Vehicle: Description and Operation
Service Information Notes

Manual

About this manual

The instructions in this manual are designed as support for mechanics with basic training as per Volvo's competence standard.
It is extremely important that the user of the instructions first read through the general safety instructions tied to most function groups.

Writer philosophy

As of 2006, a new writer philosophy has been introduced to the instructions in the mechanic section. In previous instructions, detailed text was written and supplemented with figures. In the new method, we do the opposite.
From 2006, the instruction focuses on the figure and text is only used when it is impossible to show the complete work method in figures.
Warning texts indicate any hazards applicable to a procedure. Warnings mean risk of personal injury if the instructions are not followed.
Caution texts indicate that there is a risk of damage to the vehicle or equipment if the instructions are not followed.
Note texts provide important additional information that is required in order to carry out a repair.

Environment

Always follow local safety regulations when disposing of environmentally hazardous waste or pyrotechnic (SRS) components.

Technical content

Illustrations in the information may be reused from previous models and may therefore deviate as regards the background's motif. The technical content relevant to the operation is, however, always correct.
Screws coated with friction-generating or sealing elements as well as lock nuts are screws used with lock nuts shall always be replaced unless the instructions specify reuse of the original screw or nut.
Screws or nuts that have been angle-tightened shall always be replaced with a new one.
Gaskets and O-rings shall always be replaced unless the instructions specify reuse of the original gasket or O-ring.
A new decal shall always be affixed after replacement of a component with safety decal. No decals may be painted or permanently covered in any other way.
All tools and equipment used in the instructions are in Volvo's aftermarket standard (A10 - Tools, Equipment & Information). (E10=English, A10=Swedish).
The instruction shall contain links to or all necessary information to perform the operation in a manner that ensures quality and personal safety.
If the spare part is a repair kit, the entire contents of the kit shall be used.

Links

The philosophy is to avoid having information on a specific component in more than one spot in the system. To do so, the instructions often use links that take the user directly to the correct information for the component to which the link refers.
After having followed one or more links and carried out the respective measure, the user can always return to the previous method by using VIDA's "Back" function.

Vehicle: Description and Operation
Symbols in Service Information

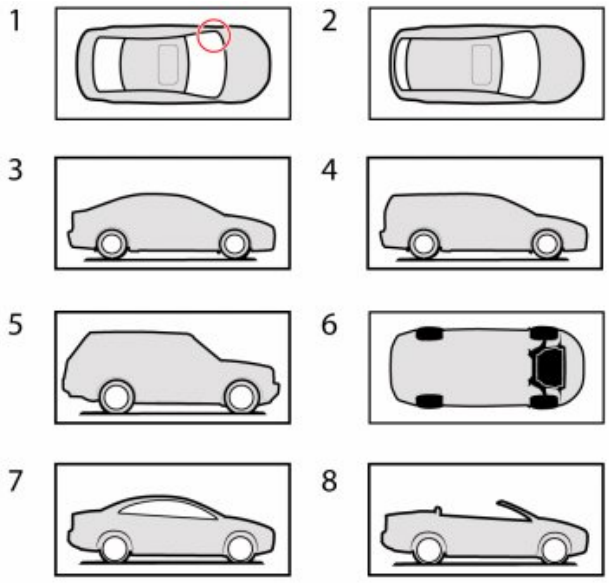
Symbols

Symbols

Symbols are used to supplement or provide further details about the procedure.
Symbols contribute to reducing the amount of text. These are designed to be easy to understand and prevent misunderstandings.
In order to clarify the meaning of the symbols an explanation is also provided.

Localization symbols

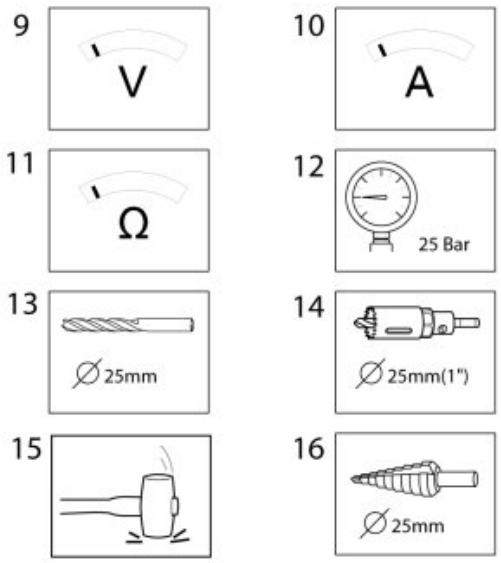
Localization symbols are used to simplify localization in the procedure.
As the images are reused, the silhouette may not correspond with the selected vehicle model.



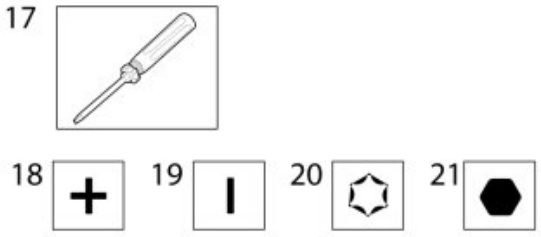
1. Sedan/coupe/convertible view from above. A red circle or a line indicates a focused area.
2. Station wagon, SUV, view from above
3. Sedan, view from side
4. Station wagon, view from side
5. SUV, view from side
6. View from below
7. Coupe/convertible, view from the side (roof closed)
8. Convertible, view from the side (roof open)

Tools

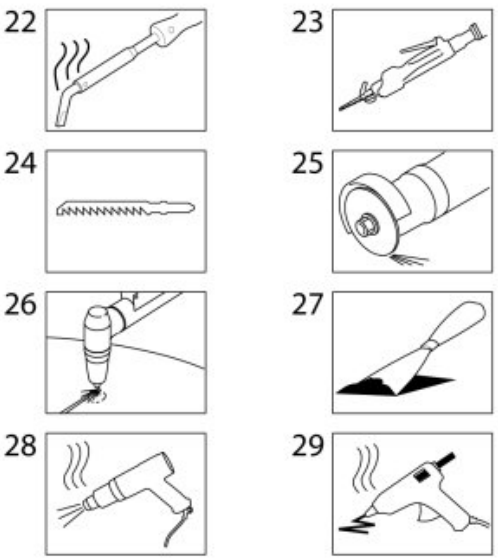
The symbols denote that a specific measurement instrument or tool is recommended for the working procedure.



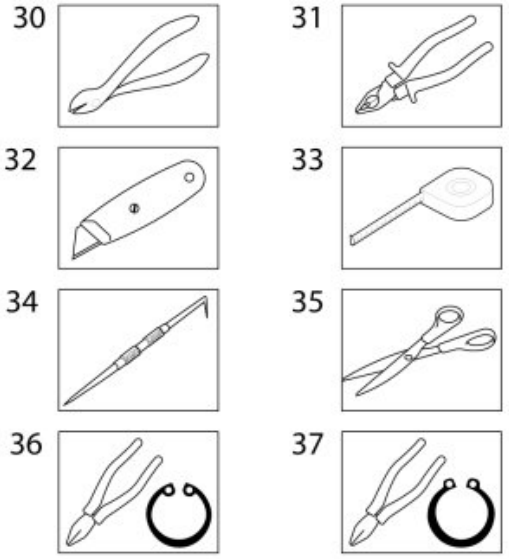
9. Use a Voltmeter
10. Use an Ammeter
11. Use an Ohmmeter
12. Use a pressure gauge, the value states the target value
13. Use a drill with the stated size
14. Use a hole saw with the stated size
15. Use an appropriate impact tool
16. Use a step drill, drill to the stated size



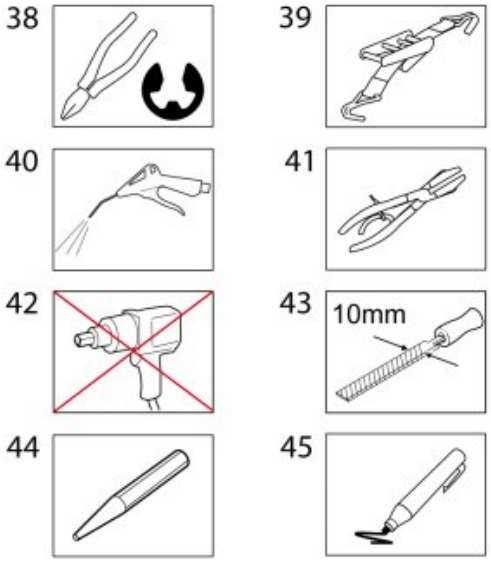
17. Use a suitable screwdriver. The symbol is used together with one of the different head types below.
18. Crosshead screw
19. Slot screw
20. Torx screw
21. Socket head cap screw



22. Use a soldering iron/soldering pen
23. Use a keyhole saw
24. Saw
25. Use a cutting disc/grinding disc
26. Use a plasma cutter
27. Scrape off
28. Use a hot-air gun
29. Use hot-melt adhesive



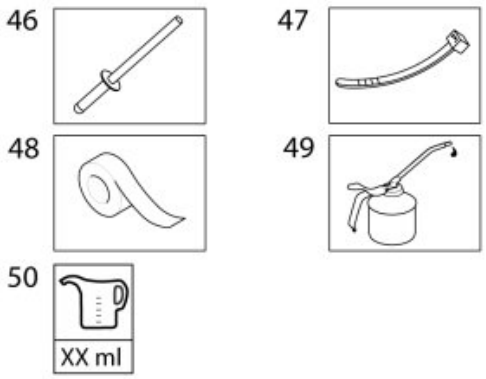
30. Use suitable nippers
31. Use suitable pliers
32. Cut
33. Measure
34. Scribe/mark up
35. Cut
36. Use suitable pliers for internal circlips
37. Use suitable pliers for external circlips



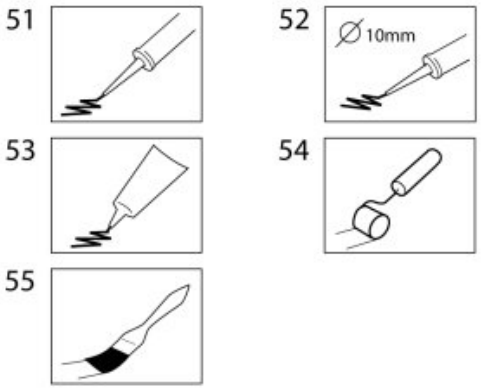
38. Use suitable tool to remove/install the retainer rings
39, Use a load strap
40. Blow clean using compressed air
41. Use pliers
42. Do not use impact screwdriver/wrench
43. Use a 10 mm wide file
44. Use driver punch
45. Mark using a pen

Materials:

The symbols indicate that some form of material is to be used in the procedure.

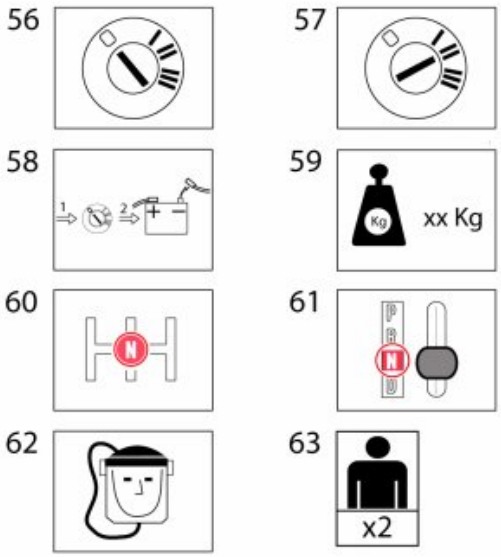


46. Use a pop rivet
47. Use a cable tie
48. Use tape
49. Use oil for lubrication
50. Add a liquid, the type of liquid is indicated by the context or is stated in the procedure.



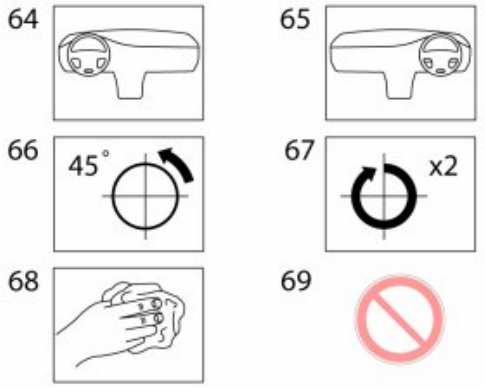
51. Apply, what is to be applied is evident from the context.
52. Apply to a diameter stated in the image, what is to be applied is evident from the context.
53. Apply, what is to be applied is evident from the context.
54. Apply using a roller, what is to be applied is evident from the context.
55. Apply using a brush, what is to be applied is evident from the context.

Other symbols

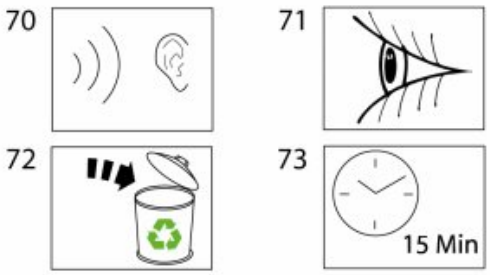


56. Ignition off, ignition to the 0 position
57. Ignition on, ignition to the 2 position
58. Disconnect the battery negative terminal
59. Add pressure with the stated number of kg

60. Engage the stated gear position, manual transmission
61. Engage the stated gear position, automatic transmission
62. Use a fresh air mask
63. Two people are required for this task.



64. Applies to left-hand drive vehicles. The symbol can also be used as a localization symbol, then with a red ring or a line in the symbol.
65. Applies to right-hand drive vehicles. The symbol can also be used as a localization symbol, then with a red ring or a line in the symbol.
66. Turn the component XX degrees in the direction of the arrow, the number of degrees is evident from the image.
67. Rotate the component XX turns in the direction of the arrow, the number of turns is evident from the image.
68. Wipe off
69. Used in combination with other symbols and then has the meaning "do not use XX"



70. Listen for noise
71. Check/Ensure
72. Component is used. Replace with new
73. Wait the specified time

Vehicle: Description and Operation
Screwed Joint, Torque/Angle Tightening

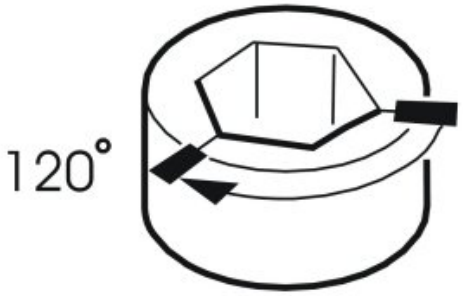
Screwed joint, torque/angle tightening

Special tools:

951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor

Screwed joint

There are a great number of torque spanner systems available on the market where the spanner grip can be replaced with other types. These wench grips are normally ideally suited to torque tightening screwed joints in poorly accessible places.
There may be occasions when torque tightening of a screwed joint must be followed by angle tightening and space does not allow the use of protractor (part number 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor). In these cases, use either a nut, a screw head or a tool. These are usually hexagonal and each corner is **60°**. If there are twelve edges, each corner is **30°**.



To angle tighten, mark the material and nut for example as illustrated and then tighten so that the markings are opposite each other.

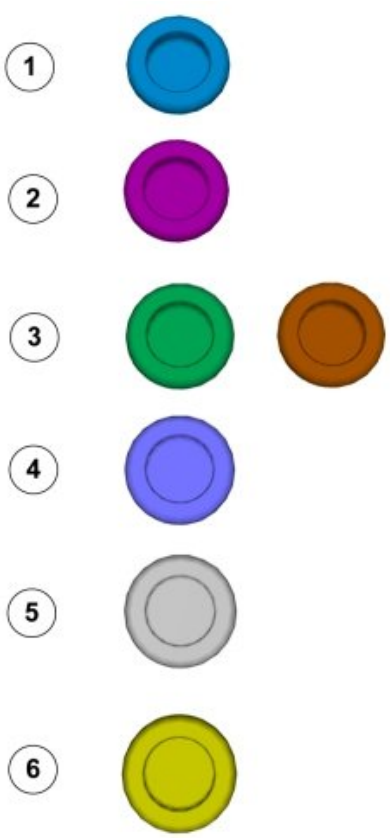
Vehicle: Description and Operation
Images in Service Information

Images

Image philosophy

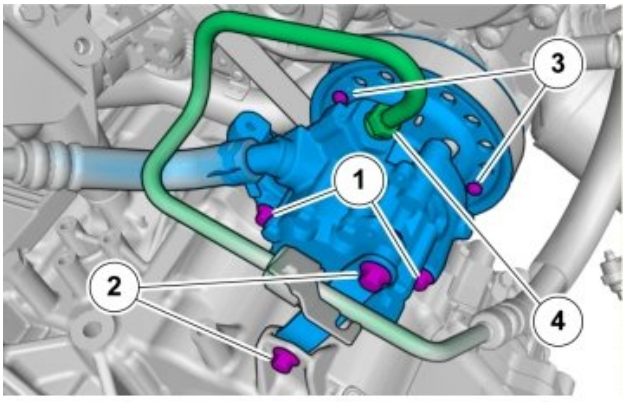
A new image philosophy has been introduced in 2006 for instructions in mechanical working procedures. In previous instructions a detailed text was supplemented with images.
In the new instructions it is the opposite.
From 2006 the instructions focus on images and text is only used where it is not possible to show the entire working procedure in images.

Color symbols



1. Used for focused component, the component with which you will do something.
2. Used for retaining elements or components to be removed/installed. Can be screws, clips, connectors, etc.
3. Used as extra colors, which needed to show or differentiate additional components.
4. Used for standard tools and special tools.
5. Used as background color for vehicle components.
6. Used when the component is not fully removed from the vehicle but only hung to the side.

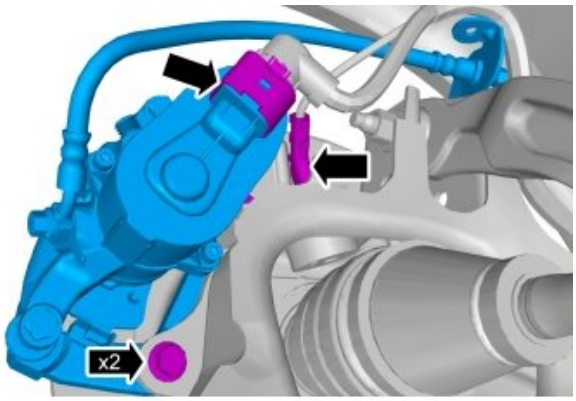
Order number



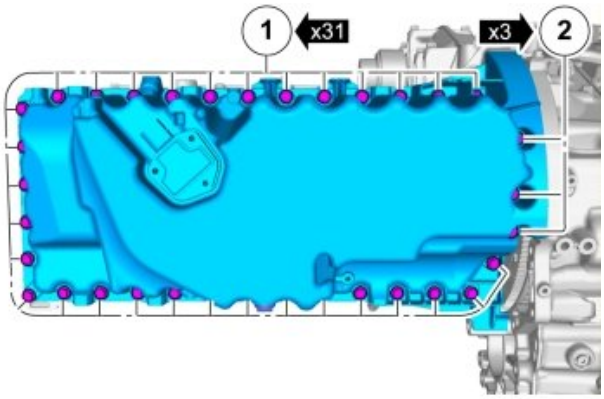
A figure in a circle denotes the order in which the different stages in the image are to be carried out.

Types of arrows

Identification arrows

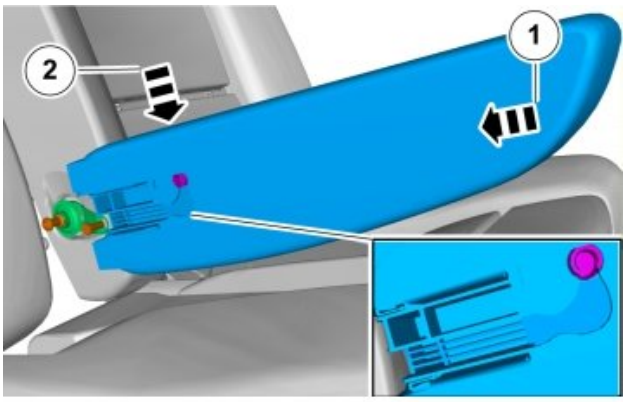


Arrows that identify parts to be removed.
The numbered arrow denotes that they are two screws to be removed to release the brake caliper.

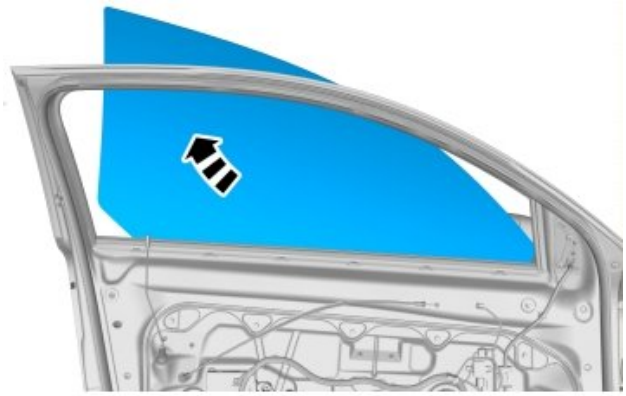


The numbered arrow denotes the number of retaining elements to be removed
All retaining elements embraced by a numbered arrow are of the same type and size.

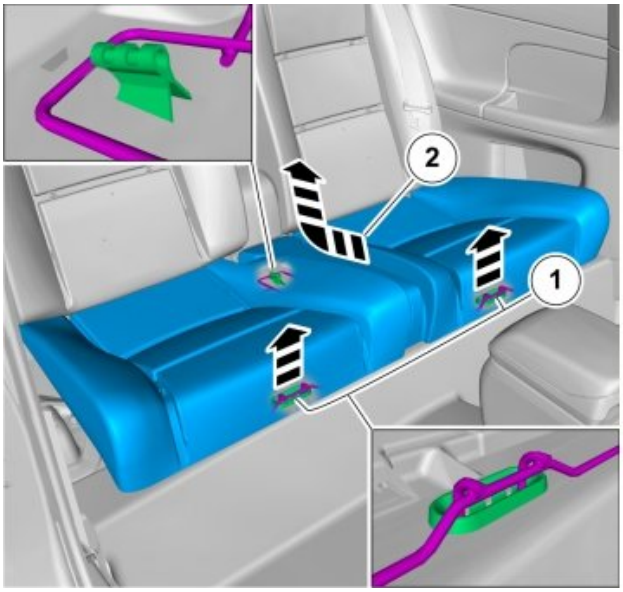
Movement arrows



Movement arrows indicate pushing or pulling in the direction of the arrow.
In this instance the movement arrows are numbered to denote the order in which you should push or pull the component.

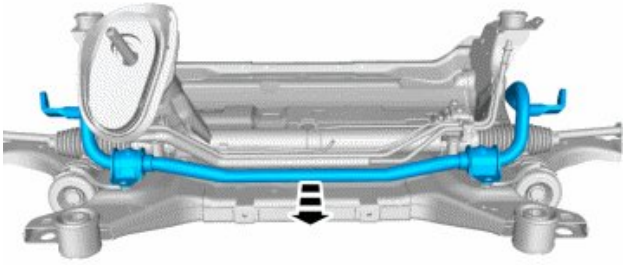


Rotation arrows denote that the component must be turned in the direction of the arrow.
The rotation arrow indicates that you should turn the component to release it.



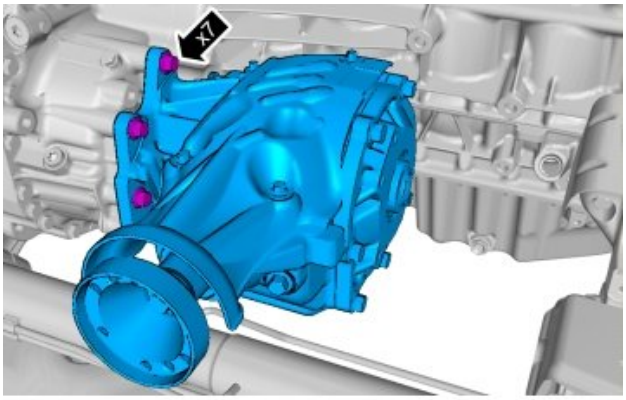
Angled movement arrows denote that the component should first be moved in one direction, and then in another direction.
The angled arrow (2) shows that you should first push the cushion backward and then upward to release it.

Background components



Background components are often taken away in order to improve the clarity of an image.
Parts that are not relevant in order to put across the instructions in the image have been omitted.

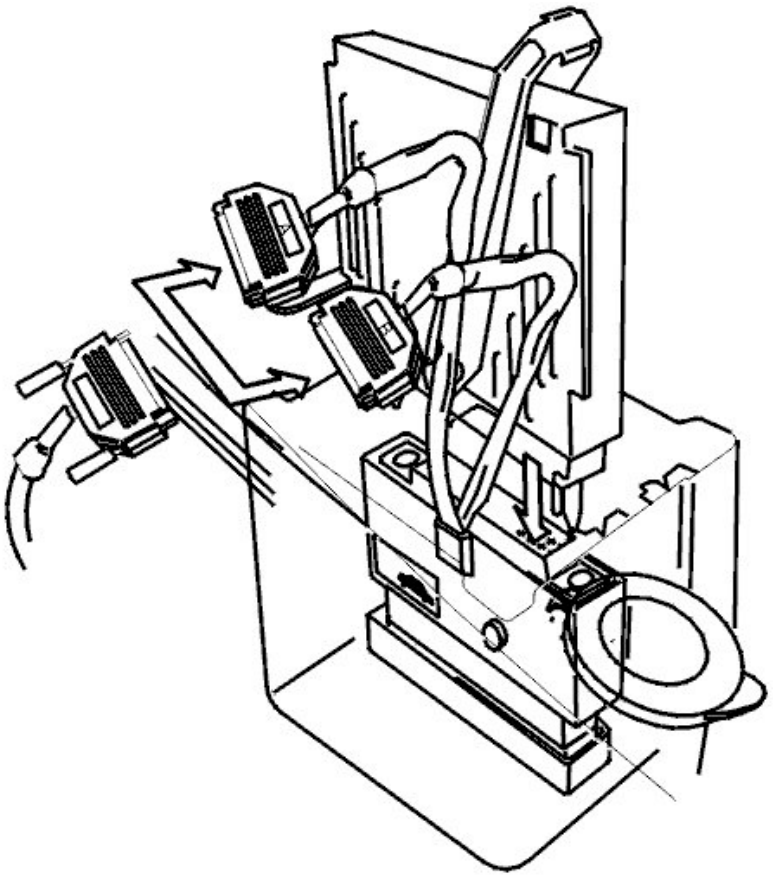
Views



Views are sometimes chosen that show components from another angle and which do not correspond with how you see the components when working on the car to make the images clearer. For example, this is done to show concealed screws.
When working on the bevel gear it is possible that you see it from this angle when installed in the car.

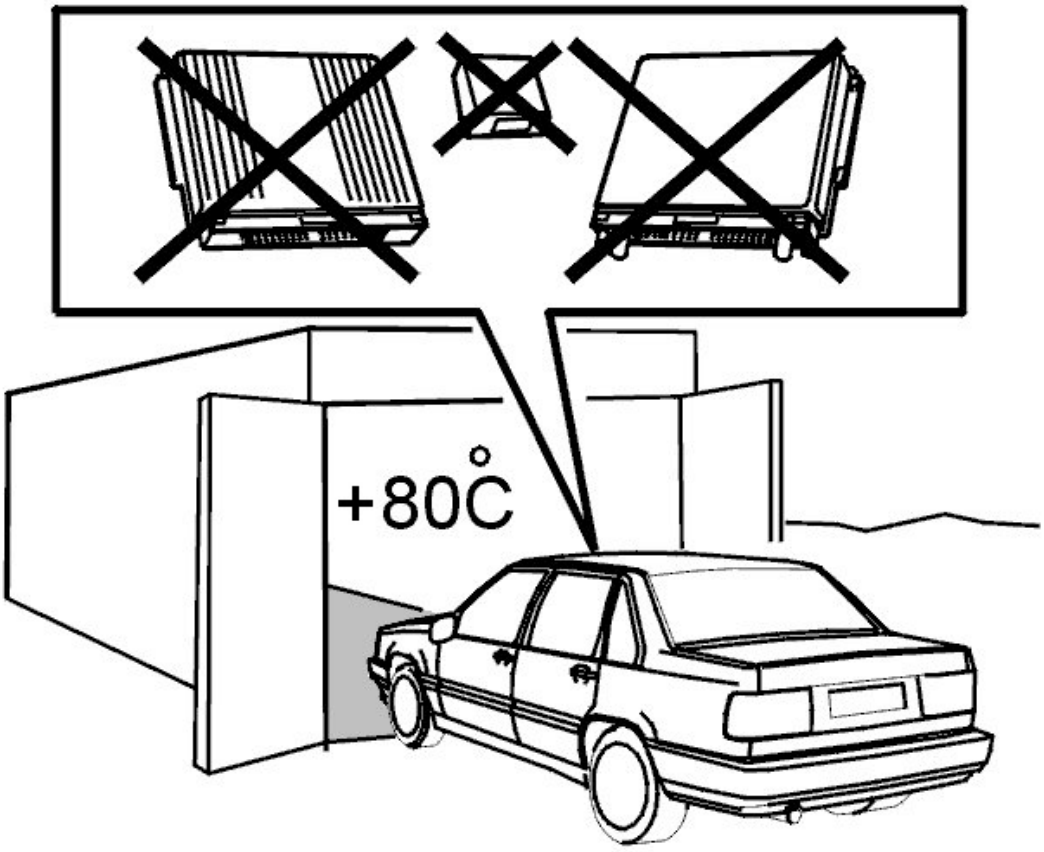
Vehicle: Service and Repair

Control modules



Connecting and disconnecting control modules

Always switch off the ignition before connecting and disconnecting control modules, connectors and the breakout box.
The ignition must be switched off when taking readings with an ohmmeter.



Temperature

The control modules must not be heated to above 80°C. Remove control modules when stoving for example.

Arc welding

Always disconnect the battery negative lead to prevent a short-circuit.
Position the welding ground as close to the welding site as possible, otherwise different ground potentials may be generated in different components.
When welding close to an electronic module, the unit **must** be removed to avoid heat damage.

Replacement

Do not replace a control module without checking its wiring and components. Otherwise the new component may be damaged in the same way as the old one.

Engine: Removal and Replacement

Engine/Transmission, Installing

Engine/transmission, installing

Special tools:

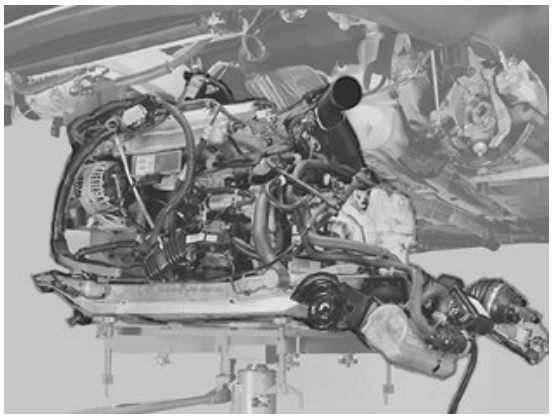
951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Note! For tightening torques, see Tightening torque See: Specifications/Tightening Torque

Note! To ensure that there is no exhaust leakage, see: Flanged joint, assembling See: Exhaust System/Exhaust Pipe/Service and Repair.

Installing the engine and transmission unit



Raise the engine and the transmission unit. Use a lifting table with locating pins.
Stop when the sub-frame is approximately 15 cm below the frame members.

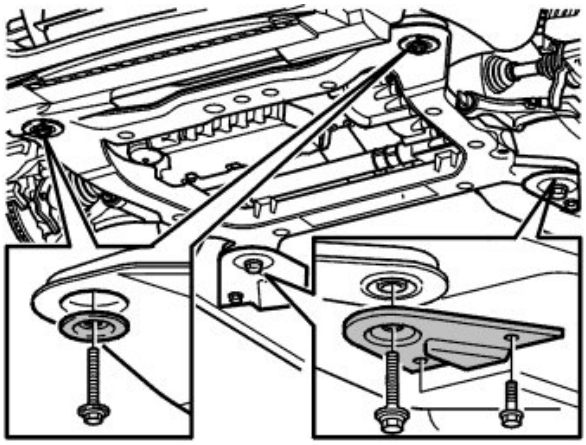
Install (left and right-hand sides)

- the drive shaft to the hub. Install the center screws. **Do not tighten yet!**
- the ball joint to the control arm. Install the nuts. **Do not tighten yet!**

Note! Ensure that the mating surfaces on the ball joints and control arms are clean.

Twist the engine block heater (option) into position. Check that the air conditioning (A/C) compressor is correctly positioned.
Check that the tie rod is in the correct position. Check that the transmission cable is routed between the steering shaft and the firewall.
Align the steering shaft joint on the steering gear.
Lift the engine and transmission unit up to the frame members.

Note! Ensure that no hoses, wiring or anything else catches.



Install

- a new screw in the lower steering shaft joint. Tighten to **20 Nm**
- new screw in the sub-frame. Lubricate the screws
- the washes at the front edge and the support plates at the rear edge of the sub-frame.

Tighten the screws for the sub-frame. Tighten to **105 Nm**. Angle-tighten **120°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor. Start on the left hand side of the sub-frame. Continue with the right hand side.
Tighten the screws for the brackets at the rear of the sub-frame. Tighten to **50 Nm**.
Remove the lifting table.

Installing the propeller shaft (all-wheel drive (AWD) only)

Install the propeller shaft (all-wheel drive (AWD) only). See Pinion seal bevel gear, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Seals and Gaskets/Service and Repair/Pinion Seal Bevel Gear, Replacing.

Installing the three-way catalytic converter (TWC) (all-wheel drive (AWD) only)

Lubricate the studs where the exhaust system separates downstream of the three-way catalytic converter (TWC). Use paste 116 1408.

Warning! Avoid skin contact with the paste.

Lift up the exhaust system and connect it to the rear system. Use a new gasket and new nuts.

Hint: Use a mobile jack with universal plate 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture as a support.

Note! The routing of the heated oxygen sensor (HO2S) wiring over the brake pipe.

Install the screws holding the SIPS member to the bodywork. Tighten the screws.
Press the brake pipe into place in the holders on the SIPS member.

Installing the front exhaust pipe

Lubricate the studs on the turbocharger (TC). Use paste 116 1408.

Warning! Avoid skin contact with the paste.

Install the front exhaust pipe on the turbocharger (TC). Use new nuts. Tighten to **30 Nm**.

Clamp the wiring for the rear heated oxygen sensor (HO2S) into place at

- the bracket at the rear of the sub-frame
- the clips on the power steering pipe at the steering gear
- the clamp at the right-hand side of the steering gear.

Connecting fuel lines

When assembling the fuel lines, see also: Fuel system, quick-release connectors See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Line Coupler/Description and Operation.

Connect the quick-release connector and the fuel line to:

- the motor
- the engine block heater (option).

Press the EVAP line together at the rubber joint.

Assembling the spring strut

Install

- the tie rods. Use new nuts. Tighten to **70 Nm**
- the link rod to the anti-roll bar. Use new nuts. Tighten to **50 Nm**. Counterhold with Tx27
- the bracket for the brake pipe to the body.

Tighten

- the nut for the ball joint and control arm. Tighten to **80 Nm**. Counterhold using Tx40
- the center screw in the drive shaft. Tighten to **50 Nm**.

Cars with engine block heaters (option)

Connect the heater connector at the vehicle wiring.
Ensure that the connector and wiring are secured at the body.
Rivet the fender liner to the fender edge.
Check that the quick-release fuel line connector is secure at the engine block heater.

Installing the air conditioning (A/C) compressor

Install the 4 screws whilst the compressor is loose.
Raise the compressor and screw it into place.

Note! Handle the compressor carefully. Ensure that there are no kinks in the air conditioning (A/C) pipes.

Connect the one-pin connector to the compressor magnetic clutch.

Installing components

Connect the engine wiring to the control module box. See Central electrical unit, engine compartment, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Central Electrical Unit Engine Compartment.

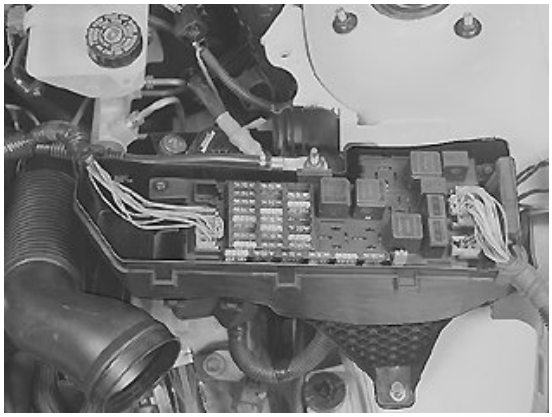
Install

- the ground lead to the ground terminal at the right fender edge in the engine compartment
- the auxiliaries belt
- the intermediate piece for the control module box
- the control modules. See Engine control module (ECM), replacing See: Powertrain Management/Computers and Control Systems/Engine Control Module/Service and Repair
- the cover for the control module box
- expansion tank. Connect the radiator breather tube to the expansion tank. Tighten the clamp. Connect the connector for the level sensor in the expansion tank
- servo oil reservoir. Check that the hoses are correctly positioned.

Clamp the ABS cable to the power steering hose.

Install
- the heat deflector plate above the turbocharger (TC)
- the 2 ground strips on the top of the cylinder head.

Clamp the wiring for the front heated oxygen sensor (HO2S) to
- the coolant pipe
- the heat deflector plate above the manifold
- the turbo control hose at the plastic intake pipe for the turbocharger (TC).

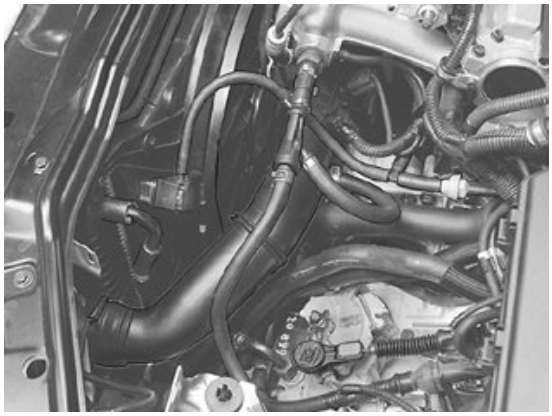


Install
- the positive lead for the starter motor
- the connector for the engine wiring
- the cover over the central electrical unit.

Installing the transmission cable

Automatic transmissions: Install the screws holding the bracket and transmission cable to the transmission.
Manual transmissions: Install the transmission cable. Assemble the clutch cable.

Installing the engine coolant fan (FC)

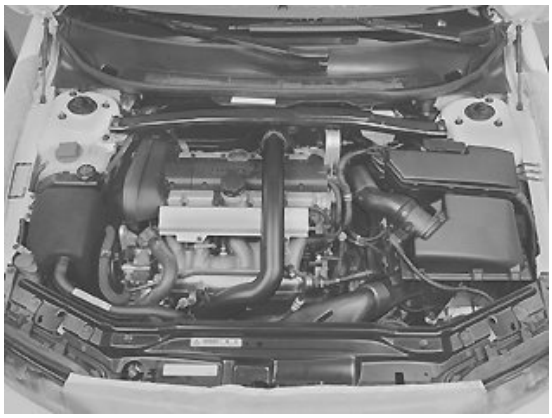


Install
- the lower engine coolant hose to the radiator. Tighten the clamp
- the lower oil cooler hose for the transmission to the radiator (automatic transmissions only). Use new O-rings
- the plastic charge air pipe between the throttle body (TB) and the charge air cooler (CAC). Only connect the plastic pipe at the throttle body (TB). Do not tighten the clamp.

Remove radiator protection 999 5474

Install

- the engine cooling fan (FC). Tighten the screws securing the fan shroud to the front panel
- the plastic charge air pipe to the connection at the charge air cooler (CAC). Tighten both the clamps. Connect the connectors for the temperature and pressure sensors in the plastic pipe
- the canister purge (CP) valve to the bracket at the fan shroud. Secure the EVAP hose to the clip at the lower section of the fan shroud
- the brake vacuum hoses
- the upper oil cooler hose for the transmission to the radiator (automatic transmissions only). Use new O-rings.



Press down the right side of the cooler unit. Pull the wiring for the pressure switch (Pressostat) into the drier bottle.

Connect the connectors to

- the engine cooling fan (FC) (x2)
- the canister purge (CP) valve.

Secure

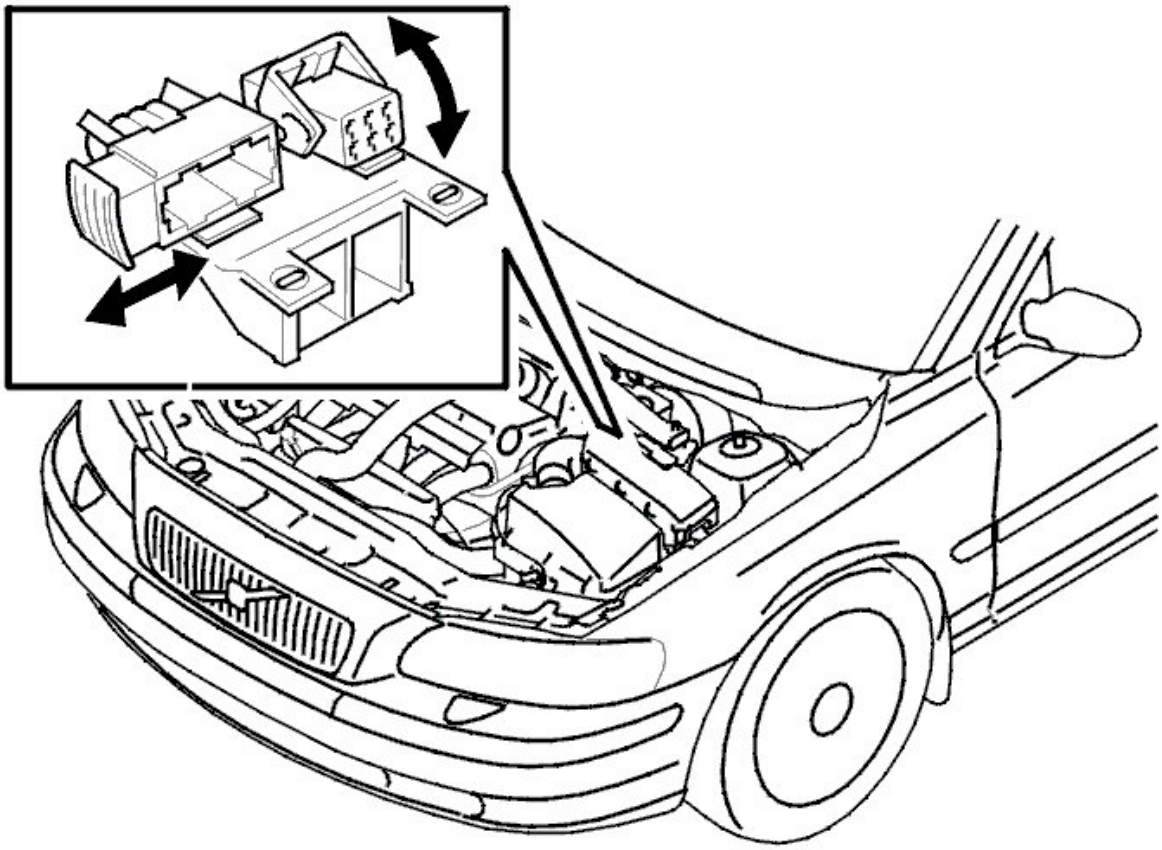
- the breather tube for the radiator at the top of the fan shroud
- the wiring at the lower right corner and at the top of the fan shroud.

Install

- the rubber hose to the inlet side of the charge air cooler (CAC)
- the plastic charge air pipe above the engine. Tighten all clamps. Secure the pipe on the engine
- the upper coolant hose. Tighten the clamp
- the ventilation pipe between the control module box and fan shroud
- the air cleaner (ACL) assembly. Connect the plastic hose to the mass air flow (MAF) sensor. Tighten the clamp
- the air cleaner (ACL) intake pipe.

Connect the connector to the mass air flow (MAF) sensor. Secure the wiring at the front of the air cleaner (ACL) housing.
Install the support brace between the suspension turrets. Secure the servo hose to the right mounting on the support brace.

Finishing



Connect the connector to the pressure switch (Pressostat) in the drier bottle. Secure the wiring.
Tighten the lower screw on the cooler unit.
Connect the connectors to both the heated oxygen sensors (HO2S).

Install

- the splash guard under the radiator
- the splash guard under the engine
- the front wheels. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair
- the battery negative lead. Also read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Final check

Top up

- coolant
- engine oil
- power steering fluid.

Start the engine.
Warm up the engine until the thermostat opens.
Check for leakage.
Check the oil and coolant levels. Adjust if necessary.
Check the transmission oil level (automatic transmissions only). Top up if necessary.

Engine/Transmission, Removing

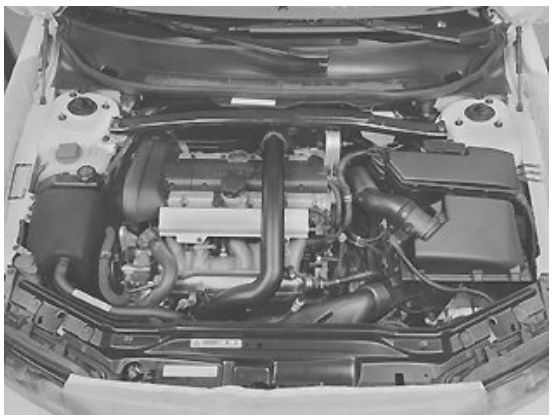
Engine/transmission, removing

Special tools:

999 5474 RADIATOR PROTECTION See: Tools and Equipment/999 5474 Radiator Protection
999 5722 Wrench See: Tools and Equipment/999 5722 Wrench

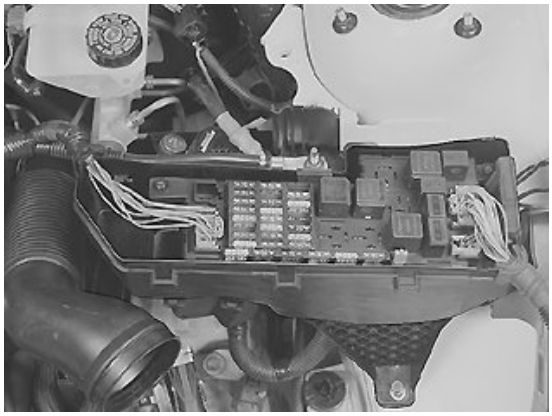
Note! Since the illustrations in the information are used for different model years and/or models, there may be some deviations. However, the essential information is always correct.

Preparation



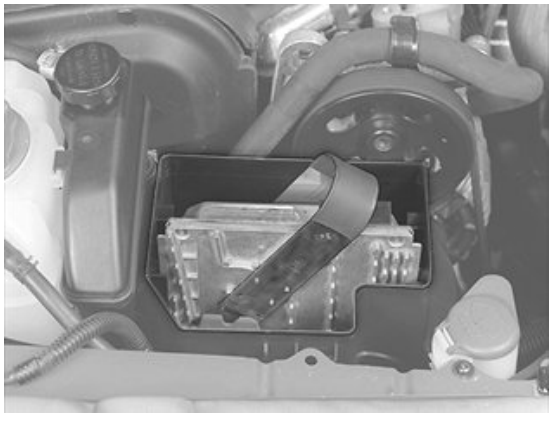
Remove

- the negative battery cable. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.
- the cross stay between the suspension turrets
- the air cleaner (ACL) assembly. Seal the opening in the plastic pipe for the turbocharger (TC)
- the plastic charge air pipe above the engine. Seal the openings
- both the ground strips at the top of the cylinder head.



Remove

- the cover over the central electrical unit
- the connector for the engine wiring from the central electrical unit
- the positive lead for the starter motor from the terminal block.



Remove

- control module unit cover
- the control modules. Use tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench. See also Engine control module (ECM), replacing See: Powertrain Management/Computers and Control Systems/Engine Control Module/Service and Repair.

Separate the control module box. Disconnect the engine wiring. Also see Central electrical unit, engine compartment, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Central Electrical Unit Engine Compartment.
Remove the ground terminal for the engine wiring at the right wheel arch.

Removing the engine cooling fan (FC)

Remove

- the brake vacuum hose from the ejector valve
- The canister purge (CP) valve from the mounting on the fan shroud. Disconnect the connector.

Expose the wiring and the breather tube for the radiator.
Disconnect the connectors for the engine cooling fan (FC).

Remove

- the screws securing the fan shroud to the front panel
- the dip stick
- the upper oil hose for the transmission at the connection to the radiator (automatic transmissions only). Seal the openings.

Lift up and remove the engine cooling fan (FC).

Remove

- the connectors for the pressure sensor and temperature sensor in the plastic charge air pipe between the charge air cooler (CAC) and the throttle body (TB)
- the rubber hose at the intake for the charge air cooler (CAC)
- the brake vacuum hose at the intake manifold
- the plastic pipe between the throttle body (TB) and the charge air cooler (CAC)
- the lower oil hose for the transmission at the connection to the radiator (automatic transmissions only). Seal the openings.

Install radiator protection 999 5474 RADIATOR PROTECTION See: Tools and Equipment/999 5474 Radiator Protection.

Removing the transmission cable

Automatic transmissions: Remove the screws for the transmission cable bracket at the transmission.
Manual transmissions: Separate the clutch cable and remove the transmission cables.
Tie up the cable(s) to the central electrical unit.

Draining the fuel line

Drain the fuel line. See Fuel system pressure release See: Cylinder Head Assembly/Fuel Pressure Release/Service and Repair. See also: Fuel system, quick-release connectors See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Line Coupler/Description and Operation.
Remove the cover from the expansion tank.

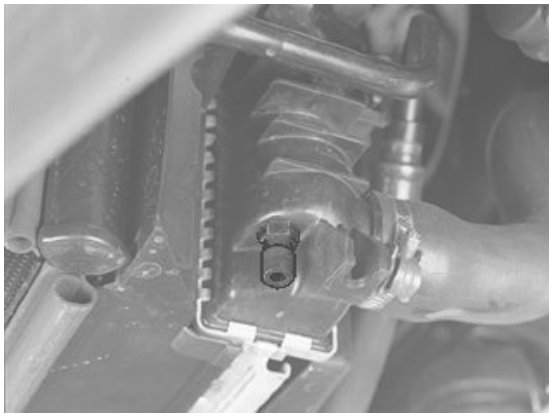
Removing components

Raise the car.

Remove

- the left and right front wheels
- the splash guard under the radiator
- the splash guard under the engine.

Draining coolant



Position a container under the radiator drain cock.
Drain the coolant.

Warning! Avoid skin contact with the coolant.

Close the cock.

Cars with engine block heaters (option)

Drill out the first three blind rivets at the right mounting for the fender lining to the fender edge, seen from the front edge and upwards.
Bend the fender liner out of the way.
Disconnect the connector from the engine block heater.

Preparations for removal of the drive shafts

Remove on the left and right-hand sides

- the tie rod from the wheel spindle
- the link rod from the anti-roll bar
- the screw that holds the brake pipe bracket to the bodywork
- the nut holding the control arm to the ball joint
- the center screw from the end of the drive shaft.

Separating the fuel line

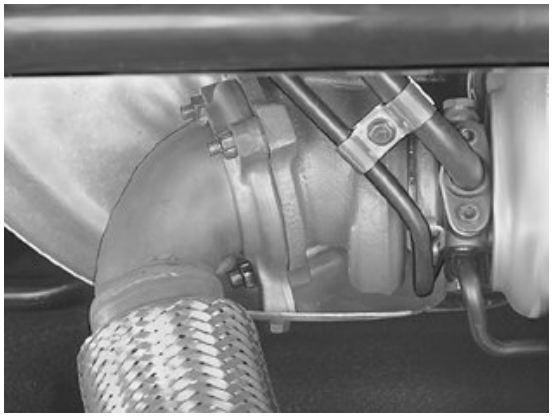
Note! If an engine block heater is installed, mark the position of the fuel lines.

Separate the quick-release connectors for the fuel pressure line and engine block heater (option). See also: Fuel system, quick-release connectors See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Line Coupler/Description and Operation.

Hint: Use tool 999 5666 Wrench See: Tools and Equipment/999 5666 Wrench.

Pull apart the EVAP line at the rubber joint behind the rear right mounting for the sub-frame.

Separating the front exhaust pipe



Remove the screw from the wiring clamp that holds the wiring for the heated oxygen sensor (HO2S) at the right side of the steering gear. Remove the wiring from the clips at the power steering line on the steering gear.

Remove

- the screw for the wiring clamp at the bracket at the rear edge of the sub-frame
- the lower screw that holds the heat deflector plate over the turbocharger (TC)

- the three nuts that hold the front exhaust pipe to the turbocharger (TC).

Tie up the front exhaust pipe at the right suspension turret (cars without All-wheel drive (AWD)).

Removing the air conditioning aggregate

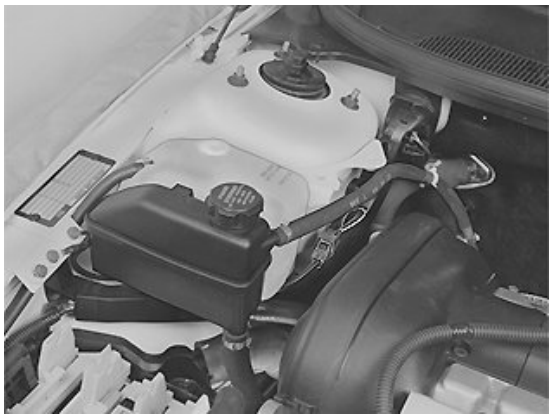
Disconnect the connector from the pressostat in the air conditioning (A/C) receiver drier.
Slacken off the lower right screw for the cooling unit.
Pull the cooling unit down. Carefully pull the wiring for the pressostat through the cavity at the mounting for the cooling unit.
Release the lower ventilation pipe for the control module box from the sub-frame.

Exposing the air conditioning (A/C) compressor

Remove the upper radiator hose.
Remove the auxiliaries belt.
Disconnect the one-pin connector for the compressor magnetic clutch.
Remove the four screws holding the air conditioning (A/C) compressor to the engine.
Tie up the compressor in the front cover plate.

Note! Handle the compressor carefully to make sure that there is no bending of the AC-pipes.

Removing components



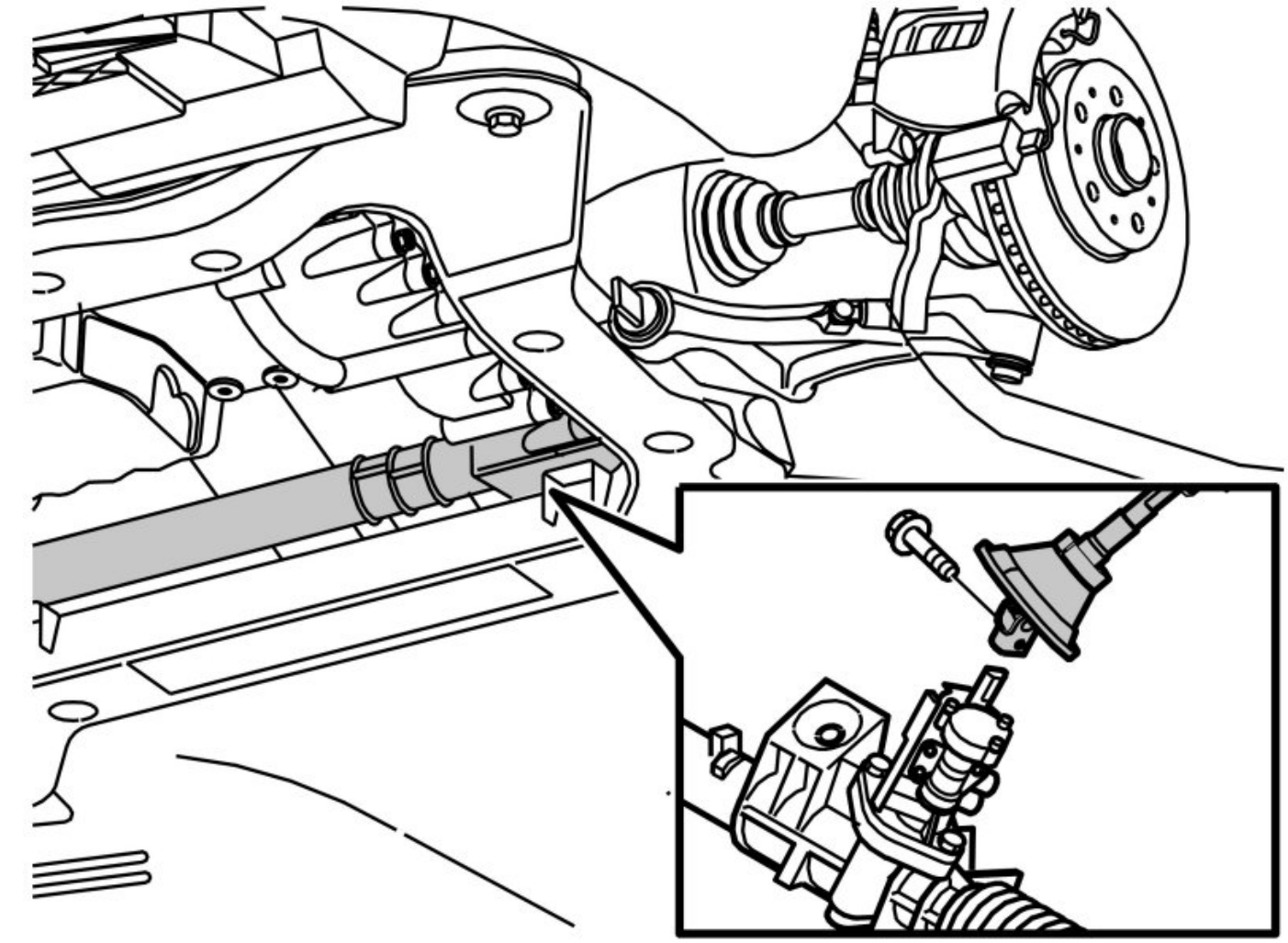
Expose the wiring for the front heated oxygen sensor (HO2S).
Disconnect the connector for the level sensor in the expansion tank.

Remove

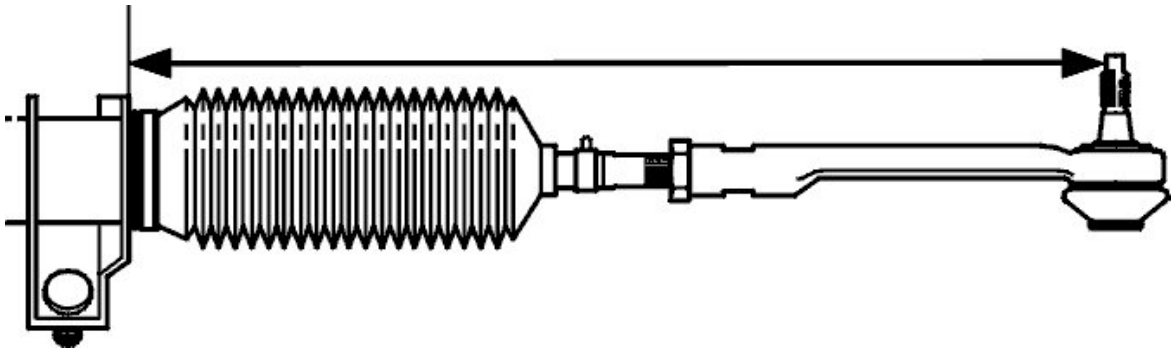
- the heat deflector plate above the turbocharger (TC)
- the hoses for the heater unit at the terminal in the firewall
- the bleed hose for the radiator at the expansion tank
- the ABS line and clips and the power steering hose.

Lift up the power steering fluid reservoir and the expansion tank. Place them on top of engine.

Separating the steering shaft



Remove the ignition key.
Remove the screw from the joint between the steering gear and the steering shaft.



On one side, measure the length of the track rod in relation to the steering gear housing. Note the measurement.
Press up the joint from the steering gear.

Caution! The steering shaft must not be turned. The contact reel in the SRS system could be damaged.

Removing the three-way catalytic converter (TWC) (all-wheel drive (AWD) only)

Remove

- the nuts where the exhaust pipe divides downstream of the three-way catalytic converter (TWC)
- the screws securing the SIPS member to the bodywork.

Remove the brake pipe from the holders on the SIPS member.
Lift off the front exhaust pipe from the turbocharger (TC) and the rear system.
Lower and pull back the three-way catalytic converter (TWC) with the SIPS member.

Note! The routing of the heated oxygen sensor's cable harness over brake pipe.

Removing the propeller shaft from the transmission and drive distribution box (all-wheel drive (AWD) only)

remove the propeller shaft from the transmission and drive distribution box (all-wheel drive (AWD) only). See Pinion seal bevel gear, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Seals and Gaskets/Service and Repair/Pinion Seal Bevel Gear, Replacing.

Lowering the engine and transmission

Use a post hoist with a lifting table and stud guides.
Position the lifting table against the sub-frame.

Note! Make sure that the lifting table is centered under the sub-frame for optimal weight distribution. Check that the lifting table is correctly applied against the sub-frame.

Remove

- the sub-frame brackets screws
- the screws for the sub-frame.

Lower the engine and transmission approximately 15 cm so that the drive shafts describe a horizontal line between the hub and transmission.

Caution! Make sure that no hoses, wiring or anything else catches when the engine/transmission unit is lowered.

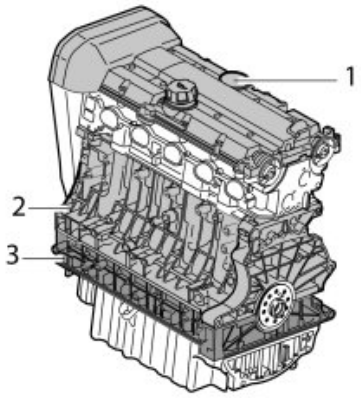
Unhook the control arms from the ball joint pinion.
Hold the constant velocity joint. Pull the drive shaft off the hub. Let the drive shafts rest against the control arms.
Turn the engine block heater out of its position.
Check that the air conditioning (A/C) compressor is hanging free.
Continue lowering the engine and transmission unit.

Engine: Overhaul

Caulking

Caulking

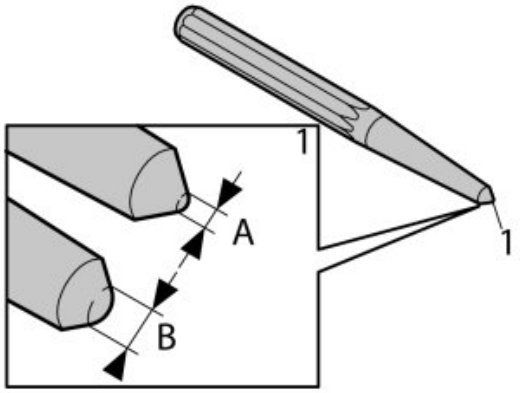
Note! Some variation in the illustrations may occur, but the essential information is always correct.



On engines manufactured of aluminium the camshaft bearing housing (1) cylinder block (2) and the intermediate section (3) may be caulked.

Note! The cylinder heads that are chill-cast may not be caulked.

Each individual case is assessed as to whether caulking can be carried out or not depending on the location of the oil leakage.

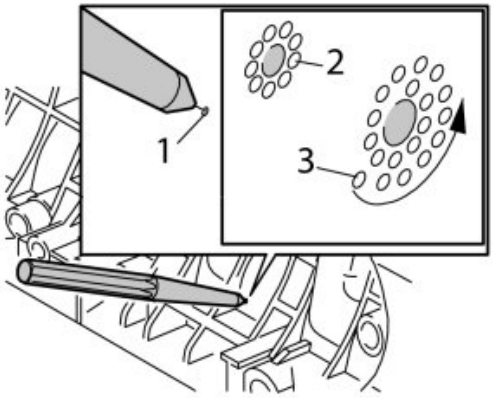


Caulking involves in the event of leakage knocking the material together using a special caulking tool.
Two caulking tools are required. Use centre punches (1). Grind down the tips so they become round. One is to be ground so the rounded tip (A) is 2 mm. The other is ground so the rounded tip (B) is 4 mm.

Note! Use the protective goggles supplied with the leak tracing kit.

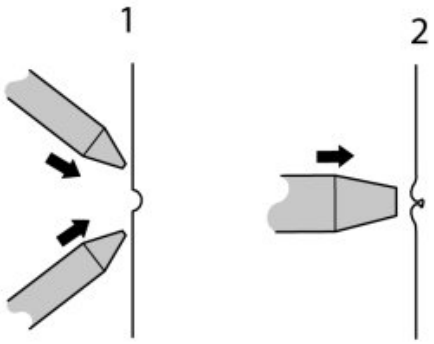
Use: Isopropanol, 1161721

Use an UV light to localize the pore. Carefully wash round the pore with Isopropanol. Check with a UV light that all the oil has been removed.



Warning! Use protective goggles.

If the pore is small, it is sufficient to place the tool (2 mm) directly on the pore and hit it with a copper or plastic hammer. If the pore is larger, angle the tool (2 mm) and drive the material in a circle toward the pore (2). If there is a lip around the pore, caulking (tool 4 mm) should be carried out in a spiral form toward the pore (3).



Drive the material toward the pore (1) using the 2 mm tool. Seal using the 4 mm tool (2).

Use: Isopropanol, 1161721

Wash with Isopropanol. Check with a UV lamp that there is no oil around the leakage point.
Test drive for 45 minutes as set out below to reach an oil temperature of about 80°C.

1. Allow the engine to idle for 20 minutes.
2. Test drive the car for 15 minutes.
3. Allow the engine to idle for a further 10 minutes.

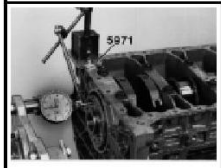
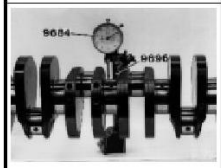
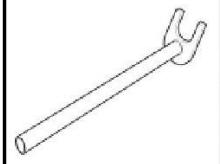
Check using a UV light that the sealed area no long leaks. If leakage remains, repeat the caulking.

Crankshaft Axial Play

Crankshaft axial play

Operation number: 21685-2

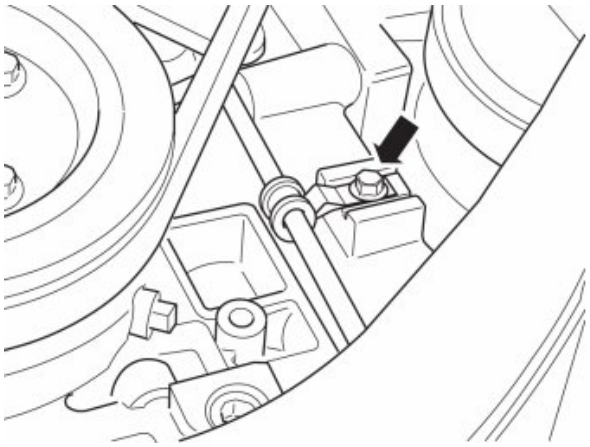
Note! Some variation in the illustrations may occur, but the essential information is always correct.

Special tools	
	**T9995971 PLATE (FOR MAGNETIC BASE)** **Tool number:**T9995971 **Tool description:**PLATE (FOR MAGNETIC BASE) **Tool boards:**
	**T9999696 MAGNETIC BASE** **Tool number:**T9999696 **Tool description:**MAGNETIC BASE **Tool boards:**
	T9813134 DIAL INDICATOR **Tool number:**T9813134 **Tool description:**DIAL INDICATOR **Tool boards:**
	**T9995462 JIMMY TOOL (DISMANTLE-DRIVE SHAFT/GEARBOX)B-VERSION** **Tool number:**T9995462 **Tool description:**JIMMY TOOL (DISMANTLE-DRIVE SHAFT/GEARBOX)B-VERSION **Tool boards:**

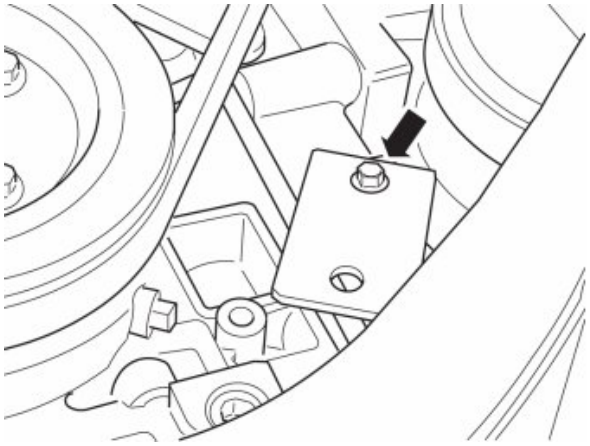
Removal

Note! Removal steps in this procedure may contain installation details.

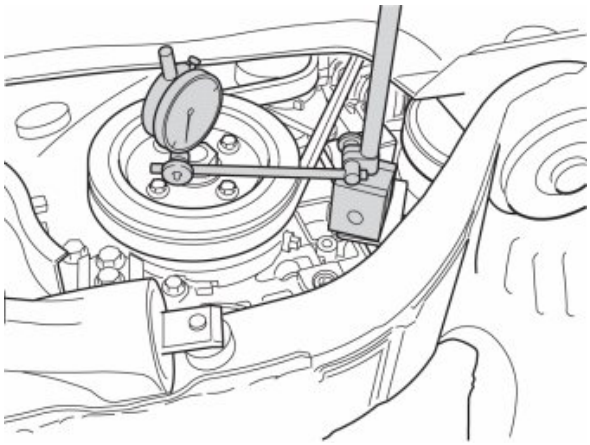
Remove the right front wheel.
When installing Refer to: Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair
Fold away the wheel arch liner and tie it up.



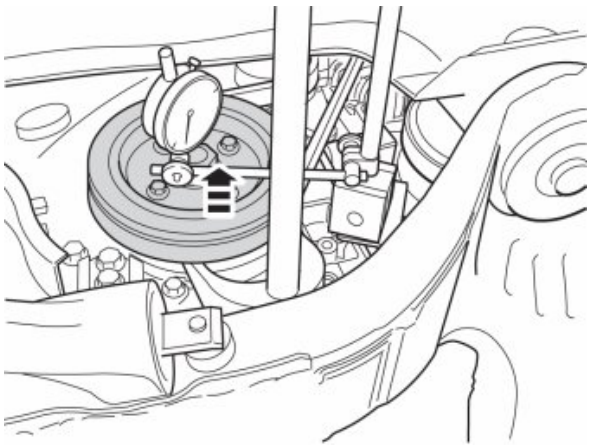
Remove the clamp screw on the fuel line. Move the clamp upward.
Torque: M7, 17 Nm



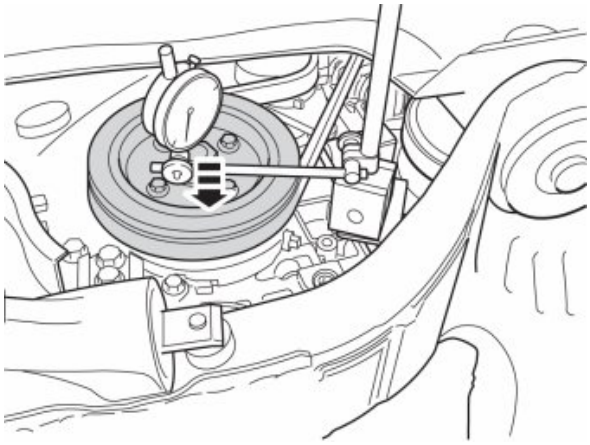
999 5971 PLATE See: Tools and Equipment/999 5971 Plate
Torque: M7, 17 Nm



999 9696 MAGNETIC BASE See: Tools and Equipment/999 9696 Magnetic Base
981 3134 DIAL INDICATOR See: Tools and Equipment/981 3134 Dial Indicator
Measure the crankshaft nut or the oscillation damper's inner ring.



Pry out the crankshaft.999 5462 Jimmy tool See: Tools and Equipment/999 5462 Jimmy Tool
Zero the dial indicator.



Push in the crankshaft. Use both hands and press hard. In the event of problems moving the crankshaft toward the gearbox, run the engine warm and use a crowbar placed between the oscillation damper and the member. Use protective blocks.
Read the dial indicator. Max permitted play 0.25 mm.
Repeat the procedure several times.

Installation

Remove the test equipment.

To install, reverse the removal procedure

Engine Body, Exposing

Engine body, exposing

Special tools:

998 9721 SCREW SET See: Tools and Equipment/998 9721 Screw Set
999 2520 FLOOR STAND See: Tools and Equipment/999 2520 Floor Stand
999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector
999 5297 ENGINE FIXTURE See: Tools and Equipment/999 5297 Engine Fixture

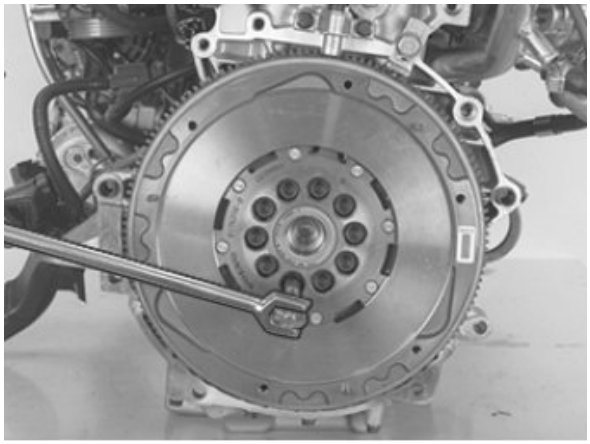
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the gearbox

Hint: Remove the lower screws (these are difficult to access) between the gearbox and engine before removing the engine and gearbox unit. The engine and gearbox unit must be placed on a suitable surface.
Relieve the transmission. Loose the remaining screws and remove the transmission **carefully**.

Remove the clutch.

Removing the flywheel and carrier plate



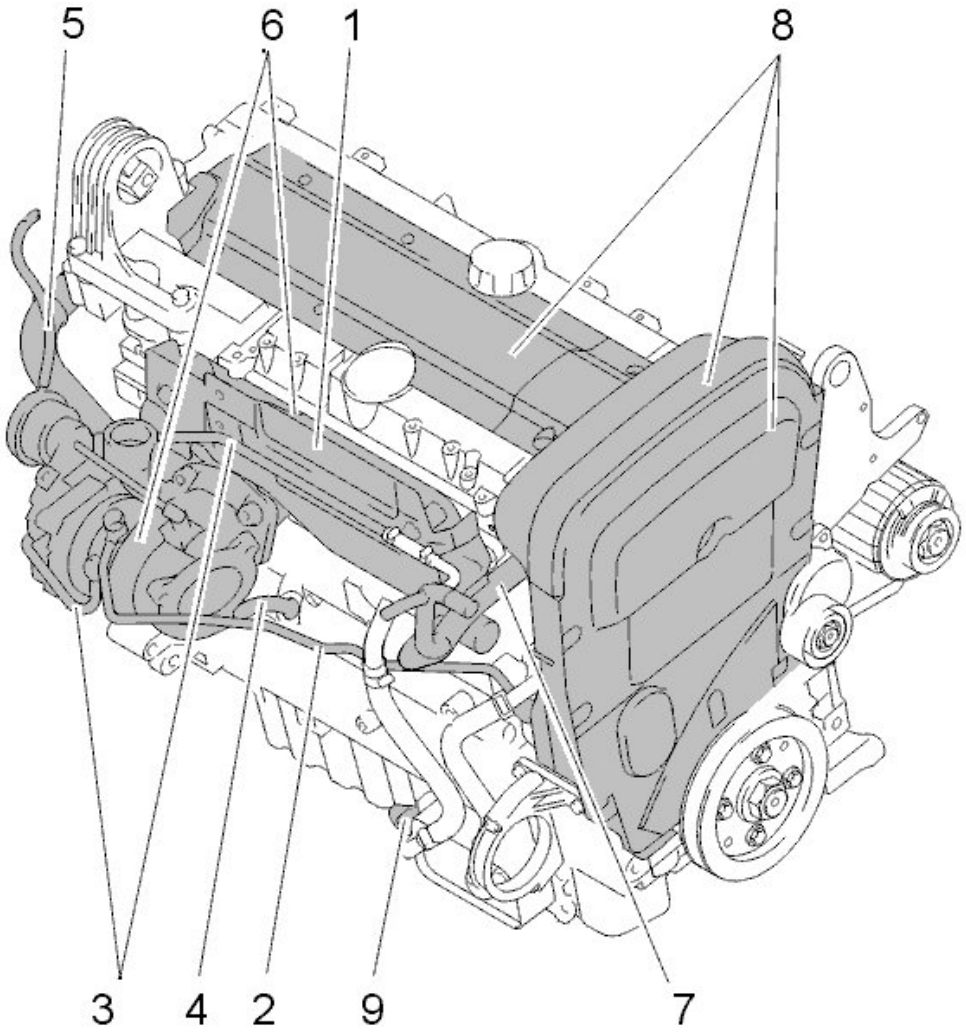
Install gear sector 999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector.
Remove all screws except for the uppermost screw which secures the flywheel to the crankshaft. Slacken off the uppermost screw. Leave it in place, screwed in a few turns.

Carefully work the flywheel and carrier plate loose. If necessary, use 2 groove-cut chisels. Apply these between the cylinder block and the flywheel and carrier plate.
Hold the flywheel and carrier plate and remove the final screw.

Install the engine in a stand

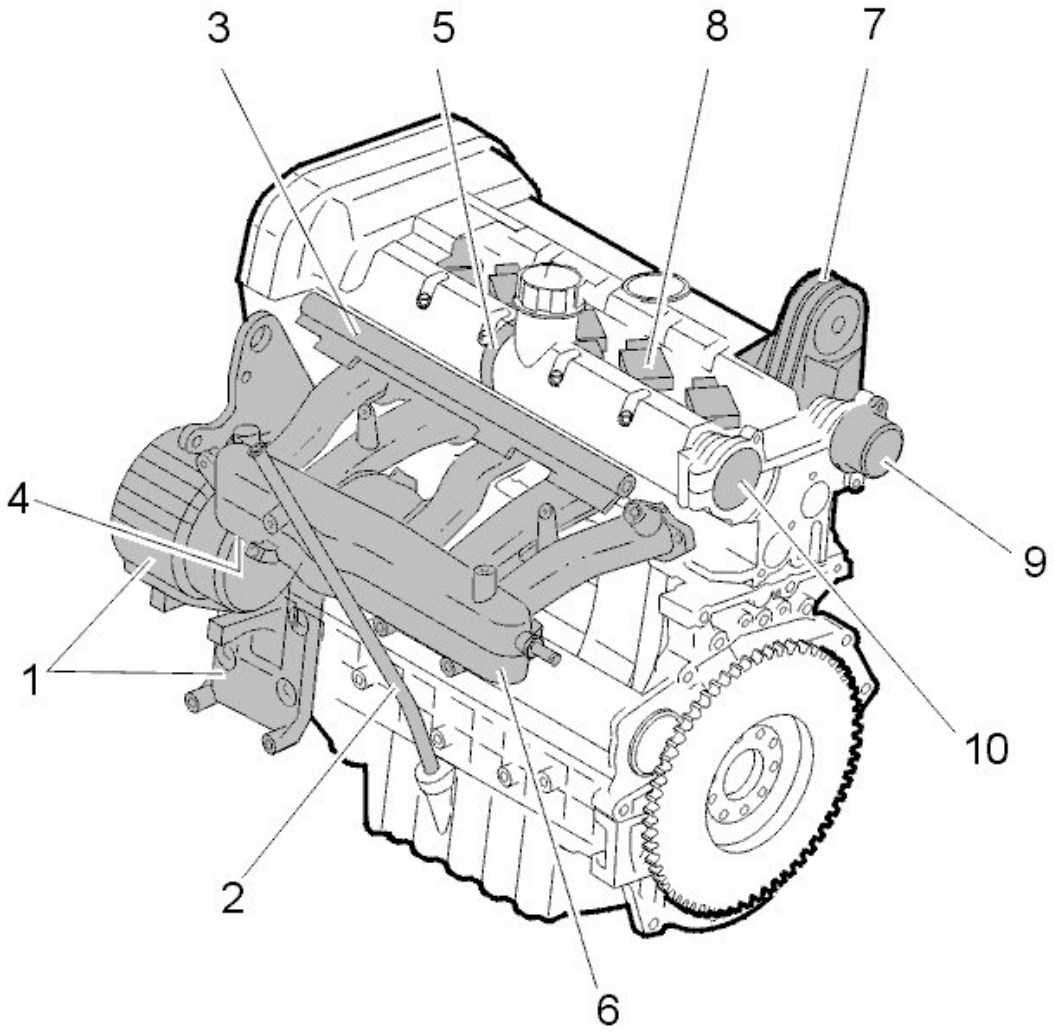
Use mounting stand 999 2520 FLOOR STAND See: Tools and Equipment/999 2520 Floor Stand , fixture 999 5297 ENGINE FIXTURE See: Tools and Equipment/999 5297 Engine Fixture and screw set 998 9721 SCREW SET See: Tools and Equipment/998 9721 Screw Set.

Exposing the engine



Remove

1. The heat deflector plate.	6. The exhaust manifold including the turbocharger (TC).
2. The oil pressure pipe.	7. The coolant pipe (water pump inlet).
3. The coolant pipes, (turbocharger (TC) inlet / outlet).	8. The upper and front timing covers and the cover over the ignition coils.
4. The oil return line.	9. Drain the engine oil.
5. The turbocharger (TC) control hoses and the valve.	



Remove

1. The generator (GEN) and the auxiliary equipment bracket.	7. The torque rod bracket.
2. The dipstick pipe.	8. The engine wiring assembly.
3. The fuel rail.	9. The ignition coils.
4. The pipe screw for the water heated crankcase ventilation.	10. The camshaft position sensor (CMP) housing and trigger wheel.
5. The crankcase ventilation hose on top of the camshaft cover.	11. The cover.
6. The intake manifold.	

Engine Block, Installing Components

Engine block, installing components

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Installing engine block components

Note! Always use new seal washers and gaskets!

Install

- thermostat housing (B52x4x)
- knock sensor (KS)
- flame trap
- the pipe screw for the water-heated crankcase ventilation.

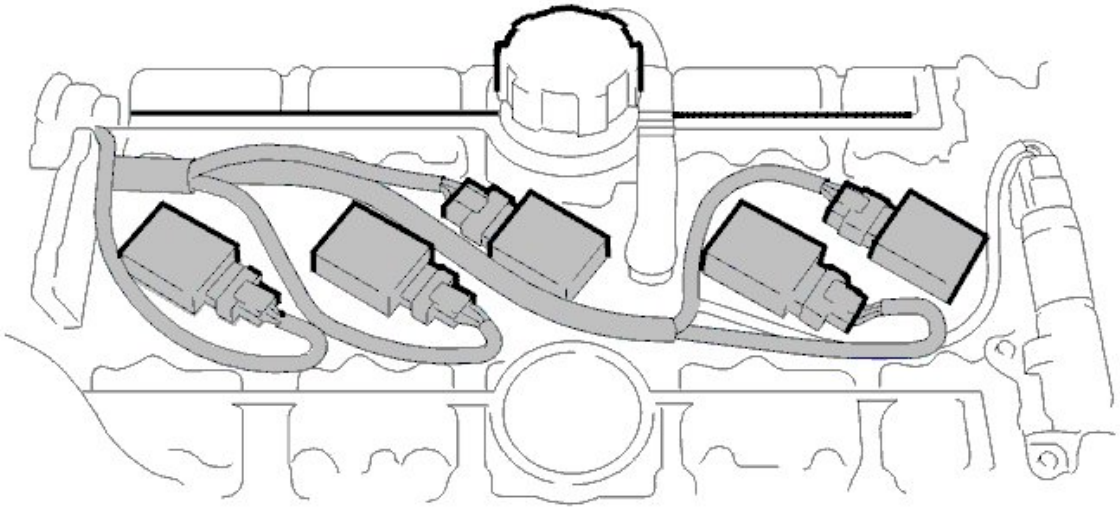
B5xx4x. Engine body, exposing, B5254T2 See: Engine Body, Exposing
B6xx4x. Engine body, exposing, B5254T2 See: Engine Body, Exposing

Install the flywheel and carrier plate. See Crankshaft seal rear, replacing See: Seals and Gaskets/Crankshaft Main Bearing Seal/Service and Repair.

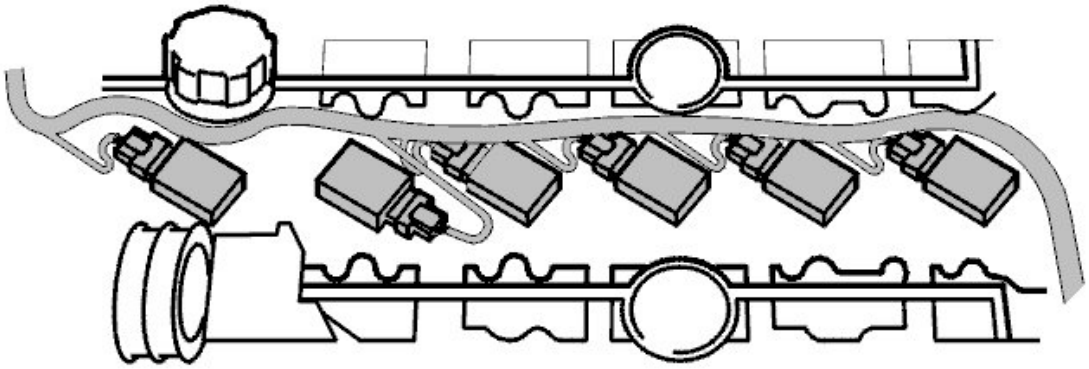
B5xx4x. Tightening torque See: Specifications/Tightening Torque
B6xx4x. Tightening torque See: Specifications/Tightening Torque

The ignition coil alignment and the wiring routing follows the illustrations below.

B5xx4x



B6xx4x



Sealing Micro-Enclosed Screws

Sealing micro-enclosed screws

Note! Micro-enclosed screws are used where the seal requirements are high. Loose screws are replaced or sealed with new sealing compound. Sealant "HYDRAULIC THREADSEAL" has P/N 11 61 056-5 and sealing must be carried out according to the instructions on the packet.The screws to be sealed with "HYDRAULIC THREAD SEAL" and their positions are shown below.

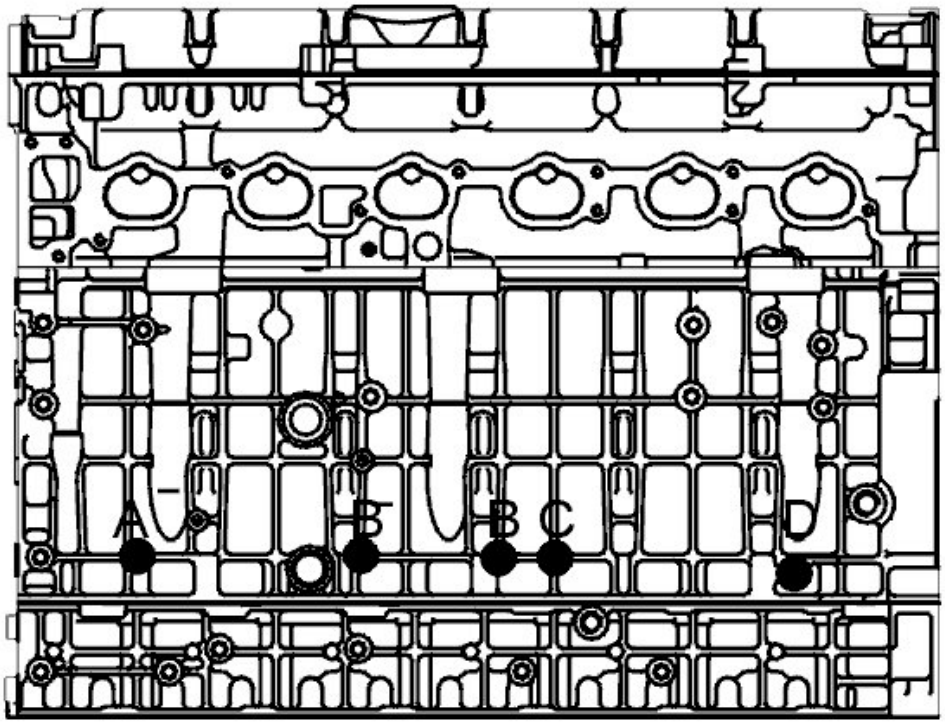
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Sealant

"Hydraulic thread sealant"

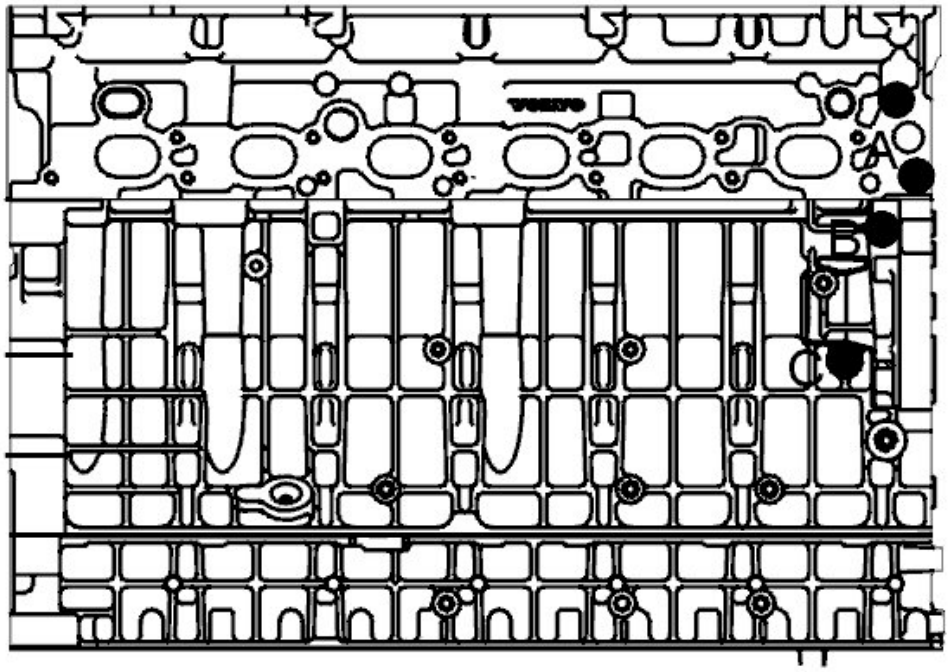
- P/N 11 61 056-5
- Use a brush and/or the packet spout to apply the sealant to the screw.
- Avoid skin contact with the sealant.

Engine intake side



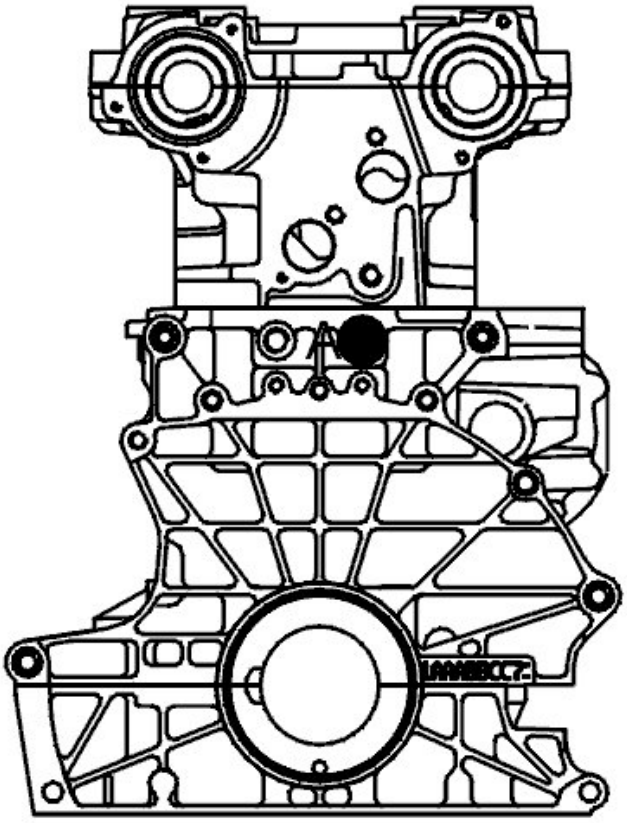
Location	Designation	Number	P/N
A	Auxiliary equipment bracket screw	1	946671-5
B	Air conditioning (A/C) stay screw (for cars with air conditioning (A/C))	1	965180-3
B	Intake manifold stay screw (cars without AC)	1	946173-2
C	Starter motor mounting screw	1	946173-2
D	Engine mounting screw	1	946470-2

Engine exhaust side



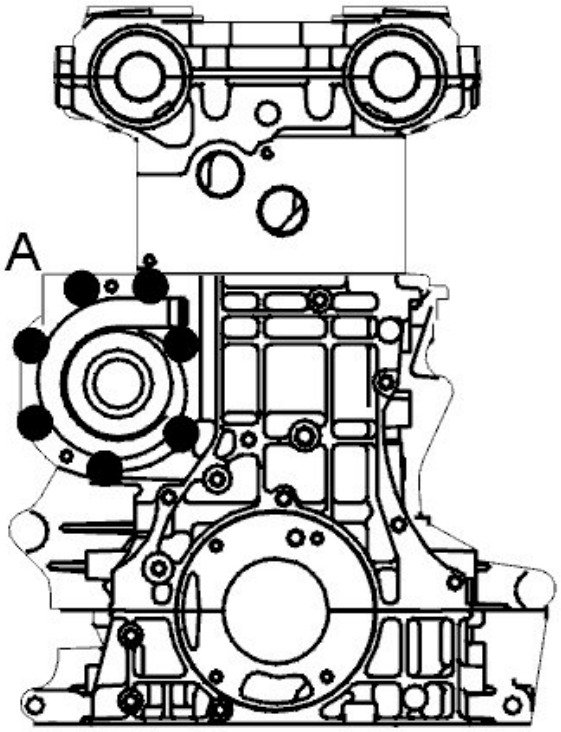
Location	Designation	Number	P/N
A	Coolant manifold screw (M7 X 20) with flange height 7mm including gasket	2	975880-6
A	Coolant manifold screw (M7 X 25) with flange height 9mm including gasket	2	979090-8
B	Plug water pump housing	1	968144-6
C	Drain cock	1	9135268-2

Rear of engine



Location	Designation	Number	P/N
A	Nipple	1	976040-6

Engine front



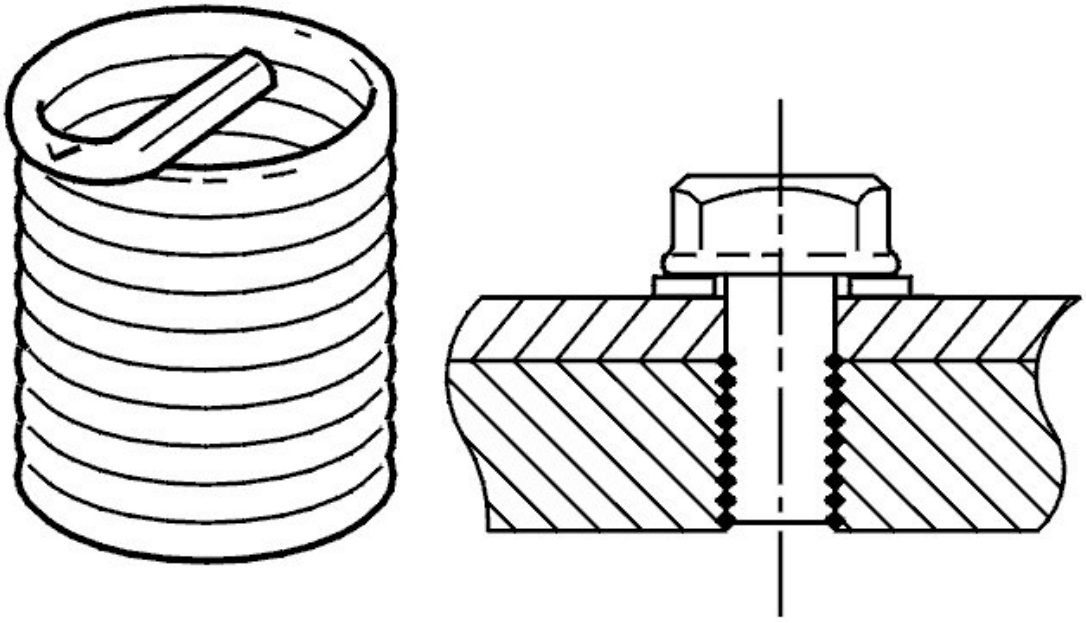
Location	Designation	Number	P/N
A	Coolant pump screw	7	977744-2

Threads

Threads

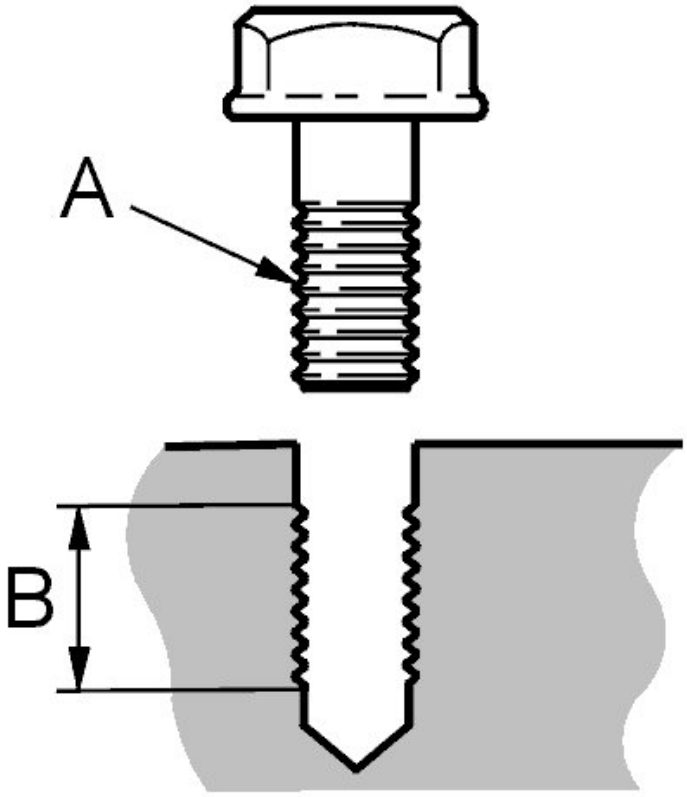
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Thread inserts, general



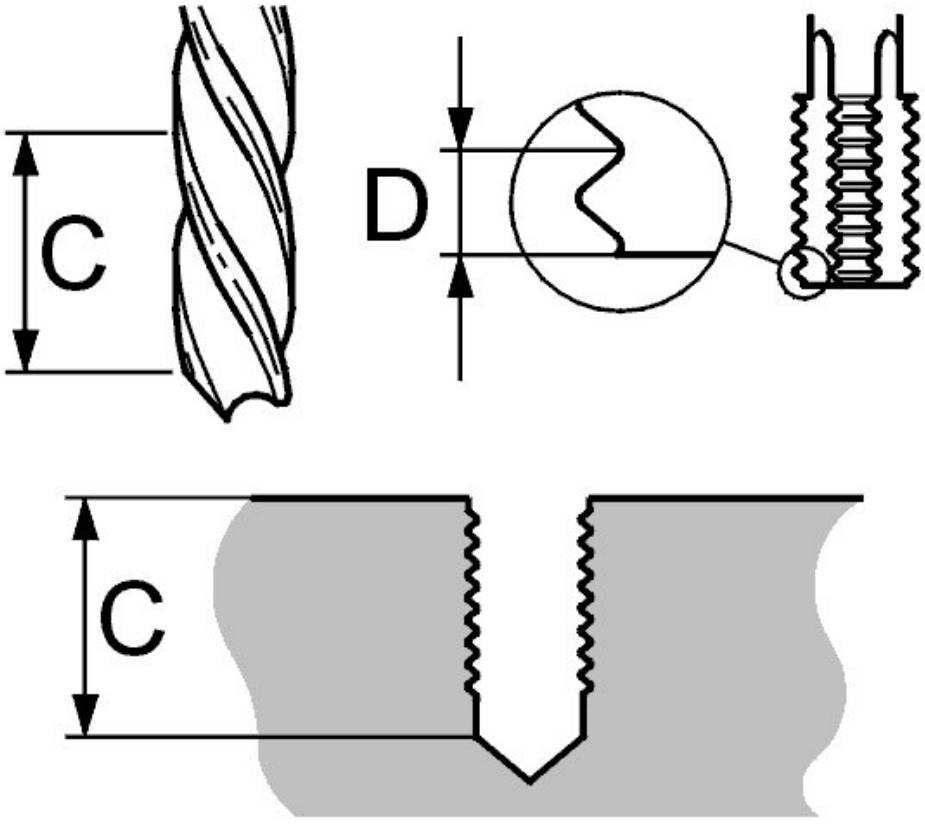
Damaged threads can in most cases be reconditioned using HELICOIL thread inserts.
Thread inserts are available in a variety of sizes, pitches and lengths. A correctly reconditioned thread will generally increase the strength of a joint.

Designation of thread insert



Measure the old threads and thread length in the hole.
A: Thread.
B: Thread length.

Drilling and tapping new thread in the hole

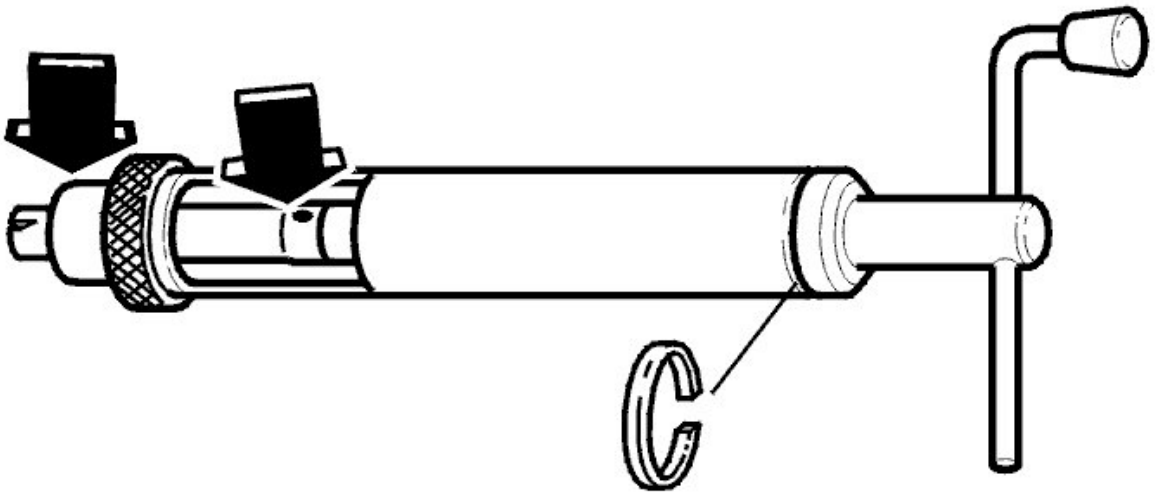


Drill out the old threads using the correct diameter drill bit. Blow the hole clean.
Tap the new thread using the correct tap.

Note! The thread taps referred to in the text are specially made for use with the HELI-COIL system.

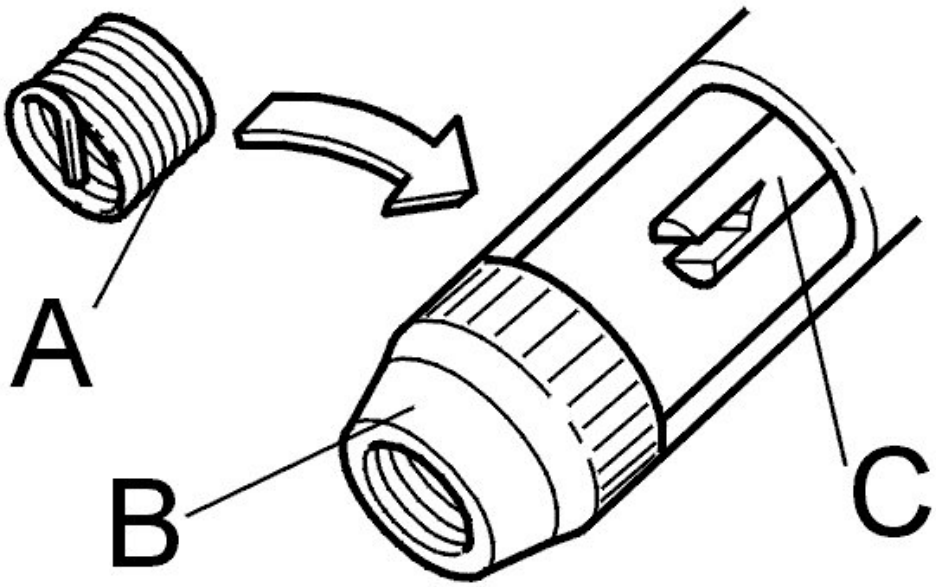
Use methylated spirit or similar to lubricate the threading operation in aluminium. Thread longer threads in stages, backing out the tap and blowing the tap and the hole clean in between.
Thread the hole to the proper depth (or through if it is to be threaded throughout).
C: drill depth.
D: cutting phase.

Tools required for installation



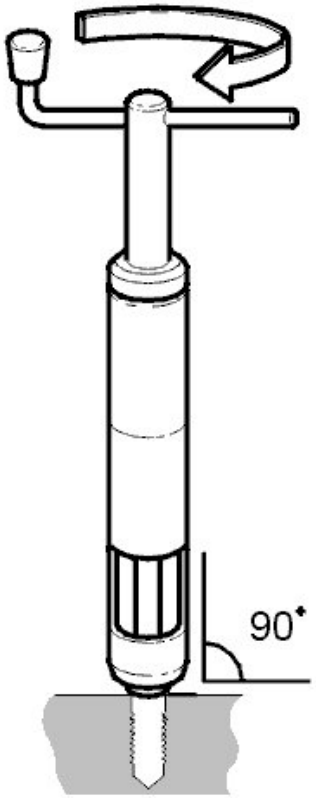
The installation tool (illustrated) is used for threads **M6 - M14**. During some operations the tool must be disassembled by removing the locking ring, for example with countersunk threads.
For threads **M16** and larger the specific tool for each thread size must be used The guide and mandrel are included.

Installing the thread insert in the installation tool



Locate the thread insert with the tang facing down in the tool.
Turn the spindle until the tang engages in the recess.
Screw the thread insert into the guide, do not apply pressure, until the first turn of the thread insert is flush with the guide opening.
A: Tang.
B: Guide.
C: Mandrel.

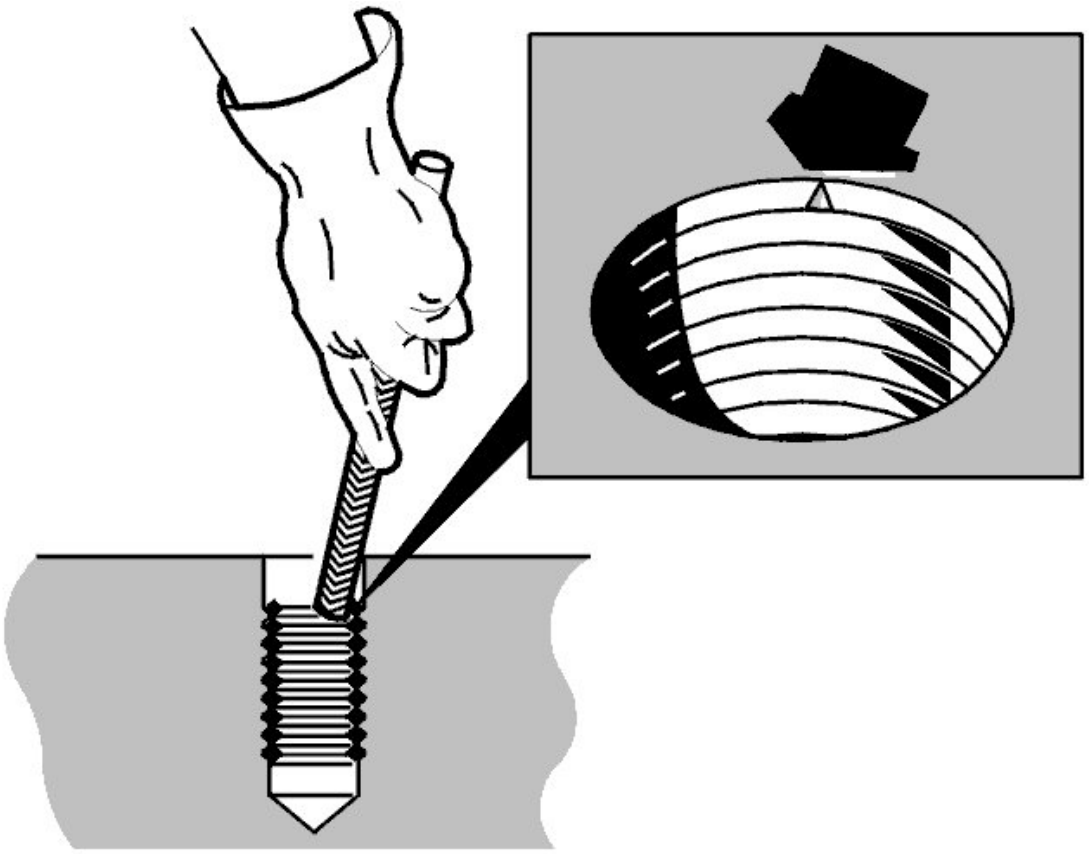
Installation of thread insert



Hold the installation tool straight above and centered over the hole. Screw in the insert without applying pressure on the spindle handle. Screw in

until the end of the insert reaches at least half a thread revolution into the thread.
The insert must not touch the bottom of the hole or stick out of the other side if it is a through hole.
Break off the tang with the proper tang breaker. For **M14** threads and coarser, use a pair of flat-nosed pliers or similar and break downwards.

Extraction of damaged thread insert



Alternative 1

File a notch in the thread insert, about a quarter turn in from the end. Do not file through the insert.

Note! Do not damage the thread in the material.

Use a triangular scraper or similar to extract the insert by rotating it.

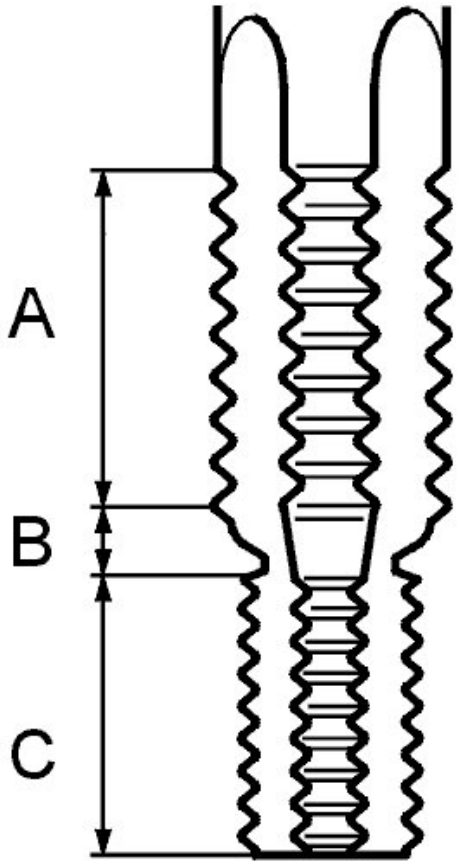
Alternative 2

Carefully expose the end of the thread insert. Use flat-nose pliers to pull the thread insert out.
Clean out the threads in the hole using the thread tap and blow clean.
Install a new thread insert.

Reconditioning sparkplug threads

Note! Reconditioning of spark plug threads must be carried out with removed cylinder head.

Tapping thread in sparkplug hole

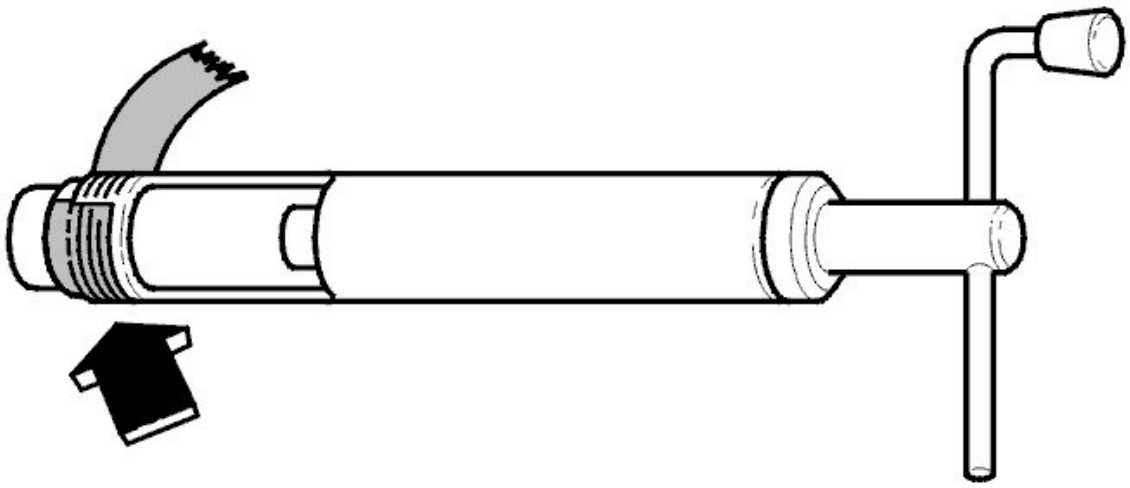


Use combination tap 998 5823-5 and thread repair inserts for spark plug thread **M14x1,25**.

Note! Do not drill out spark plug threads.

Combined tap
A: Tap.
B: Reamer.
C: Steering.

Installation of thread insert



There are times when the cap nut cannot be used because of space restrictions. On these occasions the guide should be taped into place.

Note! As the thread insert for the spark plug thread is thinner (finer) than usual it is extra important to not pressure on the pin when inserting the thread insert (both in the nozzle and the material).

Twist the thread insert down and check that the upper thread is at least a half thread down into the thread and that none of the insert protrudes into the combustion chamber.
If the insert has been screwed in too far it must be turned until it is all the way through. If it is not deformed it can be inserted again.
Break off the tang with a pair of flat nose pliers. Check the thread. Install a sparkplug.

Thread table

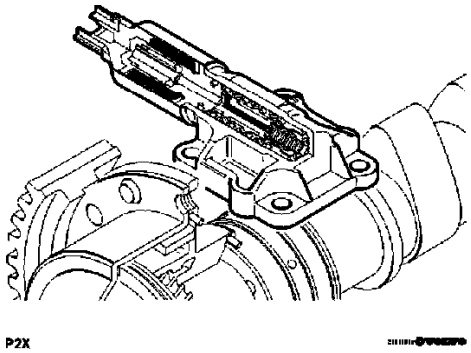
Values in mm		
Thread dimension	**Drill - diameter**	**Examples of areas of use**
M6x1	6.3	Oil pump
M7x1	7.3	Sump to cylinder block, Intermediate section to cylinder block, Water pump to cylinder block
M8x1.25	8.4	Studs at the exhaust ports
M10x1.5	10.5	Intermediate section to cylinder block, Gearbox to engine
M12x1.5	12.5	
M14x1.25		Spark plugs
M14x1.5	14.2	Oil pressure switch. Oil pressure outlet engine / turbocharger unit.
M18x1.5	18.5	Oil drain plug in the sump.

Threads which must not be reconditioned

Coolant outlet for the drain nipple, heat exchanger / oil cooler.
Plug hole for crankshaft setting.
Screw holes for cylinder head screws.

Variable Valve Timing Actuator: Description and Operation Camshaft Control (CVVT)

Camshaft Control (CVVT)



When the camshaft is set at the factory, it is aligned with the position of the crankshaft. The position of the camshaft in relation to the crankshaft is designated the camshaft 0 position.

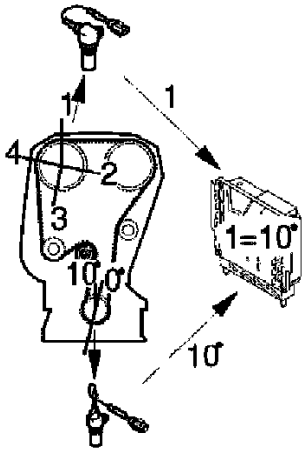
During camshaft control (CVVT) the camshaft 0 position is offset. The value of the 0 position offset is called the cam timing. The cam timing is 0 degrees if the camshaft is not being controlled.

By controlling the cam timing (the camshaft is deployed from its 0 position) the performance of the engine is increased, the idle speed quality is improved and the emissions are reduced.

In order to detect the cam timing, the engine control module (ECM) uses the signals from the engine speed (RPM) sensor (the position of the crankshaft) and from the camshaft position (CMP) sensor (the position of the camshaft). By comparing these two signals, the control module is able to determine the cam timing (the number of degrees the camshaft is from its 0 position).

There are diagnostic for this function. See also Camshaft diagnostics (CVVT).

Camshaft cam timing



The camshaft (A) is divided into four flanks per revolution of the camshaft (flanks 1-4). The angle between flanks 1-2 = 103 degrees, flanks 2-3 = 90 degrees, flanks 3-4 = 90 degrees and flanks 4-1 = 77 degrees. The angle between the flanks is different, allowing the control module to determine which flank it is detecting and therefore determine which combustion cycle the cylinders are in.

The crankshaft has four reference positions, one for each camshaft flank. The camshaft turns at half the speed of the crankshaft. This means that two reference positions are detected for each turn of the crankshaft. Therefore two engine revolutions are required to detect all flanks on the camshaft. For example (may vary between different engine variants): flank 1 at 0 degrees, flank 2 at 206 degrees, flank 3 at 386 degrees and flank 4 at 576 degrees (flanks 3 and 4 are detected during the second engine revolution).

The reference positions of the crankshaft coincide exactly with each camshaft flank if the camshaft cam timing is 0 degrees. If the cam timing deviates from 0 degrees, i.e. the flanks deviate from the reference positions of the crankshaft, the control module calculates the number of crankshaft degrees by which the flank is deviating.

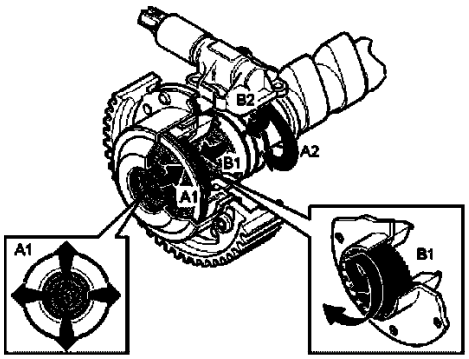
The control module detects the reference positions for the camshaft flanks using the signal from the engine speed (RPM) sensor.

Example:
If camshaft flank 1 is detected at 10 degrees from the crankshaft reference position for flank 1 (0 degrees +10 degrees), the cam timing is 10 degrees. If the cam timing is the same (10 degrees), flank 2 is detected at 216 degrees (206 degrees + 10 degrees), flank 3 at 396 degrees (386 degrees + 10 degrees), and flank 4 at 586 degrees (576 degrees + 10 degrees). The cam timing can be positive (+) or negative (-) depending on

whether the flank is detected before or after the different reference positions for the crankshaft.

The engine control module (ECM) controls the camshaft reset valve smoothly in order to regulate the camshaft cam timing. The valve controls the flow of engine oil to the continuous variable valve timing (CVVT) unit which is affected by the oil pressure that builds up. Also see Design.

Control



Control takes place as follows when deploying the camshaft:

1. Oil is forced from the engine lubricating system to the intake port on the reset valve
2. The engine control module (ECM) grounds the valve, the position of the piston in the valve changes and the oil is guided to the continuous variable valve timing (CVVT) unit chamber (A1) via the duct (A2) in the camshaft
3. The continuous variable valve timing (CVVT) unit hub is pressed backwards by the oil pressure. The continuous variable valve timing (CVVT) unit then rotates the hub and the carriers are joined by twisted splines
4. The oil flows to the engine oil pan via the outer ducts on the hub and the reset valve's return hose.

Control takes place as follows when returning the camshaft:

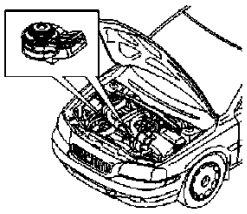
1. Oil is forced from the engine lubricating system to the intake port on the reset valve
2. The engine control module (ECM) breaks the ground connection for the valve. The piston in the valve is then pressed back by a spring. The oil flows to the continuous variable valve timing (CVVT) unit chamber (B1) via a duct (B2) in the camshaft
3. The hub of the continuous variable valve timing (CVVT) unit is forced forward by the oil pressure that is created. The continuous variable valve timing (CVVT) unit will rotate back to the nondeployed position
4. The oil flows to the engine oil pan via the center duct on the hub and the reset valve's return duct.

The above takes place very quickly. The engine control module (ECM) controls the deployment and return of the reset valve continually at high frequency. This results in rapid and exact control.

The extent of camshaft control (the change of cam timing) varies depending on the engine variant and the model year.

Variable Valve Timing Actuator: Description and Operation
Knock Control

Knock Control



Knocking occurs in the combustion chamber when the fuel and air mixture self ignites. This can occur either before or after the spark plug has produced an ignition spark. In both cases the gas in two or more places ignites in the combustion chamber.

This results in an extremely fast combustion process with flames from several directions. When these flames collide, the pressure in the cylinder increases rapidly and there is a mechanical knocking sound.

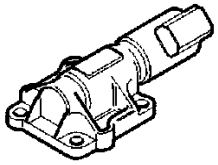
If any of the cylinders knock there is a specific type of vibration in the cylinder block. These vibrations are transferred to the knock sensors (KS) which are screwed into place in the cylinder block. The resultant mechanical stress in the piezo electrical material in the knock sensors generates a voltage. The engine control module (ECM) can then determine which cylinder is knocking with the help of the camshaft position (CMP) sensor and the engine speed (RPM) sensor.

The knock sensors (KS) also interpret a proportion of normal engine sound. The control module is able to recognize the vibrations which correspond to knocking by filtering, amplifying and using software to evaluate the signal.

If the knock sensors (KS) detect knocking in the engine over a certain threshold value, the ignition timing is first retarded and then the fuel / air mixture is enriched to eliminate knocking.

Variable Valve Timing Actuator: Description and Operation
Camshaft Reset Valve

Camshaft Reset Valve (Continuous Variable Valve Timing (CVVT))



The camshaft reset valve controls the oil flow to the CVVT unit (camshaft pulley).

The valve consists of an electro-magnetic valve with a spring-loaded piston. There are slits in the piston which channel the engine lubricating oil to the CVVT unit by moving the piston in the reset valve. The continuous variable valve timing (CVVT) unit turns the camshaft (the cam timing changes). The direction in which the camshaft turns depends on the chamber in the CVVT unit which is supplied with oil (pressure). Also see Function.

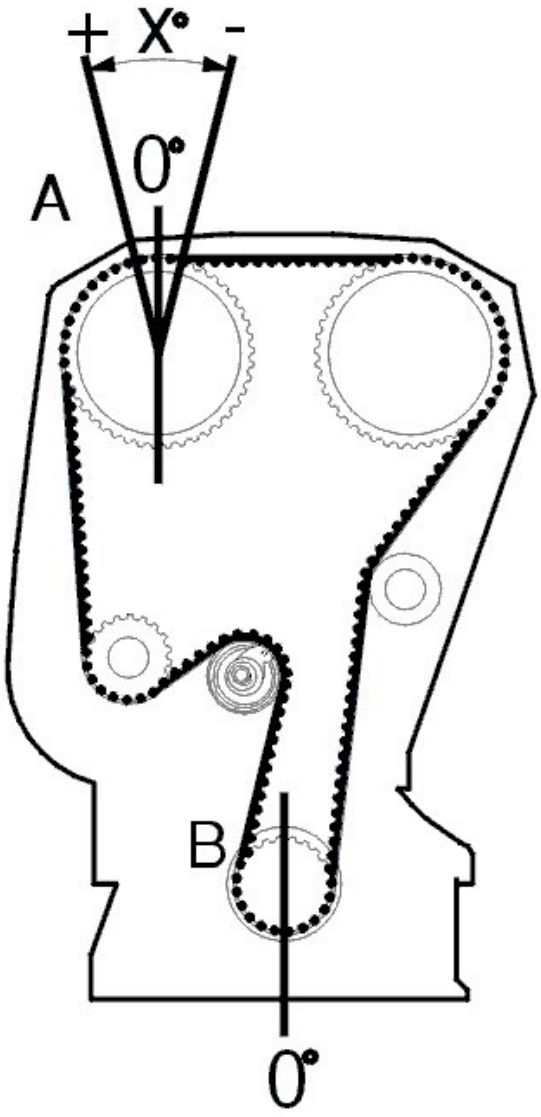
The system relay supplies the reset valve with voltage. The valve is grounded (control stage) in the engine control module (ECM). When the valve is grounded using a pulse width modulation (PWM) signal, the oil flow in the valve can be controlled to the different chambers in the continuous variable valve timing (CVVT) unit at variable rates. This allows the cam timing to be changed precisely and steplessly.

The engine control module (ECM) can diagnose the camshaft reset valve.

The valve is on the cylinder head above the camshaft with camshaft control.

Variable Valve Timing Actuator: Description and Operation
Variable Valve Timing Control

Variable valve timing control

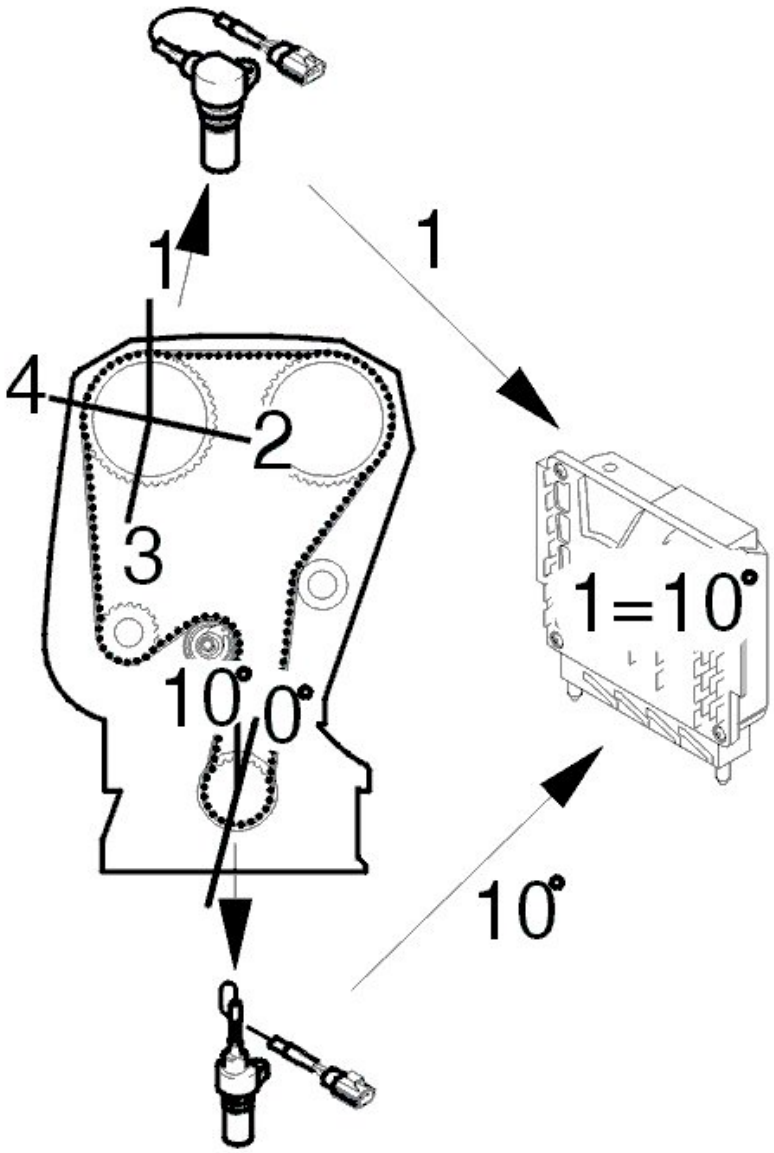


Continuous variable valve timing (CVVT) control, general

The engine combustion can be improved by changing the shift angle of the camshaft. This reduces emissions, gives lower fuel consumption and better performance. The shift angle of the camshaft is controlled by the control module which changes the pulse ratio of the reset valve. The pulse ratio of the reset valve affects the variable valve timing unit which changes the camshaft position compared to the crankshaft position (CKP). This ensures quick and precise control of the shift angle of the camshaft.
°

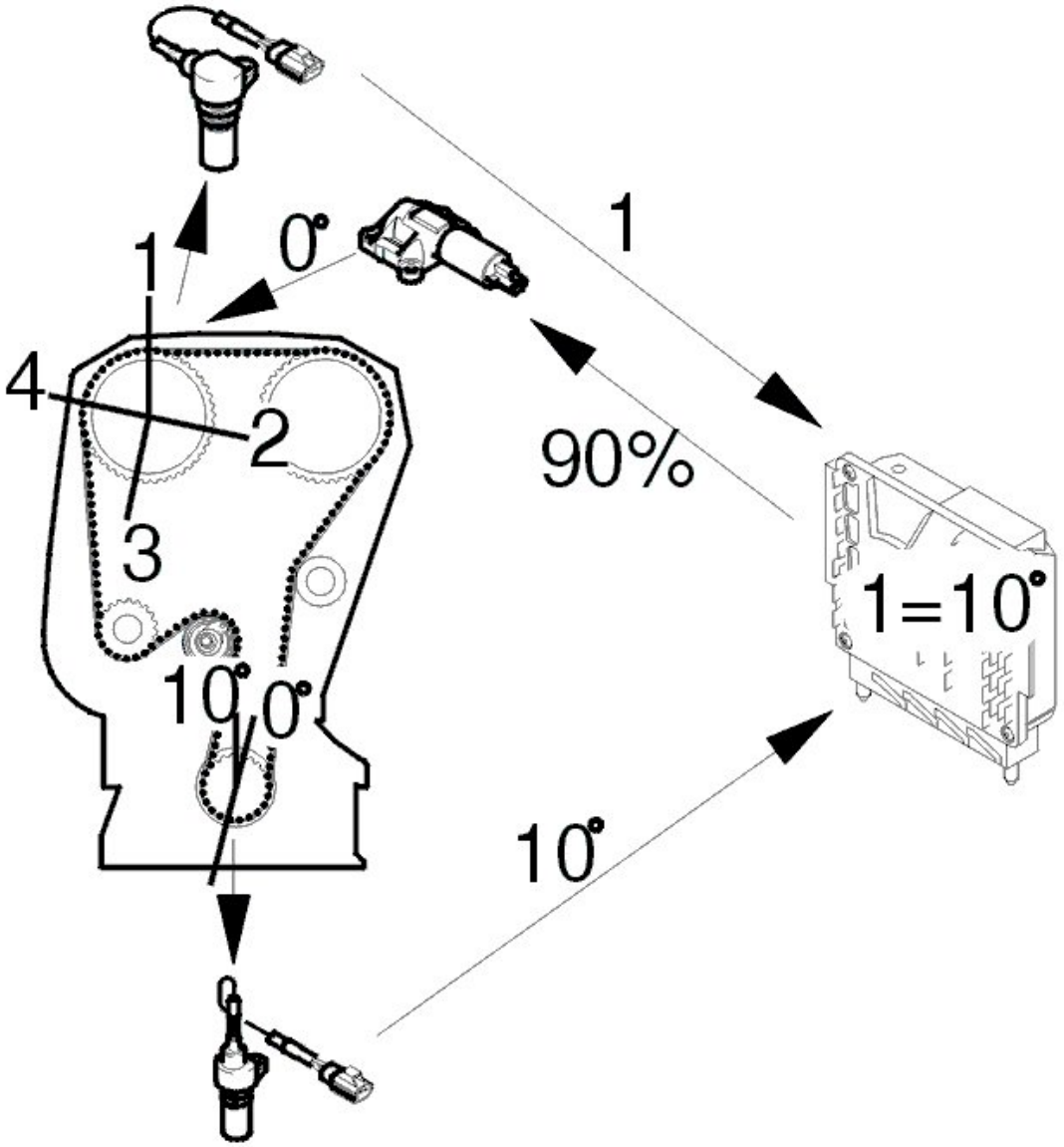
Definition of "Camshaft shift angle" (X)

When the camshaft (A) is set at the factory it is aligned to top dead center (TDC) on the crankshaft which is 0° (B). The camshaft position when aligned to the crankshaft TDC is the camshaft 0 position (0°). With continuous variable valve timing (CVVT) the camshaft 0 position is offset, the value of the offset of the camshaft 0 position is the camshaft shift angle (x°).



The control module interpretation of camshaft shift angle
(The illustration shows the camshaft shift angle at 10°)

The camshaft shift angle is checked by the control module by comparing the position of the crankshaft with the position of the camshaft.
The camshaft (A) is divided into 4 flanks per camshaft rotation (flanks 1-4). The angles are: between flanks 1-2 = 103°, flanks 2-3 = 90°, flanks 3-4 = 90° and flanks 4-1= 77°. The difference in angle between the flanks allows the control module to determine which flank is currently detected and therefore which cycle the camshaft is in. The control module detects the flanks using the signal from the camshaft position (CMP) sensor.
The crankshaft has four reference positions, one for each camshaft flank. Two reference positions are detected for each crankshaft rotation. Two engine rotations are required to detect all the camshaft flanks: flank 1 at 0°, flank 2 at 206°, flank 3 at 386° and flank 4 at 576° (flanks 3 and 4 are detected during the second rotation of the engine).
The reference positions on the crankshaft correspond exactly to the respective camshaft flank when the camshaft shift angle = 0°. The control module detects the reference positions for the camshaft flanks using the engine speed (RPM) sensor signal.
If, for example, the camshaft shift angle is +10°, the flanks correspond to the crankshaft reference positions for the respective camshaft flank and +10° from the crankshaft reference positions.
Example:
If the camshaft flank 1 is detected at 10° from the crankshaft reference position for flank 1 (0° +10°), the camshaft shift angle is 10°. If the camshaft shift angle is the same (10°), flank 2 is detected at 216° (206° + 10°), flank 3 at 396° (386° + 10°), and flank 4 at 576° (586° + 10°). The shift angle can be positive (+) or negative (-) depending on whether the flank is detected before or after the different crankshaft reference positions.



Adaptation of the camshaft shift angle, flanks 1-4
(The illustration shows the adaptation of the camshaft shift angle at 10°)

When the engine has the "basic setting", the ideal value for the camshaft adaptation value is 0°. The different camshaft flanks correspond exactly with the reference positions for the respective flanks. These values may deviate because of tolerances in the materials and installation. By adapting these deviations the camshaft shift angle can be exact.
Adaptation is carried out as follows:
Camshaft control not active, the pulse ratio on the camshaft reset valve is set to approximately 90% by the control module. This means that the camshaft 0 position (mechanical resting position) is assumed and the camshaft angles (x°) for flanks 1-4, which are then detected by the control module, are the adaptation values which are stored. (The adaptation values will be 0° if the camshaft adjustment in relation to the crankshaft is exact). When the control module operates the camshaft to a particular target value, the stored adaptation value is added to the control module's target value.
Example: The control module has adapted flanks 1-4 to an average value of +10° (as the result of an incorrectly set camshaft for example). When the control module needs to operate the camshaft to +10° (target value), the adaptation value is added to the target value which then gives a target value of 20° (10° +10°=20°).
The control module can adapt ±20°. A diagnostic trouble code (DTC) is stored in the control module if the adaptation is higher or lower than ±10°.

Other information:

- If the timing belt is incorrectly positioned by one tooth on the variable valve timing unit, this corresponds to approximately 17° on the crankshaft. This gives a theoretical adaptation value of 17°.
- If the timing belt is incorrectly positioned by one tooth on the variable valve timing unit, this corresponds to approximately 34° on the crankshaft. This gives a maximum adaptation value (20°)
- The setting of the variable valve timing unit in relation to the camshaft and crankshaft affects the adaptation value (between -20° and +20°)
- If the slide in the camshaft reset valve has jammed, the camshaft will be operate at maximum angle. This which will give an adaptation value at the maximum limit (+20° or -20°)
- The function of the variable valve timing unit affects the adaptation value (between -20° and +20°).

Variable Valve Timing Actuator: Testing and Inspection

Variable valve timing unit, checking and adjusting

Special tools:

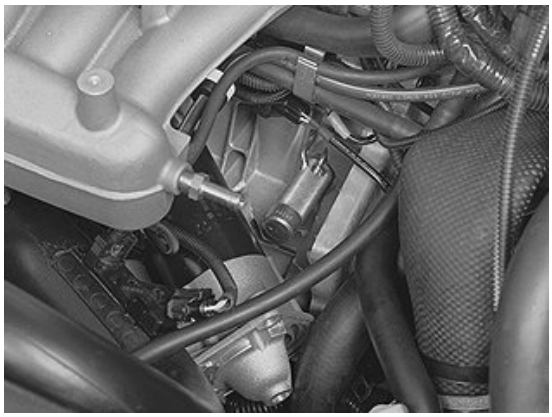
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Installing and adjusting the variable valve timing unit/timing gear pulley on the camshaft

Note! This procedure must be carried out with precision as any deviation could generate a fault symptom.

Installing the crankshaft adjustment tool

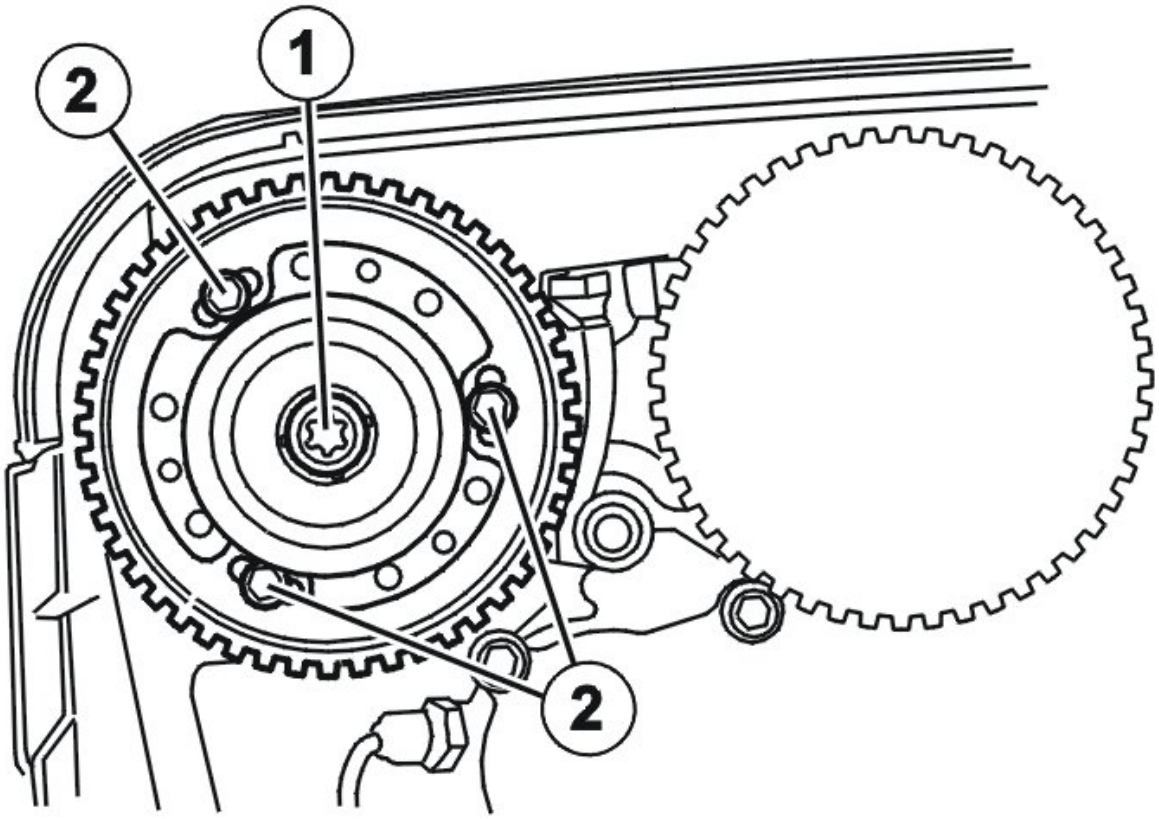


Remove the mounting screws for the starter motor.
Pull out the starter motor and place it to one side.
Remove the blind cover plug from the hole for the adjustment tool.
Turn the crankshaft clockwise slightly.
Install: 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Ensure that the tool bottoms out against the cylinder block.

Aligning the crankshaft

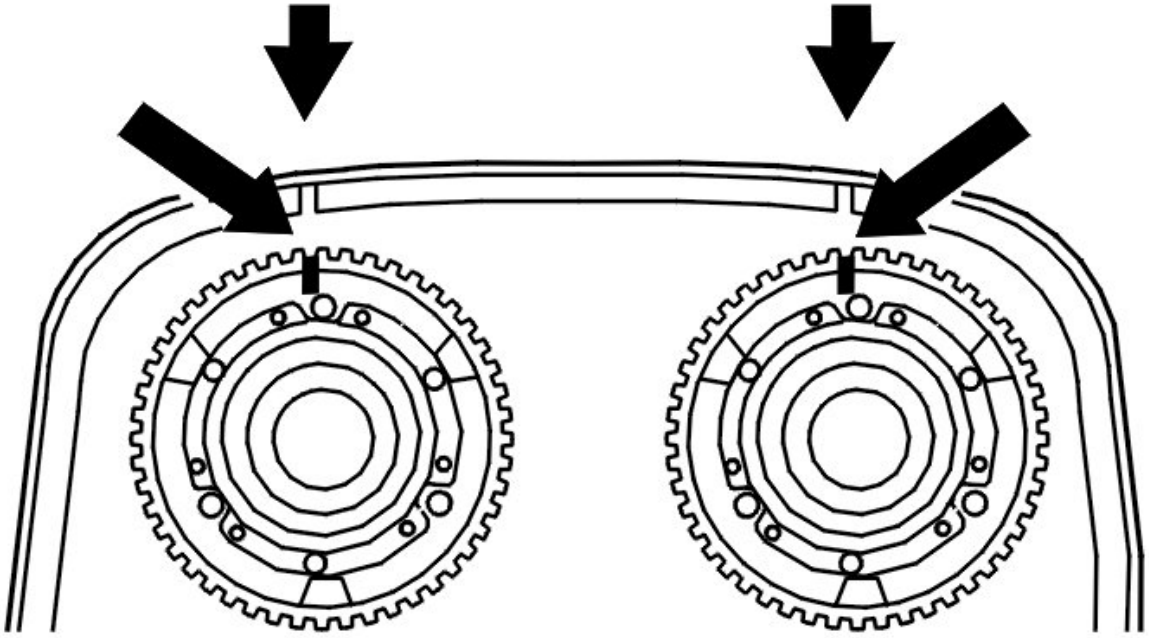
Turn the crankshaft counter-clockwise until it stops against the adjustment tool.
Check that the marking on the crankshaft timing gear pulley corresponds to the marking on the oil pump.

Installing the variable valve timing unit on the camshaft



Note! Oil the center screw before installation

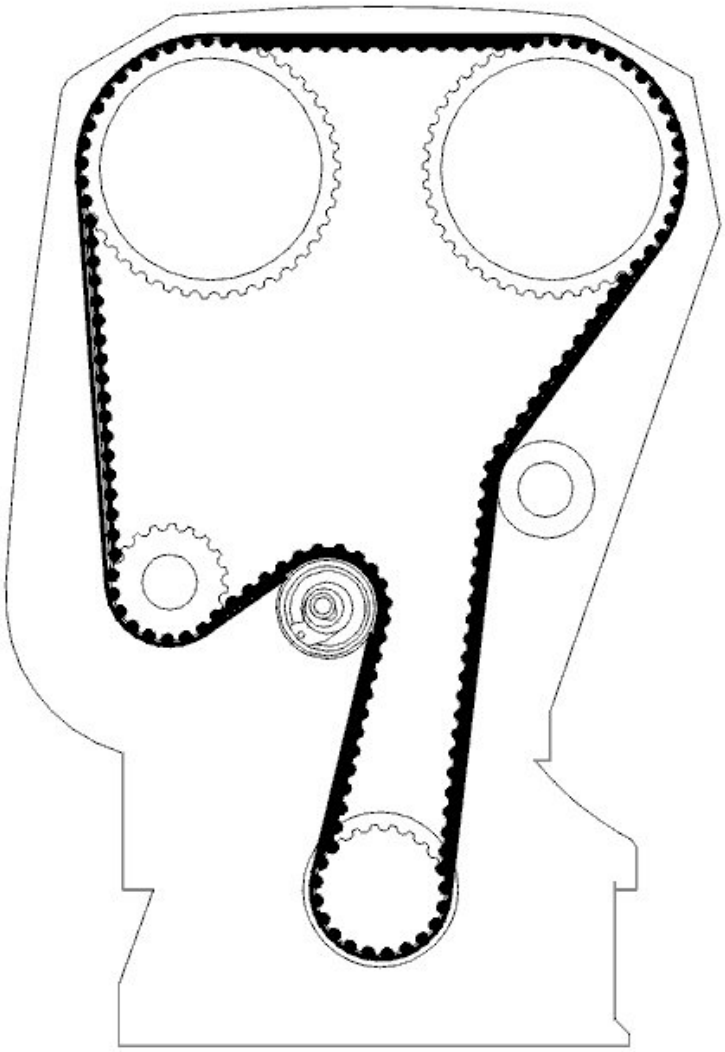
Push on the variable valve timing unit/timing gear pulley on the camshaft.
Install the center screw (1) which secures the variable valve timing unit to the camshaft. Tighten slightly.
Slacken off, but do not remove the screws (2) which secure the timing gear pulley to the variable valve timing unit.
Turn the timing gear pulley until the screws at the oval holes are in the center position. Tighten the screws (2) slightly.
Turn the variable valve timing unit clockwise to its limit position so that the unit is in its end position.
Position the upper timing cover



Undo the center screw and continue turning clockwise until the timing gear pulley marking aligns with the marking on the upper timing cover.

Tighten the center screw in the variable valve timing unit. Tighten. See: Tightening torque See: Specifications/Tightening Torque.

Installing the timing belt

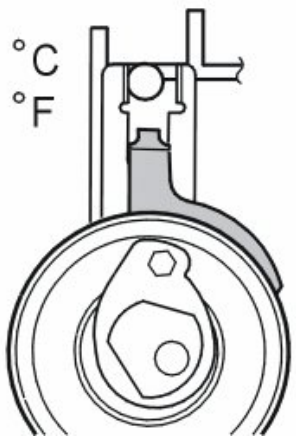


Note! Variable valve timing units do not have return springs and are easily thrown out of position when the camshaft belt is installed. Check that the markings align.

Install the belt in the following order:

- the idler pulley
- intake cam
- exhaust cam
- water pump
- tension pulley.

Tensioning of cambelt

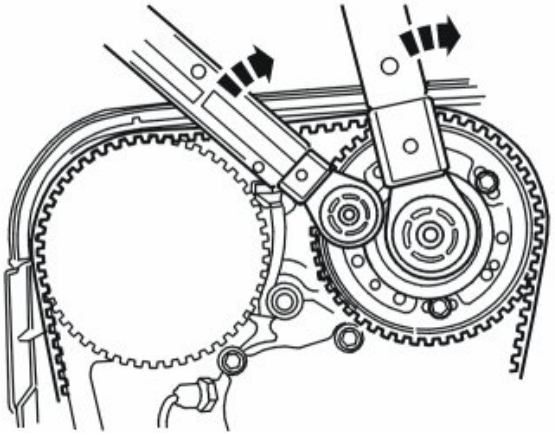


This adjustment is to be made with a cold engine.
A suitable temperature is approximately 20 °C/68 °F.
At a higher temperature, for example with a warm engine or a higher ambient temperature, the needle is further to the right.
The illustration shows the position of the indicator when aligning the timing belt tensioner at approximately 20 °C/68 °F.

Note! There are two different tensioners depending on model year.

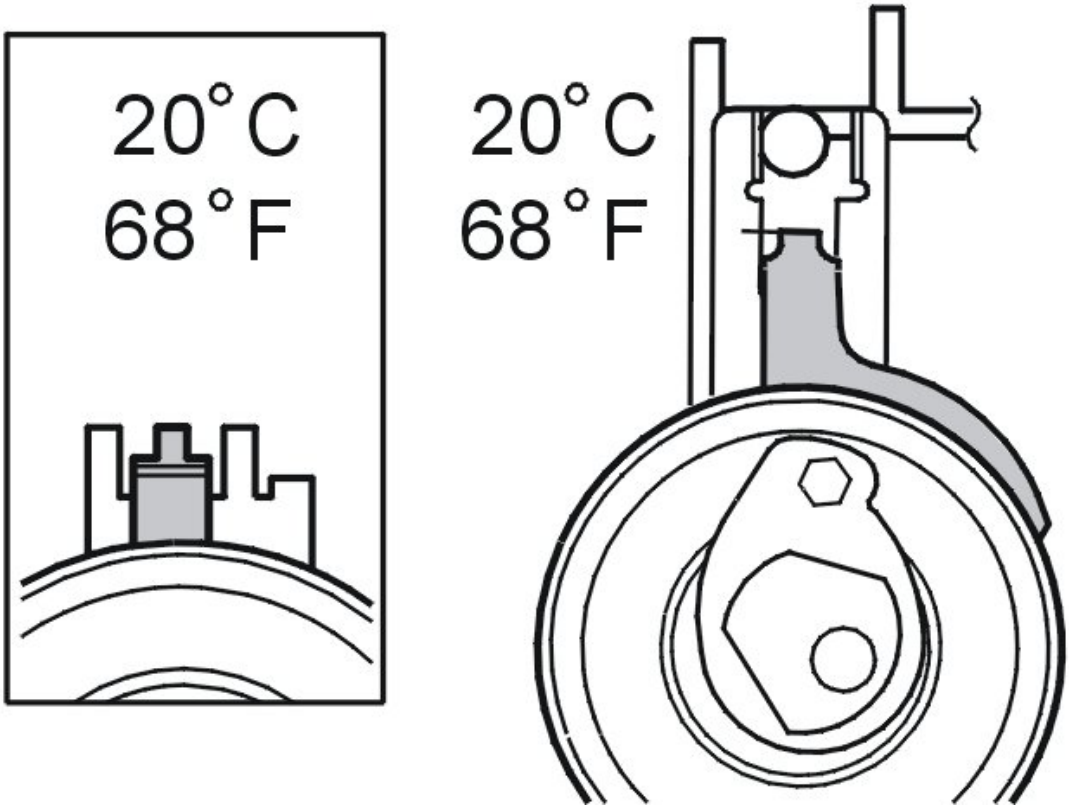
Fix the belt tensioner center screw in position and turn the belt tensioner eccentric clockwise until the tensioner indicator passes the marked position and reaches the end position. Then turn the eccentric back so the indicator reaches the marked position illustrated. Tighten the center screw. See Tightening torque See: Specifications/Tightening Torque.
Check that the indicator is in the correct position.

Tightening



Slacken off the 3 x screws for the timing gear pulley slightly (applies to both timing gear pulleys).
Install the center plug in the variable valve timing unit. Tighten. See: Tightening torque See: Specifications/Tightening Torque.
Hold the center plug at 25 Nm at the same time as tightening the 3 x screws on the camshaft timing gear pulley to: Tightening torque See: Specifications/Tightening Torque.
Tighten the 3 x screws on the timing gear pulley for the intake camshaft. See: Tightening torque See: Specifications/Tightening Torque. This is to ensure that the variable valve timing (VVT) unit is in its end position when the timing gear pulley is tightened.

Final check



Remove:

- 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool from the rear of the camshafts
- 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Install new plugs with new sealing washers. Tighten. See: Tightening torque See: Specifications/Tightening Torque.

Checking the markings and belt tension.

Position the upper timing cover.

Turn the crankshaft 2 rotations. Check that the markings on the crankshaft and timing gear pulleys correspond.

Remove the upper timing cover.

Variable Valve Timing Actuator: Adjustments

Variable valve timing unit, checking and adjusting

Special tools:

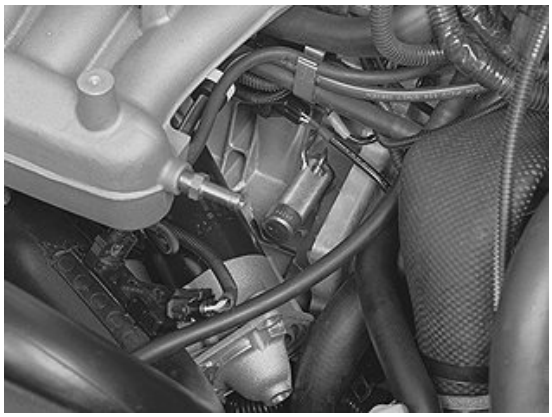
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Installing and adjusting the variable valve timing unit/timing gear pulley on the camshaft

Note! This procedure must be carried out with precision as any deviation could generate a fault symptom.

Installing the crankshaft adjustment tool

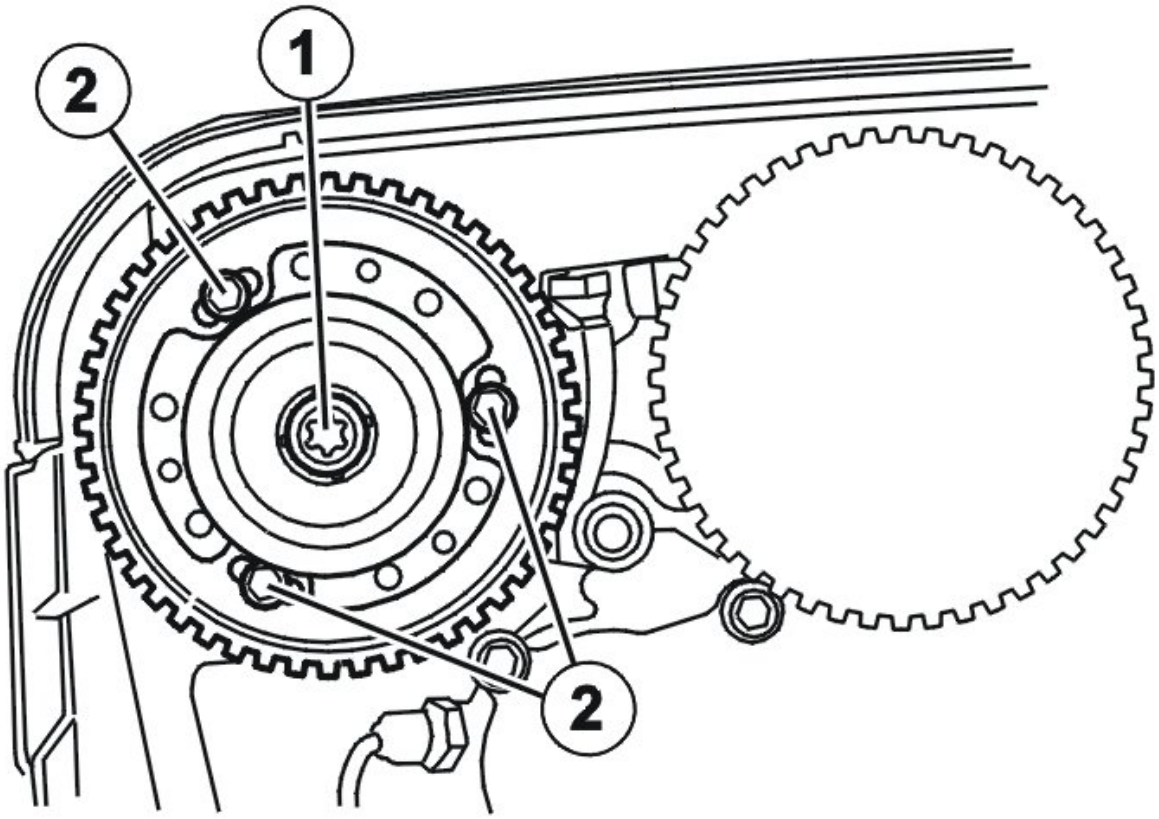


Remove the mounting screws for the starter motor.
Pull out the starter motor and place it to one side.
Remove the blind cover plug from the hole for the adjustment tool.
Turn the crankshaft clockwise slightly.
Install: 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Ensure that the tool bottoms out against the cylinder block.

Aligning the crankshaft

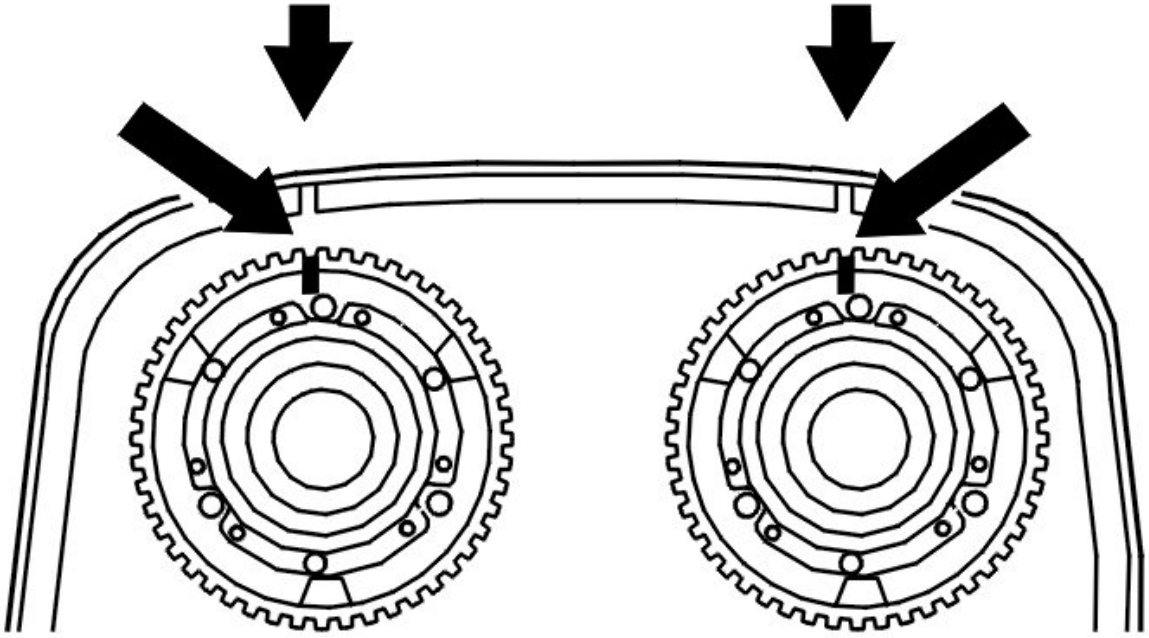
Turn the crankshaft counter-clockwise until it stops against the adjustment tool.
Check that the marking on the crankshaft timing gear pulley corresponds to the marking on the oil pump.

Installing the variable valve timing unit on the camshaft



Note! Oil the center screw before installation

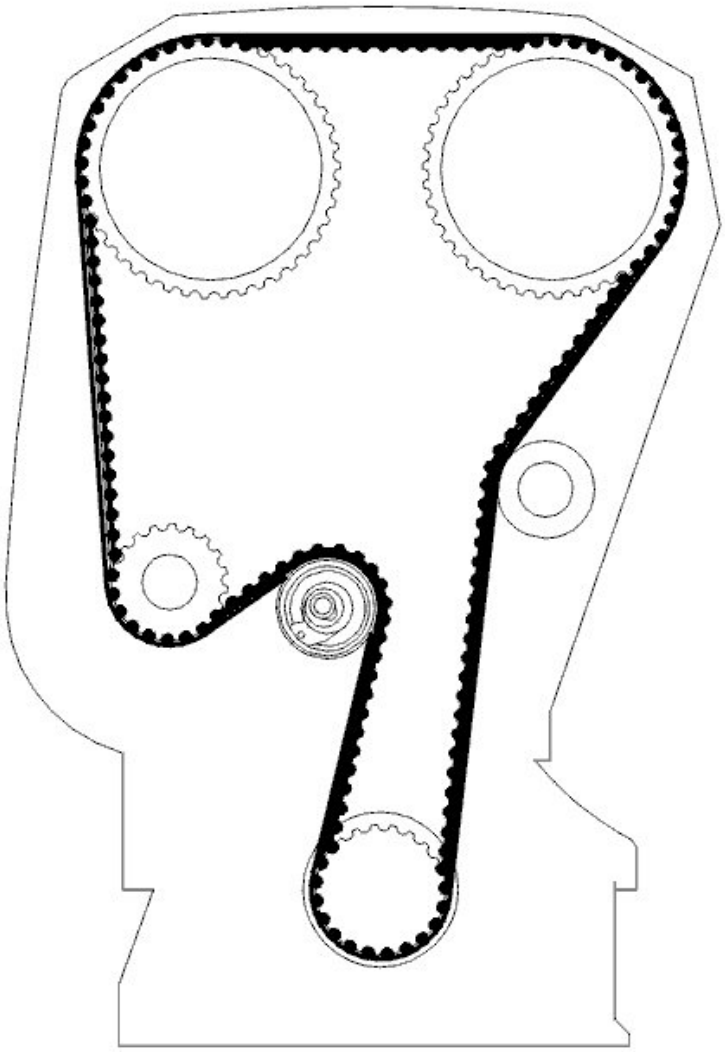
Push on the variable valve timing unit/timing gear pulley on the camshaft.
Install the center screw (1) which secures the variable valve timing unit to the camshaft. Tighten slightly.
Slacken off, but do not remove the screws (2) which secure the timing gear pulley to the variable valve timing unit.
Turn the timing gear pulley until the screws at the oval holes are in the center position. Tighten the screws (2) slightly.
Turn the variable valve timing unit clockwise to its limit position so that the unit is in its end position.
Position the upper timing cover



Undo the center screw and continue turning clockwise until the timing gear pulley marking aligns with the marking on the upper timing cover.

Tighten the center screw in the variable valve timing unit. Tighten. See: Tightening torque See: Specifications/Tightening Torque.

Installing the timing belt

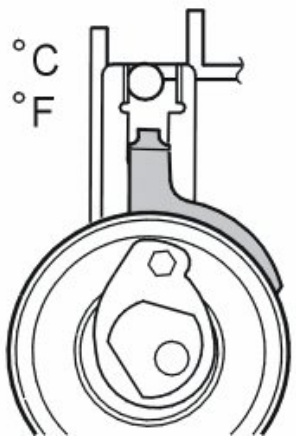


Note! Variable valve timing units do not have return springs and are easily thrown out of position when the camshaft belt is installed. Check that the markings align.

Install the belt in the following order:

- the idler pulley
- intake cam
- exhaust cam
- water pump
- tension pulley.

Tensioning of cambelt

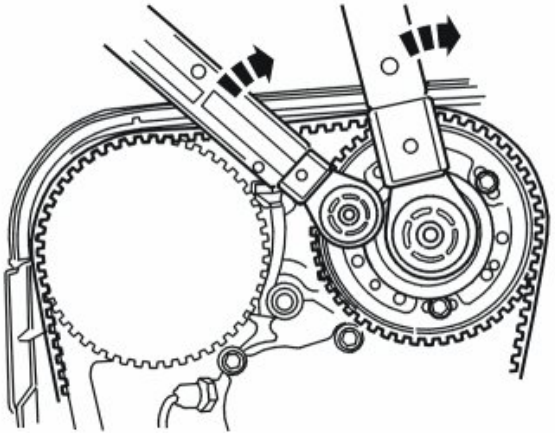


This adjustment is to be made with a cold engine.
A suitable temperature is approximately 20 °C/68 °F.
At a higher temperature, for example with a warm engine or a higher ambient temperature, the needle is further to the right.
The illustration shows the position of the indicator when aligning the timing belt tensioner at approximately 20 °C/68 °F.

Note! There are two different tensioners depending on model year.

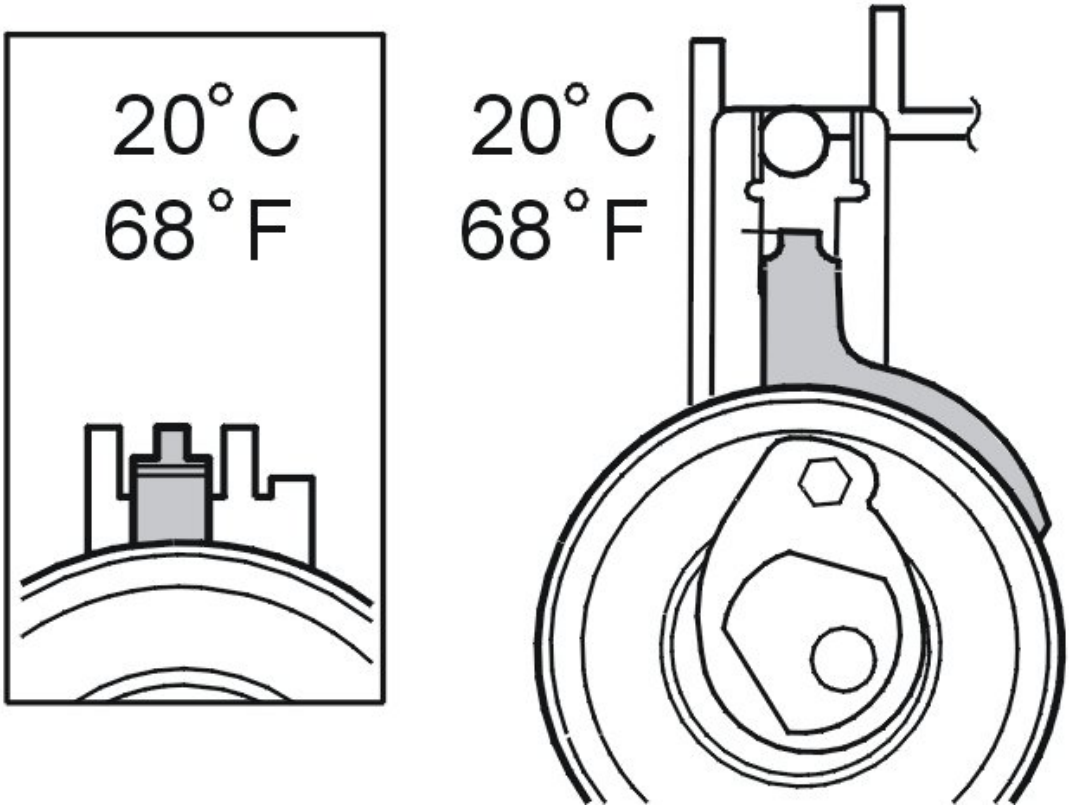
Fix the belt tensioner center screw in position and turn the belt tensioner eccentric clockwise until the tensioner indicator passes the marked position and reaches the end position. Then turn the eccentric back so the indicator reaches the marked position illustrated. Tighten the center screw. See Tightening torque See: Specifications/Tightening Torque.
Check that the indicator is in the correct position.

Tightening



Slacken off the 3 x screws for the timing gear pulley slightly (applies to both timing gear pulleys).
Install the center plug in the variable valve timing unit. Tighten. See: Tightening torque See: Specifications/Tightening Torque.
Hold the center plug at 25 Nm at the same time as tightening the 3 x screws on the camshaft timing gear pulley to: Tightening torque See: Specifications/Tightening Torque.
Tighten the 3 x screws on the timing gear pulley for the intake camshaft. See: Tightening torque See: Specifications/Tightening Torque. This is to ensure that the variable valve timing (VVT) unit is in its end position when the timing gear pulley is tightened.

Final check



Remove:

- 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool from the rear of the camshafts
- 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Install new plugs with new sealing washers. Tighten. See: Tightening torque See: Specifications/Tightening Torque.

Checking the markings and belt tension.

Position the upper timing cover.

Turn the crankshaft 2 rotations. Check that the markings on the crankshaft and timing gear pulleys correspond.

Remove the upper timing cover.

Variable Valve Timing Actuator: Service and Repair
Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

Camshaft seal/variable valve timing (VVT) unit, replacing

Special tools:

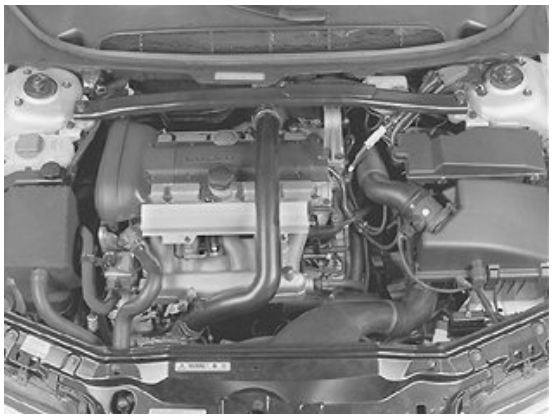
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5651 Extractor See: Tools and Equipment/999 5651 Extractor
999 5719 Drift See: Tools and Equipment/999 5719 Drift
999 5718 Drift See: Tools and Equipment/999 5718 Drift
999 5474 RADIATOR PROTECTION See: Tools and Equipment/999 5474 Radiator Protection
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5919 PULLER See: Tools and Equipment/999 5919 Puller
999 5450 PUNCH See: Tools and Equipment/999 5450 Punch

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removal

Caution! There are a number of versions of the variable valve timing unit. Therefore it is extremely important to always read the information referring to the engine variant/model year to be remedied.

Removing the camshaft seal



Note! Crankshaft and camshafts must not be turned more than is stated in the method description! If the shafts are turned in any other way the valves may be damaged.

Remove:

- the cable from the battery negative terminal.

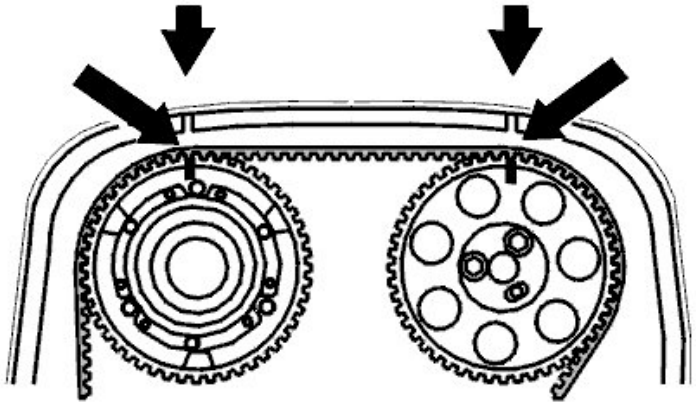
First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

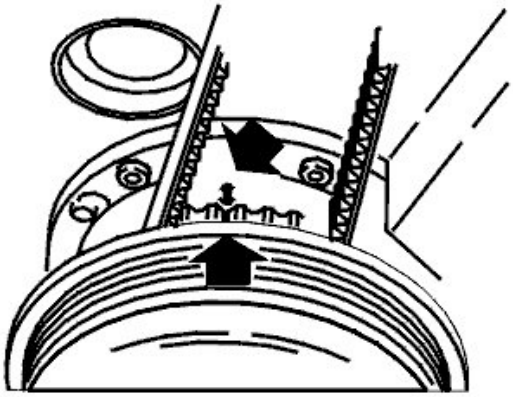
- the cross stay between the suspension turrets
- the air intake hose for the turbocharger (TC) from the air cleaner (ACL) cover. Put to one side
- the upper timing belt cover
- the cover over the ignition coils
- the upper engine stabilizer brace
- the camshaft position (CMP) sensor housing
- the trigger wheel
- the servo reservoir and the expansion tank. Lift up and place on top of the engine.

Warning! Ensure that no power steering fluid is spilled. Extremely flammable.

- the auxiliaries belt
- the front timing belt cover.

Aligning the engine according to the marking





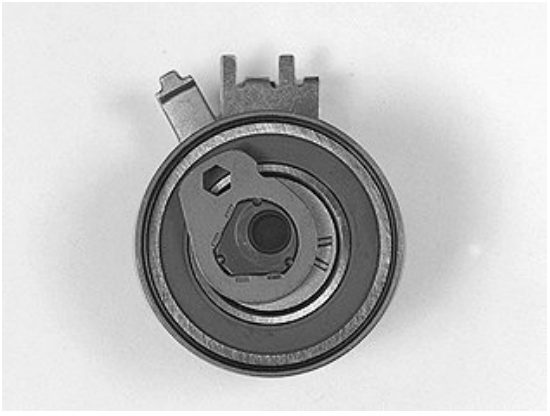
Raise the car.

Remove:

- the right front wheel
- the nuts for the cover in the wing liner.

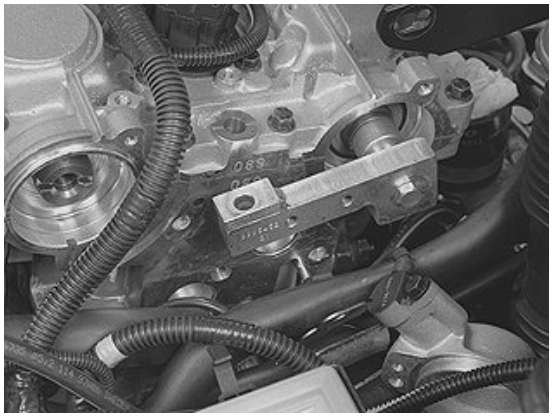
Install the upper timing belt cover.
Turn the crankshaft clockwise until the markings on the crankshaft and camshaft pulley correspond.
Turn the crankshaft a further 1/4 of a turn clockwise, then turn back counter-clockwise until the markings correspond.
The markings are illustrated.
Remove the upper timing belt cover.

Removing the timing belt



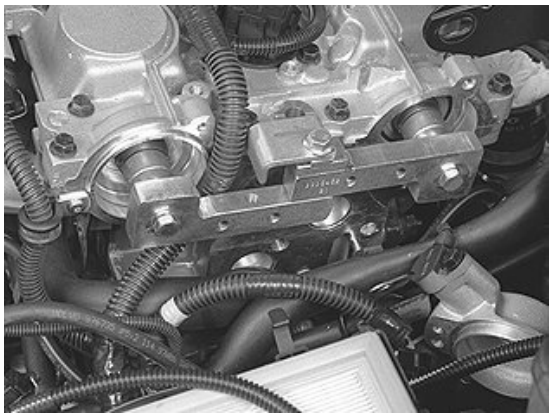
- Slacken off the belt tensioner
- Slacken off the centre screw for the belt tensioner slightly
- Hold the centre screw still. Turn the tensioner eccentric clockwise to 10 o'clock using a 6 mm Allen key
- Remove the timing belt from the camshaft pulleys.

Removing the timing gear pulley with the variable valve timing unit



Use camshaft adjustment tool:

- Install camshaft adjustment tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.
- First screw in the part of the tool intended for the exhaust camshaft (drilled hole)
- Then carefully turn the exhaust camshaft clockwise with the camshaft adjustment tool until the intake camshaft tool can be applied (threaded hole)
- Install the intake camshaft adjustment tool.



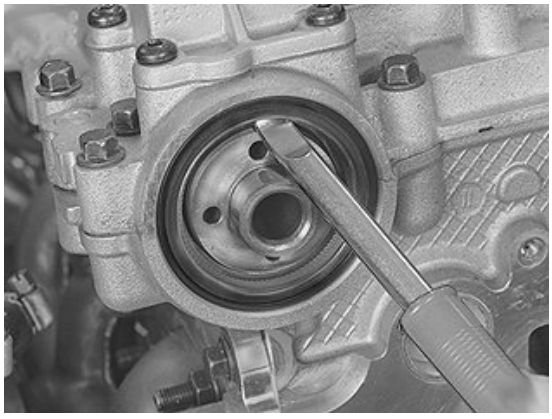
Screw the camshaft adjustment tools together.

Remove:

- the plug at the front edge of the variable valve timing unit (TORX 55)
- the centre screw in the variable valve timing unit (TORX 55). Carefully pull out the timing gear pulley with the variable valve timing (VVT) unit.

Note! Use paper to collect any spilled oil under the variable valve timing units.

Replacing the camshaft seal



Carefully press in tool 999 5651 Extractor See: Tools and Equipment/999 5651 Extractor between the sealing ring and the camshaft. Carefully pry out the seal.

Cleaning

To clean the shaft journal and mating surface, use emery cloth P/N 951 1024.

Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

Lubricate the new seal. Install the new seal for the exhaust camshaft. Use drift 999 5718 Drift See: Tools and Equipment/999 5718 Drift.

Installation

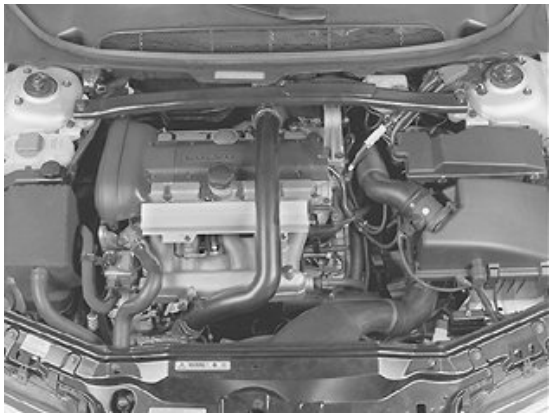
Checking and adjusting the variable valve timing unit

Check and adjust the variable valve timing unit.

Installing components

Install:
- the front timing belt cover.
- the torque rod bracket
- the cover over the ignition coils
- the upper timing belt cover
- the auxiliaries belt
- the expansion tank
- the servo reservoir. Check that the hoses are correctly positioned

- the starter motor. Tighten the screws at the gearbox to **40 Nm**. Tighten the support bracket screw to **25 Nm**
- the charge air pipe between the throttle body (TB) and the charge air cooler (CAC).



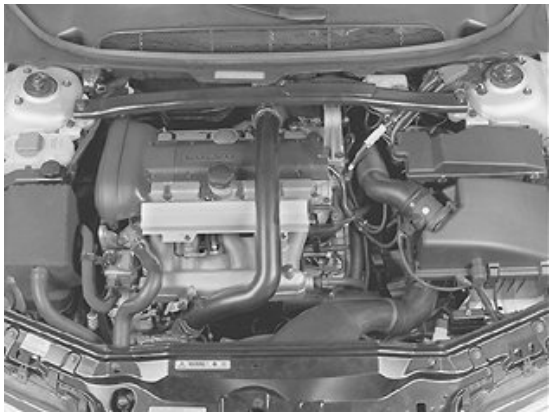
Install:

- the trigger wheel
- the camshaft position (CMP) sensor housing and a new cover
- the intake air hose between the turbocharger (TC) and the air cleaner (ACL) cover
- the engine stabilizer brace. Tighten the screws at the suspension turrets and the screw for motor bracket
- the negative battery cable. **First read** Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Checking the engine

Test drive the car to check the function of the engine.

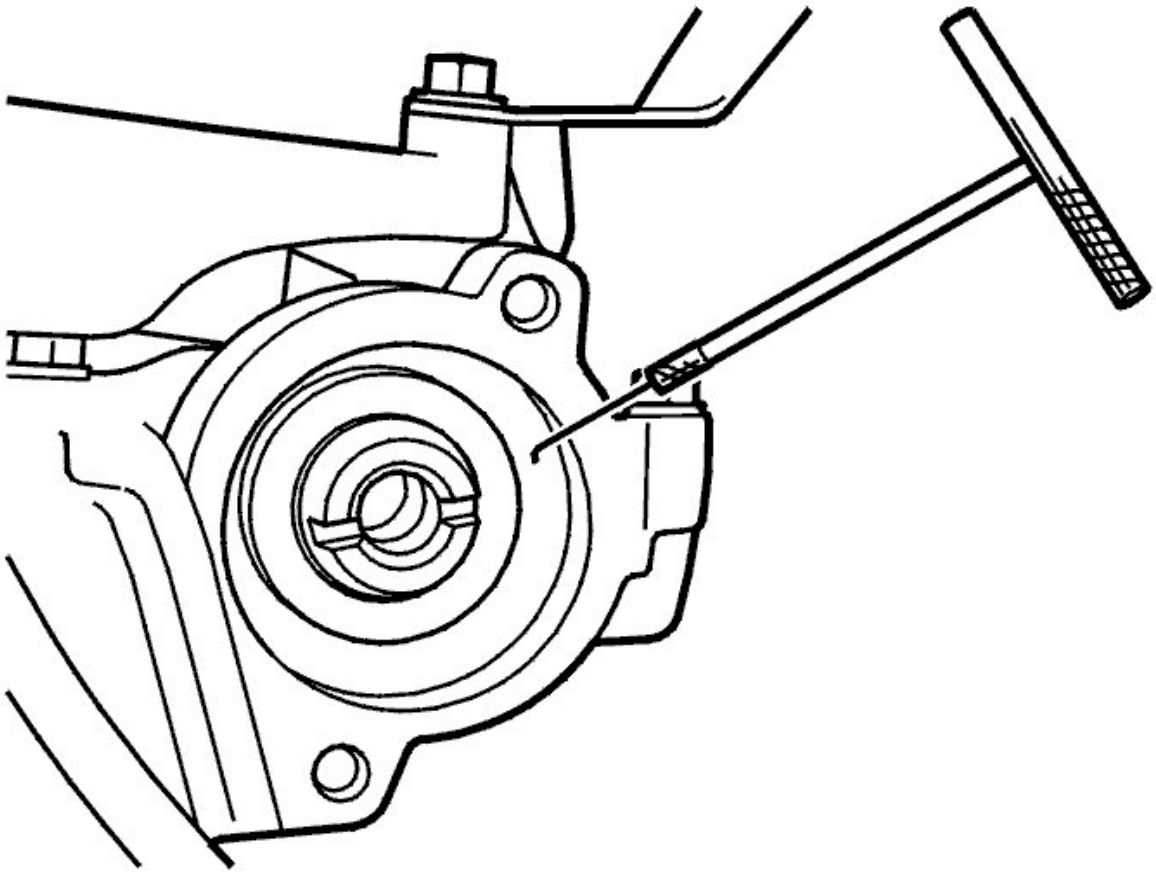
Replacing the rear seal



The following components must be removed when replacing the rear seal:

- the cross stay between the suspension turrets
- the air hose from the air cleaner (ACL) to the turbocharger (TC). Place to one side. Seal the openings
- place the air cleaner (ACL) cover to one side
- the charge air pipe over the engine. Seal the openings
- the cover over the ignition coils
- the upper torque rod bracket
- the camshaft position sensor (CMP) housing and trigger wheel.

Replacing the rear camshaft seal



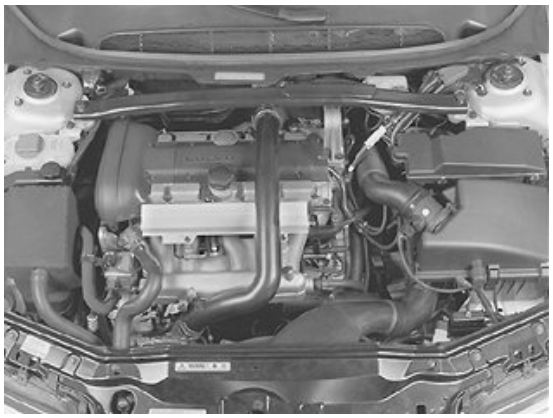
Pull out the seal. Use puller 999 5919 PULLER See: Tools and Equipment/999 5919 Puller. Use emery cloth 951 1024 to clean the shaft journal and mating surface.

Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

Lubricate the surface of the seal that the camshaft rotates against. Install the camshaft seal. Use drift 999 5450 PUNCH See: Tools and Equipment/999 5450 Punch.

Note! The seal is normally pressed in so that it is level with the internal bevelled edge.If the shaft journal is showing signs of wear, the seal can be pressed in 2 mm deeper by turning the drift socket.

Installing components



Install:

- the trigger wheel
- the camshaft position (CMP) sensor housing and a new cover
- the torque rod bracket. Tighten
- the cover over the ignition coils
- the charge air pipe over the engine. Remove the seals
- the air cleaner (ACL) cover and the intake air hose
- the engine stabilizer brace. Tighten the screws at the suspension turrets and the screw for motor bracket

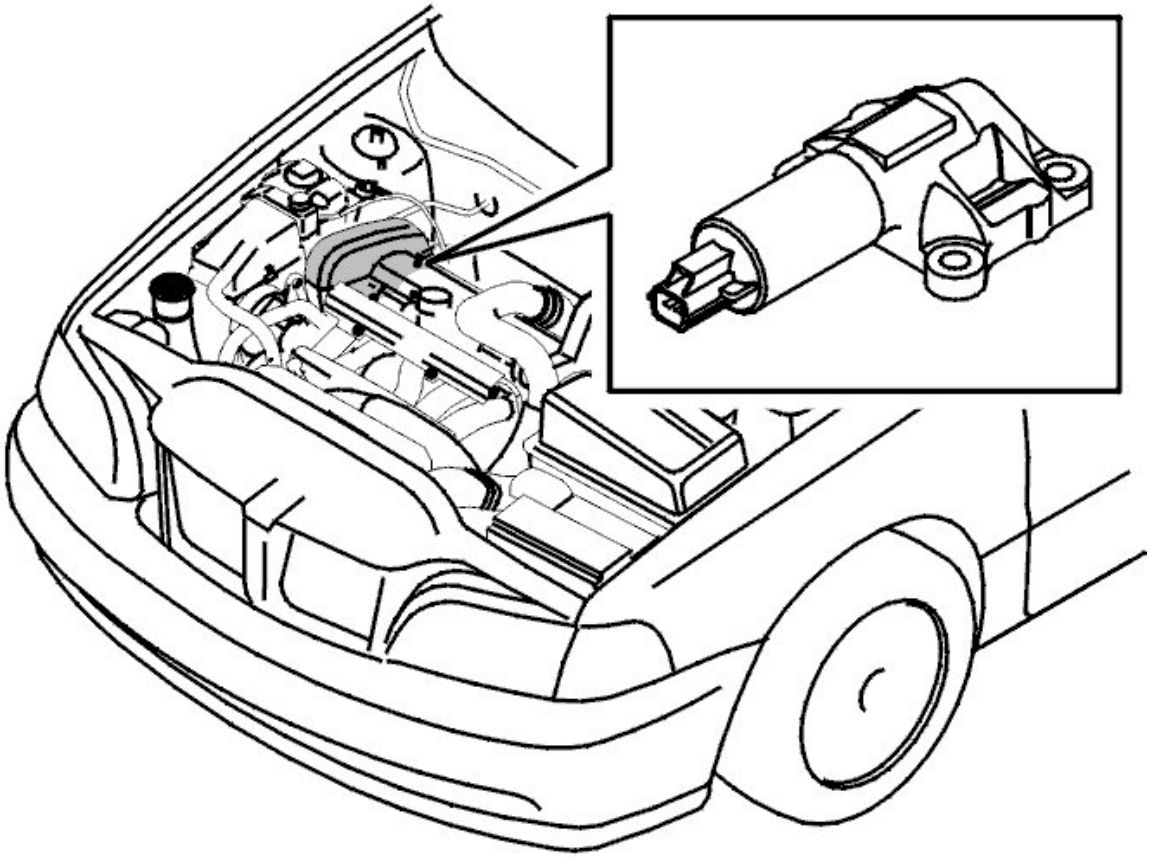
Check the engine compartment. Wipe the engine compartment clean.

Variable Valve Timing Actuator: Service and Repair
Variable Valve Timing Solenoid, Replacing

Variable valve timing solenoid, replacing

All models

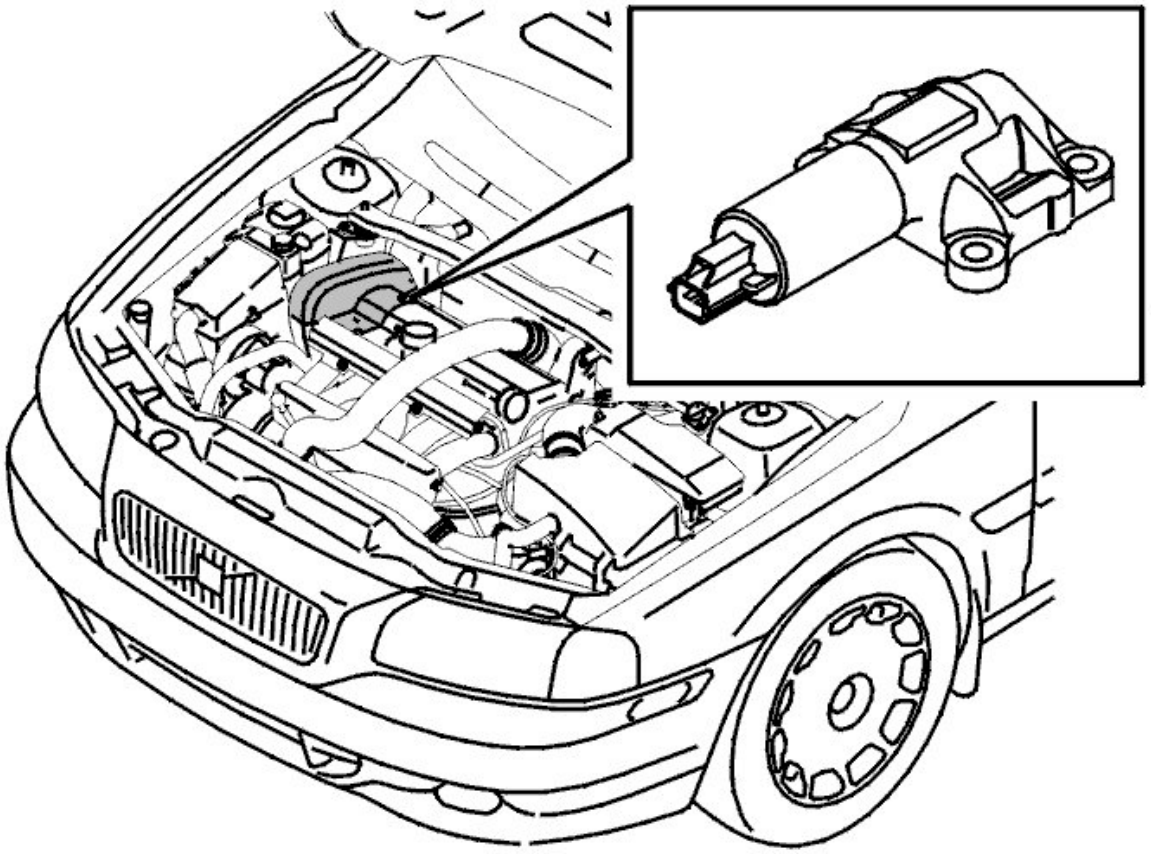
Removing the variable valve timing (VVT) control valve



Remove

- the upper timing belt cover.

Note! Clean the area around the variable valve timing (VVT) valve thoroughly to prevent anything else than clean oil from entering the channels/ variable valve timing (VVT) valve.



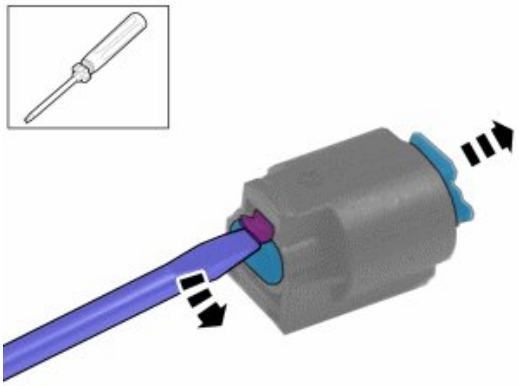
- the connector for the check valve
- the screws holding the valve
- the control valve and the gasket.

Applies to B5244Sx model years 1999-2001

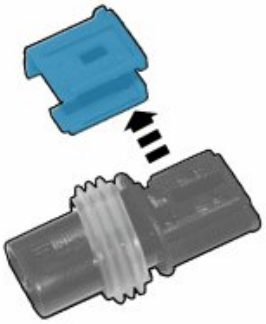
A modified VVT-solenoid is now available as spare part for **B5244Sx model years 1999-2001**. This means that the connector on the cable must be replaced. Note! Note the position of the electric connections. Cut the cables next to the connector.

Note! Note the position of the electric connections.

Cut the cables next to the connector.



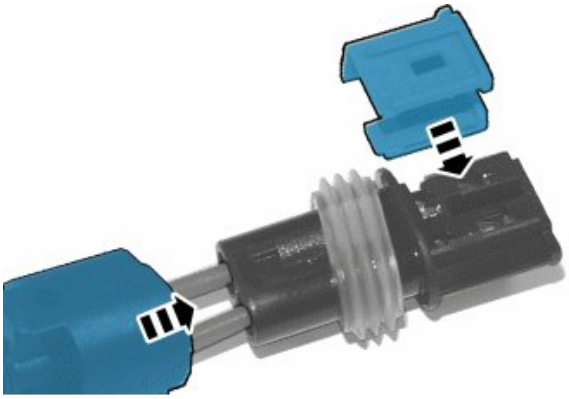
Press up the lock tab and pull out the seat for the connector pins from the casing.



Remove the lock

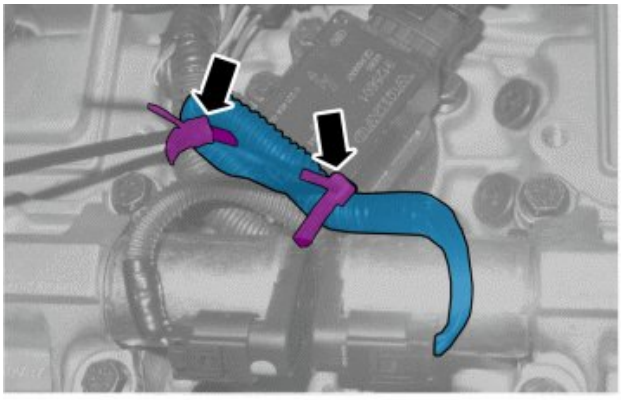
Caution! Make sure that the connector pins end up in the correct position.

Install the connector pins in the seat so that the locks on the pin end up in the opening on the side of the seat.



Install the catch.
Install the casing.

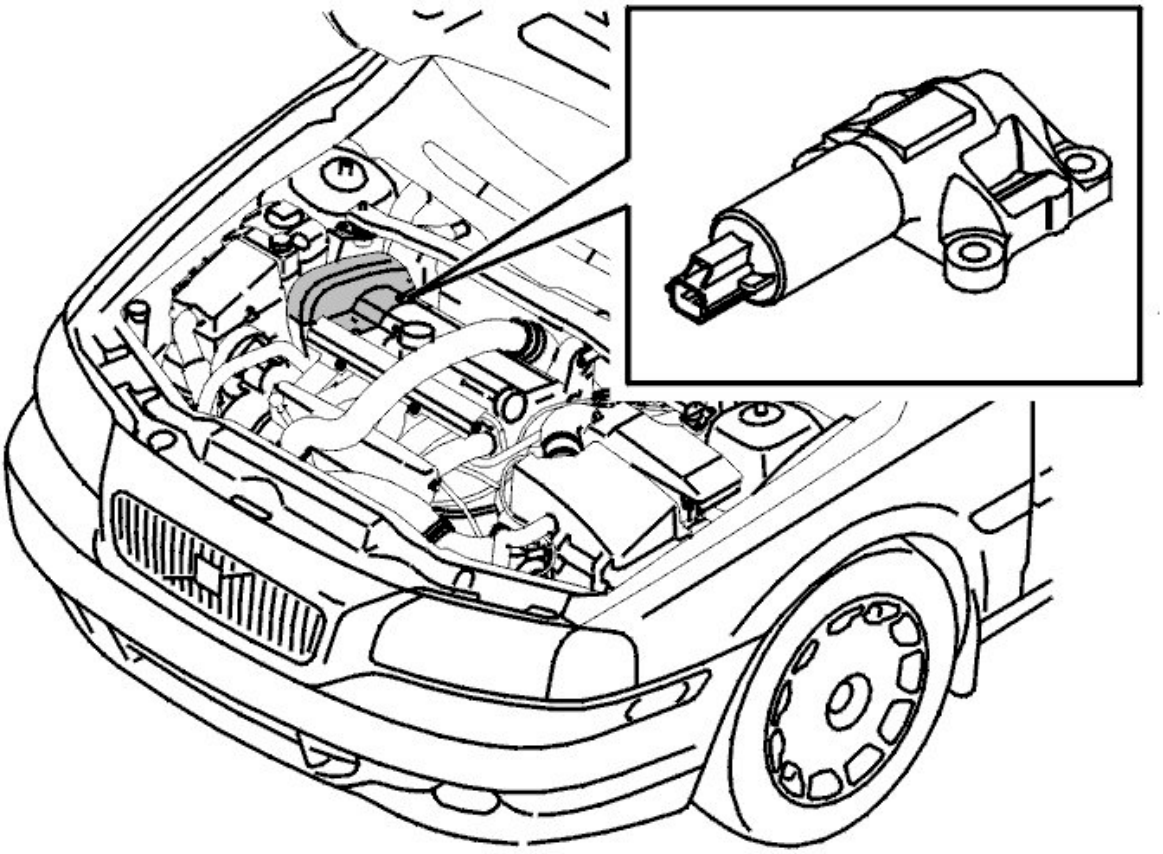
Splice the cables. Refer to: Joining the cables See: Cooling System/Coolant Level Sensor/Diagrams/Diagnostic Aids/Wiring/Joining the Cables



Caution! Make sure that the cable cannot enter the timing gears by clamping any excess cable with cable ties.

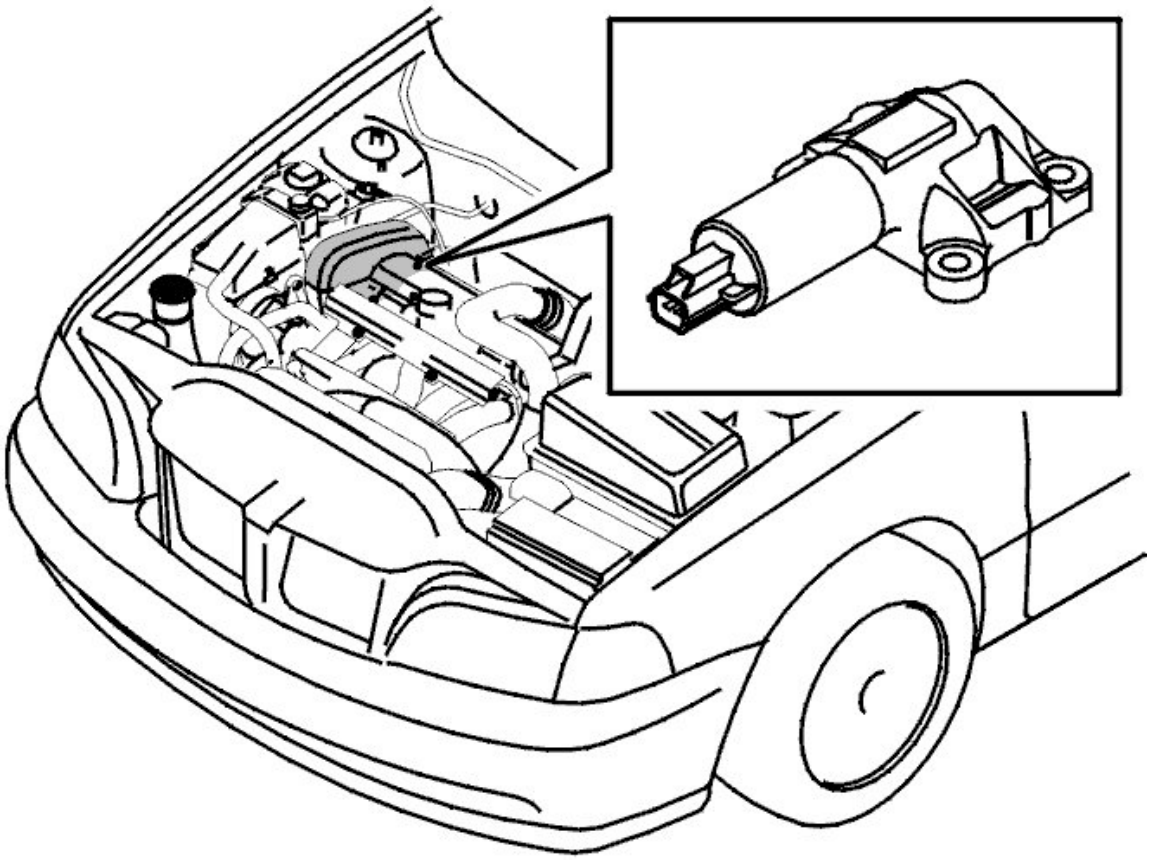
Applies to all: Installing VVT-control valve

Clean the gasket faces. Note the cleanliness requirements above.



Install a **new gasket**.
Install a new control valve. Tighten the control valve crosswise. Tighten to **10 Nm**

Connect the connector.



Install the upper timing belt cover.

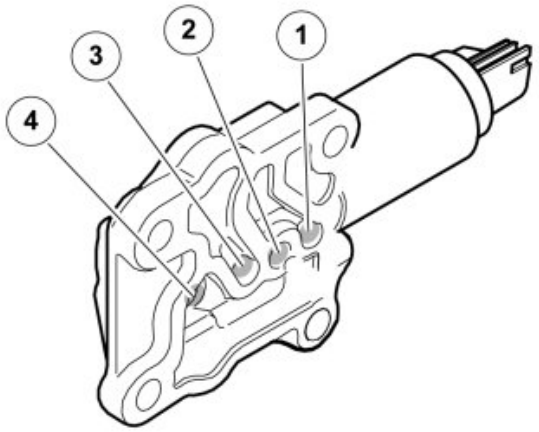
Variable Valve Timing Solenoid: Procedures

VVT Solenoid, Cleaning

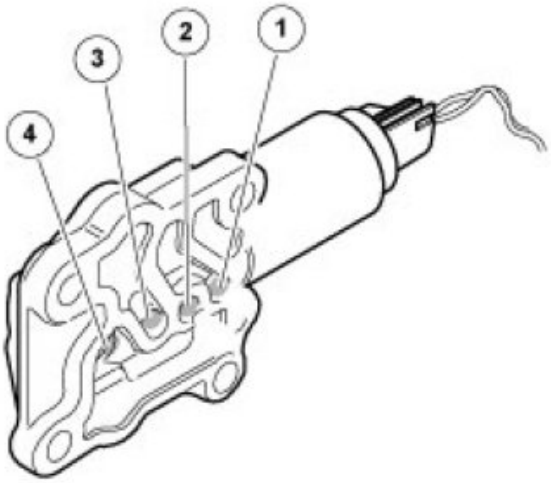
VVT solenoid, cleaning

Note! Some variation in the illustrations may occur, but the essential information is always correct.

Check

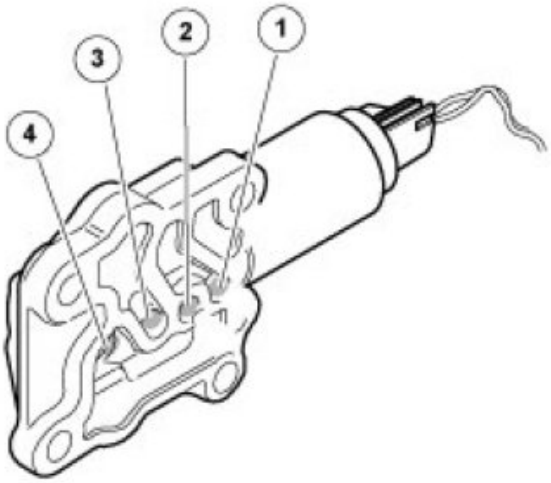


Remove the VVT solenoid.
Blow compressed air into the oil feed hole (2). Air should come out through the B port (1)
If the duct seems to be blocked, go to the cleaning step.



Connect current to the solenoid.
The solenoid should click. It may be easier to hear the click with the solenoid in your hand.
Blow compressed air into the oil feed hole (2). Air should come out through the A port (3). If the piston jams or the solenoid does not work, the direction of flow will not change. If the duct seems to be blocked, go to the cleaning step.

Cleaning



Use: cleaner, 1161826 (1161828 US)
Allow to act for 5 minutes.
Blow compressed air into all holes from both directions and look for contamination. Carry this out with current on and off to ensure that no dirt remains in the ducts.
Rinse with cleaning agent.
Use: cleaning agent, 1161721.
Blow again.
Lubricate the solenoid with engine oil to prevent it jamming.
After cleaning, check the function by repeating steps 1 and 2 again. If the solenoid still does not work after cleaning twice, replace the solenoid.

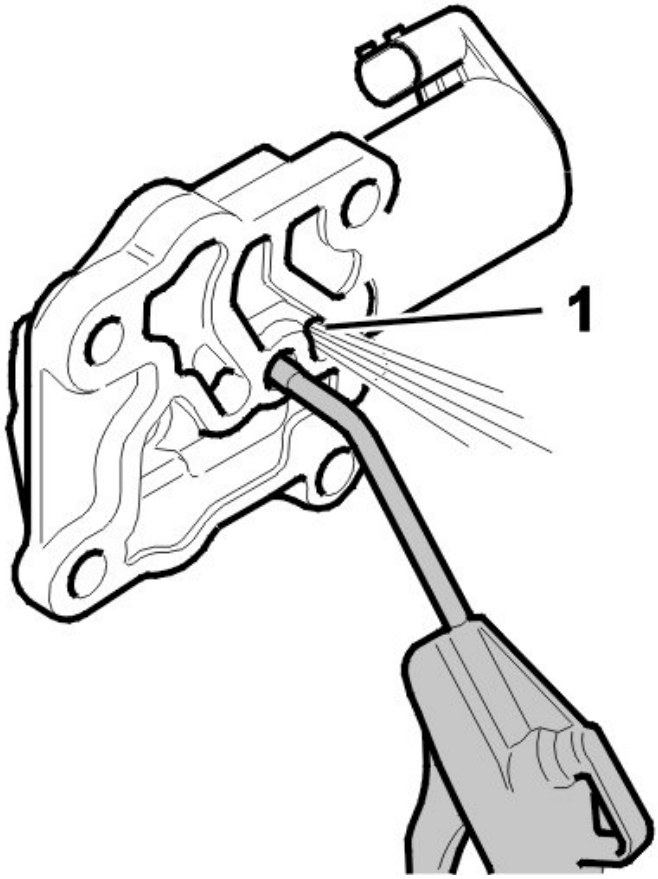
Test driving and checking

Erase Diagnostic Trouble Codes (DTCs).
Test drive the car.
Check that no new DTCs have been stored.

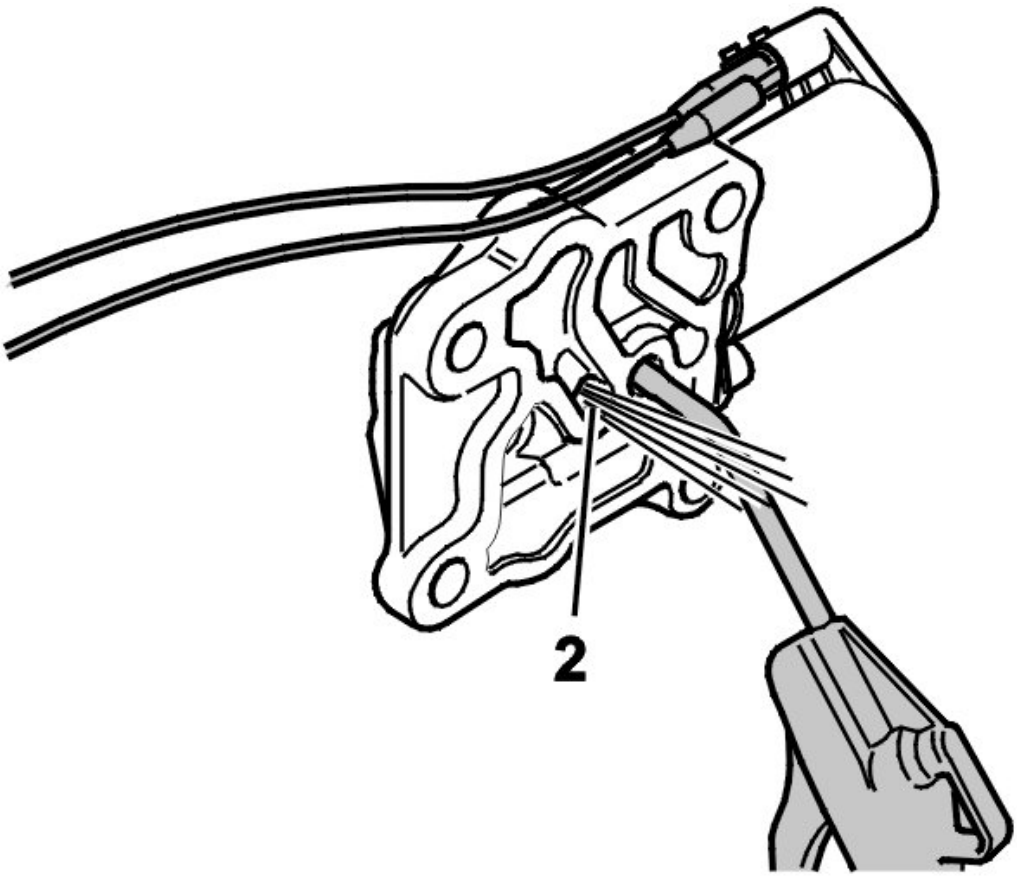
VVT Solenoid, Inspection and Cleaning

VVT solenoid, inspection and cleaning

Inspection

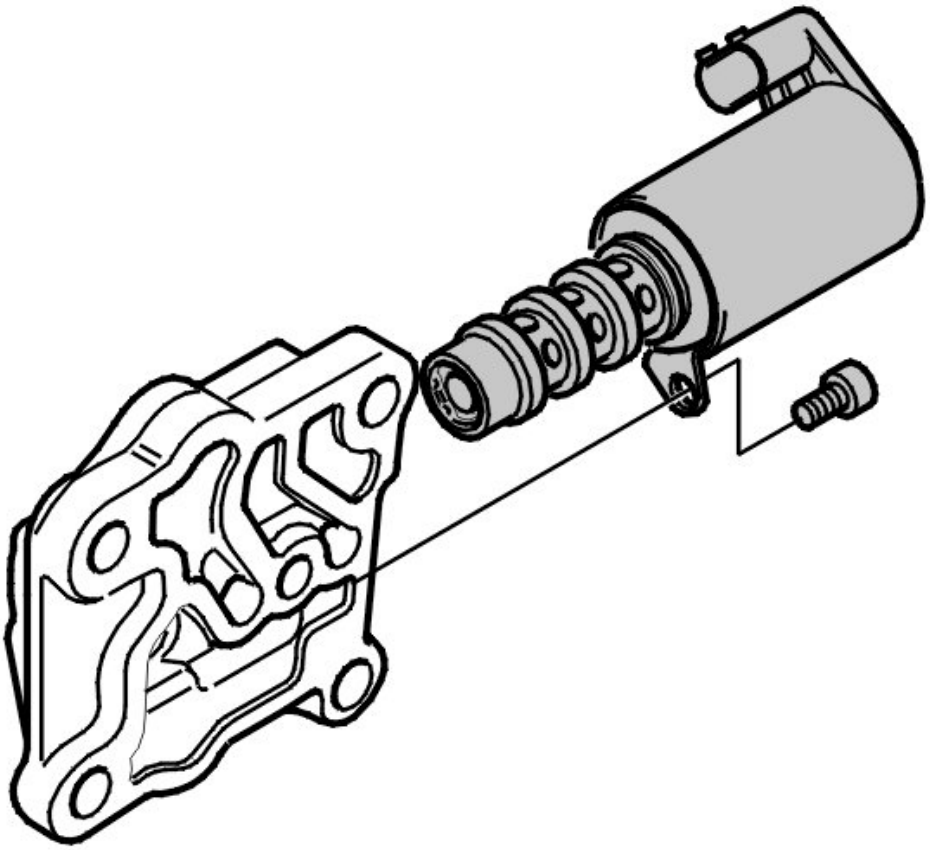


Remove VVT solenoid from camshaft cover.
Blow through center hole with compressed air.
Air should emerge from inner hole (1) nearest coil.

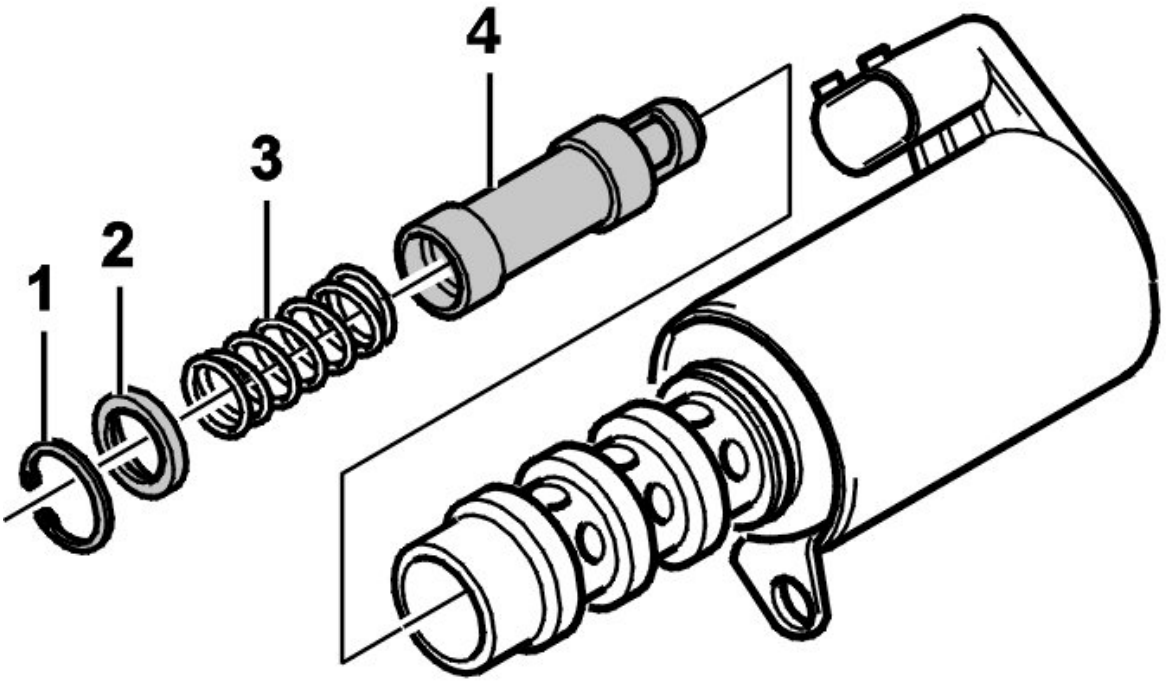


Connect power to solenoid. Solenoid should click.
Blow through center hole with compressed air.
Air should emerge from outer hole (2).
If plunger is sticking or solenoid fails to operate electrically, the direction of flow will be unchanged from step 1.

VVT solenoid, cleaning



Remove solenoid from aluminum housing.



Remove:

- snap ring (1)
- washer (2), spring (3) and plunger (4).

Inspect and clean all parts.
Blow out aluminum housing.
Oil parts with engine oil.
Reassemble solenoid.

Check operation as described in operations 1 and 2.
Reinstall solenoid in car using new seal.

Testing

Erase diagnostic trouble codes.
Test-drive car.
Check that no new diagnostic trouble codes are displayed.
If new codes are displayed, continue troubleshooting as per VIDA.

Compression Check: Testing and Inspection
Compression Test

Compression test

Special tools:

999 9689 COMPRESSION METER See: Tools and Equipment/999 9689 Compression Meter
115 8540 EXTENSION See: Tools and Equipment/115 8540 Extension

Ignition system

A check for cylinder leakage (also called "leak down") can be carried out instead of a compression test. Cylinder leakage test See: Testing and Inspection/Cylinder Leakage Test

Caution! The ignition system operates at high ignition charges and produces dangerous voltages in both the low and high voltage circuits. There is dangerous voltage throughout the entire ignition system including connectors etc.

Conditions

Note! The engine compression must always be checked with wide open throttle (WOT) and engine at operating temperature.

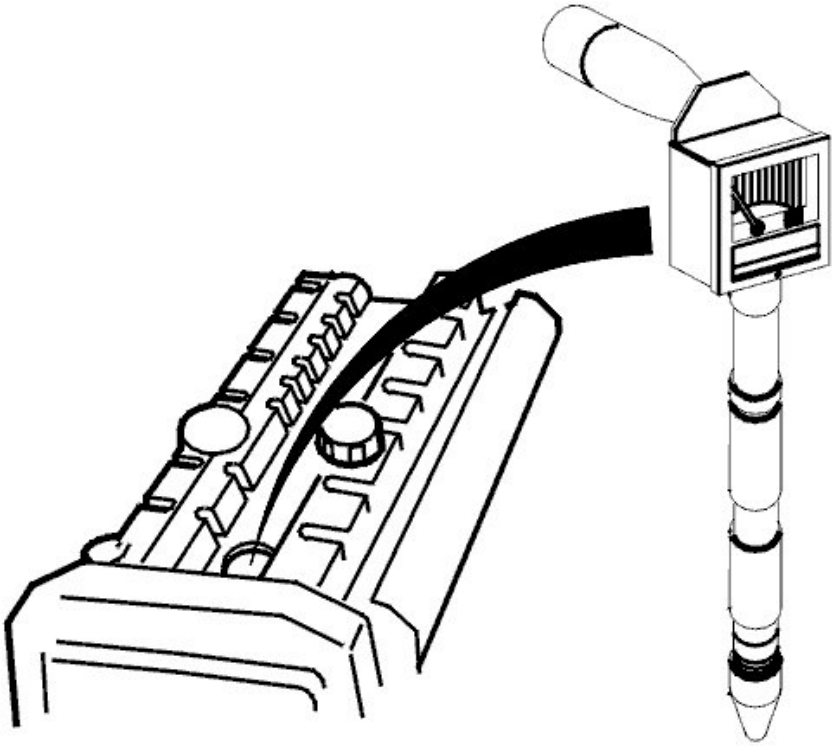
Preparations

Remove:
- the charge air pipe over the engine to improve accessibility.
- the upper timing belt cover.
- the cover over the ignition coils.
- the ignition coils.

Mark up and put to one side without disconnecting the connectors.
- the spark plugs.

Note! Separate the connector for the engine speed (RPM) sensor.

Compression testing



Note! Compression testing should always be carried out at wide open throttle (WOT) and with the engine at operating temperature. Diagnostic trouble codes (DTCs) will be stored because the engine speed (RPM) sensor and (where applicable) the camshaft position (CMP) sensor have been disconnected.

Have an assistant hold the accelerator pedal (AP) depressed at wide open throttle (WOT) during the compression test.
The starter motor is activated with the ignition key.
The ignition must be switched off after each cylinder has been compression tested.

Note! It will no longer be possible to control the throttle if the ignition is on for longer than 2 minutes.The throttle function is controlled by the control module.

Use compression meter 999 9689 COMPRESSION METER See: Tools and Equipment/999 9689 Compression Meter
with extension sleeve 115 8540 EXTENSION See: Tools and Equipment/115 8540 Extension.

Engine type:	Normal value MPa:
Turbo	1.1 - 1.3
Turbo type LT	1.2 - 1.4
Normally aspirated engine	1.3 - 1.5

Install

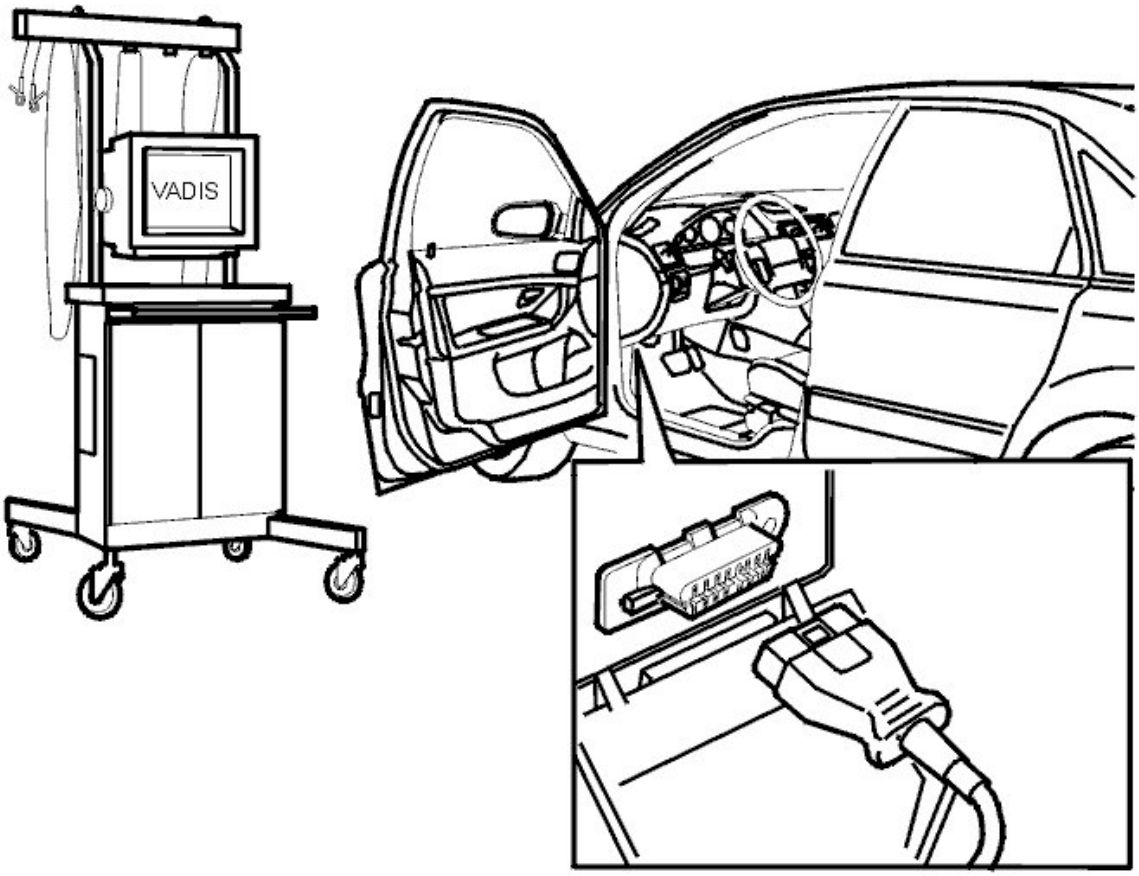
Install:
- the spark plugs.

Tighten to **25 Nm**.
- the ignition coils according to the earlier markings.

Tighten to **10 Nm**.
- the cover over the ignition coils.
- the upper timing belt cover.
- the disassembled connectors.
- charge air pipe.

Remove the seals.
Tighten the mountings and hose clamps.

Erase diagnostic trouble codes (DTCs) and check



Erase diagnostic trouble codes (DTCs):

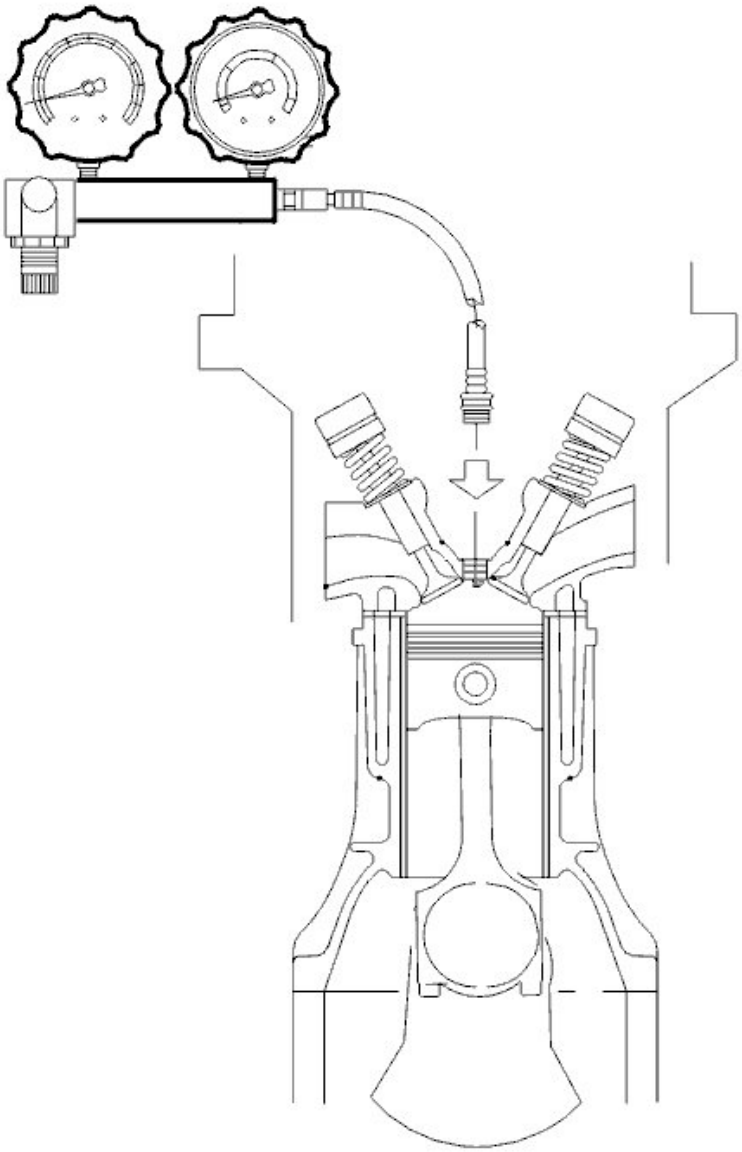
Start the engine. Check that the engine is functioning normally.
Use VIDA vehicle communication to check which diagnostic trouble codes (DTCs) have been stored.
Erase the diagnostic trouble codes (DTCs).
Check the engine compartment. Wipe the engine compartment clean.

Compression Check: Testing and Inspection
Cylinder Leakage Test

Cylinder leakage test

General method description

The cylinders can be checked for leakage as an alternative to a compression test



Using this method, the amount of leakage at the engine cylinders is measured and it is possible to locate the source of any leaks.
A similar check can be performed using a compression gauge by injecting oil in the cylinder. However, this can cause a build-up of coke!
The result will not always be decisive or precise.
In addition, the VIDA station or the Volvo System Tester (VST) must always be connected afterwards to erase any diagnostic trouble codes (DTCs).

How is the cylinder checked for leakage?

- The engine should be run to operating temperature so that the thermostat is open
- The piston in the cylinder that is being checked must be set to top dead centre (TDC) at the compression phase
- A metered air pressure is connected to the relevant cylinder via an adapter that is secured in the spark plug / glow plug well
- A gauge is used to measure the size of the leakage from the cylinder.

This is a pressure sensor with a regulator and displays the size of the leak expressed as a percentage.
This allows the extent of any problem to be determined.

Fault-tracing

The source of a leak can be located by analyzing sound at the following points.

Exhaust pipe	Faulty exhaust valve
Intake manifold / throttle body (TB)	Faulty intake valve
Dip stick hole / Crankcase ventilation	Faulty piston / piston ring
Adjacent cylinder	Faulty cylinder head gasket
Radiator	Faulty cylinder head gasket / cracked cylinder wall. Also check for bubbles in the expansion tank.

A mechanic's stethoscope or a rubber hose can be used as a listening device.

Note! There is leakage at the piston rings even on a perfect engine.This is the only place where a small leak is permissible.

Check

If a leak is detected that is assumed to come from the valve system, first check that the piston in the relevant cylinder is at top dead centre (TDC). Then try to set the piston just prior to top dead centre (TDC) and redo the test.
When repeating the leak test on the same engine, there are usually variations in the results of the measurements.
This is due to changes in the engine coolant temperature (ECT) and the piston not reaching the same position as in the previous test, and is affected by the amount of oil on the piston rings at the time.

Other information

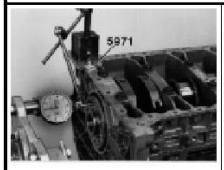
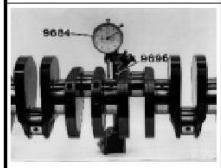
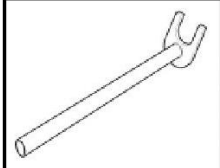
Use: 951 2775 Cylinder leak tester See: Tools and Equipment/951 2775 Cylinder Leak Tester.
For D5244TX diesel engines, use: 999 7222 Adapter See: Tools and Equipment/999 7222 Adapter.

Crankshaft: Service and Repair
Crankshaft Axial Play

Crankshaft axial play

Operation number: 21685-2

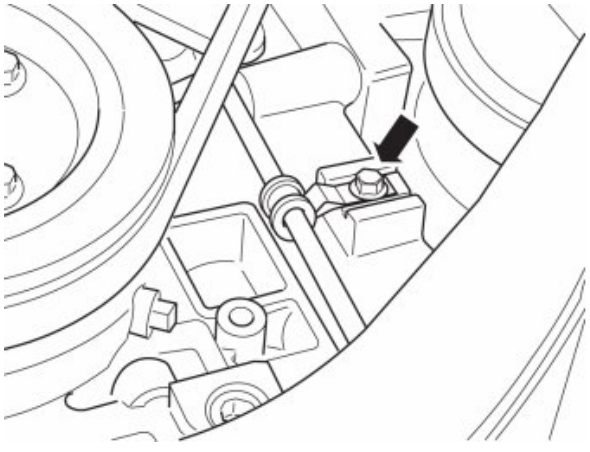
Note! Some variation in the illustrations may occur, but the essential information is always correct.

Special tools	
	**T9995971 PLATE (FOR MAGNETIC BASE)** **Tool number:**T9995971 **Tool description:**PLATE (FOR MAGNETIC BASE) **Tool boards:**
	**T9999696 MAGNETIC BASE** **Tool number:**T9999696 **Tool description:**MAGNETIC BASE **Tool boards:**
	T9813134 DIAL INDICATOR **Tool number:**T9813134 **Tool description:**DIAL INDICATOR **Tool boards:**
	**T9995462 JIMMY TOOL (DISMANTLE-DRIVE SHAFT/GEARBOX)B-VERSION** **Tool number:**T9995462 **Tool description:**JIMMY TOOL (DISMANTLE-DRIVE SHAFT/GEARBOX)B-VERSION **Tool boards:**

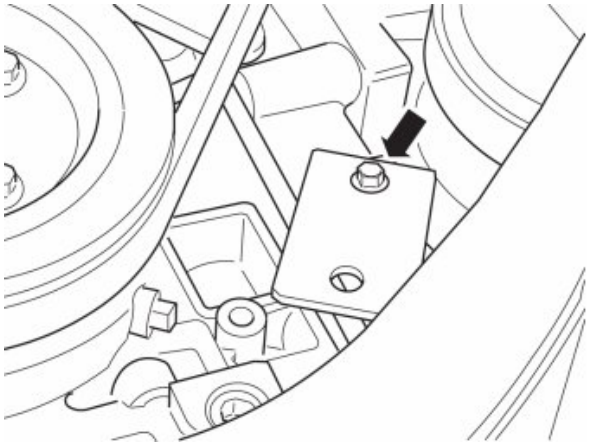
Removal

Note! Removal steps in this procedure may contain installation details.

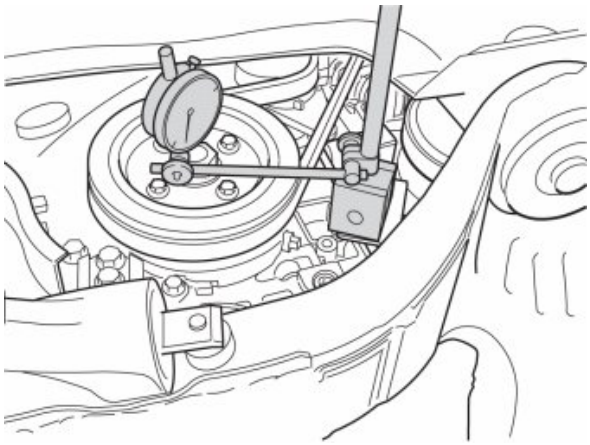
Remove the right front wheel.
When installing Refer to: Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair
Fold away the wheel arch liner and tie it up.



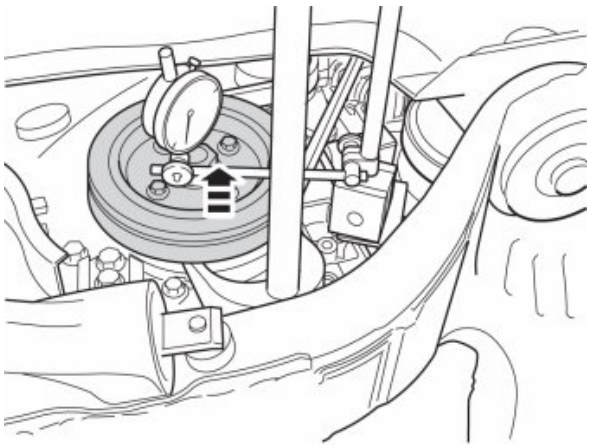
Remove the clamp screw on the fuel line. Move the clamp upward.
Torque: M7, 17 Nm



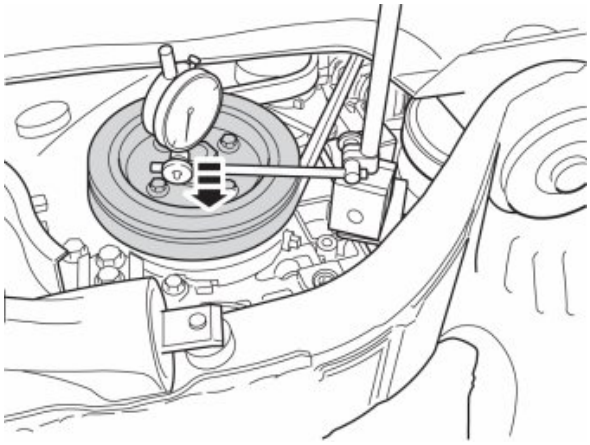
999 5971 PLATE See: Tools and Equipment/999 5971 Plate
Torque: M7, 17 Nm



999 9696 MAGNETIC BASE See: Tools and Equipment/999 9696 Magnetic Base
981 3134 DIAL INDICATOR See: Tools and Equipment/981 3134 Dial Indicator
Measure the crankshaft nut or the oscillation damper's inner ring.



Pry out the crankshaft.999 5462 Jimmy tool See: Tools and Equipment/999 5462 Jimmy Tool
Zero the dial indicator.



Push in the crankshaft. Use both hands and press hard. In the event of problems moving the crankshaft toward the gearbox, run the engine warm and use a crowbar placed between the oscillation damper and the member. Use protective blocks.
Read the dial indicator. Max permitted play 0.25 mm.
Repeat the procedure several times.

Installation

Remove the test equipment.

To install, reverse the removal procedure

Crankshaft: Service and Repair
Crank Mechanism, Dismantling

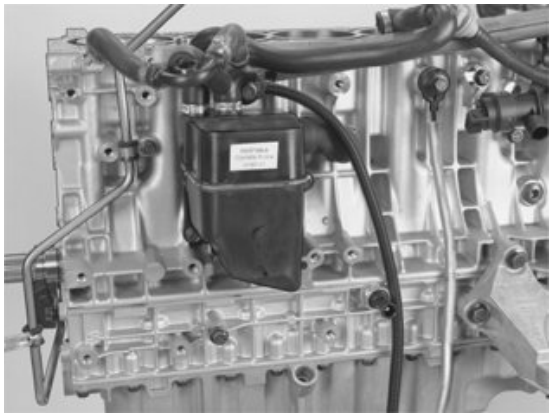
Crankshaft assembly, disassembling

Special tools:

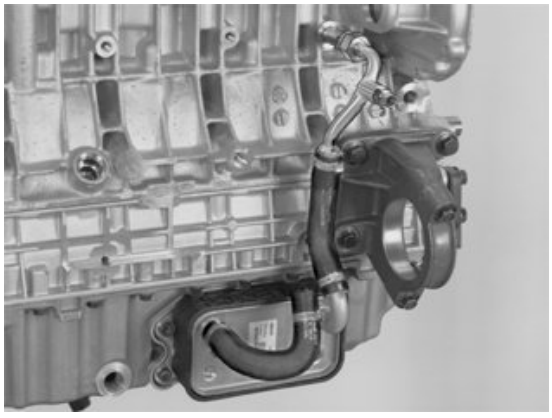
999 5458 KEY See: Tools and Equipment/999 5458 Key
999 5679 Oil filter spanner See: Tools and Equipment/999 5679 Oil Filter Spanner

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation

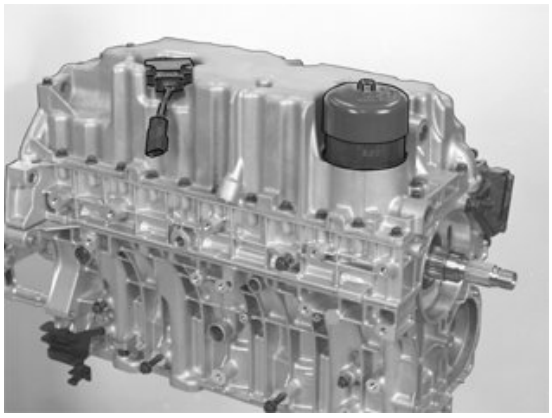


Remove:
- the oil trap
- the knock sensors (KS)
- the front engine mounting
- the oil pressure switch
- Evaporative emission system (EVAP) valve with hoses.



Remove:
- the bearing retainer for the right drive shaft
- the oil cooler and the rubber seals including hoses and pipes.

Removing the oil filter and oil pan

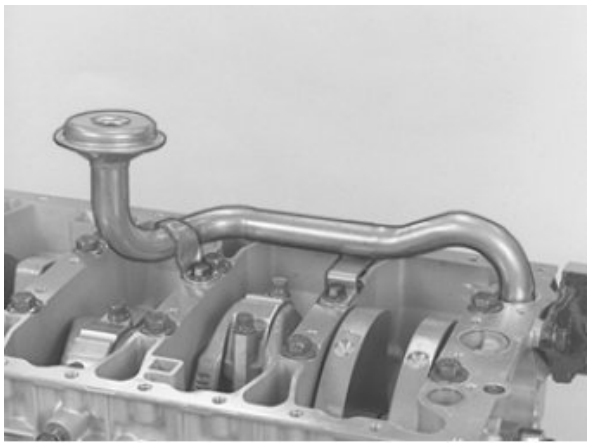


Remove:

- the oil filter. Use tool 999 5679 Oil filter spanner See: Tools and Equipment/999 5679 Oil Filter Spanner
- the screws holding the oil pump to the intermediate section.

Carefully tap the side of the oil pan with a rubber mallet.
Lift out the oil pan.

Removing the suction pipe from the oil pump

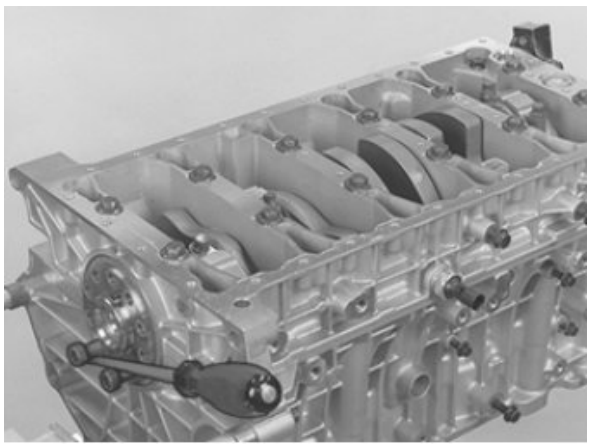


Remove:

- the O rings for the oil ducts
- the retaining screws holding the suction pump to the intermediate section. Work / lift out the suction pipe
- the O-ring for the suction pipe.

Check the pipe and the strainer. Check for cracks and impurities.

Checking markings



Install the two old screws for the flywheel and carrier plate at the rear edge of the crankshaft.
Turn the crankshaft so the piston in cylinder 1 is at bottom dead center (BDC).
Check that there are markings on the cap and connecting rods. Check which way the markings are positioned (exhaust and intake side). Make a note of this.
If necessary mark with a center punch or a number punch. See Crank mechanism, assembling, B5244T5, B5254T2 See: Crank Mechanism, Assembling.

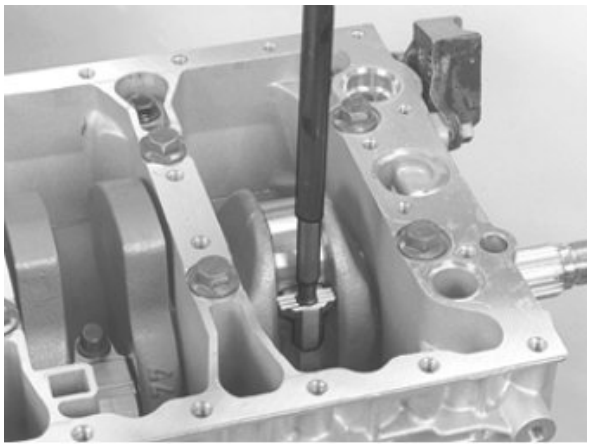
New connecting rod

A new connecting rod has been introduced on certain engines.
The mating surface between the cap and the connecting rod is not machined. It is aligned through a dedicated fracture surface.

Caution! If the cap is turned the wrong way and tightened, the structure of the fracture surface will be damaged and the connecting rod must then be discarded.

Note! Blow the fracture surface clean using compressed air before installing the cap.

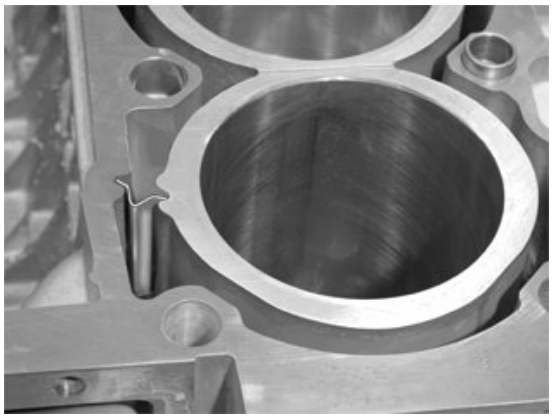
Removing the pistons from the cylinder block



Caution! The bearing covers are not interchangeable. Also note the position of the bearing caps in relation to the rotation of the crankshaft .

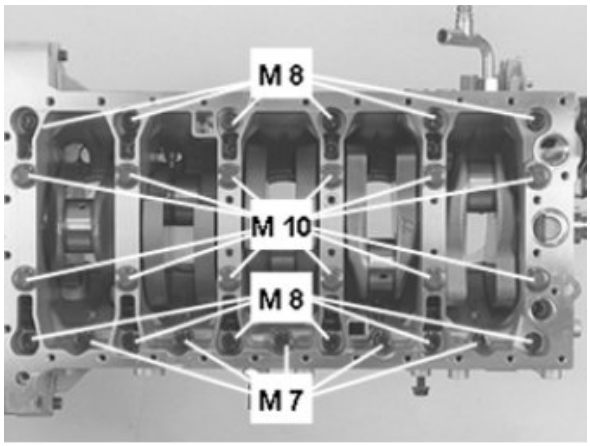
Remove the screws for the connecting rod cover.
Lift off the cover. Ensure that the bearing cover comes with it.
Install tool in the connecting rod. Press out the connecting rod and piston.
Hold by hand so that the piston does not fall to the floor. Ensure that the bearing cover comes with it.
Place the piston and connecting rod in such a way that they will be reinstalled in the correct cylinder.
Continue with cylinders 2, 3, 4 and 5 as above.

Check



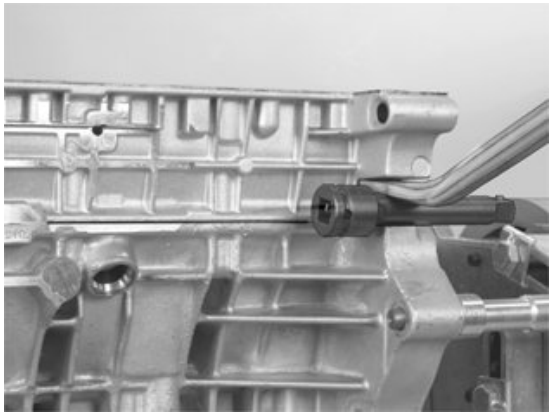
Check that the coolant guide is in place. Secure if necessary.

Removing the screwed joint from the intermediate section



First remove the M7 screws from the intermediate section.
Then remove the M8 screws. Start at the outer edges and work alternately towards the center.
Remove the M10 screws in the same way.

Separating the intermediate section from the cylinder block



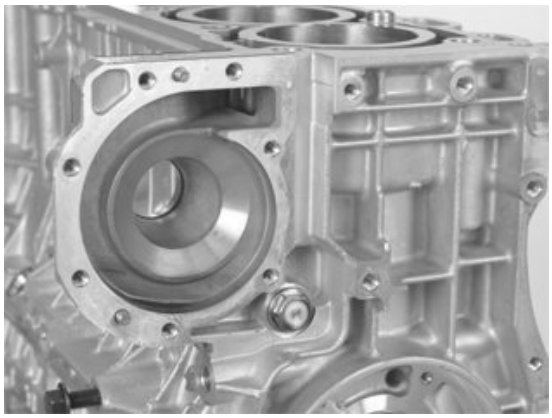
Caution! The bearing covers are not interchangeable.Also note the position of the upper half of the axial bearing for the direction of rotation of the crankshaft.The crankshaft must not rotate.

Carefully pry the intermediate section from the cylinder block so that there is a gap of approximately **6-8 mm**.
Then carefully tap off (on the exhaust side) the intermediate section with a rubber mallet.
Lift out the intermediate section. Ensure that the bearing covers for the intermediate section come with it.

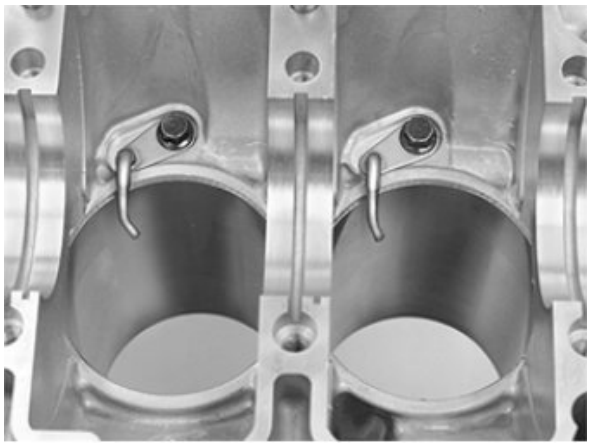
Note! The bearing covers for the different bearing recesses are not interchangeable.

Ensure that the screws for the flywheel and carrier plate, which were installed earlier, are properly tightened. Lift them and the front of the crankshaft.
Carefully lift the crankshaft straight up.
Remove the remaining bearing covers.

Removing the piston cooling valve and nozzles

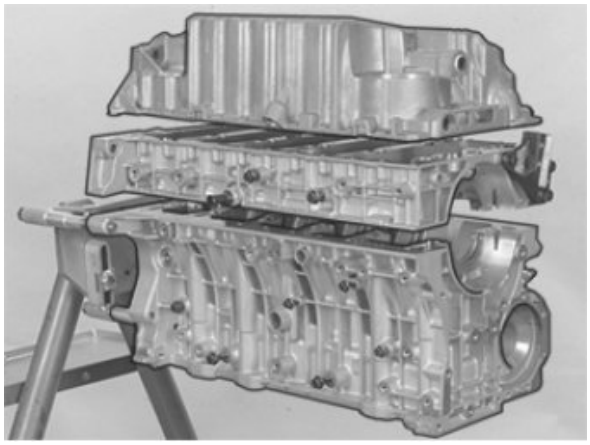


Remove the piston cooling valve at the front of the engine.



Remove the piston cooling nozzles.

Cleaning



Warning! A fume hood or extractor must be used when using gasket solution.

Clean the gasket surfaces on the cylinder block, intermediate section and oil pan.
Use a razor blade or a gasket scraper and / or gasket solvent (**P/N 116 1440**).

Crankshaft: Service and Repair
Crank Mechanism, Assembling

Crank mechanism, assembling

Special tools:

951 2767 Roller See: Tools and Equipment/951 2767 Roller
999 1801 STANDARD SHAFT See: Tools and Equipment/999 1801 Standard Shaft
999 5676 Drift replaced by 9997174 See: Tools and Equipment/999 5676 Drift Replaced By 9997174
999 5746 Holder See: Tools and Equipment/999 5746 Holder

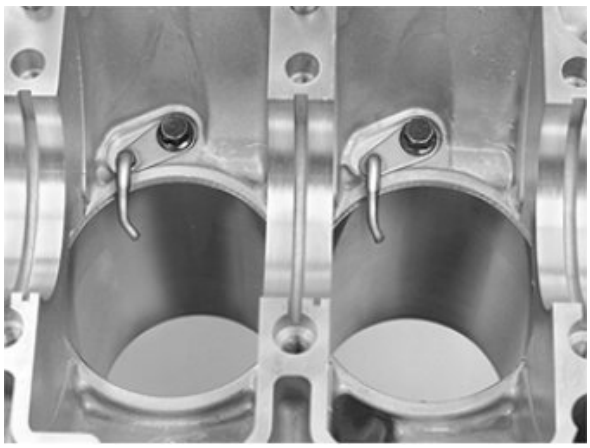
Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Note! For tightening torques not in the text, see Tightening torque See: Specifications/Tightening Torque.

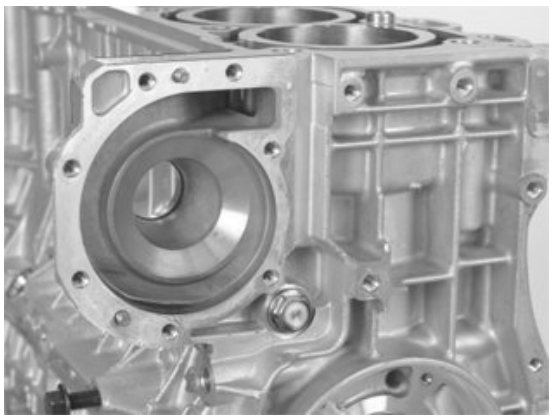
Cleaning

Ensure that the all components are **completely** clean.
Blow clean the oil ducts in the block, intermediate section and sump.

Installing the piston cooling valve and nozzles

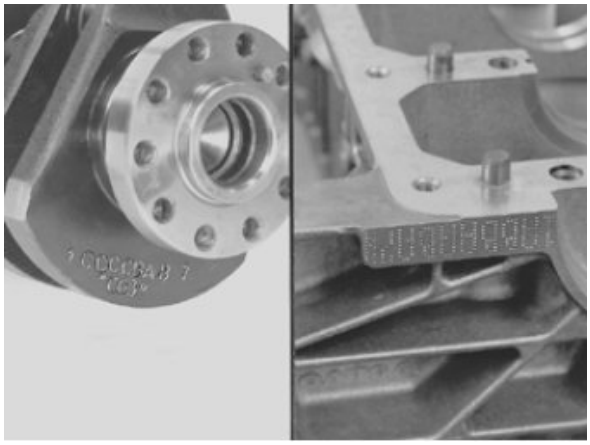


Install the piston cooling nozzles. Tighten the screws.



Install the piston cooling valve. Use a seal washer. Tighten. See Tightening torque See: Specifications/Tightening Torque.

Classification of main bearings



Wipe clean the bearing recesses in the block and the intermediate section.
Check that the components are clean and undamaged.
Check the classification of the block and crankshaft.
The classification marking is at the rear edge of the block and the crankshaft. The classification is read from digit 1 to 7. The first letter after digit 1 is the classification of main bearing 1. The bearing recesses are numbered starting at the front of the engine.

Selecting bearings

Note! Always use new bearings.

Bearing halves with grooves are always installed in the engine block.
Install the main bearings in the cylinder block and the intermediate section. See the table. The axial bearing is positioned at bearing recess 5

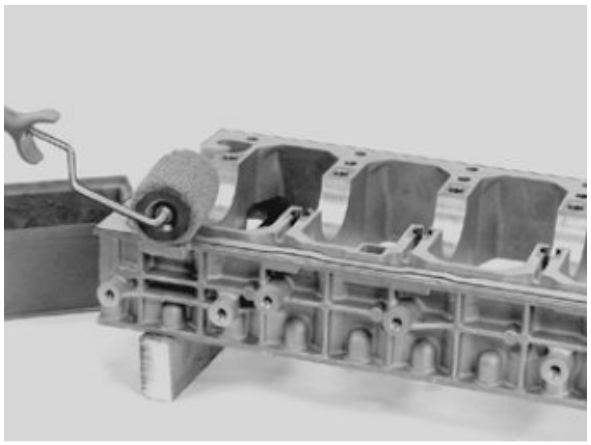
2 \ 1	A		B		C	
A	Y	Y	Y	B	B	B
B	R	Y	Y	Y	Y	B
C	R	R	R	Y	Y	Y
D	Y	B	B	B	B	B
E	Y	B	B	B	B	B
F	Y	Y	Y	B	B	B
G	Y	Y	Y	B	B	B
H	Y	Y	Y	B	B	B
J	Y	Y	Y	B	B	B
K	Y	Y	Y	B	B	B
L	R	Y	Y	Y	Y	B
M	R	Y	Y	Y	Y	B
N	R	Y	Y	Y	Y	B
O	R	Y	Y	Y	Y	B
p	R	Y	Y	Y	Y	B
R	R	R	R	Y	Y	Y
S	R	R	R	Y	Y	Y
T	R	R	R	Y	Y	Y
V	R	R	R	Y	Y	Y
X	R	R	R	Y	Y	Y
Y	R	R	R	Y	R	Y
Z	R	R	R	Y	R	Y
	3	4	3	4	3	4

1. Classification cylinder block
2. Classification crankshaft
3. cylinder block
4. Intermediate section

Example. The marking on the block at bearing position 1 is B. The marking on the crankshaft at the corresponding bearing position is C. This gives a red marked bearing in the block and a yellow marked bearing in the intermediate section.

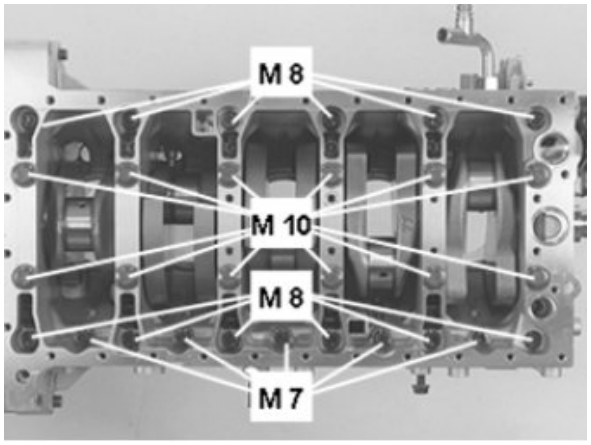
Note! The thickest of the bearing halves shall always be installed in the intermediate section. This is to keep the centre line as straight as possible.

Applying liquid gasket



Wipe the surfaces dry. Apply liquid gasket 11 61 059 to the intermediate section.
The surface must be completely covered without any excess. Use roller 951 2767 Roller See: Tools and Equipment/951 2767 Roller. Thoroughly lubricate all the bearing shells and the thrust bearing's surface.

Tightening the intermediate section



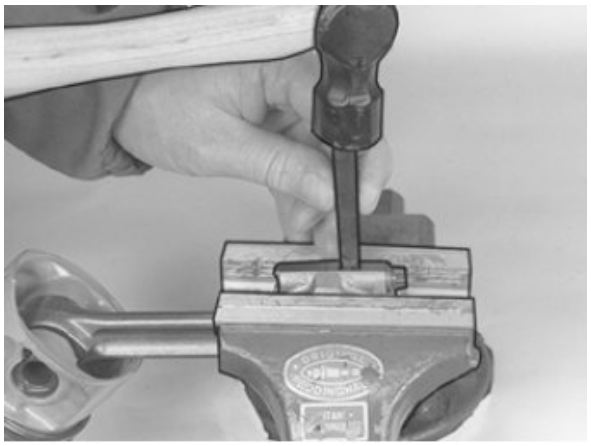
Install the two old screws for the flywheel and carrier plate at the rear edge of the crankshaft. Lift these and the front of the crankshaft.
Carefully position the crankshaft in the block. The crankshaft must **not** be turned before the intermediate section has been torque tightened. Position the intermediate section. Lubricate and install all the screws.

Note! Use new M10 bolts.

Caution! The M8-bolts on the exhaust side have two lengths.

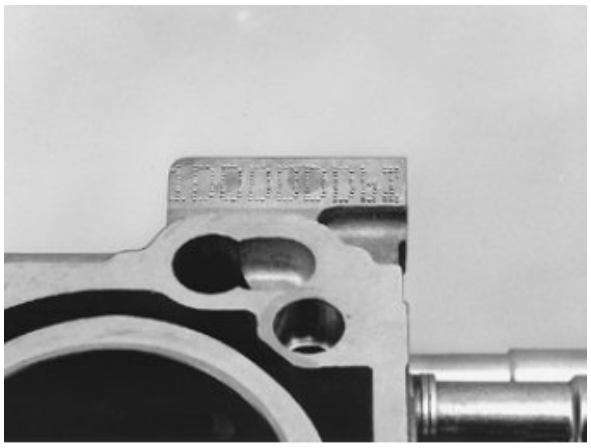
Install the intermediate section and the screws on the exhaust side at bearing recesses 2 and 5.
Pull down the intermediate section. Tighten the screws. See Tightening torque See: Specifications/Tightening Torque.

Marking the connecting rod (where applicable)



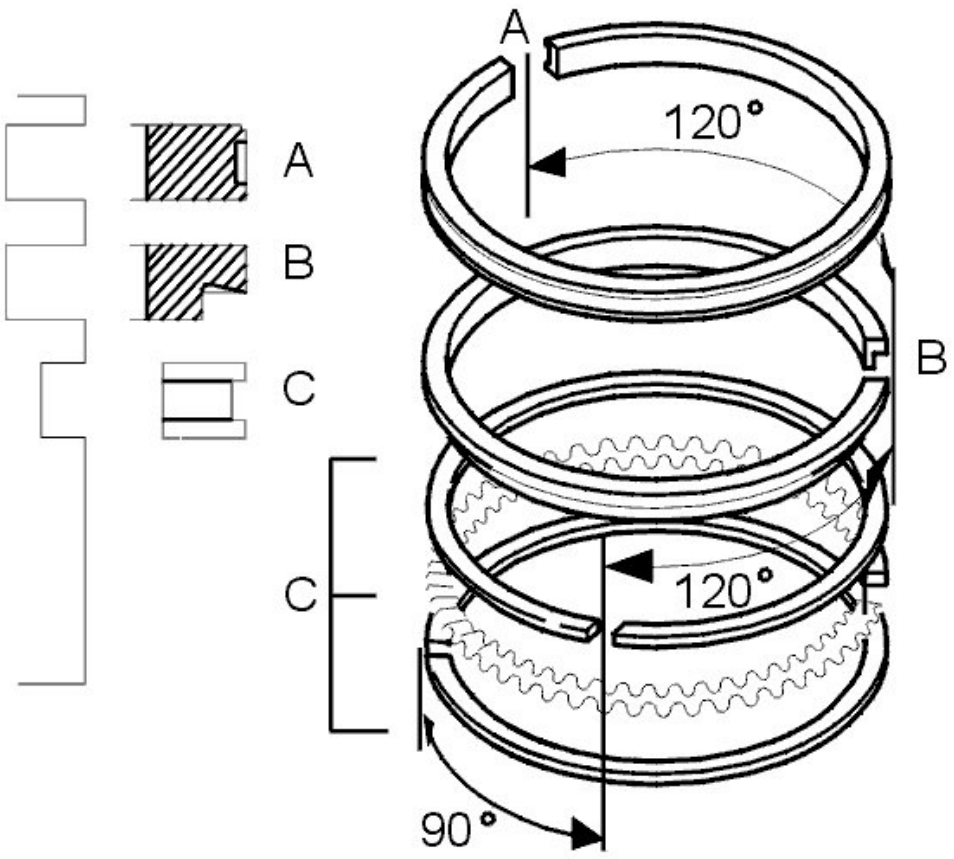
Assemble the connecting rod. Check that the cover is facing the correct direction. Tighten to **20 Nm**.
Secure the large end of the connecting rod in a vice with soft jaws (copper or aluminium). Mark both halves with the cylinder number. Use a centre punch or number punch.

Selecting piston



For every cylinder there is a classification letter stamped (C, D, E) on the top of the engine block.
First letter after the digit 1 corresponds to the classification of the cylinder bore in cylinder 1 and is then followed by cyl. 2, 3, 4, 5.
Cylinder selection is determined by the classification of the cylinder bore. For example: Cylinder class D must have pistons marked D etc.

Installing piston rings

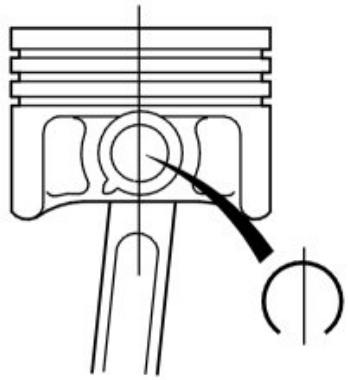


Caution! Make sure that the piston rings are not stuck and that they turn easily.

Note! Incorrect positioning may result in higher oil consumption.

Use piston ring pliers. Turn the piston rings so that the openings are offset as illustrated.
A=Compression ring. The text on the piston ring must be upwards.
B=Scraper ring. Chamfered edge must face downwards.
C=Oil ring. Three sections, identical on all sides. First install the expander ring (C), then the two other rings over the expander ring.

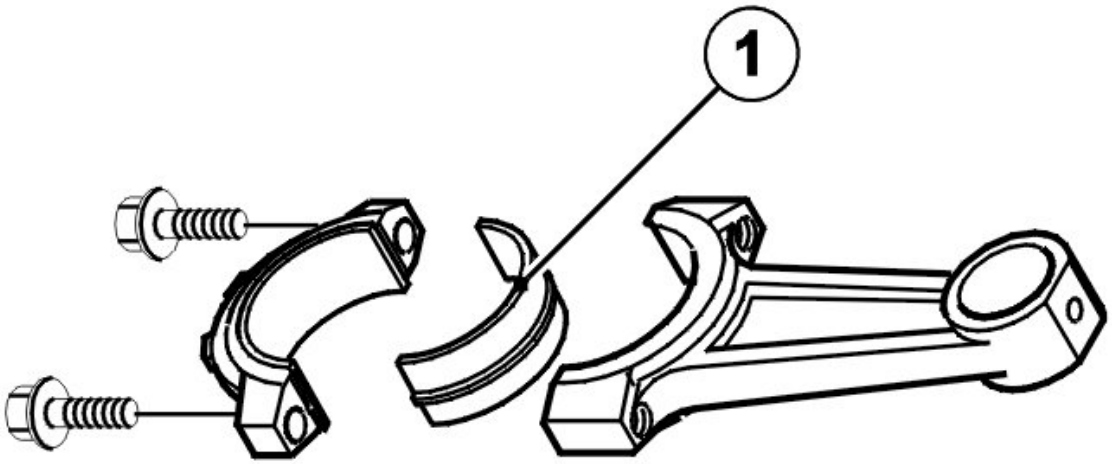
Assembling pistons and connecting rods



Warning! The lock ring can easily fly off. Wear protective goggles

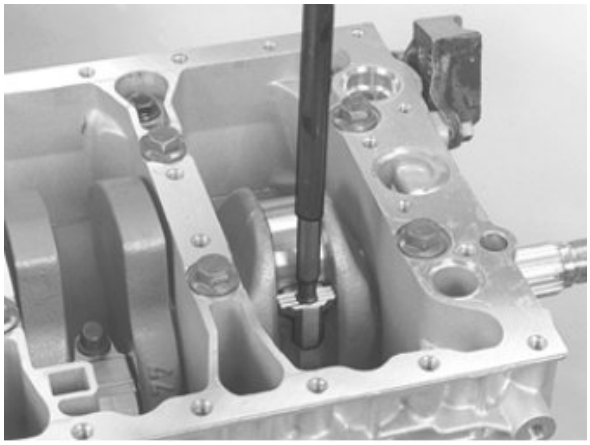
There is an arrow marking on the upper side of the cylinder. This must be turned forwards in the cylinder block.
The connecting rods are symmetrical and can be turned freely. Marked rods however must be turned in the same direction.
Assemble the connecting rod and piston with the piston pin. Check that the classification and any numbering for each cylinder/piston diameter and connecting rod correspond.
Install both the snap rings on the piston pin. Check that the snap rings are positioned correctly in the piston. The opening must be vertical.
Wipe clean around the bearing recess in the connecting rod and the cap.

Installing the main bearing shells



Always use new bearings.
Check these for colour marking. The bearing shell with a black colour coding on the side (1) must be installed in the connecting rod.

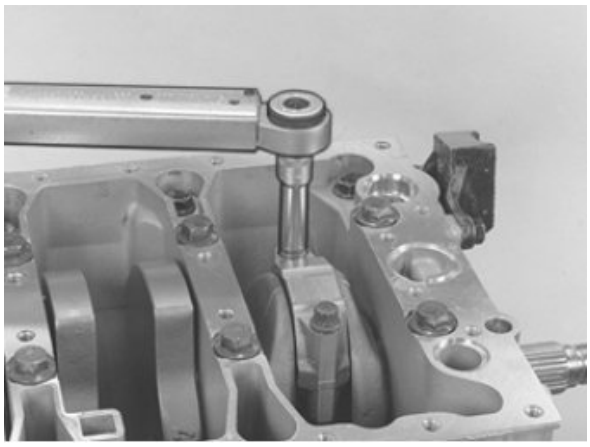
Installing the pistons in the cylinder bores



Note! The arrow (top of the piston) must point forwards, and make sure that the classification matches.

Use a cylinder ring compressor.
Lubricate the cylinder bore, the pistons and the bearing shells.
Turn the crankshaft so that the connecting rod pin is at bottom dead center (BDC) for the cylinder the piston is to be inserted in.
Ensure that the engine is in a position where the cylinder bore forms as vertical a line as possible.
Carefully press or tap the piston down (using the shaft of a hammer or similar). When the piston releases from the piston ring compressor, turn the engine **180°** in the stand.
Install tool 999 5746 Holder See: Tools and Equipment/999 5746 Holder in the connecting rod. Pull the connecting rod until it secures against the big end journals.

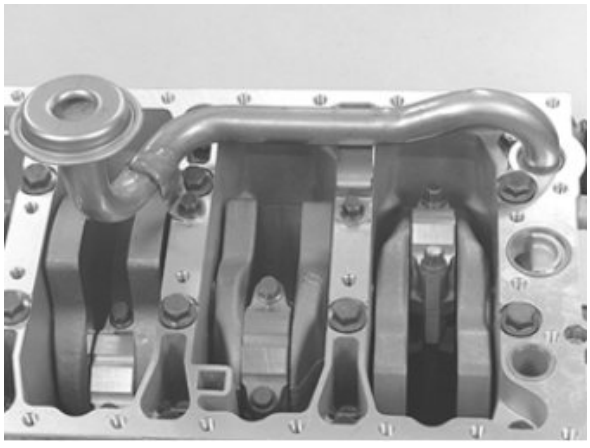
Tightening the connecting rod cover



Note! The crankshaft must not be rotated before the connecting rod cap has been tightened.

Install the cap. Check that any markings correspond.
Lubricate and install new screws. Tighten the screws. See Tightening torque See: Specifications/Tightening Torque.
Check that the connecting rod can be moved sideways.

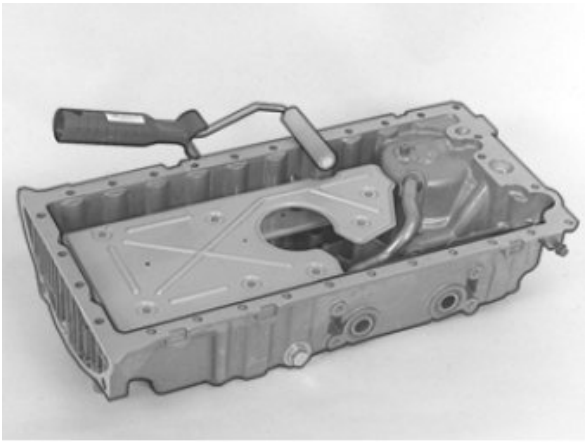
Installing the oil pump suction pipe



Install a new seal ring on the suction line.
Carefully press the suction pipe down into the intermediate section. Check that the sealing ring is correctly positioned.

Tighten the screws. Install new sealing rings for the oil ducts to the sump.

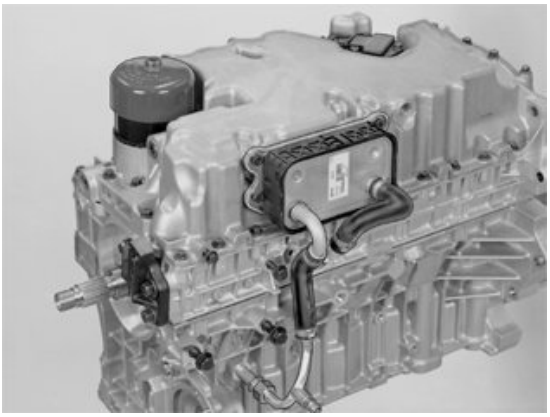
Installing the sump



Caution! Check that the rear edge of the oil sump is in line with the rear edge of the engine block. Permitted tolerance± 0.025 mm. Use a steel ruler and feeler gauge.

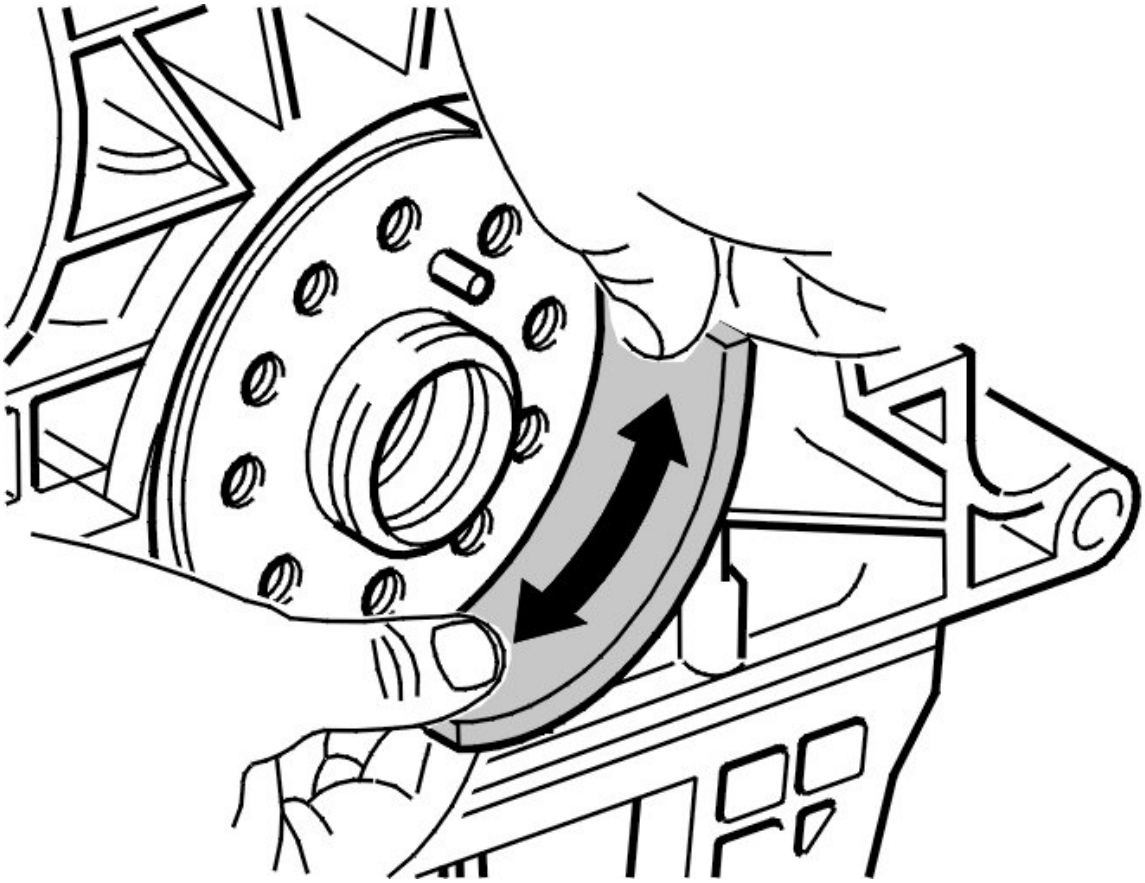
Wipe the surfaces dry.
Apply liquid gasket 11 61 059 on the oil sump. Use roller 951 2767 Roller See: Tools and Equipment/951 2767 Roller. The surface must be completely covered without any excess. Install the oil sump and install all bolts.
Tighten the screws. Start with the rear edge of the sump and work alternately forwards.

Installing the oil cooler



Install:
- new sealing rings in the oil pan
- the oil cooler. Tighten the screws
- the oil filter.

Cleaning

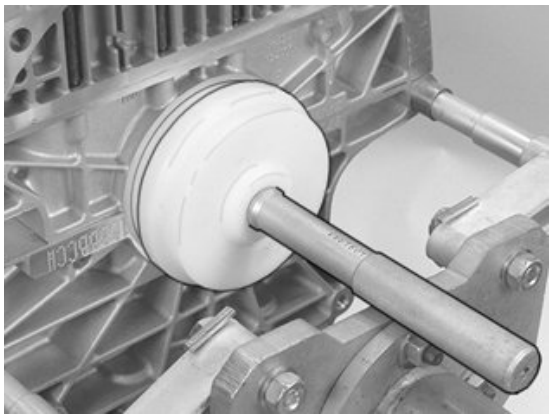


Caution! Cleaning shall always be done in the direction around the flange, not in and out. No grinding tools or similar may be used. It is extremely important that there is no remaining thread sealant or other dirt, as this may cause leakage.

Note! Use emery cloth 9511024 to clean the crankshaft end.

If necessary, wash off the oil on the rear cylinder block surface. Blow clean using compressed air.
When cleaning, work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

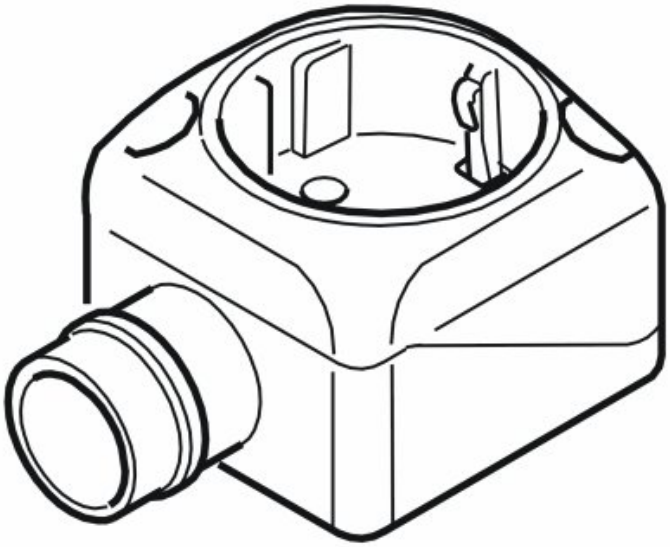
Installing the rear crankshaft seal

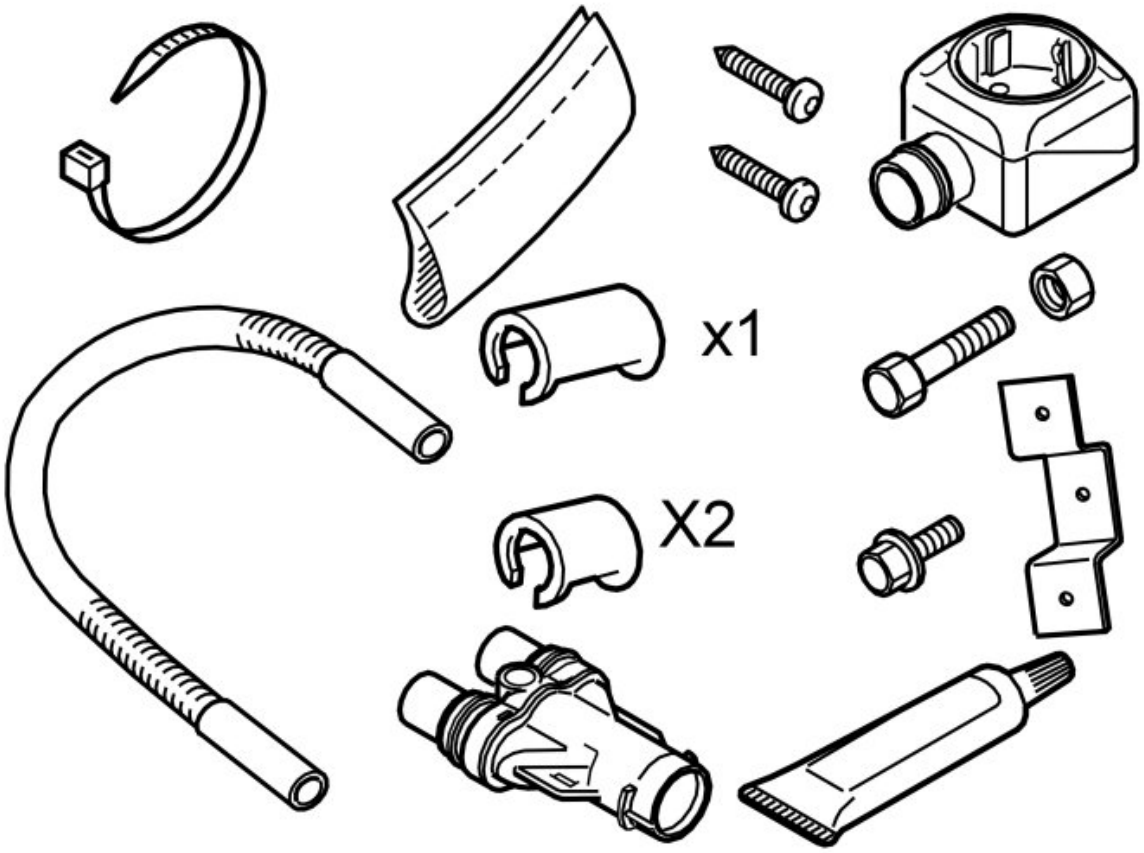


Use standard handle 999 1801 STANDARD SHAFT See: Tools and Equipment/999 1801 Standard Shaft and drift 999 5676 Drift replaced by 9997174 See: Tools and Equipment/999 5676 Drift Replaced By 9997174.
Lubricate the drift face. Thread the seal onto the drift. Tap in the seal until the drift bottoms against the block.

Engine Block Heater: Service and Repair
Passenger Compartment Connector Socket

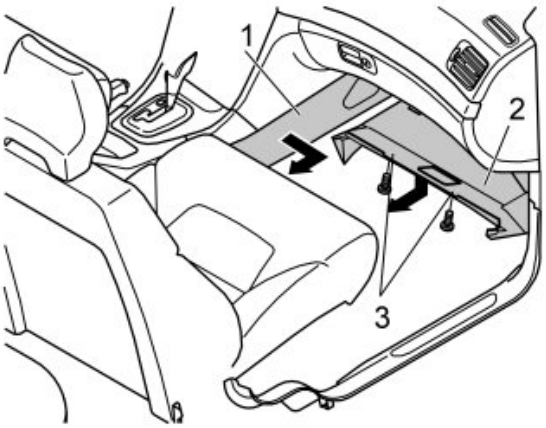
Passenger compartment connector socket





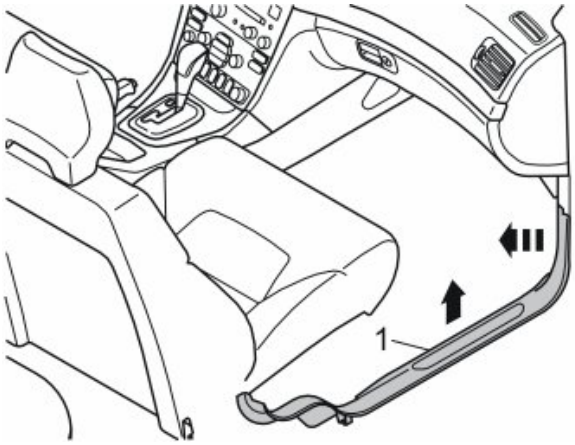
Passenger compartment connector socket

Preparations

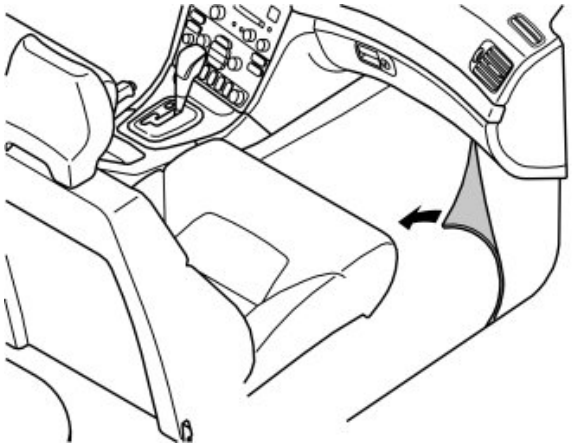


- Remove the centre console's right-hand side panel (1) by first turning the clip in the rear edge Â¼ turn anticlockwise, then pull the panel out at the rear edge and pull it away backwards.
- Remove the sound barrier (2) on the right-hand side by first unscrewing the two screws (3) in the rear edge.

Prize away the sound barrier at the rear edge so that the clips there release.
Remove the sound barrier.

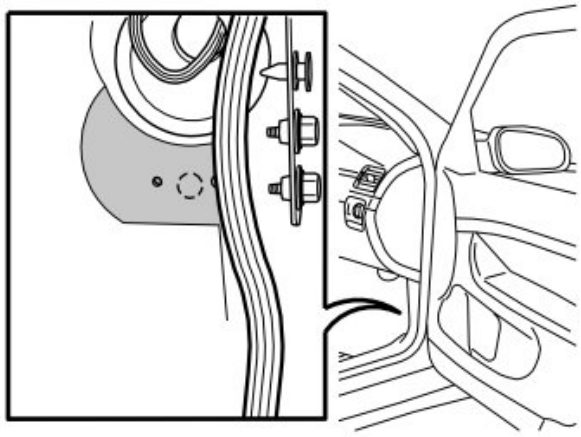


- Remove the sill moulding (1) by pulling it away starting at the front edge, until the clip there releases. Following which, pull it up until the clips on the underside release. Detach it from the B-pillar panel.

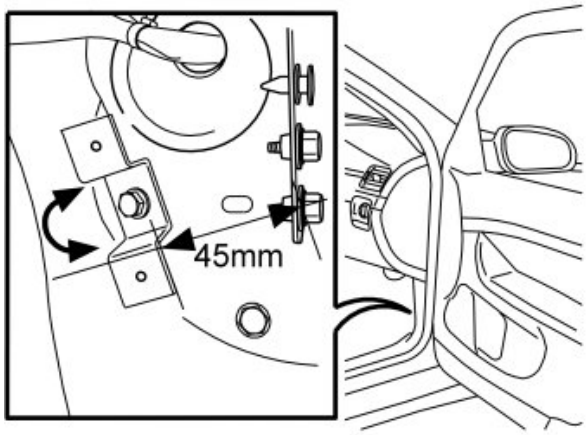


- Fold the carpet to one side.

Installing the bracket

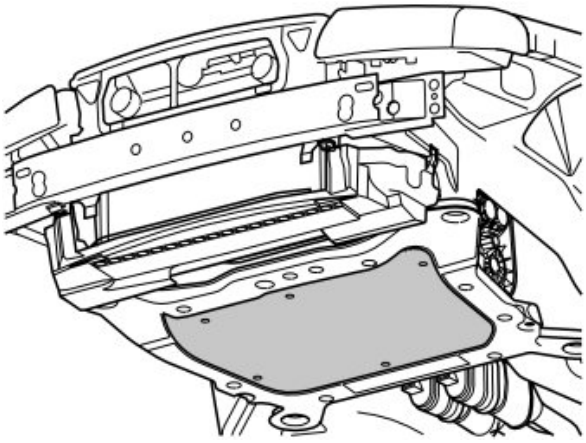


- Cut away a section of the soundproofing at the A-pillar (the shaded area in the illustration).

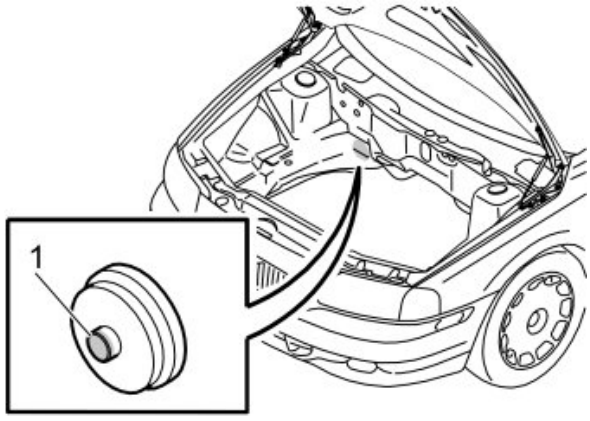


- Take the short flanged screw and the bracket from the kit.
- Remove the tape concealing the weld nut.
- Install the bracket with the screw in the weld nut as illustrated, but do not tighten the screw yet.
- Turn the bracket to maintain a distance of **45 mm** between one corner of the bracket and the centre of the hole for the lower ground screw. See the illustration.
- Tighten the screw.

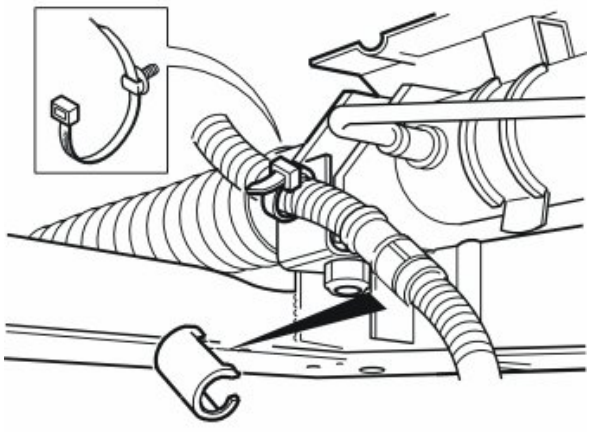
Installing the junction connector



- Remove the engine splash guard.

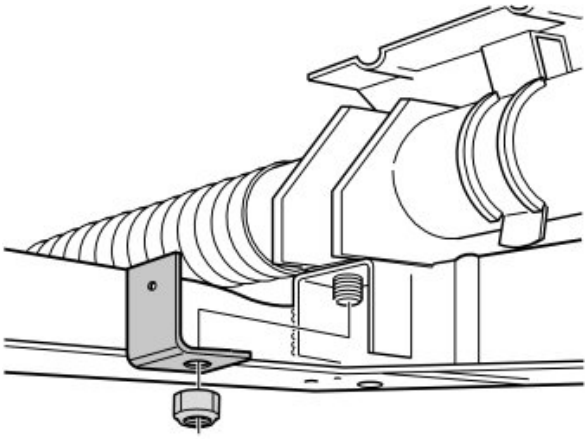


- Cut away the engine compartment insulation at the punched metal on the right-hand side down in the engine compartment.
- Remove the rubber grommet (1) inside the insulation.
- Cut off the top of the rubber grommet (1).



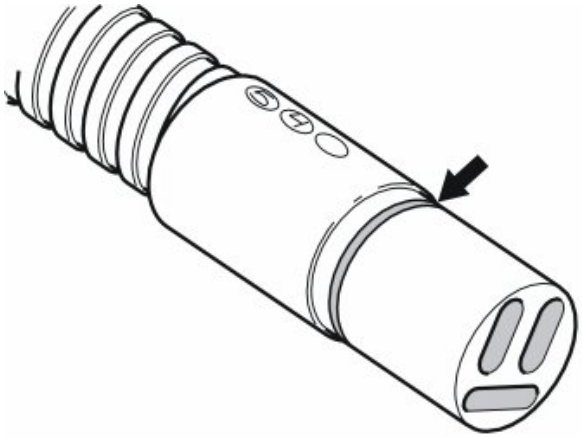
If an engine block heater is installed

- Remove the connectors for the engine block heater and the front engine block heater socket from the bracket on the steering gear.
- Remove the locking sleeve over the connectors and pull apart both cables.



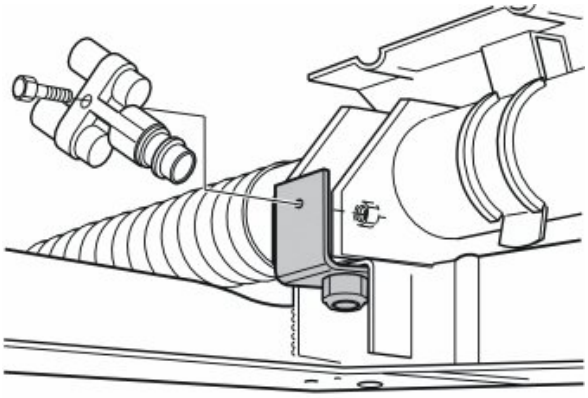
If an engine block heater is not installed

- Remove the nut from the right-hand side of the steering gear.
- Install the bracket with a new nut from the kit.
- Tighten the nut. Tighten to **50 Nm (35 lbf.ft.)**.



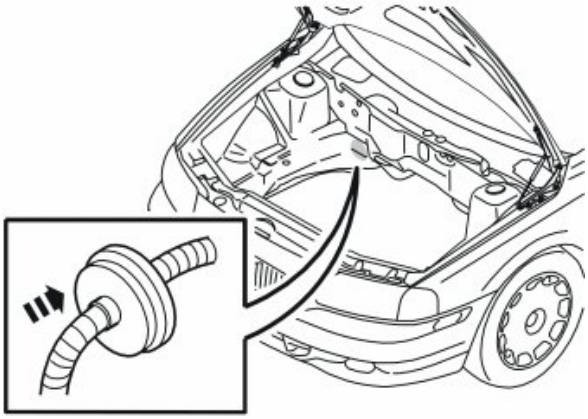
- Grease in the O-rings on the cables and on the branch connector using low temperature grease, part no. 1161417-9.

Note! Ensure that no grease gets onto the connector surfaces.



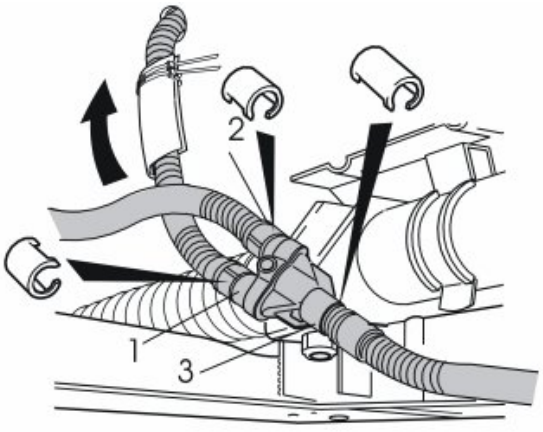
- Install the branch connector on the bracket with a screw and nut from the kit. Make sure that the screw does not catch the pipe to the steering assembly on the rear. If this is the case, swap the places for the screw and nut.

Do not tighten the bracket yet, the cables and locking sleeves must be installed first.



- Grease in the rubber grommet with low temperature grease, part no. 1161417-9 in order to ease the cable through and to locate it in the hole in the body more easily.
- Thread the cable for the passenger compartment connector socket through the rubber grommet.
- Guide the cable for the passenger compartment connector socket through the hole in the body.

Hint: Pull the rubber grommet into place from inside the passenger compartment using the cable if it is difficult to position it from the engine compartment side.

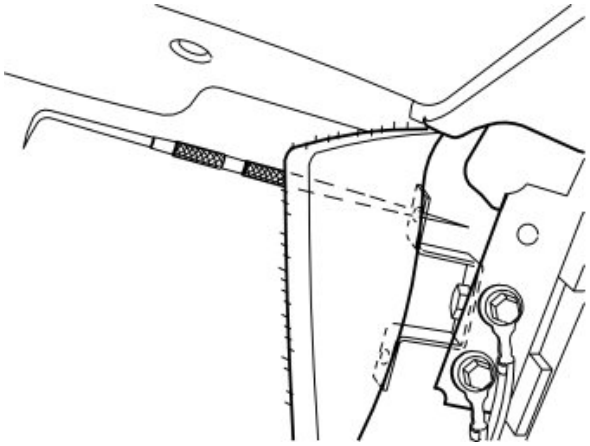


- Pull out a part of the cable for the passenger compartment connector socket from the passenger compartment. Any excess cable should be concealed behind the carpet in the passenger compartment.
- Take the heat deflector hose and two tie straps from the kit and thread it onto the cable for the passenger compartment connector socket. Pull the heat deflector hose right up to the rubber grommet. Secure the heat deflector hose with both tie straps. If the heat deflector hose is too long, cut it down to a suitable length.
- Install the cable for the passenger compartment connector socket to socket (1) on the branch connector from the kit.
- Connect the cable from the engine block heater to the socket (2) on the junction connector.
- Connect the cable from the front engine block heater socket to the socket (3) on the junction connector.
- Press the locking sleeves (from the kit) over the cable splices. The larger locking sleeve must be on the socket (3).
  Note! Check that the cables do not chafe against sharp edges or moving parts in the engine compartment.

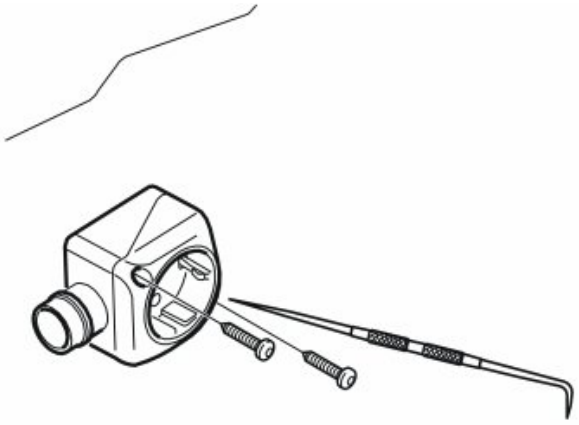
Tighten the branch connector to the bracket.

- Reinstall the engine splash guard and torque tighten the screws to **24 Nm (18 lbf.ft.)**.

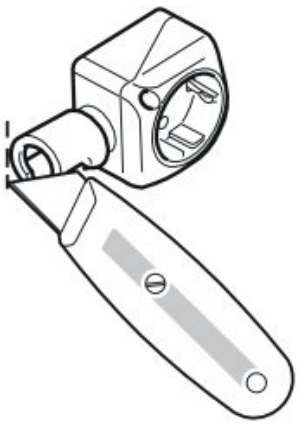
Installing the passenger compartment connector socket



- Partially fold the carpet back over the bracket.
- Make a hole in the carpet opposite the upper mounting hole in the bracket using a double ended scriber.



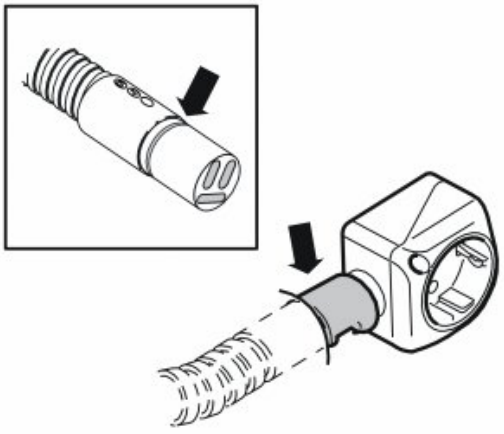
- Take a screw and the passenger compartment connector socket from the kit. Tighten the passenger compartment connector socket to the bracket in the upper mounting.
- Insert the double ended scriber into the lower mounting for the passenger compartment connector socket. Make a hole in the carpet opposite the lower hole on the bracket.
- Tighten the lower mounting for the passenger compartment connector socket using a screw from the kit.



- Press a locking sleeve (from the kit) onto the passenger compartment connector socket. Slide the locking sleeve as far along the terminal for the passenger compartment connector socket as possible.
- Take a carpet knife and cut a slit in the carpet just in front of the locking sleeve. Make the cut as long as the diameter of the locking sleeve.

Note! Do not damage any wiring and hoses under the carpet.

- Remove the passenger compartment connector socket from the bracket and fold the carpet to one side.



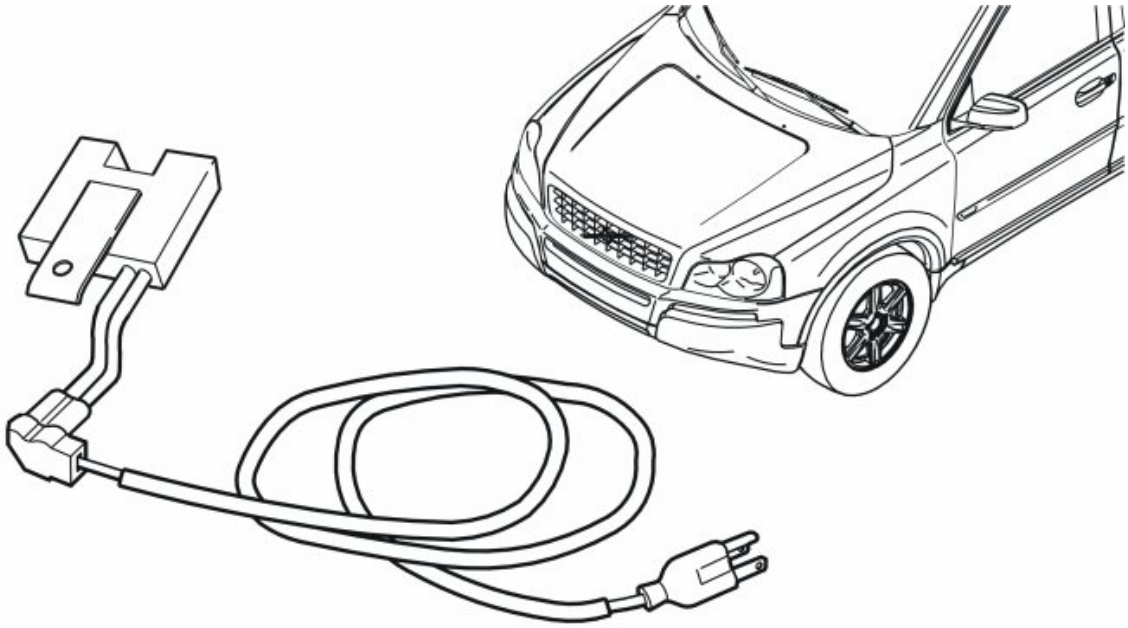
- Thread the cable through the hole in the carpet.
- Grease in the O-ring with low temperature grease (part no. 1161417-9).

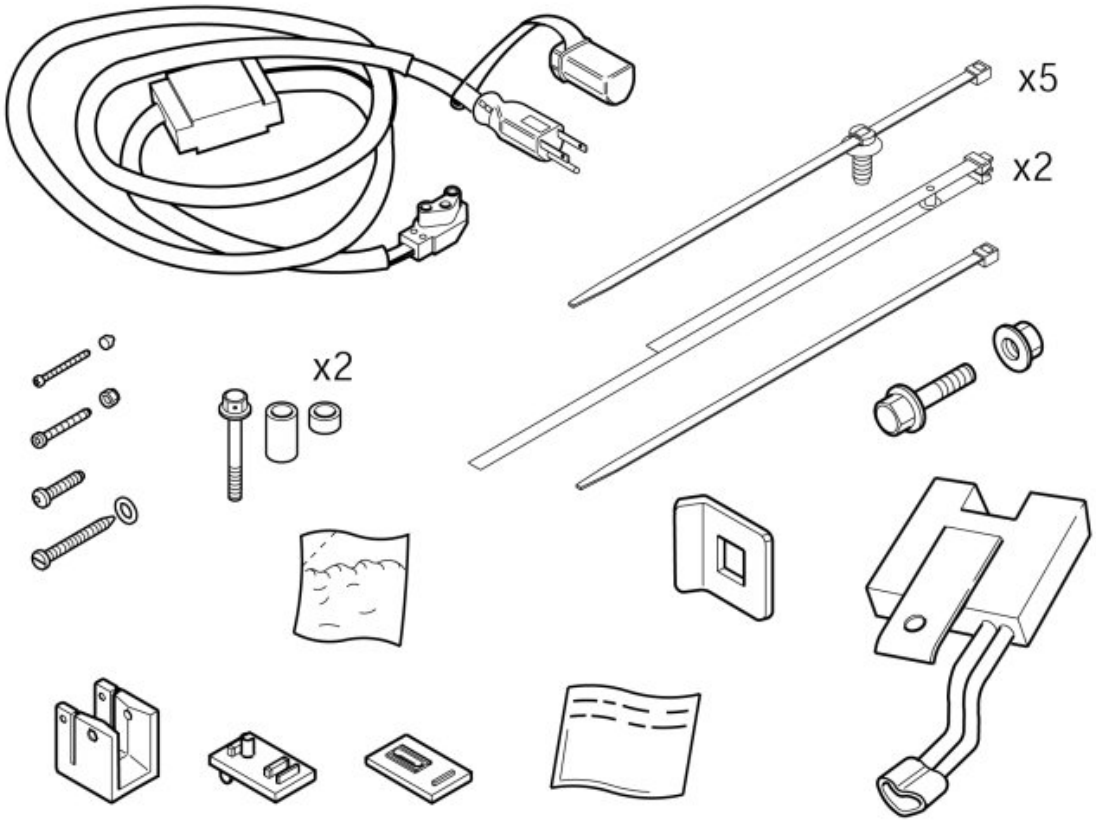
Note! Ensure that no grease gets onto the connector surfaces.

- Connect the cable to the passenger compartment connector socket. Press a locking sleeve (from the kit) over the joint.
- Fold the carpet back into position and install the passenger compartment connector socket using both the screws.
- Reinstall the sound barrier, the centre console's side panel and sill moulding.

Engine Block Heater: Service and Repair
Electric Engine Block Heater, 110V

Electric engine block heater, 5-cyl. 110V





Any comments on this publication? Please contact your nearest retailer. Thank You!

Publ.no:	Issue:	Kit no:

Comments:.....

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INTRODUCTION

- **NOTE! Read through the whole installation instruction before starting the work.**
- The front page gives the date of this edition and the edition it replaces
- The second page shows the tools needed for the installation and the contents of the installation kit
- The illustrations display the procedure in order of operation. The order of operation is repeated in the text section
- Cut out the text page in order to follow the illustrations and text at the same time.

Electric engine block heater, 5-cyl. 110V

Preparations, applies to the S60/V70/S80

Image A applies to the S60 and V70

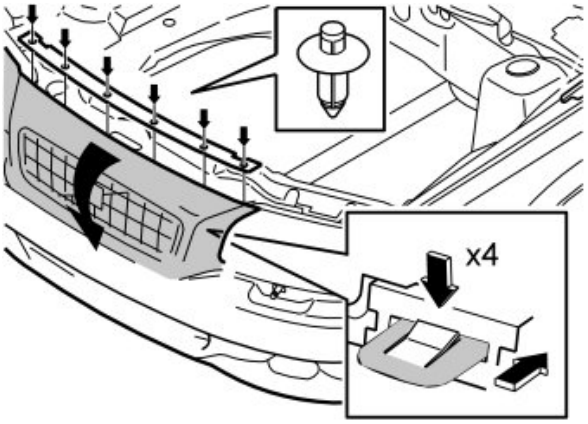
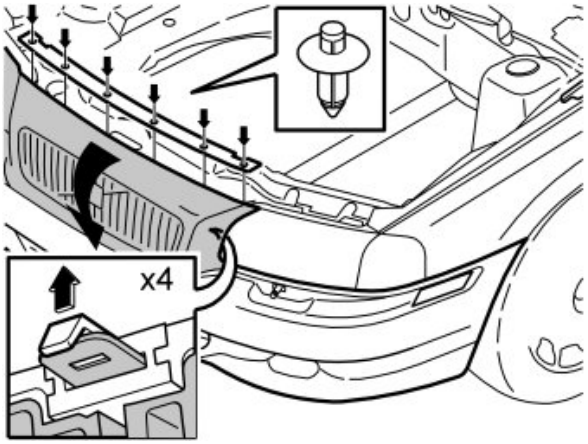
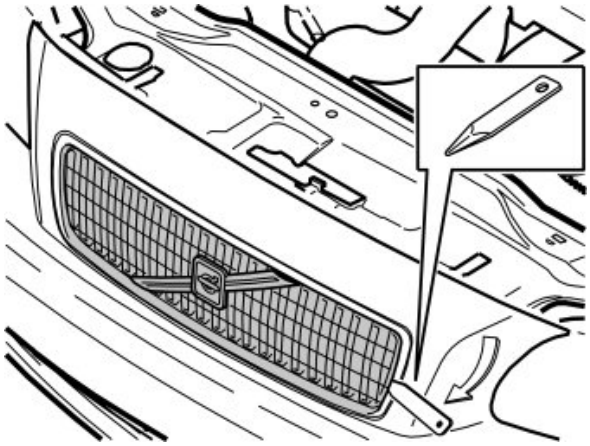


Image B applies to the S80 up to and including model year -2003 (CH -334999)



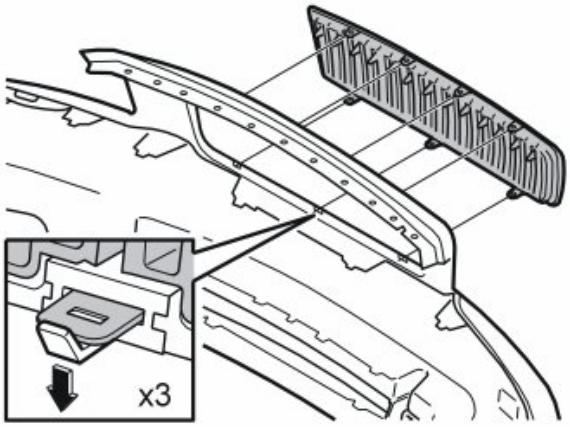
- Press in the centers of the six clips until a click is heard. Remove the clips.
- Pull the top edge of the front forward.
- Insert a hand inside and press the four catches that are evenly distributed along the upper edge up/down. Use a plastic weatherstrip tool.
- Pull the front grille at the top until the catches release.

Image A applies to the S60 and V70



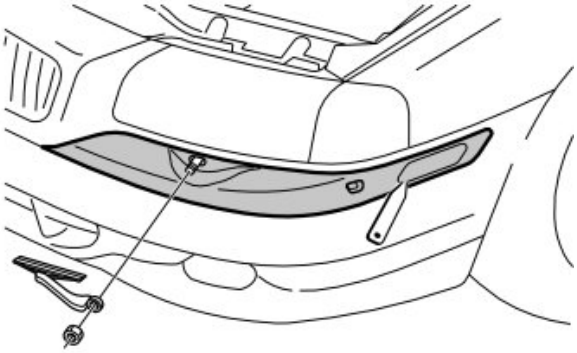
- Take a weatherstrip tool and insert it between the front grille and bumper cover, and carefully prize the front grille away along the whole of the bottom edge. It is secured with three clips.

Image B applies to the S80 up to and including model year -2003 (CH -334999)

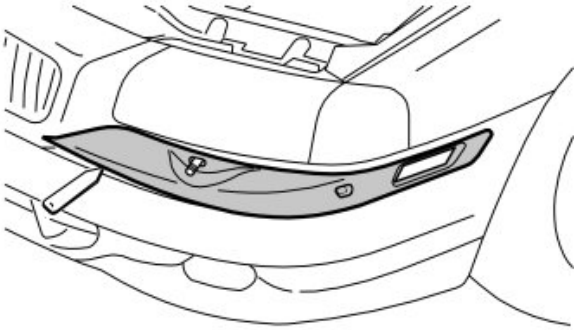


- Depress the three catches at the lower edge of the front grille using a small screwdriver or similar, remove the front grille.

Steps 3-6 apply to the S80 from model year 2003- (CH 335000-)



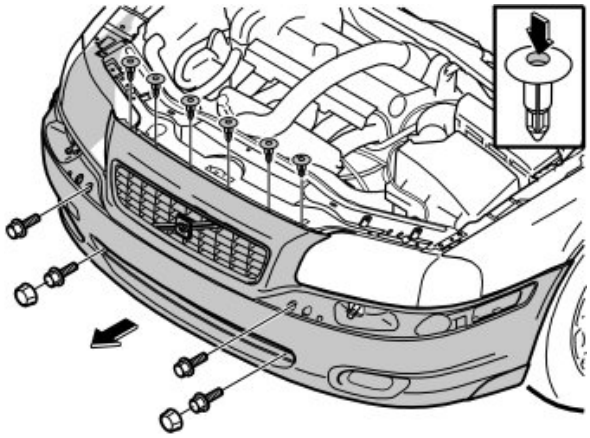
- Remove the nut and wiper arm for headlamp washing.
- Detach the hose for washing at the existing joint.
- Carefully pry off the parking lamp at the front edge. Use a plastic weatherstrip tool.
- Detach the connector and place the position lamp to one side.
- Repeat the operation on the other side.



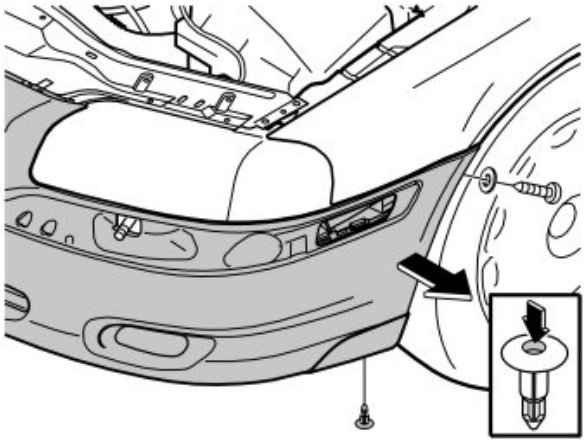
- Remove the molding under the headlamp. Use a weatherstrip tool.

  Note! Do not damage the paintwork.

- Repeat the operation on the other side.

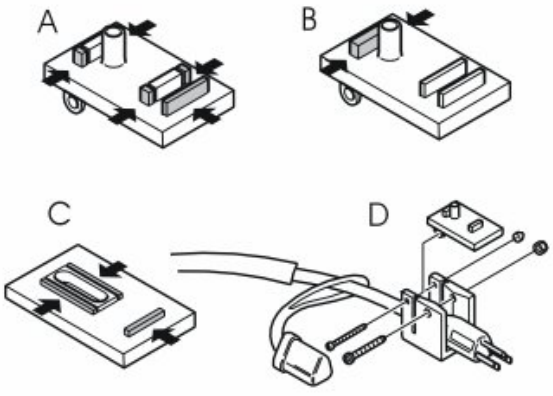


- Press in the center of the clips at the top edge of the bumper cover and remove them.
- Remove the covers in front of the bumper cover's lower screws.
- Remove the screws in the bumper cover.



- Press the center of the clip at the lower edge/side of the bumper and remove it.
- Remove the screw in the rear/top edge of the bumper cover.
- Repeat the operation on the other side.
- Carefully pull away the end face of the bumper cover from the body. It is fitted with four catches on the inside in the top edge and two in the bottom edge.
- Repeat the operation on the other side.
- Pull the bumper cover forwards, detach the connectors for the fog lamps if fitted.

Assembling the front intake



Applies to the V70, and S80 up to and including model year -2003 (CH -334999)

- Cut off the shaded sections on the mounting plates as illustrated in figures A and C.

Applies to the S80 from model year 2003- (CH 335000-)

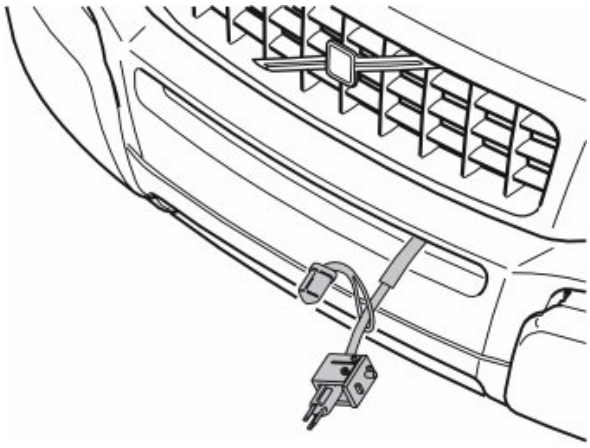
- Cut of the shaded section on the mounting plate as illustrated in figure B.

Applies to the XC90 up to and including model year -2006 (CH-327999), and S60/V70/S80

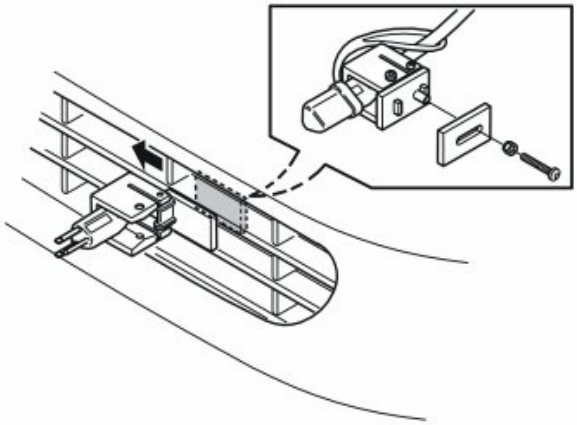
- Assemble the front intake according to figure D.

Installing the front intake, applies to the XC90

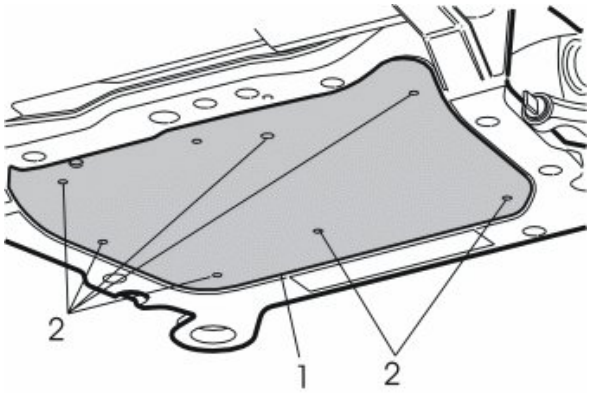
Steps 8 - 10 applies to the XC90 up to and including model year -2006 (CH-327999)



- Guide the front socket's cable in through the center hole, next furthest to the left in the grille.

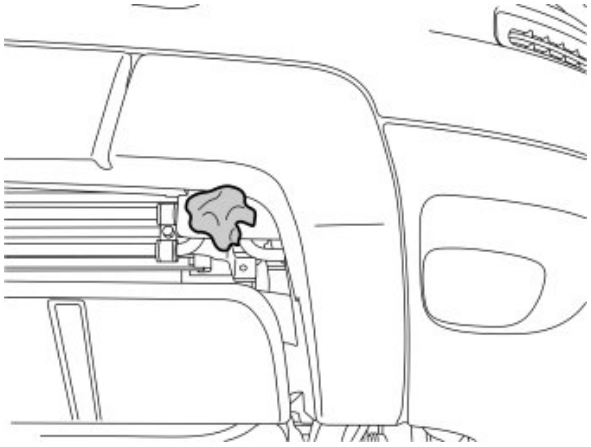


- Take a screw, washer and attaching plate from the kit and install the front socket. Push it as far to the left as possible and tighten it.
- Pull the cable to the left, in through the rubber seal on the left-hand side of the radiator, continue down by the left front side, on the right-hand side.

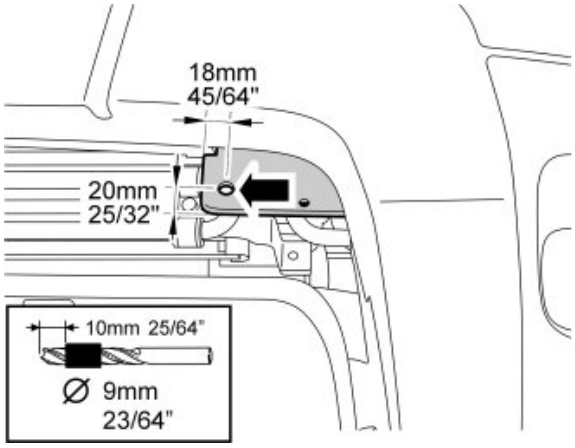


- Remove the engine splash guard (1) by first removing the screws (2).

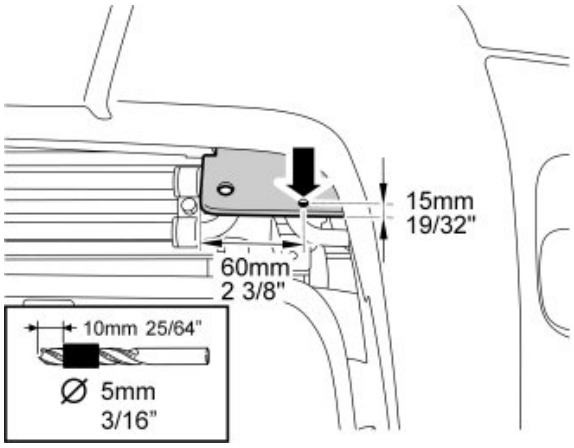
Steps 11- 23 apply to the XC90 from and including model year 2007- (CH 328000-)



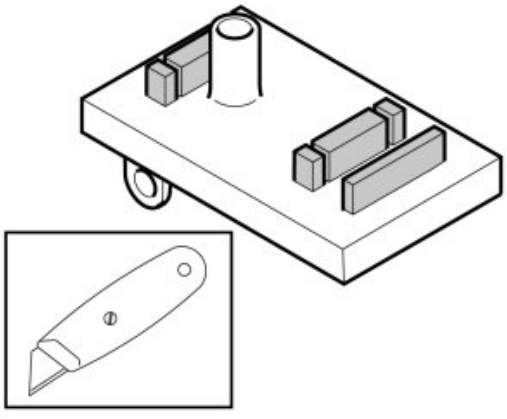
- Clean the surface where the front engine block heater socket will be secured.



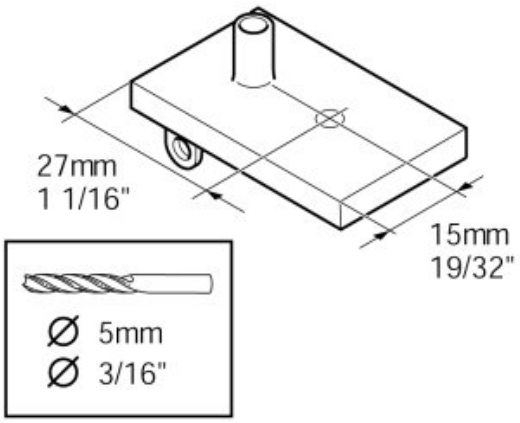
- Drill a hole for the guide to the front engine block heater socket's mounting plate.
- File down the edges of the holes.



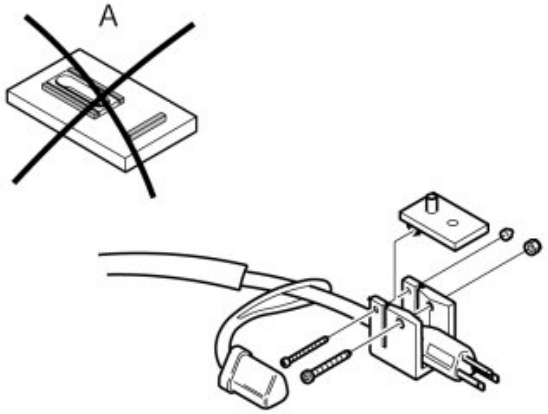
- Drill a hole for the tie strap for the front engine block heater socket's cable.
- File down the edges of the holes.



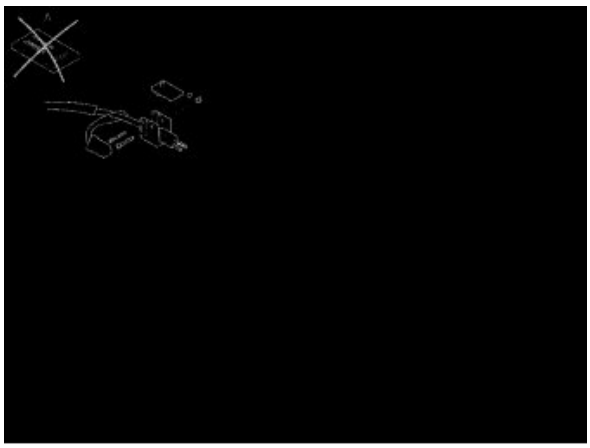
- Cut-off all shaded sections on the mounting plate so that only the cylinder shaped section remains.



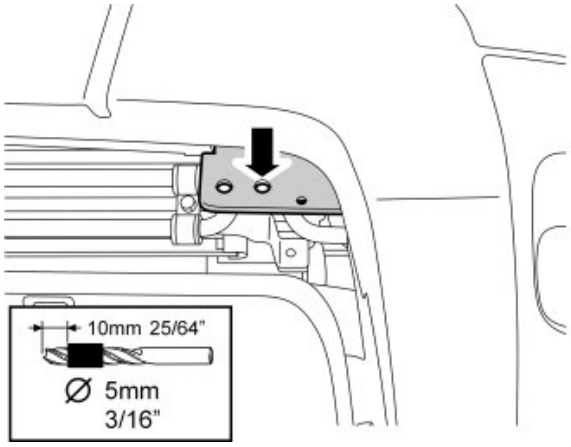
- Drill a **-5 mm (3/16 ")** diameter hole in the mounting plate.
- File down the edges of the holes.



- Assemble the front intake as illustrated. The mounting plate (A) must not be used.

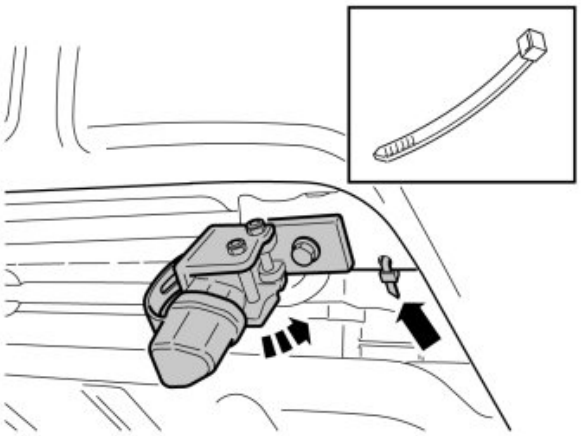


- Install the front engine block heater socket with the guide pin in the large hole.
- Route the cable in so that it runs down on the inside of the left-hand bracket for the skid plate.
- Align the front engine block heater socket so that the long sides of the mounting plate are parallel with the edges of the surface into which the mounting plate shall be screwed.
- Mark out for drilling the hole for the screw for the mounting plate.

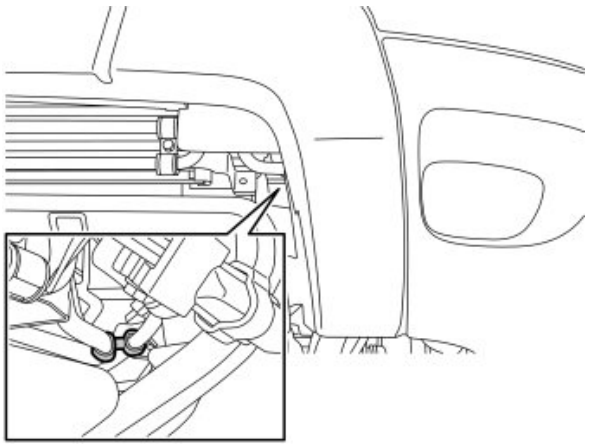


- Drill a hole with a **- 5 mm (3/16 ")** diameter drill bit for the screw for securing the front engine block heater socket's mounting plate.

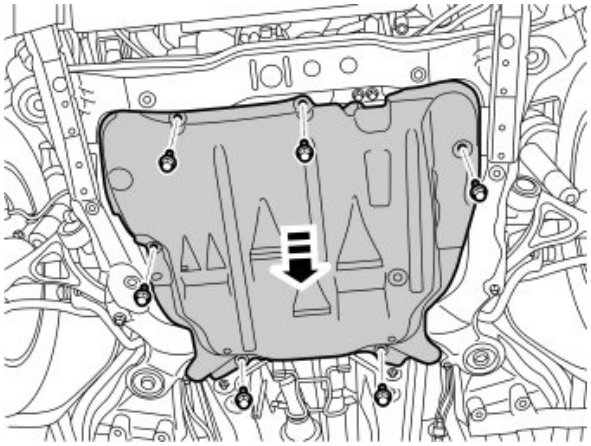
- Secure the front engine block heater socket with a screw and nut in the drilled hole and tighten.



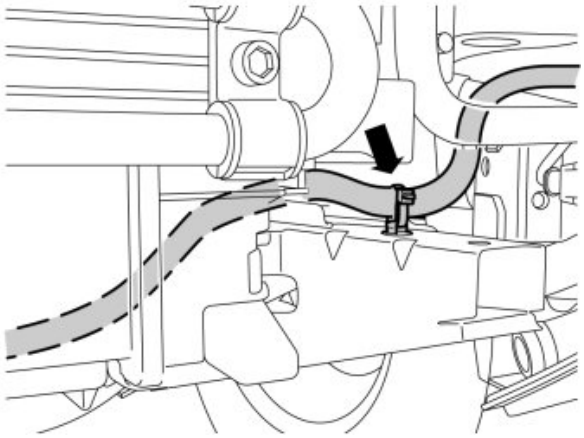
- Secure the tie strap in the hole around the front engine block heater socket's cable.
- Fold in the connector so that the cable adopts the correct length in the tie strap before it is tightened.
- Tighten the tie strap.



- Clamp the cable in at the pipe for the air conditioning using a double tie strap.



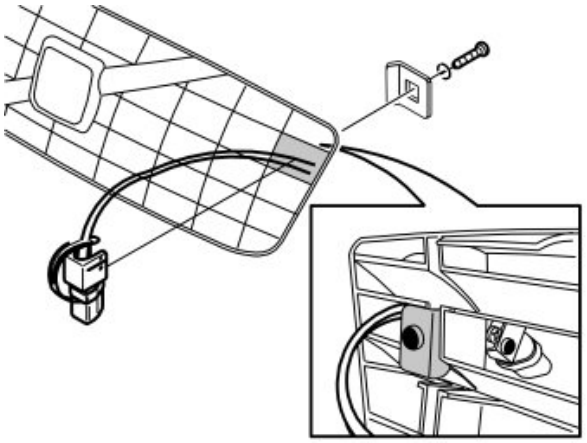
- Remove the engine splash guard.



- Pull the cable from the front intake over the skid plate, above the inside of the front left-hand side corner of the subframe, and down to the inside of the left-hand side of the subframe.
- Take the tie strap equipped with clip and press it into the hole on the top of the left-hand bracket for the skid plate.
- Tighten the cable with the tie-strap.

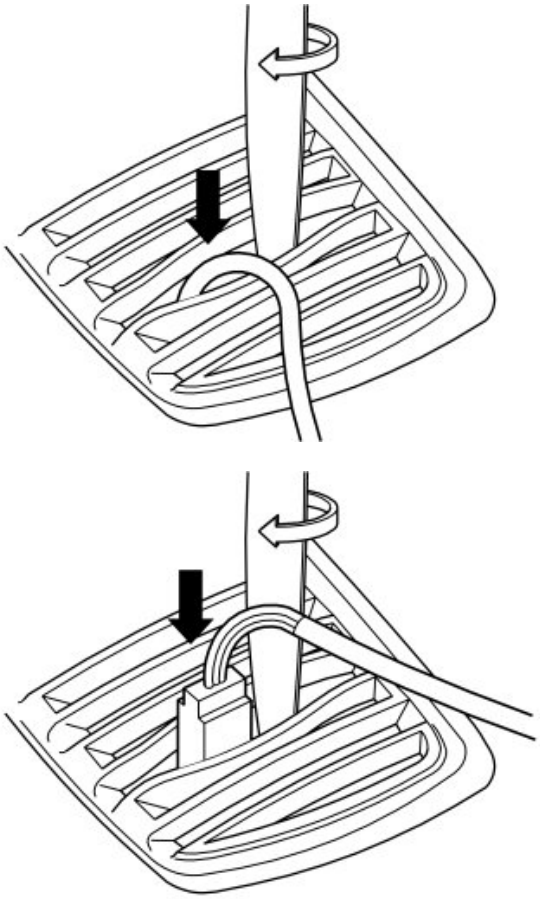
Installing the front intake, applies to the S60/V70/S80

Image A applies to the S60 and XC70



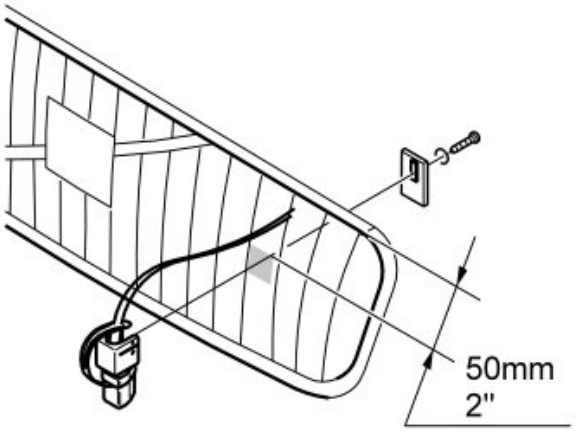
- Insert the cable through the next upper hole along to the left in the front grille. The cable must be inserted inside the weatherstrip at the edge of the front grille.
- Reinstall the front intake and tighten it with the screw.

Image B and C apply to the V70, and S80 up to and including model year -2003 (CH -334999)



- Place the front grille with the front facing upwards on a table, as illustrated.
- Place a weight on one end of the front grille so that it remains still.
- Take the electrical cable from the kit.
- Take a plastic weatherstrip tool or similar and insert it down into the fourth compartment in the left-hand side of the front grille, and turn the tool carefully so that the plates in the front grilled are separated from each other. Turn so that the cable's connector can be inserted through the front grille.
- Carry out the same procedure with the cable's black joint section, but do not bend the plates more than the join section can pass between them as this can damage the plates.

Image D applies to the V70, and S80 up to and including model year -2003 (CH -334999)

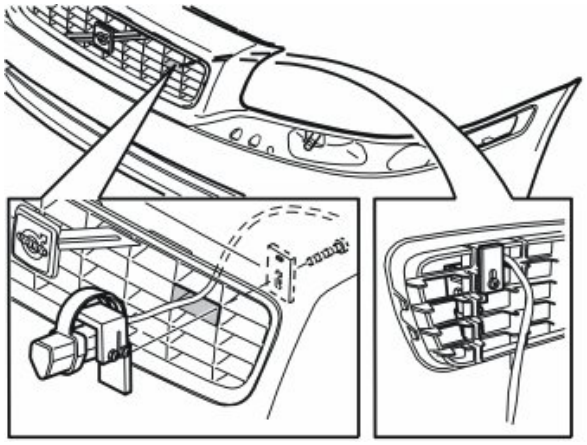


- Install the front intake 50 mm (2") from the upper edge of the front grille, and tighten using the screw.

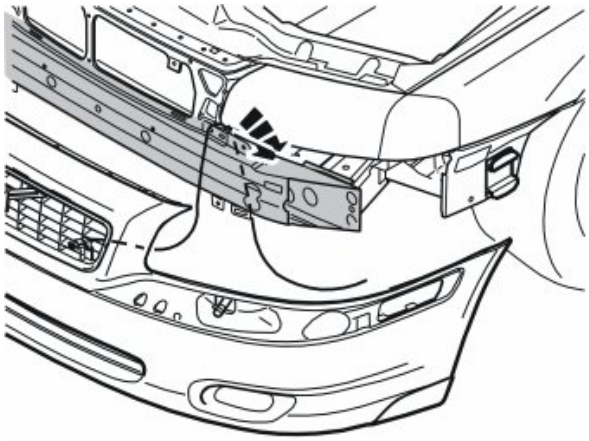
Applies to the S60, V70, and S80 up to and including model year -2003 (CH -334999)

- Reinstall the front grille and clips at the upper edge on the front.

Steps 26-27 apply to the S80 from model year 2003- (CH 335000-)

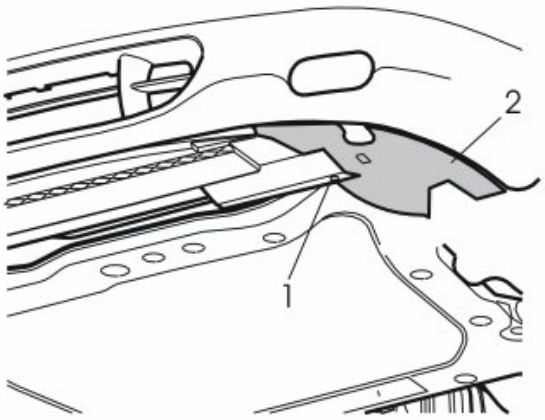


- Guide the front intake's cable in through the uppermost hole in row, next furthest to the left in the grille.
- Take screws and mounting plate from the kit. Install the front intake and slide it to the left as far as possible. Tighten.



- Insert the cable from the front intake on the upper side and rear side of the collision member on the left-hand side of the radiator and allow them to hang down.
- Reinstall the bumper cover to the body using screws and clips. Align the length of the cable by the front edge/left side of the rubber seal.
- Tighten the four M8 screws to **24 Nm (18 lbf.ft.)** and reinstall the covers.

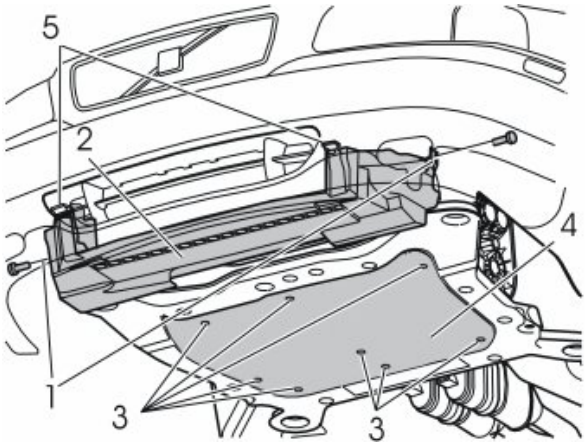
Steps 28 - 30 apply to the S60, V70 and S80



- Raise the car.

Applies to cars with side air baffles

- Remove the screw (1) from the left-hand air baffle (2), and remove the air baffle by pulling it backwards.
- Carry out the same procedure on the right-hand air baffle.



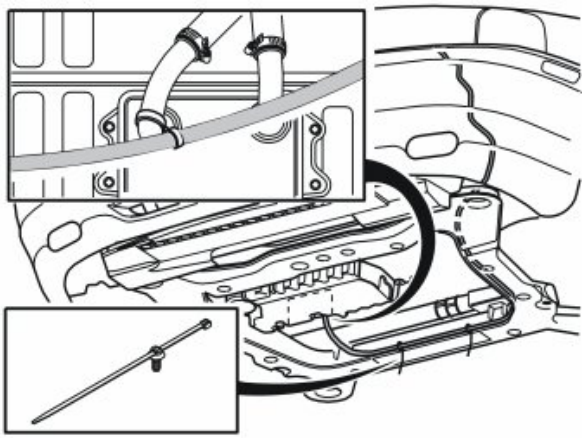
Remove:

- the air baffle (2) by undoing the screws (1), pressing up the catches (5) and moving the air baffle down and back.
- the splash guard (4) by undoing the screws (3).

- Move the cable from the front grille down to the left, passing the radiator and under the car to the air pump. (Also see image in point 30).

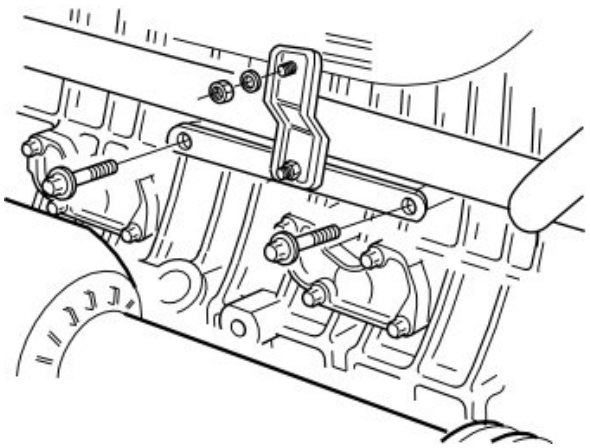
Installing, engine block heater

Applies to models



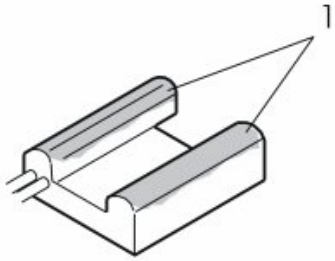
- Pull the cable above the subframe and on the inside of its left front mounting, along the left-hand side and up towards the engine.
- Clamp the cable using tie straps in the existing holes and with double clamps at pipes on the oil cooler.

Caution! Do not clamp the drive axle, and ensure that the cable does not chafe against sharp edges.



Applies to cars with T stay, as illustrated

- Remove the stay.



Applies to models

- Apply heat conducting paste, (P/N 9499205), on the surfaces (1) of the heater body that are in contact with the cylinder block.

Caution! The heat conducting paste must be applied as illustrated. This is to prevent damage from overheating.

Image A applies to cars with T stay, as illustrated

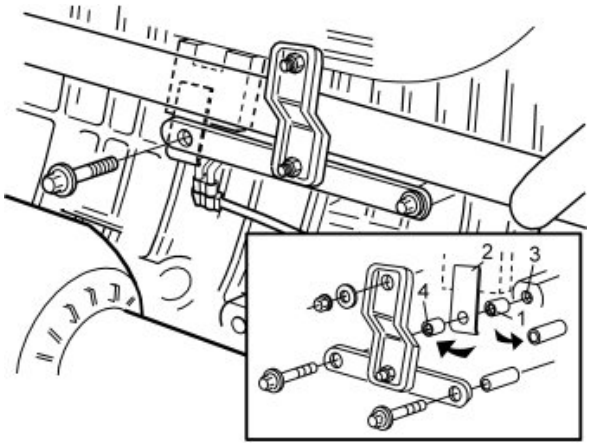
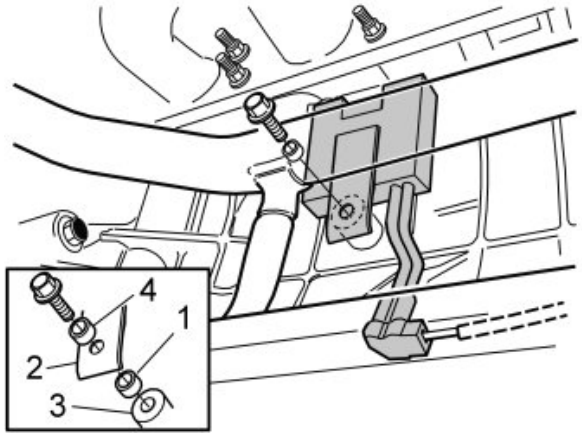


Image B applies to cars without T stay



- Clean the area where the heater is to be installed. This ensures optimal heat conduction to the cylinder block. Also clean the internal threads.
- Connect the cable supplied to the heater.
- Install the heater on the engine block, as illustrated.
- Install spacer washer (1) **(t=10 mm (25/64"))** between the mounting bracket (2) and mounting hole (3) in the engine block. The outer spacer washer(4) **(t=32 mm (1 1/4"))** is inserted between the mounting bracket (2) and the T stay, if applicable.
- Tighten the heater using the screws from the kit. Tighten to **16 Nm (12 lbf.ft.)**.

Applies to cars with stay for the turbocharger from model year 2005-

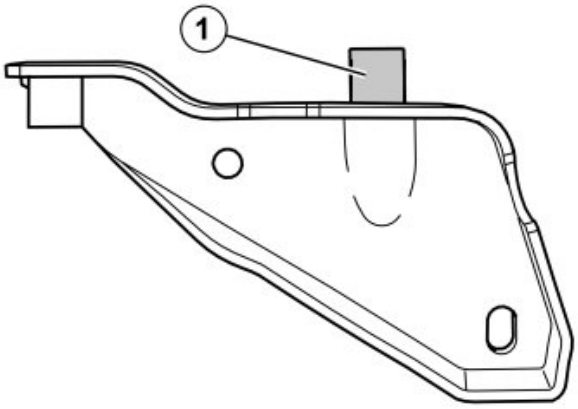
Note!

- S60 CH 425000-
- V70 CH 459000-
- XC70 CH 173000-
- S80 CH 390000-

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

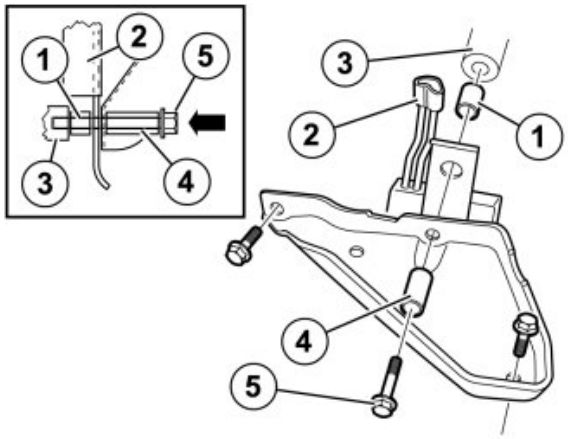
- XC90 CH 134000-

Illustration A



- Knock off the spacer (1) from the stay. Grind off the welds if the spacer is secured too tightly.

Illustration B



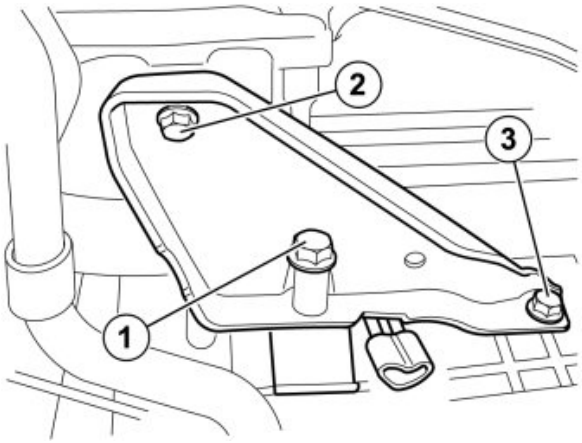
- Carefully clean the surface where the heater is to be located to provide good heat conduction to the engine block. Also clean the internal threads.

Hint: To facilitate the installation of the heater on the engine block, first secure the tensioner (2) by the heater using a small piece of butyl tape and then also secure the spacer sleeve (1) on the rear side of the tensioner using a small piece of butyl tape.

Note! The bent section of the tensioner must point away from the heater.

- Install space washer (1)**(t=10 mm (25/64"))** between tensioner (2) and the mounting in the engine block (3). Install the outer spacer washer (4) **(t=32 mm (1 1/4"))** on the outside of the bracket.
- Thread through the long screw (5) so that everything is held together.

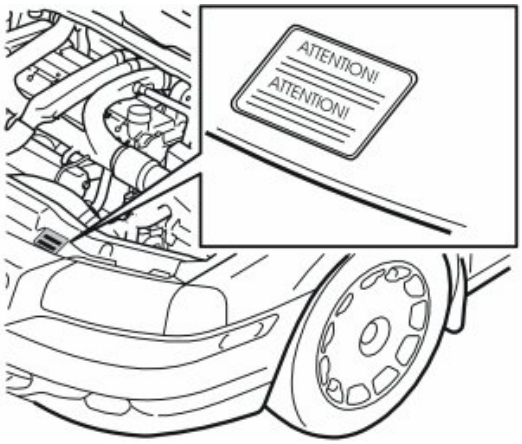
Illustration C



- Thread the heater and the tensioner. Install the turbocharger stay and screw using the three screws as follows:

- Screw the turbocharger stay into place through the tensioner in the mounting in the engine block, with the long screw (1).
- Screw the turbocharger stay in the turbocharger with the short screw (2) and into the other mounting in the engine block with the screw (3).

- Tighten the screws to **16 Nm (12 lbf.ft.)**.
- Take the radiation protection and cable from the kit. Thread the radiation protection onto the cable and connect the cable to the heater
- Install the locking sleeve on the heater's connector.



Install:

- air baffle
- the splash guard. Tighten the screws to **25 Nm (18.5 lbf.ft.)**.
- the decal from the kit.

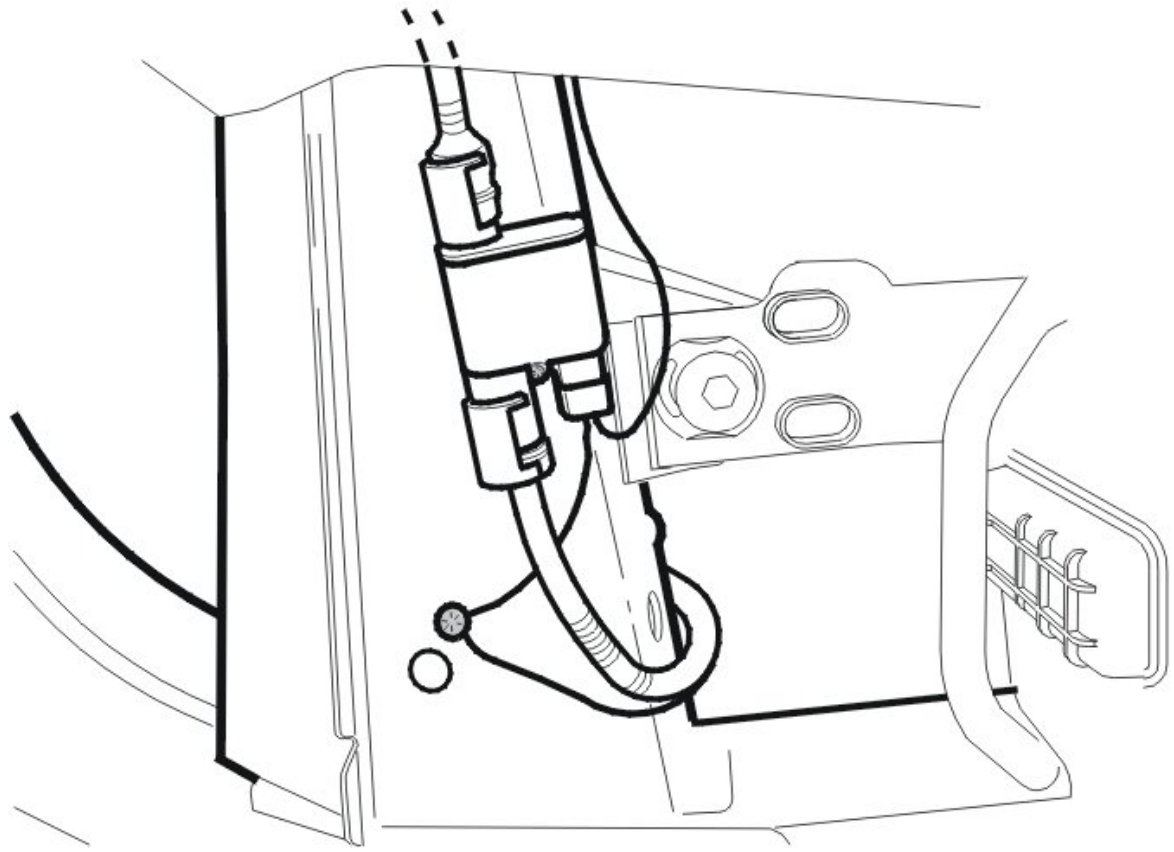
Engine Block Heater: Service and Repair
Replacing the Relay For the Electrical Engine Block Heater

Replacing the relay for the electrical engine block heater

Note! There is a relay for the accessory electronic module which is positioned on the underneath of the left front member. This may be positioned on its own or connected via an adapter socket for a charger or electrical engine block heater.

Removal

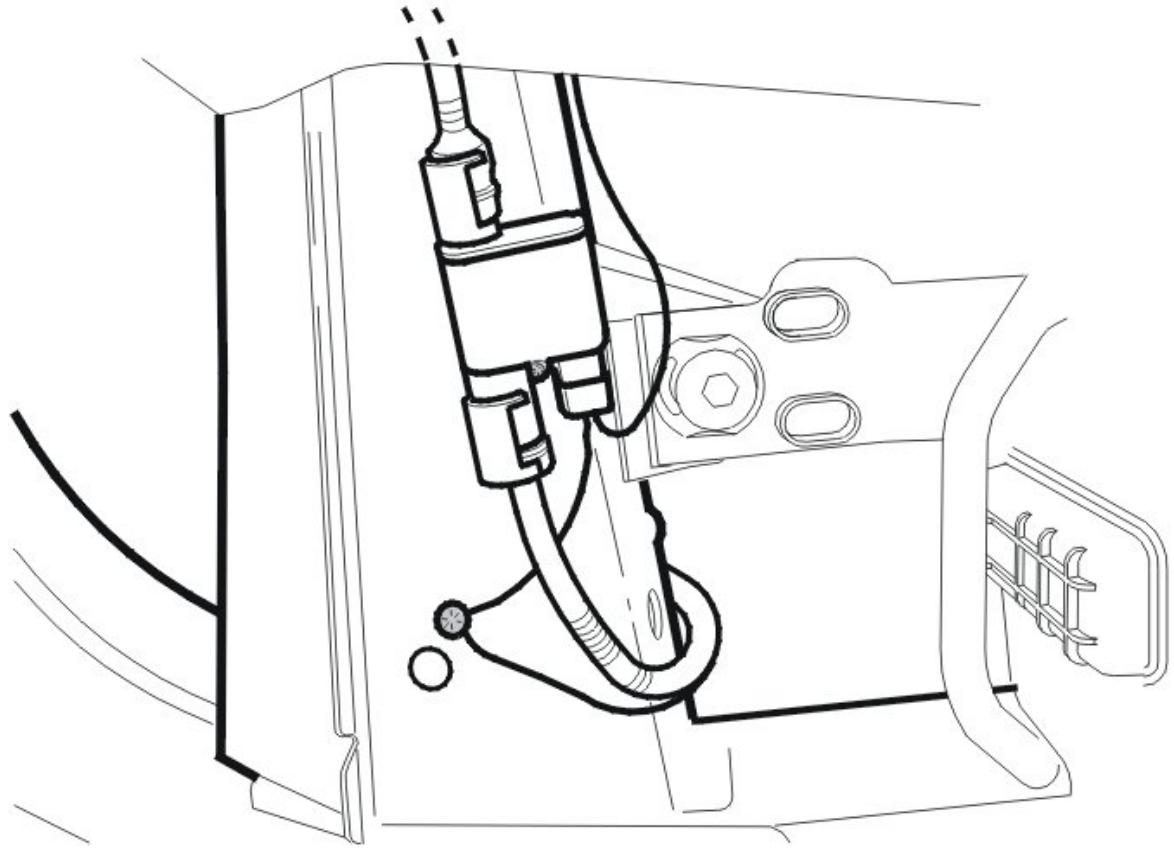
Removing the relay



Slacken off the screws for the relay.
Disconnect the connector.
Detach the relay (from the adapter socket if applicable).

Installation

Installing the relay



Connect the connector.
Reinstall the relay (reconnect it to the adapter socket if applicable).
Tighten the screw.

Cylinder Head Assembly: Removal and Replacement

Cylinder Head, Removing

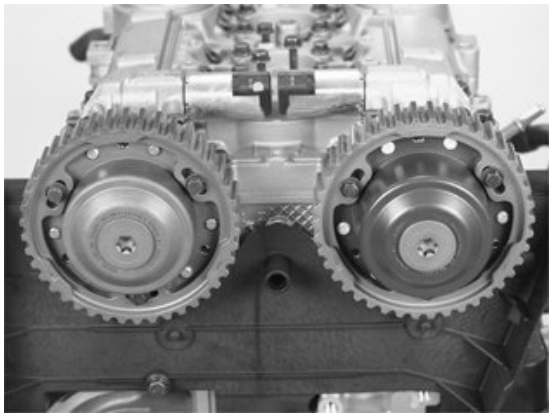
Cylinder head, removing

Special tools:

999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
999 5670 Pliers See: Tools and Equipment/999 5670 Pliers

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the camshaft pulleys



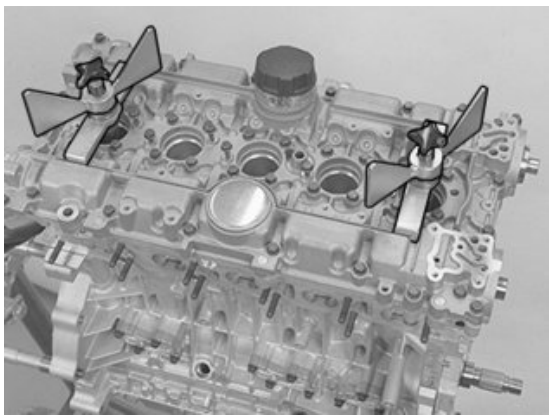
Caution! The camshafts must not be turned when the timing belt has been removed.

Install tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.
Slacken off the screws securing the timing gear pulley to the variable valve timing unit.
Remove the plug at the front edge of the variable valve timing unit (Tx 55).
Remove the center screw from the variable valve timing unit (Tx 55).
Carefully pull out the camshaft pulley with the variable valve timing unit.
Continue with the next variable valve timing unit.

Remove:

- rear timing cover
- tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool.

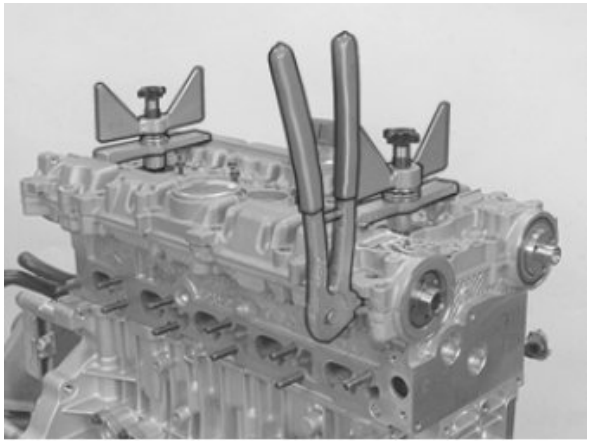
Removing the camshaft cover



Remove:

- the control valves for the variable valve timing units
- the spark plugs for cylinders 1 and 5.

Install tool 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool (2 x). Leave a **2-3 mm** gap to the camshaft cover.
Ensure that the screw in the spark plug well is tightened as far as it will go.
Remove all the screws securing the camshaft cover to the cylinder head.



Remove:

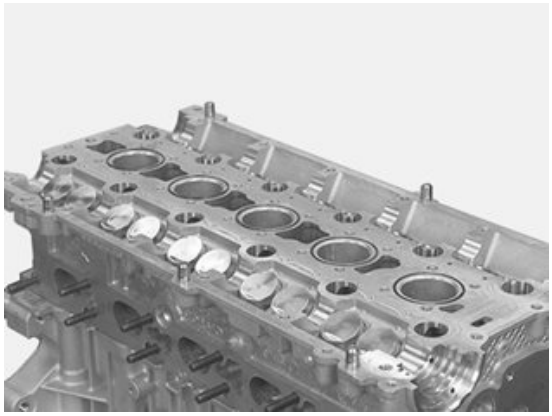
- camshaft cover with pliers 999 5670 Pliers See: Tools and Equipment/999 5670 Pliers at the stop lugs. Start with cylinder 1 and work alternately backwards
- the wing nuts approximately 2 turns. Repeat the procedure with the pliers.

Note! Do not damage the axial bearings.

Remove:

- tool 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
- the camshaft seals at both the front and rear edges
- the camshaft cover
- the camshafts. Work loose and lift at the same time.

Removing the cylinder head



Note! Do not damage the mating surface.

Remove the pipe screw for the water heated crankcase ventilation at the rear edge of the cylinder head.
Slacken off the screwed joint for the cylinder head. Start at the sides and work alternately towards the center.
Lift out the cylinder head.

Cylinder Head, Installing

Cylinder head, installing

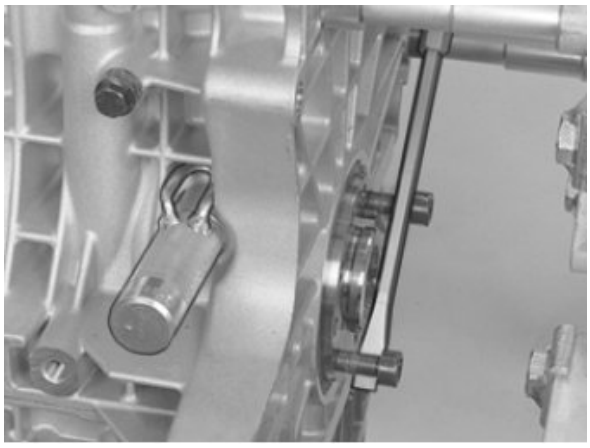
Special tools:

951 2767 Roller See: Tools and Equipment/951 2767 Roller
999 5450 PUNCH See: Tools and Equipment/999 5450 Punch
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
999 5718 Drift See: Tools and Equipment/999 5718 Drift

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

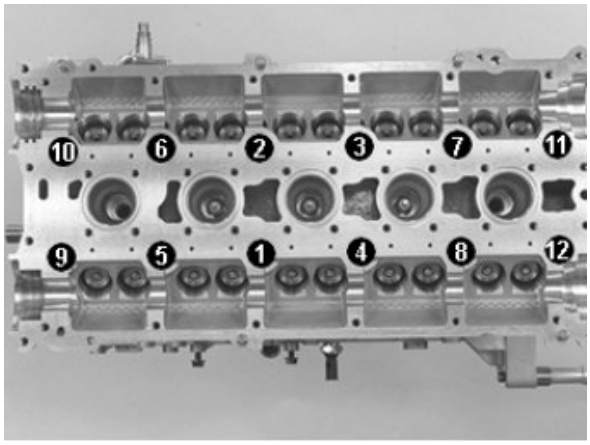
Note! For tightening torques not in the text, see Tightening torque See: Specifications/Tightening Torque.

Aligning the crankshaft



Turn the crankshaft **counter-clockwise** (viewed from the rear of the engine) until the piston in cylinder 1 reaches top dead center (TDC).
Continue turning **counter-clockwise** until the piston in cylinder 1 is approximately 2-3 cm before top dead center (BTDC).
Install the crankshaft stop999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool Ensure that it bottoms out against the cylinder block.
Now turn the crankshaft **clockwise** (viewed from the rear of the engine) until the crankshaft counter-weight is in contact with the crankshaft stop.

Installing the cylinder head

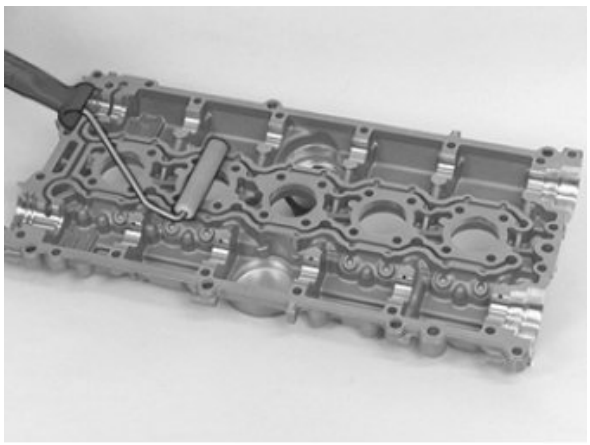


Install a **new cylinder head gasket**.
Install the cylinder head.
Use **new screws**.
Lubricate and install all the screws.
Tighten. See Tightening torque See: Specifications/Tightening Torque.

Installing valve lifters and camshafts

See Valve clearance See: Valve Clearance/Adjustments.

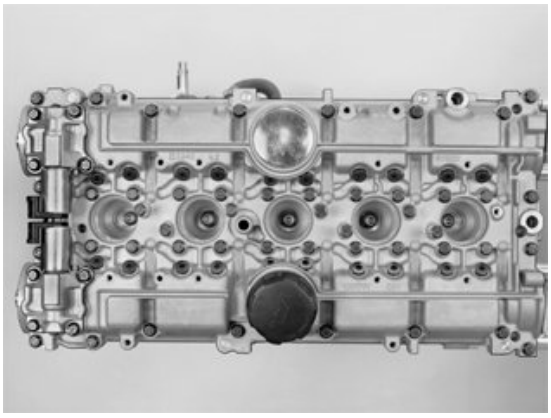
Applying liquid gasket



Wipe the oil film off the mating surfaces on the camshaft cover and cylinder head.
Install **new O-rings** around the spark plug wells at the cylinder head.
Apply liquid gasket 11 61 059 to the camshaft cover. **The surface must be completely covered without any excess.** Use roller 951 2767 Roller See: Tools and Equipment/951 2767 Roller

Note! Ensure that no liquid gasket gets in to the oil ducts.

Installing the camshaft covers



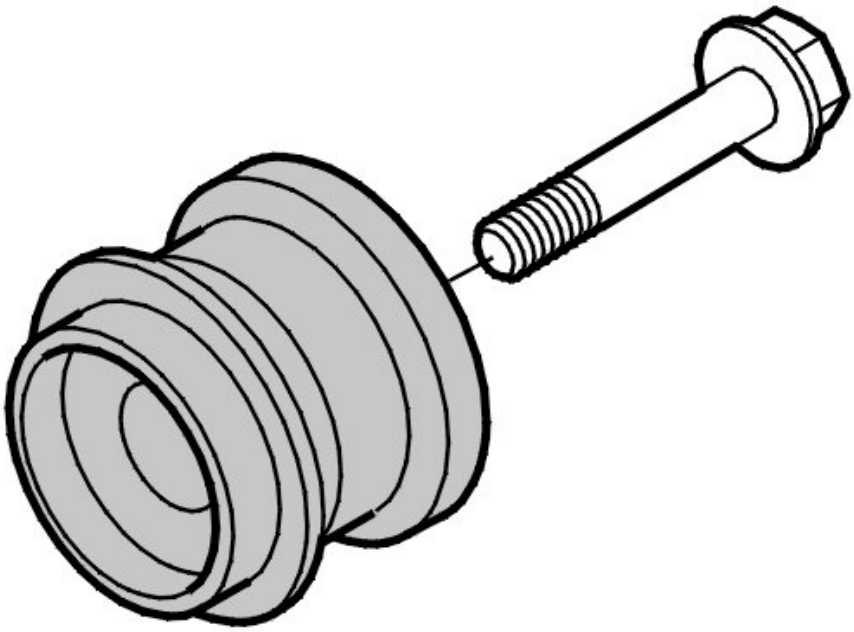
Lubricate the camshaft lobes, the camshaft bearing surfaces and the valve lifters.
Install the camshaft cover.
Install 2 press tools 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool.
Tighten the camshaft cover screws alternately, keeping it parallel to the cylinder head using the press tools.
Install all the screws and tighten.
Remove the press tools.
Install the spark plugs. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Install the control valve for the variable valve timing unit with a new gasket. Tighten.

Cleaning

To clean the camshaft journal and mating surface, use emery cloth P/N **951 1024**.

Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

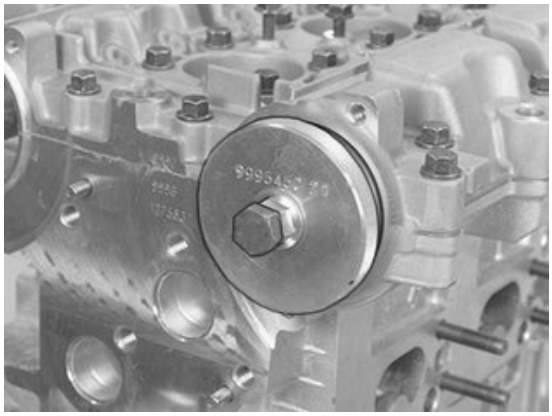
Installing the front camshaft seal



9995718

Use drift 999 5718 Drift See: Tools and Equipment/999 5718 Drift.
Use new seals.
Lubricate the surface of the seal that the camshaft rotates against.
Tap in the seal until the drift bottoms against the end of the camshaft.

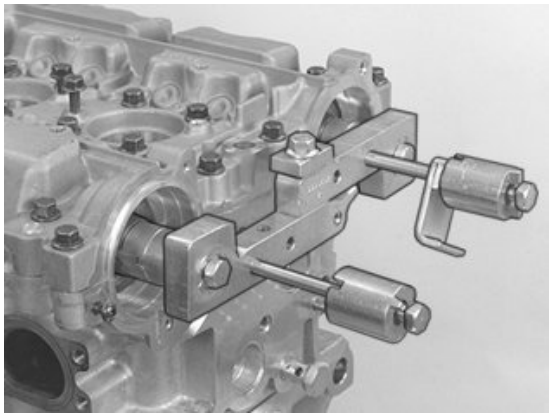
Installing the rear camshaft seal



Use drift 999 5450 PUNCH See: Tools and Equipment/999 5450 Punch.
Lubricate the surface of the seal that the camshaft rotates against.
Install the seal.
Press in the seal until the drift bottoms out.
Continue the work with the next sealing ring.

Note! If there are grooves on the camshaft, the seal can be pressed in a further 2 mm by reversing the sleeve.

Securing the camshafts



Use camshaft adjustment tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool.

Note! The camshafts must not be turned more than is listed in the text below. The valves may be damaged!

Screw the adjustment tool sections together into one.
Check that the screws retaining the adjustment tool to the camshafts and the screws holding the tool together are well tightened.

Cylinder Head/Gasket, Replacing

Cylinder head/gasket, replacement

Special tools:

999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
999 5670 Pliers See: Tools and Equipment/999 5670 Pliers
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
951 2767 Roller See: Tools and Equipment/951 2767 Roller
999 5450 PUNCH See: Tools and Equipment/999 5450 Punch
999 5718 Drift See: Tools and Equipment/999 5718 Drift
999 5719 Drift See: Tools and Equipment/999 5719 Drift

Note! Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Note! There are a number of versions of the VVT-unit (variable valve timing). Therefore it is extremely important to always read the information referring to the engine variant/model year to be remedied.

Removal

Preparation

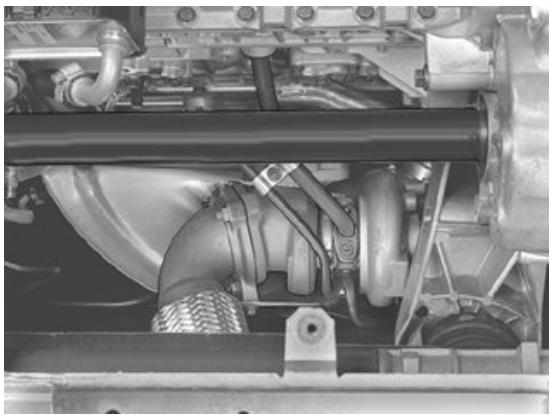
Remove

- the radiator breather tube from the expansion tank. Install lock grip pliers
- the battery negative lead. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- the right front wheel.

Draining coolant

Raise the car.
Remove the splash guard under the engine.
Open the engine nipple.
Drain the coolant into a container.
Close the nipple.

Removing components



Remove:

- the clamp between the oil pressure pipe and the oil return line at the turbocharger (TC)
- the pipe screw that holds the oil pressure pipe to the connector on the cylinder block
- the oil return line. Seal the opening in the cylinder block
- the lower screw that holds the heat deflector plate over the turbocharger (TC)
- the nuts for the front exhaust pipe connection to the turbocharger (TC). Lift off the exhaust pipe and tie it up. Seal the opening in the exhaust pipe

Note! The metal hose for the front exhaust pipe is easy to damage if it is twisted. Handle it with care to avoid leakage.

Depressurizing the fuel system

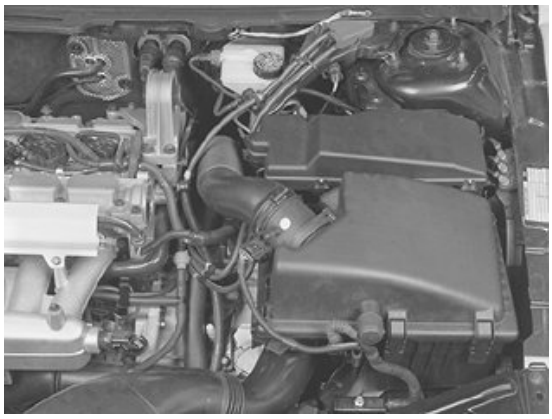
Lower the car.
Depressurize the fuel system according to: Fuel system pressure release See: Fuel Pressure Release/Service and Repair.

Removing components

Remove

- the engine stabilizer brace between the suspension turrets
- the ground strips between the engine and the firewall
- the heat deflector plate above the turbocharger (TC)
- the plastic charge air pipe above the engine. Seal the openings
- the cover over the nozzle pipes
- the cover over the ignition coils
- the upper engine coolant hose for the engine and radiator
- the screw holding the dip stick pipe to the intake manifold
- the brake vacuum hose from the intake manifold.

Undo the clamp holding the plastic charge air pipe to the electronic throttle module.



Remove

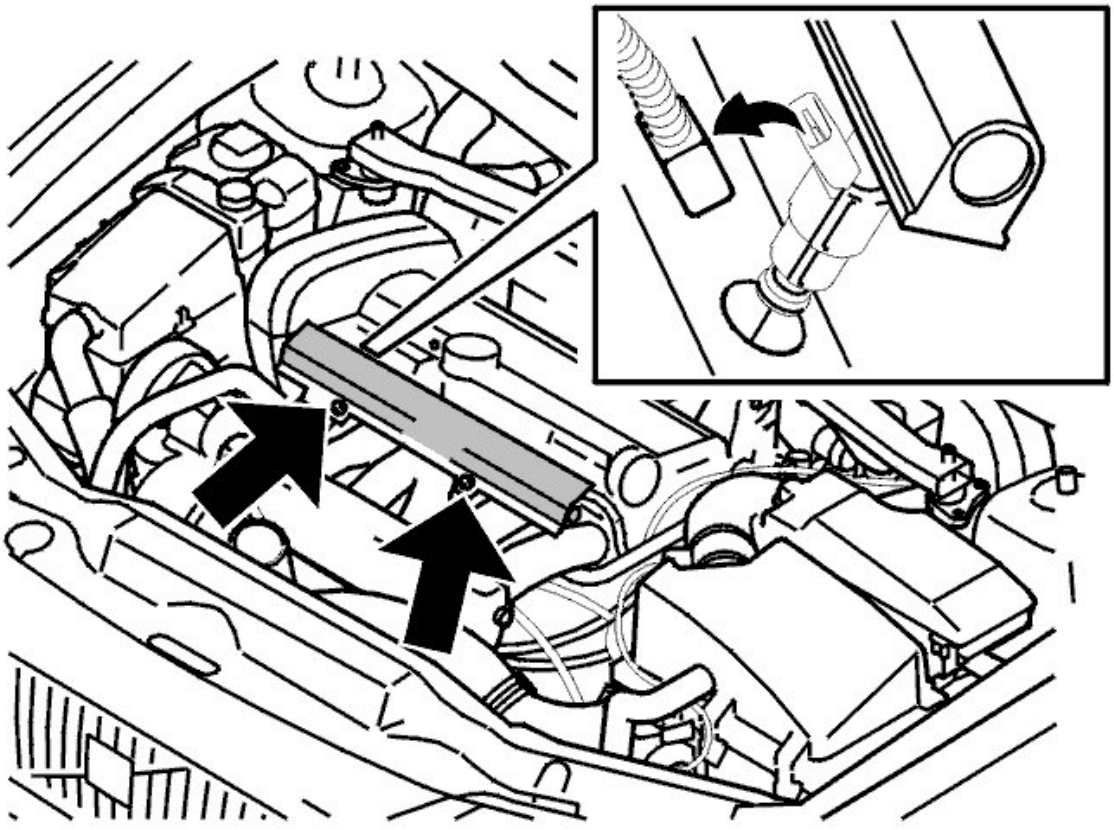
- the connector from the mass air flow (MAF) sensor
- the intake hose from the mass air flow (MAF) sensor. Seal the opening.

Release the hoses from the bracket at the rear of the cylinder head. Remove the bracket.

Remove

- the clamp for the positive lead at the rear of the cylinder head
- the torque bracket
- the pipe screw for the water-heated crankcase ventilation.

Removing the fuel rail



- Remove the clamp for the injector wiring at the rear of the cylinder head
- Detach the wiring from the injectors
- Remove the fuel rail mounting screws
- Spray universal oil or similar around the injector connectors on the intake manifold
- Gently work the fuel rail and injectors loose
- Separate the quick-release connector for the fuel line. See Fuel line, lock See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Rail/Service and Repair.
- Carefully put the fuel rail to one side.

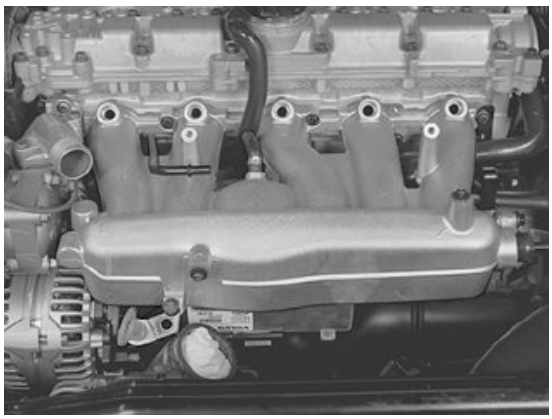
Removing ignition coils

- Mark up the ignition coils so that their original positions can be established
- Remove the mounting screws for the ignition coils and the screws at the two ground terminals
- Disconnect the connector for the variable valve timing solenoid
- Lift up and place the ignition coils and wiring to one side.

Remove:

- the crankcase ventilation hose from the top of the camshaft cover
- the camshaft position sensor (CMP) housing and trigger wheel.

Removing intake manifold



Remove:

- The EVAP hose from the intake manifold
- the by-pass valve vacuum hose. Disconnect the connector for the electronic throttle module (ETM)
- the upper row of screws holding the intake manifold to the cylinder head. Slacken off the lower screws. Lift up the intake manifold. Remove the pipe screw for the water heated crankcase ventilation underneath the intake manifold
- the pipe screw for the crankcase ventilation from the underside of the intake manifold.

Lift up and remove the intake manifold.

Note! Make sure that the fuel pressure pipe is not damaged.

Removing components

Disconnect the connectors for the ABS sensor and level sensor in the expansion tank.
Lift up the expansion tank and servo oil reservoir. Place them on top of the engine.

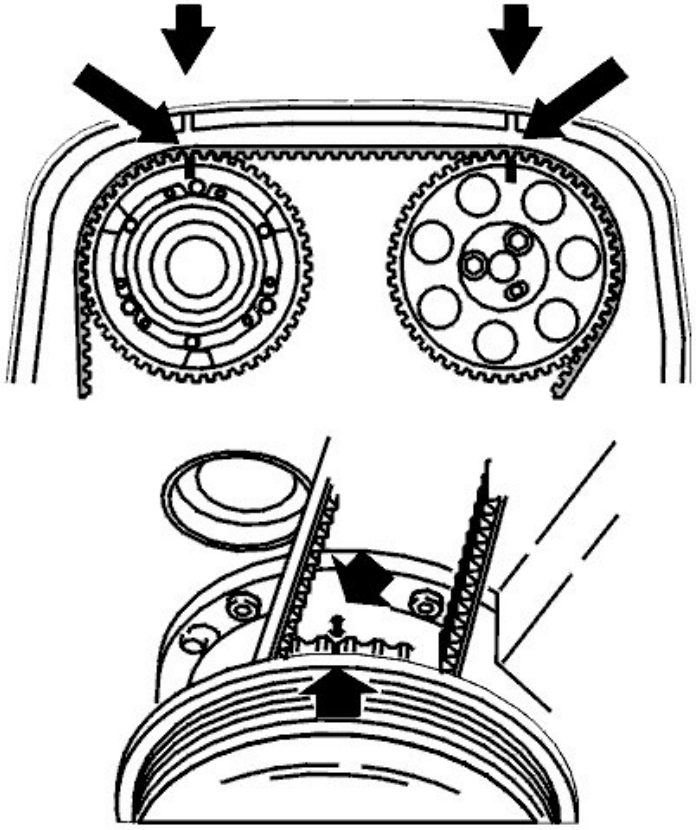
Note! Make sure that oil does not leak from the breather hole in the filler cap.

Remove the auxiliaries belt.

Remove:
- front timing cover
- the hose for the water-heated crankcase ventilation from the thermostat housing.

Separate the connector for the engine coolant temperature (ECT) sensor.

Setting up the engine



Remove the nuts from the cover on the fender liner.
Turn the crankshaft clockwise until the markings on the crankshaft and camshafts correspond.
Remove the upper timing cover.

Removing the timing belt

Slacken off the center screw for the belt tensioner slightly.
Hold the center screw secure and turn the tensioner eccentric clockwise with a 6 mm Allen key to 10 o'clock.

Remove:
- the timing belt from the timing gear pulley

- the screw that holds the inner timing cover to the cylinder head.

Install tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.

Removing the timing gear pulley

Remove the cable duct from its mountings on the right-hand suspension turret.

Note! Do not damage the paintwork.

Hold the cable duct out of the way and remove:

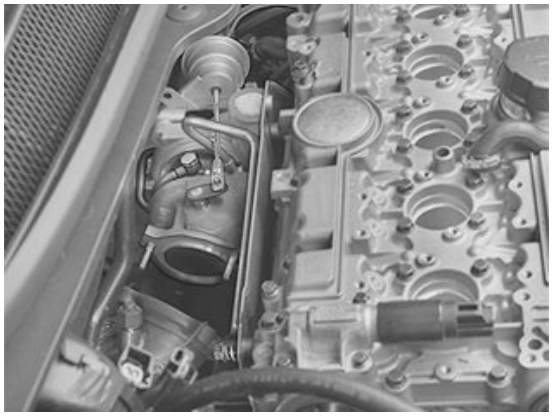
- the plug at the front of the variable valve timing unit (TX55).

Note! Use paper or similar to absorb oil that drains.

- the center screw in the variable valve timing unit (TX55).

Carefully pull out the timing gear pulley with the variable valve timing (VVT) unit.
Remove tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool.

Removing components from turbocharger (TC)

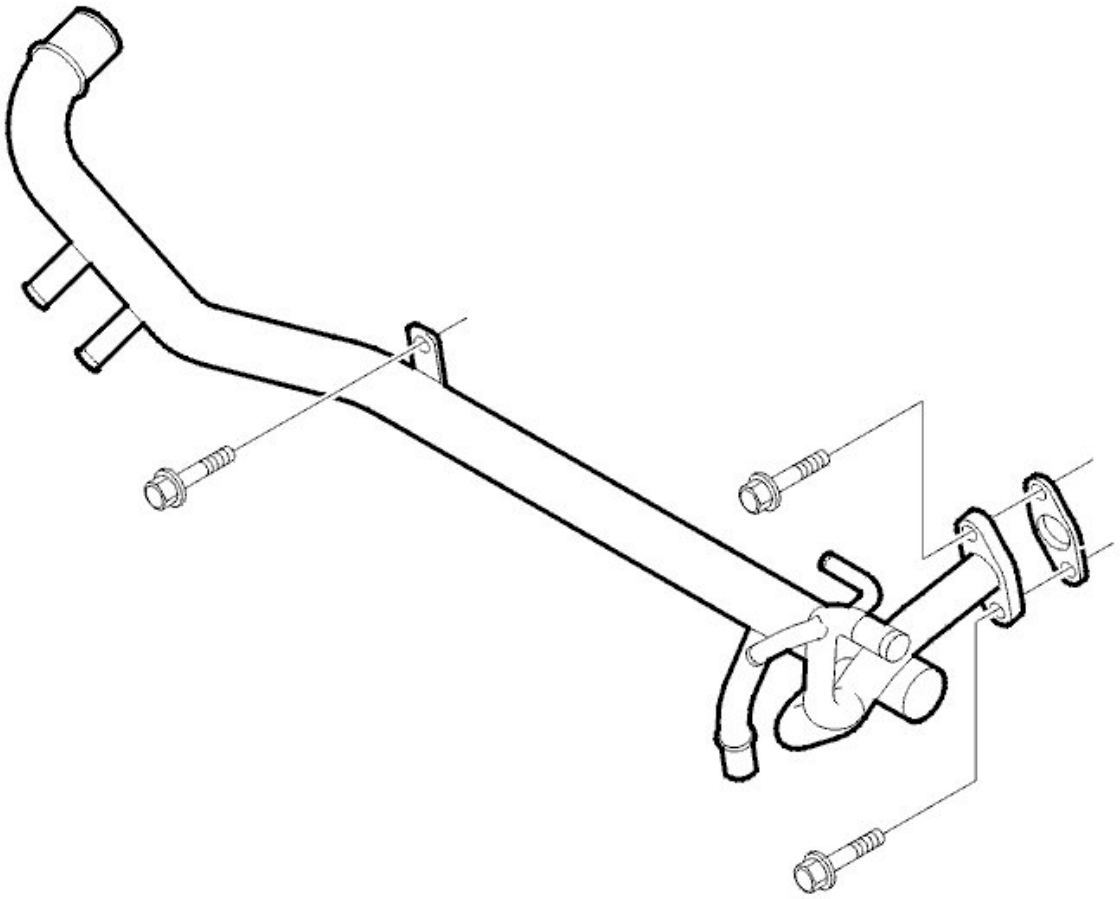


Remove:

- the heat deflector plate above the manifold
- the upper engine coolant pipe. Place it to one side
- the oil pressure pipe for the turbocharger (TC)
- the pipe screw at the lower coolant pipe for the turbocharger (TC). Put the pipe to one side
- the nuts and washers holding the manifold to the cylinder head.

Lift off the turbocharger and manifold. Carefully put them on top of the transmission.

Releasing the inlet pipe for the coolant pump



Remove:

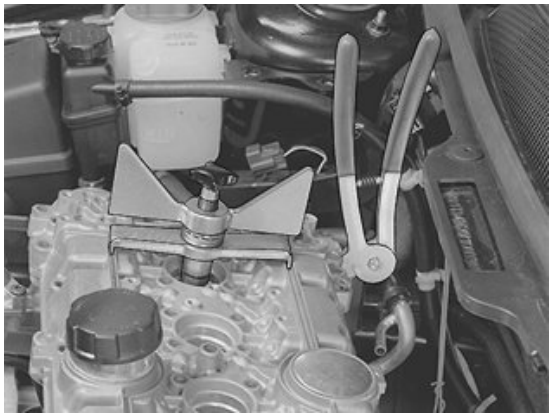
- the screw that holds the coolant pump intake pipe to the engine block a few turns. Leave the screw in place
- the two screws for the connection between the coolant pipe and the bypass channel. Carefully turn the pipe to remove it from the cylinder block.

Removing the camshaft cover and cylinder head

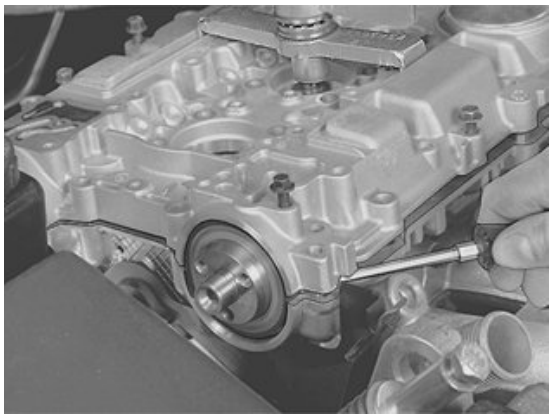
- Remove the spark plugs from cylinders 1 and 5
- Install 2 tools 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool. Leave a 2-3 mm gap to the camshaft cover.

Note! Make sure that the screw in the sparkplug thread is fully tightened. VVT-solenoid (variable valve timing).

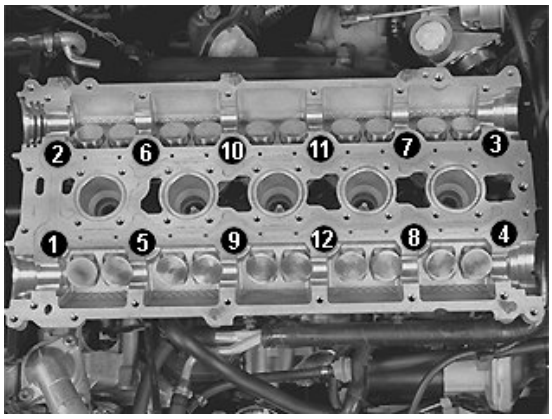
- The variable valve timing solenoids.
- Remove all the screws securing the camshaft cover to the cylinder head.



- Use pliers 999 5670 Pliers See: Tools and Equipment/999 5670 Pliers to lift the cover from the cylinder head.
- Install the pliers at the stop lugs. Start with cylinder 1 and work alternately backwards
- Slacken off the wing nuts approximately 2 turns. Repeat the procedure.



Carefully press out the front and rear camshaft seals.



Remove:

- tools 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
- the camshaft cover
- the camshafts
- the screws holding the cylinder head onto the cylinder block. Start at the sides and work alternately towards the center.

Get some help and lift of the cylinder head. Place the cylinder head on two wooden blocks.

Note! Work carefully to avoid damaging the contact faces.

When replacing or working on the cylinder head

Lift out the valve lifters. Use a magnet or suction cup.
Remove the thermostat housing and transfer it to the new cylinder head.

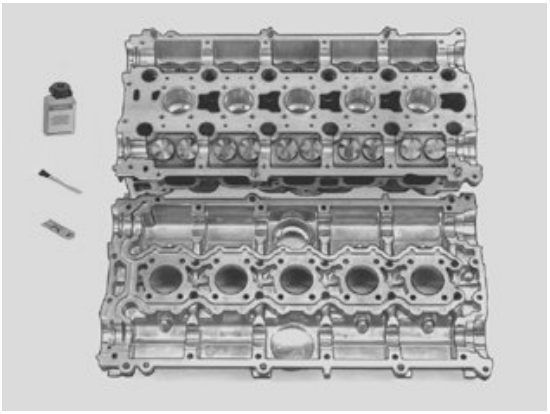
Note! Work carefully to avoid damaging the contact faces.

Installation

Note! For tightening torques, see: Tightening torque See: Specifications/Tightening Torque.

Note! To ensure that there is no exhaust leakage, see: Flanged joint, assembling See: Exhaust System/Exhaust Pipe/Service and Repair.

Cleaning



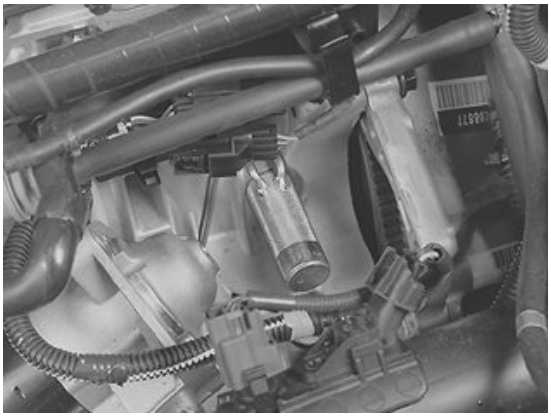
Warning! Use a fume hood or extractor when using gasket solvent!

Clean the gasket faces for:
- the manifold. Check that the studs are tightened
- the coolant bypass channel
- the thermostat housing
- the intake manifold
- the cylinder block
- camshaft cover.

Blow the oil ducts clean.

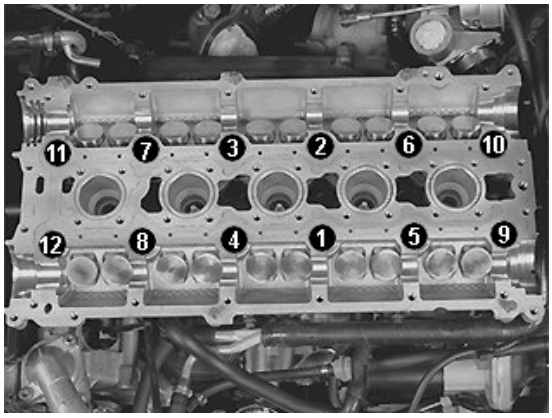
Note! Use a razor blade or a gasket scraper and gasket solvent P/N 1161 440.

Setting up the engine



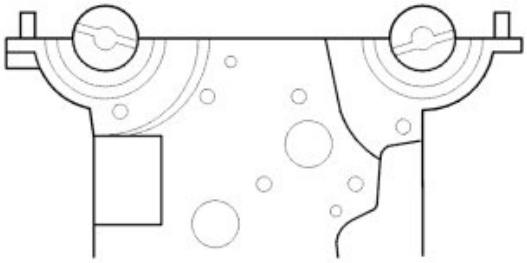
- Position the crankshaft
- Remove the starter motor mounting screws. Pull out the starter motor and place it to one side
- Remove the blind cover plug
- Turn the crankshaft slightly **clockwise**.
- Install crankshaft stop 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Ensure that it bottoms out against the cylinder block.
- Turn the crankshaft **counter-clockwise** until it stops against the crankshaft stop
- Check that the marking on the crankshaft timing gear pulley corresponds with the marking on the oil pump.

Installing the cylinder head



- Ensure that all studs at the exhaust ports are tightened
- Lubricate the studs with paste **116 1408.**
- Install a new cylinder head gasket
- Install the cylinder head
- Lubricate and install all the screws (use new screws).
- Tighten the screws as illustrated. Tighten. See Tightening torque See: Specifications/Tightening Torque. Use protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor.

Installing valve lifters and camshafts

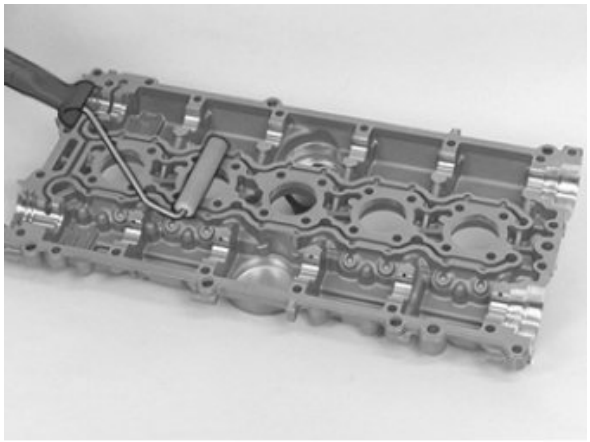


- Lubricate the valve lifter wells.

  Note! If the cylinder head has been replaced, the valve clearance must be adjusted. See Valve clearance, B5244T5, B5254T2 See: Valve Clearance/Adjustments.

- Install all valve lifters
- Lubricate the camshaft bearing positions
- Install the intake camshaft. Ensure that the groove at the back of the camshaft is **above** an imaginary center line
- Position the exhaust camshaft. Ensure that the groove at the back of the camshaft is **below** an imaginary center line.

Applying liquid gasket

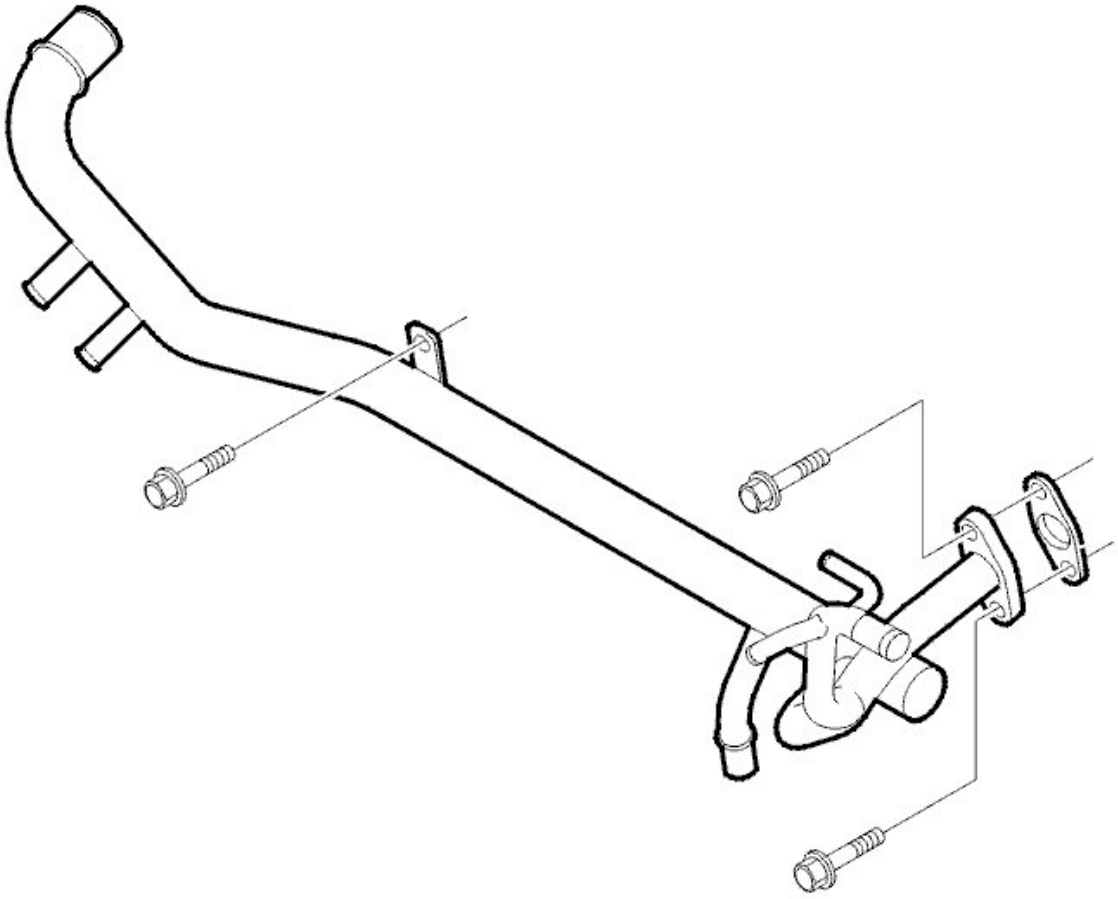


Install new O-rings around the spark plug wells at the cylinder head.
Apply liquid gasket **1161 059** to the camshaft cover.
Use roller 951 2767 Roller See: Tools and Equipment/951 2767 Roller. The surface must be **covered without any excess**.

Note! Make sure that no liquid gasket ends up in the oil channels.

Installing the camshaft cover

- Lubricate the camshaft lobes, the camshaft bearing surfaces and the valve lifters
- Install the camshaft cover
- Install press tool 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool (2x).
- Tighten the camshaft cover screws alternately, keeping it parallel to the cylinder head using the press tools
- Install all the screws. Tighten the screws from the middle and outwards
- Remove the press tools.



Install:

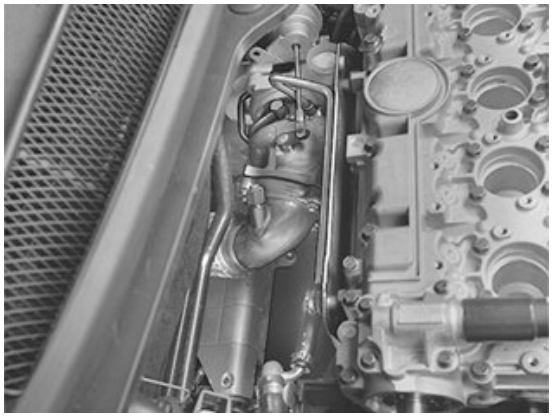
- the variable valve timing (VVT) solenoid. Use a new gasket.
- the spark plugs. Tighten. See Tightening torque See: Specifications/Tightening Torque
- the hose for water-heated crankcase ventilation to the thermostat housing. Tighten the clamp.

Connect the connector for the engine coolant temperature (ECT) sensor.
Install the inlet pipe for the coolant pump on the cylinder head. Use a new gasket.

Note! Apply thread sealant, 116 056 to the screw threads.

Tighten the screw for securing the coolant pump inlet pipe to the cylinder block.

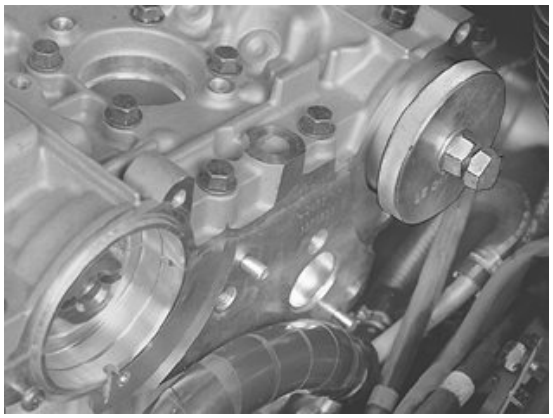
Installing the manifold and turbocharger (TC)



Install:
- new gaskets. Lift and install the manifold and turbocharger (TC)
- the nuts and washers holding the manifold to the cylinder head
- the upper and lower turbocharger (TC) coolant pipes. Tighten the clamp on the rubber hose
- the pipe screws for the coolant pipes. Use new seal washers. Tighten
- the oil pressure pipe
- the pipe screw holding the oil pressure pipe to the turbocharger (TC). Use new seal washers. **Do not tighten!**

Lubricate the studs on the turbocharger (TC). Use paste **116 1408**.
Install the front exhaust pipe onto the turbocharger (TC). Use new nuts. **Do not tighten!** Install the heat deflector plate over the manifold.

Installing the rear camshaft seal



To clean the shaft journal and mating surface, use emery cloth P/N 951 1024.

Note! For cleaning, work around the shaft journal - not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new seal ring is installed.

Use drift 999 5450 PUNCH See: Tools and Equipment/999 5450 Punch.
Lubricate the surface of the seal that the camshaft rotates against.
Press in the seal until the drift bottoms out.

Note! If there are grooves on the camshaft, the seal can be pressed in a further 2 mm: Reverse the sleeve.

Install camshaft adjustment tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.
Ensure that the screws retaining the adjustment tool to the camshafts and the screws holding the tool together are well tightened.

Installing the front camshaft seals

- Use drift 999 5718 Drift See: Tools and Equipment/999 5718 Drift.
- Lubricate the surface of the seal that the camshaft rotates against.
- Use the variable valve timing unit / timing belt pulley mounting screws. Tighten the screws until the drift bottoms out
- Remove the drift
- Install the screw holding the inner timing cover to the cylinder head.

Checking and adjusting the variable valve timing unit

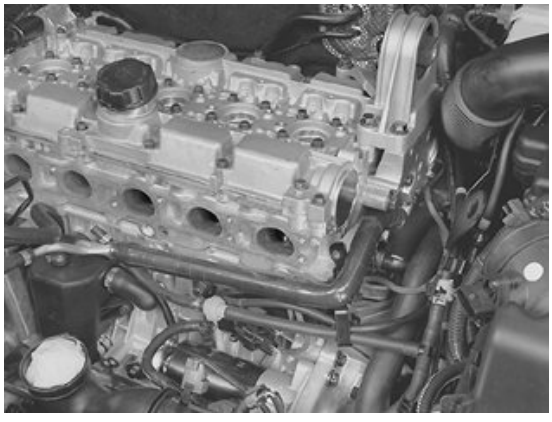
Check and adjust the variable valve timing unit. See: Variable valve timing unit, checking and adjusting, B5244T5, B5254T2 See: Actuators and Solenoids - Engine/Variable Valve Timing Actuator/Testing and Inspection

Installing components

Install:

- front timing cover
- the cable duct to the mountings on the right suspension turret
- the auxiliaries belt
- the expansion tank
- the servo oil reservoir
- the bleed hose to the expansion tank. Tighten the clamp.

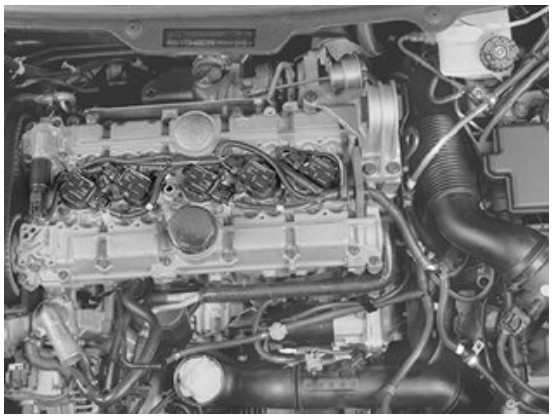
Check that the hoses are installed correctly.
Connect the connectors for the ABS sensor at the right suspension turret and for the coolant level sensor in the expansion tank.



Install:

- the starter motor
- the pipe screw for the water heated crankcase ventilation at the rear of the cylinder head. Use new seal washers. Tighten to **26 Nm**

- the camshaft position sensor (CMP) housing and trigger wheel
- the lower engine stabilizer brace bracket in the cylinder head
- the upper engine stabilizer brace.



Install:

- the bracket and lifting eyelet for the engine stabilizer brace bracket
- the ignition coils and ground terminals according to earlier markings. Connect the connector for the variable valve timing solenoid
- the clamp for the positive lead at the lifting eyelet bracket
- the plastic intake pipe to the mass air flow (MAF) sensor. Tighten the clamp.

Connect the connector to the mass air flow (MAF) sensor. Use a clamp on the wiring at the front of the air cleaner (ACL).

Installing intake manifold

Clean the intake manifold gasket face to the cylinder head.
Install a new gasket on the cylinder head. Secure with the two screws in the lower row.
Lower and twist the intake manifold so that the fuel pressure line goes through the cavity in the intake manifold.

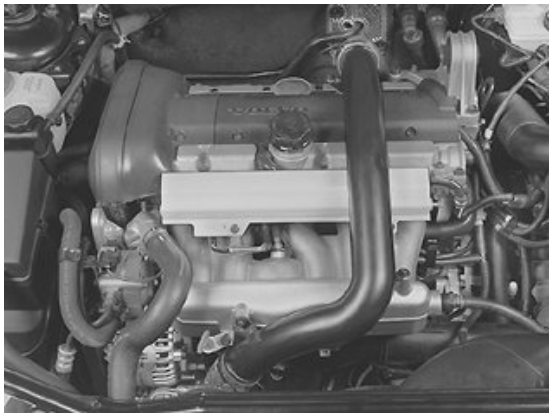
Note! Work carefully to avoid damaging the fuel pressure pipe.

Route the crankcase ventilation hose through the cavity in the intake manifold.

Install:

- the pipe screw for the crankcase ventilation on the underside of the intake manifold. Use new seal washers. Tighten to **26 Nm**
- the rest of the screws holding the intake manifold to the cylinder head. Tighten to **19 Nm**
- the hose to the canister purge (CP) valve
- the control hose for the turbocharger (TC) by-pass valve
- the brake vacuum hose
- the crankcase ventilation hose to the top of the camshaft cover. Use a new clamp
- the cover over the ignition coils
- the upper timing cover
- the upper engine coolant hose for the engine and radiator. Tighten the clamp
- the screw holding the dip stick pipe to the intake manifold. Connect the connector to the electronic throttle module (ETM)
- the charge air pipe between the throttle body (TB) and the charge air cooler (CAC). Remove the seal. Tighten the clamp.

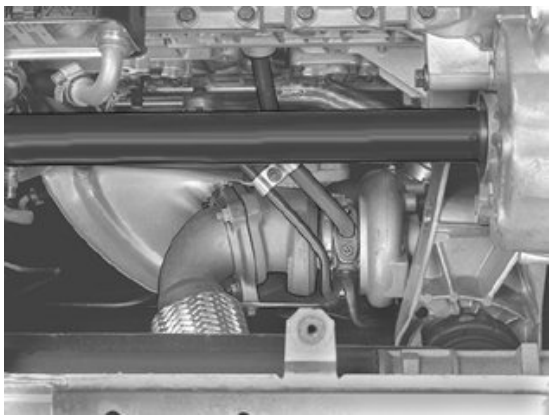
Installing the fuel rail



Install:

- the fuel rail. Use new screws. Press the quick-release connector for the fuel pressure line until it clicks. See Fuel line, lock See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Rail/Service and Repair
- the clamp for the injector wiring at the rear of the cylinder head
- the protective cover over the injector connectors
- the charge air pipe over the engine. Tighten the pipe using the three screws on the engine. Tighten the clamps.

Installing components



Raise the car. Install:

- the pipe screw that holds the turbocharger (TC) oil pressure pipe to the engine. Use new seal washers. Tighten. See Tightening torque See: Specifications/Tightening Torque
- the turbocharger (TC) oil return line. Use a new gasket and sealing ring. Tighten. See Tightening torque See: Specifications/Tightening Torque
- the clamp between the oil pressure pipe and the oil return line. Tighten the three nuts that hold the front exhaust pipe to the turbocharger (TC). See Tightening torque See: Specifications/Tightening Torque.
- the lower screw for the heat deflector plate over the turbocharger (TC)
- the splash guard under the engine
- the plastic nuts for the hatch in the right fender liner
- the right front wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Lower the car.
Tighten the pipe screw for the turbocharger (TC) oil pressure pipe. See Tightening torque See: Specifications/Tightening Torque.

Install:

- the ground strips between the cylinder head and the firewall

- the engine stabilizer brace between the suspension turrets Clamp the servo hose at the right-hand engine stabilizer brace mounting
- the negative battery lead. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Check

Replace the oil and oil filter if necessary.

Check:

- the engine oil level
- the servo oil level
- the coolant level.

Warm up the engine until the thermostat opens.
Check the engine for leaks.
Top up the coolant if necessary.

Cylinder Head Assembly: Overhaul

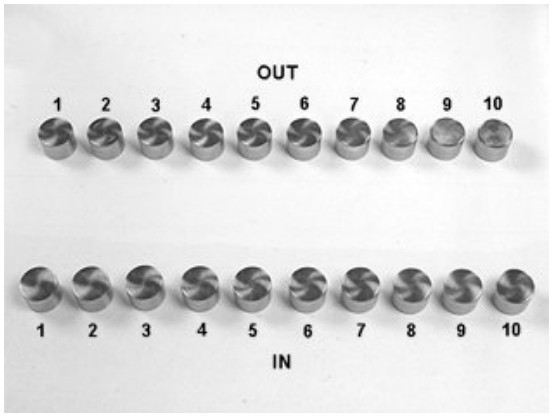
Cylinder head, dismantling/assembling

Special tools:

998 6052 VALVE SPRING B21 D16 D24 See: Tools and Equipment/998 6052 Valve Spring B21 D16 D24
999 5219 GRIP TOOL See: Tools and Equipment/999 5219 Grip Tool
999 5748 Valve compressor B 4164-B 6304 See: Tools and Equipment/999 5748 Valve Compressor B 4164-B 6304
999 7012 Drift valve stem seal diesel See: Tools and Equipment/999 7012 Drift Valve Stem Seal Diesel

Note! The illustrations in this service information are used for different model years and / or models. Therefore there may be some variation. However, the essential information in the illustrations is always correct.

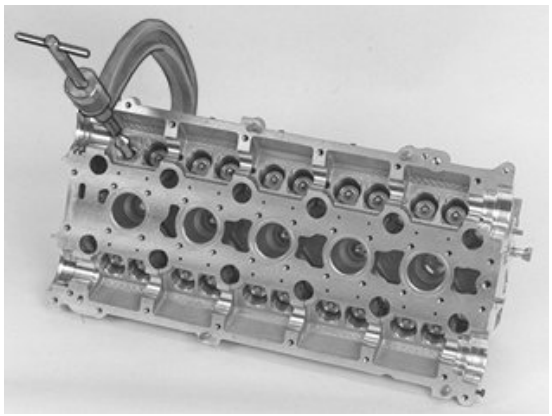
Removing tappets



Note! Magnets must not be used when lifting out the tappets.

Lift out the tappets. Mark up the tappets so that the original positions can be established.
Use a suction cup to remove the tappets.
Check for wear on the tappets.

Removing valves

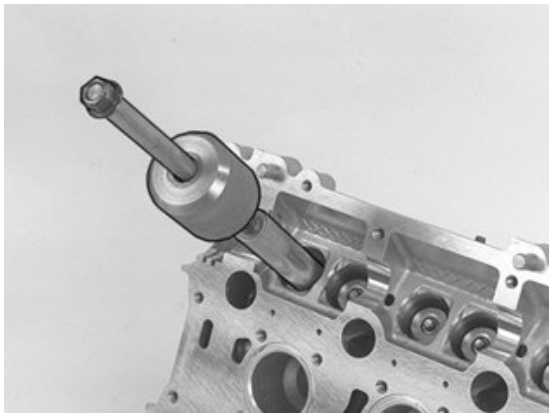


Use valve spring compressor 998 6052 VALVE SPRING B21 D16 D24 See: Tools and Equipment/998 6052 Valve Spring B21 D16 D24 with attachment claw 999 5748 Valve compressor B 4164-B 6304 See: Tools and Equipment/999 5748 Valve Compressor B 4164-B 6304.

Remove:
- the valve locks
- the upper valve collars
- the valve springs
- the valves.

Note! Keep careful track of the position of the moving parts.

Removing valve stem seals

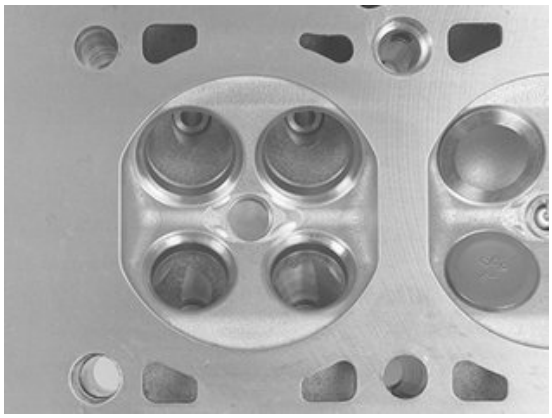


Use tool 999 5219 GRIP TOOL See: Tools and Equipment/999 5219 Grip Tool.
Remove the valve stem seals and the lower valve collars.

Clean the cylinder head:

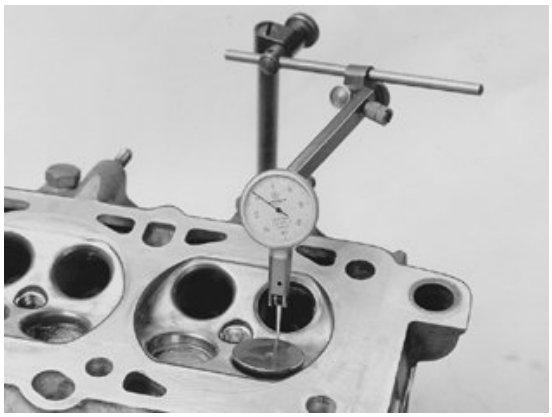
- the gasket faces
- the combustion chambers
- the inlet and exhaust ports
- the valve seats.

Checking the cylinder head



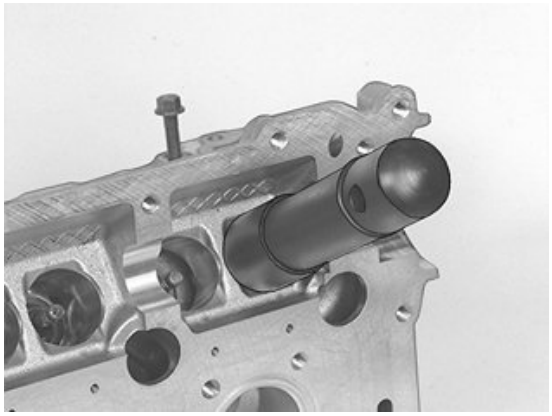
Clean the spark plug threads (tap M14 x 1.25).
Clean the valves, valve springs and collars.
Visually check for damage.
If you are unsure, replace the cylinder head.

Checking for wear in the valve guides



Measure the wear in the valve guides. Use a dial indicator and magnetic holder. Lift the valve approximately **2-3 mm** from the seat when carrying out the check.
Clearance between the valve and valve guide:
Clearance between new components: Inlet/Exhaust: **0.03 -0.06 mm**.
Maximum play for used components: Inlet/Exhaust: **0.15 mm**.

Installing valve stem seals

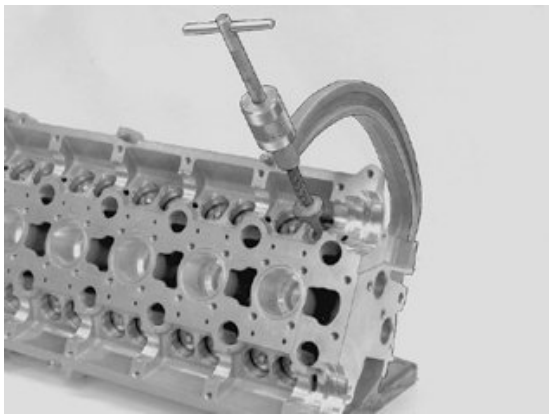


Lubricate:
- the upper end of the valve guides
- the valve stem seal.

Install:
- the lower valve spring collars
- the valve stem seal.

Press down the seal. Use tool 999 7012 Drift valve stem seal diesel See: Tools and Equipment/999 7012 Drift Valve Stem Seal Diesel. Press with hand force until the tool stops against the lower valve spring washer. Remove the tool.
Repeat the procedure with the remaining valve stem seals.

Installing the valve / valve springs



Lubricate the valve stem.

Install:
- the valve
- the valve spring
- the upper valve spring washer.

Caution! Do not compress more than is absolutely necessary, the valve stem seal may be damaged.

Compress the valve spring so that the three valve lock tracks are visible.
Use valve spring compressor 998 6052 VALVE SPRING B21 D16 D24 See: Tools and Equipment/998 6052 Valve Spring B21 D16 D24 and press foot 999 5748 Valve compressor B 4164-B 6304 See: Tools and Equipment/999 5748 Valve Compressor B 4164-B 6304. Install the valve collets. Check that valve collets are in the correct position when the spring is not loaded.
Repeat the procedure with the remaining valves.

Valve Clearance: Adjustments

Valve clearance

Special tools:

951 2767 Roller See: Tools and Equipment/951 2767 Roller
999 5450 PUNCH See: Tools and Equipment/999 5450 Punch
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool
999 5670 Pliers See: Tools and Equipment/999 5670 Pliers
999 5718 Drift See: Tools and Equipment/999 5718 Drift
999 5719 Drift See: Tools and Equipment/999 5719 Drift
999 5752 Feeler gauge See: Tools and Equipment/999 5752 Feeler Gauge
999 5765 Holder camshaft See: Tools and Equipment/999 5765 Holder Camshaft

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Note! There are a number of versions of the variable valve timing unit. Therefore, it is extremely important to always read the information referring to the engine variant/model year to be worked on.

Preparation

Remove the cable from the battery negative terminal. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.
Check the valve clearance. See Information See: .

Note! Note the valve clearance in the inspection form!

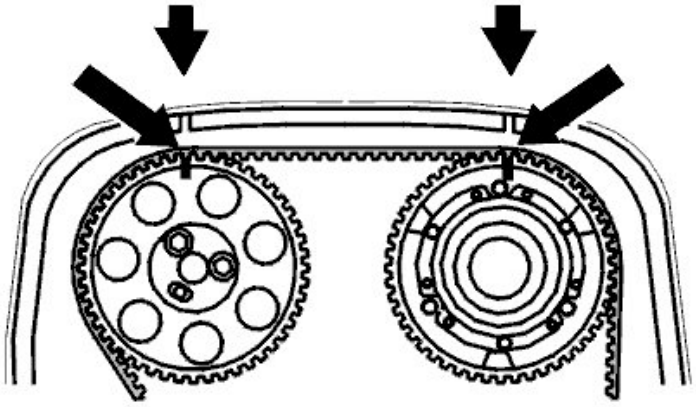
Remove

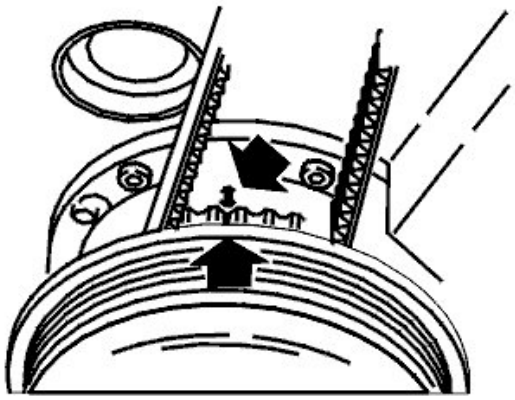
- the cross stay between the suspension turrets
- the ground strip from the cylinder head
- the upper engine stabilizer brace
- the cover in the cylinder head at the rear of the exhaust camshaft
- the crankcase ventilation hose from the top of the camshaft cover
- the radiator breather tube from the expansion tank. Install lock grip pliers.

Lift up the brake fluid reservoir.
Disconnect the ABS sensor connector.
Place the brake fluid reservoir over the engine.

Warning! Make sure that no fluid is spilled on the engine. It is extremely flammable!

Disconnect the connector for the level sensor in the expansion tank.
Lift up and place the expansion tank on top of the engine.





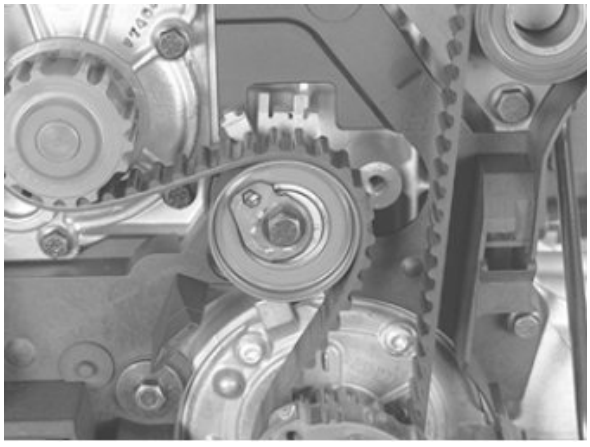
Remove

- the auxiliaries belt
- the front timing cover.

Position the upper timing cover.
Turn the crankshaft clockwise until the markings on the crankshaft belt pulley and the timing belt pulley are aligned with the markings on the oil pump and the upper timing cover.
Remove the upper timing cover.

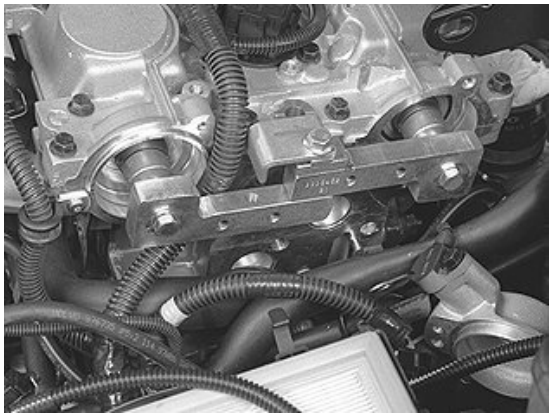
Caution! Crankshaft and camshafts must not be turned more than is stated in the method description. If the shafts are turned in any other way the valves may be damaged.

Removing the timing belt



Slacken off the center screw for the belt tensioner slightly.
Hold the center screw still. Turn the tensioner eccentric clockwise to 10 o'clock using a 6 mm Allen key.
Remove the timing belt from the camshaft pulleys.

Removing the timing gear pulley



Install gauge 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.
Check that the screws securing the adjustment tool to the camshafts and the screw holding the tool together are well tightened

Remove (timing gear pulley with variable valve timing unit)

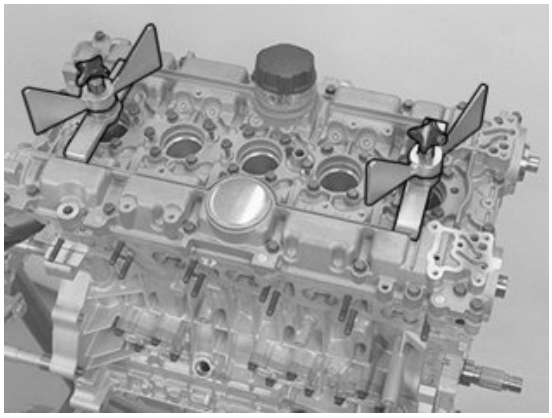
- the plug at the front of the variable valve timing unit (Tx55)
- the center screw in the variable valve timing unit (Tx55). Carefully pull out the variable valve timing unit with the timing gear pulley.

Remove (timing gear pulley without variable valve timing unit)

- the screws securing the timing gear pulley on the camshaft
- the timing gear pulley.

Remove tool 999 5452.
Reinstall the expansion tank and the brake fluid reservoir at the wing liner.

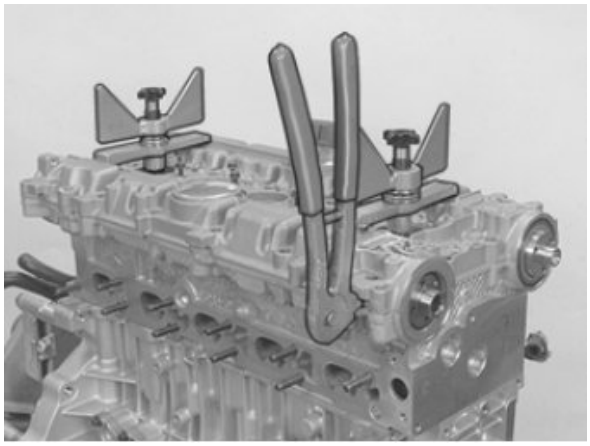
Removing the camshaft cover



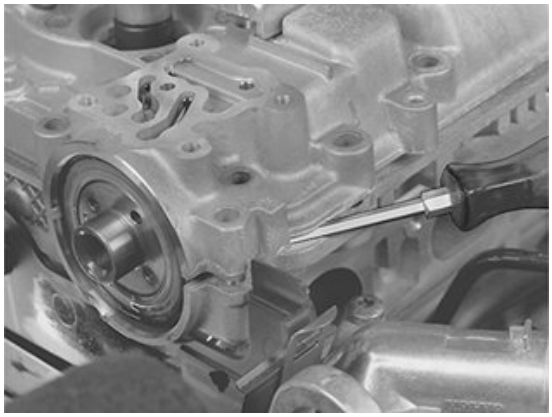
Remove

- the variable valve timing (VVT) solenoid
- spark plugs for cylinders 1 and 5.

Install tool 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool (2 pcs.) with 2-3 mm gap to the camshaft cover.
Ensure that the screw in the spark plug well is fully tightened.
Remove all the screws securing the camshaft cover to the cylinder head.

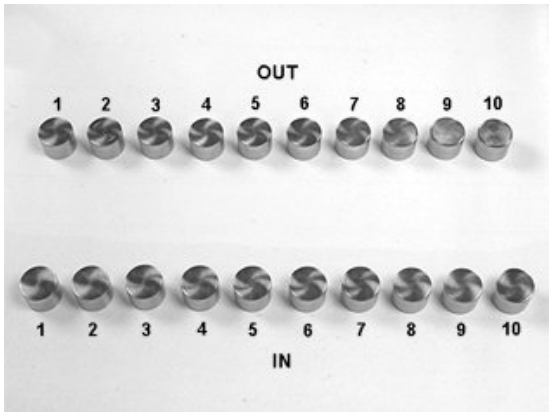


Use pliers 999 5670 Pliers See: Tools and Equipment/999 5670 Pliers to lift the cover from the cylinder head.
Install the pliers at the stop lugs. Start with cylinder 1 and work alternately backward.
Slacken off the wing nuts approximately 2 turns. Repeat the procedure with the pliers.



Carefully press the camshaft seals free.

Note! Be very careful to not damage the sealing surfaces on the camshafts.



Remove

- tool 999 5454
- the camshaft cover
- the camshafts.

Lift out the tappets. Mark up the tappets so that the original positions can be established.

Cleaning

Use a razor blade or a gasket scraper and gasket solvent P/N 1161 440 on the camshaft cover.

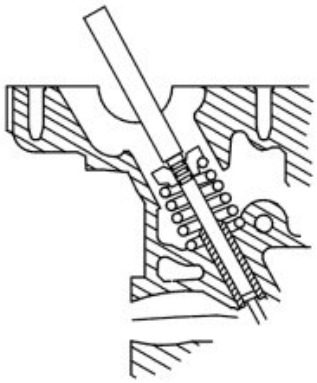
Warning! Use a fume hood or extractor when working with gasket solvent!

Use only a gasket scraper or razor blade on the cylinder head.

Caution! Be very careful around the oil channels for the variable valve timing solenoid. This applies to both the camshaft cover and the cylinder head. The solenoid is extremely sensitive to impurities.

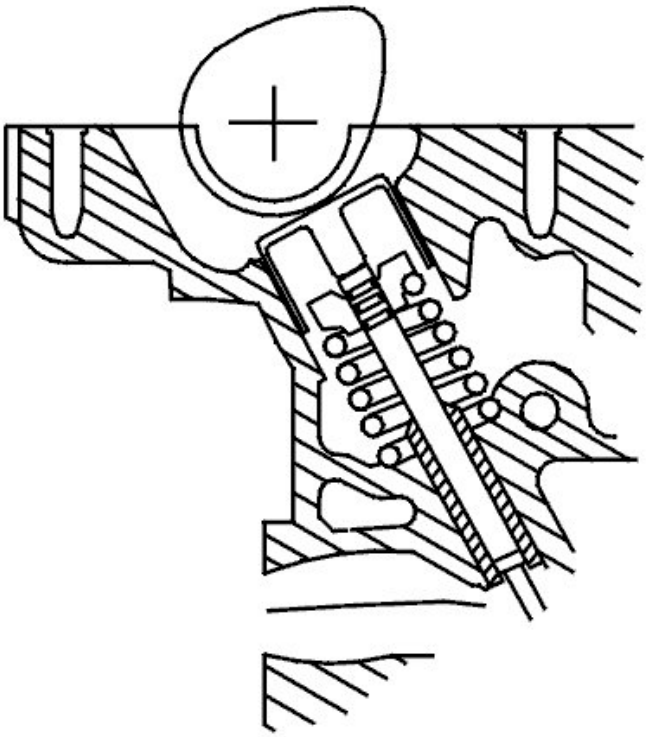
Dry and blow all surfaces clean.

Preparations



Carefully tap the end of the valve stem to ensure that the valve is correctly located in the seat.
Use a plastic, aluminum or brass drift to protect the valve and the surface of the tappet.
The sound made by tapping reveals if the valve is correctly seated.

Installing the camshaft and tappet



Install both the tappets for the inlet valves at cylinder 1.
Check the notes made earlier. Select new tappets if necessary.

Note! Only install two tappets. The tappets should be placed by the same cylinder!

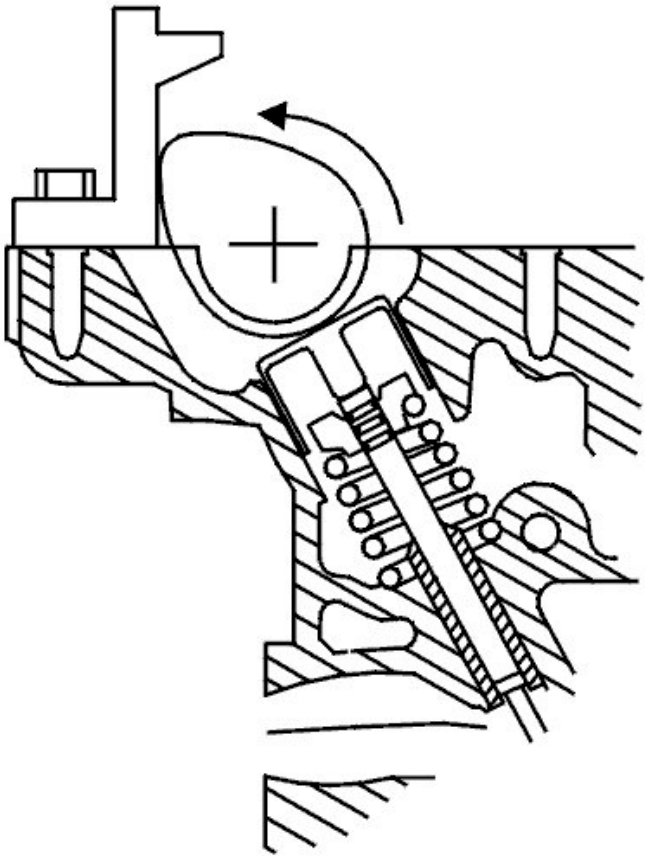
Other tappets are available as replacement part / replacement part kits.

Inlet valve: 0.20 ± 0.03 mm.
Exhaust valve: 0.40 ± 0.03 mm.

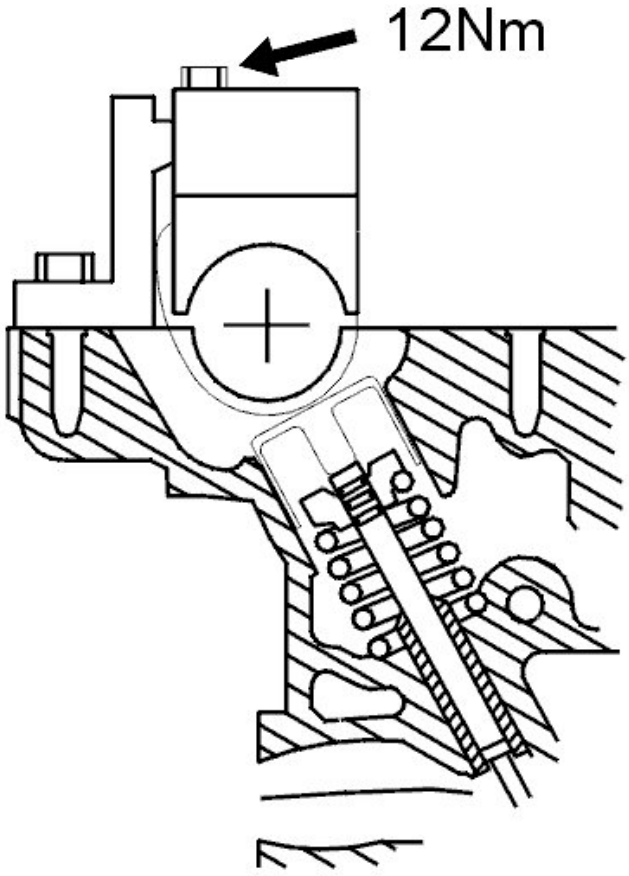
Note! The tolerances are less when setting! When checking the valve clearance through the plug hole, the tolerances are larger.

Position the intake camshaft. Ensure that the lobes at cylinder 1 point upwards.
Apply a little oil to the cam lobe and the upper side of the tappet to facilitate later measurement.

Installing the camshaft press

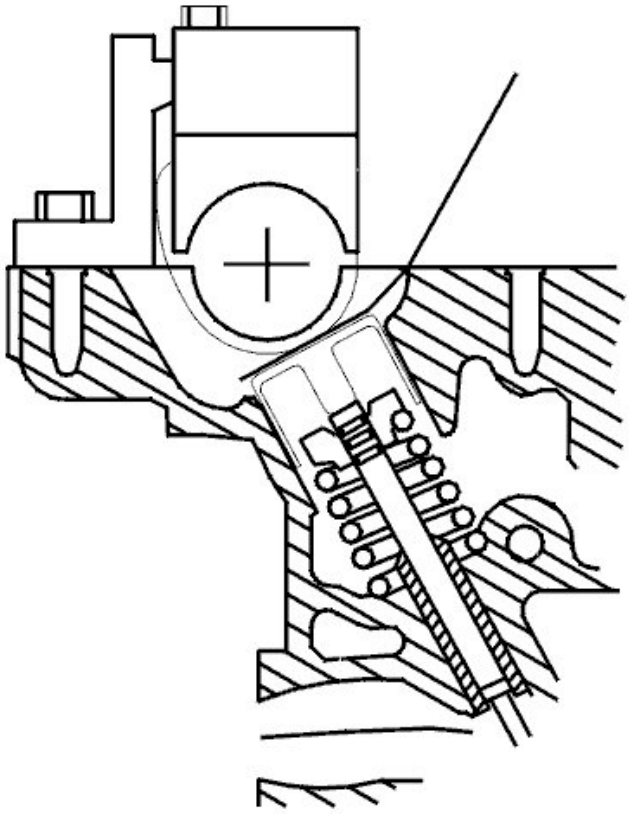


Install the lower section of camshaft press 999 5765 Holder camshaft See: Tools and Equipment/999 5765 Holder Camshaft by the inlet valves for cylinder 1.
Tighten the tool against the cylinder head. Tighten to 17 Nm.
Turn the camshaft until it stops against the camshaft press.



Install the upper section of the camshaft press.
Tighten the screw which tensions the camshaft. Tighten to **12 Nm**.

Checking the valve clearance



Note! Measurements should only be taken on a cold engine. A suitable temperature is approximately 20 °C.

Use feeler gauge 999 5752 Feeler gauge See: Tools and Equipment/999 5752 Feeler Gauge.
Press with a finger so that the feeler gauge lies parallel to the upper side of the tappet (see illustration).
Move the feeler gauge sideways when taking the reading in order to obtain as accurate a measurement as possible.

Inlet valve: 0.20 ± 0.03 mm.
Exhaust valve: 0.40 ± 0.03 mm.

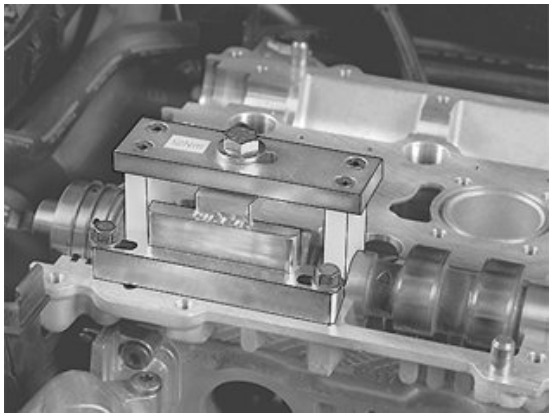
Note! The tolerances are less when setting! When checking the valve clearance through the plug hole, the tolerances are larger.

- 0.01 mm at 15 °C
+ 0.01 mm at 25 °C
+ 0.02 mm at 30 °C
+ 0.03 mm at 35 °C
+ 0.04 mm at 45 °C

Correcting measured clearance

Lift out the upper section of the press tool.
Lift out the camshaft.
Adjust the play by replacing the tappets.
Other tappets are available as replacement part / replacement part kits.
Reinstall the camshaft and the upper section of the press tool. Tighten to **12 Nm**.
Take a new measurement. See Checking the valve clearance.

When the correct valve clearance is reached



Remove

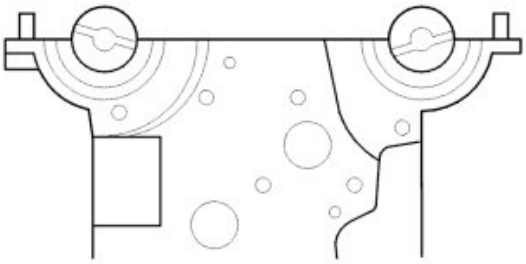
- the press tool 999 5765
- the camshaft
- the tappets.

Note! Carefully mark the tappets so that exact reinstallation can be carried out.

For example:	Intake side:	**I1, I2, I3.....I10.**
	Exhaust side:	**A1, A2, A3.....A10.**

Repeat the procedure for measuring the valve clearance for all cylinders on both the intake and exhaust sides. See Checking the valve clearance.

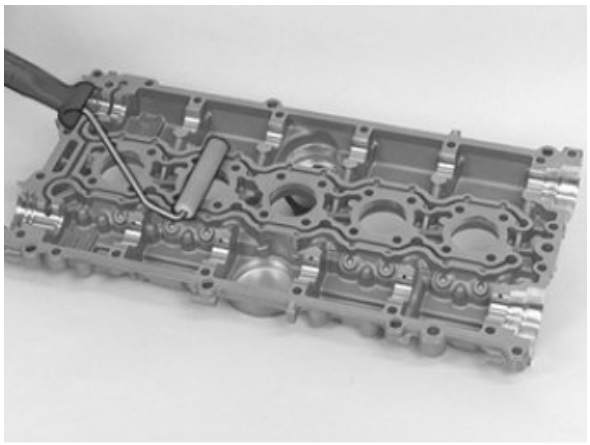
Installing tappets and camshafts



Note! For tightening torques not in the text, see Tightening torque See: Specifications/Tightening Torque.

Lubricate the valve guide wells.
Install all the tappets.
Lubricate the camshaft bearing seats and the upper sides of the tappets.
Position the intake camshaft. Ensure that the groove at the rear edge of the camshaft is **above** an imaginary center line.
Position the exhaust camshaft. Ensure that the groove at the rear edge of the camshaft is **below** an imaginary center line.

Applying liquid gasket



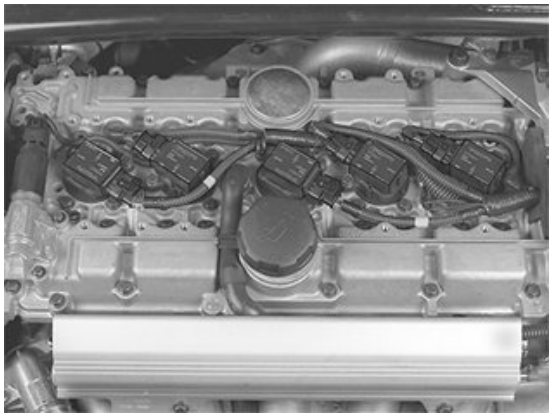
Wipe the oil film off the mating surfaces on the camshaft cover and cylinder head.

Install new O-rings around the spark plug wells at the cylinder head.
Apply liquid gasket 1161 059 on the camshaft cover. Use roller 951 2767 Roller See: Tools and Equipment/951 2767 Roller.

Note! The surface must be completely covered without any excess.

Caution! Make sure that no liquid gasket ends up in the oil channels.

Installing the camshaft covers

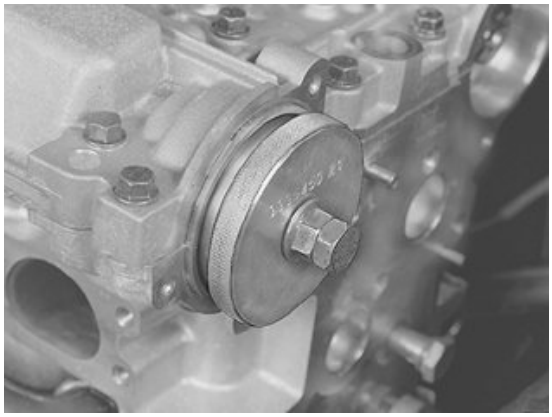


Lubricate the camshaft lobes, the camshaft bearing surfaces and the tappets.
Install the camshaft cover.
Install press tool 999 5454 PRESS TOOL See: Tools and Equipment/999 5454 Press Tool (2x).
Tighten the camshaft cover screws alternately, keeping it parallel to the cylinder head using the press tools.
Install all the screws. Tighten the screws from the middle and outwards.
Remove the press tool 999 5454

Install

- the variable valve timing (VVT) solenoid. Use a new gasket
- the spark plugs. Tighten to **30 Nm**.
- the plugs for the test holes. Tighten to **20 Nm**
- the crankcase ventilation hose to the top of the camshaft cover
- the ignition coils according to the earlier marking
- the ground terminals between the ignition coils.

Installing the rear camshaft seal



To clean the shaft journal and mating surface, use emery cloth P/N 951 1024.

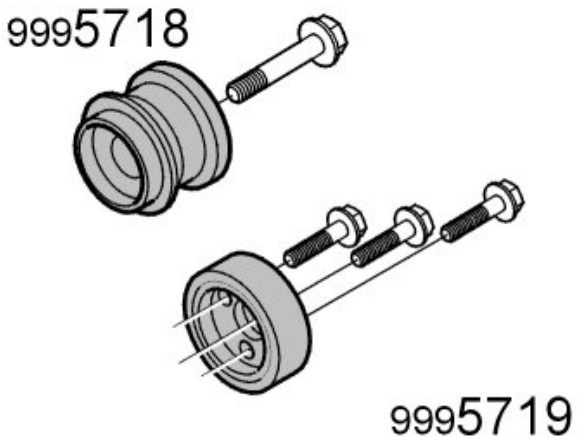
Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new seal ring is installed.

Use drift 999 5450 PUNCH See: Tools and Equipment/999 5450 Punch.
Lubricate the surface of the seal that the camshaft rotates against.
Press in the seal until the drift bottoms out.

Note! If there are wear grooves on the camshaft, the seal can be pressed in another 2 mm by reversing the tool's sleeve.

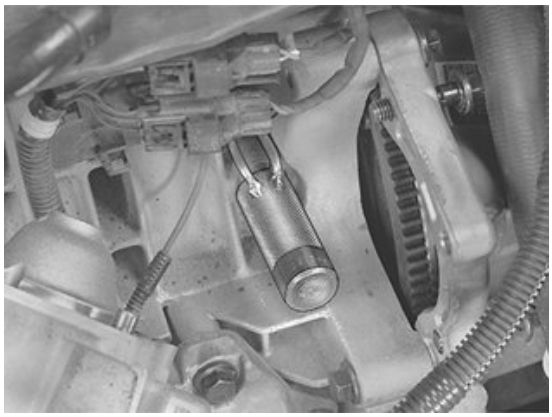
Install camshaft adjustment tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts.
Check that the screws securing the adjustment tool to the camshafts and the screws holding the tool together are well tightened.

Installing the front camshaft seal



Lift up and position the brake fluid reservoir and the expansion tank on top of the engine.
Use drift 999 5718 Drift See: Tools and Equipment/999 5718 Drift for camshaft with variable valve timing unit and drift 999 5719 Drift See: Tools and Equipment/999 5719 Drift for camshaft without variable valve timing unit.
Use new seals and lubricate the surface of the seal that the camshaft rotates against.
Use the variable valve timing unit / timing belt pulley mounting screws. Tighten the screws until the drift bottoms out.
Remove the drift.

Fixing the crankshaft position



Remove

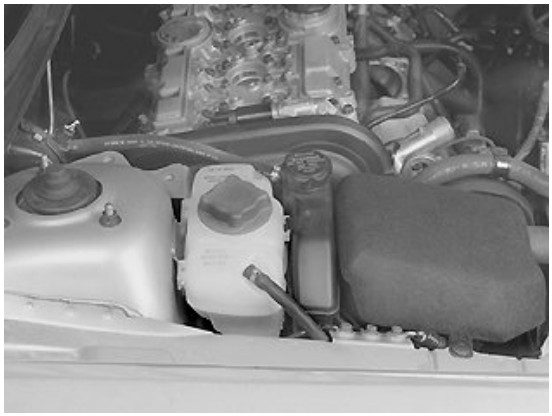
- the mounting screws for the starter motor. Pull off the starter motor. Place the starter motor to one side
- the blind cover plug and the seal washer.

Turn the crankshaft slightly **clockwise**.
Install the crankshaft stop999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool. Ensure that it bottoms out against the engine block.
Turn the crankshaft **counterclockwise** until it stops against the crankshaft stop.
Check that the marking on the crankshaft timing gear pulley corresponds with the marking on the oil pump.

Installing and adjusting the VVT unit/timing gear pulley on the camshaft

Install according to: Variable valve timing unit, checking and adjusting, B5244T5, B5254T2 See: Actuators and Solenoids - Engine/Variable Valve Timing Actuator/Testing and Inspection

Finishing



Install

- front timing cover
- the auxiliaries belt
- the expansion tank
- the servo oil reservoir
- the bleed hose for the expansion tank.

Close the clamp and check that the hoses lie correctly.

Connect the connectors for the

- The ABS sensor by the right suspension turret
- the coolant level sensor in the expansion tank.

Install

- the starter motor
- the plastic nuts for the cover in the wing liner
- the right front wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Install

- the trigger wheel.

Note! Make sure that the trigger wheel is correctly positioned against the camshaft.

- the camshaft position (CMP) sensor housing
- the cover at the rear of the exhaust camshaft
- the screws holding both the ground strips from the bulkhead to the cylinder head
- the upper engine stabilizer brace
- the cover over the ignition coils
- the upper timing cover
- the crankcase ventilation hose on the inlet hose
- the inlet hose between the air cleaner (ACL) and throttle body (TB)
- the engine stabilizer brace between the suspension turrets. Secure the servo hose at the right mounting for the engine stabilizer brace in the bodywork
- the cable to the battery negative terminal. Also read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Check

Check the level in the expansion tank and the brake fluid reservoir.
Test drive the engine until the thermostat opens and check for any leakage.

Fuel Pressure Release: Service and Repair

Draining the fuel system

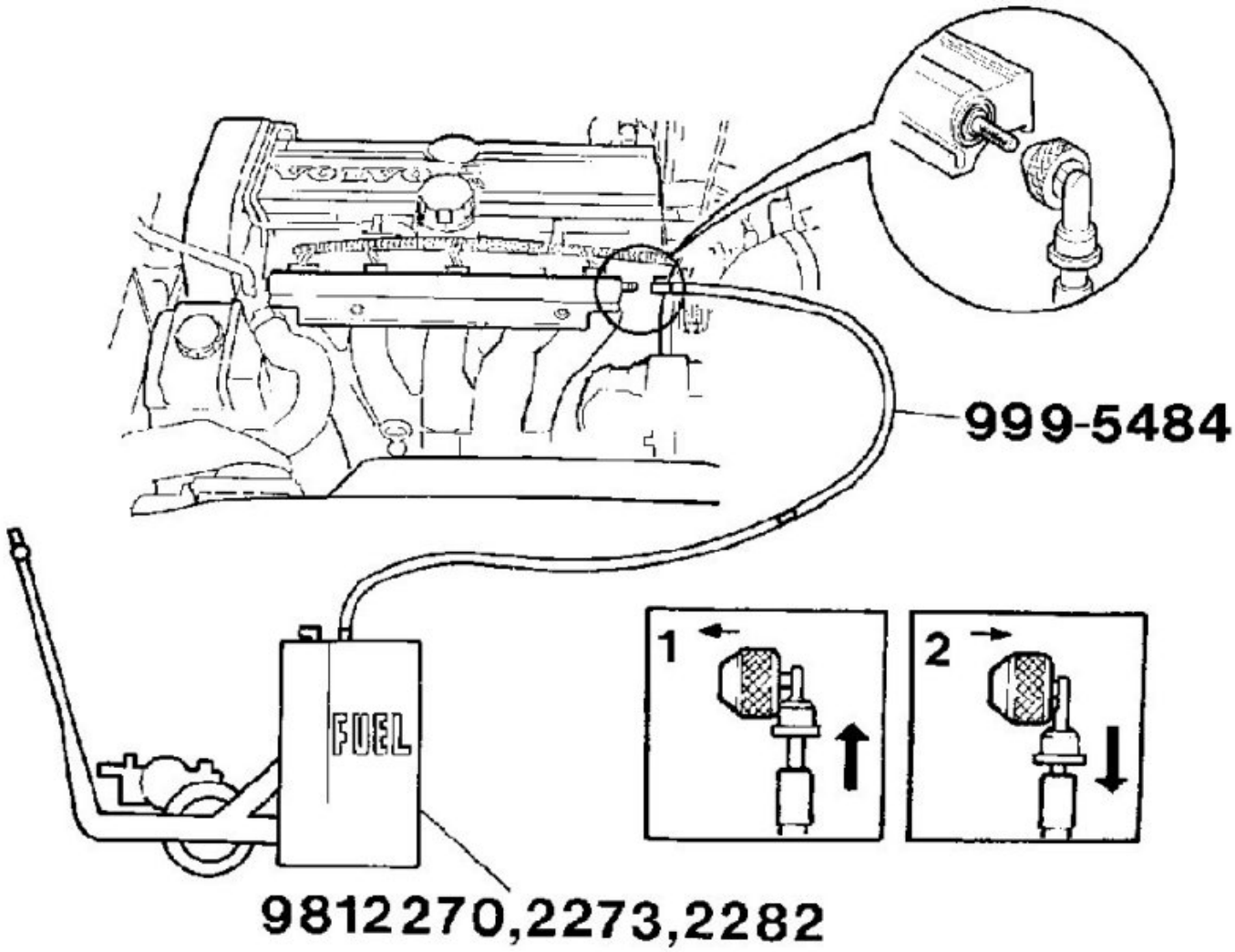
Special tools:

981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley
981 2273 PUMP See: Tools and Equipment/981 2273 Pump
981 2282 Tank See: Tools and Equipment/981 2282 Tank
999 5480 Adapter See: Tools and Equipment/999 5480 Adapter
999 5484 Adapter See: Tools and Equipment/999 5484 Adapter

Safety

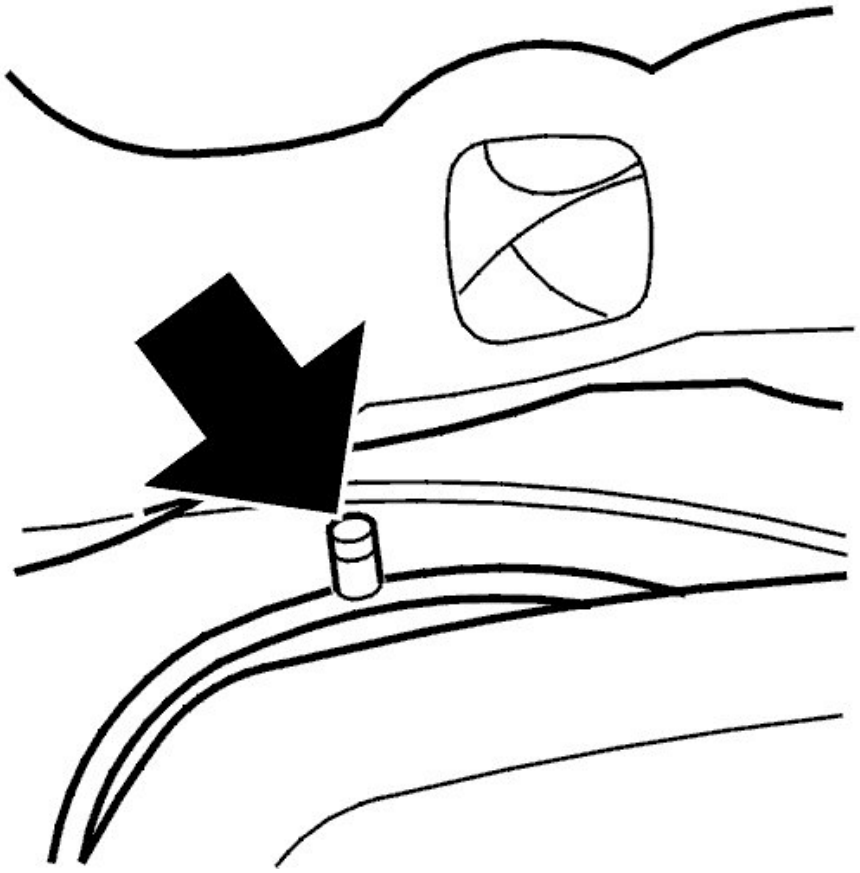
See Safety regulations for handling fuel See: Powertrain Management/Fuel Delivery and Air Induction/Service Precautions/Safety Regulations for Handling Fuel.

Engagement



Remove the cover on the valve which is positioned on the fuel rail.
Connect adapter 999 5484 Adapter See: Tools and Equipment/999 5484 Adapter to fuel draining unit 981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley , 981 2273 PUMP See: Tools and Equipment/981 2273 Pump and 981 2282 Tank See: Tools and Equipment/981 2282 Tank.
Connect the adapter to the valve on the fuel rail in the **locked** position (figure 1, valve closed).
Start the fuel drainage unit.
Unlock the adapter (illustration 2 valve open).
Raise the car.

Draining the fuel system



Remove the cover on the valve cap positioned at the fuel filter.
Connect venting hose 999 5480 Adapter See: Tools and Equipment/999 5480 Adapter to the valve prior to the fuel filter.
It takes approximately **2 minutes** to evacuate the system.

Installation

Reinstall the components in reverse order.

Caution! Do not forget to reinstall the valve caps.

Drive Belt: Service and Repair

Auxiliaries belt / belt tensioner, replacing

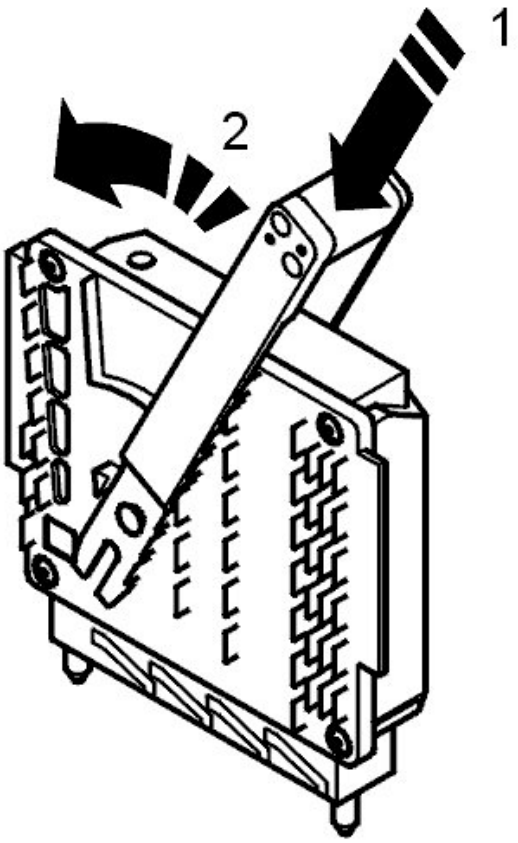
Special tools:

999 5722 Wrench See: Tools and Equipment/999 5722 Wrench
999 7109 Wrench See: Tools and Equipment/999 7109 Wrench

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removal

Removing the engine control module (ECM)

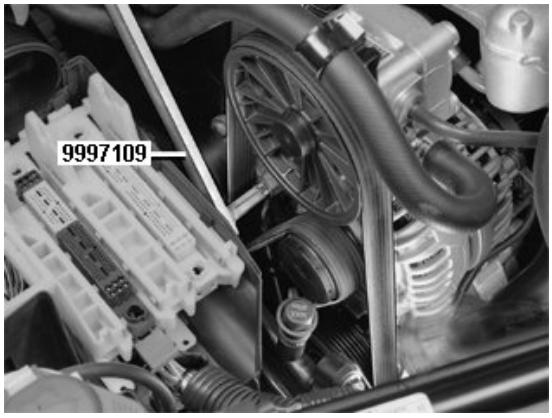


Ignition off. Wait 2 minutes.

Caution! Do not touch the terminal pins on the engine control module (ECM) with your fingers. Static electricity may damage components in the control module.

Remove the cover over the control module box. Put the cover to one side.
Insert tool: 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module. Move the upper section of the tool backwards as far as it will go. Pull up the tool. Carefully pull up the control module.
For vehicles with automatic transmissions repeat the above work.
Remove the surround from around the control module box.

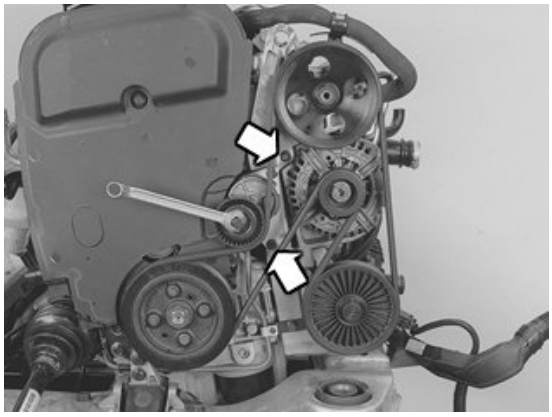
Removing the auxiliaries belt



Note! Make a note of the routing of the belt.

Remove the auxiliaries belt. Use: 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench.

Replacing the belt tensioner



Remove:

- both mounting screws from the auxiliaries belt bracket for the belt tensioner
- the belt tensioner.

Install:

- a new belt tensioner
- the screws for the belt tensioner. Tighten.

Installation

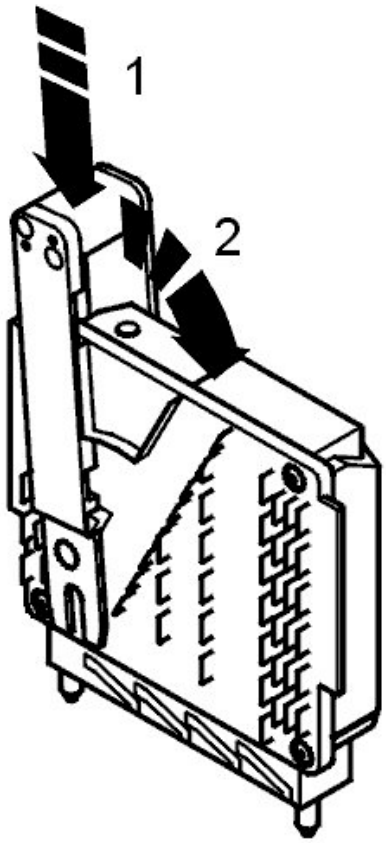
Note! For tightening torques, see: Tightening torque See: Specifications/Tightening Torque.

Installing the auxiliaries belt

Note! Ensure that the auxiliaries belt is correctly positioned on all the pulleys.

Install the auxiliaries belt. Use: 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench.

Installing the engine control module (ECM)



Caution! Check that no pins or sockets are damaged on the connector.

Install the surround for the control module box.
Carefully press the engine control module (ECM) down into the grooves on the inside of the control module box. Press down all the way.
Install the tool: 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
Move the upper section of the tool forwards as far as it will go. Pull up the tool.
Press the cover into place over the control module. Check that the air ducts are correctly positioned.

Finishing

Start the engine and check the function.

Engine Mount: Service and Repair
Engine Mount, Front, Replacing

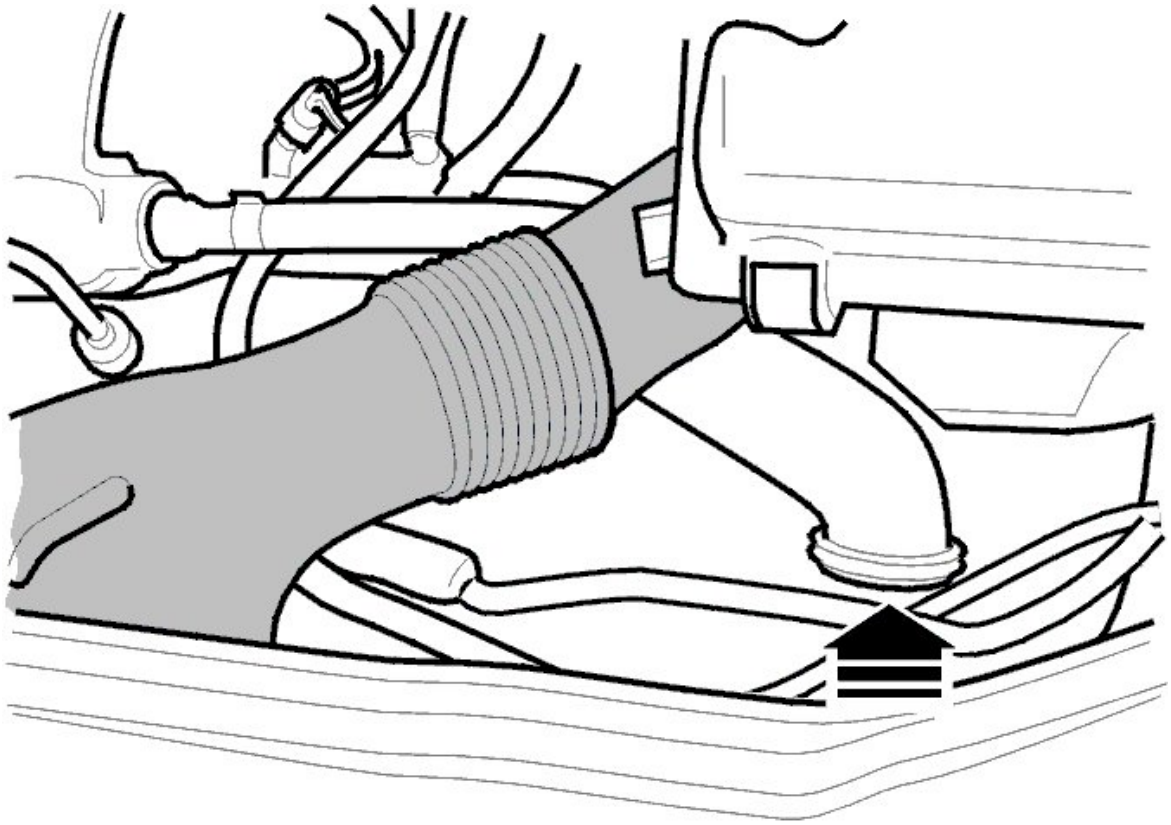
Engine mount, front, replacing

Removal

Removal

Remove

- the battery lead.See Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- the torque rod. See Replacing the torque rod See: Engine Torque Strut/Service and Repair/Replacing the Torque Rod.

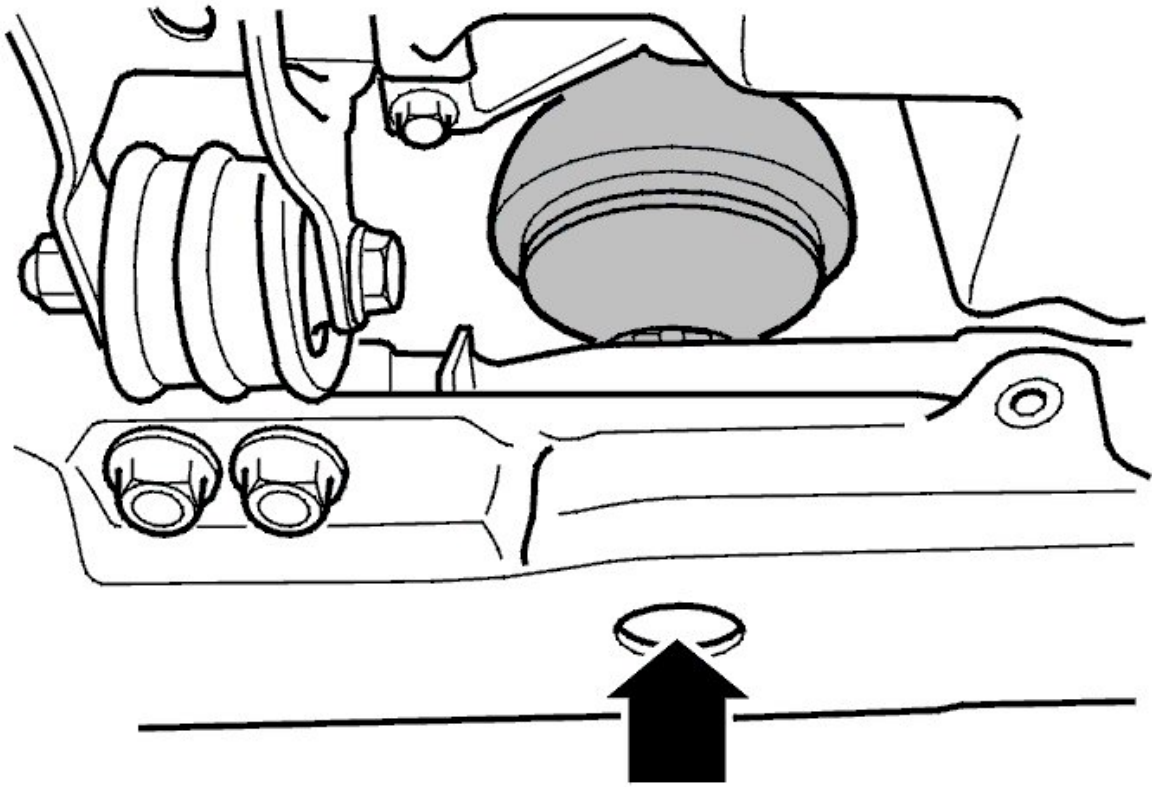


Remove

- the air intake between the air cleaner (ACL) and the front panel
- the charge air pipe from the charge air cooler (CAC) are on the left-hand side. Heat the charge air pipe using a hot-air gun. This will make removal easier.

Remove

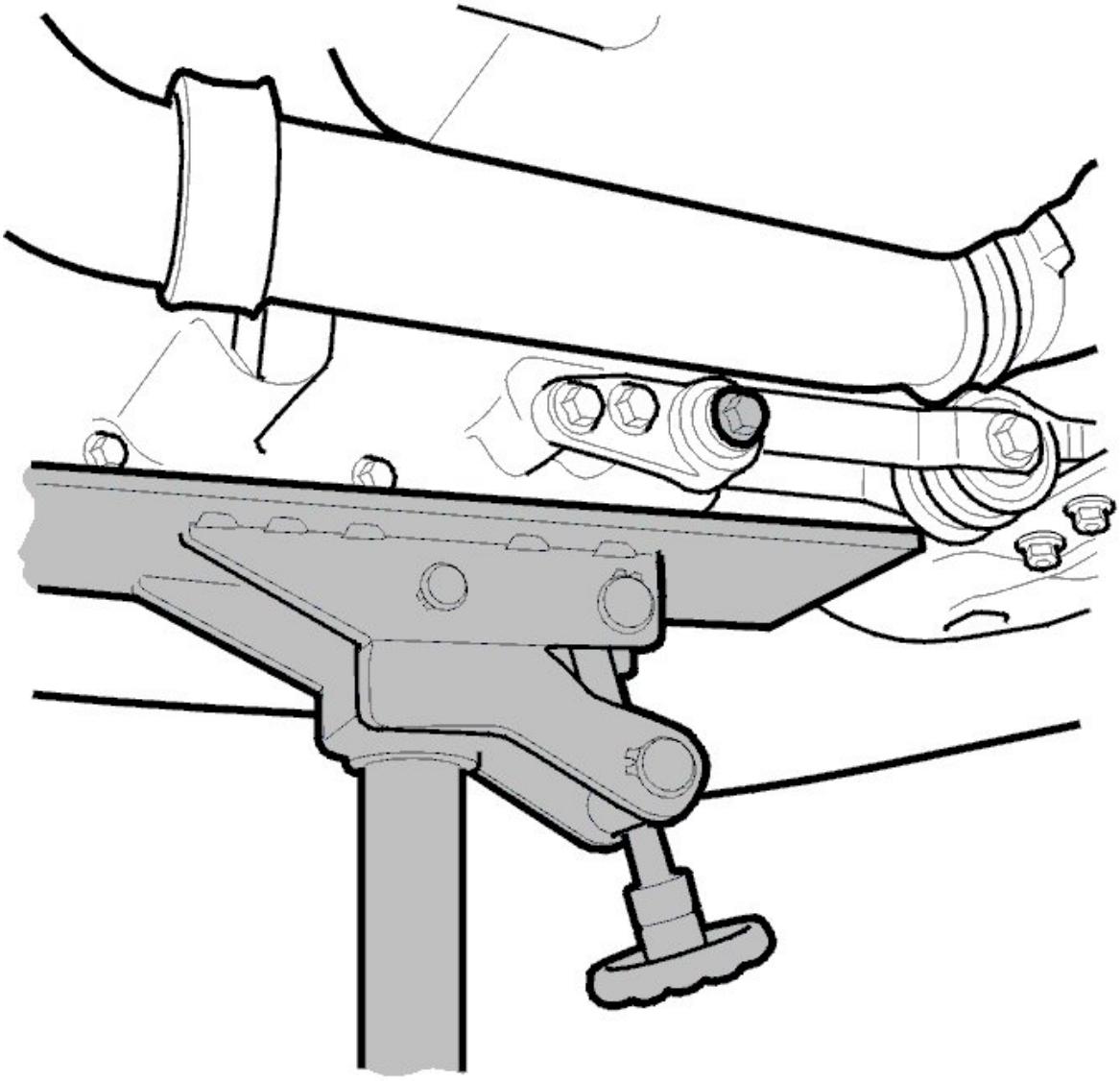
- the nut on the top for the engine pad
- raise the car.



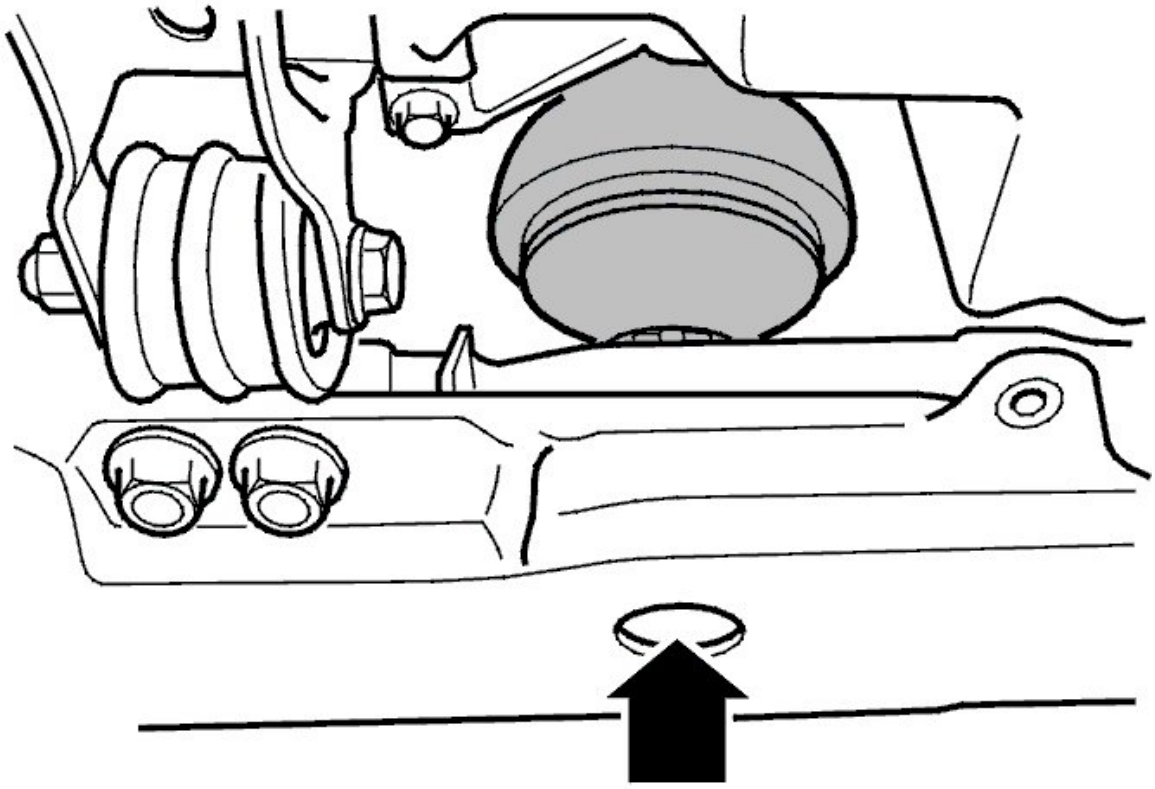
Remove

- the splash guard and the air intake cover under the engine
- the screw for the engine pad.

Replacing the front engine pad



- Remove the screw and nut at the lower torque rod mounting to the bracket on the transmission
- position a mobile jack with universal plates 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture under the transmission
- Check that the plate does not catch in the sub-frame
- carefully lift up the engine so that the engine pad can be replaced.



- install a **new screw** in the lower mounting for the engine pad. **Do not tighten yet**
- carefully lower the engine
  Note! Ensure that the guide pin at the top of the engine pad locates correctly.

- remove the mobile jack.

Installation

Installation

Finishing

- Use a **new screw and nut** on the lower torque rod. Tighten to **35 Nm**. Angle-tighten **90°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
- Tighten the lower screw in the engine pad. Tighten to **50 Nm**
- install the splash guard and the air intake cover under the engine
- lower the car.

Install

- the nut on the top of the engine pad. Tighten to **50 Nm**
- the charge air pipe to the charge air cooler (CAC)
- the air intake between the air cleaner and the front panel
- the torque rod. See Replacing the torque rod See: Engine Torque Strut/Service and Repair/Replacing the Torque Rod
- the battery lead.See Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

Engine Mount: Service and Repair
Engine Mount, Rear, Replacing

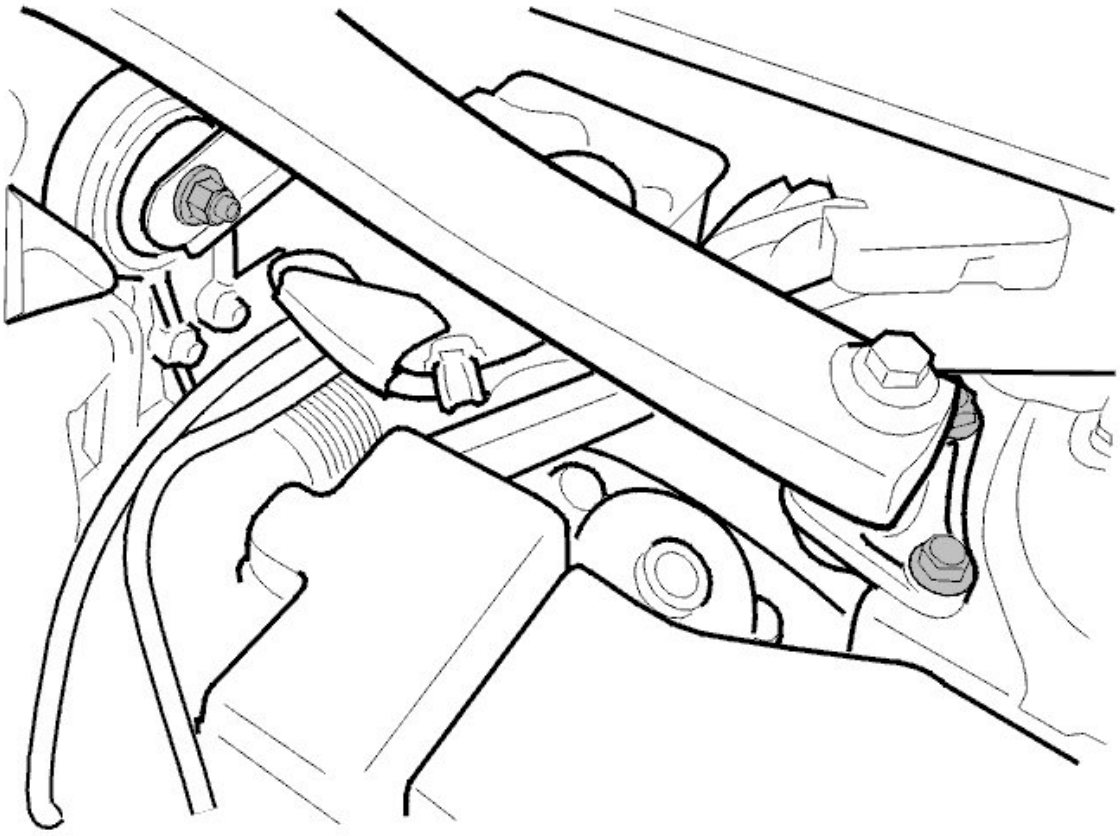
Engine mount rear, replacing

Special tools:

951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

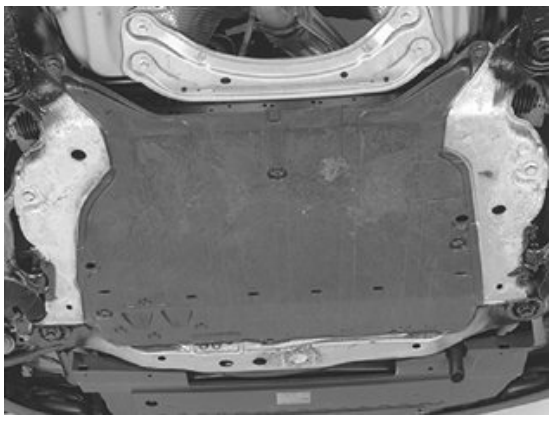
Removal

Preparation



Remove

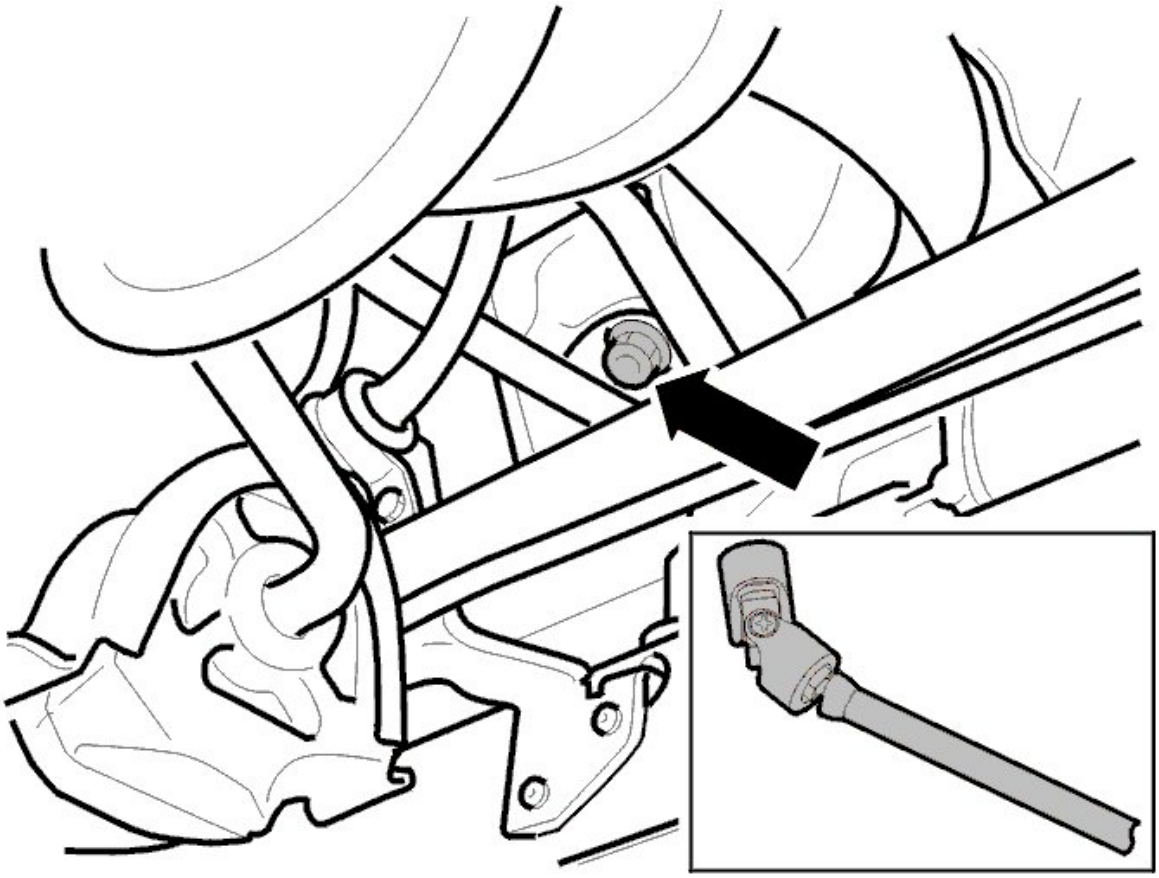
- the screw holding the mounting for the torque rod at the bracket on the engine
- the screws for the torque rod mounting at the wheel arches
- the engine stabilizer brace
- the upper nut for the rear engine pad.



Raise the car

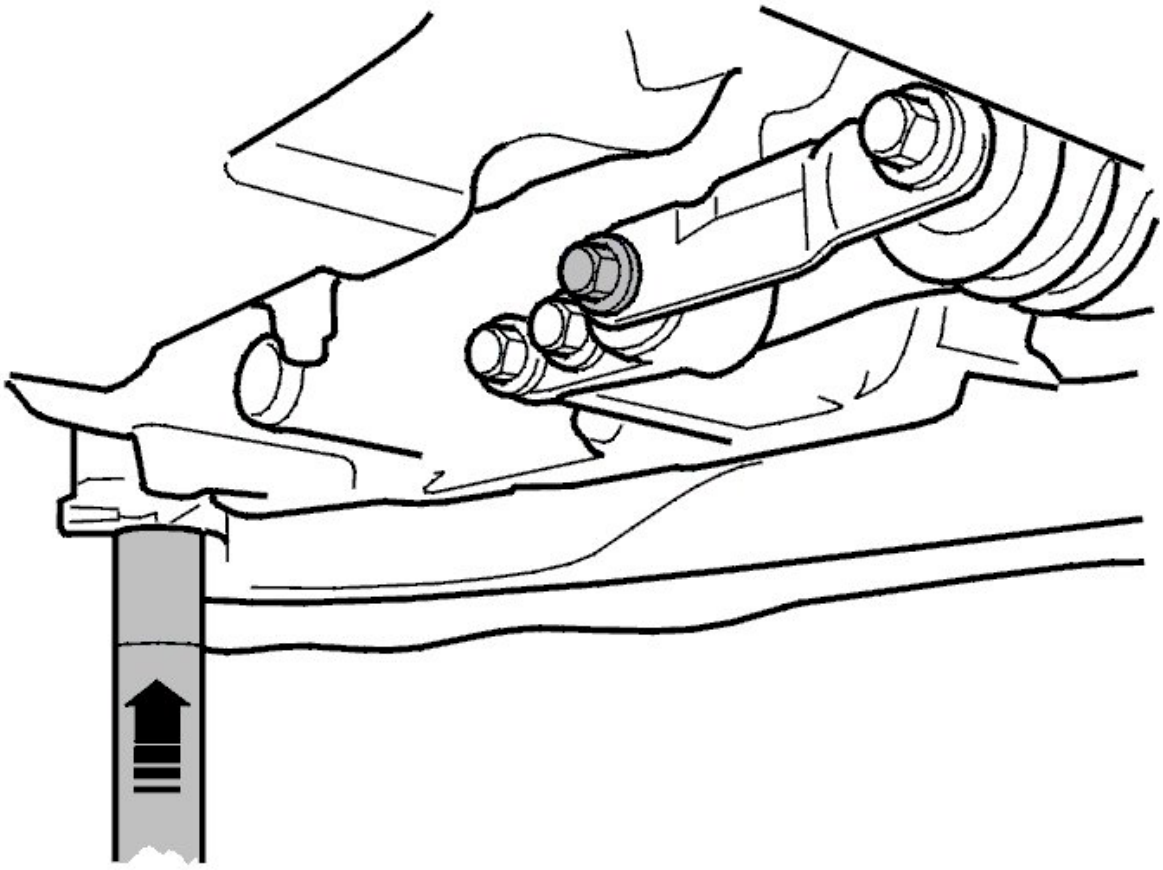
Remove

- the splash guard under the engine.



- Remove the lower screw for the engine pad
- remove both the screws for the mountings holding the three-way catalytic converter (TWC)
- fold the mountings forward.

Replacing the rear engine pad



- Remove the screw and nut at the lower torque rod mounting to the bracket on the transmission
- position a mobile jack under the transmission
- carefully lift up the engine so that the engine pad can be replaced

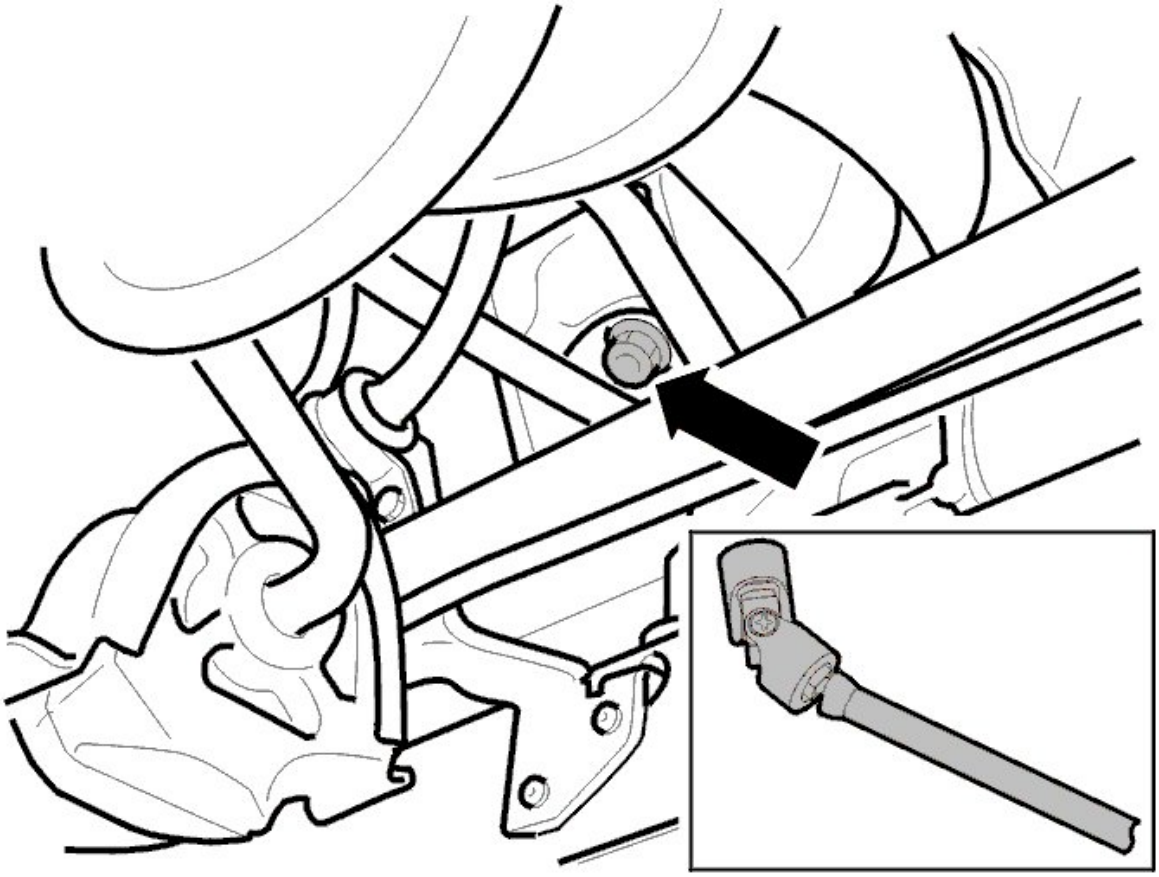
- remove the engine pad by pulling it forwards between the bevel gear and the transmission.
- Install the new engine pad
- install a **new screw** in the lower mounting for the engine pad. **Do not tighten yet**
- carefully lower the engine
  Note! Ensure that the guide pin at the top of the engine pad locates correctly.

- remove the mobile jack.

Installation

Finishing

- Install a **new screw and nut** on the lower torque rod. Tighten to **35 Nm**. Angle-tighten **90°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor.

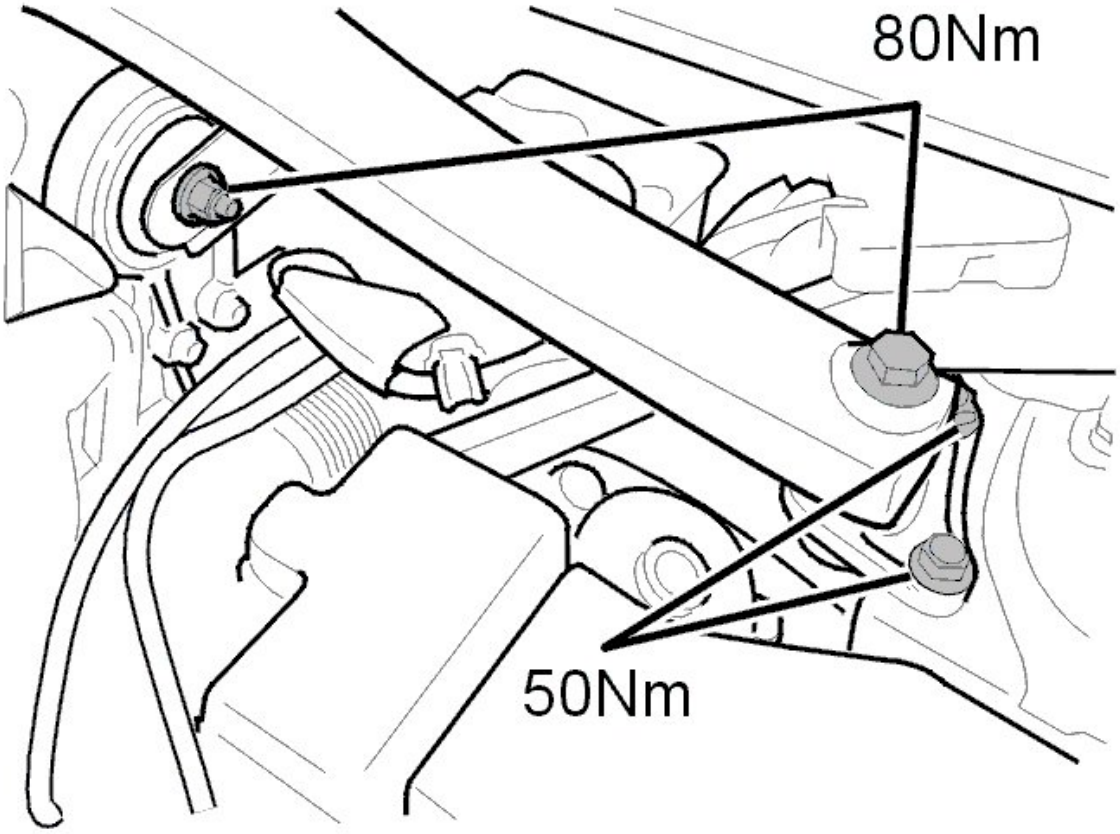


- Tighten the lower screw in the engine pad. Tighten to **50 Nm**
- install both the screws for the mountings for the three-way catalytic converter (TWC). Tighten to **10 Nm**
- install the splashguard under the engine. Tighten to **25 Nm**.

Lower the car.

Install

- A **new nut** in the upper mounting for the engine pad. Tighten to **50 Nm**.



Install

- the engine stabilizer brace between the suspension turrets. Tighten the four screws. Tighten to **50 Nm**
- the screw for the torque rod mounting at the torque bracket on the engine. Tighten to **80 Nm**.

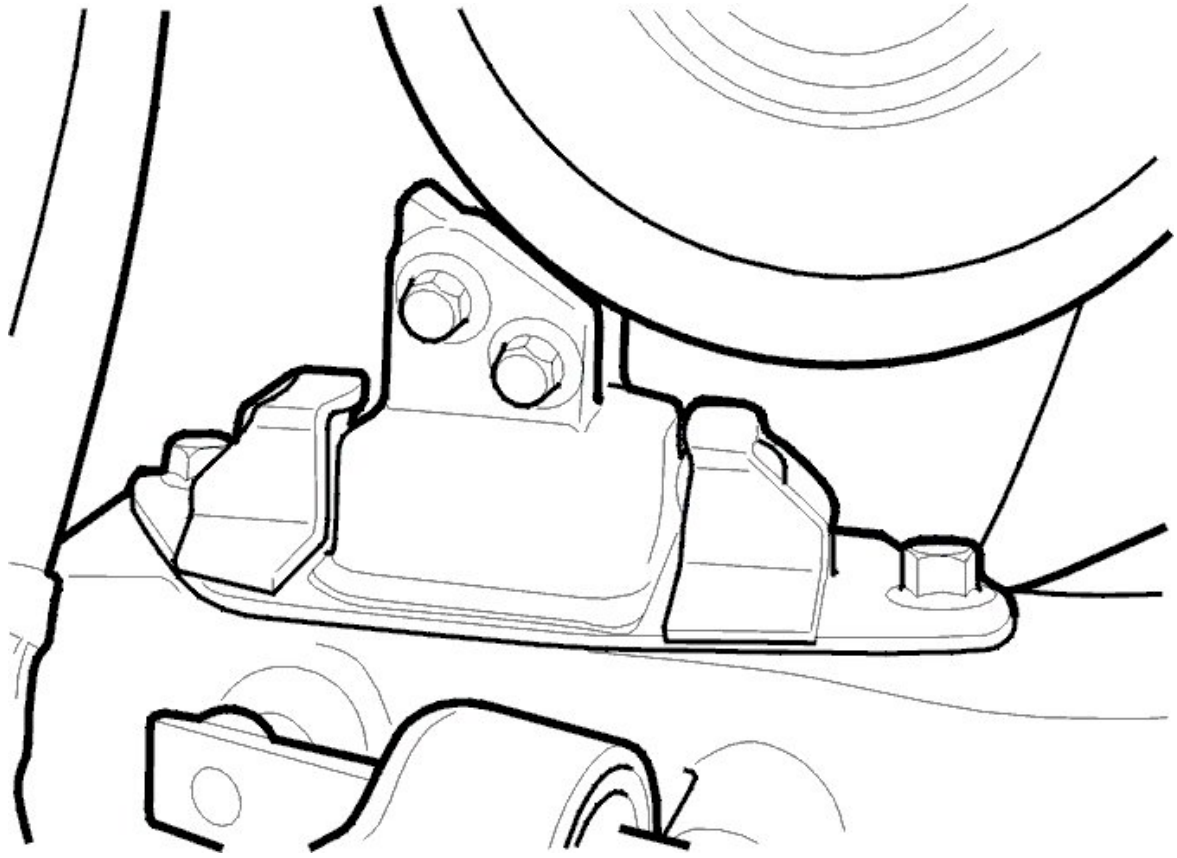
Engine Mount: Service and Repair
Engine Mount, Right, Replacing

Engine mount, right, replacing

Special tools:

951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

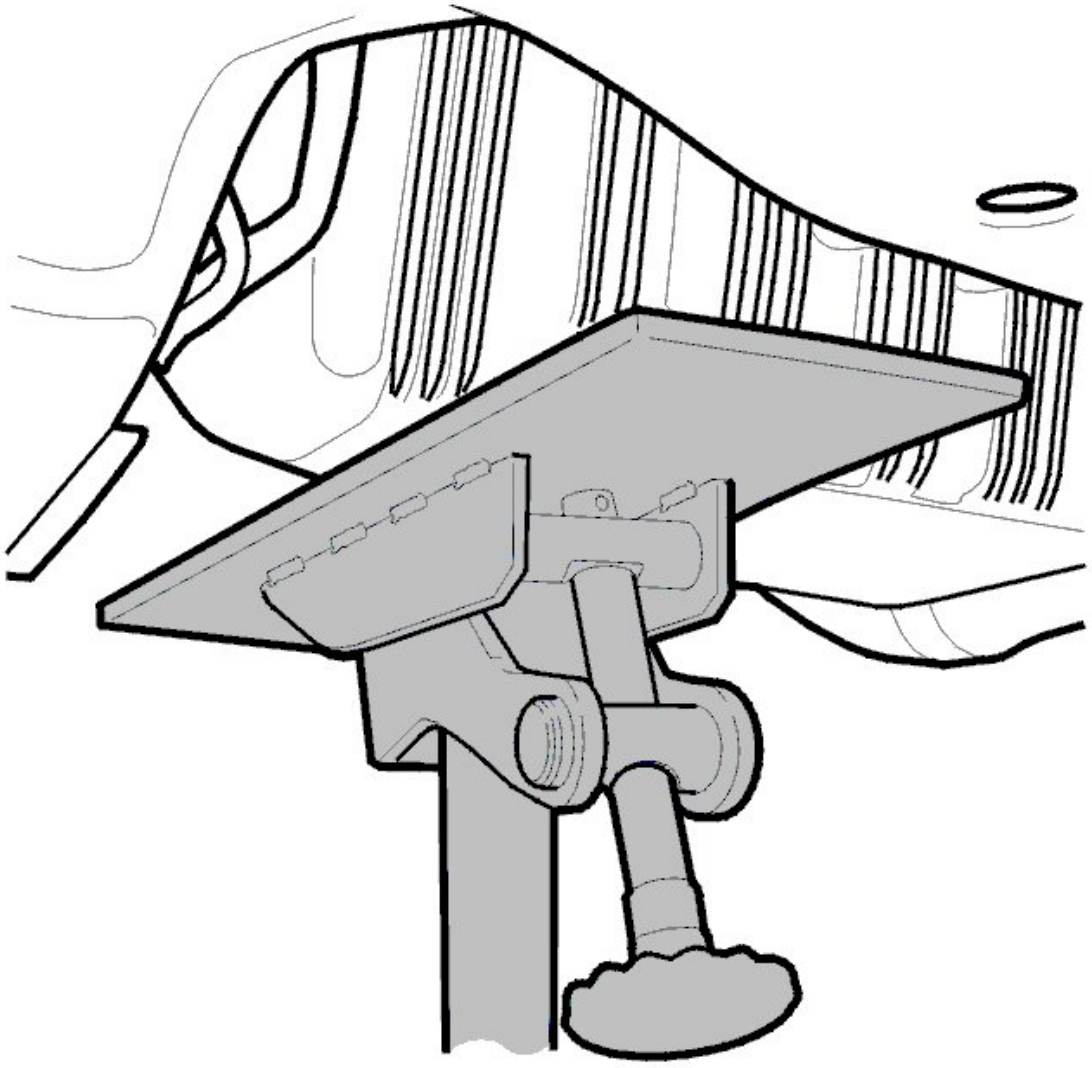
Removal (the illustrations may be slightly different for different models)



Raise the car.

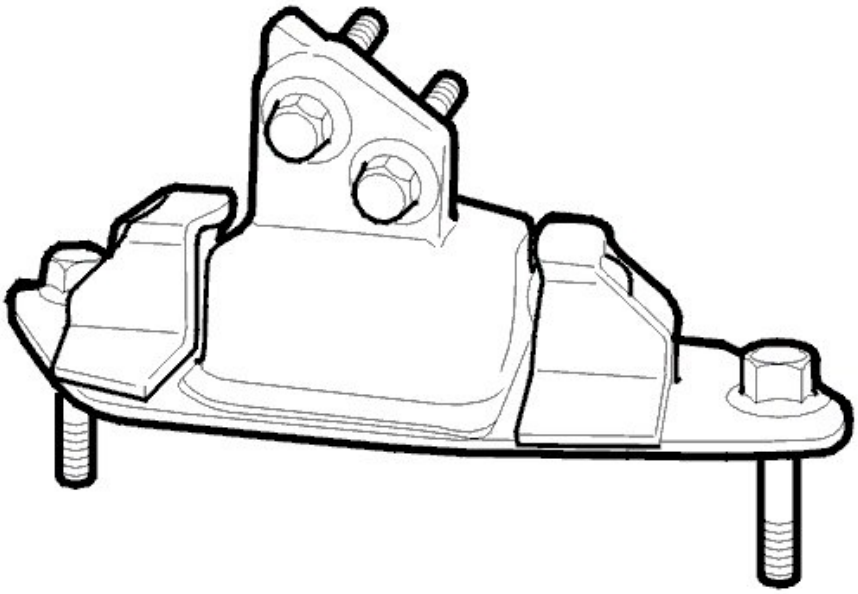
Remove

- the right front wheel
- both the plastic nuts and the reinforcement panel holding the cover in the right fender liner. Bend the fender liner out of the way
- the four screws for the right engine pad
- the splash guard under the engine.



- Position a mobile jack with universal plate 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture under the oil pan on the right side of the engine
- Check that the plate does not catch in the sub-frame
- Carefully lift the engine slightly so that the engine pad can be removed.

Installation



Install

- the new engine pad
- use **new screws** for the mounting in the sub-frame and engine. **Do not tighten yet**.
- Carefully lower the engine and remove the mobile jack
- Tighten the screws against the engine. Tighten to **35 Nm**. Angle-tighten **90°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor
- Tighten the screws to the sub-frame. Tighten to **65 Nm** and angle-tighten **60°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor.
- the splash guard under the engine. Tighten to **25 Nm**
- both the plastic nuts and the reinforcement panel holding the cover in the right fender liner
- the right front wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair

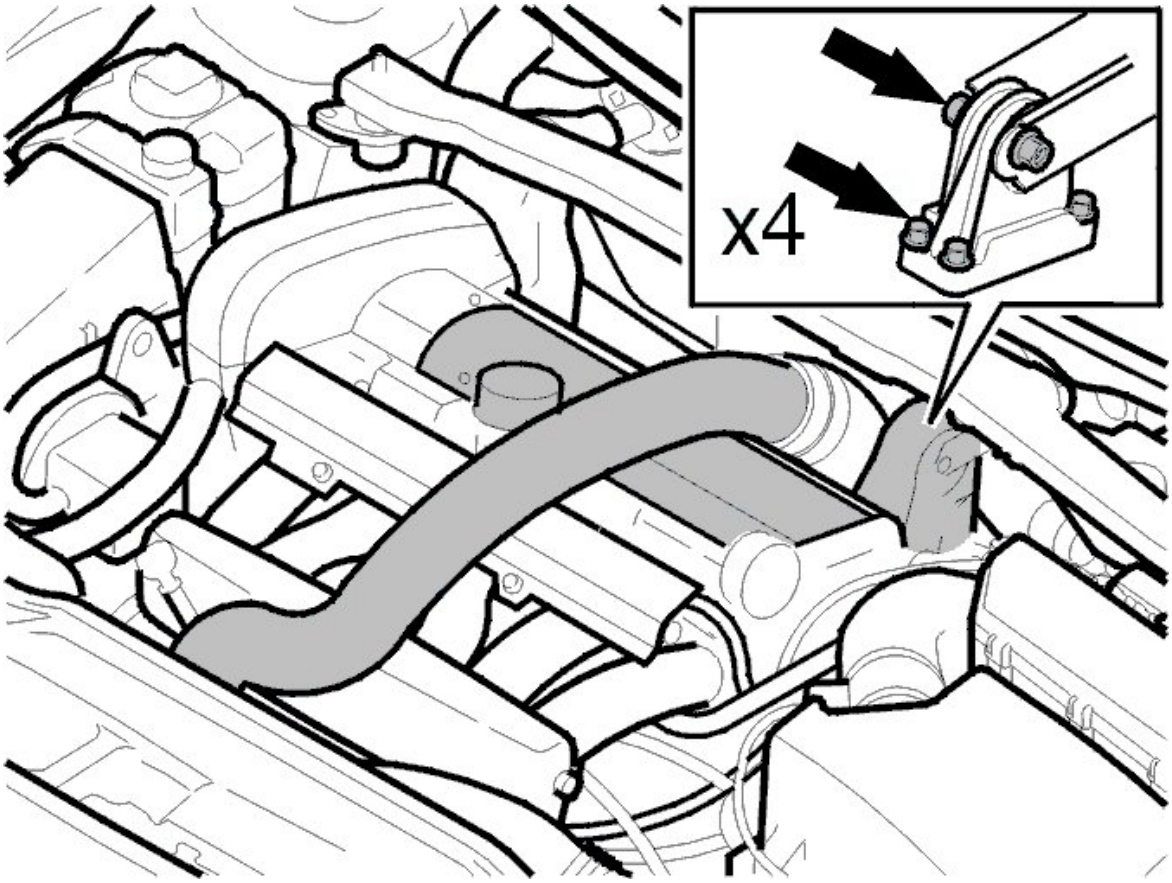
Engine Torque Strut: Service and Repair
Replacing the Engine Torque Bracket

Replacing the engine torque bracket

Removal

Removing the torque bracket

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

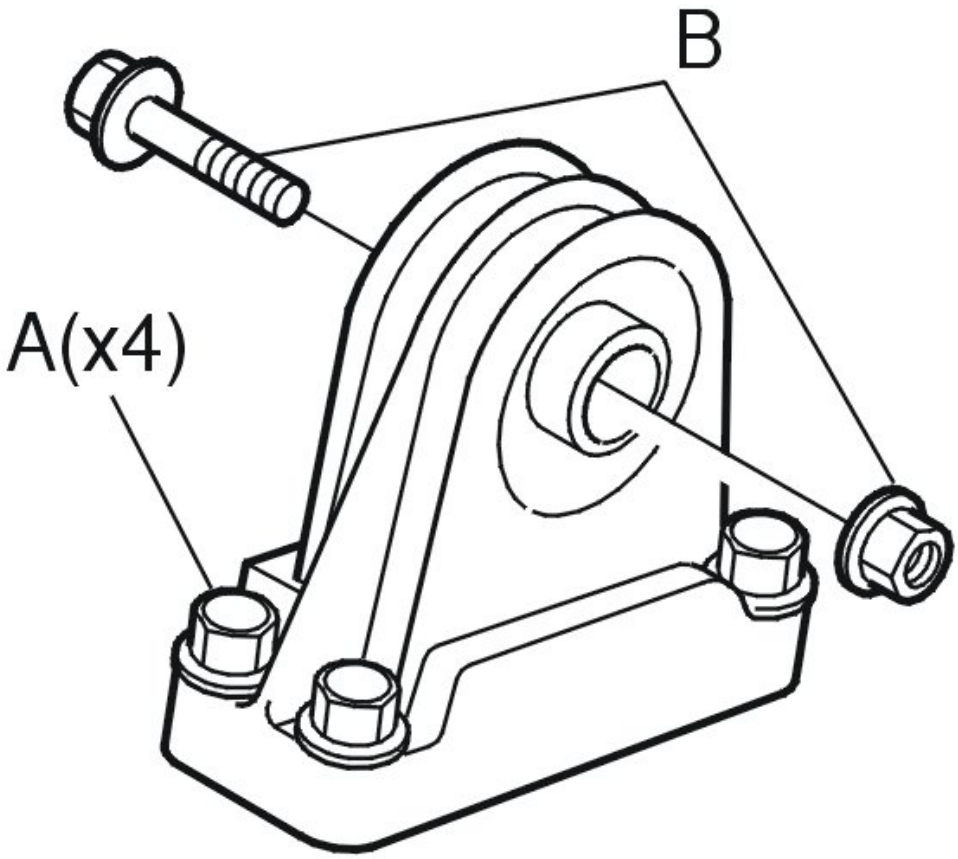


Remove

- the engine stabilizer brace
- the charge air pipe (only turbocharged (TC) engines)
- the screw for the dip stick pipe (6 cylinder automatics only)
- the oil filler cap
- the cover over the ignition coils
- the torque bracket.

Installation

Installing the torque bracket



Install

- the torque bracket. Tighten the screws (A). Tighten to **50 Nm**
- the screw for the dip stick pipe (6 cylinder automatics only)
- the cover over the ignition coils
- the oil filler cap
- the charge air pipe (only turbocharged (TC) engines)
- the engine stabilizer brace.

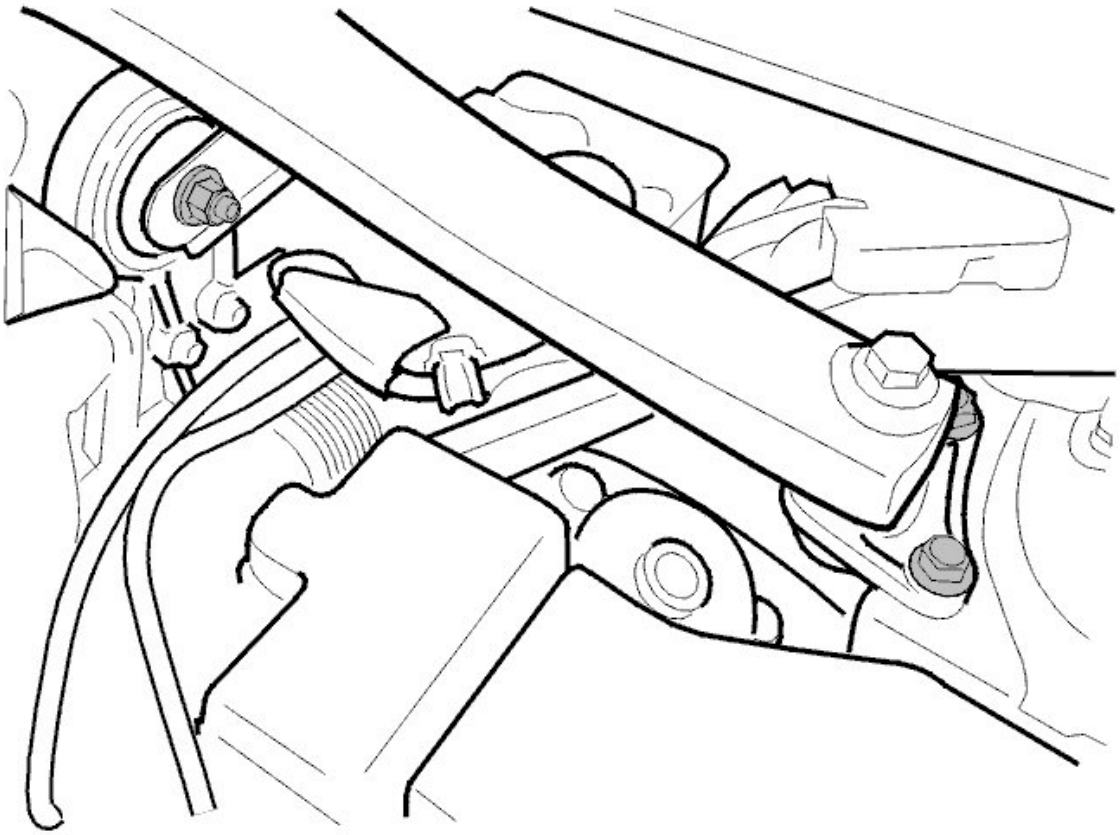
Tighten the screws on the suspension turrets. Tighten to **50 Nm**.Tighten the screw in the torque bracket (B). Tighten to **80 Nm**.

Engine Torque Strut: Service and Repair
Replacing the Torque Rod

Replacing the torque rod

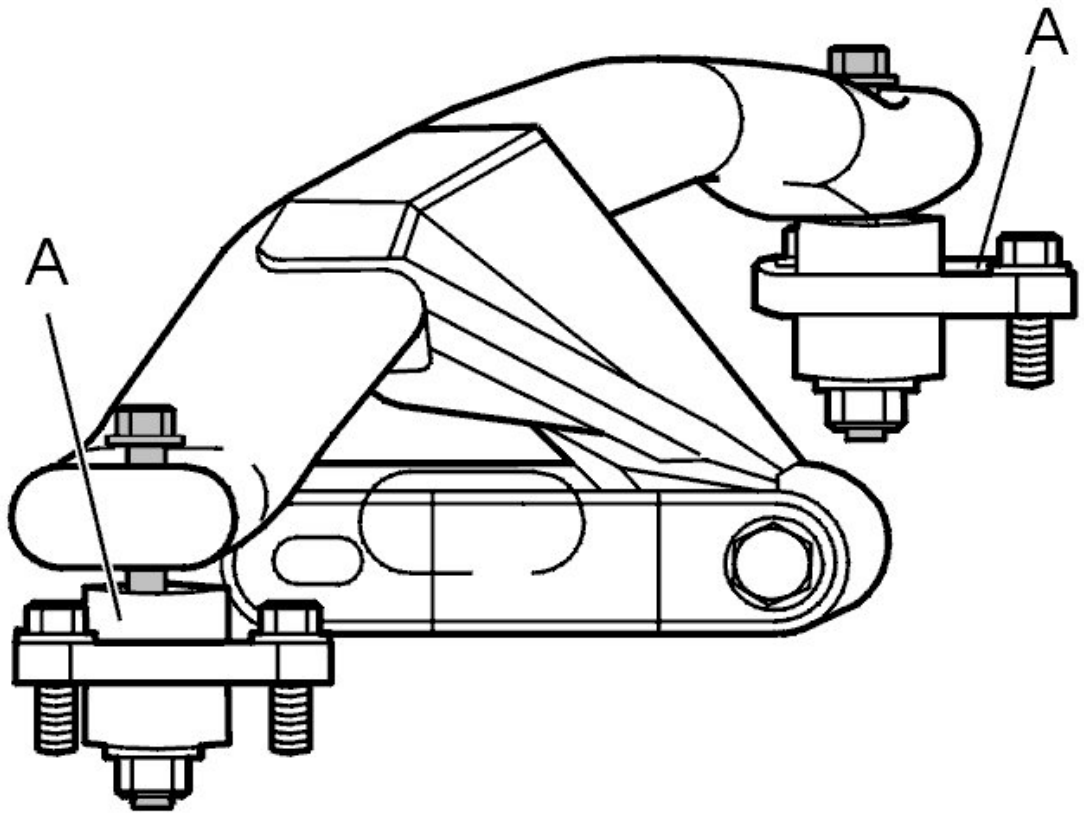
Removal

Removing the torque rod



Remove

- the screw for the torque rod mounting in the torque control arm and bracket on the engine
- the screws at the suspension turrets
- the torque rod.

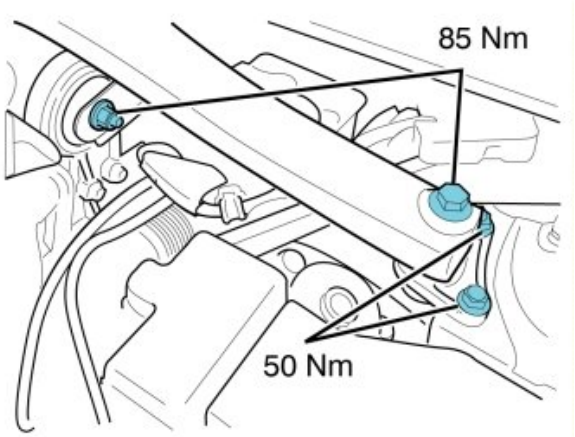


Transfer

- the brackets (A) on the left and right-hand sides to the new torque rod. Do not tighten yet.

Installation

Installing the torque rod



Install

- the torque rod
- the screws for the brackets at the suspension turrets. Tighten to **50 Nm**.
- the screw and nut for the torque rod mounting in the torque control arm/bracket on the engine. Tighten to **85 Nm**.

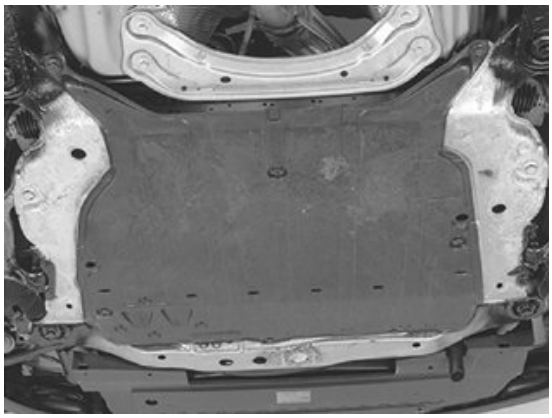
Tighten the torque rod to the brackets to **85 Nm**.

Engine Torque Strut: Service and Repair
Torque Rod, Lower, Replacing

Torque rod, lower, replacing

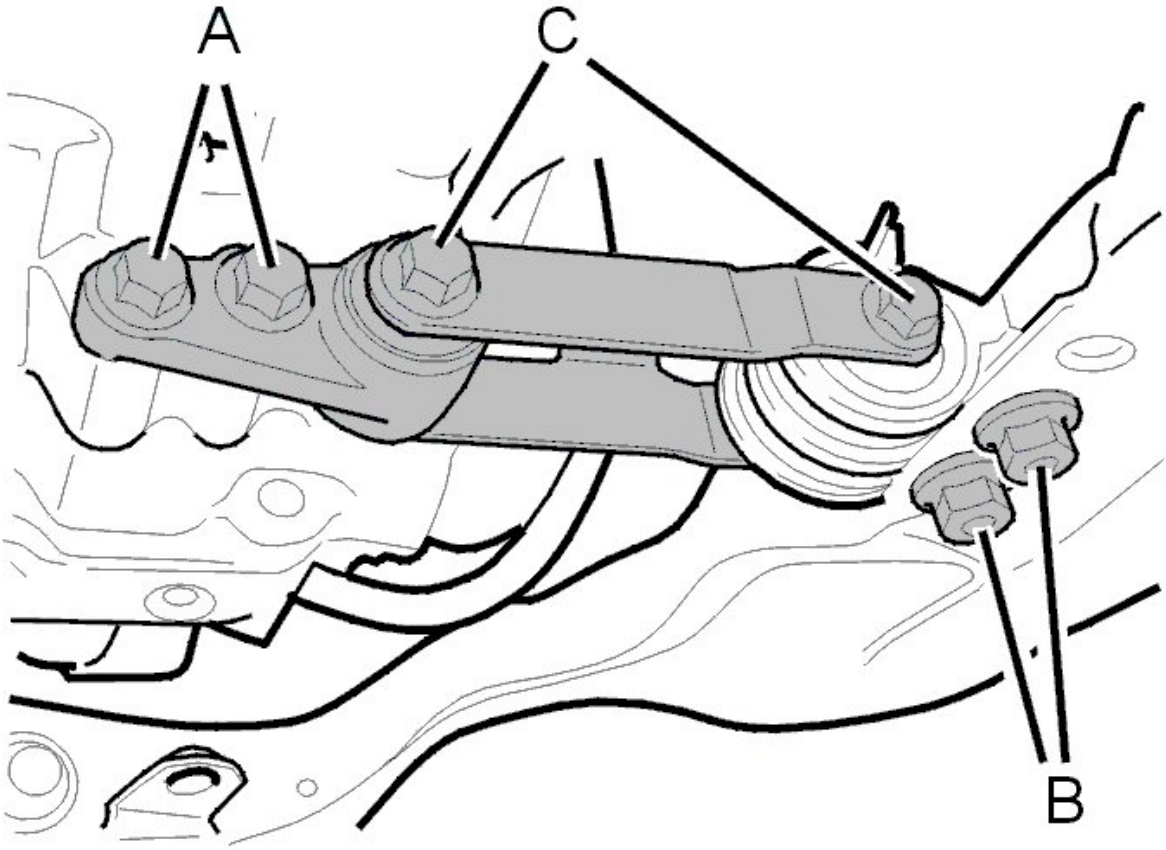
Removal

Removing the lower torque rod



Raise the car.

Remove
- the splash guard under the engine
- the torque rod from the transmission and sub-frame.



- install the new torque rod
- Tighten the screws (A) to the transmission. Tighten to **35 Nm**. Angle-tighten **40°**
- tighten the nuts (B) to the sub-frame. Tighten to **65 Nm**. Angle-tighten **60°**
- Tighten the nuts (C). Tighten to **35 Nm**. Angle-tighten **90°**.

Engine Lubrication: Testing and Inspection
Checking Oil Pressure

Checking oil pressure

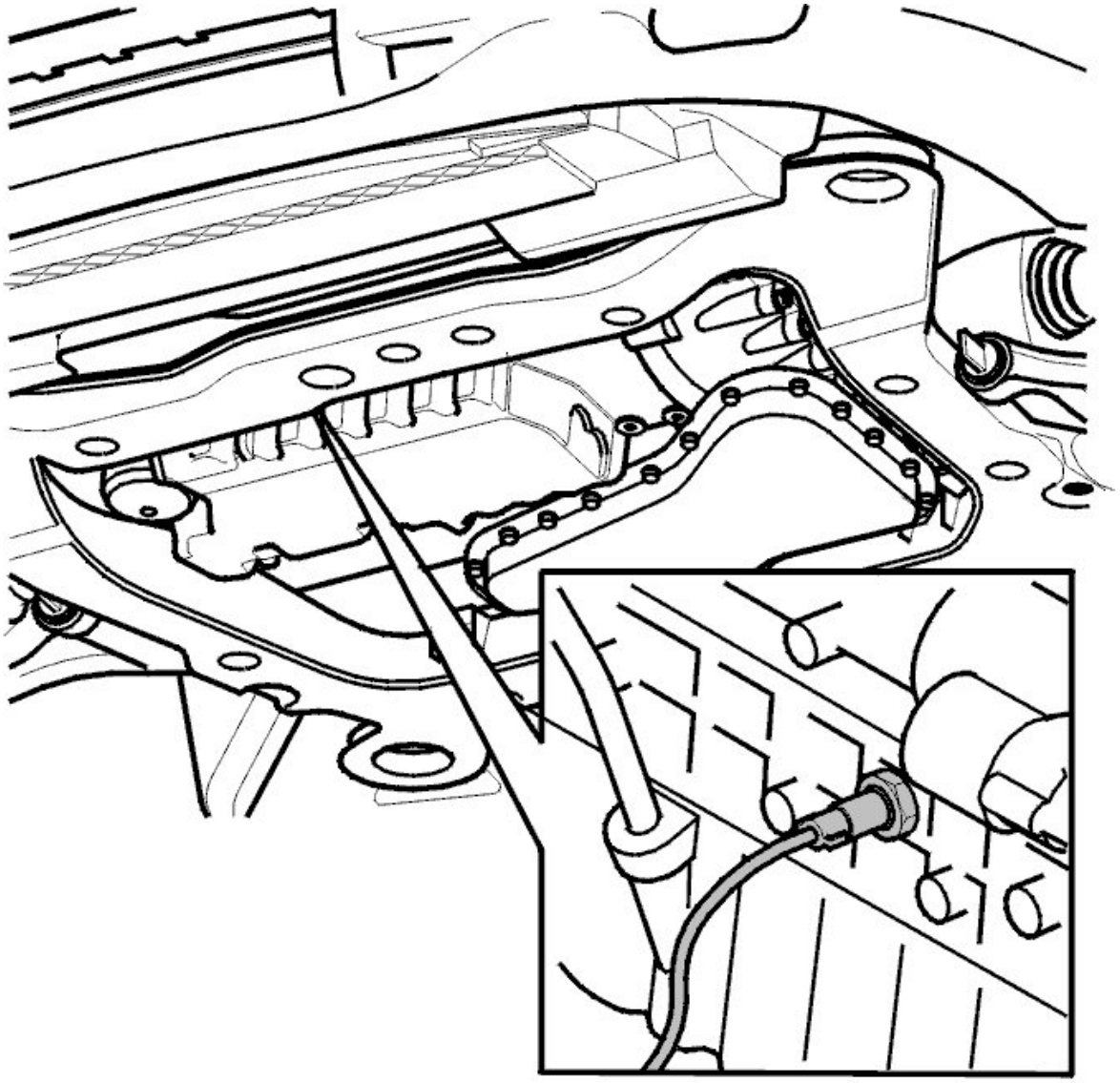
Special tools:

999 5270 OIL PRESSURE METER See: Tools and Equipment/999 5270 Oil Pressure Meter

Tightening torques

For tightening torques not in the text, see
B52x4x Tightening torque See: Specifications/Tightening Torque
B6xx4x Tightening torque See: Specifications/Tightening Torque

Checking the oil pressure sensor



Note! When checking the oil level and oil pressure, the engine should be at normal operating temperature which corresponds to 15 minutes normal driving (100°C / 212°F). If the oil quality and type or oil filter condition cannot be determined, replace the oil and filter.

Remove
- the air baffle on both sides
- the center air baffle under the engine.

Check
- the cable and connectors
- type and function. Try a new sensor
- any cable faults between sensor and warning lamp.

Note! Use a new gasket when the new sensor is installed.

Checking the oil pressure

Use instrument kit 999 5270 OIL PRESSURE METER See: Tools and Equipment/999 5270 Oil Pressure Meter. Connect to the oil pressure sensor duct on the cylinder block. Start the engine and read off oil pressure at different engine speeds (RPM).

Oil pressure B52x4x

13.3 r/s (800 rpm)	min 0.10 MPa
66.7 r/s (4000 rpm)	min 0.35 MPa
Maximum oil pressure (relief valve opens)	0.48 MPa

Oil pressure B6xx4x

12.5 r/s (750 rpm)	min 0.10 MPa
66.7 r/s (4000 rpm)	min 0.35 MPa
Maximum oil pressure (relief valve opens)	0.65 MPa

Engine Lubrication: Testing and Inspection
Oil Consumption Test

Oil consumption test

General

Some oil consumption is normal when an engine is running. The oil consumption varies depending on different factors:
- The condition of the engine (how well the engine is maintained)
- Blocked or damaged air filter
- Driving conditions - large loads, or excessive idling
- Oil grade and viscosity
- Cylinder capacity - in general a larger motor consumes a greater amount of oil than a smaller engine
- Engine power - a stronger engine consumes more oil than a smaller powered engine
- Oil level - too high a level (above the maximum mark on the dip stick) results in increased oil consumption.

Normal oil consumption
Running-in period

The oil consumption can be as much as 1 liter per 1,000 km during a running-in period of approx. 5,000 km if the engine is new or replaced (replacement of piston ring).
Driving between 5,000 and 150,000 km

Normal driving: up to 0.25 liters per 1,000 km is considered normal oil consumption.
Driving at high speed/with heavy trailer: up to 0.40 liters per 1,000 km is considered normal oil consumption.
Mountain/alpine driving: up to 0.50 liters per 1,000 km is considered normal oil consumption.
The above stated values for oil consumption can be used as guidelines if there is a suspicion that oil consumption is unusually/abnormally high.

Note! The oil consumption can be as much as the following at 150,000 km. The oil consumption can be approx. 0.35 - 0.55 liters per 1,000 km under all conditions.

To determine the exact oil consumption a test drive of at least 1,000 km must be performed under controlled conditions. The oil must be weighed before and after the test drive. This way the exact oil consumption can be calculated.

Abnormally high oil consumption

If the customer points out that the car consumes an abnormal amount of oil, the checks below must be carried out before carrying out corrective action.
- Ask the customer what their driving conditions are (see General causes of high oil consumption)
- Check for oil leaks
- Check that the crankcase ventilation is not blocked
- Check that the correct dip stick is in the engine. Check that the dip stick is pushed down as far as possible
- The car must be parked on level ground when measuring the oil. The engine should be driven at normal operating temperature on the road (not idling) for 30 minutes. The engine must then be left for 15 minutes before noting the oil level.

General causes of high oil consumption

Overfilling

If the oil has been filled above the recommended maximum level, oil is forced up against the cylinder walls and is ejected through the crankcase ventilation. The oil level must not be filled above the maximum mark on the dip stick!

Oil grade

Using a non Volvo recommended oil grade can cause increased oil consumption. The oil contains a larger amount of volatile molecules if the oil is too thin. Thin oil has difficulty in maintaining a comprehensive oil film on the cylinder walls at higher temperatures. This results in increased engine wear and increased oil consumption

Hard driving

Long and continuous driving at high engine speed (RPM) causes high engine temperature. The oil thins and consumption increases. Hard cornering at high engine speed (RPM) causes the oil to be forced against the side of the cylinder block and against the cylinder walls, resulting in increased oil consumption.

Mountain driving

Numerous and long periods of regular engine braking also causes high engine temperature. More oil is sucked into the cylinders due to an increased negative pressure in the intake pipe.

Idling

Driving the car in urban traffic conditions, where the engine may be running for long periods but only covering short distances, does not necessarily increase oil consumption but the ratio of oil consumption to distance travelled may be misleading.

Climate

In hot climates, the engine is required to work harder at a higher temperature. This increases oil consumption.

Mechanical causes of high oil consumption

Leaks

Worn crankshaft and crankshaft seal, external leakage, for example leaking gaskets.

Crankcase ventilation

Overpressure in the crank case caused by blocked crankcase ventilation.

Pistons and piston rings

Worn piston ring groove. Worn, scratched, broken or damaged piston rings. Blocked scraper rings. Incorrectly installed piston rings.

Cylinder walls

Worn or scratched cylinder walls.

Valves

Worn valve guides or valve stem. Worn, damaged or missing valve stem seals.

Cylinder head

Internal leakage between the oil ducts and leakage to the combustion chamber.

Measuring the oil consumption

General

There are two methods of determining the oil consumption. The oil is measured using a dip stick in the first method, before and after driving a test distance of 2000 km. This gives a sufficient first indication of the oil consumption. The second method consists of weighing the oil in the sump after driving 1000 km.
To reach as a correct result as possible, with both methods, the car must be driven to normal operating temperature (not idling) for 30 minutes before noting the oil level or draining the oil. Change the oil and replace the oil filter to ensure that a Volvo approved oil is used in the engine during the test period. Also replace the air cleaner (ACL) before measuring. The car must be standing on a flat surface and in the same position when measuring or weighing before and after the driven test distance.

Measuring using the dip stick

Replace the oil, oil filter and air cleaner. The oil must be Volvo approved.
Drive the car to operating temperature for 20-30 minutes (not idling). This is so that the oil reaches normal operating temperature.
Switch off the engine. Leave the engine switched off for 15 minutes.
Check the oil level. Top up with oil if necessary. Fill to the maximum mark on the dip stick.
Run the engine for 5 minutes so that the existing oil and the additional oil mix.
Switch off the engine for 15 minutes. Note the oil level on the dip stick. Note the odometer setting and vehicle data on the included form, Form for measuring oil consumption.
Drive the car 2000 km, or until the oil level has dropped to the minimum mark on the dip stick.
Drive the car to operating temperature for 20-30 minutes (not idling). This is so that the oil reaches normal operating temperature.
Switch off the engine. Leave the engine switched off for 15 minutes.
Measure the oil level on the dip stick using a sliding gauge. Note the result.
Complete the information on the form.

Weighing

Drive the car to operating temperature for 20-30 minutes (not idling). This is so that the oil reaches operating temperature.
Drain the oil from the oil trough for 15 minutes. A large amount of oil is collected in the cylinder head when the car is running. This factor, together with the design of the splash guard in the oil pan, means that it takes a long time for the oil to drain out of the engine. The oil must**not**be reused.

Warning! Take care when draining the oil. Use protective goggles and protective gloves. Hot oil can cause personal injury!

Replace the oil filter and air cleaner.
Fill with the specified amount of Volvo approved engine oil.
Drive the car to operating temperature for 20-30 minutes (not idling). This is so that the oil reaches normal operating temperature and the oil filter fills.
Carefully weigh an empty clean container (± 1 gram).
Drain the oil from the oil trough into the container for 15 minutes.

Warning! Take care when draining the oil. Use protective goggles and protective gloves. Hot oil can cause personal injury!

Carefully weigh the container + oil.
Fill the engine with the weighed oil. Ensure that as much oil as possible leaves the container.
Weigh the empty container. The container may weigh more than it did the first time due to the remaining oil film. The difference in weight is taken from the weighed oil weight.
Note the oil weight odometer setting and vehicle data on the included form, Form for measuring oil consumption.
Drive the car 1000 km, or until the oil level has dropped to the minimum mark on the dip stick.
Ensure that the engine is at normal operating temperature. Drive to normal operating temperature if necessary for 20-30 minutes (not idling).
Carefully weigh an empty clean container (± 1 gram).
Drain the oil from the oil trough into the container for 15 minutes.

Warning! Take care when draining the oil. Use protective goggles and protective gloves. Hot oil can cause personal injury!

Carefully weigh the oil + container. Deduct the weight of the container.
Complete the information on the form
If abnormal oil consumption is discovered when measuring, the engine needs to be remedied as follows.

Corrective action for high oil consumption

Conditions

A new and improved type of piston ring was introduced for naturally aspirated engines from model year 1999 inclusive and for turbocharged engines from model year 2000 inclusive. From model year 2000 inclusive the same piston rings are used on both naturally aspirated engines and turbocharged engines.
A car with an engine with the new piston rings can be expected to use 0.05-0.15 litres of oil every 1000 km.
A car with an engine with the earlier piston rings can be expected to use 0.10-0.20 litres of oil every 1000 km.
If the engine consumes more than 0.4 litres of oil every 1000 km, the following checks must be carried out to check whether the oil consumption problem is in the cylinder head, crankcase ventilation or piston ring and sleeve surface.

Check

Remove the intake manifold.
Check to see if there is an oil film or drops of oil in the cylinder head intake passage and/or oil on the valve stem and top of the valve crown.

Conclusions

If there is not an abnormally large amount of oil in the intake passage and valves and the oil consumption gradually, from being acceptable, begins to quickly increase, or consumption is between 0.30-0.80 litres per 1000 km, the problem is in the piston, piston ring or cylinder sleeve surface.
Faults in valve stem seals for example, or internal leakage in the cylinder head cannot be completely ruled out.
If the oil consumption has always been high, or there are traces of oil in the intake passage and valves, or the oil consumption is above 0.80 litres every 1000 km, the problem is probably in the cylinder head.
The cause could be leaking valve stem seals, internal leakage in the cylinder head or a fault in the crankcase ventilation (other than a blockage).

Corrective actions

If the problem seems to be in the crankcase ventilation, this must be thoroughly checked and remedied if necessary, before reconditioning or replacing the cylinder head.
If the problem seems to be with the piston, piston ring or cylinder sleeve surface, the engine should be reconditioned or if necessary, replaced.

Reconditioning

Replacing piston rings

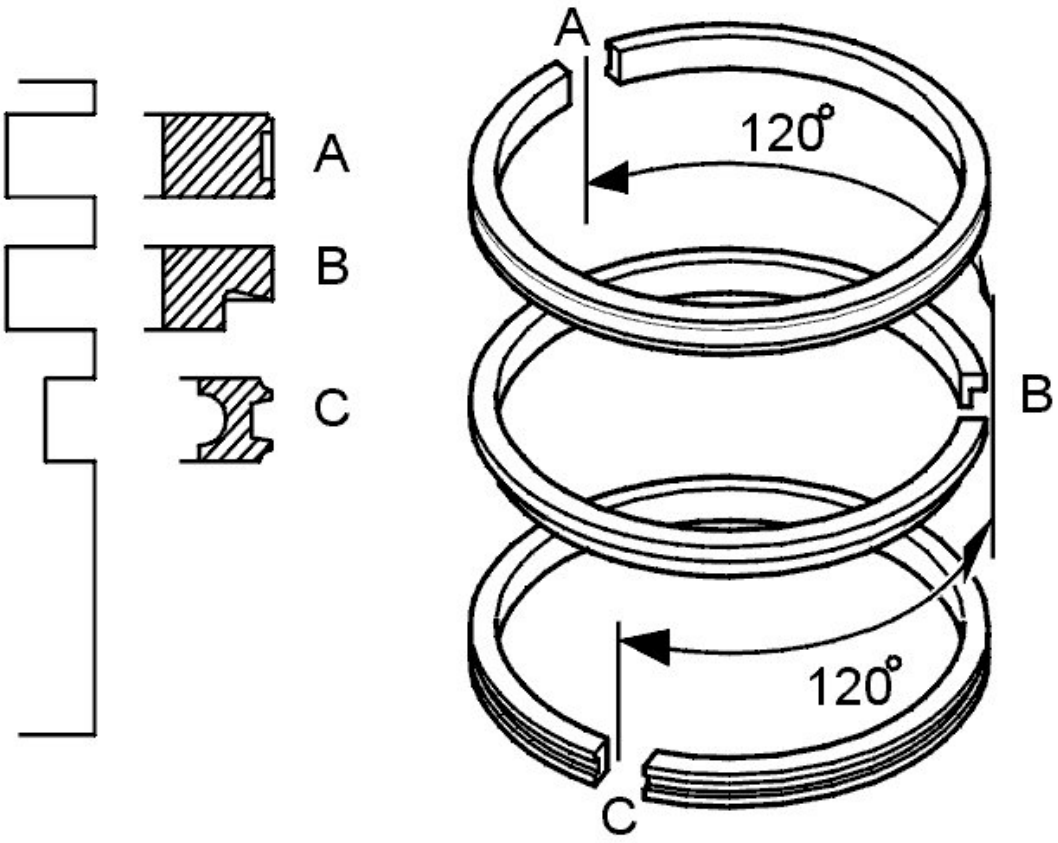
A corrective action is to replace the two lower piston rings (scraper ring and oil ring).
If the upper piston ring (compression ring) is undamaged it must not be replaced. Increased oil consumption may result if the compression ring is replaced.

Caution! Check that the upper piston ring (compression ring) faces the right way (see below)!

It is important that the uppermost and centre rings are installed the correct way up.
The lower ring can be installed any way up.

Distribute the piston ring openings as follows.

Early version



A. Compression ring

This is marked with text or with a circle. The marking must be facing upwards! It may be difficult to read the text, a magnifying glass may be required.

B. Scraper ring

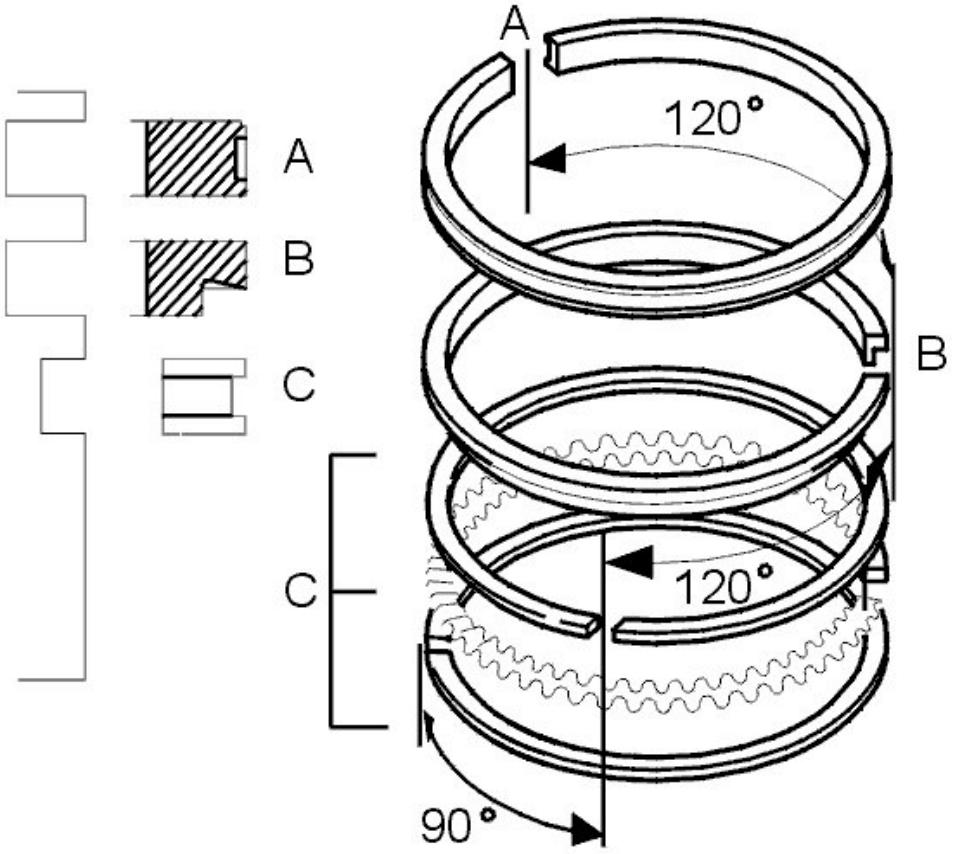
The cut out must be turned downwards. The text must be on the top of the ring.

C. Oil ring

Earlier versions of the oil ring are not marked and can be installed any side up.
Later versions of the oil ring are divided into 3 sections. These slotted rings can be installed with either side facing up.

Caution! New versions of the piston ring assembly cannot be combined with earlier versions of the piston!

Late version



Conclusions for corrective action

Replacing piston rings

As a first corrective action the piston rings should be replaced. Normally only the scraper ring and the oil ring must be replaced. The compression ring should only be replaced if absolutely necessary.

Replacing valve stem seals

If traces of oil are found on the valve crowns, in the ducts or on the valve stems, the valve stem seals should be replaced.
Thoroughly check the cylinder head. Check for internal leakage.

Replacing the cylinder head

If traces of oil (described above) are found and faults are found on the cylinder head, internal leakage for example, the cylinder head must be replaced.

Replacing the cylinder block and pistons

If damage is found in the cylinder block (worn cylinder bore, deep scratches etc.) the cylinder block, pistons and piston rings must be replaced.

Replacing the engine

The engine must be replaced if the problem cannot be remedied using the above corrective actions.

Form for measuring oil consumption

Chassis type:
Chassis number:
Engine number:
Date of arrival:
Odometer reading (km):
Checks carried out by:

1. Mileage	
Odometer reading, before check	(km)
Odometer reading, after check	(km)
Mileage driven "A"	(km)

2. Weighing	
Weight of oil before test drive	(gram)
Weight of oil after test drive	(gram)
Consumed oil weight	(gram)
Volume of consumed oil "B", (870 gram = 1 litre)	(litres)

Volume of consumed oil per 1000 km	
Volume of consumed oil "B" divided by the test drive distance "A" multiplied by 1000 = consumed amount (B / A x 1000 = consumed amount)	(litres/1000km)

Engine Oil Pressure: Testing and Inspection

Checking oil pressure

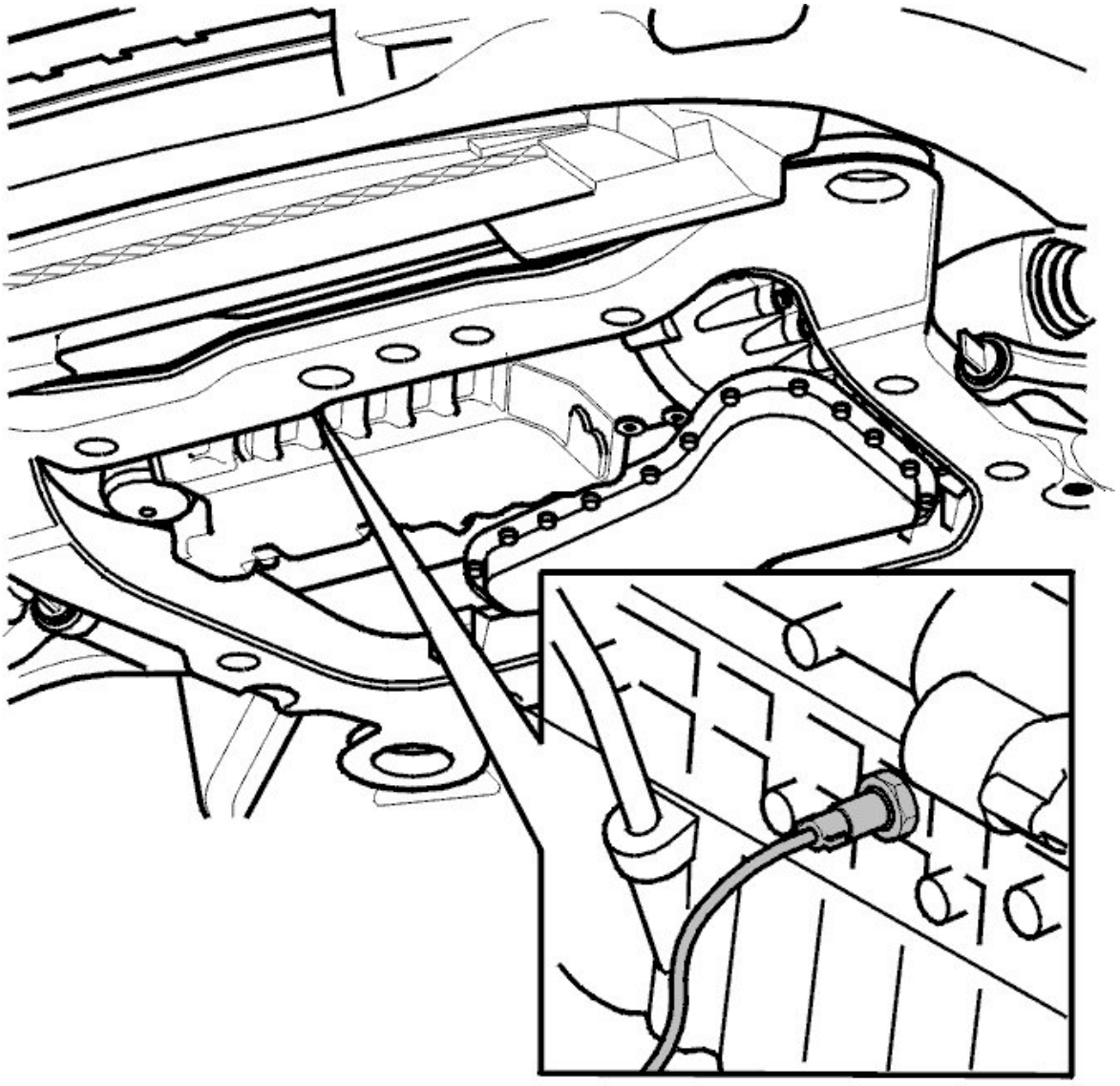
Special tools:

999 5270 OIL PRESSURE METER See: Tools and Equipment/999 5270 Oil Pressure Meter

Tightening torques

For tightening torques not in the text, see
B52x4x Tightening torque See: Specifications/Tightening Torque
B6xx4x Tightening torque See: Specifications/Tightening Torque

Checking the oil pressure sensor



Note! When checking the oil level and oil pressure, the engine should be at normal operating temperature which corresponds to 15 minutes normal driving (100°C / 212°F). If the oil quality and type or oil filter condition cannot be determined, replace the oil and filter.

Remove
- the air baffle on both sides
- the center air baffle under the engine.

Check
- the cable and connectors
- type and function. Try a new sensor
- any cable faults between sensor and warning lamp.

Note! Use a new gasket when the new sensor is installed.

Checking the oil pressure

Use instrument kit 999 5270 OIL PRESSURE METER See: Tools and Equipment/999 5270 Oil Pressure Meter. Connect to the oil pressure sensor duct on the cylinder block. Start the engine and read off oil pressure at different engine speeds (RPM).

Oil pressure B52x4x

13.3 r/s (800 rpm)	min 0.10 MPa
66.7 r/s (4000 rpm)	min 0.35 MPa
Maximum oil pressure (relief valve opens)	0.48 MPa

Oil pressure B6xx4x

12.5 r/s (750 rpm)	min 0.10 MPa
66.7 r/s (4000 rpm)	min 0.35 MPa
Maximum oil pressure (relief valve opens)	0.65 MPa

Engine Oil: Service and Repair

Oil/oil filter, replacing

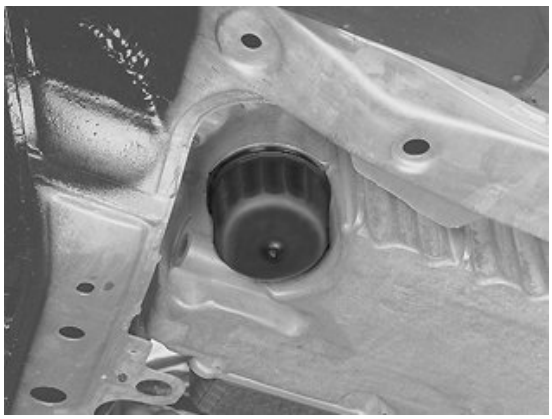
Special tools:

999 5679 Oil filter spanner See: Tools and Equipment/999 5679 Oil Filter Spanner

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Replacing the oil and oil filter

Draining the oil



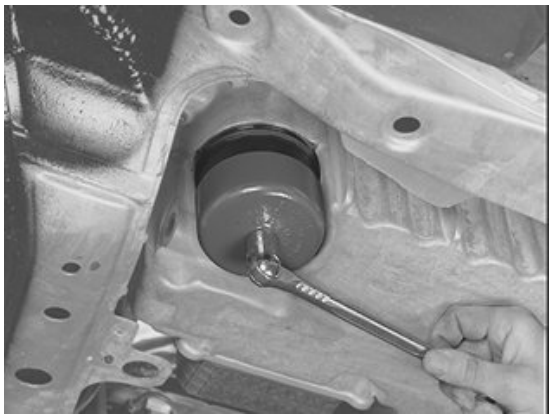
Warning! Hot oil can scald.Avoid skin contact with engine oil, particularly if the engine oil is dirty.Immediately wash hands and any skin that has been in contact with oil. Use a suitable cleaning agent and warm water.Wear protective gloves when working with engine oil.

Raise the vehicle. See: Jacking points, body See: Maintenance/Vehicle Lifting/Service and Repair and position an oil container.

Hint: The engine should be at operating temperature for the oil to drain more easily.

Remove:
- the lower splash guard. Position the container under the engine oil pan
- the oil pan plug. Discard the gasket. Drain the engine oil.

Removing the oil filter



Position the container under the oil filter.
Remove the oil filter housing. Use tool: 999 5679 Oil filter spanner See: Tools and Equipment/999 5679 Oil Filter Spanner.
Reinstall the oil plug again. Tighten. See Tightening torque See: Specifications/Tightening Torque. Always use a new sealing washer.

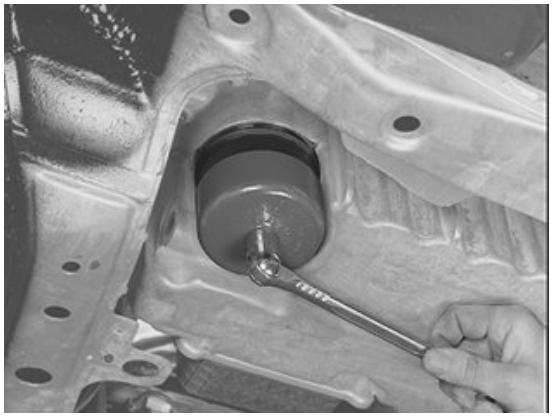
Replace the oil filter insert

Remove:

- the filter insert from the housing
- the O-ring that seals between the housing and the oil trough.

Allow the filter insert to drain and then discard it in an approved place.

Installing the oil filter



Caution! Clean the housing.

Install:

- a new filter insert
- a new O-ring. Lubricate the O-ring
- the oil filter housing. Tighten to Tightening torque See: Specifications/Tightening Torque.

Install the lower cover.

Filling with engine oil

Lower the vehicle and fill with oil.

Check:

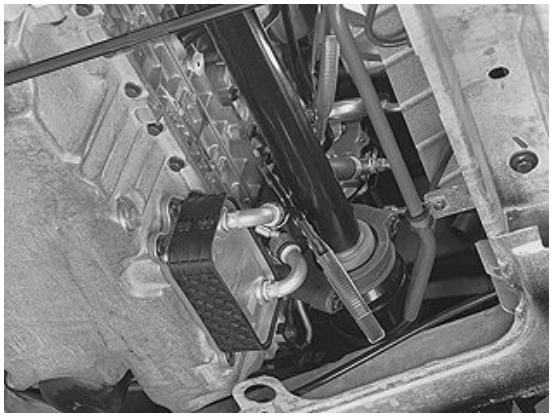
Start the engine and check for oil leakage.
Stop the engine and give the oil time to run down into the oil pan.
Then check the oil level. Top up if necessary but do not overfill. Wipe the engine compartment clean. Ensure that the steering wheel and the gear selector lever are clean.

Oil Cooler: Service and Repair

Oil cooler, replacing

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Oil cooler, removing:



Raise the car.

Remove:
- the lower splash guard.

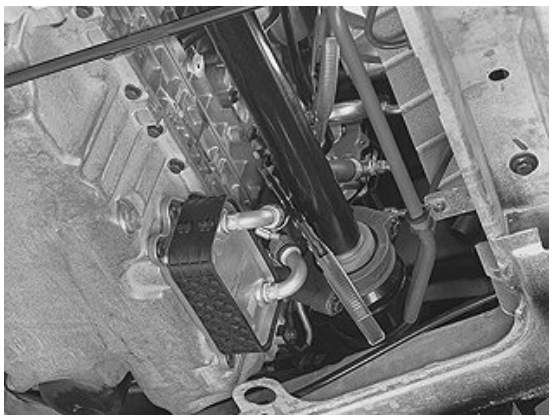
Clamp both the oil cooler coolant hoses together with lock grip pliers.

Remove:
- the coolant hoses from the oil cooler
- the oil cooler mounting screws.

Note! Collect the oil that drains from the oil cooler and any coolant.

Lift down the oil cooler.

Oil cooler, installing:



Use new seals.
The seals must be greased prior to installation.

Install:
- the oil cooler.

Screw the 4 oil cooler screws into place.
Tighten to: **17 Nm**
- the coolant hoses.

Remove the lock grip pliers.
Screw the splash guard into place.

Check

Check:
- the engine oil level

- the coolant level.

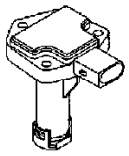
Check for leakage:

- start the engine and run to operating temperature
- then check that there is no leakage.

Check if the oil or coolant needs topping up.

Oil Level Sensor: Description and Operation

Oil Level Sensor (2004-, Certain Markets And Models Only)



The oil level sensor provides the engine control module (ECM) with information about the quality and temperature of the engine oil and the oil level in the oil trough. Which of these functions is used by the sensor varies between different car models.

All three functions are combined in one unit with a sensor section and an electronics section. There are no moving parts in the sensor.

The sensor consists of:
- a terminal with three pins
- integrated electronics
- 2 capacitive gauge elements
- a PTC resistor.

The oil level sensor is supplied with **5 V** by the engine control module (ECM). The oil level sensor generates a PWM signal for the engine control module (ECM). Also see Function.

The engine control module (ECM) can diagnose the functions of the oil level sensor. Also see Oil level sensor, diagnostics.

The oil level signal can be read out in VIDA parameter read out.

Oil Level Sensor: Service and Repair

Oil level sensor, replacing

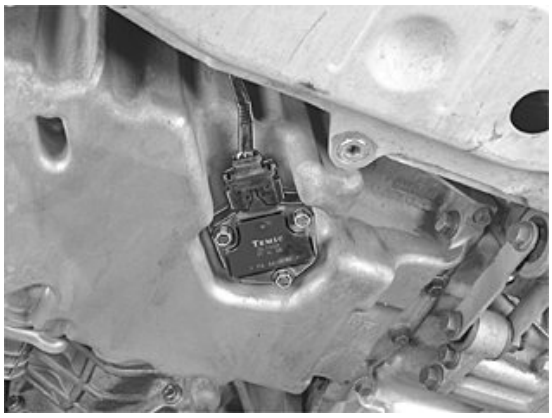
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removal and Installation

Removing the oil level sensor

Warning! Hot oil can scald. Avoid skin contact with engine oil, particularly if the engine oil is dirty. Immediately wash hands and any skin that has been in contact with oil. Use a suitable cleaning agent and warm water. Wear protective gloves when working with engine oil.

Remove the splash guard under the engine. Only applies to cars with automatic transmissions.
Position the container under the engine oil trough.
Remove the oil plug.
Drain the engine oil. It is easier to drain the oil if the engine is at operating temperature.

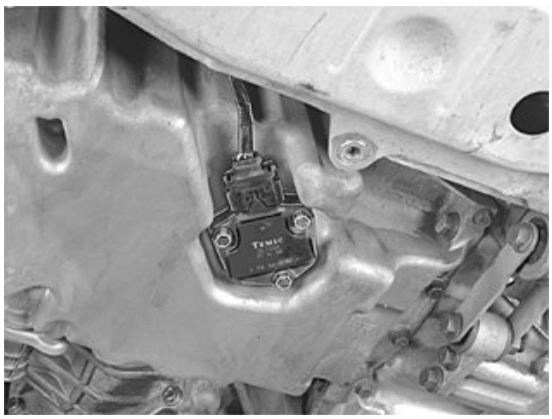


Remove:

- the screws for the sensor. Disconnect the connector for the sensor
- the sensor.

Installing the oil level sensor

Note! For tightening torques, see Tightening torque See: Specifications/Tightening Torque.



Install:

- the sensor
- screws for the sensor. Tighten. Connect the connector to the sensor
- the oil plug.

Finishing

Fill with engine oil. Run the engine to operating temperature. Check for any oil leakage.
Install the splashguard under the engine. Only applies to cars with automatic transmissions.
Check the oil level. Top up if required.

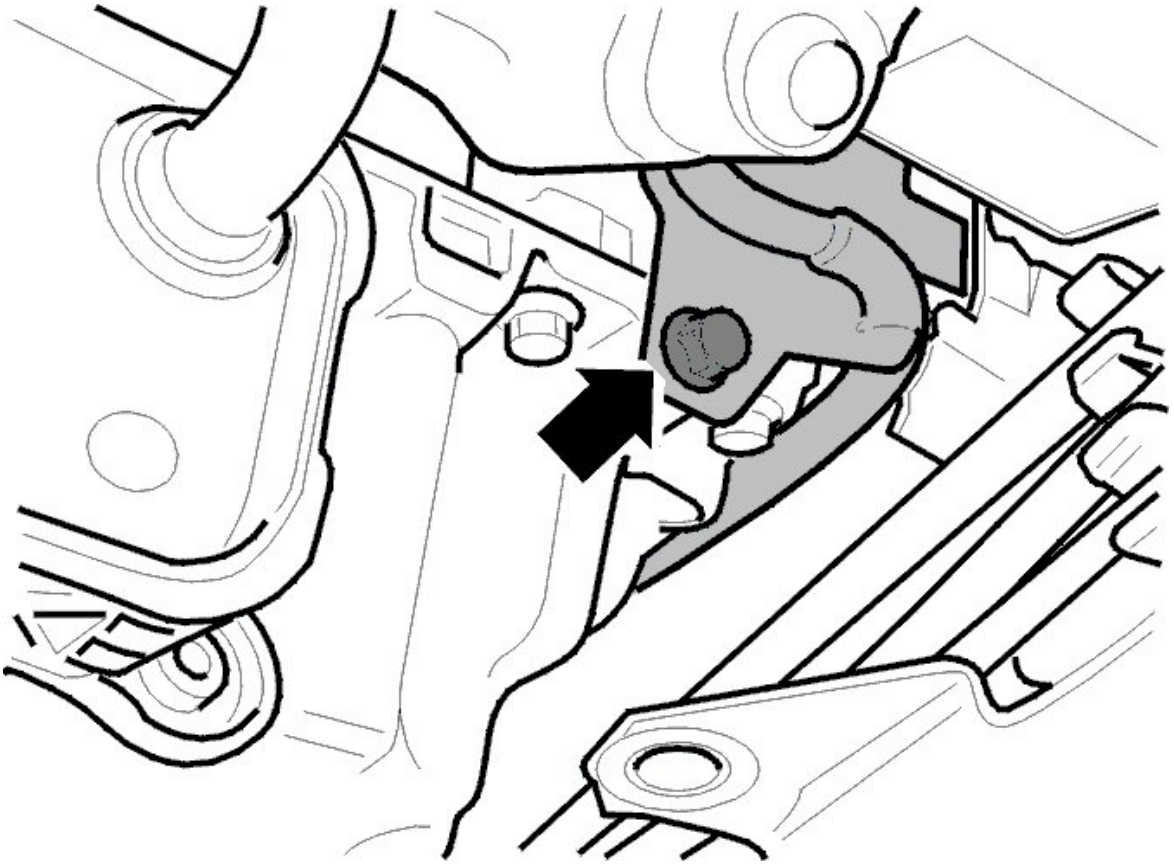
Oil Pan: Service and Repair

Oil sump replacement

Special tools:

951 2767 Roller See: Tools and Equipment/951 2767 Roller

Preparation



Remove

- the oil dipstick and its pipe.
- the splashguard under the engine.

Drain the engine oil and remove the oil filter.
Release the oil cooler from the sump. Hang up at the rear.
Remove the screw from the bracket for the fuel line.

Removing the oil sump

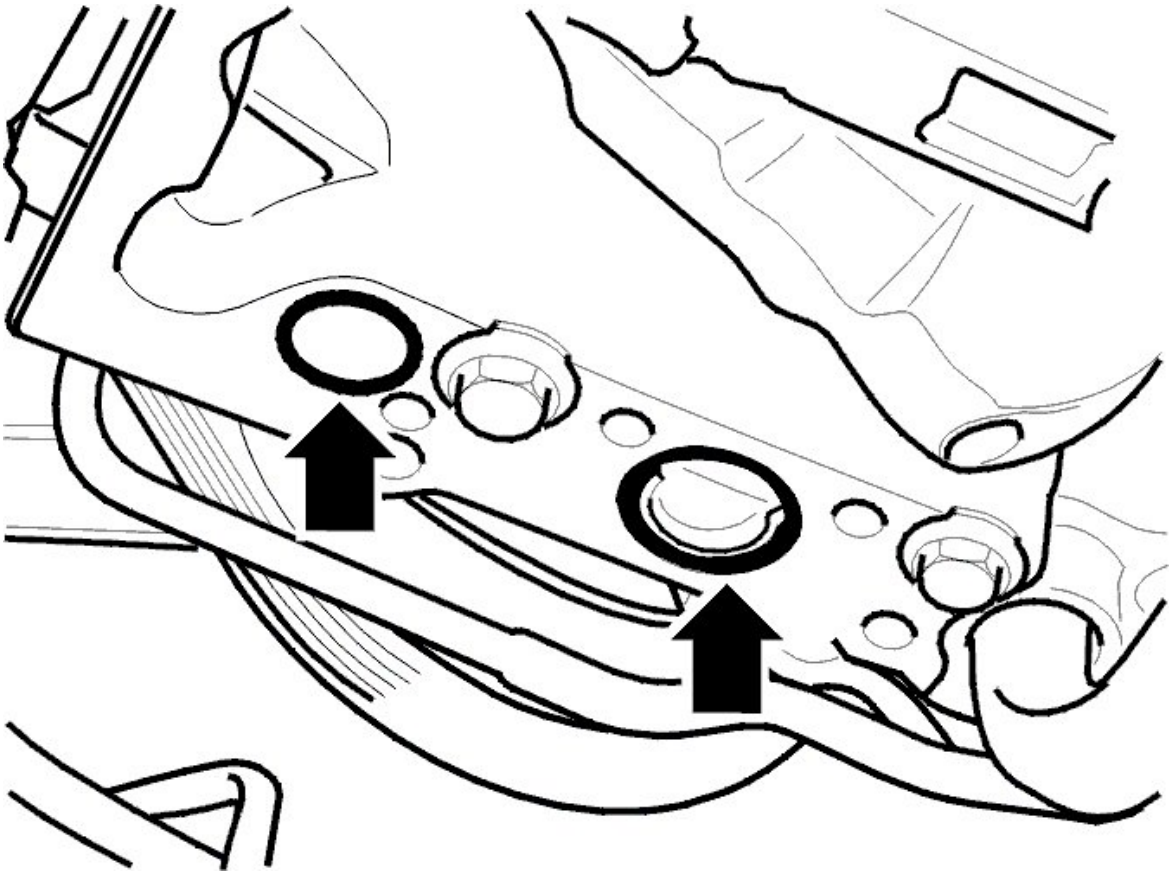
Slacken off all screws holding the oil sump.
Remove all screw except for four. It is recommended that the four screws in the corners of the sump are left in place.
Carefully tap the sump with a rubber mallet until the joint and its liquid gasket releases.
Remove the four remaining screws.
Remove the sump.

Cleaning

Clean the gasket surfaces on the oil sump and cylinder block. Use a razor blade or a gasket scraper and gasket solvent P/N 1161 440.

Warning! Use a fume hood or extractor when using gasket solvent.

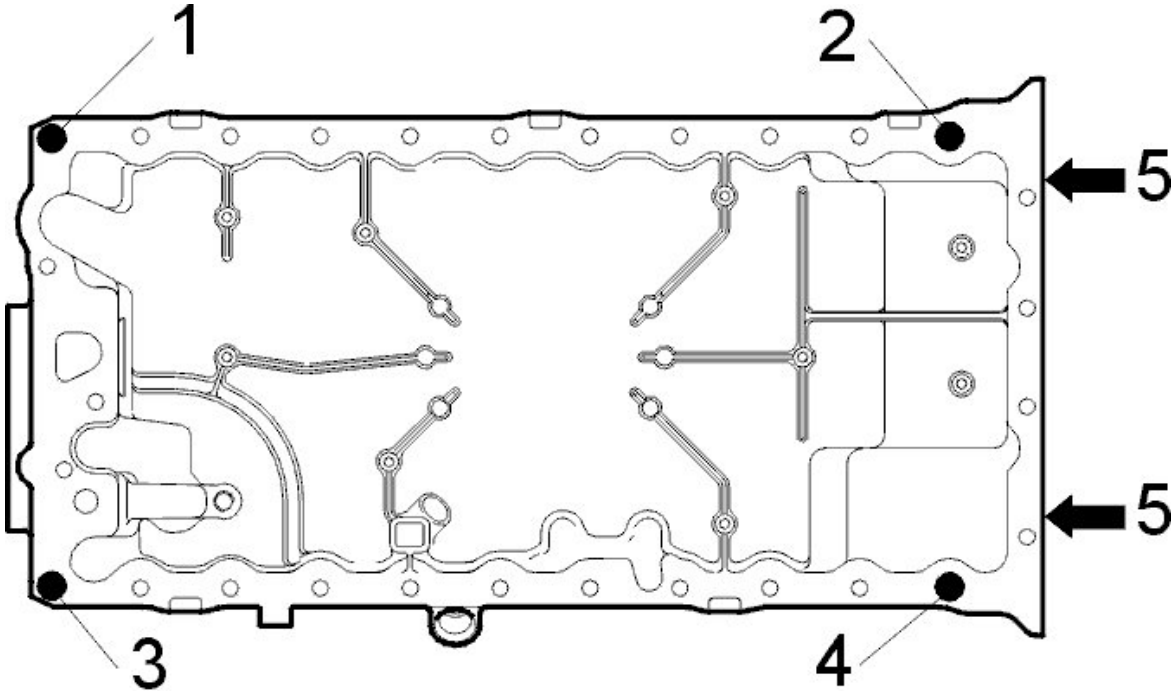
Installing the oil pan



Apply liquid gasket 1161 059-9 to the sump. Use roller951 2767 Roller See: Tools and Equipment/951 2767 Roller.

Install

- new O-rings.
- the oil sump. Secure it loosely with a few screws.
- the remaining screws loosely.



Press the sump against the transmission. Tighten the screws (1), (2), (3) and (4) to **3 Nm**. First tighten the screws (5) to **25 Nm**. Then tighten to **48 Nm**.
Tighten all screws in the sump joint to 17 Nm. Start at the transmission and continue forwards in pairs.
Install the screw for the bracket for the fuel line.
Connect the oil cooler to the sump. Use new O-rings. Reinstall the pipe on the sub-frame.

Install

- a new oil filter.
- the oil plug with a new gasket.

- the oil dipstick and its pipe. Use a new O-ring.

Note! Check that the O-ring is correctly positioned.

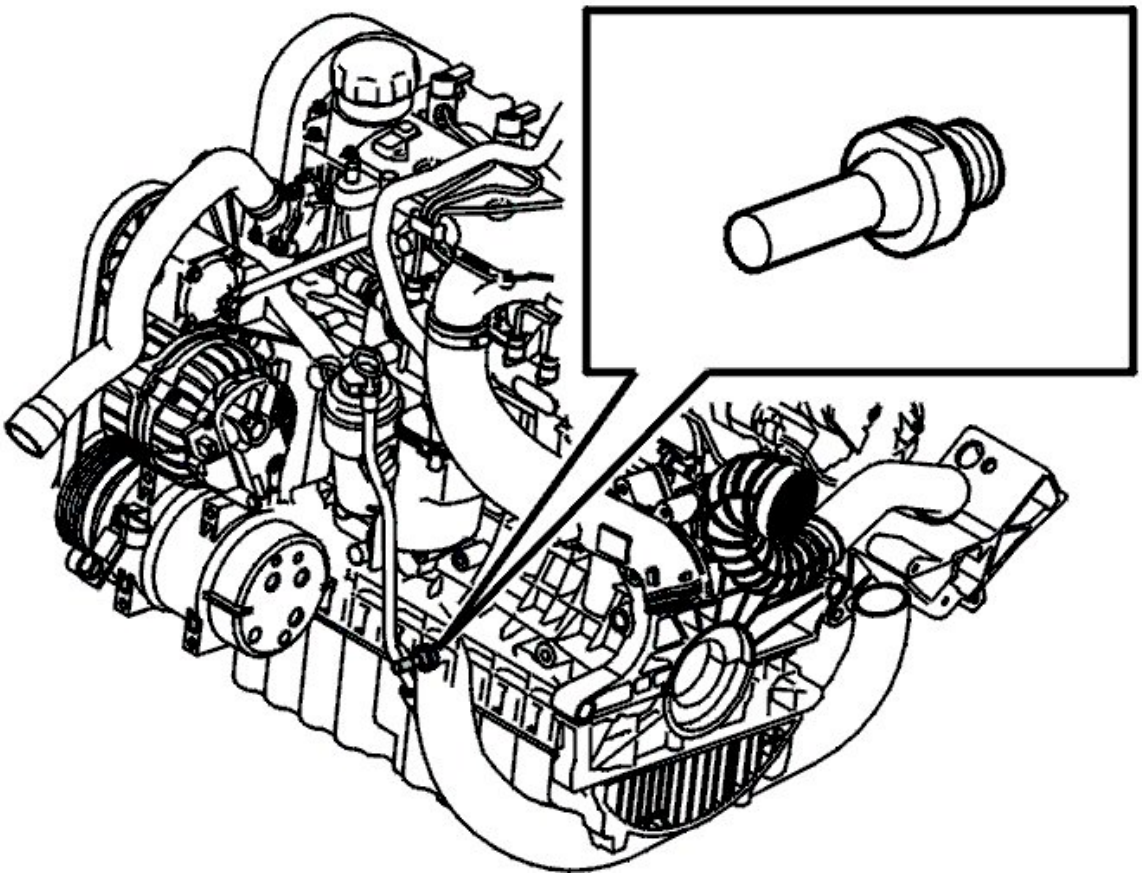
Fill with engine oil. Run the engine to operating temperature.
Check for oil leaks from the oil sump or oil cooler.
Install the splashguard under the engine.
Check the oil level. Top up if required.

Oil Pressure Sensor: Service and Repair
Replacing the Oil Pressure Sensor

Replacing the oil pressure sensor

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removing the oil pressure sensor

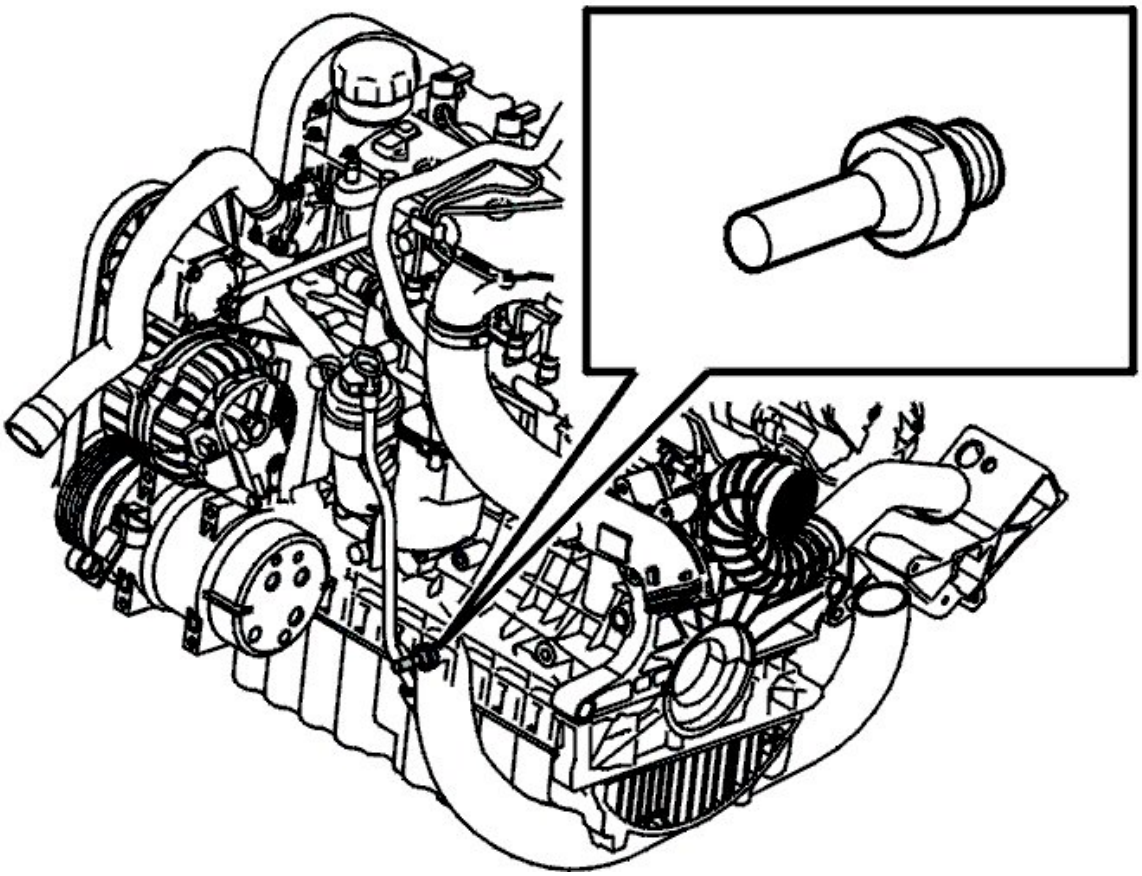


Remove the hose from the charge air pipe.

Remove:
- the screw for the charge air pipe in the cylinder block
- the connector from the oil pressure sensor
- the oil pressure sensor. Use a long 24 mm socket.

Place paper underneath in case of oil leakage.

Installing the oil pressure sensor



Install:

- the new pressure sensor
- the connector
- the screw for the charge air pipe in the cylinder block
- the hose on the charge air pipe.

Oil Pump: Service and Repair

Oil pump / crankshaft seal, front, replacing

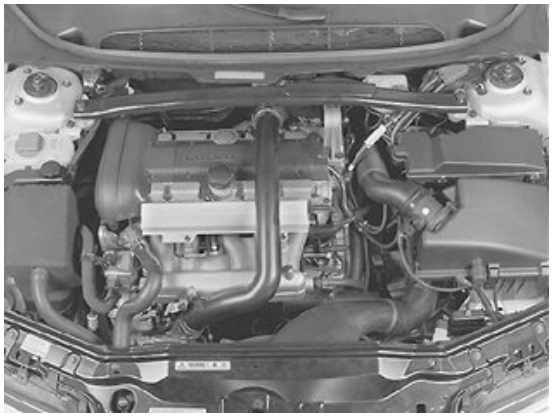
Special tools:

999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
998 6187 UNIVERSAL PULLER 100 See: Tools and Equipment/998 6187 Universal Puller 100
999 5919 PULLER See: Tools and Equipment/999 5919 Puller
999 5455 PUNCH See: Tools and Equipment/999 5455 Punch
951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Note! If the oil pressure is low or if there is possibly a fault with the oil pump, measure the oil pressure according to: Service information Section: 2 (21).

Remove engine components



Caution! Remove the ignition key.

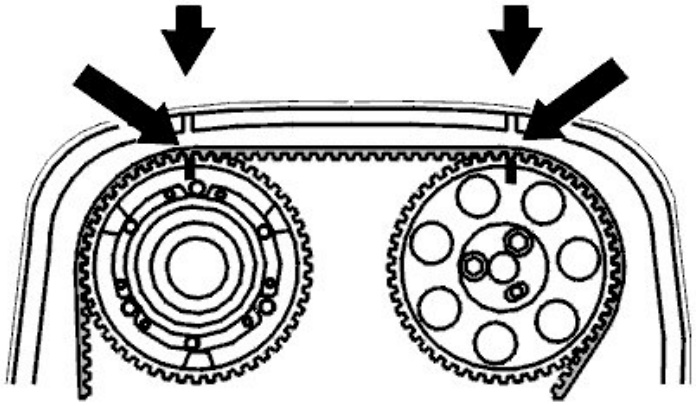
Remove

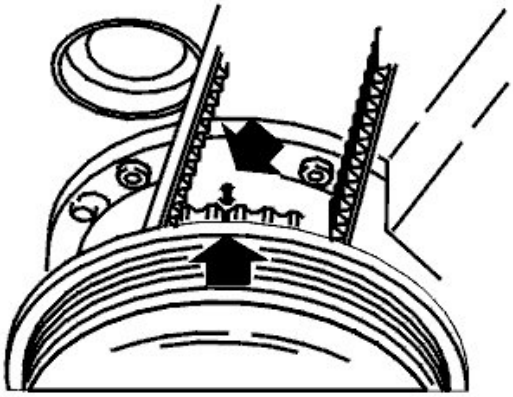
- the cross stay between the suspension turrets
- the upper timing belt cover
- the servo reservoir and expansion tank. Lift up and place on top of the engine.

Warning! Ensure that no power steering fluid is spilled. Extremely flammable.

- the auxiliaries belt
- the front timing belt cover.

Position the engine according to the marking

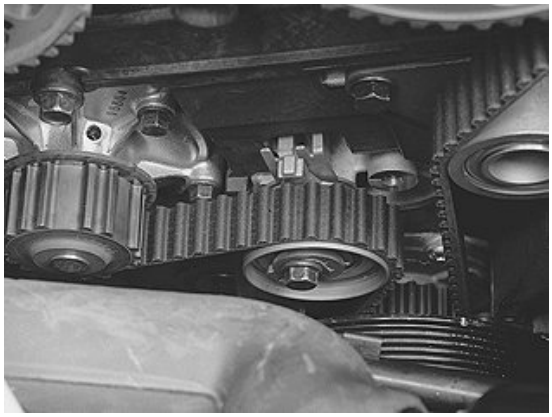




Raise the car

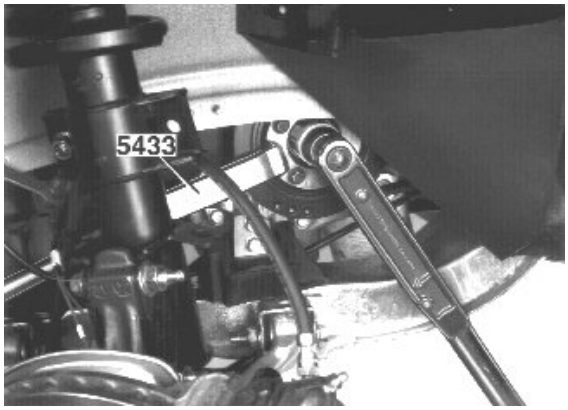
- Remove the right front wheel
- Install the upper timing belt cover
- Turn the crankshaft clockwise until the markings on the crankshaft and camshaft pulley correspond
- Turn a further 1/4 turn clockwise and then back counter-clockwise until the markings correspond
- Remove the upper camshaft cover.

Remove the timing belt



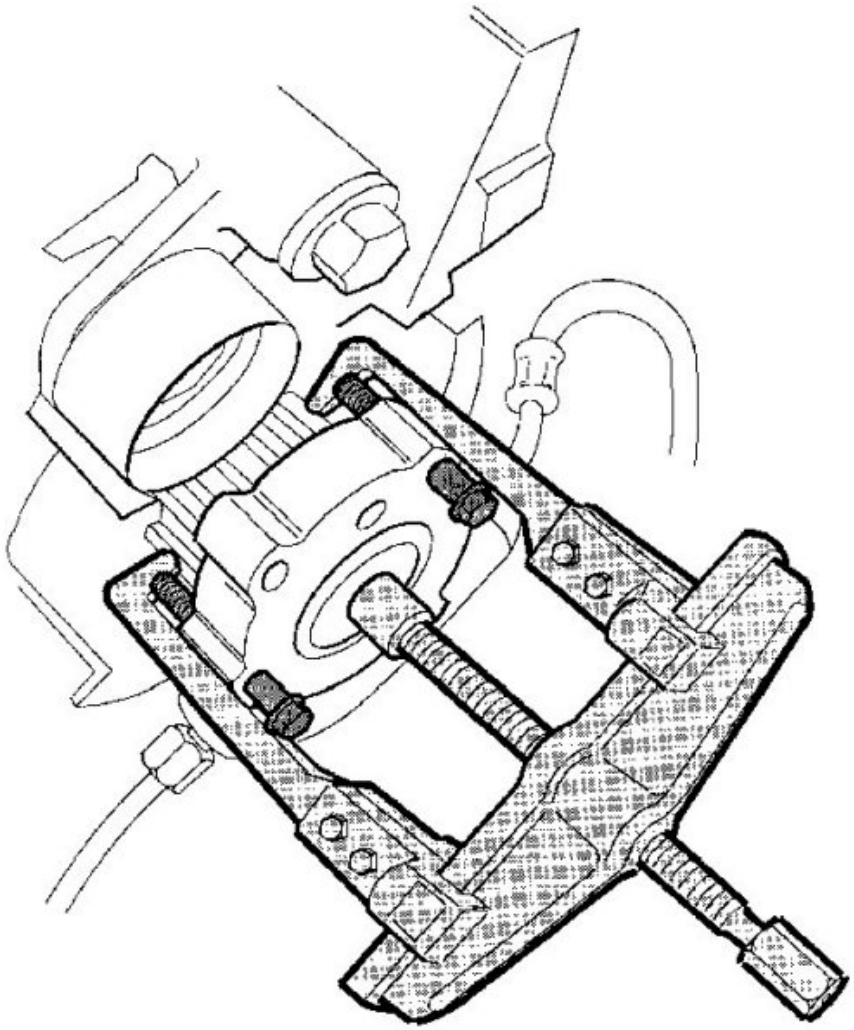
- Slacken off the center screw for the belt tensioner slightly
- Hold the center screw secure. Turn the tensioner eccentric clockwise with a 6 mm Allen key to "10 o'clock"
- Remove the timing belt.

Remove the vibration damper



- Install counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
- Counterhold and remove the crankshaft center nut
- Work the vibration damper loose and remove by hand
- Remove the camshaft belt.

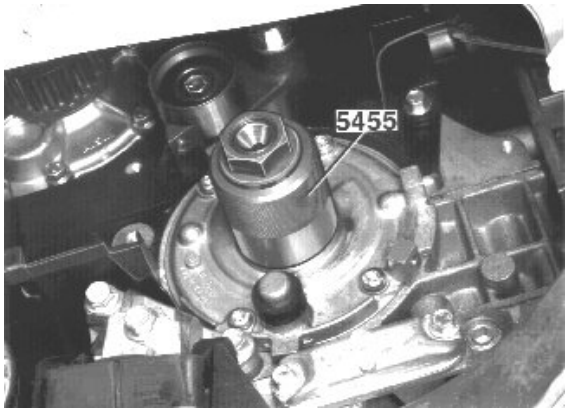
Remove the crankshaft timing gear pulley



- Use universal puller 998 6187 UNIVERSAL PULLER 100 See: Tools and Equipment/998 6187 Universal Puller 100 and two of the vibration damper screws
- Tighten both the screws by hand to stop in the pulley
- Install the puller so that the claws engage in the screws, not in the camshaft pulley.

Note! Ensure that the tool claws do not damage the pulley teeth.

When only replacing the front crankshaft seal



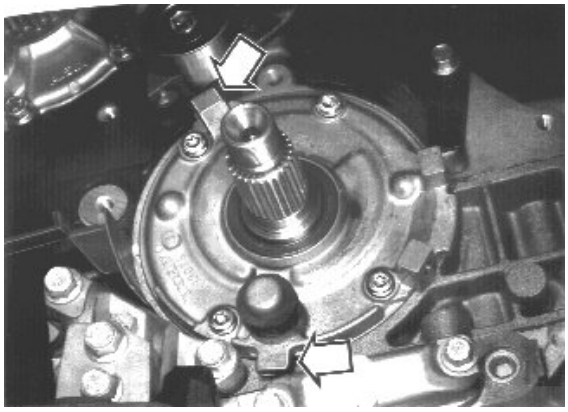
- Remove the old seal using a groove-cut chisel or: 999 5919 PULLER See: Tools and Equipment/999 5919 Puller
- Clean the mating surface
- Grease and install a new seal.

Use tool 999 5455 PUNCH See: Tools and Equipment/999 5455 Punch

- Press in the seal using a drift and the crankshaft center nut. As illustrated.

Note! Ensure that the crankshaft does not rotate when pressing in the crankshaft seal.

Remove the oil pump



- Remove the four oil pump screws
- Remove the oil pump.

Use a groove-cut chisel and **carefully** break at the stop lugs

- Clean the gasket face and the mating surfaces.

Install the oil pump

Install new oil pump

- Install a new gasket
- Carefully insert the oil pump over the end of the crankshaft.

Note! Ensure that the sealing ring in the oil pump is not damaged during installation

- Install 4 new screws as guides
- Pull in the oil pump with drift 999 5455 PUNCH See: Tools and Equipment/999 5455 Punch and the crankshaft center nut.

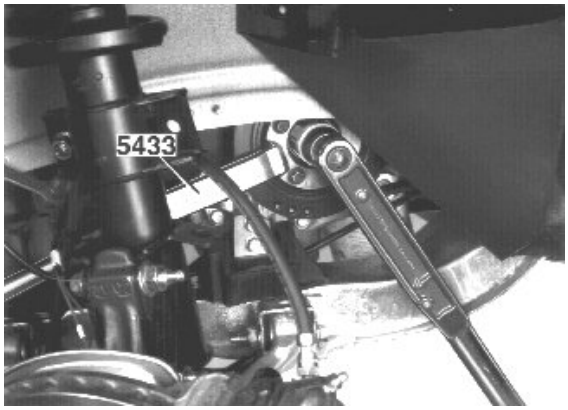
Note! Ensure that the crankshaft does not rotate when drawing in the pump.

- Tighten the screws crosswise. Tighten to **10 Nm**
- Install the crankshaft timing gear pulley.

Carefully tap alternately around the pulley until end position is reached.

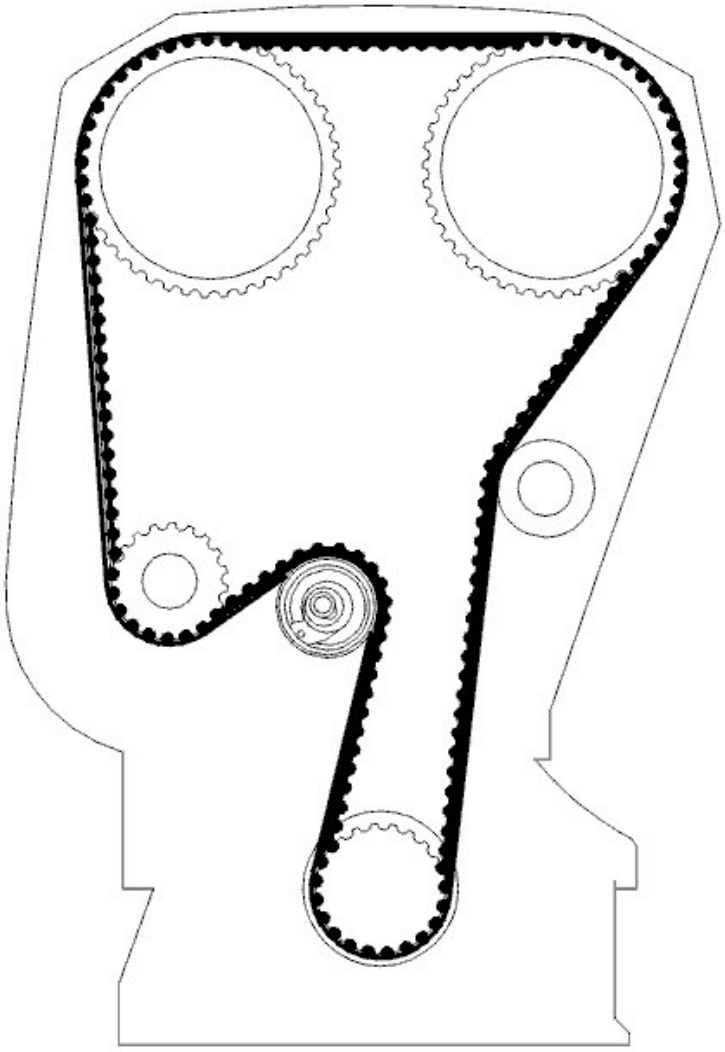
Note! The timing gear pulley can only be in one position on the splines on the end of the crankshaft.

Install the vibration damper



Install the vibration damper.
Tighten the center nut. Tighten to **180 Nm**.
Use counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold.
Remove the counterhold. Tighten the screws. Tighten to **25 Nm**.
Angle-tighten **30°**. Use bevel protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor.

Install the timing belt

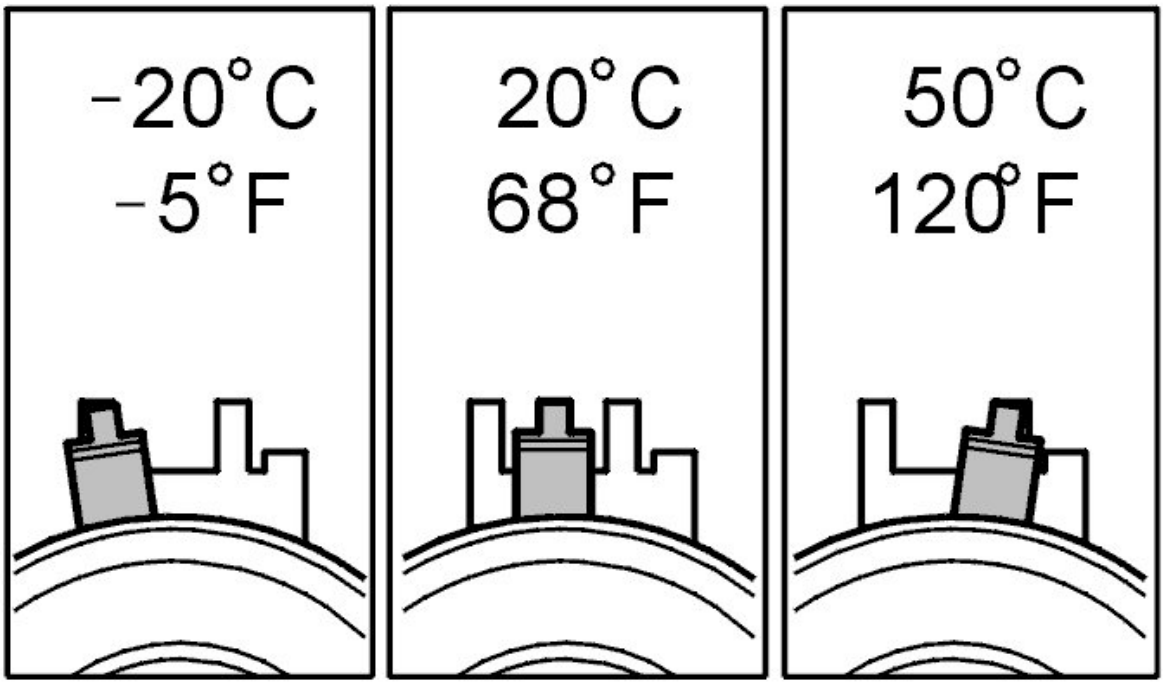


Install the upper timing belt cover.
Check that the markings on the crankshaft and camshaft timing gear pulley correspond.

Install the belt in the following order:

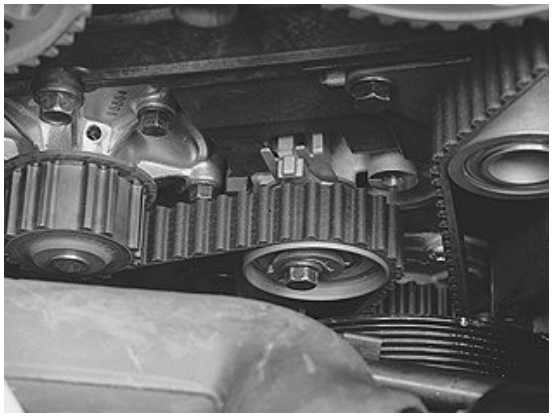
- crankshaft
- the idler pulley
- intake camshaft
- exhaust camshaft
- water pump
- belt tensioner.

Tighten the timing belt

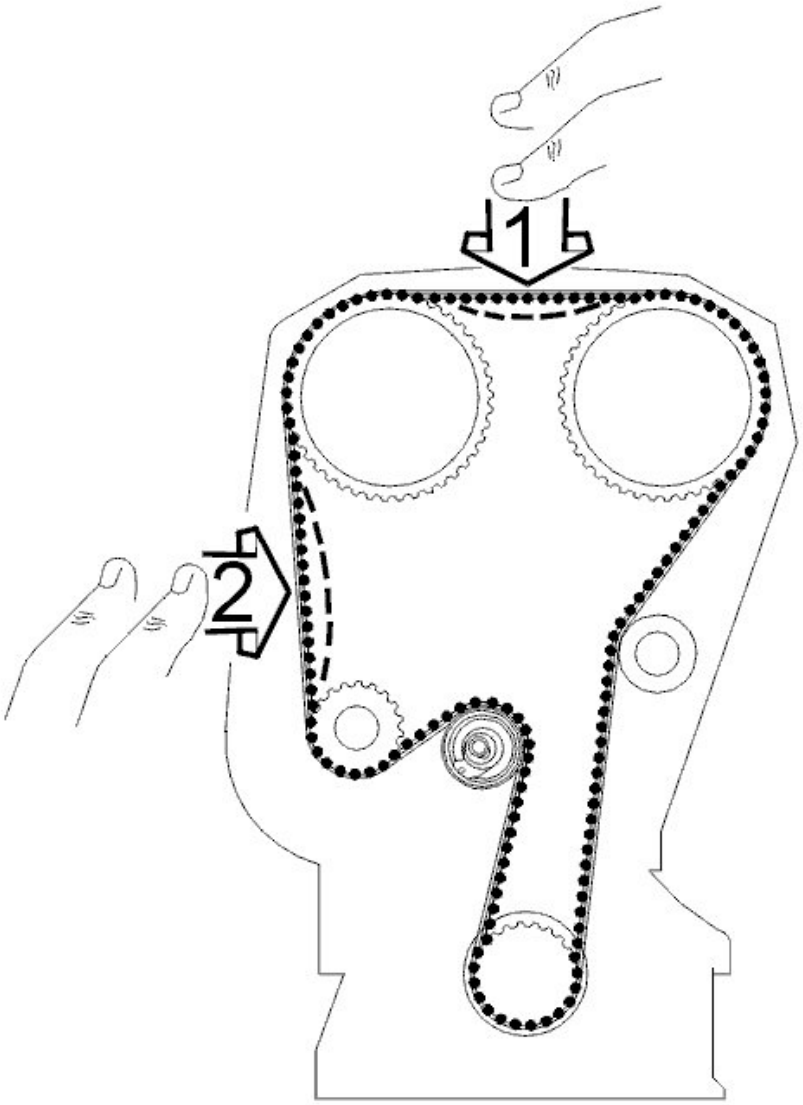


This adjustment is carried out on a cold engine. A suitable temperature is approximately 20°C/68°F.

At higher temperatures (with the engine at operating temperature or a high outside temperature for example) the indicator is further to the right. The illustration shows the position of the indicator when aligning the timing belt tensioner at different temperatures.



Carefully turn the crankshaft clockwise until the timing belt is in the tensioned position (tensioned between the intake cam, idler pulley and crankshaft).
Hold the belt tensioner center screw secure. Turn the belt tensioner eccentric counter-clockwise until the tensioner indicator passes the marked position. Turn the eccentric back until the indicator reaches the marked position in the center of the window.
Hold the eccentric secure and tighten the center screw. Tighten to **20 Nm**. Ensure that the indicator is in the correct position.

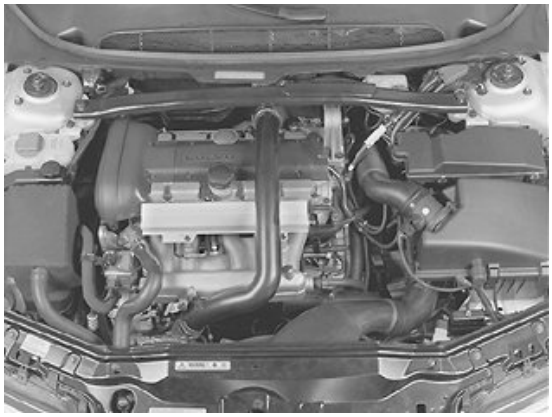


Press the belt to see that the indicator on the tensioner moves easily.
Position the upper camshaft cover.
Turn the crankshaft two turns. Check that the markings on the crankshaft and camshaft pulley correspond.
Check that the indicator on the belt tensioner is within the marked position.

Install

- the nuts for the cover in the fender liner
- the wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Finishing



Install:

- front timing belt cover.

Tighten to **12 Nm**

- the upper timing belt cover
- the auxiliaries belt

- the expansion tank and servo reservoir.

  Note! Ensure that the hoses are correctly positioned.

- the engine stabilizer brace. Tighten the screws at the suspension turrets. Tighten to **50 Nm**. Tighten the engine bracket screw. Tighten to **80 Nm**.

Carry out a function test

- Check the oil level and top up if required
- Start the engine
- Check that there is no oil leakage.

Stop the engine and give the oil time to run down into the oil trough.
Then check the oil level.
Top up if necessary.
Wipe the engine compartment clean.
Ensure that the steering wheel and gear selector lever are clean.

Oil Spray Jet: Service and Repair

Piston cooling valves, replacing

Affected engines: B52xxxx

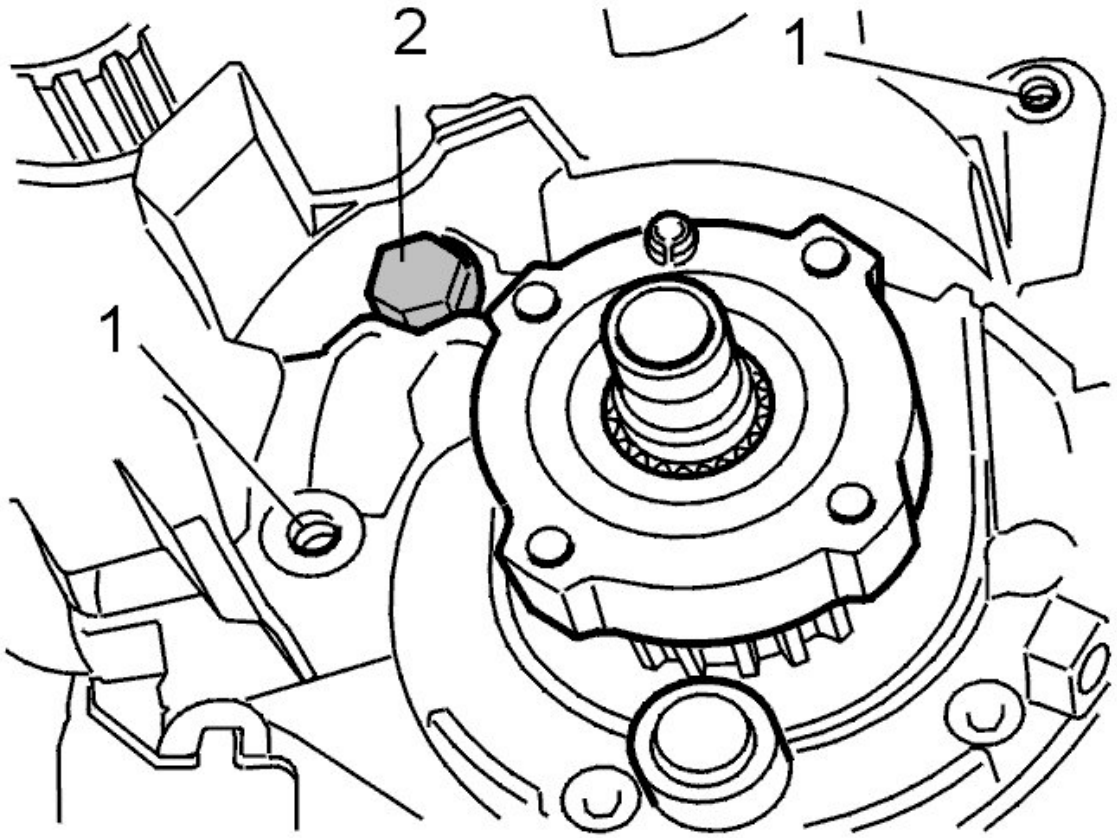
Removing the timing belt and mechanical timing belt tensioner

Remove the timing belt. See: Timing Components/Timing Belt/Service and Repair

Remove the timing belt tensioner. Remove the idler pulley. Remove the screw securing the inner timing cover to the cylinder head.
Raise the car. Continue with method: Timing belt, replacing. See: Timing Components/Timing Belt/Service and Repair

Remove the vibration damper.

Removing components

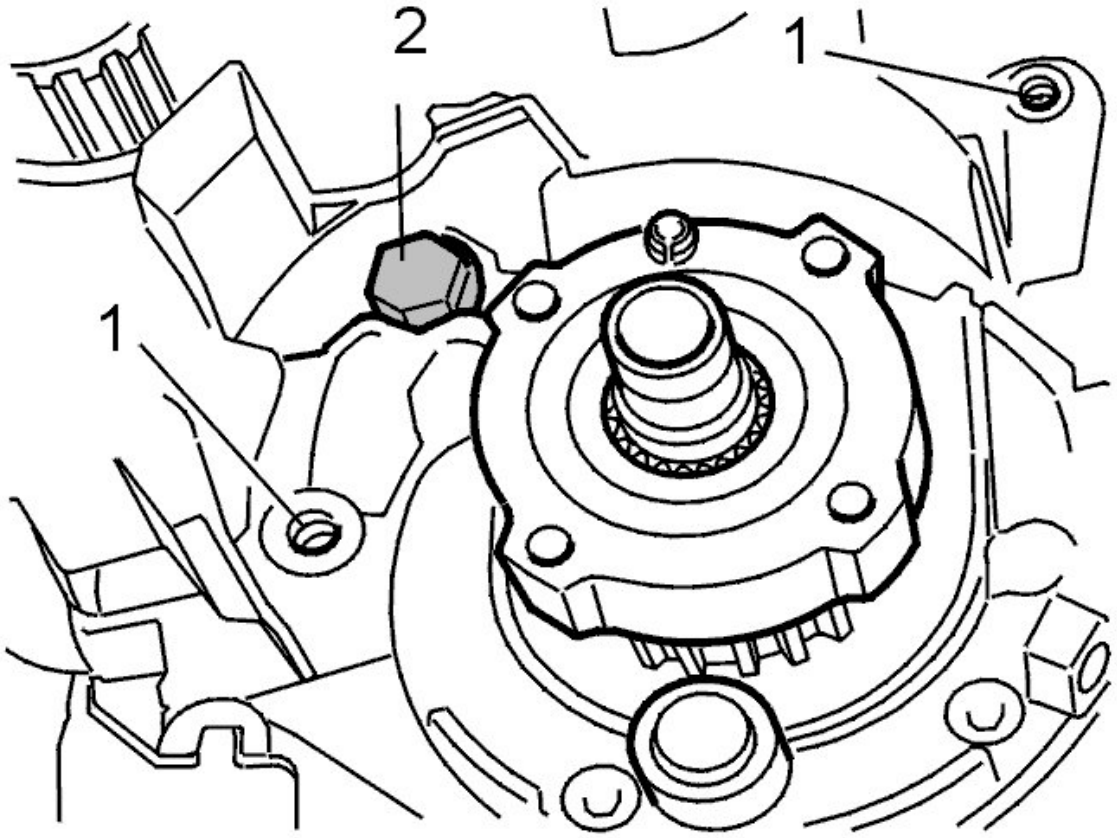


Remove:

- the two screws (1) securing the inner timing cover to the cylinder block
- the lower belt guard at the oil pump housing.

Press the inner timing cover off the flange around the coolant pump. Start at the lower edge of the pump.
Hold the cover out of the way. Remove the piston cooling valve (2) and the seal washer.

Installing components



Install:

- a new piston cooling valve (2) with a new seal washer. Tighten to **35 Nm**
- the inner timing cover. First press the cover into place over the flange at the top of the coolant pump. Then press the remaining section of the cover into place over the flange around the pump. Check that the cover is correctly positioned
- the two screws (1) securing the inner timing cover to the cylinder block
- the lower belt guard.

Installing the timing belt

Install:

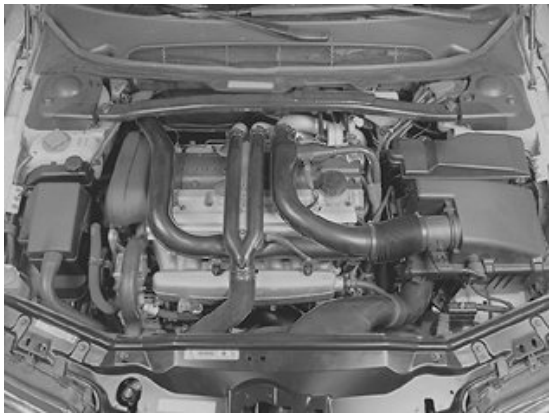
- the screw securing the inner timing cover to the cylinder head
- the idler pulley. Tighten to **25 Nm**
- the timing belt tensioner. Screw in the center screw by hand. Ensure that the fork on the tensioner centers above the cylinder block rib. Check that the Allen hole on the eccentric is at "10 O'CLOCK".

Continue with the method in: Timing belt, replacing, See: Timing Components/Timing Belt/Service and Repair, from and including: Installing the timing belt.

Affected engines: B62xxxx

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation



Caution! Remove the ignition key.

Remove

- the screw holding the engine stabilizer brace to the bracket on the engine
- the screws holding the engine stabilizer brace to the suspension turrets
- the engine stabilizer brace.

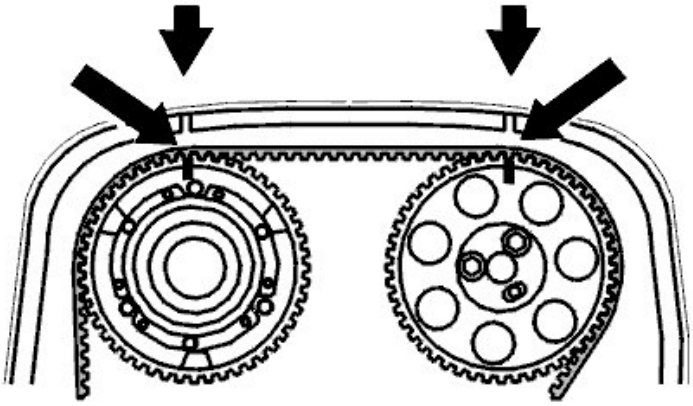
Applies only to B6xx4T engines:

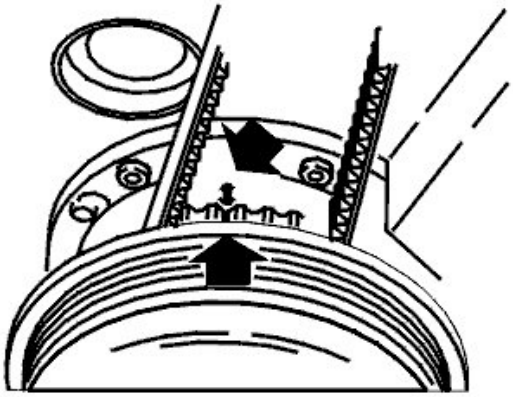
Remove the plastic pipes between the turbocharger (TC) and charge air cooler (CAC) and between the air cleaner (ACL) and turbocharger (TC). Put them to one side.
Remove the clamp from the intake manifold for the turbocharger (TC) for cylinders 1, 2 and 3. Turn the upper section of the pipe towards the firewall.

Relieve the load from the belt tensioner. Remove the auxiliaries belt.
Remove the upper timing belt cover.
Remove the front timing belt cover.
Lift up the servo reservoir and place it on top of the engine.

Note! Ensure that the oil does not leak from the ventilation hole in the filler cap.

Seal the hose between the expansion tank and the radiator. Disconnect the hose at the tank.
Lift up the expansion tank and place it on top of engine.





Raise the car.

Remove
- the right front wheel
- the plastic nuts on the cover in the fender liner.

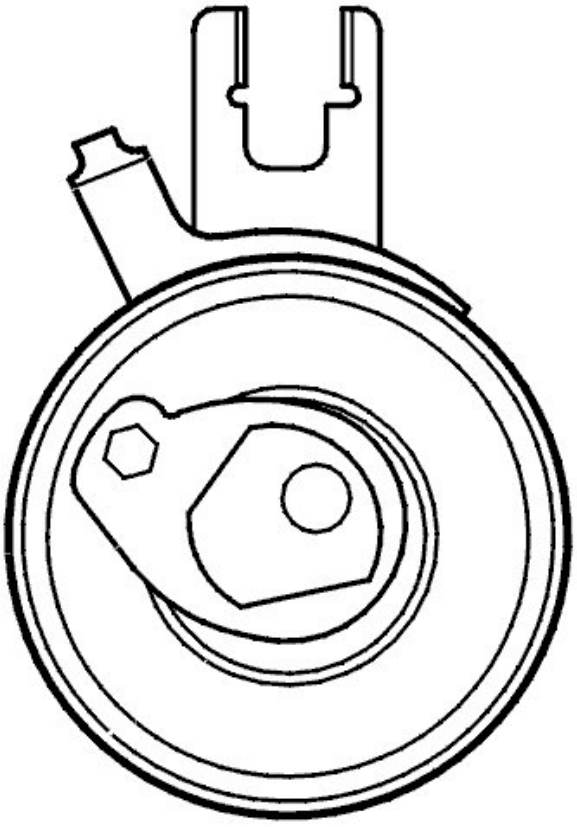
Install the upper timing belt cover.
Turn the crankshaft clockwise until the markings on the crankshaft and camshaft pulleys correspond.
Turn the crankshaft a further 1/4 turn clockwise.
Then turn back counter-clockwise until the markings correspond.
Remove the upper timing belt cover.

Remove the 4 vibration damper screws. Counterhold the crankshaft central nut.

Remove
- the vibration damper
- the auxiliaries belt
- the belt cover behind the crankshaft pulley for the auxiliaries belt.

Spray universal oil or similar around the rubber sleeve on the underside of the oil pump.
Remove the rubber sleeve.

Removing the timing belt



Slacken off the belt tensioner

Slacken off the center screw for the belt tensioner slightly.
Hold the center screw still. Turn the tensioner eccentric **counter-clockwise** using a 6 mm Allen key. Turn to 10 o'clock.
Unhook and remove the timing belt.

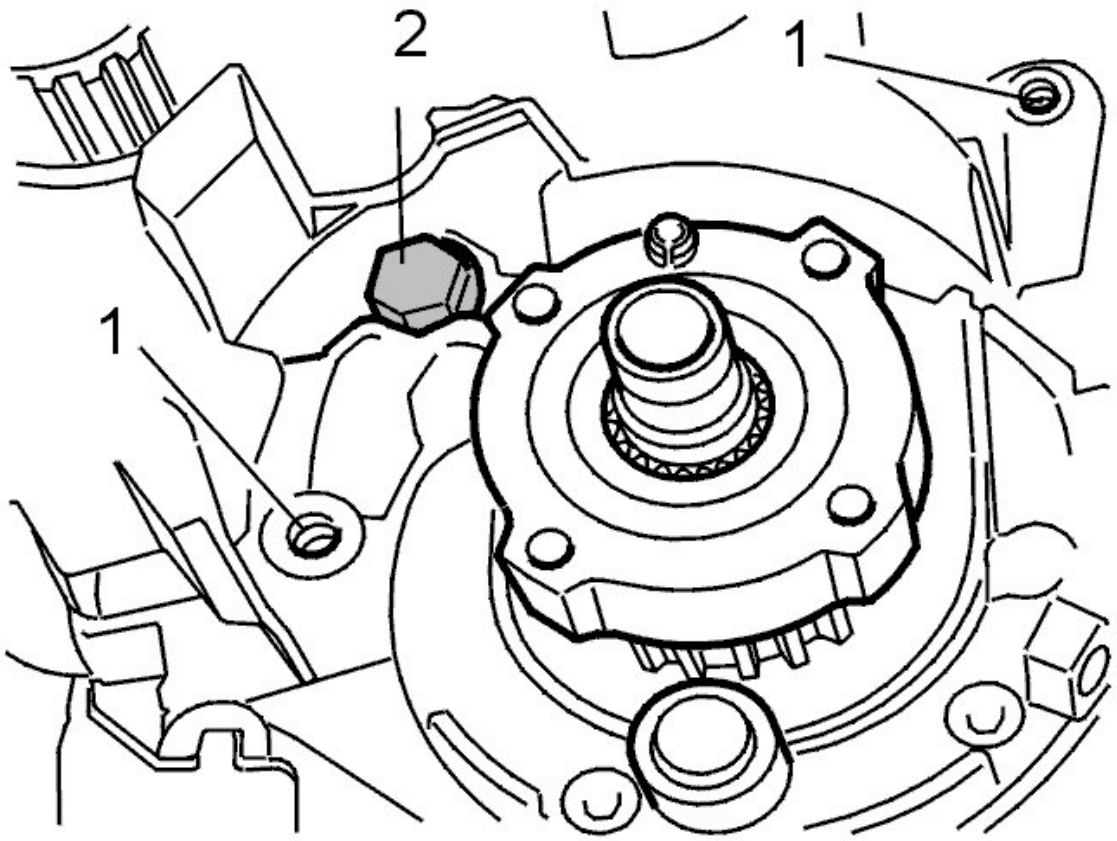
Caution! Do not turn the camshafts or the crankshaft when the timing belt has been removed.

Removing the timing belt tensioner and idler pulley

Remove the timing belt tensioner. Remove the idler pulley. Remove the screw securing the inner timing cover to the cylinder head.
Raise the car.

Removing and installing components

Removing components

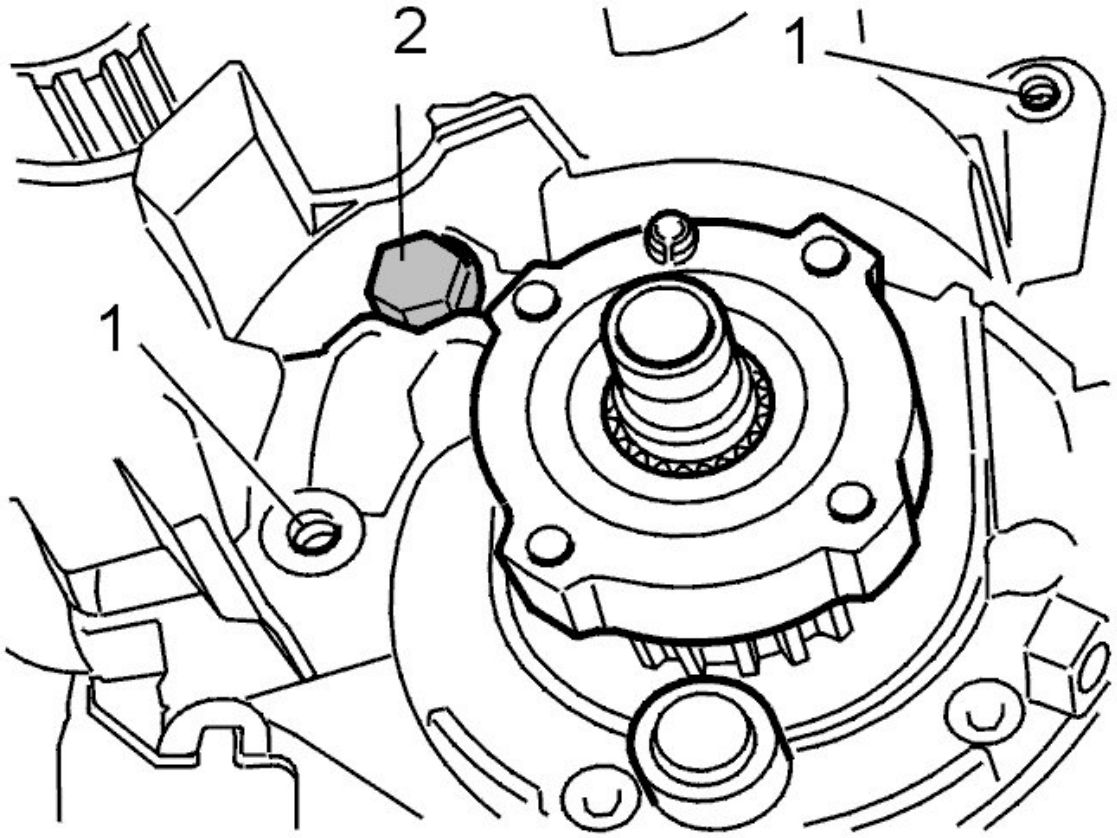


Remove:

- the two screws (1) securing the inner timing cover to the cylinder block
- the lower belt guard at the oil pump housing.

Press the inner timing cover off the flange around the coolant pump. Start at the lower edge of the pump.
Hold the cover out of the way. Remove the piston cooling valve (2) and the seal washer.

Installing components



Install:

- a new piston cooling valve (2) with a new seal washer. Tighten to **35 Nm**
- the inner timing cover. First press the cover into place over the flange at the top of the coolant pump. Then press the remaining section of the cover into place over the flange around the pump. Check that the cover is correctly positioned
- the two screws (1) securing the inner timing cover to the cylinder block
- the lower belt guard.

Install the timing belt tensioner

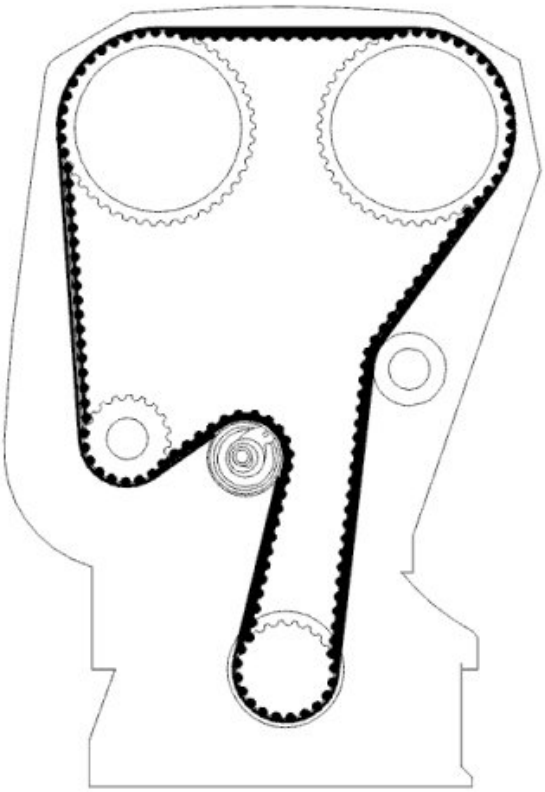
Install:

- the screw securing the inner timing cover to the cylinder head
- the idler pulley. Tighten to **25 Nm**
- the timing belt tensioner. Screw in the center screw by hand. Ensure that the fork on the tensioner centers above the cylinder block rib. Check that the Allen hole on the eccentric is at "10 O'CLOCK".

Installing the timing belt

Installing the timing belt

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

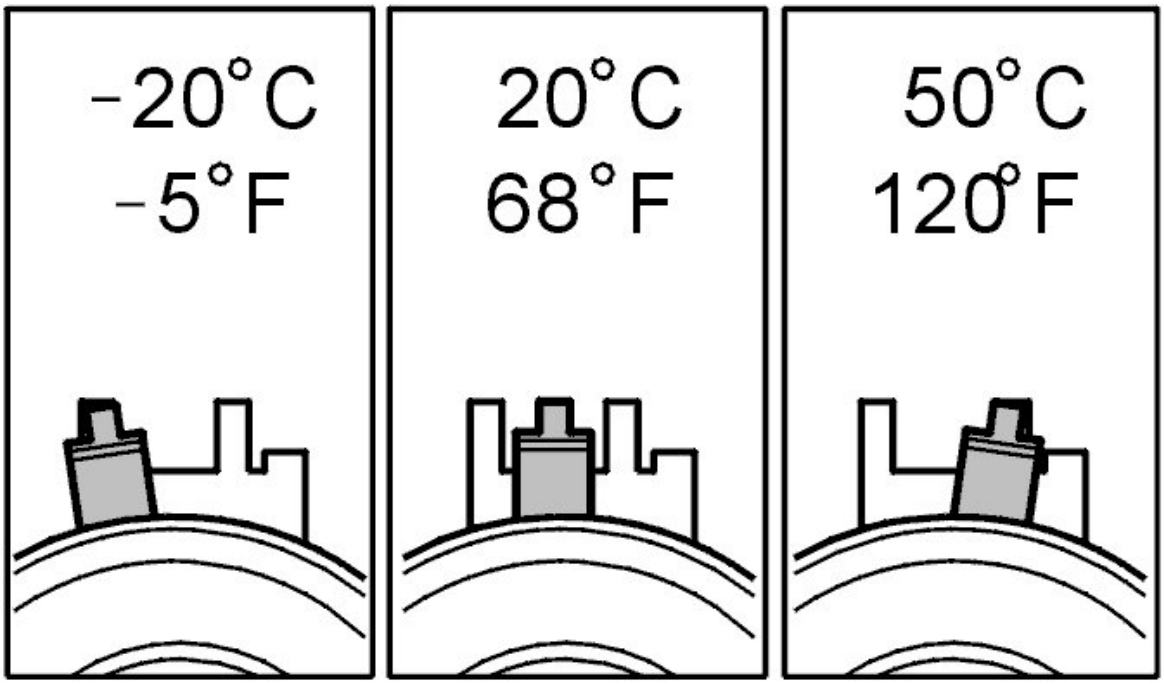


Install the belt in the following order:

- crankshaft
- the idler pulley
- intake cam
- exhaust cam
- water pump
- tension pulley.

Note! The variable valve timing unit on B6304S engines does not have a return spring. The unit is easily dislodged when reinstalling the timing belt.

Tensioning the timing belt



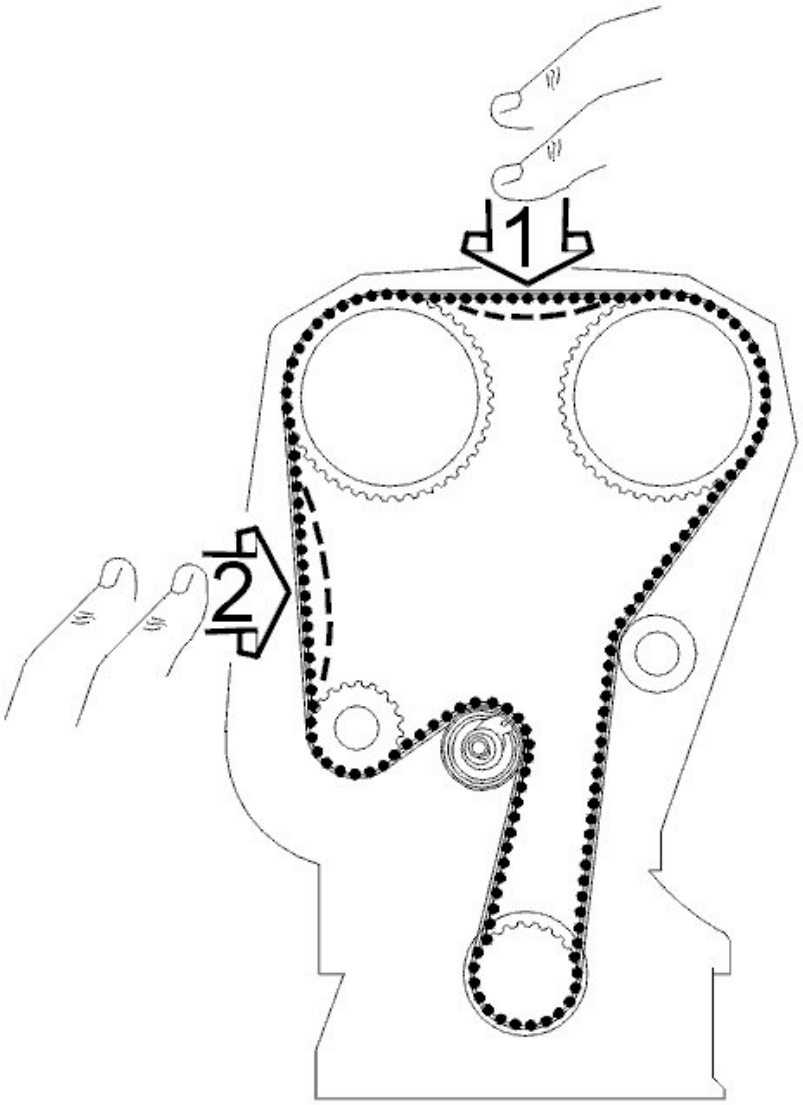
This adjustment is carried out on a cold engine. A suitable temperature is approximately20 ° C / 68 ° F.

At higher temperatures (with the engine at operating temperature or a high outside temperature for example) the indicator is further to the right. The illustration shows the position of the indicator when aligning the timing belt tensioner at different temperatures.

Carefully turn the crankshaft clockwise until the timing belt is tensioned. The belt must be in tension between the intake camshaft pulley, the idler pulley and the crankshaft.
Hold the belt tensioner center screw secure. Turn the belt tensioner eccentric **clockwise** until the tensioner indicator passes the marked position. Then turn the eccentric back so that the indicator reaches the marked position in the center of the window.
Hold the eccentric secure. Tighten the center screw to **25 Nm.**

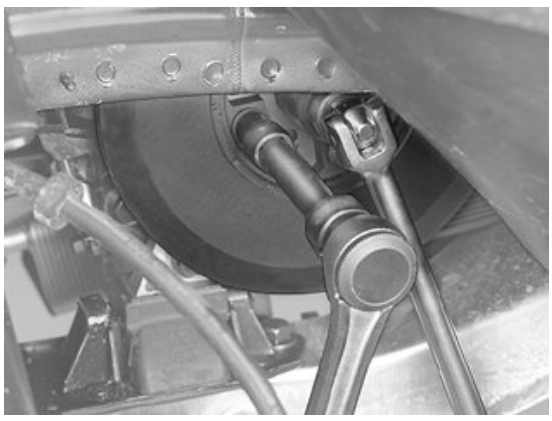
Check that the indicator is in the correct position.

Check



Press the belt to check that the indicator on the tensioner moves easily.
Install the upper timing belt cover.
Turn the crankshaft 2 turns. Check that the markings on the crankshaft and camshaft pulley correspond.
Check that the indicator on the belt tensioner is within the marked area.

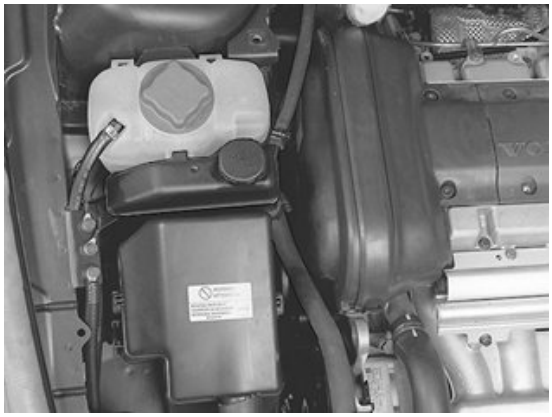
Finishing



Install the auxiliaries belt around the pulley on the crankshaft.

Install

- the rubber sleeve on the underside of the oil pump
- the vibration damper. Use **new screws**. Tighten to **35 Nm**. Angle-tighten **50°**. Use the crankshaft center nut as a counterhold
- the plastic nuts for the cover in the right-hand fender liner
- the right front wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.



Lower the car.

Install
- the front timing belt cover.

Tension the auxiliaries belt.

Install
- the expansion tank
- the hose between the expansion tank and the radiator. Remove the lock grip pliers
- the servo reservoir
- the upper timing belt cover.

Applies only to B6xx4T engines:

Twist the intake pipe for the turbocharger for cylinders 1, 2 and 3 into position. Tighten the clamp.
Install the plastic hoses between the turbocharger (TC) and the charge air cooler and between the air cleaner (ACL) and the turbocharger (TC). Tighten the hose clamps.

Install
- the engine stabilizer brace. Tighten to **50 Nm**
- the screw holding the engine stabilizer brace to the bracket on the engine. Tighten to **80 Nm**.

Final check

Check and top up if required
- coolant level
- the servo fluid level.

Test drive the engine.

Intake Manifold: Service and Repair
Intake Manifold/Gasket, Replacing

Intake Manifold/Gasket, Replacing

Removal

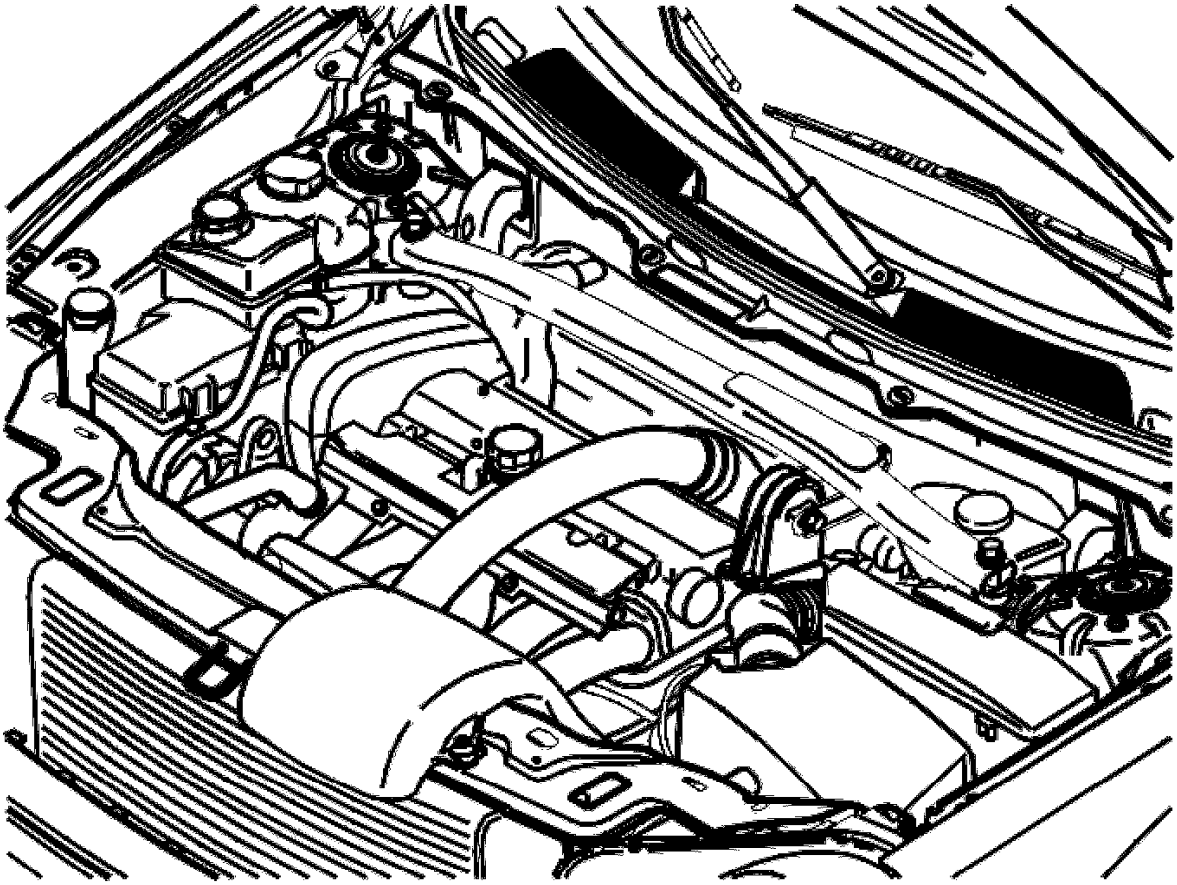
NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

Removing the intake manifold and gasket
Disconnect the battery negative lead.

Remove the fuel injection system.

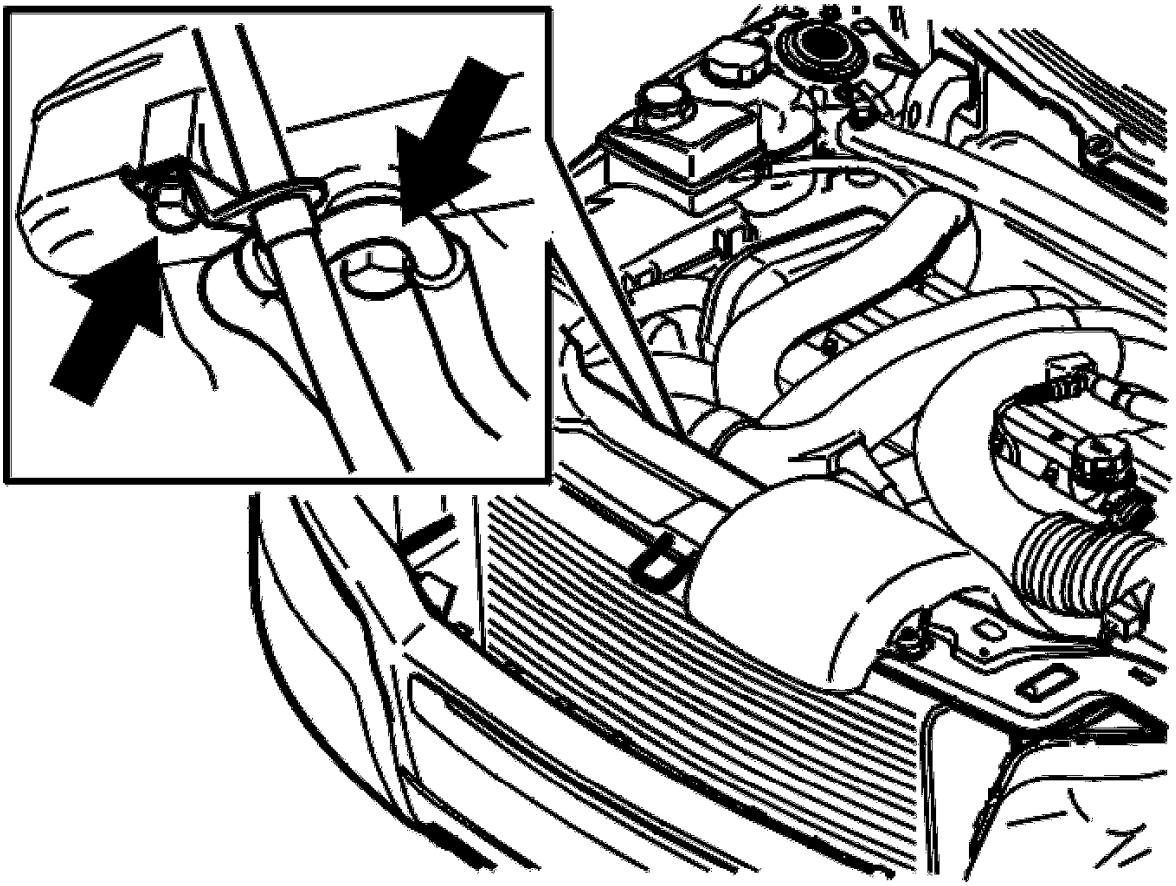
Drain the fuel injection system.

Remove:



- the charge air pipe over the engine
- the cover plate over the connectors from the injectors
- the fuel rail mounting screws. Spray universal oil or similar around the injector nozzle at the terminal on the intake manifold. Gently work the fuel rail and injector nozzles loose. Separate the fuel line quick release connector.
- Separate the throttle body (TB) connector
- Remove the plastic charge air pipe between the throttle body (TB) and the charge air cooler (CAC)
- Seal the openings. Mark up and remove the vacuum hoses from the intake manifold.

Remove:
- the oil filler cap
- the cover over the ignition coils
- the hose from the flame trap to the cam cover at the terminal in the cam cover.



- Disconnect the dip stick pipe
- Slacken off the lower screws for the intake manifold a few turns
- Remove the mounting screws in the upper row and the outer screws in the lower row
- Remove the intake manifold by lifting it approximately **20 mm**
- Remove the nipple for the water heated crankcase ventilation.

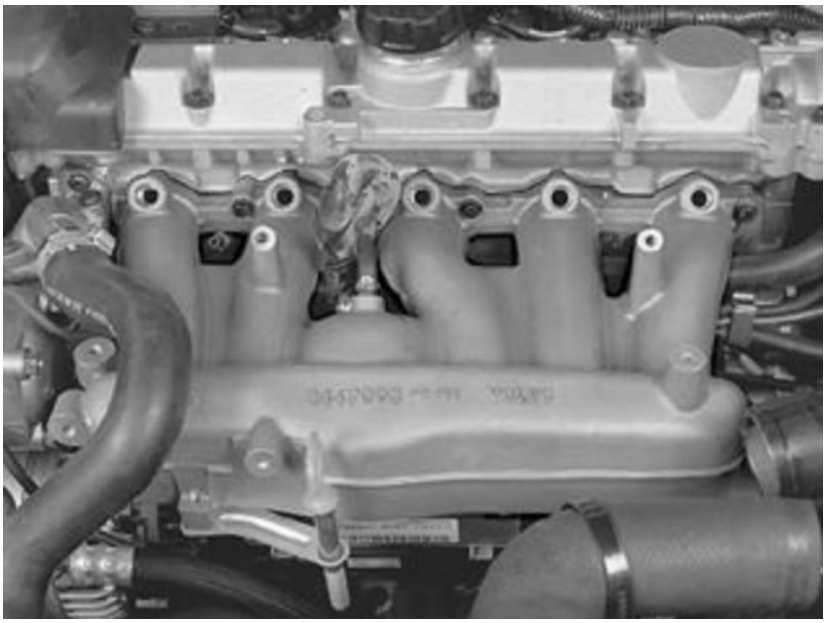
Allow the crankcase ventilation hose to run through the intake manifold without disconnecting it from the flame trap.

Transferring components when replacing the intake manifold

- Transfer the electronic throttle module.
- Use a new gasket.
- Tighten.

Installation

Installing the intake manifold and gasket



NOTE: Ensure that the gasket faces are clean.

Install:

- a new gasket held in position by the lower screws for the intake manifold. Do not forget the clamp for the fuel line at the screw in the lower row.
- the nipple for the water heated crankcase ventilation
- the intake manifold. Do not forget the crankcase ventilation hose. The hose must be inserted up through the gap between the second and third ducts
- the 3 upper screws. Torque tighten all the screws starting from the center.

Finishing

Install

- the fuel rail. Press together the quick-release connector. Use new screws.
- injector connectors
- the protective cover over the fuel rail
- the vacuum hoses according to the earlier markings
- the plastic charge air pipe between the throttle body (TB) and the charge air cooler (CAC)
- the connectors to the throttle body (TB)
- the dip stick in the intake manifold.

Final check

Test drive the car. Check the following:

- that there is no fuel leakage
- that the engine operates normally.

Check that everything is in position. Clean the engine compartment.

Intake Manifold: Service and Repair
Intake Pipe/Gasket, Replacement

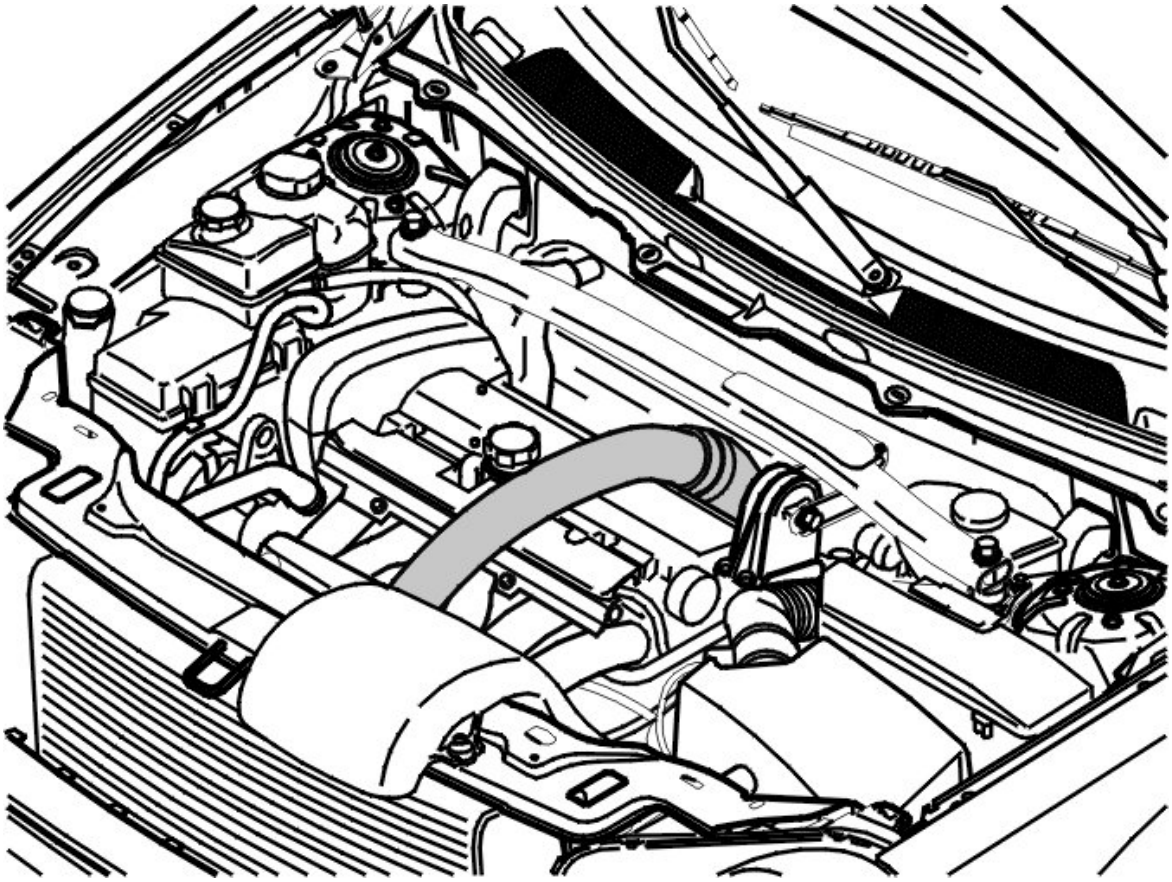
Intake pipe/gasket, replacement

Removal

Note! Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removing the intake manifold and gasket

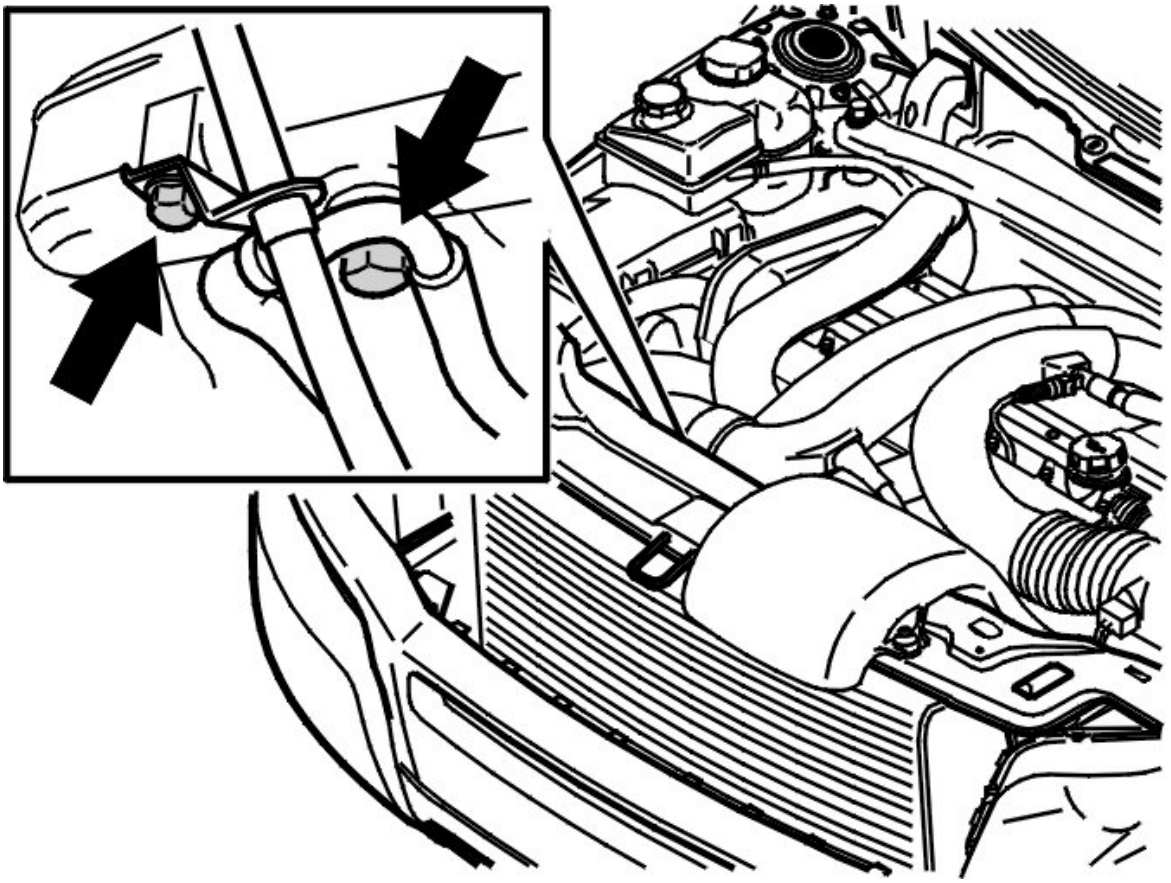
Disconnect the battery negative lead. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.



Depressurize the fuel system according to: Fuel system pressure release See: Cylinder Head Assembly/Fuel Pressure Release/Service and Repair.

Remove:
- the charge air pipe over the engine
- the cover plate over the connectors from the injectors
- the fuel rail mounting screws. Spray universal oil or similar around the injector nozzle at the terminal on the intake manifold. Gently work the fuel rail and injector nozzles loose. Separate the fuel line quick-release connector. See: Fuel line, lock See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Rail/Service and Repair.
- Separate the throttle body (TB) connector
- Remove the plastic charge air pipe between the throttle body (TB) and the charge air cooler (CAC)
- Seal the openings. Mark up and remove the vacuum hoses from the intake manifold.

Remove:
- the oil filler cap
- the cover over the ignition coils
- the hose from the flame trap to the cam cover at the terminal in the cam cover.



- Disconnect the dip stick pipe
- Slacken off the lower screws for the intake manifold a few turns
- Remove the mounting screws in the upper row and the outer screws in the lower row
- Remove the intake manifold by lifting it **approximately 20 mm**
- Remove the nipple for the water heated crankcase ventilation.

Allow the crankcase ventilation hose to run through the intake manifold without disconnecting it from the flame trap.

Transferring components when replacing the intake manifold

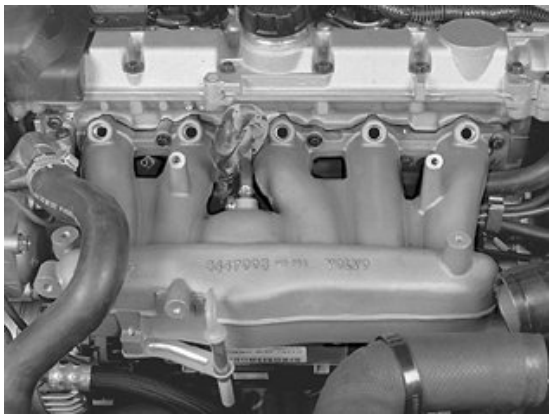
Transfer the electronic throttle module.
Use a **new gasket**.
Tighten.

Installation

Installing the intake manifold and gasket

Note! For tightening torques, see Tightening torque See: Specifications/Tightening Torque.

Note! Make sure that the gasket faces are clean.



Install:

- a **new gasket** held in position by the lower screws for the intake manifold. **Do not forget the clamp for the fuel line at the screw in the lower row.**
- the nipple for the water heated crankcase ventilation

- the intake manifold. Do not forget the crankcase ventilation hose. The hose must be inserted up through the gap between the second and third ducts
- the 3 upper screws. Torque tighten all the screws starting from the center.

Finishing

Install

- the fuel rail. Press together the quick-release connector. Use **new screws**, see also: Fuel line, lock See: Powertrain Management/Fuel Delivery and Air Induction/Fuel Rail/Service and Repair
- injector connectors
- the protective cover over the fuel rail
- the vacuum hoses according to the earlier markings
- the plastic charge air pipe between the throttle body (TB) and the charge air cooler (CAC)
- the connectors to the throttle body (TB)
- the dip stick in the intake manifold.

Final check

Test drive the car. Check the following:

- that there is no fuel leakage
- that the engine operates normally.

Check that everything is in position. Clean the engine compartment.

Camshaft Oil Seal: Service and Repair
Replacing the Camshaft Seals / Variable Valve Timing Unit

Replacing the camshaft seals / variable valve timing unit

Removing the front camshaft seal

Note! The illustrations in this service information are used for different model years and / or models. Therefore there may be some variation. However, the essential information in the illustrations is always correct.

Caution! There are a number of versions of the variable valve timing unit. Therefore it is extremely important to always read the information referring to the engine variant/model year to be remedied.

Replacing the rear camshaft seal

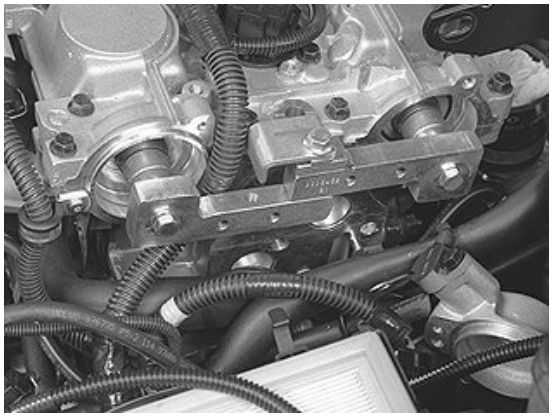
See Removing/Installing the rear camshaft seal.

Preparation

Caution! Interrupt the current: Disconnect the battery negative lead. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

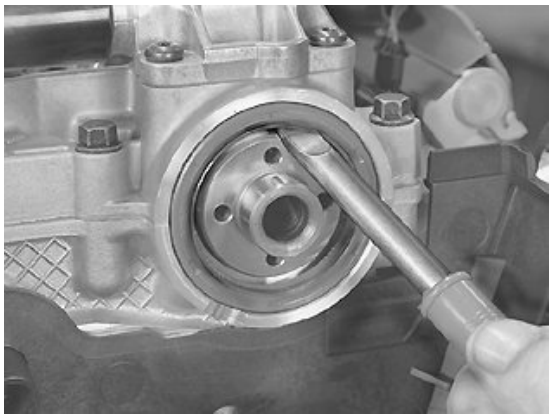
Remove the timing belt from the timing gear pulley for the camshafts.
Check the tensioner and idler pulleys.
Remove camshaft position (CMP) sensor housing and the trigger wheel.
Remove the cover at the rear edge of the camshaft.

Removing the variable valve timing unit / timing gear pulley



Install adjustment tool 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool at the rear of the camshafts. Screw the adjustment tool sections together into one. Remove the plug from the front edge of the variable valve timing unit (Tx55).
Remove the centre screw from the variable valve timing unit (Tx55). Carefully pull out the variable valve timing unit with the timing gear pulley.
The following applies to timing gear pulleys without variable valve timing:
Remove the screws. Remove the timing gear pulley.

Removing the front camshaft seal



Carefully press in tool 999 5651 Extractor See: Tools and Equipment/999 5651 Extractor between the seal and the camshaft. Pry out the seal.

Installing the front camshaft seal

Note! The purpose of the "Installing the VVT unit/timing gear pulley" section described here is to ensure that the VVT unit is correctly positioned and to reset the camshaft timing gear pulley to the correct position using the markings made at the factory. This is to ensure that the conditions are correct for any later fault-tracing.

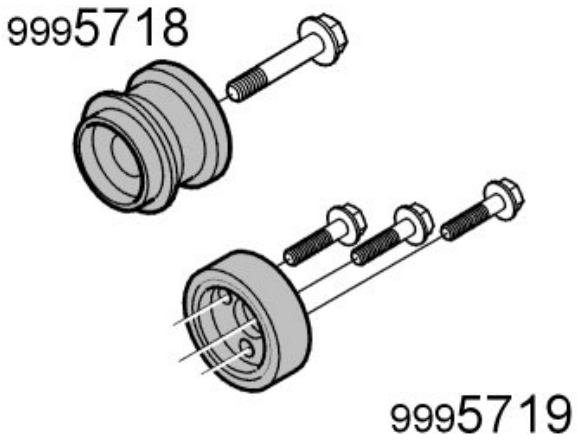
Note! For tightening torques, see Tightening torque See: Specifications/Tightening Torque.

Cleaning

To clean the shaft journal and mating surface, use emery cloth P/N 951 1024.

Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

Installing the front camshaft seal



Lubricate the surface of the seal that the camshaft rotates against. Install the camshaft seal. For camshafts with variable valve timing:
Use drift 999 5718 Drift See: Tools and Equipment/999 5718 Drift.
Use the mounting screw for the variable valve timing unit. Tighten until the drift bottoms out. for camshafts without variable valve timing:
Use drift 999 5719 Drift See: Tools and Equipment/999 5719 Drift.

Checking the variable valve timing (VVT) unit

Check the variable valve timing (VVT) unit.

Finishing

Install:
- the starter motor. Tighten screws at gearbox. Tighten. See Tightening torque See: Specifications/Mechanical Specifications/Starting and Charging
- the screw at the support bracket for the starter motor. Tighten
- the trigger wheel. Tighten the screw
- the camshaft position (CMP) sensor housing. Tighten the screws
- a new cover at the rear edge of the camshaft.

Install the auxiliaries belt around the pulley on the crankshaft.

Install:
- the plastic nuts for the cover in the right-hand wing liner
- the right front wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Install:

- front timing cover. Tension the auxiliaries belt. Check that it is correctly positioned on all pulleys
- the expansion tank
- the hose between the expansion tank and the radiator. Remove the lock grip pliers
- the servo reservoir
- the upper timing cover.

Install:

- the engine stabilizer brace. Tighten the screws
- the screw holding the engine stabilizer brace to the bracket on the engine. Tighten
- the battery negative lead. Also read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Final check

Check and top up if required:

- coolant level
- the servo fluid level.

Test drive the engine.

Removing/Installing the rear camshaft seal

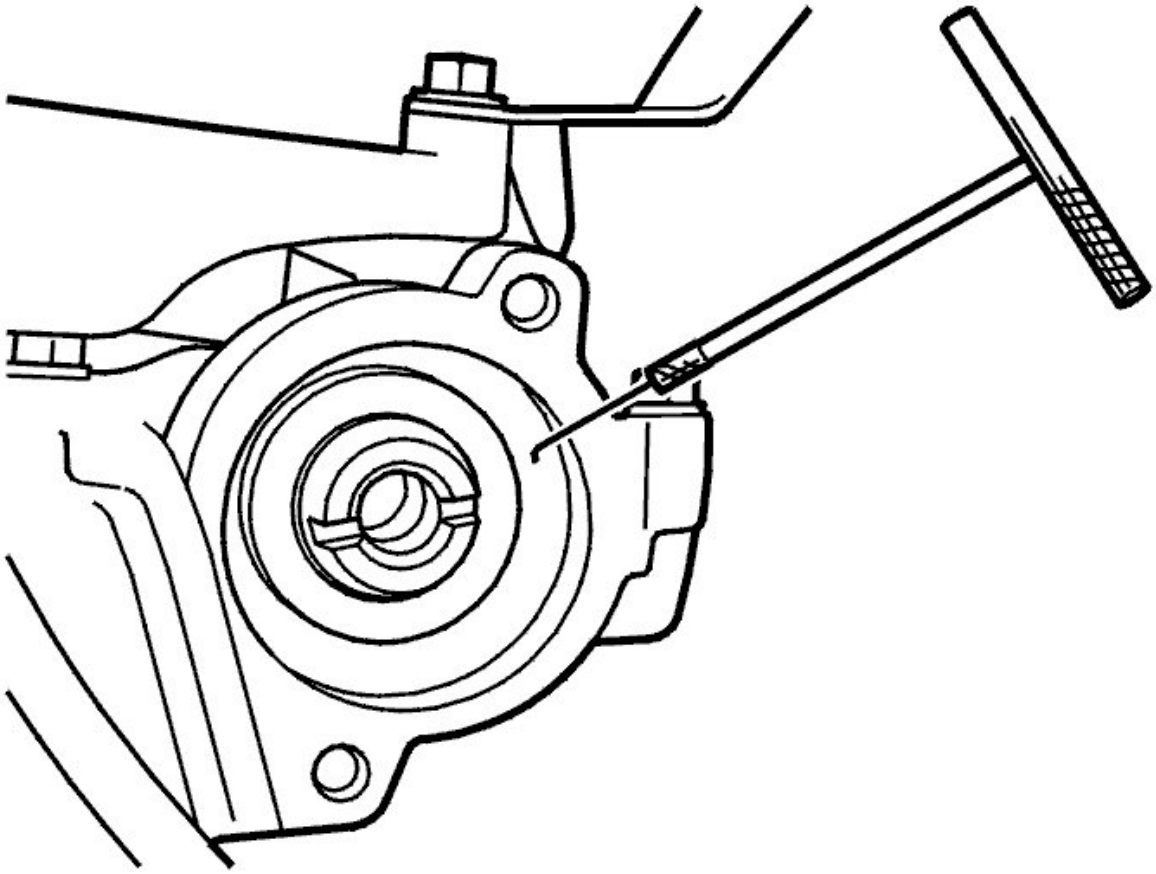
Preparation

Remove:

- the intake manifold between the electronic throttle module (ETM) and air cleaner (ACL) cover

- the air cleaner (ACL) cover. Place it to one side
- the camshaft position (CMP) sensor housing and the trigger wheel.

Removing the rear camshaft seal



Pull out the seal. Use puller 999 5919 PULLER See: Tools and Equipment/999 5919 Puller. To clean the shaft journal and mating surface, use emery cloth P/N 951 1024.

Note! When cleaning work around the shaft journal, not in and out. It is essential that any residue from the emery cloth and any other contaminants are completely removed before the new sealing ring is installed.

Lubricate the surface of the seal that the camshaft rotates against. Install the camshaft seal. Use drift 999 5450 PUNCH See: Tools and Equipment/999 5450 Punch.

Note! The seal is normally positioned at the same level as the internally bevelled edge. If the shaft journal is showing signs of wear, the seal can be pressed in a further 2 mm: Turn the drift socket.

Finishing

Install:

- the trigger wheel. Tighten the screw
- the camshaft position (CMP) sensor housing. Tighten the screws
- the air cleaner (ACL) cover
- the intake manifold between the electronic throttle module and the air cleaner (ACL) cover.

Test drive the engine.

Crankshaft Main Bearing Seal: Service and Repair

Crankshaft seal rear, replacing

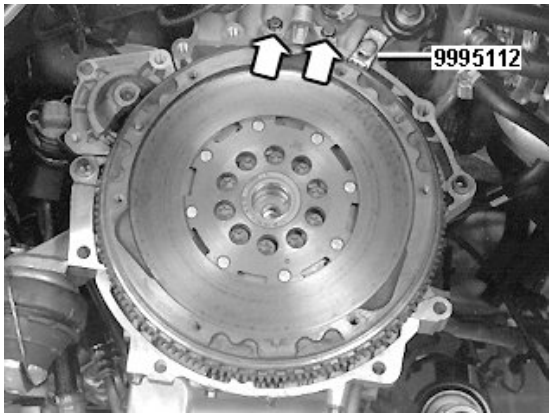
Special tools:

999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector
999 7174 Drift See: Tools and Equipment/999 7174 Drift
999 1801 STANDARD SHAFT See: Tools and Equipment/999 1801 Standard Shaft
999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removal

Removing the flywheel and carrier plate

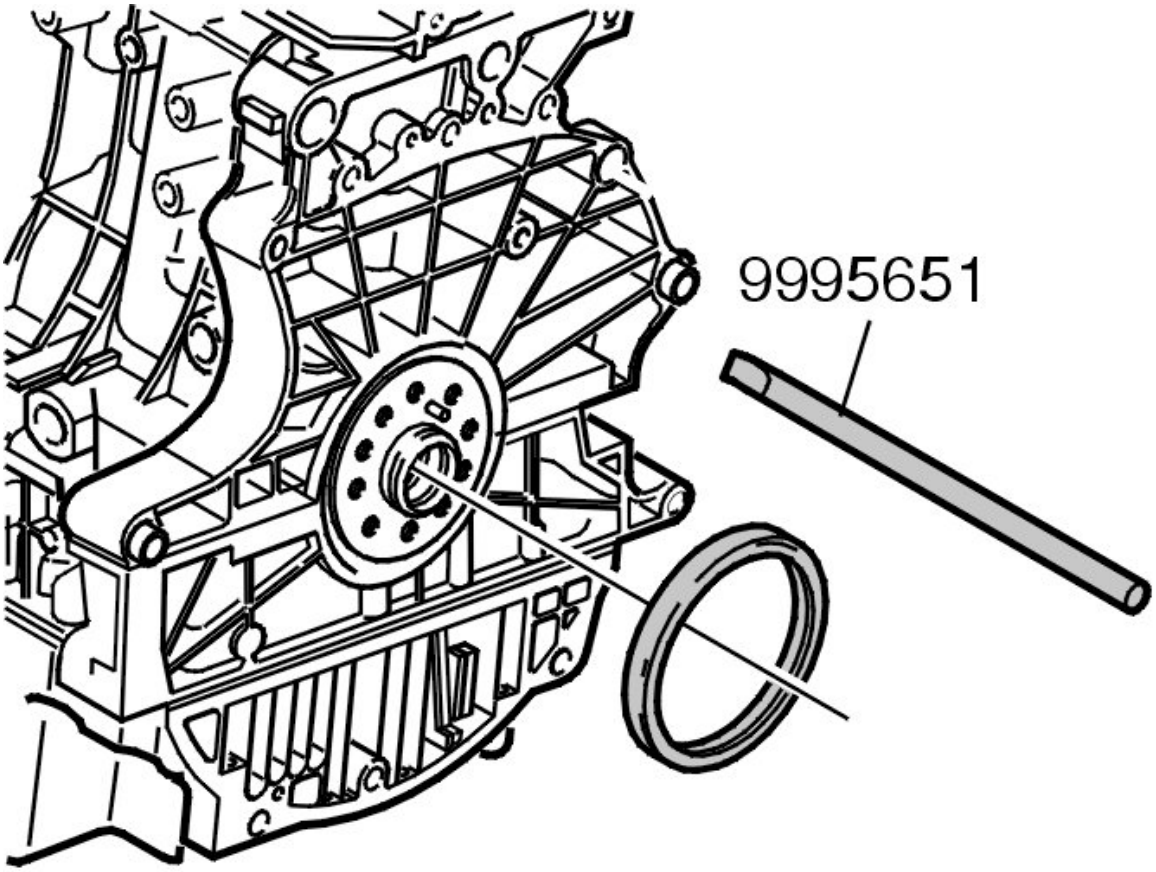


Remove the gearbox:

- **manual transmissions**. See Transmission, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing.
- **automatic transmissions**. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing.

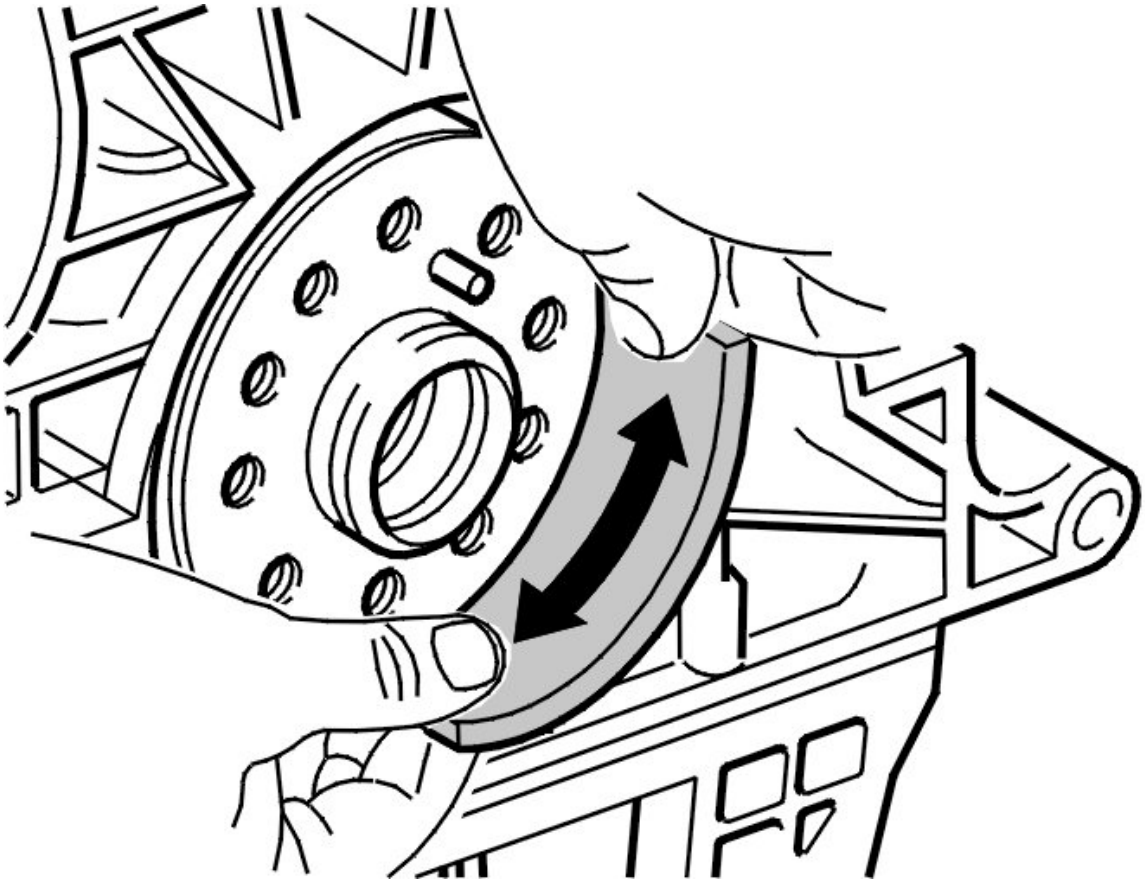
Remove the flywheel / carrier plate. Use gear sector 999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector as a counterhold when slackening off the screws.

Removing the seal



Note! Do not damage the mating surfaces of the crankshaft and cylinder block

Remove the old seal using extractor 999 5651 Extractor See: Tools and Equipment/999 5651 Extractor.
Clean around the crankshaft flange at the front and rear. Remove any thread sealant residue from the screw holes.
If necessary wash off the oil on the rear cylinder block surface and the gearbox clutch housing. Blow clean using compressed air.



Caution! When cleaning work around the flange, not in and out. No grinding tools or similar may be used.It is extremely important that there is no thread sealant residue or other dirt. This could cause leakage.

Note! To clean the crankshaft, use cloth 9511024.

Installation

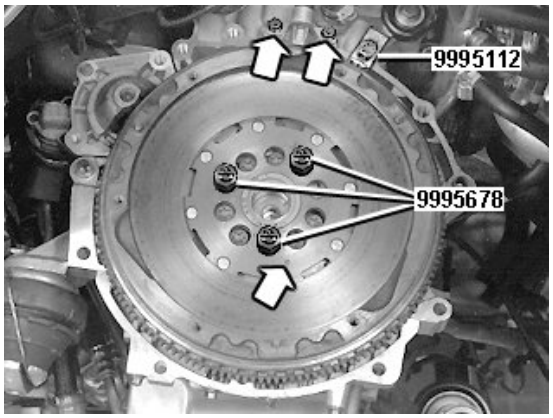
Installing the sealing ring

Caution! Only Volvo approved engine oil may be used. Grease must not be used at all. It attracts dirt and results in the build up of coke.

Lubricate the sealing ring mating surface against the cylinder block and the lips of the seal.

Thread the seal onto the bevelled part of the inner section of 999 7174 Drift See: Tools and Equipment/999 7174 Drift with the felt side of the seal outward.
Screw the drift onto the crankshaft (2 screws) of the flywheel.
Pull in the seal with the outer part of the drift, 999 7174 Drift See: Tools and Equipment/999 7174 Drift , using the screw in the center of the tool.
The seal is in place when the outer drift bottoms against the inner drift. Remove tool 999 7174 Drift See: Tools and Equipment/999 7174 Drift.
Scrap the old flywheel screws.

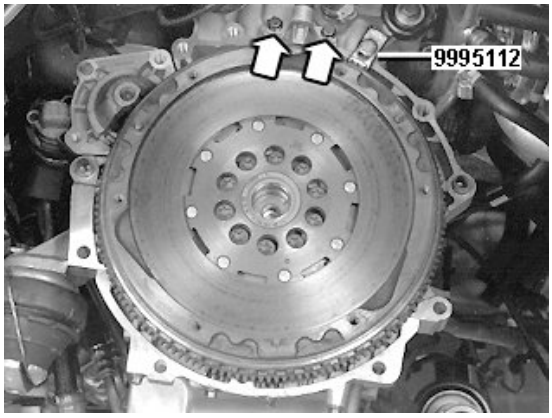
Installing flywheel and carrier plate



Caution! Ensure that the surface of the crankshaft and the mating surfaces for the flywheel / carrier plate are clean. Ensure that there is no thread sealant residue in the screw holes.

Install:
- the flywheel and carrier plate
- the 3 studs 999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw distributed as illustrated. Turn the short thread length towards the crankshaft.

Note! Check that the locating pin on the crankshaft is positioned opposite the hole in the flywheel / carrier plate. The position of the guide hole is marked.



Caution! It is important that the flywheel and carrier plate bear on the crankshaft flange before the other screws are installed.Always use new screws. Ensure that the thread sealant on the new screws is intact. If not apply a few drops of sealant 1161056 to the thread.

- Align gear sector: 999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector.
- Pull the flywheel / carrier plate towards the crankshaft using the 3 nuts on special tool 999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw. The turned section of the nut must be turned towards the flywheel / carrier plate.
- Install the other screws. Tighten. See Tightening torque See: Specifications/Tightening Torque.
- Replace the 3 special screws with new standard screws. Tighten. See Tightening torque See: Specifications/Tightening Torque.
- Then angle-tighten all 10 screws crosswise. Use 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor. Tighten. See Tightening torque See: Specifications/Tightening Torque.
- Ensure that the flywheel sensor and bracket are installed. Install the clutch driven plate and clutch.

Installing the gearbox

Install the gearbox:
- **manual transmissions**. See Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.
- **automatic transmissions**. See Gearbox, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

Checking the engine:
Test drive the car to check the function of the engine and the gearbox.

Timing Components: Service and Repair
Belt Drive, Dismantling

Belt drive, dismantling

Special tools:

999 5304 SEPARATOR See: Tools and Equipment/999 5304 Separator
999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
999 5747 Socket See: Tools and Equipment/999 5747 Socket

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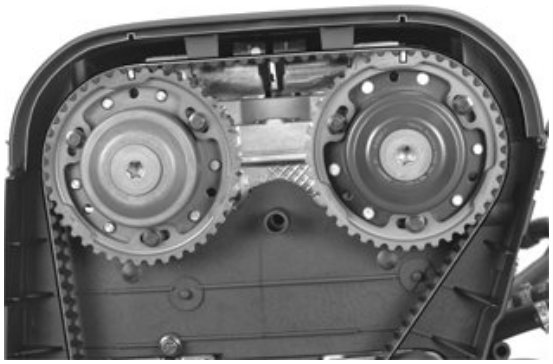
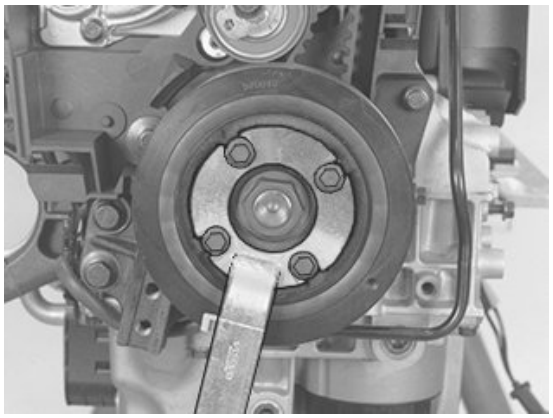
Aligning the engine according to the marking



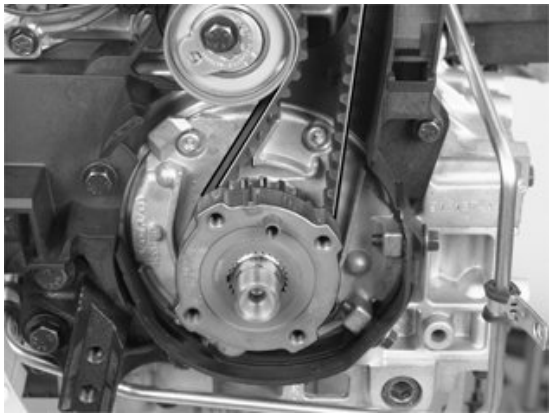
Install the upper timing belt cover.
Turn the crankshaft clockwise until the markings on the crankshaft belt pulley and the timing belt pulley are aligned with the markings on the oil pump and the upper timing belt cover.
Remove the upper timing cover.

Removing the vibration damper



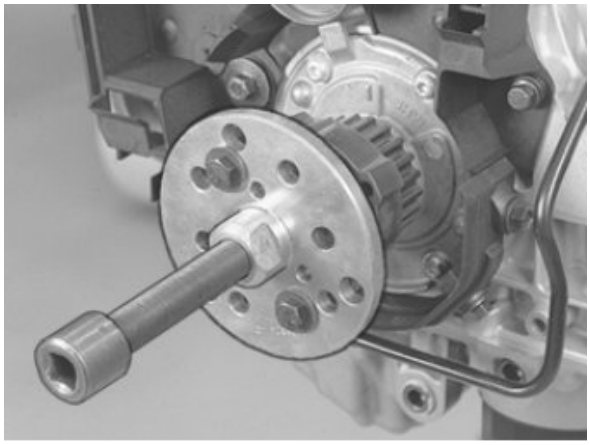
Remove the 4 screws. Use the crankshaft center nut as a counterhold.
Install counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold. Remove the center nut.
Remove counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold.
Work the vibration damper loose.

Removing the timing belt



Slacken off the center screw for the belt tensioner slightly.
Hold the center screw in place. Turn the belt tensioner eccentric clockwise to 10 o'clock using a 6mm Allen key.
Remove the timing belt from the timing gear pulley for the camshafts.
Remove the timing belt.

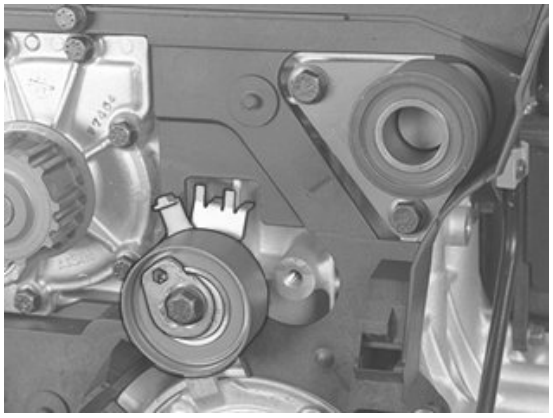
Removing the crankshaft pulley



Caution! The crankshaft must not rotate.

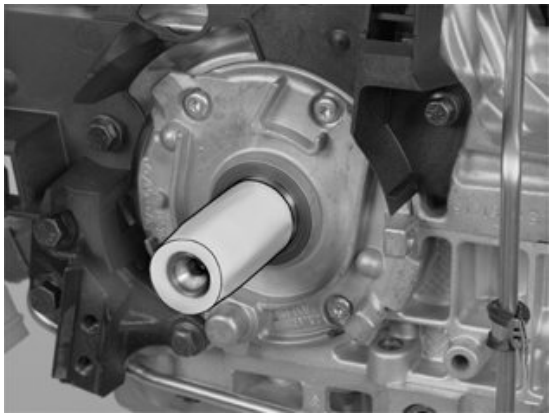
Use puller 999 5304 SEPARATOR See: Tools and Equipment/999 5304 Separator and two 45 mm M8 screws with washers.
Pull off the timing gear pulley.

Removing the belt tensioner and idler pulley



Remove the belt tensioner and idler pulley.
Check the rolling surface and the bearings.
Check for any noise. Check for any play in the bearings.
Check that the rolling surfaces are smooth and clean.

Removing the oil pump



Remove the belt protection from the oil pump.
Remove the 4 screws for the oil pump.
Carefully work the oil pump out. Use a groove-cut chisel with stop lugs.
Carefully draw the oil pump past the end of the crankshaft.
Carefully clean the gasket face and mating surfaces.
Remove tool 999 5747 Socket See: Tools and Equipment/999 5747 Socket.

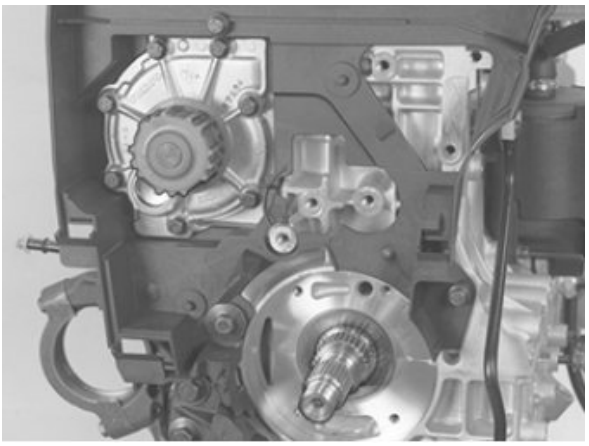
Checking the oil pump

Unscrew the oil pump. Note the position of the outer/inner pump wheel and the piston/spring for the relief valve.
Clean and check all components.
Check for damage and wear. Replace the oil pump in the event of a fault.
When replacing the sealing ring.
Carefully tap the sealing ring out. Use a carefully selected drift and hammer.
A new sealing ring is first installed after the pump has been installed in the cylinder block.

Assembling the oil pump

Place the inner and outer pump wheels in the oil pump housing.
The inner pump wheel has a inset surface around the hole for alignment to the crankshaft. The inset surface should be positioned towards the sealing ring in the oil pump housing.
Install the spring and piston for the relief valve. Screw the pump together. Tighten the screws. See: Tightening torque See: Specifications/Tightening Torque.

Removing the coolant pump/timing belt cover

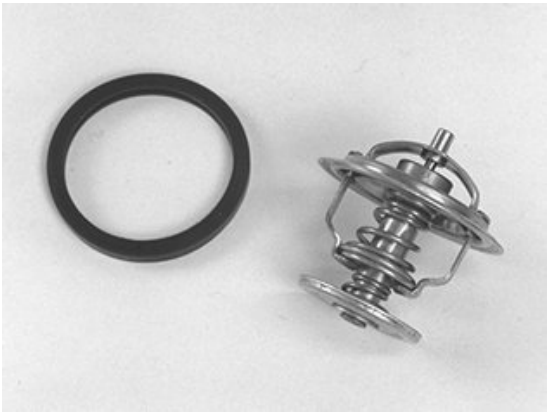


Remove the screws.
Carefully tap the pump pulley with a rubber mallet.
Work the pump loose.
Carefully clean the gasket face and mating surfaces.
Remove the inner timing belt cover.

Removing the thermostat and thermostat housing

Remove the cover over the thermostat (Tx40).
Lift out the thermostat
Remove the hose for the water heated crankcase ventilation.
Remove the thermostat housing from the cylinder head.
Carefully clean the gasket face and mating surfaces.
Remove the fuel pressure line.

Checking the opening function of the thermostat



The thermostat can be tested in warm water.
Maximum opening must occur within 2 minutes in water at opening temperature.
Marking.90° C
Starts to open at.90°C
Fully open at.105°C

Timing Components: Service and Repair
Belt Drive, Assembly

Belt drive, assembly

Special tools:

999 5747 Socket See: Tools and Equipment/999 5747 Socket
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold

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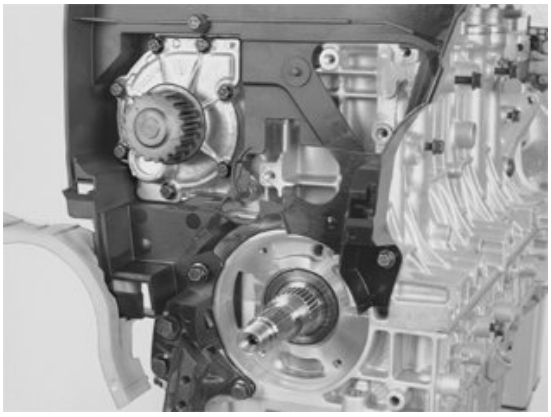
Tightening torque

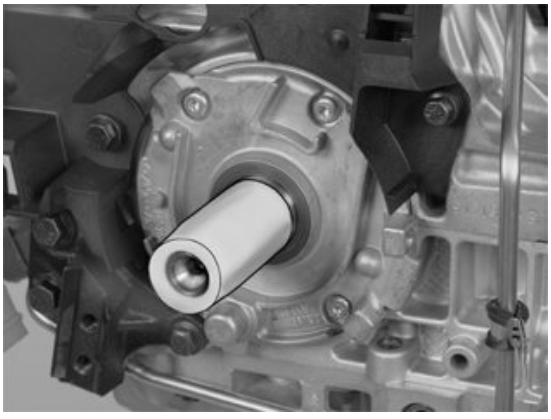
For tightening torques not in the text, see Tightening torque See: Specifications/Tightening Torque.

Installing the water pump



Install the rear timing cover.
Screw into place at the three mounting points.
Install the water pump with a **new gasket**.
Apply thread sealant, P/N 11-61 056, to all the screws for the water pump. Tighten the screws crosswise.

Installing the oil pump

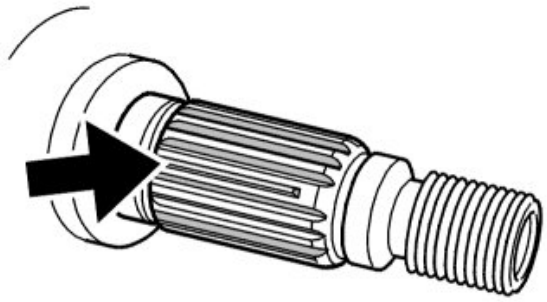


Use a new gasket and a new O-ring around the oil pump housing and new screws. Alternatively, apply thread sealant 11 61 056 to the underside of the old screw heads.
Screw sliding sleeve 999 5747 Socket See: Tools and Equipment/999 5747 Socket into place at the front of the crankshaft journal.
Press in the pump over the sliding sleeve.
Install the screws as a guide.
Carefully tap in the oil pump with a rubber mallet.
Tighten the oil pump crosswise. See Tightening torque See: Specifications/Tightening Torque.
Remove the sliding sleeve 999 5747 Socket See: Tools and Equipment/999 5747 Socket.

Installing front crankshaft seal

See Oil pump / crankshaft seal, front, replacing, B5244T5 See: Seals and Gaskets/Front Crankshaft Seal/Service and Repair.

Installing the crankshaft timing gear pulley



Note! The timing gear pulley can only be installed in one position on the crankshaft journal splines (see the illustration).

Carefully tap in the timing gear pulley with a rubber mallet.

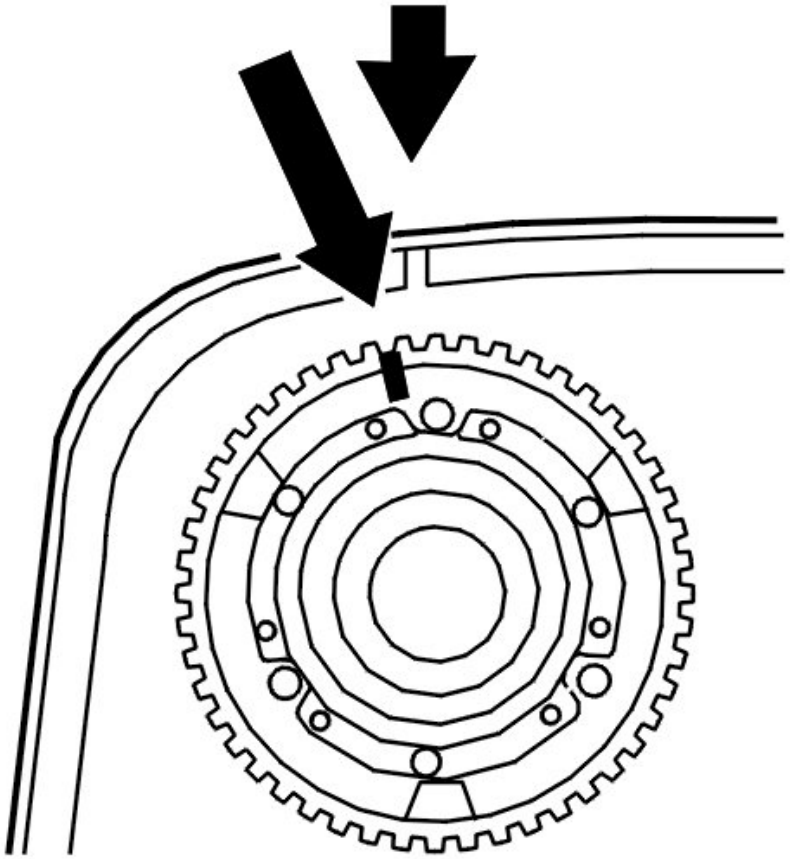
Installing the idler pulley and belt tensioner

Install:

- idler pulley. Tighten
- the belt tensioner and the center screw so that the tensioner fork is centered over the cylinder block rib. Do **not** tighten
- the lower belt guard at the oil pump
- the fuel delivery line.

Installing the timing gear pulley for the camshafts

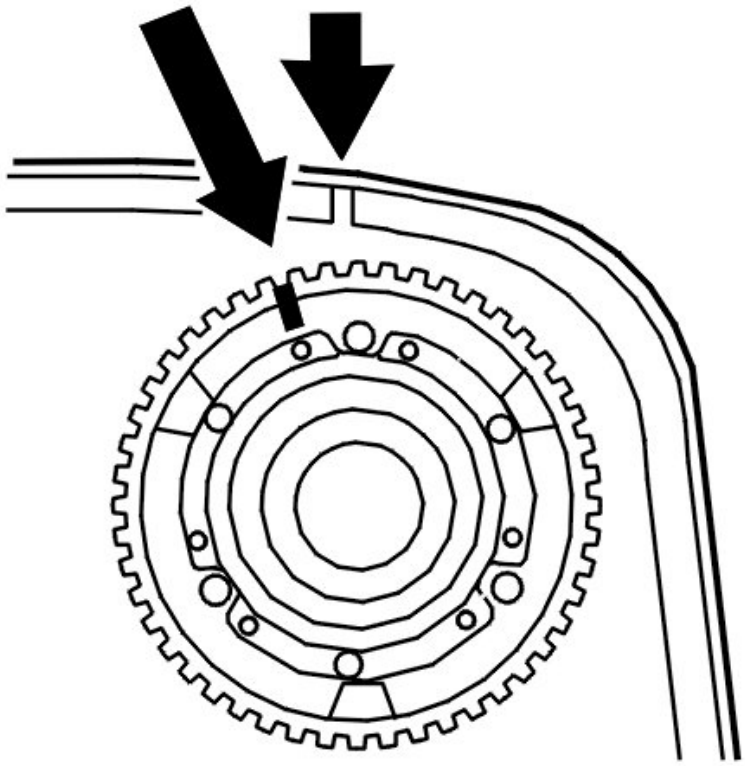
Note! The purpose of the "Installing the timing gear pulley" section described here is to ensure that the VVT unit is correctly positioned and to reset the camshaft timing gear pulley to the correct position using the markings made at the factory. This is to ensure that the conditions are correct for any later fault-tracing.



Note! Do not turn counter clockwise during this procedure.

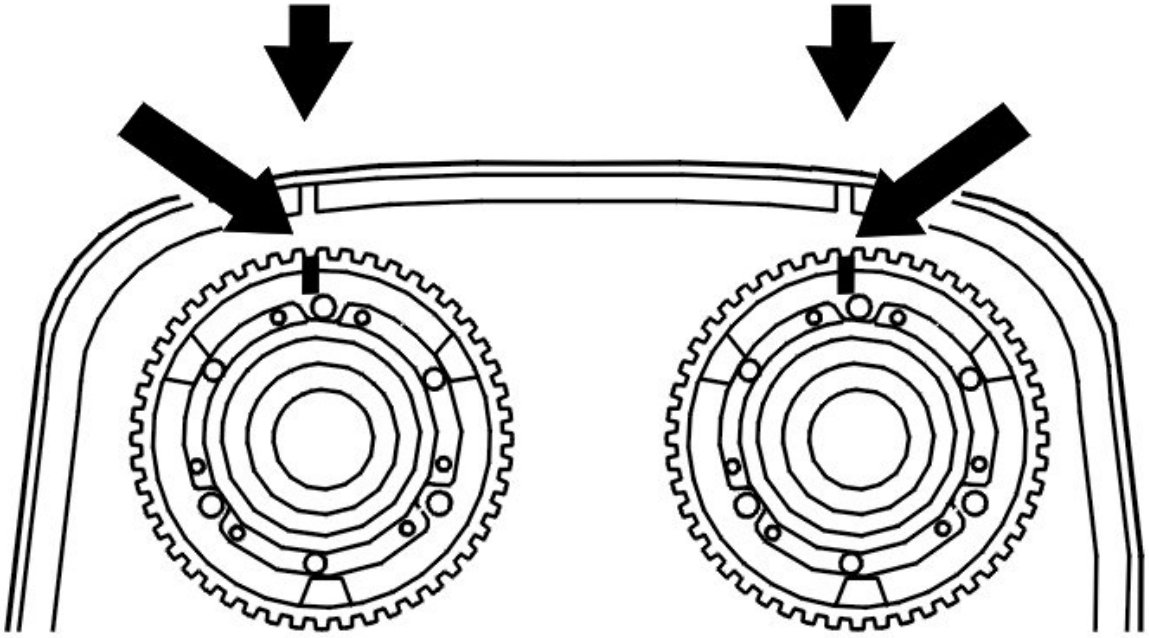
Slacken off, but do not remove, the screws which secure the timing gear pulley to the variable valve timing unit.
Press the variable valve timing unit and timing gear pulley onto the camshaft.
Install the center screw which secures the variable valve timing unit to the camshaft. Tighten slightly. Turn the variable valve timing unit **counter-clockwise** as far as it will go. Remove the center screw.
Position the upper timing cover.
Turn the timing gear pulley **clockwise**until the screws at the oval holes are in the limit position. Continue turning **clockwise** until the timing gear pulley marking is **1 cogs** before the marking on the upper timing cover.
Check that the timing gear pulley is still in the limit position in the oval holes. Tighten the center screw in the variable valve timing unit. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Check that the variable valve timing unit does not rotate when tightening. Install and tighten the center plug. See Tightening torque See: Specifications/Tightening Torque.
Turn the variable valve timing unit **clockwise** to the limit position.
Turn the timing gear pulley so that the markings correspond.

Installing the variable valve timing (VVT) unit on the intake camshaft



Note! Do not turn counter clockwise during this procedure.

Slacken off, but do not remove, the screws which secure the timing gear pulley to the variable valve timing unit. Press the variable valve timing unit and timing gear pulley onto the camshaft.
Install the center screw which secures the variable valve timing unit to the camshaft. Tighten slightly.
Turn the variable valve timing unit **counter-clockwise** as far as it will go. Remove the center screw. Position the upper timing cover.
Turn the timing gear pulley **clockwise**until the screws at the oval holes are in the limit position. Continue turning **clockwise** until the timing gear pulley marking is **1-1/2 cogs** before the marking on the upper timing cover.



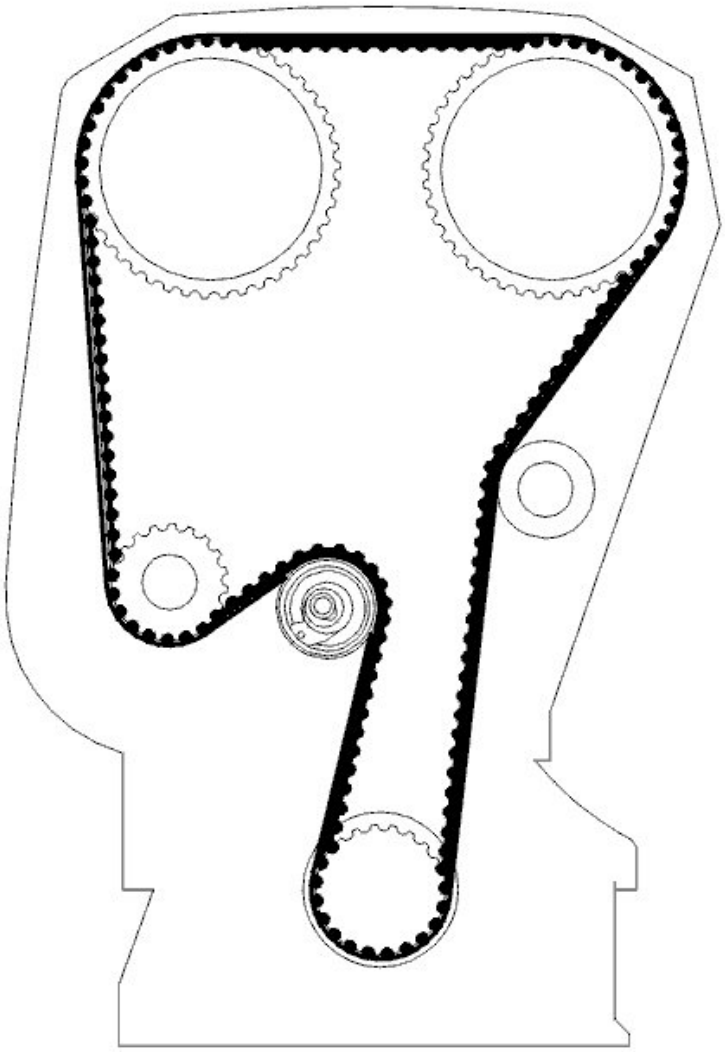
Check that the timing gear pulley is still in the limit position in the oval holes.

Tighten the center screw in the VVT unit. See Tightening torque See: Specifications/Tightening Torque.
Check that the variable valve timing unit does not rotate when tightening. Install the center plug. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Turn the variable valve timing unit clockwise to the limit position. Turn the timing gear pulley so that the markings correspond.

Finishing

Tighten the center screw on the timing belt tensioner. Tighten to **5 Nm**.

Installing the timing belt

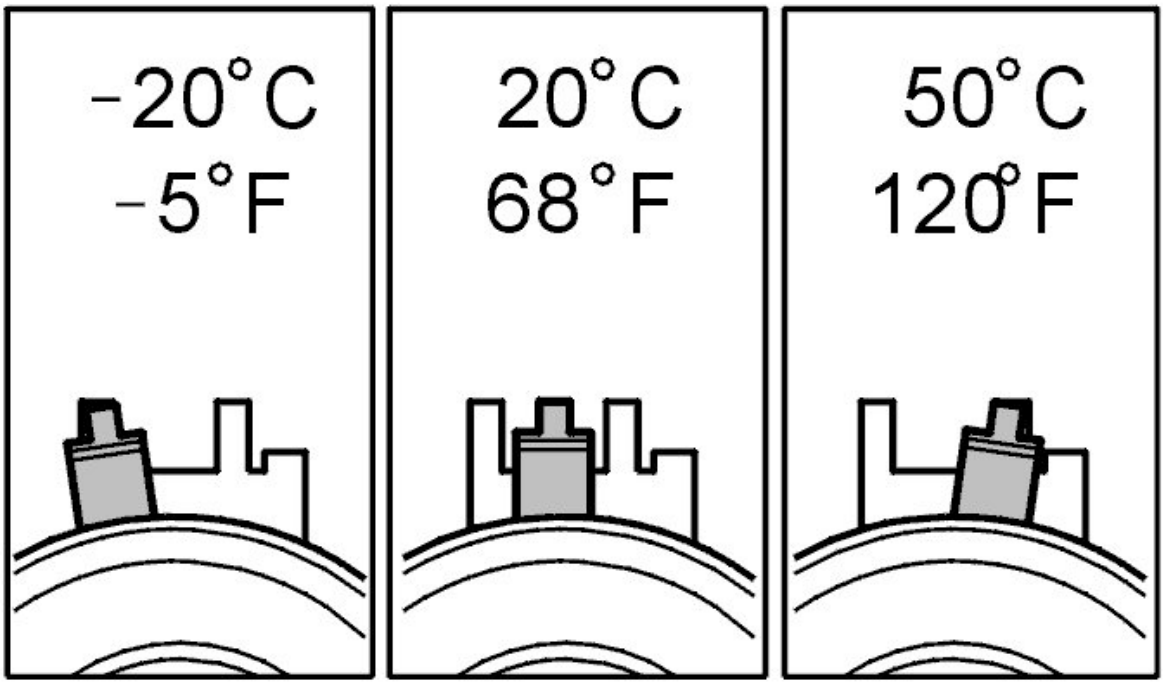


Install the belt in the following order:

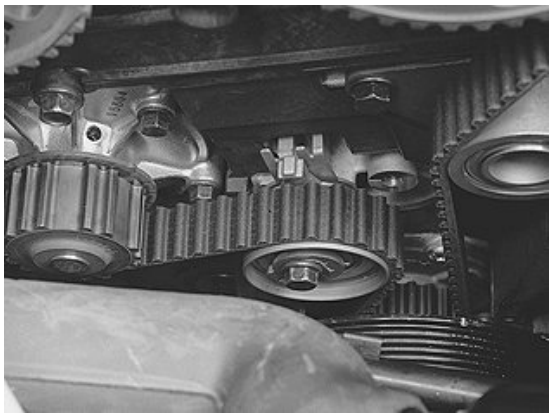
- crankshaft
- the idler pulley
- intake camshaft
- exhaust camshaft
- coolant pump
- belt tensioner.

Note! The variable valve timing units do not have a return spring and are easily dislodged when reinstalling the timing belt. Check that the markings are correct.

Adjusting the timing belt

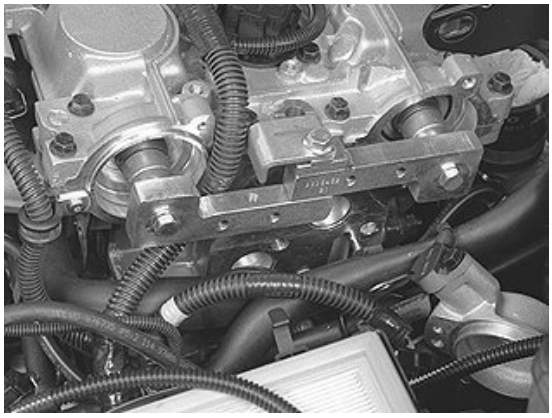


This adjustment is to be made with a cold engine. A suitable temperature is approximately **20°C/68°F**.
At higher temperatures (with the engine at operating temperature or a high outside temperature for example) the indicator is further to the right.
The illustration shows the position of the indicator when aligning the timing belt tensioner at different temperatures.
Hold the center screw secure and turn the belt tensioner eccentric clockwise until the tensioner indicator passes the marked position and reaches the limit position.
Tighten the 3 screws on the exhaust camshaft timing gear pulley. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Tighten the 3 screws on the intake camshaft timing gear pulley. Tighten. See Tightening torque See: Specifications/Tightening Torque.



Note! Check that the variable valve timing units are in the limit position.

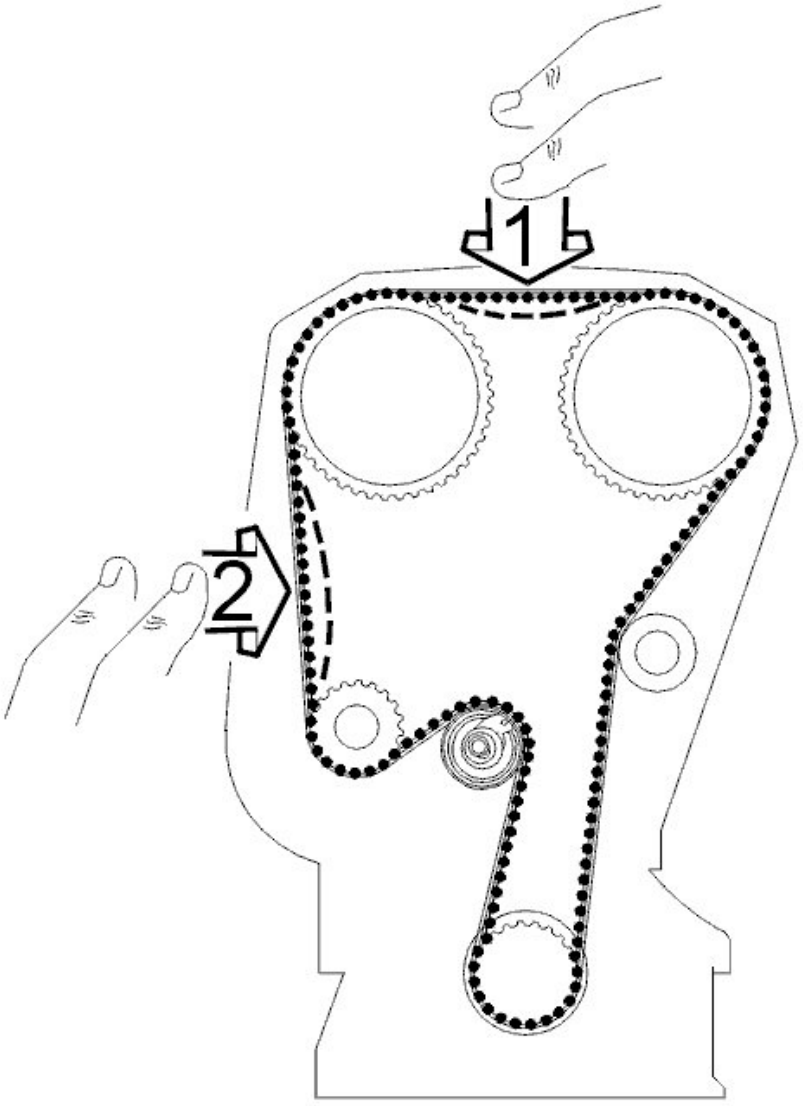
Turn the eccentric back so that the indicator reaches the marked position in the center of the window.
Remember to hold the center screw secure at the same time.
Hold the eccentric secure. Tighten the center screw. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Check that the indicator is in the correct position.



Remove:

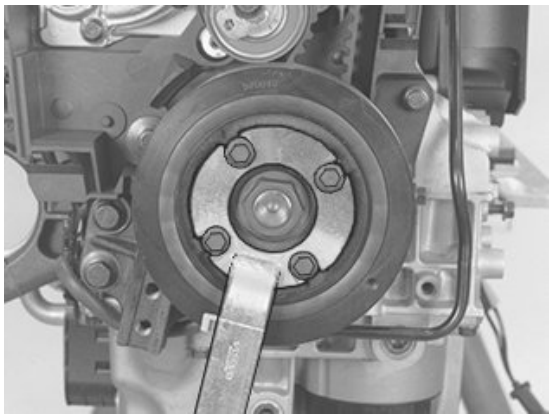
- camshaft adjustment tools 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool from the rear edge of the camshafts
- crankshaft stop 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
- the plug with a new sealing washer. Tighten. See Tightening torque See: Specifications/Tightening Torque.

Checking the markings and belt tension



Press the timing belt to check that the indicator on the belt tensioner moves easily.
Position the upper timing cover.
Turn the crankshaft 2 rotations and check that the markings on the crankshaft and camshaft pulleys correspond.
Check that the indicator on the belt tensioner is within the marked area.
Remove the upper timing cover.

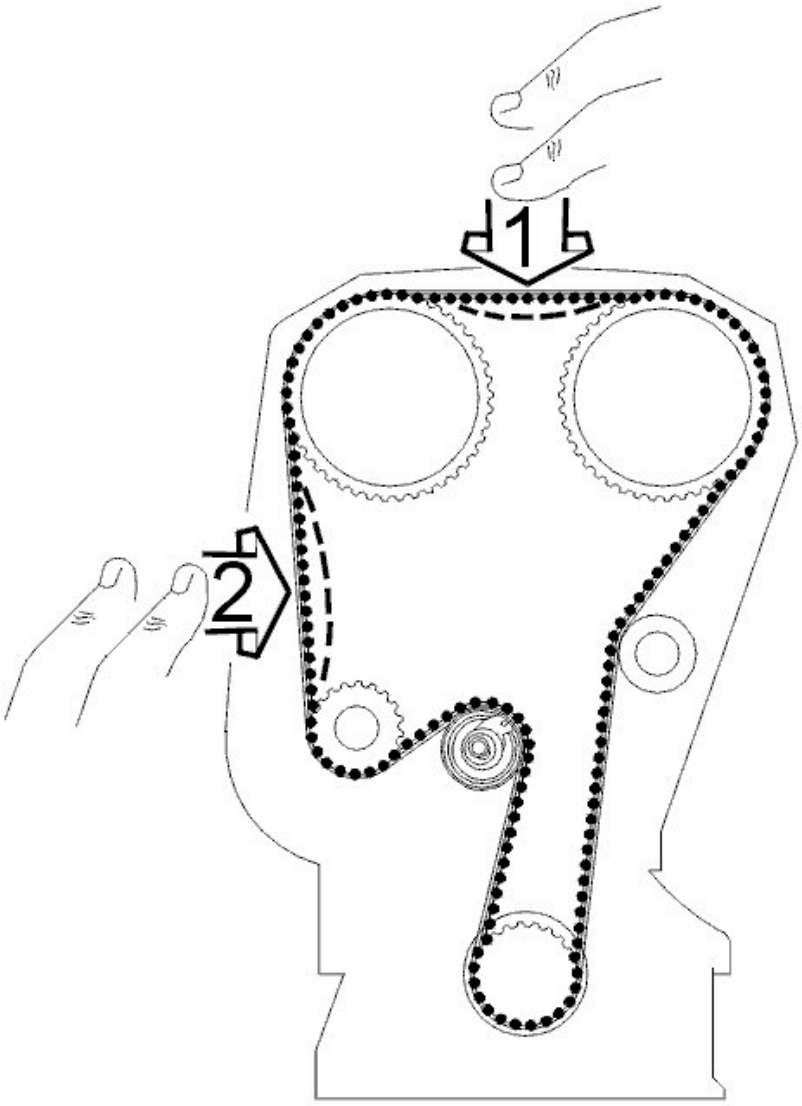
Installing the vibration damper



Install:

- the vibration damper. Use counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
- the crankshaft center nut. Tighten. See Tightening torque See: Specifications/Tightening Torque. Remove counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
- the 4 screws. Tighten. See Tightening torque See: Specifications/Tightening Torque. Use the crankshaft center screw as a counterhold.

Checking the markings and belt tension



Press the timing belt to check that the indicator on the belt tensioner moves easily.
Position the upper timing cover.
Turn the crankshaft two turns. Check that the markings on the crankshaft and timing gear pulley match up with the markings on the oil pump and upper timing cover respectively.
Check that the indicator on the belt tensioner is within the marked area.

Timing Belt: Service and Repair
Timing Belt, Replacing

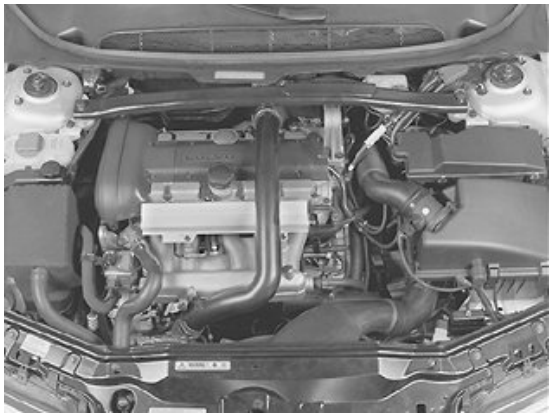
Timing belt, replacing

Special tools:

999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold

Note! Since the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

Remove components



Caution! Remove the ignition key.

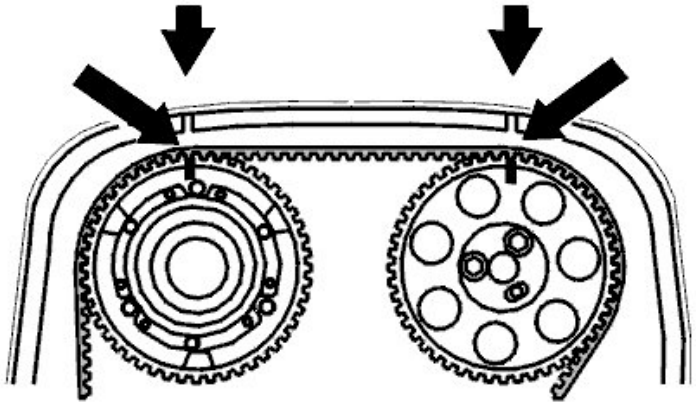
Remove:
- the cross stay between the suspension turrets
- the upper timing belt cover
- the servo reservoir and the expansion tank.

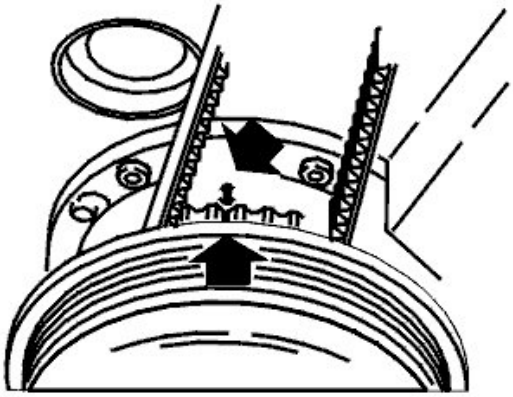
Lift up and place on top of the engine.

Warning! Make sure that no power steering fluid is spilled. Extremely flammable.

- the auxiliaries belt
- the front timing belt cover.

Position the engine according to the marking



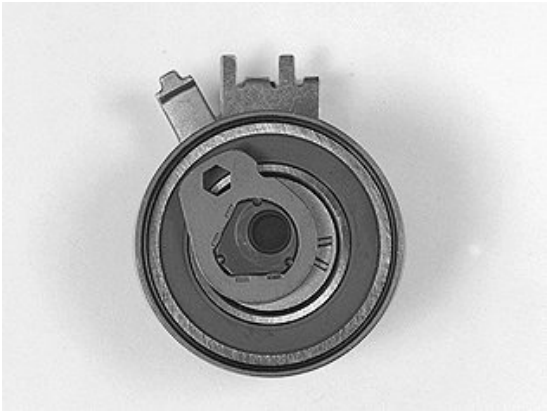


- Remove the right front wheel
- Remove the nut from the cover in the wing liner
- Install the upper timing belt cover
- Turn the crankshaft clockwise until the markings on the crankshaft and camshaft pulley correspond
- Turn the crankshaft a further 1/4 turn clockwise and then back again until the markings correspond.

The markings are illustrated

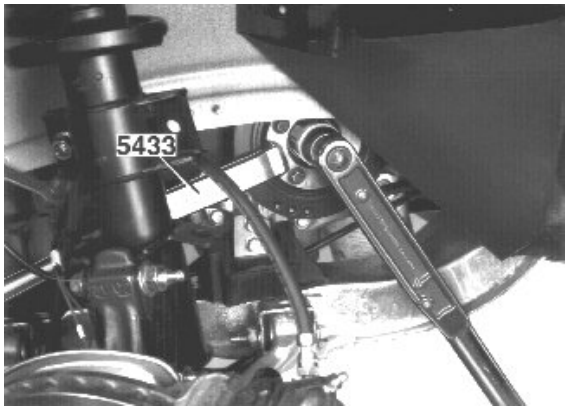
- Remove the upper timing belt cover.

Removing the timing belt



Slacken off the belt tensioner.

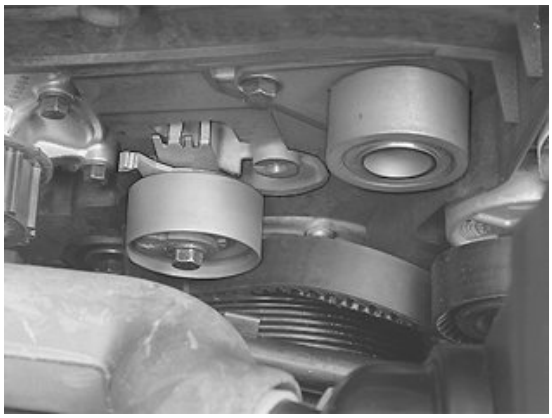
Slacken off the centre screw for the belt tensioner slightly.
Hold the centre screw still. Turn the tensioner eccentric clockwise using a 6 mm Allen key to 10 o'clock.
Remove the timing belt from the tension pulley, camshaft pulley and water pump.



Remove the vibration damper.

Remove the oscillation damper. Use counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold. Work the oscillation damper loose.
Remove the timing belt

Checking the tensioner pulley and idler pulley



Check bearing wear:

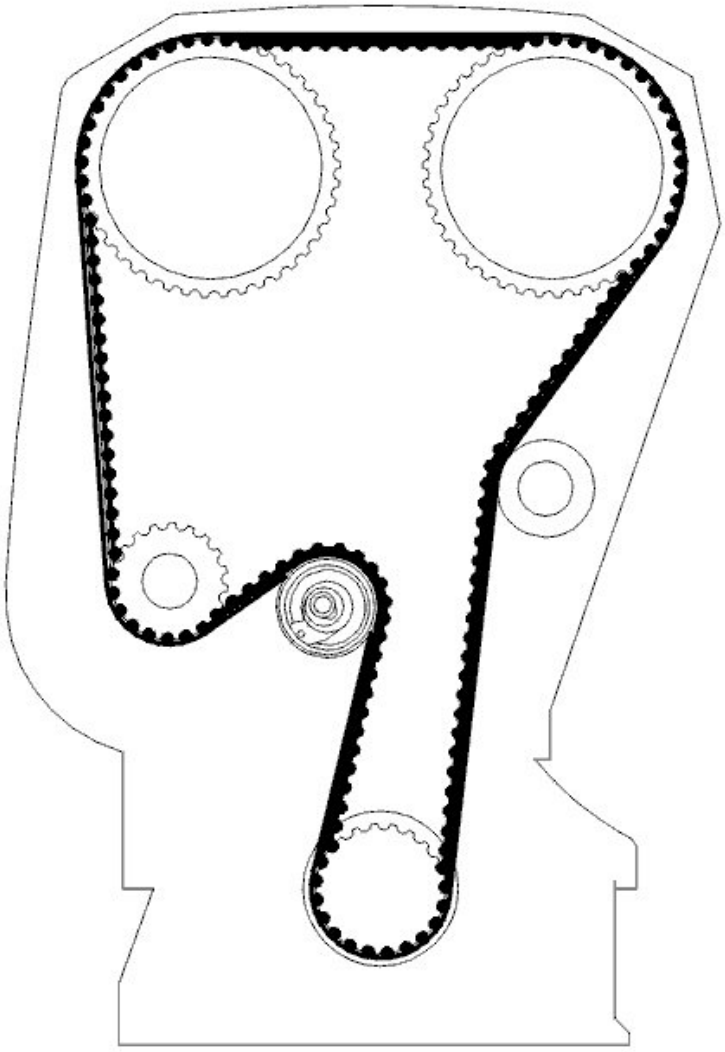
- spin the idler pulley and listen for noise.

If replacing with a new idler pulley, tighten to **24 Nm**.

- spin the tension pulley and listen for noise.

When replacing, screw the tension pulley into place using the centre screw.
Screw in the centre screw by hand.
Ensure that the tensioner fork is centered over the cylinder block rib.
Ensure that the Allen hole on the eccentric is at "10 o'clock".

Installing the timing belt



Note: For information regarding Variable Valve Timing see: Variable Valve Timing Actuator, Adjustments See: Variable Valve Timing/Variable Valve Timing Actuator/Adjustments

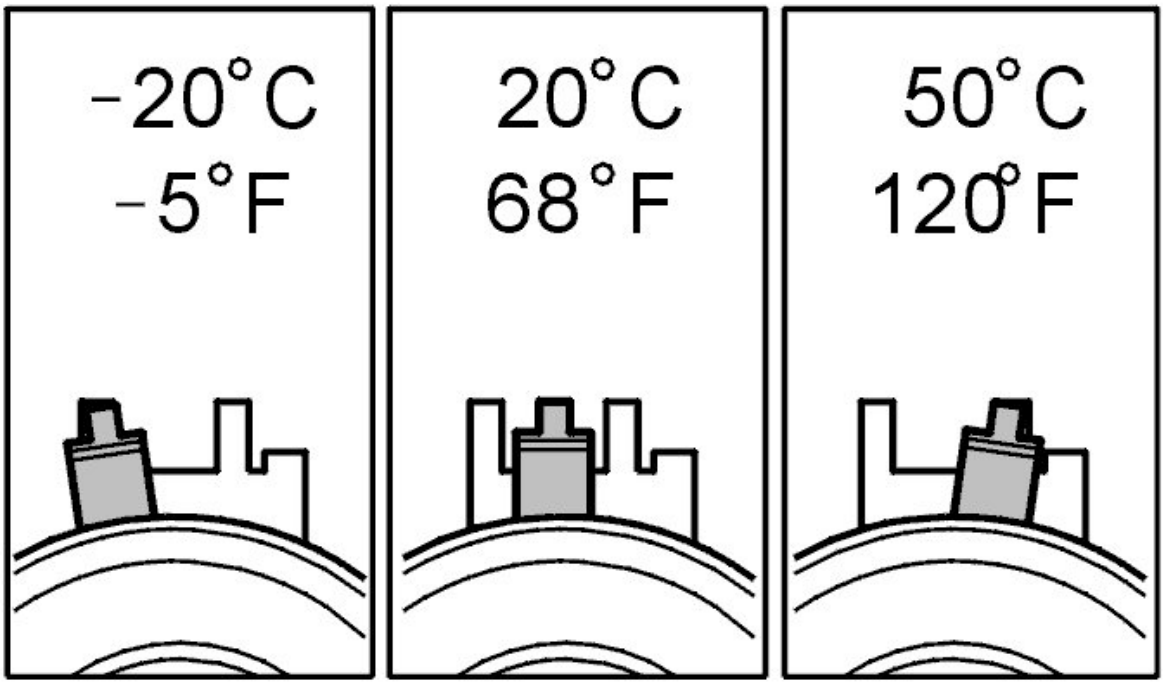
Also see Belt Drive, Assembly See: Belt Drive, Assembly

Install the timing belt over the pulley on the crankshaft.
Install the oscillation damper. Tighten the center nut to **180 Nm**. Use counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold.
Remove the counterhold and install new screws. Tighten the screws to **25 Nm**. Angle-tighten **30°**

Install the new belt in the following order:

- crankshaft
- the idler pulley
- intake camshaft pulley
- exhaust camshaft pulley
- water pump
- belt tensioner.

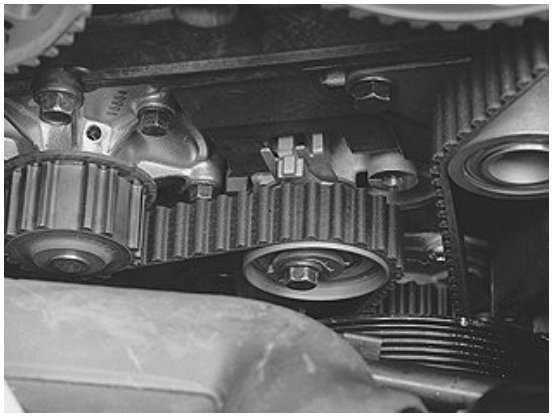
Tighten the timing belt



This adjustment is carried out on a cold engine. A suitable temperature is approximately 20°C/68°F.

At higher temperatures, for example with the engine at operating temperature or at higher ambient temperature, the needle is further to the right. The illustration shows the position of the indicator when aligning the timing belt tensioner at different temperatures.

For engine serial no. up to 3188688



Tension the timing belt as follows:

- turn the crankshaft clockwise carefully until the timing belt is tensioned. The belt must be tensioned between the intake camshaft pulley, the idler pulley and the crankshaft
- hold the centre screw on the belt tensioner fixed. Turn the belt tensioner eccentric **counter-clockwise** until the tensioner indicator passes the marked position.

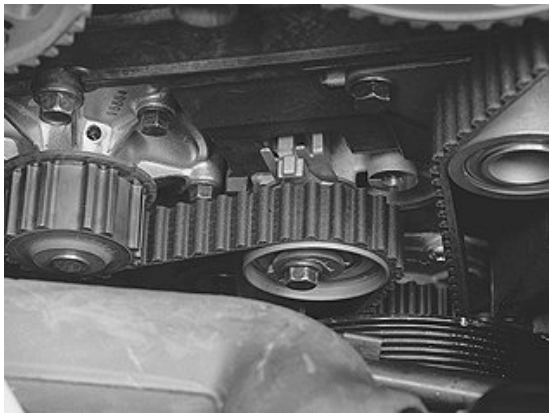
Then turn the eccentric back so that the indicator reaches the marked position in the centre of the window

- Secure the eccentric and tighten the center screw to **20 Nm**.

Check that the indicator is in the correct position.

For engine serial no. from 3188689

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Tension the timing belt as follows:

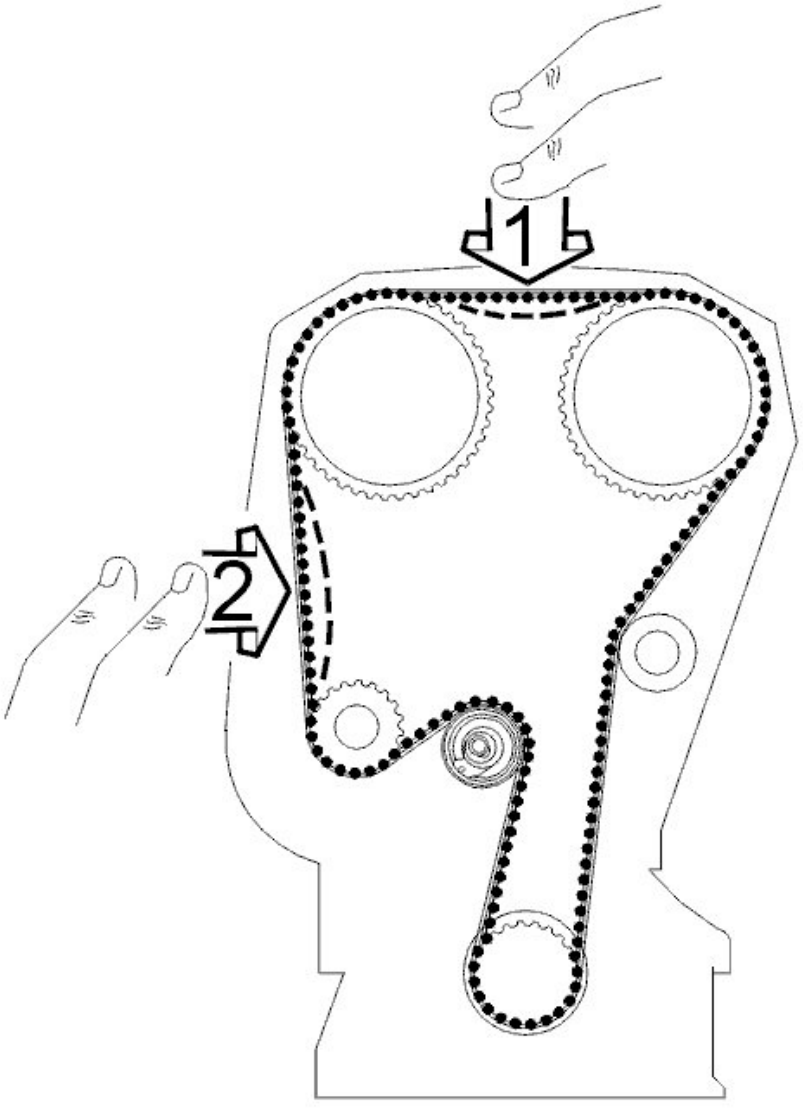
- turn the crankshaft clockwise carefully until the timing belt is tensioned. The belt must be tensioned between the intake camshaft pulley, the idler pulley and the crankshaft
- hold the centre screw on the belt tensioner fixed. Turn the belt tensioner eccentric **clockwise** until the tensioner indicator passes the marked position.

Then turn the eccentric back so that the indicator reaches the marked position in the centre of the window

- Secure the eccentric and tighten the center screw to **20 Nm**.

Check that the indicator is in the correct position.

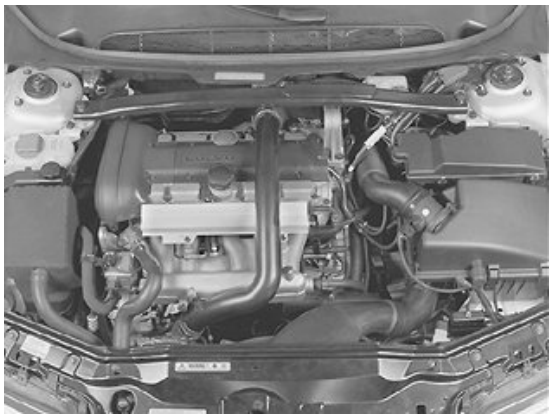
Check



Checking markings:

- press the belt to check that the indicator on the tensioner moves easily
- install the upper timing belt cover
- turn the crankshaft 2 turns. Check that the markings on the crankshaft and camshaft pulley correspond
- check that the indicator on the belt tensioner is within the marked area.

Reinstall



Reinstall the removed components:

- the front timing belt cover.

Tighten to **12 Nm.**.

- the upper timing belt cover
- install the auxiliaries belt
- the servo reservoir
- the expansion tank.

Note! Make sure that the hoses are routed positioned.

- the cross member. Tighten the screws at the suspension turret to **50 Nm** and the screw for the engine bracket to **80 Nm**.

Wipe clean and check the engine compartment

- the cover in the wing liner
- the front wheel according to Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Checking work

Function test:

- Test drive the engine.

Timing Belt: Service and Repair
Belt Drive, Assembly

Belt drive, assembly

Special tools:

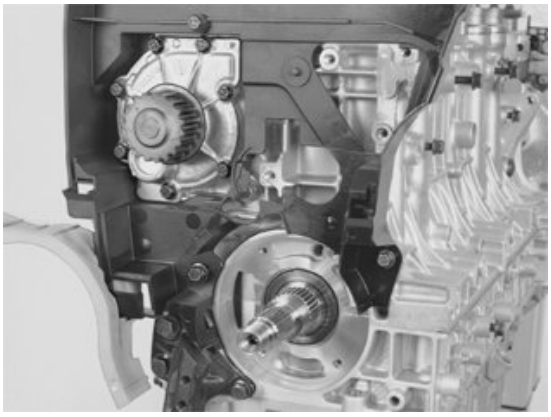
999 5747 Socket See: Tools and Equipment/999 5747 Socket
999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool
999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Tightening torque

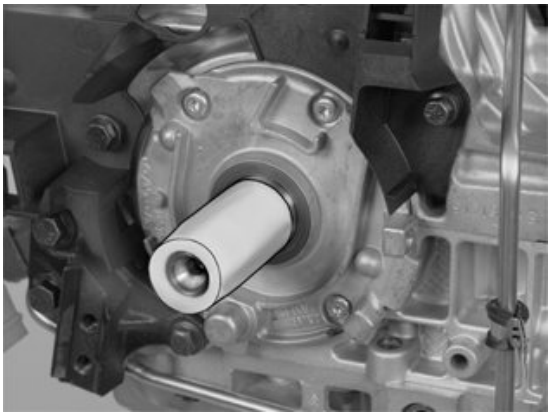
For tightening torques not in the text, see Tightening torque See: Specifications/Tightening Torque.

Installing the water pump



Install the rear timing cover.
Screw into place at the three mounting points.
Install the water pump with a **new gasket**.
Apply thread sealant, P/N 11-61 056, to all the screws for the water pump. Tighten the screws crosswise.

Installing the oil pump

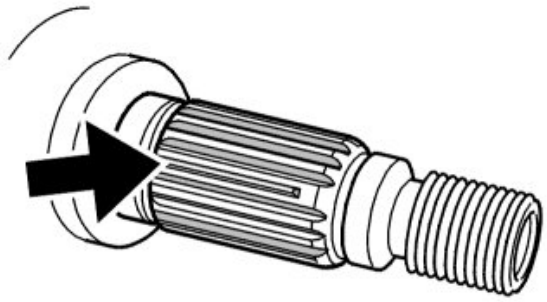


Use a new gasket and a new O-ring around the oil pump housing and new screws. Alternatively, apply thread sealant 11 61 056 to the underside of the old screw heads.
Screw sliding sleeve 999 5747 Socket See: Tools and Equipment/999 5747 Socket into place at the front of the crankshaft journal.
Press in the pump over the sliding sleeve.
Install the screws as a guide.
Carefully tap in the oil pump with a rubber mallet.
Tighten the oil pump crosswise. See Tightening torque See: Specifications/Tightening Torque.
Remove the sliding sleeve 999 5747 Socket See: Tools and Equipment/999 5747 Socket.

Installing front crankshaft seal

See Oil pump / crankshaft seal, front, replacing, B5244T5 See: Seals and Gaskets/Front Crankshaft Seal/Service and Repair.

Installing the crankshaft timing gear pulley



Note! The timing gear pulley can only be installed in one position on the crankshaft journal splines (see the illustration).

Carefully tap in the timing gear pulley with a rubber mallet.

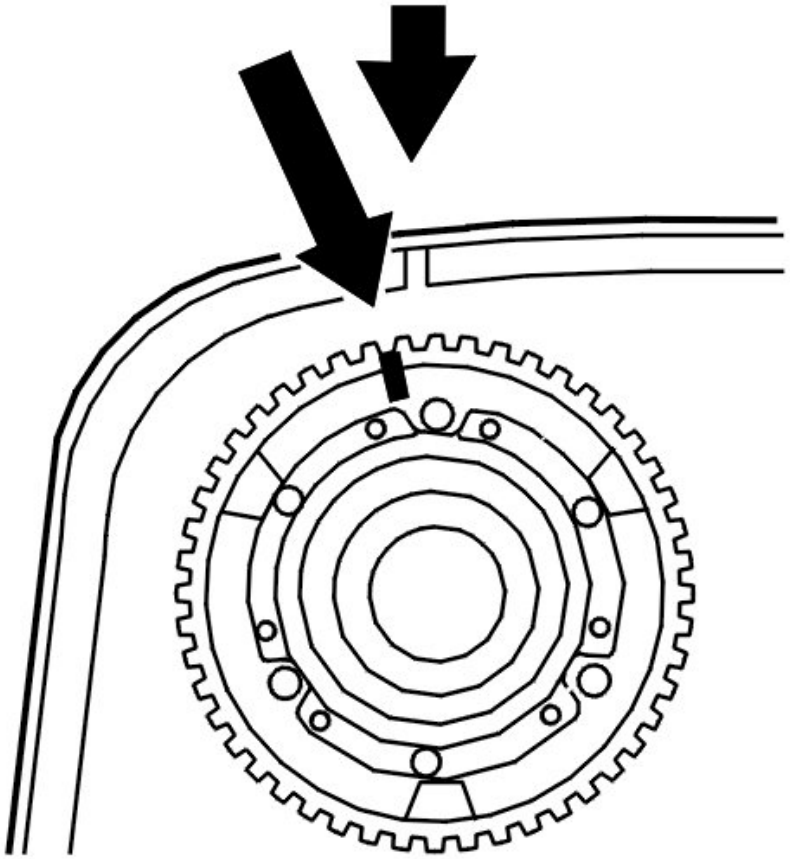
Installing the idler pulley and belt tensioner

Install:

- idler pulley. Tighten
- the belt tensioner and the center screw so that the tensioner fork is centered over the cylinder block rib. Do **not** tighten
- the lower belt guard at the oil pump
- the fuel delivery line.

Installing the timing gear pulley for the camshafts

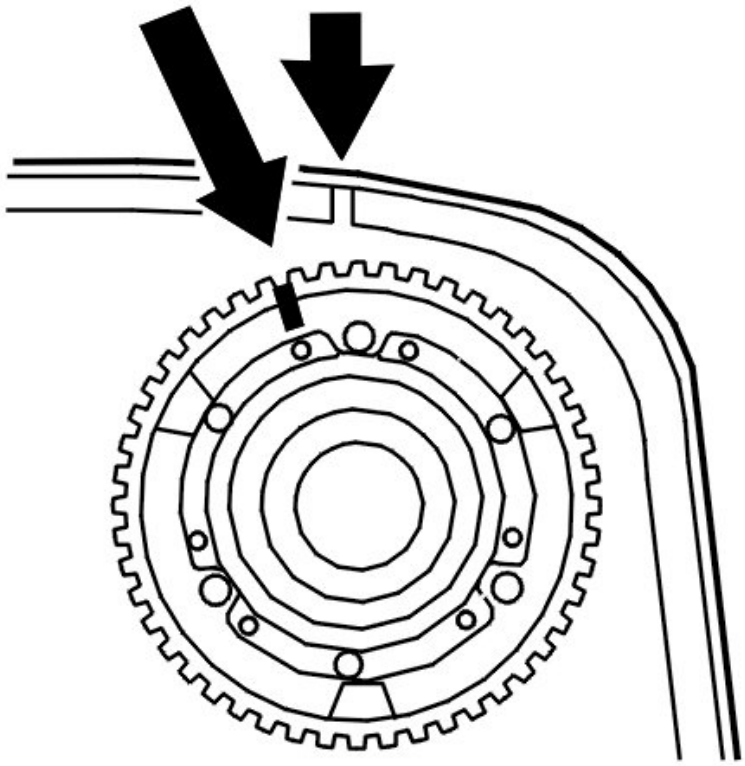
Note! The purpose of the "Installing the timing gear pulley" section described here is to ensure that the VVT unit is correctly positioned and to reset the camshaft timing gear pulley to the correct position using the markings made at the factory. This is to ensure that the conditions are correct for any later fault-tracing.



Note! Do not turn counter clockwise during this procedure.

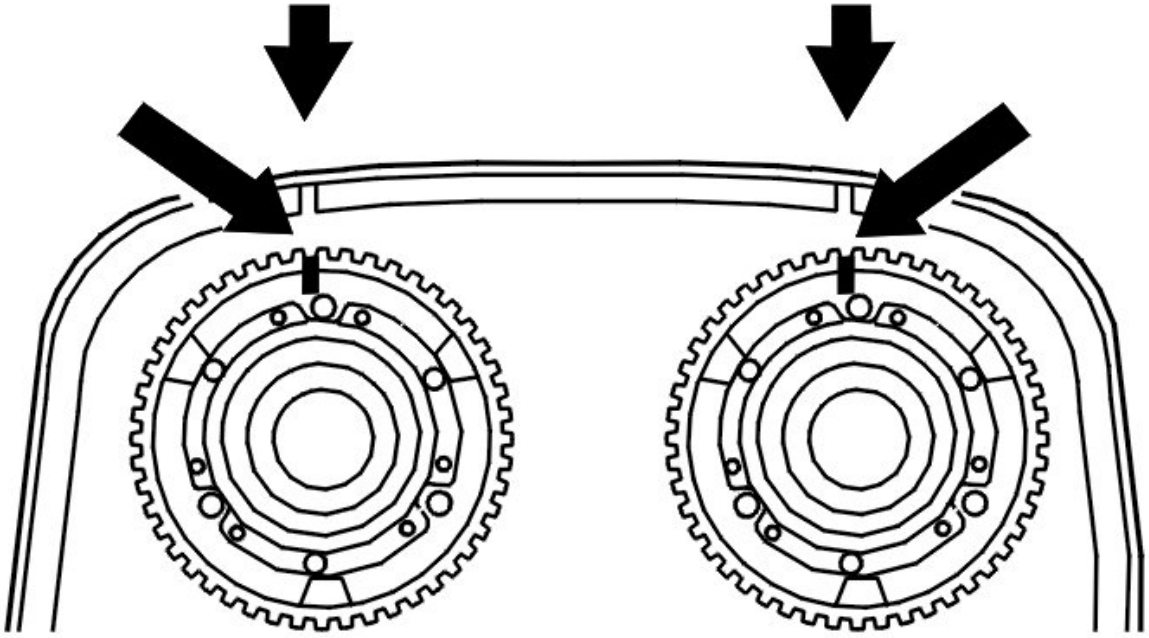
Slacken off, but do not remove, the screws which secure the timing gear pulley to the variable valve timing unit.
Press the variable valve timing unit and timing gear pulley onto the camshaft.
Install the center screw which secures the variable valve timing unit to the camshaft. Tighten slightly. Turn the variable valve timing unit **counter-clockwise** as far as it will go. Remove the center screw.
Position the upper timing cover.
Turn the timing gear pulley **clockwise**until the screws at the oval holes are in the limit position. Continue turning **clockwise** until the timing gear pulley marking is **1 cogs** before the marking on the upper timing cover.
Check that the timing gear pulley is still in the limit position in the oval holes. Tighten the center screw in the variable valve timing unit. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Check that the variable valve timing unit does not rotate when tightening. Install and tighten the center plug. See Tightening torque See: Specifications/Tightening Torque.
Turn the variable valve timing unit **clockwise** to the limit position.
Turn the timing gear pulley so that the markings correspond.

Installing the variable valve timing (VVT) unit on the intake camshaft



Note! Do not turn counter clockwise during this procedure.

Slacken off, but do not remove, the screws which secure the timing gear pulley to the variable valve timing unit. Press the variable valve timing unit and timing gear pulley onto the camshaft.
Install the center screw which secures the variable valve timing unit to the camshaft. Tighten slightly.
Turn the variable valve timing unit **counter-clockwise** as far as it will go. Remove the center screw. Position the upper timing cover.
Turn the timing gear pulley **clockwise**until the screws at the oval holes are in the limit position. Continue turning **clockwise** until the timing gear pulley marking is **1-1/2 cogs** before the marking on the upper timing cover.



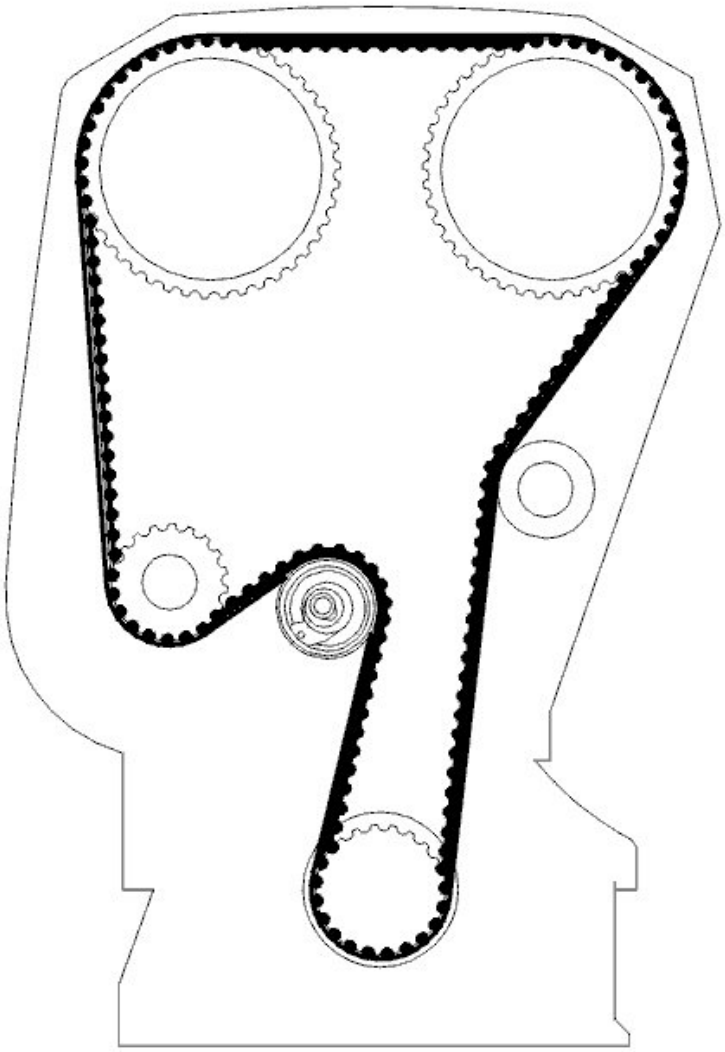
Check that the timing gear pulley is still in the limit position in the oval holes.

Tighten the center screw in the VVT unit. See Tightening torque See: Specifications/Tightening Torque.
Check that the variable valve timing unit does not rotate when tightening. Install the center plug. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Turn the variable valve timing unit clockwise to the limit position. Turn the timing gear pulley so that the markings correspond.

Finishing

Tighten the center screw on the timing belt tensioner. Tighten to **5 Nm**.

Installing the timing belt

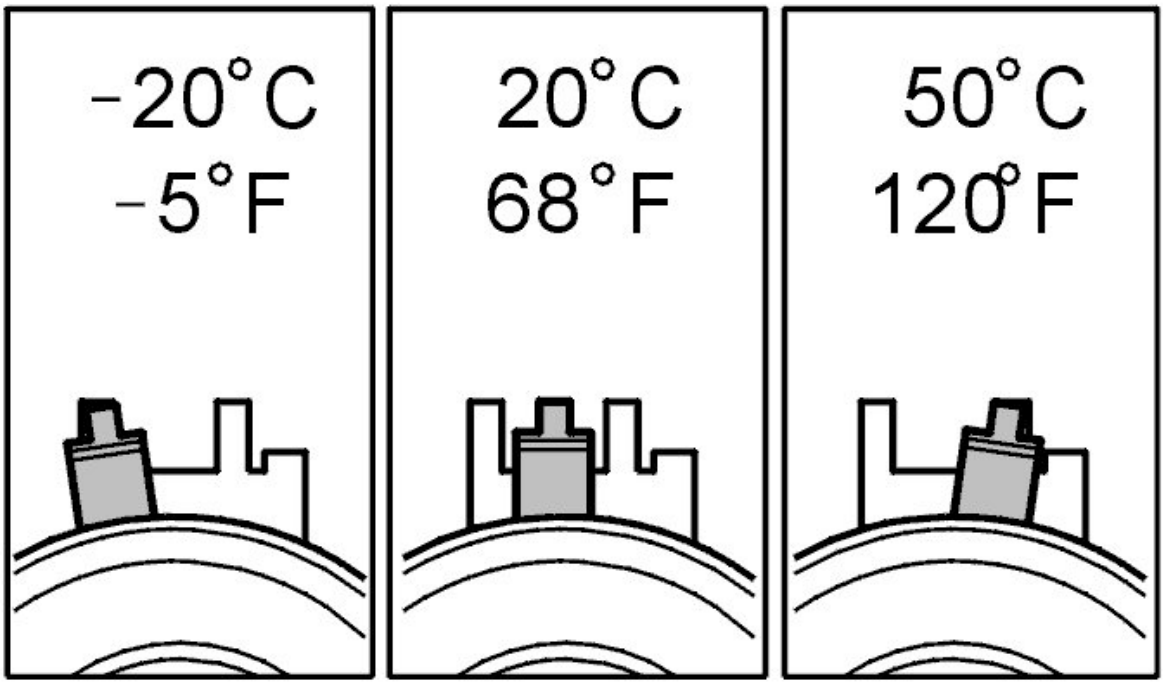


Install the belt in the following order:

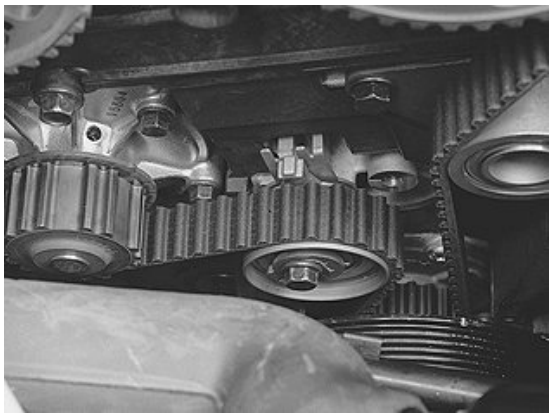
- crankshaft
- the idler pulley
- intake camshaft
- exhaust camshaft
- coolant pump
- belt tensioner.

Note! The variable valve timing units do not have a return spring and are easily dislodged when reinstalling the timing belt. Check that the markings are correct.

Adjusting the timing belt

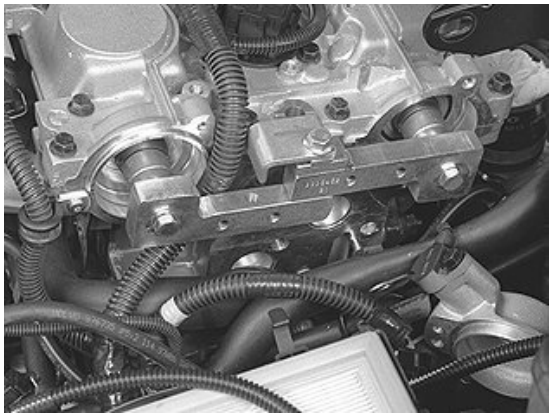


This adjustment is to be made with a cold engine. A suitable temperature is approximately **20°C/68°F**.
At higher temperatures (with the engine at operating temperature or a high outside temperature for example) the indicator is further to the right.
The illustration shows the position of the indicator when aligning the timing belt tensioner at different temperatures.
Hold the center screw secure and turn the belt tensioner eccentric clockwise until the tensioner indicator passes the marked position and reaches the limit position.
Tighten the 3 screws on the exhaust camshaft timing gear pulley. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Tighten the 3 screws on the intake camshaft timing gear pulley. Tighten. See Tightening torque See: Specifications/Tightening Torque.



Note! Check that the variable valve timing units are in the limit position.

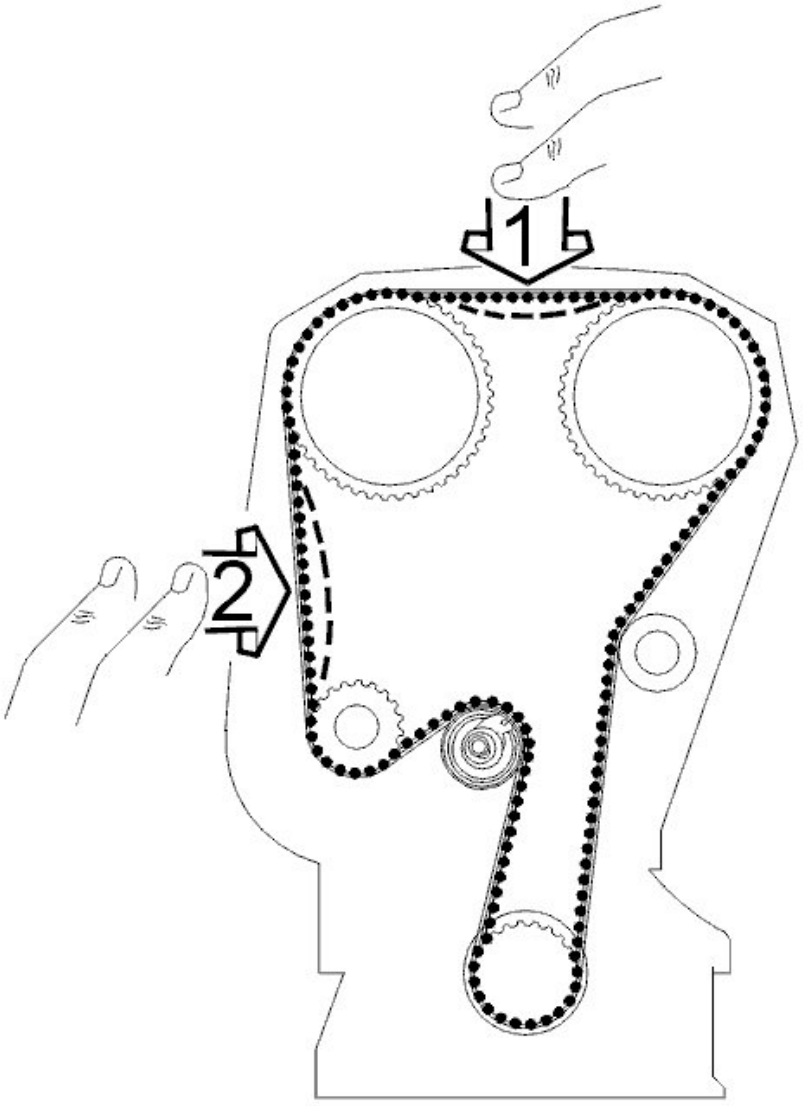
Turn the eccentric back so that the indicator reaches the marked position in the center of the window.
Remember to hold the center screw secure at the same time.
Hold the eccentric secure. Tighten the center screw. Tighten. See Tightening torque See: Specifications/Tightening Torque.
Check that the indicator is in the correct position.



Remove:

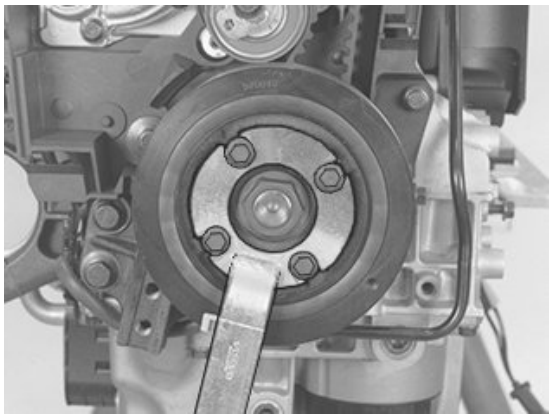
- camshaft adjustment tools 999 5452 CAMSHAFT ADJUSTMENT TOOL See: Tools and Equipment/999 5452 Camshaft Adjustment Tool from the rear edge of the camshafts
- crankshaft stop 999 5451 ADJUSTMENT TOOL See: Tools and Equipment/999 5451 Adjustment Tool
- the plug with a new sealing washer. Tighten. See Tightening torque See: Specifications/Tightening Torque.

Checking the markings and belt tension



Press the timing belt to check that the indicator on the belt tensioner moves easily.
Position the upper timing cover.
Turn the crankshaft 2 rotations and check that the markings on the crankshaft and camshaft pulleys correspond.
Check that the indicator on the belt tensioner is within the marked area.
Remove the upper timing cover.

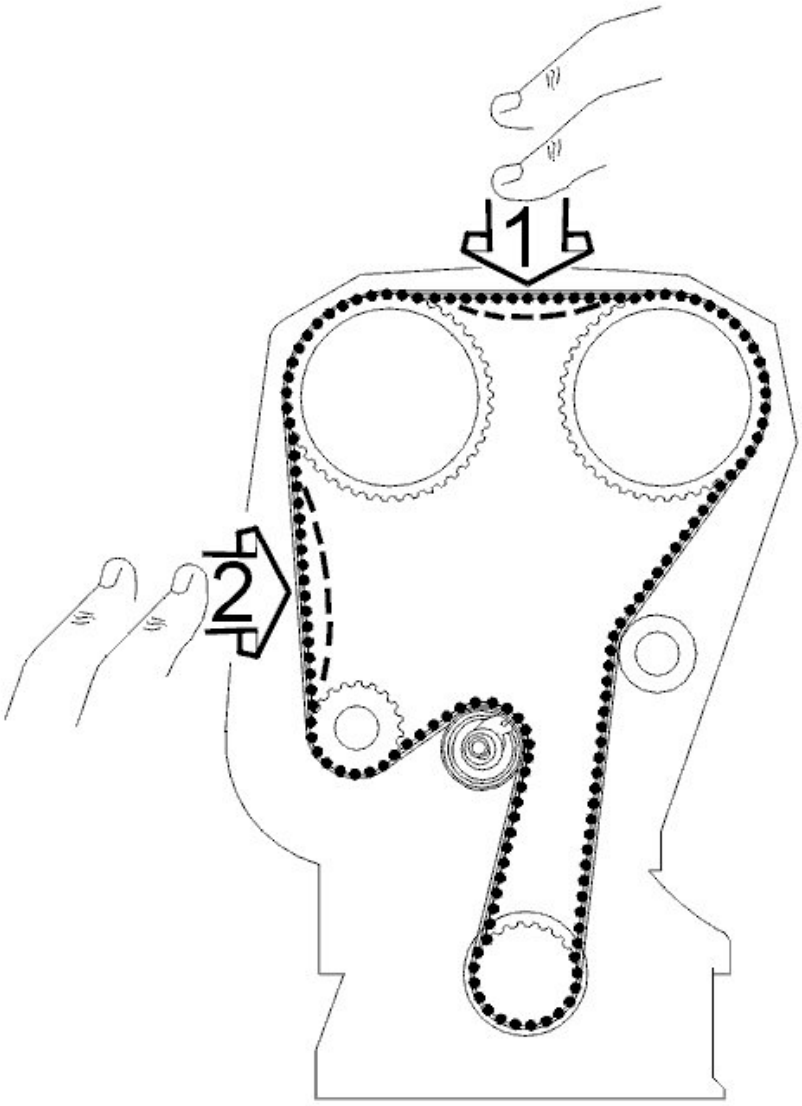
Installing the vibration damper



Install:

- the vibration damper. Use counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
- the crankshaft center nut. Tighten. See Tightening torque See: Specifications/Tightening Torque. Remove counterhold 999 5433 COUNTERHOLD See: Tools and Equipment/999 5433 Counterhold
- the 4 screws. Tighten. See Tightening torque See: Specifications/Tightening Torque. Use the crankshaft center screw as a counterhold.

Checking the markings and belt tension



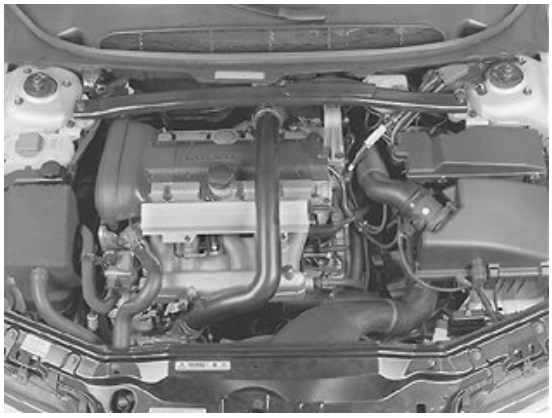
Press the timing belt to check that the indicator on the belt tensioner moves easily.
Position the upper timing cover.
Turn the crankshaft two turns. Check that the markings on the crankshaft and timing gear pulley match up with the markings on the oil pump and upper timing cover respectively.
Check that the indicator on the belt tensioner is within the marked area.

Water Pump: Service and Repair

Coolant pump, replacing

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removing the coolant pump



Caution! Remove the ignition key.

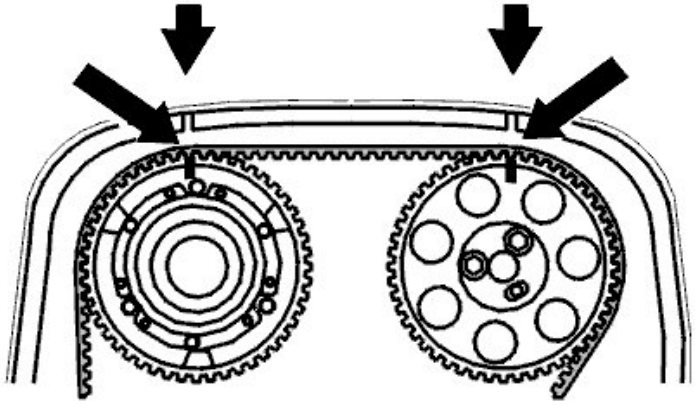
- Remove the expansion tank cap.

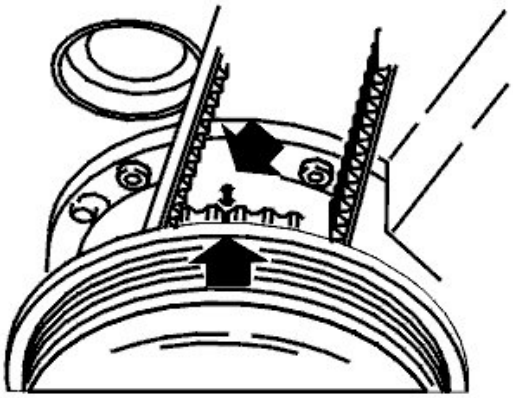
- Remove the splash guard under the engine
- Position a container under the engine drain cock. Drain the engine coolant.

Avoid skin contact with the coolant.

- Transfer the container to the radiator draining tap. Drain off the remaining coolant
- Close the nipples
- Install the splashguard under the engine.

Position the engine according to the marking





Remove

- the cross stay between the suspension turrets
- the servo reservoir and the expansion tank and place them on top of the engine.

Warning! Ensure that no power steering fluid is spilled. Extremely flammable.

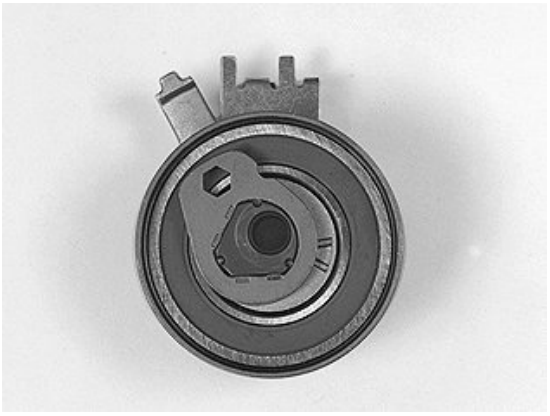
- the auxiliaries belt
- the front timing belt cover.

Raise the car.

- the right front wheel
- the nut for the cover in the right fender liner.

Install the upper timing belt cover.
Turn the crankshaft clockwise until the markings on the crankshaft and camshaft pulley correspond.
Turn the crankshaft a further 1/4 of a turn clockwise, then back counter-clockwise until the markings correspond.
Remove the upper timing belt cover.

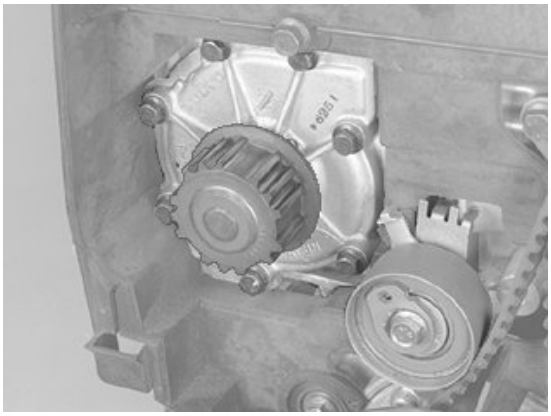
Removing the timing belt



Slacken off the belt tensioner.

Slacken off the center screw for the belt tensioner slightly.
Hold the center screw in place. Turn the tensioner eccentric clockwise to 10 o'clock using a 6 mm Allen key.
Unhook the timing belt.

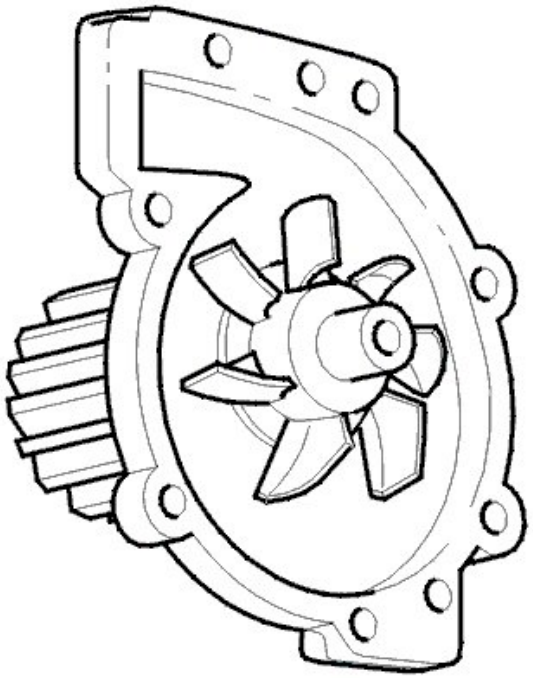
Remove the coolant pump

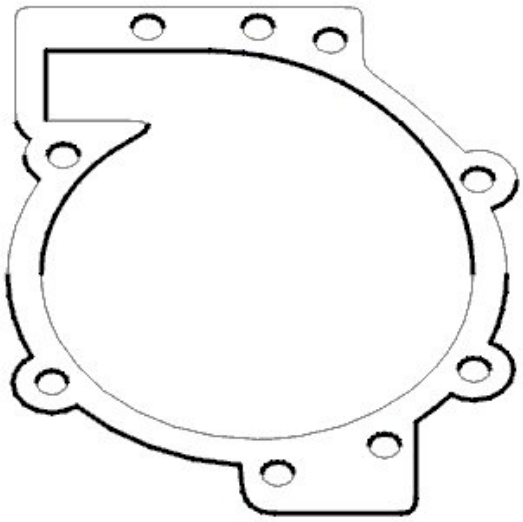


Remove the screws

- Tap the pump wheel with the shaft of a hammer and remove the pump
- Clean the gasket faces thoroughly.

Replace the coolant pump



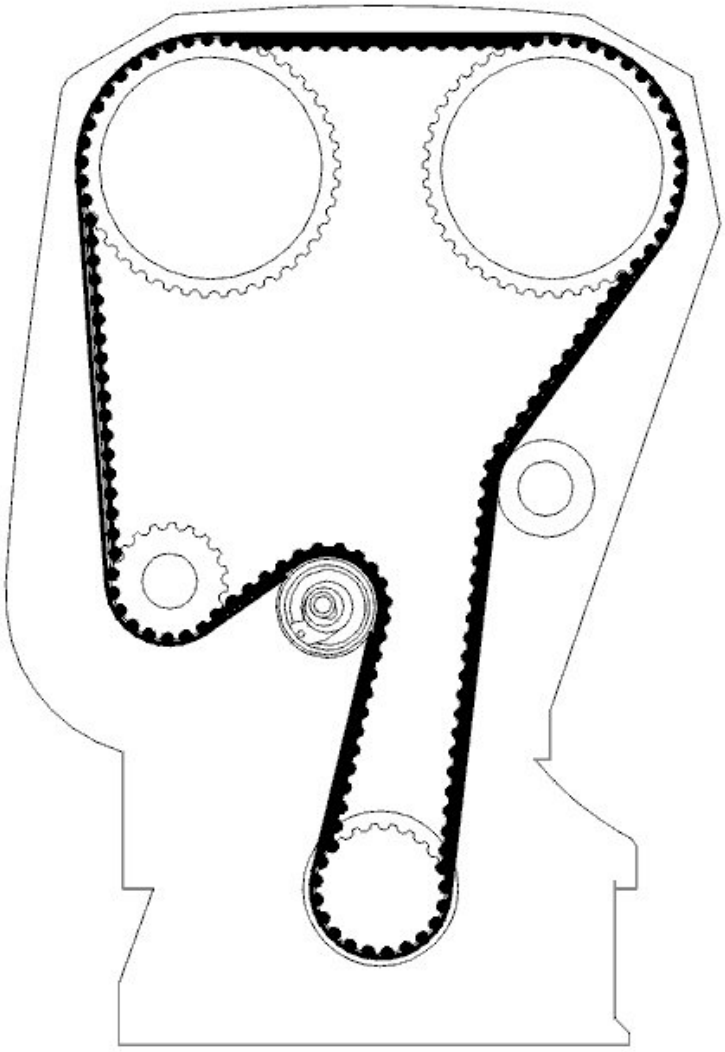


Install:

- a new gasket
- a new pump.

Tighten the screws crosswise. Tighten to **17 Nm**.

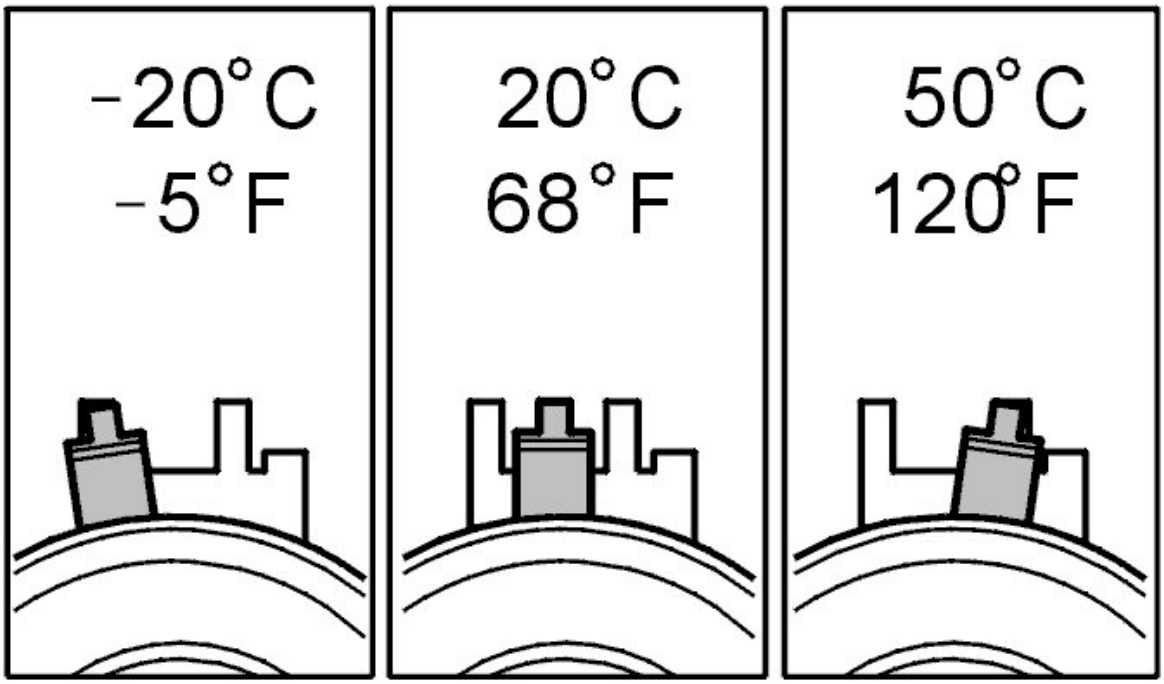
Installing the timing belt



Install the belt in the following order:

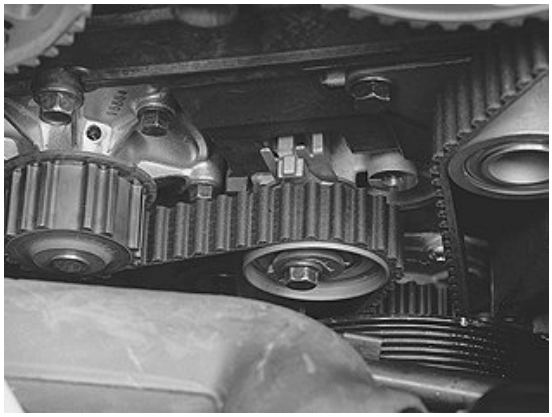
- crankshaft
- the idler pulley
- intake camshaft pulley
- exhaust camshaft pulley
- water pump
- belt tensioner.

Tension the timing belt



This adjustment is carried out on a cold engine. A suitable temperature is approximately 20°C/68°F.

At higher temperatures (with the engine at operating temperature or a high outside temperature for example) the indicator is further to the right. The illustration shows the needle position when adjusting the timing belt tensioner at different engine temperatures.



Tension the timing belt as follows

- Carefully turn the crankshaft clockwise until the timing belt is tensioned.

The belt must be tensioned between the intake camshaft pulley, the idler pulley and the crankshaft

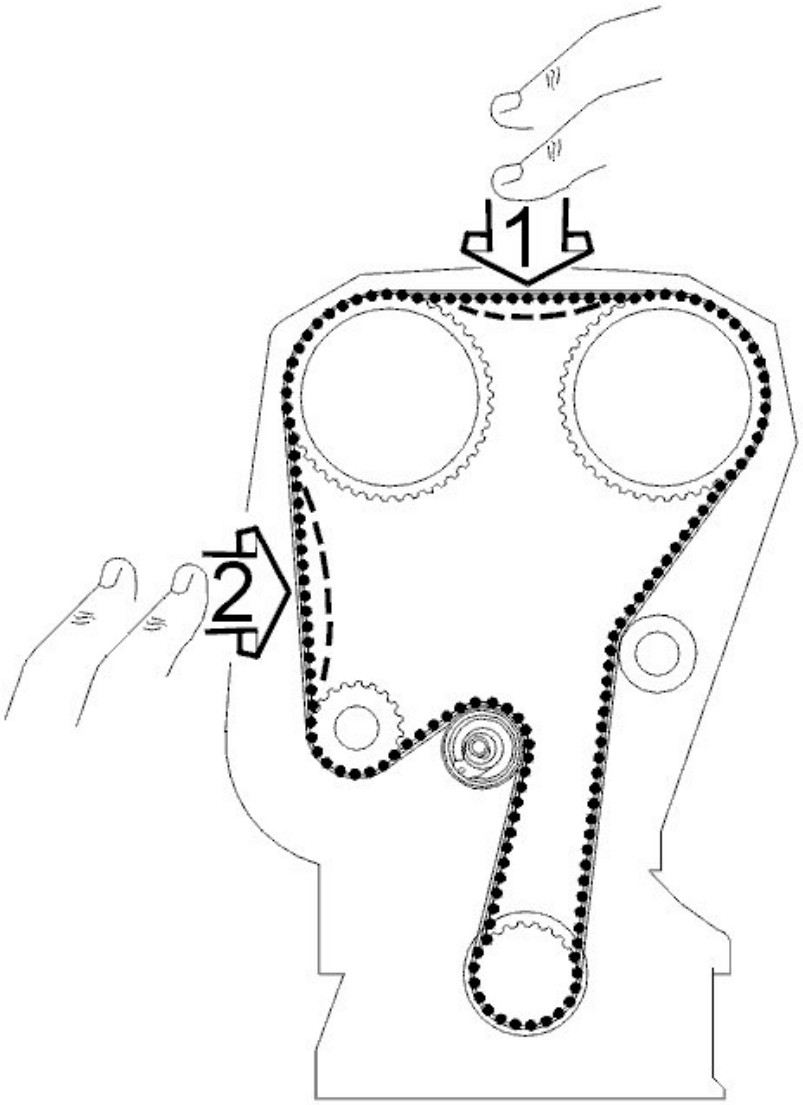
- Hold the belt tensioner center screw secure. Turn the belt tensioner eccentric counter-clockwise until the tensioner indicator passes the marked position.

Then turn the eccentric back so that the indicator reaches the marked position in the center of the window

- Hold the eccentric secure and tighten the center screw. Tighten to **20 Nm**.

Check that the indicator is in the correct position.

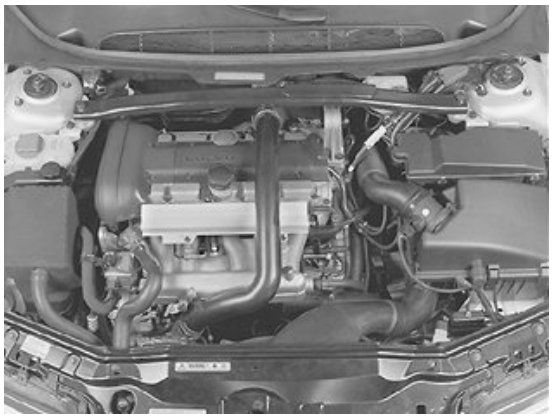
Check



Checking markings:

- press the belt to check that the indicator on the tensioner moves easily
- install the upper timing belt cover
- turn the crankshaft 2 turns. Check that the markings on the crankshaft and camshaft pulley correspond
- also check that the indicator on the belt tensioner is within the marked area.

Reinstall



Reinstall the removed components:

- the upper timing belt cover
- the front timing belt cover.

Tighten to **12 Nm**

- install the auxiliaries belt
- reinstall the servo reservoir and the expansion tank.

Ensure that the hoses are correctly positioned

- the engine stabilizer brace. Tighten the screws at the suspension turrets. Tighten to **50 Nm**.Tighten the screw for the engine bracket. Tighten

to **80 Nm**

- the cover in the fender liner
- the wheel. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Fill the cooling system with Volvo original coolant.
Wipe clean and check the engine compartment.

Checking work

Function test

- Warm up the engine until the thermostat opens
- Top up the cooling system if necessary.

Check for leaks.

Cooling System: Description and Operation

Water quality

The water that may be used in Volvo engine cooling systems together with Volvo original coolant must meet certain requirements. Tap water, for example, contains too much chlorine, minerals and salts. Water that does not meet the requirements according to the specification can cause corrosion and deposits in the cooling system even if the water is mixed with coolant. See specification.

Description	Quantity
Total fixed particles	< 340 ppm
Total hardness	< 9,5µ° dH
Chloride	< 40 ppm
Sulphate	< 100 ppm
pH value	5,5-9
Silicon	< 20 mg SiO2/l
Iron	< 0.10 ppm
Manganese	< 0.05 ppm
Conductivity	< 500 µS/cm
Organic content COD-Mn	< 115 mg/l

If in doubt about whether the water meets the requirements according to the specification, Volvo original coolant must be mixed 50/50 with distilled water (battery water) or ready mixed Volvo original coolant must be used.

When changing coolant or components in the cooling system, the system must be flushed clean with water that meets the specification or with distilled water. Alternatively the cooling system can be flushed with ready mixed Volvo original coolant.

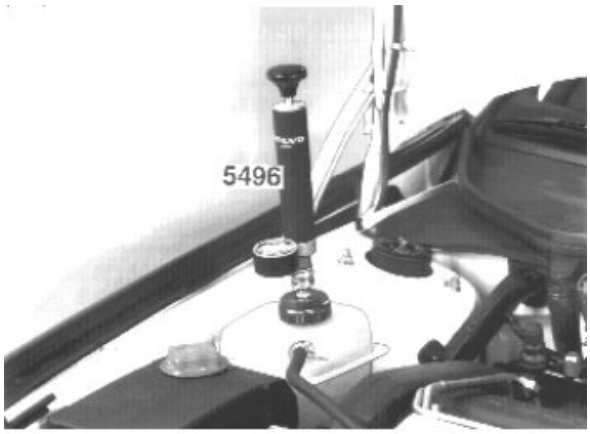
Cooling System: Testing and Inspection

Test pressurization

Special tools:

998 5496 ENGINE COOLANT SYSTEM - PRESSURE TESTER See: Tools and Equipment/998 5496 Engine Coolant System - Pressure Tester

Cooling system test pressurization



Use pressure tester 998 5496 ENGINE COOLANT SYSTEM - PRESSURE TESTER See: Tools and Equipment/998 5496 Engine Coolant System - Pressure Tester.
Connect the tester to the expansion tank cover.
Pump up the pressure and check for leaks.

- the pressure must be **150 kPa**
- the pressure in the system must be stable.

Note! Allow the pressure to stabilize for a few minutes.

Cooling System: Service and Repair

Cooling system - draining, charging and bleeding

Operation number: 26012-2

Note! Some variation in the illustrations may occur, but the essential information is always correct.

Special tools	
	T9512957 COOLANT FILLER **Tool number:**T9512957 **Tool description:**COOLANT FILLER **Tool boards:**
	T9512953 COVER **Tool number:**T9512953 **Tool description:**COVER **Tool boards:**

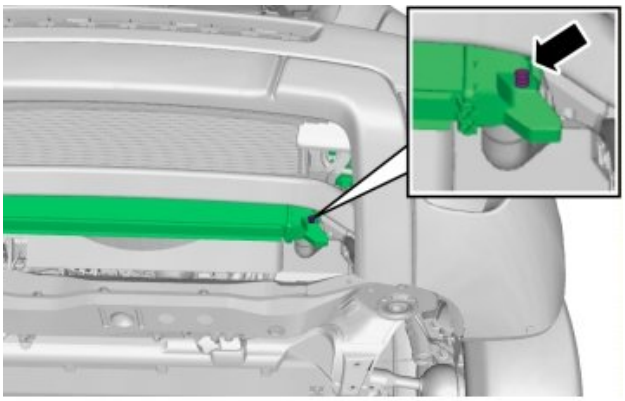
Note! Removal steps in this procedure may contain installation details.

Removal

Warning! Read the health and safety instructions for the cooling system. Refer to: Safety information Cooling system .

Warning! When releasing the cooling system pressure, cover the coolant expansion tank cap with a thick cloth.

Coolant must only be mixed with water of the correct quality. Refer to: Water quality See: Description and Operation



Installation

To install, reverse the removal procedure

Charge the cooling system. 951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir together with 951 2953 Cover See: Tools and Equipment/951 2953 Cover.

Warm up until the thermostat opens. Top off as necessary.

Auxiliary Water Pump: Service and Repair

Replacing the water pump for the engine coolant heater

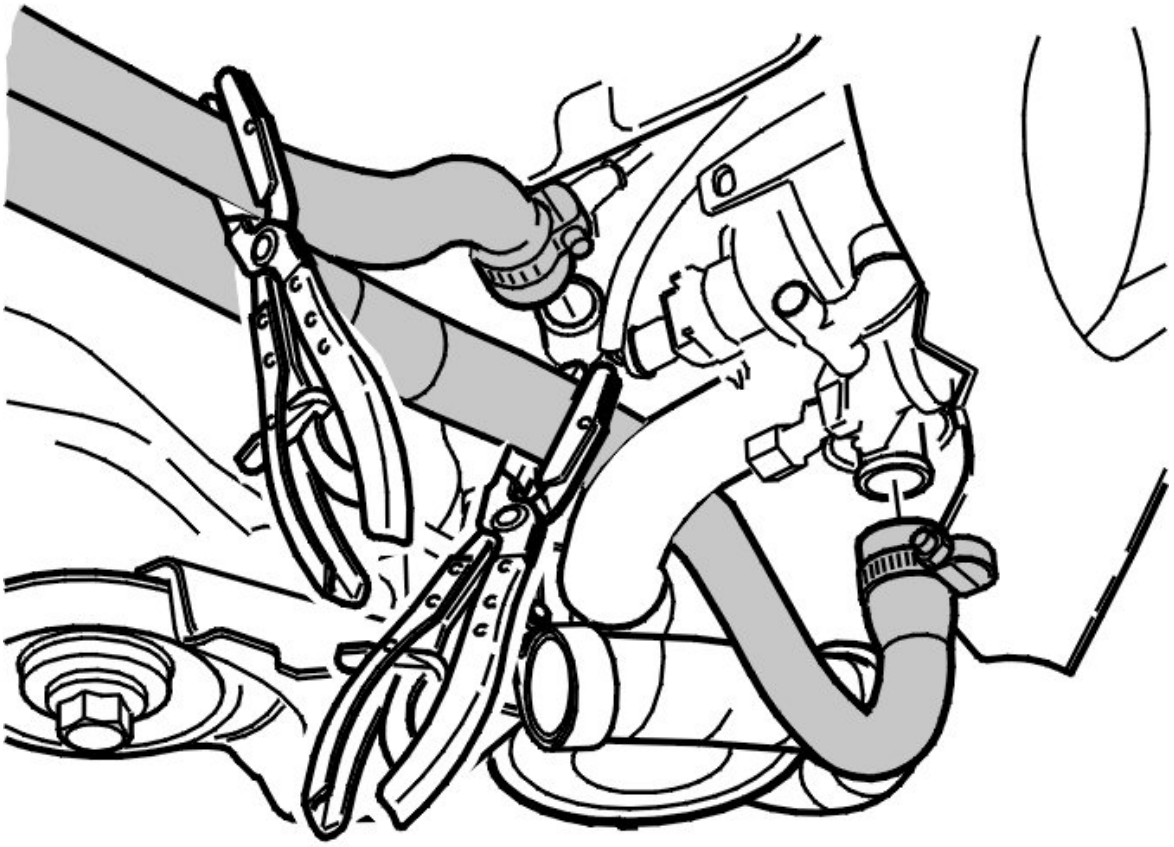
As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparations

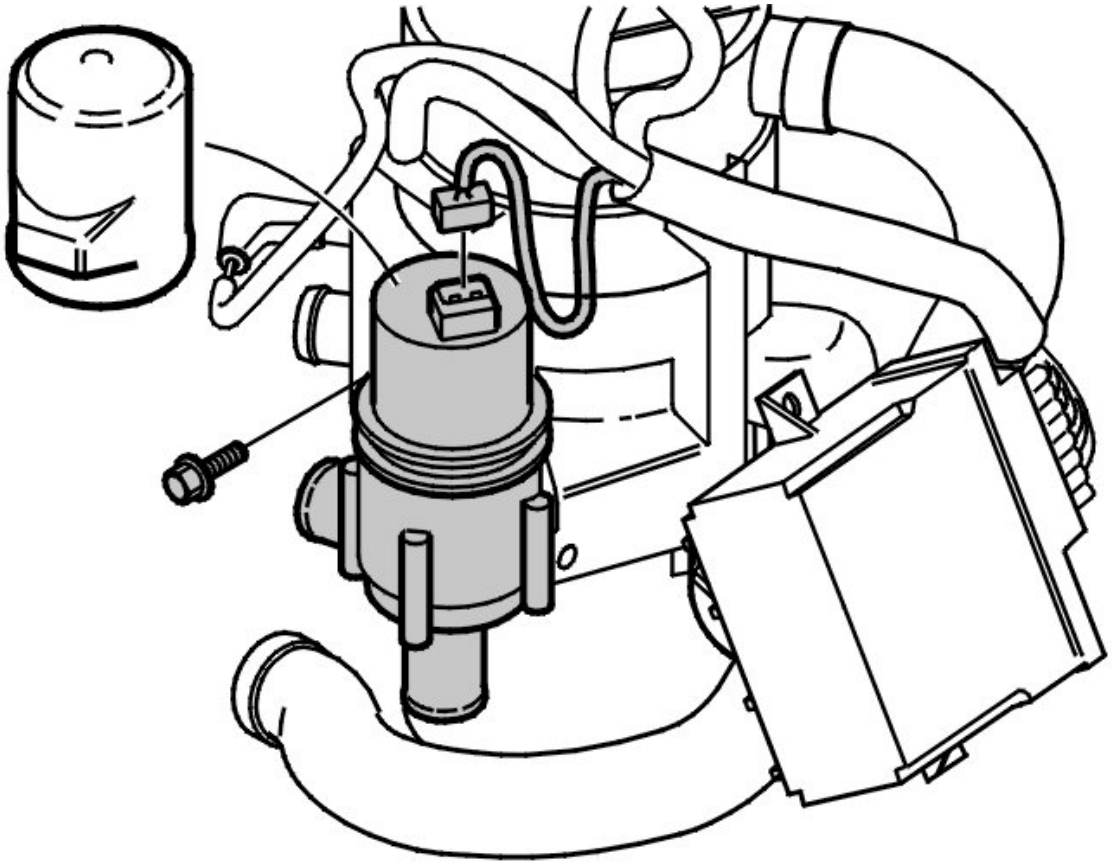
Remove:

- the air baffles
- the bumper cover. See**(S80)**, Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(V70)**, Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(V70XC)**or Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(S60)**
- the control module. See Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair. Allow the cable harness to remain on the control module.

Removing the water pump for the engine coolant heater



Install hose clips on both the engine coolant hoses by the heat exchanger.
Position a container under the heater.
Disconnect the hoses.



Cut off the tie strap holding the protective cap over the control module. Lift off the protective cap.

Remove:

- the connector
- the nut for the water pump mounting. Hold the damper while removing the water pump.

Note! Note the position of the water pump on the holder.

Installing the water pump for the engine coolant heater

Position the water pump (according to the noted position) in the shutter using the shaped hoses.

Install:

- the water pump mounting using a nut (1xM6). Tighten to **3 Nm**
- the connector
- the protective cap
- a new tie strap.

Tighten the hose clamps for both the engine coolant hoses.
Install the control module. See Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair.

Final check

Note! Start the engine and let it idle for a few seconds before starting the heater.

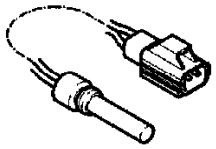
Test run the heater. Check the function of the heater. See Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.
Check for leakage in the engine coolant hoses or fuel lines.
Top up the coolant if necessary.
Check that no diagnostic trouble codes (DTC) have been stored during the repair work.

Install:

- the bumper cover. See**(S80)**, Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(V70)**, Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(V70XC)**or Casing, bumper front, replacing See: Body and Frame/Bumper/Front Bumper/Front Bumper Cover / Fascia/Service and Repair **(S60)**
- the air baffle.

Coolant Level Sensor: Description and Operation

Engine Coolant Level Sensor



The function of the engine coolant level sensor is to alert the driver if the engine coolant level in the expansion tank is too low.

The sensor is a magnetic reed switch, which is enclosed in a pipe on the bottom of the expansion tank. Around the pipe, on the inside of the expansion tank is a float. This float contains a magnet. When the engine coolant level is above minimum, the float is too high in the tank to affect the switch. However if the engine coolant level falls below the minimum level, the magnetic field acts on the switch.

The sensor is supplied with voltage (signal) from the Engine Control Module (ECM) and grounded in chassis. When the engine coolant level in the expansion tank is over a certain level the circuit closes, which produces a low signal. When the engine coolant level is below a certain level the circuit is opened by the engine coolant level sensor, which produces a high signal. When the engine control module (ECM) detects a high signal the information about low engine coolant level is transmitted via the Controller area network (CAN) to the driver information module (DIM), which warns the driver.

NOTE: There are no functions controlled by the engine which are directly connected to the low coolant level warning lamp. The Engine Control Module (ECM) only transfers the signal which is used by the Driver Information Module (DIM).

The following applies from model year 2005-

The engine coolant level sensor signal can be read using VIDA.

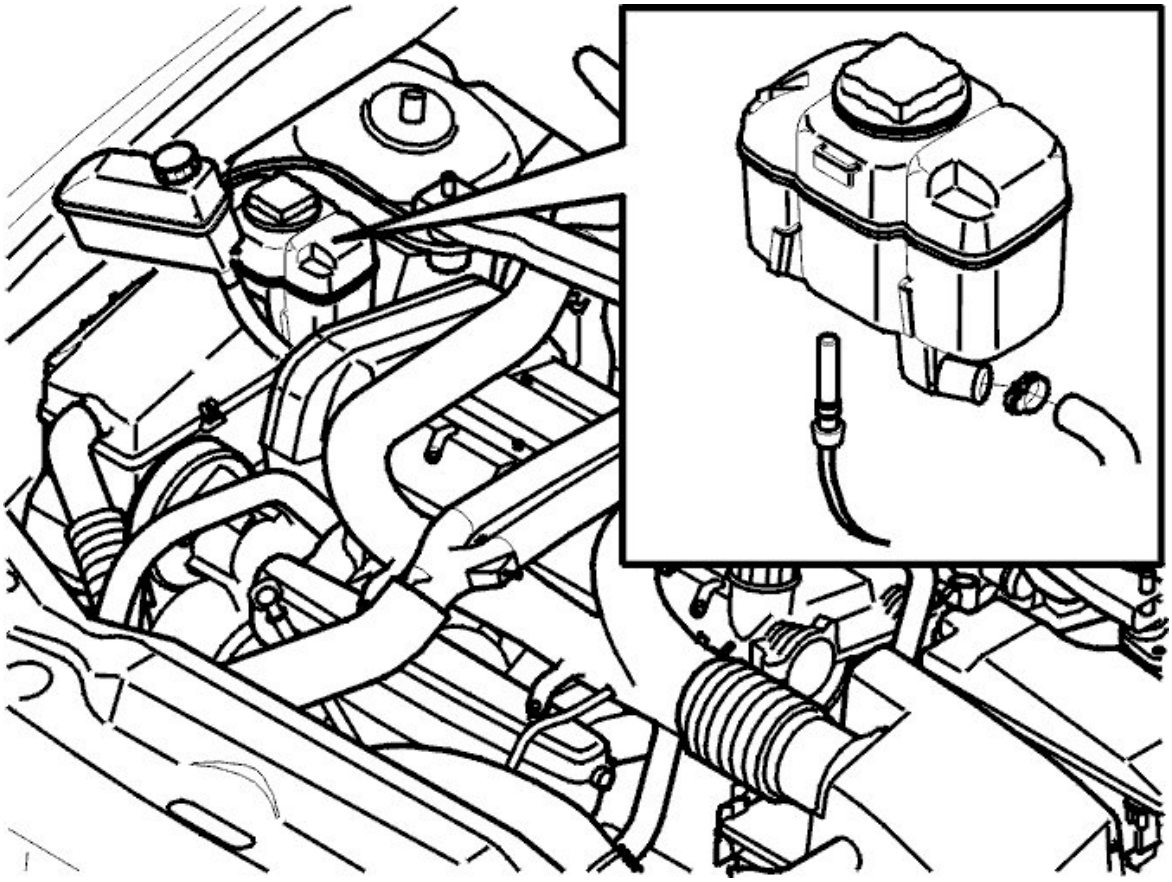
The engine control module (ECM) cannot diagnose the engine coolant level sensor.

Coolant Level Sensor: Service and Repair

Level sensor, engine coolant, replacing

Removal

Engine coolant level sensor



- Remove the fluid reservoir for the power steering pump from the bracket. Place it to one side. To remove the fluid reservoir, see
- Disconnect the expansion tank and place to one side
- Remove the sensor using a screwdriver
- Disconnect the connector.

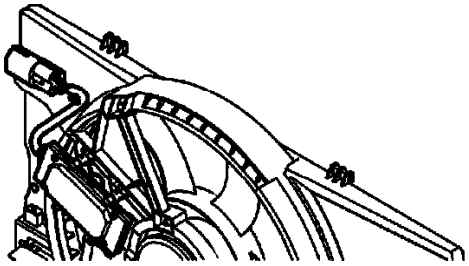
Installation

Engine coolant level sensor

In reverse order.

Radiator Cooling Fan: Description and Operation

Engine Cooling Fan (FC) / Engine Cooling Fan (FC) Control Module



The engine cooling fan (FC) has two functions. One is to cool the engine compartment, the other is to cool the condenser when the air conditioning (A/C) compressor is working.

The engine control module (ECM) transmits a pulse width modulated (PWM) signal to the engine cooling fan (FC) control module. The control module then activates the fan at different speeds.

The speed of the engine cooling fan (FC) is determined by the engine control module (ECM), depending on the coolant temperature (based on the signal from the engine coolant temperature (ECT) sensor) and the vehicle speed.

The temperature conditions for engagement of the different engine cooling fan (FC) stages may vary slightly, depending on the engine variant and the equipment level.

The temperature conditions apply when:
- the A/C is off
- no faults are detected by the Engine Control Module (ECM).

WARNING: The engine cooling fan (FC) may start itself for some time after the engine has been switched off. This is normal.

The engine cooling fan (FC) and its control module are behind the radiator.

The engine control module (ECM) can diagnose the engine cooling fan (FC). The fan can be activated using VIDA.

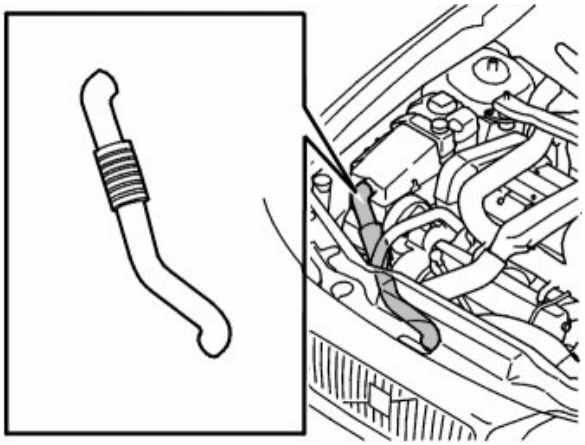
Radiator Cooling Fan: Service and Repair

Engine cooling fan (FC), replacing

Removing the engine cooling fan (FC)

Remove the intake pipe for the air cleaner housing (ACL). Disconnect both the connectors for the engine cooling fan (FC).

Remove:
- The evaporative emission system (EVAP) valve from the engine cooling fan (FC) shroud
- the hose clamps and charge air pipe/hose on the right-hand side (turbo charged engines only).



Remove the four tie straps that hold the cable harness secure at the fan shroud.

Note! Certain vehicles have three tie straps and a clip holding the cable harness at the fan shroud.

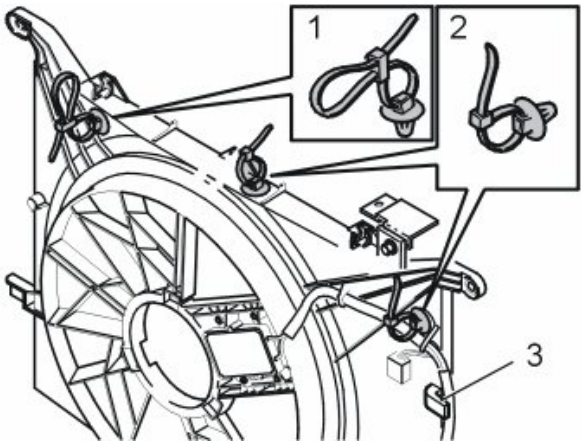
Lift out the hose for the expansion tank from the holders on top of the fan shroud

Remove:
- the cool box plastic hose from the fan shroud.
- both the screws holding the fan shroud.

Release the hose for the coolant reservoir from the fan shroud.

Installation

Installing the engine cooling fan (FC) and fan shroud

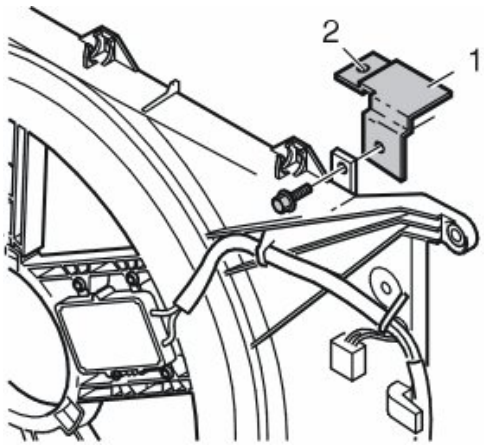


Carefully lower the fan shroud and align with the holders. Route the cable harness behind the holder (3).
Tighten both the mounting screws
Press the hose down from the expansion tank into the holder on the fan shroud
Transfer the clips from two tie-straps to the tie straps that have two catches (1).
Secure the cable harness by the fan shroud using tie straps (1) and (2).

Install:

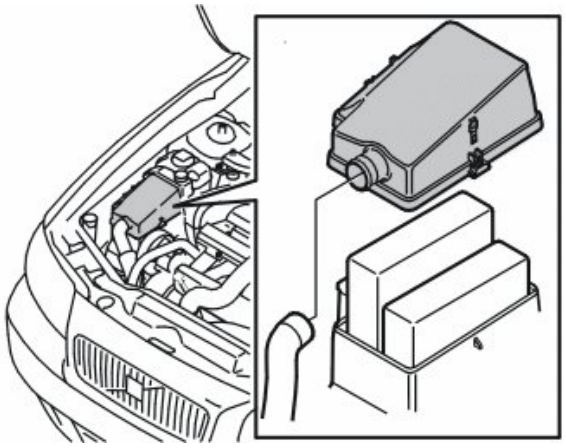
- the canister purge (CP) valve
- the hose clamp and charge air pipe/hose on the right-hand side (turbo charged engines only)
- the intake manifold to the air cleaner (ACL) housing.

Connect the engine cooling fan (FC) connectors.



Transfer the bracket (1) to the new fan shroud.
Install the connectors for the fan on the bracket using the holder from the service kit (2).

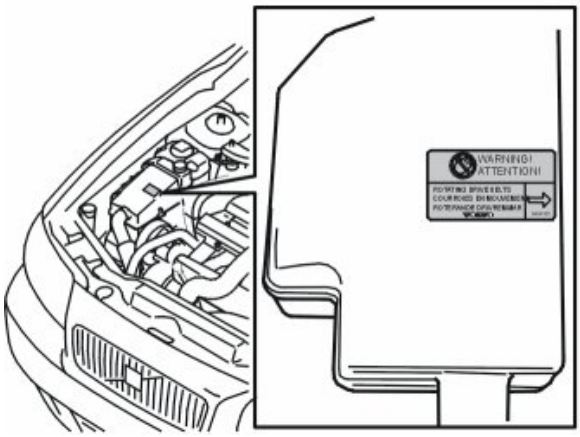
Replacing the cool box, certain versions only



Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Only applies to vehicles with chassis number:	
S60	000148-017811
S80	116812-184211
V70 (00-)	000929-082669
V70XC (01-)	000160-016110

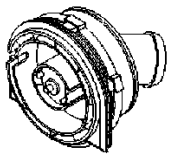
For vehicles with chassis number according to the table: Replace the cover on the cool box (Engine control module (ECM), Transmission control module (TCM)).



Apply the decal to the cover of the cool box.

Engine Compartment Fan: Description and Operation

Cooling Fan For Control Modules, Turbocharger (TC) (Certain Markets Only)



The function of the cooling fan is to cool the control modules in the control module box in the engine compartment. The control modules may be damaged if they overheat.

The engine control module (ECM) activates the fan depending on the signal from the engine coolant temperature (ECT) sensor and the temperature sensor in the control module.

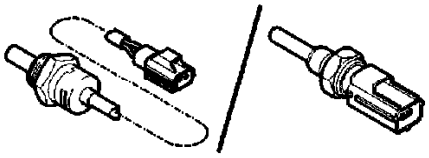
The cooling fan is in the hose between the control module box and the firewall.

The engine control module (ECM) can diagnose the engine cooling fan (FC). The fan can be activated using VIDA.

A diagnostic trouble code (DTC) is stored if the temperature in the engine control module (ECM) gets too high.

Coolant Temperature Sensor/Switch (For Computer): Description and Operation

Engine Coolant Temperature (ECT) Sensor



The engine coolant temperature (ECT) sensor checks the temperature of the engine coolant. The temperature of the engine coolant is required so that the engine control module (ECM) can regulate:

- the injection period
- the idle speed
- the engine cooling fan (FC)
- the ignition advance
- engagement and disengagement of the A/C compressor
- diagnostic functions.

The sensor is a negative temperature coefficient (NTC) type which is supplied with power from the control module (signal) and is grounded in the control module.

The resistance in the sensor changes depending on the temperature of the coolant. Depending on the resistance in the sensor, a voltage (signal) is transmitted to the Engine Control Module (ECM).

At **0 degrees C**, the voltage is approximately **4.0 V**. At **100 degrees C** the voltage is approximately **0.5 V**. Low temperature results in high voltage (high resistance), high temperature in low voltage (low resistance).

The engine coolant temperature (ECT) sensor is located beside the thermostat.

The engine control module (ECM) can diagnose the engine coolant temperature (ECT) sensor.

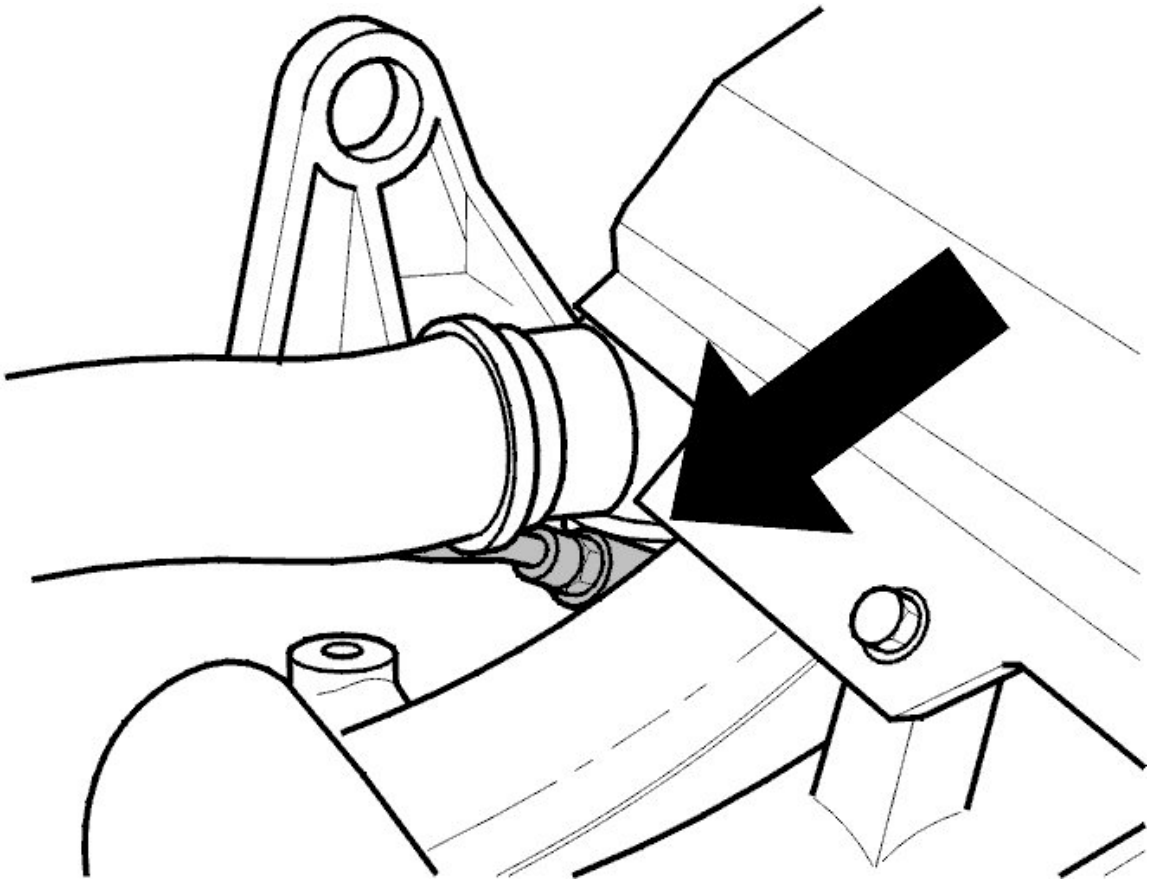
The sensor value can be read off using VIDA.

Coolant Temperature Sensor/Switch (For Computer): Service and Repair
Engine Temperature Sensor

Engine temperature sensor

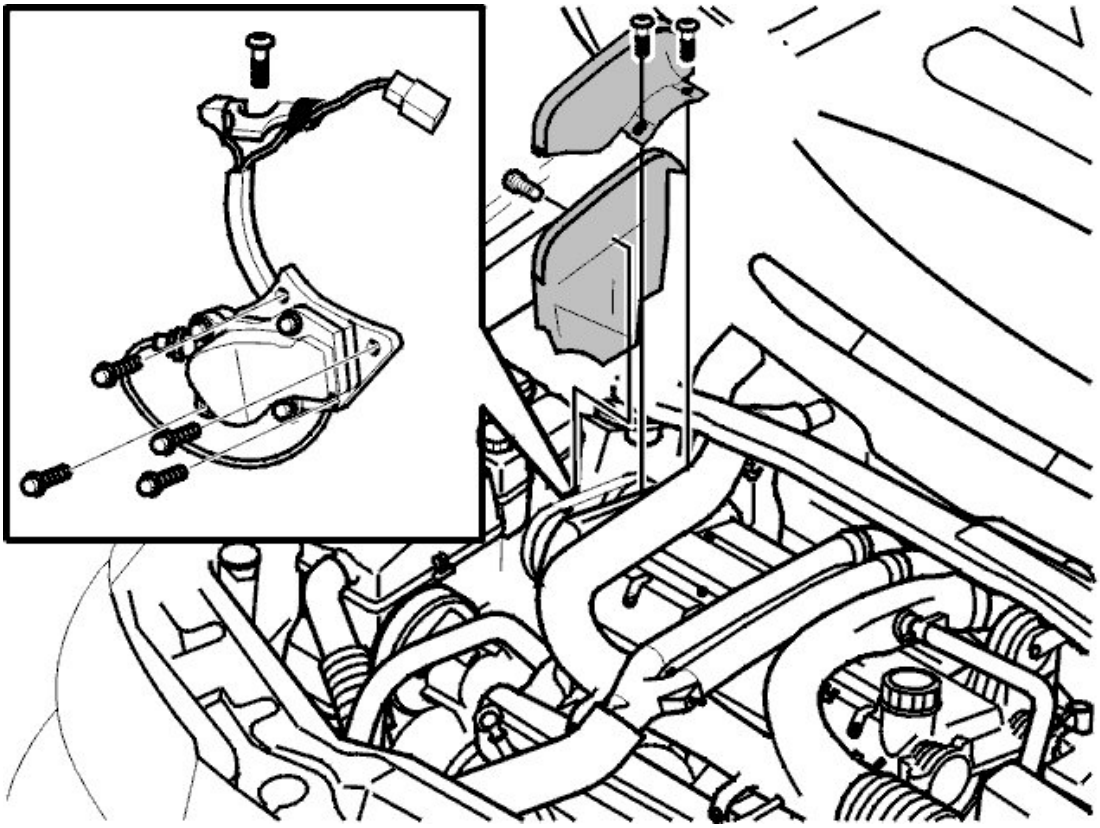
Removal

Engine temperature sensor, 5-cylinder



- Jack up the car.
- Remove protection cover from under engine.
- Drain the coolant as described in Replacing radiator/charge air cooler (CAC) See: Powertrain Management/Fuel Delivery and Air Induction/Turbocharger/Intercooler/Service and Repair.
- Lower the car.
- Release coolant hose from thermostat housing using pliers.
- Remove thermostat housing.
- Remove sensor.

Engine temperature sensor, 6-cylinder



- Jack up the car.
- Remove protection cover from under engine.
- Drain the coolant as described in Radiator / charge air cooler (CAC), replacement See: Powertrain Management/Fuel Delivery and Air Induction/Turbocharger/Intercooler/Service and Repair/Radiator / Charge Air Cooler (CAC), Replacement.
- Lower the car.
- Loosen oil reservoir for servo pump as described in.
- Remove coolant reservoir and put it to one side.
- Remove screws and outer/upper timing-gear casing.
- Remove screws and wire channel.
- Disconnect connector.
- Remove 4 screws and thermostat housing.
- Remove sensor and wires.

Installation

Engine temperature sensor, 6-cylinder

- Install thermostat housing sensor.
- Position wires in slot on thermostat housing.

Note! The white marks should be positioned in lower opening of slot, from underneath.

- Position gasket on thermostat housing correctly and install thermostat housing using two of the screws.
- Position thermostat housing correctly and tighten the four screws.
- Position wire channel correctly and position wire in channel.
- Tighten screw on wire channel.
- Connect the connector.
- Install outer/upper timing-gear casing.
- Install coolant reservoir.
- Install oil reservoir for servo pump as described in.

Follow-on work, 6-cylinder

- Fill up coolant.
- Warm the engine until the thermostat opens.

Switch engine off and check the level. Re-fill if necessary.

- Check for leaks.
- Check in VIDA vehicle communication (read-out of parameter values), for current engine system, that the engine temperature shown appears correct.

Engine temperature sensor, 5-cylinder

Install in reverse order.

Follow-on work, 5-cylinder

- Fill up coolant.
- Warm the engine until the thermostat opens.

Switch engine off and check the level. Re-fill if necessary.

- Check for leaks.
- Check in VIDA vehicle communication (read-out of parameter values), for current engine system, that the engine temperature shown appears correct.

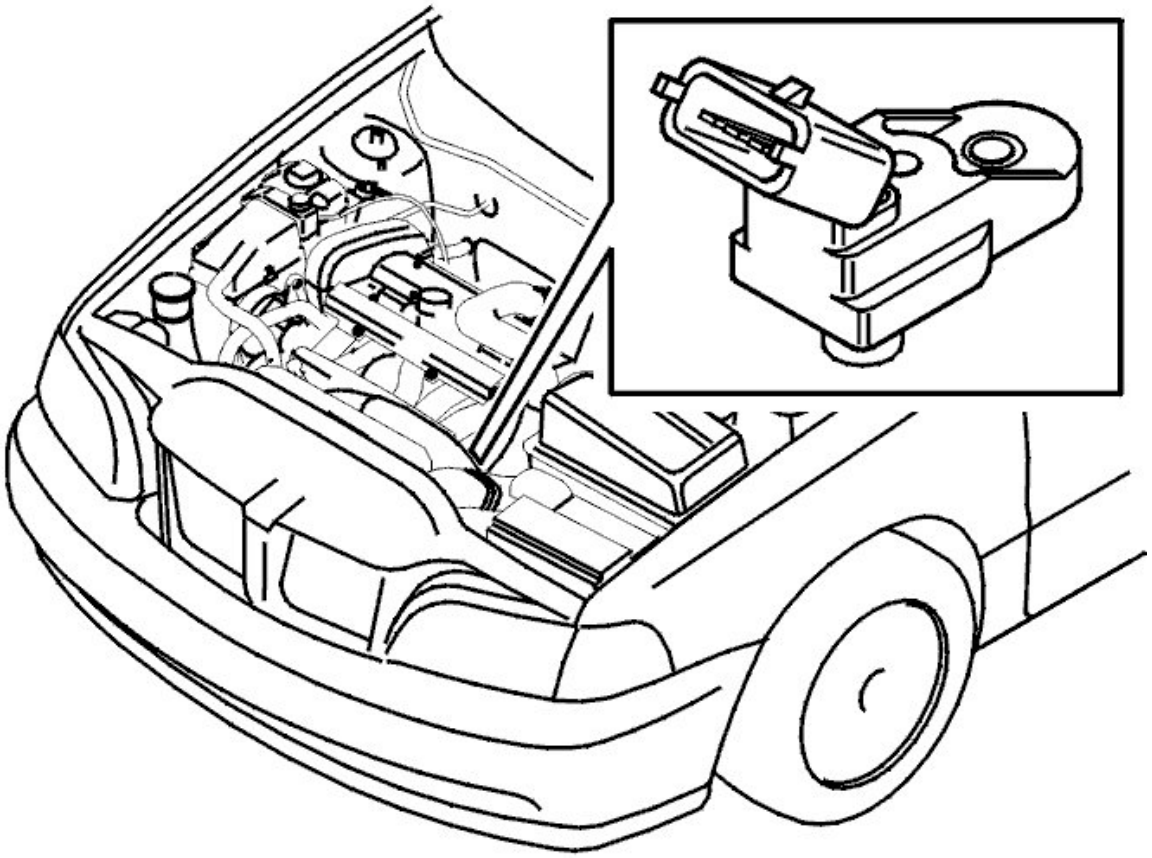
Coolant Temperature Sensor/Switch (For Computer): Service and Repair
Temperature and Pressure Sensors, Replacing

Temperature and pressure sensors, replacing

Removal and Installation

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the temperature and pressure sensors



Remove the boost pressure sensor which is on the pipe coming from the charge air cooler (CAC).

Installing the temperature and pressure sensors

Install a new sensor.

Coolant Temperature Sensor/Switch (For Computer): Service and Repair
Thermostat / Temperature Sensor, Engine Coolant, Replacing

Thermostat / temperature sensor, engine coolant, replacing

Special tools:

951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve
999 5722 Wrench See: Tools and Equipment/999 5722 Wrench
999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
951 2953 Cover See: Tools and Equipment/951 2953 Cover
951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removing / installing

Removing the engine coolant temperature (ECT) sensor

Remove:
- the upper timing belt cover. Disconnect the connector for the temperature sensor
- the temperature sensor from the thermostat housing. Use 951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve.

Note! Put paper underneath the sensor to prevent coolant spillage.

Installing the engine coolant temperature (ECT) sensor

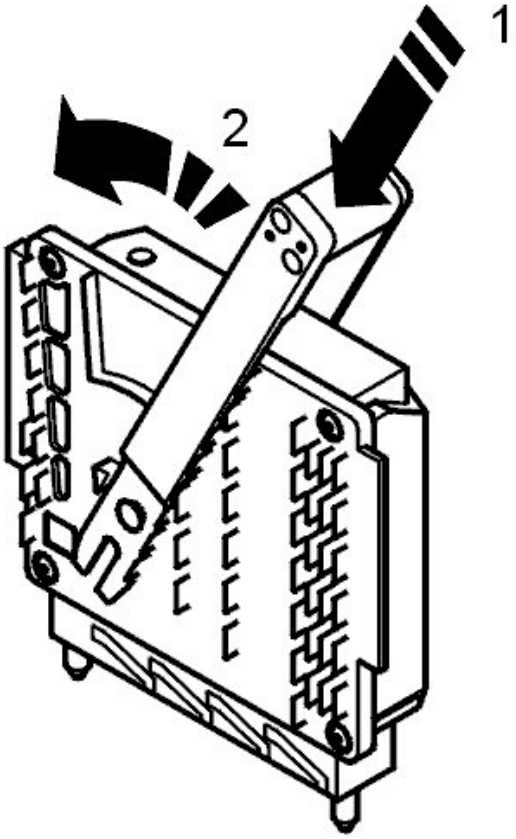
Install:
- the sensor with a new seal. Tighten. See: Tightening torque See: Engine/Specifications/Tightening Torque. Use: 951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve
- the upper timing belt cover.

Removal

Preparation

Remove the cap from the expansion tank. Install a hose clamp on the upper coolant hose.
The vehicle must be raised for this work. See: Jacking points, body See: Maintenance/Vehicle Lifting/Service and Repair. Remove the lower cover plate.
Position a container under the engine drain cock. Drain **2 liters** of engine coolant.
Close the cock. Install the lower protective panel.
Lower the vehicle.

Removing the engine control module (ECM)

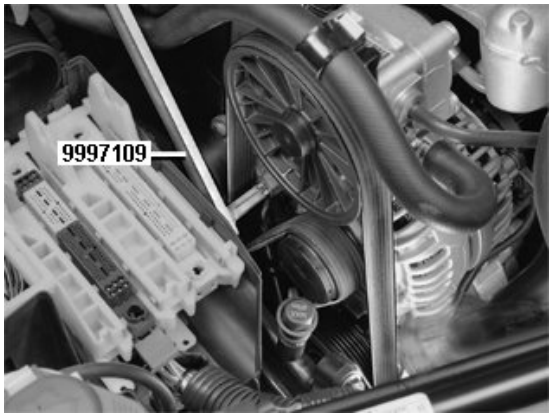


Ignition off. Wait for 2 minutes.

Caution! Do not touch the terminal pins on the control module with fingers. Static electricity may damage components in the engine control module (ECM).

Remove the cover over the control module box. Put the cover to one side.
Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
Move the upper section of the tool backwards as far as it will go. Pull up the tool. Carefully pull up the control module.
For vehicles with automatic transmissions repeat the above work.
Remove the surround from around the control module box.

Removing the auxiliaries belt



Note! Make a note of the routing of the belt.

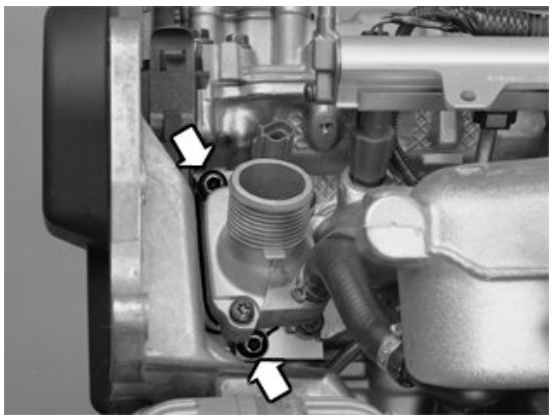
Remove:

- the auxiliaries belt. Use 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
- the upper timing belt cover.

Removing the power steering pump

Remove the 3 x screws for the power steering pump. Place the power steering pump to one side.

Removing the thermostat housing



Remove:

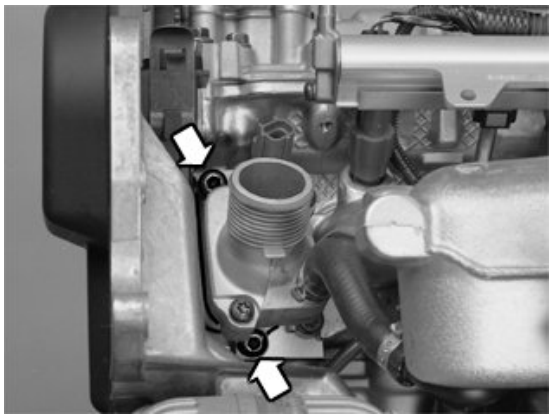
- the hose clamp to the upper radiator hose. Disconnect the hose from the thermostat housing
- the connector from the temperature sensor
- the 2 x screws for the thermostat housing at the section against the cylinder head
- the thermostat housing from the cylinder head
- the hose clamp for the water hose for heating crankcase ventilation.

Transfer the temperature sensor to the new thermostat housing.

Installation

Note! For tightening torques, see: Tightening torque See: Engine/Specifications/Tightening Torque.

Installing the thermostat housing



Install:

- the hose for the water heated crankcase ventilation. Before installing the thermostat housing, use a new hose clamp
- a new gasket
- the thermostat housing assembly. Tighten the screws
- the upper radiator hose. Tighten the hose clamp.

Connect the connector for the temperature sensor.

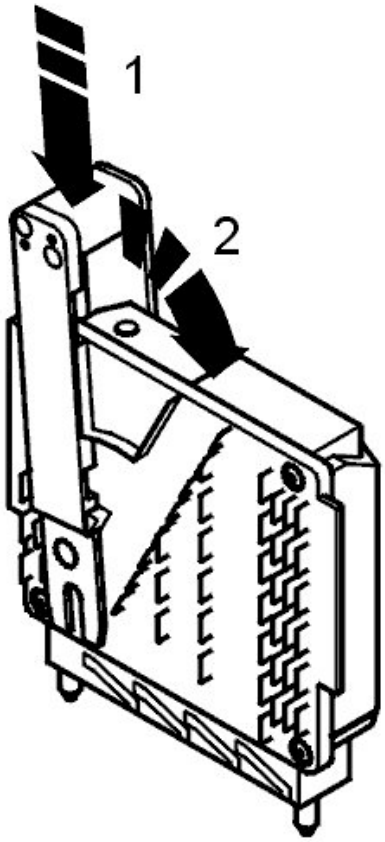
Finishing

Note! Ensure that the auxiliaries belt is correctly positioned on all the pulleys.

Install:

- the power steering pump. Tighten the 3 x screws
- the auxiliaries belt. Use 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
- the upper camshaft cover.

Installing control modules



Caution! Check that no pins or sockets are damaged on the connector.

Install the surround for the control module box.
Carefully press the control module down into the grooves on the inside of the control module box. Press to the limit position
Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
Move the upper section of the tool forwards as far as it will go. Pull up the tool.
Press the cover into place over the control modules. Check that the air ducts are correctly positioned.

Finishing

Remove the hose clip. Refill with coolant. Use filling equipment 951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir and cover 951 2953 Cover See: Tools and Equipment/951 2953 Cover. Install the cap on the expansion tank.
Test drive the engine until the thermostat has opened. Check for leakage. Top-up the coolant.

Heater Core: Service and Repair
L.H.D.

Heat exchanger, replacing

Special tools:

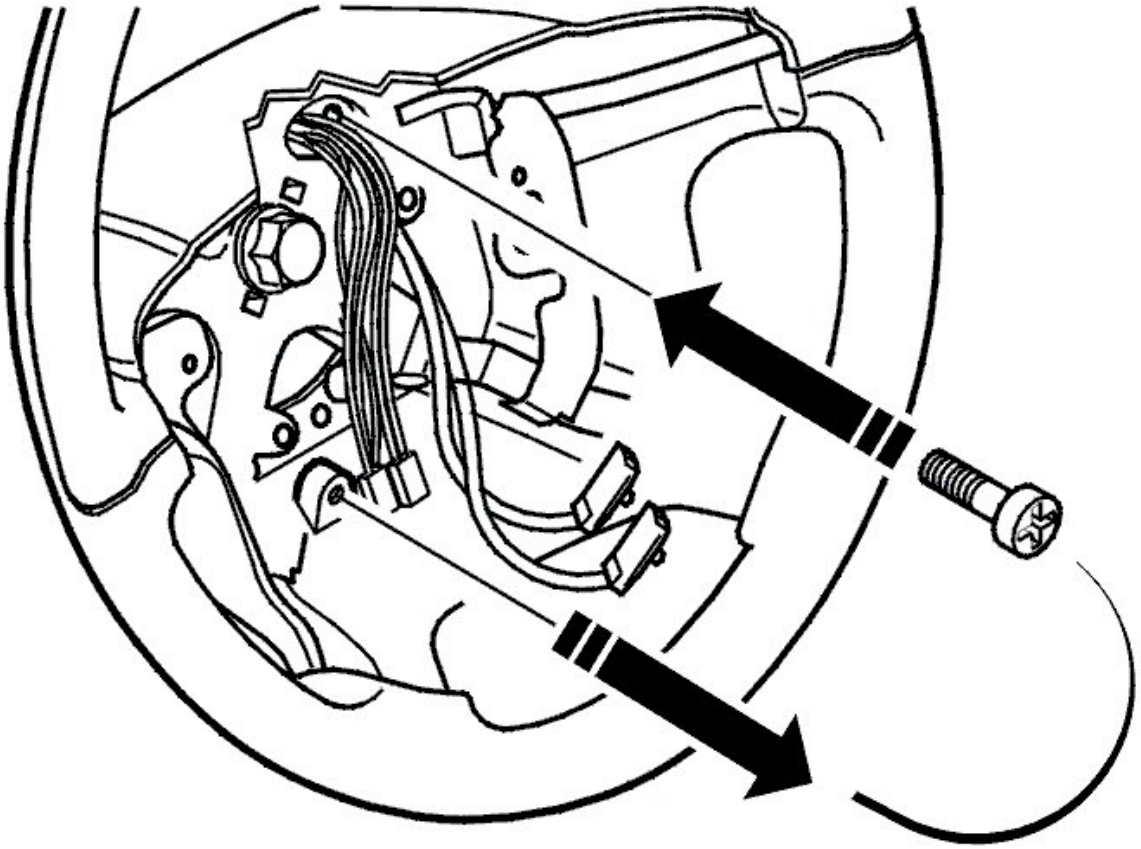
115 8957 HOSE PLIERS See: Tools and Equipment/115 8957 Hose Pliers
951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

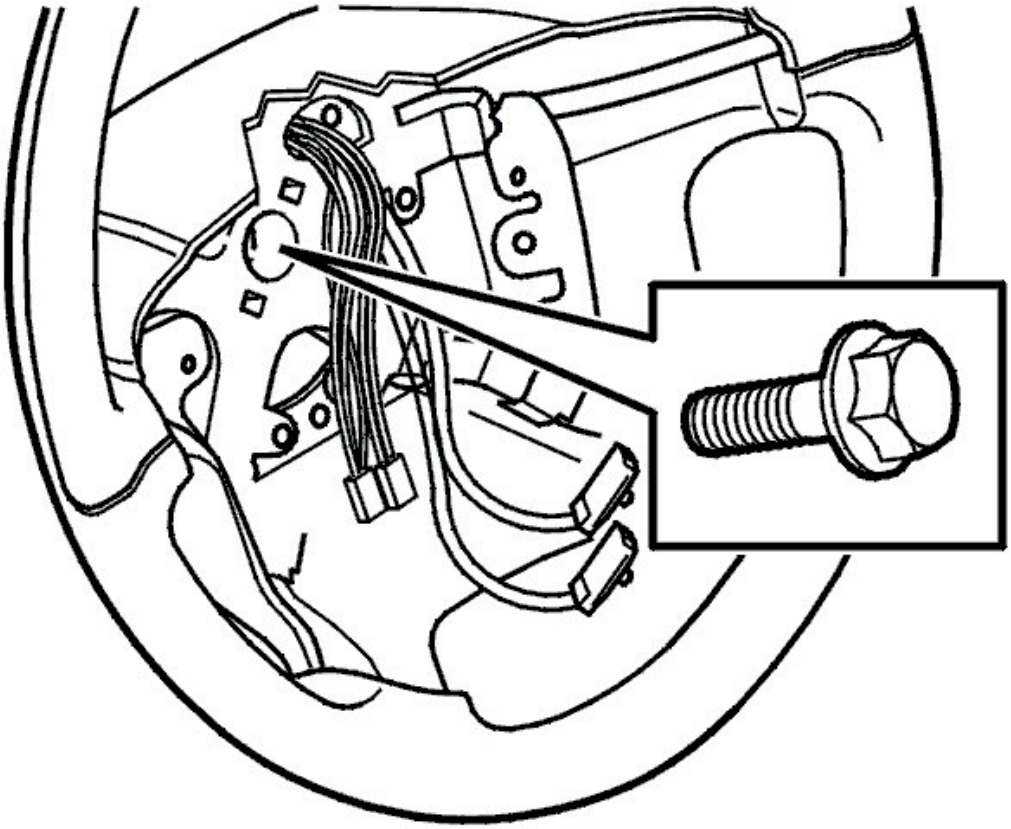
Preparatory work

Caution! Cars with DSTC systems. When working on the steering or wheel alignment, the adaptation of the steering wheel angle must be set to zero using the diagnostic tool. Test drive according to: Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Removing the steering wheel



Remove the driver's airbag module according to: Airbag driver and passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair.
Remove the lock screw from its "parking hole" in the steering wheel and install it in the contact reel.



Remove the steering wheel screw.
Make sure that the front wheels and steering wheel are pointing straight ahead
Remove the steering wheel.

Note! Take care to ensure that the connector does not catch on the steering wheel during removal.

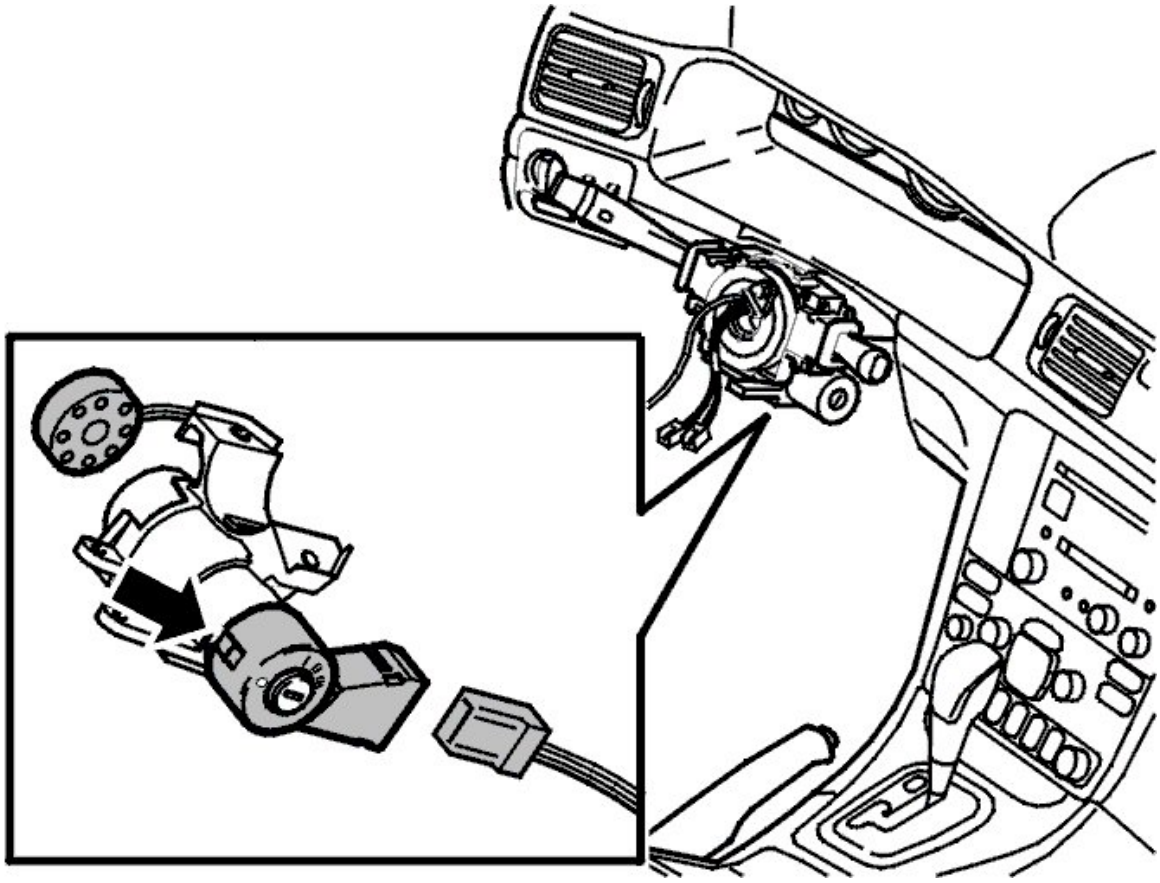
Removing steering column covers

Remove the steering column covers. See: Combined instrument panel surround See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Combined Instrument Panel Surround.

Removing soundproofing panels

Remove the soundproofing panel. See: Soundproofing panel, replacing See: Body and Frame/Interior Moulding / Trim/Dashboard / Instrument Panel/Service and Repair/Soundproofing Panel, Replacing.

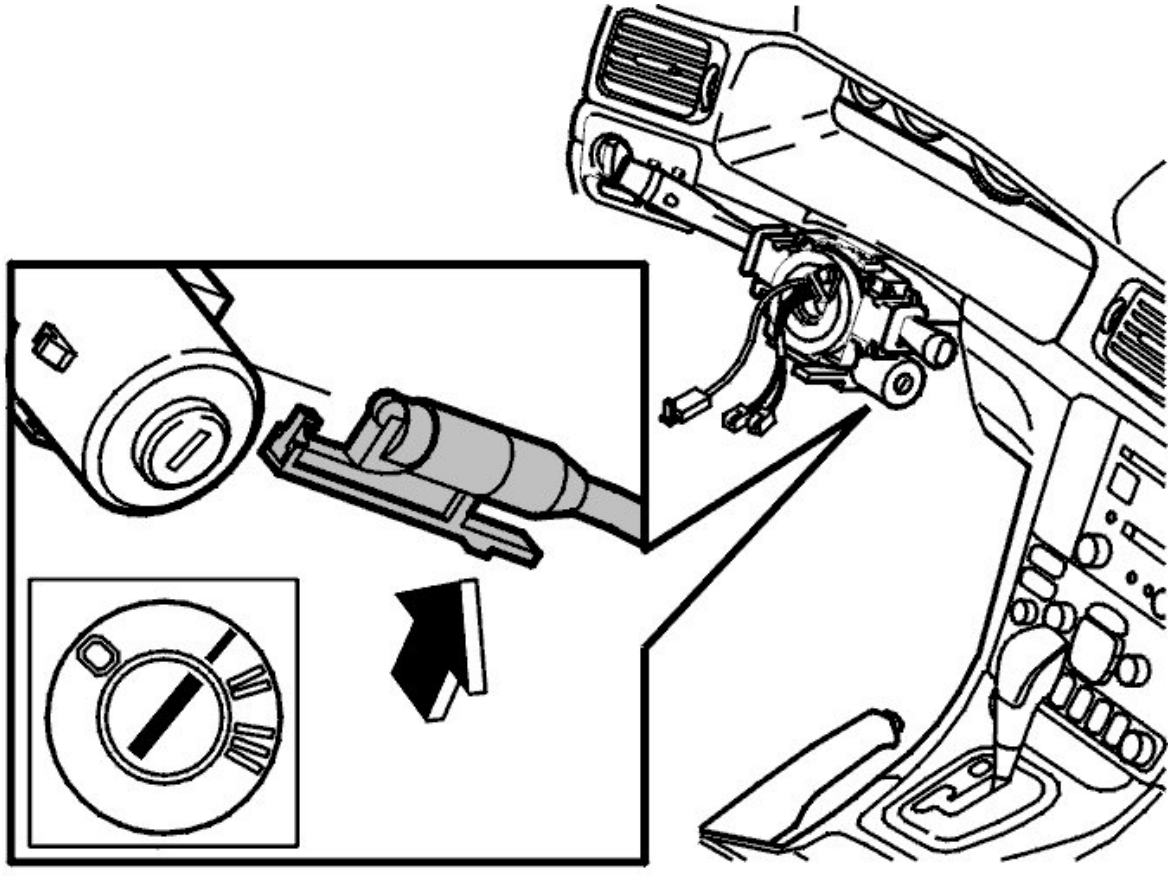
Removing the steering wheel lock module



Disconnect the connectors.
Press in the snap fastener and remove the steering wheel lock unit.

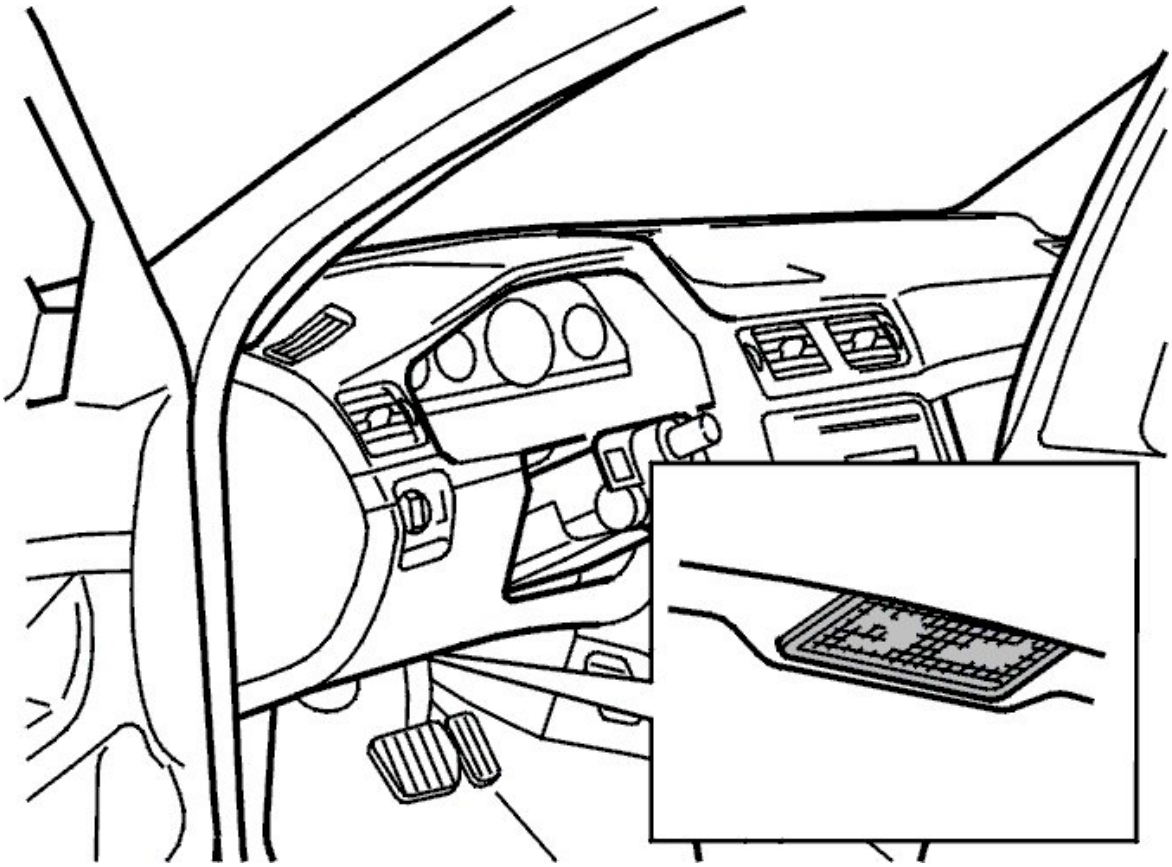
Removing cable for key interlock

Note! Applies to cars with automatic transmission.

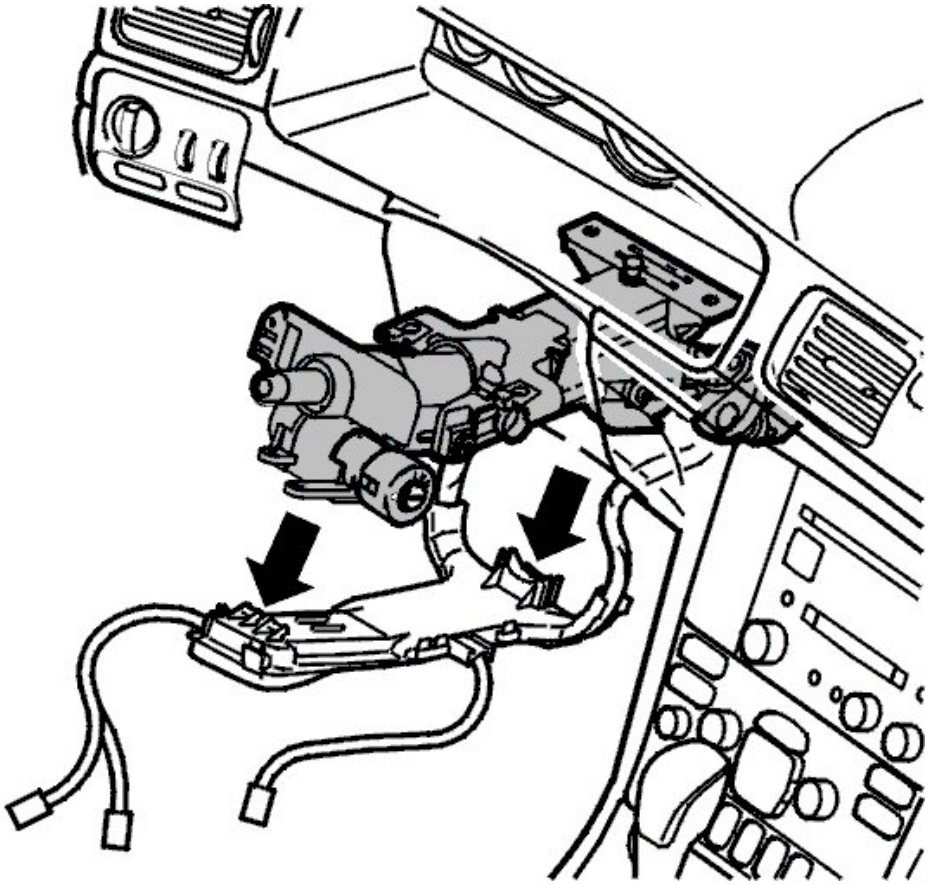


Remove the ignition switch interlock cable.
Move the ignition key to position I.
Press up the lock facing and pull out the cable.

Removing the lever console

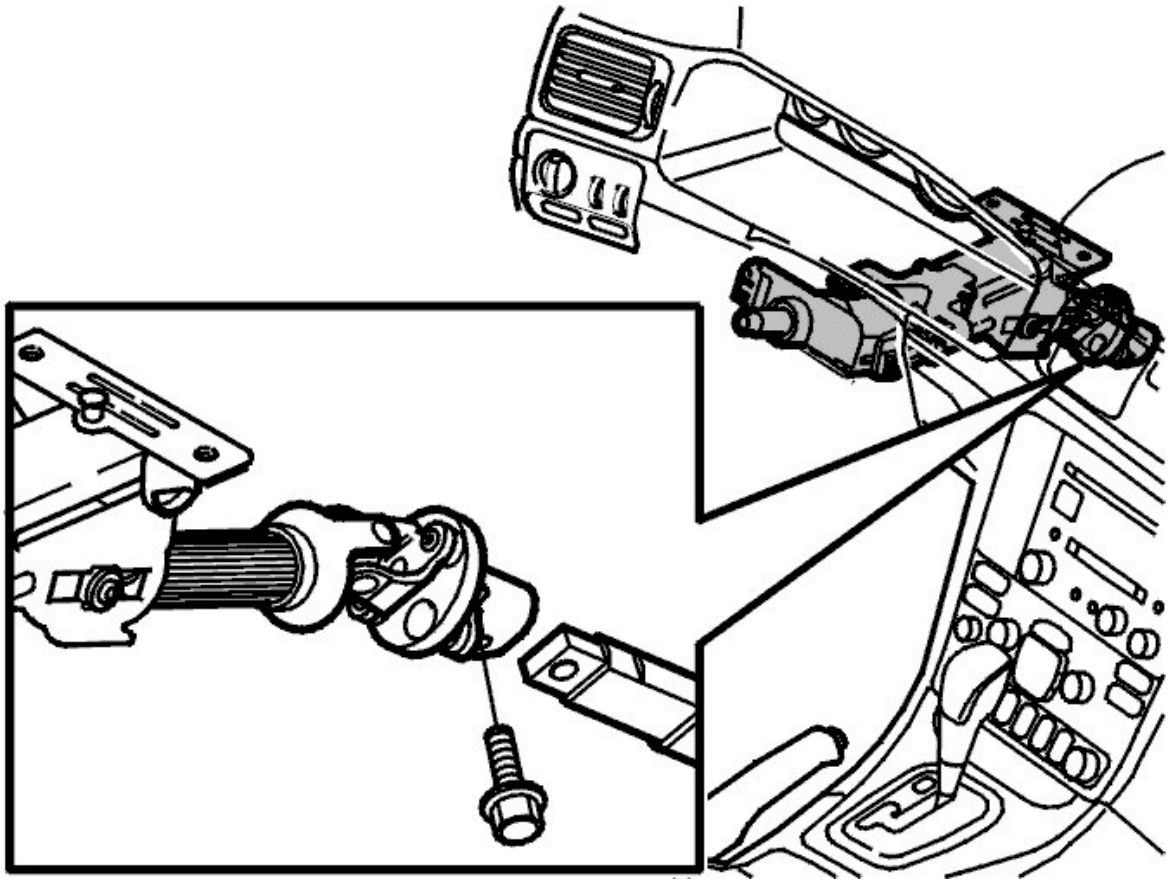


See Gear selector assembly and steering wheel module See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Gear Selector Assembly and Steering Wheel Module.
Remove the floor lighting.



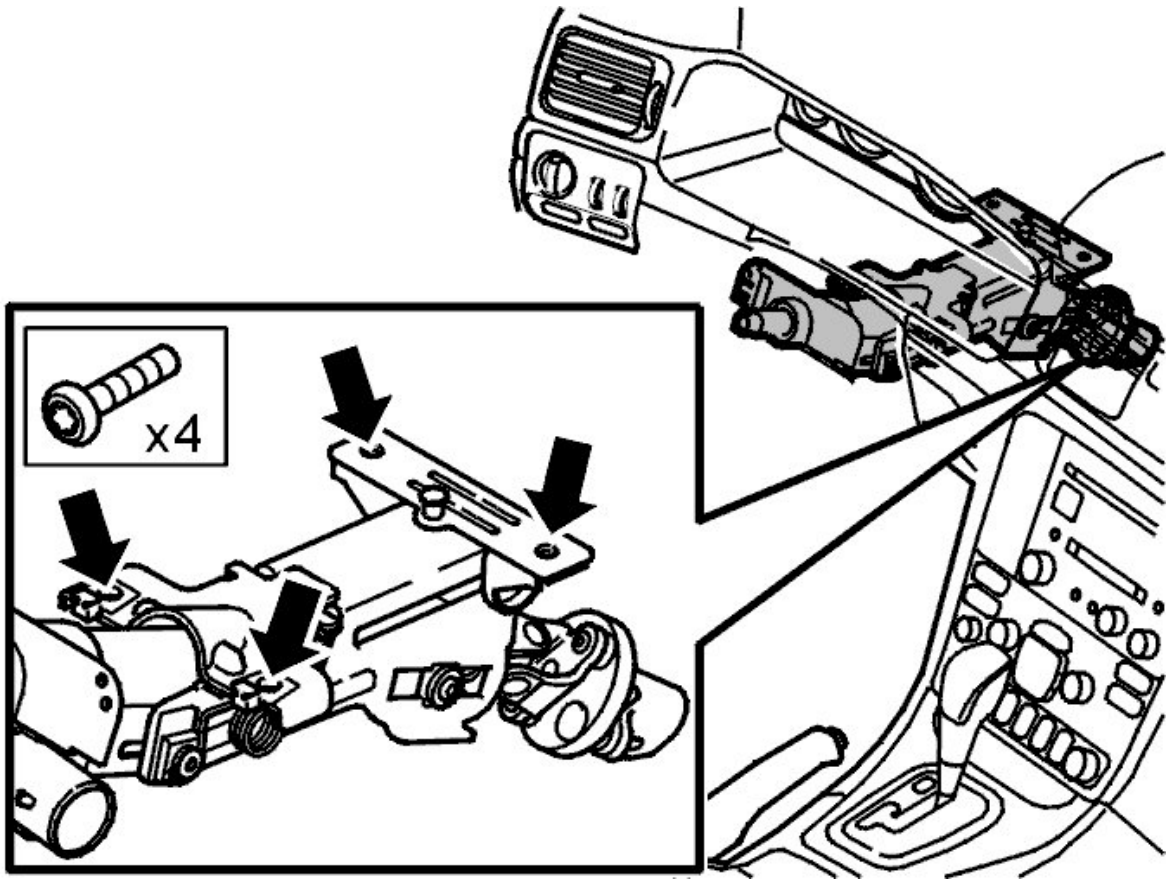
Loosen the cable casing from the steering column and lay it on the floor.

Removing universal joint from lower steering shaft

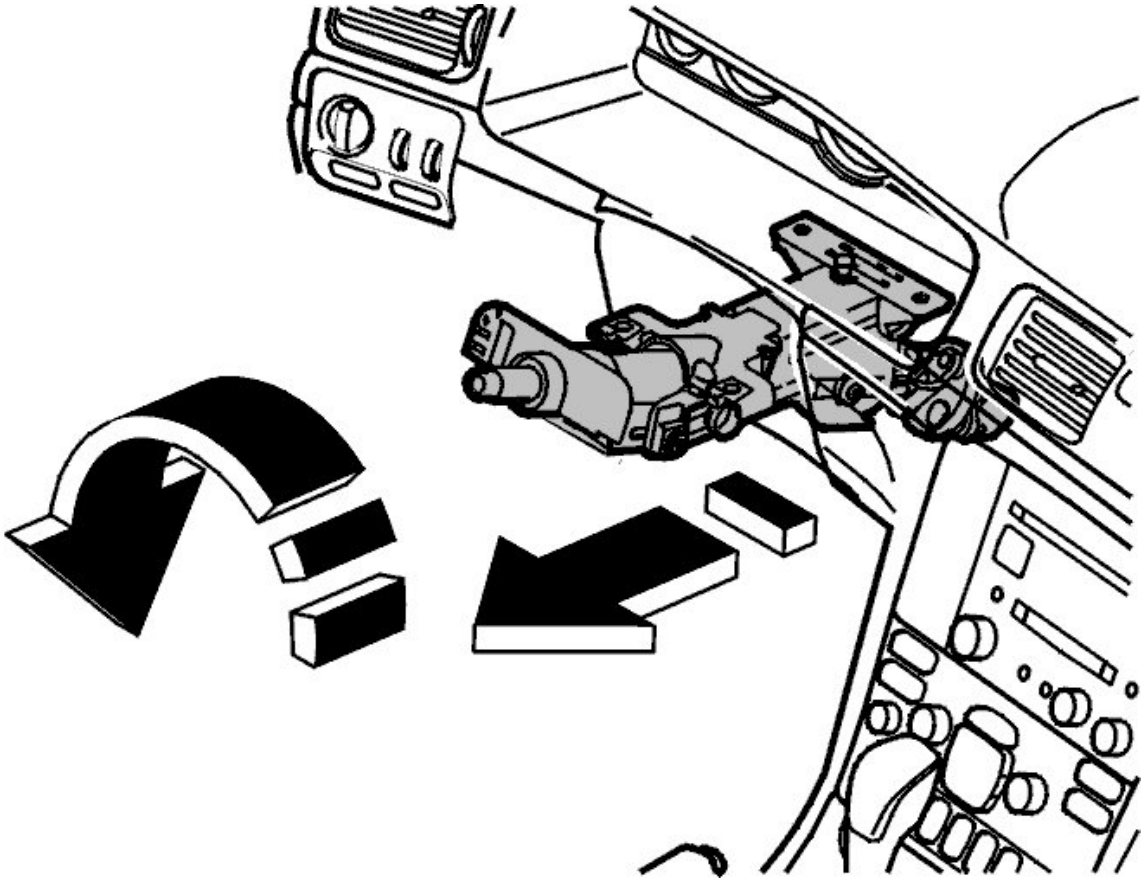


Remove the screw for the lower steering shaft's attachment in the universal joint.
Remove the universal joint from the steering shaft.

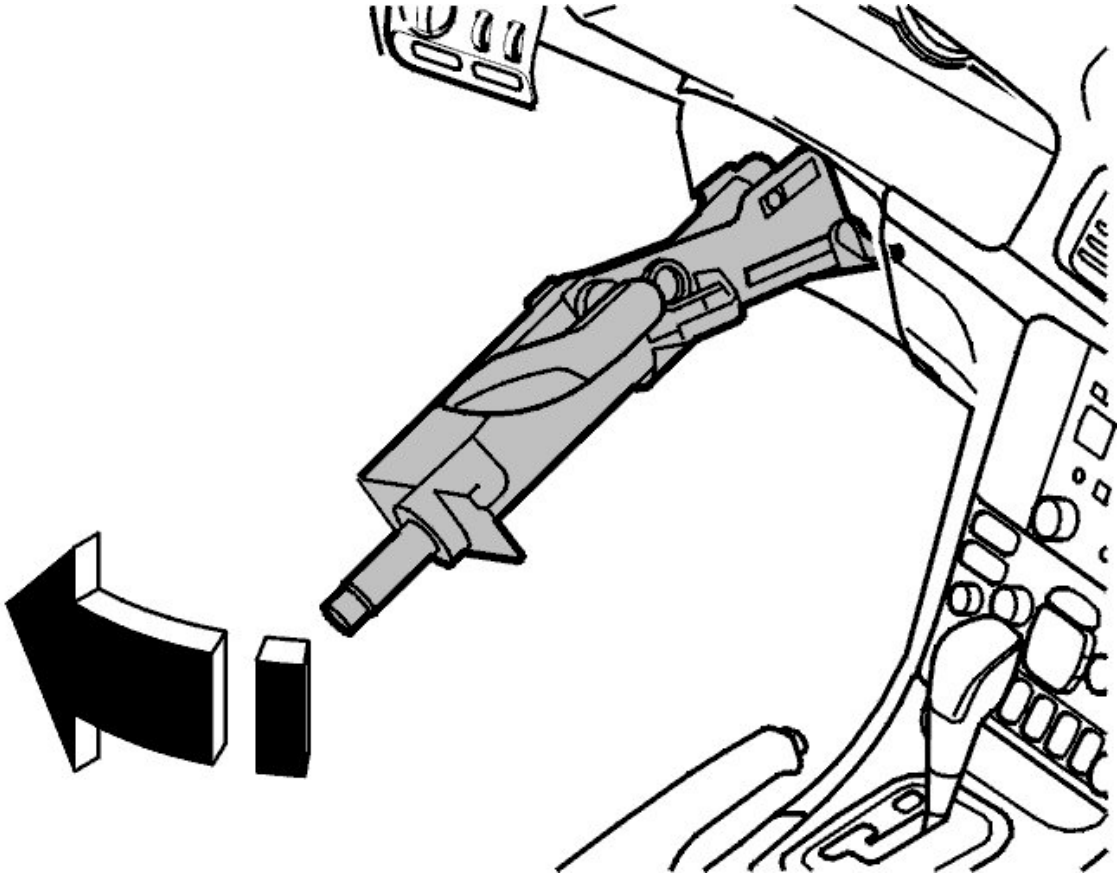
Removing steering column and steering shaft



Remove the four screws that hold the steering column.
Pull the steering column backwards from the three guides.



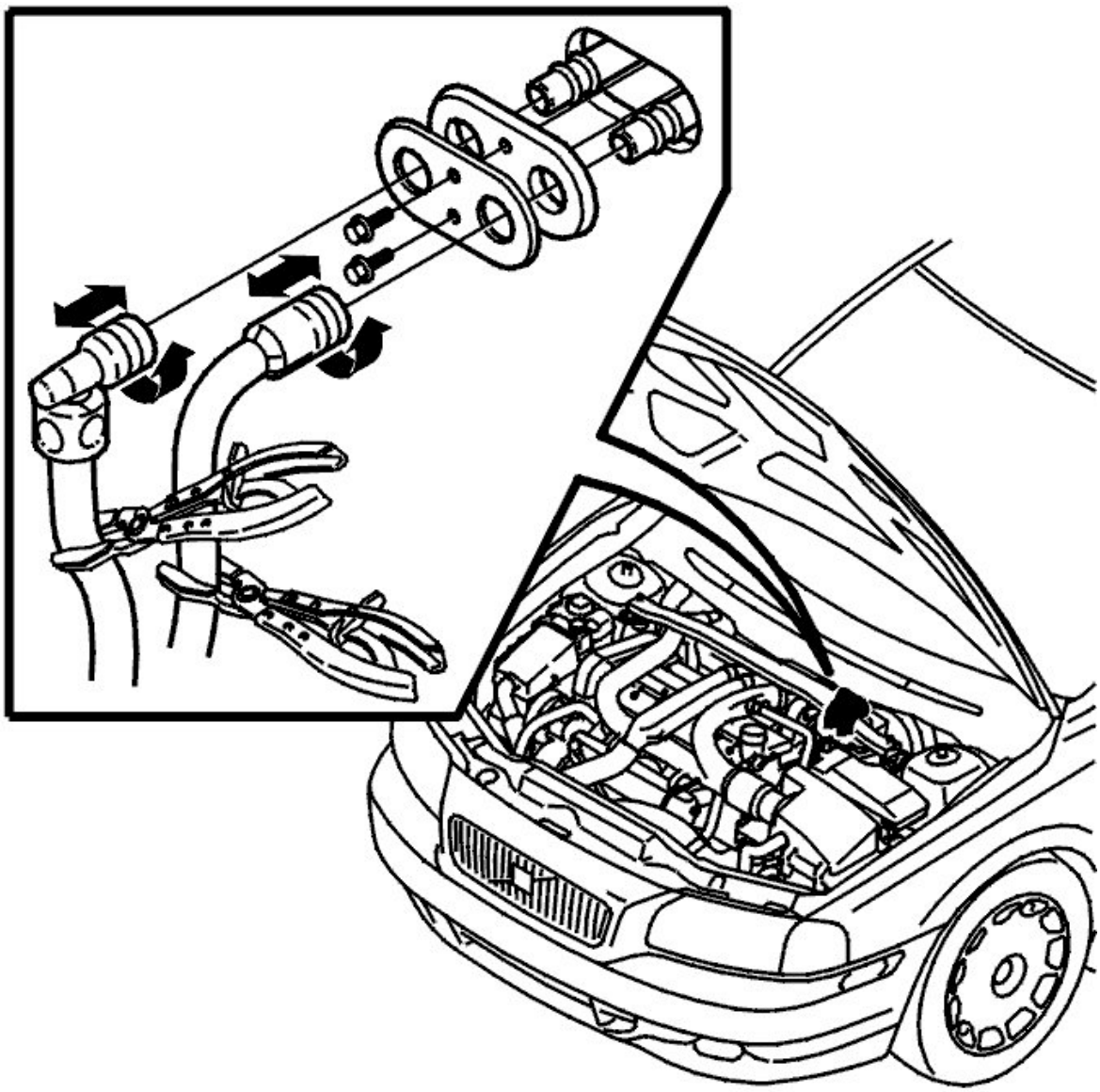
Pull out the steering column slightly and turn it half a turn to the left, to upside-down position.



Pull out the steering column at an angle backward to the left.

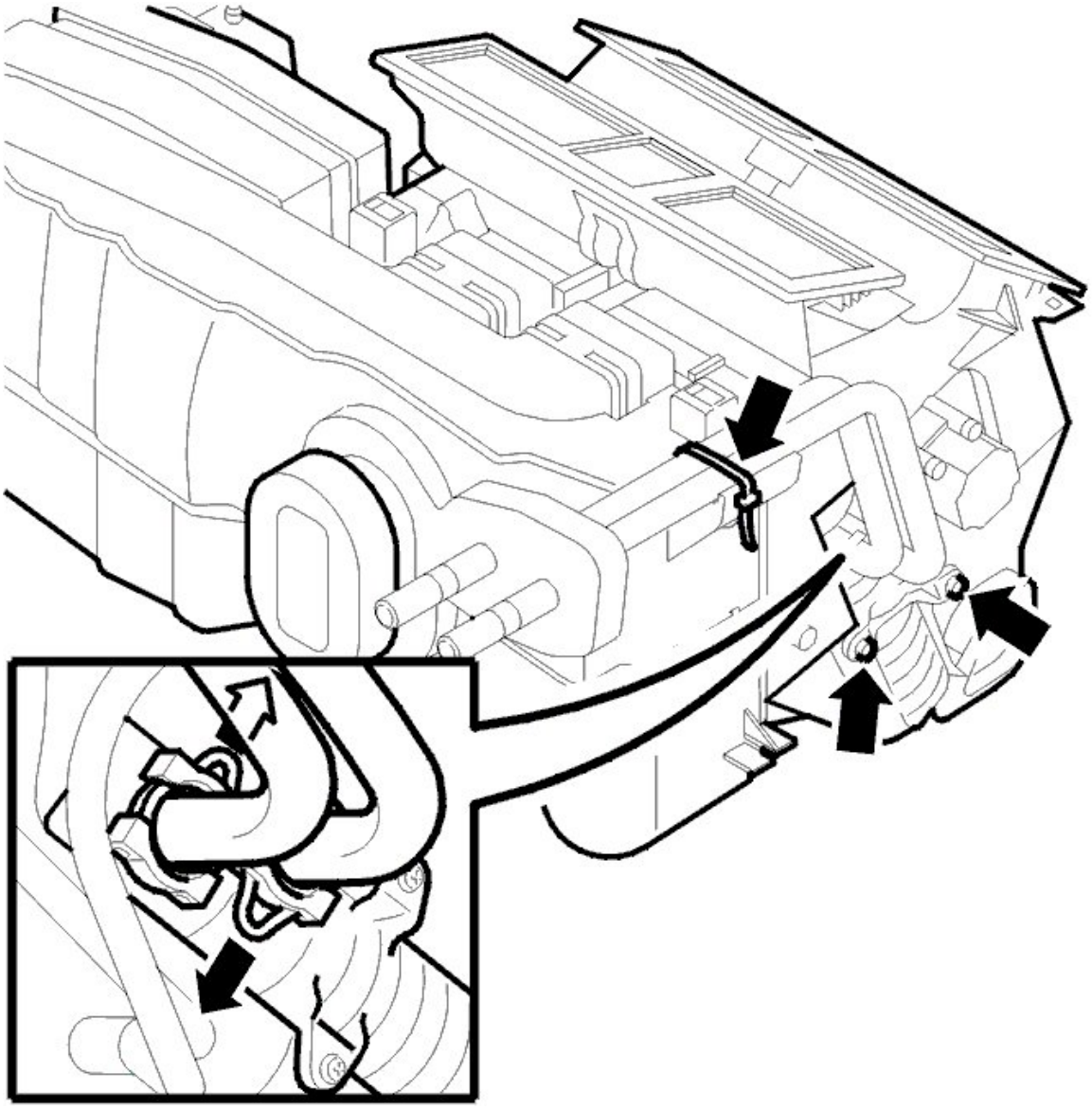
Removal

Removing heat exchanger



Remove:

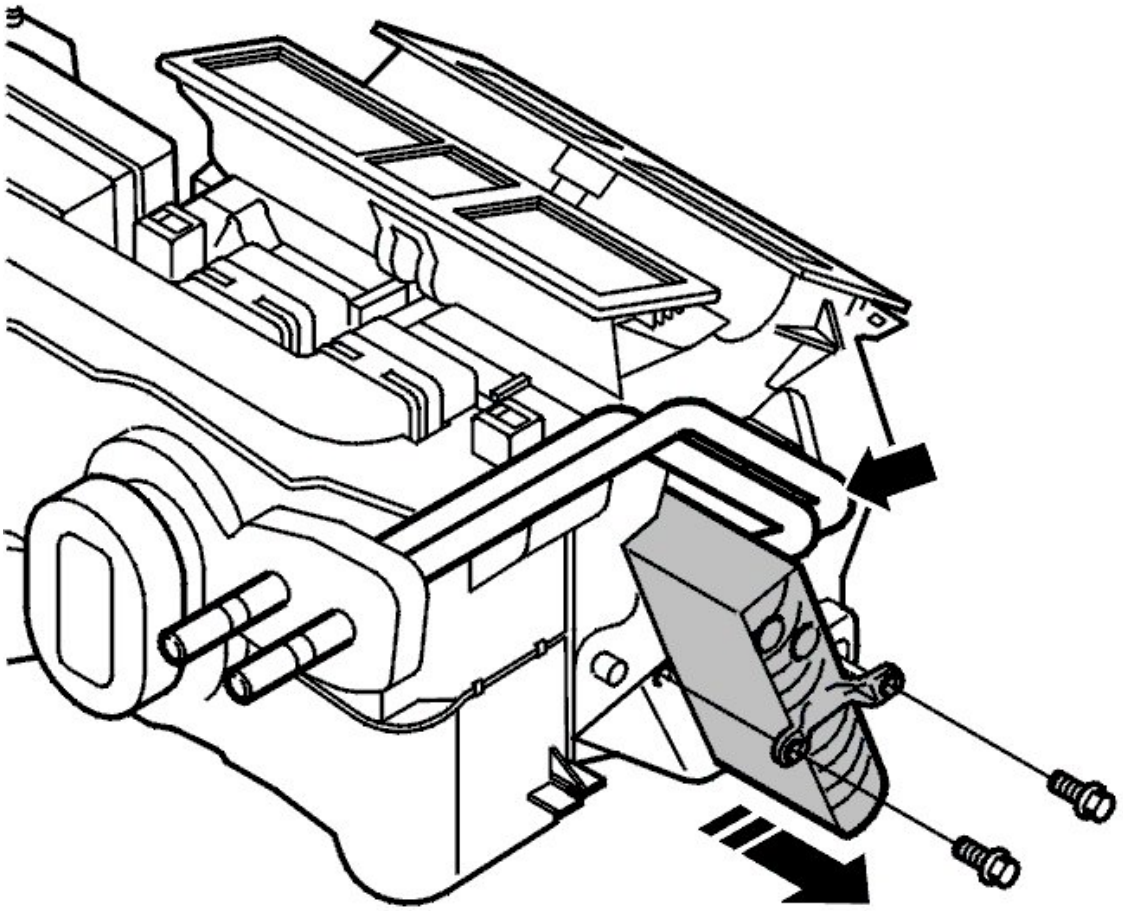
- the heater hoses in the engine compartment, use special pliers: 115 8957 HOSE PLIERS See: Tools and Equipment/115 8957 Hose Pliers
- the seal and the plate.
- the brake light switch according to: Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair



Remove:

- the tie strap for the pipes
- the screws for the heat exchanger
- the mounting brackets for the pipes.

Position plenty of paper under the heat exchanger and around the pipes
Drain the coolant in a suitable container.



Loosen the pipes and position them out of the way.
Pull out the heat exchanger.

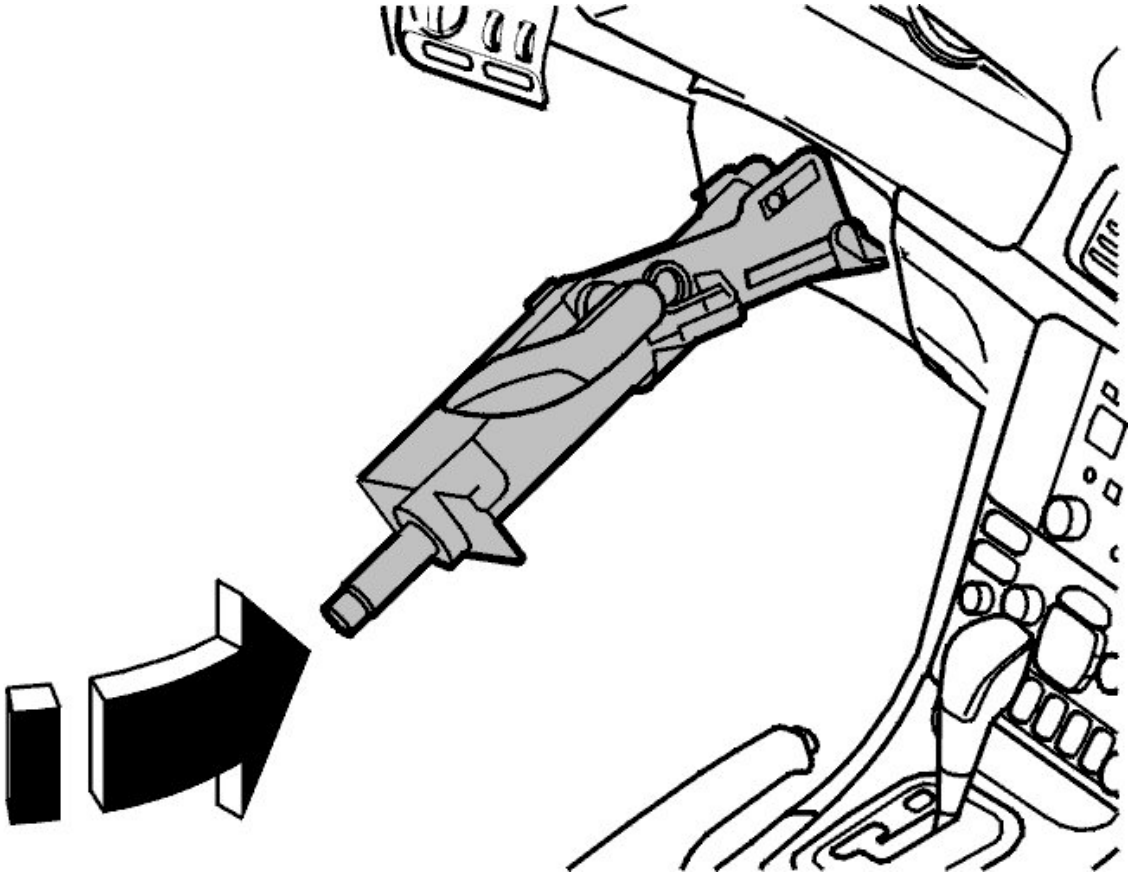
Installation

Installing heat exchanger

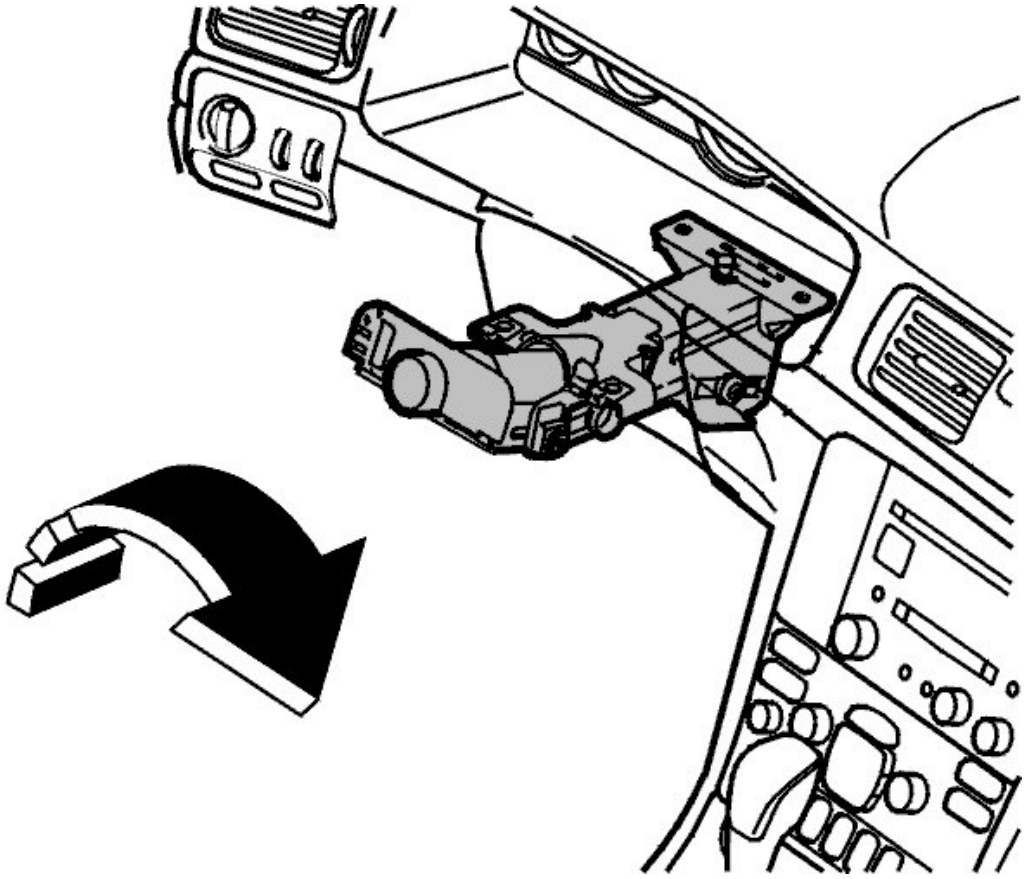
Note! Always use new O rings.

Install the heat exchanger carefully.
Screw the heat exchanger into place.
Install the upper pipes.
Install the lock bracket using round-nosed pliers.
Press in the pipes using a screwdriver and the lock catch using pliers.
Install the lower pipes.
Install the lock bracket using round-nosed pliers.
Press in the pipe using a screwdriver and the lock bracket using round-nosed pliers
Install the strip clamp for the pipes.
Install the seal and the plate.
Install the heater hoses in the engine compartment.

Installing the Steering column / Steering shaft

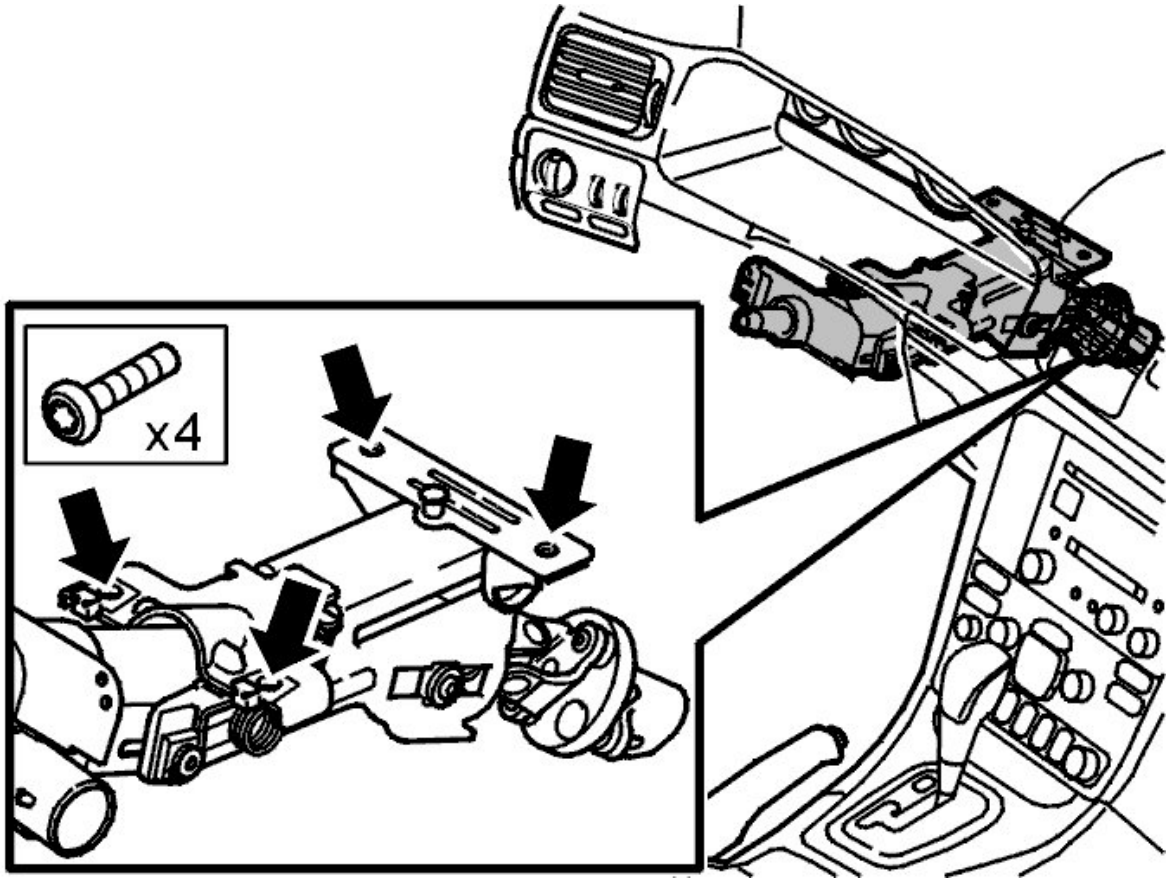


Insert the steering column in upside-down position.



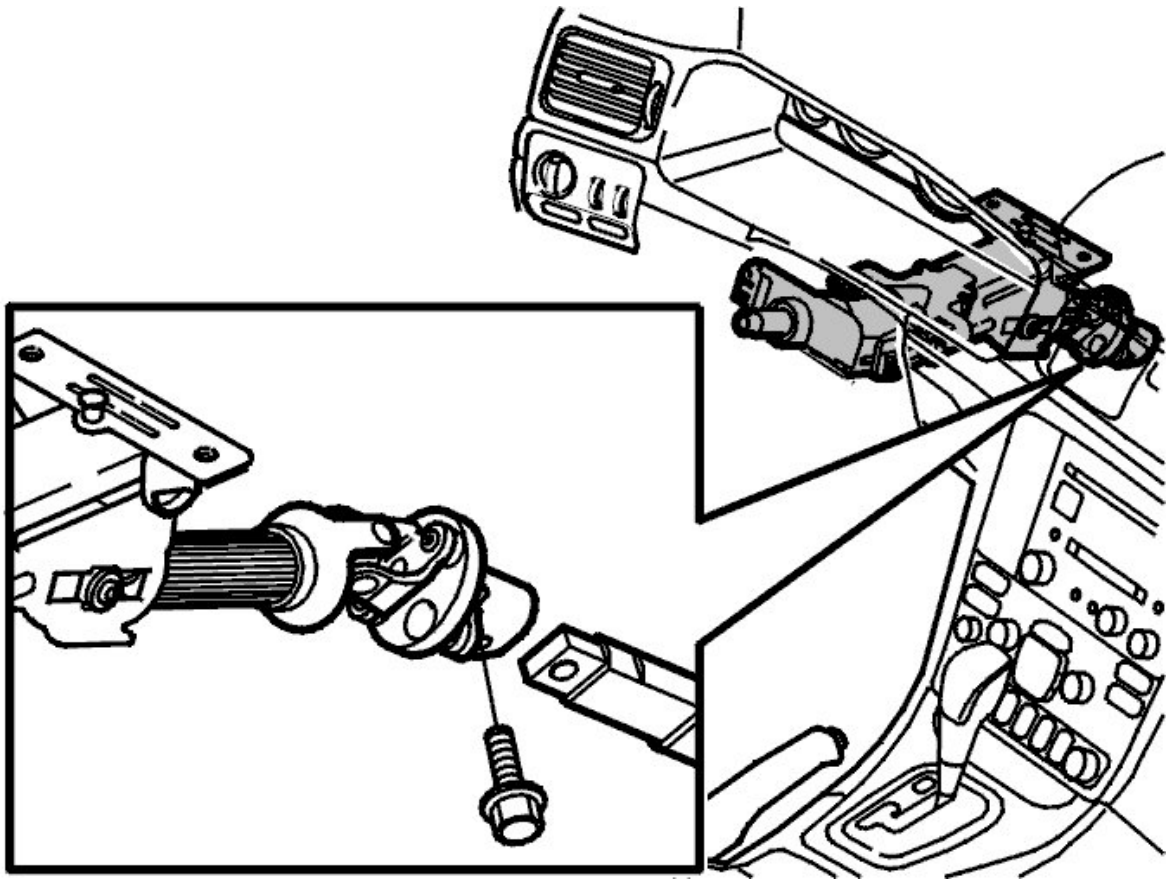
Turn it to the right to correct position.

Note! Check that the rear seat rails are undamaged.

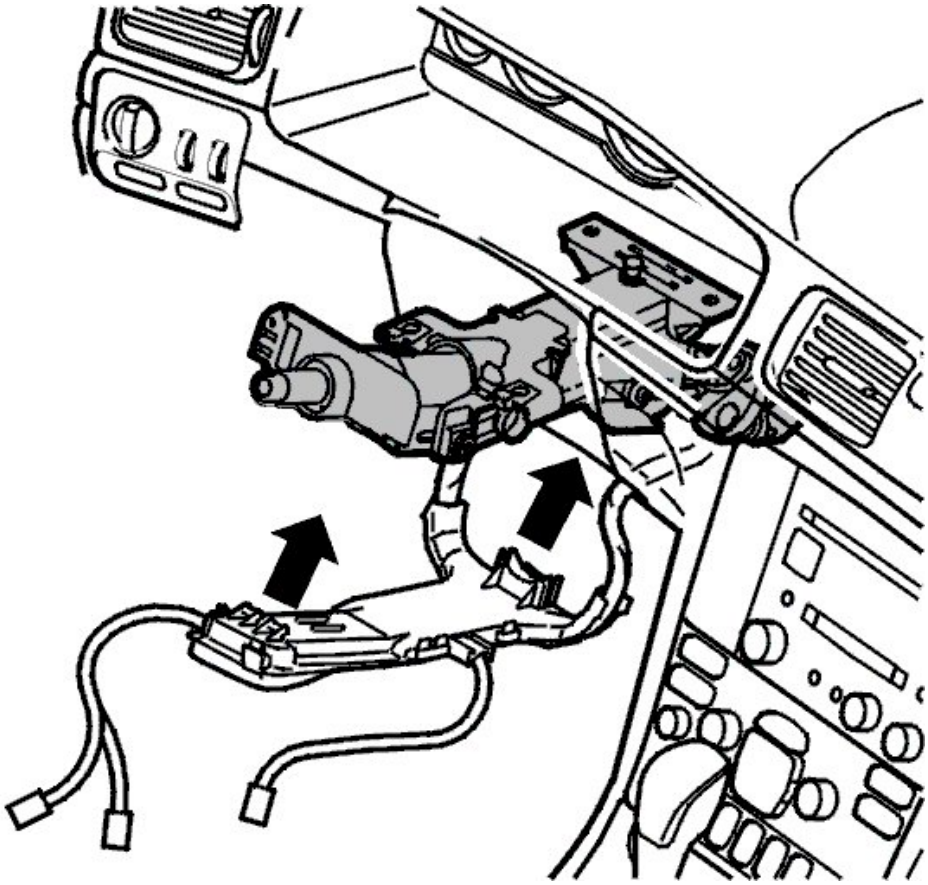


Hook the steering column into the three guides.
Install the screws and tighten with 25 Nm.
Tighten the rear screw first.

Installing steering shaft's universal joint on lower steering shaft

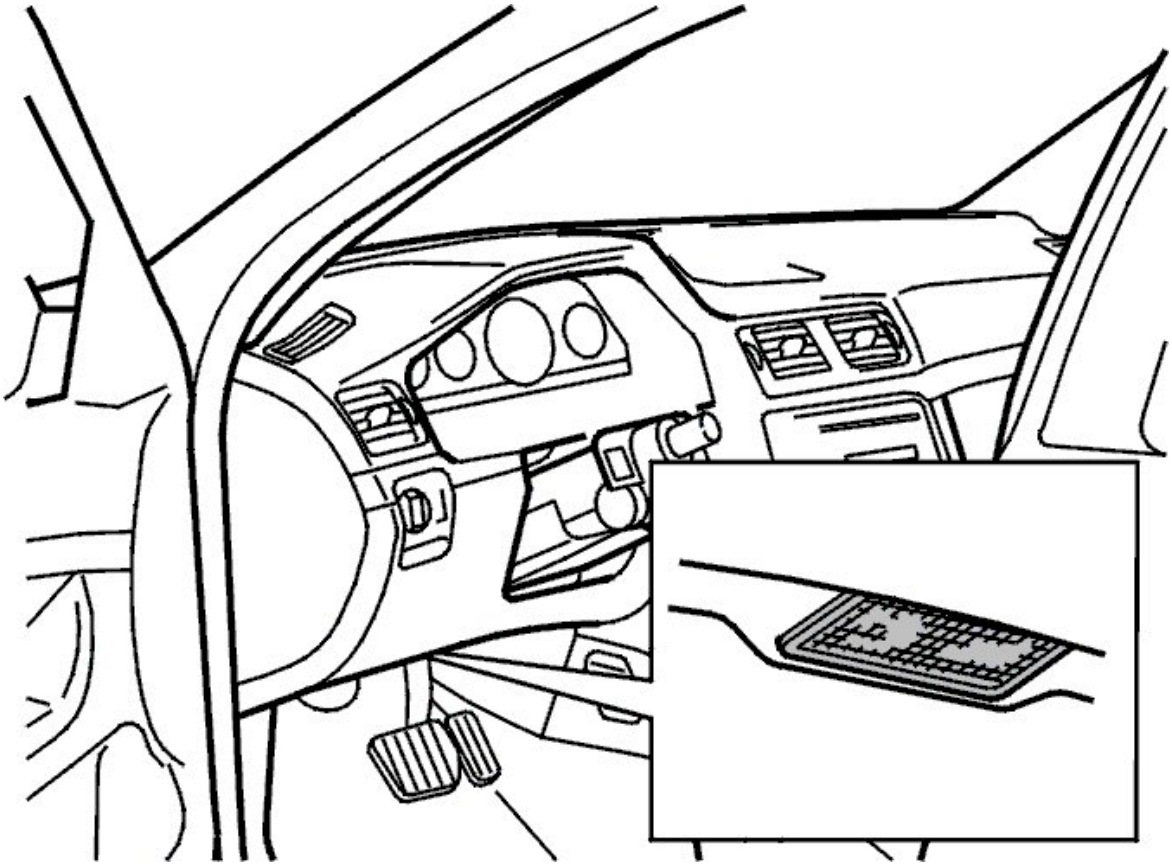


Install the steering shaft on lower steering shaft.
Set the front wheels straight ahead.
Install the upper steering shaft's universal joint on the lower steering shaft.
Install a new screw and tighten with 30 Nm.



Install the cable casing on the steering column.

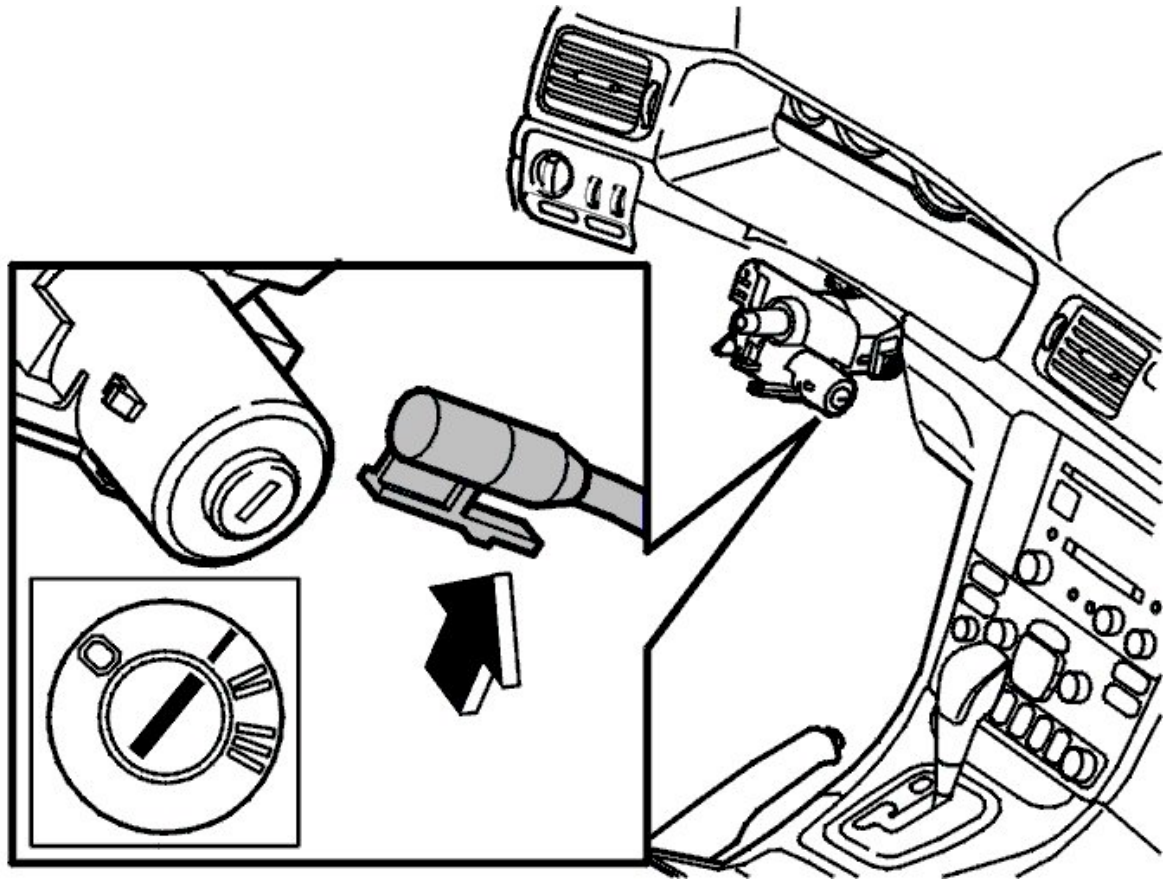
Installing the floor lighting



Install the floor lighting and plug in the connector.

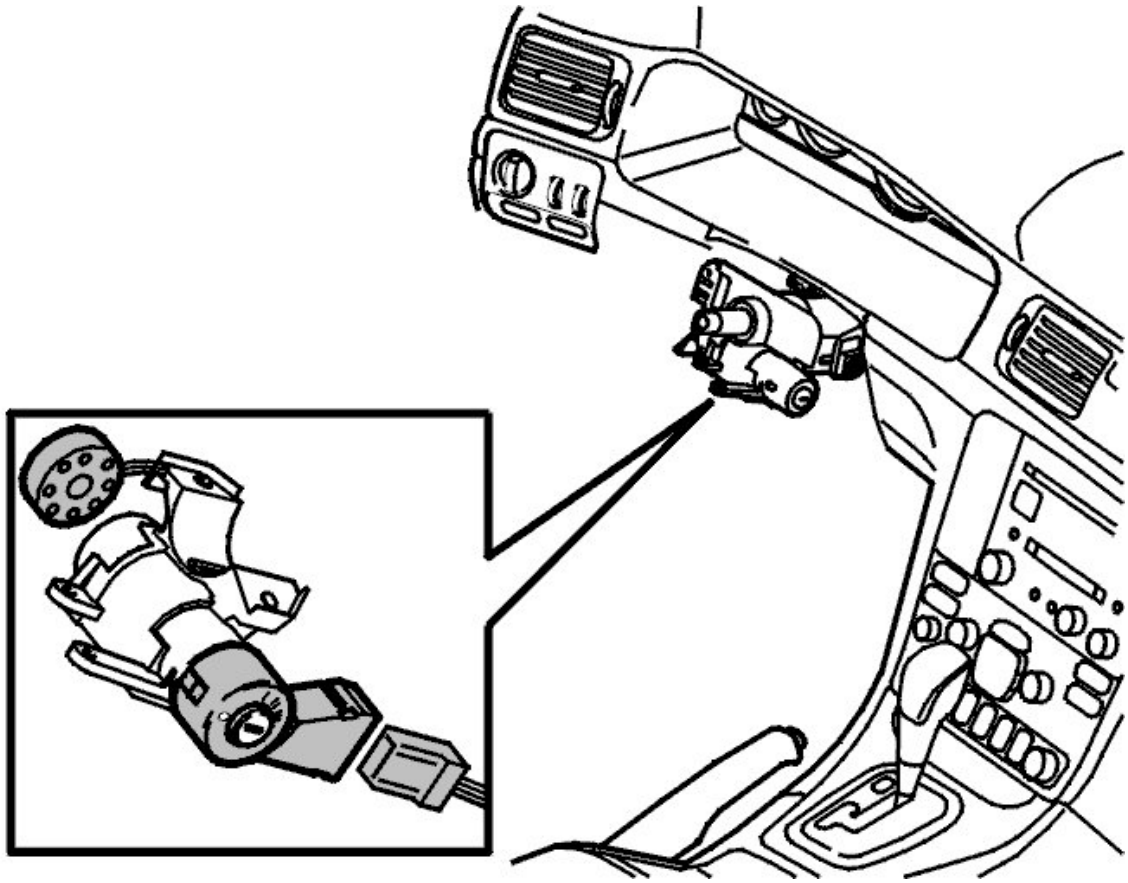
Installing cable for key interlock

Note! Applies to cars with automatic transmission.



Set the gear selector lever to P position.
Move the ignition key to position I.
Press the cable into the ignition switch and feel to see that it sits correctly.
Remove the ignition key and check that the gear selector lever is blocked in P position.

Installing the steering wheel lock module



Remove the ignition key.
Install the connector and the module for steering wheel lock.

Plug in the connectors.

Installing lever module

See Gear selector assembly and steering wheel module See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Gear Selector Assembly and Steering Wheel Module.
Connect the lever module's connectors.

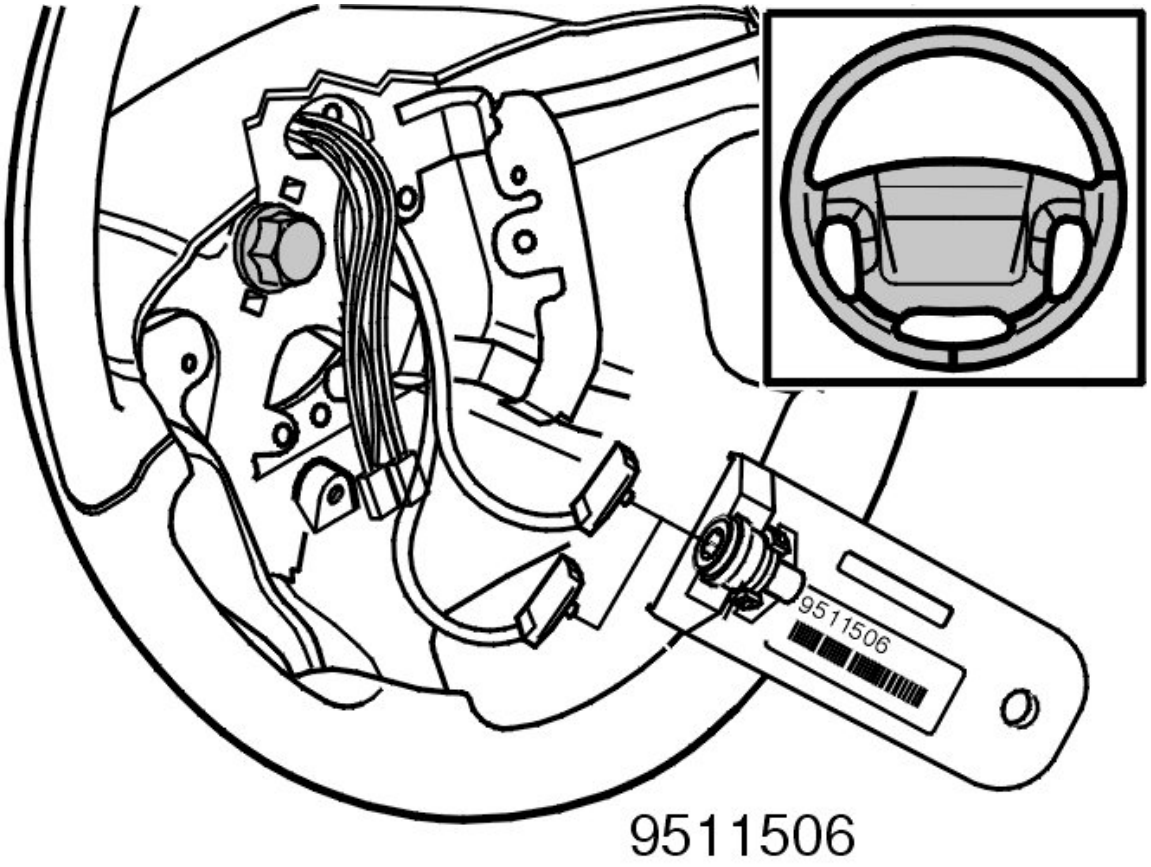
Installing steering column covers

Install the steering wheel casings according to: Combined instrument panel surround See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Combined Instrument Panel Surround.

Resetting contact roller

Reset the contact roller according to: Contact reel driver airbag module, resetting See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Reset Procedure.

Installing steering wheel and checking steering wheel position



Note! Check that the front wheels are pointing straight ahead.

Pull the connectors from the contact roller through the steering wheel.
Install the steering wheel carefully so that the contact roller's two catches fit in the steering wheel hub's both slots.
Install the steering wheel screw. Use a new screw. Tighten with fingers.

Caution! Do not turn the steering wheel when it is on the steering shaft. Since the contact reel is locked, it will be damaged beyond repair if the wheel is turned in this situation.

Loosen the lock screw that holds the contact roller.
Install it in the parking hole on the steering wheel.
Connect tools (2 pcs.): 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the contact roller's SRS-wiring.
Drive the car straight ahead and check that the steering wheel stands in position "straight ahead".
If the steering wheel position is incorrect, repeat the adjustment.
Tighten the screw in the center of the steering wheel.
Remove the tools (2 pcs.): 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy.
Tighten the steering wheel screw with 40 Nm.
Check that the SRS-light goes out, that is, that no diagnostic trouble codes remain.

Installing driver's airbag module

Install the driver's airbag module according to: Airbag driver and passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair.

Finishing

Checking function on steering column

Ensure that the steering wheel turns easily and that the steering lock functions.
Check that no diagnostic trouble codes have been stored during the repairs.
Start the engine and the heating system.
Fill coolant in the cooling system.
Check that the pipe connections do not leak.
Install the soundproofing panel according to: Soundproofing panel, replacing See: Body and Frame/Interior Moulding / Trim/Dashboard / Instrument Panel/Service and Repair/Soundproofing Panel, Replacing.

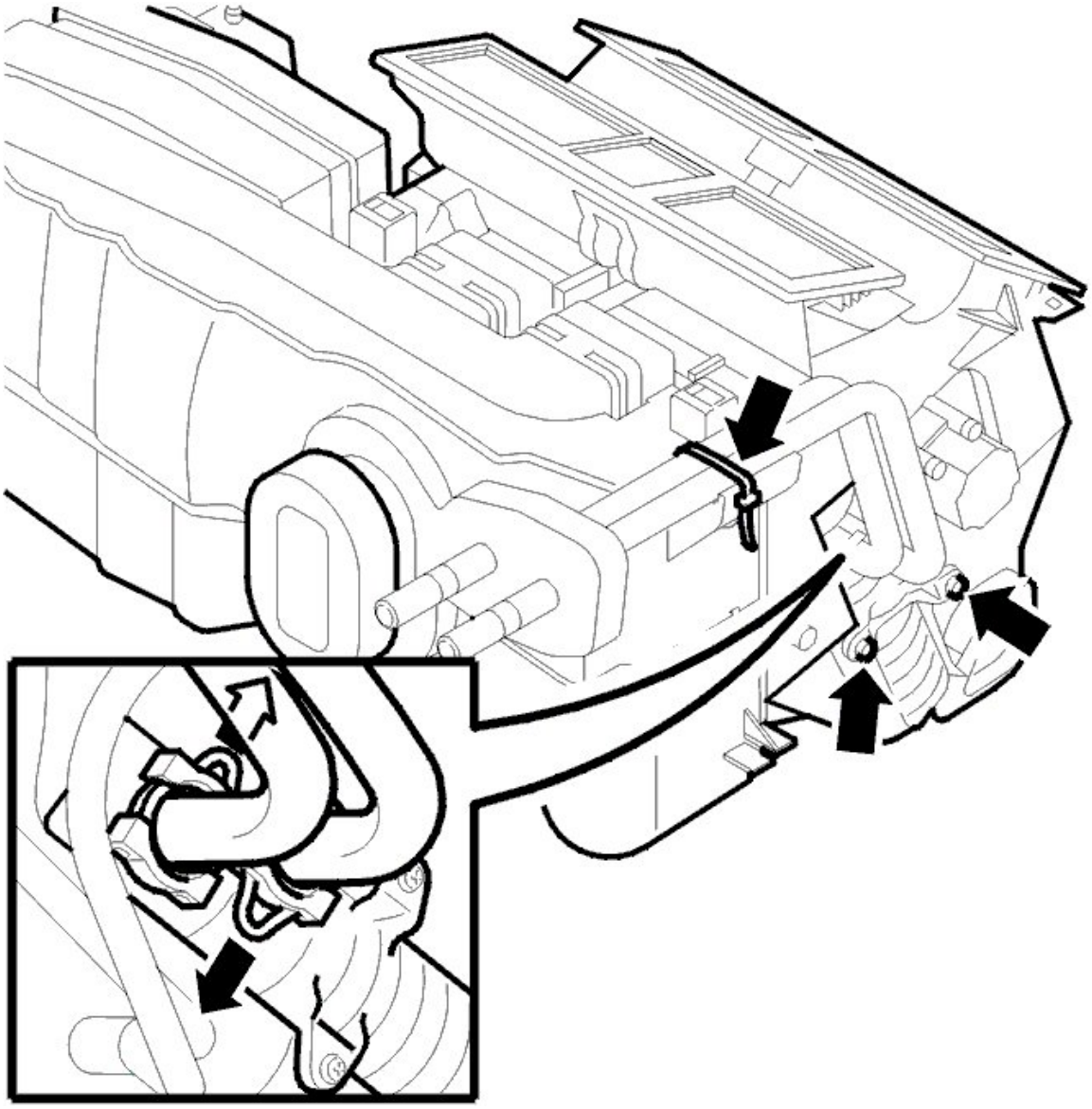
Heater Core: Service and Repair
R.H.D

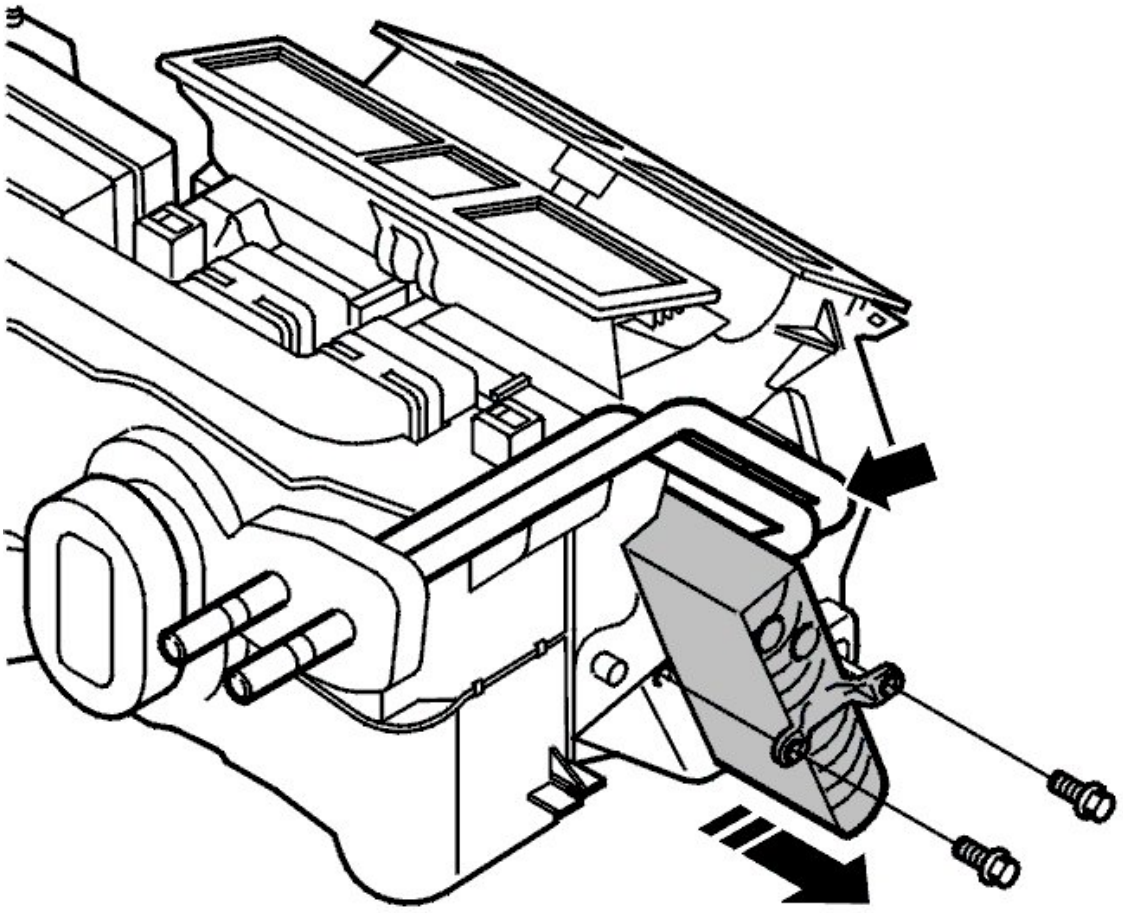
Heat exchanger, replacing

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removal

Removing heat exchanger





Remove:

- the climate control system. See Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- the tie strap for the pipe
- the mounting brackets for the pipe
- the screw/screws for the heat exchanger

Loosen the pipe for the heat exchanger and drain the coolant.
Remove the screws, 3 pcs., for the fan housing-central unit.
Fold out the central unit and remove it.
Pull out the heat exchanger from the central unit.

Installation

Installing heat exchanger

Carefully place the heat exchanger in the central unit and check that the seals are okay.
Screw the heat exchanger into place.
Install the seals for the central unit on the fan housing and bolt down.
Install the pipe. **NOTE! New O-rings**.
Brace the pipe.
Install the strip clamps for the pipes.
Install remaining components in reverse order.

Radiator: Service and Repair
Radiator/Charge Air Cooler (CAC), Replacing

Radiator / charge air cooler (CAC), replacement

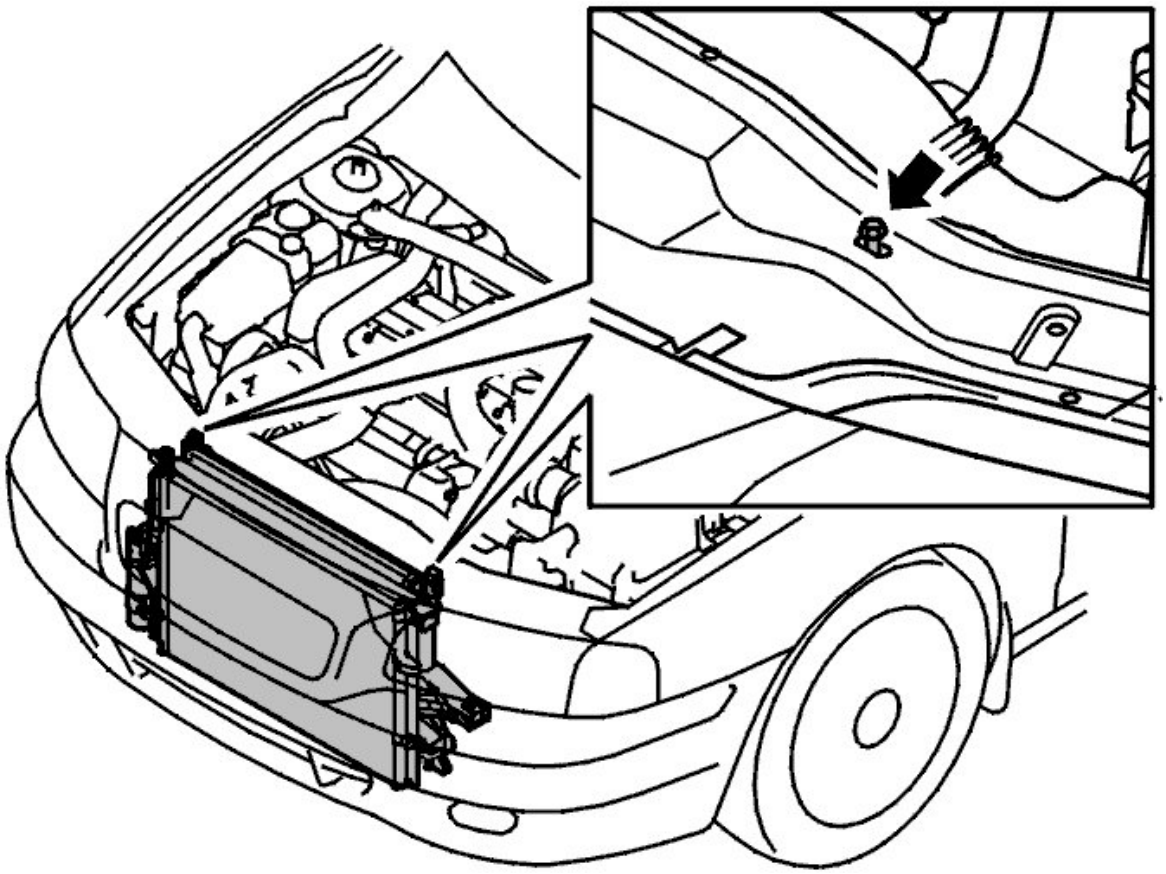
Special tools:

999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

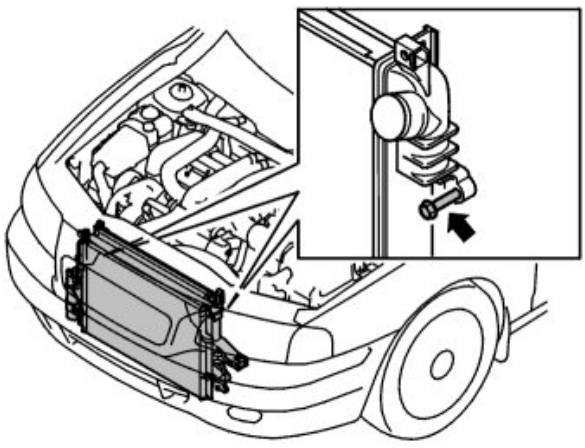
Removal

Removing the radiator unit

- Remove the engine cooling fan (FC) according to Engine cooling fan (FC), replacing See: Radiator Cooling Fan/Service and Repair.

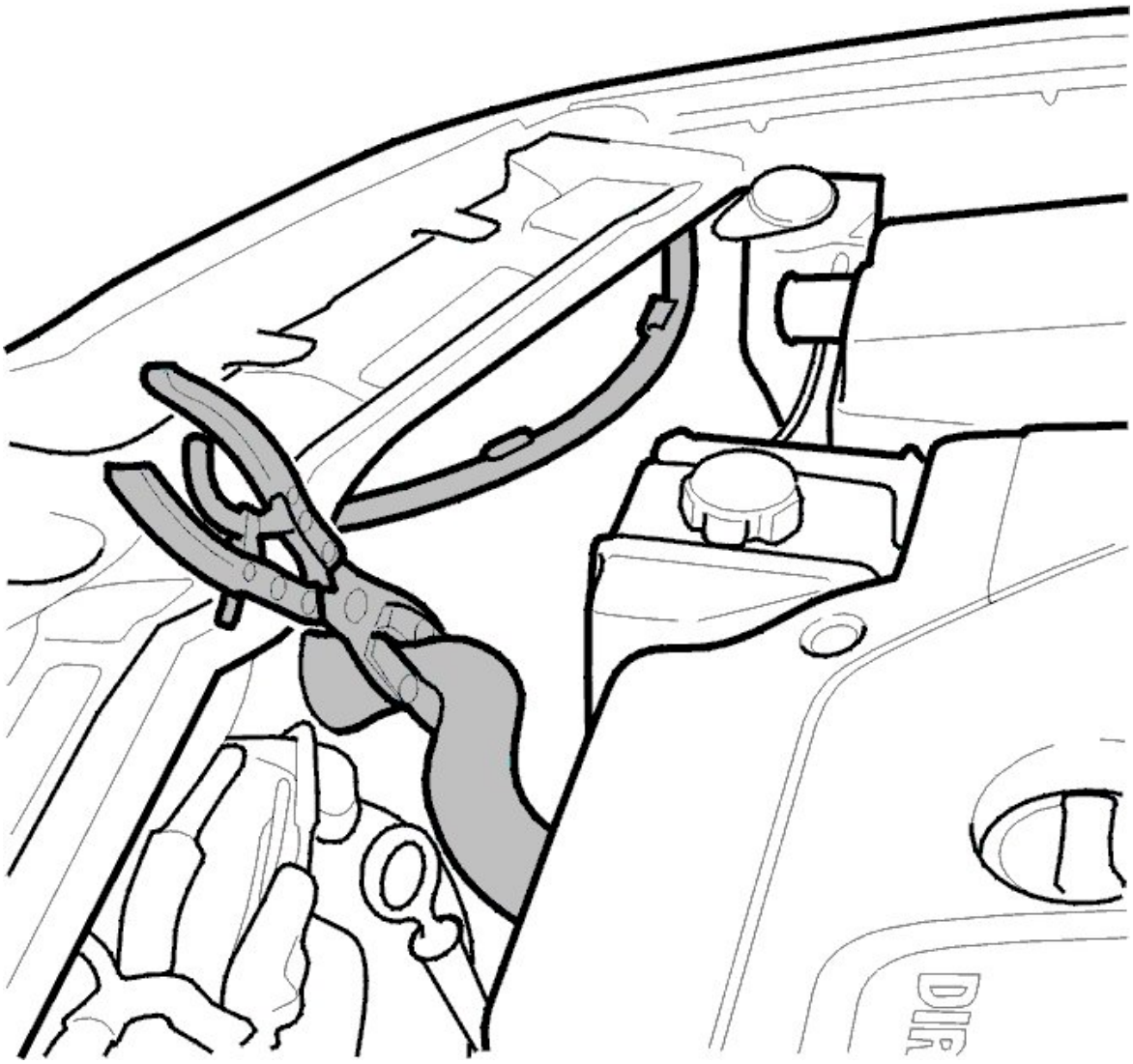


- Disconnect the charge air pipe from the charge air cooler (CAC) on the left-hand side (turbocharged engines only). If necessary, use a hot air gun to make removal easier
- Remove the screws for the radiator unit on the front cover plate.



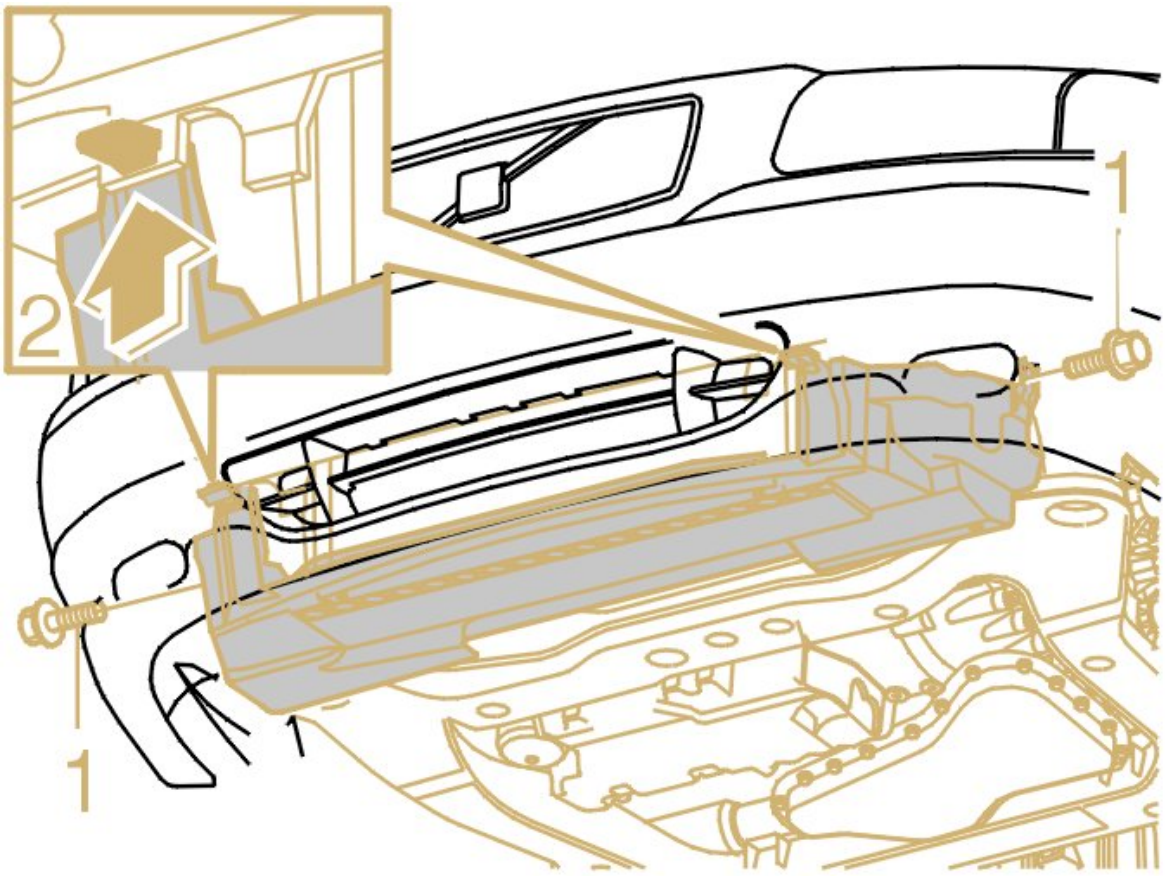
Remove

- the two upper screws holding the radiator unit together
- the expansion tank cap.



Block the upper radiator hose with lock grip pliers

Work under the car



Remove

- the air baffles
- the lower oil cooler hose from the radiator unit (automatics only)
  Note! Collect the oil from the oil cooler in a container.

- the screw for the mounting for the cable duct for engine wiring at the front edge of the sub-frame.

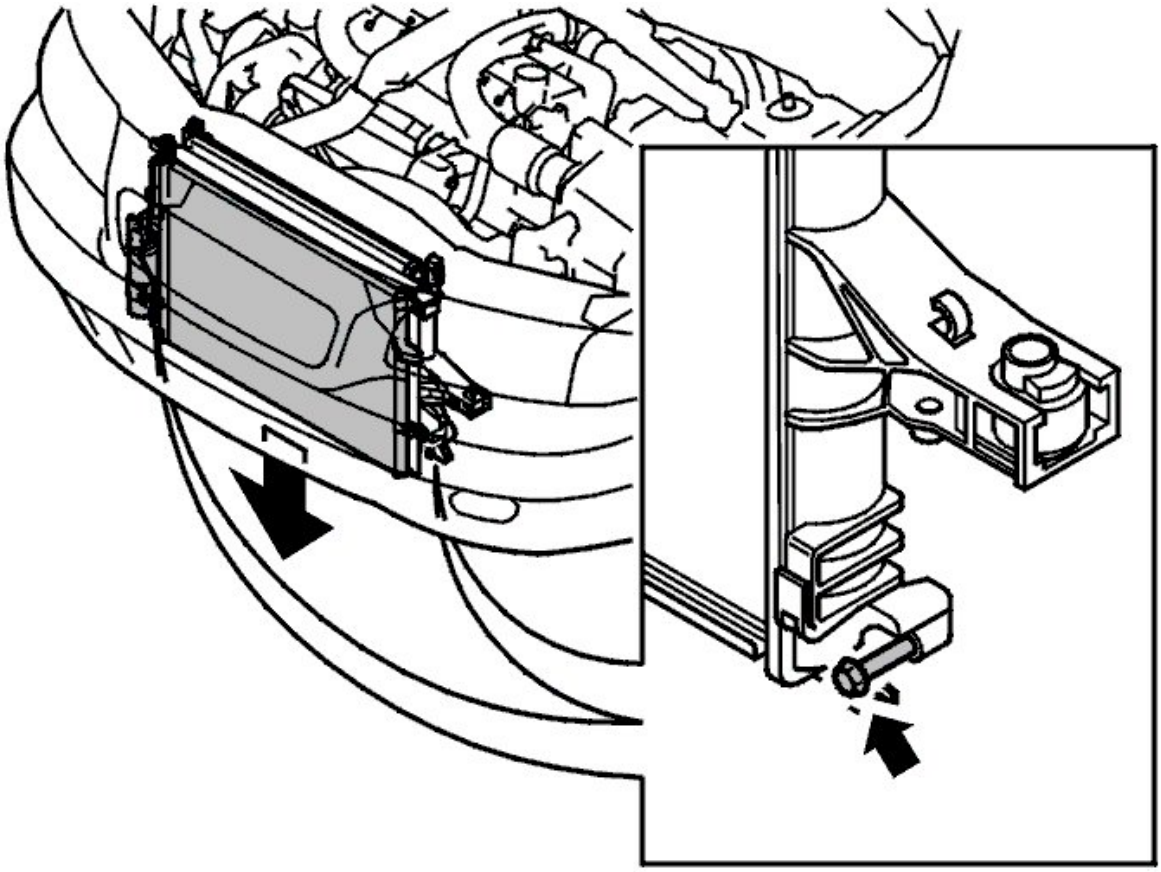
Drain the coolant

- Block the lower hose coolant hose with lock grip pliers
- Apply a hose on the nipple at the radiator
- Feed the hose down to a container
- Open the nipple and drain off the coolant.

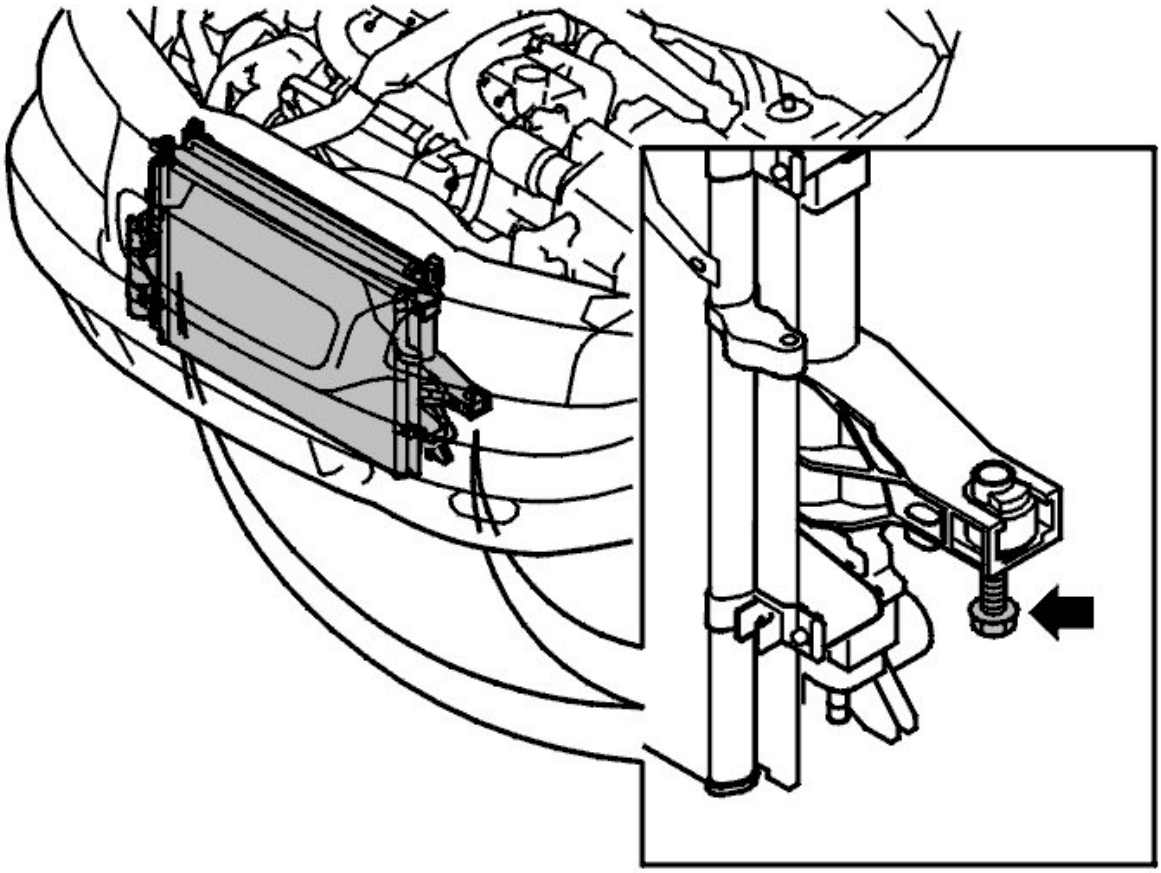
Work from above

- Remove the upper radiator hose. Place it to one side. Seal the openings.

Work under the car



- Disconnect the connector from the receiver drier and the cable from the holder
- Hang up the condenser using tie straps on the right-hand side in the pipe for the receiver drier and on the left-hand side in the pipe for the condenser
- Remove the lower screws holding the radiator unit.



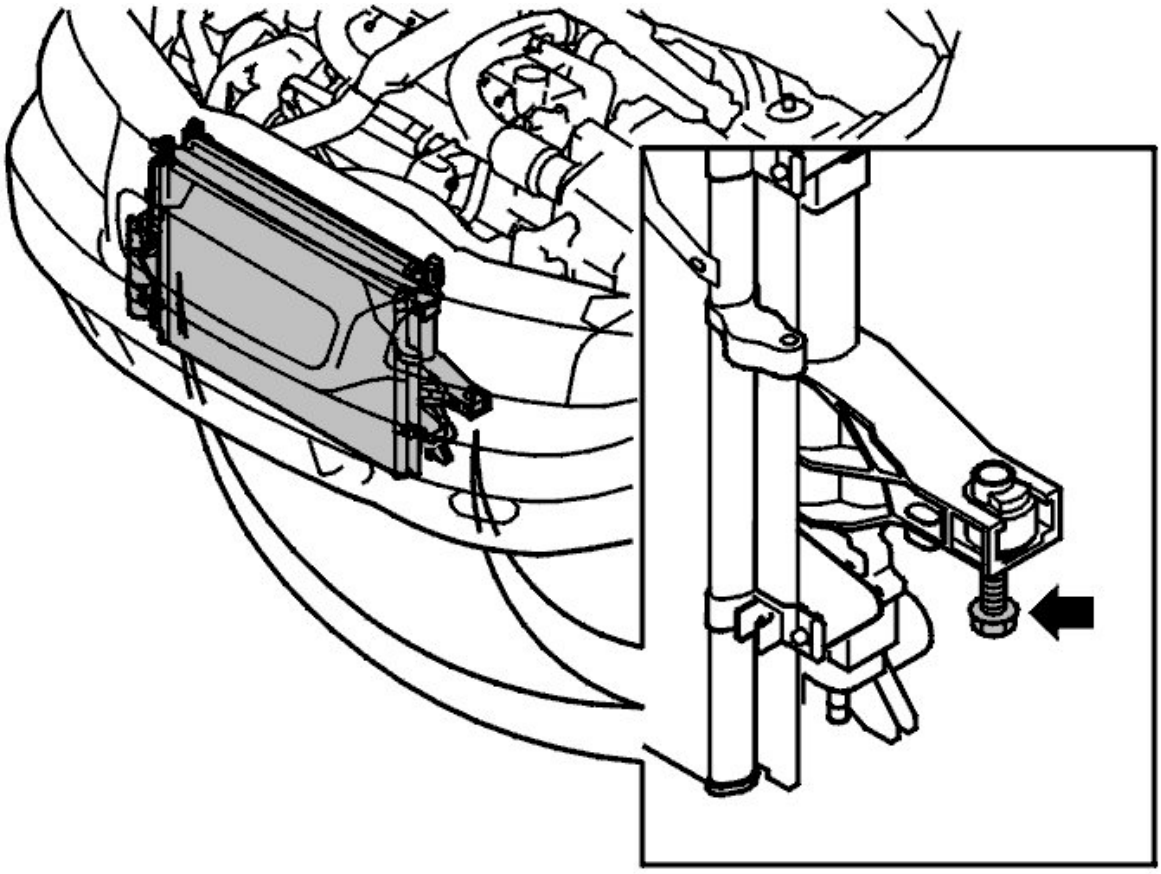
- **The following requires two people:** Disconnect the radiator and the charge air cooler (CAC) firstly from the left and then from the right-hand side by removing the two screws
- On the right-hand side, press the cable duct and the compressor hose towards the engine. At the same time release the radiator and charge air cooler (CAC) downwards on the right-hand side. Then release the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the radiator and charge air cooler (CAC) passes the AC pipe

- Disconnect the hose from the radiator to the expansion tank
- Replace the radiator / charge air cooler (CAC).

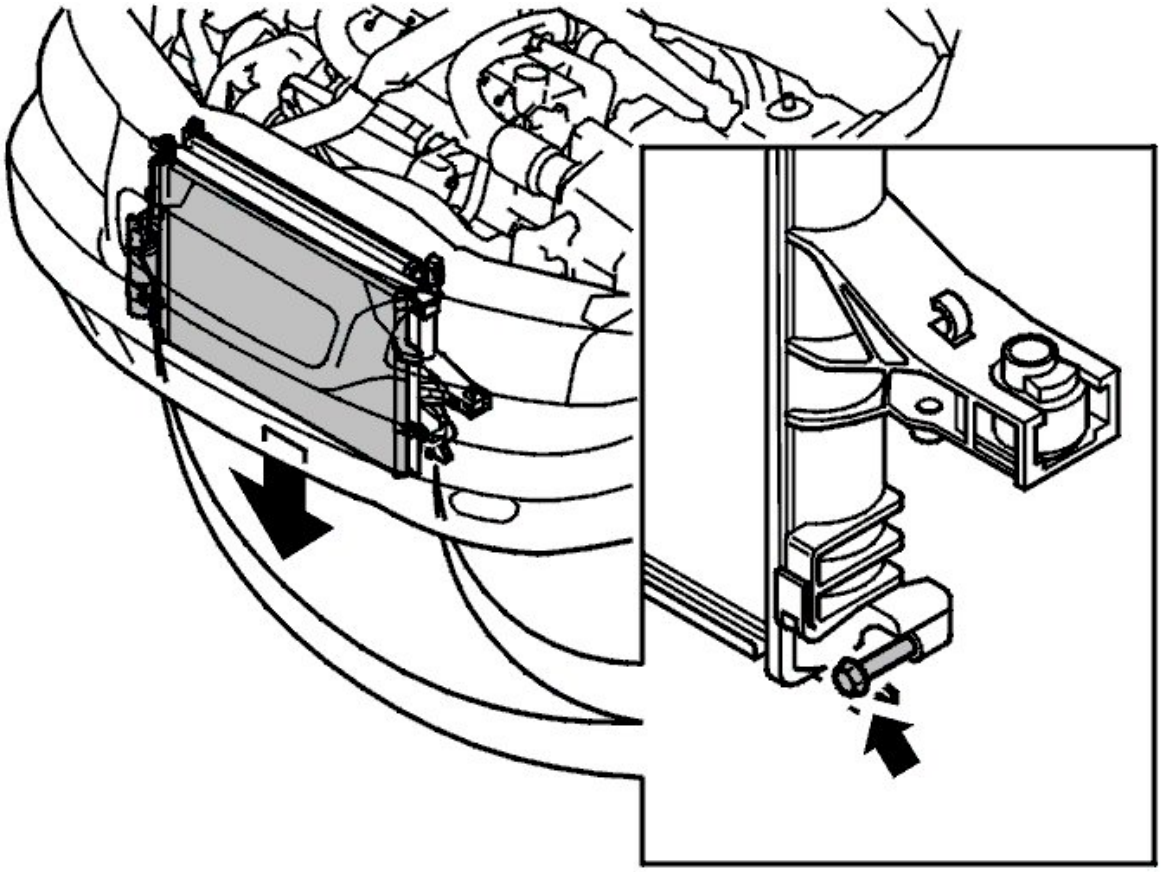
Installation

Installing the radiator and charge air cooler (CAC)

- Hold the radiator unit and secure the hose from the expansion tank to the radiator
- Install the connector from the receiver drier and the cable from the holder.

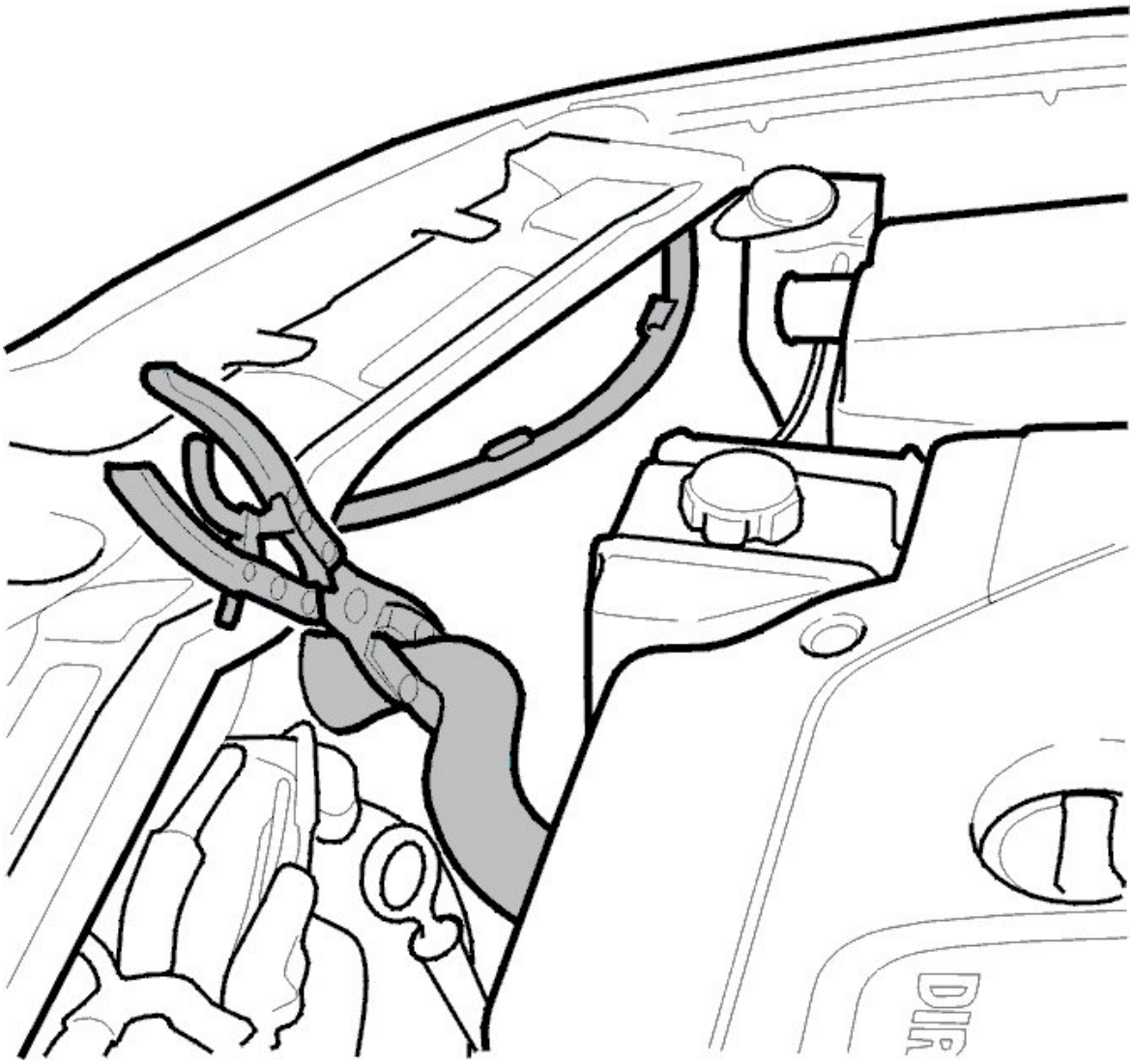


- Lift up the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the charge air cooler (CAC) passes above the AC pipe. Lift the right-hand side while pressing the cable duct and the compressor hose towards the engine
- Thread the screws for the radiator and charge air cooler (CAC) into the member.



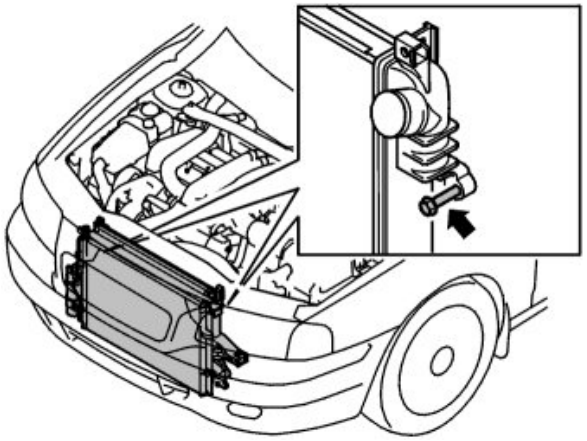
- Install the lower screws to assemble the radiator unit. Tighten the screws. Tighten to **10 Nm**
- Remove the tie straps
- Check that the radiator unit is against the rubber seal
- Tighten the radiator unit to the member. Tighten to **25 Nm**.
- Install the lower radiator hose
- Remove the lock grip pliers
- Install the screw for the mounting for the engine wiring cable duct at the front edge of the sub-frame
- Install the lower oil cooler hose on the radiator unit (automatic gearboxes only).

Work from above

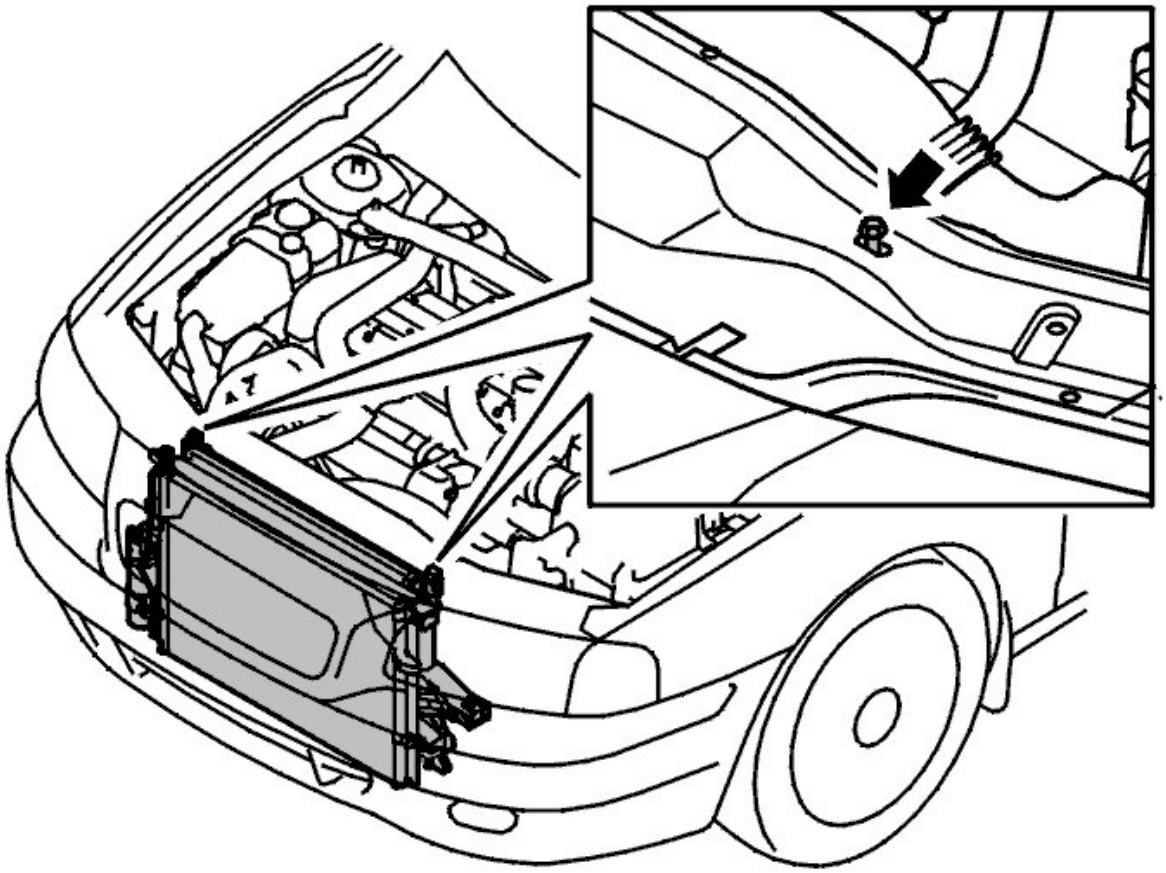


Install

- the upper radiator hose. Remove the lock grip pliers
- the charge air pipe to the charge air cooler (CAC) on the left-hand side (turbocharged engines only).



- Install the upper screws to assemble the radiator unit. Tighten the screws
- Tighten to **10 Nm**.



- Install the screws for the radiator unit on the front cover plate
- Tighten to **10 Nm**

Installing the engine cooling fan (FC)

To install the engine cooling fan (FC), see Engine cooling fan (FC), replacing See: Radiator Cooling Fan/Service and Repair.

Topping up the coolant

- Install the cap on the expansion tank
- Run the engine until the thermostat has opened
- Stop the engine. Top up if necessary.

Radiator: Service and Repair
Replacing Radiator/Charge Air Cooler (CAC)

Replacing the radiator / charge air cooler (CAC)

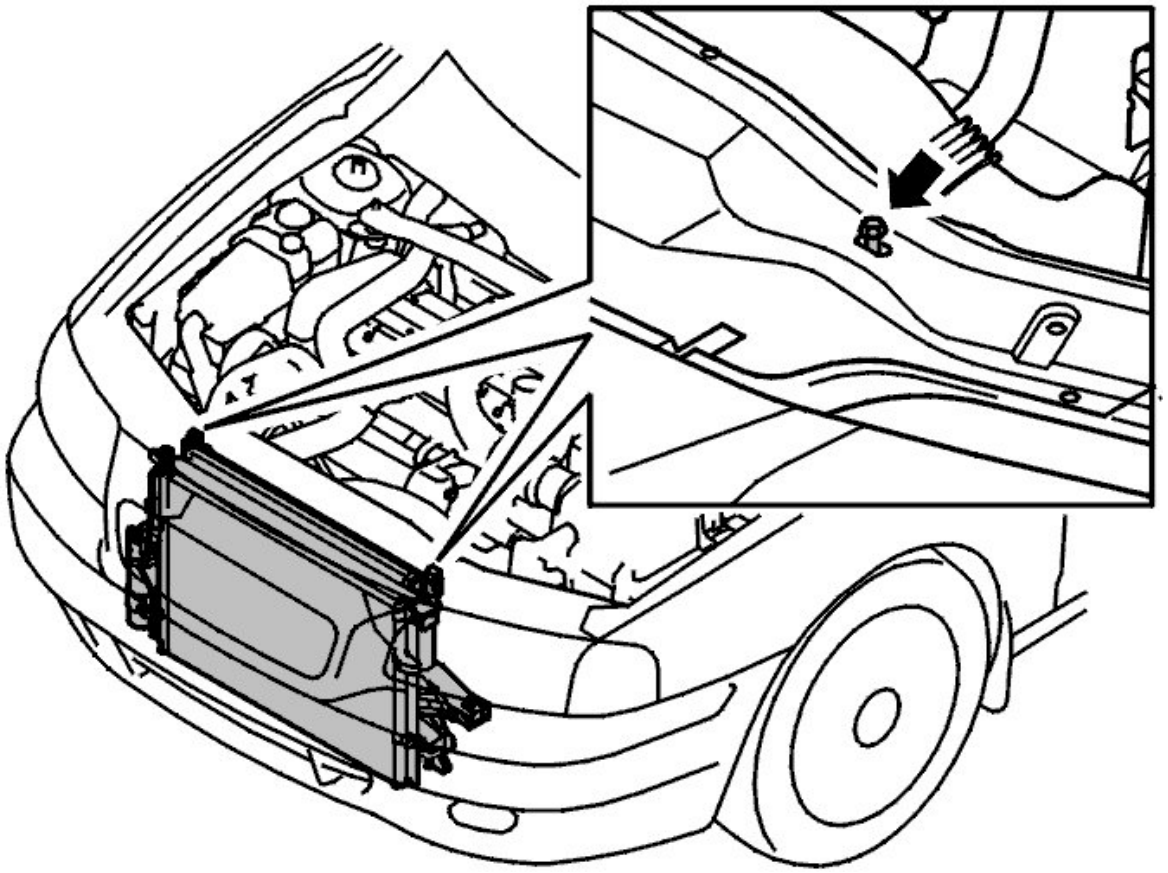
Special tools:

999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

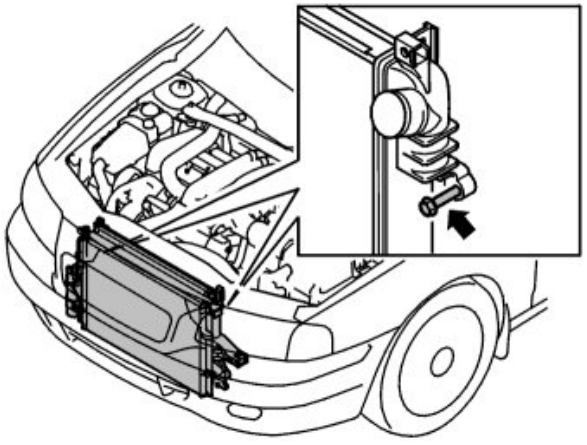
Removal

Removing the radiator unit

Remove the engine cooling fan (FC) according to Engine cooling fan (FC), replacing See: Radiator Cooling Fan/Service and Repair.

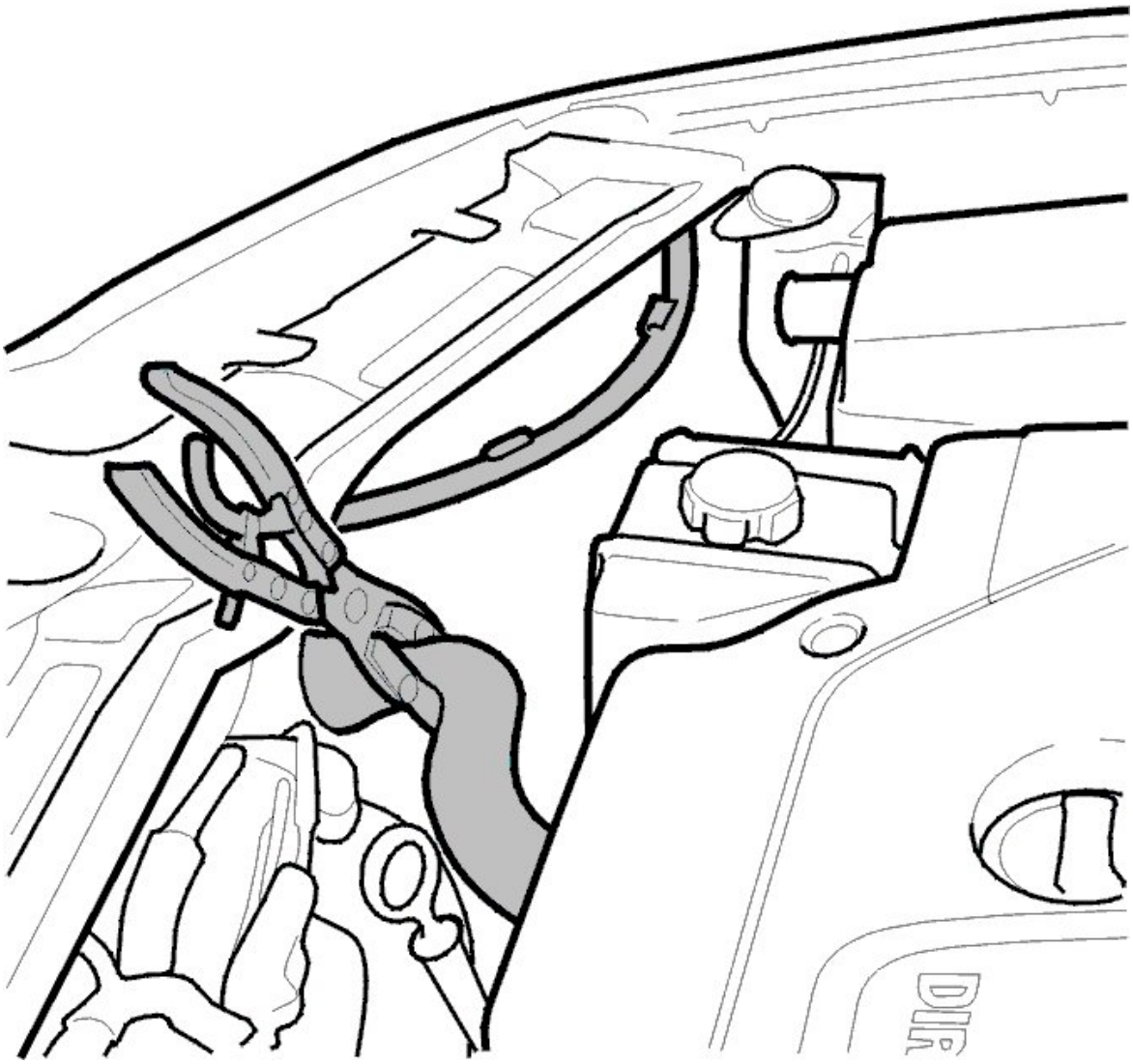


Disconnect the charge air pipe for the charge air cooler (CAC) on the left-hand and right-hand sides. Fold the hoses out of the way.
Remove the screws for the cooler unit on the front cover plate



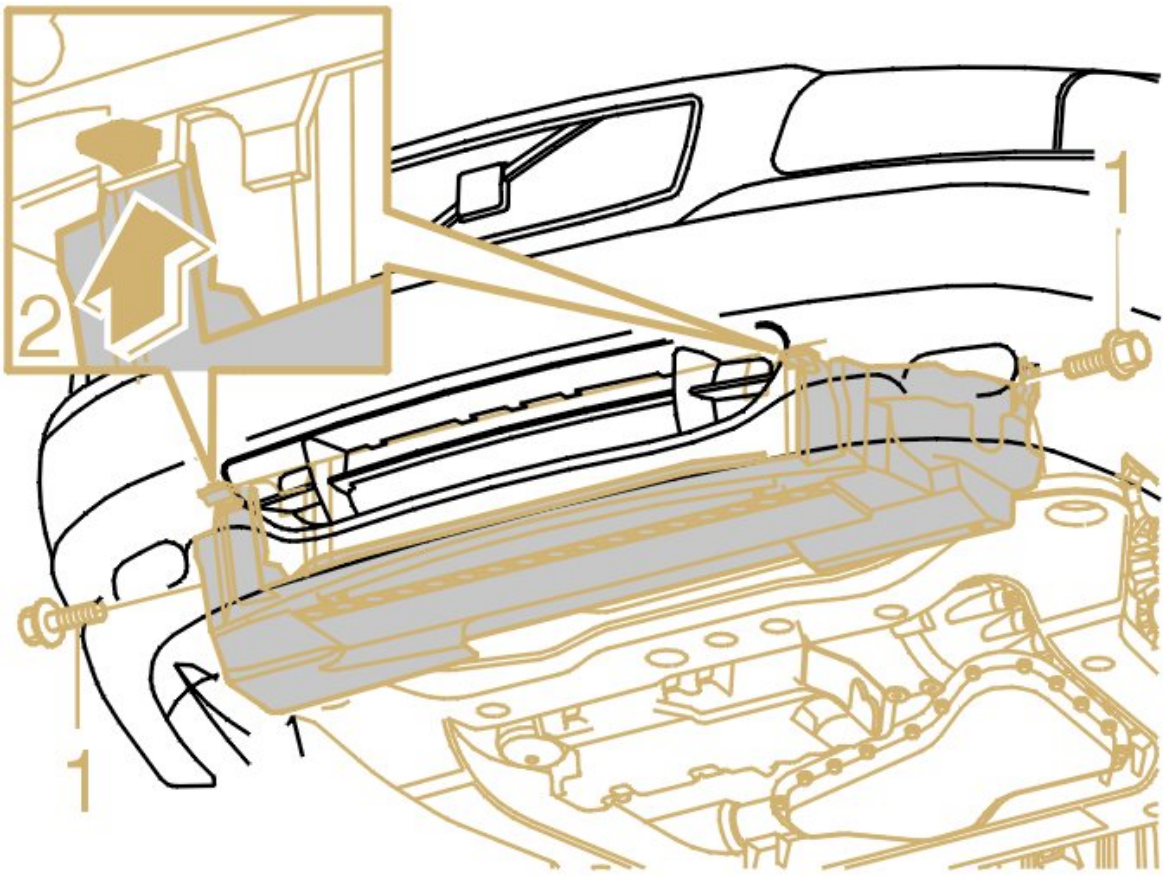
Remove:

- the two upper screws holding the air conditioning aggregate together
- the expansion tank cap.



Block the upper radiator hose with lock grip pliers.
Disconnect the hose from the radiator. Collect the coolant that flows out.

Work under the car



Remove:

- the air baffles
- the lower oil cooler hose from the cooler unit (automatics only). Protect the hose opening
  Note! Collect the oil from the oil cooler in a container.

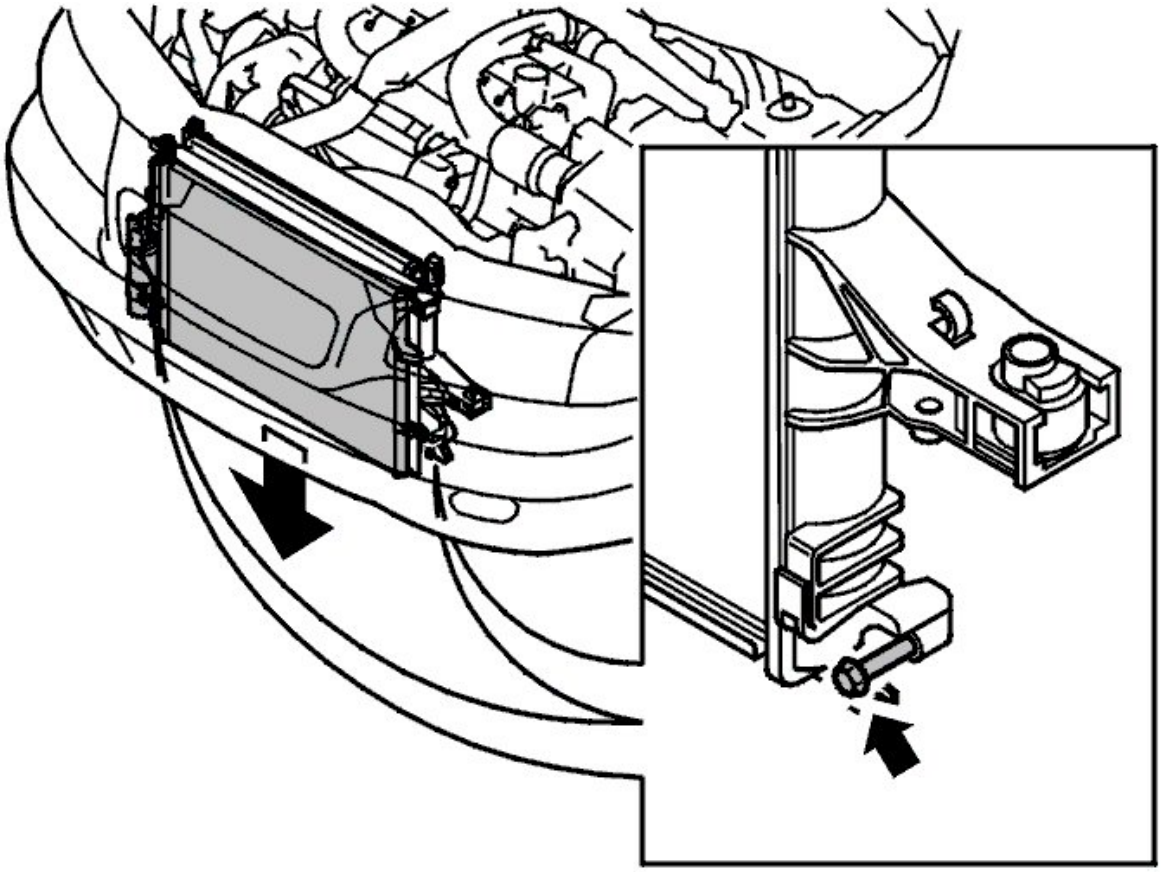
- the screw (1) for the cable harness on the front edge of the sub-frame.

Disconnect the connector from the condenser on the right side. Press the spring to disconnect the connector.

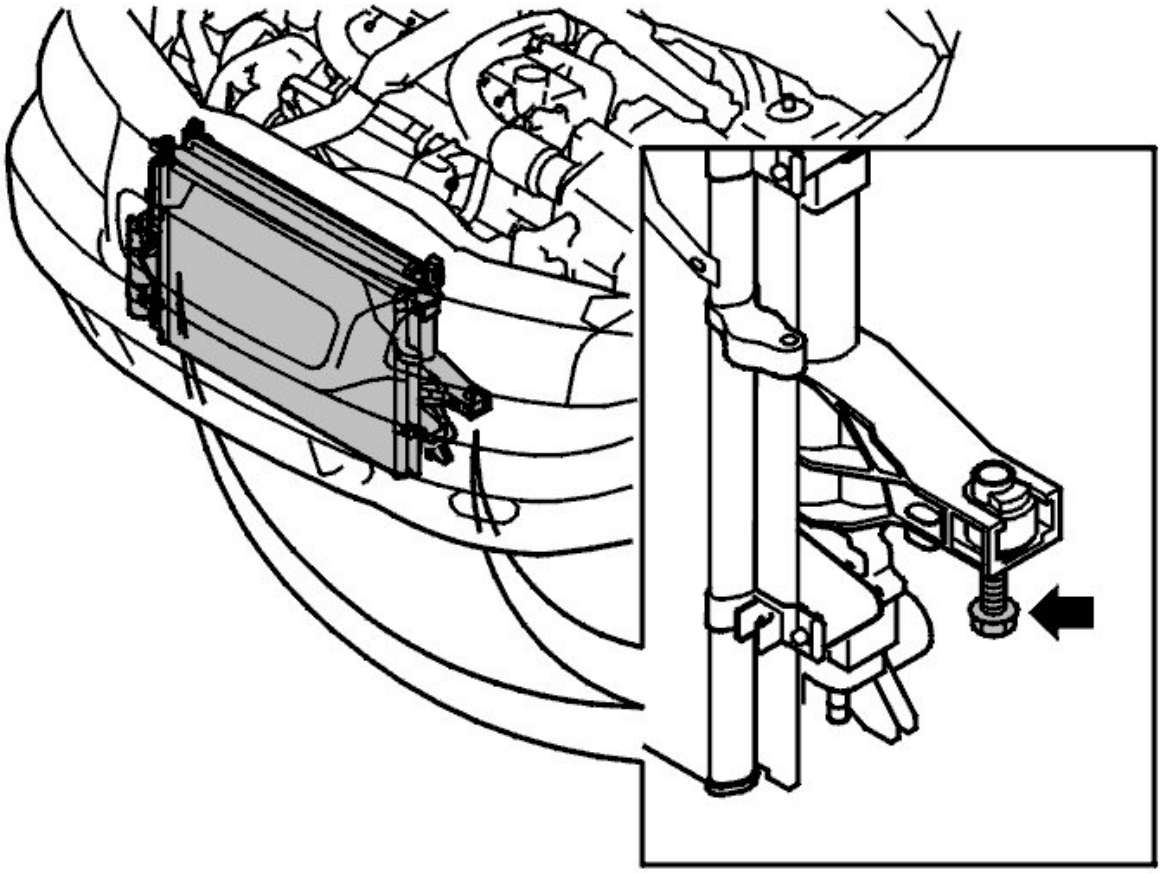
Drain the coolant

- Block the lower hose coolant hose with lock grip pliers
- Apply a hose on the nipple at the radiator
- Feed the hose down to a container
- Open the nipple and drain off the coolant.

Work under the car



Hang up the condenser using tie straps on the right-hand side in the pipe for the receiver drier and on the left-hand side in the pipe for the condenser.
Remove the lower screws holding the air conditioning aggregate.



Hint: The following step requires two people.

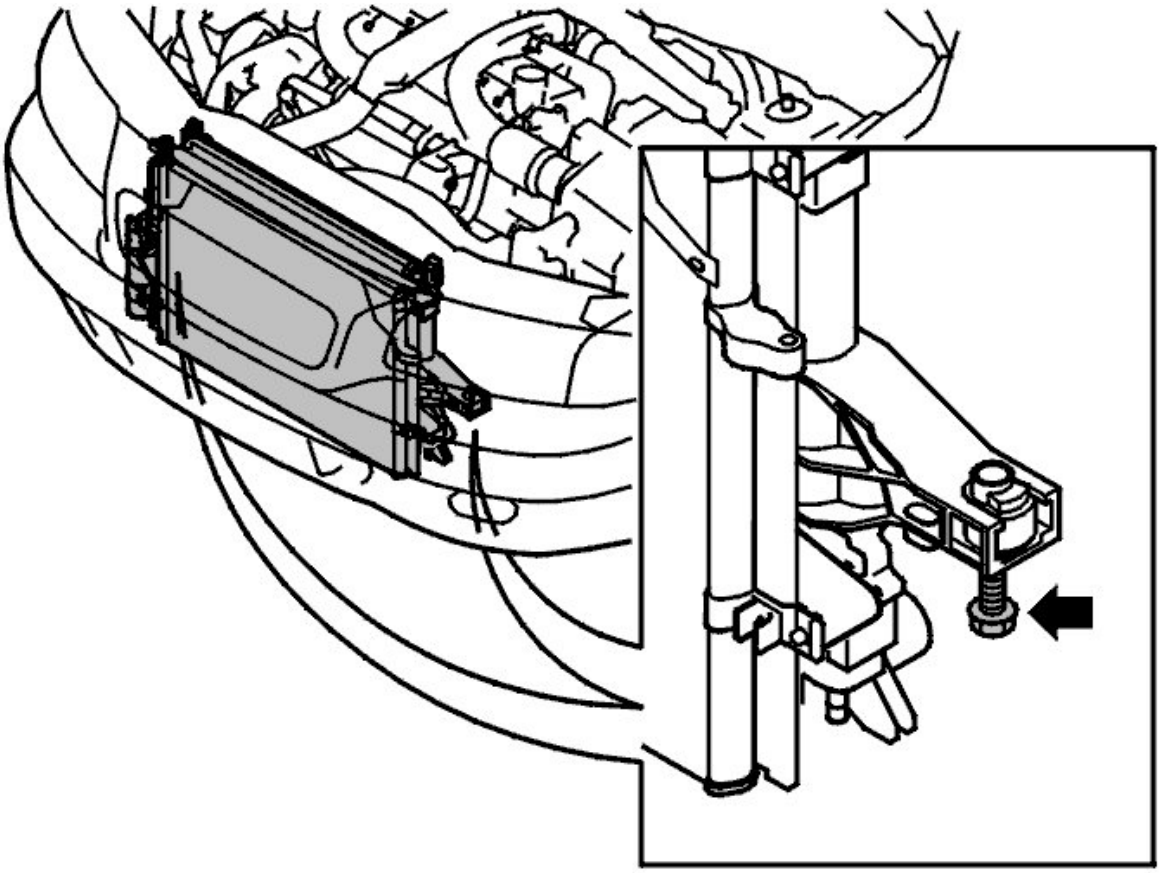
Disconnect the radiator and the charge air cooler (CAC) firstly from the left and then from the right-hand side by removing the two screws.
On the right-hand side, press the cable duct and the compressor hose towards the engine. At the same time release the radiator and charge air cooler (CAC) downwards on the right-hand side. Then release the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the radiator and charge air cooler (CAC) passes the AC pipe.

Disconnect the hose from the radiator to the expansion tank.
Remove the radiator / charge air cooler (CAC).

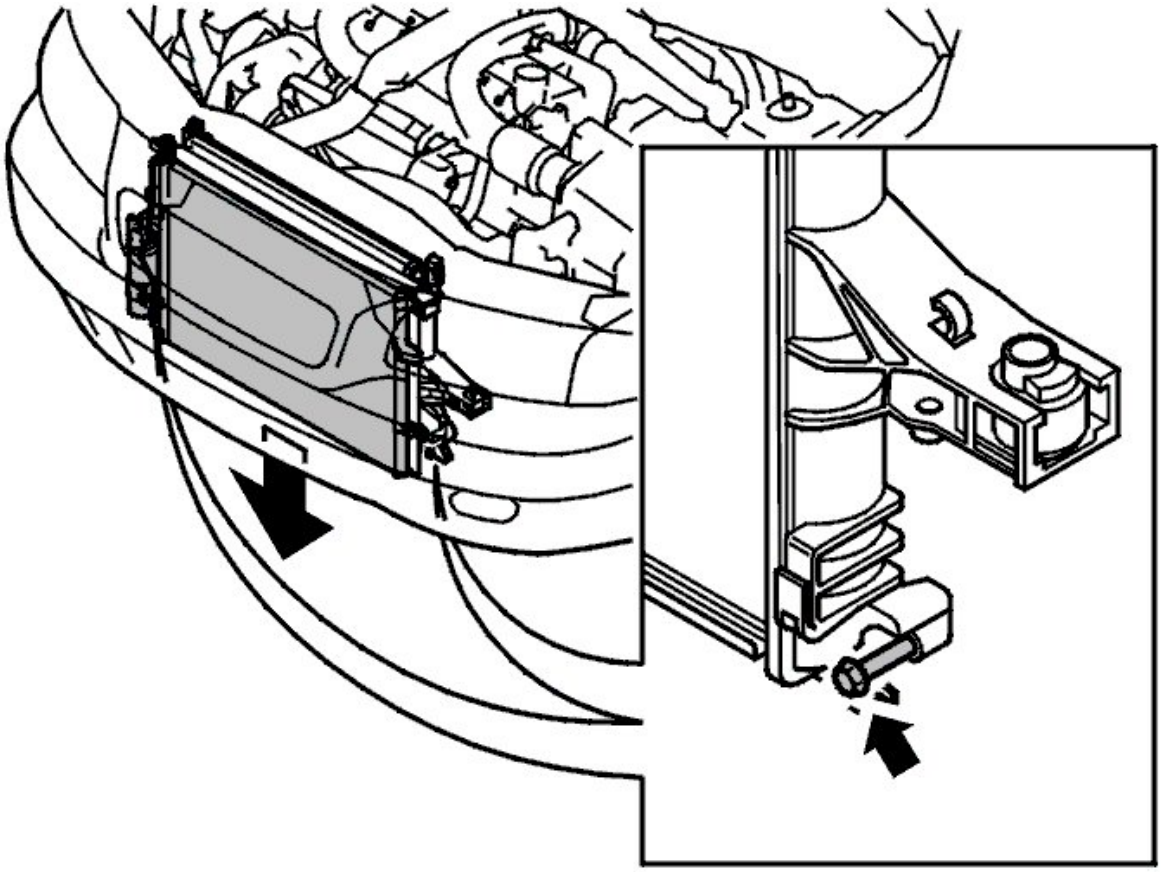
Installation

Installing the radiator and charge air cooler (CAC)

Hold the radiator unit. Secure the hose from the expansion tank to the radiator. Use a new clamp.
Check that the 2 plastic nuts are in position on the radiator.

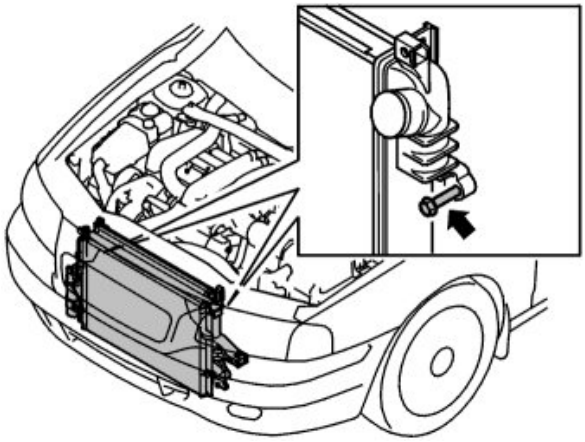


Lift up the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the charge air cooler (CAC) passes above the AC pipe. Lift the right-hand side while pressing the cable duct and the compressor hose towards the engine.
Thread the screws for the radiator and charge air cooler (CAC) into the member.
Connect the connector to the right-hand side of the condenser.

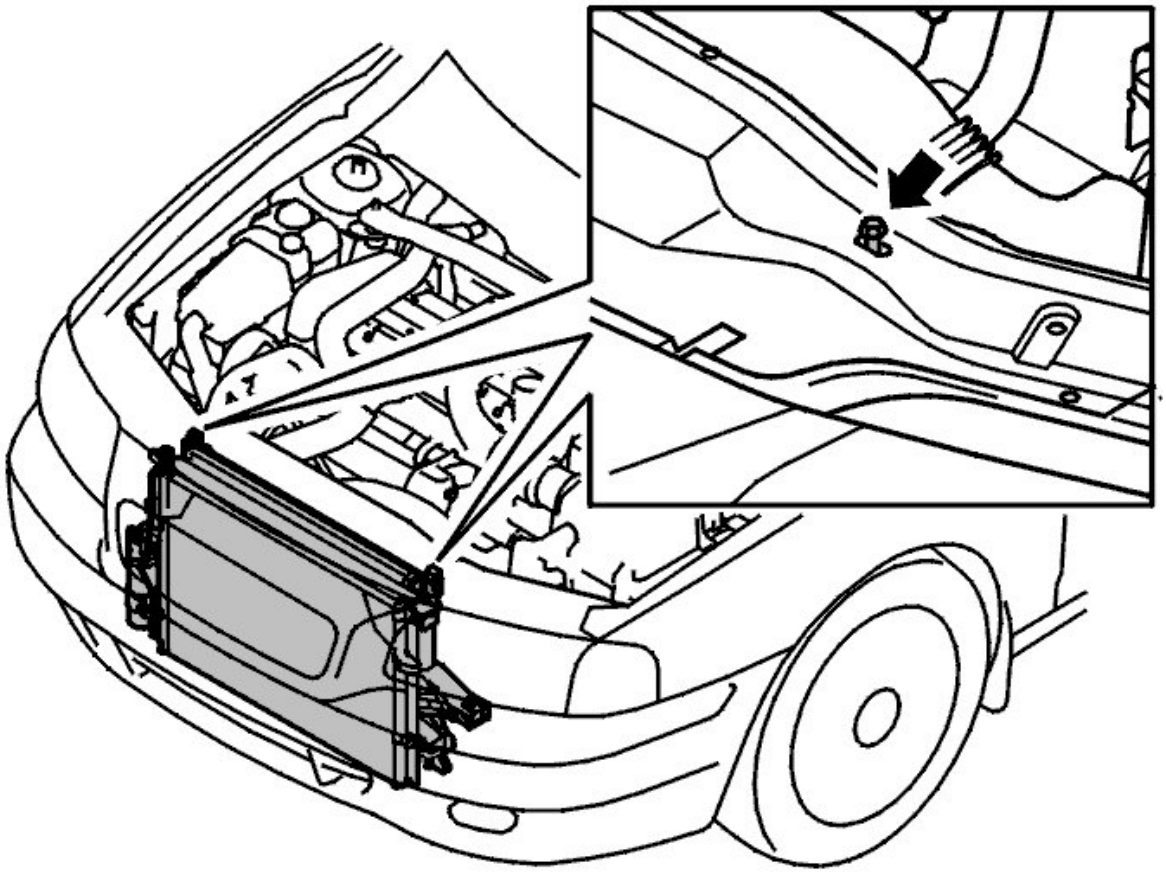


Install the lower screws to assemble the air conditioning aggregate. Tighten the screws. Tighten to **10 Nm**.
Remove the tie straps.
Check that the air conditioning aggregate is against the rubber seal. Secure.
Tighten the air conditioning aggregate to the member. Tighten to **25 Nm**.
Install the lower radiator hose.
Remove the lock grip pliers.
Install the screw for the mounting for the engine wiring cable duct at the front edge of the sub-frame.
Install the lower oil cooler hose on the air conditioning aggregate (automatic transmissions only).
Lower the car.

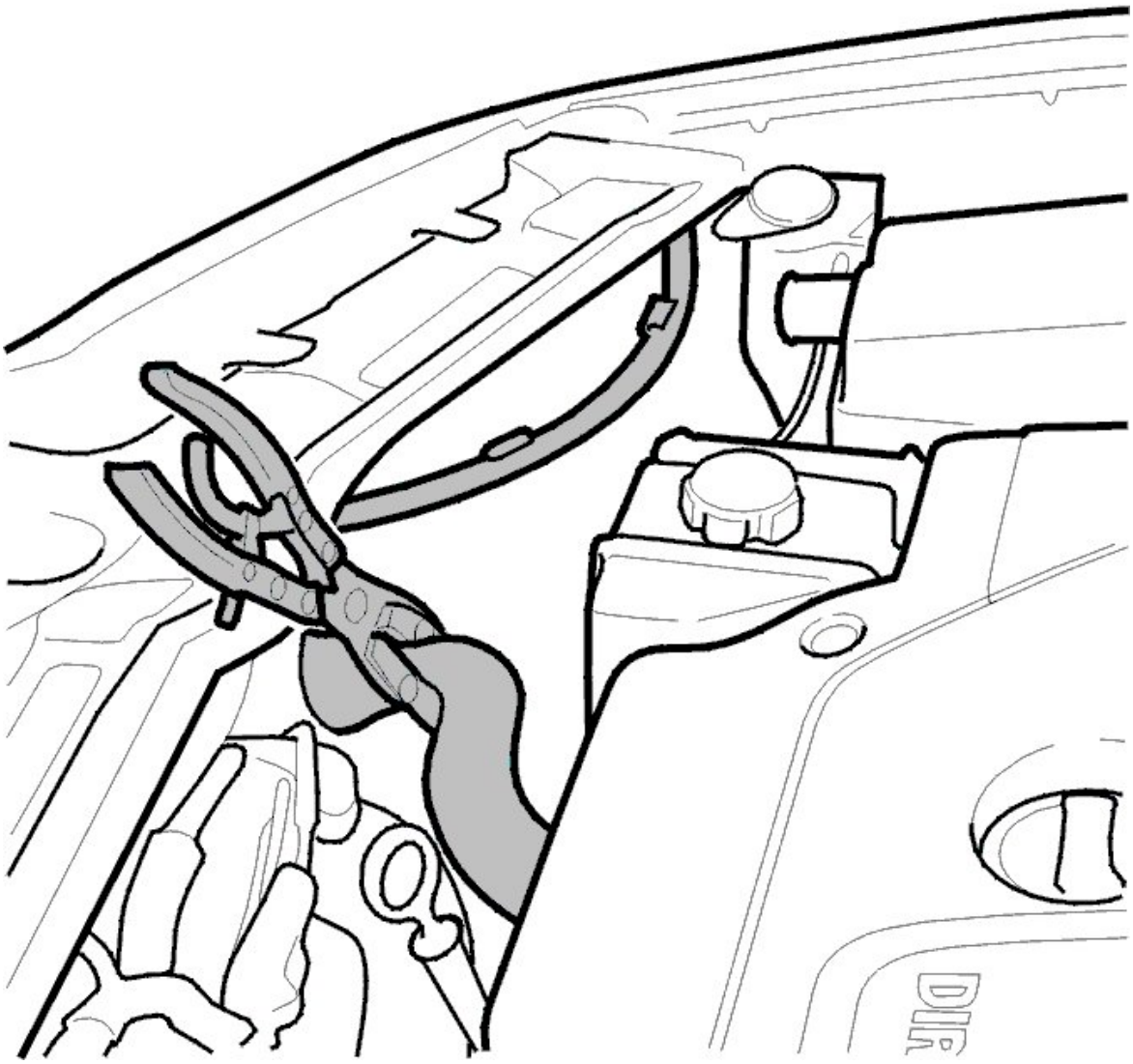
Installing the screws for the air conditioning aggregate



Install the upper screws to assemble the air conditioning aggregate. Tighten the screws. Tighten to **10 Nm**.



Install the screws for the air conditioning aggregate on the front cover plate. Tighten to **10 Nm**.



Install:

- the charge air pipe on the left and right-hand sides of the radiator
- the upper radiator hose.

Installing the engine cooling fan (FC)

To install the engine cooling fan (FC), see Engine cooling fan (FC), replacing See: Radiator Cooling Fan/Service and Repair.

Topping up the coolant

- Install the cap on the expansion tank
- Run the engine until the thermostat has opened
- Stop the engine. Top up if necessary.

Thermostat: Service and Repair
Thermostat

Thermostat / temperature sensor, engine coolant, replacing

Special tools:

951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve
999 5722 Wrench See: Tools and Equipment/999 5722 Wrench
999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
951 2953 Cover See: Tools and Equipment/951 2953 Cover
951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removing / installing

Removing the engine coolant temperature (ECT) sensor

Remove:

- the upper timing belt cover. Disconnect the connector for the temperature sensor
- the temperature sensor from the thermostat housing. Use 951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve.

Note! Put paper underneath the sensor to prevent coolant spillage.

Installing the engine coolant temperature (ECT) sensor

Install:

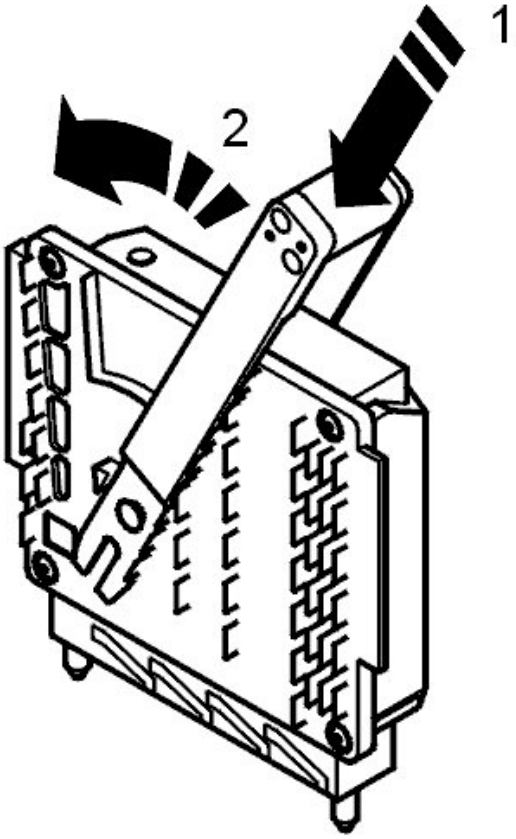
- the sensor with a new seal. Tighten. See: Tightening torque See: Engine/Specifications/Tightening Torque. Use: 951 2885 Sleeve See: Tools and Equipment/951 2885 Sleeve
- the upper timing belt cover.

Removal

Preparation

Remove the cap from the expansion tank. Install a hose clamp on the upper coolant hose.
The vehicle must be raised for this work. See: Jacking points, body See: Maintenance/Vehicle Lifting/Service and Repair. Remove the lower cover plate.
Position a container under the engine drain cock. Drain **2 liters** of engine coolant.
Close the cock. Install the lower protective panel.
Lower the vehicle.

Removing the engine control module (ECM)

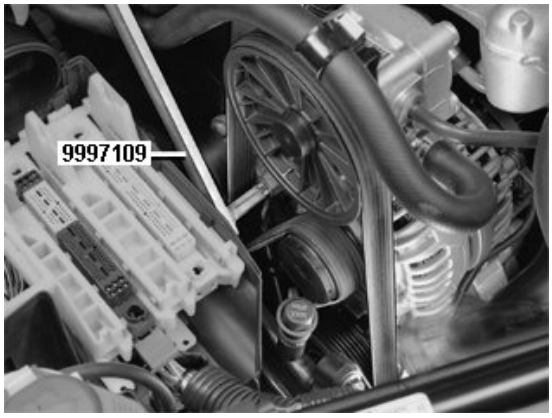


Ignition off. Wait for 2 minutes.

Caution! Do not touch the terminal pins on the control module with fingers. Static electricity may damage components in the engine control module (ECM).

Remove the cover over the control module box. Put the cover to one side.
Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
Move the upper section of the tool backwards as far as it will go. Pull up the tool. Carefully pull up the control module.
For vehicles with automatic transmissions repeat the above work.
Remove the surround from around the control module box.

Removing the auxiliaries belt



Note! Make a note of the routing of the belt.

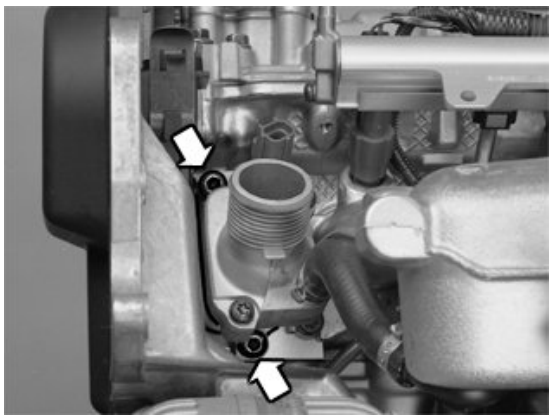
Remove:

- the auxiliaries belt. Use 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
- the upper timing belt cover.

Removing the power steering pump

Remove the 3 x screws for the power steering pump. Place the power steering pump to one side.

Removing the thermostat housing



Remove:

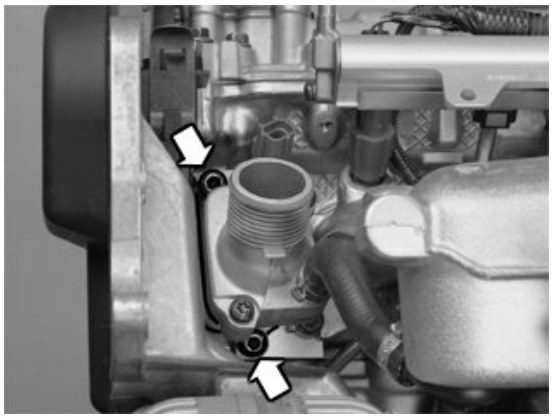
- the hose clamp to the upper radiator hose. Disconnect the hose from the thermostat housing
- the connector from the temperature sensor
- the 2 x screws for the thermostat housing at the section against the cylinder head
- the thermostat housing from the cylinder head
- the hose clamp for the water hose for heating crankcase ventilation.

Transfer the temperature sensor to the new thermostat housing.

Installation

Note! For tightening torques, see: Tightening torque See: Engine/Specifications/Tightening Torque.

Installing the thermostat housing



Install:

- the hose for the water heated crankcase ventilation. Before installing the thermostat housing, use a new hose clamp
- a new gasket
- the thermostat housing assembly. Tighten the screws
- the upper radiator hose. Tighten the hose clamp.

Connect the connector for the temperature sensor.

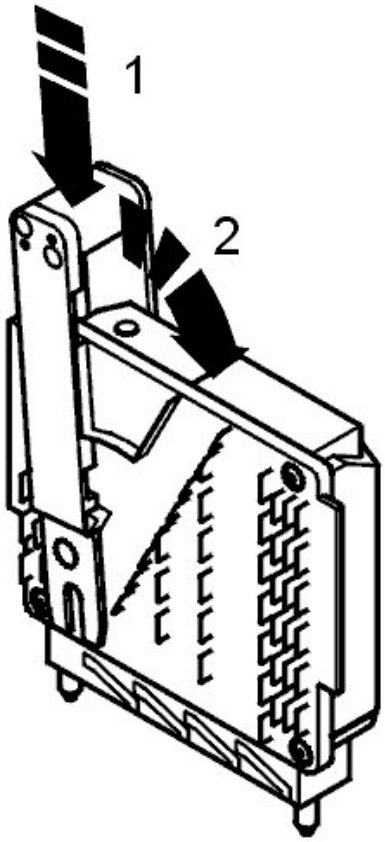
Finishing

Note! Ensure that the auxiliaries belt is correctly positioned on all the pulleys.

Install:

- the power steering pump. Tighten the 3 x screws
- the auxiliaries belt. Use 999 7109 Wrench See: Tools and Equipment/999 7109 Wrench
- the upper camshaft cover.

Installing control modules



Caution! Check that no pins or sockets are damaged on the connector.

Install the surround for the control module box.
Carefully press the control module down into the grooves on the inside of the control module box. Press to the limit position
Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
Move the upper section of the tool forwards as far as it will go. Pull up the tool.
Press the cover into place over the control modules. Check that the air ducts are correctly positioned.

Finishing

Remove the hose clip. Refill with coolant. Use filling equipment 951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir and cover 951 2953 Cover See: Tools and Equipment/951 2953 Cover. Install the cap on the expansion tank.
Test drive the engine until the thermostat has opened. Check for leakage. Top-up the coolant.

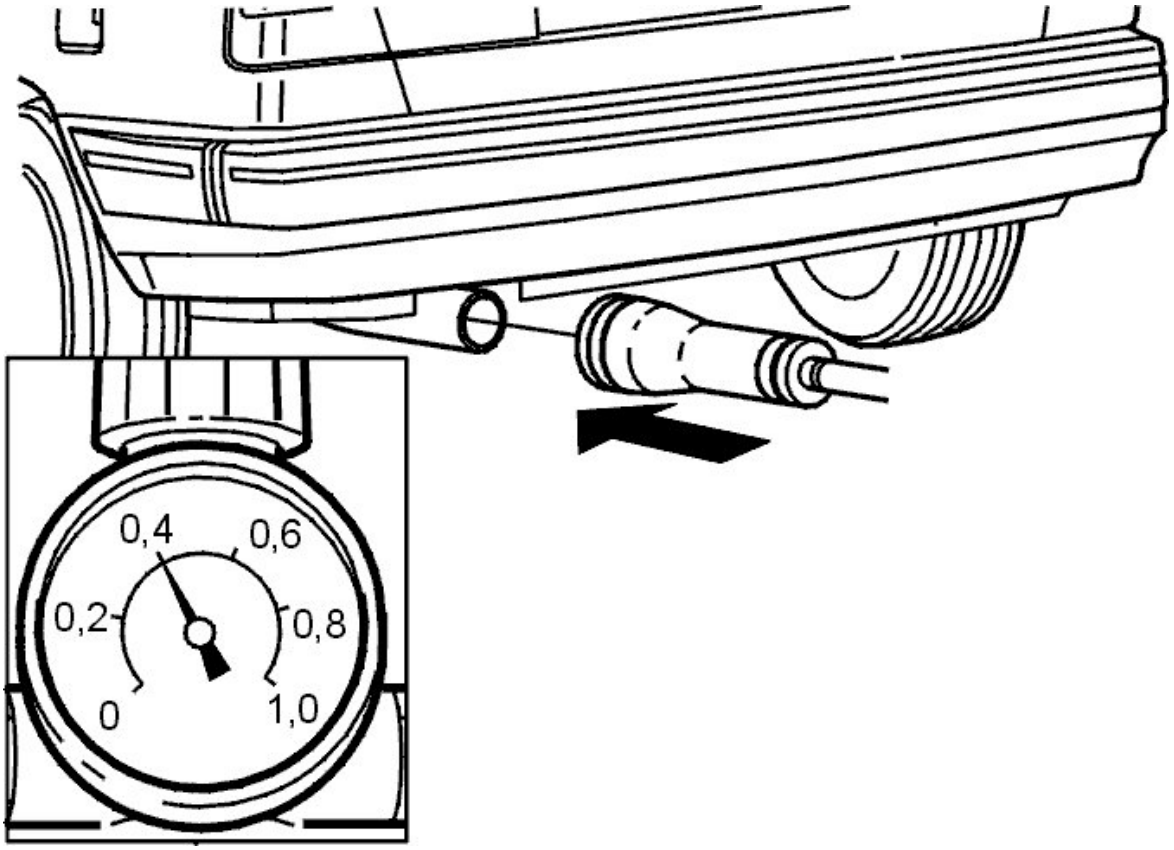
Exhaust System: Testing and Inspection
Checking for Air Leakage in the Exhaust System, B5244T5, B5254T2

Checking for air leakage in the exhaust system

Special tools:

999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
999 5546 ADAPTOR See: Tools and Equipment/999 5546 Adaptor

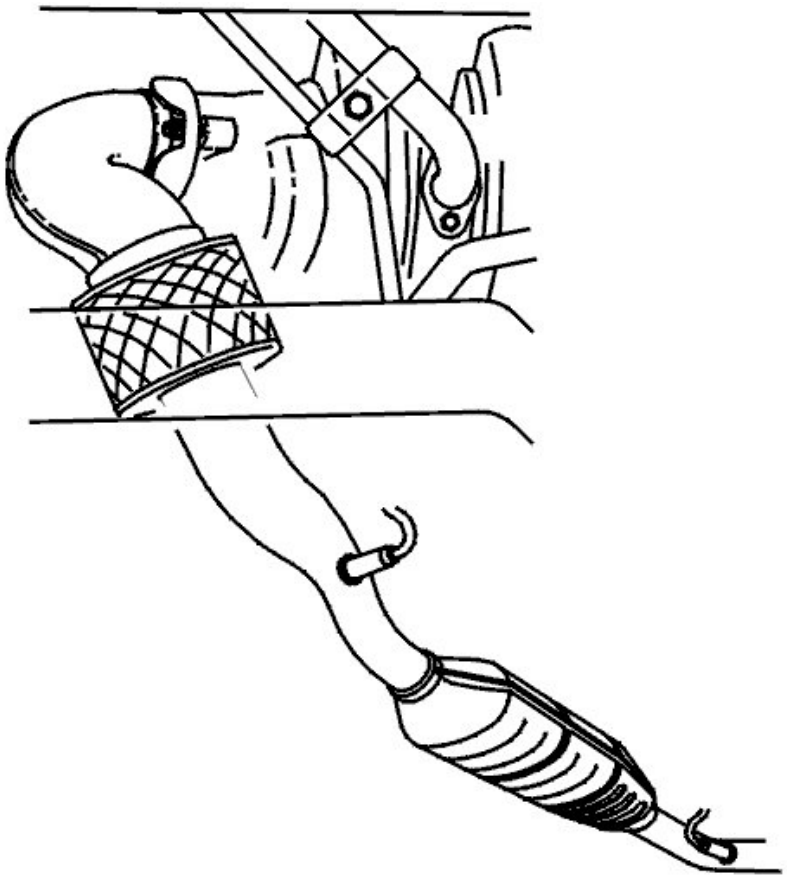
Connecting



Caution! If the car has been driven recently the exhaust system can be very hot, let it cool down a little. Otherwise the special tool may get burnt.

Remove the exhaust tail pipe.
Install tool 999 5546 ADAPTOR See: Tools and Equipment/999 5546 Adaptor with pressure regulator999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator on the exhaust system.
Adjust the pressure to **0.4 bar**. Depending on the condition of the exhaust system a **lower** pressure may be necessary.

Check



Check exhaust system by spraying a soap solution on all joints and connections between cylinder head and rear heated oxygen sensor (HO2S).
Only very small and slow bubbles are permissible.
Install tail pipe on exhaust system after check.

Exhaust System: Testing and Inspection
Air Leakage Exhaust System, Check

Checking for air leakage in the exhaust system

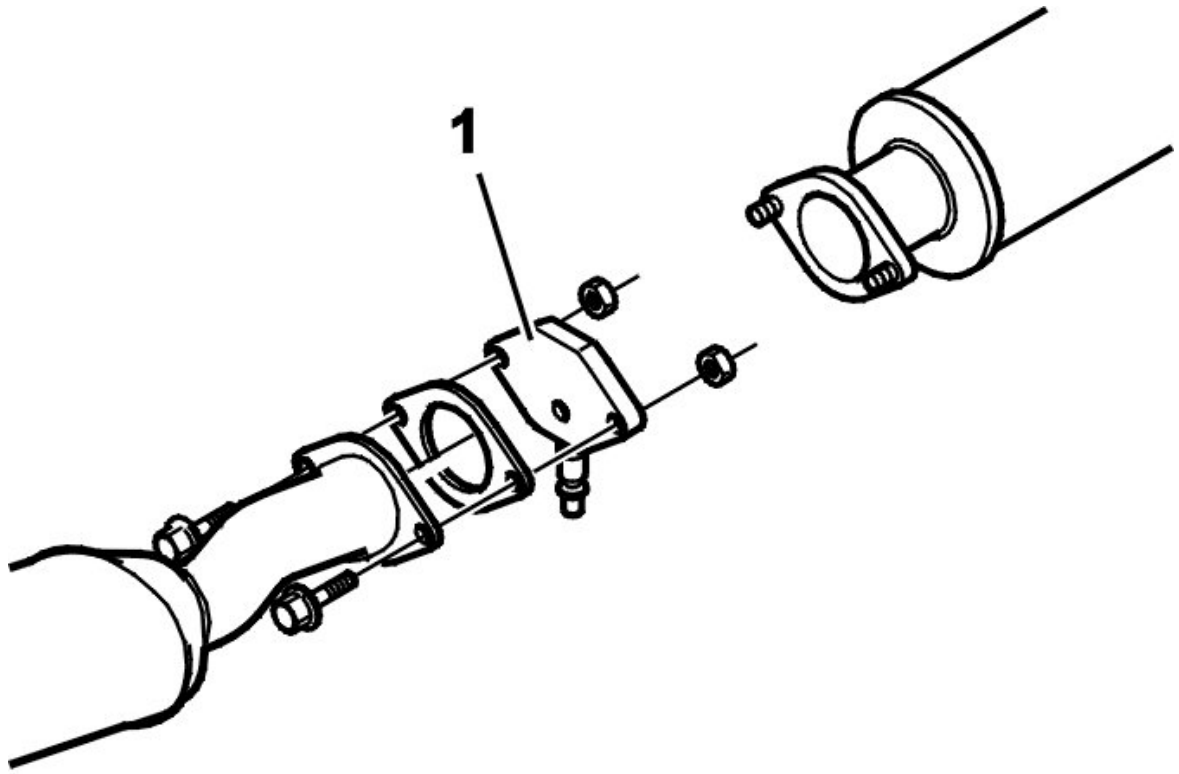
Special tools:

999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
999 7085 Adapter See: Tools and Equipment/999 7085 Adapter

Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Preparatory work

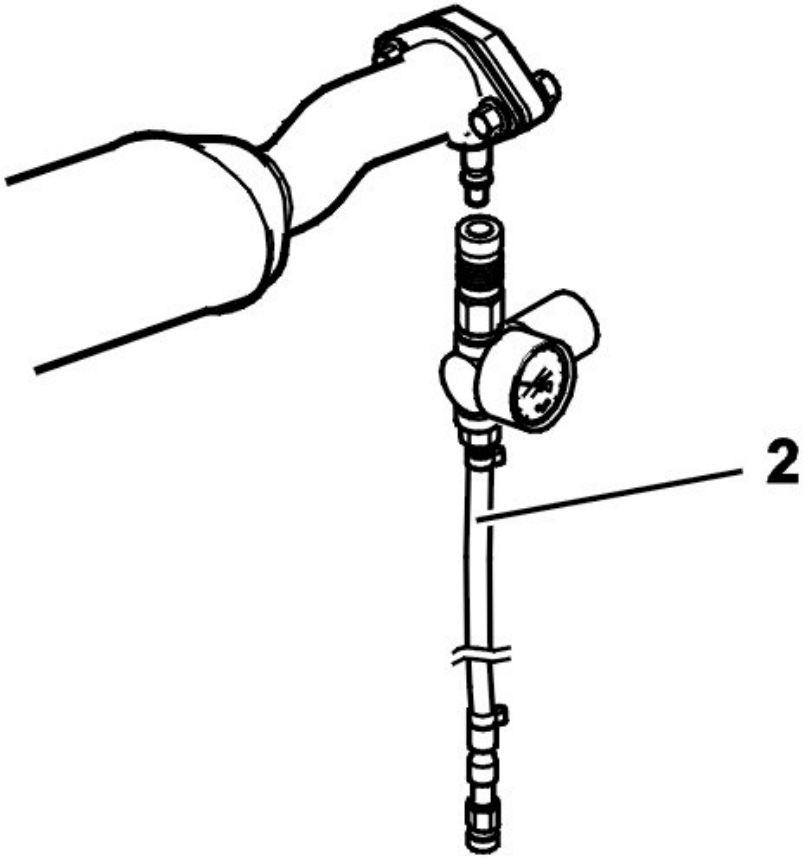
Removing components



Remove:
- the nut where the three-way catalytic converter (TWC) and exhaust system separate
  Note! Use rust solvent or similar on the nuts.

the gasket. Separate the exhaust system from the three-way catalytic converter (TWC).

Installing tool



Install:

- The tool (1) 999 7085 Adapter See: Tools and Equipment/999 7085 Adapter using a new gasket
- pressure regulator 999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator on tool 999 7085 Adapter See: Tools and Equipment/999 7085 Adapter. Adjust the pressure to **0.4 bar**.

Cleaning and checking

Check

Check the exhaust system by spraying a soap solution on all joints and connections between the cylinder head and the rear heated oxygen sensor (HO2S). Only very small and slow bubbles are permissible.

Finishing

Removing tools

Remove:

- pressure regulator 999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
- tool 999 7085 Adapter See: Tools and Equipment/999 7085 Adapter.

Installing components

Install:

- a **new** gasket where the exhaust system and three-way catalytic converter (TWC) divide
- a **new** nut for the exhaust system. Tighten.

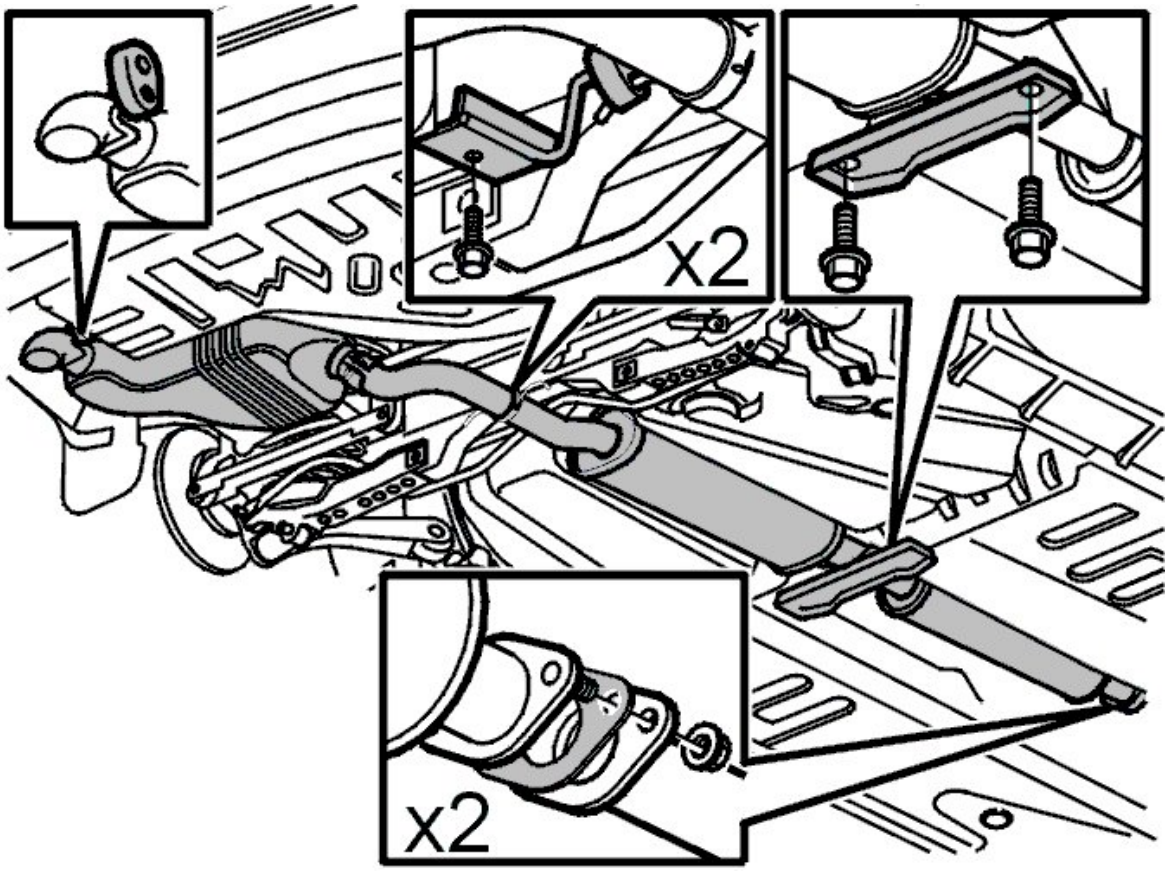
Start the engine. Check for leaks where the three-way catalytic converter (TWC) and the exhaust system divide.

Exhaust System: Service and Repair

Exhaust system, replacing

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the exhaust system

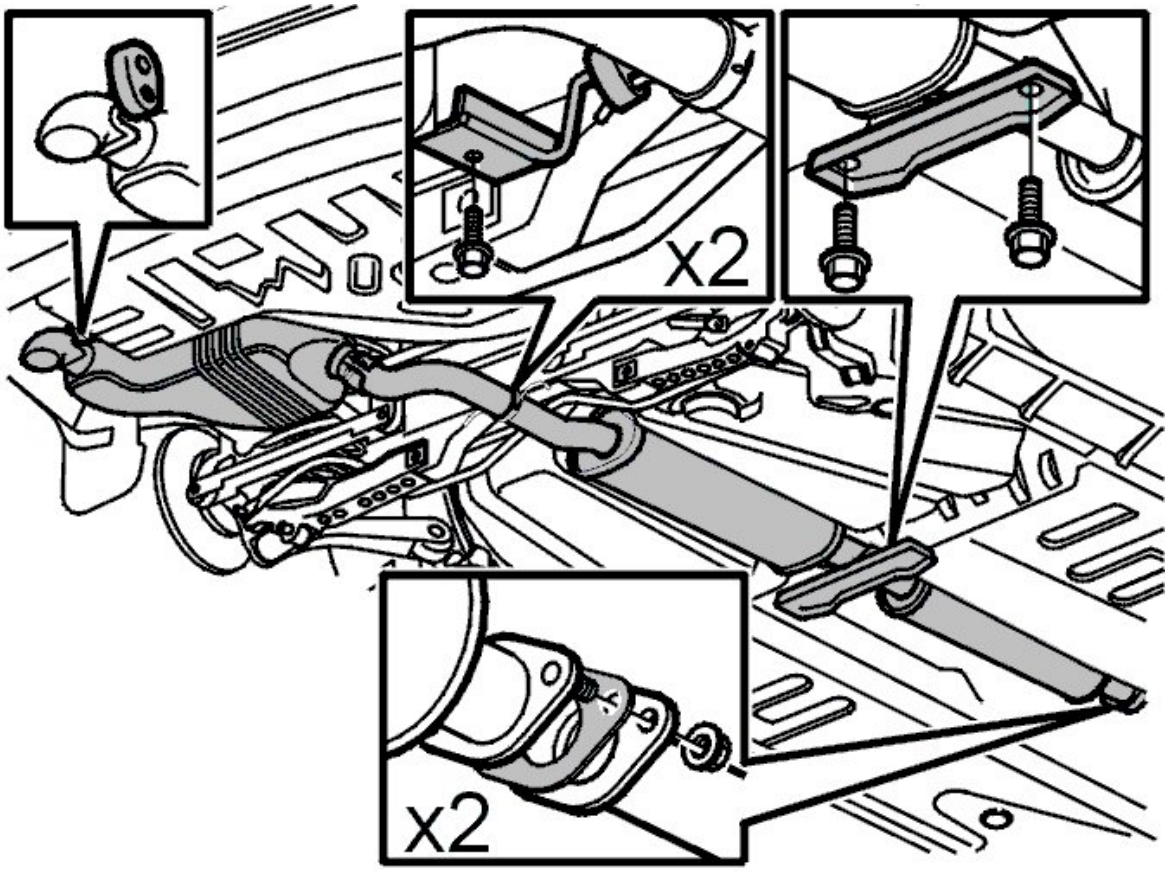


- Raise the car
- Remove the old exhaust pipe. Begin from the front.

Installing the exhaust system

Note! To ensure that there is no exhaust leakage, see: Flanged joint, assembling See: Exhaust Pipe/Service and Repair.

Note! The new exhaust system is supplied in two sections.



Install:

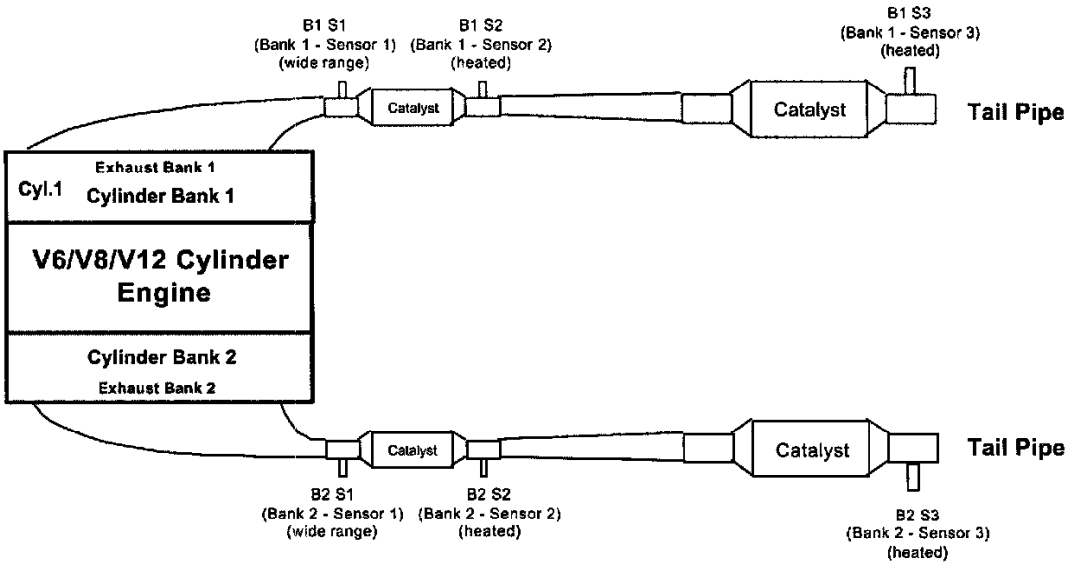
- the front section of the exhaust system. Use a new flange gasket. Do not tighten
- the rear section with the pipe clamp
- the mountings for the exhaust system.

Adjust the position of the exhaust system and tighten:

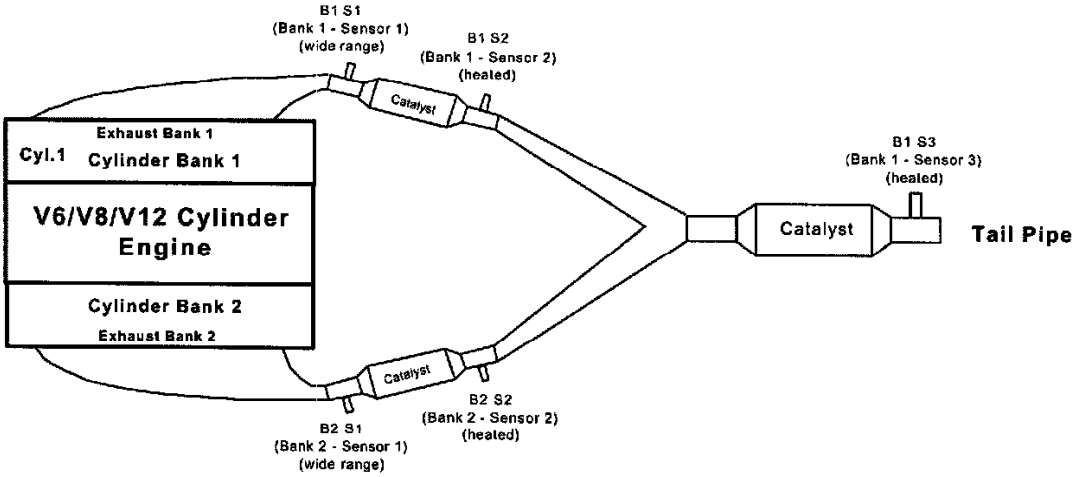
- the screws and the nuts for the flange gasket
- the pipe clamp.

Catalytic Converter: Application and ID

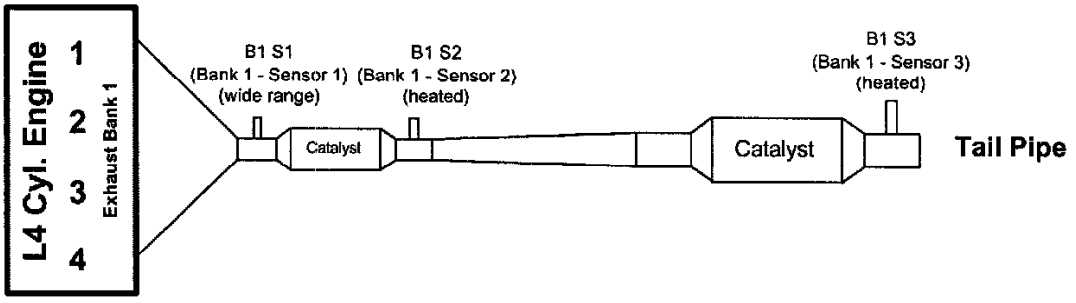
Oxygen Sensor and Catalyst Configuration Example



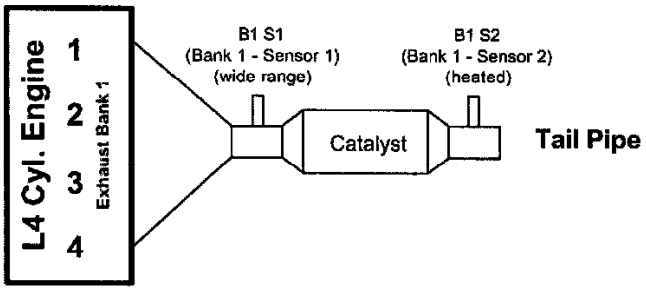
V6/V8/V12 Engine W/2 Exhaust Banks & 4 Catalysts



V6/V8/V12 Engine W/2 Exhaust Banks & 3 Catalysts



L4 Engine W/1 Exhaust Banks & 2 Catalysts



Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

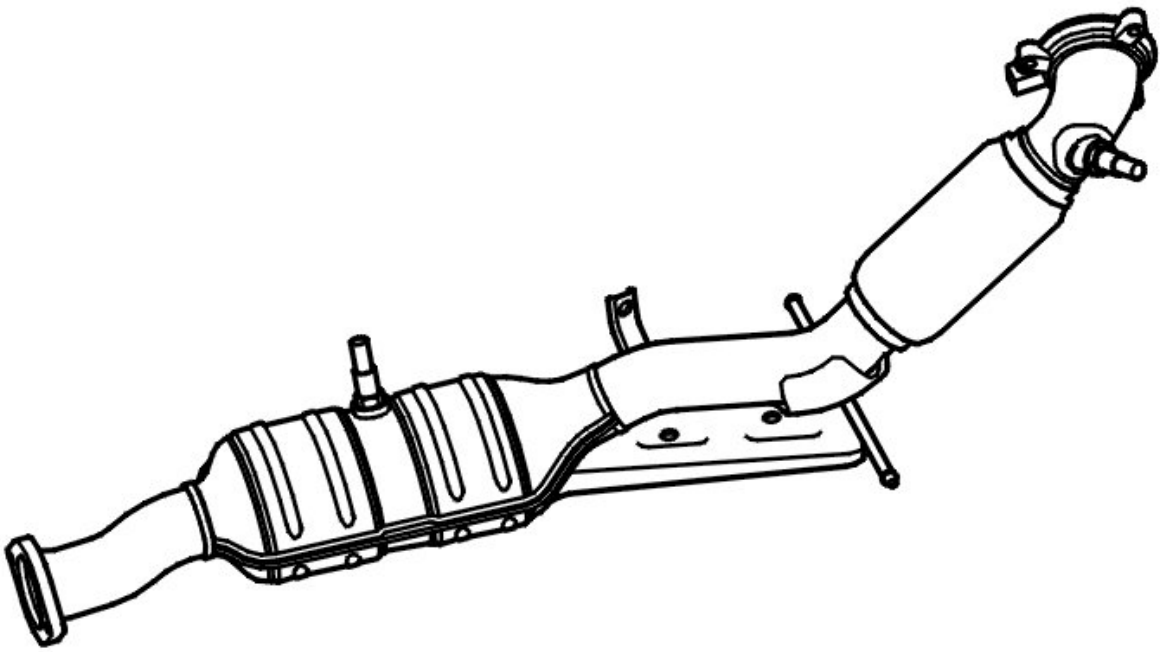
L4 Engine W/1 Exhaust Banks & 1 Catalysts

Catalytic Converter: Description and Operation
Catalytic Converter (TWC) Diagnostic

Catalytic converter diagnostic

- For 5 cylinder engines, see Catalytic converter diagnostics 5 cylinder
- For 6 cylinder engines, see Catalytic converter diagnostics 6 cylinder.

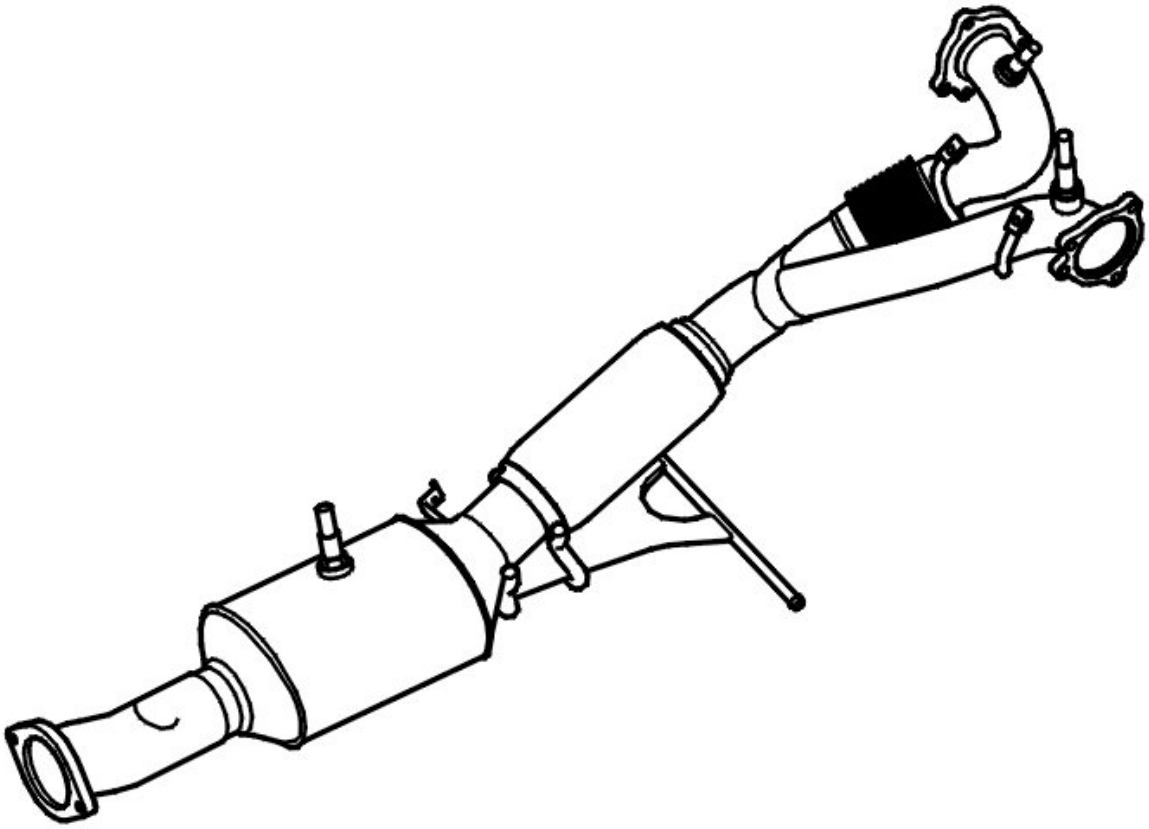
Catalytic converter diagnostics 5 cylinder



The three-way catalytic converter (TWC) stores oxygen from the exhaust gases and uses it to make toxic gases more environmentally friendly. The catalytic converter is a 3 way catalytic converter in which HC (hydrocarbons) and CO (carbon monoxide) are oxidized and NOx(nitrous oxide) is reduced. As the three-way catalytic converter (TWC) ages its ability to store oxygen drops. This reduces the conversion capacity of the three-way catalytic converter (TWC). To avoid dangerous emissions the engine control module (ECM) checks three-way catalytic converter (TWC) efficiency. In brief, this check is carried out as follows.
Two heated oxygen sensors (HO2S) are used to check the three-way catalytic converter (TWC), one upstream of the converter and one in the center of the converter (the rear heated oxygen sensor (HO2S)). The main function of the heated oxygen sensors (HO2S) is to measure the oxygen content in the exhaust gases so that the engine control module (ECM) can maintain the fuel / air mixture at around lambda=1. This mixture allows for optimum catalytic conversion. To determine catalytic converter efficiency the amplitude of the heated oxygen sensor (HO2S) signals is compared (amplitude is a measure of signal oscillation).
When efficiency of the catalytic converter is good and the fuel / air mixture is normal, the front probe signal switches between rich and lean while the rear probe signal is steady. If the three-way catalytic converter (TWC) efficiency is poor but the fuel / air mixture is normal, the rear probe signal will also switch between rich and lean. This is because the exhaust gases flow straight through the three-way catalytic converter (TWC) without being acted on. If the amplitude of the rear sensor becomes too great in relation to the amplitude of the front sensor for a number of checks, a diagnostic trouble code (DTC) will be stored for catalytic converter efficiency.

Catalytic converter diagnostics 6 cylinder

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The three-way catalytic converter (TWC) stores oxygen from the exhaust gases and uses it to make toxic gases more environmentally friendly. The catalytic converter is a 3 way catalytic converter in which HC (hydrocarbons) and CO (carbon monoxide) are oxidized and NOx(nitrous oxide) is reduced. As the three-way catalytic converter (TWC) ages its ability to store oxygen drops. This reduces the conversion capacity of the three-way catalytic converter (TWC). To avoid dangerous emissions the engine control module (ECM) checks three-way catalytic converter (TWC) efficiency. In brief, this check is carried out as follows.

Three heated oxygen sensors (HO2S) check the common catalytic converter. One heated oxygen sensor (HO2S) is in front of the three-way catalytic converter (TWC) for each bank of cylinders and a common rear heated oxygen sensor (HO2S) in the center of the three-way catalytic converter (TWC). The main function of the heated oxygen sensors (HO2S) is to measure the oxygen content in the exhaust gases so that the engine control module (ECM) can maintain the fuel / air mixture at around lambda=1. This mixture allows for optimum catalytic conversion. To determine catalytic converter efficiency the amplitude of the heated oxygen sensor (HO2S) signals is compared (amplitude is a measure of signal oscillation). When efficiency of the catalytic converter is good and the fuel / air mixture is normal, the front probe signals for banks 1 and 2 switch between rich and lean while the rear probe signal is steady. If the three-way catalytic converter (TWC) efficiency is poor but the fuel / air mixture is normal, the rear probe signal will also switch between rich and lean. This is because the exhaust gases flow straight through the three-way catalytic converter (TWC) without being acted on. If the amplitude of the rear sensor becomes too great in relation to the amplitude of the front sensor for a number of checks, a diagnostic trouble code (DTC) will be stored for catalytic converter efficiency.

Catalytic Converter: Description and Operation
Three-way Catalytic Converter (TWC) Diagnostics

Three-way catalytic converter (TWC) diagnostics

The three-way catalytic converter (TWC) stores oxygen from the exhaust gases and uses it to make toxic gases more environmentally friendly. The catalytic converter is a 3 way catalytic converter in which HC (hydrocarbons) and CO (carbon monoxide) are oxidized and NOx(nitrous oxide) is reduced. As the three-way catalytic converter (TWC) ages, its ability to store oxygen is reduced. The conversion capacity of the three-way catalytic converter (TWC) is reduced and unburned residue which is harmful to environment is released. To reduce the environmentally damaging emissions, the engine control module (ECM) checks the efficiency of the three-way catalytic converter (TWC). In brief, this check is carried out as follows.
Two heated oxygen sensors are used to check the three-way catalytic converter (TWC). One is upstream of the converter and one is in the center of the converter (the rear heated oxygen sensor).
The main function of the heated oxygen sensors is to measure the oxygen content in the exhaust gases so that the engine control module (ECM) can maintain the fuel/air mixture at around lambda=1. This mixture allows for optimum catalytic conversion.
To evaluate the efficiency of the three-way catalytic converter (TWC) one uses a deviation added to the lambda signal.
This means that 8 to 15 minutes after the engine is started (depending on the market) catalytic converter diagnostics start.
The process is as follows:
A deviation is added to the lambda signal and the engine control module (ECM) is allowed to correct this.
The deviation switches between positive and negative values so that the fuel/air mixture switches between rich and lean.
A counter registers the number of switches occurring while the diagnostic is taking place.
If the rear heated oxygen sensor registers a large number of switches exceeding a parameter, a diagnostic trouble code (DTC) for three-way catalytic converter (TWC) efficiency will be stored.
If the parameter is not exceeded the three-way catalytic converter (TWC) is deemed to be operating well.

Note! In a poorly operating three-way catalytic converter (TWC) the switches caused by the deviation will quickly exceed the parameter. This is because the exhaust gases in principle pass straight through the three-way catalytic converter (TWC) without being cleaned. If the three-way catalytic converter (TWC) is operating well the switches will be slower as it takes a longer time for the variations to make themselves felt.

Catalytic Converter: Service and Repair

Three-way catalytic converter (TWC), replacing

Special tools:

999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S

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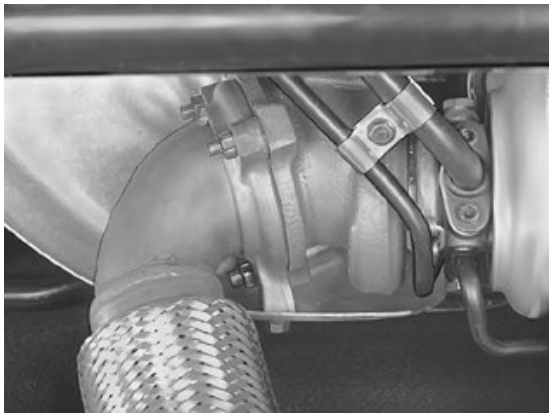
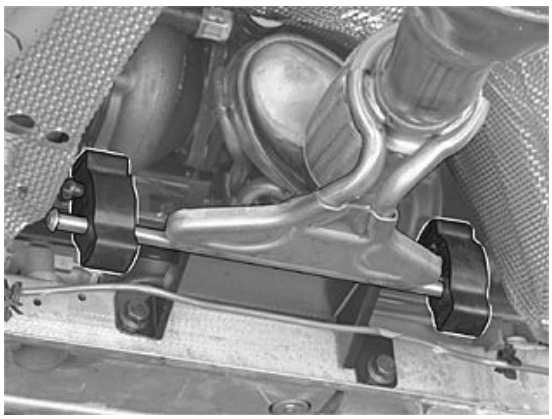
Removing the three-way catalytic converter (TWC)



Remove:

- the wiring for the front heated oxygen sensor (HO2S) from the clips and clamps. Separate the wiring. Raise the car
- the lower engine cover
- the front SIPS member. Unhook the brake pipe from the clips
- the lower screw in the heat deflector plate on the turbocharger (TC)
- the nuts for the flange between the turbocharger (TC) and the three-way catalytic converter (TWC).

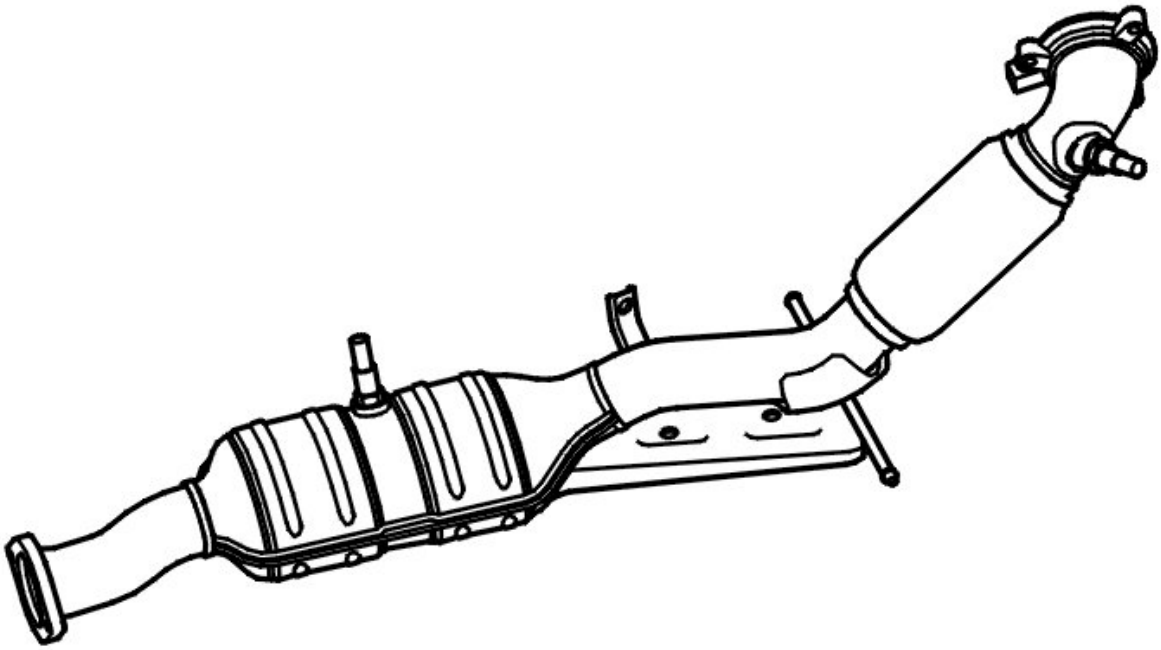
Hint: Use rust solvent or similar.



Remove:

- the rubber mounting for the three-way catalytic converter (TWC)
- the nuts for the flange between the three-way catalytic converter (TWC) and exhaust system
- the wiring for the rear heated oxygen sensor (HO2S) from the clips and clamps. Separate the wiring
- the three-way catalytic converter (TWC).

Transferring components



- Transfer the rear and front heated oxygen sensors (HO2S). Use tool 999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S.

  Caution! Do not mix up the heated oxygen sensors (HO2S).

- Tighten.

Installing the three-way catalytic converter (TWC)

Note! For tightening see Tightening torque See: Engine/Specifications/Tightening Torque.

Note! To ensure that there is no exhaust leakage, see: Flanged joint, assembling See: Exhaust Pipe/Service and Repair.

Lubricate the studs on the turbocharger (TC). Use paste, P/N: 1161408. Avoid skin contact with the paste.

Install:

- the three-way catalytic converter (TWC). Use new nuts and gaskets. Tighten. See Tightening torque See: Engine/Specifications/Tightening Torque
- the wiring for the rear heated oxygen sensors (HO2S) using the clips and the clamps. Connect the wiring
- the rubber mounting for the three-way catalytic converter (TWC)
- the lower screw in the heat deflector plate above the turbocharger (TC)
- the SIPS (side impact protection system) member. Secure the brake pipe to the member
- the lower engine cover.

Lower the car.
Install the wiring for the front heated oxygen sensor (HO2S) using clips and clamps. Connect the wiring.

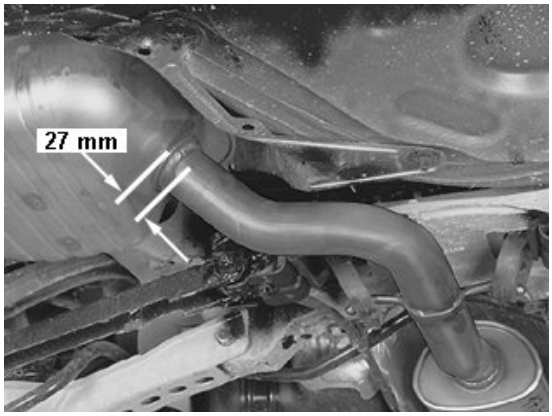
Final check

Start the engine. Check for exhaust leakage.

Muffler: Service and Repair

Muffler, rear, replace

Removing the rear muffler



Measure **27 mm** from the muffler and along the pipe. **See illustration!**

Mark and cut the pipe. Use pipe cutter 115 8590 PIPE CUTTER See: Tools and Equipment/115 8590 Pipe Cutter.
Remove the muffler.

Installing the rear muffler

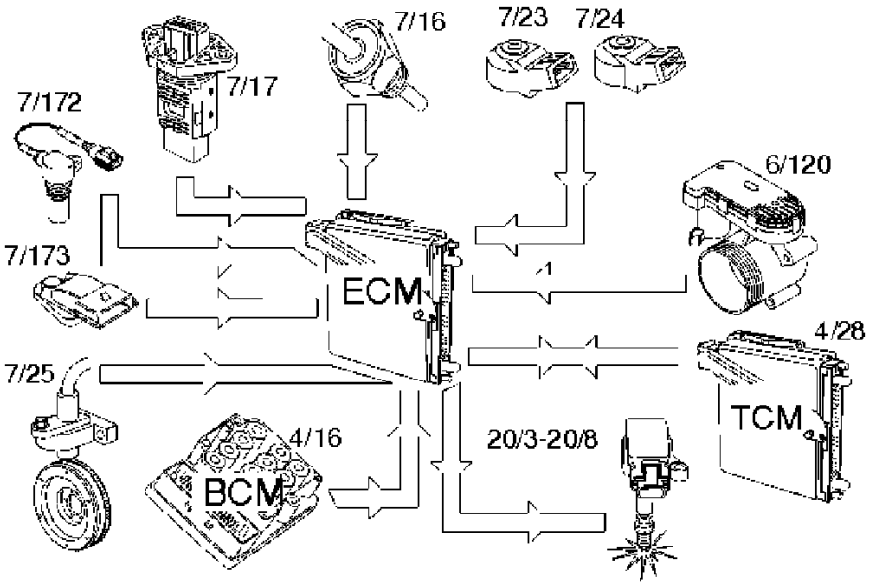
Polish the pipe with emery cloth.
Install a **new muffler**.
Tighten the clamp.

Check

Test run the engine. Check that the joint is properly sealed.

Ignition System: Description and Operation
Ignition Control

Ignition Control



The following components are used for ignition control:
- engine speed (RPM) sensor (7/25)
- camshaft position (CMP) sensor (7/172-7/173)
- mass air flow (MAF) sensor (7/17)
- engine coolant temperature (ECT) sensor (7/16)
- throttle position (TP) sensor on the electronic throttle unit (6/120)
- knock sensor (KS) (7/23-7/24)
- transmission control module (TCM) (4/28)
- spark plugs with ignition coils (20/3-20/8)
- brake control module (BCM) (4/16).

The engine control module (ECM) calculates the optimum ignition advance based on the software and information from the sensors. The engine control module (ECM) cuts the current to the ignition coil mounted on the cylinder to be ignited and produces a spark.

During the starting phase the engine control module (ECM) produces a fixed ignition setting.

When the engine starts and the car is driven the engine control module (ECM) calculates the optimum ignition setting according to the engine speed (RPM), load, temperature etc.

The engine control module (ECM) analyses the signal from the knock sensors (KS) when the engine reaches operating temperature. If any of the cylinders knock, the ignition is retarded for that specific cylinder until the knocking ceases.

The ignition then advanced to the normal position or until the knock recurs.

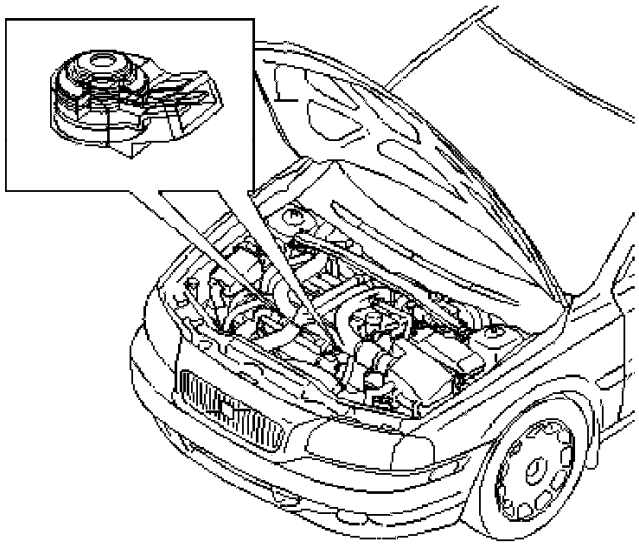
Before the transmission control module (TCM) changes gear, it sometimes transmits a torque limiting request to the engine control module (ECM). The engine control module (ECM) then retards the ignition momentarily to reduce the torque, resulting in smoother gear changes and reducing the load on the transmission. There are different ignition retardation levels depending on the signals from the transmission control module (TCM). The return signal from the engine control module (ECM) to the transmission control module (TCM) confirms that the signal reached the engine control module (ECM). The Brake Control Module (BCM) transmits information to the engine control module (ECM) about deviations in the drive line.

The signal is used to stop the diagnosis. For further information, also see Misfire diagnostics.

The engine misfires if the fuel does not ignite correctly. For further information, also see Misfire diagnostics.

Ignition System: Description and Operation
Knock Control

Knock Control



Knocking occurs in the combustion chamber when the fuel and air mixture self ignites. This can occur either before or after the spark plug has produced an ignition spark. In both cases the gas in two or more places ignites in the combustion chamber.

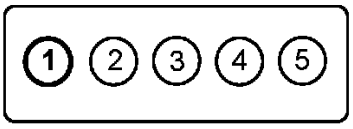
This results in an extremely fast combustion process with flames from several directions. When these flames collide, the pressure in the cylinder increases rapidly and there is a mechanical knocking sound.

If any of the cylinders knock there is a specific type of vibration in the cylinder block. These vibrations are transferred to the knock sensors (KS) which are screwed into place in the cylinder block. The resultant mechanical stress in the piezo electrical material in the knock sensors generates a voltage. The engine control module (ECM) can then determine which cylinder is knocking with the help of the camshaft position (CMP) sensor and the engine speed (RPM) sensor.

The knock sensors (KS) also interpret a proportion of normal engine sound. The control module is able to recognize the vibrations which correspond to knocking by filtering, amplifying and using software to evaluate the signal.

If the knock sensors (KS) detect knocking in the engine over a certain threshold value, the ignition timing is first retarded and then the fuel/air mixture is enriched to eliminate knocking.

Firing Order : 1-2-4-5-3



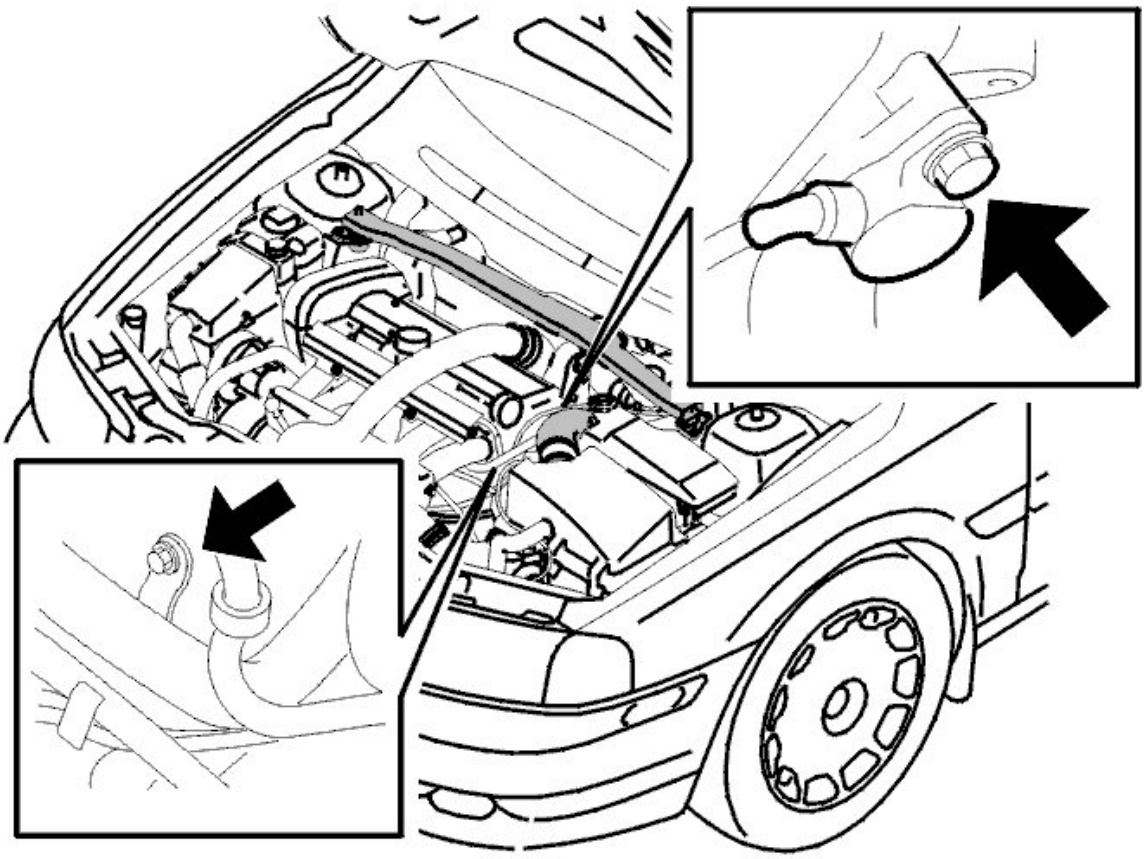
Front of Vehicle

Camshaft Position Sensor: Service and Repair

Position sensor camshaft, replacing

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removing the position sensor

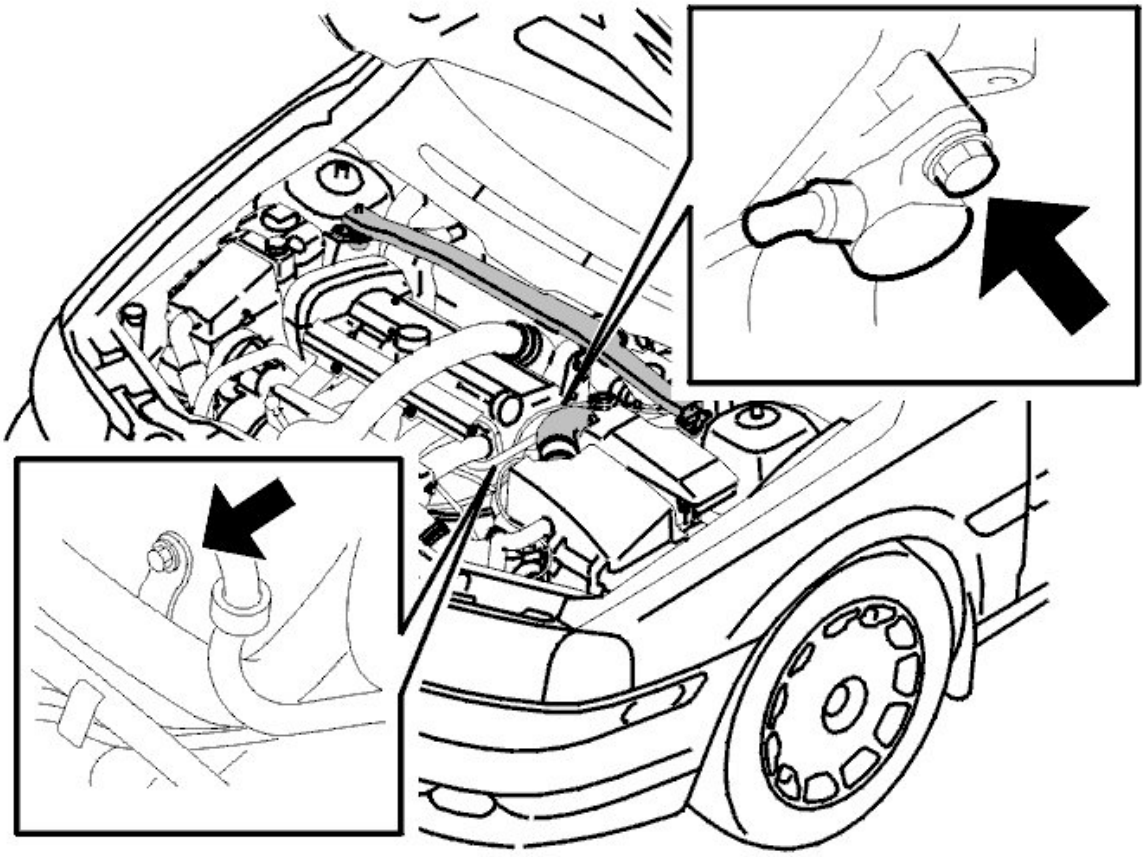


Disconnect the connector from the sensor.

Remove:

- the screw for the sensor
- the sensor.

Installing the position sensor



Install:

- the sensor
- screws. Tighten.

Connect the connector for the sensor.

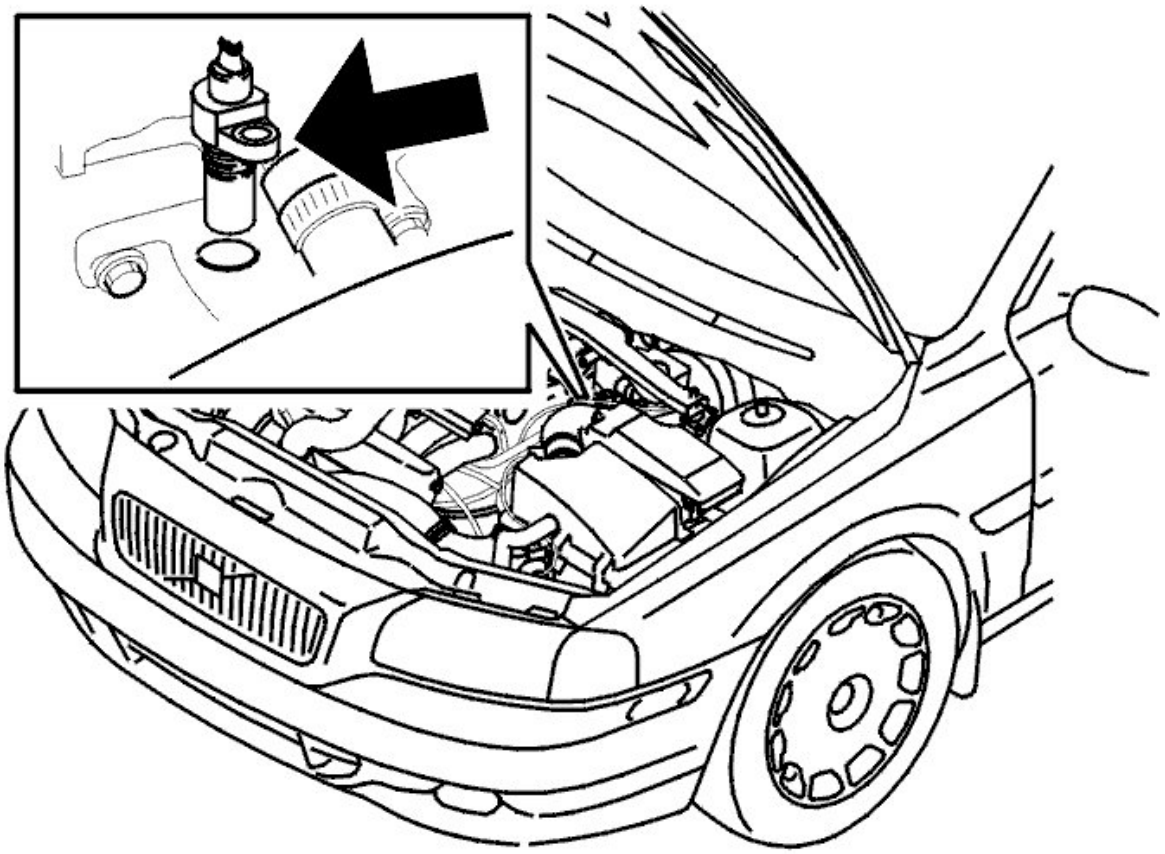
Finishing

Start the engine. Check the function.

Crankshaft Position Sensor: Service and Repair

Replacing the engine speed (RPM) sensor

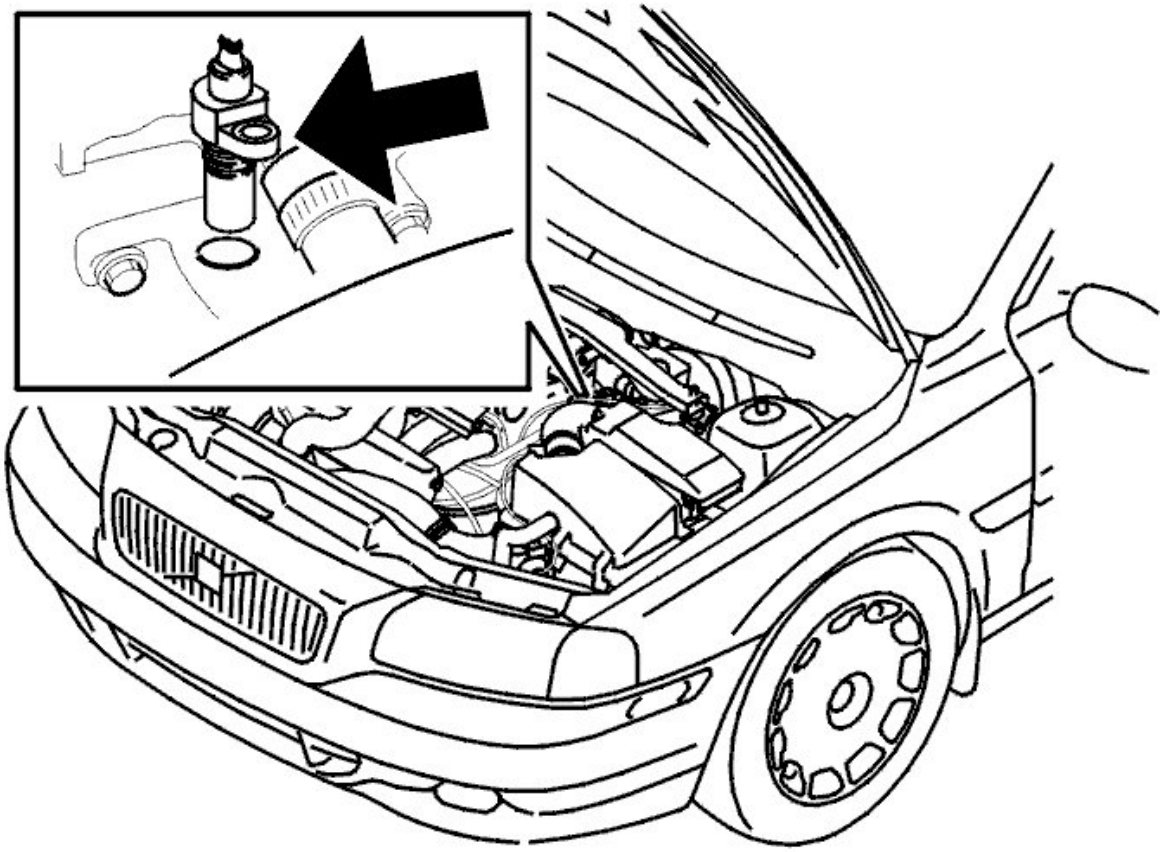
Removing the engine speed (RPM) sensor



Remove the tie strap from the torque rod.
Open the hose clamp.

Remove:
- the hoses
- the connector from the sensor
- the nut for the sensor
- the sensor.

Installing the engine speed (RPM) sensor



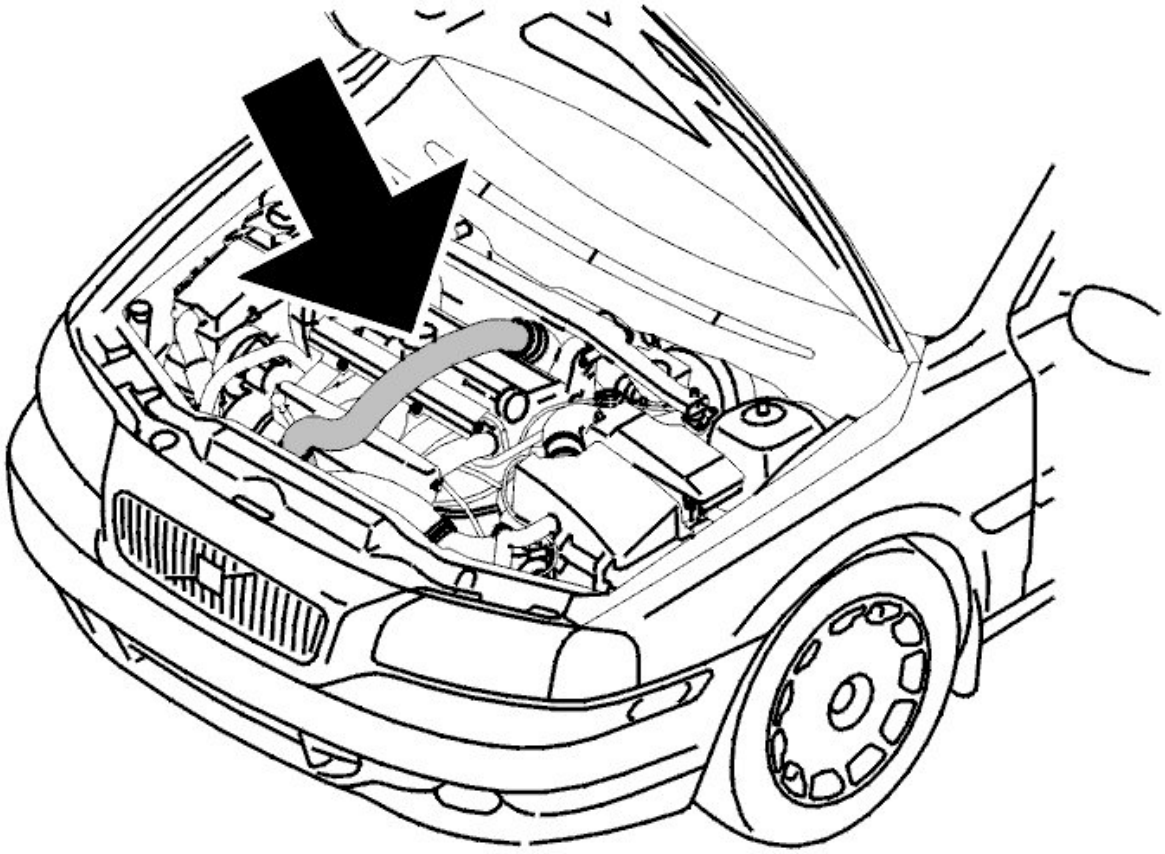
Install

- the sensor. Use a**new**nut. Tighten to **10 Nm**
- the connector
- the hoses and close the clamp
- the tie strap on the torque rod.

Ignition Coil: Service and Repair

Replacing ignition coils

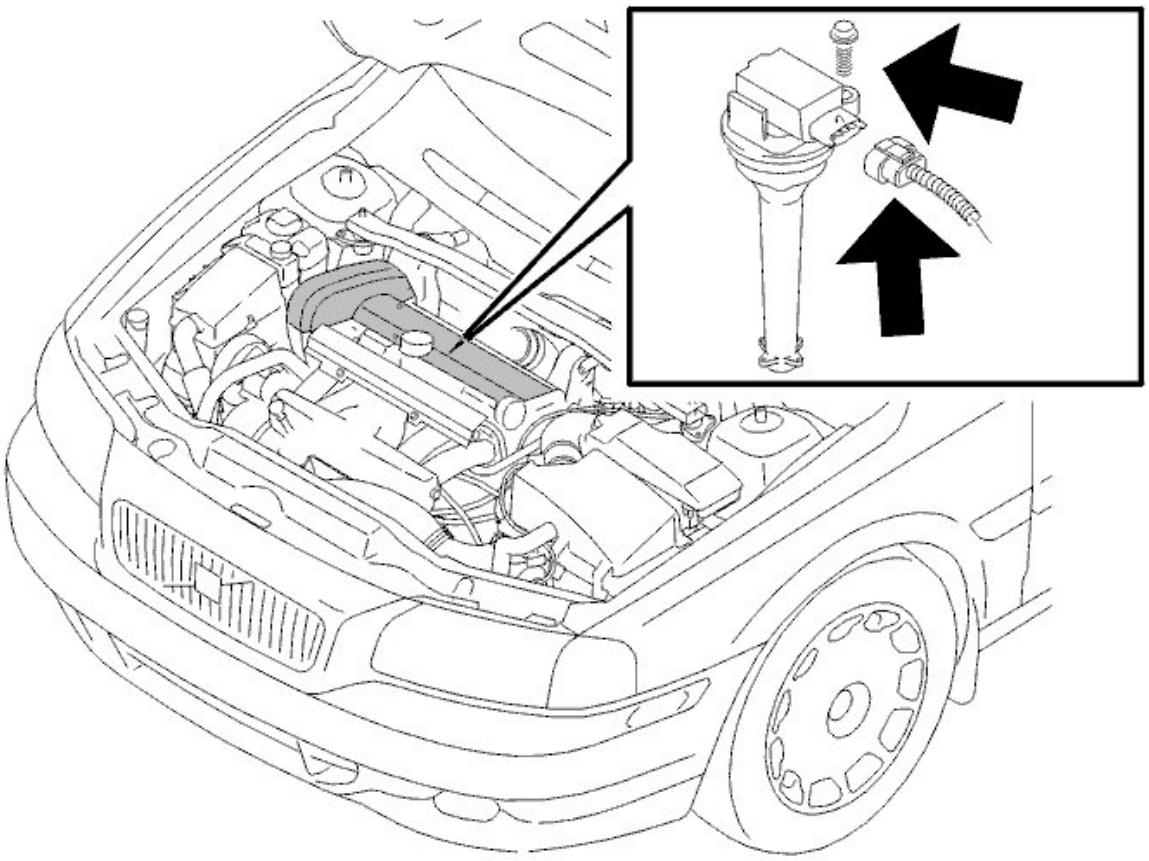
Removing ignition coils



Remove

- the charge air pipe over the engine.

Seal the openings

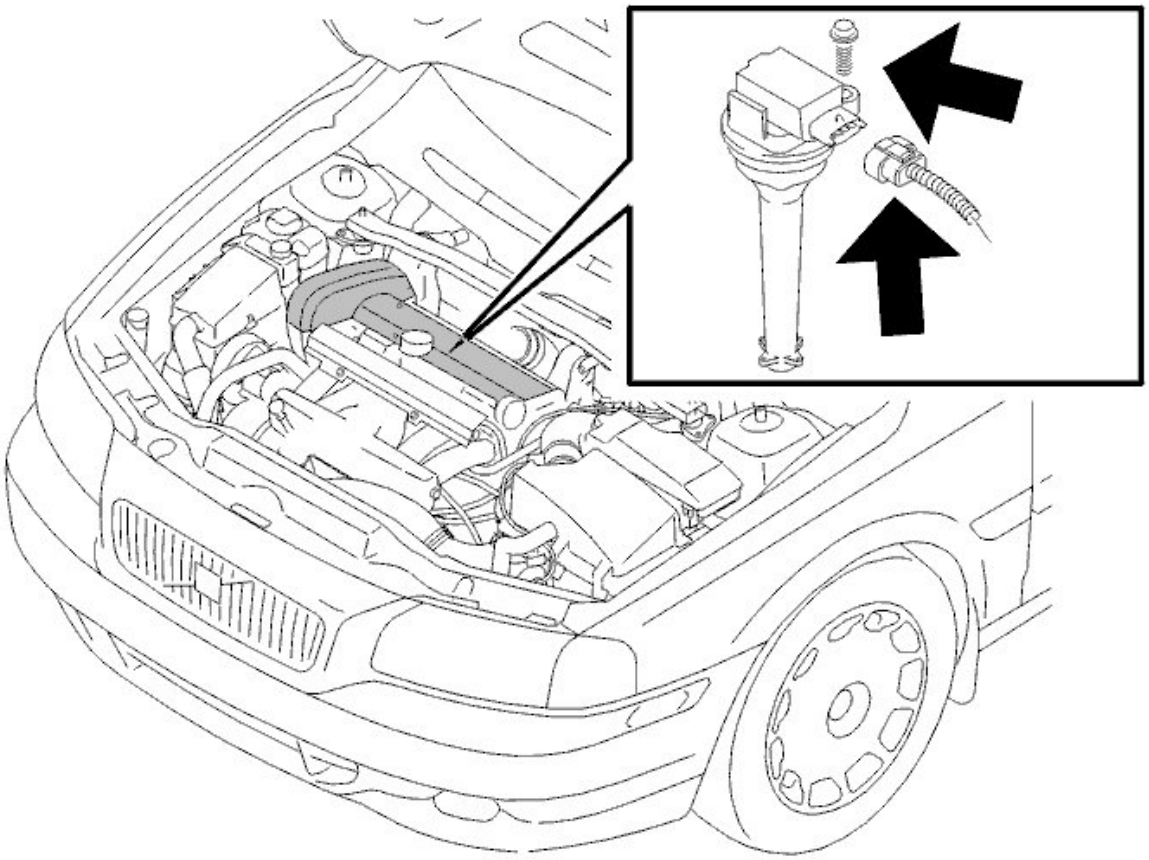


- the upper timing belt cover
- the cover over the ignition coils

Disconnect the ignition coil connector.

- the mounting screw. Pull the coil up.

Installing ignition coils



Install the**new**coil.
Align the coil and press it down. Install the screw. Tighten to **10 Nm**.

Press in the connector until a clicking sound is heard.
Install the cover over the ignition coil.
Install the upper timing belt cover.
Remove the seals from the charge air pipe. Reinstall the charge air pipe over the engine.

Knock Sensor: Service and Repair

Replacing knock sensors (KS)

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removing the knock sensor (KS)

Remove

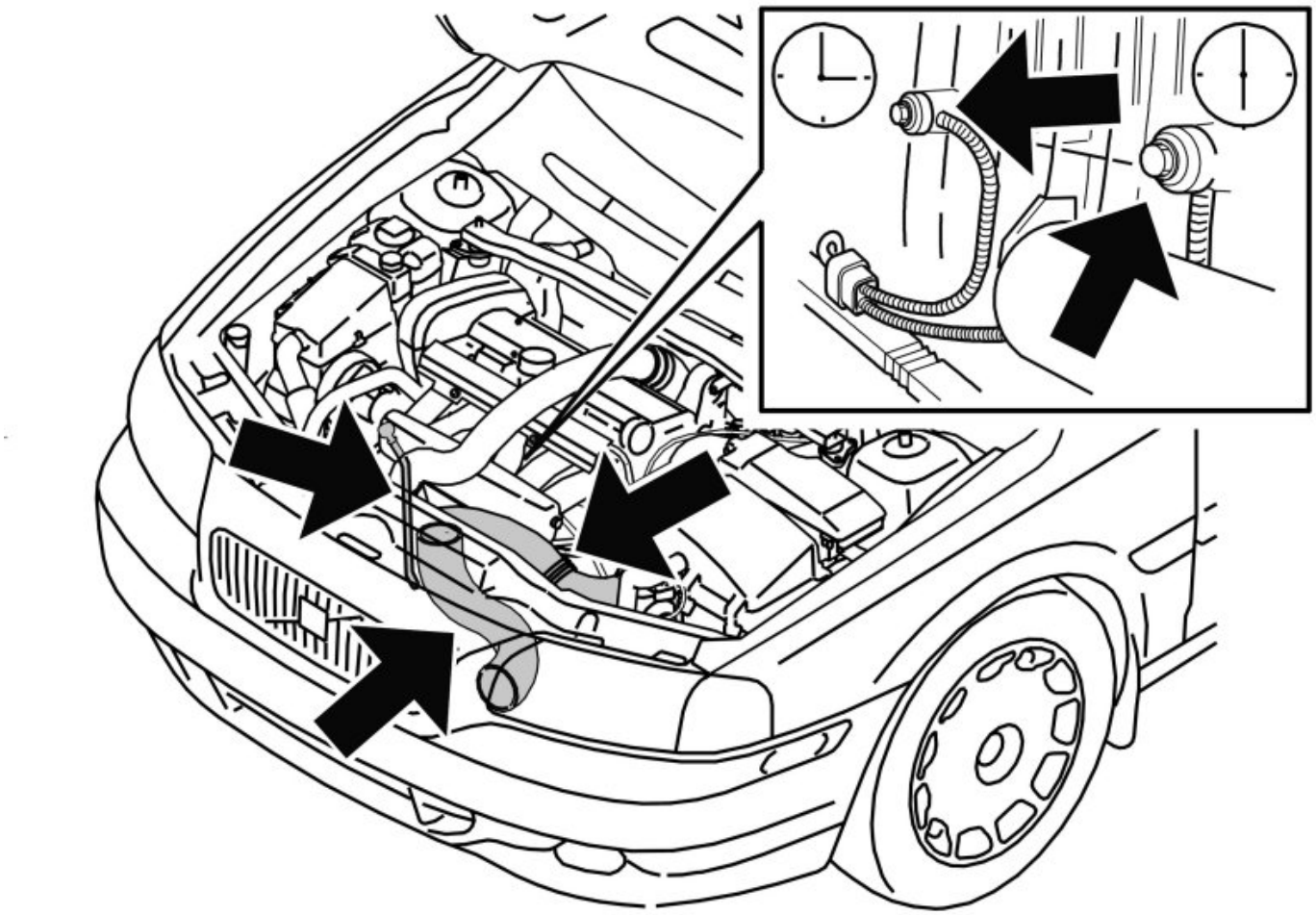
- the cable from the battery negative terminal. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- the intake pipe between the front cover plate and the air cleaner (ACL)

Detach the pipe from the charge air cooler at the throttle housing. Push the pipe to one side

- the dip stick and its holder
- the screws for the knock sensors (KS)
- the tie strap at the connector.

Disconnect the connector. Pull the sensors downwards and past the rear edge of the starter motor bracket.

Installing knock sensors (KS)



Install the new sensor. Tighten by hand.
Route the cables on the outside of the starter motor bracket.
Align the sensors. The cable from the sensor for cylinder 2 = 3 o'clock and from the sensor for cylinder 4 = 6 o'clock.
Tighten the knock sensors (KS) to **20 Nm**.
Connect the knock sensor (KS) connectors. Check that the wiring is in the correct position. Secure with a tie strap at the starter motor bracket.

Install

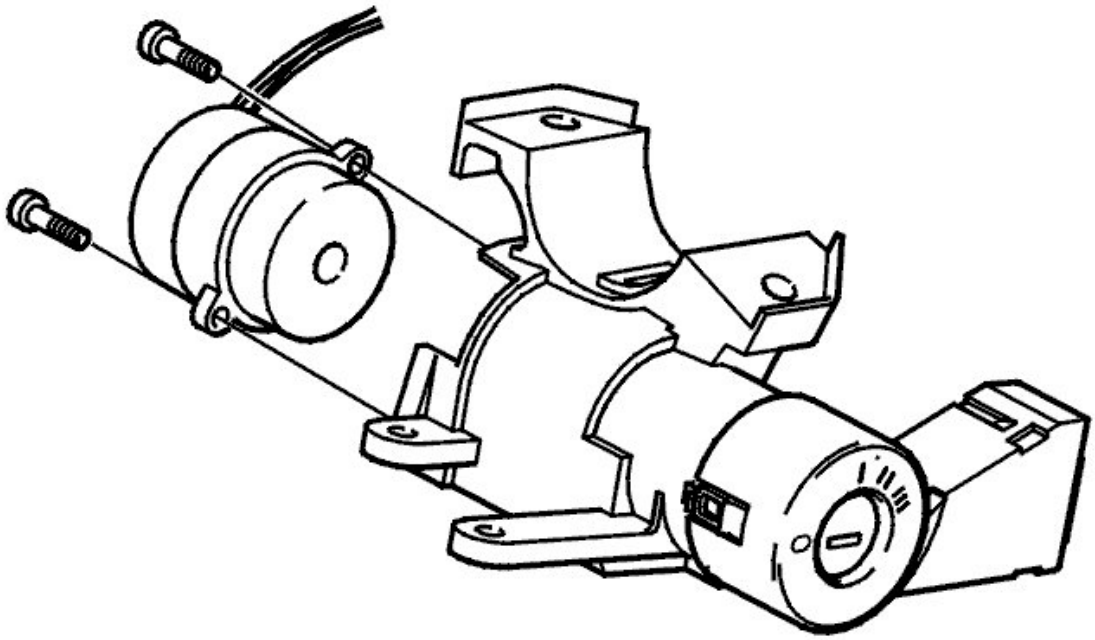
- the dip stick
- the pipe between the throttle body (TB) and the charge air cooler (CAC)
- the intake pipe between the front cover plate and the air cleaner (ACL)
- the negative battery cable. First read Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Ignition Switch: Service and Repair

Starter switch, replacing

Removal

Start switch



- Remove the steering column covers. See Soundproofing panel, replacing See: Body and Frame/Interior Moulding / Trim/Dashboard / Instrument Panel/Service and Repair/Soundproofing Panel, Replacing
- Disconnect the connector
- Remove the 2 screws
- Remove the starter switch.

Installation

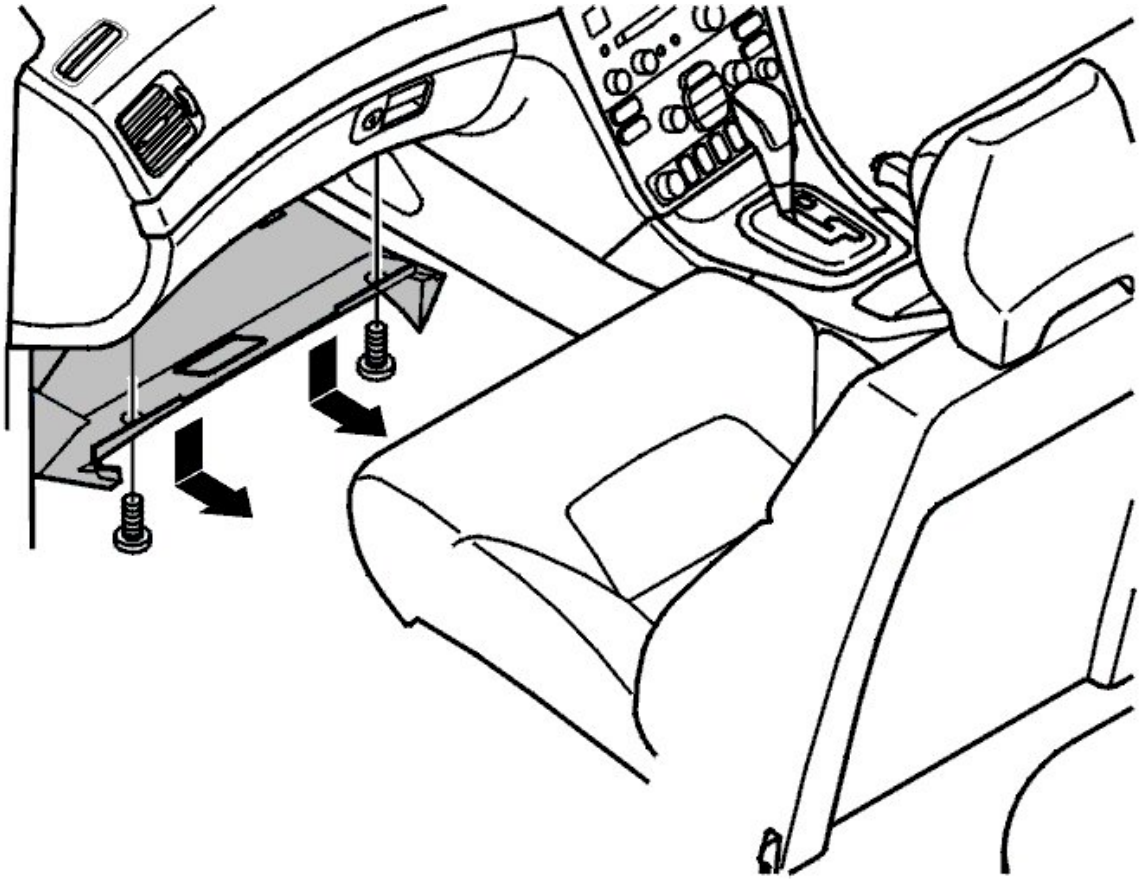
Start switch

- In reverse order
- Install the steering column covers. See Soundproofing panel, replacing See: Body and Frame/Interior Moulding / Trim/Dashboard / Instrument Panel/Service and Repair/Soundproofing Panel, Replacing.

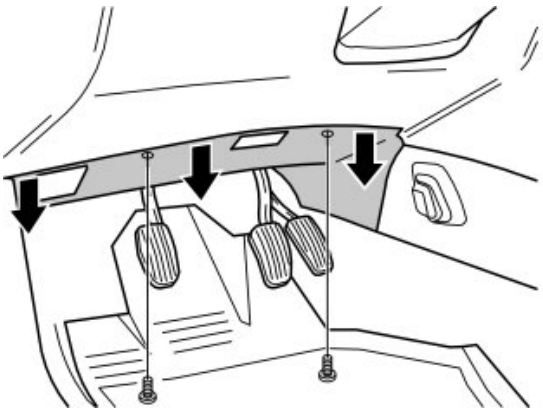
Dashboard / Instrument Panel: Service and Repair
Soundproofing Panel, Replacing

Soundproofing panel, replacing

Removing soundproofing panels



Remove two screws.
Remove the panel by pulling it straight down.



Remove two screws.
Remove the panel by pulling it straight down.

Installing soundproofing panel

Install:

In reverse order.

Spark Plug: Application and ID

Spark Plugs

Spark Plug	**Champion RC8PYP 8 (or equivalent)**
Gap	**0.028-0.032" (0.7-0.8 mm)**
Torque	**18.4 ft lb (25 Nm)**

Fuel Delivery and Air Induction: Testing and Inspection
Air Leaks in the Intake System, Checking

Air leakage in the intake system, checking

Special tools:

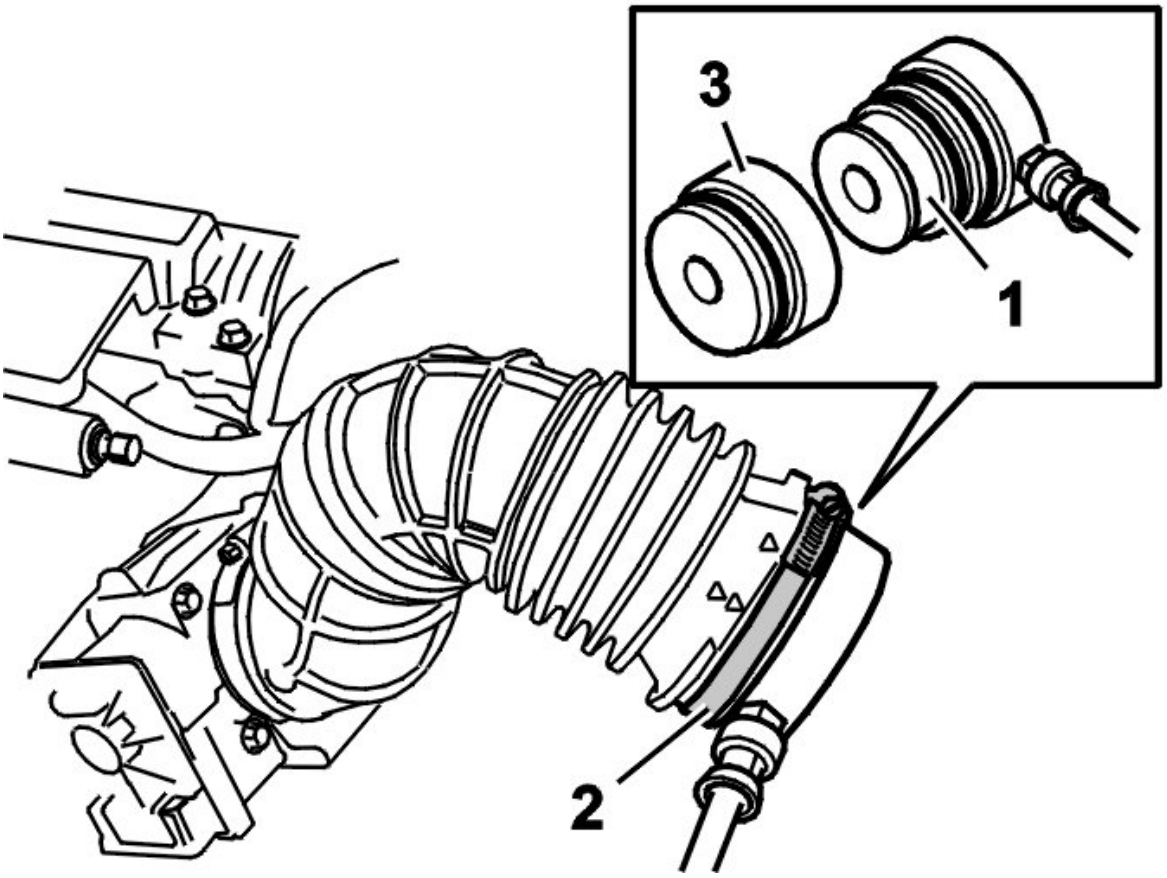
999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor
999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
999 7080 Adapter See: Tools and Equipment/999 7080 Adapter

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Preparations

Check that all hoses are undamaged and are in place with their hose clamps tightened.

Engagement



Note! S80 T6 and S60/V70 R use: 999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor (1) with 999 7080 Adapter See: Tools and Equipment/999 7080 Adapter (3). Lock 999 7080 Adapter See: Tools and Equipment/999 7080 Adapter on 999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor.

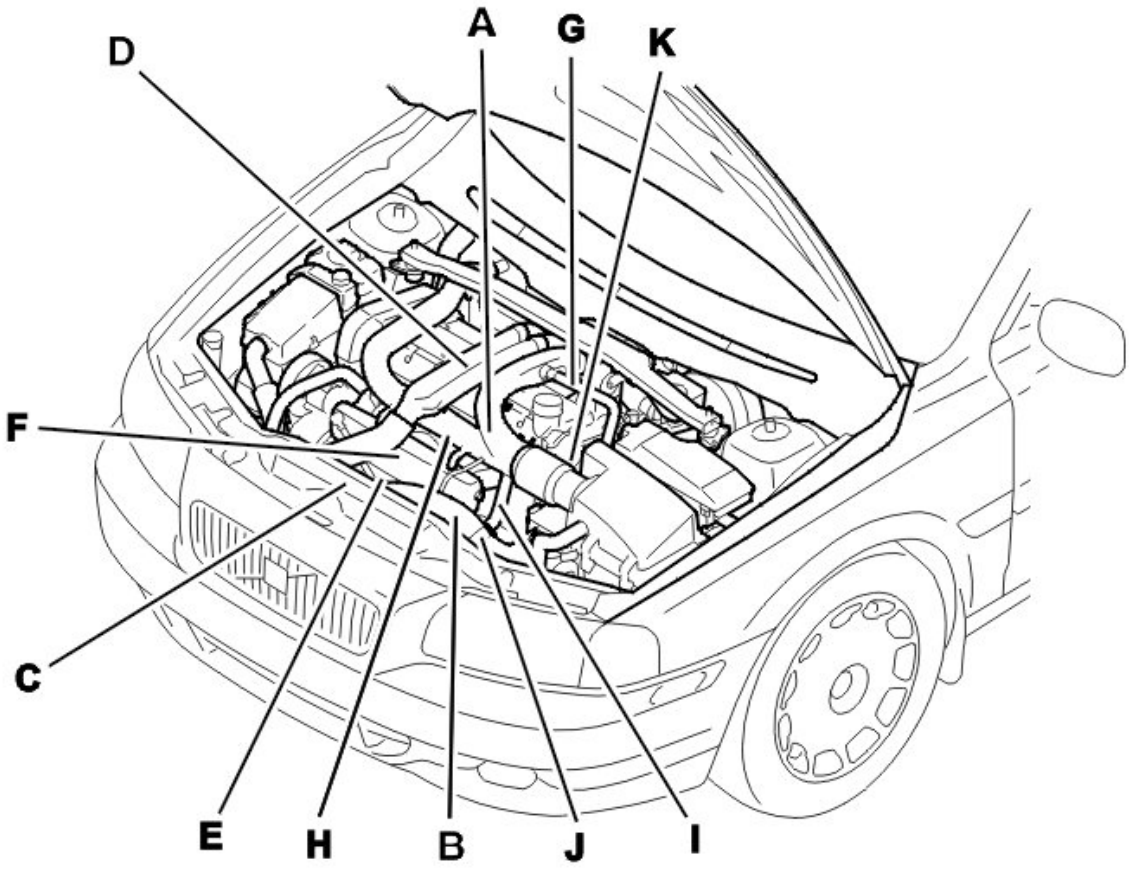
Remove the fresh air hose from the mass air flow (MAF) sensor.
Install tool 999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor (1) and pressure regulator 999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator on the fresh air intake. Tighten the hose clamp (2).
Remove the oil filler cap.

Check

Adjust the regulator to obtain a maximum pressure of **0.3 bar** (0.15 psi). There may be a gentle hissing sound from the oil filler opening. This is due to the opening of an intake valve and the leakage of cylinder pressure past the piston rings.
Check components and connections. See: Checking components.
If a leak is suspected, spray a soap solution onto the area. Check for air leakage from the canister purge (CP) valve. No leakage is permissible.

Checking components

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

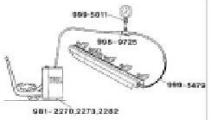
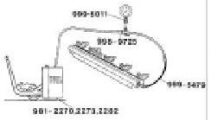
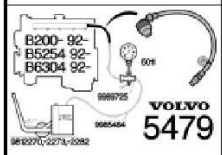
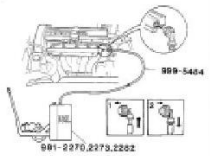
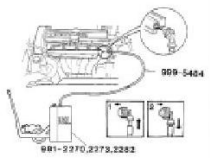
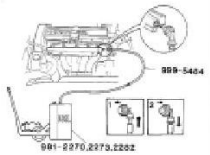


- A fresh air intake
- B lower charge air pipe
- C charge air cooler (CAC)
- D upper charge air pipe
- E throttle body (TB)
- F intake manifold with vacuum hoses and gaskets
- G crankcase ventilation
- H injectors
- I brake servo hose
- J evaporative emission system (EVAP) valve
- K Turbocharger (TC) control valve.

Fuel Delivery and Air Induction: Testing and Inspection
Fuel System Pressure, Checking

Fuel system pressure, checking

Note! Some variation in the illustrations may occur, but the essential information is always correct.

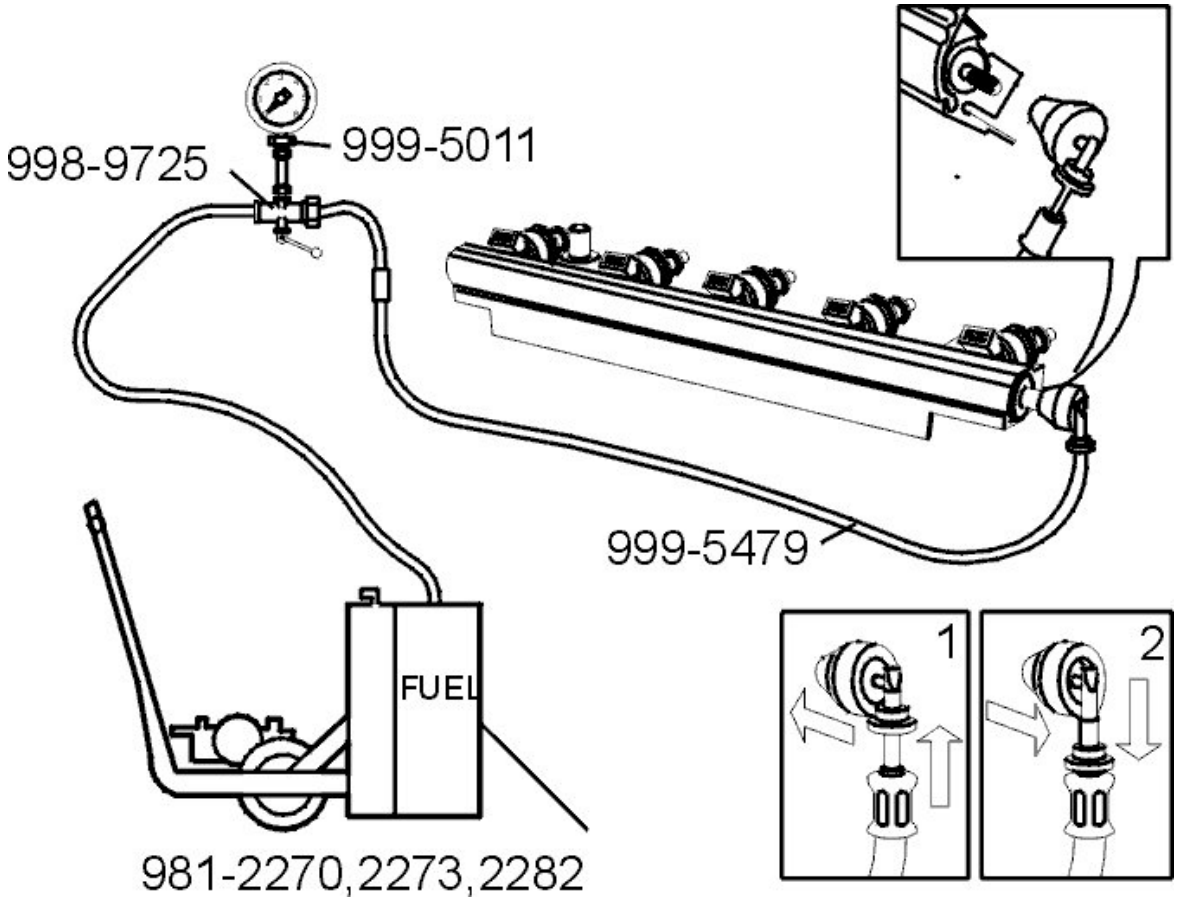
Special tools	
	**T9995011 MANOMETER (FUEL PRESSURE) CI,LH,LE** **Tool number:**T9995011 **Tool description:**MANOMETER (FUEL PRESSURE) CI,LH,LE **Tool boards:**
	**T9989725 ADAPTER(-5011 CONNECTION TANK DRAINING UNIT)** **Tool number:**T9989725 **Tool description:**ADAPTER(-5011 CONNECTION TANK DRAINING UNIT) **Tool boards:**
	**T9995479 ADAPTER (CHECK-FUEL PRESSURE)** **Tool number:**T9995479 **Tool description:**ADAPTER (CHECK-FUEL PRESSURE) **Tool boards:**
	**T9812270 PUMP TROLLEY** **Tool number:**T9812270 **Tool description:**PUMP TROLLEY **Tool boards:**
	**T9812273 PUMP (UNLEADED)** **Tool number:**T9812273 **Tool description:**PUMP (UNLEADED) **Tool boards:**
	**T9812282 TANK(UNLEADED GASOLINE)** **Tool number:**T9812282 **Tool description:**TANK(UNLEADED GASOLINE) **Tool boards:**

Check the fuel pressure see: Diagnostics, Vehicle communication, ECM, Parameters, Fuel pressure.

Absolute pressure: Fuel pressure in fuel system + air pressure.
Relative pressure: Fuel pressure in fuel system.
The air pressure is approx. 100 kPa at sea level. VIDA measures the fuel pressure in absolute pressure. External pressure gauge (pressure gauge) measures the fuel pressure in relative pressure.

Fuel line pressure. Refer to: Specifications, mechanical, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Specifications/Specifications, Mechanical

The following method must be used when reading the fuel line pressure on the fuel rail:



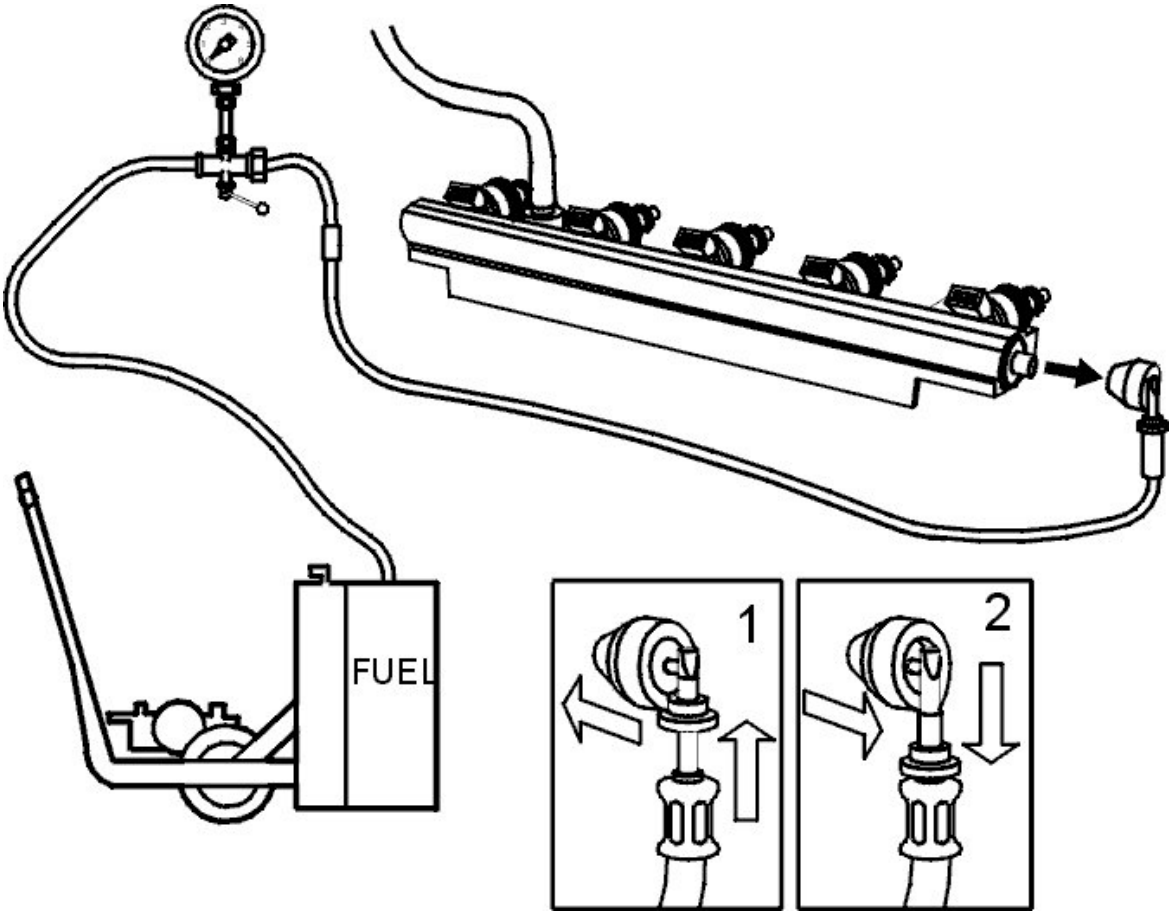
Engagement of fuel pressure gauge.
Supplement the pressure gauge with adapter and nipple before use.

- 999 5011 MANOMETER See: Tools and Equipment/999 5011 Manometer
- 998 9725 Adapter See: Tools and Equipment/998 9725 Adapter
- 999 5479 ADAPTER See: Tools and Equipment/999 5479 Adapter

Connect the adapter to the valve on the fuel rail in the locked position (image 1, valve closed).
Set the cock on the pressure gauge in the direction of the nipple.
999 5479 ADAPTER See: Tools and Equipment/999 5479 Adapter
Connect the pressure gauge's other connection to the fuel drain equipment.

- 981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley
- 981 2273 PUMP See: Tools and Equipment/981 2273 Pump
- 981 2282 Tank See: Tools and Equipment/981 2282 Tank

Unlock the adapter (illustration 2, valve open).
Start the engine.
Read off the relative pressure.



Disengagement of fuel pressure gauge.
Ignition off.
Start the draining unit.
Set the cock on the pressure gauge to the central position.
Secure the adapter (image 1, valve closed).
Remove the adapter from the valve.
Stop the draining unit.
Reset the equipment.

Fuel Delivery and Air Induction: Service and Repair

Draining the fuel system

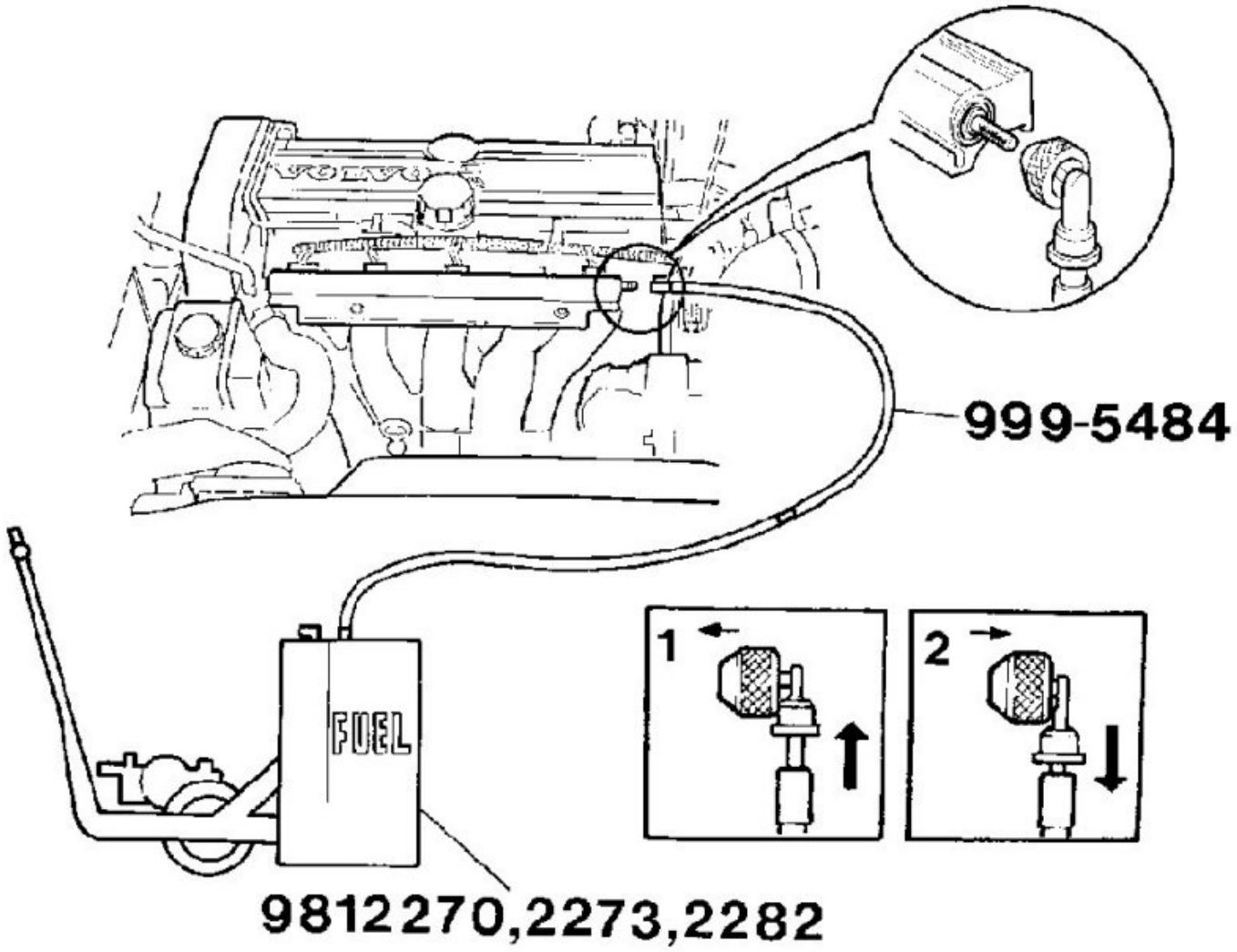
Special tools:

981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley
981 2273 PUMP See: Tools and Equipment/981 2273 Pump
981 2282 Tank See: Tools and Equipment/981 2282 Tank
999 5480 Adapter See: Tools and Equipment/999 5480 Adapter
999 5484 Adapter See: Tools and Equipment/999 5484 Adapter

Safety

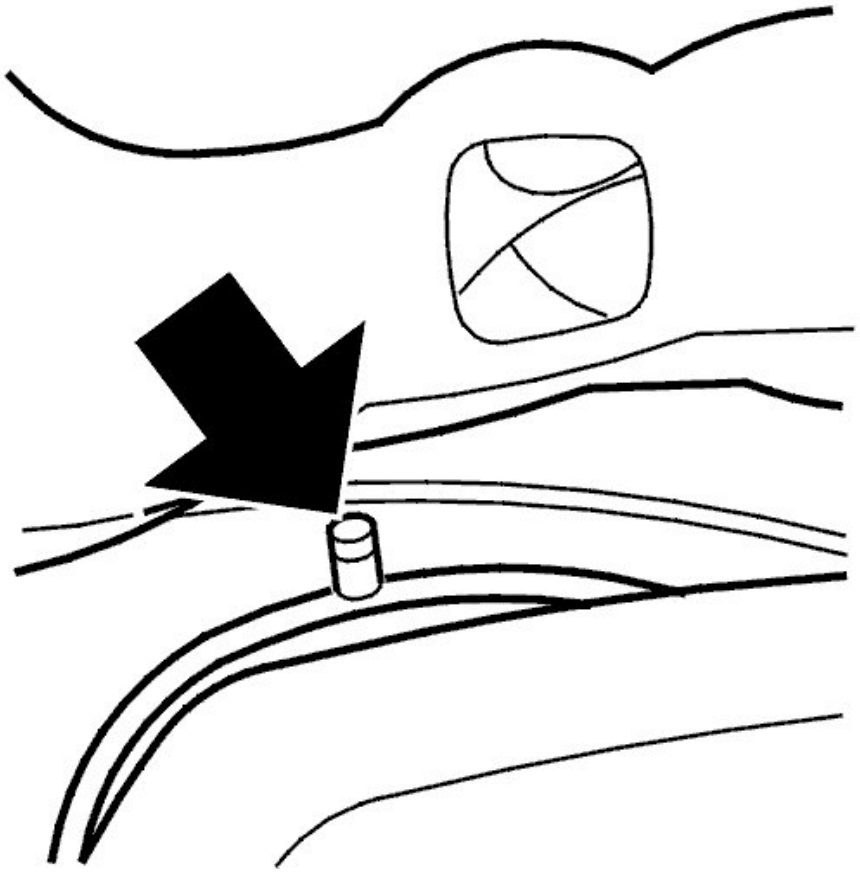
See Safety regulations for handling fuel See: Service Precautions/Safety Regulations for Handling Fuel.

Engagement



Remove the cover on the valve which is positioned on the fuel rail.
Connect adapter 999 5484 Adapter See: Tools and Equipment/999 5484 Adapter to fuel draining unit 981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley , 981 2273 PUMP See: Tools and Equipment/981 2273 Pump and 981 2282 Tank See: Tools and Equipment/981 2282 Tank.
Connect the adapter to the valve on the fuel rail in the **locked** position (figure 1, valve closed).
Start the fuel drainage unit.
Unlock the adapter (illustration 2 valve open).
Raise the car.

Draining the fuel system



Remove the cover on the valve cap positioned at the fuel filter.
Connect venting hose 999 5480 Adapter See: Tools and Equipment/999 5480 Adapter to the valve prior to the fuel filter.
It takes approximately **2 minutes** to evacuate the system.

Installation

Reinstall the components in reverse order.

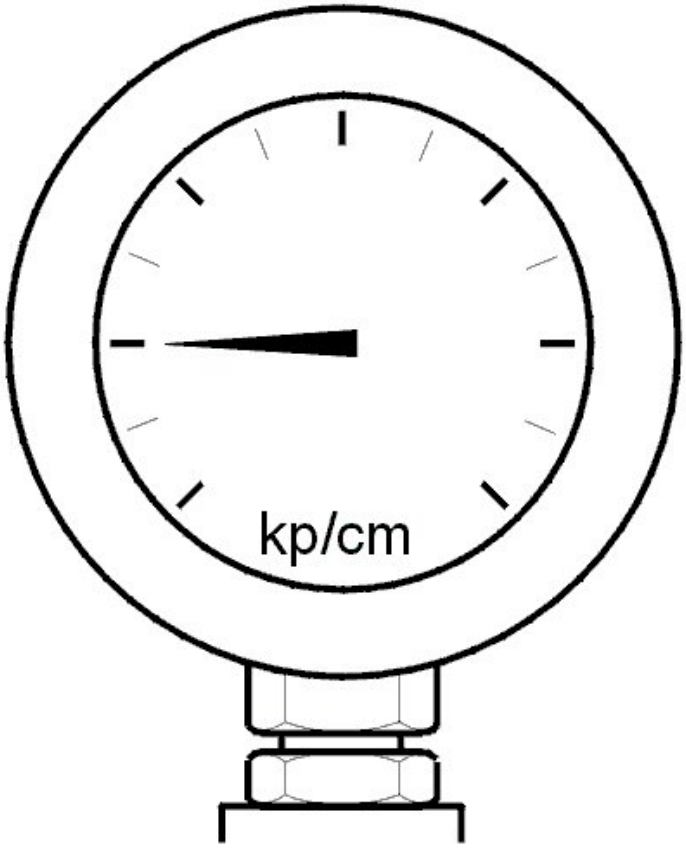
Caution! Do not forget to reinstall the valve caps.

Fuel Pressure: Testing and Inspection
Checking Fuel and Residual Pressures

Checking fuel and residual pressures

Note! For vehicles with demand activated fuel pumps (FP), see VIDA vehicle communication Quick test of fuel pump (FP).

Measuring the line pressure



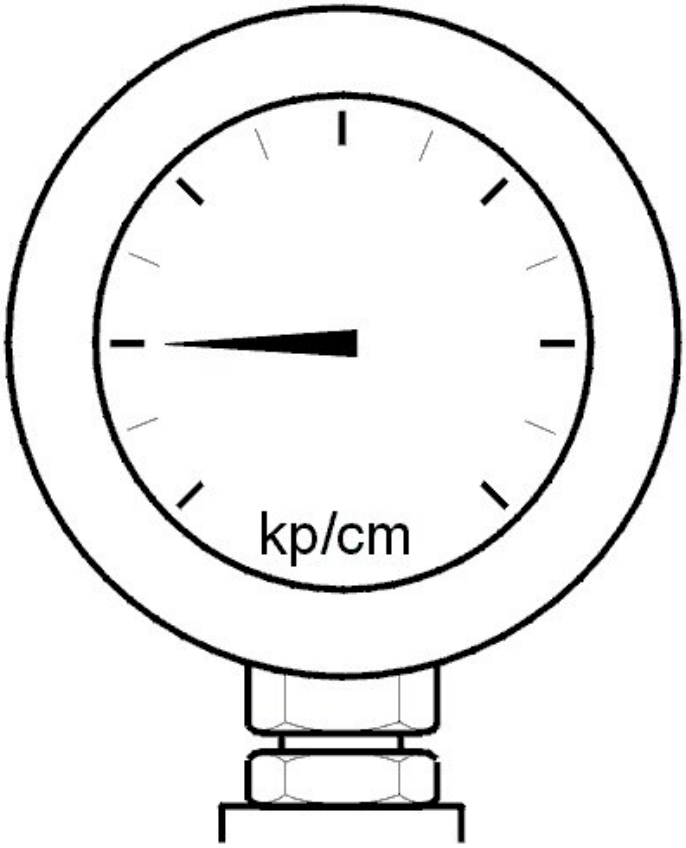
- Connect the pressure gauge according to Fuel pressure gauge See: Fuel Pressure Gauge
- Remove the soundproofing panel
- Remove the fuel pump (FP) relay (CMI 12 in the passenger compartment)
- Connect a cable to the relay base as illustrated.

Read off the line pressure from the pressure gauge. The line pressure must be 375-395 kPa.
Check the residual pressure if the fuel pressure is OK.
Remedy as necessary.

Other information:

- For the location of and to replace the fuel pump (FP) relay, see Central electronic module (CEM), replacing See: Computers and Control Systems/Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For the location of and to replace the fuel pump (FP), see
- For the location of and to replace the fuel filter, see Replacing the fuel filter See: Fuel Filter/Service and Repair
- To disconnect the pressure gauge, see Fuel pressure gauge See: Fuel Pressure Gauge

Checking the residual pressure



- Switch off the ignition
- Disconnect the cable between the terminals on the relay base
- Reinstall the fuel pump (FP) relay.

The line pressure must not fall below 200 kPa within 20 minutes of the fuel pump (FP) being shut-off.
Remedy as necessary.

Other information:

- For the location of and to replace the injector on 5-cylinder engines, see Injector/pulse damper, replacement See: Fuel Pressure Pulsation Damper/Service and Repair. For 6-cylinder engines, see
- For the location of and to replace the fuel pump (FP) relay, see Central electronic module (CEM), replacing See: Computers and Control Systems/Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For the location of and to replace the fuel pump (FP), see Right side fuel pump with level sensor See: Fuel Tank/Fuel Gauge Sender/Service and Repair/Right Side Fuel Pump With Level Sensor
- To disconnect the pressure gauge, see, Fuel pressure gauge See: Fuel Pressure Gauge.

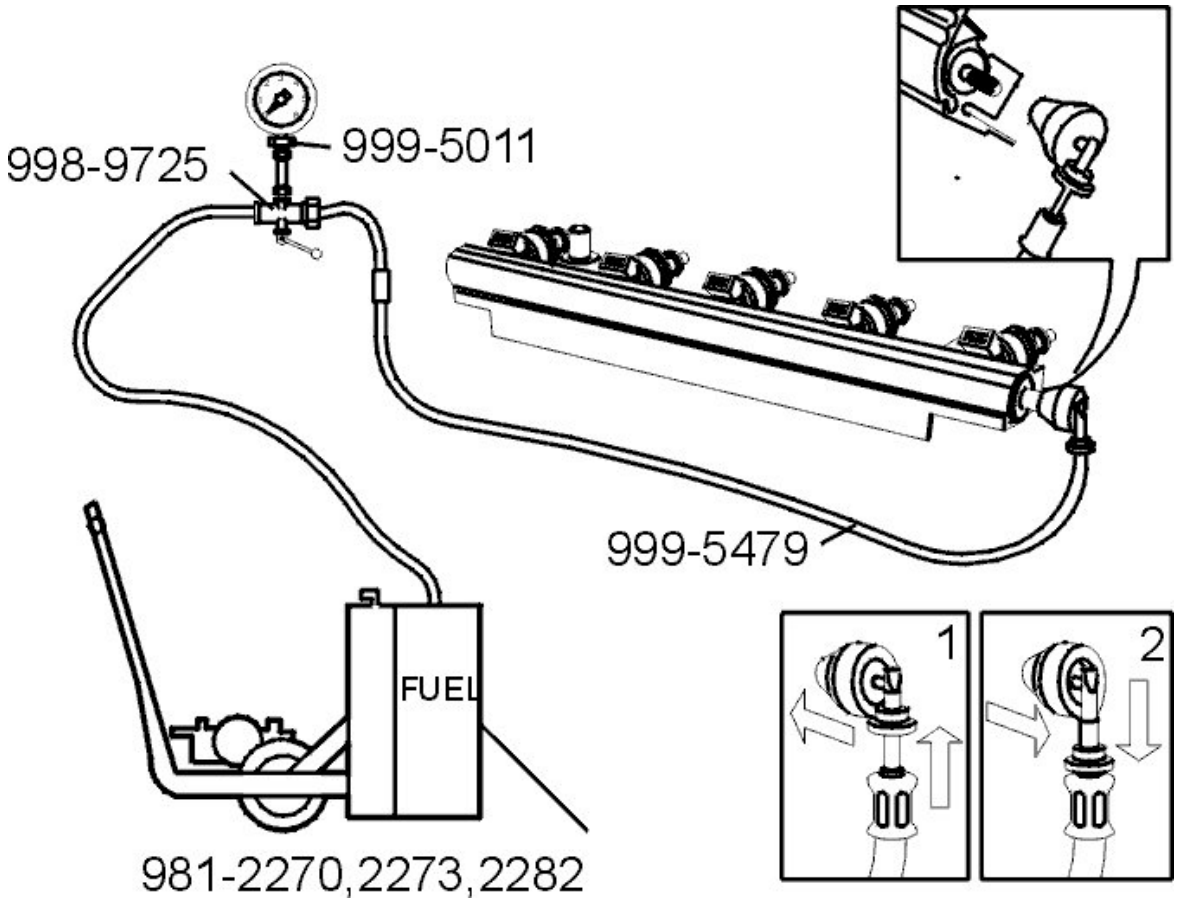
Fuel Pressure: Testing and Inspection
Fuel Pressure Gauge

Fuel pressure gauge

Special tools:

981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley
981 2273 PUMP See: Tools and Equipment/981 2273 Pump
981 2282 Tank See: Tools and Equipment/981 2282 Tank
998 9725 Adapter See: Tools and Equipment/998 9725 Adapter
999 5011 MANOMETER See: Tools and Equipment/999 5011 Manometer
999 5479 ADAPTER See: Tools and Equipment/999 5479 Adapter

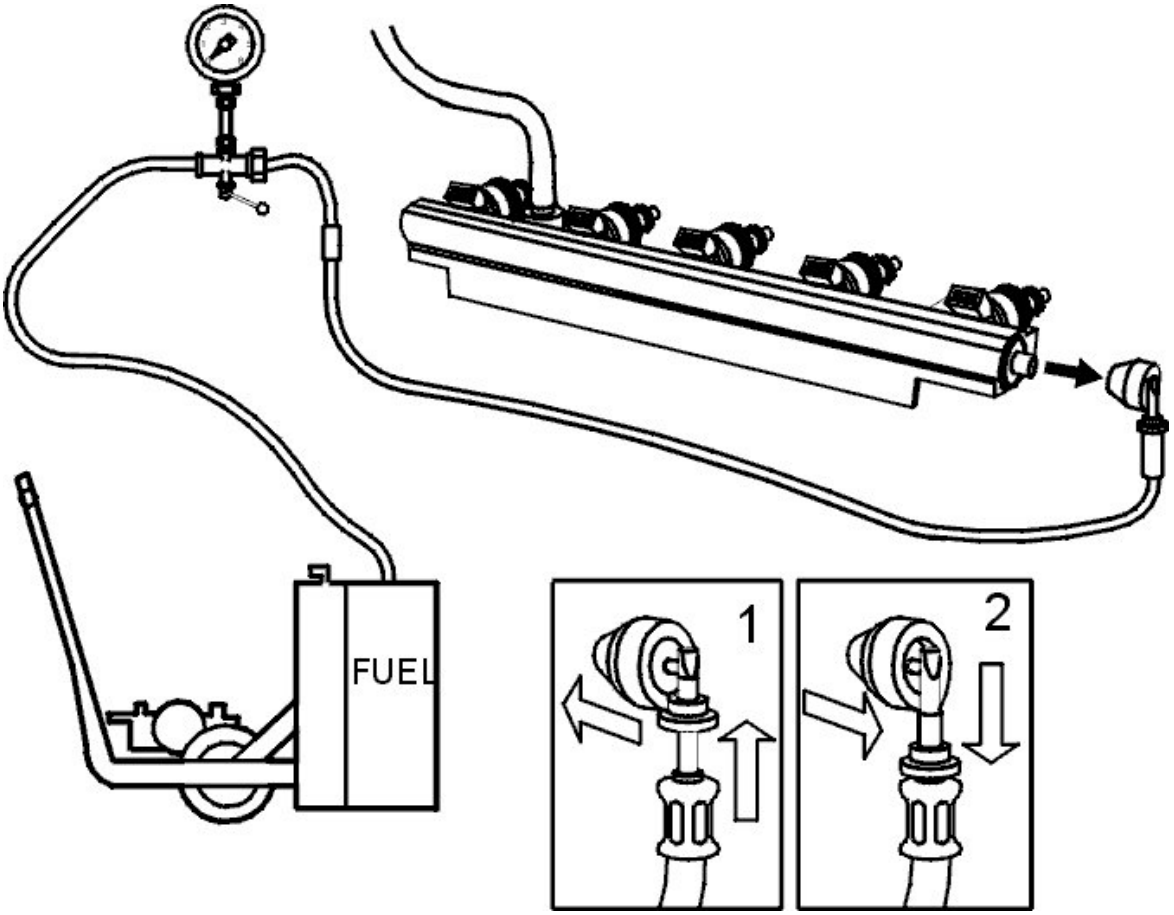
Connecting fuel pressure gauge



- Supplement pressure gauge999 5011 MANOMETER See: Tools and Equipment/999 5011 Manometer with adapter998 9725 Adapter See: Tools and Equipment/998 9725 Adapter and nipple999 5479 ADAPTER See: Tools and Equipment/999 5479 Adapter before use.
- Connect adapter to valve on fuel rail, with adapter in locked position (valve closed as in picture 1).
- Turn pressure gauge cock towards nipple999 5479 ADAPTER See: Tools and Equipment/999 5479 Adapter.
- Connect pressure gauge second connector to fuel draining unit981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley ,981 2273 PUMP See: Tools and Equipment/981 2273 Pump and981 2282 Tank See: Tools and Equipment/981 2282 Tank.
- Unlock adapter (illustration 2 valve open).

Disconnecting fuel pressure gauge

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Ignition off.
- Start draining unit.
- Turn pressure gauge cock to mid-position.
- Lock adapter (valve closed as in illustration 1).
- Disconnect adapter from valve.
- Stop draining unit.
- Reinstall equipment.

Caution! Remember to reinstall valve safety cap.

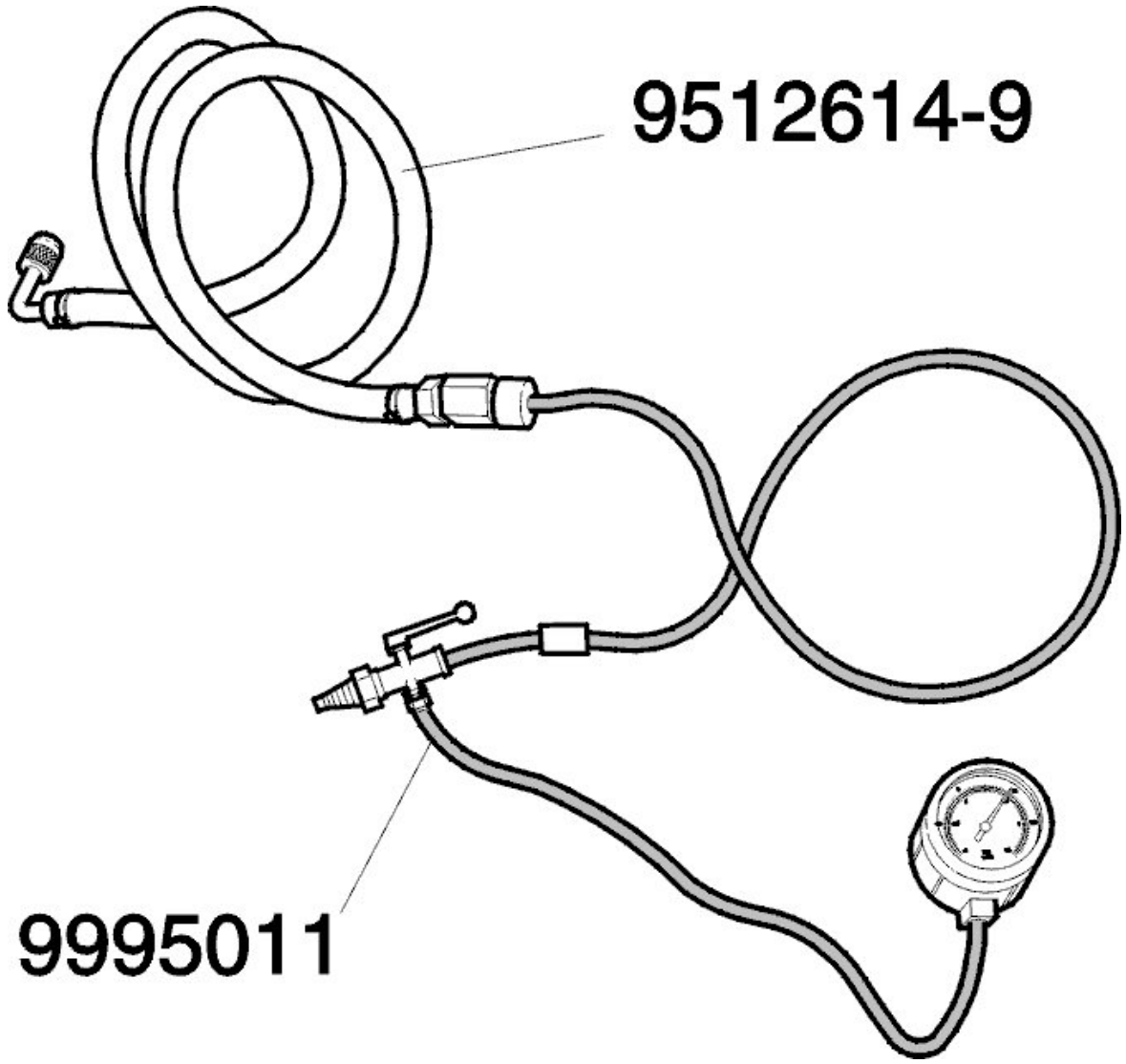
Fuel Pressure: Testing and Inspection
Taking Fuel Pressure Readings While Driving the Car

Taking fuel pressure readings while driving the car

Special tools:

999 5011 MANOMETER See: Tools and Equipment/999 5011 Manometer
951 2614 hose See: Tools and Equipment/951 2614 Hose
981 2270 PUMP TROLLEY See: Tools and Equipment/981 2270 Pump Trolley
981 2273 PUMP See: Tools and Equipment/981 2273 Pump
981 2282 Tank See: Tools and Equipment/981 2282 Tank

Installing test equipment

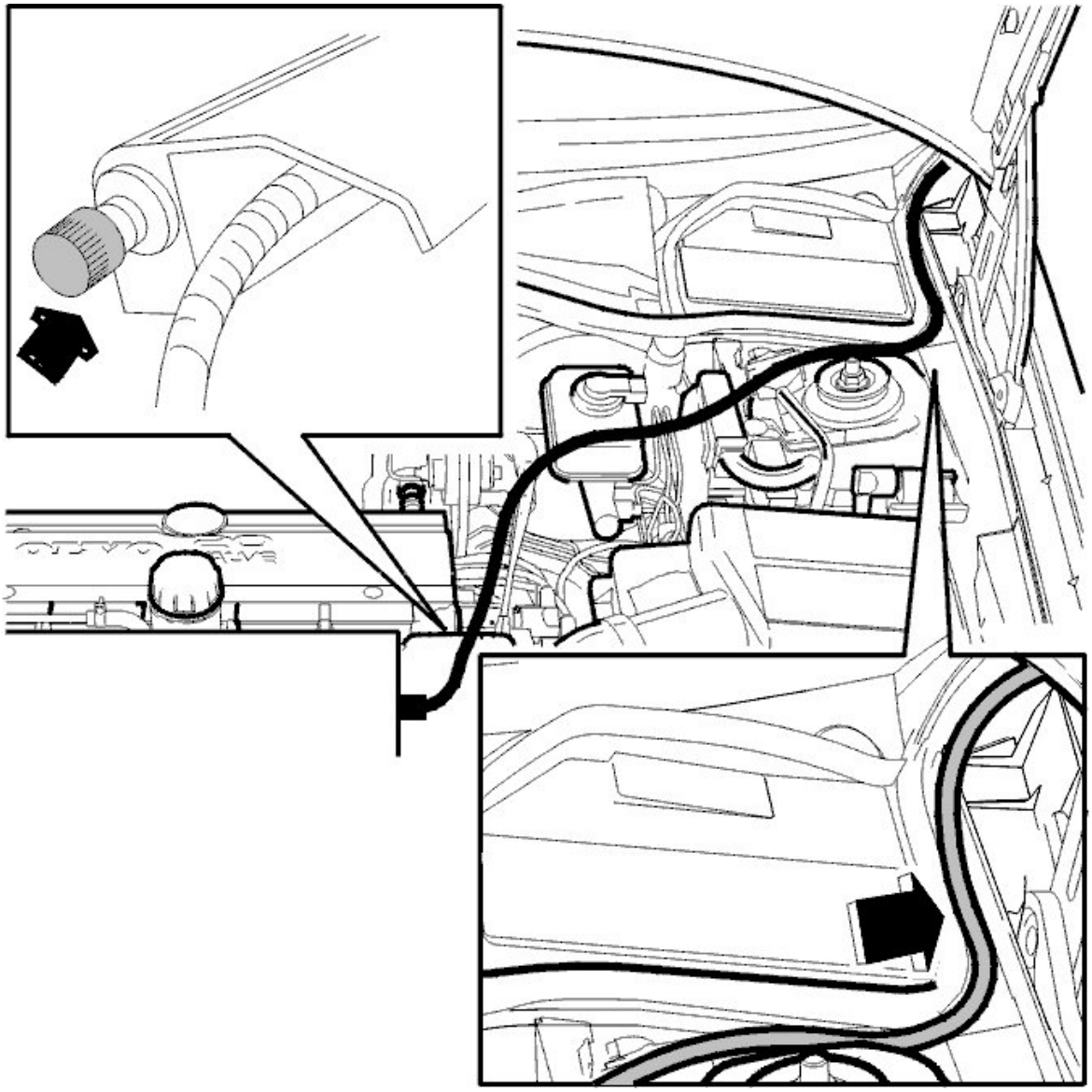


Corrective actions:

- Assemble fuel pressure gauge999 5011 MANOMETER See: Tools and Equipment/999 5011 Manometer and new adapter hose**951 2614**.
- Use foam wrapping around the fuel pressure gauge and all metal joints to avoid scratching the interior of the car or damaging the exterior paintwork.

Connecting fuel pressure gauge

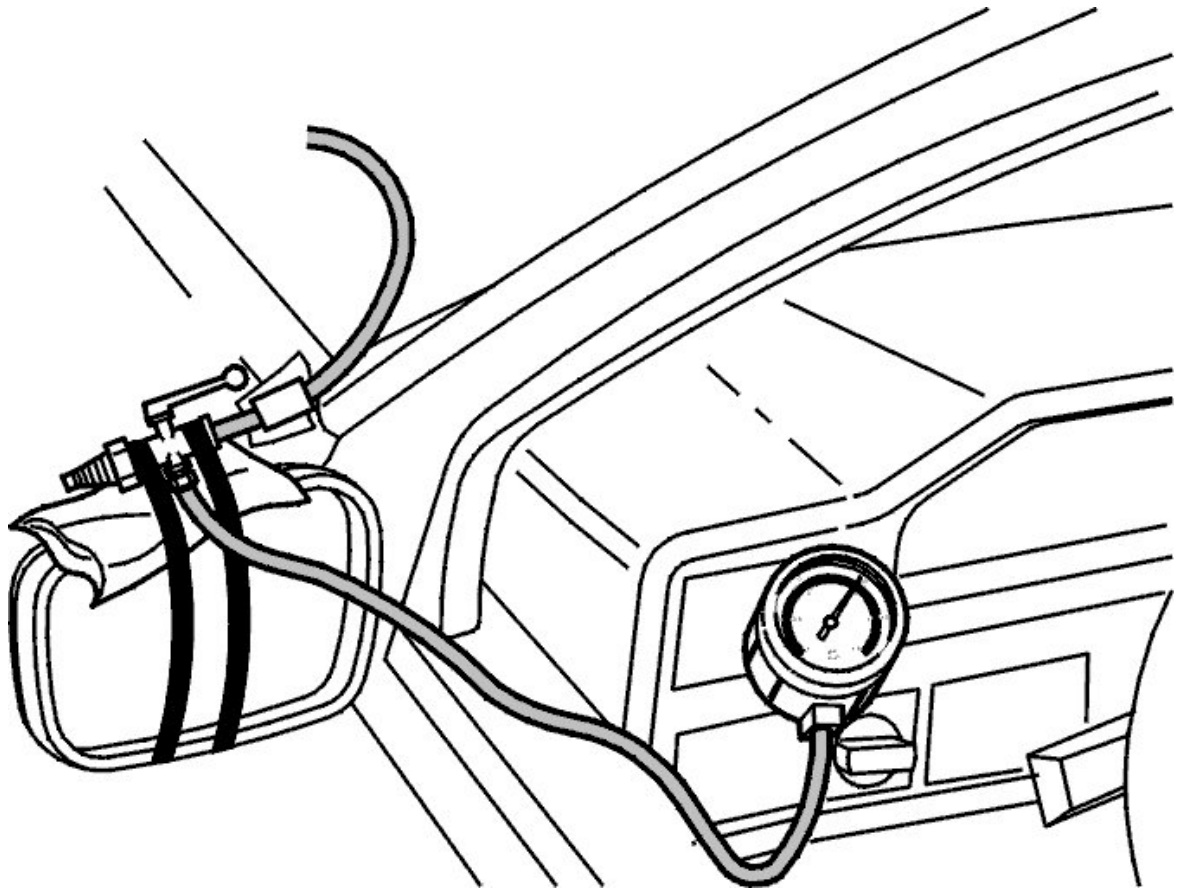
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Corrective actions:

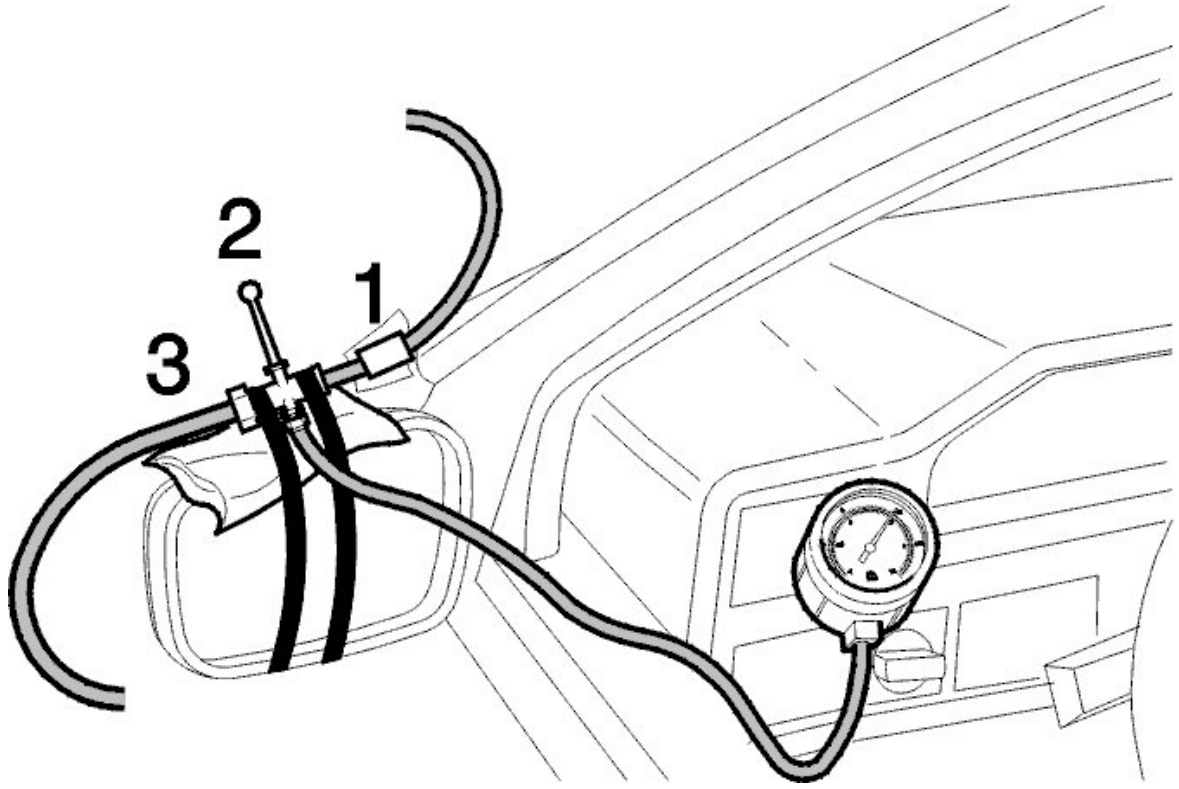
- Remove protective cap from the fuel pressure line nipple.
- Install the adapter hose nipple loosely on the nipple on the fuel pressure line. The nipple will be tightened later.
- Arrange hose as illustrated.

Caution! Ensure that the hose follows the rubber trim on the plenum chamber and then out of the engine compartment at the rear corner of the hood, with the adapter hose joint at the T-valve outside the engine room, so that neither the bonnet or the hose are damaged when the hood is closed. In addition check that hose cannot contact the throttle control reel.



- Install the T-valve to the left door mirror using tape. NOTE! Protect the door mirror and wing edge with foam protection as shown in the illustration.

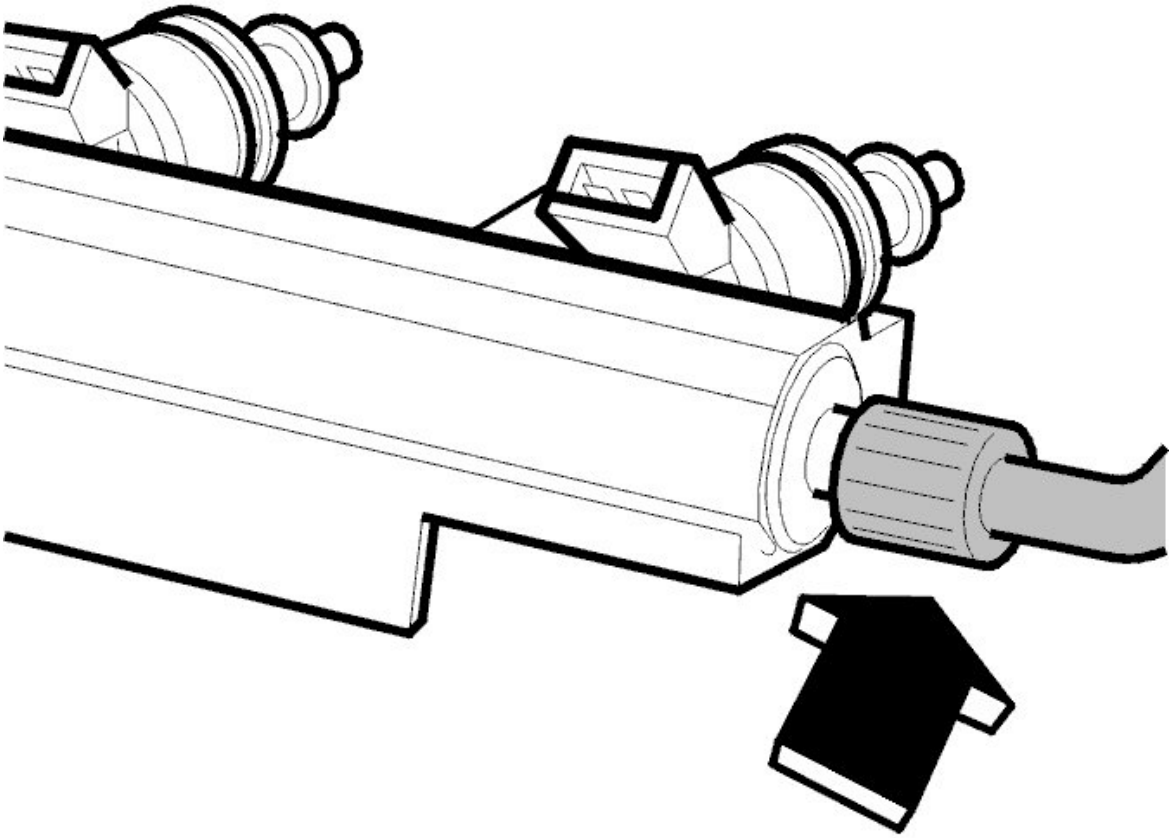
Connecting fuel draining unit



The unit must be operating when the measuring equipment's hose is connected to the engine in order to reduce the risk of fuel spillage.

Corrective actions:

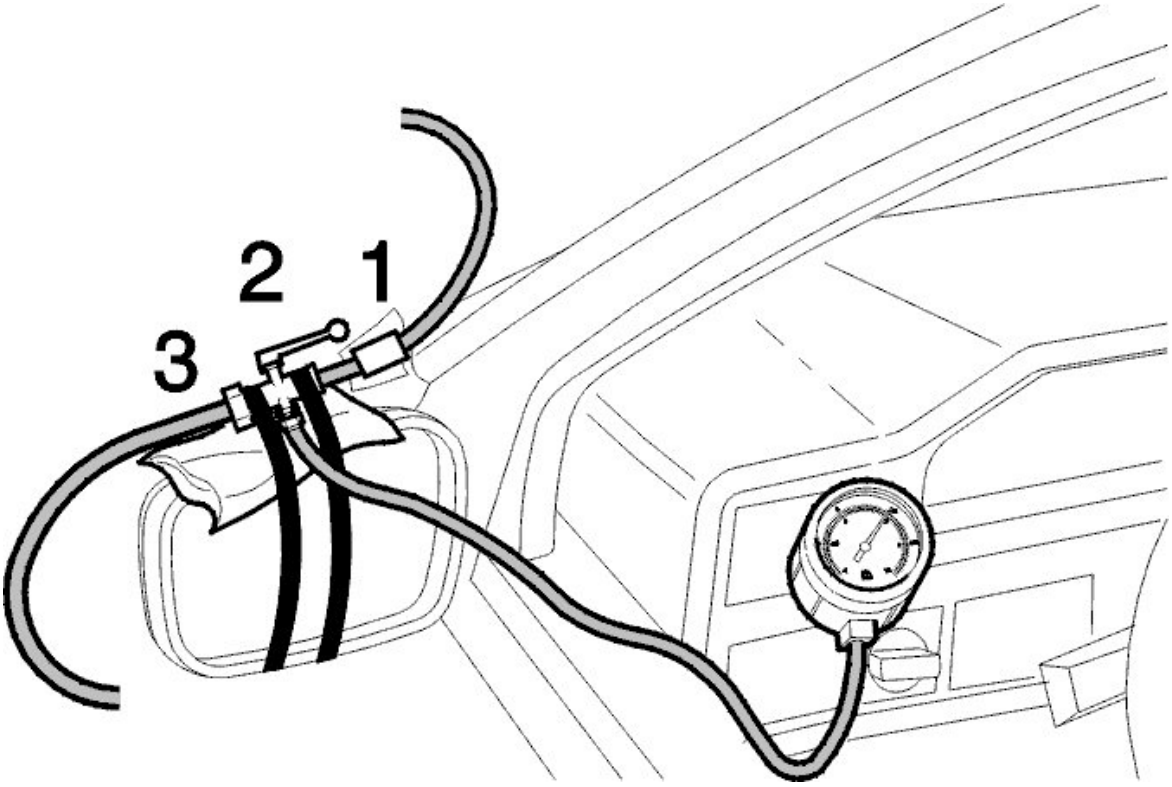
- Connect the fuel drainage unit hose to the T-valve on the door mirror (pos. 3 in illustration).
- Turn the T-valve cock to the middle position (position 2 in the illustration).
- Start the evacuation unit to get suction in the measurement unit hose to the engine.



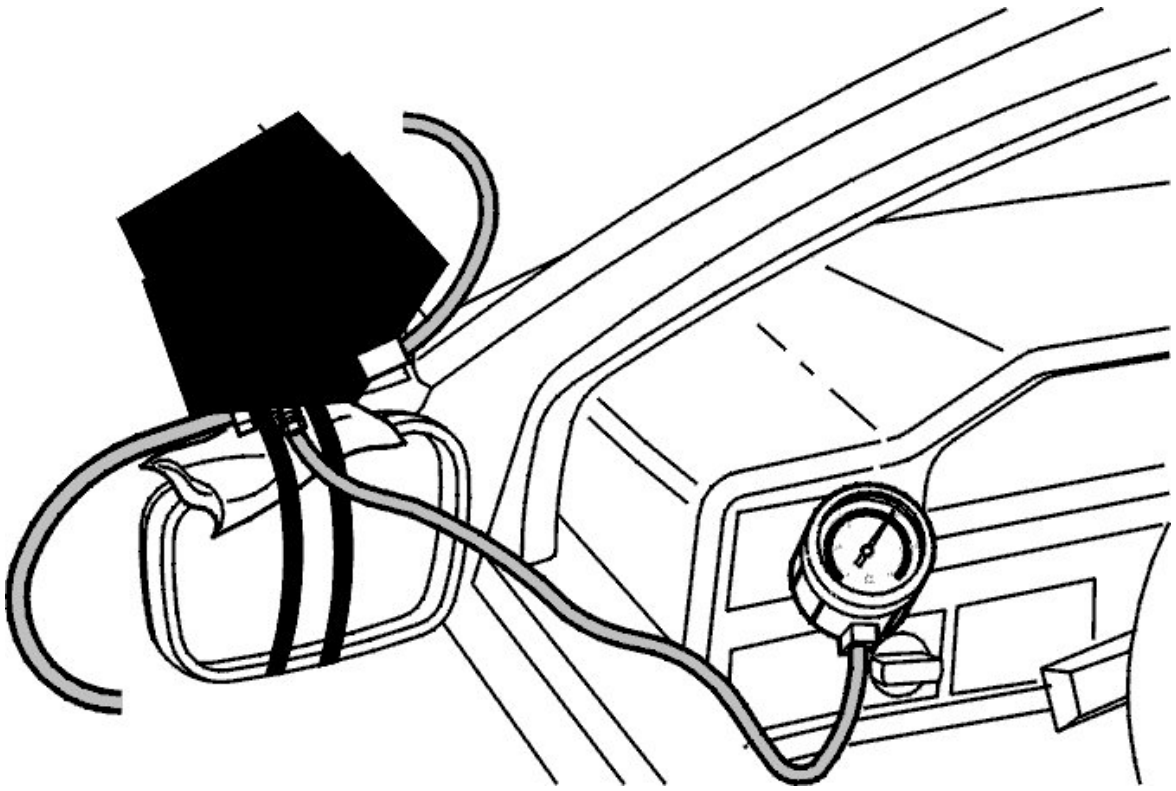
Corrective actions:

- Tighten nipple on fuel rail.

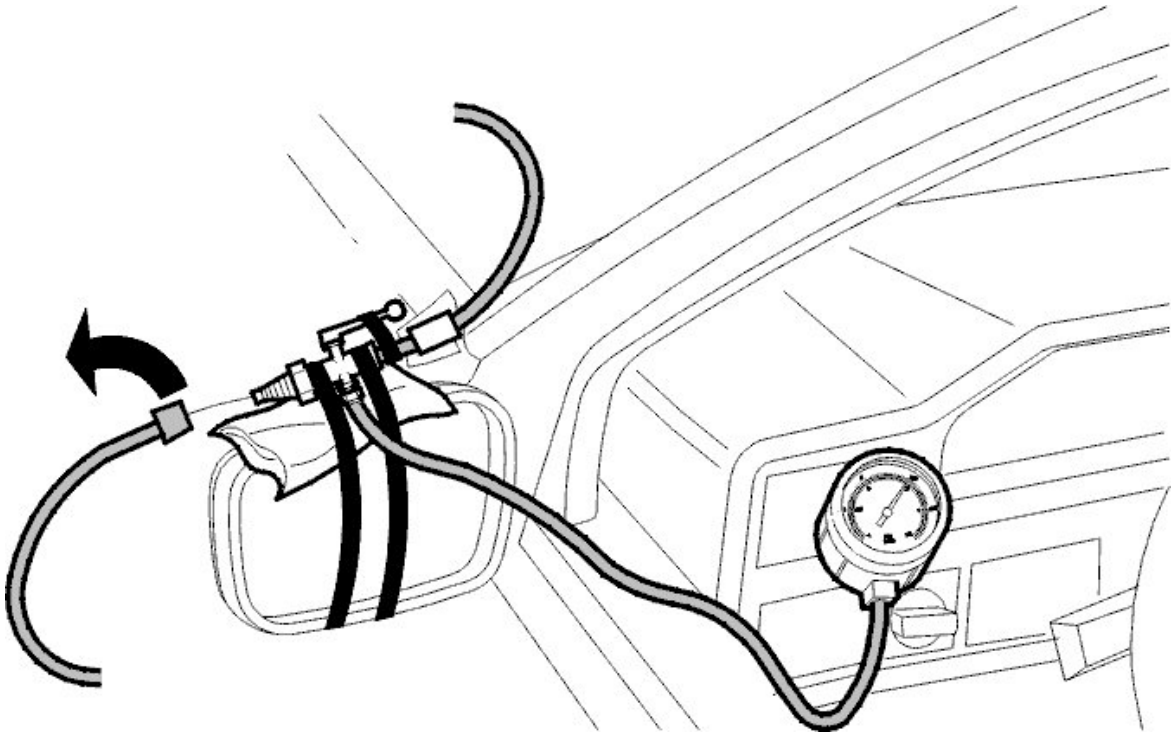
Caution! Note! Check that there is no fuel leakage and that the evacuation unit is operating while the nipple is connected to the engine.



- Turn the T-valve cock so that it is pointing toward the engine (position 1 in the illustration) to shut off the suction from the evacuation equipment.

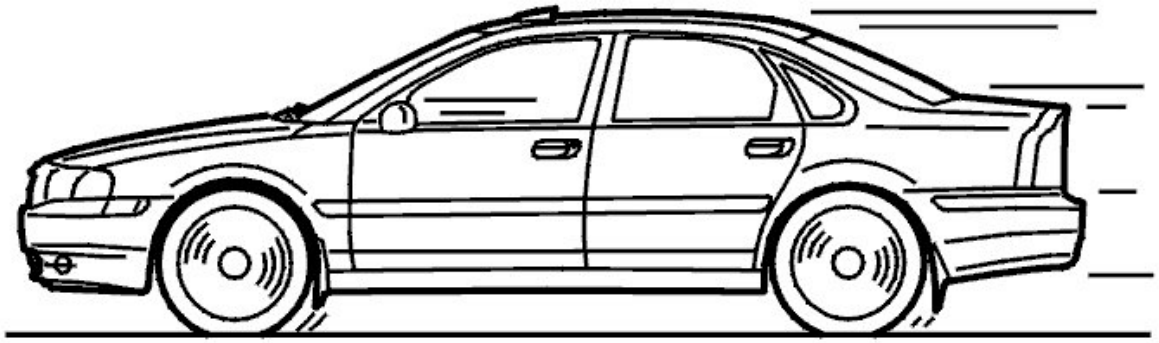


- Use a tie strap to lock the cock in the position toward the engine.



- Remove the draining unit hose from the T-valve hose connector.
- Turn off the evacuation unit when the hose is empty.
- Arrange the measuring equipment hose along the rubber list on plenum chamber cover at the left bonnet hinge in such a position that the hose and bonnet are not damaged (as in illustration on page 2).
- Carefully close the hood.

Measuring fuel pressure

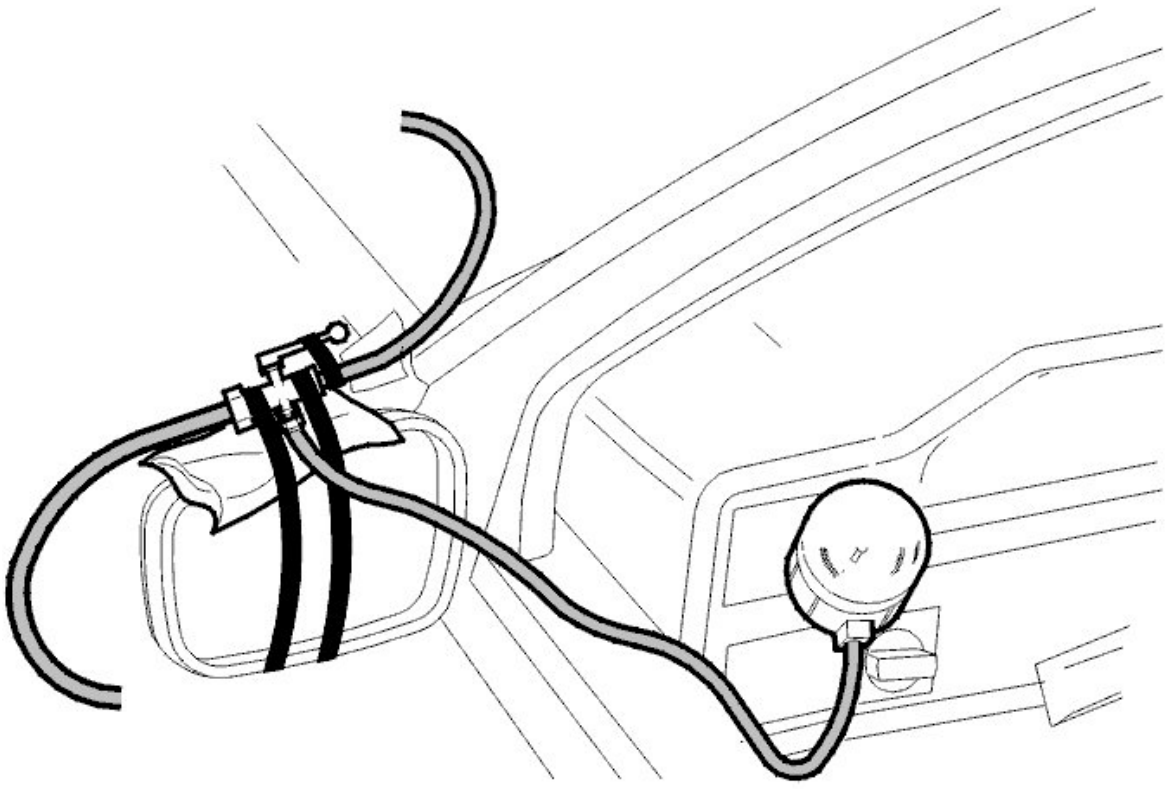


Corrective actions:

- Start the engine.
- Drive the car and read off fuel pressure while the car is being driven. The fuel pressure should be:**375-395 kPa (54.4 - 57.3 psi)**.

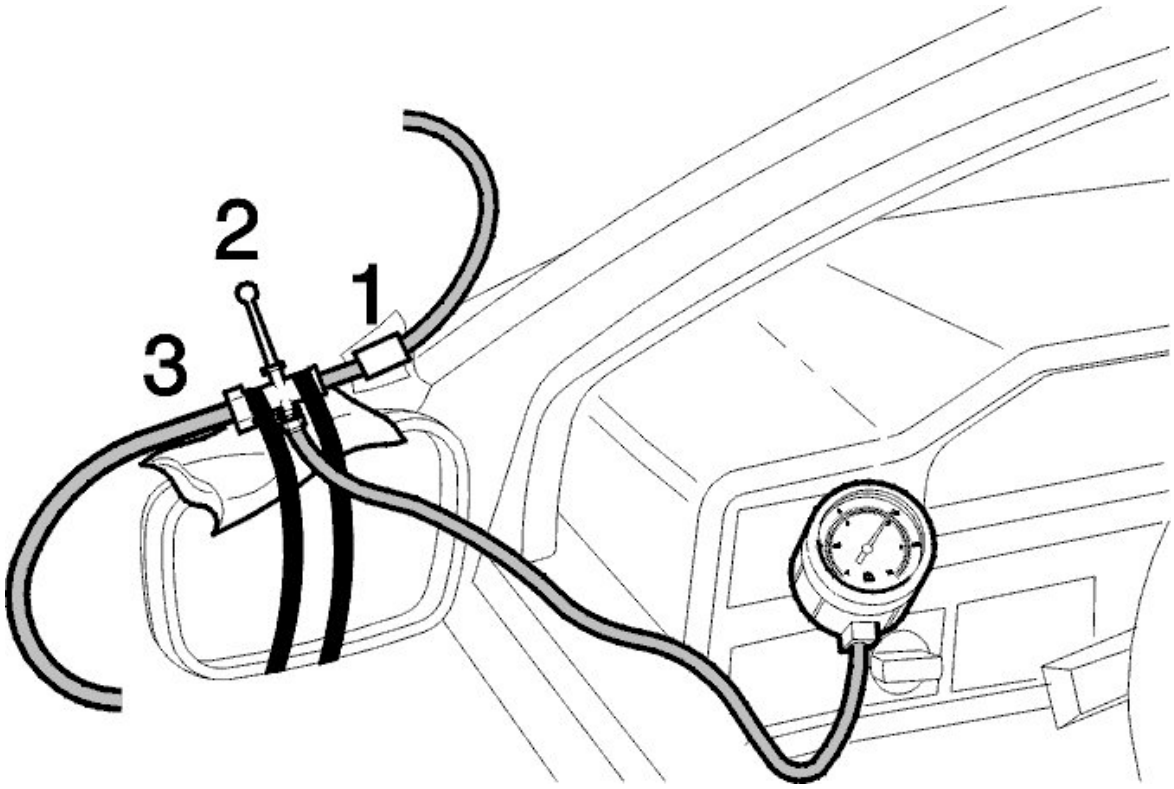
Caution! Note! At constant engine loads the fuel pressure should be stable. At acceleration or during engine braking the fuel pressure may vary between the maximum and minimum readings.

Removing fuel pressure gauge



Corrective actions:

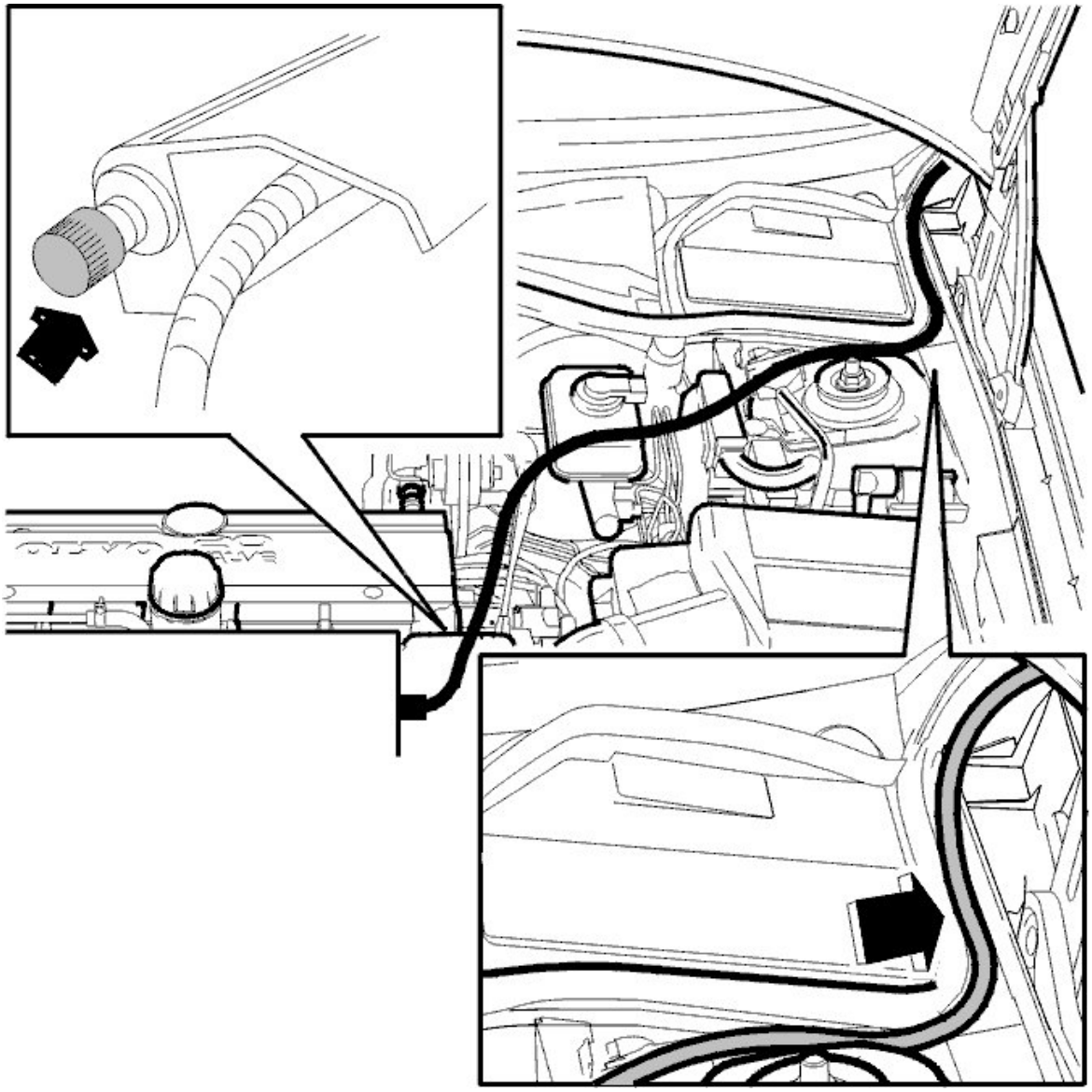
- Connect the evacuation unit hose to the hose nipple on the door mirror (see black arrow in illustration).
- Start the evacuation unit so there is suction in the hose.



Corrective actions:

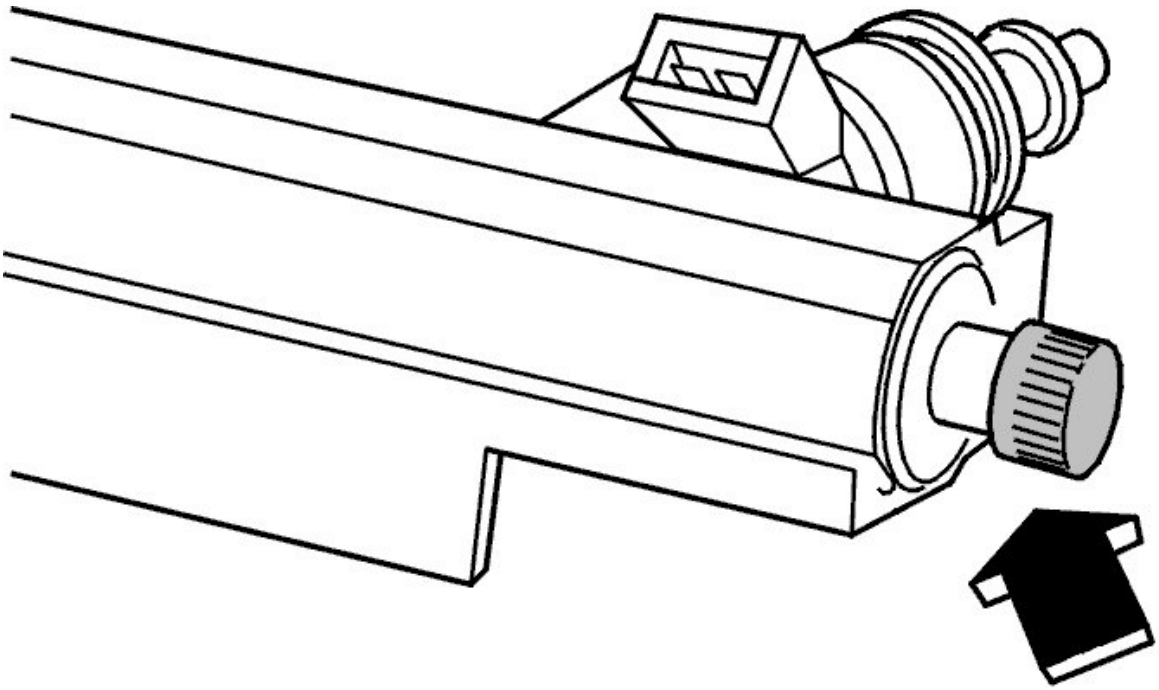
- Remove the tie strap locking the cock on the T-nipple.
- Turn the cock to the middle position (position 2) to obtain suction in the hose to the nipple in the fuel manifold on the engine.

Removing fuel draining unit



Corrective actions:

- Remove adapter hose from the engine.
- Wait a minute or so for the hose to empty.
- Turn off the draining unit.
- Remove the measurement equipment and hoses from the car.



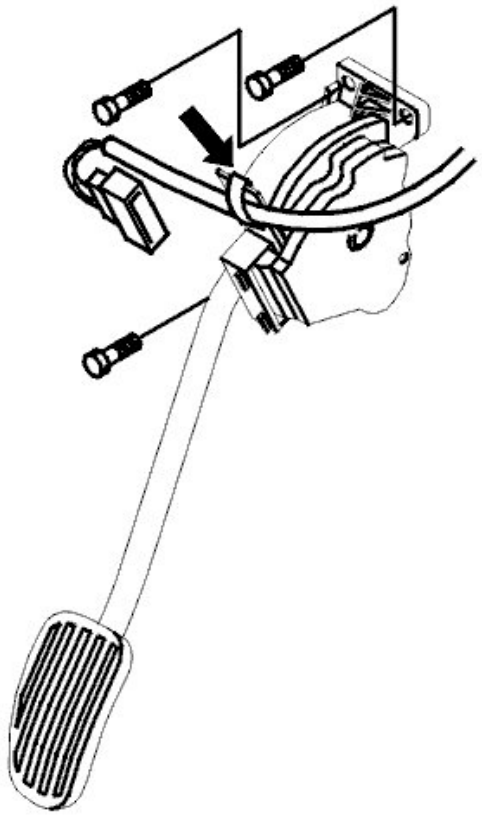
- Reinstall the protective cap on the fuel rail.

Accelerator Pedal: Service and Repair

Accelerator pedal (AP), replacing

Removal

Accelerator pedal (AP)



- Remove the soundproofing panel. See Soundproofing panel, replacing See: Body and Frame/Interior Moulding / Trim/Dashboard / Instrument Panel/Service and Repair/Soundproofing Panel, Replacing
- Remove the screws
- Cut off the clamp
- Disconnect the connector
- Remove the accelerator pedal (AP).

Installation

Accelerator pedal (AP)

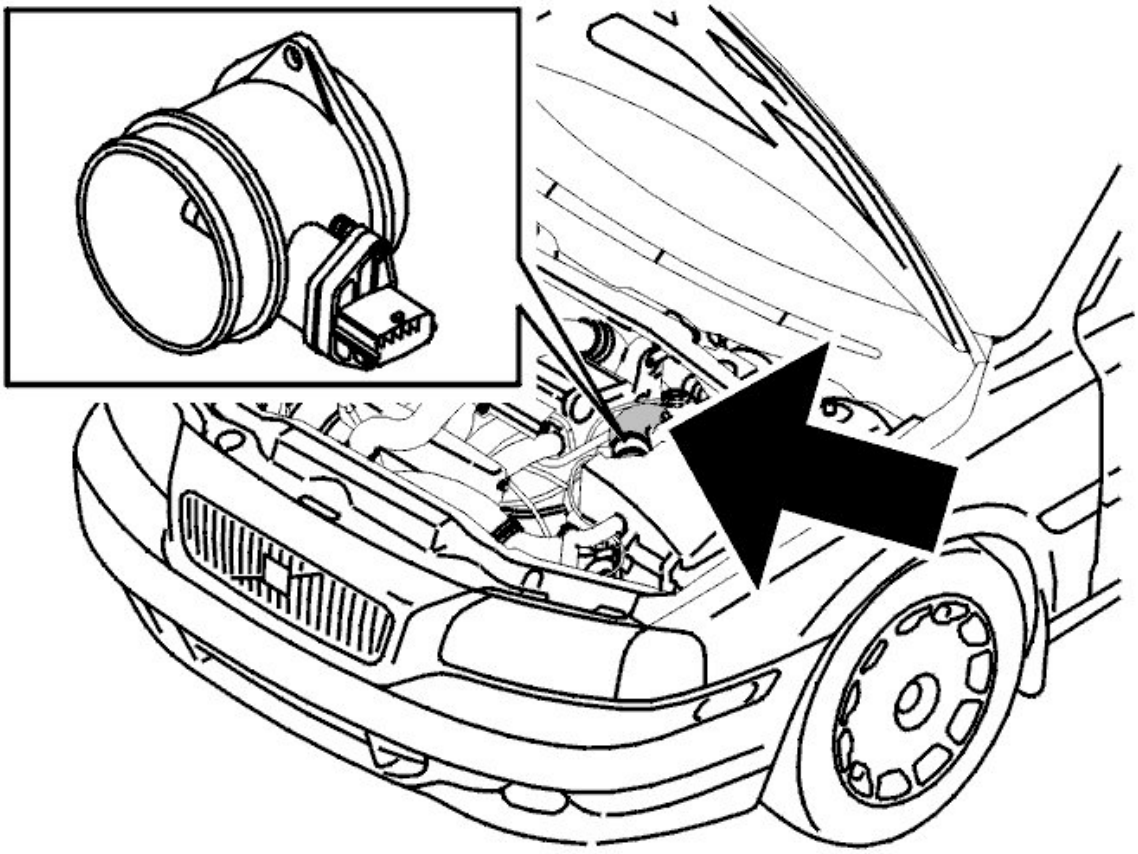
In reverse order.

Air Flow Meter/Sensor: Service and Repair

Mass air flow (MAF) sensor, replacing

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the mass air flow (MAF) sensor

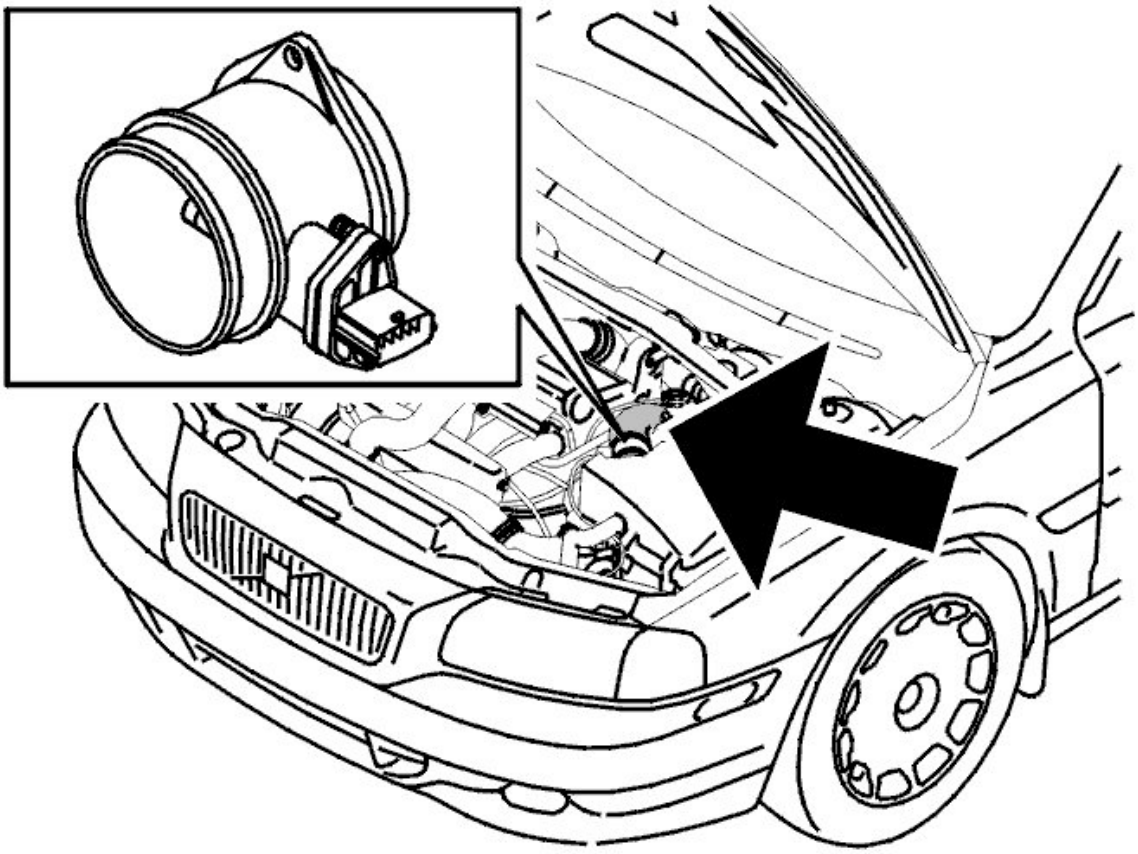


Remove:

- the inlet hose from the mass air flow (MAF) sensor
- the connector from the mass air flow (MAF) sensor
- the screws securing the mass air flow (MAF) sensor to the air cleaner (ACL) cover.

Pull and work the mass air flow (MAF) sensor loose from the air cleaner (ACL) cover.

Installing the mass air flow (MAF) sensor



Note! Apply water to the O-ring in the air cleaner (ACL) cover to facilitate installation of the mass air flow (MAF) sensor.

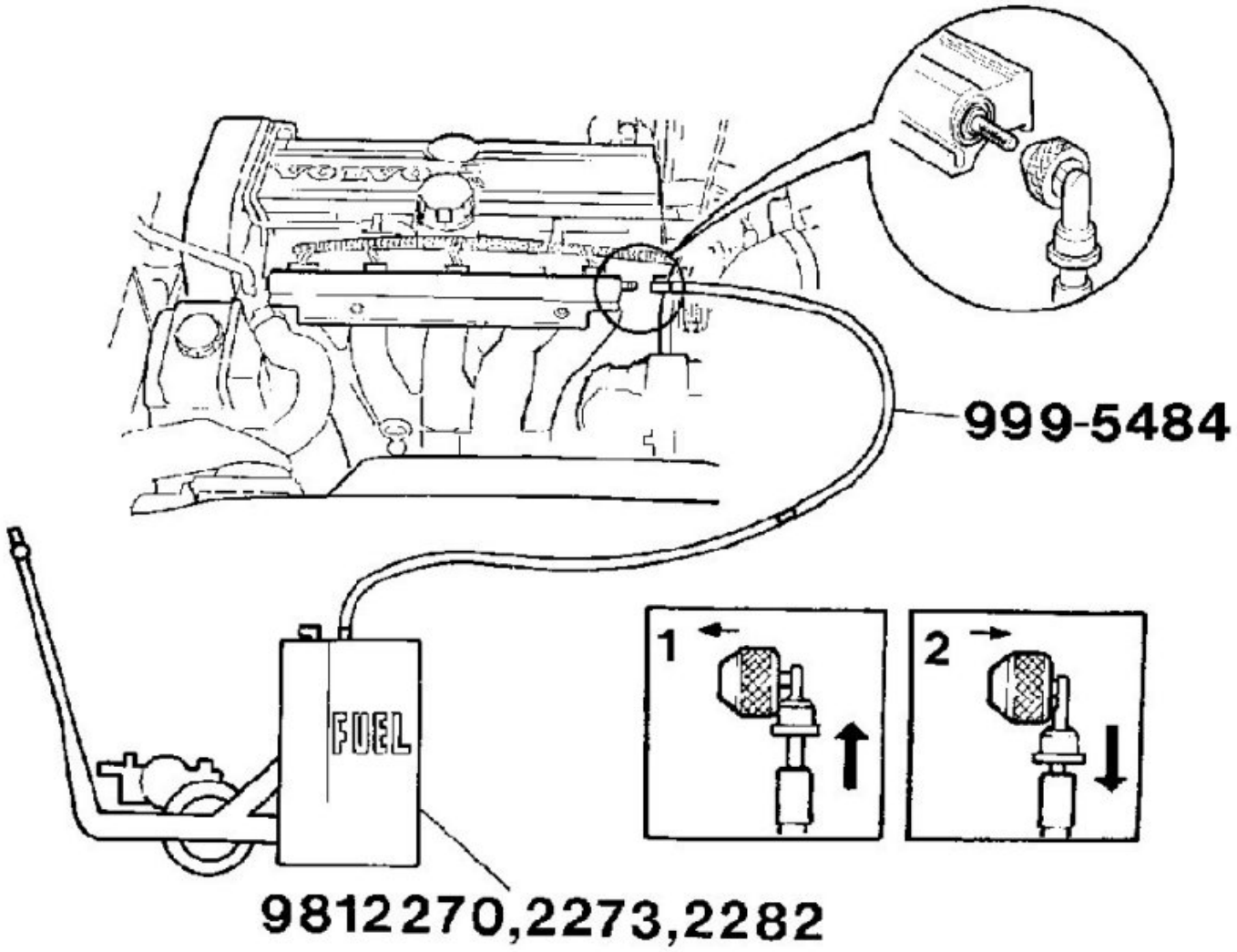
Install the new mass air flow (MAF) sensor.
Press the mass air flow (MAF) sensor into place.
Install the screws. Tighten.
Install the inlet hose on the mass air flow (MAF) sensor. Tighten the hose clamp.
Press the connector for the mass air flow (MAF) sensor into place.

Fuel Filter: Service and Repair

Replacing the fuel filter

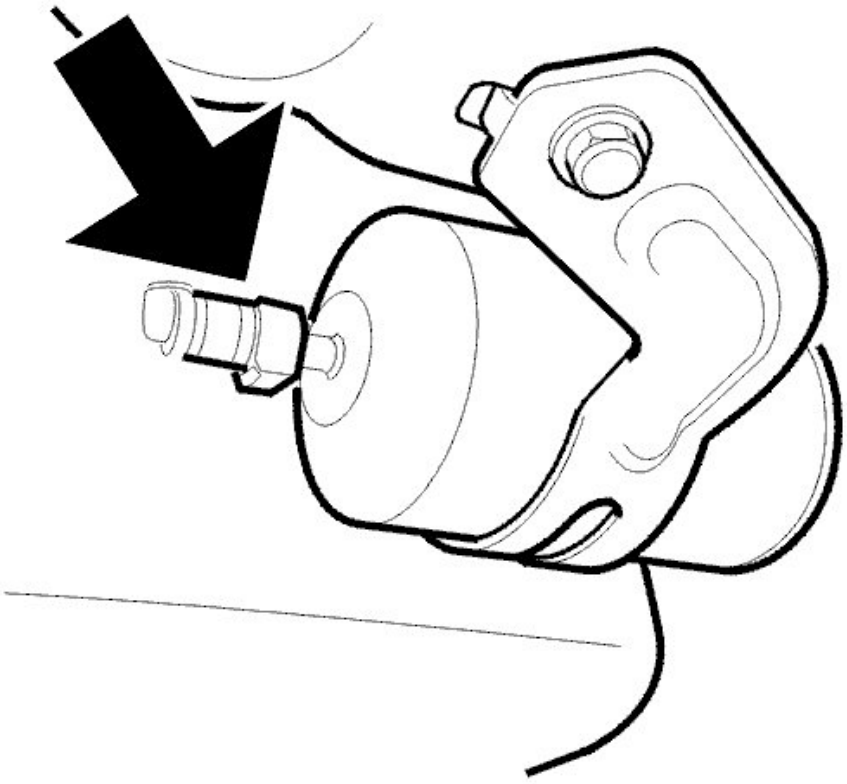
Removal

Draining the fuel system



- Depressurize the fuel system according to Fuel system pressure release See: Fuel Pressure Release/Service and Repair.

Removing the fuel filter



- Remove the screw securing the clamp around the filter
- Disconnect the quick-release connectors from the fuel filter
- Replace the filter.

Installation

Installing the fuel filter

In reverse order.
Tighten the screw. Tighten to **25 Nm**.

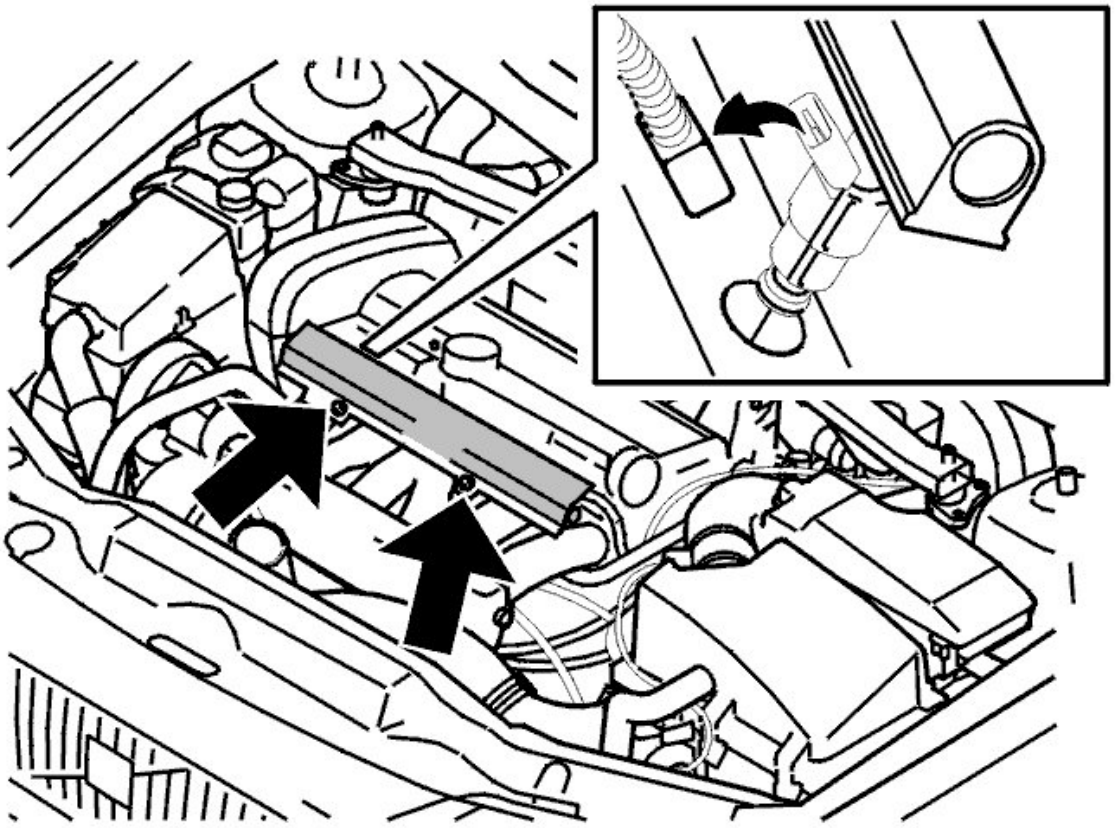
Fuel Injector: Service and Repair

Injector/pulse damper, replacement

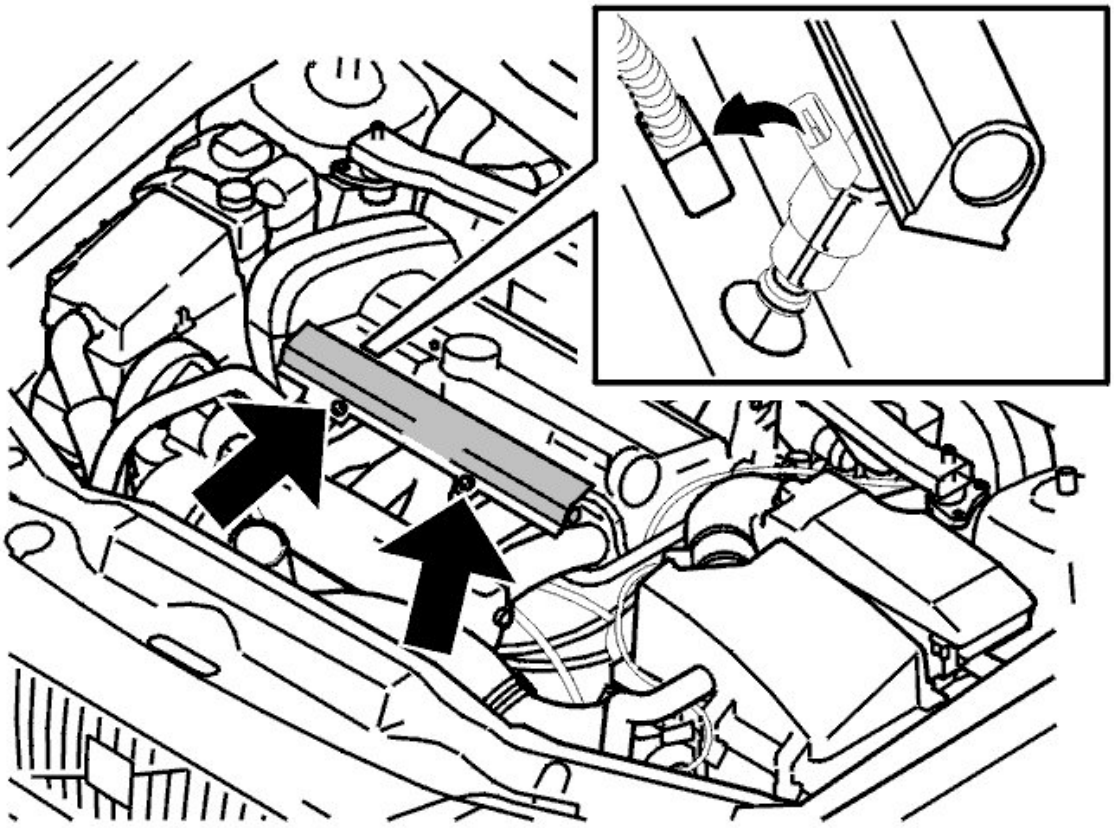
Removal and Installation

Note! Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation



Depressurize the fuel system according to: Fuel system pressure release See: Fuel Filter/Fuel Pressure Release/Service and Repair.
Remove the charge air pipe over the engine. Seal the openings.



Note! Handle the injectors carefully to avoid damage to the fuel nozzles and fuel needles.

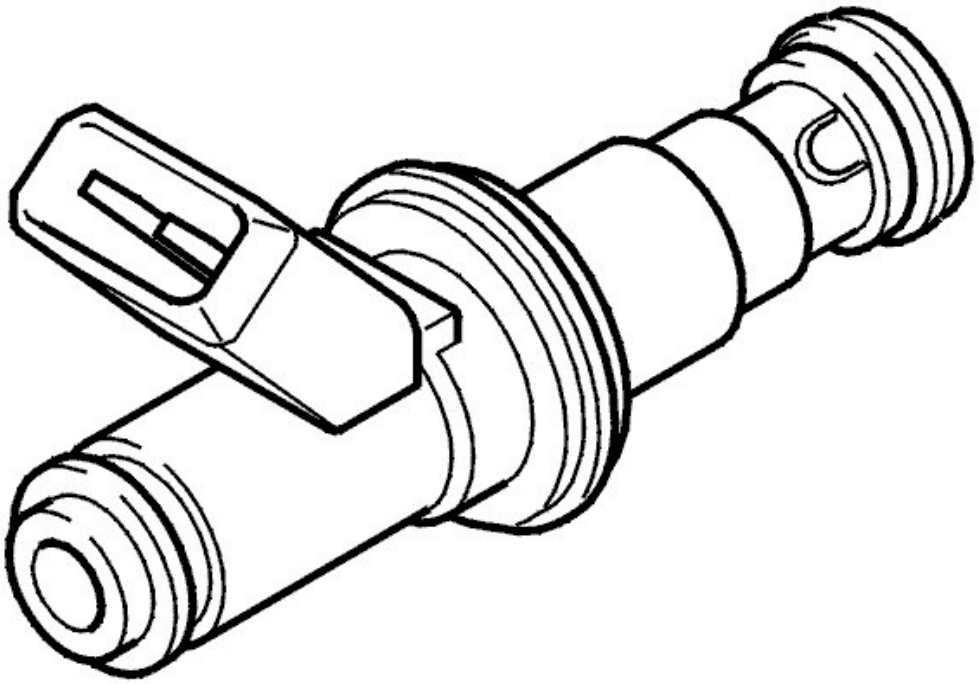
Remove the cover over the fuel rail.
Disconnect the injector connectors. Blow clean around the injectors.
Remove the mounting screws from the fuel rail.
Separate the fuel line quick-release connector. See: Fuel line, lock See: Fuel Rail/Service and Repair. Spray universal oil or similar around the injector terminals on the intake manifold.
Disconnect the connector for the fuel pressure sensor in the end of the fuel line. Gently work the fuel rail and injectors loose. Seal the openings.
Remove the tie strap for the fuel pressure sensor wiring.
Gently work the fuel rail and injectors loose. Seal the openings.

Removing injectors

Remove:
- the screws holding the mounting rail to the fuel rail
- the mounting rail
- the injector.

Installing injectors

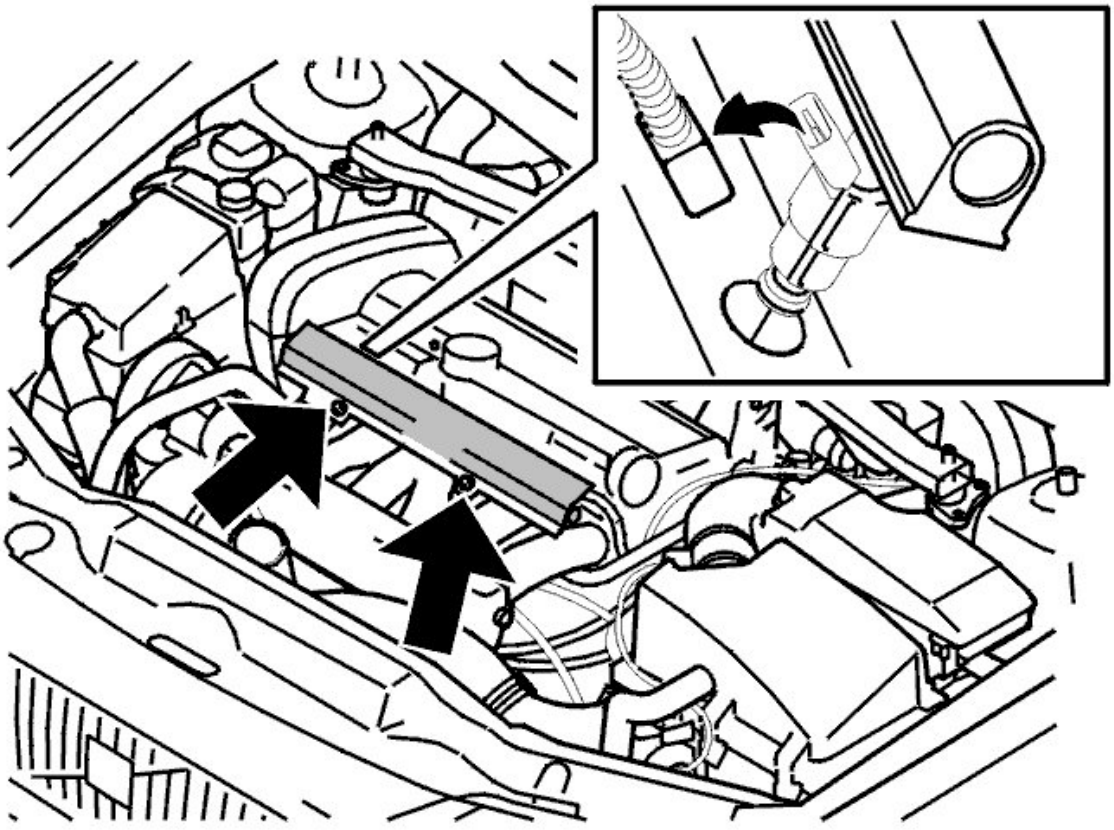
Note! For tightening torques, see: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque



Lubricate the injector O-ring using a thin layer of petroleum jelly.
Install the new injector.

Finishing

Position the mounting rail. The injectors may need to be pulled away from the fuel rail a few millimeters to install the rail.
Tighten the mounting rail to the fuel rail. See Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.
Lubricate the injector O-rings with petroleum jelly.

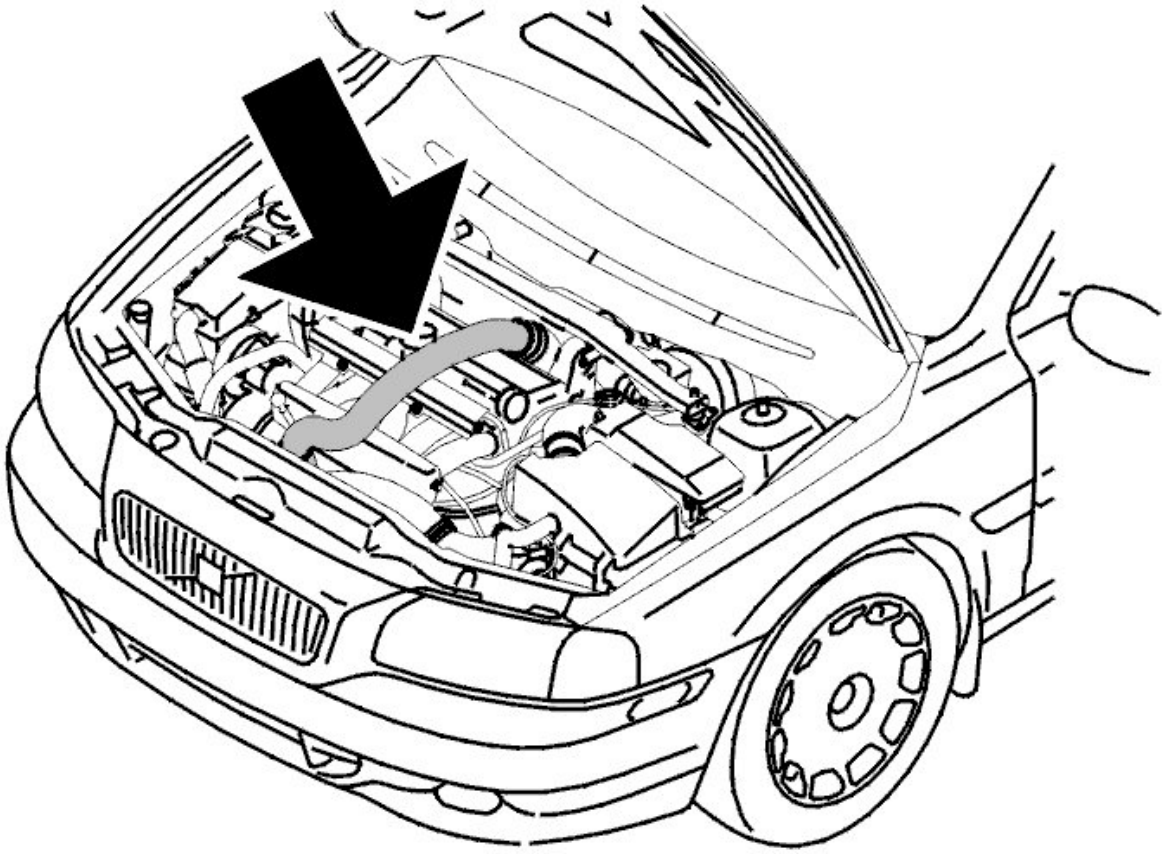


Depress the fuel rail. Ensure that all injectors sit correctly.

Screw the fuel rail into place. Use new screws and tighten. See Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.
Connect the connectors for the injectors and the fuel pressure sensor.
Install a tie strap for the cable for the fuel pressure sensor.
Press the quick-release connector together until a clicking sound is heard. See Fuel line, lock See: Fuel Rail/Service and Repair.

Caution! The fuel pressure pipe must be in place.

Reinstall the cover over the fuel rail.



Remove the seals from the charge air pipe. Reinstall the charge air pipe over the engine.
Start the engine. Check for fuel leakage.

Fuel Line Coupler: Description and Operation

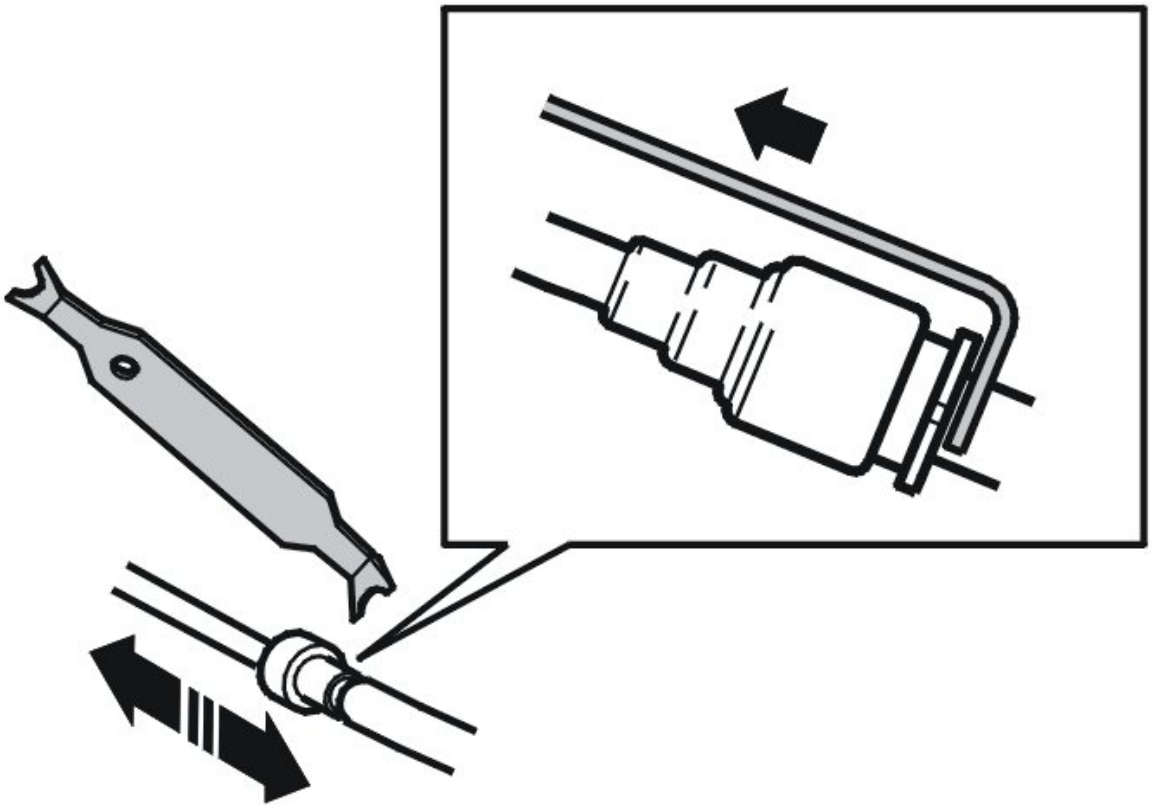
Fuel system, quick-release connectors

Special tools:

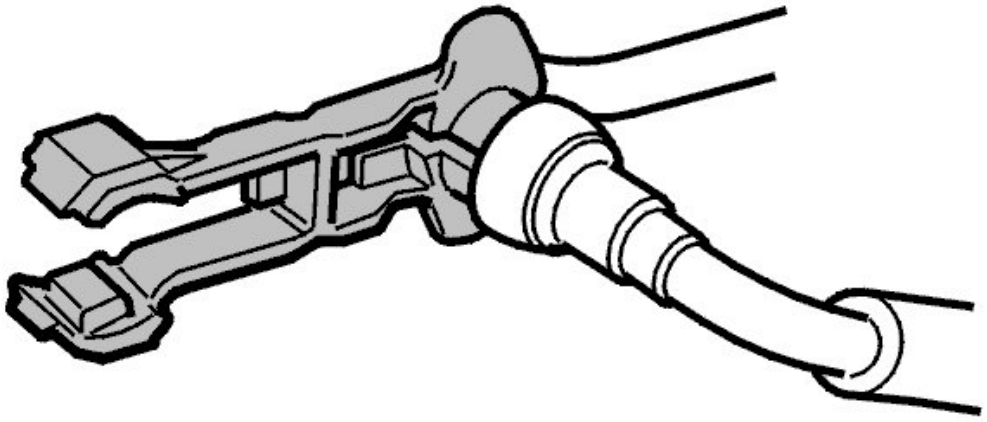
999 5666 Wrench See: Tools and Equipment/999 5666 Wrench
951 2666 Replaced by 9997298 See: Tools and Equipment/951 2666 Replaced By 9997298

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

There are different types of quick-release connector in the fuel system. Special tools are required for some connectors (see below).



If the catch appears as illustrated, special tool999 5666 Wrench See: Tools and Equipment/999 5666 Wrench must be used to press in the catch.



If the connector has an internal catch, special tool951 2666 Replaced by 9997298 See: Tools and Equipment/951 2666 Replaced By 9997298 must be used.

Fuel Pump: Service and Repair
Draining the Fuel Tank

Special Tools: 999 5720, 999 5721

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation
Disconnect the battery negative lead. See Note when disconnecting/connecting the battery lead

WARNING: RISK OF EXPLOSION! THE USE OF A FRESH AIR MASK IS RECOMMENDED.

Insert the heavy duty hose **1.3 meters** into the fuel filler pipe, measured from the edge of the opening of the filler pipe.

Pump until air comes out.

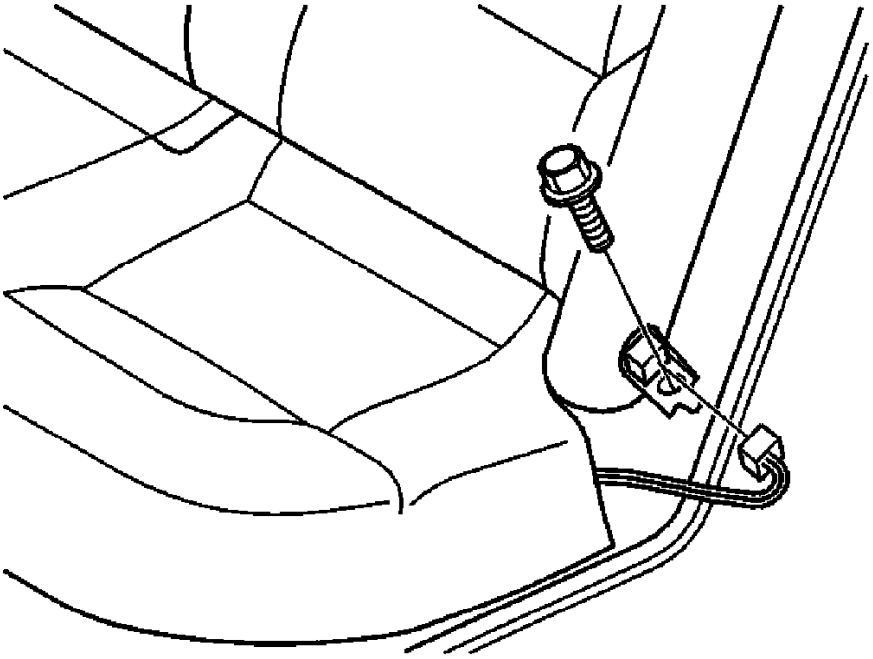
(V70) Fold up both sides of the rear seat.

(S80, S60) Remove the seat cushion for the rear seat.

Remove the right side cushion. See Side cushion

Disconnect the connector at the hinge.

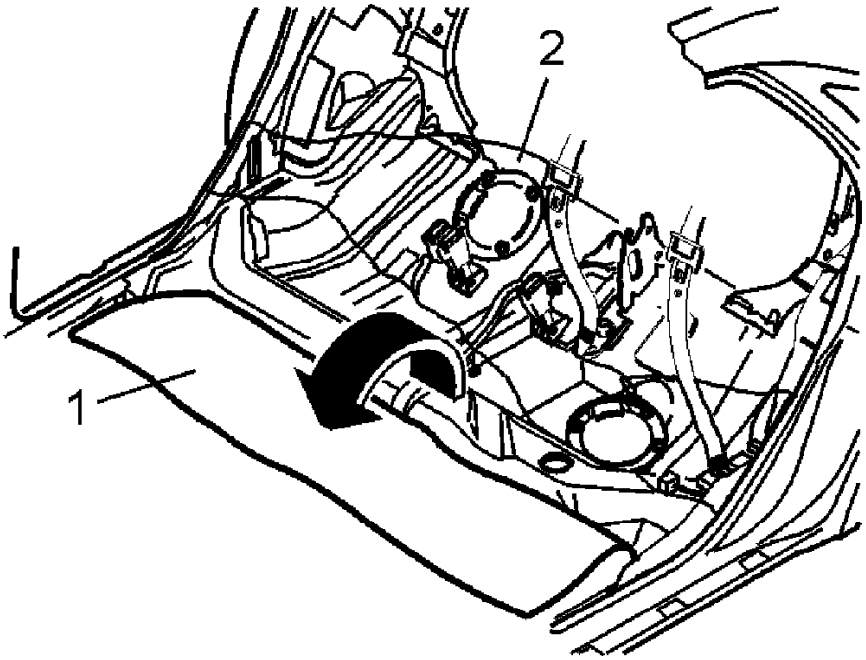
Remove:



- the mounting screw for the hinge
- the screw for the seatbelt end mounting.

Release the strap/straps of the folding mechanism for the seat belt buckle. (Hooked into place on the lower edge of the backrest).

Lift out the backrest.



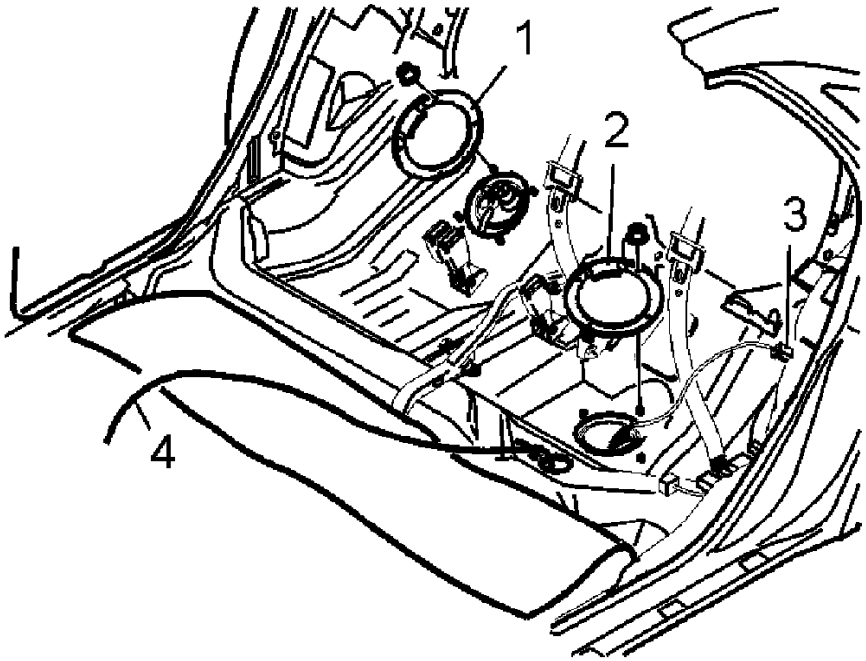
Fold the carpet (1) out of the way.

Remove the insulation panel.

Cover the area (2) around the cover and between the doors with absorbent material.

CAUTION: Ensure that there is no risk of dirt getting into the tank.

Removing the fuel tank filler cap over the fuel tank units

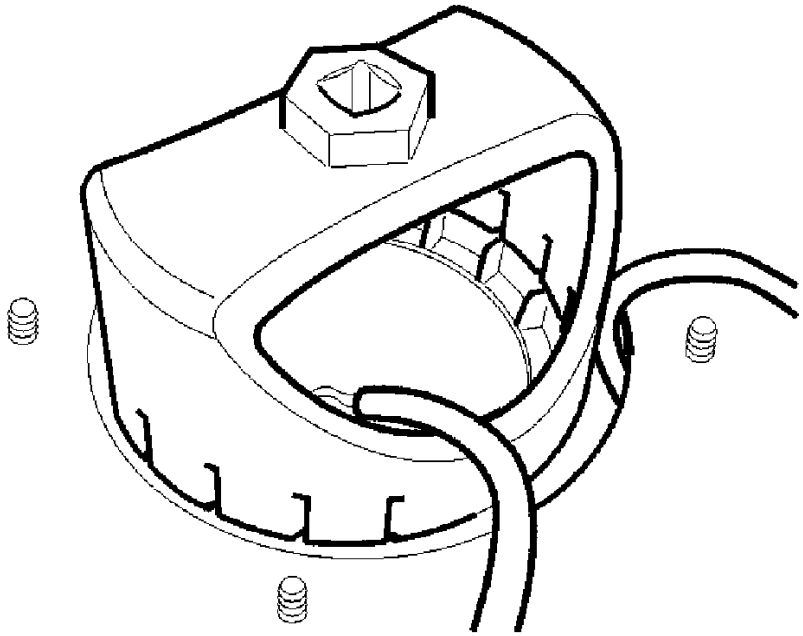


Remove the covers (1.2) over the fuel tank units.

Disconnect the fuel tank unit connectors (3).

Remove the hoses from the fuel tank unit.

Draining the fuel tank

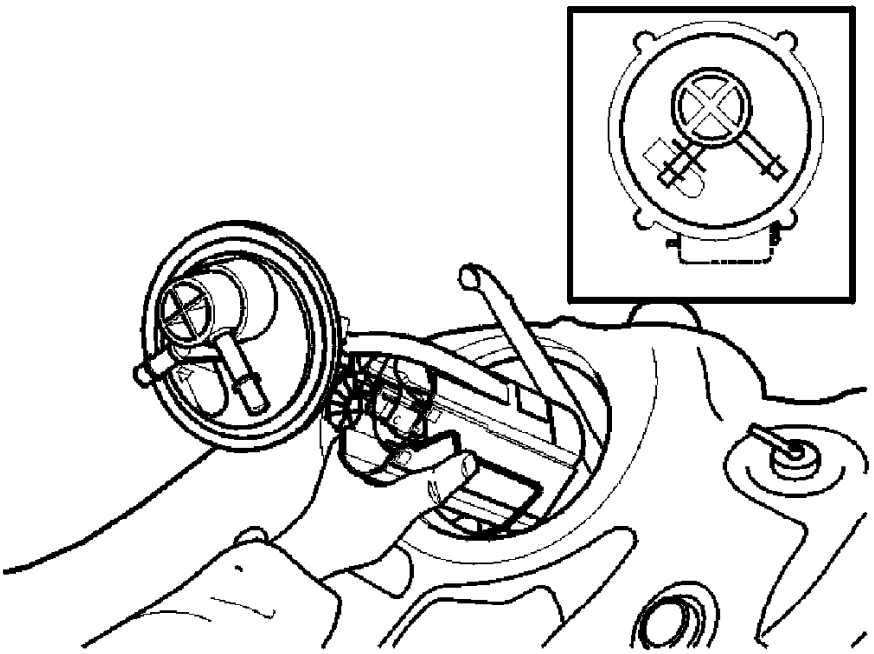


Special Tools: 999 5720

Clean the area around the fuel tank unit thoroughly.

Open the right fuel tank unit. Insert the heavy duty hose and suck out the remains from the bottom of the right-hand side of the fuel tank.

Connect hose 999 5721 to the heavy duty hose. Suck out the remains from the bottom of the fuel tank unit reservoir.



Carefully remove the overflow pipe from the reservoir.

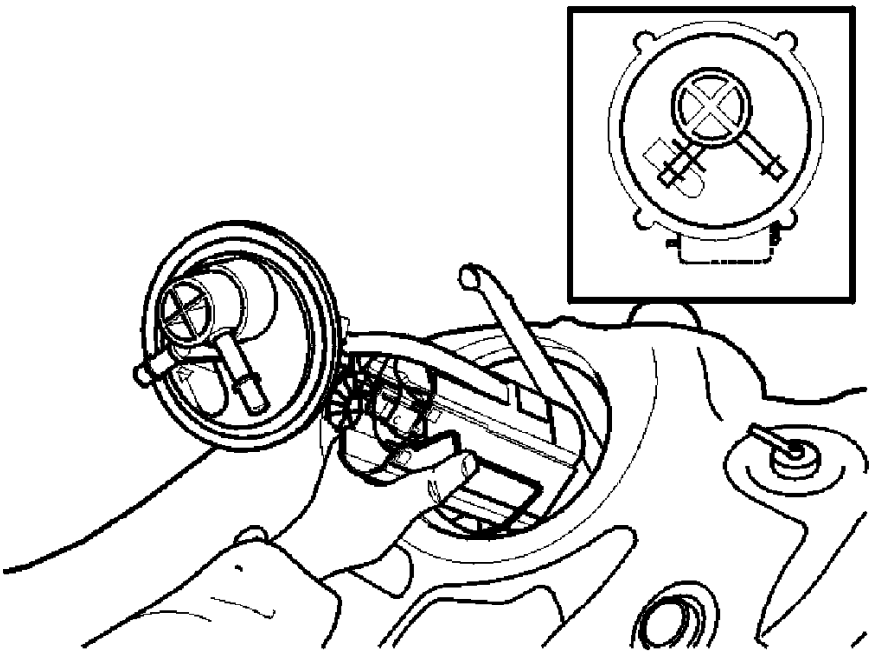
Remove the thin hose (999 5721) from the heavy duty hose. Connect the thin hose to the overflow pipe. Use a hose clamp.

Pump until a lot of air comes out.

Open the left fuel tank unit. Insert the heavy duty hose and suck out the remains from the bottom of the left-hand side of the fuel tank.

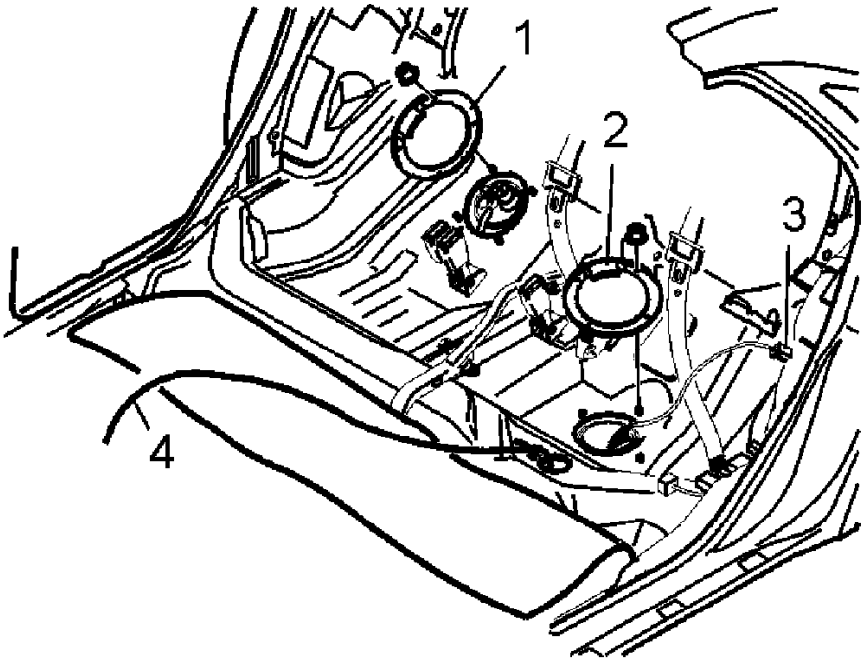
Installation

Right fuel tank unit:



- Place the overflow pipe **approximately half a centimeter** to the lefthand side
- Grip the right fuel tank unit reservoir. Pinch the fuel tank unit reservoir so that the float is held in its lowest position
- Lower the reservoir carefully while rotating it backwards around the front-rear shaft on the float
- Install the overflow pipe on the reservoir.

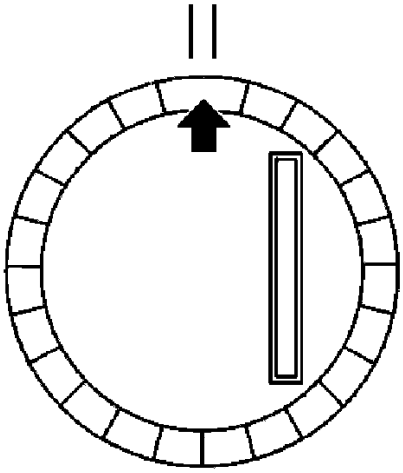
Left fuel tank unit:



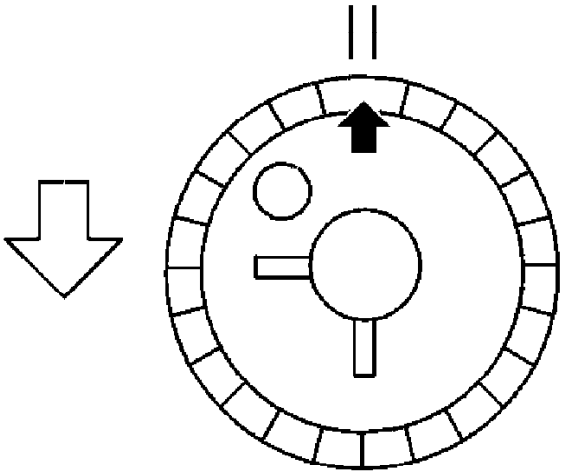
- Install a new O-ring. Lubricate the new O-ring using petroleum jelly
- Press the left fuel tank unit down so that the row of protruding cables runs along the car
- Check that the O-ring is not trapped
- Tighten the screw. Tighten to **60 Nm**
- Wipe up any fuel spillage
- Position the wiring in the cut-out in the rubber ring.

NOTE: Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.

Right fuel tank unit, continued:



- Install a new O-ring. Lubricate the new O-ring using petroleum jelly
- Press the right fuel tank unit down so that the fuel line connectors are pointing forwards and to the right
- Check that the O-ring is not trapped
- Tighten the screw. Tighten to **60 Nm**
- Install the hoses on the fuel tank unit
- Wipe up any fuel spillage
- Position the wiring in the cut-out in the rubber ring.

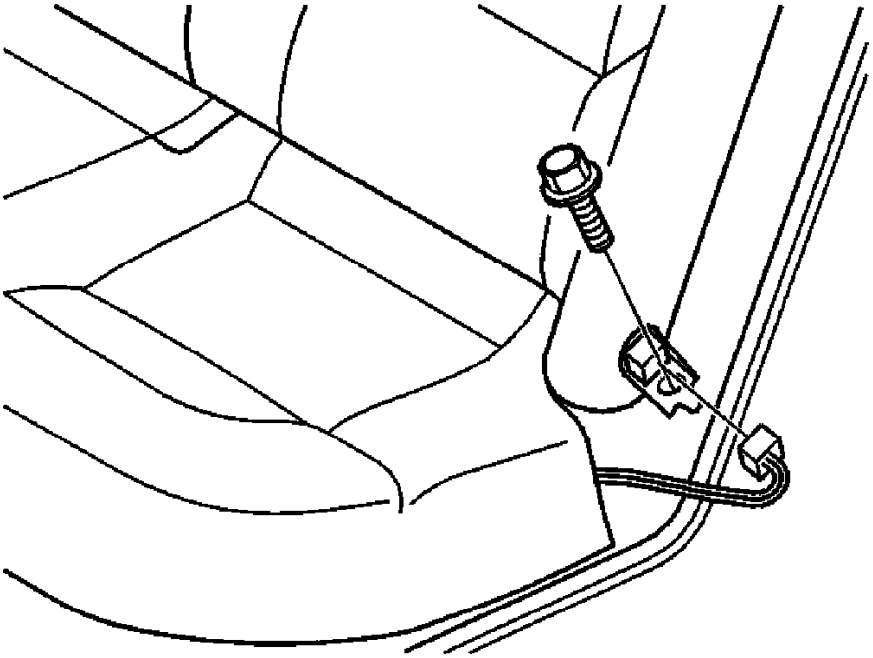


NOTE: Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.

Install the cover over the fuel tank unit. Tighten the nuts.

Connect the wiring and the connectors.

Install:



- the backrest
- the mounting screw for the hinge. Tighten to **50 Nm**
- the connector for the hinge
- the seat belt end mounting. Tighten to **48 Nm**
- the side cushion.

(V70) Fold the seat cushion forward.

(S80, S60) Install the seat cushion.

Fuel Pump: Service and Repair
Level Sensor, Fuel Tank/Fuel Pump, Replacement

Level sensor, fuel tank/fuel pump, replacement

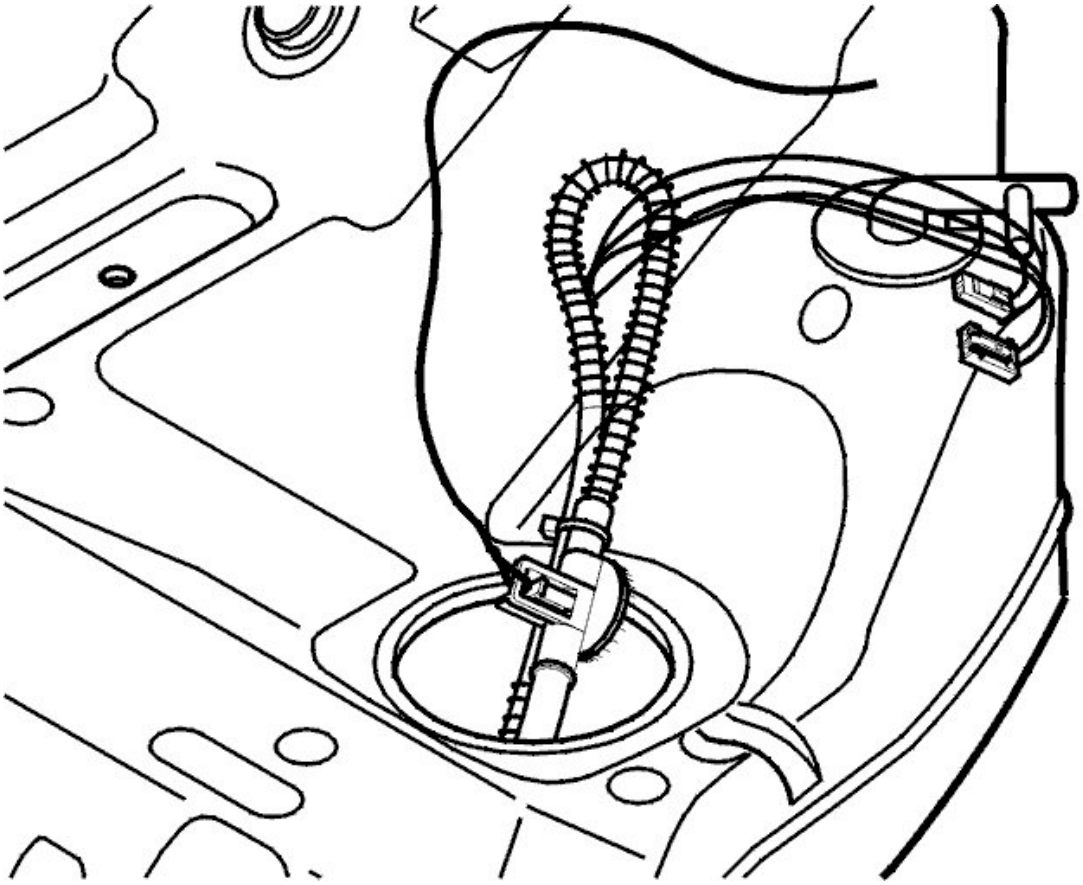
Removal

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Draining the fuel system and fuel tank

Drain:
- the fuel system. See Draining the fuel system See: Service and Repair.
- the fuel tank. See Draining the fuel tank See: Service and Repair.

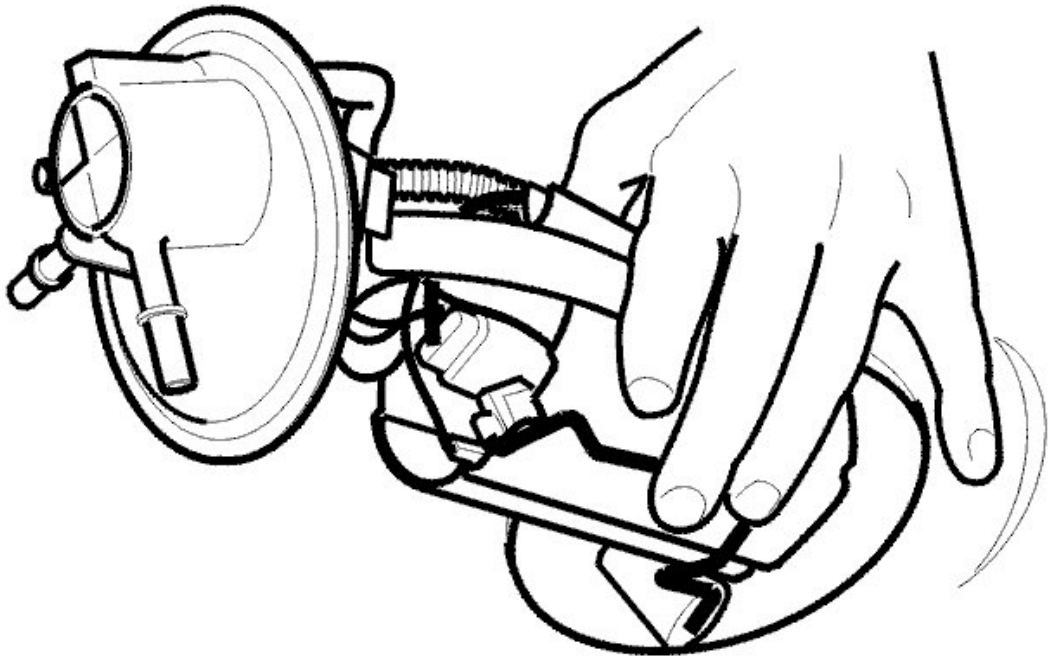
Removing the left-hand level sensor



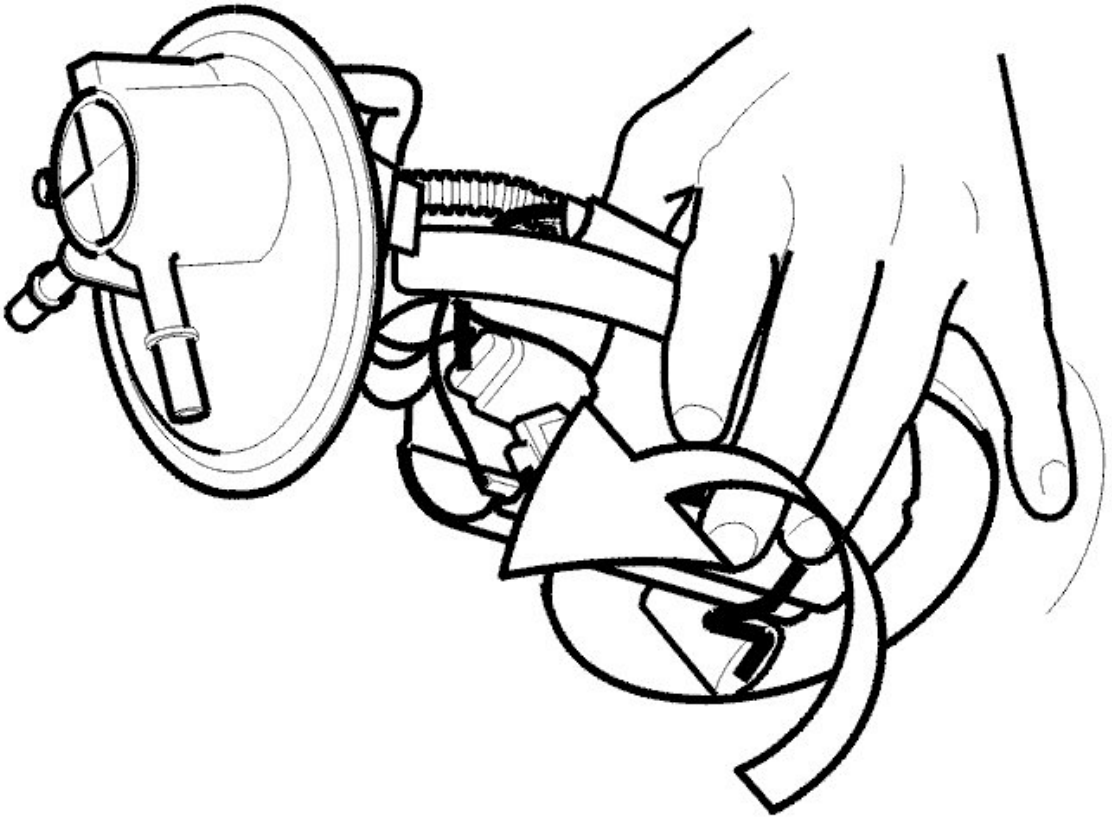
Remove:
- the two connectors from the underneath of the left-hand level sensor
- the left-hand level sensor from the ejector on which it is positioned.

Note! Secure a wire in the area of the ejector.The wire must be sufficiently long that it reaches over to the opposite side of the tank with some excess remaining to ensure that it does not slide into the tank. The wire is needed to pull the hoses and wiring back to the left-hand side of the tank after the fuel tank unit has been replaced.

Removing the right-hand level sensor / pump



- Grip the right-hand level sensor and pump holder and pinch the float so that it is held in its lowest position.



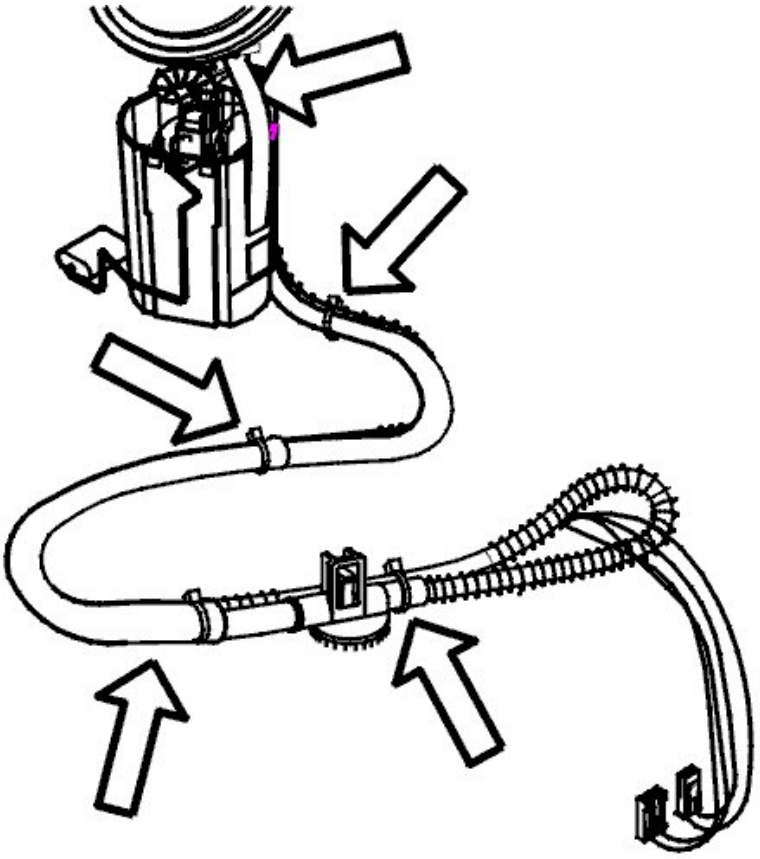
Note! Take care with the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.
Pull the hoses out from the tank without pulling up the entire wire from the right-hand hole in the tank.

Note! It is extremely important that the float arm is not broken or bent.

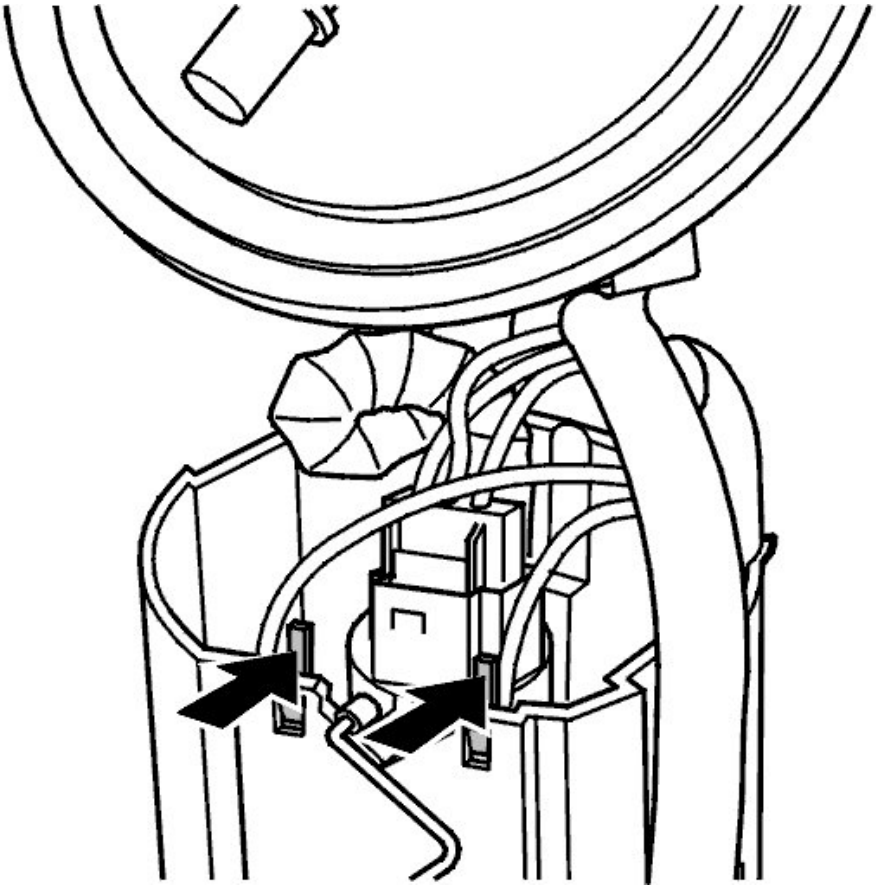
Remove the wire from the old level sensor and pump ejector.

Removing the right-hand level sensor



Remove:

- the tie straps around the protective sheath, hoses and wiring
- the net protective sheath by carefully threading it off the hoses and wiring
- the tie strap under the protective sheath.



Remove:

- the tie strap around the wiring above the pump

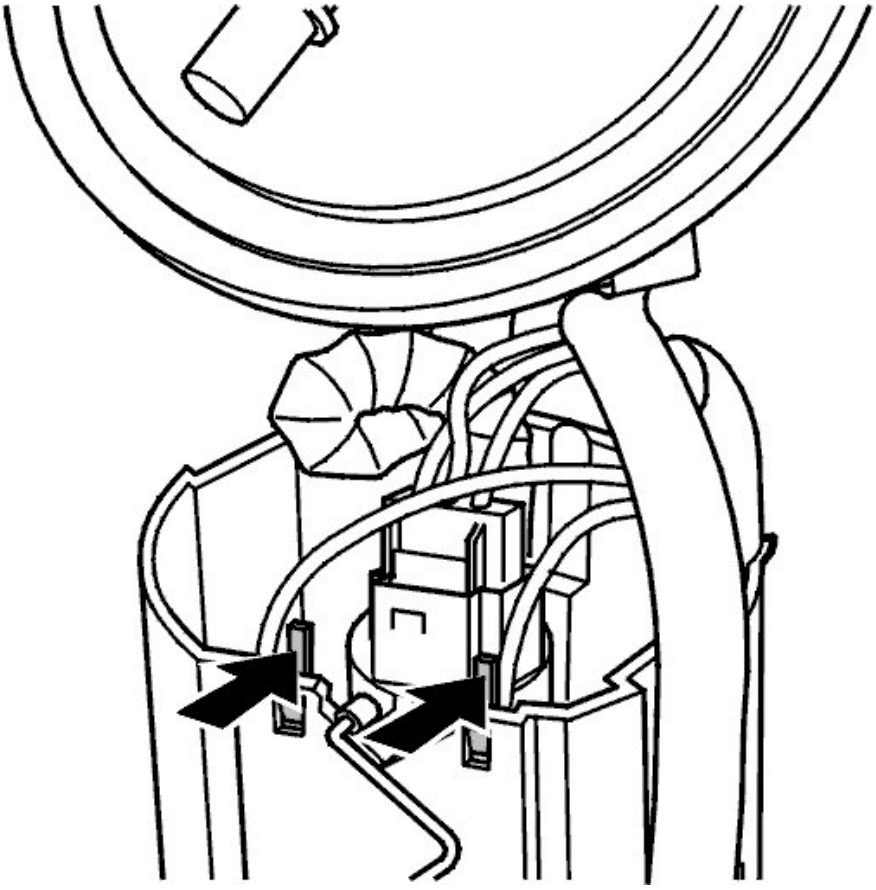
- the level sensor by pressing in the two clips and pulling upwards
- the thin pipe from the holder on the outside of the fuel tank unit
- the wiring from the holder in the fuel tank unit.

Installation

Only applies to vehicles with parking heaters

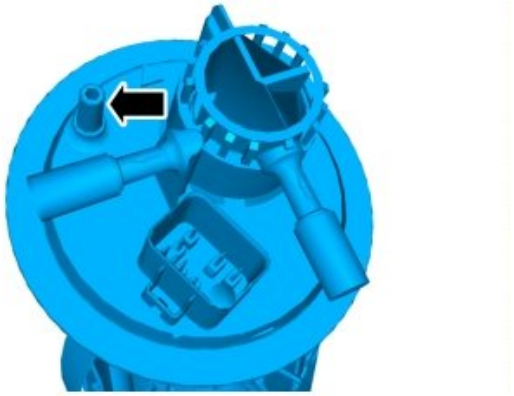
If the vehicle has an engine block heater, drill out the hole connection in the fuel tank unit. Use a -4 mm drill bit. Transfer the dip pipe.

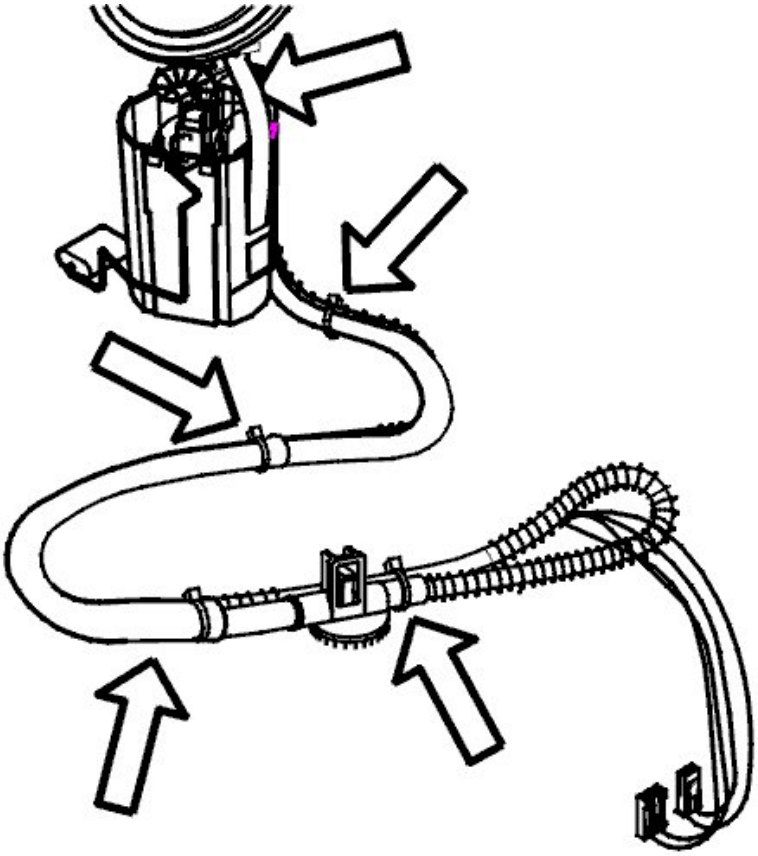
Installing the right-hand level sensor



Install:

- the new level sensor
- the wiring in the holder
- the thin pipe in the holder on the outside of the fuel tank unit
- the tie strap around the wiring above the pump.





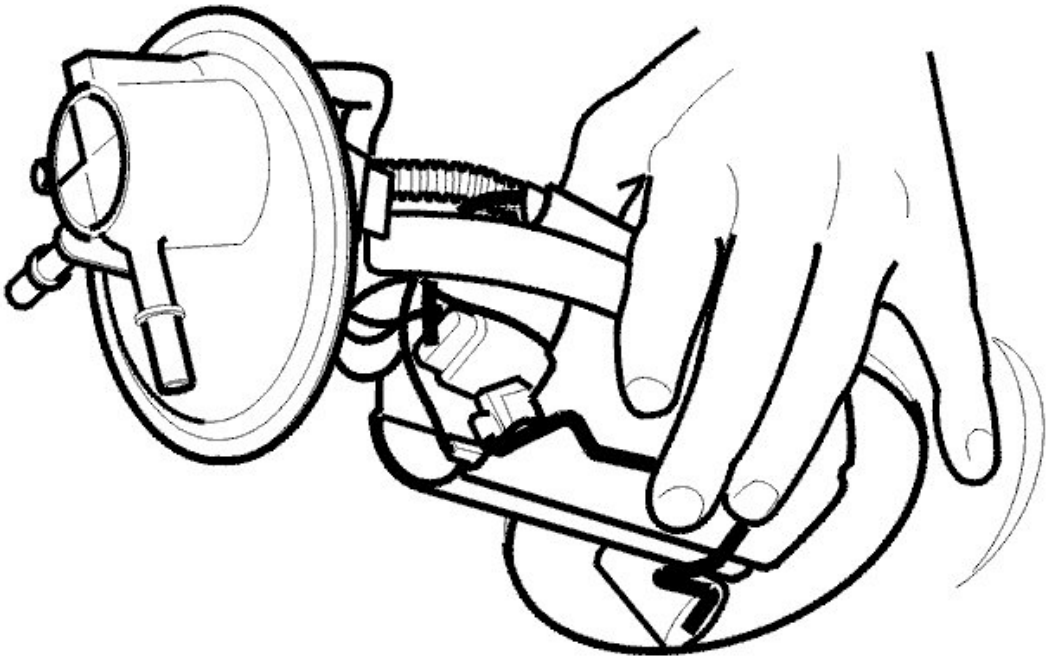
Install:

- the tie strap under the protective sheath

Note! Secure the tie strap on the smooth central section of the corrugated hose.

- the protective sheath
- four tie straps around the protective sheath, hoses and wiring. Secure the tie straps on the four smooth central sections of the corrugated hose.

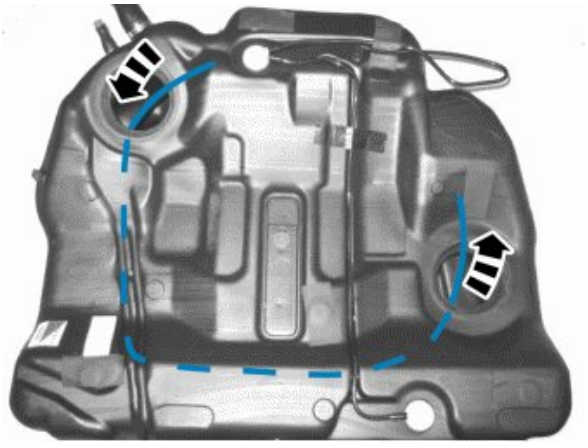
Installing the right-hand level sensor and pump and the left-hand level sensor in the fuel tank



If the fuel tank is replaced, see next step.

- Install the wire on the new ejector for the level sensor and pump
- Insert the hoses and wiring into the tank via the right-hand tank hole
- Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position
- Carefully and slowly lower the holder. Carefully work the holder into place
- Pull the wire so that the hoses and wiring end up on the left side of the tank
- Install the left-hand level sensor on the ejector
- Install the switches on the underneath of the left-hand level sensor
- Remove the wire from the ejector.

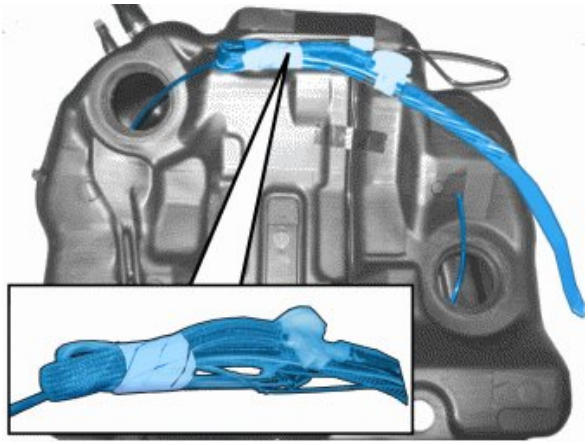
Cable routing when replacing the fuel tank



If replacing the fuel tank, wire cannot be used.
The image shows how to route the fuel lines and electrical wiring in the tank. Use a plastic pipe at least 1.7 m long.

Hint: Use spare part plastic pipe between the carbon filter and EVAP valve.

Insert the hose through the hole for the level sensor on the left-hand side of the vehicle and press it through the tank and take the end of the hose through the hole for the fuel pump.



Tape the fuel pump's fuel lines/electrical wiring to the plastic pipe.
Pull the wiring out of the hole for the level sensor. Remove the plastic pipe and the tape. Check that there is no tape/adhesive residue on the wiring.
Pull the wiring forwards and backwards to check that it has not bent or got trapped.

Finishing

- Install the sensor, backrest, side cushion and seat cushion. See Draining the fuel tank See: Service and Repair.

Fuel Pump: Service and Repair
Replacing the Fuel Pump / Level Sensor for the Right-Hand Fuel Tank

Replacing the fuel pump / level sensor for the right-hand fuel tank

Special tools:

999 5720 Wrench See: Tools and Equipment/999 5720 Wrench

Removal

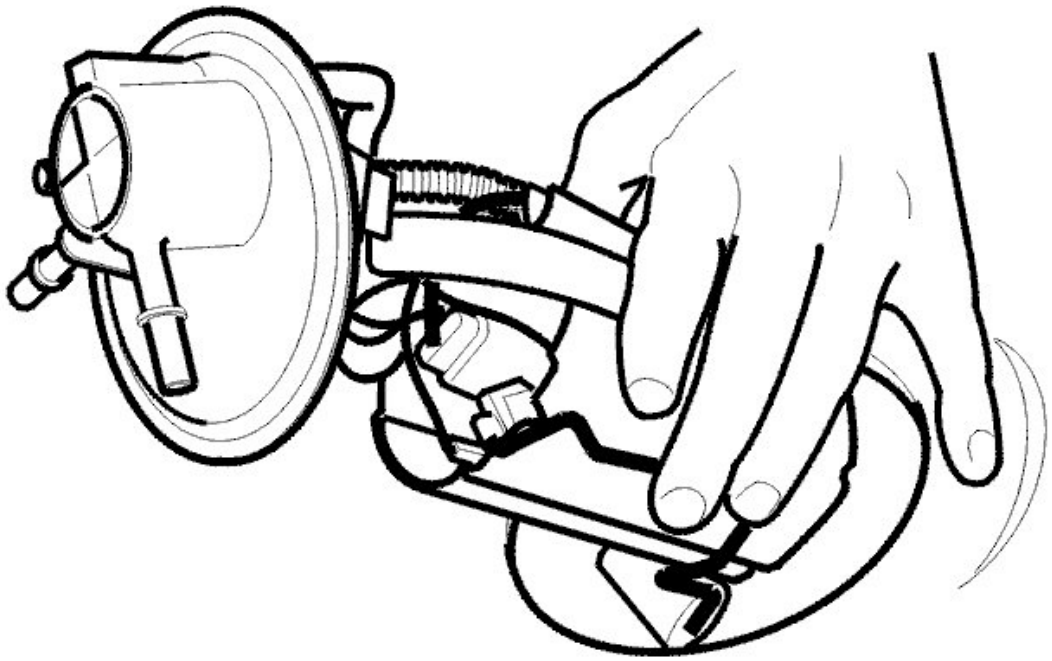
Removing the rear seat

Remove:
- the backrest. See Backrest See: Body and Frame/Seats/Seat Back/Service and Repair/Backrest.

Draining the fuel system and fuel tank

Drain:
- the fuel system. See the relevant service procedure.

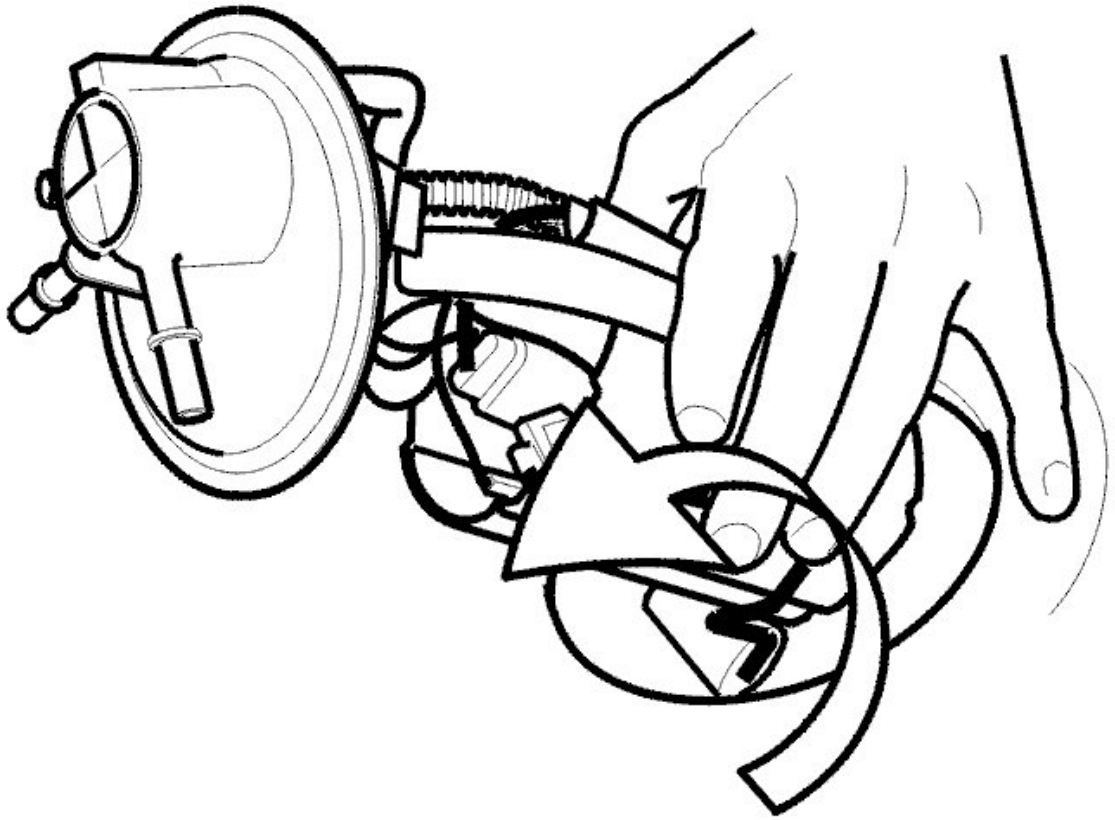
Removing the level sensor / pump



Note! Use special tool999 5720 Wrench See: Tools and Equipment/999 5720 Wrench to remove the snap ring for the level sensor / pump.

Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position.

Removing the level sensor / pump, continued



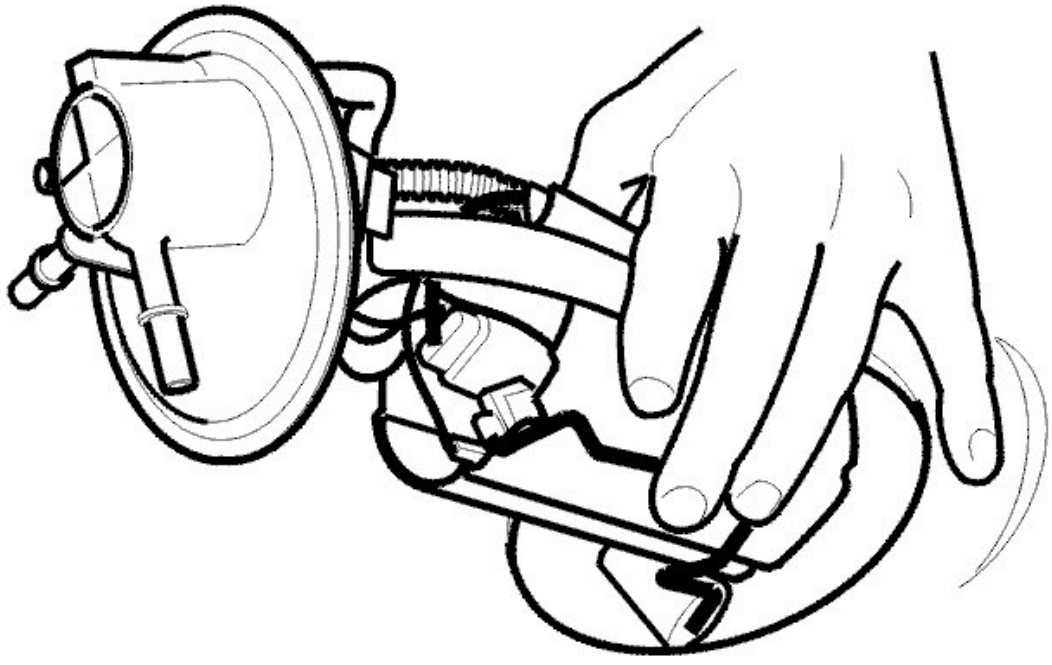
Caution! Take care with the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.

Caution! It is extremely important that the float arm is not broken or bent.

Installation

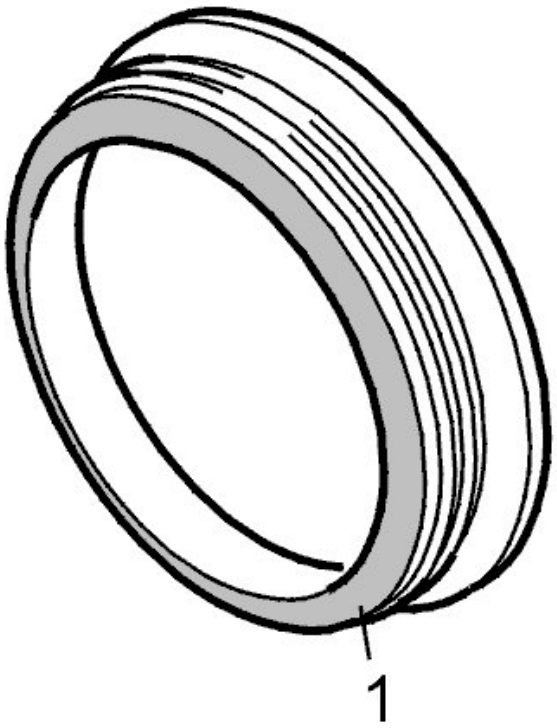
Installing the level sensor / pump



Note! Use special tool999 5720 Wrench See: Tools and Equipment/999 5720 Wrench to tighten the snap ring for the level sensors.

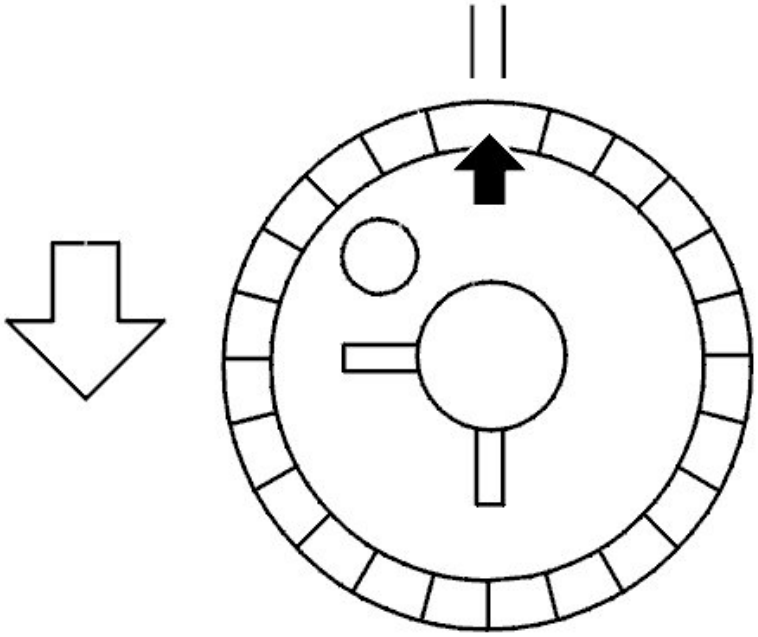
Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position.
Carefully and slowly lower the holder. Carefully work the holder into place.

Lubricating the screw, level sensor and pump



Thoroughly clean and dry the O-ring mating surfaces.
Install a**new**O-ring.
Use petroleum jelly to lubricate the screw mating surface with the fuel tank unit. This is so that the screw does not turn the fuel tank unit when it is tightened.
Press down the right fuel sensor and pump so that the fuel line is pointing forward and to the right.**Ensure that the arrow on the cover is between the markings on the tank**.
Check that the O-ring does not deform.
Tighten the screw. Tighten to **60 Nm**.

Note! Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.



Finishing

Wipe up any fuel spillage.
Position the wiring in the cut-out in the rubber ring.
Connect the connectors.
Install the cover over the left-hand level sensor and right-hand level sensor and pump. Tighten the nuts.
Install the rear seat backrest. See Backrest See: Body and Frame/Seats/Seat Back/Service and Repair/Backrest.

Fuel Pump: Service and Repair
Replacing the Right-Hand Level Sensor and Pump

Replacing the right-hand level sensor and pump

Removal

Note! Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

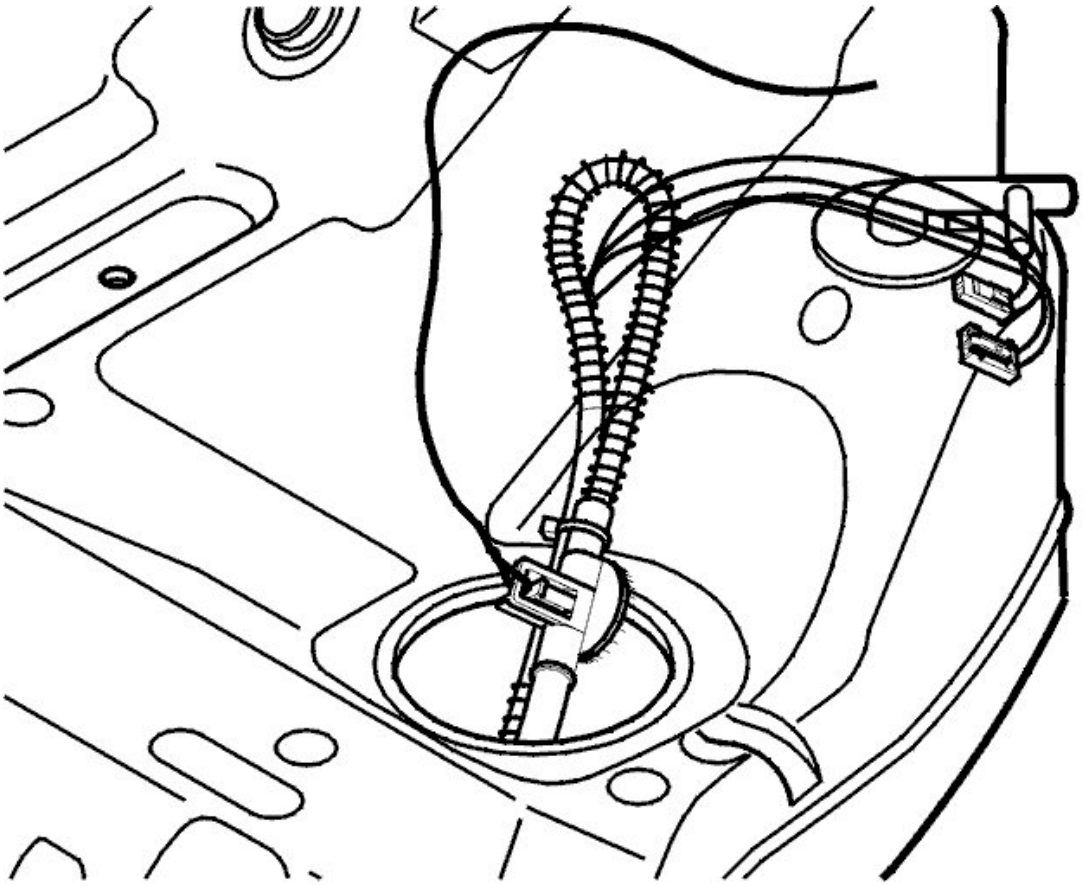
Depressurizing the fuel system

Depressurize the fuel system according to, Fuel system pressure release See: Fuel Filter/Fuel Pressure Release/Service and Repair

Draining fuel tank

Drain the fuel tank according to, Draining the fuel tank See: Service and Repair

Removing the left-hand level sensor

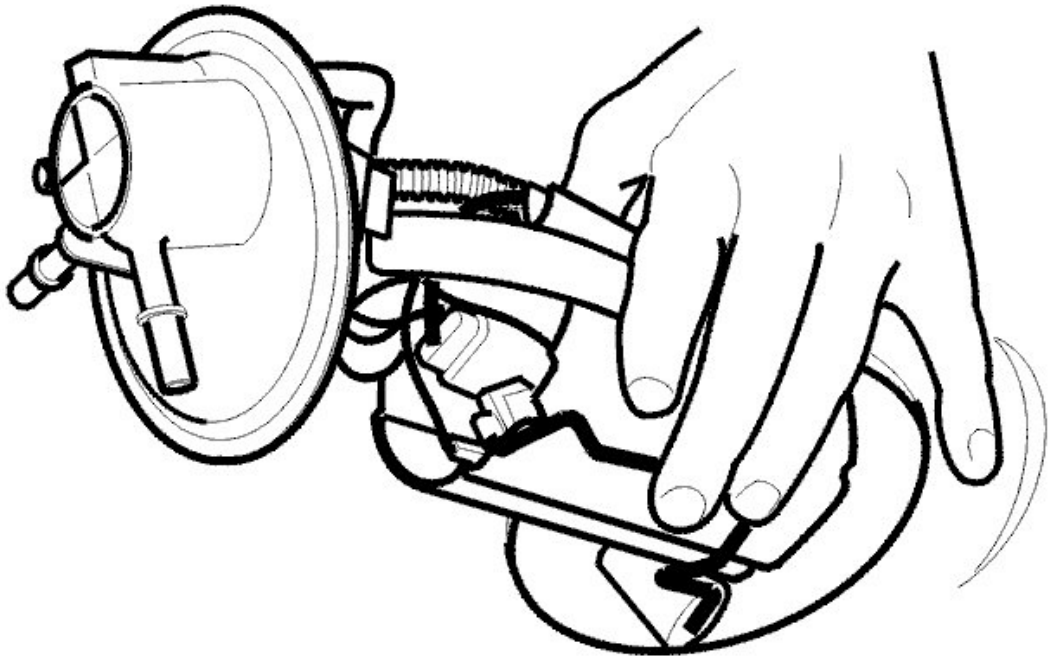


Disconnect:

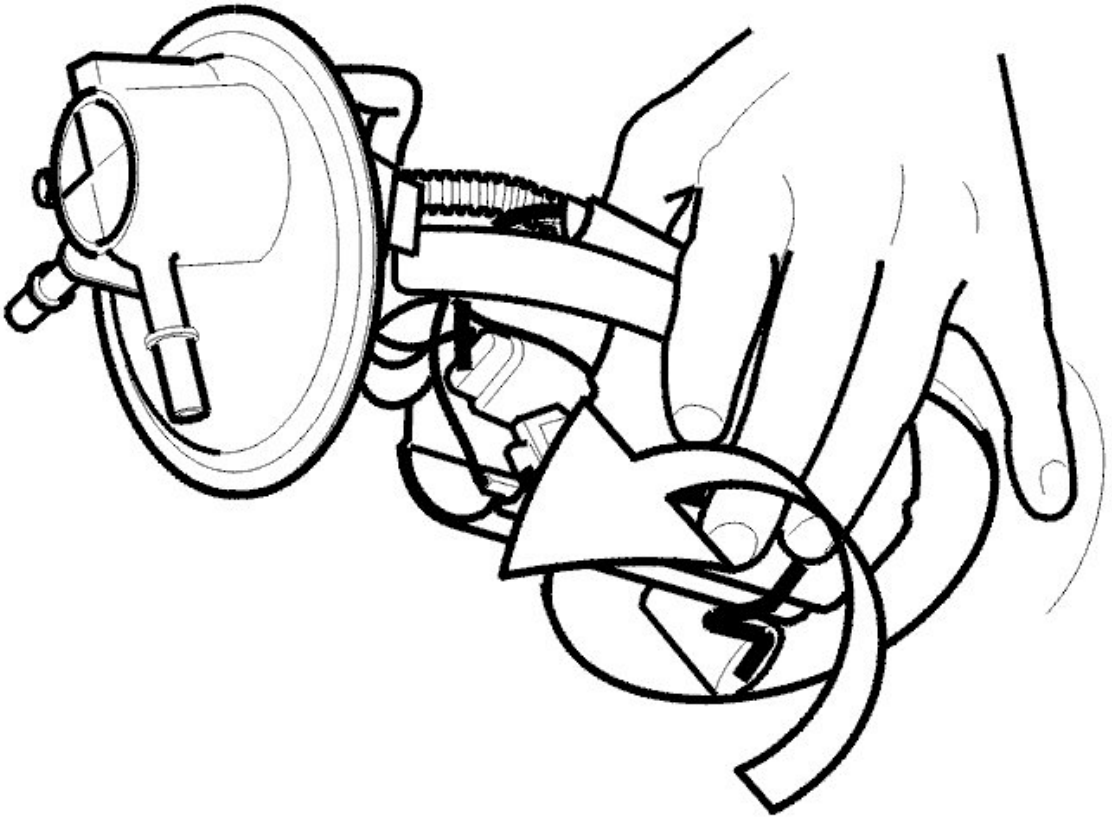
- the two connectors from the underneath of the left-hand level sensor
- the left-hand level sensor from the ejector on which it is positioned.

Note! Fasten a wire in the area of the ejector.The wire must be long enough that it reaches over to the opposite side of the tank with some excess remaining to ensure that it does not slide into the tank. The wire is needed to pull the hoses and wiring back to the left side of the tank after the fuel tank unit has been replaced.

Removing the right-hand level sensor / pump



- Grip the right-hand level sensor and pump holder and pinch the float so that it is held in its lowest position.



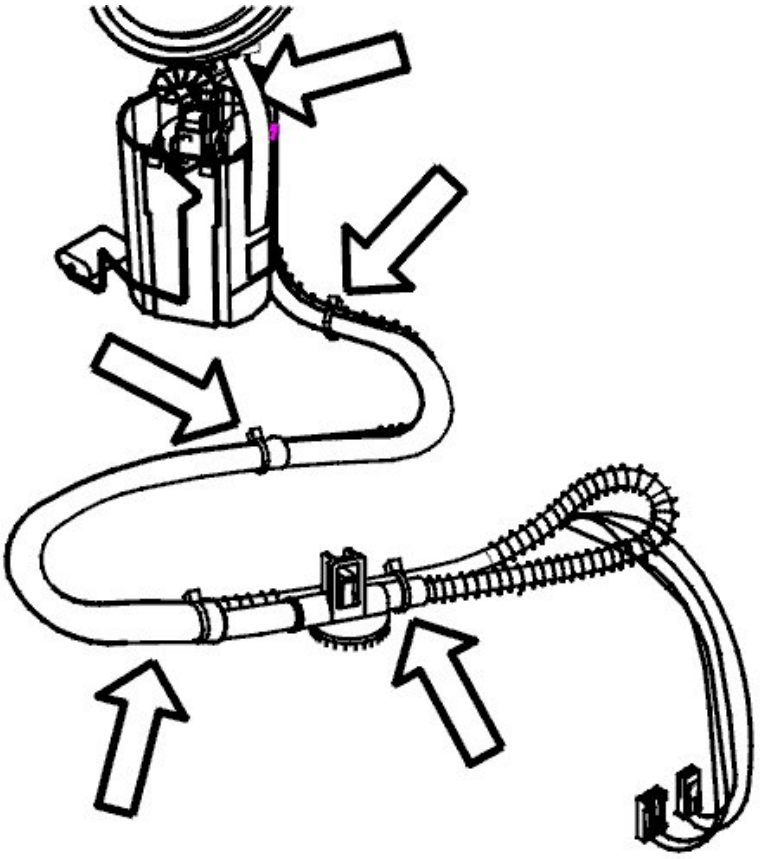
Note! Watch out for the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.
Pull the hoses out from the tank without pulling up the entire wire from the right-hand hole in the tank.

Note! It is extremely important that the float arm is not broken or bent.

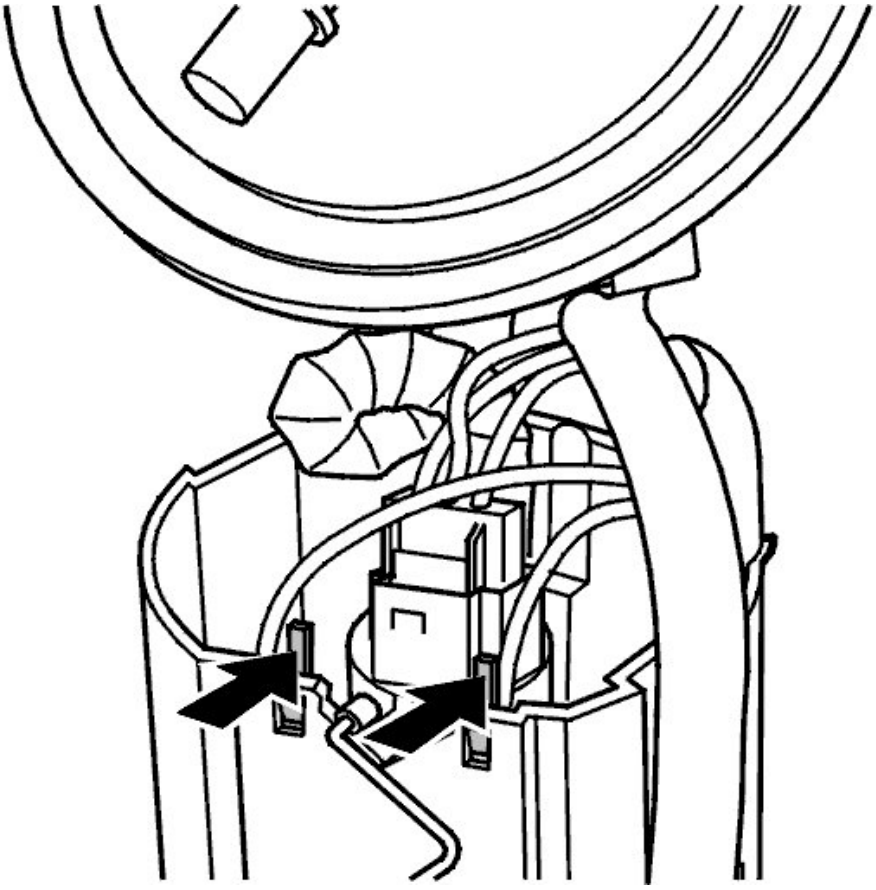
Remove the wire from the old level sensor and pump ejector.

Removing the right-hand level sensor



Remove:

- the tie straps around the protective sheath, hoses and wiring
- the net protective sheath by carefully threading it off the hoses and wiring
- the tie strap under the protective sheath.



Remove:

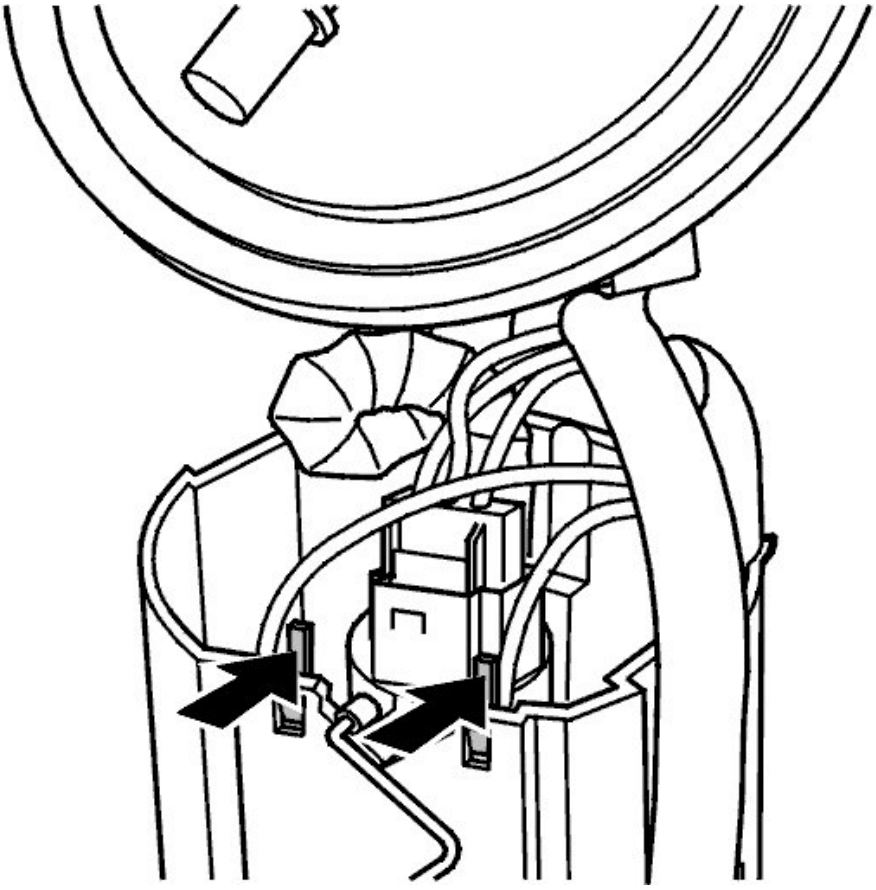
- the tie strap around the wiring above the pump

- the level sensor by pressing in the two clips and pulling upwards
- the thin pipe from the holder on the outside of the fuel tank unit
- the wiring from the holder in the fuel tank unit.

Installation

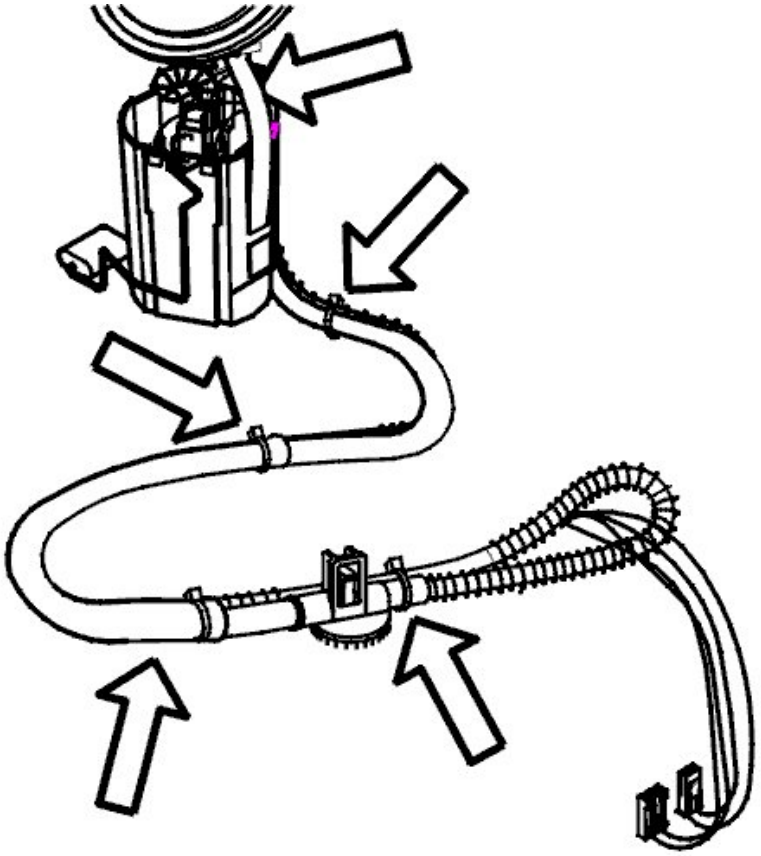
Installing the right-hand level sensor

If the vehicle has an engine block heater, drill out the hole connection in the fuel tank unit. Use a -4 mm drill bit. Transfer the dip pipe.



Install:

- the new level sensor
- the wiring in the holder
- the thin pipe in the holder on the outside of the fuel tank unit
- the tie strap around the wiring above the pump.



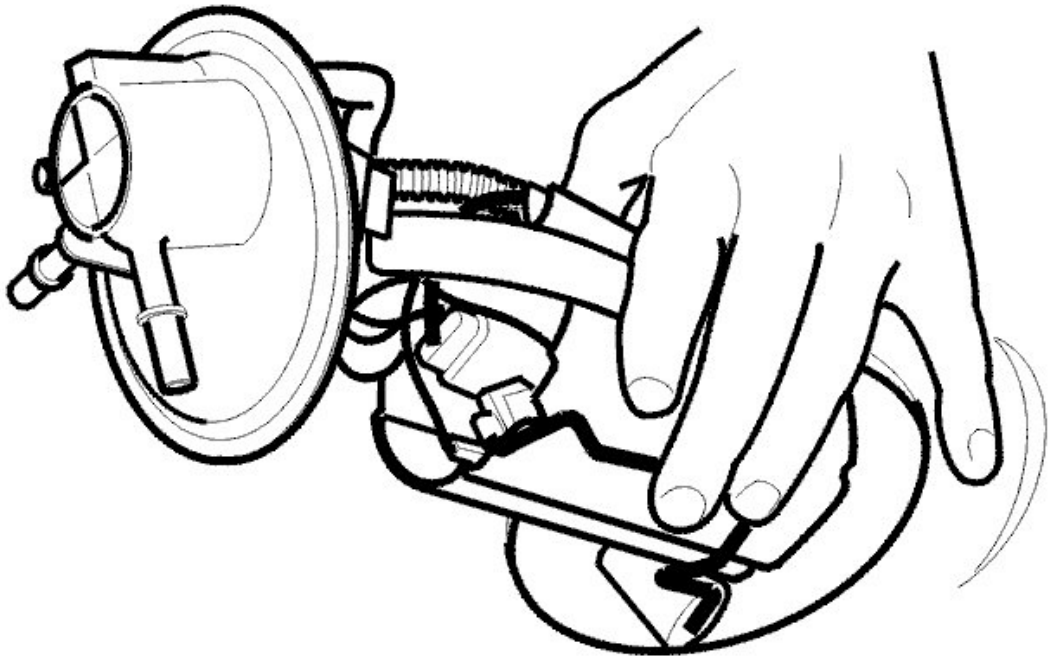
Install:

- the tie strap under the protective sheath

Note! Fasten the cable tie on the smooth central section of the corrugated hose.

- the protective sheath
- four tie straps around the protective sheath, hoses and wiring. Secure the tie straps on the four smooth central sections of the corrugated hose.

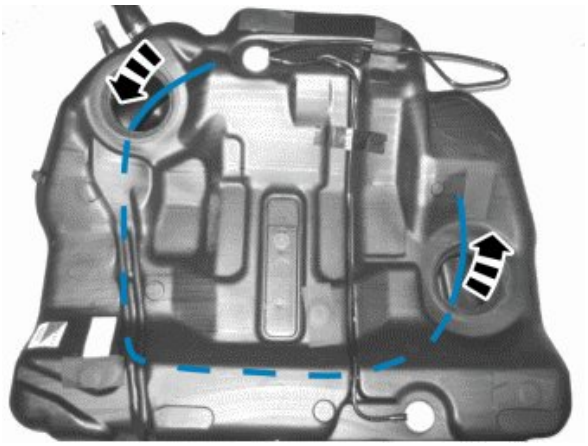
Installing the right-hand level sensor and pump and the left-hand level sensor in the fuel tank



If the fuel tank is replaced, see next step.

- Install the wire on the new ejector for the level sensor and pump
- Insert the hoses and wiring into the tank via the right-hand tank hole
- Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position
- Carefully and slowly lower the holder. Carefully work the holder into place
- Pull the wire so that the hoses and wiring end up on the left side of the tank
- Install the left-hand level sensor on the ejector
- Install the switches on the underneath of the left-hand level sensor
- Remove the wire from the ejector.

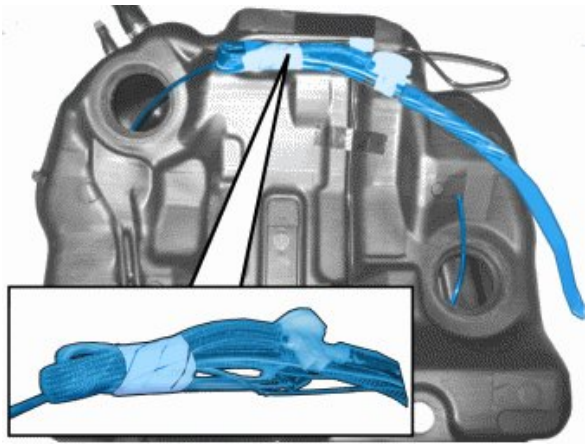
Cable routing when replacing the fuel tank



If replacing the fuel tank, wire cannot be used.
The image shows how to route the fuel lines and electrical wiring in the tank. Use a plastic pipe at least 1.7 m long.

Hint: Use spare part plastic pipe between the carbon filter and EVAP valve.

Insert the hose through the hole for the level sensor on the left-hand side of the vehicle and press it through the tank and take the end of the hose through the hole for the fuel pump.



Tape the fuel pump's fuel lines/electrical wiring to the plastic pipe.
Pull the wiring out of the hole for the level sensor. Remove the plastic pipe and the tape. Check that there is no tape/adhesive residue on the wiring.
Pull the wiring forwards and backwards to check that it has not bent or got trapped.

Finishing

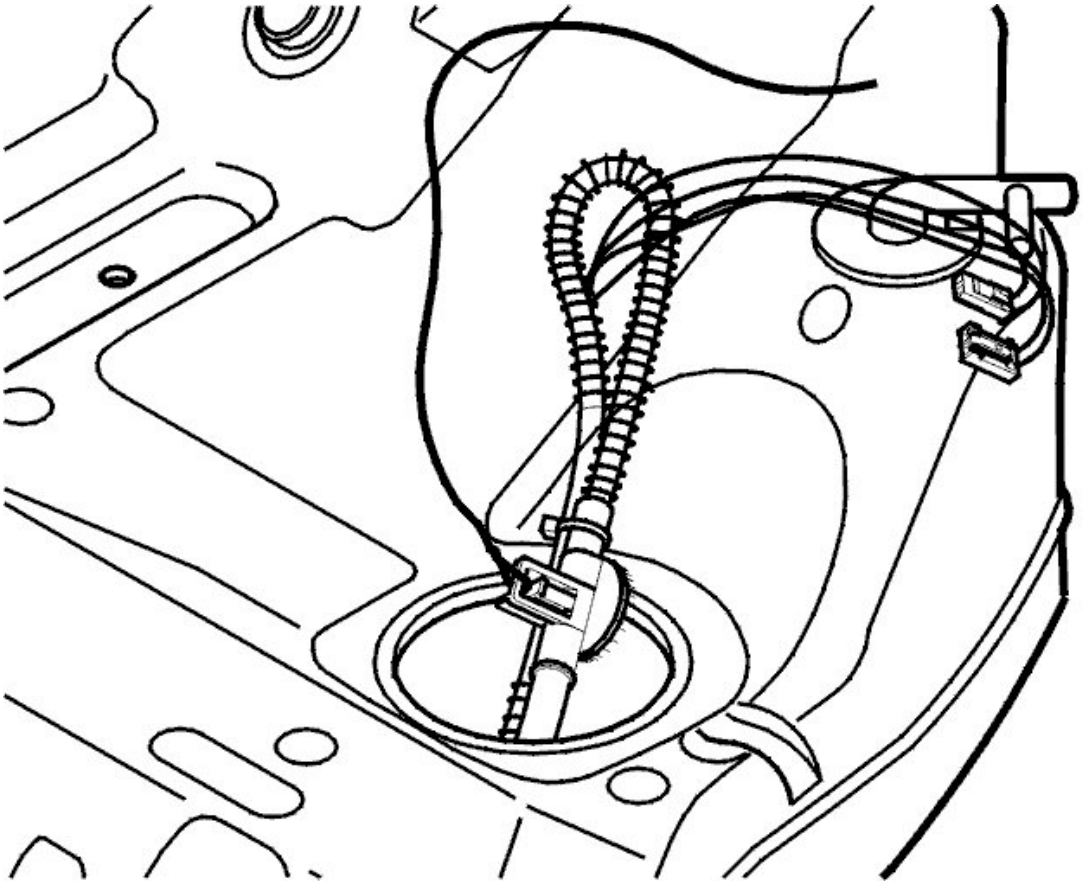
- Install the sensor, backrest, side cushion and seat cushion. See Draining the fuel tank See: Service and Repair.

Fuel Pump: Service and Repair
Right Side Fuel Pump with Level Sensor

Right side fuel pump with level sensor

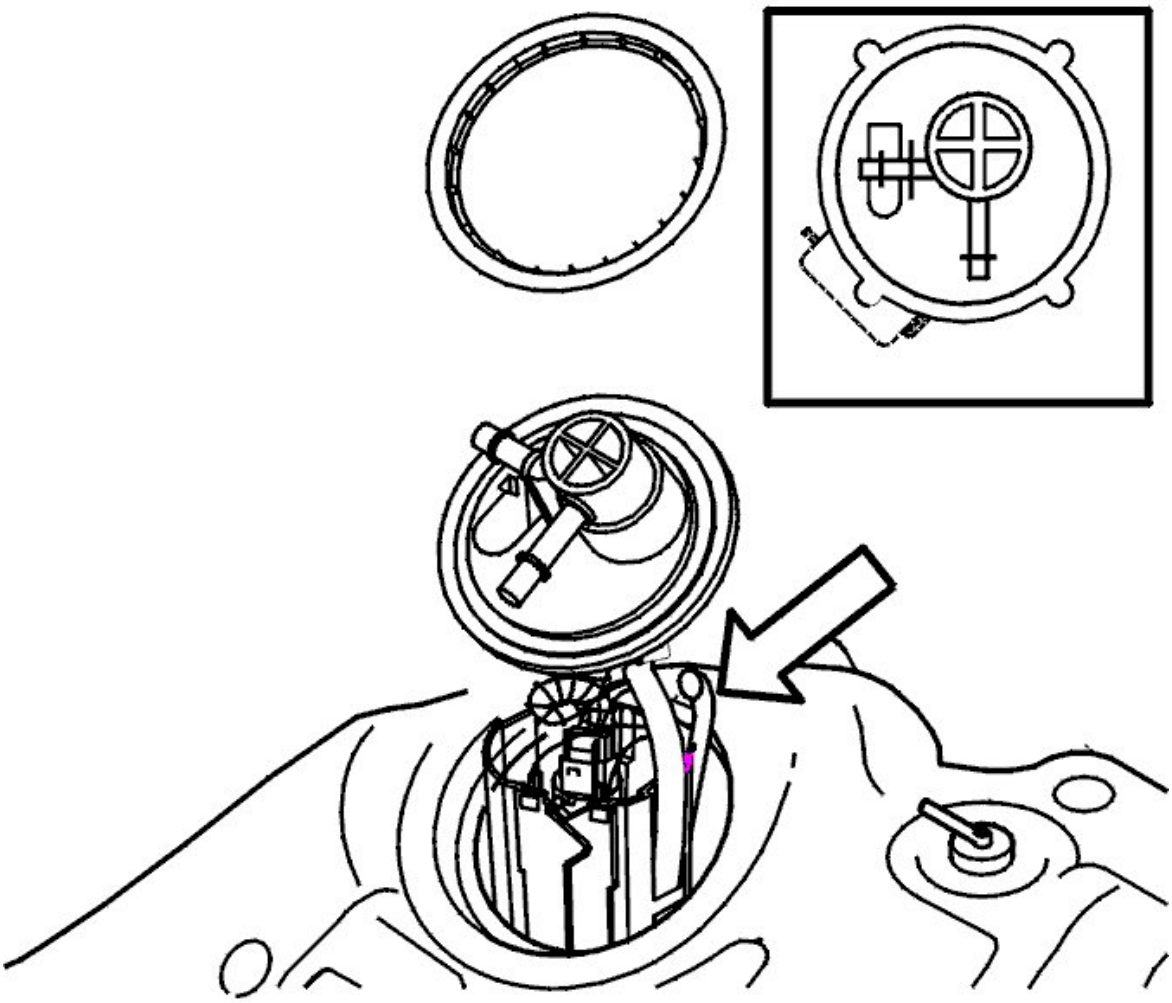
Removal

Preparation

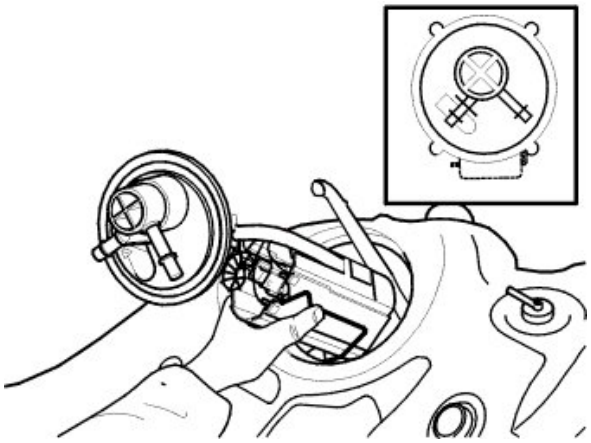


- Remove left side fuel gauge sensor as described in Left fuel gauge sensor See: Fuel Tank/Fuel Gauge Sender/Service and Repair/Left Fuel Gauge Sensor
- Attach a piece of string or steel wire onto attachments for wire and tube system on left side fuel gauge sensor.

Right side fuel pump with level sensor

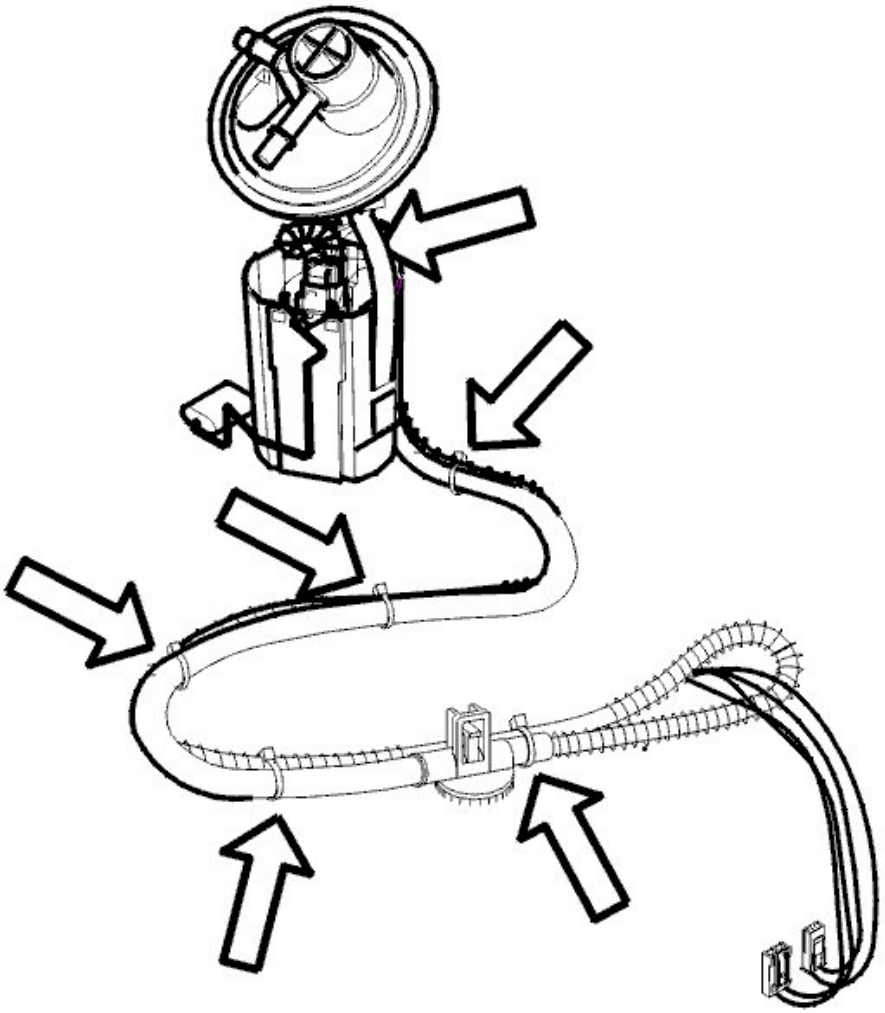


- Remove hatch and seal from fuel pump
- Loosen fuel pipe
- Loosen fuel pump lock ring using special tool999 5720 Wrench See: Tools and Equipment/999 5720 Wrench
- Pull up fuel pump to position 1 (see figure) and release plastic tube.



- Turn fuel pump to position 2 (see figure)
- Hold float against pump housing, then turn fuel pump forwards and lift it up
- Pull wire and tube system out using string or steel wire.

Level sensor with cable and pipe system

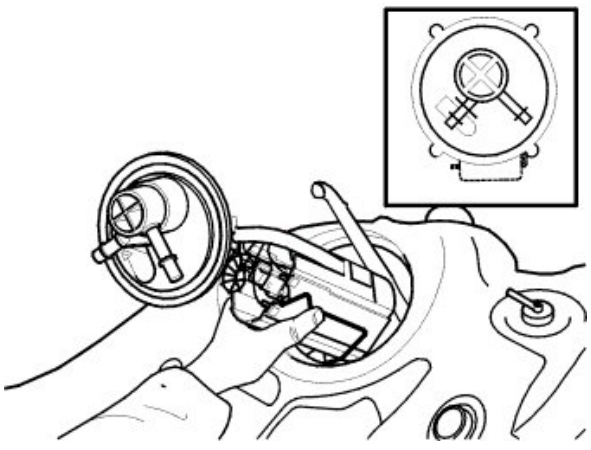


- Remove fuel pump with wire and tube system
- Release six clamps. Note clamp positions
- Position fuel pump correctly, loosen fixings and push level sensor up.

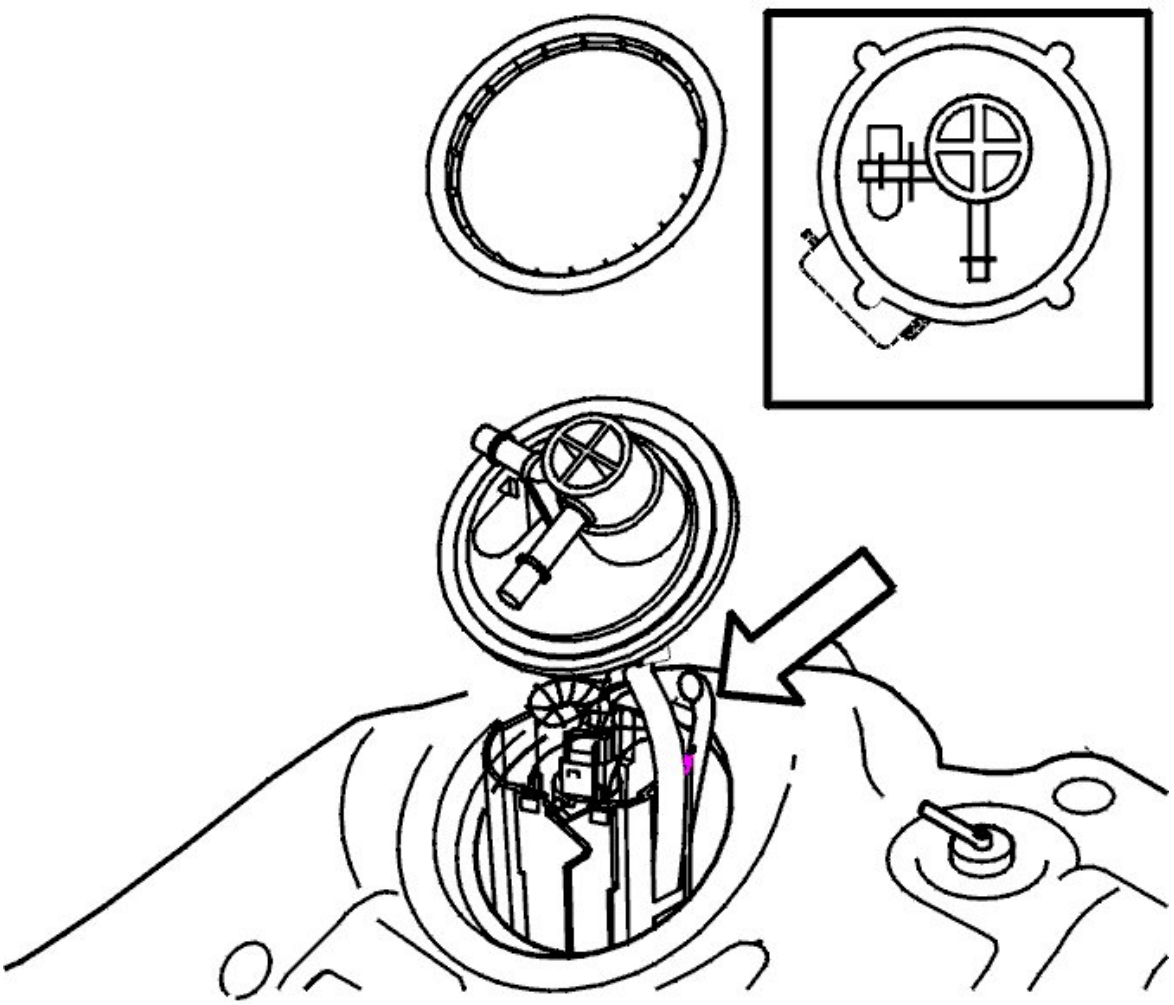
Installation

Level sensor with cable and pipe system
- Position level sensor and press firmly
- Pull out wire next to wire and tube system and install clamps. Note clamp positions.

Right side fuel pump with level sensor
- Attach a piece of string or steel wire onto attachments for wire and tube system on left side fuel gauge sensor
- Install wire and tube system into fuel tank
- Pull wire and tube system towards opening for left side level sensor, and feed through.



- Loosen plastic tube from slot in pump housing
- Hold float against pump housing and install fuel pump in position 2 (see figure).



- Turn fuel pump to position 1 (see figure)
- Press plastic tube firmly into slot in pump housing
- Press fuel pump down in hole
- Install lock ring and tighten by hand.

Note! Markings on cover and fuel tank.

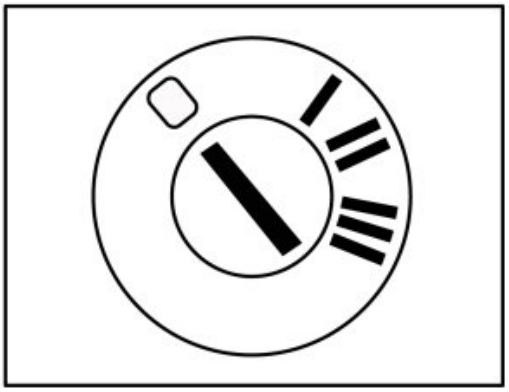
- Tighten lock ring using special tool999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.
- Install seal and hatch onto fuel pump.

Fuel Pump Control Unit: Service and Repair

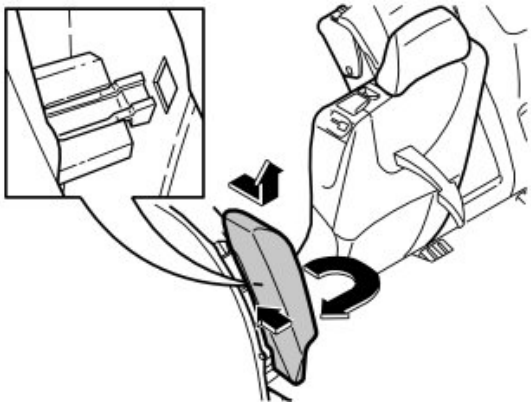
Control module fuel pump (FP), replacing

Note! Some variation may occur. However, the essential information in the illustrations is always correct.

Removal



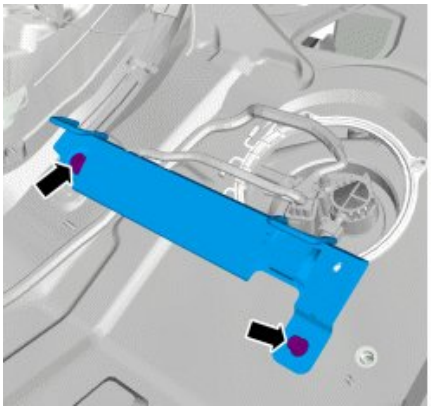
Vehicles with fuel pump module located on fuel tank



Open Luggage Compartment Lid/tailgate

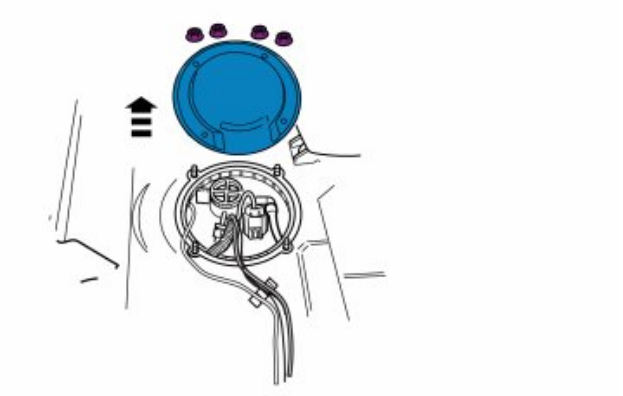
Remove:
- luggage compartment mat/floor hatches and side panels on the right side
- backseat's seat cushion

Fold the rear seat backrest forward.
Remove the right side upholstery Refer to: Upholstery, side cushion, replacing See: Body and Frame/Seats/Seat Cover/Service and Repair/Rear Seat, Passenger Seat/Upholstery, Side Cushion, Replacing
Remove the right part of the backrest
Use new bolt, 1 pc. M10.
Tighten with 50 Nm.



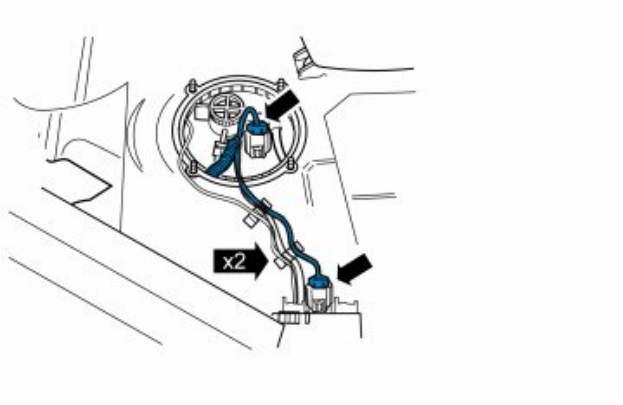
Remove bracket for child seat from the floor.
Use new bolt and nut.
1 pc. M10, tighten with 50 Nm.
1 pc. M12, tighten with 80 Nm.

Move aside the insulating mat.



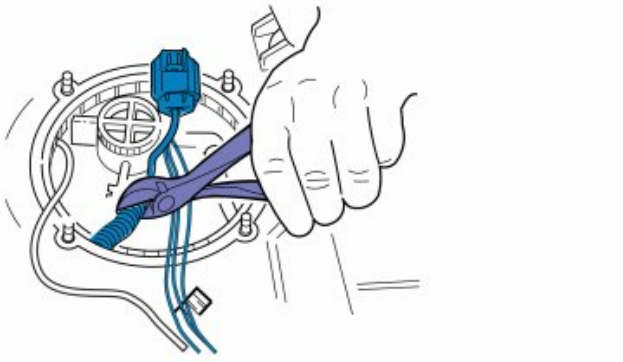
Remove:

- right floor hatch over fuel tank
- the cable harness

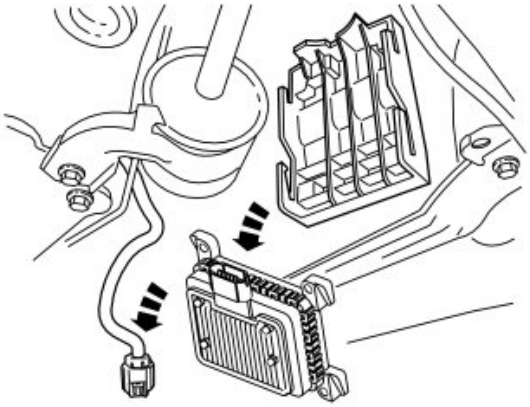


Disconnect:

- cable harness' connectors by wheel housing/sill and fuel pump
- cable from brackets



Cut off the cable harness as shown. This is done to make it easier to remove the cable harness.
Remove the remaining part of the cable harness with connector.



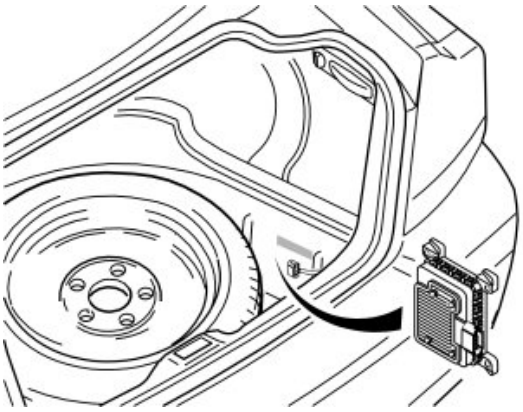
Raise the car

Remove:

- the connector from the control unit
- control module from the vehicle
- cable harness from its brackets
- cable harness from the vehicle

Check that the fuel line is located in its clamps.

Vehicles with fuel pump module located in spare wheel well's right trailing edge.

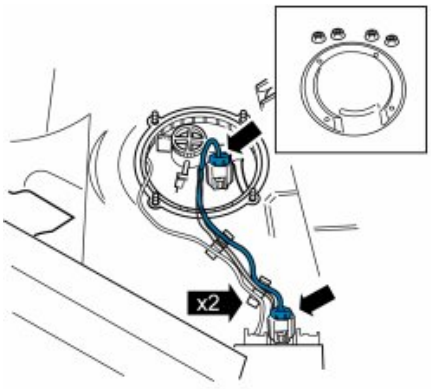


Remove:

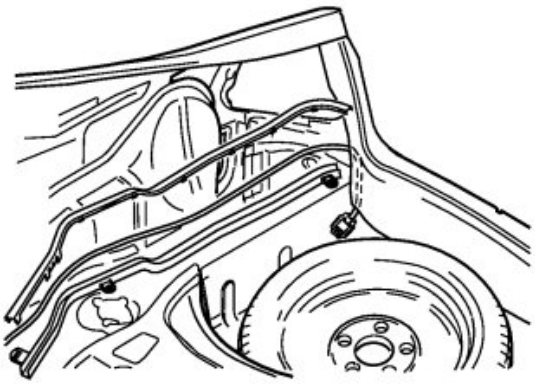
- luggage compartment mat/floor hatches so that spare wheel well can be released
- the connector from the control unit
- the control module from Velcro fastener

Installation

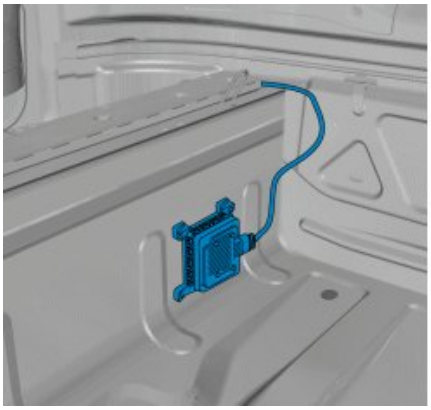
Vehicles with fuel pump module originally located on fuel tank.



Connect a new cable harness to the connector by the sill and the fuel tank.
Place the cable harness in the seal ring's slot and in the bracket on the body.
Install the floor hatch and tighten with 6 Nm.
Check carefully that the seal is in place when the hatch is installed.



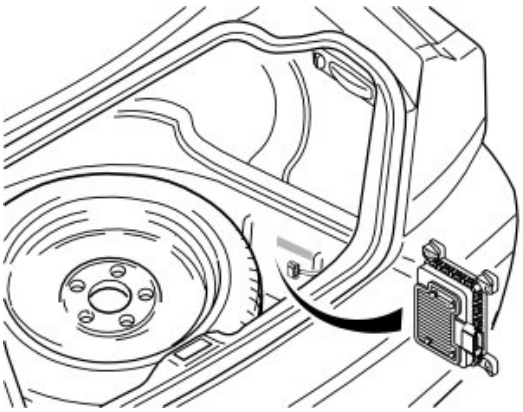
Open the vehicle's cable channel and lay down the cable harness.
Close the cable channel.



The control module shall be placed in the spare wheel well's rear part on the right side, between the two markings and below the bead of sealing compound.
Remove the protective tape from the self-adhesive Velcro fastener and install the control module.
Plug in the connector from the cable harness to the control module.

To install, reverse the removal procedure.

Vehicles with fuel pump module originally located in spare wheel well's right trailing edge.



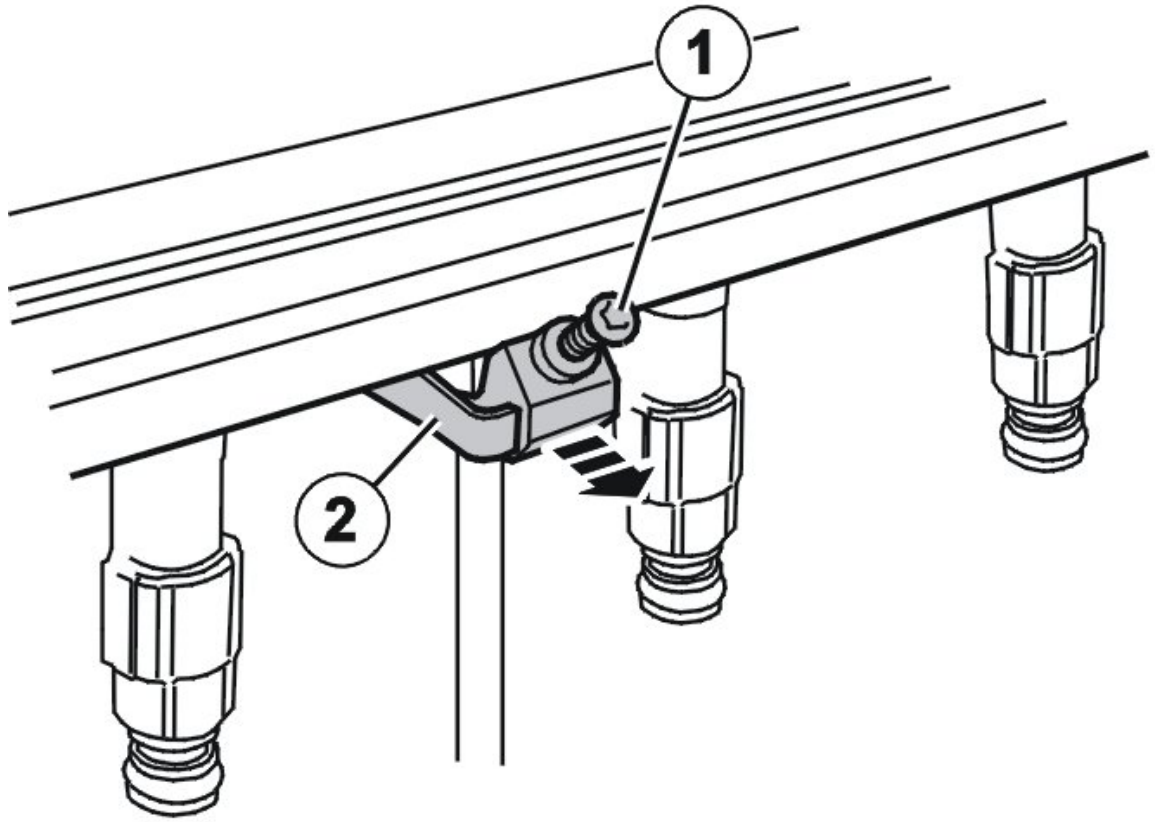
Install:

- new control module
- the connector to the control module
- the luggage compartment mat/floor hatches

Fuel Rail: Service and Repair

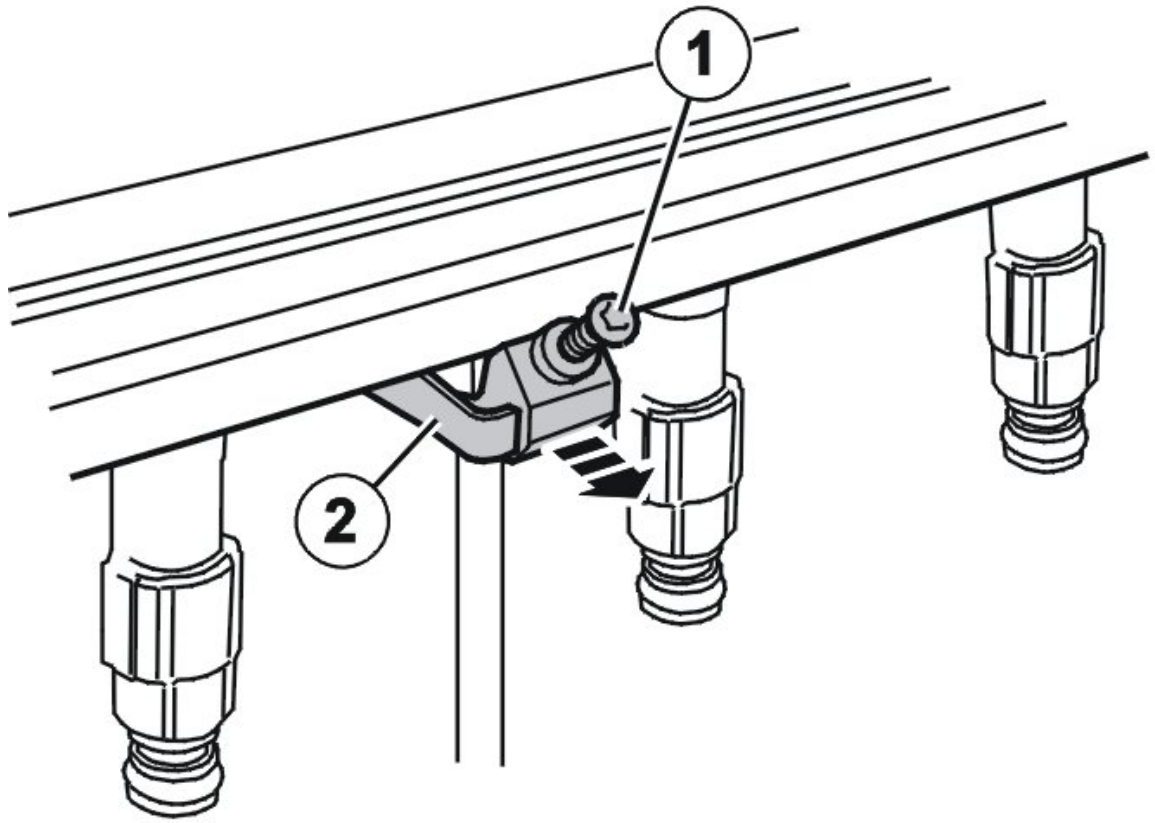
Fuel line, lock

Removing lock



Unscrew the screw (1).
Bend out the secondary lock (2). Pull out the catch.
Remove the fuel rail.

Installing the lock



Note! Screw in the screw until it takes.

Install the fuel rail.
Press in the secondary lock (2).
Screw the screw (1) right in.

Fuel Tank: Testing and Inspection
Test Pressurizing the Tank System

Test pressurizing the tank system

Special tools:

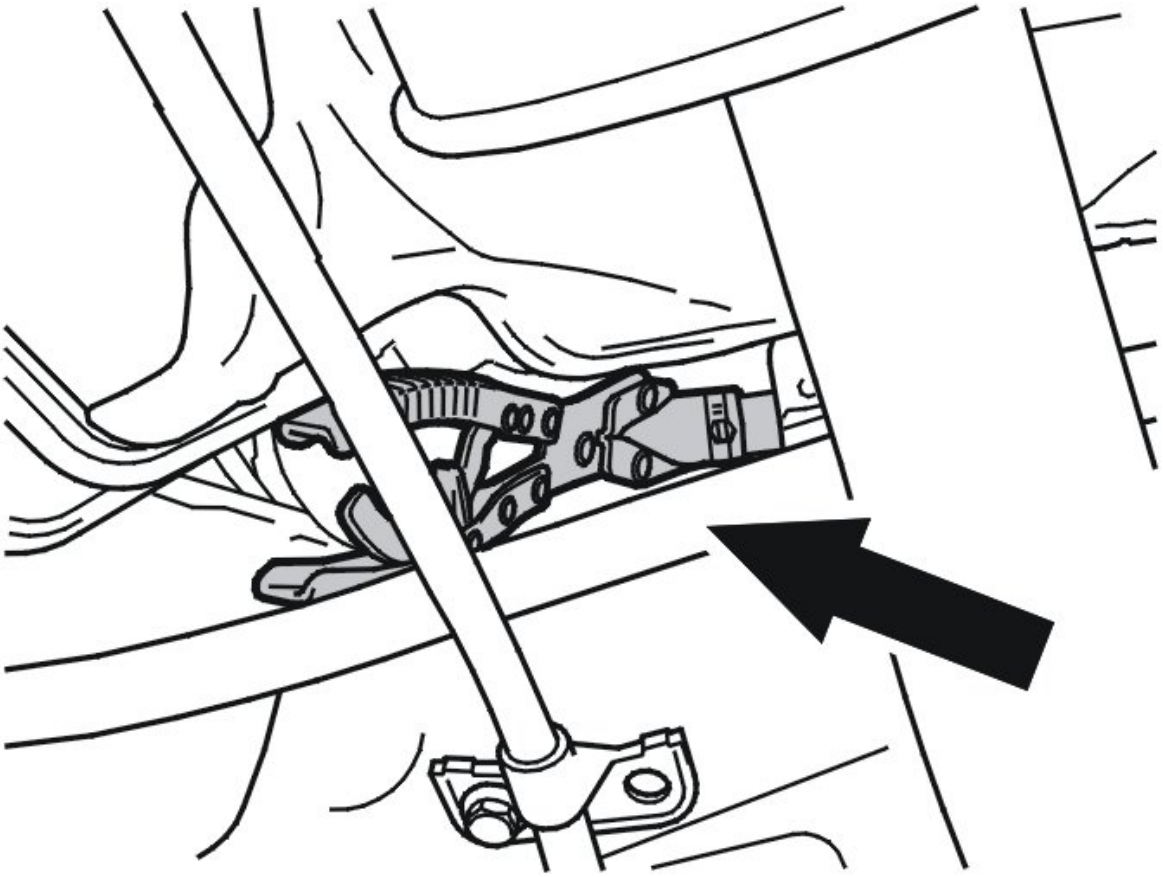
999 5646 Pressure gauge See: Tools and Equipment/999 5646 Pressure Gauge
999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator

Safety

First read Safety regulations for handling fuel See: Service Precautions/Safety Regulations for Handling Fuel.

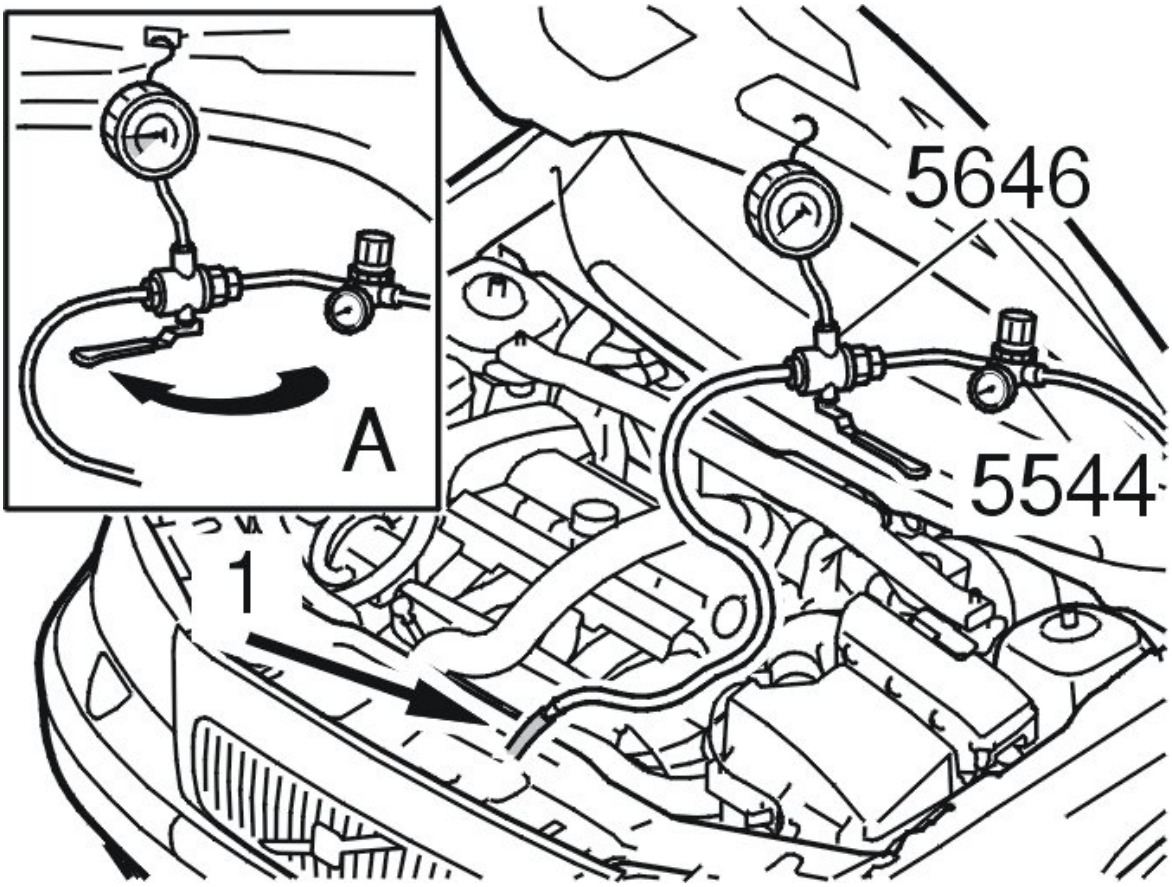
Note! The tank must not be more than 85% full when test pressurizing.

Preparation



Ignition off.
Block the hose between the leak diagnostic module and the leak diagnostic module filter by clamping the hose using hose clips.

Connecting the manometer



Expose the canister purge (CP) valve.
Disconnect the hose (1) between the EVAP canister and the EVAP canister purge valve.
Connect manometer 999 5646 Pressure gauge See: Tools and Equipment/999 5646 Pressure Gauge to the hose (1) and the pressure regulator 999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator to the manometer.

Caution! The cock should face the pressure regulator.

Connect compressed air to the pressure regulator
Set the pressure to a **maximum of 7 kPa** (read off from manometer 999 5646).
Pressurize the fuel tank system by turning the cock at right angles to the hoses.
Allow pressure to build up in the tank system.
Check that the system does not leak.
Stop the pressurization by turning the cock towards the hose (1) as illustrated in A.

Note! A certain amount of leakage may occur from the leak diagnostic unit. The pressure may therefore drop when the pressurization is stopped. This is normal. The leakage is caused because the pressurization is not carried out using the leak diagnostic unit.

Caution! Never leave the car unattended with the tank system pressurized

Resetting

Remove the manometer. Reconnect the hose to the EVAP canister purge valve.
Remove the hose clip from the hose to the filter.

Fuel Tank: Procedures

Draining The Fuel Tank

Special Tools: 999 5720, 999 5721

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation
Disconnect the battery negative lead. See Battery Disconnecting.

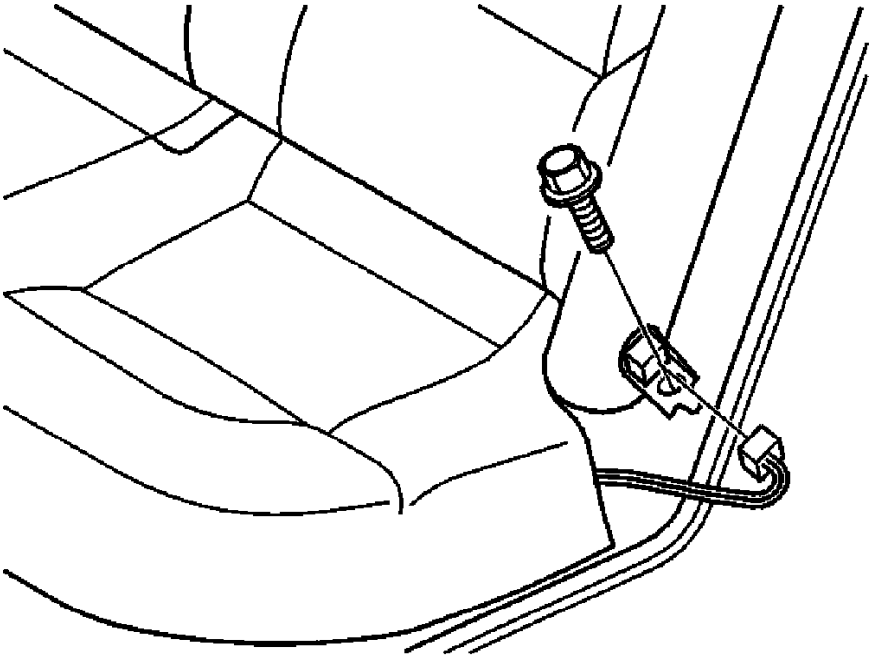
WARNING: RISK OF EXPLOSION! THE USE OF A FRESH AIR MASK IS RECOMMENDED.

Insert the heavy duty hose **1.3 meters** into the fuel filler pipe, measured from the edge of the opening of the filler pipe.
Pump until air comes out.

NOTE: Always ensure that there is a ground connection between the fuel intake and the fuel filler pipe.

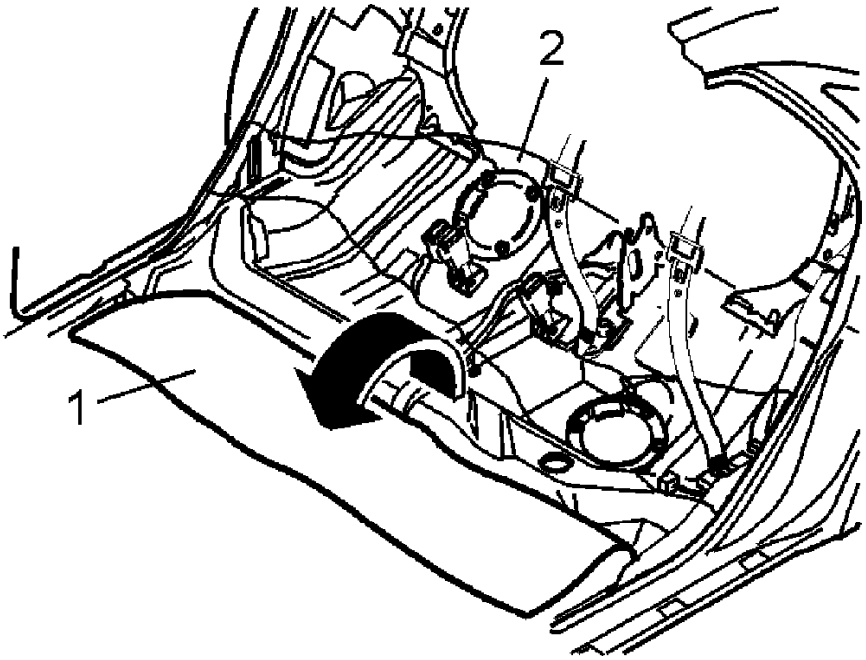
(V70) Fold up both sides of the rear seat.
(S80, S60) Remove the seat cushion for the rear seat.
Remove the right side cushion.
Disconnect the connector at the hinge.

Remove:



- the mounting screw for the hinge
- the screw for the seatbelt end mounting.

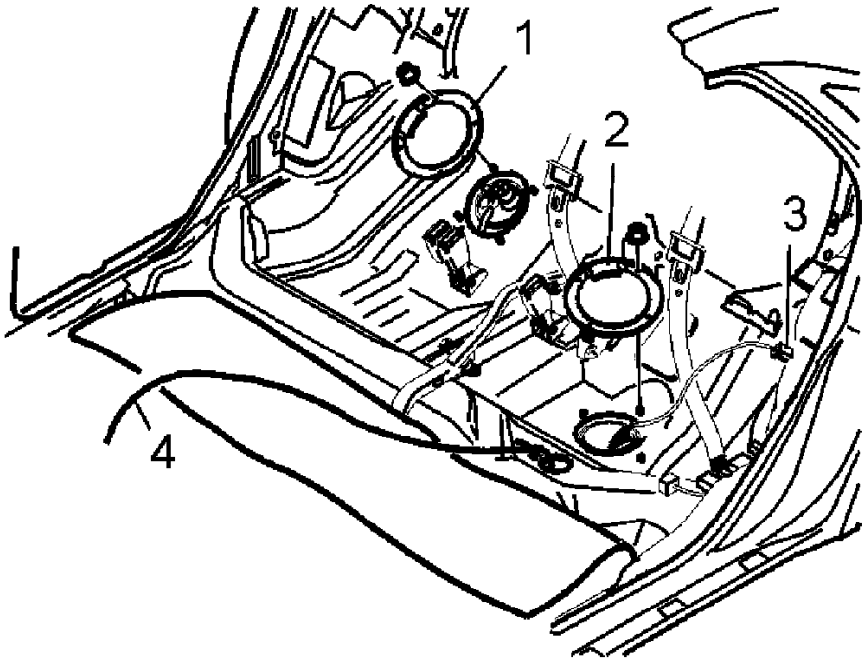
Release the strap/straps of the folding mechanism for the seat belt buckle. (Hooked into place on the lower edge of the backrest).
Lift out the backrest.



Fold the carpet (1) out of the way.
Remove the insulation panel.
Cover the area (2) around the cover and between the doors with absorbent material.

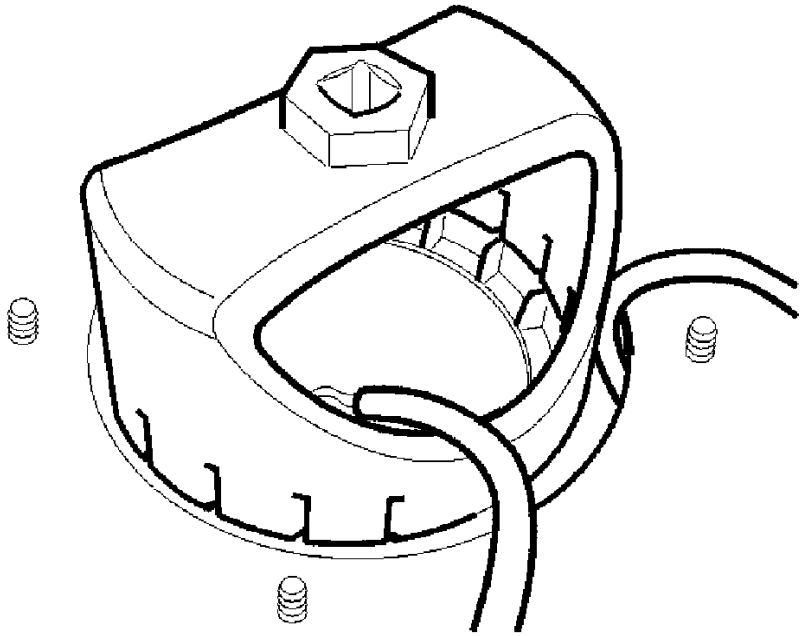
CAUTION: Ensure that there is no risk of dirt getting into the tank.

Removing the fuel tank filler cap over the fuel tank units



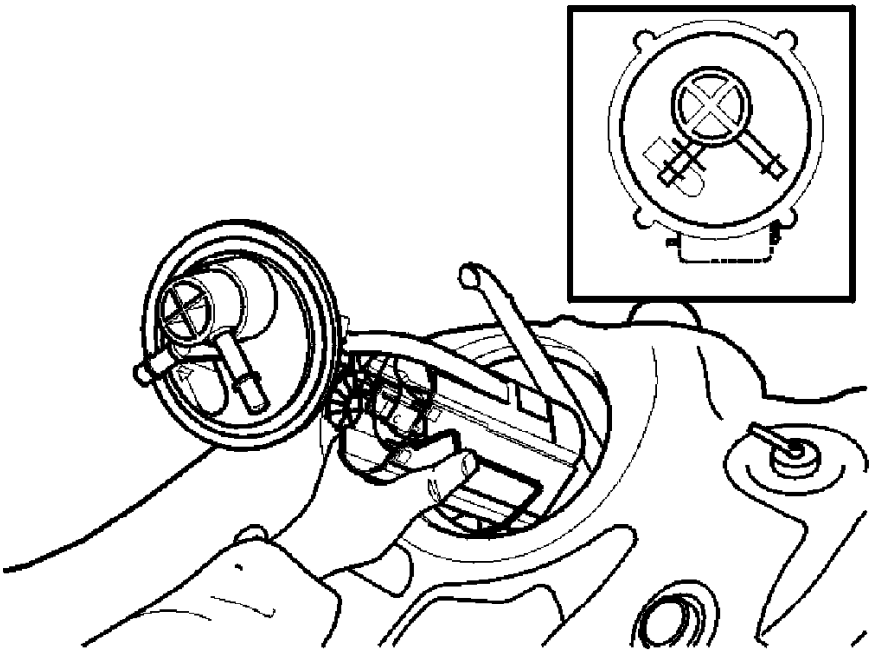
Remove the covers (1.2) over the fuel tank units.
Disconnect the fuel tank unit connectors (3).
Remove the hoses from the fuel tank unit.

Draining the fuel tank



Special Tools: 999 5720

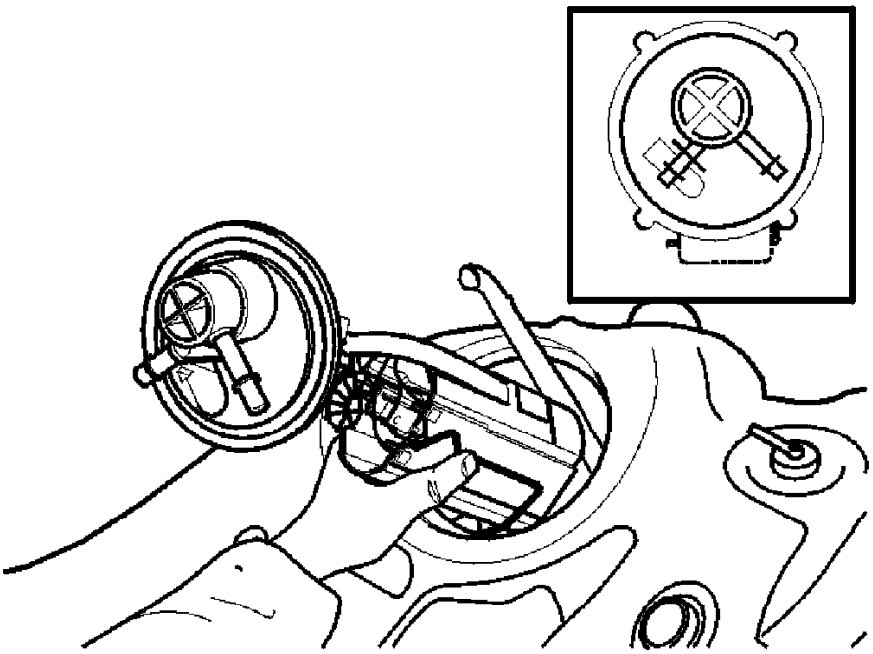
Clean the area around the fuel tank unit thoroughly.
Open the right fuel tank unit. Insert the heavy duty hose and suck out the remains from the bottom of the right-hand side of the fuel tank.
Connect hose 999 5721 to the heavy duty hose. Suck out the remains from the bottom of the fuel tank unit reservoir.



Carefully remove the overflow pipe from the reservoir.
Remove the thin hose (999 5721) from the heavy duty hose. Connect the thin hose to the overflow pipe. Use a hose clamp.
Pump until a lot of air comes out.
Open the left fuel tank unit. Insert the heavy duty hose and suck out the remains from the bottom of the left-hand side of the fuel tank.

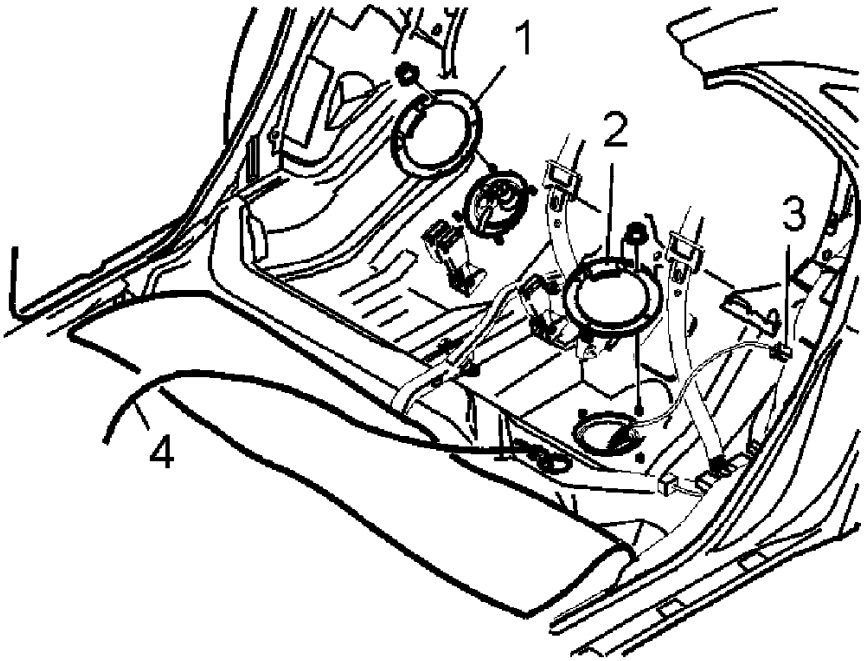
Installation

Right fuel tank unit:

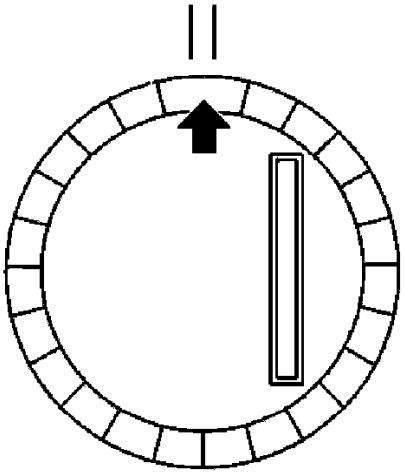


- Place the overflow pipe approximately half a centimeter to the lefthand side
- Grip the right fuel tank unit reservoir. Pinch the fuel tank unit reservoir so that the float is held in its lowest position
- Lower the reservoir carefully while rotating it backwards around the front-rear shaft on the float
- Install the overflow pipe on the reservoir.

Left fuel tank unit:

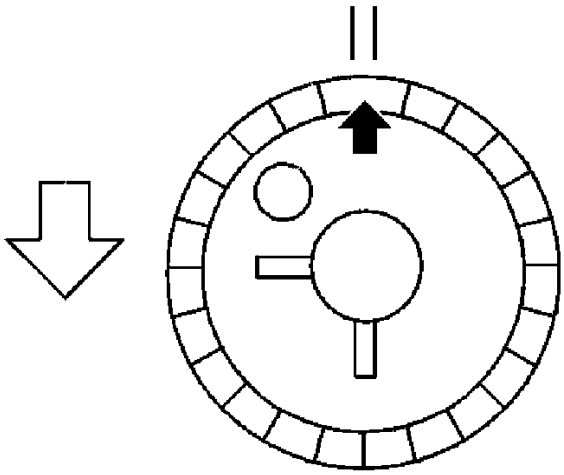


- Install a new O-ring. Lubricate the new O-ring using petroleum jelly
- Press the left fuel tank unit down so that the row of protruding cables runs along the car
- Check that the O-ring is not trapped
- Tighten the screw. Tighten to **60 Nm**
- Wipe up any fuel spillage
- Position the wiring in the cut-out in the rubber ring.



NOTE: Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.

Right fuel tank unit, continued:

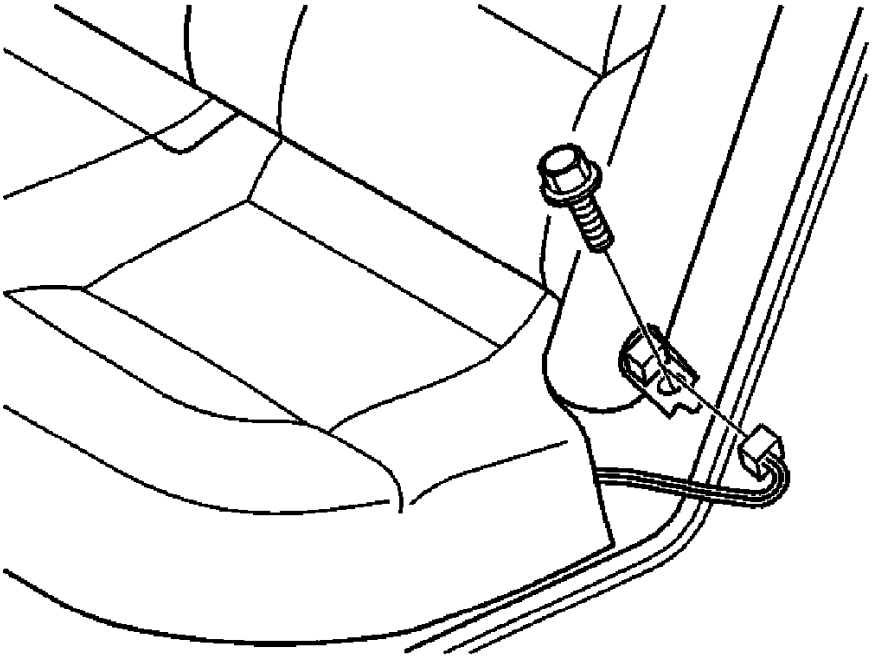


- Install a new O-ring. Lubricate the new O-ring using petroleum jelly
- Press the right fuel tank unit down so that the fuel line connectors are pointing forwards and to the right
- Check that the O-ring is not trapped
- Tighten the screw. Tighten to **60 Nm**
- Install the hoses on the fuel tank unit
- Wipe up any fuel spillage
- Position the wiring in the cut-out in the rubber ring.

NOTE: Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.

Install the cover over the fuel tank unit.
Tighten the nuts. Connect the wiring and the connectors.

Install:



- the backrest
- the mounting screw for the hinge. Tighten to **50 Nm**
- the connector for the hinge
- the seat belt end mounting. Tighten to **48 Nm**
- the side cushion.

(V70) Fold the seat cushion forward.
(S80, S60) Install the seat cushion.

Fuel Tank: Removal and Replacement

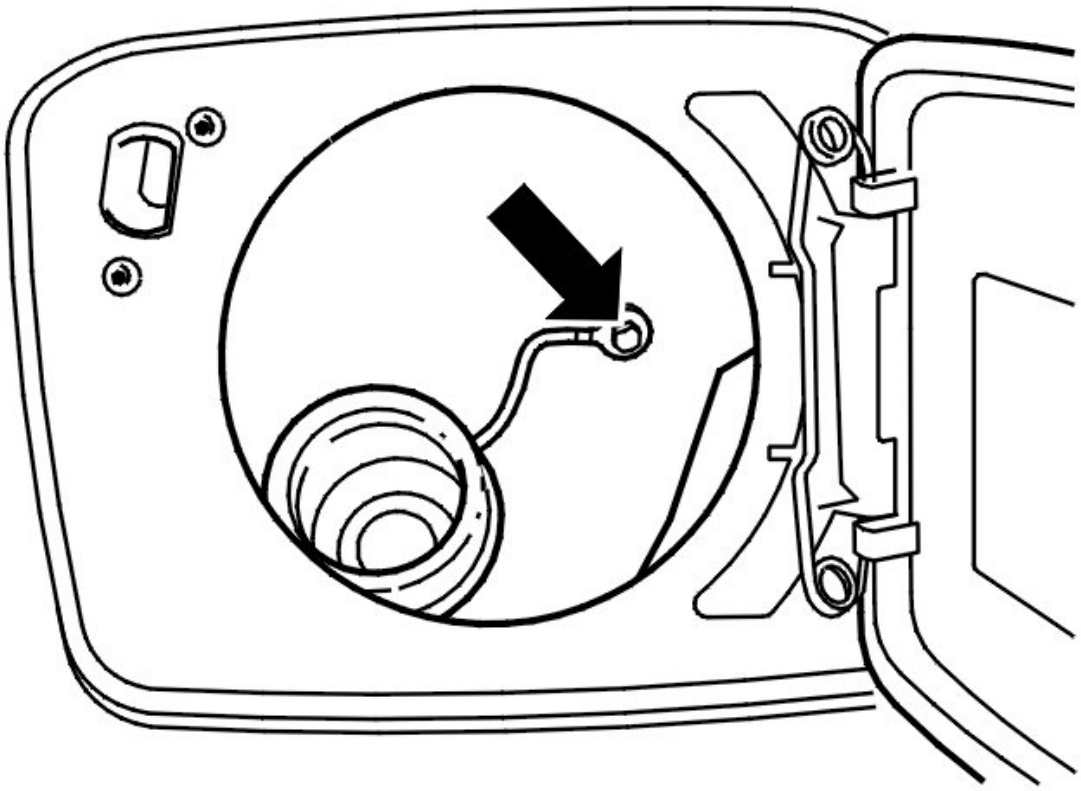
Fuel tank, replacing

Special tools:

998 5972 JACK See: Tools and Equipment/998 5972 Jack
999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture
999 5720 Wrench See: Tools and Equipment/999 5720 Wrench
999 7017 Socket set rear axle See: Tools and Equipment/999 7017 Socket Set Rear Axle

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

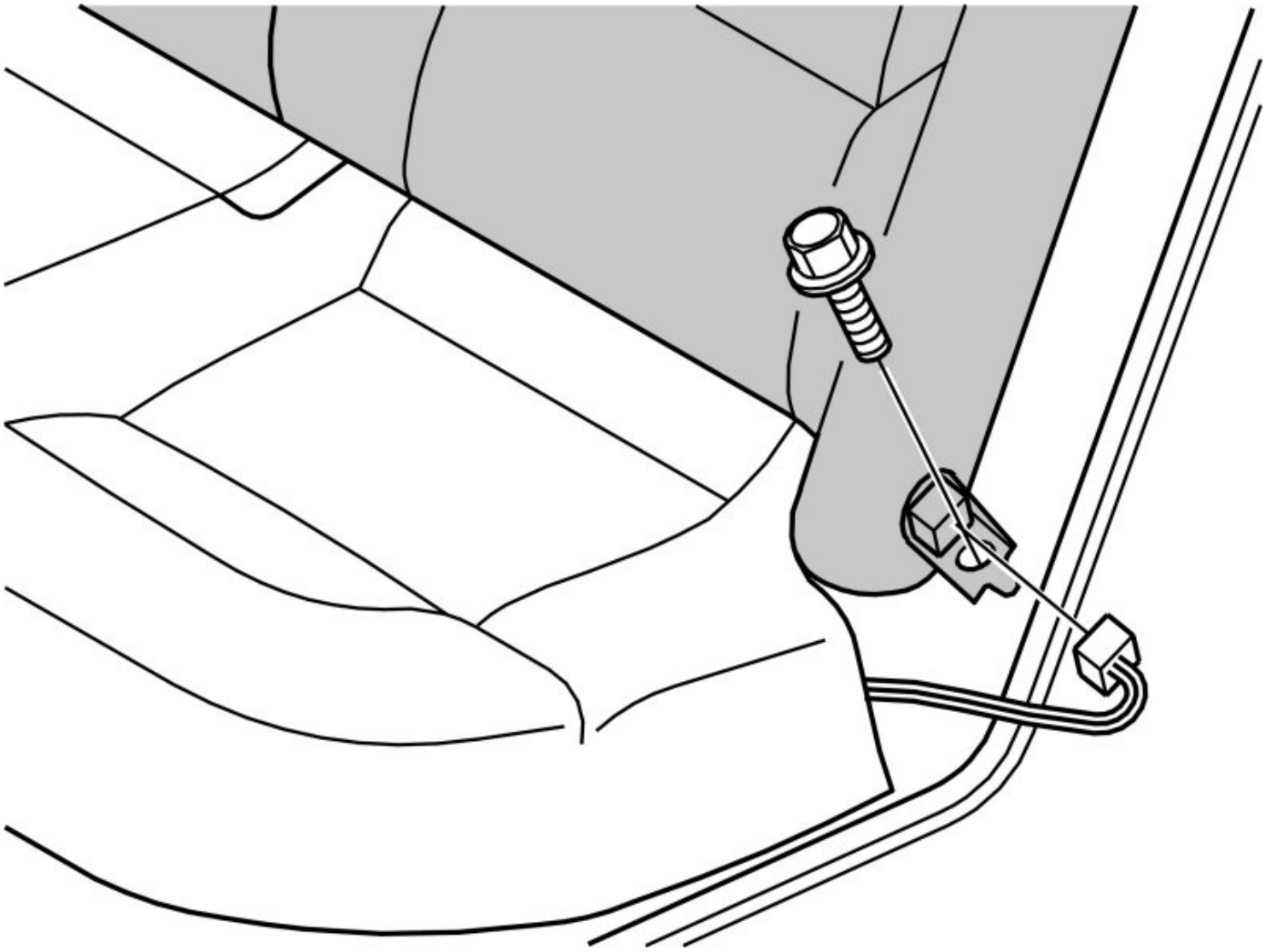
Preparation



Drain the fuel tank. See Fuel tank, draining See: Service and Repair.

Remove:

- the rubber seal around the fuel filler pipe
- the screw for the ground strip.



Applies to V70:

Lift up the right-hand seat cushion.
Remove the right side cushion. See Side cushion See: Body and Frame/Seats/Service and Repair/Removal and Replacement/Rear Seat/Side Cushion.

Applies to the S60:

Remove:

- the seat cushion. See Upholstery, seat cushion, replacing See: Body and Frame/Seats/Seat Cover/Service and Repair/Rear Seat, Passenger Seat/Upholstery, Seat Cushion, Replacing
- the right-hand side cushion. See Side cushion See: Body and Frame/Seats/Service and Repair/Removal and Replacement/Rear Seat/Side Cushion.

Applies to all models:

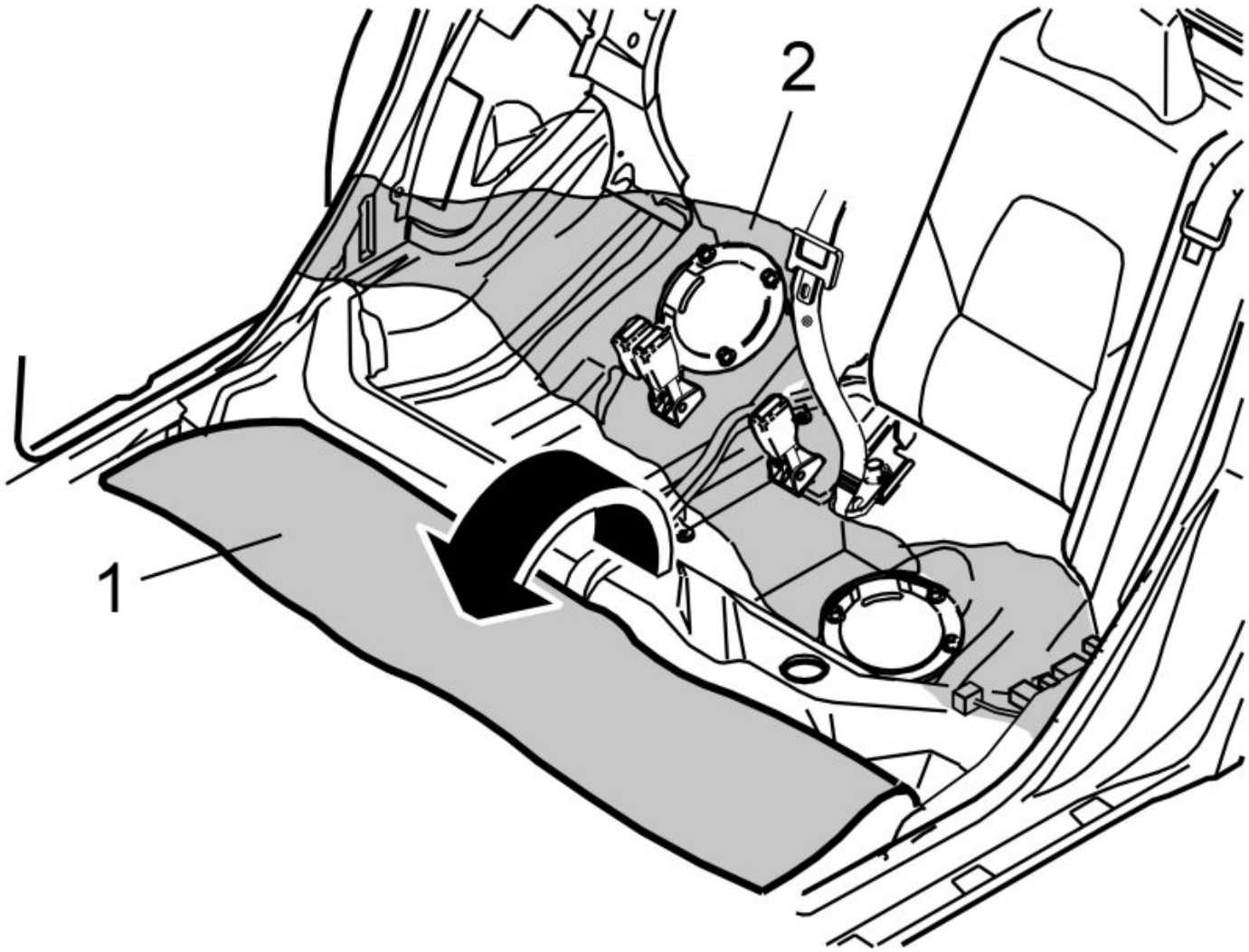
Disconnect the connector at the hinge.

Remove:

- the mounting screw for the hinge
- the screw for the hinge end mounting.

Release the strap/straps of the folding mechanism for the seat belt buckle. (Hooked into place on the lower edge of the backrest).
Lift out the backrest.

Removing the cover for the level sensor/fuel pump (FP)



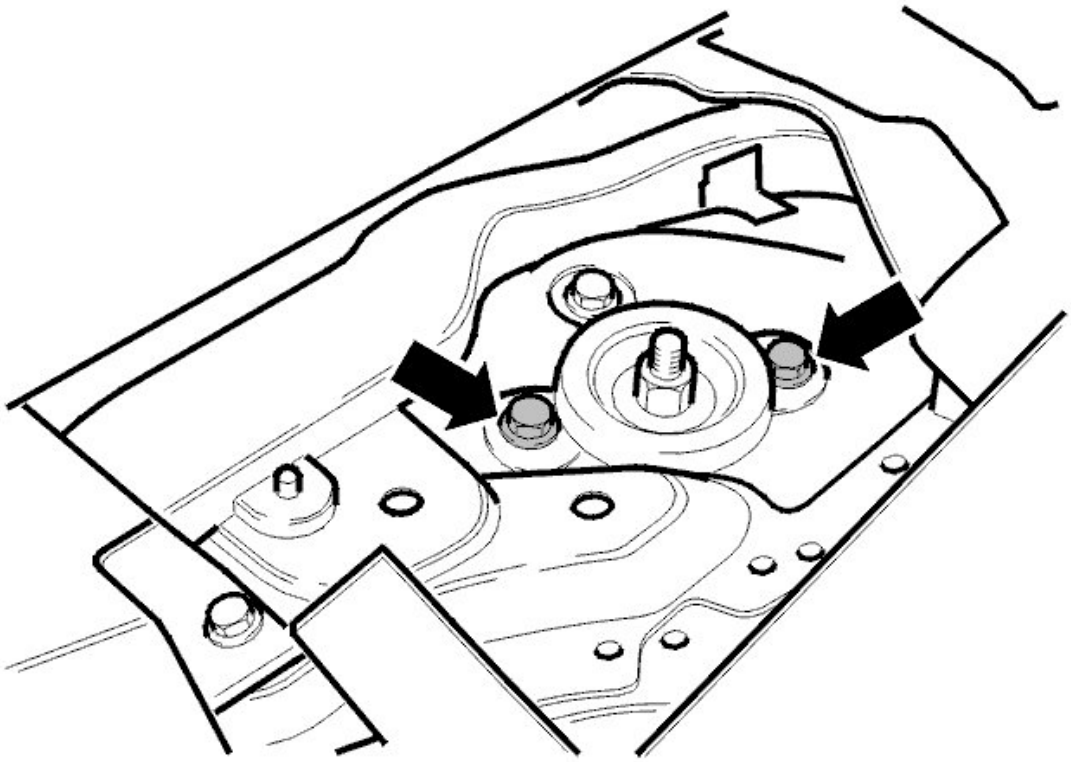
Push the carpet to one side.

Remove:

- the insulation panel
- the cover (2).

Disconnect the connectors for the leak diagnostic pump and level sensor/fuel pump (FP).
Place the cable harnesses on the tank.

Removing the screws for the upper spring seat



Remove the cargo compartment carpet.
Disconnect and fold out the side panels in the cargo compartment.
Remove the seal above the shock absorber mounting on both sides.
Remove the two screws for the spring seat mounting on both sides.
Raise the car.

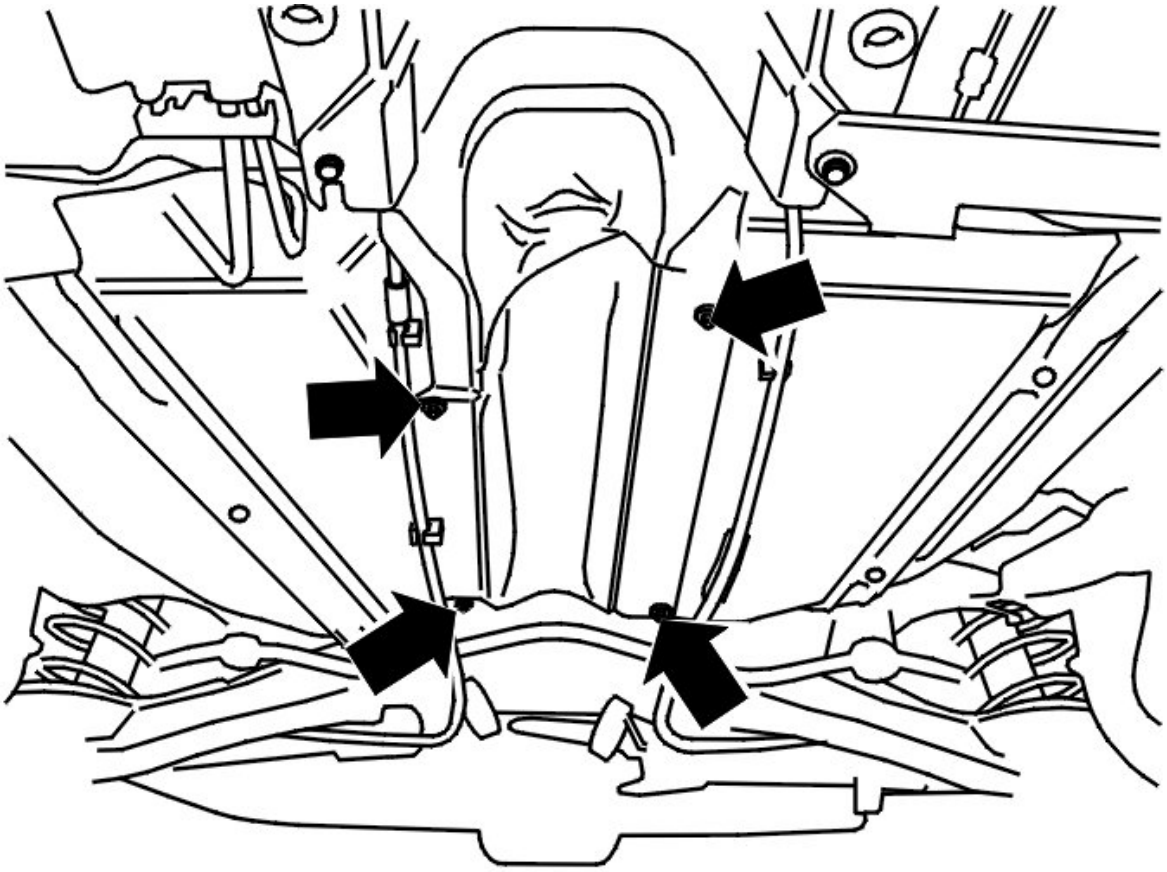
Note! Lift the sill edges so that the rear axle is free.

Removing the exhaust system

Remove:

- the exhaust system from the three-way catalytic converter (TWC) and backward. See Exhaust system, replacing See: Engine, Cooling and Exhaust/Exhaust System/Service and Repair.

Removing the heat deflector plate

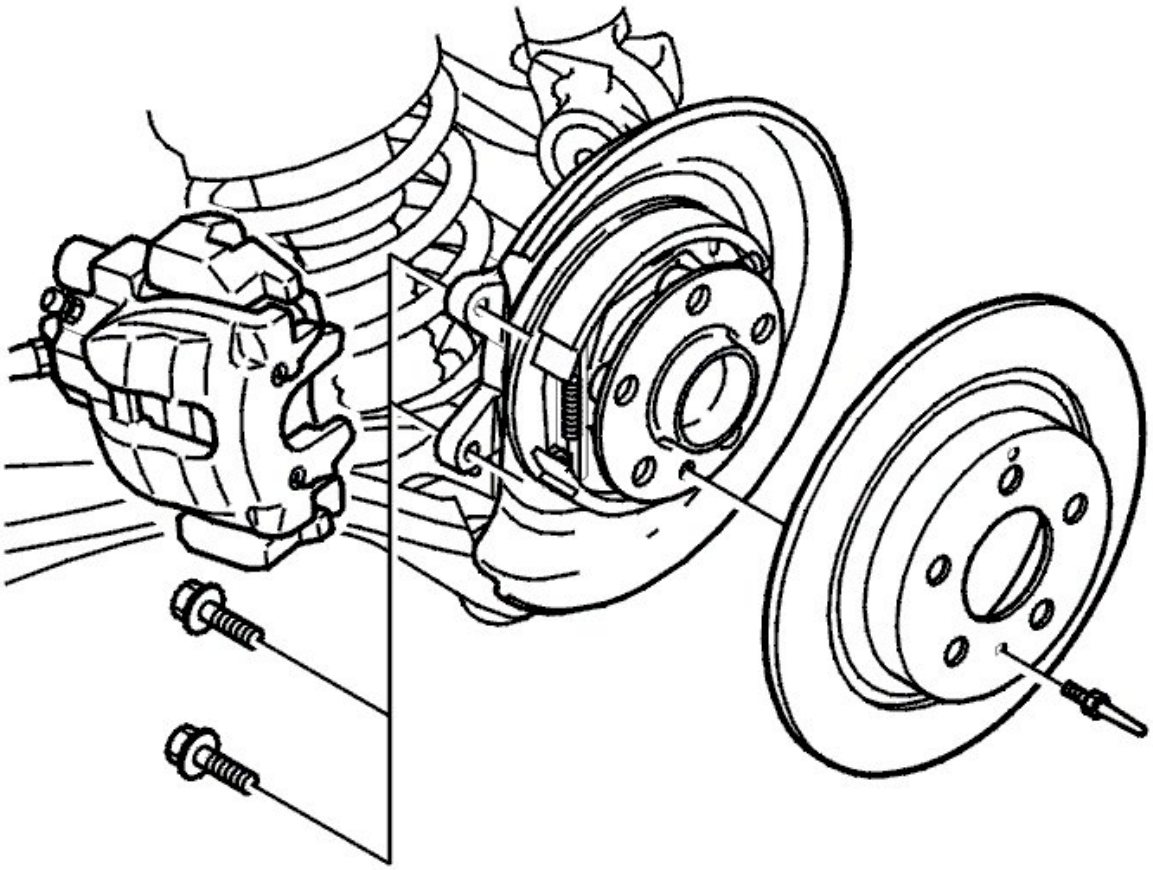


Remove:

- the four plastic nuts
- the heat deflector plate.

Pull the handbrake cables from the clips on the tank.

Removing the brake calliper



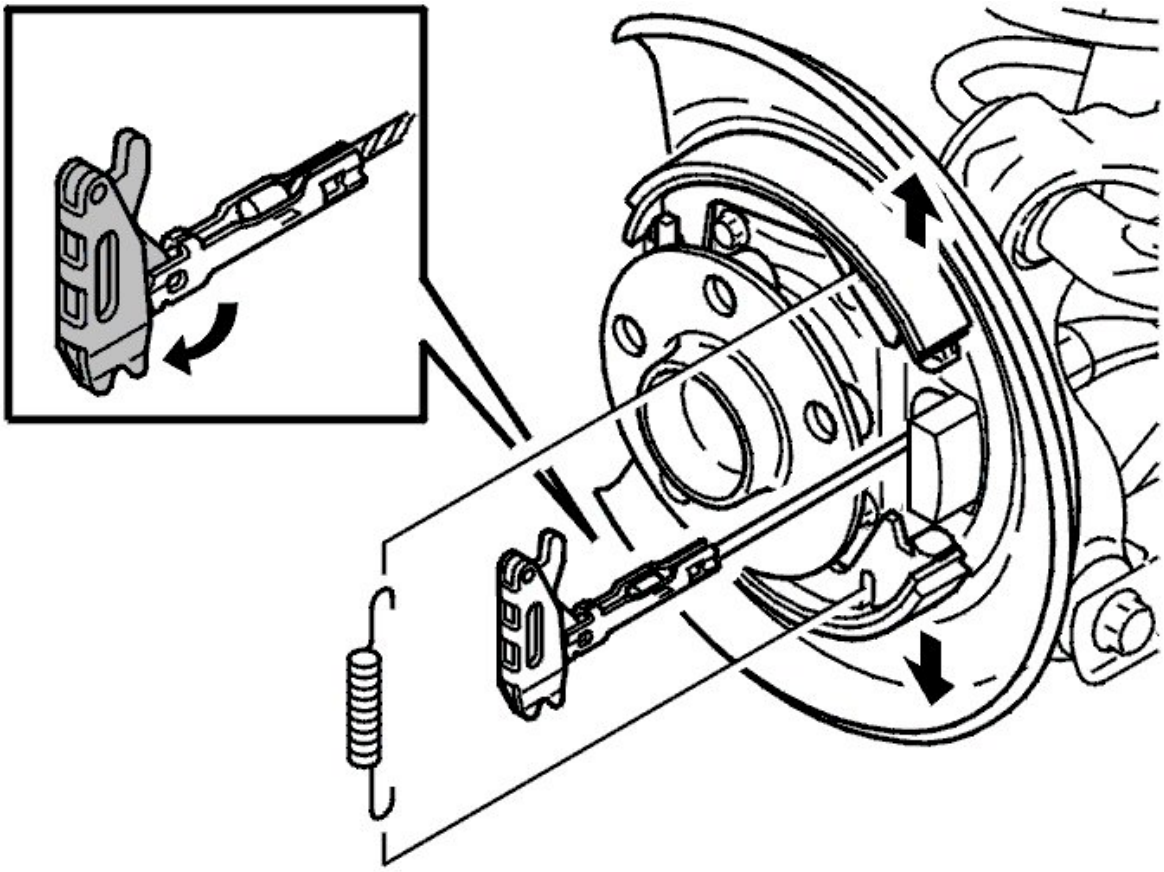
Release the handbrake adjuster. See Handbrake, brake shoes, replacing See: Brakes and Traction Control/Parking Brake System/Parking Brake Shoe/Service and Repair.

Remove (on both sides):

- the wheel
- the ABS sensor and the ABS line from the bracket on the stub axle
- the brake calliper mounting screws.

Hang up the ABS line and the brake calliper. Use a piece of wire.

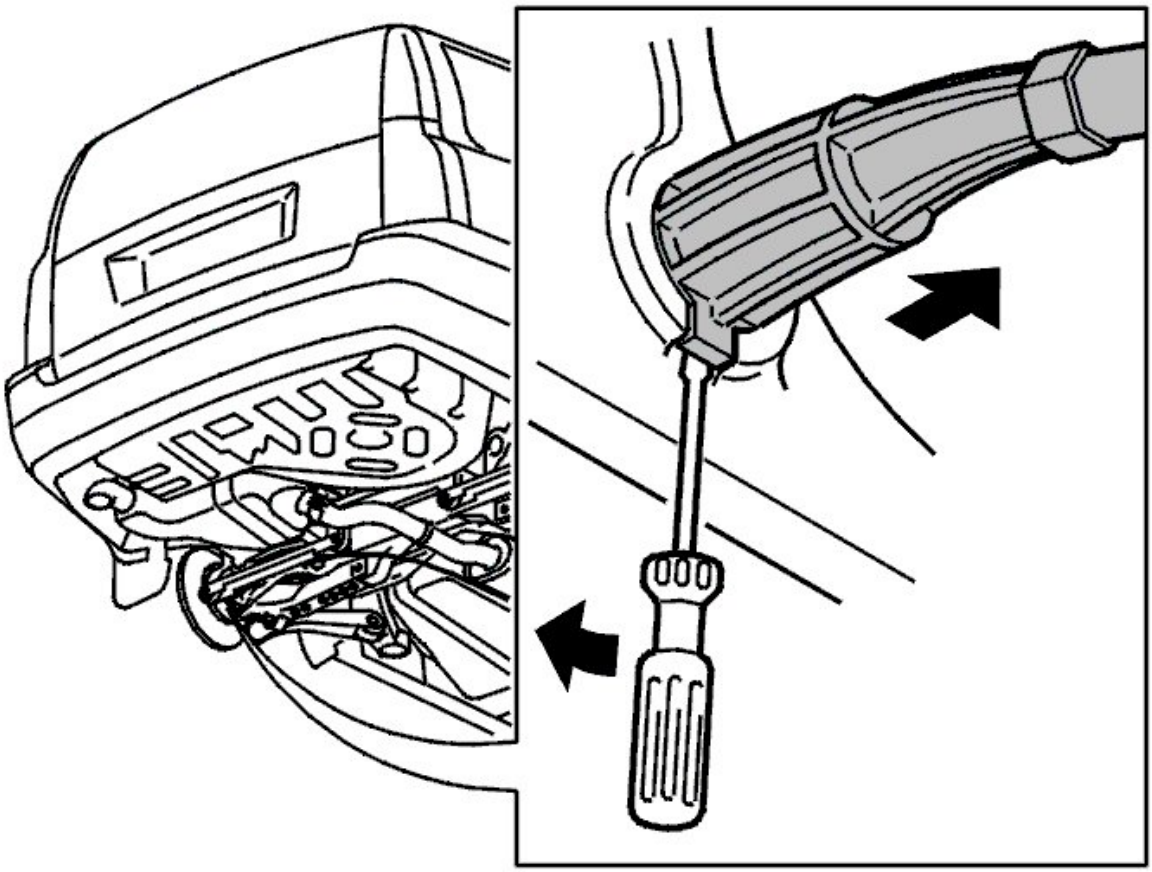
Removing the brake cable for the handbrake



Remove:

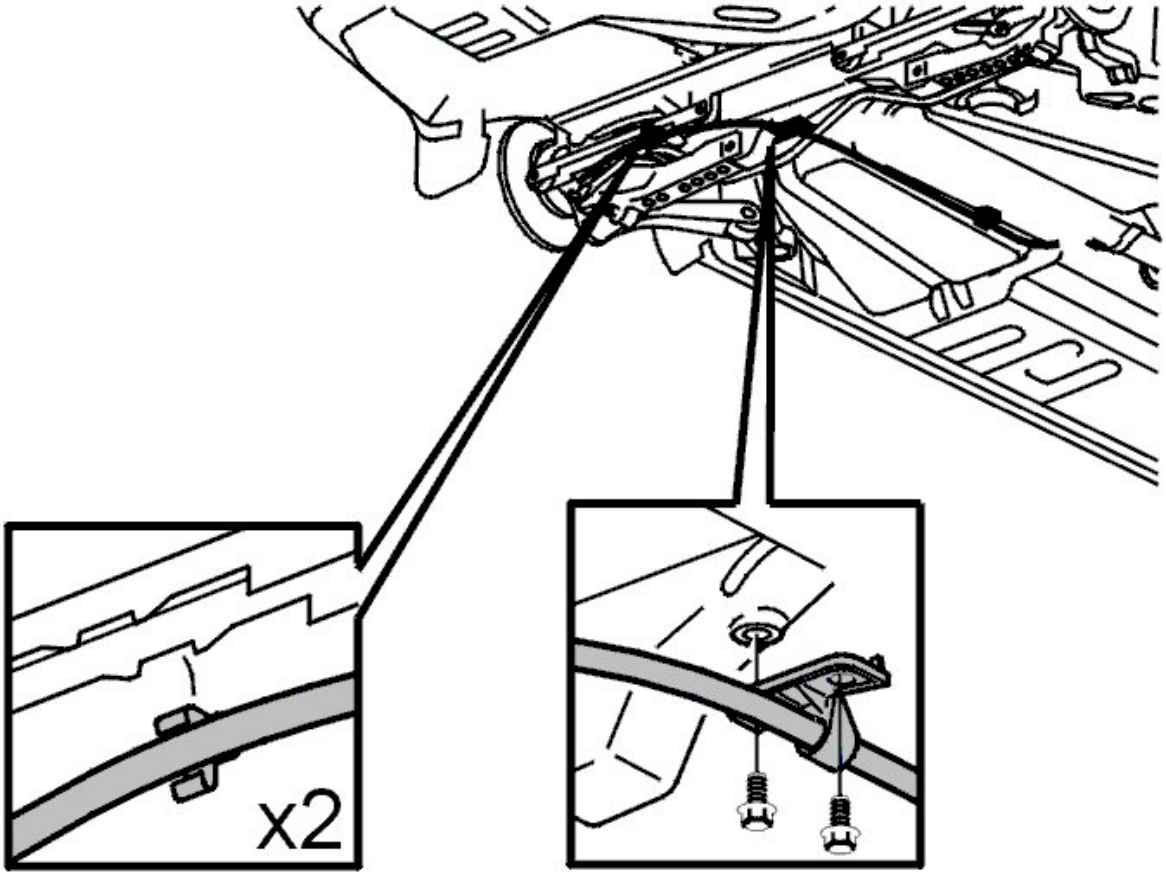
- the locating pin for the brake disc
- the brake disc
- the return spring at the expander
- the expander. Lift the brake shoe slightly. Grip the expander. Pull the expander outwards.

Unhook the expander from the metal bracket.



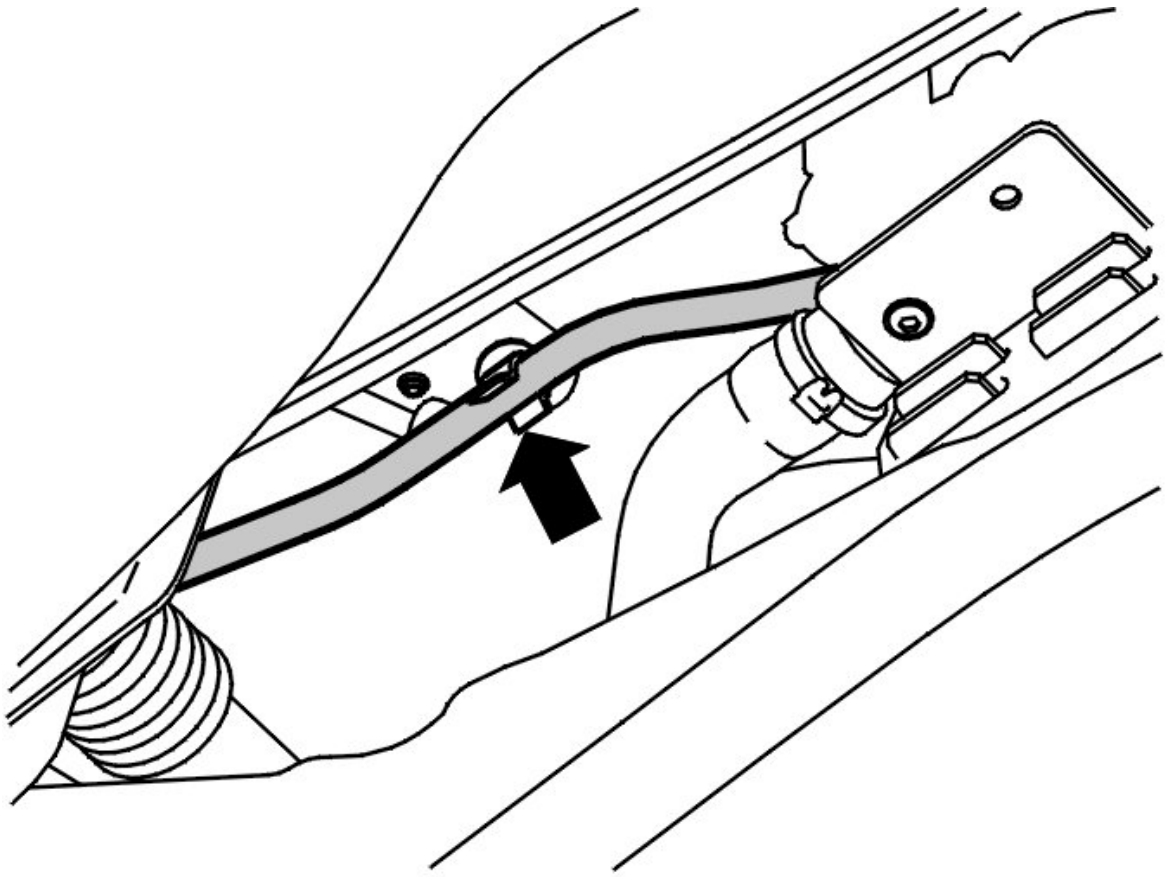
Remove (on both sides):

- the guide sleeve for the cable sleeve. Apply a screwdriver between the guide sleeve lug and wheel arch. Pry apart slightly to remove the sleeve.

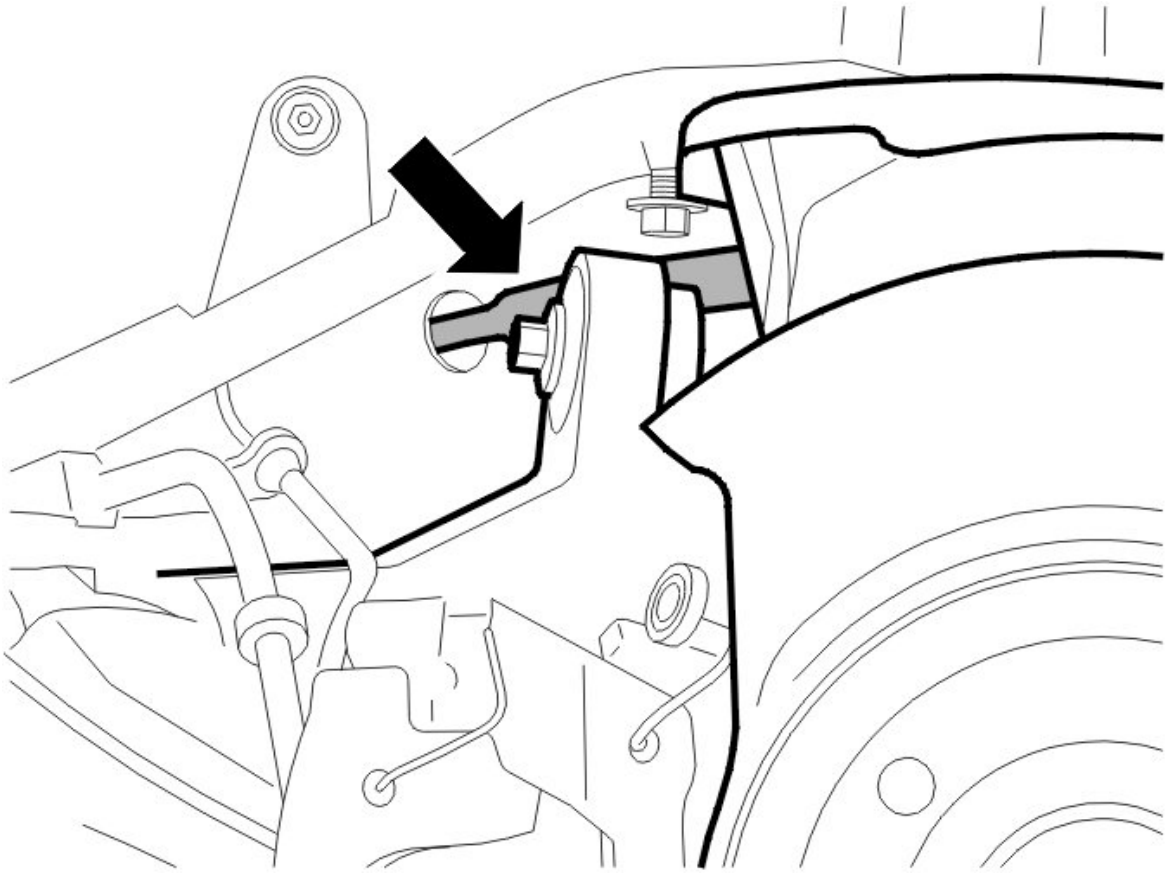


Remove the handbrake cable from the track rod and the sub-frame on both sides.

Preparations for lowering the rear axle

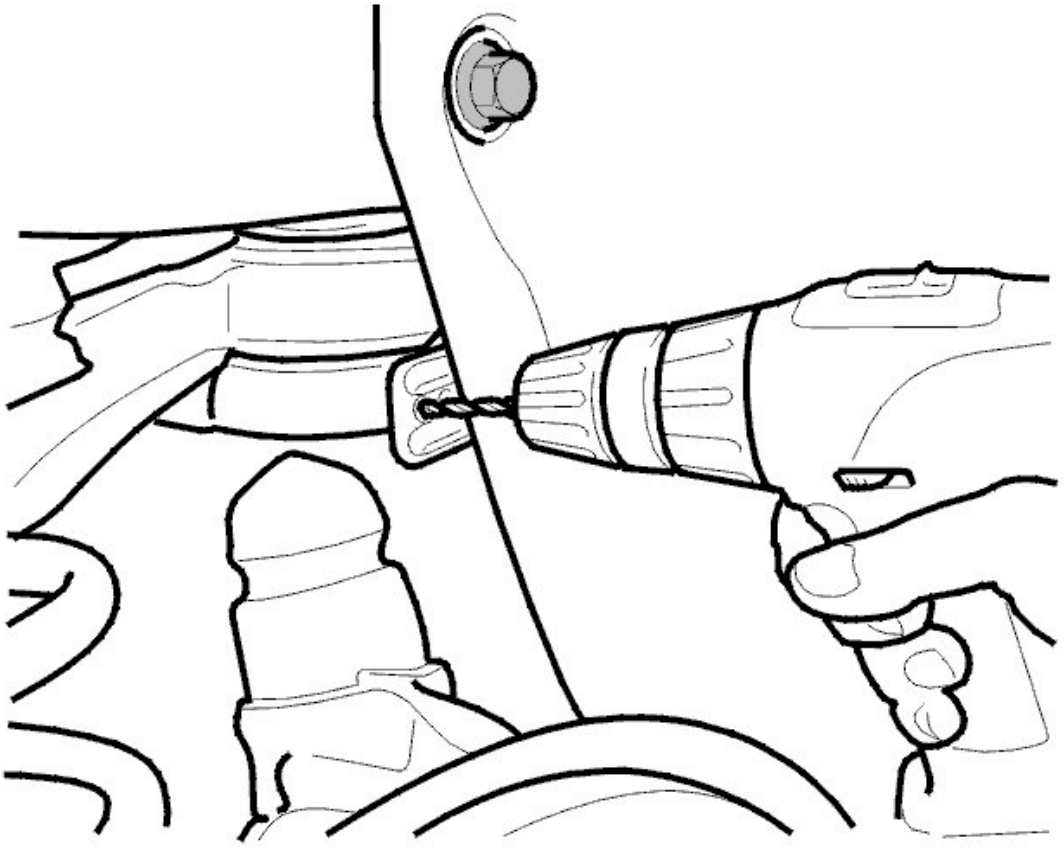


Remove the evaporative emission system (EVAP) pipe from the clip between the tank and rear axle.

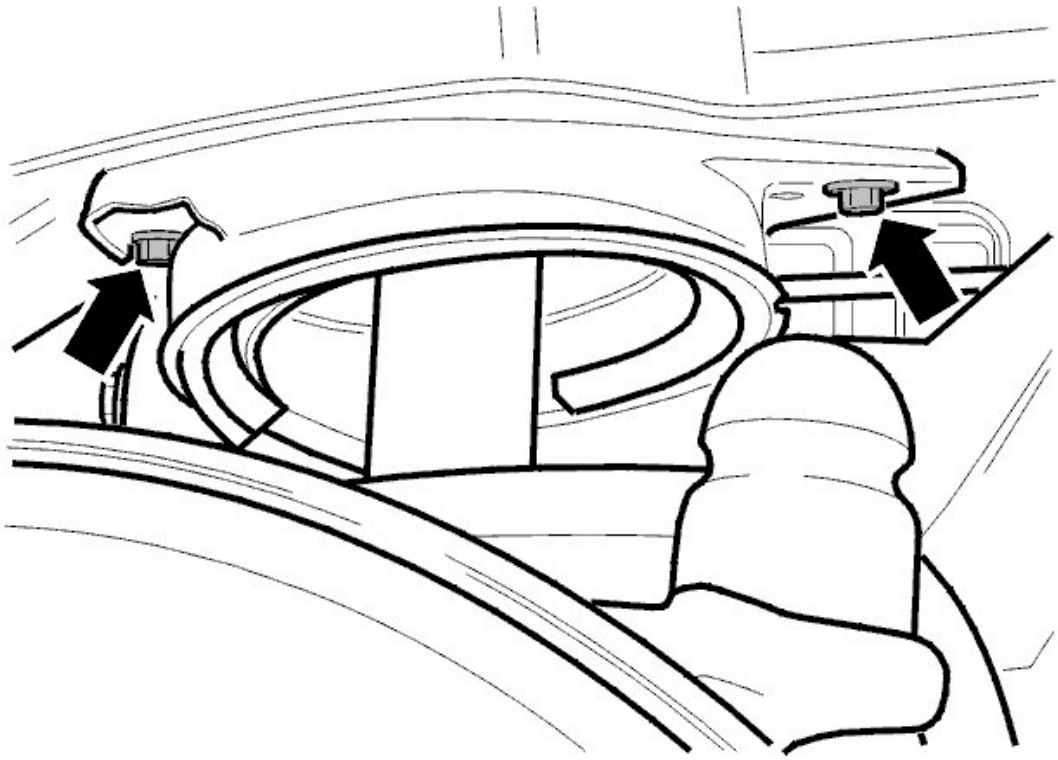


Remove the hose for the carbon filter from the tank.

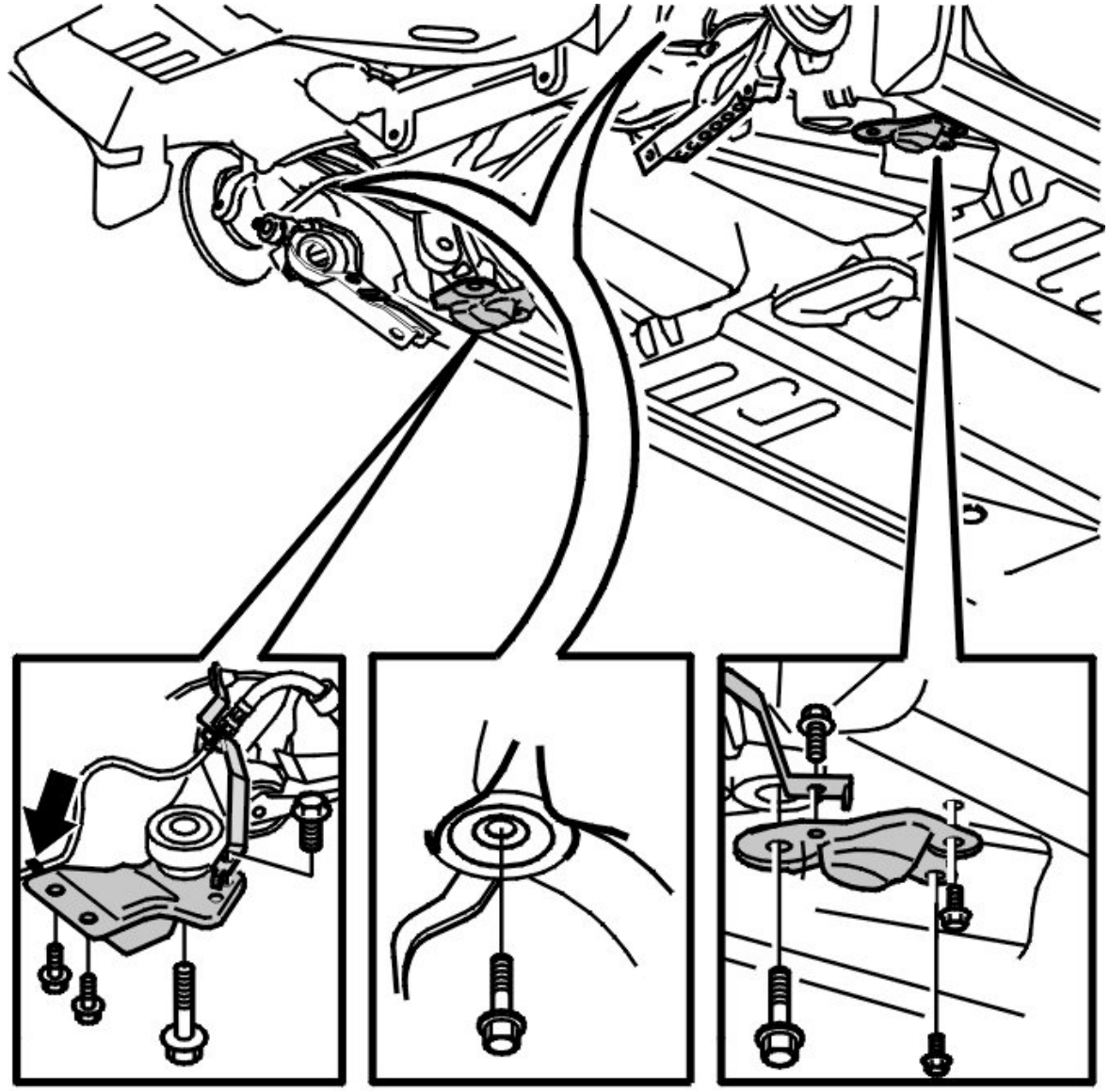
Removing the rear axle



Remove the plastic nut for the wing liner. Bend the wing liner out of the way.
Drill out the heat deflector plate rivet on the sub-frame left rear bushing.



Remove the two screws for the spring seat mounting on both sides.



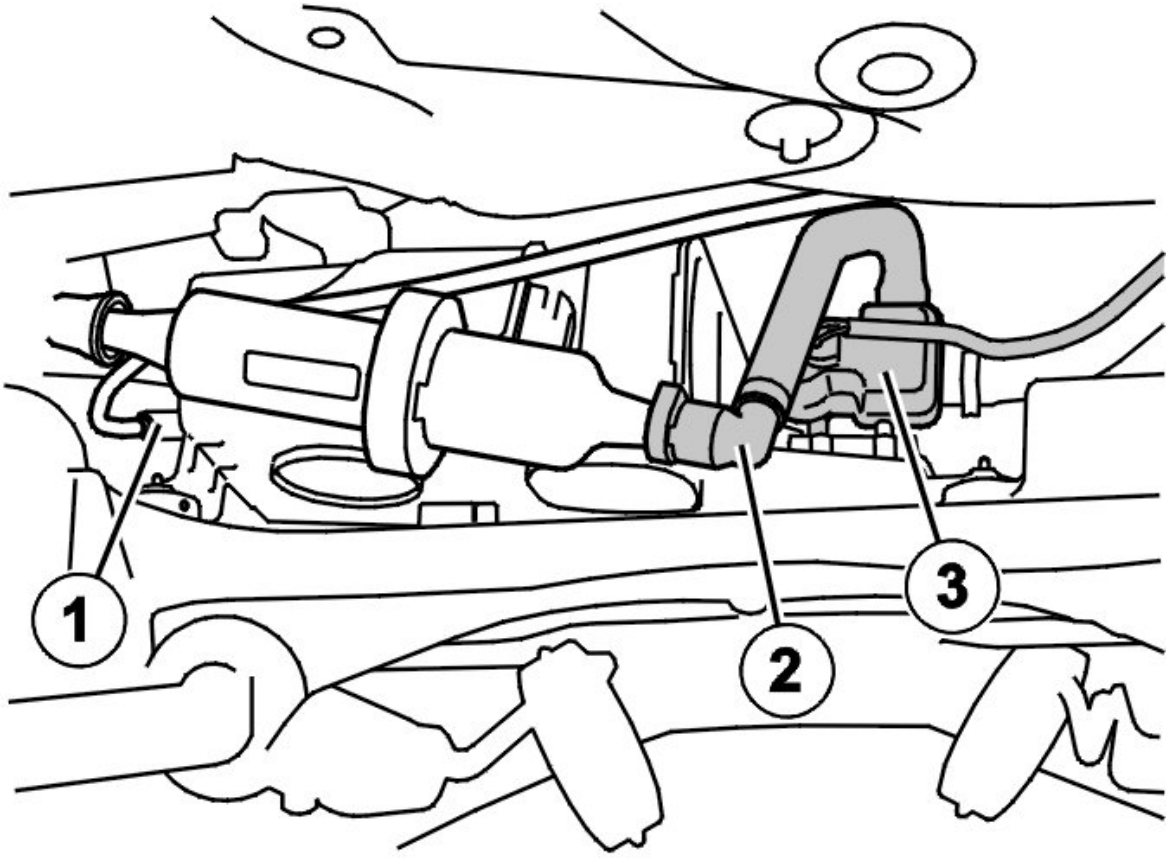
Position a lifting table under the rear suspension.

Warning! Always check that the car does not lift from the lifting arms of the car lift when working with the lifting table.

Remove:

- the four sub-frame mountings
- the sub-frame brackets screws
- the brake hose mounting stays from mountings on the brackets
- the brake pipes from the plastic clips.

Carefully lower the rear suspension approximately 50 mm.

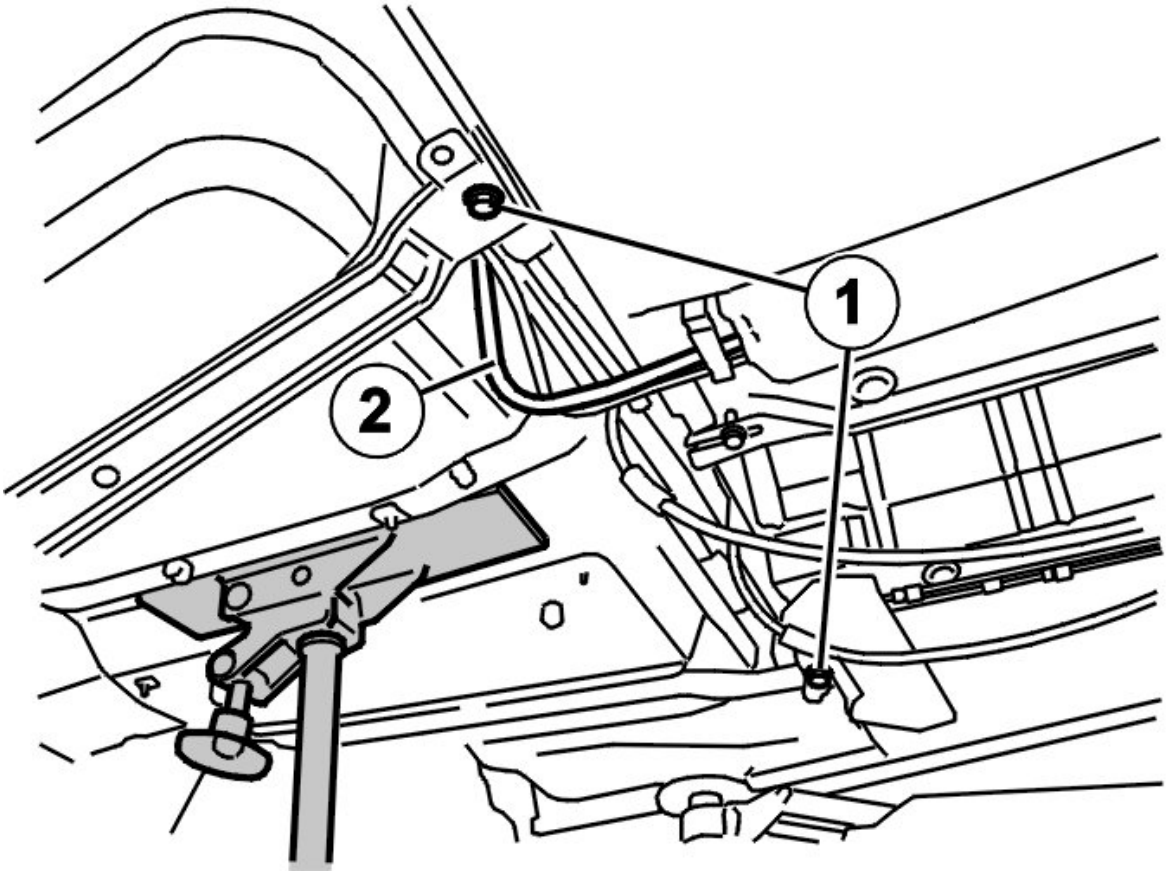


Remove:

- the evaporative emission system (EVAP) hose (1)
- the leak diagnostic hose (2).

Pull the leak diagnostic pump (3) from the mounting.
Lower and remove the rear suspension.

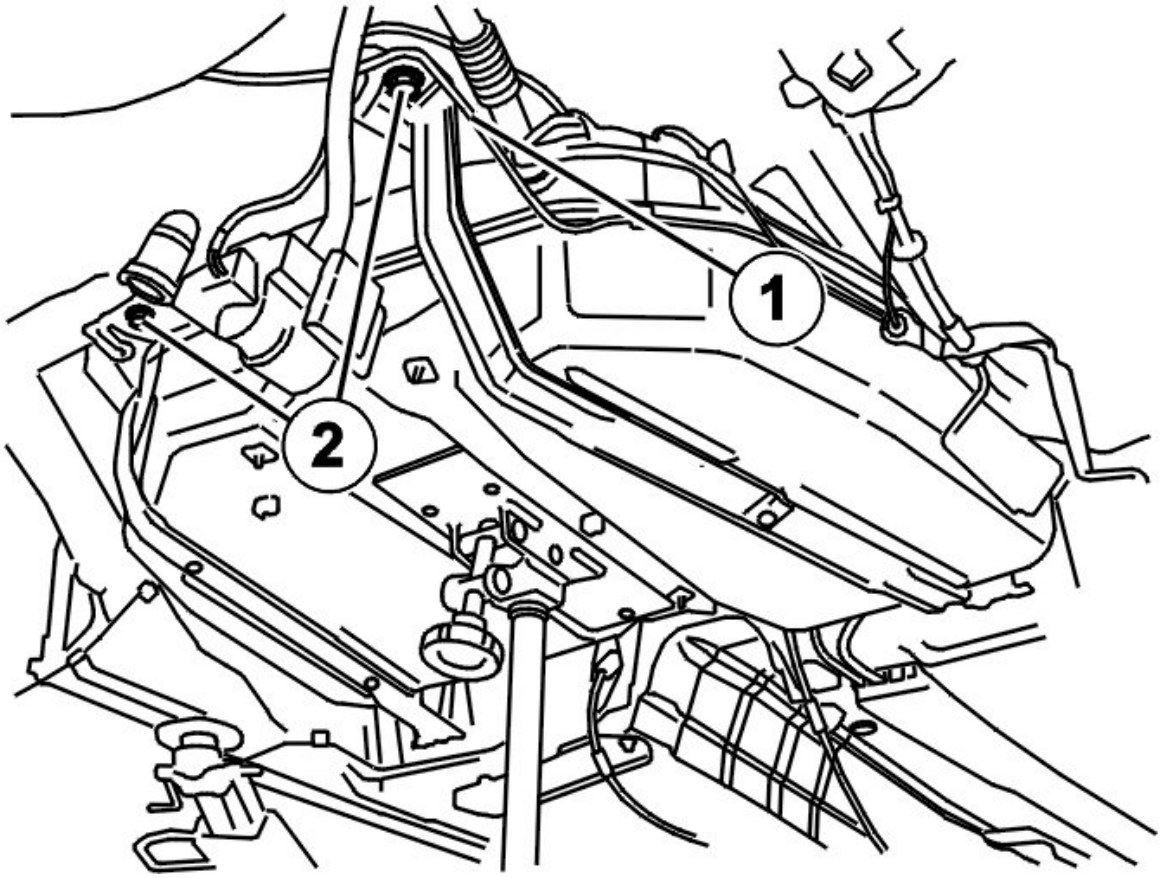
Removing the tank



Position gearbox jack 998 5972 JACK See: Tools and Equipment/998 5972 Jack with plate 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture under the tank.

Remove:

- the fuel line (1)
- the two screws for the front mounting (2) for the fuel tank.

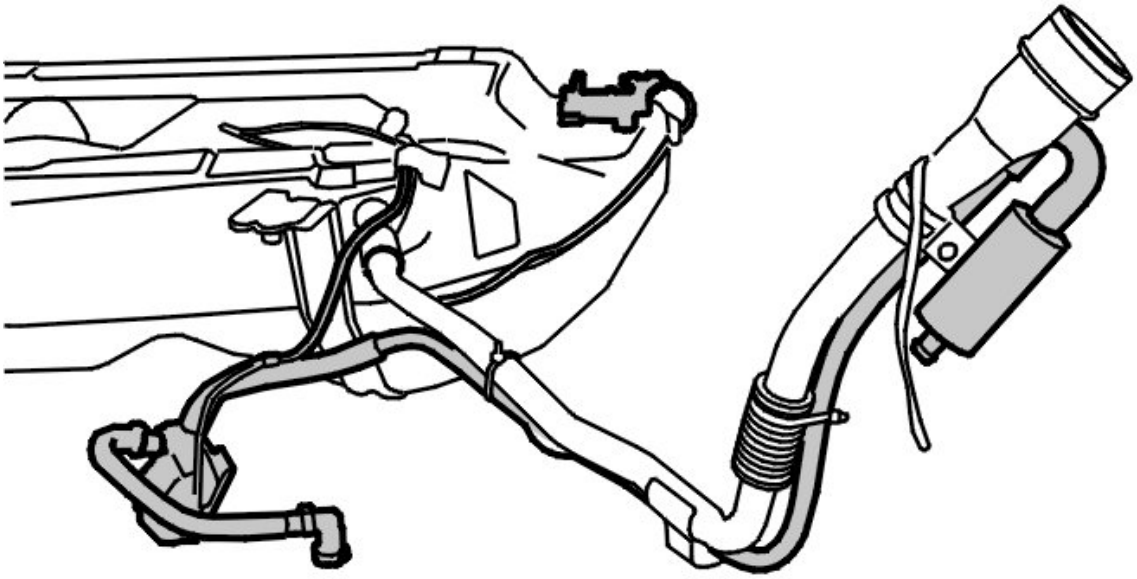


Remove the evaporative emission system (EVAP) hose (1) from the clip mountings.
Remove the two screws (2) for the rear mounting for the fuel tank.
Lower and remove the fuel tank.

Tightening torque

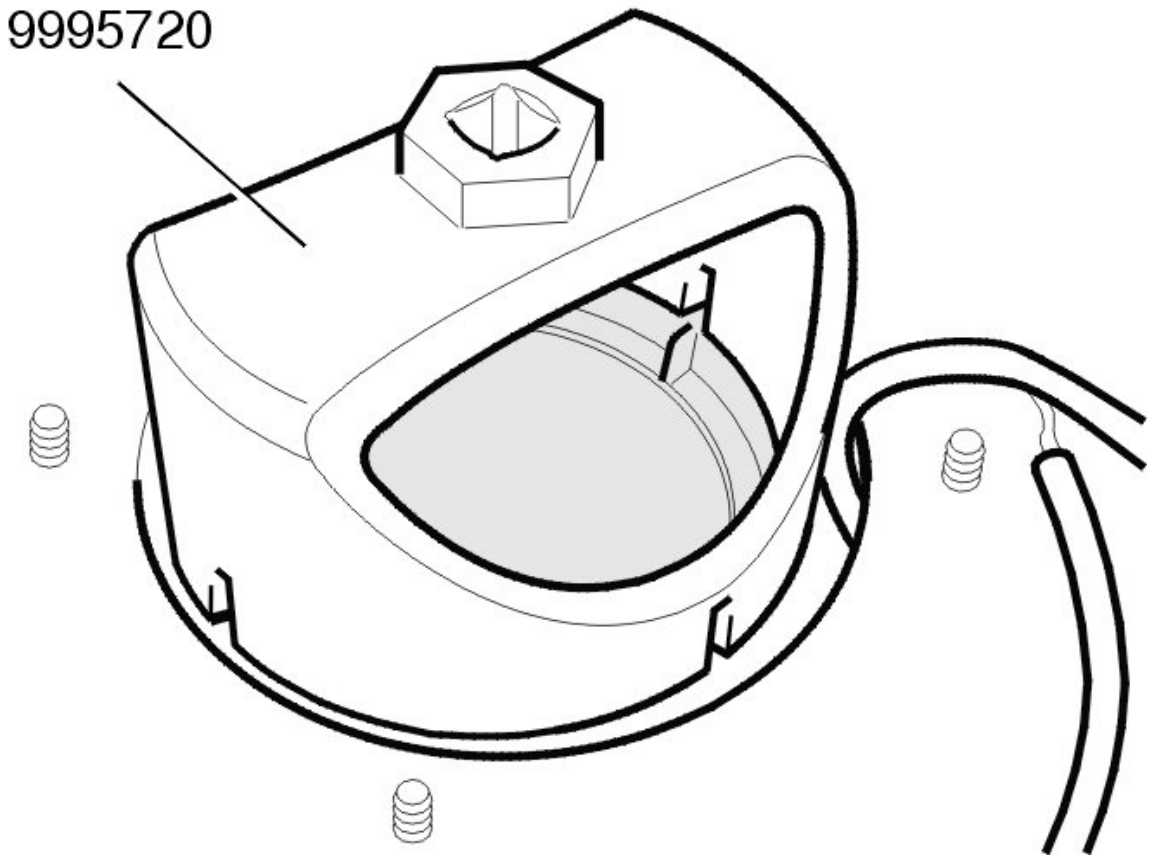
For tightening torques, see Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Transferring components



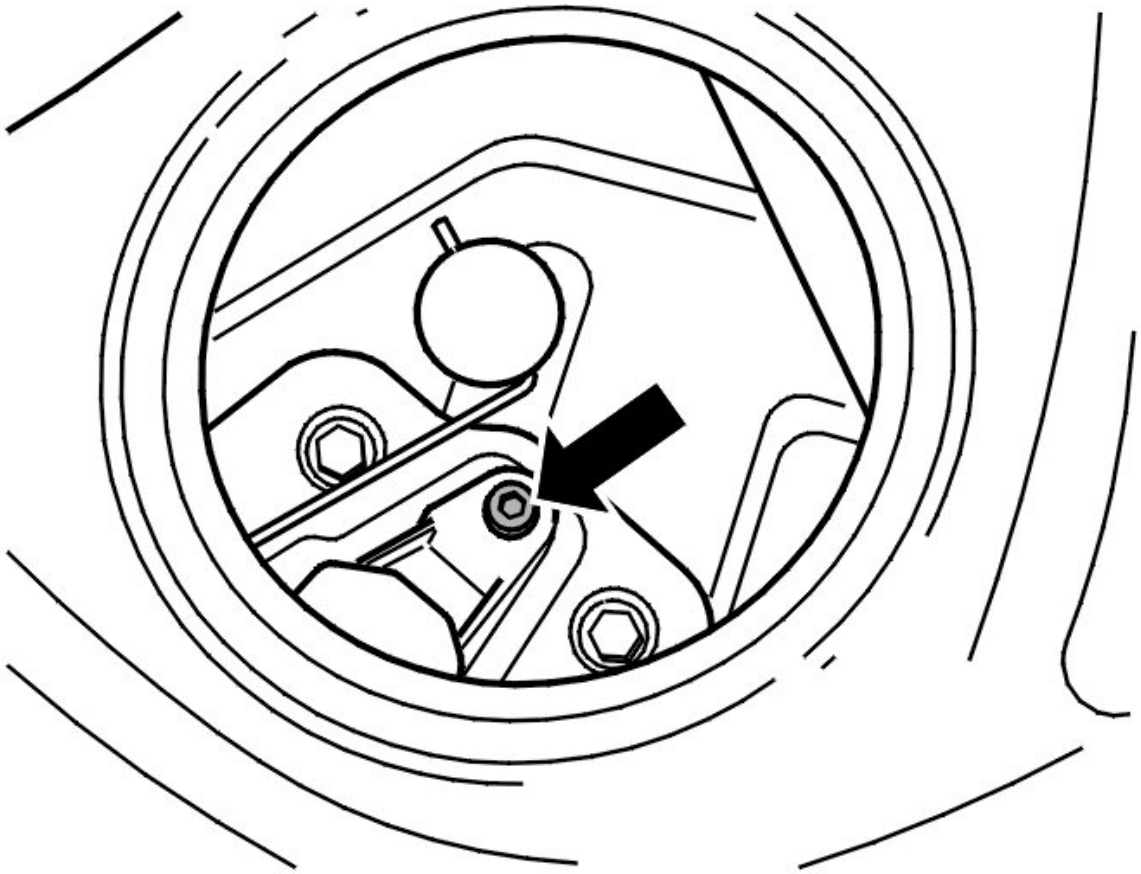
Transfer the venting pipe, leak diagnostic pump, pump control module and cable harnesses.

Transferring the fuel pump (FP)

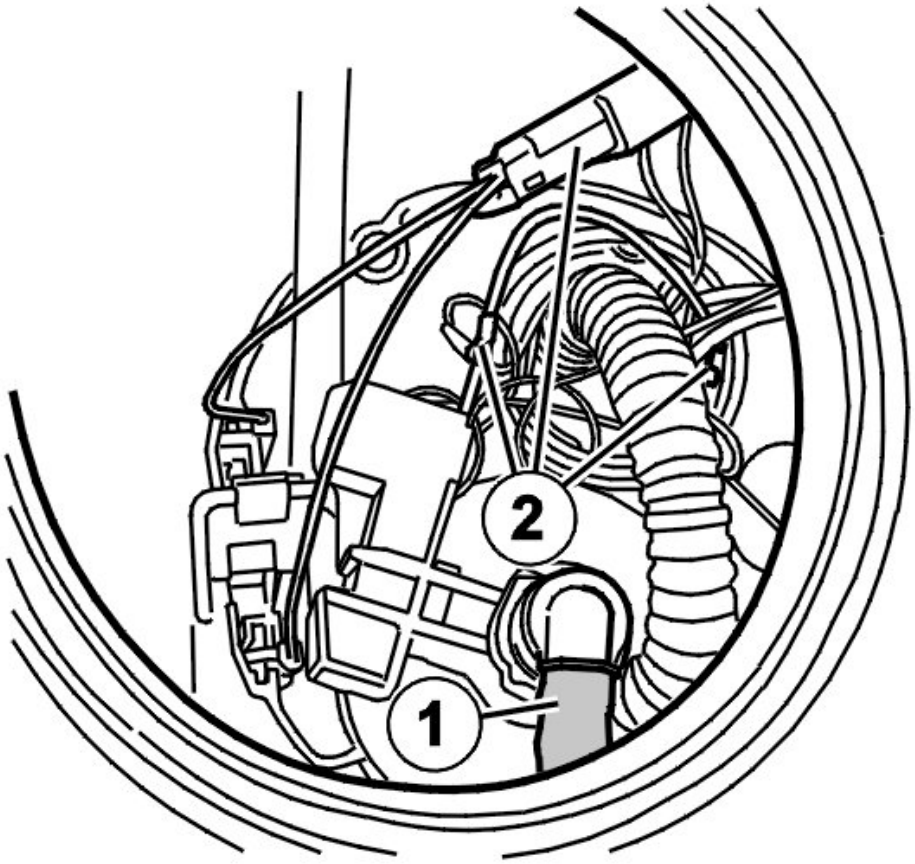


Removal

Remove the cover.
Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.



Remove the screw (1).



Carefully turn the pump to access the fuel hose (1).

Remove:

- the hose (1)
- the three connectors (2).

Carefully lift up the pump.

Note! Ensure that the level sensor arm is not obstructed. Do not bend the arm when removing the pump.

Installation

Lower the pump into the tank.

Install:
- the fuel hose
- the three connectors.

Turn the pump to the installation position. Install the mounting bracket and screw. (M6)
Install the cover.
Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.
For tightening torques, see Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Installing the tank

Use 998 5972 JACK See: Tools and Equipment/998 5972 Jack together with plate 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture.
Carefully raise the tank.

Install:
- the two screws for the rear mounting for the fuel tank. (M8)
- the evaporative emission system (EVAP) hose in the mounting clips
- the two screws for the front mounting for the fuel tank. (M8)
- the fuel line.

Remove 998 5972 JACK See: Tools and Equipment/998 5972 Jack and 999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture.

Installing the rear suspension

Raise the rear suspension until the spring seats enter the holes in the chassis.

Note! Do not trap the hoses, lines or brake components when raising the rear suspension.

Install:
- the leak diagnostic pump in its mounting
- the leak diagnostic hose
- the evaporative emission system (EVAP) hose.

Raise the rear suspension further so that there is a 20mm gap between the chassis and the sub frame bushing.

Warning! Always check that the car does not lift from the lifting arms of the car lift when working with the lifting table.

Install the screws for the upper spring seat. (M10)
Slide up the centring sleeves 999 7017 Socket set rear axle See: Tools and Equipment/999 7017 Socket Set Rear Axle in the two rear mountings on the sub-frame.

Install:
- the screws. Tighten lightly
- the screws for the front mountings on the sub-frame (install the screws through the brackets).

Tighten all front mountings. (M12)
Remove the screws for the rear mountings on the sub-frame. Remove the centering sleeves.
Install the screws for the rear mountings on the sub-frame again. Tighten. (M12)
Remove the lifting table.

Install:
- the brake pipes in the plastic clips on the brackets
- the screw for the brake line mounting stay. (M8)
- rivets to the heat shield on the sub-frame left rear bushing
- the plastic nut for the wing liner
- the hose for the carbon filter on the tank
- the evaporative emission system (EVAP) pipe between the tank and rear suspension.

Installing the brake cable for the handbrake
Applies to both sides:

Install the mounting for the cables on the sub-frame and the clips on the tie rods.
Thread the mechanical cables into the brake covers.

Hint: Lubricate the O-rings on the guide sleeves of the mechanical cables. Use silicone grease.

Note! Ensure that the guide sleeve lug is correctly positioned in the cover.

Hook the expander in the plate bracket.

Install:
- the expander
- the return spring
- the brake disc
- the locating pin for the brake disc. (M6).

Installing the brake calliper
Applies to both sides:

Install:
- the brake calliper
- the brake calliper mounting screw. Use new screws.

For tightening torques, see Tightening torque See: Brakes and Traction Control/Specifications/Tightening Torque.

Install:
- the ABS sensor
- the screw. (M6)
- the ABS sensor cable in the bracket
- the wheels. See Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

Installing the heat deflector plate

Install:
- the heat deflector plate.
- the four plastic nuts
- the handbrake cables from the clips on the tank.

Installing the exhaust system

Install the exhaust system starting from the three-way catalytic converter (TWC) and working backward. See Exhaust system, replacing See: Engine, Cooling and Exhaust/Exhaust System/Service and Repair.

Installing the screws for the upper spring seat

Install on both sides:
- the two screws for the spring seat mounting
- the seal above the shock absorber mounting
- the side panels in the cargo compartment.

Install the cargo compartment carpet.

Installing the cover for the level sensor/fuel pump (FP)

Connect the connectors for the leak diagnostic pump and level sensor/fuel pump (FP).

Install:
- the cover
- the insulation panel.

Reinstall the carpet.

Finishing

Install:
- the backrest
- the screw for the hinge mounting (M10)
- the connector for the hinge
- the end mounting for the seat belt.

For tightening torques, see the relevant service procedure.
Install the side cushion.
(V70) Fold the seat cushion forward.
(S80, S60) Install the seat cushion.

Install:
- the screw for the ground strip.
- the rubber seal around the fuel filler pipe

Top up the fuel.

Fuel Gauge Sender: Service and Repair

Left Fuel Gauge Sensor

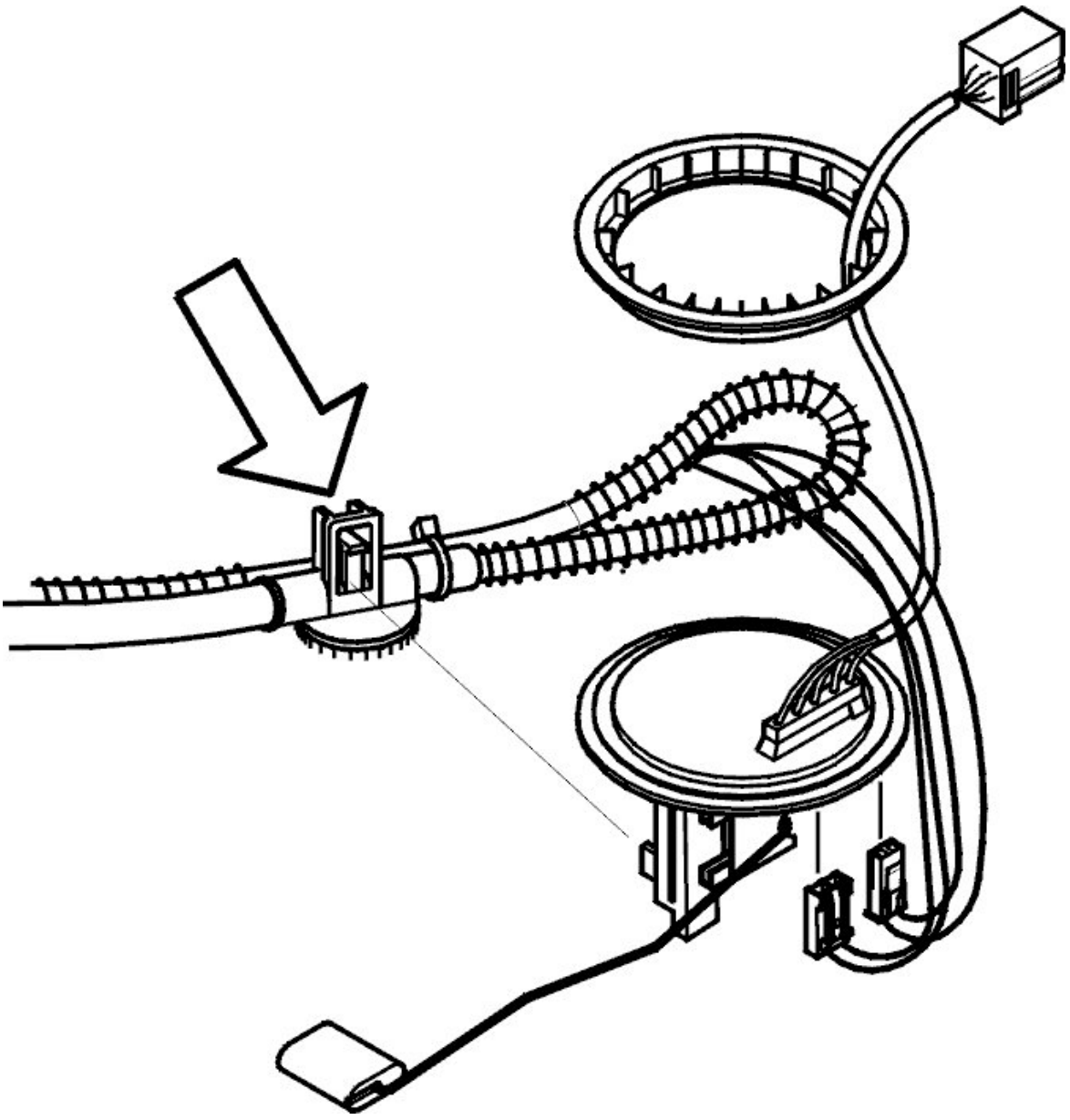
Left fuel gauge sensor

Removal

Preparation

- Remove rear seat as described in Rear seat assembly See: Body and Frame/Seats/Service and Repair/Removal and Replacement/Rear Seat/Rear Seat Assembly
- Remove insulation
- Fold floor mat in boot under.

Fuel gauge sensor



- Remove level sensor cover
- Disconnect connector
- Loosen level sensor lock ring using special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench
- Remove level sensor. It is easier if the fuel pipe bends upwards through the hole
- Disconnect the 2 connectors from the level sensor
- Loosen tube system by pressing release button down
- Remove level sensor.

Installation

Fuel gauge sensor

- Position level sensor correctly
- Install a new rubber seal
- Connect the 2 connectors to the level sensor
- Press tube system onto level sensor
- Carefully position level sensor down with tube system and wires
- Install level sensor attaching ring but do not tighten it
- Press level sensor into position. Note position marks on cover and tank
- Tighten lock ring, first by hand and then using special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench
- Install wire in rubber seal slots
- Connect the connector
- Install level sensor cover
- The rest of the section is done in reverse order.

Additional information

To replace fuel gauge sensor on right side, see Right side fuel pump with level sensor See: Right Side Fuel Pump With Level Sensor.

Level Sensor, Fuel Tank Left, Replacing

Level sensor fuel tank left, replacing

Special tools:

999 5720 Wrench See: Tools and Equipment/999 5720 Wrench

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Preparatory work

Disconnecting the battery lead

Disconnect the battery negative lead. See: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Warning! Explosion risk.Use a fresh air mask.

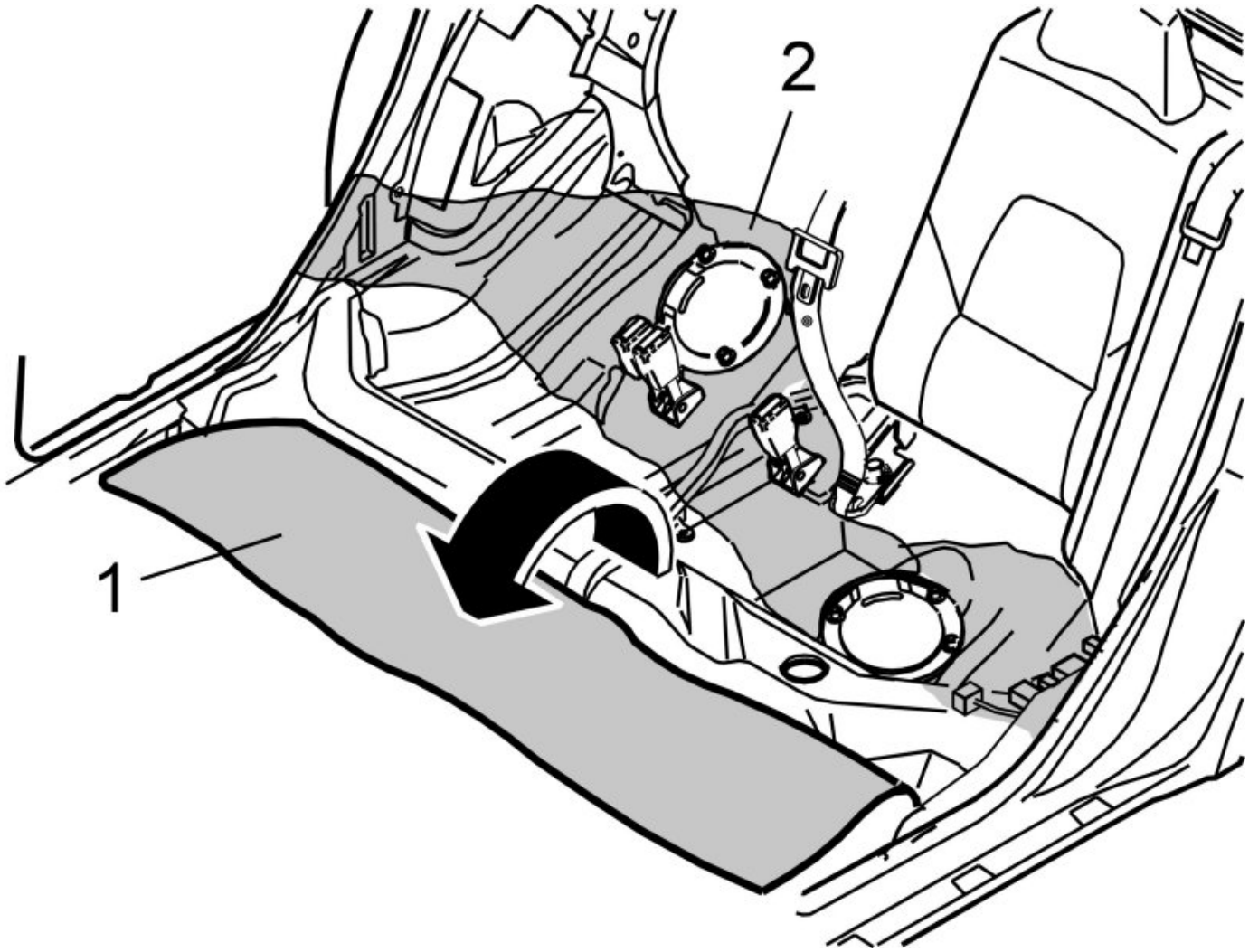
Draining fuel tank

Note! Before draining the fuel, see: Safety regulations for handling fuel See: Service Precautions/Safety Regulations for Handling Fuel.

Insert the heavy duty hose 1.3 meters into the fuel filler pipe, measured from the edge of the opening of the filler pipe.
Pump until air comes out.
V70: Fold up both sides of the rear seat. Remove the rear seat.
S80, S60: Remove the seat cushion for the rear seat.

Removal

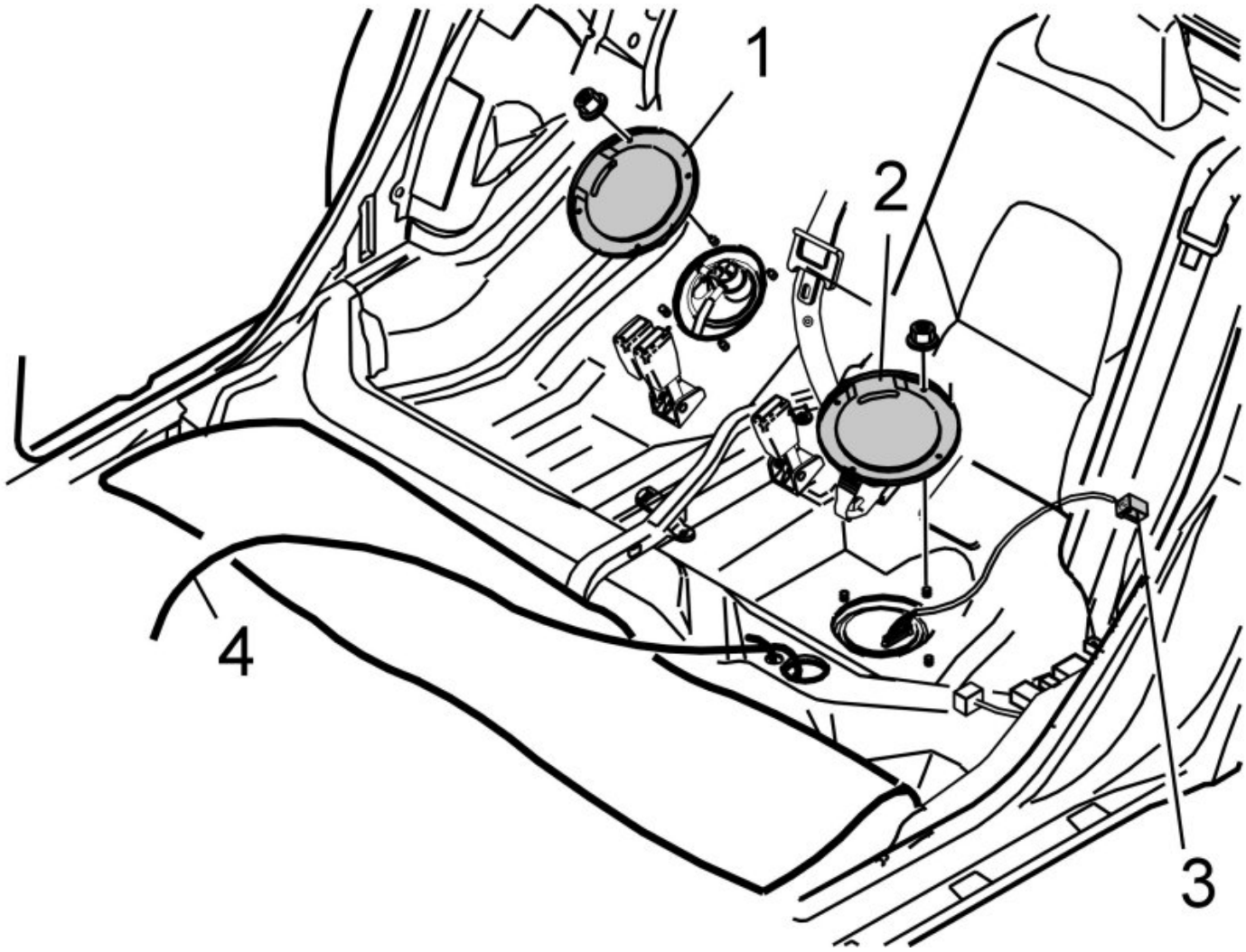
Removing the insulation panel



Fold the carpet (1) out of the way.
Remove the insulation panel.
Cover the area (2) around the cover and between the doors with absorbent material.

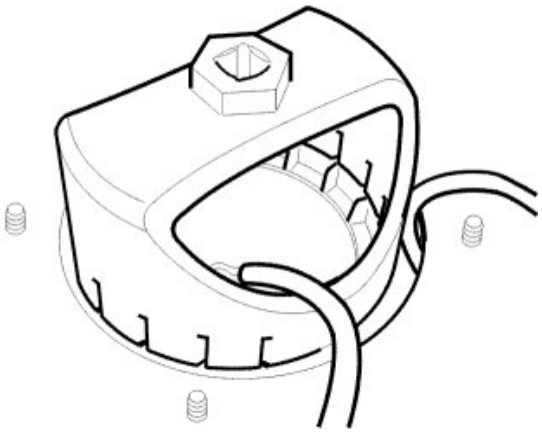
Caution! Ensure that there is no risk of dirt getting into the tank.

Removing the cap over the left-hand level sensor

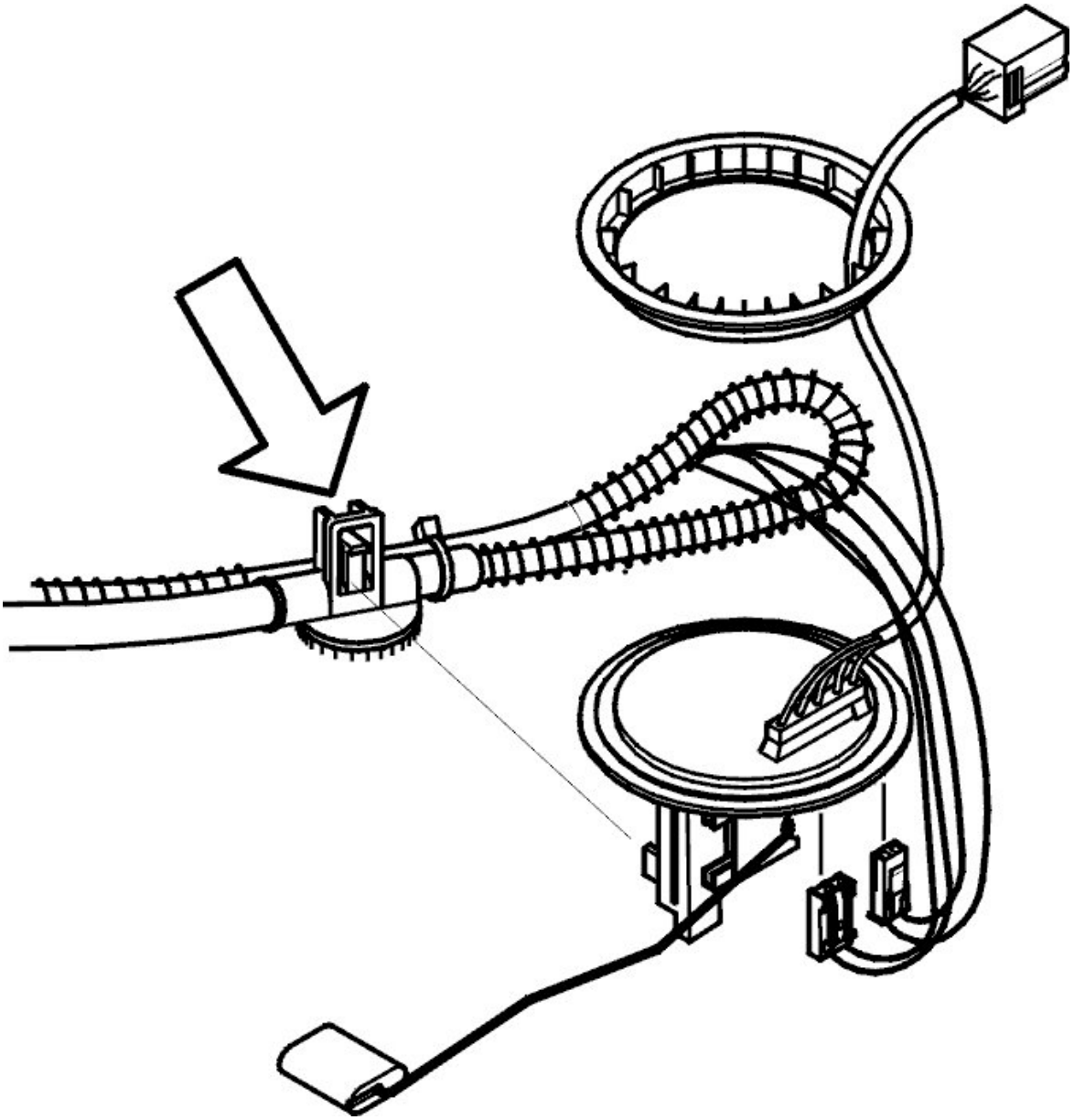


Remove the cover (2) over the level sensor.
Disconnect the level sensor connector (3).

Removing the left-hand level sensor



Clean the area around the level sensor thoroughly.
Open the left-hand level sensor. Use: 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.

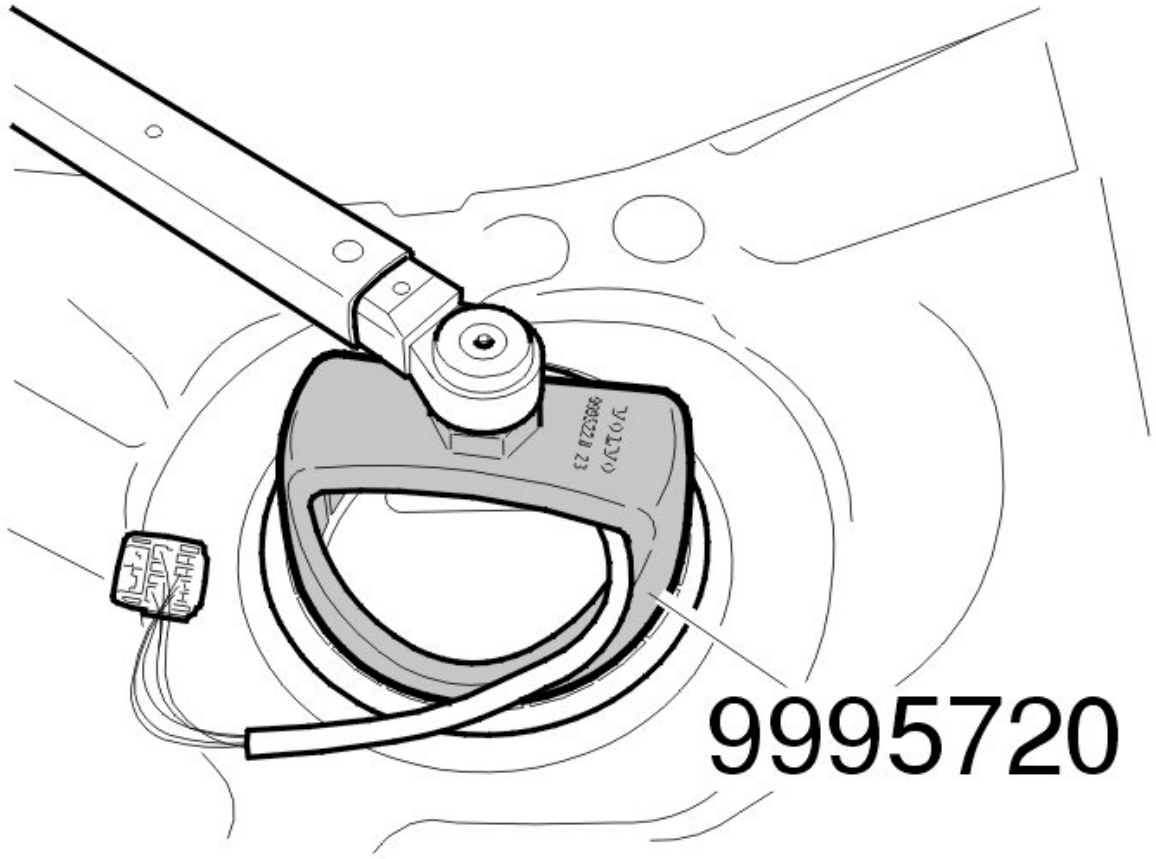


Remove:

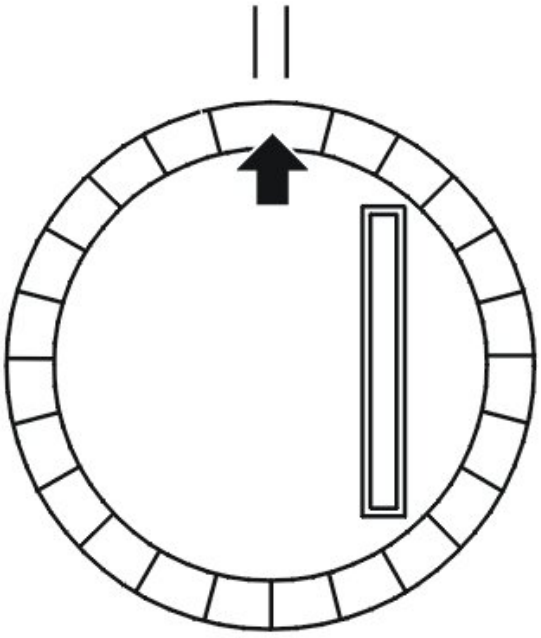
- the ejector
- the connectors.

Installation

Installing the left-hand level sensor



Install the left-hand level sensor on the ejector.
Install the connectors on the underside of the left-hand level sensor.
Install a new O-ring. Lubricate the new O-ring. Use petroleum jelly.
Press the left level sensor down so that the row of protruding cables runs along the vehicle.
Check that the O-ring is not trapped.
Install the screw. Use 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench. Tighten. See: Tightening torque See: Specifications/Mechanical Specifications/Starting and Charging.
Position the wiring in the cut-out in the rubber ring.
Wipe up any fuel spillage.



Note! Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the sensor. Tighten as above.

Install the cover over the fuel tank unit. Tighten the nuts.
Connect the cables and the connectors.
Reinstall the insulation panel and fold down the seat cushion.

Level Sensor, Fuel Tank/Fuel Pump, Replacement

Level sensor, fuel tank/fuel pump, replacement

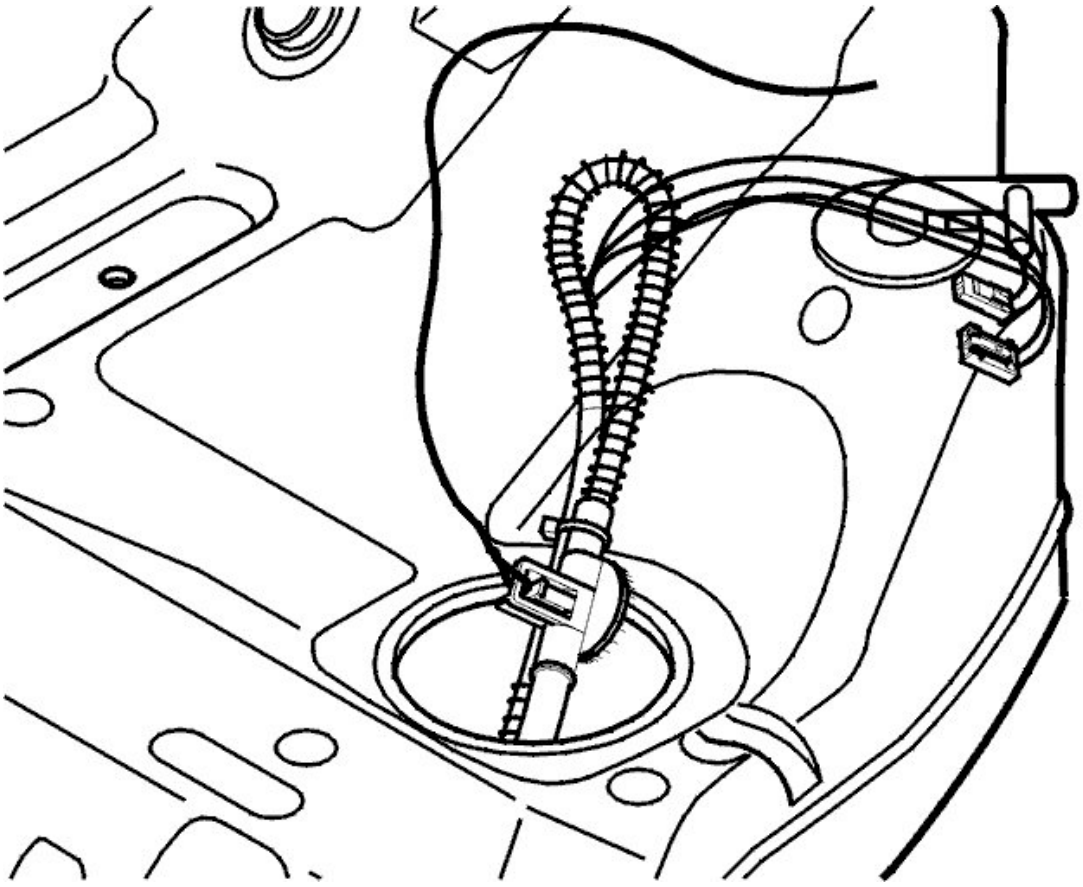
Removal

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Draining the fuel system and fuel tank

Drain:
- the fuel system. See Draining the fuel system See: Service and Repair.
- the fuel tank. See Draining the fuel tank See: Service and Repair.

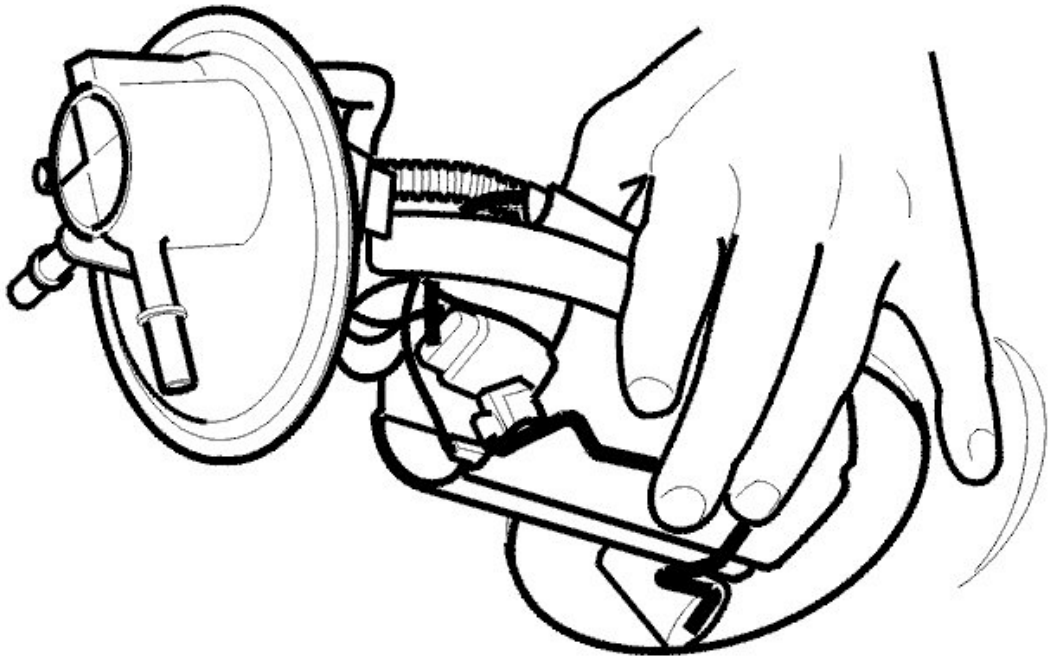
Removing the left-hand level sensor



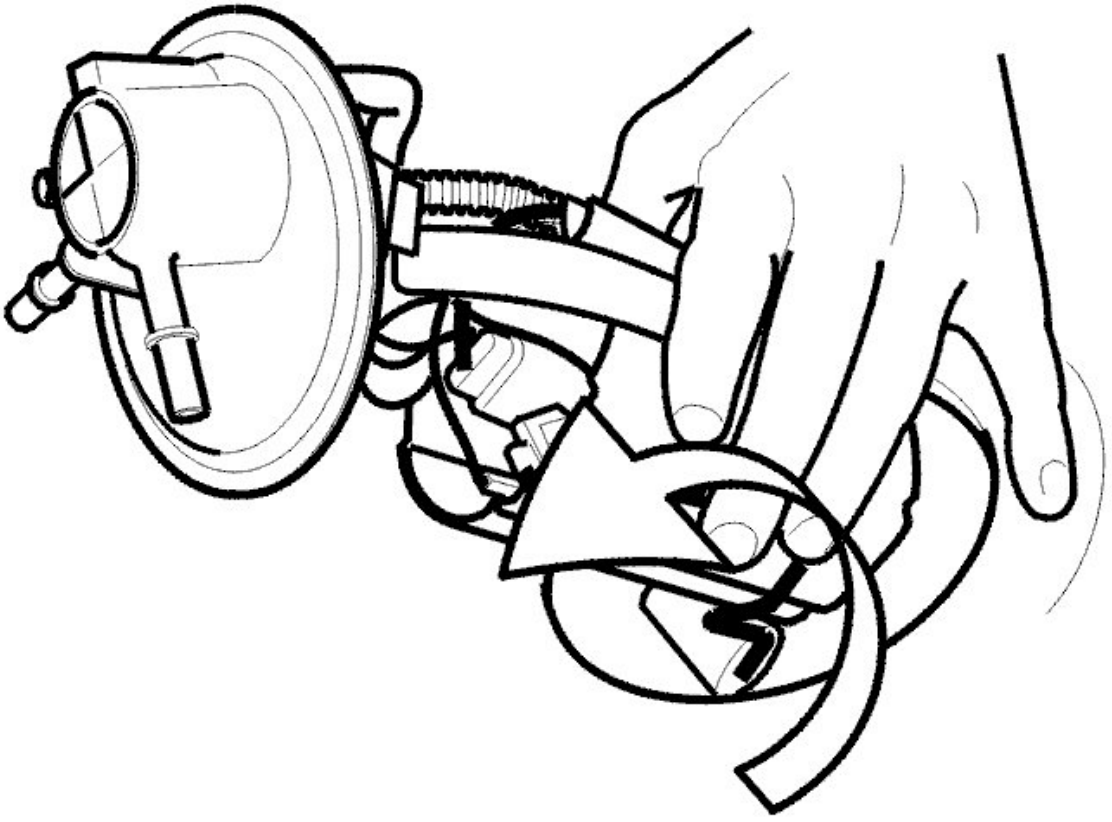
Remove:
- the two connectors from the underneath of the left-hand level sensor
- the left-hand level sensor from the ejector on which it is positioned.

Note! Secure a wire in the area of the ejector.The wire must be sufficiently long that it reaches over to the opposite side of the tank with some excess remaining to ensure that it does not slide into the tank. The wire is needed to pull the hoses and wiring back to the left-hand side of the tank after the fuel tank unit has been replaced.

Removing the right-hand level sensor / pump



- Grip the right-hand level sensor and pump holder and pinch the float so that it is held in its lowest position.



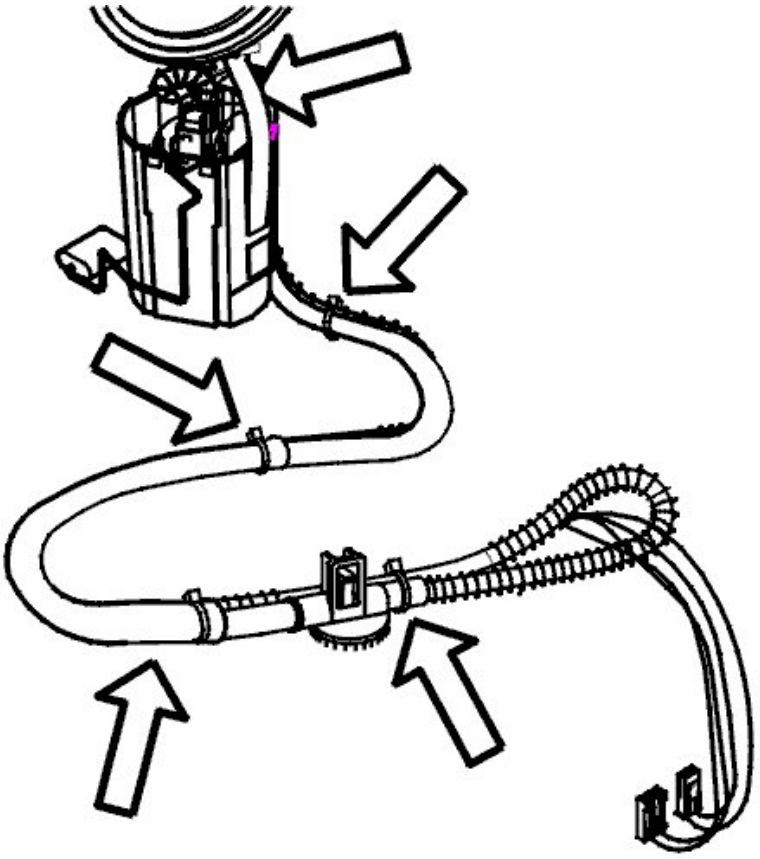
Note! Take care with the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.
Pull the hoses out from the tank without pulling up the entire wire from the right-hand hole in the tank.

Note! It is extremely important that the float arm is not broken or bent.

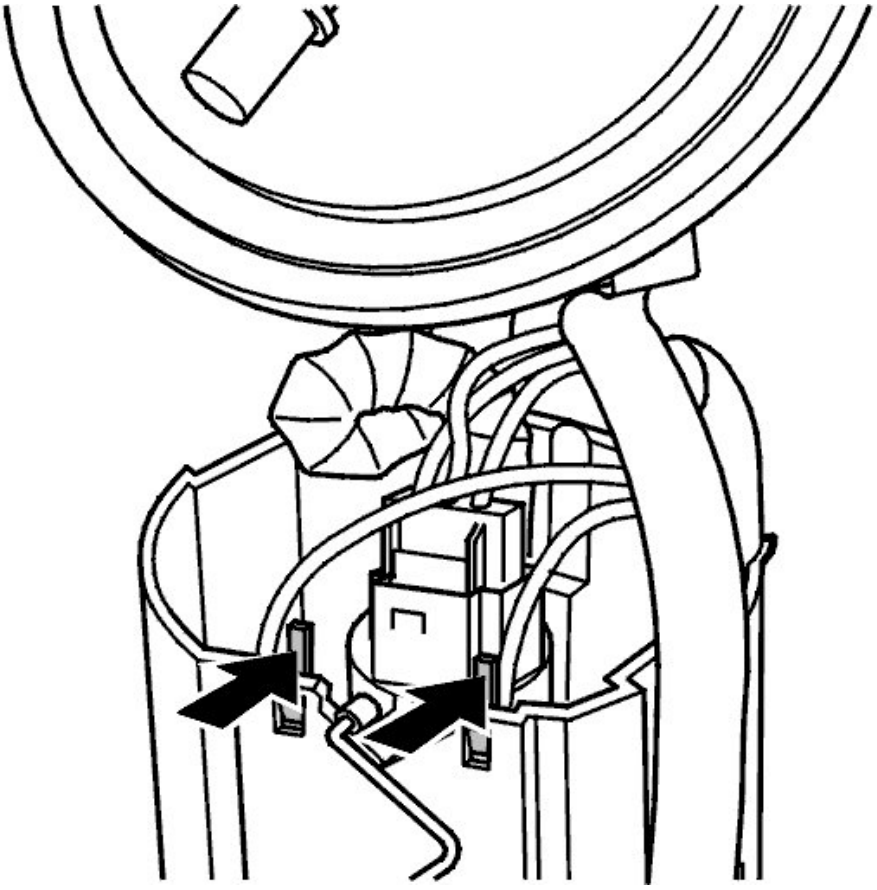
Remove the wire from the old level sensor and pump ejector.

Removing the right-hand level sensor



Remove:

- the tie straps around the protective sheath, hoses and wiring
- the net protective sheath by carefully threading it off the hoses and wiring
- the tie strap under the protective sheath.



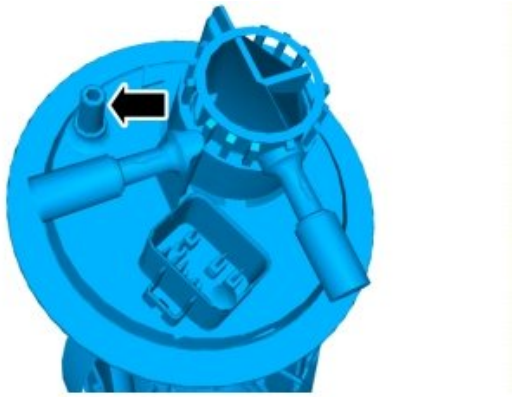
Remove:

- the tie strap around the wiring above the pump

- the level sensor by pressing in the two clips and pulling upwards
- the thin pipe from the holder on the outside of the fuel tank unit
- the wiring from the holder in the fuel tank unit.

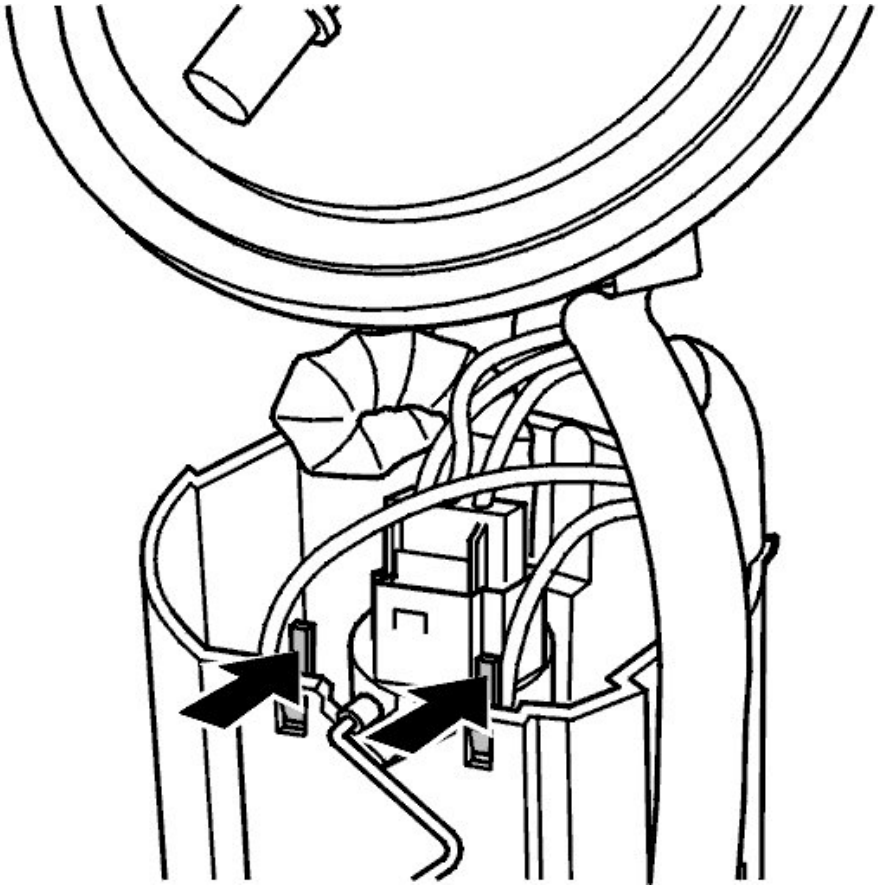
Installation

Only applies to vehicles with parking heaters



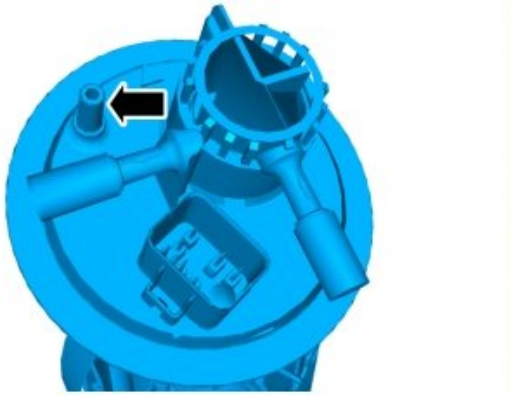
If the vehicle has an engine block heater, drill out the hole connection in the fuel tank unit. Use a -4 mm drill bit. Transfer the dip pipe.

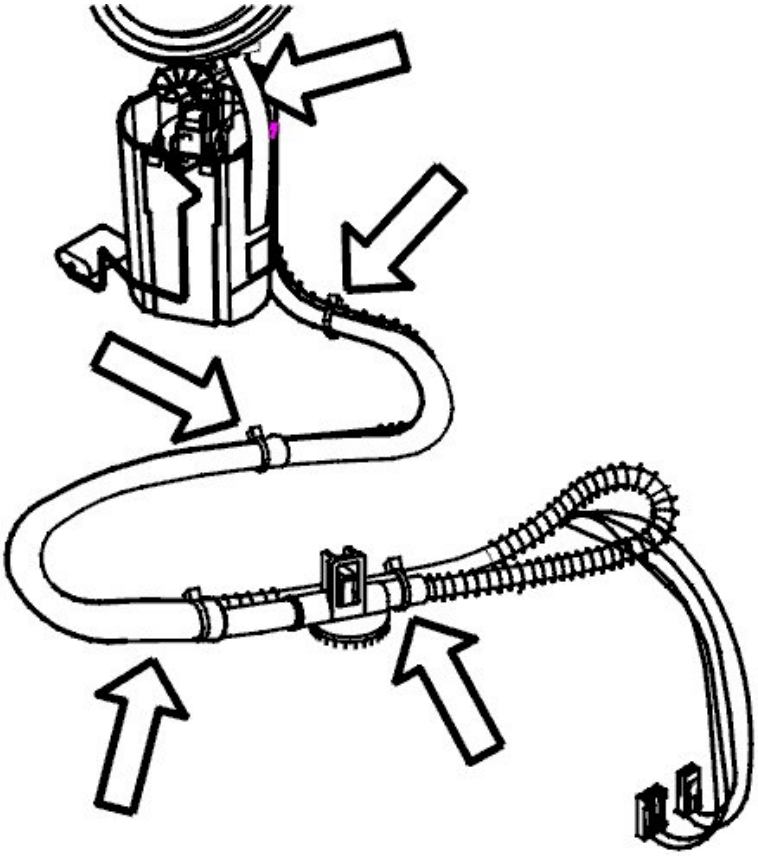
Installing the right-hand level sensor



Install:

- the new level sensor
- the wiring in the holder
- the thin pipe in the holder on the outside of the fuel tank unit
- the tie strap around the wiring above the pump.





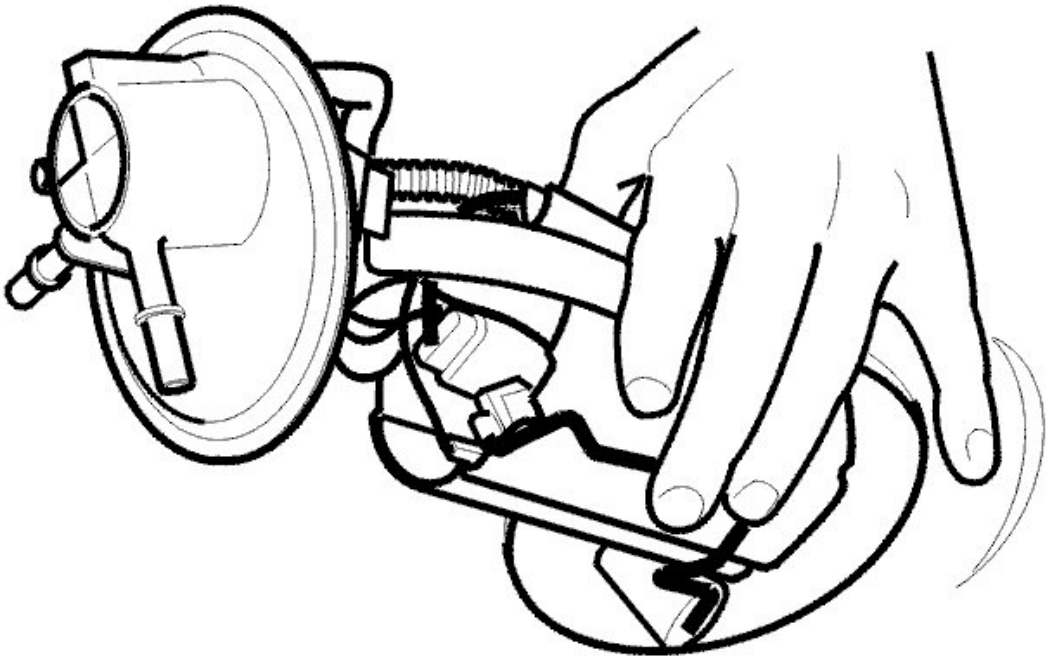
Install:

- the tie strap under the protective sheath

Note! Secure the tie strap on the smooth central section of the corrugated hose.

- the protective sheath
- four tie straps around the protective sheath, hoses and wiring. Secure the tie straps on the four smooth central sections of the corrugated hose.

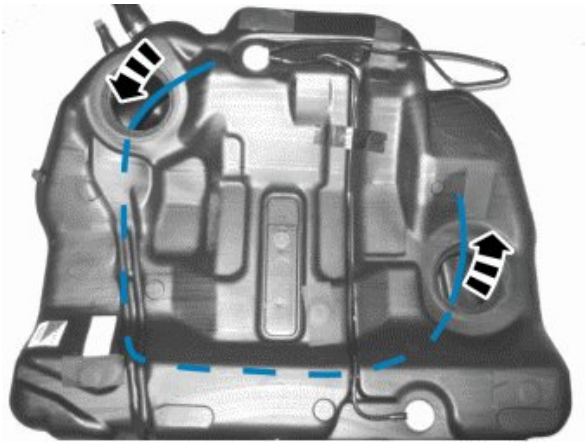
Installing the right-hand level sensor and pump and the left-hand level sensor in the fuel tank



If the fuel tank is replaced, see next step.

- Install the wire on the new ejector for the level sensor and pump
- Insert the hoses and wiring into the tank via the right-hand tank hole
- Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position
- Carefully and slowly lower the holder. Carefully work the holder into place
- Pull the wire so that the hoses and wiring end up on the left side of the tank
- Install the left-hand level sensor on the ejector
- Install the switches on the underneath of the left-hand level sensor
- Remove the wire from the ejector.

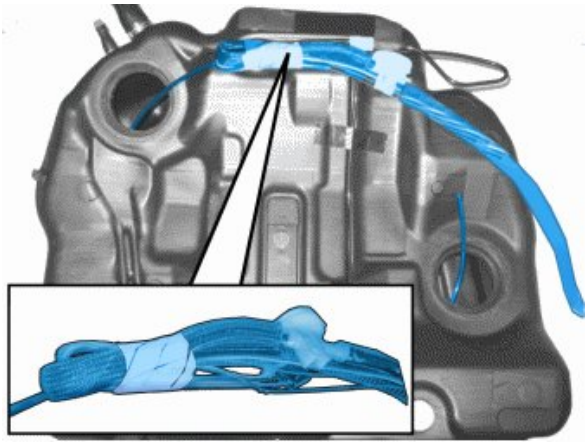
Cable routing when replacing the fuel tank



If replacing the fuel tank, wire cannot be used.
The image shows how to route the fuel lines and electrical wiring in the tank. Use a plastic pipe at least 1.7 m long.

Hint: Use spare part plastic pipe between the carbon filter and EVAP valve.

Insert the hose through the hole for the level sensor on the left-hand side of the vehicle and press it through the tank and take the end of the hose through the hole for the fuel pump.



Tape the fuel pump's fuel lines/electrical wiring to the plastic pipe.
Pull the wiring out of the hole for the level sensor. Remove the plastic pipe and the tape. Check that there is no tape/adhesive residue on the wiring.
Pull the wiring forwards and backwards to check that it has not bent or got trapped.

Finishing

- Install the sensor, backrest, side cushion and seat cushion. See Draining the fuel tank See: Service and Repair.

Level Sensor, Replacing

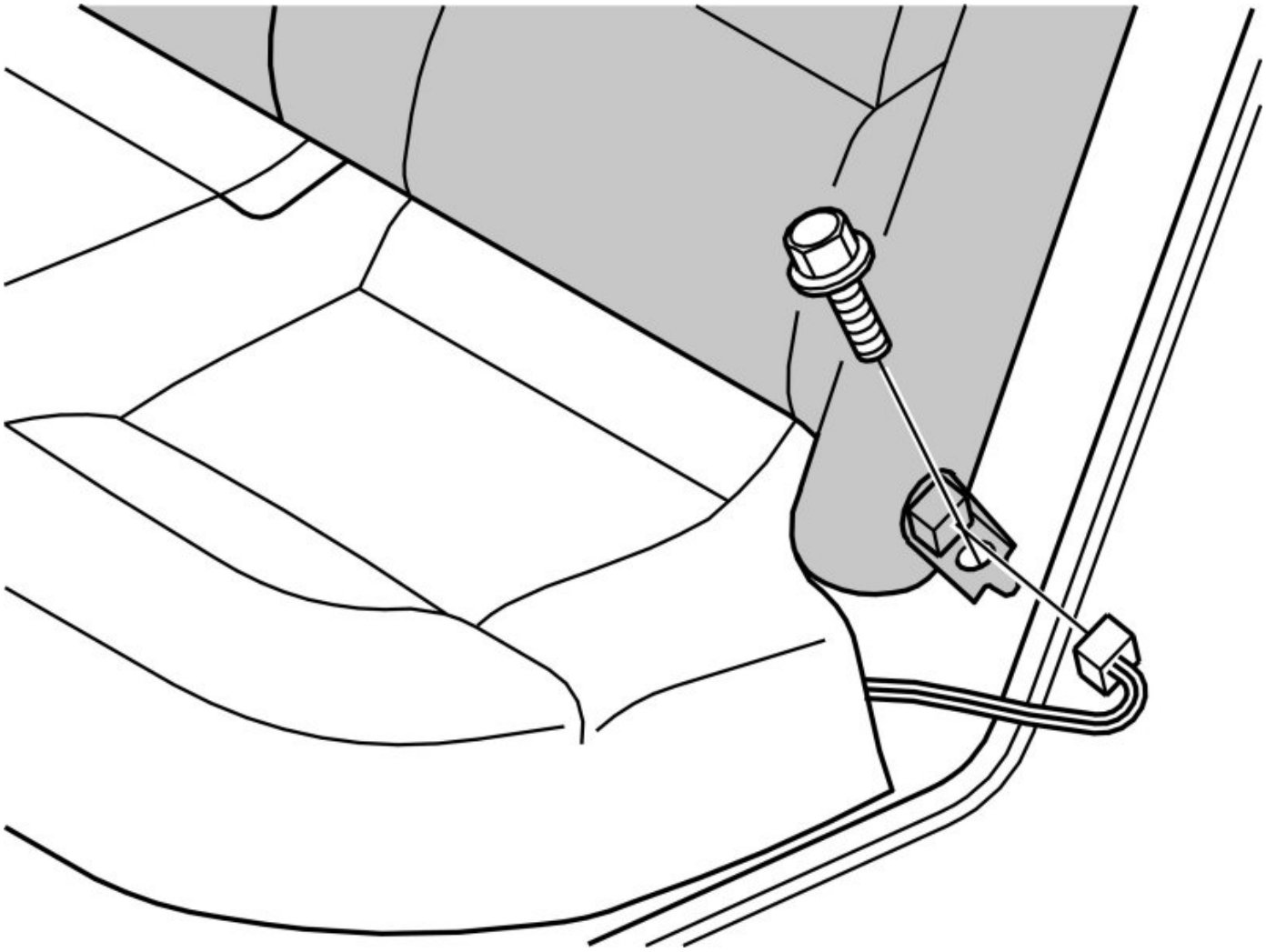
Level sensor, replacing

Special tools:

999 5720 Wrench See: Tools and Equipment/999 5720 Wrench

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Preparation



Drain the tank. See Fuel tank, draining See: Service and Repair.
Applies to V70:

Lift up the right-hand seat cushion.
Remove the right side cushion. See Side cushion See: Body and Frame/Seats/Service and Repair/Removal and Replacement/Rear Seat/Side Cushion.
Applies to the S60:

Remove:
- the seat cushion. See Upholstery, seat cushion, replacing See: Body and Frame/Seats/Seat Cover/Service and Repair/Rear Seat, Passenger Seat/Upholstery, Seat Cushion, Replacing
- the right-hand side cushion. See Side cushion See: Body and Frame/Seats/Service and Repair/Removal and Replacement/Rear Seat/Side Cushion.

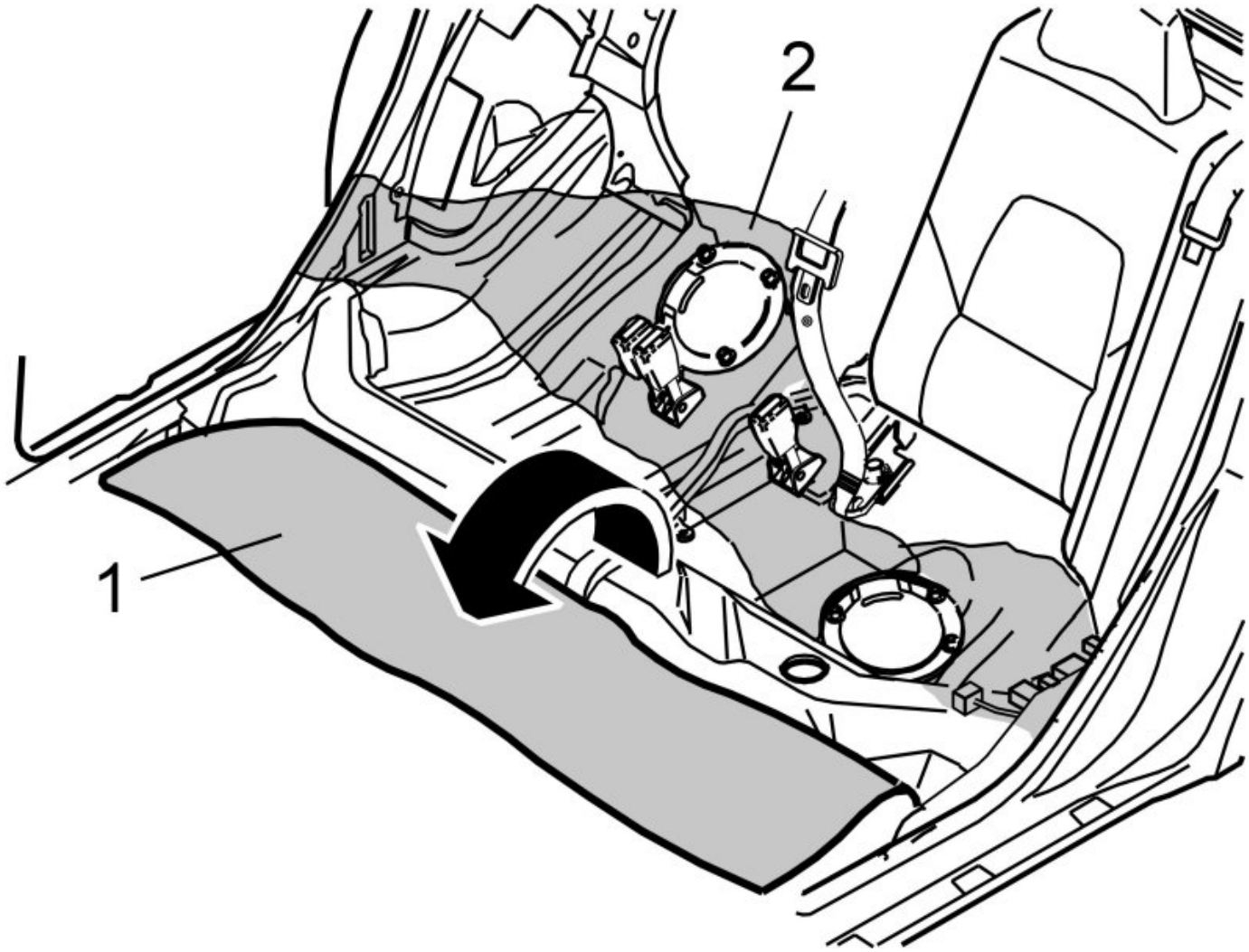
Applies to all models:

Disconnect the connector at the hinge.

Remove:
- the mounting screw for the hinge
- the screw for the hinge end mounting.

Release the strap/straps of the folding mechanism for the seat belt buckle. (Hooked into place on the lower edge of the backrest).
Lift out the backrest.

Removing the cover for the level sensor/fuel pump (FP)

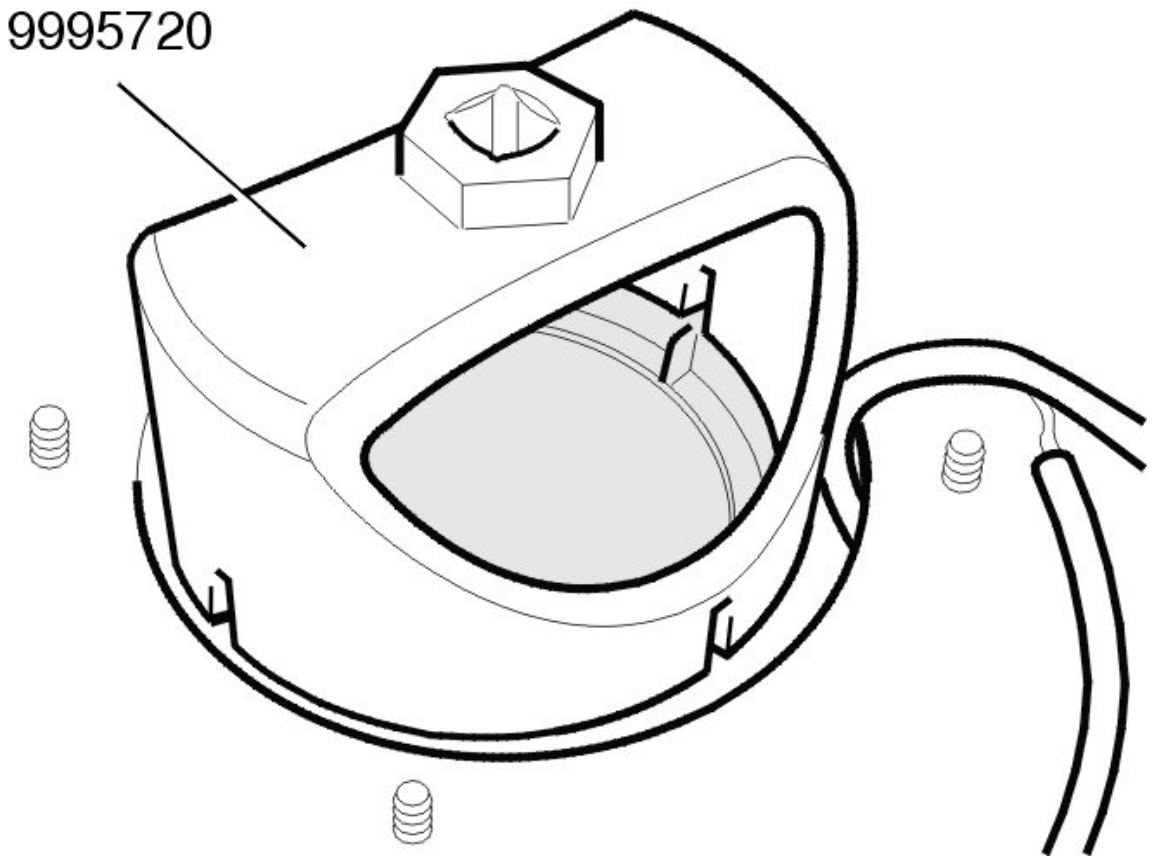


Push the carpet to one side.

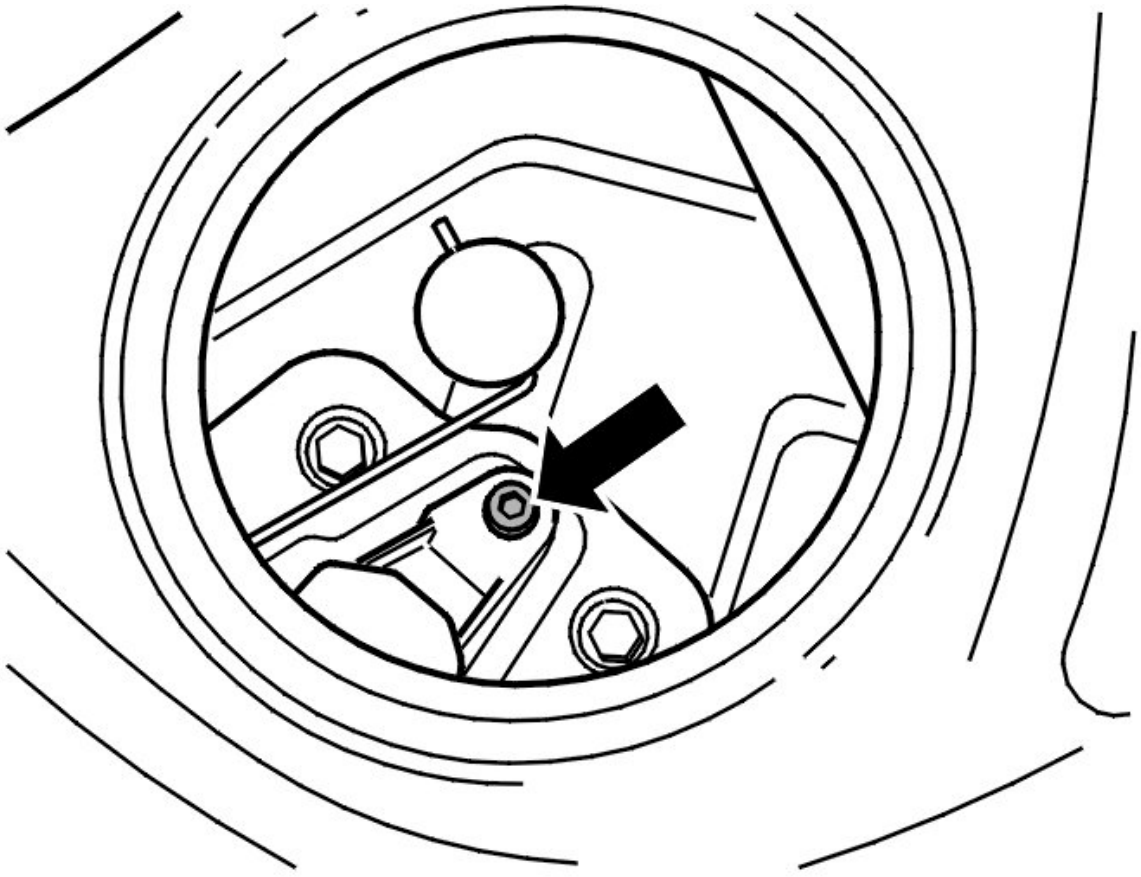
Remove:

- the insulation panel
- the cover (2).

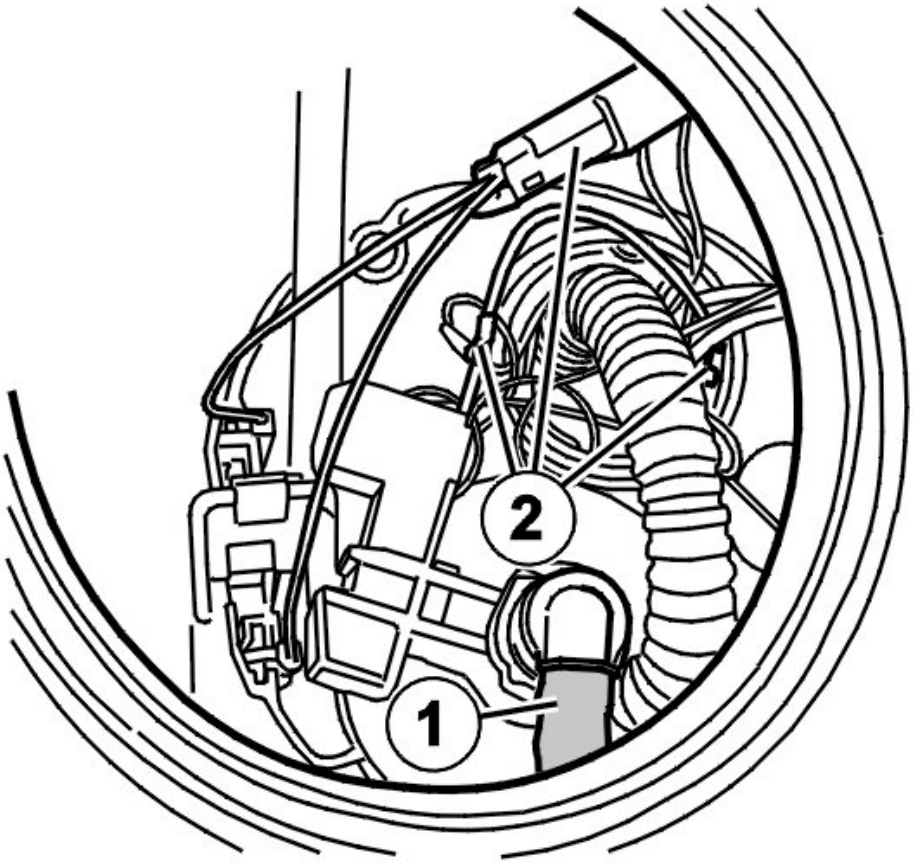
Removing the fuel pump (FP)



Remove the cover. Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.



Remove the screw (1).



Carefully turn the pump in order to access the fuel hose (1).

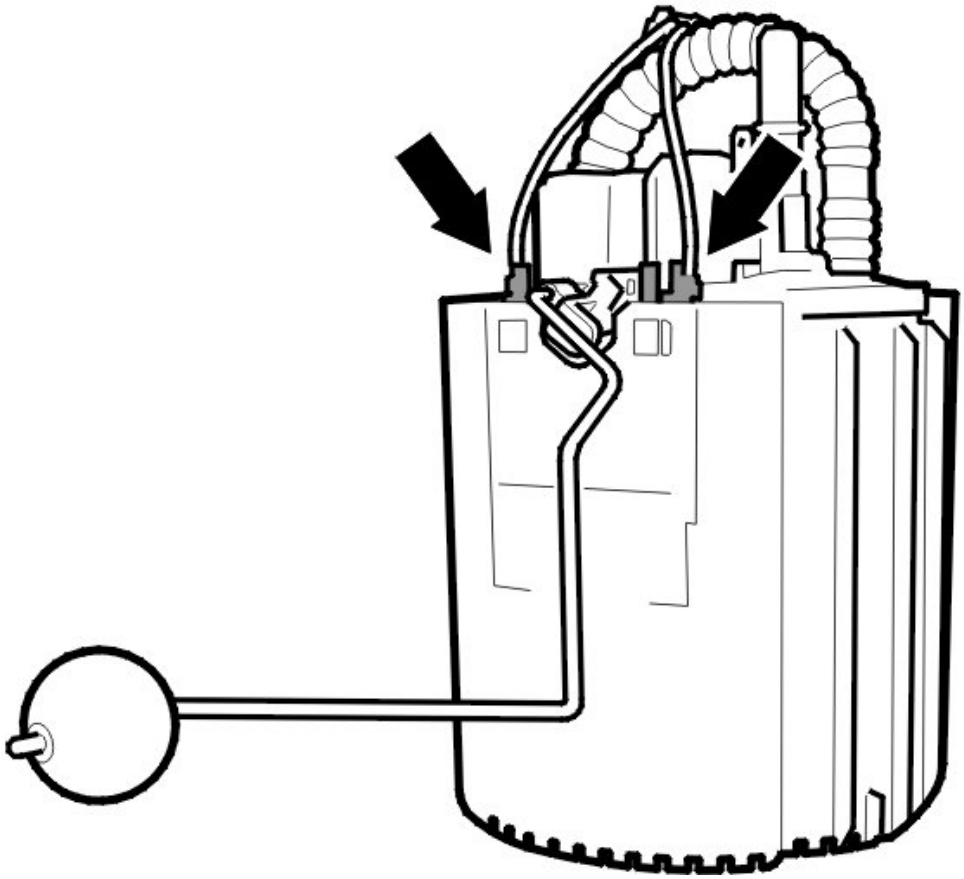
Remove:

- the hose (1)
- the three connectors (2).

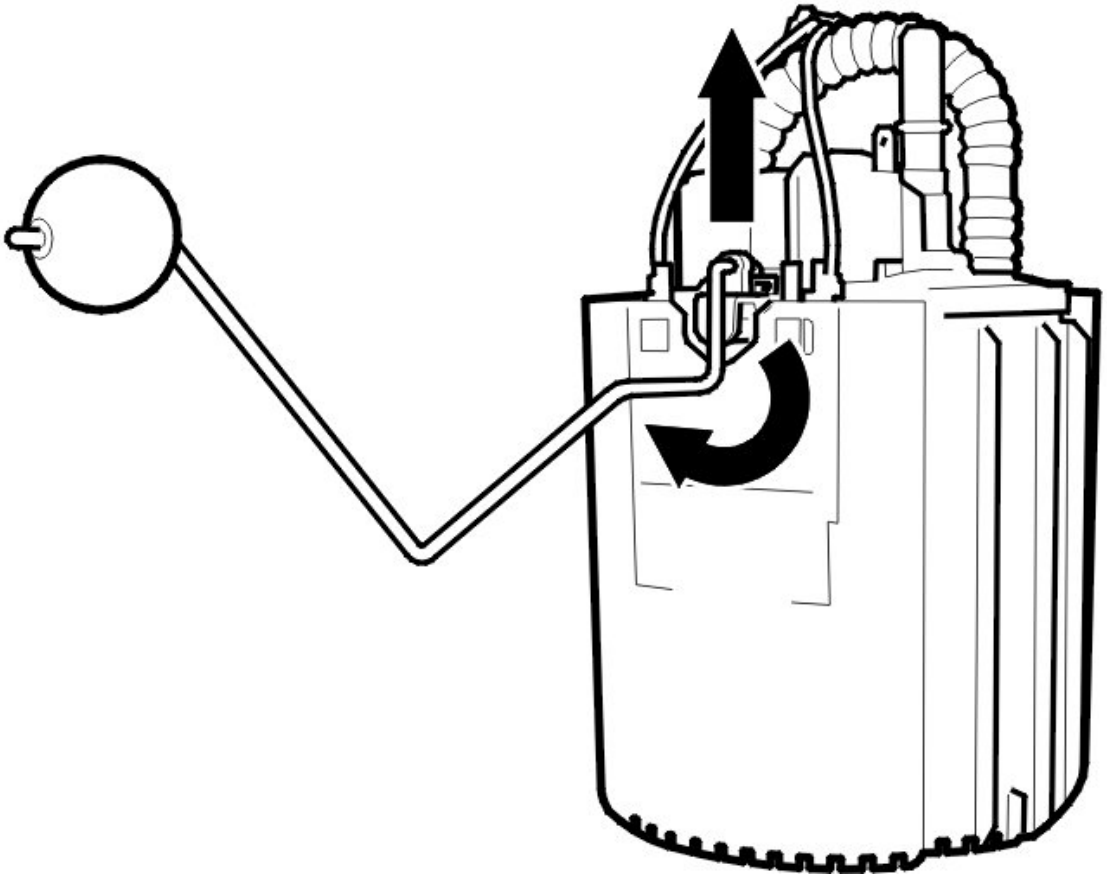
Carefully lift up the pump.

Note! Ensure that the level sensor arm is not obstructed. Do not bend the arm when removing the pump.

Removing the level sensor



Carefully press in both retaining clips and lift the level sensor approx. 5 mm. Lift up the float to the centre position and remove the level sensor.



Lift up the float arm to the centre position and remove the level sensor.

Installing the level sensor

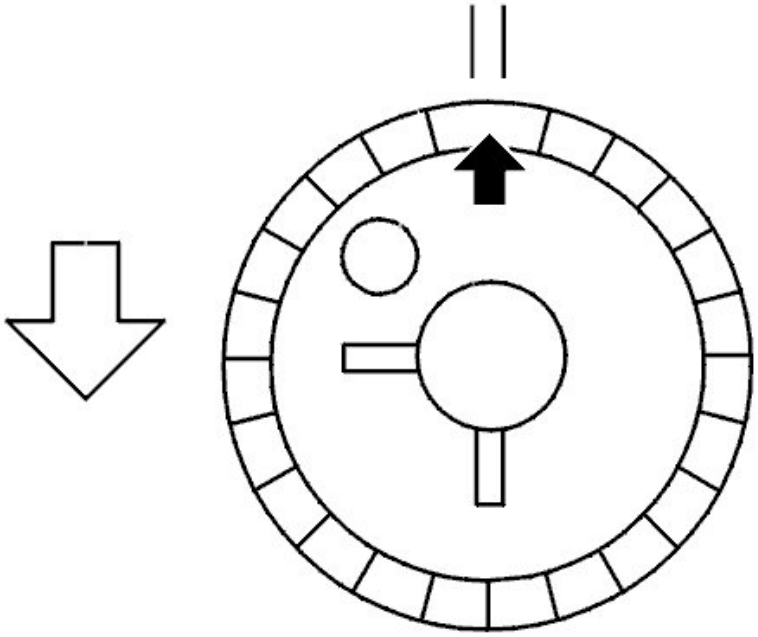
Hold the float arm in the centre position and press the level sensor into position.

Installing the fuel pump (FP)

Lower the pump into the tank.

Install:
- the fuel hose
- the three connectors.

Turn the pump to the installation position. Install the mounting bracket and screw. (M6)
Install the cover.
Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.
For tightening torques, see Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.



Note! Check that the arrow on the cap ends up between the markings on the tank. If the arrow ends up outside the markings it will result in the tank gauge indicating the wrong value and the float may jam against the tank's inner wall.

Installing the cover for the level sensor/fuel pump (FP)

Install:
- the cover
- the insulation panel.

Reinstall the carpet.

Finishing

Install:
- the backrest
- the screw for the hinge mounting (M10)
- the connector for the hinge
- the end mounting for the seat belt.

For tightening torques, see Tightening torque See: Body and Frame/Specifications.
Install the side cushion.
(V70) Fold the seat cushion forward.
(S80, S60) Install the seat cushion.

Replacing the Fuel Pump / Level Sensor For the Right-Hand Fuel Tank

Replacing the fuel pump / level sensor for the right-hand fuel tank

Special tools:

999 5720 Wrench See: Tools and Equipment/999 5720 Wrench

Removal

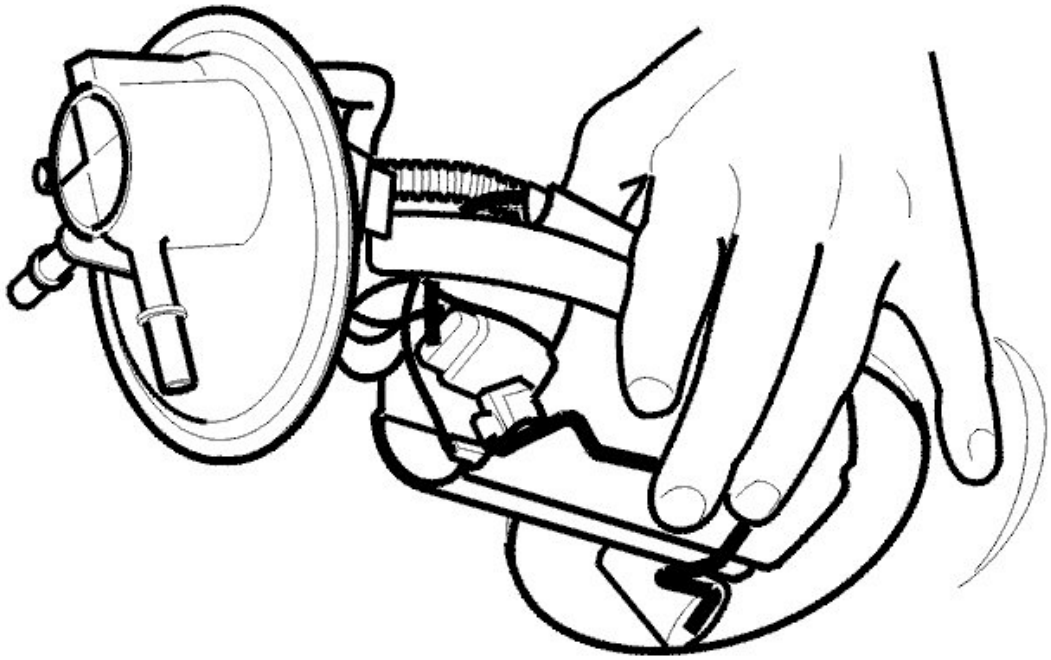
Removing the rear seat

Remove:
- the backrest. See Backrest See: Body and Frame/Seats/Seat Back/Service and Repair/Backrest.

Draining the fuel system and fuel tank

Drain:
- the fuel system. See the relevant service procedure.

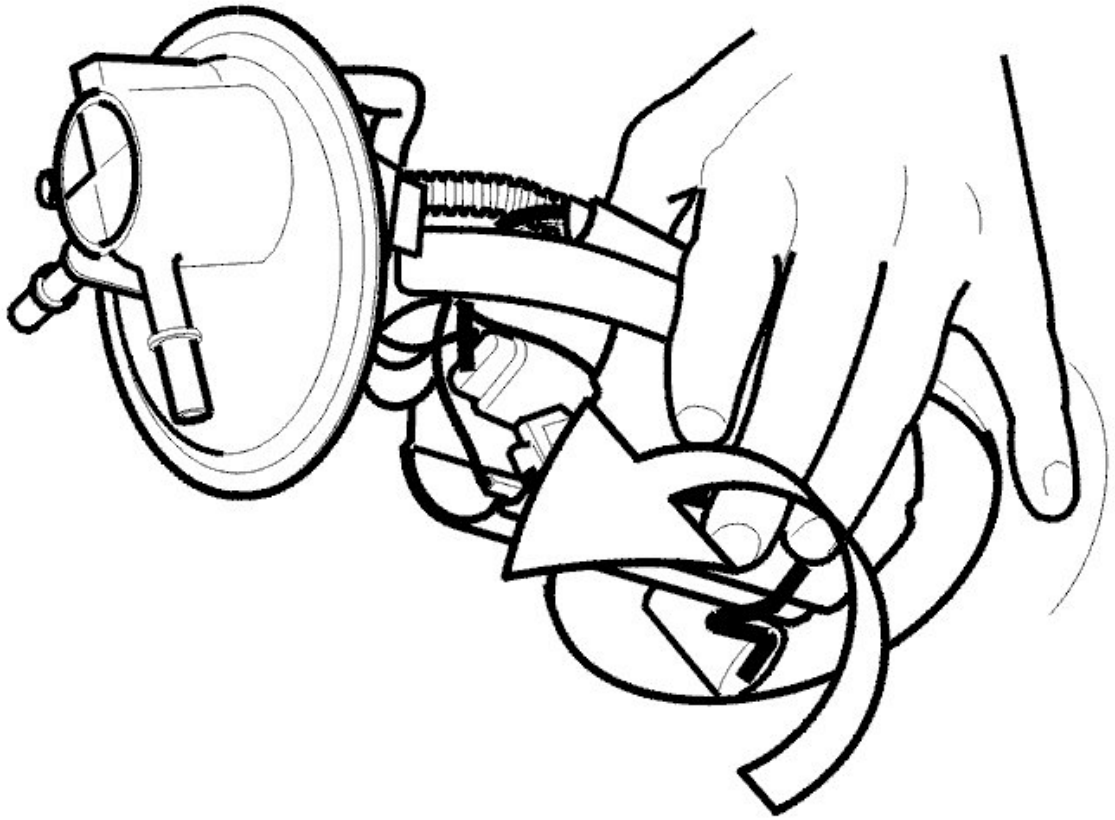
Removing the level sensor / pump



Note! Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench to remove the snap ring for the level sensor / pump.

Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position.

Removing the level sensor / pump, continued



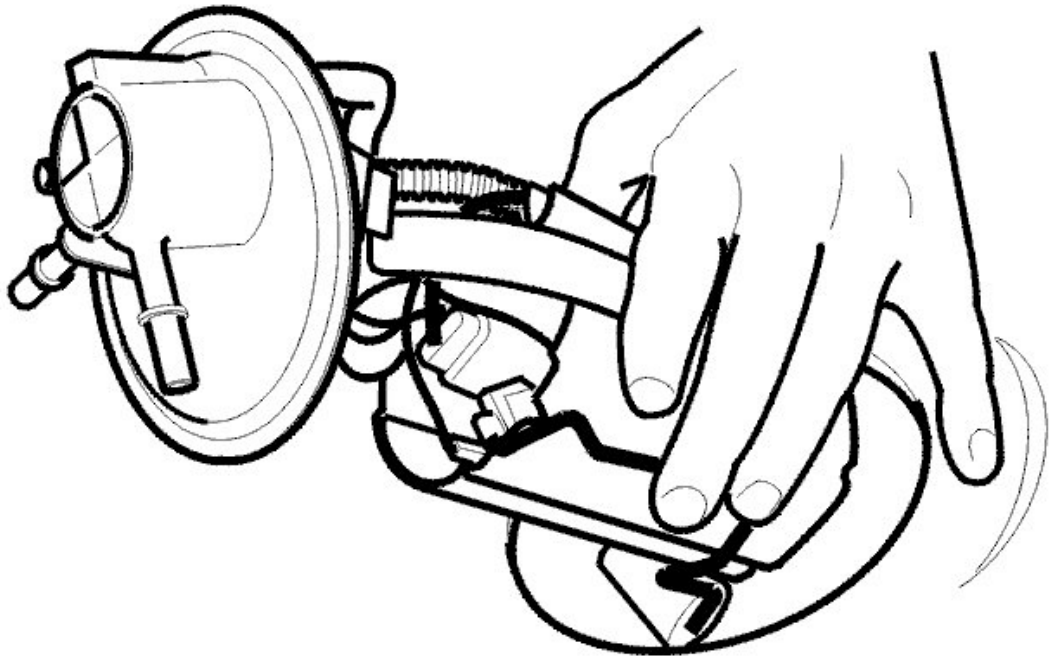
Caution! Take care with the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.

Caution! It is extremely important that the float arm is not broken or bent.

Installation

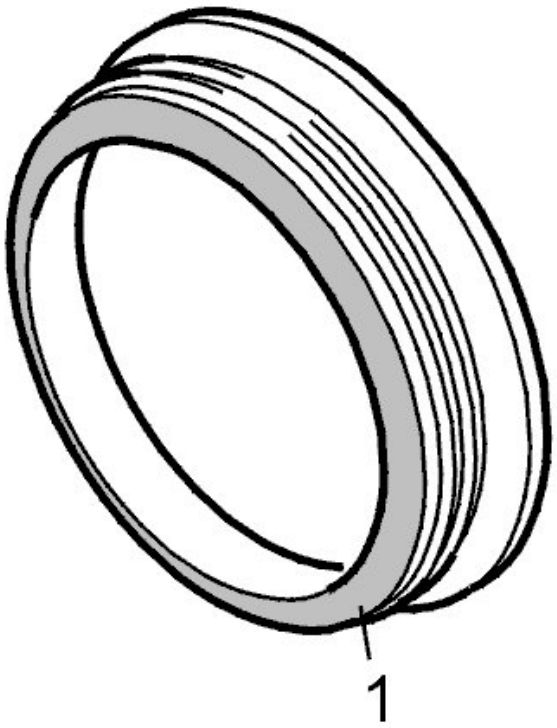
Installing the level sensor / pump



Note! Use special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench to tighten the snap ring for the level sensors.

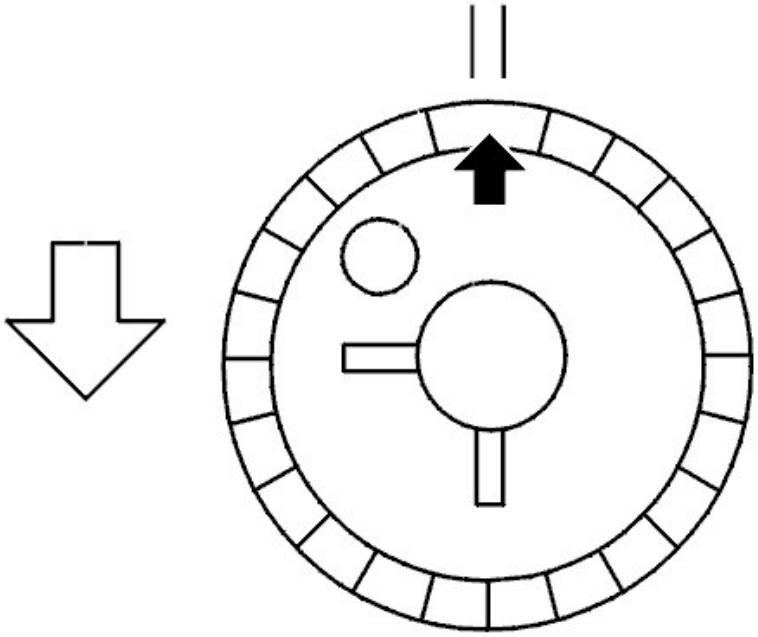
Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position.
Carefully and slowly lower the holder. Carefully work the holder into place.

Lubricating the screw, level sensor and pump



Thoroughly clean and dry the O-ring mating surfaces.
Install a **new** O-ring.
Use petroleum jelly to lubricate the screw mating surface with the fuel tank unit. This is so that the screw does not turn the fuel tank unit when it is tightened.
Press down the right fuel sensor and pump so that the fuel line is pointing forward and to the right. **Ensure that the arrow on the cover is between the markings on the tank**.
Check that the O-ring does not deform.
Tighten the screw. Tighten to **60 Nm**.

Note! Check that the arrow on the cover is between the markings on the tank. If the arrow is outside the markings the fuel gauge sensor will give an incorrect value and the float may catch against the inner wall of the tank. If not: Slacken off the screw and adjust the position of the fuel tank unit. Tighten as above.



Finishing

Wipe up any fuel spillage.
Position the wiring in the cut-out in the rubber ring.
Connect the connectors.
Install the cover over the left-hand level sensor and right-hand level sensor and pump. Tighten the nuts.
Install the rear seat backrest. See Backrest See: Body and Frame/Seats/Seat Back/Service and Repair/Backrest.

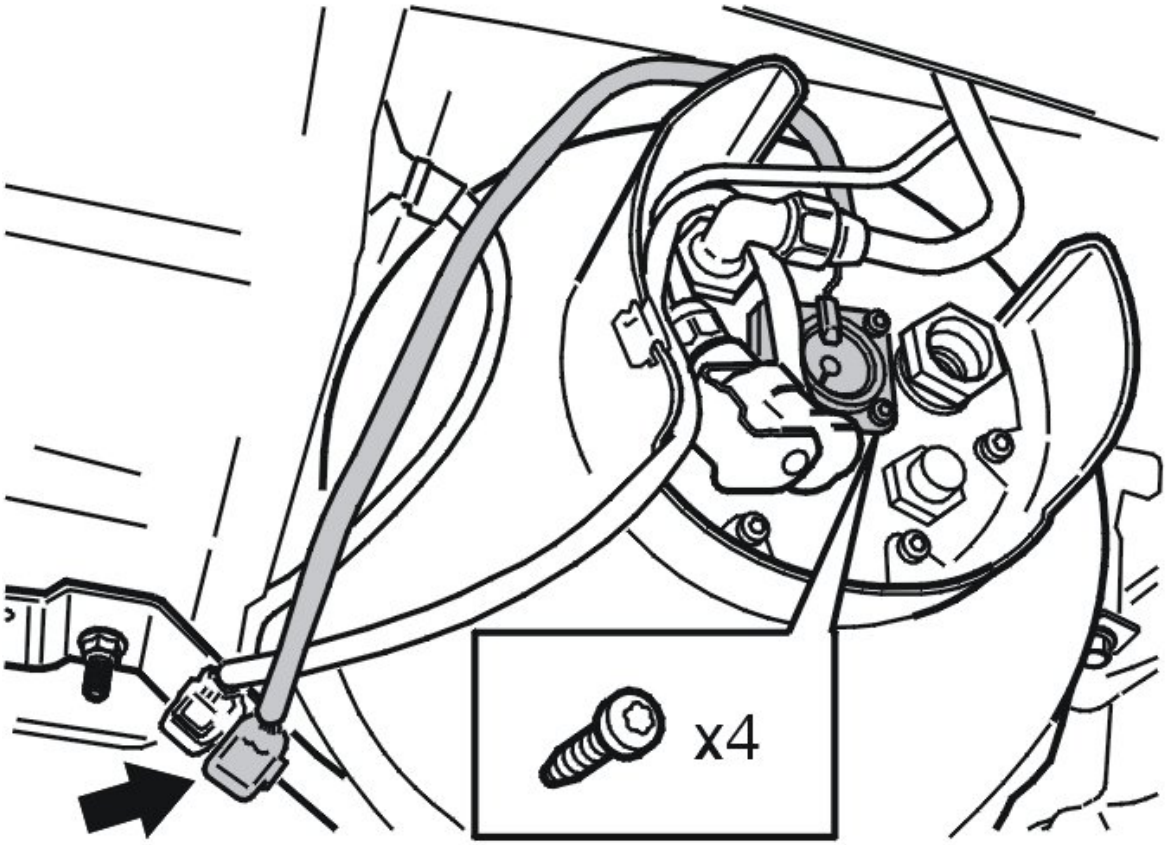
Replacing the Level Sensor For the Gas Tank

Replacing the level sensor for the gas tank

Caution! When replacing the level sensor the tank must be removed from the car. The tank must be placed upright so that the float is not damaged.

Caution! When replacing components on the tank, the gas pipes and the tank must be drained. The battery negative terminal must be disconnected during all work carried out on gas installations. See Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.Do not damage the seals.

Removing level sensor assembly



Note! Always clean around any connections that will be disconnected. This is to prevent contaminants from entering the system.

Remove:

- the guard for the gas tank
- the connector
- the four screws

Note! There may be residual pressure in the tank. Slacken off the screws one revolution and release using a screwdriver and allow the gas to hiss out.

Warning! Take care when working with highly pressurized gas. There is a risk of explosion and cold damage. Carry out any work outdoors or in a workshop with extraction fans.

the level sensor assembly.

Installing the level sensor assembly

Caution! Before installation, check that the pipe ends and connections are undamaged.

Install:

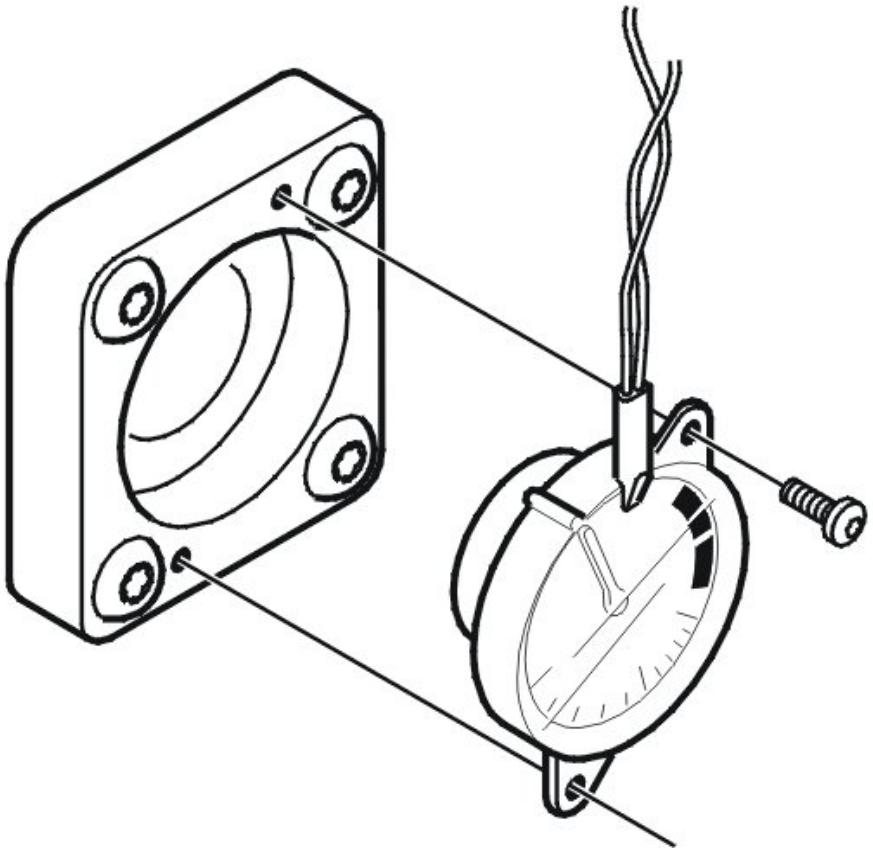
- level sensor, assembly with new gasket
- four screws. Tighten to **6 Nm**
- the connector. Check for leakage.
- the guard for the gas tank.

Connect the connector in the cargo compartment.

Replacing the electronic level sensor

Hint: The gas tank does not need to be emptied when replacing the analog level sensor.

Removing analog level sensors



Remove:

- the guard for the gas tank
- the connector
- the two screws
- slacken off the level sensor and turn the pipe first **180°** clockwise and then **180°** counter-clockwise. Rotate the level sensor to the correct position with a magnet
- the cable.

Installing analog level sensors

Install:

- the cable
- the level sensor. Rotate the level sensor to the correct position with a magnet
- the two screws
- the connector
- the guard for the gas tank.

Replacing the Right-Hand Level Sensor and Pump

Replacing the right-hand level sensor and pump

Removal

Note! Since the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

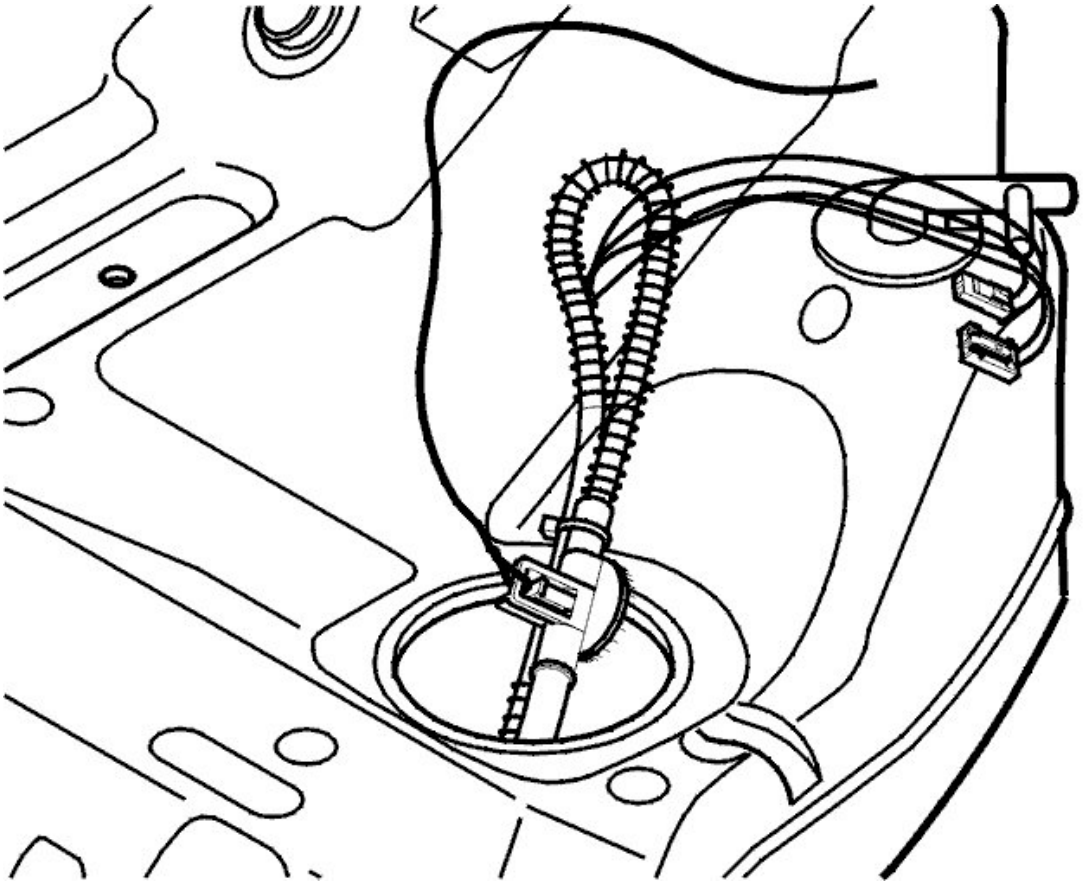
Depressurizing the fuel system

Depressurize the fuel system according to, Fuel system pressure release See: Fuel Filter/Fuel Pressure Release/Service and Repair

Draining fuel tank

Drain the fuel tank according to, Draining the fuel tank See: Service and Repair

Removing the left-hand level sensor

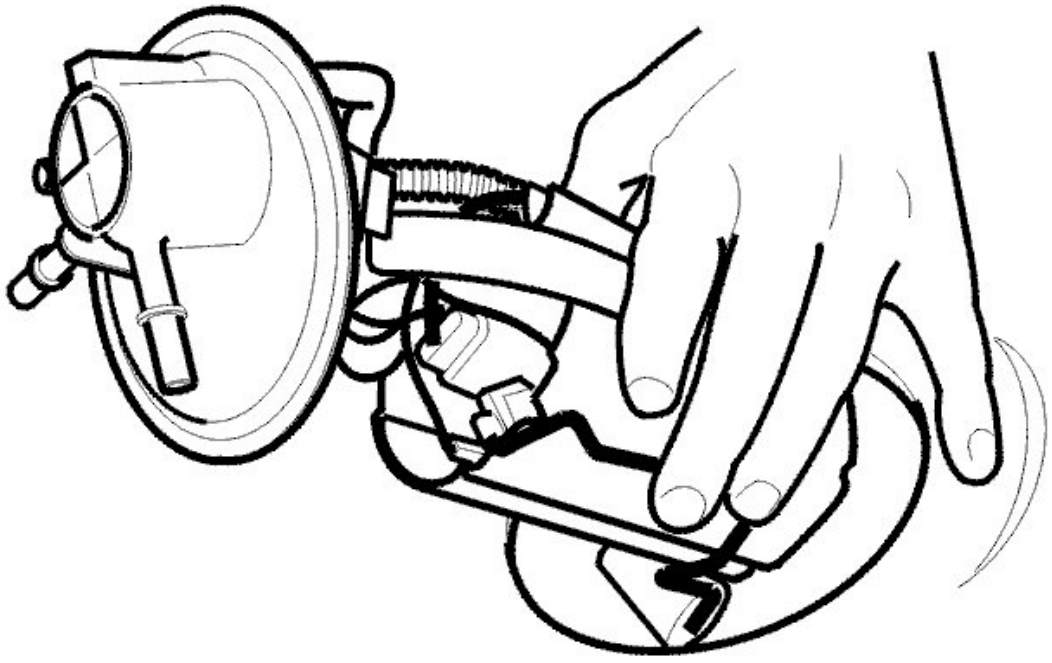


Disconnect:

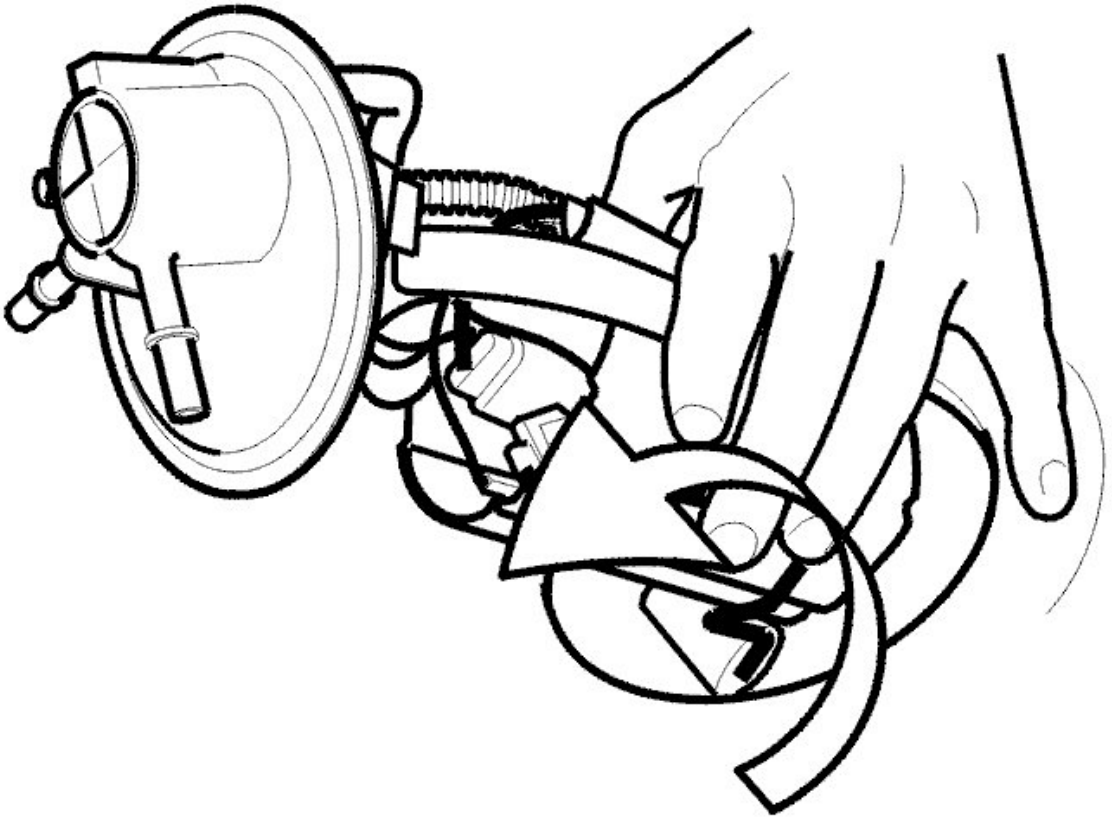
- the two connectors from the underneath of the left-hand level sensor
- the left-hand level sensor from the ejector on which it is positioned.

Note! Fasten a wire in the area of the ejector.The wire must be long enough that it reaches over to the opposite side of the tank with some excess remaining to ensure that it does not slide into the tank. The wire is needed to pull the hoses and wiring back to the left side of the tank after the fuel tank unit has been replaced.

Removing the right-hand level sensor / pump



- Grip the right-hand level sensor and pump holder and pinch the float so that it is held in its lowest position.



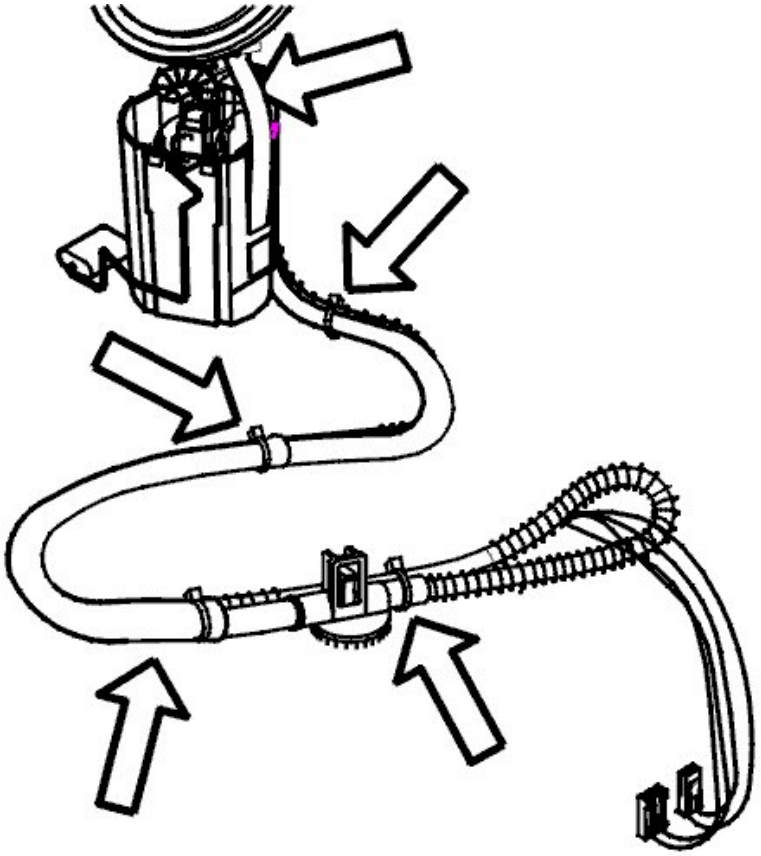
Note! Watch out for the fuel tank.

Carefully and slowly pull up the holder. Carefully work the holder out.
Pull the hoses out from the tank without pulling up the entire wire from the right-hand hole in the tank.

Note! It is extremely important that the float arm is not broken or bent.

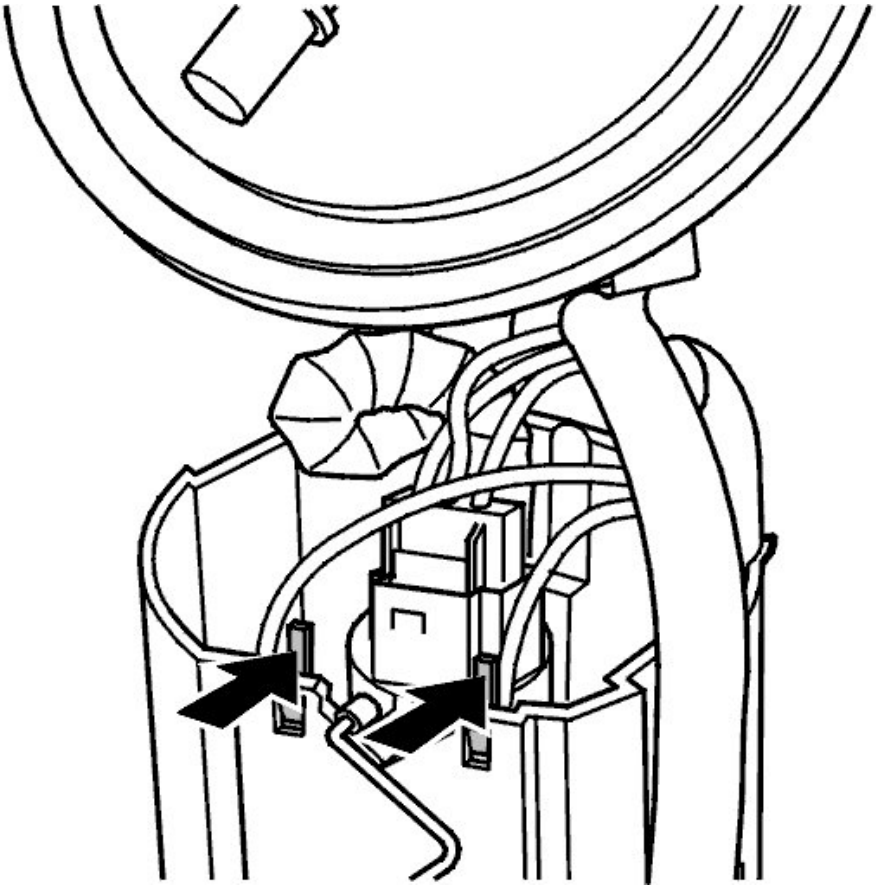
Remove the wire from the old level sensor and pump ejector.

Removing the right-hand level sensor



Remove:

- the tie straps around the protective sheath, hoses and wiring
- the net protective sheath by carefully threading it off the hoses and wiring
- the tie strap under the protective sheath.



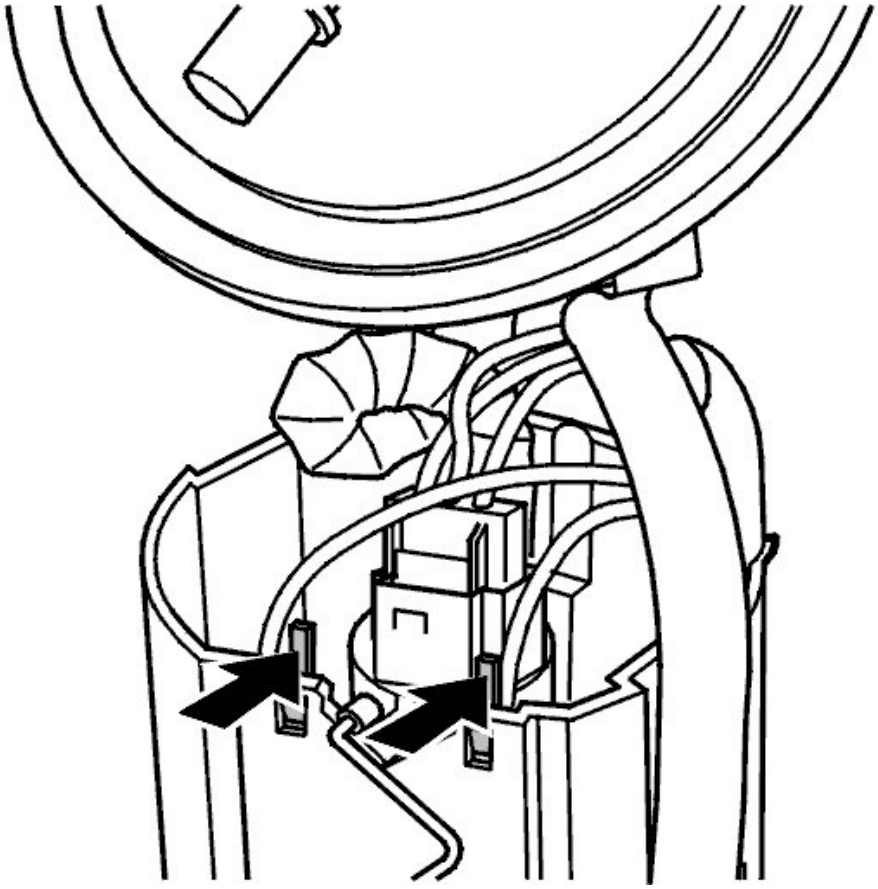
Remove:

- the tie strap around the wiring above the pump
- the level sensor by pressing in the two clips and pulling upwards
- the thin pipe from the holder on the outside of the fuel tank unit
- the wiring from the holder in the fuel tank unit.

Installation

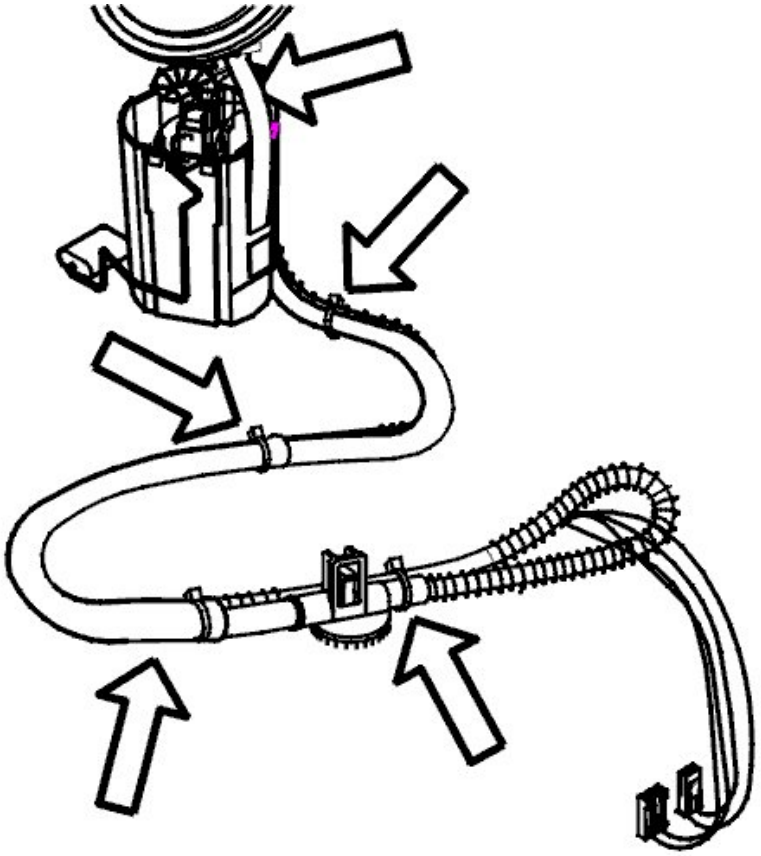
Installing the right-hand level sensor

If the vehicle has an engine block heater, drill out the hole connection in the fuel tank unit. Use a -4 mm drill bit. Transfer the dip pipe.



Install:

- the new level sensor
- the wiring in the holder
- the thin pipe in the holder on the outside of the fuel tank unit
- the tie strap around the wiring above the pump.



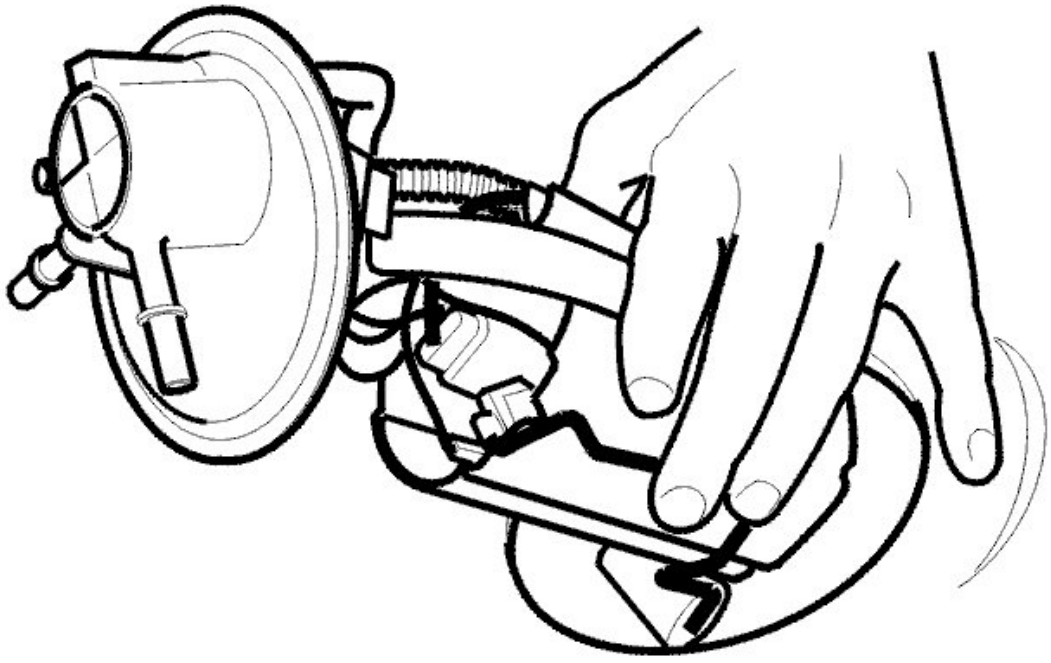
Install:

- the tie strap under the protective sheath

Note! Fasten the cable tie on the smooth central section of the corrugated hose.

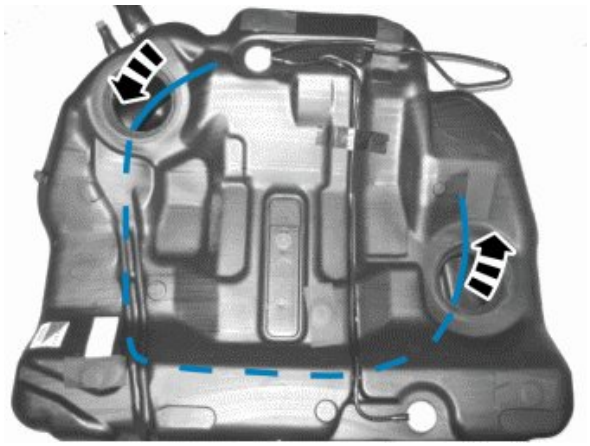
- the protective sheath
- four tie straps around the protective sheath, hoses and wiring. Secure the tie straps on the four smooth central sections of the corrugated hose.

Installing the right-hand level sensor and pump and the left-hand level sensor in the fuel tank



If the fuel tank is replaced, see next step.
- Install the wire on the new ejector for the level sensor and pump
- Insert the hoses and wiring into the tank via the right-hand tank hole
- Grip the right-hand level sensor and pump holder and pinch it so that the float is held in its lowest position
- Carefully and slowly lower the holder. Carefully work the holder into place
- Pull the wire so that the hoses and wiring end up on the left side of the tank
- Install the left-hand level sensor on the ejector
- Install the switches on the underneath of the left-hand level sensor
- Remove the wire from the ejector.

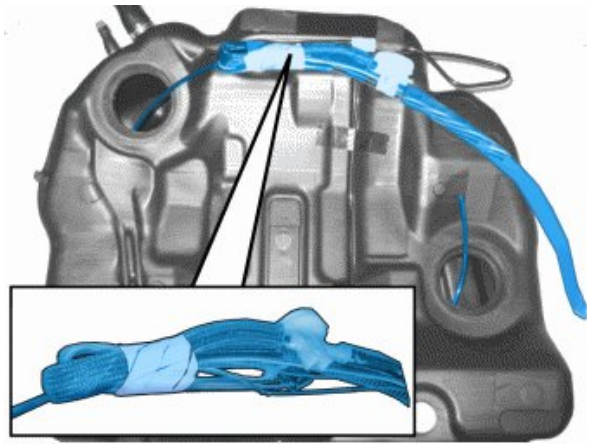
Cable routing when replacing the fuel tank



If replacing the fuel tank, wire cannot be used.
The image shows how to route the fuel lines and electrical wiring in the tank. Use a plastic pipe at least 1.7 m long.

Hint: Use spare part plastic pipe between the carbon filter and EVAP valve.

Insert the hose through the hole for the level sensor on the left-hand side of the vehicle and press it through the tank and take the end of the hose through the hole for the fuel pump.



Tape the fuel pump's fuel lines/electrical wiring to the plastic pipe.
Pull the wiring out of the hole for the level sensor. Remove the plastic pipe and the tape. Check that there is no tape/adhesive residue on the wiring.
Pull the wiring forwards and backwards to check that it has not bent or got trapped.

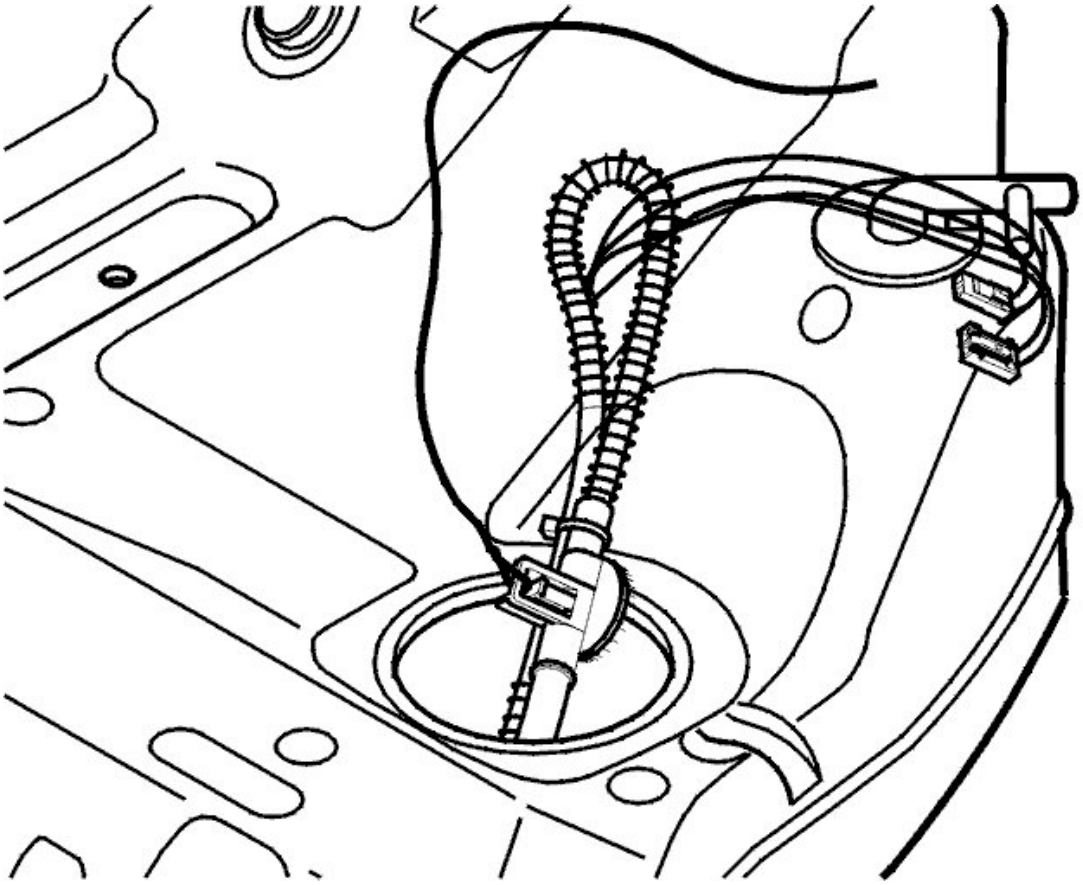
Finishing
- Install the sensor, backrest, side cushion and seat cushion. See Draining the fuel tank See: Service and Repair.

Right Side Fuel Pump With Level Sensor

Right side fuel pump with level sensor

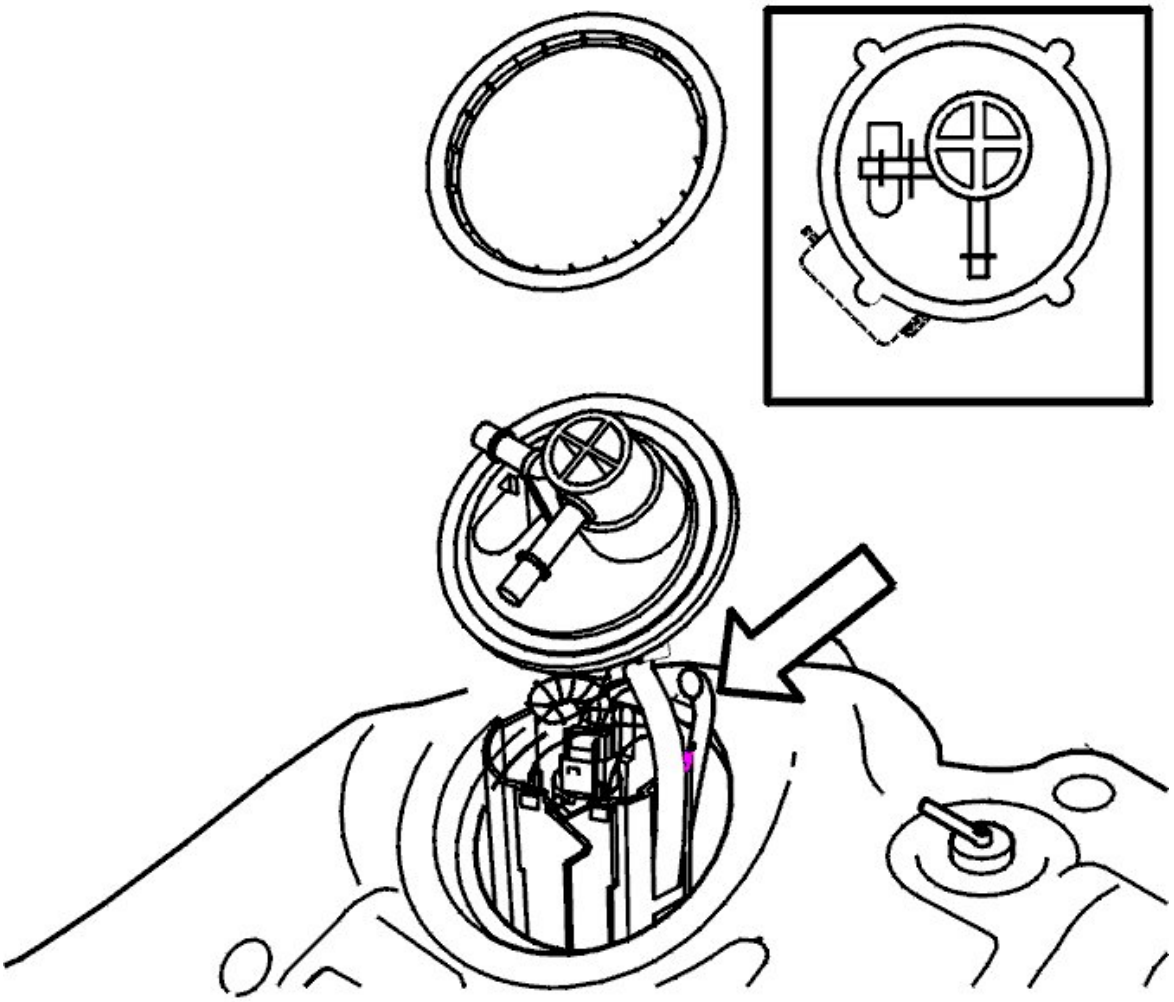
Removal

Preparation

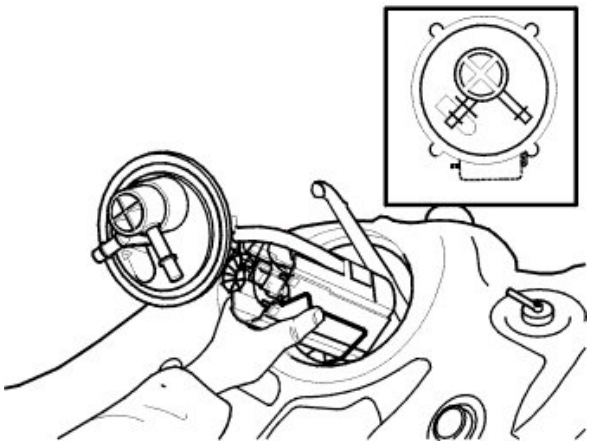


- Remove left side fuel gauge sensor as described in Left fuel gauge sensor See: Left Fuel Gauge Sensor
- Attach a piece of string or steel wire onto attachments for wire and tube system on left side fuel gauge sensor.

Right side fuel pump with level sensor

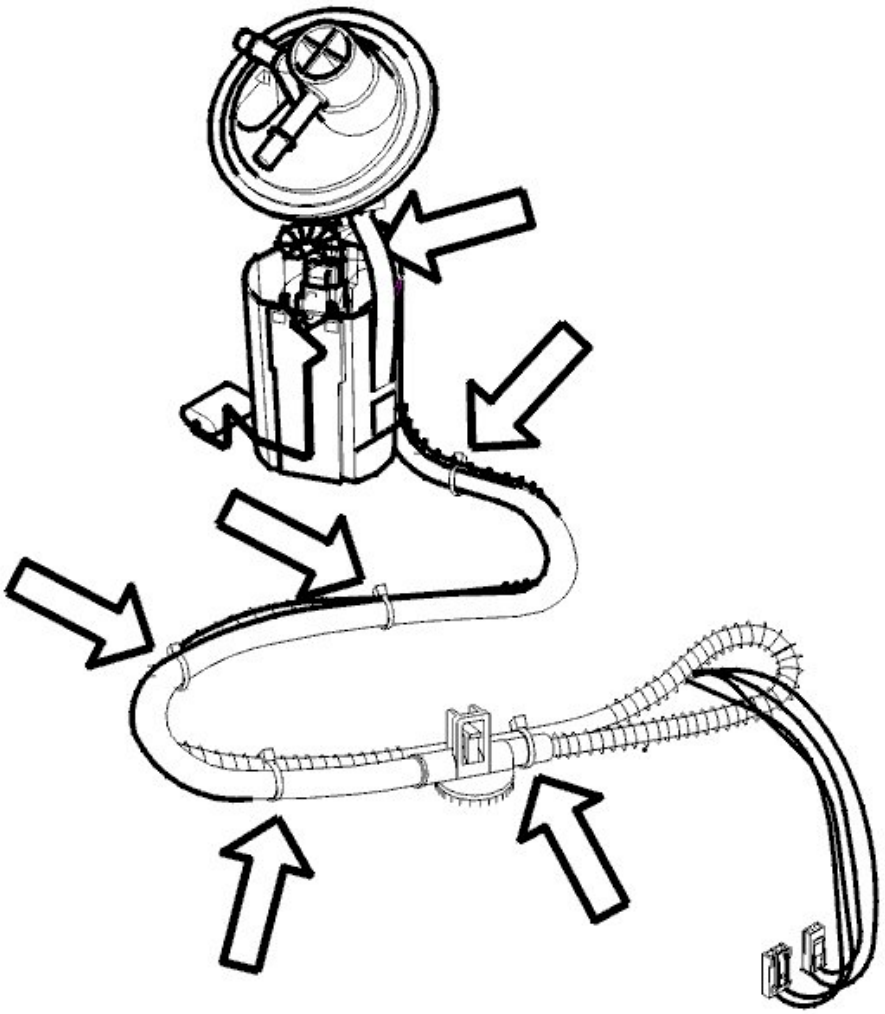


- Remove hatch and seal from fuel pump
- Loosen fuel pipe
- Loosen fuel pump lock ring using special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench
- Pull up fuel pump to position 1 (see figure) and release plastic tube.



- Turn fuel pump to position 2 (see figure)
- Hold float against pump housing, then turn fuel pump forwards and lift it up
- Pull wire and tube system out using string or steel wire.

Level sensor with cable and pipe system



- Remove fuel pump with wire and tube system
- Release six clamps. Note clamp positions
- Position fuel pump correctly, loosen fixings and push level sensor up.

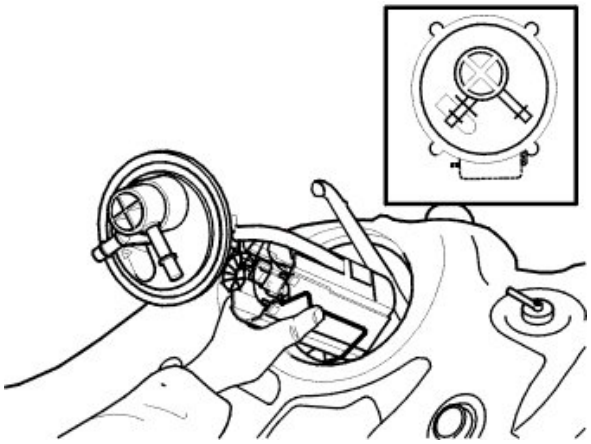
Installation

Level sensor with cable and pipe system

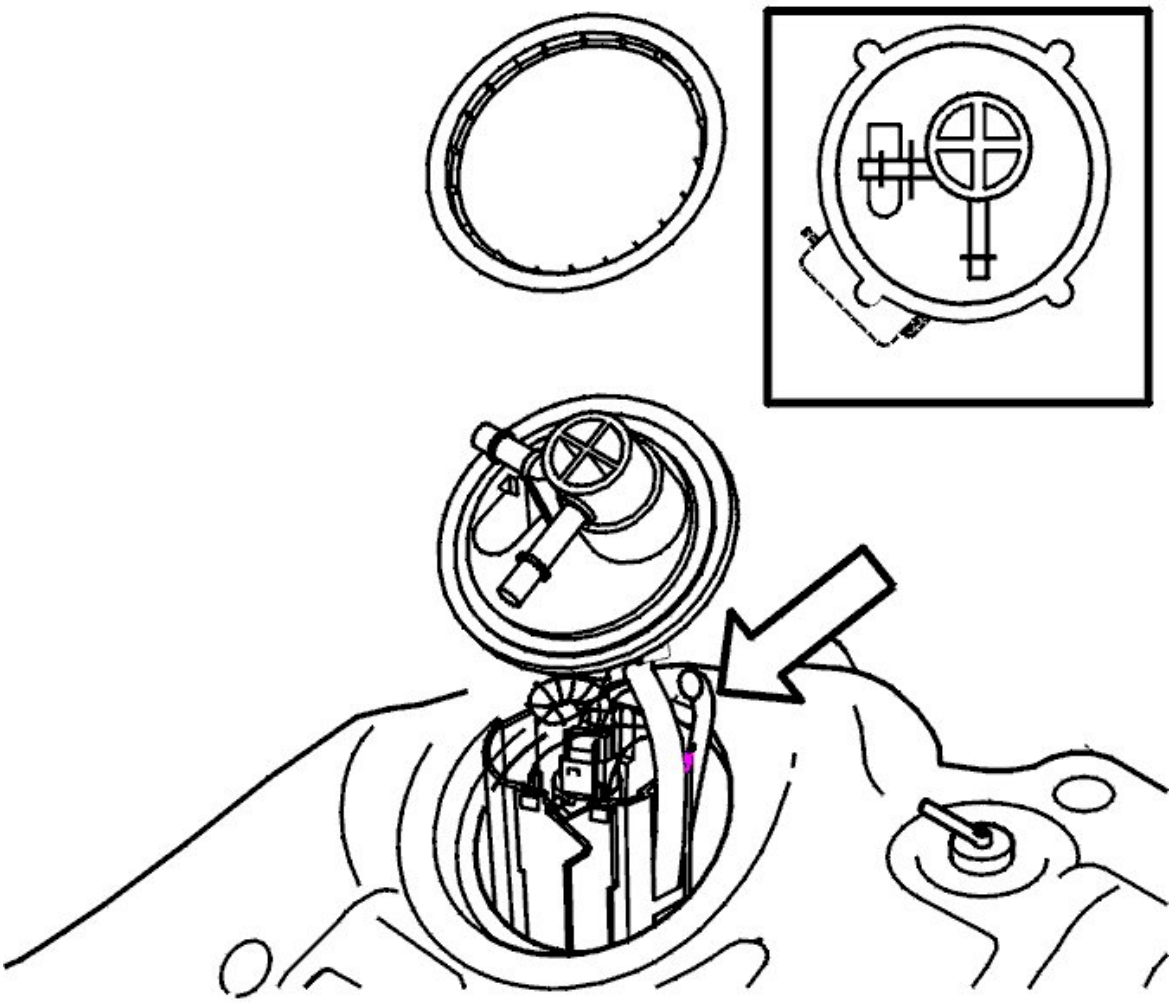
- Position level sensor and press firmly
- Pull out wire next to wire and tube system and install clamps. Note clamp positions.

Right side fuel pump with level sensor

- Attach a piece of string or steel wire onto attachments for wire and tube system on left side fuel gauge sensor
- Install wire and tube system into fuel tank
- Pull wire and tube system towards opening for left side level sensor, and feed through.



- Loosen plastic tube from slot in pump housing
- Hold float against pump housing and install fuel pump in position 2 (see figure).



- Turn fuel pump to position 1 (see figure)
- Press plastic tube firmly into slot in pump housing
- Press fuel pump down in hole
- Install lock ring and tighten by hand.

Note! Markings on cover and fuel tank.

- Tighten lock ring using special tool 999 5720 Wrench See: Tools and Equipment/999 5720 Wrench.
- Install seal and hatch onto fuel pump.

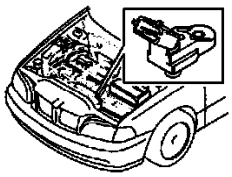
Turbo Boost Sensor: Service and Repair

Temperature And Pressure Sensors, Replacing

Removal and Installation

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the temperature and pressure sensors



Remove the boost pressure sensor which is on the pipe coming from the charge air cooler (CAC).

Installing the temperature and pressure sensors
Install a new sensor.

Throttle Body: Procedures

Throttle body (TB), cleaning

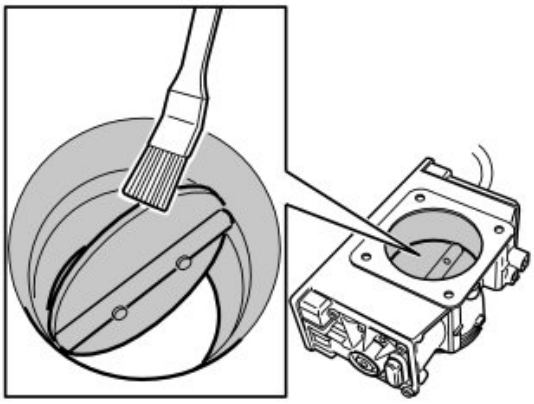
Operation number: 25121

Note! Some variation in the illustrations may occur, but the essential information is always correct.

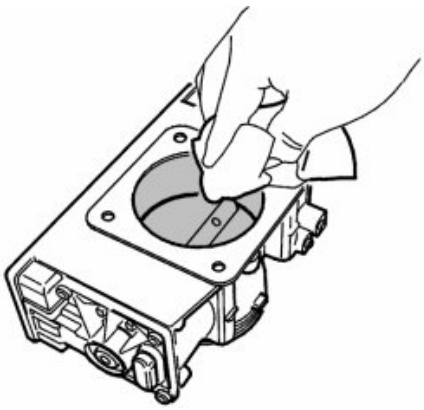
Removal and Installation

Note! Removal steps in this procedure may contain installation details.

Remove the throttle body Refer to: Throttle body (electronic throttle module (ETM)), replacing See: Removal and Replacement



Clean the throttle body with a brush.
Use: Cleaner, 1161826
Ensure that all deposits are removed from the marked surfaces.



Carefully wipe clean the air duct on both sides of the throttle disc. Also wipe clean the edge of the throttle disc.

Install the throttle body Refer to: Throttle body (electronic throttle module (ETM)), replacing See: Removal and Replacement

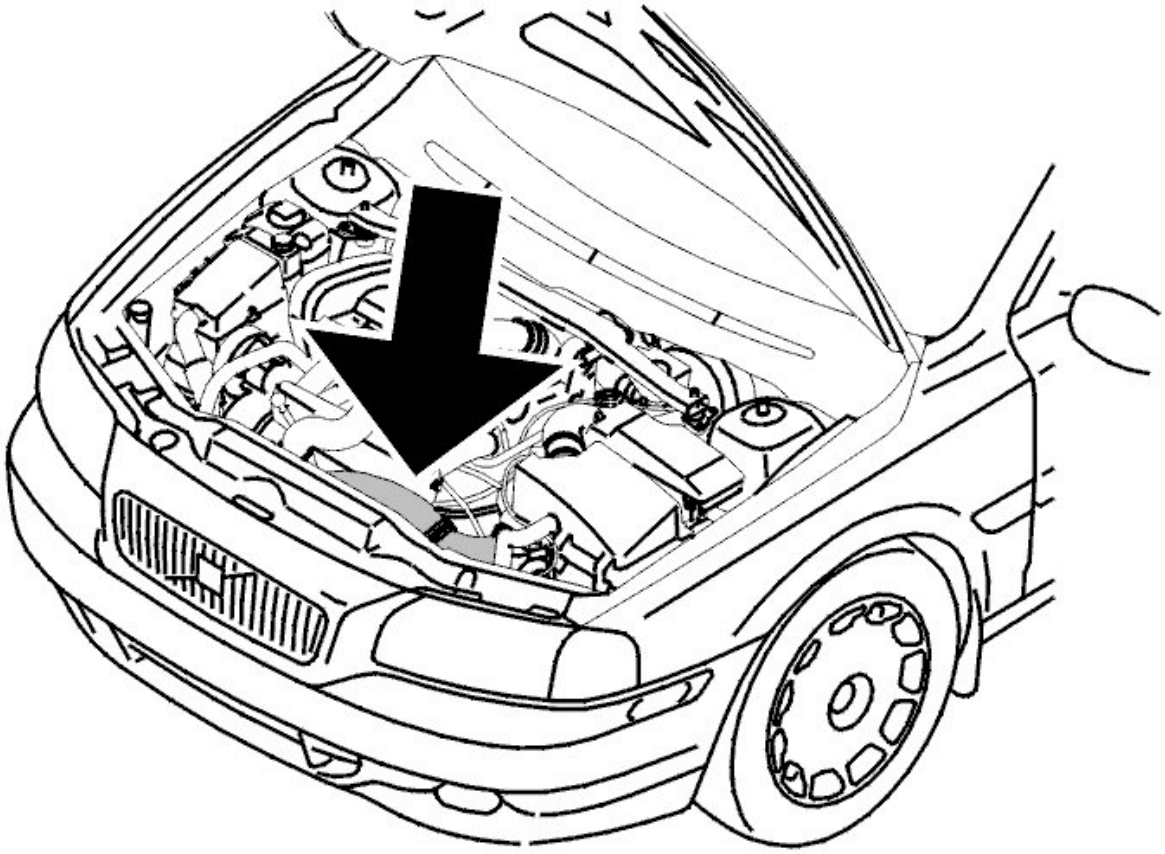
Throttle Body: Removal and Replacement

Throttle body (electronic throttle module (ETM)), replacing

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removal

Preparation



Remove:
- the air intake between the front cover plate and the air cleaner (ACL) housing
- the charge air pipe between the charge air cooler (CAC) and the electronic throttle module (ETM).

Removing the electronic throttle module (ETM)

Disconnect the connector for the electronic throttle module.
Remove the 4 x screws for the electronic throttle module (ETM). Lift out the electronic throttle module (ETM). Discard the gasket.

Installation

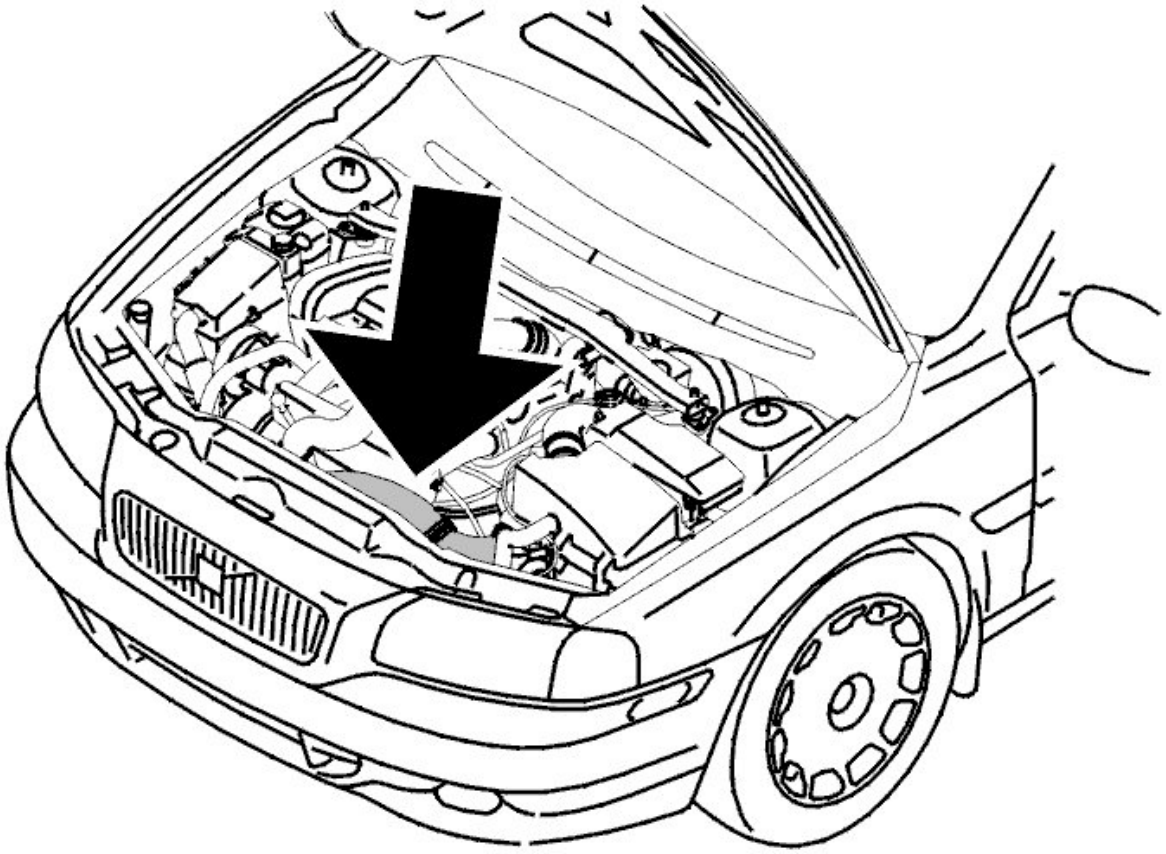
Note! For tightening torques, see: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Replacing the electronic throttle module (ETM)

Caution! Ensure that the surfaces between the throttle body (TB) and the intake manifold are clean.

Install a new electronic throttle module (ETM). Use a new gasket. Tighten the 4 screws.

Installing components



Install the charge air pipe between the electronic throttle module (ETM) and the charge air cooler (CAC).

Note! Heat the pipe at the connections to facilitate installation.

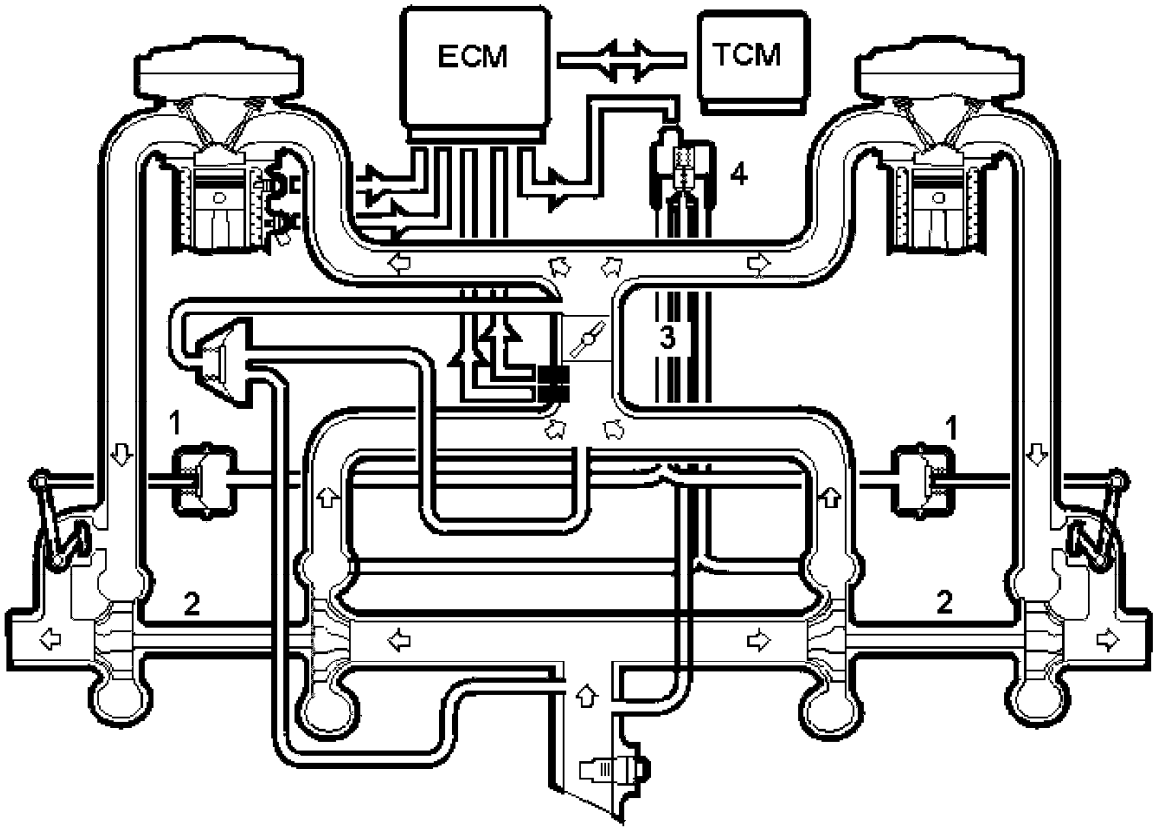
Install the intake pipe between the front cover plate and the air cleaner (ACL) housing.

Finishing

After replacing the electronic throttle module (ETM), the electronic throttle module (ETM) must be adapted using the vehicle communication input: "Adaptation of the electronic throttle unit"
Start the engine and check the function.

Turbocharger: Description and Operation

Turbocharger (TC) Control System



HINT: The above illustration is for a 6 cylinder engine. However the principle is the same for 5 cylinder engines.

The boost pressure in the intake manifold is controlled by the boost pressure control (BPC) valves, whose pressure regulators (1) are affected by the pressure from the turbocharger (TC) (2).

The Engine Control Module (ECM) receives information about the actual throttle position via the throttle position sensor (TP) for the throttle unit (3), engine load, knocking etc. This affects the boost pressure that is permitted. The boost pressure is measured by the boost pressure sensor.

The control module controls the control pressure using the turbocharger (TC) control valve (4) (also see Design), which controls the pressure to the boost pressure control (BPC) valves so that the control is adapted to the required pressure.

The pressure regulators in the boost pressure control (BPC) valves are affected when the pressure rises. When the boost pressure has increased to the maximum permissible value, the boost pressure control (BPC) valves open. Some of the exhaust gases pass the turbine in the turbocharger (TC), limiting the boost pressure.

Turbocharger (TC) control is governed continually by the engine control module (ECM).

When a higher boost pressure is permitted, the control module opens the turbocharger (TC) control valve further. Some of the boost pressure which affects the pressure regulators for the boost pressure control (BPC) valves is released back into the turbocharger (TC) intake. This lowers the control pressure, the boost pressure control (BPC) valves open later and the boost pressure increases.

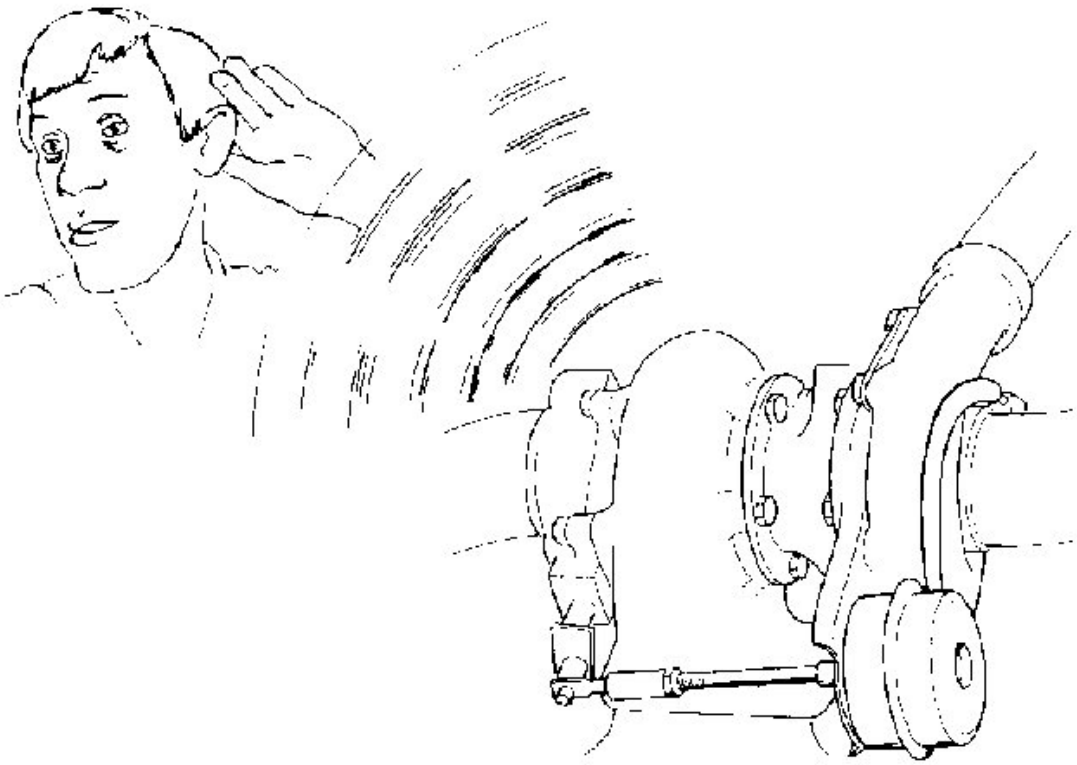
Because the control module calculates the boost pressure using the signal from the boost pressure sensor and the intake temperature sensor, there is automatic compensation of boost pressure control when driving at altitude and at different temperatures. As a result engine power will not be noticeably affected by the air density or temperature.

The engine control module (ECM) can diagnose the turbocharger (TC) control function.

Turbocharger: Testing and Inspection

Quick check, turbocharger (TC)

Stop engine and listen to turbocharger (TC) at the moment of stopping



Normally the rotating turbocharger (TC) components stop moving after the engine.

If this is not the case:

Remove the inlet hose from the compressor housing.

Check afterwards that:
- the compressor wheel spins easily when rotated.
- axial- and radial play feels normal.
- the compressor wheel does not rub in the compressor housing.

Replacing turbocharger (TC)

In a number of cases the turbocharger (TC) has been changed unnecessarily. This happened because some play has been felt when checking (the shaft floats on an oil film).
Play should always be checked before replacing, to determine if the bearings are worn.

The turbocharger (TC) should always be replaced complete:
- plug all terminals on the old turbocharger before it is sent away.

Turbocharger: Service and Repair

Turbocharger (TC), replacing

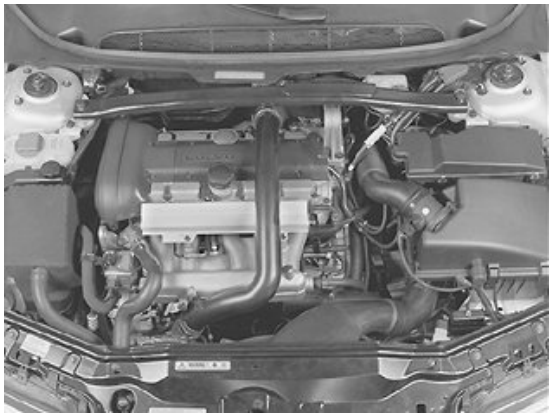
Special tools:

999 5562 PROTECTIVE SOCKET See: Tools and Equipment/999 5562 Protective Socket
999 7076 Lever See: Tools and Equipment/999 7076 Lever
999 7057 Counterhold See: Tools and Equipment/999 7057 Counterhold
951 2953 Cover See: Tools and Equipment/951 2953 Cover
951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Preparatory work

Removing components



Remove:
- the cross stay between the suspension turrets
- the charge air hose and the charge air pipe above the engine. Remove the hose clamps for the turbocharger (TC) intake pipe at the turbocharger (TC). Pull off the pipe from the connector. Place the pipe to one side.

Raise the vehicle. See: Jacking points, body See: Maintenance/Vehicle Lifting/Service and Repair.

Draining coolant

Remove the splash guard under the engine. Open the engine nipple. Drain the coolant into a container. Close the nipple. Lower the vehicle.

Removal

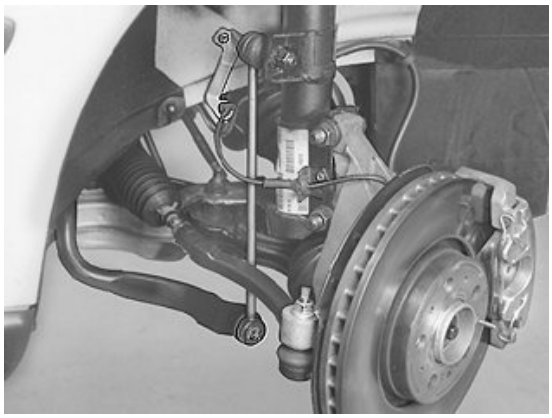
Removing components from the turbocharger (TC)

Mark up the vacuum hose for the pressure regulator on the turbocharger (TC).

Remove:
- the vacuum hose from the pressure regulator on the turbocharger (TC)
- the cable for the heated oxygen sensors (HO2S) from the clips and clamps
- the upper heat deflector plate from the turbocharger (TC)
- the pipe screw for the oil pressure pipe in the turbocharger (TC). Discard the gaskets

- the pipe screws for the upper coolant pipe from the turbocharger (TC). Discard the gaskets.

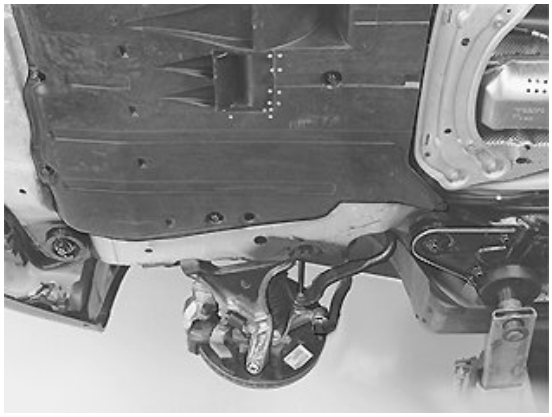
Disconnecting the front suspension components



Remove:

- the right-hand front wheel
- the screw for the drive shaft / wheel hub.

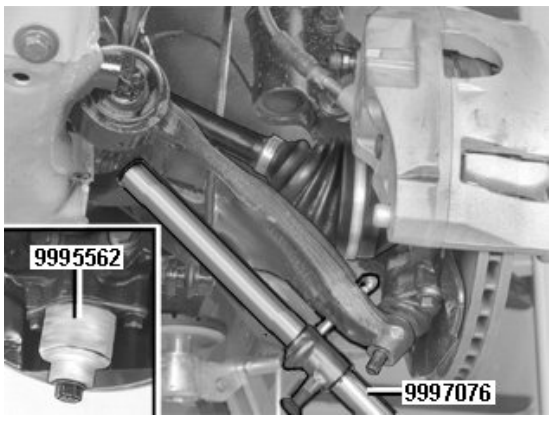
Disconnecting the front suspension components, continued



Note! Clean the exposed threads outside the nut. Spray using rust solvent before removing the nut.

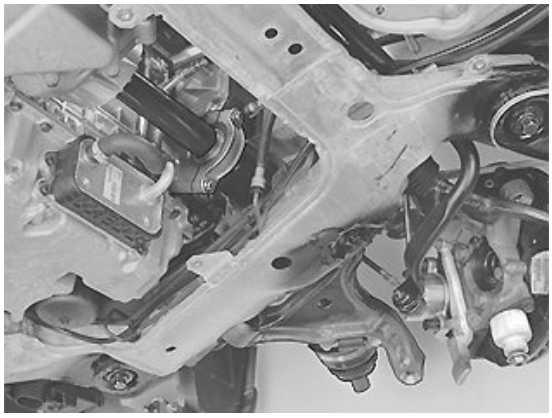
Remove the nut for the ball joint and control arm. Counterhold the ball joint pinion so that the boot does not twist. Use a Torx wrench.

Removing the drive shaft from the wheel hub



Fold down the control arm. Use lever 999 7076 Lever See: Tools and Equipment/999 7076 Lever to move the wheel spindle to the side. At the same time, install protective sleeve 999 5562 PROTECTIVE SOCKET See: Tools and Equipment/999 5562 Protective Socket on the ball joint pinion. Hold the sleeve in place using the nut for the ball joint.

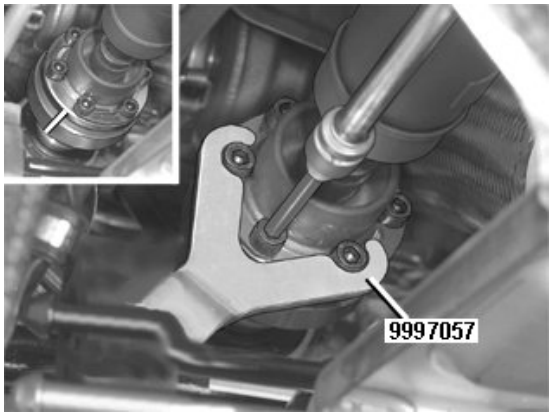
Removing the drive shaft



Caution! Do not pull the outer part of the shaft. Doing so could damage the axial stops in the joints.

Press out the wheel spindle. Detach the drive shaft from the hub. Do not damage the drive shaft boot. Use a tensioner band to pull the spring strut backwards. Remove the screws from the bearing cap for the drive shaft. Pull the drive shaft straight out.

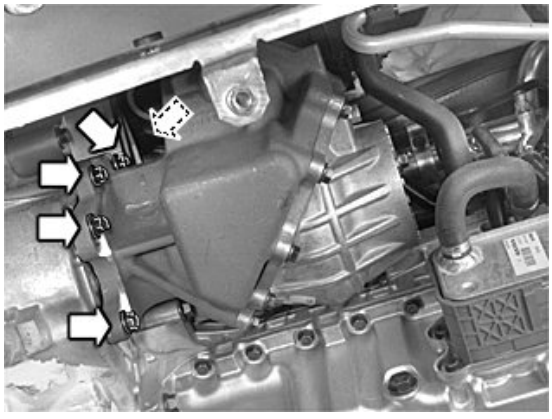
Removing the propeller shaft



For AWD vehicles carry out the following work:

Remove the front member from the car body.
Remove the brake pipe from the mountings in the member. Mark the propeller shaft CV joint in relation to the bevel gear flange.
Remove the screws from the propeller shaft. Use: 999 7057 Counterhold See: Tools and Equipment/999 7057 Counterhold. Press the drive shaft joints together as much as possible. Remove the shaft from the bevel gear. Leave the end of the shaft resting against the anti-roll bar.

Removing bevel gear



Remove the 5 x screws for the bevel gear. Pull the bevel gear straight out. Then turn it during removal.

Removing the three-way catalytic converter (TWC)

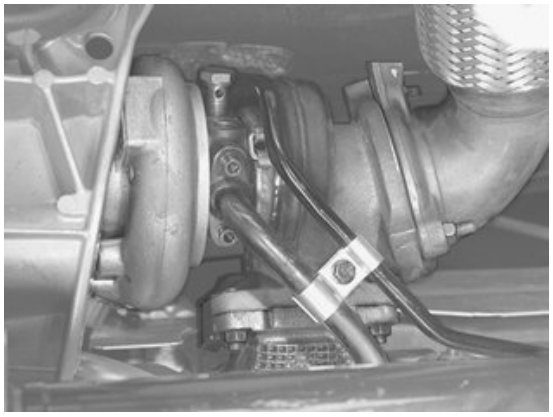
Remove the three-way catalytic converter (TWC). See: Three-way catalytic converter (TWC), replacing, B5244T5, B5254T2 See: Emission Control Systems/Catalytic Converter/Service and Repair.

Removing the support bracket

Remove:

- the 3 x screws
- the bracket.

Removing components from the turbocharger (TC)



Remove:

- the clamp between the turbocharger (TC) oil pressure line and the oil return line
- the screws where the oil return line connects to the turbocharger (TC). Pull the pipe from the cylinder block.

Note! Check that the rubber sealing ring comes away with the pipe. Seal the opening in the cylinder block.

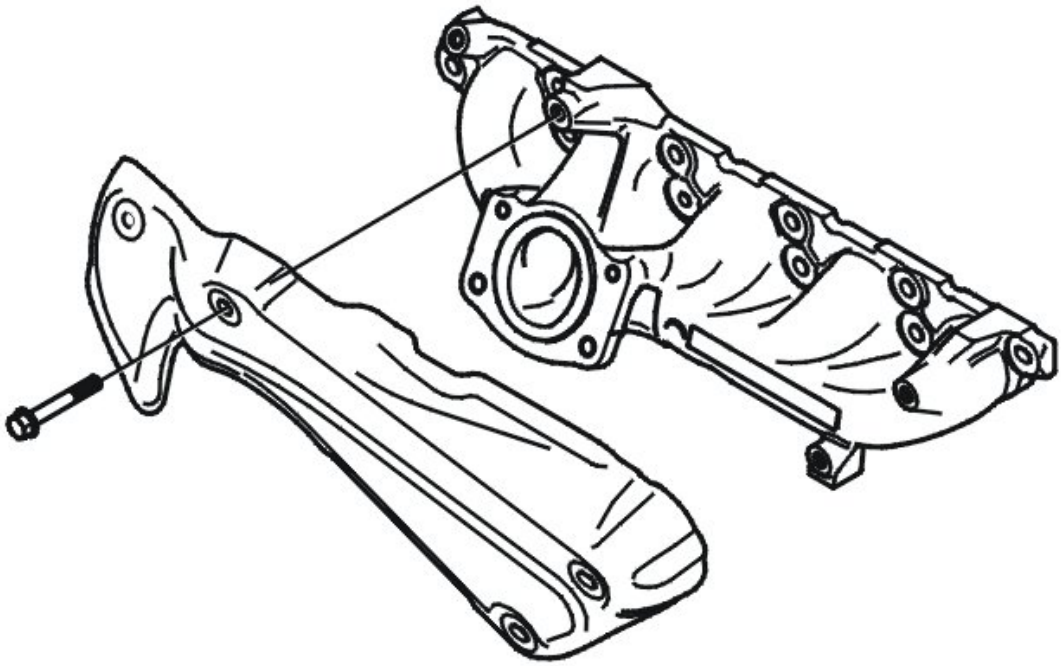
Remove:

- the pipe screws for the lower coolant pipe from the turbocharger (TC). Discard the gaskets
- the pipe screw for the oil pressure pipe in the engine block. Discard the gaskets.

Note! Collect any oil spilled under the pipe screws in the cylinder block.

Remove the oil pressure pipe.

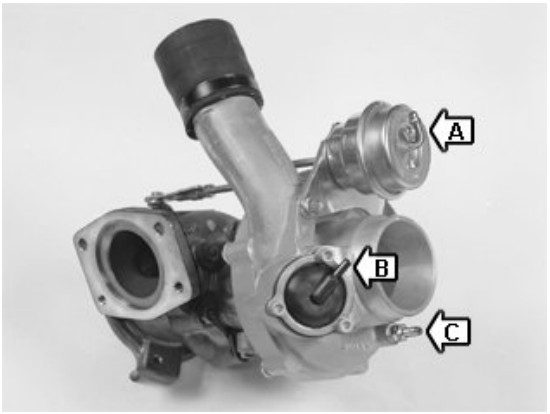
Removing the turbocharger (TC) and exhaust manifold



Hint: Use rust solvent or similar on the studs.

Remove:

- the inner heat deflector plate from the manifold
- the nuts and washers holding the manifold to the cylinder head
- the manifold
- the old gasket residue. Clean the gasket faces. Check that all the studs are tightened.



Lower the turbocharger (TC) and exhaust manifold as one complete unit.

Note! Mark up the hoses on the turbocharger (TC) in a suitable way.

Installation

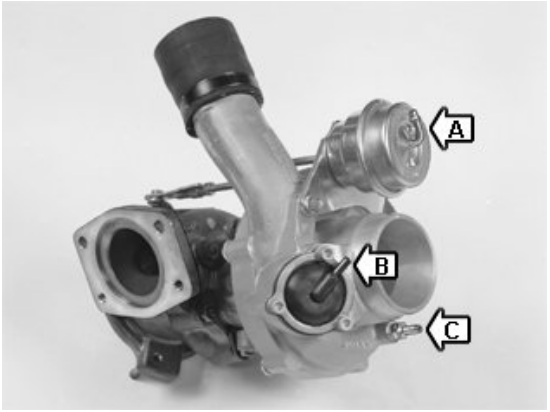
Note! For tightening torques, see: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Note! To ensure that there is no exhaust leakage, see: Flanged joint, assembling See: Engine, Cooling and Exhaust/Exhaust System/Exhaust Pipe/Service and Repair.

Assembling the turbocharger (TC)

Install:

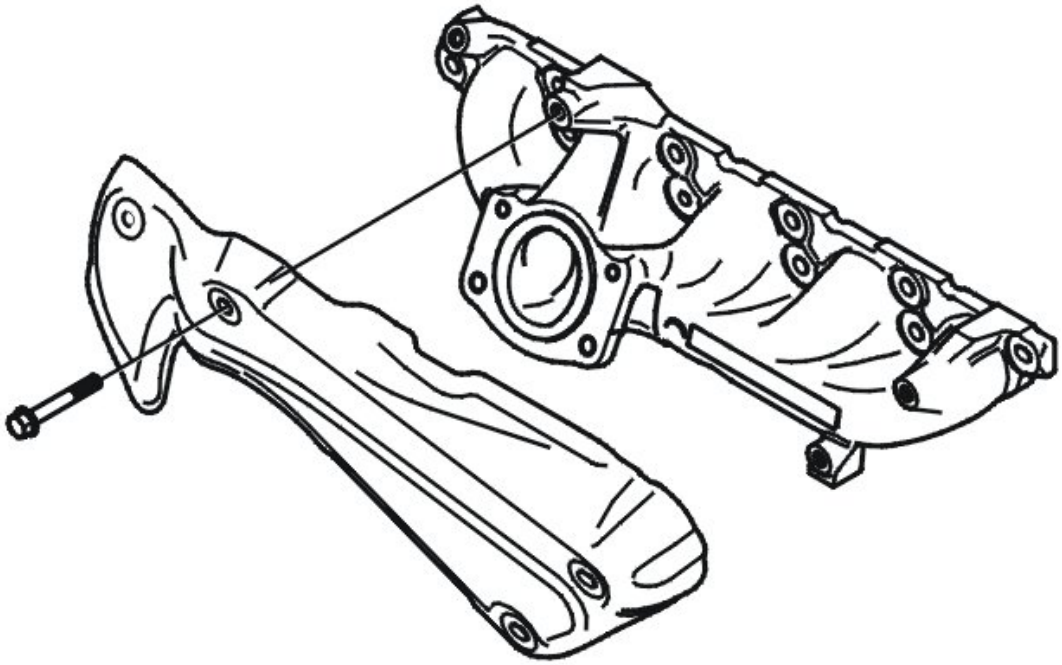
- a new gasket between the turbocharger (TC) and exhaust manifold
- the turbocharger (TC) to the exhaust manifold
- new screws and tighten.



Note! Install the hoses on the turbocharger (TC) according to the marking.

Raise the turbocharger (TC) and exhaust manifold as one complete unit.

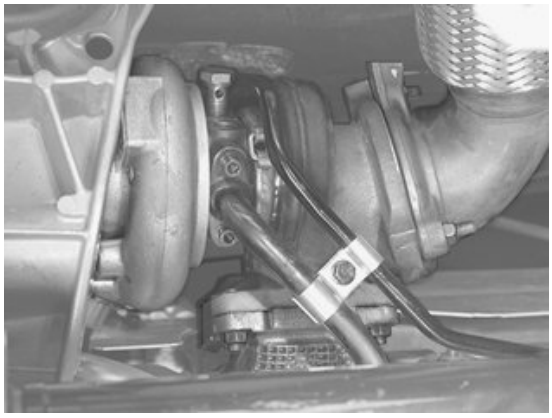
Installing the turbocharger and exhaust manifold



Install:

- new gaskets
- the turbocharger (TC) and the exhaust manifold. Use new nuts at the manifold. Tighten
- the inner heat deflector plate.

Installing components on the turbocharger (TC)



Install:

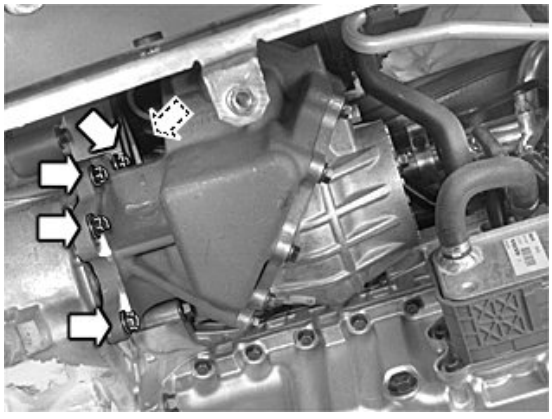
- the oil pressure pipe in the cylinder block with the pipe screw. Use new gaskets. Do not tighten
- the oil return line in the cylinder block with a new sealing ring
- the 2 x screws for the oil return line in the turbocharger (TC). Use a new gasket. Tighten
- the lower and upper coolant pipe and pipe screws. Tighten. See: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque
- the clamp between the oil pressure pipe and the return pipe. Tighten.

Installing the bracket

Install:

- the bracket
- the 3 screws. Tighten. See: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

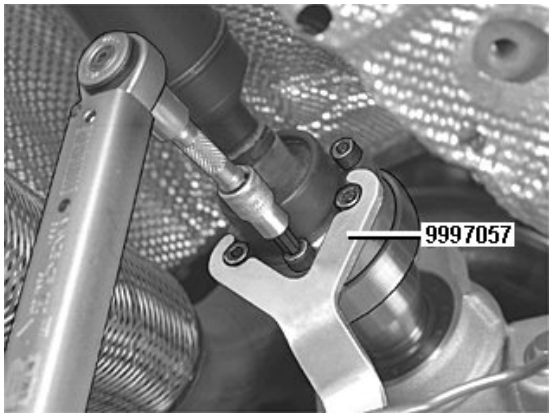
Installing the bevel gear



For AWD vehicles carry out the following work:

Before installing the bevel gear, lubricate the spline joint between the transmission and the bevel gear. Use appropriate grease.
Ensure that the mating surfaces on the transmission and bevel gear are clean. Install the bevel gear. Lightly tighten the M10 screws alternately. Tighten.

Installing the propeller shaft



Check that the mating surfaces of the propeller shaft and flange are clean. Install the propeller shaft using the marking made earlier. Use new screws. Tighten the screws. See: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

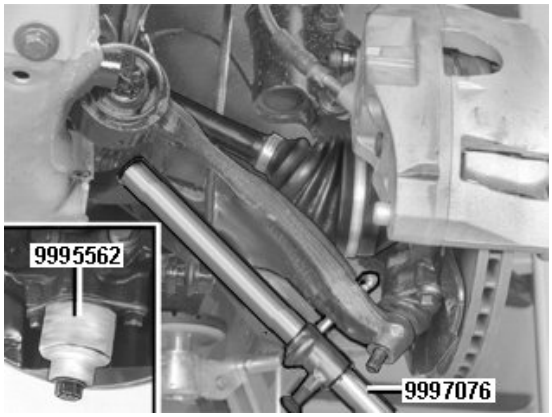
Installing the three-way catalytic converter (TWC)

Install the three-way catalytic converter (TWC). See: Three-way catalytic converter (TWC), replacing, B5244T5, B5254T2 See: Emission Control Systems/Catalytic Converter/Service and Repair.

Installing the drive shaft and bearing cap on the pilot bearing for the shaft

Lubricate the mating surface at the end of the drive shaft. Use wheel bearing grease P/N 1161 241-3 (80 g). Install the drive shaft on the transmission and the mounting for the pilot bearing with the bearing cap and the 2 M8 screws. Tighten.

Installing the drive shaft



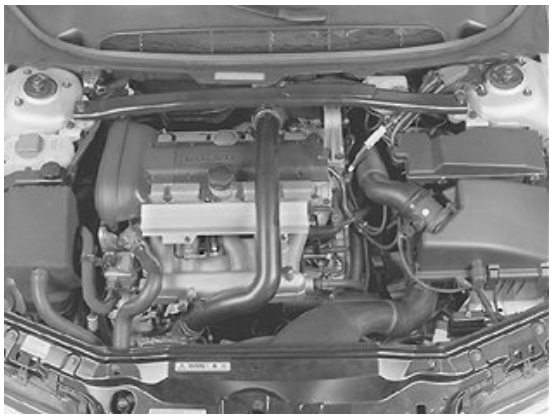
Caution! Check that the seal on the end of the drive shaft is correctly positioned. See: Seal CV joint housing, replacing See: Transmission and Drivetrain/Drive Axles, Bearings and Joints/Seals and Gaskets/Service and Repair/Seal CV Joint Housing, Replacing.

Press out the spring strut. Align the drive shaft in the hub. Remove protective sleeve. Use: 999 5562 PROTECTIVE SOCKET See: Tools and Equipment/999 5562 Protective Socket. Locate the control arm on the ball joint pinion. Use: 999 7076 Lever See: Tools and Equipment/999 7076 Lever.

Install:

- the nut for the ball joint and control arm. Tighten to applicable specifications. Counterhold so that the ball joint boot does not rotate. Use a Torx wrench
- the drive shaft center screw. Use a new screw. Tighten to applicable specifications. Use a screwdriver as a counterhold on the brake disc.

Installing the components engine compartment



Install:

- the pipe screw together with new gaskets on the oil pressure pipe in the turbocharger (TC). Tighten
- the upper heat deflector plate. Tighten the screws
- the charge air pipe over the engine
- the cross stay between the suspension turrets
- the tie strap for the servo cable in the cross stay. Raise the vehicle. See: Jacking points, body See: Maintenance/Vehicle Lifting/Service and Repair.

Finishing

Routing the joint

Tighten the pipe screws for the oil pressure pipe in the cylinder block. See: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Installing components

Install:

- the lower engine cover
- the right-hand front wheel. See: Installing wheels See: Maintenance/Wheels and Tires/Wheels/Service and Repair.

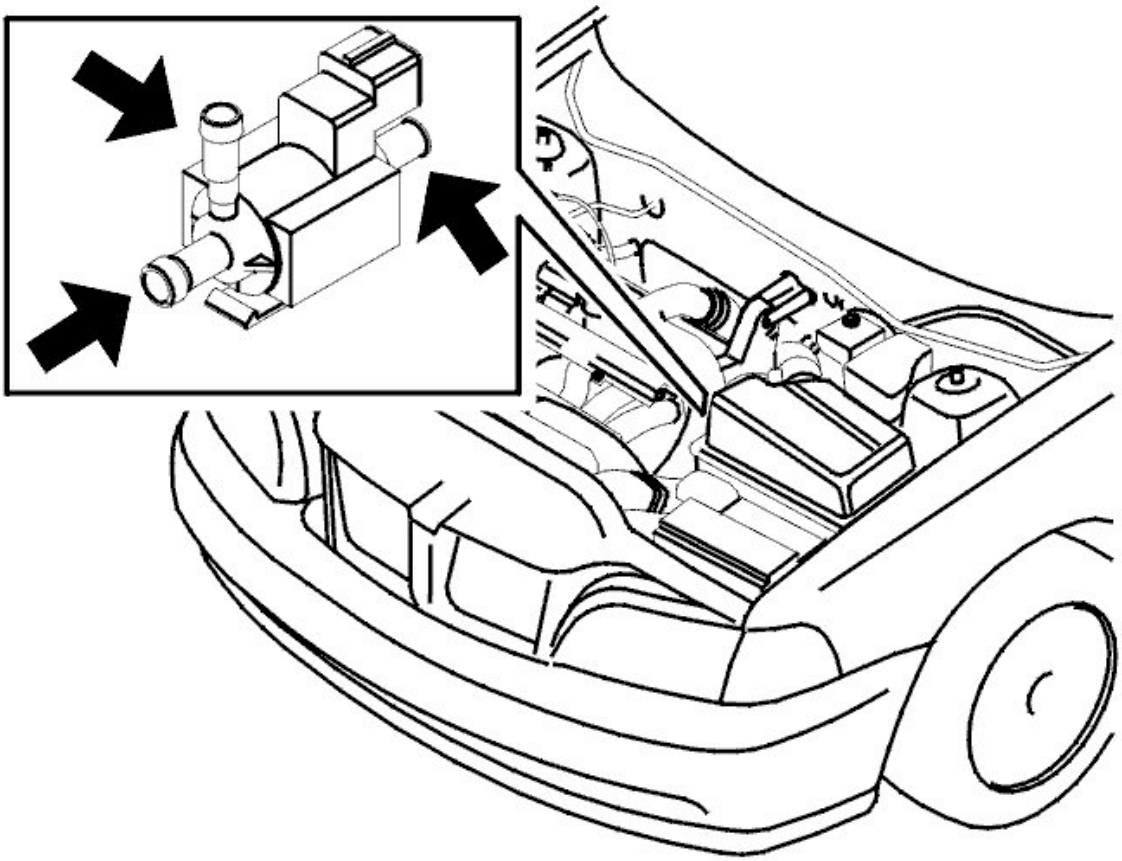
Check

Fill with coolant. Use the filling equipment: 951 2957 Coolant Reservoir See: Tools and Equipment/951 2957 Coolant Reservoir and cover 951 2953 Cover See: Tools and Equipment/951 2953 Cover.
Start the engine and run the engine to normal operating temperature.
Check the function. Check for leaks. To up the coolant to max if necessary.

Boost Solenoid: Service and Repair

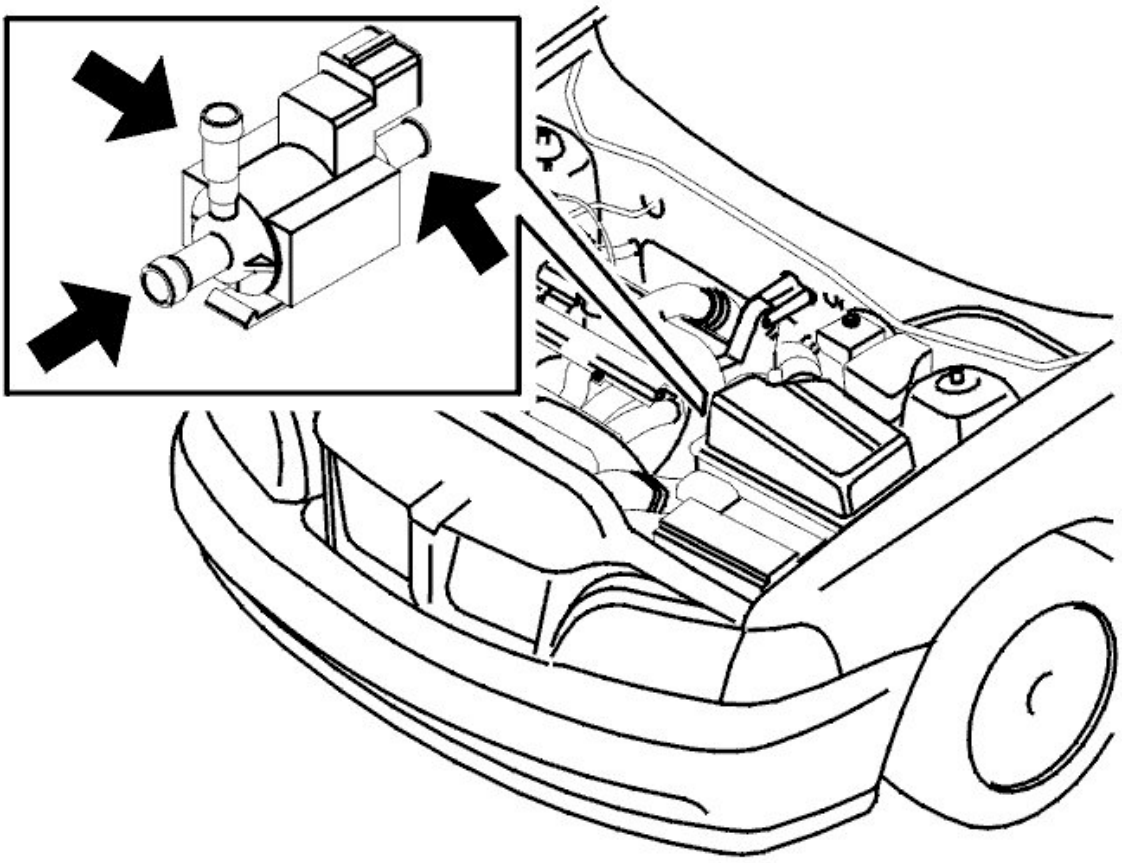
Replacing the turbocharger (TC) control valve

Removing the turbocharger (TC) control valve



Lift the valve away from the air cleaner (ACL) cover.
Remove the connector from the valve.
Mark up and pull off the hoses.

Installing the turbocharger (TC) control valve



Install

- the hoses according to the marking on the control valve
- the connector on the valve
- the valve on the air cleaner (ACL) cover.

Intercooler: Service and Repair
Radiator / Charge Air Cooler (CAC), Replacement

Radiator / charge air cooler (CAC), replacement

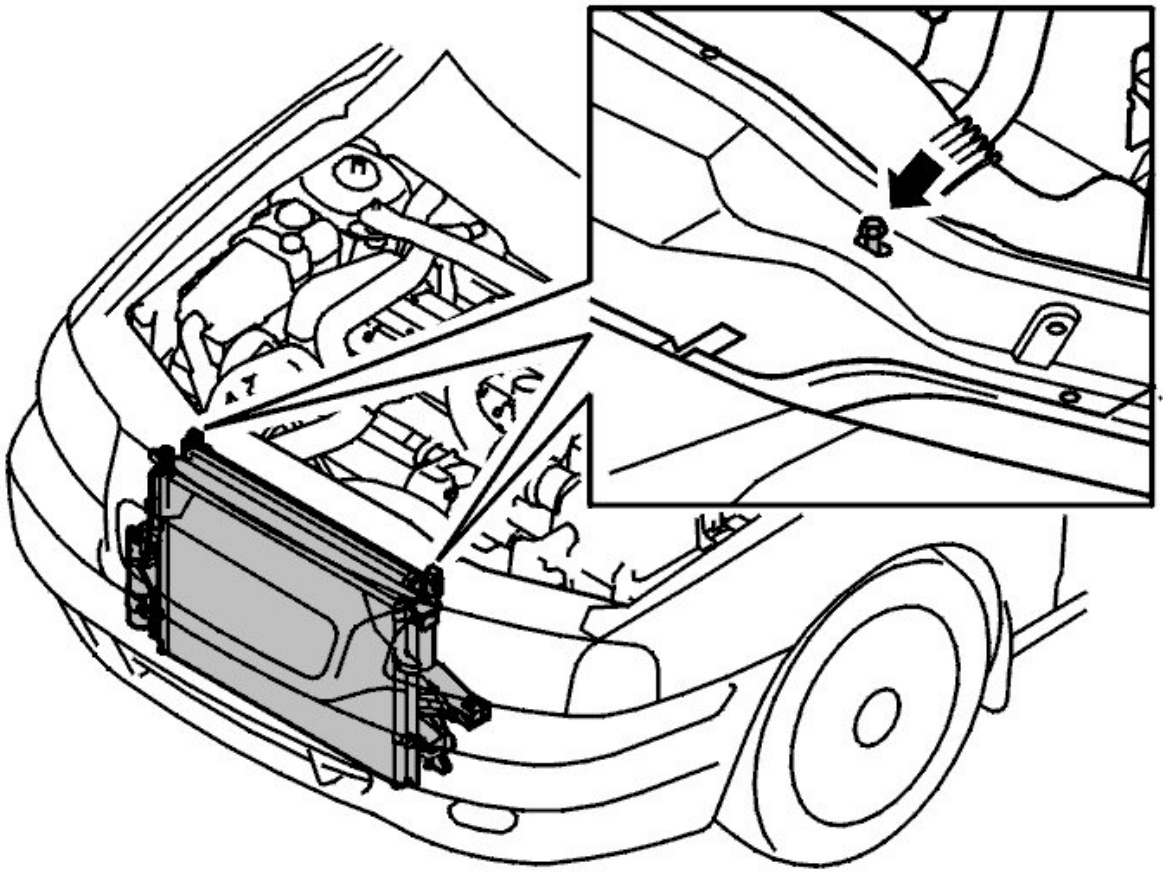
Special tools:

999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

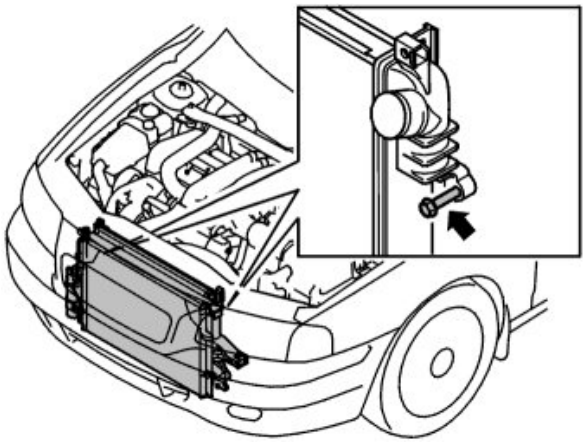
Removal

Removing the radiator unit

- Remove the engine cooling fan (FC) according to Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair.

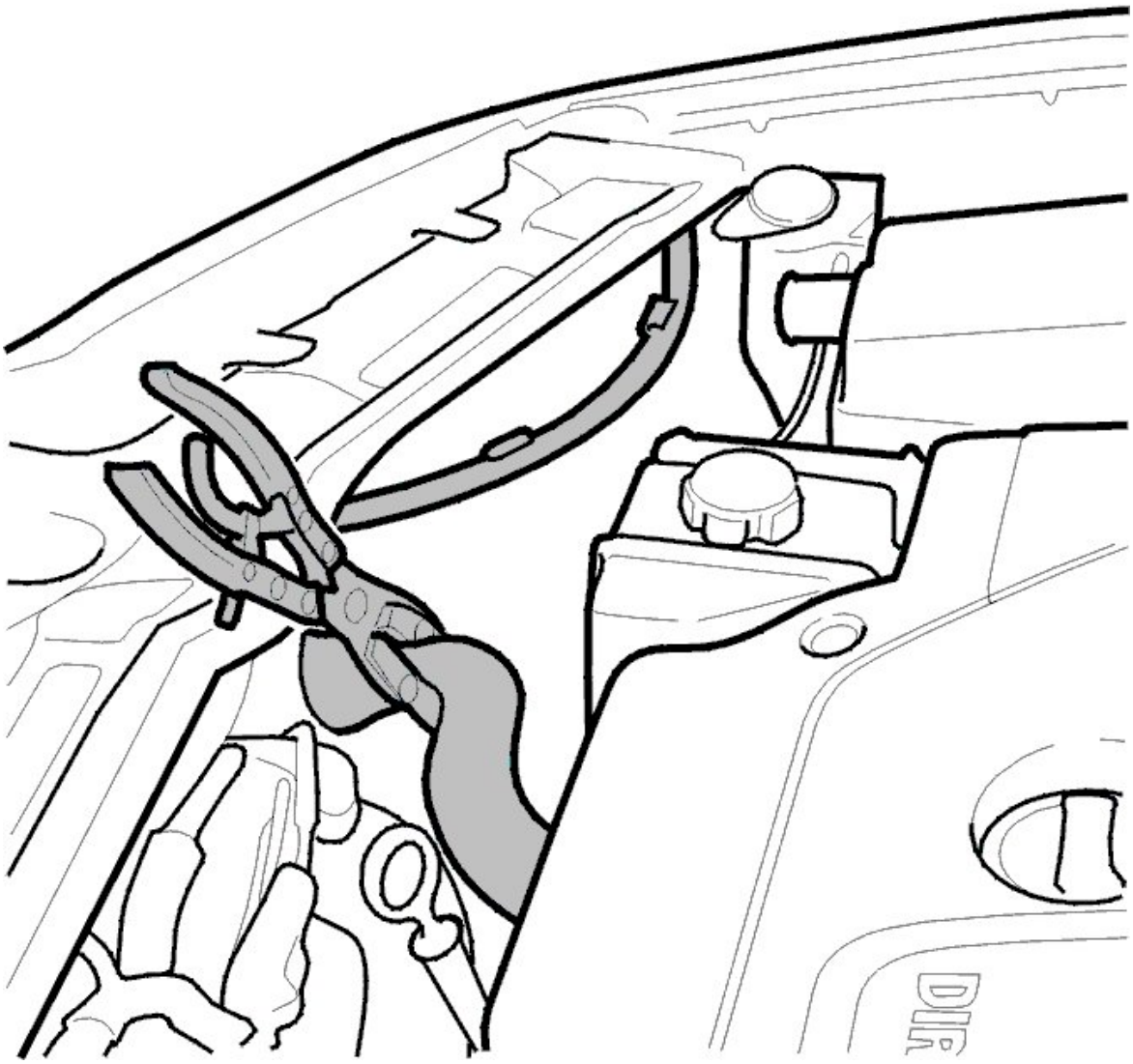


- Disconnect the charge air pipe from the charge air cooler (CAC) on the left-hand side (turbocharged engines only). If necessary, use a hot air gun to make removal easier
- Remove the screws for the radiator unit on the front cover plate.



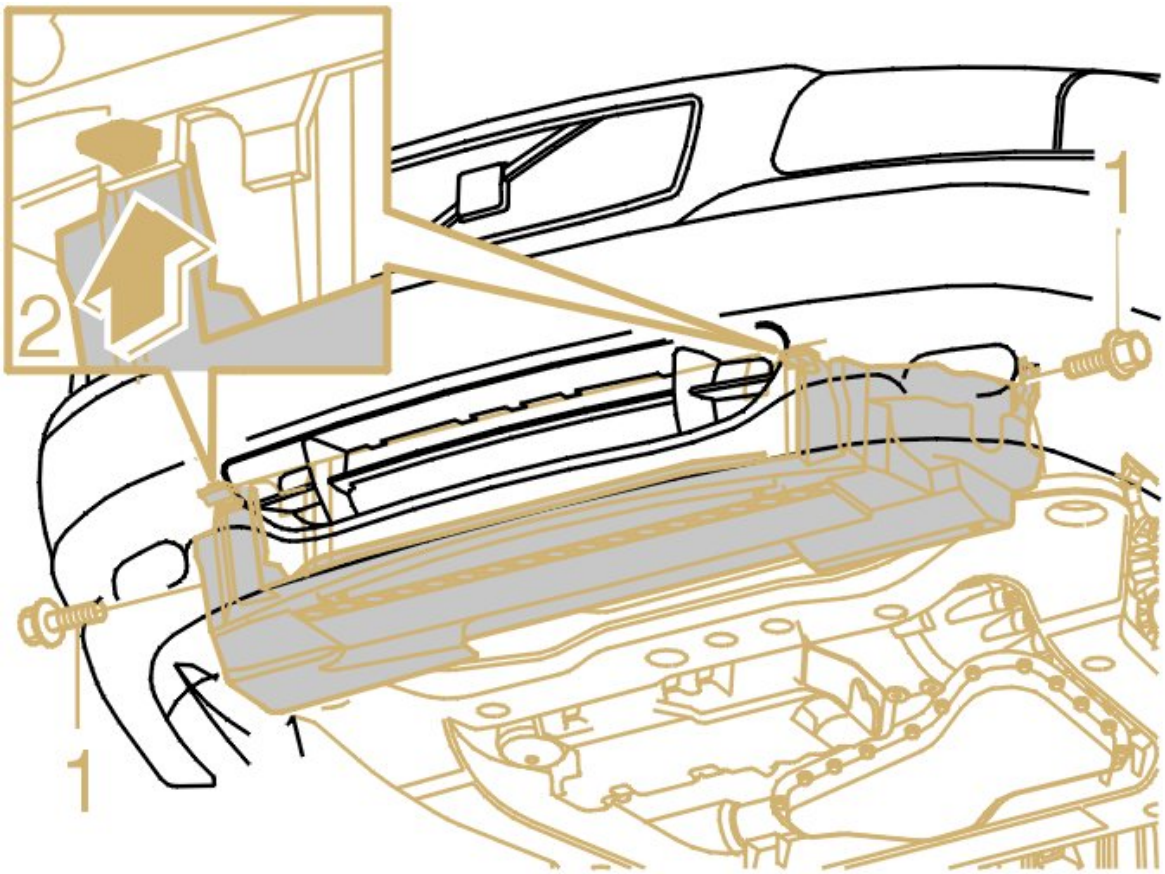
Remove

- the two upper screws holding the radiator unit together
- the expansion tank cap.



Block the upper radiator hose with lock grip pliers

Work under the car



Remove

- the air baffles
- the lower oil cooler hose from the radiator unit (automatics only)
  Note! Collect the oil from the oil cooler in a container.

- the screw for the mounting for the cable duct for engine wiring at the front edge of the sub-frame.

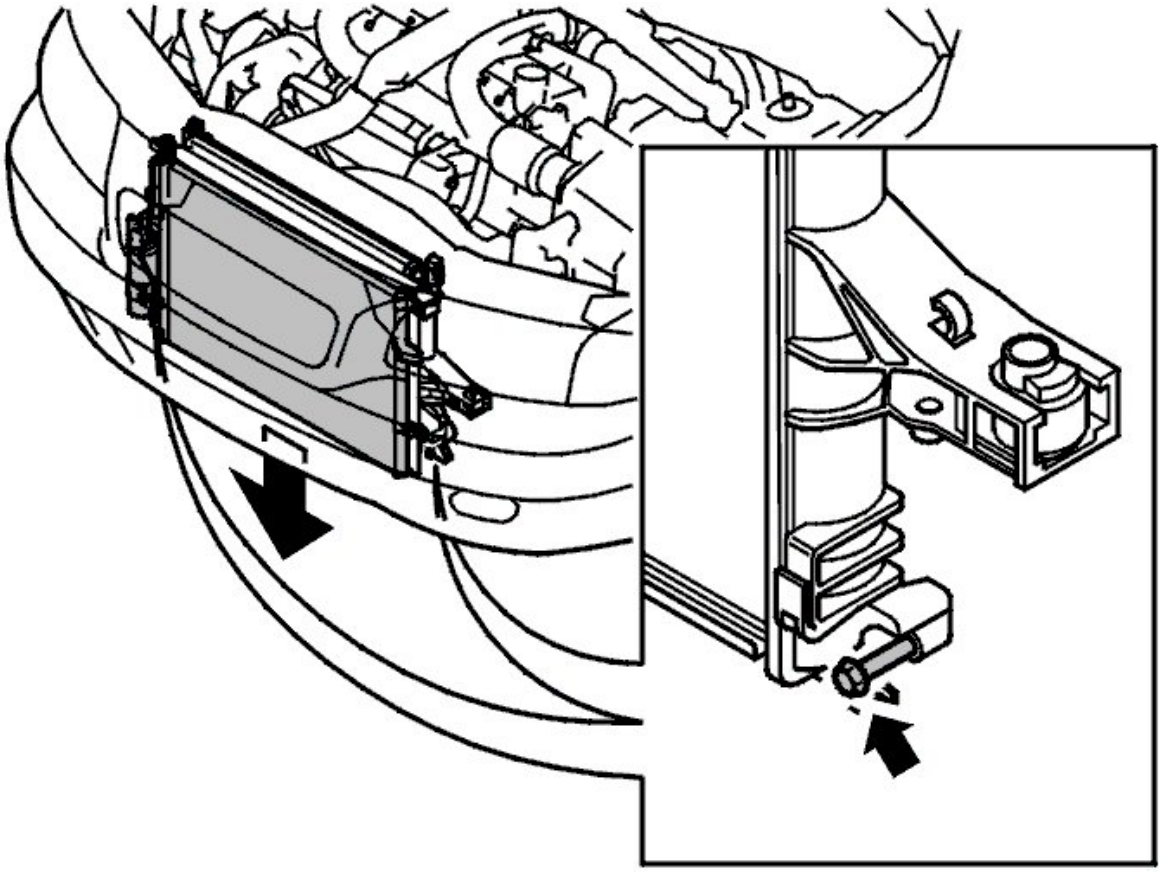
Drain the coolant

- Block the lower hose coolant hose with lock grip pliers
- Apply a hose on the nipple at the radiator
- Feed the hose down to a container
- Open the nipple and drain off the coolant.

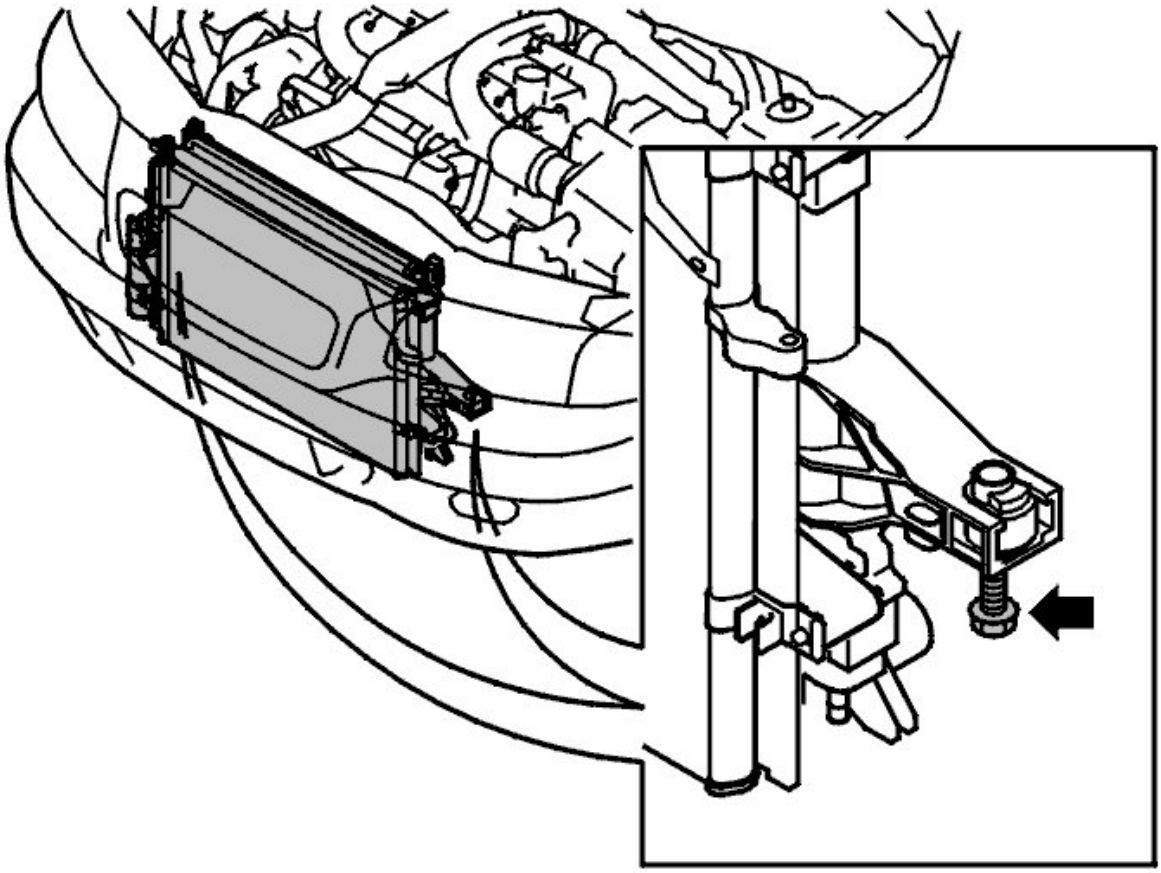
Work from above

- Remove the upper radiator hose. Place it to one side. Seal the openings.

Work under the car



- Disconnect the connector from the receiver drier and the cable from the holder
- Hang up the condenser using tie straps on the right-hand side in the pipe for the receiver drier and on the left-hand side in the pipe for the condenser
- Remove the lower screws holding the radiator unit.



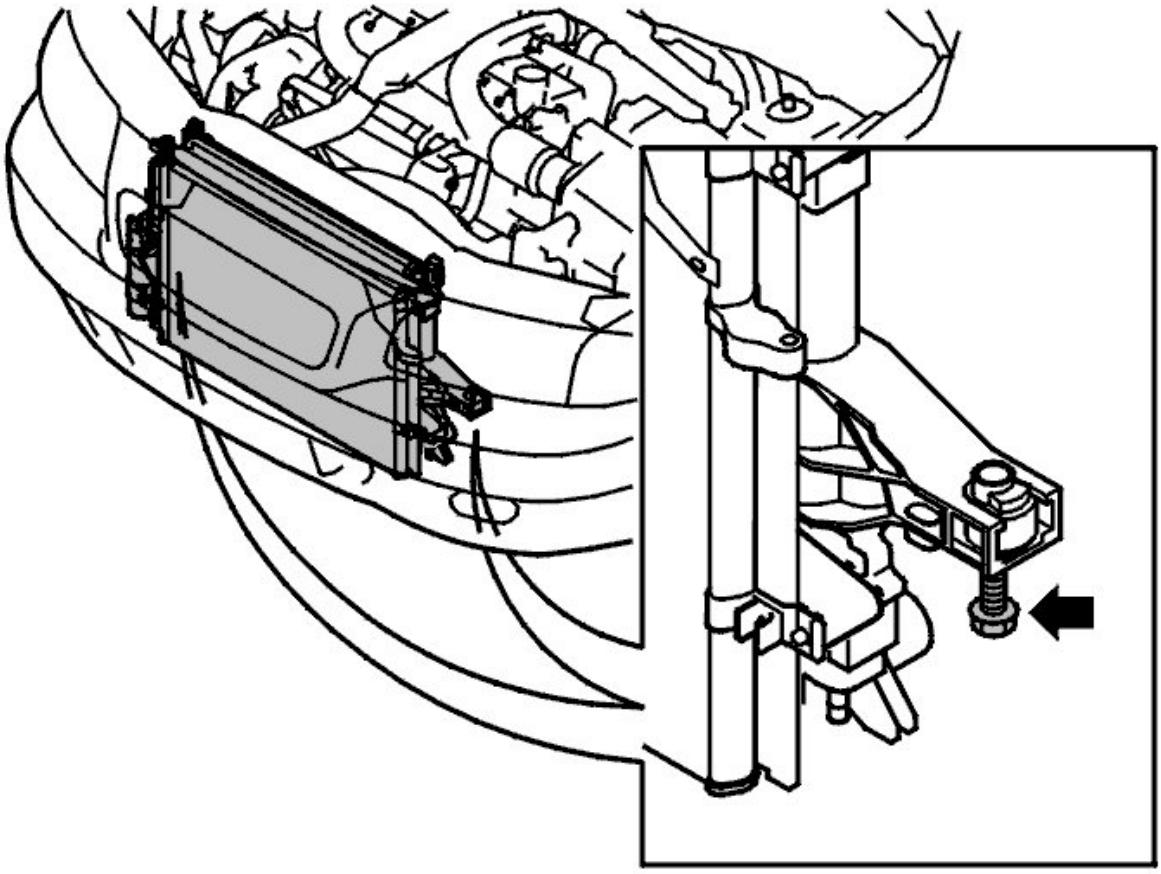
- **The following requires two people:** Disconnect the radiator and the charge air cooler (CAC) firstly from the left and then from the right-hand side by removing the two screws
- On the right-hand side, press the cable duct and the compressor hose towards the engine. At the same time release the radiator and charge air cooler (CAC) downwards on the right-hand side. Then release the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the radiator and charge air cooler (CAC) passes the AC pipe

- Disconnect the hose from the radiator to the expansion tank
- Replace the radiator / charge air cooler (CAC).

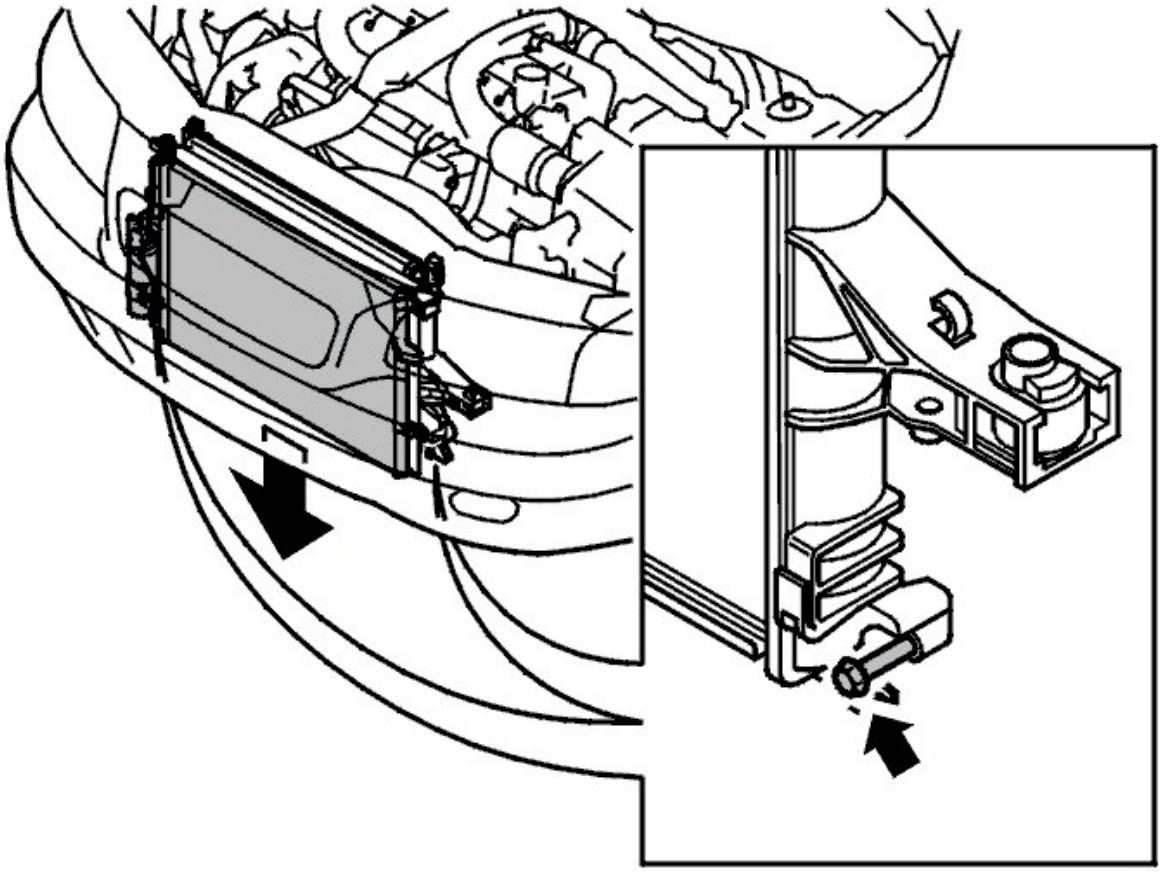
Installation

Installing the radiator and charge air cooler (CAC)

- Hold the radiator unit and secure the hose from the expansion tank to the radiator
- Install the connector from the receiver drier and the cable from the holder.

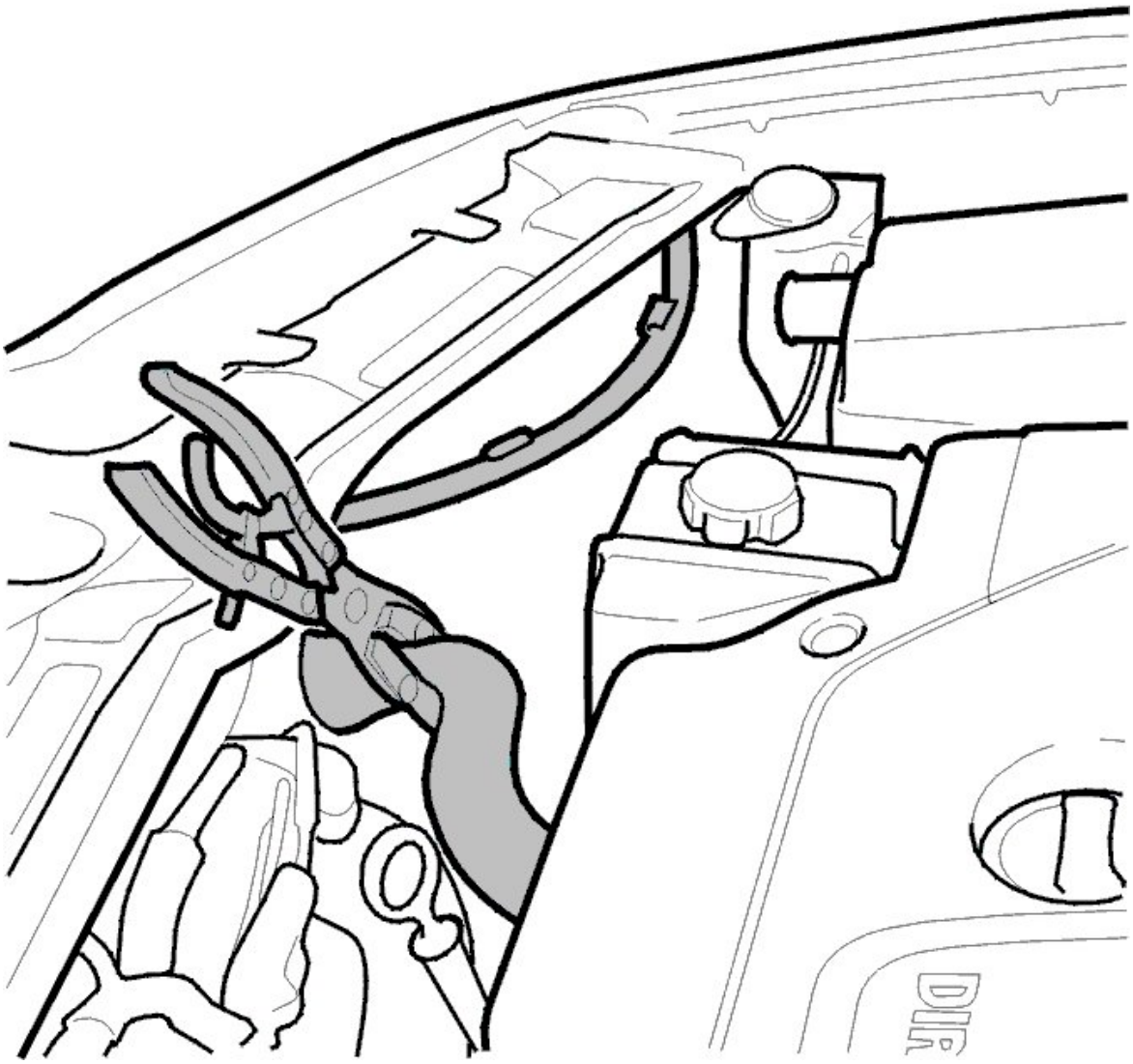


- Lift up the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the charge air cooler (CAC) passes above the AC pipe. Lift the right-hand side while pressing the cable duct and the compressor hose towards the engine
- Thread the screws for the radiator and charge air cooler (CAC) into the member.



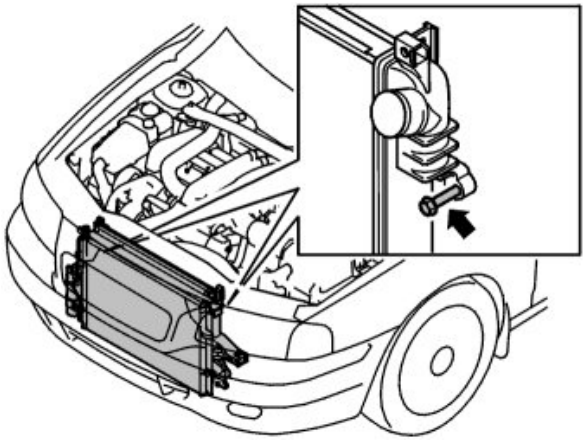
- Install the lower screws to assemble the radiator unit. Tighten the screws. Tighten to **10 Nm**
- Remove the tie straps
- Check that the radiator unit is against the rubber seal
- Tighten the radiator unit to the member. Tighten to **25 Nm**.
- Install the lower radiator hose
- Remove the lock grip pliers
- Install the screw for the mounting for the engine wiring cable duct at the front edge of the sub-frame
- Install the lower oil cooler hose on the radiator unit (automatic gearboxs only).

Work from above

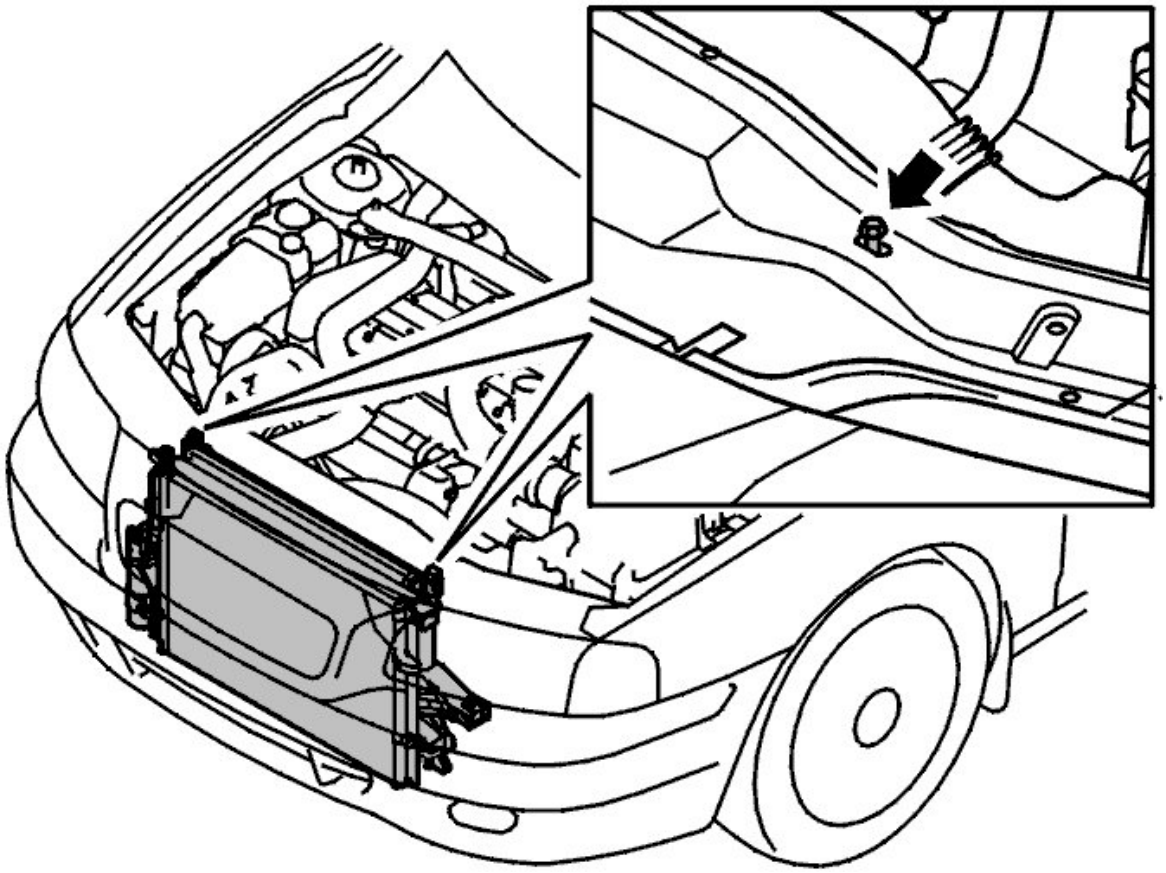


Install

- the upper radiator hose. Remove the lock grip pliers
- the charge air pipe to the charge air cooler (CAC) on the left-hand side (turbocharged engines only).



- Install the upper screws to assemble the radiator unit. Tighten the screws
- Tighten to **10 Nm**.



- Install the screws for the radiator unit on the front cover plate
- Tighten to **10 Nm**

Installing the engine cooling fan (FC)

To install the engine cooling fan (FC), see Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair.

Topping up the coolant

- Install the cap on the expansion tank
- Run the engine until the thermostat has opened
- Stop the engine. Top up if necessary.

Intercooler: Service and Repair
Replacing the Radiator / Charge Air Cooler (CAC)

Replacing the radiator / charge air cooler (CAC)

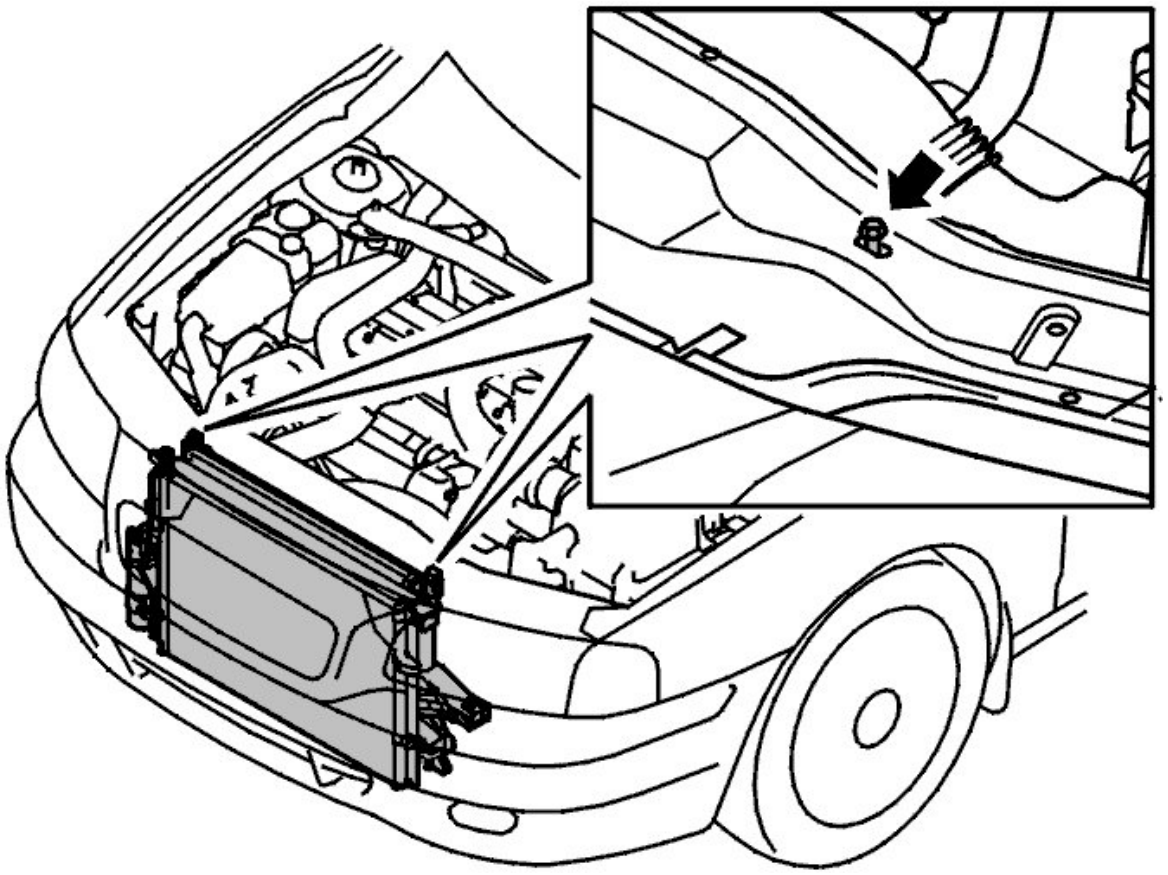
Special tools:

999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

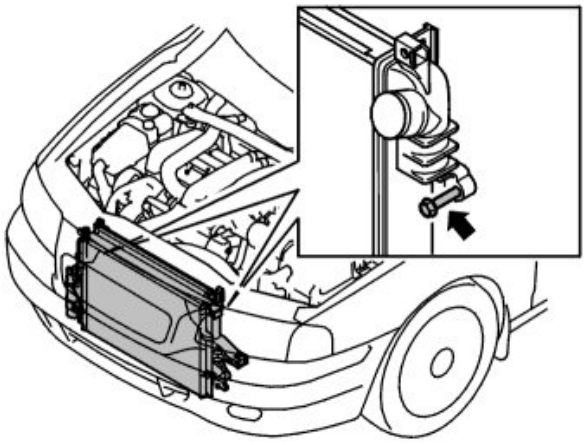
Removal

Removing the radiator unit

Remove the engine cooling fan (FC) according to Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair.

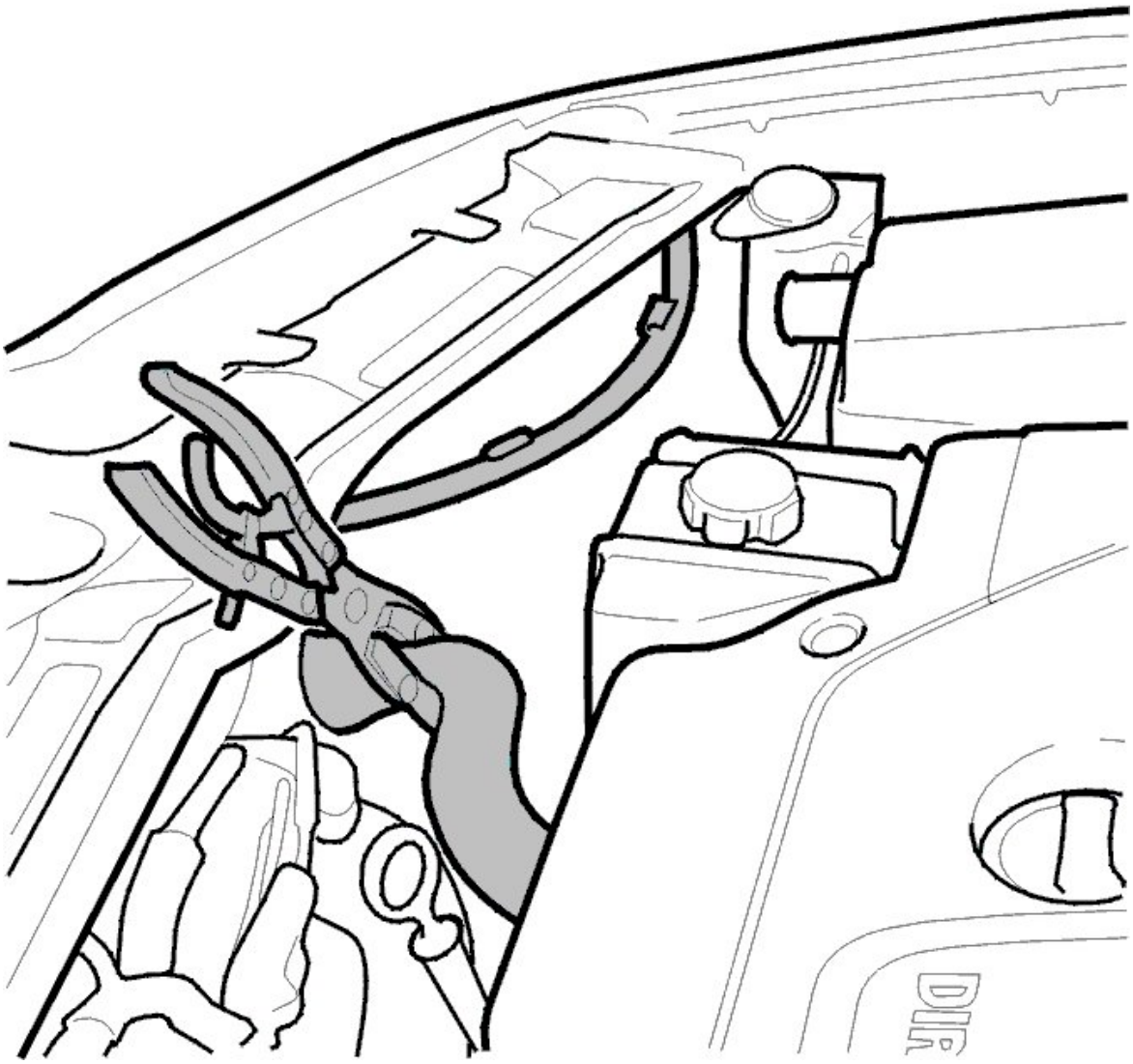


Disconnect the charge air pipe for the charge air cooler (CAC) on the left-hand and right-hand sides. Fold the hoses out of the way.
Remove the screws for the cooler unit on the front cover plate



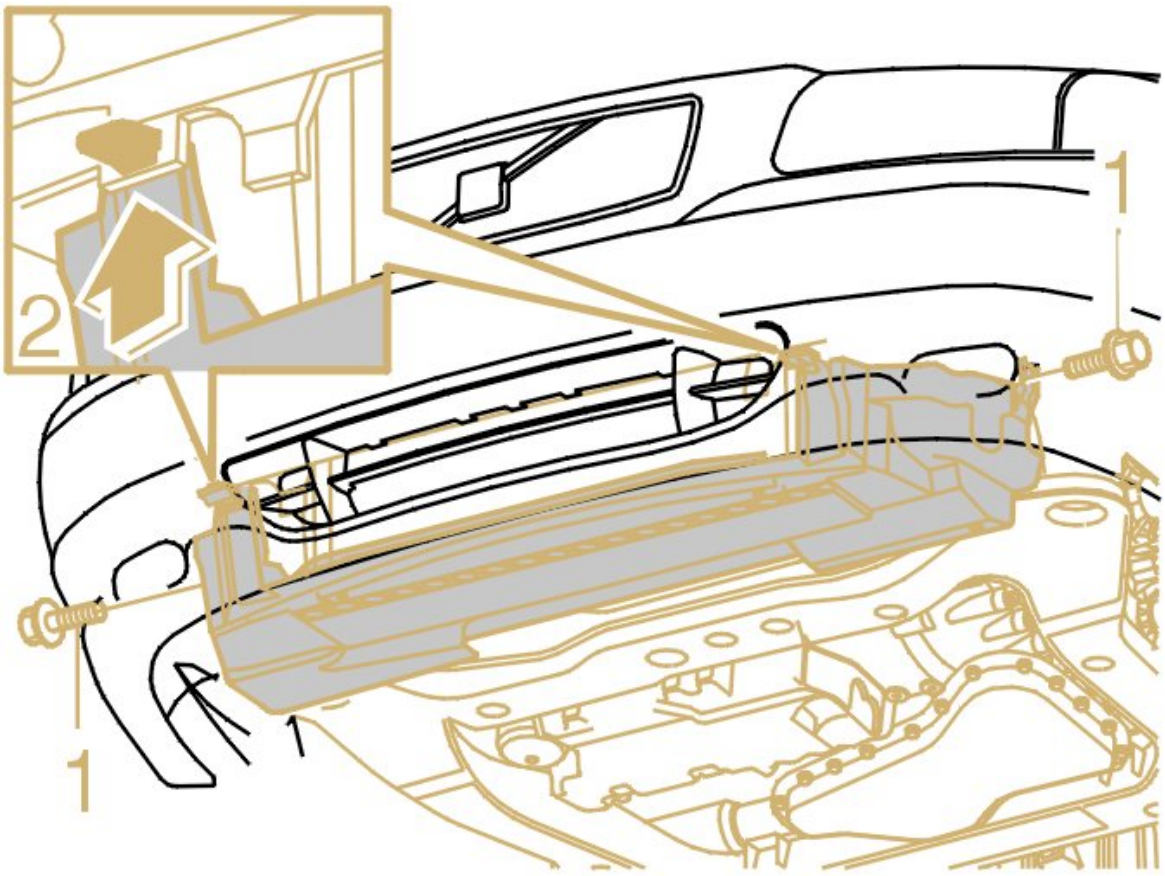
Remove:

- the two upper screws holding the air conditioning aggregate together
- the expansion tank cap.



Block the upper radiator hose with lock grip pliers.
Disconnect the hose from the radiator. Collect the coolant that flows out.

Work under the car



Remove:

- the air baffles
- the lower oil cooler hose from the cooler unit (automatics only). Protect the hose opening
  Note! Collect the oil from the oil cooler in a container.

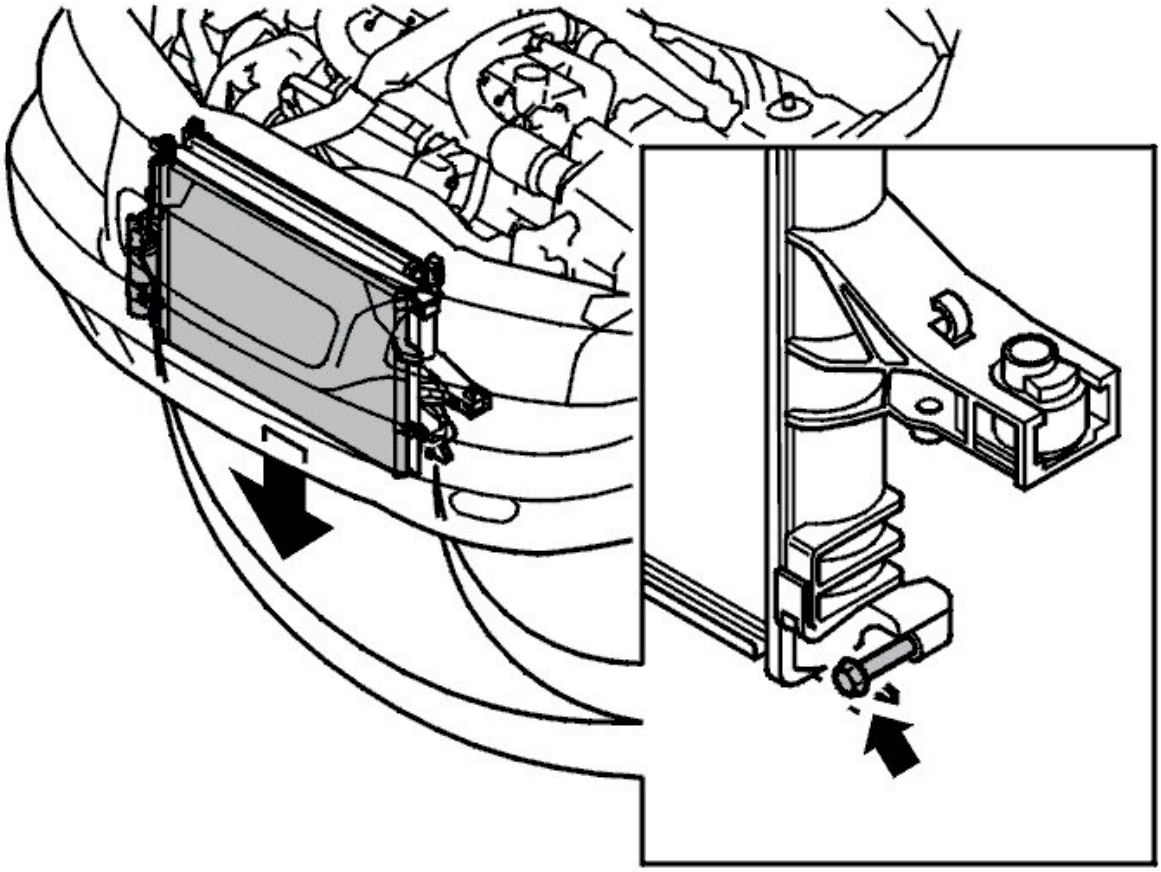
- the screw (1) for the cable harness on the front edge of the sub-frame.

Disconnect the connector from the condenser on the right side. Press the spring to disconnect the connector.

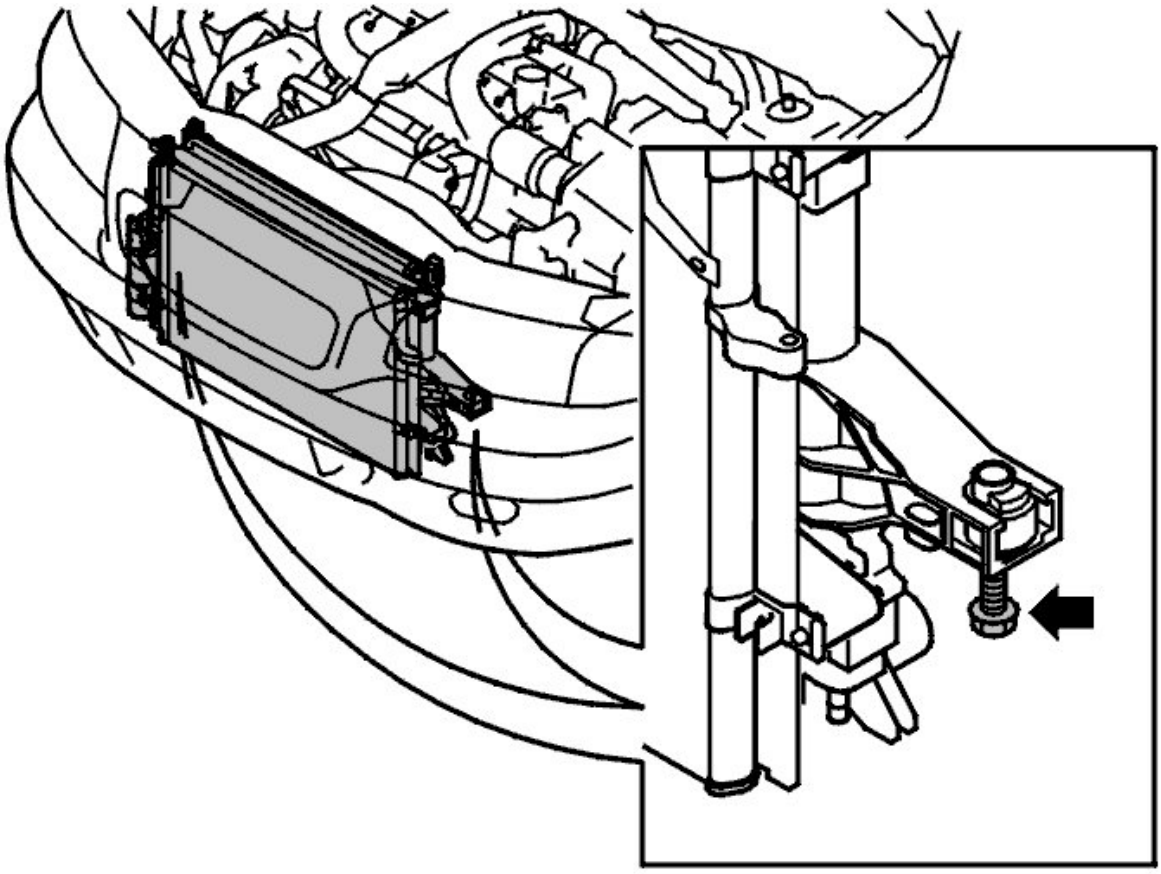
Drain the coolant

- Block the lower hose coolant hose with lock grip pliers
- Apply a hose on the nipple at the radiator
- Feed the hose down to a container
- Open the nipple and drain off the coolant.

Work under the car



Hang up the condenser using tie straps on the right-hand side in the pipe for the receiver drier and on the left-hand side in the pipe for the condenser.
Remove the lower screws holding the air conditioning aggregate.



Hint: The following step requires two people.

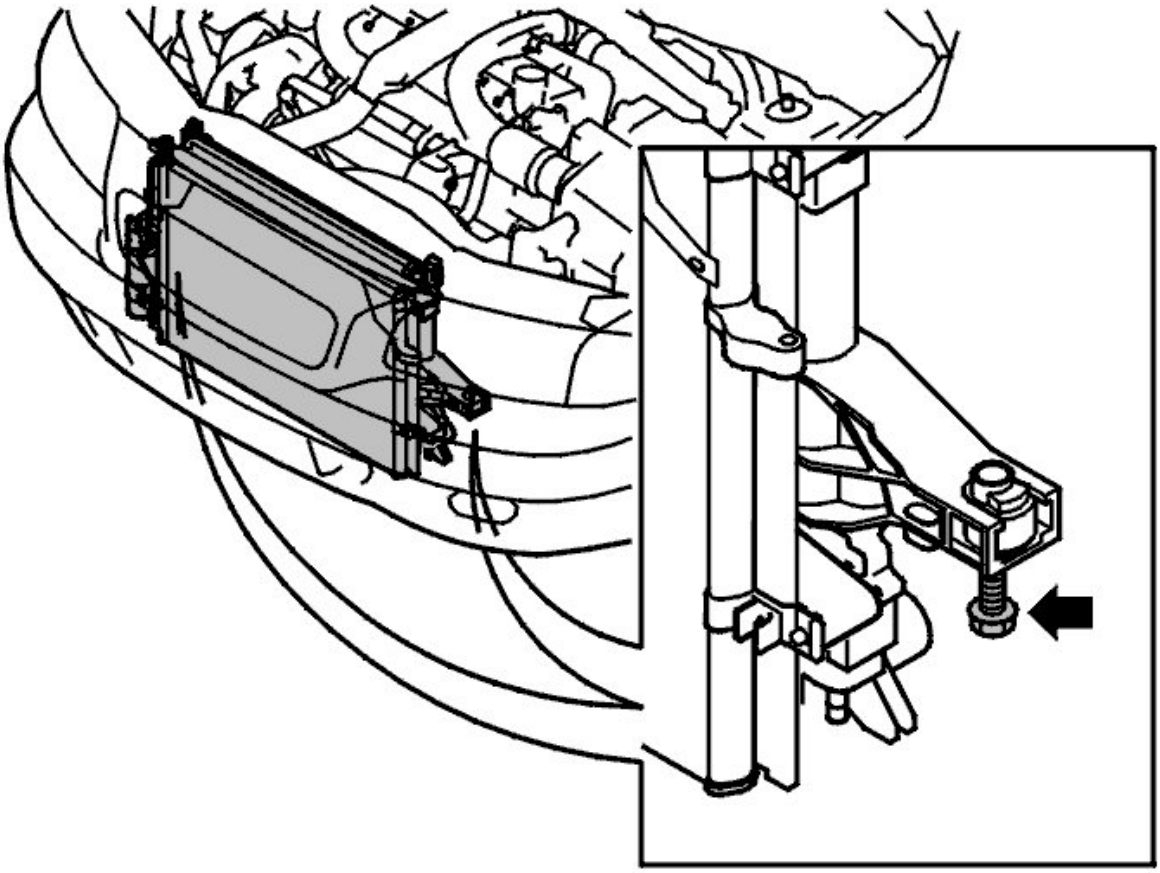
Disconnect the radiator and the charge air cooler (CAC) firstly from the left and then from the right-hand side by removing the two screws.
On the right-hand side, press the cable duct and the compressor hose towards the engine. At the same time release the radiator and charge air cooler (CAC) downwards on the right-hand side. Then release the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the radiator and charge air cooler (CAC) passes the AC pipe.

Disconnect the hose from the radiator to the expansion tank.
Remove the radiator / charge air cooler (CAC).

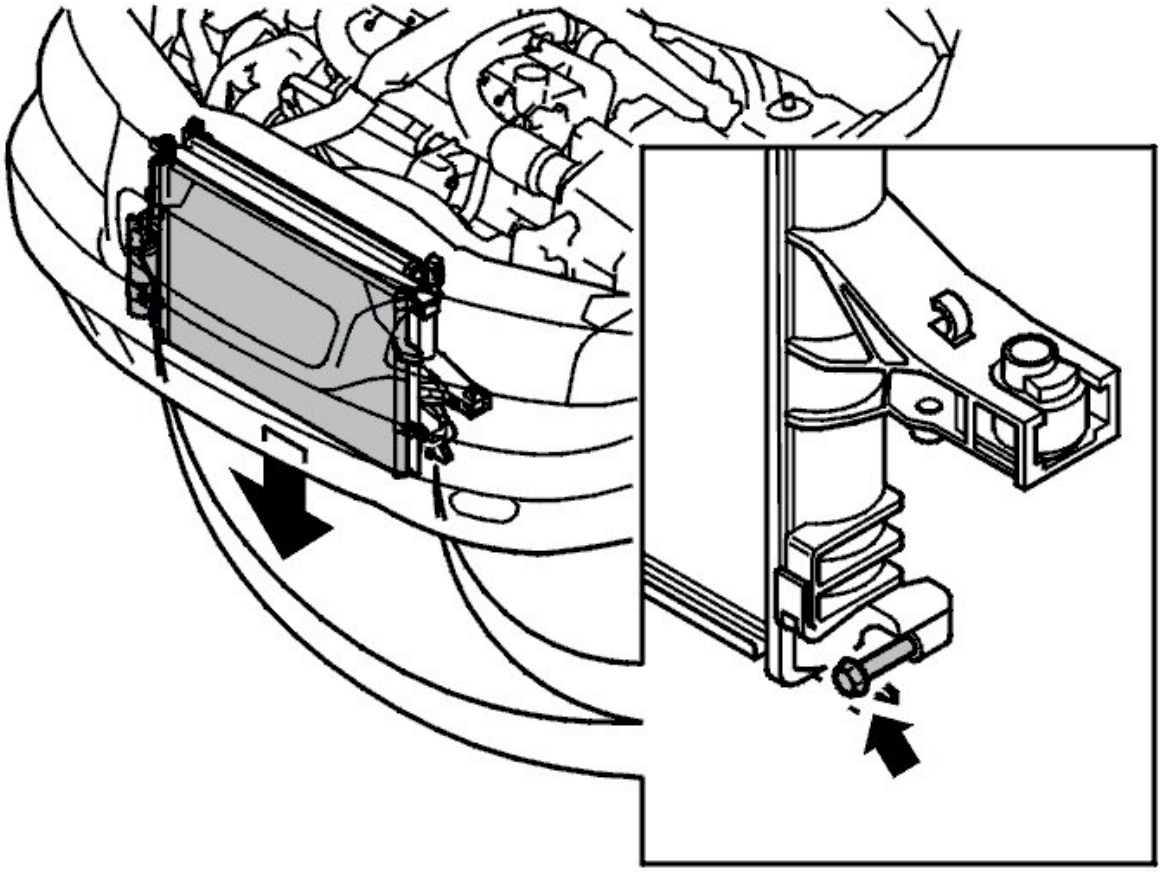
Installation

Installing the radiator and charge air cooler (CAC)

Hold the radiator unit. Secure the hose from the expansion tank to the radiator. Use a new clamp.
Check that the 2 plastic nuts are in position on the radiator.

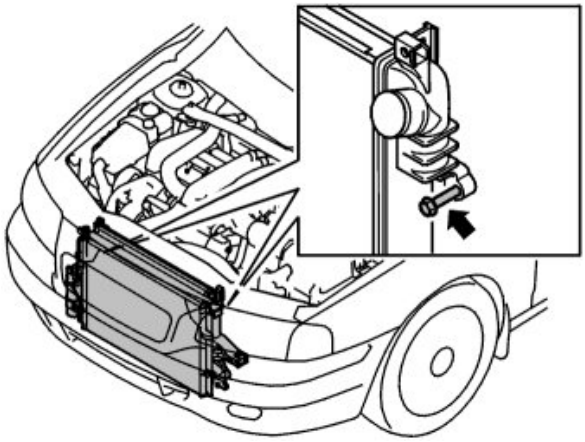


Lift up the radiator and charge air cooler (CAC) on the left-hand side. Ensure that the mounting for the charge air cooler (CAC) passes above the AC pipe. Lift the right-hand side while pressing the cable duct and the compressor hose towards the engine.
Thread the screws for the radiator and charge air cooler (CAC) into the member.
Connect the connector to the right-hand side of the condenser.

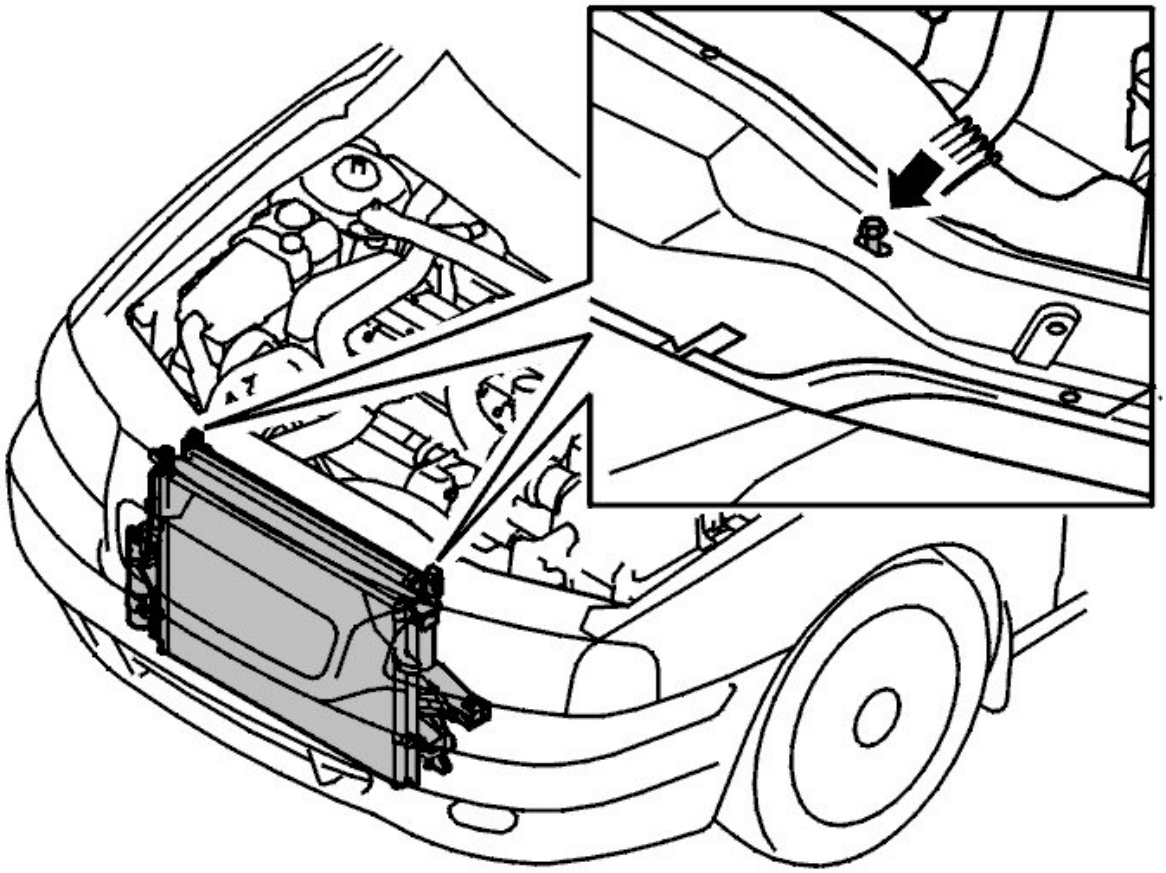


Install the lower screws to assemble the air conditioning aggregate. Tighten the screws. Tighten to **10 Nm**.
Remove the tie straps.
Check that the air conditioning aggregate is against the rubber seal. Secure.
Tighten the air conditioning aggregate to the member. Tighten to **25 Nm**.
Install the lower radiator hose.
Remove the lock grip pliers.
Install the screw for the mounting for the engine wiring cable duct at the front edge of the sub-frame.
Install the lower oil cooler hose on the air conditioning aggregate (automatic transmissions only).
Lower the car.

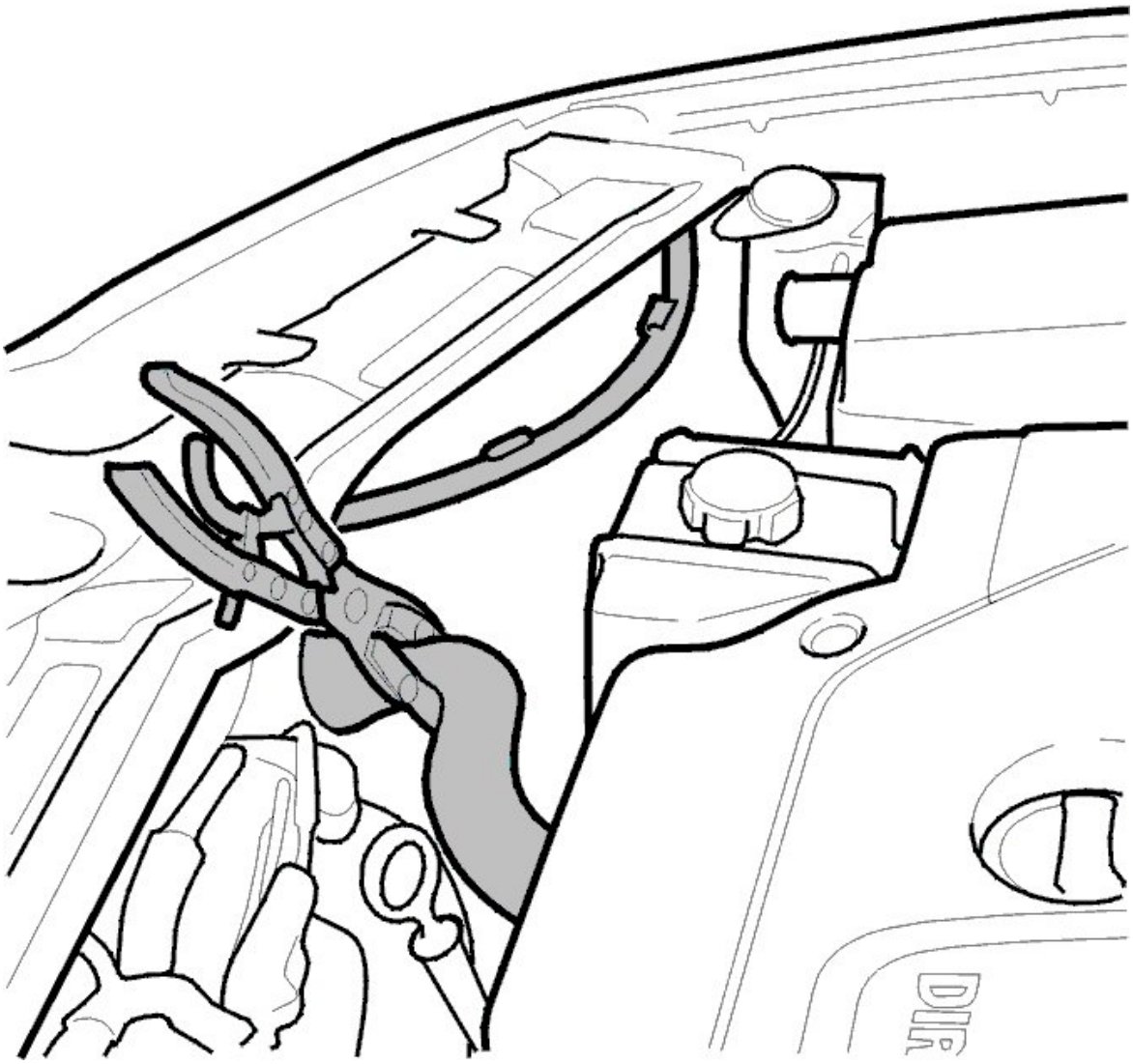
Installing the screws for the air conditioning aggregate



Install the upper screws to assemble the air conditioning aggregate. Tighten the screws. Tighten to **10 Nm**.



Install the screws for the air conditioning aggregate on the front cover plate. Tighten to **10 Nm**.



Install:

- the charge air pipe on the left and right-hand sides of the radiator
- the upper radiator hose.

Installing the engine cooling fan (FC)

To install the engine cooling fan (FC), see Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair.

Topping up the coolant

- Install the cap on the expansion tank
- Run the engine until the thermostat has opened
- Stop the engine. Top up if necessary.

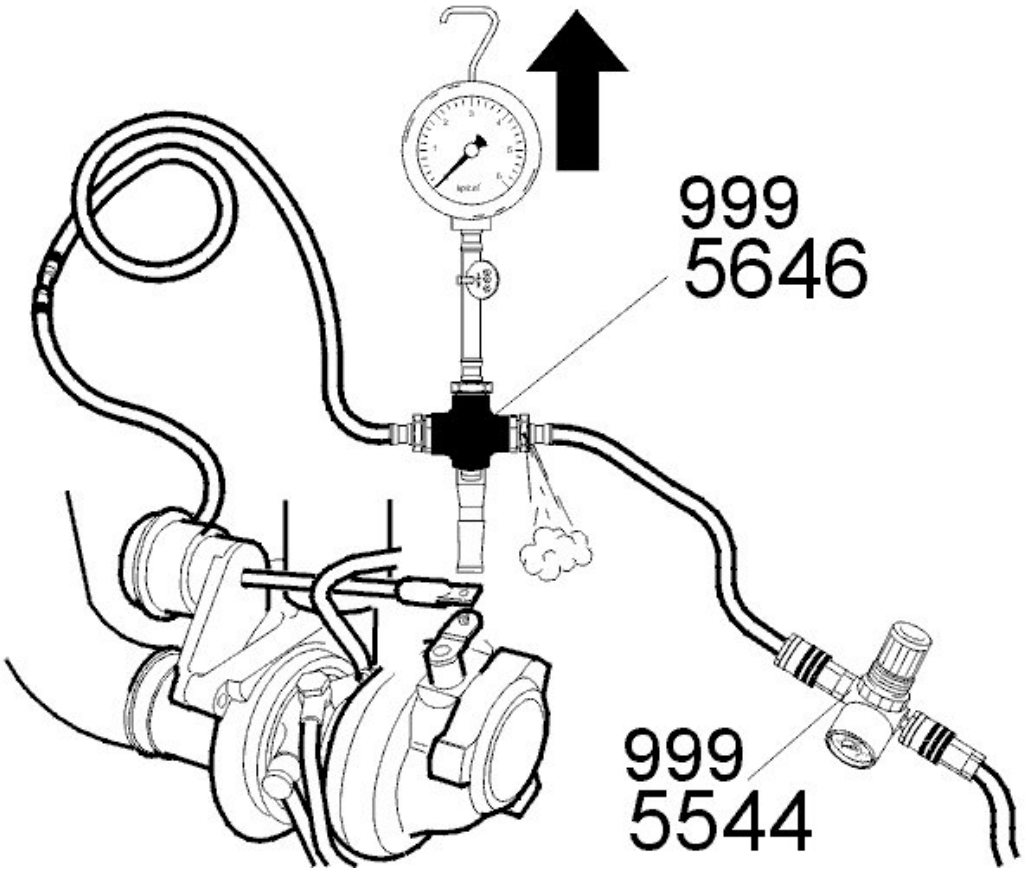
Wastegate Actuator: Adjustments

Wastegate valve, adjusting

Special tools:

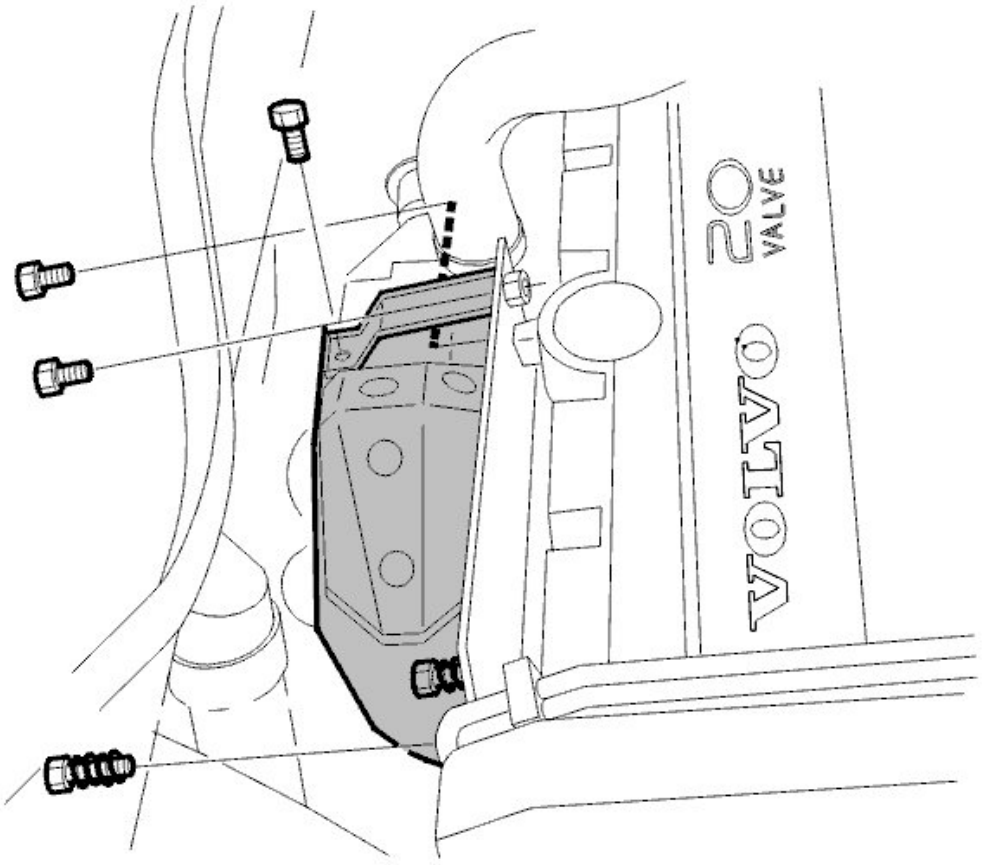
999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
999 5646 Pressure gauge See: Tools and Equipment/999 5646 Pressure Gauge

Manometer



Use test equipment 999 5646 Pressure gauge See: Tools and Equipment/999 5646 Pressure Gauge to measure the adjustment pressure. The manometer must always hang vertically when taking readings. This is to ensure that the values obtained are correct.

Removing the heat deflector plate



Remove the heat deflector plate over the turbocharger (TC). 4 screws.

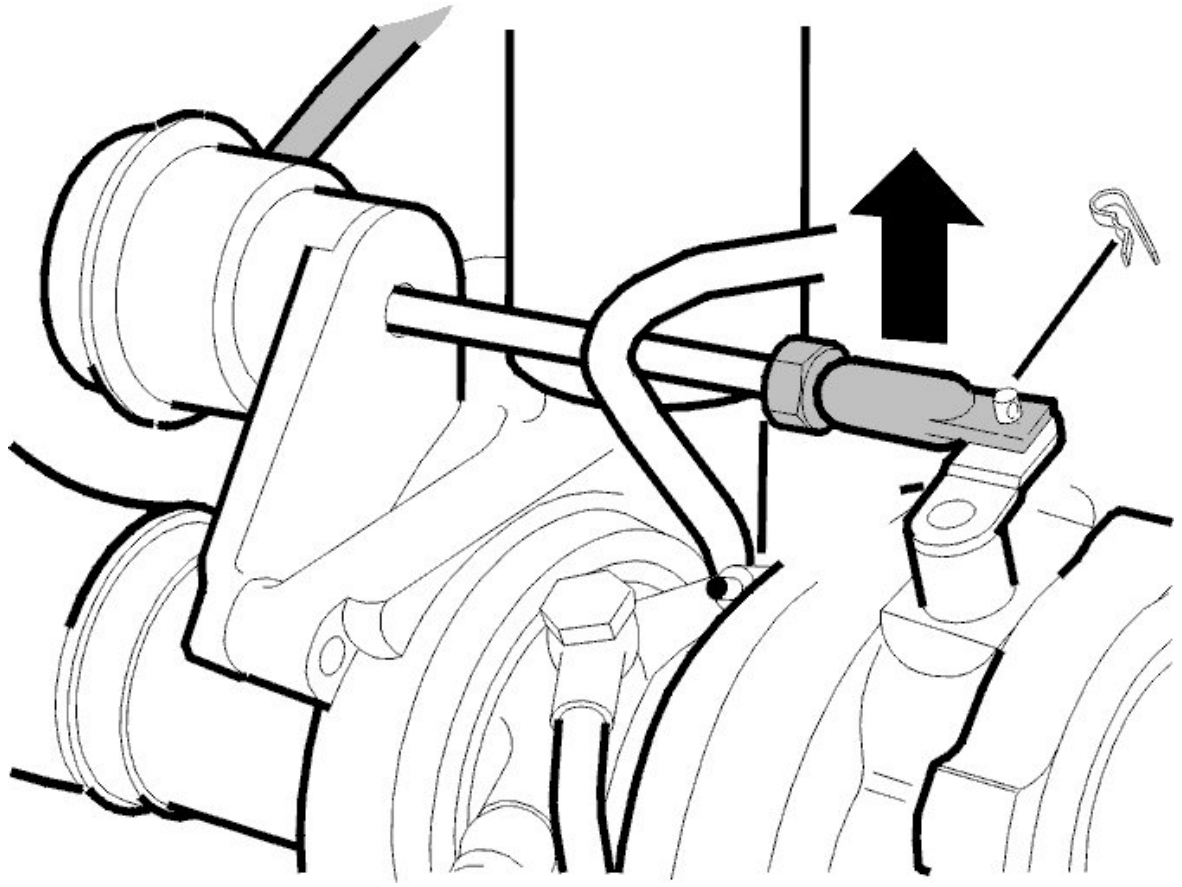
Removing the hose for the pressure regulator

Remove the hose for the pressure regulator (marked yellow). Disconnect the hose at the turbocharger (TC) control valve.
Remove the fresh air intake hose from the air cleaner (ACL) to access the hose clamp.

Only S70/V70/C70:

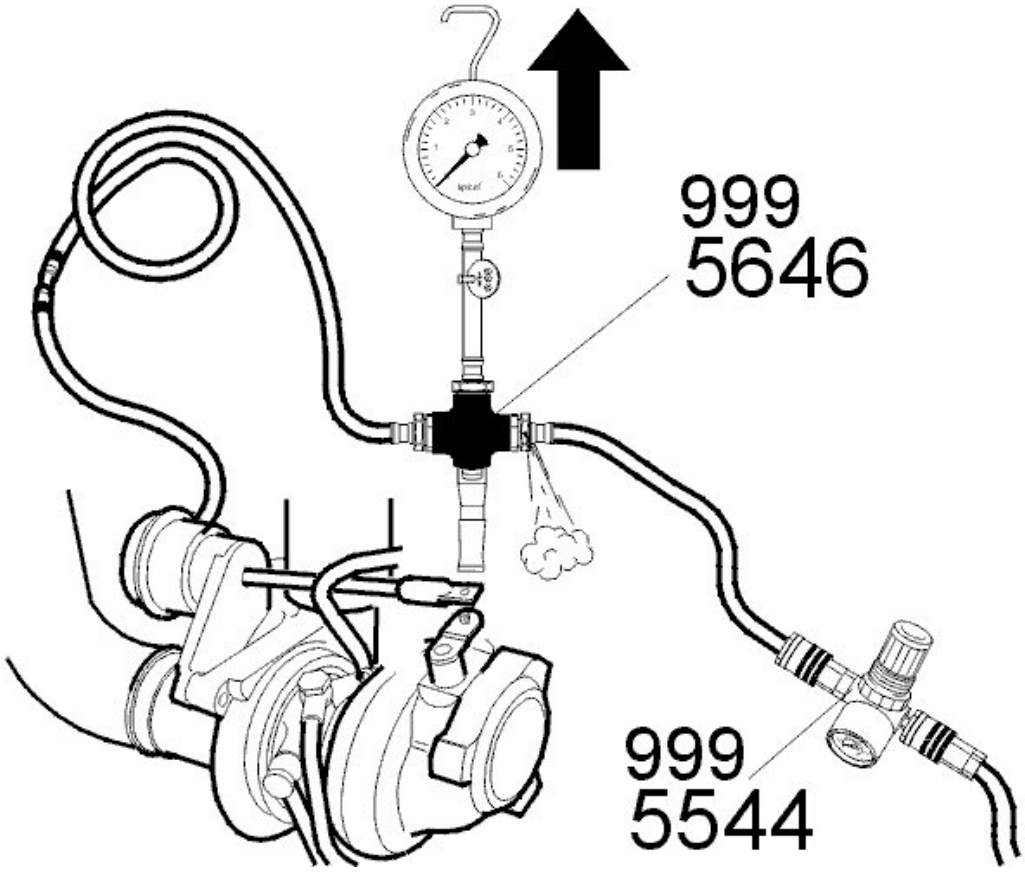
The position and version of the turbocharger (TC) control valve have been changed on the S70/V70/C70.
Disconnect the hose running backward on the turbocharger (TC) control valve (marked yellow).

Release the push rod



Remove the split pin from the lever.
Release the push rod. Lift the push rod straight up.

Connecting test equipment



Connect:

- manometer 999 5646 Pressure gauge See: Tools and Equipment/999 5646 Pressure Gauge to the pressure regulator hose
- pressure regulator 999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator to the manometer.

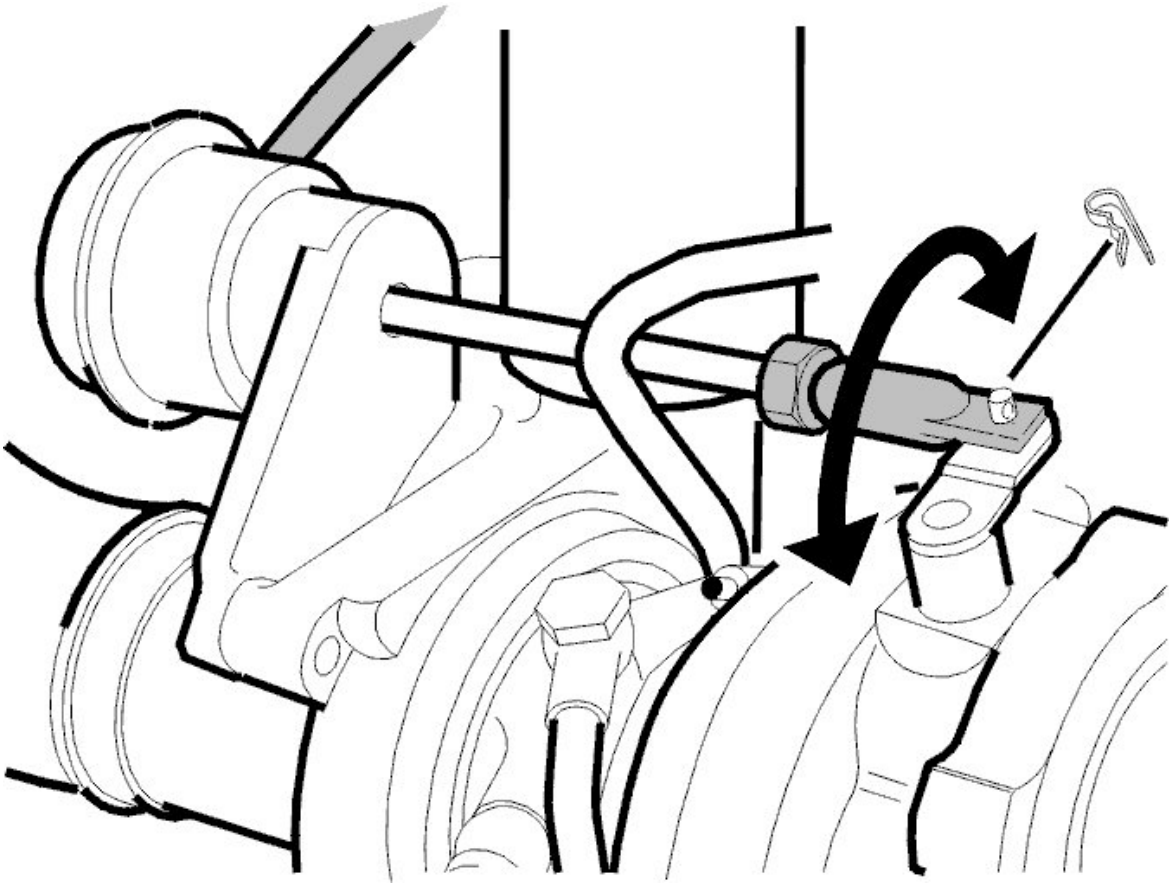
Note! When taking readings the manometer must always hang vertically from its hook. This is to ensure that the correct values are

obtained. Set the 3-way junction connector handle in its middle position.

Screw out the adjustment screw for the pressure regulator completely.
Connect compressed air to the pressure regulator.
Screw in the adjustment screw for the pressure regulator so that the manometer displays the value applicable to the relevant engine. See the table.
3-way junction connector has a vent (drilled hole) where it connects to the pressure regulator. This is to facilitate setting the correct pressure.

Engine	Adjustment pressure
B5204T	12.5 kPa
B5204T2	12.5 kPa
B5204T3	15 kPa
B5204T3, from model year 1999	18 kPa
B5204T4	12.5 kPa
B5204T5	12.5 kPa
B5234T	12.5 kPa
B5234T2	30 kPa
B5234T3	30 kPa
B5234T4	12.5 kPa
B5234T4 R-line, from model year 1998	28 kPa
B5234T5	12.5 kPa
B5234T6	30 kPa
B5234T7	12.5 kPa
B5234T8	30 kPa
B5244T	12.5 kPa
B5244T2	30 kPa
B5244T3	12.5 kPa
B5244T7	12.5 kPa
B5254T	12.5 kPa

Checking and adjusting



Push the lever for the boost pressure control (BPC) valve towards the turbocharger (TC) housing.
The boost pressure control (BPC) valve must be closed.
Check that the push rod locates on the lever lug.
If necessary, adjust the push rod until it locates.

Note! The push rod must be mounted on the lever when the lock-nut is adjusted.The diaphragm in the pressure regulator will be damaged if the push rod is twisted.

Reinstall

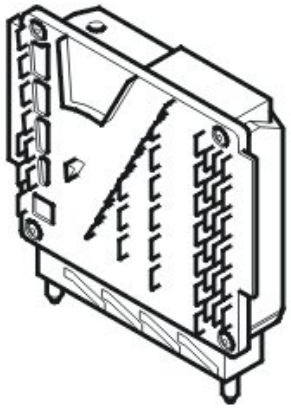
Install the split pin on the lever.
Tighten the lock-nut on the push rod.
Remove the test equipment.
Connect the hose.
Install the heat shield.
Erase any diagnostic trouble codes (DTCs).
Test drive the car. Accelerate to wide open throttle (WOT) a couple of times.
Then check that no diagnostic trouble codes (DTCs) have been stored.

Computers and Control Systems: Description and Operation
Engine Management System

System Overview

System overview

Control module



The Engine Control Module (ECM) controls the following functions:
- injectors
- ignition
- camshafts (CVVT)
- evaporative emission system (EVAP) valve
- turbocharger (TC) control
- throttle angle
- engine cooling fan (FC)
- Air conditioning (A/C) compressor
- fuel pump (only vehicles with demand controlled fuel pumps).

There is a micro-processor in the control module which receives signals from the different sensors in the car. The micro-processor uses a program which interprets the signals from the different sensors and how the components / functions should be controlled.
The control module has several self-learning (adaptive) functions. It continually adapts ongoing calculations to changing circumstances (wear, air leaks, differences between different fuels etc.).
Emissions are kept low through efficient management of the injection period, ignition, evaporative emission system (EVAP) valve and camshafts etc. Faults which affect emissions can be detected by running diagnostics for functions and components.
The control module is in a box in the engine compartment.
The engine control module (ECM) communicates with other control modules using controller area network (CAN) communication.
The engine control module (ECM) checks activations, input and output signals and functions using an integrated diagnostic system. A diagnostic trouble code (DTC) is stored if, after validation, the control module detects a fault. In certain cases the faulty signal is replaced with a substitute value or certain functions are limited.
Substitute values can be set for e.g.:
- engine coolant temperature (ECT)
- mass air flow
- throttle position
- atmospheric pressure
- etc.

Mathematical calculations and signals from certain components are used to calculate the substitute values. Other substitute values are fixed, predefined values in the control module.
The substitute value allows the car to be driven and for the emissions to be kept at a reasonable level even though vital functions / components are faults.
Functions which are limited may be for example:
- turbocharger (TC) control
- Camshaft control (CVVT)
- fuel trim
- throttle angle
- etc.

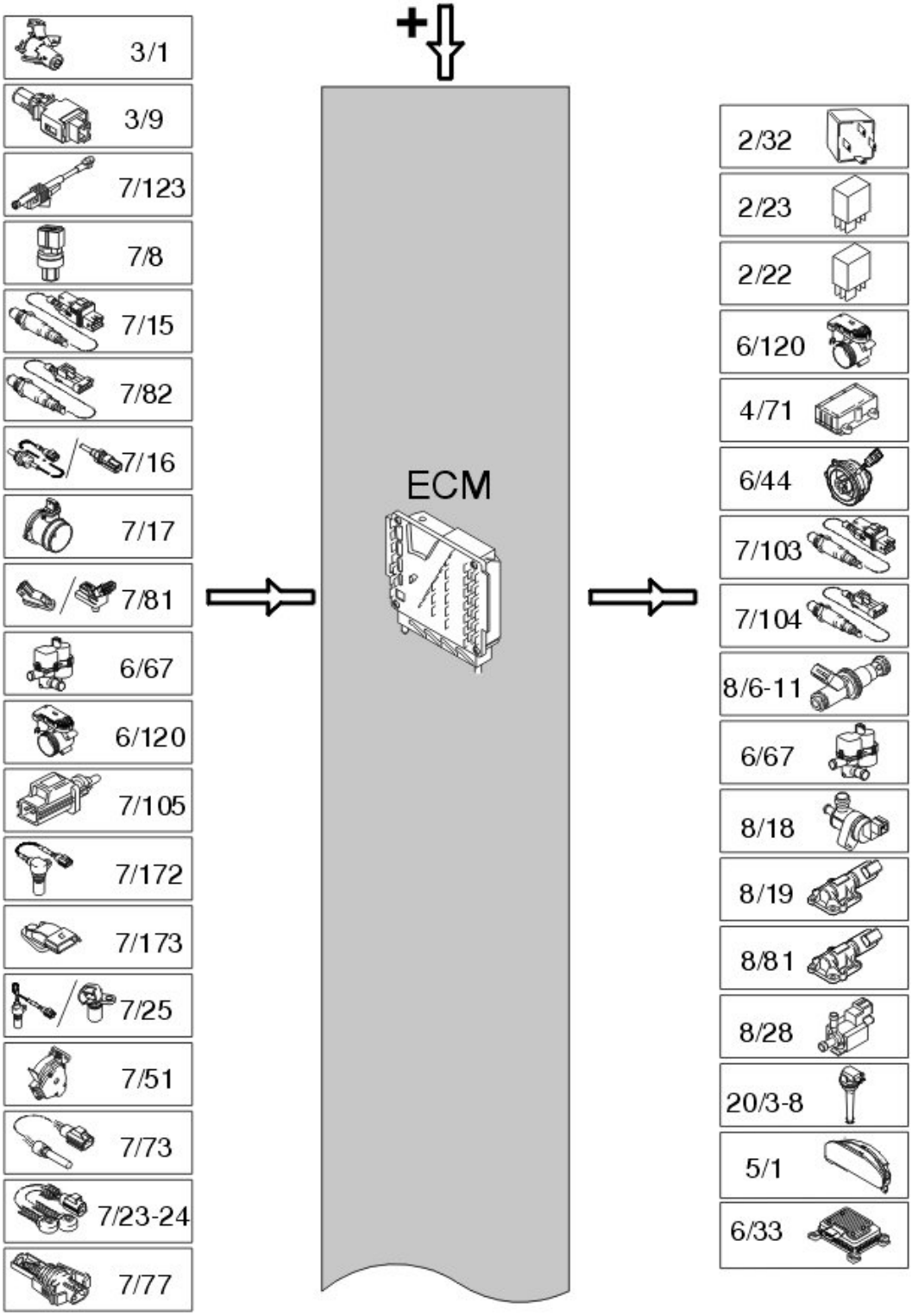
A function is limited so that the system still functions, to protect components or for safety reasons (for example the throttle angle).
Any diagnostic trouble codes (DTCs) are stored in the control module memory. The data can be read off using VIDA.

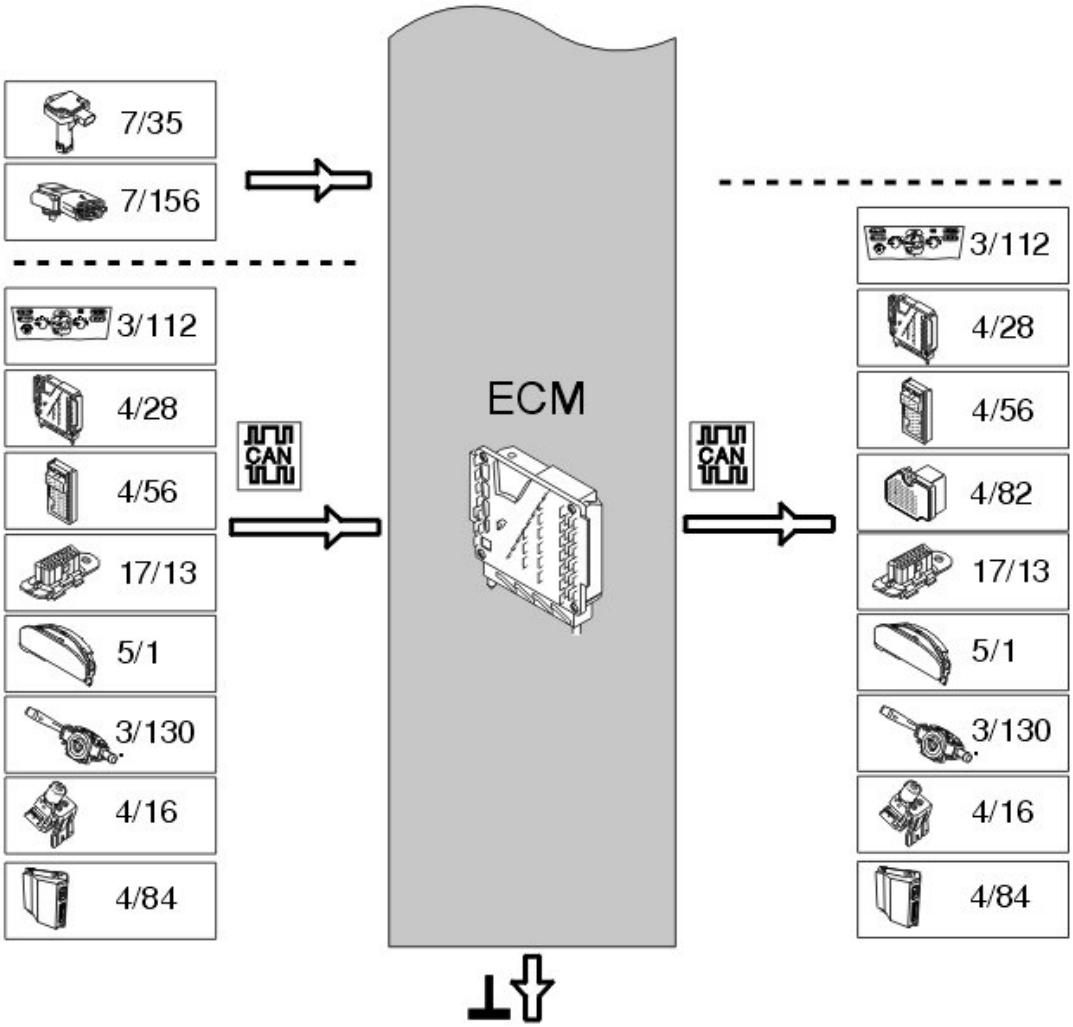
Signals

The table below summarizes the input signals to and output signals from the Engine Control Module (ECM). The signal types are divided into directly connected signals, serial communication and controller area network (CAN) communication. The illustration below displays the same

information with the Volvo component designations.

Input signals	**Output signals**
Directly connected:	**Directly connected:**
• Ignition switch (3/1) • Stop lamp switch (3/9) • Clutch pedal sensor (7/123) • Air conditioning (A/C) pressure sensor (7/8) • Front heated oxygen sensor (HO2S) (7/15) • Rear heated oxygen sensor (HO2S) (7/82) • Engine coolant temperature (ECT) sensor (7/16) • Mass air flow (MAF) sensor (7/17) • Manifold absolute pressure (MAP) sensor, intake (7/81) (certain turbocharged engines only) • Manifold absolute pressure (MAP) sensor, with integrated intake air temperature (IAT) sensor, intake (7/81) (certain turbocharged engines only) • Leak diagnostic unit (6/67), (certain markets only) • Electronic throttle unit (6/120) • Outside temperature sensor (7/105) • Camshaft position (CMP) sensor (7/172) • Camshaft position (CMP) sensor (7/173) • Engine speed (RPM) sensor (7/25) • Accelerator pedal (AP) position sensor (7/51) • Engine coolant level sensor (7/73) • Knock sensor (KS) (7/23-7/24) • Manifold absolute pressure (MAP) sensor, intake (7/77) (not turbocharged engines 2003-2004) • Oil level sensor (7/35) (certain markets and models only) • Fuel pressure sensor with integrated fuel temperature sensor (7/156) (vehicles with demand controlled fuel pumps only).	• Main relay (system relay) (2/32) • Fuel pump (FP) relay (2/23) • Air conditioning (A/C) relay (2/22) • Electronic throttle unit (6/120) • Engine cooling fan (FC) control module (4/71) • Engine cooling fan (FC) control module box (6/44) (turbocharger (TC) only and certain markets) • Front heated oxygen sensor (HO2S), preheating (7/103) • Rear heated oxygen sensor (HO2S), preheating (7/104) • Injectors (8/6-8/11) • Leak diagnostic unit (6/67), (certain markets only) • Evaporative emission system (EVAP) valve (8/18) • Camshaft reset valve (CVVT) (8/19) (certain engines only) • Camshaft reset valve (CVVT) (8/81) (certain engines only) • Turbocharger (TC) control valve (8/28) • Ignition coils (20/3-20/8) • Driver information module (DIM) (5/1), emissions warning lamp • Fuel pump control module (6/33) (only vehicles with demand controlled fuel pumps) • Central electronic module (CEM) (4/56).
Via Controller Area Network (CAN) communication:	**Via Controller Area Network (CAN) communication:**
• Transmission Control Module (TCM) (4/28) (only cars with automatic transmissions) • Brake control module (BCM) (4/16) • Central electronic module (CEM) (4/56) • Suspension module (SUM) (4/84) (vehicle with Four-C (Continuously Controlled Chassis Concept) only). Via central electronic module (CEM) (4/56): • Climate Control Module (CCM) (3/112) • Data link connector (DLC) (17/13) • Driver information module (DIM) (5/1) • Steering wheel module (SWM) (3/130).	• Transmission Control Module (TCM) (4/28) (only cars with automatic transmissions) • Brake control module (BCM) (4/16) • Central electronic module (CEM) (4/56) • Differential electronic module (DEM) (4/82) (AWD only) • Suspension module (SUM) (4/84) (vehicle with Four-C (Continuously Controlled Chassis Concept) only). Via central electronic module (CEM) (4/56): • Climate Control Module (CCM) (3/112) • Data link connector (DLC) (17/13) • Driver information module (DIM) (5/1) • Steering wheel module (SWM) (3/130).

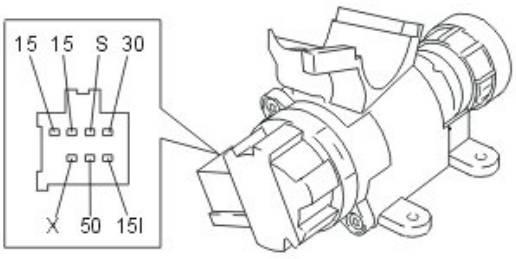

3/1
3/9
7/123
7/8
7/15
7/82
7/16
7/17
7/81
6/67
6/120
7/105
7/172
7/173
7/25
7/51
7/73
7/23-24
7/77
+
ECM
2/32
2/23
2/22
6/120
4/71
6/44
7/103
7/104
8/6-11
6/67
8/18
8/19
8/81
8/28
20/3-8
5/1
6/33



Part 1

Design

Ignition switch

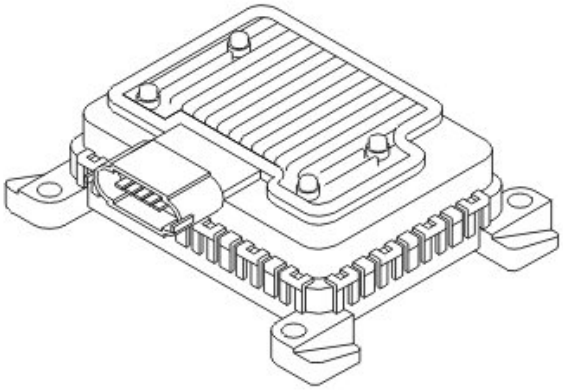


The Engine Control Module (ECM) uses the signal from the ignition switch to detect when the ignition key has been turned to position II or III. When the key is in the ignition position (position II) or starting position (position III) a high signal (Ubat) is transmitted from the ignition switch to the engine control module (ECM). The engine management system prepares for start-up (for example, temporarily activates the fuel pump (FP) relay). When the flywheel in the engine rotates, the engine speed (RPM) sensor signal is used to keep the fuel pump (FP) relay activated.
The fuse in the fusebox in the passenger compartment supplies current to the ignition switch.
The central electronic module (CEM) can diagnose the ignition switch.

Immobilizer

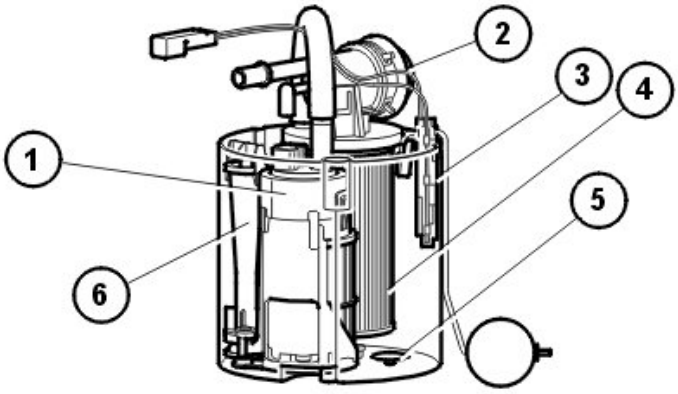
See Design and Function, Immobilizer.

Fuel pump control module (only vehicles with demand controlled fuel pumps)



The fuel pump control module powers the fuel pump and regulates the output of the pump. The fuel pressure changes with the output of the pump.
The fuel pump control module is supplied with battery voltage by the fuel pump (FP) relay and is grounded in the car body. The fuel pump (FP) relay is controlled by the central electronic module (CEM) when requested by the engine control module (ECM).
The engine cannot be started if the power supply to the fuel pump control module is faulty because the fuel pump will not then be powered.
The fuel pump control module is controlled by the engine control module (ECM) via serial communication. The fuel pump control module then controls the fuel pump by transmitting a PWM voltage on the ground lead for the fuel pump. This means that the voltage drop across the pump changes, and with it the output of the fuel pump. Also see Function, B5244T5, B5254T2 See: Function.
There are no diagnostics for the fuel pump control module. The engine control module (ECM) has diagnostics for fuel pressure regulation and the associated components. Also see Fuel pressure regulation, diagnostics See: Diagnostic Functions/Fuel Pressure Regulation, Diagnostics.
The pulse-width modulated (PWM) signal from the engine control module (ECM) to the fuel pump control module can be read using VIDA.
The fuel pump control module is on the outside on the right-hand side of the fuel tank.

Fuel pump (only vehicles with demand controlled fuel pumps)

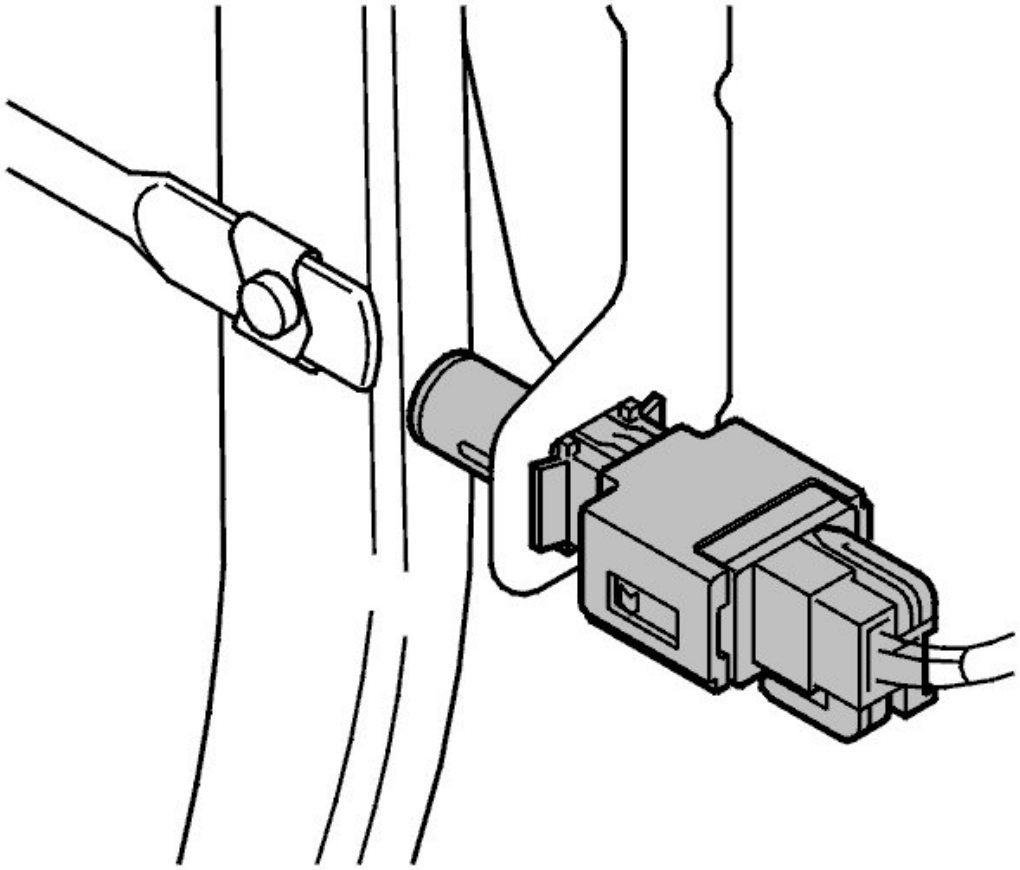


The function of the fuel pump is to ensure that the pressure is correct at the delivery lines for the injectors when requested by the fuel pump control module.
The fuel pump consists of:

1. An electrical pump with an integrated safety valve
2. A pressure equalization valve. This valve equalizes rapid pressure peaks which occur, for example, when the injectors close during engine braking. It also contains a non-return valve which ensures that the pressure in the system does not drop when the engine is switched off
3. Fuel level sensor
4. Fuel filter, cannot be replaced separately
5. Relief valve, releases fuel into the pump housing
6. Ejector pump, continuously fills the pump housing with fuel. The fuel always flows from the fuel pump through the ejector and back to the pump housing.

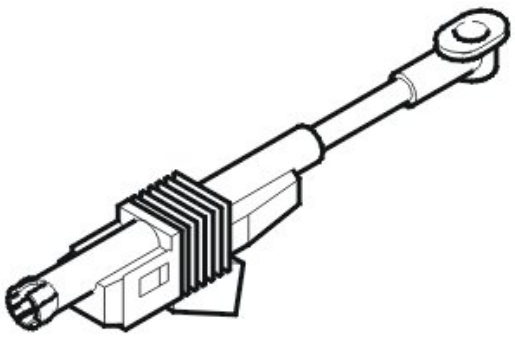
The fuel pump is supplied with battery voltage by the fuel pump control module and is grounded in the car body.
The engine control module (ECM) has diagnostics for the fuel pump function to ensure that the pressure is correct. Also see Fuel pressure regulation, diagnostics See: Diagnostic Functions/Fuel Pressure Regulation, Diagnostics.
The fuel pump can be activated and its status read off using VIDA.
The pressure in the fuel rail can be measured by connecting a manometer to a nipple. This nipple is on the right-hand end of the fuel rail.

Brake light switch



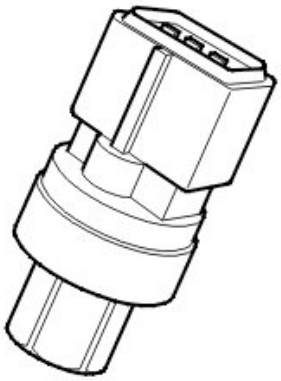
The task of the brake light switch is to provide the engine control module (ECM) with information about the position of the brake pedal.
A signal is transmitted to the engine control module (ECM) when the brake pedal is pressed. The engine control module (ECM) disengages the cruise control (if activated). The brake pedal sensor also disengages cruise control. For further information, see Design and Function, Brake system, design.
The brake light switch is supplied with power from the ignition switch (terminal 30). When the brake pedal is depressed the switch closes and a high signal (12 V) is transmitted to the engine control module (ECM).
The engine control module (ECM) can diagnose the brake light switch. The status of the switch can be read using VIDA.
The brake light switch is on the pedal box by the brake pedal.

Clutch pedal sensor (manual transmissions only)



The clutch pedal sensor provides the Engine Control Module (ECM) with information about the position of the clutch pedal.
This information is used by the control module to switch off the cruise control.
The sensor signal is also used by the control module to prevent engine start if the clutch pedal is not pressed (certain markets).
The sensor consists of a sliding potentiometer which is supplied with power by the control module (signal) and which is grounded in the control module.
The resistance in the sensor drops when the clutch pedal is pressed.
The engine control module (ECM) can diagnose the clutch pedal sensor. The status (position) of the sensor can be read using VIDA.
The sensor is on the pedal box by the clutch pedal.

Air conditioning (A/C) pressure sensor



The air conditioning (A/C) pressure sensor detects the pressure in the high-pressure side of the air conditioning (A/C) system. This is so the engine control module (ECM) can control:

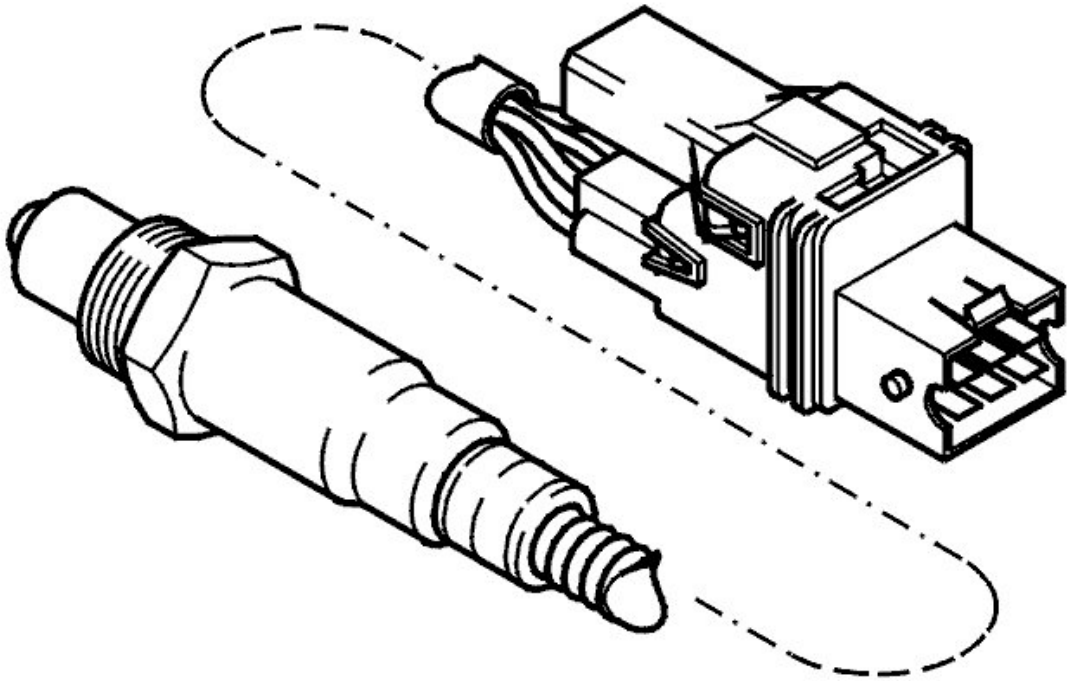
- engine cooling fan (FC) start
- stopping the compressor if the pressure in the air conditioning (A/C) is too high
- constant idle speed compensation for the air conditioning (A/C) compressor load.

The sensor is linear. It is grounded in the control module and supplied with a 5 Volt current from the control module. A linear signal (between 0-5 V depending on the pressure in the air conditioning (A/C)) is transmitted to the control module. At 0.25 kPa or lower, the voltage is 0 V, at 3100 kPa the voltage is approximately 4.75 V. Low pressure results in low voltage, high pressure in high voltage.
The engine control module (ECM) can diagnose the air conditioning (A/C) pressure sensor. The sensor value can be read off using VIDA.
The air conditioning (A/C) pressure sensor is positioned on the high pressure delivery line for the air conditioning (A/C) system.

Heated oxygen sensors (HO2S)

- 5 cylinder engines have two heated oxygen sensors (HO2S), front and rear
- 6 cylinder engines have four heated oxygen sensors (HO2S), front and rear for bank 1 (cylinders 1-3) and front and rear for bank 2 (cylinders 4-6)
- XC90s with 6 cylinder engines utilize the Y-concept, where the engine has two heated oxygen sensors (HO2S) bank 1 (cyl. 1 -3), bank 2 (cyl. 4 -6) and a rear heated oxygen sensor (HO2S) (bank 1).

Front heated oxygen sensor (HO2S)



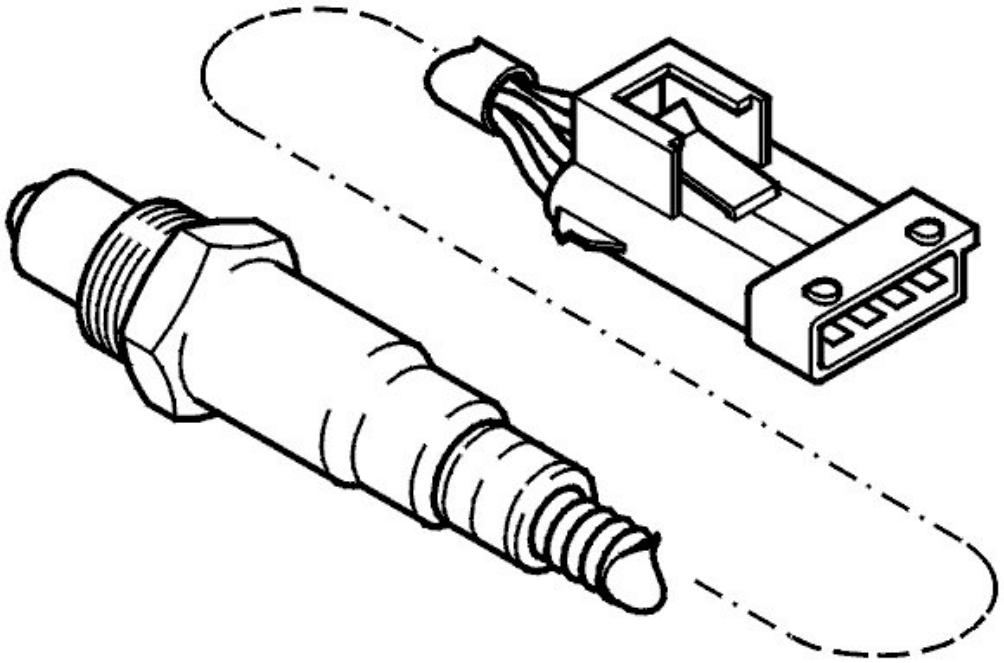
The front heated oxygen sensor (HO2S) is used to provide the Engine Control Module (ECM) with information about the remaining oxygen content of the exhaust gases in front of the three-way catalytic converter (TWC). This is so that the Engine Control Module (ECM) can continually check the combustion so that lambda=1. lambda=1 is the ideal fuel-air ratio, with 14.7 kg air/1 kg fuel.
The heated oxygen sensor uses current regulation and its signal characteristic is linear. With a linear signal characteristic, the amplitude of the

signal curve is low when changing the oxygen content in the exhaust gases. The probe consists of a preheating element (see "Pre-heating heated oxygen sensors (HO2S)") and the actual lambda sensor. The lambda sensor is an oxygen sensitive ceramic body consisting of zirconium oxide. The control module supplies power to the ceramic body, which reacts to the oxygen content of the exhaust gases. This in turn affects the signal to the engine control module (ECM). In order to determine the oxygen content in the exhaust pipe, the heated oxygen sensor needs reference air from the surrounding air. This reference air reaches the heated oxygen sensor via the wiring.

Caution! The wiring for the heated oxygen sensors (HO2S) must not be trapped or damaged in any way. The connectors for the heated oxygen sensors (HO2S) must not be greased under any circumstances. The oil in the grease would disrupt the reference air and the function of the heated oxygen sensors (HO2S).

The engine control module (ECM) can diagnose the heated oxygen sensor. For further information, see Heated oxygen sensor (HO2S) diagnostic See: Diagnostic Functions/Heated Oxygen Sensor (HO2S) Diagnostic. VIDA can be used to read off the calculated lambda value from the heated oxygen sensor.

Rear heated oxygen sensor (HO2S)



The rear heated oxygen sensor (HO2S) is used to provide the Engine Control Module (ECM) with information about the remaining oxygen content of the exhaust gases beyond the three-way catalytic converter (TWC). This information is used by the Engine Control Module (ECM) to check the function of the three-way catalytic converter (TWC). This check is carried out when the conditions for the catalytic converter diagnostics have been met. The rear heated oxygen sensor (HO2S) has no direct effect on regulation of the fuel/air mixture. However the Engine Control Module (ECM) uses the signal to optimize the signal from the front heated oxygen sensor (HO2S). For further information, see:
For S60/ S80/ V70/ V70XC/ XC70: Three-way catalytic converter (TWC) diagnostics See: Diagnostic Functions/Three-Way Catalytic Converter (TWC) Diagnostics.
For XC90: Catalytic converter diagnostic See: Diagnostic Functions/Three-Way Catalytic Converter (TWC) Diagnostics.
The heated oxygen sensor (HO2S) uses voltage control. The signal characteristic is binary. With a binary signal characteristic, the amplitude of the signal curve changes considerably when changing the oxygen content in the exhaust gases. Otherwise its components and function are the same as the front heated oxygen sensor (HO2S).

Caution! The wiring for the heated oxygen sensors (HO2S) must not be trapped or damaged in any way. The connectors for the heated oxygen sensors (HO2S) must not be greased under any circumstances. The oil in the grease would disrupt the reference air and the function of the heated oxygen sensors (HO2S).

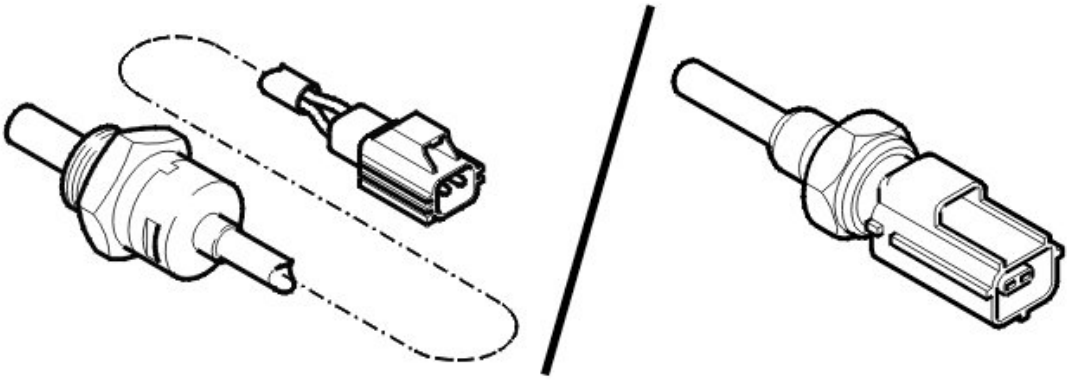
The engine control module (ECM) can diagnose the rear heated oxygen sensor. The signal can be read using VIDA.

Preheating of the heated oxygen sensors (HO2S)

The heated oxygen sensor (HO2S) only functions above a certain temperature, approximately 300 °C. The normal operating temperature is between 300-900 °C. The heated oxygen sensors (HO2S) are electrically pre-heated so that operating temperature is rapidly reached. This also ensures that the heated oxygen sensors (HO2S) maintain a normal operating temperature and to prevent condensation which could damage the heated oxygen sensor (HO2S).

The heater element in the probe consists of a positive temperature coefficient (PTC) resistor. The system relay supplies the heater element with voltage. The element is grounded in the engine control module (ECM). When the control module grounds the connection a current flows through the PTC resistor. When the heated oxygen sensor (HO2S) is cold, the resistance in the PTC resistor is low and a large current will flow through the circuit. The current from the Engine Control Module (ECM) is pulsed at first to prevent condensation damage to the heated oxygen sensor (HO2S). Depending on the temperature, allowances are made for factors such as the dew point. As the temperature in the PTC resistor rises, the resistance rises, the current falls and switches in stages to a constant current. The pre-heating time for the front heated oxygen sensor (HO2S) is short, approximately 20 seconds.
Probe preheating begins as soon as the engine is started. The heater element heats the heated oxygen sensors (HO2S) to approximately 350 °C. The probes maintain this as a minimum temperature.
The engine control module (ECM) can diagnose the heater element.

Engine coolant temperature (ECT) sensor

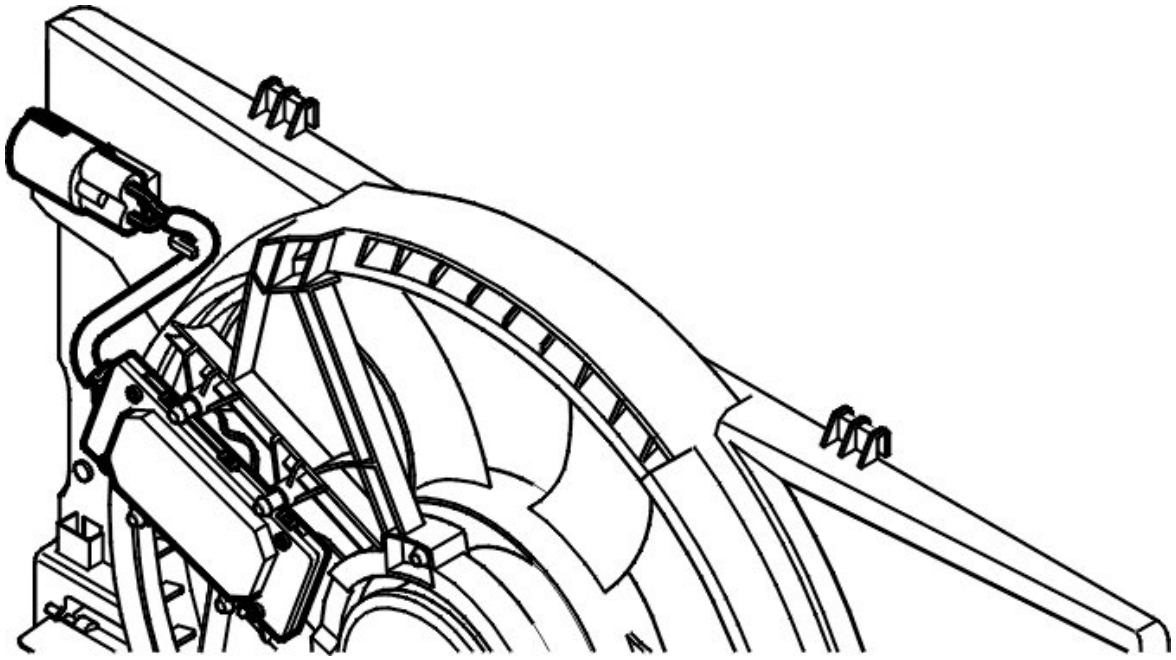


The engine coolant temperature (ECT) sensor checks the temperature of the engine coolant. The temperature of the engine coolant is required so that the engine control module (ECM) can regulate:

- the injection period
- the idle speed
- the engine cooling fan (FC)
- the ignition advance
- engagement and disengagement of the A/C compressor
- diagnostic functions.

The sensor is a negative temperature coefficient (NTC) type which is supplied with power from the control module (signal) and is grounded in the control module.
The resistance in the sensor changes depending on the temperature of the coolant. Depending on the resistance in the sensor, a voltage (signal) is transmitted to the Engine Control Module (ECM). At 0 °C, the voltage is approximately 4.0 V. At 100 °C the voltage is approximately 0.5 V. Low temperature results in high voltage (high resistance), high temperature in low voltage (low resistance).
The engine coolant temperature (ECT) sensor is located beside the thermostat.
The engine control module (ECM) can diagnose the engine coolant temperature sensor. The sensor value can be read off using VIDA.

Engine cooling fan (FC) / engine cooling fan (FC) control module



The engine cooling fan (FC) has two functions. One is to cool the engine compartment, the other is to cool the condenser when the air conditioning

(A/C) compressor is working.
The engine control module (ECM) transmits a pulse width modulated (PWM) signal to the engine cooling fan (FC) control module. The control module then activates the fan at different speeds. The speed of the engine cooling fan (FC) is determined by the engine control module (ECM), depending on the coolant temperature (based on the signal from the engine coolant temperature (ECT) sensor) and the vehicle speed.
The temperature conditions for engagement of the different engine cooling fan (FC) stages may vary slightly, depending on the engine variant and the equipment level.
The temperature conditions apply when:

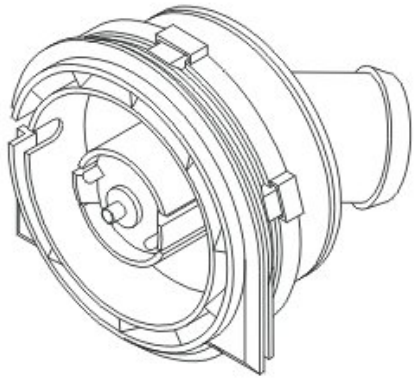
- the A/C is off
- no faults are detected by the Engine Control Module (ECM).

Note! The engine cooling fan may have a post-run of up to approx. 6 minutes after the engine has been turned off. The time for the fan's post-run depends on engine temperature, temperature in the engine compartment and pressure level in the AC-system.

Warning! Be careful since the engine cooling fan may have a post-run after the engine has been turned off.

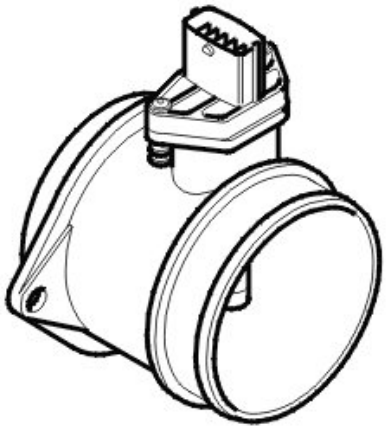
The engine cooling fan (FC) and its control module are behind the radiator.
The engine control module (ECM) can diagnose the engine cooling fan. The fan can be activated using VIDA.

Cooling fan for control modules, turbocharger (TC) (certain markets only)



The function of the cooling fan is to cool the control modules in the control module box in the engine compartment. The control modules may be damaged if they overheat.
The engine control module (ECM) activates the fan depending on the signal from the engine coolant temperature (ECT) sensor and the temperature sensor in the control module.
The cooling fan is in the hose between the control module box and the firewall.
The engine control module (ECM) can diagnose the cooling fan. The fan can be activated using VIDA.
A diagnostic trouble code (DTC) is stored if the temperature in the engine control module (ECM) gets too high.

Mass air flow (MAF) sensor (2002-2004)



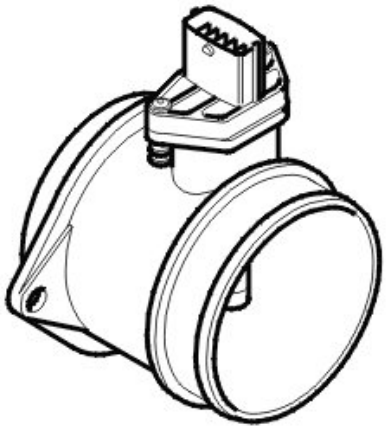
The mass air flow (MAF) sensor gauges the air mass sucked into the engine. It continuously transmits signals to the engine control module (ECM) about the mass of the intake air. This data is used by the engine control module (ECM) to calculate:

- the injection period
- the ignition timing
- turbocharger (TC) boost pressure (turbocharged engines only)
- the engine load.

The transmission control module (TCM) also uses this data for its gear shift calculations. This data is transmitted to the transmission control module (TCM) from the engine control module (ECM) via the high speed side of the Controller area network (CAN).
The mass air flow (MAF) sensor consists of a plastic housing with connectors, test electronics and an aluminum heat sink. The test electronics in

the mass air flow (MAF) sensor consist of a hot film comprised of four resistors. The hot film is cooled by the air flow to the engine.
The mass air flow (MAF) sensor is supplied with battery voltage by the system relay and is grounded in the engine control module (ECM). The signal from the sensor is analogue and varies between approximately 1-5 V depending on the air mass. Low air flow (low mass) results in low voltage, high air flow (high mass) gives high voltage. No air flow gives a reading of approximately 1 V.
The mass air flow (MAF) sensor is positioned between the air cleaner (ACL) housing and the intake manifold.
The shape of the mass air flow (MAF) sensor is slightly different on naturally aspirated engines and also contains an air temperature sensor.
The engine control module (ECM) can diagnose the mass air flow (MAF) sensor. The signal can be read using VIDA.

Mass air flow (MAF) sensor (2005-)



The mass air flow (MAF) sensor measures the air mass sucked into the engine. On naturally aspirated engines and 5 cylinder turbocharged engines (except B5254T2/-T4), it also measures the temperature of the intake air.

Air mass

The mass air flow (MAF) sensor transmits signals to the engine control module (ECM) about the mass of the intake air. This data is used by the engine control module (ECM) to calculate:

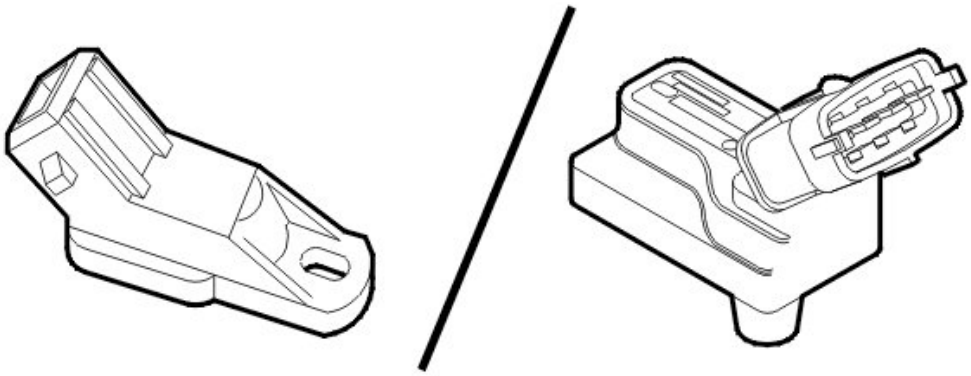
- the injection period
- the ignition timing
- turbocharger (TC) boost pressure (turbocharged engines only)
- the engine load.

The transmission control module (TCM) also uses this data for its gear shift calculations. This data is transmitted to the transmission control module (TCM) from the engine control module (ECM) via the high speed side of the Controller area network (CAN).
The mass air flow (MAF) sensor consists of a plastic housing with connectors, test electronics and an aluminum heat sink. The test electronics in the mass air flow (MAF) sensor consist of a hot film comprised of four resistors. The hot film is cooled by the air flow to the engine.
The mass air flow (MAF) sensor is supplied with battery voltage by the system relay and is grounded in the engine control module (ECM). The signal from the sensor is analogue and varies between approximately 1-5 V depending on the air mass. Low air flow (low mass) results in low voltage, high air flow (high mass) gives high voltage. No air flow gives a reading of approximately 1 V.

Intake temperature

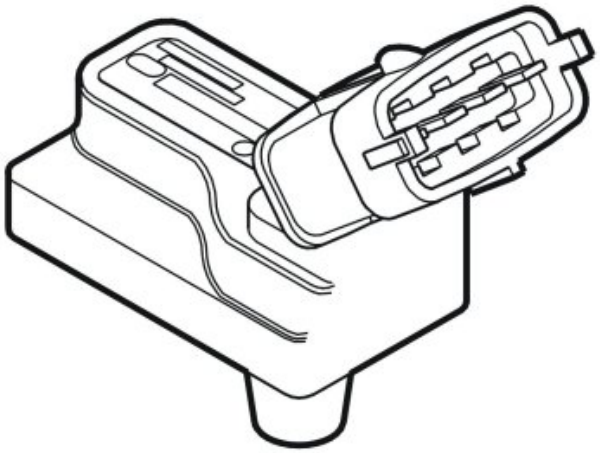
The temperature sensor detects the temperature of the intake air after the charge air cooler (CAC). This data is used by the engine control module (ECM) to calculate the boost pressure control (turbocharger (TC) and to calculate the injection period. The control module also controls certain diagnostic functions using the signal from the temperature sensor.
The sensor, which is an NTC resistor, is grounded in the control module and supplied with power (signal) from the control module. The resistance in the sensor changes according to the temperature of the intake air. This provides the control module with a signal of between 0-5 V. The lower the temperature the higher the voltage (high resistance). A high temperature results in low voltage (low resistance).
The mass air flow (MAF) sensor is positioned between the air cleaner (ACL) housing and the intake manifold.
The engine control module (ECM) can diagnose the air mass and intake temperature of the mass air flow sensor. The signals can be read using VIDA.

Manifold absolute pressure (MAP) sensor, intake (turbocharged engines only, 2002-2004)



The manifold absolute pressure (MAP) sensor detects the pressure in the intake manifold downstream of the charge air cooler (CAC). The signal from the sensor is primarily used by the engine control module (ECM) to check that the correct boost pressure is reached. The boost pressure is governed by the turbocharger (TC) control valve.
The sensor, which is a piezo resistor, is grounded in the control module and supplied with 5 V from the control module.
The resistance in the sensor changes depending on the pressure in the intake manifold, giving a signal of 0 -5 V. Low pressure results in low voltage, high pressure in high voltage.
The engine control module (ECM) can diagnose the manifold absolute pressure sensor. The sensor signal can be read using VIDA.
The manifold absolute pressure (MAP) sensor is in the intake hose for the throttle body (TB).

Manifold absolute pressure (MAP) sensor, intake (turbocharged engines only, 2005-)



The manifold absolute pressure (MAP) sensor detects the pressure in the intake manifold downstream of the charge air cooler (CAC). On 6 cylinder turbocharged engines and B5254T2/-T4, the temperature of the intake air is also detected.

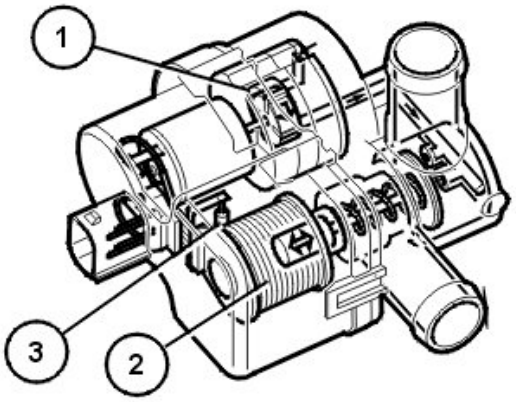
Pressure sensor

The signal from the sensor is primarily used by the engine control module (ECM) to check that the correct boost pressure is reached. The boost pressure is governed by the turbocharger (TC) control valve.
The sensor, which is a piezo resistor, is grounded in the control module and supplied with 5 V from the control module.
The resistance in the sensor changes depending on the pressure in the intake manifold, giving a signal of 0 -5 V. Low pressure results in low voltage, high pressure in high voltage.

Intake temperature

The temperature sensor detects the temperature of the intake air after the charge air cooler (CAC). This data is used by the engine control module (ECM) to calculate the boost pressure control (turbocharger (TC) and to calculate the injection period. The control module also controls certain diagnostic functions using the signal from the temperature sensor.
The sensor, which is an NTC resistor, is grounded in the control module and supplied with power (signal) from the control module.
The resistance in the sensor changes according to the temperature of the intake air. This provides the control module with a signal of between 0-5 V. The lower the temperature the higher the voltage (high resistance). A high temperature results in low voltage (low resistance).
The engine control module (ECM) can diagnose the manifold absolute pressure sensor. The sensor signal can be read using VIDA.
The manifold absolute pressure (MAP) sensor is in the intake hose for the throttle body (TB).

Leak diagnostic unit (certain markets only)



The function of the leak diagnostic unit is to pressurize the fuel tank system during leak diagnostics.
The leak diagnostic unit consists of a plastic housing with:

1. electrical air pump
2. a valve / solenoid which governs the air flow in the unit
3. a heater element (PTC resistor) which warms up the pump.

The electrical pump, valve and heater element in the unit are supplied with voltage by the system relay. The pump, valve and heater element are grounded (control) in the engine control module (ECM).

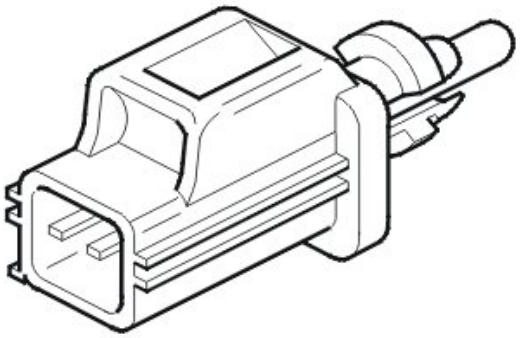
Note! On model years, 2002-2004 the heating element was controlled by the Central electronic module (CEM), but on request from the Engine control module (ECM).

During leak diagnostics the pump in the leak diagnostic unit starts. The valve in the unit is operated by the engine control module (ECM) by grounding the different circuits internally in the engine control module (ECM).
The Engine control module (ECM) checks the fuel tanks system for leaks by pressurizing the system and at the same time monitoring a number of relevant parameters. Also see: Leak diagnostics (certain markets only) See: Diagnostic Functions/Leak Diagnostics (Certain Markets Only)
The engine control module (ECM) can diagnose the leak diagnostic unit.
The valve in the leak diagnostic unit can be activated.
The leak diagnostic unit is at the upper front edge of the fuel tank.

Part 2

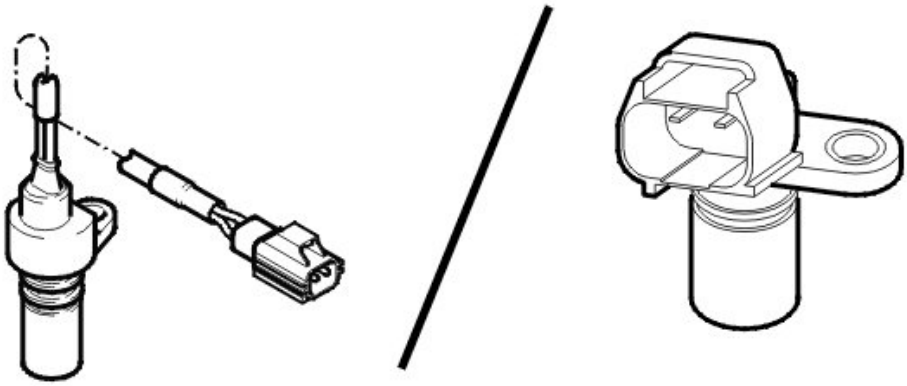
Design (Continued)

Outside temperature sensor



The outside temperature sensor detects the temperature in the surrounding air. The signal is used by the engine control module (ECM) as a substitute value in the event of a fault in certain components or functions and to control certain diagnostic functions.
The sensor is a negative temperature coefficient (NTC) type which is supplied with power from the control module (signal) and is grounded in the control module.
The resistance in the sensor, which provides a signal between 0-5 V, changes depending on the outside temperature. Low temperatures produce high voltage (high resistance), high temperatures produce low voltage (low resistance).
The outside temperature sensor is positioned in the left door mirror.
The engine control module (ECM) can diagnose the outside temperature sensor. The sensor value can be read off using VIDA.

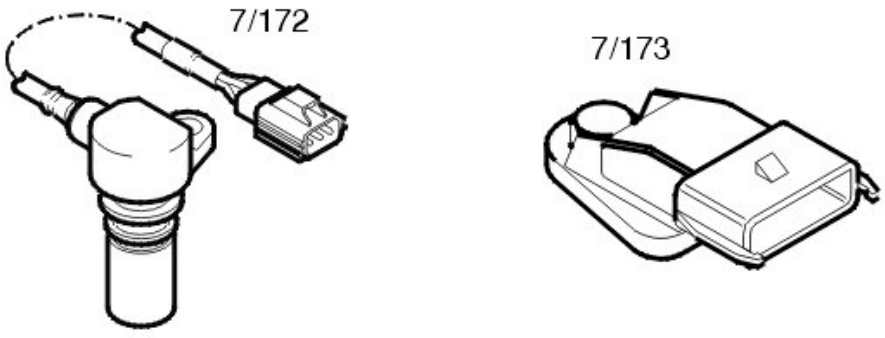
Engine speed (RPM) sensor



The engine speed (RPM) sensor provides the Engine Control Module (ECM) with information about the speed and position of the crankshaft. The Engine Control Module (ECM) is able to use the signal from the engine speed (RPM) sensor to determine when a piston is approaching top dead center (TDC). However it is unable to use the signal from the engine speed (RPM) sensor to determine whether the piston is in the combustion stroke or whether the exhaust valve is open (exhaust stroke). The signal from the camshaft position (CMP) sensor is also required to determine the operating cycle of the engine.
The signal from the engine speed (RPM) sensor is also used to check the engine for misfires. For further information, see Misfire diagnostics See: Diagnostic Functions/Misfire Diagnostics.
Cars with manual transmissions have a series of holes drilled in the periphery of the flywheel. Cars with automatic transmissions have a steel ring with punched holes. This steel ring is welded to the edge of the carrier plate. In both cases, there is 6° between each hole. This arrangement creates a hole for each tooth. There are 360° in one revolution. 6° between each hole means that there are 60 holes. However one hole is not drilled/punched, to create a reference position (tooth) for the crankshaft. This reference position is 72° before the top dead center (TDC) of cylinder 1 on a 5 cylinder engine.
The engine speed (RPM) sensor is at the rear of the engine above the flywheel.
The sensor is inductive with a permanent magnet. An alternating current is induced in the sensor when the flywheel/carrier plate passes the engine speed (RPM) sensor. The generated voltage and frequency increases with the engine speed (rpm). The signal varies between 0.1-100 V depending on the engine speed (RPM).
The Engine Control Module (ECM) is able to determine the engine speed (RPM) by counting the number of holes per time unit. When the reference tooth passes the engine speed (RPM) sensor, the voltage and frequency drop momentarily to zero, even though the engine is still running. This allows the engine control module (ECM) to determine the position of the crankshaft.
The following applies to model year 2002 onwards:

If the signal from the engine speed (RPM) sensor is incorrect or missing, the control module will use the signals from the camshaft position (CMP) sensor, on the condition that the position of the camshaft has been adapted and the car can be driven if there is no signal.
The engine control module (ECM) can diagnose the engine speed (RPM) sensor. The sensor value (engine speed (rpm)) can be read off using VIDA.

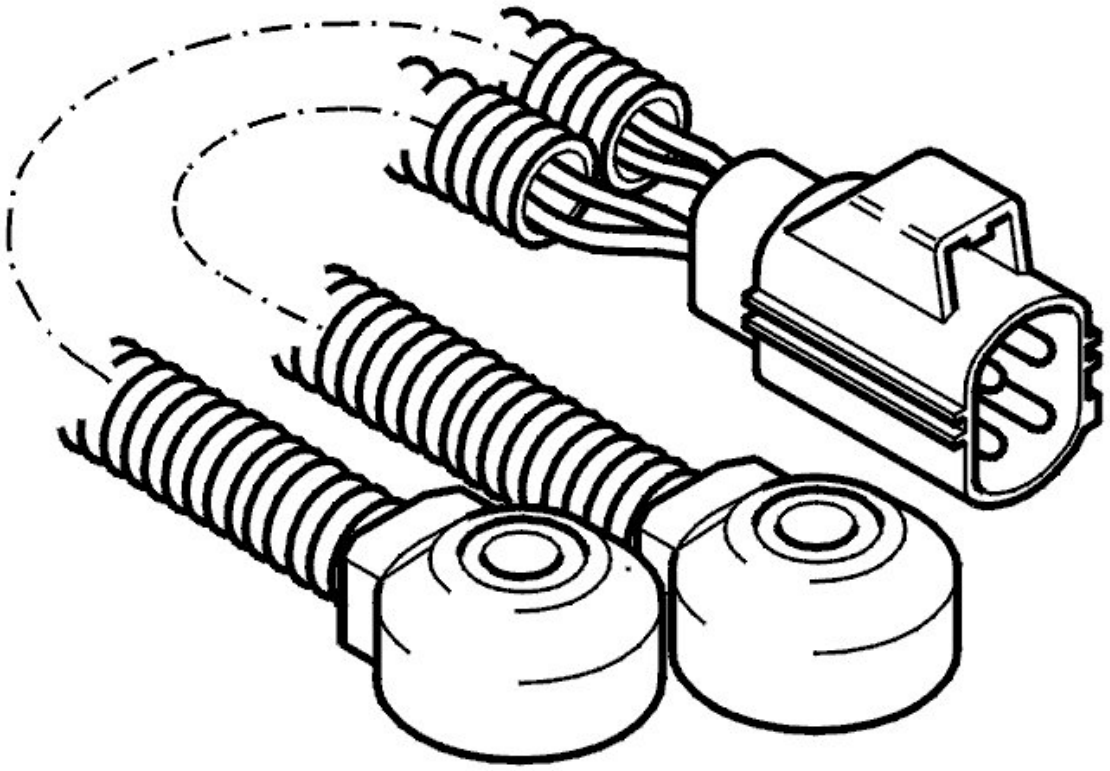
Camshaft sensor



The function of the camshaft position (CMP) sensor is to detect the camshaft flanks. The signal from the sensor is used by the engine control module (ECM) to determine the radial position of the camshaft.
Each camshaft has four flanks per camshaft revolution. A pulse wheel on the camshaft consisting of four teeth (the teeth are positioned by each flank) is used by the camshaft position sensor (CMP) to detect the flanks.
The flanks are not symmetric on the camshaft. This allows the control module to determine which flank has been detected and therefore which operating cycle the camshaft is in.
When the operating cycle of the camshaft is established, the control module is able to determine which cylinder should be ignited. In the event of misfire or engine knock, the control module is also able to determine which cylinder is misfiring or knocking. Also see Knock sensor (KS) and Engine speed (RPM) sensor.
Data about the position of the camshaft is used during camshaft control (CVVT). See Function, B5244T5, B5254T2 See: Function.
The sensor, which is a magnetic resistor with a permanent magnet, is grounded in the control module and supplied with 5 V from the control

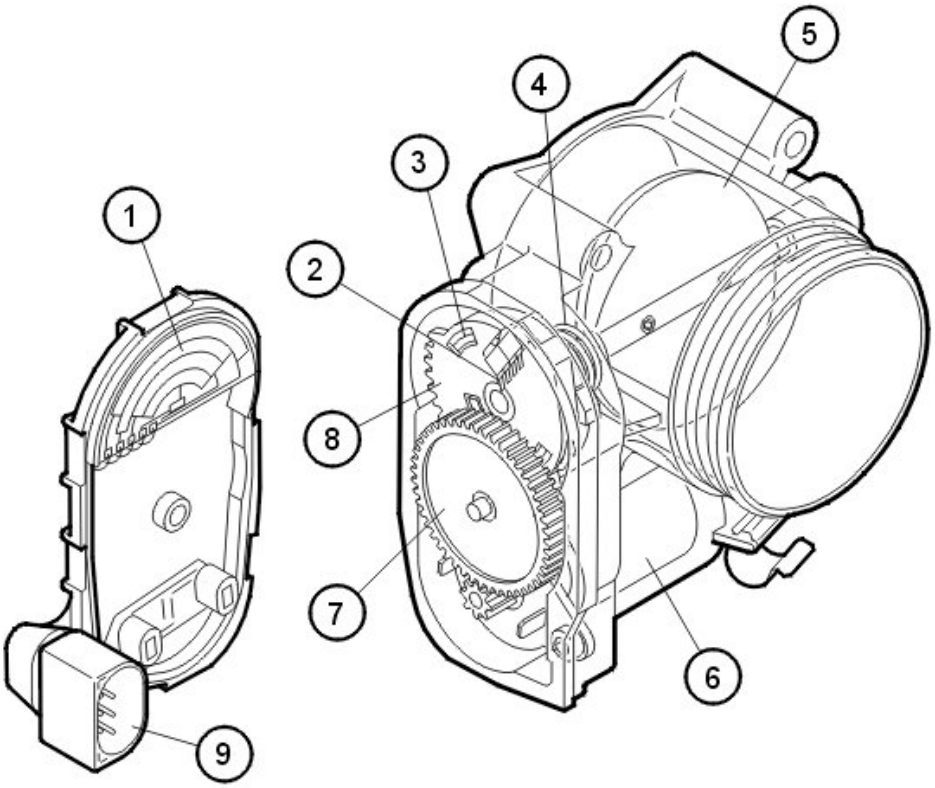
module. When one of the teeth on the camshaft pulse wheel passes the camshaft position (CMP) sensor, a signal is transmitted to the control module from the camshaft position (CMP) sensor. The signal varies between 0-1 V and is low when a flank passes the camshaft position (CMP) sensor.
The camshaft position (CMP) sensor is positioned at the rear of the engine by the controllable camshaft (CVVT).
The engine control module (ECM) can diagnose the camshaft position (CMP) sensor.

Knock sensor (KS)



The function of the knock sensor (KS) is to monitor combustion knocking from the engine. Knocking may damage the engine and reduces the efficiency of engine combustion.
If the engine control module (ECM) registers knocking from any of the cylinders, the ignition will be retarded for that cylinder at the next combustion stage. If repeated ignition retardation does not prevent knocking, the injection period will be increased. This has a cooling effect. On turbocharged engines the boost pressure will also be lowered, reducing the engine load.
The sensor is made up of a Piezo electrical crystal. If there is engine knock, vibrations (sound waves) spread through the cylinder block to the knock sensor (KS). The resultant mechanical stress in the piezo electrical material in the knock sensors generates a voltage. This signal is transmitted to the engine control module (ECM). The signal corresponds to the frequency and amplitude of the sound waves. This allows the Engine Control Module (ECM) to determine if the engine is knocking. The camshaft position (CMP) sensor and engine speed (RPM) sensor are used to determine the operating cycle of the engine (which cylinder is igniting) and thereby which cylinder is knocking.
The knock sensors (KS) are positioned on the cylinder block below the intake manifold.
The engine control module (ECM) can diagnose the knock sensors (KS).

Electronic throttle unit



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The electronic throttle unit, using the control signal from the engine control module (ECM), regulates the amount of air for engine combustion. This is done using an electronic shutter.
The electronic throttle unit consists of a round throttle disc on a shaft. This is turned using a DC motor (damper motor), gear wheel and two springs, an opening spring and a return spring. The damper motor is controlled by the engine control module (ECM) and is supplied with power by an integrated power stage in the control module. At one of the limit positions the throttle disc is closed so that no air can pass the throttle unit. At the other limit position the throttle disc is parallel to the air flow so that the air is able to freely pass through the throttle unit. The throttle disc shaft is mechanically connected to two built-in potentiometers (position sensors) which are supplied with power by the control module. The signals from the potentiometers provide the control module with data about the position of the throttle disc. The electronic throttle unit has a connector with six gold plated pins.

Note! A damaged terminal pin surface can interfere with the function

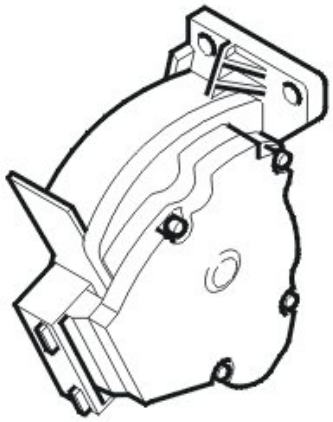
1. Current channels, potentiometers
2. Contact strips, potentiometers
3. Spring
4. Spring
5. Throttle disc
6. Damper motor
7. Gear wheel
8. Gear sector
9. Connector.

The electronic throttle unit is located on the engine intake manifold.
In the event of a fault, the throttle unit must be replaced as a single unit.
The engine control module (ECM) can diagnose the electronic throttle unit.

Throttle position (TP) sensor

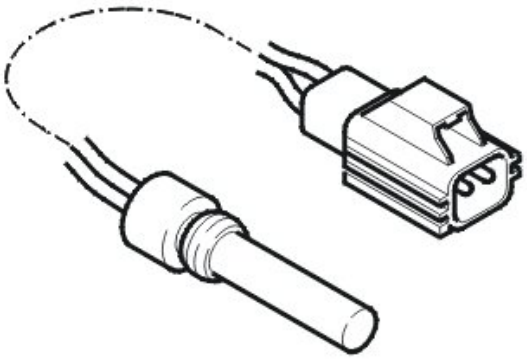
See Electronic throttle unit.

Accelerator pedal (AP) position sensor



The function of the accelerator pedal (AP) position sensor is to provide the engine control module (ECM) with information about the position of the accelerator pedal. This data is used by the control module to deploy the shutter in the throttle unit to the correct angle.
The sensor consists of a plastic housing with two potentiometers, an Analog/Digital converter and circuits. The potentiometers are connected to a shaft which is affected by the position of the accelerator pedal (AP). The resistance in the potentiometers changes with the position of the accelerator pedal (AP).
The accelerator pedal (AP) position sensor transmits an analogue and a digital signal (pulse width modulated (PWM) signal) to the control module. These signals indicate the position of the accelerator pedal (AP). The digital signal is generated by the sensors Analog/Digital converter.
The analog and digital signals are used at the same time by the control module to regulate the throttle shutter angle.
The sensor is supplied with 12 V by the system relay via a fuse and is grounded to the body.
The digital signal is also used in conjunction with the analog signal for accelerator pedal position sensor diagnostics. The accelerator pedal (AP) position sensor signals can be read off using VIDA. A diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a difference between the analog and digital signals. The engine control module (ECM) then uses a minimal value to ensure the function (limp home).
The accelerator pedal (AP) position sensor is located on the accelerator pedal bracket.

Engine coolant level sensor

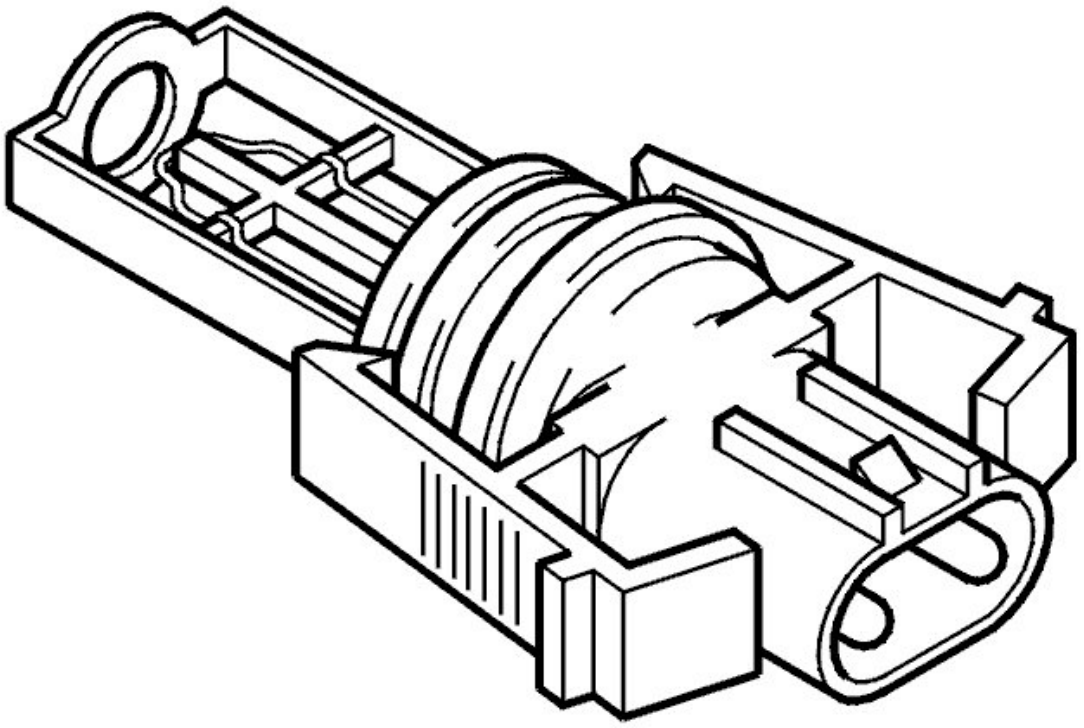


The function of the engine coolant level sensor is to alert the driver if the engine coolant level in the expansion tank is too low.
The sensor is a magnetic reed switch, which is enclosed in a pipe on the bottom of the expansion tank. Around the pipe, on the inside of the expansion tank is a float. This float contains a magnet. When the engine coolant level is above minimum, the float is too high in the tank to affect the switch. However if the engine coolant level falls below the minimum level, the magnetic field acts on the switch.
The sensor is supplied with voltage (signal) from the Engine Control Module (ECM) and grounded in chassis. When the engine coolant level in the expansion tank is over a certain level the circuit closes, which produces a low signal. When the engine coolant level is below a certain level the circuit is opened by the engine coolant level sensor, which produces a high signal. When the engine control module (ECM) detects a high signal the information about low engine coolant level is transmitted via the Controller area network (CAN) to the driver information module (DIM), which warns the driver.

Note! There are no functions controlled by the engine which are directly connected to the low coolant level warning lamp. The Engine Control Module (ECM) only transfers the signal which is used by the Driver Information Module (DIM).

The following applies from model year 2005-
The signal of the engine coolant level sensor can be read using VIDA.
The engine control module (ECM) cannot diagnose the engine coolant level sensor.

Temperature sensor, intake (turbocharged engines only, 2002-2004)

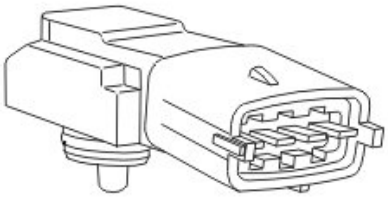


On naturally aspirated engines, the intake air temperature sensor is integrated in the mass air flow (MAF) sensor. On model year 2002 turbocharged engines, the temperature sensor is a stand-alone component. On turbocharged engines from model year 2003, the temperature sensor is integrated in the intake air pressure sensor.
The temperature sensor detects the temperature of the intake air after the charge air cooler (CAC). This data is used by the engine control module (ECM) to calculate the boost pressure control (turbocharger (TC) and to calculate the injection period. The control module also controls certain diagnostic functions using the signal from the temperature sensor.
The sensor, which is an NTC resistor, is grounded in the control module and supplied with power (signal) from the control module.
The resistance in the sensor changes according to the temperature of the intake air. This provides the control module with a signal of between 0-5 V. The lower the temperature the higher the voltage (high resistance). A high temperature results in low voltage (low resistance).
The temperature sensor is between the air cleaner (ACL) housing and the intake manifold (does not apply to turbocharged engines 2003-). The temperature sensor on turbocharged engines 2003- is integrated in the intake air pressure sensor.
The engine control module (ECM) can diagnose the temperature sensor. The sensor signal can be read using VIDA.

Part 3

Design (Continued)

Fuel pressure sensor / fuel temperature sensor (only vehicles with demand controlled fuel pumps)



The fuel pressure sensor is combined and consisted of both the fuel pressure sensor and the fuel temperature sensor. The sensor detects the fuel pressure (the absolute pressure) and the temperature of the fuel in the fuel rail.

Fuel pressure sensor

The pressure sensor is a Piezo resistive type resistor, the resistance of which changes with the pressure. Depending on the pressure in the fuel rail, an analog signal of 0-5 V is transmitted. Low pressure results in low voltage, high pressure in high voltage.
The engine control module (ECM) then uses this signal to adjust the pressure in the fuel rail using the fuel pump control module. Also see Function, B5244T5, B5254T2 See: Function.
The pressure sensor is supplied with 5 V and grounded in the engine control module (ECM). The pressure sensor transmits a signal indicating the fuel pressure to the engine control module (ECM) on a separate cable.
The engine control module (ECM) can diagnose the fuel pressure sensor. Its signals (pressure and temperature) can be read using VIDA.

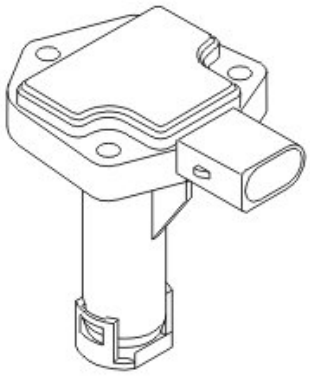
Note! The absolute pressure is displayed when using VIDA parameter readout to read off the fuel pressure. If there is no pressure at the fuel rail, the atmospheric pressure will be displayed.

Hint: The relative pressure (absolute pressure minus atmospheric pressure) is displayed when reading off the fuel pressure via a manometer connected to the fuel rail.

Fuel temperature sensor

The temperature sensor is an NTC sensor. The sensor is supplied with voltage (signal) from and grounded in the engine control module (ECM). The resistance in the sensor changes according to the temperature of the fuel. This provides the engine control module (ECM) with a signal of between 0-5 V. Low temperature results in high voltage (high resistance). High temperature results in low voltage (low resistance).
The engine control module (ECM) uses the signal to calculate the volume of the fuel.
The fuel pressure sensor is on the left-hand end of the fuel rail.

Oil level sensor (2004-, certain markets and models only)

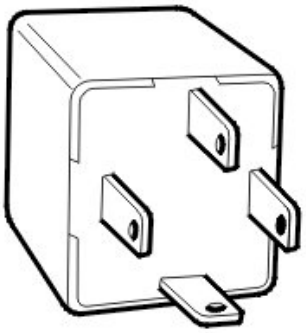


The oil level sensor provides the engine control module (ECM) with information about the quality and temperature of the engine oil and the oil level in the oil trough. Which of these functions is used by the sensor varies between different car models.
All three functions are combined in one unit with a sensor section and an electronics section. There are no moving parts in the sensor.
The sensor consists of:

- a terminal with three pins
- integrated electronics
- 2 capacitive gauge elements
- a PTC resistor.

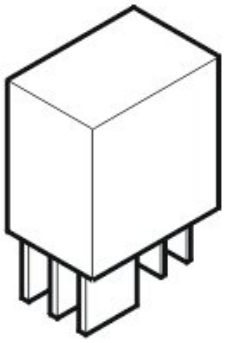
The oil level sensor is supplied with 5 V by the engine control module (ECM). The oil level sensor generates a PWM signal for the engine control module (ECM). Also see Function, B5244T5, B5254T2 See: Function.
The engine control module (ECM) can diagnose the functions of the oil level sensor. Also see Oil level sensor, diagnostics See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Testing and Inspection.
The pulse-width modulated (PWM) signal from the oil level sensor can be read using parameter readout.

Main relay (system relay)



The function of the main relay (system relay) is to supply certain components with voltage.
The relay is mechanical and has a closing function. In the rest position the circuit in the relay is open.
The main relay terminals (#30 and #86) are supplied with voltage by the battery. When the ignition key has been turned and the Engine Control Module (ECM) is powered, the terminal (#85) on the main relay is grounded by the Engine Control Module (ECM).
When the terminal (#85) is grounded, the relay is activated and a number of components are powered via the relay terminal (#87).
The engine control module (ECM) can diagnose the main relay.
The main relay is in the relay/fusebox in the engine compartment.

Air conditioning (A/C) relay

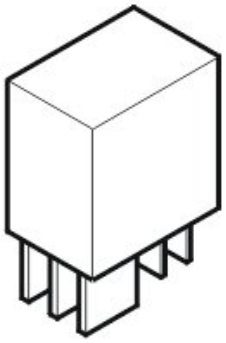


The air conditioning (A/C) relay supplies the A/C compressor with voltage. The relay is controlled by the engine control module (ECM) based on information from different signals:

- the climate control module (CCM) (via the control area network (CAN))
- the engine coolant temperature
- the position of the accelerator pedal (AP)
- the pressure in the system.

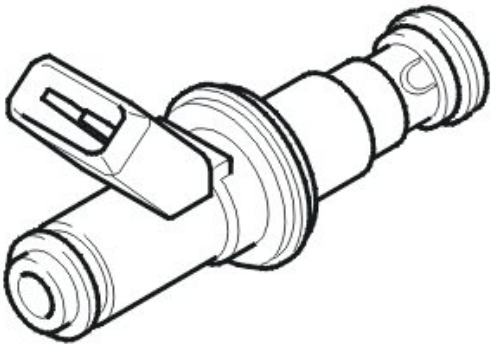
The Engine Control Module (ECM) can temporarily disengage the A/C compressor during wide open throttle (WOT) acceleration.
The relay is mechanical. It has a closing / breaking function and is supplied with power from the system relay.
In the rest position the circuit in the relay is open.
The system relay supplies the coil and the relay with power. The relay activates when the coil is grounded in the engine control module (ECM), the circuit closes and the A/C compressor is supplied with power via the relay voltage output.
The relay coil is grounded (signal) when the engine control module (ECM) receives a signal via the Controller area network (CAN) from the climate control module (CCM) to activate the relay and start the compressor.

Fuel pump (FP) relay, (2002-2004)



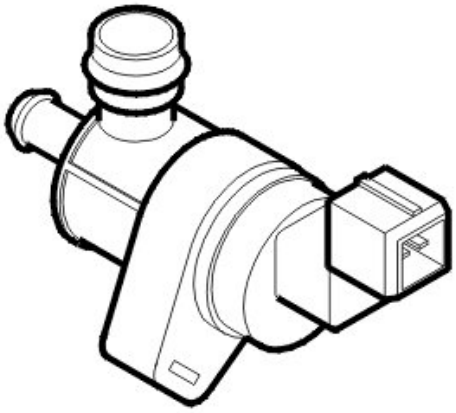
For information about the fuel pump (FP) relay for model year 2005-, see Design and Function, central electronic module (CEM).
The following applies for model year 2002-2004
The fuel pump (FP) relay supplies the fuel pump with power. The relay also cuts the power to the pump when the ignition is switched off or if the engine stops. In cars with demand controlled fuel pumps, the above function applies to the fuel pump control module. The central electronic module (CEM) also cuts the power to the relay if the supplemental restraint module (SRS) transmits a message indicating that an airbag has deployed.
The central electronic module (CEM) activates and deactivates the relay when requested by the engine control module (ECM) (via the Controller area network (CAN)).
See Design and Function, central electronic module (CEM).
When the ignition is switched on, the engine control module (ECM) sends a signal to the central electronic module (CEM) via the controller area network (CAN) to run the fuel pump (FP) for one seconds. This is so that the pressure increases in the fuel system, shortening the start time.
When the flywheel in the engine rotates (generating a signal from the engine speed (rpm) sensor), the engine control module (ECM) will transmit a request to the central electronic module (ECM) via the controller area network (CAN) to start the fuel pump. In the event of the engine stopping, the Engine Control Module (ECM) cancels the "activated fuel pump" signal. The central electronic module (CEM) then switches off the fuel pump.
There is a directly connected cable between the engine control module (ECM) and the central electronic module (CEM). In the event of a fault in the controller area network (CAN), this cable is used for the "activated fuel pump" signal.

Injectors



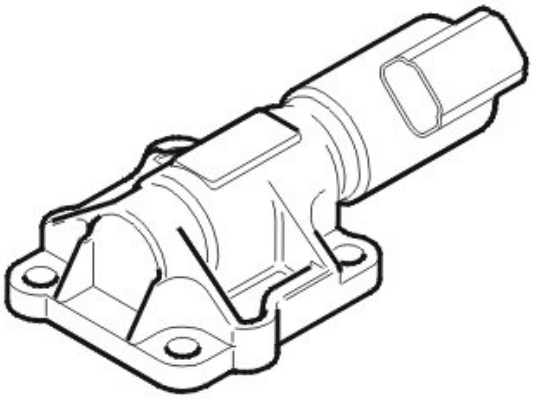
The function of the injectors is to spray fuel into the cylinders in the correct spray patterns. This happens sequentially.
The injectors are in the intake manifold.
It is essential that the injectors are correctly installed with no air leakage around them. Fuel leakage from the top of an injector when it is not activated may lead to starting and driving problems.
The engine control module (ECM) controls the injectors using a pulse width modulation (PWM) signal.
The injectors for each cylinder have different terminals in the engine control module (ECM), depending on whether the engine has 5 or 6 cylinders.
The engine control module (ECM) can diagnose the injectors. The injectors can be activated using VIDA.

evaporative emission system (EVAP) valve



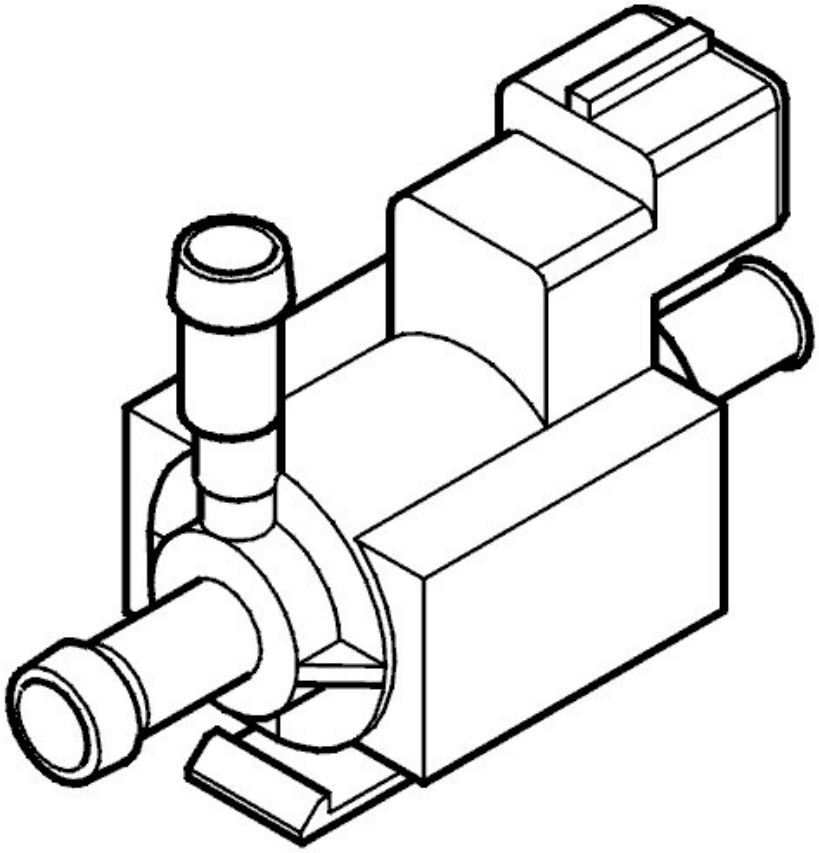
The evaporative emission system (EVAP) valve is used to open/close the connection between the EVAP canister and the intake manifold. The valve controls the flow of hydro-carbons (fuel vapor) from the EVAP canister to the engine intake manifold using the vacuum in the intake manifold. This ensures that hydro-carbons stored in the EVAP canister are used in the engine combustion process.
The valve is an electro-magnetic valve which is powered from the system relay. When the valve needs to be opened, it is grounded internally in the engine control module (ECM). The evaporative emission system (EVAP) valve is closed when in the standby position (open-circuit).
When the control module requests that the EVAP canister should be emptied (the hydrocarbons stored in the canister should be released into the engine), the control module deploys the evaporative emission system (EVAP) valve by grounding it. The valve is grounded using a pulse width modulation (PWM) signal, allowing the control module to govern the extent to which the valve opens and adapting the emptying of the canister according to how full it is, engine speed (rpm) and load etc.
The engine control module (ECM) can diagnose the evaporative emission system (EVAP) valve. The valve can be activated using VIDA.
The evaporative emission system (EVAP) valve is close to the intake manifold.

Camshaft reset valve (Continuous variable valve timing (CVVT))



The camshaft reset valve controls the oil flow to the CVVT unit (camshaft pulley).
The valve consists of an electro-magnetic valve with a spring-loaded piston. There are slits in the piston which channel the engine lubricating oil to the CVVT unit by moving the piston in the reset valve. The continuous variable valve timing (CVVT) unit turns the camshaft (the cam timing changes). The direction in which the camshaft turns depends on the chamber in the CVVT unit which is supplied with oil (pressure). Also see Function, B5244T5, B5254T2 See: Function.
The system relay supplies the reset valve with voltage. The valve is grounded (control stage) in the engine control module (ECM). When the valve is grounded using a pulse width modulation (PWM) signal, the oil flow in the valve can be controlled to the different chambers in the continuous variable valve timing (CVVT) unit at variable rates. This allows the cam timing to be changed precisely and steplessly.
The engine control module (ECM) can diagnose the camshaft reset valve.
The valve is on the cylinder head above the camshaft with camshaft control.

Turbocharger (TC) control valve

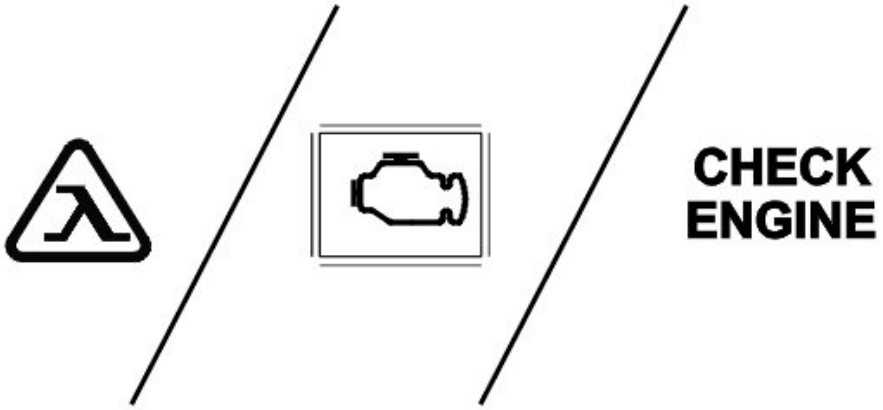


The turbocharger (TC) control valve is used to open/close the connection between the intake manifold and the pressure servo for the turbocharger (TC). The valve controls the pressure servo which affects the boost pressure control (BPC) valve and therefore the boost pressure. Also see Function, B5244T5, B5254T2 See: Function.
The valve is an electro-magnetic valve which is powered from the system relay. When the valve needs to be opened, it is grounded internally in the engine control module (ECM). The valve can be controlled steplessly by grounding the valve using a pulse width modulation (PWM) signal.
The valve is closed when in the standby position (open-circuit).
The turbocharger control valve can be diagnosed and can be activated using VIDA.
The turbocharger (TC) control valve is on a hose between the intake manifold and the pressure servo for the turbocharger.

Ignition coils

The ignition coils supply the spark plugs with high voltage to produce sparks. The engine control module (ECM) controls the ignition coils so that sparks are generated at the correct time.
Each ignition coil has its own integrated power stage.
The ignition coils are in the sparkplug wells above each spark plug.
The ignition coils for each cylinder have different terminals in the engine control module (ECM), depending on whether the engine has 5 or 6 cylinders.
The engine control module (ECM) can diagnose the ignition coils.

Emissions warning lamp



The emissions warning lamp in the Driver Information Module (DIM) has a warning symbol. This warning symbol varies depending on the market and model year. The warning symbols are:

- "Engine symbol" (not USA, model year 2001-)
- "CHECK ENGINE" (MIL - Malfunction Indicator Lamp, USA only).
- "Lambda symbol" (not USA, model year 1999-2000).

The warning symbol lights when the ignition key is turned to position II and goes out when the engine is started if the engine management system does not detect any faults.
The warning lamp is directly connected to the engine control module (ECM).
The warning lamp will light if there is a fault in one of the parameters in the engine management system. The warning lamp will also light in response to a request transmitted via the Control area network (CAN) if there is a fault in one of the following systems which affects emissions:

- transmission control module (TCM)
- brake control module (BCM).

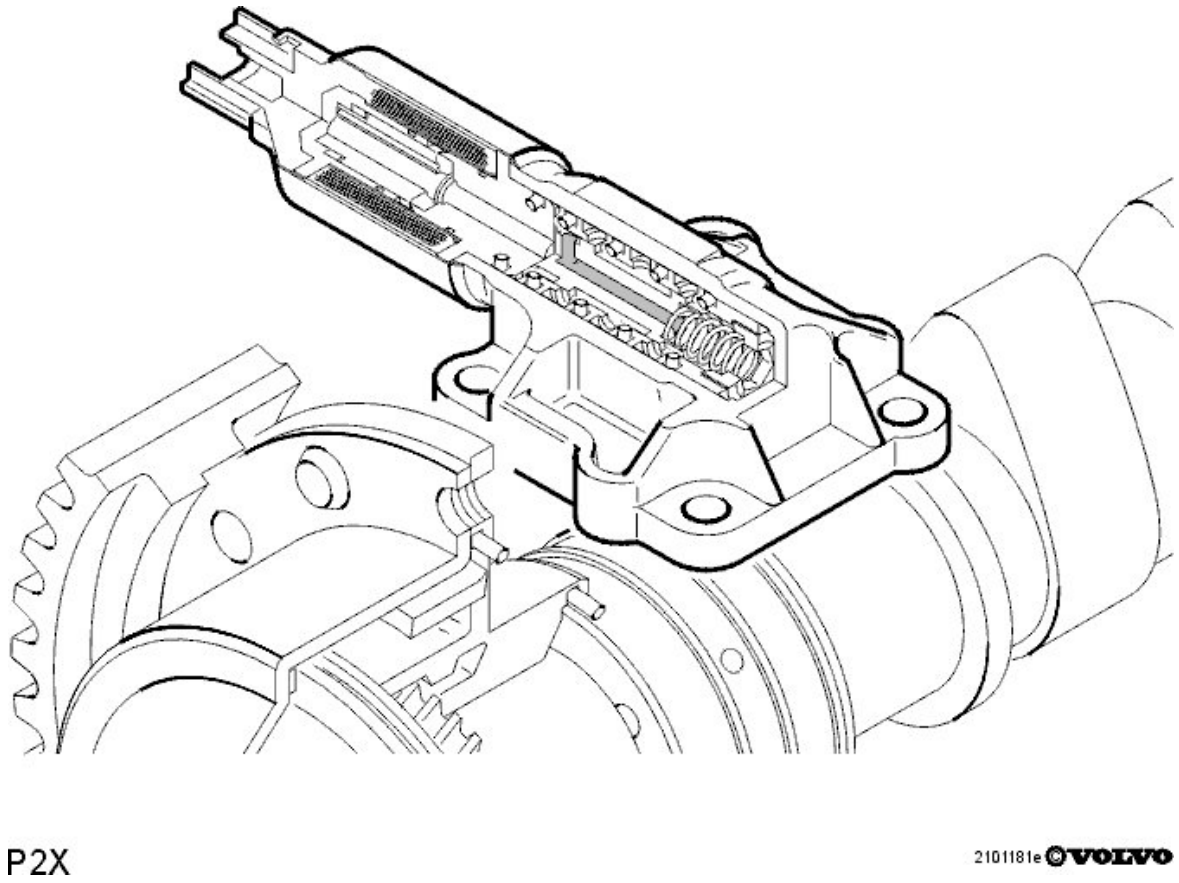
Part 1

Function

Immobilizer

See Design and Function, Immobilizer.

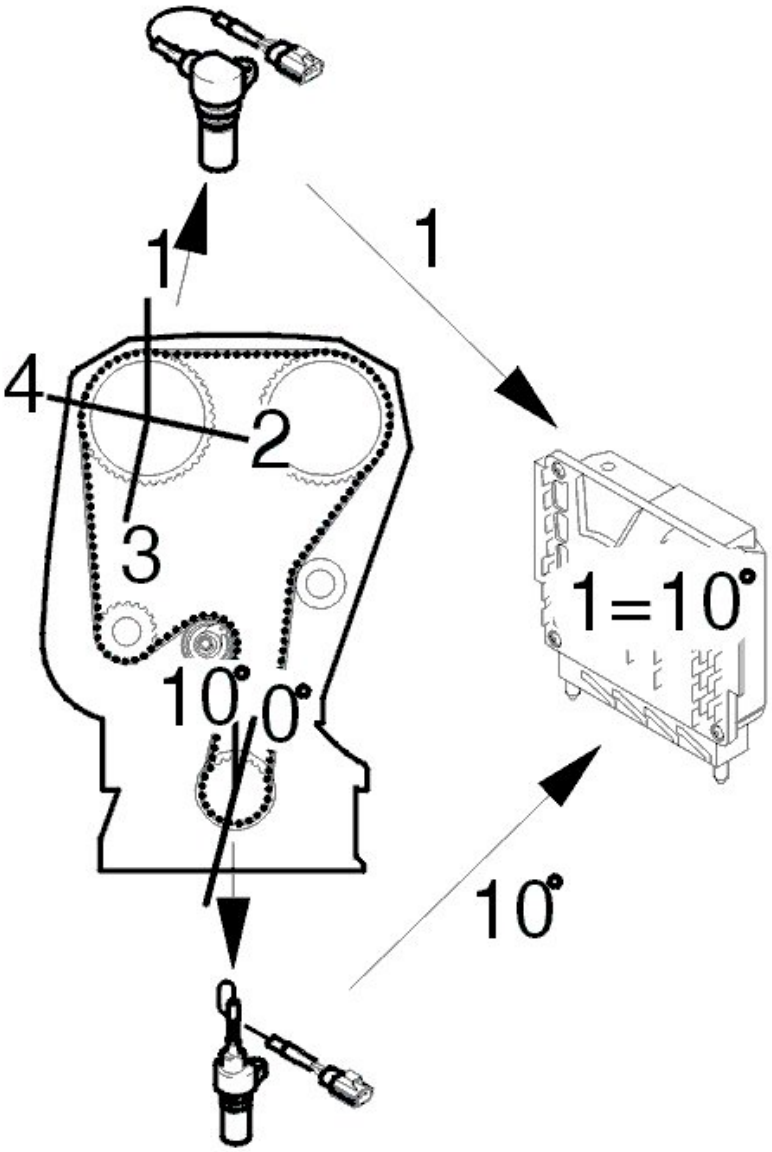
Camshaft control (CVVT)



When the camshaft is set at the factory, it is aligned with the position of the crankshaft. The position of the camshaft in relation to the crankshaft is

designated the camshaft 0 position. During camshaft control (CVVT) the camshaft 0 position is offset. The value of the 0 position offset is called the cam timing. The cam timing is 0° if the camshaft is not being controlled.
By controlling the cam timing (the camshaft is deployed from its 0 position) the performance of the engine is increased, the idle speed quality is improved and the emissions are reduced.
In order to detect the cam timing, the engine control module (ECM) uses the signals from the engine speed (RPM) sensor (the position of the crankshaft) and from the camshaft position (CMP) sensor (the position of the camshaft). By comparing these two signals, the control module is able to determine the cam timing (the number of degrees the camshaft is from its 0 position).
There are diagnostic for this function. See also Camshaft diagnostics (CVVT) See: Diagnostic Functions/Camshaft Diagnostics (CVVT).

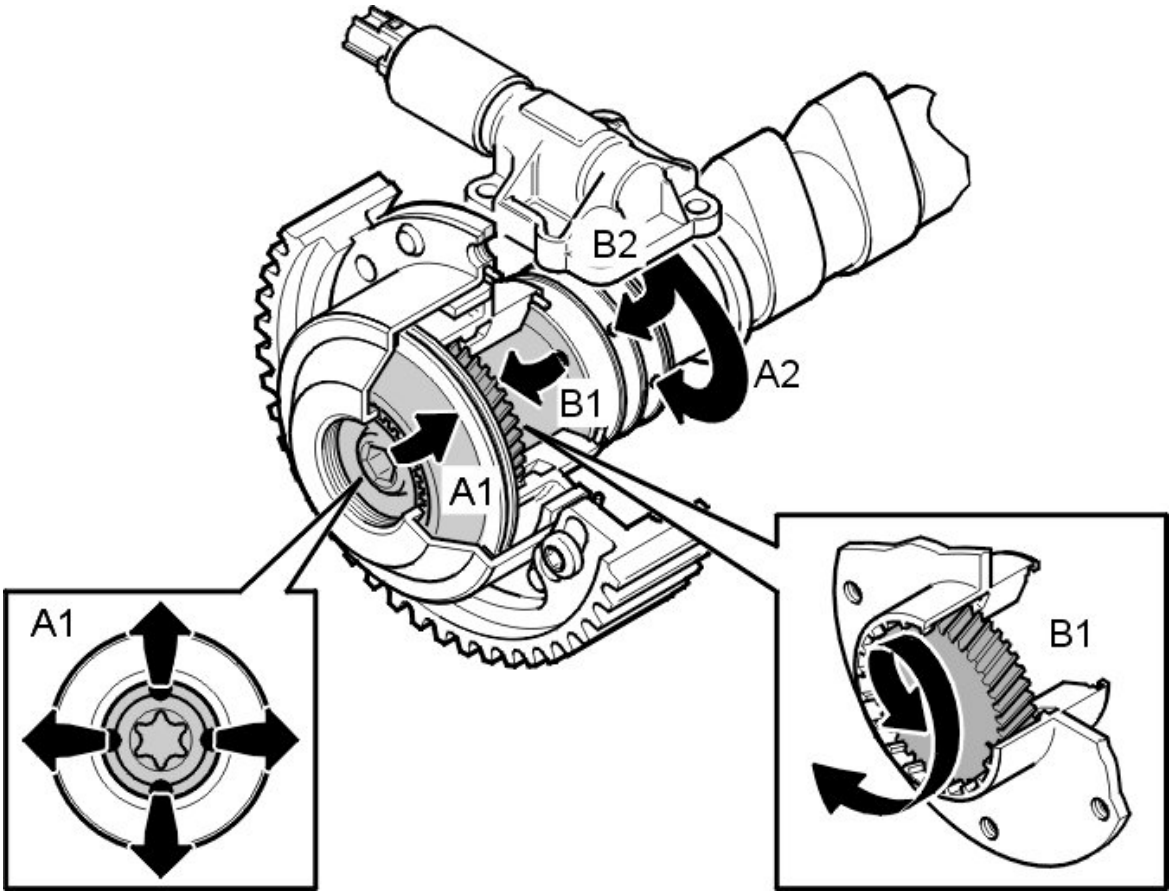
Camshaft cam timing



The camshaft (A) is divided into four flanks per revolution of the camshaft (flanks 1-4). The angle between flanks 1-2 = 103°, flanks 2-3 = 90°, flanks 3-4 = 90° and flanks 4-1 = 77°. The angle between the flanks is different, allowing the control module to determine which flank it is detecting and therefore determine which combustion cycle the cylinders are in,
The crankshaft has four reference positions, one for each camshaft flank. The camshaft turns at half the speed of the crankshaft. This means that two reference positions are detected for each turn of the crankshaft. Therefore two engine revolutions are required to detect all flanks on the camshaft. For example (may vary between different engine variants): flank 1 at 0°, flank 2 at 206°, flank 3 at 386° and flank 4 at 576° (flanks 3 and 4 are detected during the second engine revolution).
The reference positions of the crankshaft coincide exactly with each camshaft flank if the camshaft cam timing is 0°. If the cam timing deviates from 0°, i.e. the flanks deviate from the reference positions of the crankshaft, the control module calculates the number of crankshaft degrees by which the flank is deviating.
The control module detects the reference positions for the camshaft flanks using the signal from the engine speed (RPM) sensor.
Example:

If camshaft flank 1 is detected at 10° from the crankshaft reference position for flank 1 (0° +10°), the cam timing is 10°. If the cam timing is the same (10°), flank 2 is detected at 216° (206° + 10°), flank 3 at 396° (386° + 10°), and flank 4 at 586° (576° + 10°). The cam timing can be positive (+) or negative (-) depending on whether the flank is detected before or after the different reference positions for the crankshaft.
The engine control module (ECM) controls the camshaft reset valve smoothly in order to regulate the camshaft cam timing. The valve controls the flow of engine oil to the continuous variable valve timing (CVVT) unit which is affected by the oil pressure that builds up.
Also see Design, B5244T5, B5254T2 See: Design.

Control



Control takes place as follows when deploying the camshaft:

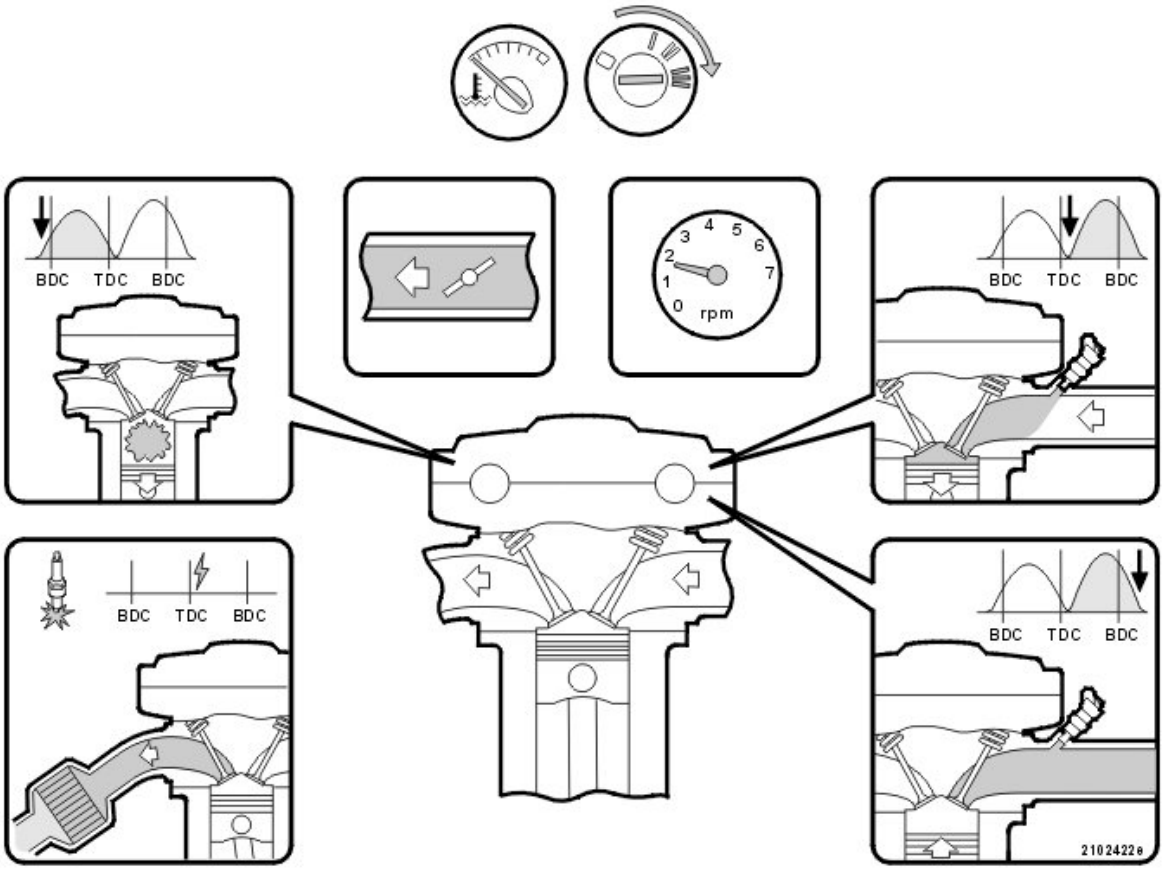
1. Oil is forced from the engine lubricating system to the intake port on the reset valve
2. The engine control module (ECM) grounds the valve, the position of the piston in the valve changes and the oil is guided to the continuous variable valve timing (CVVT) unit chamber (A1) via the duct (A2) in the camshaft
3. The continuous variable valve timing (CVVT) unit hub is pressed backwards by the oil pressure. The continuous variable valve timing (CVVT) unit then rotates the hub and the carriers are joined by twisted splines
4. The oil flows to the engine oil pan via the outer ducts on the hub and the reset valve's return hose.

Control takes place as follows when returning the camshaft:

1. Oil is forced from the engine lubricating system to the intake port on the reset valve
2. The engine control module (ECM) breaks the ground connection for the valve. The piston in the valve is then pressed back by a spring. The oil flows to the continuous variable valve timing (CVVT) unit chamber (B1) via a duct (B2) in the camshaft
3. The hub of the continuous variable valve timing (CVVT) unit is forced forward by the oil pressure that is created. The continuous variable valve timing (CVVT) unit will rotate back to the non-deployed position
4. The oil flows to the engine oil pan via the center duct on the hub and the reset valve's return duct.

The above takes place very quickly. The engine control module (ECM) controls the deployment and return of the reset valve continually at high frequency. This results in rapid and exact control. The extent of camshaft control (the change of cam timing) varies depending on the engine variant and the model year.

"Wide Range" concept



Ignition timing

The combustion of the fuel film on the cylinder walls is improved by retarding the ignition.
Retarded ignition reduces the efficiency of the engine and the heat energy which is generated is released with the exhaust gases. This is used to heat the three-way catalytic converters (TWC).

Exhaust camshaft (turbocharged engines)

By opening the exhaust valve late, combustion takes place over a relatively long period. The film of fuel on the cylinder walls combusts, reducing the exhaust emissions.

Intake camshaft

By opening/closing the intake valve late:

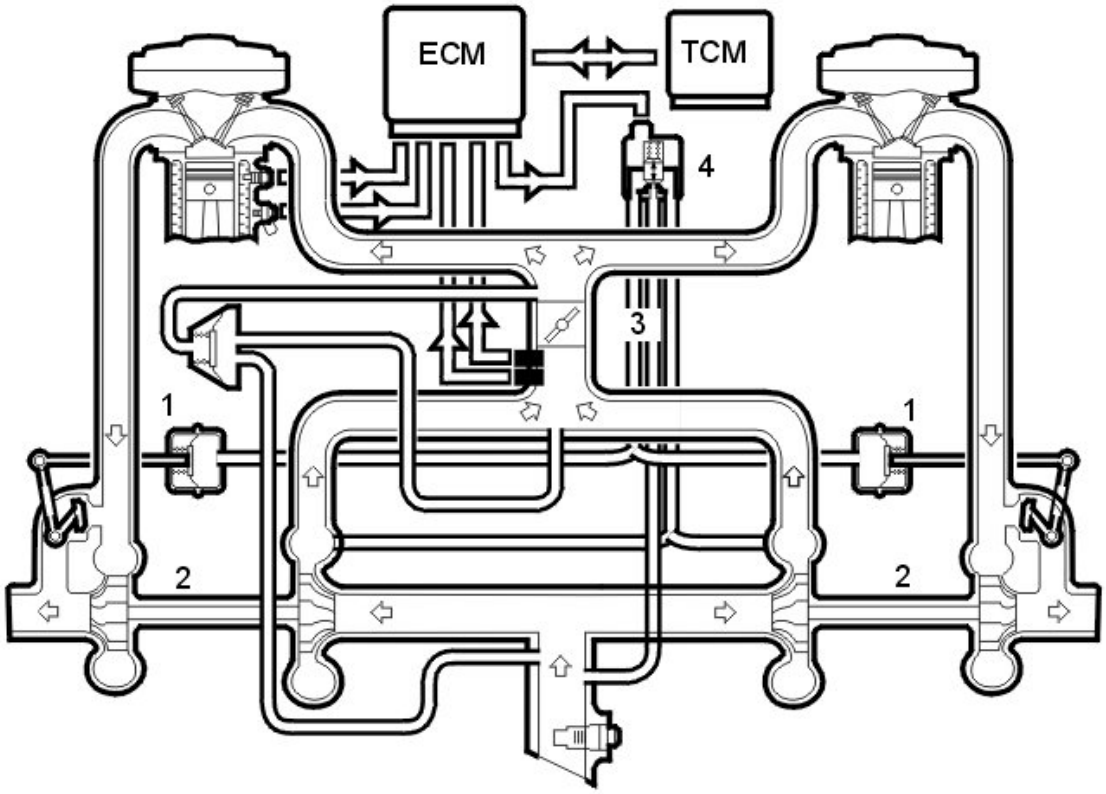
- so that there is little or no overlap, a predetermined pressure difference is maintained between the intake manifold and the combustion chamber/cylinder. The lower pressure in the cylinder ensures that all the injected fuel reaches the cylinder. This allows the Engine Control Module (ECM) to calculate and control the fuel quantity required in the combustion phase in advance
- maintains a high and stable pressure in the intake manifold (due to the upwards movement of the piston). Stable high pressure means that the vaporization of the fuel which has condensed on the walls of the intake manifold can be predicted.

Double continuous variable valve timing (CVVT)

CVVT on both the intake camshaft and the exhaust camshaft means that the valve overlap can be changed to a greater degree than on engines where only one of the camshafts is controlled. Valve overlap is the extent to which the intake and exhaust valves (on the same cylinder) are open at the same time.
The advantages of continuous variable valve timing (CVVT) are used in different operating conditions:

- **during cold starting and during the warm-up phases**when the intake camshaft and exhaust camshaft are set late. This reduces the emissions
- **during idle and when the engine is at operating temperature**when the exhaust camshaft is set to early and the intake camshaft is set to late. This results in small valve overlap, reducing exhaust gas recirculation (EGR) and ensuring stable idling
- **at part load**when both the exhaust and intake camshaft are set to relatively late, with greater valve overlap. Greater valve overlap results in internal exhaust gas recirculation (EGR) which reduces the release of nitrous oxide. This also limits the incoming fuel/air mixture to the cylinder. As a result, the throttle does not need to reduce the supply of air, thereby reducing "pump losses" and lowering the fuel consumption. At higher engine speeds (RPM), the camshafts are set for a smaller valve overlap. The exhaust camshaft is set earlier, the intake camshaft later. This provides an optimum fuel/air mixture to the cylinder. Reduces internal exhaust gas recirculation (EGR).

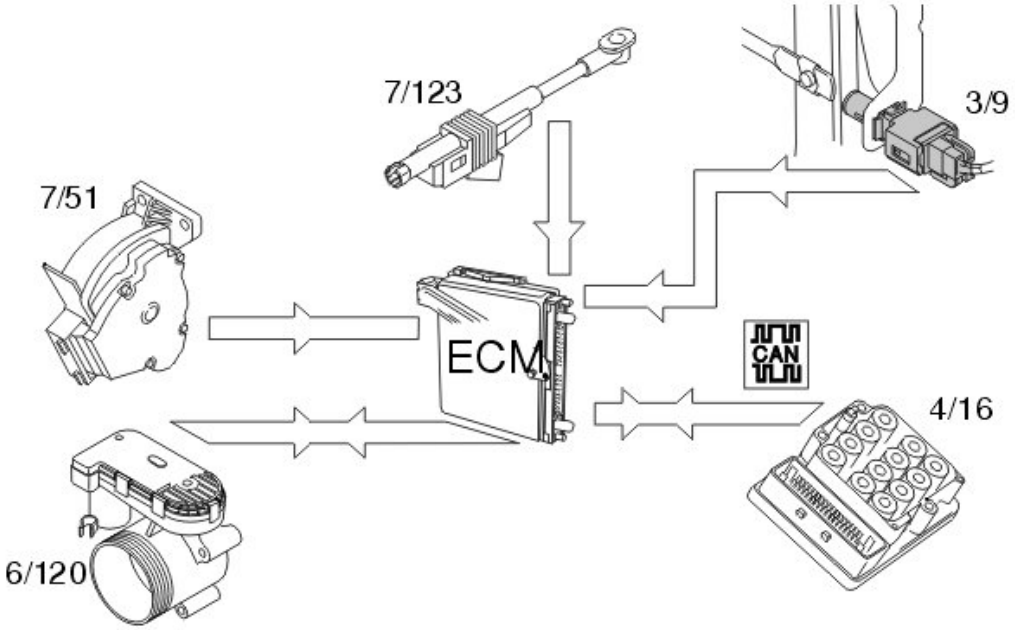
Turbocharger (TC) control system



Hint: The above illustration is for a 6 cylinder engine. However the principle is the same for 5 cylinder engines.

The boost pressure in the intake manifold is controlled by the boost pressure control (BPC) valves, whose pressure regulators (1) are affected by the pressure from the turbocharger (TC) (2).
The Engine Control Module (ECM) receives information about the actual throttle position via the throttle position sensor (TP) for the throttle unit (3), engine load, knocking etc. This affects the boost pressure that is permitted. The boost pressure is measured by the boost pressure sensor.
The control module controls the control pressure using the turbocharger (TC) control valve (4) (also see Design, B5244T5, B5254T2 See: Design), which controls the pressure to the boost pressure control (BPC) valves so that the control is adapted to the required pressure.
The pressure regulators in the boost pressure control (BPC) valves are affected when the pressure rises. When the boost pressure has increased to the maximum permissible value, the boost pressure control (BPC) valves open. Some of the exhaust gases pass the turbine in the turbocharger (TC), limiting the boost pressure.
Turbocharger (TC) control is governed continually by the engine control module (ECM).
When a higher boost pressure is permitted, the control module opens the turbocharger (TC) control valve further. Some of the boost pressure which affects the pressure regulators for the boost pressure control (BPC) valves is released back into the turbocharger (TC) intake. This lowers the control pressure, the boost pressure control (BPC) valves open later and the boost pressure increases.
Because the control module calculates the boost pressure using the signal from the boost pressure sensor and the intake temperature sensor, there is automatic compensation of boost pressure control when driving at altitude and at different temperatures. As a result engine power will not be noticeably affected by the air density or temperature.
The engine control module (ECM) can diagnose the turbocharger (TC) control function.

Throttle control



To ensure that the correct throttle angle is reached, the engine control module (ECM) controls the throttle shutter in the throttle unit (6/120), mainly using the signal from:

- accelerator pedal (AP) position sensor (7/51)
- clutch pedal sensor (7/123)
- stop lamp switch (3/9)
- the throttle position (TP) sensor on the electronic throttle unit (6/120)
- brake control module (BCM) (4/16), signal for the brake pedal sensor.

Additional signals and parameters are used to ensure optimum throttle control. For example there is compensation for the load from the air conditioning (A/C) compressor, load from the transmission depending on the gear selected (automatic), engine temperature etc. In cars with Four-C (Continuously Controlled Chassis Concept), the throttle characteristic changes depending on the driving mode selected.
The position of the throttle is measured by two potentiometers, in the throttle position (TP) sensor, which are on the throttle unit. These are connected, so that potentiometer 1 produces a higher voltage as the throttle angle increases, while potentiometer 2 does the opposite.
In a combustion engine, the difference between the minimum and maximum airflow is considerable. The smaller air flows need more thorough regulation, so the potentiometer signal from potentiometer 1 is amplified approximately 4 times in the engine control module (ECM) before it reaches the Analog/Digital converter in the engine control module (ECM). This means that there are three, two real and one fictitious, input signals available to the engine control module (ECM). These signals are used to determine the position of the throttle and to deploy the damper motor to the correct position. In general the amplified signal is primarily used for small throttle angles (small air flows), which are desirable when a high degree of accuracy is required, for idle air trim for example.
Because the signal is amplified, it reaches its maximum value as early as approximately a quarter of maximum deployment.
The engine control module (ECM) first uses the signal from potentiometer 1 to measure the throttle opening. The signal from potentiometer 2 is mainly used to check that potentiometer 1 is functioning correctly. The engine control module (ECM) then uses the signal to calculate a throttle angle (actual value). This is the actual throttle angle. The value for the actual throttle angle is used by those functions in the engine control module (ECM) which depend on this information so that the throttle can be correctly regulated.
There is an adaptation (learning) in the engine control module (ECM) so that the control module can calculate how the damper motor needs to be controlled. See "Adaptation of the throttle unit" below. This adaptation is carried out during manufacture of the car, when the engine control module (ECM) deploys the throttle disc to the different positions and reads off and registers the actual values from the potentiometers.
The throttle angle is regulated so that the actual angle (actual value) is the same as the angle calculated by the engine control module (ECM) (desired value). The engine control module (ECM) also uses the values that were stored during adaptation of the throttle angle, and the actual signals from the potentiometers.
The damper motor is controlled by a power stage integrated in the engine control module (ECM) using a pulse width modulation (PWM) signal.
The torsion from the opening and return springs in the throttle unit is also used. If there is a fault in the engine control module (ECM) so that the throttle unit cannot be operated or supplied with power, the springs in the throttle unit will turn the throttle disc to the limp home position (return position). This return position gives a throttle angle large enough to allow the car to be driven to a workshop, although with considerably reduced drivability.

Throttle angle

The throttle angle is usually gauged by potentiometer 1. For small angles the amplified signal is used to obtain a clearer signal. The engine control module (ECM) also monitors the throttle unit signals from the potentiometers to check that they are plausible, that they are within the minimum and maximum limits and that the signals correspond to the same throttle angle. If there is a difference in the signals, a fictitious throttle signal is calculated from the load signal, the engine speed (rpm) and the prevailing conditions, particularly pressure and temperature.
The potentiometer whose signal is closest to the calculated throttle angle will then be assumed to be correct. The other potentiometer is then classified as not functioning and a diagnostic trouble code (DTC) is stored. The system then constantly monitors the throttle angle of the remaining potentiometer in comparison to the calculated throttle angle. If there is a difference between these values, the engine control module (ECM) will not rely on any of the throttle unit potentiometers. The power stage in the throttle unit is then disengaged, and the throttle switches to limp home mode

(return position).

Adaptation of the throttle unit

Normally the engine control module (ECM) adapts the throttle unit during manufacture of the car. There are a number of other occasions when the throttle unit must be adapted. A new adaptation is obviously required if the throttle unit or the engine control module (ECM) is replaced, but also if the software in the engine control module (ECM) is replaced. This is because the adaptation values are stored in the EEPROM memory in the control module, at a predetermined location in the memory for each software. These storage locations may vary between different software, in which case a new adaptation will be required. The final reason for adaptation is that the values for the throttle unit may have changed during its service life. Therefore there is a routine which begins adaptation of the throttle unit if the car is left with the engine off and the throttle on for 30 seconds (and other basic conditions for adaptation of the throttle unit are met). A new adaptation is then carried out. If the "new" values are different from the "old" values, the new values are used. Adaptation usually takes place automatically when the engine control module (ECM) detects that the adaptation has not been run or that the values from a previous adaptation are outside certain tolerances. However a number of basic conditions must be met to ensure that the adaptation is carried out correctly:

Basic conditions for adaptation of the throttle unit:

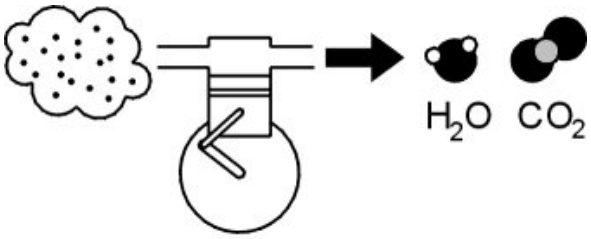
- ignition on / engine off
- battery voltage above 10 V
- accelerator pedal (AP) released (unaffected)
- the car must be stationary (no speed signal)
- engine coolant temperature (ECT) between 5 and 100 °C
- intake air temperature (IAT) above 5 °C.

During adaptation, the engine control module (ECM) checks that the values obtained are within reasonable limits. This helps to determine whether the throttle unit is functioning correctly or not. When the adaptation has been carried out, all relevant values are stored in the EEPROM memory in the control module so that they can be retrieved if the power supply is broken. This means that if the battery is replaced for example, a new adaptation is not necessary.

Part 2

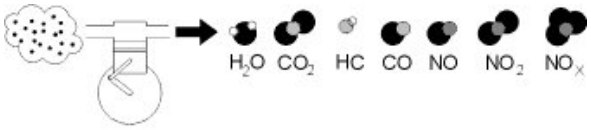
Function (Continued)

Fuel trim

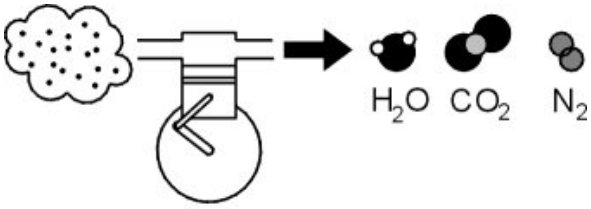


Overview

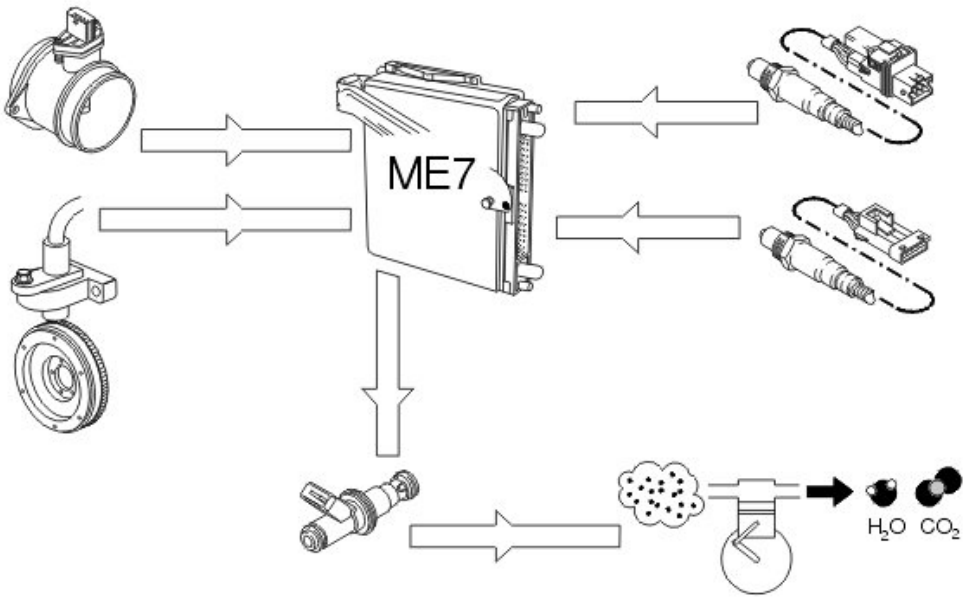
Fuel trim reduces exhaust emissions. Fuel trim reduces nitrous oxide (NOx), carbon monoxide (CO) and hydrocarbon (HC) emissions.
Theoretically, if the correct amount of oxygen is added during combustion, fuel can be converted to water (H2O) and carbon dioxide (CO2). Emissions would then be completely safe.
In practice considerable amounts of hydro-carbons (HC) and varying amounts of carbon monoxide (CO) and carbon dioxide (CO2) remain.



Due to the high temperature and pressure, nitrous oxides such as NO and NO2are also formed. The common designation for these gases is nitrous oxides NOx.



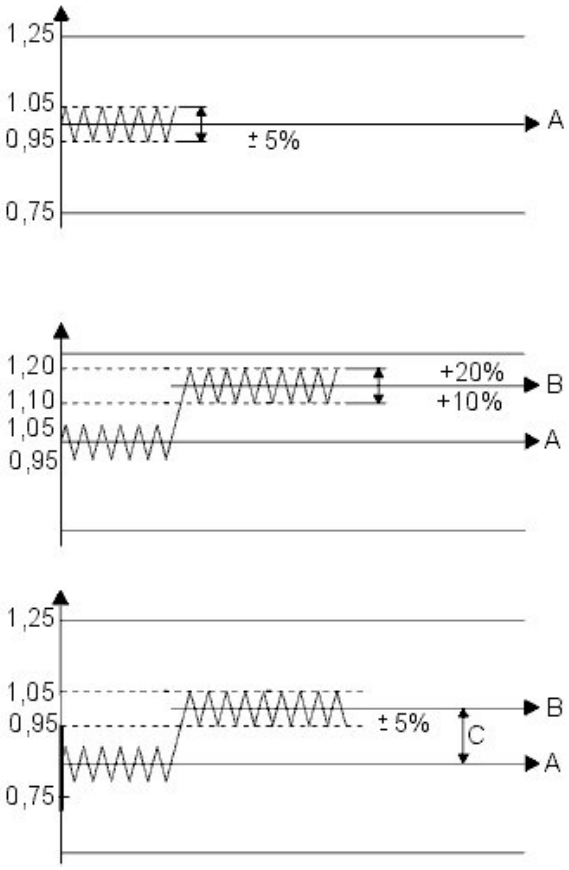
By speeding up the reaction between the remaining reactive components using a catalytic converter, these can be converted to water (H2O), carbon dioxide (CO2) and nitrogen (N2).
However this can only happen if the balance of hydro-carbons (HC), carbon monoxide (CO), oxygen (O2) and nitrous oxides (NOx) is exactly right in the exhaust. This happens when the fuel air mixture before combustion is 14.7 kg of air per kg of fuel. The Lambda value is then said to be one, (lambda=1).



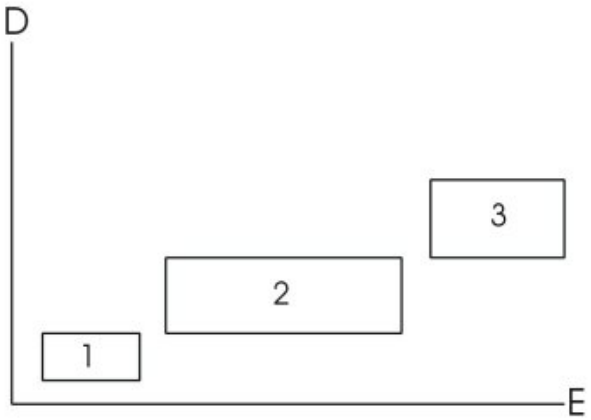
A base program in the engine control module (ECM) calculates the injection period based on data about load, i.e. the measured air mass and engine speed (rpm). The calculated injection time (from the base program) is then modified by a circuit (short-term fuel trim). The signal from the heated oxygen sensor (HO2S) is used to finely adjust the injection period so that lambda=1 is reached. The short-term fuel trim is also a circuit that finely adjusts the injection period so that the fuel air mixture is optimized (lambda=1). The control module also used the signals from the front and rear heated oxygen sensors (HO2S) to correct the front heated oxygen sensor (HO2S) (offset adjustment) and thereby the injection period. This gives a

higher degree of accuracy during fuel trim. Fuel trim is a rapid process which may take place several times a second. Adjustment of the calculated injection period calculated in the base program is limited.
The fuel trim can be read off using VIDA.

Adaptive functions



Certain factors, such as deviations in tolerance for certain components such as the mass air flow (MAF) sensor and injectors, intake air leakage, fuel pressure etc, will affect the composition of the fuel air mixture. To compensate for this, the engine control module (ECM) has adaptive (self learning) functions. When the engine is new, the short-term fuel trim is assumed to vary cyclically around a nominal center line (A) 1.00 with, for example, a ± 5% change in the injection period when fuel trim is active.
If there is air leakage for example, the short-term fuel trim will quickly be offset to a new position (B) and will then work for example between 1.10 (+10%) and 1.20 (+20%), although still at an amplitude of 5%, but with an offset in relation to the original center line (A). The injection period has then been increased to compensate the increase in the amount of air.
The adaptive functions will correct the change, so that the short-term fuel trim will work around the new center line (B) where it will again have its full range of control available.
Put simply, fuel trim is a measurement of the difference (C) between the original short-term fuel trim center line (A) and the new center line (B).



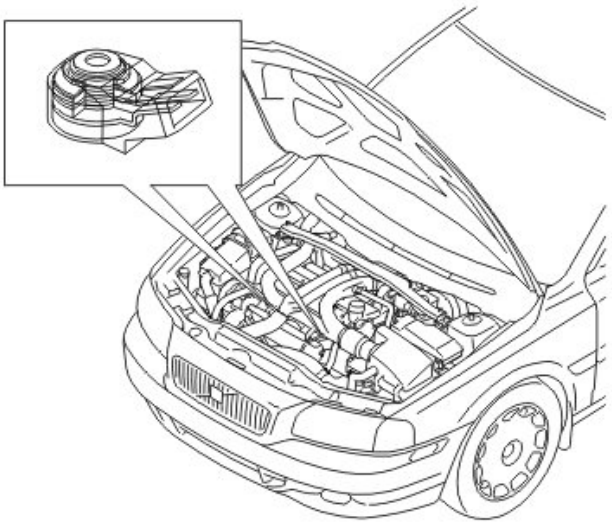
The adaptive functions consist of three sections and correspond to the different operating ranges of the engine; load (D) and engine speed (E):

- Additive adaptation (1) is when the engine is idling. This is how the control module adjusts the CO content at idle speed. Long-term fuel trim, idling can be read off using VIDA
- Multiplicative adaptation, lower part load (2), carried out in the lower part load range. Lower part load range is reached when driving at low load. Long-term fuel trim, lower part load can be read off using VIDA

- Multiplicative adaptation, upper part load (3). Carried out in the upper part load range. The upper part load range is reached when driving under high load and at high engine speed (rpm). Long-term fuel trim, upper part load can be read off using VIDA.

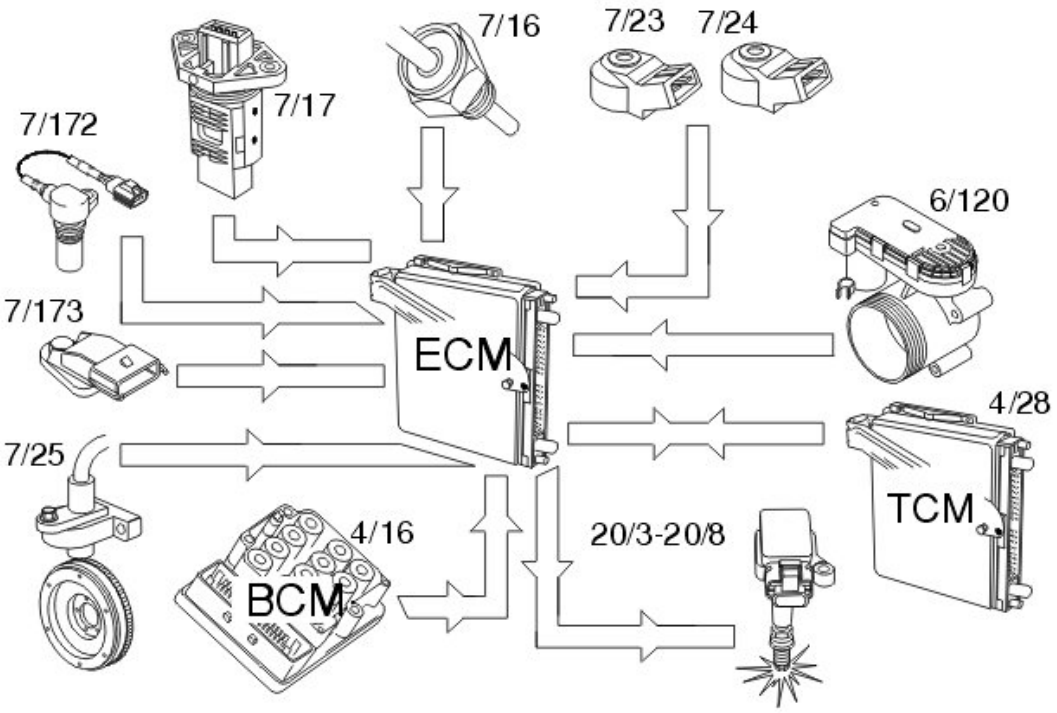
The adaptive adjustments of the injection period are stored continuously in the control module. This means that under different operating conditions the fuel air mixture is obtained before the heated oxygen sensor (HO2S) is warm enough to function.
A diagnostic trouble code (DTC) will be stored in the control module if any adaptation value is too high or too low. For further information, also see Heated oxygen sensor (HO2S) diagnostic See: Diagnostic Functions/Heated Oxygen Sensor (HO2S) Diagnostic.

Knock control



Knocking occurs in the combustion chamber when the fuel and air mixture self ignites. This can occur either before or after the spark plug has produced an ignition spark. In both cases the gas in two or more places ignites in the combustion chamber.
This results in an extremely fast combustion process with flames from several directions. When these flames collide, the pressure in the cylinder increases rapidly and there is a mechanical knocking sound.
If any of the cylinders knock there is a specific type of vibration in the cylinder block. These vibrations are transferred to the knock sensors (KS) which are screwed into place in the cylinder block. The resultant mechanical stress in the piezo electrical material in the knock sensors generates a voltage. The engine control module (ECM) can then determine which cylinder is knocking with the help of the camshaft position (CMP) sensor and the engine speed (RPM) sensor.
The knock sensors (KS) also interpret a proportion of normal engine sound. The control module is able to recognize the vibrations which correspond to knocking by filtering, amplifying and using software to evaluate the signal.
If the knock sensors (KS) detect knocking in the engine over a certain threshold value, the ignition timing is first retarded and then the fuel / air mixture is enriched to eliminate knocking.

Ignition control



The following components are used for ignition control:
- engine speed (RPM) sensor (7/25)
- camshaft position (CMP) sensor (7/172-7/173)
- mass air flow (MAF) sensor (7/17)
- engine coolant temperature (ECT) sensor (7/16)
- throttle position (TP) sensor on the electronic throttle unit (6/120)
- knock sensor (KS) (7/23-7/24)
- transmission control module (TCM) (4/28)
- spark plugs with ignition coils (20/3-20/8)
- brake control module (BCM) (4/16).

The engine control module (ECM) calculates the optimum ignition advance based on the software and information from the sensors. The engine control module (ECM) cuts the current to the ignition coil mounted on the cylinder to be ignited and produces a spark.
During the starting phase the engine control module (ECM) produces a fixed ignition setting. When the engine starts and the car is driven the engine control module (ECM) calculates the optimum ignition setting according to the engine speed (RPM), load, temperature etc.
The engine control module (ECM) analyses the signal from the knock sensors (KS) when the engine reaches operating temperature. If any of the cylinders knock, the ignition is retarded for that specific cylinder until the knocking ceases.
The ignition then advanced to the normal position or until the knock recurs.
Before the transmission control module (TCM) changes gear, it sometimes transmits a torque limiting request to the engine control module (ECM). The engine control module (ECM) then retards the ignition momentarily to reduce the torque, resulting in smoother gear changes and reducing the load on the transmission. There are different ignition retardation levels depending on the signals from the transmission control module (TCM). The return signal from the engine control module (ECM) to the transmission control module (TCM) confirms that the signal reached the engine control module (ECM). The Brake Control Module (BCM) transmits information to the engine control module (ECM) about deviations in the drive line.
The signal is used to stop the diagnosis. For further information, also see Misfire diagnostics See: Diagnostic Functions/Misfire Diagnostics.
The engine misfires if the fuel does not ignite correctly. For further information, also see Misfire diagnostics See: Diagnostic Functions/Misfire Diagnostics.

Cruise control

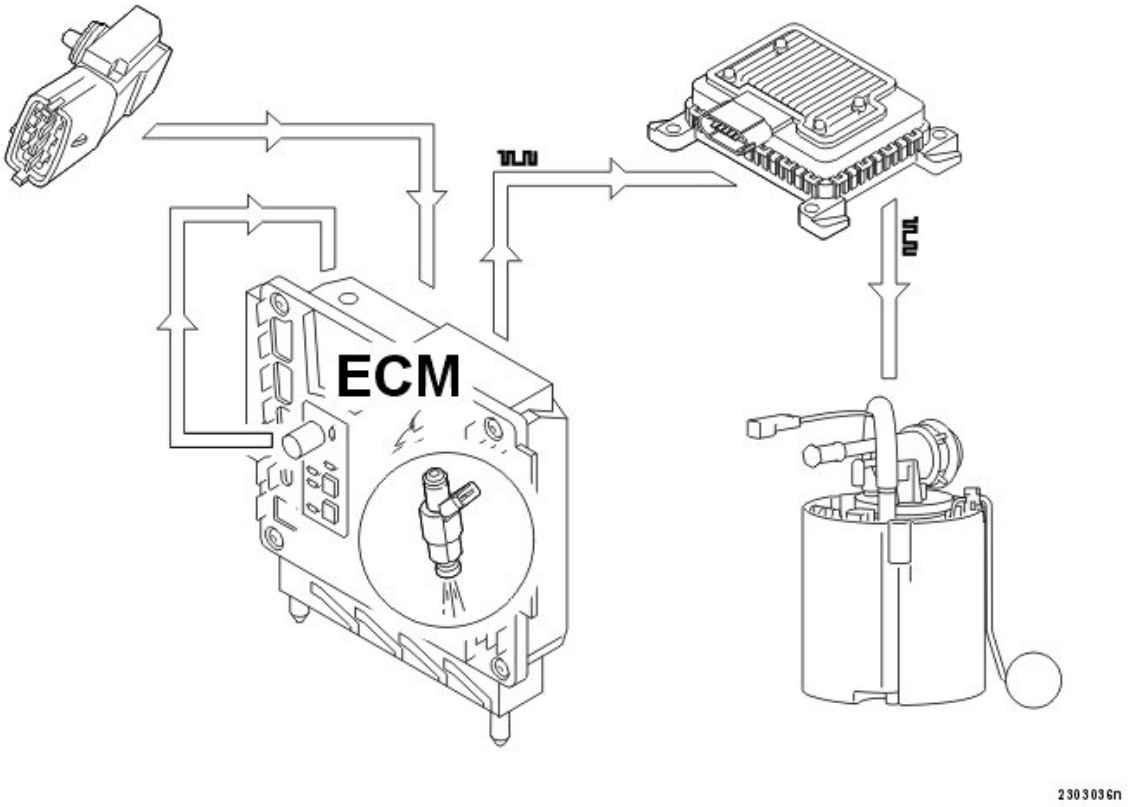
The cruise control function is an example of distributed functionality.
The following components are used when driving using cruise control:
- engine control module (ECM)
- electronic throttle unit
- brake control module (BCM)
- accelerator pedal (AP) position sensor
- clutch pedal sensor
- brake pedal sensor
- control unit cruise control
- steering wheel module (SWM)
- central electronic module (CEM)
- transmission control module (TCM)
- driver information module (DIM).

To activate cruise control the function must be switched on using the "CRUISE" button. A lamp lights up in the driver information module (DIM).
The driver activates the function by pressing the SET+ or SET- button. A message is then transmitted via the low speed side of the Controller area network (CAN) to the central electronic module (CEM) which then transmits the message on via the high speed side of the Controller area network (CAN) to the engine control module (ECM).
The engine control module (ECM) controls the throttle angle so that a constant speed is maintained using the vehicle speed signal from the Brake Control Module (BCM). The transmission control module (TCM) also receives a message indicating that cruise control is active via the Controller area network (CAN), so that the transmission follows certain shifting patterns when the cruise control is active.
If the accelerator pedal (AP) is depressed the speed increases as normal and then resumes to the stored value when the driver releases the accelerator pedal (AP) again.
The engine control module (ECM) continually stores the speed. If the cruise control is disengaged, if for example the driver presses the brake pedal, the previous stored speed can be used by pressing the "RESUME" button.
Cruise control cannot be activated at speeds below 35 km/h.

Cruise control is disengaged:

- when the driver presses the clutch pedal or brake pedal
- when the driver presses the "CRUISE" button on the steering wheel
- when the driver depresses the "0" button on the steering wheel
- if the "P" or "N" positions are transmitted on the controller area network (CAN) (applies to automatic transmissions)
- if the speed deviates too much from the set value
- when certain diagnostic trouble codes (DTCs) are stored which do not allow continued activation (For further information see diagnostic trouble code (DTC) information).

Fuel pressure regulation (only vehicles with demand controlled fuel pumps)



General

Fuel pressure regulation for demand controlled fuel pumps (DECOS - DEmand COntrolled fuel Supply) means that the fuel pressure is controlled steplessly by varying the output of the fuel pump. The design of the system allows a greater maximum pressure (approximately 6.5 bar) in the fuel pump. This pressure is used in extreme situations, such as heavy engine load for example.

The following components are used for fuel pressure regulation:

- engine control module (ECM)
- the fuel pump control module
- a fuel pressure sensor with a fuel temperature sensor
- a fuel pump (FP) with a by-pass valve.

The time taken for the engine start procedure can be reduced by rapidly increasing the pressure in the fuel rail when the engine control module (ECM) receives a signal about the position of the ignition switch from the central electronic module (CEM).

The engine control module (ECM) is better able to calculate the injection period because the signal from the fuel pressure sensor gives information about the fuel pressure. This particular improves the cold starting characteristics of the engine.

The advantages of varying the output of the fuel pump so that it is not always at full power are:

- the total power consumption of the fuel pump (FP) is reduced, reducing the load on the power supply system
- the service life of the fuel pump (FP) is increased
- fuel pump noise is reduced.

Control

The engine control module (ECM) calculates the desired fuel pressure. A signal is then transmitted to the fuel pump control module indicating the desired fuel pressure. Serial communication between the engine control module (ECM) and the fuel pump control module is used to carry the signal. The fuel pump control module then operates the fuel pump unit to obtain the desired pressure using a pulse width modulation voltage on the ground lead. The fuel pump (FP) can be controlled steplessly by changing the pulse width modulation (PWM) signal. Only that pressure which is required at that specific time will then be released to the fuel rail/injectors. The value of the pulse width modulation (PWM) signal is a measurement of the operational load of the fuel pump (FP) (% duty, 100% = maximum pressure).

The engine control module (ECM) continuously monitors the fuel pressure using the signal from the fuel pressure sensor. This allows the desired fuel pressure to be reached, and if necessary a signal is transmitted to the fuel pump control module requesting that the fuel pressure is adjusted.

By-pass valve

When the injectors are closed because of too high pressure (during engine braking for example) there is a pressure peak. The by-pass valve in the fuel pump (FP) is used to even out the pressure peak. The opening pressure of the valve is approximately 6.5 bar.
The by-pass valve also functions as a non-return valve, ensuring that the fuel pressure in the system is maintained when the engine is switched off. There is high pressure before the engine is started. This high pressure means that the valve in the by-pass valve opens and the system is "flushed".

Passive safety

For safety reasons, the engine control module (ECM) shuts off the fuel pump (FP) if the supplemental restraint system module (SRS) detects a collision.

Oil level monitoring (2004-, certain markets and models only)

General

The following components are used for oil monitoring:
- the oil level sensor
- engine control module (ECM)
- driver information module (DIM).

One of the advantage of always monitoring the oil level is that the driver can then be informed, via the driver information module (DIM), if the oil needs topping up.

Oil quality detection

To calculate the quality of the oil, the capacitance of the oil is gauged and then compared with the capacitance of the air. (Capacitance is the ability to store an electrical charge).
The capacitance of the oil and air is measured using both the capacitive gauge elements. The volume of contaminants in the oil increases the capacitance. This provides the electronics integrated in the oil level sensor with an oil quality dependent input signal.

Oil temperature detection

The PTC resistor integrated in the oil level sensor is used to calculate the oil temperature. The resistance of the PTC resistor changes, depending on the oil temperature. The resistance increases as the oil temperature rises. This provides the electronics integrated in the oil level sensor with a temperature dependent input signal.

Oil level detection

The electronics integrated in the sensor calculate the oil level using the obtained values for oil temperature and quality.
Temporary changes in the oil level in the oil trough must be taken into account to correctly calculate the oil level. This happens when cornering and taking hills for example. The engine control module (ECM) makes these calculations using the oil level sensor signal and a number of other parameters. These other parameters include the vehicle speed signal and the load signal.

Oil level sensor signal

The oil level sensor internally calculates the parameters for oil level, quality and temperature. A PWM signal is then generated and transmitted on a cable to the engine control module (ECM).
The PWM signal consists of a pulse train. The first pulse in the pulse train represents the oil temperature. The second pulse represents the oil level. The third pulse represents the oil quality. A change in oil level, quality or oil temperature affects the pulse ratio of the relevant pulse.

Overview

Diagnostic functions

Overview

See Overview. See: General Overview

Misfire diagnostic

See Misfire diagnostics See: Diagnostic Functions/Misfire Diagnostics.

Camshaft diagnostics (CVVT)

See Camshaft diagnostics (CVVT) See: Diagnostic Functions/Camshaft Diagnostics (CVVT).

Leak diagnostics (certain markets only)

To minimize false detection of leakage, new software has been released for the Engine control module (ECM). The software has been released afterwards, in order of priority, started at the end of 2006.
To check the current software version, see Vehicle communication in VIDA.
The improved software version makes diagnostics more robust and durable against aging and wear of the leak diagnostic unit. It affects strategies, behavior and to a degree also read off parameters.

- Leak diagnostics, original version (-2004) See: Diagnostic Functions/Leak Diagnostics (Certain Markets Only)/Leak Diagnostics, Original Version (-2004)
- Leak diagnostics, original version (2005-) See: Diagnostic Functions/Leak Diagnostics (Certain Markets Only)/Leak Diagnostics, Original Version (2005-)
- Leak diagnostics, improved version (2002-) See: Diagnostic Functions/Leak Diagnostics (Certain Markets Only)/Leak Diagnostics, Improved Version (2002-)

Heated oxygen sensor (HO2S) diagnostic

See Heated oxygen sensor (HO2S) diagnostic See: Diagnostic Functions/Heated Oxygen Sensor (HO2S) Diagnostic.

Three-way catalytic converter (TWC) diagnostics
S60/ S80/ V70/ V70XC/ XC70:

See Three-way catalytic converter (TWC) diagnostics See: Diagnostic Functions/Three-Way Catalytic Converter (TWC) Diagnostics.
XC90:

See Catalytic converter diagnostic See: Diagnostic Functions/Three-Way Catalytic Converter (TWC) Diagnostics.

Fuel pressure regulation, diagnostics (only vehicles with demand controlled fuel pumps)

See Fuel pressure regulation, diagnostics See: Diagnostic Functions/Fuel Pressure Regulation, Diagnostics.

Oil level sensor, diagnostics (2004-, certain markets and models only)

See Oil level sensor, diagnostics See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Testing and Inspection.

Camshaft Diagnostics (CVVT)

Camshaft diagnostics (CVVT)

In addition to electrical checks of the camshaft reset valve, the engine control module (ECM) checks that the position of the camshaft is correct and that the control (deployment and return of the camshaft) is working satisfactorily. The control module uses the signals from the camshaft position sensor and engine speed (RPM) sensor (crankshaft position) for the diagnostics.

Checking the camshaft position

The control module checks that the 0 position of the camshaft (mechanical rest position) is correct. At idle speed camshaft control is not active. The control module checks the camshaft deviation from the 0 position, that is, how much the camshaft flanks deviate from the predetermined positions on the crankshaft.
The position of the camshaft is stored in the control module. If the position is incorrect the diagnostic trouble code (DTC) is stored in the engine control module (ECM). The camshaft position value can be read off using VIDA.

Checking the camshaft control

Active camshaft control checks that the camshaft assumes the position the control module intends the camshaft to move to, that is that the correct camshaft angle is obtained. This is done by measuring the time the system takes to deploy to the correct camshaft position (the transition time from the actual to the desired camshaft angle). A diagnostic trouble code (DTC) is stored in the engine control module (ECM) If the camshaft angle does not reach the desired value within a certain time frame.
The actual value and the desired value for the camshaft's angle can be read using VIDA.

Fuel Pressure Control, Diagnostics

Fuel pressure control, diagnostics

General

The fuel pump control module has no functions for diagnostics. Fuel pressure control components and functions are diagnosed by the engine control module (ECM).
The following components and functions are diagnosed by the engine control module (ECM). Diagnostic trouble codes (DTCs) can be stored for each component and function:

- **Fuel pump control module**, a diagnostic checks the power supply. A diagnostic trouble code (DTC) will be stored and the fuel pump will not work if there is no power supply to the fuel pump control module
- **Fuel pressure sensor**with temperature sensor, a diagnostic checks the pressure and temperature signals to see if they are outside the normal

operating range of the sensor. If a fault in the fuel pressure sensor is detected, the fuel pump (FP) will run at a predefined power and the pressure is governed by the by-pass valve in the fuel tank
- **Fuel pressure**, the engine control module (ECM) compares the requested pressure with the measured pressure(signal from the fuel pressure sensor). If the measured pressure deviates excessively from the requested pressure, or if the pressure pulses, a diagnostic trouble code (DTC) will be stored for incorrect fuel pressure. The diagnostic is not active if a diagnostic trouble code (DTC) for the fuel pressure sensor is stored. A diagnostic trouble code (DTC) for fuel pressure will be stored if there is a fault in the**fuel pump**
- **Communication cable.**The engine cannot be started if there is a fault in the communication cable between the engine control module (ECM) and the fuel pump control module. A diagnostic trouble code (DTC) will be stored for the fault.

For further information about diagnostic trouble codes (DTCs), see Information, diagnostic trouble codes (DTCs) in VIDA.

Components and functions which cannot be diagnosed:

If there is a fault in the**by-pass valve**in the tank unit, the starting process of the engine will take longer if the valve is leaking fuel when the fuel pump is off. If the valve does not open when there are pressure peaks in the fuel system, engine operation will be affected negatively, especially after engine braking. The fault can also cause rough idling.

Fuel Pressure Regulation, Diagnostics

Fuel pressure regulation, diagnostics

General

The fuel pump control module has no functions for diagnostics. Fuel pressure regulation components and functions are diagnosed by the engine control module (ECM).
The following components/functions are diagnosed by the engine control module (ECM). Diagnostic trouble codes (DTCs) can be stored for each component/function:
- **Fuel pump control module**, the power supply is checked. A diagnostic trouble code (DTC) will be stored and the fuel pump will not work if there is no power supply to the fuel pump control module
- **Fuel pressure sensor with temperature sensor**, the pressure and temperature signals are checked to see if they are outside the normal operating range of the sensor. If a fault in the fuel pressure sensor is detected, the fuel pump (FP) will run at full power and the pressure is governed by the by-pass valve in the fuel tank
- **Fuel pressure**, the engine control module (ECM) compares the requested pressure with the measured pressure(the signal from the fuel pressure sensor). If the measured pressure deviates excessively from the requested pressure, or if the pressure pulses, a diagnostic trouble code (DTC) will be stored for incorrect fuel pressure. The diagnostic is not active if a diagnostic trouble code (DTC) for the fuel pressure sensor is stored. A diagnostic trouble code (DTC) for fuel pressure will be stored if there is a fault in the**fuel pump**
- **Communication cable.**The engine cannot be started if there is a fault in the communication cable between the engine control module (ECM) and the fuel pump control module. A diagnostic trouble code (DTC) will be stored for the fault.

For further information about diagnostic trouble codes (DTCs), see Information, diagnostic trouble codes (DTCs) in VIDA.

Components/functions which cannot be diagnosed:

If there is a fault in the**by-pass valve**in the tank unit, the starting process of the engine will take longer if the valve is leaking fuel when the fuel pump is off. If the valve does note open when there are pressure peaks in the fuel system, engine operation will be negatively effected, especially after engine braking.

Heated Oxygen Sensor (HO2S) Diagnostic

Heated oxygen sensor (HO2S) diagnostic

Heated oxygen sensor (HO2S) diagnostic

Two heated oxygen sensors (HO2S) are used in the Denso engine control module (ECM). The heated oxygen sensors (HO2S) are checked as usual for short-circuits and open-circuits. Diagnostic trouble code (DTC) ECM-2120 (front heated oxygen sensor (HO2S)) or ECM-2200 (rear heated oxygen sensor (HO2S)) will be stored if any of these faults occur. The probe heat elements are also checked. In the event of a fault, diagnostic trouble code (DTC) ECM-2110 (front heated oxygen sensor (HO2S), heating), ECM-2120 (front heated oxygen sensor (HO2S), probe control) or ECM-2210 (rear heated oxygen sensor (HO2S), heating) will be stored. In addition, probe control is also checked. In brief, these checks are carried out as follows.

The front heated oxygen sensor (HO2S)

The front heated oxygen sensor (HO2S), which is a linear type: Two checks where the switch over time between rich-lean and lean rich fuel / air mixture is checked. The diagnostic checks the response time of the front heated oxygen sensor (HO2S) when fuel shut-off is activated and deactivated.
The rich-lean check takes place when the fuel shut-off system is activated, on condition that the sensor current is below a lower limit (indicates rich fuel / air mixture). When the fuel shut-off system is activated, the sensor current usually rises (this indicates a lean fuel / air mixture). The lean-rich check measures the time taken for the sensor current to rise from a lower to an upper limit value. If the time counter exceeds a fault level without the sensor current having reached the upper limit value, the response is considered to be too slow; a fault marker is stored.
The lean-rich check is carried out in a similar way when the fuel shut-off system is deactivated. The difference is that the time taken for the sensor current to fall is measured. Diagnostic trouble code (DTC) ECM-210A (front heated oxygen sensor (HO2S)) is stored in the event of a fault in both

of these checks.
In addition, the lambda value is also checked. This value must not deviate significantly from its control value. Diagnostic trouble code (DTC) ECM-210F (front heated oxygen sensor (HO2S)) is stored if the difference is too great.

Rear heated oxygen sensor (HO2S)

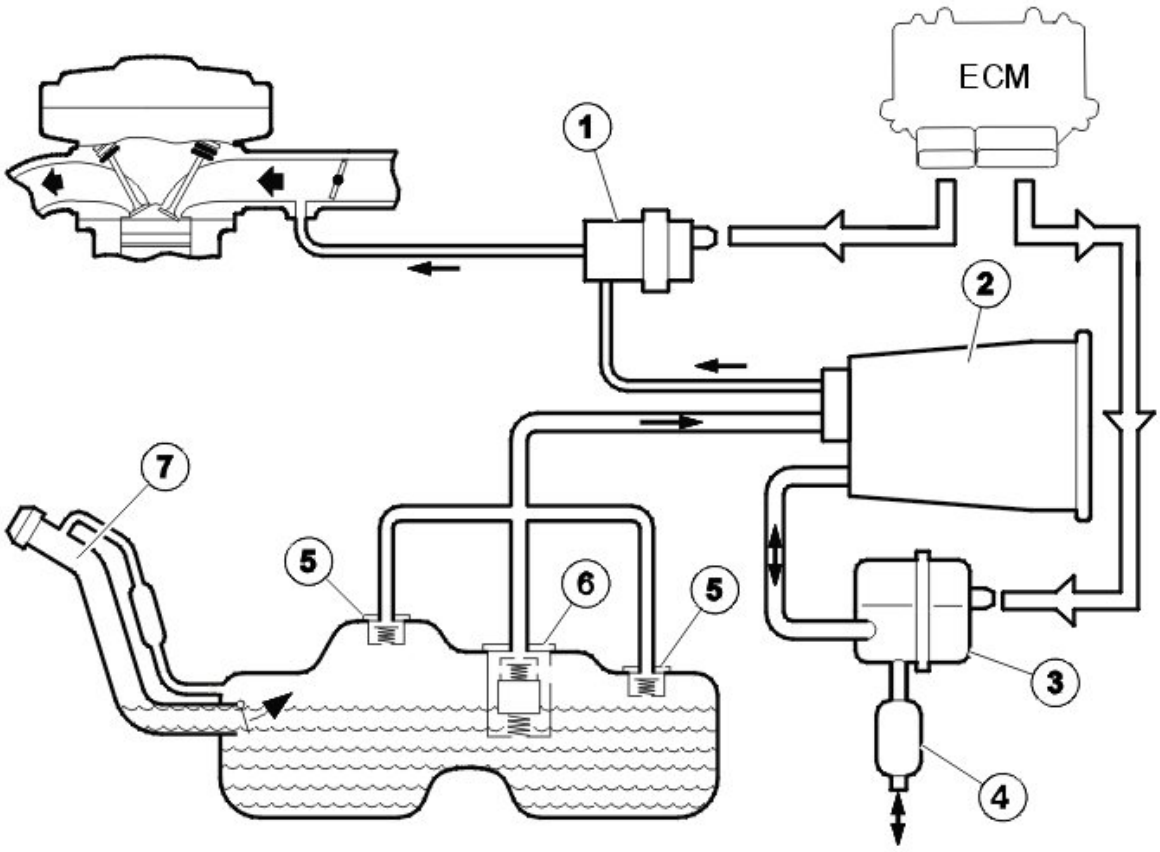
The rear heated oxygen sensor (HO2S), which is a binary type, is checked in the following way.
The control module checks the difference between the rear probe voltage maximum and minimum values. This voltage must not exceed 0.5 V. If the difference is greater, the control module takes an initialization value as its starting point. This is a maximum of 0 V and a minimum of 5 V. After this, the rear heated oxygen sensor (HO2S) maximum value must exceed the initialization value (0 V) for the probe voltage by at least 0.6 V and fall below the initialization value (5 V) probe voltage to the minimum value 0.1 V. If these limit values are not reached within approximately 5 minutes and the accumulated and actual probe warming has not reached certain limit values, the control module interprets it as a fault.

Twin probe control starts and is active when
- the front probe has started control
- the rear probe has reached operating temperature

Twin probe control is interrupted during fuel shut-off, during misfiring or in the event of a fault in
- the catalytic converter
- heated oxygen sensor (HO2S) heating

Leak Diagnostic

Leak diagnostic



All gases that evaporate from fuel in the fuel tank must be led to and stored in the evaporative emission system (EVAP) canister so that they can be directed into the engine for combustion. In order to detect leakages which cause evaporation of gases into the air, the fuel tank system is diagnosed for leakage. The fuel tank system consists of:
- fuel tank
- Canister purge (CP) valve (1)
- EVAP canister (2)
- leak diagnostic unit (3)
- air cleaner (ACL) (4)
- Roll-over valve (5)
- Float Limit Vent Valve (6)
- fuel filler pipe (7)
- all lines between the above components.

The fuel tank system has a leak diagnostic unit to diagnose any leakage. The leak diagnostic unit pressurizes the fuel tank system when the ignition is off, if the conditions for diagnosis have been met. The control module can detect faults in the function of the leak diagnostic unit and leakage that

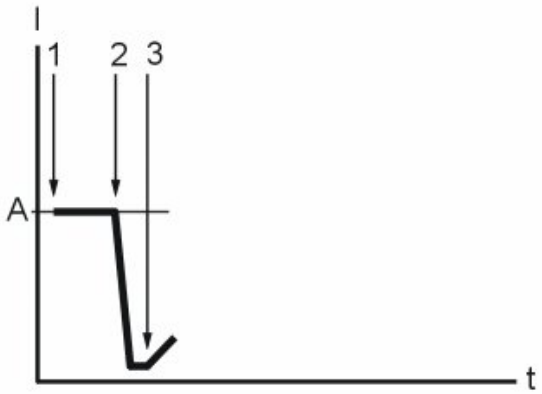
is 0.5 mm or greater. Minor leak; leakage greater than 0.5 mm but less than 1.0 mm. Major leak (fuel tank filler cap missing for example) leakage greater than 1.0 mm.
The leak diagnostic unit consists of a pump and a valve that controls the air flow in the unit. The fuel tank system tests for leaks by measuring the power consumption of the pump. The power consumption of the pump corresponds to a certain pressure in the fuel tank system. During diagnosis, the rate at which the pressure can build up is checked, taking into account the quantity of fuel in the tank. The quicker the pressurization the better the fuel tank system is sealed.

Conditions for diagnosis

The diagnosis begins when all the following conditions are met:
- There must be no diagnostic trouble code (DTC) stored for the following components or functions:
  - the power stage for the pump in the leak diagnostic unit
  - the power stage for the valve in the leak diagnostic unit
  - the power stage for the EVAP canister purge valve
  - the EVAP canister purge valve.
- Engine off for at least 5 hours (continuous), engine running for at least 20 minutes (continuous)
- Ignition off
- Vehicle speed 0 km/h
- Engine coolant temperature (ECT) +4 °C or higher
- Maximum altitude of 2500 meters above sea level
- Outside temperature between +4 and +35 °C
- Stable signal from the fuel level sensor
- Fuel volume in the tank between 15-85 %
- Battery voltage between 11.0-14.5 V. The voltage must be stable
- EVAP canister purge valve closed
- Low volume in the canister.

Diagnostic phases

The diagnostic is divided into the following phases and is carried out in sequence when all conditions for the diagnostic have been met.
- reference phase 1
- function test
- leak diagnostic
- reference phase 2 (only during minor leak diagnostics, if the previous phase detected leaks).

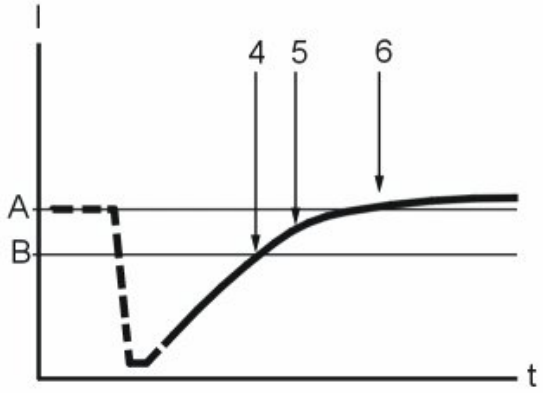


Reference phase 1 (1-2)

The illustration is a diagram of a fault free fuel tank system.
Before the leak diagnostic begins, the control module runs reference phase 1 for leakage. During reference phase 1 (1-2) for leakage that is 0.5 mm, the pump in the leak diagnostic unit pumps ambient air through a 0.5 mm hole and back out to the ambient air. At the same time, the power consumption (A) of the pump is measured and stored in the control module. The stored value (A) for the power consumption of the pump corresponds to a leakage of 0.5 mm. This value is then used by the engine control module (ECM) to determine the leak status of the fuel tank system.

Function test (1-3)

If the value for the power consumption of the pump is too high or low during reference phase 1 (1-2), or if the value for pump power consumption varies too much during reference phase 1 (1-2), the diagnostic is cancelled and starts again the next time the conditions for the diagnostic are met. A diagnostic trouble code (DTC) is stored if the diagnostic is cancelled because the power consumption of the pump is varying excessively.
After reference phase 1, the valve (2) in the leak diagnostic unit is activated and controls the air flow to the fuel tank to pressurize the fuel tank system. This change of air flow will cause the power consumption of the pump to fall briefly before the pressure builds up in the fuel tank system (3). A diagnostic trouble code is stored if the value for the power consumption of the pump drops too quickly, slowly or not at all.

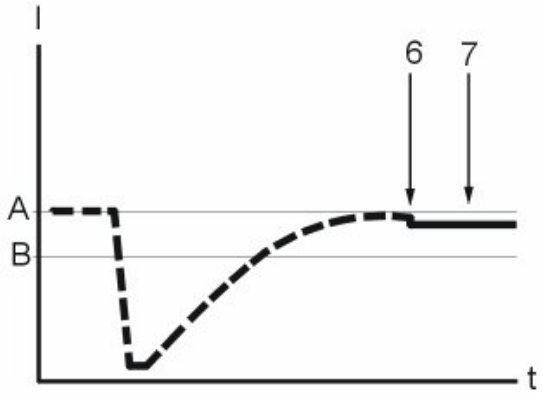


Leak diagnostic, major leak (leakage greater than 1.0mm)

The diagnostic for "major leaks" is carried out every other time when the conditions for the diagnostic are met. The leak diagnostic unit pressurizes the fuel tank system, measures the power consumption of the pump (4) and compares this with a calculated desired value (B). If the measured value reaches the calculated desired value within a certain time frame (determined by the fuel level in the tank), the engine control module (ECM) assumes that the fuel tank system is free of major leaks.
If a diagnostic trouble code (DTC) for major leaks is stored by the engine control module (ECM), a diagnostic trouble code (DTC) for fuel tank filler cap missing will also be stored and the driver will be notified by a text message in the driver information module (DIM).

Leak diagnostic, minor leak (leakage greater than 0.5mm but less than 1.0mm)

The diagnostic for minor leaks is run every 14th time the conditions for the diagnostic are met. The diagnostic for major leaks is always run before the diagnostic for minor leaks. The leak diagnostic unit continues to pressurize the fuel tank system (5). If the measured value (6) is the same or less than the value stored in reference phase 1 (A) (minor leak) after a certain amount of time (the time is determined by the fuel level in the tank), reference phase 2 is run (see reference phase 2 below).
A diagnostic trouble code (DTC) for minor leakage is stored, depending on the power consumption of the pump during reference phase 2.



Reference phase 2

The illustration shows the reference phase after the diagnostic for minor leaks, sealed fuel tank system.
Reference phase 2 is run when the power consumption of the pump is too low during the diagnostic for leakage. This is to ensure that lower power consumption during the minor leak diagnostic (6) is not caused by changes in components. If the measured power consumption during reference phase 2 (7) is lower than that measured during pressurization (6), the control module interprets this as meaning that the fuel tank system is sealed. A diagnostic trouble code (DTC) for minor leakage is stored if the measured power consumption from reference phase 2 (7) is the same or higher than that measured during pressurization (6).

Leak Diagnostics

Leak diagnostics

Overview

Vapor which evaporates from the fuel in the fuel tank is routed to and stored in the EVAP canister from where it is guided into the combustion process via the canister purge (CP) valve and negative pressure in the intake manifold. The diagnosis is designed to detect leaks between 0.5-1 mm, depending on the model year.
The tank system consists of the fuel tank, fuel tank filler cap, fuel filler pipe, roll-over valve, EVAP canister, EVAP components, fuel tank pressure sensor, and EVAP canister shut-off valve.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The diagnostic is divided into different phases under which the various components are tested and faulty components are isolated with a diagnostic trouble code (DTC).

Conditions for diagnosis

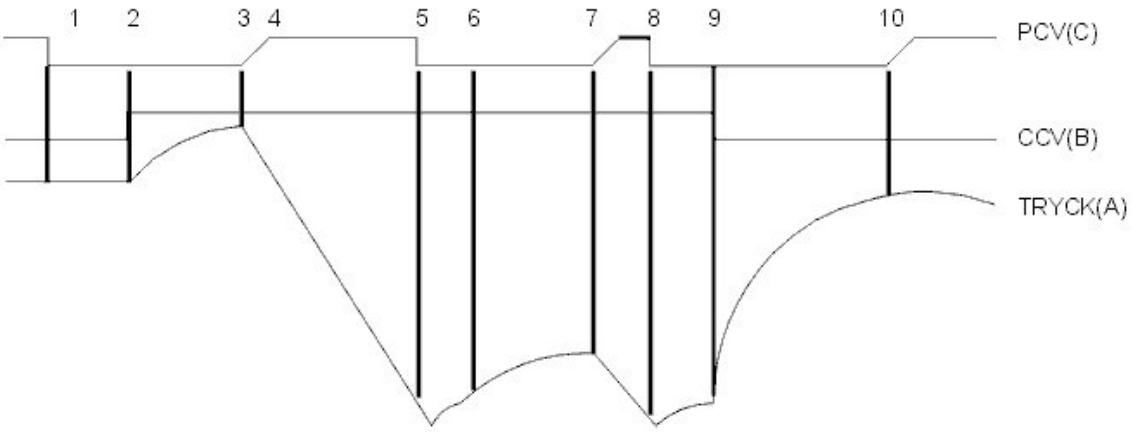
The diagnosis begins when all the following conditions are met.
There must be no diagnostic trouble code (DTC) stored for the following components or functions:

- EVAP canister shut-off valve
- the fuel tank pressure sensor
- the canister purge (CP) valve
- Vehicle speed is between 30-160km/h, must be steady driving
- Engine speed below 3500 rpm
- Engine coolant temperature (ECT)> 60°C
- Maximum altitude of 2500 meters above sea level
- Outside temperature above +3.5°C
- Stable fuel tank pressure
- Low volume in the canister.

The diagnostic test works as follows:

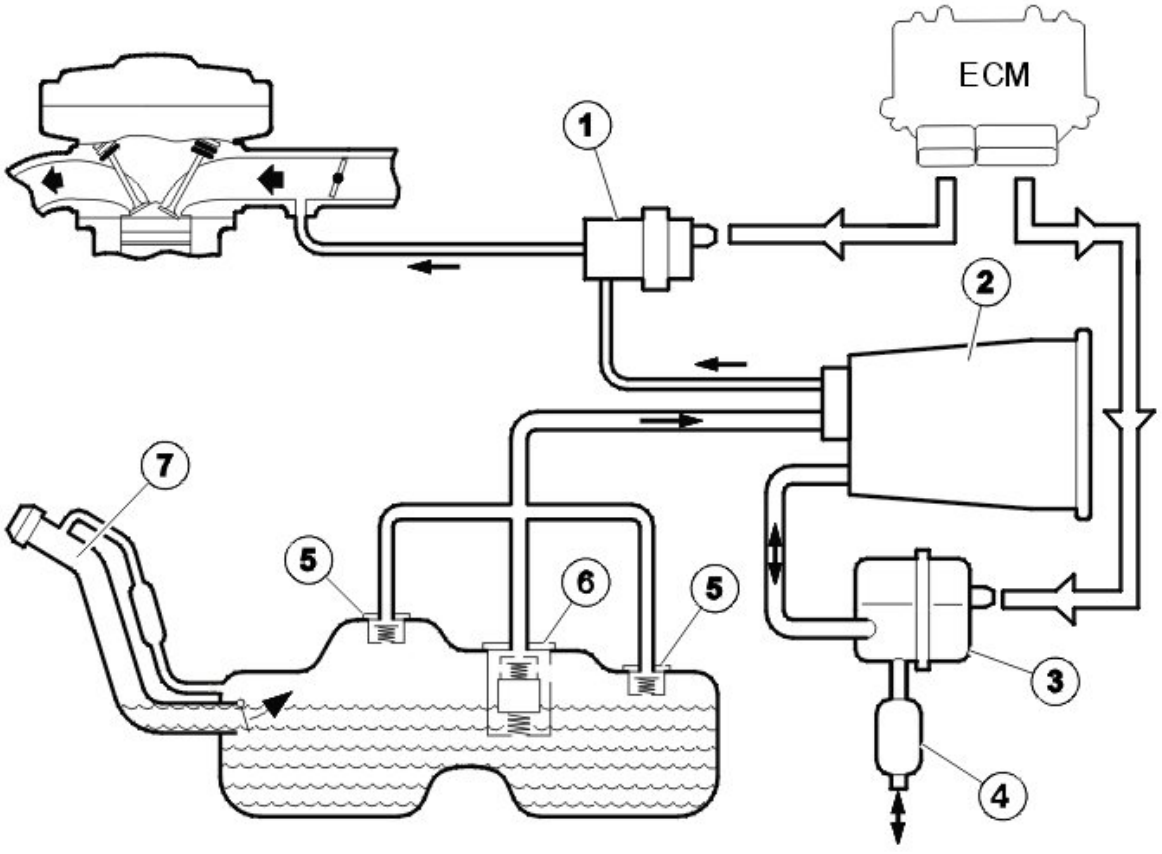
- 1. The canister purge (CP) valve (C) closes the fuel tank ventilation. The EVAP canister shut-off valve is still open. The pressure in the tank must now return to atmospheric pressure. If the pressure in the fuel tank does not return to atmospheric pressure, the canister purge (CP) valve (C) is leaking or that the EVAP canister shut-off valve (B) is blocked. Diagnostic trouble code (DTC) ECM-4047 canister purge (CP) valve leaking or EVAP canister shut-off valve blocked is stored
- 2. The evaporative emission system (EVAP) valve (C) is closed and the EVAP canister shut-off valve (B) closes the opening for fresh air ventilation. The pressure in the fuel tank must be unchanged or rise. If the fuel tank pressure drops the canister purge (CP) valve is leaking. Diagnostic Trouble Code (DTC) ECM-4047, canister purge (CP) valve leaking is stored. If the pressure in the fuel tank rises, there is considerable fuel evaporation and the diagnostic is cancelled
- 3-4. The EVAP canister shut-off valve (B) remains closed, the evaporative emission system (EVAP) valve (C) starts to pulse. The pressure (A) in the fuel tank now starts to drop quite quickly. If the pressure does not drop quickly there is a major leak in the system. Diagnostic trouble code (DTC) ECM-4308 leak diagnostic major leak is then stored. If the pressure drops too quickly instead, the fuel tank level is too high and the diagnostic is cancelled
- 5-6-7 The canister purge (CP) valve (C) closes. The EVAP canister shut-off valve (B) remains closed. When the fuel tank pressure has stabilized, a check is carried out as to whether pressure is rising too quickly in the fuel tank. This would indicate a minor leak in the fuel tank system and ECM-4308 Minor leak would be stored
- 8-9-10. The evaporative emission system (EVAP) valve (C) pulses, so that the fuel tank pressure (A) drops again. The EVAP canister shut-off valve (B) then opens so that the fuel tank pressure can return to atmospheric pressure. Diagnostic trouble code (DTC) ECM-4047 EVAP canister shut-off valve blocked is stored if the recovery time is too long. The time taken to return to atmospheric pressure is also a measurement of the amount of fuel in the tank. The fuel level is used as a compensation value when calculating the size of the leak during stages 5-6-7 above.

The diagnostic test starts at the earliest 13 minutes after the engine has started when all conditions have been fulfilled, and takes approximately 60-80 seconds. If the diagnostic is interrupted it will try again when all the conditions have been fulfilled again. The control module makes a maximum of 20 attempts in one trip. No more attempts are made until the engine is started again.



Leak Diagnostics, Improved Version (2002-)

Leak diagnostics, improved version (2002-)



All gases that evaporate from fuel in the fuel tank must be led to and stored in the evaporative emission system (EVAP) canister so that they can be directed into the engine for combustion. In order to detect leakages which cause evaporation of gases into the air, the fuel tank system is diagnosed for leakage. The fuel tank system consists of:

- fuel tank
- the EVAP canister purge valve (1)

- EVAP canister (2)
- leak diagnostic unit (3)
- air cleaner (ACL) (4)
- Roll-over valve (5)
- Float Limit Vent Valve (6)
- fuel filler pipe (7)
- all lines between the above components.

The fuel tank system has a leak diagnostic unit to diagnose any leakage. The leak diagnostic unit pressurizes the fuel tank system when the conditions for leak diagnostics are met.
The control module can detect faults in the function of the leak diagnostic unit and leakage that is 0.5 mm or greater. Minor leak; leakage greater than 0.5 mm but less than 1.0 mm. Major leak; leakage greater than 1.0 mm.
The leak diagnostic unit consists of a pump and a valve that controls the air flow in the unit. The Engine control module (ECM) checks for leakage in the fuel tank system by measuring the relationship between reached pressure and flow from the leak diagnostic pump during pressurization.
If a certain pressure is not reached with a predetermined supplied flow (with known mass), the Engine control module (ECM) interprets this as a leak from the fuel tank system.
Leak diagnostics starts in normal operation when specific conditions are met, see below. The diagnostics can also be started on command using VIDA when some of these conditions are ignored.

Conditions for diagnosis

The diagnosis begins when all the following conditions are met.
Note: When diagnostics are started on command using VIDA, certain different conditions apply. See relevant information about these, available with starting Quick test fuel tank system.

- No diagnostic trouble codes (DTCs) for EVAP valve or atmospheric pressure sensor may be stored.
- The engine is switched off until the engine coolant temperature (ECT) has fallen to a few degrees above the outside temperature, then engine running for at least 10 minutes
- Ignition off
- Vehicle speed 0 km/h.
- Engine coolant temperature (ECT) 4-35°C.
- Maximum altitude of 2500 meters above sea level
- Outside temperature 4-35 °C.
- Fuel volume in the tank between 0-85 %. The engine control module (ECM) ignores these parameters if a diagnostic trouble code (DTC) is stored for the fuel level sensor and the fuel volume cannot be determined.
- Battery voltage between 11-15 V. The voltage must be stable.
- EVAP canister purge valve closed
- Low volume in the canister.
- Fuel tank filler cap locked. Tip. Locking occurs when the vehicle speed exceeds approximately 20 km/h.

Diagnostic phases

The diagnostic is divided into the following phases and is carried out in sequence when all conditions for the diagnostic have been met.

- reference phase
- function test
- checking the fuel tank system

Reference phase

Before the leak diagnostic begins, the control module runs a reference phase for leakage. During the reference phases for leakage that is 0.5 mm, the pump in the leak diagnostic unit pumps ambient air through a 0.5 mm hole and back out to the ambient air. At the same time, the pump in the leak diagnostic unit is monitored and the reference values stored for later use to determine whether the tank system is leaking or not.
If a reference value for the pump is outside its unexpectedly high or low, or deviates too much, diagnostics is cancelled and a DTC is stored.

Function test

After the reference phase, the valve in the leak diagnostic unit is activated and controls the air flow to the fuel tank to pressurize the fuel tank system. This change of air flow will cause the load the pump to fall briefly before the pressure builds up in the fuel tank system. If the load does not change within permitted parameters within a permitted time, diagnostics is cancelled and a DTC is stored.

Checking the tank system, major leak (leak greater than 1.0 mm)

Diagnostics are carried out every time conditions for diagnostics are met.
The leak diagnostic unit pressurizes the fuel tank system and checks for leaks by monitoring the pressure the fuel tank system. The pressure is a calculated pressure, calculated using the measured pump power consumption. If the pressure stabilizes and/or does not exceed 1500 Pa within 450 seconds, this is interpreted as a leak from the fuel tank system. Diagnostics are cancelled and a DTC for major leak is stored.

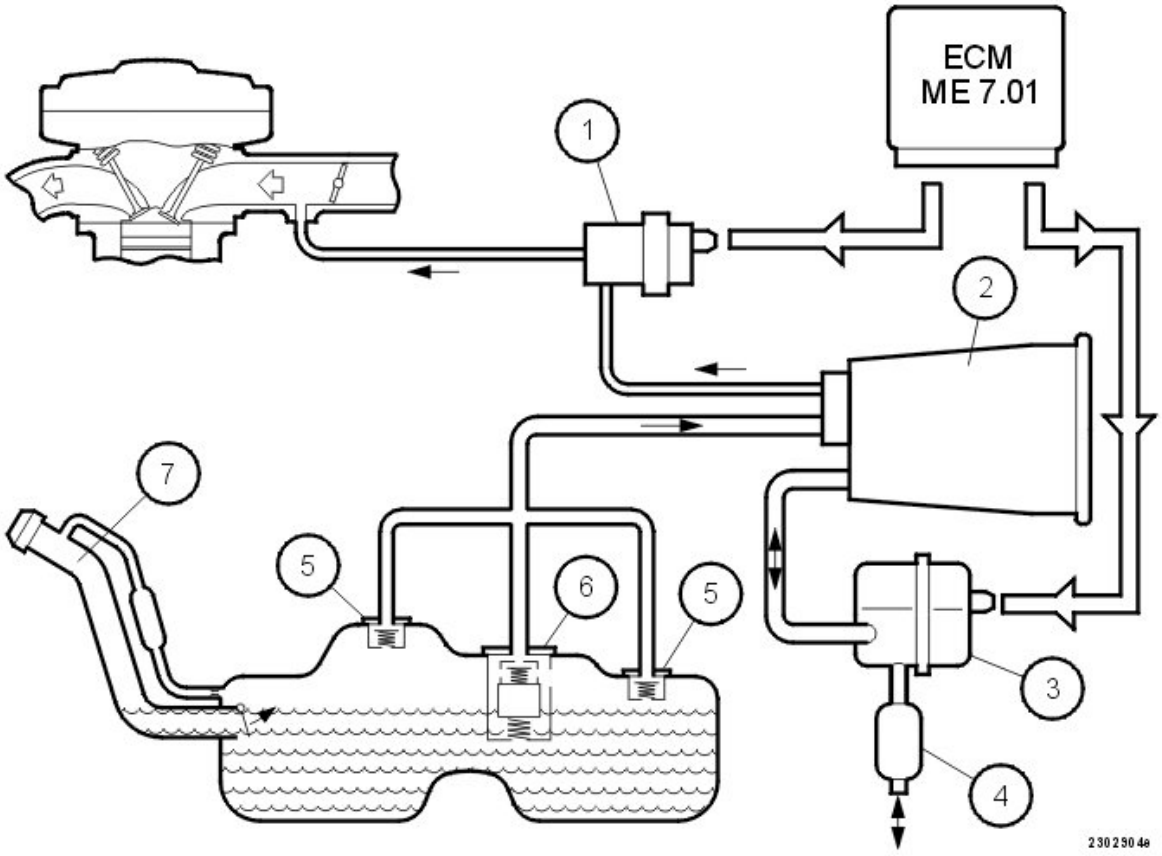
Checking the fuel tank system, minor leak (leakage greater than 0.5 mm but less than 1.0 mm)

The diagnostic for minor leaks is run every other time that the conditions for the diagnostic are met. Otherwise diagnostics stop after checking for major leaks.
The leak diagnostic unit continues to pressurize the fuel tank system. The Engine control module (ECM) checks for leakage in the fuel tank system

by measuring the relationship between reached pressure and flow from the leak diagnostic pump during pressurization. In a sealed system the relationship between these must be linear. Any deviations from the linear relationship are calculated and used to determine how well sealed the tank system is.
A diagnostic trouble code (DTC) is stored if a minor leak is detected within 15 minutes.

Leak Diagnostics, Original Version (-2004)

Leak diagnostics, original version (-2004)



All gases that evaporate from fuel in the fuel tank must be led to and stored in the evaporative emission system (EVAP) canister so that they can be directed into the engine for combustion. In order to detect leakages that cause gas to evaporate into the air, the fuel tank system is diagnosed for leakage. The fuel tank system consists of fuel tank, roll-over valve (5), Float Limit Vent Valve (6), fuel filler pipe (7), EVAP canister (2), EVAP valve (1), air cleaner (4), leak diagnostic unit (3) and all cables between these components. The fuel tank system has a leak diagnostic unit that makes it possible to diagnose any leaks. The unit pressurizes the fuel tank system when the ignition is switched off if the conditions for leak diagnostics are met. The control module can detect faults in the function of the diagnostic unit and leakage that is 0.5 mm (minor leak) or greater (major leak, fuel filler cap missing).
The leak diagnostic unit consists of a pump and a valve that controls the air flow in the unit. The fuel tank system tests for leaks by measuring the power consumption of the pump. The power consumption of the pump corresponds to a certain pressure in the fuel tank system. During diagnosis, the rate at which the pressure can build up is checked, taking into account the quantity of fuel in the tank. The quicker the pressurization the better the fuel tank system is sealed.

Conditions for diagnosis

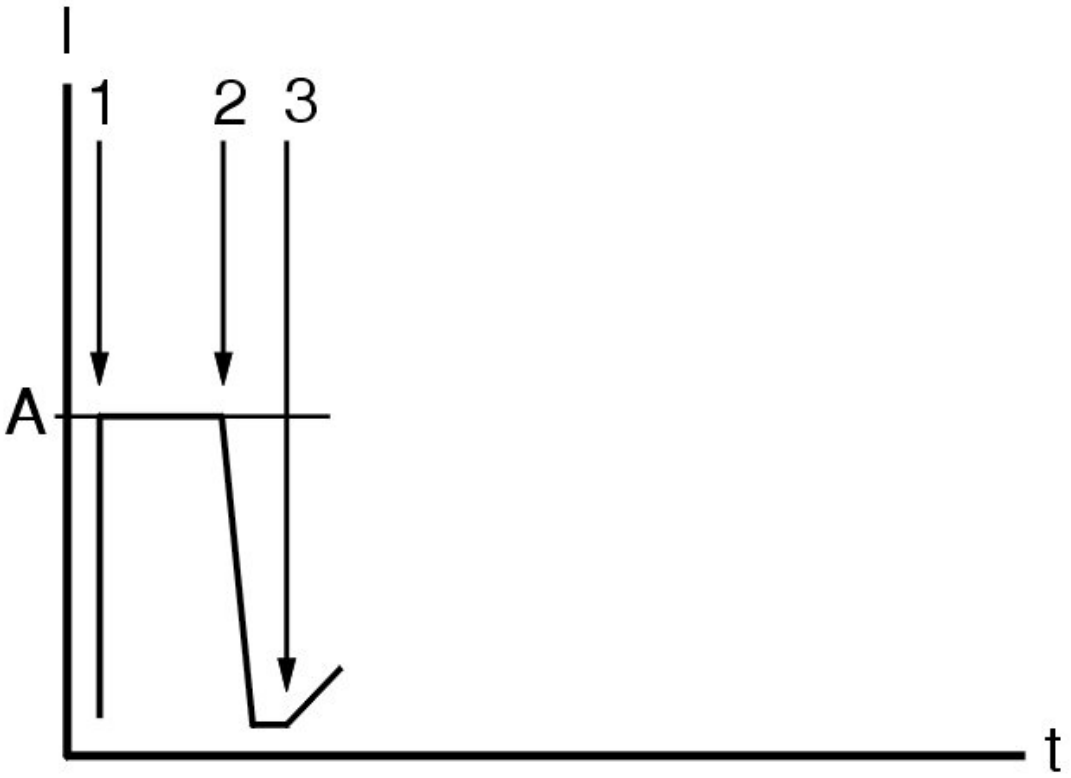
The diagnosis begins when all the following conditions are met:
- There must be no diagnostic trouble code (DTC) stored for the following components or functions:
  - the power stage for the pump in the leak diagnostic unit
  - the power stage for the valve in the leak diagnostic unit
  - the power stage for the EVAP canister purge valve
  - the EVAP canister purge valve.
- Engine off for at least 5 hours (context), engine running for at least 20 minutes (context)
- Ignition off
- Vehicle speed 0 km/h
- Engine coolant temperature (ECT) +4 °C or higher
- Maximum altitude of 2500 meters above sea level
- Outside temperature between +4 and +35 °C
- Stable signal from the fuel level sensor
- Fuel volume in the tank between 15-85 %
- Battery voltage between 11.0-14.5 V. The voltage must be stable
- EVAP canister purge valve closed
- Low volume in the canister.

Diagnostic phases

The diagnostic is divided into the following phases and is carried out in sequence when all conditions for the diagnostic have been met.

- Reference phase 1
- Function test
- Leak diagnostic.

Reference phase and function test



(the illustration is a diagram of a fault free fuel tank system) Before the actual leak diagnostic begins, the control module enters a reference phase for leakage and checks the components in the system.

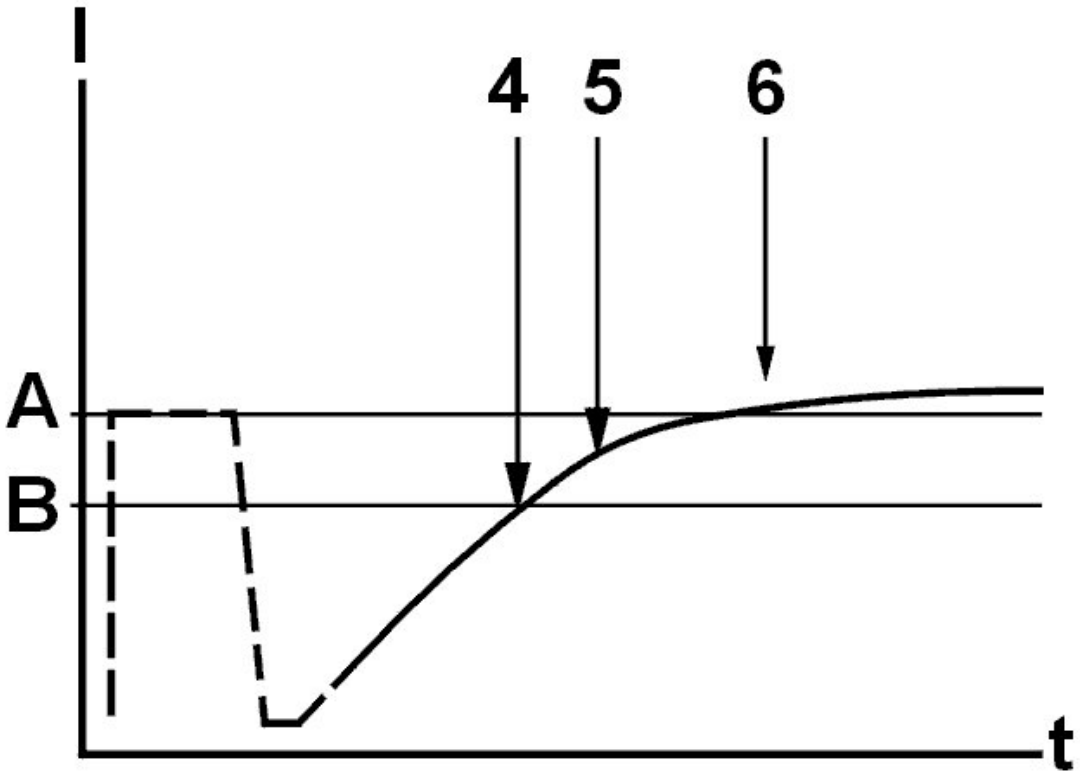
Reference phase 1 and reference phase 2

During the reference phases (1-2) for leakage that is 0.5 mm, the pump in the leak diagnostic unit pumps ambient air through a 0.5 mm hole and back out to the ambient air. At the same time, the power consumption of the pump is measured and stored in the control module (A). The stored value for the power consumption of the pump corresponds to a leakage of 0.5 mm.

Function test

If the value for the power consumption of the pump is too high or low during reference phase1 (1-2), or if the value varies too much during reference phase 1 (1-2), the diagnostic is cancelled and starts again the next time the conditions for the diagnostic are met. Diagnostic trouble code (DTC) ECM-431D, faulty signal, is stored if the diagnostic is cancelled 10 times due to excessive variation in the power consumption of the pump. After the reference phase, the valve (2) in the leak diagnostic unit is activated and controls the air flow to the fuel tank to pressurize the fuel tank system. This change of air flow will cause the power consumption of the pump to fall briefly before the pressure builds up in the fuel tank system (3). Diagnostic trouble code (DTC) ECM-431D, signal missing, is stored if the value for the power consumption of the pump drops too quickly, too slowly or not at all.

Leak diagnostic

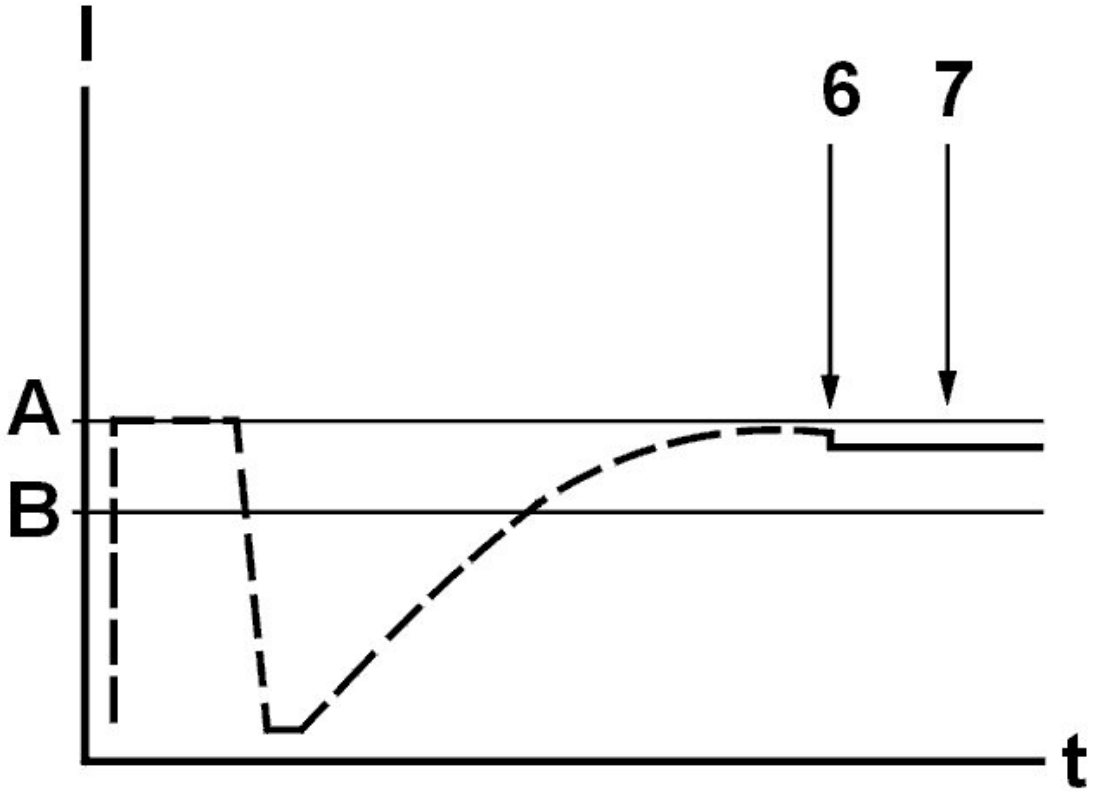


(the illustration is a diagram of a fault free fuel tank system). As long as diagnostic trouble code (DTC) ECM-431D is not stored, the leak diagnostic will be carried out after the reference phase and the function test.

Major leak

(leaks >1.0 mm) The diagnostic for "major leaks" is carried out every other time when the diagnostic conditions are met. The leak diagnostic unit pressurizes the fuel tank system, measures the power consumption of the pump (4) and compares this with a calculated desired value (B). If the measured value does not reach the calculated desired value within a certain amount of time (this time is determined by the fuel level in the tank), the function of the leak diagnostic unit is rechecked by running reference phase 2 again to check that low power consumption has not led to changes in the components. Diagnostic trouble code ECM-400C, major leak, is generated if the power consumption of the pump is OK during reference phase 2.
Diagnostic trouble code (DTC) ECM-4338 (fuel tank filler cap missing) will also be stored and the driver will receive a text message in the Driver Information Module (DIM) when a major leak is detected by the Engine Control Module (ECM).

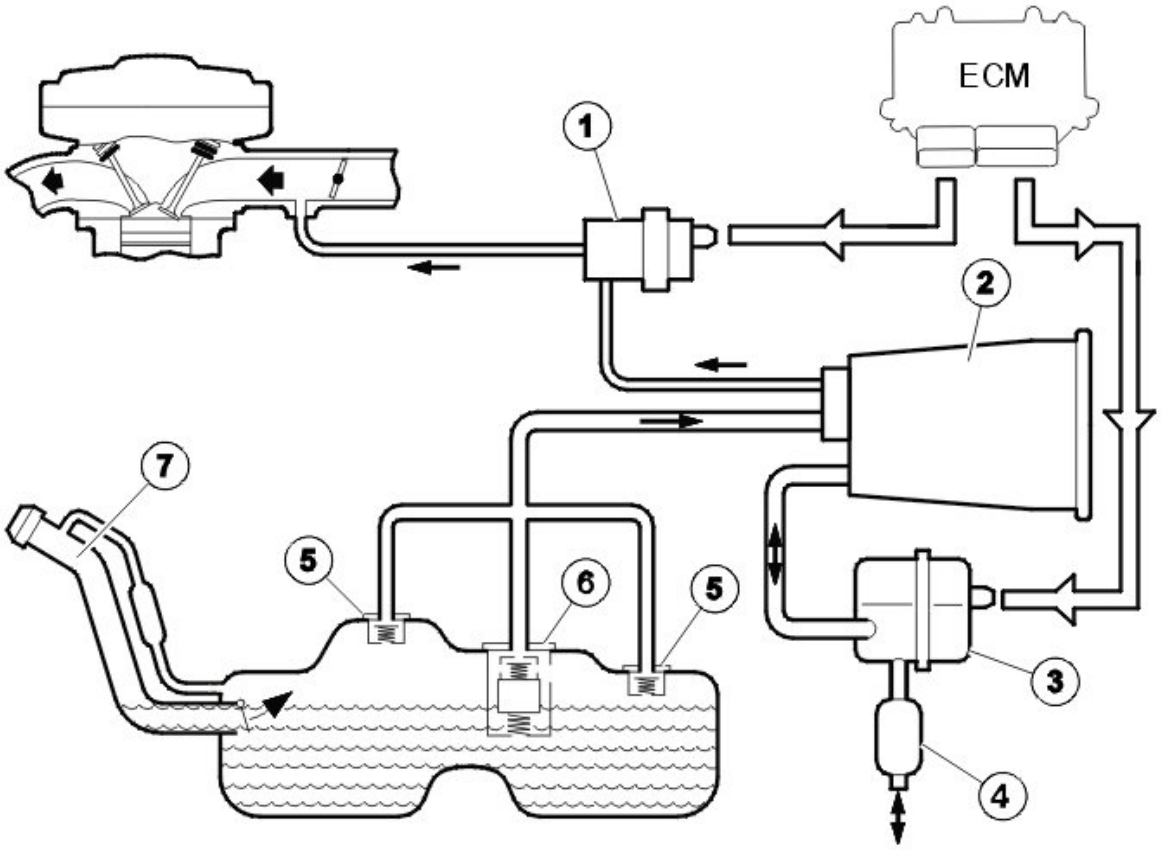
Minor leak



(leaks >0.5 mm <1.0 mm). The diagnostic for "minor leaks" is carried out every 14th time when the diagnostic conditions are met. The diagnostic for major leaks is always run before the diagnostic for minor leaks. The leak diagnostic unit continues to pressurize the fuel tank system (5). If the measured value (6) is the same or less than the value stored in the reference phase (A) after a certain amount of time (determined by the fuel level in the tank), reference phase 2 (7) is run to ensure that the lower power consumption (6) is not the result of changes in components. If the measured power consumption during the second reference phase (7) is lower than that measured during pressurization (6), the control module interprets this as meaning that the fuel tank system is sealed. Diagnostic trouble code ECM-400C, minor leak, is generated if the measured power consumption from the second reference phase (7) is the same or higher than that measured during pressurization (6).

Leak Diagnostics, Original Version (2005-)

Leak diagnostics, original version (2005-)



All gases that evaporate from fuel in the fuel tank must be led to and stored in the evaporative emission system (EVAP) canister so that they can be directed into the engine for combustion. In order to detect leakages which cause evaporation of gases into the air, the fuel tank system is diagnosed for leakage. The fuel tank system consists of:

- fuel tank
- the EVAP canister purge valve (1)
- EVAP canister (2)
- leak diagnostic unit (3)
- air cleaner (ACL) (4)
- Roll-over valve (5)
- Float Limit Vent Valve (6)
- fuel filler pipe (7)
- all lines between the above components.

The fuel tank system has a leak diagnostic unit to diagnose any leakage. The leak diagnostic unit pressurizes the fuel tank system when the ignition is off, if the conditions for diagnosis have been met. The control module can detect faults in the function of the leak diagnostic unit and leakage that is 0.5 mm or greater. Minor leak; leakage greater than 0.5 mm but less than 1.0 mm. Major leak; leakage greater than 1.0 mm.
The leak diagnostic unit consists of a pump and a valve that controls the air flow in the unit. The fuel tank system tests for leaks by measuring the power consumption of the pump. The power consumption of the pump corresponds to a certain pressure in the fuel tank system. During diagnosis, the rate at which the pressure can build up is checked, taking into account the quantity of fuel in the tank. The quicker the pressurization the better the fuel tank system is sealed.

Conditions for diagnosis

The diagnosis begins when all the following conditions are met:

- There must be no diagnostic trouble code (DTC) stored for the following components or functions:
  - the power stage for the pump in the leak diagnostic unit
  - the power stage for the valve in the leak diagnostic unit
  - the power stage for the EVAP canister purge valve
  - the evaporative emission system (EVAP) valve
  - the engine coolant temperature (ECT) sensor
  - speed signal.
- The engine is switched off until the engine coolant temperature (ECT) has fallen to a few degrees above the outside temperature, then engine running for at least 10 minutes
- Ignition off
- Vehicle speed 0 km/h
- Engine coolant temperature (ECT) -5 °C or higher
- Maximum altitude of 2500 meters above sea level.
- Outside temperature between -5 and +35 °C
- Fuel volume in the tank less than 85 %. The engine control module (ECM) ignores these parameters if a diagnostic trouble code (DTC) is stored for the fuel level sensor and the fuel volume cannot be determined
- Battery voltage between 11.0-14.5 V. The voltage must be stable

- EVAP canister purge valve closed
- Low volume in the canister.

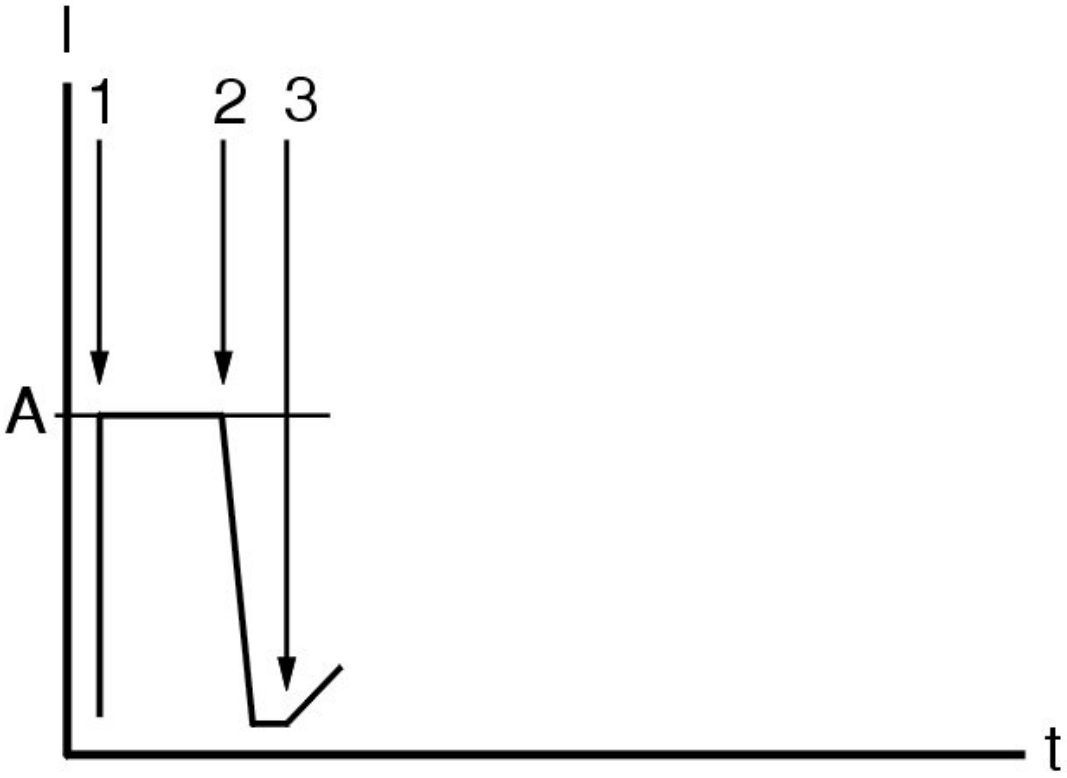
Fuel tank filler cap check

The exception from the above conditions is when the car has been refuelled. The engine control module (ECM) starts a check of the fuel tank filler cap after refuelling. This check is a simplified version of the leak diagnostic unit for major leaks. The fuel tank filler cap control is run whilst the vehicle is being driven. This allows the control module to check that the cap has been reinstalled. A diagnostic trouble code (DTC) is stored in the engine control module (ECM) and a text message is displayed in the driver information module (DIM) if the cap is missing.

Diagnostic phases

The diagnostic is divided into the following phases and is carried out in sequence when all conditions for the diagnostic have been met.
- Reference phase
- Function test
- Leak diagnostics

Reference phase (1-2)

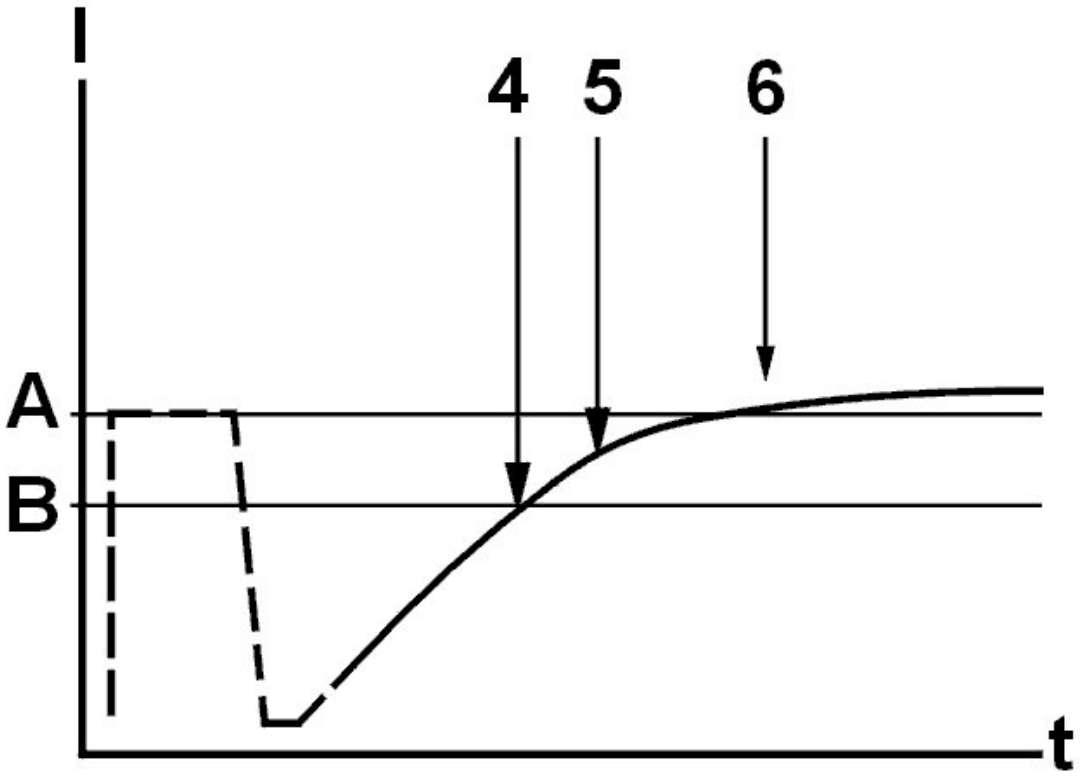


The illustration is a diagram of a fault free fuel tank system.
Before the leak diagnostic begins, the control module runs a reference phase for leakage. During the reference phase (1-2) for leakage that is 0.5 mm, the pump in the leak diagnostic unit pumps ambient air through a 0.5 mm hole and back out to the ambient air. At the same time, the power consumption (A) of the pump is measured and stored in the control module. The stored value (A) for the power consumption of the pump corresponds to a leakage of 0.5 mm. This value is then used by the engine control module (ECM) to determine the leak status of the fuel tank system.

Function test (1-3)

If the value for the power consumption of the pump is too high or low during the reference phase (1-2), or if the value varies too much during the reference phase (1-2), the diagnostic is cancelled and starts again the next time the conditions for the diagnostic are met. A diagnostic trouble code (DTC) is stored if the diagnostic is cancelled several time in a row because the power consumption of the pump is varying excessively.
After the reference phase, the valve (2) in the leak diagnostic unit is activated and controls the air flow to the fuel tank to pressurize the fuel tank system. This change of air flow will cause the power consumption of the pump to fall briefly before the pressure builds up in the fuel tank system (3). A diagnostic trouble code is stored if the value for the power consumption of the pump drops too quickly, slowly or not at all.

Leak diagnostic, major leak (leakage greater than 1.0mm)



The diagnostic for "major leaks" is carried out each time when the conditions for the diagnostic are met. The leak diagnostic unit pressurizes the fuel tank system, measures the power consumption of the pump (4) and compares this with a calculated desired value (B). A diagnostic trouble code (DTC) for a major leak is stored if the measured value does not reach the calculated desired value within a certain time (the time is determined by atmospheric pressure and the fuel level in the tank).

Leak diagnostic, minor leak (leakage greater than 0.5mm but less than 1.0mm)

The diagnostic for minor leaks is run every other time that the conditions for the diagnostic are met. The diagnostic for major leaks is always run before the diagnostic for minor leaks. The leak diagnostic unit continues to pressurize the fuel tank system (5-6). After a certain amount of time (the time varies depending on the fuel level in the tank), the engine control module (ECM) checks that the fuel tank system for leaks. This is determined based on:

- time
- the measured reference current consumption of the pump (A)
- the measured power consumption of the pump when the assessment is made
- the shape and character of the current curve during pressurization.

A diagnostic trouble code (DTC) is stored if a minor leak is detected.

Misfire Diagnostics

Misfire diagnostics

Misfiring

If the fuel / air mixture does not ignite completely in the ignition stroke the engine is misfiring. The engine control module (ECM) detects the misfire by registering deviations in the rotation of the flywheel.
Deviation in flywheel rotation is due to:

- driveline oscillations
- normal variations caused by uneven combustion
- flywheel mechanical tolerances
- misfiring, which is caused by:
  - incorrect fuel / air mixture
  - poor ignition sparking
  - insufficient compression.

Diagnostics

The mechanical tolerances and oscillations in the drive line disrupt the signal. This makes it difficult to determine if a misfire has occurred or if the detection is incorrect.
The signal from the flywheel is adapted to filter out the irregular rotation. This eliminates the mechanical variations in the flywheel.
Misfires can be detected by registering the time difference between the intervals and comparing this with the filtered time difference in the

flywheel. If the flywheel signal has not been adapted, the diagnostic is active. However this cannot identify misfires as accurately as an adapted flywheel signal. The adaptation is carried out at different loads and engine speed ranges. For the values to be set in the different ranges, the deviation in rotation must be within certain fixed limits.
Drive line oscillations, caused by extremely uneven road surfaces for example, may lead to uneven engine operation. Drive line oscillations are registered by the accelerator in the brake control module (BCM) which sends this information to the engine control module (ECM).
The misfire diagnostic is shut off when:

- The brake control module (BCM) transmits information to the engine control module (ECM) about driveline oscillations
- A fault has been detected by the engine control module (ECM) in the engine speed (RPM) sensor or mass air flow (MAF) sensor
- When DSTC, traction control and/or ABS is active.

Diagnostic trouble code (DTC) management

Diagnostic trouble codes (DTC) for misfiring will light the malfunction indicator lamp (MIL).
The engine control module (ECM) determines how much the engine is misfiring by counting the number of misfires during a certain number of engine revolutions.

Misfire affecting emission levels

If the engine control module (ECM) detects a certain number of misfires during 1000 engine revolutions, this is interpreted as misfiring which affects emissions. If misfiring is detected in the first 1000 engine revolutions a diagnostic trouble code (DTC) is stored and the malfunction indicator lamp (MIL) lights. However, if misfiring is detected after the first 1000 engine revolutions, four misfires need to be detected before a diagnostic trouble code (DTC) is stored.

Catalytic converter damage

If the engine control module (ECM) detects a certain number of misfires during 200 engine revolutions, this is interpreted as misfiring which damages the three-way catalytic converter (TWC). The number of misfires that the engine control module (ECM) allows before interpreting it as misfiring depends on the load and engine speed range.
The engine control module (ECM) registers and stores the engine speed and load range and whether the engine is warm or cold when misfiring is detected.
If the misfire stops, the requirements for the engine speed and load parameters must be met without misfiring before the engine control module (ECM) will begin counting down to extinguish the warning lamp and erase stored diagnostic trouble codes (DTCs) for misfiring.

Three-Way Catalytic Converter (TWC) Diagnostics

Three-way catalytic converter (TWC) diagnostics

The three-way catalytic converter (TWC) stores oxygen from the exhaust gases and uses it to make toxic gases more environmentally friendly. The catalytic converter is a 3 way catalytic converter in which HC (hydrocarbons) and CO (carbon monoxide) are oxidized and NOx(nitrous oxide) is reduced. As the three-way catalytic converter (TWC) ages, its ability to store oxygen is reduced. The conversion capacity of the three-way catalytic converter (TWC) is reduced and unburned residue which is harmful to environment is released. To reduce the environmentally damaging emissions, the engine control module (ECM) checks the efficiency of the three-way catalytic converter (TWC). In brief, this check is carried out as follows.
Two heated oxygen sensors are used to check the three-way catalytic converter (TWC). One is upstream of the converter and one is in the center of the converter (the rear heated oxygen sensor).
The main function of the heated oxygen sensors is to measure the oxygen content in the exhaust gases so that the engine control module (ECM) can maintain the fuel/air mixture at around lambda=1. This mixture allows for optimum catalytic conversion.
To evaluate the efficiency of the three-way catalytic converter (TWC) one uses a deviation added to the lambda signal.
This means that 8 to 15 minutes after the engine is started (depending on the market) catalytic converter diagnostics start.
The process is as follows:
A deviation is added to the lambda signal and the engine control module (ECM) is allowed to correct this.
The deviation switches between positive and negative values so that the fuel/air mixture switches between rich and lean.
A counter registers the number of switches occurring while the diagnostic is taking place.
If the rear heated oxygen sensor registers a large number of switches exceeding a parameter, a diagnostic trouble code (DTC) for three-way catalytic converter (TWC) efficiency will be stored.
If the parameter is not exceeded the three-way catalytic converter (TWC) is deemed to be operating well.

Note! In a poorly operating three-way catalytic converter (TWC) the switches caused by the deviation will quickly exceed the parameter. This is because the exhaust gases in principle pass straight through the three-way catalytic converter (TWC) without being cleaned. If the three-way catalytic converter (TWC) is operating well the switches will be slower as it takes a longer time for the variations to make themselves felt.

Readiness Monitor (Certain Markets Only)

Readiness Monitor (certain markets only)

This is a function in Engine control module (ECM) that controls the control module's emission-related sub-system. With the function you can read out if the control module has run all diagnostics for the following sub-systems:

- Misfiring

- Fuel system
- Catalytic converter
- Evaporative emission (EVAP) system
- Heated oxygen sensors (HO2S)
- Other related components

Thus, Readiness refers only to if the diagnostics (tests) have been run or not, not if a malfunction was found or not. If a malfunction is found during the test, a diagnostic trouble code is stored and the malfunction light (MIL-light) is lit.
If the tests are run in the driving cycle without detecting a malfunction, then "Readiness" is immediately generated to OK.
However, if a malfunction is found in the driving cycle, then Readiness is generated to Not OK, and another driving cycle is required where the test is run to generate Readiness to OK.

The following alternatives are possible:

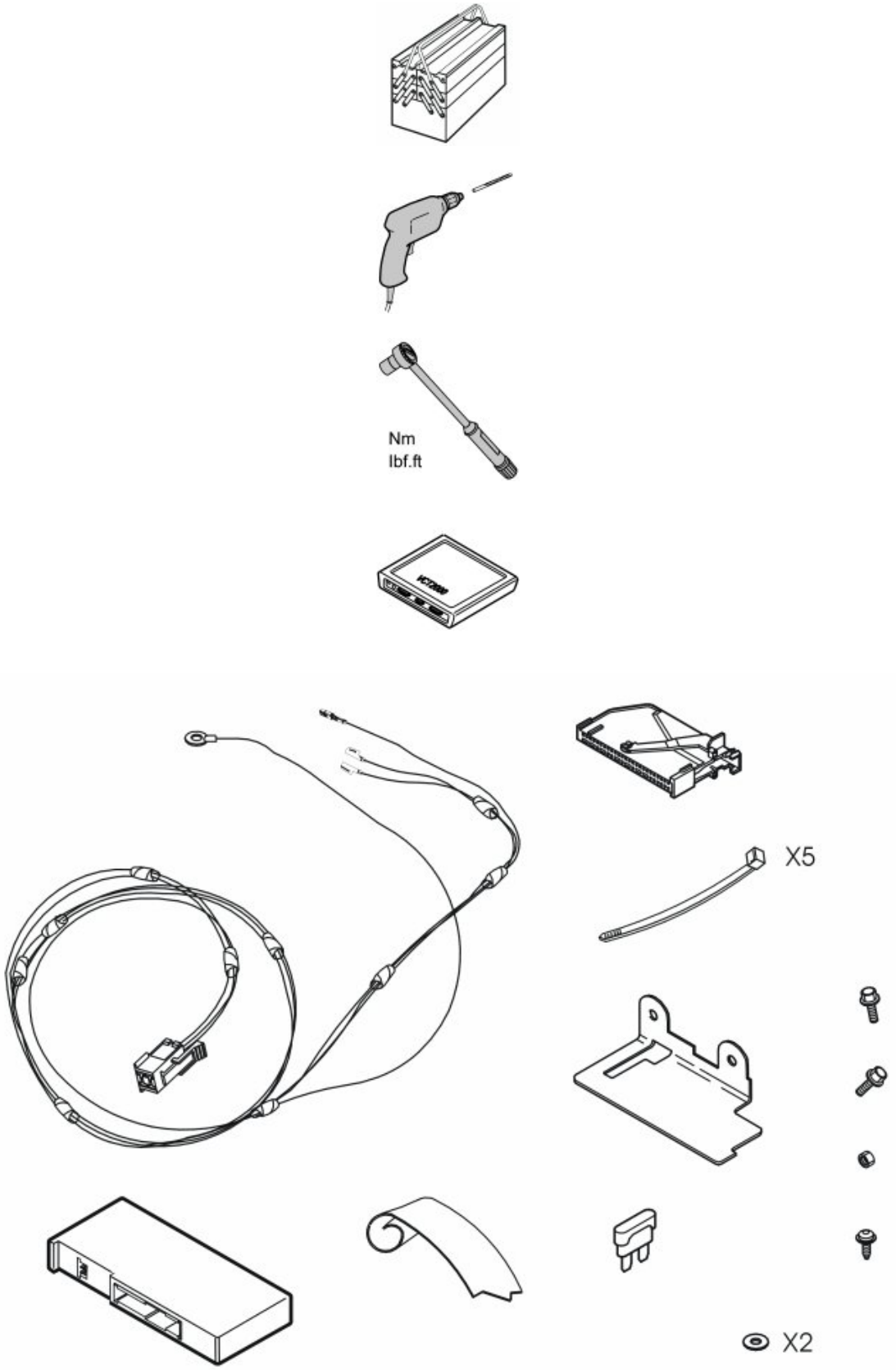
- Readiness is run (OK), no malfunction detected, which means that the vehicle can be approved in a check.
- Readiness is run (OK), with malfunction detected, which means that the vehicle cannot be approved in a check.
- Readiness is not run (Not OK), which means that the vehicle cannot be approved in a check.

Readiness was originally a requirement from the American authority, United States Environmental Protection Agency (EPA), and is used there for Inspection and maintenance test (IM-test) (corresponds to annual inspection). Depending on legal requirements, the function may also be found on other markets.

Body Control Module: Service and Repair

Accessory Electronic Module (AEM)

Accessory Electronic Module (AEM)

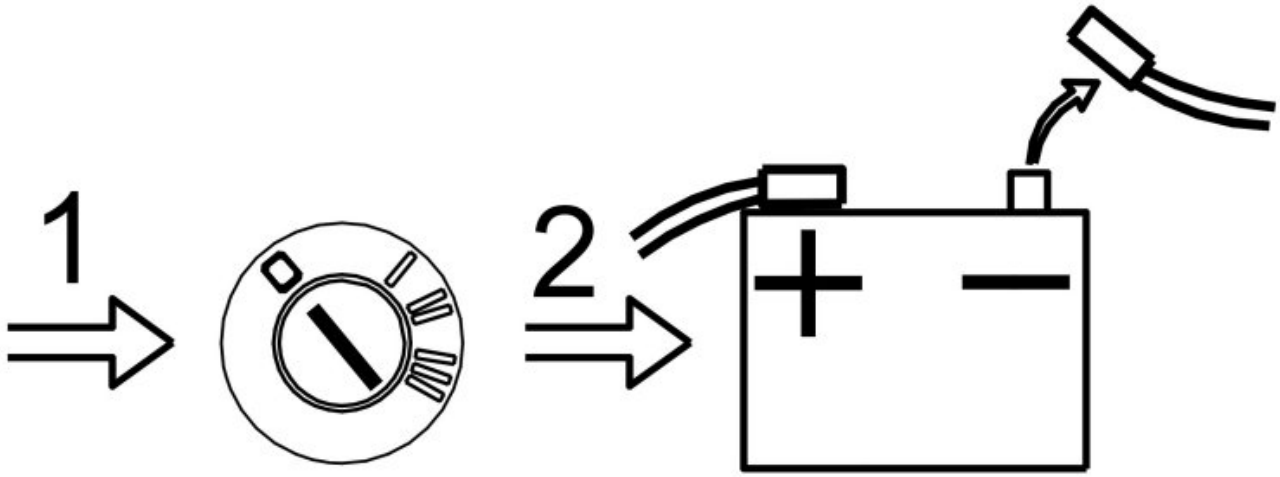


Accessory Electronic Module (AEM)

Note!

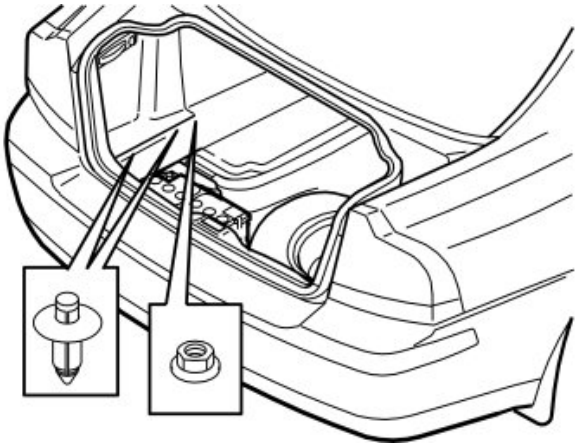
- Steps 1 - 16 apply to S60 and S80.
- Steps 17 - 39 apply to V70.

Applies to S60 and S80

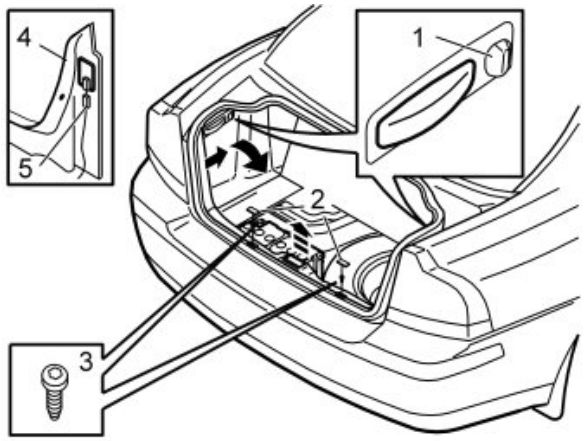


- Turn the ignition switch to position 0.
- Disconnect the battery negative lead.

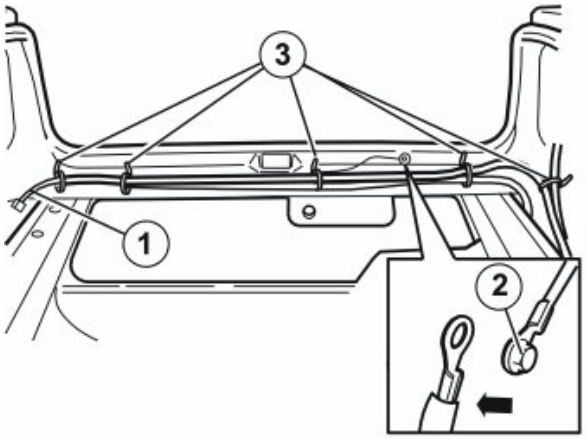
Note! Wait at least five minutes before disassembling the connectors or removing other electrical equipment.



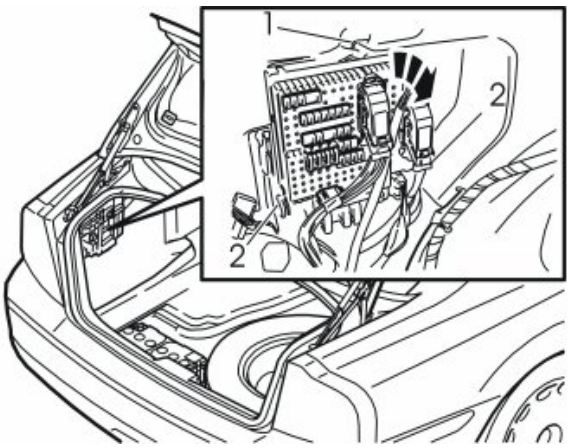
- Remove the cargo compartment carpet.
- Remove the clips from the lower edge of the folding panel by pressing in the clip centre until there is an audible click.
- Remove the clips.
- Unscrew the front clip.
- Repeat the operation on the other side.



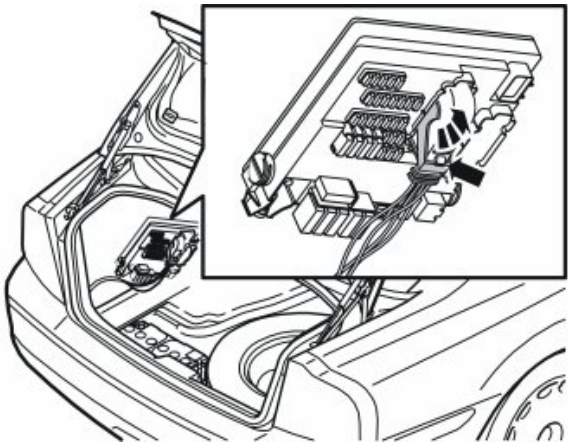
- Turn the knob (1) on the right/left side 90°.
- Fold the panels inwards. Lift the panels out
- Remove the two covers (2) and the screws (3) underneath (applies to S80 only).
- First pull the boot lid sill panel (4) forward until the two clips on the right/left side release. Pull hard but carefully as the panel is securely fastened. Then pull the panel straight up until the four clips in the bottom edge release.
- Remove the wiring (5) for the cargo compartment lighting.
- Lift out the sill trim panel.



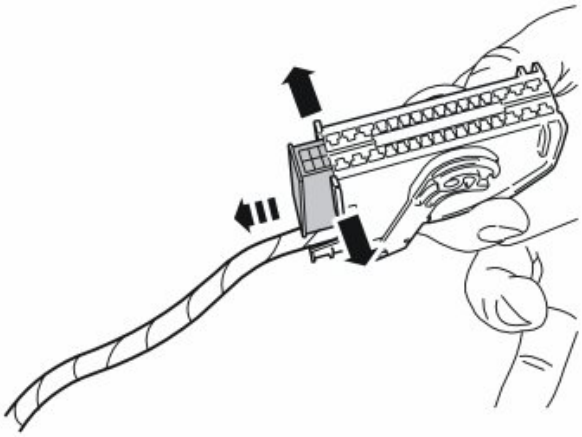
- Take the wiring harness (1) from the kit. Position it along the boot lid sill with the black connector to the right, in the rear edge on the right wheel housing.
- Remove the ground screw (2) and connect the ground cable of the new wiring harness to the existing grounding point. Tighten the ground screw securely.
- Take five cable ties (3) from the kit and secure the wiring harness to the existing wiring harness as illustrated.



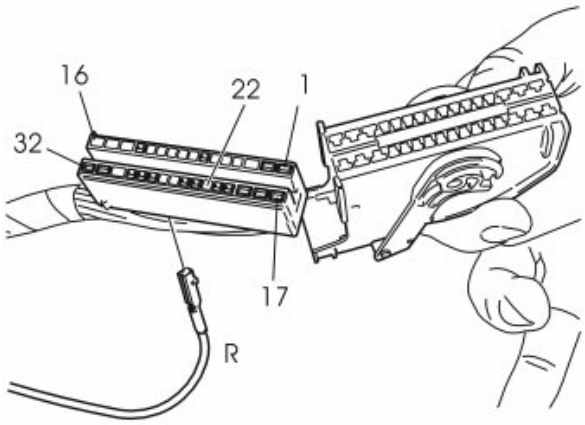
- Remove the Rear Electronic Module (REM) by opening the lock (1) on the top of the unit. Tip the unit forward and lift it out of the mountings (2).



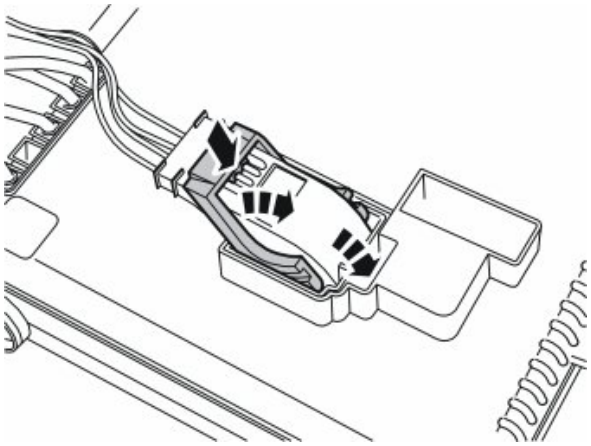
- Press in the catch on the rear brown connector in the fuse holder in the cargo compartment, turn the lock arm up as far as it will go and pull out the connector.



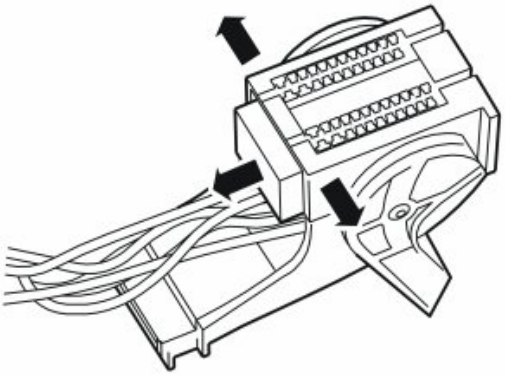
- Carefully prise apart the sides of the connector holder in the ends so that the connector can pass by the retaining hooks.
- Pull out the connector.



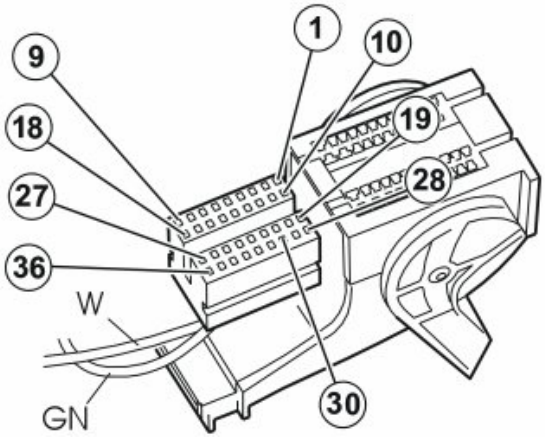
- Connect the red (R) cable to position 22.
- Reinstall the connector in the holder
- Reinstall the connector in the fuse holder.



- Press in the catch on the grey connector on the rear of the fuse holder in the cargo compartment, turn the lock arm up as far as it will go and pull out the connector.

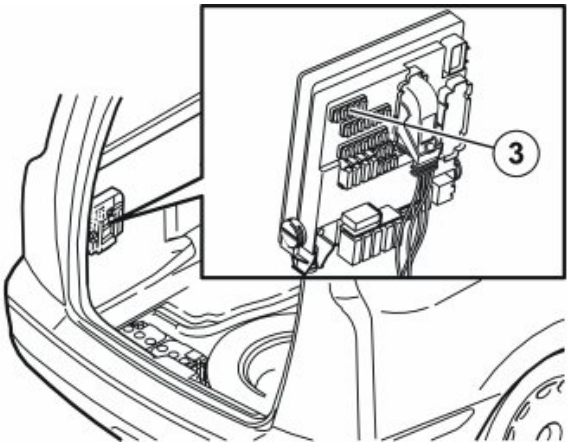


- Carefully prise apart the sides of the connector holder in the ends so that the connector can pass by the retaining hooks.
- Pull out the connector.

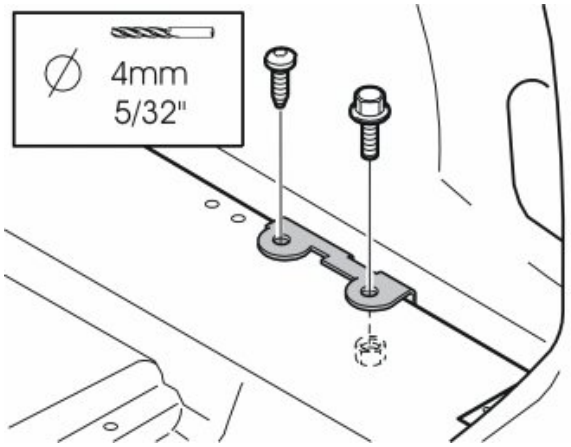


Note! Make a note of the position number of the connector. These are located on the ends of the connector and in the bottom of the fuse holder.

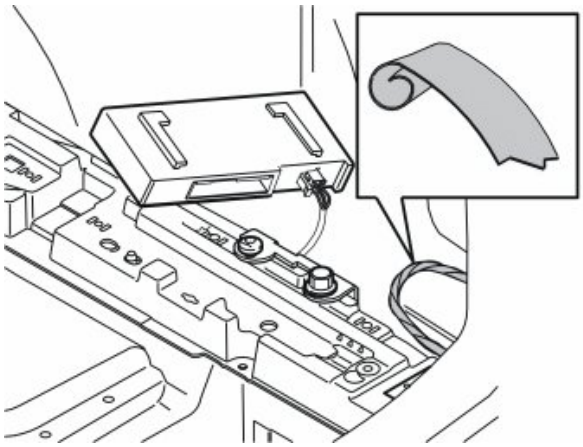
- Connect the green (GN) cable to position 19 in the connector. Connect the white (W) cable to position 30.
- Reinstall the connector in the holder
- Reinstall the connector in the fuse holder.
- Refit the Rear Electronic Module (REM).



- Fit fuse 15A from the kit in position 3 on the fuse holder.



- Install the new bracket on the right-hand rear side member as illustrated
- Install and tighten the bracket parallel with the side member. Use the screw and the nut from the kit
- Drill a **-4 mm (5/32")** hole in the side member, through the front hole in the bracket.
- Remove any swarf.
- Detach the bracket and treat the edges of the holes using a rust-proofing agent.
- Tighten the bracket to the side member.
- Tighten the rear bolt/nut to **10 Nm (8 lbf.ft.)**.

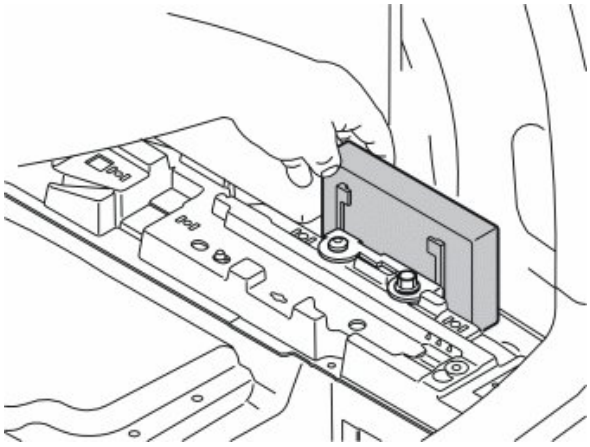


Applies to cars equipped with a Diversity aerial amplifier

- Wrap foam tape around the cable / wiring for the aerial amplifier.

Applies to all models

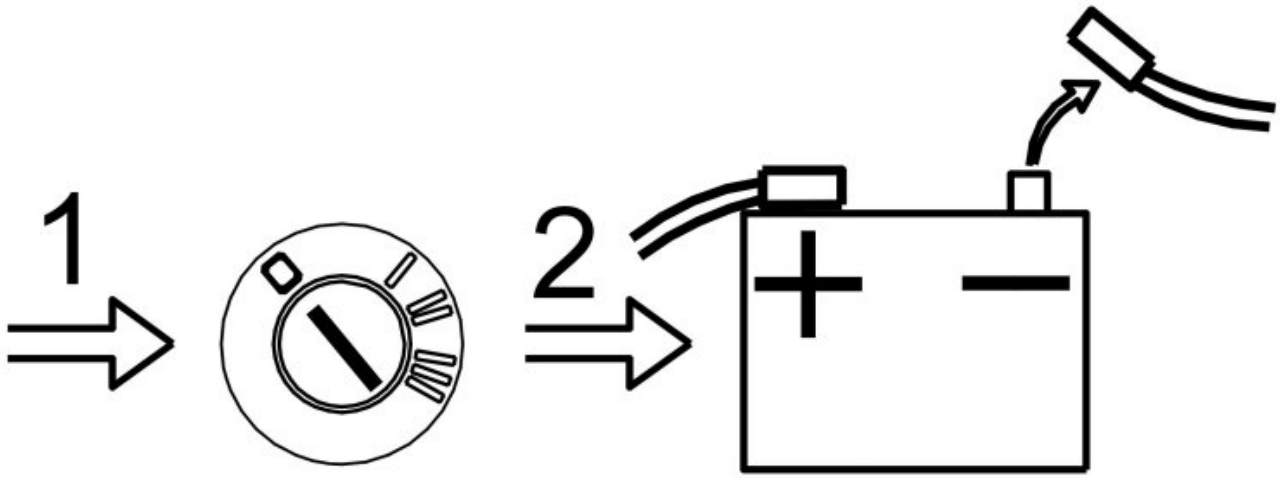
- Take the accessory electronic module from the kit. Connect the routed cable to the cable illustrated.



- Press the control module onto the bracket by the side member

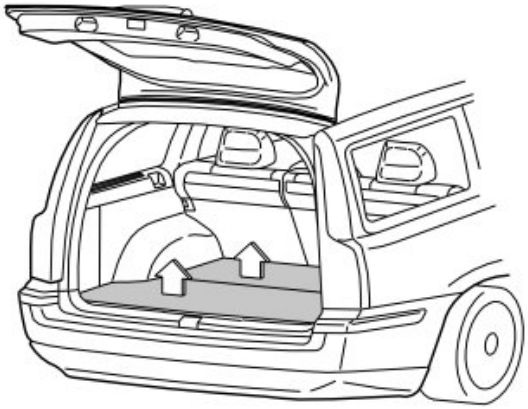
- Plug in the connectors of the cargo compartment lighting and refit the sill panel.
- Turn the ignition key to position II.
- Reconnect the battery negative lead
- Reposition the folding panels and refit the cargo compartment carpet.
- Program the software according to the service information in VIDA.

Applies to the V70

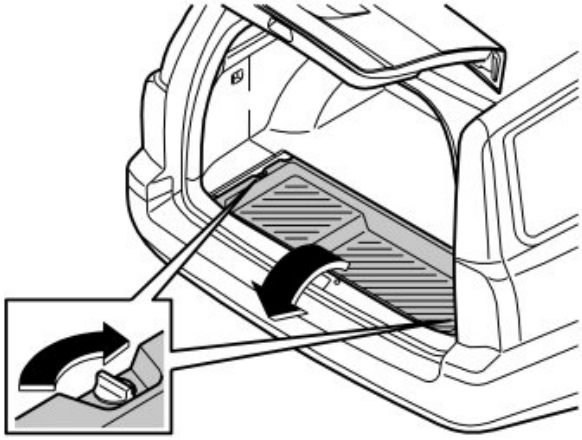


- Turn the ignition switch to position 0.
- Disconnect the battery negative lead.

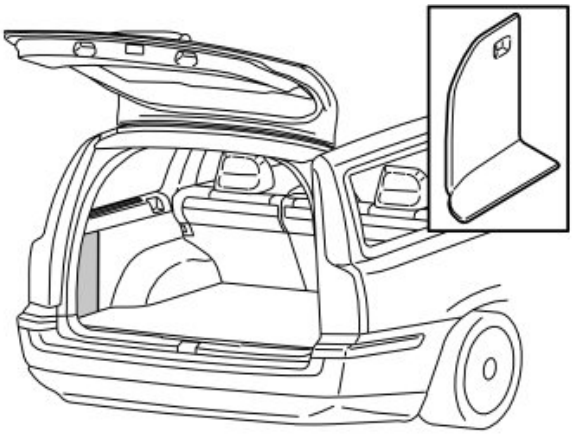
Note! Wait at least five minutes before disassembling the connectors or removing other electrical equipment.



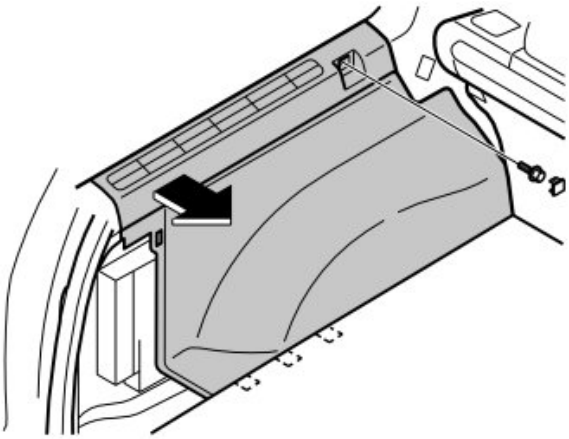
- Remove both the floor hatches. First lift the rear edges of the floor hatches slightly. Then pull the hatches backwards from their mountings.



- Remove the storage box under the rear floor hatch by turning the clip on the right and left-hand side 90°. Lift out the box.

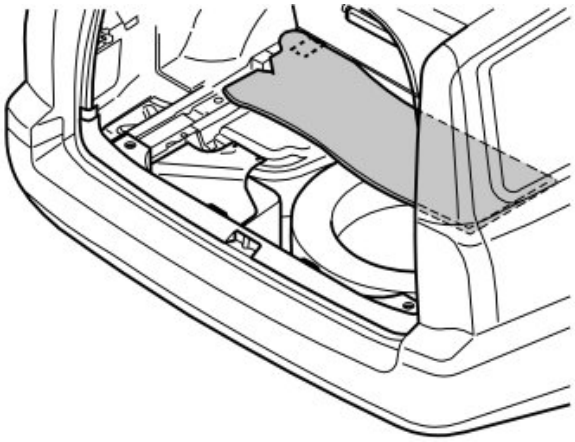


- Remove the left folding panel from the cargo compartment.
- Repeat the operation on the other side.

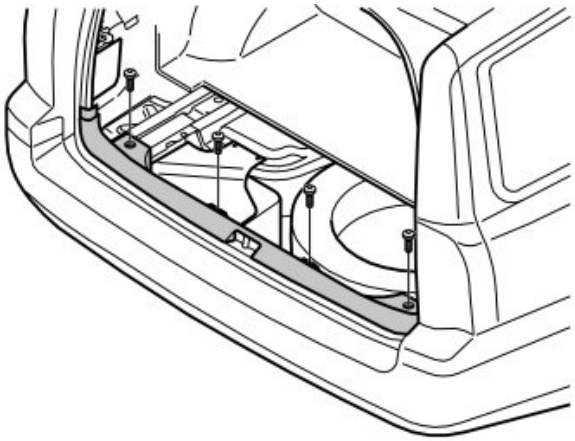


- Remove the left side panel by first removing the cover and the screw from the front edge.

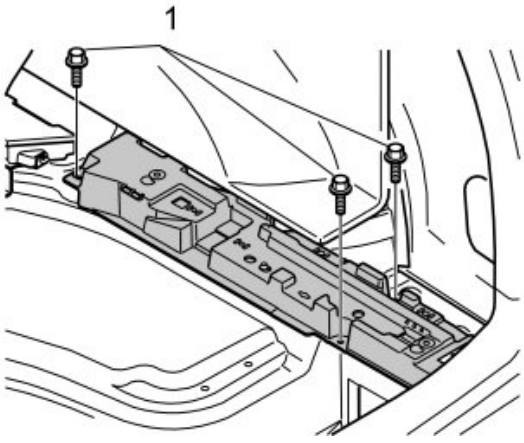
- Pull the top edge of the panel out until the clips release
- Fold the panel inwards. Lift the panel out.
- Repeat the operation on the other side.



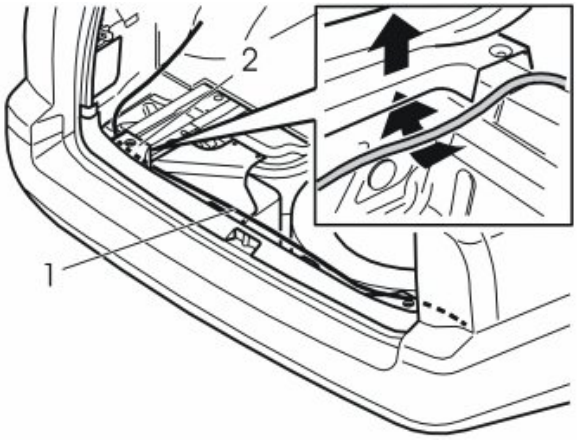
- Remove the insulation panel from the cargo compartment.



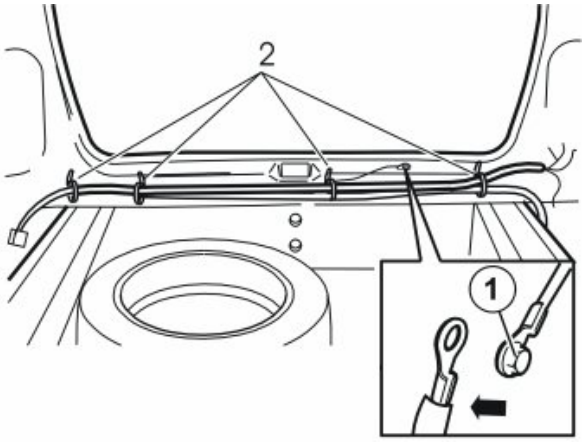
- Remove the 4 x screws in the tailgate sill panel.



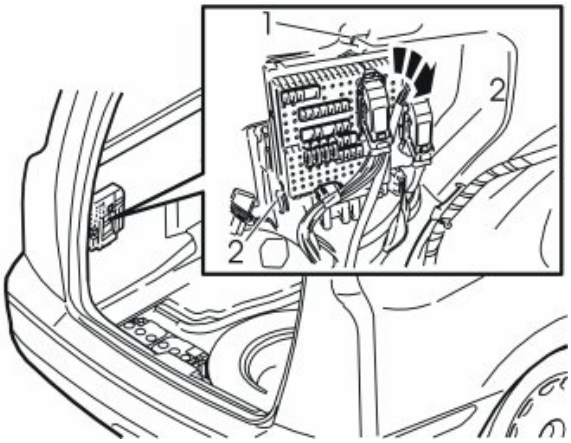
- Remove the three screws (1) from the right-hand floor support
- Remove the floor support.



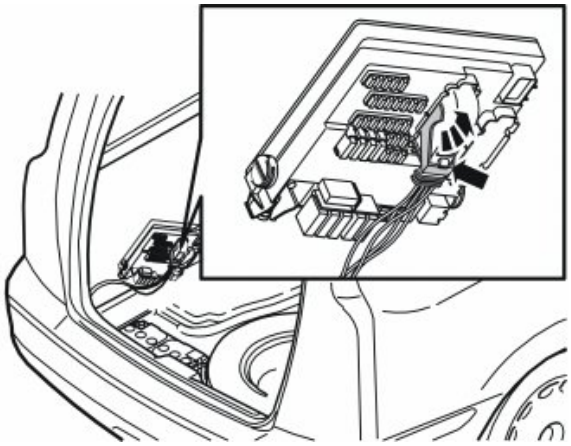
- Take the wiring harness (1) from the kit and position it along the tailgate sill panel with the black connector to the right.
- Carefully pull the tailgate sill panel upward at the left-hand corner until there is an audible click and the clips release.
- Lift the panel and insert the wiring harness into the gap between the floor support (2) and the panel.
- Insert the cable as far under the panel as possible. Ensure that the cable is not trapped
- Also insert the cable under the sill panel on the right side and then out to the rear edge of the wheel housing.



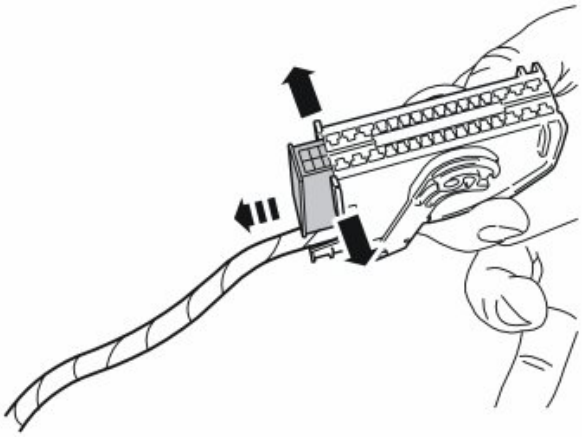
- Remove the ground screw (1) and connect the ground cable of the new wiring harness to the existing grounding point. Tighten the ground screw securely.
- Take four cable ties (2) from the kit and secure the wiring harness to the existing wiring harness as illustrated.
- Press the sill panel into place.
- Reinstall the screws in the panel. Tighten.



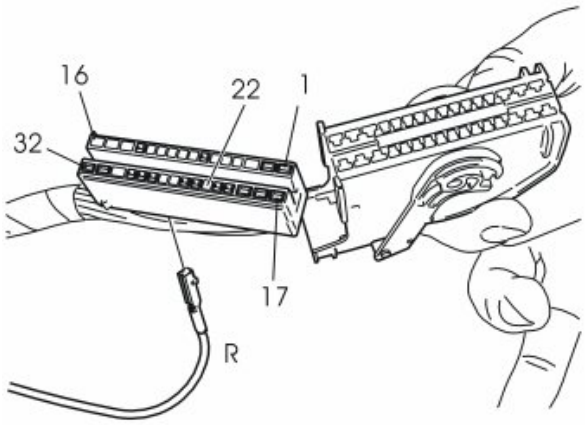
- Remove the Rear Electronic Module (REM) by opening the lock (1) on the top of the unit. Tip the unit forward and lift it out of the mountings (2).



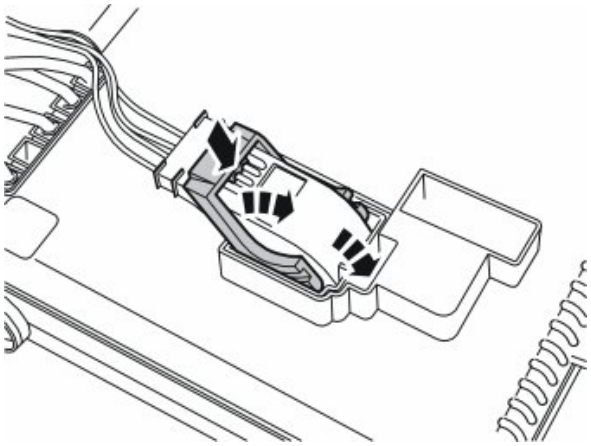
- Press in the catch on the rear brown connector in the fuse holder in the cargo compartment, turn the lock arm up as far as it will go and pull out the connector.



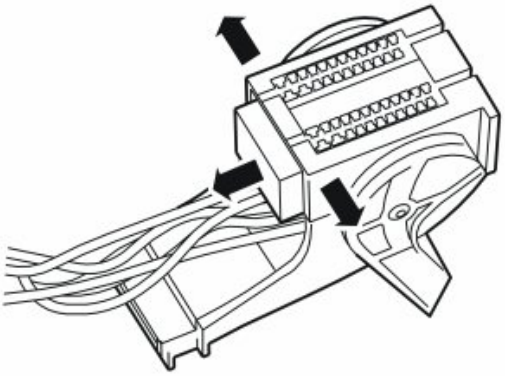
- Carefully prise apart the sides of the connector holder in the ends so that the connector can pass by the retaining hooks.
- Pull out the connector.



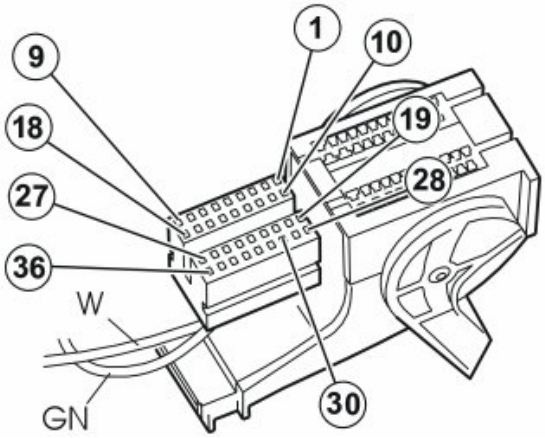
- Connect the red (R) cable to position 22.
- Reinstall the connector in the holder
- Reinstall the connector in the fuse holder.



- Press in the catch on the grey connector on the rear of the fuse holder in the cargo compartment, turn the lock arm up as far as it will go and pull out the connector.

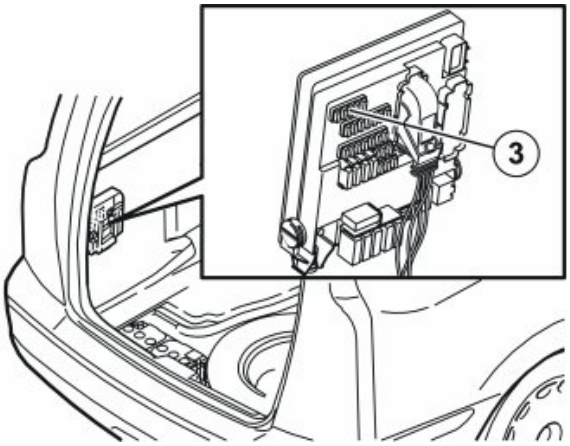


- Carefully prise apart the sides of the connector holder in the ends so that the connector can pass by the retaining hooks.
- Pull out the connector.

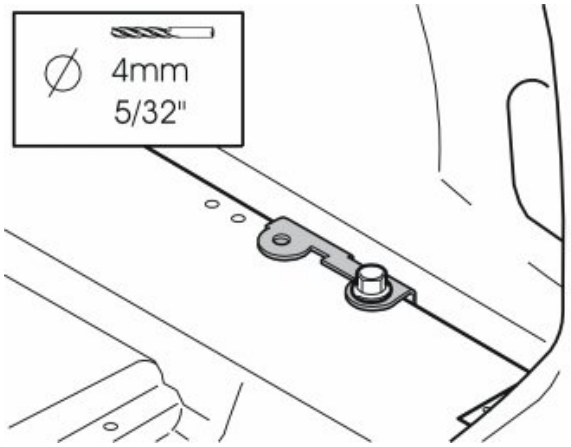


Note! Make a note of the position number of the connector. These are located on the ends of the connector and in the bottom of the fuse holder.

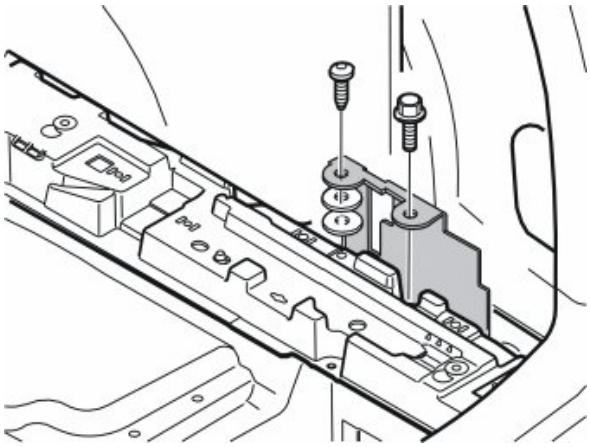
- Connect the green (GN) cable to position 19 in the connector. Connect the white (W) cable to position 30.
- Reinstall the connector in the holder
- Reinstall the connector in the fuse holder.
- Refit the Rear Electronic Module (REM).



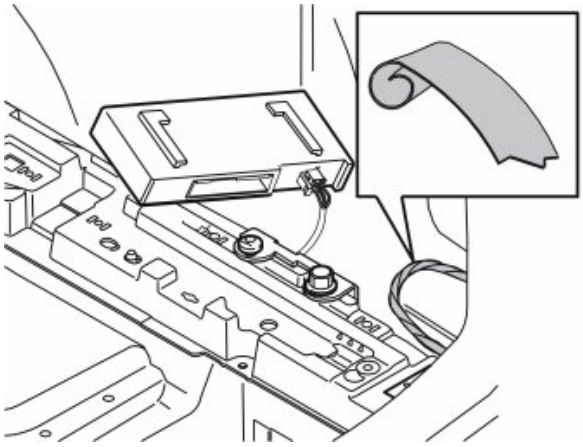
- Fit fuse 15A from the kit in position 3 on the fuse holder.



- Tighten the bracket of the accessory electronic module in the rear right hole for the floor support parallel to the side member as illustrated. On newer cars, there is a foam rubber block on the right-hand side member. This is to be kept in place and is compressed when the bracket is fitted in place.
- Drill a **-4 mm (5/32")** hole in the side member, through the front hole in the bracket.
- Remove the screw and the bracket
- Remove any swarf.
- Treat the edges of the holes using a rust-proofing agent.



- Reinstall the floor support. Tighten the floor support together with the bracket for the accessory electronic module. Use the three M6-screws, tightening them to **10 Nm (8 lbf.ft.)**.
- Position two new spacer washers between the front hole in the bracket and the floor support. Tighten using a new self tapping screw.

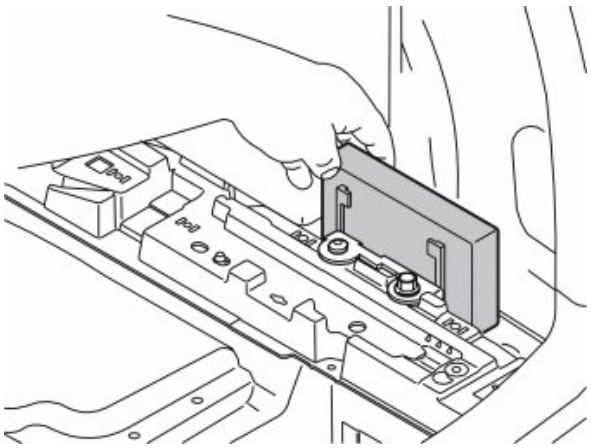


Applies to cars equipped with a Diversity aerial amplifier

- Wrap foam tape around the cable / wiring for the aerial amplifier.

Applies to all models

- Take the accessory electronic module from the kit. Connect the routed cable to the cable illustrated.



- Press the control module onto the bracket by the side member

- Turn the ignition key to position II.
- Reconnect the battery negative lead
- Reinstall the panels.
- Refit the insulation panel.
- Reinstall the storage box.
- Reinstall both floor hatches
- Program the software according to the service information in VIDA.

Central Electronic Module (CEM), Replacing

Central electronic module (CEM), replacing

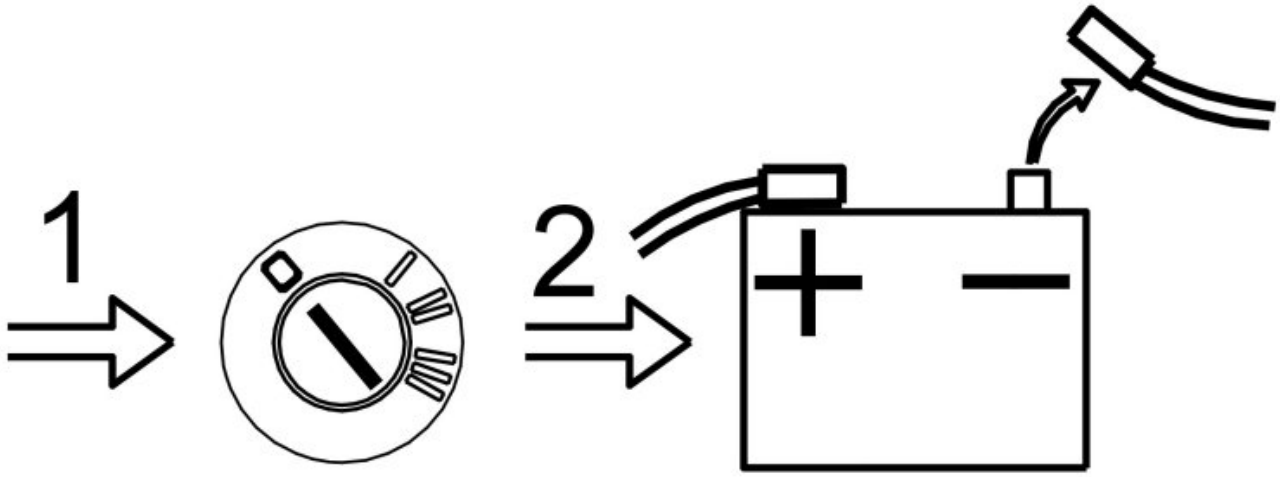
Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

For further information, see Downloading software and replacing the control module See: Body and Frame/Body Control Systems/Testing and Inspection/Programming and Relearning/Downloading Software and Replacing the Control Module/Central Electronic Module (CEM)

Preparatory work

Disconnecting the battery lead

Caution! The customer-programmed data must be read off before the control module is replaced. The relevant data must then be programmed into the new control module, via VIDA vehicle communication, after it has been installed.



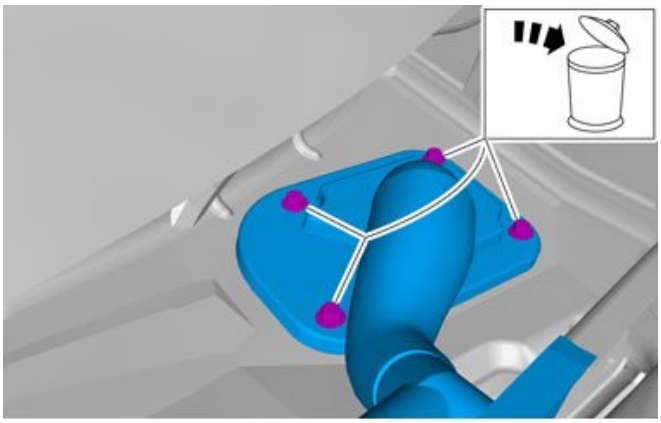
Ignition off
Disconnect the battery negative cable. See: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Note! For vehicles equipped with Volvo On Call Plus, the automatic alarm for the emergency services may deploy.

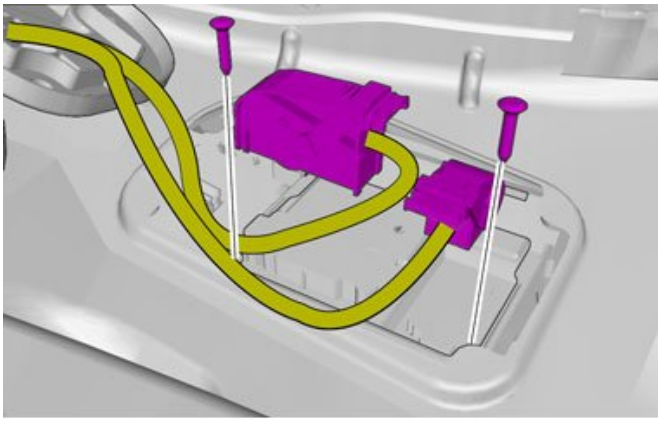
Note! The driver information module (DIM) must not be replaced at the same time. This would erase the mileage.

Removal

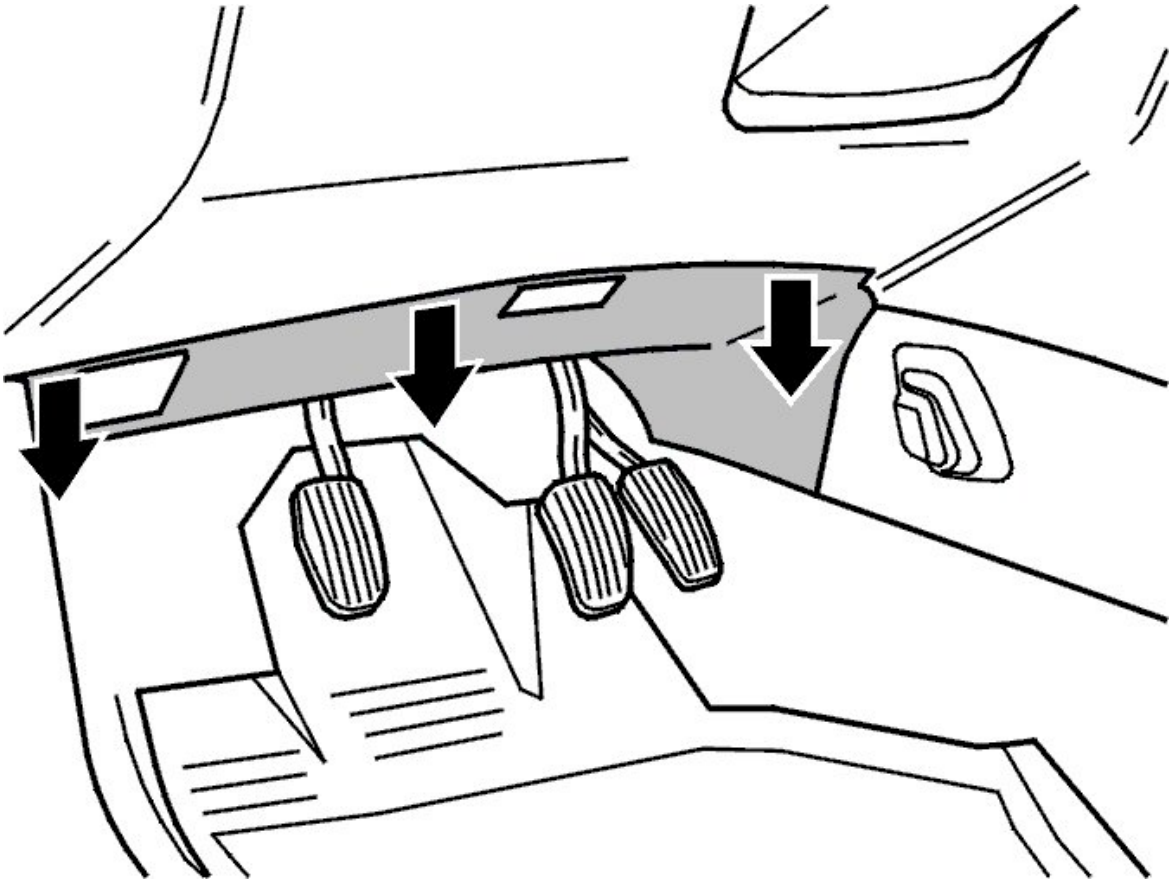
Removing the wiper mechanism and cover



Remove the wiper mechanism according to: Wiper mechanism, windshield, replacing See: Wiper and Washer Systems/Wiper Motor Linkage/Service and Repair/Wiper Mechanism, Windshield, Replacing



Removing the soundproofing panel on the driver's side

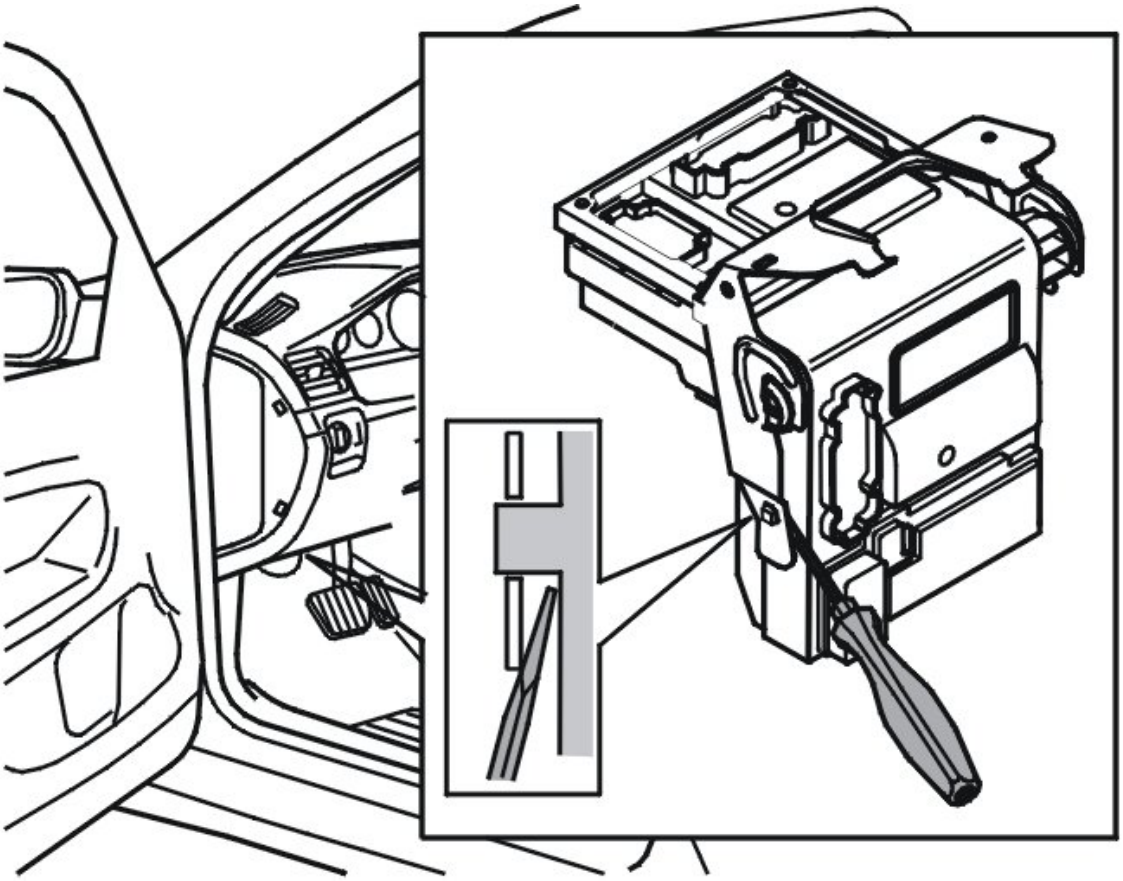


Remove the 2 screws.

Hint: The soundproofing panel sits in a groove at the pedal box.

Remove the soundproofing panel by pulling it straight down and back.

Removing the central electronic module (CEM)



Remove:

- the connectors
- the control module by inserting a screwdriver up between the bracket and the relay box. Turn the screwdriver so that the bracket opens out. At the same time, pull the relay box out of the bracket towards the underside of the dashboard
- the control module from the bracket and pull downwards under the dashboard.

Remove the fuses from the central electronic module (CEM).

Hint: For the location of the fuses, see:

- The wiring diagram for the relevant model year
- The decals by the relevant fuse box in the vehicle
- The Pocket Data booklet
- The Owner's manual.

Installation

Installing the central electronic module (CEM)

Caution! The pins are fragile. Check that the connectors go straight down into the control module.

Install:

- the control module on the bracket. Press the control module forward so that the catches enter the bracket
- the connectors
- the soundproofing panel on the driver's side
- the 2 screws on top of the control module
- the 2 connectors on top of the control module.

Note! Make sure that the rubber seal is correctly positioned in the groove.

Install:

- the cover
- the wiper arm mechanism. See: Wiper mechanism, windshield, replacing See: Wiper and Washer Systems/Wiper Motor Linkage/Service and Repair/Wiper Mechanism, Windshield, Replacing
- the battery negative lead. See: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Finishing

Ordering software

Order applicable software.

Programming data

Program in the data read off from the old control module (customer-programmed data for example). This is performed via VIDA vehicle communication.
Reset the service reminder indicator (SRI). Otherwise the lamp will receive incorrect reference data. (Global time is reset when the central electronic module (CEM) is replaced.) Reset the service reminder indicator (SRI). See: Resetting the service reminder indicator (SRI) See: Instrument Panel, Gauges and Warning Indicators/Maintenance Required Lamp/Indicator/Service and Repair/Resetting The Service Reminder Indicator (SRI).
Check that the CAN-communication is functioning. This is done by reading off the control module ID for the central electronic module (CEM), rear electronic module (REM) and engine control module (ECM) via VIDA vehicle communication.

Other information

For the location of other relay and fuse boxes, see: Relays, fuse boxes and wiring See: Power and Ground Distribution/Locations.

Door Module (Power Windows, Power Mirrors, Child Locks, Central Locking), Front Doors

Door module (power windows, power mirrors, child locks, central locking), front doors

Replacing the driver door module (DDM) and passenger door module (PDM)

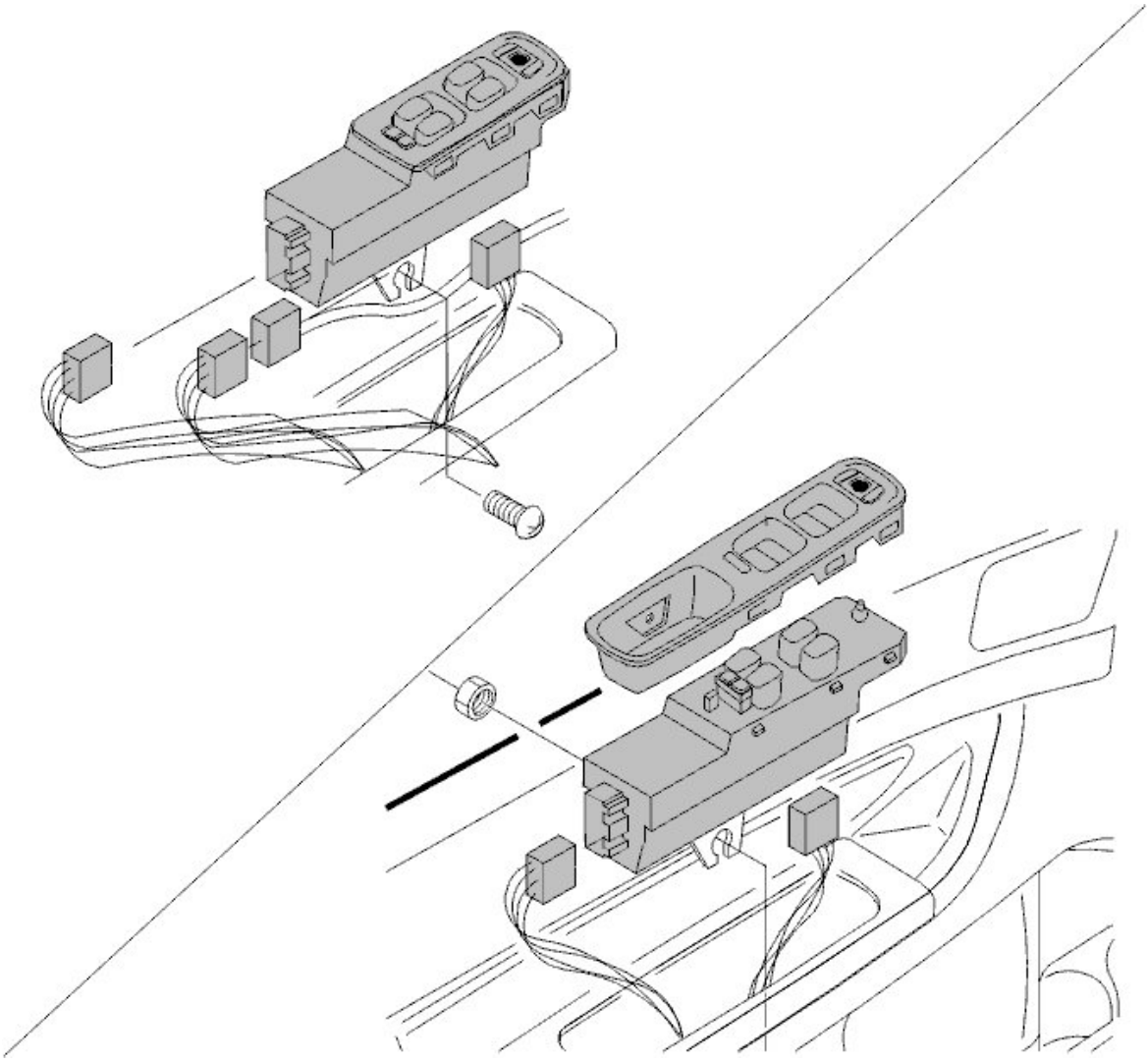
Preparations

Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

Always check that the control module and control module box connectors do not have bent or damaged terminals or socket / sleeves. This may have been the cause of the fault.

Removing the control module

This method of removal applies to both the driver door module (DDM) and the passenger door module (PDM).



The illustration shows the driver door module (DDM).

- Ignition off
- Remove the door panel
- Remove the nut and screw holding the door module
- Disconnect the connectors
- Pry up the rear edge of the door module. Pull the door module backwards and upwards. Remove the door module from its mounting on the door panel
- Press up the door module.

To remove the upper panel, see Removing the upper panel.

Check

Check that the control module's connectors are intact.

Installing the control module

This method of installation applies to both the driver door module (DDM) and the passenger door module (PDM).

- Position the door module in the hole on the door panel.

Check that the lower mounting for the door module is correctly located in the support on the door panel

- Press the door module into place
- Connect the connectors
- Install the nut and screw
- Install the door panel.

Ordering software

Order software for the driver door module (DDM) according to the table below.

V70 2000-	9494718
S80	9438272

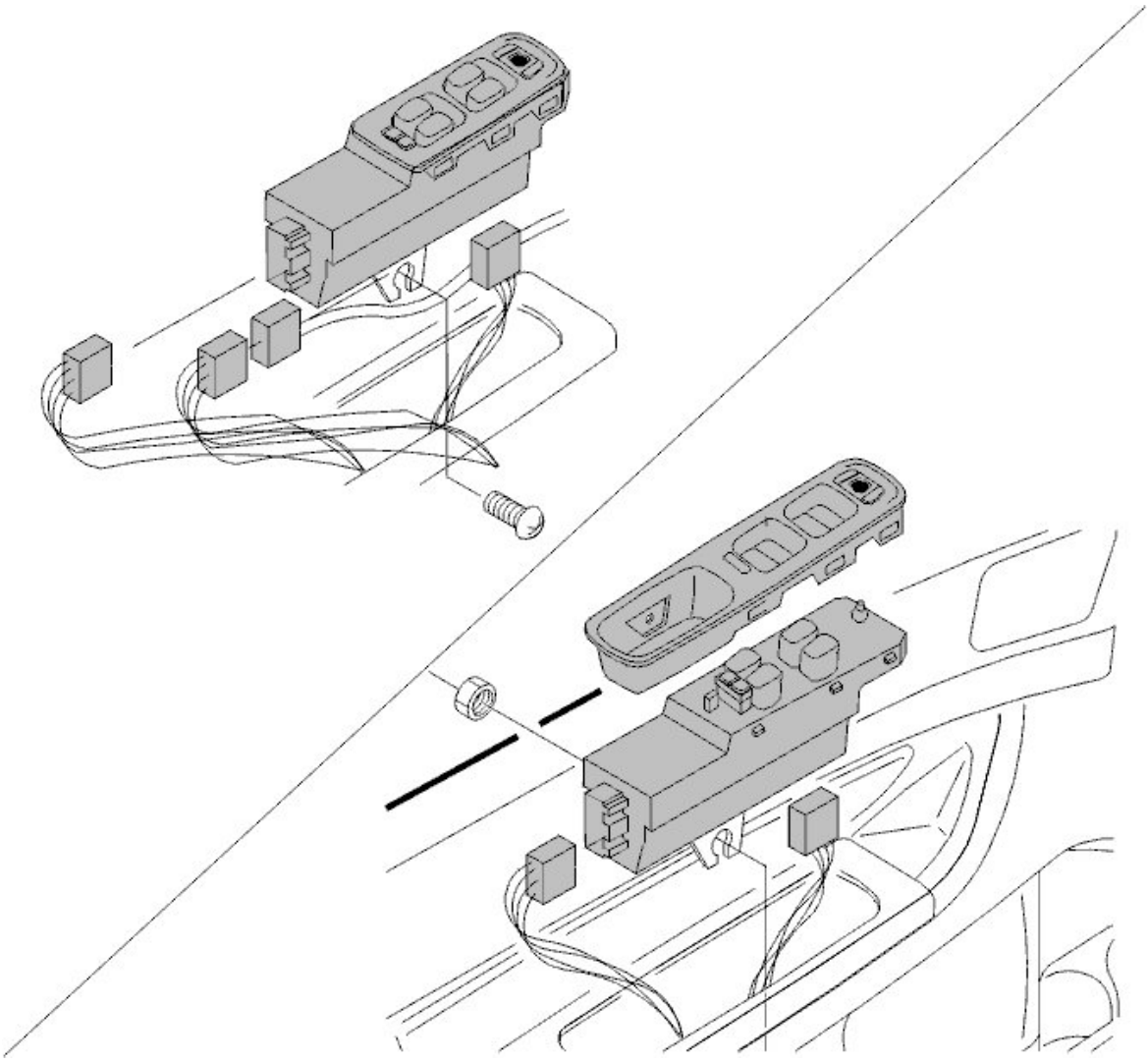
Order software for the passenger door module (PDM) according to the table below.

V70 2000-	9494719
S80	9438296

Finishing

Initialise the window position in the communication input

Removing the upper panel



The illustration shows the driver door module (DDM).

- Remove the control module, see instruction Removing the control module.
- Disconnect the catches. Lift the upper panel from the control module.

Installing the upper panel

In reverse order.

Driver Door Module (DDM)

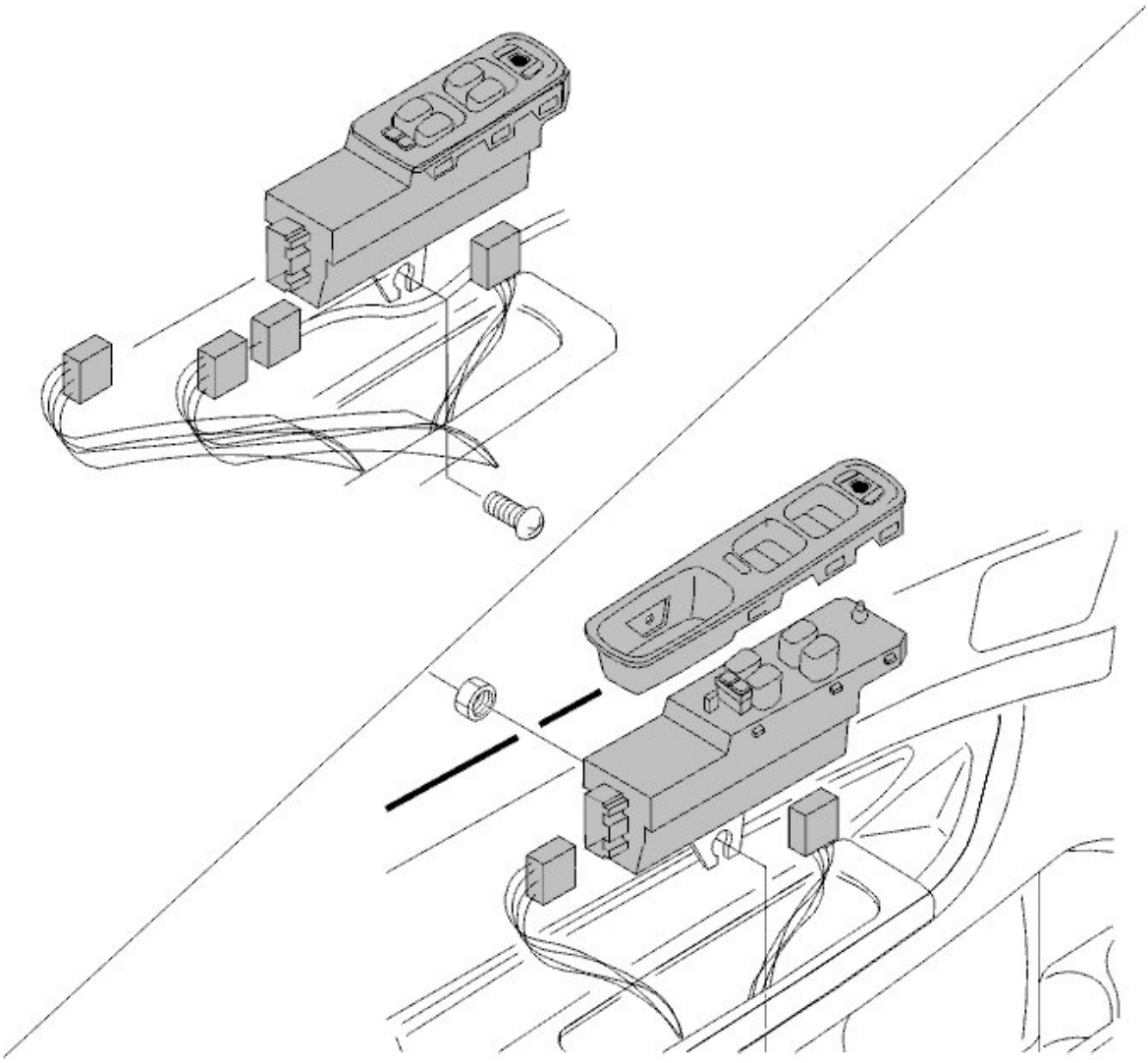
Driver door module (DDM), replacing

Preparations

Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

Always check that the control module and control module box connectors do not have bent or damaged terminals or sockets. This may have been the cause of the fault.

Removing the driver door module (DDM)



Ignition off.

Remove:

- the door panel, see Replacing the front door side panel See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Panel/Service and Repair/Front Door Side Panel.
- the nut and screw holding the control module in place
- the connectors.

Pull up the rear edge of the door module.
Pull the control module backwards and upwards.
Detach the control module from the mounting on the door panel.
Press up the control module.
Disconnect the catches. Lift the upper panel from the control module.

Note! Check that the control module's connectors are intact.

Installing the driver door module (DDM)

Install the upper panel.
Position the control module in the hole on the door panel.
Check that the lower mounting for the control module is correctly located in the support on the door panel.
Press the control module into place.

Install:

- the connectors
- the nut and screw
- the door panel, see Replacing the front door side panel See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Panel/Service and Repair/Front Door Side Panel.

Ordering software

Order software for the driver door module (DDM) according to the table below.

S60	8645429
V70 XC 2001-/XC70	9494718
XC90	8691286

Finishing

Initialise the window position in the communication input.

Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing

Driver's door module / passenger door module (DDM/PDM), replacing

S60 2001-, V70 2001-, V70XC 2001-, XC90
- Replacing the driver's side door module. See Driver door module (DDM), replacing See: Driver Door Module (DDM)
- Replacing the passenger side door module. See Passenger door module (PDM), replacing See: Passenger Door Module (PDM).

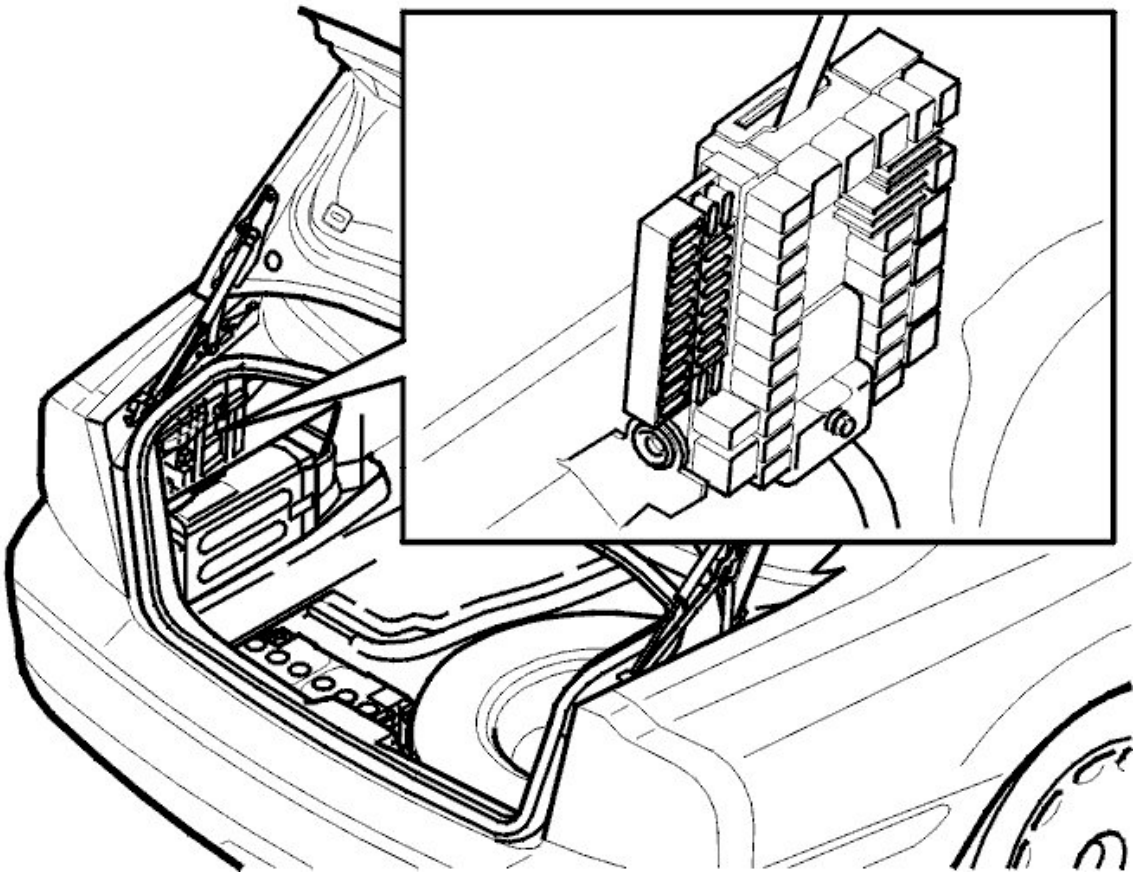
S80, V70 2000:
- Replacing the driver and passenger side door modules. See Door module (power windows, power mirrors, child locks, central locking), front doors See: Door Module (Power Windows, Power Mirrors, Child Locks, Central Locking), Front Doors.

Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing

Integrated relay/fusebox cargo compartment/Rear electronic module (REM), replacing

Integrated relay/fusebox in the cargo compartment

Exposing the integrated relay/fusebox in the cargo compartment



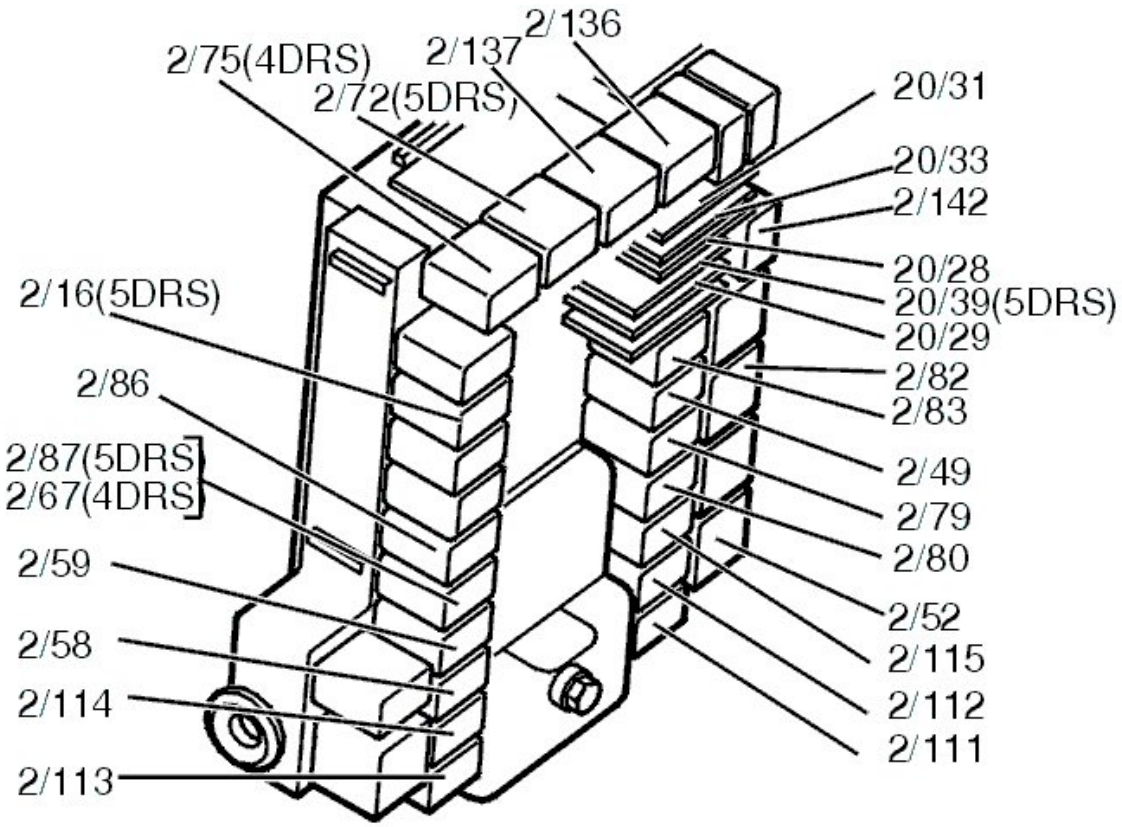
- Open the catch for the left-hand side panel in the cargo compartment. Fold down the upholstery

If necessary:
- Remove the floor hatch in the cargo compartment
- remove the clips on the floor. Remove the upholstery
- remove the road traffic information module (RTI), see Road traffic information module (RTI), replacing.
- remove the CD changer. See CD reader, RTI (road traffic information), replacing.

Replacing relays, shunts and fuses

- Expose the relay and fuse box, see instruction Exposing the integrated relay/fusebox in the cargo compartment.
- Replace the relay, shunt and/or fuse.

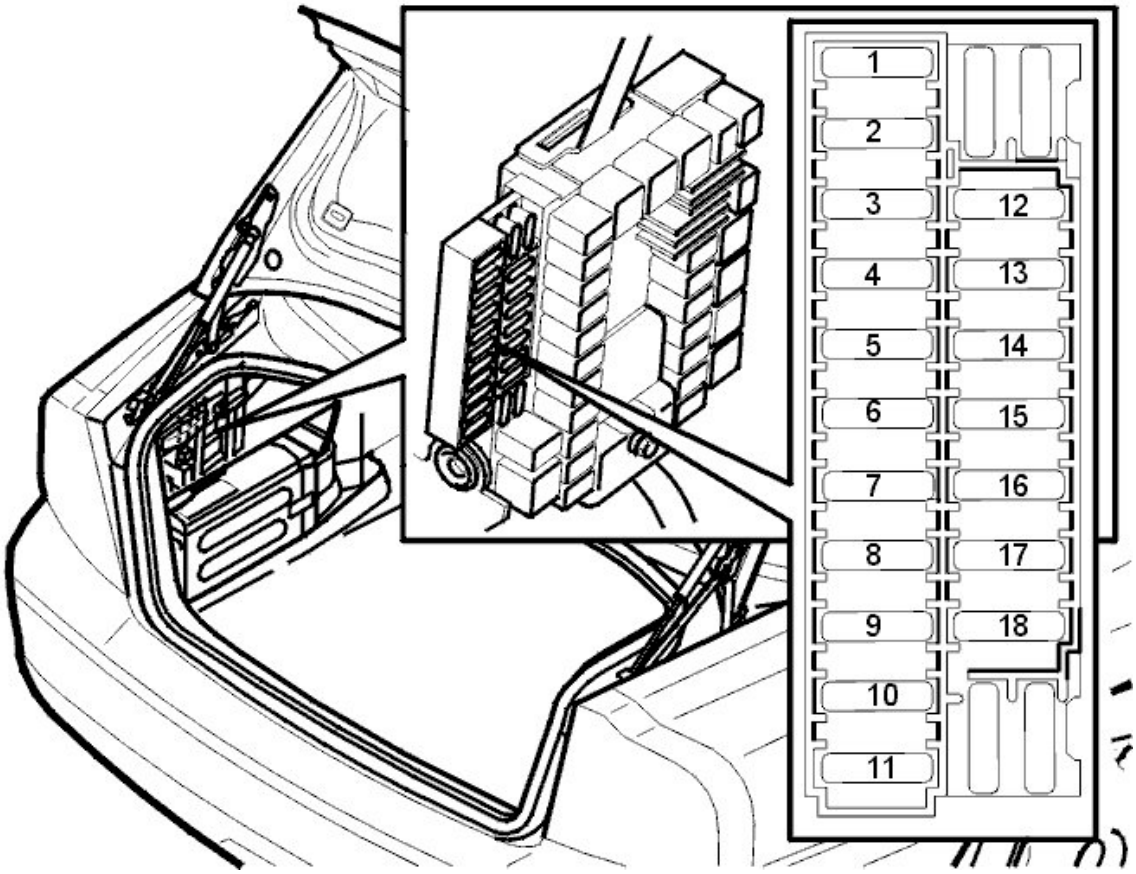
Relay location



For the location of the relays, see:

1. Wiring diagram for relevant model year
2. Decals at both the integrated relay box and fusebox in the car
3. Pocket data book
4. Owner's Manual.

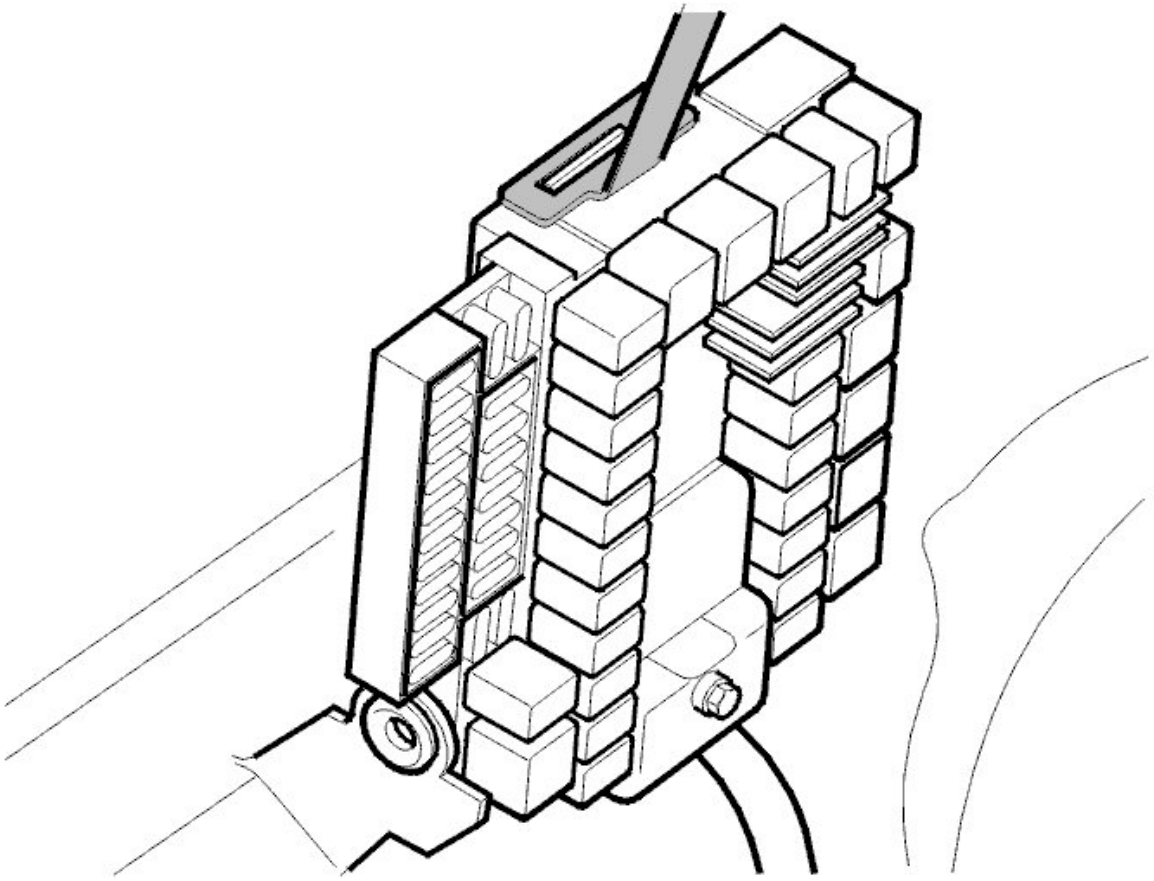
Location of fuse 11D



For the location of the fuses, see:

1. Wiring diagram for relevant model year
2. Decals at both the integrated relay box and fusebox in the car
3. Pocket data book
4. Owner's Manual.

Removing the integrated relay/fusebox in the cargo compartment



- Expose the integrated relay / fusebox. See Exposing the integrated relay/fusebox in the cargo compartment
- Release the catch on the top as illustrated. Fold down the integrated relay / fusebox and lift up to release it.

Installing the integrated relay / fusebox in the cargo compartment

- Install the integrated relay / fusebox. Ensure that the catches on the top engage correctly
- Install the upholstery
- Reinstall the floor hatch.

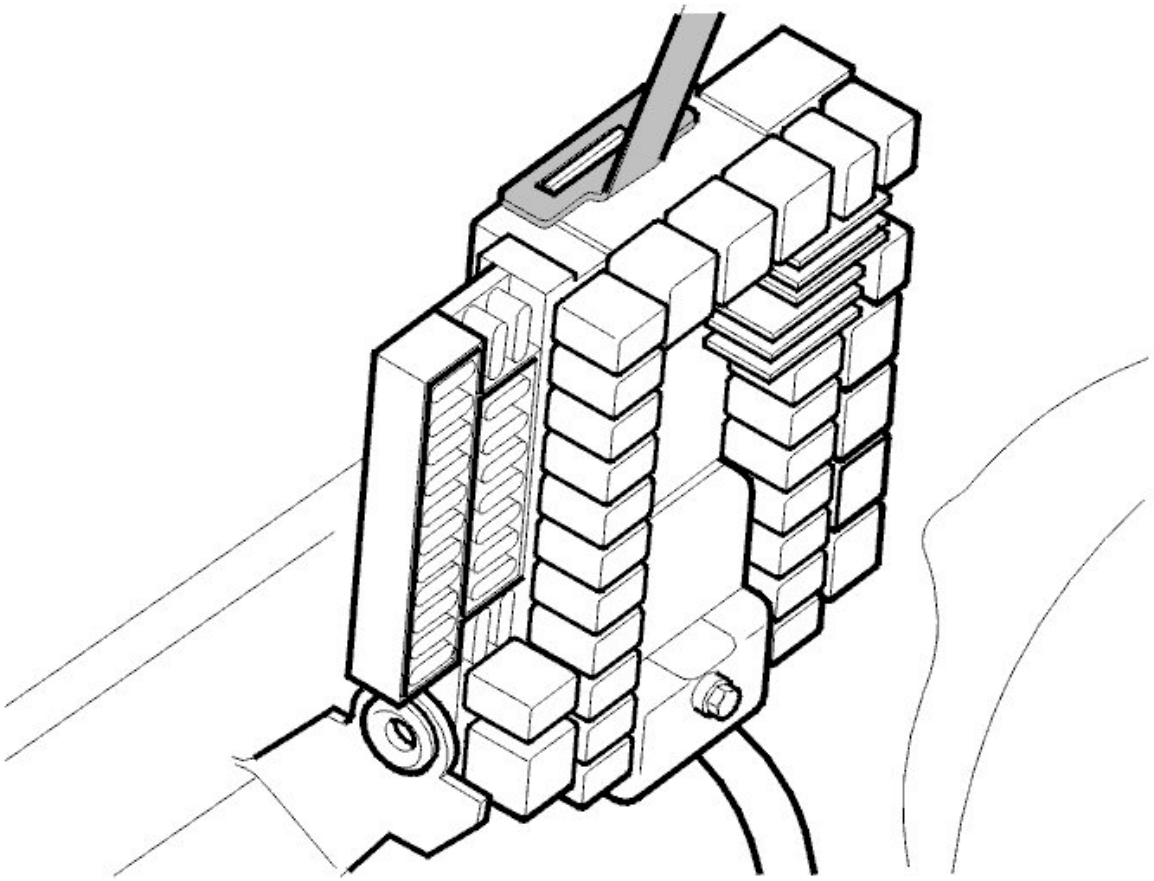
Rear electronic module (REM)

Preparations

Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

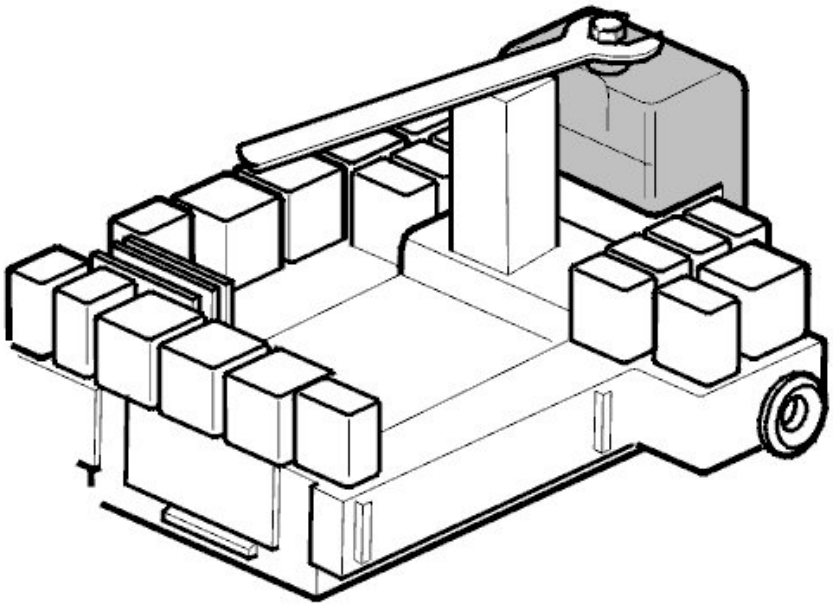
Always check that the control module and control module box connectors do not have bent or damaged terminals or socket / sleeves. This may have been the cause of the fault.

Removing the control module



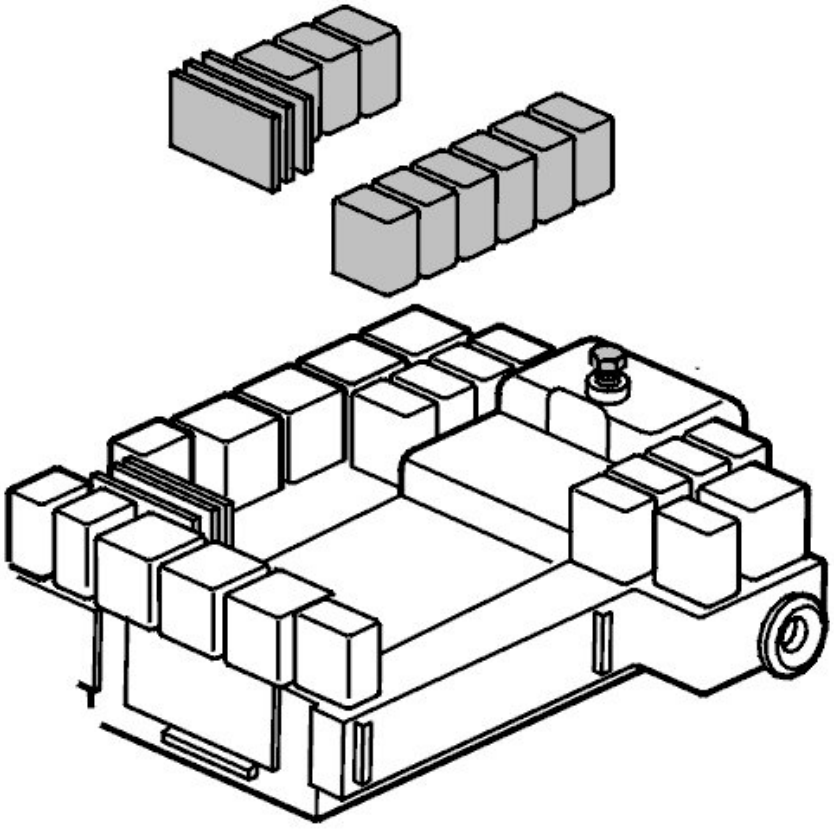
The rear electronic module (REM) is a separate unit in the relay box in the cargo compartment.

- Remove the integrated relay / fusebox. See Removing the integrated relay/fusebox in the cargo compartment.



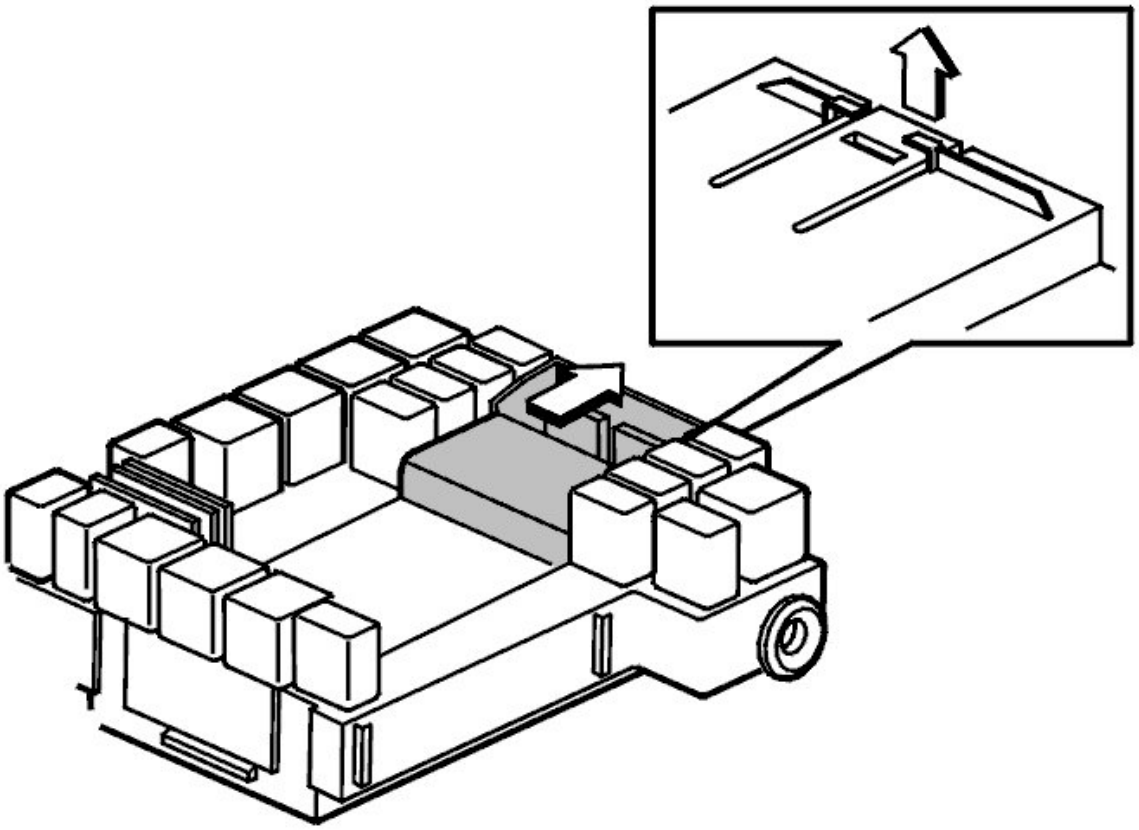
- Unscrew the screw holding the connector so that it is free of its threads. Check that the screw is free using your fingers
- Disconnect the connector. Use an open spanner and a support. See the illustration.

Note! Do not damage the terminal pins.



- Remove all relays and shunts bridged to the control module.

Note the locations.



- Release the catch on the rear. Use a screwdriver
- Lift and pull out the control module.

Check

Check that the control module connectors are intact.

Installing the control module

- Press the control module into place so that the catch on the rear engages
- Position the connector. **Carefully** press the connector down.

Note! The pins are fragile. Check that the connector goes straight down into the control module.

- Tighten the screw for the connector
- Check that the connector cover is correctly positioned. Remedy if necessary
- Install the relays and shunts. For relay locations, see instruction Relay location.
- Install the integrated relay / fusebox, see Installing the integrated relay / fusebox in the cargo compartment.

Ordering software

Order the software. See 9438285.

Other information

For the location of other relay and fuse boxes, see Relays, fuse boxes and wiring See: Power and Ground Distribution/Locations.

Passenger Door Module (PDM)

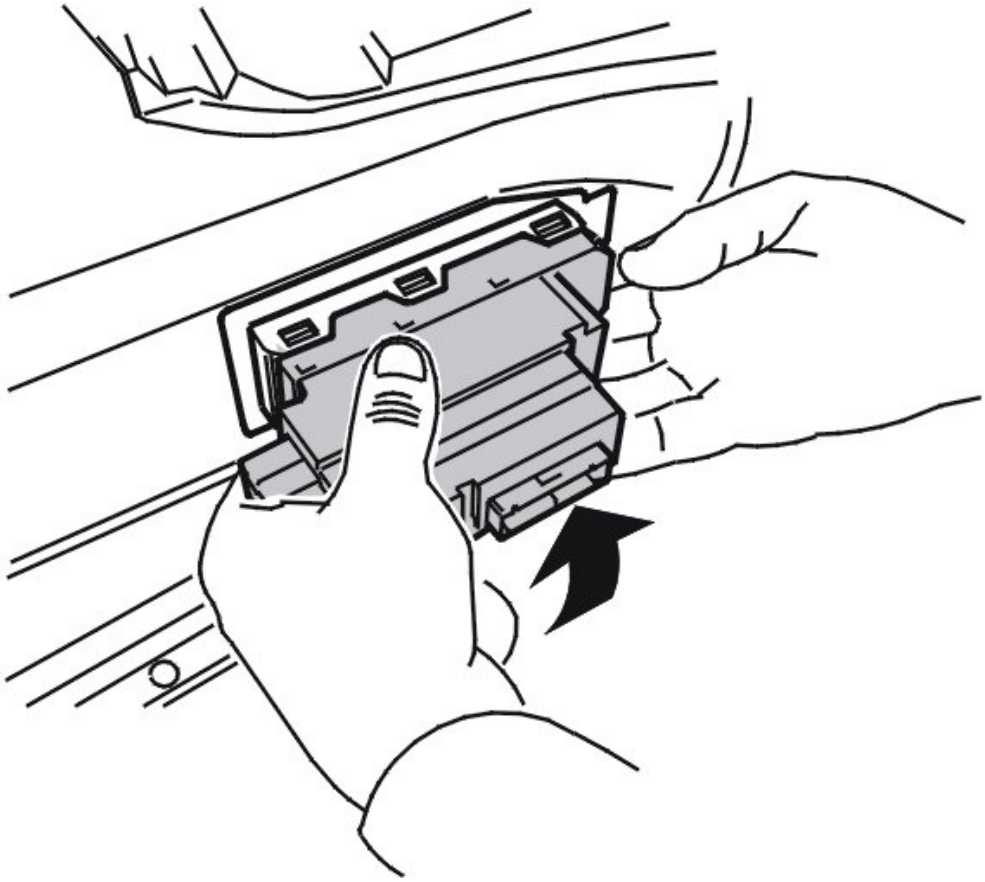
Passenger door module (PDM), replacing

Preparations

Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

Always check that the control module and control module box connectors do not have bent or damaged terminals or sockets. This may have been the cause of the fault.

Removing the passenger door module (PDM)

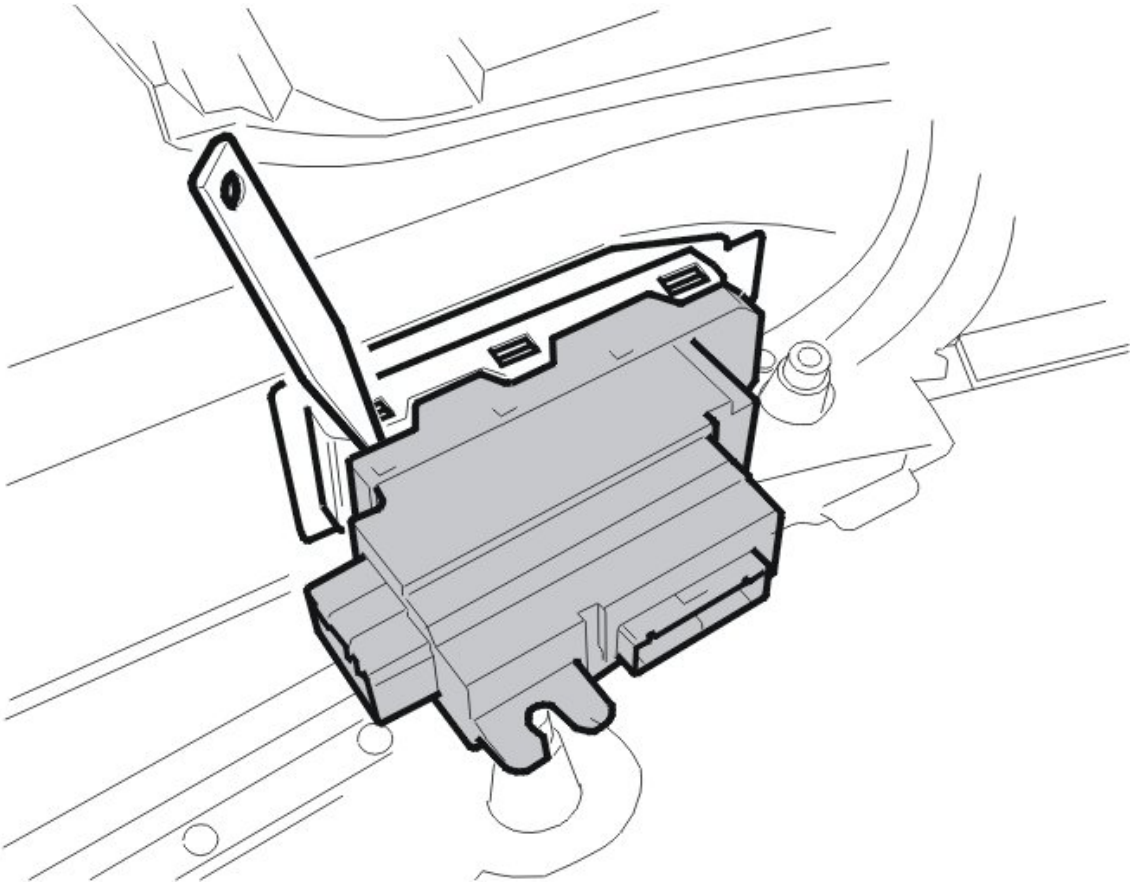


Ignition off.

Remove:

- the door panel, see Replacing the front door side panel See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Panel/Service and Repair/Front Door Side Panel.
- the nut and screw holding the control module in place
- the connectors.

Grasp the underneath of the control module. Press upwards. Carefully pull the module from the lower catches.



Release the upper catches using a weatherstrip tool. Lift out the control module.

Note! Check that the control module's connectors are intact.

Installing the passenger door module (PDM)

Press the control module into place.

Install:
- the connectors
- the nut and screw
- the door panel, see Replacing the front door side panel See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Panel/Service and Repair/Front Door Side Panel.

Ordering software

Order software for the passenger door module (PDM) according to the table below.

S60	8645430
V70 XC 2001-/XC70	9494719
XC90	8691287

Finishing

Initialise the window position in the communication input.

Rear Electronic Module (REM), Replacing

Rear electronic module (REM), replacing

Note! Since the illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Preparatory work

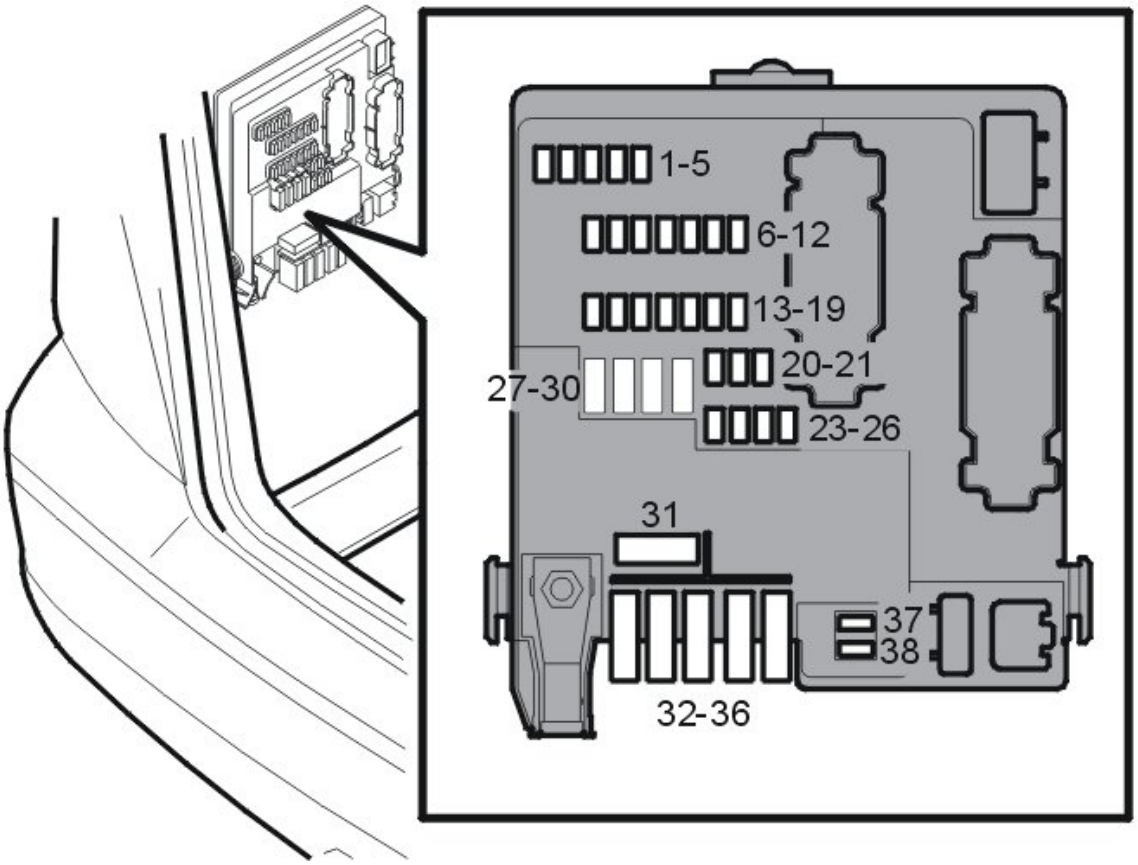
Ignition off

Ignition off.

Removal

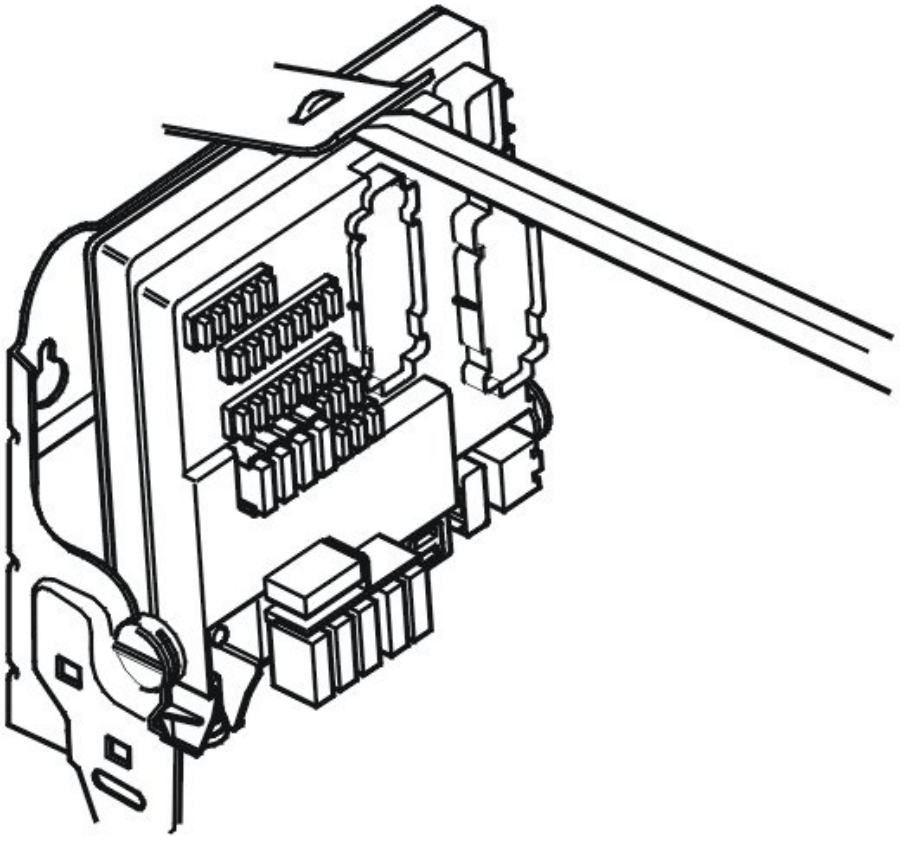
Removing the left cargo compartment side panel

Hint: The rear panel in the side panel of the cargo compartment can be removed to change fuses.



Remove the left-hand side panel in the cargo compartment. See: Side panel, cargo compartment, replacing See: Body and Frame/Interior Moulding / Trim/Trim Panel/Service and Repair/Side Panel, Cargo Compartment, Replacing.

Removing the rear electronic module (REM)



Remove:

- the control module by lifting the catches at the upper edge and angle out
- the connectors.

Note! Always check that the terminals or pins/sockets of the control module and control module box connectors are not bent or damaged.

This may be the cause of the problem.

Hint: For the location of relays, see:

- The wiring diagram for the relevant model year
- Decals at both the integrated relay box and fusebox in the car
- The Pocket Data book
- The Owner's manual.

Installation

Installing the rear electronic module (REM)

Caution! The pins are fragile. Check that the connector enters straight down into the control module.

Install:
- the connectors
- the control module in the bracket groove. Press the control module into place.

Installing the left cargo compartment side panel

Install the left-hand side panel in the cargo compartment. See: Side panel, cargo compartment, replacing See: Body and Frame/Interior Moulding / Trim/Trim Panel/Service and Repair/Side Panel, Cargo Compartment, Replacing.

Finishing

Ordering software

Caution! New software can only be ordered when the new control module is installed in the vehicle. The new control module identity is read off by VIDA with ordering, which is required for ordering the correct software.

Order applicable software.

Vehicles with Xenon headlights, without four_C

Perform calibration.

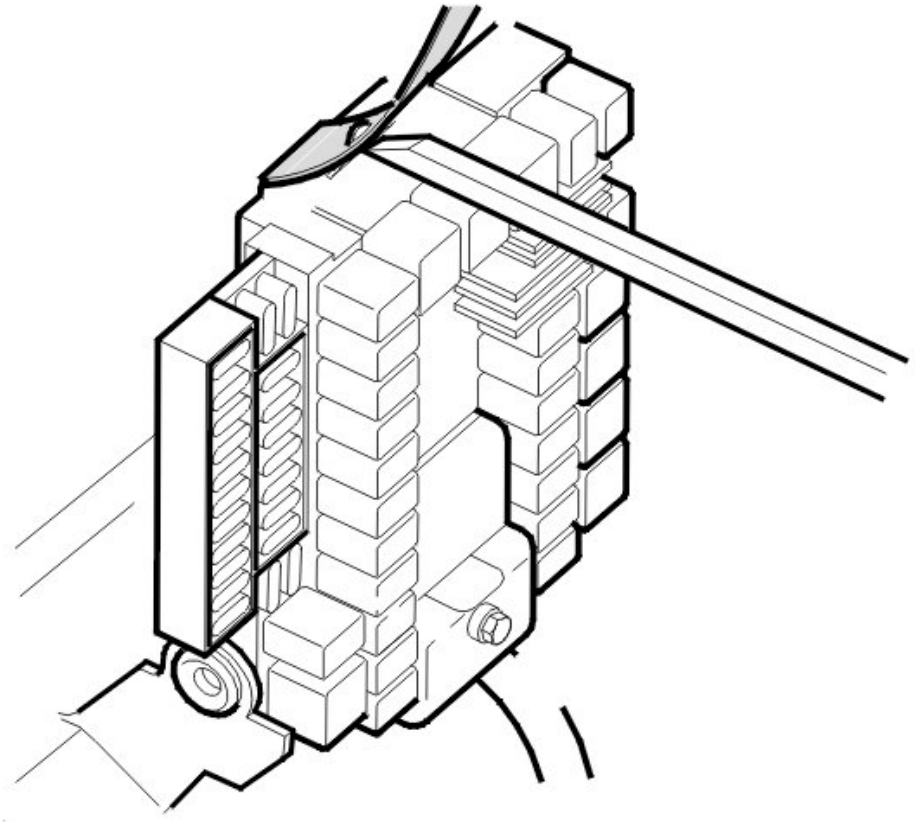
Relay/Fuse Box Cargo Compartment/Rear Electronic Module (REM), Replacing

Relay/fuse box cargo compartment/Rear electronic module (REM), replacing

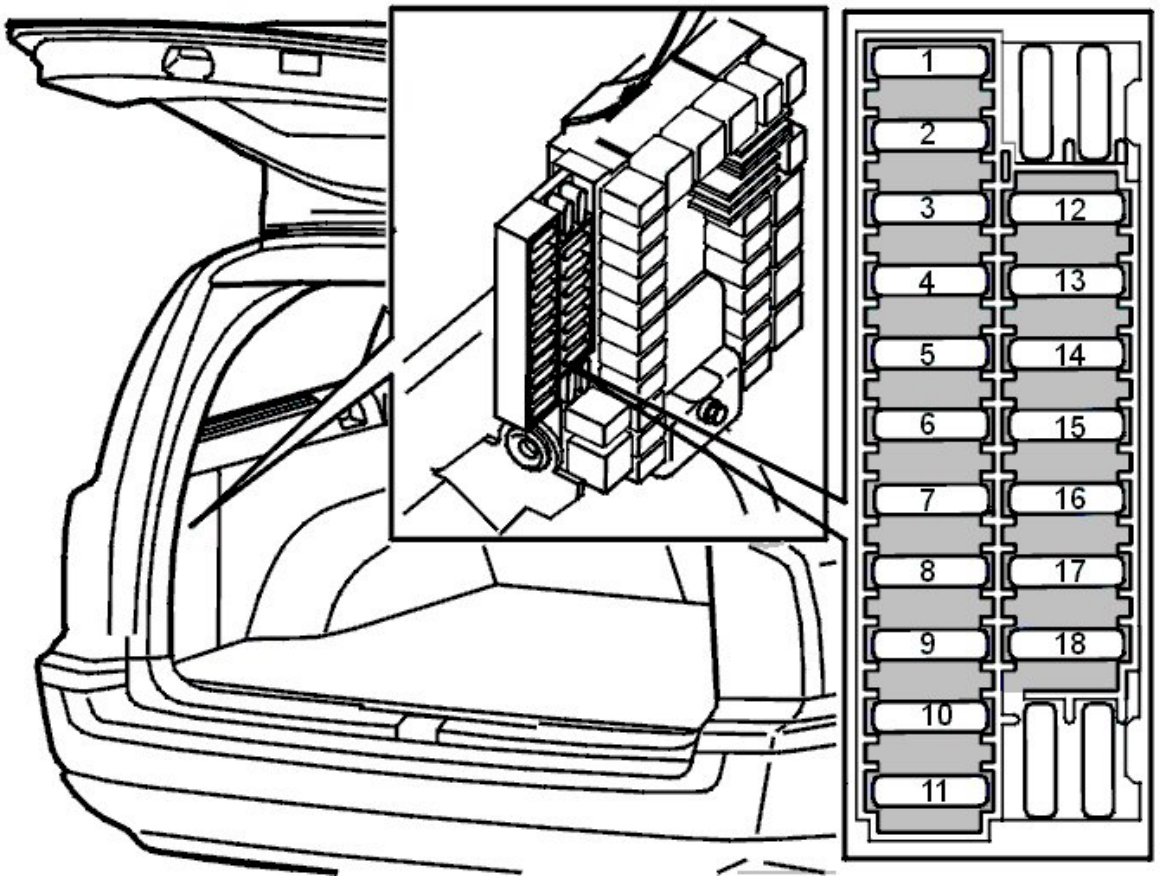
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Exposing the integrated relay/fusebox in the cargo compartment

Switch off the ignition.



Remove the left side panel in the cargo compartment.
Release the integrated relay/fusebox. Lift the catch by the upper edge and angle out the integrated relay/fusebox.



Hint: The rear panel in the side panel of the cargo compartment can be removed to change fuses.

Relay and fuse location, 11D

For the location of the relays and fuses, see:

1. Wiring diagram for relevant model year
2. Decals at both the integrated relay box and fusebox in the car

3. Pocket data book
4. Owner's Manual.

Installing the integrated relay / fusebox in the cargo compartment

Align the integrated relay/fusebox in the grooves in the bracket and press into place.
Install the left side panel in the cargo compartment.

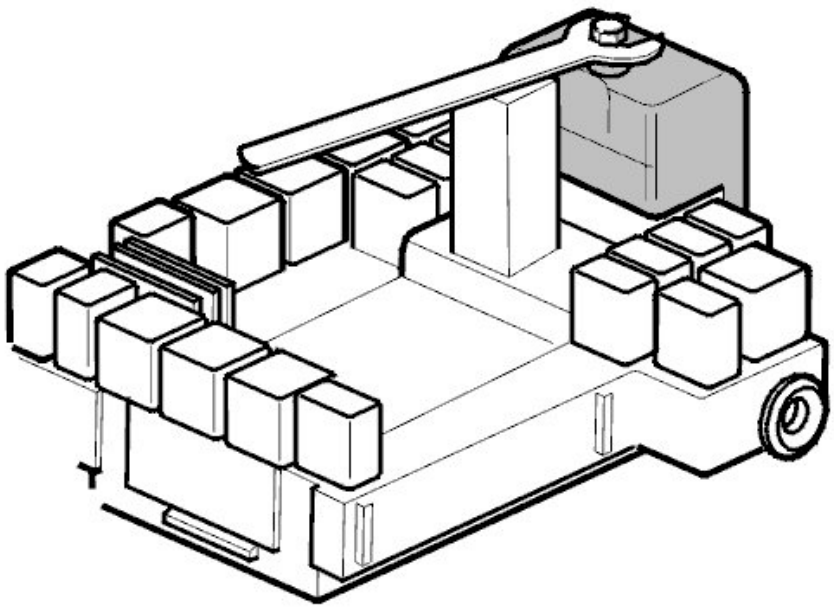
Replacing the rear electronic module (REM)

The rear electronic module (REM) is a separate unit in the relay box in the cargo compartment.

Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

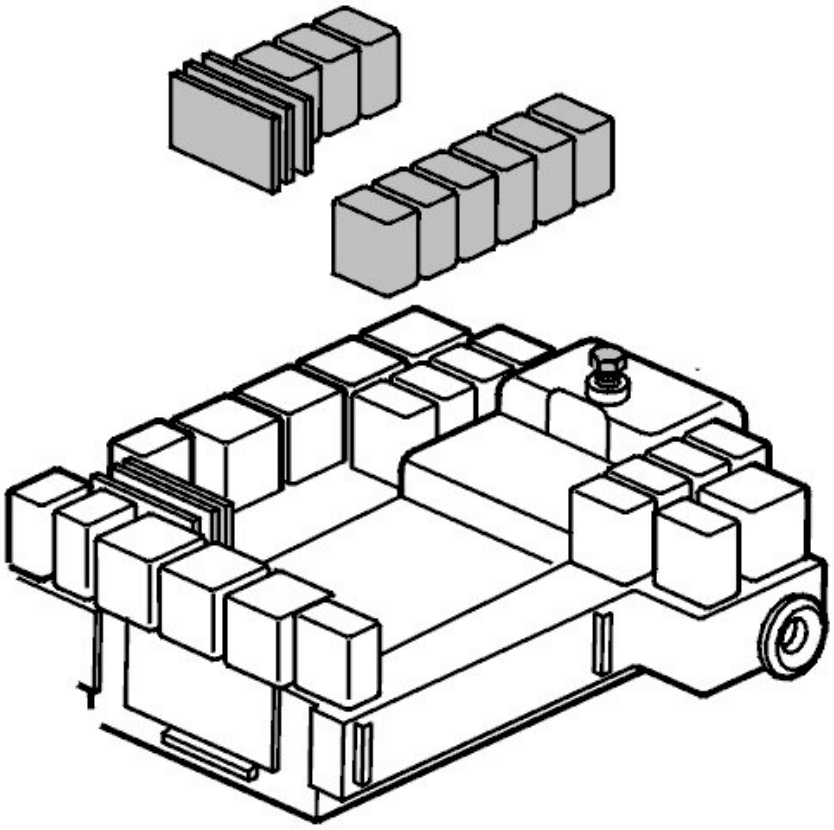
Release the relay and fuse box. See Exposing the integrated relay/fusebox in the cargo compartment.

Removing the control module

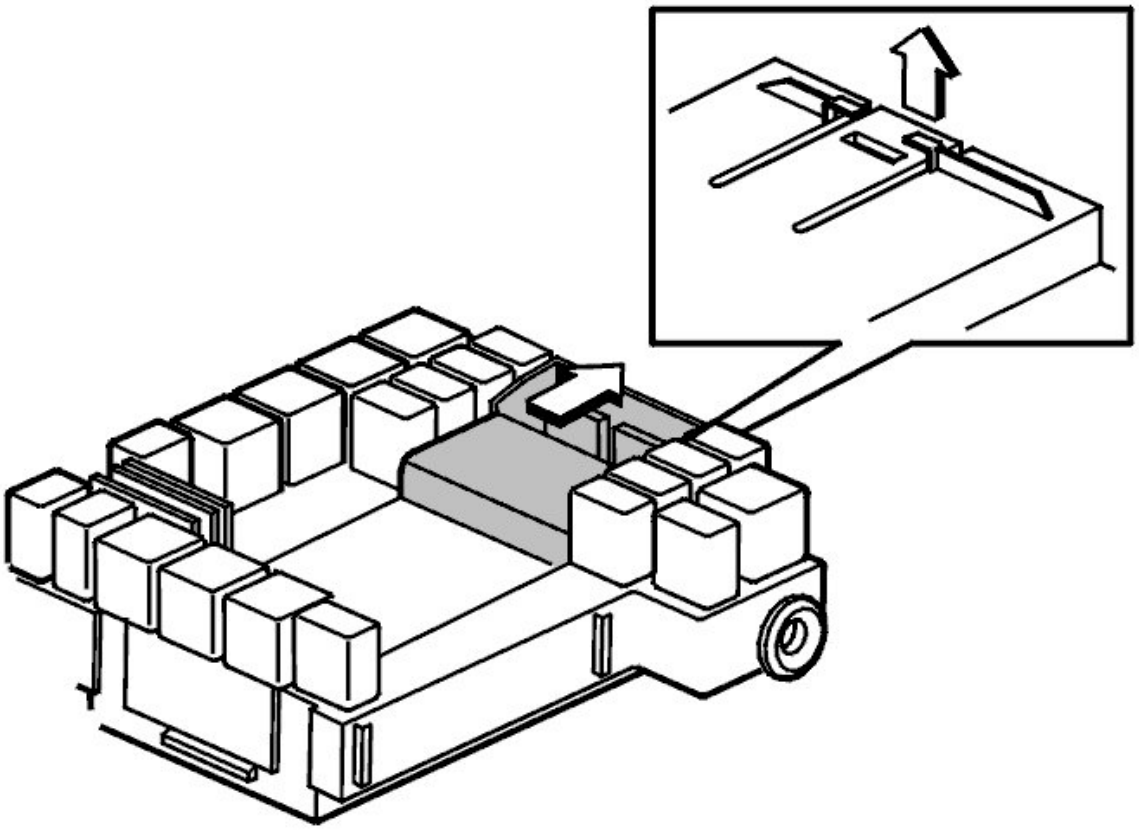


Unscrew the screw holding the connector so that it is free of its threads. Check that the screw is free with your fingers.
Disconnect the connector. Use an open spanner and a support. See the illustration.

Note! Do not damage the pins. Always check that the control module's and control module box's connectors do not have bent or damaged pins or sleeves. This may have be the cause of the problem.



Remove all relays and shunts bridged to the control module. Note the locations.



Release the catch on the rear. Use a screwdriver.
Lift and pull out the control module.

Check

Check that the control module's connectors are intact.

Installing the control module

- Press the control module into place so that the catch on the rear engages
- Position the connector. **Carefully** press the connector down.

Note! The pins are fragile. Check that the connector goes straight down into the control module.

- Tighten the screw for the connector
- Check that the connector cover is correctly positioned. Remedy if necessary
- Install the relays and shunts. Note their locations
- Install the integrated relay / fusebox. See Installing the integrated relay / fusebox in the cargo compartment.

Ordering software

Order the software. See 9494723.

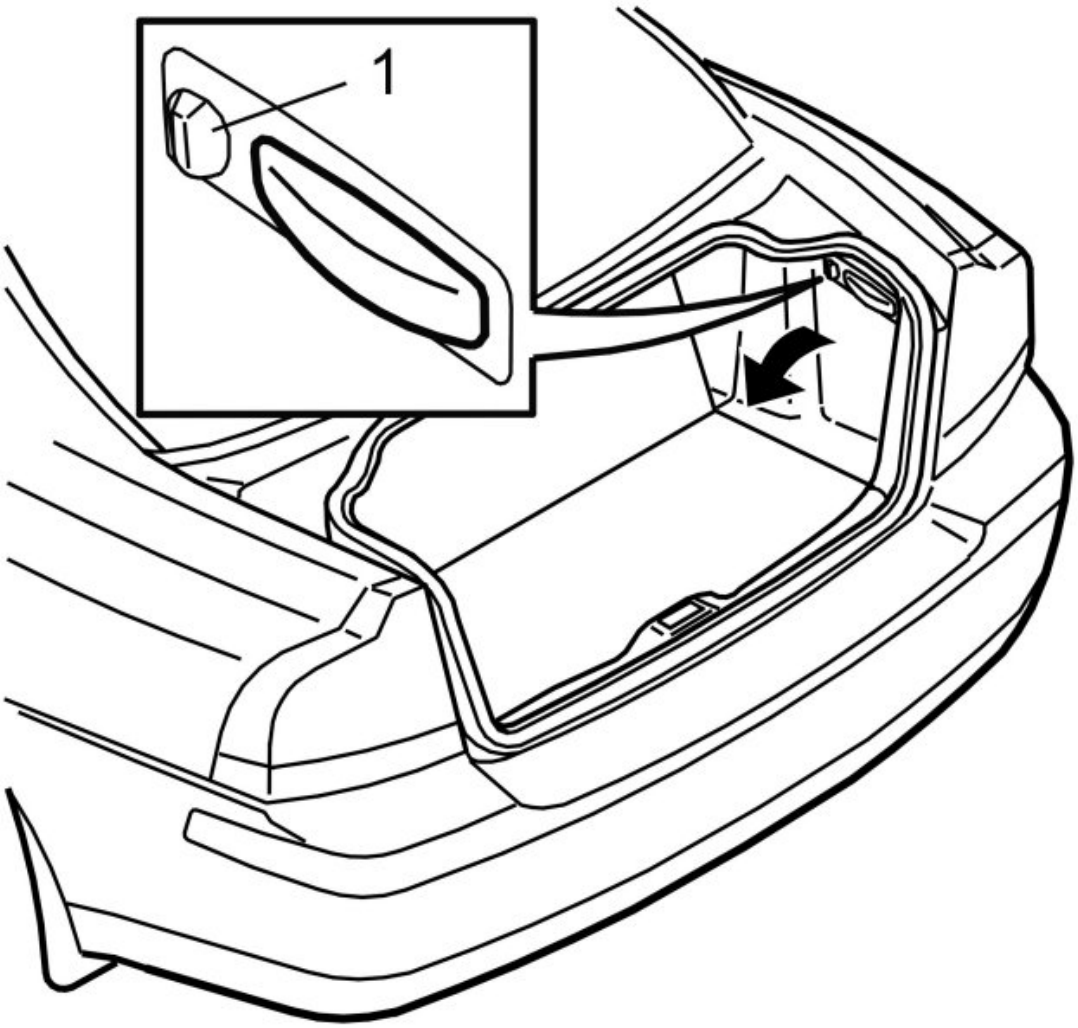
Replacing the Accessory Electronic Module

Replacing the accessory electronic module

Removal

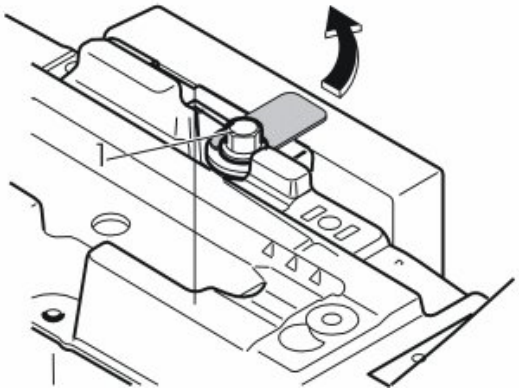
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Preparation



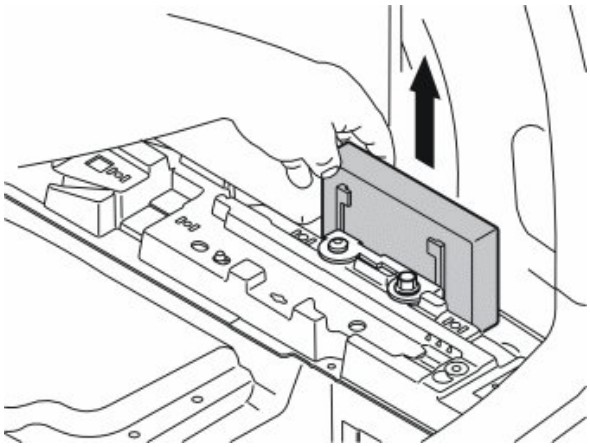
Remove the side panel on right-hand side.

Removing the lock plate



Slacken off the screw slightly and twist out the lock plate.
Remove the lock plate.

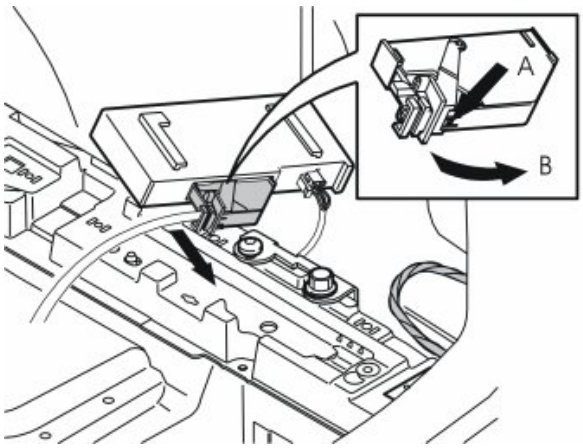
Exposing the control module



Lift the control module out of the bracket to access the connectors.

Hint: On **V70** and **V70XC**, it may be necessary to angle the control module downwards and forwards to access the connectors.

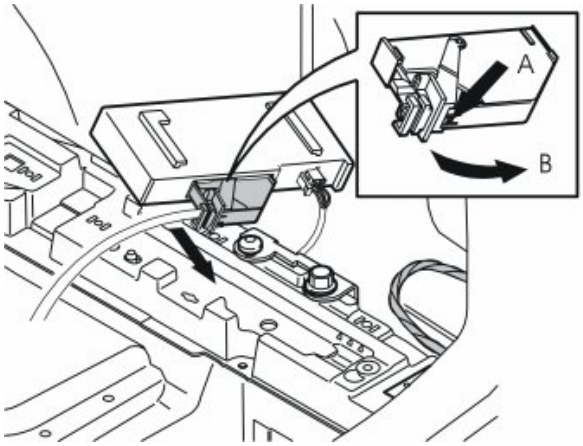
Disconnecting the connectors



Press the catch (A) and pull the lock handle backwards. Pull the connector out of the control module.
Disconnect the small connector from the control module.
Replace the control module.

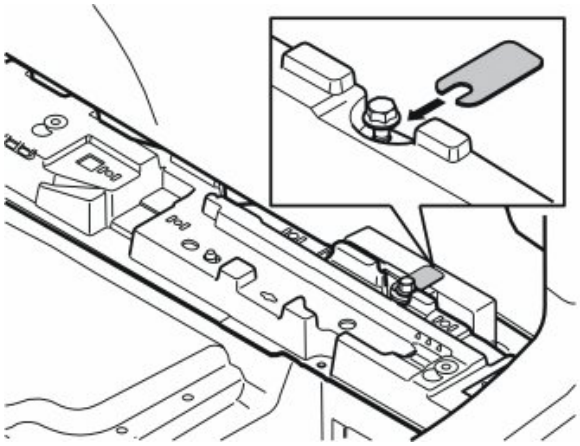
Installation

Installing the connectors



Install the large connector on the control module.
Lock the connector using the lock handle above the catch (A).
Install the other connector.

Installing the control module



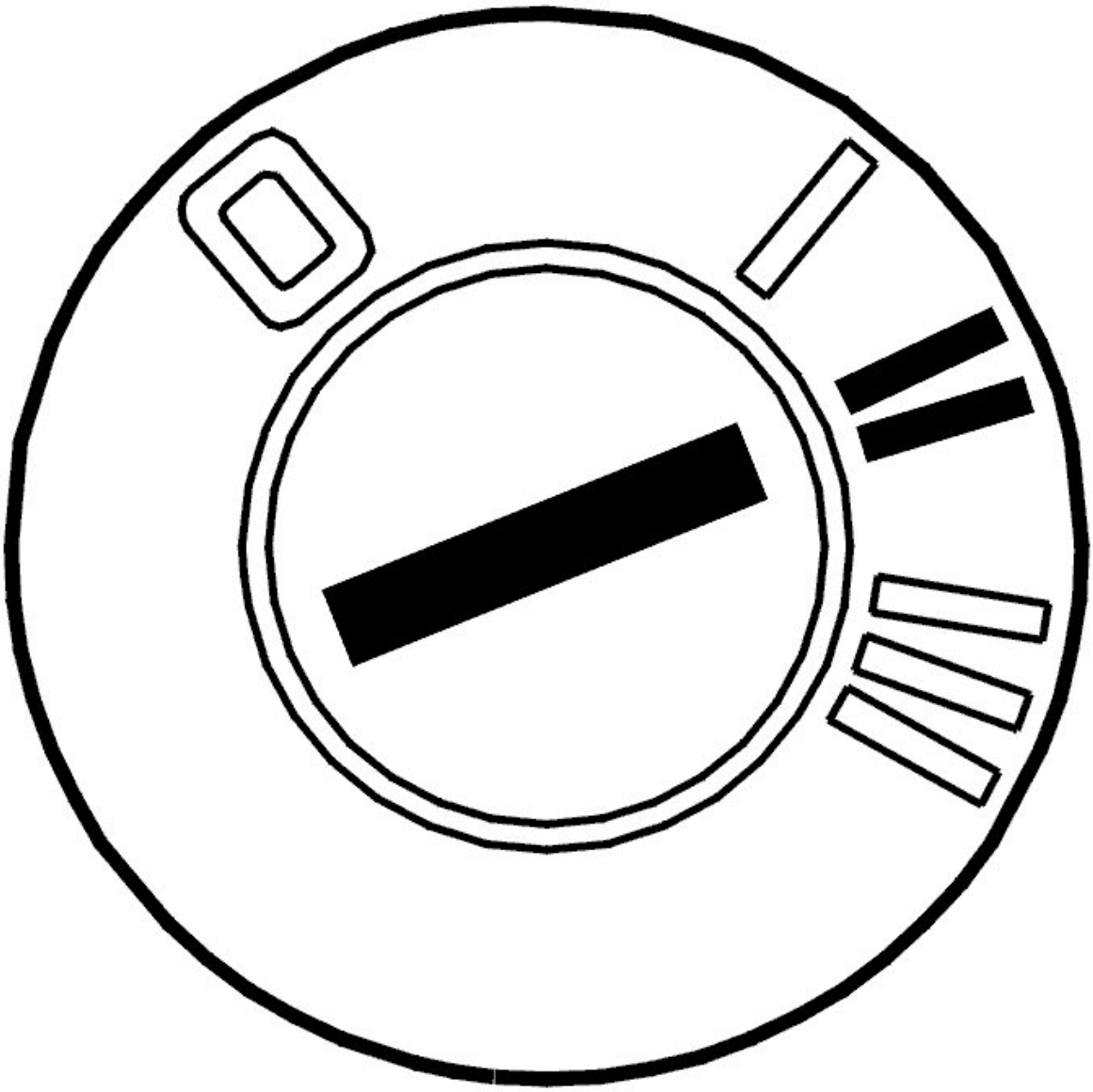
Move the wiring to the outside of the control module.
Place the control module in the bracket and press it down.
Install the lock plate. Tighten the screw. Tighten to **10 Nm**.
Reinstall the side panel.
After consultation with the customer, new software that corresponds to the car can be downloaded. Software for the accessory electronic module must be downloaded first. Software for the connected accessories must then be downloaded.
Check that no diagnostic trouble codes (DTCs) have been stored during the repair.

Replacing the Control Module (UEM)

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

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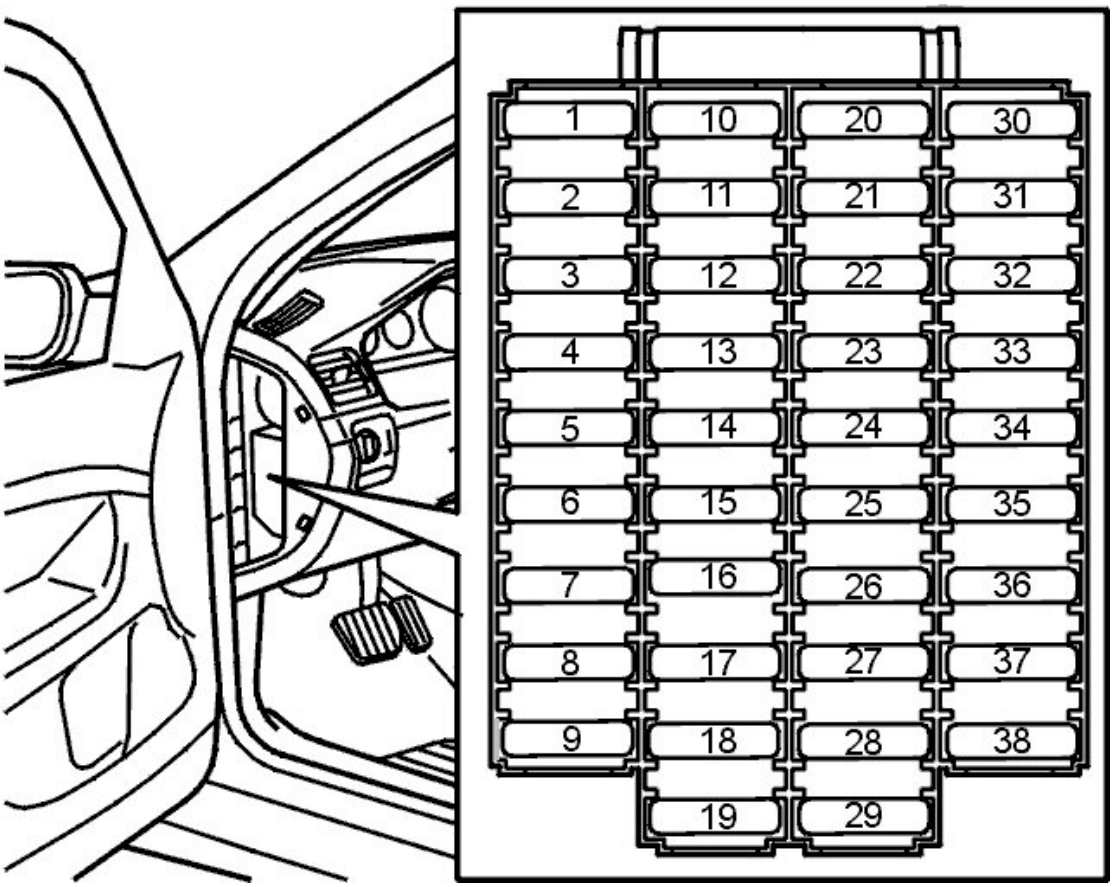
Replacing control modules and downloading software

Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: .

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting
2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short
- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long
- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:
- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

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Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: .

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - DONE

DONE - DONE

Upper Electronic Module (UEM)/Rearview Mirror, Replacing

Upper electronic module (UEM)/rearview mirror, replacing

Removal

Preparatory information

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Note! A rear view mirror with manual function cannot be replaced with automatic anti-dazzle or vice versa. The system will store diagnostic trouble codes (DTCs). The upper electronic module (UEM) is integrated in the rear view mirror.

Note! Read off data from the control module before replacing the control module. Program this data back into the new control module. Programmed data is read off via VIDA vehicle communication.

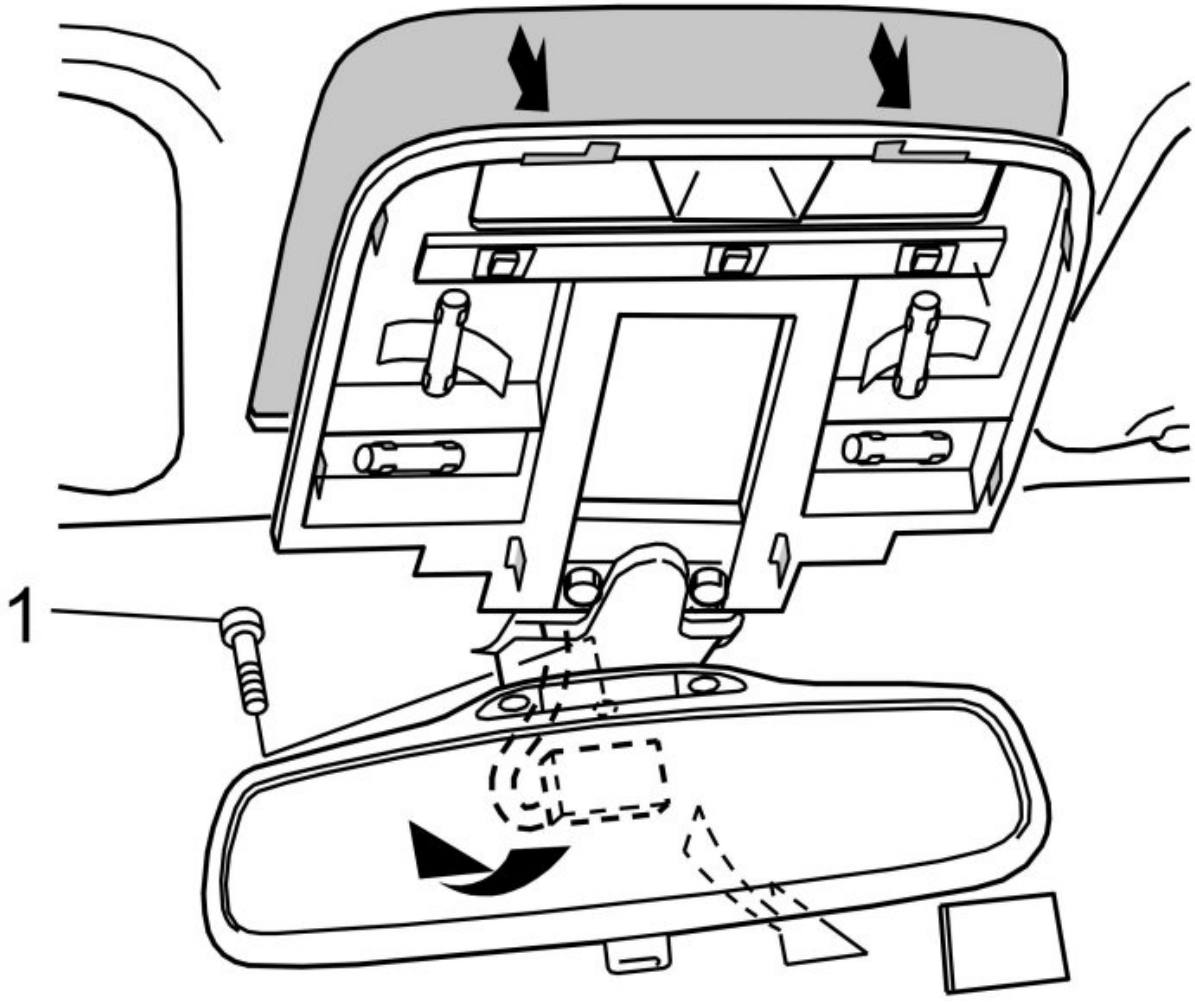
Caution! New software can only be ordered when the control module is installed in the car. VIDA reads off the new control module identity which is required to order the correct software.

Note! Always check that the control module and control module box connectors do not have bent or damaged terminals or socket / sleeves. This may have been the cause of a fault.

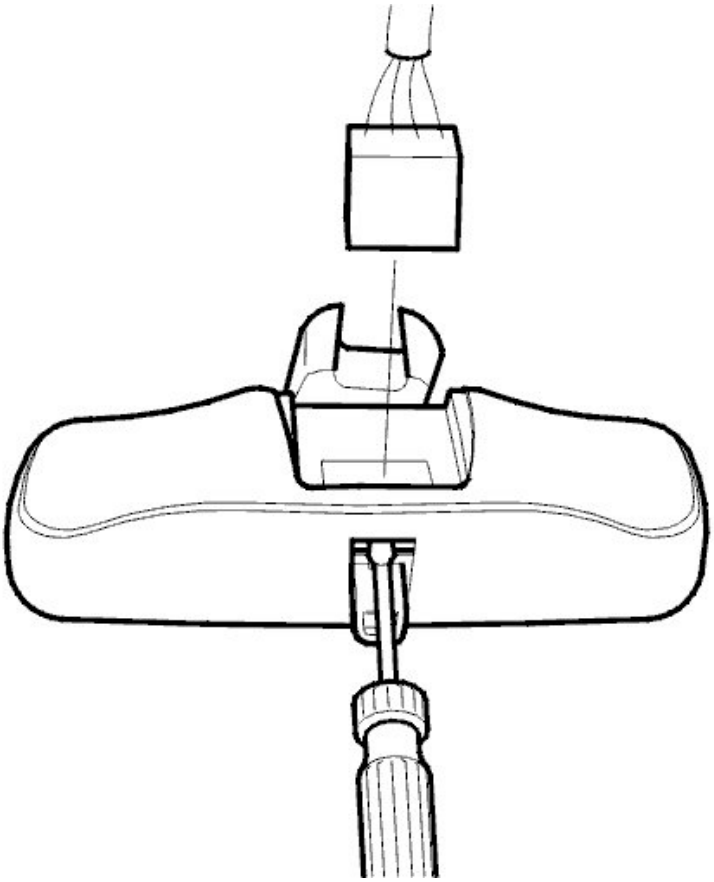
Preparatory work

Remove the interior lighting. See Interior lighting, replacing See: Lighting and Horns/Dome Lamp/Service and Repair/Interior Lighting, Replacing.

Removing the rear view mirror/control module



- Remove the cover over the connector for the rear view mirror and control module
- Remove the cable spring using a screwdriver
- For rear view mirrors with manual anti-dazzle: Flip the anti-dazzle button toward the lens.



Disconnect the connector by pressing the catch using a small screwdriver.

Installation

Installing the rear view mirror and control module

Connect the connector.
- The cable spring
- The connector cover
- The interior lighting. See Interior lighting, replacing See: Lighting and Horns/Dome Lamp/Service and Repair/Interior Lighting, Replacing.

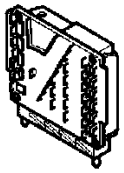
Ordering software

Order applicable software.

S60	8645443
V70 2000-, V70 2001-/XC70	8637415
S80	8637414
XC90	8691298

Engine Control Module: Description and Operation

Control Module



The Engine Control Module (ECM) controls the following functions:
- injectors
- ignition
- camshafts (CVVT)
- evaporative emission system (EVAP) valve
- turbocharger (TC) control
- throttle angle
- engine cooling fan (FC)
- Air conditioning (A/C) compressor
- fuel pump (only vehicles with demand controlled fuel pumps).

There is a micro-processor in the control module which receives signals from the different sensors in the car. The micro-processor uses a program which interprets the signals from the different sensors and how the components / functions should be controlled.

The control module has several self-learning (adaptive) functions. It continually adapts ongoing calculations to changing circumstances (wear, air leaks, differences between different fuels etc.).

Emissions are kept low through efficient management of the injection period, ignition, evaporative emission system (EVAP) valve and camshafts etc. Faults which affect emissions can be detected by running diagnostics for functions and components.

The control module is in a box in the engine compartment.

The engine control module (ECM) communicates with other control modules using controller area network (CAN) communication.

The engine control module (ECM) checks activations, input and output signals and functions using an integrated diagnostic system. A diagnostic trouble code (DTC) is stored if, after validation, the control module detects a fault. In certain cases the faulty signal is replaced with a substitute value or certain functions are limited.

Substitute values can be set for e.g.:
- engine coolant temperature (ECT)
- mass air flow
- throttle position
- atmospheric pressure
- etc.

Mathematical calculations and signals from certain components are used to calculate the substitute values. Other substitute values are fixed, predefined values in the control module. The substitute value allows the car to be driven and for the emissions to be kept at a reasonable level even though vital functions / components are faults.

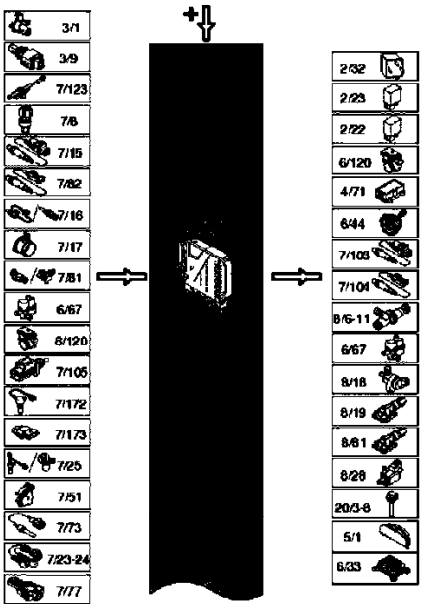
Functions which are limited may be for example:
- turbocharger (TC) control
- Camshaft control (CVVT)
- fuel trim
- throttle angle
- etc.

A function is limited so that the system still functions, to protect components or for safety reasons (for example the throttle angle). Any diagnostic trouble codes (DTCs) are stored in the control module memory. The data can be read off using VIDA.

Signals

The table summarizes the input signals to and output signals from the Engine Control Module (ECM). The signal types are divided into directly connected signals, serial communication and controller area network (CAN) communication. The illustration displays the same information with the Volvo component designations.

Input signals	Output signals
Directly connected: * Ignition switch (3/1) * Stop lamp switch (3/9) * Clutch pedal sensor (7/123) * Air conditioning (A/C) pressure sensor (7/8) * Front heated oxygen sensor (HO2S) (7/15) * Rear heated oxygen sensor (HO2S) (7/82) * Engine coolant temperature (ECT) sensor (7/16) * Mass air flow (MAF) sensor (7/17) * Manifold absolute pressure (MAP) sensor, intake (7/81) (certain turbocharged engines only) * Manifold absolute pressure (MAP) sensor, with integrated intake air temperature (IAT) sensor, intake (7/81) (certain turbocharged engines only) * Leak diagnostic unit (6/67), (certain markets only) * Electronic throttle unit (6/120) * Outside temperature sensor (7/105) * Camshaft position (CMP) sensor (7/172) * Camshaft position (CMP) sensor (7/173) * Engine speed (RPM) sensor (7/25) * Accelerator pedal (AP) position sensor (7/51) * Engine coolant level sensor (7/73) * Knock sensor (KS) (7/23-7/24) * Manifold absolute pressure (MAP) sensor, intake (7/77) (not turbocharged engines 2003-2004) * Oil level sensor (7/35) (certain markets and models only) * Fuel pressure sensor with integrated fuel temperature sensor (7/156) (vehicles with demand controlled fuel pumps only).	**Directly connected:** * Main relay (system relay) (2/32) * Fuel pump (FP) relay (2/23) * Air conditioning (A/C) relay (2/22) * Electronic throttle unit (6/120) * Engine cooling fan (FC) control module (4/71) * Engine cooling fan (FC) control module box (6/44) (turbocharger (TC) only and certain markets) * Front heated oxygen sensor (HO2S), preheating (7/103) * Rear heated oxygen sensor (HO2S), preheating (7/104) * Injectors (8/6-8/11) * Leak diagnostic unit (6/67), (certain markets only) * Evaporative emission system (EVAP) valve (8/18) * Camshaft reset valve (CVVT) (8/19) (certain engines only) * Camshaft reset valve (CVVT) (8/81) (certain engines only) * Turbocharger (TC) control valve (8/28) * Ignition coils (20/3-20/8) * Driver information module (DIM) (5/1), emissions warning lamp * Fuel pump control module (6/33) (only vehicles with demand controlled fuel pumps) * Central electronic module (CEM) (4/56).
Via Controller Area Network (CAN) communication: * Transmission Control Module (TCM) (4/28) (only cars with automatic transmissions) * Brake control module (BCM) (4/16) * Central electronic module (CEM) (4/56) * Suspension module (SUM) (4/84) (vehicle with Four-C (Continuously Controlled Chassis Concept) only). Via central electronic module (CEM) (4/56): * Climate Control Module (CCM) (3/112) * Data link connector (DLC) (17/13) * Driver information module (DIM) (5/1) * Steering wheel module (SWM) (3/130).	**Via Controller Area Network (CAN) communication:** * Transmission Control Module (TCM) (4/28) (only cars with automatic transmissions) * Brake control module (BCM) (4/16) * Central electronic module (CEM) (4/56) * Differential electronic module (DEM) (4/82) (AWD only) * Suspension module (SUM) (4/84) (vehicle with Four-C (Continuously Controlled Chassis Concept) only). Via central electronic module (CEM) (4/56): * Climate Control Module (CCM) (3/112) * Data link connector (DLC) (17/13) * Driver information module (DIM) (5/1) * Steering wheel module (SWM) (3/130).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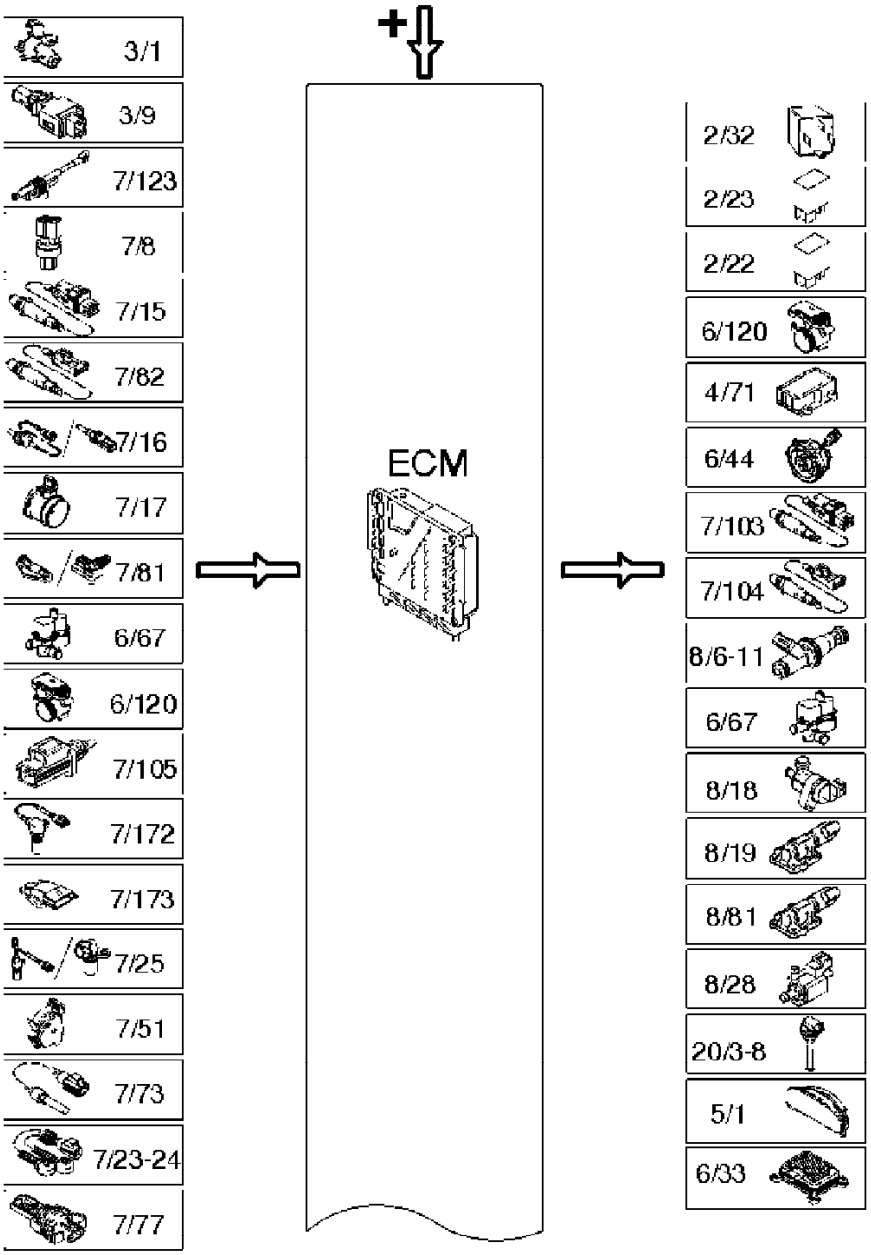
7/173
7/25
7/51
7/73
7/23-24
7/77
ECM
2/32
2/23
2/22
6/120
4/71
6/44
7/103
7/104
8/6-11
6/67
8/18
8/19
8/81
8/28
20/3-8
5/1
6/33


3/1
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ECM
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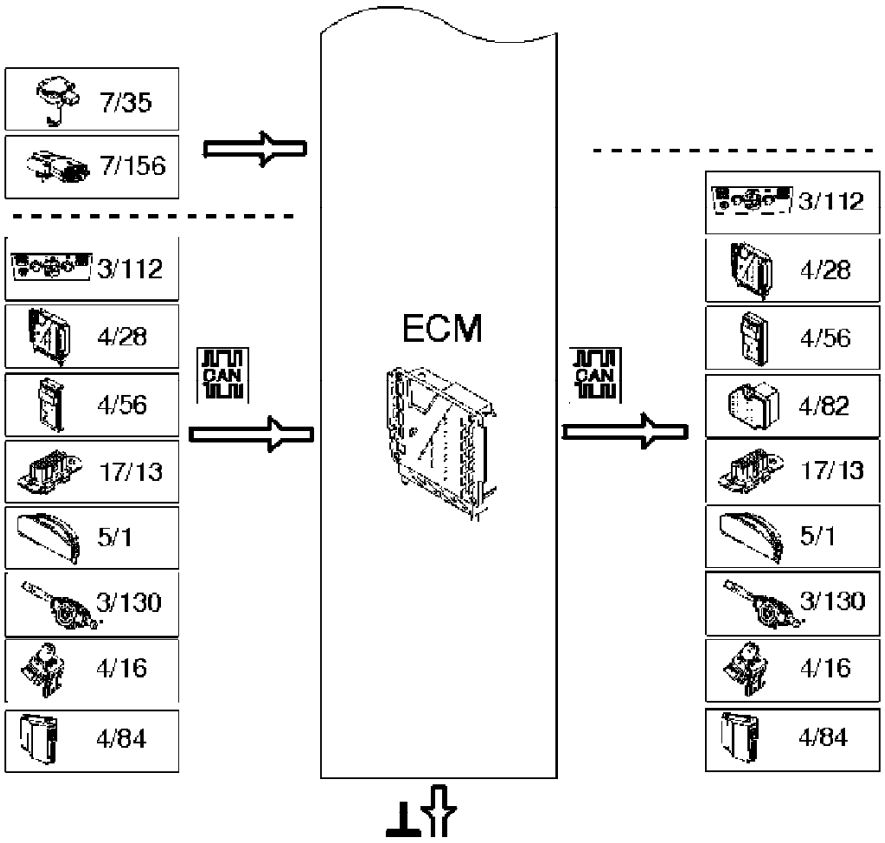
6/33

Part 3


7/35
7/156
3/112
4/28
4/56
17/13
5/1
3/130
4/16
4/84
CAN
ECM
CAN
3/112
4/28
4/56
4/82
17/13
5/1
3/130
4/16
4/84

Part 4

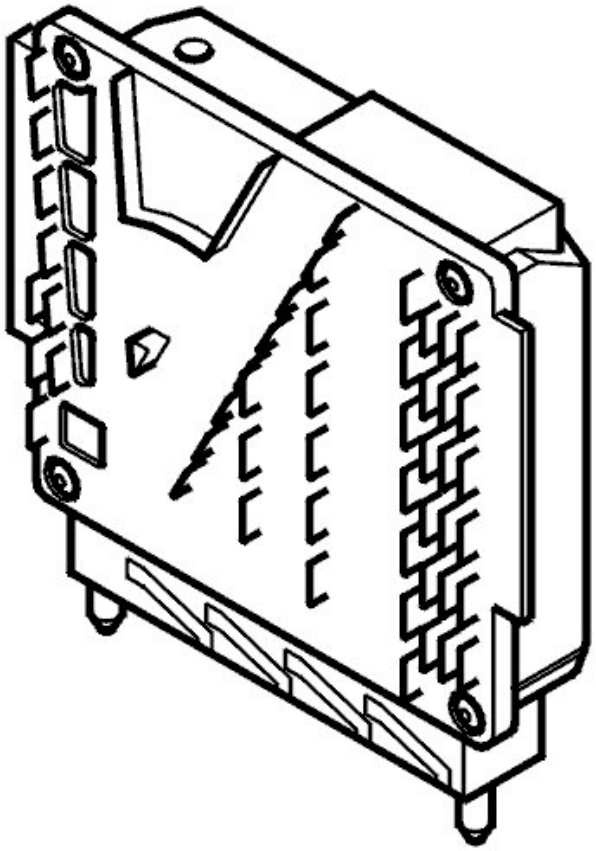
Engine Control Module: Service and Repair

Engine control module (ECM), replacing

Special tools:

999 5722 Wrench See: Tools and Equipment/999 5722 Wrench

Points to observe when replacing the control module

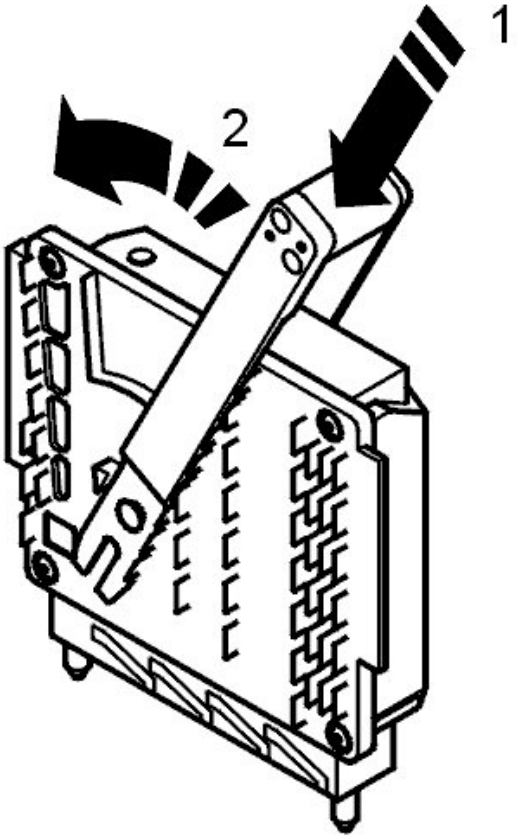


Caution! New software can only be ordered when the control module is installed in the vehicle. VIDA reads off the new control module identity which is required to order the correct software.The software can only be ordered when the new control module is installed in the car.

Caution! Wait 2 minutes after the ignition has been switched off. The main relay must be voltage-free before the control module can be removed from the car. If the engine cooling fan runs on after the ignition has been switched off, wait until it stops and then wait for another 2 minutes.

Caution! Always check that the control module and control module box connector pins and sleeves are not bent or damaged. This may have caused the fault.

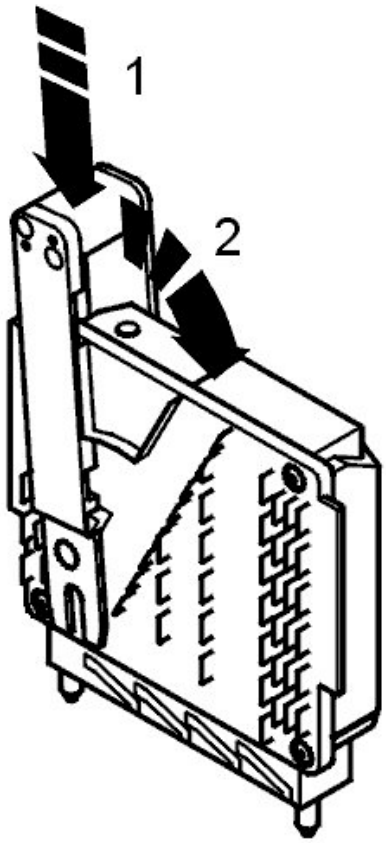
Removing the engine control module (ECM)



- Ignition off. Wait for 2 minutes
- Remove the cover over the control module box. Put the cover to one side
  Note! Do not touch the control module terminal pins with your fingers. Static electricity may damage components in the control module.

- Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
- Move the upper section of the tool backwards as far as it will go. Pull up the tool
- Carefully pull up the control module.

Installing the engine control module (ECM)



- Check that no pins or sockets are damaged on the connector.
- Carefully press the control module down into the grooves on the inside of the control module box. Press to the limit position
- Insert tool 999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module.
- Move the upper section of the tool forwards as far as it will go. Pull up the tool
- Press the cover into place over the control modules
- Check that the air ducts are correctly positioned.

Ordering software

Order applicable software.

S60	8645426
V70 2000-, V70 XC 2001-/XC70	9494715
S80	9438288
XC90	8691283

Note! After downloading the software or replacing the engine control module (ECM), the throttle unit must be adapted according to vehicle communication input: "Adapting the throttle unit".

Finishing

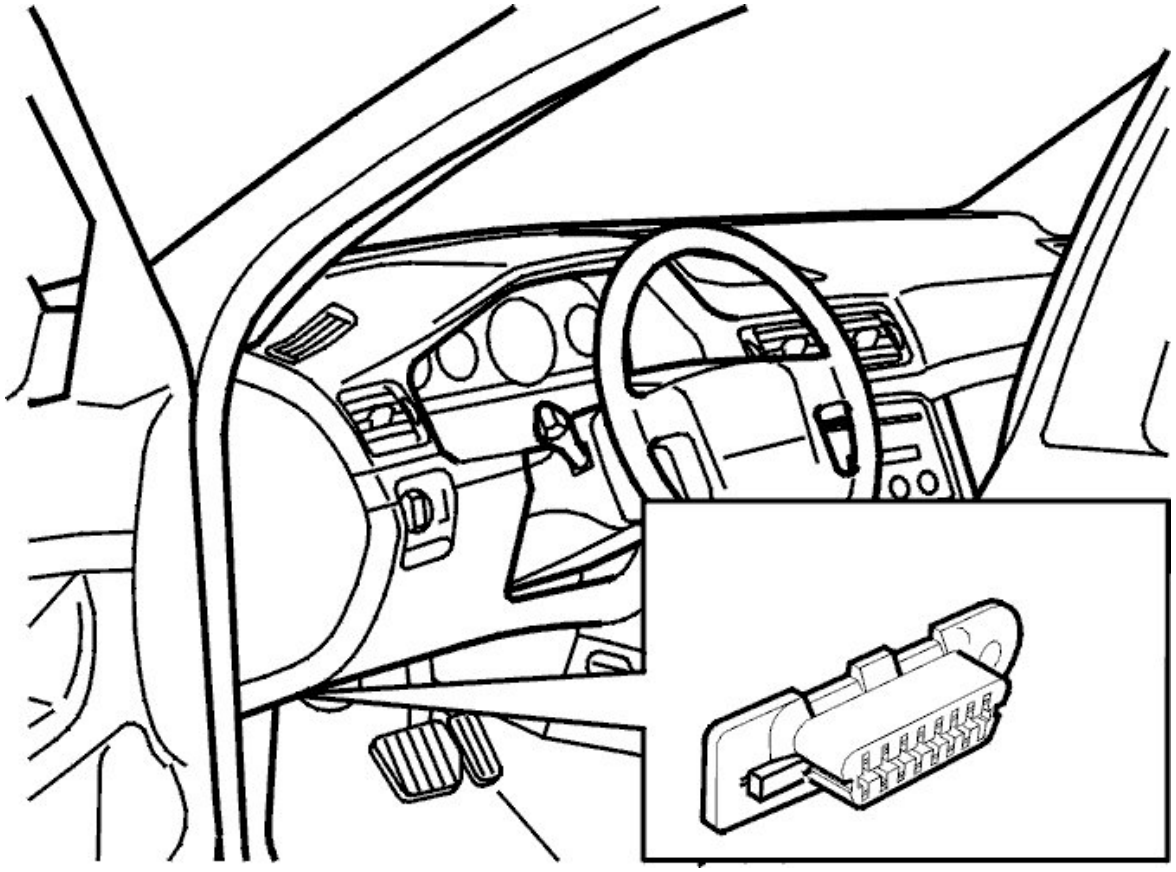
Check that no diagnostic trouble codes have been stored during the repair.
Test drive the car. Check the function of the engine.

Data Link Connector: Service and Repair

Data link connector (DLC), replacing

Removal

Data link connector (DLC) without bracket



- Disconnect the catch using a screwdriver
- Pull out the data link connector (DLC).

Data link connector (DLC) with bracket

- Remove the screws (2) for the bracket
- Disconnect the catch using a screwdriver
- Pull out the data link connector (DLC).

Installation

Data link connector (DLC) with bracket

In reverse order.

Data link connector (DLC) without bracket

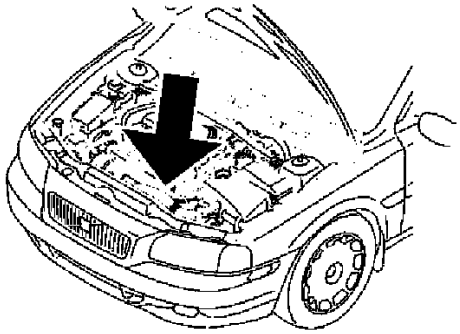
In reverse order.

Electronic Throttle Control Module: Service and Repair

Throttle body (electronic throttle module (ETM)), replacing

Note: The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removal
Preparation
Remove:



- the air intake between the front cover plate and the air cleaner (ACL) housing
- the charge air pipe between the charge air cooler (CAC) and the electronic throttle module (ETM).

Removing the electronic throttle module (ETM)

Disconnect the connector for the electronic throttle module.

Remove the 4 x screws for the electronic throttle module (ETM). Lift out the electronic throttle module (ETM). Discard the gasket.

Installation

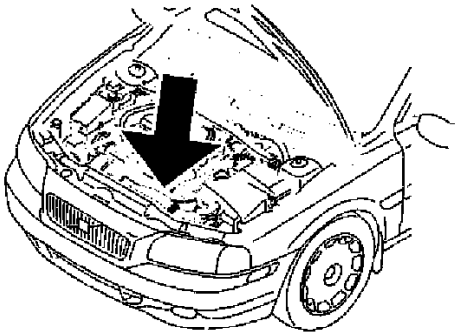
Note: For tightening torques, see Specifications.

Replacing the electronic throttle module (ETM)

Caution: Ensure that the surfaces between the throttle body (TB) and the intake manifold are clean. Install a new electronic throttle module (ETM).

Use a new gasket. Tighten the 4 screws.

Installing components



Install the charge air pipe between the electronic throttle module (ETM) and the charge air cooler (CAC).

Note: Heat the pipe at the connections to facilitate installation.

Install the intake pipe between the front cover plate and the air cleaner (ACL) housing.

Finishing

After replacing the electronic throttle module (ETM), the electronic throttle module (ETM) must be adapted using the vehicle communication input: "Adaptation of the electronic throttle unit"

Start the engine and check the function.

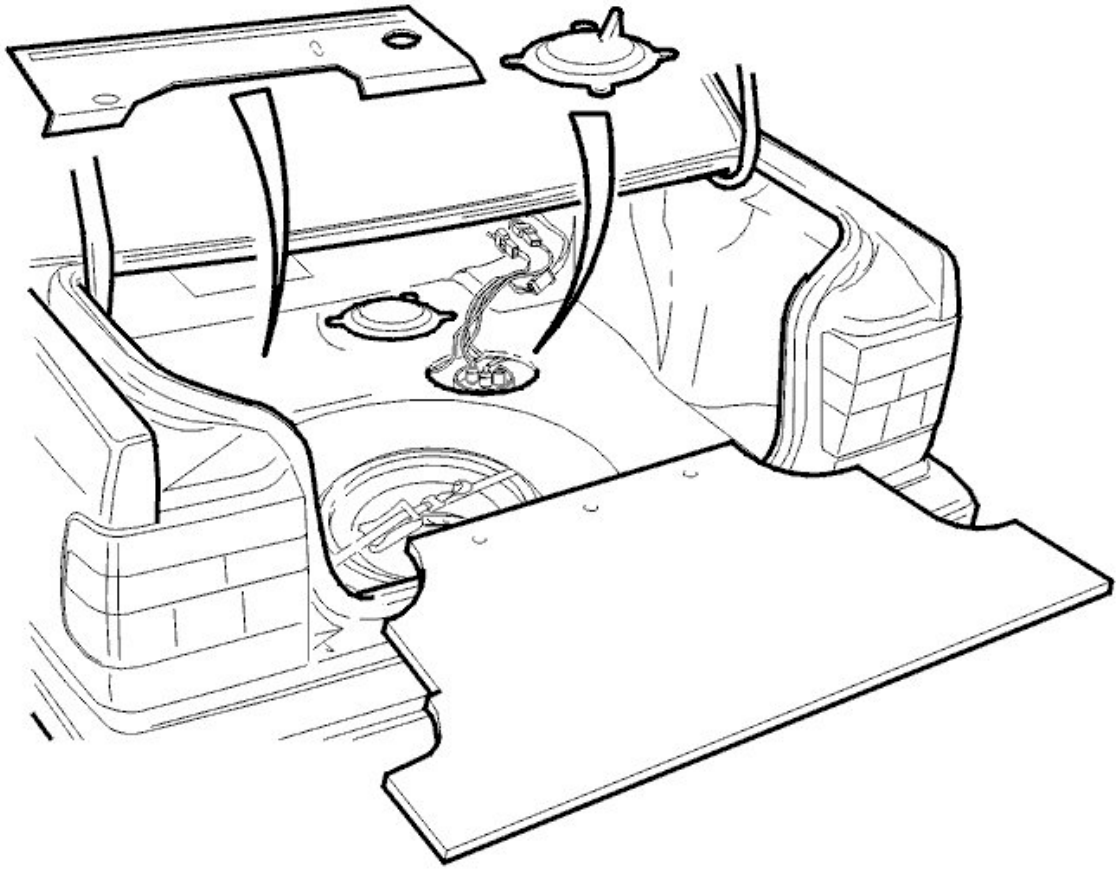
Fuel Tank Pressure Sensor: Service and Repair

Replacing fuel tank pressure sensor

Special tools:

999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture

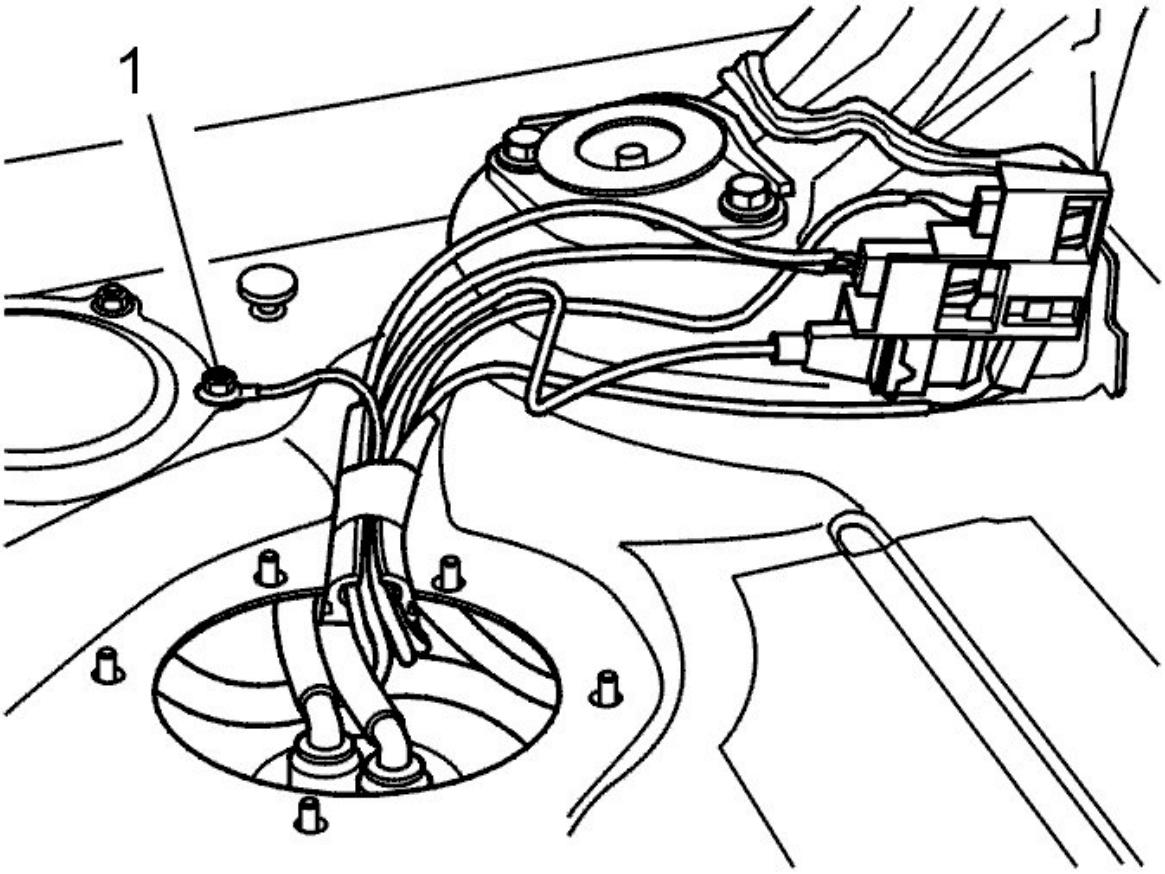
Preparations



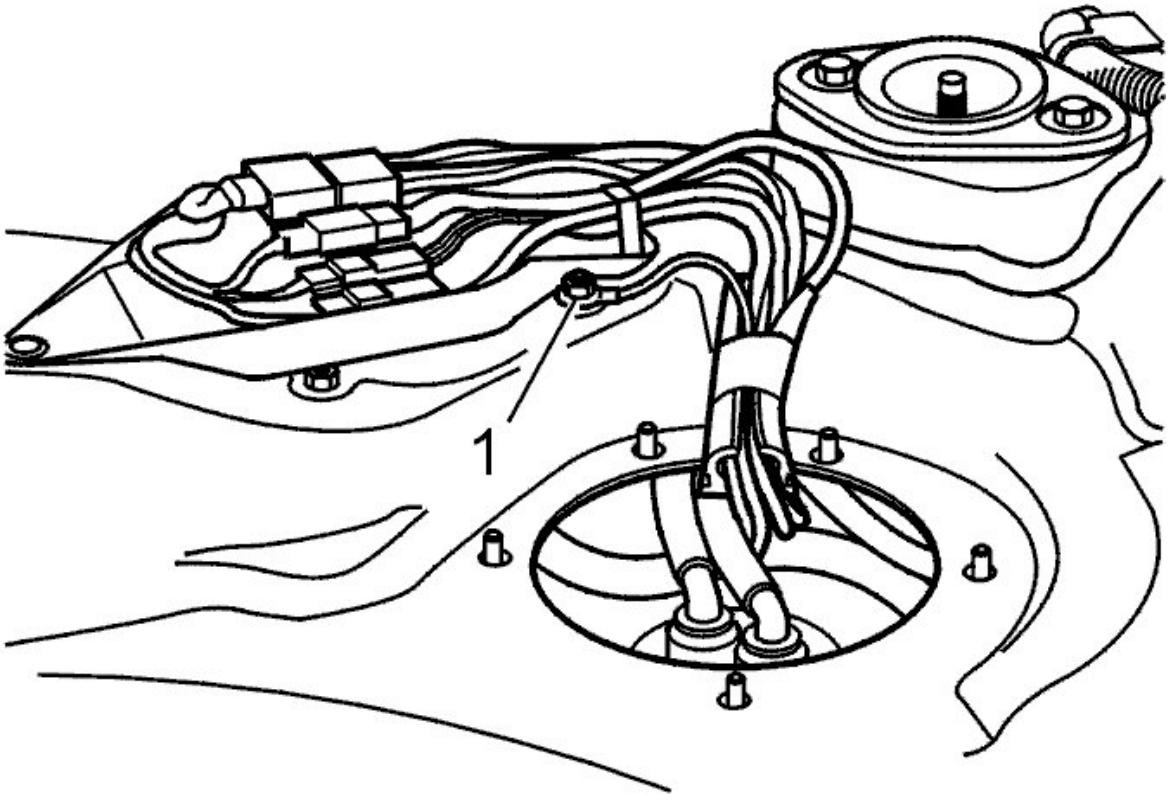
5-door cars:
- Remove all floor hatches and fold back carpet.
- Remove cover over fuel pump (FP) unit.

4-door cars:
- Fold forward right rear seat
- Remove cargo compartment carpet.
- Fold back corner of wheel housing panel at shock absorber mounting.
- Remove cover over fuel pump (FP) unit.

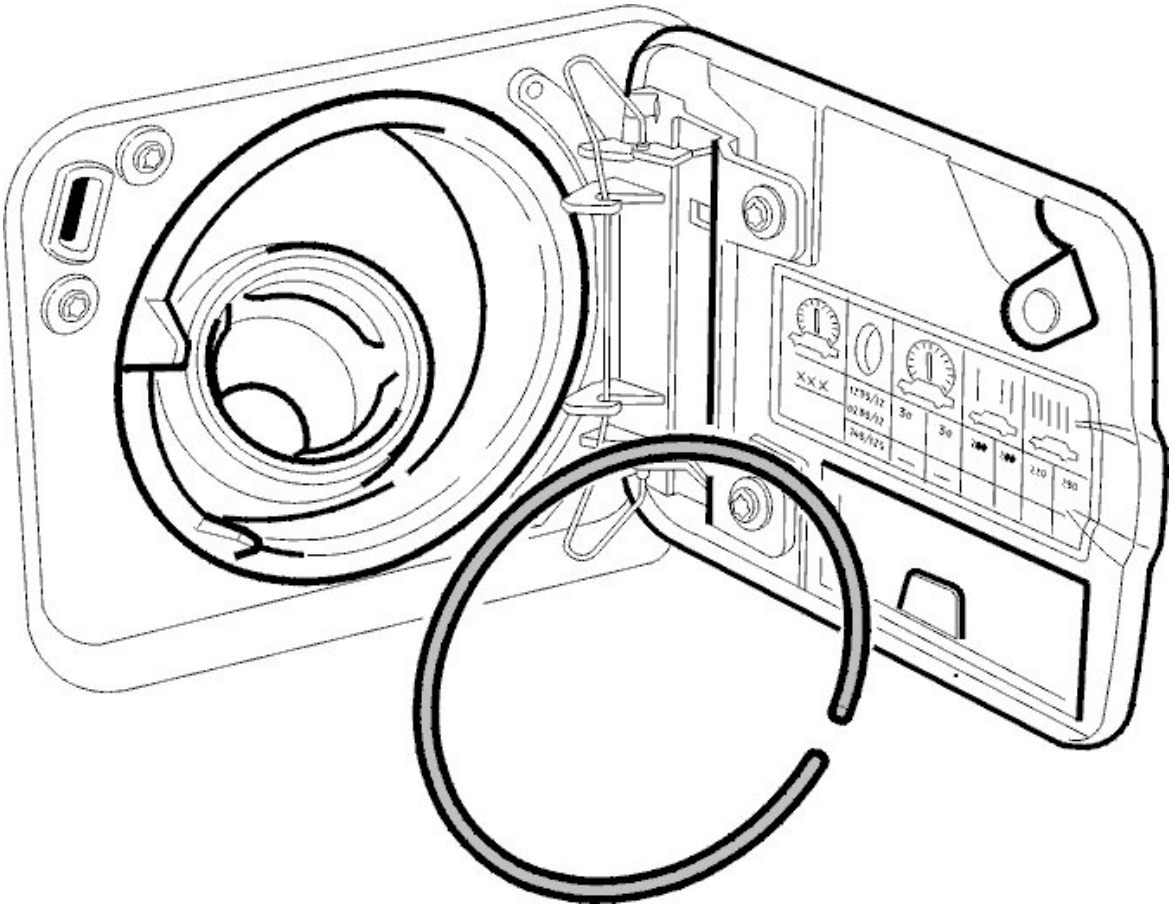
Disconnect connectors



- Disconnect all connectors on the bracket.
- Remove rubber bracket around wiring.
- Remove fuel filler pipe ground lead from nut on fuel tank level sensor cover.
- Ensure that all cables routed through the fuel pump (FP) unit hole are free to follow the fuel tank when it is lowered.

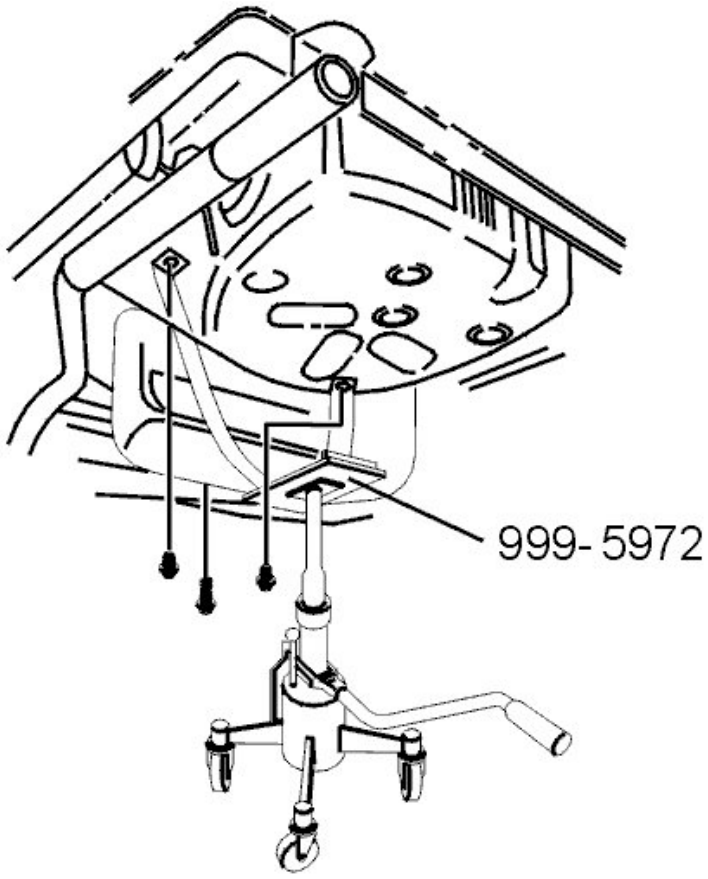


Remove fuel filler pipe



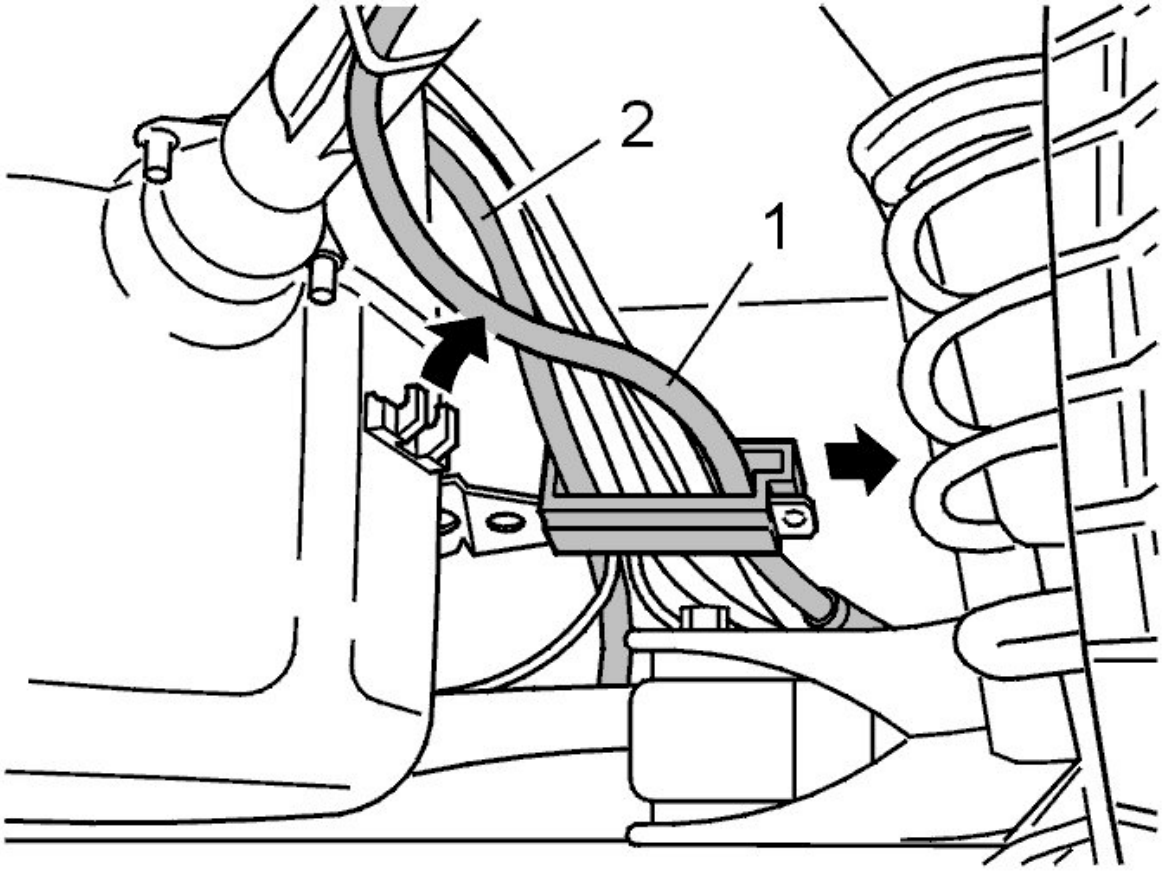
- Remove circlip securing rubber seal.
- Release rubber seal from bodywork.

Remove fuel tank



- Position mobile jack with fixture999 5972 FIXTURE See: Tools and Equipment/999 5972 Fixture under fuel tank, check that the lifting platform is flat so as not to damage the fuel tank.
- Undo tank retaining straps and lower tank slightly.

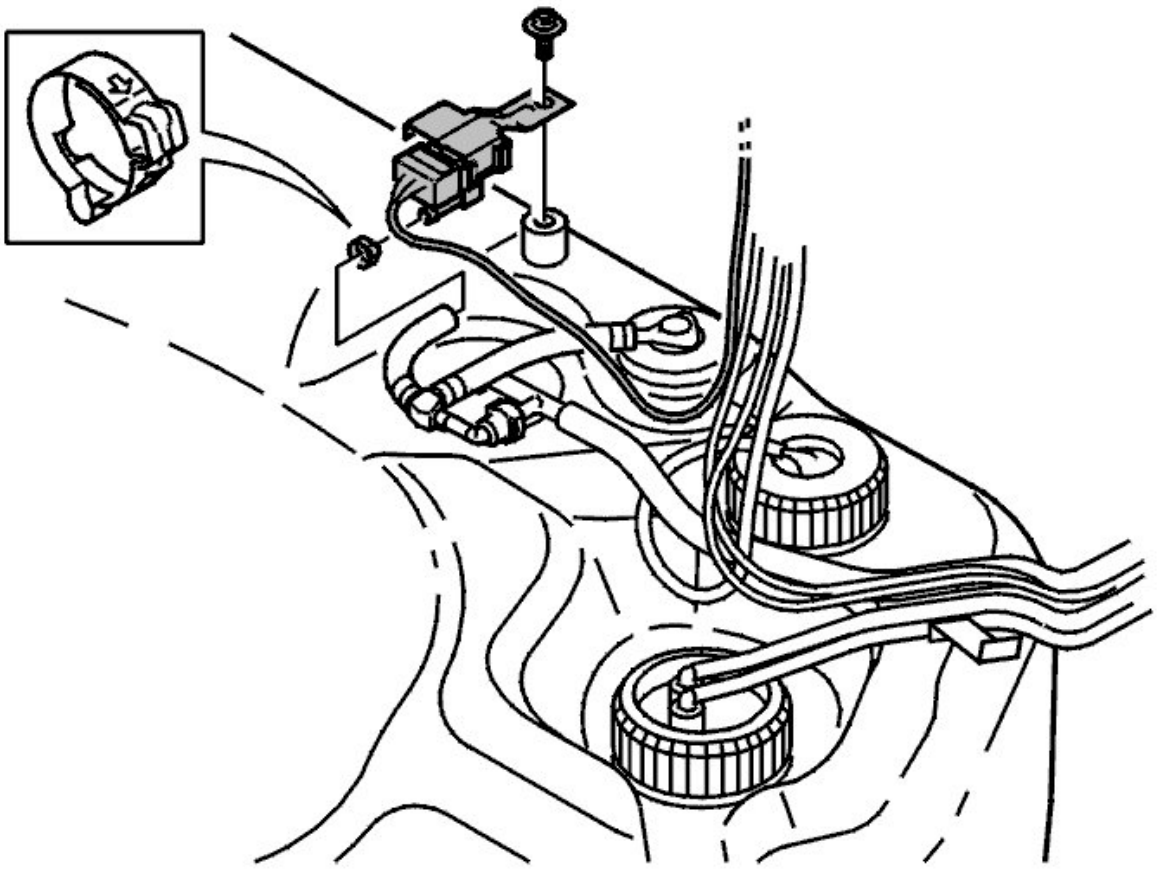
Remove front holder

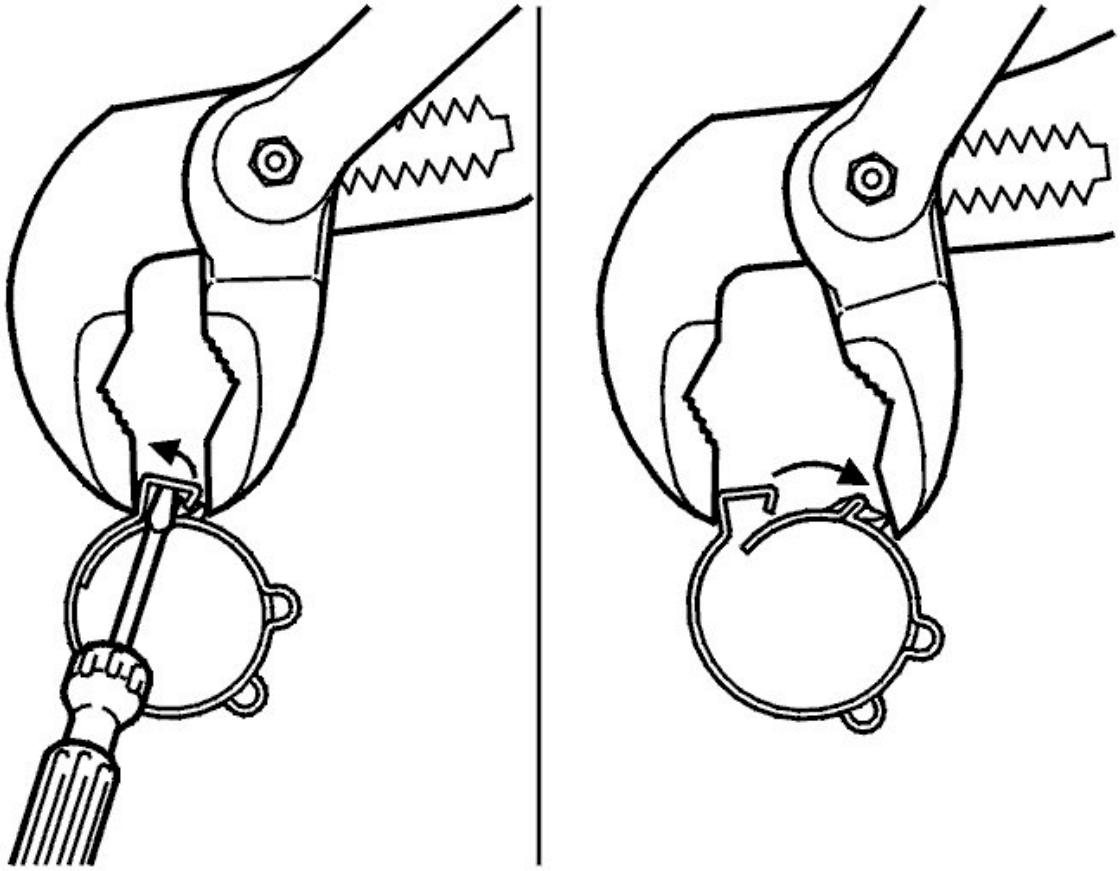


- Remove the entire mounting from the bracket by pulling it towards the right of the car.
- Disconnect the hose between the EVAP canister shut-off valve and air cleaner (ACL) from the clamp on the fuel tank.

Hint: Note position of hose in the clamp in case it opens. The hoses must be reinstalled in their original positions.

Replacing fuel tank pressure sensor





- Remove the screw
- Remove clamp

Note! The clamp will be reused

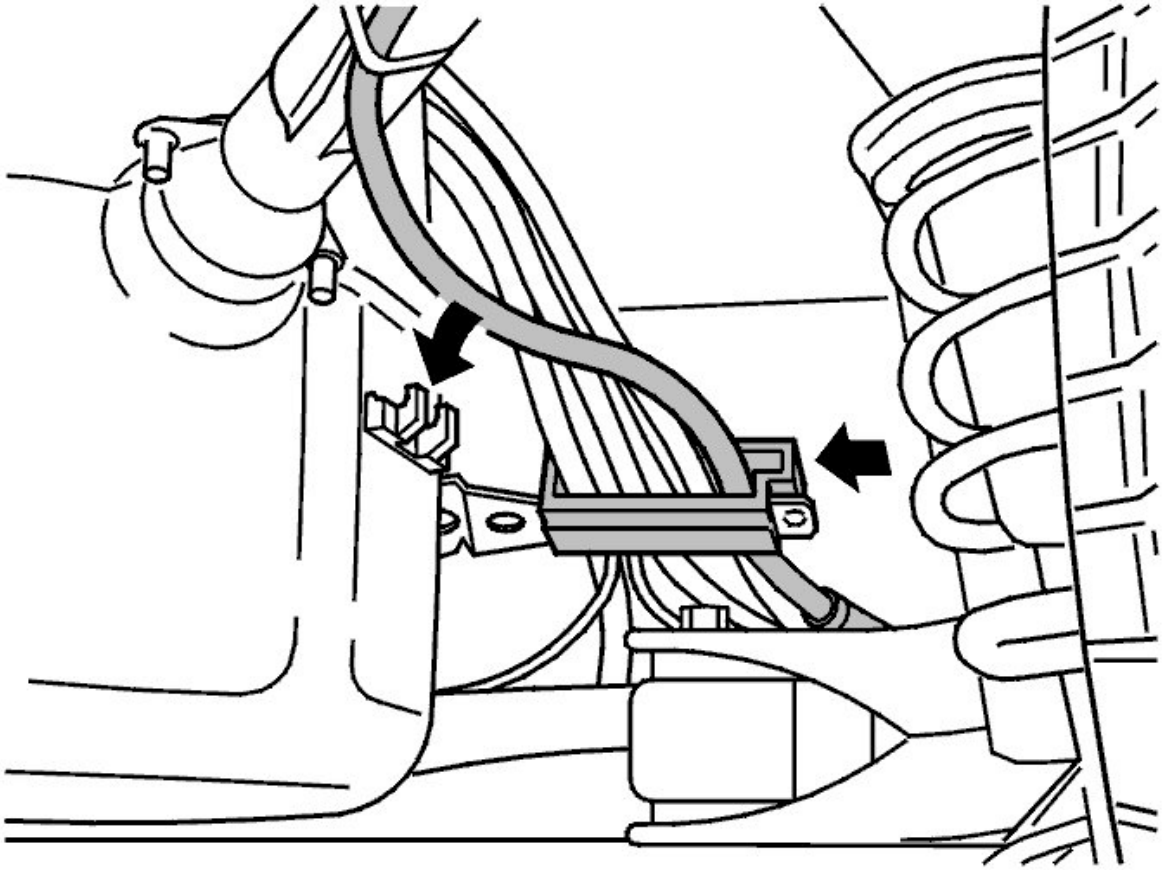
Removing clamp:
- squeeze clamp with a pipe wrench. Hold in place
- pry apart with a small screwdriver.

Note! It is reusable.

- Disconnect hose.
- Remove cable harness.
- Install the new pressure sensor, route cabling as before.

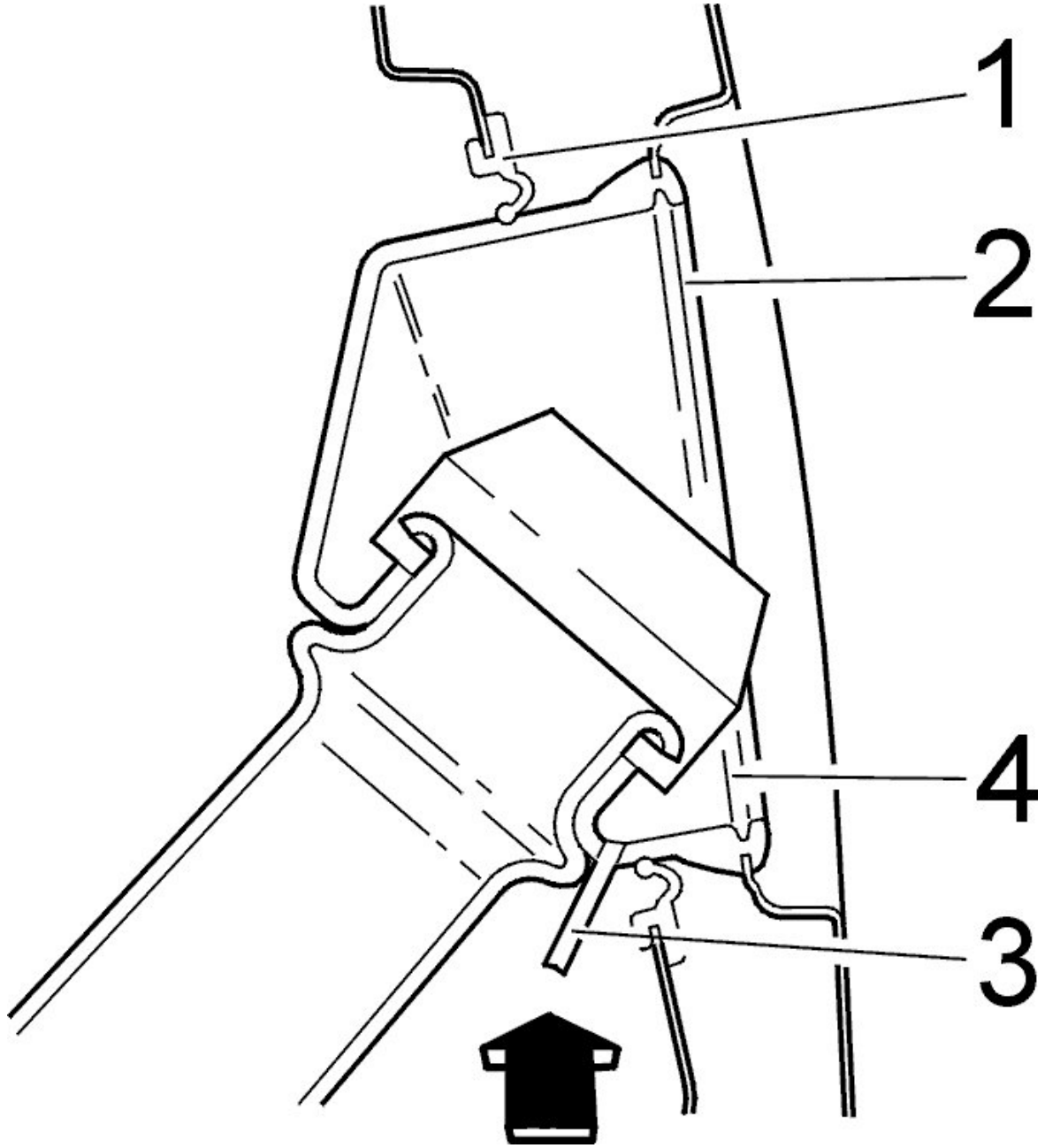
Installing clamp:
- Press in the clamp with a pipe wrench until it locks.

Installing fuel tank



- Raise the fuel tank so that the front holder can be installed to the bracket by pressing it until it locks into place.
- Ensure that cabling routed through the fuel pump (FP) unit hole will not be trapped when the fuel tank is installed.
- Raise the fuel tank and fix it to the bodywork.
- Install EVAP canister shut-off valve hose in the clamp on the fuel tank.

Installing rubber cover on fuel filler pipe



- Check that the inner rubber seal is correctly seated and that the drain pipe is inside the inner seal.
- Check that circlip (1) is in position.
- Lubricate rubber cover sealing surfaces (2) with petroleum jelly.
- Install rubber cover (ensure that it is correctly positioned in relation to bodywork).
- Install circlip (4) and drain pipe (3).
- Connect all connectors and install fuel filler pipe ground lead.
- Install rubber bracket around wiring.
- Install panels, covers and carpets.

Fuel Pressure Sensor: Service and Repair

Fuel pressure sensor

Operation number: 28406-3

Note! Some variation in the illustrations may occur, but the essential information is always correct.

Materials:	
Designation	**Part number**
Lubricant	1161580

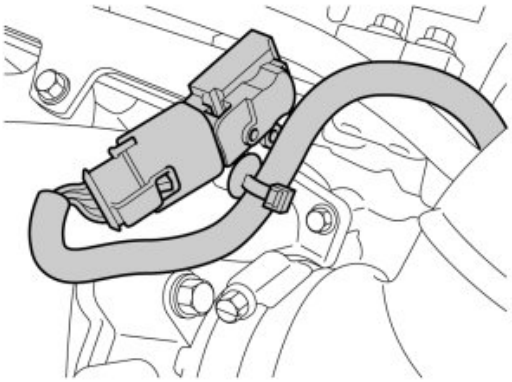
Removal

Note! Removal steps in this procedure may contain installation details.

Work on the fuel system. Refer to: Safety regulations for handling fuel See: Fuel Delivery and Air Induction/Service Precautions/Safety Regulations for Handling Fuel

Depressurize the fuel system. Refer to: Fuel system pressure release See: Fuel Delivery and Air Induction/Fuel Filter/Fuel Pressure Release/Service and Repair

Warning! Wear protective goggles.

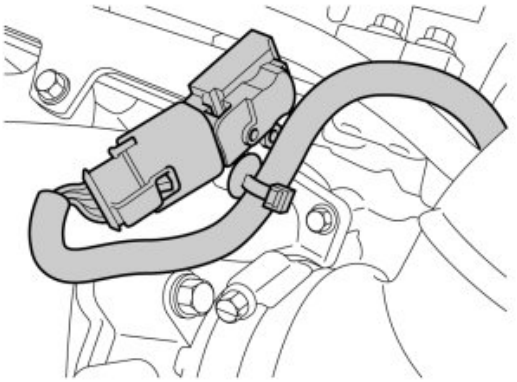


Blow clean with compressed air around the fuel pressure sensor.

Remove the following items:
- cable tie
- Connector
- screw.

Place paper under the fuel pressure sensor to take care of any petrol that may remain in the fuel distribution pipe.
Cut out the bottom of a plastic bottle and place on the paper.
Remove the fuel pressure sensor.

Installation



Lubricate the O-ring on the new fuel pressure sensor.
Use: Lubricant, 1161580

Install the following items:
- the fuel pressure sensor
- screw**Torque:** M5, 5 Nm

- cable tie
- the connector
- cable in the cable tie.

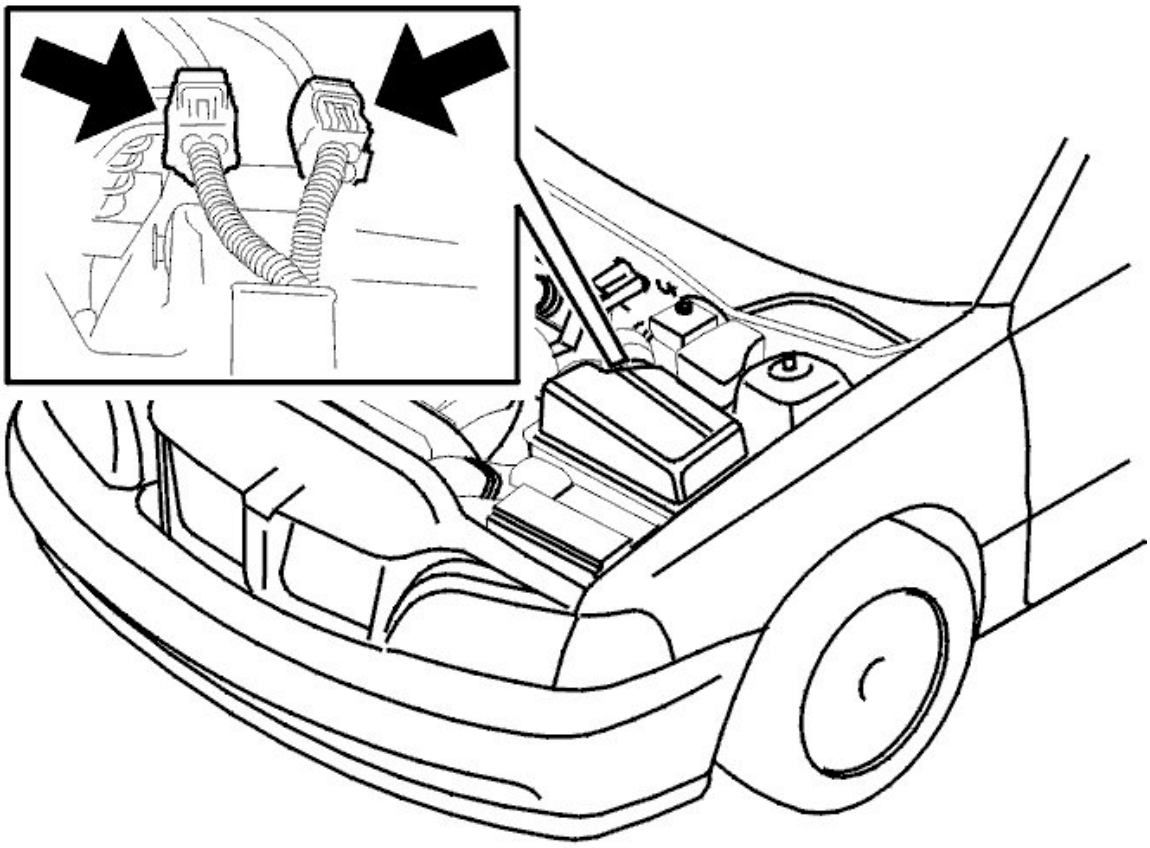
Start the engine and check that there are no leaks.

Oxygen Sensor: Service and Repair
Adapter Wiring Switch, Replacing

Adapter wiring switch, replacing

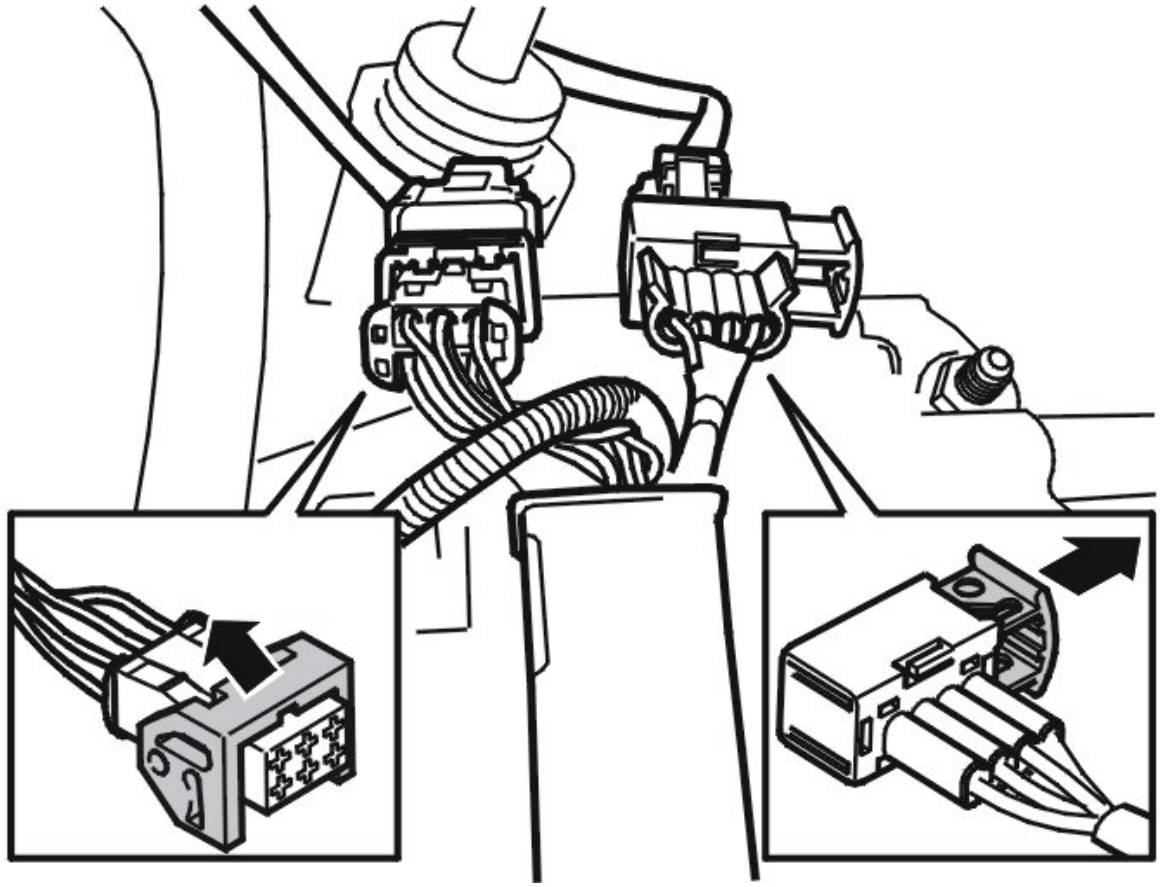
Removal and Installation

Removing heated oxygen sensors (HO2S)



The connectors for the heated oxygen sensors (HO2S) are on the transmission.

Preparations

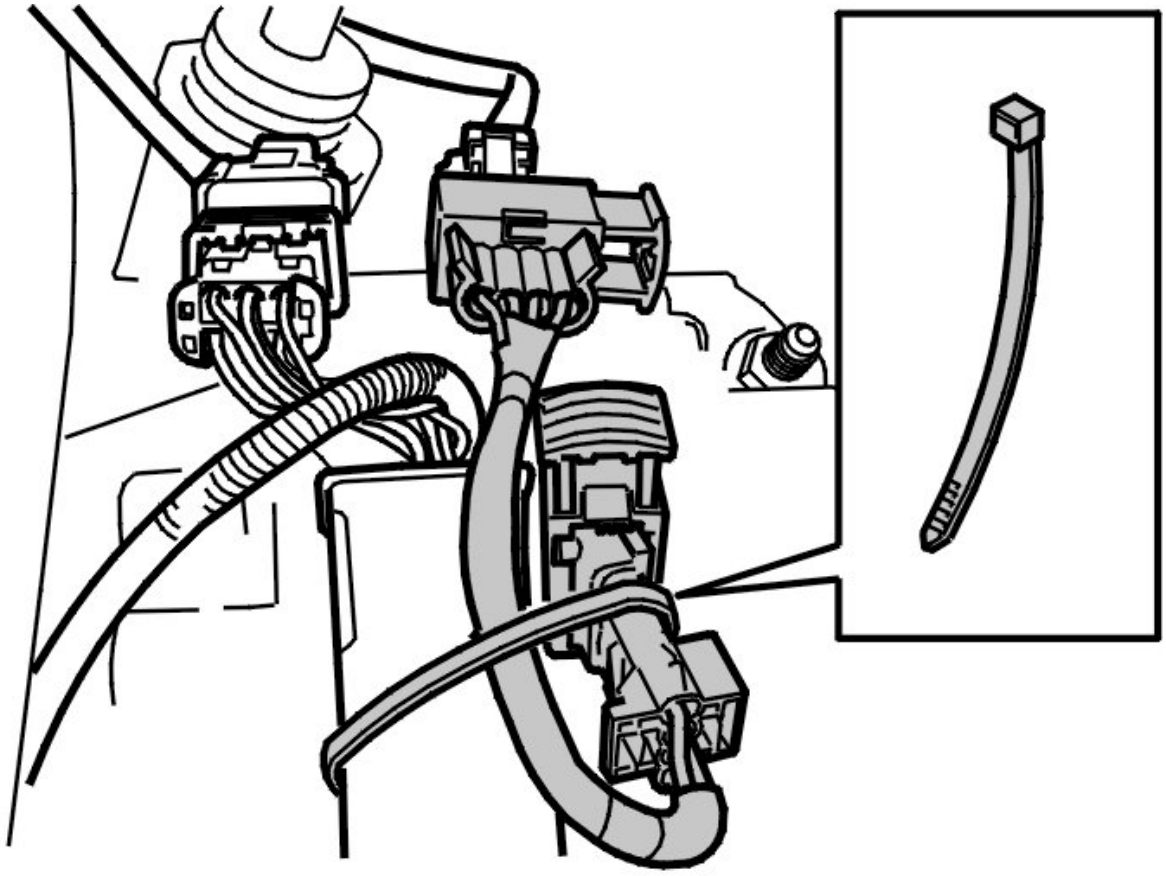


Switch off the ignition.
Remove the air cleaner (ACL) housing.
Detach the inlet hose between the air cleaner (ACL) and the turbocharger (TC) from the turbocharger (TC).
Open the catches and disconnect both the connectors for the heated oxygen sensors (HO2S).

Heated oxygen sensors (HO2S), removing

See Heated oxygen sensor (HO2S), replacing See: Heated Oxygen Sensor (HO2S), Replacing.

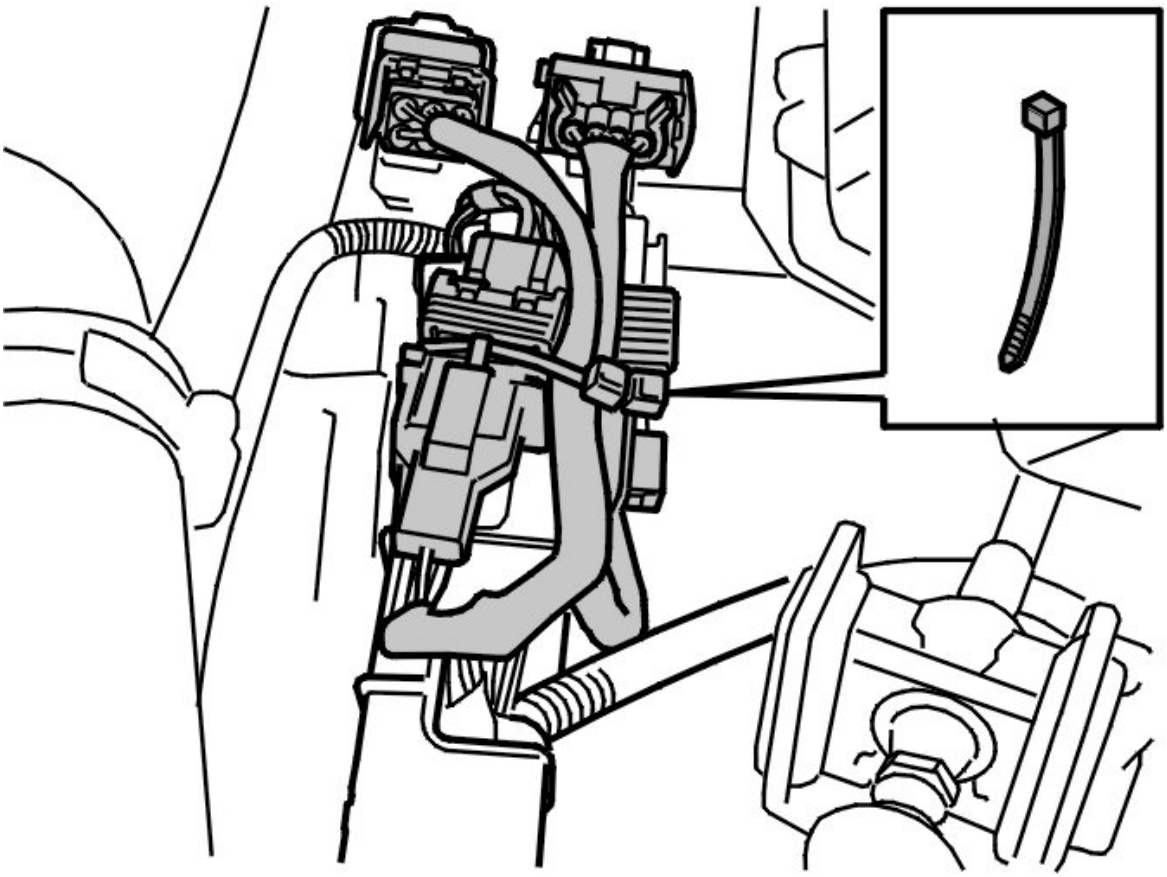
Installing the adapter cable



Note! Ensure that the ends of the protective sheath on the adapter cable point downwards so that water does not gather in the protective sheath.

Install:

- the adapter cable between the existing 4-pin connectors
- a tie strap as illustrated.



Install the adapter wiring between the existing 6-pin connectors.

Note! Ensure that the ends of the protective sheath on the adapter cable point downwards so that water does not gather in the protective

sheath.

Install:

- the inlet hose between the air cleaner (ACL) and turbocharger (TC) on the turbocharger (TC)
- the air cleaner (ACL) housing.

Oxygen Sensor: Service and Repair
Heated Oxygen Sensor (HO2S), Replacing

Heated oxygen sensor (HO2S), replacing

Special tools:

999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S

Removal and Installation

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Removing the front heated oxygen sensor (HO2S)

Remove the heated oxygen sensor (HO2S) wiring from the clips and clamps.
Separate the wiring.
Raise the car

Remove:
- the lower engine cover
- the heated oxygen sensor (HO2S). Use tool 999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S.

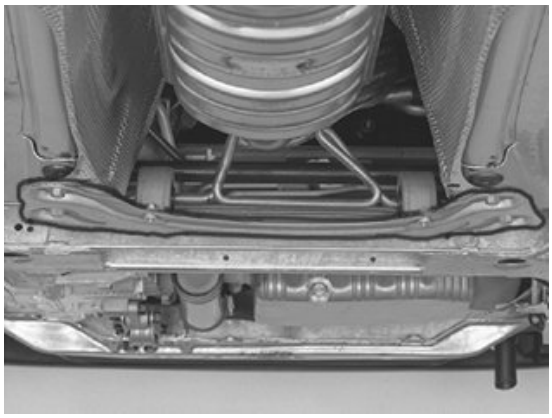
Installing the front heated oxygen sensor (HO2S)

For tightening torques, see: Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque

Install:
- the front heated oxygen sensor (HO2S). Tighten to **45 Nm**. Use tool 999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S
- the lower engine cover. Lower the car
- the wiring for the heated oxygen sensor (HO2S) using clips and clamps. Connect the wiring.

Removal and Installation

Removing the rear heated oxygen sensor (HO2S)



Raise the car.

Remove:
- the lower engine cover
- the front SIPS member. Unhook the brake pipe from the clips
- unhook the three-way catalytic converter (TWC) from the rubber mountings
- the nuts between the three-way catalytic converter (TWC) and exhaust system. Unhooks the three-way catalytic converter (TWC)
- the wiring for the heated oxygen sensor (HO2S) from the clips and clamps. Disconnect the wiring
- the rear probe. Use tool 999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543 Socket NV-22 HO2S.

Installing the rear probe

Note! For tightening torques, see Tightening torque See: Engine, Cooling and Exhaust/Engine/Specifications/Tightening Torque.

Install:
- the rear heated oxygen sensor (HO2S). Tighten to **45 Nm**. Use tool 999 5543 SOCKET NV-22 HO2S See: Tools and Equipment/999 5543

Socket NV-22 HO2S

- the wiring for the heated oxygen sensor (HO2S) in clips and clamps. Connect the wiring
- a new gasket and new nuts at the join between the three-way catalytic converter (TWC) and the exhaust system. Tighten to **24 Nm**
- the rubber mounting for the three-way catalytic converter (TWC)
- the front SIPS member. Press the brake pipe into place in the member
- the lower engine cover.

Erase Diagnostic Trouble Codes (DTCs).

Reset trim.

Transmission Position Switch/Sensor: Adjustments

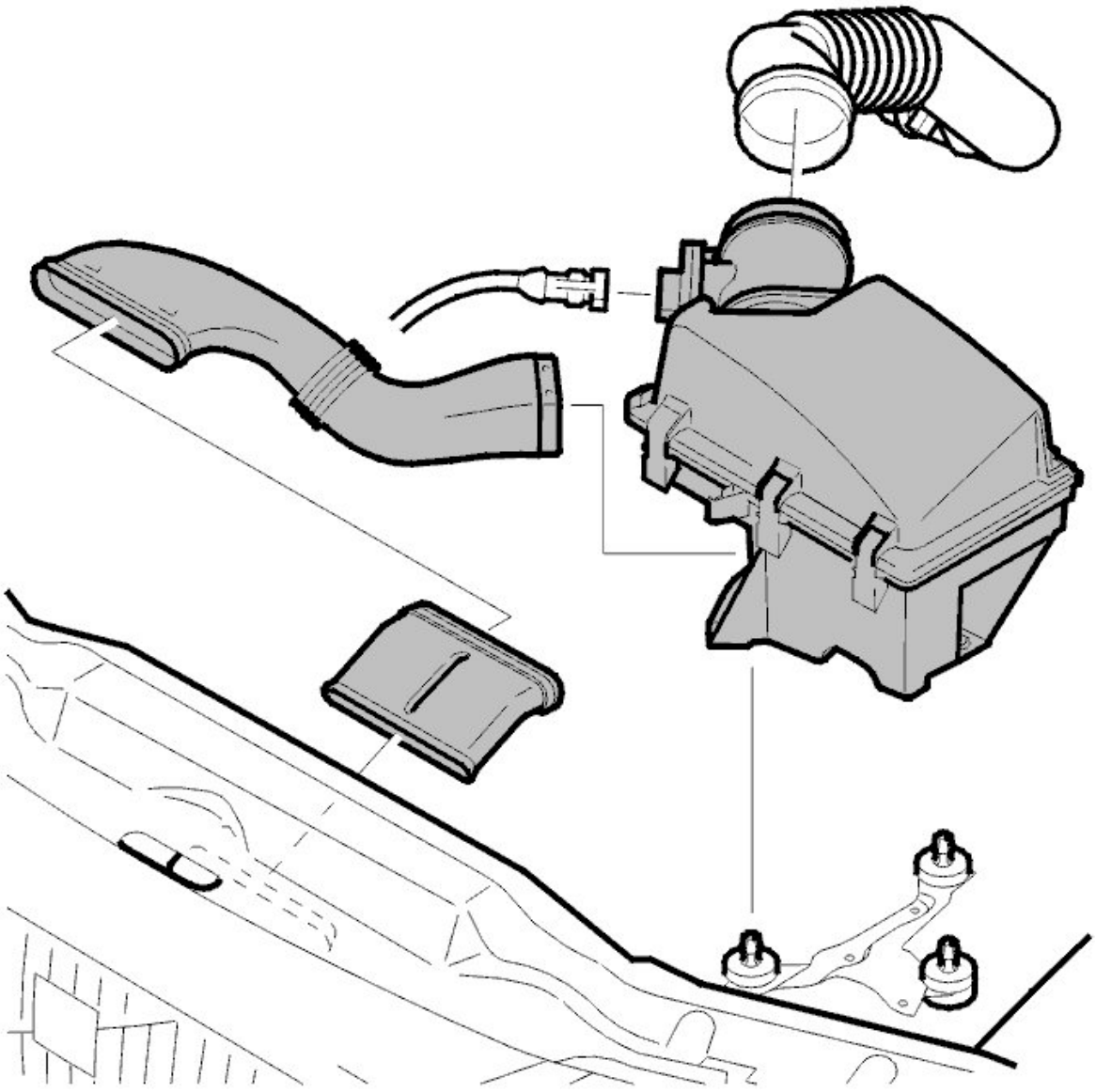
Gear-shift position sensor, checking/adjusting

Special tools:

999 5475 GAUGE See: Tools and Equipment/999 5475 Gauge
999 7077 Jimmy bar See: Tools and Equipment/999 7077 Jimmy Bar

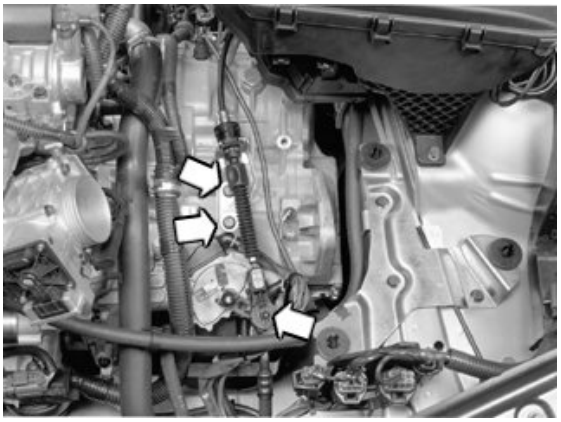
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removing the air cleaner (ACL) housing

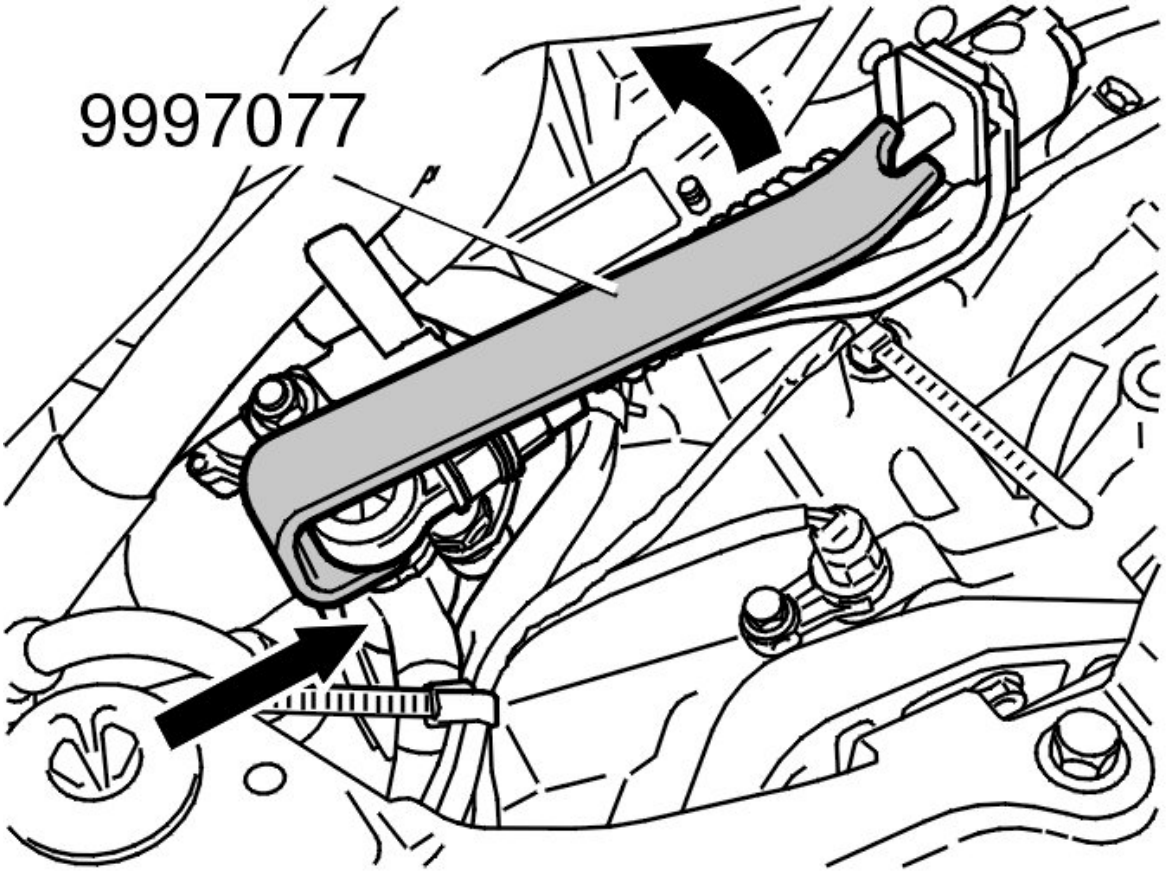


Remove the air cleaner housing ACL assembly with the intake pipe.

Removing the gear selector cable

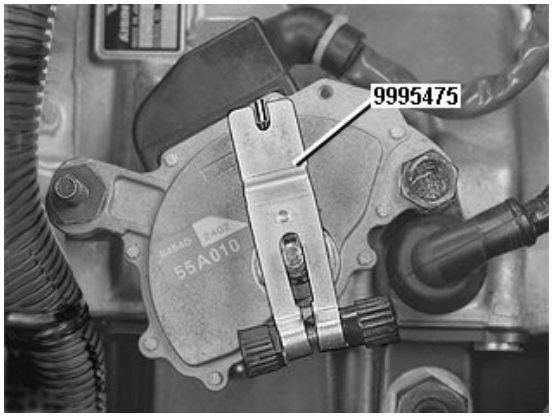


Remove the screws from the bracket for the gear selector cables.



Detach the cable from the lever. Use special tool 999 7077 Jimmy bar See: Tools and Equipment/999 7077 Jimmy Bar.
Remove the cable from the bracket.
Move the cable to one side.

Checking the setting

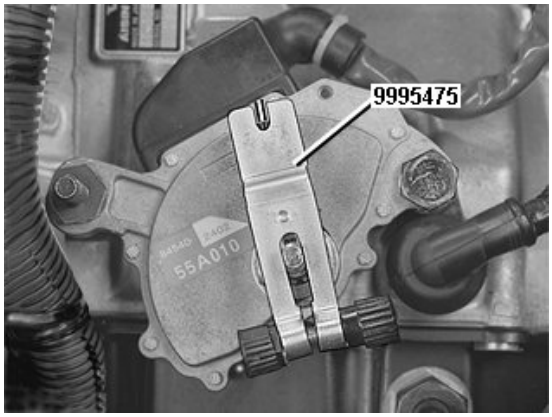


Note! When adjusting the gear-shift position sensor, press the tool down to the flat surfaces below the thread on the shaft.

Remove the lever. Install adjustment tool 999 5475 GAUGE See: Tools and Equipment/999 5475 Gauge on the gear shift linkage rod. Check that

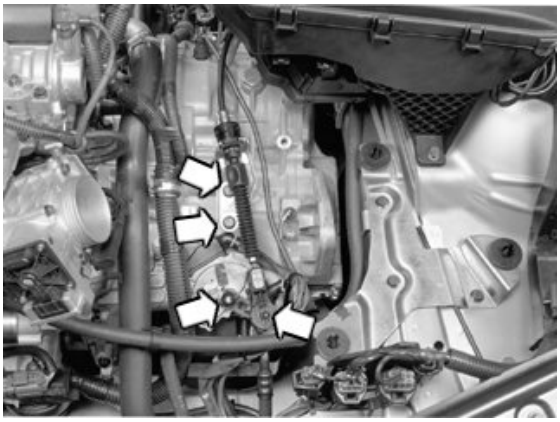
the shaft is in the N position. The groove on the tool must align with the marking on the gear position sensor.
If adjustment is required, see the following procedure in this section.

Adjusting the gear-shift position sensor



Remove the nut for the cable duct. Lift the cable duct away from the screw.
Slacken off the screws for the gear-shift position sensor.
Rotate the gear position sensor so that the mark on the switch aligns with the groove on the tool. Tighten the screws for the sensor. Tighten to **25 Nm**.
Remove the adjustment tool.

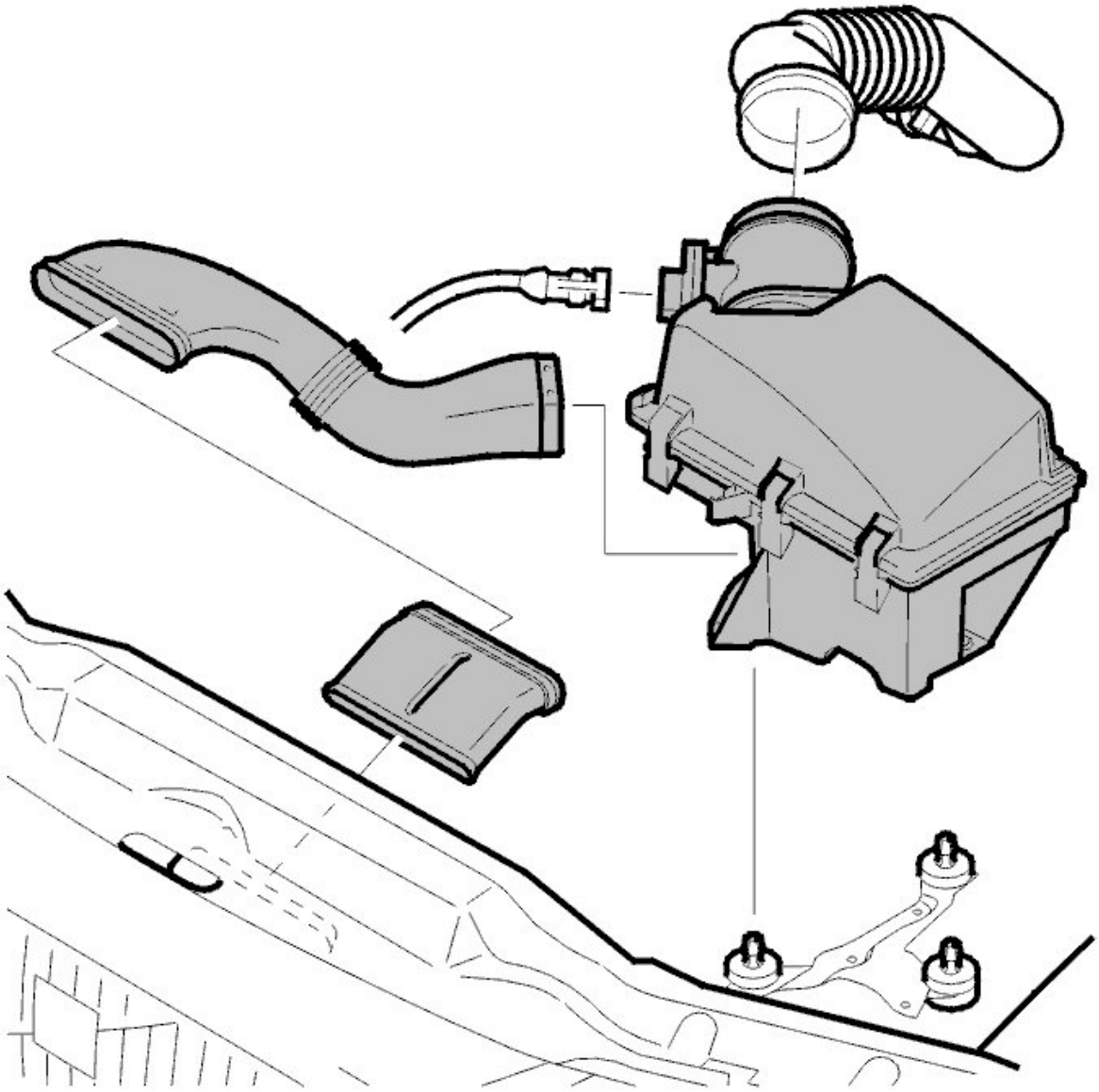
Installing the lever and gear selector cable



Install:

- the lever on the gear shift linkage rod. Tighten to **16 Nm**
- the cable on the lever
- the screws for the bracket. Tighten to **25 Nm**.

Installing the air cleaner (ACL) housing



Install the air cleaner housing (ACL) assembly with the intake pipe and connector.

Checking diagnostic trouble codes (DTCs)

Check and erase any diagnostic trouble codes (DTCs).
Check the gear-shift position sensor positions: Use the on-board diagnostic (OBD) system.

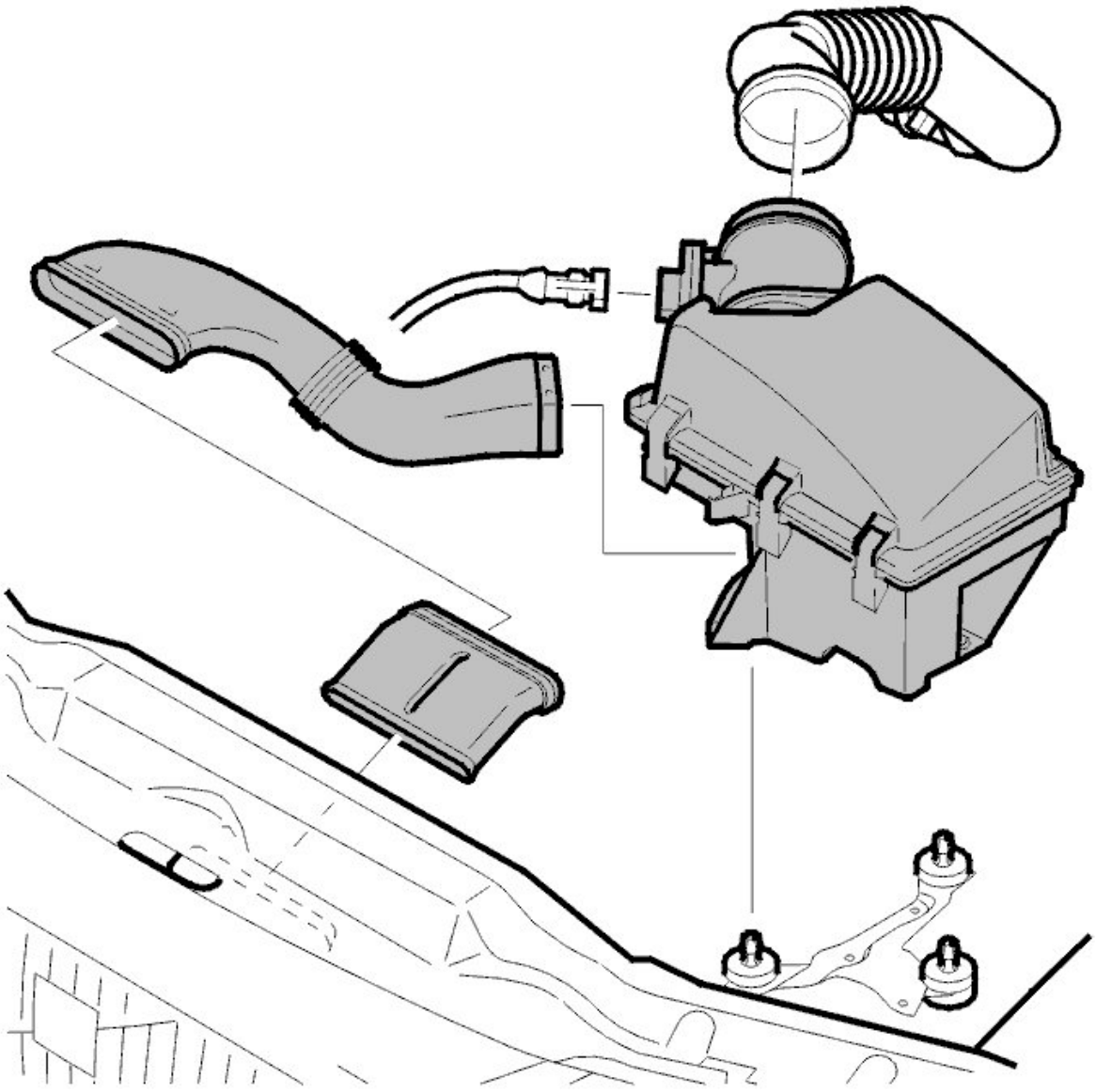
Transmission Position Switch/Sensor: Service and Repair

Replacing the gear-shift position sensor

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information is always correct.

Removal

Removing the air cleaner (ACL) housing



Ignition off.
Remove the air cleaner housing ACL assembly with the intake pipe.

Removing the gear selector cable and connector

Remove the gear selector from the lever and the cable mounting from the transmission.
Unhook the mounting with the connector for the transmission from the bracket for the air cleaner (ACL) housing.
Remove the tie straps for the cable harness and the mounting in the cover for the control system.
Separate the connector for the gear-shift position sensor. Remove the gear-shift position sensor from the mounting.

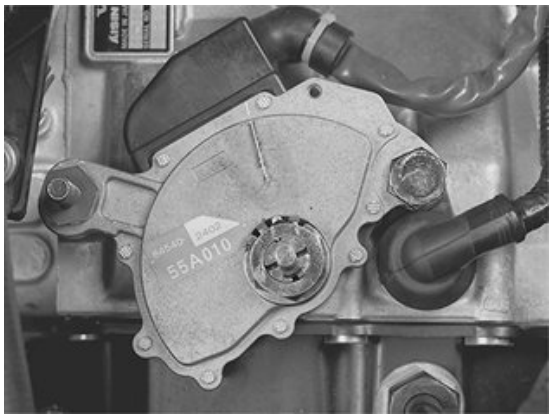
Removing the gear-shift position sensor

Remove:

- the lever for the gear shift linkage rod
- the nut, locking washer and rubber seal securing the gear-shift position sensor to the gear shift linkage rod
- the 2 screws
- the gear-shift position sensor.

Installation

Installing the gear-shift position sensor



Install:

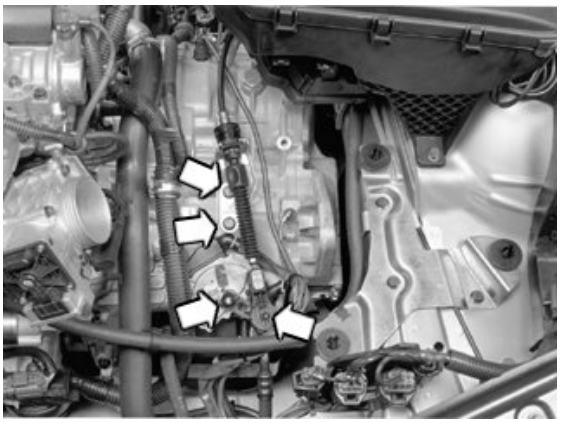
- the sensor. Lightly tighten the 2 screws
- the rubber washer, the lock washer and the nut on the sensor.

Tighten the nut. Lock the nut with the locking washer.

Adjusting the gear-shift position sensor

Adjust the gear-shift position sensor according to adjustments.

Installing the lever and the gear-shift position sensor

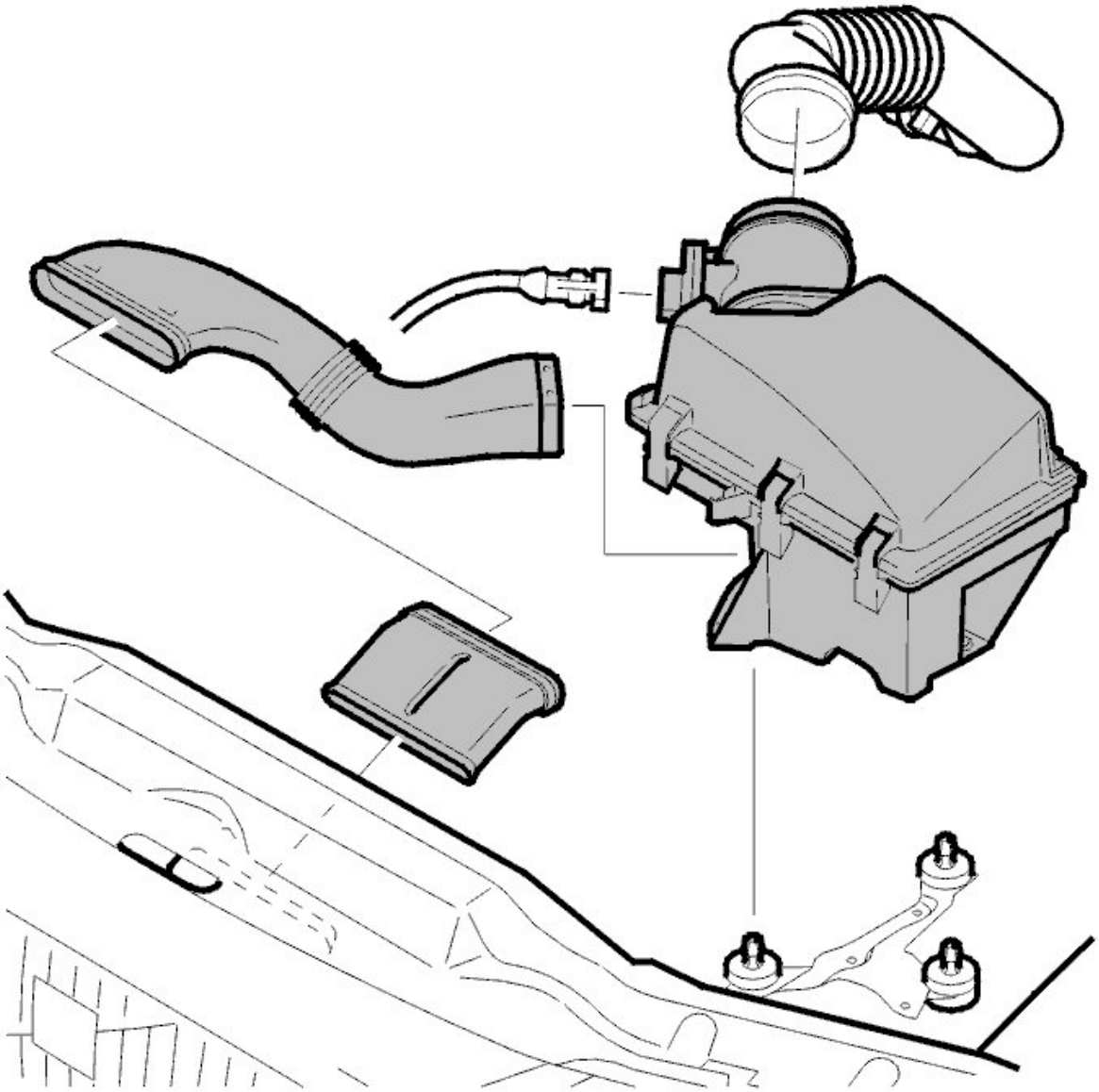


Install:

- the lever for the gear shift linkage rod. Tighten the nut. Tighten to **16 Nm**
- the gear selector cable on the lever and transmission. Tighten to **25 Nm**
- the connector for the gear-shift position sensor on the mounting. Connect the connector.

Assemble the cable harness with tie straps.
Press the mounting for the cable harness into place in the cover for the control system. Install the mounting for the connectors on the bracket.

Installing the air cleaner (ACL) housing



Install the air cleaner (ACL) housing with connections.

Checking diagnostic trouble codes (DTCs)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Check and erase any diagnostic trouble codes (DTCs).

Vehicle: Specifications

System Specifications

Component specifications

The component specification gives the value of the component when the connector is disconnected. Where no value is given, it is not possible to measure a relevant value at the component.
The figure within the brackets indicates the terminal pin on the component to which the value refers.

Designation	Type	Supply voltage	Value	Other
Active yaw control sensor	CAN node with integrated yaw rate sensor, lateral accelerometer and accelerometer (AWD only)	12 V (#3-#5)	Yaw rate sensor: °/s Lateral accelerometer: m/s^2 Accelerometer: m/s^2	The active yaw control sensor either contains two (2WD) or three (AWD) sensors and is connected to the brake control module with its own CAN lead.
Brake pressure sensor 1 & 2	Pressure switch (Pressostat)	5 V (#1-#3)	Operating range 0-170 bar 21 bar when brake pedal is not depressed	-
Pressure build-up valve	Electro magnetically controlled valve	12 V	Pulse width modulated (PWM) signal	-
Wheel sensor	Hall sensor	12 V	Tooth against sensor: I≈ 14mA U≈9V Cover against sensor: I≈7 mA U≈1V below Ubat	-
Pedal pressure sensor	Two position switch	12 V (#2-#5) NO (#1-#5) NC	NO=Normally open NC=Normally closed	-
Pedal position sensor	Slide potentiometer	12 V	0 mm: ≈ 0 V 38.5 mm: ≈ 95 % of Ubat	-

Braking Sensor/Switch

Component specifications

- Mass air flow (MAF) sensor
- Air pressure sensor intake manifold (MAP)
- Engine coolant temperature (ECT) sensor
- Intake air temperature (IAT) sensor inlet
- A/C pressure sensor
- Air conditioning (A/C) pressostat
- Sensor for fuel pressure and fuel temperature (only for vehicles with demand-controlled fuel pump)
- Clutch pedal sensor
- Brake pedal sensor
- Impulse sensor
- Knock sensor

System Specifications

Component specifications

The component specification gives the value of the component when the connector is disconnected. Where no value is given, it is not possible to measure a relevant value at the component.

The figure within the brackets indicates the terminal pin on the component to which the value refers.

Designation	Type	Supply voltage	Value	Other
Air conditioning (A/C) relay	Mechanical relay	12V (#1)	Approximately 96 Ω (coil)	
A/C pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Stop lamp switch	Position switch	12 V (#1)	The switch is closed when the pedal is depressed (terminals #1-#5)	
Fuel pump (FP) relay	Mechanical relay	-	Approximately 96 Ω (coil)	The relay is controlled by the central electronic module (CEM)
Fuel temperature sensor	NTC resistor	5V (#3)	5896 Ω at 0°C 3792 Ω at 10°C 2500Ω at 20°C 1707Ω at 30°C 1175 Ω at 40°C (#1-#2)	Integrated in the fuel pressure sensor
Fuel pressure sensor	Piezo resistive pressure sensor	5V (#3)	-	
Engine cooling fan (FC) control module	-	12 V (#2)	-	
Canister purge (CP) valve	Electromagnetic valve	12 V (#1)	17-24 Ω at 20°C (terminals #1-#2)	
Accelerator pedal (AP) position sensor	Electronic pedal sensor with two output signals, PWM and a linear analog signal	12 V (terminal #1) 5 V (terminal #6) Power supply analog position sensors	-	
Throttle unit	Electronic throttle control module with two integrated potentiometers and a damper motor	5 V (#3)	1.2-3.5 Ω (terminals #1-#4 motor winding). 1000-1500 Ω (terminals #2-#3 Parallel connection of potentiometers 1 and 2).	-

Designation	Type	Supply voltage	Value	Other
			Approximately 820 Ω when the throttle is closed. Approximately 1580 Ω at wide open throttle (terminals #2-#6 potentiometer 1). Approximately 1480 Ω when the throttle is closed. Approximately 500 Ω at wide open throttle (terminals #2-#5 potentiometer 2)	
Injector	Electromagnetic injector valve	12 V (#1)	Approximately 12 Ω at 20°C (terminal #1-#2)	
Camshaft sensor	Magneto-resistive sensor	5 V (#1)	-	
Knock sensor (KS)	Piezo electric component	-	Greater than 1 MΩ (terminal #1-#2 front knock sensor (KS)). Greater than 1 MΩ (terminals #3-#4 rear knock sensor (KS))	Separate signal ground for the knock sensors (KS)
Clutch pedal sensor	Slide potentiometer	5 V (#2)	Unaffected pedal: 1400-2400 Ω Fully depressed pedal: 200-800 Ω (#2-#4)	
Cooling fan for control modules	Fan motor	12 V (#1)	-	The engine cooling fan (FC) is controlled by the engine control module (ECM)
Coolant level sensor	Position switch	Connected to ground (terminal #2)	Closed when the engine coolant level is normal	
Boost pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Preheating, front heated oxygen sensor (HO2S)	PTC resistor	12 V (#3)	2.6-3.4 Ω at 20°C (terminals #3-#4)	
Preheating, rear heated oxygen sensor (HO2S)	PTC resistor	12 V (#1)	Approximately 9 Ω at 20°C (terminal #1-#2)	

Designation	Type	Supply voltage	Value	Other
Mass air flow (MAF) sensor	-	12 V (#2) 5 V (#4)	-	
Air temperature sensor, intake	NTC resistor	5 V (#3)	5886 Ω at 0°C 3791 Ω at 10°C 2510 Ω at 20°C 1715 Ω 30°C (#1-#2)	Integrated in the boost pressure sensor
Leak diagnostic unit	Consists of an air pump, an electromagnetic valve and an internal heating element (PTC resistor)	12 V (#4)	Approximately 118 Ω (terminals #1-#4 pump motor winding) 27.9 -34.1 Ω (terminals #3-#4 Valve coil)	The heating element for heating up the pulsed secondary air injection system (PAIR) pump is controlled by the central electronic module (CEM)
Engine coolant temperature (ECT) sensor	NTC resistor	5 V (#1)	15040 Ω at -20°C 2450 Ω at 20°C 318 Ω at 80°C (#1- #2)	
PTC resistor air preheating	PTC resistor	12 V (#1)	Approximately 10 Ω at 20°C	
Oil level sensor	Electronic sensor with PTC resistor and capacitive measurement element	5 V (#3)	-	
Oil pressure sensor	Pressure switch (Pressostat)	Grounded in the cylinder block	Closed switch when the oil pressure is low	
Camshaft reset valve	Electromagnetic valve	12 V (#1)	3.7-11.1 Ω (#1-#2)	
Flywheel sensor	Engine speed sensor	-	108.5-142.5 Ω at 20°C (terminals #1-#2)	
System relay	Mechanical relay	12V (#1)	Approximately 80 Ω (coil)	
Turbocharger (TC) control valve	Electromagnetic valve (3 way)	12 V (#1)	21.8-24.2 Ω at 20° C (terminals #1-#2)	
Outer temperature sensor	NTC resistor	5 V (#1)	18702 Ω at -20 °C 6318 Ω at 0°C 2424 Ω at 20°C 1034 Ω at 40°C (#1- #3)	

Engine Control Module

Component specifications

The component specification gives the value of the component when the connector is disconnected. Where no value is given, it is not possible to measure a relevant value at the component.
The figure within the brackets indicates the terminal pin on the component to which the value refers.

Designation	Type	Supply voltage	Value	Other
Air conditioning (A/C) relay	Mechanical relay	12V (#1)	Approximately 96 Ω (coil)	
A/C pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Stop lamp switch	Position switch	12 V (#1)	The switch is closed when the pedal is depressed (terminals #1-#5)	
Fuel pump (FP) relay	Mechanical relay	-	Approximately 96 Ω (coil)	The relay is controlled by the central electronic module (CEM)
Fuel temperature sensor	NTC resistor	5V (#3)	5896 Ω at 0°C 3792 Ω at 10°C 2500Ω at 20°C 1707Ω at 30°C 1175 Ω at 40°C (#1-#2)	Integrated in the fuel pressure sensor
Fuel pressure sensor	Piezo resistive pressure sensor	5V (#3)	-	
Engine cooling fan (FC) control module	-	12 V (#2)	-	
Canister purge (CP) valve	Electromagnetic valve	12 V (#1)	17-24 Ω at 20°C (terminals #1-#2)	
Accelerator pedal (AP) position sensor	Electronic pedal sensor with two output signals, PWM and a linear analog signal	12 V (terminal #1) 5 V (terminal #6) Power supply analog position sensors	-	
Throttle unit	Electronic throttle control module with two integrated potentiometers and a damper motor	5 V (#3)	1.2-3.5 Ω (terminals #1-#4 motor winding). 1000-1500 Ω (terminals #2-#3 Parallel connection of potentiometers 1 and 2). Approximately 820 Ω when the throttle is closed. Approximately 1580 Ω at wide open throttle (terminals #2-#6 potentiometer 1). Approximately 1480 Ω when the throttle is closed. Approximately 500 Ω at wide open throttle (terminals #2-#5 potentiometer 2)	-
Injector	Electromagnetic injector valve	12 V (#1)	Approximately 12 Ω at 20°C (terminal #1-#2)	
Camshaft sensor	Magneto-resistive sensor	5 V (#1)	-	
Knock sensor (KS)	Piezo electric component	-	Greater than 1 MΩ (terminal #1-#2 front knock sensor (KS)). Greater than 1 MΩ (terminals #3-#4 rear knock sensor (KS))	Separate signal ground for the knock sensors (KS)
Clutch pedal sensor	Slide potentiometer	5 V (#2)	Unaffected pedal: 1400-2400 Ω Fully depressed pedal: 200-800 Ω (#2-#4)	

Cooling fan for control modules	Fan motor	12 V (#1)	-	The engine cooling fan (FC) is controlled by the engine control module (ECM)
Coolant level sensor	Position switch	Connected to ground (terminal #2)	Closed when the engine coolant level is normal	
Boost pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Preheating, front heated oxygen sensor (HO2S)	PTC resistor	12 V (#3)	2.6-3.4 Ω at 20°C (terminals #3-#4)	
Preheating, rear heated oxygen sensor (HO2S)	PTC resistor	12 V (#1)	Approximately 9 Ω at 20°C (terminal #1-#2)	
Mass air flow (MAF) sensor	-	12 V (#2) 5 V (#4)	-	
Air temperature sensor, intake	NTC resistor	5 V (#3)	5886 Ω at 0°C 3791 Ω at 10°C 2510 Ω at 20°C 1715 Ω 30°C (#1-#2)	Integrated in the boost pressure sensor
Leak diagnostic unit	Consists of an air pump, an electromagnetic valve and an internal heating element (PTC resistor)	12 V (#4)	Approximately 118 Ω (terminals #1-#4 pump motor winding) 27.9 -34.1 Ω (terminals #3-#4 Valve coil)	The heating element for heating up the pulsed secondary air injection system (PAIR) pump is controlled by the central electronic module (CEM)
Engine coolant temperature (ECT) sensor	NTC resistor	5 V (#1)	15040 Ω at -20°C 2450 Ω at 20°C 318 Ω at 80°C (#1- #2)	
PTC resistor air preheating	PTC resistor	12 V (#1)	Approximately 10 Ω at 20°C	
Oil level sensor	Electronic sensor with PTC resistor and capacitive measurement element	5 V (#3)	-	
Oil pressure sensor	Pressure switch (Pressostat)	Grounded in the cylinder block	Closed switch when the oil pressure is low	
Camshaft reset valve	Electromagnetic valve	12 V (#1)	3.7-11.1 Ω (#1-#2)	
Flywheel sensor	Engine speed sensor	-	108.5-142.5 Ω at 20°C (terminals #1-#2)	
System relay	Mechanical relay	12V (#1)	Approximately 80 Ω (coil)	
Turbocharger (TC) control valve	Electromagnetic valve (3 way)	12 V (#1)	21.8-24.2 Ω at 20°C (terminals #1-#2)	
Outer temperature sensor	NTC resistor	5 V (#1)	18702 Ω at -20 °C 6318 Ω at 0°C 2424 Ω at 20°C 1034 Ω at 40°C (#1- #3)	

Intake Air Temperature Sensor

Outer temperature sensor

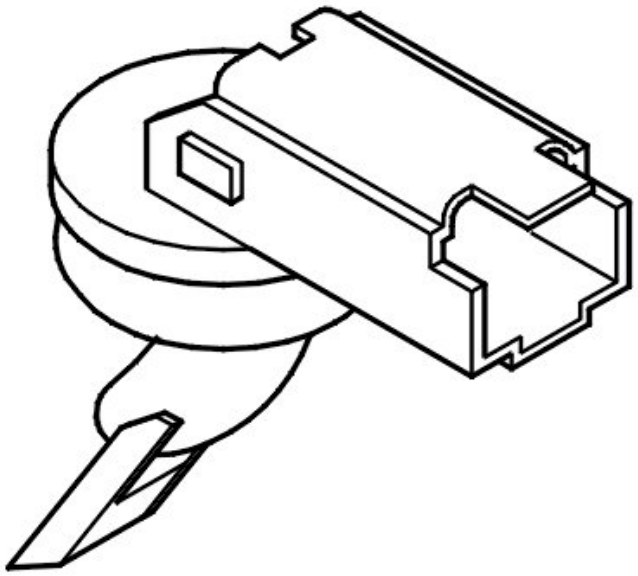
Temperature, °C	Resistance, Ω	Voltage, V
0	6318	3.99
10	3857	3.53
20	2424	3.01
30	1513	2.43
40	1034	1.96

System Specifications

Component resistance values

Resistance values, evaporator temperature sensor

The component specification gives the value of the component without the connector connected.



Measurement values, resistance	Other
-40 °C = approximately 91.8 kΩ -35 °C = approximately 66.3 kΩ -30 °C = approximately 48.4 kΩ -25 °C = approximately 35.7 kΩ -20 °C = approximately 26.6 kΩ -15 °C = approximately 20.0 kΩ -10 °C = approximately 15.2 kΩ -5 °C = approximately 11.6 kΩ 0 °C = approximately 9.0 kΩ 5 °C = approximately 7.0 kΩ 10 °C = approximately 5.5 kΩ 15 °C = approximately 4.3 kΩ 20 °C = approximately 3.5 kΩ 25 °C = approximately 2.7 kΩ 30 °C = approximately 2.2 kΩ 35 °C = approximately 1.8 kΩ 40 °C = approximately 1.5 kΩ 45 °C = approximately 1.2 kΩ 50 °C = approximately 1.0 kΩ 55 °C = approx. 826 Ω 60 °C = approx. 688 Ω 65 °C = approx. 576 Ω 70 °C = approx. 485 Ω 75 °C = approx. 409 Ω 80 °C = approx. 347 Ω 85 °C = approx. 296 Ω 90 °C = approx. 253 Ω 95 °C = approx. 217 Ω 100 °C = approx. 187 Ω	Measure the resistance between terminals #1 and #2.

Auxiliary Cabin Heater

Components resistance values

Resistance values are given at +20°C (+68°F) unless otherwise stated.

Component	Other
Water temperature sensor	Resistance: 10°C (50°F): approximately 20 k(20°C (68°F): approximately 11 k(30°C (86°F): approximately 8 k(75°C (167°F): approximately 1.5 k(90°C (194°F): approximately 900 (
Heater fan	Wire resistance between connections: 1-10 (
Water pump	Wire resistance between connections: 1-10 (
Fuel pump	Wire resistance between connections: approximately 8 (
Glow plug	Resistance: approximately 1 (
Overheat thermostat	Resistance: Not activated < 3 (Activated > 10 k(

Outside Temperature Display Sensor

Outside temperature sensor

Outside temperature sensor

Temperature, °C	Resistance, Ω	Voltage, V
0	1407	2.34
10	912.8	1.82
20	607.5	1.38
25	500	1.19
30	413.8	1.03

Suspension Control (Automatic - Electronic Level)

Component specifications

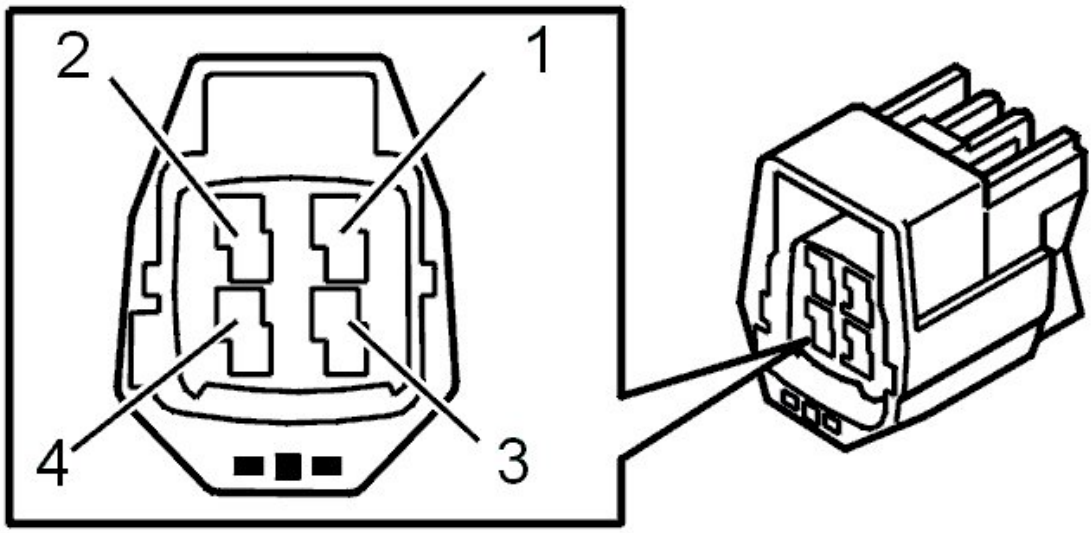
The component specification gives the value of the component when the connector is disconnected. Where no value is given, it is not possible to measure a relevant value at the component.
The figure within the brackets indicates the terminal pin on the component to which the value refers.

Designation	Type	Supply voltage	Value	Other
Acceleration sensor suspension, left and right-side front		5V (#5)	Output signal (terminal #1) 0.5V - 4.5V	Resistance readings cannot be taken
Position sensor suspension, left and right sides rear		5V (#5)	Output signal (terminal #1) 0.5V - 4.5V	Resistance readings cannot be taken
Acceleration sensor body		5V (#5)	Output signal (terminal #1) 0.5V - 4.5V	Resistance readings cannot be taken
Keypad		5V		-
Shock absorber solenoids		U_{bat} (#1)	Pulse width modulated (PWM) signal	Approximately 5 Ω(terminals #1-#2)

Connector A, Transmission

Connector A, transmission

4-pin connector



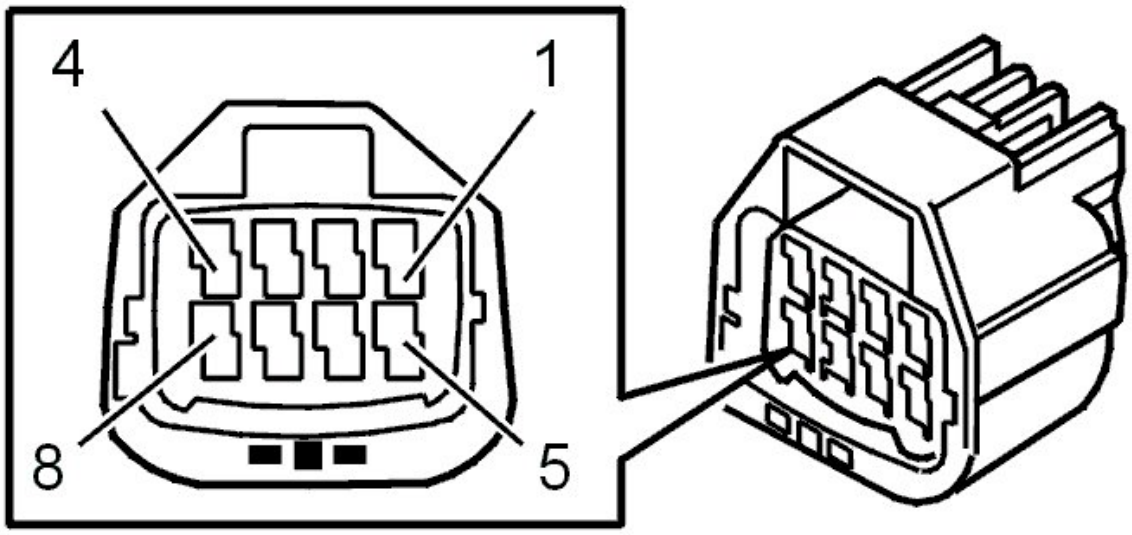
Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
A1	Signal ground, transmission input speed sensor (SP2)	A41
A2	Power supply, engine speed (RPM) sensor (SP2)	A59
A3	Signal ground, transmission output speed sensor (SP1)	A39
A4	Power supply, speed sensor (SP1)	A57

Connector B, Transmission

Connector B, transmission

6-pin connector



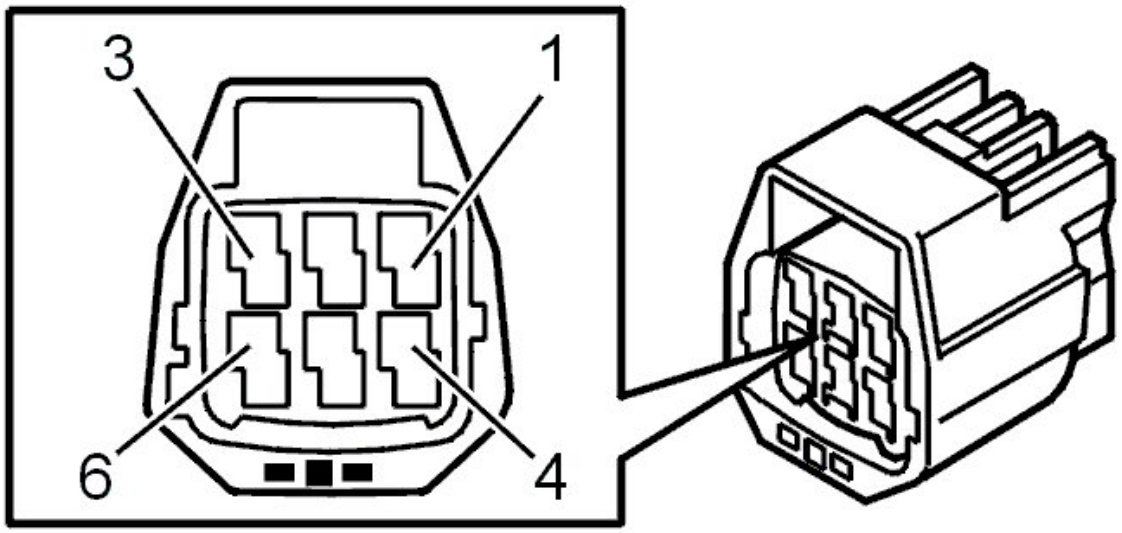
Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
B1	Shift lock solenoid, replacement	
B2	Shift lock solenoid, replacement	
B4	Ground terminal, gear-shift position sensor	
B5	Gear-shift position sensor, signal A	A46
B6	Gear-shift position sensor, signal B	A64
B7	Gear-shift position sensor, signal C	A45
B8	Gear-shift position sensor, signal PA	A63

Connector C, Transmission

Connector C, transmission

6-pin connector



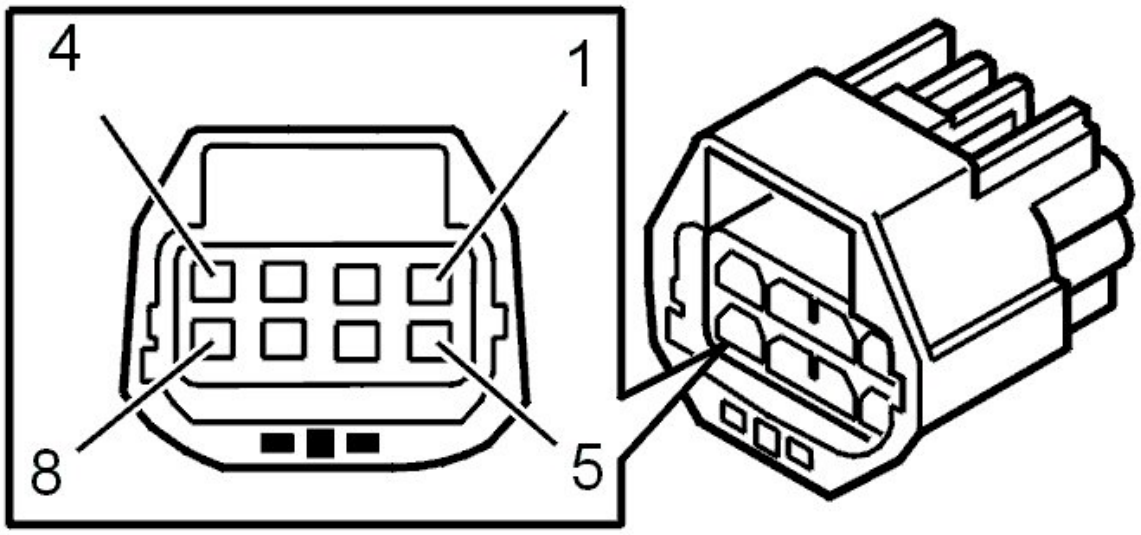
Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
C1	S1	A50
C2	S2	A68
C3	S3	A48
C4	S4	A47
C5	S5	A66
C6		

Connector D, Transmission

Connector D, transmission

8-pin connector



Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box.

Terminal	Signal	Connected to control module terminal #
D1	Control signal, Lock-up solenoid SLU	A51
D2	Signal ground, Lock-up solenoid SLUG	A69
D3	Control signal, line pressure solenoid SLT	A52
D4	Signal ground, line pressure solenoid SLTG	A70
D5	Control signal, line pressure solenoid SLS	A49
D6	Signal ground, line pressure solenoid SLSG	A67
D7	Power supply, oil temperature sensor OT	A37
D8	Signal ground, oil temperature sensor OTG	A55

Component Resistance Values

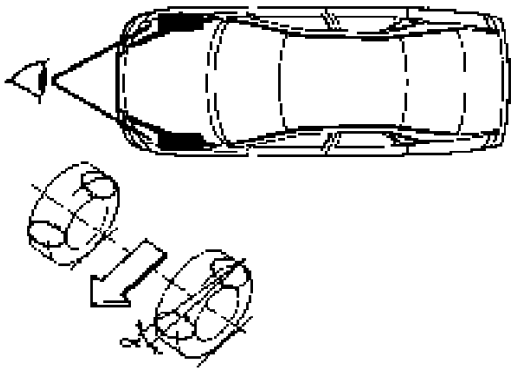
Component resistance values

The resistance values assume a temperature of +20°C unless otherwise stated.

Component	Remarks	Resistance (Ω)
Shift solenoid S1	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	12-16
Shift solenoid S2	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S3	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S4	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Shift solenoid S5	Resistance between the solenoid pin and the solenoid sleeve or transmission housing	11-15
Lock-up solenoid SLU	Resistance between the solenoid pins	5.0-5.6
Throttle solenoid SLT	Resistance between the solenoid pins	5.0-5.6
Throttle solenoid SLS	Resistance between the solenoid pins	5.0-5.6
Oil temperature sensor, temperature (°C)	0	
20	5800-7900	
40		
80		
100	261-263	
150		

Alignment

NOTE: This article contains changes called out by Service Bulletin SB60-5500-0506



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Adjusting toe angle, a

Adjusting to positive values generates toe-in angle while adjusting to negative values generates toe-out angle.

Note! All published toe values are for total toe measurement (left and right wheels together).

S60 / V70(01-) / V70XC(01-) / XC70 / S80(-06) / XC90

Camber measurement per side

Model	Front	Rear
S60	-0.3° ± 0.9°	0° ±1.0°
V70 (01-)	-0.3° ± 0.9°	0° ±1.0°
V70 (01-) AWD	-0.3° ± 0.9°	-0.3° ±1.0°
V70XC (01-)/XC70	-0.3° ± 0.9°	0.3° ±1.0°
S80	-0.3° ± 0.9°	0° ±1.0°
XC90	-0.3° ± 0.9°	-0.4° ±1.0°

Camber Adjustment Per Side

Caster measurement per side

Model	Front	Variation right/left
S60	4.0° ±1.0°	0° ± 0.25°
V70 (01-)	4.0° ±1.0°	0° ± 0.25°
V70 (01-) AWD	4.0° ±1.0°	0° ± 0.25°
V70XC (01-)/XC70	5.0° ±1.0°	0° ± 0.25°
S80	4.0° ±1.0°	0° ± 0.25°
XC90	5.7° ±1.0°	0° ± 0.50°

Caster Adjustment Per Side

Toe measurement across both wheels

Model	Front	Rear
S60 (except S60R, see below)	0.10° ± 0.10°	0.20° ± 0.20°
V70 (01-)	0.10° ± 0.10°	0.20° ± 0.20°
V70 (01-) AWD (except V70 (01-)R, see below)	0.10° ± 0.10°	0.20° ± 0.20°
S60R/V70 (01-)R	0.10° ± 0.10°	0.16° ± 0.10°
V70 XC (01-)/XC70	0.20° ± 0.10°	0.20° ± 0.20°
S80	0.10° ± 0.10°	0.20° ± 0.20°
XC90	-0.20° ± 0.10°	0.3° ± 0.2°

Toe Measurement Across Both Wheels

System Specifications

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Caution! Screws coated with locking fluid or sealant must be replaced with new ones when reinstalling.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

AWD

Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
Universal joint CV fastened with 6 bolts	Stage 1: Crosswise 10 Nm Crosswise 25 Nm
Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Fluid Pan, A/T

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

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All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

AWD

Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
Universal joint CV fastened with 6 bolts	Stage 1: Crosswise 10 Nm Crosswise 25 Nm
Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Body and Frame

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Note! Screws coated with locking fluid or sealant must be replaced with new ones when reinstalled.

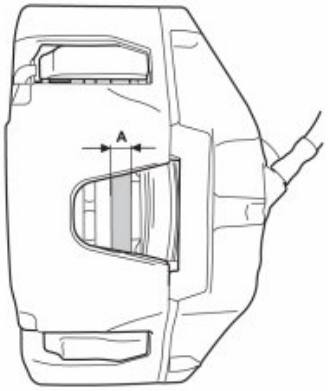
Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

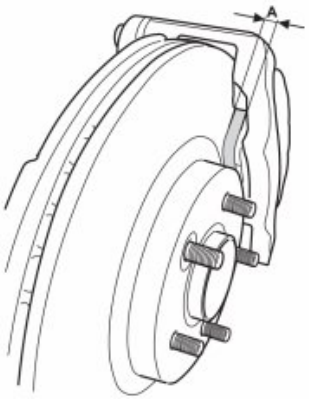
Seat belts	
Seatbelt front: seatbelt reel Seatbelt front: bracket Seatbelt rear center: seatbelt reel Seatbelt rear center: upper seatbelt mounting Seatbelt (third row): seatbelt reel	40 Nm 48 Nm 24 Nm 48 Nm
Collision sensor	
Collision sensor Collision sensor front	6 Nm 6 Nm
Buckle seatbelt	
Buckle seatbelt front Buckle seatbelt rear (second row) Buckle seatbelt rear (third row)	48 Nm 48 Nm 48 Nm
End plate	
End plate front Endplate rear (second row) End plate center seat (second row) End plate rear (third row)	48 Nm 48 Nm 48 Nm 48 Nm
Whiplash unit	
Deformation element Whiplash element: self tapping Torx-screw, fixed seat Whiplash element: lock nut	17 Nm 9 Nm 18 Nm
Rails	
Rails front mounting Rails center mounting Rails rear mounting	8 Nm 8 Nm 8 Nm
Engine coolant heater	
Control module Water pump holder / clamp Cover (over engine coolant temperature sensor and overheat protection thermostat) Overheat protection thermostat Engine cooling fan (FC) mounting Engine cooling fan (FC) shaft Glow plug	2 Nm 3 Nm 2 Nm 2 Nm 2 Nm 3 Nm 15 Nm
AC compressor	
Magnetic clutch compressor - magnetic coil Magnetic clutch compressor - drive plate (5 and 6 cylinder engines) Magnetic clutch compressor - drive plate (8 cylinder engine)	5 Nm 13 Nm 24 Nm
Air conditioning (A/C) condenser with integrated drier	
Pressure sensor Drier, lower mounting	13 Nm 13 Nm
Drier, upper mounting	Step 1: 6 Nm. Step 2: Loosen 90°.
Rear air conditioning (A/C)	
Upper mounting points (climate control unit assembly) Lower mounting point (climate control unit assembly) Fan motor Pipe connection to expansion valve Covers around evaporator	6 Nm 6 Nm 1.7 ± 0.3 Nm 4.5 ± 0.5 Nm 1.5 ± 0.3 Nm
Seats	
Upper screw seat frame	50 Nm
Lower screw seat frame	24 Nm

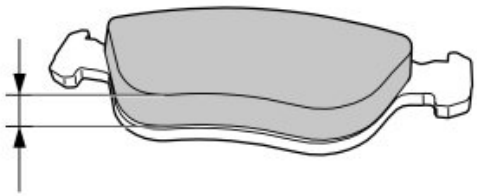
Floor hatch	
Sems screw M6 x 20	6 Nm
Center arm rest rear seat	
Screw for the bracket	1 Nm
Screw for the shaft and cover	4 Nm

Front

Brake pads, front







Note! The brake pads are measured in place in the brake caliper.

The illustrations show where to measure the thickness of the pad.

Note! The brake pad's backing plate is not included in the dimensions.

Example at 20, 000 km service interval

The wear is given in mm on the brake pad for the next service interval. **Note!** 2 mm (replacement limit) must be added to all dimensions.		
S60/V70/XC70	=	4 mm + 2 mm
S60 R/V70 R	=	3 mm + 2 mm
S80 (-06)	=	4 mm + 2 mm
XC90	=	6 mm + 2 mm

Example at 30, 000 km service interval

The wear is given in mm on the brake pad for the next service interval. **Note!** 2 mm (replacement limit) must be added to all dimensions.		
S60/V70/XC70	=	6 mm + 2 mm
S60 R/V70 R	=	5 mm + 2 mm
S80 (-06)	=	6 mm + 2 mm
XC90	=	9 mm + 2 mm

Rear

Brake Pads, Rear

Minimum thickness for replacing the brake pads ..... 2 mm

Tightening Torque

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of specific components and tightening torques

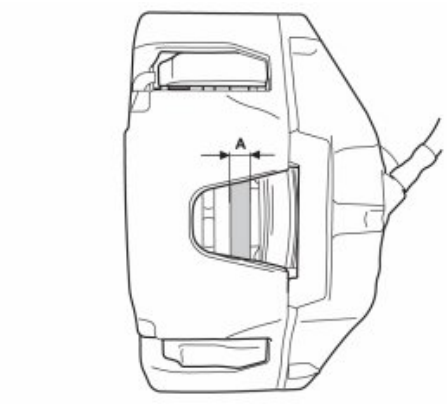
Note! Screws coated with locking fluid or sealant must be replaced with new when reinstalled.

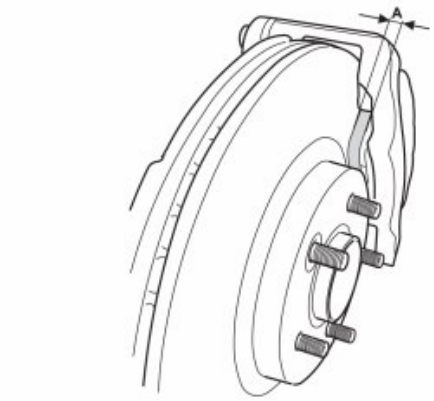
Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

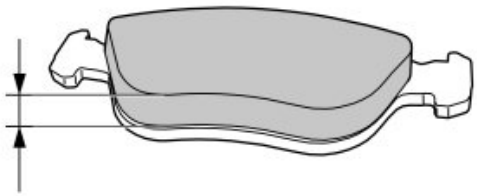
Brake caliper in wheel spindle not XC90	100 Nm
Brake caliper in steel wheel spindle only XC90 (M14)	1st step, 105 Nm 2nd stage, 60°
Bleed nipple in brake caliper (M10)	9 Nm
Sliding pin in brake caliper (M9)	27.5 Nm
Brake shield front in wheel spindle steel up to and including w918 and XC90 (M8)	20 Nm
Brake shield front in wheel spindle, aluminum not XC90 (M8)	15 Nm
Brake caliper Rear in wheel bearing housing not XC90 (M10)	60 Nm
Brake caliper rear in wheel bearing housing XC90 (M10)	1st step, 35 Nm 2nd stage, 60°
Brake shield rear in wheel bearing housing (M6)	12 Nm
Brake pipe in ABS modulator (M12)	14 Nm
Brake pipe in master cylinder (M12)	14 Nm
Brake pipe in brake hose (M10)	14 Nm
Brake hose in brake caliper (M10)	18 Nm
Brake pipe in joint fitting (M10)	14 Nm
Brake fluid reservoir in master cylinder (M5)	3.5 Nm
Bracket, ABS in hydraulic unit (M6)	8 Nm
Bracket ABS cable in shock absorber front (M5)	6 Nm
Bracket brake cable in sub-frame rear (M8)	20 Nm
Screw control module (BCM)	1.8 Nm
Mounting Brake pedal LHD automatic (M10)	30 Nm
Mounting Brake pedal RHD manual (M10)	35 Nm
Mounting Brake pedal LHD manual (M10)	40 Nm
Vacuum pump bracket in front cross member, only XC90 (M6)	8 Nm
Heat deflector plate in activation unit, RHD only (M8)	10 Nm

Front

Brake pads, front







Note! The brake pads are measured in place in the brake caliper.

The illustrations show where to measure the thickness of the pad.

Note! The brake pad's backing plate is not included in the dimensions.

Example at 20, 000 km service interval

The wear is given in mm on the brake pad for the next service interval. **Note!** 2 mm (replacement limit) must be added to all dimensions.		
S60/V70/XC70	=	4 mm + 2 mm
S60 R/V70 R	=	3 mm + 2 mm
S80 (-06)	=	4 mm + 2 mm
XC90	=	6 mm + 2 mm

Example at 30, 000 km service interval

The wear is given in mm on the brake pad for the next service interval. **Note!** 2 mm (replacement limit) must be added to all dimensions.		
S60/V70/XC70	=	6 mm + 2 mm
S60 R/V70 R	=	5 mm + 2 mm
S80 (-06)	=	6 mm + 2 mm
XC90	=	9 mm + 2 mm

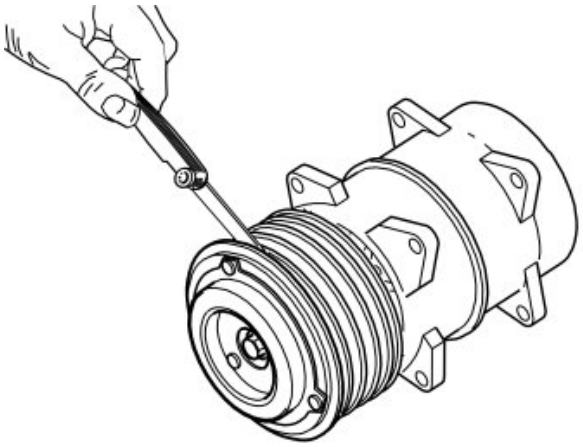
Rear

Brake Pads, Rear

Minimum thickness for replacing the brake pads ..... 2 mm

Compressor Clutch

Checking the clearance



Check the clearance between the turning plate and the belt pulley with a feeler gauge.

The clearance should be 0.3 - 0.5 mm.

0.3 mm clearance all the way round.

It must not be possible to insert 0.6 mm at any point.

If clearance is not within given values, replace the shims.
The following dimensions are available:
- 0.2 mm
- 0.3 mm
- 1.0 mm.

System Specifications

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of specific components and tightening torques

Note! Screws coated with locking fluid or sealant must always be replaced with new screws during reinstallation.

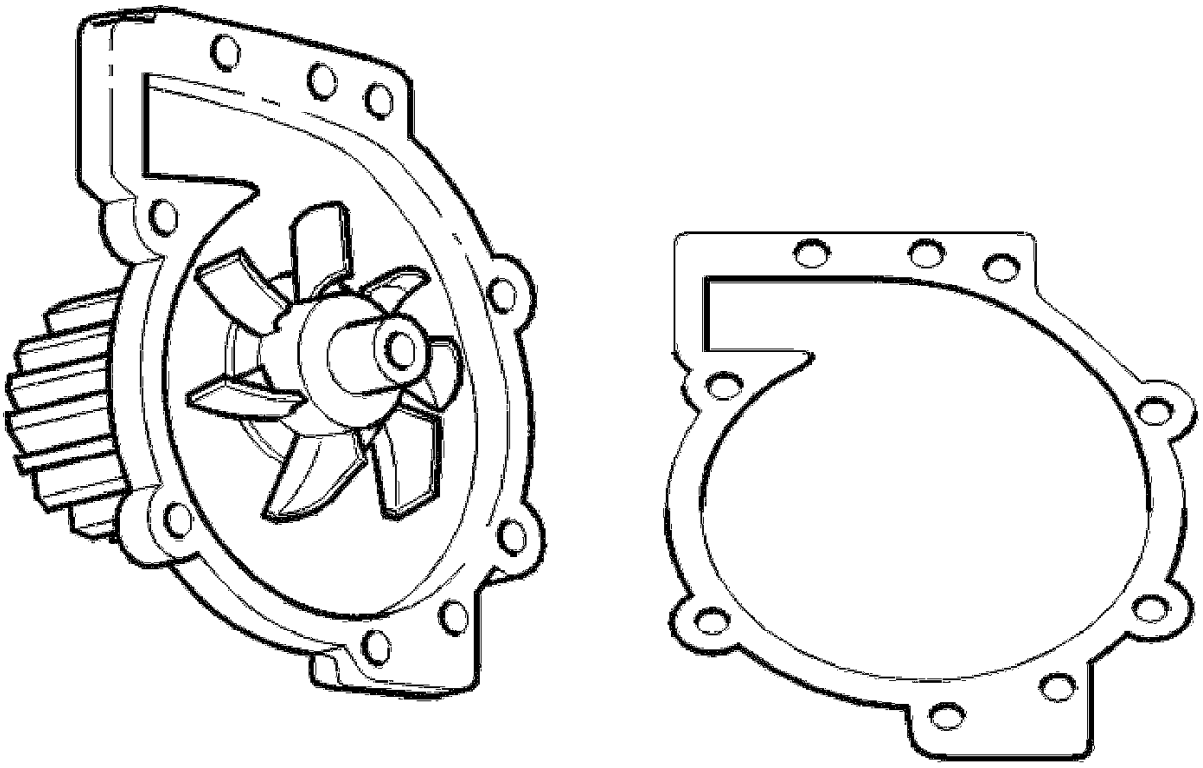
Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Exhaust system (to the turbocharger (TC))	24 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	Stage 1.....65 Nm Stage 2.....60°
Subframe screws (start on the left-hand side, then the right-hand side)	Stage 1.....105 Nm Stage 2.....120°
Subframe bracket	50 Nm
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block)	Stage 1.....35 Nm Stage 2.....60°
Engine mounting Right side (M8x23 to cylinder block)	Stage 1.....20 Nm Stage 2.....60°
Right-hand engine pad for the subframe (Only applies to XC90)	Stage 1.....120 Nm Stage 2.....40°
Lower torque rod, transmission screw	Stage 1.....35 Nm Stage 2.....40°
Lower torque rod, sub-frame nut	Stage 1.....65 Nm Stage 2.....60°
Oil filter (environmental filter)	25 Nm

Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm
Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to .....3 Nm the screws (5). Tighten to .....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2 .....60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover,(front/rear)	12 Nm
Timing cover,(upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....90°
Transmission screw (lower torque rod)	Stage 1.....35 Nm Stage 2.....40°
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

Water Pump

Install:



- a new gasket
- a new pump.

Tighten the screws crosswise..... 17 Nm

Hold the eccentric secure and tighten the center screw. Tighten..... 20 Nm

Upper and Front timing belt cover. Tighten..... 12 Nm

Engine stabilizer brace. Tighten the screws at the suspension turrets..... 50 Nm
Tighten the screw for the engine bracket..... 80 Nm

Differential Assembly

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Caution! Screws coated with locking fluid or sealant must be replaced with new ones when reinstalling.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

AWD

Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
Universal joint CV fastened with 6 bolts	Stage 1: Crosswise 10 Nm Crosswise 25 Nm
Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Drive Axles, Bearings and Joints

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

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Summary of tightening torques for specific components

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All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

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Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
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Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Drive/Propeller Shaft

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

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Summary of tightening torques for specific components

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All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

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Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
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TF-80SC

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M56, M58, M66

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Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Tightening Torque

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

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Summary of specific components and tightening torques

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Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Exhaust system (to the turbocharger (TC))	24 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	Stage 1.....65 Nm Stage 2.....60°
Subframe screws (start on the left-hand side, then the right-hand side)	Stage 1.....105 Nm Stage 2.....120°
Subframe bracket	50 Nm
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block)	Stage 1.....35 Nm Stage 2.....60°
Engine mounting Right side (M8x23 to cylinder block)	Stage 1.....20 Nm Stage 2.....60°
Right-hand engine pad for the subframe (Only applies to XC90)	Stage 1.....120 Nm Stage 2.....40°
Lower torque rod, transmission screw	Stage 1.....35 Nm Stage 2.....40°
Lower torque rod, sub-frame nut	Stage 1.....65 Nm Stage 2.....60°
Oil filter (environmental filter)	25 Nm

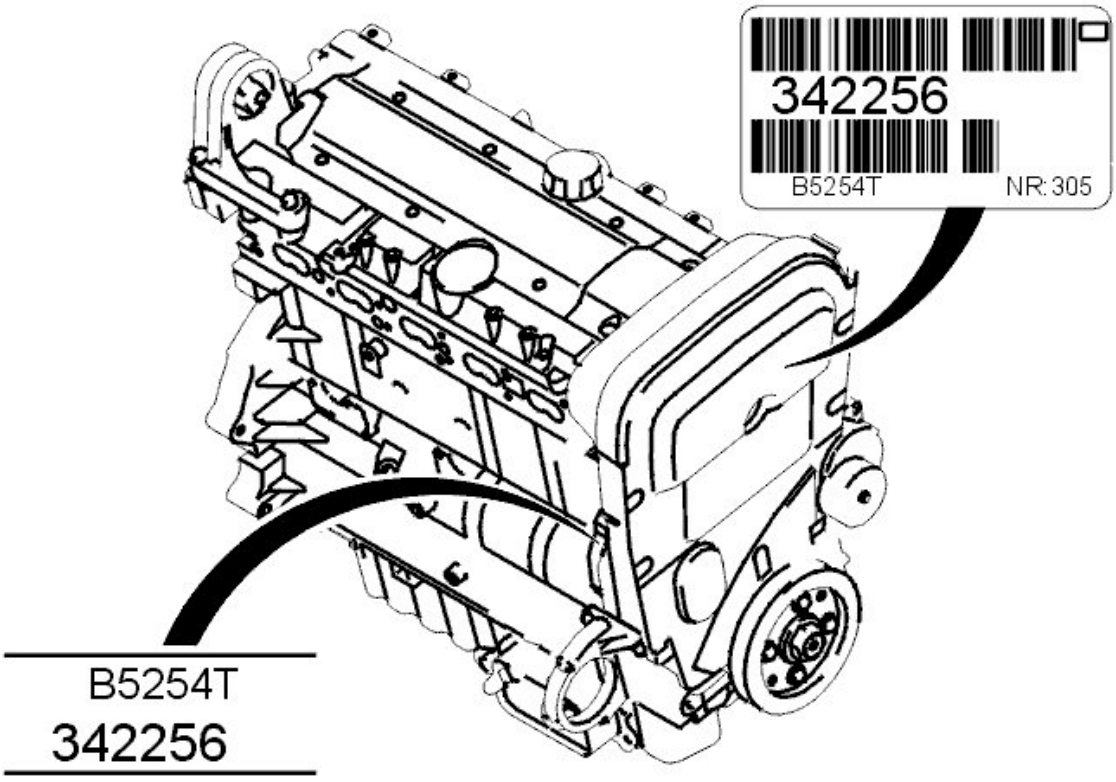
Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm
Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to .....3 Nm the screws (5). Tighten to .....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2 .....60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover,(front/rear)	12 Nm
Timing cover,(upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....90°
Transmission screw (lower torque rod)	Stage 1.....35 Nm Stage 2.....40°
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

Specifications, Mechanical

Specifications, mechanical

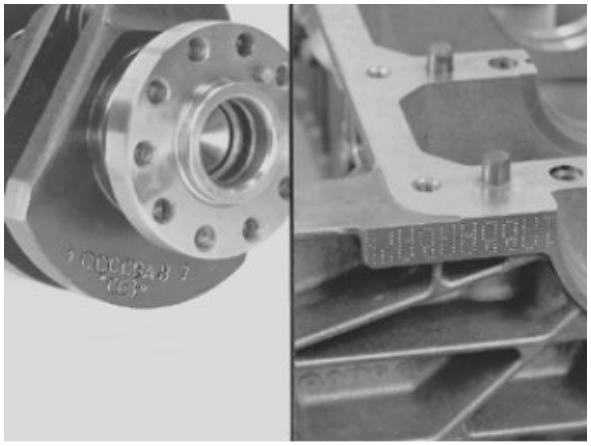
Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Engine manufacture number, engine serial number and type

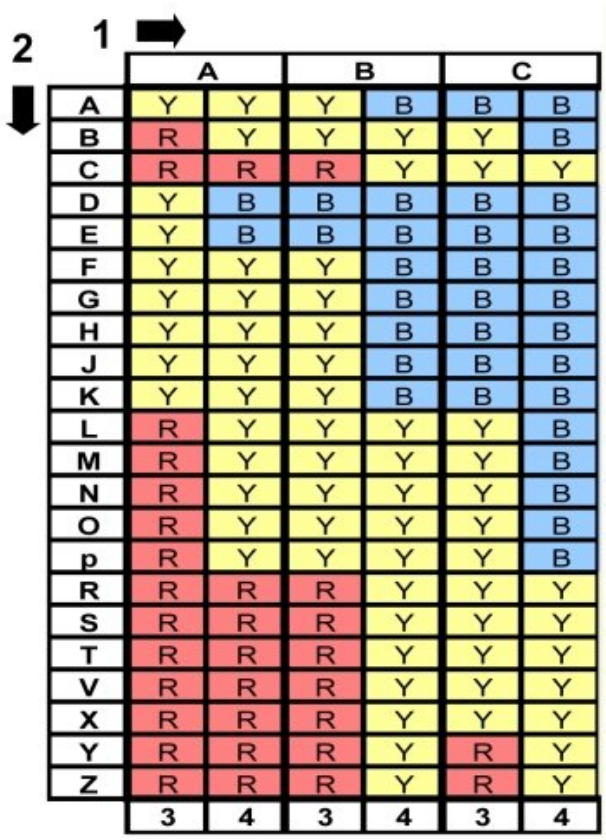


The engine serial number and type are stamped on the left side of the cylinder block at the top of the mounting for the water pump. There is also a decal on the timing casing with the engine type, manufacturing number, and serial number.

Classification of main bearings



The marking is stamped on the cylinder block and crankshaft.



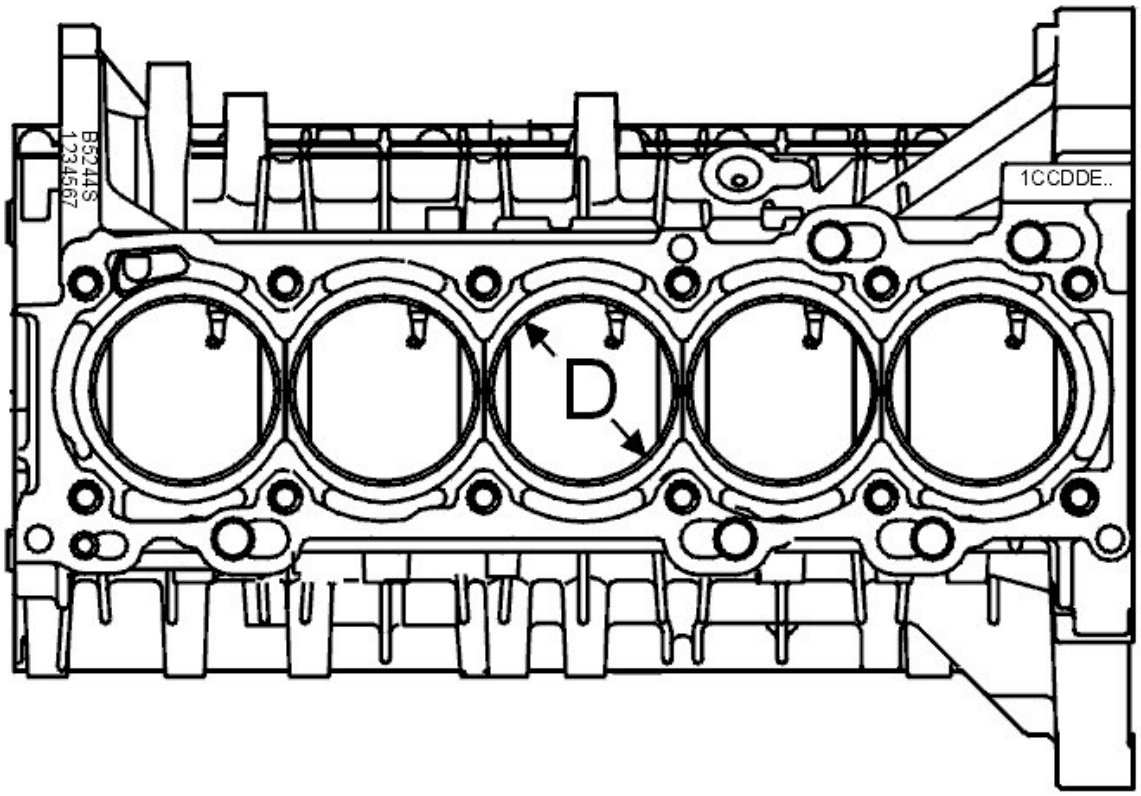
2 \ 1	A		B		C	
	3	4	3	4	3	4
A	Y	Y	Y	B	B	B
B	R	Y	Y	Y	Y	B
C	R	R	R	Y	Y	Y
D	Y	B	B	B	B	B
E	Y	B	B	B	B	B
F	Y	Y	Y	B	B	B
G	Y	Y	Y	B	B	B
H	Y	Y	Y	B	B	B
J	Y	Y	Y	B	B	B
K	Y	Y	Y	B	B	B
L	R	Y	Y	Y	Y	B
M	R	Y	Y	Y	Y	B
N	R	Y	Y	Y	Y	B
O	R	Y	Y	Y	Y	B
p	R	Y	Y	Y	Y	B
R	R	R	R	Y	Y	Y
S	R	R	R	Y	Y	Y
T	R	R	R	Y	Y	Y
V	R	R	R	Y	Y	Y
X	R	R	R	Y	Y	Y
Y	R	R	R	Y	R	Y
Z	R	R	R	Y	R	Y

1. Classification cylinder block
2. Classification crankshaft
3. Cylinder block
4. Intermediate section

General data (engine capacities)

	B5204T5	B5234T3	B5244T2	B5244T3	B5254T2
Output (kw at rpm)	132/5280	184/5220	195/5700	147/6000	154/5000
Maximum torque (Nm at rpm)	240/2220-5280	330/2520-5220	350/2400-5100	285/1800-4980	320/1500-4500
Max rpm	6200	6200	6200	6200	6500
Idling (rpm)	670	670	850	670	670
No. of cylinders	5	5	5	5	5
Cylinder bore (mm)	81	81	83	83	83
Stroke (mm)	77	90	90	90	93.2
Cylinder displacement (dmÂ³ =litres)	1984	2319	2435	2435	2521
Firing sequence	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3
Compression ratio	9.5:1	8.5:1	8.5:1	9.0:1	9.0:1
Weight, complete, including oil (kg)	approximately 177	approximately 177	approximately 177	approximately 177	approximately 177

Cylinder block

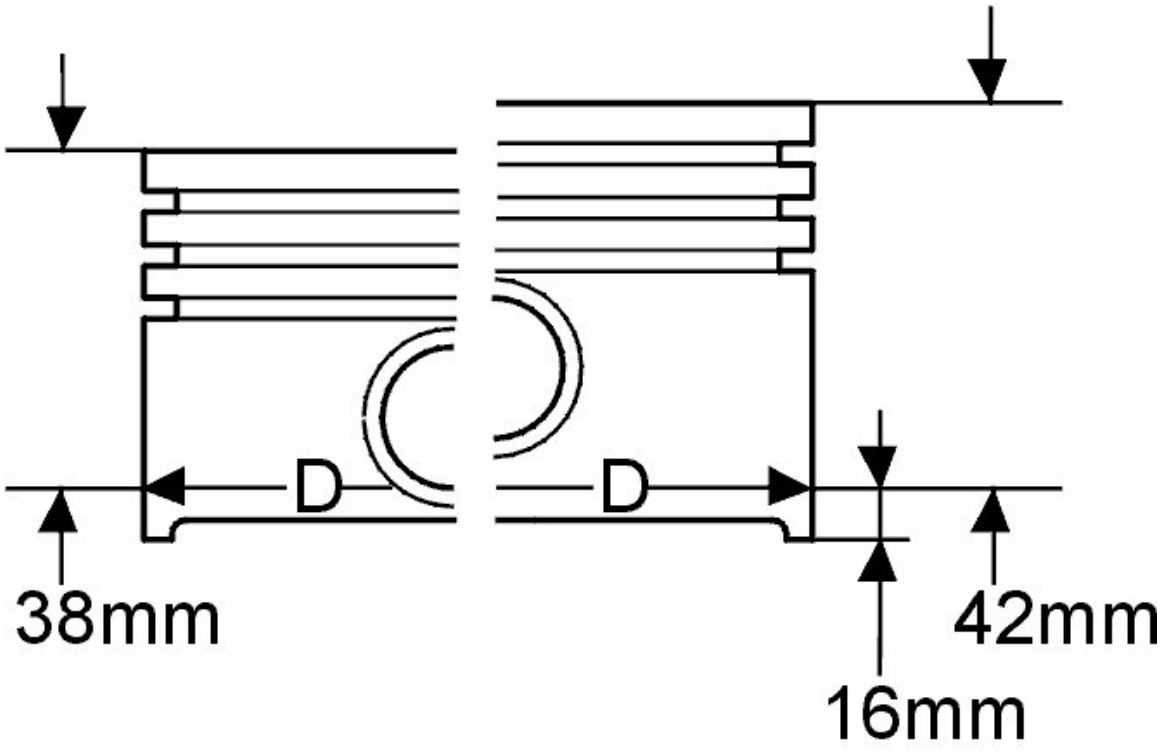


Bore (D) in mm

Standard	B5204Tx	B5234Tx	B5244Tx
C-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010
D-markedÂ¹	81.010-81.020	81.010-81.020	83.010-83.020
E-markedÂ¹	81.020-81.030	81.020-81.030	83.020-83.030

The bore classification is stamped on top of the engine block. For example: 1CCDDE is read as cyl 1=C, cyl 2=C, cyl 3=D, cyl 4=D, cyl 5=E.

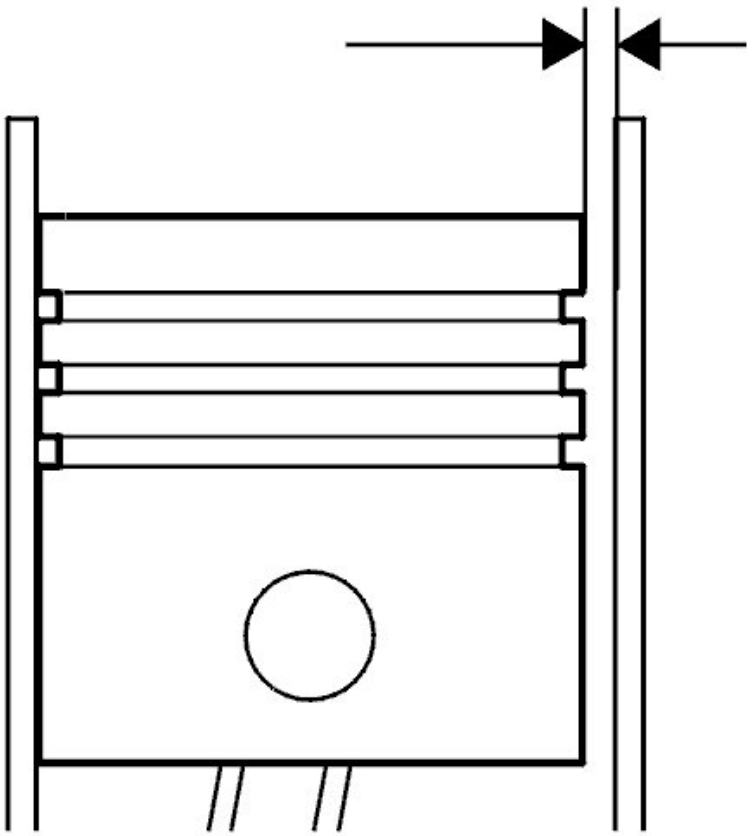
Pistons (engine capacities)



Bore (D) in mm

Standard	**B5204T5** Measured 16 mm from the bottom of the piston	**B5234T3** Measured 42 mm from the top of the piston	**B5244T2** Measured 42 mm from the top of the piston	**B5244T3** Measured 38 mm from the top of the piston
C-markedÂ¹	80.980-80.990	80.980-80.990	82.980-82.990	82.980-82.990
D-markedÂ¹	80.990-81.000	80.990-81.000	82.990-83.000	82.990-83.000
E-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010	83.000-83.010

Classification is marked on the top of the piston.



Piston running clearance (example)

Measured cylinder diameter.....	83.015 mm
Measured piston diameter.....	82.995 mm
The piston running clearance is.....	0.020 mm
The piston running clearance must be 0.010-0.030 mm.	

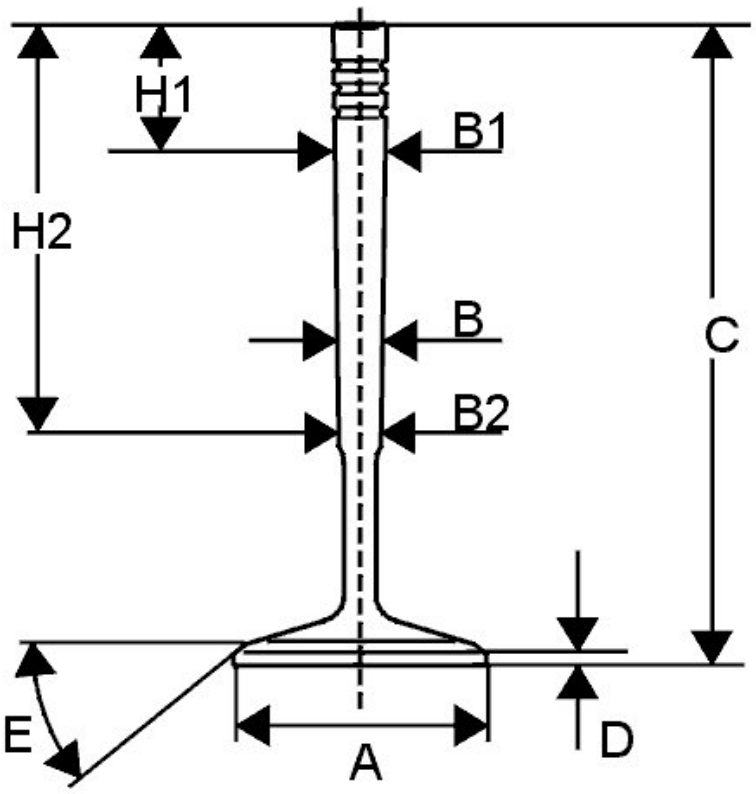
Piston rings

Upper compression ring.0.030-0.070 mm
Lower compression ring.0.030-0.070 mm
Oil control ring assembly.0.038-0.142 mm
Upper.1,200 -0.010/-0.030 mm
Lower.1,500 -0.010/-0.030 mm
Spring.1.510 ± 0.020 mm
Rail.0.460 ± 0.011 mm

Piston pin

	B52x4Tx (excluding B5244T3)	**B5244T3**
Diameter (mm)	23.000 +0/-0.004	21.000 +0/-0.004
Length (mm)	61.000 +0/-0.200	60.000 +0/-0.200

Valves

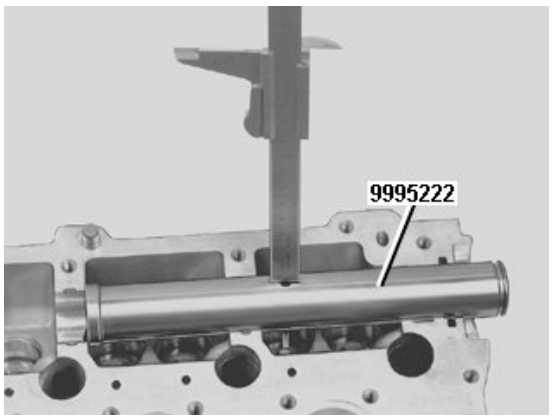


Inlet.31.00 ± 0.15 mm
Exhaust.27.00± 0.15 mm
Inlet (early versions).6.970 +0/-0.015mm
Inlet (late versions).5.970 +0/-0.015mm

Valve stem diameter (B1/B2)

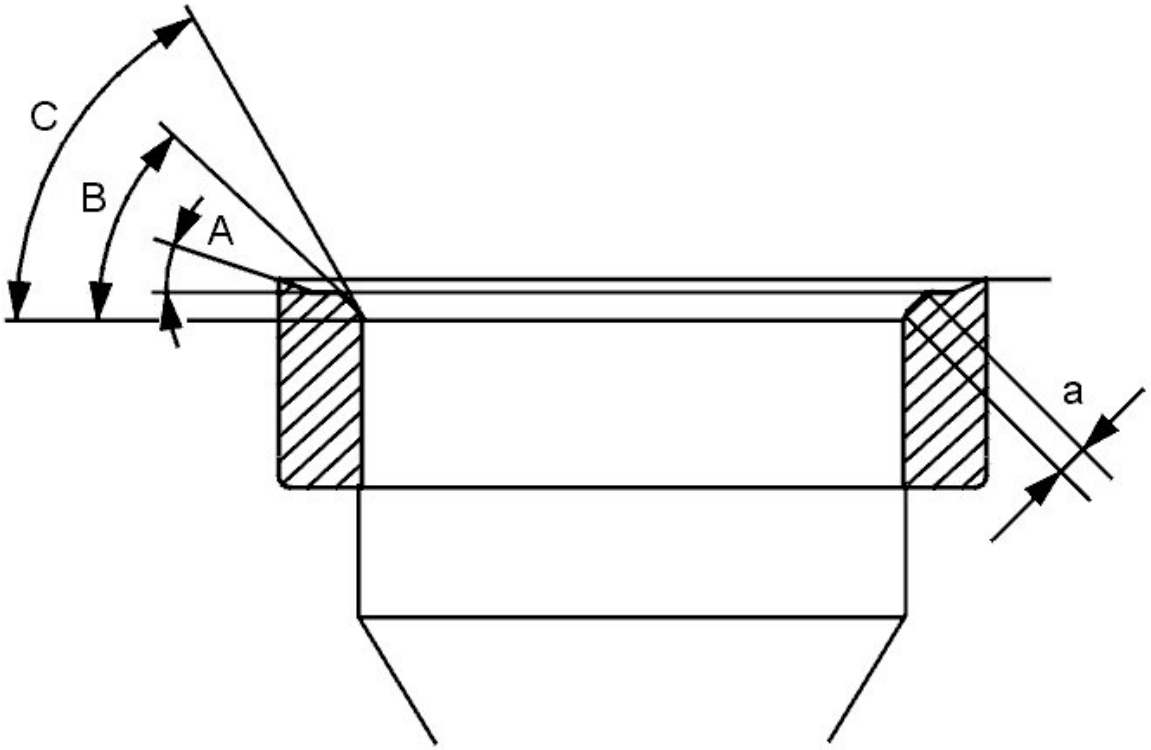
Exhaust (early versions)	
H1 = 22.7 mm	B1 = 6,962 ± 0.007 mm
H2 = 65.1	B2 = 6,954 ± 0.007 mm
Exhaust (late versions)	
H1 = 22.7 mm	B1 = 5.962 ± 0.007 mm
H2 = 65.1	B2 = 5954 ± 0.007 mm

Inlet.102.00 ± 0.07 mm
Exhaust.101.05± 0.07 mm
Inlet and exhaust.1.50 mm
Minimum height after grinding.1.20 mm
Inlet and exhaust.44.5°



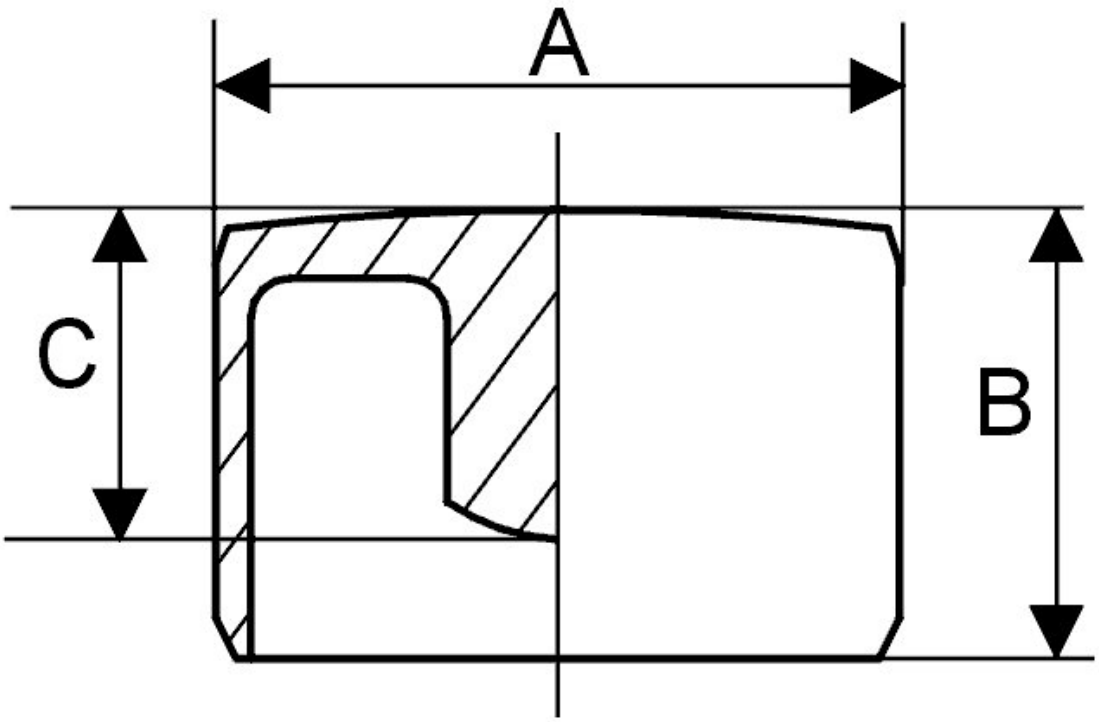
Valve stem height.48.4± 0.5 mm
Maximum machining of the valve stem.0.5 mm

Valve seats



Upper reduction angle (A)
Inlet.....20°
Exhaust.....15°
Matching surface angle (B)
Inlet/Exhaust.....45°
Lower reduction angle (C)
Inlet/Exhaust.....60°
Valve seat, width (a)
Inlet.....1.4-1.8 mm
Exhaust.....1.8-2.2 mm

Tappets



Tappets, dimensions

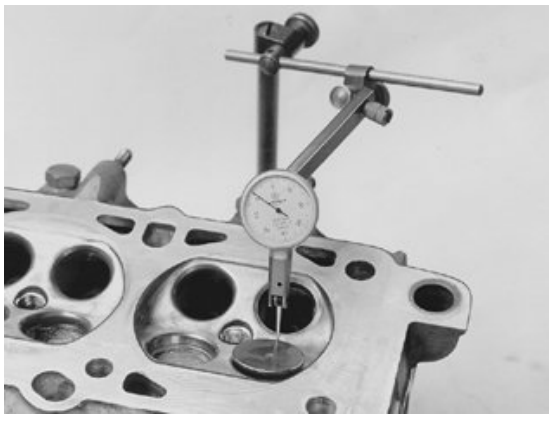
External diameter (A).32.000 +0.025/-0.041 mm
External height (B).26.0± 0.5 mm
Solid valve lifter shaft length (C)

15.96 mm at 0.02 mm intervals up to 16.16 mm. The dimensions are listed on the inside of each valve lifter.

Valve springs

Length.45.1 + 1.5/-0.5 mm
Type.Conical

Valve guides

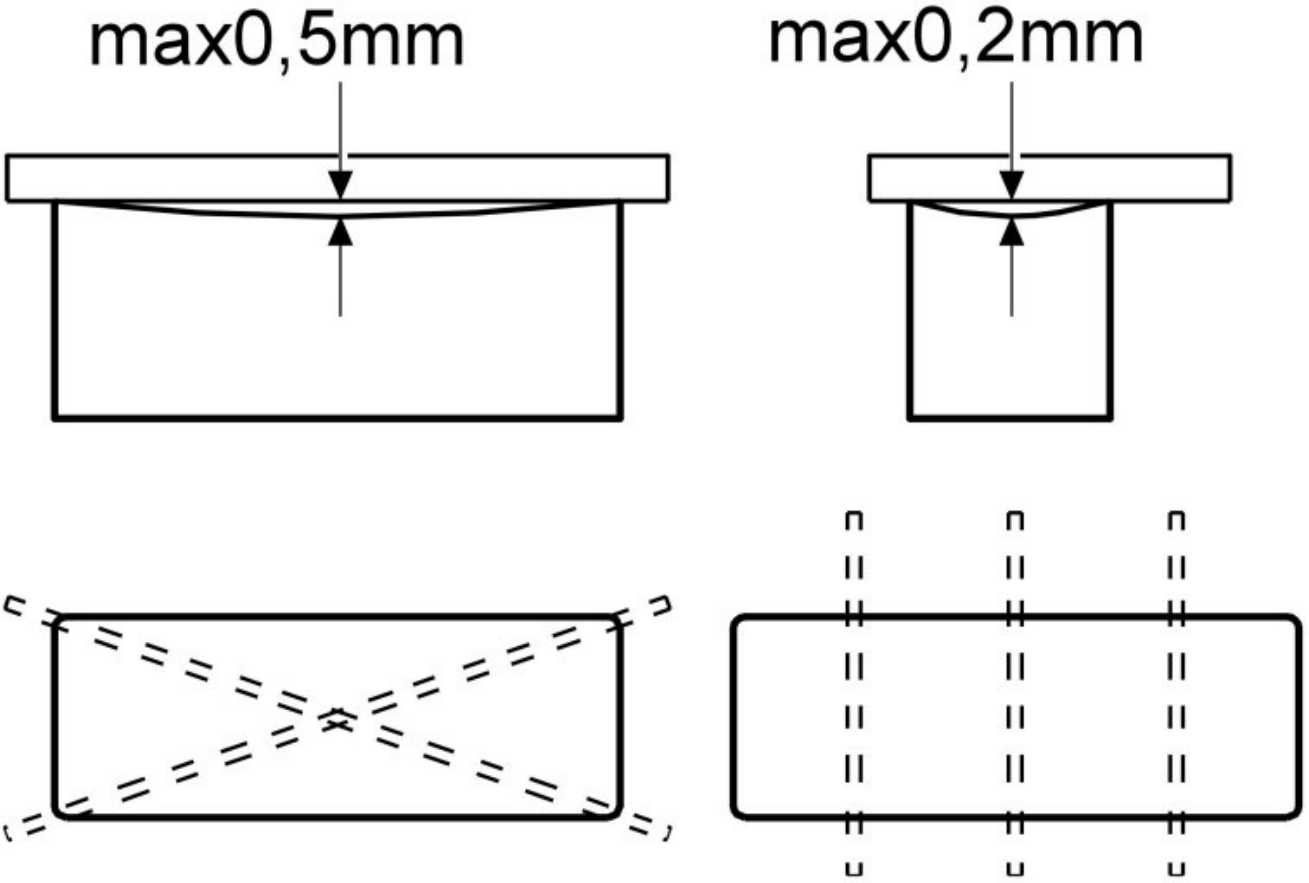


Inlet/Exhaust.0.03-0.06 mm
Inlet/Exhaust.0.15 mm

Camshafts

Inlet camshaft	Part number	Maximum lift height (mm)	Exhaust camshaft	Part number	Maximum lift height (mm)
B5204Tx excluding T4	9207943	8.40	**B5204Tx**	9207944	9.05
B5204T4	9207941	8.15			
B5234Tx	9207943	8.40	**B5234Tx**	9207944	9.05
B5244Tx excluding T2, T3	9207942	8.40	**B5244Tx** excluding T3	9207944	9.05
B5244T2	9497231	8.40	**B5244T3**	9497822	9.05
B5244T3	9497823	8.45	**B5254Tx**	9207944	9.05
B5254Tx	9207942	8.40			

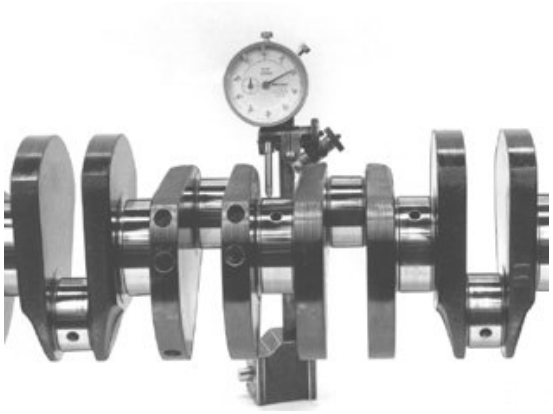
Cylinder head



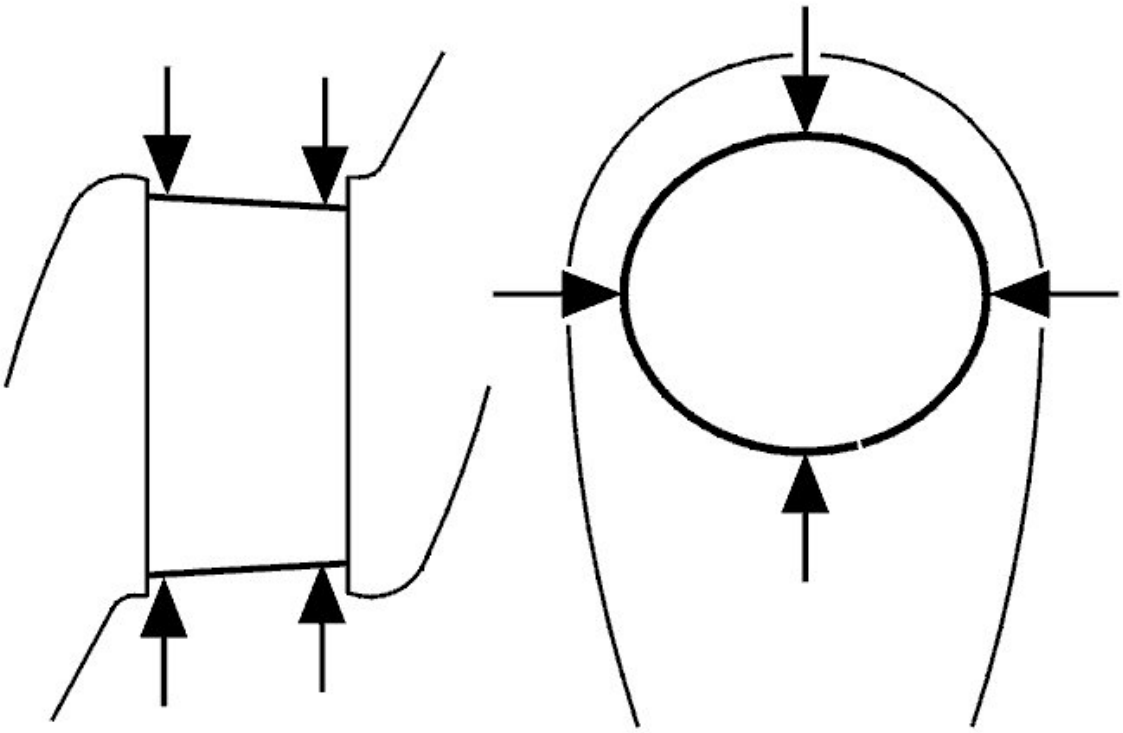
Front-rear.0.50 mm
Lateral.0.20 mm
Cylinder head height.129.00± 0.05 mm
Maximum machining.0.30 mm

Caution! Scratches and corrosion to the cylinder head gasket face should only be machined on a flat cylinder head.

Crank mechanism



Main bearing journal radial runout. maximum 0.040 mm
Axial play (Measured in the engine with the intermediate section tightened). 0.08-0.19 mm
Main bearing journal radial runout. 0.020-0.043 mm

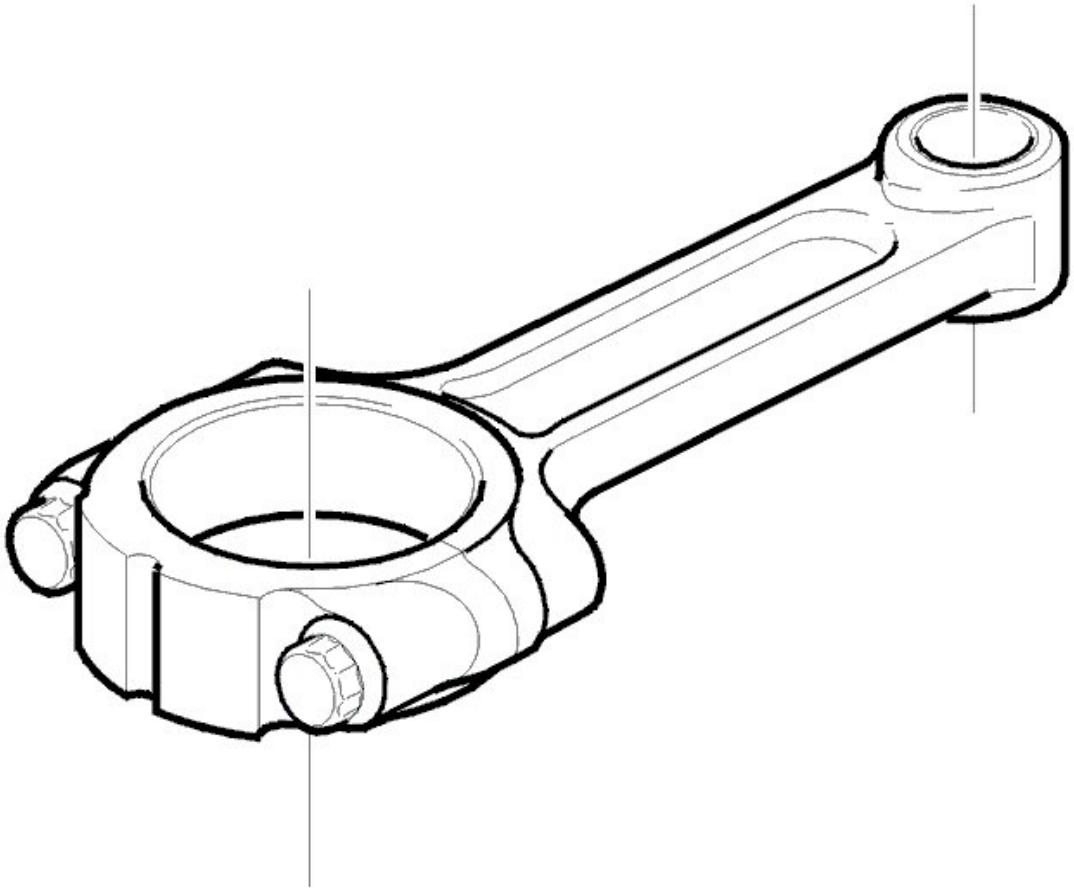


Diameter, standard. 50.000 +0/-0.016
Bearing recess width. 26.0 ± 0.1 mm
Maximum out-of-round. 0.004 mm
Maximum taper. 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard. 65.000 +0.003/-0.016 mm
Axial bearing width. 26.00 +0/-0.04mm
Maximum out-of-round. 0.004 mm
Maximum taper. 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

Designation	B52x4Tx excluding B5244T3	B5244T3
Big end (mm)	53.000 -0/+0.013	53.000 -0/+0.013
Small end (mm)	21.000 +0.011/+0.005	23.000 +0.011/+0.005
Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Engine oil

Oil volume including filter.6.6 liters
According to API Service.lowest SH or SJ.
According to ACEA.Grade A2, A2/B2, A3 or A3/B3.
13.3 r/s (800 rpm).0.10 Mpa
14.2 r/s (850 rpm).0.10 Mpa
66.7 r/s (4000 rpm).0.35 Mpa
Maximum oil pressure (the relief valve opens).0.48 Mpa

The oil pressure given is for an oil temperature of 100 °C, which is reached after 10-15 minutes driving.

Fuel line pressure

Desired value	
Relative pressure	380 kPa
absolute pressure	480 kPa

Cooling system

Marking. 90
Starts to open at. 90°C
Fully open at. 105°C

Camshaft Bearing

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of specific components and tightening torques

Note! Screws coated with locking fluid or sealant must always be replaced with new screws during reinstallation.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Exhaust system (to the turbocharger (TC))	24 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	Stage 1.....65 Nm Stage 2.....60°
Subframe screws (start on the left-hand side, then the right-hand side)	Stage 1.....105 Nm Stage 2.....120°
Subframe bracket	50 Nm
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block)	Stage 1.....35 Nm Stage 2.....60°
Engine mounting Right side (M8x23 to cylinder block)	Stage 1.....20 Nm Stage 2.....60°
Right-hand engine pad for the subframe (Only applies to XC90)	Stage 1.....120 Nm Stage 2.....40°
Lower torque rod, transmission screw	Stage 1.....35 Nm Stage 2.....40°
Lower torque rod, sub-frame nut	Stage 1.....65 Nm Stage 2.....60°
Oil filter (environmental filter)	25 Nm

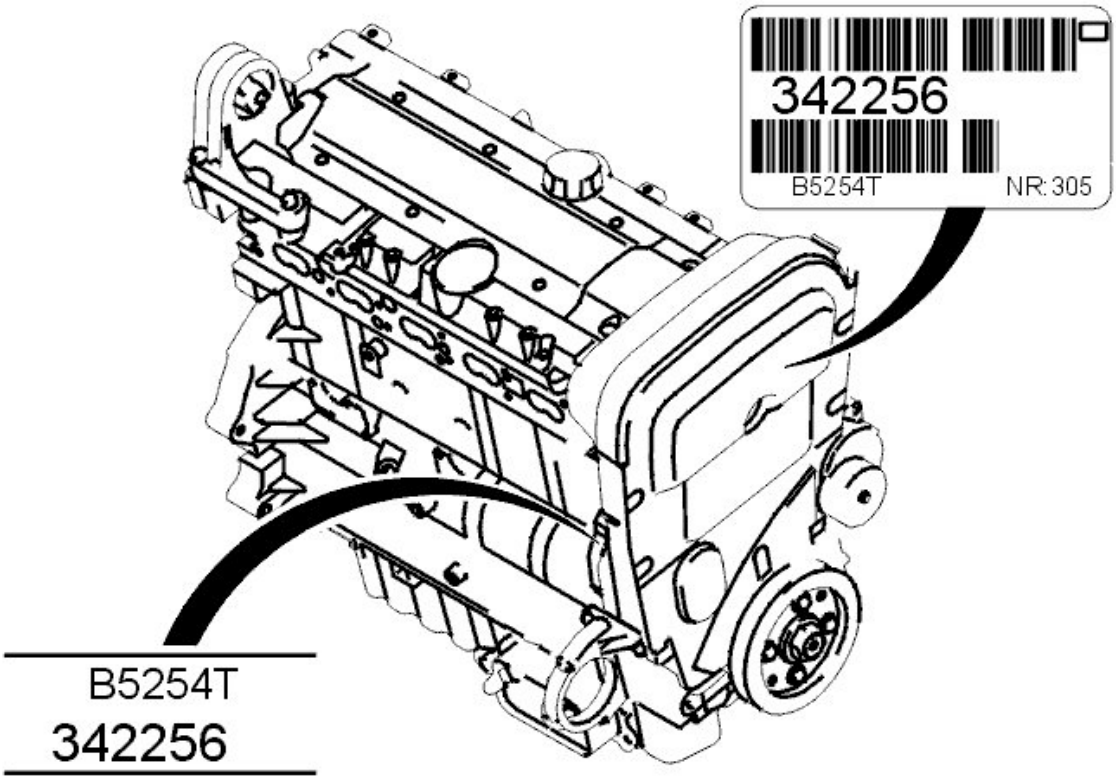
Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm
Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to .....3 Nm the screws (5). Tighten to .....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2 .....60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover,(front/rear)	12 Nm
Timing cover,(upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....90°
Transmission screw (lower torque rod)	Stage 1.....35 Nm Stage 2.....40°
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

Specifications, Mechanical

Specifications, mechanical

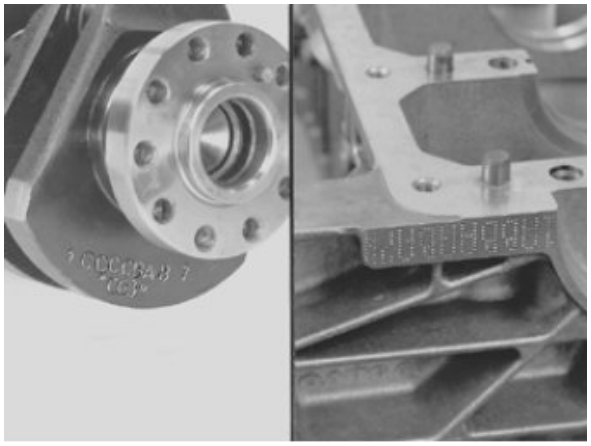
Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Engine manufacture number, engine serial number and type

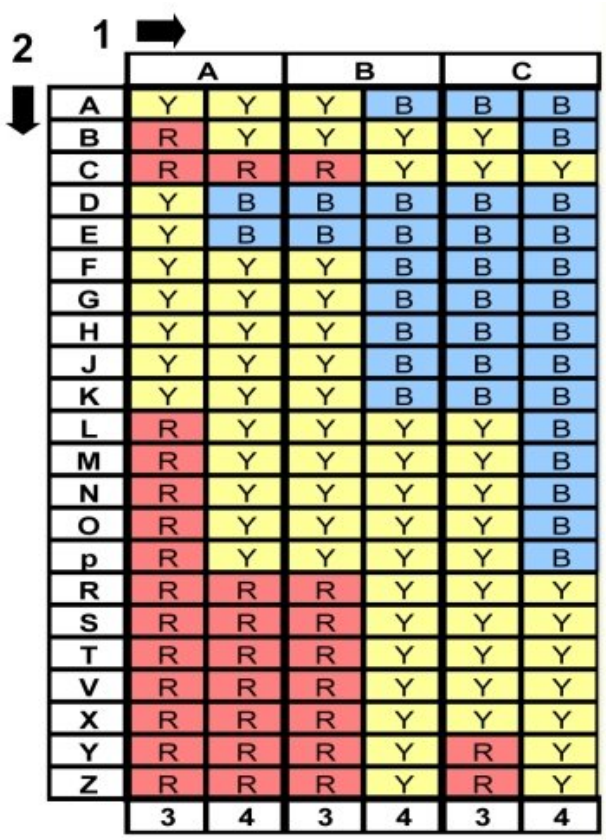


The engine serial number and type are stamped on the left side of the cylinder block at the top of the mounting for the water pump. There is also a decal on the timing casing with the engine type, manufacturing number, and serial number.

Classification of main bearings



The marking is stamped on the cylinder block and crankshaft.



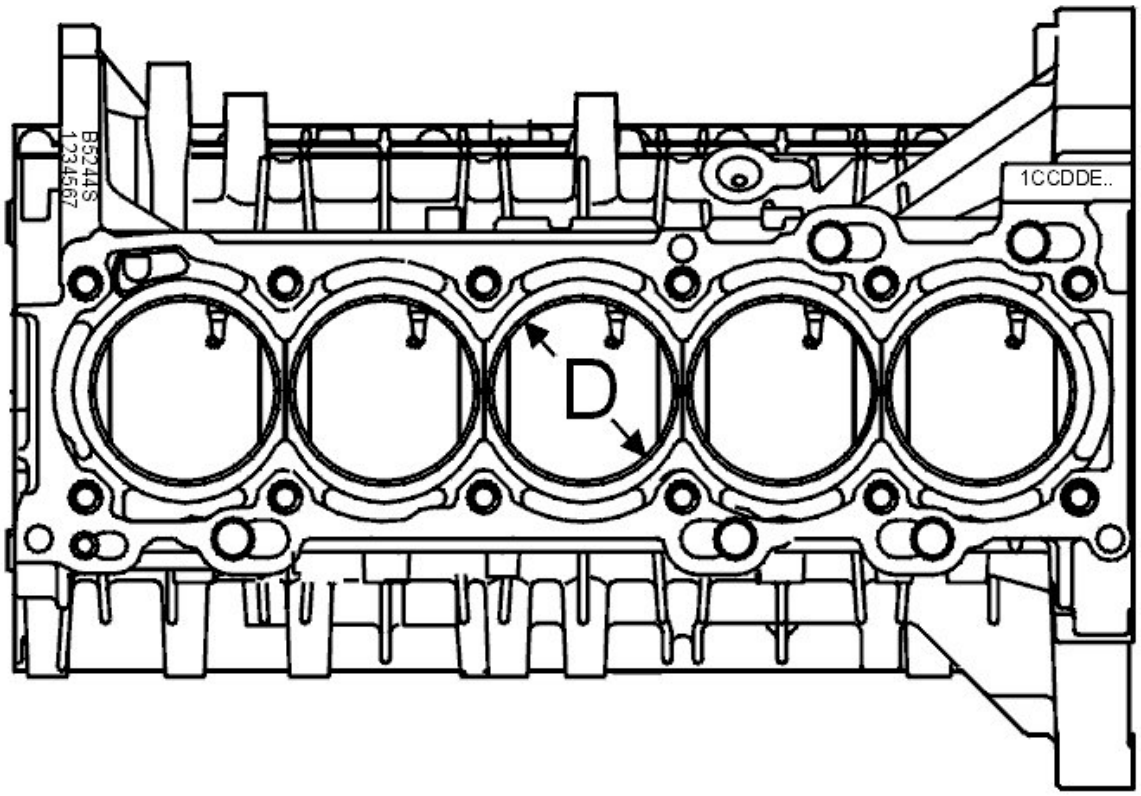
2 \ 1	A		B		C	
A	Y	Y	Y	B	B	B
B	R	Y	Y	Y	Y	B
C	R	R	R	Y	Y	Y
D	Y	B	B	B	B	B
E	Y	B	B	B	B	B
F	Y	Y	Y	B	B	B
G	Y	Y	Y	B	B	B
H	Y	Y	Y	B	B	B
J	Y	Y	Y	B	B	B
K	Y	Y	Y	B	B	B
L	R	Y	Y	Y	Y	B
M	R	Y	Y	Y	Y	B
N	R	Y	Y	Y	Y	B
O	R	Y	Y	Y	Y	B
p	R	Y	Y	Y	Y	B
R	R	R	R	Y	Y	Y
S	R	R	R	Y	Y	Y
T	R	R	R	Y	Y	Y
V	R	R	R	Y	Y	Y
X	R	R	R	Y	Y	Y
Y	R	R	R	Y	R	Y
Z	R	R	R	Y	R	Y
	3	4	3	4	3	4

1. Classification cylinder block
2. Classification crankshaft
3. Cylinder block
4. Intermediate section

General data (engine capacities)

	B5204T5	B5234T3	B5244T2	B5244T3	B5254T2
Output (kw at rpm)	132/5280	184/5220	195/5700	147/6000	154/5000
Maximum torque (Nm at rpm)	240/2220-5280	330/2520-5220	350/2400-5100	285/1800-4980	320/1500-4500
Max rpm	6200	6200	6200	6200	6500
Idling (rpm)	670	670	850	670	670
No. of cylinders	5	5	5	5	5
Cylinder bore (mm)	81	81	83	83	83
Stroke (mm)	77	90	90	90	93.2
Cylinder displacement (dmÂ³ =litres)	1984	2319	2435	2435	2521
Firing sequence	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3	1-2-4-5-3
Compression ratio	9.5:1	8.5:1	8.5:1	9.0:1	9.0:1
Weight, complete, including oil (kg)	approximately 177	approximately 177	approximately 177	approximately 177	approximately 177

Cylinder block

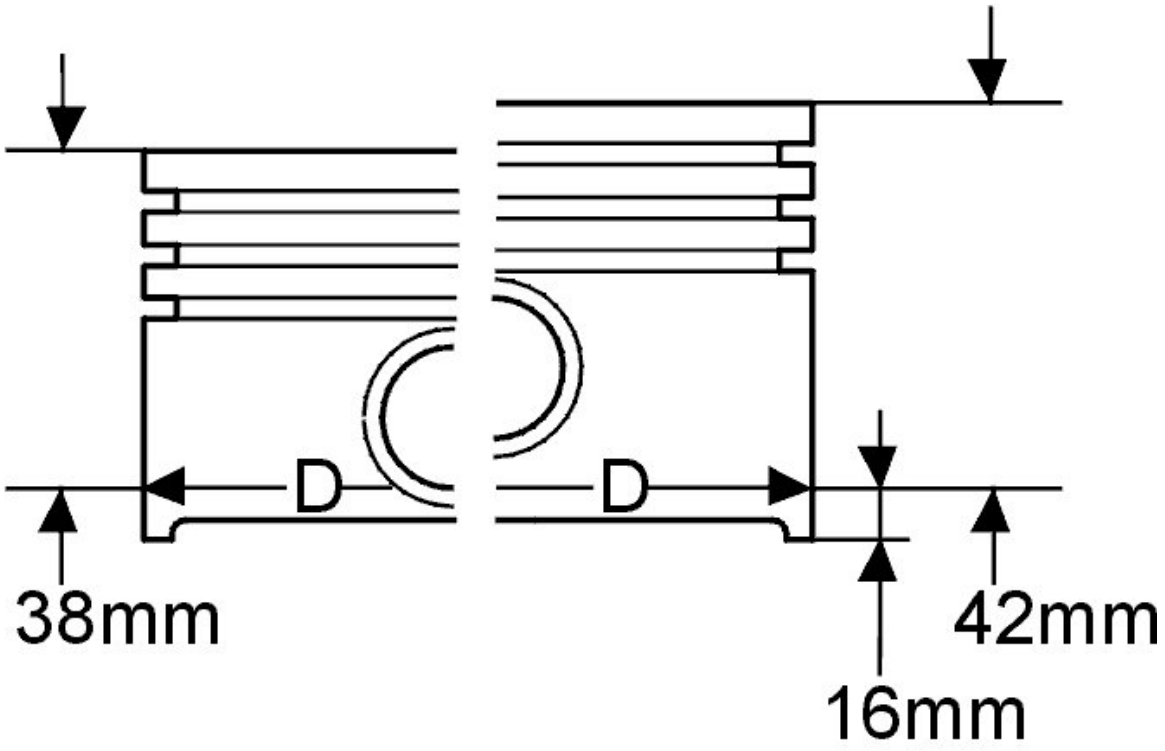


Bore (D) in mm

Standard	B5204Tx	B5234Tx	B5244Tx
C-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010
D-markedÂ¹	81.010-81.020	81.010-81.020	83.010-83.020
E-markedÂ¹	81.020-81.030	81.020-81.030	83.020-83.030

The bore classification is stamped on top of the engine block. For example: 1CCDDE is read as cyl 1=C, cyl 2=C, cyl 3=D, cyl 4=D, cyl 5=E.

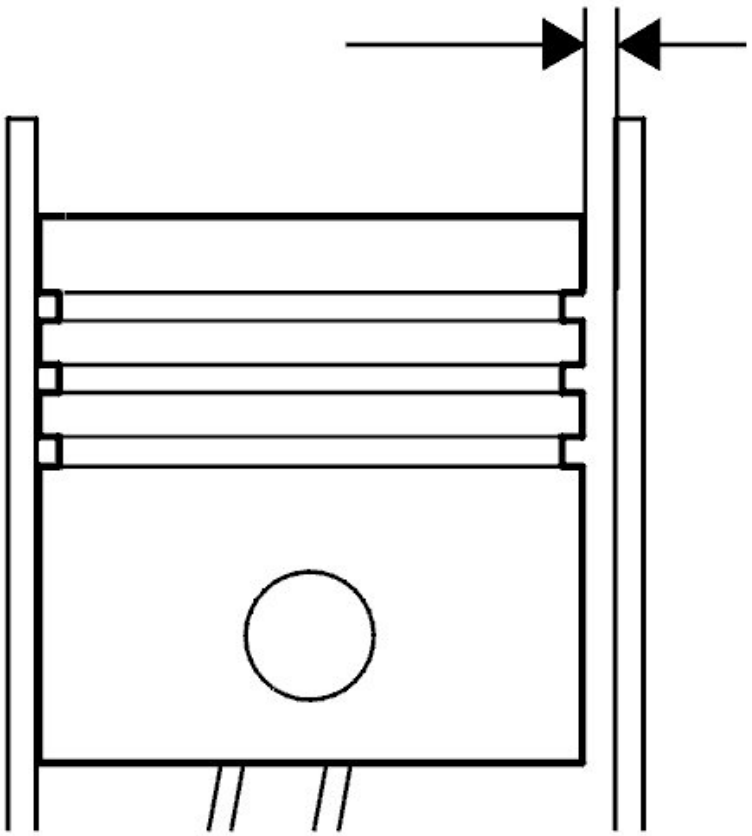
Pistons (engine capacities)



Bore (D) in mm

Standard	**B5204T5** Measured 16 mm from the bottom of the piston	**B5234T3** Measured 42 mm from the top of the piston	**B5244T2** Measured 42 mm from the top of the piston	**B5244T3** Measured 38 mm from the top of the piston
C-markedÂ¹	80.980-80.990	80.980-80.990	82.980-82.990	82.980-82.990
D-markedÂ¹	80.990-81.000	80.990-81.000	82.990-83.000	82.990-83.000
E-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010	83.000-83.010

Classification is marked on the top of the piston.



Piston running clearance (example)

Measured cylinder diameter.....	83.015 mm
Measured piston diameter.....	82.995 mm
The piston running clearance is.....	0.020 mm
The piston running clearance must be 0.010-0.030 mm.	

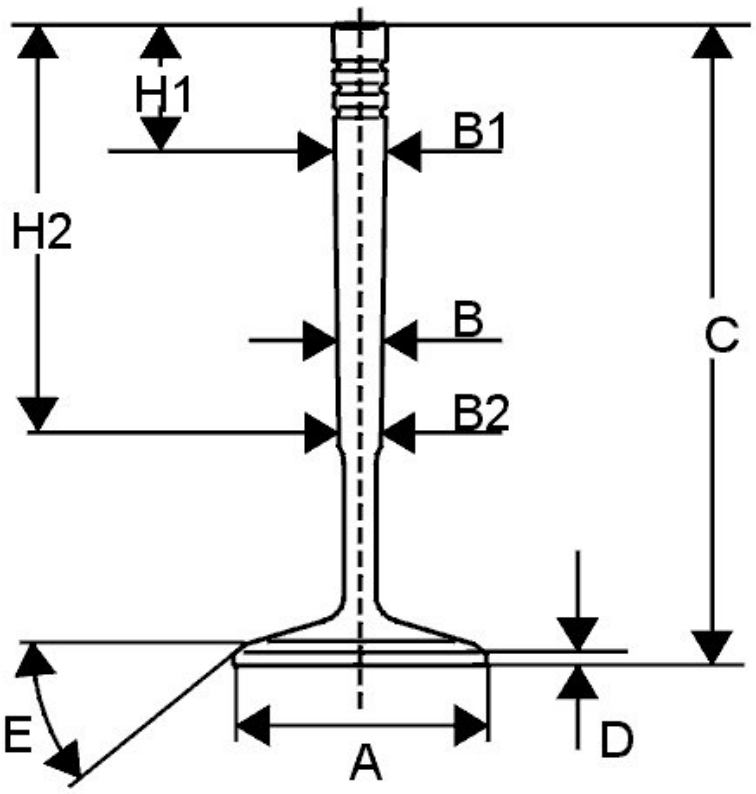
Piston rings

Upper compression ring.0.030-0.070 mm
Lower compression ring.0.030-0.070 mm
Oil control ring assembly.0.038-0.142 mm
Upper.1,200 -0.010/-0.030 mm
Lower.1,500 -0.010/-0.030 mm
Spring.1.510 ± 0.020 mm
Rail.0.460 ± 0.011 mm

Piston pin

	B52x4Tx (excluding B5244T3)	**B5244T3**
Diameter (mm)	23.000 +0/-0.004	21.000 +0/-0.004
Length (mm)	61.000 +0/-0.200	60.000 +0/-0.200

Valves

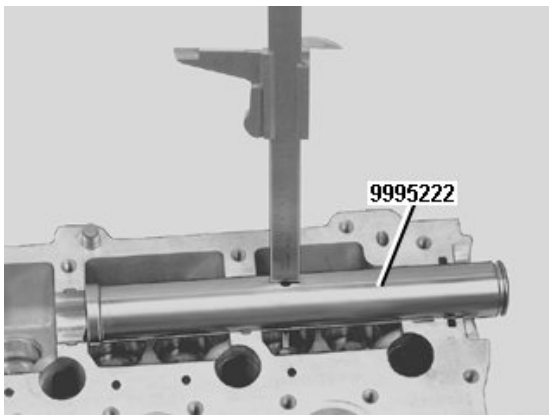


Inlet.31.00 ± 0.15 mm
Exhaust.27.00± 0.15 mm
Inlet (early versions).6.970 +0/-0.015mm
Inlet (late versions).5.970 +0/-0.015mm

Valve stem diameter (B1/B2)

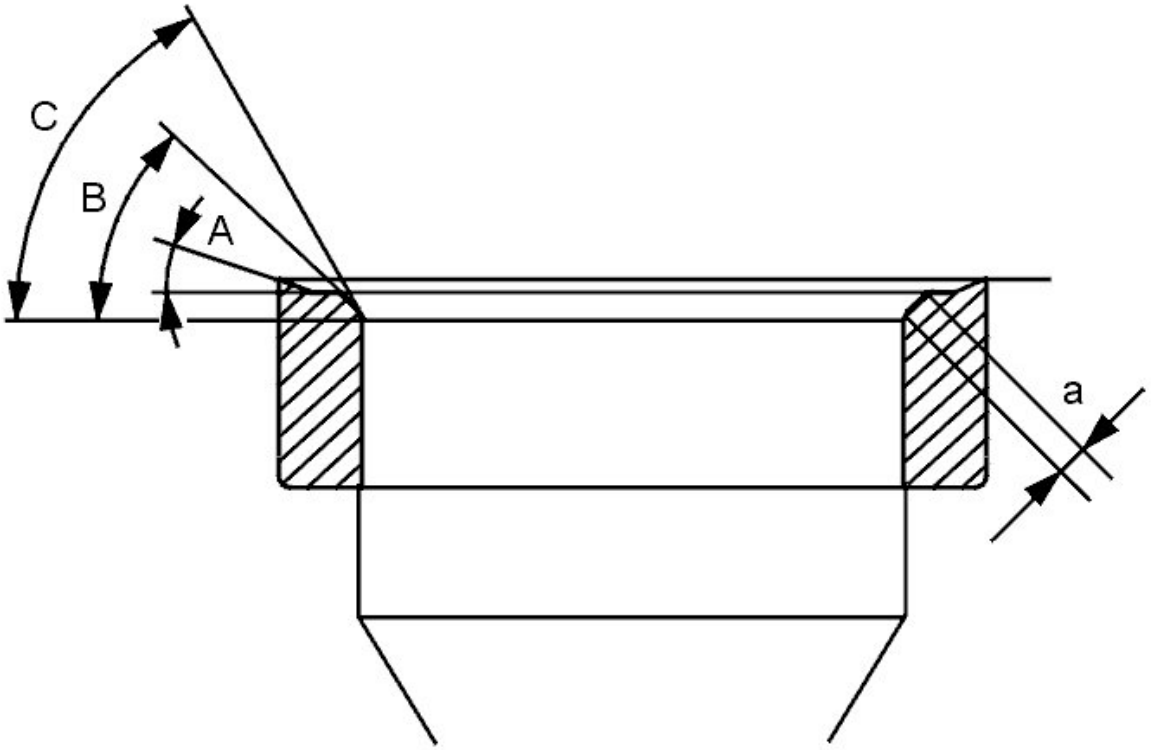
Exhaust (early versions)	
H1 = 22.7 mm	B1 = 6,962 ± 0.007 mm
H2 = 65.1	B2 = 6,954 ± 0.007 mm
Exhaust (late versions)	
H1 = 22.7 mm	B1 = 5.962 ± 0.007 mm
H2 = 65.1	B2 = 5954 ± 0.007 mm

Inlet.102.00 ± 0.07 mm
Exhaust.101.05± 0.07 mm
Inlet and exhaust.1.50 mm
Minimum height after grinding.1.20 mm
Inlet and exhaust.44.5°



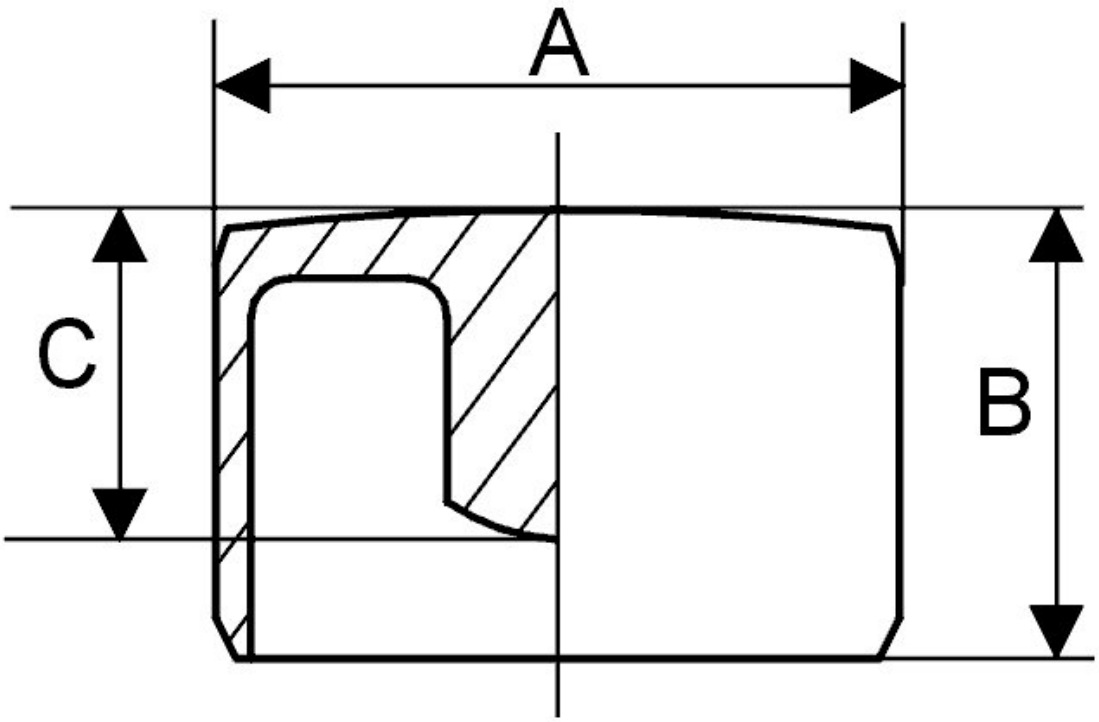
Valve stem height.48.4± 0.5 mm
Maximum machining of the valve stem.0.5 mm

Valve seats



Upper reduction angle (A)
Inlet.....20°
Exhaust.....15°
Matching surface angle (B)
Inlet/Exhaust.....45°
Lower reduction angle (C)
Inlet/Exhaust.....60°
Valve seat, width (a)
Inlet.....1.4-1.8 mm
Exhaust.....1.8-2.2 mm

Tappets



Tappets, dimensions

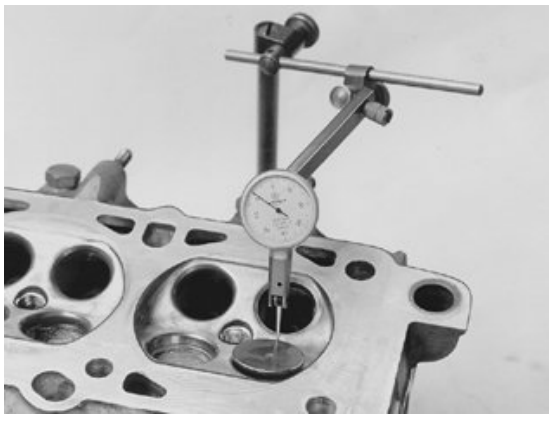
External diameter (A).32.000 +0.025/-0.041 mm
External height (B).26.0± 0.5 mm
Solid valve lifter shaft length (C)

15.96 mm at 0.02 mm intervals up to 16.16 mm. The dimensions are listed on the inside of each valve lifter.

Valve springs

Length.45.1 + 1.5/-0.5 mm
Type.Conical

Valve guides

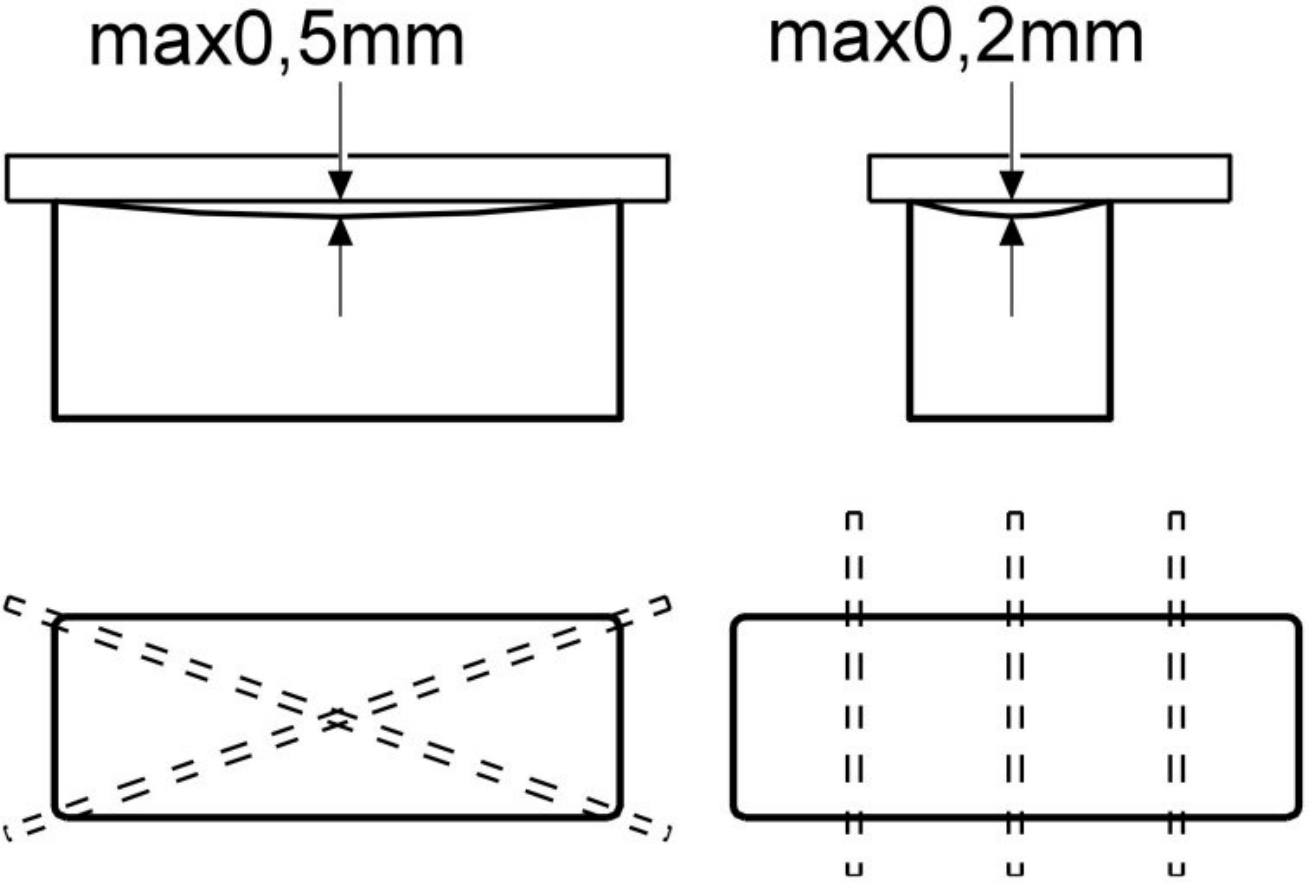


Inlet/Exhaust.0.03-0.06 mm
Inlet/Exhaust.0.15 mm

Camshafts

Inlet camshaft	Part number	Maximum lift height (mm)	Exhaust camshaft	Part number	Maximum lift height (mm)
B5204Tx excluding T4	9207943	8.40	**B5204Tx**	9207944	9.05
B5204T4	9207941	8.15			
B5234Tx	9207943	8.40	**B5234Tx**	9207944	9.05
B5244Tx excluding T2, T3	9207942	8.40	**B5244Tx** excluding T3	9207944	9.05
B5244T2	9497231	8.40	**B5244T3**	9497822	9.05
B5244T3	9497823	8.45	**B5254Tx**	9207944	9.05
B5254Tx	9207942	8.40			

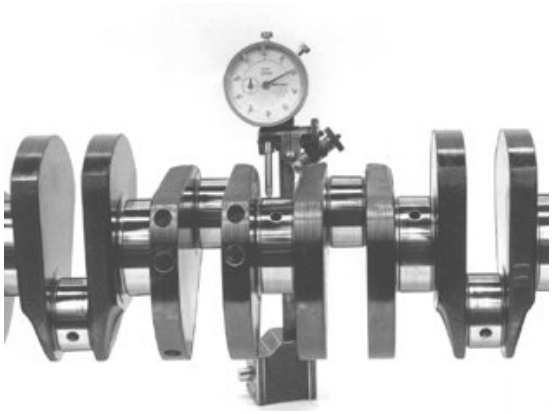
Cylinder head



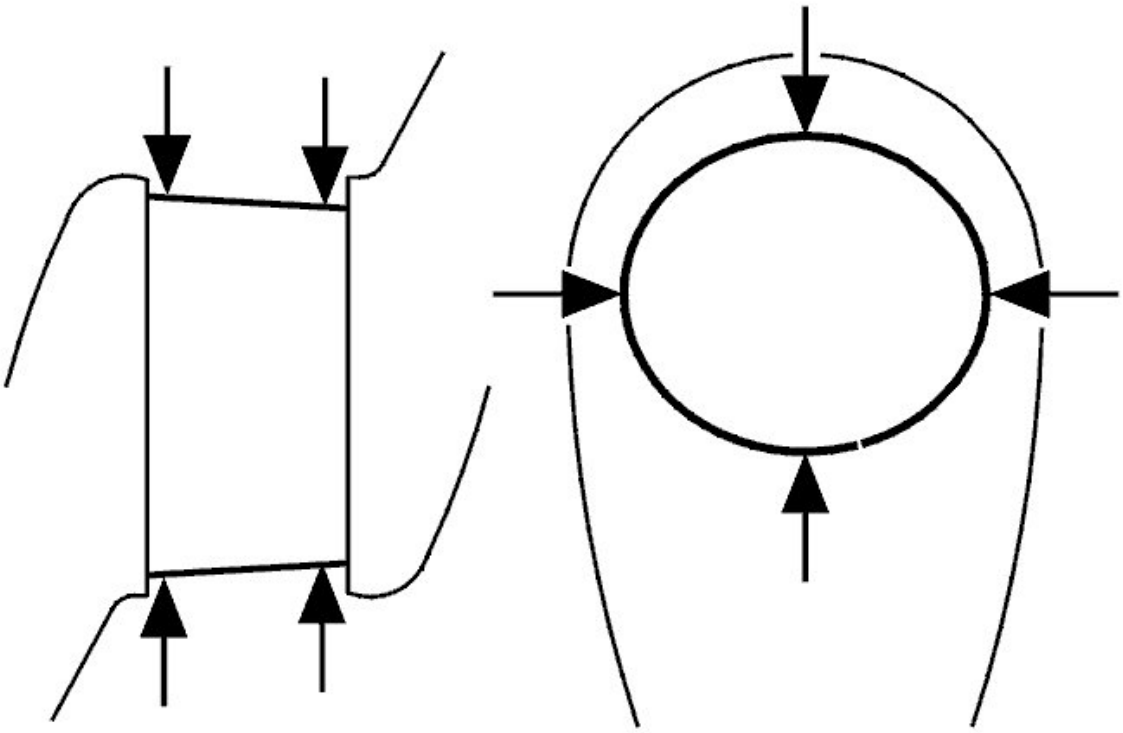
Front-rear.0.50 mm
Lateral.0.20 mm
Cylinder head height.129.00± 0.05 mm
Maximum machining.0.30 mm

Caution! Scratches and corrosion to the cylinder head gasket face should only be machined on a flat cylinder head.

Crank mechanism



Main bearing journal radial runout. maximum 0.040 mm
Axial play (Measured in the engine with the intermediate section tightened). 0.08-0.19 mm
Main bearing journal radial runout. 0.020-0.043 mm

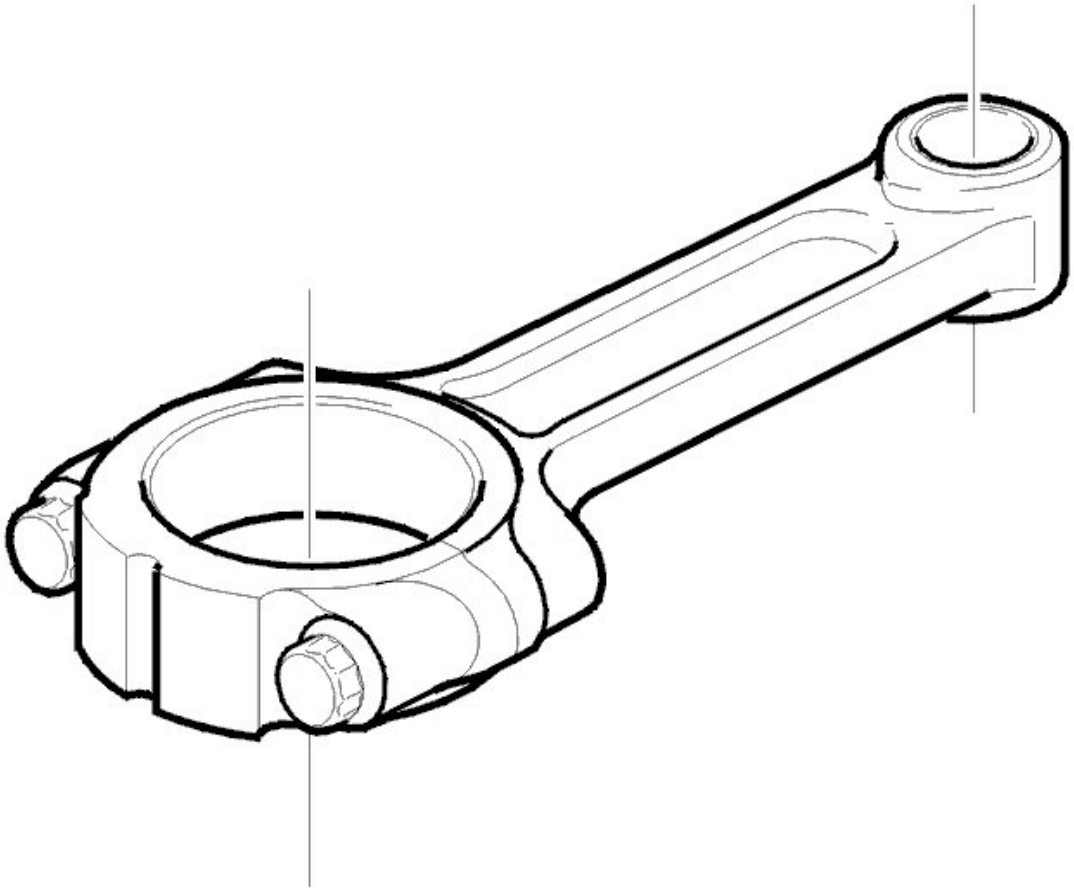


Diameter, standard. 50.000 +0/-0.016
Bearing recess width. 26.0 ± 0.1 mm
Maximum out-of-round. 0.004 mm
Maximum taper. 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard. 65.000 +0.003/-0.016 mm
Axial bearing width. 26.00 +0/-0.04mm
Maximum out-of-round. 0.004 mm
Maximum taper. 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

Designation	B52x4Tx excluding B5244T3	B5244T3
Big end (mm)	53.000 -0/+0.013	53.000 -0/+0.013
Small end (mm)	21.000 +0.011/+0.005	23.000 +0.011/+0.005
Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Engine oil

Oil volume including filter.6.6 liters
According to API Service.lowest SH or SJ.
According to ACEA.Grade A2, A2/B2, A3 or A3/B3.
13.3 r/s (800 rpm).0.10 Mpa
14.2 r/s (850 rpm).0.10 Mpa
66.7 r/s (4000 rpm).0.35 Mpa
Maximum oil pressure (the relief valve opens).0.48 Mpa

The oil pressure given is for an oil temperature of 100 °C, which is reached after 10-15 minutes driving.

Fuel line pressure

Desired value	
Relative pressure	380 kPa
absolute pressure	480 kPa

Cooling system

Marking. 90
Starts to open at. 90°C
Fully open at. 105°C

Tightening Torque

TIGHTENING TORQUE

General Tightening Torque

NOTE: Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Nuts and screws which are not self locking can be reused provided that they are in good condition.

Summary Of Specific Components And Tightening Torques

NOTE: Screws coated with locking fluid or sealant must be replaced with new when reinstalled.

Always use new screws and nuts when angle tightening. Any exceptions to this rule will be indicated in the method.

Angle-tightening in tight spaces.

Exhaust system (to the turbocharger (TC))	30 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....angle-tighten 130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	65 Nm. Angle-tighten 60º
Sub-frame screw	105 Nm. Angle-tighten 120°
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....angle-tighten 50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....angle-tighten 90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block) **Engine mounting Right side** (M8x23 to cylinder block)	Stage 1.....35 Nm Stage 2.....angle-tighten 60° Stage 1.....20 Nm Stage 2.....angle-tighten 60°
Lower torque rod, transmission screw	35 Nm. Angle-tighten 40º
Lower torque rod, sub-frame nut	65 Nm. Angle-tighten 60º
Oil filter (environmental filter)	25 Nm
Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm

Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to.....3 Nm the screws (5). Tighten to.....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....angle-tighten 65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....angle-tighten 30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2.....angle-tighten 60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover, (front/rear)	12 Nm
Timing cover, (upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....angle-tighten 90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....angle-tighten 90°
Transmission screw (lower torque rod)	35 Nm. Angle-tighten 40º
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

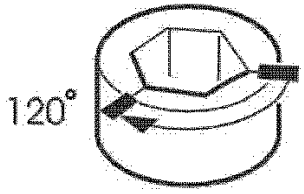
Screwed Joint, Torque/Angle Tightening

Special tools: 951 2050

There are a great number of torque wrench Systems available on the market where the wrench grip can be replaced with other types. These wench grips are normally ideally suited to torque tightening screwed joints in poorly accessible places.

There may be occasions when torque tightening of a screwed joint must be followed by angle tightening and space does not allow the use of protractor 951 2050. In these cases, use either a nut, a screw head or a tool. These are usually hexagonal and each corner is 60°. If there are twelve edges, each corner is 30°.

To angle tighten, mark the material and nut for example as illustrated and then tighten so that the markings are opposite each other.



Specifications, Mechanical

Specifications, mechanical

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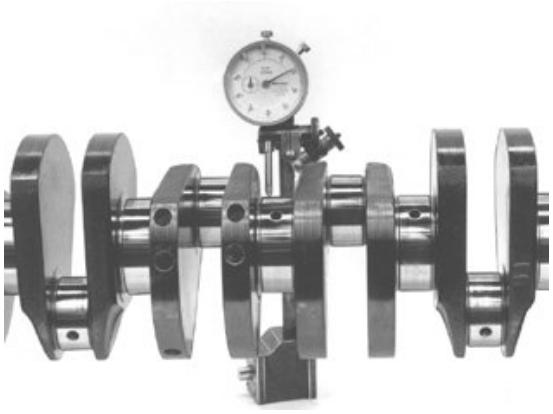
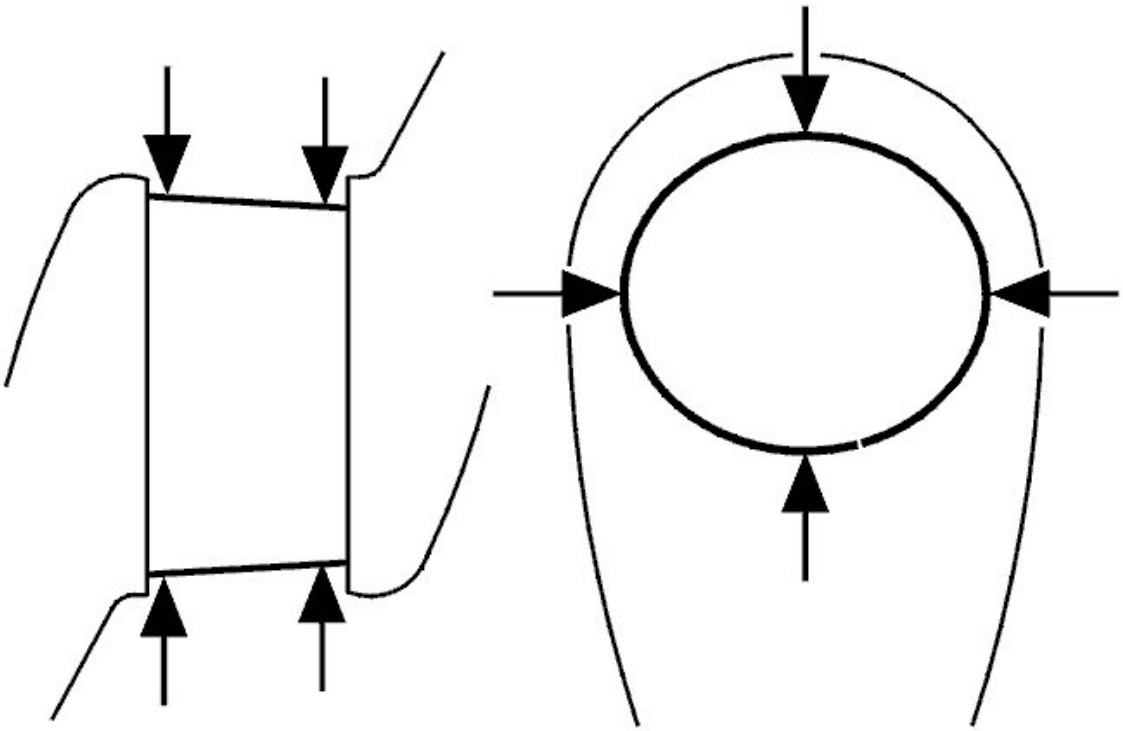
the essential information in the illustrations is always correct.

Crank mechanism



Main bearing journal radial runout: maximum 0.040 mm
Axial play (Measured in the engine with the intermediate section tightened): 0.08-0.19 mm
Main bearing journal radial runout: 0.020-0.043 mm

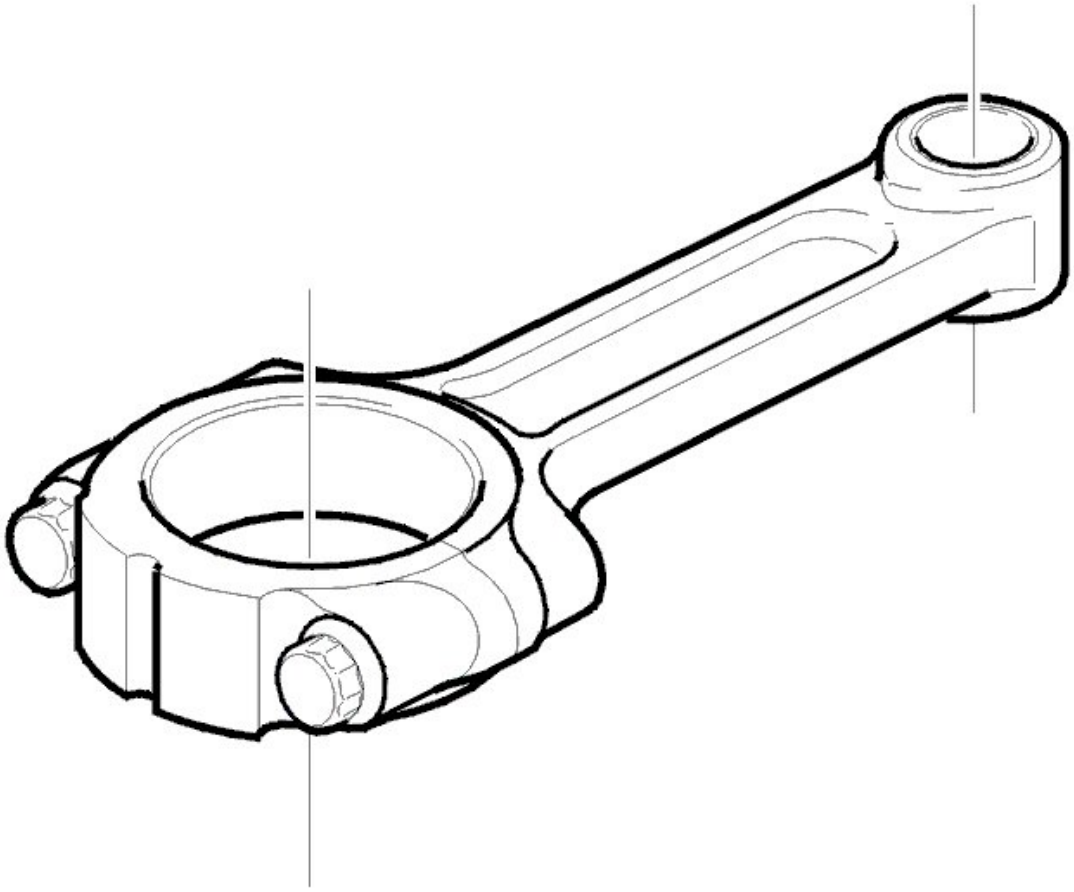


Diameter, standard: 50.000 +0/-0.016
Bearing recess width: 26.0 ± 0.1 mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard: 65.000 +0.003/-0.016 mm
Axial bearing width: 26.00 +0/-0.04mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

Designation	B52x4Tx excluding B5244T3	B5244T3
Big end (mm)	53.000 -0/+0.013	53.000 -0/+0.013
Small end (mm)	21.000 +0.011/+0.005	23.000 +0.011/+0.005
Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Tightening Torque

Connecting rod cap

connecting rod with treated toothed surface between the connecting rod and cap, screw with waist
Stage 1 ..... 20 Nm
Stage 2 ..... angle-tighten 90 degrees

connecting rod with fracture surface between the connecting rod and cap, fully threaded screw
Stage 1 ..... 30 Nm
Stage 2 ..... angle-tighten 90 degrees

Specifications, Mechanical

Specifications, mechanical

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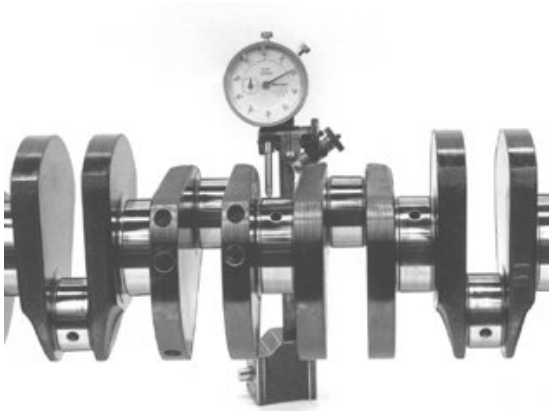
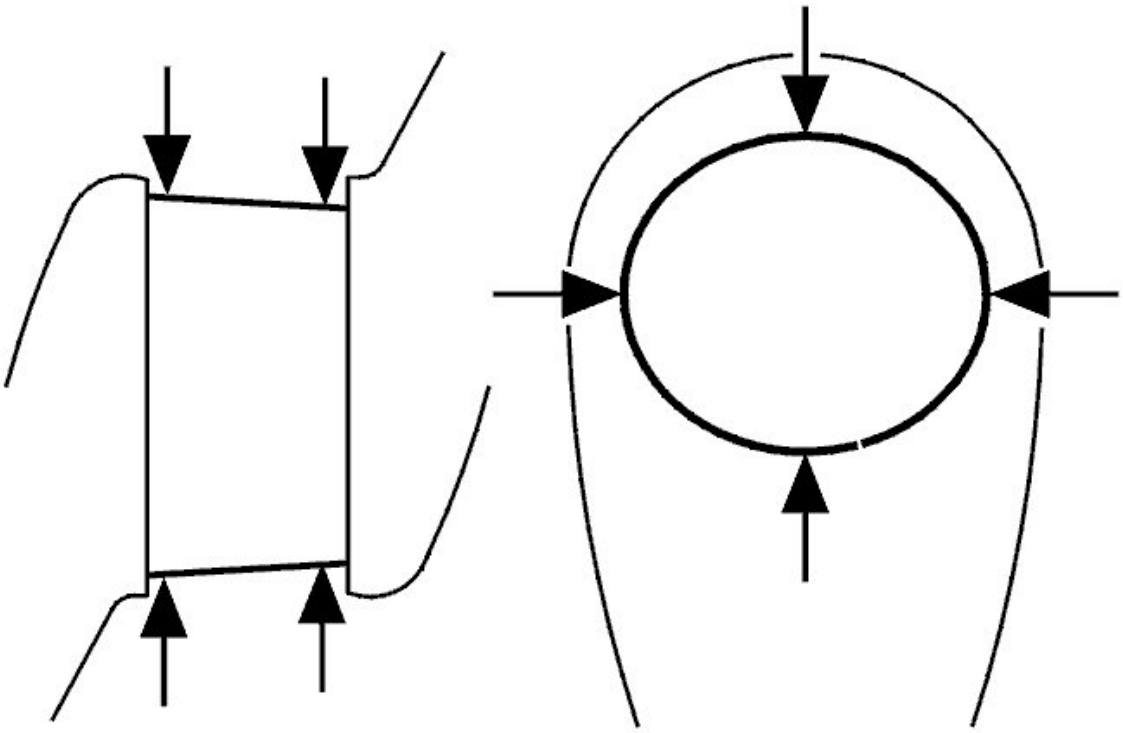
Crank mechanism



Main bearing journal radial runout: maximum 0.040 mm
Axial play (Measured in the engine with the intermediate section tightened): 0.08-0.19 mm
Main bearing journal radial runout: 0.020-0.043 mm



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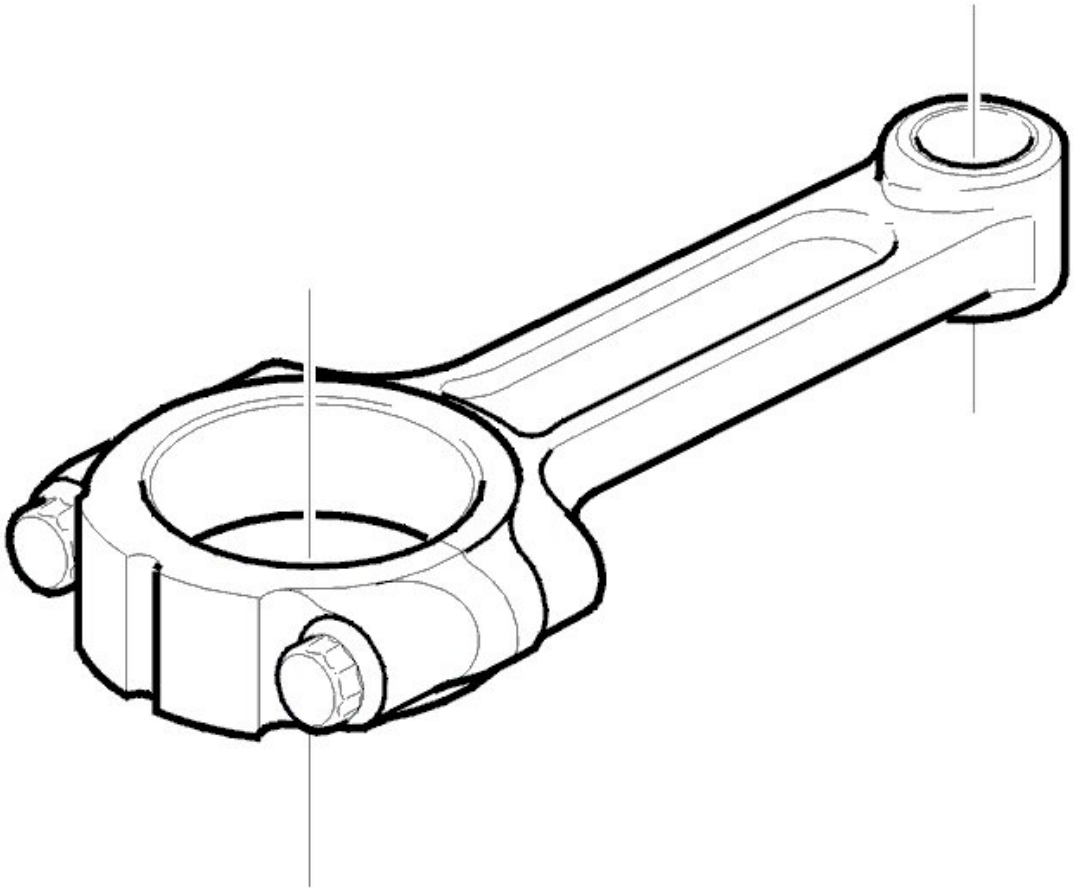
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard: 65.000 +0.003/-0.016 mm
Axial bearing width: 26.00 +0/-0.04mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

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Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Tightening Torque

Connecting rod cap

connecting rod with treated toothed surface between the connecting rod and cap, screw with waist

Stage 1 ..... 20 Nm
Stage 2 ..... angle-tighten 90 degrees

connecting rod with fracture surface between the connecting rod and cap, fully threaded screw

Stage 1 ..... 30 Nm
Stage 2 ..... angle-tighten 90 degrees

Crankshaft Gear/Sprocket

Tightening Specifications

Crankshaft Gear/Sprocket:

Vibration Damper Up To 2002:
Flanged screws x4
Step 1 ..... 25 Nm
Step 2 ..... Angle Tighten 30°

Vibration Damper From 2002:
Flanged screws x4

Step 1 ..... 25 Nm
Step 2 ..... Angle Tighten 60°

Center Nut ..... 180 Nm

Specifications, Mechanical

Specifications, mechanical

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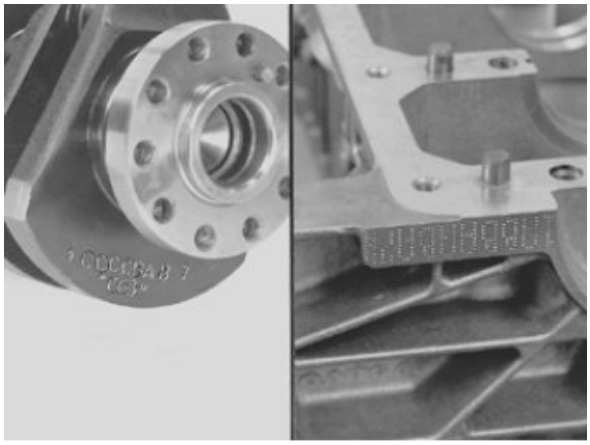
Classification of main bearings

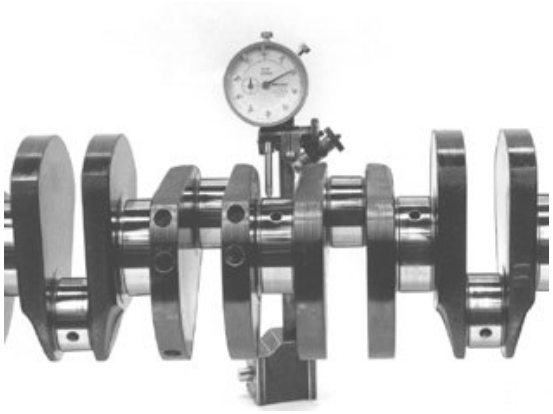


The marking is stamped on the cylinder block and crankshaft.

2 \ 1	A		B		C	
A	Y	Y	Y	B	B	B
B	R	Y	Y	Y	Y	B
C	R	R	R	Y	Y	Y
D	Y	B	B	B	B	B
E	Y	B	B	B	B	B
F	Y	Y	Y	B	B	B
G	Y	Y	Y	B	B	B
H	Y	Y	Y	B	B	B
J	Y	Y	Y	B	B	B
K	Y	Y	Y	B	B	B
L	R	Y	Y	Y	Y	B
M	R	Y	Y	Y	Y	B
N	R	Y	Y	Y	Y	B
O	R	Y	Y	Y	Y	B
p	R	Y	Y	Y	Y	B
R	R	R	R	Y	Y	Y
S	R	R	R	Y	Y	Y
T	R	R	R	Y	Y	Y
V	R	R	R	Y	Y	Y
X	R	R	R	Y	Y	Y
Y	R	R	R	Y	R	Y
Z	R	R	R	Y	R	Y
	3	4	3	4	3	4

1. Classification cylinder block
2. Classification crankshaft
3. Cylinder block
4. Intermediate section

Crank mechanism



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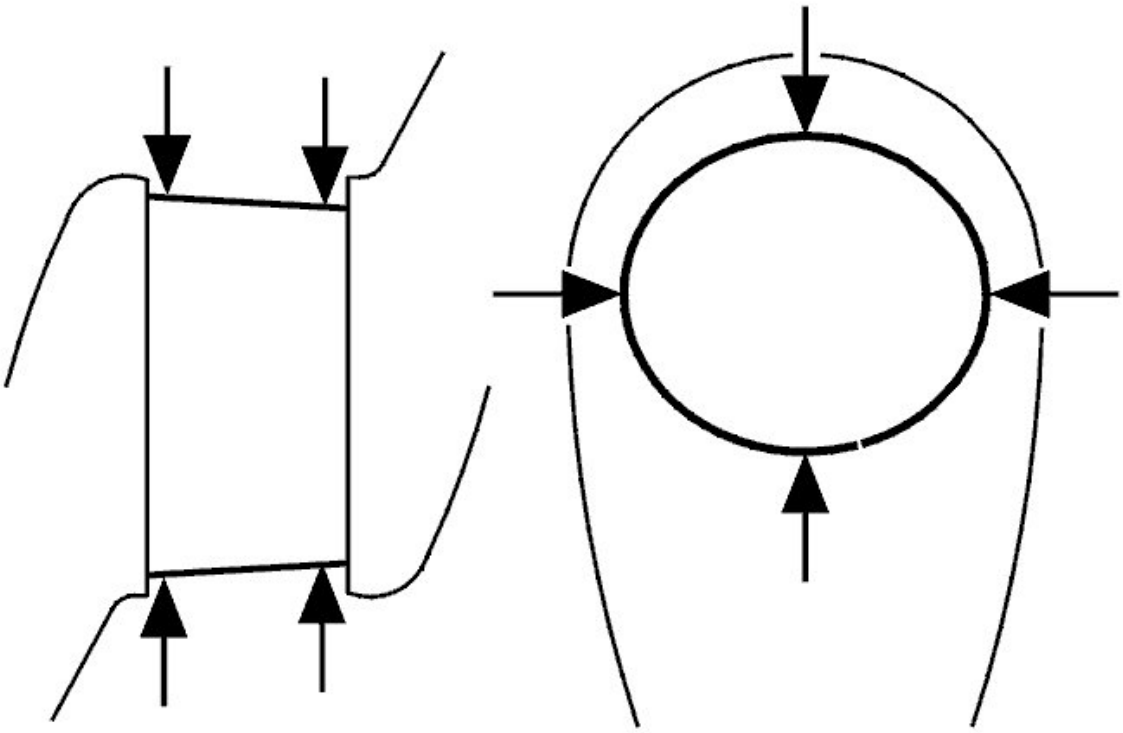
Main bearing journal radial runout: 0.020-0.043 mm

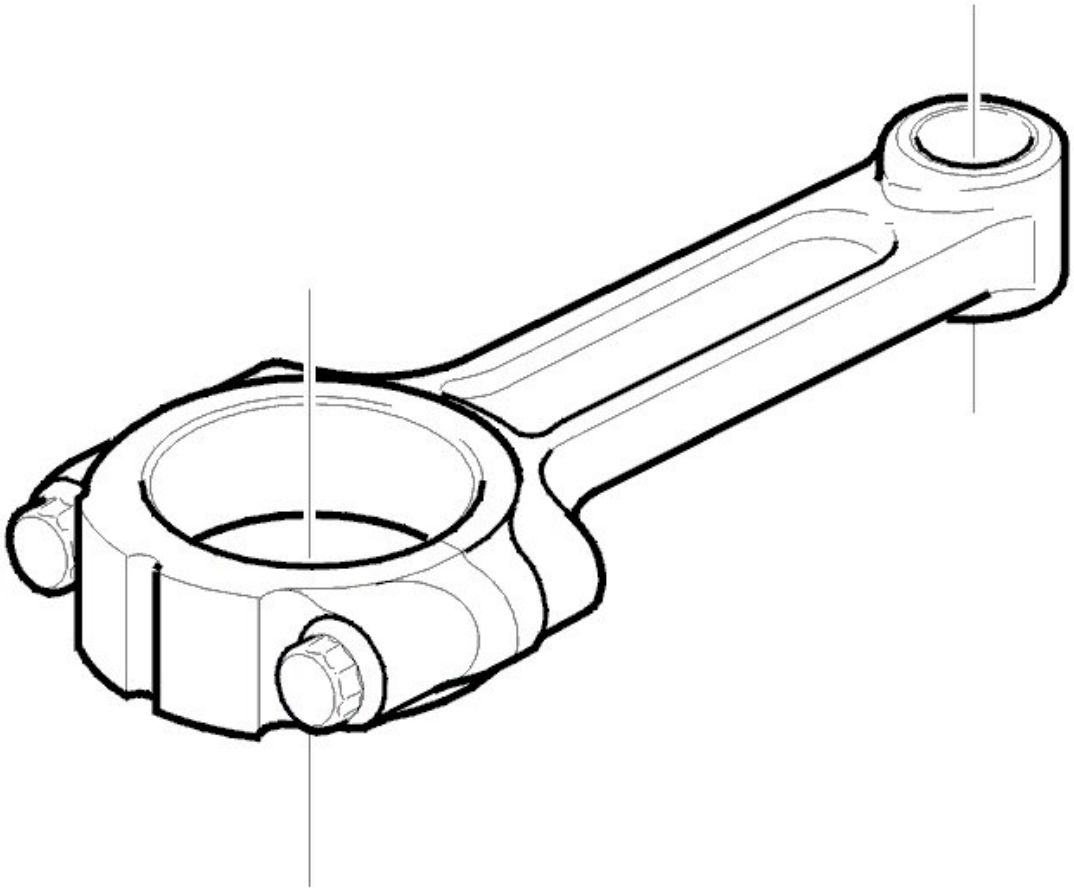


Diameter, standard: 50.000 +0/-0.016
Bearing recess width: 26.0 ± 0.1 mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard: 65.000 +0.003/-0.016 mm
Axial bearing width: 26.00 +0/-0.04mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

Designation	B52x4Tx excluding B5244T3	B5244T3
Big end (mm)	53.000 -0/+0.013	53.000 -0/+0.013
Small end (mm)	21.000 +0.011/+0.005	23.000 +0.011/+0.005
Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Tightening Torque

Intermediate Section

Tighten the screws in sequence from the center and outwards.

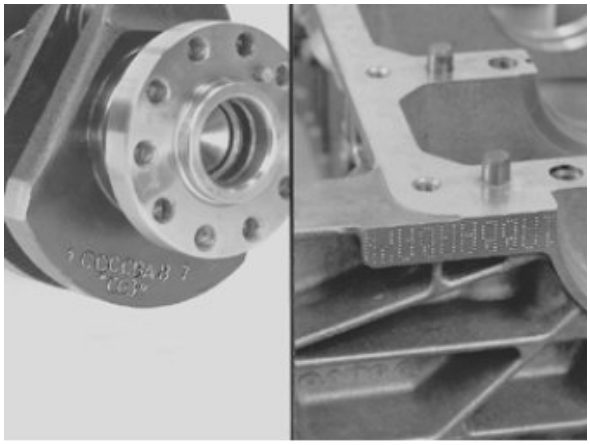
Stage 1 M10 screws ..... 20 Nm
Stage 2 M10 screws ..... 45 Nm
Stage 3 M8 screws ..... 24 Nm
Stage 4 M7 screws ..... 17 Nm
Stage 5 M10 screws ..... 90 degrees

Crankshaft, Engine

Specifications, mechanical

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Classification of main bearings

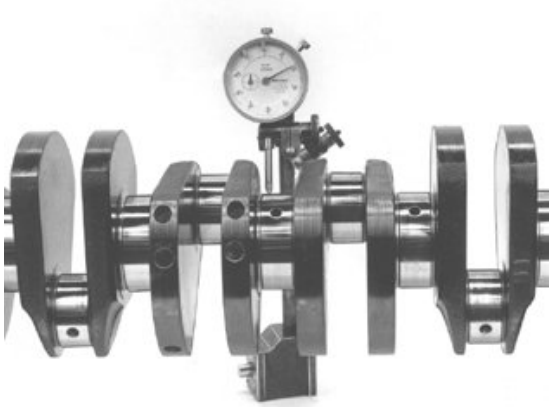


The marking is stamped on the cylinder block and crankshaft.

2 \ 1	A		B		C	
A	Y	Y	Y	B	B	B
B	R	Y	Y	Y	Y	B
C	R	R	R	Y	Y	Y
D	Y	B	B	B	B	B
E	Y	B	B	B	B	B
F	Y	Y	Y	B	B	B
G	Y	Y	Y	B	B	B
H	Y	Y	Y	B	B	B
J	Y	Y	Y	B	B	B
K	Y	Y	Y	B	B	B
L	R	Y	Y	Y	Y	B
M	R	Y	Y	Y	Y	B
N	R	Y	Y	Y	Y	B
O	R	Y	Y	Y	Y	B
p	R	Y	Y	Y	Y	B
R	R	R	R	Y	Y	Y
S	R	R	R	Y	Y	Y
T	R	R	R	Y	Y	Y
V	R	R	R	Y	Y	Y
X	R	R	R	Y	Y	Y
Y	R	R	R	Y	R	Y
Z	R	R	R	Y	R	Y
	3	4	3	4	3	4

1. Classification cylinder block
2. Classification crankshaft
3. Cylinder block
4. Intermediate section

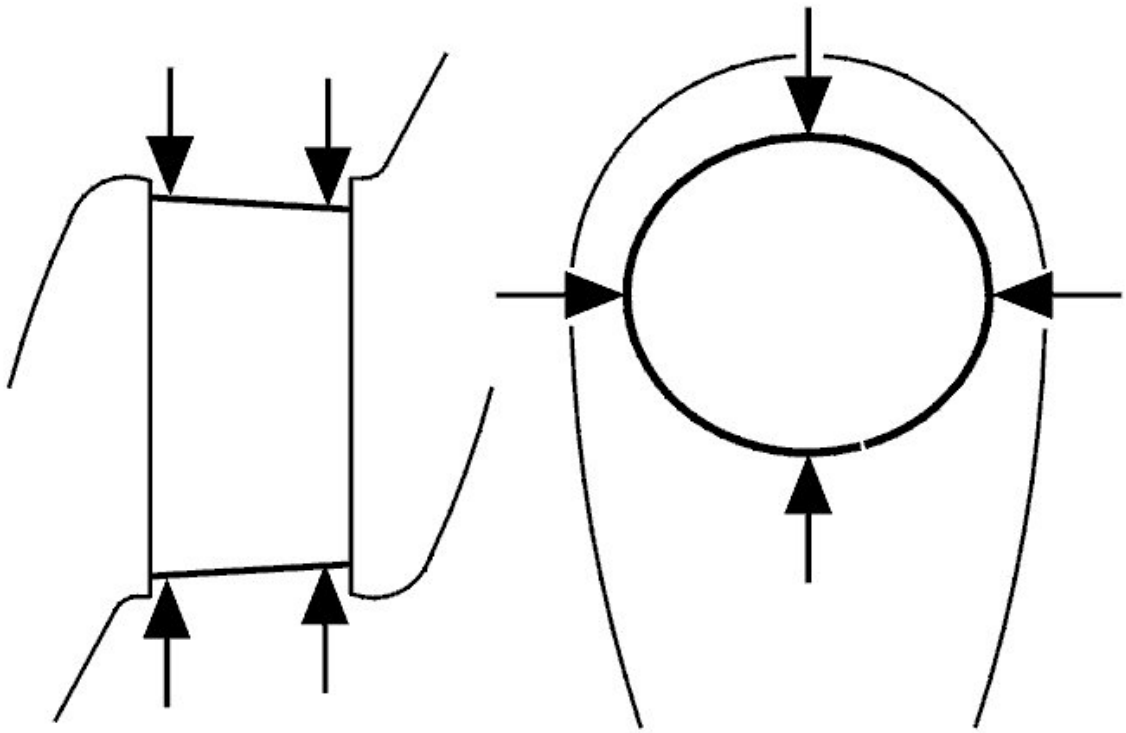
Crank mechanism



Main bearing journal radial runout: maximum 0.040 mm
Axial play (Measured in the engine with the intermediate section tightened): 0.08-0.19 mm

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Main bearing journal radial runout: 0.020-0.043 mm

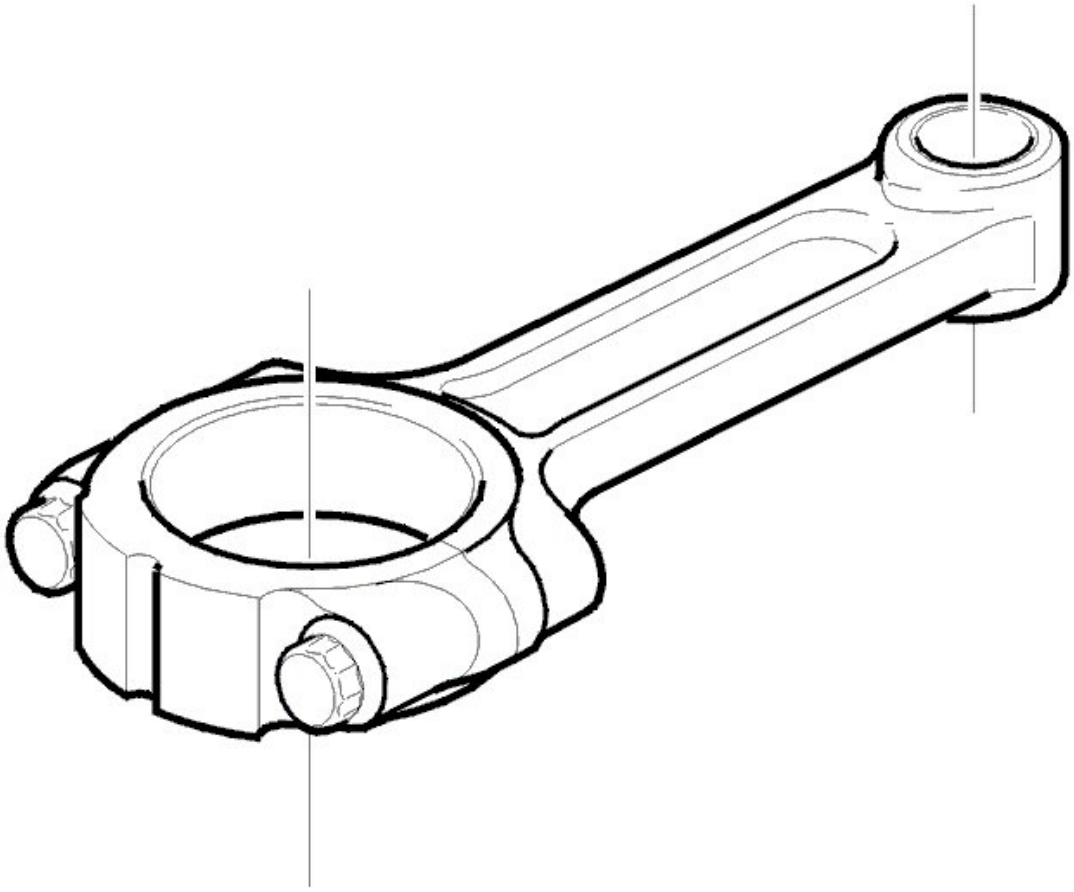


Diameter, standard: 50.000 +0/-0.016
Bearing recess width: 26.0 ± 0.1 mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.

Diameter, standard: 65.000 +0.003/-0.016 mm
Axial bearing width: 26.00 +0/-0.04mm
Maximum out-of-round: 0.004 mm
Maximum taper: 0.004 mm

The variation in diameter for each bearing journal must not exceed 0.008 mm.



Diameter, bearing recesses

Designation	B52x4Tx excluding B5244T3	B5244T3
Big end (mm)	53.000 -0/+0.013	53.000 -0/+0.013
Small end (mm)	21.000 +0.011/+0.005	23.000 +0.011/+0.005
Max. ovality in the bearing recesses	0.006	0.006
Length big end-small end (mm)	147	139.5

Harmonic Balancer - Crankshaft Pulley

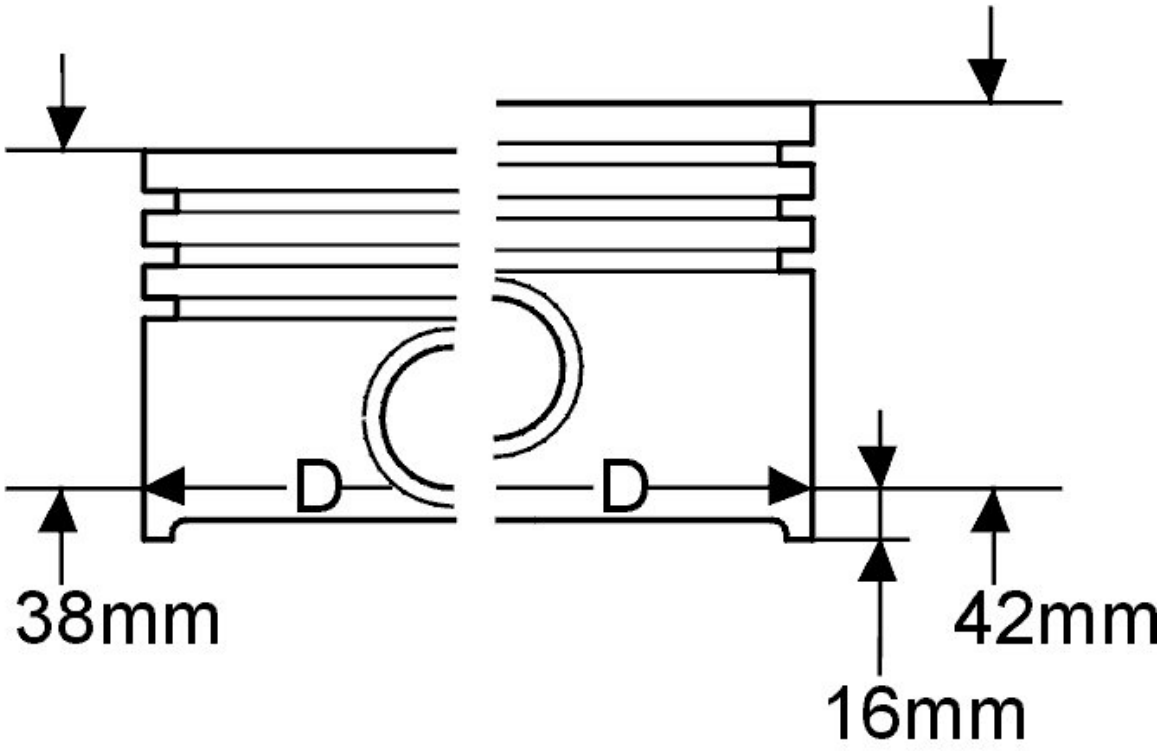
Vibration Damper
- Flanged Screws (x4)
  - Stage 1 ..... 25 Nm
  - Stage 2 ..... angle-tighten 60°
- Center nut ..... 180 Nm

Piston Pin, Engine

Specifications, mechanical

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

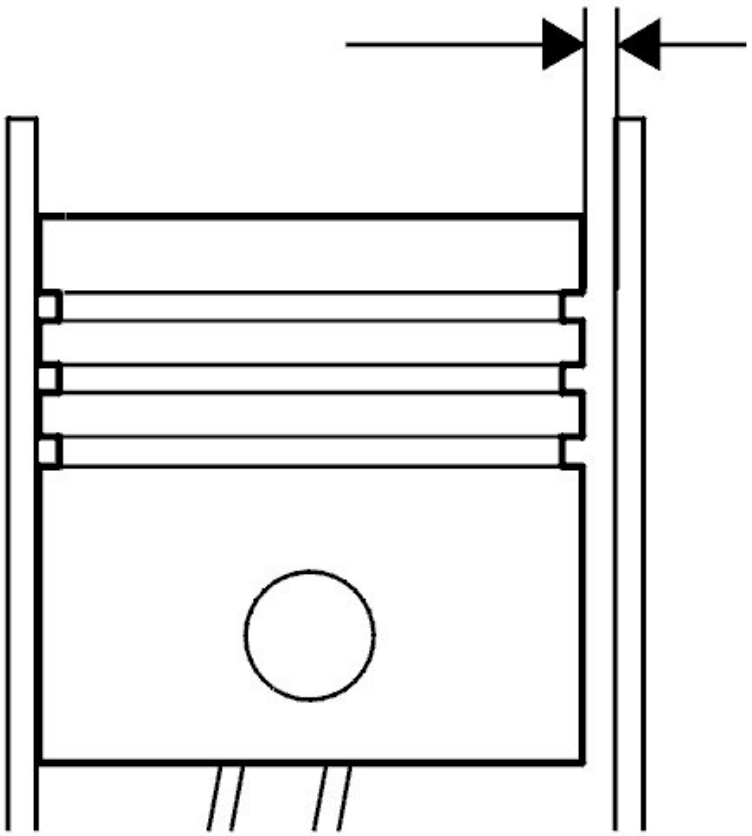
Pistons (engine capacities)



Bore (D) in mm

Standard	**B5204T5** Measured 16 mm from the bottom of the piston	**B5234T3** Measured 42 mm from the top of the piston	**B5244T2** Measured 42 mm from the top of the piston	**B5244T3** Measured 38 mm from the top of the piston
C-markedÂ¹	80.980-80.990	80.980-80.990	82.980-82.990	82.980-82.990
D-markedÂ¹	80.990-81.000	80.990-81.000	82.990-83.000	82.990-83.000
E-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010	83.000-83.010

Classification is marked on the top of the piston.



Piston running clearance (example)

Measured cylinder diameter.....	83.015 mm
Measured piston diameter.....	82.995 mm
The piston running clearance is.....	0.020 mm
The piston running clearance must be 0.010-0.030 mm.	

Piston rings

Upper compression ring.0.030-0.070 mm
Lower compression ring.0.030-0.070 mm
Oil control ring assembly.0.038-0.142 mm
Upper.1,200 -0.010/-0.030 mm
Lower.1,500 -0.010/-0.030 mm
Spring.1.510 ± 0.020 mm
Rail.0.460 ± 0.011 mm

Piston pin

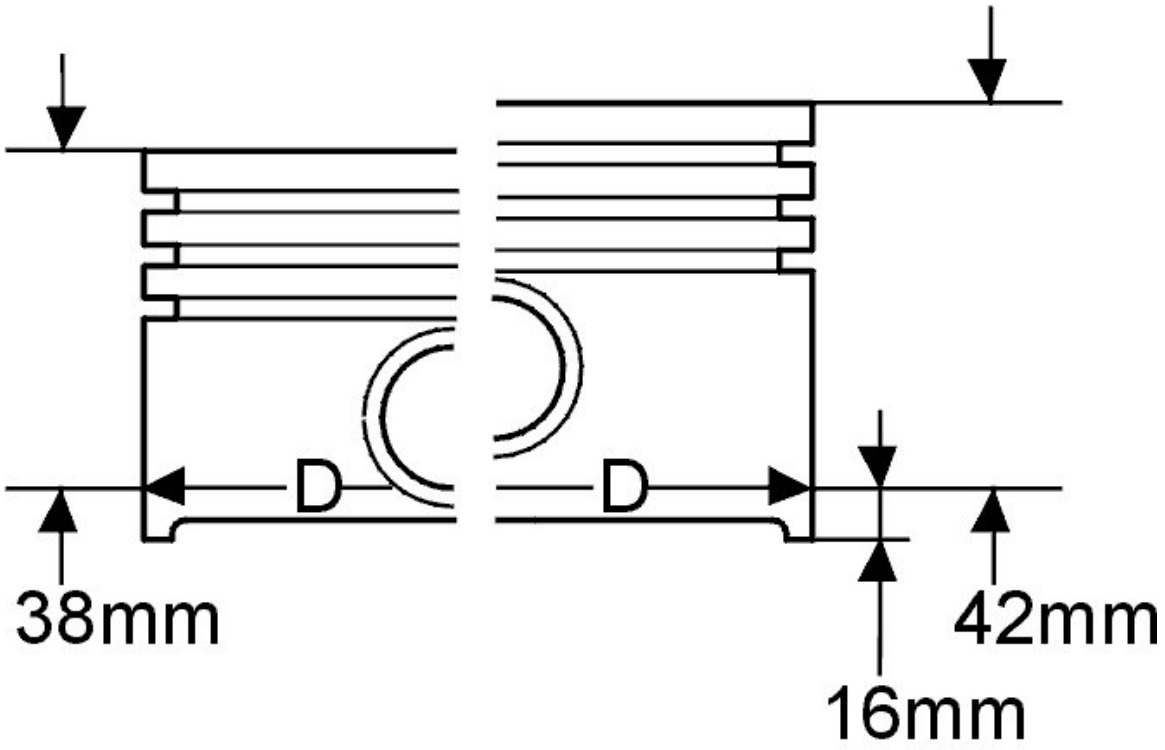
	B52x4Tx (excluding B5244T3)	**B5244T3**
Diameter (mm)	23.000 +0/-0.004	21.000 +0/-0.004
Length (mm)	61.000 +0/-0.200	60.000 +0/-0.200

Piston Ring, Engine

Specifications, mechanical

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Pistons (engine capacities)



Bore (D) in mm

Standard	**B5204T5** Measured 16 mm from the bottom of the piston	**B5234T3** Measured 42 mm from the top of the piston	**B5244T2** Measured 42 mm from the top of the piston	**B5244T3** Measured 38 mm from the top of the piston
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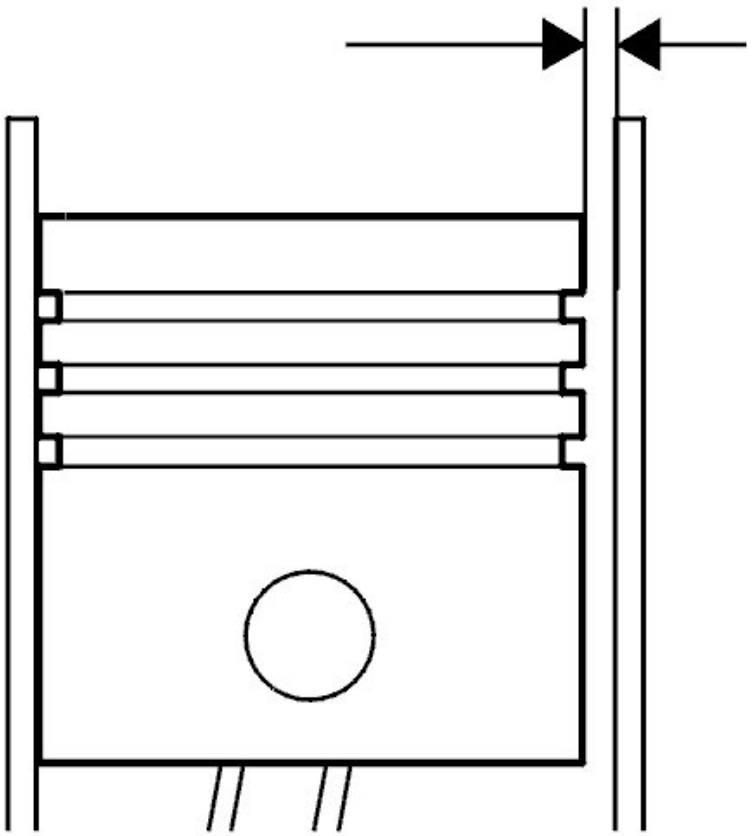
D-markedÂ¹	80.990-81.000	80.990-81.000	82.990-83.000	82.990-83.000
E-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010	83.000-83.010

Classification is marked on the top of the piston.



Piston running clearance (example)

Measured cylinder diameter.....	83.015 mm
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Lower compression ring.0.030-0.070 mm
Oil control ring assembly.0.038-0.142 mm
Upper.1,200 -0.010/-0.030 mm
Lower.1,500 -0.010/-0.030 mm
Spring.1.510 ± 0.020 mm
Rail.0.460 ± 0.011 mm

Piston pin

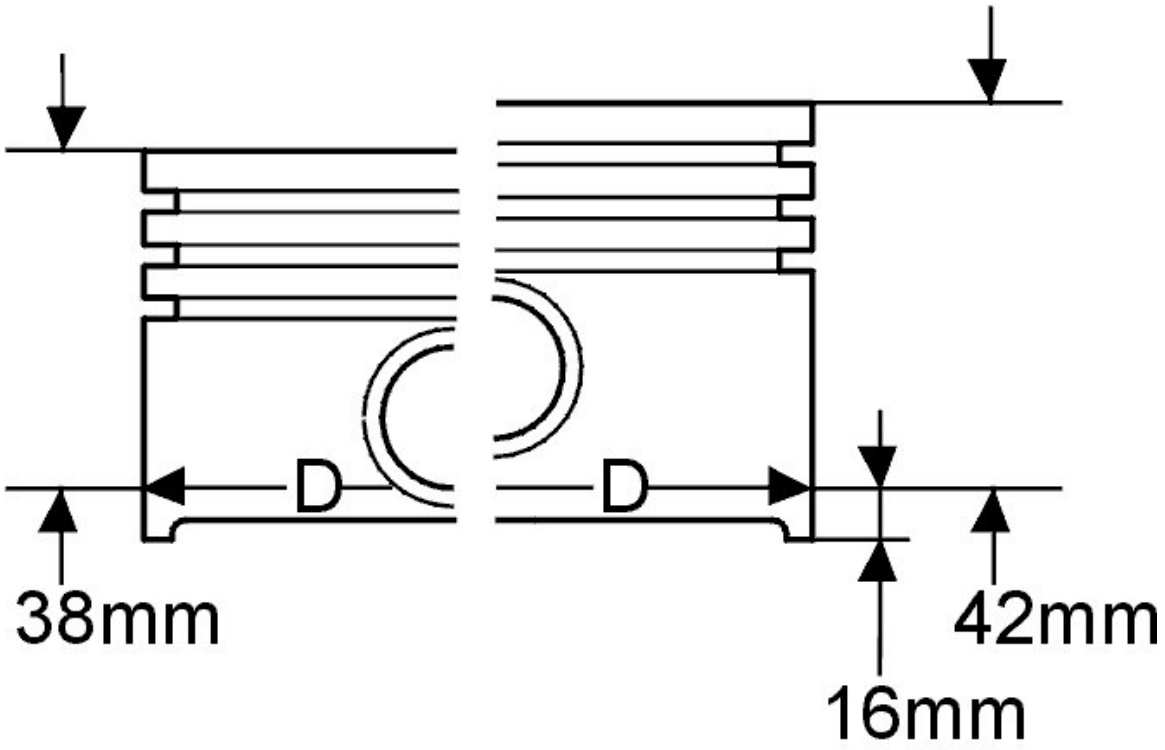
	B52x4Tx (excluding B5244T3)	**B5244T3**
Diameter (mm)	23.000 +0/-0.004	21.000 +0/-0.004
Length (mm)	61.000 +0/-0.200	60.000 +0/-0.200

Piston, Engine

Specifications, mechanical

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Pistons (engine capacities)



Bore (D) in mm

Standard	**B5204T5** Measured 16 mm from the bottom of the piston	**B5234T3** Measured 42 mm from the top of the piston	**B5244T2** Measured 42 mm from the top of the piston	**B5244T3** Measured 38 mm from the top of the piston
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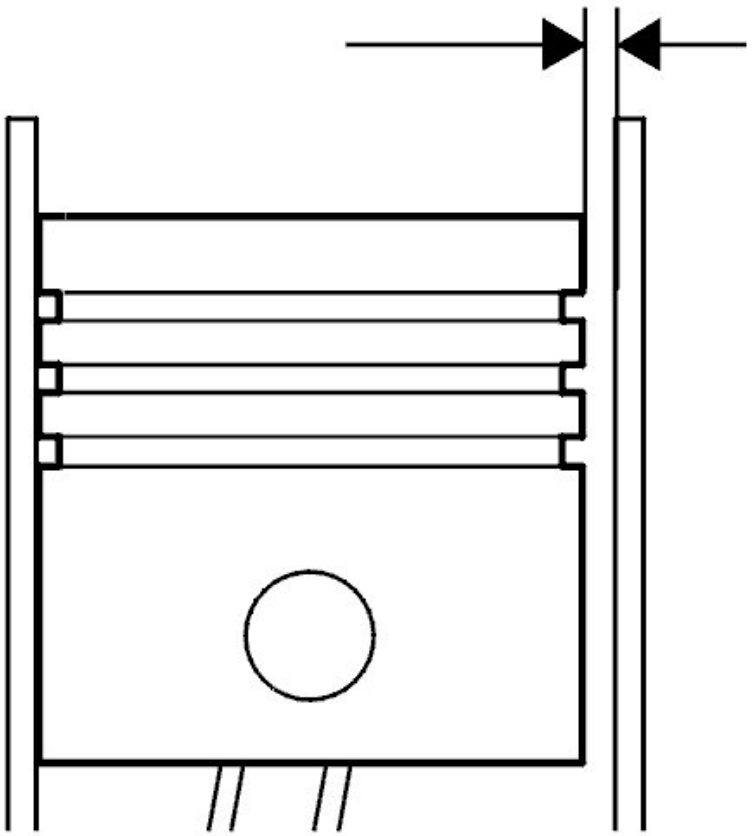
D-markedÂ¹	80.990-81.000	80.990-81.000	82.990-83.000	82.990-83.000
E-markedÂ¹	81.000-81.010	81.000-81.010	83.000-83.010	83.000-83.010

Classification is marked on the top of the piston.



Piston running clearance (example)

Measured cylinder diameter.....	83.015 mm
Measured piston diameter.....	82.995 mm
The piston running clearance is.....	0.020 mm
The piston running clearance must be 0.010-0.030 mm.	

Piston rings

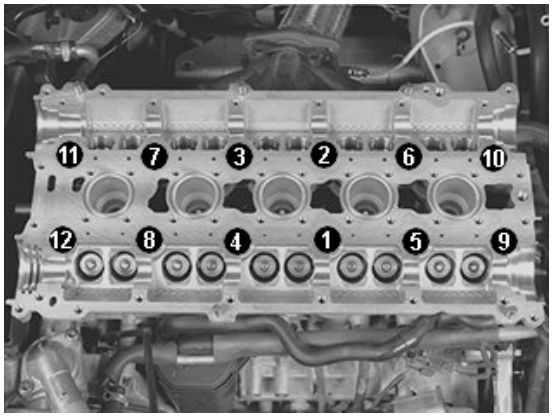
Upper compression ring.0.030-0.070 mm
Lower compression ring.0.030-0.070 mm
Oil control ring assembly.0.038-0.142 mm
Upper.1,200 -0.010/-0.030 mm
Lower.1,500 -0.010/-0.030 mm
Spring.1.510 ± 0.020 mm
Rail.0.460 ± 0.011 mm

Piston pin

	B52x4Tx (excluding B5244T3)	**B5244T3**
Diameter (mm)	23.000 +0/-0.004	21.000 +0/-0.004
Length (mm)	61.000 +0/-0.200	60.000 +0/-0.200

Tightening Torque

Installing the cylinder head



Install a new cylinder head gasket.
Install the cylinder head.
Ensure that no wiring or hoses are trapped between the cylinder head and cylinder block.
Use new screws. Lubricate and install all the screws.
Tighten the screws as illustrated.
Tighten the screws in the following order:
1. 20 Nm.
2. 60 Nm.
3. Angle tighten 130°. Use protractor 951 2050 BEVEL PROTRACTOR See: Tools and Equipment/951 2050 Bevel Protractor.

Specifications, Mechanical

Specifications, mechanical

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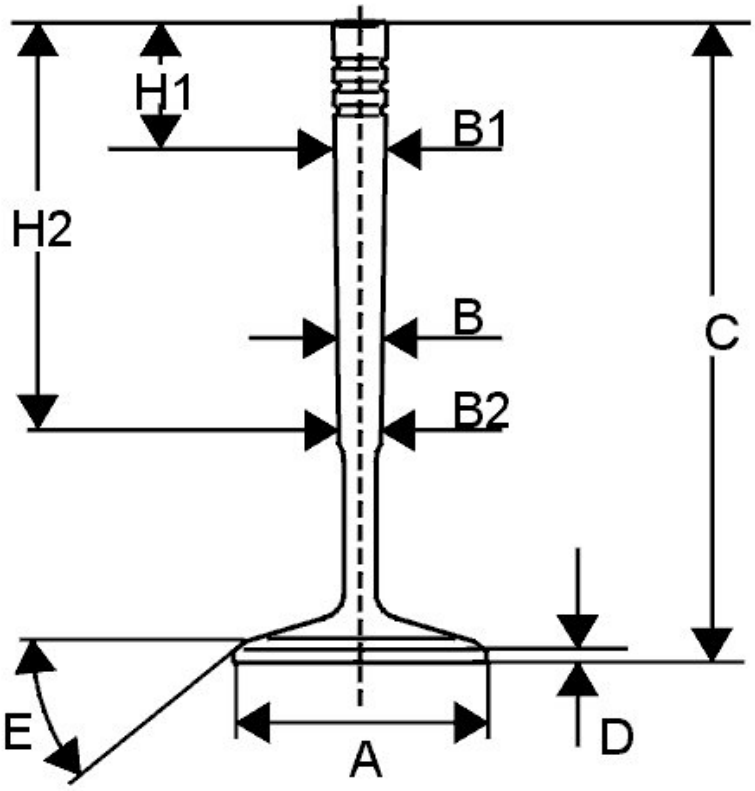
Valves



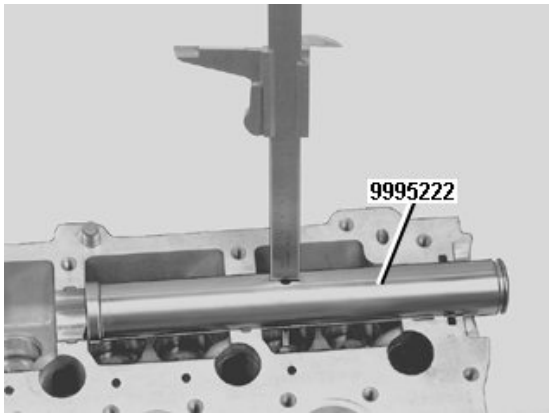
Inlet.31.00 ± 0.15 mm
Exhaust.27.00± 0.15 mm

Inlet (early versions).6.970 +0/-0.015mm
Inlet (late versions).5.970 +0/-0.015mm

Valve stem diameter (B1/B2)

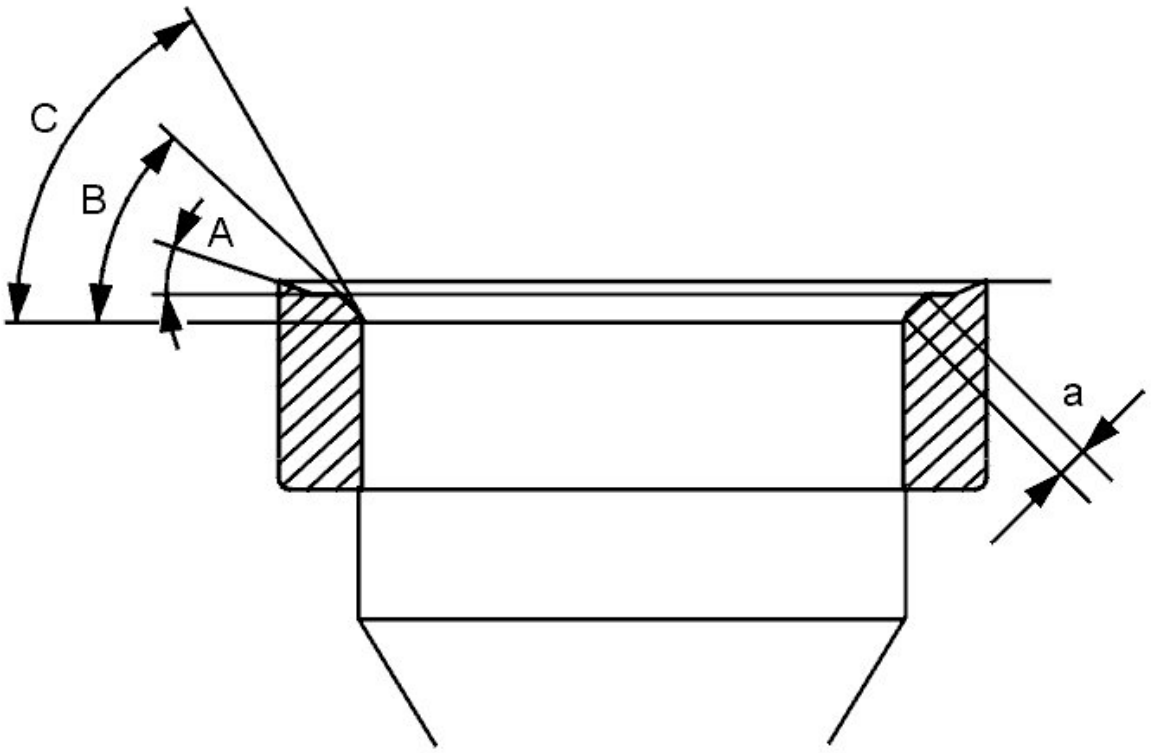
Exhaust (early versions)	
H1 = 22.7 mm	B1 = 6,962 ± 0.007 mm
H2 = 65.1	B2 = 6,954 ± 0.007 mm
Exhaust (late versions)	
H1 = 22.7 mm	B1 = 5.962 ± 0.007 mm
H2 = 65.1	B2 = 5954 ± 0.007 mm

Inlet.102.00 ± 0.07 mm
Exhaust.101.05± 0.07 mm
Inlet and exhaust.1.50 mm
Minimum height after grinding.1.20 mm
Inlet and exhaust.44.5°



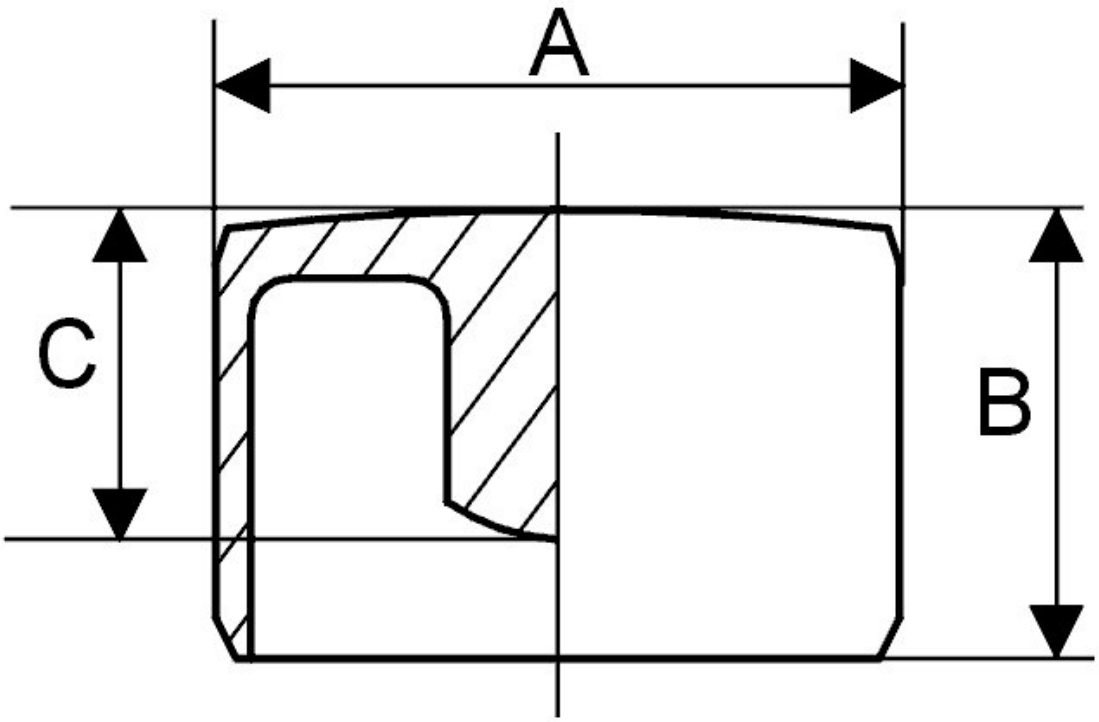
Valve stem height.48.4± 0.5 mm
Maximum machining of the valve stem.0.5 mm

Valve seats



Upper reduction angle (A)
Inlet.....20°
Exhaust.....15°
Matching surface angle (B)
Inlet/Exhaust.....45°
Lower reduction angle (C)
Inlet/Exhaust.....60°
Valve seat, width (a)
Inlet.....1.4-1.8 mm
Exhaust.....1.8-2.2 mm

Tappets



Tappets, dimensions

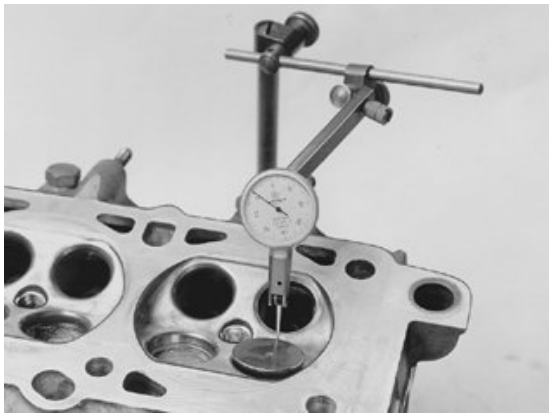
External diameter (A).32.000 +0.025/-0.041 mm
External height (B).26.0± 0.5 mm
Solid valve lifter shaft length (C)

15.96 mm at 0.02 mm intervals up to 16.16 mm. The dimensions are listed on the inside of each valve lifter.

Valve springs

Length.45.1 + 1.5/-0.5 mm
Type.Conical

Valve guides

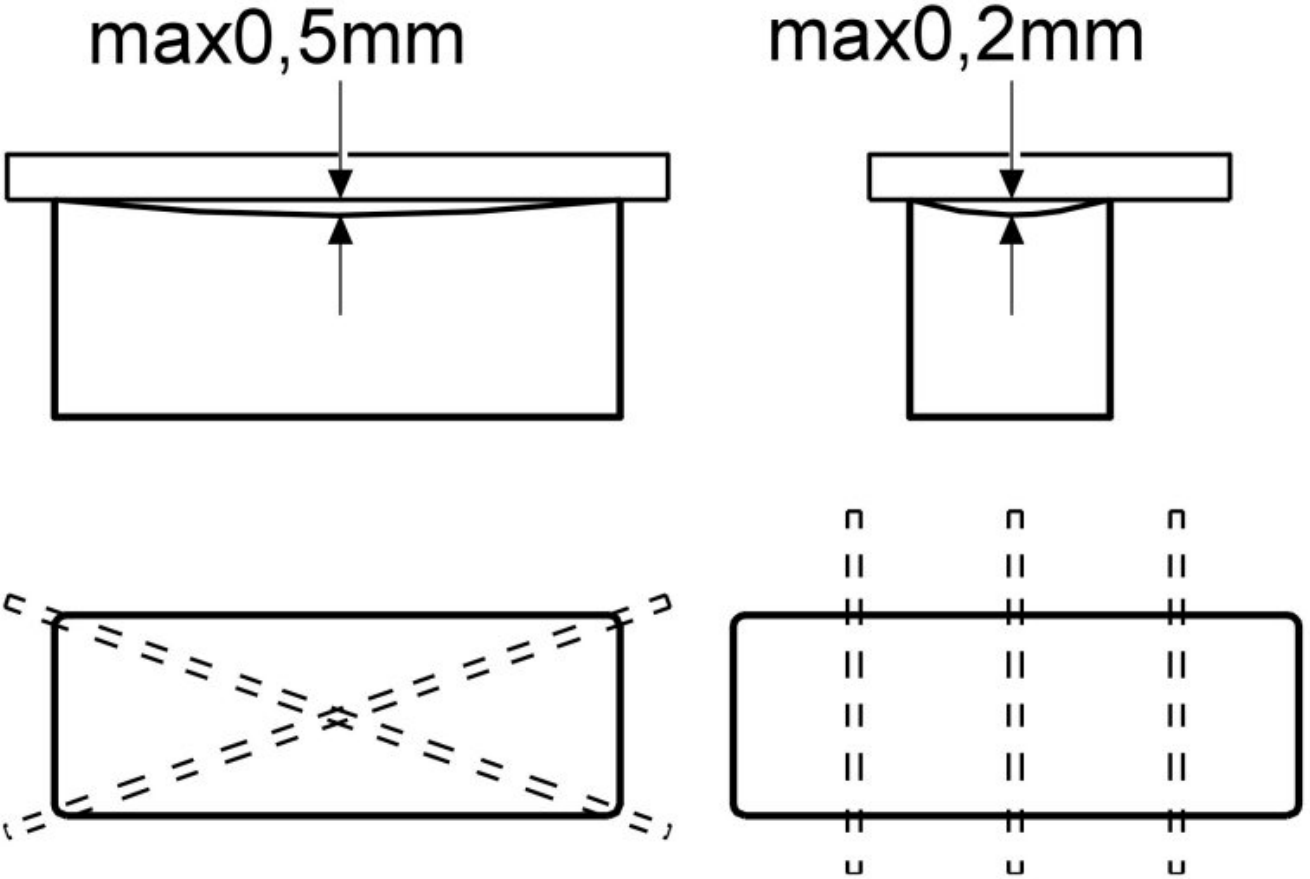


Inlet/Exhaust.0.03-0.06 mm
Inlet/Exhaust.0.15 mm

Camshafts

Inlet camshaft	Part number	Maximum lift height (mm)	Exhaust camshaft	Part number	Maximum lift height (mm)
B5204Tx excluding T4	9207943	8.40	**B5204Tx**	9207944	9.05
B5204T4	9207941	8.15			
B5234Tx	9207943	8.40	**B5234Tx**	9207944	9.05
B5244Tx excluding T2, T3	9207942	8.40	**B5244Tx** excluding T3	9207944	9.05
B5244T2	9497231	8.40	**B5244T3**	9497822	9.05
B5244T3	9497823	8.45	**B5254Tx**	9207944	9.05
B5254Tx	9207942	8.40			

Cylinder head



Front-rear.0.50 mm
Lateral.0.20 mm
Cylinder head height.129.00± 0.05 mm
Maximum machining.0.30 mm

Caution! Scratches and corrosion to the cylinder head gasket face should only be machined on a flat cylinder head.

Valve Clearance

The valve clearance measured on cold engines (approximately 20°C) should be:

Inlet valve ..... 0.20 ± 0.03 mm
Exhaust valve ..... 0.40 ± 0.03 mm

Note: The tolerances are less at setting! When checking the valve clearance through the plug hole the tolerances are larger.

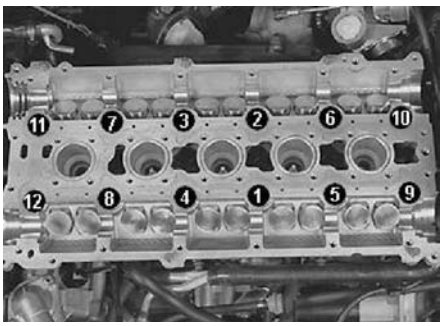
Differences in valve clearance for different engines / ambient temperatures:

- 0.01 mm at 15° C
+ 0.01 mm at 25° C
+ 0.02 mm at 30° C
+ 0.03 mm at 35° C
+ 0.04 mm at 45° C

Cylinder Head Gasket

Tightening Specifications

Cylinder Head



Use new screws.
Lubricate all the screws.
Tighten the screws in the order shown.
Tighten the screws alternately from the center and outwards.

1st Step ..... 20 Nm
2nd Step ..... 60 Nm
3rd Step ..... Angle-tighten 130°

Intake Manifold

Torque ..... 25 Nm

Exhaust Manifold

Torque ..... 25 Nm

Camshaft Bearing Caps/Camshaft Cover

Refer to General Tightening Torque, see Engine, Specifications.
Refer to procedure for sequence. See: Engine, Cooling and Exhaust/Engine/Cylinder Head Assembly/Service and Repair

Camshaft Timing Gear Pulley

Camshafts Without Variable Valve Timing ..... 20 Nm
Camshafts With Variable Valve Timing ..... 10 Nm

Drive Belt Tensioner

Tightening Specifications

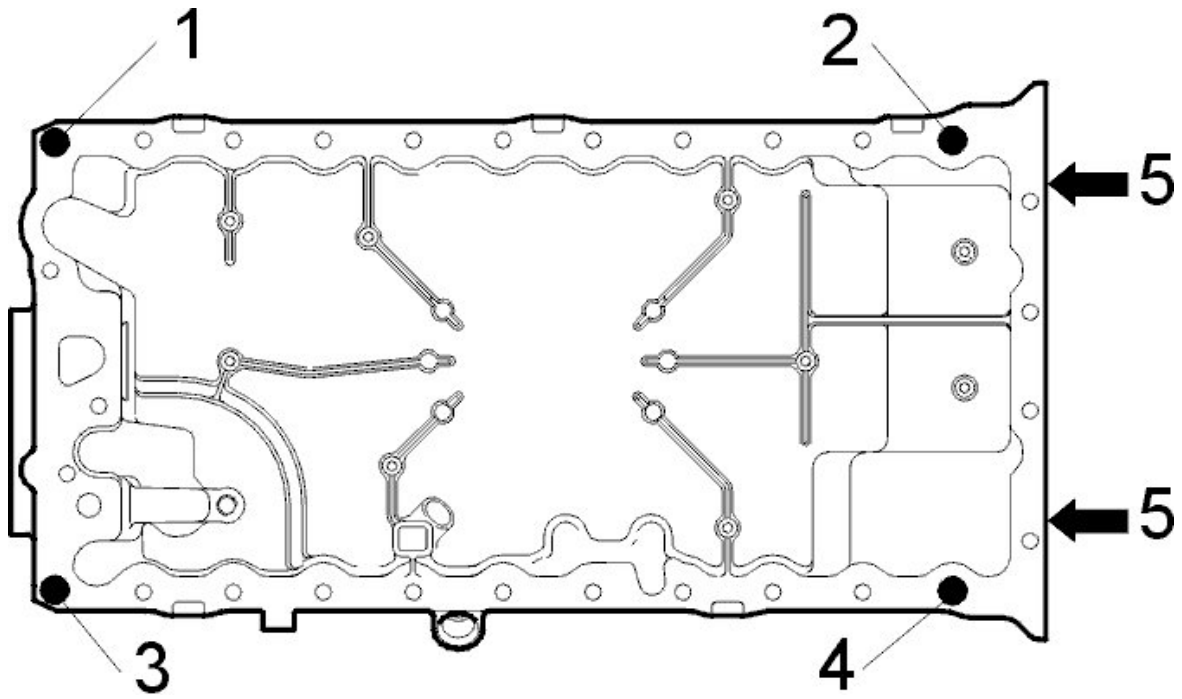
Belt Tensioner (Mechanical) ..... 20 Nm

Intake Manifold

Intake Manifold ..... 19 Nm

Torque tighten all the screws starting from the center.

Oil Pan, Engine



Press the sump against the transmission.

Tighten the screws (1), (2), (3) and (4) to 3 Nm.

First tighten the screws (5) to 25 Nm. Then tighten to 48 Nm.

Tighten all screws in the sump joint to 17 Nm.

Start at the transmission and continue forwards in pairs.

Oil Pump, Engine

Tighten the oil pump screws crosswise..... 10 Nm

Vibration damper
Tighten the center nut..... 180 Nm
Remove the counterhold. Tighten the screws..... 25 Nm
Angle-tighten..... 30 degrees

Hold the eccentric secure and tighten the center screw..... 20 Nm
Ensure that the indicator is in the correct position.

Front timing belt cover. Tighten..... 12 Nm

The engine stabilizer brace.
Tighten the screws at the suspension turrets..... 50 Nm
Tighten the engine bracket screw..... 80 Nm

Oil pump..... 6 Nm
(countersunk Allen, M6x20, holds the pump housing together)

System Specifications

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of specific components and tightening torques

Note! Screws coated with locking fluid or sealant must always be replaced with new screws during reinstallation.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Exhaust system (to the turbocharger (TC))	24 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	Stage 1.....65 Nm Stage 2.....60°
Subframe screws (start on the left-hand side, then the right-hand side)	Stage 1.....105 Nm Stage 2.....120°
Subframe bracket	50 Nm
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block)	Stage 1.....35 Nm Stage 2.....60°
Engine mounting Right side (M8x23 to cylinder block)	Stage 1.....20 Nm Stage 2.....60°
Right-hand engine pad for the subframe (Only applies to XC90)	Stage 1.....120 Nm Stage 2.....40°
Lower torque rod, transmission screw	Stage 1.....35 Nm Stage 2.....40°
Lower torque rod, sub-frame nut	Stage 1.....65 Nm Stage 2.....60°
Oil filter (environmental filter)	25 Nm

Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm
Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to .....3 Nm the screws (5). Tighten to .....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2 .....60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover,(front/rear)	12 Nm
Timing cover,(upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....90°
Transmission screw (lower torque rod)	Stage 1.....35 Nm Stage 2.....40°
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

Timing Belt Tensioner

Timing Belt Tensioner ..... 5 Nm

Timing Cover

Timing cover,(front/rear) ..... 12 Nm
Timing cover,(upper) ..... 8 Nm

System Specifications

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of specific components and tightening torques

Note! Screws coated with locking fluid or sealant must always be replaced with new screws during reinstallation.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

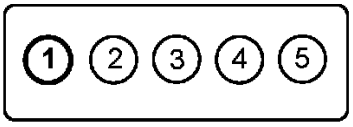
Exhaust system (to the turbocharger (TC))	24 Nm
Cylinder head Tighten the screws in sequence from the center and outwards.	Stage 1.....20 Nm Stage 2.....60 Nm Stage 3.....130°
Manifold (cylinder head side)	25 Nm
Pipe screw (coolant pipe / turbocharger (TC))	26 Nm
Pipe screw (water heated crankcase ventilation.)	26 Nm
Pipe screw (oil pressure line / turbocharger (TC))	26 Nm
Pipe screw (oil pressure line / engine block)	38 Nm
Sub-frame nut (lower torque rod)	Stage 1.....65 Nm Stage 2.....60°
Subframe screws (start on the left-hand side, then the right-hand side)	Stage 1.....105 Nm Stage 2.....120°
Subframe bracket	50 Nm
Intake manifold	19 Nm
Catalytic converter (to the turbocharger (TC)) (to the exhaust system)	25 Nm 24 Nm
Knock sensor (KS)	20 Nm
Piston cooling valve (piston cooling oil duct, in cylinder block)	36 Nm
Timing gear pulley (camshafts without variable valve timing)	20 Nm
Timing gear pulley (camshafts with variable valve timing)	10 Nm
Heated oxygen sensor (HO2S)	45 Nm
Carrier plate	Stage 1.....45 Nm Stage 2.....50°
Intermediate section Tighten the screws in sequence from the center and outwards.	Stage 1 M10.....20 Nm Stage 2 M10.....45 Nm Stage 3 M8.....24 Nm Stage 4 M7.....17 Nm Stage 5 M10.....90°
Torque converter	50 Nm
Engine mounting Right side (M10x35 to cylinder block)	Stage 1.....35 Nm Stage 2.....60°
Engine mounting Right side (M8x23 to cylinder block)	Stage 1.....20 Nm Stage 2.....60°
Right-hand engine pad for the subframe (Only applies to XC90)	Stage 1.....120 Nm Stage 2.....40°
Lower torque rod, transmission screw	Stage 1.....35 Nm Stage 2.....40°
Lower torque rod, sub-frame nut	Stage 1.....65 Nm Stage 2.....60°
Oil filter (environmental filter)	25 Nm

Oil trap	15 Nm
Oil pan plug	38 Nm
Oil pump (countersunk Allen, M6x20, holds the pump housing together)	6 Nm
Oil return line (turbocharger (TC))	12 Nm
Oil pan (Applies to B5254T4)	the screws (1, 2, 3 and 4). Tighten to .....3 Nm the screws (5). Tighten to .....25 Nm. Then tighten to 48 Nm
Oil pressure switch	27 Nm
Stud (at exhaust port, manifold, turbocharger (TC))	20 Nm
Plug (check hole for gauging valve clearance)	20 Nm
Plug (gauge hole / crankshaft seal)	38 Nm
Belt tensioner (mechanical)	20 Nm
Flywheel	Stage 1.....45 Nm Stage 2.....65°
Vibration damper -2002 (flanged screws x4)	Stage 1.....25 Nm Stage 2.....30°
Vibration damper 2002- /flanged screws x4	Stage 1.....25 Nm Stage 2 .....60°
(center nut)	180 Nm
Temperature sensor (coolant)	22 Nm
Timing cover,(front/rear)	12 Nm
Timing cover,(upper)	8 Nm
Turbocharger (TC) (to manifold, without gasket)	25 Nm
Turbocharger (TC) (to manifold, with gasket)	37 Nm
Spark plugs	30 Nm
Connecting rod cap (connecting rod with treated toothed surface between the connecting rod and cap, screw with waist)	Stage 1.....20 Nm Stage 2.....90°
Connecting rod cap (connecting rod with fracture surface between the connecting rod and cap, fully threaded screw)	Stage 1.....30 Nm Stage 2.....90°
Transmission screw (lower torque rod)	Stage 1.....35 Nm Stage 2.....40°
Variable valve timing center screw	120 Nm
Variable valve timing center plug	35 Nm

Exhaust Manifold

Manifold (cylinder head side) ..... 25 Nm

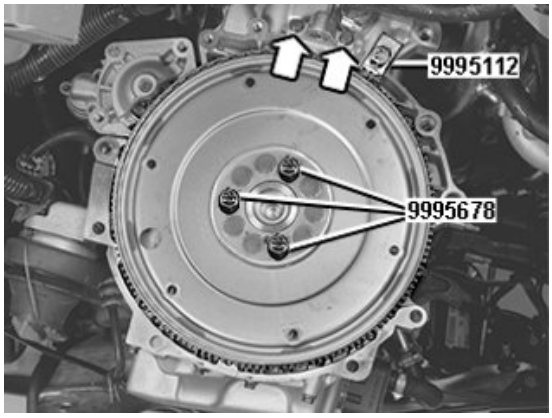
Firing Order : 1-2-4-5-3



Front of Vehicle

Flex Plate

Installing the carrier plate



Note! Ensure that the mating surfaces on the crankshaft and carrier plate are completely clean.

Use tool 999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw , which consists of 3 studs with nuts.

Install:

- The 3 studs belonging to tool 999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw , distributed as illustrated
- the carrier plate.

Note! Check that the locating pin on the crankshaft is positioned opposite the hole in the carrier plate.

Locate gear sector 999 5112 GEAR SECTOR See: Tools and Equipment/999 5112 Gear Sector against the carrier plate.
Pull the flywheel towards the crankshaft using the three nuts on special tool 999 5678 Special screw See: Tools and Equipment/999 5678 Special Screw.

Caution! The carrier plate must lie against the crankshaft flange before the screws are installed. There is a risk that excess locking fluid on the screws will come between the mating surfaces.

Install 7 new screws. Tighten crosswise.

Tighten to 45 Nm.

Remove the 3 nuts and studs.

Install the remaining 3 new screws. Tighten the screws.

Tighten to 45 Nm.

Then angle-tighten all 10 screws crosswise.

Tighten to 50°.

Manual Transmission/Transaxle

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Caution! Screws coated with locking fluid or sealant must be replaced with new ones when reinstalling.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

AWD

Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
Universal joint CV fastened with 6 bolts	Stage 1: Crosswise 10 Nm Crosswise 25 Nm
Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

Pressure Plate

Install the clutch and locate the guide pins. Check that the clutch is in contact with the flywheel all around its circumference. Carefully tighten the six screws, crosswise, so that the clutch is guided up onto the guide pins and lies in contact all around with the flywheel. Tighten the screws crosswise. Tighten to **25 Nm**.

Spark Plug

Spark Plugs

Spark Plug	**Champion RC8PYP 8 (or equivalent)**
Gap	**0.028-0.032" (0.7-0.8 mm)**
Torque	**18.4 ft lb (25 Nm)**

Starting and Charging

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Note! Screws coated with locking fluid or sealant must always be replaced with new screws during reinstallation.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Battery connector	2.5 Nm
Generator B+ terminal	15 Nm
Generator, fixed belt pulley	65 Nm
Generator, freewheel pulley	80 Nm
Starter motor	40 Nm
Starter motor B+ terminal	15 Nm
Windshield wiper arm	20 Nm
Rear window wiper arm	14 Nm
Upper screw of tail light, XC90	6 Nm
Lower screw of tail light, XC90	8 Nm
Tail light, other	10 Nm
Screw, speed sensor	10 Nm
Screw, left level sensor	60 Nm
Screw, washer fluid reservoir	17 Nm
Nut, generator cover	16 Nm

Steering

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.

Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Note! Screws coated with locking fluid or sealant must be replaced with new when reinstalled.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Bushing housing upper link arm in sub-frame rear XC90 (M12)	1st step, 65 Nm 2nd step, 90°
Rear sub-frame in body (M12)	100 Nm
Rear cross member	25 Nm
Spring strut/Wheel spindle	1st step, 105 Nm 2nd step, 60°
Ball joint in wheel spindle, aluminum from and incl. w919 not XC90 (M10)	40 Nm
Ball joint in link arm XC90 (M14)	100 Nm
Ball joint in control arm aluminum (not XC90)(M12)	1st step, 50 Nm. 2nd step, 40°
Ball joint in control arm steel (not XC90)(M14)	100 Nm
Drive shaft ball joint	1st step, 35 Nm. 2nd step, 90°
Anti-roll bar to link	50 Nm
Cover rear sub-frame AWD (not XC90) (M12)	100 Nm.
Cover rear sub-frame AWD (not XC90)	80 Nm
Link arm front in sub-frame, front mounting (M12)	1st step, 65 Nm. 2nd step, 105°
Link arm front in sub-frame, rear mounting (M14)	1st step, 105 Nm. 2nd step, 180°
Control arm, rear, lower to subframe (applies to XC90)	1st step, 65 Nm 2nd step, 180°
Lock nut outer steering joint against inner steering joint (M14)	70 Nm
Return hose in steering gear (M18)	25 Nm
Screw for steering wheel - steering column (M14)	1st step, 30 Nm 2nd step, 30°
Steering wheel lock in steering column (M8)	18 Nm
Dirt deflector in longitudinal stay not XC90 and R-line (M8)	10 Nm
Lower steering column/steering shaft wing screw - lock nut (M8) not XC90	30 Nm
Lower steering shaft joint to steering gear locking screw (M8) not XC90	25 Nm
Joint for steering column/steering shaft locking screw (M8) XC90	32 Nm
Joint for steering gear locking nut (M8) XC90	25 Nm
Outer screws for the track rod XC90	90 Nm
Eccentric screw and nut for the track rod XC90	90 Nm
Tie rod, inner nut	80 Nm
Tie rod's ball joint to steering gear	100 Nm
Steering arm/tie rod end in wheel spindle steel	70 Nm
Steering joint in wheel spindle aluminum	1st step, 50 Nm 2nd step, 40°
Steering joint in wheel spindle XC90	1st step, 50 Nm 2nd step, 35°
Steering gear	50 Nm
Support plate	50 Nm
Pressure line to steering gear (M16)	25 Nm
Pressure hose in pump (M16)	32 Nm
Delivery line to power steering pump XC90	30Nm
Cross member	25 Nm

Heat shield plate in steering gear (M5)	6 Nm

System Specifications

Tightening torque

General tightening torque

Note! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Note! Screws coated with locking fluid or sealant must be replaced with new when reinstalled.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

Rear wheel hub in wheel bearing housing (M12)	Step 1: 20 Nm Step 2: 45 Nm Step 3: Angle-tighten 60°
Drive shaft in front wheel hub not XC90 (M10)	Step 1: 35 Nm Step 2: Angle-tighten 90°
Drive shaft in front wheel hub, only XC90 (M10)	Step 1: 35 Nm Step 2: Angle-tighten 120°
Tire pressure sensor in rim	8 Nm
Tire pressure sensor in valve.	1,4 Nm
Front wheel hub in steering arm (M12)	Step 1: 20 Nm Step 2: 45 Nm Step 3: Angle-tighten 60°
Wheel in hub (M14)	Step 1: 20 Nm Step 2: 140 Nm
Anti-roll bar link in shock absorber front (M12)	90 Nm
Anti-roll bar link in anti-roll bar front (M10)	60 Nm
Anti-roll bar link to spring strut	50 Nm
Shock absorber bearing rear upper in shock absorber (M12)	60 Nm
Shock absorber bearing front upper in shock absorber (M14)	70 Nm
Shock absorber in steering arm (M14) XC90	Step 1: 105 Nm Step 2: Angle-tighten 75°
Shock absorber in steering arm (M14) S60/V70/XC70/S80	Step 1: 105 Nm Step 2: Angle-tighten 60°
Spring front, retaining nut	70 Nm
Spring strut in body	25 Nm

Axle Nut

Drive Shaft in Front Wheel Hub (M10)

Step 1 ..... 35 Nm
Step 2 ..... Angle Tighten 90°

Rear Wheel Hub in Wheel Bearing Housing (M12)

Step 1 ..... 20 Nm
Step 1 ..... 45 Nm
Step 2 ..... Angle Tighten 60°

Ball Joint

Please see Ball Joint; Service and Repair for tightening procedures.

Transfer Case

Tightening torque

General tightening torque

Caution! Screws coated with a locking fluid or self locking nuts must be replaced with new when reinstalled.

See the table below to find the tightening torques for components not included in the summary.
Nuts and screws which are not self locking can be reused provided that they are in good condition.

Applies to screwed joint with strength class 8.8.	
Thread	Tightening torque (Nm)
M5	5
M6	10
M7	17
M8	24
M10	50
M12	80
M14	130

Summary of tightening torques for specific components

Caution! Screws coated with locking fluid or sealant must be replaced with new ones when reinstalling.

Always use **new screws and nuts** when angle tightening. Any exceptions to this rule will be indicated in the method.
Angle-tightening in tight spaces. See Screwed joint, torque/angle tightening See: Description and Operation/Screwed Joint, Torque/Angle Tightening.

All drive shafts

Bolt drive shaft - wheel hub, front	Stage 1: 35 Nm Stage 2: 90°
Bolt drive shaft - wheel hub, version with rubber cone	50 Nm
Bolt drive shaft - wheel hub, rear	50 Nm

All gearboxes, angle gears, chain angle gears and rear axle gears

Sensors	6 Nm
Filler plug, Level plug and Drain plug	35 Nm

AW, 4T65

Cover, control system (AW)	Diagonally 14 Nm
The nut for the lever and gear shift linkage rod	16 Nm
Side cover, gearbox (4T65)	Stage 1: Crosswise 10 Nm Stage 2: Crosswise 25 Nm
Bolt driver plate - torque converter 6 x bolts	35 Nm
Screws for the lower torque rod in the transmission **Note!** Applies to 5-cylinder engines only	Stage 1: 35 Nm Stage 2: 40°
Connection, oil cooler pipe to gearbox	30 Nm
Screw, oil pipe - transmission	6 Nm
Screw, oil pipe - dipstick pipe - transmission	15 Nm
Dipstick pipe for the transmission	24 Nm

TF-80SC

Integrated level plug/Torx	8 Nm
Cover, control system	Diagonally 14 Nm
Torque converter to carrier plate 6 screws	60 Nm
Gear selector mechanism (nut)	16 Nm

M56, M58, M66

Back-up (reversing) lamps switch	24 Nm

AWD

Bevel gear to transmission	75 Nm
Universal joint (spider) fastened with 4 bolts	Stage 1: Crosswise 16 Nm Stage 2: Crosswise 120°
Universal joint CV fastened with 6 bolts	Stage 1: Crosswise 10 Nm Crosswise 25 Nm
Pinion nut (Active on Demand Coupling)	150 Nm
Pinion nut, angle gear	180 Nm
Oil pump (AOC)	5 Nm
Control module (AOC)	5 Nm
Driveshaft (center bearing)	30 Nm
Oil plug, final drive	35 Nm
Oil plug, Active On-Demand Coupling	35 Nm
Bevel gear bracket	Stage 1: alternately to light contact Stage 2: 50 Nm
Manifold support bracket bevel gear	Stage 1: 35 Nm Stage 2: 90°

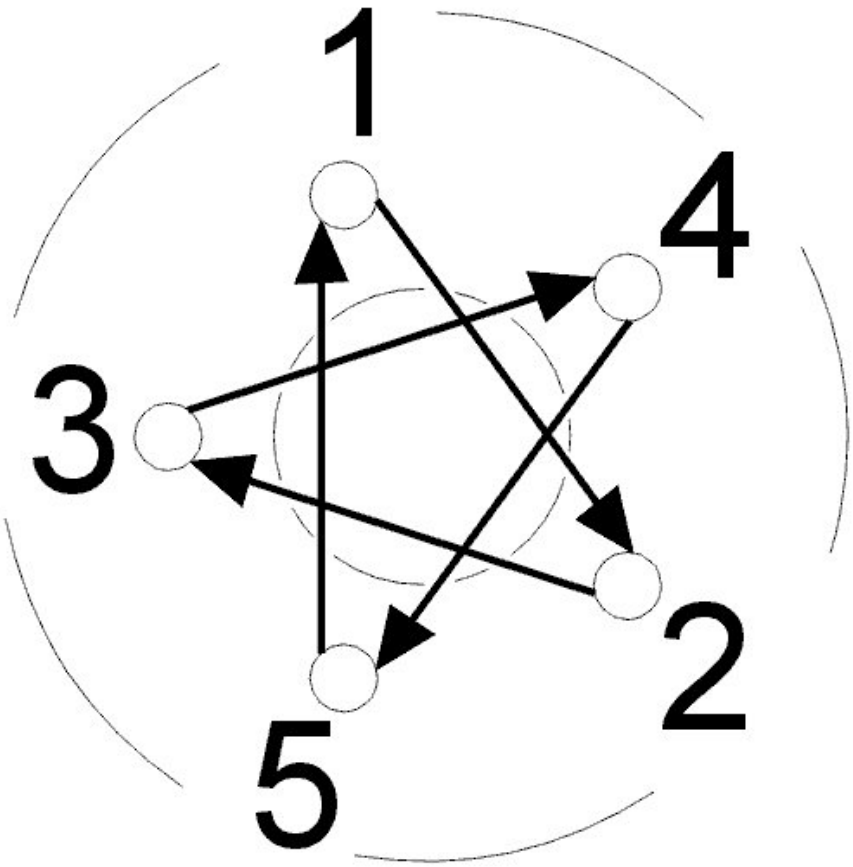
Wheel Fastener

Installing wheels

Special tools:

951 2835 Torque socket 19mm S80 See: Tools and Equipment/951 2835 Torque Socket 19mm S80

Installing wheels



Ensure that the brake disc and wheel rim mating surfaces are clean. Grease the hub center location dowel for the rim. Use installation paste **1161397-3**.
Install the wheel studs lightly. Then tighten crosswise. Tighten to **140 Nm**. Use torque socket 951 2835 Torque socket 19mm S80 See: Tools and Equipment/951 2835 Torque Socket 19mm S80 if an impact wrench is being used.
Crosswise tightening and torque tightening is important to prevent stresses in the brake disc.

Note! The torque socket is designed for use with a standard, pneumatic impact nut runner providing a torque of250-350 Nm.

Compression Check

Engine type: ..... **Normal value MPa:**
Turbo ..... 1.1 - 1.3
Turbo type LT ..... 1.2 - 1.4
Normally aspirated engine ..... 1.3 - 1.5

System Specifications

Thermostat
Marking 90
Starts to open at ..... 90 degree C
Fully open at ..... 105 degree C

Thermostat, Engine Cooling

Thermostat
Marking 90
Starts to open at ..... 90 degree C
Fully open at ..... 105 degree C

System Specifications

Oil Pressure (Minimum)
13.3 r/s (800 r/min) ..... 0.10 Mpa (1)
14.2 r/s (850 r/min) ..... 0.10 Mpa (1)
66.7 r/s (4,000 r/min) ..... 0.35 Mpa (1)
Maximum oil pressure (the relief valve opens) ..... 0.48 Mpa

(1) The oil pressure listed is for an oil temperature of 100 degree C, which is reached after 10 - 15 minutes driving.

Engine Oil Pressure

Oil Pressure (Minimum)
13.3 r/s (800 r/min) ..... 0.10 Mpa (1)
14.2 r/s (850 r/min) ..... 0.10 Mpa (1)
66.7 r/s (4,000 r/min) ..... 0.35 Mpa (1)
Maximum oil pressure (the relief valve opens) ..... 0.48 Mpa

(1) The oil pressure listed is for an oil temperature of 100 degree C, which is reached after 10 - 15 minutes driving.

Heating and Air Conditioning

Pressure values, A/C

Component	Pressure
High pressure shut-off for the compressor	30 bar
Safety valve	38 bar

System Specifications

Automatic Transmission Fluid

Capacity ..... **7.1 ±0.25 liters**

Type ..... **116 1540-8 (1 liter)**

Type ..... **116 1640-6 (4 liters)**

Note: Capacity shown is for a dry transmission

Fluid - A/T

Automatic Transmission Fluid

Dry fill ..... 7.1 ±0.25 liters

Brake Fluid

Brake/Clutch Fluid Capacity

Fluid Capacity ..... **0.6 liters (0.64 quarts)**

Coolant

Cooling system voluem

Engine
5 cylinder turbo ..... **8.0 liters (2.1 gal, 8.4 quarts)**
5 cylinder non-turbo ..... **8.8 liters (2.32 gal, 9.3 quarts)**

System Specifications

Rear final drive

Capacity ..... **0.7 liters**

Type **116 1620-8**

Fluid - Differential

Rear final drive

Capacity ..... 0.7 liters

Drive Axles, Bearings and Joints

Lubrication transmission

Constant velocity joint boot, grease quantity

Engine/transmission	Wheel side	Transmission side
B8444S/B6324S/TF-80SCAWD	150g / 2X80g = 160g	180g / 3x65g = 195g
D5244T4/TF-80SC	150g / 2X80g = 160g	180g / 3x65g = 195g
D5254T6/TF-80SC	203g / 2X80g + 1X60g = 220g	140g / 1X85g + 1X65g = 150g
B5254T6/M66	150g / 2X80g = 160g	100g / 1X120g
D5244T4/M66	150g / 2X80g = 160g	100g / 1X120g
D4204T/MPS6	120g / 1X120g	174g / 3X65g = 195g

Miscellaneous

Designation	Part number	Package quantity
Bevel gear	312 59380	1 liter
Chain housing	1161 745	1 liter
Clutch four-wheel drive	307 59648	0.3 liters
Final drive	1161 620	1 liter
Universal oil	1161 657	0,2 liter
PFPE-grease aerosol	307 59651	0.15 litres
Grease, dog-clutch	312 59589	30 gram

Engine Oil

Oil

Capacity ..... 6.1 US qts. (5.8 liters)

Fuel Tank

Fuel Tank

Capacity ..... **18 US Gallons (68 liters)**

Refrigerant

Refrigerant

Capacity ..... 2.2 lb (1,000 g)

Hint: A specification decal in the engine compartment lists the refrigerant capacity of the air conditioning (A/C) system.

Refrigerant Oil

Refrigerant Oil

When replacing components, the following oil volumes shall be found in the new components or shall be filled in the system through the service valve, except for the compressor (see the "Compressor" below):

Receiver Drier ..... 30 cu.cm
Evaporator ..... 50 cu.cm
Condenser ..... 30 cu.cm
Tube ..... 10 cu.cm
Hose ..... 10 cu.cm

Compressor

Oil return when reusing compressor:
- measure the volume of the oil drained from the compressor
- replace the volume of drained oil according to the table below:

Drained Oil:
Greater than 70 cu.cm = Replace the volume of drained oil with the corresponding quantitiy.
Less than 70 cu.cm = Fill with 70 cu.cm of oil.

Oil return when replacing compressor:
- Drain the old compressor of oil, and measure the amount.
- Drain the new compressor of oil (the amount may be below specified value since it is not possible to drain all oil from the compressor).
- Use the table below to fill the new compressor with the right amount of oil:

Drained Oil:
Greater than 70 cu.cm = Replace the volume of drained oil with the corresponding quantitiy.
Less than 70 cu.cm = Fill with 70 cu.cm of oil.

Caution! When installing completely new system: Check that there is oil in the compressor. The other components should contain no oil.

System Specifications

Lubrication transmission

Miscellaneous

Designation	Part number	Package quantity
Bevel gear	312 59380	1 liter
Chain housing	1161 745	1 liter
Clutch four-wheel drive	307 59648	0.3 liters
Final drive	1161 620	1 liter
Universal oil	1161 657	0,2 liter
PFPE-grease aerosol	307 59651	0.15 litres
Grease, dog-clutch	312 59589	30 gram

Designation (Part number) ..... **Package quantity**
Bevel gear (312 59380) ..... 1 liter
Chain housing (1161 745) ..... 1 liter
Clutch four-wheel drive (307 59648) ..... 0.3 liters
Final drive (1161 620) ..... 1 liter
Universal oil (1161 657) ..... 0.2 liter
PFPE-grease aerosol (307 59651) ..... 0.15 litres
Grease, dog-clutch (312 59589) ..... 30 gram

Fluid - Transfer Case

Auxiliary transmission, bevel gear and overdrive

Bevel Gear
Capacity ..... 750 ml

Active On Demand Coupling
Capacity ..... 0.8 liters

System Specifications

Automatic Transmission Fluid ..... **JWS 3309**

Fluid - A/T

Automatic Transmission Fluid ..... JWS 3309

Brake Fluid

Brake Fluid

Brake Fluid Type ..... **Dot 4+**

Coolant

Engine Coolant

Type ..... **Volvo Original Coolant**
Note: Volvo Original Coolant comes in different colors, it may be green, blue-green, red, or orange. Make a note of the color of the engine coolant prior to draining or filling the cooling system. **Do not mix engine coolants of different colors**

System Specifications

Rear final drive

Capacity ..... **0.7 liters**

Type **116 1620-8**

Fluid - Differential

Rear final drive

Type 116 1620-8

Drive Axles, Bearings and Joints

Lubrication transmission

Constant velocity joint boot, grease quantity

Engine/transmission	Wheel side	Transmission side
B8444S/B6324S/TF-80SCAWD	150g / 2X80g = 160g	180g / 3x65g = 195g
D5244T4/TF-80SC	150g / 2X80g = 160g	180g / 3x65g = 195g
D5254T6/TF-80SC	203g / 2X80g + 1X60g = 220g	140g / 1X85g + 1X65g = 150g
B5254T6/M66	150g / 2X80g = 160g	100g / 1X120g
D5244T4/M66	150g / 2X80g = 160g	100g / 1X120g
D4204T/MPS6	120g / 1X120g	174g / 3X65g = 195g

Miscellaneous

Designation		Part number	Package quantity
Bevel gear		312 59380	1 liter
Chain housing		1161 745	1 liter
Clutch four-wheel drive		307 59648	0.3 liters
Final drive		1161 620	1 liter
Universal oil		1161 657	0,2 liter
PFPE-grease aerosol		307 59651	0.15 litres
Grease, dog-clutch		312 59589	30 gram

Engine Oil

Engine Oil

Grade ..... API SJ, SJ/CF, SJ/EC, ACEA A1, ILSAC GF-2
Below 30° C (86° F) 5W-30
-20° to 40° C (-4° to 104° F) 10W-30

Fuel

Minimum octane requirement - AKI 87 (RON 91) - unleaded fuel

Power Steering Fluid

Power steering fluid

Type ..... **Pentosin CHF 11S**
Do not mix with other hydraulic fluids

Refrigerant

Refrigerant

Refrigerant Type **R134a**

Refrigerant Oil

Refrigerant Oil

Type ..... **PAG**

System Specifications

Lubrication transmission

Miscellaneous

Designation		Part number	Package quantity
Bevel gear		312 59380	1 liter
Chain housing		1161 745	1 liter
Clutch four-wheel drive		307 59648	0.3 liters
Final drive		1161 620	1 liter
Universal oil		1161 657	0,2 liter
PFPE-grease aerosol		307 59651	0.15 litres
Grease, dog-clutch		312 59589	30 gram

Designation (Part number) ..... **Package quantity**
Bevel gear (312 59380) ..... 1 liter
Chain housing (1161 745) ..... 1 liter
Clutch four-wheel drive (307 59648) ..... 0.3 liters
Final drive (1161 620) ..... 1 liter
Universal oil (1161 657) ..... 0.2 liter
PFPE-grease aerosol (307 59651) ..... 0.15 litres
Grease, dog-clutch (312 59589) ..... 30 gram

Fluid - Transfer Case

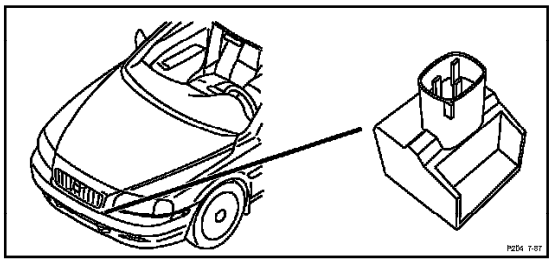
Auxiliary transmission, bevel gear and overdrive

Bevel Gear
Type (1 liter container)..... 116 1513-5

Active On Demand Coupling
Type 116 1641

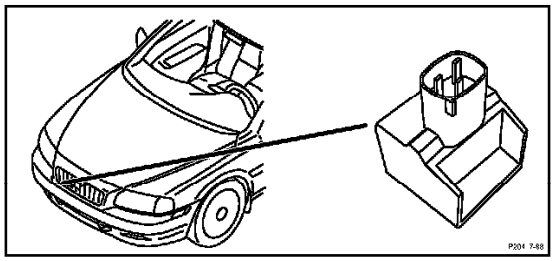
Vehicle: Locations

7/87 Acceleration sensor, Four-C, front left



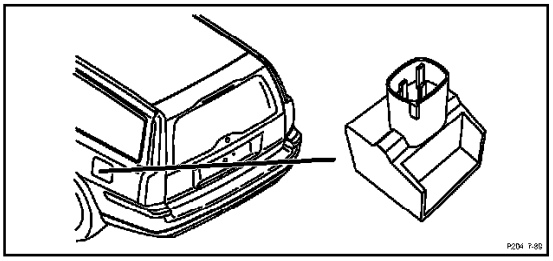
7/87 Acceleration Sensor, Four-C, Front Left

7/88 Acceleration sensor, Four-C, front right



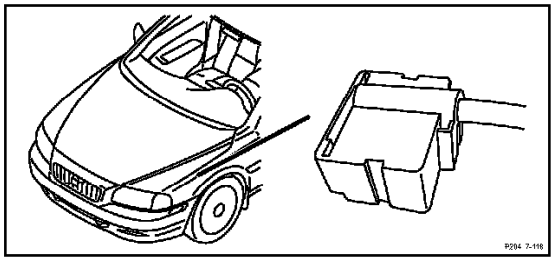
7/88 Acceleration Sensor, Four-C, Front Right

7/89 Acceleration sensor, Four-C, rear left



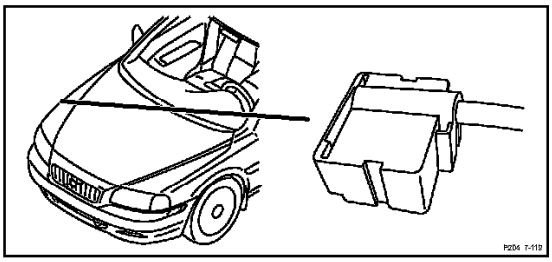
7/89 Acceleration Sensor, Four-C, Rear Left

7/118 Acceleration sensor, shock absorber, Four-C, front left



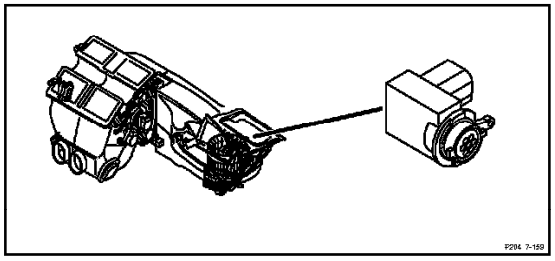
7/118 Acceleration Sensor, Shock Absorber, Four-C, Front Left

7/119 Acceleration sensor, shock absorber, Four-C, front right



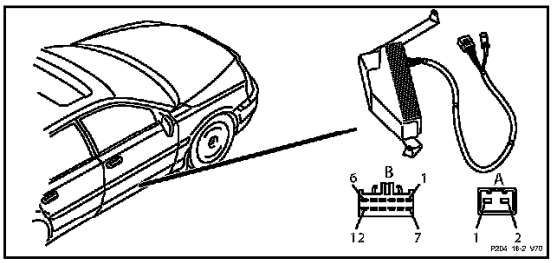
7/119 Acceleration Sensor, Shock Absorber, Four-C, Front Right

7/159 Air Quality Sensor (AQS)



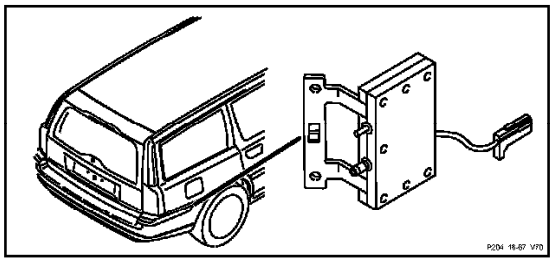
7/159 Air Quality Sensor (AQS)

16/2 Amplifier



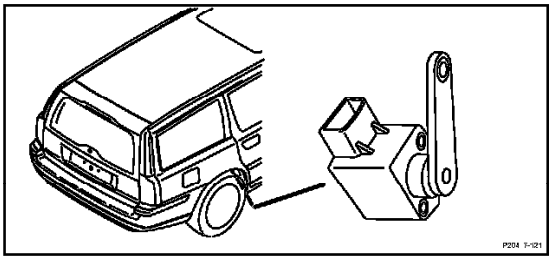
16/2 Amplifier

16/67 Amplifier antenna, bumper



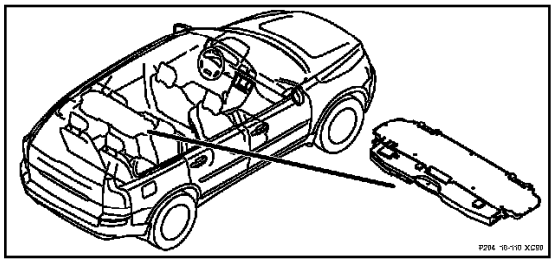
16/67 Amplifier Antenna, Bumper

7/121 Angle sensor Four-C/Bi-Xenon rear right



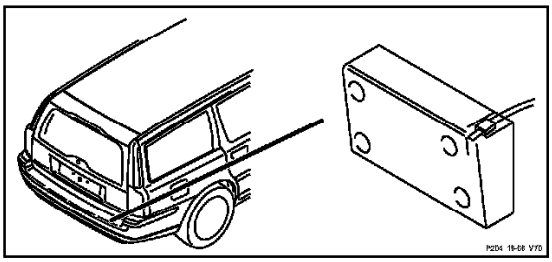
7/121 Angle Sensor Four-C/Bi-Xenon Rear Right

16/110 Antenna control module (ATM)



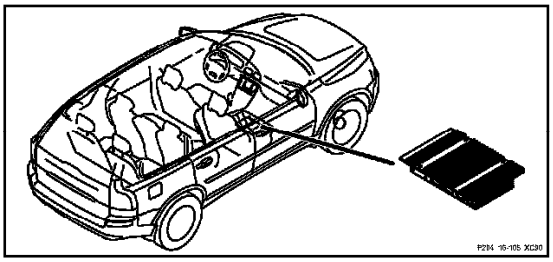
16/110 Antenna Control Module (ATM)

16/68 Antenna, bumper



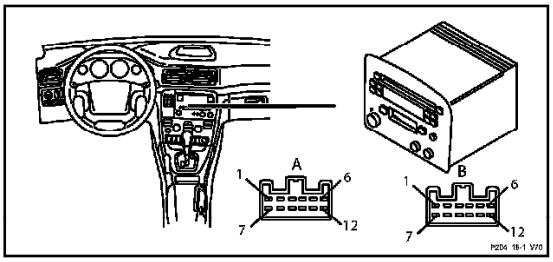
16/68 Antenna, Bumper

16/105 Audio Module (AUD)



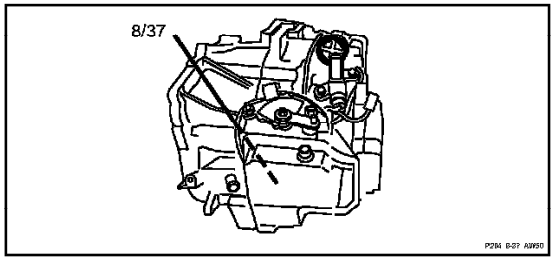
16/105 Audio Module (AUD)

16/1 Audio Module (AUM)



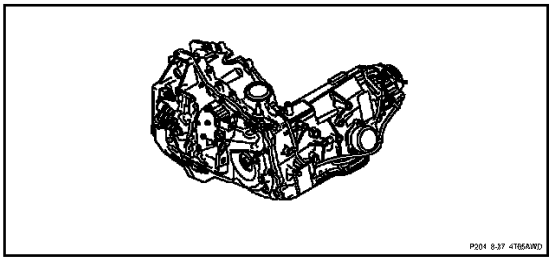
16/1 Audio Module (AUM)

8/37 Automatic transmission AW50



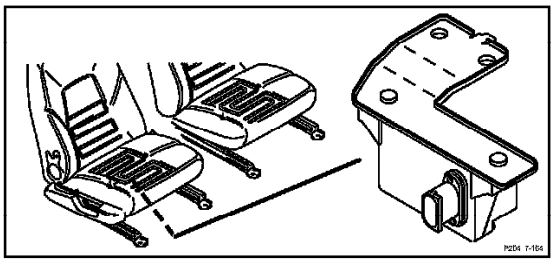
8/37 Automatic Transmission

8/37 Automatic transmission 4T65AWD



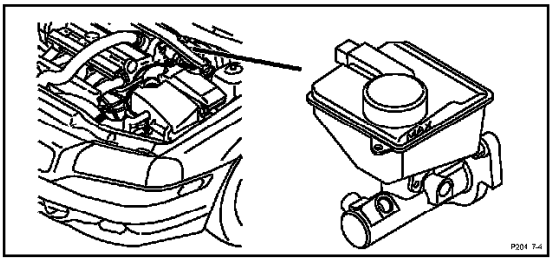
8/37 Automatic Transmission

7/164 Body Sensor Cluster (BSC)



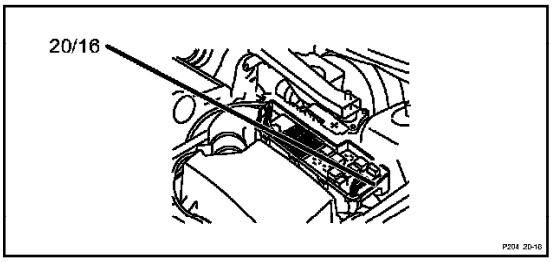
7/164 Body Sensor Cluster (BSC)

7/4 Brake fluid level sensor



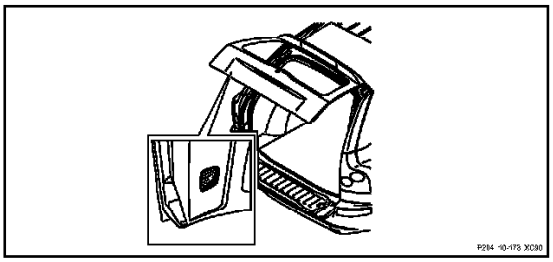
7/4 Brake Fluid Level Sensor

20/16 Capacitor



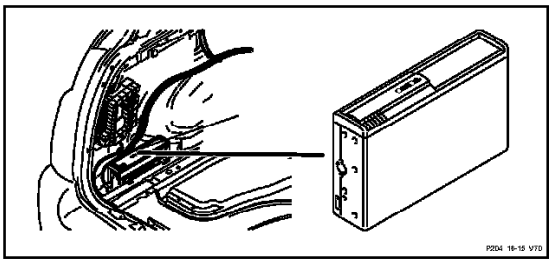
20/16 Capacitor

10/173 Cargo compartment lighting, tailgate



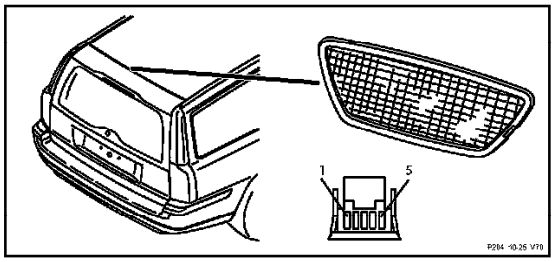
10/173 Cargo Compartment Lighting, Tailgate

16/15 CD changer



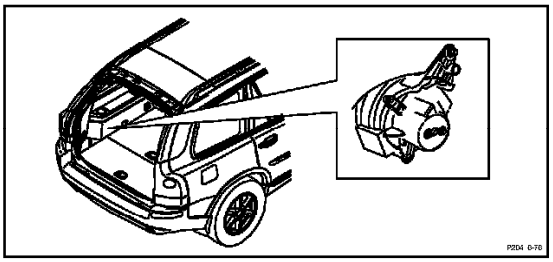
16/15 CD Changer

10/25 Ceiling light, cargo compartment



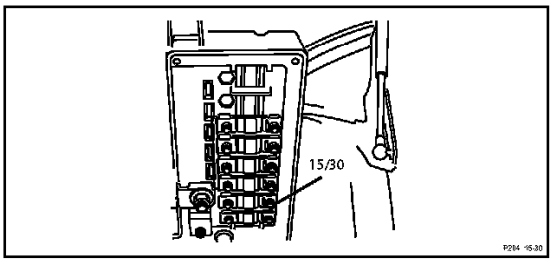
10/25 Ceiling Light, Cargo Compartment

6/76 Climate control system, rear



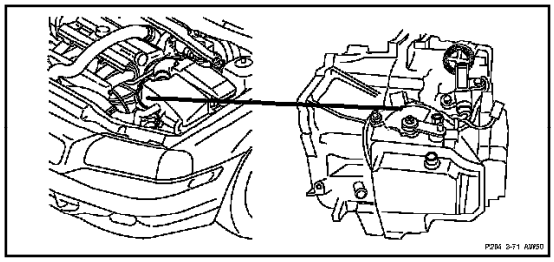
6/76 Climate Control System, Rear

15/30 Connecting rail to 15/31



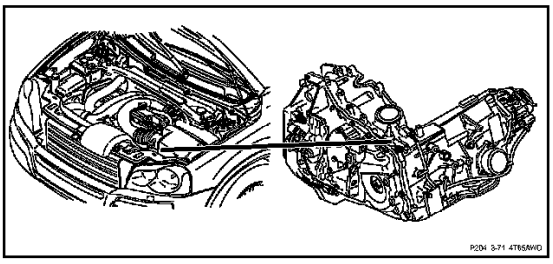
15/30 Connecting Rail To 15/31

3/71 Contacts gear selector AW50



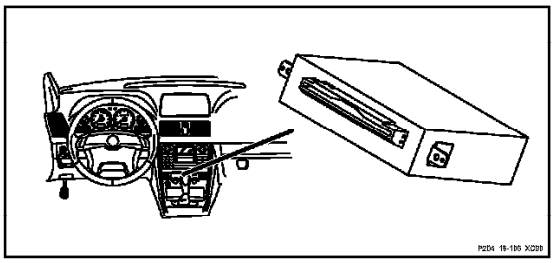
3/71 Contacts Gear Selector

3/71 Contacts gear selector 4T65AWD



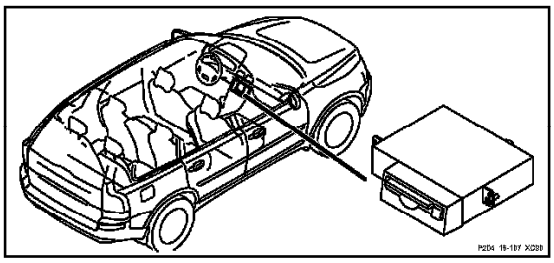
3/71 Contacts Gear Selector

16/106 Control module, CD player (MP2)



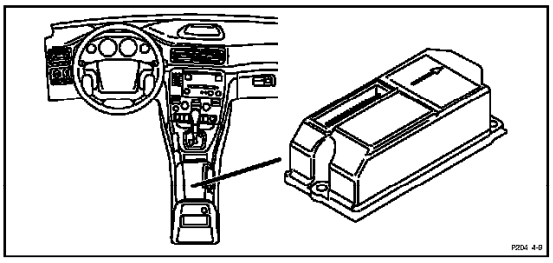
16/106 Control Module, CD Player (MP2)

16/107 Control module, MD player (MP1)



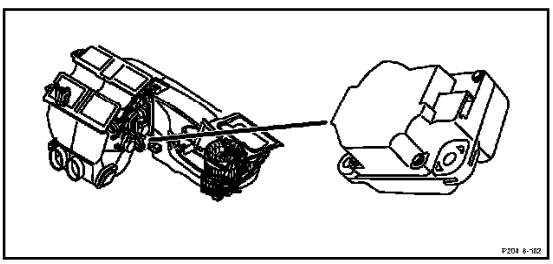
16/107 Control Module, MD Player (MP1)

4/9 Control module, Supplementary Restraint System (SRS)



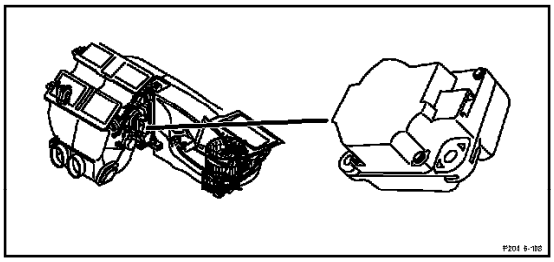
4/9 Control Module, Supplementary Restraint System (SRS)

6/102 Damper Motor Module (DMM), defroster



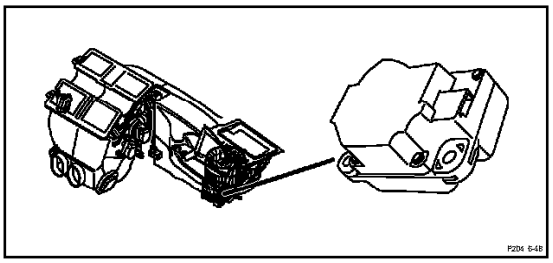
6/102 Damper Motor Module (DMM), Defroster

6/103 Damper Motor Module (DMM), floor/ventilation



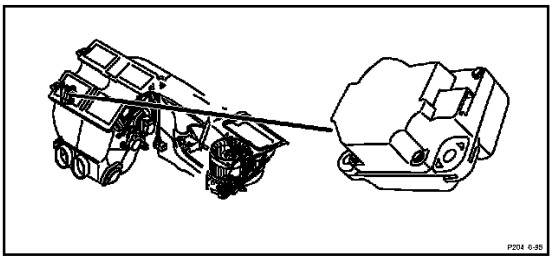
6/103 Damper Motor Module (DMM), Floor/Ventilation

6/48 Damper Motor Module (DMM), recirculation



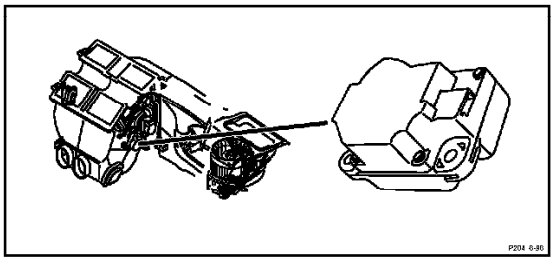
6/48 Damper Motor Module (DMM), Recirculation

6/95 Damper Motor Module (DMM), temperature, left-hand side



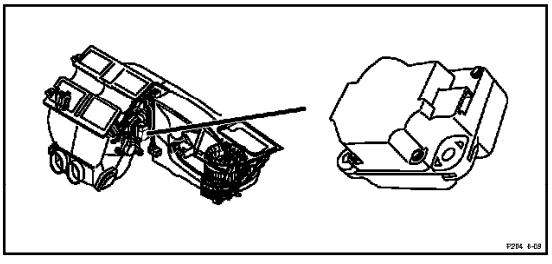
6/95 Damper Motor Module (DMM), Temperature, Left-Hand Side

6/96 Damper Motor Module (DMM), temperature, right-hand side



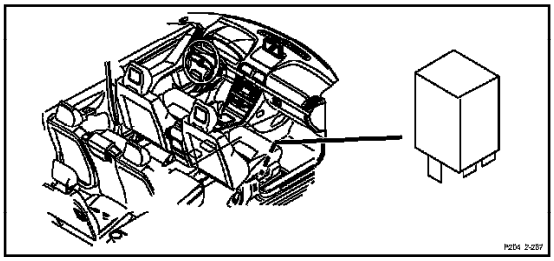
6/96 Damper Motor Module (DMM), Temperature, Right-Hand Side

6/69 Damper Motor Module (DMM), ventilation/floor/defroster



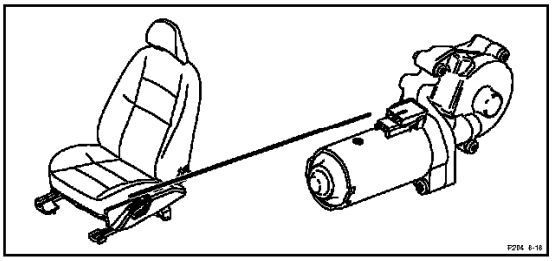
6/69 Damper Motor Module (DMM), Ventilation/Floor/Defroster

2/237 Disconnect relay, rear speaker



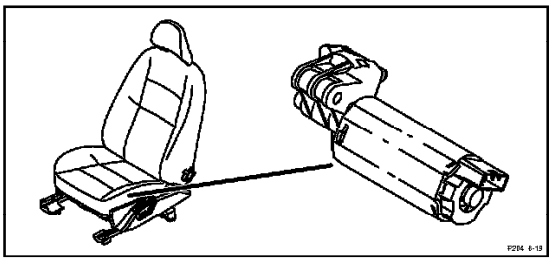
2/237 Disconnect Relay, Rear Speaker

6/16 Driver seat motor, backrest angle



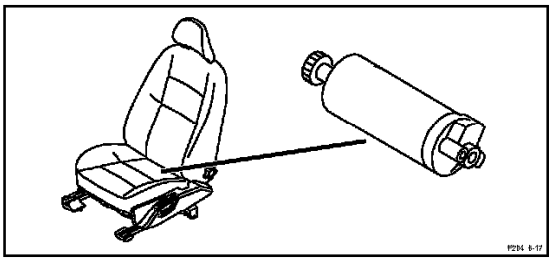
6/16 Driver Seat Motor, Backrest Angle

6/19 Driver seat motor, forward/backward



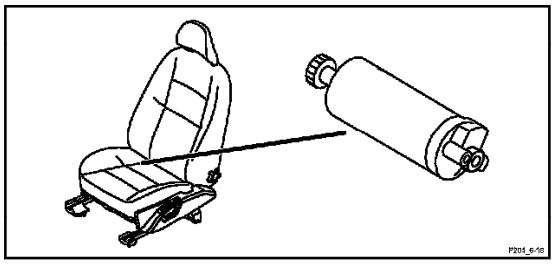
6/19 Driver Seat Motor, Forward/Backward

6/17 Driver seat motor, up/down front edge



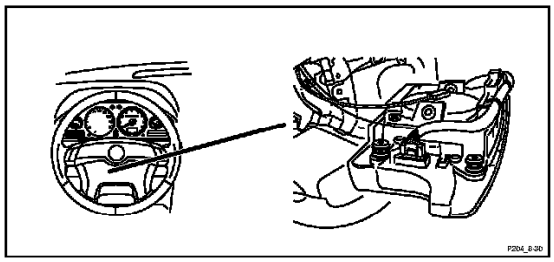
6/17 Driver Seat Motor, Up/Down Front Edge

6/18 Driver seat motor, up/down rear edge



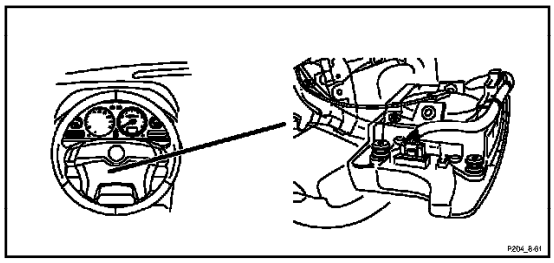
6/18 Driver Seat Motor, Up/Down Rear Edge

8/30 Driver side airbag igniter



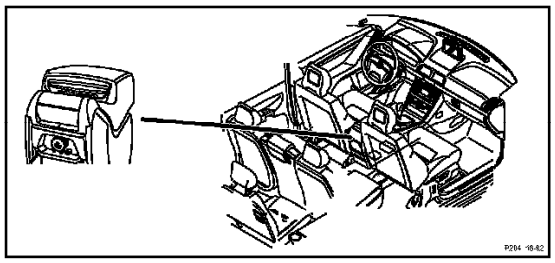
8/30 Driver Side Airbag Igniter

8/61 Driver side airbag igniter step 2



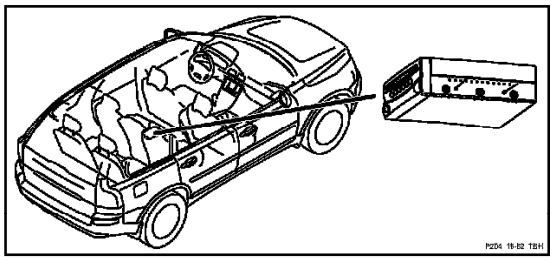
8/61 Driver Side Airbag Igniter Step 2

16/82 DVD-player



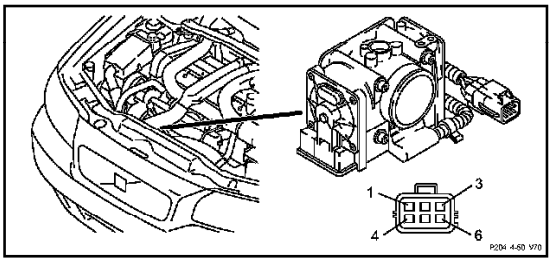
16/82 DVD-player

16/82 DVD-player accessory



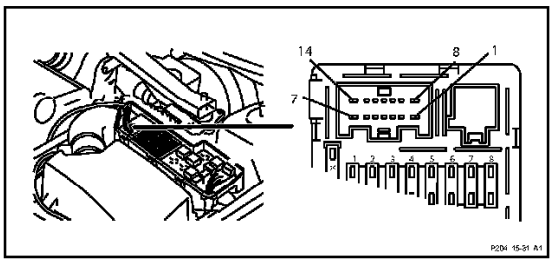
16/82 DVD-player Accessory

4/50 Electronic Throttle Module (ETM)



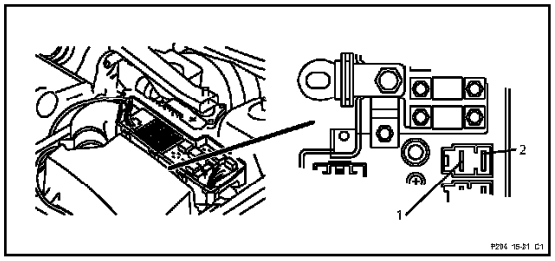
4/50 Electronic Throttle Module (ETM)

15/31_A1 Engine compartment distribution box



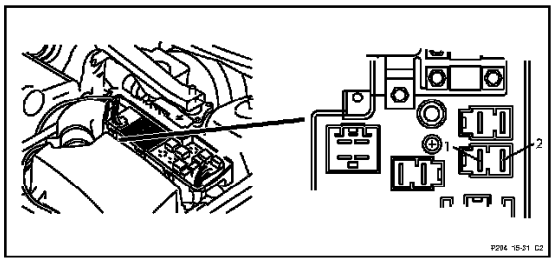
15/31_A1 Engine Compartment Distribution Box

15/31_C1 Engine compartment distribution box



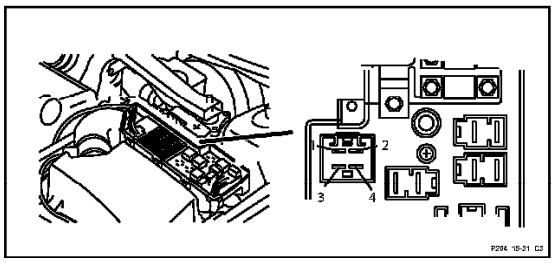
15/31_C1 Engine Compartment Distribution Box

15/31_C2 Engine compartment distribution box



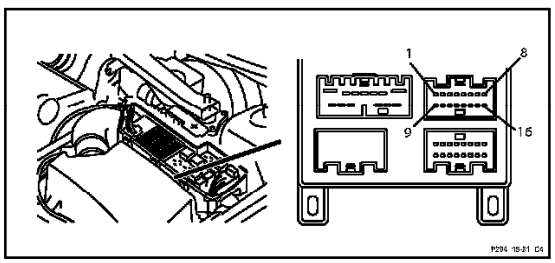
15/31_C2 Engine Compartment Distribution Box

15/31_C3 Engine compartment distribution box



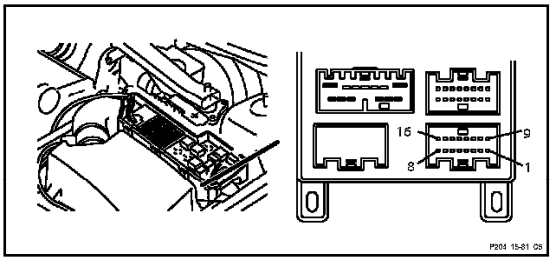
15/31_C3 Engine Compartment Distribution Box

15/31_C4 Engine compartment distribution box



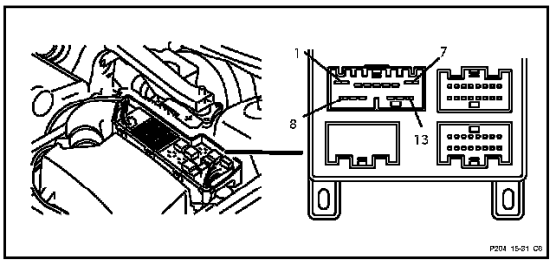
15/31_C4 Engine Compartment Distribution Box

15/31_C5 Engine compartment distribution box



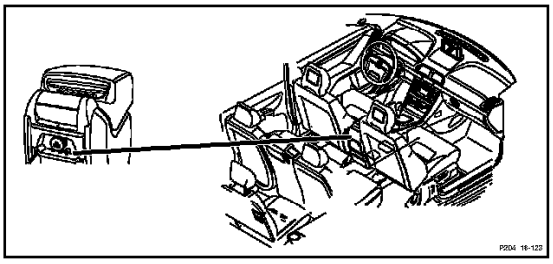
15/31_C5 Engine Compartment Distribution Box

15/31_C6 Engine compartment distribution box



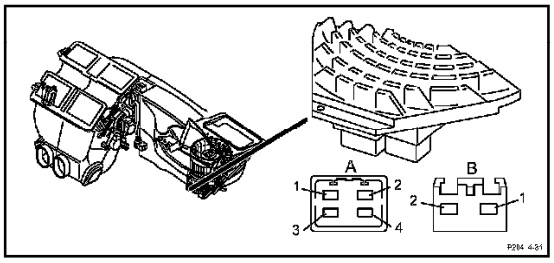
15/31_C6 Engine Compartment Distribution Box

16/123 External equipment socket (AUX)



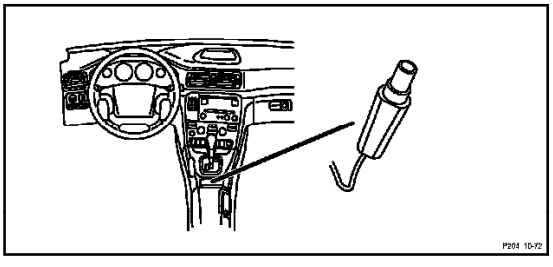
16/123 External Equipment Socket (AUX)

4/31 Fan control module



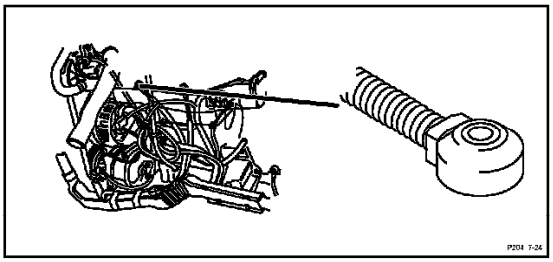
4/31 Fan Control Module

10/72 Front ashtray lighting



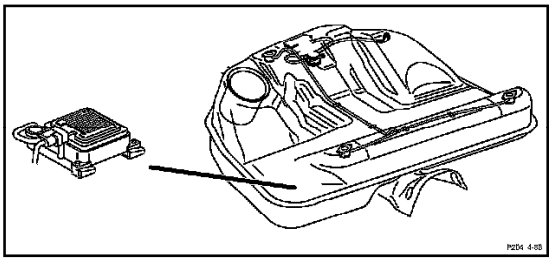
10/72 Front Ashtray Lighting

7/24 Front knock sensor



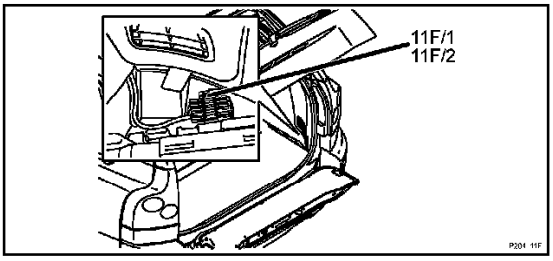
7/24 Front Knock Sensor

4/83 Fuel pump control module



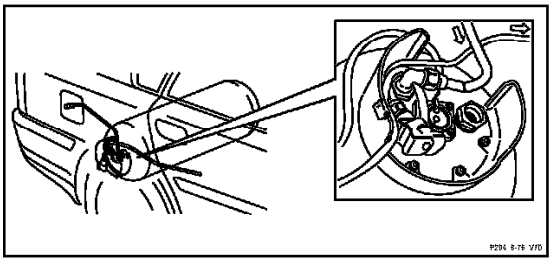
4/83 Fuel Pump Control Module

11F Fuses in cargo compartment auxiliary fuse box



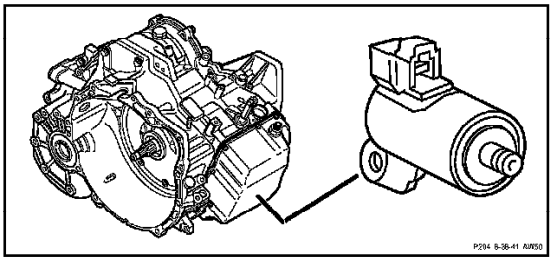
11F Fuses In Cargo Compartment Auxiliary Fuse Box

8/76 Gas tank valve



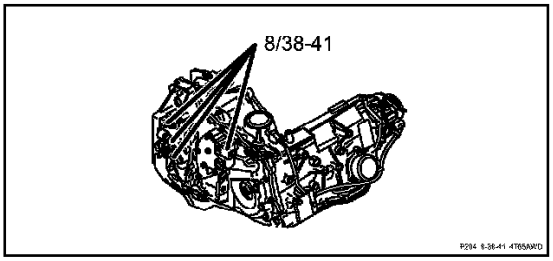
8/76 Gas Tank Valve

8/38 Gearshifting solenoid 1 AW50



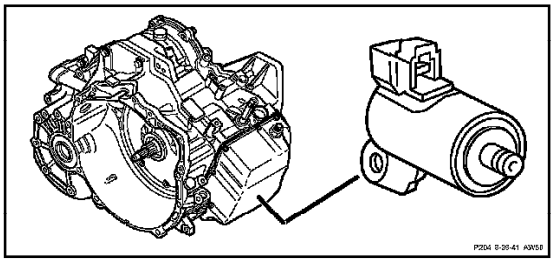
8/38 Gearshifting Solenoid 1

8/38 Gearshifting solenoid 1 4T65AWD



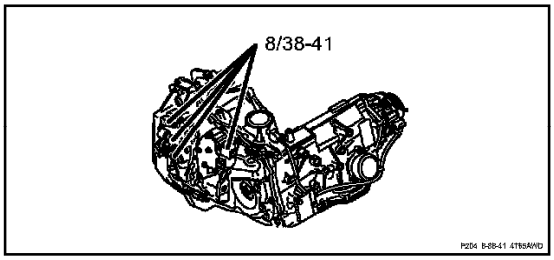
8/38 Gearshifting Solenoid 1

8/39 Gearshifting solenoid 2 AW50



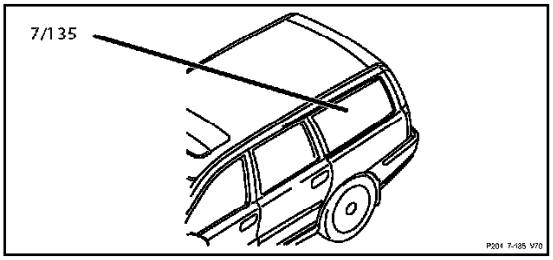
8/38 Gearshifting Solenoid 2

8/39 Gearshifting solenoid 2 4T65AWD



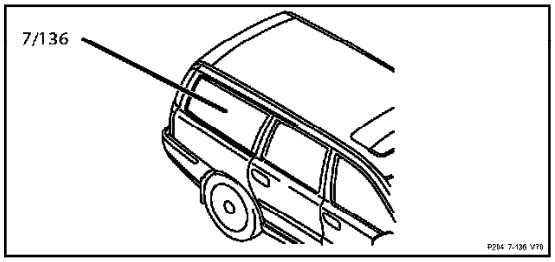
8/38 Gearshifting Solenoid 2

7/135 Glass breakage sensor, left-hand



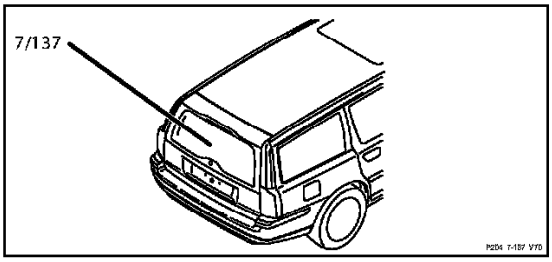
7/135 Glass Breakage Sensor, Left-Hand

7/136 Glass breakage sensor, right-hand



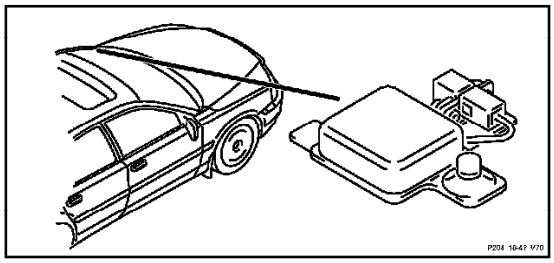
7/136 Glass Breakage Sensor, Right-Hand

7/137 Glass breakage sensor, tailgate



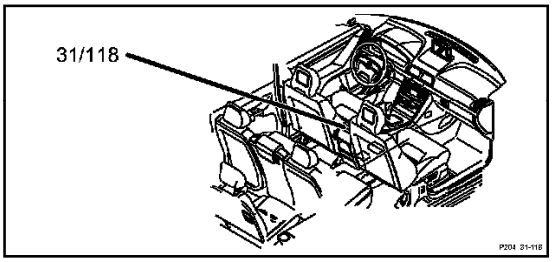
7/137 Glass Breakage Sensor, Tailgate

16/47 GPS antenna RTI



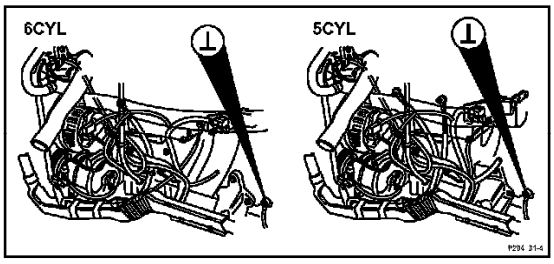
16/47 GPS Antenna RTI

31/118 Ground connection, Between front seats under the armrest



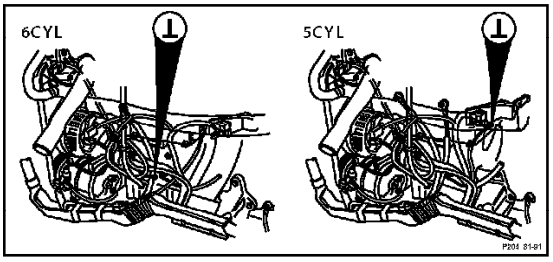
31/118 Ground Connection, Between Front Seats Under The Armrest

31/4 Ground connection, Engine



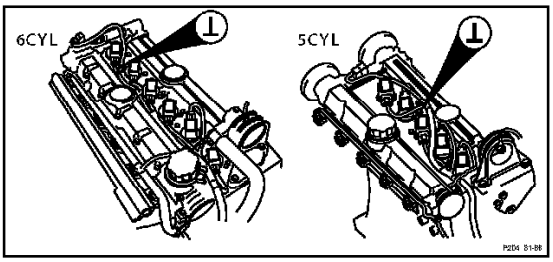
31/4 Ground Connection, Engine

31/91 Ground connection, Engine



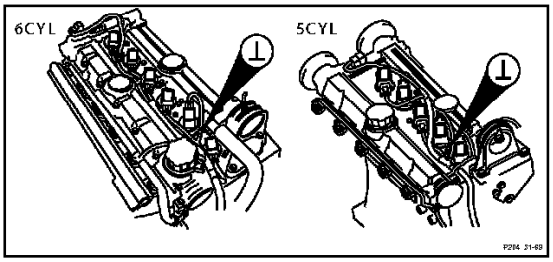
31/91 Ground Connection, Engine

31/88 Ground connection, Engine ignition coil group 1



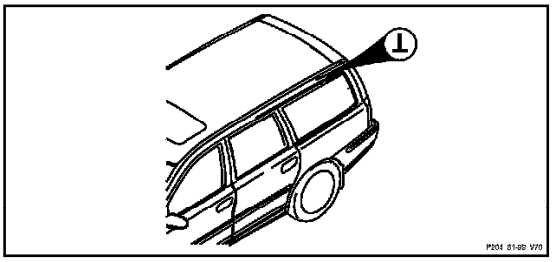
31/88 Ground Connection, Engine Ignition Coil Group 1

31/89 Ground connection, Engine ignition coil group 2



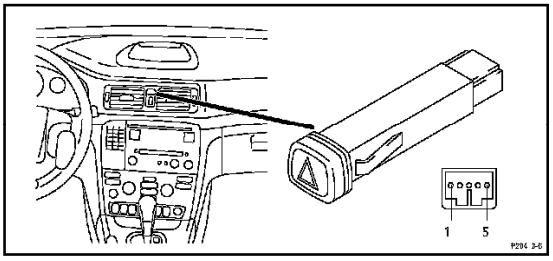
31/89 Ground Connection, Engine Ignition Coil Group 2

31/99 Ground connection, Side window left



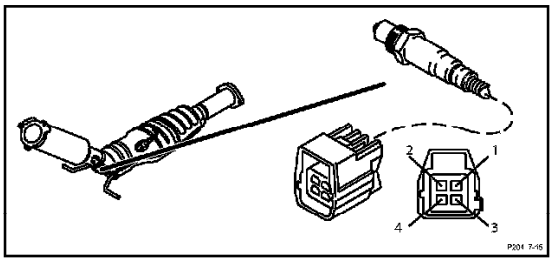
31/99 Ground Connection, Side Window Left

3/6 Hazard warning flasher switch



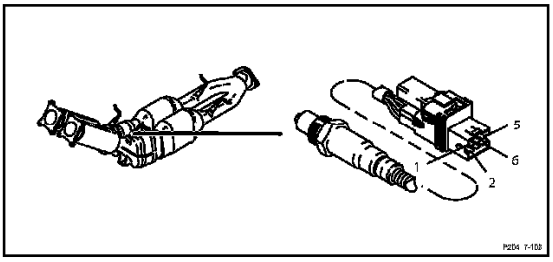
3/6 Hazard Warning Flasher Switch

7/15 Heated oxygen sensor



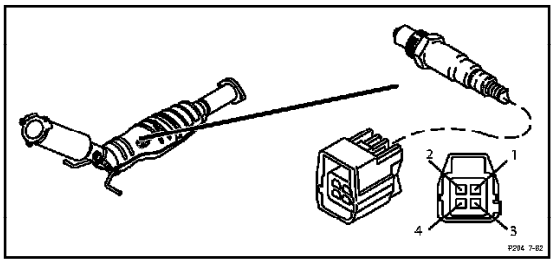
7/15 Heated Oxygen Sensor

7/103 Heated oxygen sensor 3



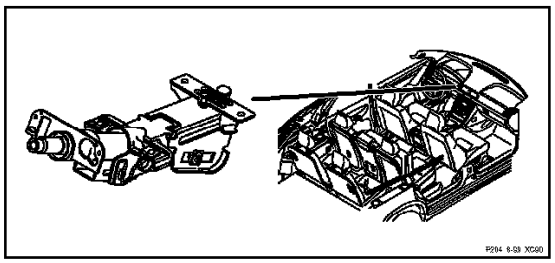
7/103 Heated Oxygen Sensor 3

7/82 Heated oxygen sensor, diagnosis 1



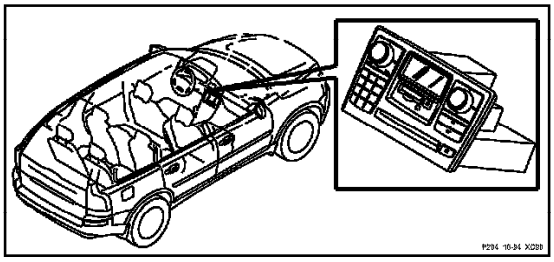
7/82 Heated Oxygen Sensor, Diagnosis 1

8/99 Igniter, steering column



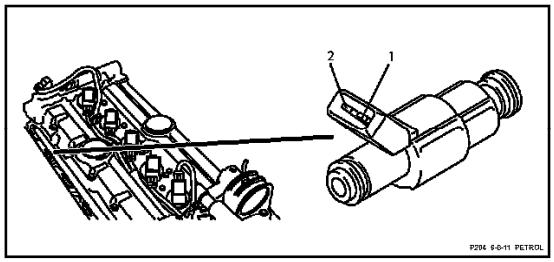
8/99 Igniter, Steering Column

16/94 Infotainment Control Module (ICM)



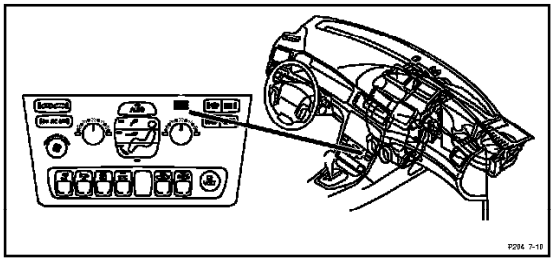
16/94 Infotainment Control Module (ICM)

8/6-11 Injectors Gasoline



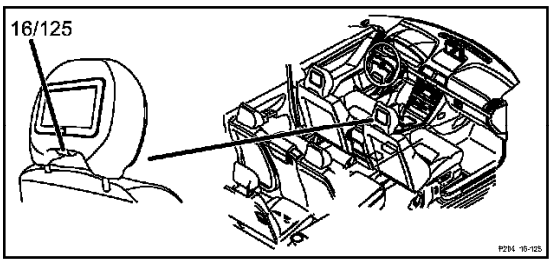
8/6-11 Injectors

7/10 Interior temperature sensor



7/10 Interior Temperature Sensor

16/125 IR transmitter



16/125 IR Transmitter

Junction Points

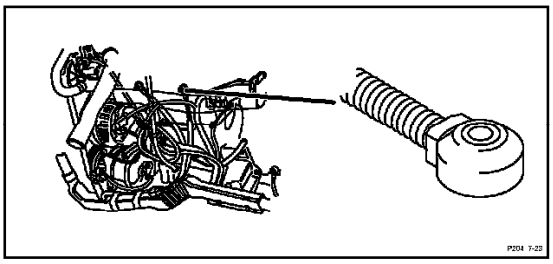
Junction Points

All references in the diagrams that begin with the numbers 53 (i.e 53/###) are references to the vehicle's Junction Points.

Diagrams for the Junctions Points can be found at Branching Points Diagrams. See: Power and Ground Distribution/Branching Point/Diagrams/Electrical Diagrams

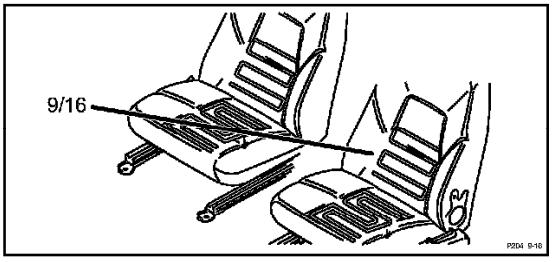
Locations for the Junctions Points can be found within the Harness Locations images at the vehicle level. See: Harness Locations

7/23 Knock sensor rear



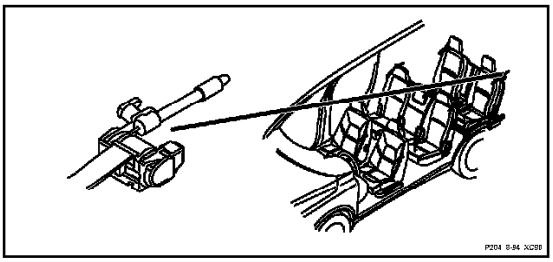
7/23 Knock Sensor Rear

9/16 Left-hand backrest heating element



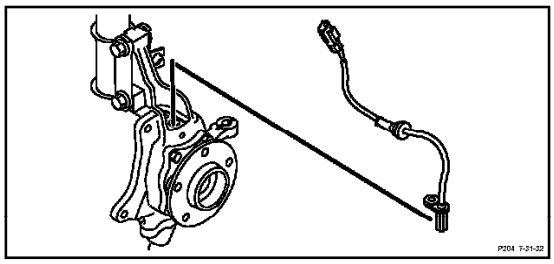
9/16 Left-Hand Backrest Heating Element

8/94 Left-hand belt tensioner igniter, third row of seats



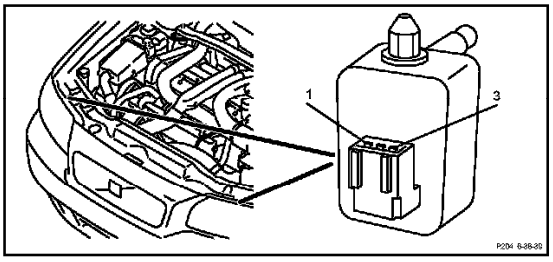
8/94 Left-Hand Belt Tensioner Igniter, Third Row Of Seats

7/31 Left-hand front ABS sensor



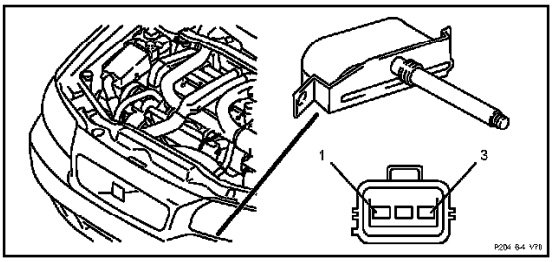
7/31 Left-Hand Front ABS Sensor

6/38 Left-hand headlight level adjustment motor



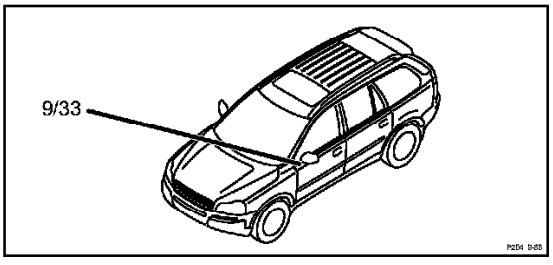
6/38 Left-Hand Headlight Level Adjustment Motor

6/4 Left-hand headlight wiper motor



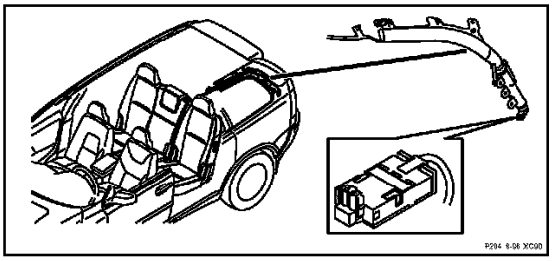
6/4 Left-Hand Headlight Wiper Motor

9/33 Left-hand heated door mirror



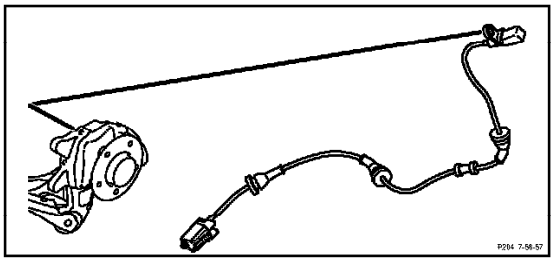
9/33 Left-Hand Heated Door Mirror

8/96 Left-hand inflatable curtain igniter, third row of seats



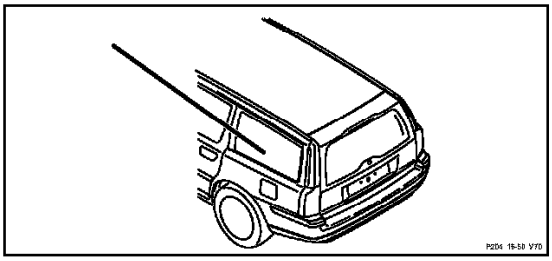
8/96 Left-Hand Inflatable Curtain Igniter, Third Row Of Seats

7/56 Left-hand rear ABS sensor



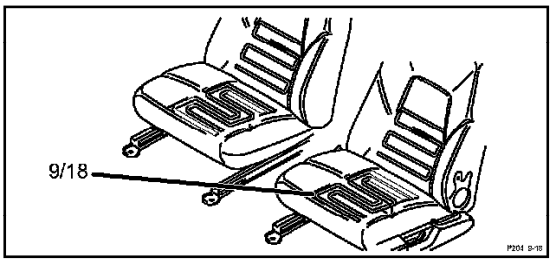
7/56 Left-Hand Rear ABS Sensor

16/50 Left-hand rear window antenna



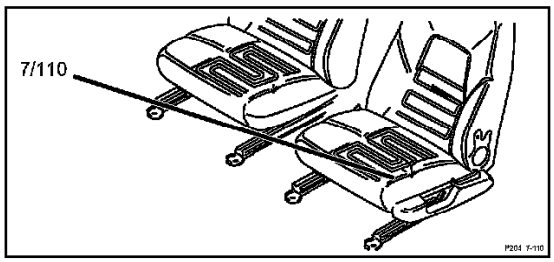
16/50 Left-hand Rear Window Antenna

9/18 Left-hand seat heating element



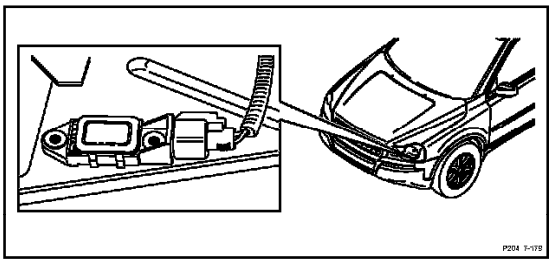
9/18 Left-Hand Seat Heating Element

7/110 Left-hand seat temperature sensor



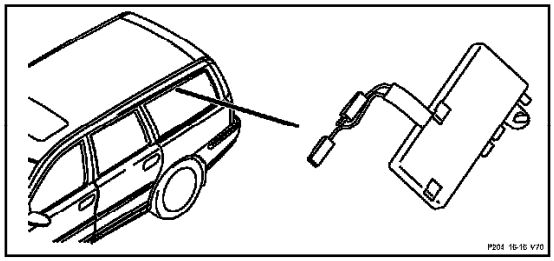
7/110 Left-Hand Seat Temperature Sensor

7/179 LH front impact sensor



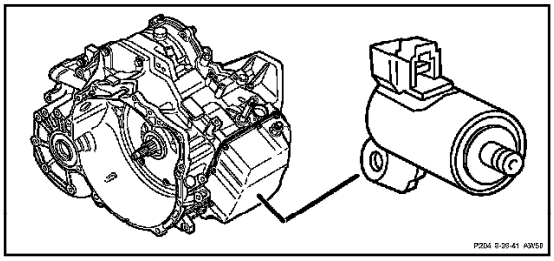
7/179 LH Front Impact Sensor

16/16 LH window antenna amplifier 1



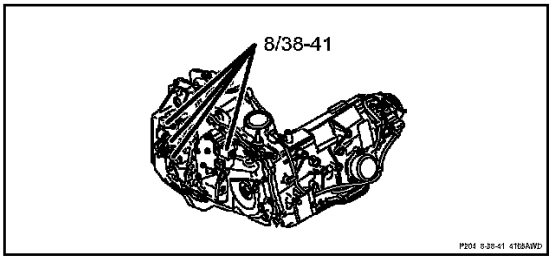
16/16 LH Window Antenna Amplifier 1

8/40 Lock-up solenoid AW50



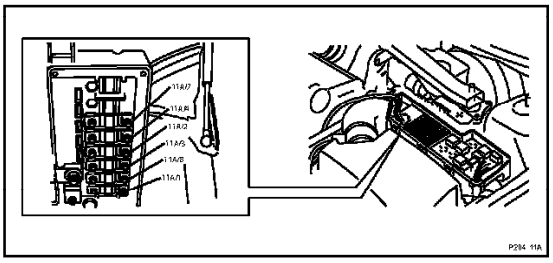
8/40 Lock-Up Solenoid

8/40 Lock-up solenoid 4T65AWD



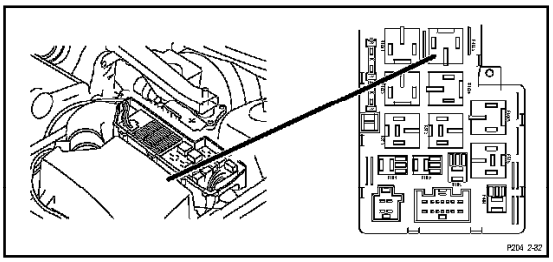
8/40 Lock-Up Solenoid

11A Main fuses in engine compartment fuse box



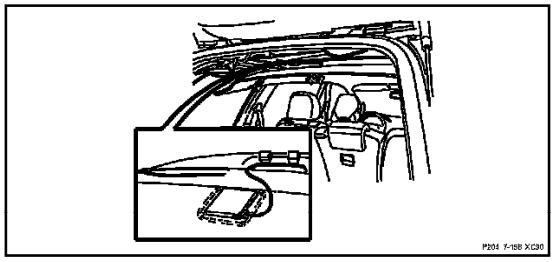
11A Main Fuses In Engine Compartment Fuse Box

2/32 Main relay, engine management system



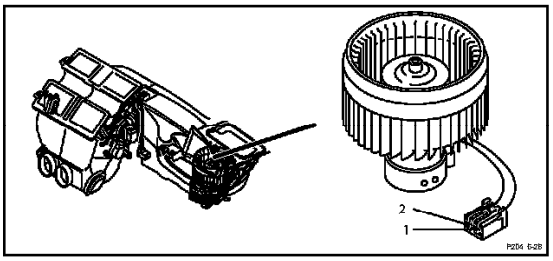
2/32 Main Relay, Engine Management System

7/158 Mass Movement Sensor (MMS), rear



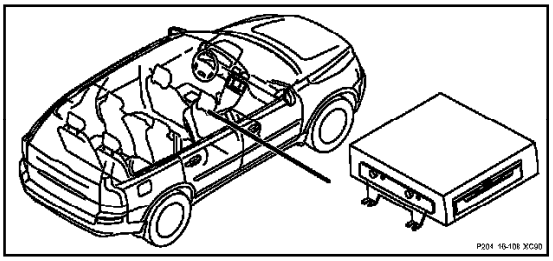
7/158 Mass Movement Sensor (MMS), Rear

6/28 Motor, passenger compartment fan



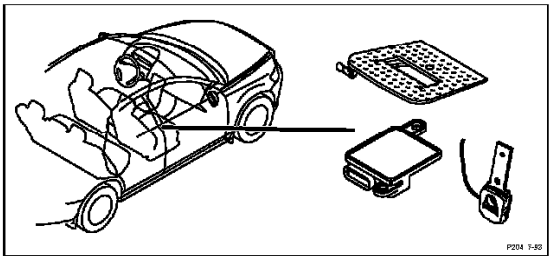
6/28 Motor, Passenger Compartment Fan

16/108 Multimedia module (MMM)



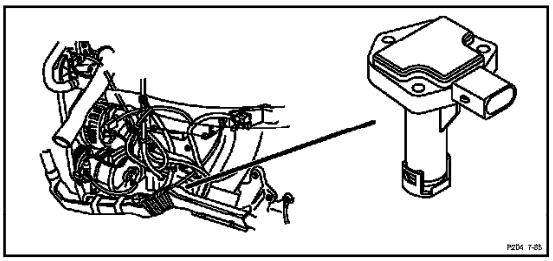
16/108 Multimedia Module (MMM)

7/93 Occupant Weight Sensor (OWS)



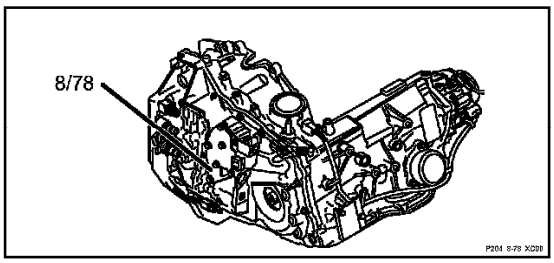
7/93 Occupant Weight Sensor (OWS)

7/35 Oil level sensor



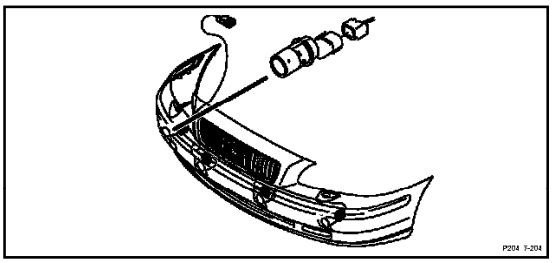
7/35 Oil Level Sensor

8/78 Oil pressure sensor



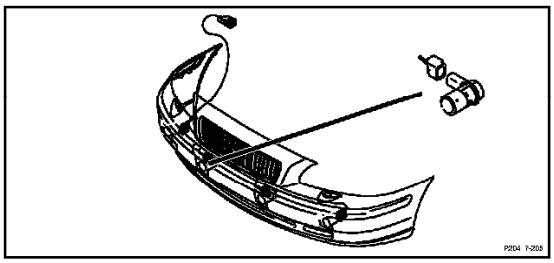
8/78 Oil Pressure Sensor

7/204 Parking assistance sensor, front 5 LHD



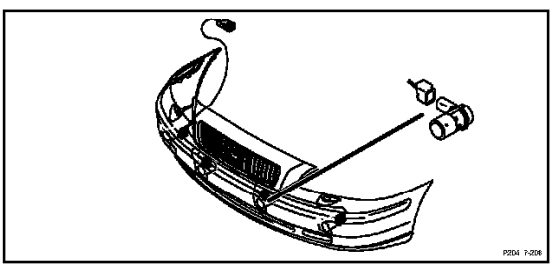
7/204 Parking Assistance Sensor, Front 5 LHD

7/205 Parking assistance sensor, front 6 LHD



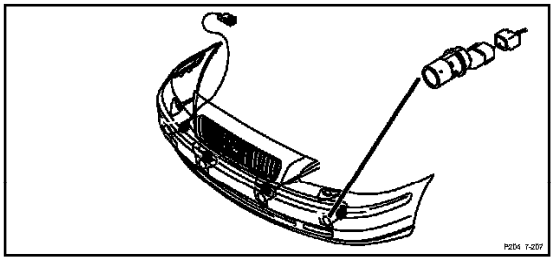
7/205 Parking Assistance Sensor, Front 6 LHD

7/206 Parking assistance sensor, front 7 LHD



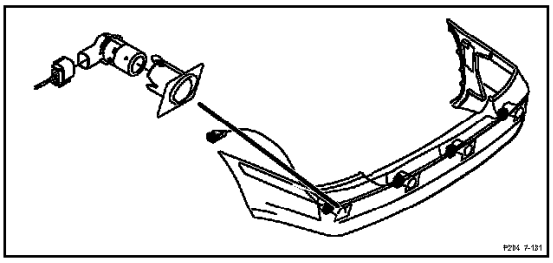
7/206 Parking Assistance Sensor, Front 7 LHD

7/207 Parking assistance sensor, front 8 LHD



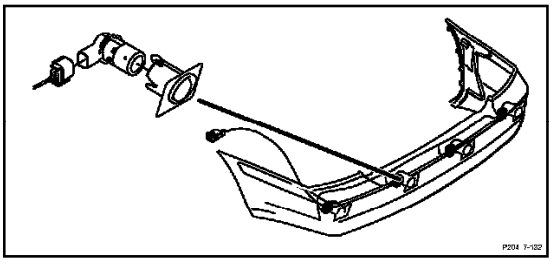
7/207 Parking Assistance Sensor, Front 8 LHD

7/131 Parking assistance sensor, rear 1



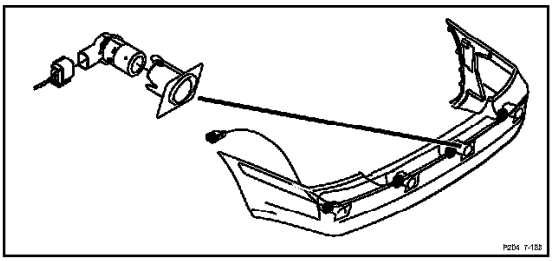
7/131 Parking Assistance Sensor, Rear 1

7/132 Parking assistance sensor, rear 2



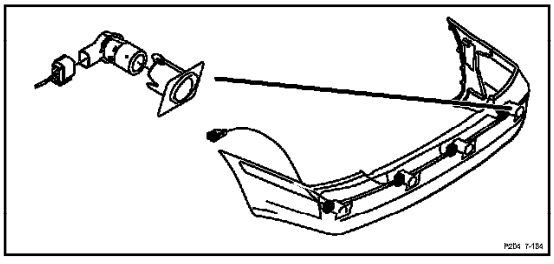
7/132 Parking Assistance Sensor, Rear 2

7/133 Parking assistance sensor, rear 3



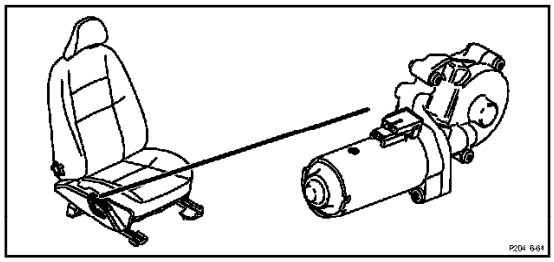
7/133 Parking Assistance Sensor, Rear 3

7/134 Parking assistance sensor, rear 4



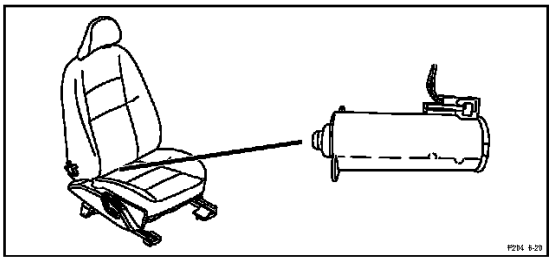
7/134 Parking Assistance Sensor, Rear 4

6/64 Passenger seat motor, backrest angle



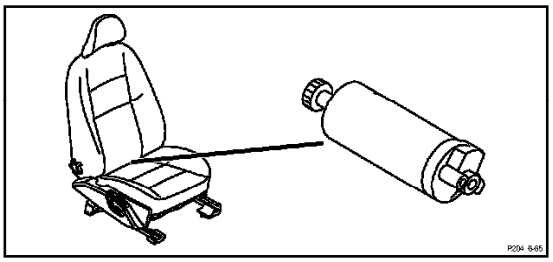
6/64 Passenger Seat Motor, Backrest Angle

6/20 Passenger seat motor, forward/backward



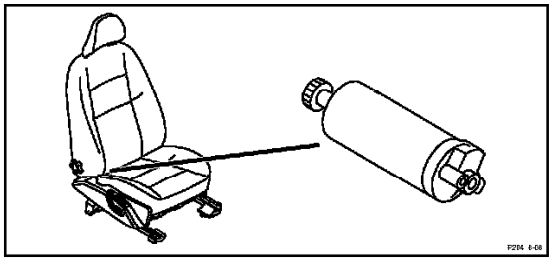
6/20 Passenger Seat Motor, Forward/Backward

6/65 Passenger seat motor, up/down front edge



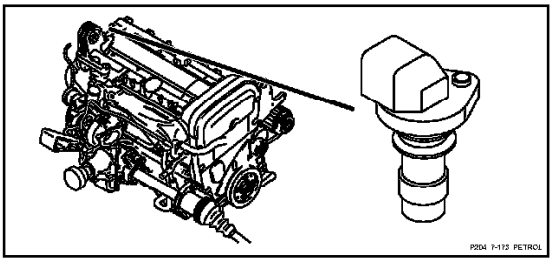
6/65 Passenger Seat Motor, Up/Down Front Edge

6/66 Passenger seat motor, up/down rear edge



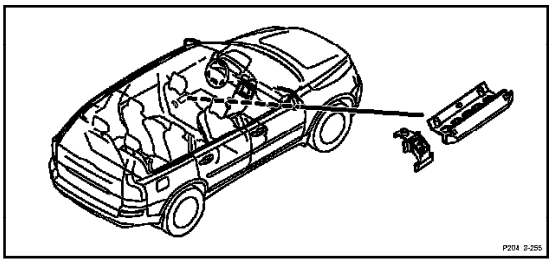
6/66 Passenger Seat Motor, Up/Down Rear Edge

7/173 Position sensor camshaft exhaust side Gasoline



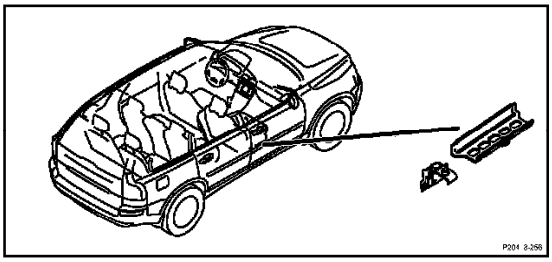
7/173 Position Sensor Camshaft Exhaust Side

3/255 Position sensor driver's seat



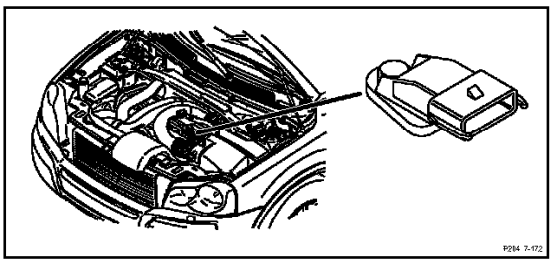
3/255 Position Sensor Driver's Seat

3/256 Position sensor passenger seat



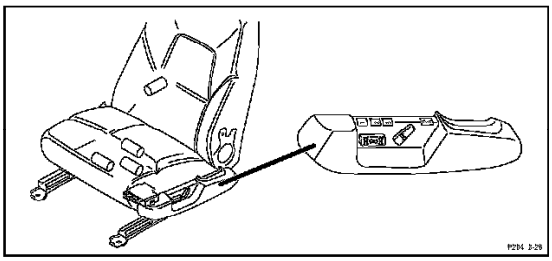
3/256 Position Sensor Passenger Seat

7/172 Position sensor, camshaft, intake side



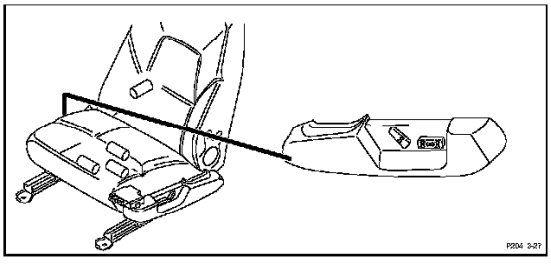
7/172 Position Sensor, Camshaft, Intake Side

3/26 Power driver's seat module



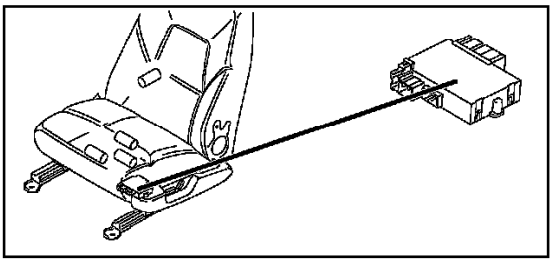
3/26 Power Driver's Seat Module

3/27 Power passenger seat module



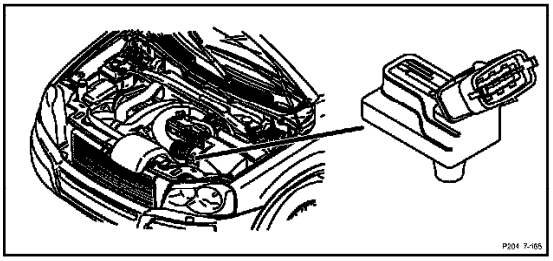
3/27 Power Passenger Seat Module

4/52 Power Seat Module (PSM)



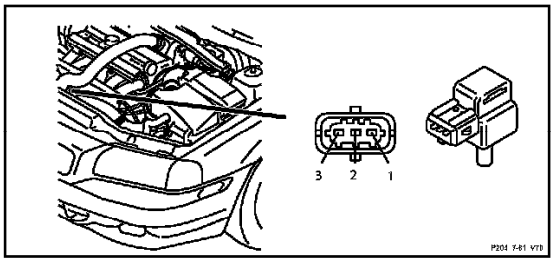
4/52 Power Seat Module (PSM)

7/165 Pressure and temperature sensor, intake manifold



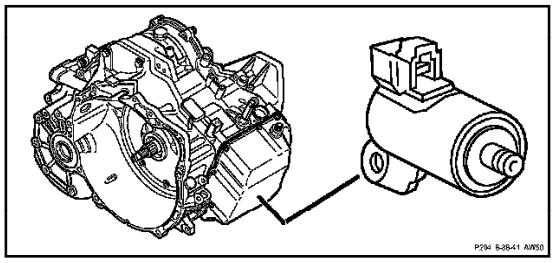
7/165 Pressure And Temperature Sensor, Intake Manifold

7/81 Pressure sensor, intake manifold



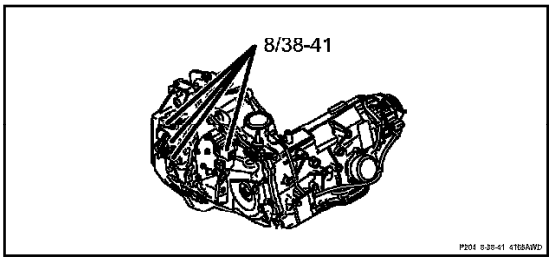
7/81 Pressure Sensor, Intake Manifold

8/41 Pressure solenoid AW50



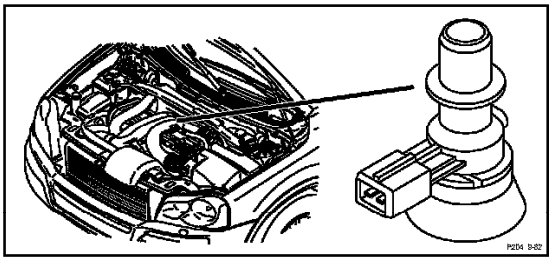
8/41 Pressure Solenoid

8/41 Pressure solenoid 4T65AWD



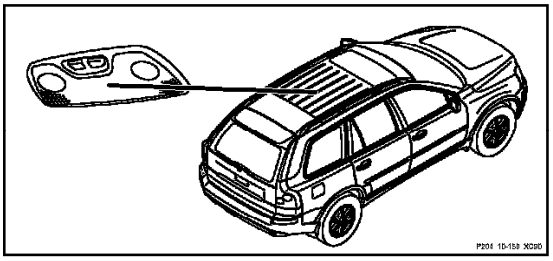
8/41 Pressure Solenoid

9/32 PTC resistor - air preheating



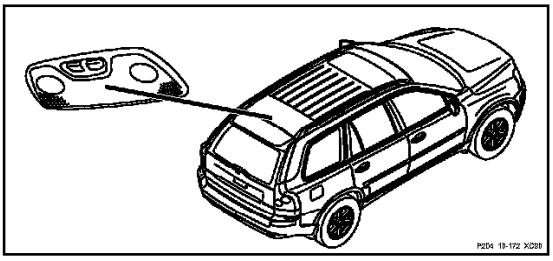
9/32 PTC Resistor - Air Preheating

10/150 Reading light rear XC90



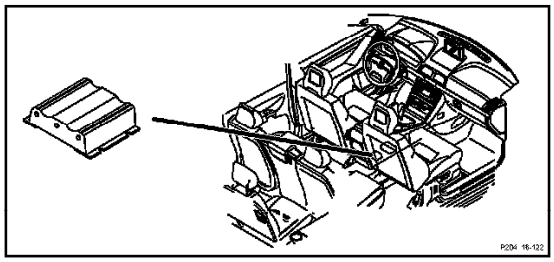
10/150 Reading Light Rear

10/172 Reading light, third row of seats



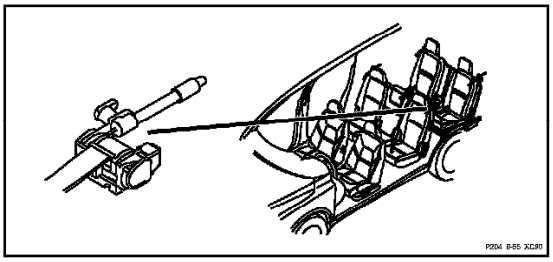
10/172 Reading Light, Third Row Of Seats

16/122 Rear Audio Separation module (RAS)



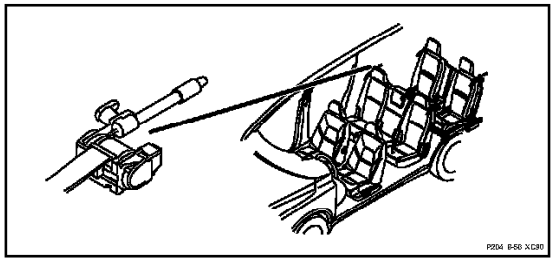
16/122 Rear Audio Separation Module (RAS)

8/55 Rear left belt tensioner igniter



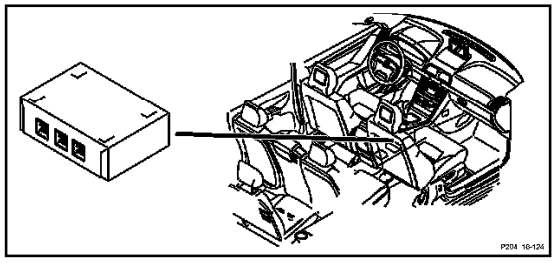
8/55 Rear Left Belt Tensioner Igniter

8/56 Rear right belt tensioner igniter



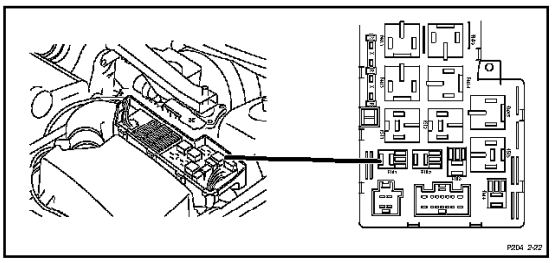
8/56 Rear Right Belt Tensioner Igniter

16/124 Rear Seat Entertainment module (RSE)



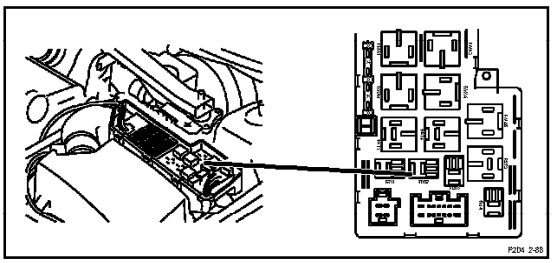
16/124 Rear Seat Entertainment Module (RSE)

2/22 Relay, climate control system



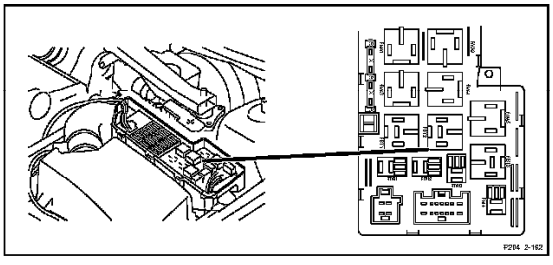
2/22 Relay, Climate Control System

2/33 Relay, fuel system



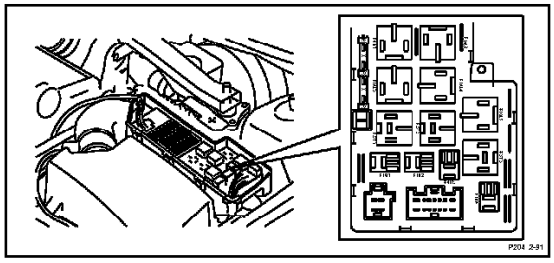
2/33 Relay, Fuel System

2/182 Relay, high pressure headlight washer motor



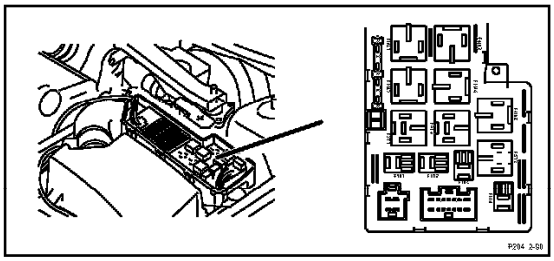
2/182 Relay, High Pressure Headlight Washer Motor

2/91 Relay, intermittent wiping



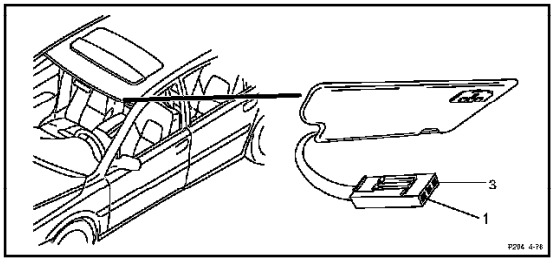
2/91 Relay, Intermittent Wiping

2/90 Relay, windshield wiper, low/high speed



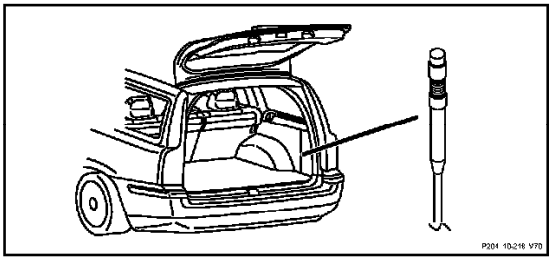
2/90 Relay, Windshield Wiper, Low/High Speed

4/76 Remote control unit for garage door opener



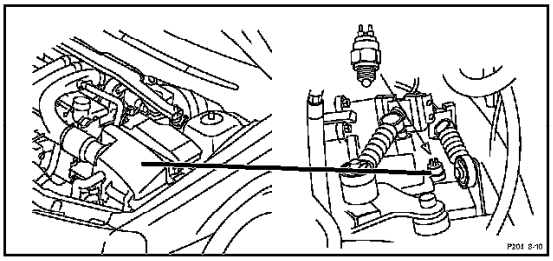
4/76 Remote Control Unit For Garage Door Opener

10/218 Remote start indicator light



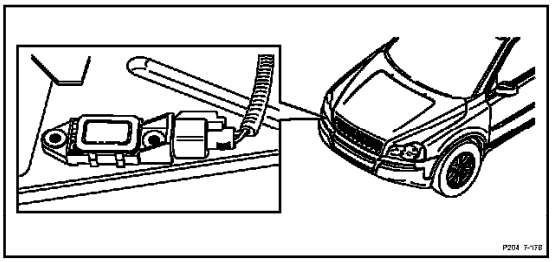
10/218 Remote Start Indicator Light

3/10 Reversing light contact



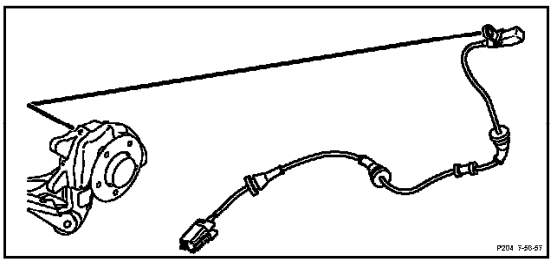
3/10 Reversing Light Contact

7/178 RH front impact sensor



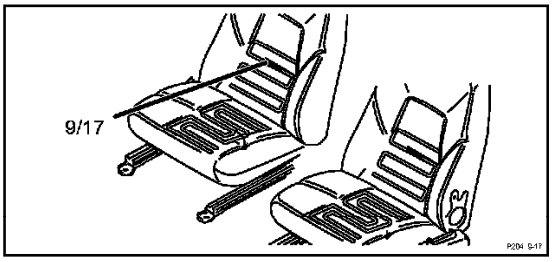
7/178 RH Front Impact Sensor

7/57 Right rear ABS sensor



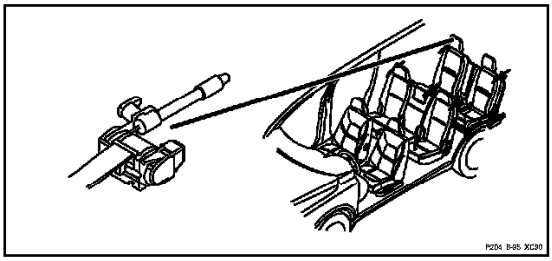
7/57 Right Rear ABS Sensor

9/17 Right-hand backrest heating element



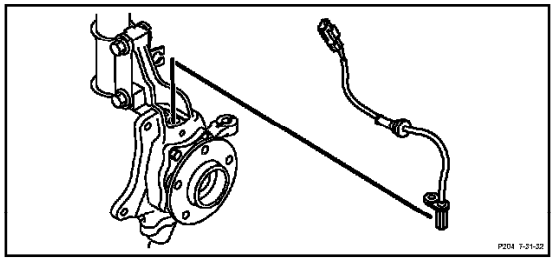
9/17 Right-Hand Backrest Heating Element

8/95 Right-hand belt tensioner igniter, third row of seats



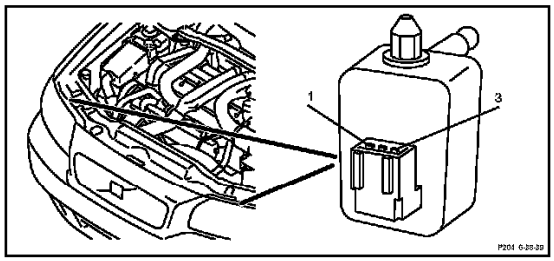
8/95 Right-Hand Belt Tensioner Igniter, Third Row Of Seats

7/32 Right-hand front ABS sensor



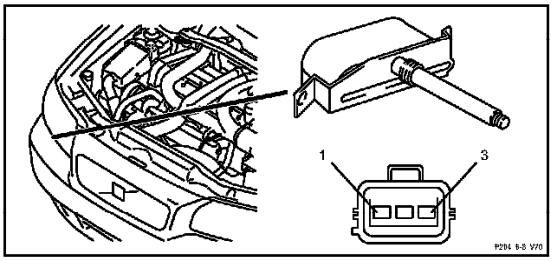
7/32 Right-Hand Front ABS Sensor

6/39 Right-hand headlight adjustment motor



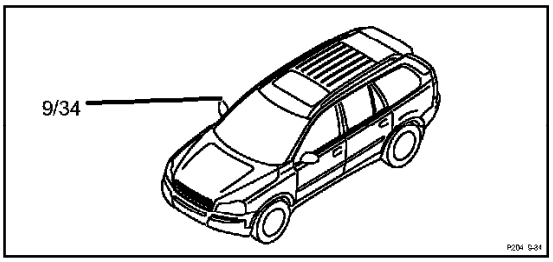
6/39 Right-Hand Headlight Adjustment Motor

6/3 Right-hand headlight wiper motor



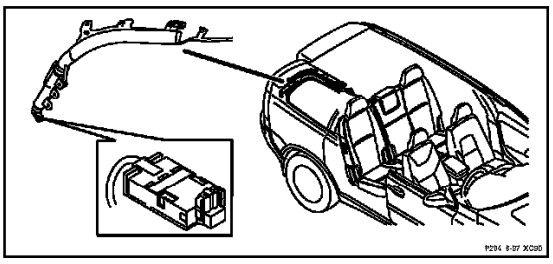
6/3 Right-Hand Headlight Wiper Motor

9/34 Right-hand heated door mirror



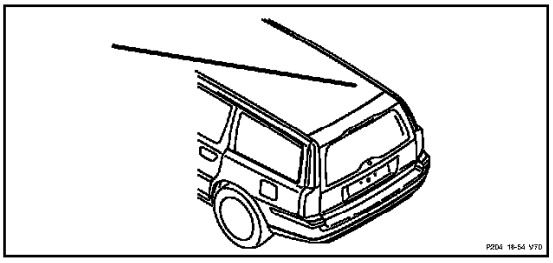
9/34 Right-Hand Heated Door Mirror

8/97 Right-hand inflatable curtain igniter, third row of seats



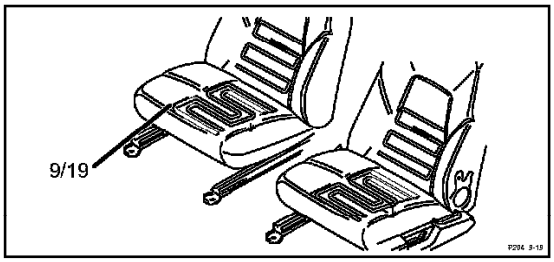
8/97 Right-Hand Inflatable Curtain Igniter, Third Row Of Seats

16/54 Right-hand rear window antenna



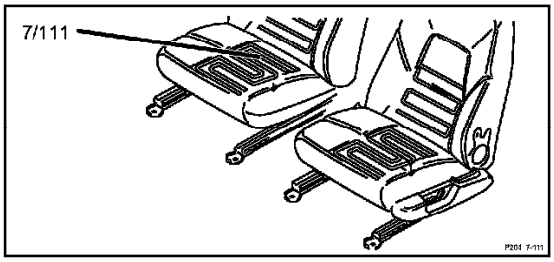
16/54 Right-hand Rear Window Antenna

9/19 Right-hand seat heating element



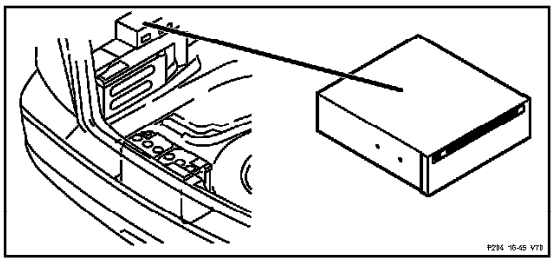
9/19 Right-Hand Seat Heating Element

7/111 Right-hand seat temperature sensor



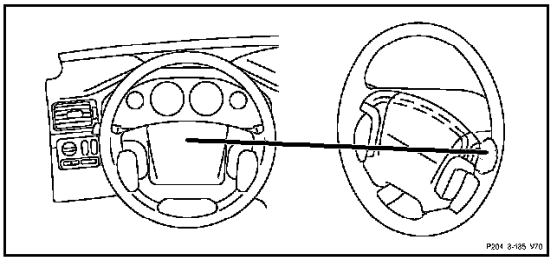
7/111 Right-Hand Seat Temperature Sensor

16/45 Road Traffic Information (RTI)



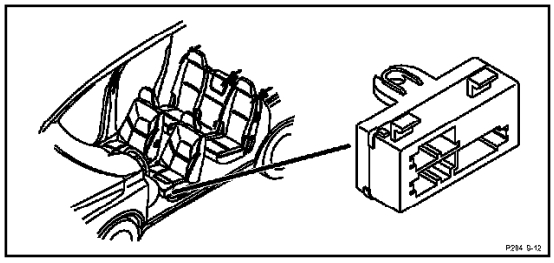
16/45 Road Traffic Information (RTI)

3/135 RTI switch



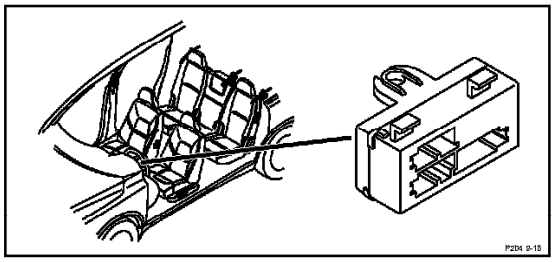
3/135 RTI Switch

9/12 Seat Heater Module (SHM), left-hand



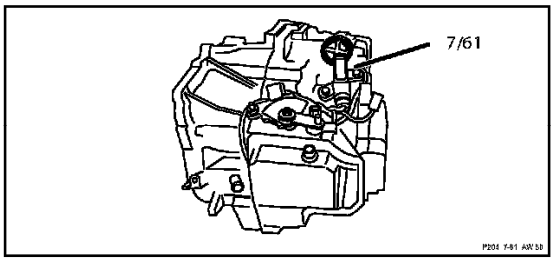
9/12 Seat Heater Module (SHM), Left-Hand

9/13 Seat Heater Module (SHM), right-hand



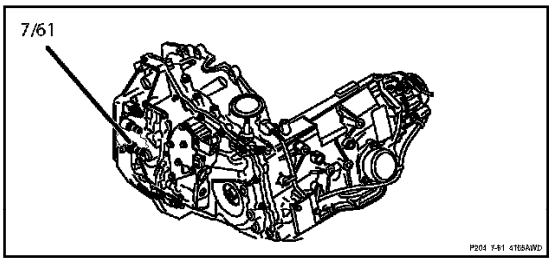
9/13 Seat Heater Module (SHM), Right-Hand

7/61 Sensor input rpm AW50



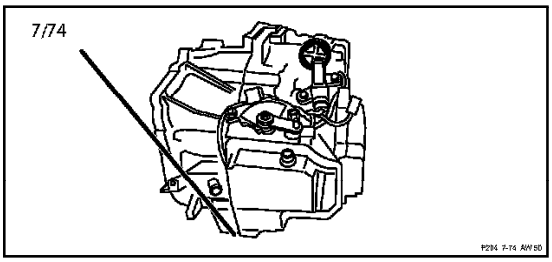
7/61 Sensor Input RPM

7/61 Sensor input rpm 4T65AWD



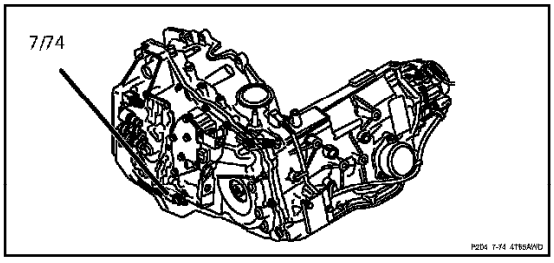
7/61 Sensor Input RPM

7/74 Sensor oil temperature automatic transmission AW50



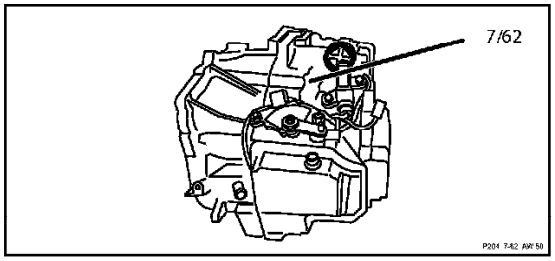
7/74 Sensor Oil Temperature Automatic Transmission

7/74 Sensor oil temperature automatic transmission 4T65AWD



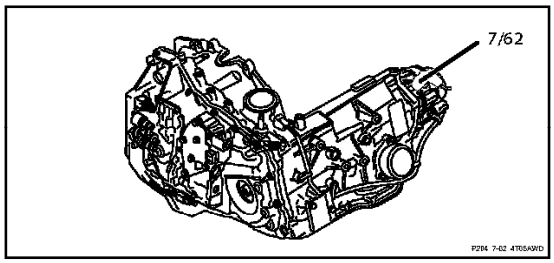
7/74 Sensor Oil Temperature Automatic Transmission

7/62 Sensor output rpm AW50



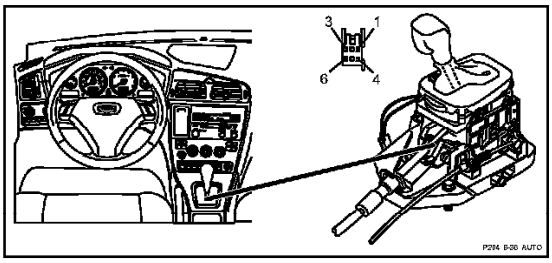
7/62 Sensor Output RPM

7/62 Sensor output rpm 4T65AWD



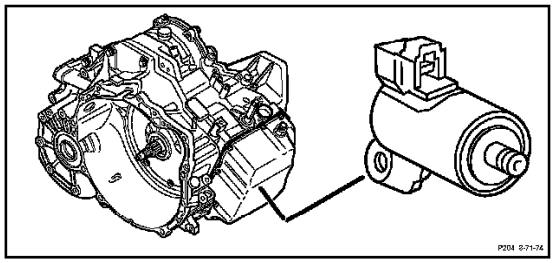
7/62 Sensor Output RPM

8/36 Shift lock solenoid



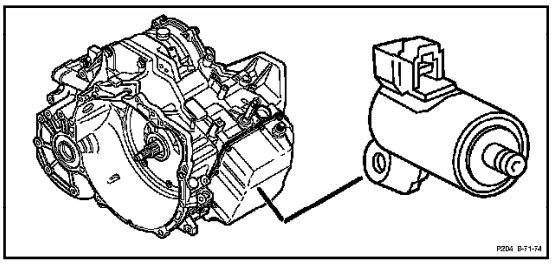
8/36 Shift Lock Solenoid

8/72 Shift solenoid 3



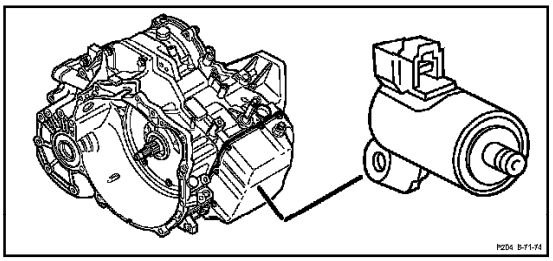
8/72 Shift Solenoid 3

8/73 Shift solenoid 4



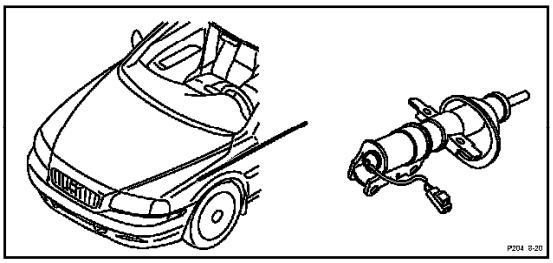
8/73 Shift Solenoid 4

8/74 Shift solenoid 5



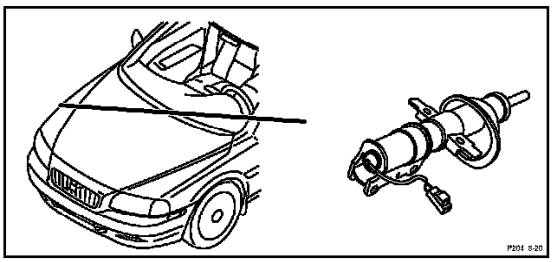
8/74 Shift Solenoid 5

8/20 Shock absorber, Four-C, front left



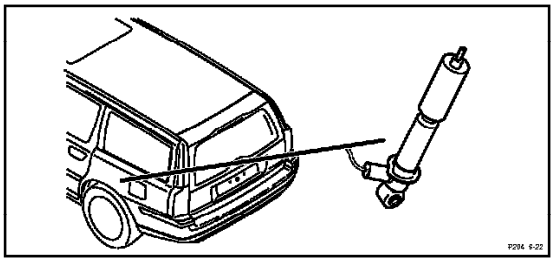
8/20 Shock Absorber, Four-C, Front Left

8/21 Shock absorber, Four-C, front right



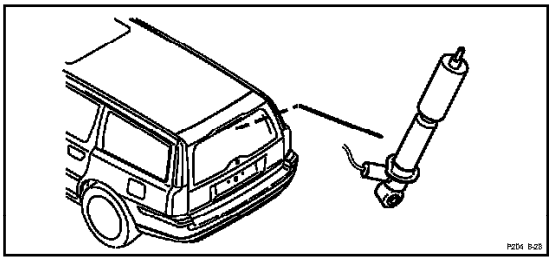
8/21 Shock Absorber, Four-C, Front Right

8/22 Shock absorber, Four-C, rear left



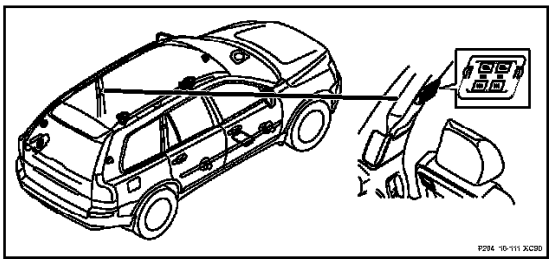
8/22 Shock Absorber, Four-C, Rear Left

8/23 Shock absorber, Four-C, rear right



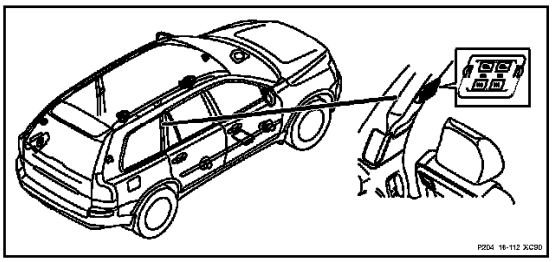
8/23 Shock Absorber, Four-C, Rear Right

16/111 Socket, rear left headphones



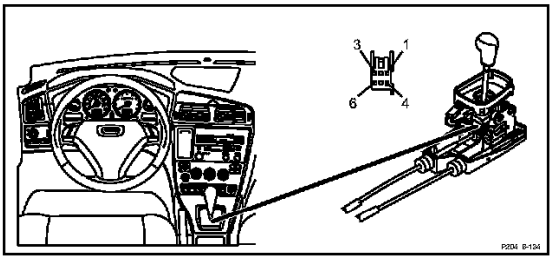
16/111 Socket, Rear Left Headphones

16/112 Socket, rear right headphones



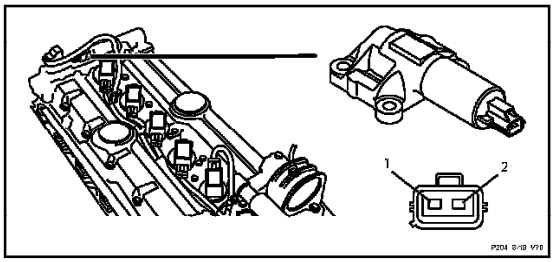
16/112 Socket, Rear Right Headphones

8/134 Solenoid, reverse interlock, manual



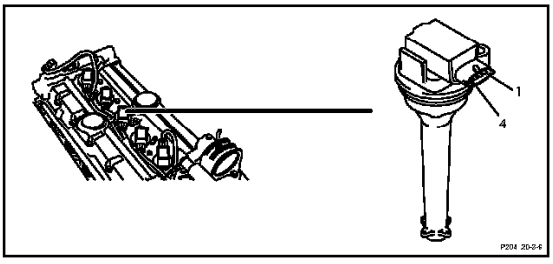
8/134 Solenoid, Reverse Interlock, Manual

8/19 Solenoid, variable valve time, inlet



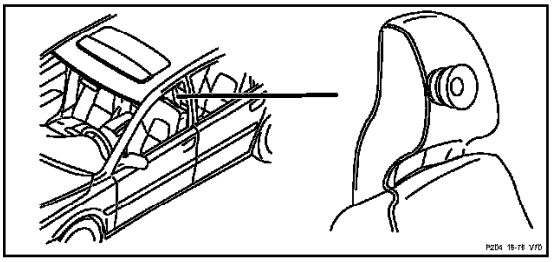
8/19 Solenoid, Variable Valve Time, Inlet

20/3-8 Spark plug and ignition coil



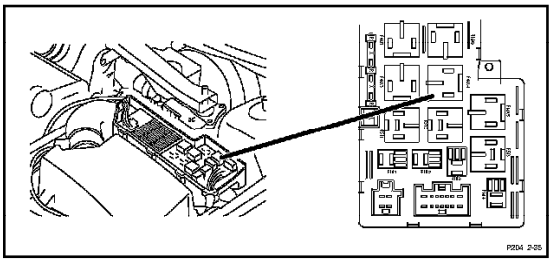
20/3-8 Spark Plug And Ignition Coil

16/78 Speaker, cellular telephone



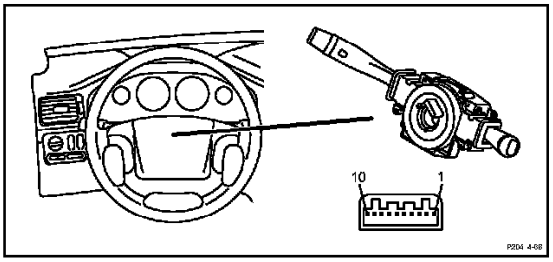
16/78 Speaker, Cellular Telephone

2/35 Starter motor relay



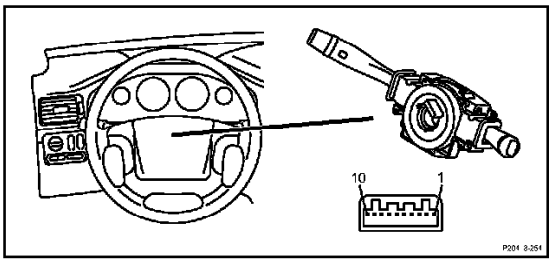
2/35 Starter Motor Relay

4/68 Steering Angle Sensor module (SAS)



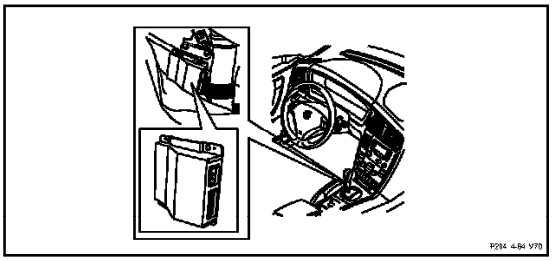
4/68 Steering Angle Sensor Module (SAS)

3/254 Steering Wheel Module (SWM)



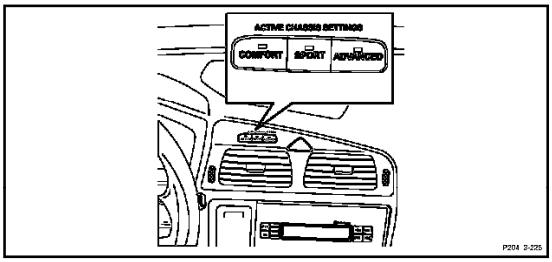
3/254 Steering Wheel Module (SWM)

4/84 Suspension Module (SUM)



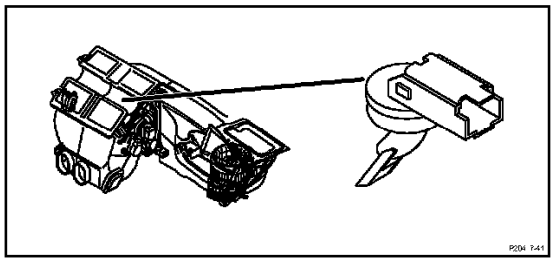
4/84 Suspension Module (SUM)

3/225 Switch unit continuous damping control (CCD)



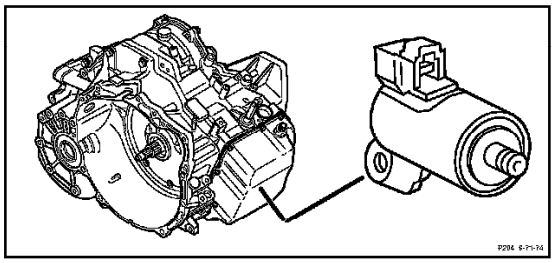
3/225 Switch Unit Continuous Damping Control

7/41 Temperature sensor, evaporator



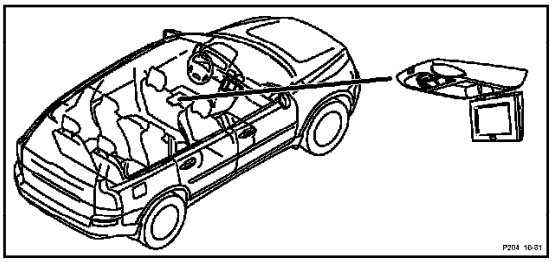
7/41 Temperature Sensor, Evaporator

8/71 Throttle solenoid



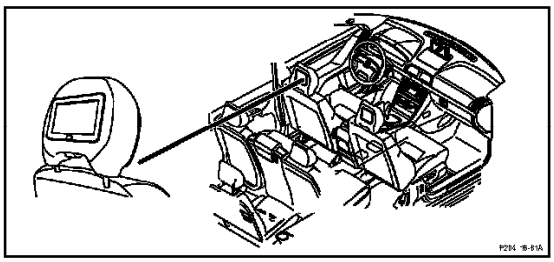
8/71 Throttle Solenoid

16/81 TV display, accessory



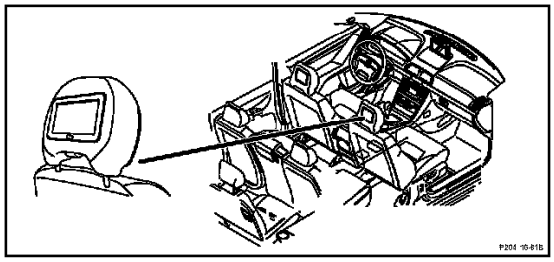
16/81 TV Display, Accessory

16/81A TV display, LH head restraint



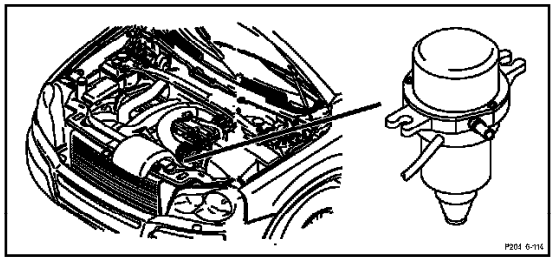
16/81A TV Display, LH Head Restraint

16/81B TV display, RH head restraint



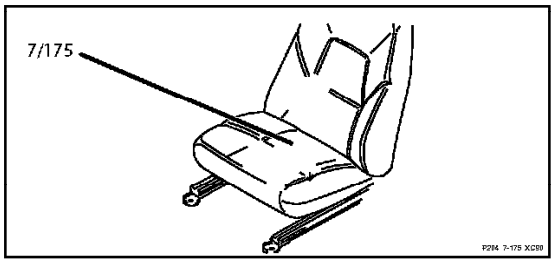
16/81B TV Display, RH Head Restraint

6/114 Vacuum pump



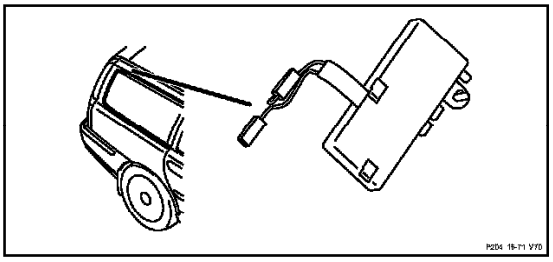
6/114 Vacuum Pump

7/175 Weight sensor passenger seat, seat belt reminder



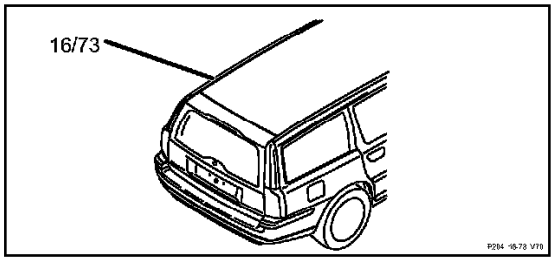
7/175 Weight Sensor Passenger Seat, Seat Belt

16/71 Window antenna amplifier 1 right



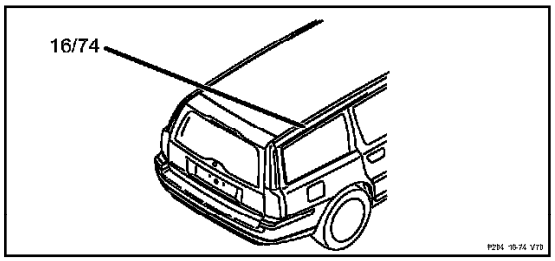
16/71 Window Antenna Amplifier 1 Right

16/73 Window antenna amplifier 2 left



16/73 Window Antenna Amplifier 2 Left

16/74 Window antenna amplifier 2 right

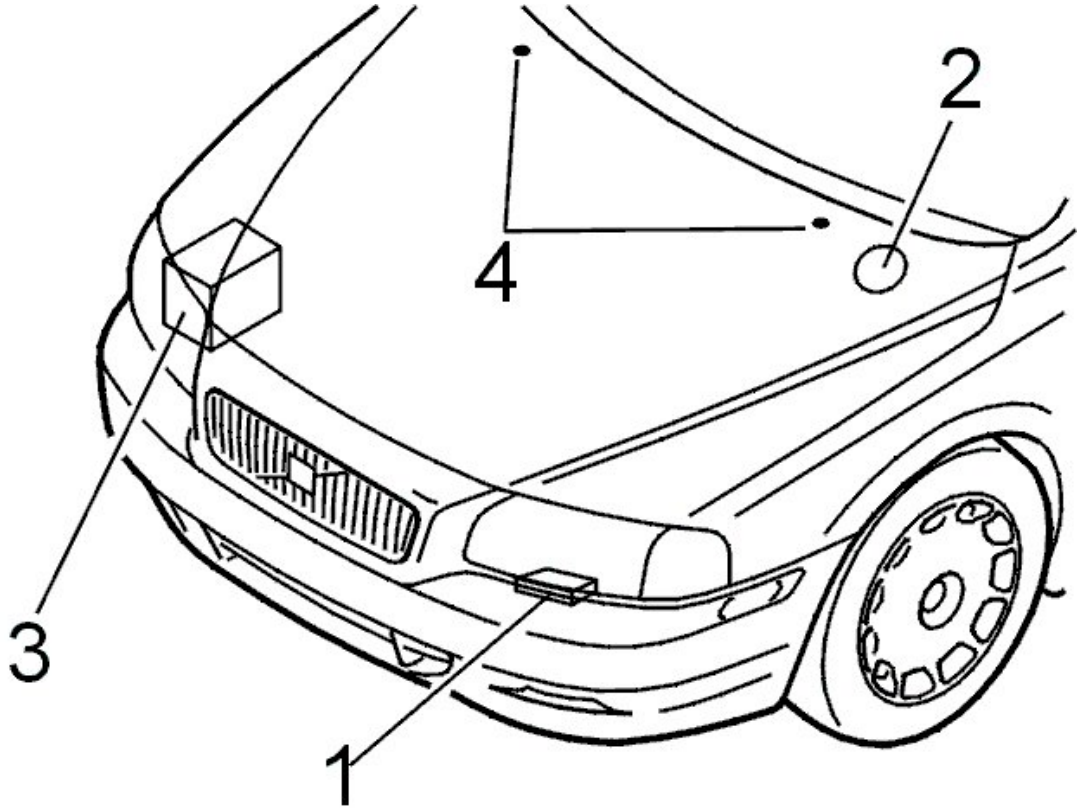


16/74 Window Antenna Amplifier 2 Right

General, Other Electrical Components

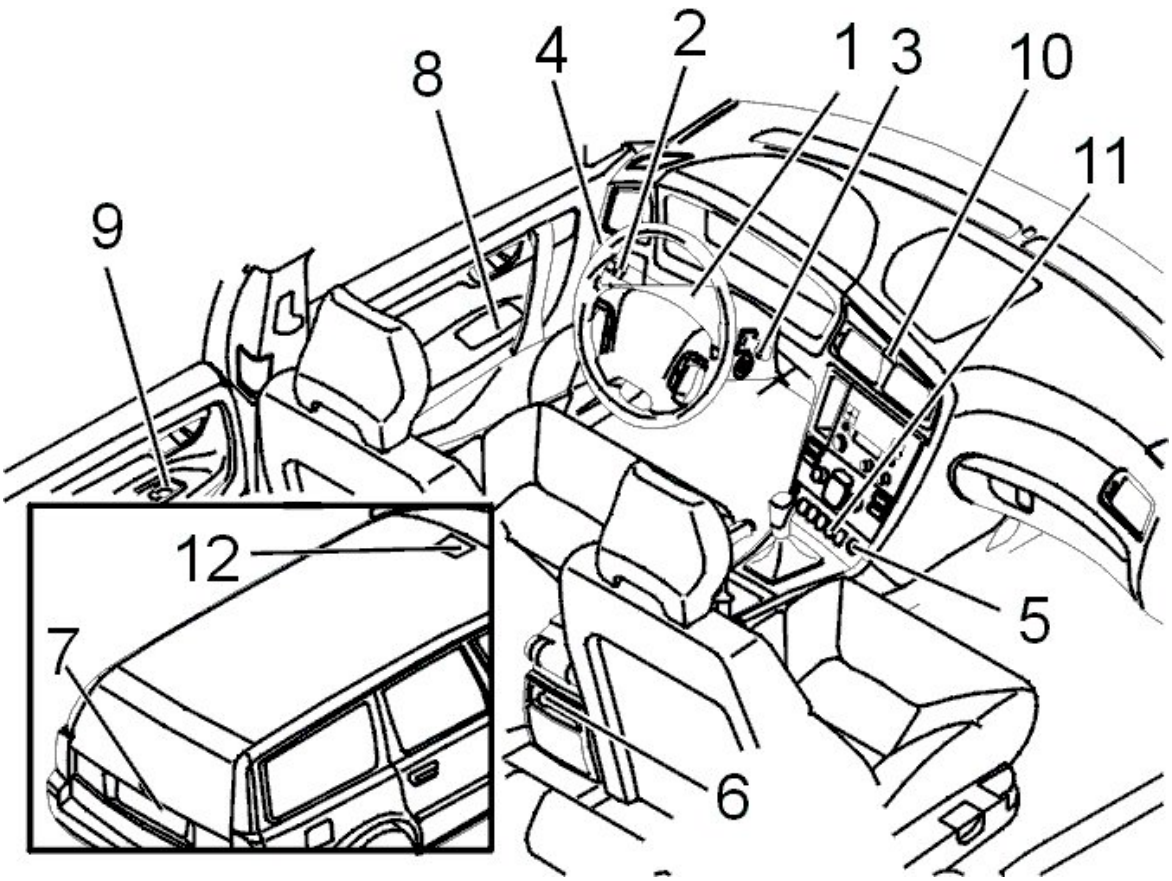
Other electrical components

Wiper and washer components



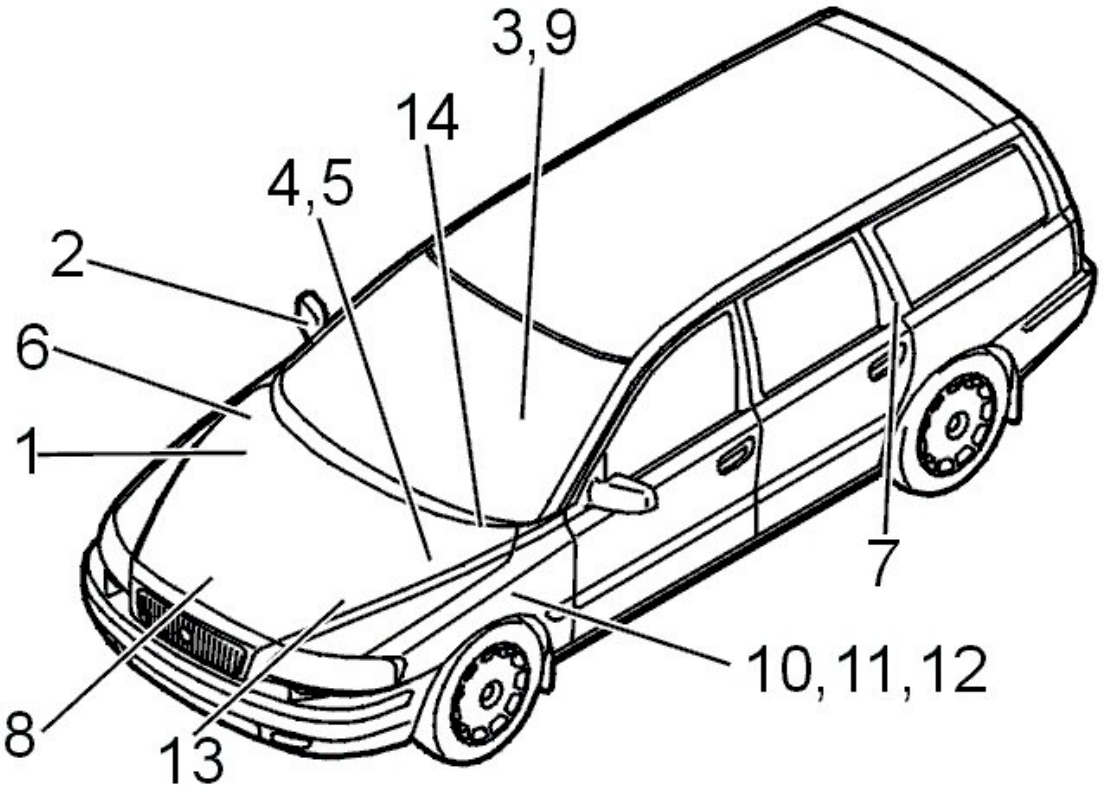
1. Headlamp wiper motor
2. Windshield wiper mechanism and wiper motor
3. Washer fluid reservoir
4. Washer nozzle.

Switches



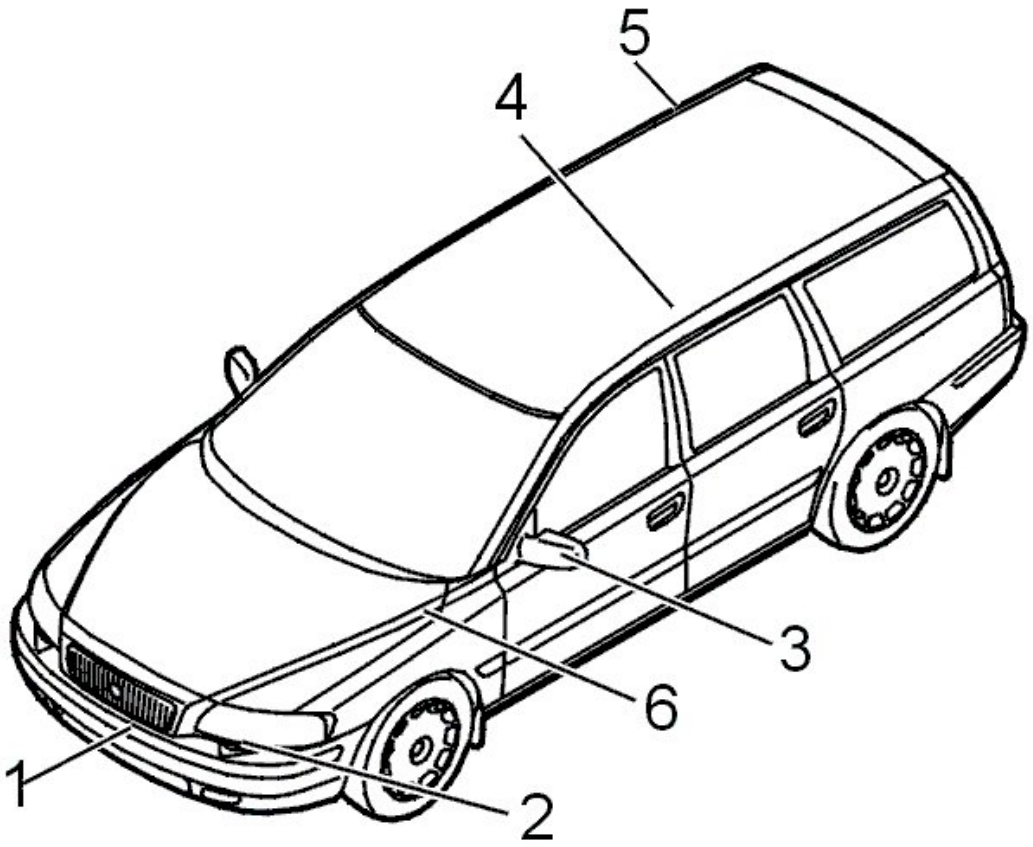
1. Switch gear lever module
2. Turn signal lamp and dip switch
3. Windshield wiper and washer switch
4. Light switch
5. Front cigarette lighter and electrical socket
6. Rear cigarette lighter and electrical socket
7. Trunk lid handle and switch
8. Door module, driver's door module and passenger door module
9. Rear door switch
10. Switch for the hazard warning signal flasher
11. Dashboard environment panel switches
12. Sun roof switch.

Sensors



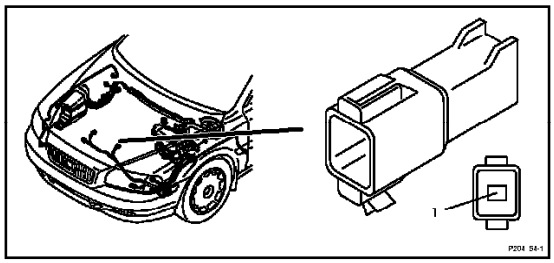
1. Engine coolant temperature (ECT) sensor
2. Outer temperature sensor
3. Parking brake switch
4. Pedal sensor for the power brake booster
5. Brake fluid level sensor
6. Engine coolant level sensor
7. Left fuel level sensor
8. Oil pressure sensor
9. Yaw rate and lateral acceleration sensors
10. Accelerator pedal (AP)
11. Clutch pedal position sensor
12. Stop lamp switch
13. Back-up (reversing) lamps switch
14. Start switch.

Miscellaneous, electrical components



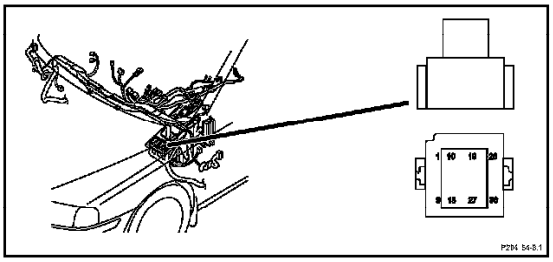
1. Horn
2. Motor for headlamp beam height control
3. Door mirror
4. Fuel pump (FP) with sensor, right-hand side
5. Motor for the fuel tank filler cover
6. Data Link Connector (DLC).

54/1 Connector



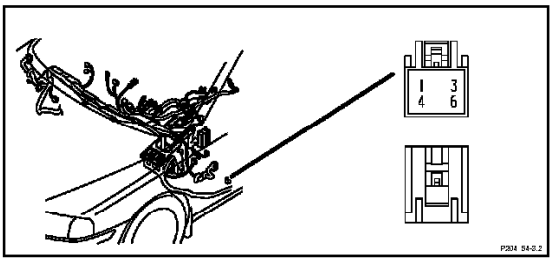
54/1 Connector

54/3.1 Connector



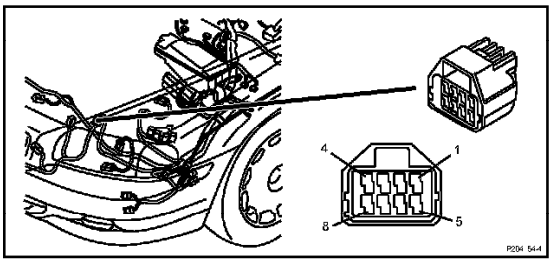
54/3.1 Connector

54/3.2 Connector



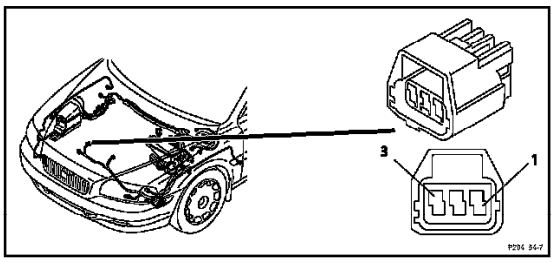
54/3.2 Connector

54/4 Connector



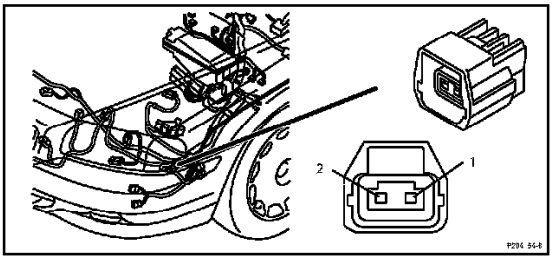
54/4 Connector

54/7 Connector



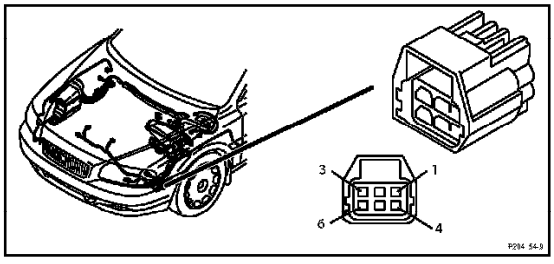
54/7 Connector

54/8 Connector



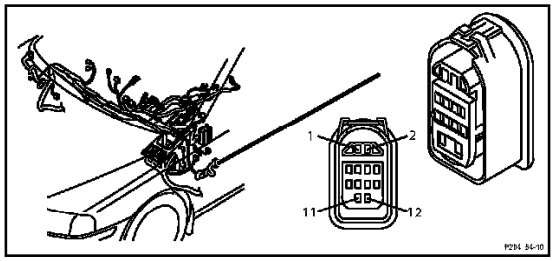
54/8 Connector

54/9 Connector



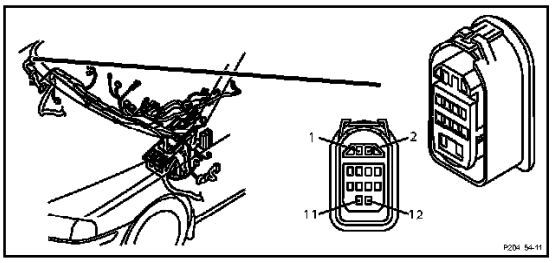
54/9 Connector

54/10 Connector



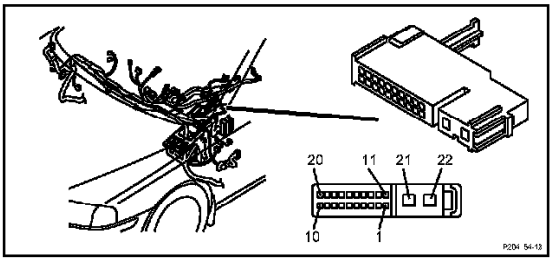
54/10 Connector

54/11 Connector



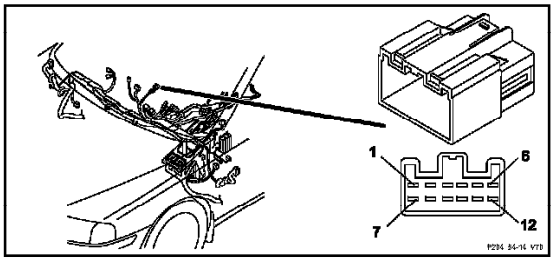
54/11 Connector

54/13 Connector



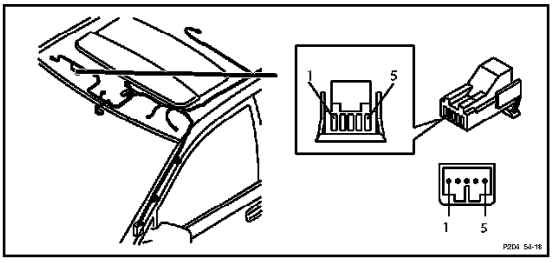
54/13 Connector

54/14 Connector



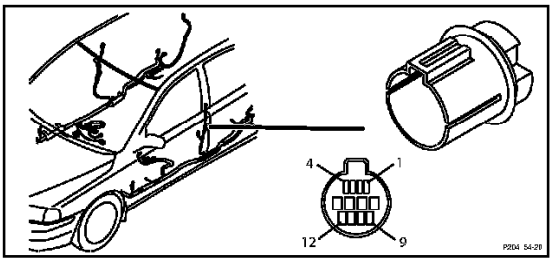
54/14 Connector

54/16 Connector



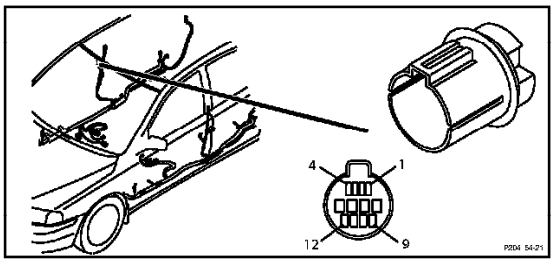
54/16 Connector

54/20 Connector



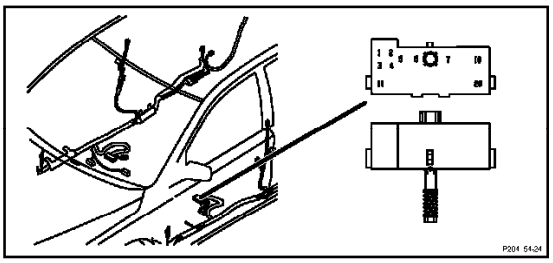
54/20 Connector

54/21 Connector



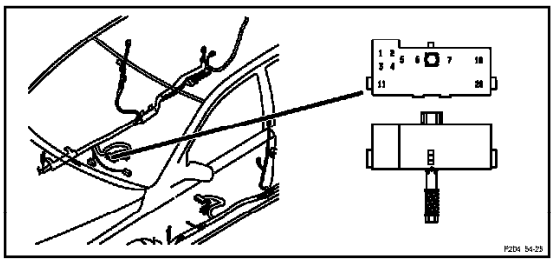
54/21 Connector

54/24 Connector



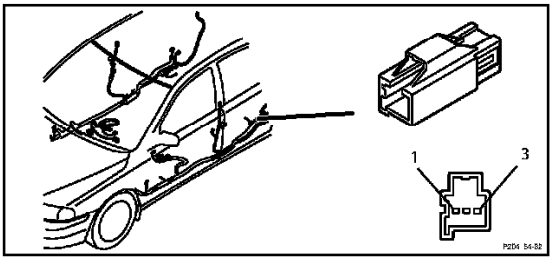
54/24 Connector

54/25 Connector



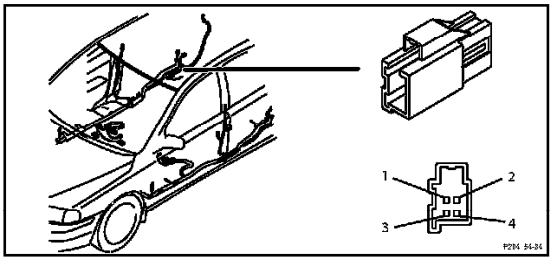
54/25 Connector

54/32 Connector



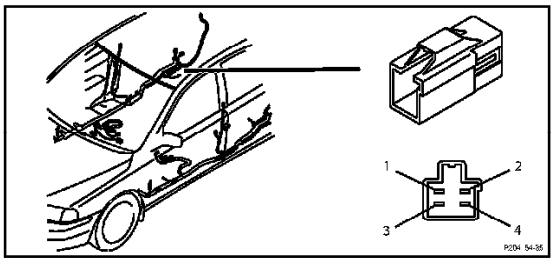
54/32 Connector

54/34 Connector



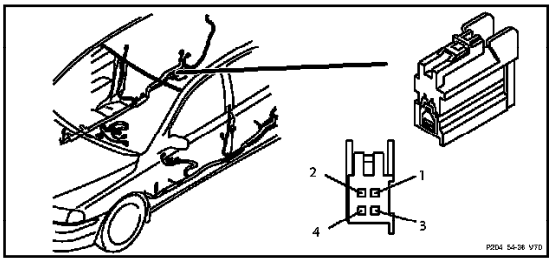
54/34 Connector

54/35 Connector



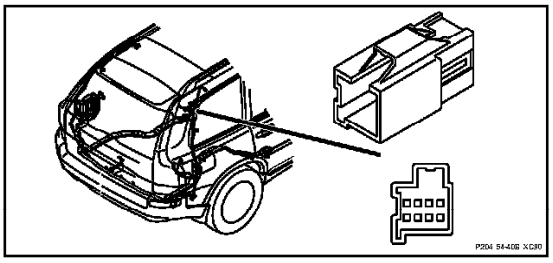
54/35 Connector

54/39 Connector



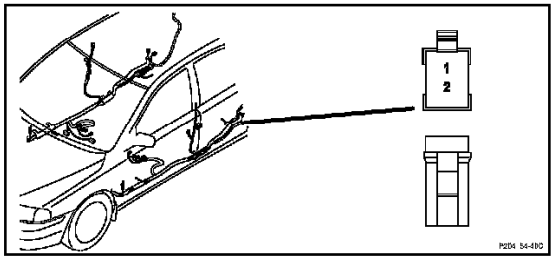
54/39 Connector

54/40B Connector



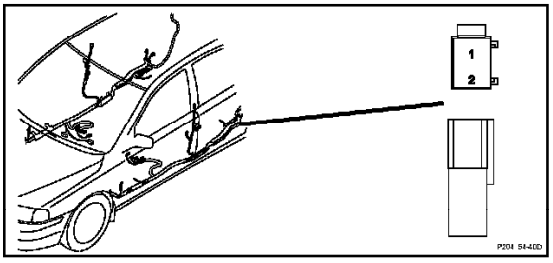
54/40B Connector

54/40C Connector



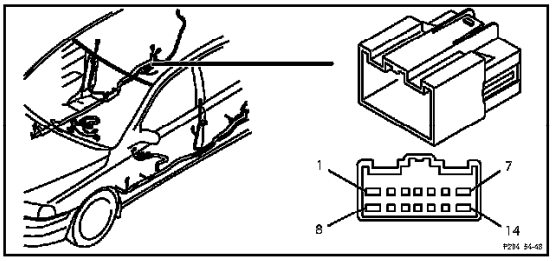
54/40C Connector

54/40D Connector



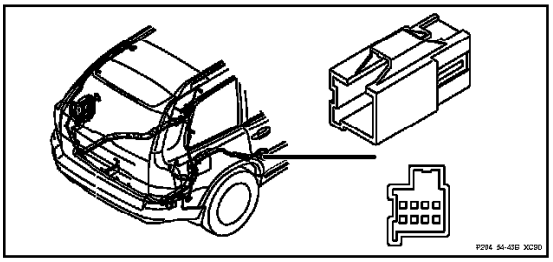
54/40D Connector

54/43 Connector



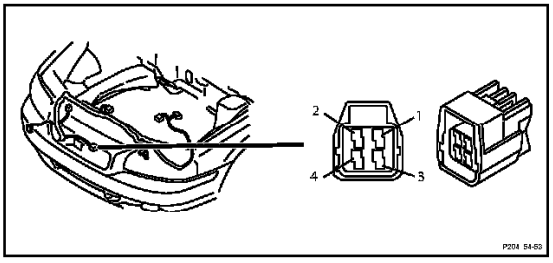
54/43 Connector

54/43B Connector



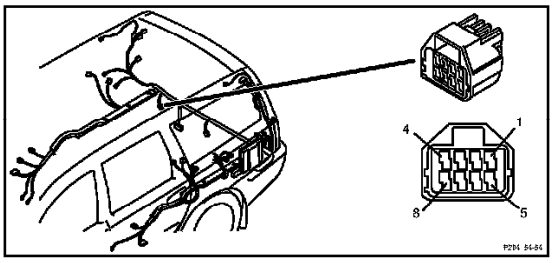
54/43B Connector

54/53 Connector



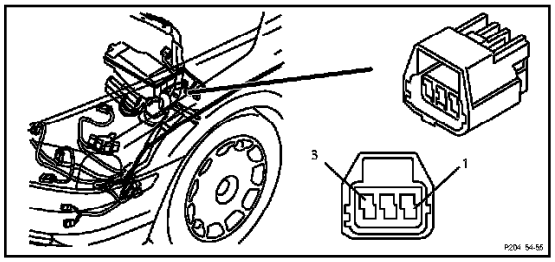
54/53 Connector

54/54 Connector



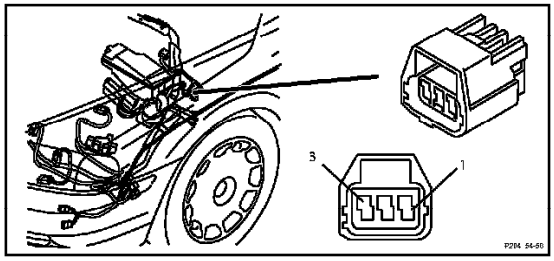
54/54 Connector

54/55 Connector



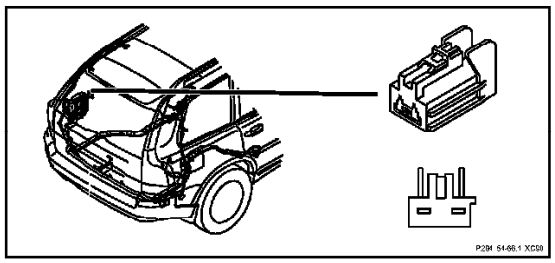
54/55 Connector

54/56 Connector



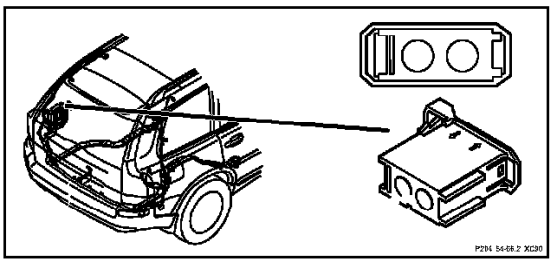
54/56 Connector

54/66.1 Connector



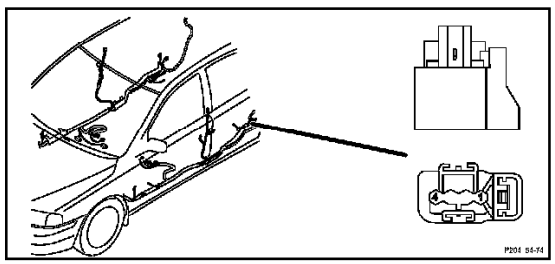
54/66.1 Connector

54/66.2 Connector



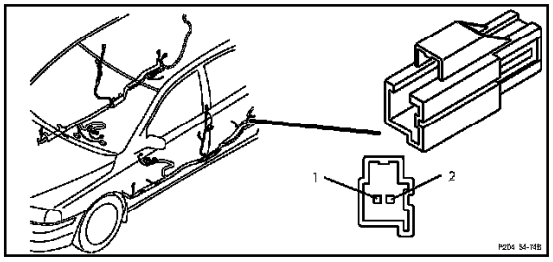
54/66.2 Connector

54/74 Connector



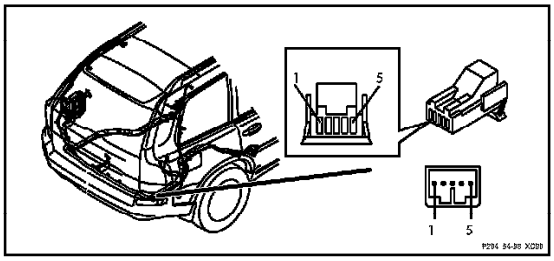
54/74 Connector

54/74B Connector



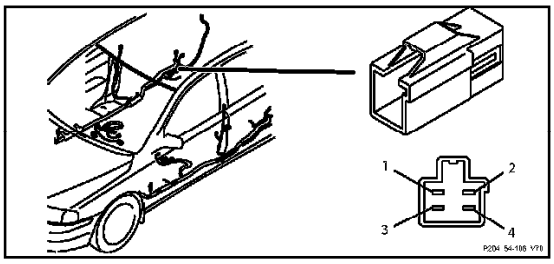
54/74B Connector

54/98 Connector



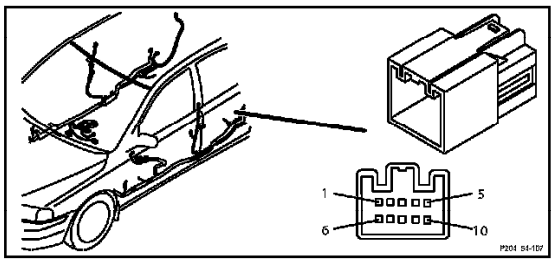
54/98 Connector

54/106 Connector



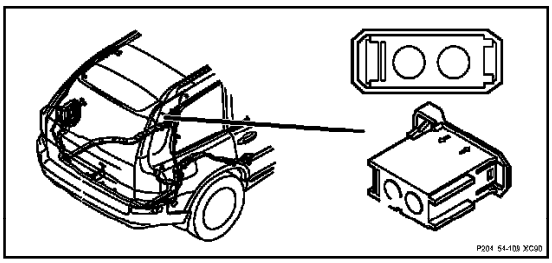
54/106 Connector

54/107 Connector



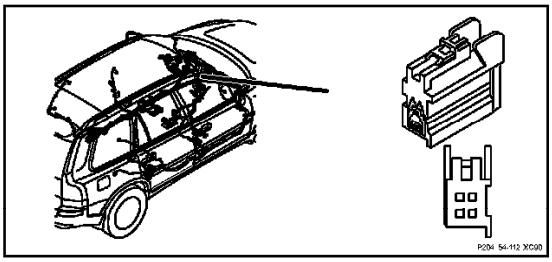
54/107 Connector

54/109 Connector



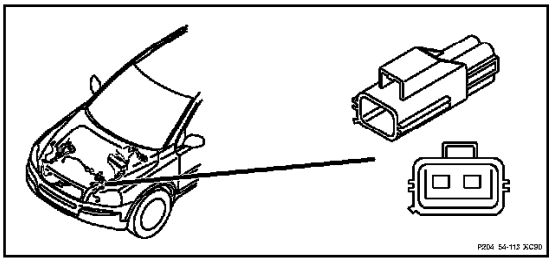
54/109 Connector

54/112 Connector



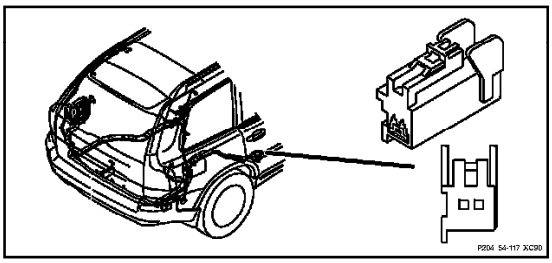
54/112 Connector

54/113 Connector



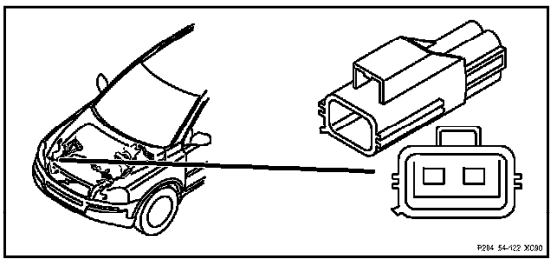
54/113 Connector

54/117 Connector



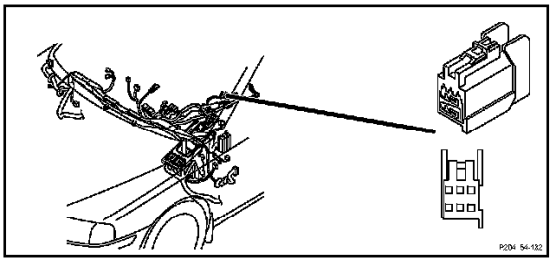
54/117 Connector

54/122 Connector



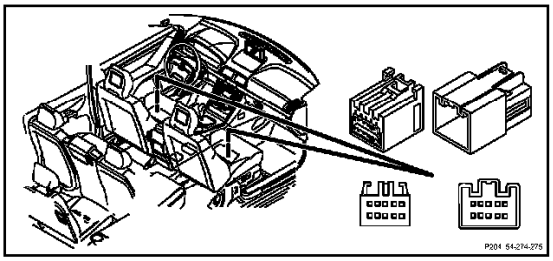
54/122 Connector

54/132 Connector



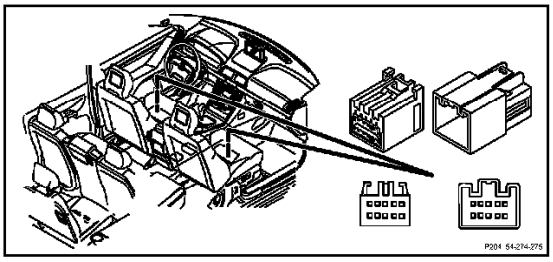
54/132 Connector

54/274 Connector
54/ 275 Connector



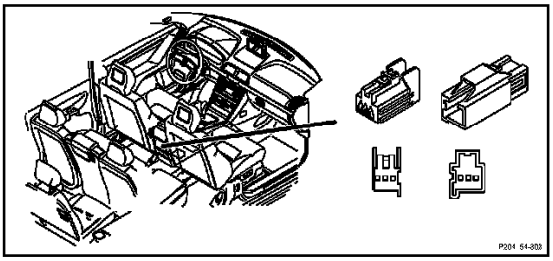
54/274, 275 Connector

54/274 Connector
54/ 275 Connector



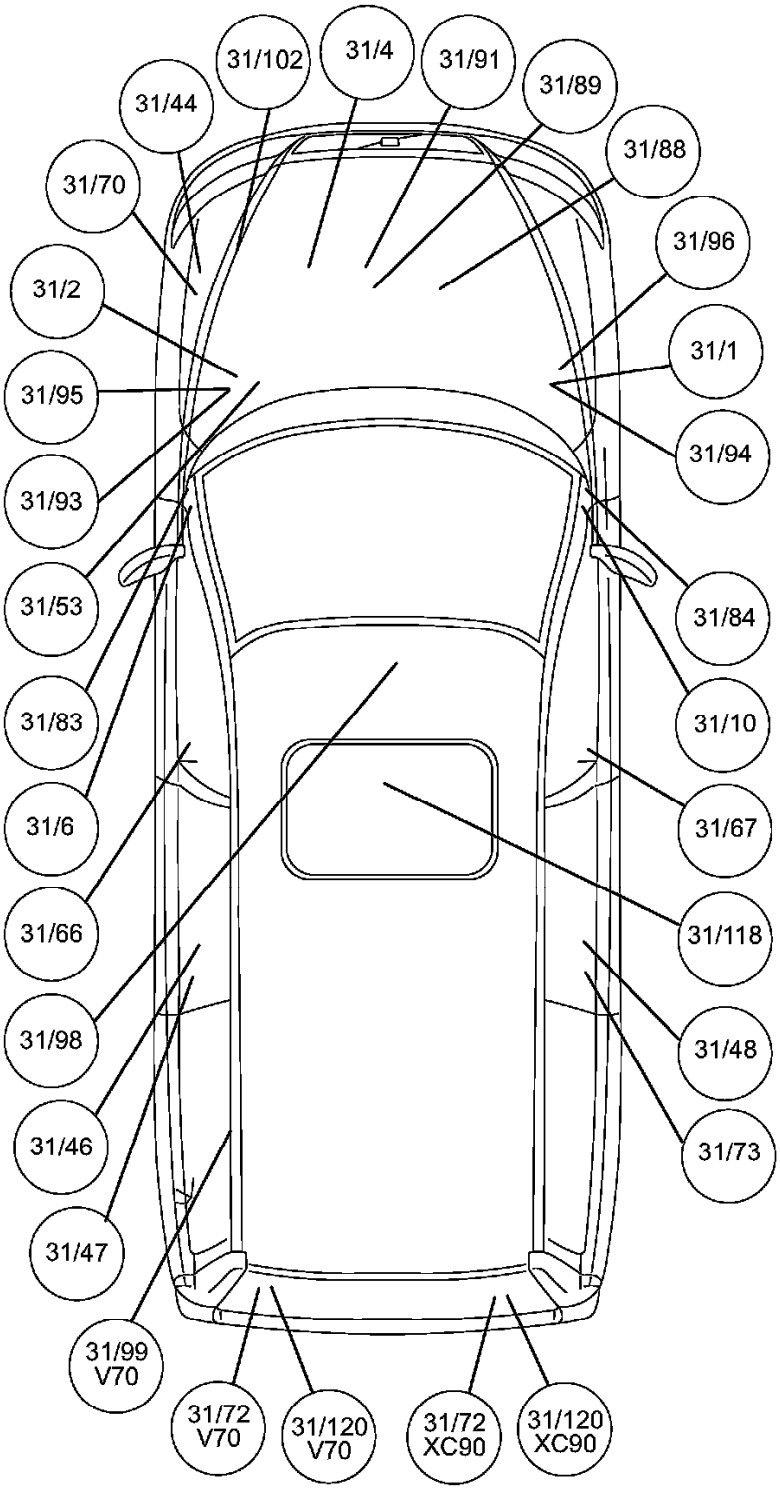
54/274, 275 Connector

54/303 Connector



54/303 Connector

Overview



Overview

31/1	Right MacPherson strut tower
6/3	Right-hand headlight wiper motor, V70
6/104	High pressure headlight washer motor
7/5	Washer fluid level sensor

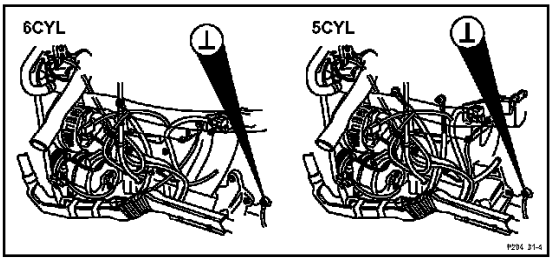
31/2	Left MacPherson strut tower
4/71	Cooling fan control module

31/2

31/4	Engine
31/44	Ground connection

31/4

31/4 Ground connection, Engine



31/4 Ground Connection, Engine

31/6	A-post, left-hand side
3/6	Hazard warning flasher switch
4/31	Fan control module, RHD
4/33	Sunroof Control Module (SRM)
4/56	Central Electronic Module (CEM), LHD
10/29	Glove compartment lighting
10/125	Left-hand front courtesy lighting
10/126	Right-hand front courtesy lighting
16/65	Antenna ring/ignition switch illumination

31/6

31/10	A-post, right-hand side
4/31	Fan control module, LHD
4/56	Central Electronic Module (CEM), RHD
4/84	Suspension Module (SUM), V70
9/1	Outlet 12V front
9/25	Outlet 12V rear

31/10

31/44	Left-hand side member, lower engine compartment
31/4	Ground connection

31/44

31/46	Rear seat riser, left-hand side
3/27	Switch unit, power passenger seat, RHD
3/76	Left-hand rear door lock unit
3/85	Rear left door power window switch
4/52	Power Seat Module (PSM), LHD
4/82	Differential Electronic Module (DEM)
8/51	Front left side airbag igniter
9/12	Seat Heater Module (SHM), left-hand

31/46

31/47	Rear seat riser, left-hand side
4/58	Rear Electronic Module (REM)
8/66	Left-hand inflatable curtain igniter, V70

31/47

31/48	Rear seat riser, right-hand side
4/83	Fuel pump control module
6/31	Feed pump, ejectors
6/33	Fuel pump

31/48

31/53	Firewall
1/1	Battery

31/53

31/66	Front seat riser, left-hand side
3/126	Driver/Passenger Door Module (DDM)/(PDM)
10/15	Direction indicator, left front door, XC90

31/66

31/67	Front seat riser, right-hand side
2/139	Deadlock relay, right-hand rear door, PCL
3/27	Switch unit, power passenger seat, LHD
3/77	Right-hand rear door lock unit, PCL
3/86	Rear right door power window switch
3/127	Passenger/Driver Door Module (PDM)/(DDM)
4/52	Power Seat Module (PSM), RHD
6/35	Fuel pump, auxiliary heater
7/93	Occupant Weight Sensor (OWS)
8/52	Front right side airbag igniter
9/13	Seat Heater Module (SHM), right-hand
10/16	Direction indicator, right front door, XC90

31/67

31/70	Left-hand side member, lower engine compartment
10/65	Front right auxiliary light, accessory
10/69	Front left auxiliary light, accessory

31/70

31/72	Cargo compartment
4/58	Rear Electronic Module (REM)
4/86	Parking Assistance Module (PAM)
6/32	Rear window wiper motor
6/76	Climate control system, rear XC90
7/100	Inclination Sensor Module (ISM)
7/137	Glass breakage sensor, tailgate, V70
8/66	Left-hand inflatable curtain igniter, XC90
9/2	Heated rear window
10/18	Rear left lamp housing
16/15	CD-changer, accessory, V70
16/45	Road Traffic Information module, (RTI), V70

31/72

31/73	Rear seat riser, right-hand side
8/76	Gas tank valve, Bi-Fuel
8/85	Thermal switch and electric fuel filter heating, Diesel
8/88	Solenoid, fuel tank CNG rear, Bi-Fuel
8/89	Solenoid, fuel tank CNG front left, Bi-Fuel
8/90	Solenoid, fuel tank CNG front right, Bi-Fuel
10/17	Rear right lamp housing
16/79	Bass speaker, V70
16/79	Subwoofer Module (SUB), XC90
16/81	LCD-screen accessory, XC90
16/82	DVD-player accessory, XC90
17/19	12V outlet, cargo compartment
54/98	Connector cable harness accessory, XC90

31/73

31/83	A-post, left-hand side
3/117	Dome light control module
4/33	Sunroof Control Module (SRM)
4/70	Upper Electronic Module (UEM)
4/76	Remote control unit for garage door opener
5/1	Driver Information Module (DIM)
7/122	Mass Movement Sensor (MMS), front
7/149	Rain Sensor Module (RSM)
7/158	Mass movement sensor MMS, rear, XC90
10/25	Ceiling light, cargo compartment, V70
10/114	Left-hand vanity mirror lighting
10/150	Rear reading light
10/172	Reading light, third row of seats, XC90
16/65	Antenna ring/ignition switch illumination
16/108	Multimedia module (MMM), XC90
31/98	Ground connection

31/83

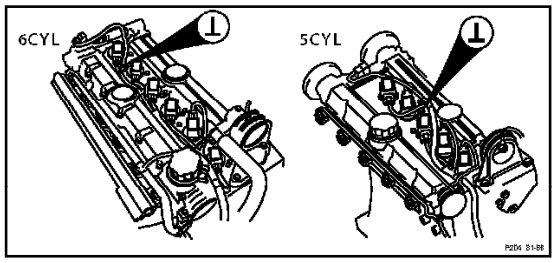
31/84	A-post, right-hand side
3/111	Light Switch Module (LSM)
3/112	Climate Control Module (CCM)
3/254	Steering Wheel Module (SWM)
4/68	Steering Angle Sensor module (SAS)
6/48	Damper Motor Module (DMM), recirculation
6/69	Damper Motor Module (DMM), ventilation/floor/defroster
6/95	Damper Motor Module (DMM), temperature, left-hand side
6/96	Damper Motor Module (DMM), temperature, right-hand side
6/102	Damper Motor Module (DMM), defroster
6/103	Damper Motor Module (DMM), floor/ventilation
7/159	Air Quality Sensor (AQS)
16/1	Audio Module (AUM), V70
16/2	Amplifier, V70
16/46	RTI display, V70
16/46	Multimedia display, XC90
16/60	Phone Module (PHM)
16/93	Control module, cellular phone handsfree, accessory
16/94	Infotainment Control Module (ICM), XC90
16/105	Audio control module (AUD), XC90
16/106	Control module, CD player (MP2), XC90
16/107	Control module, MD player (MP1), XC90
16/108	Multimedia module (MMM), accessory, XC90
17/13	Data link connector
54/112	Connector cable harness Infotainment, XC90

31/84

31/88	Engine, ignition coils, group 1
20/3	Spark plug and ignition coil
20/4	Spark plug and ignition coil

31/88

31/88 Ground connection, Engine ignition coil group 1

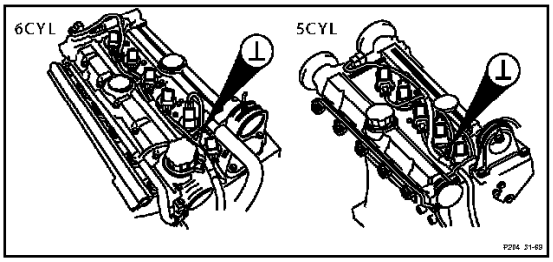


31/88 Ground Connection, Engine Ignition Coil Group 1

31/89	Engine, ignition coils, group 2
20/5	Spark plug and ignition coil
20/6	Spark plug and ignition coil
20/7	Spark plug and ignition coil
20/8	Spark plug and ignition coil

31/89

31/89 Ground connection, Engine ignition coil group 2

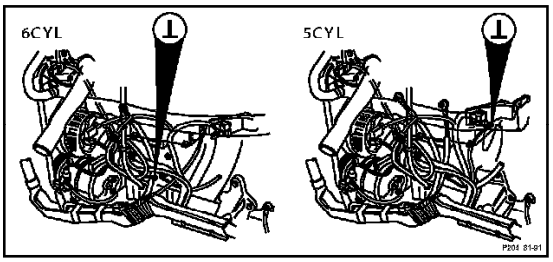


31/89 Ground Connection, Engine Ignition Coil Group 2

31/91	Engine
4/50	Electronic Throttle Module (ETM), Bi-Fuel
9/32	PTC resistor, air preheating, Bi-Fuel

31/91

31/91 Ground connection, Engine



31/91 Ground Connection, Engine

31/93	Left MacPherson strut tower
3/10	Reversing light contact, MAN
3/62	Hood alarm contact
4/7	Combustion Preheater Module (CPM)
4/56	Central Electronic Module (CEM)
4/99	Electronic power steering control module
6/1	Windshield wiper motor
6/38	Left-hand headlight level adjustment motor
6/114	Vacuum pump
6/4	Left-hand headlight wiper motor, V70
7/4	Brake fluid level sensor
7/73	Coolant level sensor
7/51	Accelerator pedal sensor
8/37	Automatic transmission
8/79	Valve LPG, Bi-Fuel
8/134	Solenoid, reverse interlock, manual
9/30	Auxiliary heater
10/1	Left-hand front lamp housing
10/5	Front left fog light
10/11	Front left parking light, XC90
10/13	Front left direction indicator
10/15	Direction indicator front fender left, EU/OS, V70
10/71	Side running light, front left
16/10	Horn 1
16/11	Horn 2, V70
20/16	Capacitor, Bi-Fuel

31/93

31/94	Right MacPherson strut tower
4/28	Transmission Control Module (TCM), AUTO
6/39	Right-hand headlight adjustment motor
10/2	Right-hand front lamp housing
10/6	Front right fog light
10/12	Front right parking light, XC90
10/14	Front right direction indicator
10/16	Direction indicator front fender right, EU/OS, V70
10/73	Side running light, front right
16/35	Siren Control Module (SCM)

31/94

31/95	Left MacPherson strut tower
4/16	Brake Control Module (BCM)

31/95

31/96	Right MacPherson strut tower
4/46	Engine Control Module (ECM)
6/105	Fuel distributor gas, Bi-Fuel
9/32	PTC resistor - air preheating

31/96

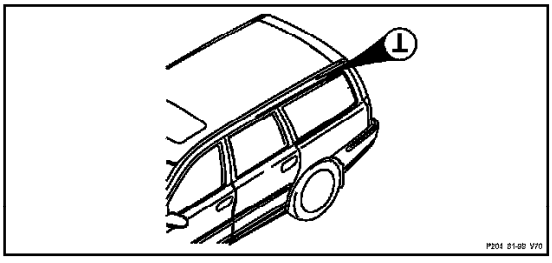
31/98	Windshield member, upper
3/117	Dome light control module
4/33	Sunroof Control Module (SRM)
4/70	Upper Electronic Module (UEM)
4/76	Remote control unit for garage door opener
5/1	Driver Information Module (DIM)
7/122	Mass Movement Sensor (MMS), front
7/149	Rain Sensor Module (RSM)
7/158	Mass Movement Sensor (MMS), rear, XC90
10/25	Ceiling light, cargo compartment, V70
10/114	Left-hand vanity mirror lighting
10/115	Right-hand vanity mirror lighting
10/150	Rear reading light
10/172	Reading light, third row of seats, XC90
16/65	Antenna ring/ignition switch illumination
16/108	Multimedia module (MMM), XC90
31/83	Ground connection

31/98

31/99	Left-hand side window
7/135	Glass breakage sensor, left-hand, V70

31/99

31/99 Ground connection, Side window left



31/99 Ground Connection, Side Window Left

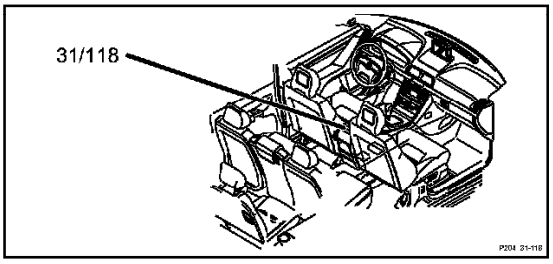
31/102	Front member
2/192	Relay (230V), engine heater, accessory

31/102

31/118	Between front seats under the armrest
2/237	Disconnect relay, rear speaker
16/122	Rear Audio Separation module (RAS)
16/124	Rear Seat Entertainment module (RSE)

31/118

31/118 Ground connection, Between front seats under the armrest

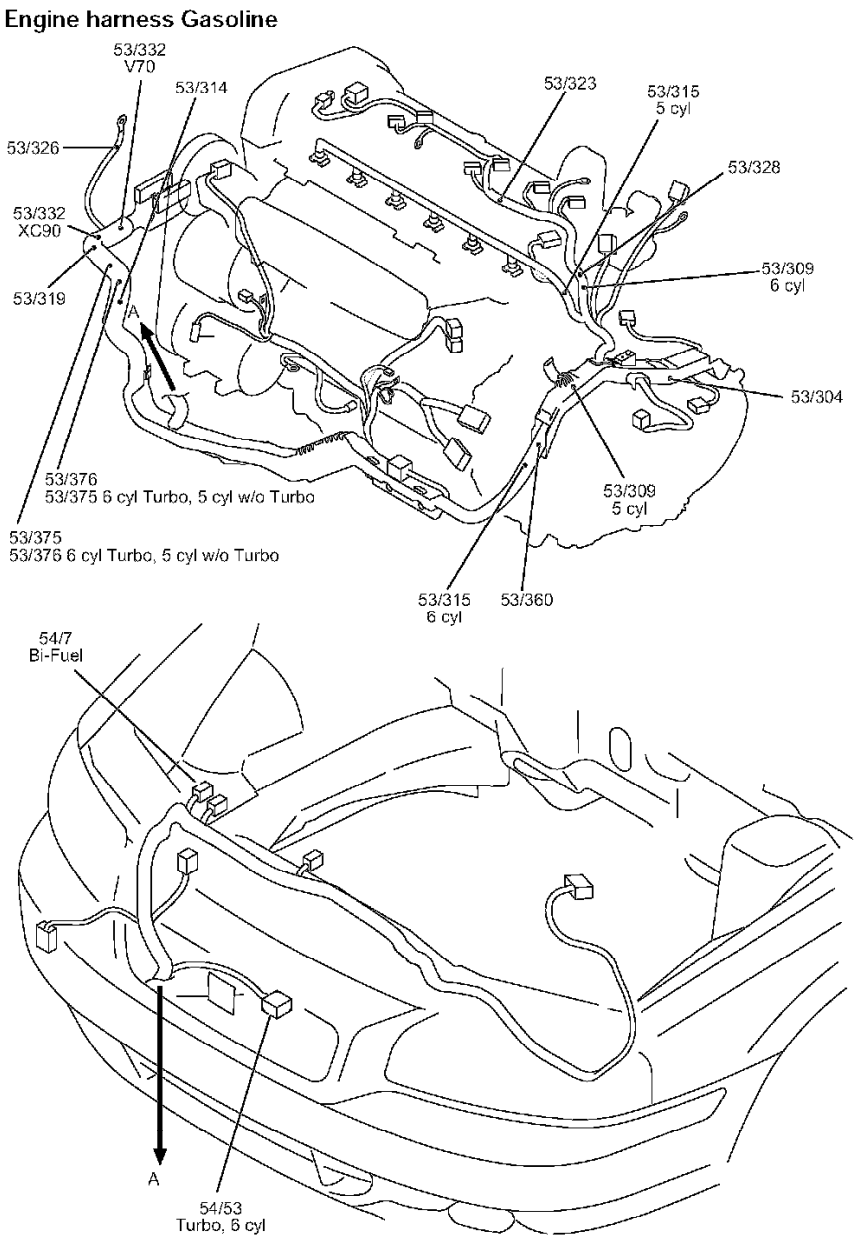


31/118 Ground Connection, Between Front Seats Under The Armrest

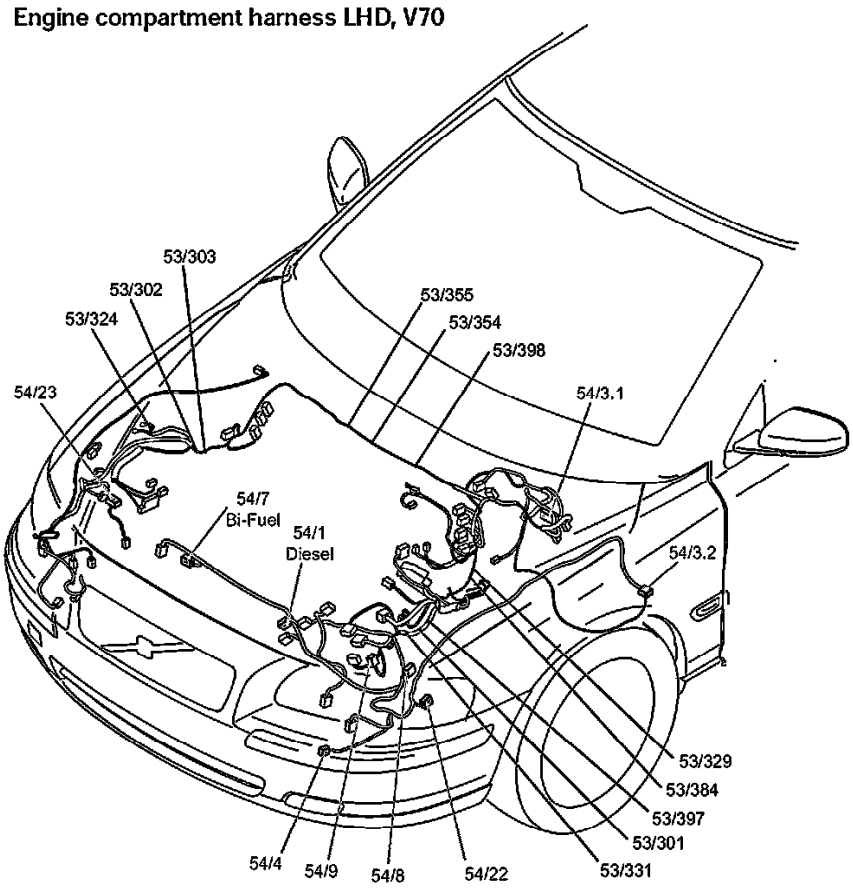
31/120	Cargo compartment, accessory
2/191	Relay, remote parking heater start, radio signal, V70
4/78	Accessory Electronic Module (AEM)
4/106	Control module, remote parking heater start, V70
4/110	Trailer Module
10/218	Indicator light remote start, V70
16/15	CD changer, V70
16/45	Road Traffic Information module (RTI), V70
16/46	RTI display, V70
16/79	Bass speaker, V70)
16/79	Subwoofer Module (SUB), XC90
17/37	4-pin outlet, cable harness tow hitch
17/38	7-pin outlet, tow hitch cable harness
17/39	13-pin outlet, tow hitch cable harness
26/4	Converter, cable harness tow hitch

31/120

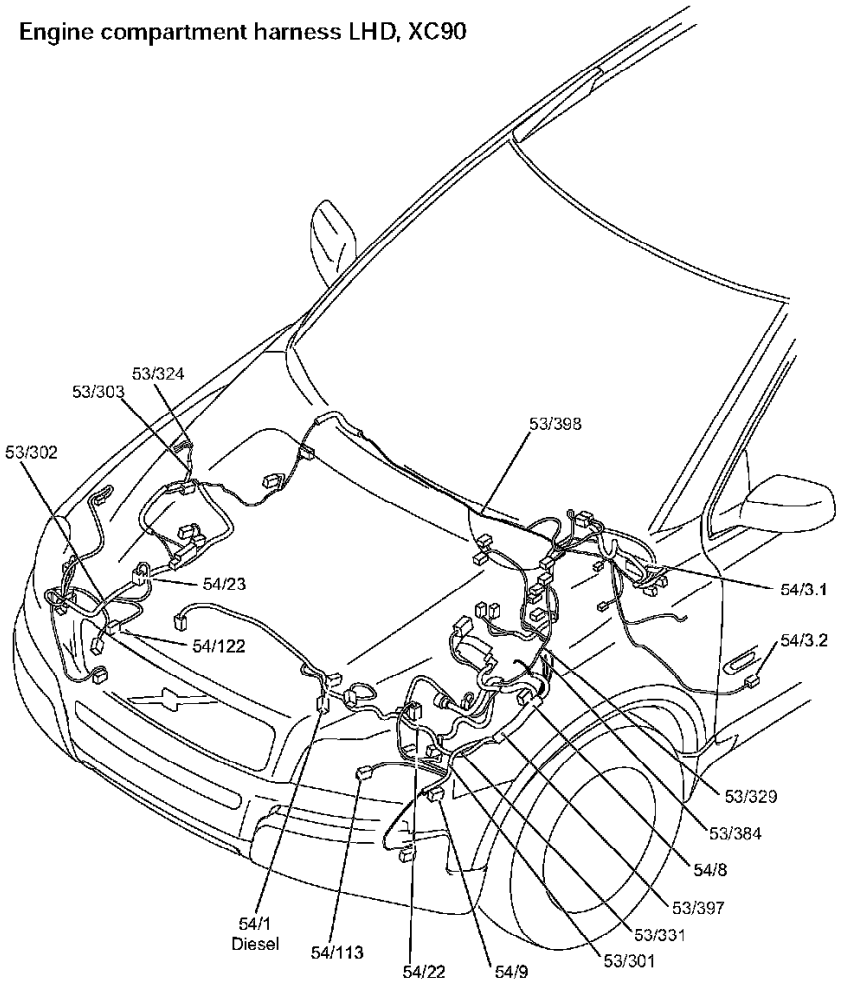
Harness Locations



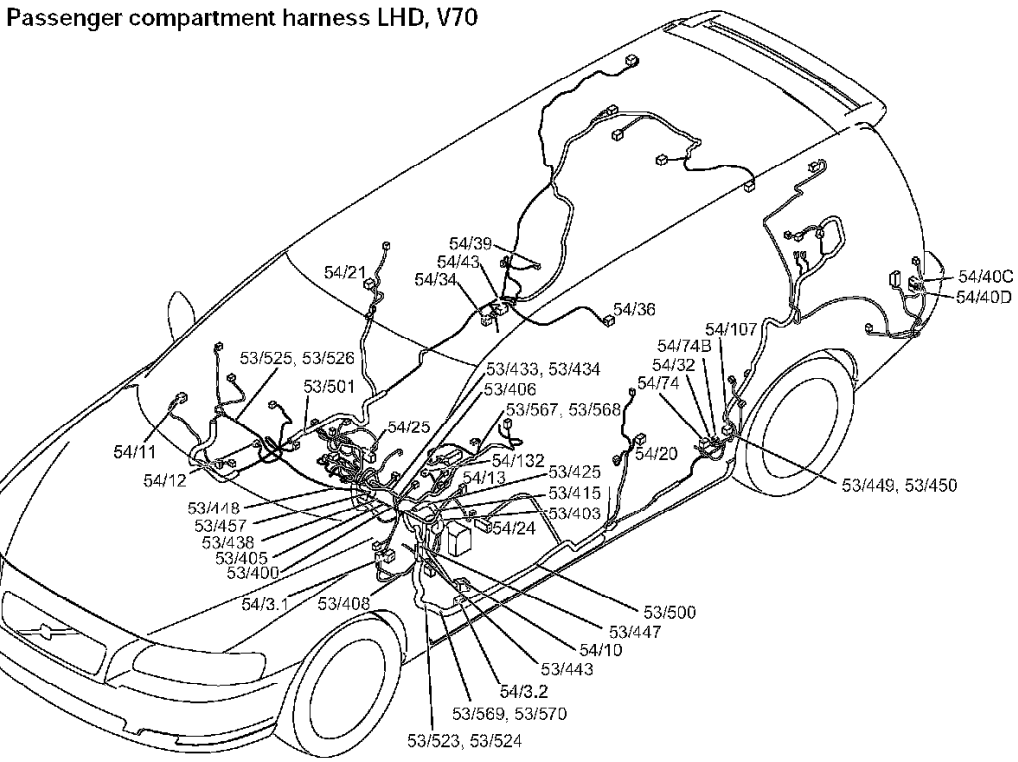
Engine Harness Gasoline



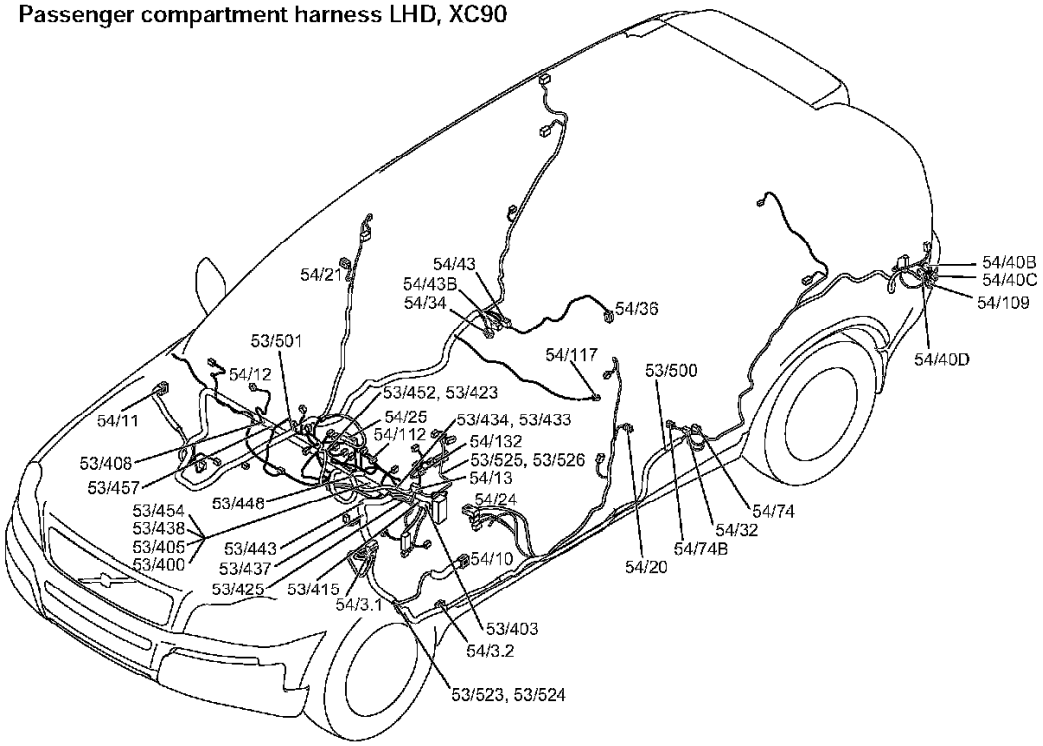
Engine Compartment Harness LHD, V70



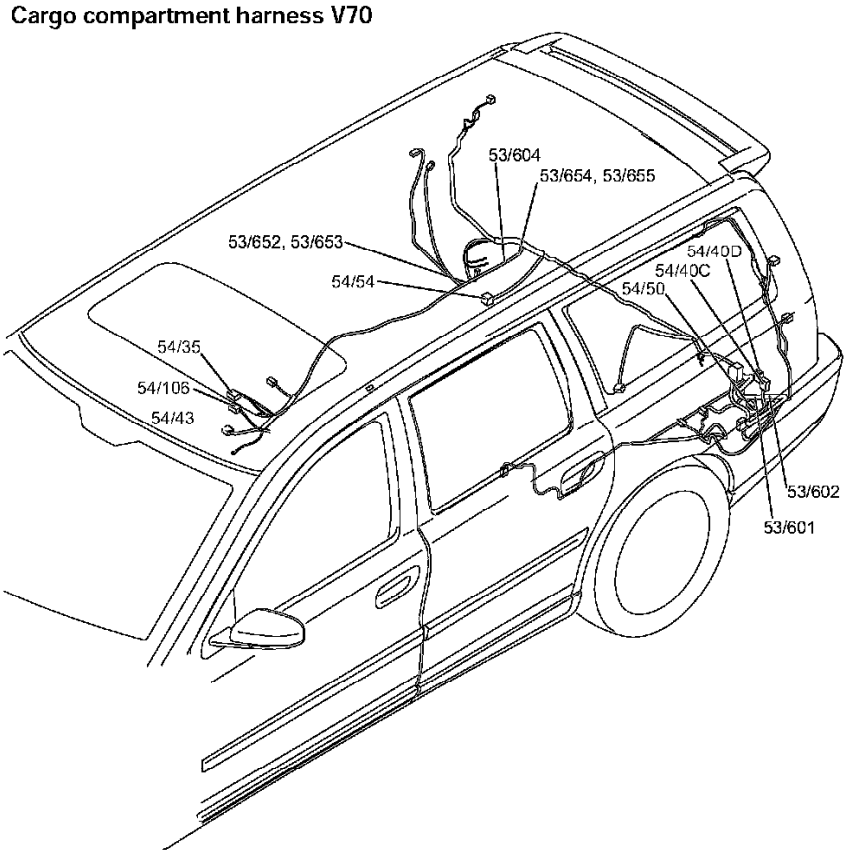
Engine Compartment Harness LHD, XC90



Passenger Compartment Harness LHD, V70

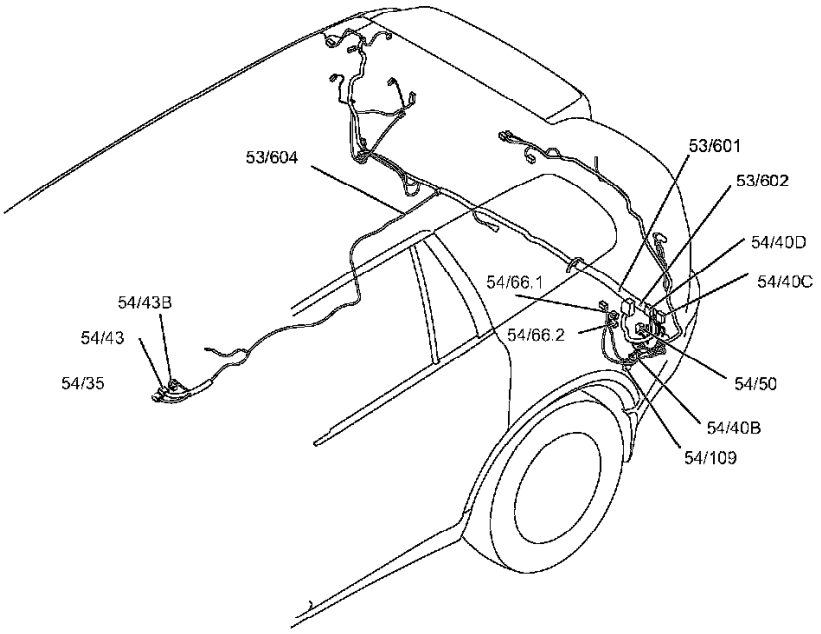


Passenger Compartment Harness LHD, XC90



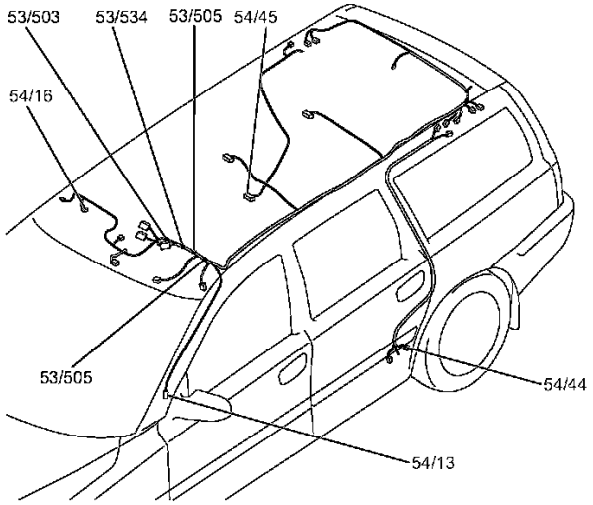
Cargo Compartment Harness V70

Cargo compartment harness XC90



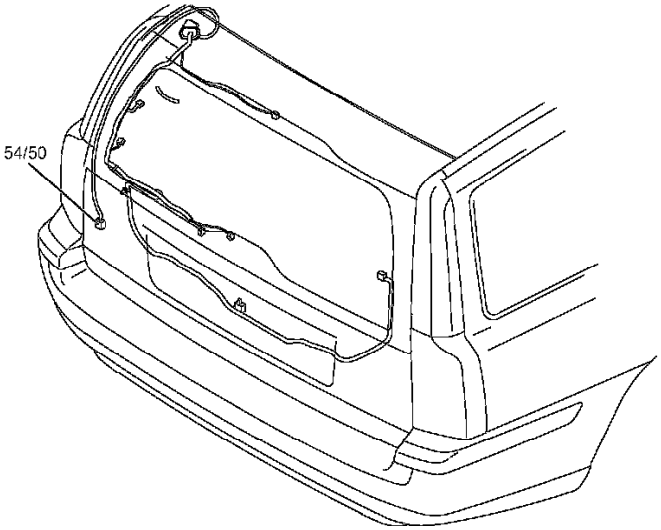
Cargo Compartment Harness XC90

Roof harness & Inflatable curtain harness V70



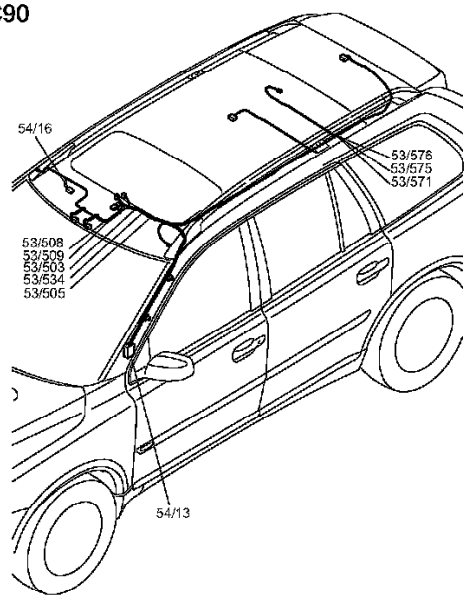
Roof Harness & Inflatable Curtain Harness V70

Tailgate harness V70



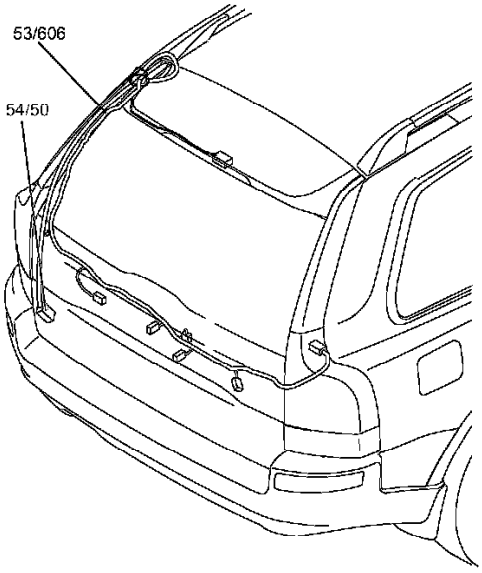
Tailgate Harness V70

Roof harness XC90

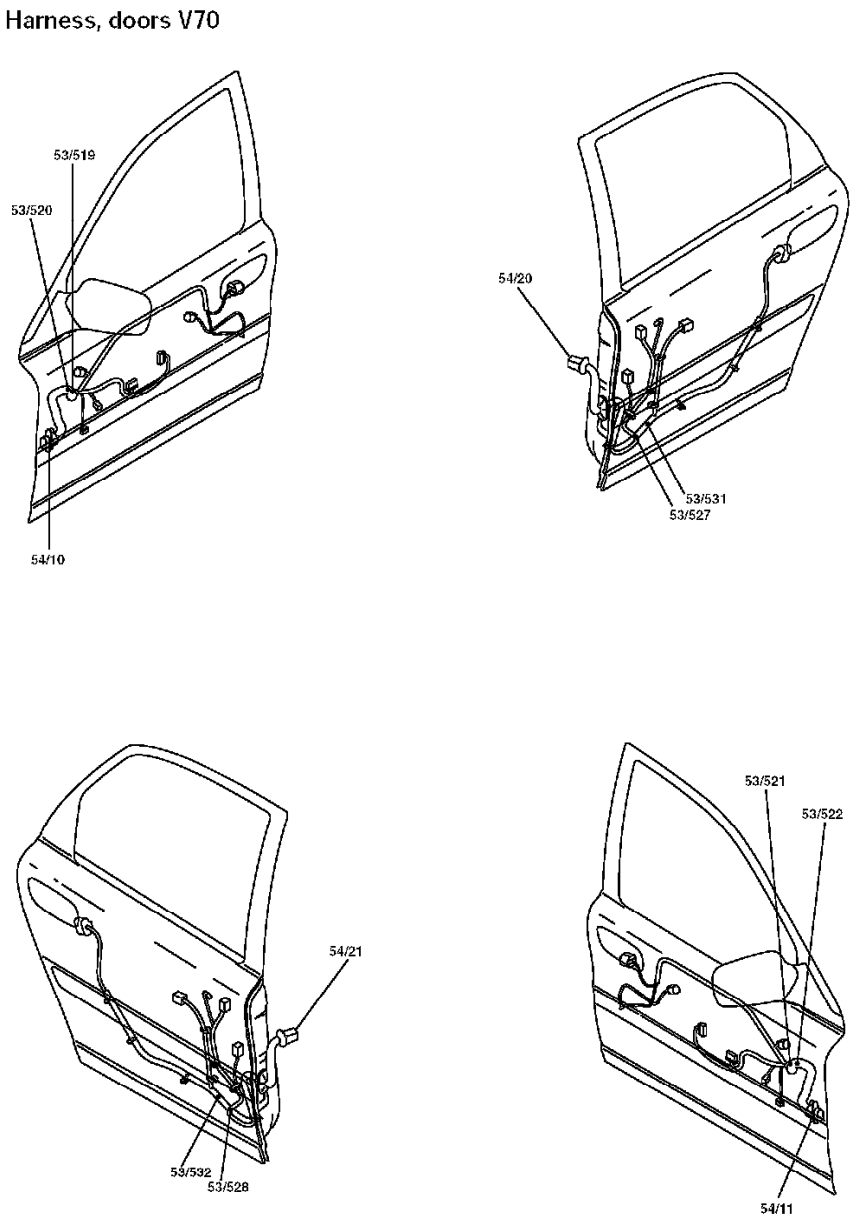


Roof Harness XC90

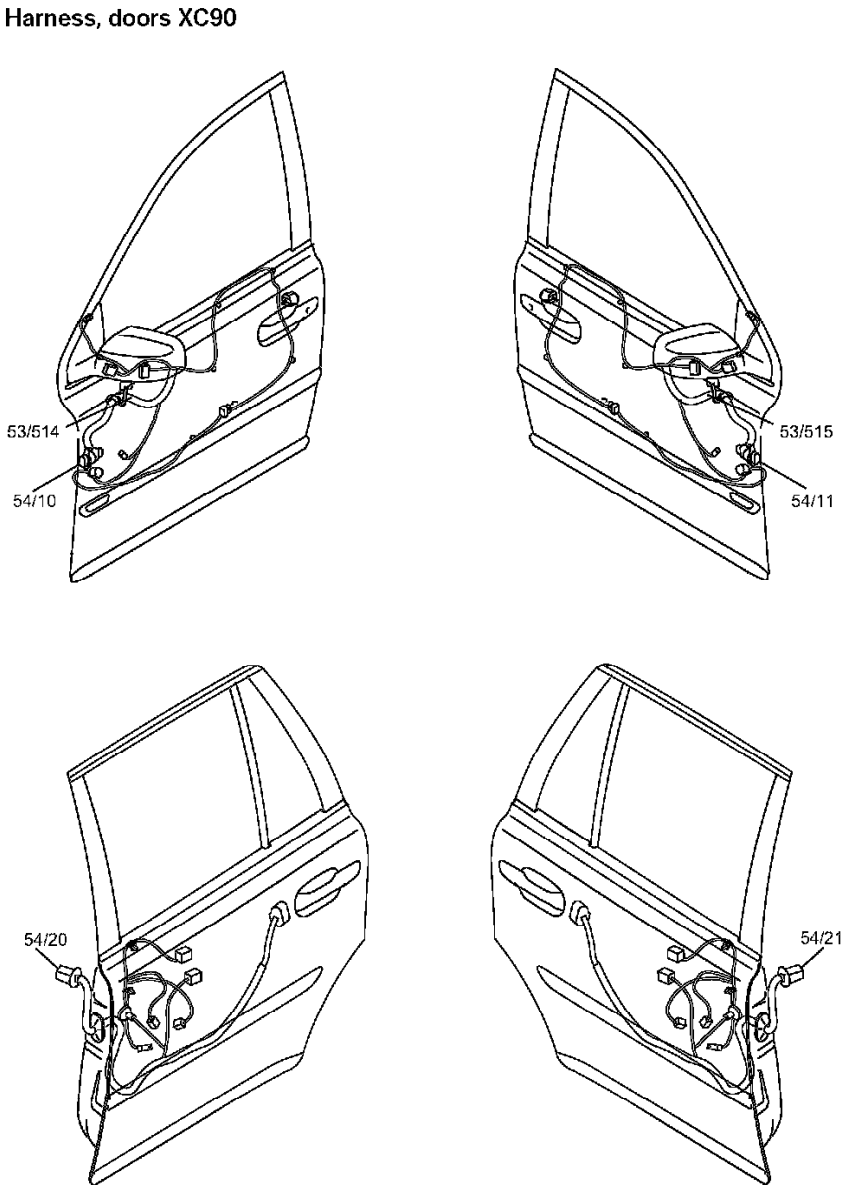
Tailgate harness XC90



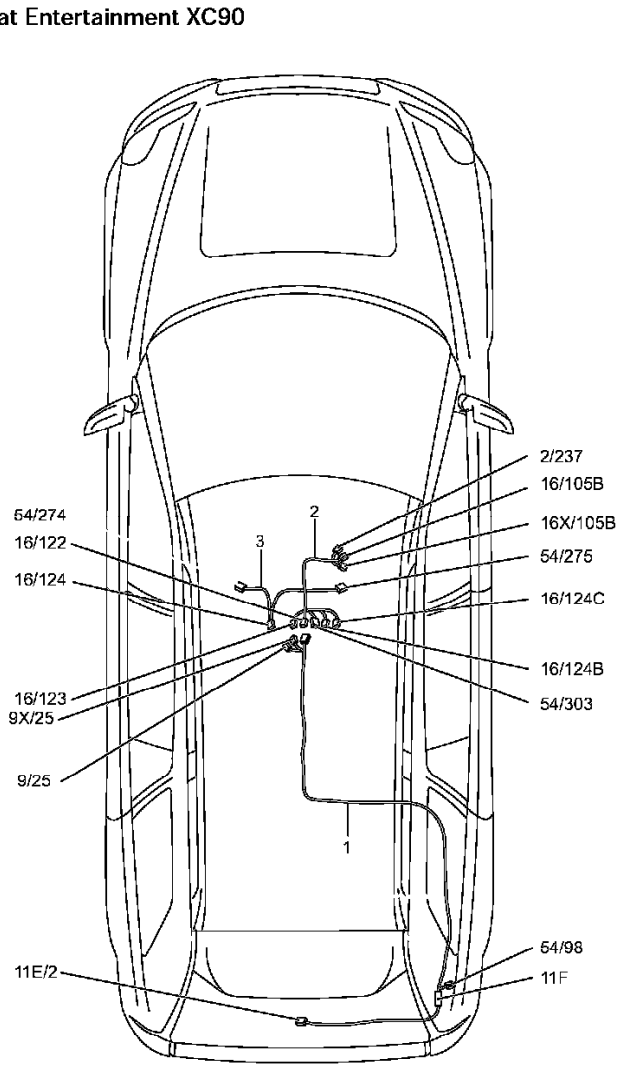
Tailgate Harness XC90



Harness, Door V70



Harness, Doors XC90



Rear Seat Entertainment XC90

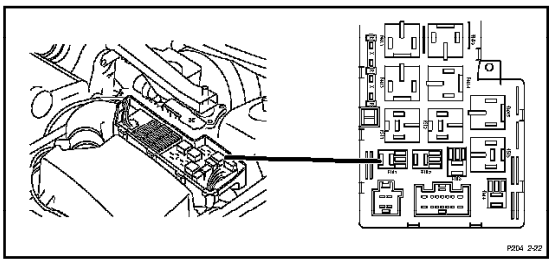
Image Legend: See: Diagrams/Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagrams/Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagrams/Diagram Information and Instructions/List of Components By Component Number

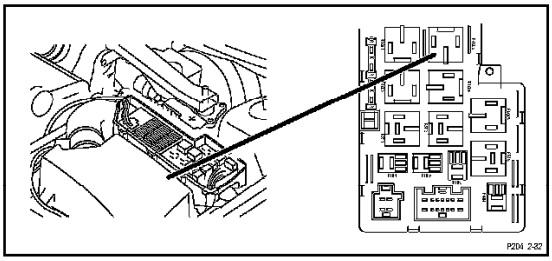
Vehicle: Diagrams

2/22 Relay, climate control system



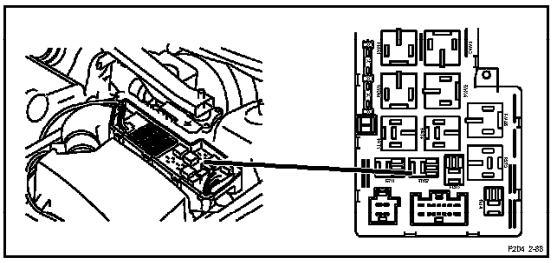
2/22 Relay, Climate Control System

2/32 Main relay, engine management system



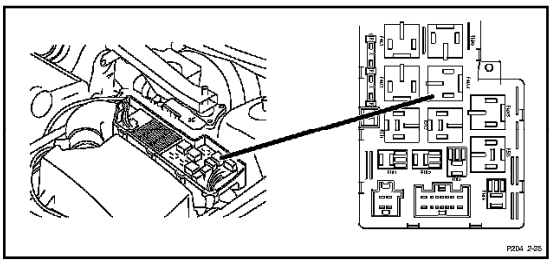
2/32 Main Relay, Engine Management System

2/33 Relay, fuel system



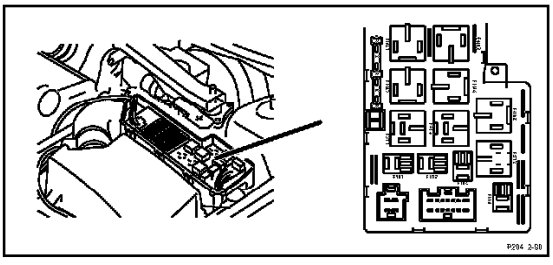
2/33 Relay, Fuel System

2/35 Starter motor relay



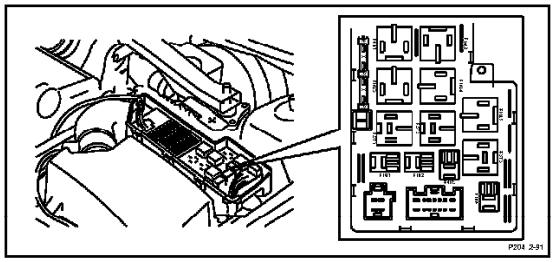
2/35 Starter Motor Relay

2/90 Relay, windshield wiper, low/high speed



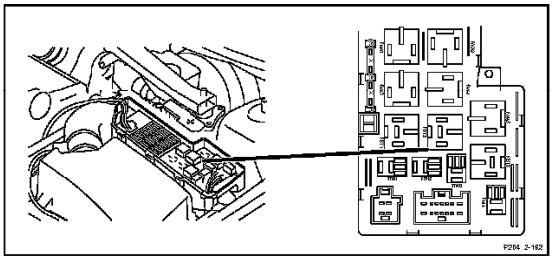
2/90 Relay, Windshield Wiper, Low/High Speed

2/91 Relay, intermittent wiping



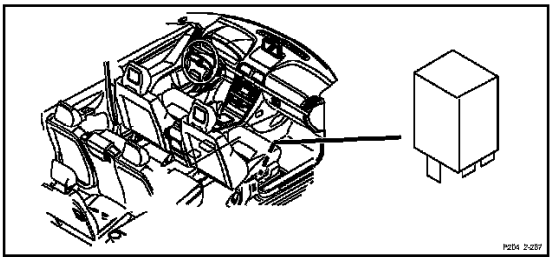
2/91 Relay, Intermittent Wiping

2/182 Relay, high pressure headlight washer motor



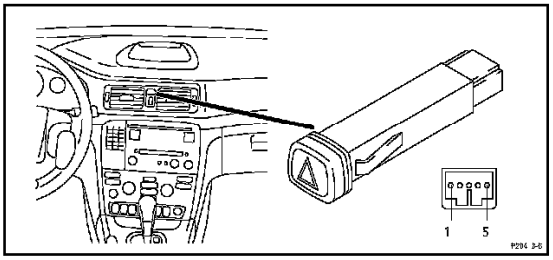
2/182 Relay, High Pressure Headlight Washer Motor

2/237 Disconnect relay, rear speaker



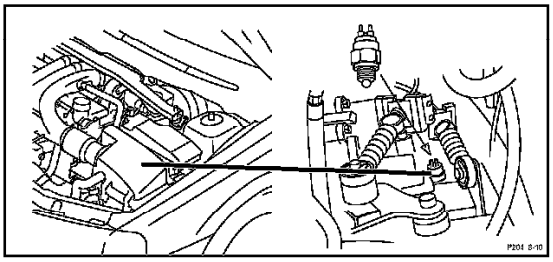
2/237 Disconnect Relay, Rear Speaker

3/6 Hazard warning flasher switch



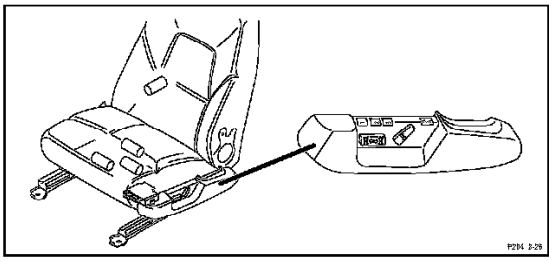
3/6 Hazard Warning Flasher Switch

3/10 Reversing light contact



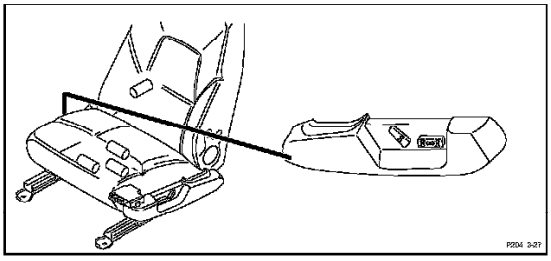
3/10 Reversing Light Contact

3/26 Power driver's seat module



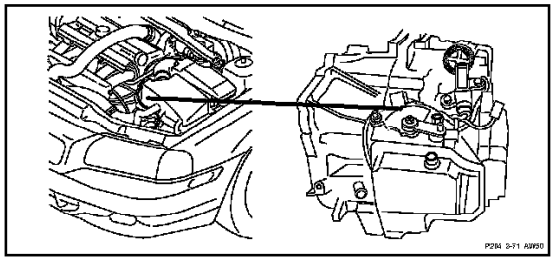
3/26 Power Driver's Seat Module

3/27 Power passenger seat module



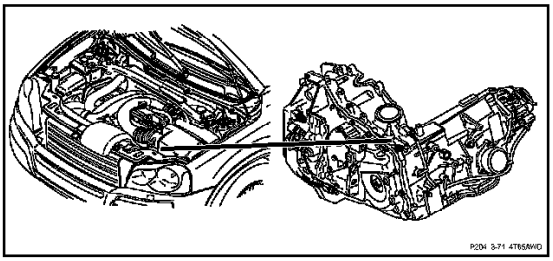
3/27 Power Passenger Seat Module

3/71 Contacts gear selector AW50



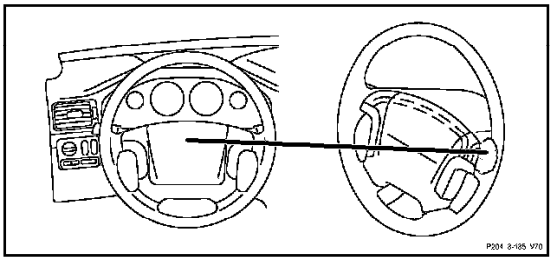
3/71 Contacts Gear Selector

3/71 Contacts gear selector 4T65AWD



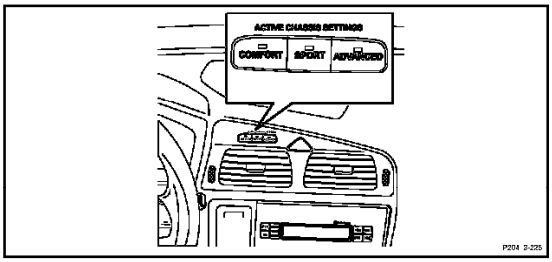
3/71 Contacts Gear Selector

3/135 RTI switch



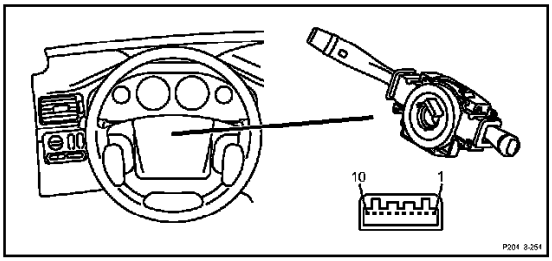
3/135 RTI Switch

3/225 Switch unit continuous damping control (CCD)



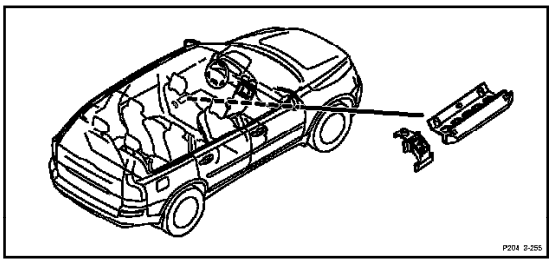
3/225 Switch Unit Continuous Damping Control

3/254 Steering Wheel Module (SWM)



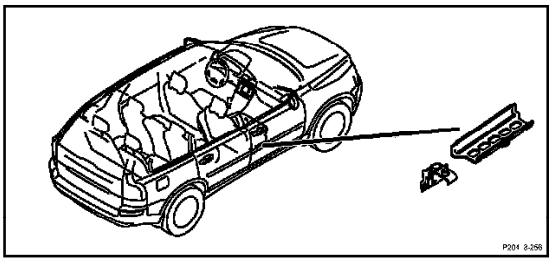
3/254 Steering Wheel Module (SWM)

3/255 Position sensor driver's seat



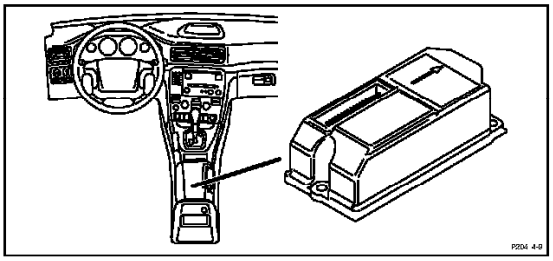
3/255 Position Sensor Driver's Seat

3/256 Position sensor passenger seat



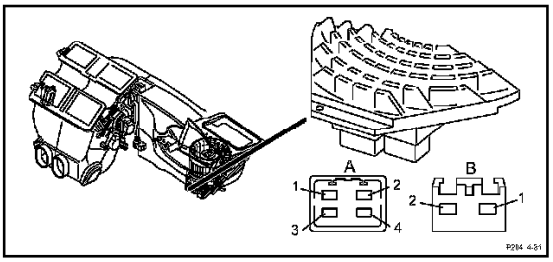
3/256 Position Sensor Passenger Seat

4/9 Control module, Supplementary Restraint System (SRS)



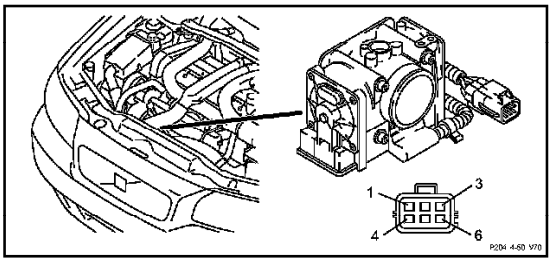
4/9 Control Module, Supplementary Restraint System (SRS)

4/31 Fan control module



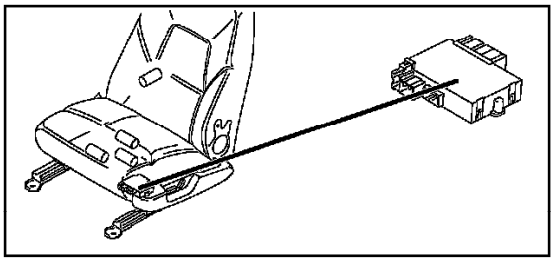
4/31 Fan Control Module

4/50 Electronic Throttle Module (ETM)



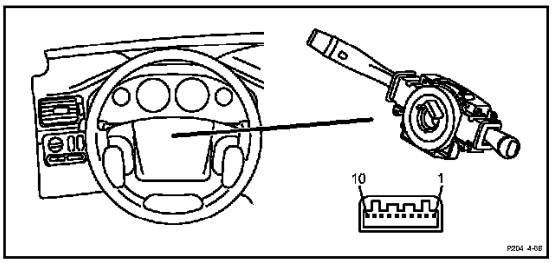
4/50 Electronic Throttle Module (ETM)

4/52 Power Seat Module (PSM)



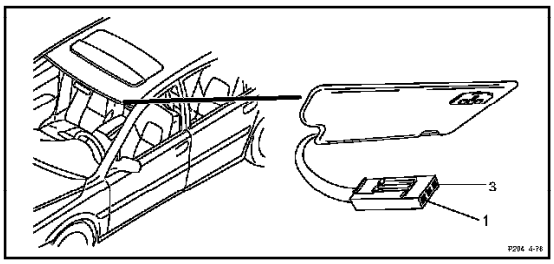
4/52 Power Seat Module (PSM)

4/68 Steering Angle Sensor module (SAS)



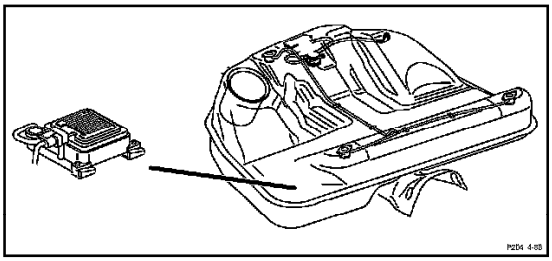
4/68 Steering Angle Sensor Module (SAS)

4/76 Remote control unit for garage door opener



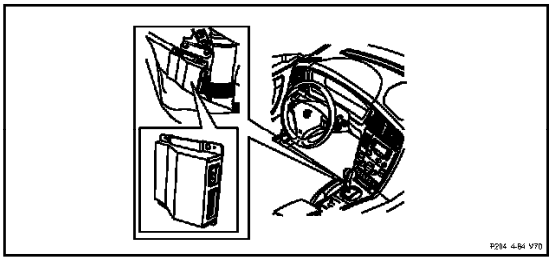
4/76 Remote Control Unit For Garage Door Opener

4/83 Fuel pump control module



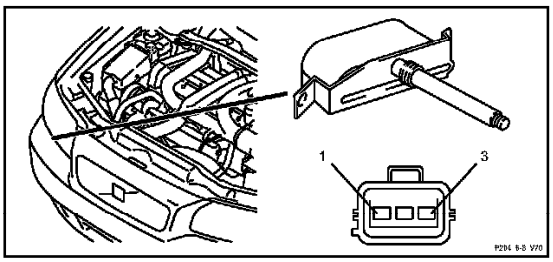
4/83 Fuel Pump Control Module

4/84 Suspension Module (SUM)



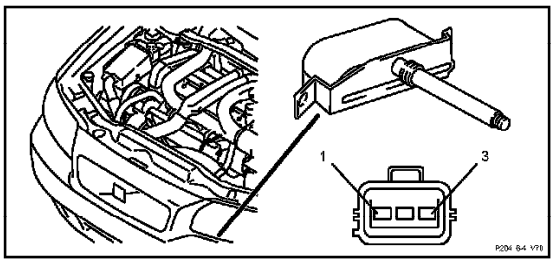
4/84 Suspension Module (SUM)

6/3 Right-hand headlight wiper motor



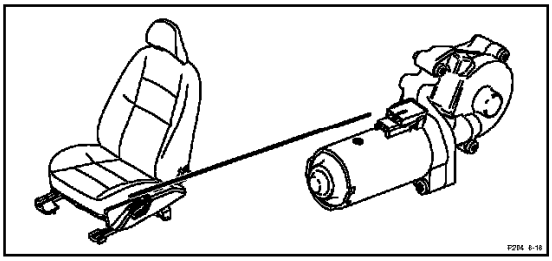
6/3 Right-Hand Headlight Wiper Motor

6/4 Left-hand headlight wiper motor



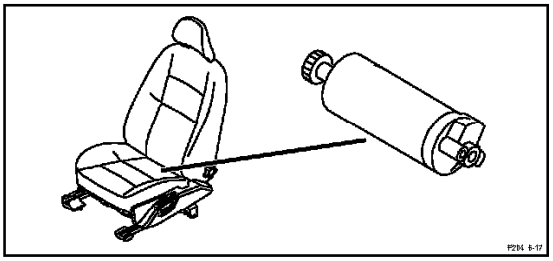
6/4 Left-Hand Headlight Wiper Motor

6/16 Driver seat motor, backrest angle



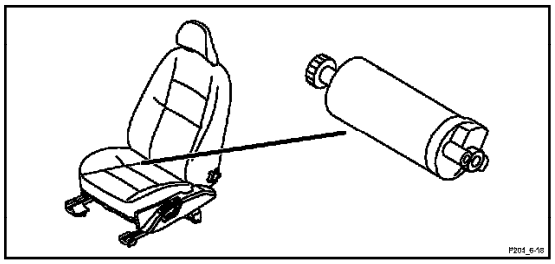
6/16 Driver Seat Motor, Backrest Angle

6/17 Driver seat motor, up/down front edge



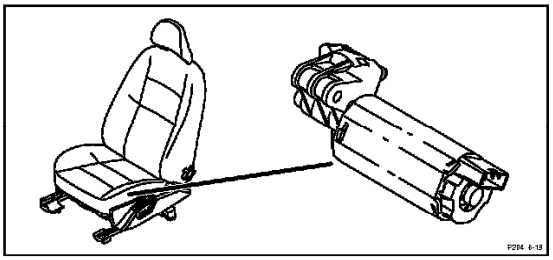
6/17 Driver Seat Motor, Up/Down Front Edge

6/18 Driver seat motor, up/down rear edge



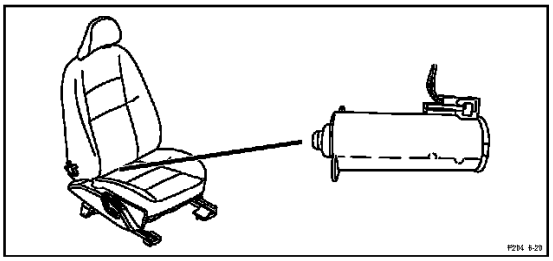
6/18 Driver Seat Motor, Up/Down Rear Edge

6/19 Driver seat motor, forward/backward



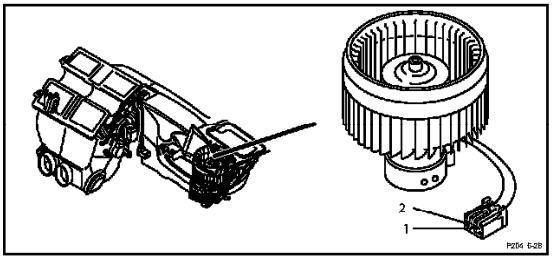
6/19 Driver Seat Motor, Forward/Backward

6/20 Passenger seat motor, forward/backward



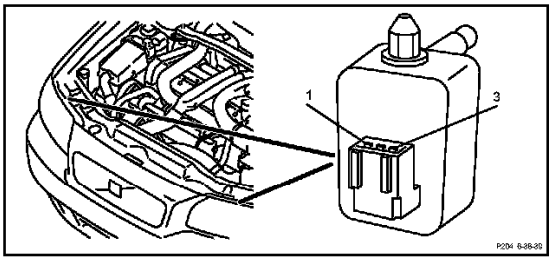
6/20 Passenger Seat Motor, Forward/Backward

6/28 Motor, passenger compartment fan



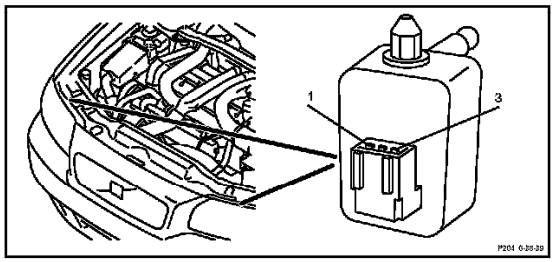
6/28 Motor, Passenger Compartment Fan

6/38 Left-hand headlight level adjustment motor



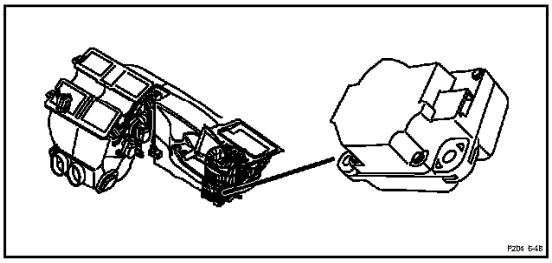
6/38 Left-Hand Headlight Level Adjustment Motor

6/39 Right-hand headlight adjustment motor



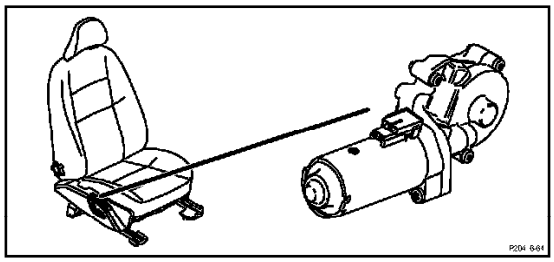
6/39 Right-Hand Headlight Adjustment Motor

6/48 Damper Motor Module (DMM), recirculation



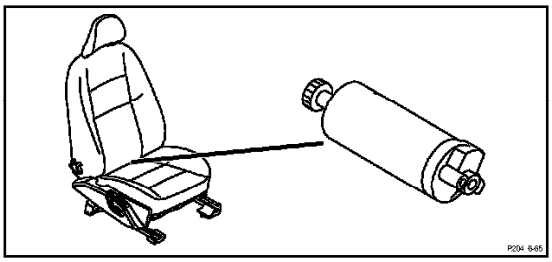
6/48 Damper Motor Module (DMM), Recirculation

6/64 Passenger seat motor, backrest angle



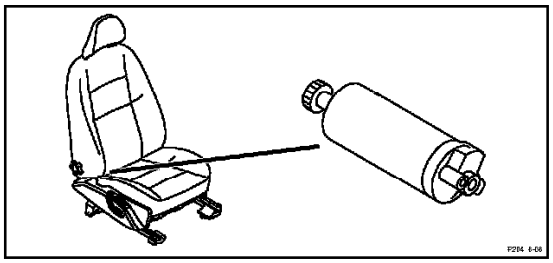
6/64 Passenger Seat Motor, Backrest Angle

6/65 Passenger seat motor, up/down front edge



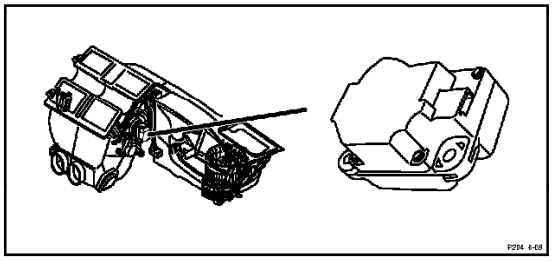
6/65 Passenger Seat Motor, Up/Down Front Edge

6/66 Passenger seat motor, up/down rear edge



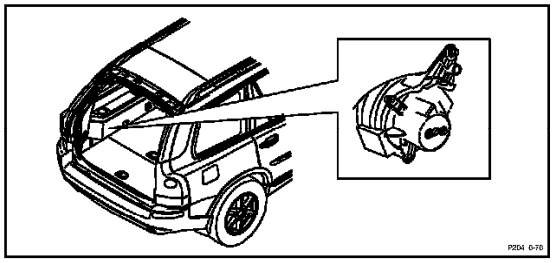
6/66 Passenger Seat Motor, Up/Down Rear Edge

6/69 Damper Motor Module (DMM), ventilation/floor/defroster



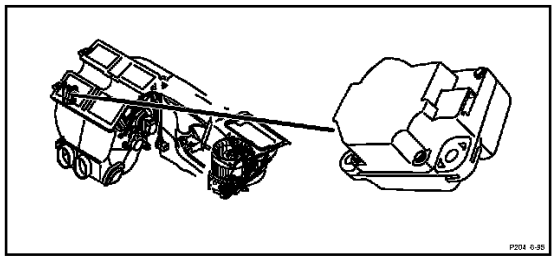
6/69 Damper Motor Module (DMM), Ventilation/Floor/Defroster

6/76 Climate control system, rear



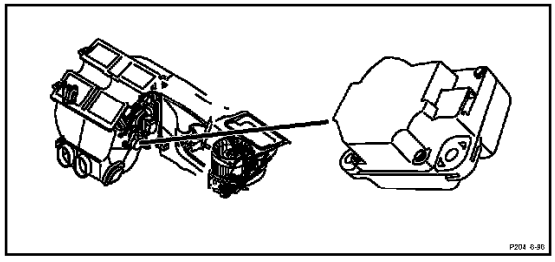
6/76 Climate Control System, Rear

6/95 Damper Motor Module (DMM), temperature, left-hand side



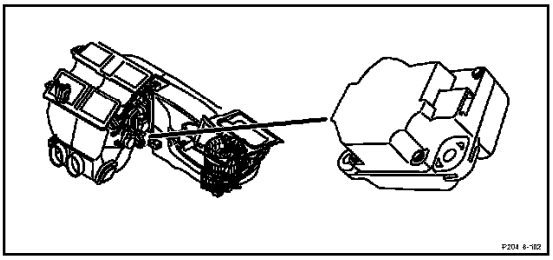
6/95 Damper Motor Module (DMM), Temperature, Left-Hand Side

6/96 Damper Motor Module (DMM), temperature, right-hand side



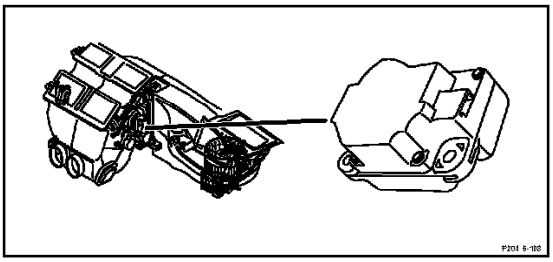
6/96 Damper Motor Module (DMM), Temperature, Right-Hand Side

6/102 Damper Motor Module (DMM), defroster



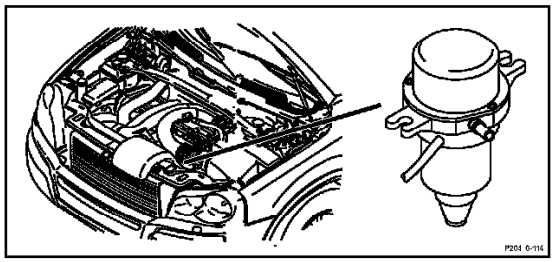
6/102 Damper Motor Module (DMM), Defroster

6/103 Damper Motor Module (DMM), floor/ventilation



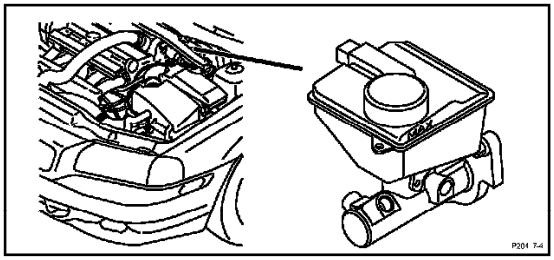
6/103 Damper Motor Module (DMM), Floor/Ventilation

6/114 Vacuum pump



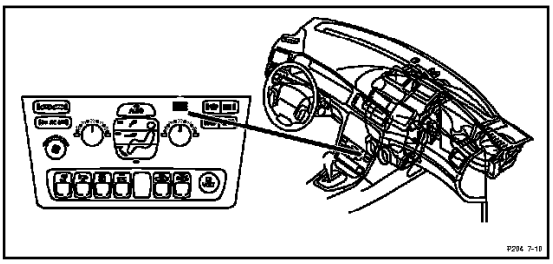
6/114 Vacuum Pump

7/4 Brake fluid level sensor



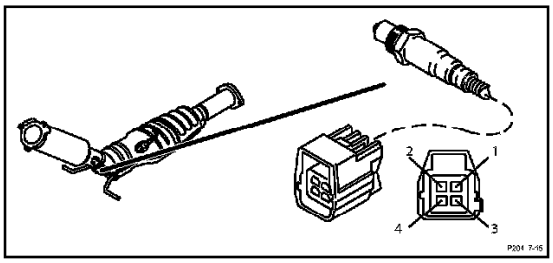
7/4 Brake Fluid Level Sensor

7/10 Interior temperature sensor



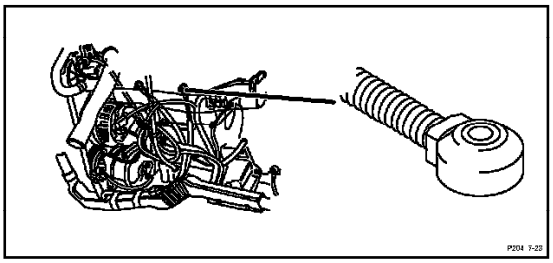
7/10 Interior Temperature Sensor

7/15 Heated oxygen sensor



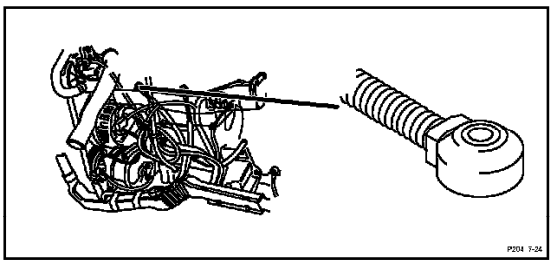
7/15 Heated Oxygen Sensor

7/23 Knock sensor rear



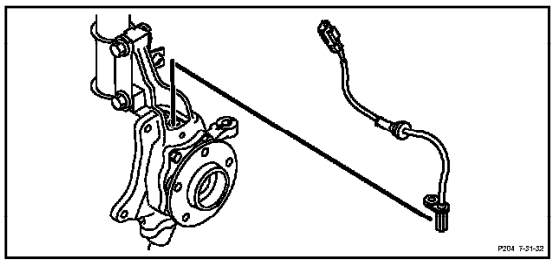
7/23 Knock Sensor Rear

7/24 Front knock sensor



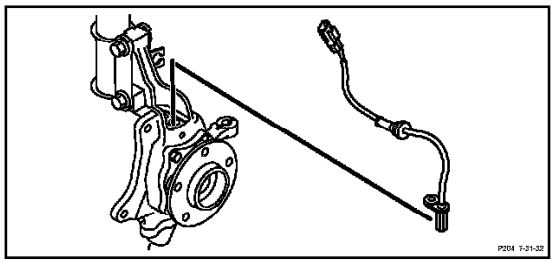
7/24 Front Knock Sensor

7/31 Left-hand front ABS sensor



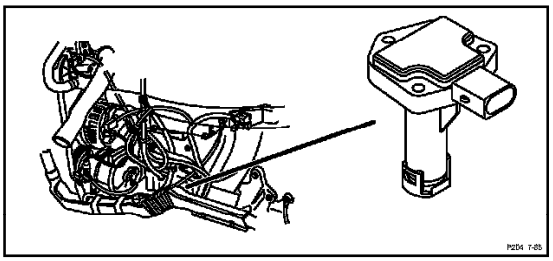
7/31 Left-Hand Front ABS Sensor

7/32 Right-hand front ABS sensor



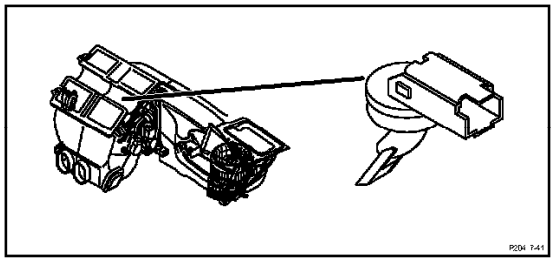
7/32 Right-Hand Front ABS Sensor

7/35 Oil level sensor



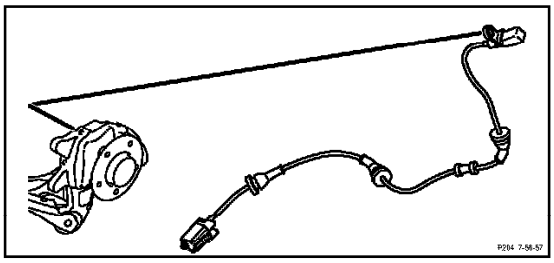
7/35 Oil Level Sensor

7/41 Temperature sensor, evaporator



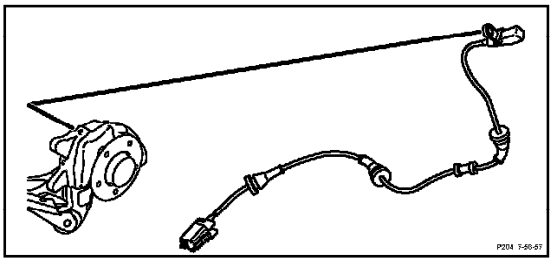
7/41 Temperature Sensor, Evaporator

7/56 Left-hand rear ABS sensor



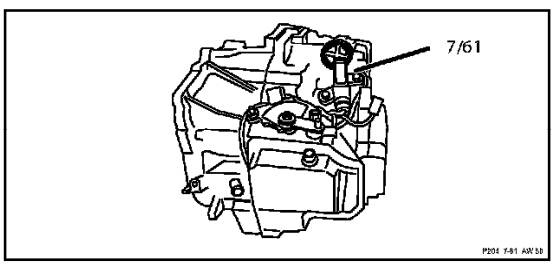
7/56 Left-Hand Rear ABS Sensor

7/57 Right rear ABS sensor



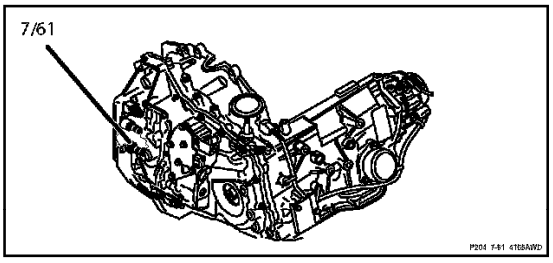
7/57 Right Rear ABS Sensor

7/61 Sensor input rpm AW50



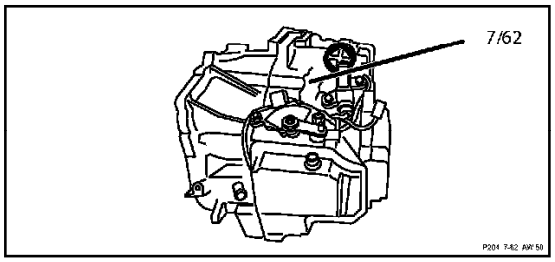
7/61 Sensor Input RPM

7/61 Sensor input rpm 4T65AWD



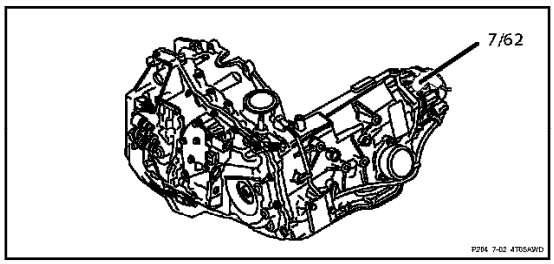
7/61 Sensor Input RPM

7/62 Sensor output rpm AW50



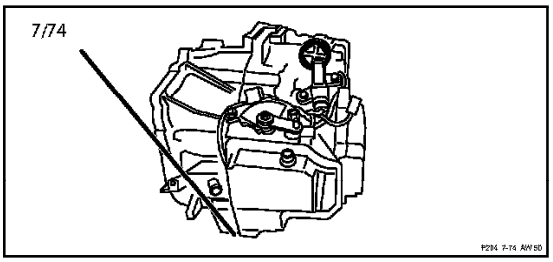
7/62 Sensor Output RPM

7/62 Sensor output rpm 4T65AWD



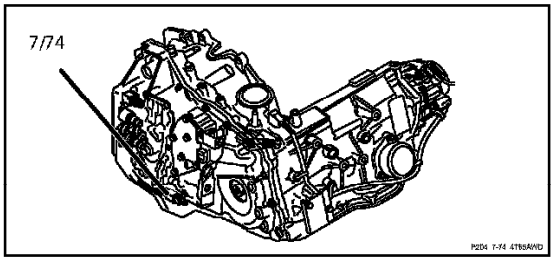
7/62 Sensor Output RPM

7/74 Sensor oil temperature automatic transmission AW50



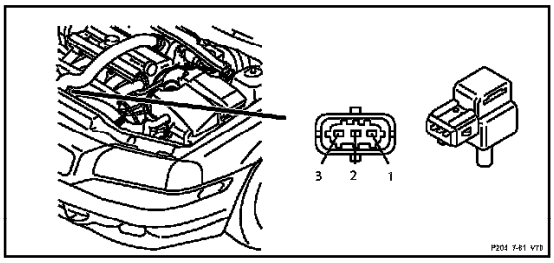
7/74 Sensor Oil Temperature Automatic Transmission

7/74 Sensor oil temperature automatic transmission 4T65AWD



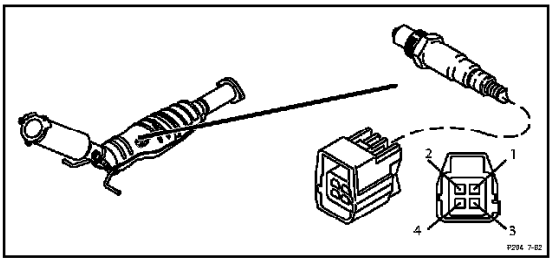
7/74 Sensor Oil Temperature Automatic Transmission

7/81 Pressure sensor, intake manifold



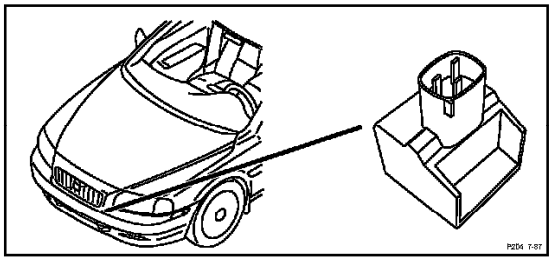
7/81 Pressure Sensor, Intake Manifold

7/82 Heated oxygen sensor, diagnosis 1



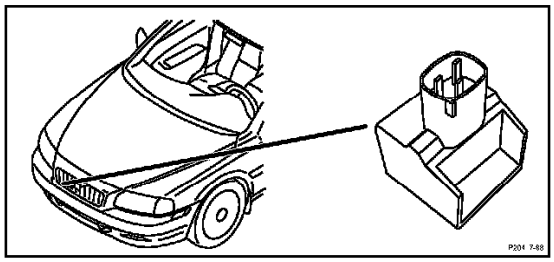
7/82 Heated Oxygen Sensor, Diagnosis 1

7/87 Acceleration sensor, Four-C, front left



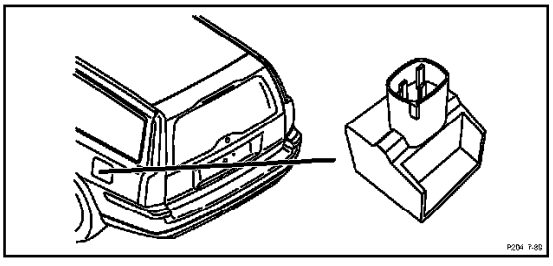
7/87 Acceleration Sensor, Four-C, Front Left

7/88 Acceleration sensor, Four-C, front right



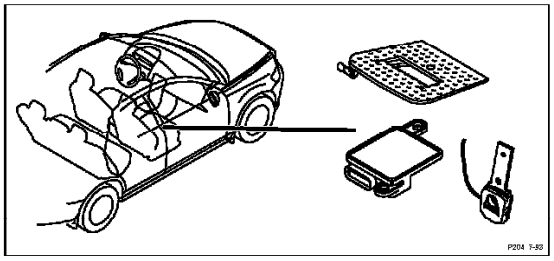
7/88 Acceleration Sensor, Four-C, Front Right

7/89 Acceleration sensor, Four-C, rear left



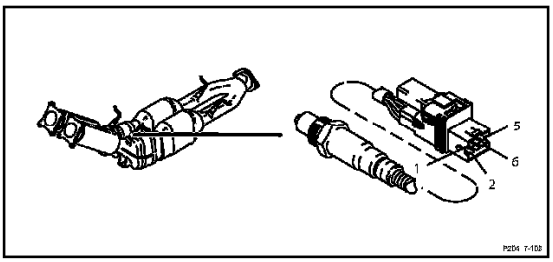
7/89 Acceleration Sensor, Four-C, Rear Left

7/93 Occupant Weight Sensor (OWS)



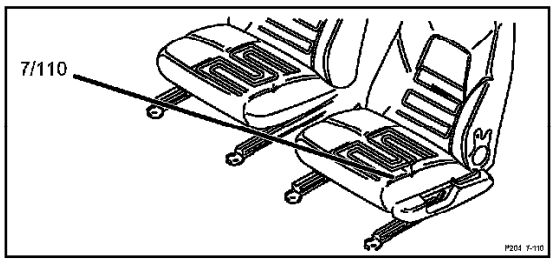
7/93 Occupant Weight Sensor (OWS)

7/103 Heated oxygen sensor 3



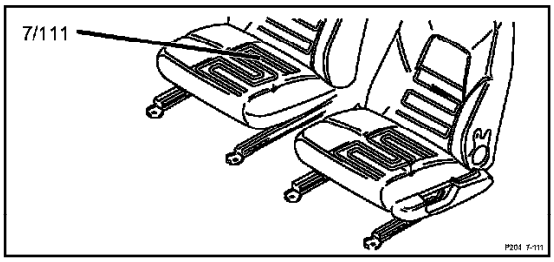
7/103 Heated Oxygen Sensor 3

7/110 Left-hand seat temperature sensor



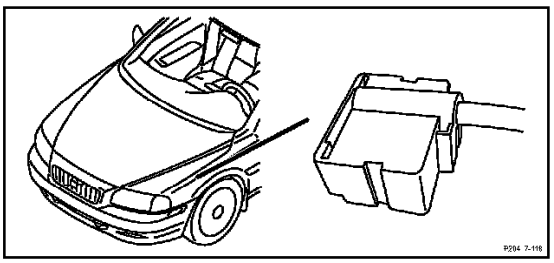
7/110 Left-Hand Seat Temperature Sensor

7/111 Right-hand seat temperature sensor



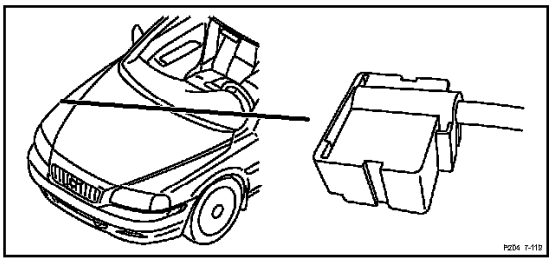
7/111 Right-Hand Seat Temperature Sensor

7/118 Acceleration sensor, shock absorber, Four-C, front left



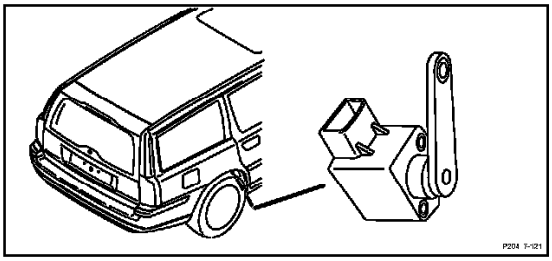
7/118 Acceleration Sensor, Shock Absorber, Four-C, Front Left

7/119 Acceleration sensor, shock absorber, Four-C, front right



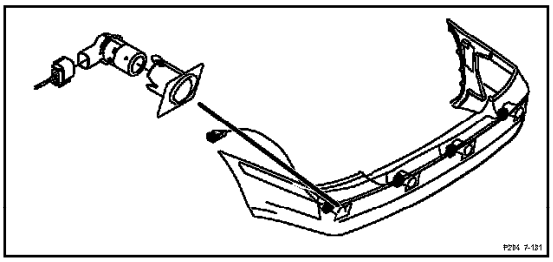
7/119 Acceleration Sensor, Shock Absorber, Four-C, Front Right

7/121 Angle sensor Four-C/Bi-Xenon rear right



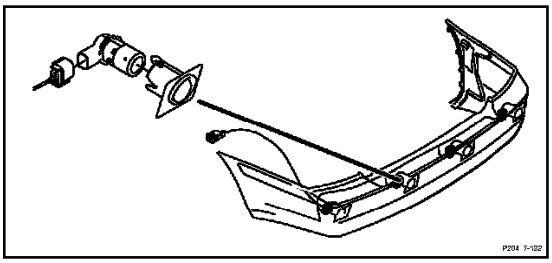
7/121 Angle Sensor Four-C/Bi-Xenon Rear Right

7/131 Parking assistance sensor, rear 1



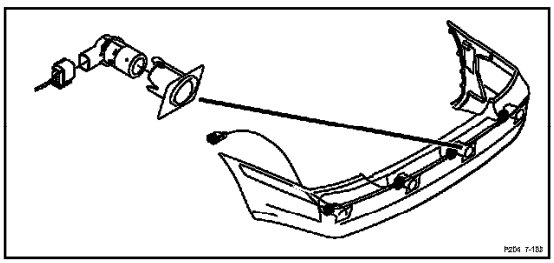
7/131 Parking Assistance Sensor, Rear 1

7/132 Parking assistance sensor, rear 2



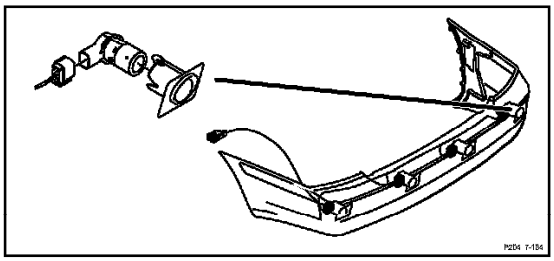
7/132 Parking Assistance Sensor, Rear 2

7/133 Parking assistance sensor, rear 3



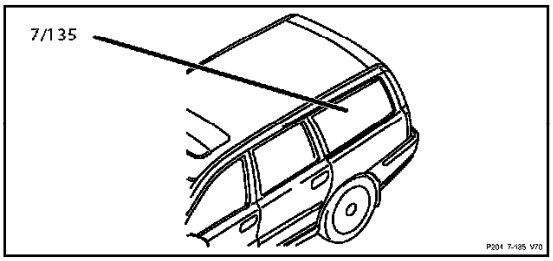
7/133 Parking Assistance Sensor, Rear 3

7/134 Parking assistance sensor, rear 4



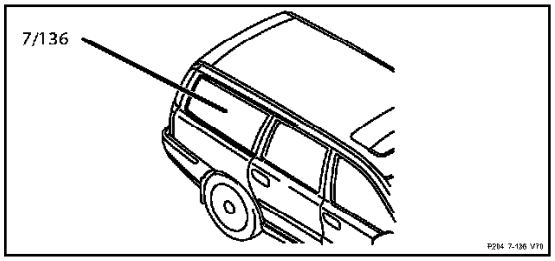
7/134 Parking Assistance Sensor, Rear 4

7/135 Glass breakage sensor, left-hand



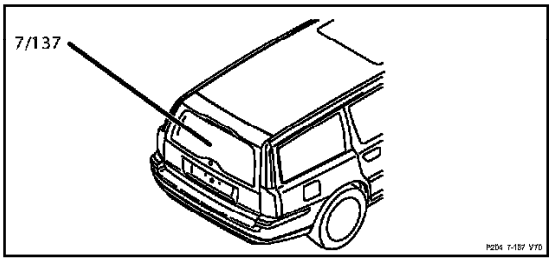
7/135 Glass Breakage Sensor, Left-Hand

7/136 Glass breakage sensor, right-hand



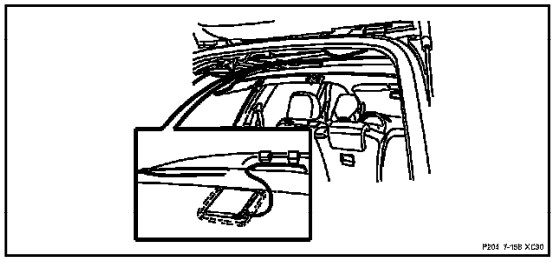
7/136 Glass Breakage Sensor, Right-Hand

7/137 Glass breakage sensor, tailgate



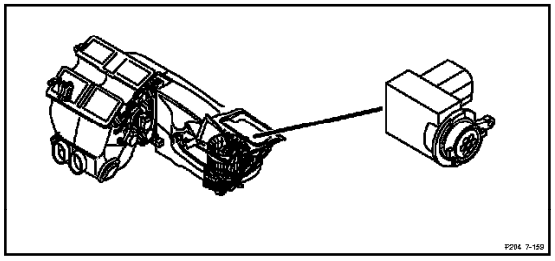
7/137 Glass Breakage Sensor, Tailgate

7/158 Mass Movement Sensor (MMS), rear



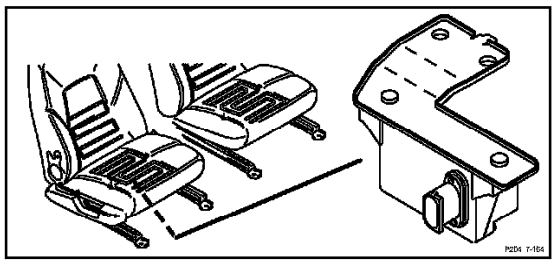
7/158 Mass Movement Sensor (MMS), Rear

7/159 Air Quality Sensor (AQS)



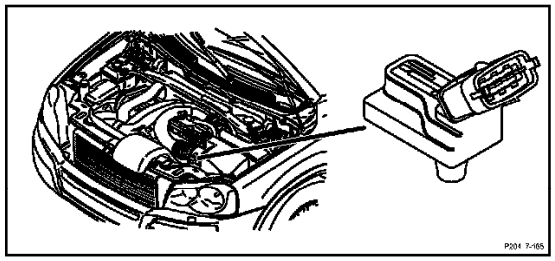
7/159 Air Quality Sensor (AQS)

7/164 Body Sensor Cluster (BSC)



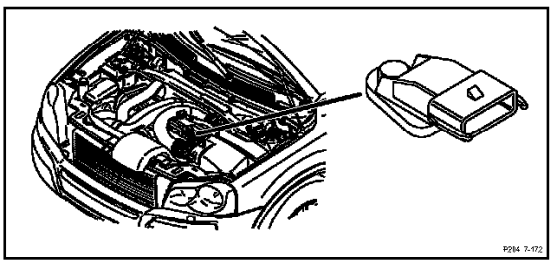
7/164 Body Sensor Cluster (BSC)

7/165 Pressure and temperature sensor, intake manifold



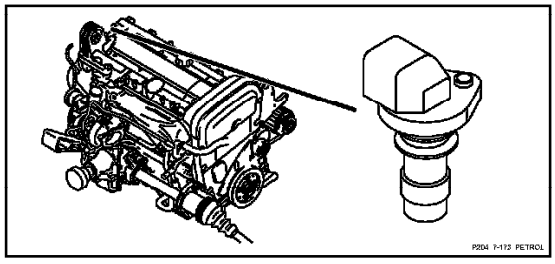
7/165 Pressure And Temperature Sensor, Intake Manifold

7/172 Position sensor, camshaft, intake side



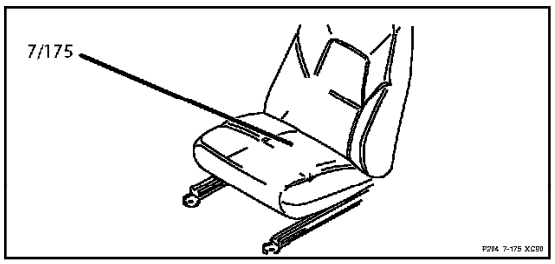
7/172 Position Sensor, Camshaft, Intake Side

7/173 Position sensor camshaft exhaust side Gasoline



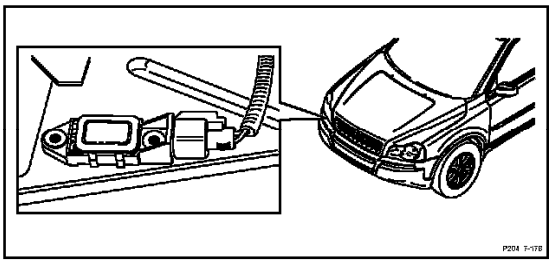
7/173 Position Sensor Camshaft Exhaust Side

7/175 Weight sensor passenger seat, seat belt reminder



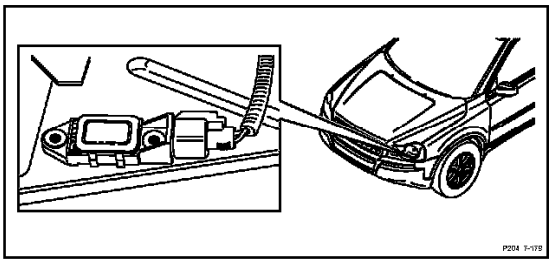
7/175 Weight Sensor Passenger Seat, Seat Belt

7/178 RH front impact sensor



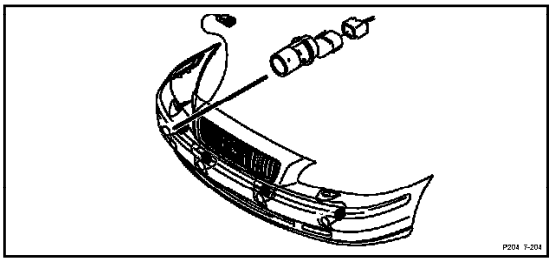
7/178 RH Front Impact Sensor

7/179 LH front impact sensor



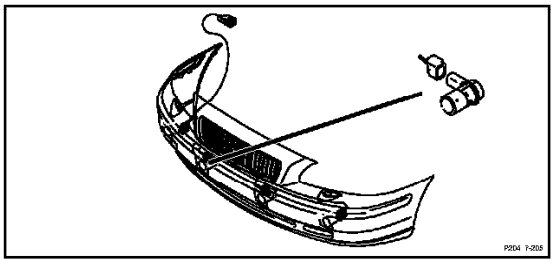
7/179 LH Front Impact Sensor

7/204 Parking assistance sensor, front 5 LHD



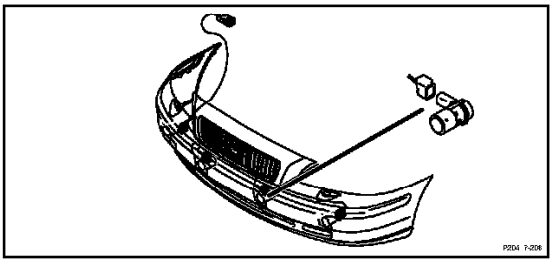
7/204 Parking Assistance Sensor, Front 5 LHD

7/205 Parking assistance sensor, front 6 LHD



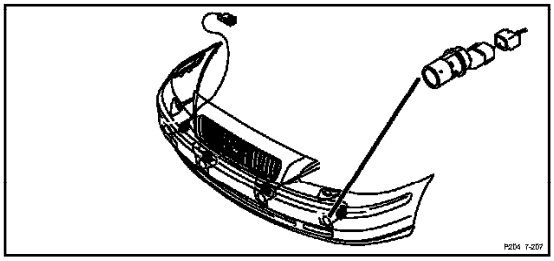
7/205 Parking Assistance Sensor, Front 6 LHD

7/206 Parking assistance sensor, front 7 LHD



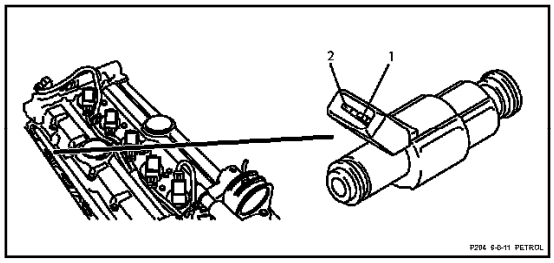
7/206 Parking Assistance Sensor, Front 7 LHD

7/207 Parking assistance sensor, front 8 LHD



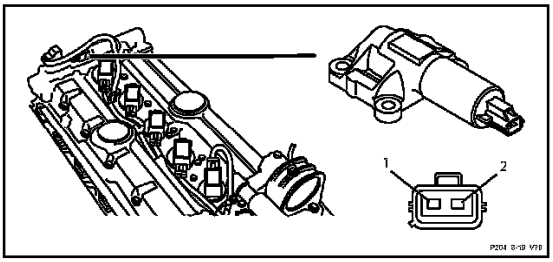
7/207 Parking Assistance Sensor, Front 8 LHD

8/6-11 Injectors Gasoline



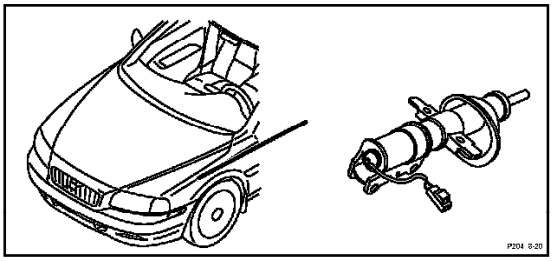
8/6-11 Injectors

8/19 Solenoid, variable valve time, inlet



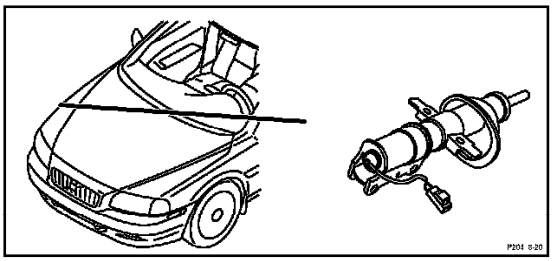
8/19 Solenoid, Variable Valve Time, Inlet

8/20 Shock absorber, Four-C, front left



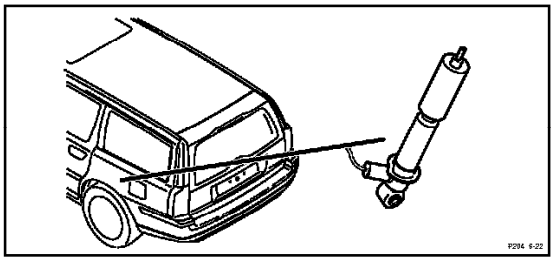
8/20 Shock Absorber, Four-C, Front Left

8/21 Shock absorber, Four-C, front right



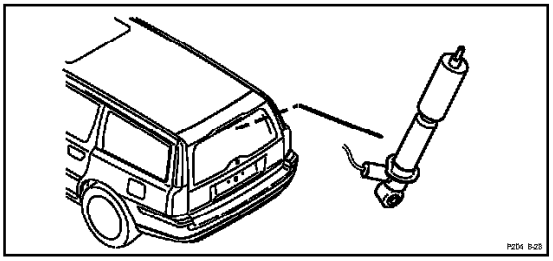
8/21 Shock Absorber, Four-C, Front Right

8/22 Shock absorber, Four-C, rear left



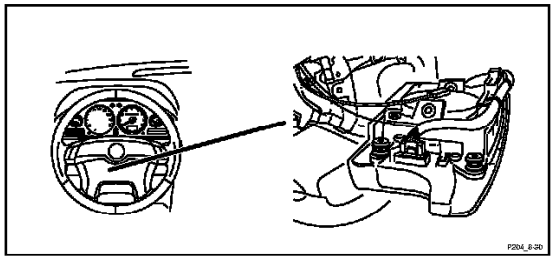
8/22 Shock Absorber, Four-C, Rear Left

8/23 Shock absorber, Four-C, rear right



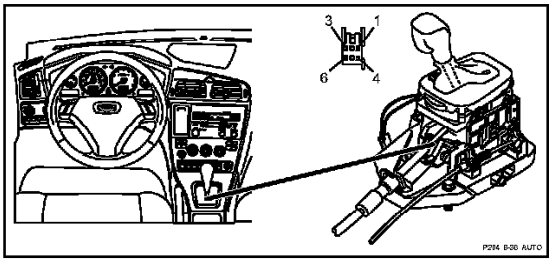
8/23 Shock Absorber, Four-C, Rear Right

8/30 Driver side airbag igniter



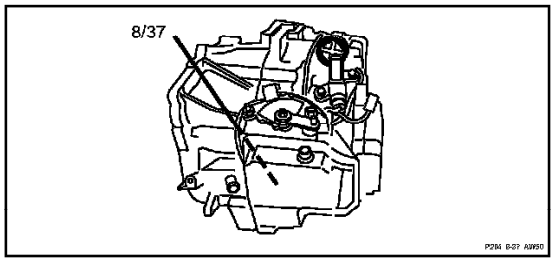
8/30 Driver Side Airbag Igniter

8/36 Shift lock solenoid



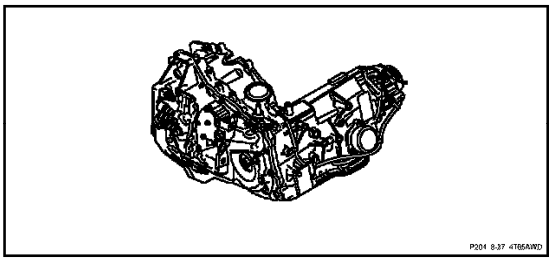
8/36 Shift Lock Solenoid

8/37 Automatic transmission AW50



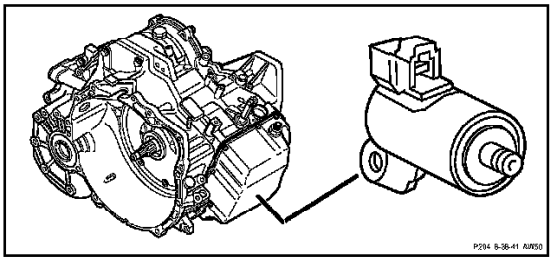
8/37 Automatic Transmission

8/37 Automatic transmission 4T65AWD



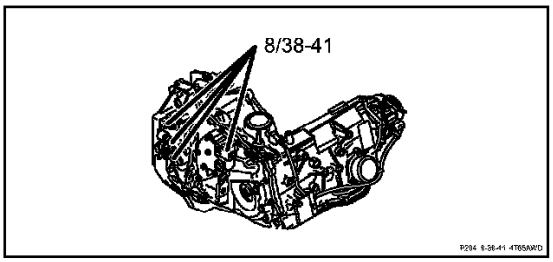
8/37 Automatic Transmission

8/38 Gearshifting solenoid 1 AW50



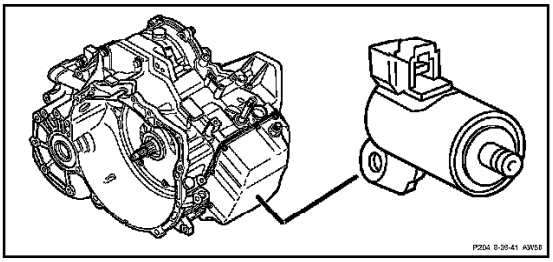
8/38 Gearshifting Solenoid 1

8/38 Gearshifting solenoid 1 4T65AWD



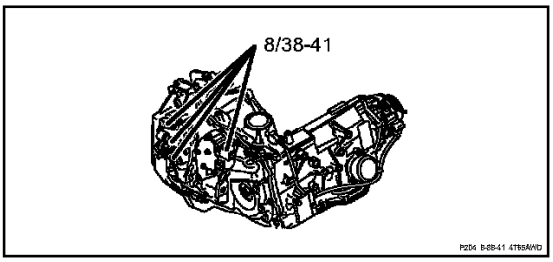
8/38 Gearshifting Solenoid 1

8/39 Gearshifting solenoid 2 AW50



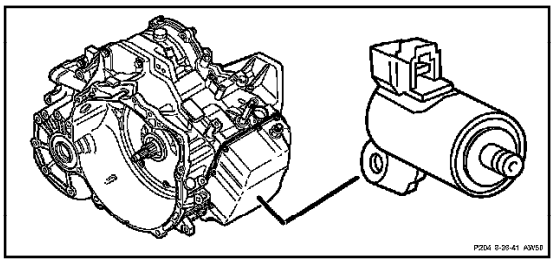
8/38 Gearshifting Solenoid 2

8/39 Gearshifting solenoid 2 4T65AWD



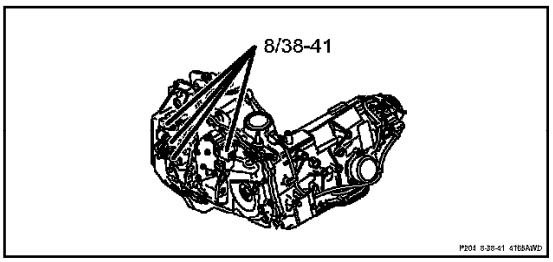
8/38 Gearshifting Solenoid 2

8/40 Lock-up solenoid AW50



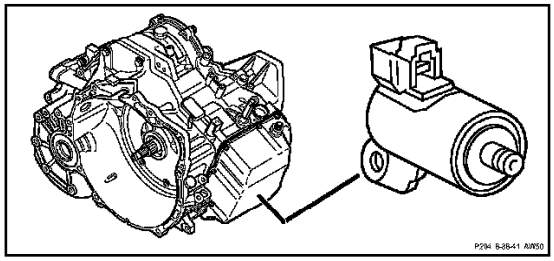
8/40 Lock-Up Solenoid

8/40 Lock-up solenoid 4T65AWD



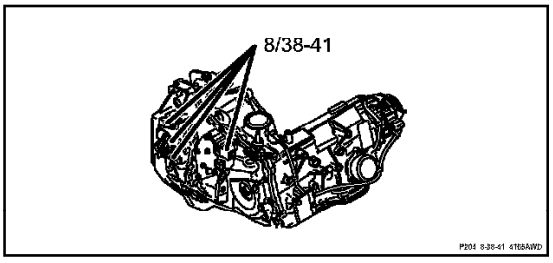
8/40 Lock-Up Solenoid

8/41 Pressure solenoid AW50



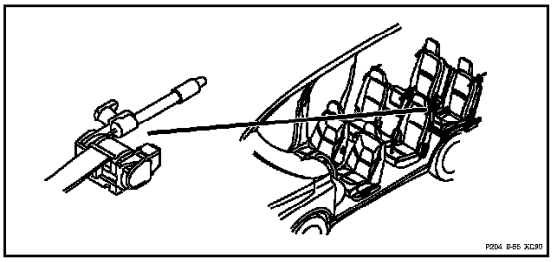
8/41 Pressure Solenoid

8/41 Pressure solenoid 4T65AWD



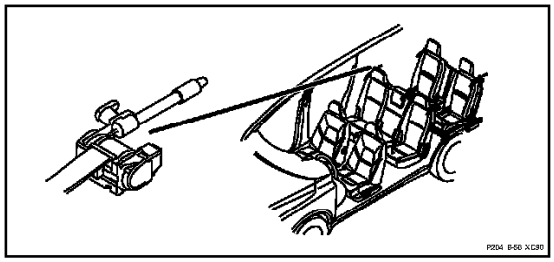
8/41 Pressure Solenoid

8/55 Rear left belt tensioner igniter



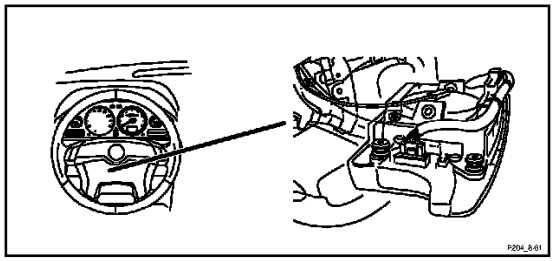
8/55 Rear Left Belt Tensioner Igniter

8/56 Rear right belt tensioner igniter



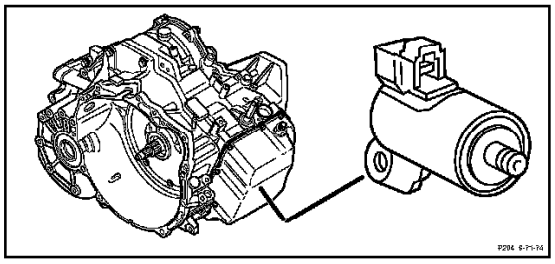
8/56 Rear Right Belt Tensioner Igniter

8/61 Driver side airbag igniter step 2



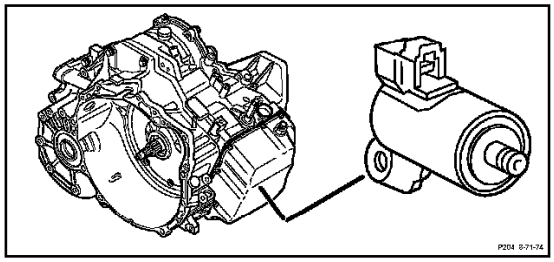
8/61 Driver Side Airbag Igniter Step 2

8/71 Throttle solenoid



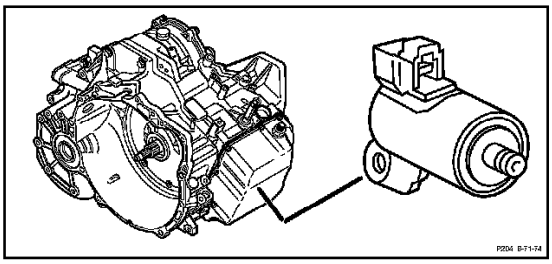
8/71 Throttle Solenoid

8/72 Shift solenoid 3



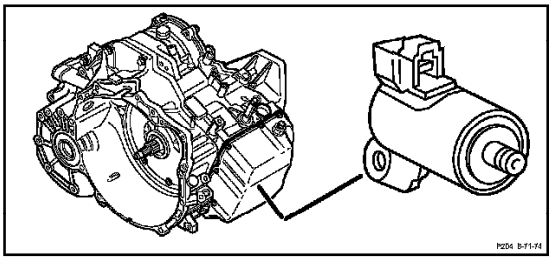
8/72 Shift Solenoid 3

8/73 Shift solenoid 4



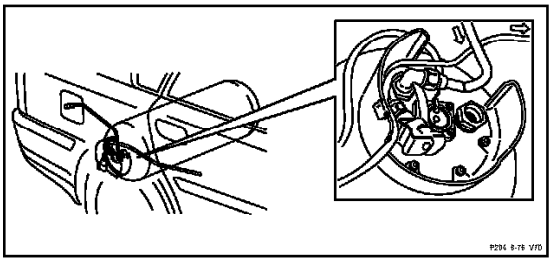
8/73 Shift Solenoid 4

8/74 Shift solenoid 5



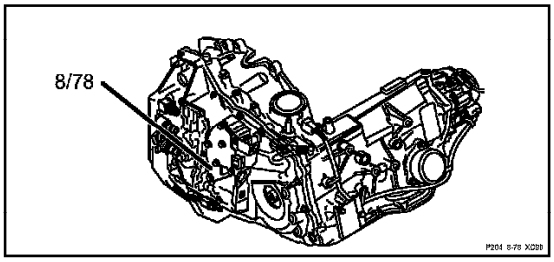
8/74 Shift Solenoid 5

8/76 Gas tank valve



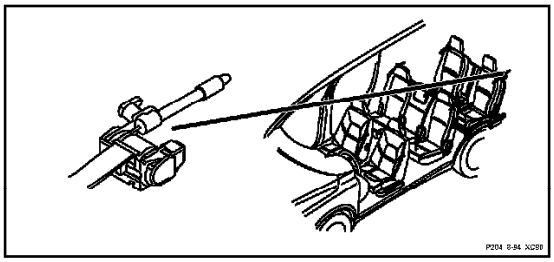
8/76 Gas Tank Valve

8/78 Oil pressure sensor



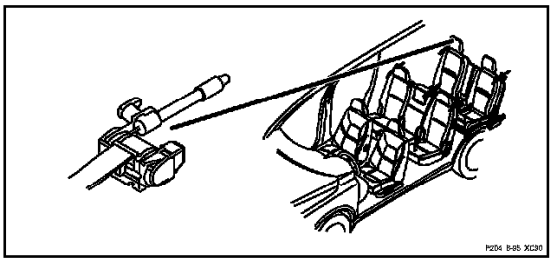
8/78 Oil Pressure Sensor

8/94 Left-hand belt tensioner igniter, third row of seats



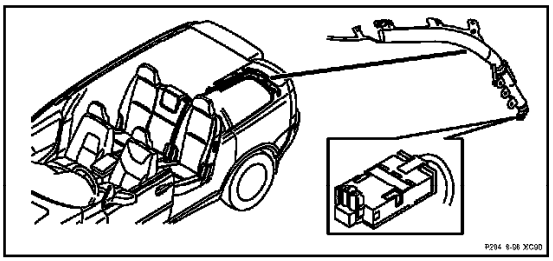
8/94 Left-Hand Belt Tensioner Igniter, Third Row Of Seats

8/95 Right-hand belt tensioner igniter, third row of seats



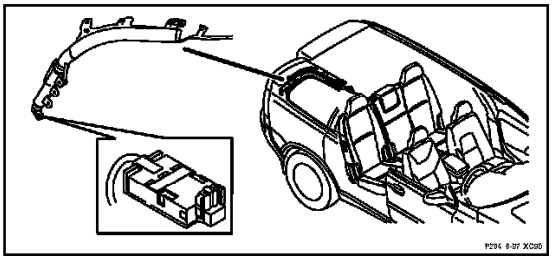
8/95 Right-Hand Belt Tensioner Igniter, Third Row Of Seats

8/96 Left-hand inflatable curtain igniter, third row of seats



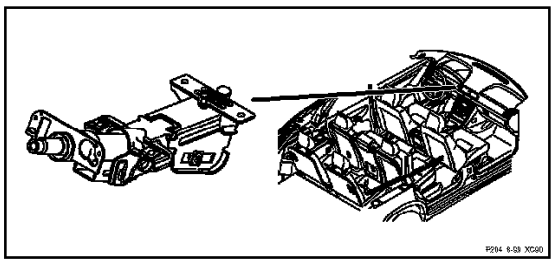
8/96 Left-Hand Inflatable Curtain Igniter, Third Row Of Seats

8/97 Right-hand inflatable curtain igniter, third row of seats



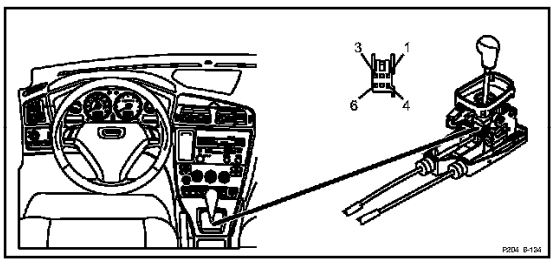
8/97 Right-Hand Inflatable Curtain Igniter, Third Row Of Seats

8/99 Igniter, steering column



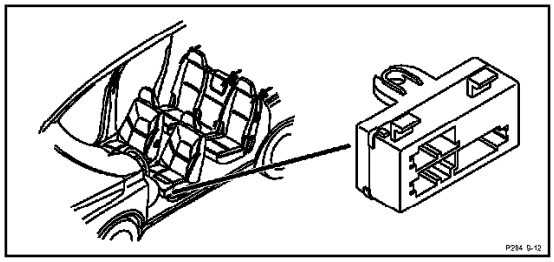
8/99 Igniter, Steering Column

8/134 Solenoid, reverse interlock, manual



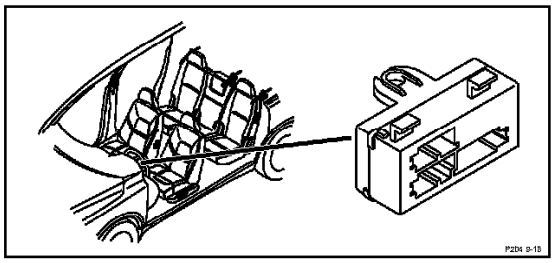
8/134 Solenoid, Reverse Interlock, Manual

9/12 Seat Heater Module (SHM), left-hand



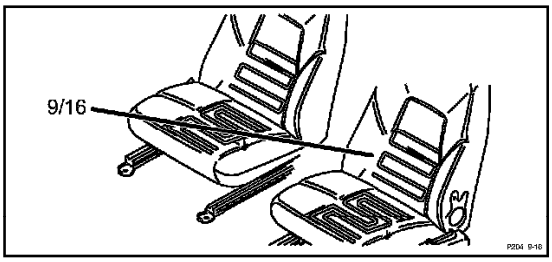
9/12 Seat Heater Module (SHM), Left-Hand

9/13 Seat Heater Module (SHM), right-hand



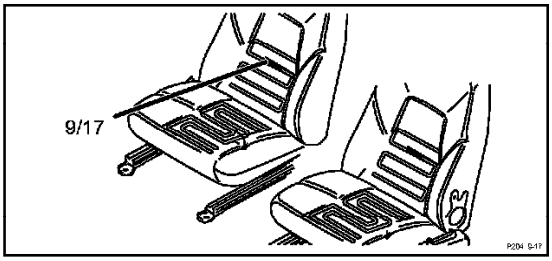
9/13 Seat Heater Module (SHM), Right-Hand

9/16 Left-hand backrest heating element



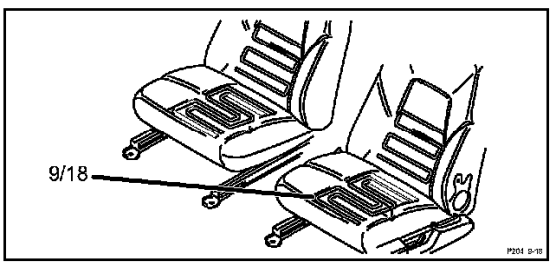
9/16 Left-Hand Backrest Heating Element

9/17 Right-hand backrest heating element



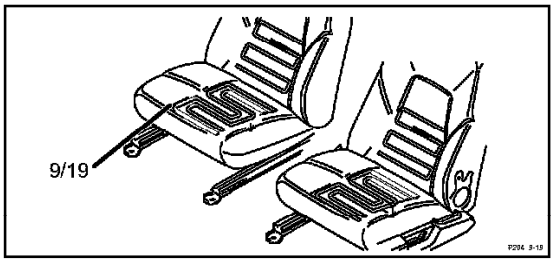
9/17 Right-Hand Backrest Heating Element

9/18 Left-hand seat heating element



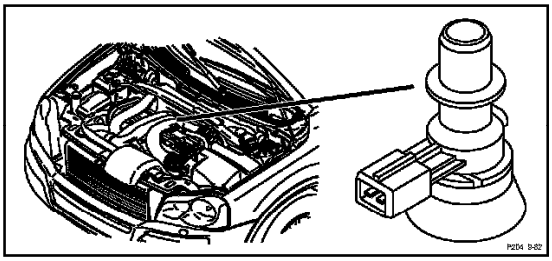
9/18 Left-Hand Seat Heating Element

9/19 Right-hand seat heating element



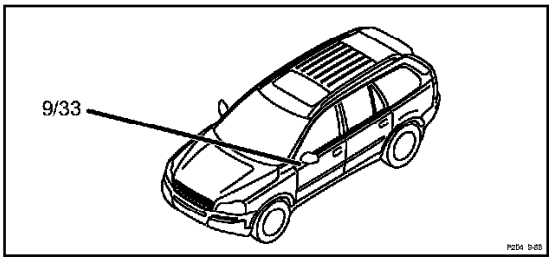
9/19 Right-Hand Seat Heating Element

9/32 PTC resistor - air preheating



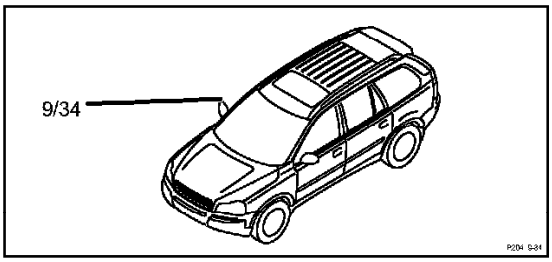
9/32 PTC Resistor - Air Preheating

9/33 Left-hand heated door mirror



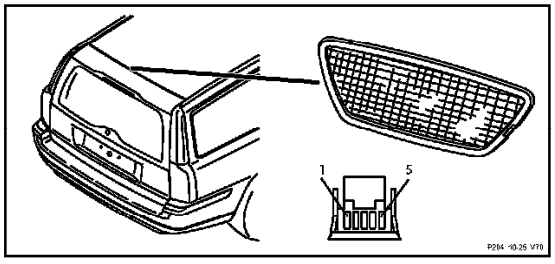
9/33 Left-Hand Heated Door Mirror

9/34 Right-hand heated door mirror



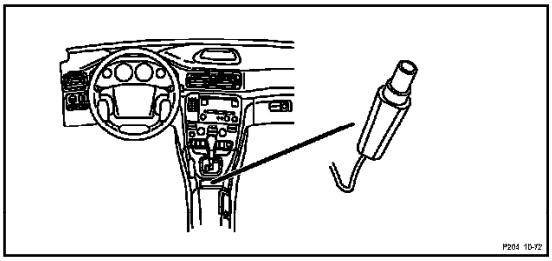
9/34 Right-Hand Heated Door Mirror

10/25 Ceiling light, cargo compartment



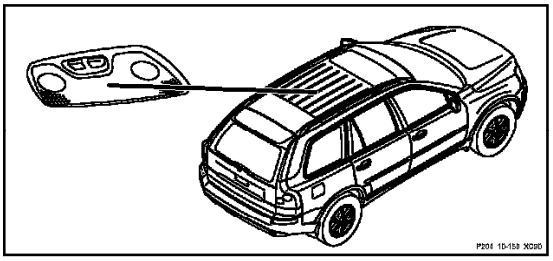
10/25 Ceiling Light, Cargo Compartment

10/72 Front ashtray lighting



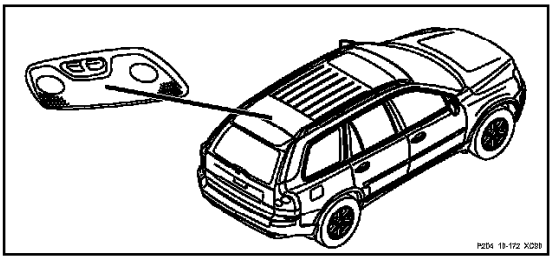
10/72 Front Ashtray Lighting

10/150 Reading light rear XC90



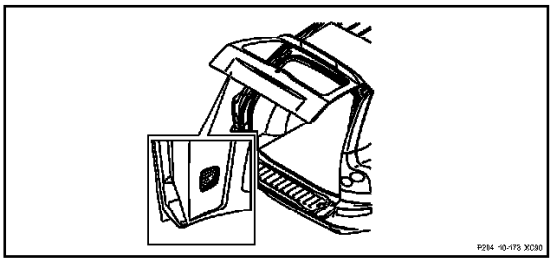
10/150 Reading Light Rear

10/172 Reading light, third row of seats



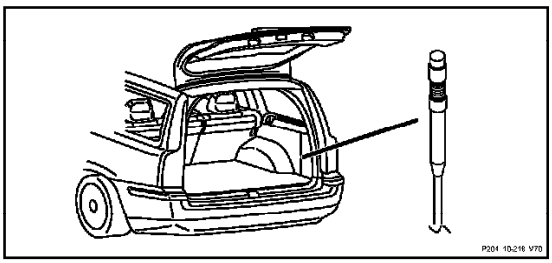
10/172 Reading Light, Third Row Of Seats

10/173 Cargo compartment lighting, tailgate



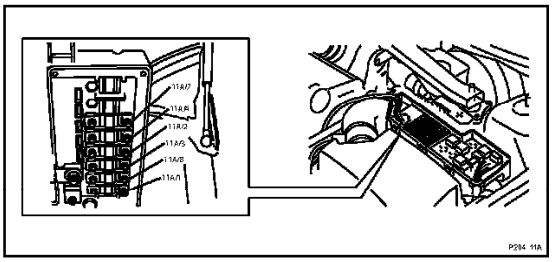
10/173 Cargo Compartment Lighting, Tailgate

10/218 Remote start indicator light



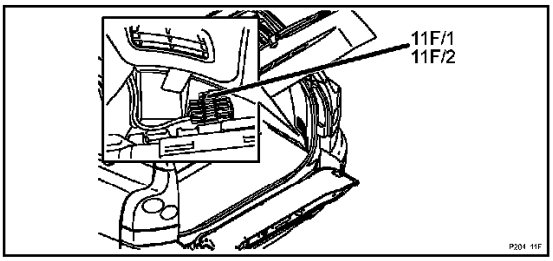
10/218 Remote Start Indicator Light

11A Main fuses in engine compartment fuse box



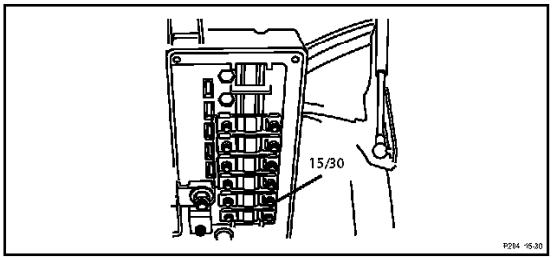
11A Main Fuses In Engine Compartment Fuse Box

11F Fuses in cargo compartment auxiliary fuse box



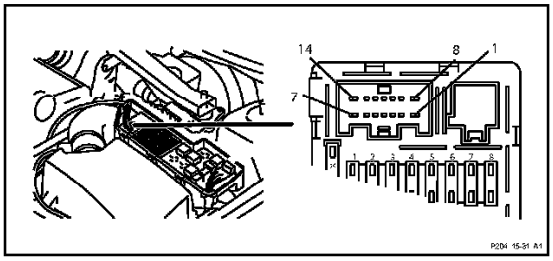
11F Fuses In Cargo Compartment Auxiliary Fuse Box

15/30 Connecting rail to 15/31



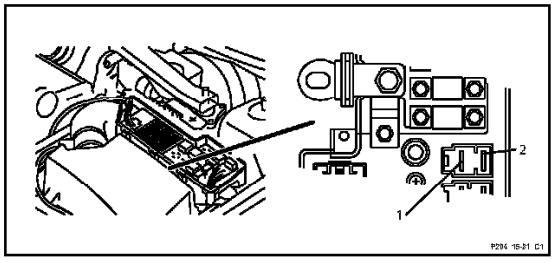
15/30 Connecting Rail To 15/31

15/31_A1 Engine compartment distribution box



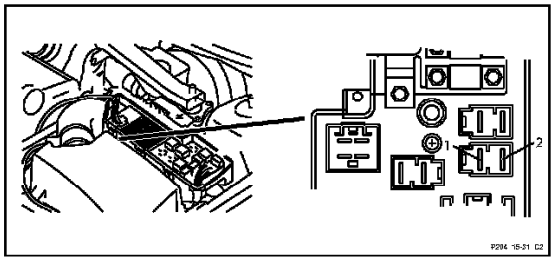
15/31_A1 Engine Compartment Distribution Box

15/31_C1 Engine compartment distribution box



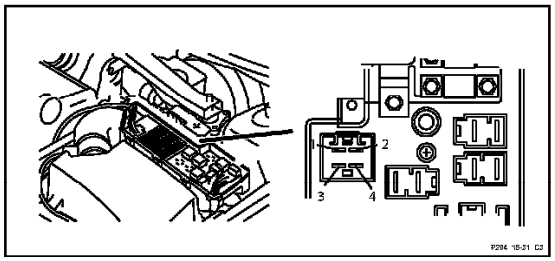
15/31_C1 Engine Compartment Distribution Box

15/31_C2 Engine compartment distribution box



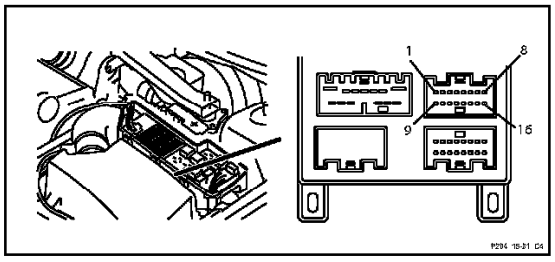
15/31_C2 Engine Compartment Distribution Box

15/31_C3 Engine compartment distribution box



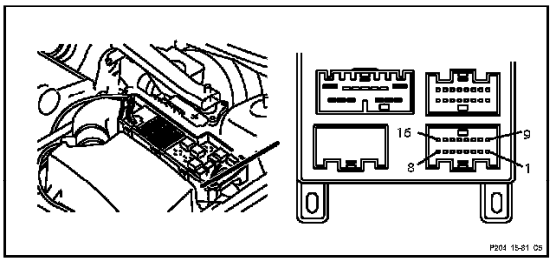
15/31_C3 Engine Compartment Distribution Box

15/31_C4 Engine compartment distribution box



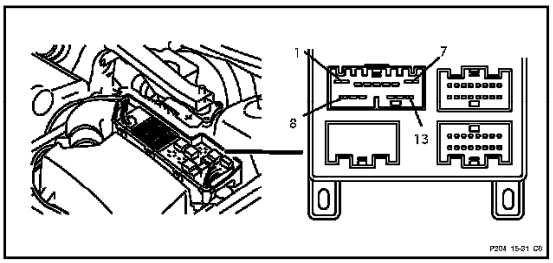
15/31_C4 Engine Compartment Distribution Box

15/31_C5 Engine compartment distribution box



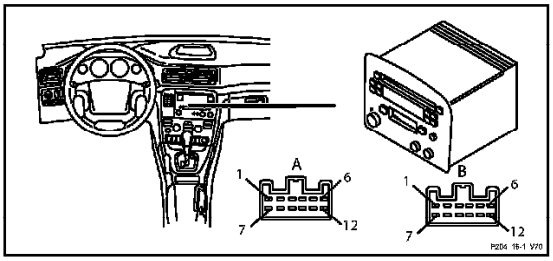
15/31_C5 Engine Compartment Distribution Box

15/31_C6 Engine compartment distribution box



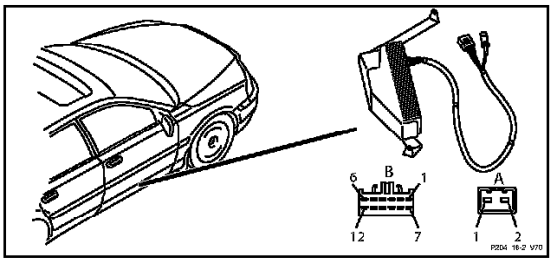
15/31_C6 Engine Compartment Distribution Box

16/1 Audio Module (AUM)



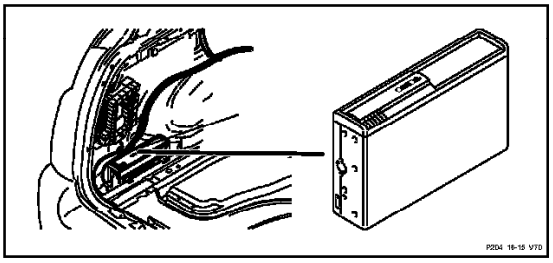
16/1 Audio Module (AUM)

16/2 Amplifier



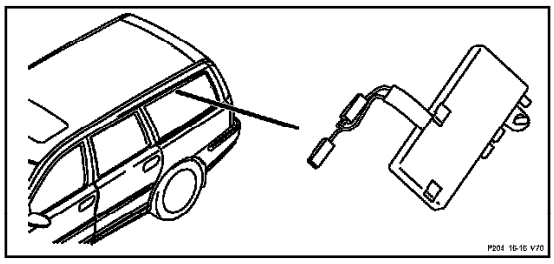
16/2 Amplifier

16/15 CD changer



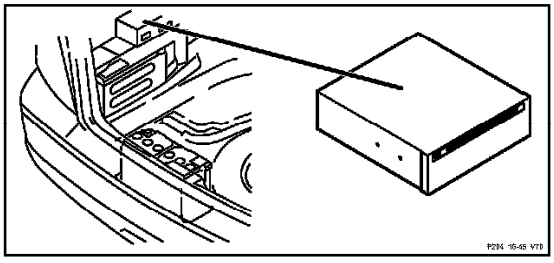
16/15 CD Changer

16/16 LH window antenna amplifier 1



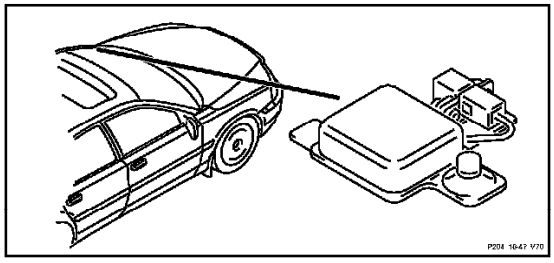
16/16 LH Window Antenna Amplifier 1

16/45 Road Traffic Information (RTI)



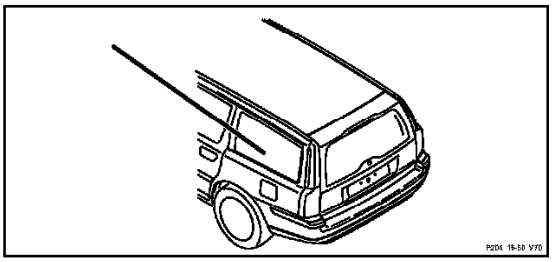
16/45 Road Traffic Information (RTI)

16/47 GPS antenna RTI



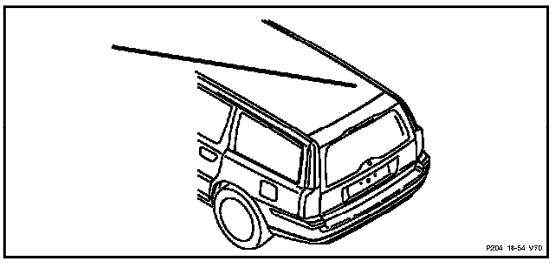
16/47 GPS Antenna RTI

16/50 Left-hand rear window antenna



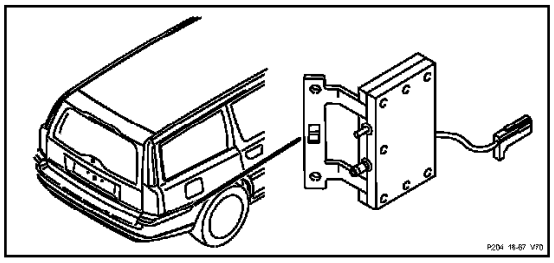
16/50 Left-hand Rear Window Antenna

16/54 Right-hand rear window antenna



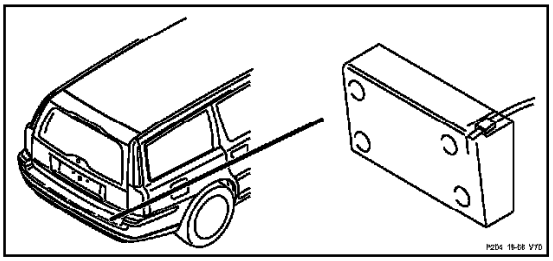
16/54 Right-hand Rear Window Antenna

16/67 Amplifier antenna, bumper



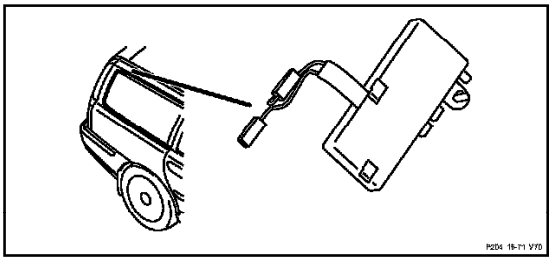
16/67 Amplifier Antenna, Bumper

16/68 Antenna, bumper



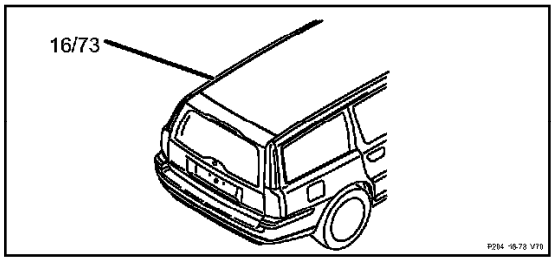
16/68 Antenna, Bumper

16/71 Window antenna amplifier 1 right



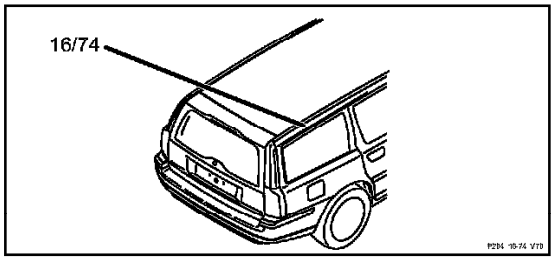
16/71 Window Antenna Amplifier 1 Right

16/73 Window antenna amplifier 2 left



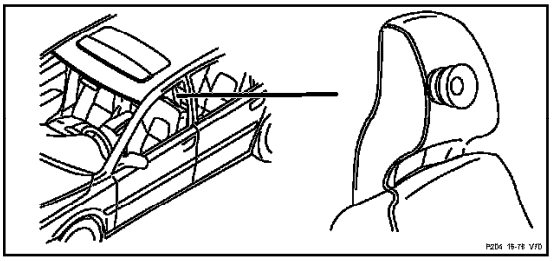
16/73 Window Antenna Amplifier 2 Left

16/74 Window antenna amplifier 2 right



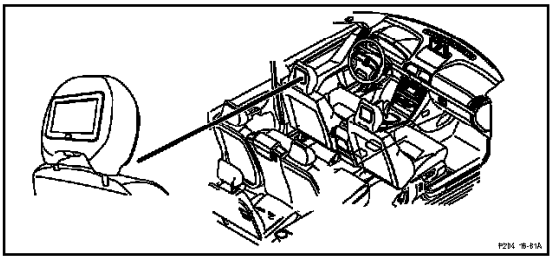
16/74 Window Antenna Amplifier 2 Right

16/78 Speaker, cellular telephone



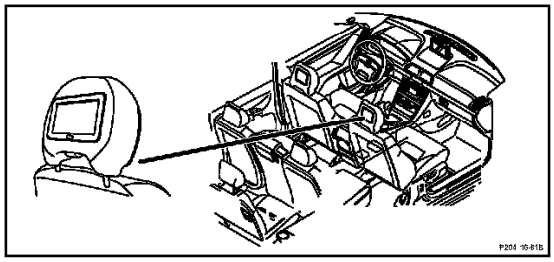
16/78 Speaker, Cellular Telephone

16/81A TV display, LH head restraint



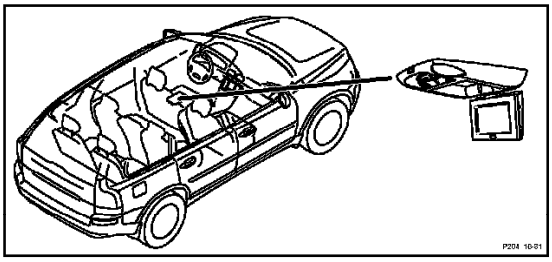
16/81A TV Display, LH Head Restraint

16/81B TV display, RH head restraint



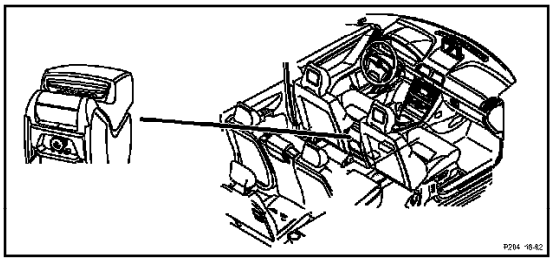
16/81B TV Display, RH Head Restraint

16/81 TV display, accessory



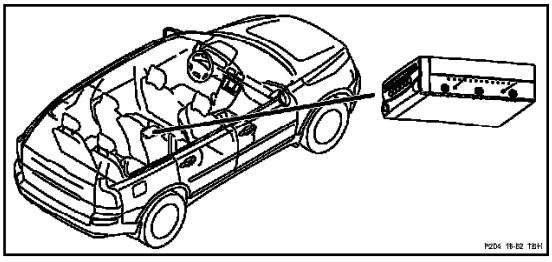
16/81 TV Display, Accessory

16/82 DVD-player



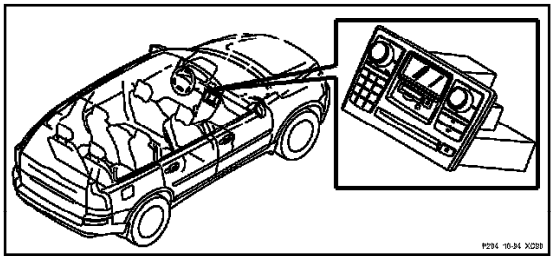
16/82 DVD-player

16/82 DVD-player accessory



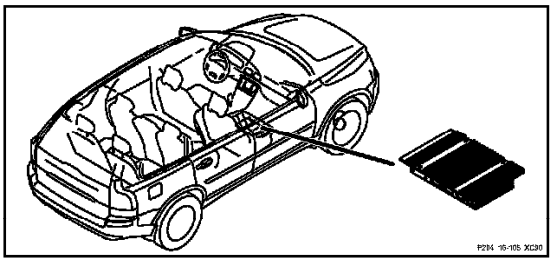
16/82 DVD-player Accessory

16/94 Infotainment Control Module (ICM)



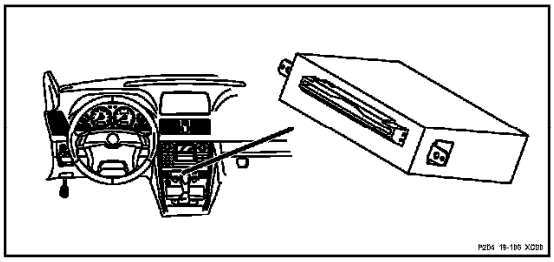
16/94 Infotainment Control Module (ICM)

16/105 Audio Module (AUD)



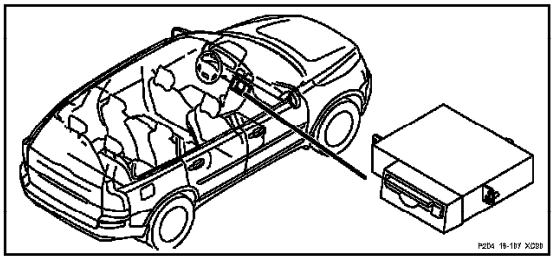
16/105 Audio Module (AUD)

16/106 Control module, CD player (MP2)



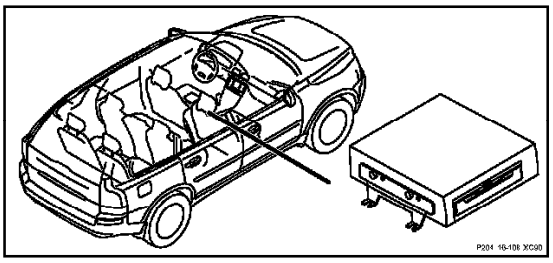
16/106 Control Module, CD Player (MP2)

16/107 Control module, MD player (MP1)



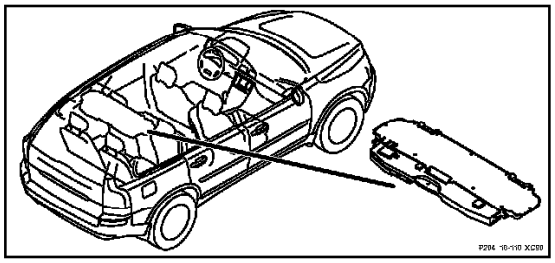
16/107 Control Module, MD Player (MP1)

16/108 Multimedia module (MMM)



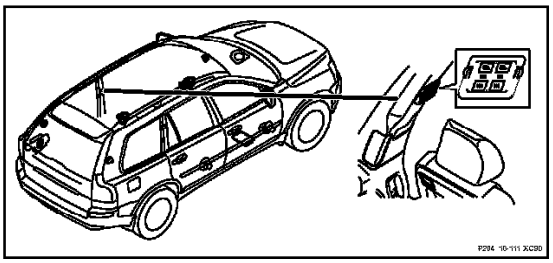
16/108 Multimedia Module (MMM)

16/110 Antenna control module (ATM)



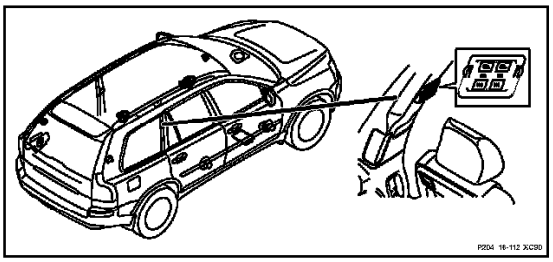
16/110 Antenna Control Module (ATM)

16/111 Socket, rear left headphones



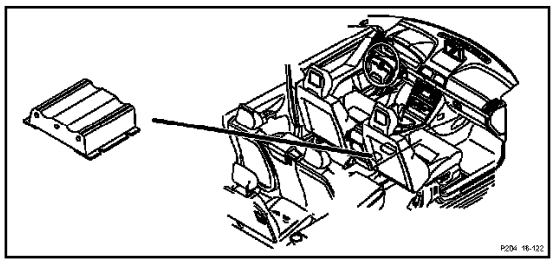
16/111 Socket, Rear Left Headphones

16/112 Socket, rear right headphones



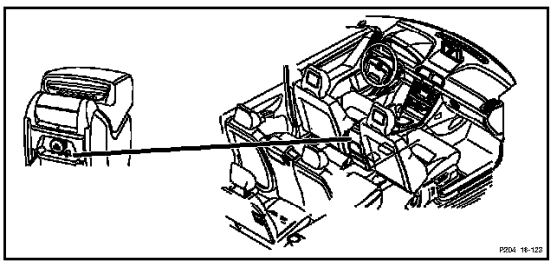
16/112 Socket, Rear Right Headphones

16/122 Rear Audio Separation module (RAS)



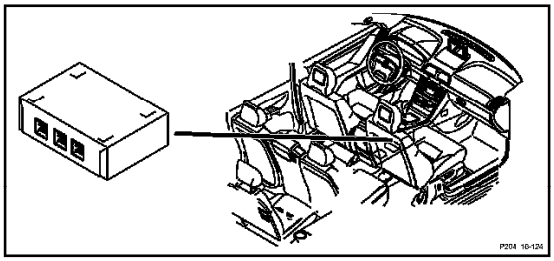
16/122 Rear Audio Separation Module (RAS)

16/123 External equipment socket (AUX)



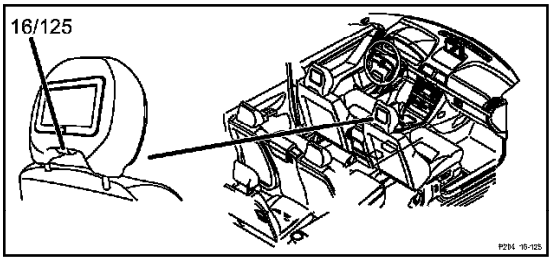
16/123 External Equipment Socket (AUX)

16/124 Rear Seat Entertainment module (RSE)



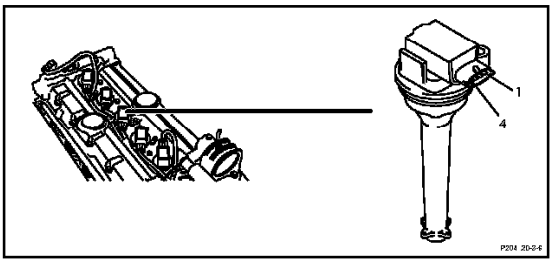
16/124 Rear Seat Entertainment Module (RSE)

16/125 IR transmitter



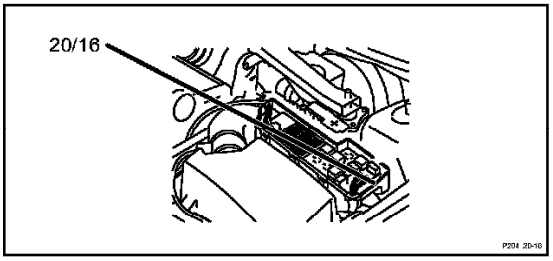
16/125 IR Transmitter

20/3-8 Spark plug and ignition coil



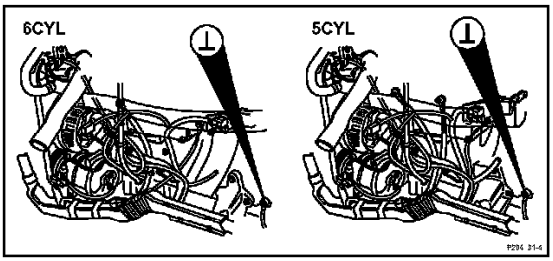
20/3-8 Spark Plug And Ignition Coil

20/16 Capacitor



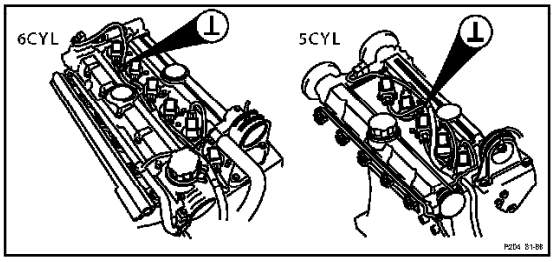
20/16 Capacitor

31/4 Ground connection, Engine



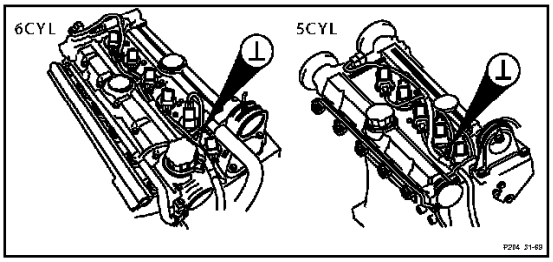
31/4 Ground Connection, Engine

31/88 Ground connection, Engine ignition coil group 1



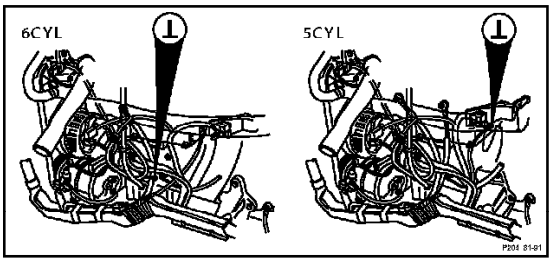
31/88 Ground Connection, Engine Ignition Coil Group 1

31/89 Ground connection, Engine ignition coil group 2



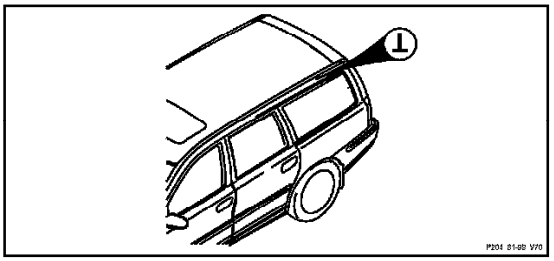
31/89 Ground Connection, Engine Ignition Coil Group 2

31/91 Ground connection, Engine



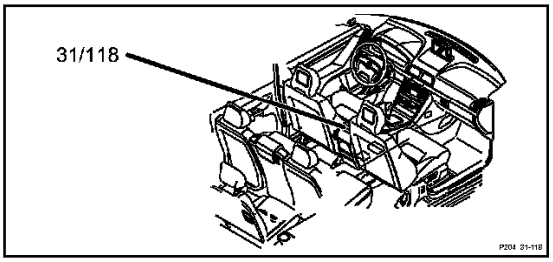
31/91 Ground Connection, Engine

31/99 Ground connection, Side window left



31/99 Ground Connection, Side Window Left

31/118 Ground connection, Between front seats under the armrest



31/118 Ground Connection, Between Front Seats Under The Armrest

53/### Junction Points

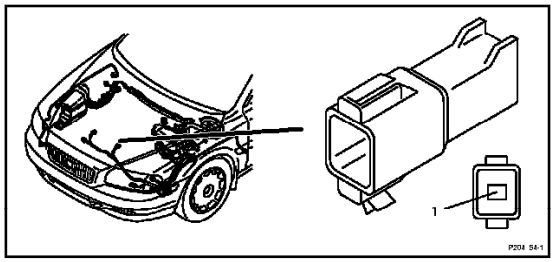
Junction Points

All references in the diagrams that begin with the numbers 53 (i.e 53/###) are references to the vehicle's Junction Points.

Diagrams for the Junctions Points can be found at Branching Points Diagrams. See: Power and Ground Distribution/Branching Point/Diagrams/Electrical Diagrams

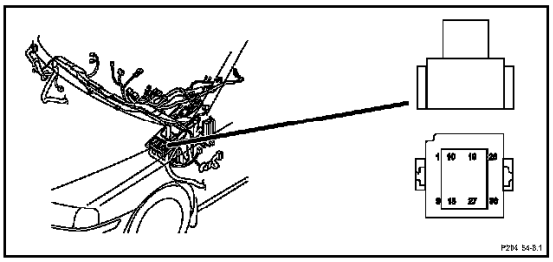
Locations for the Junctions Points can be found within the Harness Locations images at the vehicle level. See: Locations/Harness Locations

54/1 Connector



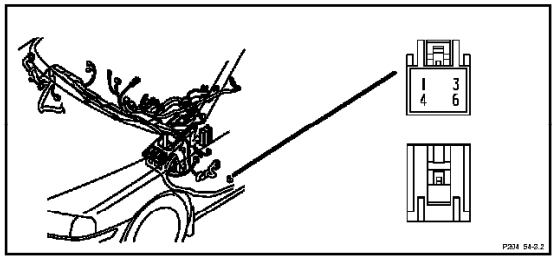
54/1 Connector

54/3.1 Connector



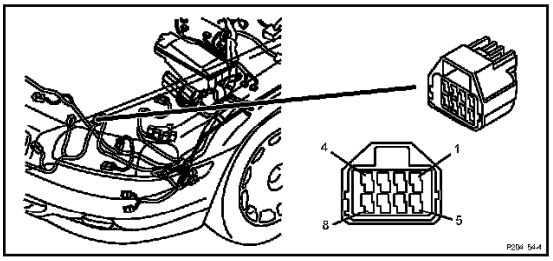
54/3.1 Connector

54/3.2 Connector



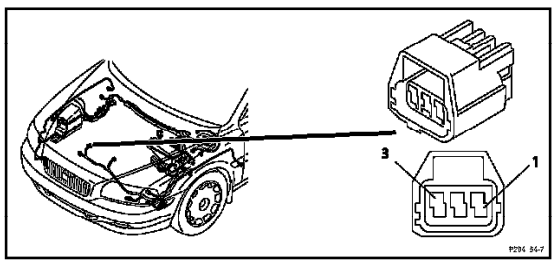
54/3.2 Connector

54/4 Connector



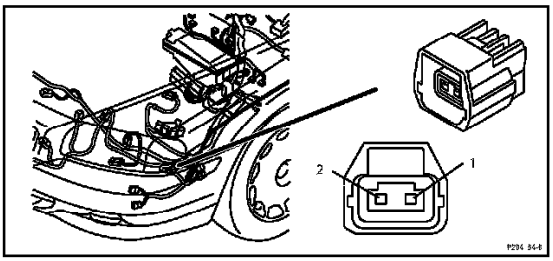
54/4 Connector

54/7 Connector



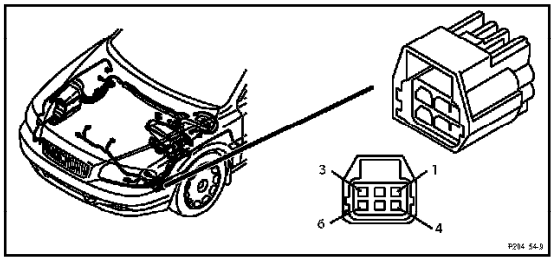
54/7 Connector

54/8 Connector



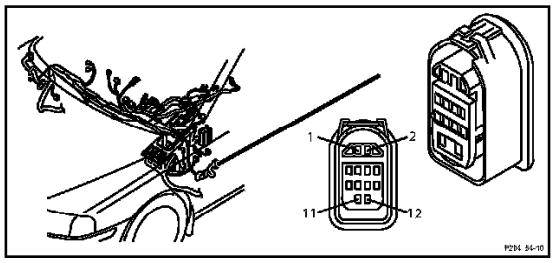
54/8 Connector

54/9 Connector



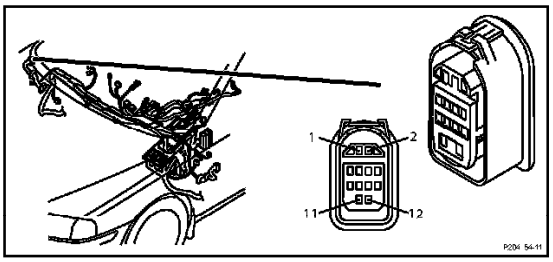
54/9 Connector

54/10 Connector



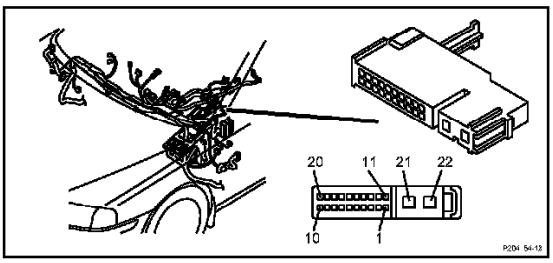
54/10 Connector

54/11 Connector



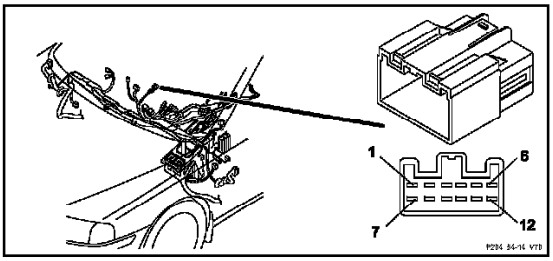
54/11 Connector

54/13 Connector



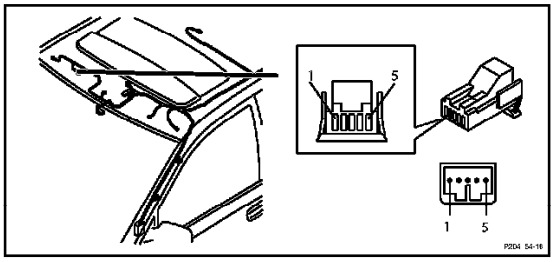
54/13 Connector

54/14 Connector



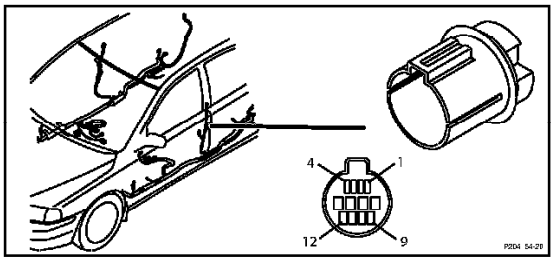
54/14 Connector

54/16 Connector



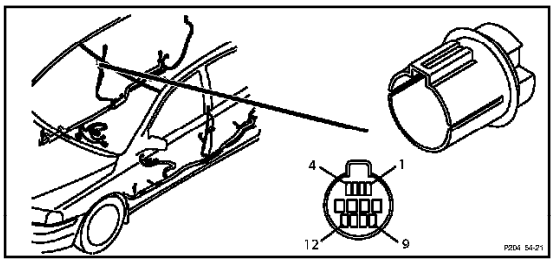
54/16 Connector

54/20 Connector



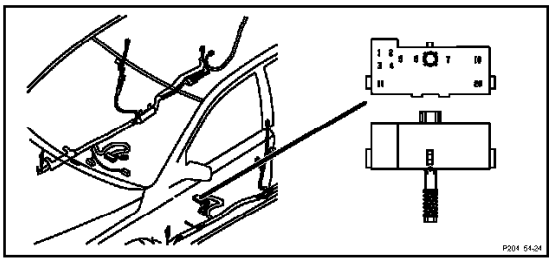
54/20 Connector

54/21 Connector



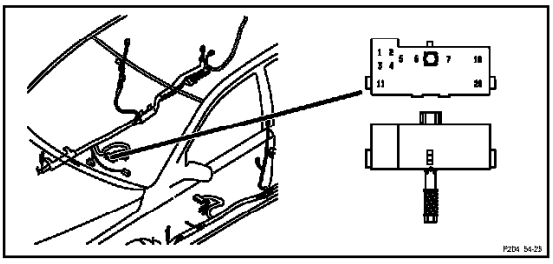
54/21 Connector

54/24 Connector



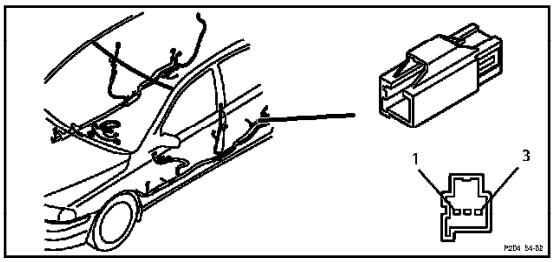
54/24 Connector

54/25 Connector



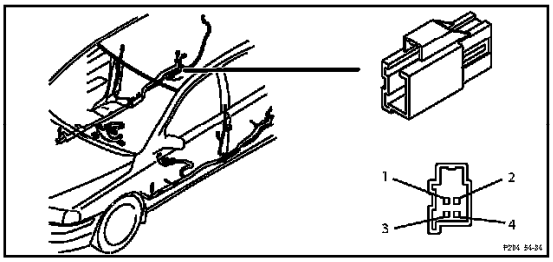
54/25 Connector

54/32 Connector



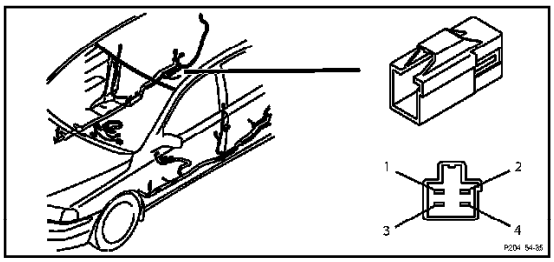
54/32 Connector

54/34 Connector



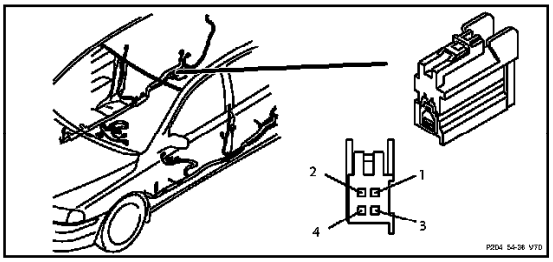
54/34 Connector

54/35 Connector



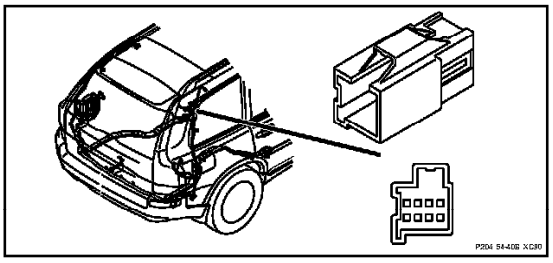
54/35 Connector

54/39 Connector



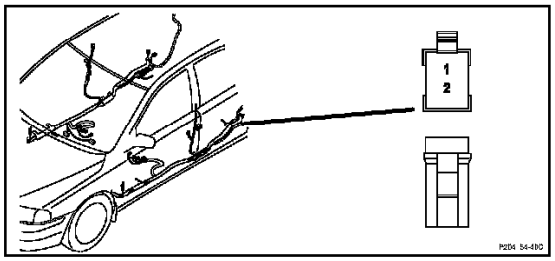
54/39 Connector

54/40B Connector



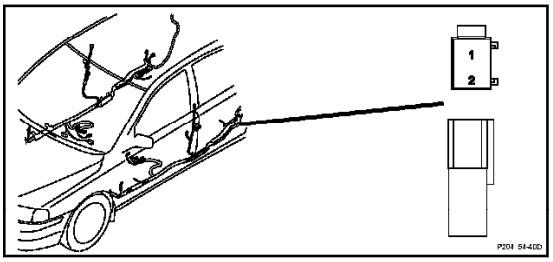
54/40B Connector

54/40C Connector



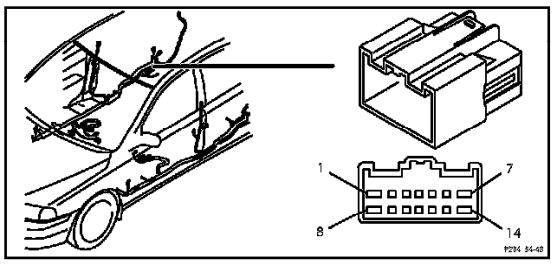
54/40C Connector

54/40D Connector



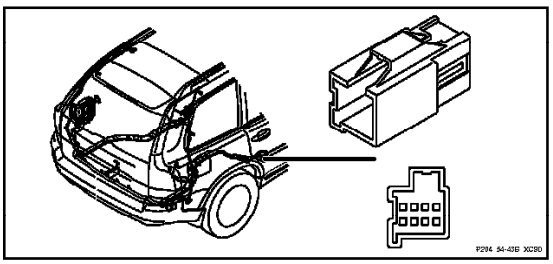
54/40D Connector

54/43 Connector



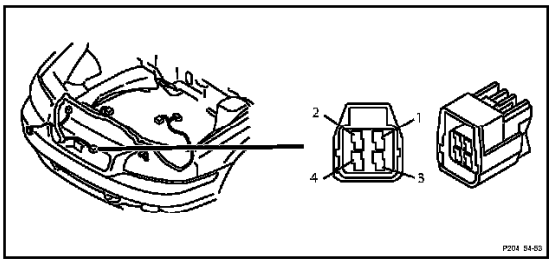
54/43 Connector

54/43B Connector



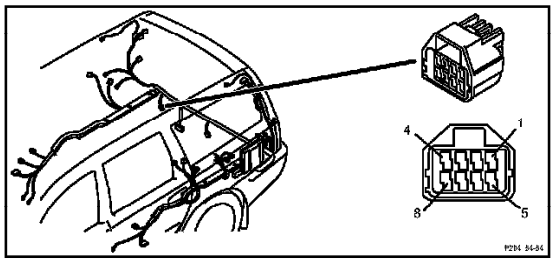
54/43B Connector

54/53 Connector



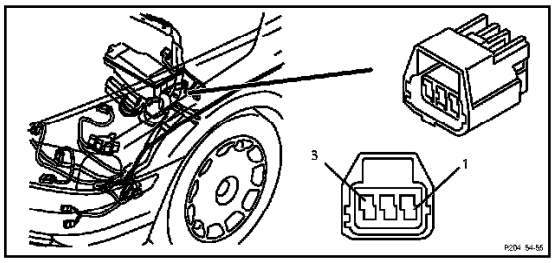
54/53 Connector

54/54 Connector



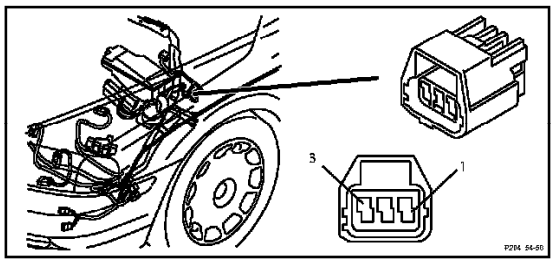
54/54 Connector

54/55 Connector



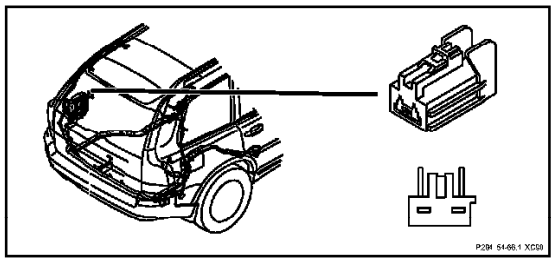
54/55 Connector

54/56 Connector



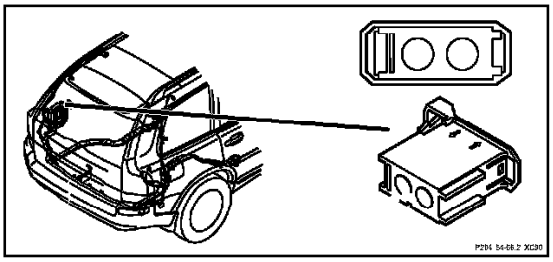
54/56 Connector

54/66.1 Connector



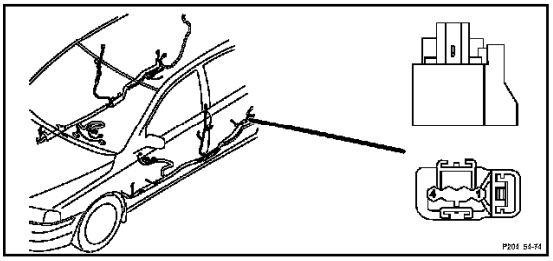
54/66.1 Connector

54/66.2 Connector



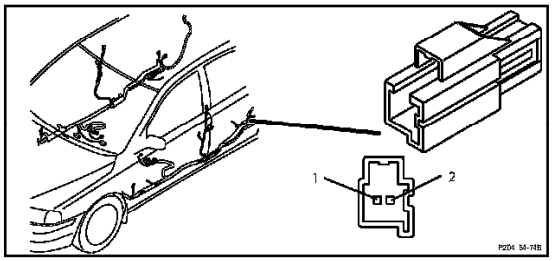
54/66.2 Connector

54/74 Connector



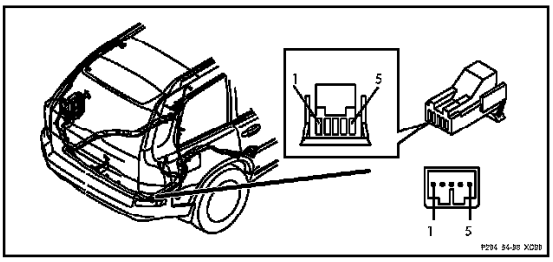
54/74 Connector

54/74B Connector



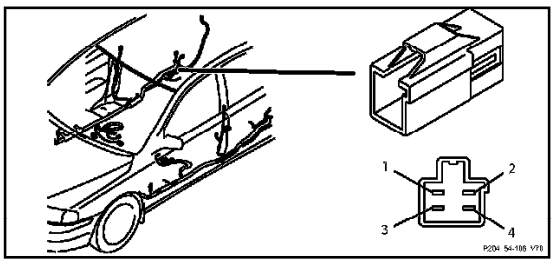
54/74B Connector

54/98 Connector



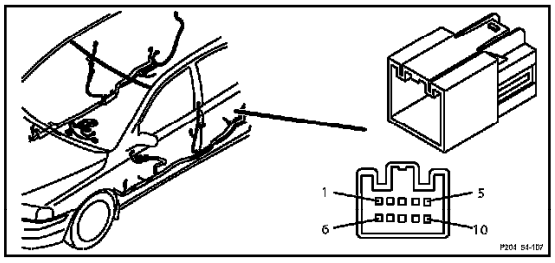
54/98 Connector

54/106 Connector



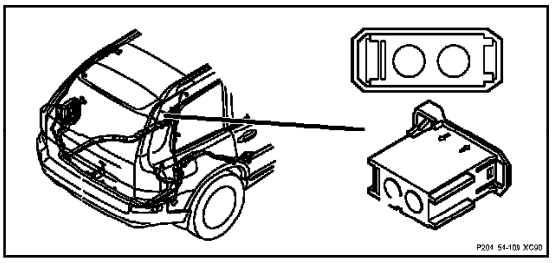
54/106 Connector

54/107 Connector



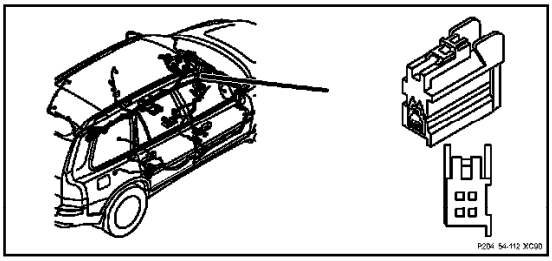
54/107 Connector

54/109 Connector



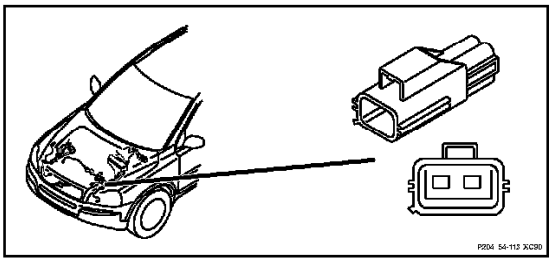
54/109 Connector

54/112 Connector



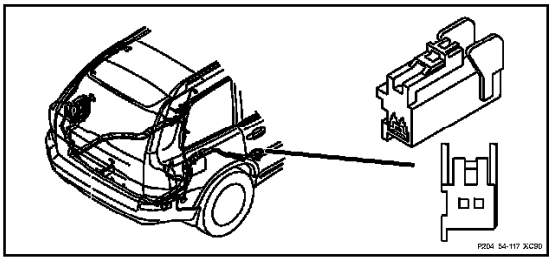
54/112 Connector

54/113 Connector



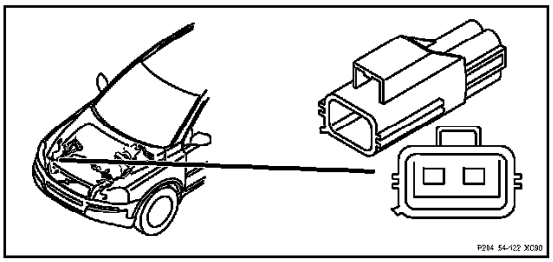
54/113 Connector

54/117 Connector



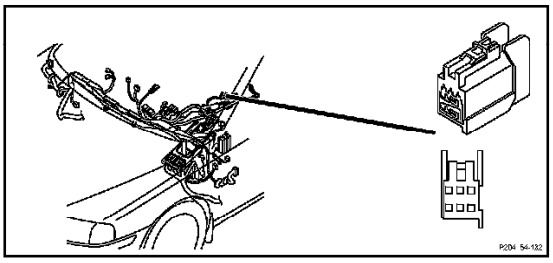
54/117 Connector

54/122 Connector



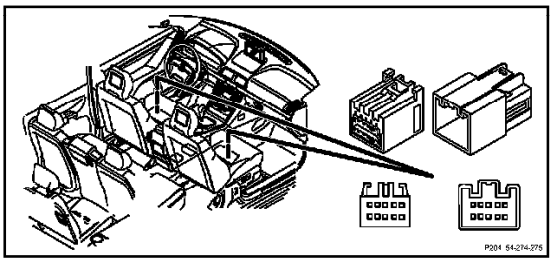
54/122 Connector

54/132 Connector



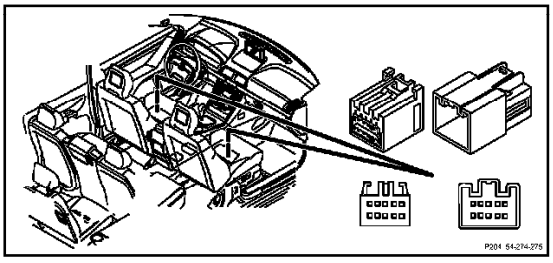
54/132 Connector

54/274 Connector
54/ 275 Connector



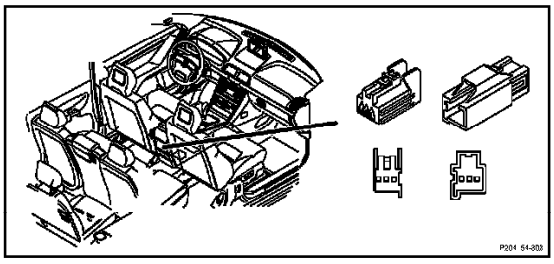
54/274, 275 Connector

54/274 Connector
54/ 275 Connector



54/274, 275 Connector

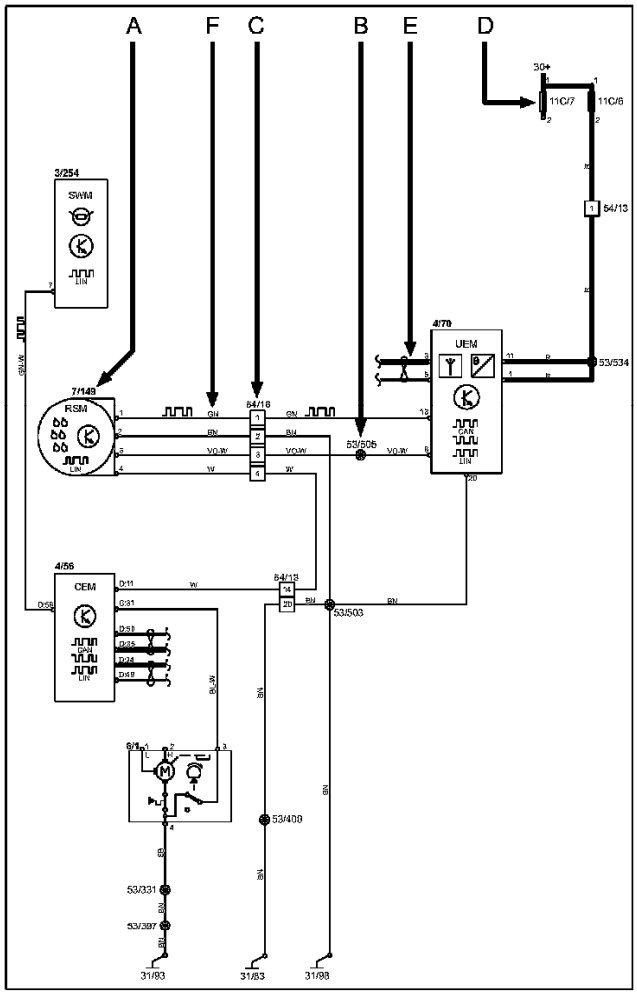
54/303 Connector



54/303 Connector

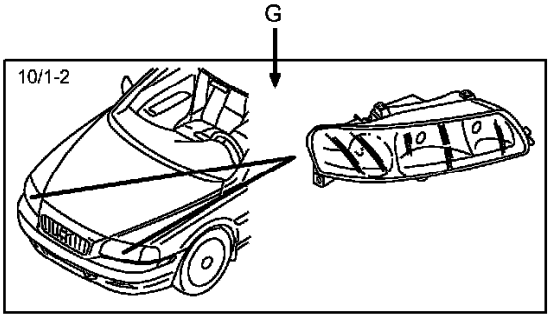
How to Use the Wiring Diagrams

How To Use The Wiring Diagrams



List of symbols

- = System voltage
- = Ground connection via wiring
- = Ground connection in component/chassis
- = Screened wire
- = Junction point
- = Twisted cable
- = Electrical connection
- = Variant
- = CAN communication
- = CAN high data signal (CAN H)
- = CAN low data signal (CAN L)
- = LIN communication
- = LIN communication
- = DIN cable, coaxial cable, etc.
- = Data communication
- = CAN communication
- = MOST communication
- = MOST communication
- = Connection with distribution box
- = Further connection to...
- = Connector between cable harnesses
- = Connector connected in component



The descriptions below apply in general to all wiring diagrams, although not all sections are necessarily contained here.

A. Component designation

Every component has a component designation that consists of two parts.

The first part is a type number that describes the type of component in question, for example 3/xx.

The second part of the designation is a serial number, for example. x/2.

Combined these give a component designation, for example 3/2.

There is a list of components at Component I.D List, where, with the help of the component designation, you can read off the name of the component, for example, 3/2 = light switch. See: Diagram Information and Instructions/Diagram Legend

List of type numbers

The list shows which type of component that respective type numbers refer to, for example, 3/x = switch, 6/x = electric motor, etc.

1 Battery
2 Relay
3 Switch
4 Control module
5 Driver information module
6 Electric motor
7 Sensor
8 Actuator
9 Heating element
10 Light
11 Fuse
15 Electrical distribution rail/box
16 Audio
17 Service/diagnostics
18 Contact reel
19 Meter
20 Ignition component/shunt
26 Converter
27 Optics
31 Ground connection
53 Junction point
54 Connector

B. Junction points

The wiring diagrams contain numbered Junction points, for example 53/352.

This information contains a section (Junction Points Diagrams) with a list of junction points. This list shows all the components that are connected to each junction point. See: Power and Ground Distribution/Branching Point/Diagrams/Electrical Diagrams

The location of the junction points is shown in the Vehicle Level Harness Locations images. See: Locations/Harness Locations

C. Connectors

Connectors provide a bridge between two cable harnesses and are described in the Vehicle Level Connector Views. See: Connector Views

D. Electrical distribution

Operation of the fuses and relays is shown in the "Power and Ground Distribution Diagrams". See: Power and Ground Distribution/Diagrams/Electrical Diagrams

E. Data communication

Today's cars are equipped with CAN, LIN & MOST networks that transmit information. Connections to these networks are shown in their entirety on the respective wiring diagram. Complete information on Data communication can be found in the "Information Bus". See: Powertrain Management/Computers and Control Systems/Information Bus/Diagrams/Electrical Diagrams

F. Abbreviations

A number of different abbreviations are used in the diagrams. These are explained in the "Wire Color Code And Other Abbreviations". See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

G. Component location

The appearance and location of components is described in alphabetical order at the Vehicle Level component locations A - Z Component List. See: Locations/Component Locations/A - Z Component List

List of Components By Component Number

List of Components By Component Number

1/1	Battery V70
1/1	Battery XC90
2/14	Relay, glow plug unit
2/22	Relay, climate control system
2/32	Main relay, engine management system
2/33	Relay, fuel system
2/35	Starter motor relay
2/64	Relay extra lights V70
2/64	Relay extra lights XC90
2/90	Relay, windshield wiper, low/high speed
2/91	Relay, intermittent wiping
2/138	Deadlock relay left rear door V70
2/138	Deadlock relay left rear door XC90
2/139	Deadlock relay right rear door V70
2/139	Deadlock relay right rear door XC90
2/182	Relay, high pressure headlight washer motor
2/191	Relay, remote parking heater start, radio signal
2/192	Relay (230 V) electric engine heater V70
2/192	Relay (230 V) electric engine heater XC90
2/237	Disconnect relay, rear speaker
3/1	Ignition V70
3/1	Ignition XC90
3/4	Switch unit cruise control (SWS) V70
3/4	Switch unit cruise control (SWS) XC90
3/6	Hazard warning flasher switch
3/8	Switch heated rear window/rear-view mirrors V70
3/8	Switch heated rear window/rear-view mirrors XC90
3/9	Contact brake light V70
3/9	Contact brake light XC90
3/10	Reversing light contact
3/25	Switch power sunroof V70
3/25	Switch power sunroof XC90
3/26	Power driver's seat module
3/27	Power passenger seat module
3/37	Contact horn V70
3/37	Contact horn XC90
3/47	Contact parking brake V70
3/47	Contact parking brake XC90
3/59	Control headlight adjustment V70
3/59	Control headlight adjustment XC90
3/60	Switch extra lights V70
3/60	Switch extra lights XC90
3/62	Hood alarm contact V70
3/62	Hood alarm contact XC90
3/71	Contacts gear selector AW50
3/71	Contacts gear selector 4T65AWD
3/73	Switch child safety lock PCL V70
3/73	Switch child safety lock PCL XC90
3/74	Lock unit left front door V70
3/74	Front left door lock unit XC90
3/75	Lock unit right front door V70
3/75	Lock unit front right door XC90
3/76	Lock unit left rear door V70
3/76	Left rear door lock unit XC90
3/77	Lock unit right rear door V70
3/77	Right rear door lock unit XC90
3/78	Tailgate lock unit V70
3/78	Tailgate lock unit XC90
3/80	Switch central locking system left V70
3/80	Switch central locking system left XC90
3/82	Switch central locking system right V70
3/82	Switch central locking system right XC90
3/85	Left rear door power window switch V70
3/85	Left rear door power window switch XC90
3/86	Right rear door power window switch V70
3/86	Right rear door power window switch XC90
3/91	Switch heated seat left V70
3/91	Switch heated seat left XC90
3/92	Switch heated seat right V70
3/92	Switch heated seat right XC90
3/93	Switch, left seat belt buckle V70
3/93	Switch, left seat belt buckle XC90
3/94	Switch, right seat belt buckle V70
3/94	Switch, right seat belt buckle XC90
3/95	Switch spin control V70
3/95	Switch spin control XC90
3/111	Light Switch Module (LSM) V70
3/111	Light Switch Module (LSM) XC90
3/112	Climate Control Module (CCM) V70
3/112	Climate Control Module (CCM) XC90
3/117	Ceiling light switch unit V70
3/117	Ceiling light switch unit XC90
3/126	Driver/Passenger Door Module (DDM)/(PDM) V70
3/126	Driver/Passenger Door Module (DDM)/(PDM) XC90
3/127	Passenger/Driver Door Module (PDM)/(DDM) V70
3/127	Passenger/Driver Door Module (PDM)/(DDM) XC90
3/131	Switch audio/cellular telephone V70
3/131	Switch audio/cellular telephone XC90
3/135	RTI switch
3/155	Mode selector automatic transmission V70
3/155	Mode selector automatic transmission XC90
3/156	Gear Selector Module (GSM) V70
3/156	Gear Selector Module (GSM) XC90
3/157	Switch airbag passenger side V70
3/157	Switch airbag passenger side XC90
3/171	Switch retractable rear-view mirrors V70
3/171	Switch retractable rear-view mirrors XC90
3/173	Switch private locking tailgate V70
3/173	Switch private locking tailgate XC90
3/174	Switch reduced alarm V70
3/174	Switch reduced alarm XC90
3/225	Switch unit continuous damping control (CCD)
3/254	Steering Wheel Module (SWM)
3/255	Position sensor driver's seat
3/256	Position sensor passenger seat
4/7	Combustion Preheater Module (CPM) V70
4/7	Combustion Preheater Module (CPM) XC90
4/9	Control module, Supplementary Restraint System (SRS)
4/16	Brake Control Module (BCM) V70
4/16	Brake Control Module (BCM) XC90
4/28	Transmission Control Module (TCM) V70
4/28	Transmission Control Module (TCM) XC90
4/31	Fan control module
4/33	Sunroof Control Module (SRM) V70
4/33	Sunroof Control Module (SRM) XC90
4/46	Engine Control Module (ECM) V70
4/46	Engine Control Module (ECM) XC90
4/50	Electronic Throttle Module (ETM)
4/52	Power Seat Module (PSM)
4/56	Central Electronic Module (CEM) V70
4/56	Central Electronic Module (CEM) XC90
4/58	Rear Electronic Module (REM) V70
4/58	Rear Electronic Module (REM) XC90
4/68	Steering Angle Sensor module (SAS)
4/70	Upper Electronic Module (UEM) V70
4/70	Upper Electronic Module (UEM) XC90
4/71	Cooling fan control module V70
4/71	Cooling fan control module XC90

1/1 Through 4/71

4/76	Remote control unit for garage door opener
4/78	Accessory Electronic Module (AEM) V70
4/78	Accessory Electronic Module (AEM) XC90
4/82	Differential Electronic Module (DEM) V70
4/82	Differential Electronic Module (DEM) XC90
4/83	Fuel pump control module
4/84	Suspension Module (SUM)
4/86	Parking Assistance Module (PAM) V70
4/86	Parking Assistance Module (PAM) XC90
4/99	Electronic power steering control module
4/106	Control module, remote parking heater start
4/107	Control module, parking heater, Call start
4/110	Trailer Module V70
4/110	Trailer Module XC90
5/1	Driver Information Module (DIM) V70
5/1	Driver Information Module (DIM) XC90
6/1	Windshield wiper motor V70
6/1	Windshield wiper motor XC90
6/3	Right-hand headlight wiper motor
6/4	Left-hand headlight wiper motor
6/15	Sunroof motor V70
6/15	Sunroof motor XC90
6/16	Driver seat motor, backrest angle
6/17	Driver seat motor, up/down front edge
6/18	Driver seat motor, up/down rear edge
6/19	Driver seat motor, forward/backward
6/20	Passenger seat motor, forward/backward
6/25	Starter motor V70
6/25	Starter motor XC90
6/26	Alternator V70
6/26	Alternator XC90
6/28	Motor, passenger compartment fan
6/29	Motor cooling fan V70
6/29	Motor cooling fan XC90
6/31	Feed pump, ejectors
6/32	Rear window wiper motor V70
6/32	Rear window wiper motor XC90
6/33	Fuel pump V70
6/33	Fuel pump XC90
6/35	Fuel pump auxiliary heater V70
6/35	Fuel pump auxiliary heater XC90
6/37	Lock motor fuel filler cover V70
6/37	Lock motor fuel filler cover XC90
6/38	Left-hand headlight level adjustment motor
6/39	Right-hand headlight adjustment motor
6/44	Cooling fan electronics box engine compartment V70
6/44	Cooling fan electronics box engine compartment XC90
6/48	Damper Motor Module (DMM), recirculation
6/58	Front left power window motor V70
6/58	Front left power window motor XC90
6/60	Front right power window motor V70I
6/60	Front right power window motor XC90
6/62	Left power door mirror V70
6/62	Left power door mirror XC90
6/63	Right power door mirror V70
6/63	Right power door mirror XC90
6/64	Passenger seat motor, backrest angle
6/65	Passenger seat motor, up/down front edge
6/66	Passenger seat motor, up/down rear edge
6/67	Pump fuel leakage control, V70I
6/67	Pump fuel leakage control, XC90
6/69	Damper Motor Module (DMM), ventilation/floor/defroster
6/71	Valve speed-dependent power steering, XC90
6/73	Coolant pump auxiliary heater V70
6/73	Coolant pump auxiliary heater XC90
6/76	Climate control system, rear
6/92	Left rear power window motor V70
6/92	Left rear power window motor XC90
6/93	Right rear power window motor V70
6/93	Right rear power window motor XC90
6/95	Damper Motor Module (DMM), temperature, left-hand side
6/96	Damper Motor Module (DMM), temperature, right-hand side
6/102	Damper Motor Module (DMM), defroster
6/103	Damper Motor Module (DMM), floor/ventilation
6/104	Washer motor headlight high pressure V70
6/104	Washer motor headlight high pressure XC90
6/105	Fuel distributor, gas
6/114	Vacuum pump
6/120	Engine throttle body V70
6/120	Engine throttle body XC90
6/127	Washer motor V70
6/127	Washer motor XC90
7/4	Brake fluid level sensor
7/5	Sensor washer fluid level V70
7/5	Sensor washer fluid level XC90
7/6	Oil pressure monitor V70
7/6	Oil pressure monitor XC90
7/8	Pressure sensor climate control system V70
7/8	Pressure sensor climate control system XC90
7/10	Interior temperature sensor
7/11	Sensor ambient temperature V70
7/11	Sensor ambient temperature XC90
7/12	Solar sensor, dusk sensor and indication alarm V70
7/12	Solar sensor, dusk sensor and indication alarm XC90
7/15	Heated oxygen sensor
7/16	Sensor coolant temperature V70
7/16	Sensor coolant temperature XC90
7/17	Mass airflow sensor (MAF) V70
7/17	Mass airflow sensor (MAF) XC90
7/23	Knock sensor rear
7/24	Front knock sensor
7/25	Pulse sensor V70 Diesel
7/25	Pulse sensor XC90 Diesel
7/25	Pulse sensor V70 Gasoline
7/25	Pulse sensor XC90 Gasoline
7/31	Left-hand front ABS sensor
7/32	Right-hand front ABS sensor
7/35	Oil level sensor
7/41	Temperature sensor, evaporator
7/51	Sensor accelerator V70
7/51	Sensor accelerator XC90
7/56	Left-hand rear ABS sensor
7/57	Right rear ABS sensor
7/61	Sensor input rpm AW50
7/61	Sensor input rpm 4T65AWD
7/62	Sensor output rpm AW50
7/62	Sensor output rpm 4T65AWD
7/73	Sensor coolant level V70
7/73	Sensor coolant level XC90
7/74	Sensor oil temperature automatic transmission AW50
7/74	Sensor oil temperature automatic transmission 4T65AWD
7/81	Pressure sensor, intake manifold
7/82	Heated oxygen sensor, diagnosis 1
7/87	Acceleration sensor, Four-C, front left
7/88	Acceleration sensor, Four-C, front right
7/89	Acceleration sensor, Four-C, rear left

7/91	Sensor steering wheel angle V70
7/91	Sensor steering wheel angle XC90
7/93	Occupant Weight Sensor (OWS)
7/100	Inclination Sensor Module (ISM) V70
7/100	Inclination Sensor Module (ISM) XC90
7/103	Heated oxygen sensor 3
7/105	Sensor ambient temperature engine control module V70
7/105	Sensor ambient temperature engine control module XC90
7/108	Side impact sensor rear left V70
7/108	Side impact sensor rear left XC90
7/109	Side impact sensor rear right V70
7/109	Side impact sensor rear right XC90
7/110	Left-hand seat temperature sensor
7/111	Right-hand seat temperature sensor
7/115	Side impact sensor front left V70
7/115	Side impact sensor front left XC90
7/116	Side impact sensor front right V70
7/116	Side impact sensor front right XC90
7/118	Acceleration sensor, shock absorber, Four-C, front left
7/119	Acceleration sensor, shock absorber, Four-C, front right
7/120	Angle sensor Four-C/Bi-Xenon rear left V70
7/120	Angle sensor Four-C/Bi-Xenon rear left XC90
7/121	Angle sensor Four-C/Bi-Xenon rear right
7/122	Mass Movement Sensor (MMS), front V70
7/122	Mass Movement Sensor (MMS), front XC90
7/123	Sensor clutch pedal V70
7/123	Sensor clutch pedal XC90
7/124	Sensor brake pedal V70
7/124	Sensor brake pedal XC90
7/129	Brake pressure sensor 2 V70
7/129	Brake pressure sensor 2 XC90
7/130	Sensor fuel level ejector side V70
7/130	Sensor fuel level ejector side XC90
7/131	Parking assistance sensor, rear 1
7/132	Parking assistance sensor, rear 2
7/133	Parking assistance sensor, rear 3
7/134	Parking assistance sensor, rear 4
7/135	Glass breakage sensor, left-hand
7/136	Glass breakage sensor, right-hand
7/137	Glass breakage sensor, tailgate
7/139	Brake pressure sensor 1 V70
7/139	Brake pressure sensor 1 XC90
7/143	Sensor fuel level pump side V70
7/143	Sensor fuel level pump side XC90
7/149	Rain Sensor Module (RSM) V70
7/149	Rain Sensor Module (RSM) XC90
7/153	Sensor, fuel level LPG
7/156	Pressure and temperature sensor CNG
7/156	Pressure and temperature sensor fuel
7/158	Mass Movement Sensor (MMS), rear
7/159	Air Quality Sensor (AQS)
7/162	Pressure sensor fuel lines V70
7/162	Pressure sensor fuel lines XC90
7/164	Body Sensor Cluster (BSC)
7/165	Pressure and temperature sensor, intake manifold
7/172	Position sensor, camshaft, intake side
7/173	Position sensor camshaft exhaust side Diesel
7/173	Position sensor camshaft exhaust side Gasoline
7/175	Weight sensor passenger seat, seat belt reminder
7/178	RH front impact sensor
7/179	LH front impact sensor
7/201	Pressure and temperature sensor, gas
7/204	Parking assistance sensor, front 5 LHD
7/205	Parking assistance sensor, front 6 LHD
7/206	Parking assistance sensor, front 7 LHD
7/207	Parking assistance sensor, front 8 LHD
8/3	Electromagnetic clutch climate control system V70
8/3	Electromagnetic clutch climate control system XC90
8/6-10	Injectors Diesel
8/6-11	Injectors Gasoline
8/17	EGR valve, Diesel V70
8/17	EGR valve, Diesel XC90
8/18	EVAP valve V70
8/18	EVAP valve XC90
8/19	Solenoid, variable valve time, inlet
8/20	Shock absorber, Four-C, front left
8/21	Shock absorber, Four-C, front right
8/22	Shock absorber, Four-C, rear left
8/23	Shock absorber, Four-C, rear right
8/28	Turbo control valve V70
8/28	Turbo control valve XC90
8/30	Driver side airbag igniter
8/31	Igniter airbag passenger side V70
8/31	Igniter airbag passenger side XC90
8/32	Igniter airbag passenger side stage 2 V70
8/32	Igniter airbag passenger side stage 2, XC90
8/33	Igniter belt tensioner front left V70
8/33	Igniter belt tensioner front left XC90
8/34	Igniter belt tensioner front right V70
8/34	Igniter belt tensioner front right XC90
8/36	Shift lock solenoid
8/37	Automatic transmission AW50
8/37	Automatic transmission 4T65AWD
8/38	Gearshifting solenoid 1 AW50
8/38	Gearshifting solenoid 1 4T65AWD
8/39	Gearshifting solenoid 2 AW50
8/39	Gearshifting solenoid 2 4T65AWD
8/40	Lock-up solenoid AW50
8/40	Lock-up solenoid 4T65AWD
8/41	Pressure solenoid AW50
8/41	Pressure solenoid 4T65AWD
8/46	Activation unit DSTC V70
8/46	Activation unit DSTC XC90
8/51	Igniter side airbag front left V70
8/51	Igniter side airbag front left XC90
8/52	Igniter airbag front right V70
8/52	Igniter airbag front right XC90
8/55	Rear left belt tensioner igniter
8/56	Rear right belt tensioner igniter
8/61	Driver side airbag igniter step 2
8/62	Igniter belt tensioner center rear V70
8/62	Igniter belt tensioner center rear XC90
8/64	Solenoid valve engine mounting, Diesel V70
8/64	Solenoid valve engine mounting, Diesel XC90
8/66	Igniter inflatable curtain left V70
8/66	Igniter inflatable curtain left XC90
8/67	Igniter inflatable curtain right V70
8/67	Igniter inflatable curtain right XC90
8/71	Throttle solenoid
8/72	Shift solenoid 3
8/73	Shift solenoid 4
8/74	Shift solenoid 5
8/75	Valve, fuel cut-off DFCO
8/76	Gas tank valve
8/78	Oil pressure sensor
8/79	Valve LPG
8/81	Solenoid variable valve timing exhaust V70

7/91 Through 8/81

8/81	Solenoid variable valve timing exhaust XC90
8/82	Solenoid variable turbo geometry, Diesel V70
8/82	Solenoid variable turbo geometry, Diesel XC90
8/84	Switch, vacuum pump
8/85	Thermal switch and fuel filter heating V70
8/85	Thermal switch and fuel filter heating XC90
8/88	Solenoid, gas tank CNG rear
8/89	Solenoid, fuel tank CNG front left
8/90	Solenoid, fuel tank CNG front right
8/94	Left-hand belt tensioner igniter, third row of seats
8/95	Right-hand belt tensioner igniter, third row of seats
8/96	Left-hand inflatable curtain igniter, third row of seats
8/97	Right-hand inflatable curtain igniter, third row of seats
8/99	Igniter, steering column
8/111	Solenoid valve, high-pressure diesel
8/123	Igniter airbag driver side stage 3, XC90
8/124	Igniter passenger side airbag stage 3, XC90
8/134	Solenoid, reverse interlock, manual
9/1	Outlet 12V front V70
9/1	Outlet 12V front XC90
9/2	Heated rear window V70
9/2	Heated rear window XC90
9/12	Seat Heater Module (SHM), left-hand
9/13	Seat Heater Module (SHM), right-hand
9/16	Left-hand backrest heating element
9/17	Right-hand backrest heating element
9/18	Left-hand seat heating element
9/19	Right-hand seat heating element
9/25	Outlet 12V rear V70
9/25	Outlet 12V rear XC90
9/30	Auxiliary heater V70
9/30	Auxiliary heater XC90
9/32	PTC resistor - air preheating
9/33	Left-hand heated door mirror
9/34	Right-hand heated door mirror
10/1	Front left lamp housing V70
10/1	Front left lamp housing XC90
10/2	Front right lamp housing V70
10/2	Front right lamp housing XC90
10/3	License plate lighting V70
10/3	License plate lighting, XC90
10/5	Front left fog light V70
10/5	Front left fog light XC90
10/6	Front right fog light V70
10/6	Front right fog light XC90
10/11	Front left running/parking light V70
10/11	Front left running/parking light XC90
10/12	Front right running/parking light V70
10/12	Front right running/parking light XC90
10/13	Front left direction indicator V70
10/13	Front left direction indictor XC90
10/14	Front right direction indicator V70
10/14	Front right direction indicator XC90
10/15	Direction indicator left front fender V70
10/15	Direction indicator, left front door, XC90
10/16	Direction indicator right front fender V70
10/16	Direction indicator, right front door, XC90
10/17	Lamp housing rear right V70
10/17	Rear right lamp housing XC90
10/18	Rear left lamp housing V70
10/18	Rear left lamp housing XC90
10/19	Extra brake light V70
10/19	Extra brake light XC90
10/25	Ceiling light, cargo compartment
10/29	Lighting glove compartment V70
10/29	Lighting glove compartment XC90
10/43	Brake light right V70
10/43	Brake light right XC90
10/44	Tail light 1 right V70
10/44	Tail light 1 right XC90
10/45	Tail light 2 right V70
10/46	Fog light rear right V70
10/46	Fog light rear right XC90
10/47	Right rear direction indicator V70
10/47	Right rear direction indicator XC90
10/48	Back-up light right V70
10/48	Back-up light right XC90
10/50	Brake light left V70
10/50	Brake light left XC90
10/51	Tail light 1 left V70
10/51	Tail light 1 left XC90
10/52	Tail light 2 left V70
10/53	Fog light rear left V70
10/53	Fog light rear left XC90
10/54	Left rear direction indicator V70
10/54	Left rear direction indicator XC90
10/55	Back-up light left V70
10/55	Back-up light left XC90
10/64	High beam right V70
10/64	High beam right XC90
10/65	Extra light front right V70
10/65	Extra light front right XC90
10/66	Low beam right V70
10/66	Low beam right XC90
10/68	High beam left V70
10/68	High beam left XC90
10/69	Extra light front left V70
10/69	Extra light front left XC90
10/70	Low beam left V70
10/70	Low beam left XC90
10/71	Side running light front left V70
10/71	Side running light front left XC90
10/72	Front ashtray lighting
10/73	Side running light front right V70
10/73	Side running light front right XC90
10/114	Lighting vanity mirror left V70
10/114	Lighting vanity mirror left XC90
10/115	Lighting vanity mirror right V70
10/115	Lighting vanity mirror right XC90
10/125	Courtesy lighting front left V70
10/125	Courtesy lighting front left XC90
10/126	Courtesy lighting front right V70
10/126	Courtesy lighting front right XC90
10/148	Lighting door mirror left V70
10/148	Lighting door mirror left XC90
10/149	Lighting door mirror right V70
10/149	Lighting door mirror right XC90
10/150	Reading light rear V70
10/150	Reading light rear XC90
10/151	Left-hand rear door switch lighting
10/152	Right-hand rear door switch lighting
10/172	Reading light, third row of seats
10/173	Cargo compartment lighting, tailgate
10/218	Remote start indicator light
11A	Main fuses in engine compartment fuse box
11B	Main fuses in fuse box engine compartment V70
11B	Main fuses in fuse box engine compartment XC90
11C	Fuses in fuse box passenger compartment V70

8/81 Through 11C

11C	Fuses in fuse box passenger compartment XC90
11E	Main fuses at battery V70
11E	Main fuses at battery XC90
11F	Fuses in cargo compartment auxiliary fuse box
15/30	Connecting rail to 15/31
15/31_A1	Engine compartment distribution box
15/31_C1	Engine compartment distribution box
15/31_C2	Engine compartment distribution box
15/31_C3	Engine compartment distribution box
15/31_C4	Engine compartment distribution box
15/31_C5	Engine compartment distribution box
15/31_C6	Engine compartment distribution box
16/1	Audio Module (AUM)
16/2	Amplifier
16/3	Speaker front door right V70
16/3	Speaker front door right XC90
16/4	Speaker front door left V70
16/4	Speaker front door left XC90
16/5	Speaker rear door right V70
16/5	Speaker rear door right XC90
16/6	Speaker rear door left V70
16/6	Speaker rear door left XC90
16/10	Horn 1 V70
16/10	Horn 1 XC90
16/11	Horn 2 V70
16/15	CD changer
16/16	LH window antenna amplifier 1
16/26	Speaker dashboard center V70
16/26	Speaker dashboard center XC90
16/35	Siren Control Module (SCM) V70
16/35	Siren Control Module (SCM) XC90
16/36	TV receiver V70
16/45	Road Traffic Information (RTI)
16/46	RTI display V70
16/46	Multimedia display, XC90
16/47	GPS antenna RTI
16/50	Left-hand rear window antenna
16/54	Right-hand rear window antenna
16/55	Treble speaker front door left V70
16/55	Treble speaker front door left XC90
16/56	Treble speaker front door right V70
16/56	Treble speaker front door right XC90
16/57	Speaker D-pillar left V70
16/57	Speaker D-pillar left XC90
16/58	Speaker D-pillar right V70
16/58	Speaker D-pillar right XC90
16/59	Antenna, remote control
16/60	Phone Module (PHM) V70
16/60	Phone Module (PHM) XC90
16/62	Hand unit cellular telephone V70
16/62	Hand unit cellular telephone XC90
16/63	GPS antenna, cellular telephone
16/64	Antenna cellular telephone V70
16/64	Antenna cellular telephone XC90
16/65	Antenna ring/lighting ignition V70
16/65	Antenna ring/lighting ignition XC90
16/67	Amplifier antenna, bumper
16/68	Antenna, bumper
16/71	Window antenna amplifier 1 right
16/73	Window antenna amplifier 2 left
16/74	Window antenna amplifier 2 right
16/77	Microphone cellular telephone V70
16/77	Microphone cellular telephone XC90
16/78	Speaker, cellular telephone
16/79	Bass speaker, V70
16/79	Subwoofer Module (SUB) XC90
16/81A	TV display, LH head restraint
16/81B	TV display, RH head restraint
16/81	TV display, accessory
16/82	DVD-player
16/82	DVD-player accessory
16/93	Control module, cellular telephone handsfree, V70
16/93	Control module handsfree cellular telephone XC90
16/94	Infotainment Control Module (ICM)
16/105	Audio Module (AUD)
16/106	Control module, CD player (MP2)
16/107	Control module, MD player (MP1)
16/108	Multimedia module (MMM)
16/110	Antenna control module (ATM)
16/111	Socket, rear left headphones
16/112	Socket, rear right headphones
16/122	Rear Audio Separation module (RAS)
16/123	External equipment socket (AUX)
16/124	Rear Seat Entertainment module (RSE)
16/125	IR transmitter
16/126	Holder handsfree cellular telephone V70
16/126	Holder handsfree cellular telephone XC90
16/127	Microphone handsfree cellular telephone V70
16/127	Microphone handsfree cellular telephone XC90
17/13	Data link connector V70
17/13	Data link connector XC90
17/17	Auxiliary start connection V70
17/17	Auxiliary start connection XC90
17/19	Outlet 12 V cargo compartment V70
17/19	Outlet 12 V cargo compartment XC90
17/37	4-pin outlet, tow hitch cable harness V70
17/37	4-pin outlet, tow hitch cable harness XC90
17/38	7-pin outlet, tow hitch cable harness V70
17/38	7-pin outlet, cable harness tow hitch XC90 EU/OS
17/38	7-pin outlet, cable harness tow hitch XC90 USA
17/39	13-pin outlet, tow hitch cable harness V70
17/39	13-pin outlet, tow hitch cable harness XC90
18/4	Contact reel V70
18/4	Contact reel XC90
20/3-8	Spark plug and ignition coil
20/16	Capacitor
20/22-26	Glow plug
26/4	Converter cable harness tow hitch V70
26/4	Converter cable harness tow hitch XC90
31/1	Ground connection, Right MacPherson strut tower, V70
31/1	Ground connection, Right MacPherson strut tower, XC90
31/2	Ground connection, Left MacPherson strut tower, V70
31/2	Ground connection, Left MacPherson strut tower, XC90
31/4	Ground connection, Engine
31/6	Ground connection, A-pillar left side, V70
31/6	Ground connection, A-pillar left side, XC90
31/10	Ground connection, A-pillar right side, V70
31/10	Ground connection, A-pillar right side, XC90
31/44	Ground connection, Left side member lower engine compartment V70
31/44	Ground connection, Left side member lower engine compartment XC90
31/46	Ground connection, Rear seat riser left side, V70

31/46	Ground connection, Rear seat riser left side, XC90
31/47	Ground connection, Rear seat riser right side, V70
31/47	Ground connection, Rear seat riser right side, XC90
31/48	Ground connection, Rear seat riser right side, V70
31/48	Ground connection, Rear seat riser right side, XC90
31/53	Ground connection, Firewall, V70
31/53	Ground connection, Firewall, XC90
31/66	Ground connection, Front seat riser left side, V70
31/66	Ground connection, Front seat riser left side, XC90
31/67	Ground connection, Front seat riser right side, V70
31/67	Ground connection, Front seat riser right side, XC90
31/70	Ground connection, Left side member lower engine compartment, V70
31/70	Ground connection, Left side member lower engine compartment, XC90
31/72	Ground connection, Cargo compartment, V70
31/72	Ground connection, Cargo compartment, XC90
31/73	Ground connection, Rear seat riser right side, V70
31/73	Ground connection, Rear seat riser right side, XC90
31/83	Ground connection, A-pillar left side, V70
31/83	Ground connection, A-pillar left side, XC90
31/84	Ground connection, A-pillar right side, V70
31/84	Ground connection, A-pillar right side, XC90
31/88	Ground connection, Engine ignition coil group 1
31/89	Ground connection, Engine ignition coil group 2
31/91	Ground connection, Engine
31/93	Ground connection, Left MacPherson strut tower, V70
31/93	Ground connection, Left MacPherson strut tower, XC90
31/94	Ground connection, Right MacPherson strut tower, V70
31/94	Ground connection, Right MacPherson strut tower, XC90
31/95	Ground connection, Left MacPherson strut tower, V70
31/95	Ground connection, Left MacPherson strut tower, XC90
31/96	Ground connection, Right MacPherson strut tower, V70
31/96	Ground connection, Right MacPherson strut tower, XC90
31/98	Ground connection, Windshield member upper, V70
31/98	Ground connection, Windshield member upper, XC90
31/99	Ground connection, Side window left
31/102	Ground connection, Front member, V70
31/102	Ground connection, Front member, XC90
31/118	Ground connection, Between front seats under the armrest
31/120	Ground connection, Cargo compartment, V70
31/120	Ground connection, Cargo compartment, XC90
54/1	Connector
54/3.1	Connector
54/3.2	Connector
54/4	Connector
54/7	Connector
54/8	Connector
54/9	Connector
54/10	Connector
54/11	Connector
54/12	Connector V70
54/12	Connector XC90
54/13	Connector
54/14	Connector
54/16	Connector
54/20	Connector
54/21	Connector
54/22	Connector V70
54/22	Connector XC90
54/23	Connector V70
54/23	Connector XC90
54/24	Connector
54/25	Connector
54/32	Connector
54/34	Connector
54/35	Connector
54/36	Connector
54/36	Connector V70
54/36	Connector XC90
54/39	Connector
54/40B	Connector
54/40C	Connector
54/40D	Connector
54/43	Connector
54/43B	Connector
54/50	Connector V70
54/50	Connector XC90
54/53	Connector
54/54	Connector
54/55	Connector
54/56	Connector
54/66.1	Connector
54/66.2	Connector
54/74	Connector
54/74B	Connector
54/98	Connector
54/106	Connector
54/107	Connector
54/109	Connector
54/112	Connector
54/113	Connector
54/117	Connector
54/122	Connector
54/132	Connector
54/274	Connector
54/ 275	Connector
54/303	Connector
54/1300	Connector V70
54/1300	Connector XC90
54/1400	Connector V70
54/1400	Connector XC90
4X/78	Connector, original car interface
9X/25	Connector, original car interface
16X/1	Connector, original car interface
16X/45	Connector, original car interface
16X/57	Connector, original car interface
16X/58	Connector, original car interface
16X/105	Connector, original car interface
54X/no.	Connector, original car interface
A1	Connecting rail to 15/31
C1-6	Connecting rail to 15/31

1/1	Battery	11F	Fuses in cargo compartment auxiliary fuse box
2/14	Relay, glow plug unit		
2/22	Relay, climate control system	16/3-4	Speaker, front right door & front left door
2/32	Main relay, engine management system	16/5-6	Door speaker, rear right door & rear left door
2/35	Starter motor relay	16/26	Speaker instrument board center
2/90	Relay, windshield wiper, low/high speed	16/55-56	Tweeter, front left door & front right door
2/91	Relay, intermittent wiping	16/57-58	Speaker, LH & RH D-pillar
2/182	Relay, headlight washer motor	16/65	Antenna ring/ignition switch illumination
2/237	Disconnect relay, rear speaker	16/77	Microphone, mobile telephone
		16/81A	TV display, LH head restraint
3/1	Ignition switch	16/81B	TV display, RH head restraint
		16/82	DVD player, rear
4/9	Control module, Supplementary Restraint System (SRS)	16/105	Audio Module (AUD)
		16/122	Rear Audio Separation module (RAS)
4/56	Central Electronic Module (CEM)	16/123	External equipment socket AUX
4/58	Rear Electronic Module (REM)	16/124	Rear Seat Entertainment module (RSE)
		16/125	IR transmitter
6/25	Starter motor		
6/26	Alternator	31/10	Ground connection
		31/118	Ground connection
9/1	Front 12V socket		
9/24	Coolbox rear seat	54/33	Connector
9/25	Rear 12V socket	54/36	Connector
		54/98	Connector
10/72	Front ashtray lighting	54/274	Connector
		54/275	Connector
11E	Main fuses at battery	54/303	Connector

1/1 Through 54/303 (Premier Model Only)

Wire Color Code and Other Abbreviations

Wire Color Code Identification and Other Abbreviations

Ignition switch symbols

X = Accessories (audio position)
S = Powered upon insertion of key
15 = The switch remains connected during start
15I = Contact is broken while starting
30 = Constant power from the battery
50 = Start

Countries/Markets

A = Austria
AUS = Australia
B = Belgium
CDN = Canada
CH = Switzerland
D = Germany
DK = Denmark
E = Spain
EU/OS = Markets outside USA and Canada
FIN = Finland
GB = Great Britain
ISR = Israel
J = Japan
KOR = Korea
N = Norway
NL = Netherlands
S = Sweden
USA = United States of America
WEU = Western Europe

Other

ACC = Accessory
AMP = Amplifier
AUDIO = Audio system
AUTO = Automatic transmission

Bi-X = Bi-Xenon
CEM = Central Electronic Module
DRL = Daytime Running Lights
DSTC = Dynamic Stability Traction Control
ECC = Electronic climate control system
ECPS = Electronic power steering
EXC = Exclusive
EXT.D = Extended electrical distribution
HISPEED = High speed data bus
LH = Left-hand side
LHD = Left-hand drive
LOSPEED = Low speed data bus
MAN = Manual transmission
OPN = Option (factory-installed)
PCL = Power Child Lock
PETROL = Gasoline
REM = Rear Electronic Module
RH = Right-hand side
RHD = Right-hand drive
RTI = Road Traffic Information
SRS = Airbag
SUBWOOF = Bass speaker
SULEV = Super Ultra Low Emission Vehicle
SUM = Suspension Module (SUM)
T = Turbo engine
ULEV = Ultra Low Emission Vehicle
W/O = Without
5CYL = 5-cylinder engine
6CYL = 6-cylinder engine

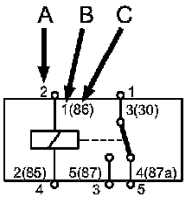
Colors

BL = Blue
BN = Brown
GN = Green
GR = Gray
LBL = Light Blue
LGN = Light Green
OR = Orange
P = Pink
R = Red
SB = Black
VO = Violet
W = White
Y = Yellow

Relays, General

Relays, General

The diagram indicates two or three different designations for the relay's position. This is described below.



A = Corresponds to the position on the back of the relay box (wiring side)
B = Corresponds to the position on the relay.
C = An old designation that may be found on the relay.

VIDA (Vehicle Information & Diagnostics For Aftersales)

VIDA (Vehicle Information & Diagnostics for Aftersales)

During the second half of 2004, VADIS (Volvo Aftersales Diagnostic and Information System) was phased out and replaced by VIDA (Vehicle Information & Diagnostics for Aftersales). The purpose of VIDA is to support service providers in repairing and servicing Volvo vehicles. VIDA provides Service and Parts information, as well as diagnostic fault tracing, and software downloads. As in VADIS, these areas are integrated into one single application. All functionality that could be found in VADIS will be found in VIDA. However, in some particular areas, e.g., the diagnostic work flow, search functionality, and the Parts catalogue, VIDA contains considerable enhancements when compared to VADIS.

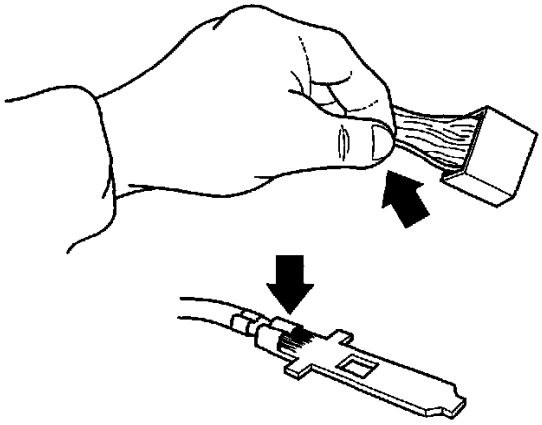
Volvo's VIDA (Vehicle Information & Diagnostics for Aftersales) system ties together service and repair data, parts data, service bulletins, software (firmware) downloads, fault tracing and on-board diagnostic as well as other related information to decrease service time.

Much of the diagnostic information provided here is presented in a manner that assumes the technician is using the web-based Volvo diagnostic system (VIDA) to diagnose the vehicle. Volvo does not provide any information based on performing diagnosis with a third party diagnostic tool aside from a conversion from P Codes to Volvo ECM Codes. See: Powertrain Management/Computers and Control Systems/Testing and Inspection/Diagnostic Trouble Code Descriptions/Conversion Table Standardized Diagnostic Trouble Codes (DTCs)/Volvo Diagnostic Trouble Codes

Check Terminals Visually

Cleaning female socket terminals and male pin terminals
Greasing female terminals

Check terminals visually



NOTE: When checking the engine control module (ECM), do not remove the control module from the car before the main relay has interrupted the power supply. This may take up to **4 minutes** after the ignition has been switched off and the engine cooling fan (FC) has stopped running.

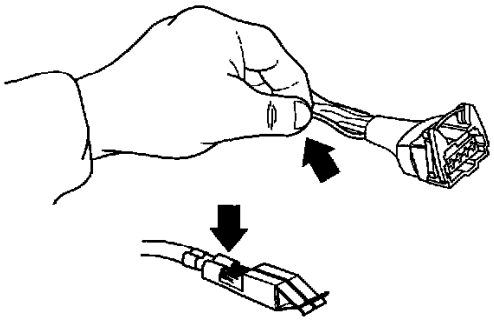
Inspect the terminals visually when checking, or taking readings from, opened connectors.

Repair wiring and cable terminals, using appropriate procedures.

Checks:
- Check for oxidation. This can cause poor connections in the terminals
- Check for damage to pins and terminals. Check that they are properly inserted into the connector. Check that the cable is properly connected to the pin or terminal. Check pins and terminals particularly carefully
- Use a separate male terminal to check the female terminal. Check that they are secure. Pull on the pin.

Contact Resistance and Oxidation

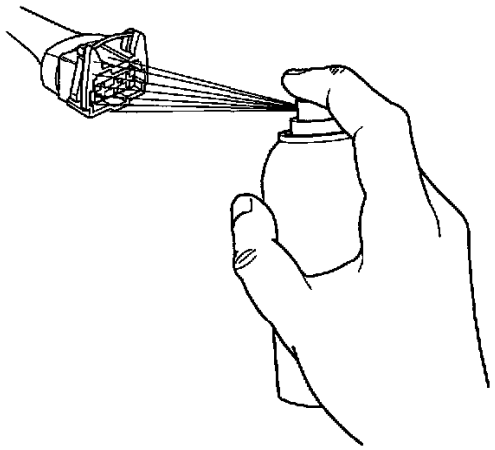
Contact resistance and oxidation



Repair wiring and cable terminals, using appropriate procedures.
In theory, the resistance across contacts, leads and terminals should be **0 [ohm]**. However, there is always some resistance due to terminal oxidation.
If this resistance becomes too great the result will be a malfunction. The magnitude of the resistance before it causes a malfunction depends on the circuit load.

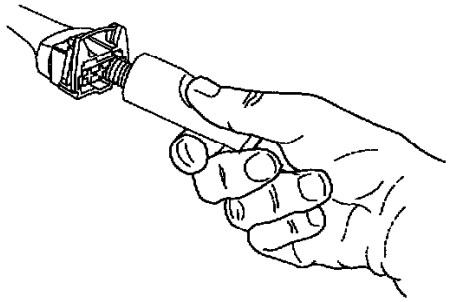
Checks:

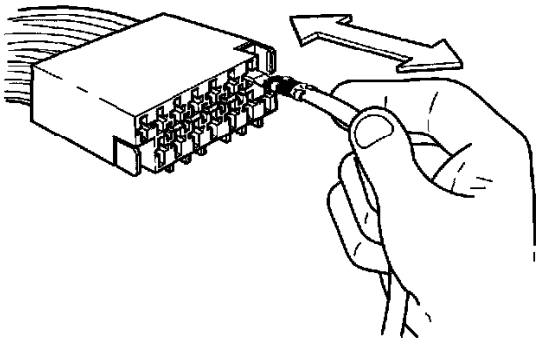
- Check the cables visually according to "Check Terminals Visually."



NOTE: Do not apply rust solvent spray or grease to the Heated Oxygen Sensor (HO2S) or combined instrument panel connectors.

- Ignition off
- Disconnect the battery negative terminal
- Use compressed air to clean the disconnected connector
- Apply rust solvent spray 1161422 to the disconnected connectors
- Blow clean using compressed air.



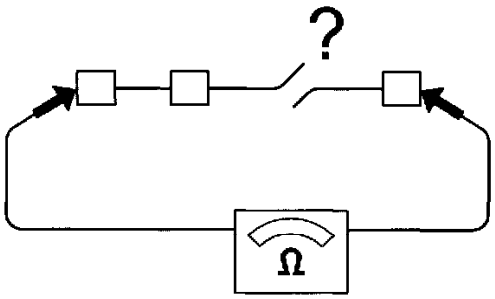


NOTE: Do not fill the protective cover with grease.

- Press grease, P/N 1161417-9, into the female sockets directly from tube
- Check that all the terminal cavities are filled
- Use a loose male pin to ensure that the connection in the sockets is good. The pin should remain in position when pulled gently.

Open-Circuit, Permanent Faults

Open-circuit, permanent faults

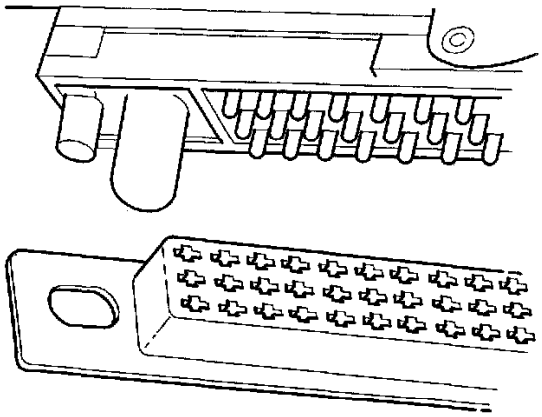


An open-circuit in a cable is indicated by a loss of one or more functions.
Chafed and broken cables or terminals that have come loose are common causes of faults in electrical systems.

Repair wiring and cable terminals, using appropriate procedures.

Checks:
- Disconnect the connectors at both ends of the cable.

Connect an ohmmeter between the ends of the cable.
The ohmmeter should read approximately **0 [ohm]** if there is no open-circuit in the cable



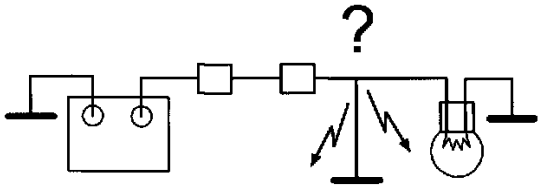
If the reading is not correct. Replace the cable and/or continue, according to "Contact Resistance and Oxidation"

Always check the control module and control module box connectors to ensure that their pins and sockets are not bent or damaged, as this can cause faults.

Check pins and terminals particularly for this fault. See "Check Terminals Visually."

Short-Circuit to Ground, Permanent Faults

Short-circuit to ground, permanent faults



A short-circuit between a live cable and ground is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.

Repair wiring and cable terminals, using appropriate procedures.

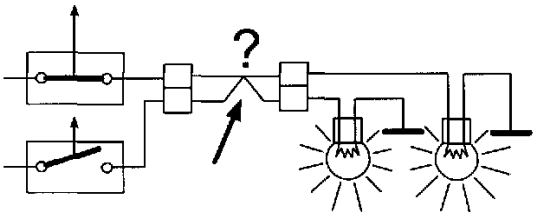
Checks:
- Check terminals visually.
- Activate all switches and sensors in the circuit. Check whether the fuse blows
- Disconnect the connectors in the circuit to ensure that they do not affect readings.

Use an ohmmeter to take a resistance reading between the cable and ground.
The ohmmeter should read infinite resistance if no components are connected.

Check pins and terminals particularly for this fault. See "Check Terminals Visually."

Short-Circuit to Supply Voltage. Permanent Faults

Short-circuit to supply voltage. Permanent faults



A short-circuit between a cable and supply voltage is often indicated by the loss of a function or a fuse blowing when voltage is passed through the cable.

Repair wiring and cable terminals, using appropriate procedures.

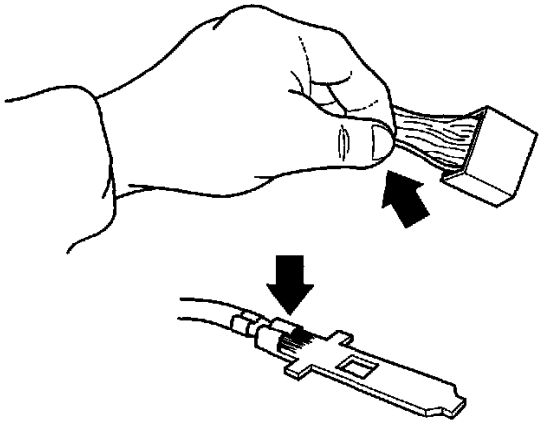
Checks:
- Use a voltmeter to take readings at various points in the circuit while operating switches and sensors.

Voltmeter readings will depend on which circuit is tested and the status of switches and sensors, Use the wiring diagram to determine the correct voltage in the circuit.
Use an ohmmeter between the suspect cables to detect short-circuits between them.
The ohmmeter should read infinite resistance between cables not connected to each other in the circuit.
Check pins and terminals particularly for this fault. See "Check Terminals Visually."

Inspect Terminals Visually

Checking female socket terminals and male pin terminals
Greasing female terminals

Inspect terminals visually



NOTE: When checking the engine control module (ECM), do not remove the control module from the car before the main relay has interrupted the power supply. This may take up to **4 minutes** after the ignition has been switched off and the engine cooling fan (FC) has stopped running.

Inspect the terminals visually when checking, or taking readings from, opened connectors.

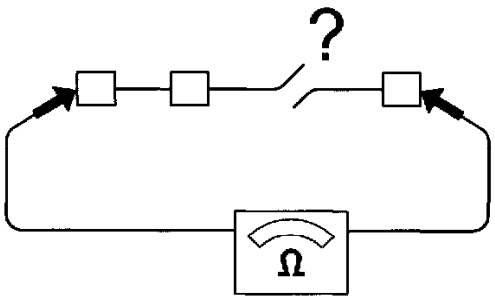
Repair wiring and cable terminals as required, using appropriate procedures.

Checks:
- Check for oxidation. This can cause poor connections in the terminals
- Check for damage to pins and terminals. Check that they are properly inserted into the connector. Check that the cable is properly connected to the pin or terminal. Check pins and terminals particularly carefully

- Using a loose male connector, test to see if the female connector provides a good contact and that the pin remains in place when the male connector is pulled lightly
- Shake the cable lightly and pull on connectors during measurement to locate damage.

Open-Circuit, Intermittent Faults

Open-circuit, Intermittent faults



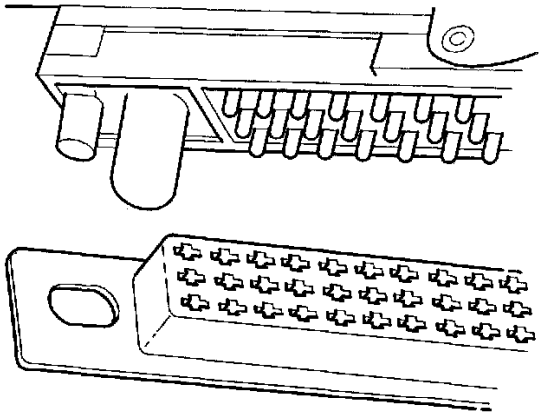
An open-circuit in a cable will be indicated by the loss of a function (or functions).
Chafed and broken leads are common causes of faults.
Repair wiring and cable terminals as required, using appropriate procedures.

Checks:

- Disconnect the connectors at both ends of the cable.

Check the cables visually according to "Inspect Terminals Visually".

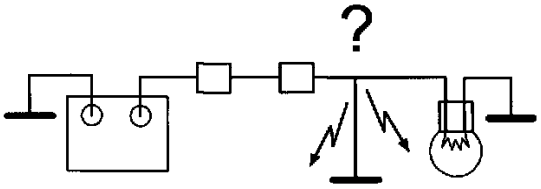
Connect an ohmmeter between the ends of the cable. The ohmmeter should read approximately **0 [ohm]** if there is no open-circuit in the cable.
Shake the cable lightly and pull on connectors during measurement to locate the damage.



If the reading is not correct. Replace the cable and/or continue according to "Contact Resistance and Oxidation".
Always check the control module and control module box connectors to ensure that their pins and sockets are not bent or damaged, this may cause faults.
Check pins and terminals particularly carefully.

Short-Circuit to Ground, Intermittent Faults

Short-circuit to ground, intermittent faults



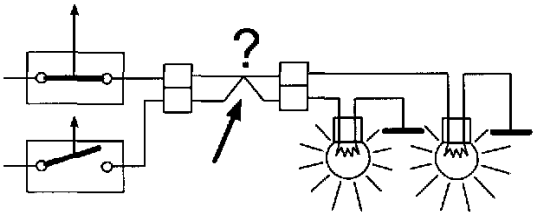
A short-circuit between a live cable and ground is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
Repair wiring and cable terminals as required, using appropriate procedures.

Checks:
- Check the cables visually according to "Inspect Terminals Visually". Activate all switches and sensors in the circuit. Check whether the fuse blows.
- Disconnect the connectors in the circuit to ensure that they do not affect readings.

Connect an ohmmeter between cable and ground. The ohmmeter should read infinite resistance if no components are connected.
Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the value is not correct, try a new cable and/or continue according to "Contact Resistance and Oxidation".

Short-Circuit to Supply Voltage. Intermittent Faults

Short-circuit to supply voltage, intermittent faults



A short-circuit between a cable and supply voltage is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.

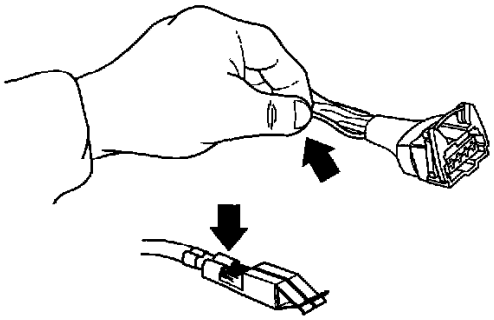
Repair wiring and cable terminals, using appropriate procedures.

Checks:
- Check the cables visually according to "Inspect Terminals Visually". Use a voltmeter to take readings at various points in the circuit while operating switches and sensors.

The voltmeter reading depends on the circuit being tested and the positions of switches and sensors. Use the wiring diagram to determine the correct voltage in the circuit.
Use an ohmmeter between the suspect cables to detect short-circuits between them.
The ohmmeter should read infinite resistance between cables not connected to each other in the circuit. Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct. Replace the cable and/or continue according to "Loose Connections (Terminals)".

Loose Connections (Terminals)

Loose connections (terminals)



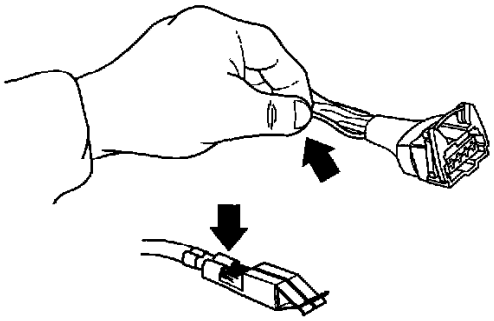
Repair wiring and cable terminals, using appropriate procedures.

Loose connections in terminals may be caused by oxidation of the pins and sockets, or by a faulty connection of a cable to its cable terminal.
Loose connections produce the same faults as an intermittent open-circuit in a cable.

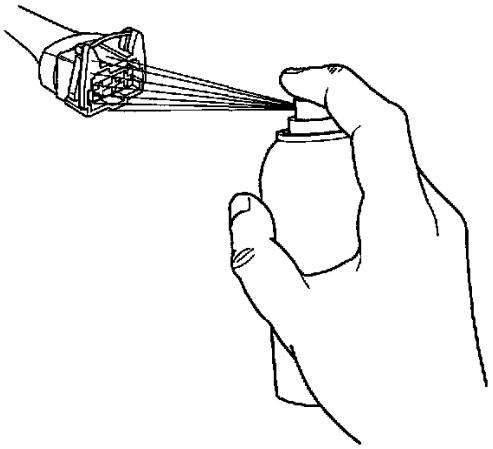
Checks:
- Inspect terminals visually according to "Inspect Terminals Visually". Continue according to "Contact Resistance and Oxidation".

Contact Resistance and Oxidation

Contact resistance and oxidation

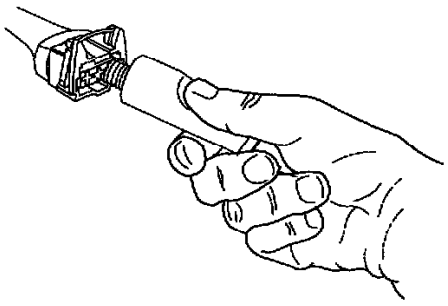


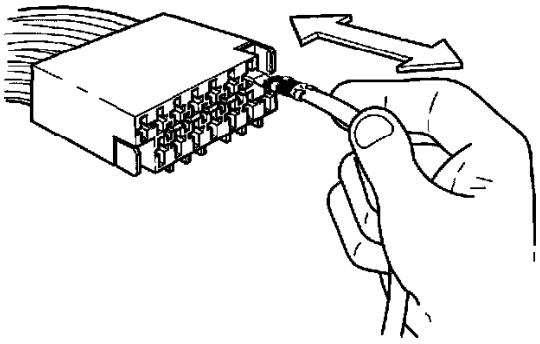
In theory, the resistance across contacts, leads and terminals should be **0 [ohm]**. However, there is always some resistance due to terminal oxidation.
If resistance is too great there will be function problems.
The magnitude of the resistance before it causes a malfunction depends on the circuit load. A guideline would be a few ohms.



NOTE: Do not apply rust solvent spray or grease to the Heated Oxygen Sensor (HO2S) or combined instrument panel connectors.

- Ignition off
- Disconnect the battery negative terminal
- Use compressed air to clean the disconnected connector
- Apply rust solvent spray 1161422 to the disconnected connectors
- Blow clean using compressed air.





NOTE: Do not fill the protective cover with grease.

- Press grease, P/N 1161417-9, into the terminals directly from the tube
- Check that all the cavities in the connectors are filled
- Use a loose male pin to ensure that contact in sockets is good. The pin should remain in position when pulled gently.

Connector

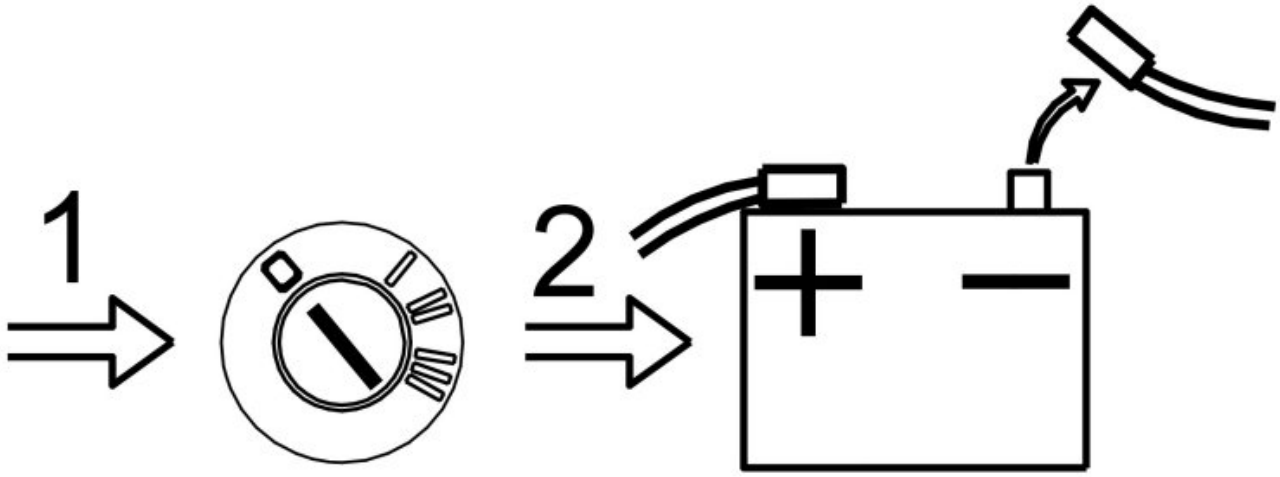
Connectors, repair

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

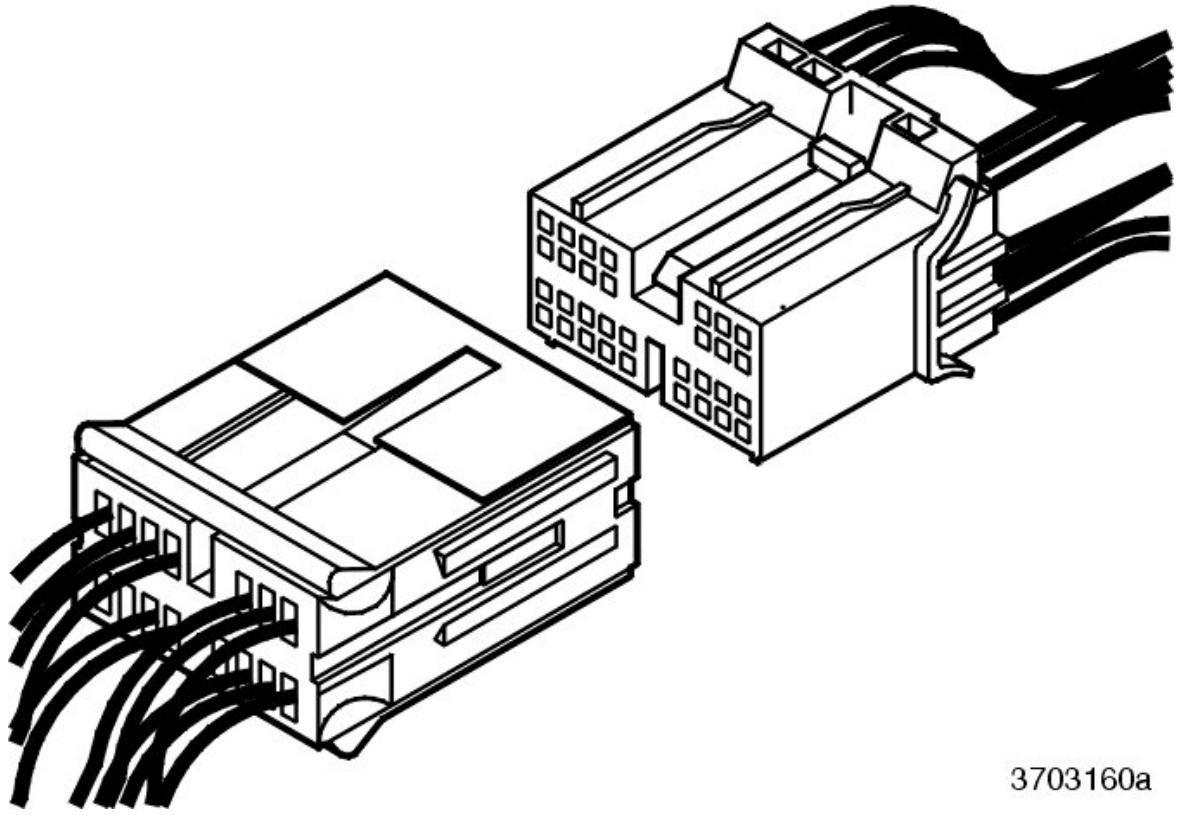
Connector

The commonest types of connector and central electrical unit in the vehicle are listed here.
For more information about secondary locking, primary locking, terminal removal tools, etc., see the link by each type of connector.

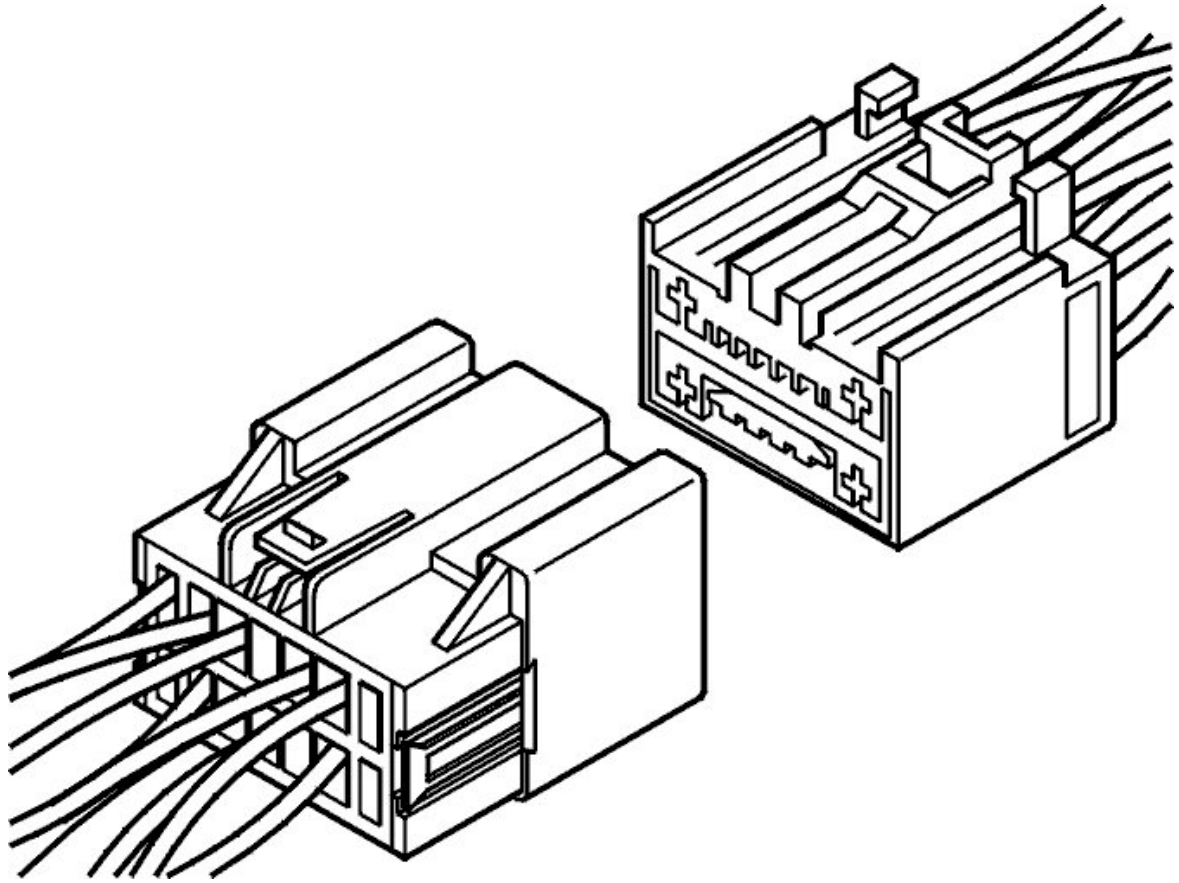
Note! Before working in the connector, disconnect the battery negative terminal, Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.



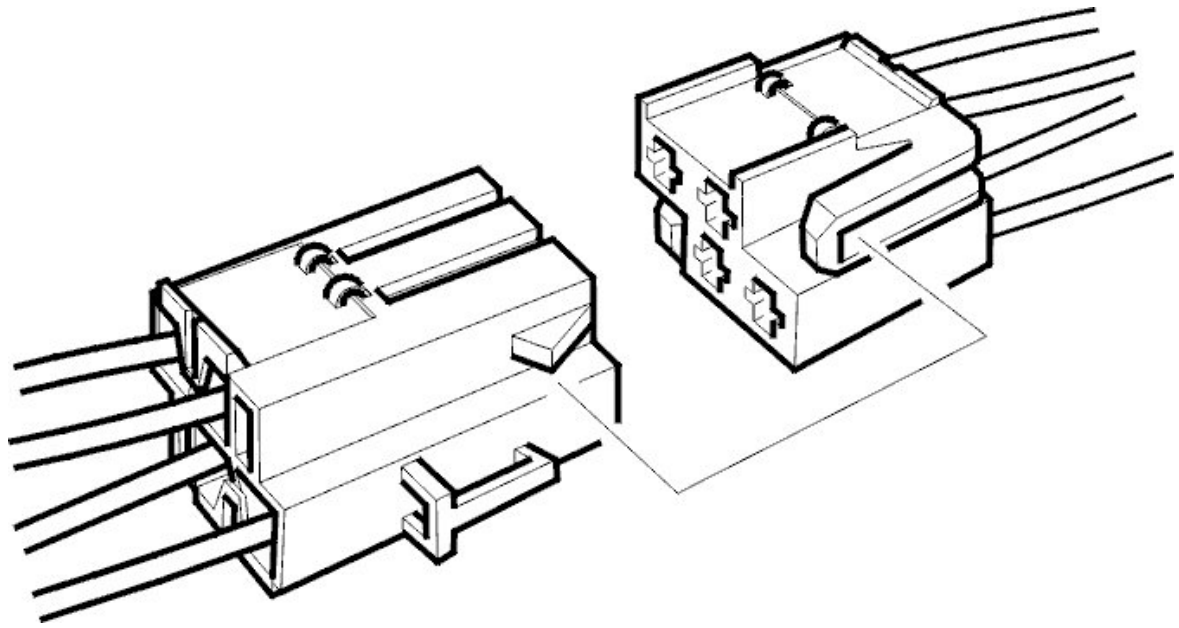
Note! When several tools are recommended for the same type of connector, choose the correct tool according to the size of the lock.



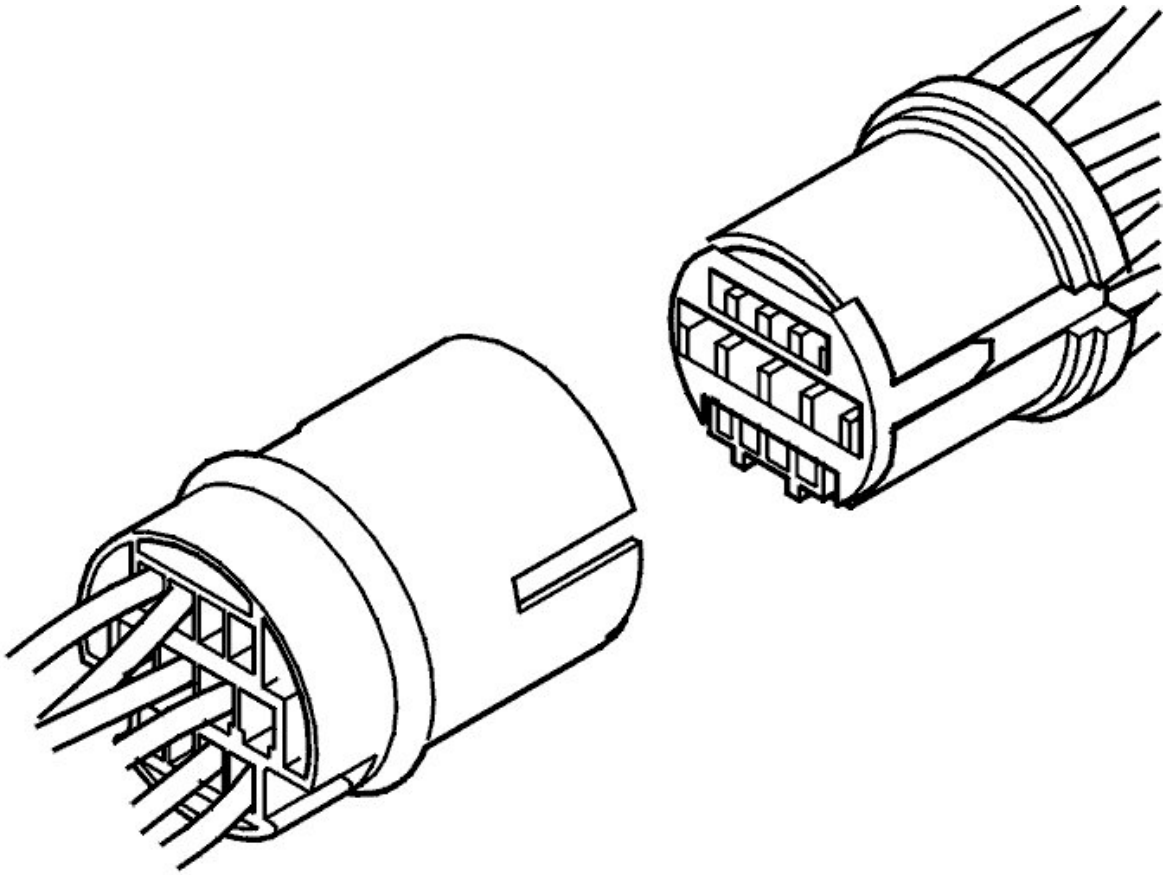
Connectors occur in a number of variants with different numbers of conductors. See Connectors, repair. See: Diagnostic Aids/Connectors, Repair/Connector Type 1



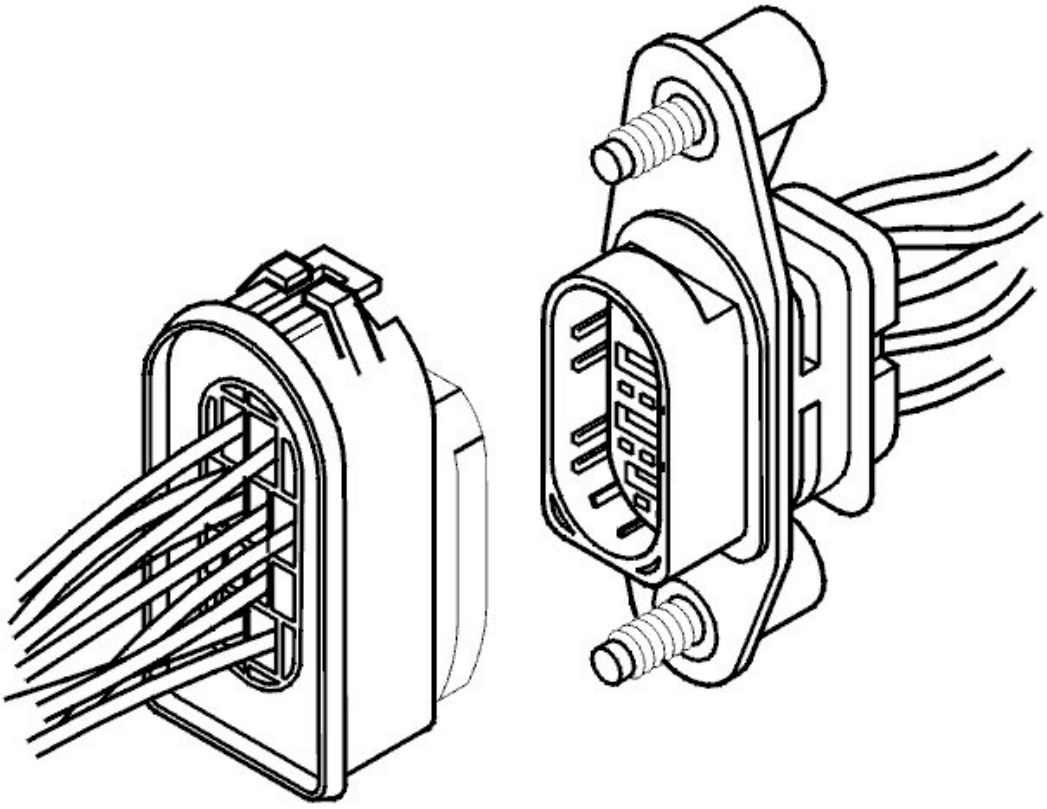
Connectors occur in a number of variants with different numbers of conductors. See Connectors, repair. See: Diagnostic Aids/Connectors, Repair/Connector Type 2



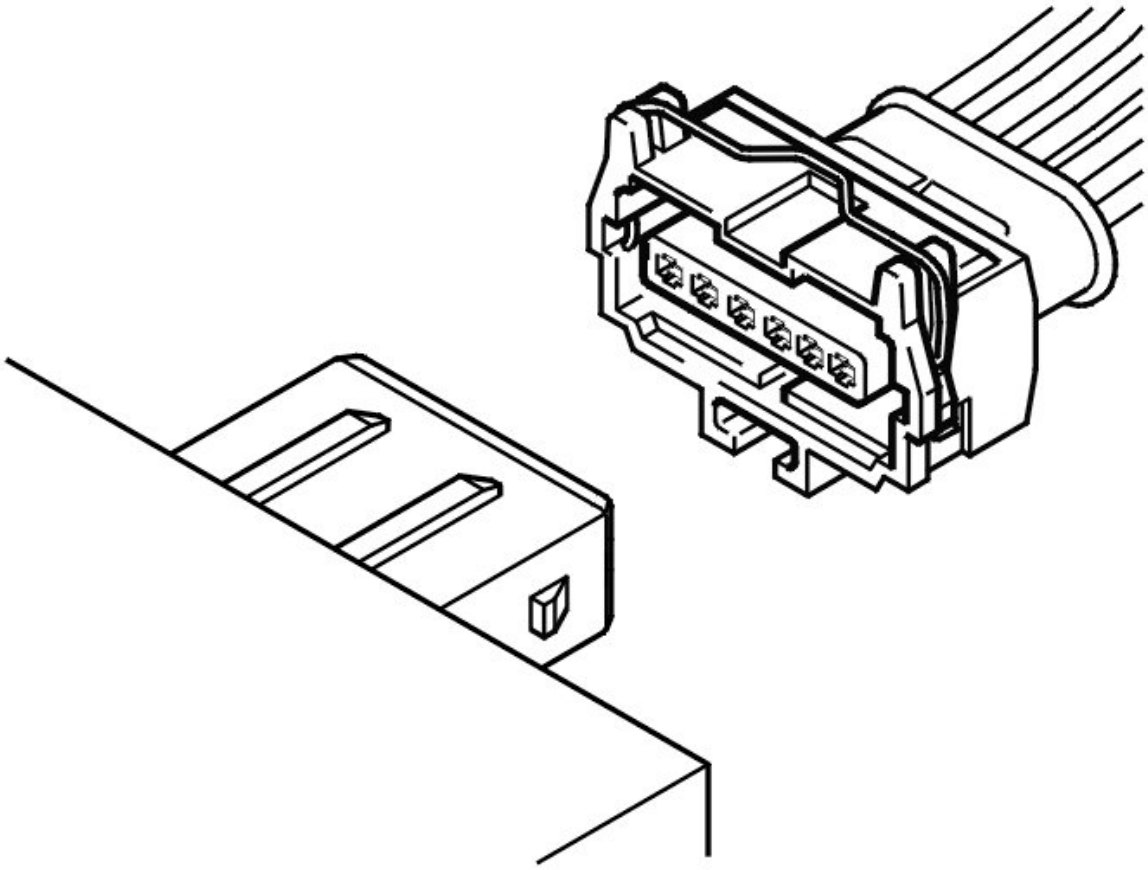
Connectors occur in a number of variants with different numbers of conductors. See Connectors, repair. See: Diagnostic Aids/Connectors, Repair/Connector Type 3



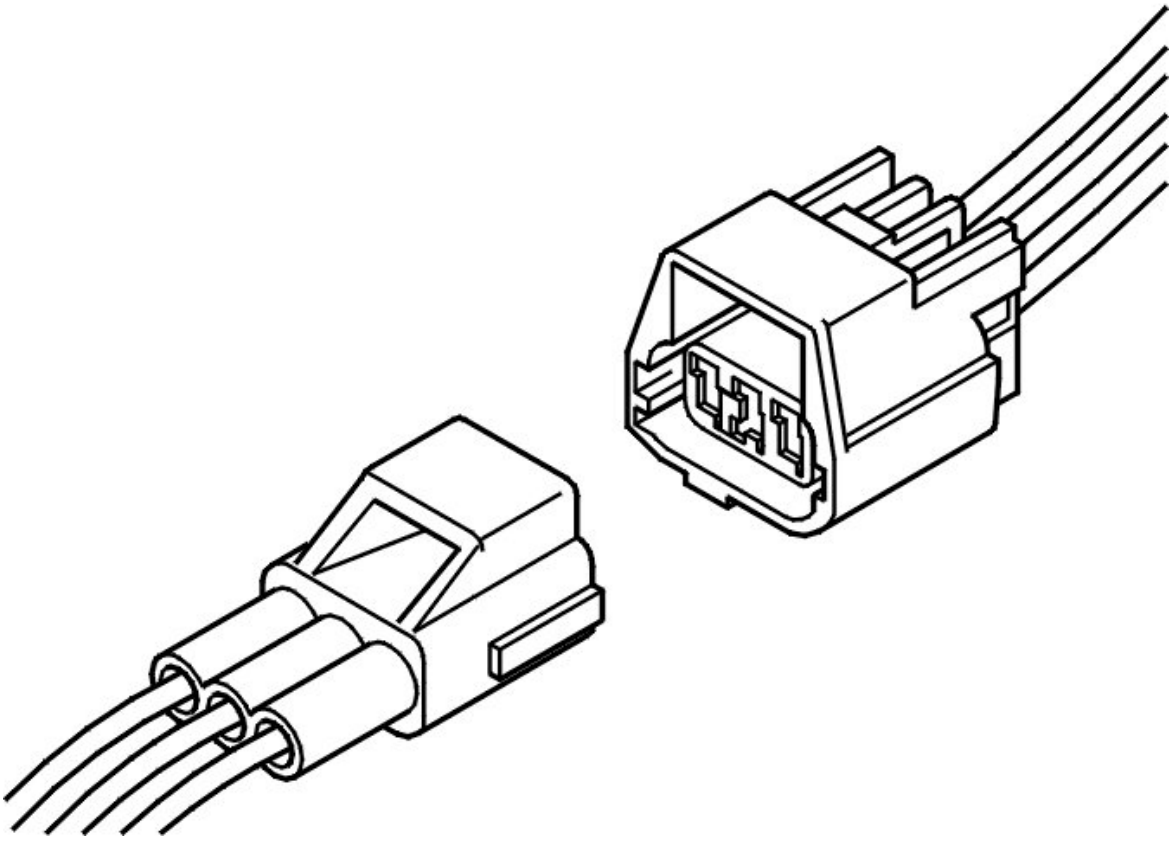
Connector, see Connectors, repair. See: Diagnostic Aids/Connectors, Repair/Connector Type 4



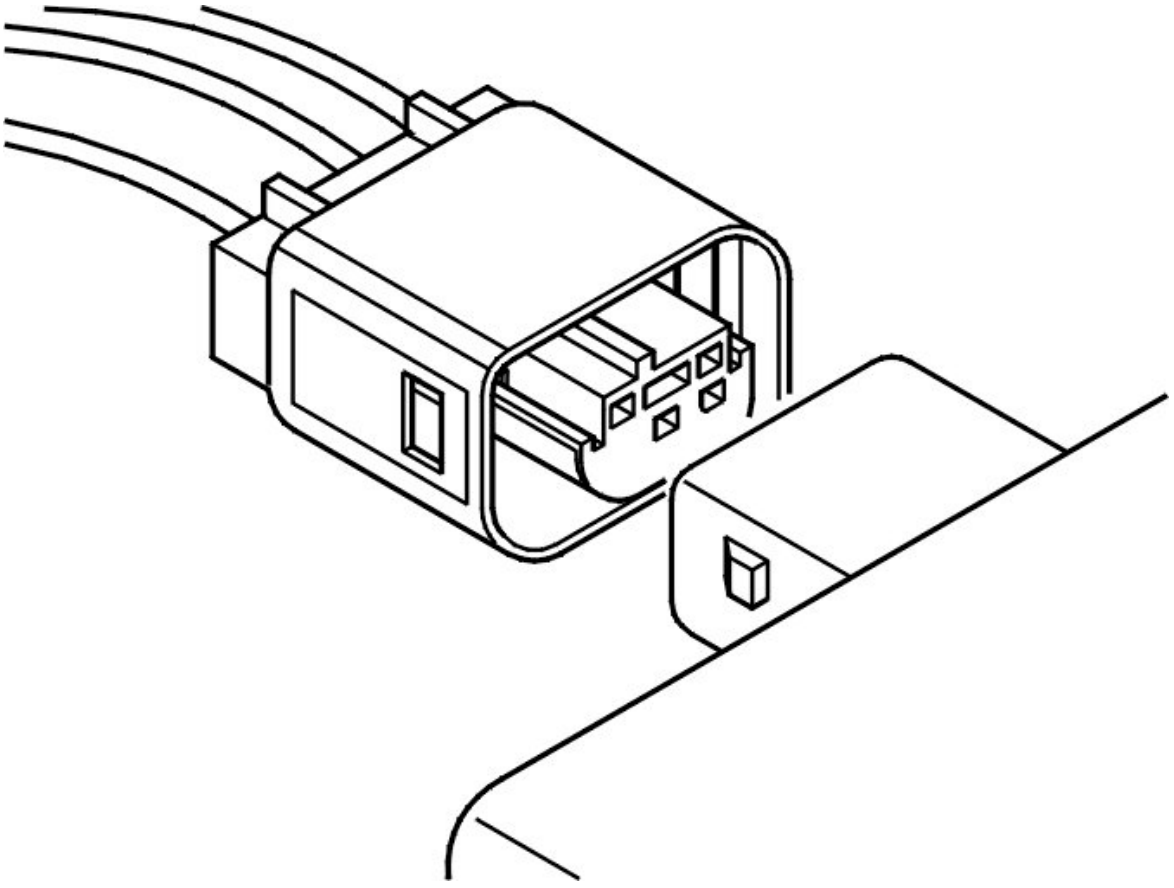
Connector door, see Connector door, repair. See: Diagnostic Aids/Connectors, Repair/Connector Type 5



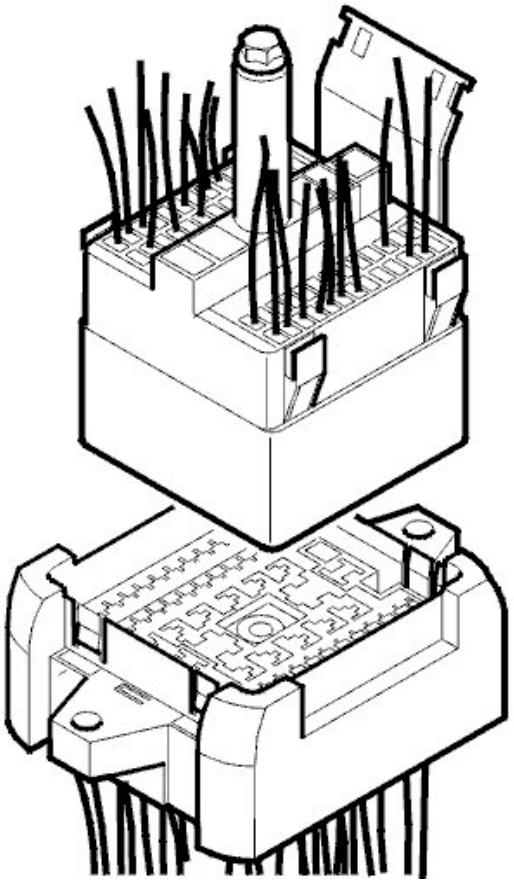
Sealed connectors occur in a number of variants with different numbers of conductors. See Connector sealed, repair. See: Diagnostic Aids/Connectors, Repair/Sealed Connector Type 1



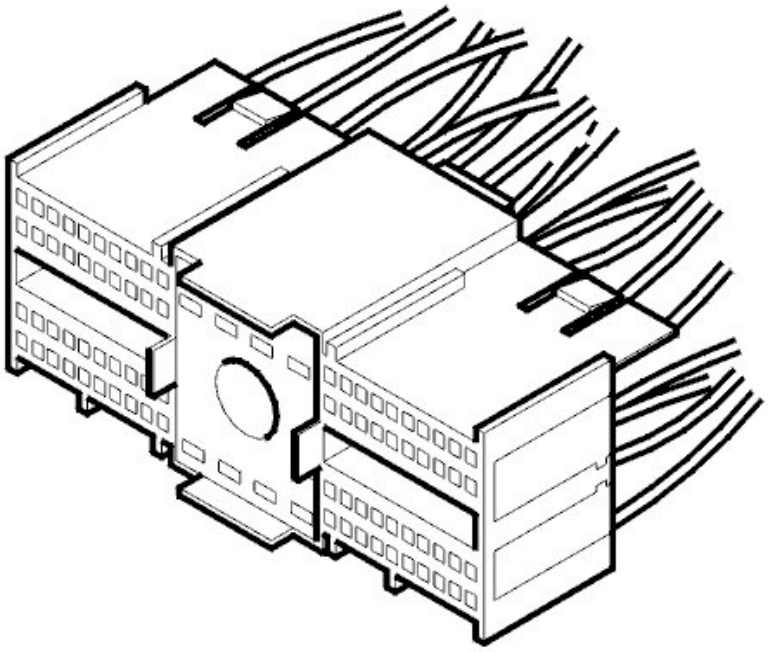
Sealed connectors occur in a number of variants with different numbers of conductors. See Connector sealed, repair. See: Diagnostic Aids/Connectors, Repair/Sealed Connector Type 2



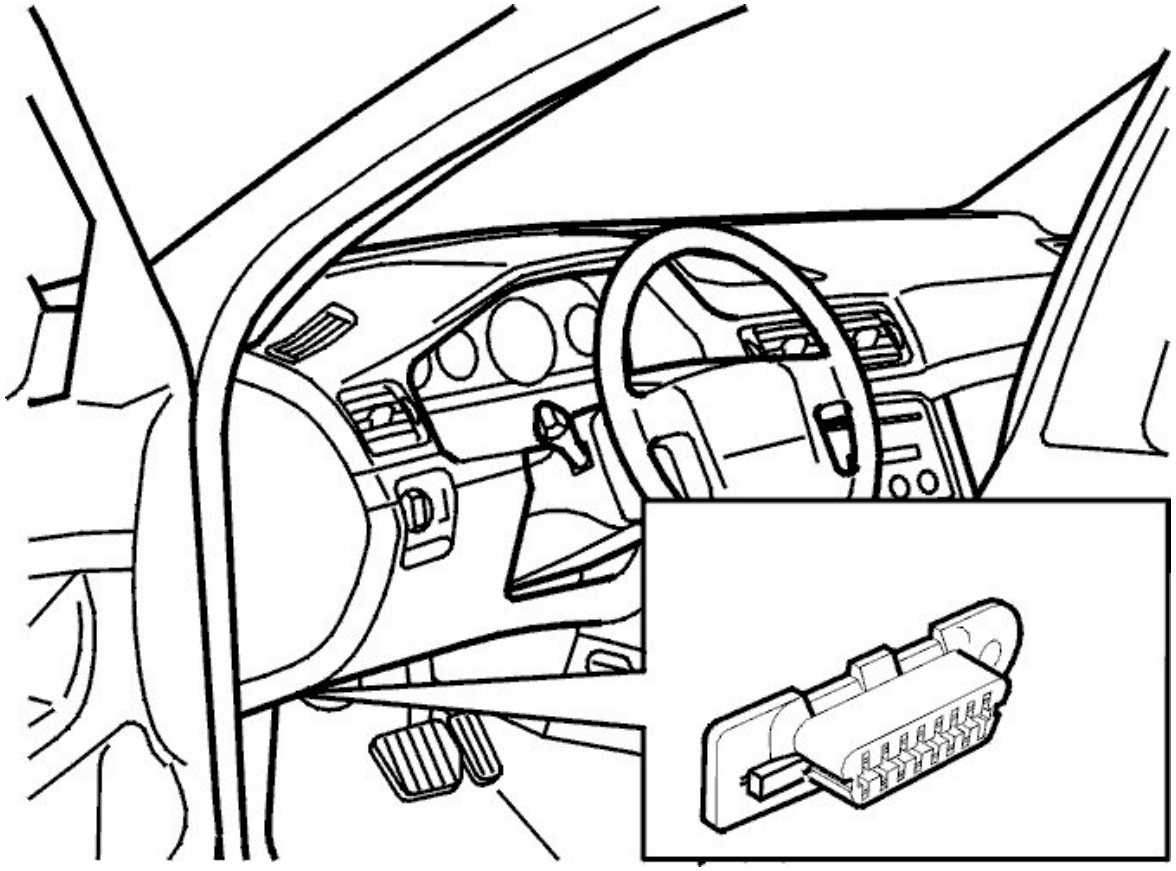
Sealed connectors occur in a number of variants with different numbers of conductors. See Connectors, repair. See: Diagnostic Aids/Connectors, Repair/Sealed Connector Type 3



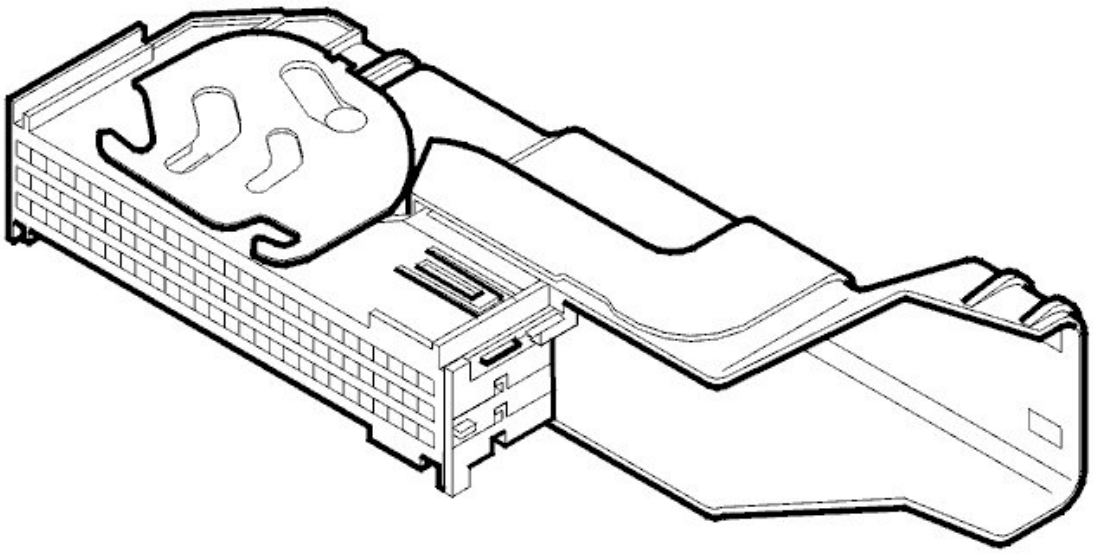
Connector, see Connectors, repair See: Diagnostic Aids/Connectors, Repair.



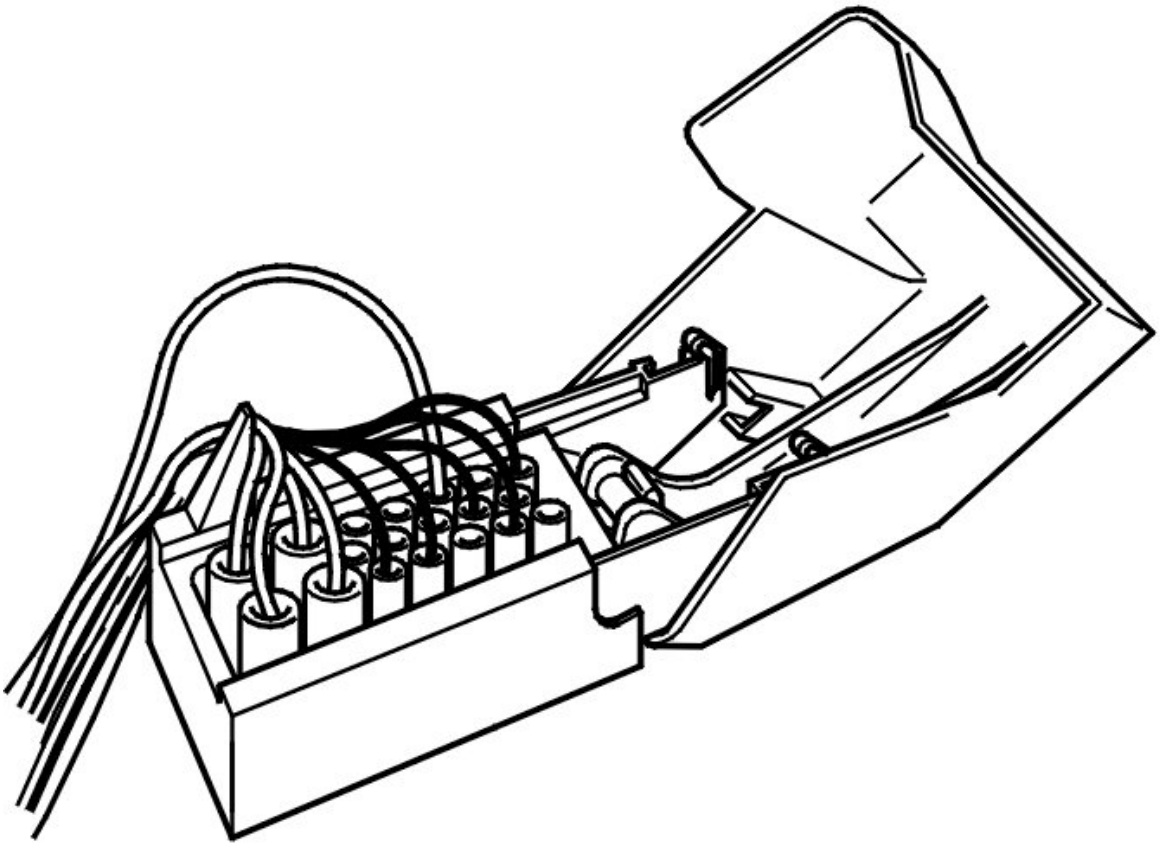
Connector, see Connectors, repair See: Diagnostic Aids/Connectors, Repair.



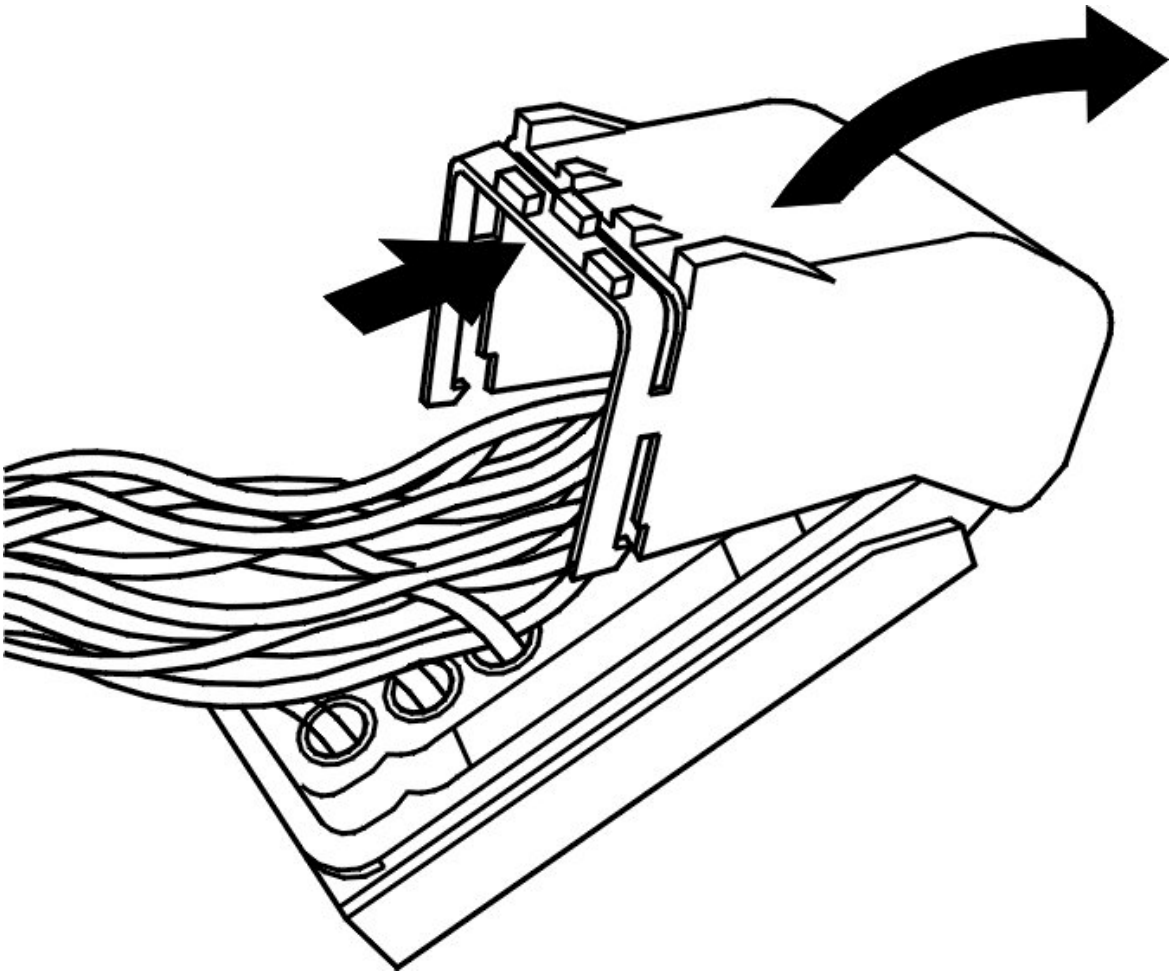
Data Link Connector (DLC). See Connector data link connector (DLC), repair See: Diagnostic Aids/Connectors, Repair/Connector Data Link Connector (DLC), Repair.



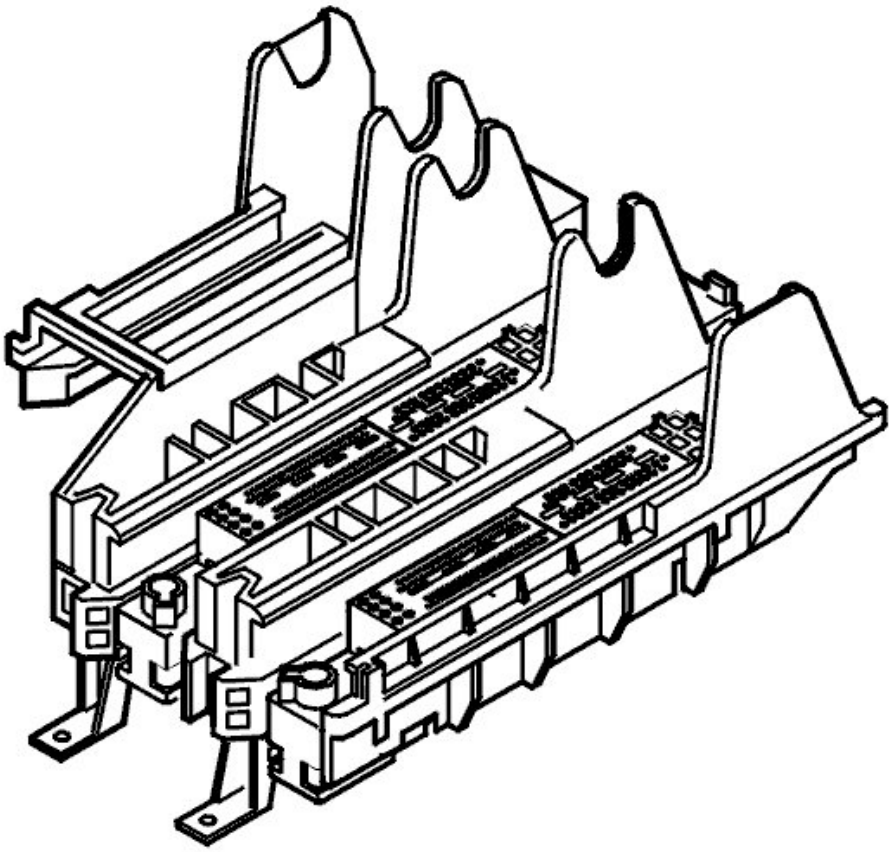
Connector for the SRS module, see Connector Supplemental Restraint System Module (SRS), repair See: Diagnostic Aids/Connectors, Repair/Connector Supplemental Restraint System Module (SRS), Repair.



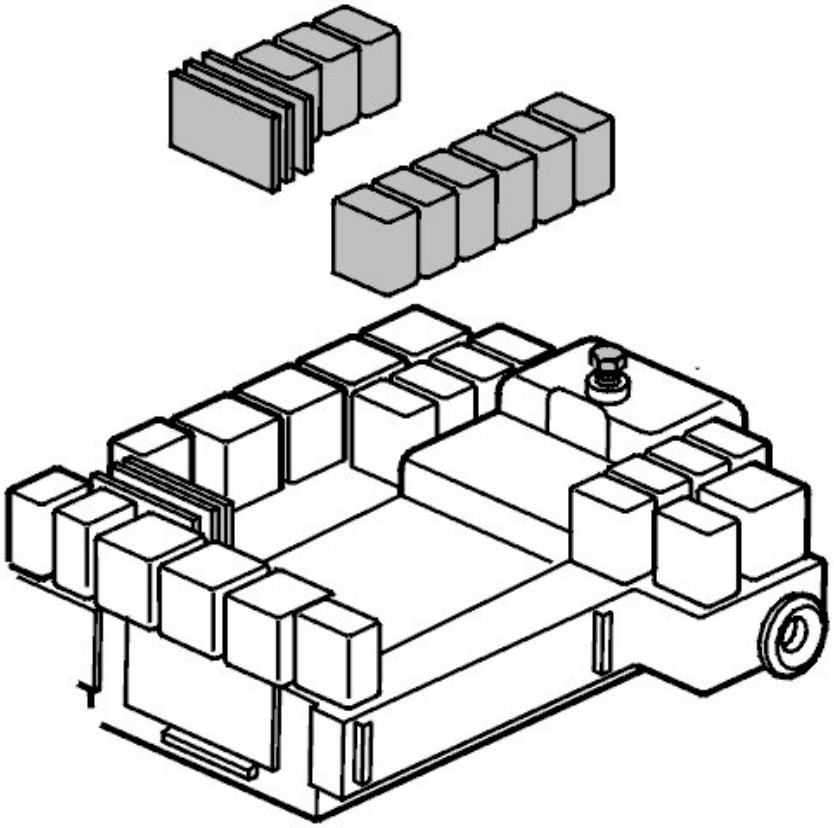
Connector Control module for anti-lock brakes (ABS). See Connector control module for Anti-lock Brake System Module (ABS), repair See: Diagnostic Aids/Connectors, Repair/Connector Control Module for Anti-lock Brake System Module (ABS), Repair.



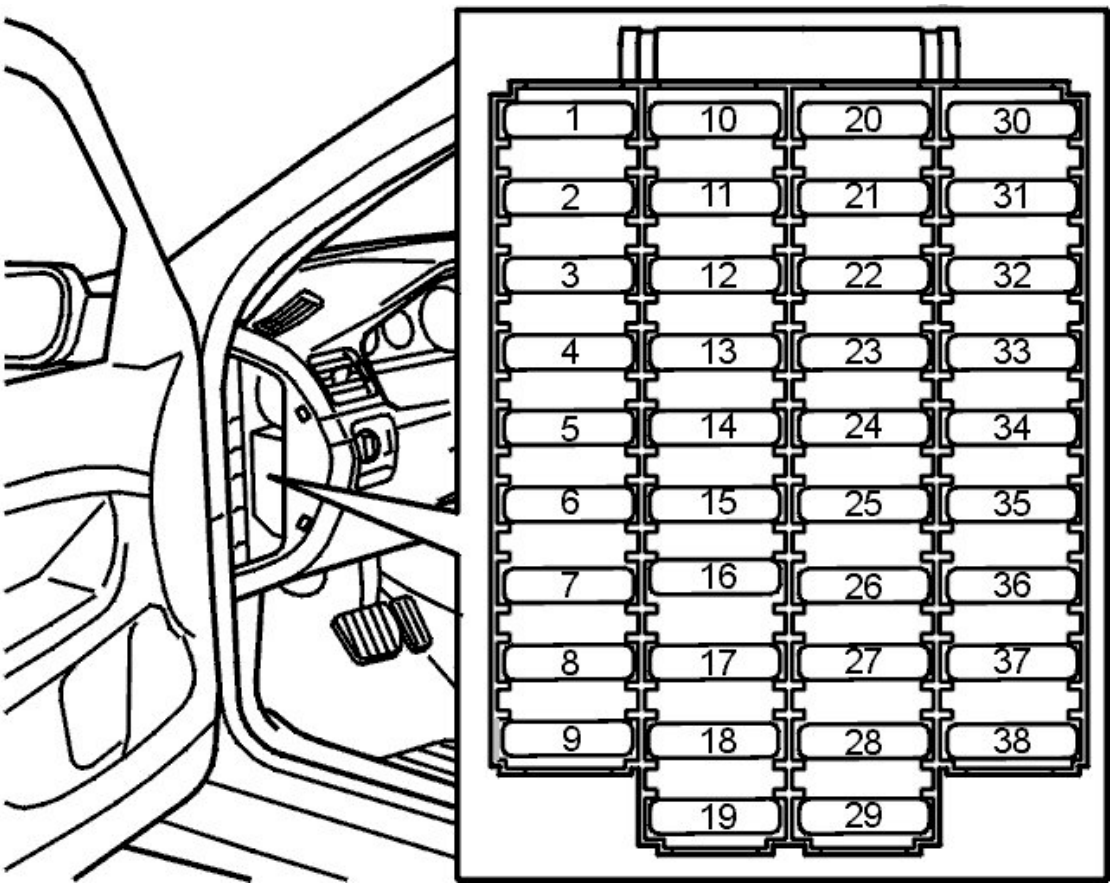
Connector Brake Control Module (BCM). See Connector Brake Control Module (BCM), repair See: Diagnostic Aids/Connectors, Repair/Connector Brake Control Module (BCM), Repair.



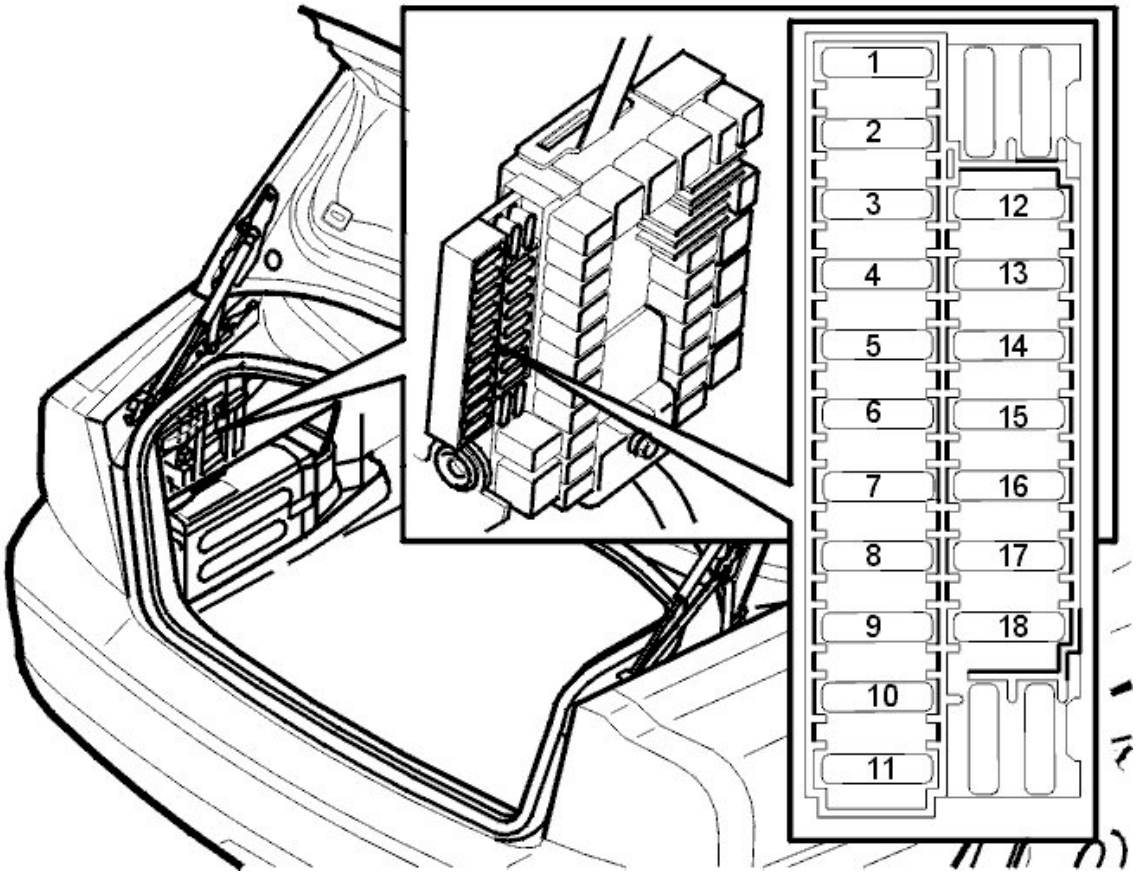
Central electrical unit engine/transmission control module (ECM/TCM).



Relay box in passenger compartment/cargo compartment. See Connector relay box, repair See: Diagnostic Aids/Connector Relay Box, Repair.



Fuse holder in passenger compartment/cargo compartment. See Connector fuse holder, repair See: Diagnostic Aids/Connector Fuse Holder, Repair.



Connector Brake Control Module (BCM), Repair

Connector Brake Control Module (BCM), repair

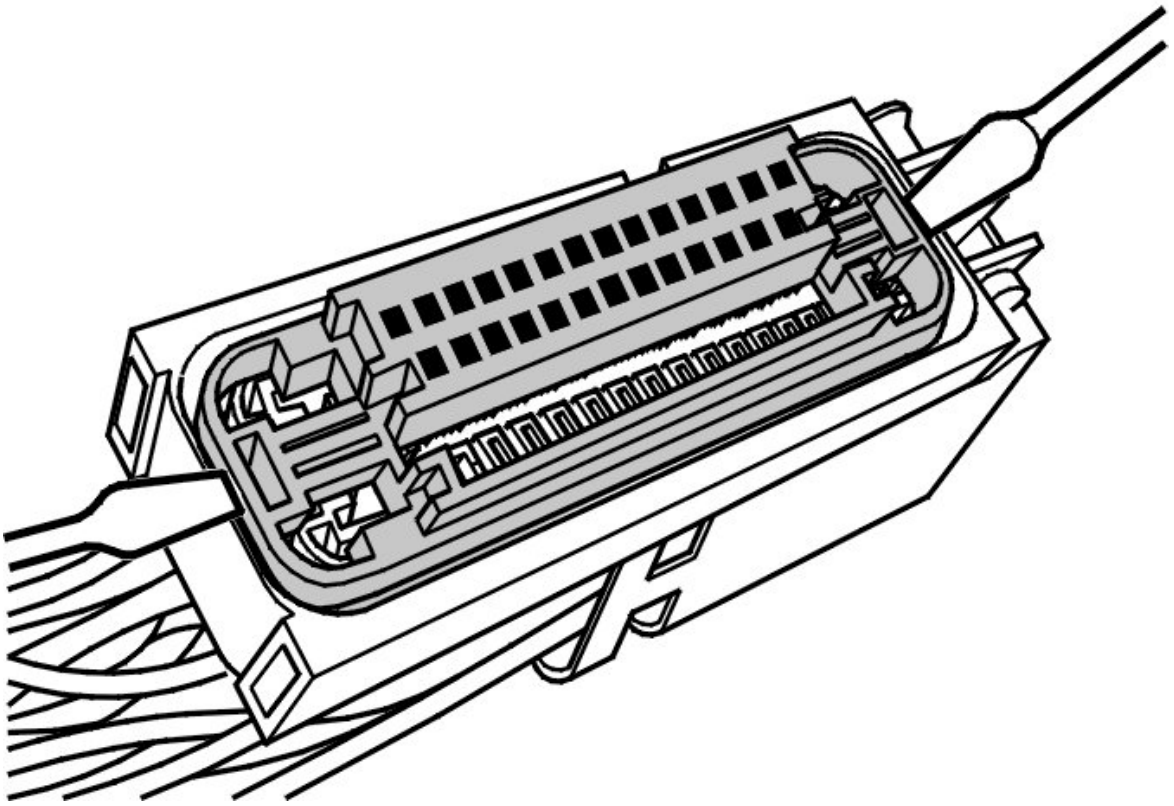
Special tools:
951 2636 Terminal removal tool See: Tools and Equipment/951 2636 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

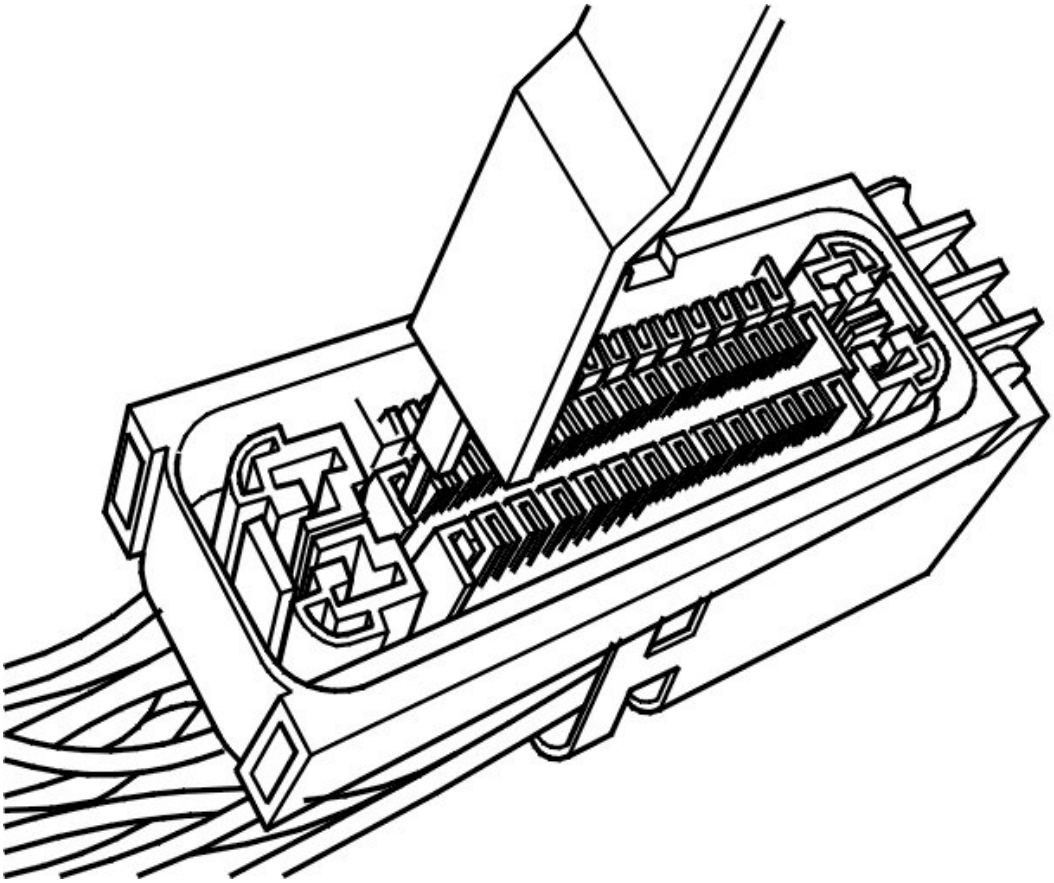
Secondary lock



Release the secondary lock. Use electrician's screwdriver as illustrated.

Caution! Disconnect and work with only one cable at a time to minimize the risk of mixing them up.

Primary lock



Use tools 951 2636 Terminal removal tool See: Tools and Equipment/951 2636 Terminal Removal Tool or951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated.
At the same time pull the cable carefully backwards.

Connector, assembling

Note! Wheel sensor cables are twisted pair (positive and negative signal) cables for each wheel. It is important that paired cables are twinned in the same way when they are reinstalled in the connector. The cables must be twisted approximately 3 times per 100 mm.

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Control Module for Anti-lock Brake System Module (ABS), Repair

Connector control module for Anti-lock Brake System Module (ABS), repair

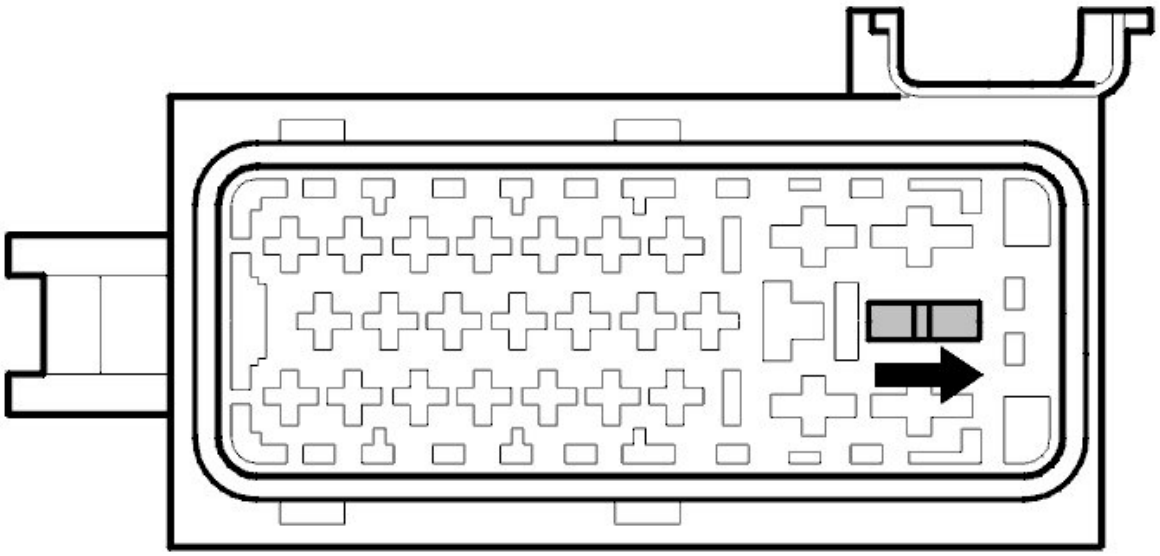
Special tools:
951 2630 Terminal removal tool See: Tools and Equipment/951 2630 Terminal Removal Tool

951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

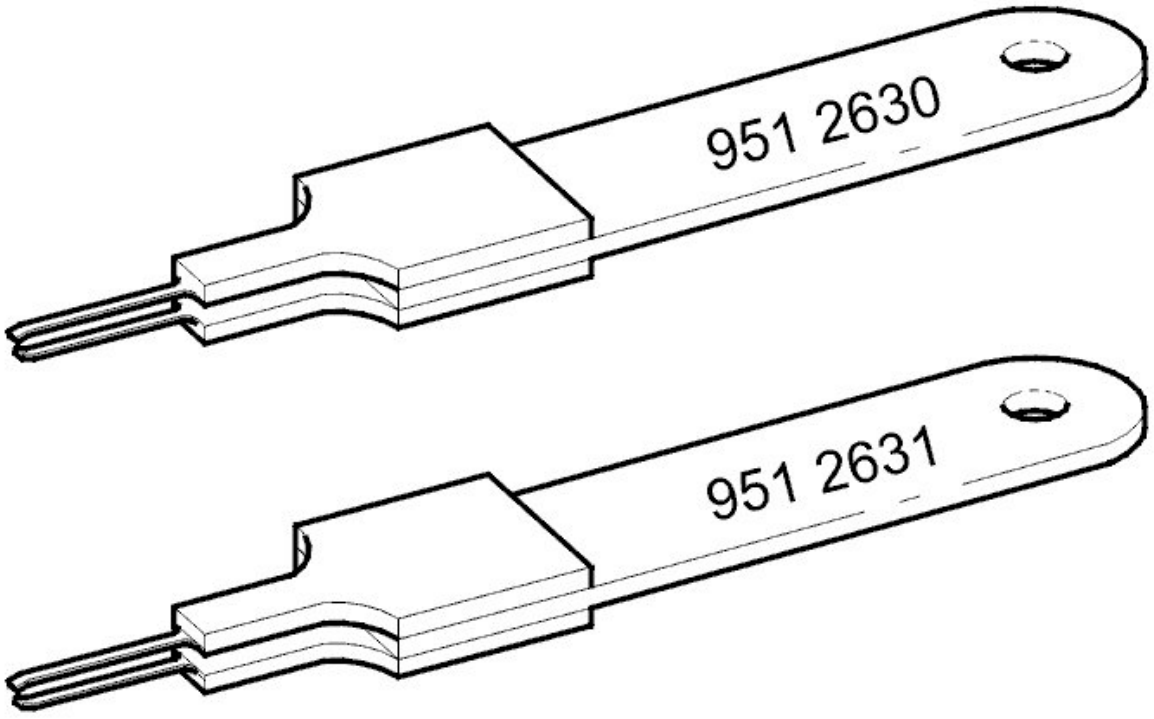
Secondary lock



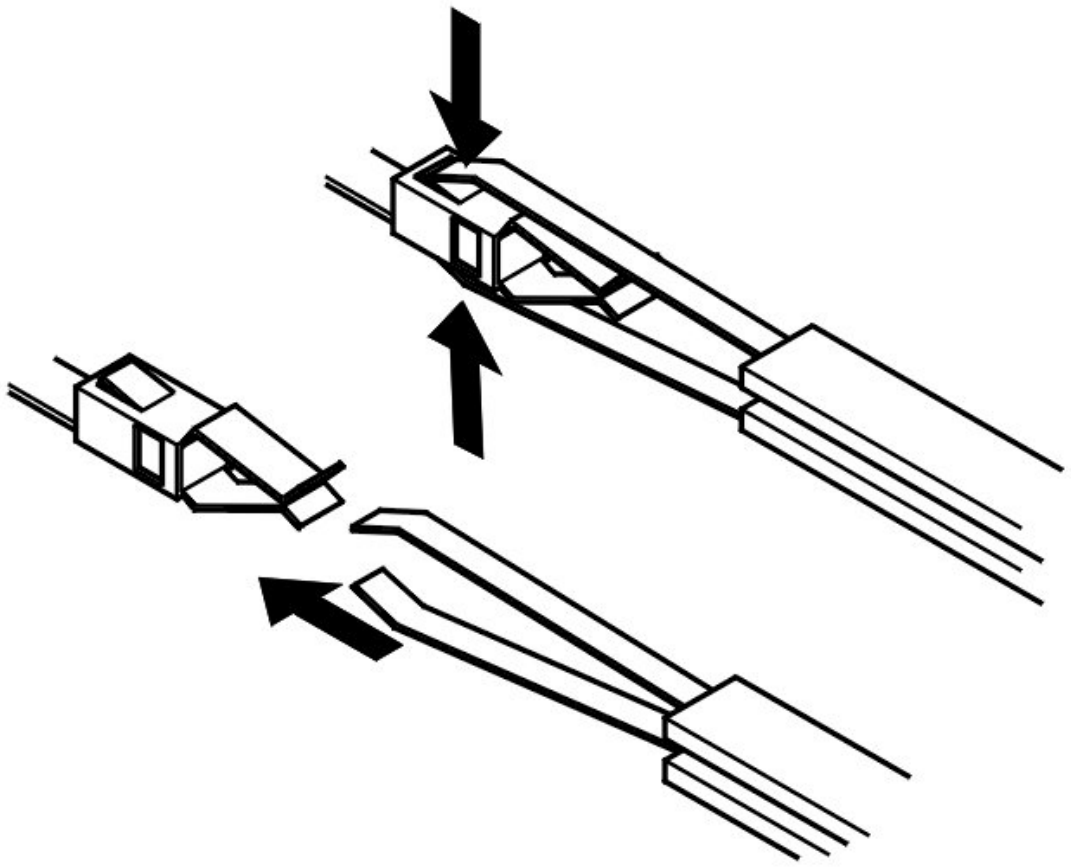
Slide the catch in the direction of the arrow, as illustrated.

Caution! Disconnect and work with only one cable at a time to minimize the risk of mixing them up.

Primary lock



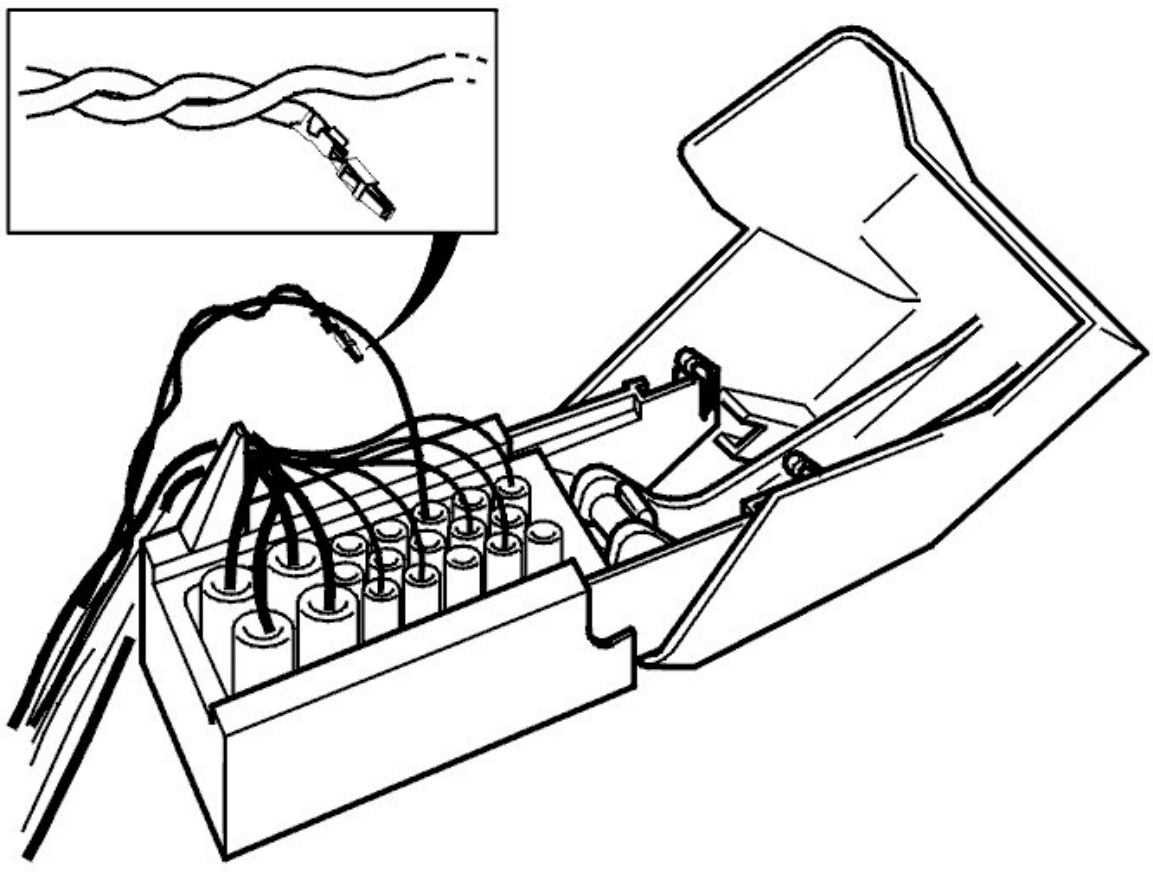
Use tools 951 2630 Terminal removal tool See: Tools and Equipment/951 2630 Terminal Removal Tool and951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool to remove the primary lock, as illustrated.
At the same time pull the cable carefully backwards.



Connector, assembling

Note! Wheel sensor cables are twisted pair (positive and negative signal) cables for each wheel. It is important that paired cables are twinned in the same way when they are reinstalled in the connector. The cables must be twisted approximately 3 times per 100 mm.

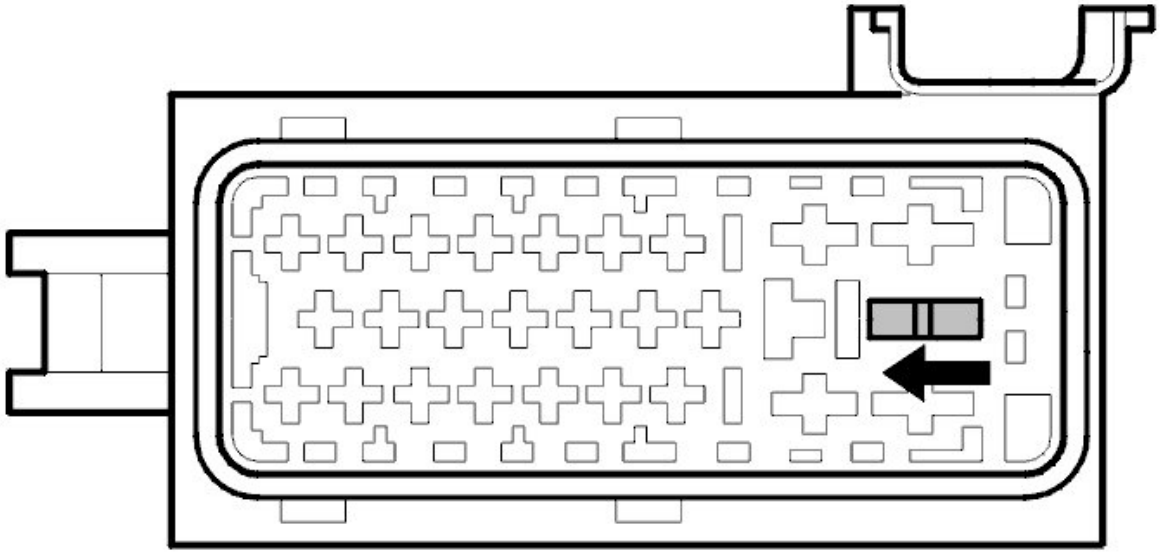
Primary lock



Check that the cable terminal is undamaged.
Press the cable terminal into the housing.

Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock



Slide the catch in the direction of the arrow, as illustrated.

Connector Data Link Connector (DLC), Repair

Connector data link connector (DLC), repair

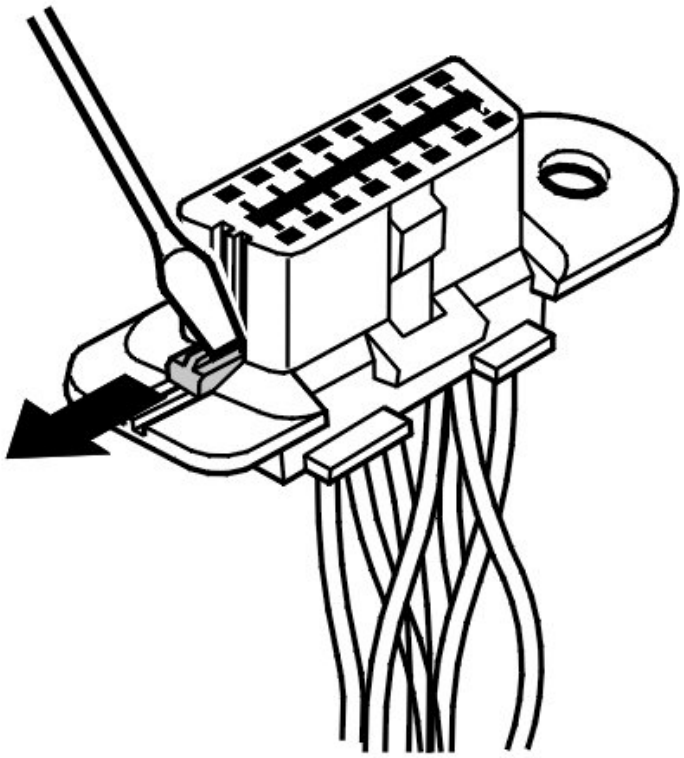
Special tools:
951 2636 Terminal removal tool See: Tools and Equipment/951 2636 Terminal Removal Tool

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

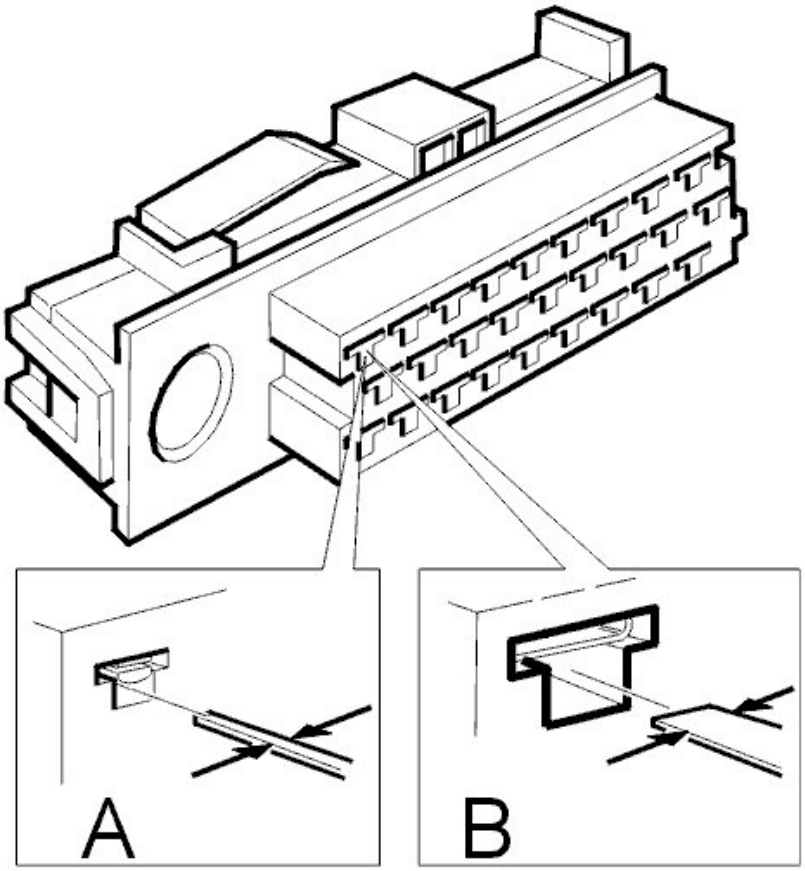
Data link connector (DLC), dismantling

Expose the data link connector (DLC).

Secondary lock



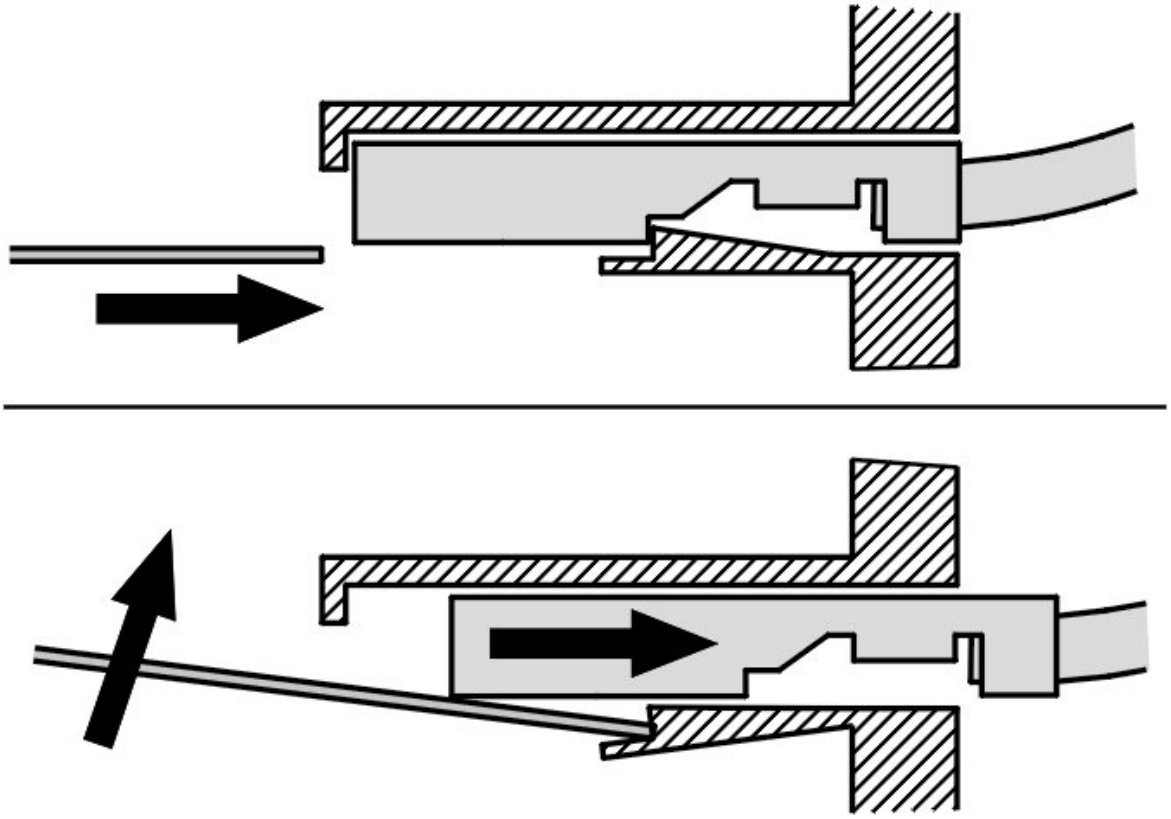
Pull the secondary lock out to the side. Use an electrician's screwdriver, as illustrated.



Use tool 951 2636 Terminal removal tool See: Tools and Equipment/951 2636 Terminal Removal Tool to remove the cable terminal lock, as illustrated.
At the same time pull the cable carefully backwards.

Data link connector, assembling

Primary lock



Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Supplemental Restraint System Module (SRS), Repair

Connector Supplemental Restraint System Module (SRS), repair

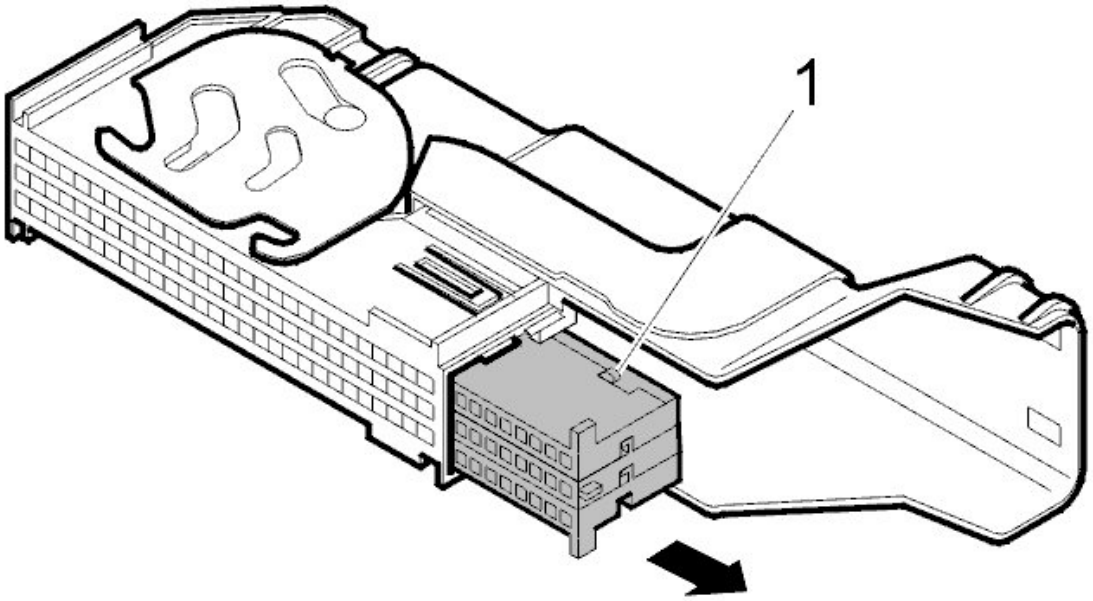
Special tools:
951 2812 Terminal removal tool See: Tools and Equipment/951 2812 Terminal Removal Tool

951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

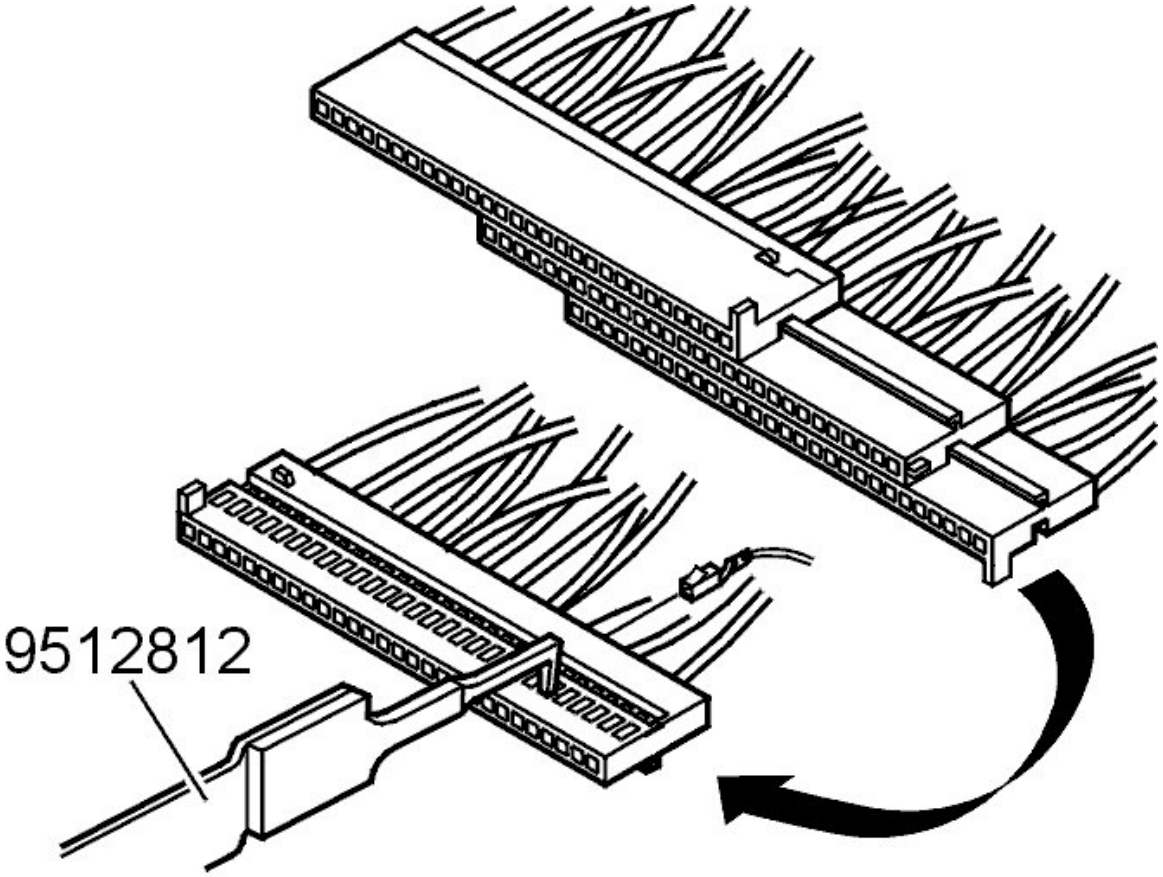
Secondary lock



Press in the active catches on both sides of the socket housing and slide out the receptacle housings.

Caution! Disconnect and work with only one cable at a time to minimize the risk of mixing them up.

Primary lock



Press in the locking tab on the cable terminal and carefully pull out the cable and the cable terminal. Use tool 951 2812 Terminal removal tool See: Tools and Equipment/951 2812 Terminal Removal Tool or tool 951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool , as illustrated.

Connector, assembling

Primary locking

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary locking

Press the secondary lock into place.

Connector Type 1

Connectors, repair

Special tool 951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool.

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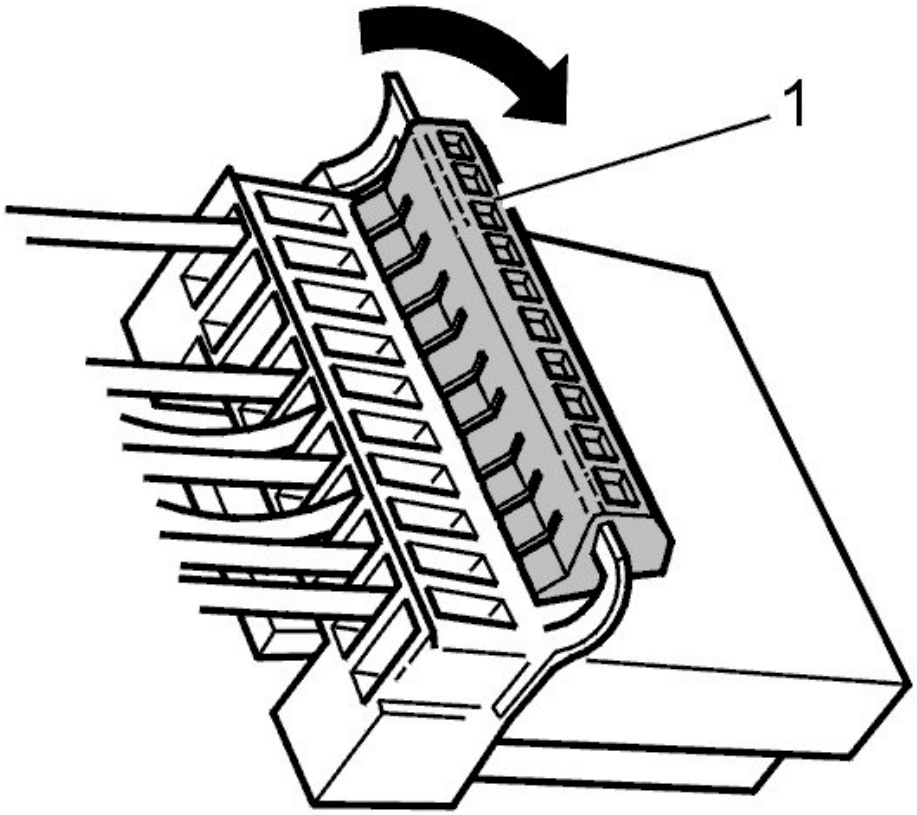
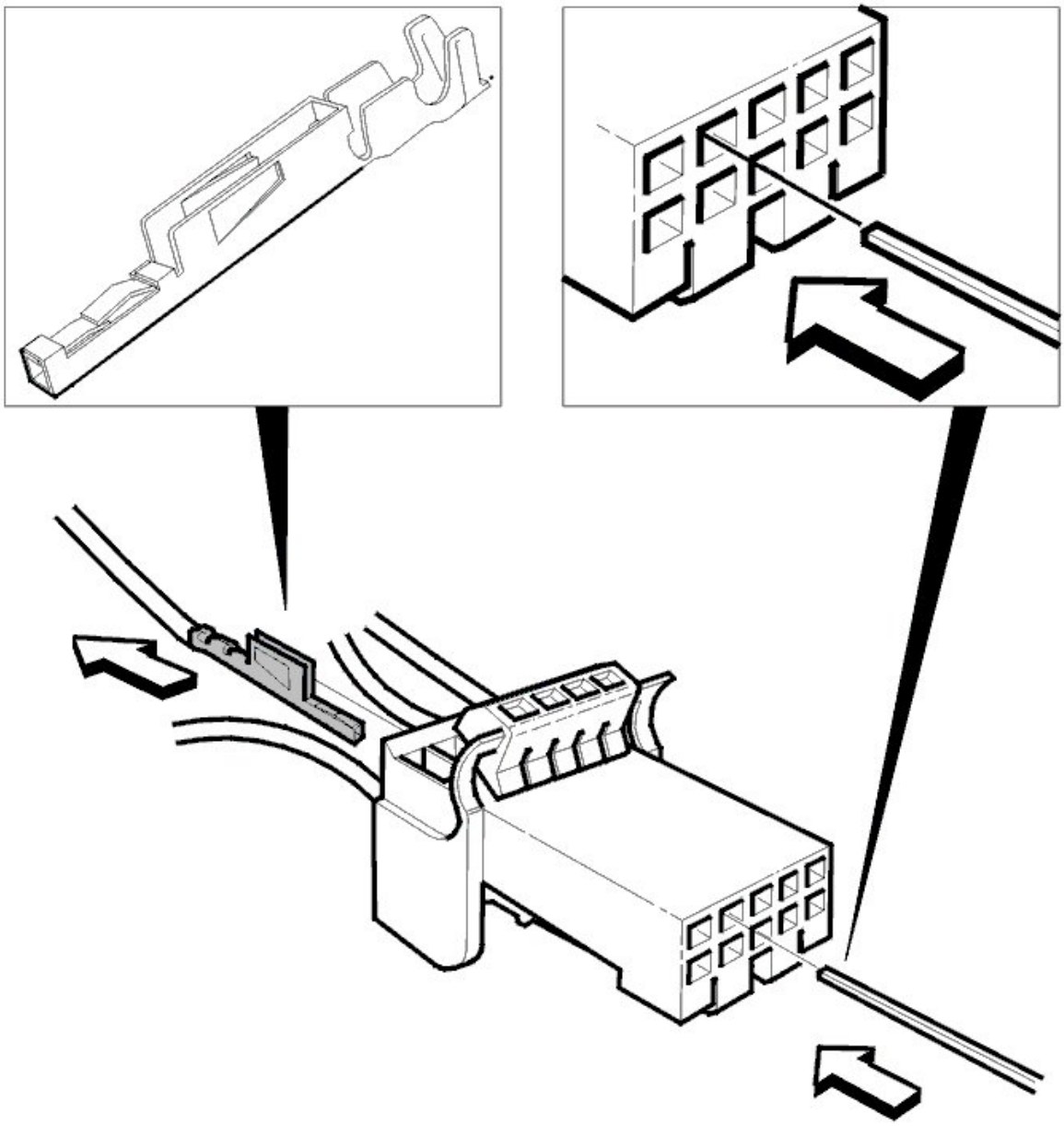
Connector, dismantling

Secondary lock



Fold up the secondary lock (1), as illustrated. Use an electrician's screwdriver.

Primary lock



Use tool 951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool to remove the primary lock, as illustrated.
At the same time pull the cable carefully backwards.

Connector, assembling

Primary locking

Check that the catches for the cable terminal are undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary locking

Press the secondary lock into place.

Connector Type 2

Connectors, repair

Special tools:
951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

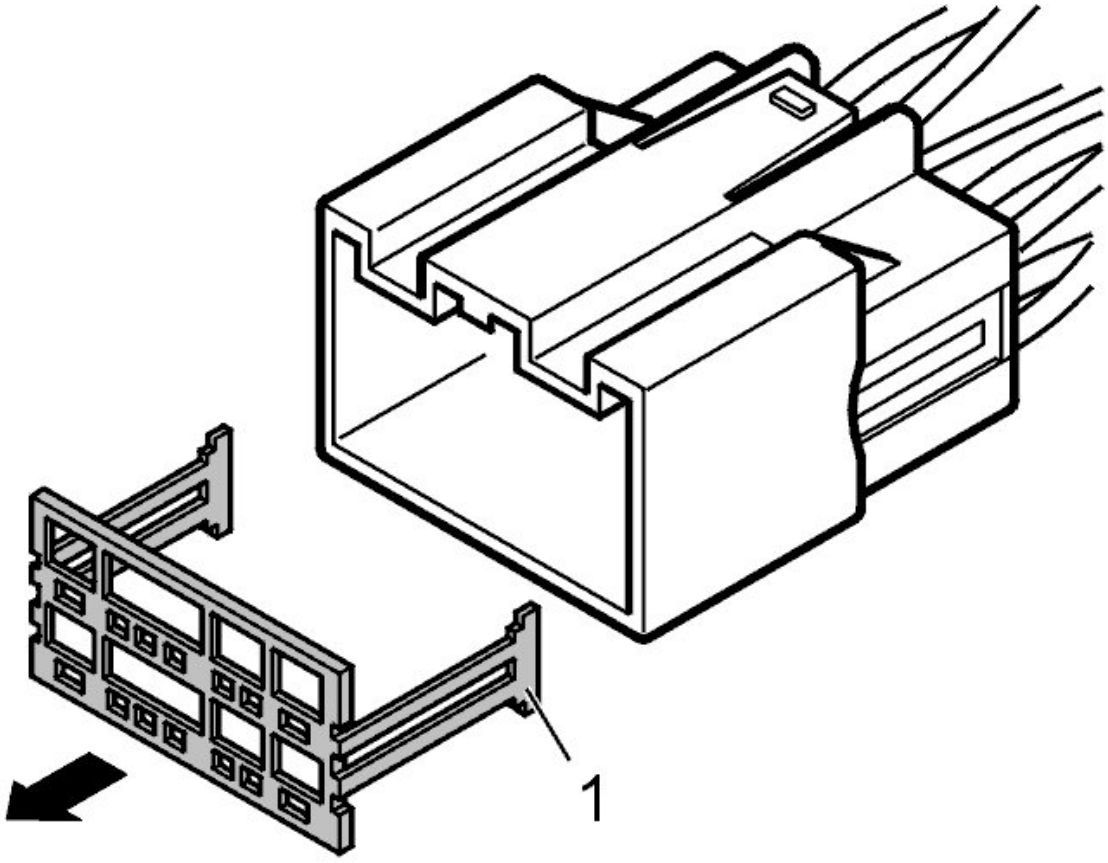
951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool

951 2853 Terminal removal tool See: Tools and Equipment/951 2853 Terminal Removal Tool

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

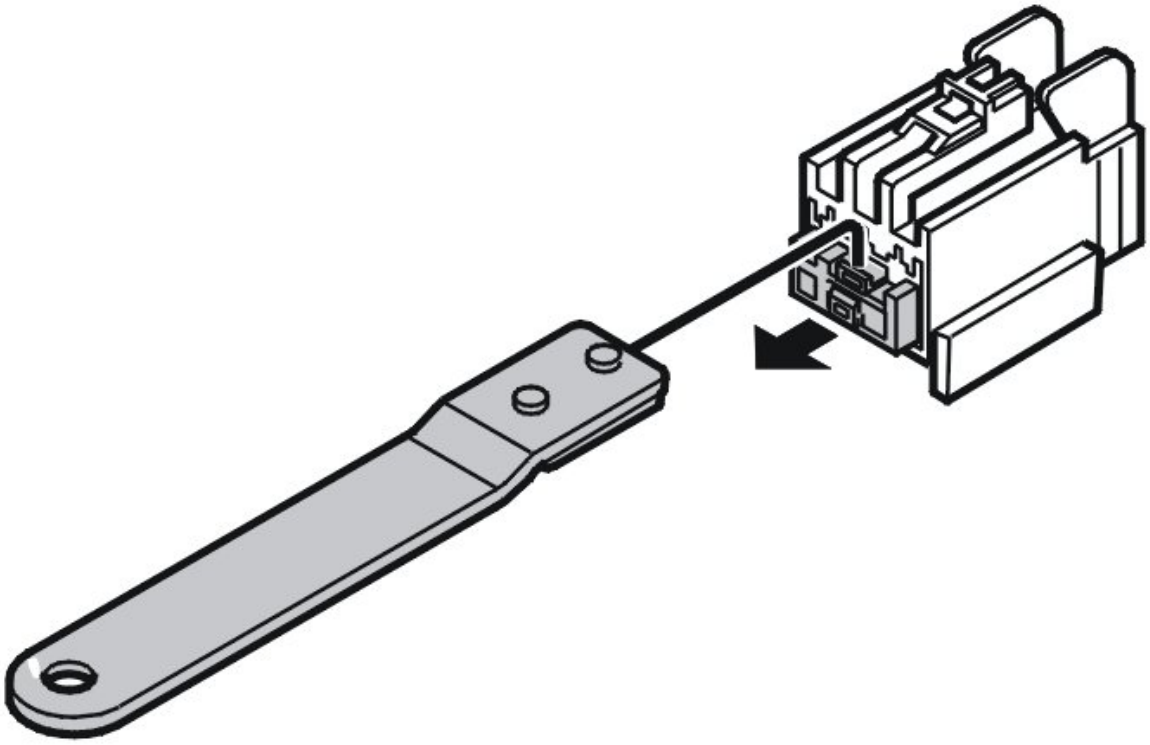
Connector, dismantling

Secondary lock



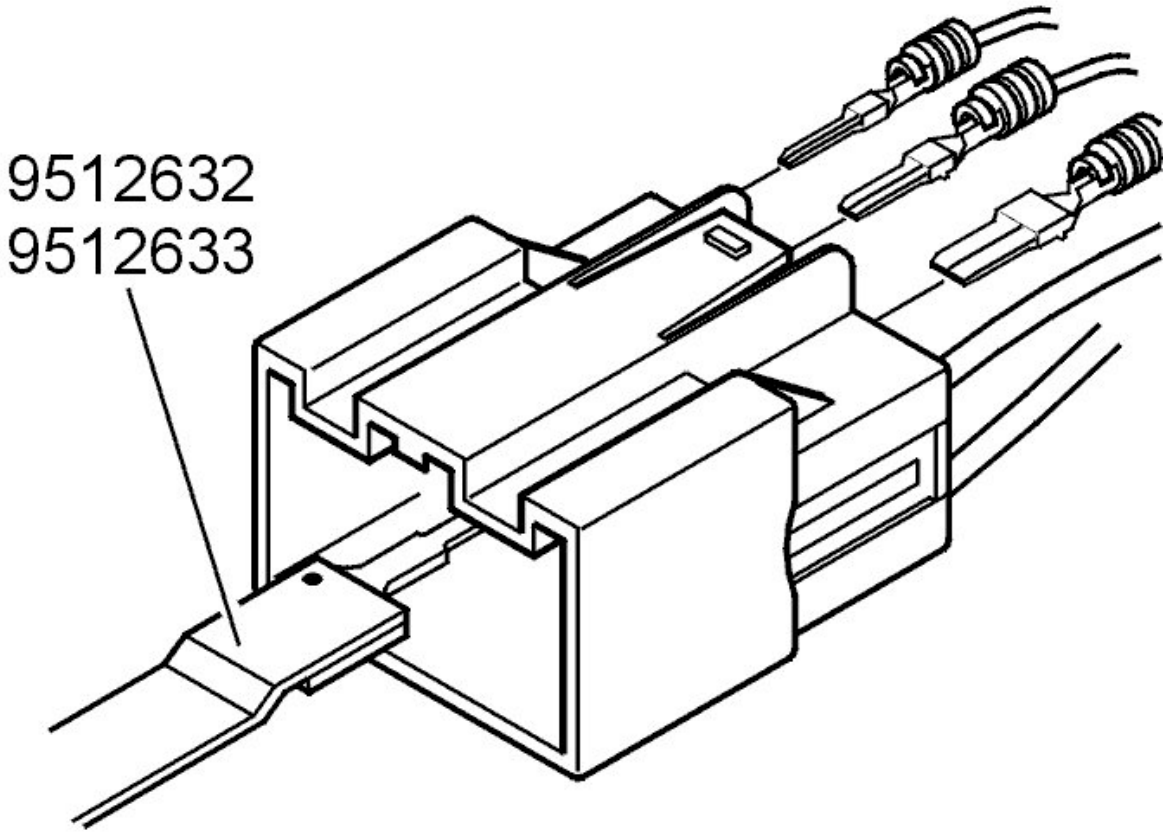
Pin housing

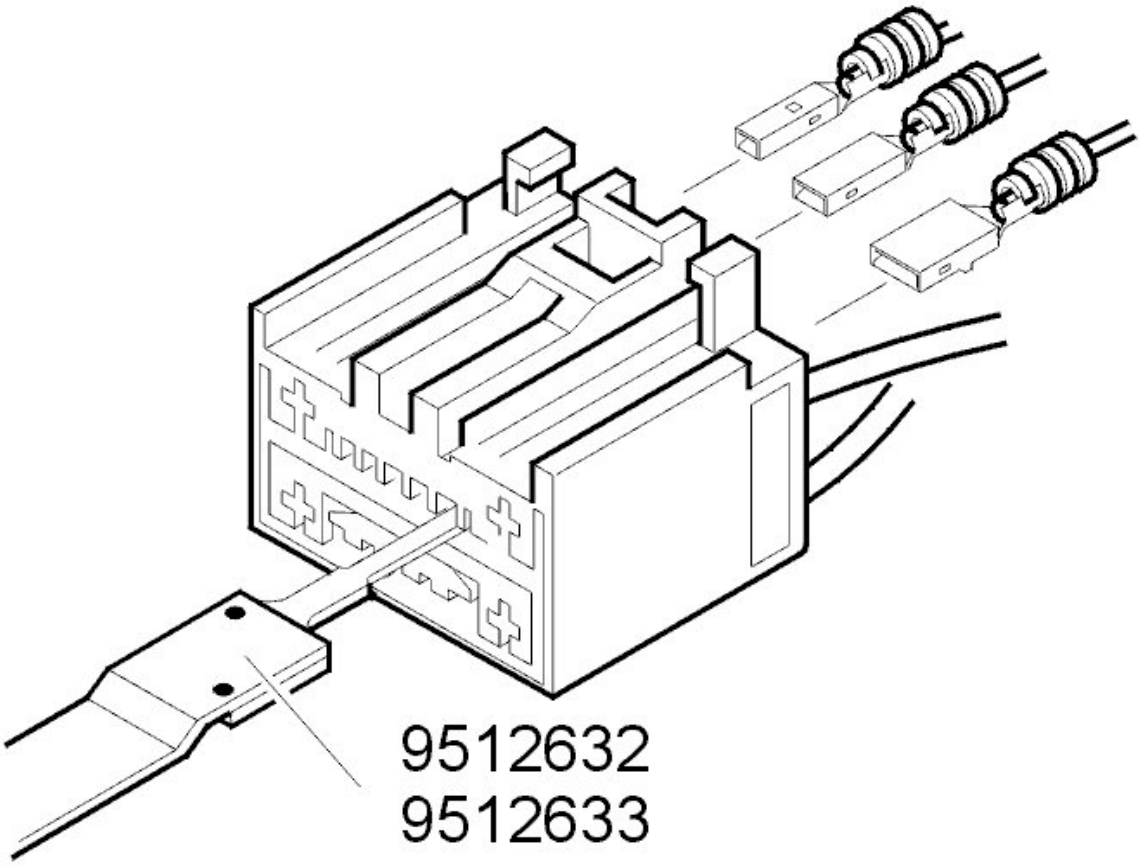
Release the front housing section on the pin housing by pulling out the rear catches while at the same time pressing the housing section forwards.



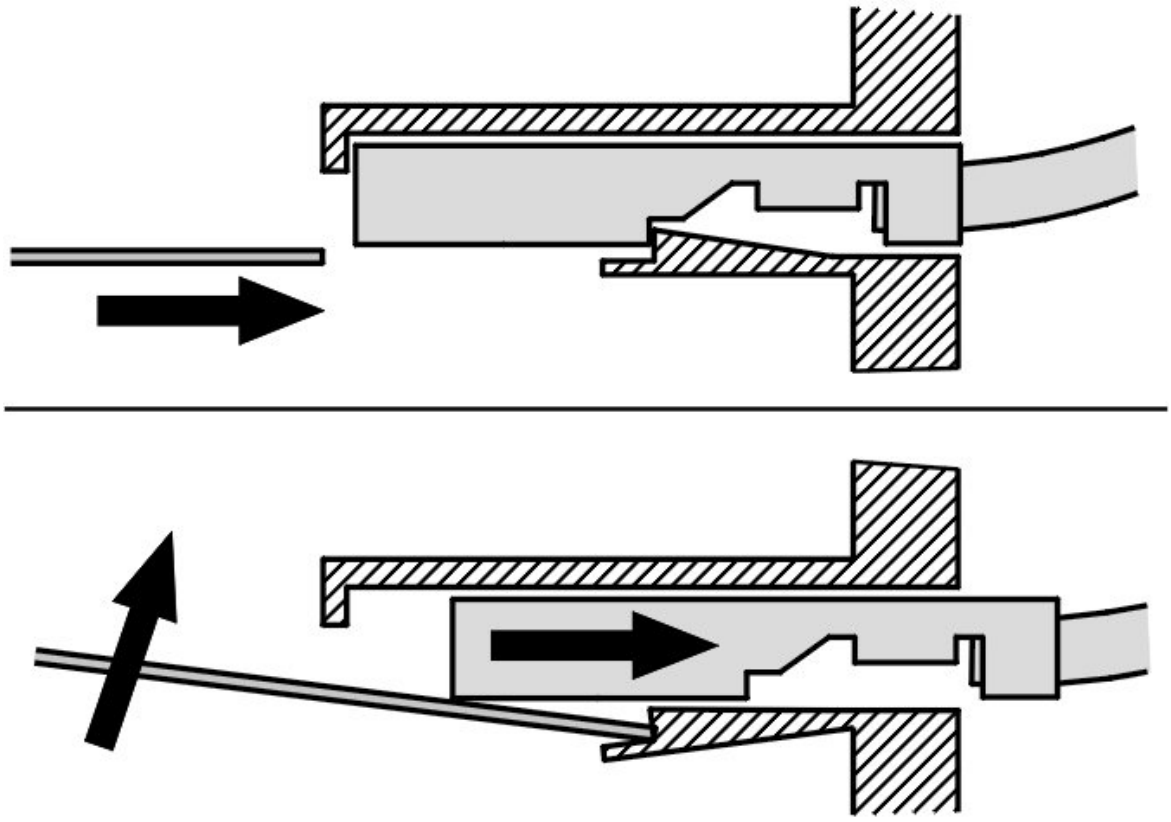
Socket housing

Open the catches and pull out the secondary lock, use tool 951 2853 Terminal removal tool See: Tools and Equipment/951 2853 Terminal Removal Tool or an electrician's screwdriver, as illustrated.





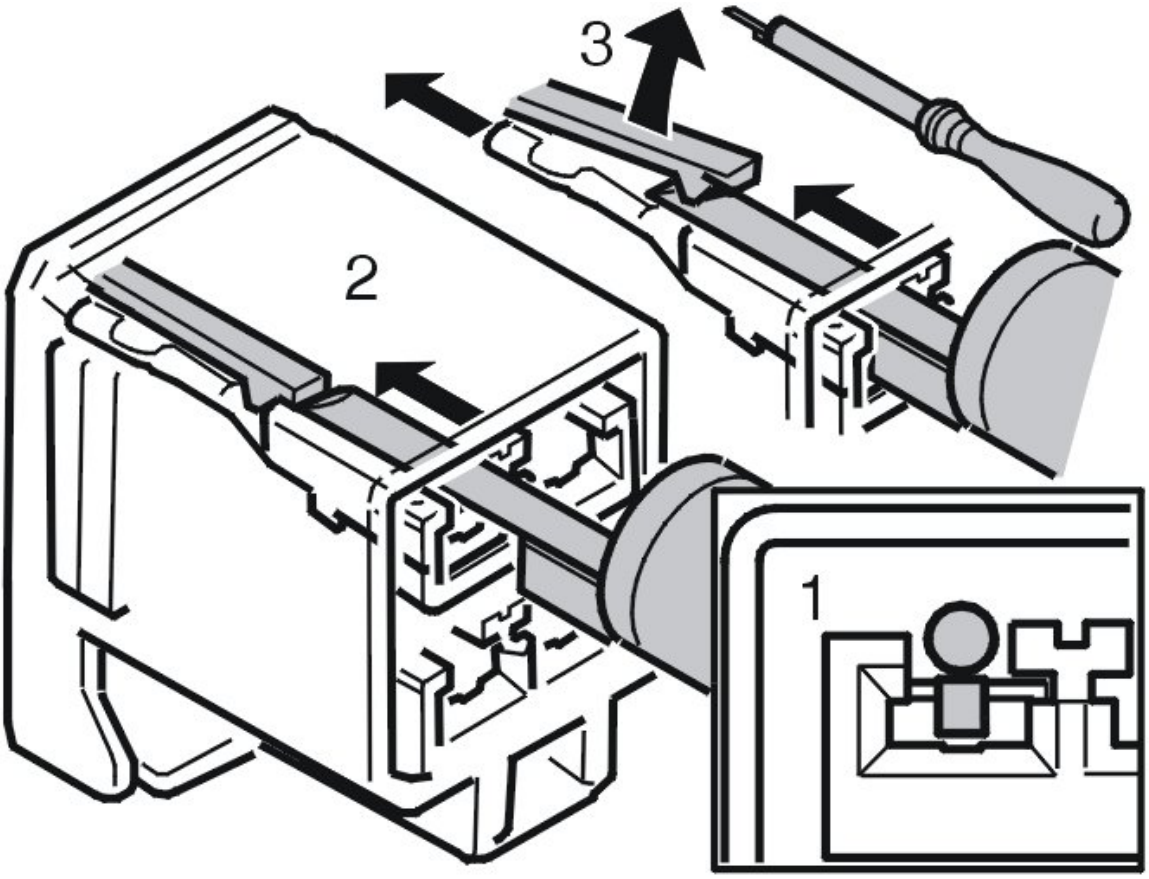
Primary lock



Use tools 951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.



Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Note! tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool can only be used for socket housings.

Connector, assembling

Primary locking

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary locking

Press the secondary lock into place.

Connector Type 3

Connectors, repair

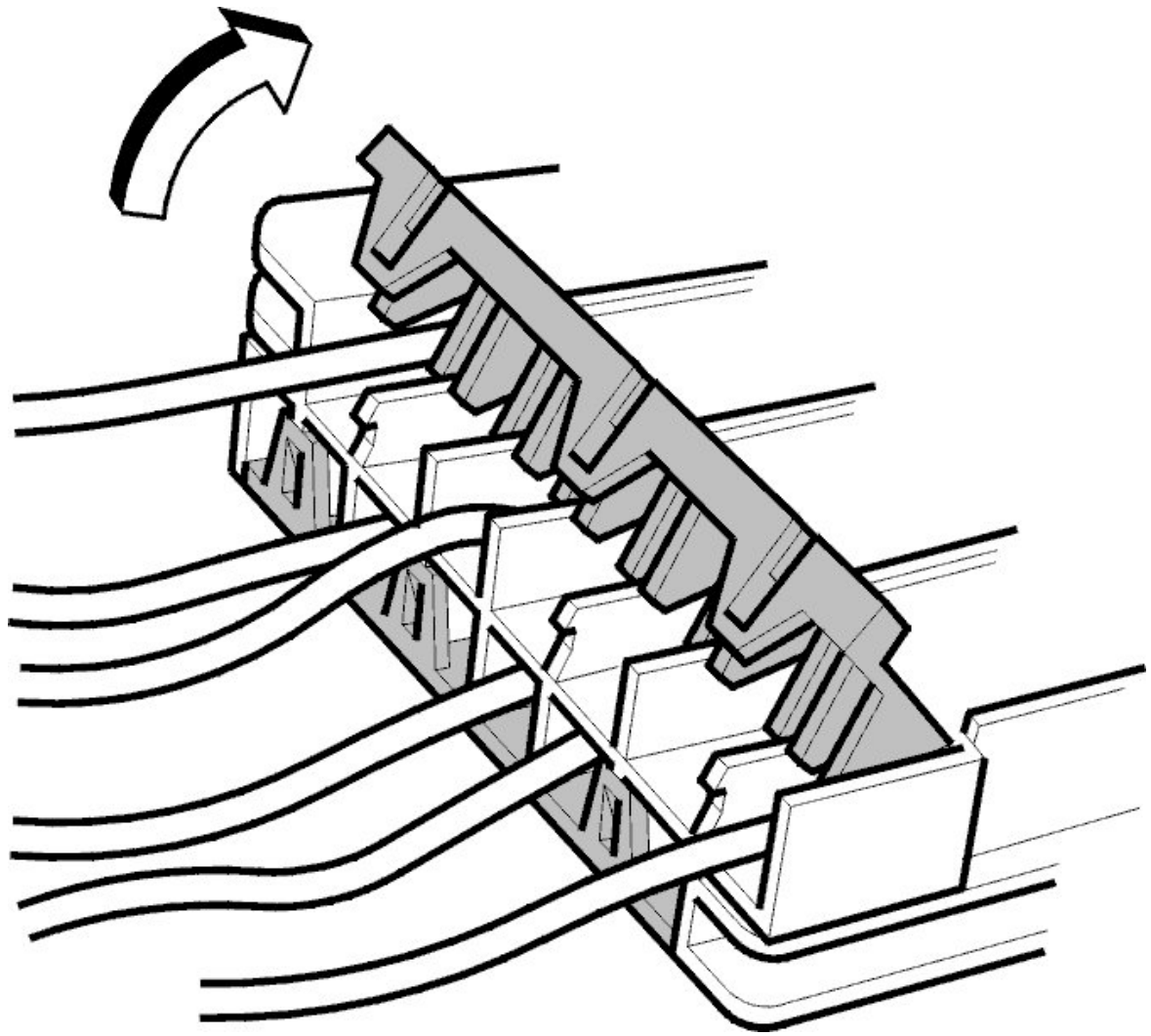
Special tools:
951 2630 Terminal removal tool See: Tools and Equipment/951 2630 Terminal Removal Tool

951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

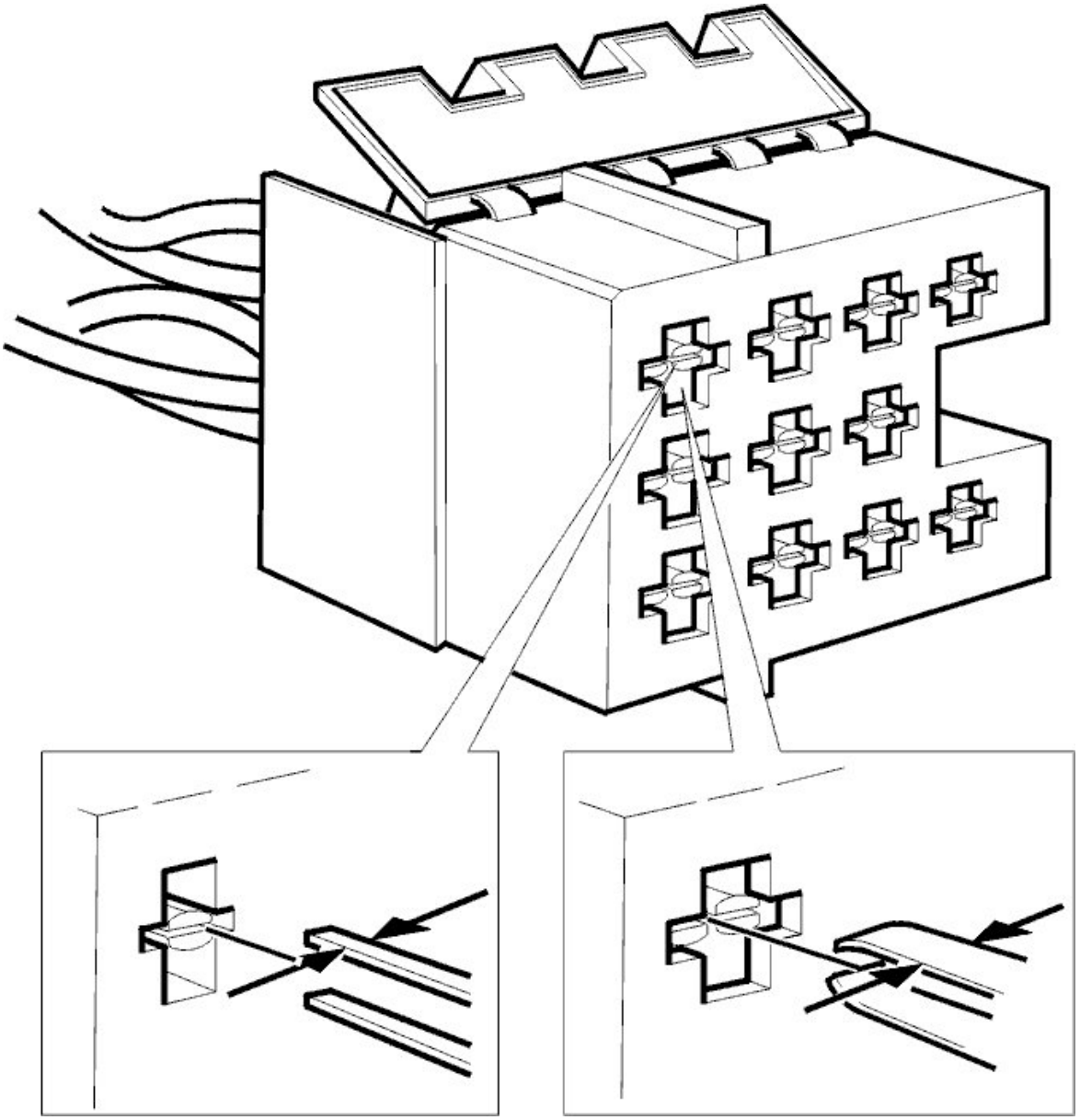
Connector, dismantling

Secondary lock



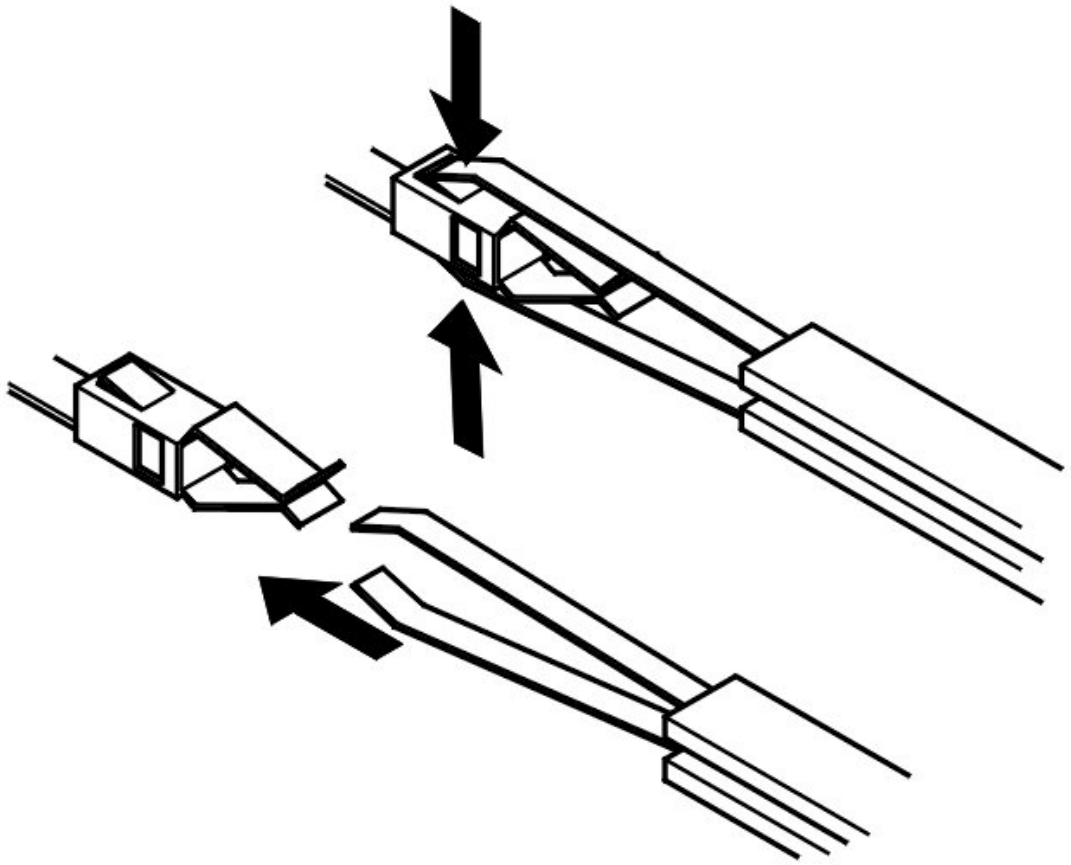
Fold up the secondary lock. If necessary use an electrician's screwdriver.

Primary lock



Use tools 951 2630 Terminal removal tool See: Tools and Equipment/951 2630 Terminal Removal Tool

951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool to remove the primary lock, as illustrated. Pull the cable carefully backwards.



Connector, assembling

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Type 4

Connectors, repair

Special tools:
951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

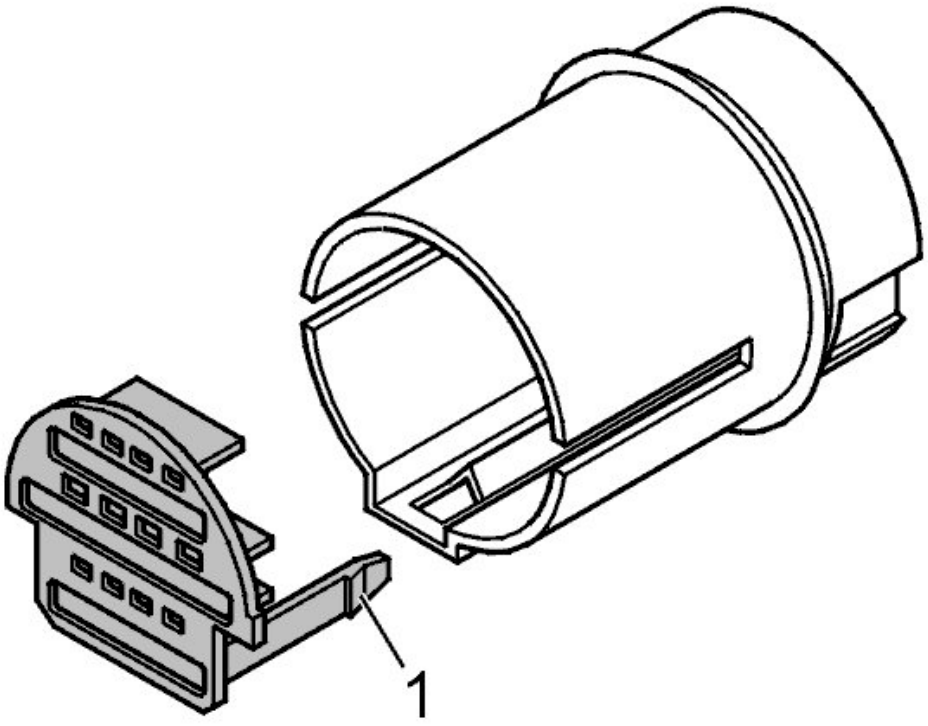
951 2810 Terminal removal tool See: Tools and Equipment/951 2810 Terminal Removal Tool

951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool.

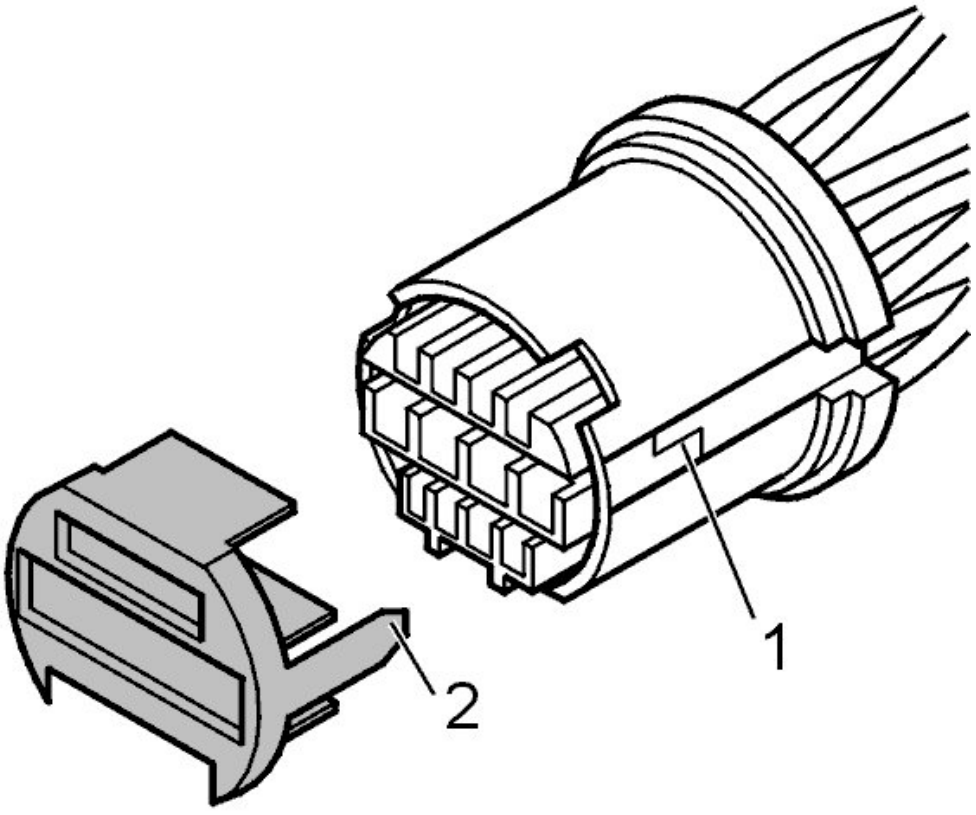
Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

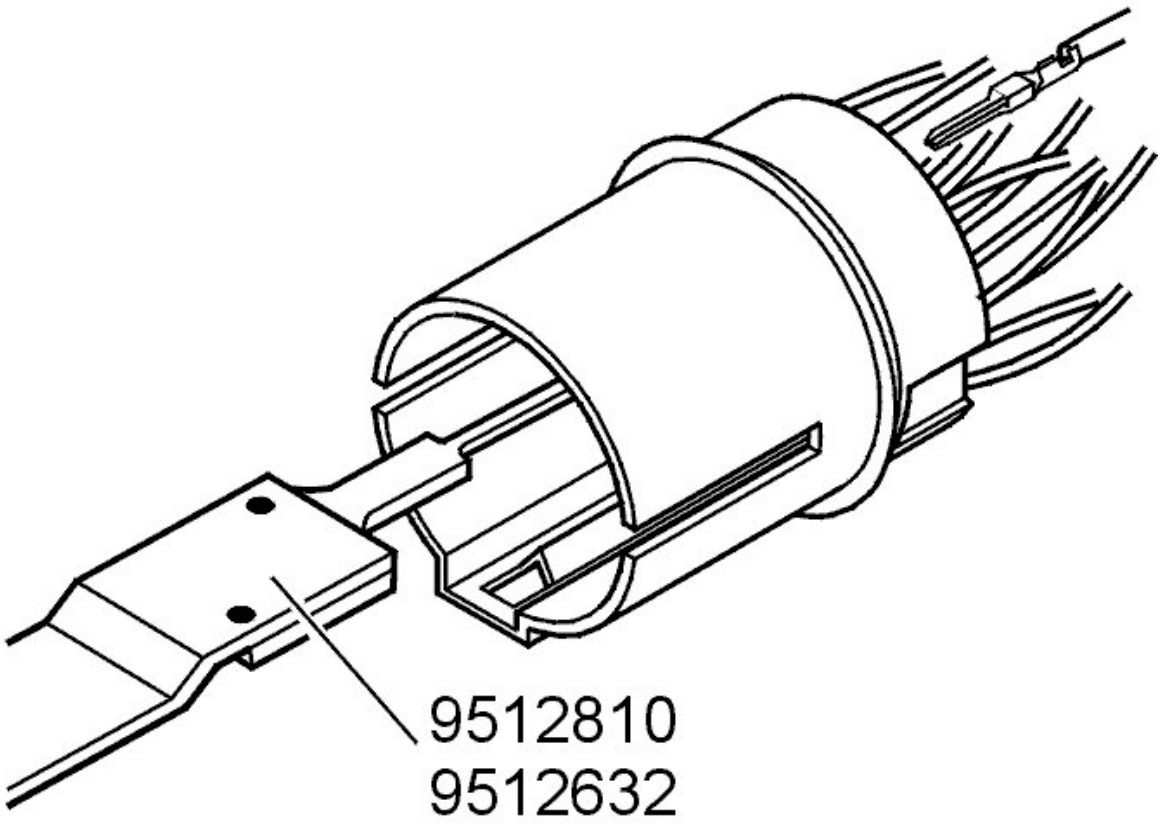
Secondary lock



Angle out the catches on both sides.
Pull out the secondary lock.



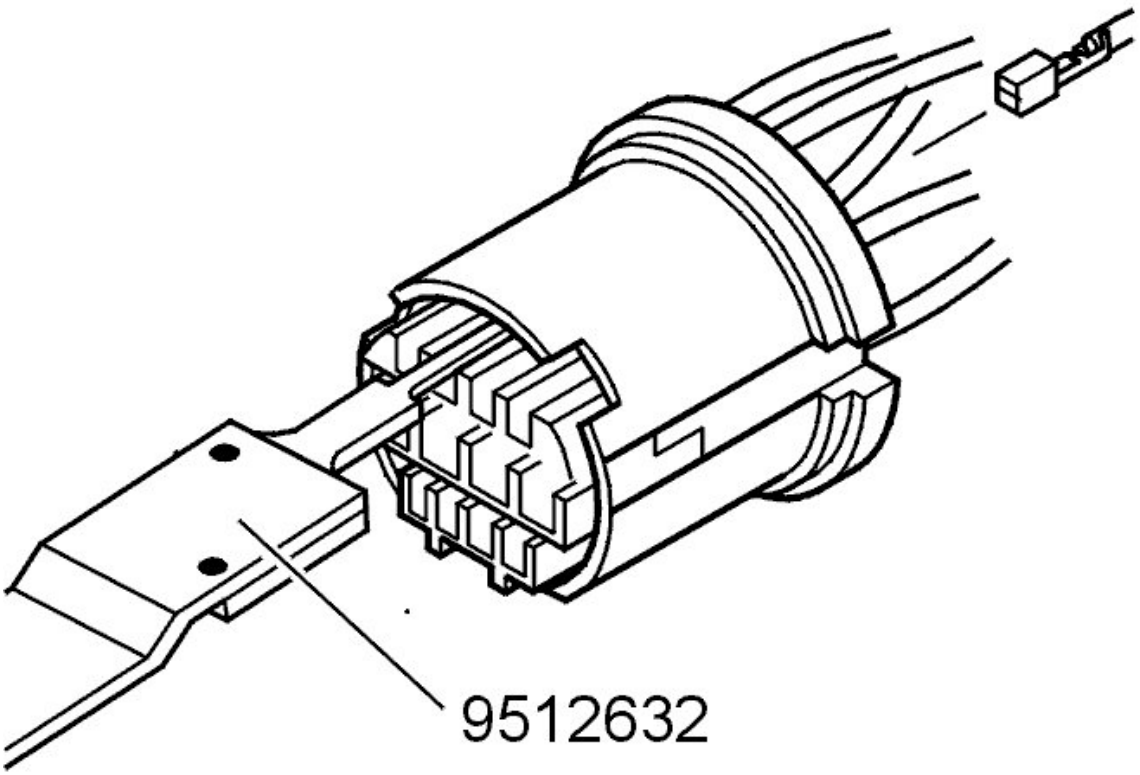
Primary lock

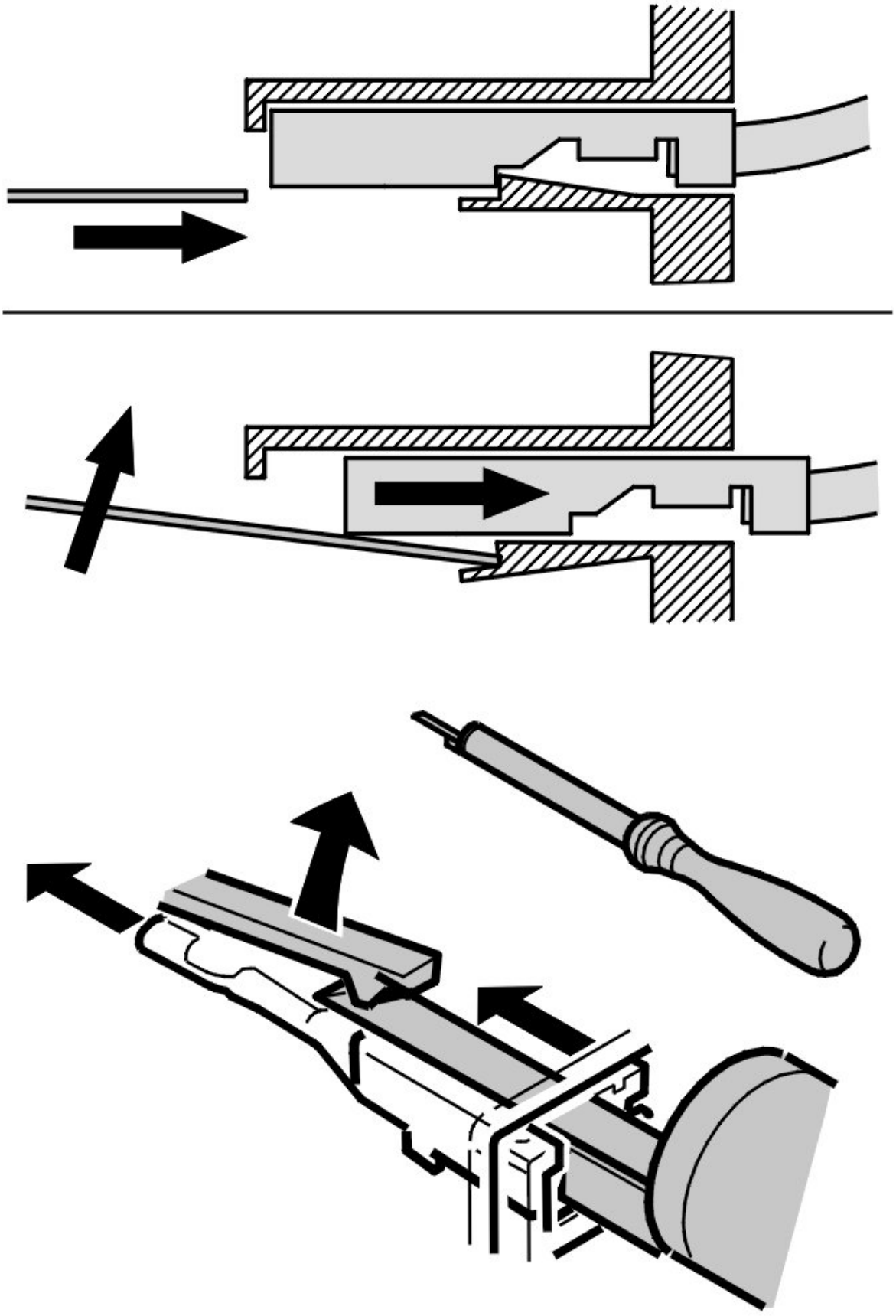


Use tools 951 2810 Terminal removal tool See: Tools and Equipment/951 2810 Terminal Removal Tool

951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.





Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Note! tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool can only be used for socket housings.

Connector, assembling

Primary lock

Check that the cable terminal is undamaged.

Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Type 5

Connector door, repair

Special tools:
951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

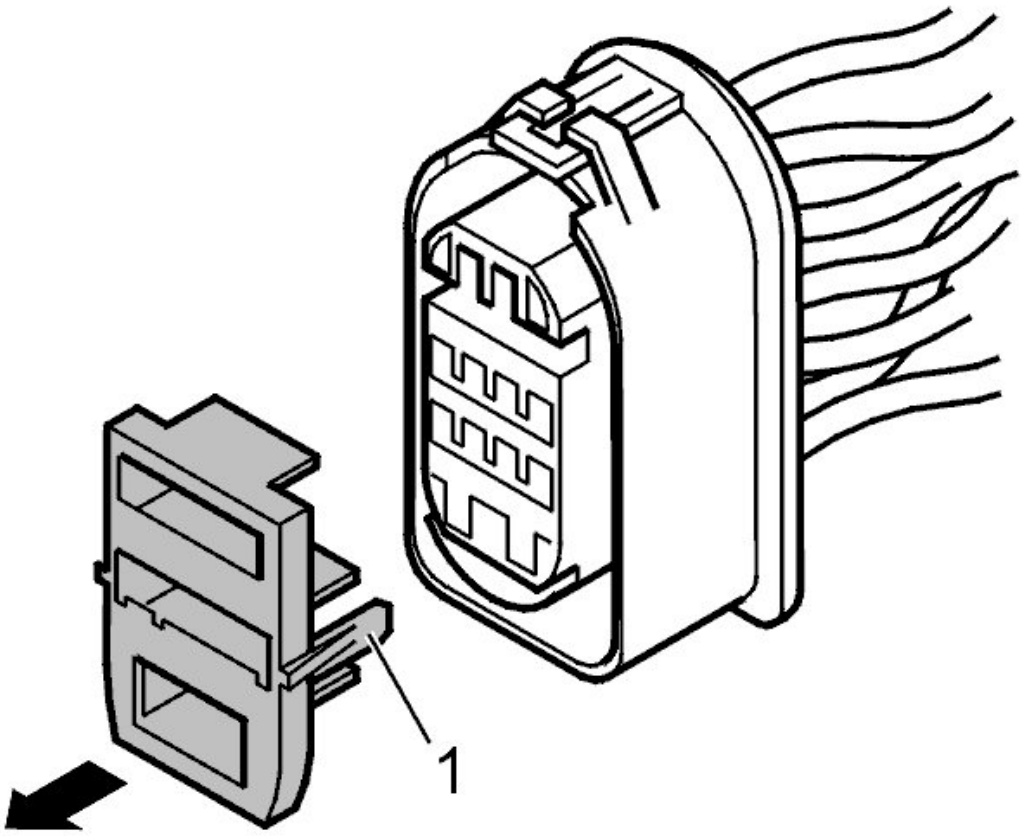
951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

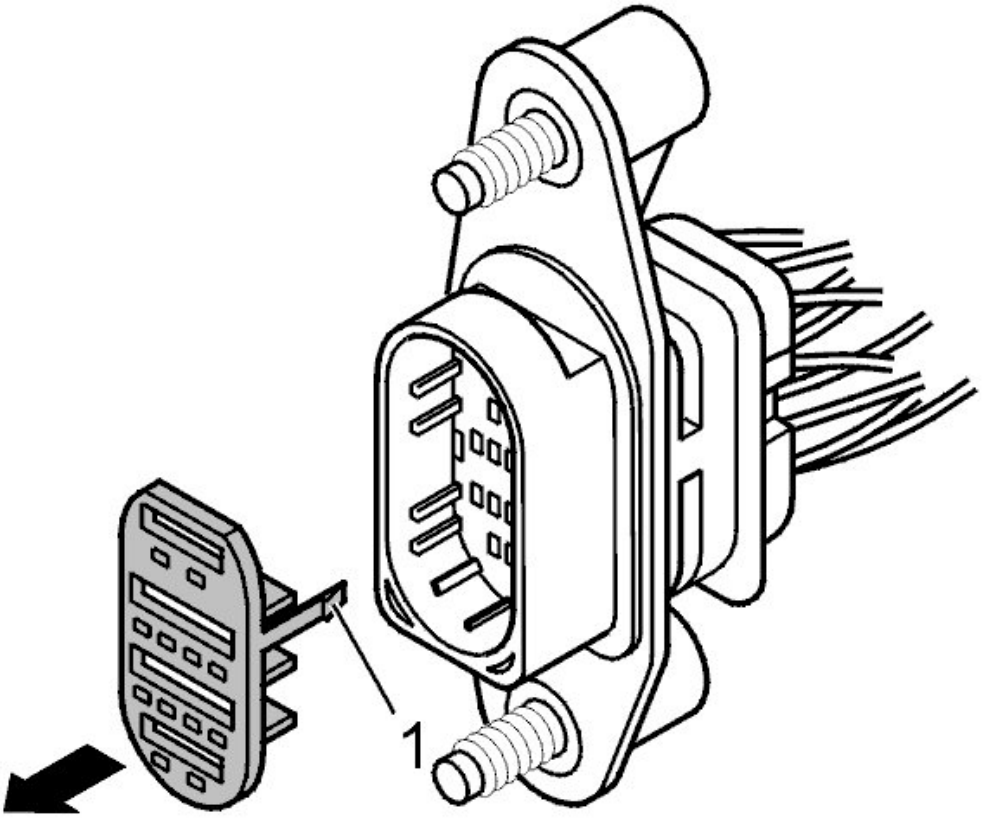
951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

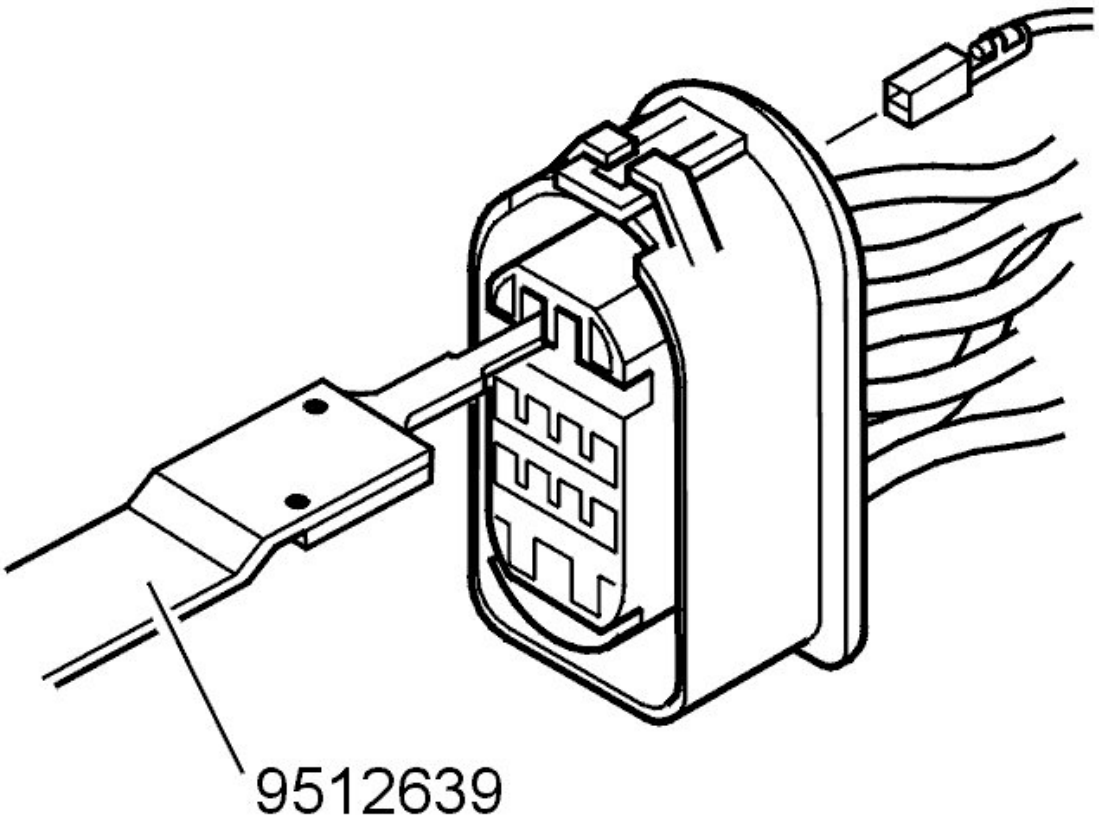
Secondary lock

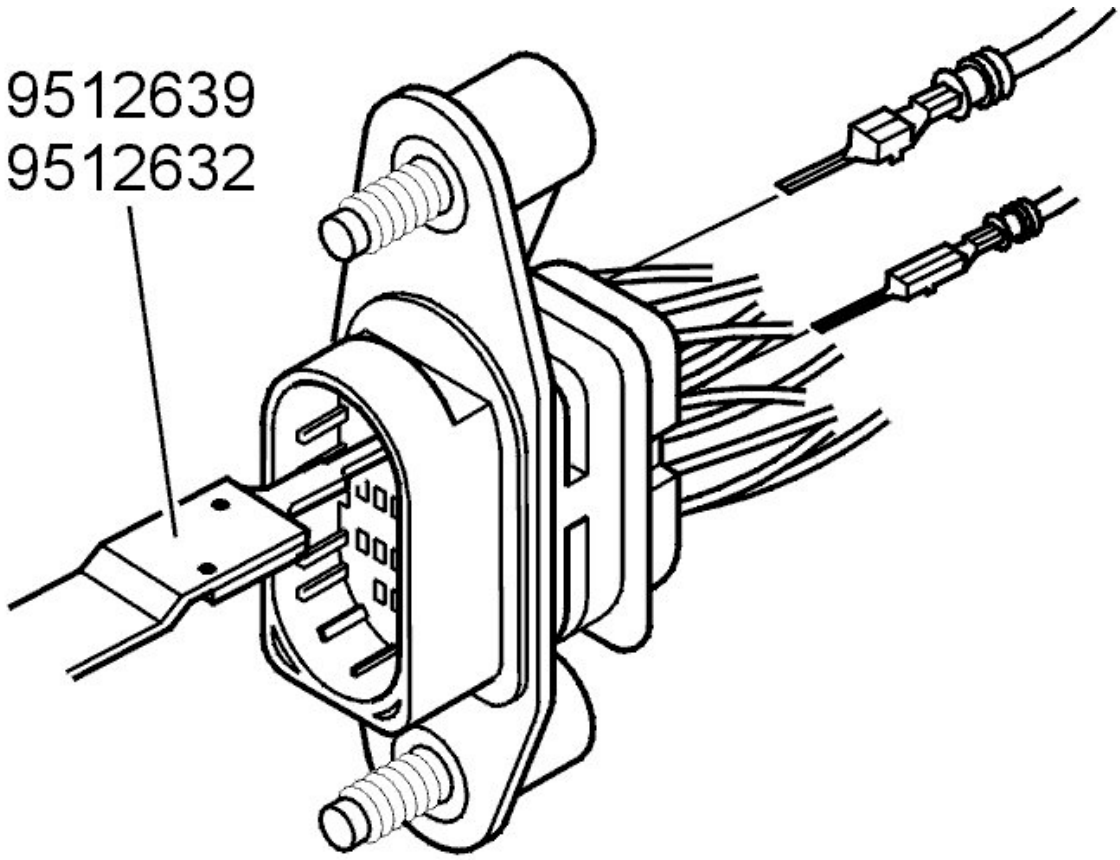




Angle out the catches on both sides.
Pull out the secondary lock.

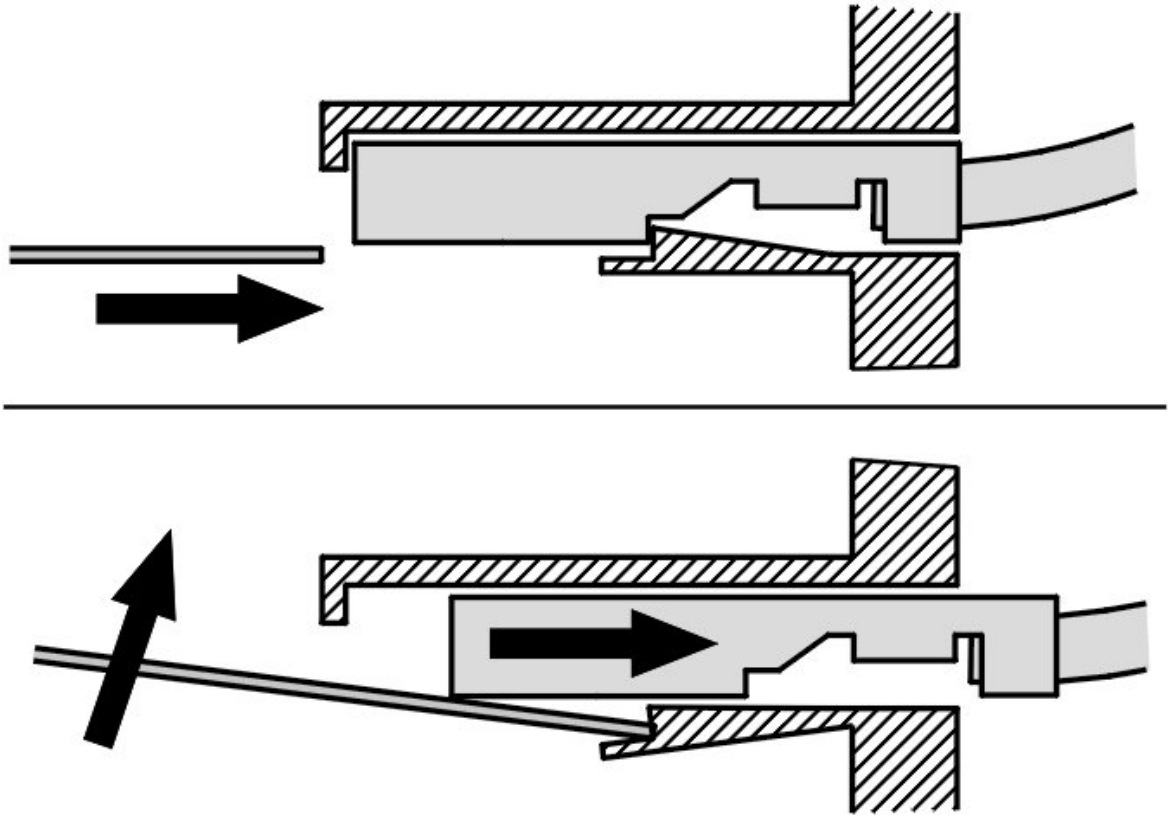
Primary lock

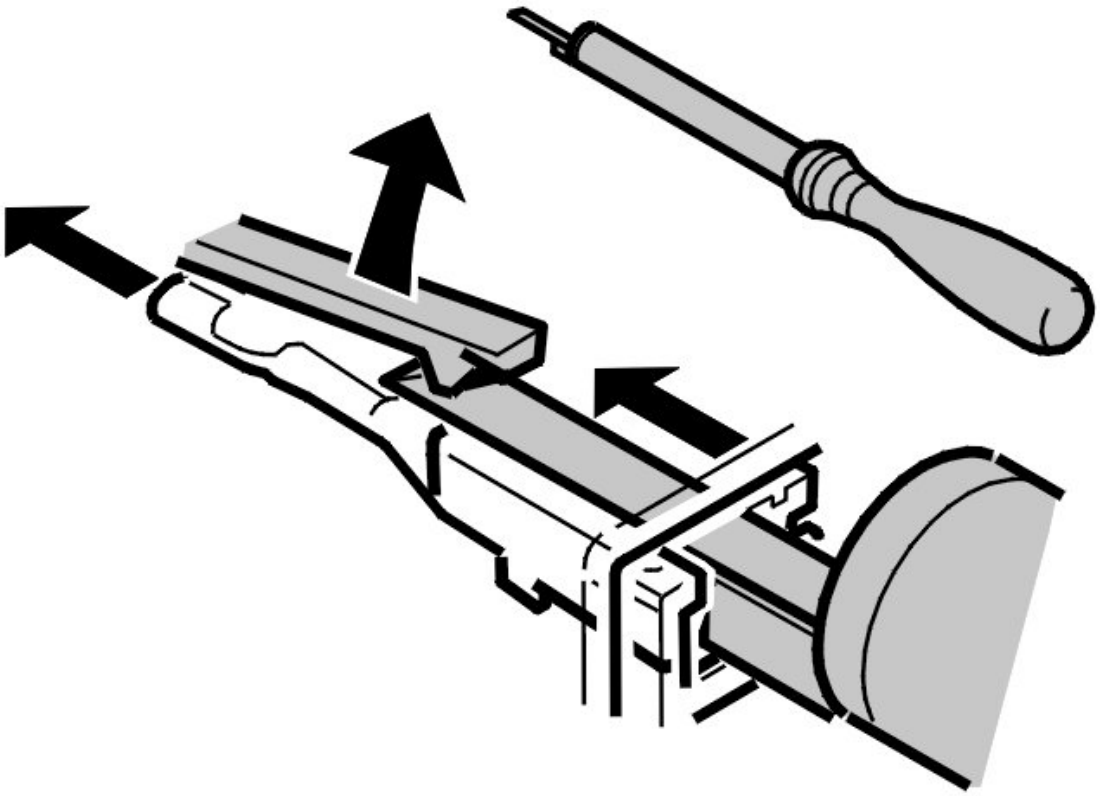




Use tools 951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.





Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Note! tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool can only be used for socket housings.

Connector, assembling

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Type 6

Connectors, repair

Special tools:
951 2811 Terminal removal tool See: Tools and Equipment/951 2811 Terminal Removal Tool

951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

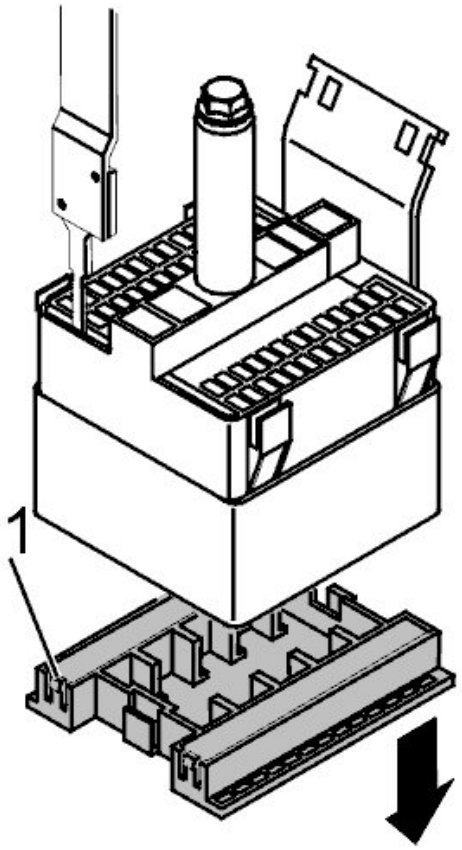
951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

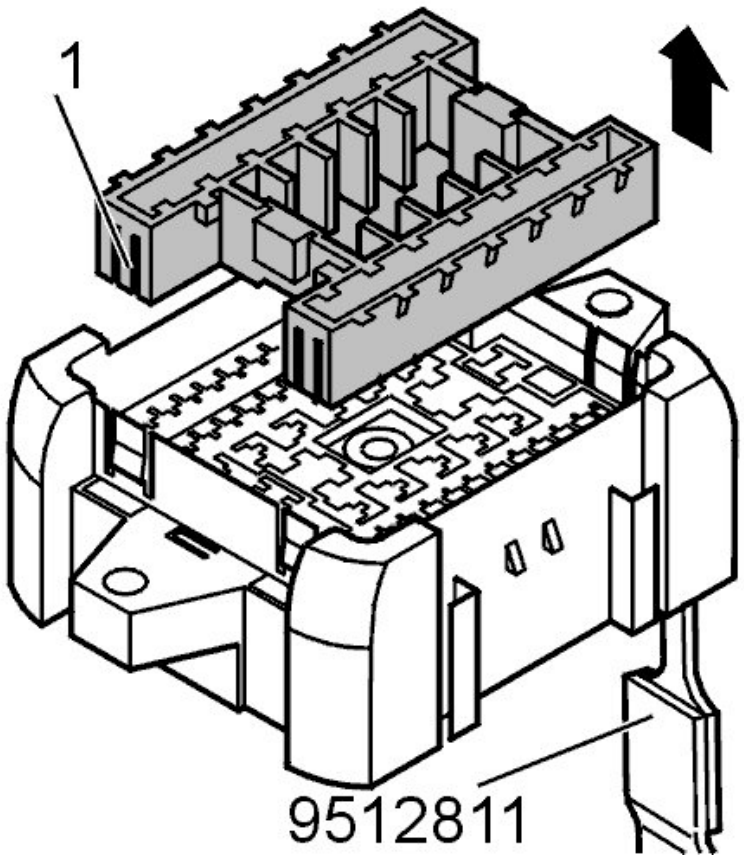
951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

Connector, dismantling

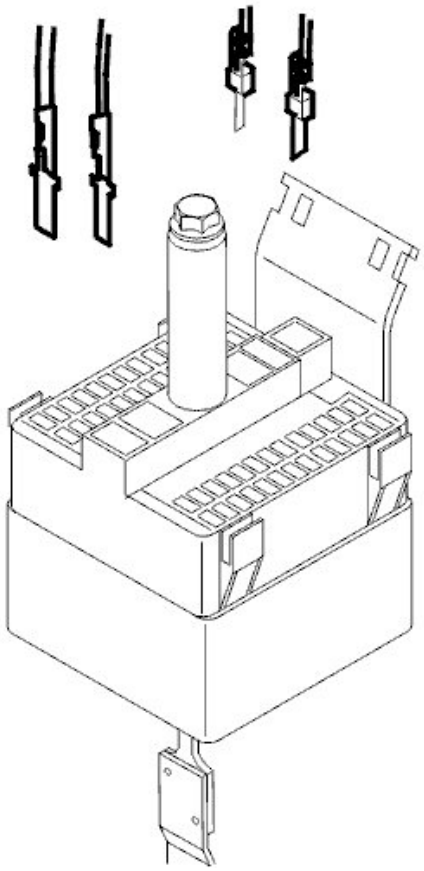
Secondary lock

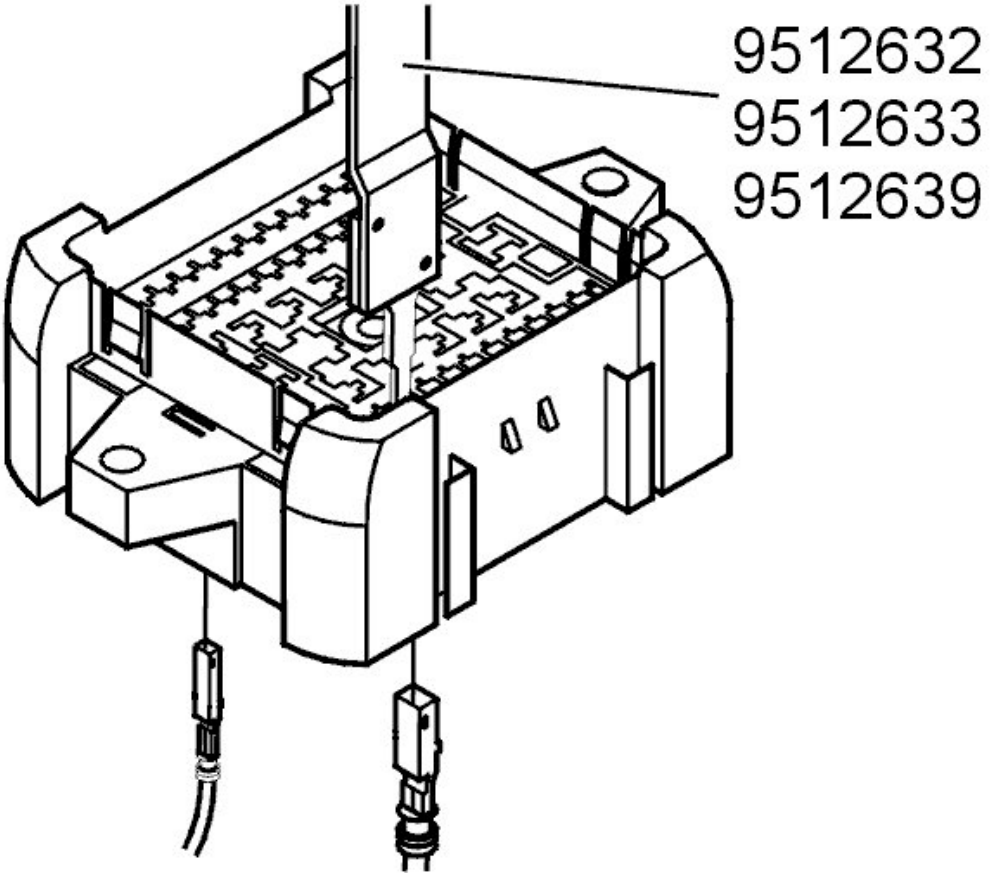




Press out the secondary lock from the cable side using tool 951 2811 Terminal removal tool See: Tools and Equipment/951 2811 Terminal Removal Tool or an electrician's screwdriver, as illustrated.

Primary lock

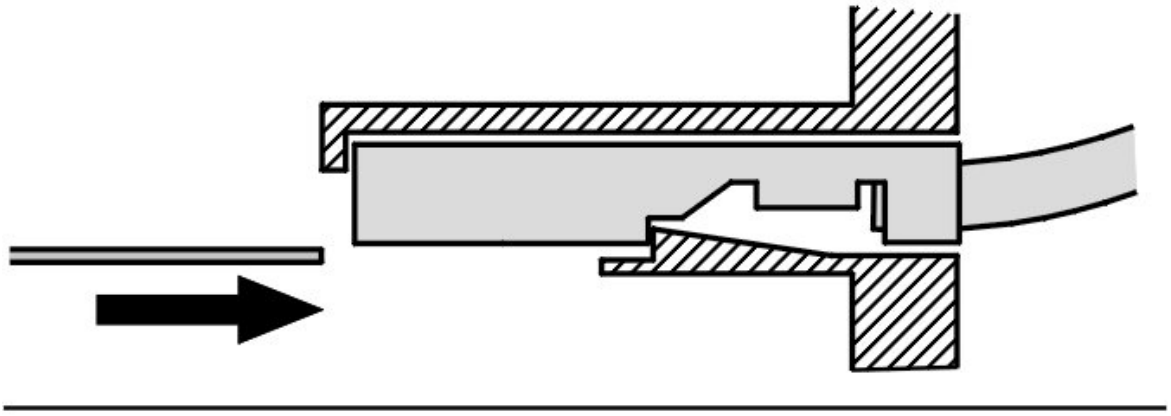


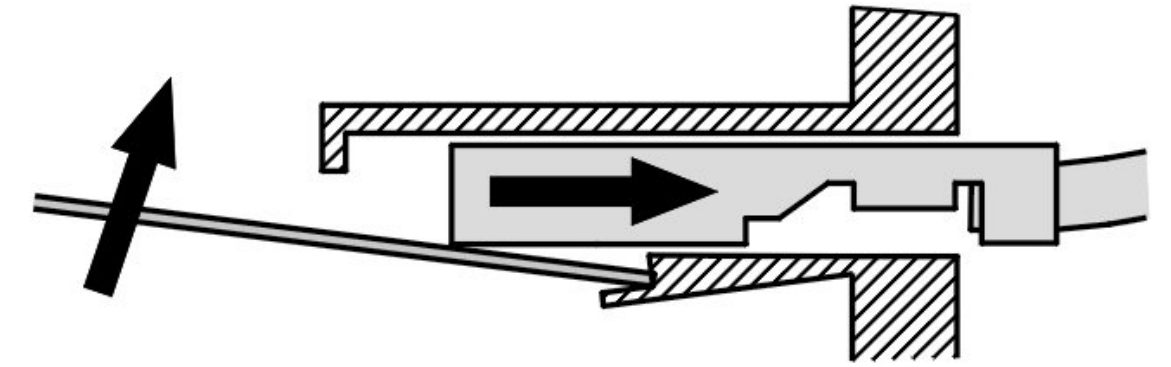


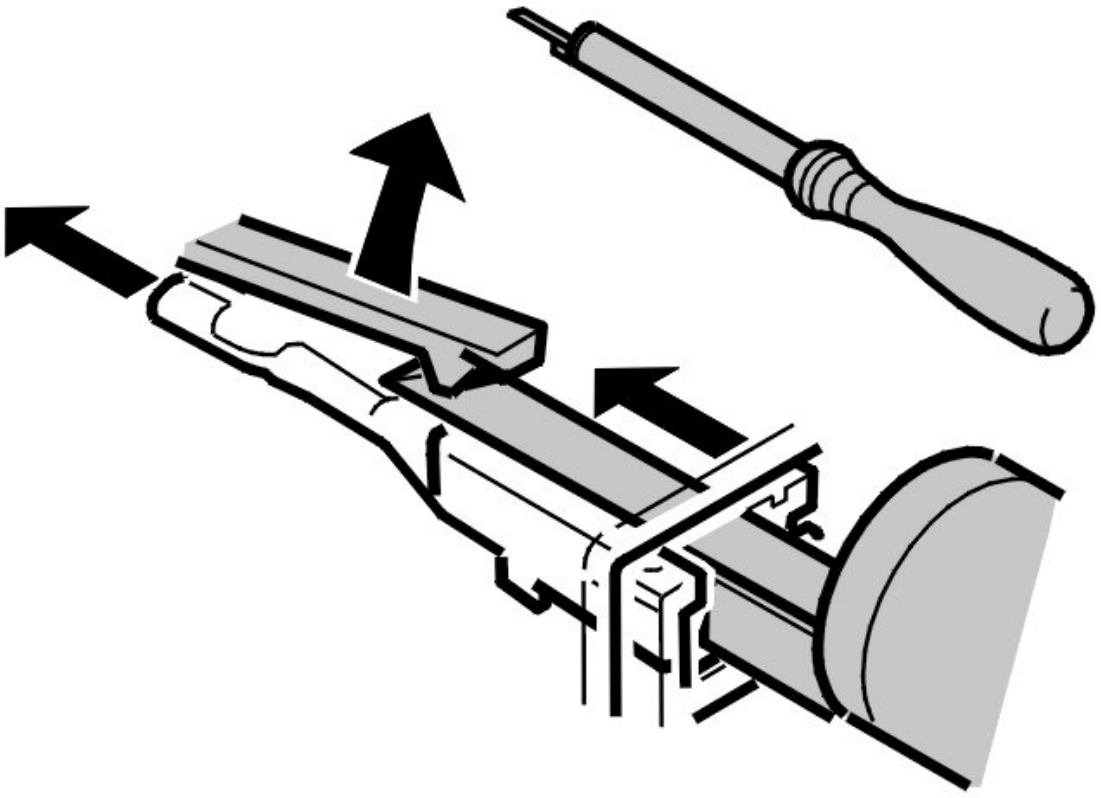
Use tools 951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.







Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Note! tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool can only be used for socket housings.

Connector, assembling

Primary lock

Check that the cable terminal is undamaged.

Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

The secondary lock

Press the secondary lock into place.

Connector Type 7

Connectors, repair

Special tools:
951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

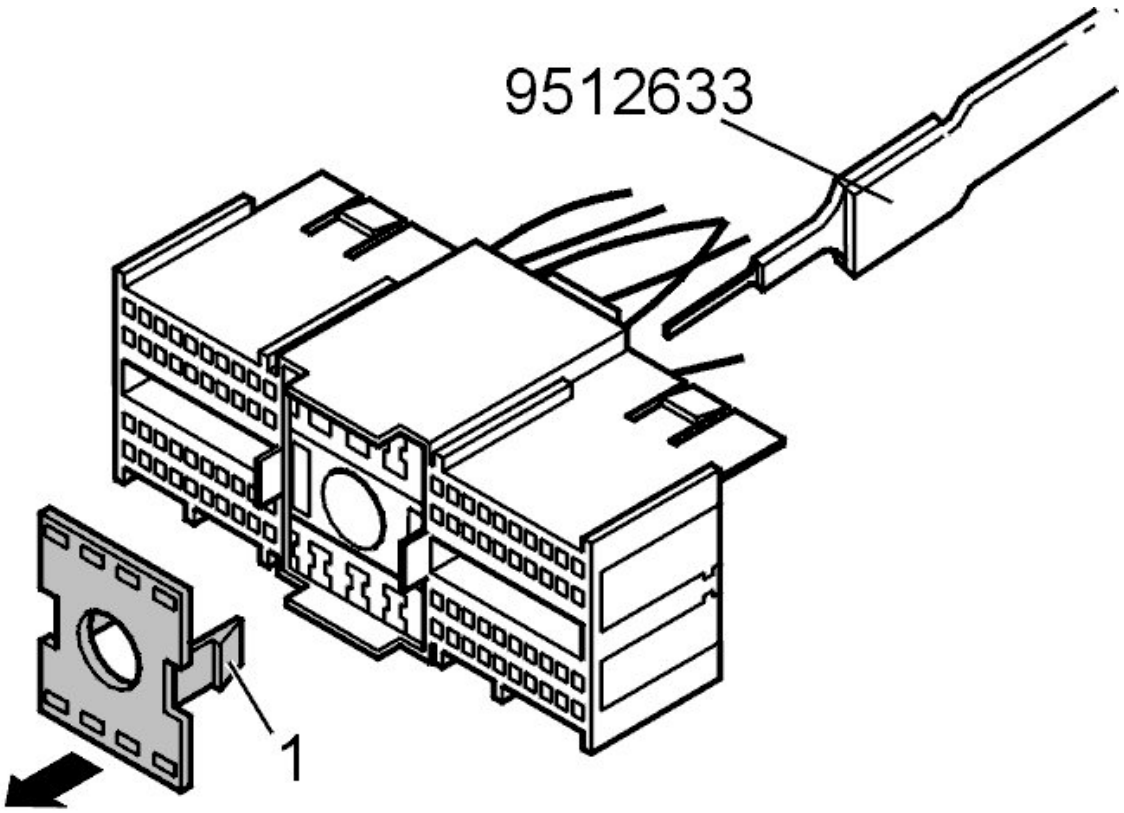
951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool

951 2812 Terminal removal tool See: Tools and Equipment/951 2812 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

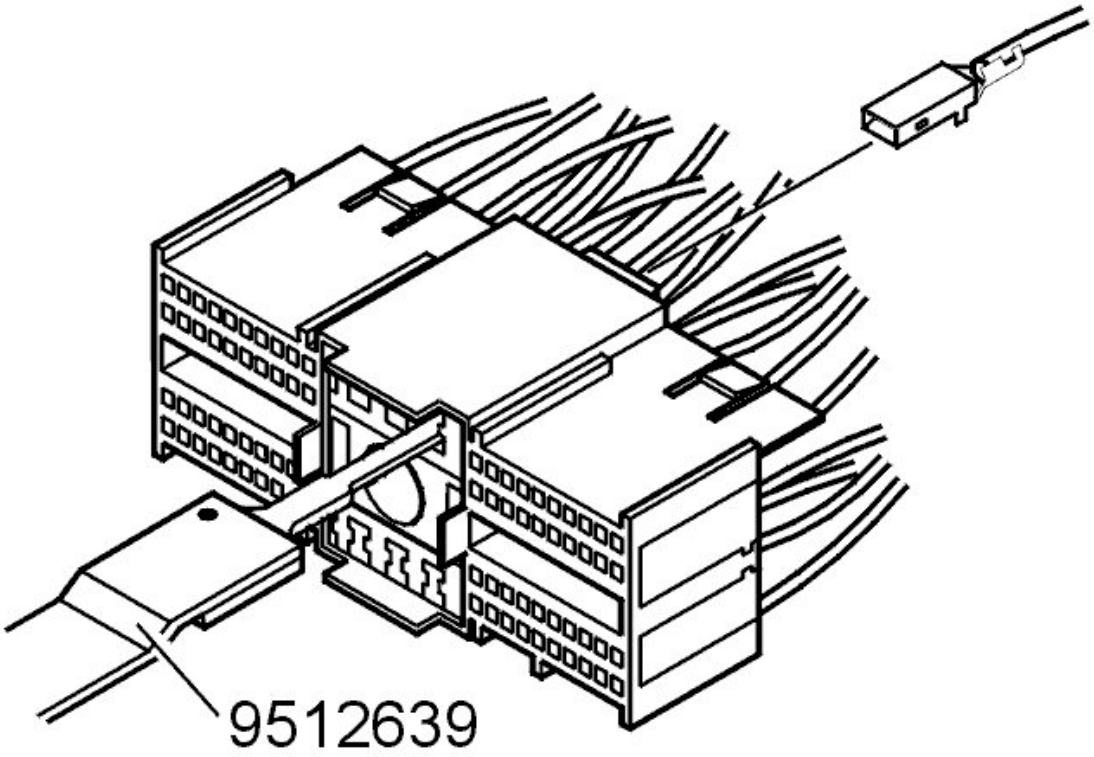
Connector, dismantling

Secondary lock

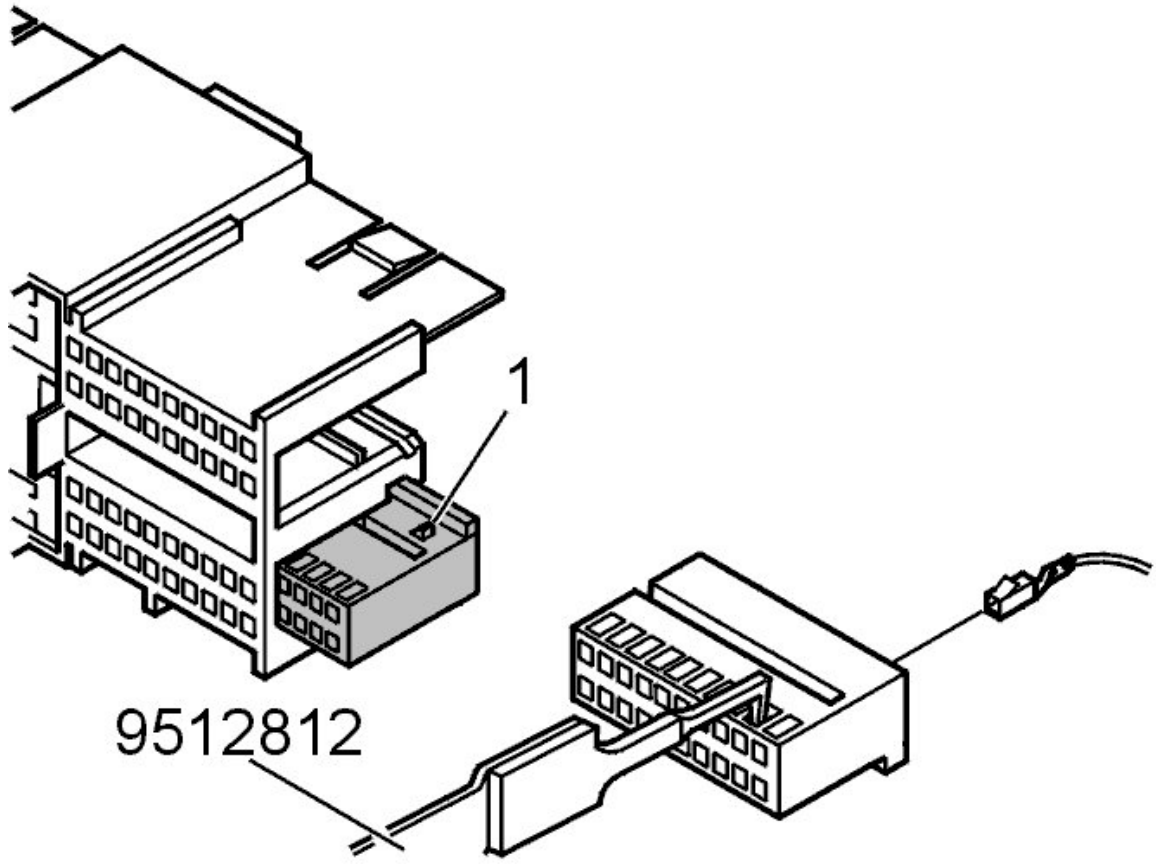


Press out the secondary lock from the cable side using tool 951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool or an electrician's screwdriver, as illustrated.

Primary lock



Use tool 951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the center cable terminals, as illustrated.
At the same time pull the cable carefully backwards.



Release the inner housing section on the socket housing by lifting the sleeve beside the catch and pulling the housing section outwards.
Disconnect the cable terminals. Use tool 951 2812 Terminal removal tool See: Tools and Equipment/951 2812 Terminal Removal Tool or951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool , as illustrated.
At the same time pull the cable carefully backwards.

Connector, assembling

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Slide the receptacle housing into the connector.
Press the secondary lock into place.

Sealed Connector Type 1

Connector sealed, repair

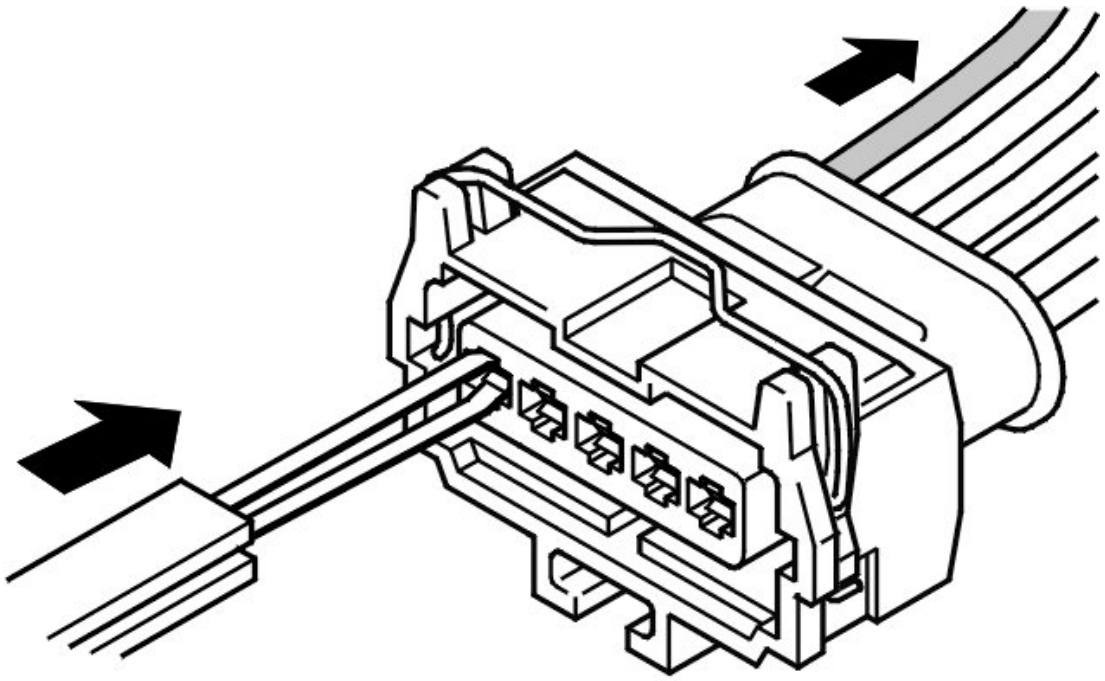
Special tools:
951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

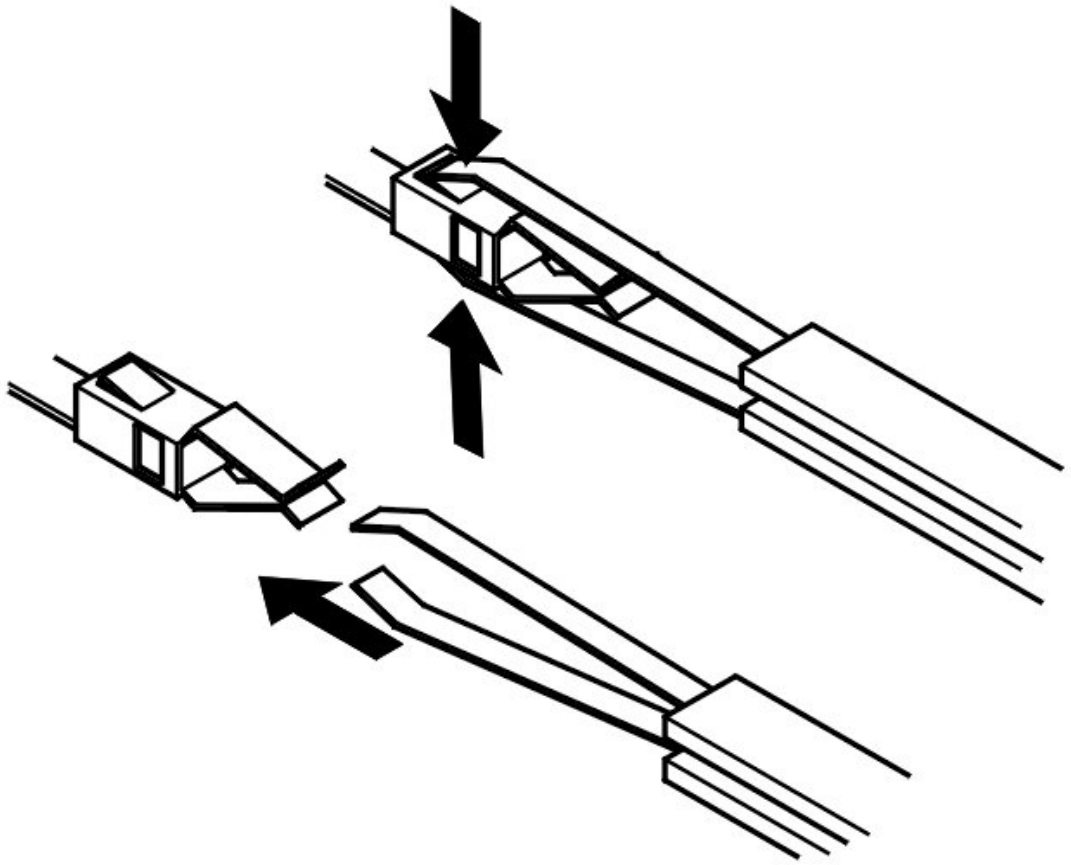
Connector, dismantling

The connector has no secondary lock.

Primary lock



Use tool 951 2631 Terminal removal tool See: Tools and Equipment/951 2631 Terminal Removal Tool to remove the primary lock, as illustrated.
At the same time pull the cable carefully backwards.



Connector, assembling

Primary locking

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the seal is correctly positioned and that the cable terminal is properly locked by pulling carefully on the cable.

Sealed Connector Type 2

Connector sealed, repair

Special tools:
951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

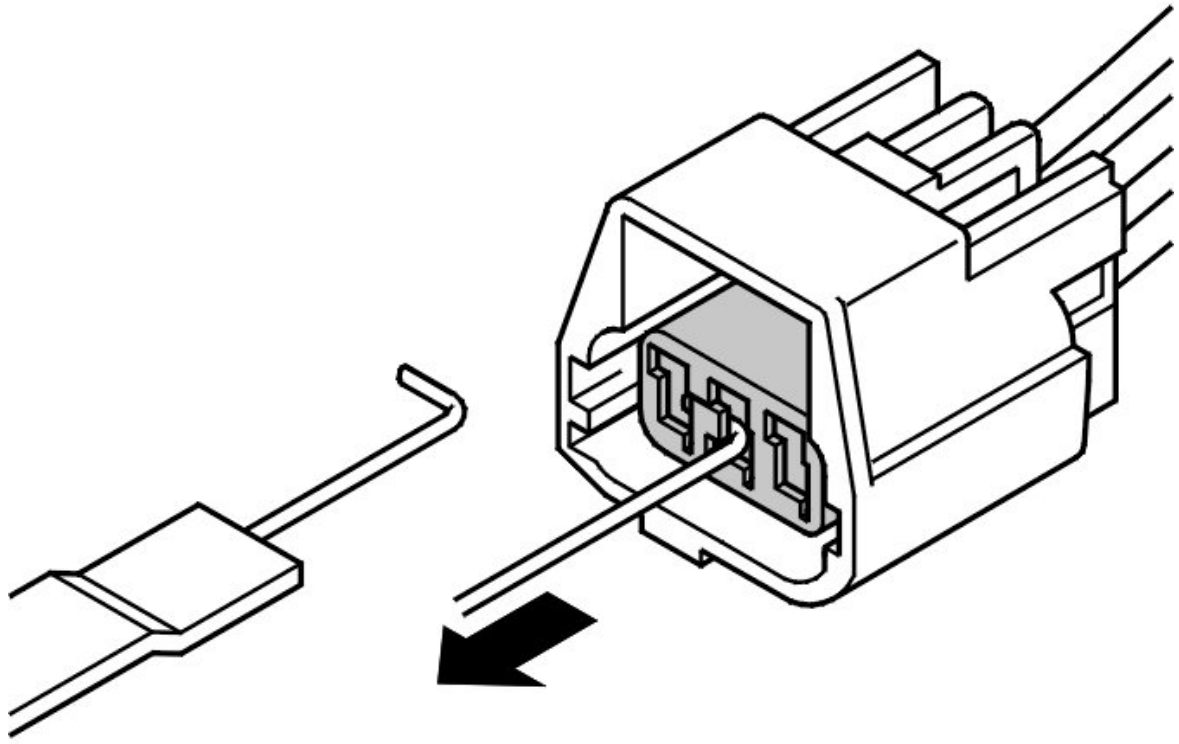
951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool

951 2853 Terminal removal tool See: Tools and Equipment/951 2853 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

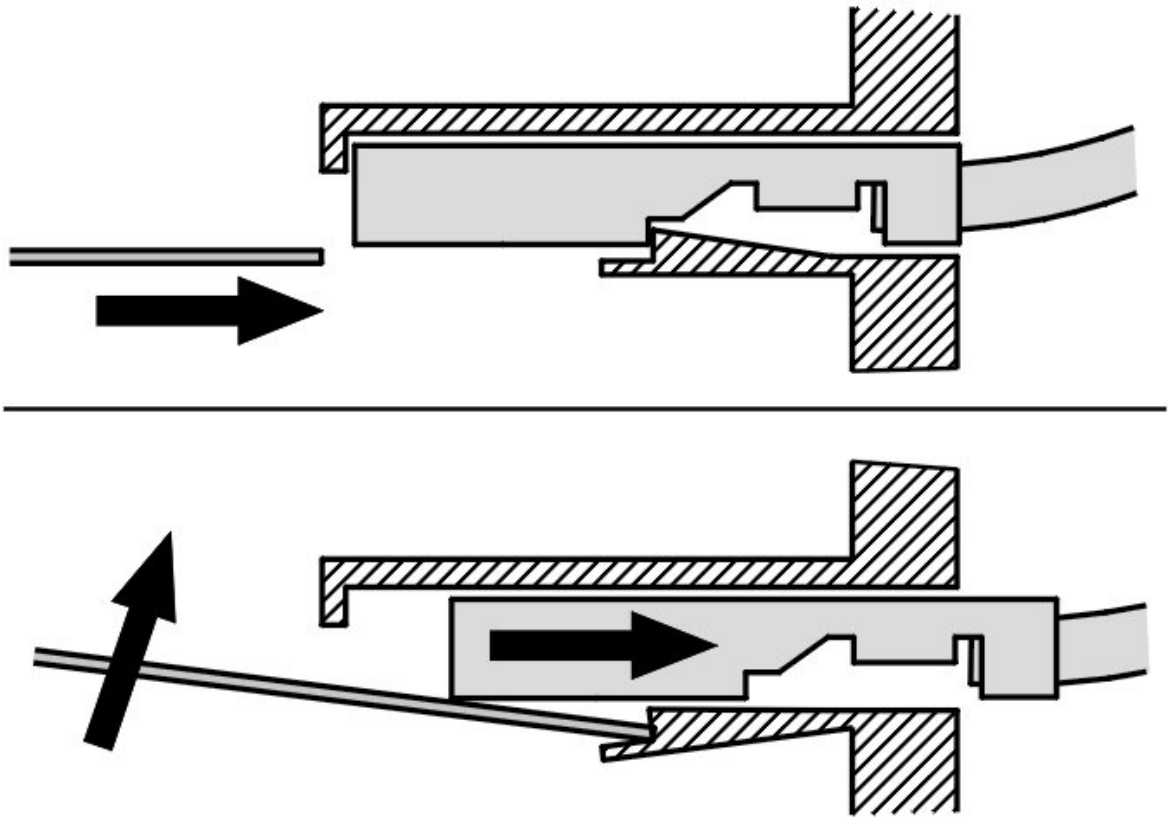
Connector, dismantling

Secondary lock



Open the catches and pull out the secondary lock, use tool 951 2853 Terminal removal tool See: Tools and Equipment/951 2853 Terminal Removal Tool or an electrician's screwdriver, as illustrated.

Primary lock



Use tools 951 2632 Terminal removal tool See: Tools and Equipment/951 2632 Terminal Removal Tool

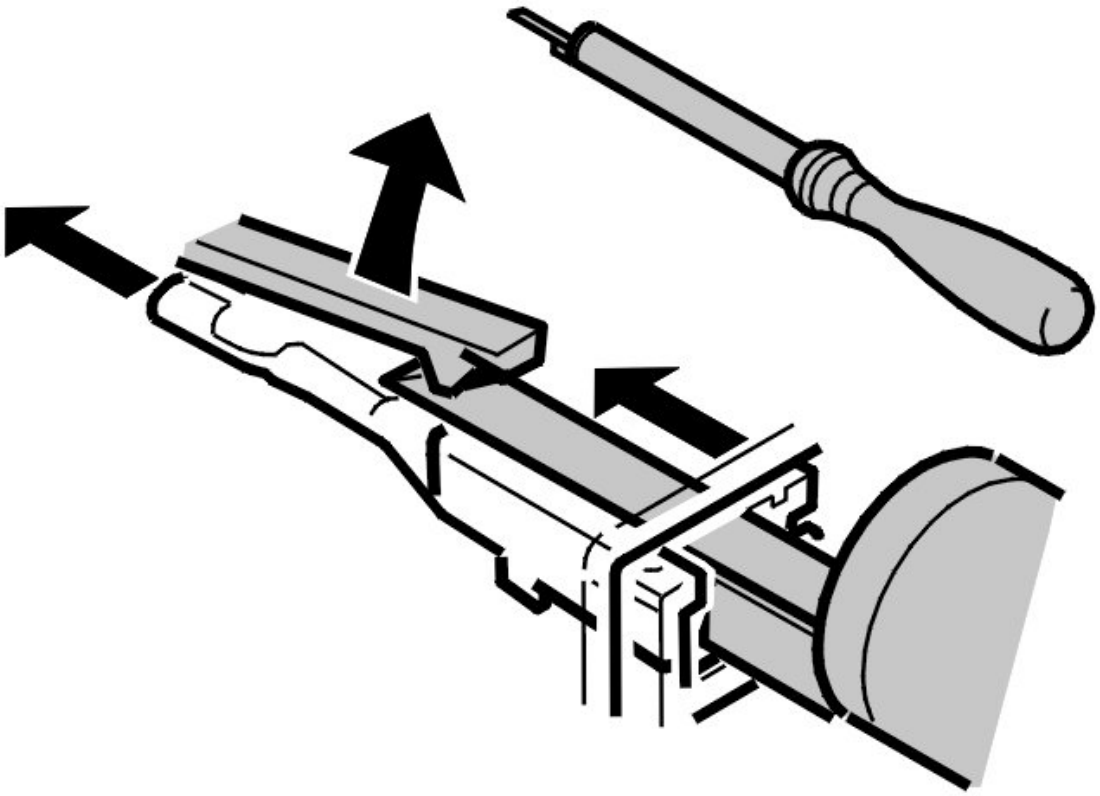
951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.

Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Note! tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool can only be used for socket housings.

Connector, assembling

Primary locking



Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the seal is correctly positioned and that the cable terminal is properly locked by pulling carefully on the cable.

Sealed Connector Type 3

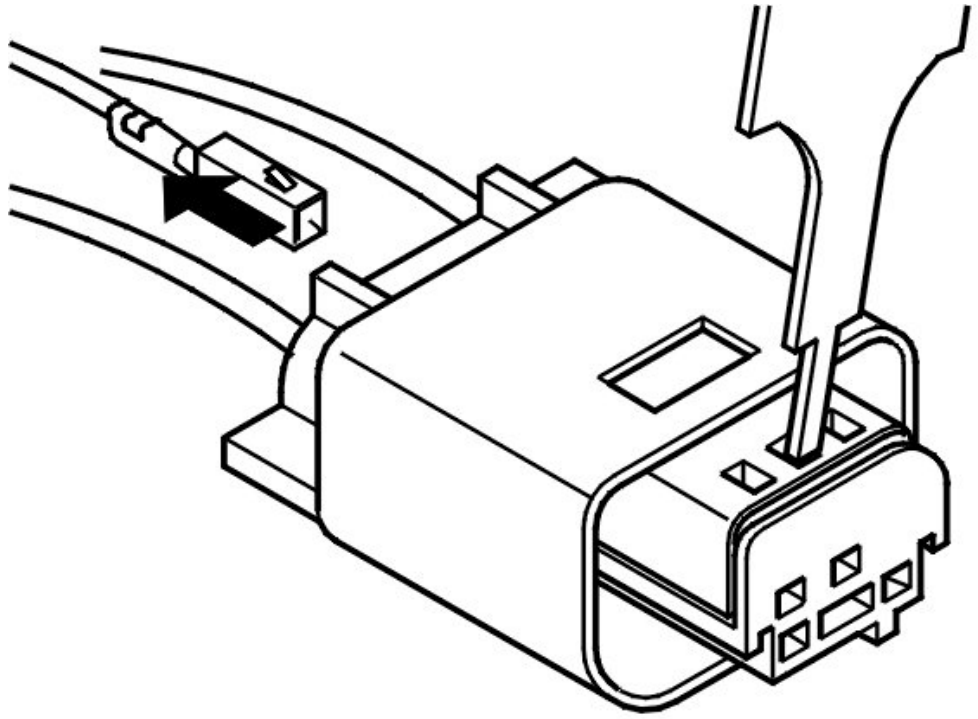
Connectors, repair

Special tools:
951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

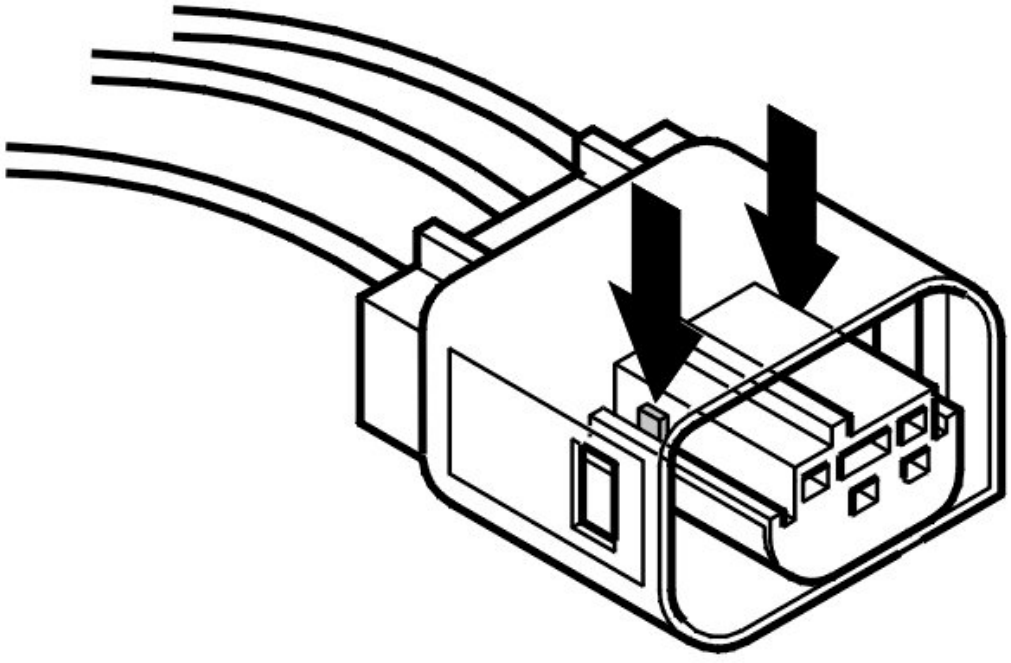
Connector, dismantling

Secondary lock



Adjust the lock pins using an electrician's screwdriver and press up the secondary lock, as illustrated.

The primary lock



Use tool 951 2637 Terminal removal tool See: Tools and Equipment/951 2637 Terminal Removal Tool to press down the cable terminal locking tab, as illustrated.
At the same time pull the cable carefully backwards.

Connector, assembling

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the seal is correctly positioned and that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Press the secondary lock into place.

Connector Fuse Holder, Repair

Connector fuse holder, repair

Special tools:
951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

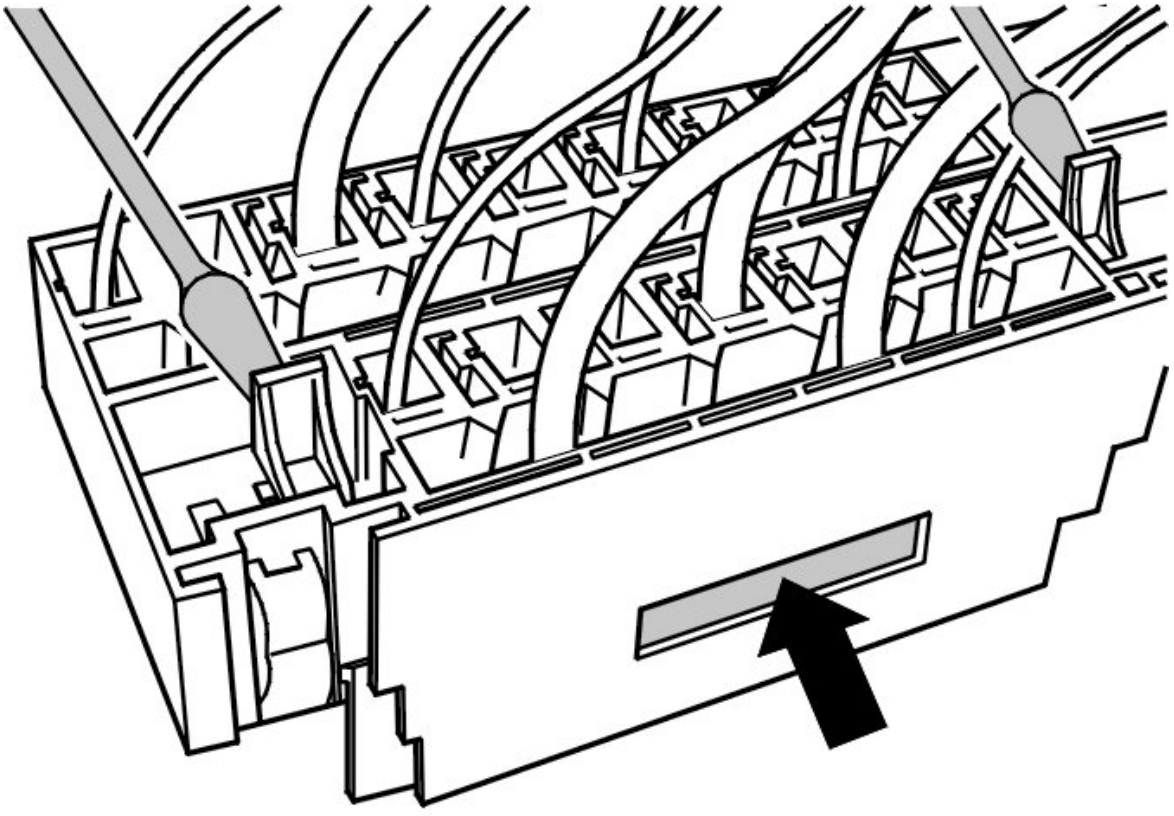
Preparatory work

Expose the relevant fusebox.
Remove the fuses. Note the positions of the fuses.

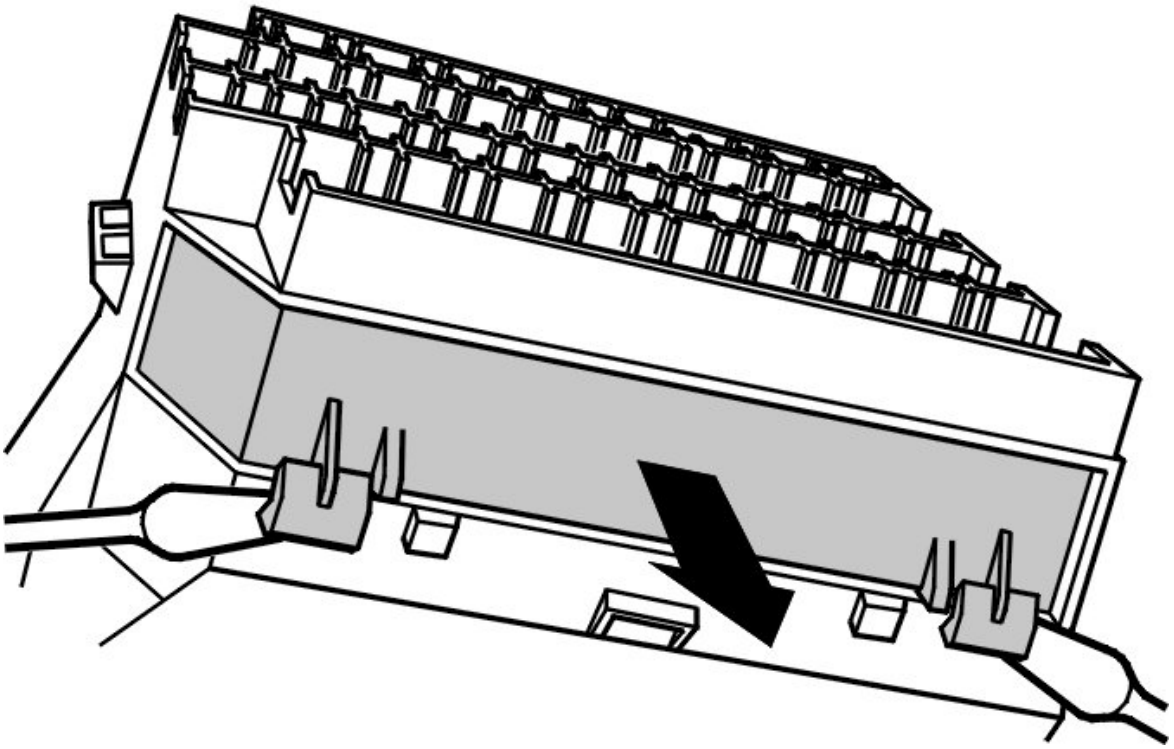
Dismantling

Secondary lock

Releases the catches for the secondary lock.
Slide the secondary lock to one side to access the primary lock, as illustrated.

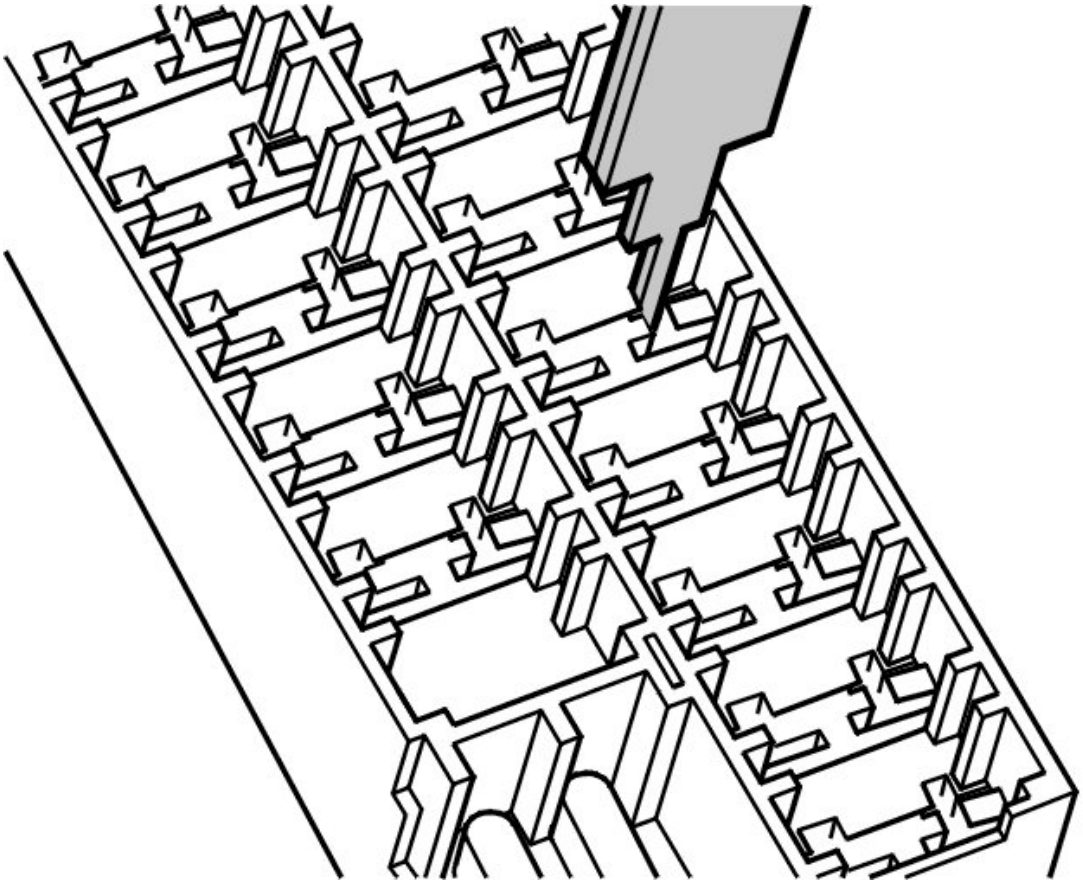


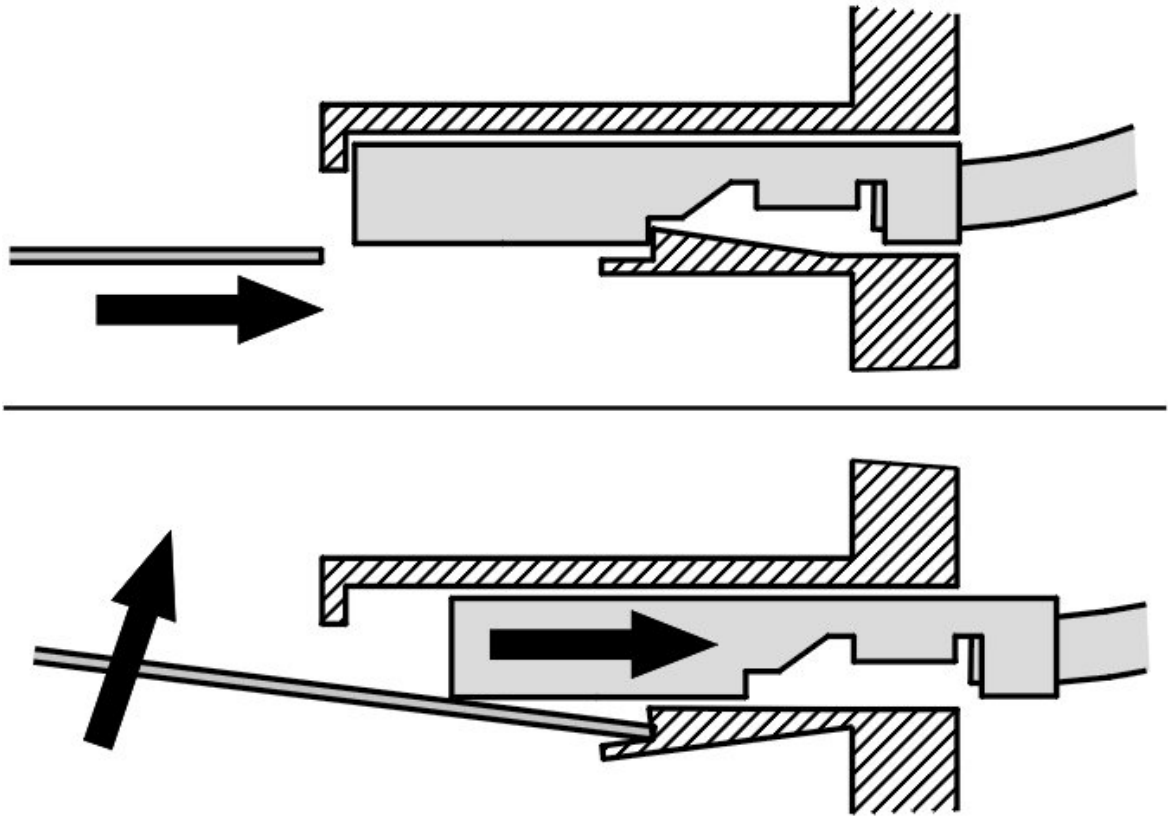
Fuse holder cargo compartment.



Fuse holder passenger compartment.

Primary lock



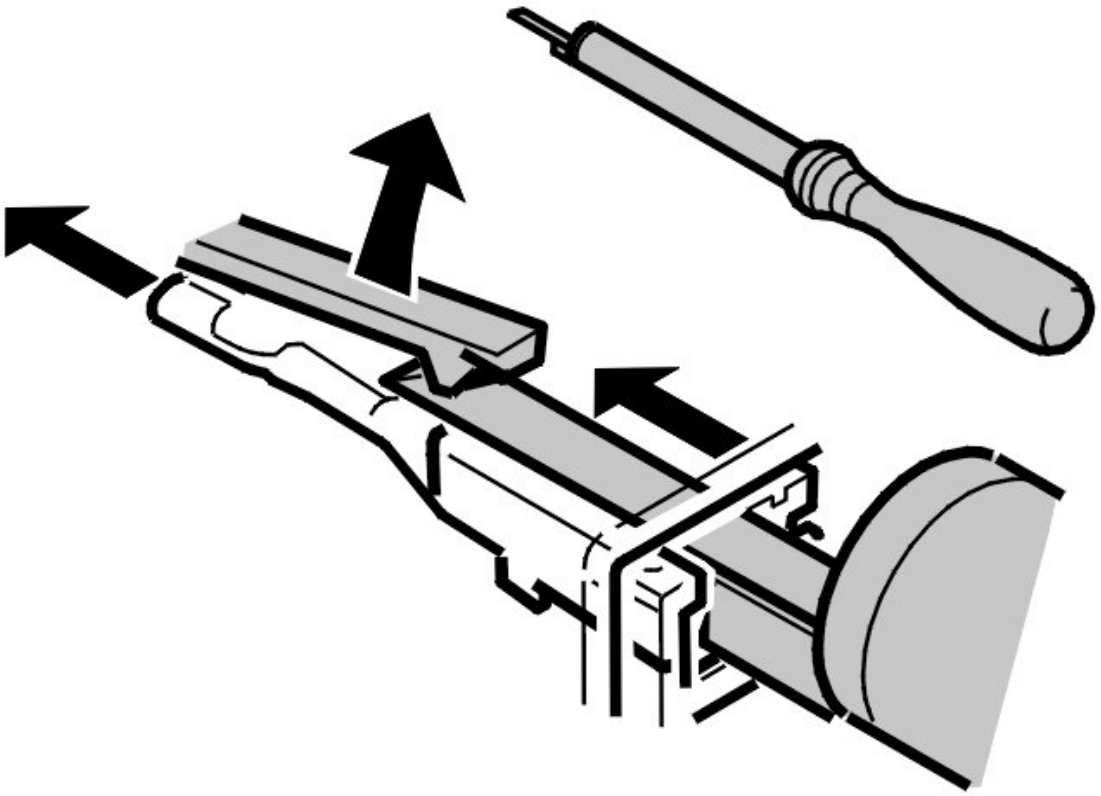


Use tools 951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated.

Note! The relay holders can be connected and several locks may need to be adjusted at the same time.

At the same time pull the cable carefully backwards.



Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Installation

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable.

Secondary lock

Slide back the secondary lock.

Finishing work

Install the relays.

Note! Take care with the positioning.

Reinstall the central relay box.

Connector Relay Box, Repair

Connector relay box, repair

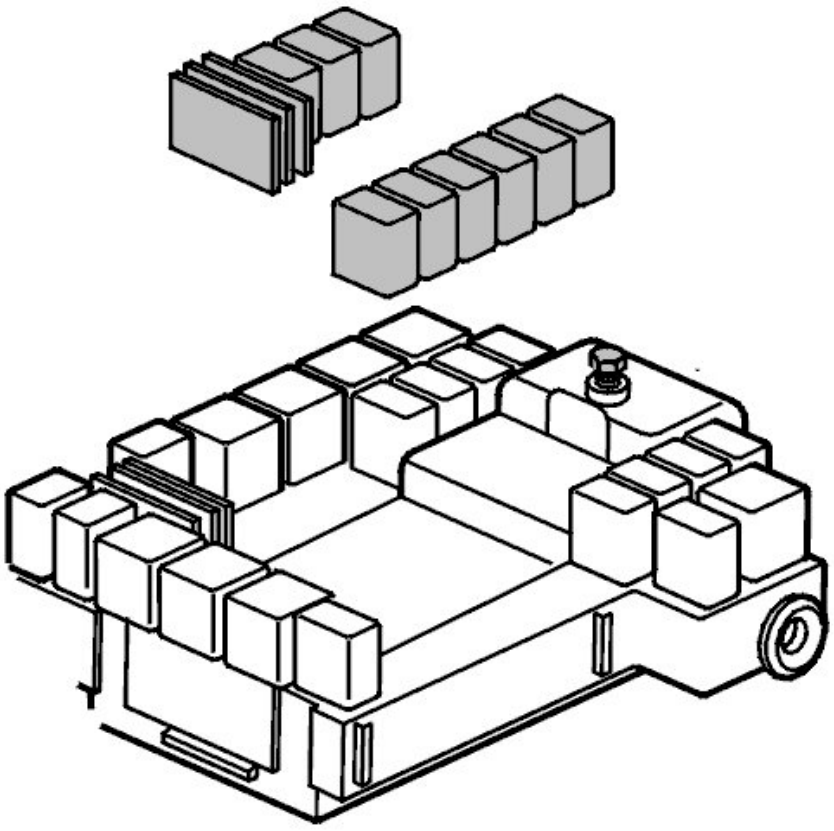
Special tools:
951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool

951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool.

Note! As the illustrations in this service information are used for different model years and / or models, some variation may occur. However, the essential information in the illustrations is always correct.

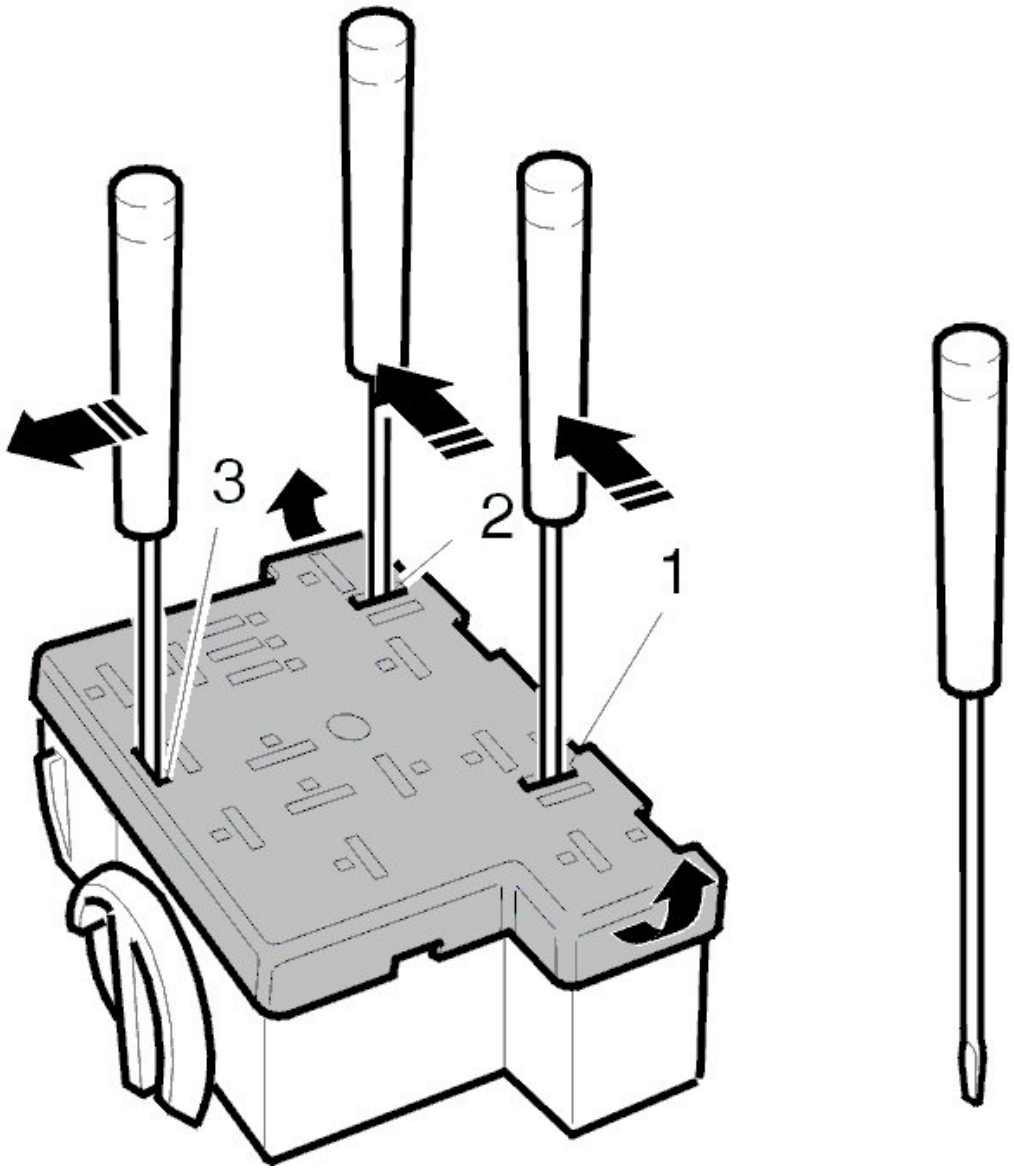
Preparatory work



Expose the relevant relay box.
Remove the relevant relays, noting their position.

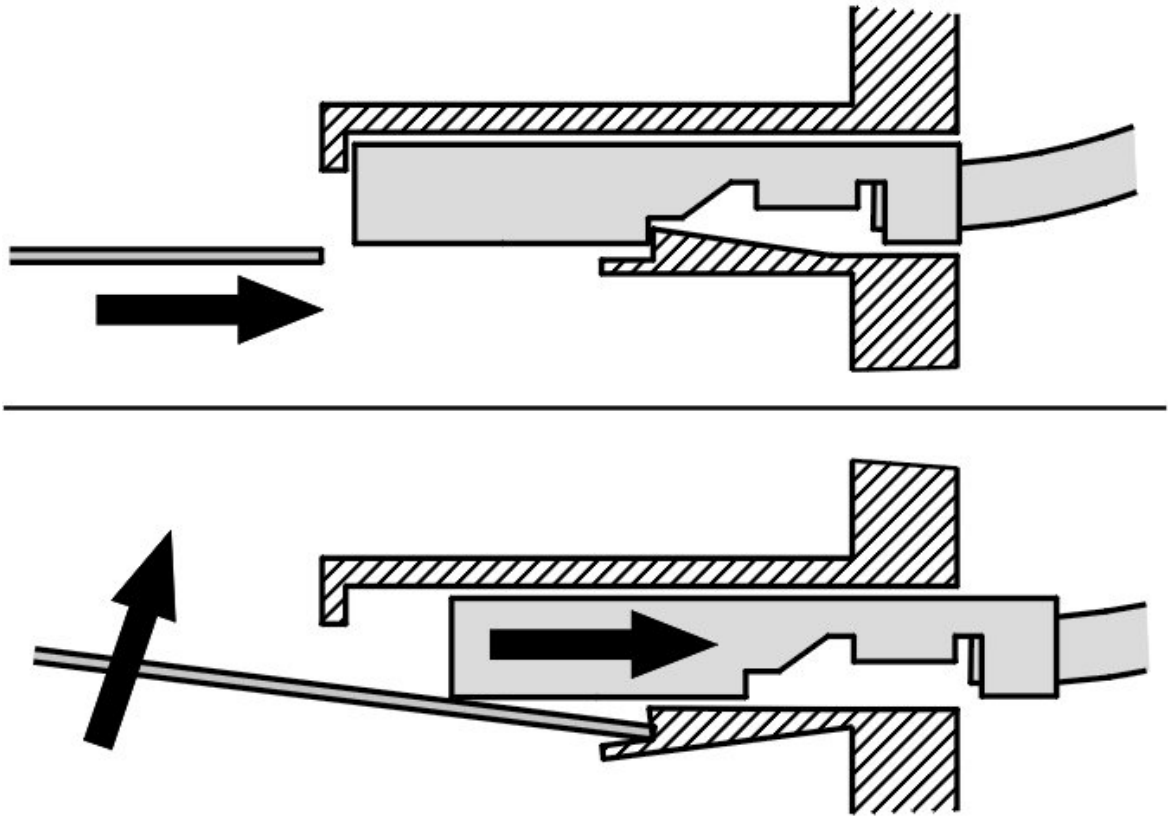
Dismantling

Secondary lock



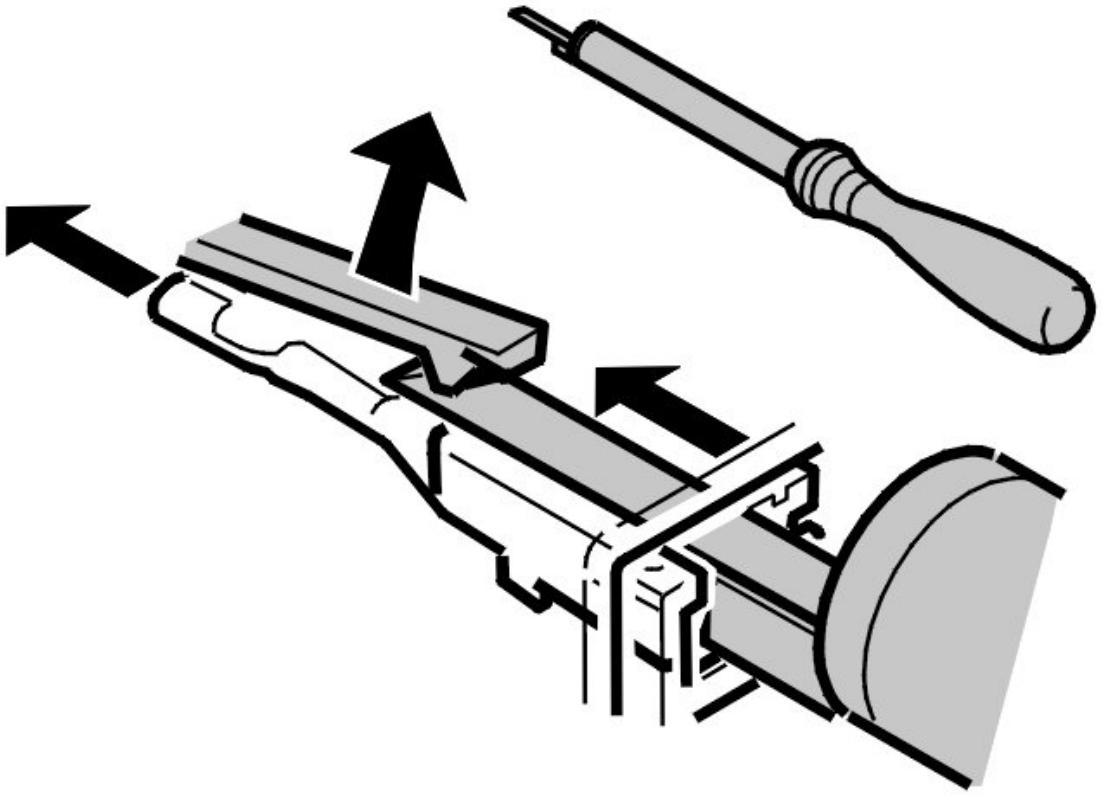
Release the relevant secondary lock by adjusting the locks with an electrician's screwdriver, as illustrated.

Primary lock



Use tools 951 2633 Terminal removal tool See: Tools and Equipment/951 2633 Terminal Removal Tool

951 2639 Terminal removal tool See: Tools and Equipment/951 2639 Terminal Removal Tool to remove the primary lock, as illustrated. At the same time pull the cable carefully backwards.



Alternatively use tool 951 2852 Terminal removal tool See: Tools and Equipment/951 2852 Terminal Removal Tool as illustrated.

Installation

Primary lock

Check that the cable terminal is undamaged.
Press the cable terminal into the housing.
Check that the cable terminal is properly locked by pulling carefully on the cable,

The secondary lock

Press the secondary lock into place.

Finishing work

Install the relays.

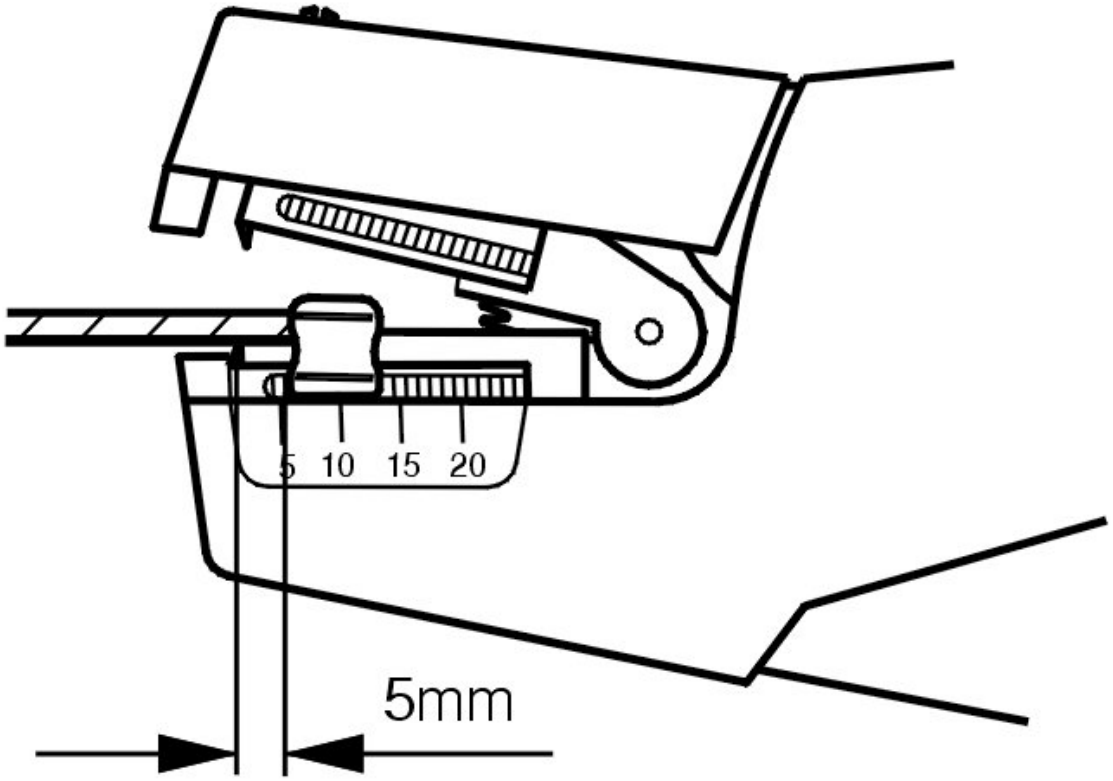
Note! Take care with the positioning.

Install the relevant relay box.

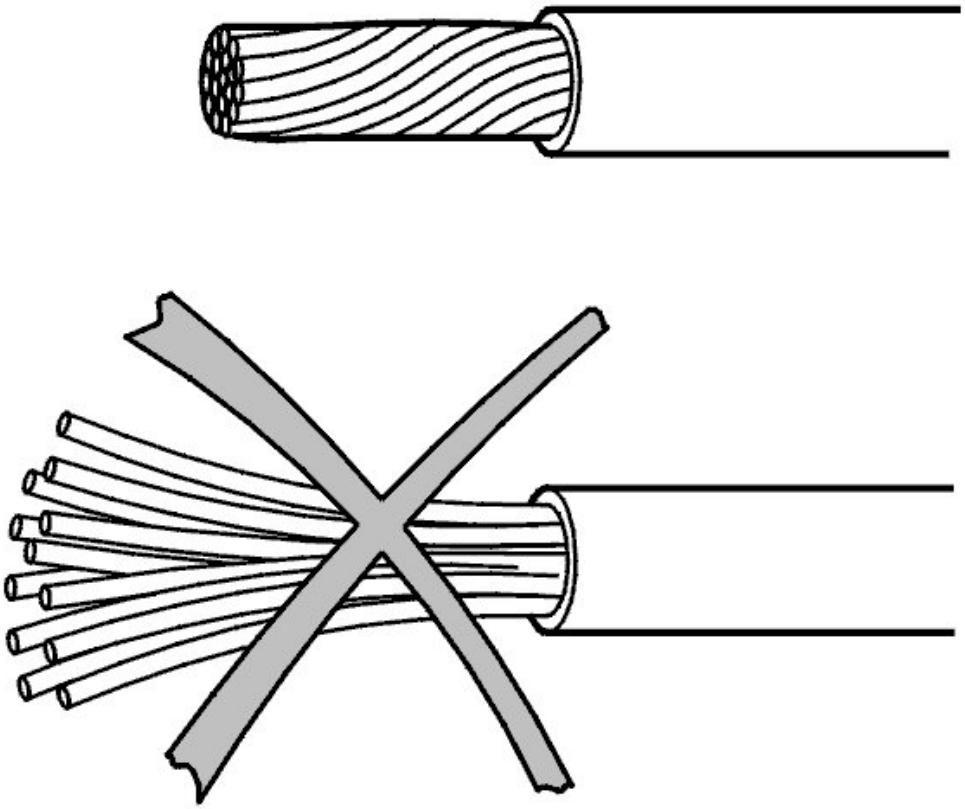
Splicing the Cables

Splicing the cables

Strip the wire



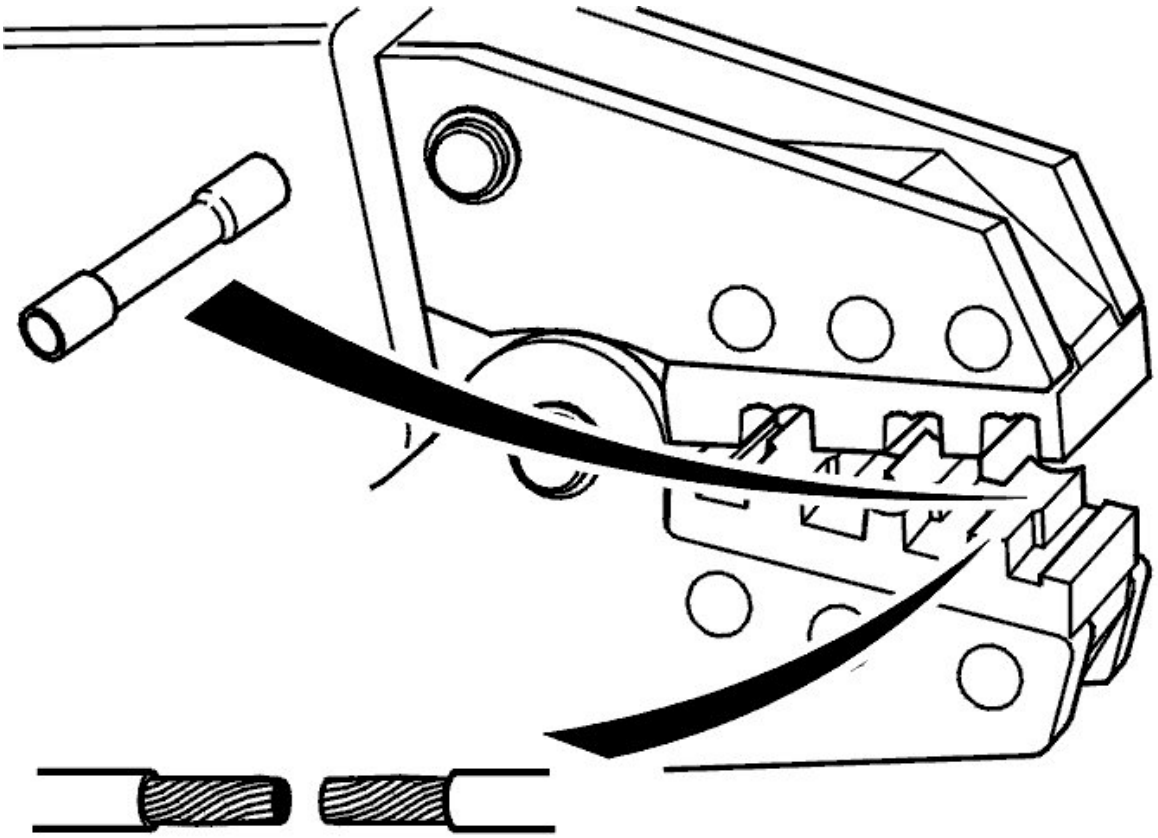
Peel 5.0mm / 0.2 in of the insulation off the 4 cable ends (13/64 inches) using pliers951 2620 Stripping tool See: Tools and Equipment/951 2620 Stripping Tool.



Twist the strands on the stripped wire ends. Do NOT forget to do this on all four wire ends.

Note! Make sure the strands are twisted.

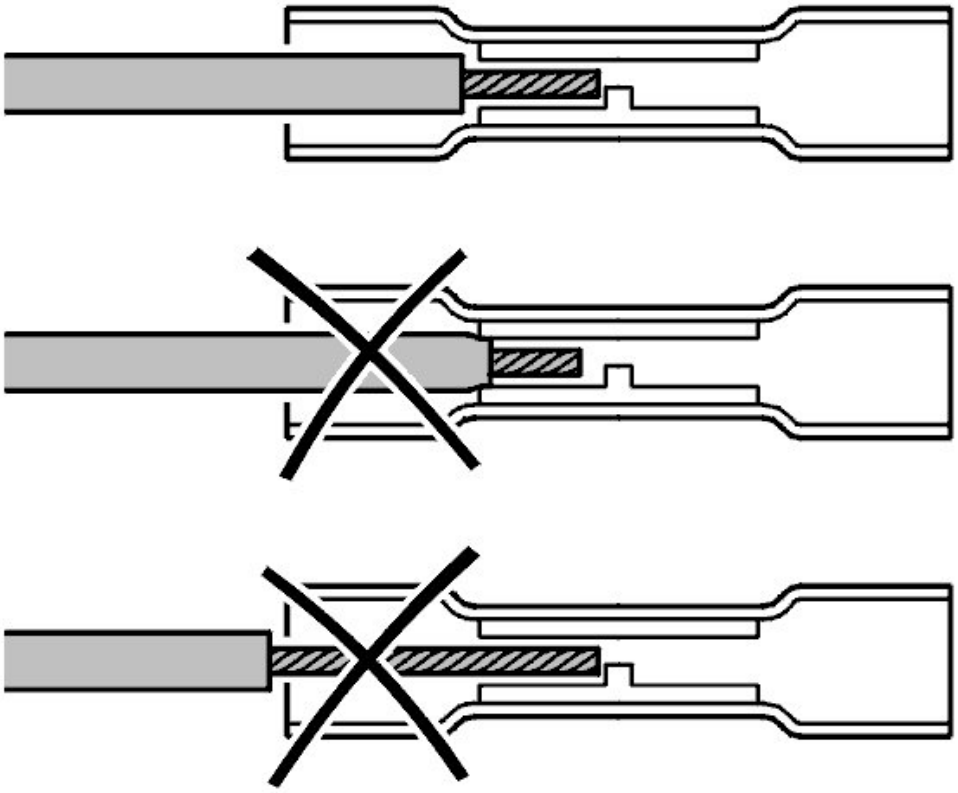
Joining the wire ends with the same colors/ single or multi-colored



Note! Cable should always be connected colour for colour, single colour to single colour or multiple colors to multiple colors. The cables must NOT under any circumstances be incorrectly connected, always colour for colour.

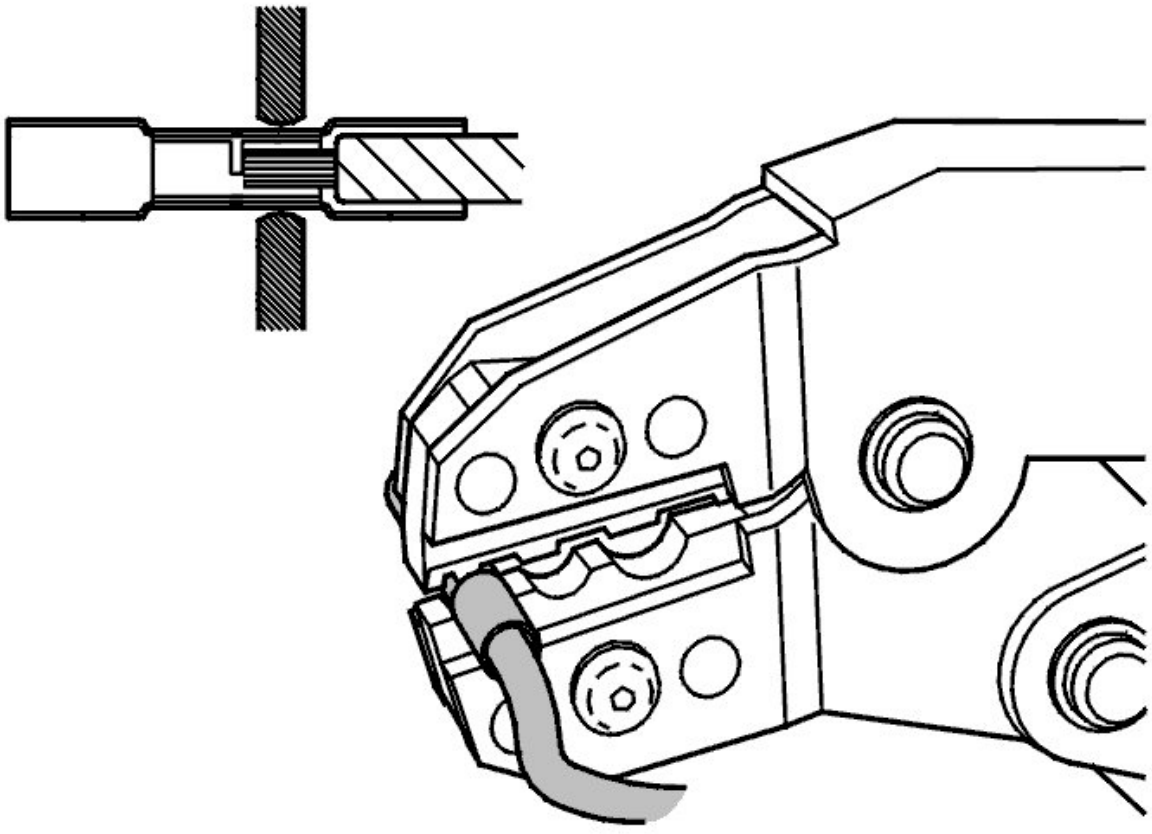
Install the shrink tubing 951 2783 in the pressure tool 951 2785 Crimping tool See: Tools and Equipment/951 2785 Crimping Tool in output

"Green". Clamp the pliers enough to hold the shrink tubing.

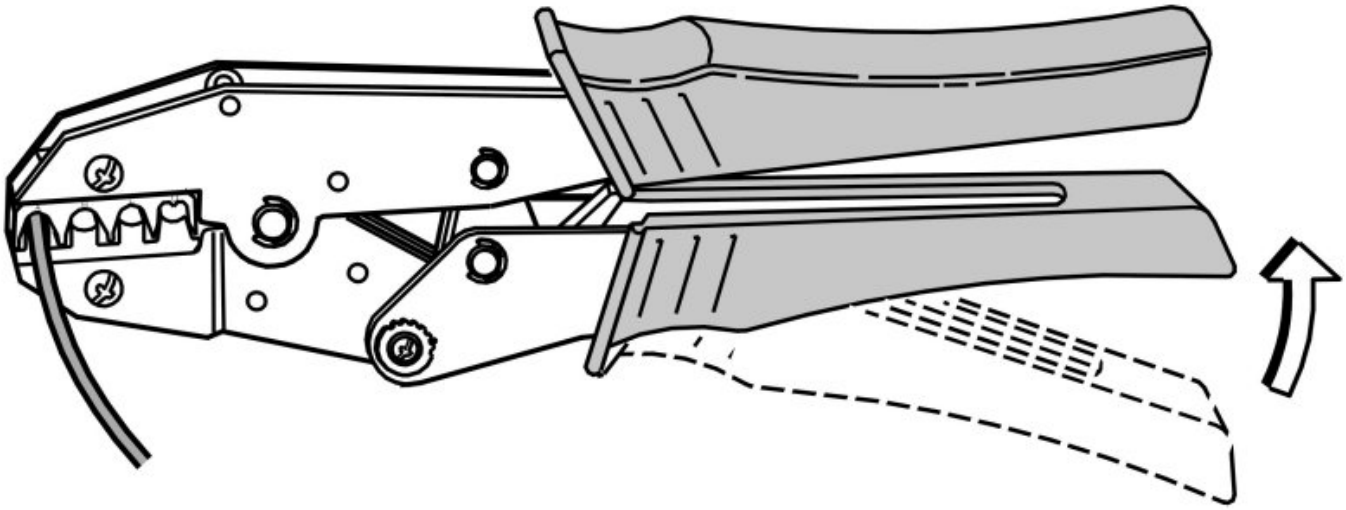


Note! The sleeve must sit in the correct output of the pressure tool, position "Green".

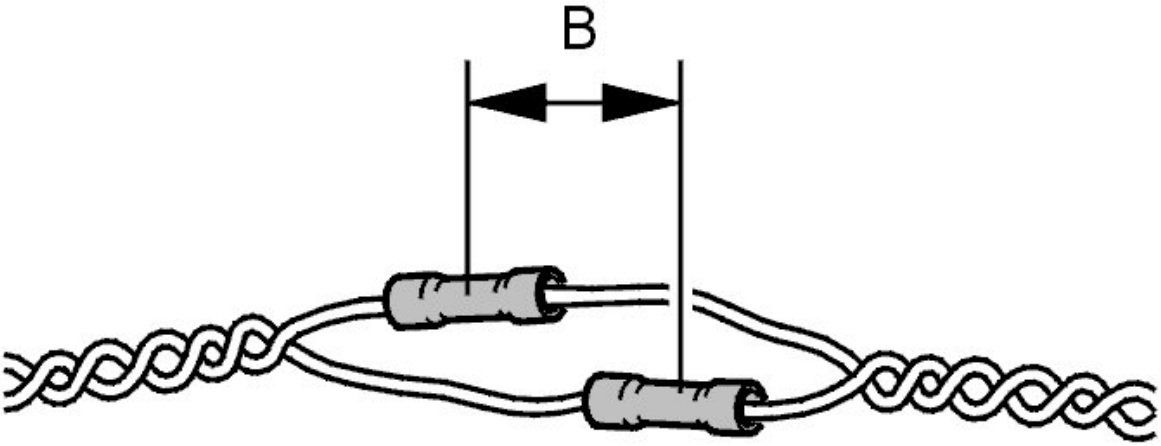
Feed the end of the wire in the shrink tubing that is held by the pliers. Feed the wire into the shrink tubing until it stops, make sure that the wire insulation does not go near the clamp on the sleeve or the stripped wire will protrude outside the sleeve.



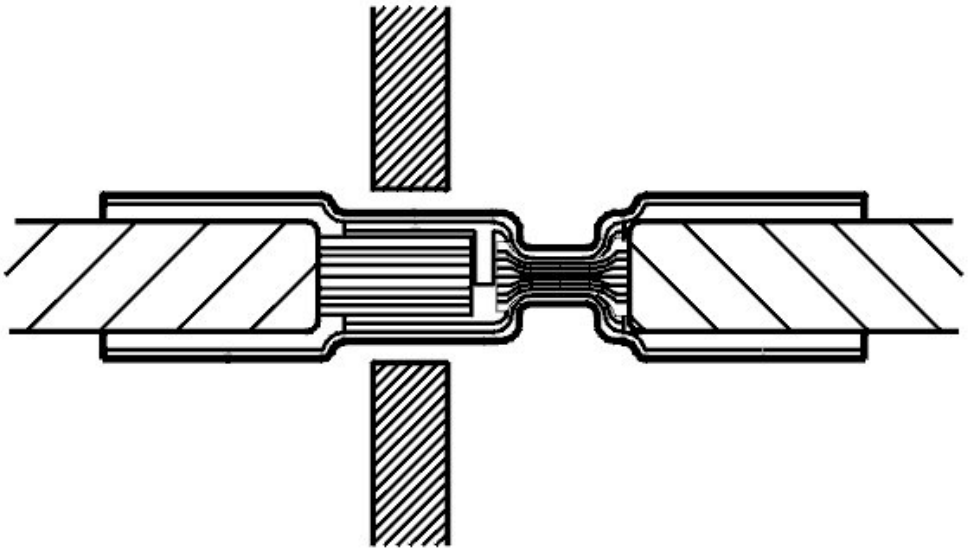
Clamp the shrink tubing tightly.



Press the handles of the pliers fully together to obtain a correct joint, the pliers automatically release their grip afterwards.



Feel by hand to make sure the shrink tubing is correctly installed.
Check that measurement B is 40mm (1-1/2 inches) between the joints from centre to centre.



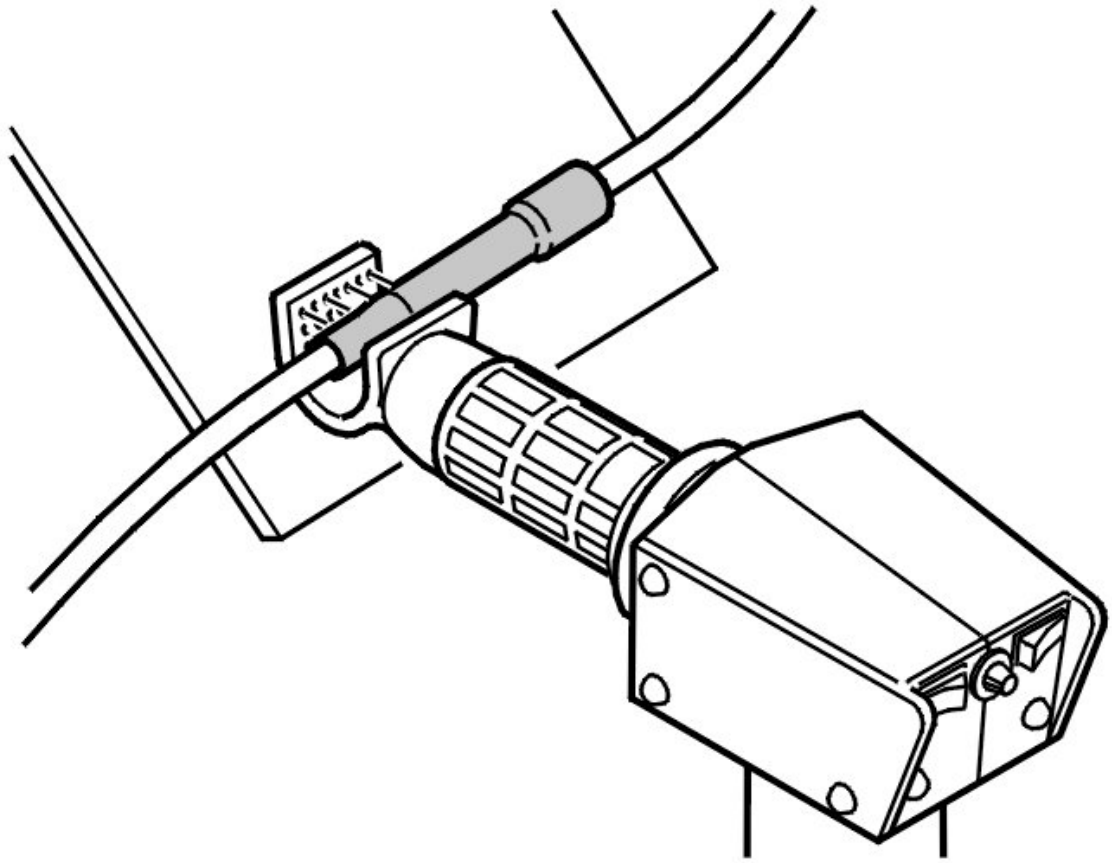
Note! Remember the cable, colour to colour (with same colour/ single or multi-colored).

When the first join is completed and checked, join the rest of the wire ends in the same way.

Heating the shrink tubing

The shrink tubing ensures the electric wire is satisfactory and provides a safe join.
Hold a pad or other item behind the shrink tubing to avoid heat escaping.

Hint: Suitable setting of heat gun951 2777 Hot-air gun See: Tools and Equipment/951 2777 Hot-Air Gun , air distribution switch in position 2 and potentiometer for temperature setting in position between 2 and 3.



Heat the sleeve using the hot air gun951 2777 Hot-air gun See: Tools and Equipment/951 2777 Hot-Air Gun and suitable jet kit. Heat the shrink tubing rapidly to avoid heat escaping. It is very important that the shrink tubing is correctly shrunk around the wire. It should be tight at both ends.

Note! Adjust the heat shield if necessary.

Joining the Cables

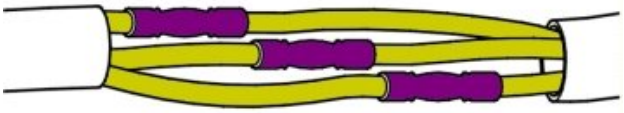
Joining the cables

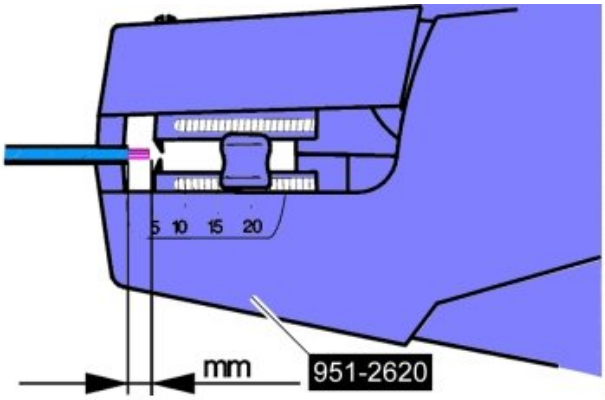
Connecting

see information about SRS cables: Refer to: Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures

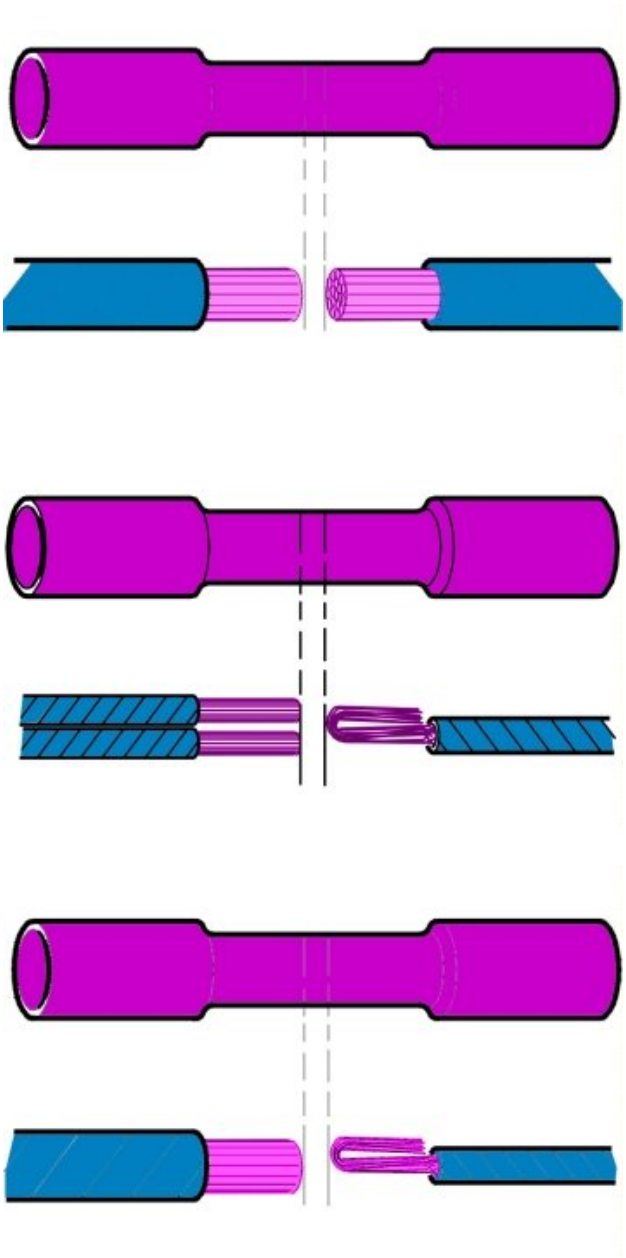
Perform battery disconnection. Refer to: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

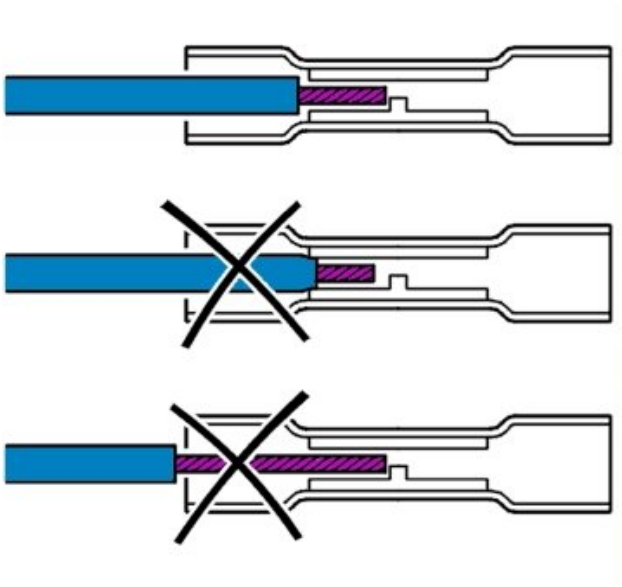
see information about cable terminals surface treatment. Refer to: Cable terminals surface treatment See: Power and Ground Distribution/Wiring Harness/Service and Repair/Cable Terminals Surface Treatment



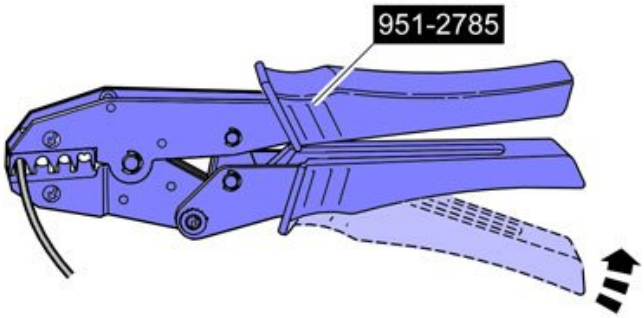


951 2620 Stripping tool See: Tools and Equipment/951 2620 Stripping Tool
See information about stripping length. Refer to: Junction sleeve See: Power and Ground Distribution/Wiring Harness/Service and Repair/Junction Sleeve

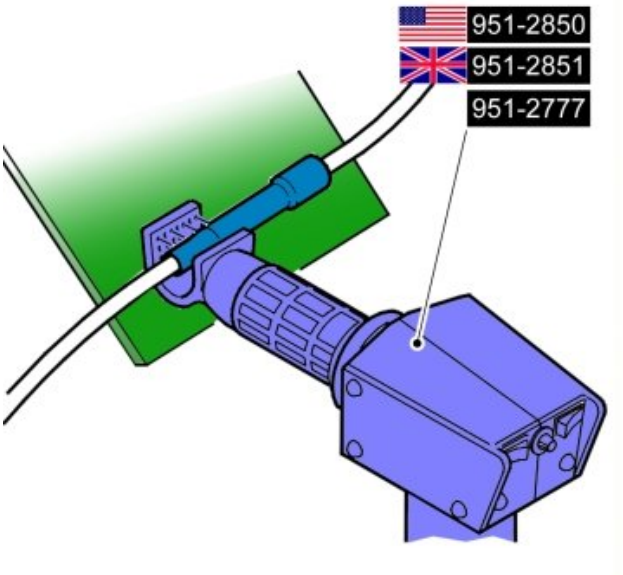




Junction sleeve

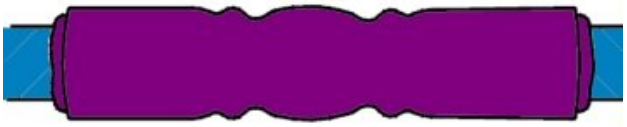


951 2785 Crimping tool See: Tools and Equipment/951 2785 Crimping Tool



Caution! Protect the surroundings from the heat.

951 2850 Hot air gun See: Tools and Equipment/951 2850 Hot Air Gun 951 2851 Hot-air gun See: Tools and Equipment/951 2851 Hot-Air Gun
951 2777 Hot-air gun See: Tools and Equipment/951 2777 Hot-Air Gun

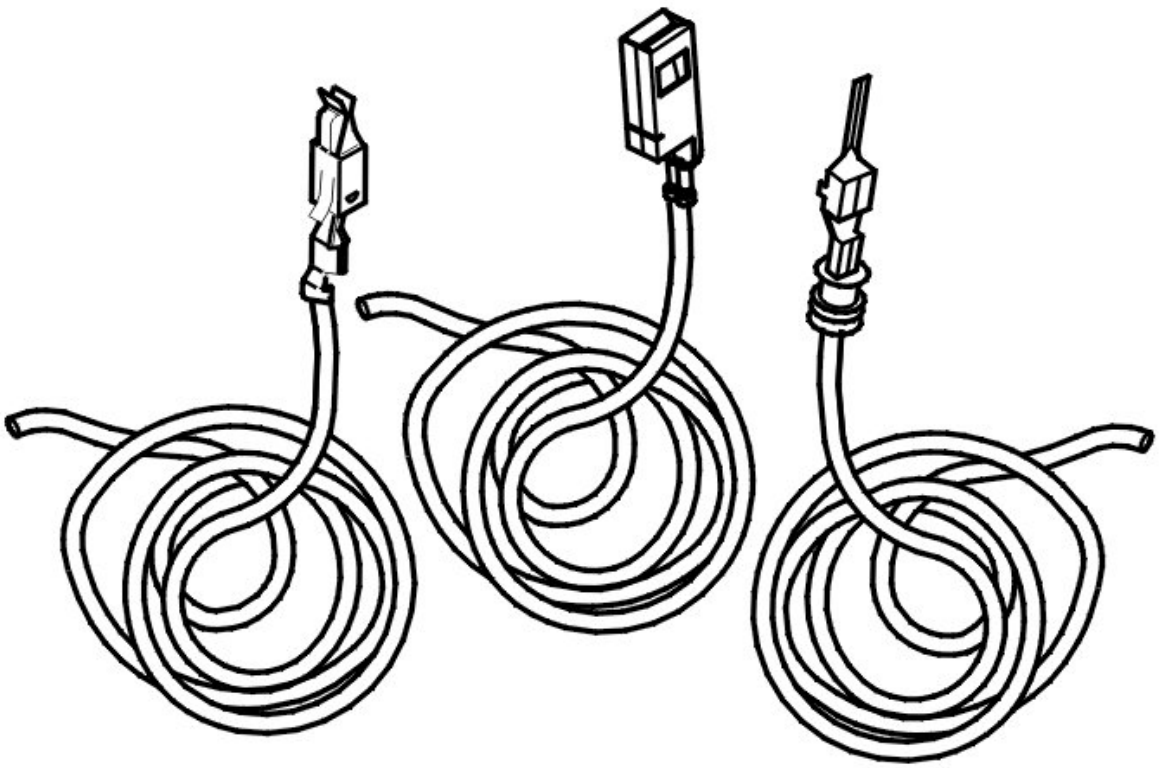


Cable Shoe

Cable shoe

Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Information

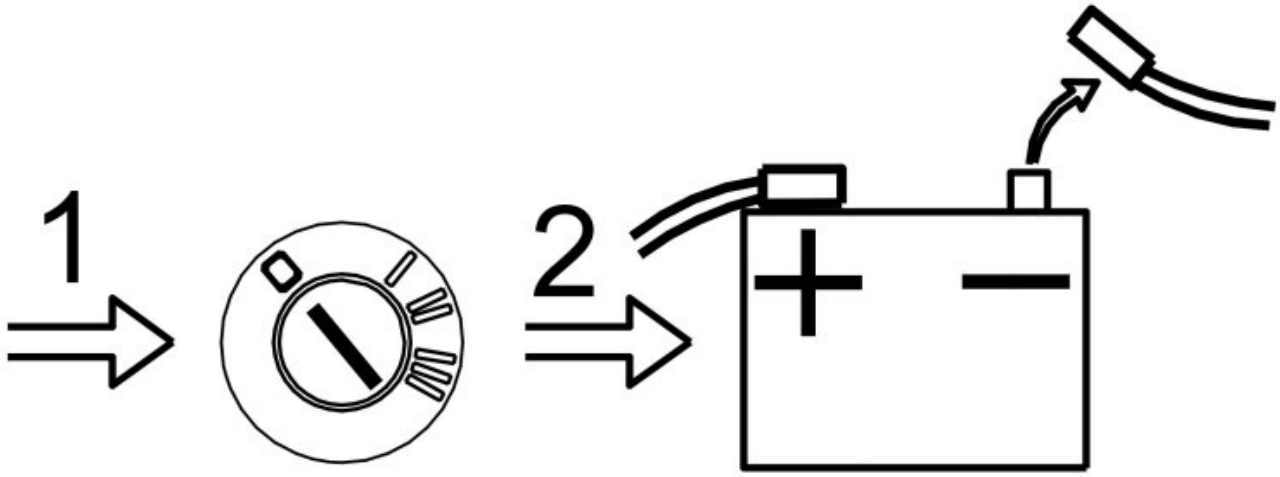


Note! In 2003 the cable terminal with a pre-crimped cable section was introduced to the Volvo range. See the illustration. This method applies for repairs with this type of cable terminal.

Caution! Ensure that the new pin has the same type of surface treatment as the old.

Caution! For repairing SRS wiring, see: Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.

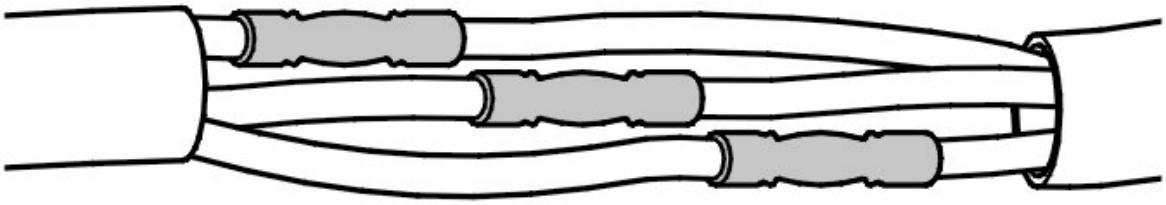
Preparatory work



Disconnect the battery negative cable. See: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

Removal

Caution! Disconnect and work with only one cable at a time to minimize the risk of mixing them up.

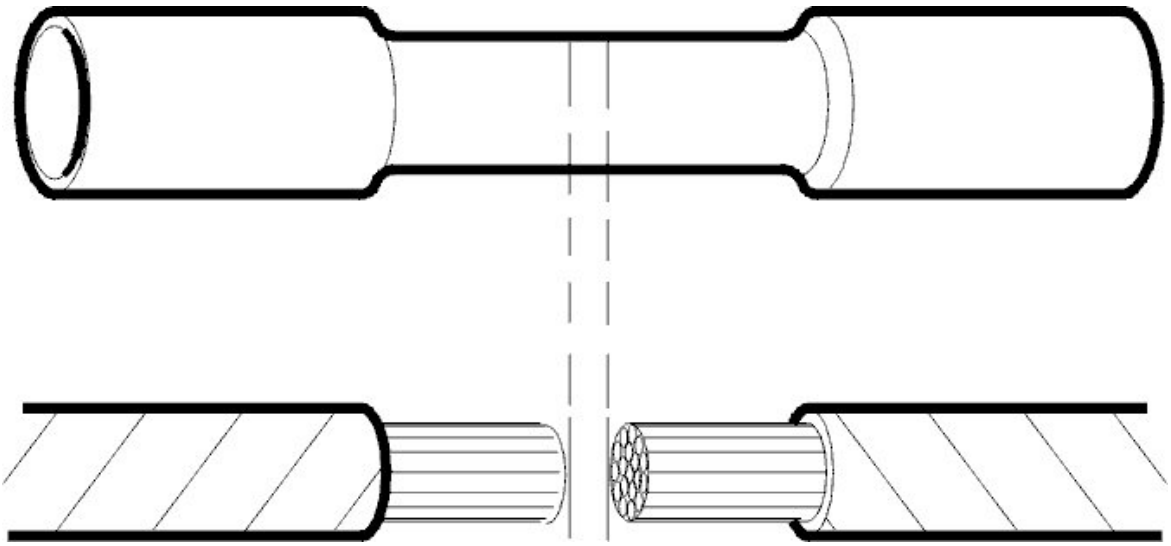


Disconnect the cable terminal that is to be replaced. See: Connectors, repair See: Diagnostic Aids/Connectors, Repair.

Hint: If several cable terminals are to be replaced at the same time, spread out the splice points, as illustrated.

Cut the cable at a suitable point. Note the length of the new cable terminal cable.

Installation



Select a cable terminal with the same area as the old one.
Select a butt connector that corresponds to the cable area. The butt connector is the same color as the cable terminal cable.
Cut the new cable terminal cable to a suitable length.
Splice the cables. See: Joining the cables See: Diagnostic Aids/Wiring/Joining the Cables.

Finishing work

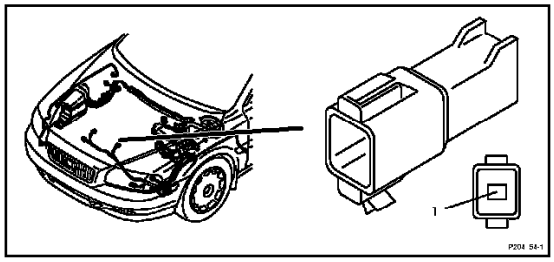
Reinstall the cable harness. If necessary use a crimping sleeve and tie straps.
Connect the battery negative lead. See: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.
Test the function.

54/1
1-pin gray

No.	Engine compartment harness			Engine harness Diesel		
1	15/31C2:2	Engine compartment distribution box	R	53/374	Junction point	R

54/1

54/1 Connector



54/1 Connector

54/3.1
36-pin gray

No.	Passenger compartment harness			Engine compartment harness		
1	4/9B:18/46	Control module, Supplementary Restraint System (SRS)	OR	54/4:5 54/113:1	Connector, V70 Connector, XC90	OR
2	4/9B:19/47	Control module, Supplementary Restraint System (SRS)	OR-SB	54/4:6 54/113:2	Connector, V70 Connector, XC90	OR-SB
3	4/9B:21/49	Control module, Supplementary Restraint System (SRS)	GN-OR	54/4:7 54/122:1	Connector, V70 Connector, XC90	GN-OR
4	4/9B:20/48	Control module, Supplementary Restraint System (SRS)	OR	54/4:8 54/122:2	Connector, V70 Connector, XC90	OR OR-W
5	3/156A:2	Gear Selector Module (GSM)	GN-W	4/28B:21	Transmission Control Module (TCM)	GN-SB
6	54/10:6	Connector	BN	4/46B:4 53/324	Engine Control Module (ECM) Junction point	BN
7	54/10:5	Connector	W	4/46B:29	Engine Control Module (ECM)	OR-W
8	54/36:6	Connector	Y	4/46B:47	Engine Control Module (ECM)	Y
9	7/56:1	Left-hand rear ABS sensor	BN	4/16:36	Brake Control Module (BCM)	BN-OR
10	7/56:2	Left-hand rear ABS sensor	Y	4/16:37	Brake Control Module (BCM)	Y-VO
11	4/56D:32 54/74:4	Central Electronic Module (CEM) Connector	W	4/16:11	Brake Control Module (BCM)	W
12	4/56D:47 54/74:2	Central Electronic Module (CEM) Connector	GN	4/16:15	Brake Control Module (BCM)	GN
13	-		-	-		-
14	4/58C:4	Rear Electronic Module (REM)	Y	54/4:3 3/62:1	Connector, V70 Hood alarm contact, XC90	Y-GR Y
15	54/13:15	Connector	P	16/35:2	Siren Control Module (SCM)	P
16	5/1:6	Driver Information Module (DIM)	Y-R	7/4:1	Brake fluid level sensor	Y-R
17	6/35:1	Fuel pump, auxiliary heater	Y	54/9:2	Connector	Y
18	5/1:2	Driver Information Module (DIM)	GR	4/46B:46	Engine Control Module (ECM)	GR
19	7/57:1	Right-hand rear ABS sensor	BN	4/16:43	Brake Control Module (BCM)	BN-W

continues

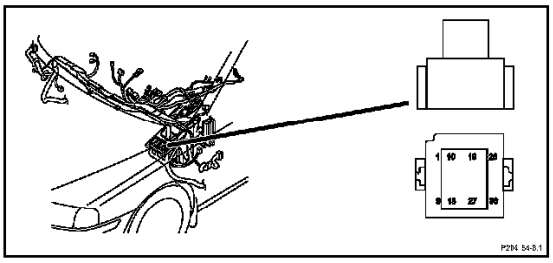
54/3.1, Part 1

54/3.1
36-pin gray

No.	Passenger compartment harness			Engine compartment harness		
20	7/57:2	Right-hand rear ABS sensor	Y	4/16:42	Brake Control Module (BCM)	Y-W
21	7/164:1	Body Sensor Cluster (BSC)	GN	4/16:25	Brake Control Module (BCM)	GN
22	7/164:2	Body Sensor Cluster (BSC)	W	4/16:29	Brake Control Module (BCM)	W
23	7/164:3	Body Sensor Cluster (BSC)	GR	4/16:6	Brake Control Module (BCM)	P-W
24	7/164:5	Body Sensor Cluster (BSC)	GR-W	4/16:39	Brake Control Module (BCM)	GR-SB
25	5/1:5	Driver Information Module (DIM), XC90	Y	3/47:1	Contact parking brake, XC90	Y
26	3/156A:6	Gear Selector Module (GSM)	SB	4/28A:54 53/329	Transmission Control Module (TCM) Junction point	BL-SB SB
27	4/84A:9	Suspension Module (SUM), V70	GR-R	8/21:1	Shock absorber, Four-C, FR, V70	GN-W
28	4/84A:8	Suspension Module (SUM), V70	BN-W	8/21:2	Shock absorber, Four-C, FR, V70	BN-W
29	4/84A:27	Suspension Module (SUM), V70	BN	7/119:2	Acceleration sensor, shock absorber, Four-C, FR, V70	Y-BN
30	53/570	Junction point, V70	SB	53/355	Junction point, V70	SB
31	53/569	Junction point, V70	R	53/354	Junction point, V70	R-W
32	4/84A:22	Suspension Module (SUM), V70	VO	7/88:1	Acceleration sensor, Four-C, FR, V70	VO
33	4/84A:10	Suspension Module (SUM), V70	VO-W	7/87:1	Acceleration sensor, Four-C, FL, V70	VO-W
34	4/84A:12	Suspension Module (SUM), V70	Y-W	7/118:2	Acceleration sensor, shock absorber, Four-C, FL, V70	Y-W
35	4/84A:6	Suspension Module (SUM), V70	GN	8/20:1	Shock absorber, Four-C, FL, V70	GN-SB
36	4/84A:7	Suspension Module (SUM), V70	BL-R	8/20:2	Shock absorber, Four-C, FL, V70	BL-Y

54/3.1, Part 2

54/3.1 Connector



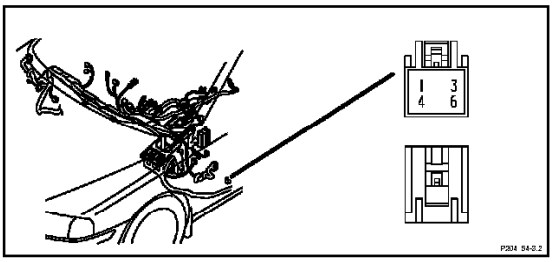
54/3.1 Connector

54/3.2
6-pin gray, LHD

No.	Passenger compartment harness			Engine compartment harness		
1	54/34:1	Connector	GN-GR	15/31C5:13	Engine compartment distribution box	GN-GR
2	54/34:2	Connector	GN-R	4/46B:34	Engine Control Module (ECM)	GN-R
3	54/34:3	Connector	GN	4/46B:40	Engine Control Module (ECM)	GN
4	54/34:4	Connector	BL-SB	4/46B:7	Engine Control Module (ECM)	BL-SB
5	-		-	-		-
6	-		-	-		-

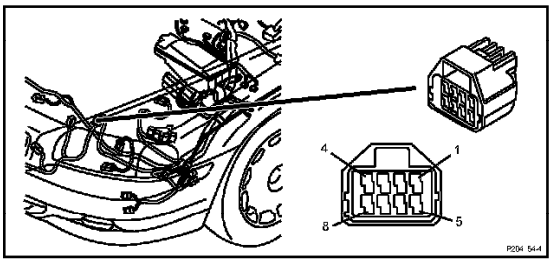
54/3.2

54/3.2 Connector



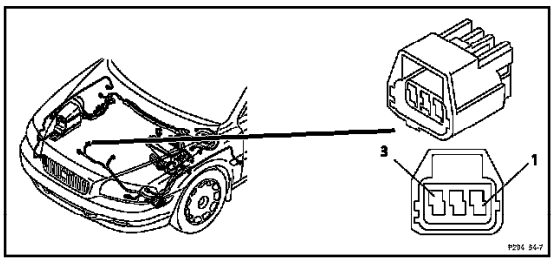
54/3.2 Connector

54/4 Connector



54/4 Connector

54/7 Connector



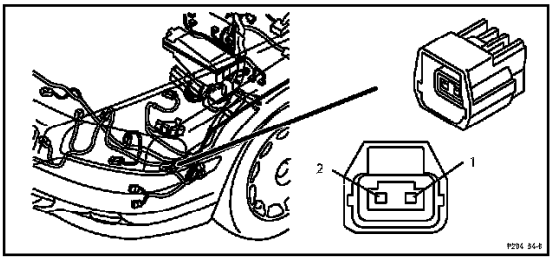
54/7 Connector

54/8
2-pin gray

No.	Engine compartment harness			Harness accessories	
1	15/31C6:3	Engine compartment distribution box	R-SB	30 feed	-
2	4/56C:9	Central Electronic Module (CEM)	BN-W	Signal ground	-

54/8

54/8 Connector



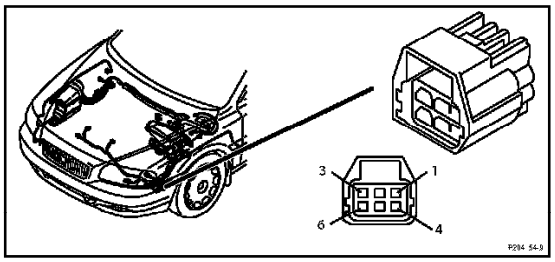
54/8 Connector

54/9
6-pin gray

No.	Engine compartment harness			Heater harness		
1	15/31C6:7	Engine compartment distribution box	R	4/7:9	Combustion Preheater Module (CPM)	R
2	54/3.1:17	Connector	Y	9/30	Auxiliary heater	Y
3	53/331	Junction point	BN-SB	4/7:3 9/30	Combustion Preheater Module (CPM) Auxiliary heater	SB
4	4/56B:10	Central Electronic Module (CEM)	VO-W	4/7:15	Combustion Preheater Module (CPM)	VO-W
5	-		-	-		-
6	4/56C:32	Central Electronic Module (CEM)	GN-W	4/7:6	Combustion Preheater Module (CPM)	GN-W

54/9

54/9 Connector



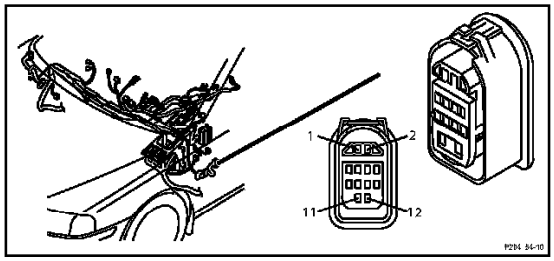
54/9 Connector

54/10
12-pin black

No.	Passenger compartment harness			Front left door harness		
1	11C/5:2	Fuses in passenger compartment fuse box	R	3/126B:12	Driver/Passenger Door Module (DDM)/(PDM)	R
2	-		-	-		-
3	4/56D:39	Central Electronic Module (CEM)	W	3/126A:2	Driver/Passenger Door Module (DDM)/(PDM)	W
4	4/56D:54	Central Electronic Module (CEM)	GN	3/126A:3	Driver/Passenger Door Module (DDM)/(PDM)	GN
5	54/3.1:7	Connector	W	6/62:2	Left-hand power door mirror	W
6	54/3.1:6	Connector	BN	6/62:3	Left-hand power door mirror	BN
7	4/56A:12 4/58A:21	Central Electronic Module (CEM), XC90 Rear Electronic Module (REM), XC90	GN-W	10/15:2	Direction indicator front fender left, XC90	GN
8	4/58C:12	Rear Electronic Module (REM)	P	3/74:3	Left-hand front door lock unit	P
9	16/1B:1 54/14:1 16/105B:9	Audio Module (AUM), V70 Connector, V70 Audio control module (AUD), XC90	GR-R	16/4:1	Left-hand front door speaker	GR-R
10	16/1B:2 54/14:2 16/105B:1	Audio Module (AUM), V70 Connector, V70 Audio control module (AUD), XC90	GR	16/4:2	Left-hand front door speaker	GR
11	31/66	Ground connection	SB	3/126B:5 53/514	Driver/Passenger Door Module (DDM)/(PDM), V70 Junction point, XC90	SB
12	-		-	-		-

54/10

54/10 Connector



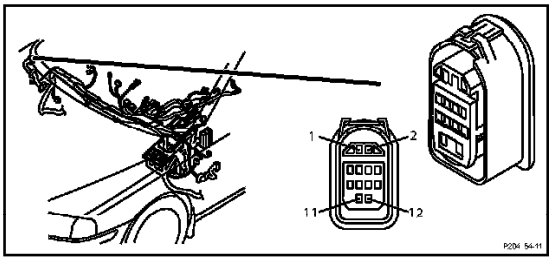
54/10 Connector

54/11
12-pin black

No.	Passenger compartment harness			Front right door harness		
1	11C/4:2 11C/6:2	Fuses in the passenger compartment fuse box, V70 Fuses in the passenger compartment fuse box, XC90	R	3/127B:12	Passenger/Driver Door Module (PDM)/(DDM)	R
2	-		-	-		-
3	53/433	Junction point	W	3/127A:2	Passenger/Driver Door Module (PDM)/(DDM)	W
4	53/434	Junction point	GN	3/127A:3	Passenger/Driver Door Module (PDM)/(DDM)	GN
5	-		-	-		-
6	-		-	-		-
7	4/56A:29 4/58A:20	Central Electronic Module (CEM), XC90 Rear Electronic Module (REM), XC90	GN	10/16:2	Direction indicator, right front door, XC90	GN-W
8	54/43:4	Connector	P	3/75:3	Right-hand front door lock unit	P
9	16/1B:5 54/14:5 16/105B:11	Audio Module (AUM), V70 Connector, V70 Audio control module (AUD), XC90	GR-R	16/3:1	Right-hand front door speaker	GR-R
10	16/1B:6 54/14:6 16/105B:3	Audio Module (AUM), V70 Connector, V70 Audio control module (AUD), XC90	GR	16/3:2	Right-hand front door speaker	GR
11	53/501	Junction point	SB	3/127B:5 53/515	Passenger/Driver Door Module (PDM)/(DDM), V70 Junction point, XC90	SB
12	-		-	-		-

54/11

54/11 Connector



54/11 Connector

54/13
22-pin black

No.	Passenger compartment harness			Roof harness		
1	11C/6:2 11C/12:2	Fuses in the passenger compartment fuse box, V70 Fuses in the passenger compartment fuse box, XC90	R	53/534	Junction point	R
2	-		-	-		-
3	-		-	-		-
4	-		-	-		-
5	4/56D:38	Central Electronic Module (CEM)	W	4/70:3	Upper Electronic Module (UEM)	W
6	4/56D:53	Central Electronic Module (CEM)	GN	4/70:5	Upper Electronic Module (UEM)	GN
7	-		-	-		-
8	-		-	-		-
9	-		-	-		-
10	-		-	-		-
11	-		-	-		-
12	-		-	-		-
13	-		-	-		-

continues

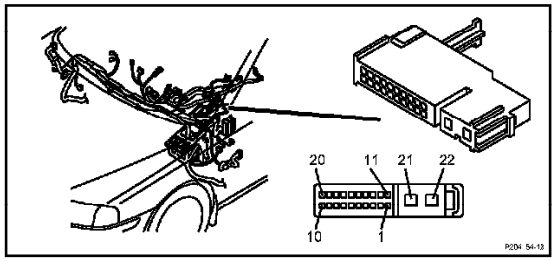
54/13, Part 1

54/13
22-pin black

No.	Passenger compartment harness			Roof harness		
14	4/56D:11	Central Electronic Module (CEM)	W	54/16:4	Connector	W
15	54/3.1:15	Connector	P	4/33A:4 4/70:21	Sunroof Control Module (SRM) Upper Electronic Module (UEM)	P
16	4/58C:8	Rear Electronic Module (REM), V70	Y	7/136A:1	Right-hand glass breakage sensor, V70	Y
17	-		-	-		-
18	-		-	-		-
19	-		-	-		-
20	53/400	Junction point	BN	53/503	Junction point	BN
21	11C/7:2 11C/13:2	Fuses in the passenger compartment fuse box, V70 Fuses in the passenger compartment fuse box, XC90	R	4/33A:1	Sunroof Control Module (SRM)	R
22	53/405	Junction point	SB	4/33A:10	Sunroof Control Module (SRM)	SB

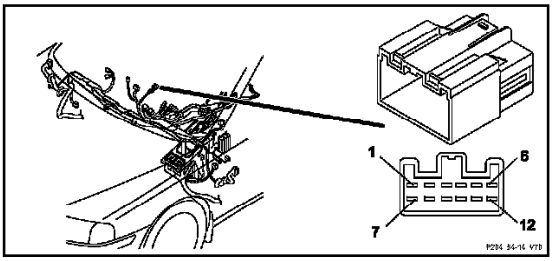
54/13, Part 2

54/13 Connector



54/13 Connector

54/14 Connector



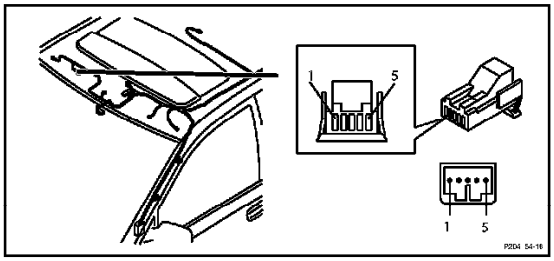
54/14 Connector

54/16
5-pin green

No.	Roof harness			Rain sensor harness		
1	4/70:13	Upper Electronic Module (UEM)	GN	7/149:1	Rain Sensor Module (RSM)	GN
2	53/503	Junction point	BN	7/149:2	Rain Sensor Module (RSM)	BN
3	53/505	Junction point	VO-W	7/149:3	Rain Sensor Module (RSM)	VO-W
4	54/13:14	Connector	W	7/149:4	Rain Sensor Module (RSM)	W
5	-		-	-		-

54/16

54/16 Connector



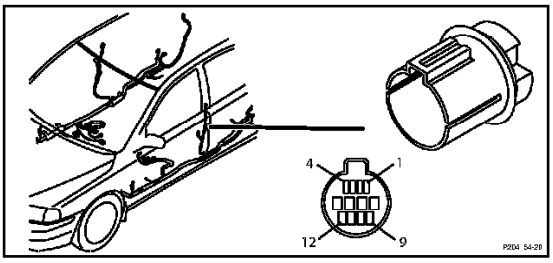
54/16 Connector

54/20
12-pin black

No.	Passenger compartment harness			Rear left door harness		
1	53/523	Junction point	GR-W	16/6:1	Left-hand rear door speaker	GR-W
2	53/524	Junction point	GR	16/6:2	Left-hand rear door speaker	GR
3	4/58C:3	Rear Electronic Module (REM)	P	3/76:2	Left-hand rear door lock unit	P
4	4/58C:5	Rear Electronic Module (REM)	BL	3/76:5	Left-hand rear door lock unit	BL
5	4/58A:19	Rear Electronic Module (REM)	Y	3/85:1	Rear left door power window switch	Y
6	4/58A:2	Rear Electronic Module (REM)	BL	3/85:3	Rear left door power window switch	BL
7	4/58C:10	Rear Electronic Module (REM)	W	3/76:7	Left-hand rear door lock unit	W
8	4/58A:1	Rear Electronic Module (REM)	GN-BN	3/85:5	Rear left door power window switch	GN-BN
9	4/58A:27	Rear Electronic Module (REM)	VO	2/138:1 3/76:8	Deadlock relay, left-hand rear door Left-hand rear door lock unit	VO
10	4/58A:24	Rear Electronic Module (REM)	GR	3/76:6	Left-hand rear door lock unit	GR
11	4/58A:23	Rear Electronic Module (REM)	Y	3/76:4	Left-hand rear door lock unit	Y
12	53/500	Junction point	SB	3/76:1 3/85:2	Left-hand rear door lock unit Rear left door power window switch	SB

54/20

54/20 Connector



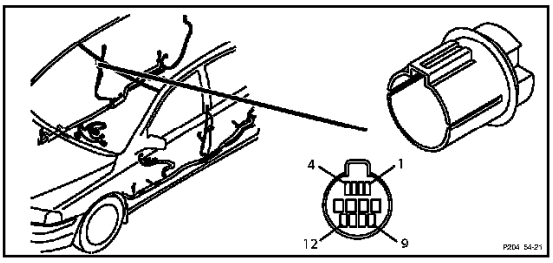
54/20 Connector

54/21
12-pin black

No.	Passenger compartment harness			Rear right door harness		
1	53/525	Junction point	GR-W	16/5:1	Right-hand rear door speaker	GR-W
2	53/526	Junction point	GR	16/5:2	Right-hand rear door speaker	GR
3	54/43:5	Connector	P	3/77:2	Right-hand rear door lock unit	P
4	54/43:11	Connector	BL	3/77:5	Right-hand rear door lock unit	BL
5	54/43:7	Connector	Y	3/86:1	Rear right door power window switch	Y
6	54/43:1	Connector	BL	3/86:3	Rear right door power window switch	BL
7	54/43:14	Connector	W	3/77:7	Right-hand rear door lock unit	W
8	54/43:8	Connector	GN-BN	3/86:5	Rear right door power window switch	GN-BN
9	54/43:6	Connector	VO	2/139:1 3/77:8	Deadlock relay, right-hand rear door Right-hand rear door lock unit	VO
10	54/43:3	Connector	GR	3/77:6	Right-hand rear door lock unit	GR
11	54/43:2	Connector	Y	3/77:4	Right-hand rear door lock unit	Y
12	53/501	Junction point	SB	3/86:2 53/532	Rear right door power window switch Junction point	SB

54/21

54/21 Connector



54/21 Connector

54/24
20-pin black

No.	Passenger compartment harness			Front left seat harness		
1	53/500	Junction point	SB	9/12A:1	Seat Heater Module (SHM), left-hand	-
2	4/56A:19	Central Electronic Module (CEM)	BL	9/12A:4	Seat Heater Module (SHM), left-hand	-
3	-		-	-		-
4	54/132:2	Connector	GN-W	9/12A:2	Seat Heater Module (SHM), left-hand	-
5	4/56D:10	Central Electronic Module (CEM), XC90	OR-W	3/255:1	Position sensor driver's seat, XC90	Y

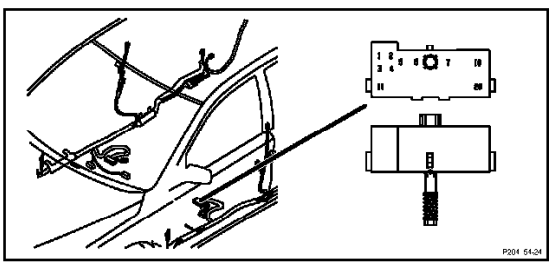
continues

54/24
20-pin black

No.	Passenger compartment harness			Front left seat harness		
6	4/56D:25	Central Electronic Module (CEM), XC90	OR-SB	3/255:2	Position sensor driver's seat, XC90	BN
7	4/9A:4/4	Control module, Supplementary Restraint System (SRS)	OR	8/51:1	Front left side airbag igniter	BL
8	4/9A:3/3	Control module, Supplementary Restraint System (SRS)	BL-OR	8/51:2	Front left side airbag igniter	BN
9	16/60:5	Phone Module (PHM), V70 LHD	GR-R	16/78:1	Speaker cellular telephone, V70 LHD	-
10	16/60:4	Phone Module (PHM), V70 LHD	GR	16/78:2	Speaker cellular telephone, V70 LHD	-
11	4/56D:51	Central Electronic Module (CEM), LHD	GN	4/52D:3	Power Seat Module (PSM), LHD	GN
	4/56D:27	Central Electronic Module (CEM), XC90 RHD	Y	7/175:1	Weight sensor passenger seat, seat belt reminder	Y
12	4/56D:36	Central Electronic Module (CEM), LHD	W	4/52D:2	Power Seat Module (PSM), LHD	W
	4/56D:28	Central Electronic Module (CEM), XC90 RHD	VO	7/175:2	Weight sensor passenger seat, seat belt reminder	VO
13	53/500	Junction point	SB	8/51	Front left side airbag igniter	SB
14	4/56A:22	Central Electronic Module (CEM), RHD	VO	3/27:3	Switch unit, power passenger seat, RHD	GN-R
	53/437	Junction point, LHD	VO-W	4/52D:1	Power Seat Module (PSM), LHD	
15	11C/1:2	Fuses in the passenger compartment fuse box, V70 LHD	R	4/52C:1	Power Seat Module (PSM), V70 LHD	BL-R
	11C/2:2	Fuses in the passenger compartment fuse box, V70 RHD		3/27:1	Switch unit power passenger seat, V70 RHD	
	11C/3:2	Fuses in the passenger compartment fuse box, XC90 LHD		4/52C:1	Power Seat Module (PSM), XC90 LHD	
	11C/4:2	Fuses in the passenger compartment fuse box, XC90 RHD		3/27:1	Switch unit power passenger seat, XC90 RHD	
16	53/500	Junction point	SB	3/27:2	Switch unit, power passenger seat, RHD	SB
				4/52C:2	Power Seat Module (PSM), LHD	
				4/52D:4	Power Seat Module (PSM), LHD	
17	4/9A:25/25	Control module, Supplementary Restraint System (SRS)	VO	3/93:1	Switch, left-hand seat belt buckle	-
18	4/9A:26/26	Control module, Supplementary Restraint System (SRS)	OR-SB	3/93:2	Switch, left-hand seat belt buckle	-
19	-		-	-		-
20	-		-	-		-

54/24, Part 2

54/24 Connector



54/24 Connector

54/25
20-pin black

No.	Passenger compartment harness			Front right seat harness		
1	53/501	Junction point	SB	9/13A:1	Seat Heater Module (SHM), right-hand	-
2	4/56A:18	Central Electronic Module (CEM)	BL	9/13A:4	Seat Heater Module (SHM), right-hand	-
3	-		-	-		-
4	54/132:5	Connector	GN-W	9/13A:2	Seat Heater Module (SHM), right-hand	-
5	4/56D:18	Central Electronic Module (CEM), XC90	GN-OR	3/256:1	Position sensor passenger seat, XC90	Y
6	4/56D:26	Central Electronic Module (CEM), XC90	BL-OR	3/256:2	Position sensor passenger seat, XC90	BN
7	4/9C:4/60	Control module, Supplementary Restraint System (SRS)	OR	8/52:1	Front right side airbag igniter	BL
8	4/9C:3/59	Control module, Supplementary Restraint System (SRS)	BL-OR	8/52:2	Front right side airbag igniter	BN
9	16/60:5	Phone Module (PHM), V70 RHD	GR-R	16/78:1	Speaker cellular telephone, V70 RHD	-
10	4/9C:1/57 16/60:4	Control module Supplementary Restraint System (SRS), LHD Phone Module (PHM), V70 RHD	GN-W GR	7/93:E 16/78:2	Occupant Weight Sensor (OWS), LHD Speaker cellular telephone, V70 RHD	-
11	4/56D:51 4/56D:27	Central Electronic Module (CEM), RHD Central Electronic Module (CEM), XC90 LHD	GN Y	4/52D:3 7/175:1	Power Seat Module (PSM), RHD Weight sensor passenger seat, seat belt reminder, XC90 LHD	GN Y
12	4/56D:36 4/56D:28	Central Electronic Module (CEM), RHD Central Electronic Module (CEM), XC90 LHD	W VO	4/52D:2 7/175:2	Power Seat Module (PSM), RHD Weight sensor passenger seat, seat belt reminder, XC90 LHD	W VO
13	53/501	Junction point	SB	8/52	Front right side airbag igniter	SB
14	4/56A:22 53/437	Central Electronic Module (CEM), LHD Junction point, RHD	VO VO-W	3/27:3 4/52D:1	Switch unit, power passenger seat, LHD Power Seat Module (PSM), RHD	GN-R

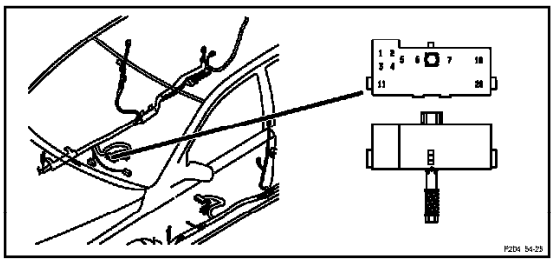
continues

54/25
20-pin black

No.	Passenger compartment harness			Front right seat harness		
15	11C/1:2 11C/2:2 11C/3:2 11C/4:2	Fuses in the passenger compartment fuse box, V70 RHD Fuses in the passenger compartment fuse box, V70 LHD Fuses in the passenger compartment fuse box, XC90 RHD Fuses in the passenger compartment fuse box, XC90 LHD	R	4/52C:1 3/27:1 4/52C:1 3/27:1	Power Seat Module (PSM), V70 RHD Switch unit power passenger seat, V70 LHD Power Seat Module (PSM), XC90 RHD Switch unit, power passenger seat, XC90 LHD	BL-R
16	53/501	Junction point	SB	3/27:2 4/52C:2 4/52D:4	Switch unit, power passenger seat, LHD Power Seat Module (PSM), RHD Power Seat Module (PSM), RHD	SB
17	4/9C:25/81	Control module, Supplementary Restraint System (SRS)	VO	3/94:1	Switch, right-hand seat belt buckle	-
18	4/9C:26/82	Control module, Supplementary Restraint System (SRS)	OR-SB	3/94:2	Switch, right-hand seat belt buckle	-
19	31/67	Ground connection, LHD	BN	7/93:D	Occupant Weight Sensor (OWS), LHD	-
20	53/437	Junction point, LHD	VO-W	7/93:G	Occupant Weight Sensor (OWS), LHD	-

54/25, Part 2

54/25 Connector

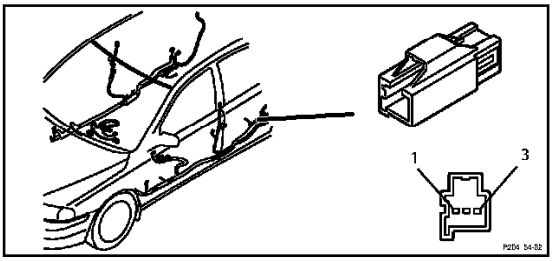


54/25 Connector

54/32
3-pin gray

No.	Passenger compartment harness			Rear left angle sensor harness		
1	4/58C:11	Rear Electronic Module (REM)	GN-R	7/120:5	Angle sensor, Four-C/Bi-Xenon rear left	BL-R
2	4/58C:6	Rear Electronic Module (REM)	GR	7/120:4	Angle sensor, Four-C/Bi-Xenon rear left	GR-W
3	4/58C:9	Rear Electronic Module (REM)	BN-W	7/120:1	Angle sensor, Four-C/Bi-Xenon rear left	BN

54/32 Connector



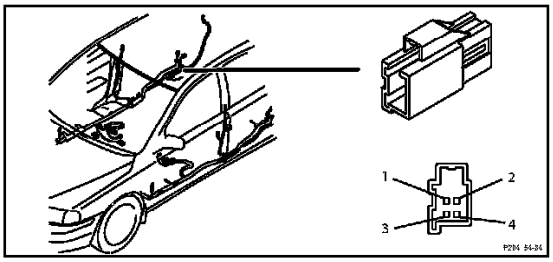
54/32 Connector

54/34
4-pin gray

No.	Passenger compartment harness			Fuel leakage pump harness		
1	54/3.2:1	Connector	GN-GR	6/67:4	Pump, fuel leakage control	GN-GR
2	54/3.2:2	Connector	GN-R	6/67:2	Pump, fuel leakage control	GN-R
3	54/3.2:3	Connector	GN	6/67:3	Pump, fuel leakage control	GN
4	54/3.2:4	Connector	BL-SB	6/67:1	Pump, fuel leakage control	BL-SB

54/34

54/34 Connector



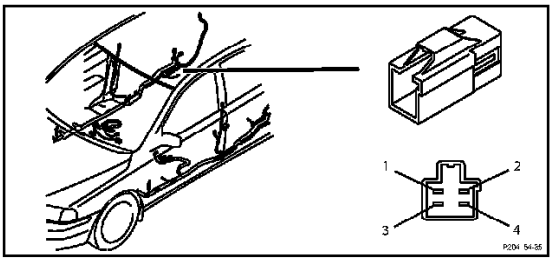
54/34 Connector

54/35
4-pin gray

No.	Cargo compartment harness			Heated fuel filter harness		
1-2	-		-	-		-
3	4/58B:15	Rear Electronic Module (REM)	BL	8/85:1	Thermostatic switch and fuel filter heating	BL
4	53/604	Junction point	SB	8/85:2	Thermostatic switch and fuel filter heating	SB

54/35

54/35 Connector



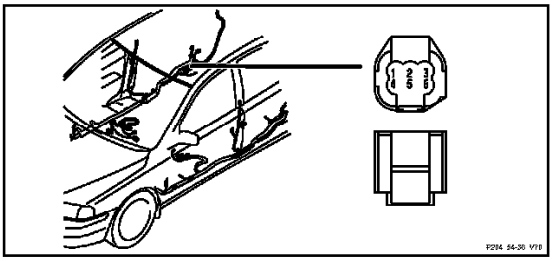
54/35 Connector

54/36
6-pin gray

No.	Passenger compartment harness			Fuel tank harness		
1	4/56D:44	Central Electronic Module (CEM)	BL	6/33:4 6/33:A 6/33:P	Fuel pump Fuel pump Fuel pump	BL BL -
2	4/56D:45	Central Electronic Module (CEM)	BN	6/33:3 6/33:B 6/33	Fuel pump Fuel pump Fuel pump	BN BN -
3	4/56D:43	Central Electronic Module (CEM)	GN	6/33:2 6/33:E	Fuel pump Fuel pump	GN -
4	31/48	Ground connection	SB	53/579 4/83:3 6/33	Junction point Fuel pump control module Fuel pump	SB SB -
5	4/56A:16	Central Electronic Module (CEM)	BL	53/578 4/83:2 6/33	Junction point Fuel pump control module Fuel pump	BL BL -
6	54/3.1:8	Connector	Y	4/83:1	Fuel pump control module	Y

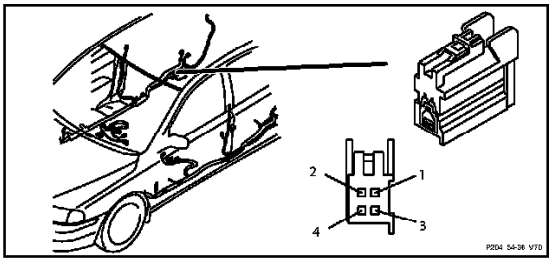
54/36

54/36 Connector



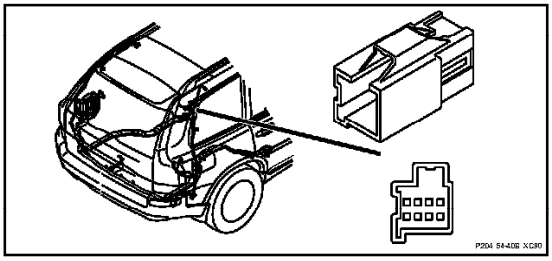
54/36 Connector

54/39 Connector



54/39 Connector

54/40B Connector



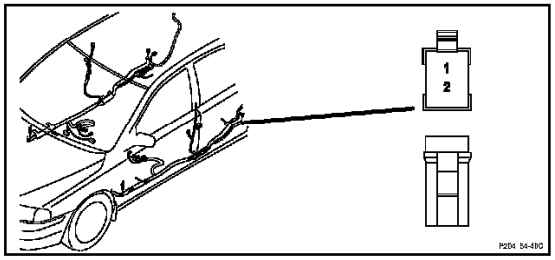
54/40B Connector

54/40C
2-pin black

No.	Passenger compartment harness			Cargo compartment harness		
1	53/415	Junction point	R	11E/6:2	Main fuses at battery	R
2	53/403	Junction point	R	11E/7:2	Main fuses at battery	R

54/40C

54/40C Connector



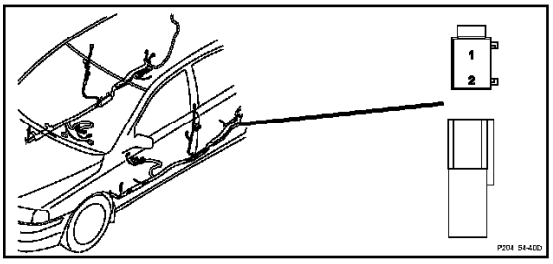
54/40C Connector

54/40D
2-pin black

No.	Passenger compartment harness			Cargo compartment harness		
1	4/56E:B	Central Electronic Module (CEM)	R	11E/4:2	Main fuses at battery	R
2	4/56E:A	Central Electronic Module (CEM)	R	11E/5:2	Main fuses at battery	R

54/40D

54/40D Connector



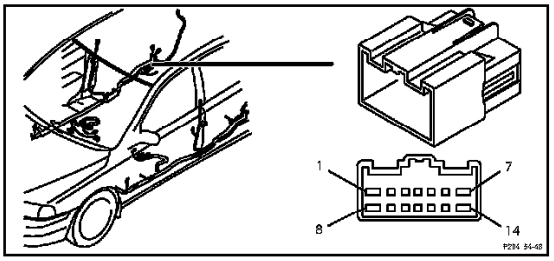
54/40D Connector

54/43
14-pin gray

No.	Passenger compartment harness			Cargo compartment harness		
1	54/21:6	Connector	BL	4/58B:2	Rear Electronic Module (REM)	BL
2	54/21:11	Connector	Y	6/37:2	Lock motor, fuel filler cover	Y
3	54/21:10	Connector	GR	4/58B:12	Rear Electronic Module (REM)	GR
4	54/11:8	Connector	P	4/58D:29	Rear Electronic Module (REM)	P
5	54/21:3	Connector	P	4/58D:33	Rear Electronic Module (REM)	P
6	54/21:9	Connector	VO	4/58B:24	Rear Electronic Module (REM)	VO
7	54/21:5	Connector	Y	4/58B:30	Rear Electronic Module (REM)	Y
8	54/21:8	Connector	GN-BN	4/58B:1	Rear Electronic Module (REM)	GN-BN
9	53/525	Junction point	GR-W	16/58:1 53/652	Speaker, right-hand D-pillar Junction point, V70	GR-W
10	53/526	Junction point	GR	16/58:2 53/653	Speaker, right-hand D-pillar Junction point, V70	GR
11	54/21:4	Connector	BL	4/58D:28	Rear Electronic Module (REM)	BL
12	53/524	Junction point	GR	16/57:2 53/655	Speaker, left-hand D-pillar Junction point, V70	GR
13	53/523	Junction point	GR-W	16/57:1 53/654	Speaker, left-hand D-pillar Junction point, V70	GR-W
14	54/21:7	Connector	W	4/58D:4	Rear Electronic Module (REM)	W

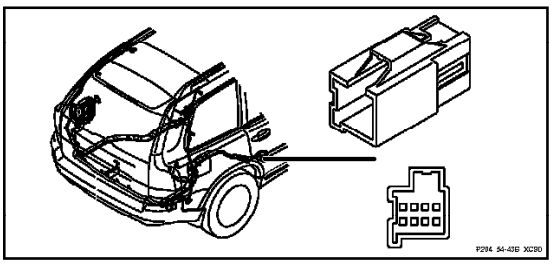
54/43

54/43 Connector



54/43 Connector

54/43B Connector



54/43B Connector

54/50
2-pin gray

No.	Cargo compartment harness			Trunk lid/tailgate harness		
1	53/601	Junction point	SB	6/32:3 9/2C:1 6/32:3 9/2C:1	Rear window wiper motor, V70 Heated rear window, V70 Rear window wiper motor, XC90 Heated rear window, XC90	SB SB W W
2	-		-	-		-

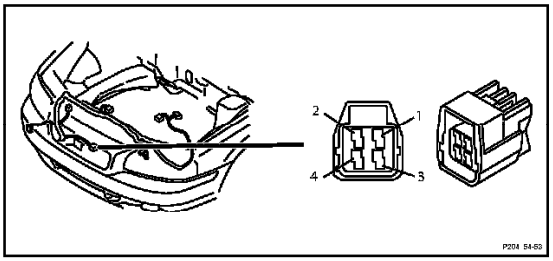
54/50

54/53
4-pin gray

No.	Engine harness, 5-CYL T & 6-CYL			Knock sensor harness		
1	4/46A:46	Engine Control Module (ECM)	BN-SB	7/24:1	Front knock sensor	-
2	4/46A:64	Engine Control Module (ECM)	SB	7/24:2	Front knock sensor	-
3	4/46A:45	Engine Control Module (ECM)	BN	7/23:1	Rear knock sensor	-
4	4/46A:67	Engine Control Module (ECM)	Y-SB	7/23:2	Rear knock sensor	-

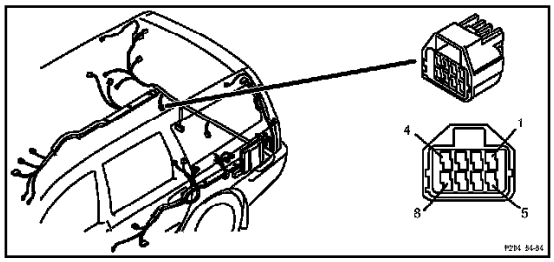
54/53

54/53 Connector



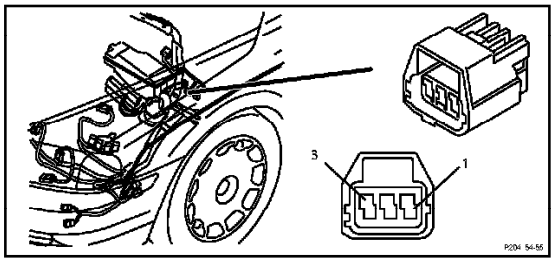
54/53 Connector

54/54 Connector



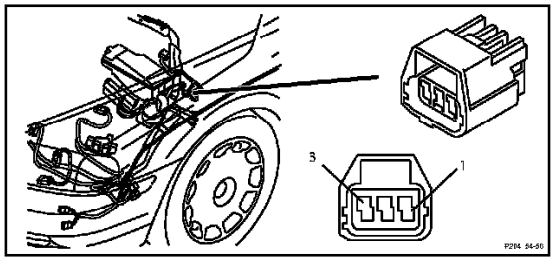
54/54 Connector

54/55 Connector



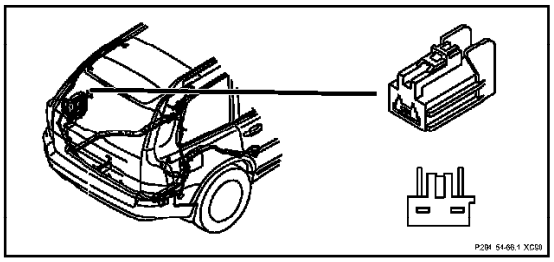
54/55 Connector

54/56 Connector



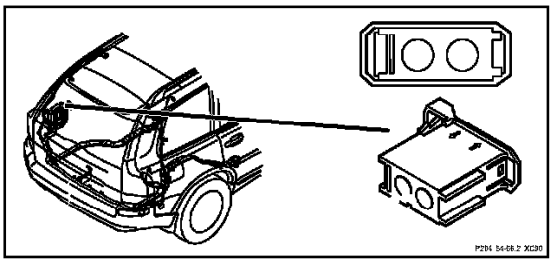
54/56 Connector

54/66.1 Connector



54/66.1 Connector

54/66.2 Connector



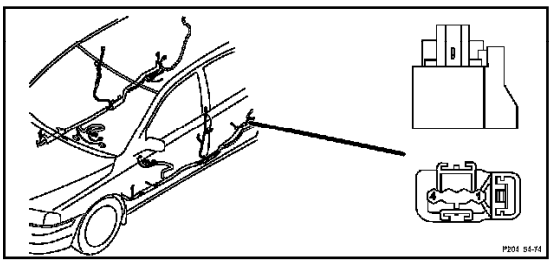
54/66.2 Connector

54/74
4-pin yellow

No.	Passenger compartment harness			Harness, differential electronic module		
1	4/56D:47 53/568	Central Electronic Module (CEM) Junction point, V70	GN	53/513	Junction point	GN
2	54/3.1:12	Connector	GN	53/513	Junction point	GN
3	4/56D:32 53/567	Central Electronic Module (CEM) Junction point, V70	W	53/512	Junction point	W
4	54/3.1:11	Connector	W	53/512	Junction point	W

54/74

54/74 Connector



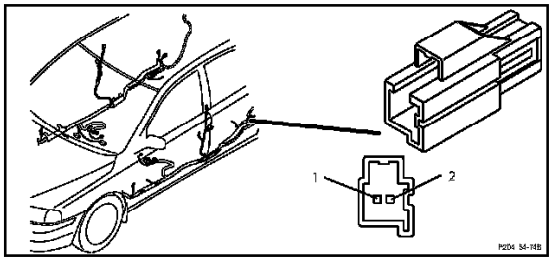
54/74 Connector

54/74B
2-pin orange

No.	Passenger compartment harness			Harness, differential electronic module		
1	4/58A:14	Rear Electronic Module (REM)	BL	53/502	Junction point	BL-R
2	31/46	Ground connection	SB	53/535 53/582	Junction point Junction point	BN SB

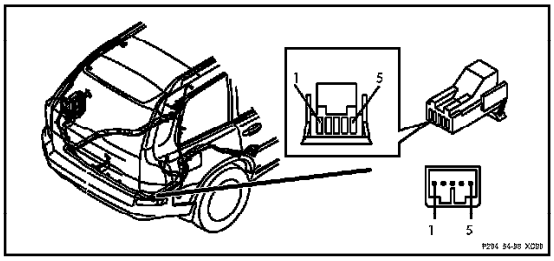
54/74B

54/74B Connector



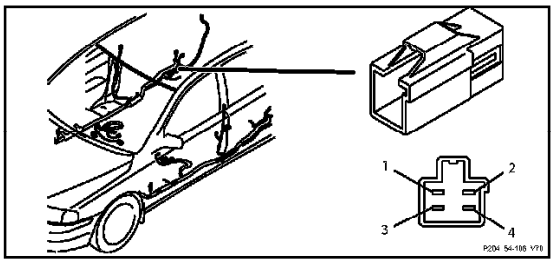
54/74B Connector

54/98 Connector



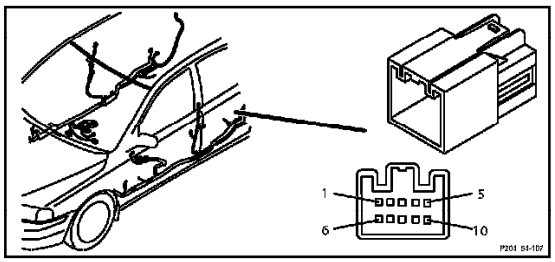
54/98 Connector

54/106 Connector



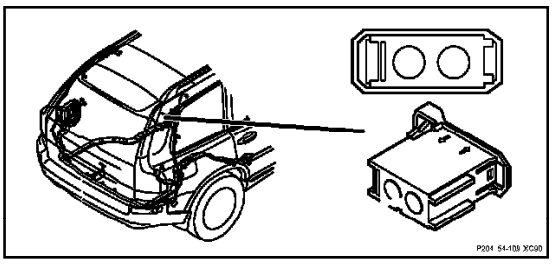
54/106 Connector

54/107 Connector



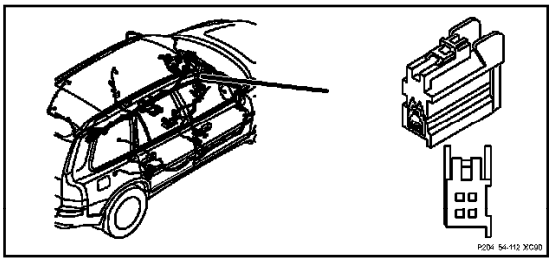
54/107 Connector

54/109 Connector



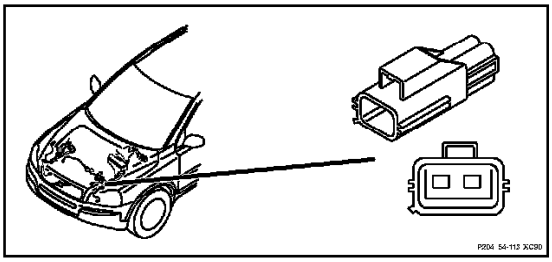
54/109 Connector

54/112 Connector



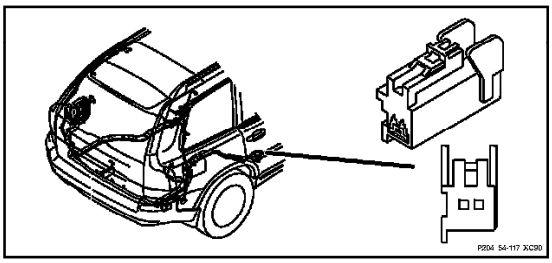
54/112 Connector

54/113 Connector



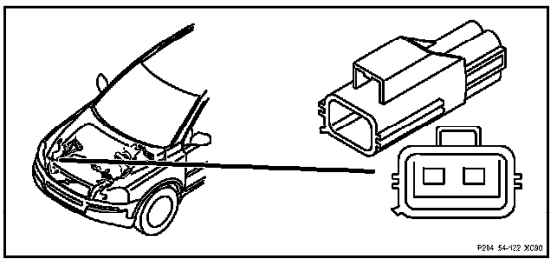
54/113 Connector

54/117 Connector



54/117 Connector

54/122 Connector



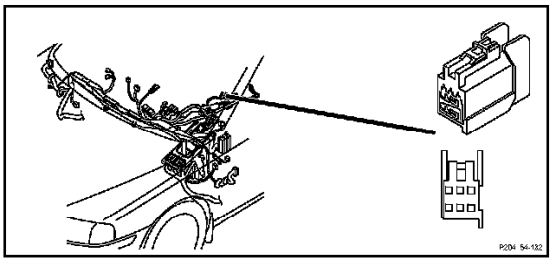
54/122 Connector

54/132
6-pin gray

No.	Passenger compartment harness			Climate control system harness		
1	53/437	Junction point	VO-W	53/458	Junction point	R
2	3/112A:12 54/24:4	Climate Control Module (CCM) Connector	GN-W	53/461	Junction point	GN-Y
3	3/112A:5	Climate Control Module (CCM)	VO	7/41:4	Temperature sensor, evaporator	VO
4	3/112A:13	Climate Control Module (CCM)	BN	7/41:3	Temperature sensor, evaporator	BN
5	3/112A:7 54/25:4	Climate Control Module (CCM) Connector	GN-W	53/460 6/96:2	Junction point Damper Motor Module (DMM), temperature, right side, RHD MCC	Y
6	53/438	Junction point	BN	53/459	Junction point	BL

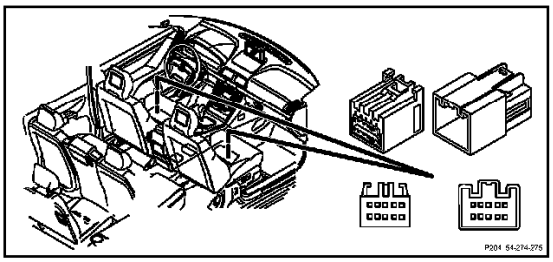
54/132

54/132 Connector



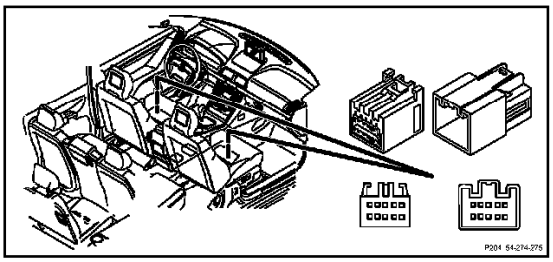
54/132 Connector

54/274 Connector
54/ 275 Connector



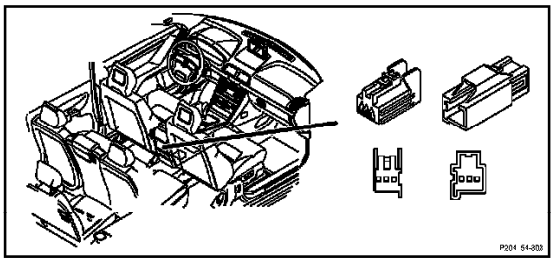
54/274, 275 Connector

54/274 Connector
54/ 275 Connector



54/274, 275 Connector

54/303 Connector



54/303 Connector

54/1300
6-pin gray

No.	PAM harness engine compartment			PAM harness bumper		
1	54/1400:1	Connector	BL	7/204:1 7/205:1 7/206:1 7/207:1	Parking assistance sensor, front 5 Parking assistance sensor, front 6 Parking assistance sensor, front 7 Parking assistance sensor, front 8	BL
2	54/1400:2	Connector	GN	7/207:2	Parking assistance sensor, front 8	GN
3	54/1400:3	Connector	VO	7/206:2	Parking assistance sensor, front 7	VO
4	54/1400:4	Connector	Y	7/205:2	Parking assistance sensor, front 6	Y
5	54/1400:5	Connector	W	7/204:2	Parking assistance sensor, front 5	W
6	54/1400:6	Connector	SB	7/204:3 7/205:3 7/206:3 7/207:3	Parking assistance sensor, front 5 Parking assistance sensor, front 6 Parking assistance sensor, front 7 Parking assistance sensor, front 8	SB

54/1300

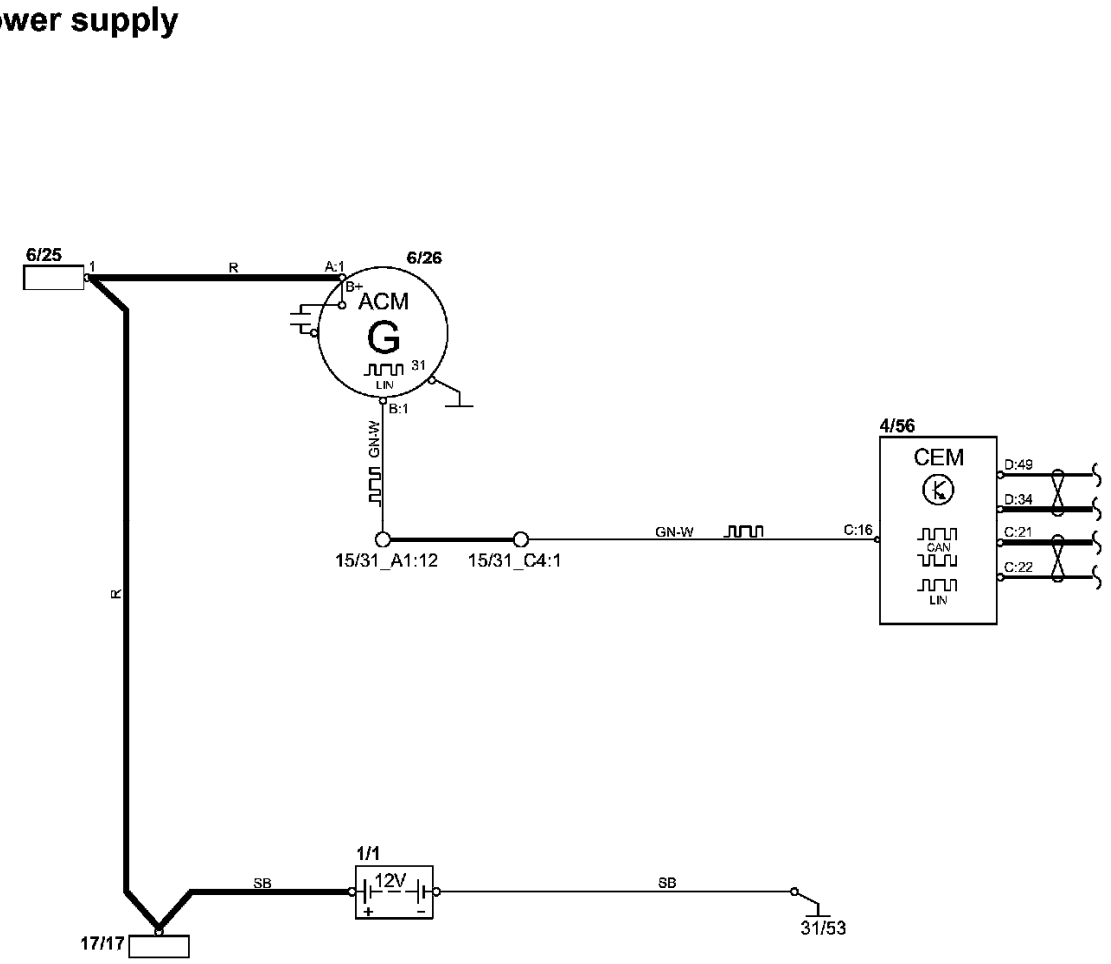
54/1400
6-pin gray

No.	PAM harness passenger compartment			PAM harness engine compartment		
1	4/86B:2	Parking Assistance Module (PAM)	BL	54/1300:1	Connector	BL
2	4/86B:8	Parking Assistance Module (PAM)	GN	54/1300:2	Connector	GN
3	4/86B:7	Parking Assistance Module (PAM)	VO	54/1300:3	Connector	VO
4	4/86B:6	Parking Assistance Module (PAM)	Y	54/1300:4	Connector	Y
5	4/86B:5	Parking Assistance Module (PAM)	W	54/1300:5	Connector	W
6	4/86B:1	Parking Assistance Module (PAM)	SB	54/1300:6	Connector	SB

54/1400

System Diagram

Power Supply



Power Supply

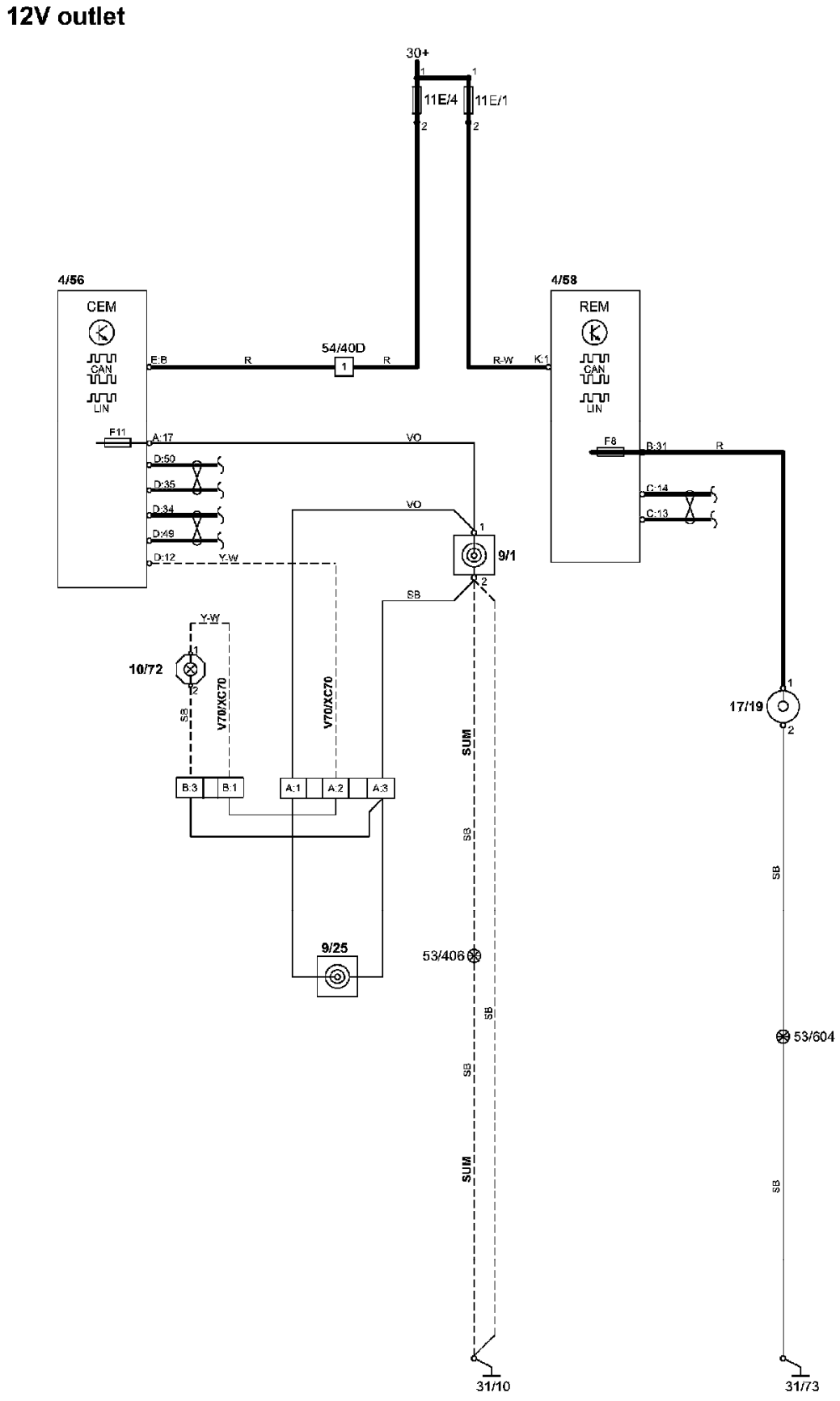
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Auxiliary Power Outlet

12V Outlet



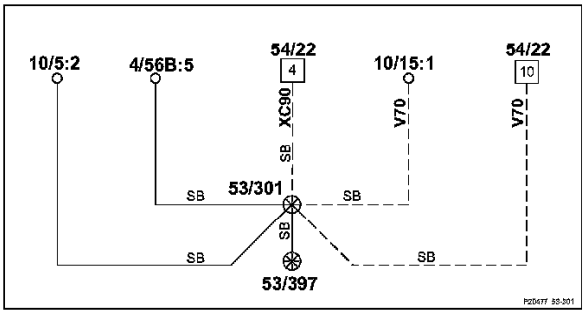
12V Outlet

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

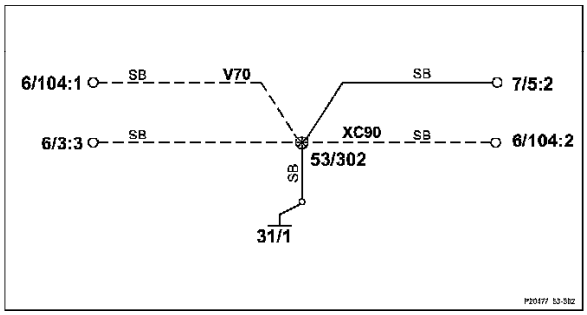
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

53/301



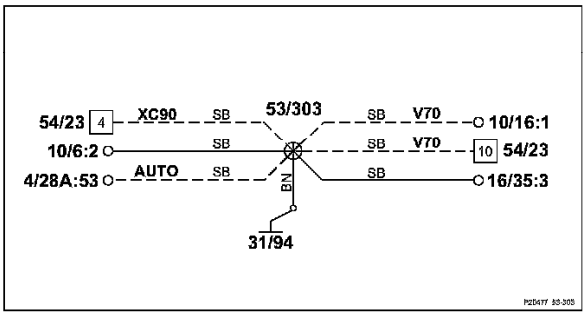
Junction Point 53/301

53/302



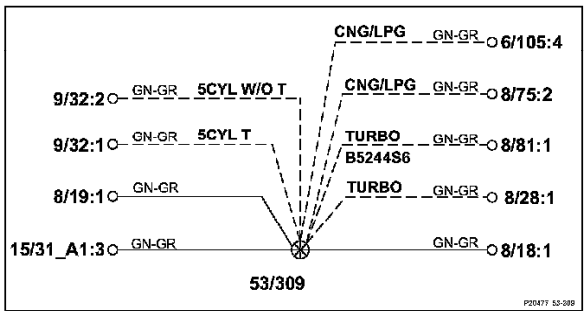
Junction Point 53/302

53/303



Junction Point 53/303

53/309



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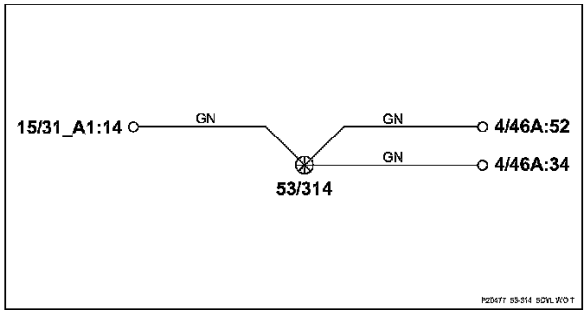
53/314



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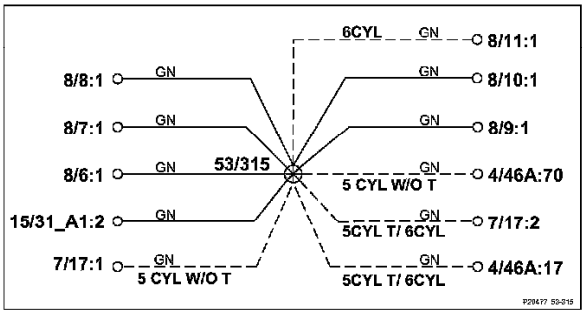
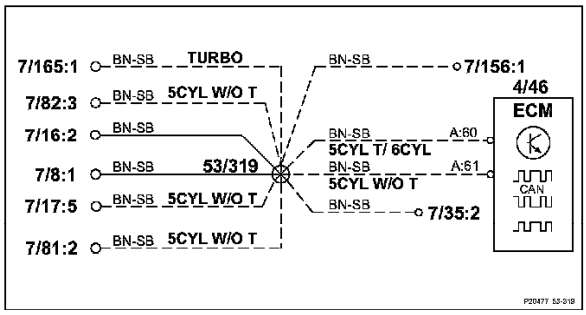
53/315



Junction Point 53/315

53/319



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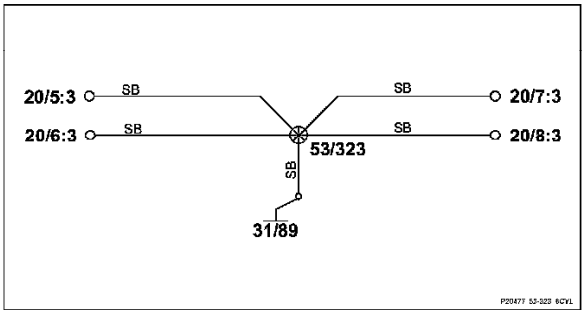
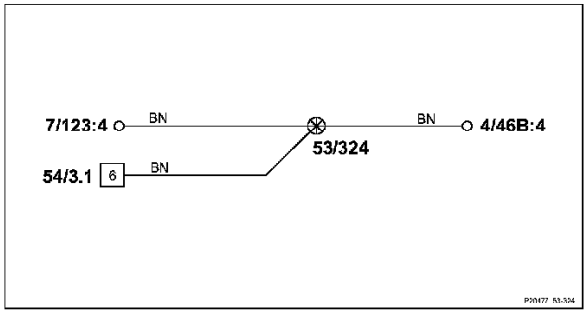
53/323



Junction Point 53/323

53/324



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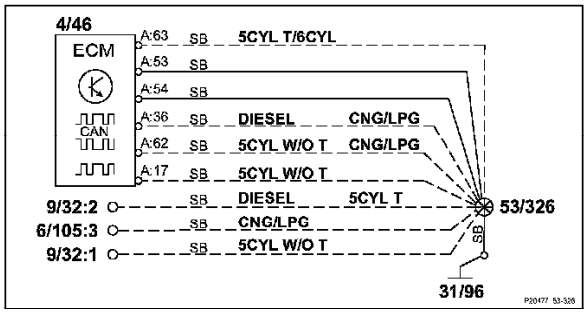
53/326



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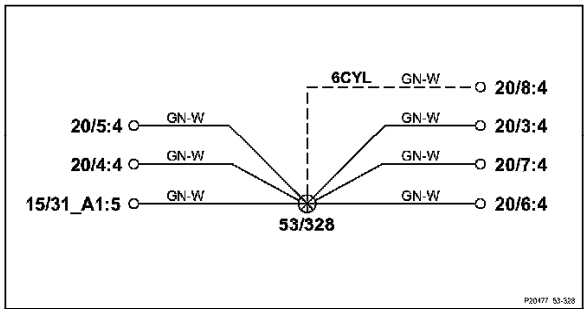
53/328



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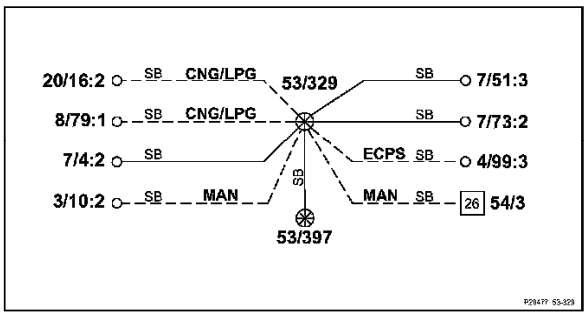
53/329



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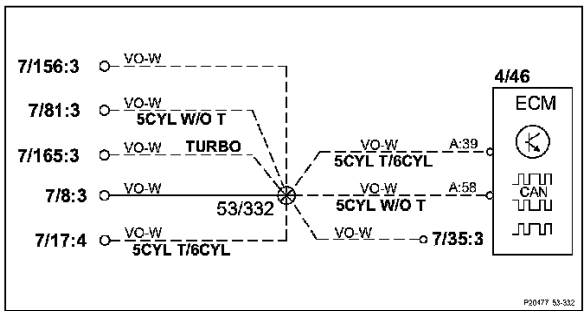
53/332



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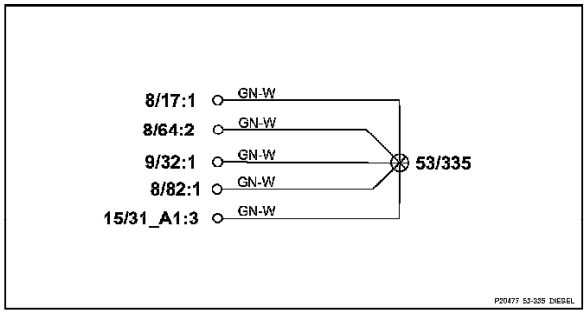
53/335



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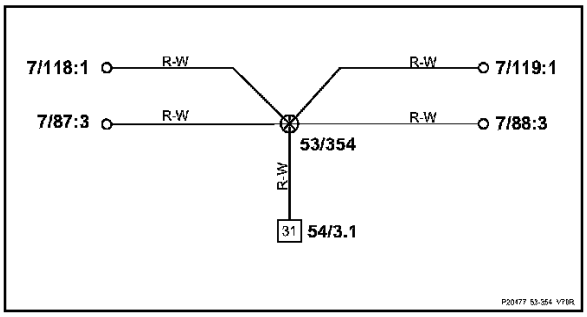
53/354



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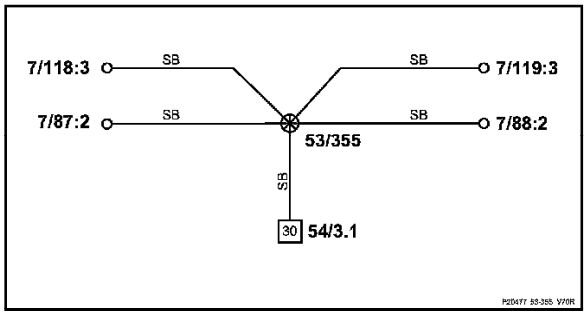
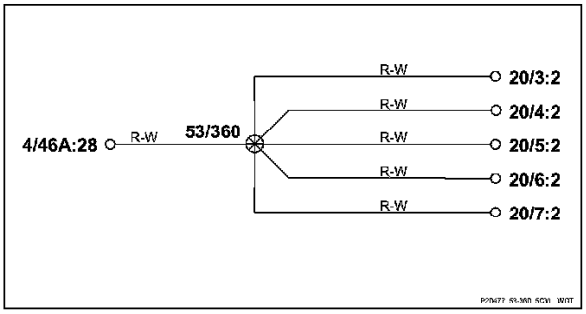
53/355



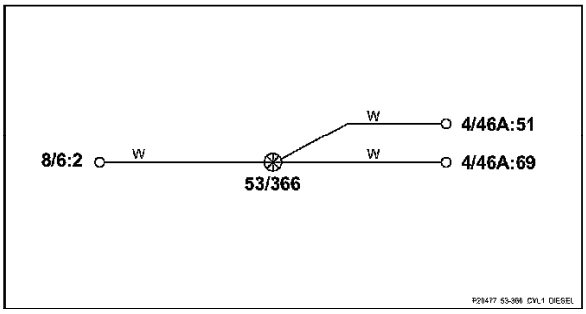
Junction Point 53/355

53/360



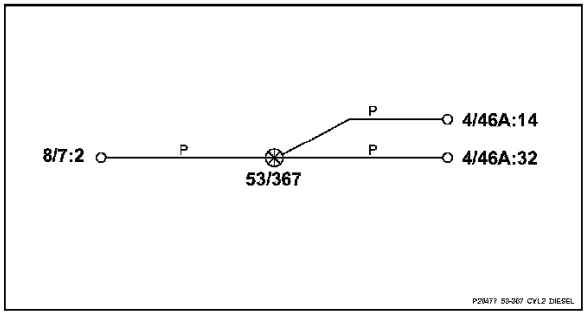
Junction Point 53/360

53/366



Junction Point 53/366

53/367



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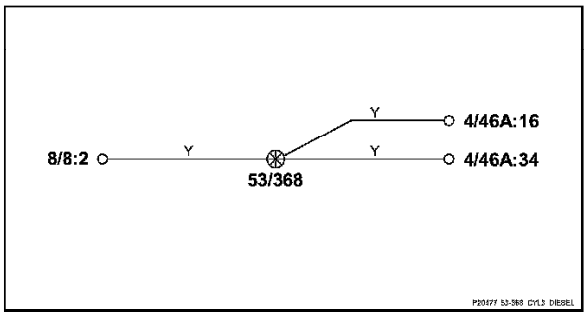
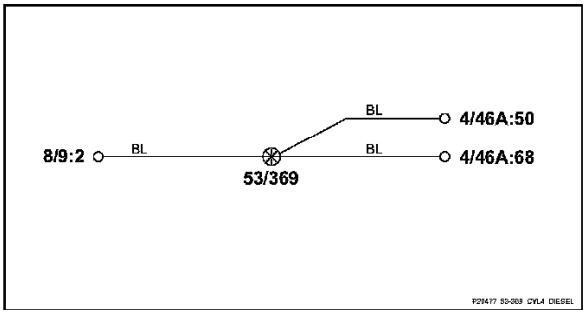
53/368



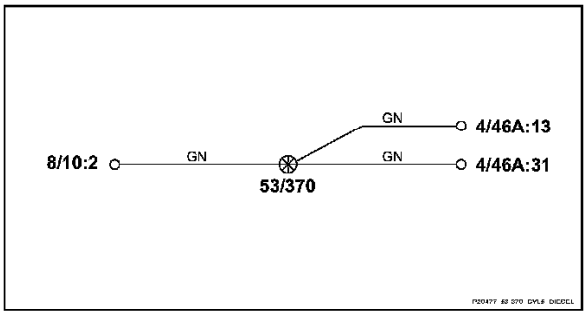
Junction Point 53/368

53/369



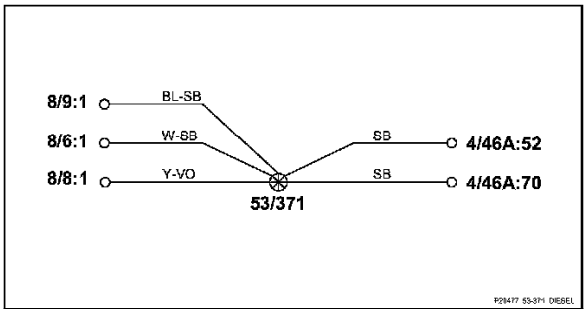
Junction Point 53/369

53/370



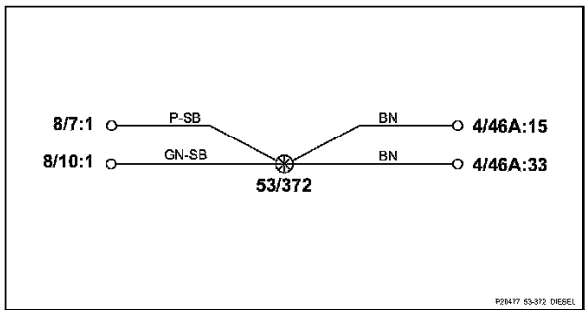
Junction Point 53/370

53/371



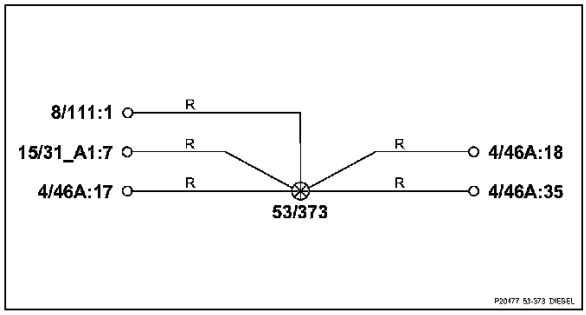
Junction Point 53/371

53/372



Junction Point 53/372

53/373



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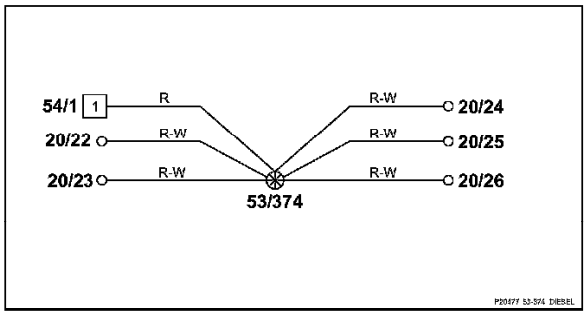
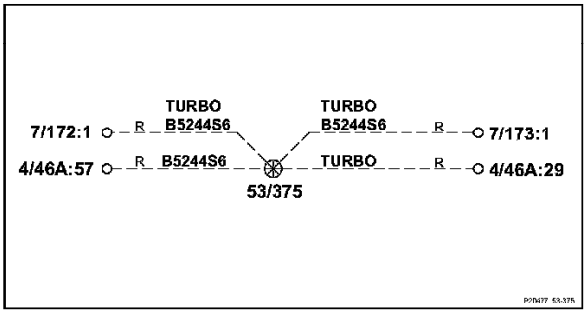
53/374



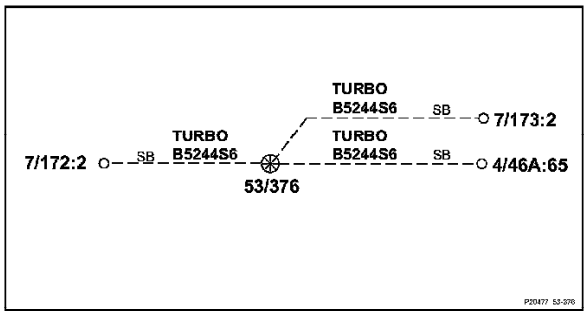
Junction Point 53/374

53/375



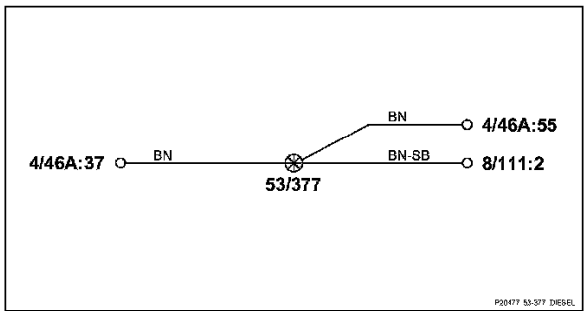
Junction Point 53/375

53/376



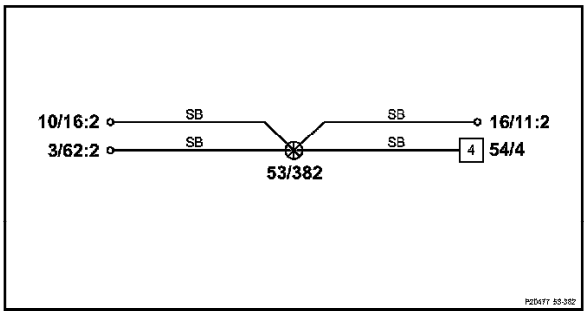
Junction Point 53/376

53/377



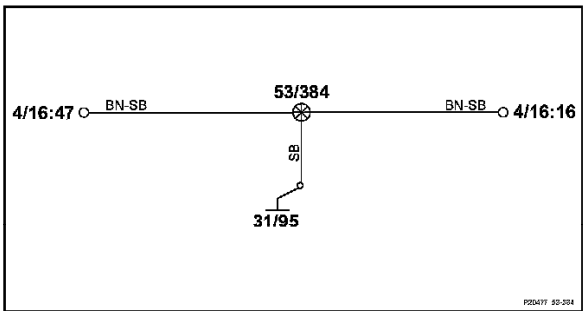
Junction Point 53/377

53/382



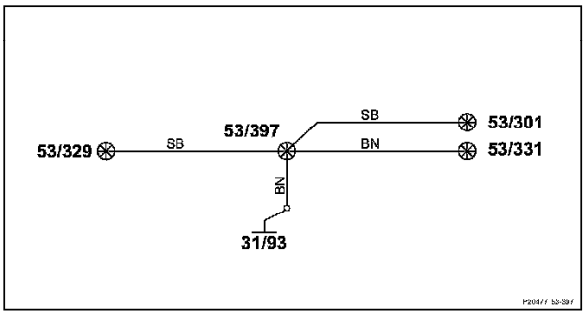
Junction Point 53/382

53/384



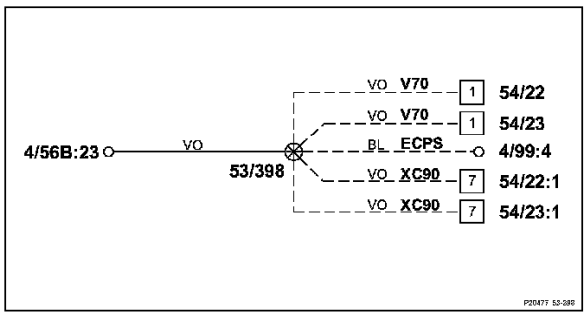
Junction Point 53/384

53/397



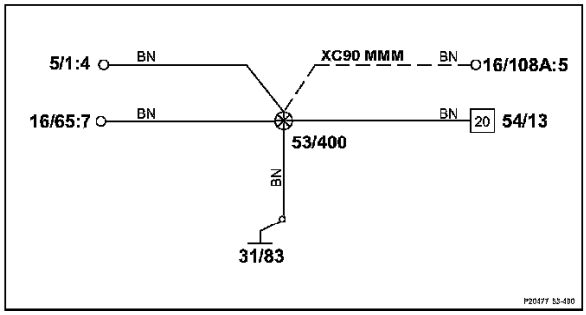
Junction Point 53/397

53/398



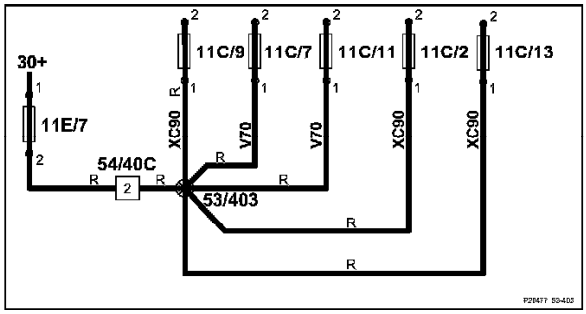
Junction Point 53/398

53/400



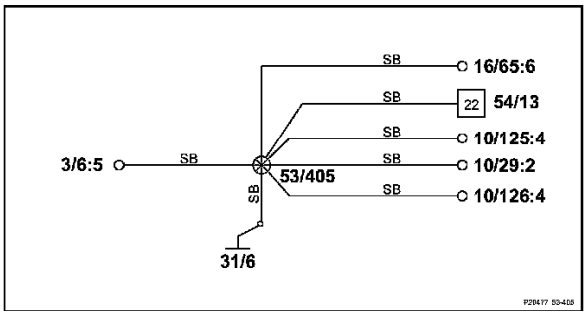
Junction Point 53/400

53/403



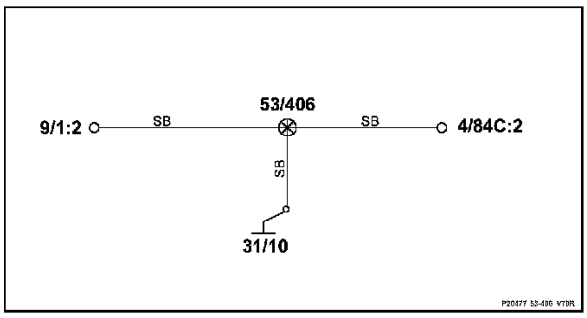
Junction Point 53/403

53/405



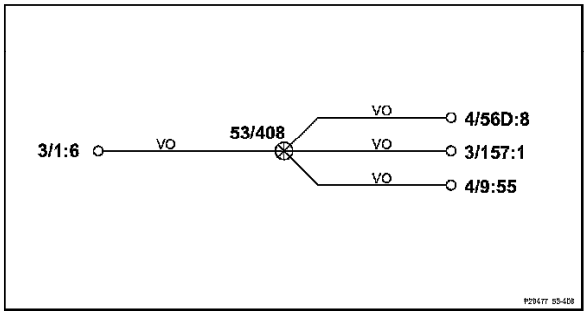
Junction Point 53/405

53/406



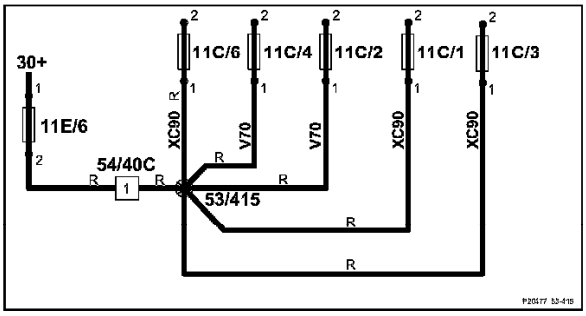
Junction Point 53/406

53/408



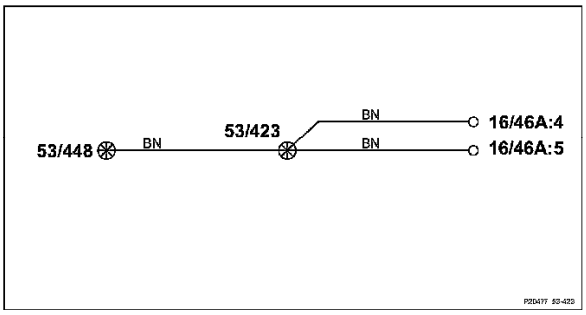
Junction Point 53/408

53/415



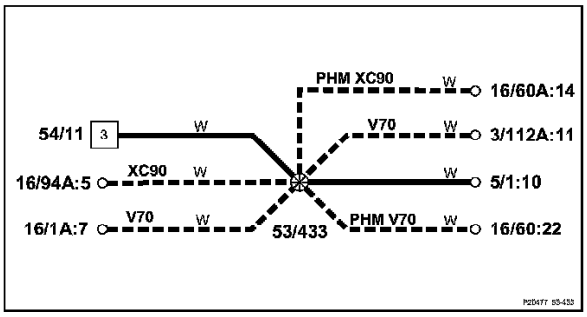
Junction Point 53/415

53/423



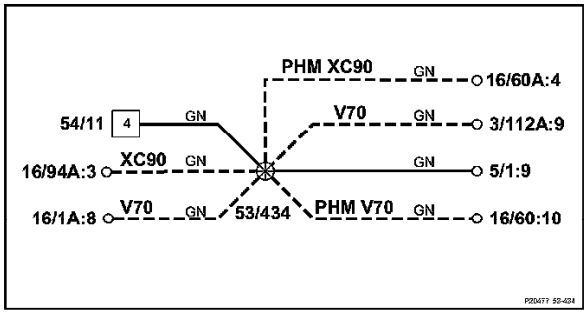
Junction Point 53/423

53/433



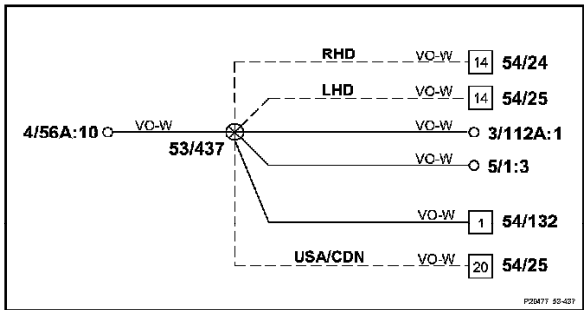
Junction Point 53/433

53/434



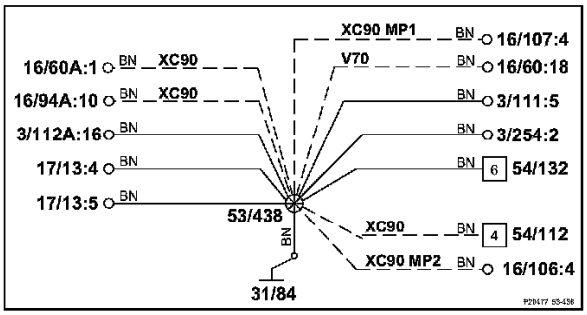
Junction Point 53/434

53/437



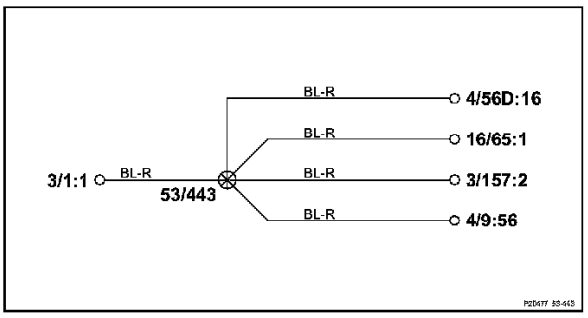
Junction Point 53/437

53/438



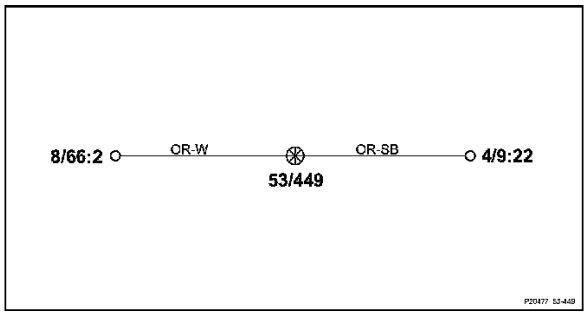
Junction Point 53/438

53/443



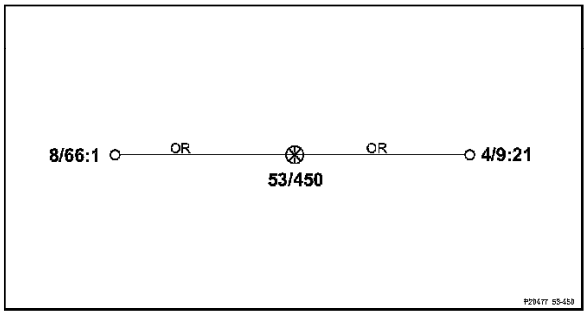
Junction Point 53/443

53/449



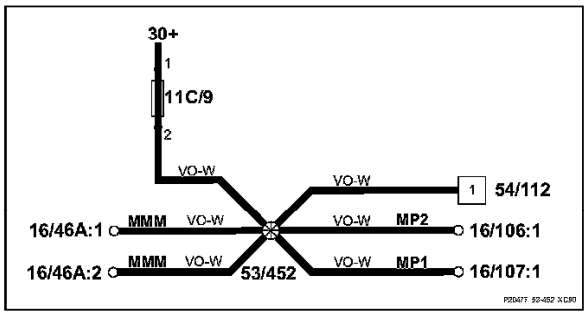
Junction Point 53/449

53/450



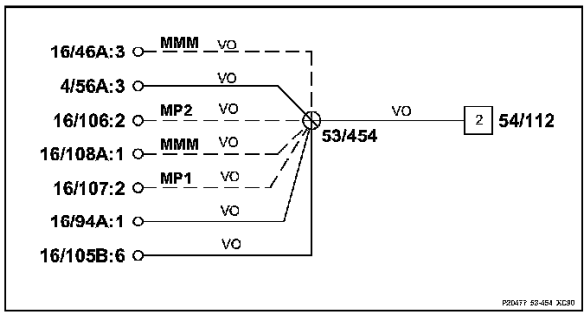
Junction Point 53/450

53/452



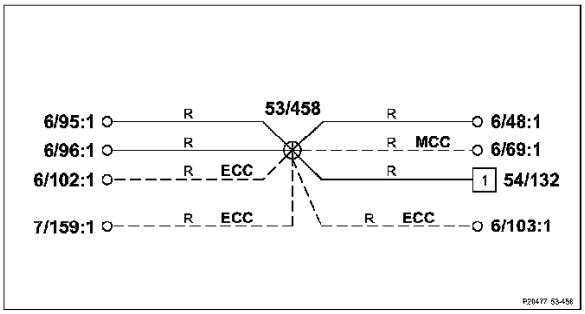
Junction Point 53/452

53/454



Junction Point 53/454

53/458



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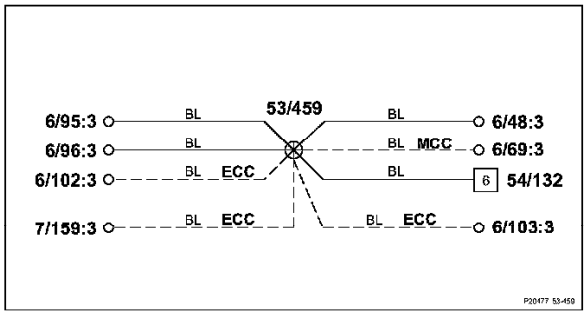
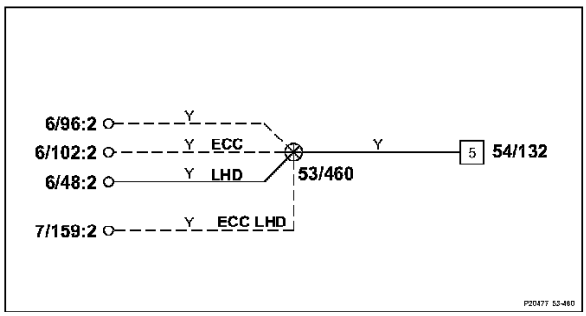
53/459



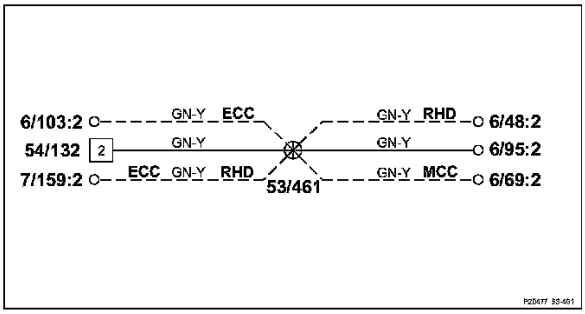
Junction Point 53/459

53/460



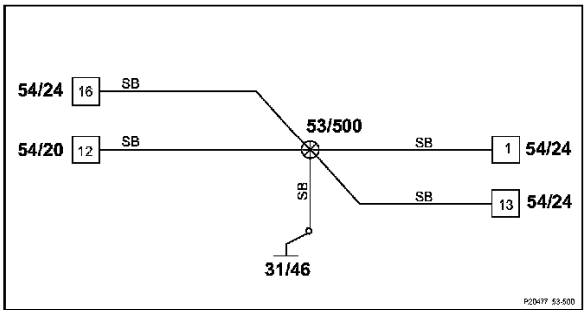
Junction Point 53/460

53/461



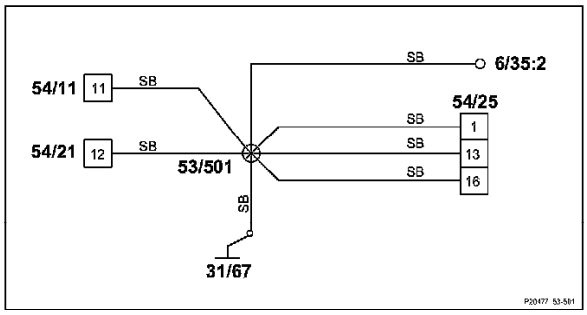
Junction Point 53/461

53/500



Junction Point 53/500

53/501



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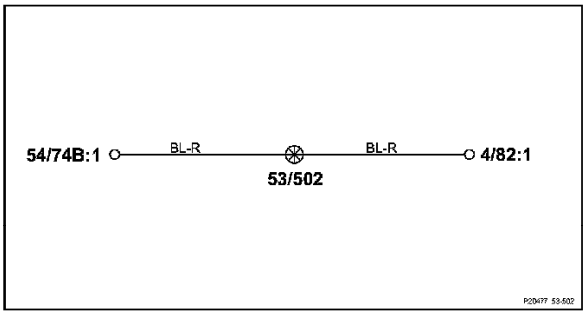

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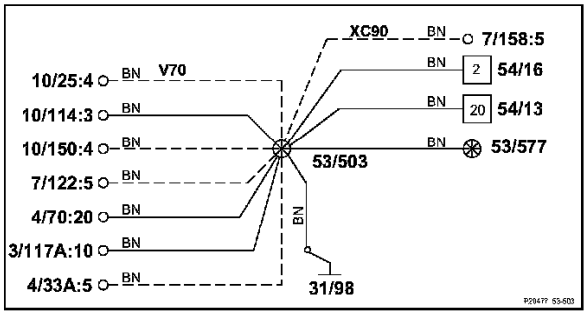
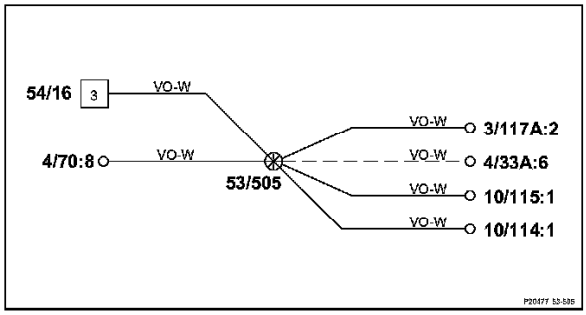
53/503



Junction Point 53/503

53/505



Junction Point 53/505

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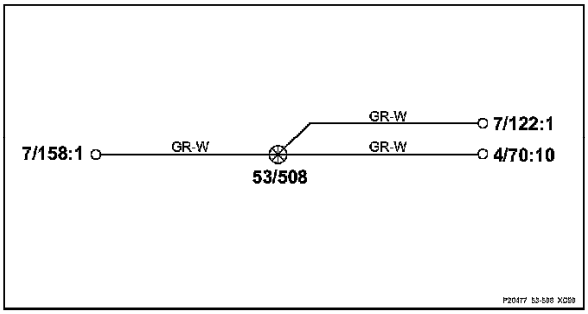

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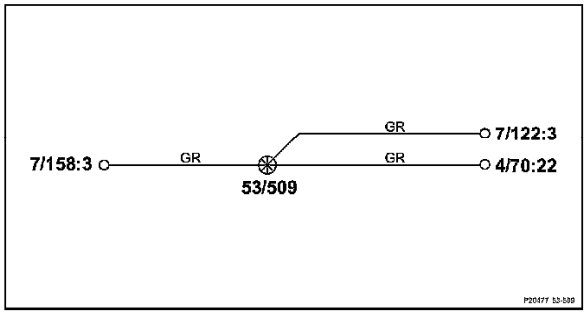
53/509



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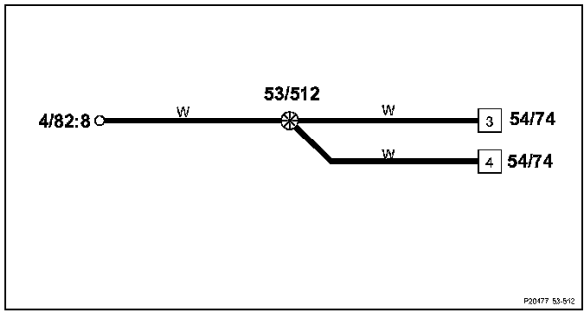

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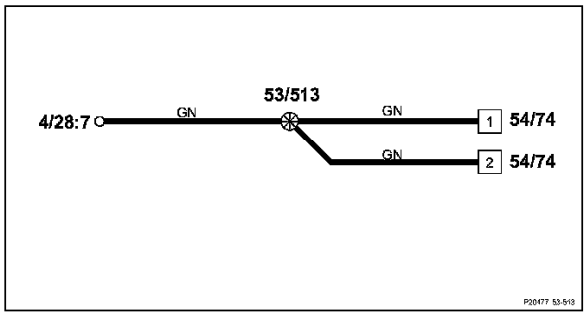
53/513



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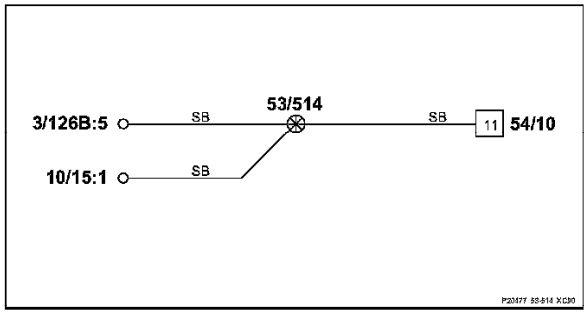
53/514



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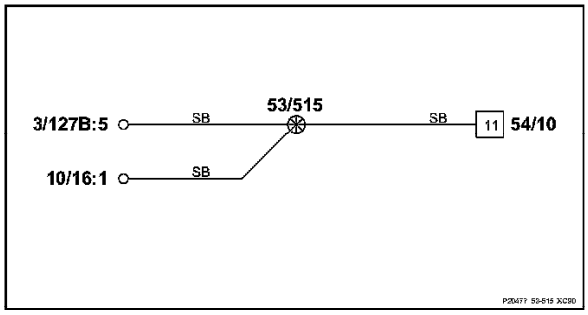

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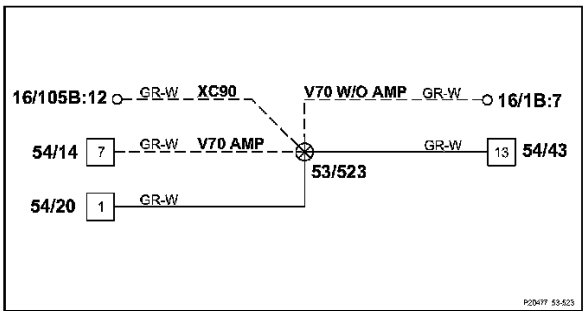

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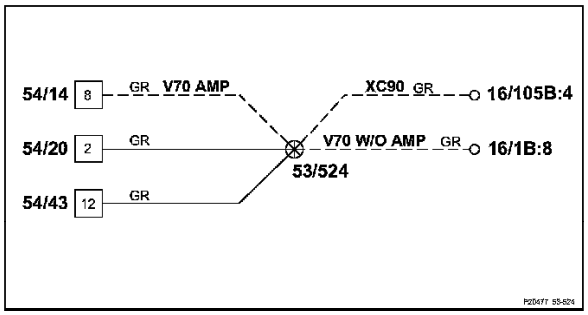

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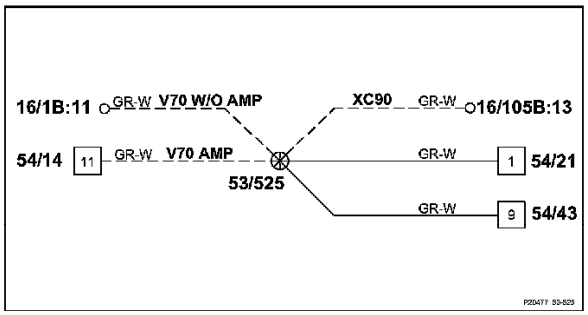

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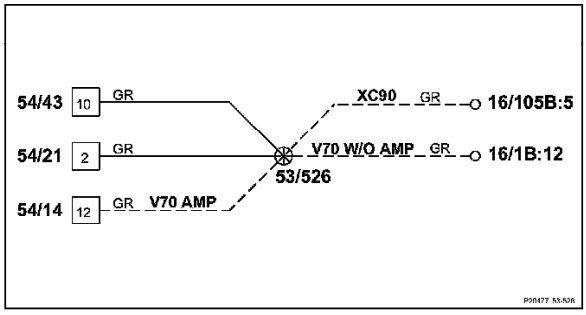

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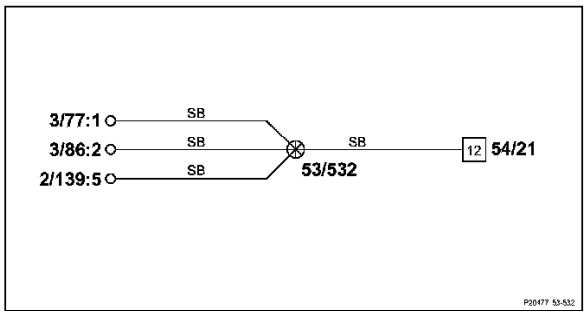

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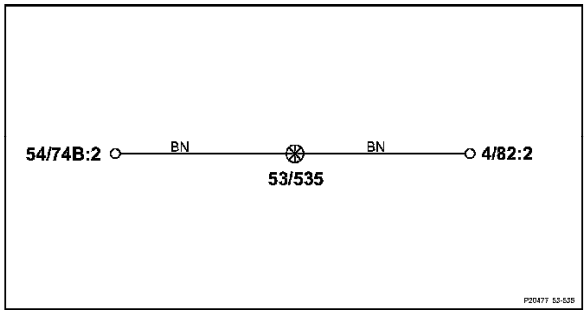

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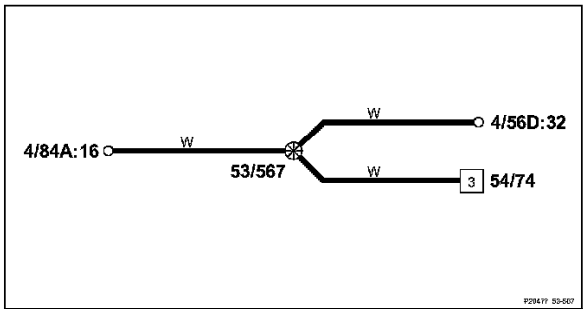

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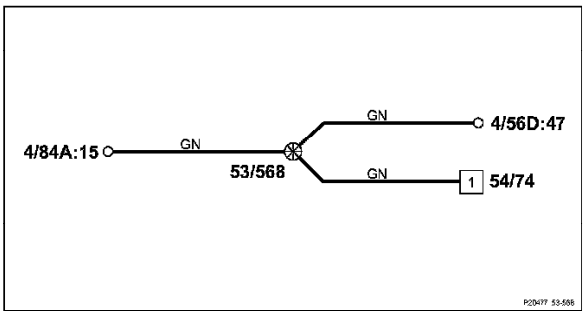
53/568



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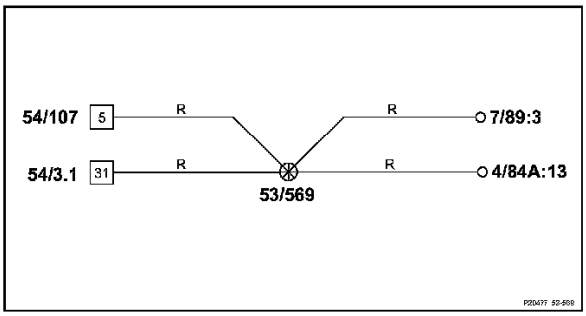
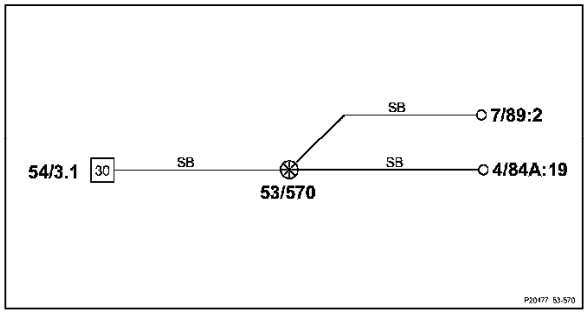


Junction Point 53/569

53/570



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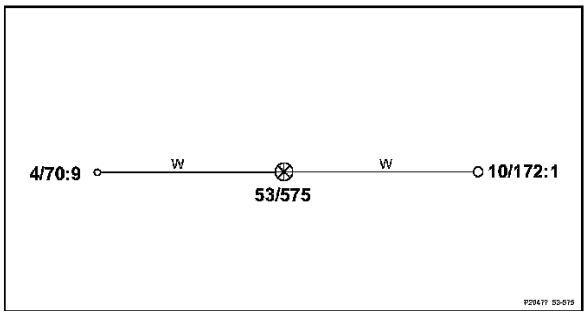

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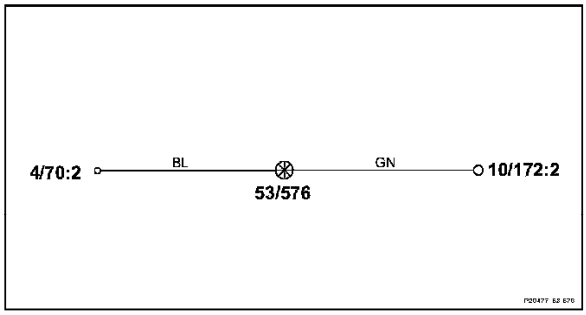
53/576



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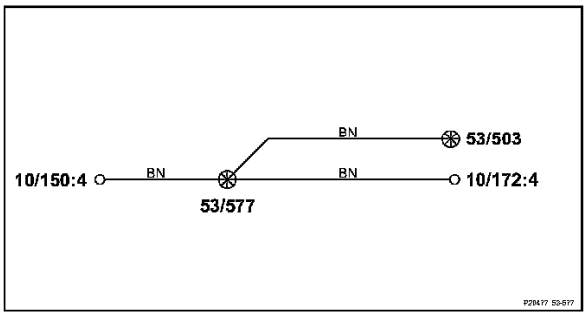

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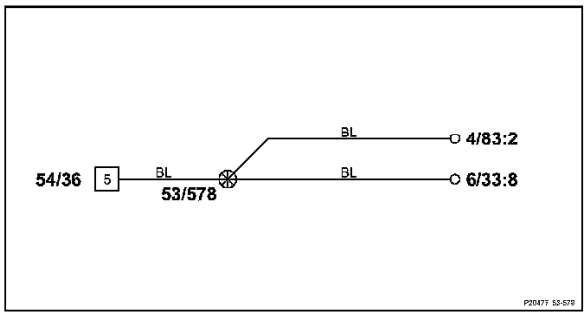
53/578



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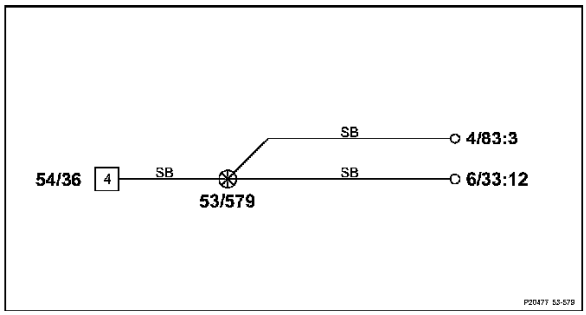
53/579



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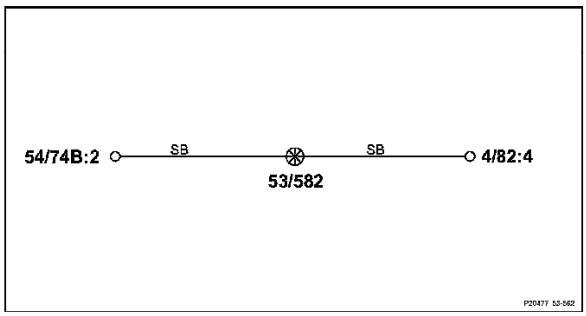

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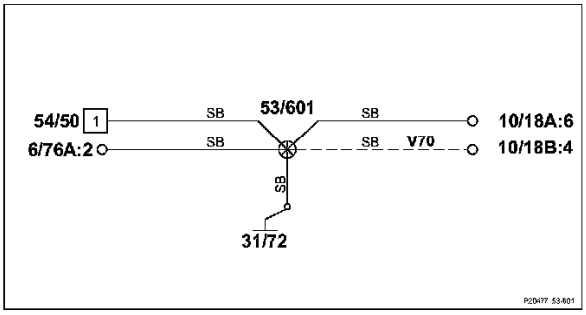

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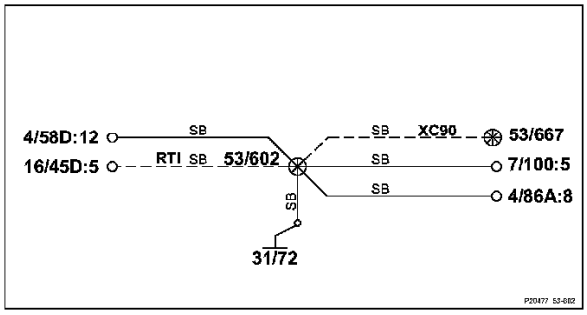
53/602



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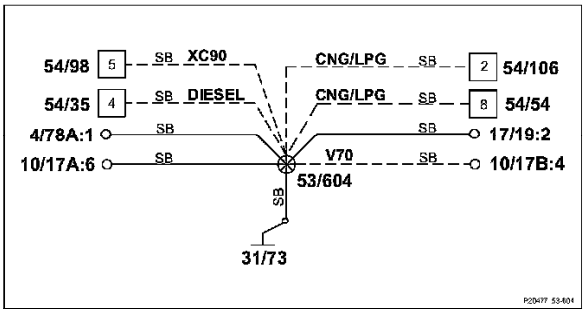

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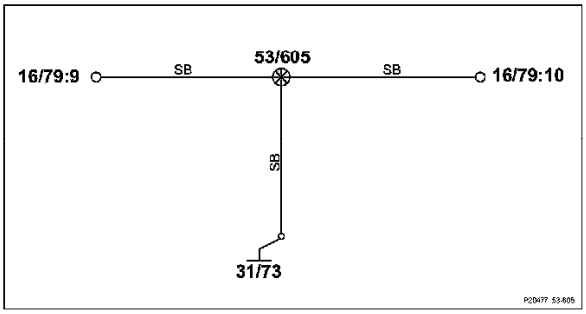
53/605



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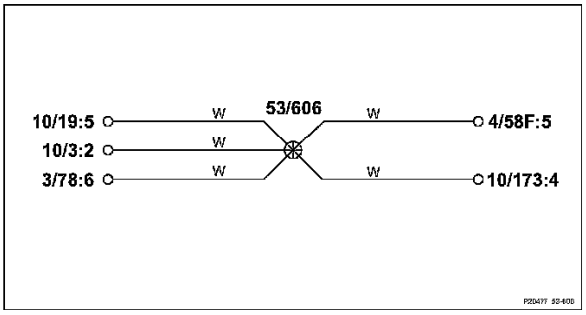
53/606



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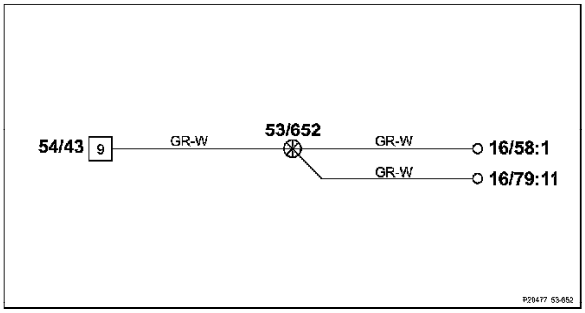
53/652



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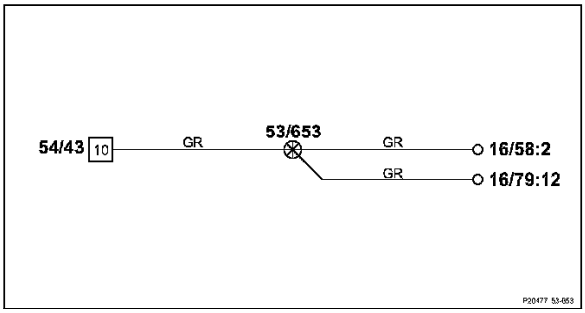
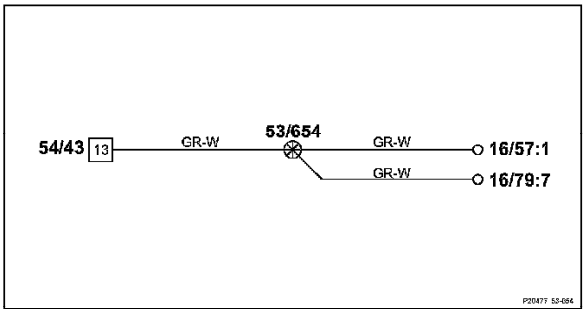
53/653



Junction Point 53/653

53/654



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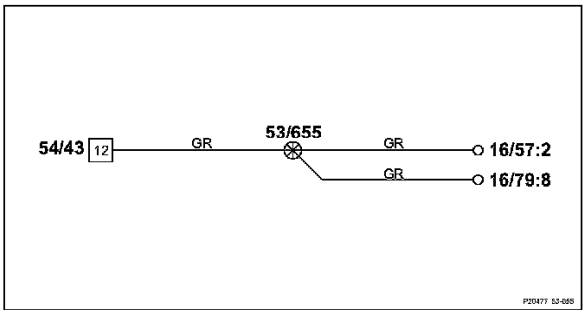
53/655



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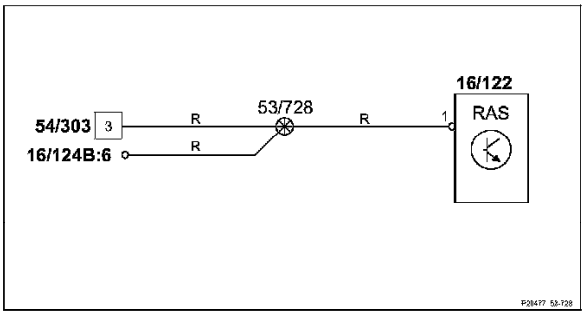
53/728



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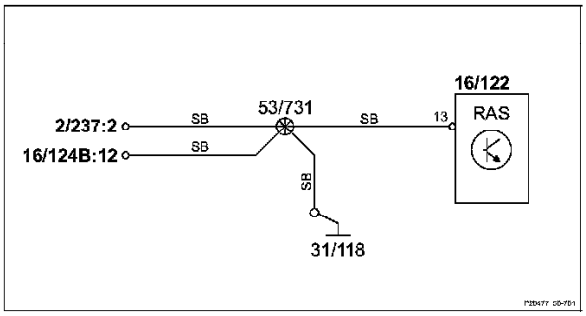

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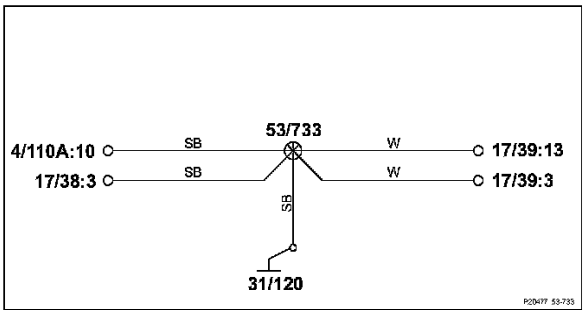

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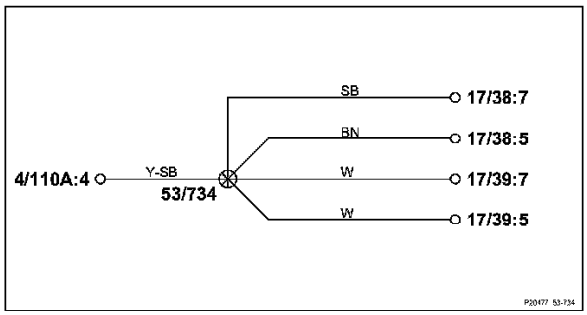
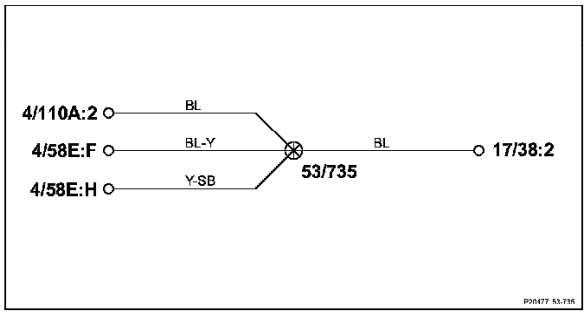


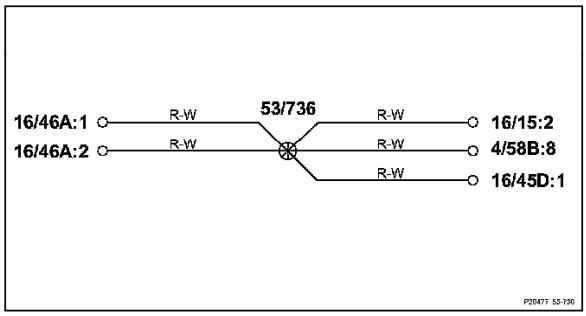
Junction Point 53/734

53/735



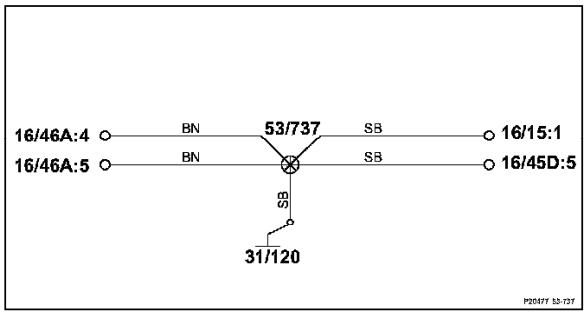
Junction Point 53/735

53/736



Junction Point 53/736

53/737



Junction Point 53/737

Fuse

For information regarding diagrams for this component, please refer to Power and Ground Distribution diagrams. See: Power and Ground Distribution/Diagrams/Electrical Diagrams

Fuse Block

For information regarding diagrams for this component, please refer to Power and Ground Distribution diagrams. See: Power and Ground Distribution/Diagrams/Electrical Diagrams

Relay Box

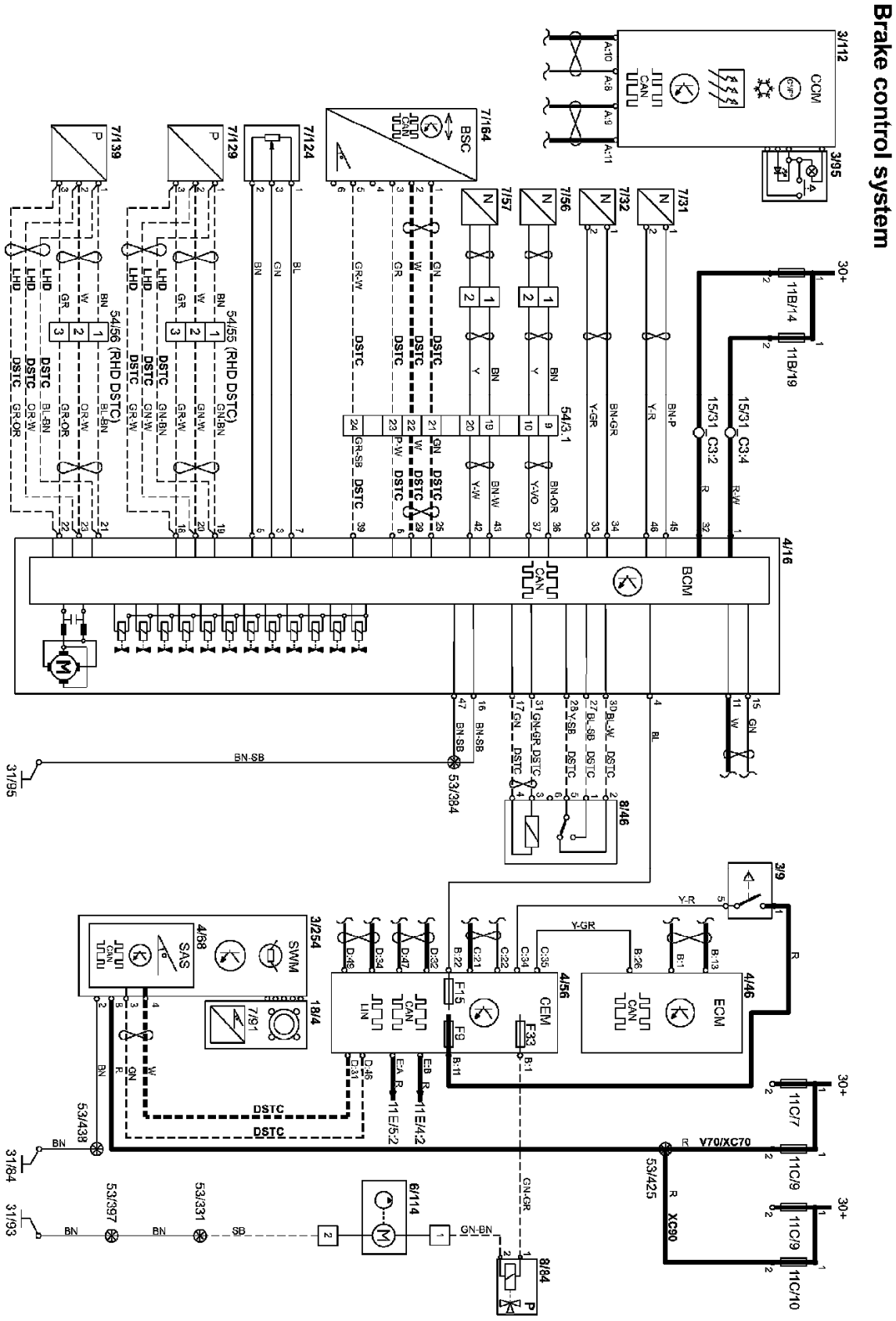
For information regarding diagrams for this component, please refer to Power and Ground Distribution diagrams. See: Power and Ground Distribution/Diagrams/Electrical Diagrams

Amplifier, Sound System

For information regarding diagrams for this component, please refer to Radio, Stereo, and Compact Disc diagrams.

System Diagram

Brake Control System



Brake Control System

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

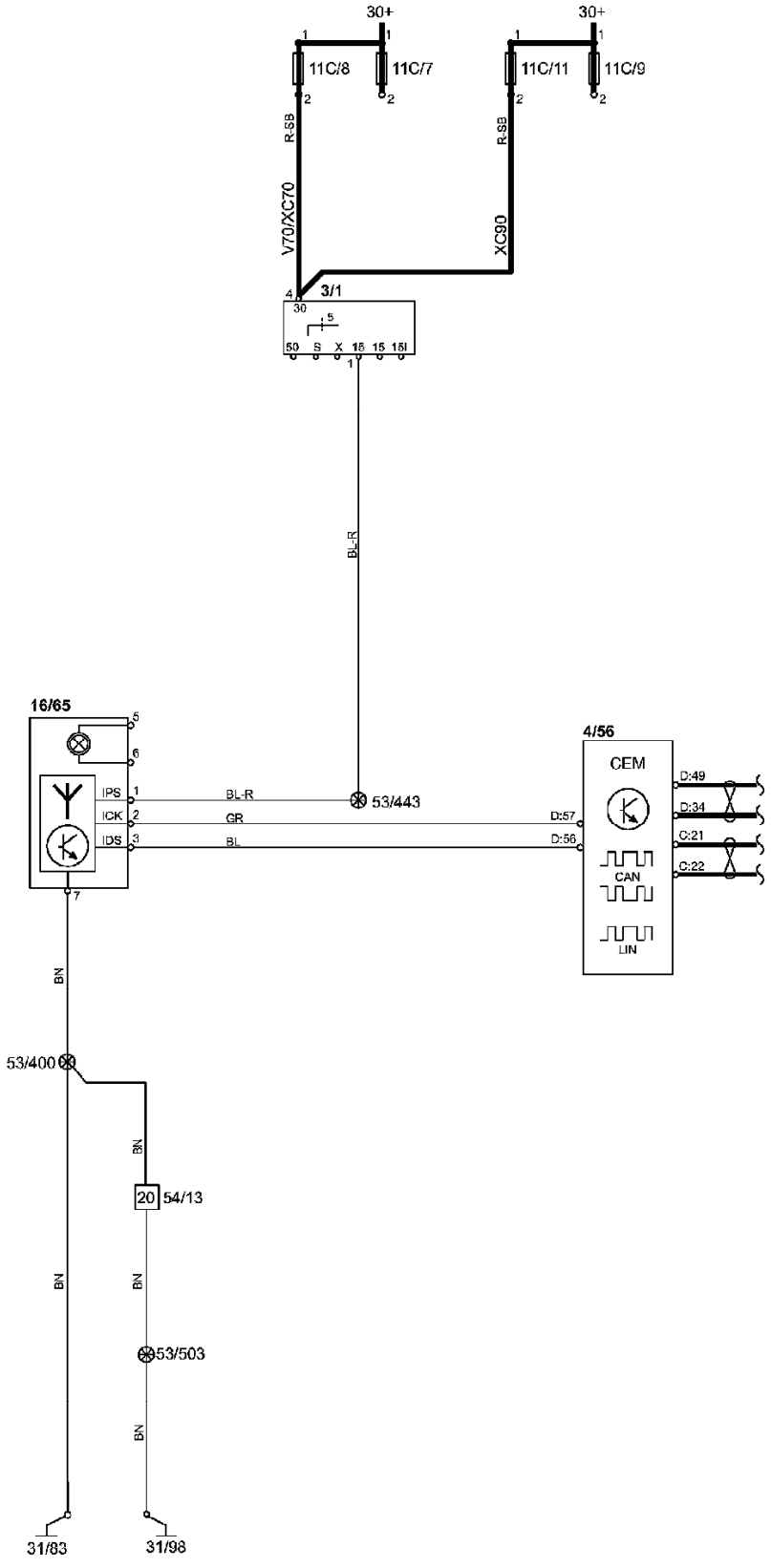
Electronic Brake Control Module

For information regarding diagrams for this component, please refer to Antilock Brakes / Traction Control Systems diagrams. See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Diagrams/Electrical Diagrams

System Diagram

Electronic Immobilizer

Electronic immobilizer



Electronic Immobilizer

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Arm/Disarm Switch, Antitheft

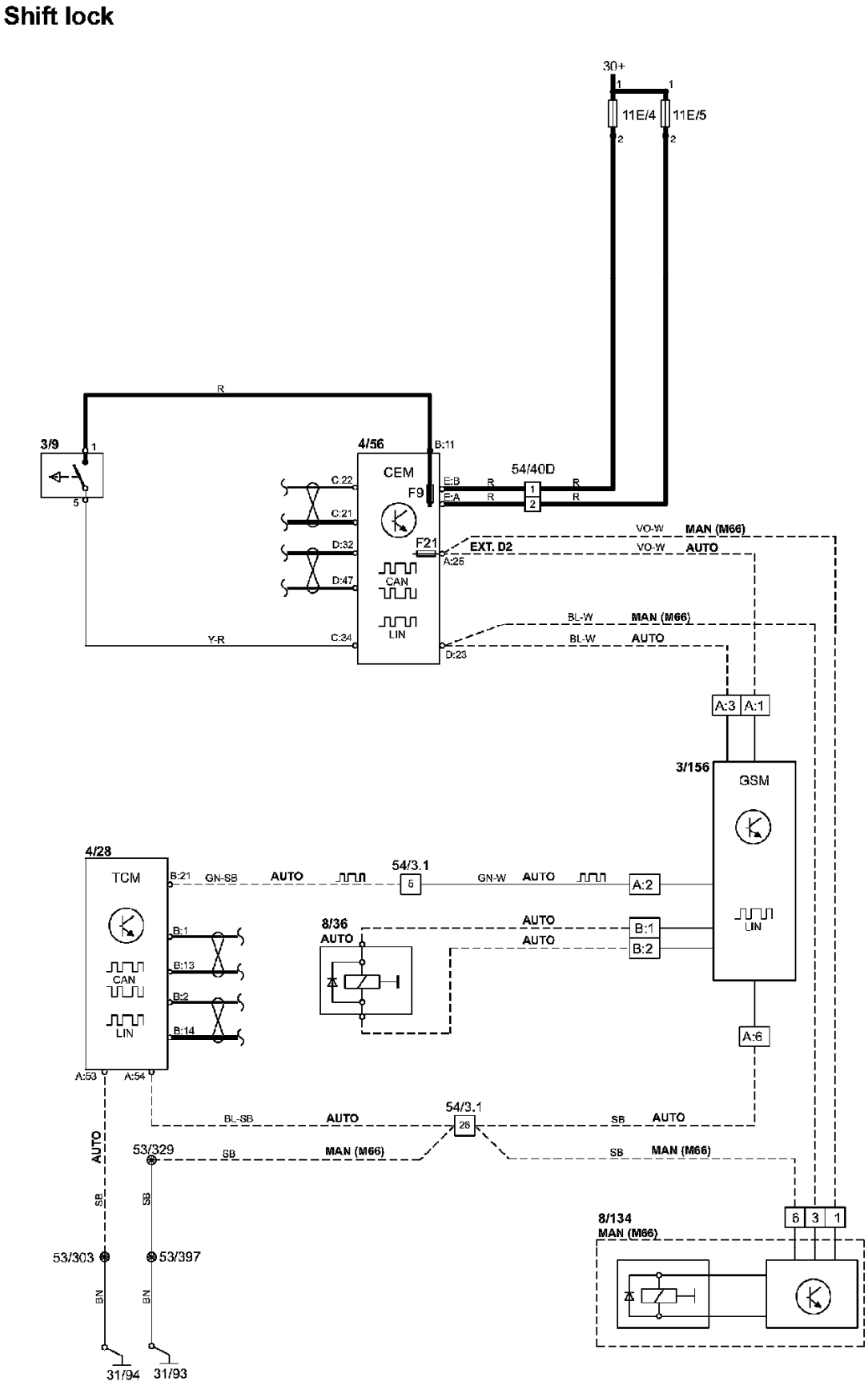
For information regarding diagrams for this component, please refer to Antitheft and Alarm Systems diagrams. See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Diagrams/Electrical Diagrams

System Diagram

For information regarding diagrams for this system, please refer to Transmission Control Systems diagrams. See: Powertrain Management/Transmission Control Systems/Diagrams/Electrical Diagrams

Shift Interlock, A/T

Shift Lock



Shift Lock

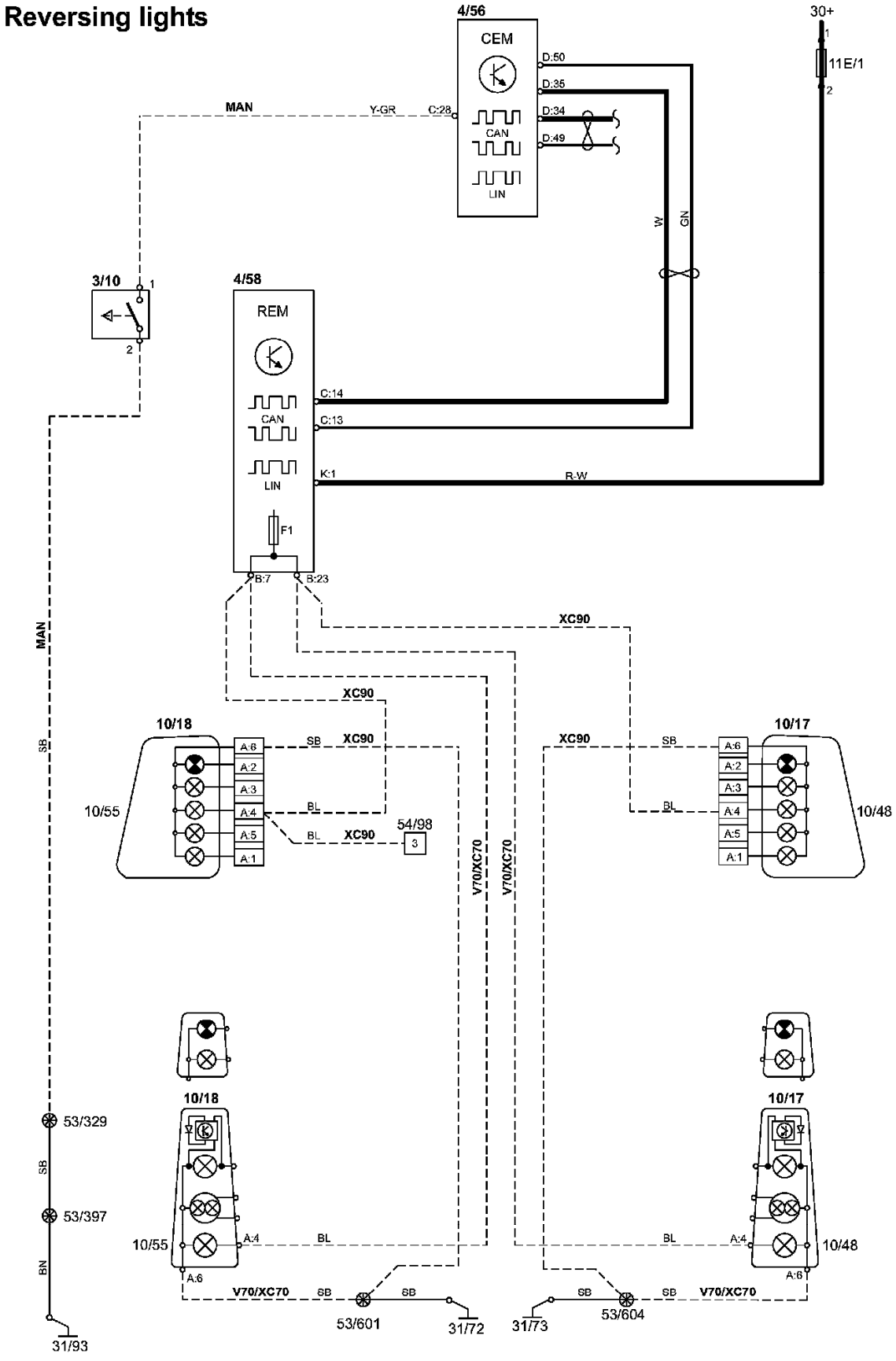
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Backup Lamp

Reversing Lights



Reversing Lights

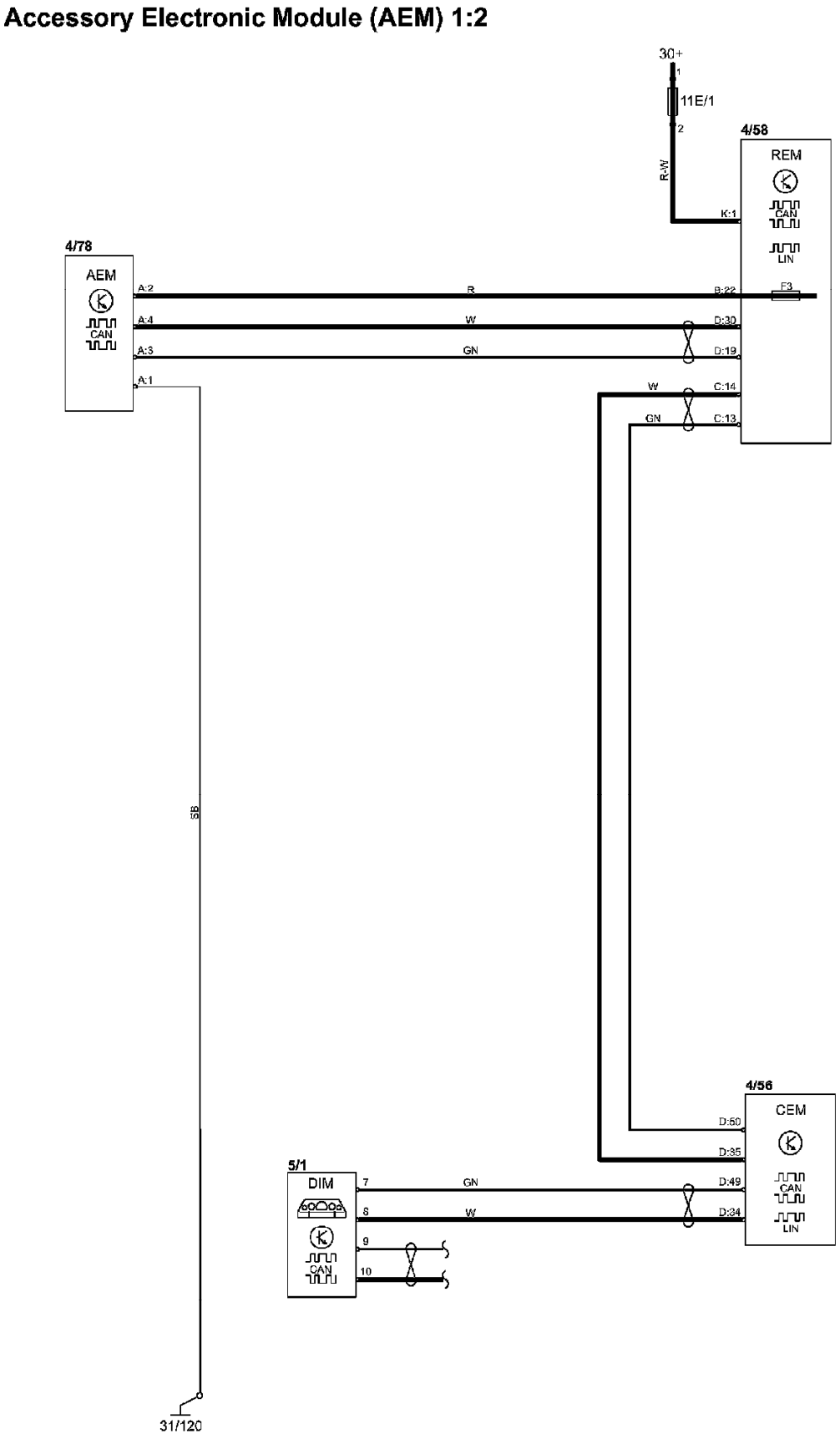
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

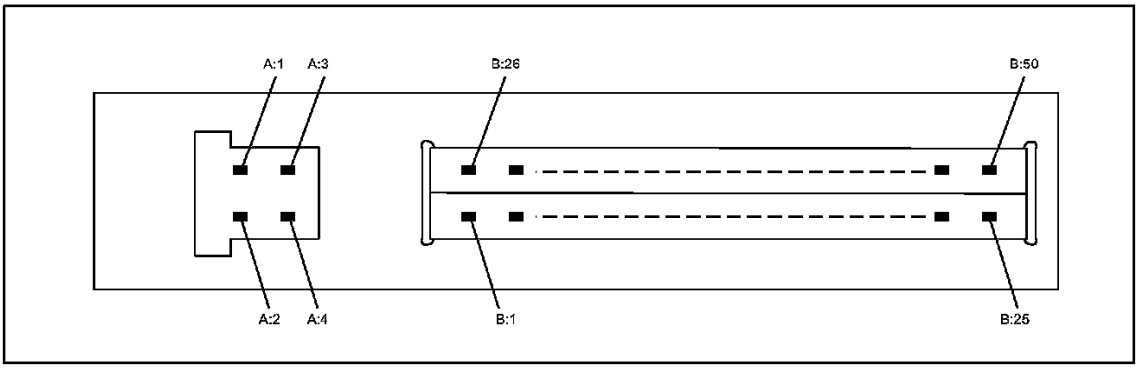
Accessory Electronic Module (AEM)

Accessory Electronic Module (AEM)



Accessory Electronic Module (AEM), Part 1

Accessory Electronic Module (AEM) 2:2



Pos	Function	Type
A:1	Electrical distribution	Ground
A:2	Electrical distribution	Feed
A:3	CAN communication	Input/output signals
A:4	CAN communication	Input/output signals
B:1	Remote heater start, minicall	Feed
B:2	Remote heater start, minicall	Ground
B:3	Remote heater start, minicall	Input signal
	Remote heater start, radio signal	
B:5	Engine heater	Steering, alternating current feed
B:6	Parking Assistance	Feed
B:7	Parking Assistance	Input signal
B:8	Parking Assistance	Ground
B:11	Handsfree, audio disengage	Input signal
B:12	Audio disengage	Output signals
B:13	Rheostat, audio	Output signals
B:14	Speed signal, audio	Output signals
	Speed signal, RTI Japan	
B:15	Alarm signal	Output signals
B:16	Alarm signal	Output signals
B:30	Antenna amplifier, audio	Feed
	dimmer, RTI Japan	Output signals
B:33	Alarm signal	Output signals
	RTI Japan	Steering, X-feed
B:34	Alarm signal	Output signals
	Reverse gear signal, RTI Japan	

Accessory Electronic Module (AEM), Part 2

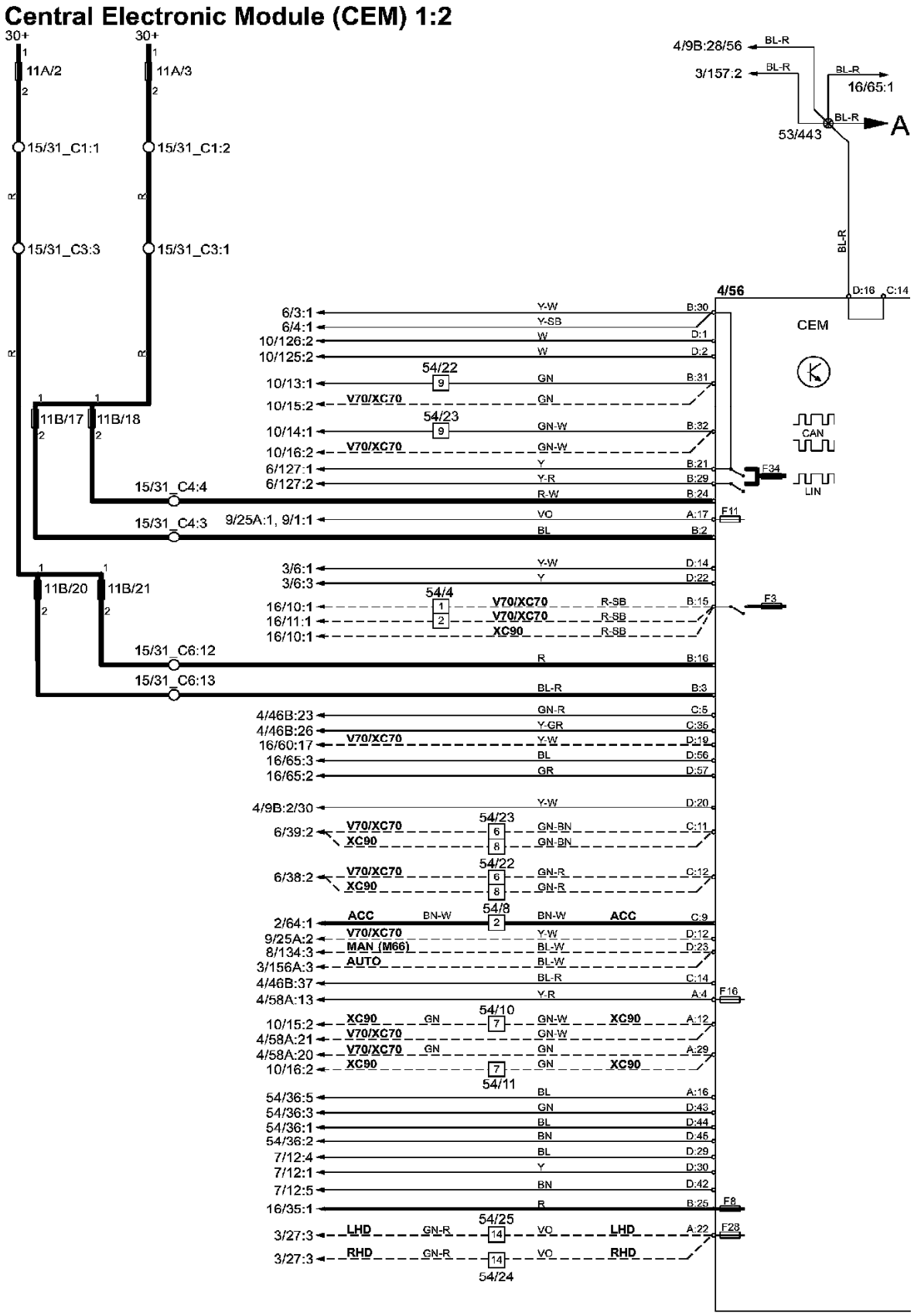
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

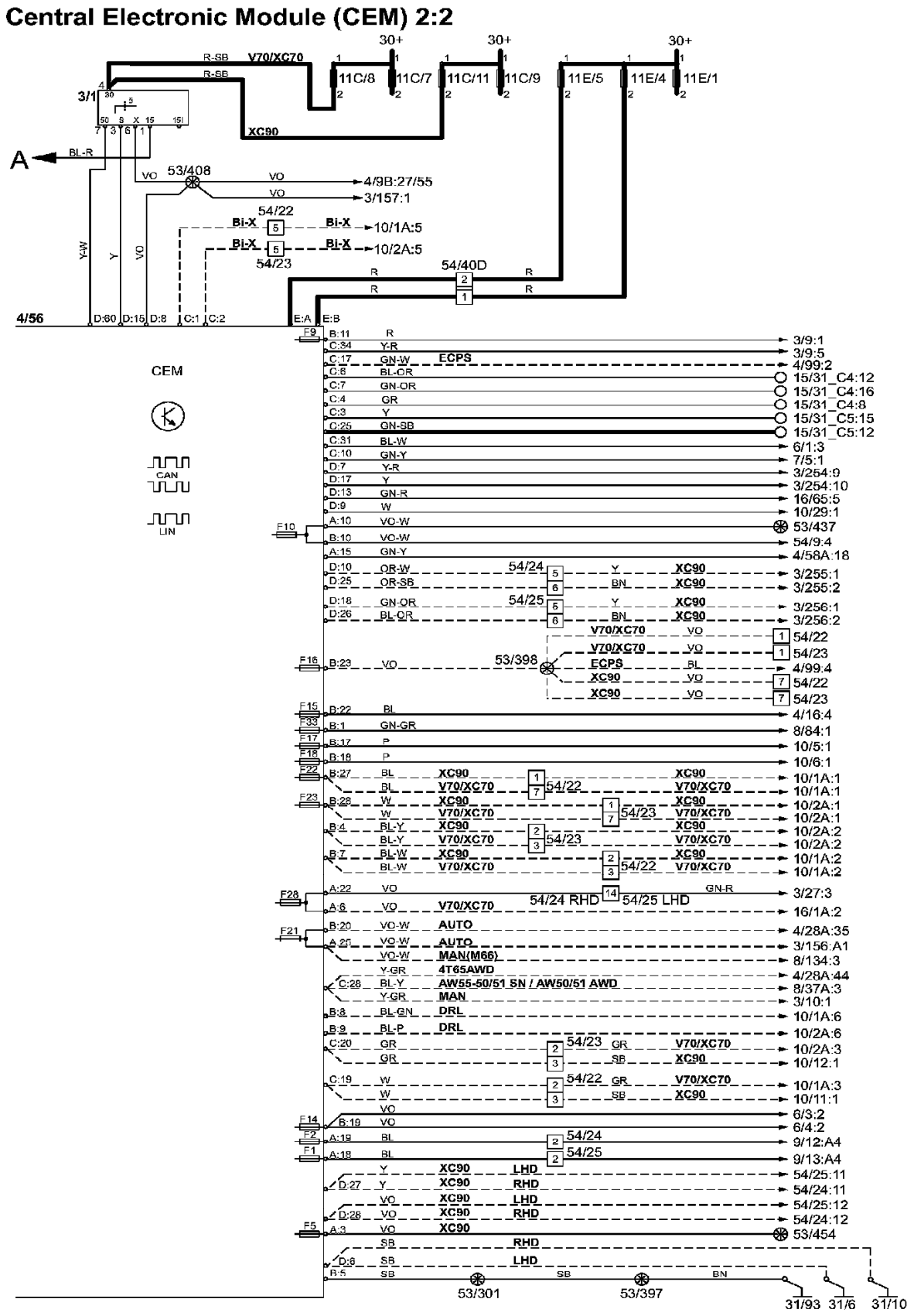
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Central Electronic Module (CEM)

Central Electronic Module (CEM)



Central Electronic Module (CEM), Part 1



Central Electronic Module (CEM), Part 2

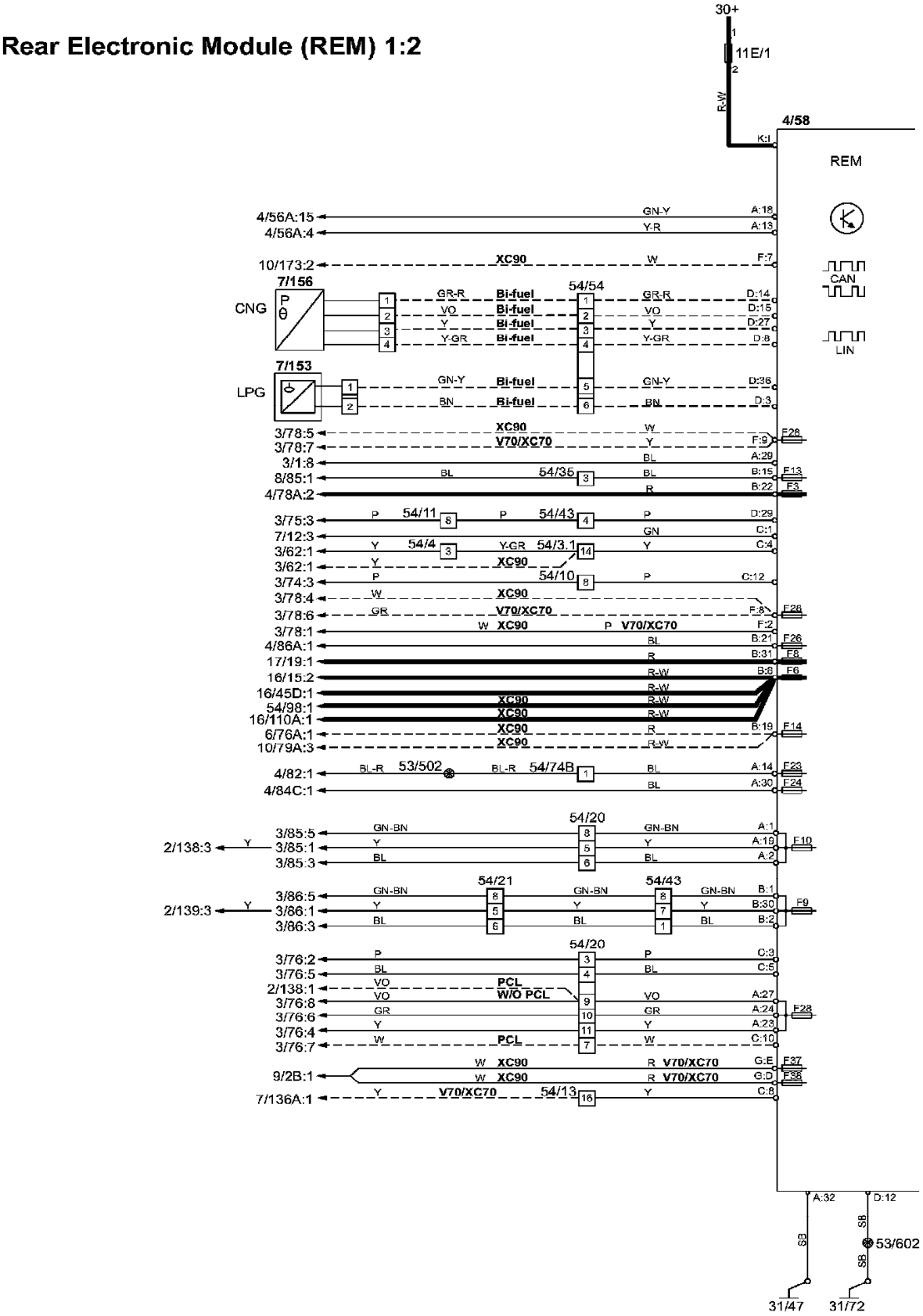
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

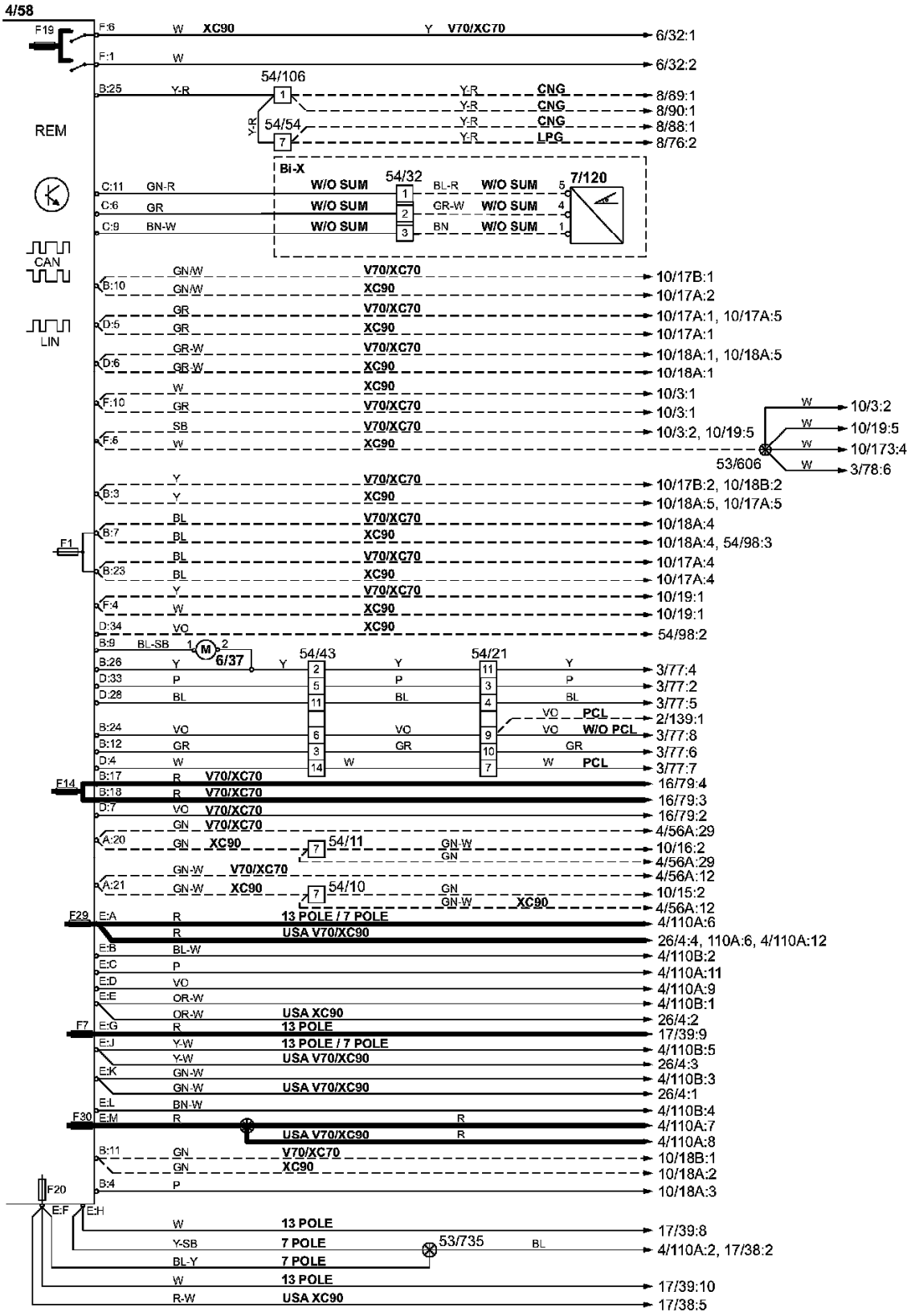
Rear Electronic Module (REM)

Rear Electronic Module (REM)



Rear Electronic Module (REM), Part 1

Rear Electronic Module (REM) 2:2



Rear Electronic Module (REM), Part 2

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

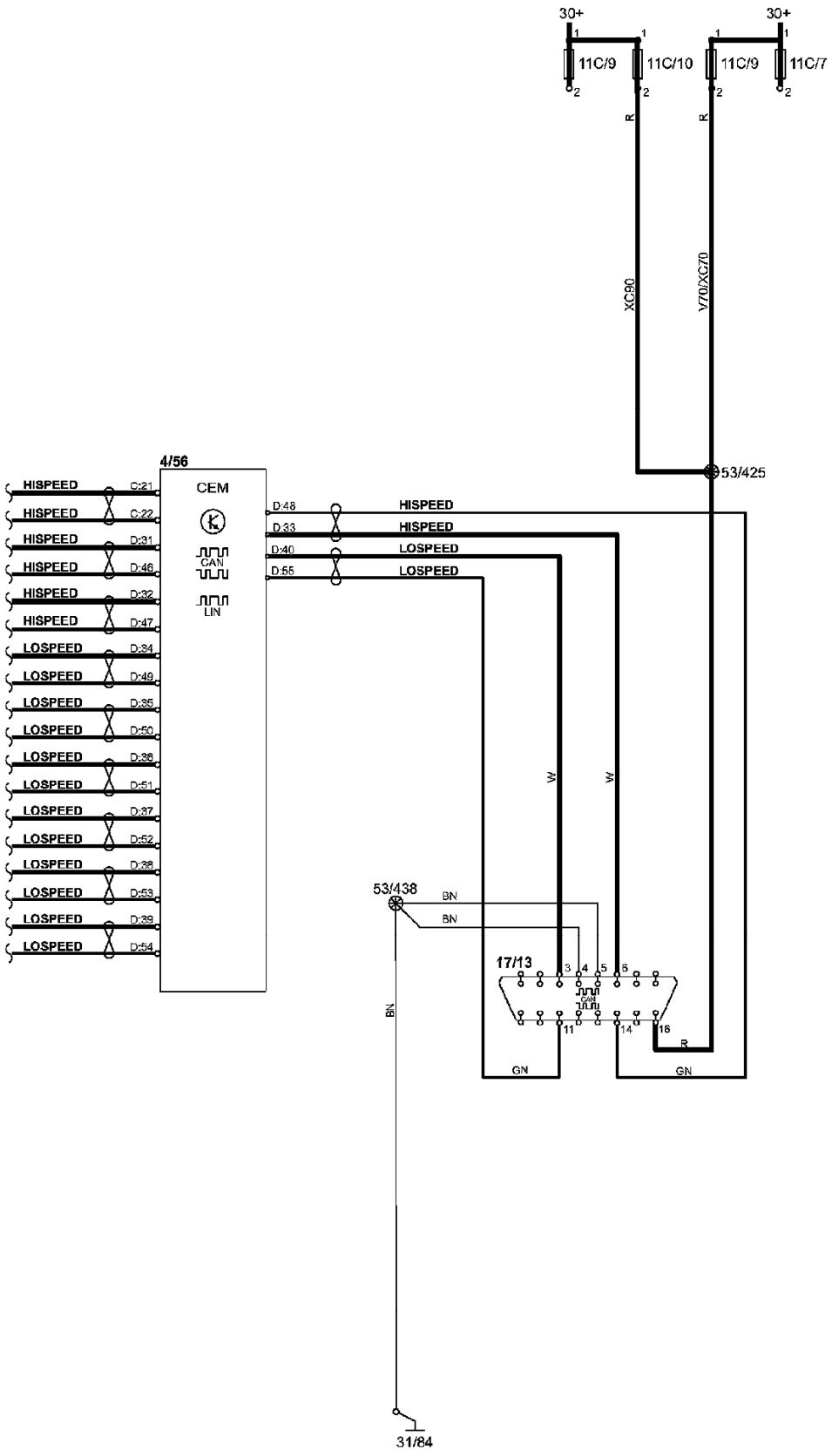
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Diagnostics System

Diagnostics System

Diagnostics system



Diagnostics System

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

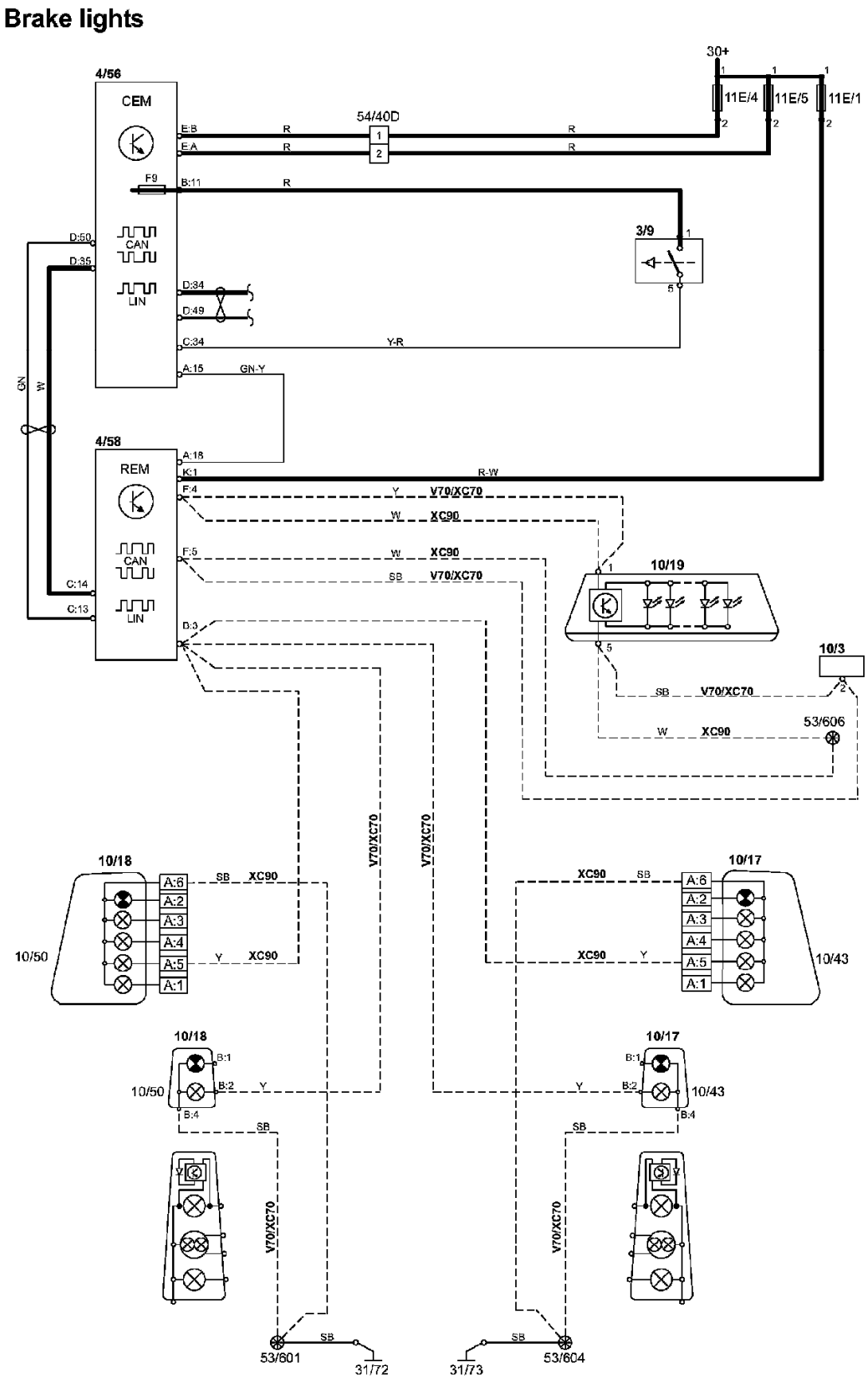
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

For information regarding additional/related diagrams for this component, please refer to Trailer Lamps diagrams. See: Accessories and Optional Equipment/Towing / Trailer System/Trailer Lamps/Diagrams/Electrical Diagrams

Brake Lamp

Brake Lights



Brake Lights

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

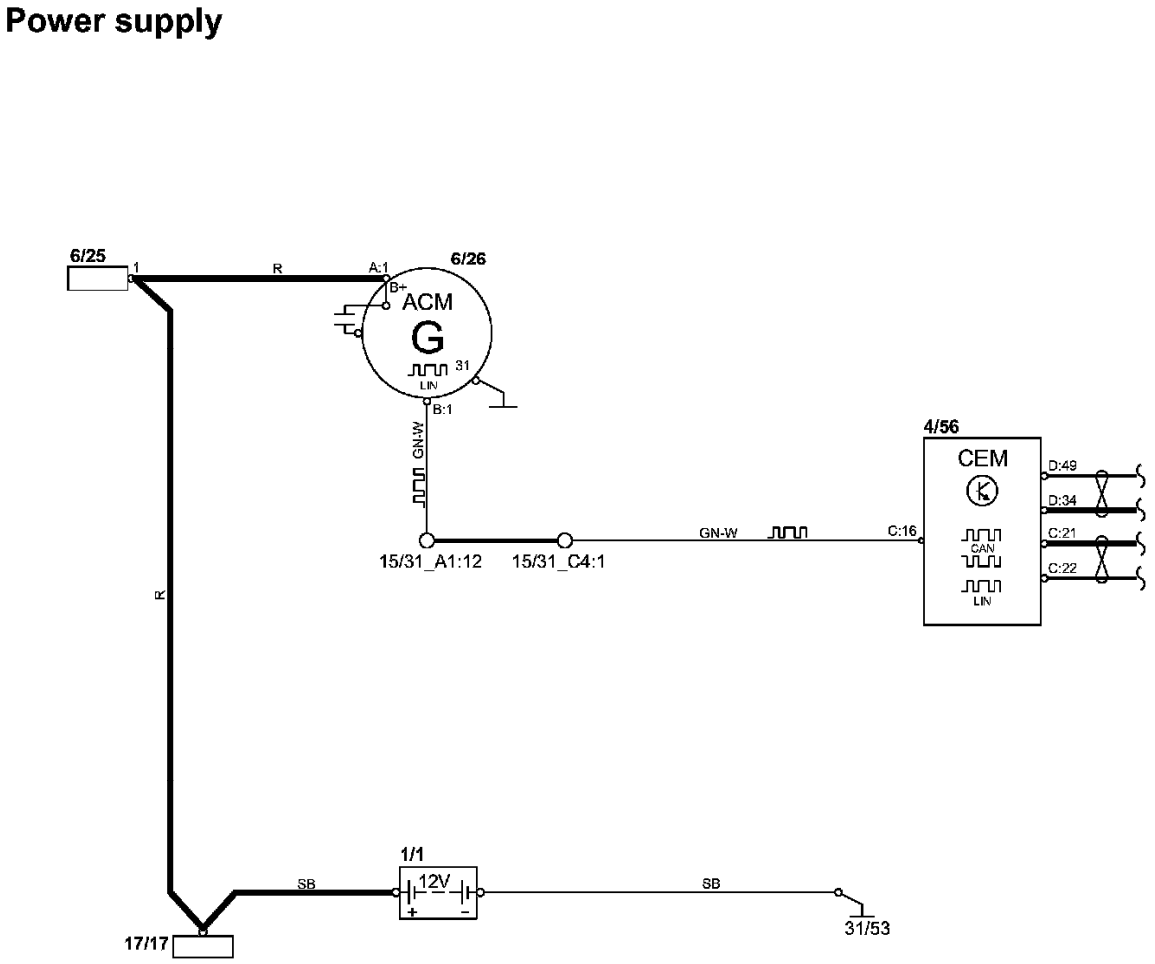
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Brake Light Switch

For information regarding diagrams for this component, please refer to Brake Lamp diagrams. See: Lighting and Horns/Brake Lamp/Diagrams/Electrical Diagrams

Charging System

Power Supply



Power Supply

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

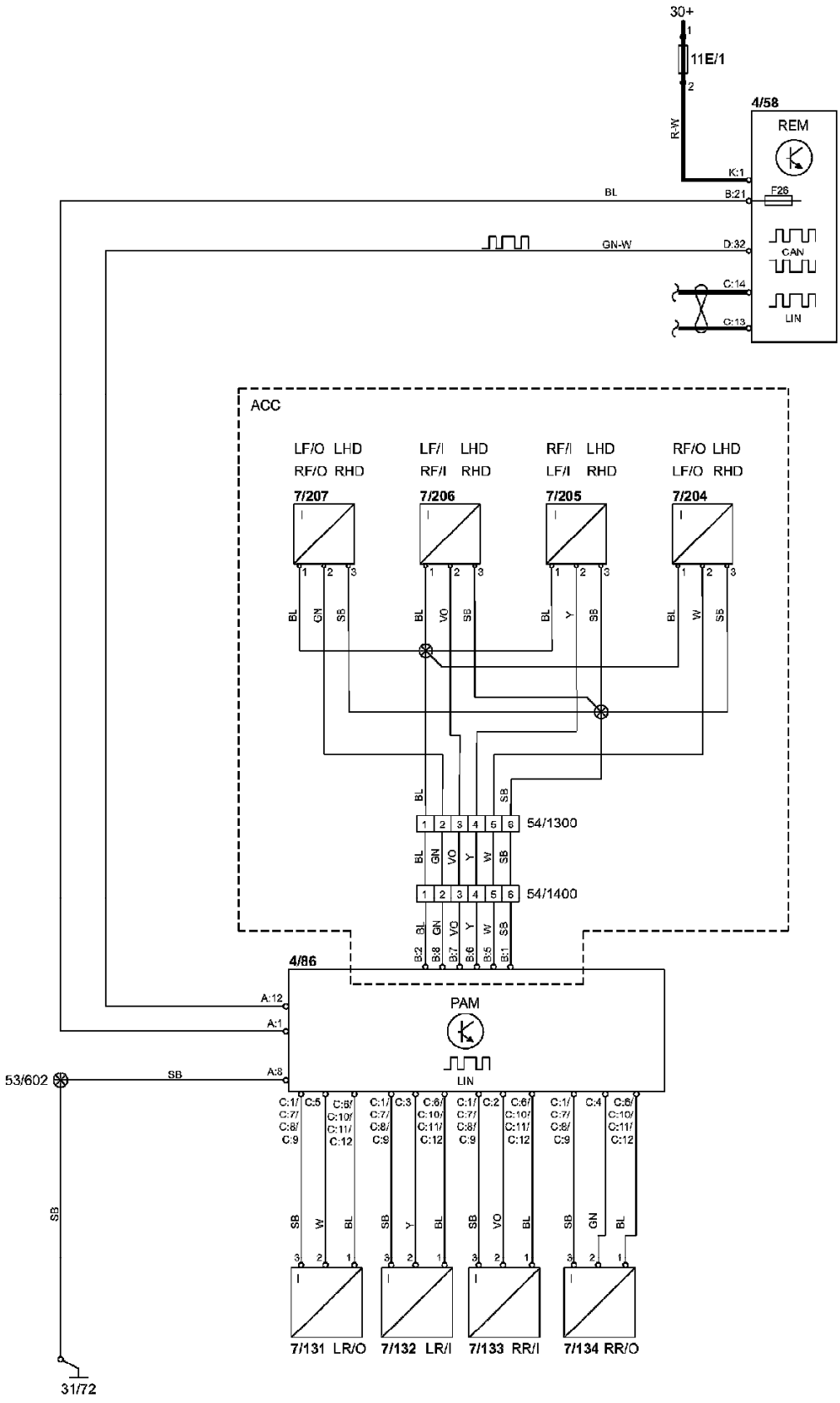
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Collision Avoidance and Parking Assist Systems

Parking Assistance

Parking assistance



Parking Assistance

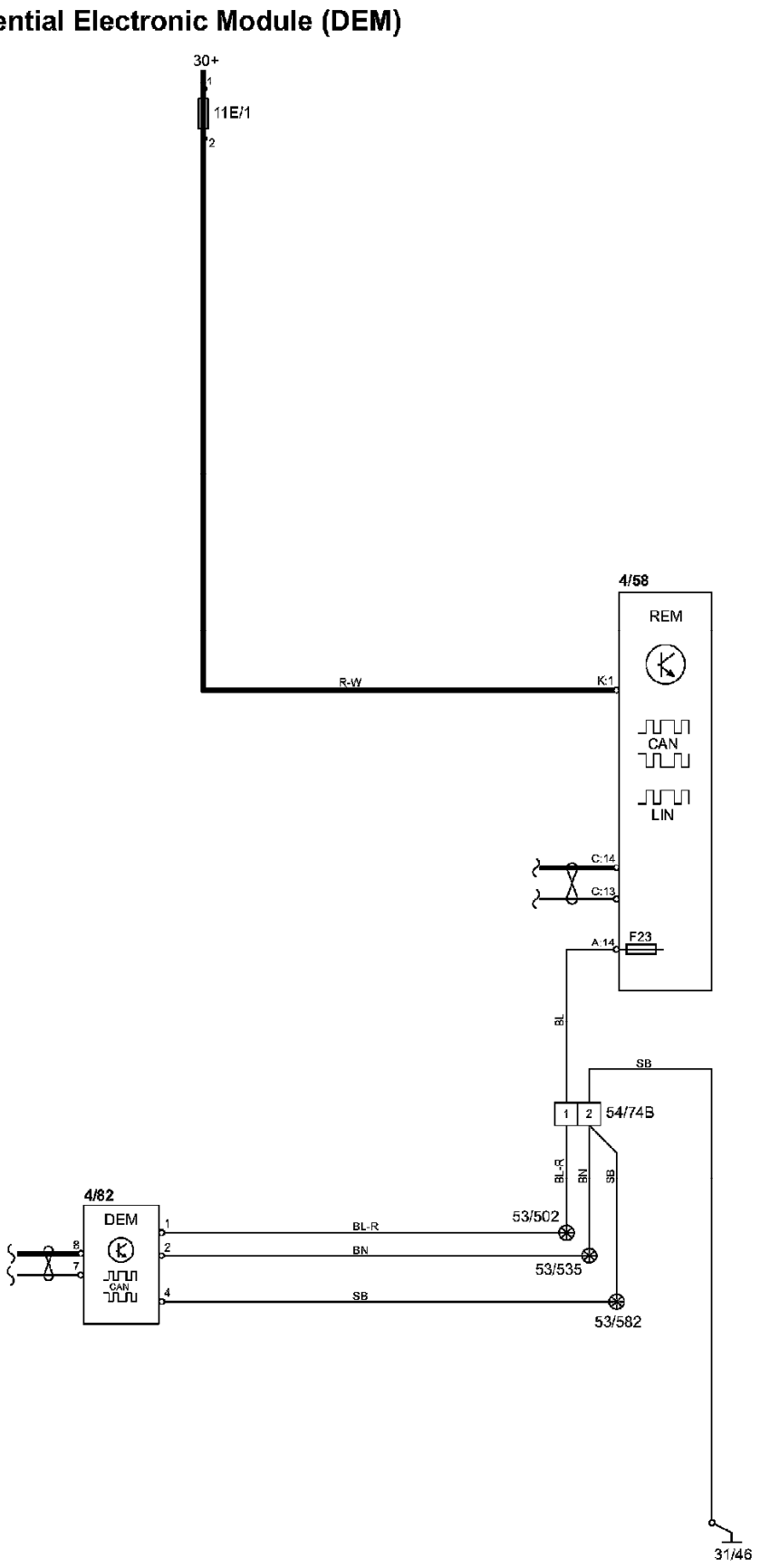
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Control Unit, Differential Lock

Differential Electronic Module (DEM)



Differential Electronic Module (DEM)

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

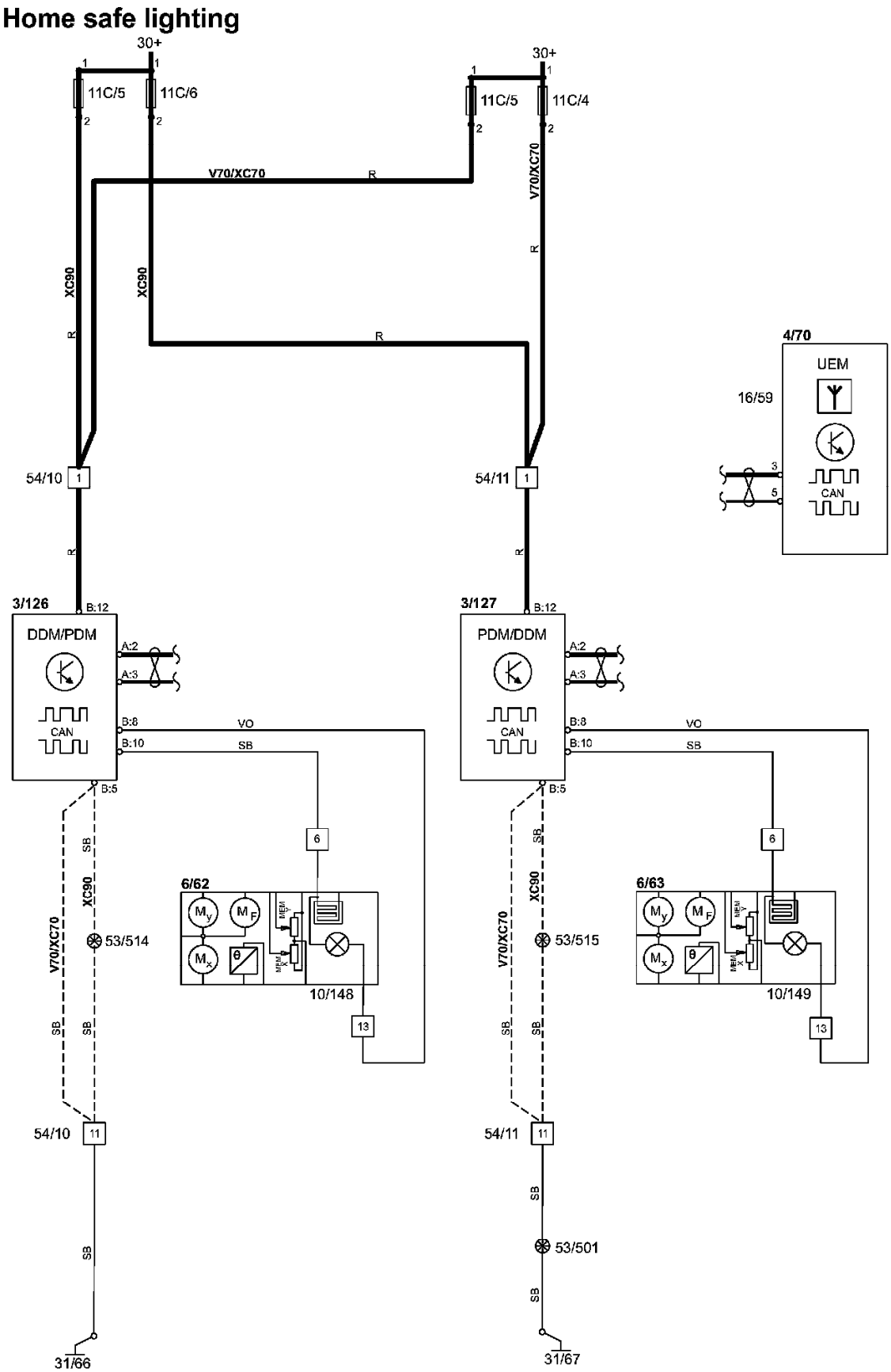
Coolant Level Sensor

For information regarding diagrams for this component, if equipped, please refer to Radiator Cooling Fan diagrams. See: Engine, Cooling and

Exhaust/Cooling System/Radiator Cooling Fan/Diagrams/Electrical Diagrams

Courtesy Lamp

Home Safe Lighting



Home Safe Lighting

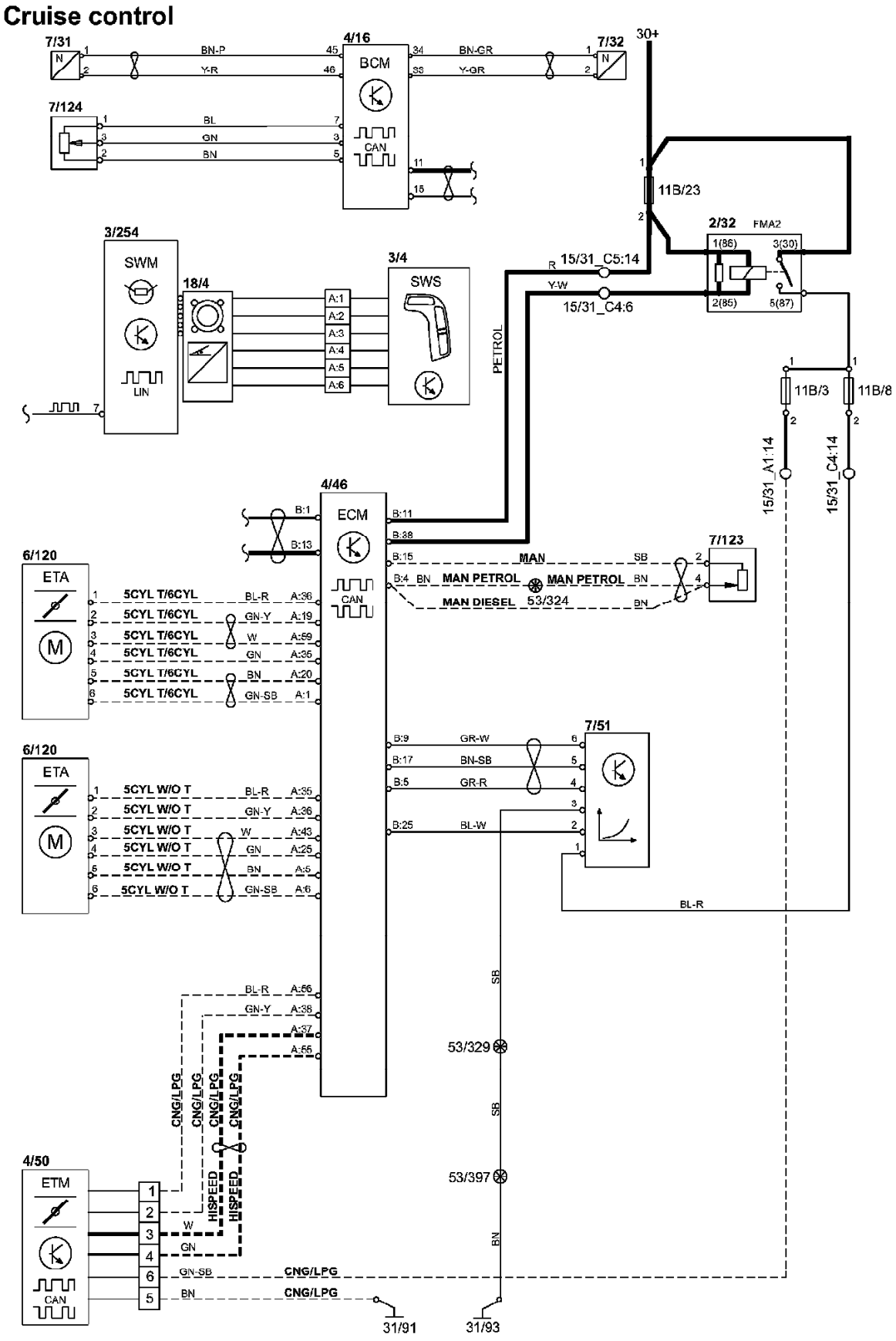
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Cruise Control

Cruise Control



Cruise Control

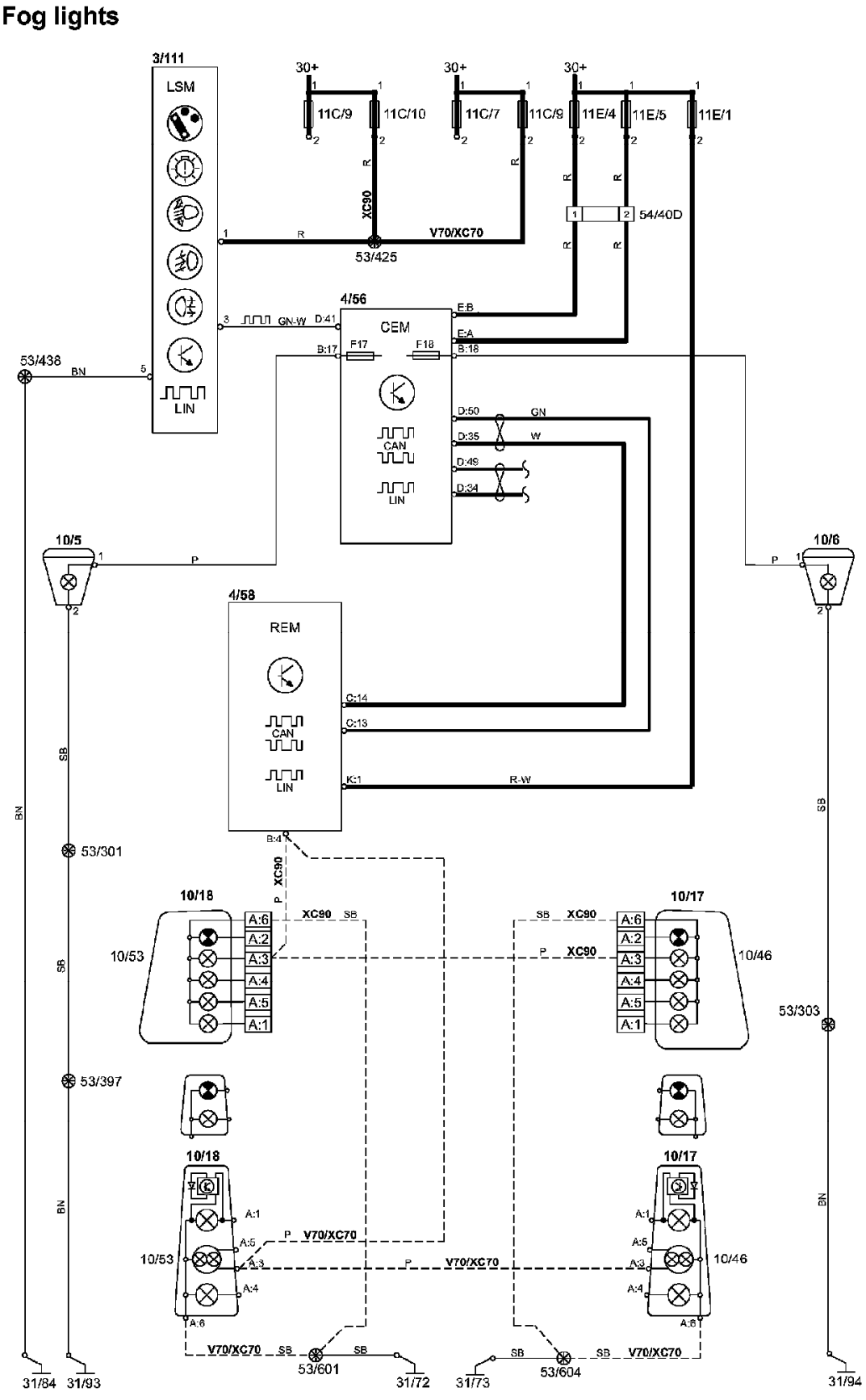
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Fog Lights

Fog Lights



Fog Lights

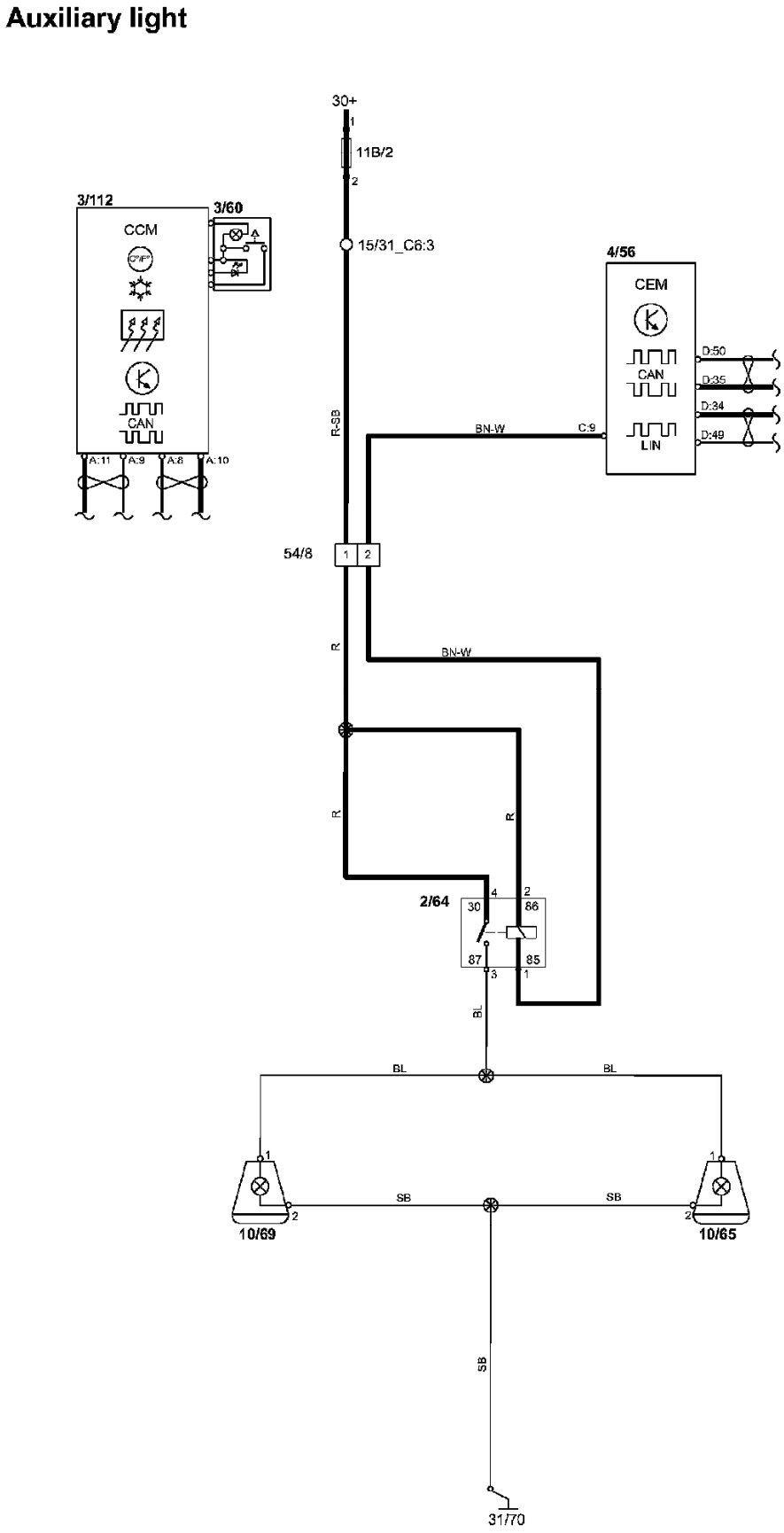
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Auxiliary Light

Auxiliary Light



Auxiliary Light

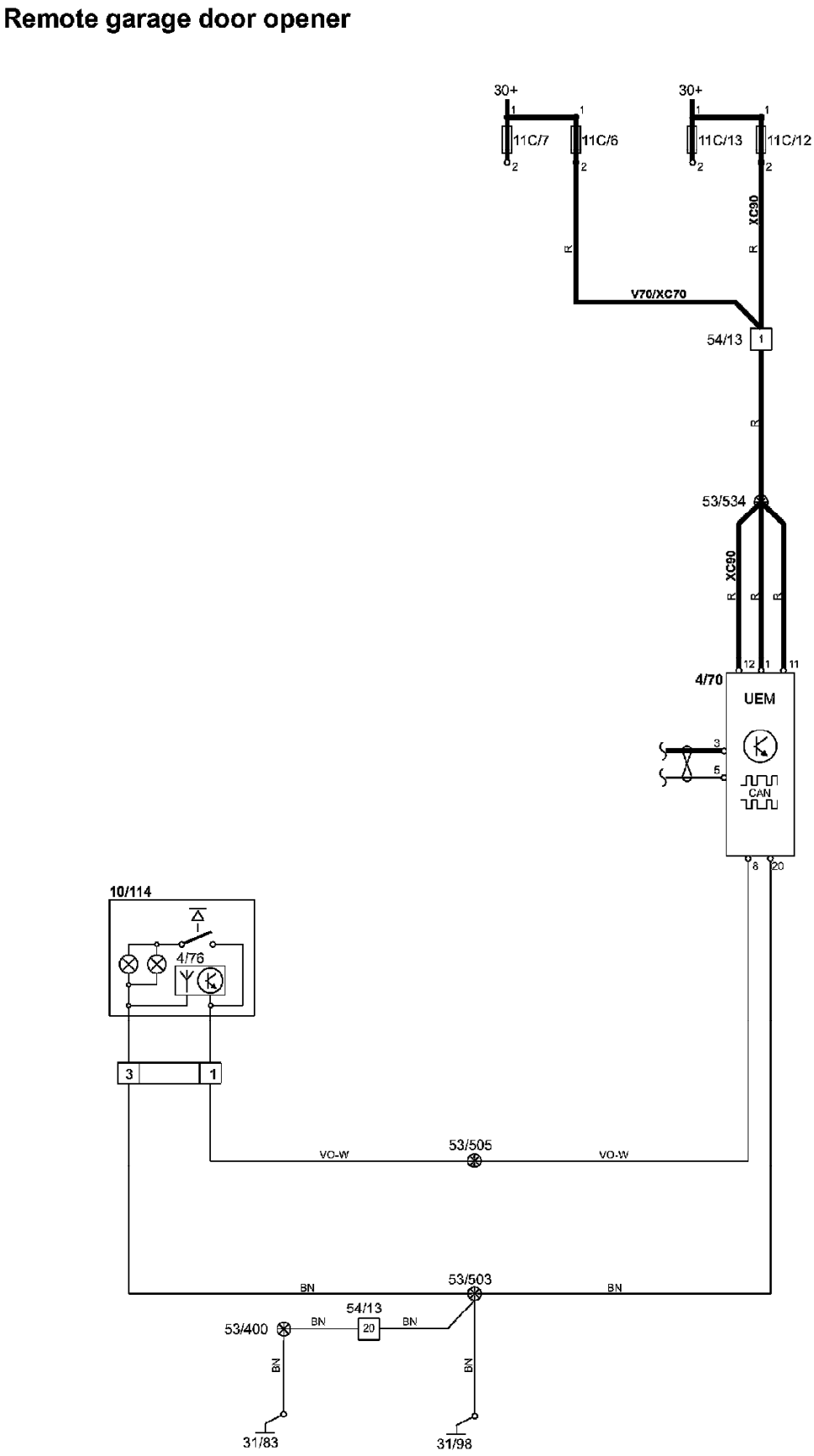
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Garage Door Opener Transmitter

Remote Garage Door Opener



Remote Garage Door Opener

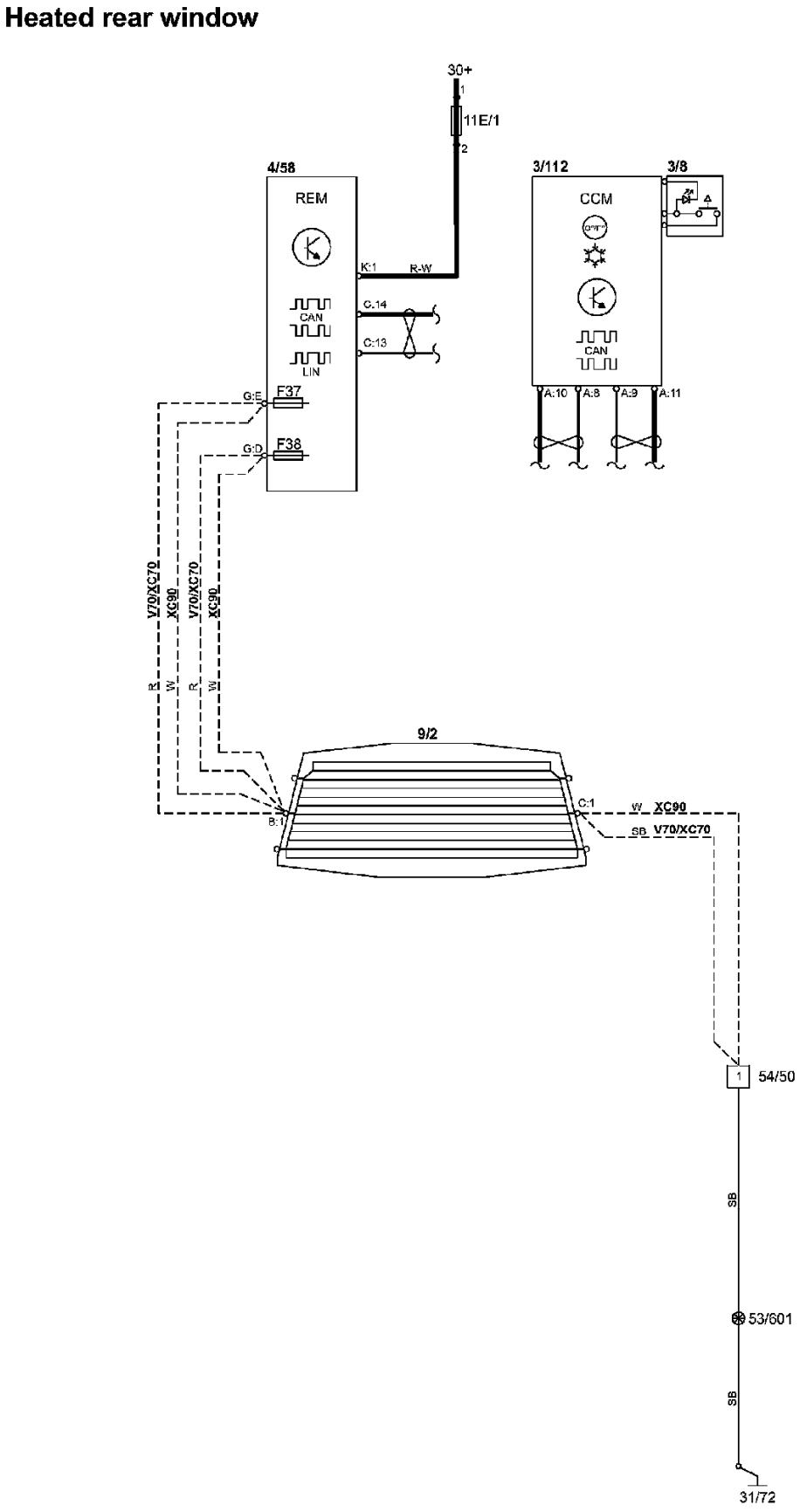
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Heated Glass Element

Heated Rear Window



Heated Rear Window

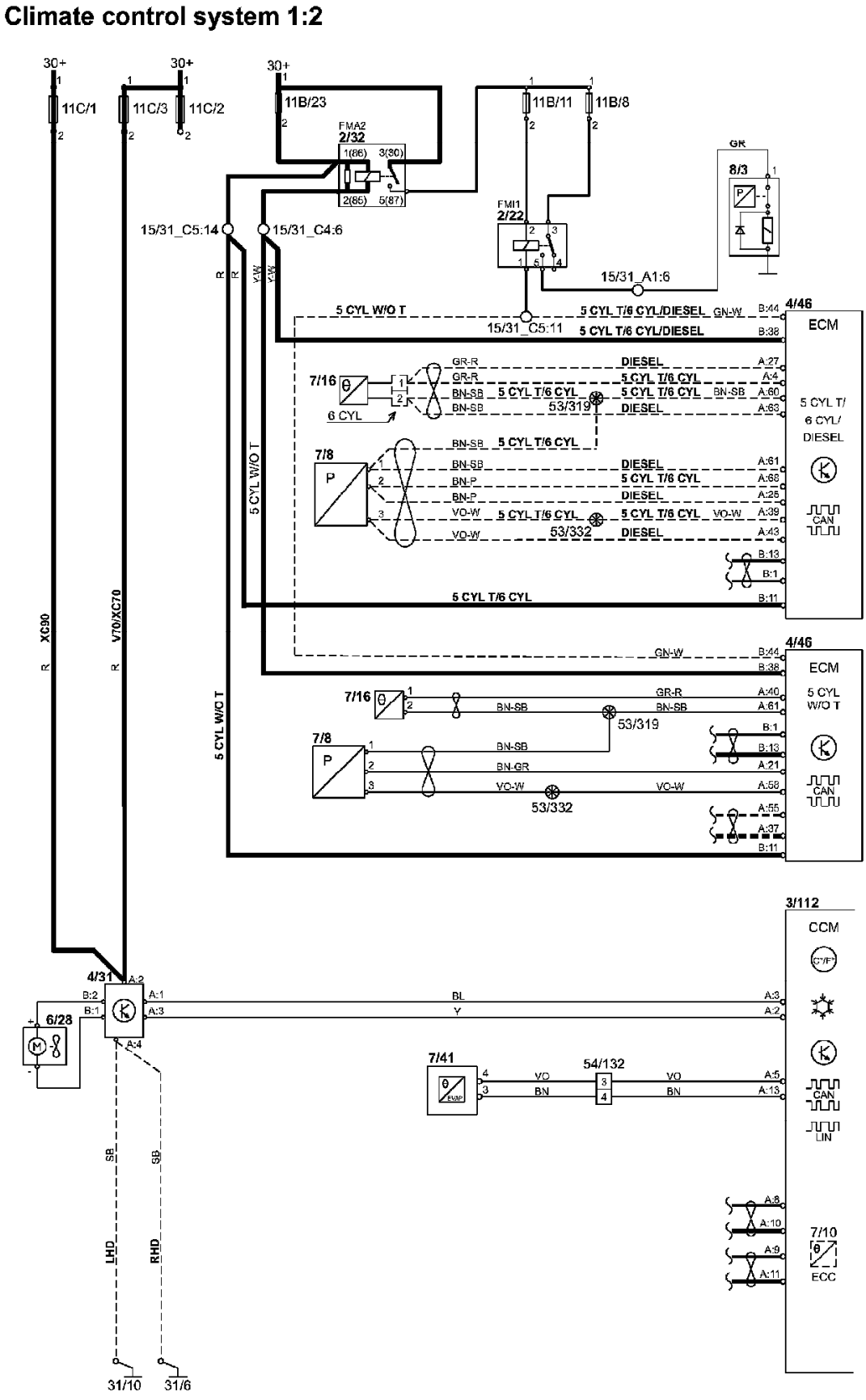
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

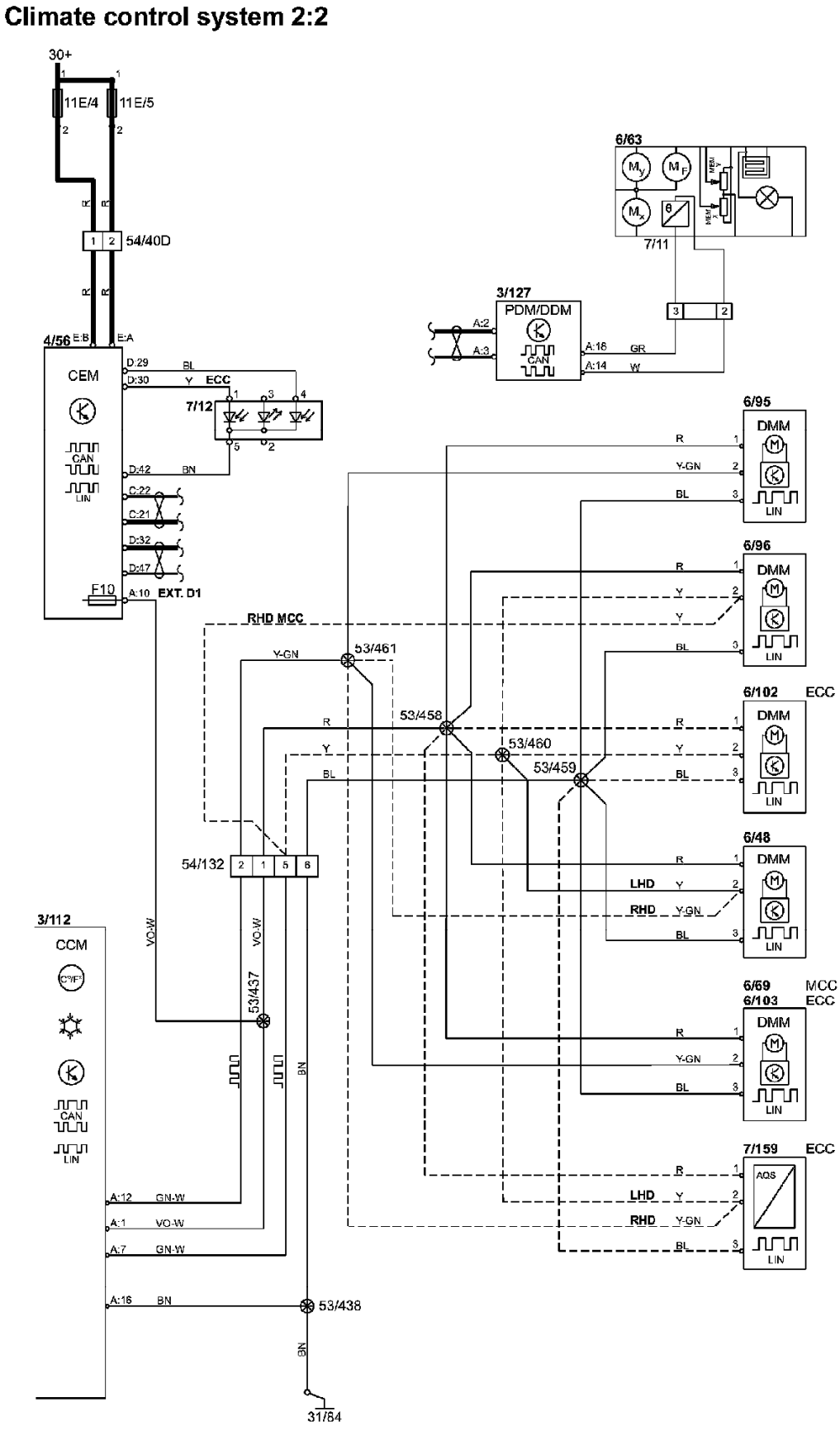
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

System Diagram

Climate Control System



Climate Control System, Part 1



Climate Control System, Part 2

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Compressor HVAC

For information regarding diagrams for this component, please refer to Heating and Air Conditioning diagrams. See: Heating and Air Conditioning/Diagrams/Electrical Diagrams

Control Assembly, HVAC

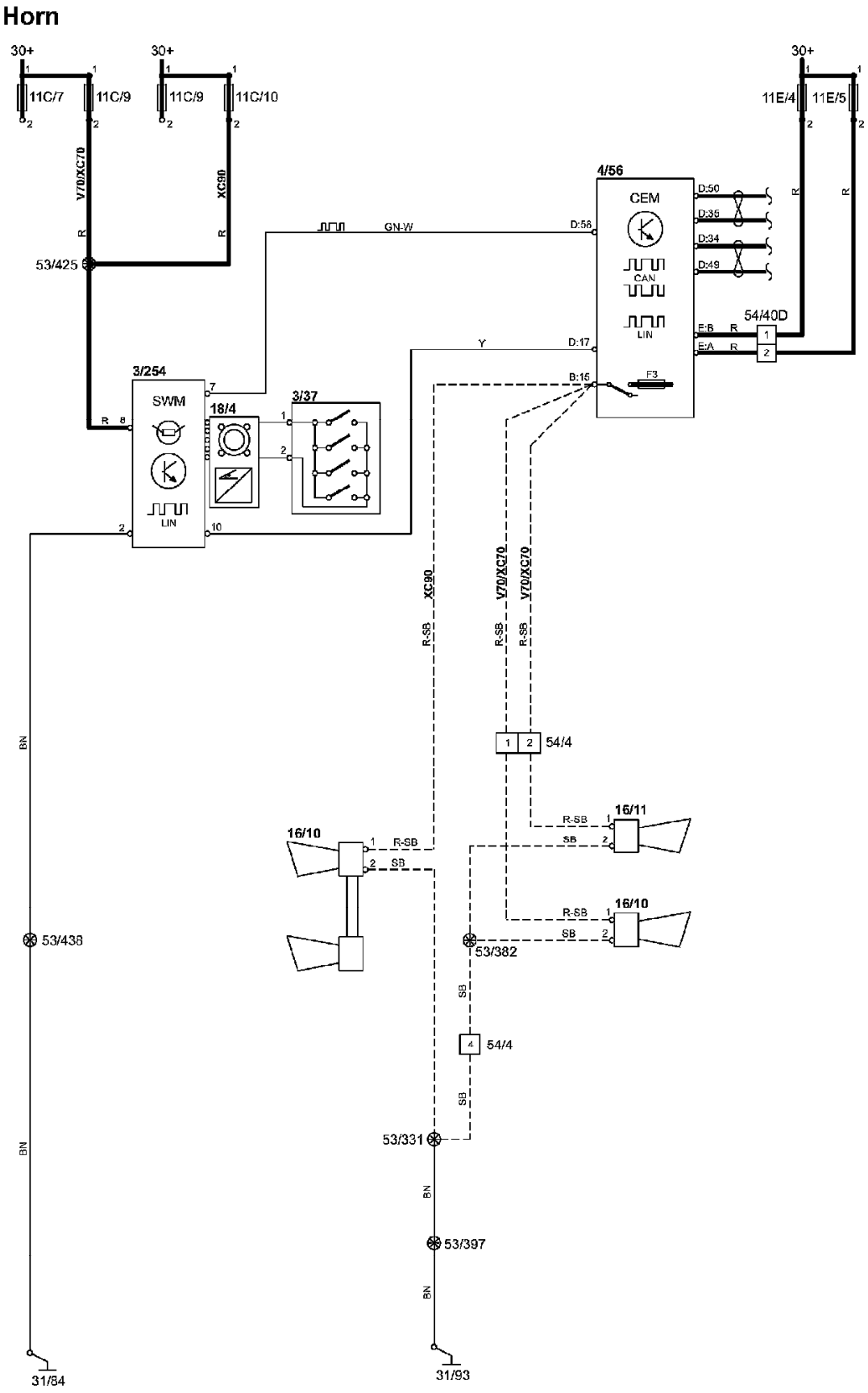
For information regarding diagrams for this component, please refer to Heating and Air Conditioning diagrams. See: Heating and Air Conditioning/Diagrams/Electrical Diagrams

Control Module HVAC

For information regarding diagrams for this component, please refer to Heating and Air Conditioning diagrams. See: Heating and Air Conditioning/Diagrams/Electrical Diagrams

Horn

Horn



Horn

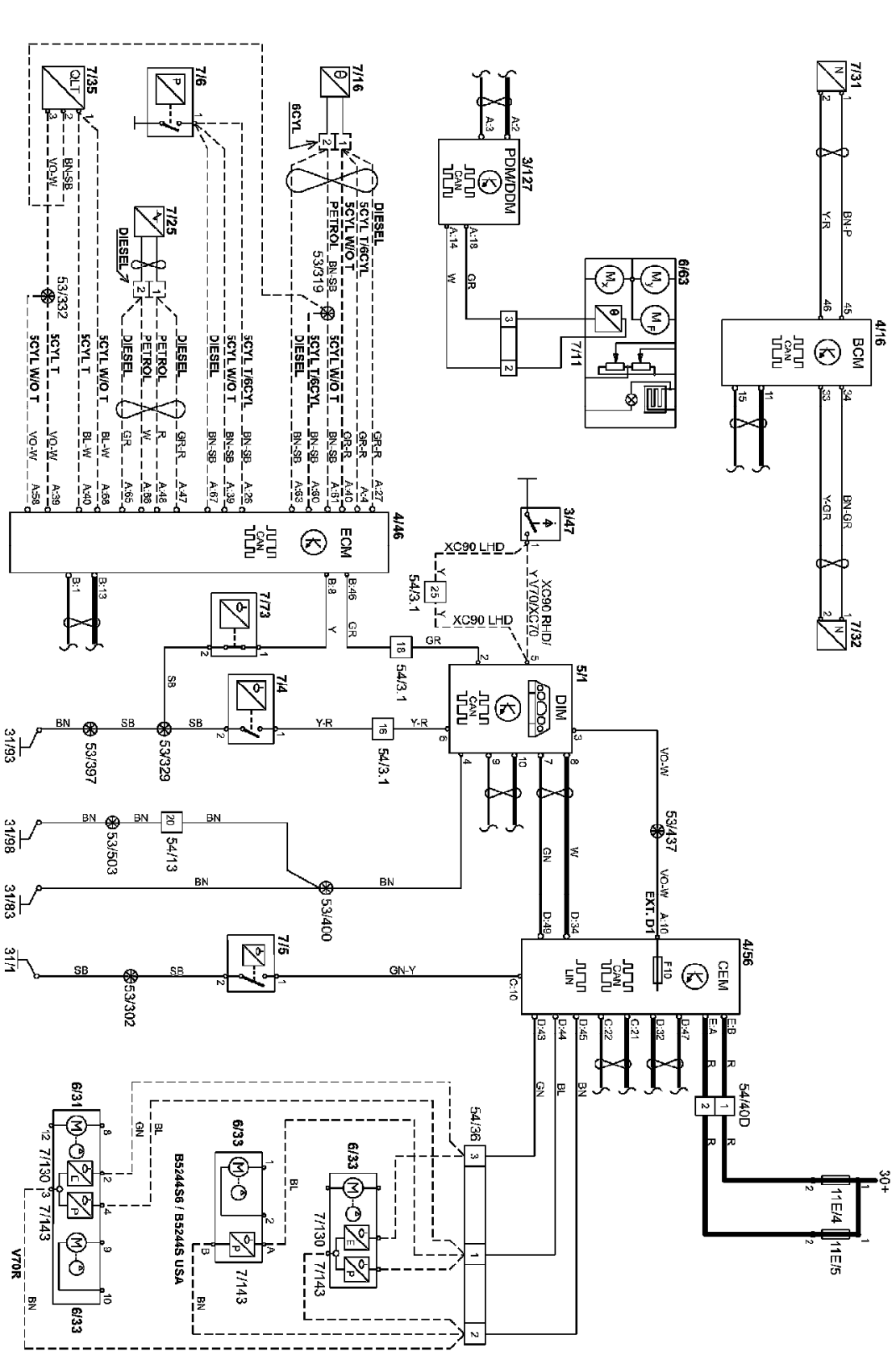
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

System Diagram

Driver Information Module



Driver Information Module

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

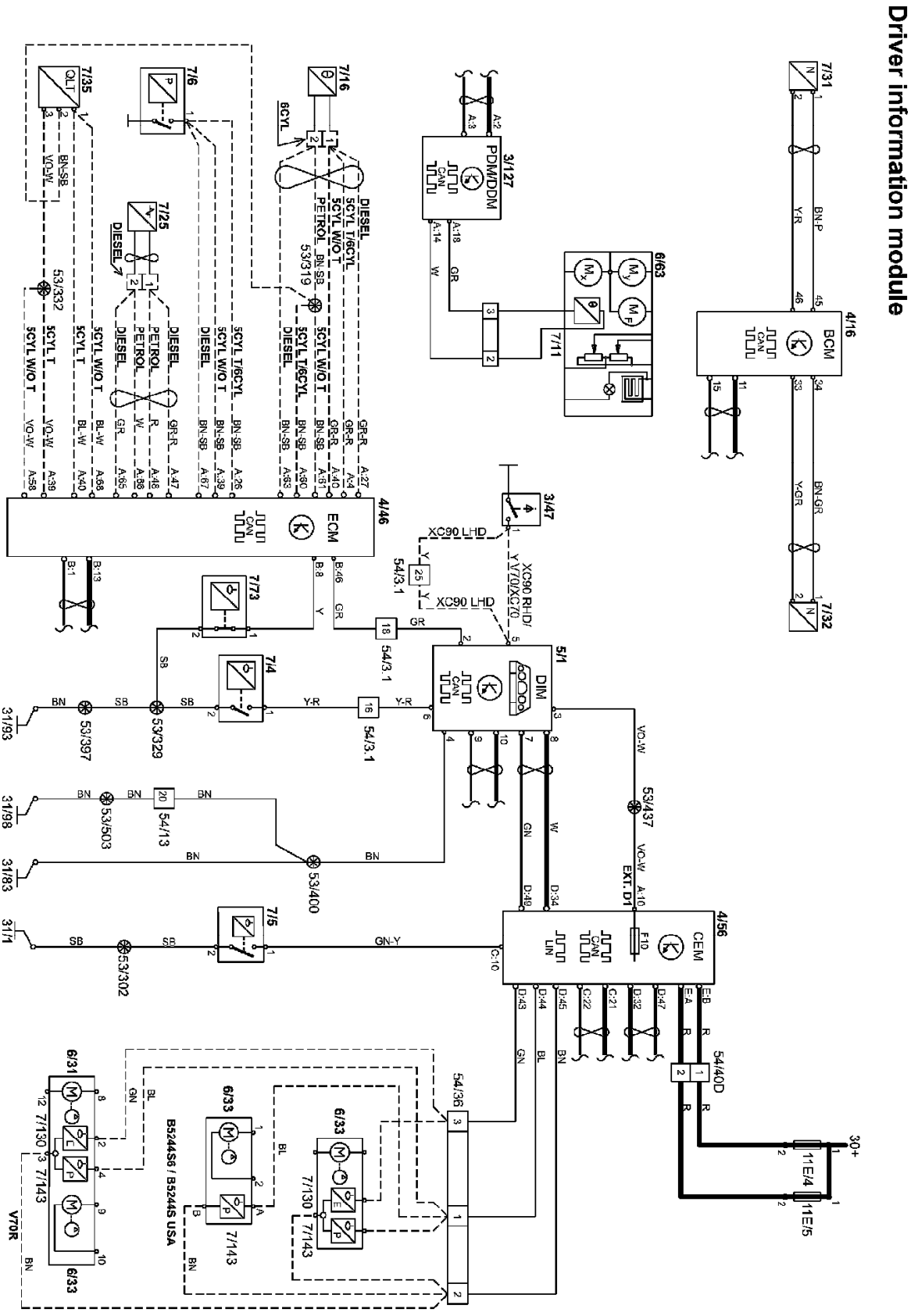
Cigarette Lighter

For information regarding diagrams for this component, please refer to Auxiliary Power Outlet diagrams. See: Power and Ground

Distribution/Auxiliary Power Outlet/Diagrams/Electrical Diagrams

Driver/Vehicle Information Display

Driver Information Module



Driver Information Module

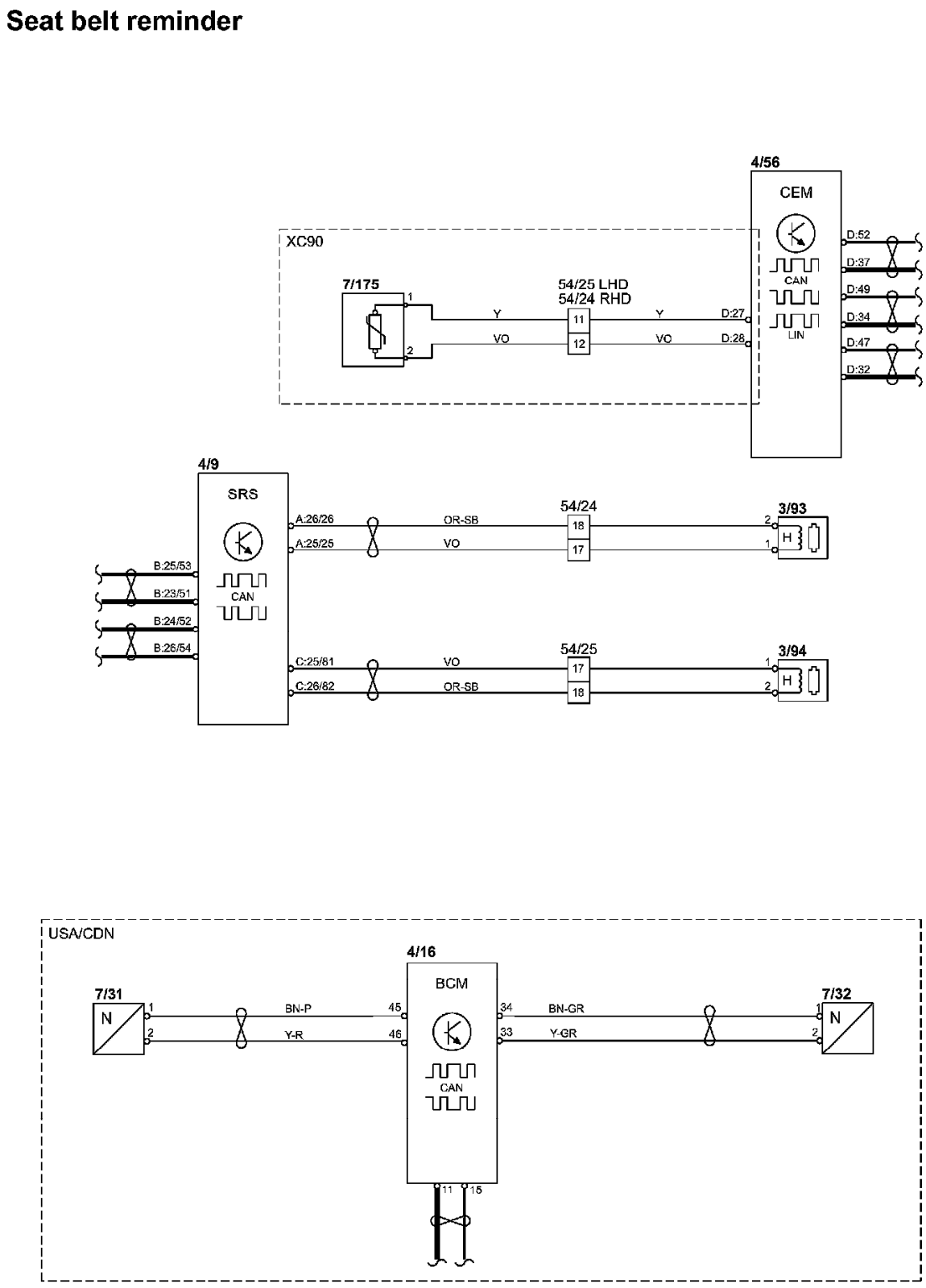
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Seat Belt Reminder Buzzer

Seat Belt Reminder



Seat Belt Reminder

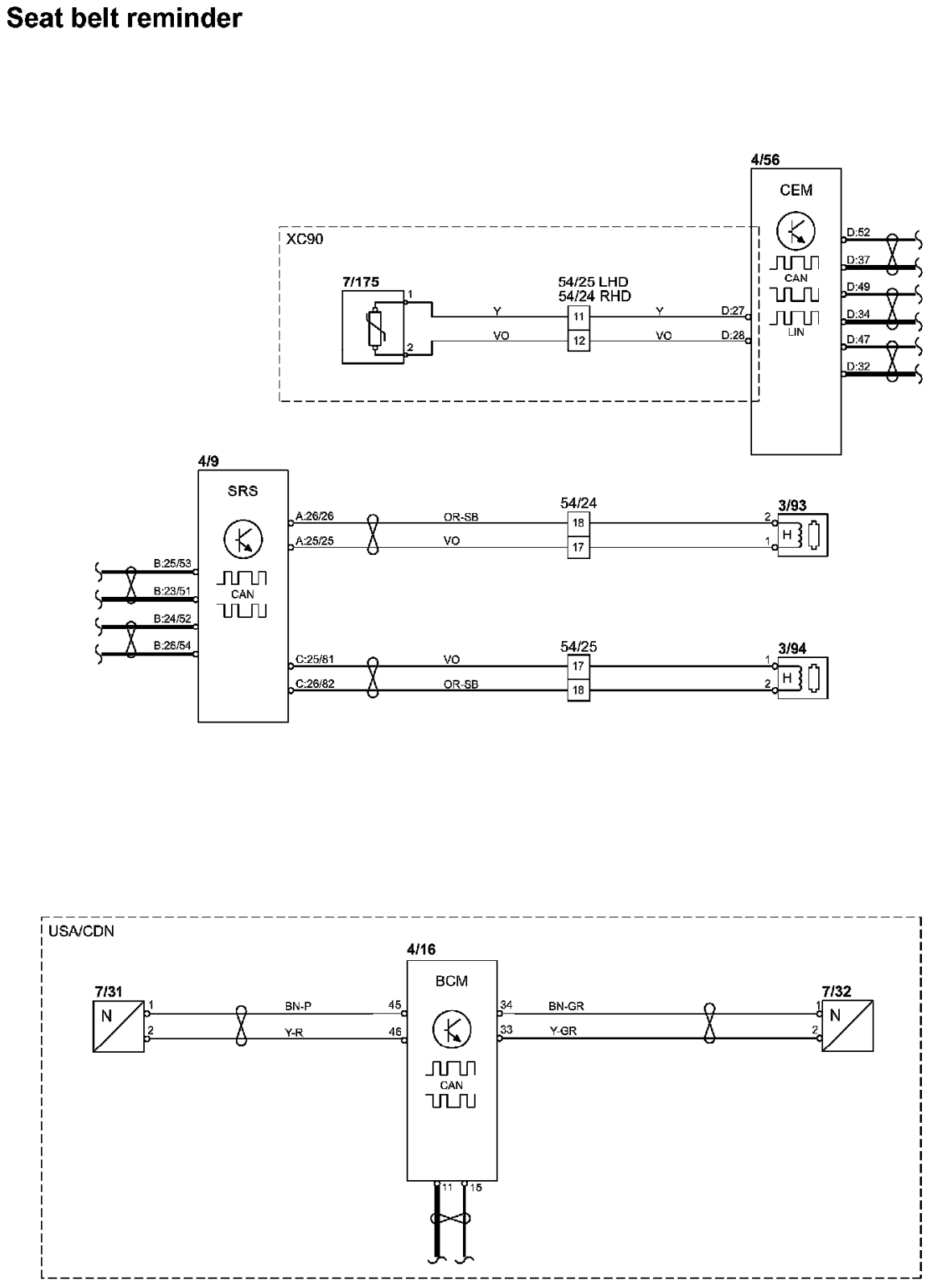
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Seat Belt Reminder Lamp

Seat Belt Reminder



Seat Belt Reminder

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

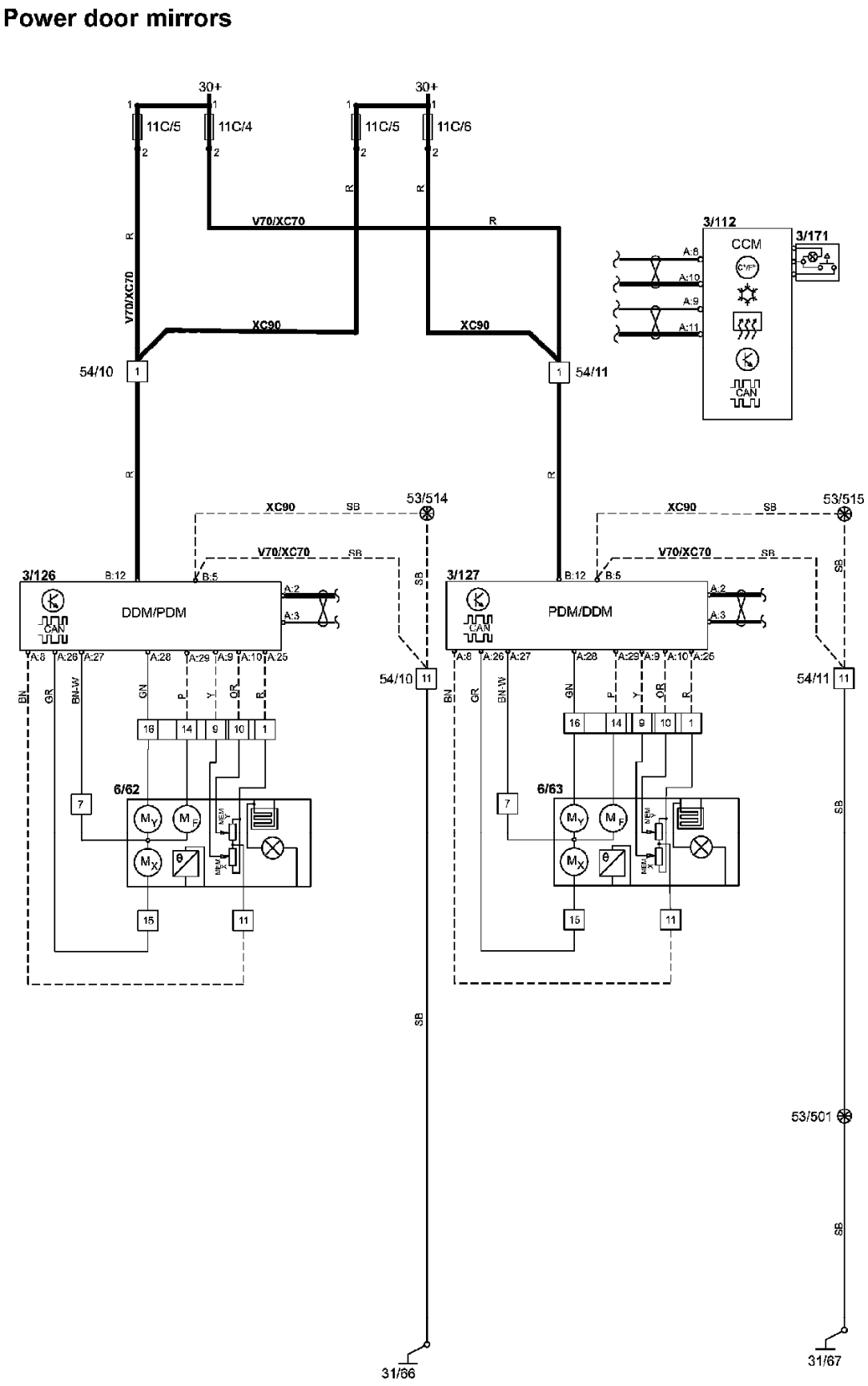
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Speedometer Head

For information regarding diagrams for this component, please refer to Instrument Panel, Gauges and Warning Indicators diagrams. See: Instrument Panel, Gauges and Warning Indicators/Diagrams/Electrical Diagrams

Power Door Mirrors

Power Door Mirrors



Power Door Mirrors

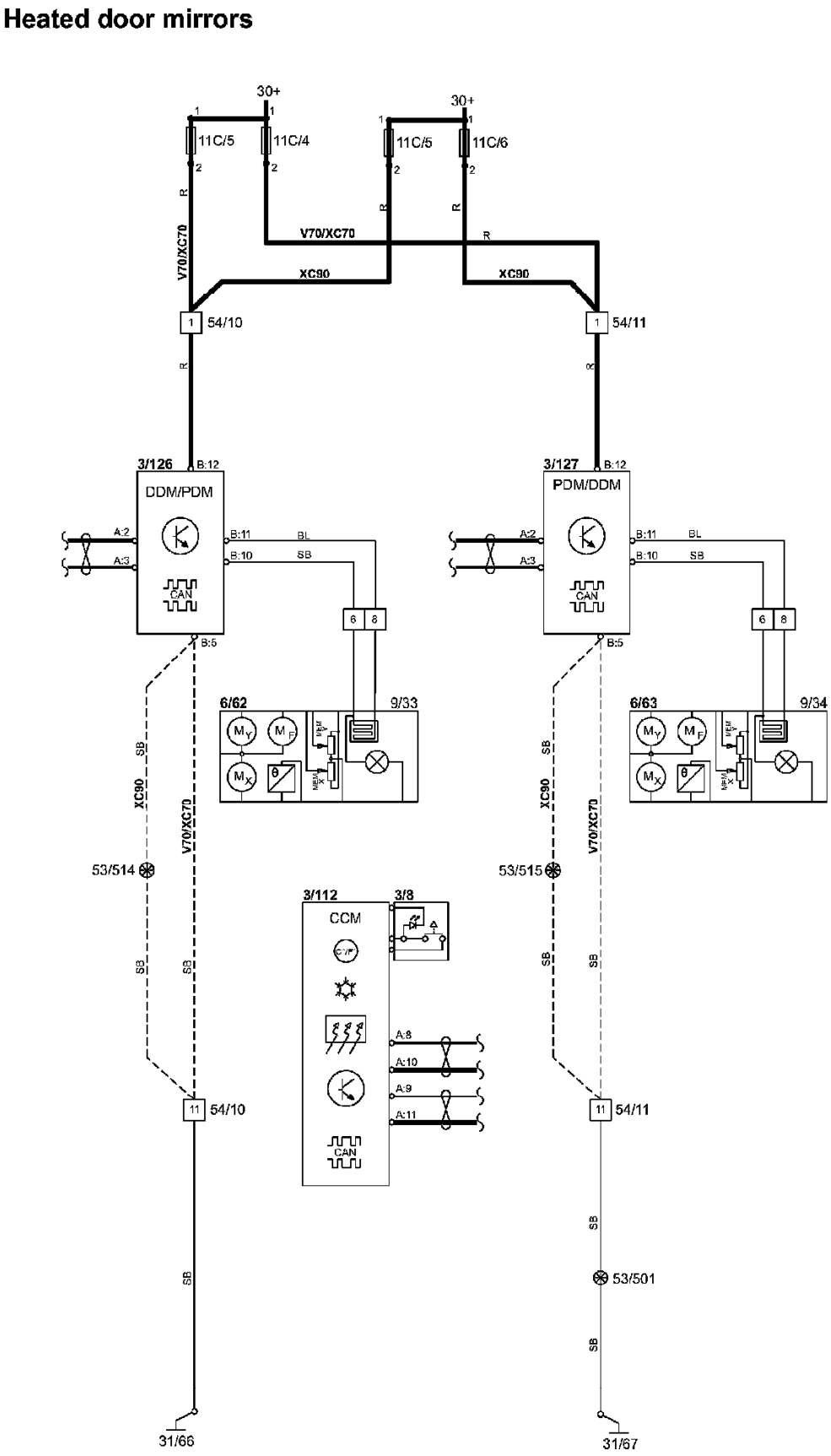
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Heated Door Mirrors

Heated Door Mirrors



Heated Door Mirrors

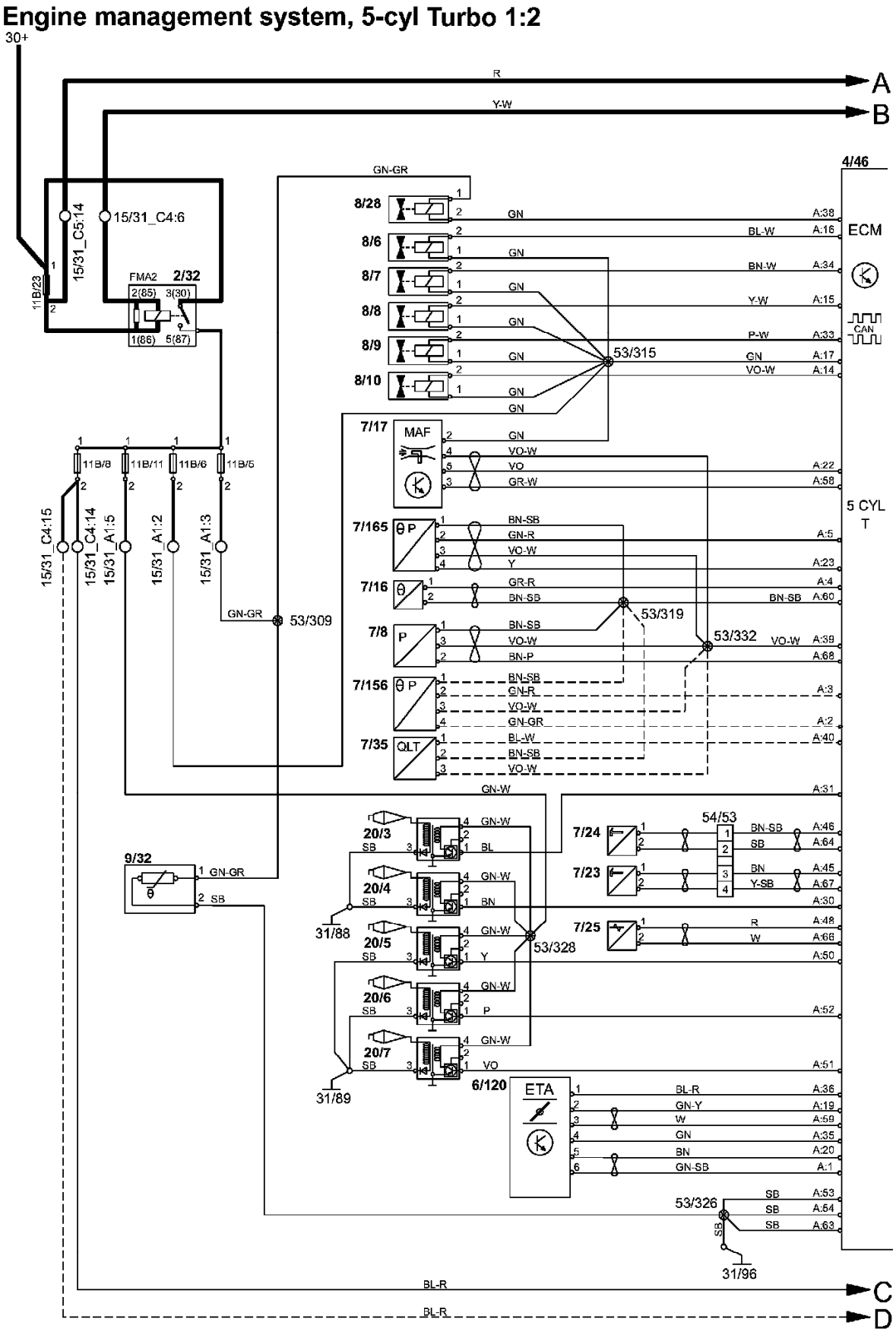
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

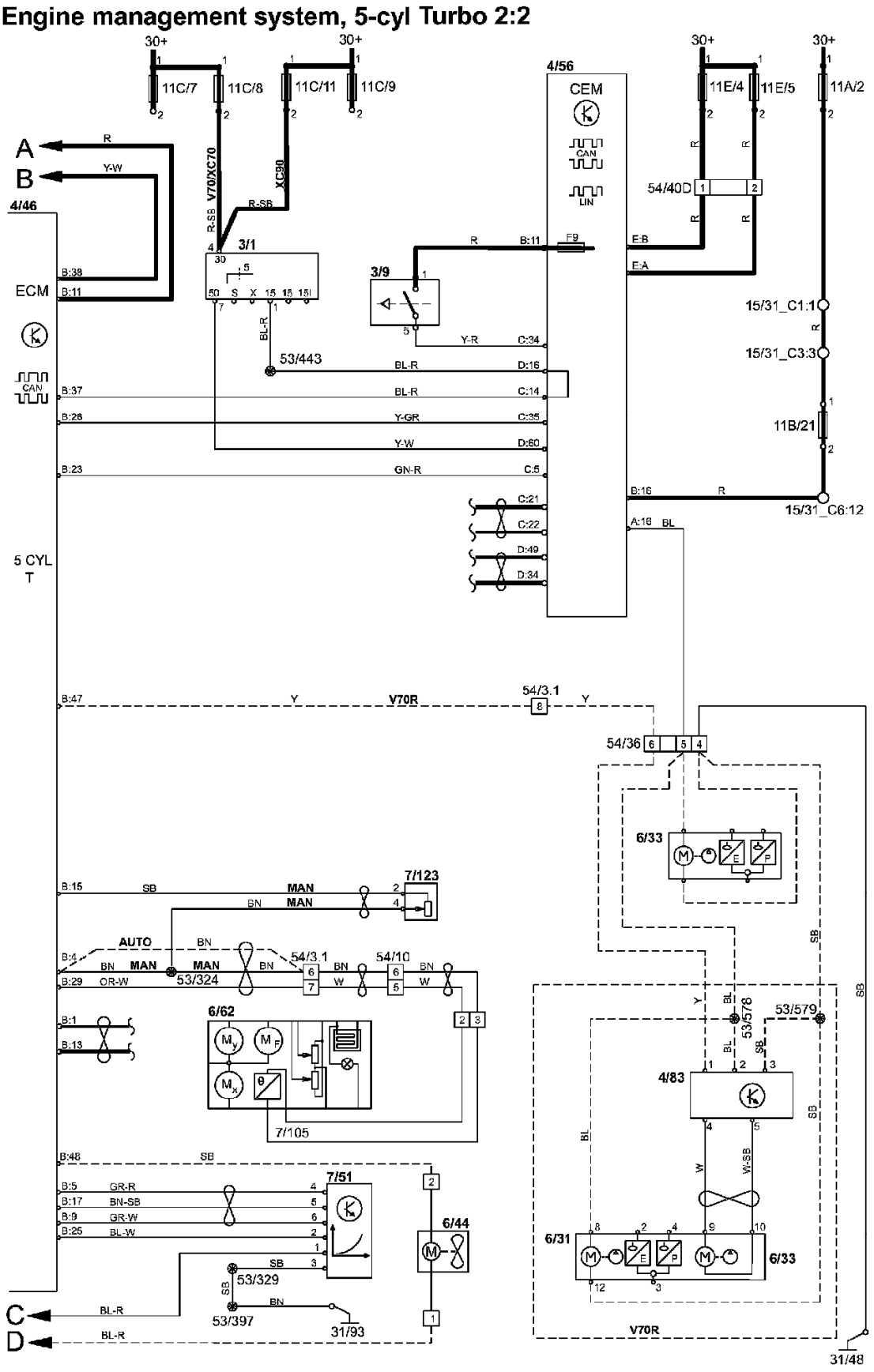
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

System Diagram

Engine Management System, 5-Cyl Turbo



Engine Management System, 5-Cyl Turbo, Part 1



Engine Management System, 5-Cyl Turbo, Part 2

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

System Diagram

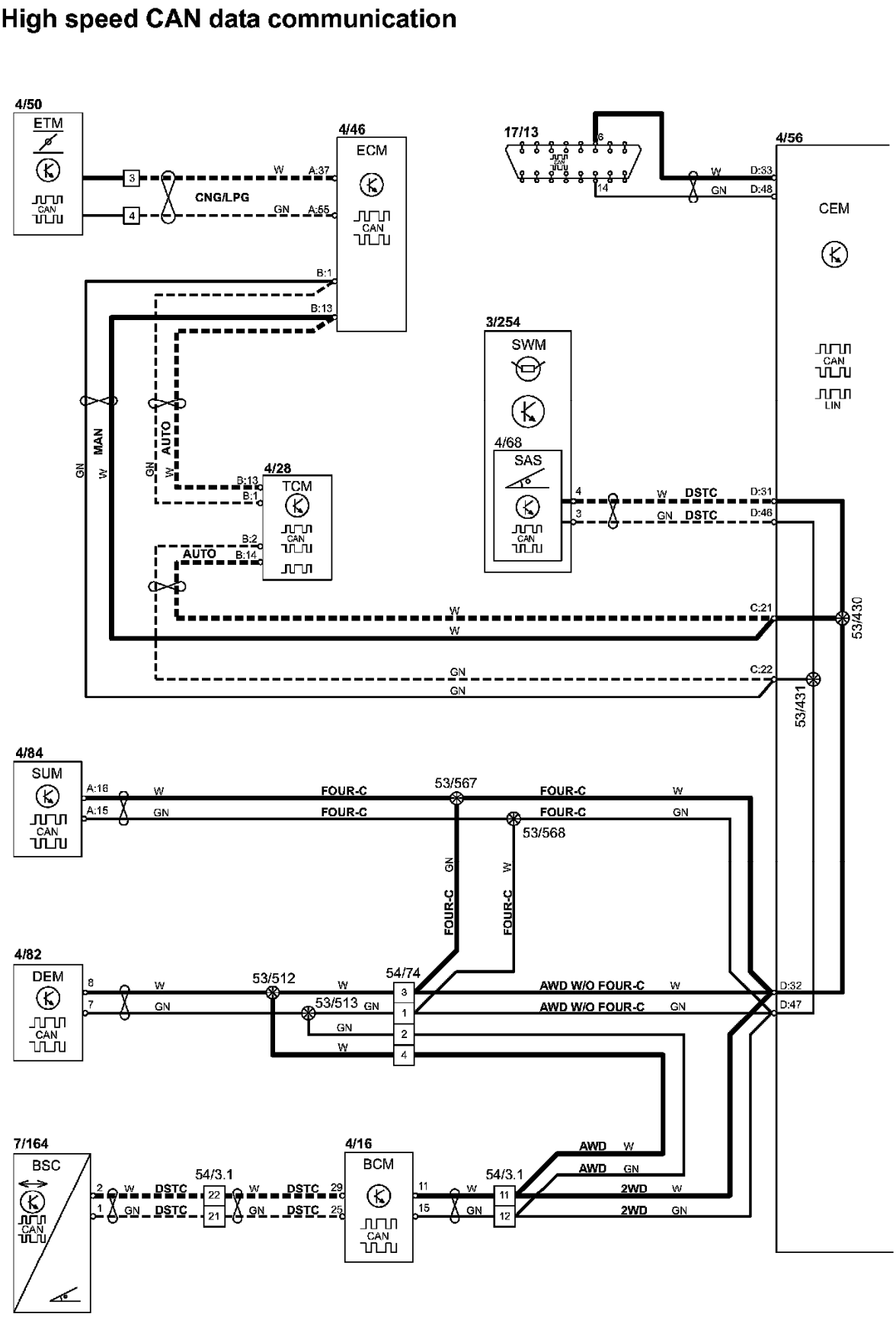
For wiring diagrams and schematics please refer to **"Powertrain Management : Diagrams : Electrical"**. See: Powertrain Management/Diagrams/Electrical Diagrams

Engine Control Module

For wiring diagrams and schematics please refer to **"Powertrain Management : Diagrams : Electrical"**. See: Powertrain Management/Diagrams/Electrical Diagrams

High Speed CAN Data Communication

High Speed CAN Data Communication



High Speed CAN Data Communication

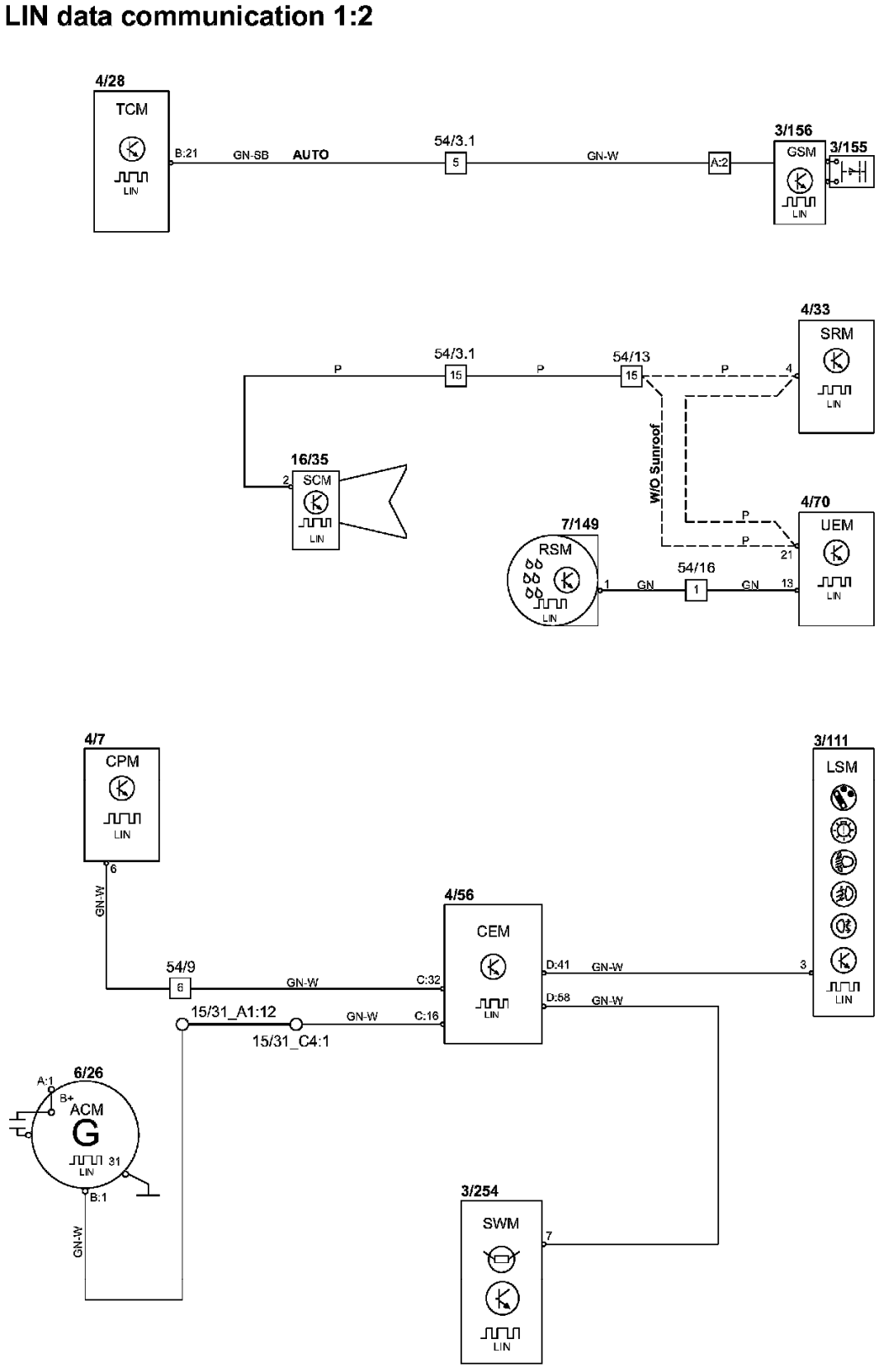
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

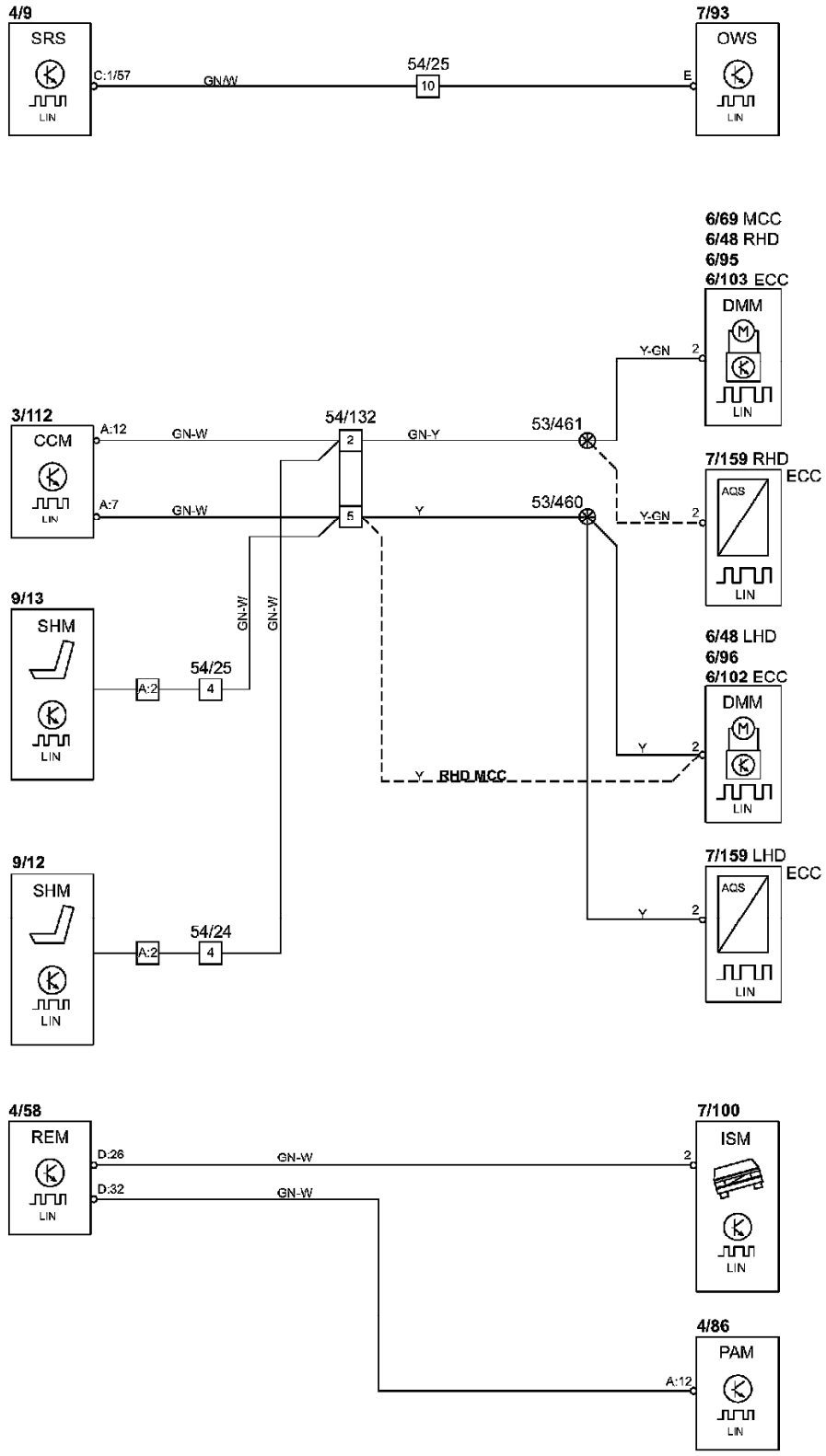
LIN Data Communication

LIN Data Communication



LIN Data Communication, Part 1

LIN data communication 2:2



LIN Data Communication, Part 2

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

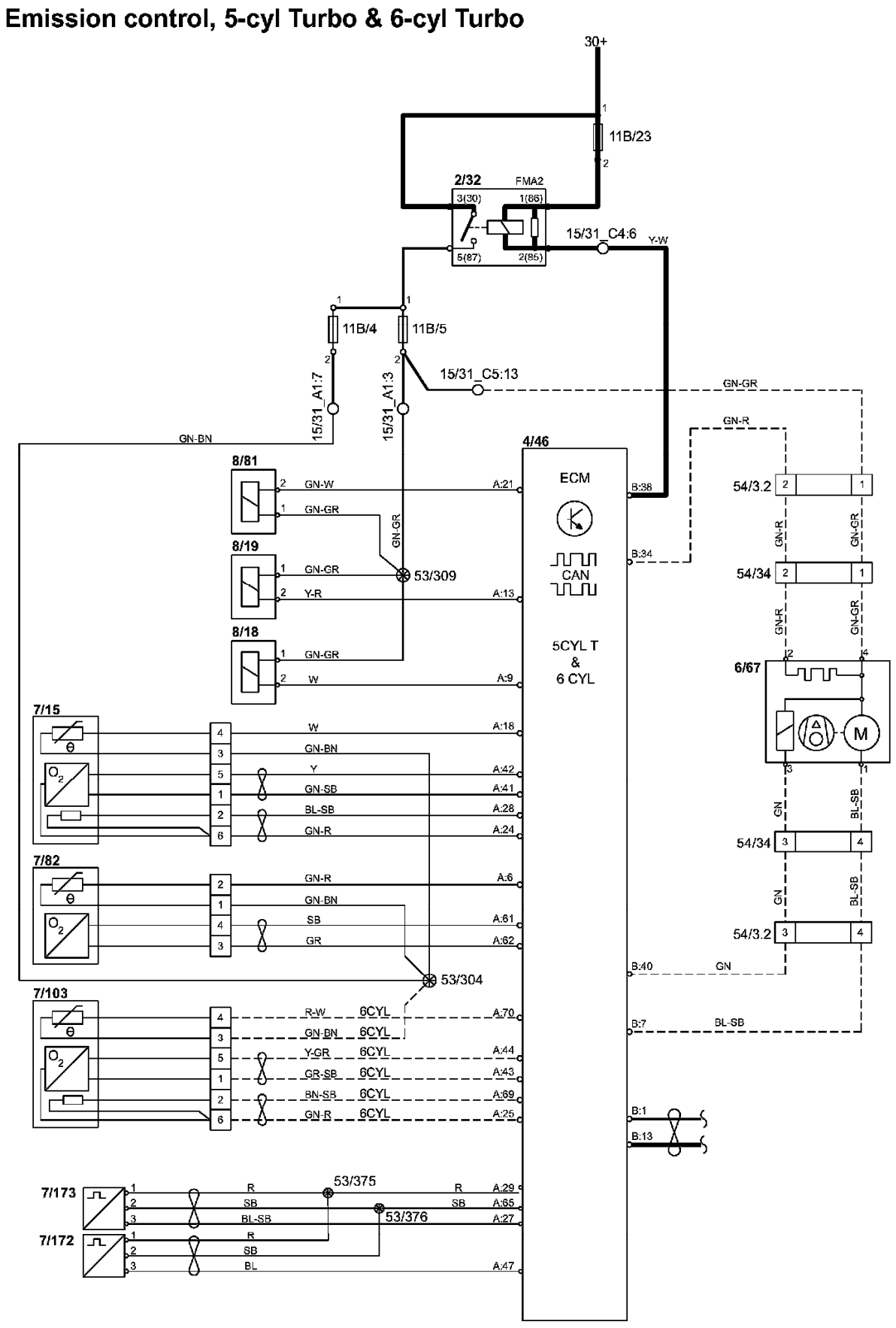
List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Oxygen Sensor

For information regarding diagrams for this component, please refer to Powertrain Management diagrams. See: Powertrain Management/Diagrams/Electrical Diagrams

System Diagram

Emission Control, 5-Cyl Turbo & 6-Cyl Turbo



Emission Control, 5-Cyl Turbo & 6-Cyl Turbo

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Air Injection Pump Relay

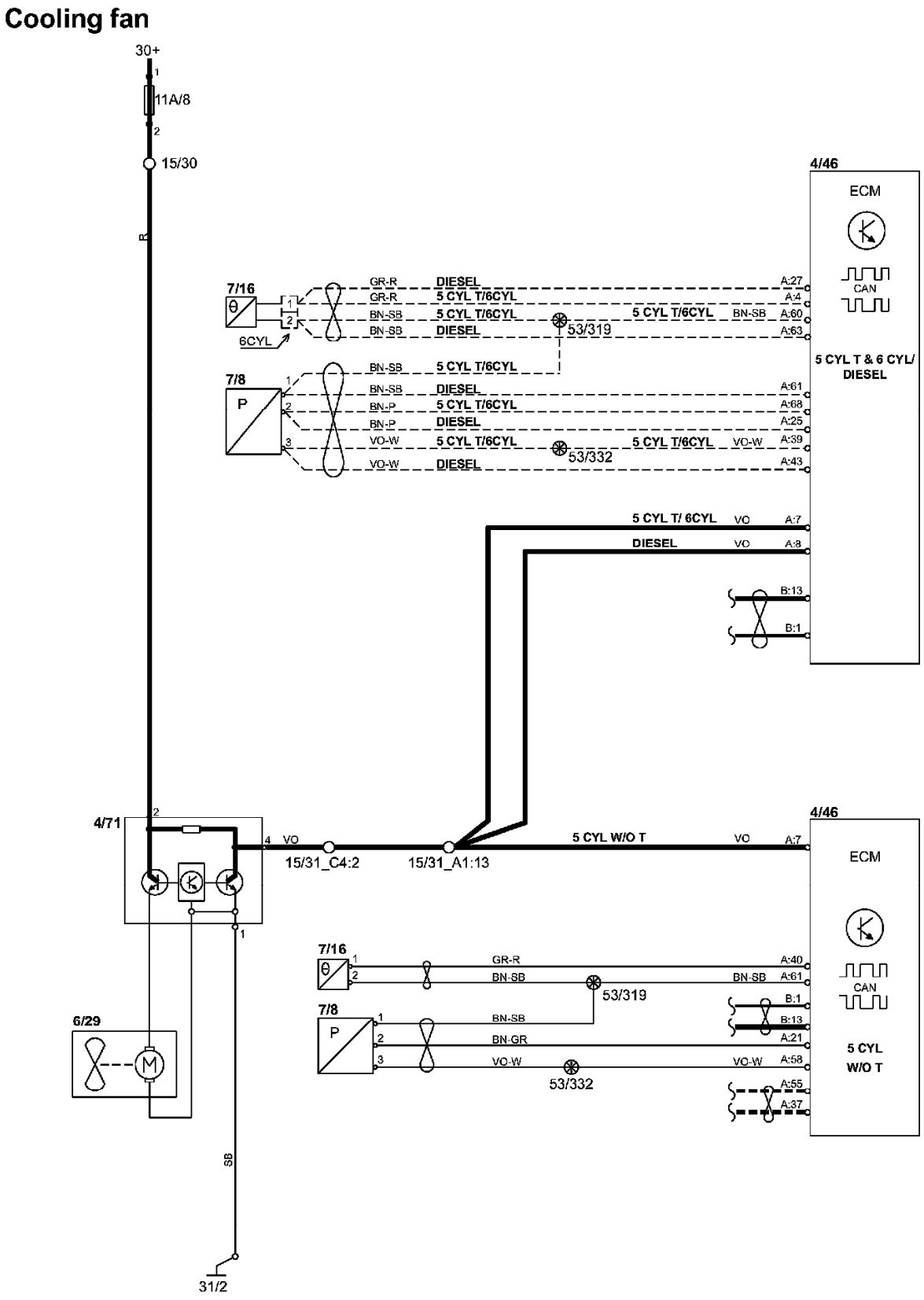
For information regarding diagrams for this component, please refer to Emission Control System Diagrams. See: Powertrain Management/Emission Control Systems/Diagrams/Electrical Diagrams

Fuel Delivery and Air Induction

For information regarding diagrams for this system, please refer to Powertrain Management diagrams. See: Powertrain Management/Diagrams/Electrical Diagrams

Radiator Cooling Fan

Cooling Fan



Cooling Fan

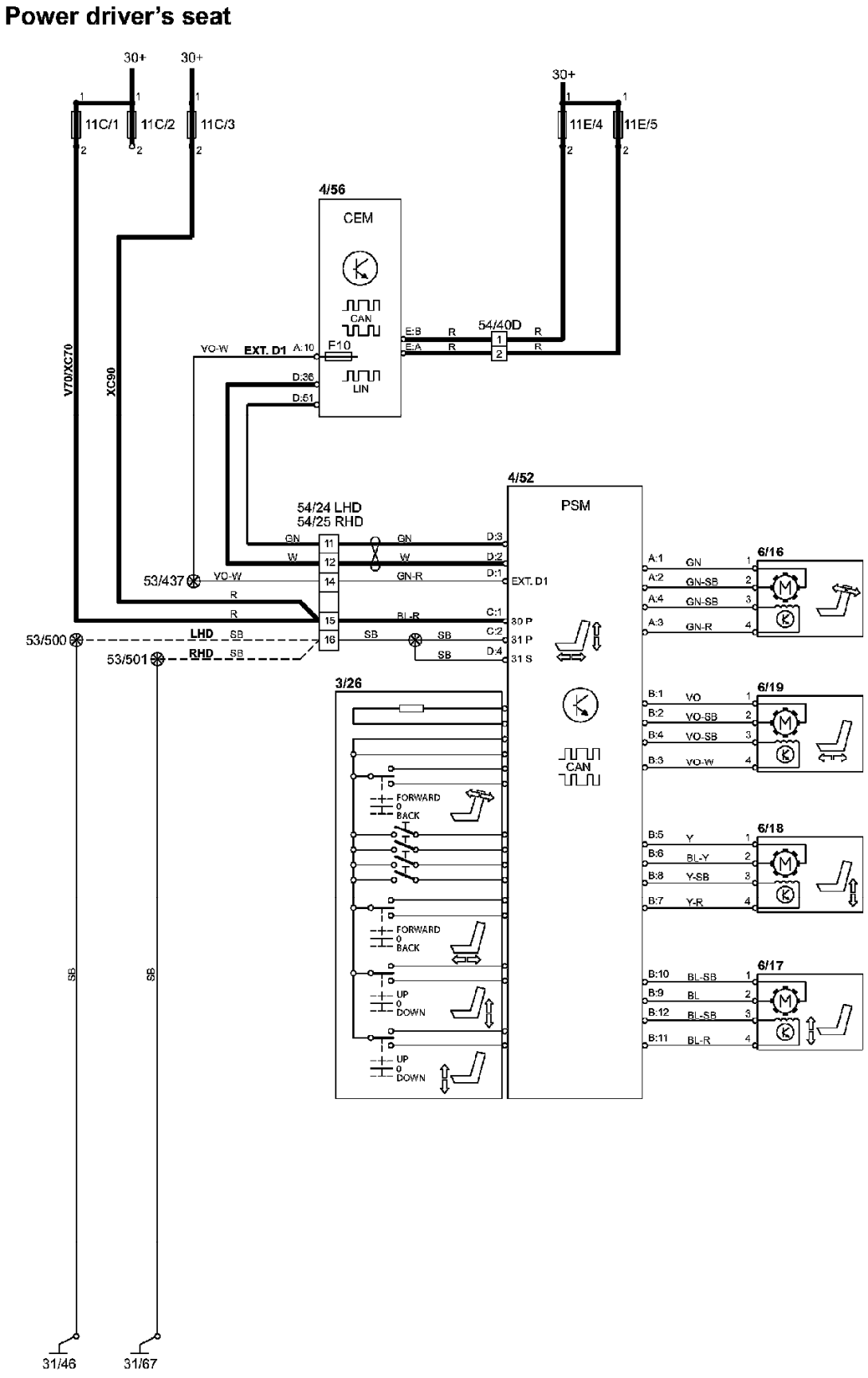
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Power Driver's Seat

Power Driver's Seat



Power Driver's Seat

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

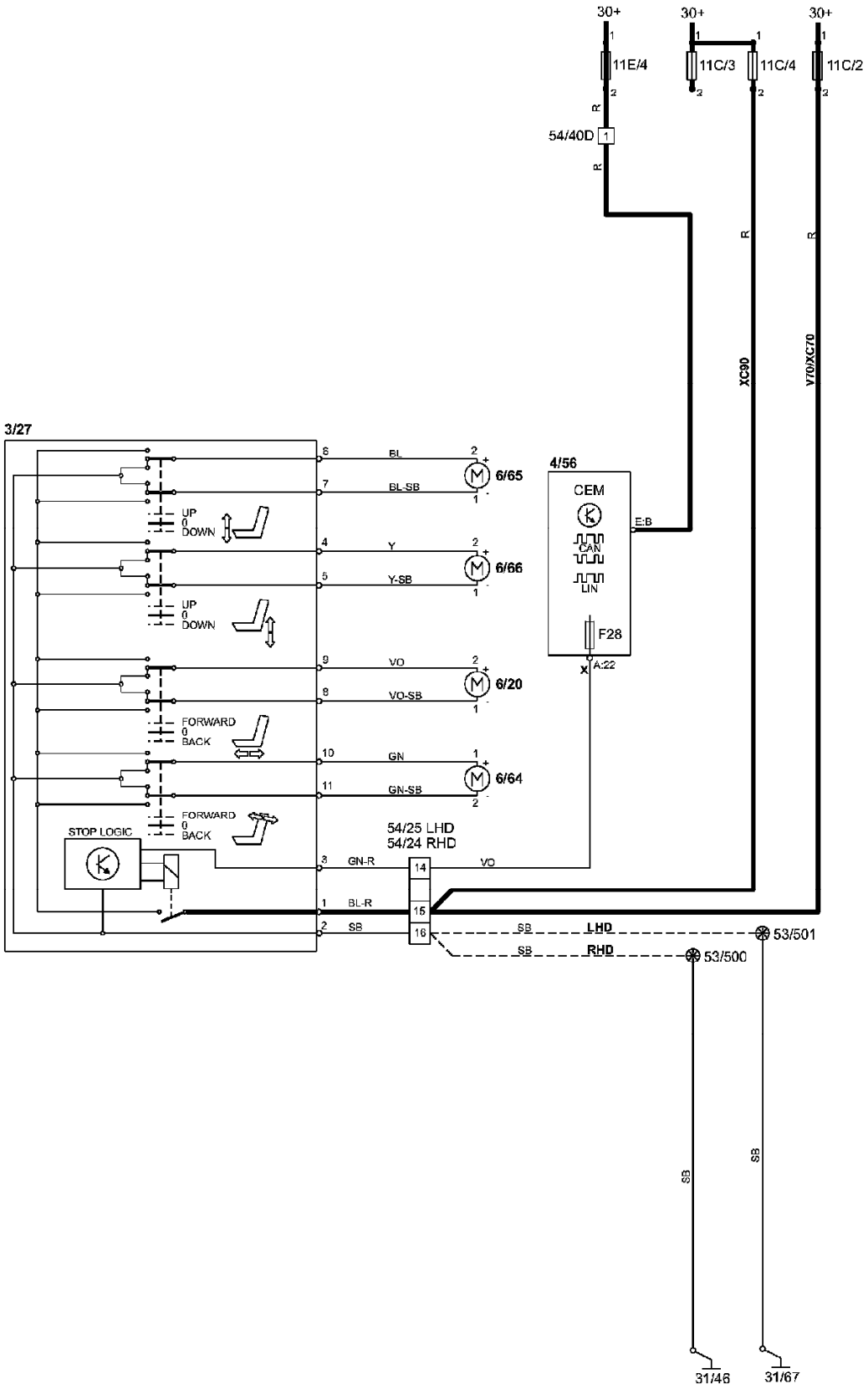
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Power Passenger Seat

Power Passenger Seat

Power passenger seat



Power Passenger Seat

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

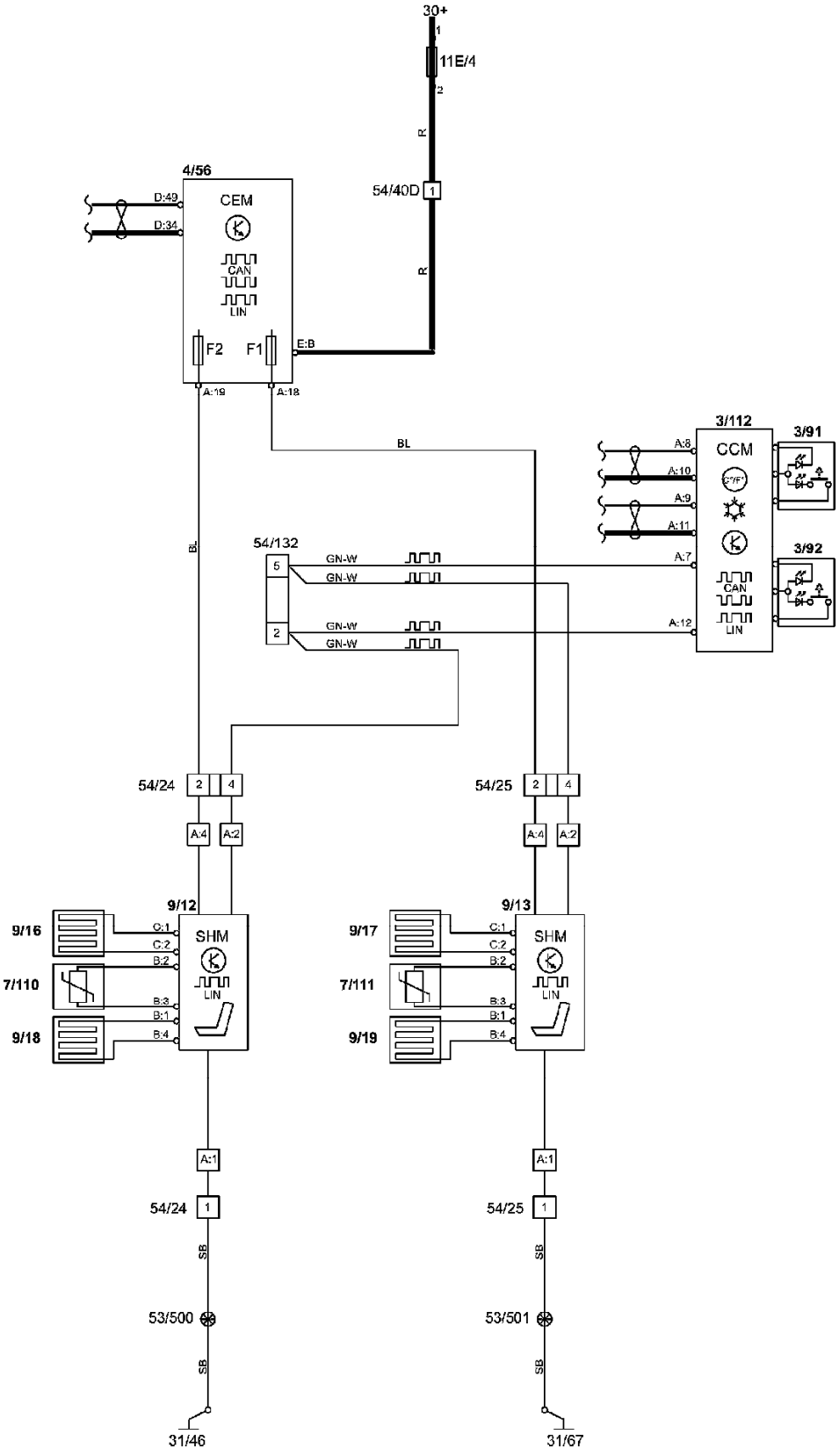
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Seat Heater

Heated Seats

Heated seats



Heated Seats

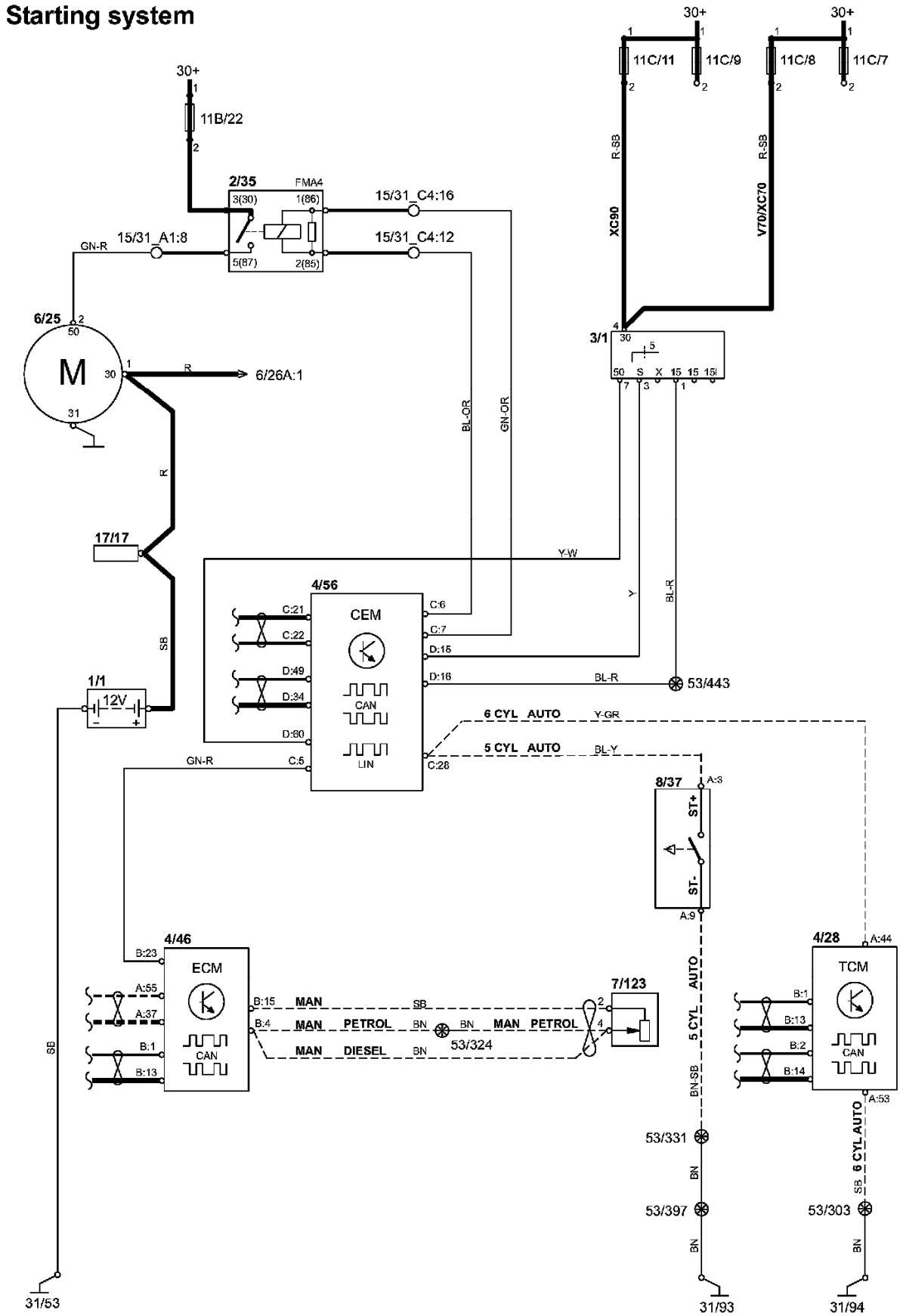
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

System Diagram

Starting System



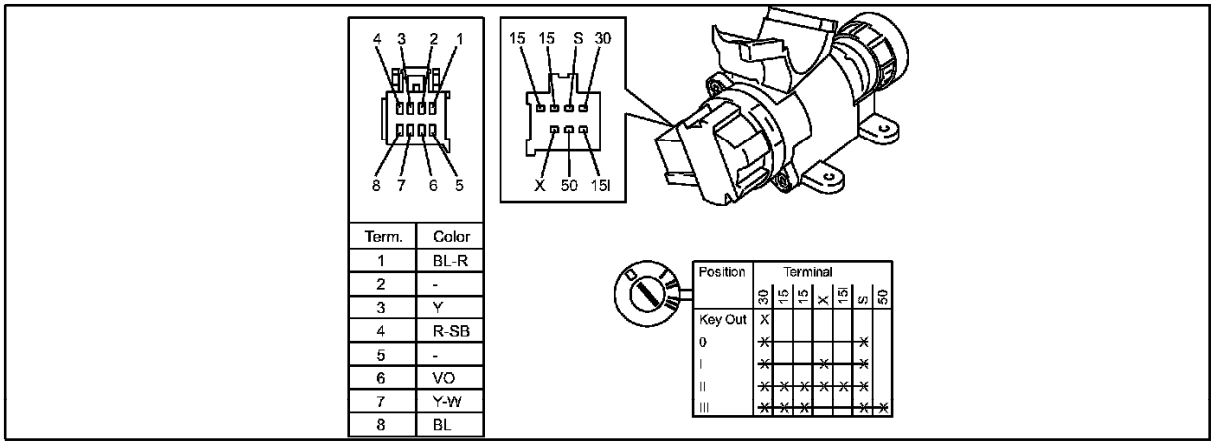
Starting System

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Ignition and relays

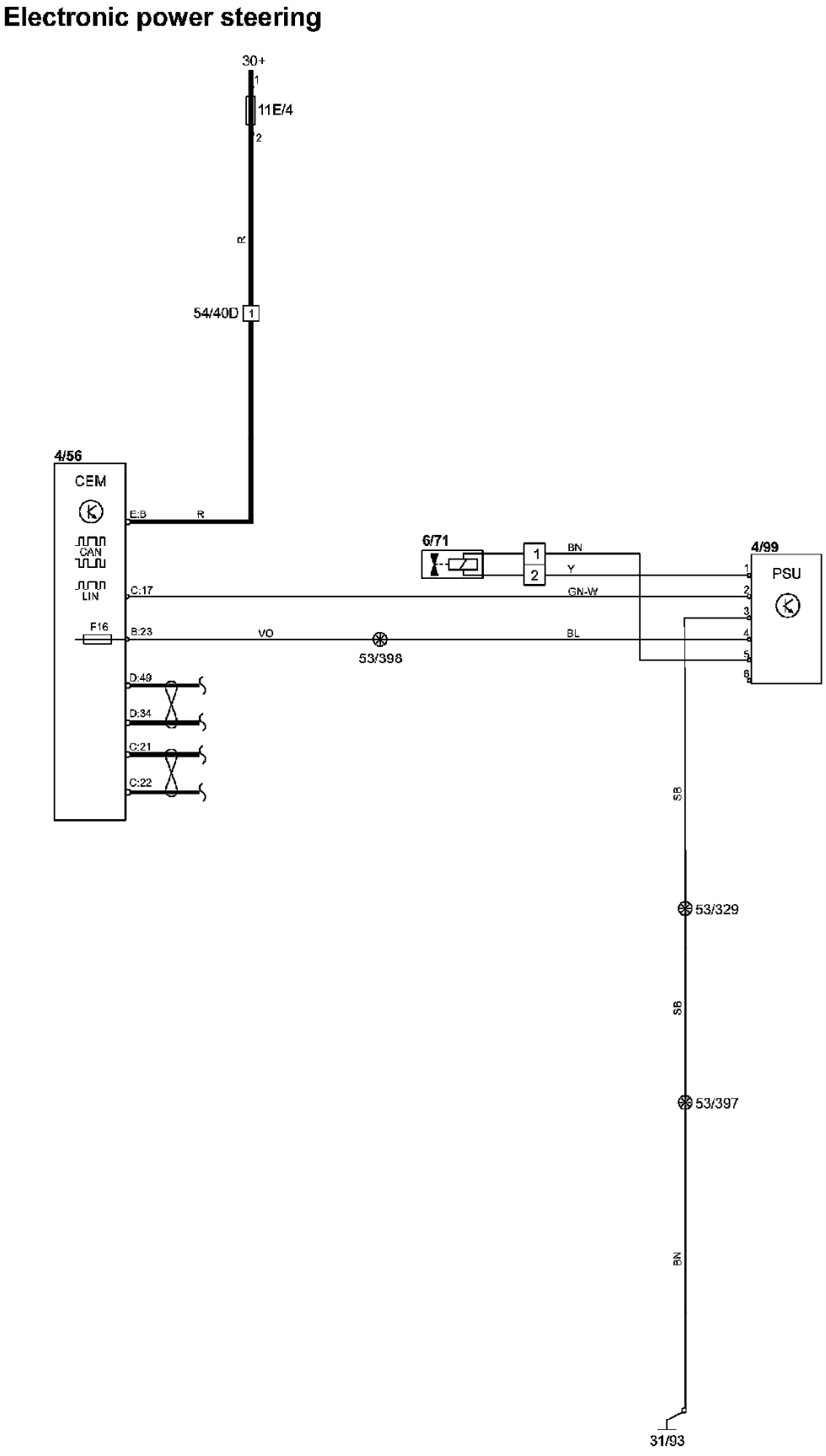


Term.	Color
1	BL-R
2	-
3	Y
4	R-SB
5	-
6	VO
7	Y-W
8	BL

Ignition And Relays

Steering

Electronic Power Steering



Electronic Power Steering

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

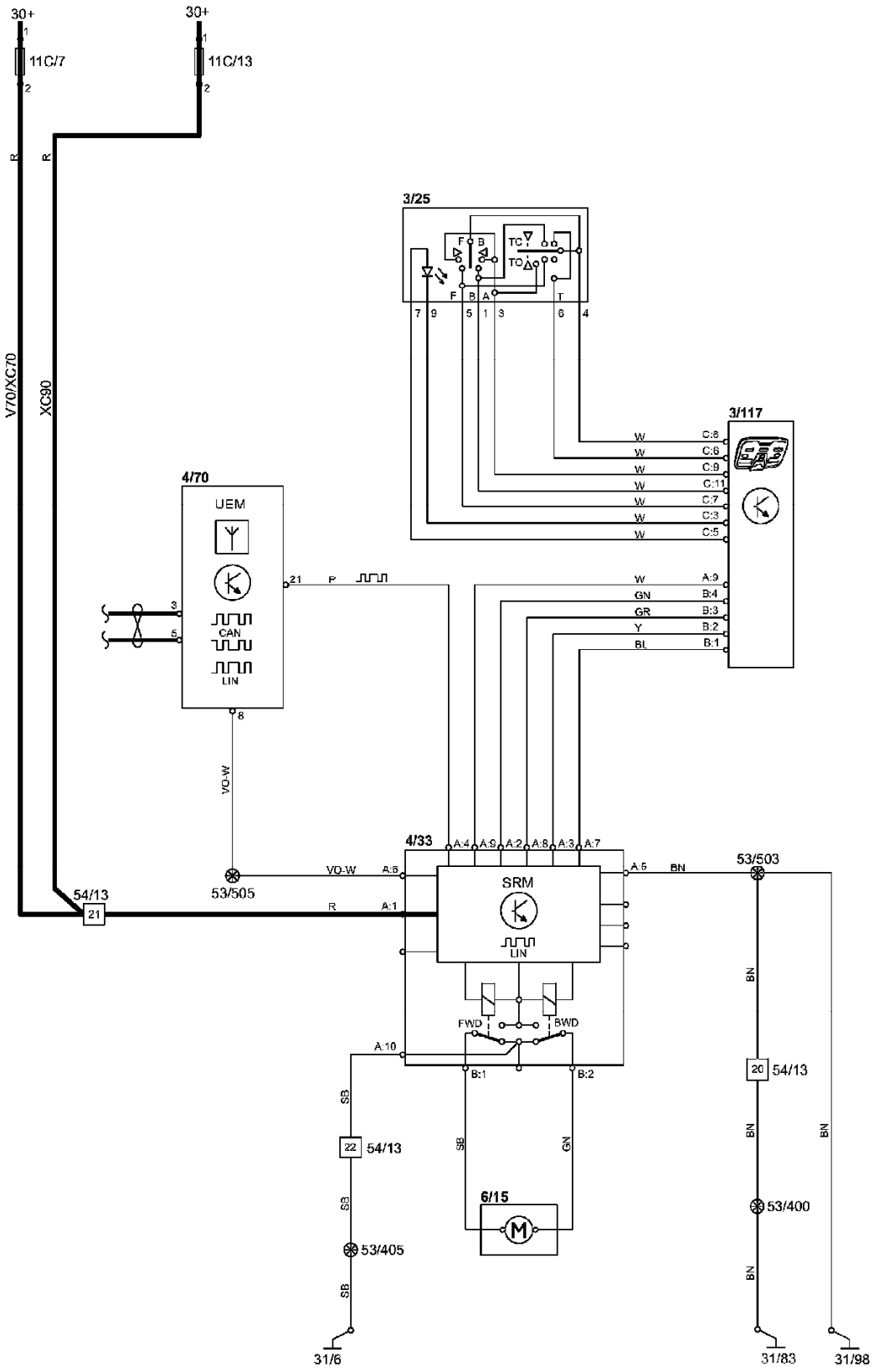
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Sunroof / Moonroof

Power Sunroof

Power sunroof



Power Sunroof

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

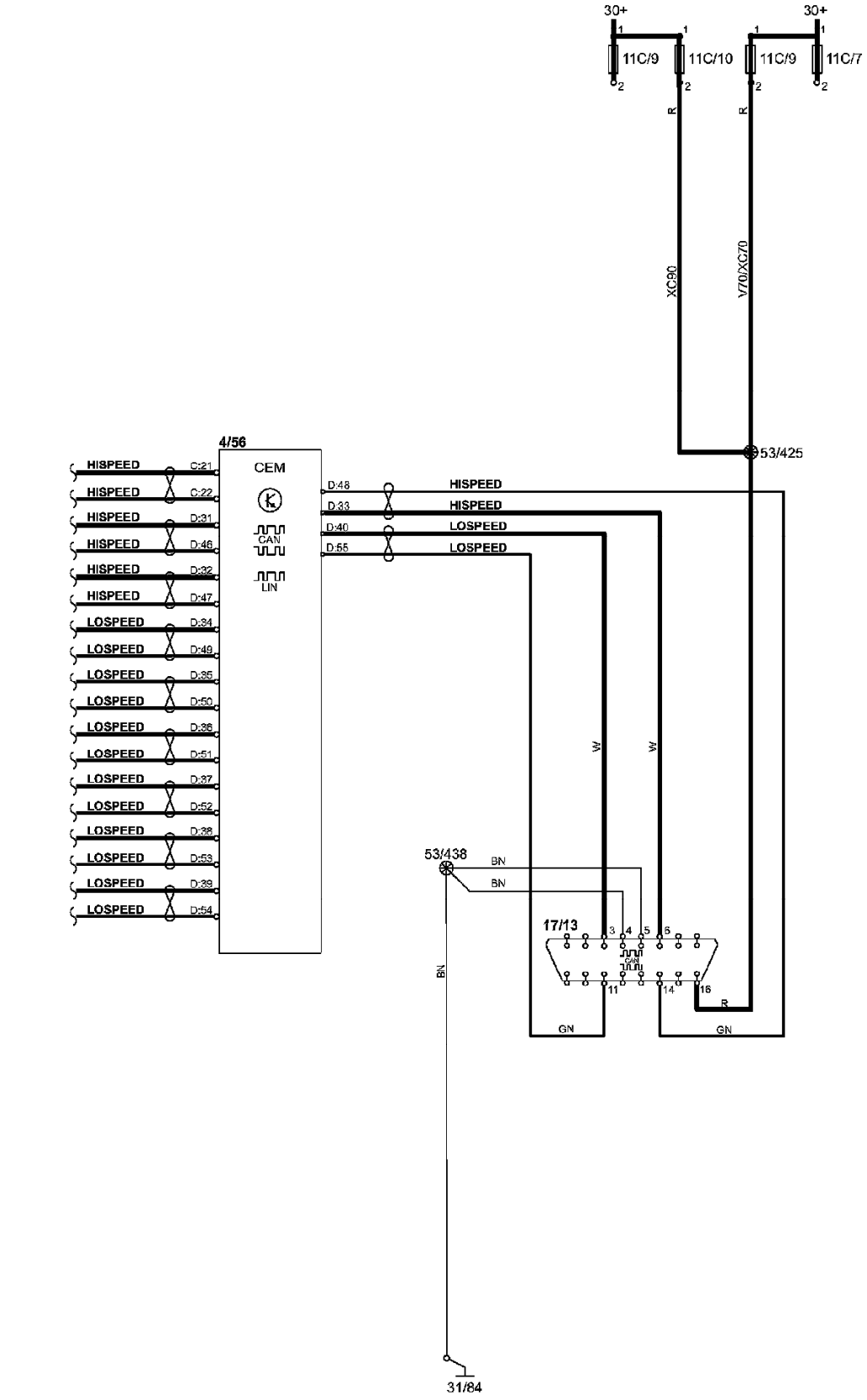
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Trailer Connector

Diagnostics System

Diagnostics system



Diagnostics System

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

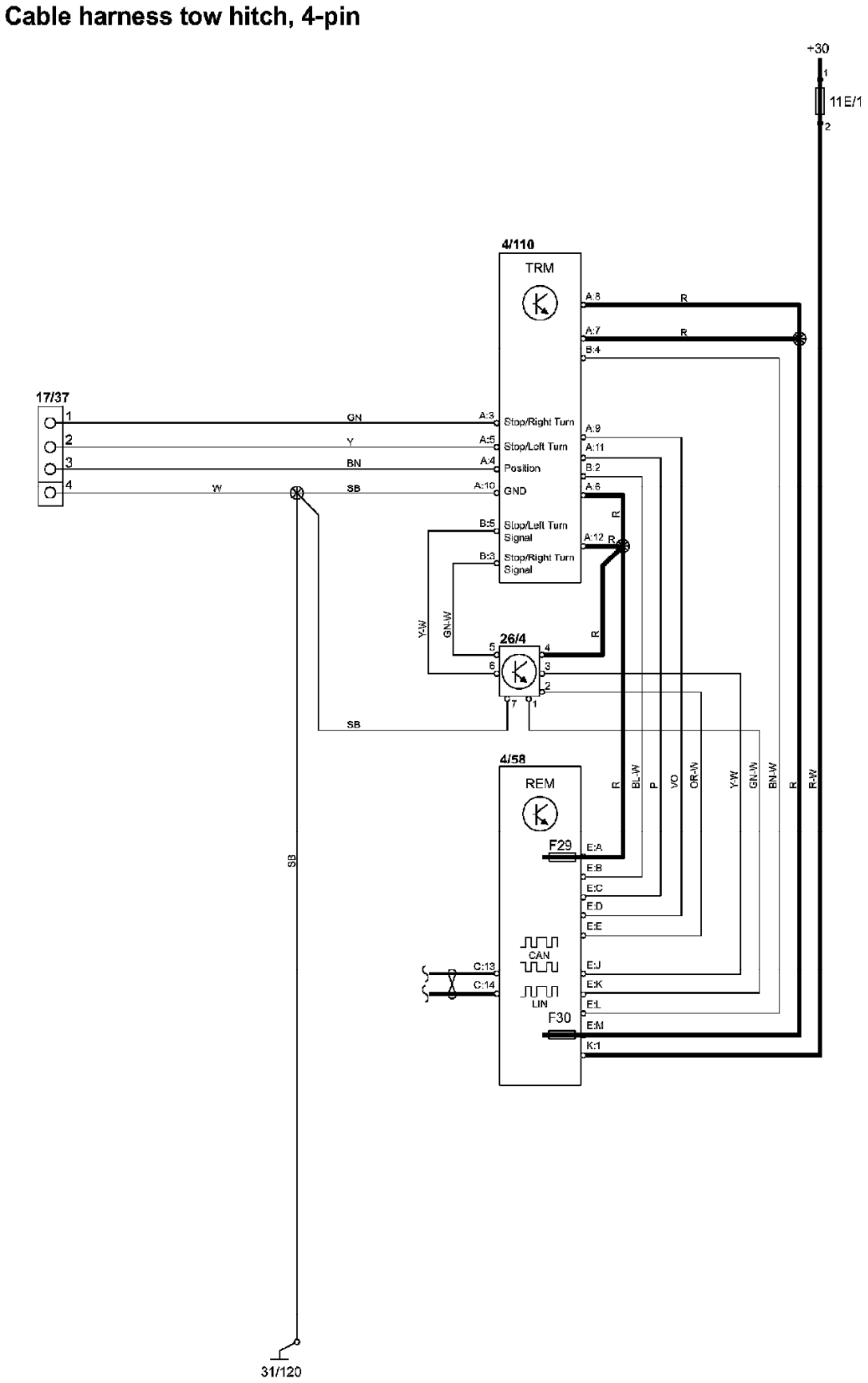
Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

For information regarding additional/related diagrams for this component, please refer to Trailer Lamps diagrams. See: Accessories and Optional Equipment/Towing / Trailer System/Trailer Lamps/Diagrams/Electrical Diagrams

Cable Harness Tow Hitch, 4-Pin

Cable Harness Tow Hitch, 4-Pin



Cable Harness Tow Hitch, 4-Pin

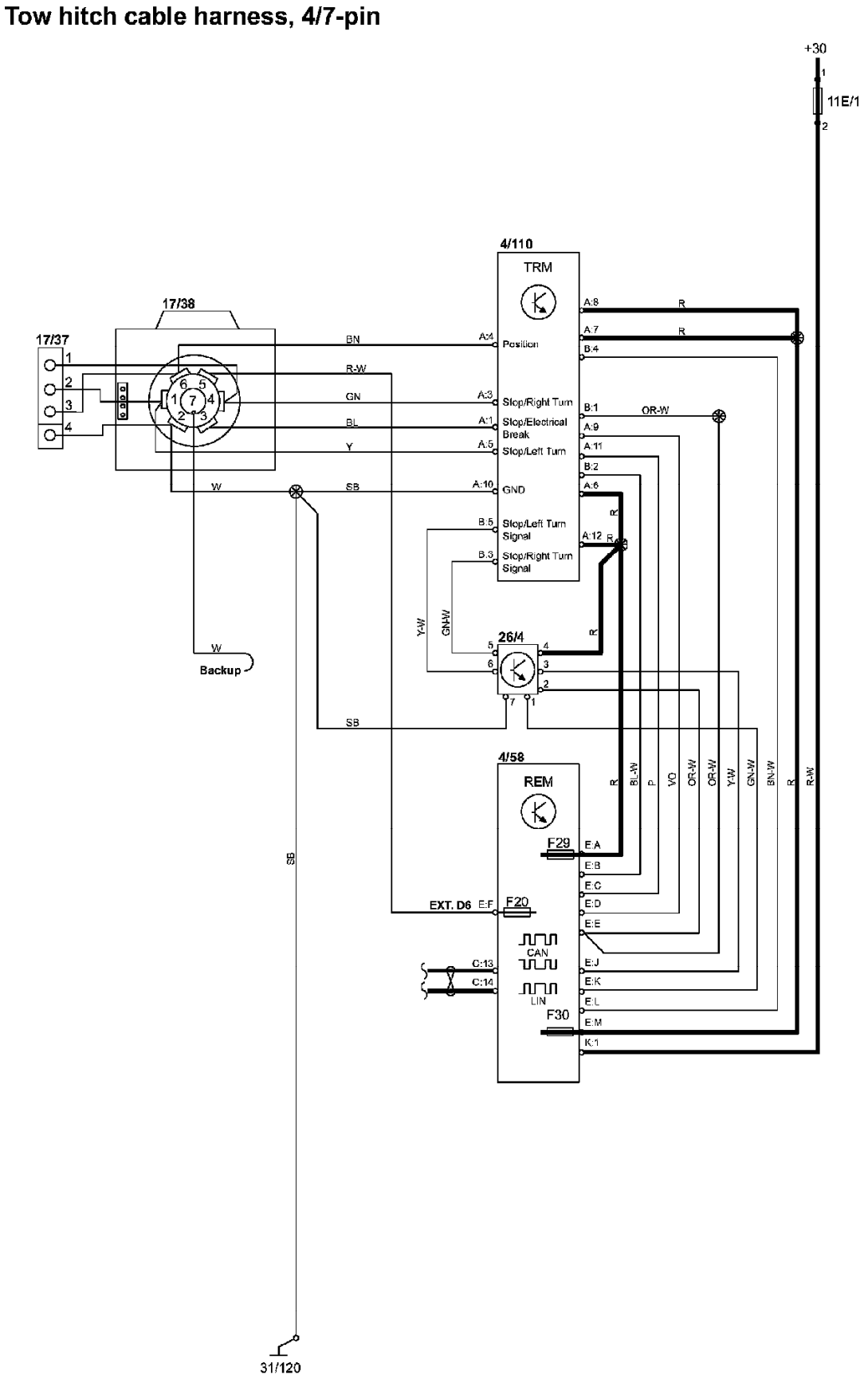
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Tow Hitch Cable Harness, 4/7-Pin

Tow Hitch Cable Harness, 4/7-Pin



Tow Hitch Cable Harness, 4/7-Pin

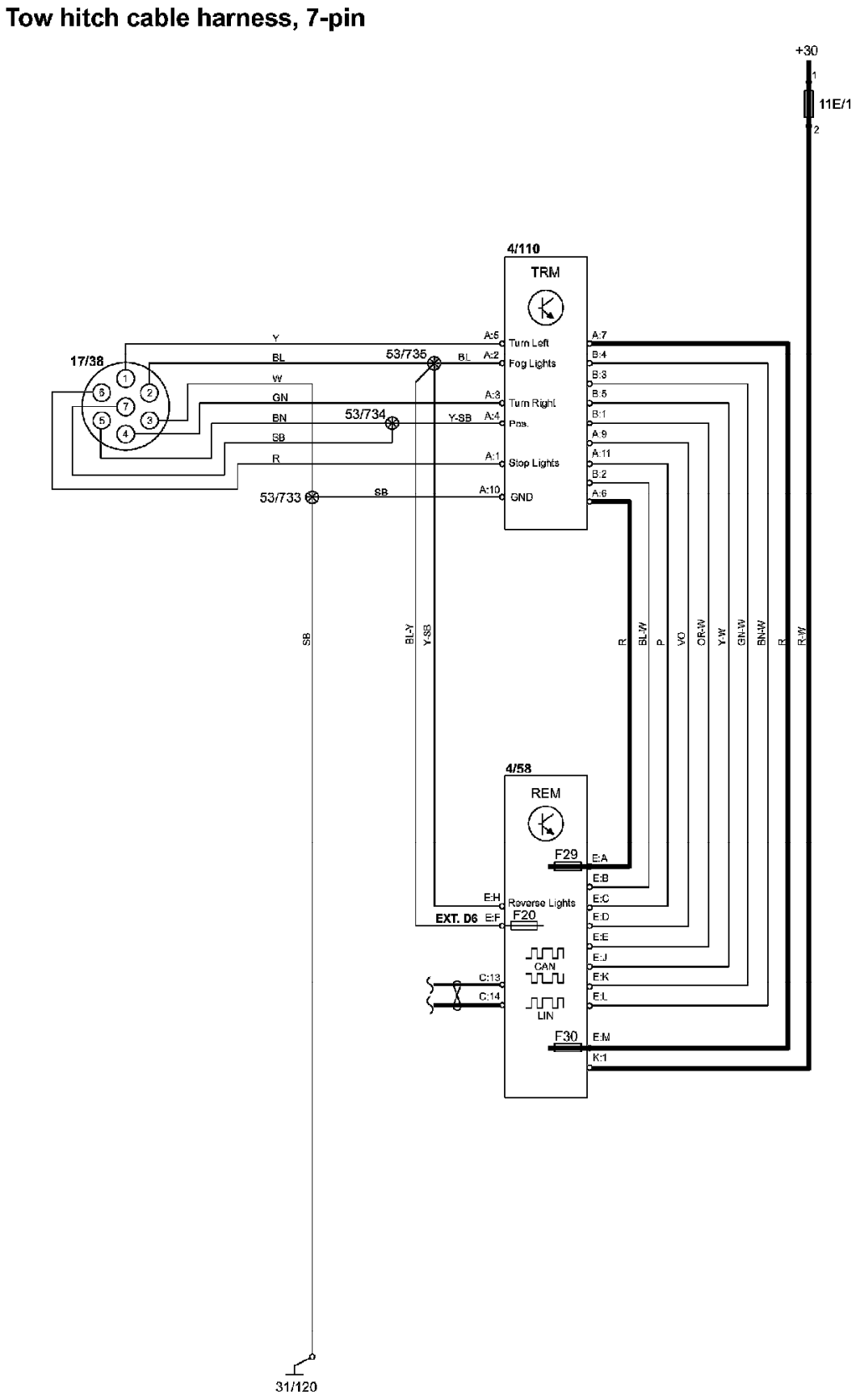
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Tow Hitch Cable Harness, 7-Pin

Tow Hitch Cable Harness, 7-Pin



Tow Hitch Cable Harness, 7-Pin

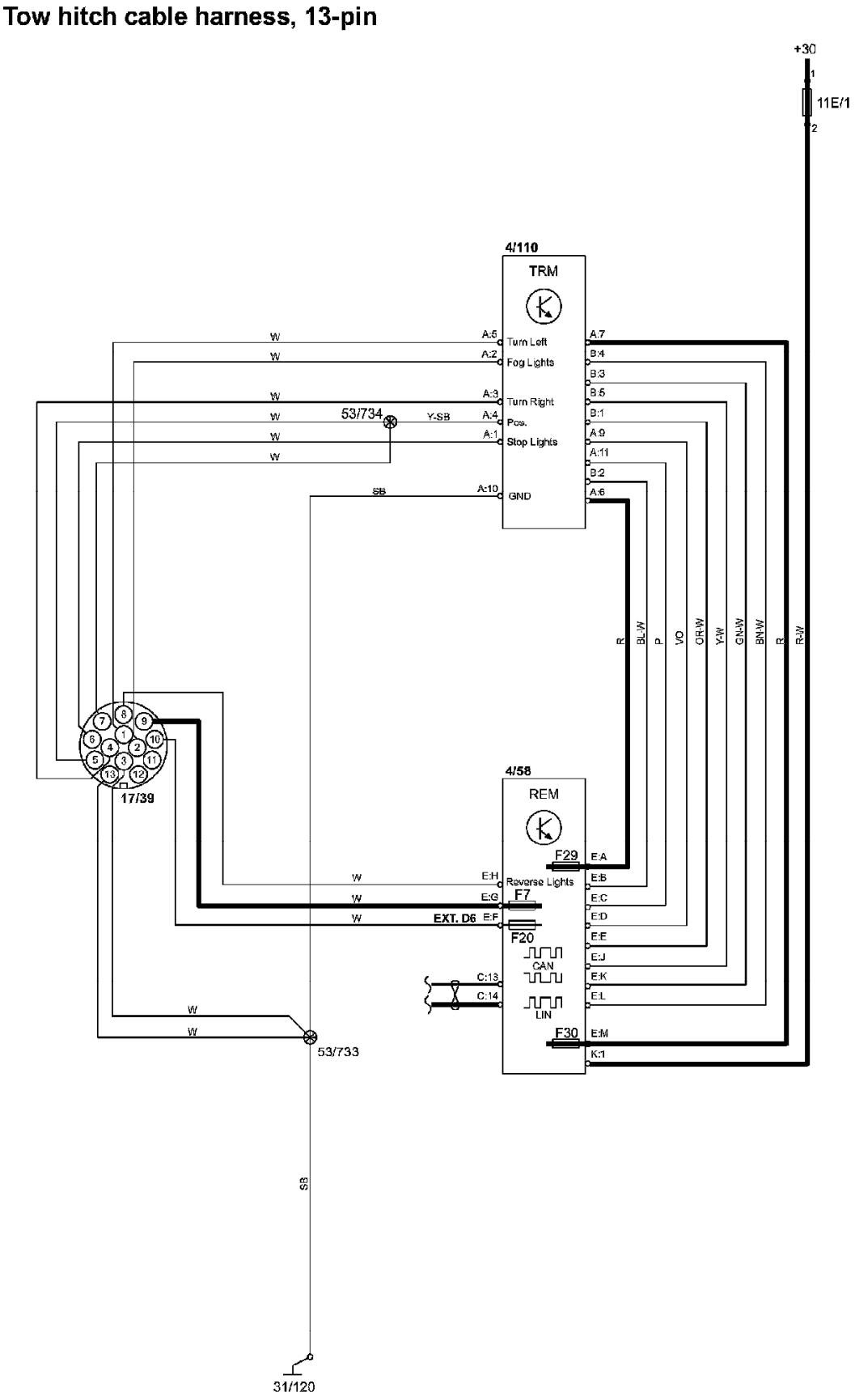
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Tow Hitch Cable Harness, 13-Pin

Tow Hitch Cable Harness, 13-Pin



Tow Hitch Cable Harness, 13-Pin

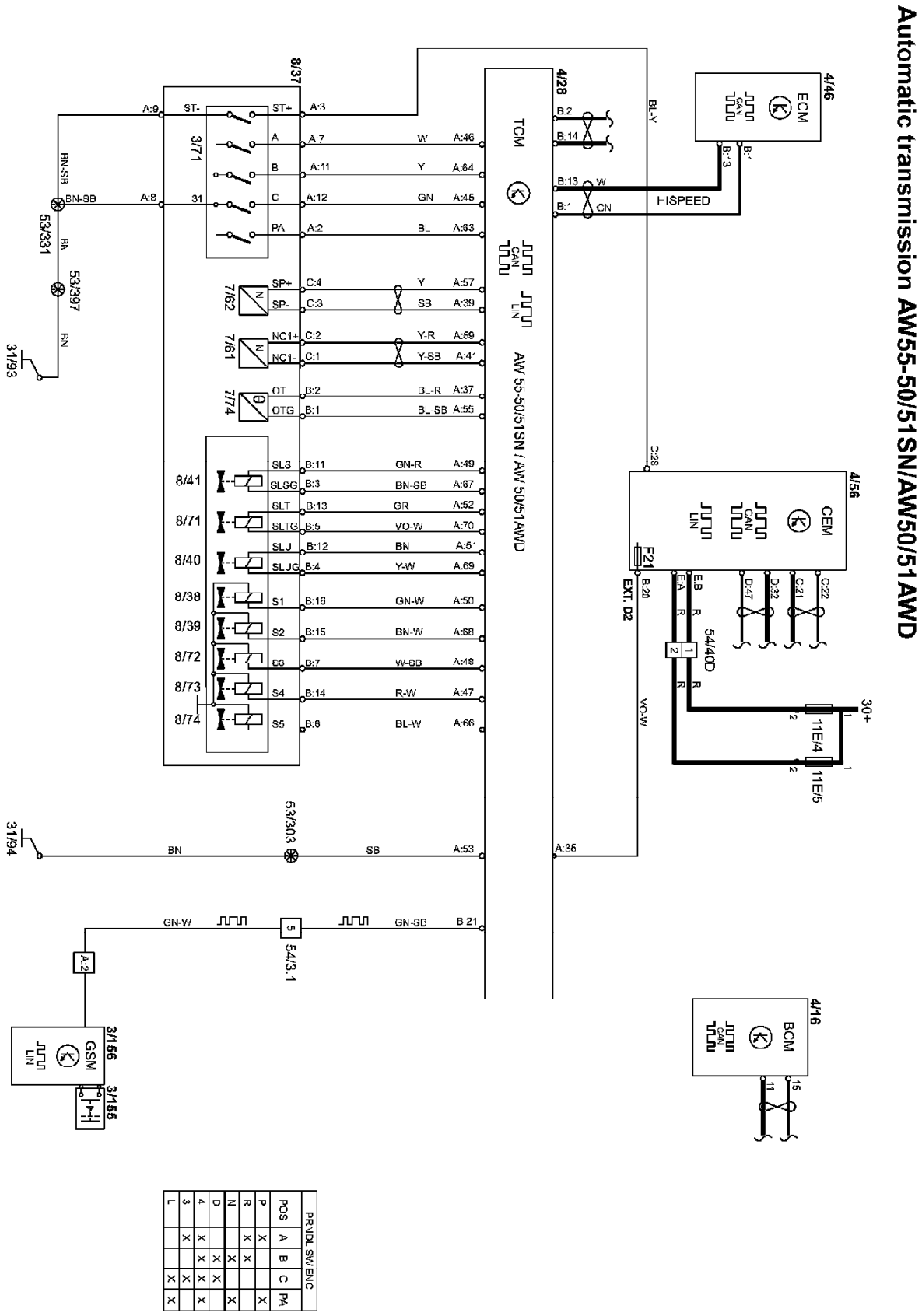
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Automatic Transmission AW55-50/51SN/AW50/51AWD

Automatic Transmission



Automatic Transmission, AW55-50/51SN/AW50/51AWD

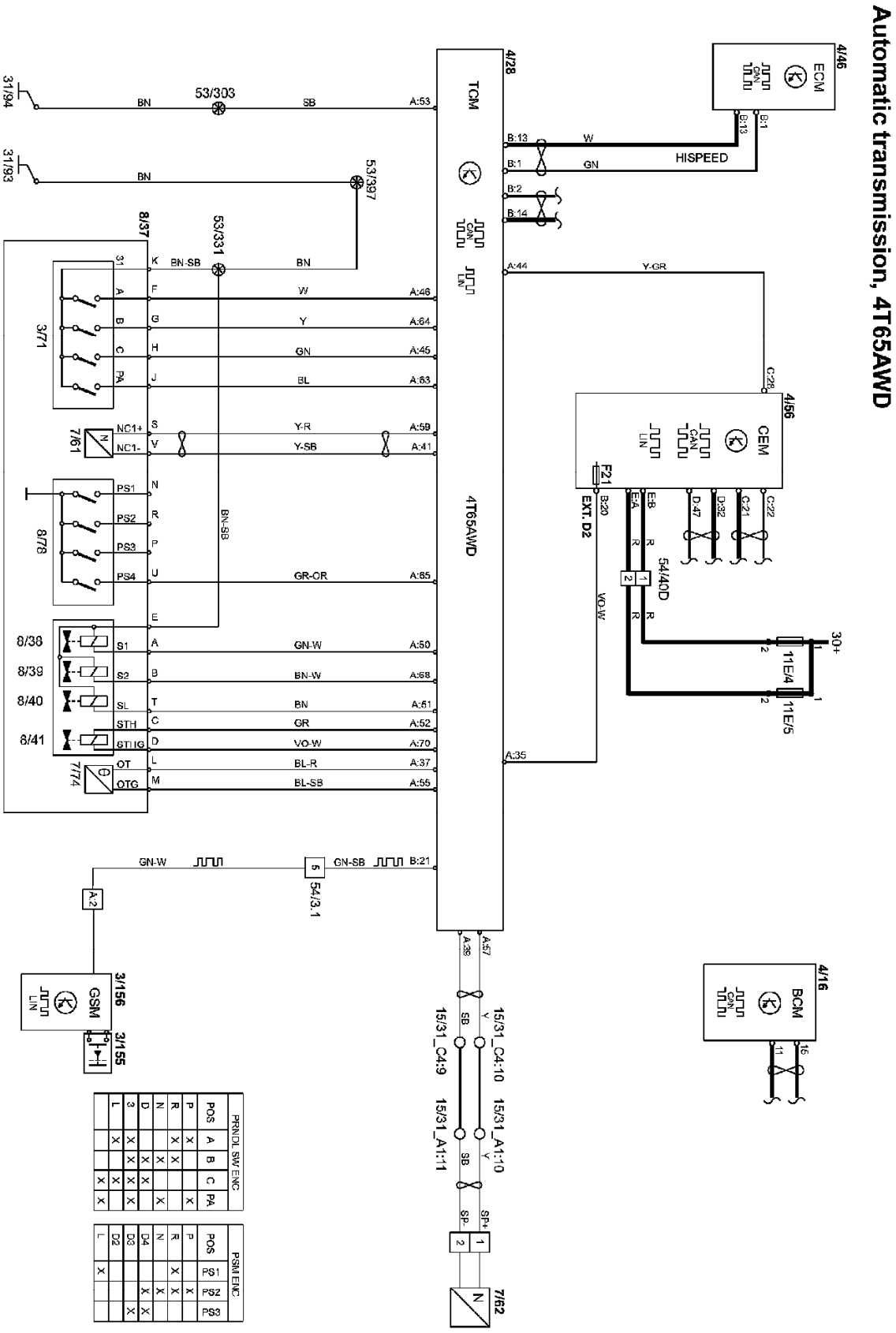
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Automatic Transmission, 4T65AWD

Automatic Transmission



Automatic Transmission, 4T65AWD

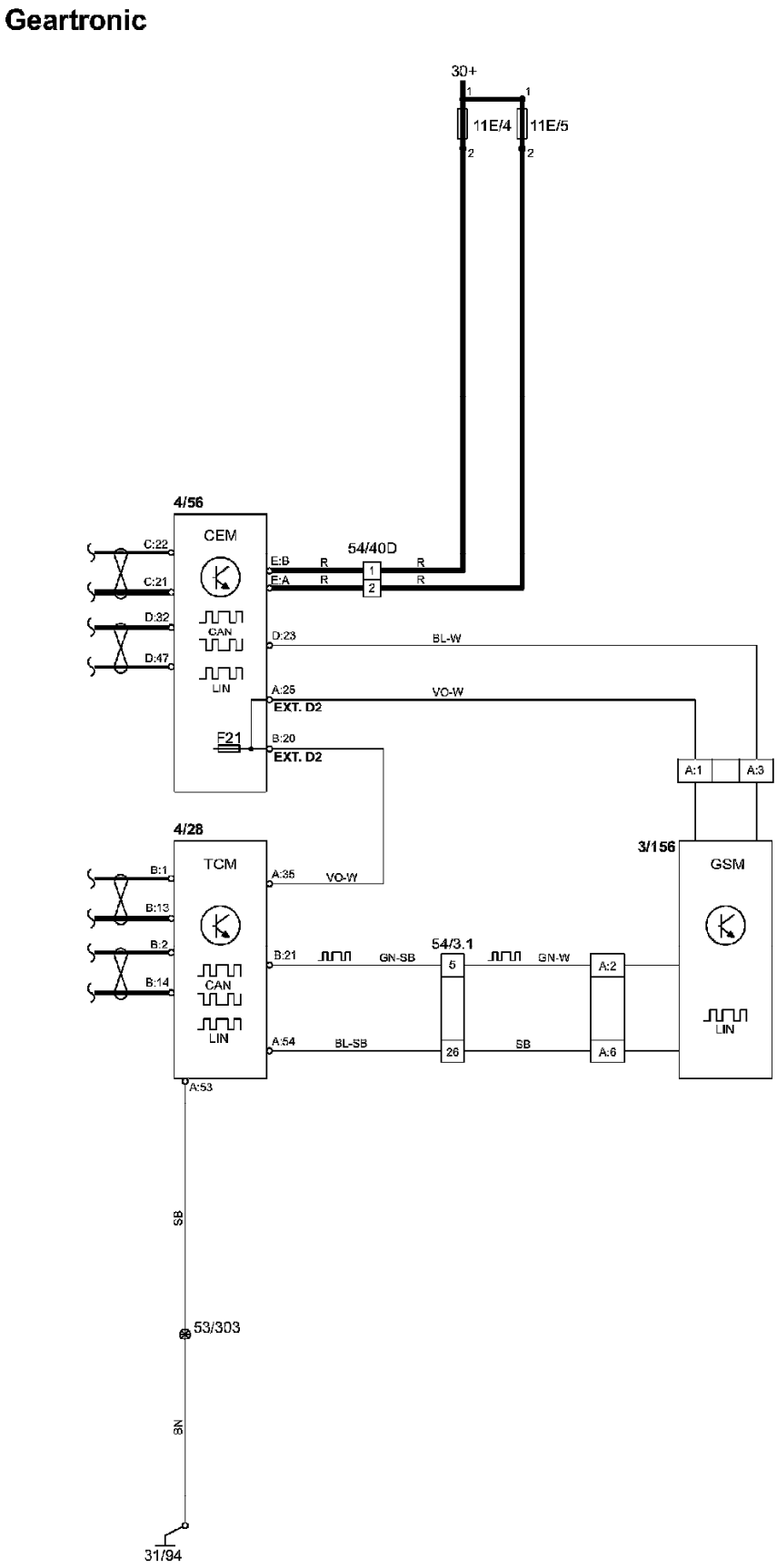
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Geartronic

Geartronic



Geartronic

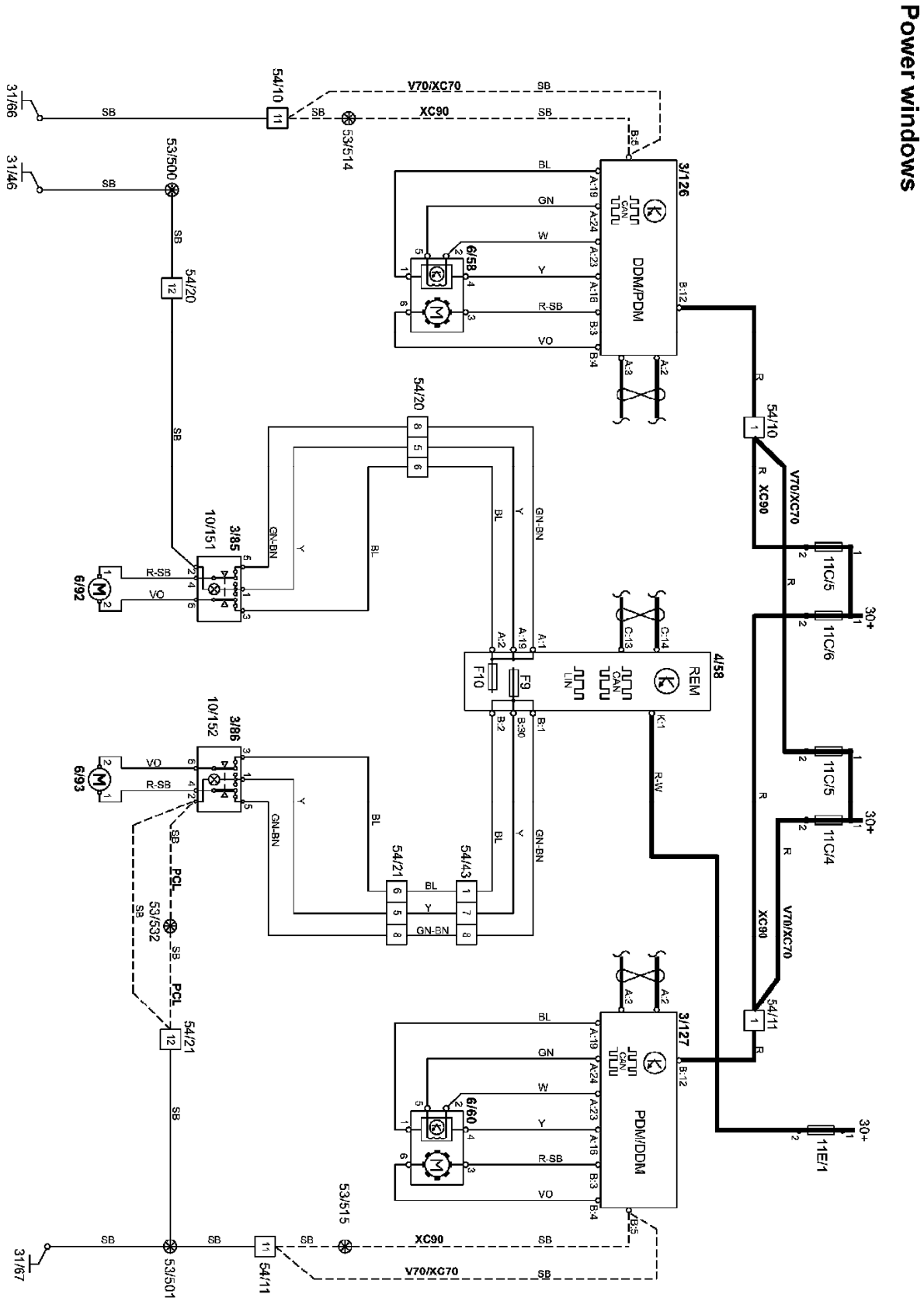
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Windows

Power Windows



Power Windows

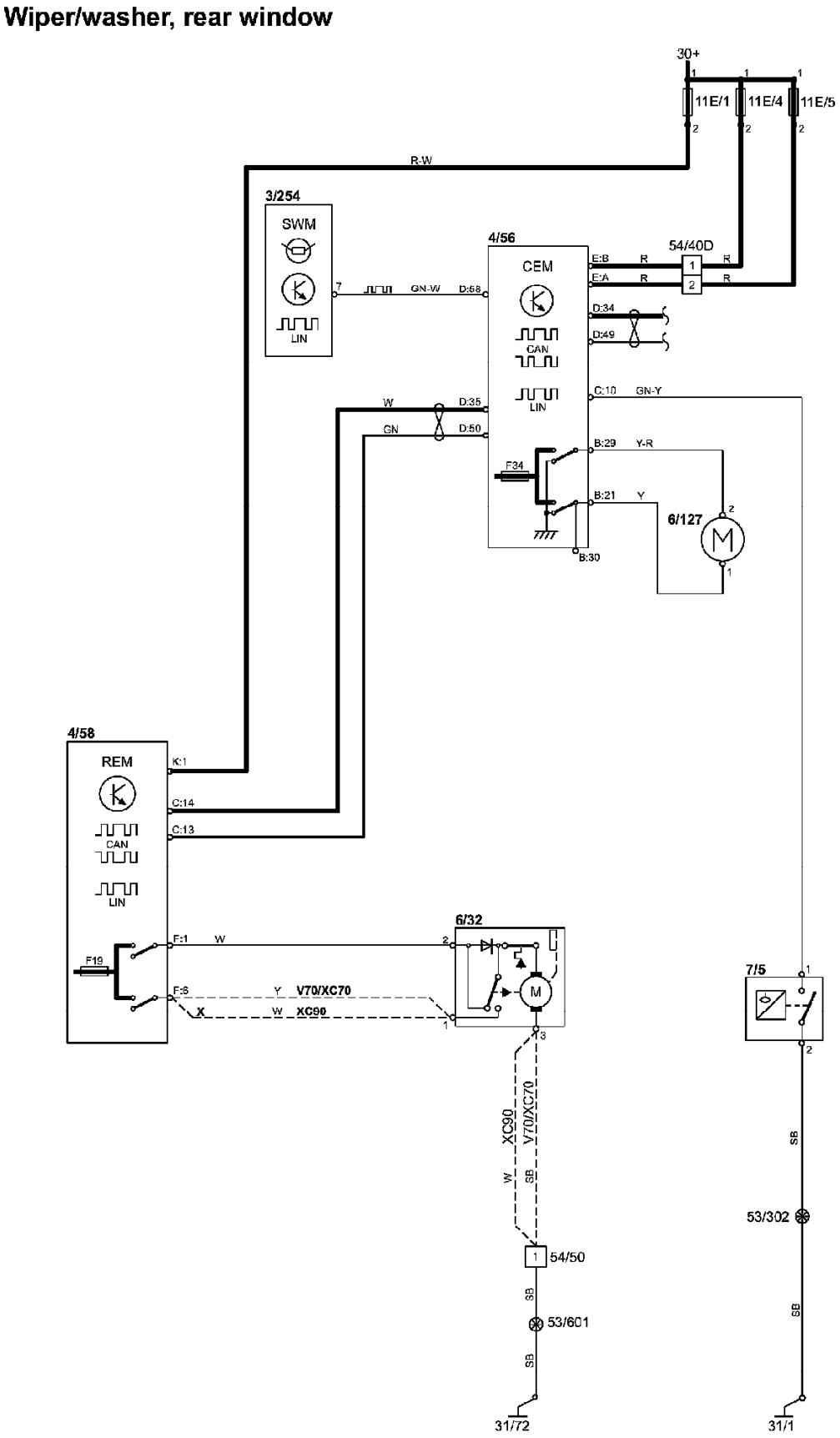
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Wipers/Washers, Rear Window

Wiper/Washer, Rear Window



Wiper/Washer, Rear Window

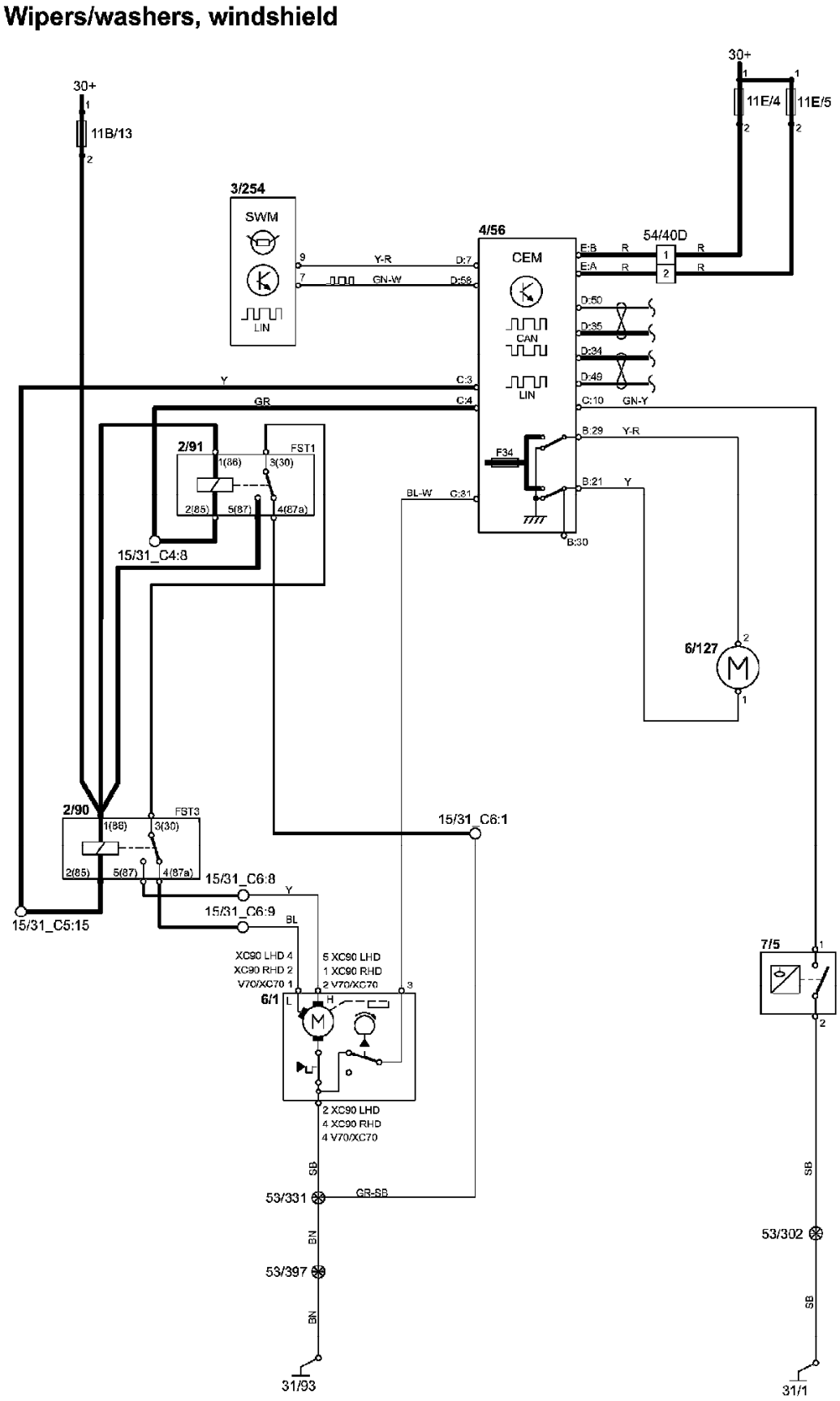
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Wipers/Washers, Windshield

Wipers/Washers, Windshield



Wipers/Washers, Windshield

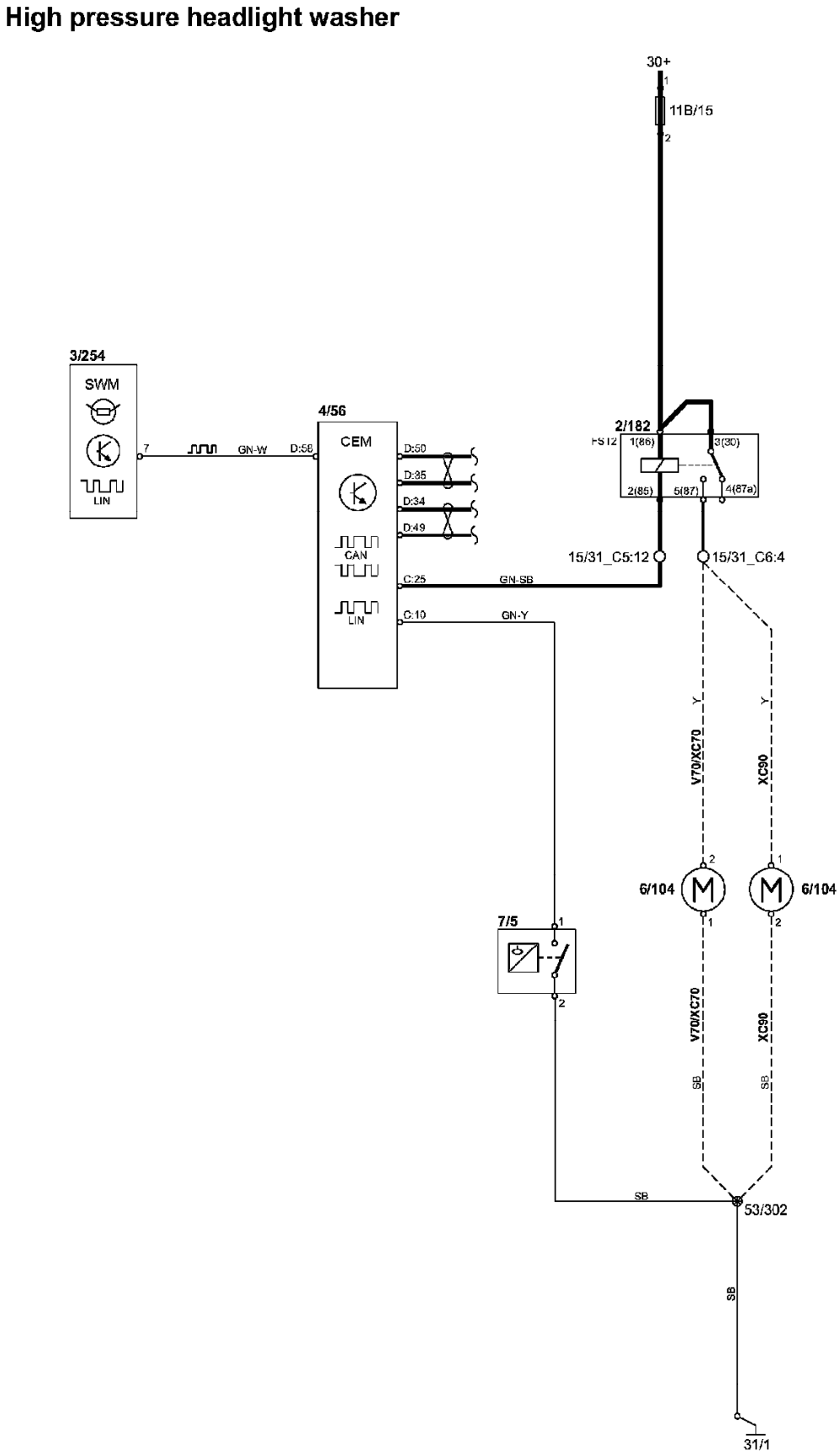
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

High Pressure Headlight Washer

High Pressure Headlight Washer



High Pressure Headlight Washer

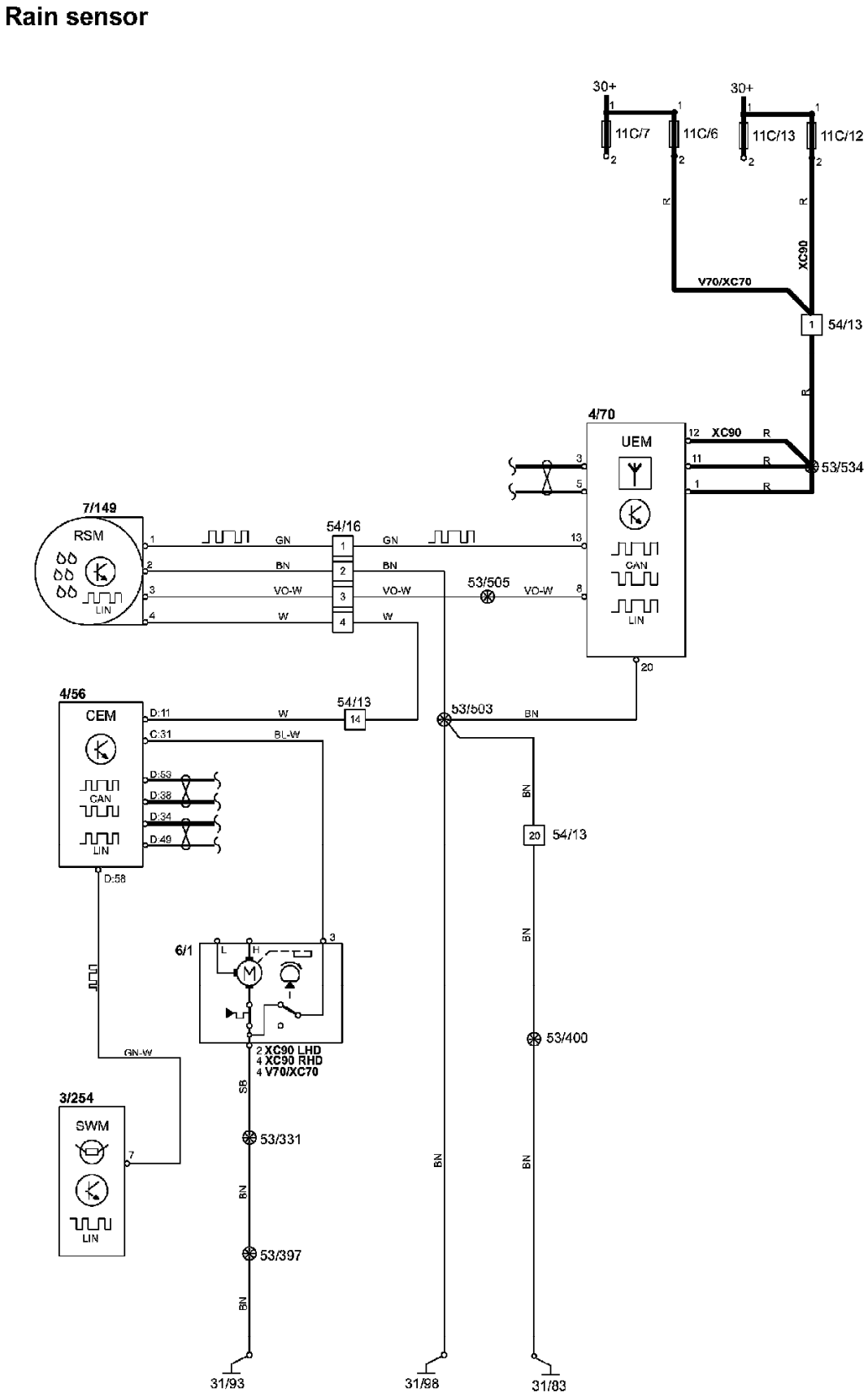
Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Rain Sensor

Rain Sensor



Rain Sensor

Diagram Legend: See: Diagram Information and Instructions/Diagram Legend

Wire Color Code Identification and Other Abbreviations: See: Diagram Information and Instructions/Wire Color Code and Other Abbreviations

List of Components by Component Number: See: Diagram Information and Instructions/List of Components By Component Number

Wiper Motor

For information regarding diagrams for this component, please refer to Wiper and Washer Systems diagrams. See: Wiper and Washer Systems/Diagrams/Electrical Diagrams

Technical Service Bulletins

All Technical Service Bulletins:

Number	Date	Name
TJ20402	Sep 10	Computers/Controls - CAN Error Frame Finder Info.
TJ23502	Sep 10	Computers/Controls - Usage of RELOAD Software
TJ19245	Jul 10	Vehicle - Platform Identification
TJ19674	Jul 10	Steering/Suspension - Alignment Specifications
TJ19096	Jul 10	Steering - Scraping Noise When Turning Steering Wheel
TJ16761	Jun 10	A/T Controls -TCM Updates For Various Issues
TJ16514	Jun 10	Navigation System - Software Disc SW Upgrade
TJ21713	May 10	Computers/Controls -Intermittent No Start And DTC's
TJ18942	Apr 10	Tire Monitor System - Additional Diagnostic Information
TJ22403	Feb 10	Wheels/Hubs - Vibrations While Driving
TJ21965	Feb 10	Cooling System - Engine Oil/A/T Fluid Contamination
TJ22294	Feb 10	Instruments - Fuel Gauge Reads '0' With Fuel In Tank
TJ22103	Dec 09	Drivetrain - Rear Differential Leaking And Resealing
TJ16629	Nov 09	Emissions - Improved EVAP Leak Detection Diagnostics
TJ18299	Nov 09	Interior - Door Switch Buttons Cracking
TJ21507	Sep 09	Engine - Pressure Washing Precautions
TJ21291	Sep 09	Global Positioning - Erratic Garmin(R) 765 Operation
TJ19495	Sep 09	A/T - Cooler/Line Flushing Information
TJ21232	Jul 09	Blind Spot Information Sys.(BLIS) - Function/Diag. Guide
TJ11280	Jan 09	Steering - ZF Steering Gear Fluid Line Replacement
TJ16773	Jan 09	Transmission/Drivetrain - Lubricants And Fluids
SMB39-004	Jan 09	Audio System - Stuck CDs in Audio System
TJ304	Jan 09	Body - Front/Rear Door Weatherstrips Come Loose
TJ19624	Dec 08	Wheels/Tires - Vibration While Driving
TJ19254	Dec 08	Lighting - Headlamp Low-Beam Connector Replacement
TJ20057	Nov 08	Cell Phone - Bluetooth(R) Software Upgrade Information
TJ16724	Oct 08	A/T - Coolant Contamination Information
TJ19292	Oct 08	A/C - Climate Control System Cleaning
TJ18513	Sep 08	Drivetrain - Fluid Leakage From The Angle Gear
TJ19636	Sep 08	Lighting - Halogen Headlamp Bulb Replacement Info.
TJ16094	Jun 08	Restraints - Front Seat Belt Rattling Noise
TNN23-32	Apr 08	Fuel System - Fuel Pump Control Module Replacement
TNN23-31	Apr 08	Fuel System - Starting Problems Parked on a Downhill
TNN77-21	Mar 08	Tire Monitor - Service Kit Part Numbers/Applications
TNN23-29	Jan 08	Fuel System - Installing Extra Fuel Pump Feed Cable
TNN40-02	Dec 07	Computers/Controls - TCM/DEM Software Updates
TNN60-10	Oct 07	Steering - Vehicle Pull On Acceleration/Cruise
TNN87-53	Oct 07	A/C - System Odors/Afterblow Function
TNN39-59	Oct 07	Navigation System - RTI Identification Guide
TNN64-17	Aug 07	Steering - Power Steering Reservoir Fluid Leak
TNN85-28	Jun 07	Interior - Play/Knocking Noise In Front Seat Backs
TNN77-18	May 07	Tires - Pressure Requirements/Recommendations
TNN36-59	May 07	Antitheft - No Start/DTC's CEM-6C48 or CEM-6C49
TNN21-25	May 07	Engine - Exchange Cylinder Block Modification
TNN39-57	Apr 07	Entertainment System - 'Input Password' Displayed
TNN88-44	Apr 07	Air Bag Systems - Occupant Weight Sensor Installation
TNN39-58	Feb 07	DVD Player - Won't Accept/Eject DVD's/Inoperable
TNN85-30	Feb 07	Interior - Holes in Passenger Side Carpet
TNN88-45	Feb 07	Air Bag System - 'PASSENGER AIR BAG OFF' Displayed
TNN25-25	Feb 07	BULLETIN CANCELLATION NOTIFICATION
TNN20-05	Jan 07	Engine - Lubrication System Contamination Cleaning
TNN64-23	Jan 07	Steering - ZF System Fault Tracing & Repair
TNN25-26	Jan 07	Exhaust System - Squealing/Pinging Noises
TNN20-04	Jan 07	Engine Controls - Engine Management Software Usage
TNN87-56	Dec 06	A/C, Interior - Whistle From Right Side of Dash
TNN21-19	Sep 06	Engine - Fluid Weepage at Bell Housing Weep Hole
TNN88-41	Jul 06	Air Bag System - System Life Expectancy
TNN28-66	Jul 06	Engine Controls - False ECM DTC 434C
TNN43-51	Jun 06	A/T, M/T - Parts Transfer When Replacing Trans Assembly
TNN37-35	May 06	Central Electrical Module - DTC's Set/Systems Errors
TNN43-49	Apr 06	A/T AW55 - TCM DTC's 010A, 010B, 010C
TNN39-52	Feb 06	Electrical - Wiring Connector Labeling Addition
TNN32-04	Dec 05	Electrical - CEM DTC DD21/Alternator Not Charging
TNN87-54	Nov 05	A/C - Vent Temperature Cycles From Hot to Cold

Technical Service Bulletins

All Technical Service Bulletins:

Number	Date	Name
TNN87-53	Nov 05	A/C - Musty Odors From Vents
TNN40-04	Oct 05	A/T, M/T, AWD - Approved Lubricants
TNN30-04	Oct 05	Engine Controls - Software Download Fault Prevention
TNN39-50	Sep 05	Cell Phone - Bluetooth Hands Free Kit Information
TNN28-60	Sep 05	Engine Controls - DTC 7300 (Gear Position Sensor)
TNN39-49	Aug 05	Audio System - AM Static Caused By PEM, Turbo Cars Only
TNN87-51	Jul 05	A/C - Stops Working Intermittently
TNN28-145	Jun 05	Recall - Software Upgrade for EVAP System Performance
TNN36-49	May 05	Keyless Entry - Remote Transmitter Intermittently Inop.
TNN87-49	Mar 05	A/C - Uneven Temperature Drop Between L/H & R/H Vents
TNN87-48	Mar 05	A/C - Damper Motor Module (DMM) ID & Calibration
TNN77-11	Jan 05	Drivetrain/Wheels - Wheel Bolts Corroding
TNN85-25	Dec 04	Interior - Front Seat Slide Rail Adjustment
TNN64-20	Dec 04	Power Steering - ECPS System Diagnostics
TNN36-48	Sep 04	Electrical - Fuse Box Label Error
TNN43-45	Jun 04	A/T/Ignition - Shift Interlock Cable Clip Service
TNN21-18	May 04	Body/Frame - Squeaking/Crunching Noise When Wet/Cold
TNN21-17	Oct 02	Engine - Rear Main Seal Replacement
TNN36-35	Aug 02	Antitheft System - Immobilizer System Overview
TNN37-22	Dec 01	Computers/Controls - CANbus Network Information

Vehicle: All Technical Service Bulletins

Technical Service Bulletin # **TJ19245** Date: **100727**

Vehicle - Platform Identification

TIE - Technical Journal

Title Vehicle type and platform identification

Ref No US19245.1.5 en-GB

Issure -

Partner 3US7501 Volvo Cars North Amercia

Func Group 0100 Func Desc

Status Released

Status Date 2010-07-27

Issue Date 2010-07-27

Reference

Attachment

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
xxx							1927 -9999		0000001 -0999999	0 -0

Vehicle Type

Code	Description
1C	Administrative and Factory scheduled maintenance/Administrative and Factory scheduled maintenance

CSC

DTC

Text
CSC* = Customer Symptom Code

NOTE!

This document supersedes the previous "RTJ 19245 - Vehicle type and platform" dated 7-01-2010. Correction to C70 (873) to include 2005 Model Year. PLEASE UPDATE YOUR FILES.

Background:

In our Service Literature, a vehicle is often referred to by its "type" not its "model". For example the 1999 - 2006 Model Year S80 is type "184". You may also see the designation, for example "P2X". This is referring to a platform type or vehicle family.

NOTE:

If a document states "P1X" or "5XX" as an example, it will apply to all models within the platform type. "54X" will apply to the "544", "545" and "542" models. "X" represents variable data.

Platform	Model	Type	Model Years
P1X	S40	544	2004 -
	V50	545	2005 -
	C30	533	2007 -
	C70	542	2006 -

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Platform	Model	Type	Model Years
P2X	S80	184	1999 - 2006
	V70	285	2001 - 2007
	XC70	295	2001 - 2007
	S60	384	2001 - 2009
	XC90	275	2003 -

Platform	Model	Type	Model Years
P3X	S80	124	2007 -
	V70	135	2008 -
	XC70	136	2008 -
	XC60	156	2010 -
	S60	134	2011 -

Platform	Model	Type	Model Years
40 Series	S40	644	2000 - 2004
(nedcar)	V40	645	2000 - 2004

Platform	Model	Type	Model Years	Comments
900 Series	940	944	1991 - 1995	four cylinder, four door
	940	945	1991 - 1995	four cylinder, five door
	960/S90	964	1992 - 1998	six cylinder, four door
	960/V90	965	1992 - 1998	six cylinder, five door

Platform	Model	Type	Model Years	Comments
800 Series	850	854	1993 - 1997	five cylinder, four door
	850	855	1994 - 1997	five cylinder, five door
	S70	874	1998 - 2000	five cylinder, four door
	V70	875	1998 - 2000	five cylinder, five door
	XC70	876	1998 - 2000	Cross Country
	C70	872	1998 - 2002	Coupe
	C70	873	1998 - 2005	Convertible

Platform	Model	Type	Model Years	Comments
700 Series	740	744	1985 - 1992	four cylinder, four door
	740	745	1985 - 1992	four cylinder, five door
	760	764	1983 - 1990	four or six cylinder, four door
	760	765	1985 - 1990	four or six cylinder, five door
	780	782	1987 - 1991	four or six cylinder, two door "Bertone"

Platform	Model	Type	Model Years	Comments
200 Series	242	242	1975 - 1984	four cylinder, two door
	244	244	1975 - 1993	four cylinder, four door
	245	245	1975 - 1993	four cylinder, five door
	262	262	1976 - 1981	six cylinder, two door "Bertone"
	264	264	1976 - 1982	six cylinder, four door
	265	265	1976 - 1982	six cylinder, five door

Platform	Model	Type	Model Years	Comments
100 Series	142	142	1967 - 1974	four cylinder, two door
	144	144	1967 - 1974	four cylinder, four door
	145	145	1967 - 1976	four cylinder, five door
	164	164	1967 - 1976	six cylinder, four door

The table above will clarify the vehicle type and platform designations:

Technical Service Bulletin # **TNN87-53** Date: **051101**

A/C - Musty Odors From Vents

NO: 87-53
DATE: 11-01-2005
MODEL: S60, S80, V70, XC7O, XC9O
M. YEAR: MYO3 - MYO6
SUBJECT:
Air Conditioning, "Afterblow" Function.
REFERENCE: VIDA

DESCRIPTION:
Under certain conditions, customers may complain about a musty odor from the A/C system.

Activating the afterblow function prevents this from occurring.

Type	Model	MY	Chassis	Plant
384	S60	MY03 - MY06	235000-501290	22
184	S80	MY03 - MY06	297035-426600	21
285	V70	MY03 - MY06	287167-531400	21
285	V70	MY03 - MY06	286000-531530	22
295	XC70	MY03 - MY06	095082-208900	21
275	XC90 (excl. V8)	MY03 - MY06	000690-226300	21

Note: Cars before and after the chassis breaks listed above have the afterblow function enabled from the factory.

VEHICLES AFFECTED:

SERVICE:
To avoid a musty odor from the A/C system, it is strongly recommended to enable the after blow function on all cars within the above chassis limits, especially in warm and humid climates.

For customer complaints matching the above description, perform following steps:

1) Check NC system for leaks (the PAG oil in the refrigerant has a very distinctive smell).

2) If you suspect a leak, perform fault tracing to locate the leak (use UV-light) and replace the faulty component.

3) If there is no indication of a leak, switch on the afterblow function according VIDA.

4) If activation of the afterblow function does not solve the problem, further fault tracing must be done:

Important notes:

^ Downloading new software in the 0CM may switch off the afterblow function (default value in the car configuration file is "OFF" for all cars in or above the chassis ranges listed under vehicles affected). After downloading or upgrading the 0CM software, always verify if the afterblow function is still enabled.

^ XC9O V8 variants DO NOT have the afterblow option feature.

General Information about the afterblow function:

When the afterblow function is activated and certain criteria are fulfilled (depending on driving cycle and use of the A/C system) the interior fan will start to blow 50 minutes after the car is switched off. The interior fan will blow for 5 minutes with external air directed to the dashboard air outlets.

If you activate the afterblow function, it is recommended to inform the customer about this function and the behavior of the car.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
36050-2	Activating afterblow with VIDA	0.2 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION Technical Service Bulletin # **TNN87-54** Date: **051130**

A/C - Vent Temperature Cycles From Hot to Cold

NO: 87-54
DATE: 11-30-2005
MODEL: S60, S80, V70, XC70, XC90
MY: MY05 MY06
SUBJECT: Temperature Coming Out of the Climate Vents may Start to Cycle from Max Hot Back to Full Cold When Max Hot is Req
REFERENCE: VIDA

This Tech-net note supersedes the previous 87-54 dated 11-02-2005. Please update your files.

DESCRIPTION:
If the temperature knobs are turned to max hot, the temperature coming out of the climate vents may start to cycle from max hot back to full cold with a period of 4-15 seconds. No Diagnostic Trouble Codes (DTCs) are stored.

The number of steps on a temperature Damper Motor Module (DMM) may have increased from factory settings, causing the affected DMM to set a "not calibrated" flag to the Climate Control Module (CCM). This causes the climate system to self-calibrate over and over again resulting in the cycling temperature from the vents.

Type	Model	MY	Chassis	MY	Chassis
384	S60	2005	0483037-0485503	2006	0500000-0514000
184	S80	2005	0414352-0415868	2006	0426000-0431150
285	V70	2005	0518612-0522632	2006	0530000-0540400
295	XC70	2005	0203013-0205202	2006	0208000-0215200
275	XC90	2005	0213964-0219021	2006	0224000-0234800

VEHICLES AFFECTED:

SERVICE METHOD:
The above mentioned symptom could be solved by a recalibration of the CCM.

For affected vehicles that are still in retailer stock, upgrade the cars during CPS or prior to customer delivery following the service method in VIDA:

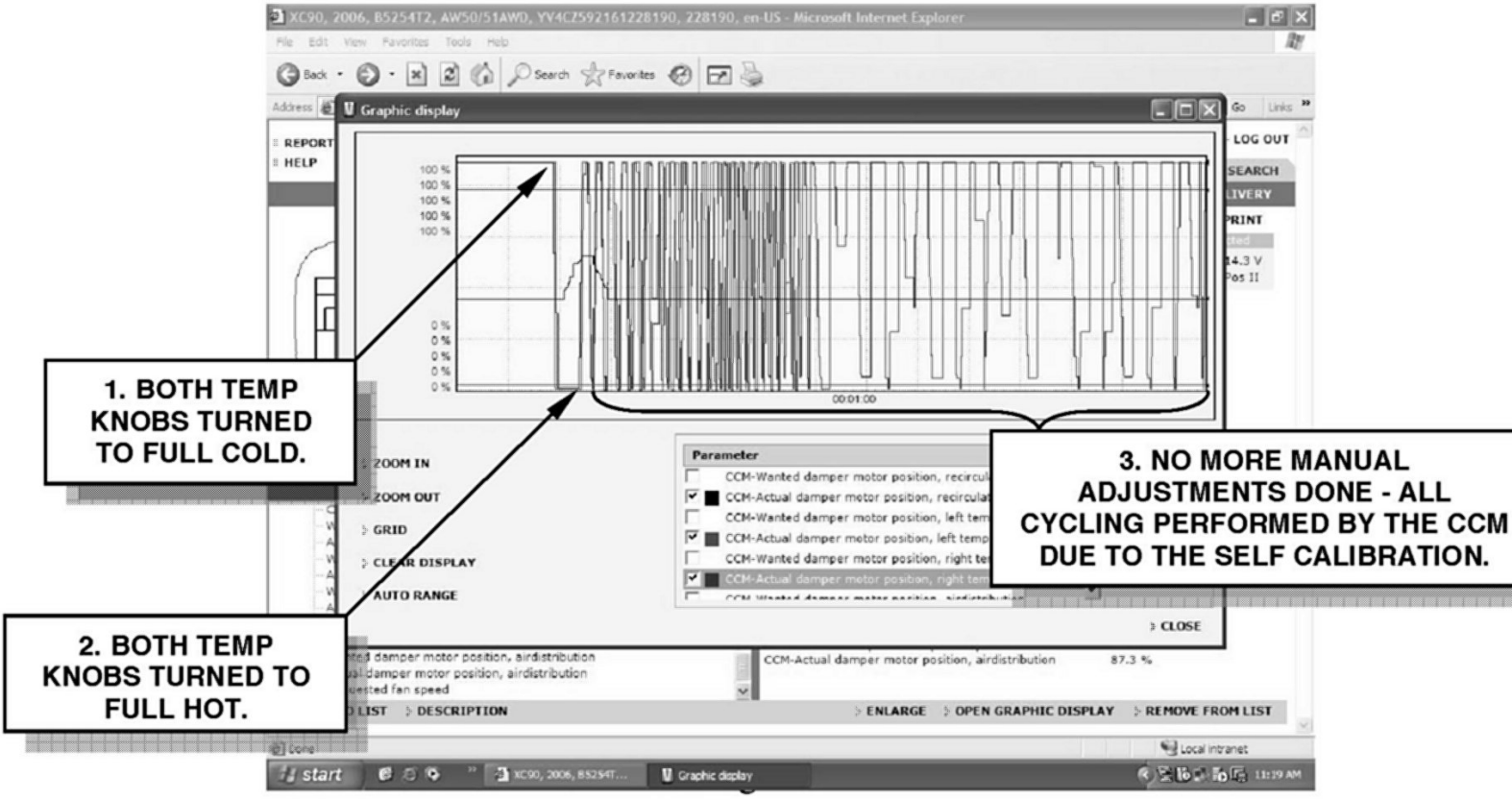
1. Erase CCM DTCs.
2. Perform calibration of the CCM as follows:
   - Select the "Diagnostics" tab followed by the "Vehicle communication" tab.
   - Click the CCM box.
   - Select the "Advanced" tab.
   - Click "Checking LIN bus".
   - Click "No" if no Damper Motor Module (DMM) has been replaced.
   - Read and follow the instructions (to the right) carefully and click the VCT2000 symbol.
   - Click the "Start" button (left on screen tool).
   - Wait until status "Completed" is shown on the screen tool.
   - Regardless of DTCs or no DTCs it is now OK to click the "Hide" button to continue.
   - Click the "Continue" button to proceed.

3. Perform functional check of the climate system as follows:
   - Start engine.
   - Turn FAN speed to MAX.
   - Select DEMIST and check airflow to windscreen.
   - Select FLOOR and check airflow to floor.
   - Select VENT and check airflow to dashboard vents.
   - Turn to MAX COLD and check cold air from dashboard vents left and right.
   - Turn to MAX HOT and check hot air from dashboard vents left and right.
   - Turn temperature and fan speed controls to midrange.
   - Select Recirculation and check difference in airflow noise in climate system.

- Switch off Recirculation and check difference in airflow noise in climate system.

4. Use VIDA to read CCM DTCs.

5. If CCM DTCs are present repeat step 1 to 4. If CCM DTCs are persistent after the third attempt, perform fault tracing according to VIDA.



EXAMPLE OF GRAPHIC DISPLAY IN VIDA OF THE PROBLEM

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36001-2	Diagnostic trouble codes reading/resetting	0.2 hr
36060-3	Calibration using VIDA	0.1 hr
99318-3	CCM Function Check	0.1 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty Claim Information

Technical Service Bulletin # **TNN21-17** Date: **021015**

Engine - Rear Main Seal Replacement

NO: 21-17

DATE: 10-15-2002

MODEL/YEAR:
All 1992 and Later Equipped with 4, 5 and 6 Cylinder White Engines

AFFECTED ENGINES:
B41xx, B52xx, B62xx, B63xx

SUBJECT:
Crankshaft Seal, Rear, Replacing

REFERENCE:
VADIS/TNN 21-13 Oil Weepage, Rear Engine Seal, Flywheel Retaining Bolts

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

DESCRIPTION:

Several recommended method changes have been made to the rear crankshaft seal replacement procedures in VADIS. Rear main seal replacement can be found in VADIS at:

Information Manager/Function group 2/Repair and installation/ 21 Engine/Crank Mechanism/Seal Rear, Replacing.

The changes include:

^ New Special Tools

^ New cleaning methods

^ New seal lubrication recommendations

^ New flywheel attachment procedure

From this time on we strongly recommend this new method be put into practice however not all tools are currently available; see service below for alternatives. Testing and follow-up evaluation has shown a considerable reduction in repeat repairs when they are applied.

SERVICE:

Special Tools: 9995112 extractor, tool and 9995678 Special Screws are not available at this time.

Continue to use extractor 9995919 until further notice and be especially careful not to scratch the engine block or crankshaft when removing the seal.

Removed flywheel screws can be used as a substitute for Special Screws 9995678.

Remove all remaining sealant from the threads and mark the screw heads using paint or a punch mark so they can easily be identified. The reason for drawing up the flywheel tight to the crankshaft flange, before installing new bolts and additional sealant, see TNN 21-13, is to avoid any sealant from becoming lodged between the crank flange and flywheel which can result in an axial run-out condition.

Cleaning cloth 9511024 is available from Volvo parts. It is extremely important that there is no thread sealant residue or other dirt remaining on the crankshaft or block before new seal is installed. It is equally important to remove and clean the flywheel flange screw holes. If debris remains it can be pushed inward when the new screws are installed and cause poor seal performance.

Lubrication, Only Volvo Approved engine oil may be used to lubricate the new seal. Under no circumstances should grease be used. Grease attracts dirt and results in the build up of contamination on the crankshaft flange causing poor seal performance.

Warranty Note:

Below you will find the applicable operation number and labor description for the above repair. Labor Time has not been added. Reason for this is the large number of variant combinations that this TNN covers. Consult the VSTG for the correct labor time as it applies to the repaired vehicle.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	SYMPTOM CODE	CAUSE CODE	LABOR TIME
21644	Crankshaft seal rear replace	5E	27	Varying

Claims may be submitted under the New Car warranty when there is a documented customer complaint using claim type: 01

Warranty Claim Information Technical Service Bulletin # **TNN87-48** Date: **050308**

A/C - Damper Motor Module (DMM) ID & Calibration

NO: 87-48

DATE: 03-08-2005

MODEL:
All new S40 and V50, S60, V70, XC70, S80, XC90.

M. YEAR:
MY04 (All new S40) and MY05 (all models).

SUBJECT:
Damper Motor Module, Identification and Calibration.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

REFERENCE:
VADIS 2004F+

DESCRIPTION:

When replacing a Damper Motor Module (DMM), it is necessary to identify the DMM before performing the calibration. It may be difficult to find the identification process in VADIS version 2004F+.

SERVICE:

When a DMM is replaced, perform following steps:

Important Note:
Before performing identification or calibration, make sure that the climate unit has normal room temperature. It is possible that heater flaps may not go all the way to the end positions if the unit is too cold. This may result in temperature difference between left and right side.

1) Performing identification after replacing a DMM:

In VADIS version F+: Go to "Information Manager/Group 8/Diagnostic information/ Diagnostic trouble codes and associated procedures.

Select group 87, climate units, and open the DTC CCM-0071 - Damper motor, faulty position. In this page, click "continue" to proceed to the "Identification of damper motors" page. For certain variants, a selection for the structure week must be made. The structure week of a car can be found in VADIS under "Vehicle Communication/Group 0/General service/Reading off structure week".

2) After Identification, proceed with the calibration:

In VADIS version F+: Go to "Vehicle communication/group 8/ Climate Control Module/Checking LIN bus. Click on the VCT symbol to start calibrating the CCM.

For future VADIS/VIDA versions, the identification process will be moved to "Vehicle Communication".

USEFUL INFORMATION:

What is done during the identification?

The Climate Control Module (CCM) commands each DMM to move to its lower and upper end stop. The CCM counts the amount of steps the DMM moved.

Reference table with ranges for corresponding DMM's

DMM Position	All new S40/V50 (MY04 and later)		S60/V70/XC70/S80/XC90 (MY05 and later)	
	MCC	ECC	MCC	ECC
DEFROST	Default: 398 OK Range: 370 - 426	Default: 398 OK Range: 370 - 426	N/A	Default: 502 OK Range: 462 - 542
RECIRC/OSA	Default: 1340 OK Range: 1312 - 1368	Default: 1340 OK Range: 1312 - 1368	Default: 1017 OK Range: 977 - 1057	Default: 1026 OK Range: 986 - 1066
TEMPERATURE LEFT	Default: 456 OK Range: 428 - 484	Default: 456 OK Range: 428 - 484	Default: 342 OK Range: 302 - 382	Default: 334 OK Range: 294 - 374
AIR DISTRIBUTION	Default: 537 OK Range: 509 - 565	Default: 537 OK Range: 509 - 565	Default: 1878 OK Range: 1838 - 1918	Default: 1887 OK Range: 1847 - 1927
TEMPERATURE RIGHT	N/A	Default: 456 OK Range: 428 - 484	Default: 342 OK Range: 302 - 382	Default: 333 OK Range: 293 - 373

The amount of steps is then used to determine which function the DMM has in the system (see reference table shown). The CCM will then reprogram the DMM with the ID corresponding to that function.

What is done during the calibration?

The Calibration checks the configuration of the LIN bus 1 and LIN bus 2. The CCM checks the presence of the Damper Motor Modules, Seat heat modules (option) and Air Quality Sensor (option). The range for each DMM is also checked to ensure that they are within specification.

Hint for fault tracing:

Reading out the actual ranges between upper and lower end positions measured by the DMM's (see reference table) can be helpful during fault

tracing.

In VADIS, go to "Information Manager/Group 8/Diagnostic Information/Diagnostic trouble codes and associated procedures. Select group 87, climate units, and open the DTC CCM-0071 - Damper motor, faulty position. Click on the VCT symbol to proceed to reading out the actual range per DMM.

If you would run into a range of 0 or 4095, there may be an identification problem. Try to re-identify before continuing with fault tracing.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36050-2	DMM Identification/Calibration with VADIS	0.2 hr
36060-3	DMM Calibration with VADIS	0.1 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty InformationTechnical Service Bulletin # **TNN87-49** Date: **050315**

A/C - Uneven Temperature Drop Between L/H & R/H Vents

NO: 87-49

DATE: 03-15-2005

MODEL:
S60, S80, V70, XC70, XC90

M. YEAR:
2005

SUBJECT:
Climate Control Module, temperature drop during extended drive, or temperature deviation between left and right side.

REFERENCE:
VADIS

DESCRIPTION:

Cases have been reported of cars with temperature deviation, more than 7°F, between left and right air outlets after driving for a period of time. In other cases, the temperature dropped during extended driving.

Type	Model	MY	Chassis	Plant
384	S60	2005	425000-464304	22
184	S80	2005	390000-406836	21
285	V70	2005	459000-499621	21 & 22
295	XC70	2005	173000-192486	21
275	XC90	2005	134000-188365	21

If the vehicle is within the listed chassis range shown, follow the service procedure in this document. If the vehicle is above the listed chassis range, follow fault tracing as per VADIS.

SERVICE:

If a customer is complaining of these symptoms, follow steps 1 through 3:

Step 1: Check if there are any fault codes stored for Climate Control Module (CCM) or Damper Motor Modules (DMM). Do not replace parts if there are no fault codes found.

If fault codes are found, perform fault tracing according VADIS. If a DMM needs replacement, perform the identification and calibration as described in TNN No. 87-48 - Damper Motor Module, Identification and Calibration. Then proceed with step 2 below.

Step 2: Download upgraded CCM software, P/N 30677016. Auto calibration of the DMM's is included in the new software and will start immediately after the downloading is completed. The auto calibration procedure takes approximately 30 seconds (leave the key in the ignition in position II for at least one minute after the software download is completed).

Step 3: Check full functionality of the air distribution and temperature controls. Read CCM diagnostics to ensure that no fault codes were set during the software download.

If a communication/identification problem is detected, it may be the result of a communication failure between the Seat Heater Module (SHM) and

the CCM. Replace the Seat Heater Module to solve this problem.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
36001-2	DTC's Read/Delete	0.2 hr
36002-3	Software	0.1 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty InformationTechnical Service Bulletin # **TNN77-11** Date: **050113**

Drivetrain/Wheels - Wheel Bolts Corroding

NO: 77-11
DATE: 1-13-2005
MODEL/YEAR2003 - 2005 XC90
2004-2005 S60/V70/XC70/580
CHASSIS: See list below
SUBJECT: Wheel Bolts Corroding

Type	Year	Assembly Plant	Chassis range
1 8 4	2004 – 2005	21	358743 – 401749
2 8 5	2004 – 2005	21	398507 – 486974
2 9 5	2004 – 2005	21	144620 – 186603
2 8 5	2004 – 2005	22	394133 – 485179
3 8 4	2004 – 2005	22	363918 – 450311
2 7 5	2003 – 2005	21	000001 – 171481

DESCRIPTION:
Under certain conditions the wheel bolts may have evidence of surface corrosion. If you should have a customer concern with this issue and the vehicle falls within the chassis range listed below, please install wheel bolt caps (kit PN 9139853).

SERVICE:
Install wheel bolt cap kit PN 9139853. The tweezer tool will need to be attached to the vehicle tool pouch using the rubber band supplied in the kit.

NOTE:
Each Volvo retailer will be supplied an initial allocation of tweezer tools, these tools should be distributed to the technicians.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99255-7	Caps wheel bolts 20 pcs replace/install.	0.1hrs

Claims may be submitted under the New Car Warranty when there is a documented customer complaint using claim type: 01

Warranty Claim InformationTechnical Service Bulletin # **TNN30-04** Date: **051013**

Engine Controls - Software Download Fault Prevention

NO: 30-04

DATE: 10-13-2005

MODEL: All Vehicles

M. YEAR: All

SUBJECT:
Midtronics PSC-550 Vehicle Power Supply use required during Software Download. Includes Mobile Technician Program

REFERENCE:
Special tool bulletin no. 111-A // VADIS/VIDA repair instruction

This Tech Note supercedes the previous TNN 30-04 dated 10-11-05. Please update your files.

DESCRIPTION:
Software Download failure due to too high or too low voltage

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

When performing a software download as well as electronic diagnostics, activations and quick tests within VIDA, it is imperative that the vehicle's system voltage is maintained between apx. 13.0V and 14.0V.

We have found that certain SWDL (Software Download) faults may occur due to too high or too low a voltage. Among them are; Half loaded nodes and check sum errors.

Too high a voltage can be caused by using commonly available Constant current type chargers. These are the type used in most automotive shops. This type of charger will increase the charging voltage to maintain a constant current setting. Therefore, the Voltage may increase up to 17 Volts or higher depending on the condition (internal resistance) of the battery to maintain the current setting. While the higher voltages can be advantageous for charging batteries, it can also be the reason for failed Software Downloads, one or more nodes stuck in Program mode and misleading results while fault tracing certain circuits.

Too low a voltage can also cause nodes to become stuck in programming mode. Therefore, Battery Booster Packs are not acceptable for use during Software Downloads.

Fast chargers, Boost chargers, standard battery chargers, especially when set to "boost" should never be used during software downloads due to the excessive voltage and current they can supply under certain conditions.

Volvo now requires the use of the Midtronics PSC 550 when performing SWDLs and during fault tracing. This includes downloads performed by your Mobile technician if your retailer is using one. The Midtronics PSC 550 is a constant voltage power supply capable of 55 Amperes max while regulating the voltage to 13.6. The use of this power supply will prevent over voltages during SWDLs and fault tracing.

The Midtronics PSC-550 is classified as a mandatory tool and will be allocated to all US and Canadian retailers by SPX/Kent-Moore during October 2005. Please refer to Special Tool Bulletin 111-A for more information.

FOR MOBILE TECHNICIAN RETAILERS:

The Midtronics PSC-550 power supply unit is also required for all SWDLs in the field. As a Mobile Technician retailer you are required to add this mandatory tool to your inventory. This power supply supersedes the previous 20 AMP battery charger previously required.

Note:
The unit purchased for Mobile Technician use will be in addition to your allocated requirement.

Important Note:
Connection procedure:

Install the clamps at the battery before connecting the unit to the 115VAC outlet.

Technical Service Bulletin # **TNN32-04** Date: **051214**

Electrical - CEM DTC DD21/Alternator Not Charging

NO: 32-04

DATE: 12-14-2005

MODEL:
S60, S80, V70, XC70, XC90 (excl. V8)

Model YEAR:
2005 & 2006

SUBJECT:
CEM DTC DD21 due to faulty LIN-network, Alternator Not Charging

REFERENCE:
VIDA

DESCRIPTION:

DTC CEM-DD21 may be set because of faulty communication between the Alternator and CEM due to the installation of extra LIN wiring for the upcoming BLIS, (Blind Spot Information System). Customers may also report an intermittent DIM message "POWER SYSTEM SERVICE REQUIRED" It may be possible that there is a pinched LIN-bus wire from the CEM to the BLIS-system between A-pillar body and the dashboard assembly on the left side. See details below under "SERVICE".

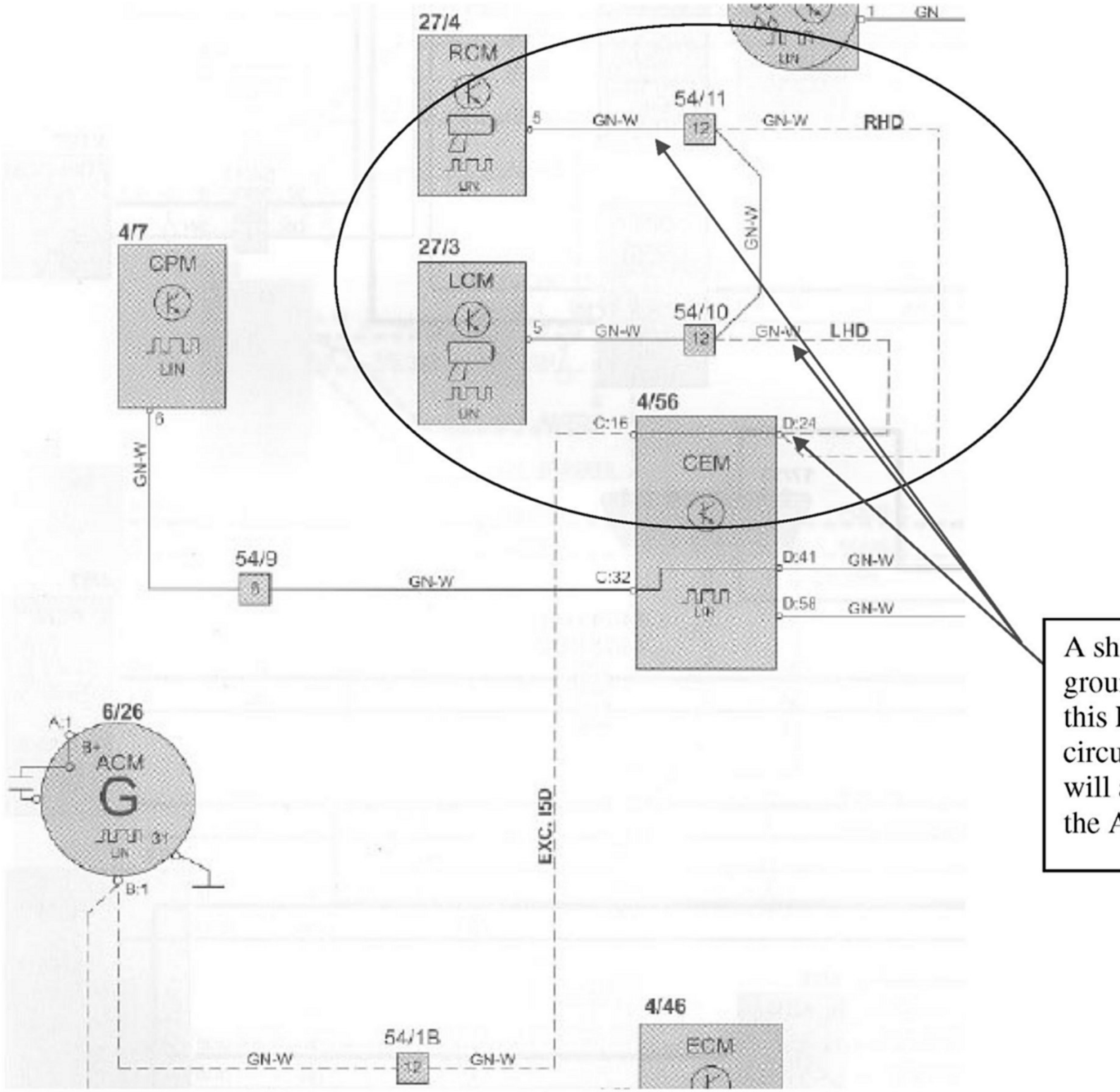
PRODUCT MODIFICATION:

A clip has been installed on the cars to prevent the LIN wire being pinched in production.

SERVICE:

BLIS = Blind Spot Information System
ACM = Alternator Control Module
LCM = Left-hand Camera Module
RCM = Right-hand Camera Module
CEM = Central Electrical Module
LIN = Local interconnect network

Although BLIS (BLind spot Information System) has not been introduced yet, vehicles are pre-wired in production. The cables from CEM to RCM (Right Camera Module) and LCM (Left Camera Module) are present up to the mirror connector in both front doors.



The LIN-bus is also connected internally inside the CEM (see updated wiring diagram shown). When fault tracing a CEM-DD21, please assure that the RCM and LCM circuits are not overlooked. The BLIS circuits are not indicated in the Wiring Diagram for MY2005, but have been corrected for MY2006.

If there is a short to ground in the circuit from CEM D24, repair the affected wiring as necessary.

If the DTC CEM-DD21 remains, perform normal fault tracing for the DTC per VIDA instruction.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
03740	Checking cables for DTC CEM DD 21	0.3 hr
37419	General op for repairing cables *(Claimed time must be substantiated)*	-------

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN28-145** Date: **050616**

Recall - Software Upgrade for EVAP System Performance

NO: 28 - 145
DATE: 6/16/05
MODEL/CHASSIS: See Table Below
YEAR: 2005
SUBJECT: Recall Campaign 145: Purge Performance
REFERENCE: SMB 28-145 VADIS/VIDA

Type	Engine Type from VIN	Engine Variants	Chassis Number Range
S80	59, 91	2.5T, T6	0390000 - 0398028
XC90	59, 91	2.5T, T6	0134000 - 0167185
V70	54, 59	T5, 2.5T	0459000 - 0477839
XC70	59	2.5T	0173000 - 0182285
V70	52, 54, 59	R, T5, 2.5T	0459000 - 0476102
S60	52, 54, 59	R, T5, 2.5T	0425000 - 0442350

NOTE:
RETAILER MUST CONFIRM VEHICLE ELIGIBILITY IN VRC2 PRIOR TO BEGINNING RECALL CAMPAIGN REPAIRS.

DESCRIPTION:
Certain model year 2005 S60, S80, V70, XC70 and XC90 vehicles do not meet the requirements of the Environmental Protection Agency (EPA) and the California Air Resource Board (CARB) for removing pollutants from the Evaporative Emissions System.

The requirement only pertains to purge performance and does not affect the safety or drivability of the vehicle. However in certain cases, this may cause the vehicle to fail a state inspection or Smog Check test.

The corrective action will be a software upgrade of the Engine Control Module (ECM).

SERVICE:

Upgrade Engine management software (SW) using the ECM upgrade option in the VADIS Software manager. SW product # 30677021

Technical Service Bulletin # **TNN28-60** Date: **050907**

Engine Controls - DTC 7300 (Gear Position Sensor)

NO: 28-60
DATE: 9-7-2005

Vehicle	Type	Model Year	Chassis Range	Structure Week
XC90	275	2005 - 2006	134000-236031	200425-200526
S80	1 8 4	2005 - 2006	390000-429460	200425-200526
V70	2 8 5	2005 - 2006	459000-538561	200425-200526
XC70	2 9 5	2005 - 2006	173000-213146	200425-200526
S60	3 8 4	2005 - 2006	425000-508223	200425-200527

MODEL/CHASSIS: See chart (Turbocharged engines with Automatic gearbox only)
M. YEAR: 2005-2006
SUBJECT: ECM DTC 7300 Gear Position Sensor, Faulty Signal
REFERENCE: VIDA Fault Tracing

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

DESCRIPTION:
If a driver moves the gearshift lever from "D" to "P" while the vehicle is still moving above 3km/h (1.8mph), DTC ECM 7300 will be set for Gear position Sensor, Faulty signal. After the high chassis limits above, the threshold for the DTC is changed to 15km/h (9.3mph).

SERVICE:
Downloading the ECM upgrade Software part # 30677021 to a vehicle within the chassis range above will raise the DTC threshold to 15 km/h (9.3mph).

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	SOFTWARE DOWNLOAD	0.3hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATIONTechnical Service Bulletin # **TNN39-50** Date: **050907**

Cell Phone - Bluetooth Hands Free Kit Information

NO: 39-50
DATE: 9-7-2005
MODEL:
XC90 All
2001- S60/V70/XC70/S80 (excl. Executive, Elite, Premier, 75th anniversary)
2005- S40 from ch. no. 80924 // V50 from ch. no. 78750
SUBJECT: Bluetooth Hands Free Kit Information
REFERENCE: VRC2/Aftersales information

The purpose of this TNN is to provide information

The Volvo Bluetooth hands free kit will integrate most Bluetooth enabled cell phones into the Volvo audio system. It consists of a base kit, and an adapter harness which is vehicle specific. The system is wired into the speaker output of the Volvo audio system and will automatically mute the audio and navigation system when making an outgoing call or receiving an incoming call.

In addition, the system uses speech recognition for initiating call and menu commands.

Frequently Asked Questions

Item	Question	Answer
	Microphone - Speech recognition/Audio Uplink	
1A	Where should I place my microphone for the best performance?	Securely mount the microphone on the overhead console or headliner between the driver and passenger. DO NOT mount on the visor or windshield. Vibrations will negatively impact audio and speech recognition performance.
2A	People on the other end of the line complain that the audio from my car kit is choppy. Is there anything I can do to improve the audio quality?	Make sure your microphone is installed properly. If the background noise on the other end of the line (the person you are talking to) is excessive, your voice may be muted or choppy to the person you are speaking with due to the noise cancellation software running. Verify that there is not an excessive amount of background noise (including car radio, climate control system, windshield wipers, or a passenger speaking) in the car, as it may impact voice quality and volume as well.
	Speaker - Audio Downlink/Mute	
1B	Even though I increased the volume of my last call, the next call seems to be quiet again. How can I get the car kit to retain the higher volume level?	To change the default volume setting, it should be increased or decreased during the voice prompt of one of the speech recognition menus.
2B	Why does the radio un-mute during dialling?	This is a limitation of the handset. The handset takes longer to dial. So the Volvo Handsfree System with Bluetooth times out and unmutes the radio. Handset may only support Handsfree Profile 0.96 profile.
	UIM	
1C	Why don't I get a visual indication when making an outgoing call from the Volvo Handsfree System with Bluetooth?	The Volvo Handsfree System with Bluetooth is dependent on call setup indication/AT command from the handset. Some handsets do not provide this indication.
2C	Why don't I get a visual indication when making an outgoing or accepting an incoming call from the Volvo Handsfree System with Bluetooth while turning on the ignition or returning into BT range?	The Volvo Handsfree System with Bluetooth is dependent on call setup indication/AT command from the handset. Some handsets do not provide this indication.
3C	Why does the call waiting visual indication stop?	The Volvo Handsfree System with Bluetooth is dependent on the handset sending call status indicators/AT commands. Not all handsets repeat the call waiting status indications and therefore the visual indication stops
	Bluetooth	
1D	Why does my handset complete the pairing process after passcode entry when I've terminated the pairing process before passcode entry screen?	This is a BT limitation of the handset. The handset is finishing its pairing process before it prompts for the passkey.
2D	Why does my handset reconnect before the SIM PIN is entered?	This is a handset limitation. The handset is finishing its re-connection process before prompting for the SIM PIN.
3D	How do I turn the Bluetooth on to link up my handset and car kit?	Follow the instructions provided by your handset's manufacturer to ensure that Bluetooth is turned on (for Motorola handsets this can be found from the main menu: Settings -> Connection -> Bluetooth Link -> Setup, then select Power and turn it on. The turn the phone off, then on again). The first time you link with the car kit, you will have to pair your handset (see user manual for instructions), but subsequent times your handset and car kit should connect automatically over the Bluetooth link.
4D	My handset has the Bluetooth headset profile. Can I use the car kit?	No, you cannot use the Volvo Handsfree System with Bluetooth car kit with a handset that does not have hands-free profile. You will not be able to complete the pairing process with a handset that has the BT headset profile.

5D	Why can I make a connection with the Volvo Handsfree System with Bluetooth from the handset quickly sometimes and other times it takes awhile?	-The Volvo Handsfree System with Bluetooth always tries to connect to the last connected handset. This process takes approximately 15 sec per each handset in its device list. -After the Volvo Handsfree System with Bluetooth has gone through its device list, there is a 20 sec idle state. It is during this idle state that you can connect to the Volvo Handsfree System with Bluetooth from your handset.
6D	Why can I connect another handset to the Volvo Handsfree System with Bluetooth, after a previous handset has moved out of BT range, quickly and other times it takes awhile?	-After a link loss of the BT signal between the Volvo Handsfree System with Bluetooth and a handset, the Volvo Handsfree System with Bluetooth continues to try to connect to the previously connected handset. This reconnection time depends some internal timing within the Volvo Handsfree System with Bluetooth. After it times out, It will go into a 10 Sec - idle state. This is the only time to connect to another device. The Volvo Handsfree System with Bluetooth will continue this cycle indefinitely.
Call Issues		
1E	Why do my active or held calls terminate when I press and release the END button?	This a handset limitation. The handset does not respond properly when the AT command, 'hangup', is sent by the Volvo Handsfree System with Bluetooth
2E	Why can't I store handset voice tags while connected to the Volvo Handsfree System with Bluetooth?	Some handsets do not support storing handset voice tags while connected to the Volvo Handsfree System with Bluetooth. Drop the BT connection to the Volvo Handsfree System with Bluetooth, store your handset voice tag and re-connect to the Volvo Handsfree System with Bluetooth.
3E	Why does a last number redial happen when I answer an incoming call?	This is due to a delay when the handset gets the call and notifies the Volvo Handsfree System with Bluetooth. Since the Volvo Handsfree System with Bluetooth has not been notified of the call, it interprets the ANSWER button press as a redial.
4E	Why can't I answer a call waiting after I've terminated an active call?	Due to some handset limitations, the call waiting call must be answered within 6 seconds of notification.
5E	Why does the ANSWER button continue to flash, indicating a call is still waiting, when the held call is terminated on the handset or remote handset?	The handset does not respond properly to the 'multi-party call' AT command from the Volvo Handsfree System with Bluetooth. This is a limitation of the handset, which could be improved with a software update of the handset.
6E	Why can't I toggle between active and held call with button presses of the ANSWER button?	The handset does not respond properly to the 'multi-party call' AT command from the Volvo Handsfree System with Bluetooth. This is a limitation of the handset, which could be improved with a software update of the handset.
7E	Why are DTMF tones heard as continuous tone on the remote handset?	This is a handset limitation. Sometimes the handset stops responding to the Volvo Handsfree System with Bluetooth's DTMF AT command. It will continue to play a tone until it recovers, which is to respond to another command.
8E	Why can't I terminate a call with the END button while the call is dialing on the network?	This is a handset limitation. The handset does not notify the Volvo Handsfree System with Bluetooth of a DIP when using the handset voice tags or the call button of the handset. Since the Volvo Handsfree System with Bluetooth was not notified of a DIP, it remains in the ready state. Therefore, the END button will not work. However, the Volvo Handsfree System with Bluetooth receives a DIP notification from the handset if a redial is made.
9E	When an active call is terminated with a call on hold, why does my handset continue to display call is active?	This is a handset limitation. The handset does not resume the held call automatically when an active call is terminated.
10E	Why can't I terminate an active and a held call with a press and hold of the END button?	This a handset limitation. The handset does not respond properly when the AT command, 'hangup', is sent by the Volvo Handsfree System with Bluetooth
11E	Why can't I answer a call after I turn the ignition on?	This is a handset limitation. The Volvo Handsfree System with Bluetooth does not get the DIP and or the ringing AT command to put the UIM in the state to answer the call. Therefore, you will not be able to answer the call from the Volvo Handsfree System with Bluetooth. However, the Volvo Handsfree System with Bluetooth may get the 'call connected' AT command, so the buttons may be set to an in call state which will allow the ability to switch, end etc.
12E	Why do I have HF audio when the call was put into private mode during DIP?	This is a handset issue. The Volvo Handsfree System with Bluetooth will not get the call indication while dialing. The indication will be received after the call is connected, so the call is in handsfree, but the ring will not

		be heard.
13E	Why can't I reject an incoming call when the active call is held?	The handset does not respond properly to the 'multi-party call' AT command from the Volvo Handsfree System with Bluetooth. This is a limitation of the handset, which could be improved with a software update of the handset.
14E	Why does the ringing stop or the call ends if the flip is closed during an incoming call.	This is a handset issue. It does this because when you open the flip on the handset for an incoming call it automatically answers the call even though it is connected to the Volvo Handsfree System with Bluetooth. In addition, something similar happens when the flip is closed. But it terminates the call.
15E	Why, when using hold and resume, do I hear a busy signal?	This is a handset issue. After it enters the HOLD mode, after a gap of about 20 seconds the handset automatically resumes. You will hear quick BeepBeepBeep when that happens.
16E	Why don't I hear call rejected when the END button is pressed with an incoming call?	This is a limitation of the handset, which could be improved with a software update of the handset.
17E	Why doesn't hold and resume work?	This is a limitation of the handset, which could be improved with a software update of the handset.
18E	Will the car kit announce the caller ID if I have an incoming call via call waiting?	No, the car kit will not announce the incoming number (caller ID) so as not to disturb the original call. The car kit will play a tone to notify you that there is a second call coming in.
21E	Why does the speed dial command dial the last number dialed?	This is a limitation of the handset, which could be improved with a software update of the handset.
22E	Why doesn't the HANG UP command work when a call is on hold?	This is a handset issue. The call needs to be resumed before ending the call
23E	Can I answer or end a call with voice recognition?	You cannot answer a call using the voice recognition. You must press the ANSWER button on the UIM. However, you can end a call by pressing the TALK button and saying "end call" after the listening beep. Alternately you can end the call by using the END button on the UIM.
24E	Why don't I hear a ring tone when making an outgoing call from the Volvo Handsfree System with Bluetooth?	The Volvo Handsfree System with Bluetooth is dependent on call setup indication/AT command from the handset. Some handsets do not provide this indication.
25E	Why don't I hear a ring tone when making an outgoing or accepting an incoming call from the Volvo Handsfree System with Bluetooth while turning on the ignition or returning into BT range?	The Volvo Handsfree System with Bluetooth is dependent on call status indications/AT command from the handset. Some handsets do not provide this indication.
26E	Why do I hear the ring tone from handset, not from the Volvo Handsfree System with Bluetooth's speaker?	This is handset specific behavior.
27E	Why don't I get an audio indication from the Volvo Handsfree System with Bluetooth for new messages or voicemail?	This is handset specific behavior.
28E	Why don't I get audio while answering an incoming call, and receiving an SMS?	This is a limitation of the handset, which could be improved with a software update of the handset.
29E	Why can't I transition the audio to Private Mode from Handsfree Mode via the UIM or SR?	This is a limitation of the handset, which could be improved with a software update of the handset.
30E	Why didn't I hear '+' on the Caller ID during an incoming international call?	This is a handset issue. The handset does not send the '+'.
31E	Why doesn't an active call switch to HF audio during a BT connection?	This is a limitation of the handset. When there is an incoming call and the BT connection is made there will not be any handsfree audio.
32E	Why doesn't mute work for held call?	After pressing the ANSWER button to place a call on hold, wait at least 5 seconds to press Mute button. Else the Mute will not be effective.
33E	I don't hear the touch tones while I'm dialing a call. Am I doing something wrong?	No, unless you are in a call, you will not hear the touch tones when your handset is linked up to the car kit.

34E	How do I maintain my call when I turn off my car?	First, if you have a flip handset, ensure the flip is open (if it is not, your call may disconnect when your car is turned off). Depending on your handset model, the call will either be automatically switched to the handset or it may prompt you to "switch to handset". These same steps apply if you are switching from hands-free to privacy mode while the car is running.
35E	Why does my handset end the call when I transfer the audio from Handsfree Mode to Private Mode?	This is a limitation of the handset, which could be improved with a software update of the handset.
36E	Why is there a pause in audio after I press the ANSWER button and before the person on the other end hears me?	This is a combination of delays from both the Volvo Handsfree System with Bluetooth and the handset. There is a slight delay from the Volvo Handsfree System with Bluetooth between when the call is setup and when the audio channel is opened. In addition, most handsets will pass the audio to the Volvo Handsfree System with Bluetooth when a call is setup. However, if the Volvo Handsfree System with Bluetooth doesn't receive the audio within a certain time, it will request the audio.
37E	Why don't I hear my handset's ring tone on the car kit?	This is a limitation of the handset, which could be improved with a software update of the handset.
38E	Ring tone audio quality sounds poor. Why is that?	This is a limitation of the handset, which could be improved with a software update of the handset.
39E	Why does the handset call timer continue to give an indication that a call is in progress after the call has been ended on the Volvo Handsfree System with Bluetooth?	This problem is caused by network delays.
40E	Why do I have to press the END button multiple times before a call is ended?	There is a delay in responding to the user due to network and handset delays
41E	Why, with low network signal, the Volvo Handsfree System with Bluetooth remains in an in-call status when redial is initiated by pressing the ANSWER button?	This is a handset/network issue. The Volvo Handsfree System with Bluetooth does not get the end notification. The handset may indicate "call failed, retry?"

Miscellaneous

NOTE: Some handset limitations may be overcome with a handset software update. Contact your handset provider for more information.

Abbreviations/Definitions

AT command - command set used for communication between the handset and Volvo Handsfree System with Bluetooth
BT - Bluetooth
CIP - call in progress
DIP - dial in progress
HF - handsfree
LED - light emitting diode
UIM - User Interface Module

Troubleshooting guide

Item	Symptom	Solution	Next-Level Solution	Last Solution
		UIM		
1A	System does not respond. UIM buttons not lit.	- Switch on ignition. - Check UIM connection.	- Check the UIM connection to the interface harness. Look for loose connectors, loose pins, and crimped or frayed wires.	Check the power connections to the module (Battery, Ignition, Ground). This is easily done by probing the 8 Pin Molex connector: pins 1 for Ground, 2 for Battery, 3 for Ignition. Voltages are nominally 12.5V. If voltage is not ok, check vehicle fuses. If fuses are intact replace the Mute Adaptor Harness. If voltages are ok, check the system fuses on the Interface Harness. If fuses are intact, replace the UIM. If not corrected, replace the Interface Harness. If not corrected, replace the ECU.
		Microphone - Speech recognition/Audio Uplink		
1B	Poor Speech Recognition (SR) performance	- Enter Digits in Segments. - Speak with no pauses. - Wait until after the listening prompt before speaking. If you speak too early, the Volvo Handsfree System with Bluetooth may not recognize what you are saying. - Talk Loudly. - Speak in the direction of the microphone. - Check position of the microphone (see microphone installation sheet). - Verify that there is not an excessive amount of background noise (including car radio, climate control system, windshield wipers, or a passenger speaking) while you are using the voice command functions as this could also interfere with the voice recognition. - If you are using the kit in English, you may find that UK English or US English works better depending upon your accent. You	- Check microphone connection to Interface Harness. Look for loose connectors, loose pins, and crimped or frayed wires.	Replace microphone. If not corrected, and the UIM is lit, replace the Interface Harness. If UIM is not lit see 1A. If not corrected, replace the ECU.

		can find instructions on how to switch the language in your user guide.		
2B	SR does not respond, or in-vehicle audio is not heard on the remote handset	- Check microphone connection	- Check microphone connection to Interface Harness. Look for loose connectors, loose pins, and crimped or frayed wires.	Is the UIM lit? If not, see 1A. Replace microphone. If not corrected, and the UIM is lit, replace the Interface Harness. If not corrected, replace the ECU.
3B	Poor uplink audio. Far side hears an echo. Etc.	- Check position of the microphone. - Ensure that your microphone is securely mounted. - Ensure air vent is not blowing into microphone.	- Reduce the volume of the speakers in the car kit as this may help to reduce the echo on the line as well. - Ensure there is not an excessive amount of background noise (including car radio, climate control system, windshield wipers, or a passenger speaking) in the car, as it may impact voice quality and volume as well.	
Speaker - Audio Downlink/Mute				
1C	No Speech Recognition (SR) prompts or Hands-Free (HF) audio is heard. Radio audio is muted.	- Check the speaker connections through the Mute Adapter Harness and Relay. - Check that the relay "clicks" when a SR of HF session starts and ends.	- Check speaker connections through the Interface Harness, Mute Adapter Harness, and Relay. Look for loose connectors, loose pins, and crimped or frayed wires.	Is the UIM lit? If not, see 1A. Check the power connections to the Mute Adapter Harness (Battery, Ground). This is easily done by probing the Mute Adapter Harness side of the 8 Pin Molex connector: pins 1 for Ground, 2 for Battery. Voltages are nominally 12.5V. If voltages are ok and the Volvo Handsfree System with Bluetooth fuses are intact, replace the Mute Adaptor Harness. If not corrected, replace the Interface Harness. If not corrected, replace the ECU.

2C	Vehicle Audio System does not Mute when an SR or HF session is active.	- Check the Mute Adapter Harness connection to the Relay. Check that the Relay "clicks" when a SR or HF session starts and ends.	- Check Mute line connections through the Interface harness, Mute Adapter Harness, and Relay. The Mute line is on pin 4 of the 8p White Molex connector of the Mute Adapter Harness and Interface Harness. Look for loose connectors, loose pins, and crimped or frayed wires.	Is the UIM lit? If not, see 1A. If the Mute signal does not show 0V (ground, active low) at the 8p White Molex connector when HF or SR audio should be present, replace the Interface Harness. If the Mute signal is still not active low, replace the Adaptor Harness. If the Mute signal is still not active low, replace the Mute Adaptor Harness.
3C	Vehicle Audio System is Muted all the time.	- Check Mute line connections through the Interface Harness and Mute Adapter Harness. Look for any place that the Mute line may be shorted to Ground through a crimped or frayed wire, loose connection of loose pin. - Short press the end key.	- Reset the system	Replace the ECU.
		Bluetooth		
1D	Cannot pair a new handset with the system	- The handset must support Bluetooth Handsfree Profile 0.96 or 1.0 - The system supports a maximum of 4 handsets at once. Make sure this limit is not exceeded. - Remove all previous pairings using the REMOVE ALL command. The system should be reset. - Delete the pairing information on the handset and ensure that the handset is removed from any other systems with which it is paired.	- Check handset Compatibility Matrix to see if the handset being used has been tested and is supported.	Is the UIM lit? If not, see 1A. Replace the ECU.
2D	Handset doesn't reconnect when starting car.	- Check is Bluetooth is switched on at handset. - Is ECU set as authorized on handset. - Is handset a paired device on ECU? - Is ECU a paired device on handset? - Is UIM lit? If not see 1A.	- Check handset Compatibility Matrix to see if the handset being used supports seamless mobility. - Restart vehicle or reset system.	Remove all previous pairings using the REMOVE ALL command. The system should be reset. Then delete the pairing information on the handset and ensure that the handset is removed from any other systems with which it is paired. Pair the handset to the system again. If not corrected, replace the ECU.

Call Issues				
1E	Digits not caller name is heard on incoming call.	- Add caller's number to contact list on ECU.		
2E	Handset voice tag not working.	- Check handset Compatibility Matrix to see if the handset being used supports handset voice tags.	- Check to see if handset voice tags are enabled on handset - Wait for handset to open audio channel before entering voice tag. Handset should sent a beep to indicate this.	Update handset SW.
3E	Speed dial not working?	- Check handset Compatibility Matrix to see if the handset being used supports speed dial.	- Is it a valid speed dial.	Update handset SW.
4E	Unable to switch audio back to handsfree when in Private Mode.	- Check to see if ECU is in the call menu in private mode. if not, handset has removed the BT link. - Check handset Compatibility Matrix to see if the handset being used supports private Mode to Handsfree Mode transition.	Use handset menu to transfer audio back to handsfree.	Purchase handset that supports Private Mode to Handsfree Mode transition.
5E	No ring tone is heard on system for incoming call.	- Check if handset ring mode is set to silent/vibrate. If so change.		
6E	No caller ID is heard.	- Check handset Compatibility Matrix to see if the handset being used supports caller ID. - Check if caller ID is hidden.	- Set 'Call Announce' to On in setup menu.	Purchase handset that supports caller ID.
7E	Incoming call is automatically answered.	- Check if handset is set to auto answer. If so change.		
8E	Radio is unmuted when switched to Private Mode.	- Check to see if the Volvo Handsfree System with Bluetooth is in the Call Menu in Private Mode. if not, handset has removed the BT link and unmuting the radio is expected behavior.	#NAME?	Purchase handset that supports Private Mode to Handsfree Mode transition.
9E	Unable to access contact list.	- Contact list is only available when a handset is connected to system.		

Fault tracing guide and FAQs Information regarding the Bluetooth kit

Please go to; VRC2 external links < Aftersales Business Volvo Hands Free Compatibility Matrix > for links to the following information;

^ Phone compatibility matrix
^ Phone pairing procedures and examples
^ Volvo Handsfree with Bluetooth Brochure
^ Volvo Handsfree with Bluetooth training Overview
^ Frequently asked questions
^ Interactive users guide for the IHF1000

Questions regarding phone compatibility, set up, and Motorola(R) specific operational problems can be forwarded to the Motorola(R) technical assistance Hotline. 877-MOTO-2-GO (877-668-6246)

Installation questions on Genuine Volvo Handsfree Bluetooth should be forwarded to the Volvo Technical Hotline. Please have the installation instructions handy if you need assistance.

*Updates to this Chart reflecting new products can be found on VRC2 >Ext links>Aftersales information>Volvo hands free compatibility matrix

IHF1000 Phone Interoperability Results

The IHF1000 car kit supports the Bluetooth® 'Hands-Free' Profile. In order for your compatible Bluetooth enabled phone to communicate with the IHF1000 car kit, it must also support this profile. However, even if your phone supports the Bluetooth 'Hands-Free' Profile, it may not be capable of taking advantage of all the advanced features/functionality of the IHF1000 car kit. The chart below outlines the compatibility of several popular Bluetooth enabled phones with many of the advanced features of the IHF1000 car kit. This chart was compiled based on testing conducted by Motorola, and is believed to be accurate, however product compatibility and/or features/functionalities are subject to change without notice or obligation. The IHF1000 car kit supports Bluetooth 'Hands-Free' Profile. Your phone should support this profile.

#	BLNC Feature List	Sony Ericsson Z600	Sony Ericsson T68i	Sony Ericsson T610	Sony Ericsson K700i	Siemens S66	Siemens S56	Siemens S55	Orange SPV C500	Nokia 6600	Nokia 6310i	Nokia 6230b	Nokia 3650	Motorola V80	Motorola V710	Motorola V635	Motorola V600	Motorola V6	Motorola V551	Motorola V3	Motorola MPx220	Motorola E815	Motorola E398	Motorola A630	Motorola A1000	LG PM-325	iDEN i605	Motorola M1000	BlackBerry 7290
1	Pair phone	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
2	Remove phone	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Answer incoming call using UIM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
4	Terminate call from UIM or using SR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
5	Last number redial using the UIM or SR	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
6	Call reject from UIM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Incoming call notification	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
8	Multi-party calling – toggle between calls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Multi-party calling – terminate	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	Transfer audio to Phone using UIM and/or SR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	Make a call using phone voice tags	N	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	N	Y
12	Make a call using digit dialing SR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
13	Call waiting – accept	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	Call waiting – reject	N	Y	N	N	Y	Y	Y	N	Y	N	N	N	Y	N	Y	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y
15	Transfer audio to HF using UIM and/or SR	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
16	Make a Call using "SPEED DIAL"	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
17	Using DTMF tones via "ENTER" command	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	Low Battery Audio Indicator	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
19	Voicemail Audio Indicator	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Above is a compatibility matrix chart as of 8/25/2005 * that will help you decide whether or not the customer's phone will work with the system

Application information;
The installation will consist two Part numbers, the base kit and the adapter harness.

The Base kit will include a Bluetooth Control unit, Control unit harness, a microphone and a controller module (UIM). The Adapter harness is specific to the vehicle and/or the audio system installed. Specific application info is below.

S40/V50

The Bluetooth hands free kit is only compatible with Integrated Audio Module (IAM) based systems (S40 from chassis no. 80924 and V50 from chassis no 78750). Cars built before the break points indicated are equipped with AFM systems, Bluetooth hands free cannot be installed in these vehicles.

S40/V50 base level audio system (availability mid October 2005)

Base Kit P/N	8640101
Adapter harness P/N	8640108

S40/V50 Premium Audio system

Base Kit P/N	8640101
Adapter harness P/N	8640104

2001 and newer S60 V70, XC70, S80 (availability mid to end of September 20
(Cannot be installed on S80 Executive, S80 Elite, S80 Premier or S80 75th An

Base kit	8640101
Adapter harness	8640105

XC90 all

Base kit	8640101
Adapter harness	8640106

There are 2 adapter harnesses available depending on the level of the Audio system. The photographs of the radio display during "boot up" will help identify which level system you are working with.

Antitheft System - Immobilizer System Overview

NO: 36-35
DATE: 8-01-2002
MODEL/YEAR: MY99- S80, MY01- S60, V70, V70XC
SUBJECT: Immobilizer System Information
CHASSIS: N/A
REFERENCE: N/A

BACKGROUND:
This Tech Net Note is intended to provide a general system overview of the Immobilizer system for 560, V70, V70 XC, and S80.

NOTE:
The C70, MY00 and older S/V/XC70, and S/V40 immobilizer system is significantly different than described in this document. Therefore, this Tech Net Note cannot be applied to those vehicles. Some specific real world" cases are also described from a technical point of view and a customer perspective. Although this information is accurate, it is impossible to describe all possible scenarios and faults in this document. This Tech Net Note is intended to supplement, not replace, the fault tracing provided in VADIS.

In order to ensure a proper repair, it is critical to have a detailed description of the customer complaint; "the car will not start" is not sufficient. The customer must describe the no start condition in terms of: no crank, crank no start, or start stall. The exact text displayed in the DIM message display is also important.

The immobilizer check is only performed during the initial start-up. Once the engine is running, the immobilizer check has passed. Therefore, in the event of engine stalling after initial start, the immobilizer system is not the cause.

DESCRIPTION:

Document layout:

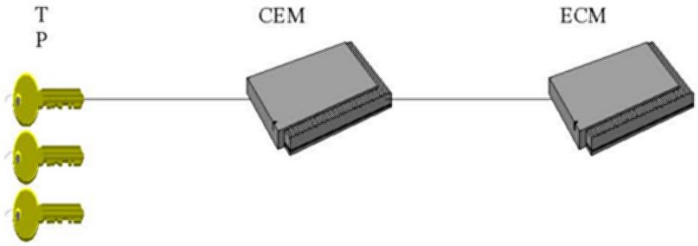
^ System functionality. This section gives some basic explanation of the immobilizer functionality.

^ Symptom Overview. This section provides examples of possible faults based on text message in the DIM and DTC's: No crank, no text (in DIM), no DTC's; no crank, text (in DIM), no DTC's; and No crank, text (in DIM), and DTC's.

^ Tips and Hints. This section includes some "quick sheets" which provide a system overview and some quick fault tracing tips. The "quick sheets" cover various starting situations described as: No crank, no start; Crank, no start; Start - stall.

The Three Parts of the S60, V70, V70XC, and S80 Immobilizer system are:

- The Ignition Key with a Transponder (TP)
- The Central Electronic Module (CEM)
- The Engine Control Module (ECM)

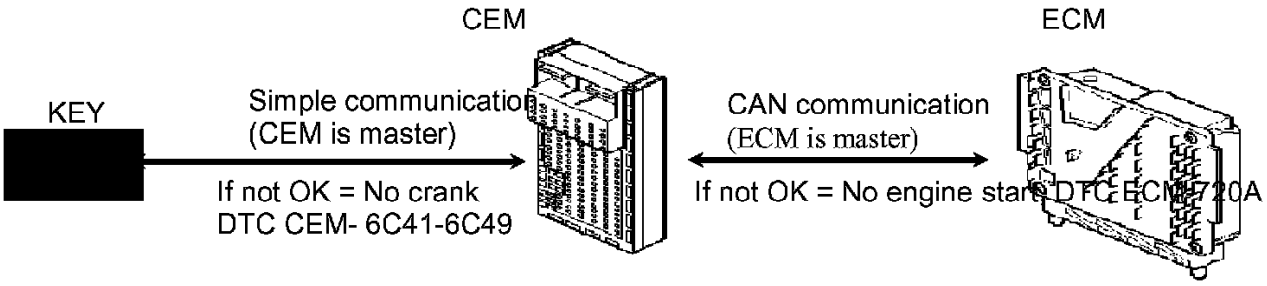


System Functionality

NOTE:
There are other components involved in transmitting the start request (such as immo antenna ring and wiring). The components listed above are vehicle specific and can not be swapped.

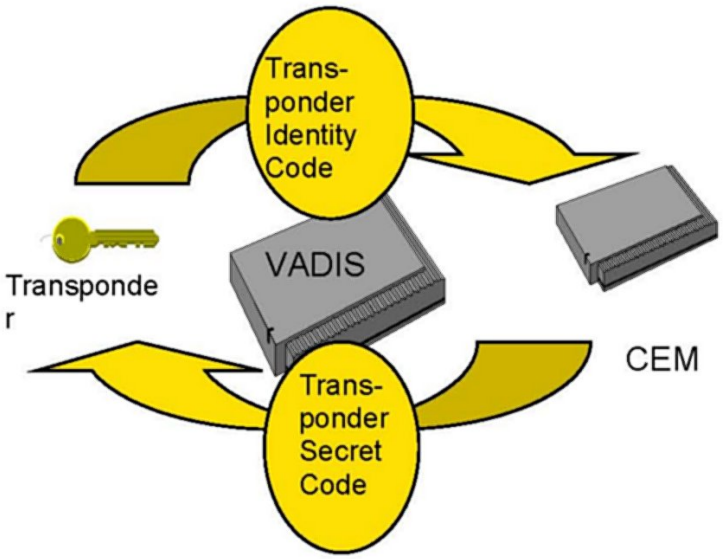
The functions controlled by the immobilizer are the starter motor, ignition and fuel supply.

S60, V70, V70XC, and S80 Immobilizer system and codes



S60, V70, V70XC and S80 Immobilizer system and codes

The GEM Transponder Secret code, is the same for all ignition keys (for a specific car) and is stored in a central database (VITaL). Each key also has a unique Transponder Identity code (stored in GEM) which is not stored in VITaL. When using the "ADD KEY" function, the transponder identity code is written and stored in GEM.



Another code is used in the communication between CEM and ECM. That code is also stored in the database and is automatically handled when replacing the ECM or CEM. Therefore, the CEM and ECM can not be swapped between vehicles; even for test purposes.

^ When programming new keys, the code handling is carried out by VADIS.

^ A spare transponder (key) is delivered with Transponder Identity code but without Transponder Secret code.

^ The new Transponder Identity code is transferred to the existing CEM and Transponder Secret code is transferred to the transponder from CEM when adding keys with VADIS. The Transponder Secret code can only be written once, i.e. a transponder can only be programmed to one vehicle.

^ If a transponder (key) is lost, it is necessary to erase all keys and then add all the remaining transponders (keys) again. In this sequence, the key in the ignition is programmed automatically.

Symptom Overview

NOTE:

^ As for all problems, always check the basics! fuel, fuel pressure, injectors, sparks, battery.

^ If the problem only occurs when parking downhill for example, make sure enough fuel gets to the engine.

^ Some no-crank or crank-no-start situations can occur in a workshop environment by a combination of key cycles. This means that it is not advisable to repeatedly crank and start engine to test the system. The Immo verification is only done once per key cycle and it will not add any value to stress ignition switch on and off. This may create false immo messages or DTCs.

No Crank, no text (in DIM), no DTC

S60, V70, V70XC, and S80 will not allow you to crank the car if:

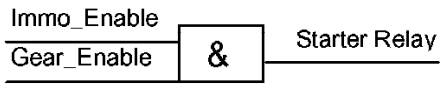
^ The gearshift is not in park / neutral mode

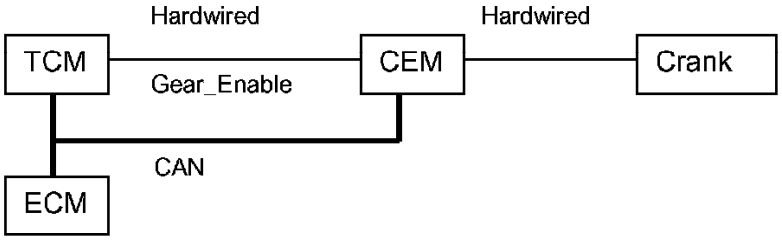
^ Clutch not pressed (Manual with start blocking)

The following information depends on vehicle equipment and structure week. The different versions are described below:

1. GM4T65 Transmission (early S80 production) with good ECM-TCM CAN communication.

Immo_Enable =1 when start is approved from the immobilizer
Gear_Enable = 1 when start is approved from start blocking due to gear position.

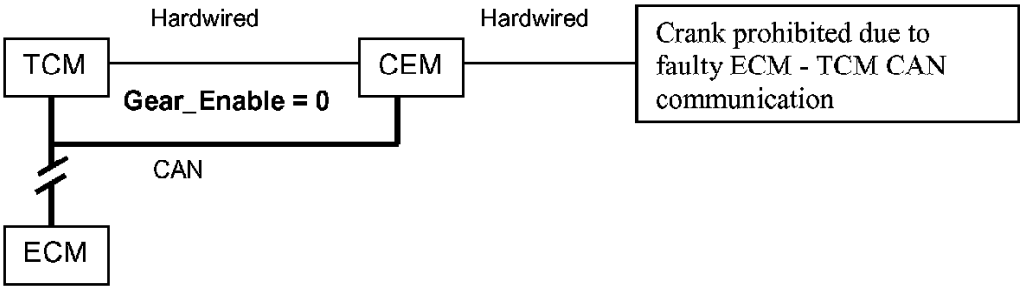




Two conditions must be fulfilled to let the starter motor run. Both logical states "Immo_Enable" and "Gear_Enable" must be set to true. (= 1)

NOTE:
Although these states can not be determined using VADIS, they can be concluded by using CAN communication DTC, gear position, and immobilizer parameter readouts.

2. GM4T65 Transmission (early S80 production) and Faulty ECM-TCM CAN communication.

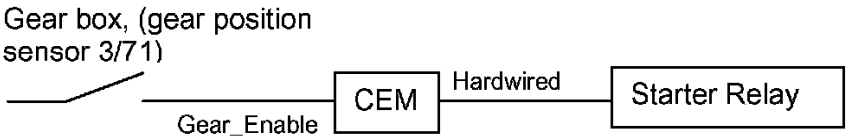


In the case with a 4T65 gearbox of early S80 production, the starter motor will not run if the TCM has lost CAN communication with ECM. The 1CM will then not set the hardwired signal Gear_Enable to 1. The starter motor will therefore not be enabled by CEM.

Note, in later MY vehicles this feature is taken away.

3. S80 GM4T65 (later production)
Will enable crank (Gear Enable=1) even with faulty ECM-TCM CAN communication.

4. S60, V70, and V70XC with AW 55-50



In the case with an AW gearbox the starter motor will be allowed to crank even with faulty ECM-TCM CAN communication. The signal Gear Enable is hardwired directly from the gearbox.

No Crank, Text (in DIM), No DTC

IMMOBILIZER SEE MANUAL

The above text message may be displayed in the DIM.

Verify that no metal objects or other transponder keys are on the key ring when the message was displayed.

NOTE:
Remember the customer may not leave the complete key ring when the car is left for service. It may be necessary to ask the customer about the "normal" key ring. Verify that starter motor gets power and is functioning properly.

START PREVENTED TRY AGAIN

The above text message may be displayed in the DIM.

Verify all ignition positions through VADIS together with other immo communication parameters.

No Crank, Text (in DIM), DTC

Text "Immobilizer start prevented"

DTC 6C41	ICK short to plus
DTC 6C42	ICK short to gnd/OC
DTC 6C43	IDS short to plus
DTC 6C44	IDS short to gnd/OC
DTC 6C46	IAU internal fault
DTC 6C48	Wrong, not programmed, not recognized or no transponder in key currently inserted
DTC 6C49	Wrong transponder response

ICK = Immo clock, IDS = Immo data signal, IAU = antenna

Points towards antenna ring or key, but can randomly occur due to other communication disturbances. NOTE! If this has been a single incident, it is not likely to be a faulty antenna ring. Check counters in the Vehicle communication / extended fault-tracing information window.

Crank - No Start

If a S60, V70, V7OXC, or S80 vehicle cranks but does not start there may be a CAN communication problem in the high speed network. This can be verified by checking CAN related fault codes from all nodes.

A crank and no start situation occurs also if the CEM is in pre-set mode, i.e. the diagnostic command for security access (code handling) has been sent to the CEM, but the command for closing the security access is not sent. This may occur after programming a CEM or installing new keys. "Crank - No start" can also occur if ECM and CEM are not coded to each other. (E.G. If for some reason the ECM has already been programmed to another car.)

Crank, Start and Stall

Crank, start and stall can occur if the ECM and GEM are not coded together in a certain circumstance,

If you turn the key very quickly from position 2 to position 3 the ECM may do a "prestart" . When the immobilizer communication gets NOK the ECM will then stall the engine.

For the normal symptom when ECM and GEM are not coded together, see above.

Tips and hints

^ Check the keys you get as spare parts. There is a red dot for S60, V70, V70XC, and S80 cars.

^ Make sure to check that coil is energized in the S60, V70, V70XC, and S80 starter motor relay. A volt meter can make you draw the wrong conclusions since you will measure 0V constantly on relay.

^ Use VADIS to check the key inserted in the ignition and all activity between key and CEM (very useful).

^ Check for "low relay" for the ECM and TCM.

^ Verify the function of any new key which has been programmed to the vehicle. If any of the keys fail to crank the vehicle, this may be due to a

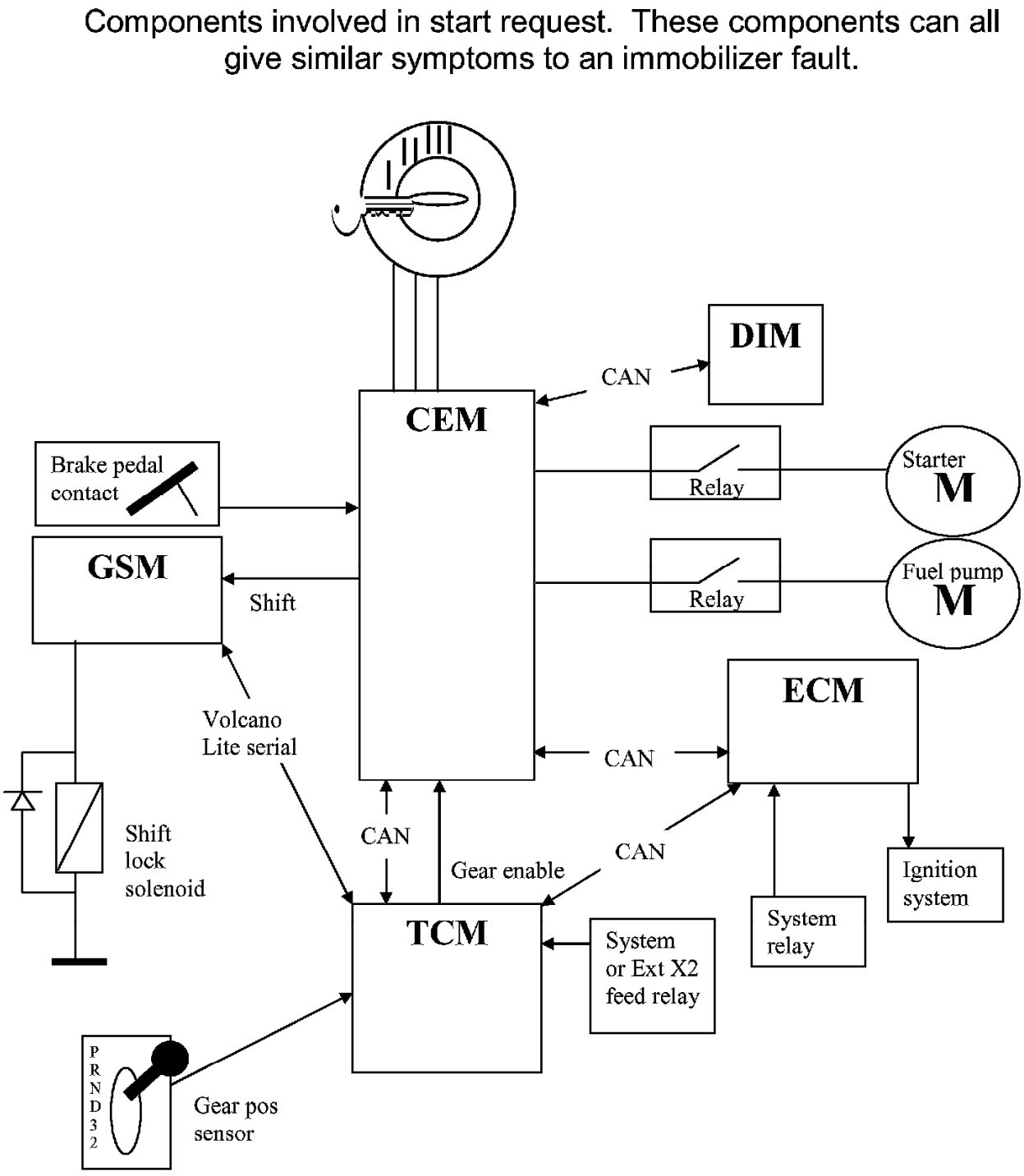
key programming error, not immobilizer system failure.

Quick Sheets:

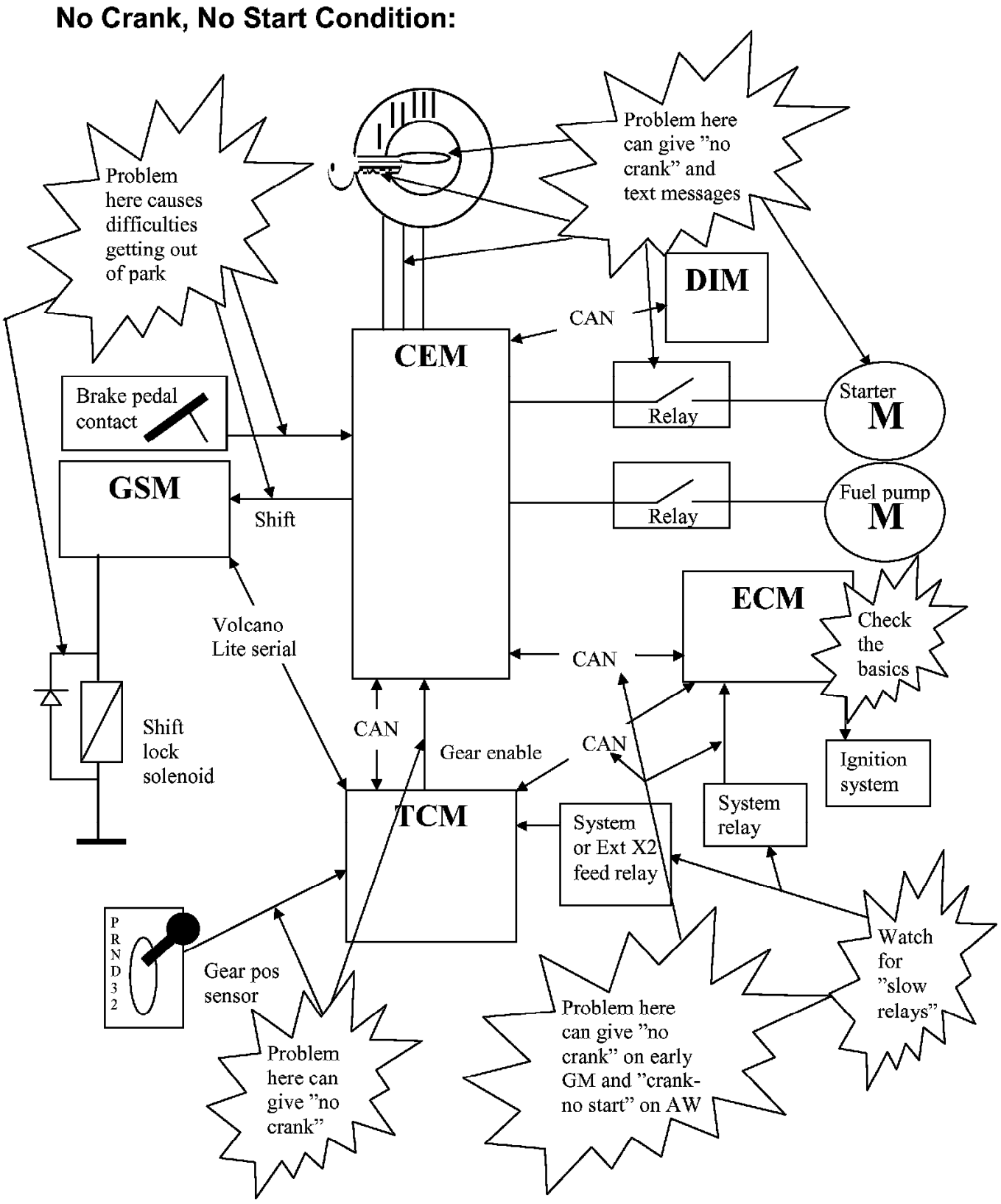
This section provides examples of possible faults based on various cranking conditions: No crank, no start; Crank, no start; Start - stall.

This section is intended to provide a graphical overview of the components involved in cranking and starting.

Note! This is NOT to be viewed as the only possible causes. Refer to the section SYMPTOM OVERVIEW for more detailed information.

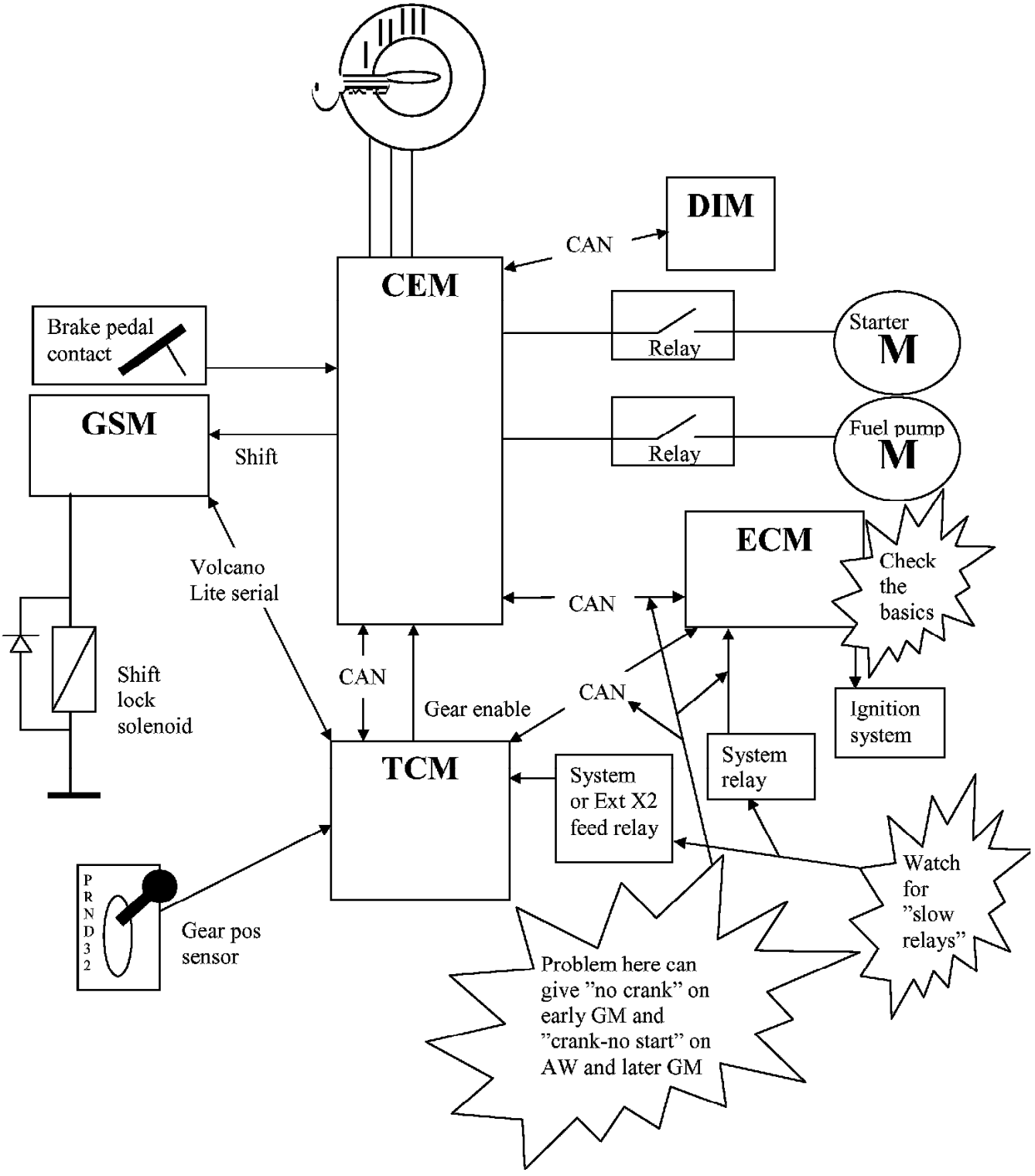


Components involved in start request. These components can all give similar symptoms to an immobilizer fault.



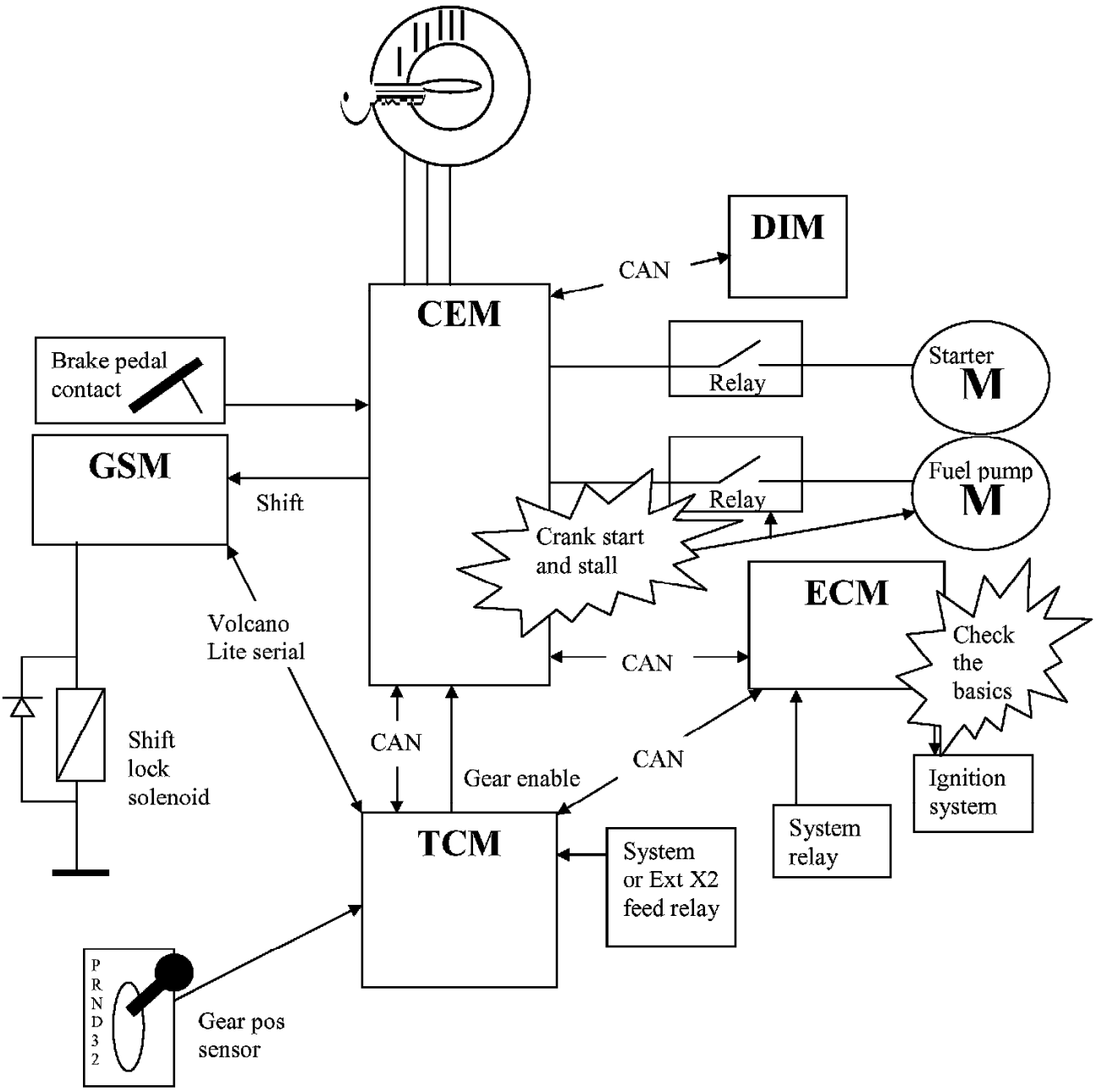
No Crank, no Start Condition:

Crank, No Start Condition:



Crank, No Start Condition:

Start - Stall Condition:

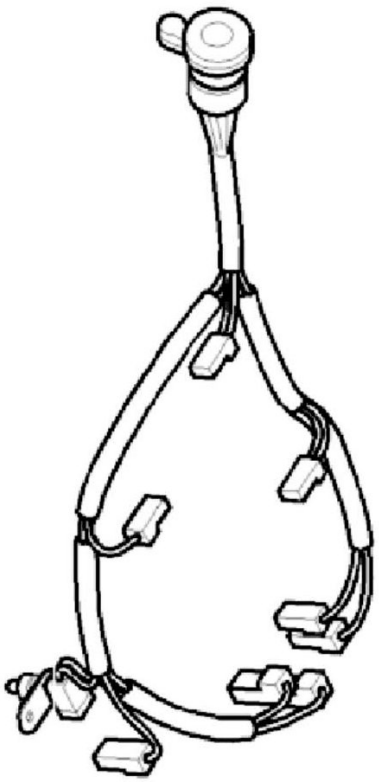


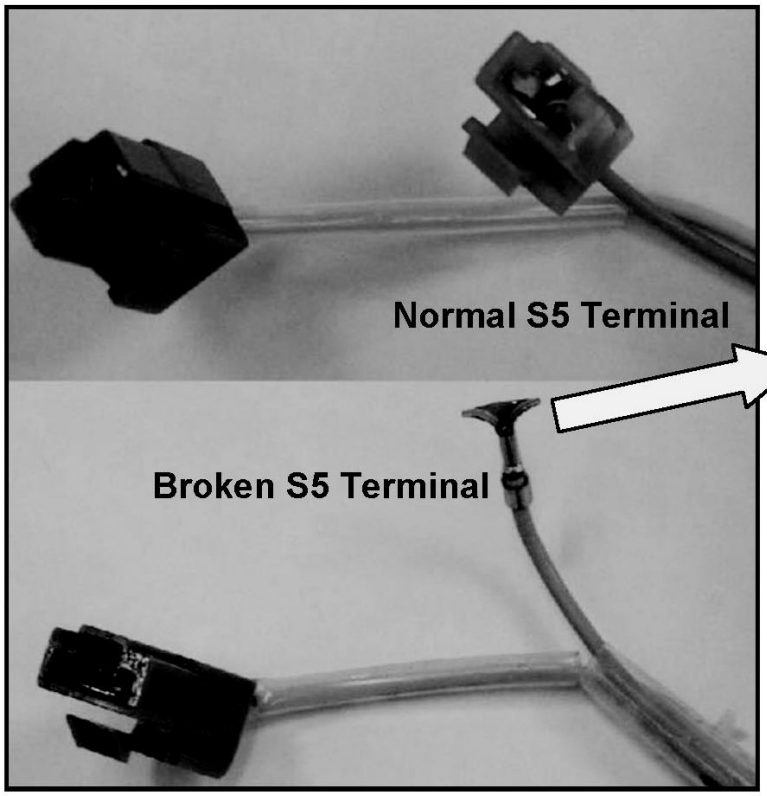
Start - Stall Condition:

Technical Service Bulletin # **TNN43-49** Date: **060406**

A/T AW55 - TCM DTC's 010A, 010B, 010C

NO: 43-49
DATE: 04-06-2006
MODEL: S40, V50, S60, V70, XC70, S80, XC90 with AW55 Transmission
YEAR: 2004-2005
SUBJECT:
AW55 TCM DTC 010A, 010B, 010C Shift Solenoid S5 signal low, high or missing





DESCRIPTION:
A likely cause for a DTC related to the S5 solenoid (010A, 010B, 010C) in the AW55 transmission on a model year 2004 or 2005 vehicle is a broken wiring terminal at the solenoid.

SERVICE:
Follow the VIDA fault tracing for these DTCs. Repair or replace the valve body wiring harness if necessary.Technical Service Bulletin #
TNN40-04 Date: **051013**

A/T, M/T, AWD - Approved Lubricants

NO: 40-04

DATE: 10-13-2005

MODEL/YEAR: All Models

SUBJECT:

Application	Note	Part Number
• 5 and 6 Speed Automatic Transmissions -AW55 -TF80-SC This fluid is also recommended to address two complaints on the AW 50-42: •Harsh Lock-Up engagement/disengagement (SB 43-0029) •Squeaking noise during low speed turns (TNN 43-11)	JWS 3309 The only oil approved for the 5 and 6 speed automatic transmissions is JWS 3309. None of the other fluids available on the market have been evaluated by Volvo to meet the requirements of these specific transmissions regarding: • Shift quality • Slipping lock-up functionality • Transmission durability	1161540 (1 liter) 1161640 (4 liter)
• 4 Speed Automatic Transmissions -GM4T65EV -AW50-42 -AW30-40/43 -AW70/71/72 -ZF22	Dexron IIIG or IIIH	1161621 (4 liter)
• 5 and 6 Speed Manual Transmissions -M56 -M66 • Chain Housing -XC90 T6	API GL4, Synthetic	1161745 (1liter)
• Angle Gears (All)	API GL5, BOT	1161648 (1 liter)
• AOC (Active On-Demand Coupling)	Specific oil for the AWD clutch	1161641 (300 ml)
• Rear Differential (200/700/900 with optional limited slip)	API GL5, with limited slip additive	1161619 (1 liter)
• Rear Differential (All Others)	API GL5, low friction	1161620 (1 liter)
• Cleaning Manual Transmission Input Shafts	Sprayable mineral based grease	1161657 (200 ml)
• Lubricating Manual Transmission Input Shafts	Sprayable PFPE grease	30759651 (150 ml)
• Lubricating AWD spline interface -splines between transmission and angle gear	Lithium grease with PAO base	1161748 (10 ml)

Transmission and AWD Lubricants

REFERENCE: Owners Manual and VIDA

Technical Service Bulletin # **TNN36-48** Date: **040902**

Electrical - Fuse Box Label Error

NO: 36-48
DATE: 9-2-2004
MODEL: 860, 880, V70, XC70
M. YEAR: 2005
SUBJECT: Fuse Position Error DDM / PDM in Wiring Diagram and Decal
REFERENCE:

DESCRIPTION:

The fuse decal (P/N 30728024) which is located inside the lid of the fuse panel at the end of the driver's dashboard, is incorrect for S60, V70 and S80 M/Y 2005. The printed positions of fuses for the DDM and PDM have been switched.

Also, Wiring Diagrams TP 3976xx1 (S60, 880) and 3977xx1 (V70, XC90) have the same error.

Correct information about fuse positions:

Driver Door Module, DDM = Fuse # 11/C:5

Passenger Door Module, PDM = Fuse # 11/C:4

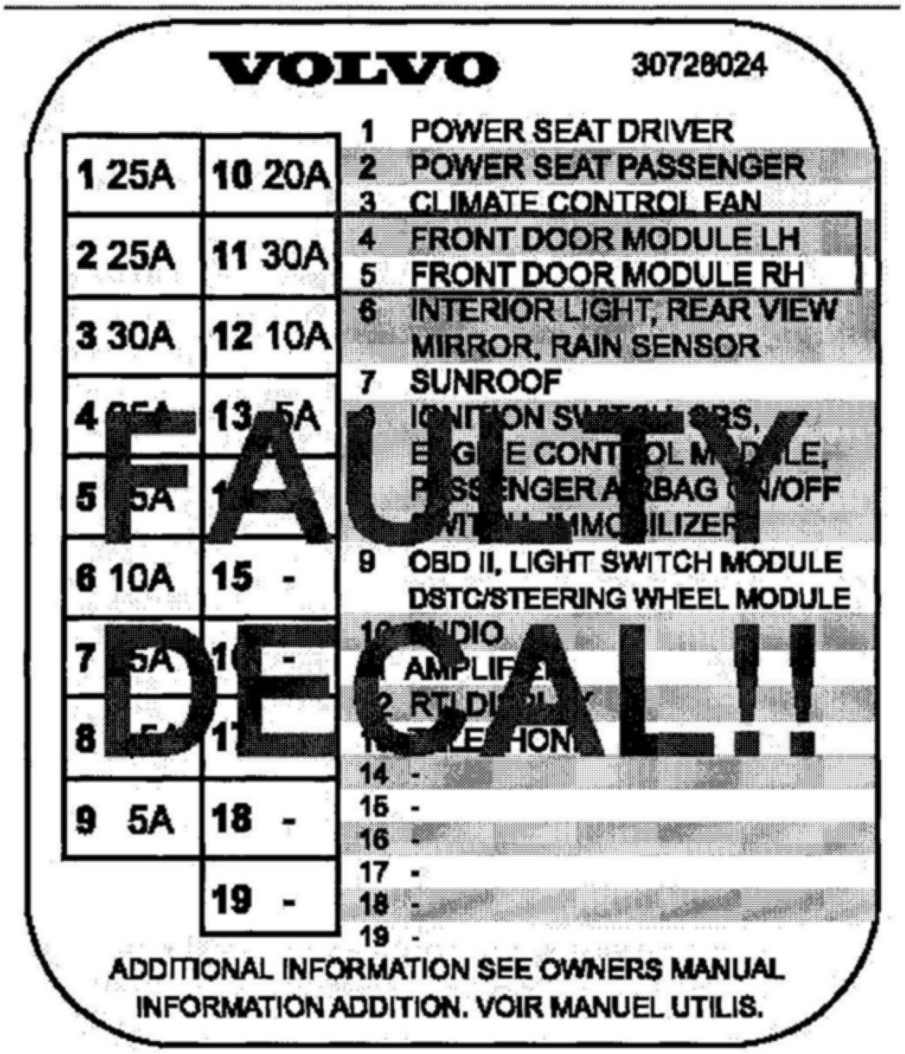
Note:

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Owner's Manuals are OK.

SERVICE INFORMATION PRODUCT UPDATE:

Updated Wiring Diagrams for S60, V70 and S80 will be available in November.



New decal will be available in Volvo production at the end of August 2004, P/N 30728433.

This decal will be available as a spare part later in 2004.Technical Service Bulletin # **TNN39-52** Date: **060209**

Electrical - Wiring Connector Labeling Addition

NO: 39-52

DATE: 2-09-2006

MODEL:
All Models 2005-

CHASSIS:

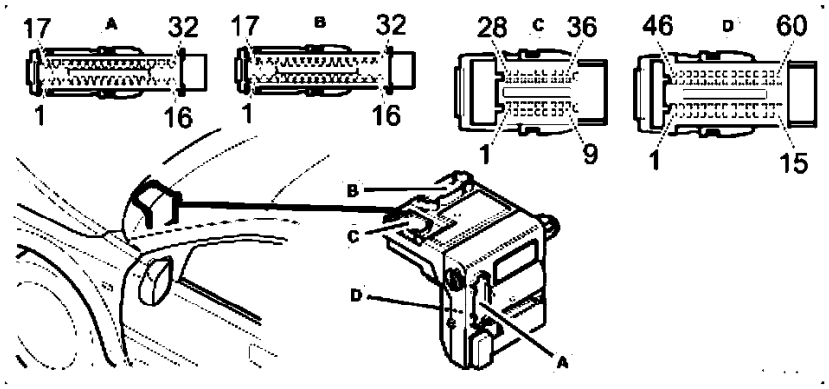
SUBJECT:
Wiring Diagram Component Illustrations for CEM and REM

REFERENCE:
TP 3988202, TP 3989202, TP 3990202

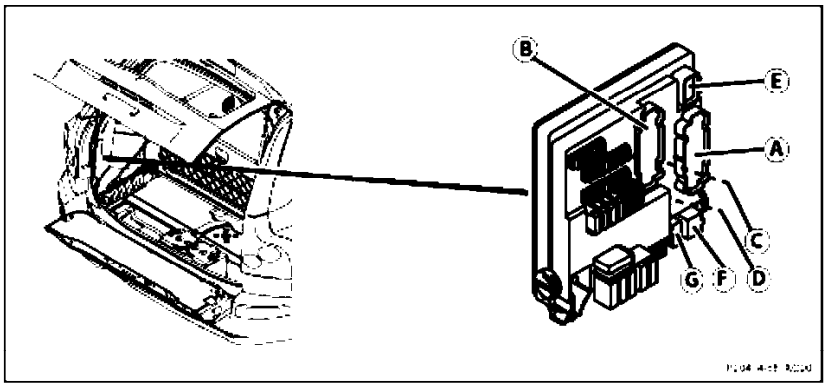
DESCRIPTION:

TP 3988202 WIRING DIAGRAM S60/S60R/S80 2006
Page 190
Illustration 4/56 CEM: Near the illustration, note "See TNN 39-52 for connector labels."
Illustration 4/58 REM: Near the illustration, note "See TNN 39-52 for connector labels

4/56 Central Electronic Module (CEM) S60V70/XC70/S80/XC90

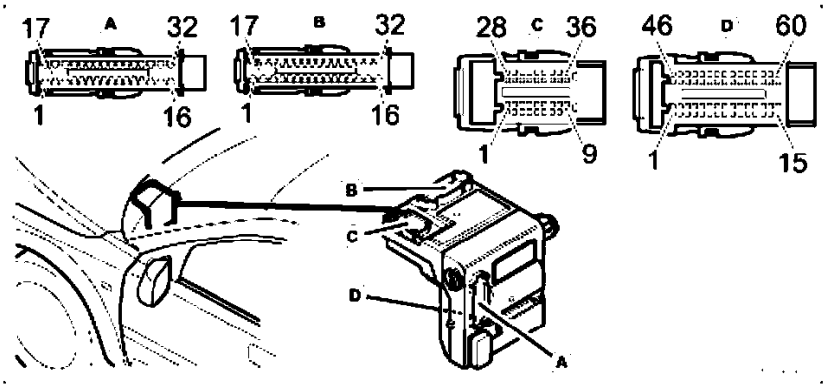


4/58 Rear Electronic Module (REM) S60/V70/XC70/S80/XC90

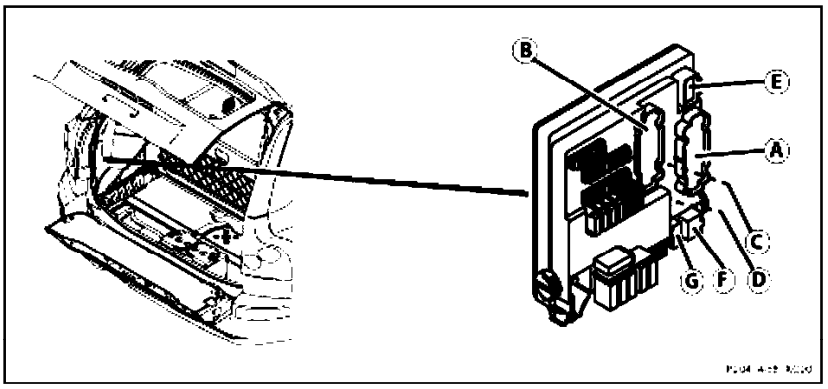


TP 3989202 WIRING DIAGRAM V70/V70R/XC70/XC90 2006
Page 249
Illustration 4/56 CEM: Near the illustration, note "See TNN 39-52 for connector labels."
Illustration 4/58 REM (V70) and 4/58 (XC90): Near the illustrations, note "See TNN 39-xxx for connector labels.

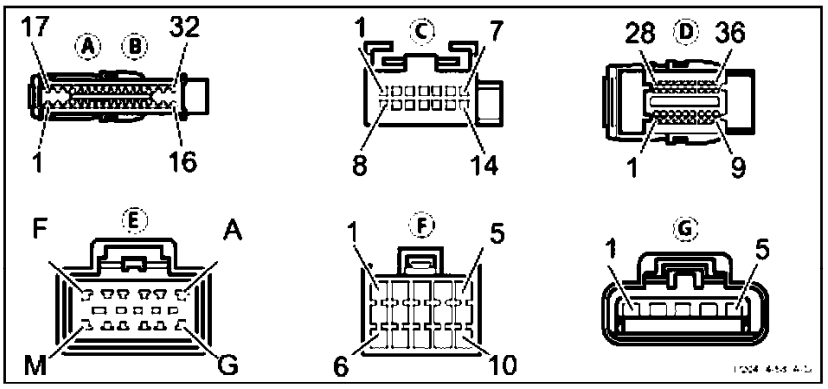
4/56 Central Electronic Module (CEM) S60V70/XC70/S80/XC90



4/58 Rear Electronic Module (REM) S60/V70/XC70/S80/XC90

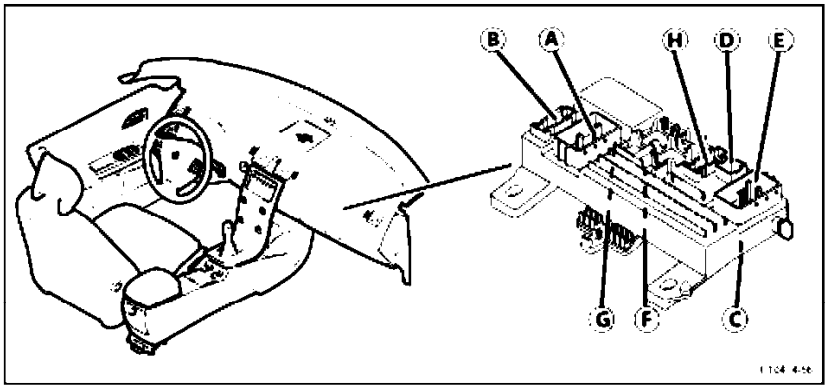


4/58 Rear Electronic Module (REM) S60/V70/XC70/S80/XC90

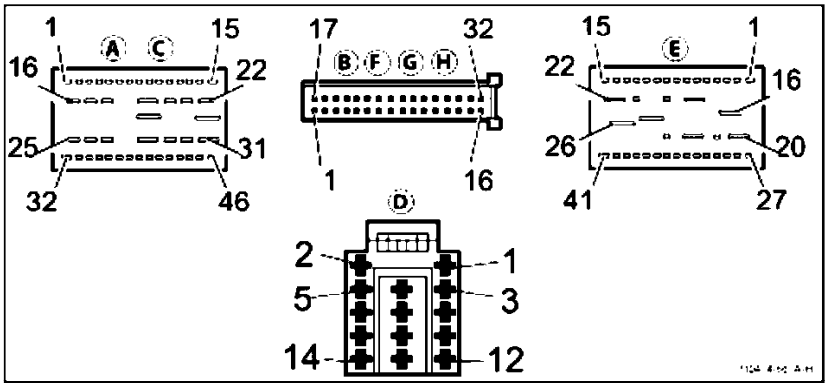


TP 3990202 WIRING DIAGRAM S40(04-)/V50 2006
Page 207
Illustration 4/56 CEM: Near the illustration, write a note to "See TNN 39-52 for connector labels."

4/56 Central Eletronic Module (CEM)



4/56 Central Eletronic Module (CEM)



The component illustrations in these books did not label the connectors. This Tech-Net Note provides updated illustrations with labeled connectors.

Either write in the indicated changes or print copy(s) and place them in the appropriate page in the wiring diagram book.

Technical Service Bulletin # **TNN43-45** Date: **040604**

A/T/Ignition - Shift Interlock Cable Clip Service

NO: 43-45

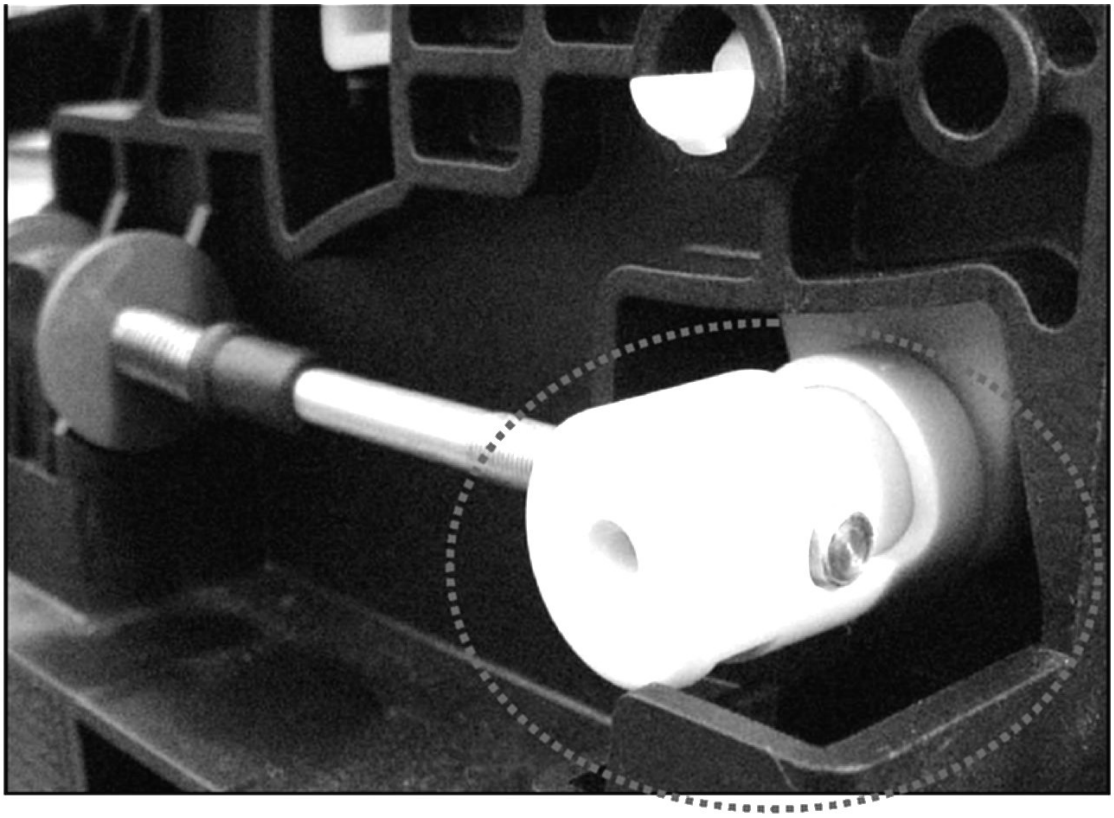
DATE: 6-4-2004

MODEL:
1999-S80, 2001- S60/V70/XC70/XC90

CHASSIS:
All

SUBJECT:
Ignition Interlock Cable Clip

DESCRIPTION:



The yellow plastic ignition interlock cable clip can be damaged when it is unlocked to perform a repair. Because of this, it should be replaced with a new clip (PN 30711794) whenever it is unlocked. Future VADIS versions will reflect this change in repair method.

Technical Service Bulletin # **TNN21-18** Date: **040504**

Body/Frame - Squeaking/Crunching Noise When Wet/Cold

NO: 21-18

DATE: 5-4-2004

MODEL:
S60, 2001 - S80, 1999 - V70, V70 XC, XC 70 & V70 AWD, 2001 - XC90, 2003 -

CHASSIS:
See chart below

SUBJECT:
Sub Frame Squeaking Noise

REFERENCE:
VADIS

DESCRIPTION:

Under certain conditions when driving in cold and or wet weather a squeaking or crunching type noise may be heard from the vehicle sub frame bushings.

Vehicle Type	Plant	Chassis #
184	21	377934 -
275	21	116392 -
285	21	438489 -
295	22	165147 -
384	22	408514 -

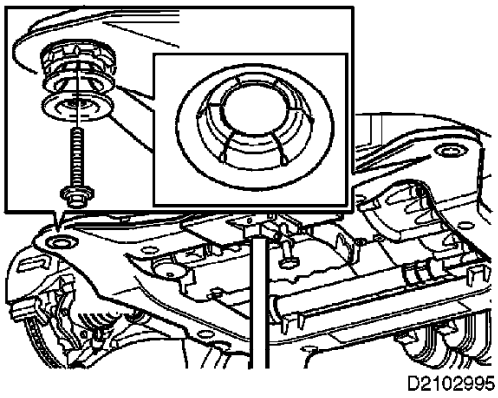
This noise may be more noticeable during low speed maneuvers or when braking at low speeds. From the chassis break point shown a new insulating washer PN 30660816 has been introduced in production and is available as a service solution. If the customer should experience this condition and the vehicle is below the chassis # listed the sub frame washers should be installed.

Description	Quantity	P/N
Washer	4	30660816
Bolt	4	981062

Parts Information

Service:

1. Support the front of the sub frame using a suitable jack.

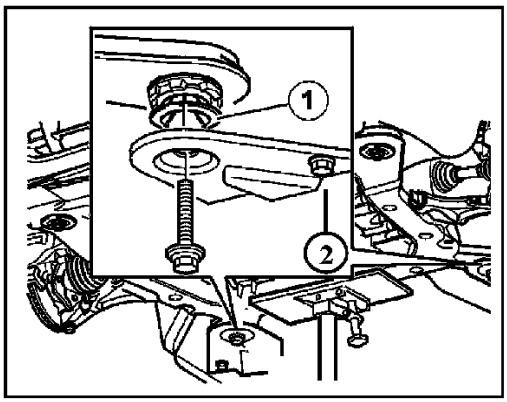


Remove the front bolts from the sub frame. Install the plastic washers PN 30660816 between the steel plate and the bushing as illustrated.

Use new bolts PN 981062 and torque to 105 Nm, + 120°.

2. Support the rear of the sub frame using a suitable jack.

Loosen the bolts (2) for the sub frame brackets 5 turns.



Remove the sub frame bolts. Install the plastic washer (1) between the plate and the bushing as illustrated.

Use new bolts PN 981062 and torque to 105 Nm, + 120°.

Torque the bolts (2) for the brackets to 50 Nm.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION		LABOR TIME
99151-2	Washer fixing point sub-frame front install	S60/V70/XC70/S80/XC90	0.4

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty Information

Technical Service Bulletin # **TNN85-25** Date: **041207**

Interior - Front Seat Slide Rail Adjustment

NO: 85-25

DATE: 12-07-2004

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

MODEL:
S60 (01-)/V70 (01-)/V70XC and XC70 (01-)/S80 (99-)/XC90 (03-)

SUBJECT:
Mechanical front seats, adjusting seat slide rail locking position.

DESCRIPTION:

This TNN describes the method for proper front seat slide rail adjustment after replacing or removing a seat from the vehicle. If this is not properly done, front seat movement under acceleration or deceleration might be experienced.

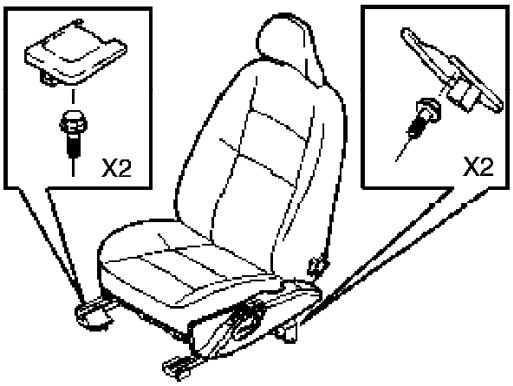
CHECKING PARALLELISM:

Verify that each adjustment mechanism can be locked individually to ensure that there is no problem with the slide rail lock mechanism (due to damage or foreign objects).

Sit on the seat. Lock one side and move the other side of the seat forward and rearward to determine if the seat adjustment mechanism must be moved forward or rearward in relation to the slide rails.

ADJUSTING THE SLIDE RAILS:

Step 1:



Remove the four cover panels for the slide rail bolts.

Unscrew front and rear slide rail bolts a couple of turns but do not remove them.

Step 2

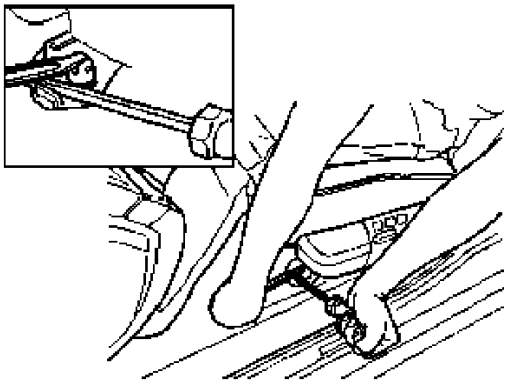
Check if both adjustment mechanisms can lock at the same time in each slide rail now that the slide rail bolts are loosened.

If both slide rails can be locked at the same time, tighten all bolts to 29.50 Lb ft (40 Nm).

Start with the front bolts, then rear bolts and proceed with step 4.

If the slide rails cannot be aligned, proceed with step 3.

Step 3:



Press one slide rail forward/rearward based on the result of step 1. While doing so, tighten the front bolt. Then tighten the rear bolt of the same rail. Make sure that the slide rail is locked when this is done.

Next, check that both sides can lock at the same time by sitting on the seat and adjusting its longitudinal position. With both slide rail mechanisms locked, tighten the two remaining loose bolts (front and rear). Check that the longitudinal position and height of the seat can be adjusted.

If the function is still not OK, start adjusting the other rail according the method described above and work in the opposite direction. Finally, tighten all four bolts to 29.50 Lb ft (40 Nm). Reinstall the cover panels.

Step 4:

Check the longitudinal and height position of the seat. If you can still feel play and hear a clicking sound see Service Bulletin 850036 for reducing the play/clicking sound at the lower mounting points of the front height adjuster.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
85968-2	Front seat slide rail adjustment, 1 side	0.3 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty InformationTechnical Service Bulletin # **TNN36-49** Date: **050516**

Keyless Entry - Remote Transmitter Intermittently Inop.

NO: 36-49

DATE: 0516-2005

MODEL/YEAR: S60, S80, V70, XC70 and XC90.

M. YEAR: MY O5

SUBJECT:
Key Integrated Remote Control, Intermittent function

CHASSIS:
S60 468280-485113
S80 407494-415649
V70 500355-522330
XC70 193327-204897
XC90 190567-218294

REFERENCE: VADIS/VIDA repair instruction

DESCRIPTION:

Customers may report an intermittent function of the Key Integrated Remote Control (KIR).

This can be caused by a slightly misplaced battery spring clip connection.

Potential affected vehicles;

^ Cars with reported complaints of intermittent KIR functions within the above chassis limit

^ Cars undergoing Customer Preparation Service (CPS) within the above chassis limits

These vehicles shall have both KIRs checked and adjusted.

This TNN describes how the KIRs can be checked and corrected.

SERVICE:

^ Use cotton or latex gloves during handling of complete KIR assembly and battery to prevent cosmetic damage to the KIR and depositing oils on the battery and its contacts.

^ The tool to be used for removal of the KIR battery cover and for adjusting the battery spring clip shall be a bone tool or a similarly blunt edged soft tool.

^ When battery is replaced it must be possible to read "Panasonic" on top of battery, i.e. the + pole is upwards.

^ Function test must be performed after battery check. Lock and unlock the car by using KIR buttons.

Step 1

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Instruction:
Remove battery cover from the KIR with a bone tool. Use gloves during handling.

Step 2

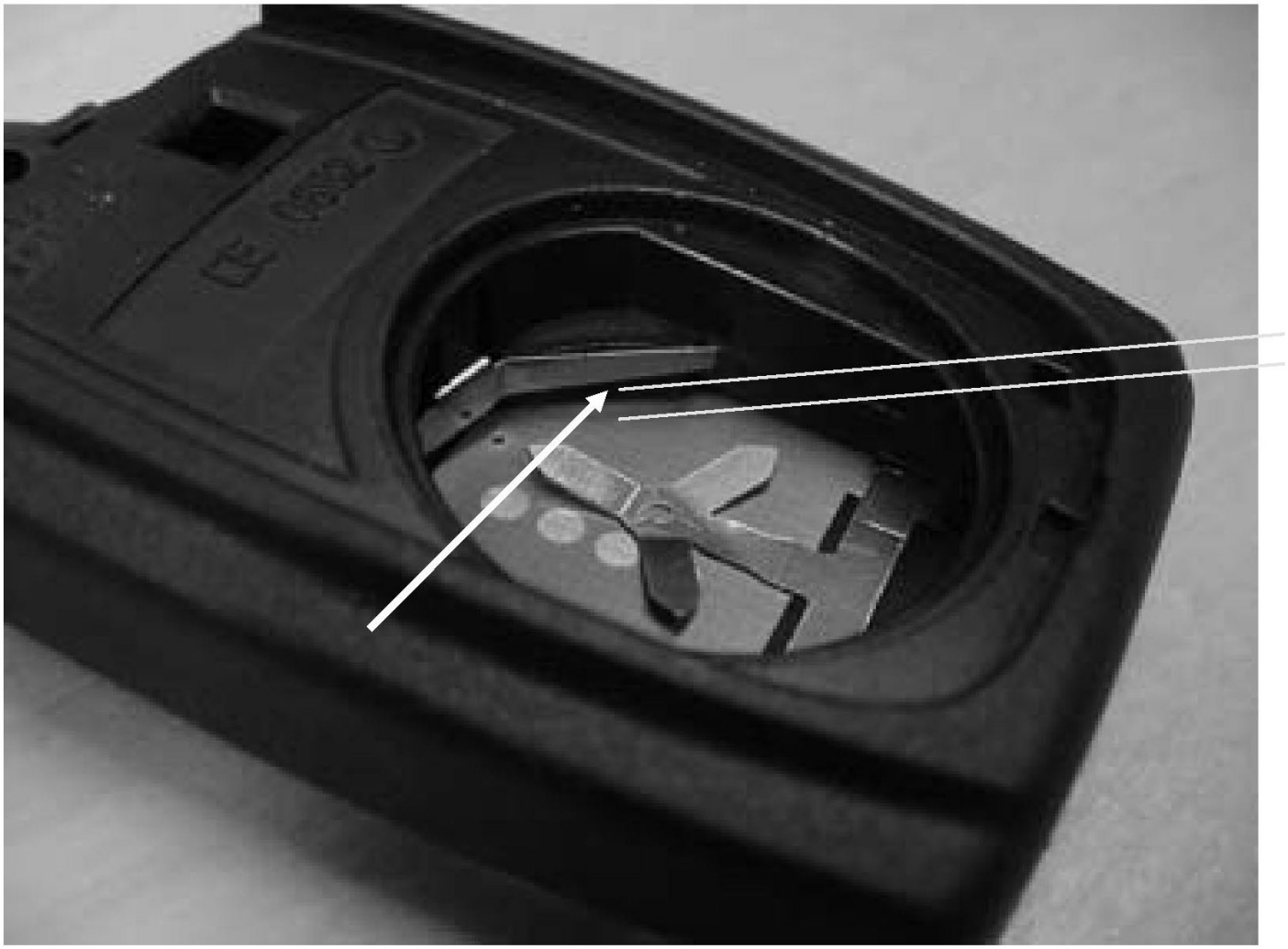
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Instruction:
Turn the KIR with battery facing downwards. Shake gently and if battery falls out, proceed to Step 3, otherwise reinstall battery cover.

Step 3

Instruction:
Place upward force on Spring Battery holder (Right Hand Side) as shown above using a bone tool.

Step 4



Instruction:
Apply force as described in Step 3 until a visible gap occurs between the Printed Circuit Board, PCB (green color surface) and metallic spring clip.

Step 5

Instruction:
Reinstall Battery putting downward force on battery. When battery is reinstalled it must be possible to read '~Panasonic" on top of battery, i.e. the + pole is upwards.

Step 6

Instruction:
Repeat Step 2 to make sure battery is now secure. If not secure repeat Step 3

Step 7
Replace the battery cover. Function test must be performed after battery check.
Lock and unlock the car by using KIR buttons.

LABOR OP	LABOR DESCRIPTION	LABOR TIME
99287-2	Remote control (KIR) ignition key adjustment	0.1hr

Claims may be submitted under the New Car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION Technical Service Bulletin # **TNN87-51** Date: **050715**

A/C - Stops Working Intermittently

NO: 87-51
DATE: 07-15-2005
MODEL: S60, S80, V70, XC70, XC90.
M. YEAR: MY05
SUBJECT: A/C System Intermittently Stops Working. Possibly Overcharged.
REFERENCE: VIDA

DESCRIPTION:
Under specific conditions, high temperatures and stop and go traffic, the A/C system may intermittently stop working. For cars with this symptom, check if the A/C system is filled with the correct amount of refrigerant. If the A/C system is found to be overcharged, refill the system with the correct amount of refrigerant.

MODEL	CHASSIS No.
S60	471445 - 500000
S80	409455 - 426000
V70 (Factory 22 - Belgium)	505663 - 530000
V70 (Factory 21 - Sweden)	506584 - 530000
XC70	195820 - 208000
XC90	196988 - 224000

VEHICLES AFFECTED:

Note:
The chassis ranges only indicate that a limited number of cars within these range are affected!

SERVICE METHOD:
For cars with a complaint as in the description above, verify the correct filling amount of refrigerant by evacuating the A/C system.

From the lower chassis numbers listed in the chassis number list above, the filling amount was reduced due to a new smaller condenser and new smaller receiver dryer.

If the A/C system is found to be overcharged, refill the system with the correct amount of refrigerant (see reference table). The correct filling amount can also be found on the A/C label in the engine compartment.

If the system was found to be charged correctly, continue with normal fault tracing.

CARS WITH NEW STYLE RECEIVER DRYER/CONDENSER (after breakpoints listed above)		
Variant	Correct A/C filling amount	Correct A/C label
S60, V70, XC70, S80 and XC90 with front A/C only.	1.54 lb. (700g)	30734536
XC90 with dual A/C.	2.31 lb. (1050g)	30734539

CARS WITH OLD STYLE RECEIVER DRYER/CONDENSER (prior to breakpoints listed above)		
Variant	Correct A/C filling amount	Correct A/C label
S60, V70, XC70, S80 and XC90 with front A/C only.	2.17 lb. (1000g)	9454292
XC90 with dual A/C.	2.87 lb. (1300g)	9454489

Overview with correct filling amounts & correct labels shown.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
87001-2	Refrigerant draining	0.6 hr
87003-2	Vacuum pumping/filling air conditioning	0.8 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN39-49** Date: **050823**

Audio System - AM Static Caused By PEM, Turbo Cars Only

NO: 39-49

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

DATE: 8/23/2005
MODEL:
XC70 173000-191800
S60 315000 - 462700
V70 349000 - 498300
S80 335000 - 406200
M. YEAR: 2004 & 2005
SUBJECT:
AM-Radio Static on Turbo Cars, Caused by PEM.
REFERENCE: VIDA

DESCRIPTION:
Analysis has found that the PWM (Pulse Width Communication) between the Engine Control Module (ECM) and the PEM (Pump Electric Module) can induce a whining noise on the lower frequencies of the AM-band.

From MY 2005 the PEM was introduced on all Turbo models.

PRODUCT MODIFICATION:

From 2005 week 4 (see chassis number limitations in header) a ferrite has been introduced in the cable harness to the PEM. This will minimize the noise on the AM-band.

SERVICE:
Install the service kit according to the instruction shown.

Material

Description	Quantity	Part No.
Ferrite Kit. (service solution 1), S60R, V70R, engine code 52 (B5254T4), Model year 2004 only. See steps 1 - 8.	1	30724619
Ferrite.Kit (service solution 2), S60, V70, S80, engine code 59 (B5254T2) with steel tank, model year 2004 only. See steps 9 - 13.	1	30739381
Ferrite Kit. (service solution 3), S60, V70, S80, engine codes 54 (B5244T5), 52 (B5254T4), 59 (B5254T2), 91 (B6294T), Model year 2005. all turbo engines See steps 14 - 21.	1	30739380

Special tools

Description	Part No.
Dismantling tool	951 2853
Dismantling tool	951 2639

Material

Service solution 1

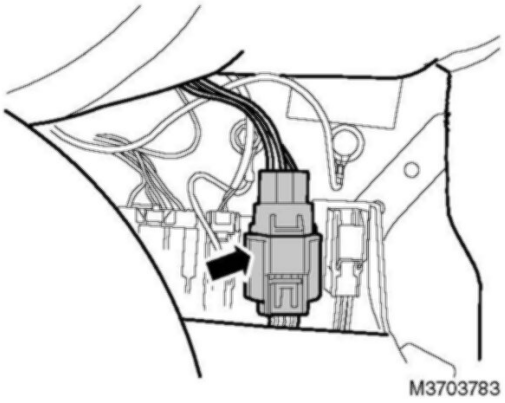
S60R, V70R, engine code 52 (B5254T4),
Model year 2004 only. Steps 1-8.

1.

Exposing connectors
Lift up the rear seat cushion, see:
Removal, replacement and installation
Body and interior
Interior
Rear seat, passenger seat, seat
Upholstery seat cushion, replacing

Lift the insulation on the right side and expose the connectors.
Dismantling

2.

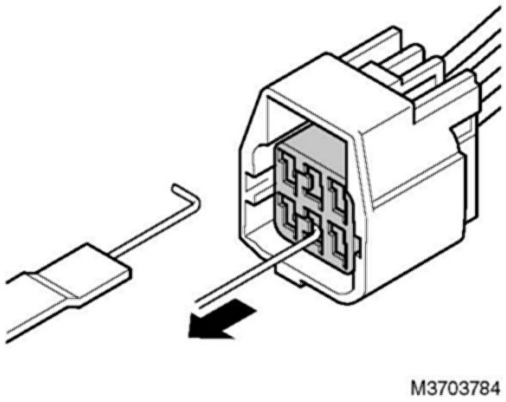


Dismantling connector
Remove the six-pin connector from the attaching plate.
Unplug the connector.

Removal

3.

Remove secondary lock



Release the catch and pull out the secondary lock.
Use dismantling tool 951 2853 or a radio screwdriver, see figure.

4.

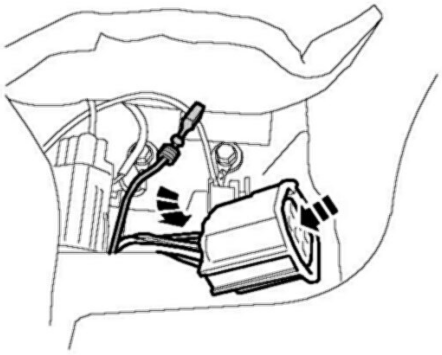
Remove cable

Remove the yellow cable in position 6. Use dismantling tool 951 2639, see figure.

Installation

5.

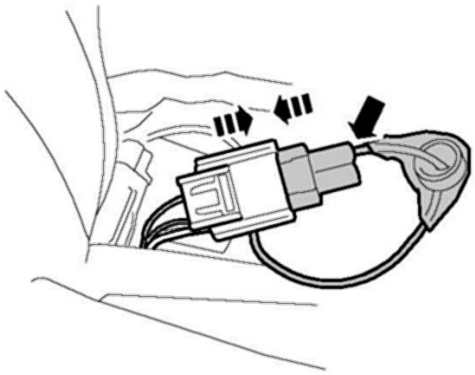
Install service kit



M3703686

Install the removed cable in position 1 of the loose connector that comes with the service kit.
Check that the terminal locks securely.
Press in the secondary lock.
Install the service kit's terminal in the unoccupied slot of the vehicle's connector (where the yellow terminal was removed from)

6.

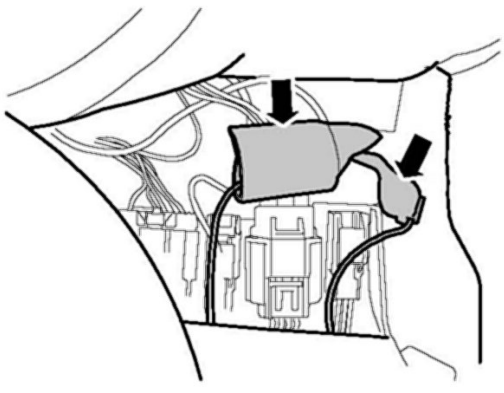


M3703787

Install both connectors.

7.

Install foam tape

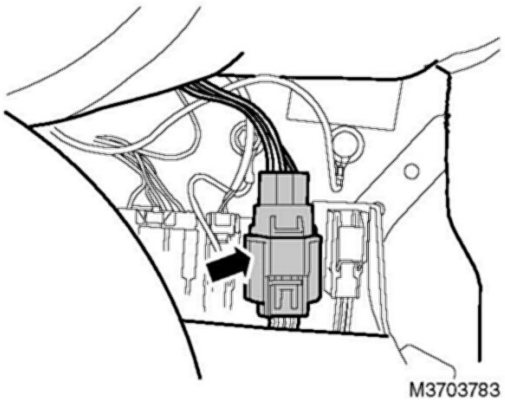


M3703788

Wrap foam tape around the two-pin connector.

8.

Install connector



Press in the new connector under the plastic protection and secure the six-pin connector on the holder.
Restore the insulation and reinstall the seat cushion.

Service solution 2

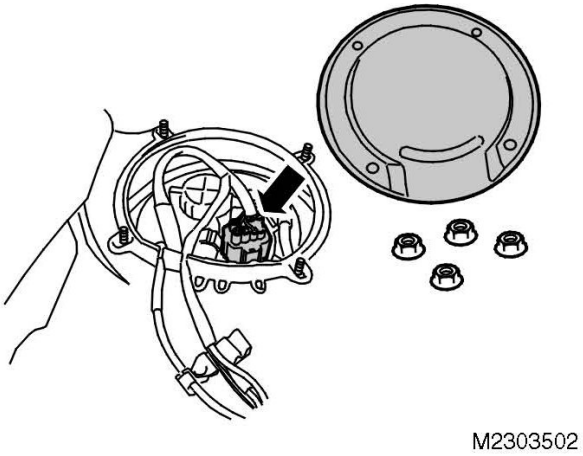
S60, V70, S80, engine code 59 (B5254T2) with steel tank,
Model year 2004 only. Steps 9 - 13.

9.
Exposing connector

Lift up the seat cushion and remove the backrest, see:
Removal, replacement and installation
Body and interior
Interior
Rear seat, passenger seat, seat
Upholstery seat cushion, replacing
Upholstery back rest, replacing

Removal

10.
Remove cover for fuel pump



M2303502

Remove:

^ Nuts, 4 pcs.

^ Cover

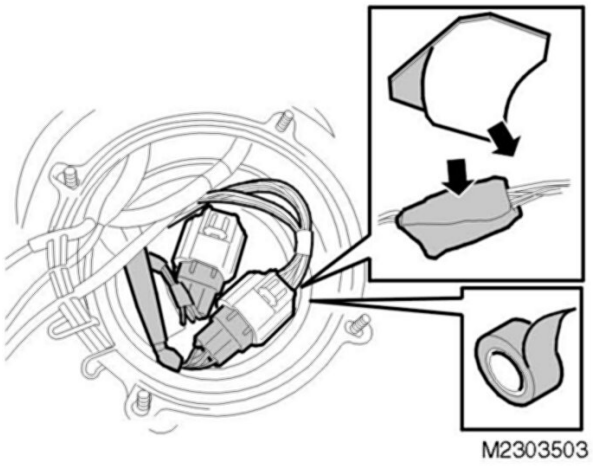
^ The six-pin connector.

Installation

11.

Install service kit

Install:



M2303503

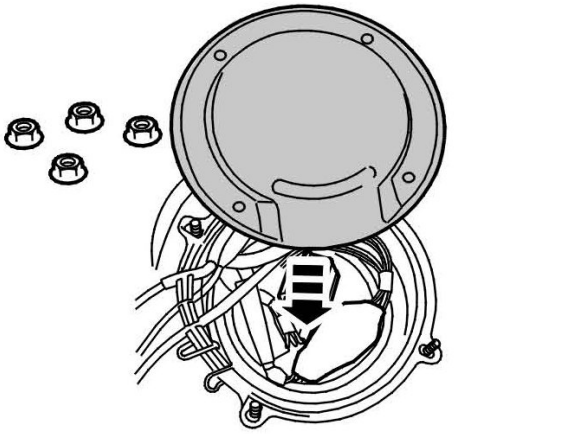
^ adapter cable harness between the fuel pump and the cable harness

^ Foam tape around the loose connector.

Fix the connector on the tank with the supplied tape.

12.

Install cover for fuel pump



M2303501

Install:

^ Cover

^ Nuts, 4 pcs. Tighten with 10 Nm.

13.

Install backrest and seat cushion
Install backrest and seat cushion, see:
Removal, replacement and installation
Body and interior
Interior
Rear seat, passenger seat, seat
Upholstery seat cushion, replacing
Upholstery back rest, replacing

Service solution 3

S60, V70, S80, engine codes 54 (B5244T5), 52 (B5254T4), 59 (B5254T2), 91 (B6294T),
Model year 2005. All turbo engines. Steps 14 21

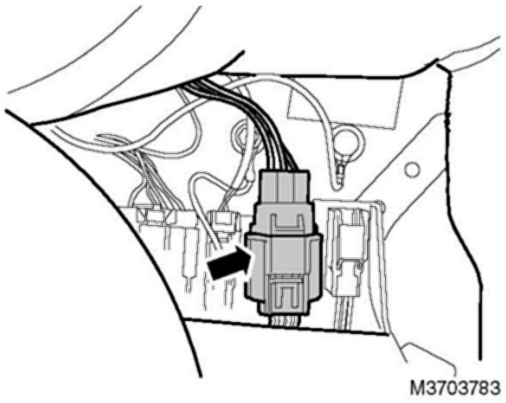
14.

Exposing connector

Lift up the rear seat cushion, see:
Removal, replacement and installation
Body and interior
Interior
Rear seat, passenger seat, seat
Upholstery seat cushion, replacing
Lift the insulation on the right side and expose the
connectors.

15.

Dismantling connector

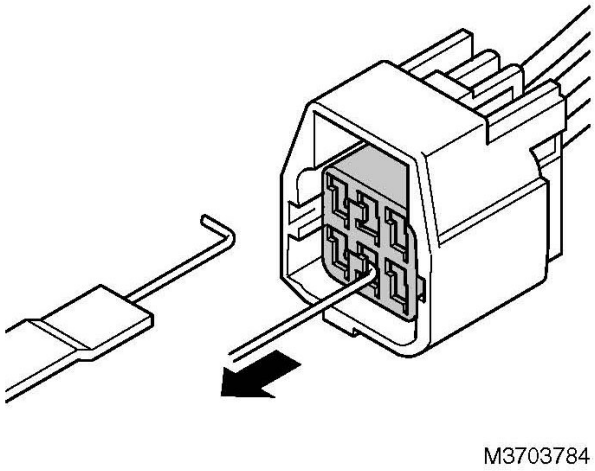


Remove the six-pin connector from the attaching plate. Unplug the connector.

Removal

16.

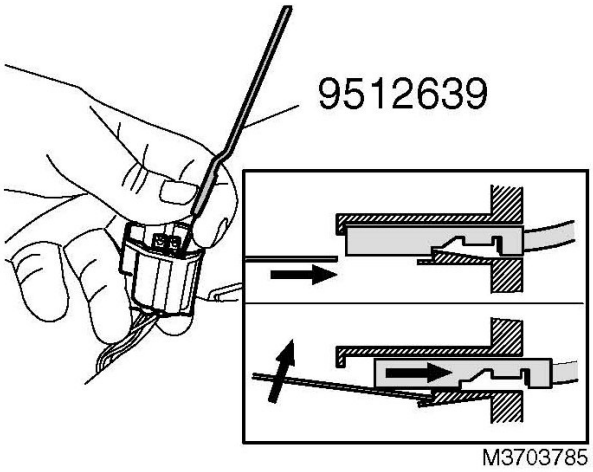
Remove secondary lock



Release the catch and pull out the secondary lock. Use dismantling tool 951 2853 or a radio screwdriver, see figure.

17.

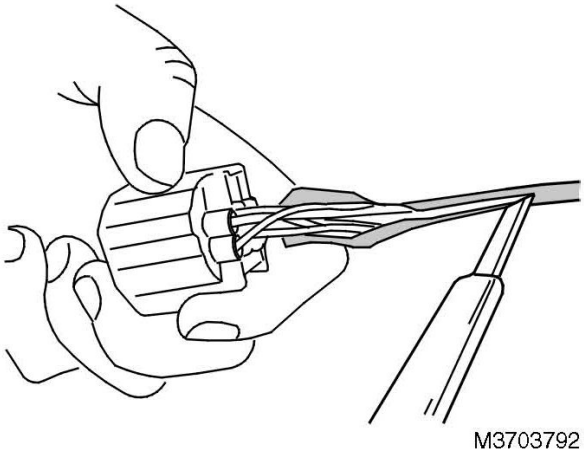
Remove cable



Remove the yellow cable in position 6. Use dismantling tool 951 2639, see figure.

Dismantling

18.



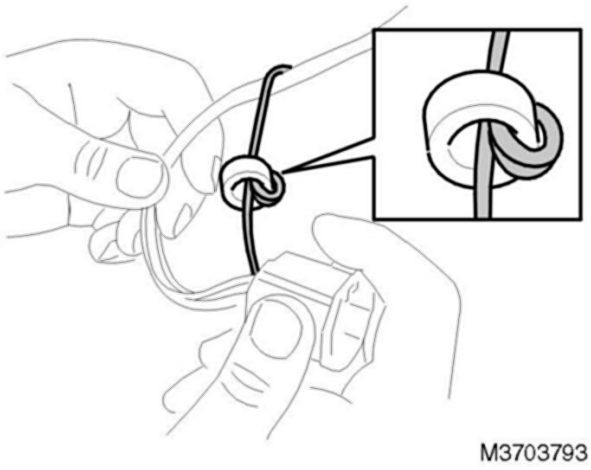
Opening cable harness

Carefully cut open the casing 150 mm.
Caution! Cut carefully so that no cable is damaged.

Installation

19.

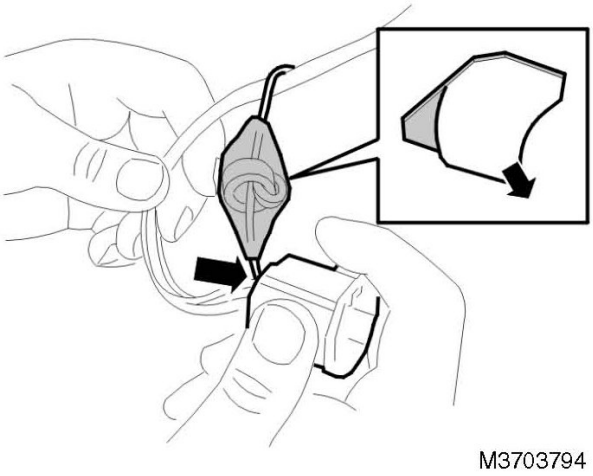
Install ferrite ring



Wrap the yellow cable three times around the ferrite ring, see figure.

20.

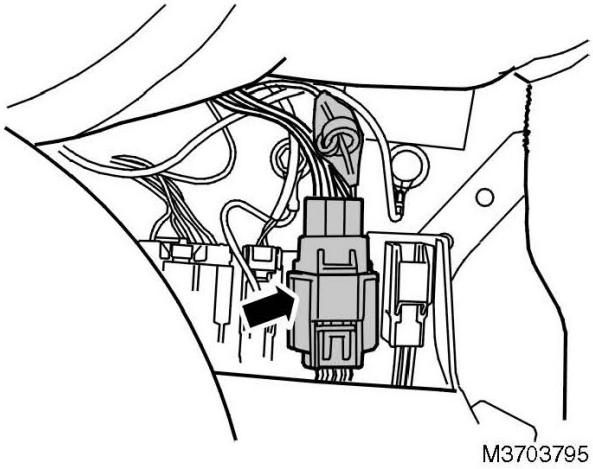
Install foam tape



Install foam tape around the ferrite ring and the cable.

Reinstall the cable in the connector, position 6.

21.



Install connector

Plug in the connector and secure it in the holder.
Reinstall the insulation and seat cushion.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
39914-2	Service kit AM interference fuel pump, install All involved models except S60 B5254T4 MY 05	0.3 hr
39914-2	Service kit AM interference fuel pump, install S60 B5254T4	0.2 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION
Technical Service Bulletin # **TNN64-20** Date: **041202**

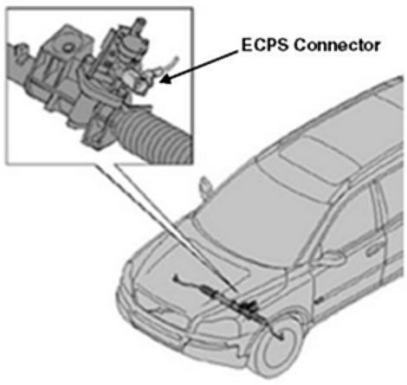
Power Steering - ECPS System Diagnostics

NO: 64-20
DATE: 12-02-2004
MODEL/ YEAR 2003 and later, XC90
2004 and later, S60, V70, XC7O, S80

SUBJECT: ZF Power Steering Diagnostics, (ECPS) Electronically Controlled Power Steering
REFERENCE: VADIS / VIDA

DESCRIPTION:
When Diagnosing Power steering problems on vehicles equipped with ZF ECPS (Electronically Controlled Power Steering) it is important to understand how the system is designed. The ZF steering rack used in these vehicles does not have diagnostics, meaning no DTCs. If the system should have an electrical malfunction (e.g. open fuse etc.) the default mode will be low assist, which can result in increased steering effort at low speed.

SERVICE:
If the vehicle is equipped with ECPS you should fault trace using VADIS / VIDA symptom entry.



It must first be determined if the vehicle is fitted with ECPS. ECPS can be identified by looking for the connector on the steering gear as illustrated.

Technical Service Bulletin # **TNN28-66** Date: **060707**

Engine Controls - False ECM DTC 434C

No: 28-66

DATE: 7-7-2006

MODEL YEAR:
S80, S60, V70, XC70, XC90, 2005 & 2006 (turbo engines only {type 91, 59, 54, 52})

CHASSIS:
S60 425000-520985
V70 459000-552728
S80 390000-434874
XC90 134000-254487
XC70 173000-220217

SUBJECT:
ECM DTC 434C Fuel tank system, leakage; Minor leak

REFERENCE: VIDA

This TNN supercedes the previous TNN 28-66 3/10/06 and replaces TNN's 28-63 & 28-57

DESCRIPTION:

ECM DTC 434C may be set in the above vehicles due to an over sensitivity in the engine management software. Perform the following tests:

^ Test the system for leakage using the methods in VIDA. If there are no actual leaks, proceed to upgrade the ECM software as described in the 'Service' section below.

^ Using the "quick-test of the fuel tank system" found in VIDA Vehicle Communication, fault trace any faults or leaks according to VIDA.

If a leak is found and remedied during fault tracing, thus solving the cause of the ECM 434C DTC, proceed to upgrade the ECM software as described in the 'Service' section below to prevent a false recurrence of DTC ECM 434C.

SERVICE:

Upgrade the engine management software using the ECM upgrade option in VIDA. SW P/N 30677021.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	SOFTWARE DOWNLOAD	0.3hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATIONTechnical Service Bulletin # **TNN88-41** Date: **060712**

Air Bag System - System Life Expectancy

No: 88-41

DATE: 7-12-2006

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

MODEL:
All Models with Supplemental Restraint System (SRS)

MODEL YEAR:
All Model Years with Supplemental Restraint System (SRS)

SUBJECT:
Extended Supplemental Restraint System (SRS) Lifetime

REFERENCE: SMB 88-0017

DESCRIPTION:

BACKGROUND:

Based on testing and experience since the 1980's, Volvo has extended the lifetime of the Supplemental Restraint System (SRS) components to be the same as the lifetime of the car.

This lifetime extension supersedes all previous publications concerning Supplemental Restraint System (SRS) component lifetime. Periodic inspections and servicing of the Supplemental Restraint System (SRS) components, based solely on the age of the vehicle, are no longer required.

The lifetime extension applies to all pyrotechnic components in vehicles equipped with Supplemental Restraint System (SRS):

^ Driver airbag module

^ Passenger airbag module

^ Seat belts with pyrotechnic seat belt pretensioners

^ SIPS (Side Impact Protection System) airbag module

^ IC (Inflatable Curtain) airbag module

^ Adaptive Steering Column (ASC)

^ Adaptive Load Limiter (ADLL)

Note:
Equipment is different for different car models.

SERVICE:

Note!
If the vehicle has been involved in a collision, regardless of crash severity, or if the SRS warning lamp is lit, immediately contact an authorized Volvo dealer for further action and inspection.

TEMPORARY SOLUTION:

For customers who want to make an appointment for an inspection, explain the situation using this Tech Net Note.

For customers who still want to have an inspection, carry out the inspection and remove the SRS Airbag Service Decal from the vehicle according to the SRS Airbag Service Decal Removal Instruction below. Explain that no further inspection is necessary.

In case replacement of components is required, remove the SRS Airbag Service Decal from the vehicle according to the SRS Airbag Service Decal Removal Instruction below and explain that no further inspection is necessary after the replacement.

FINAL SOLUTION:

VIDA will be updated with information about the service life of pyrotechnic components on a running basis. All vehicles equipped with Supplemental Restraint System (SRS) are affected.

Path for general information in VIDA:

Information / Repair / General information / 8 Body and interior / 88 Interior equipment / General / Service life pyrotechnic components

VIDA will be updated regarding Supplemental Restraint System (SRS) components in the service programs on a running basis. All vehicles equipped with Supplemental Restraint System (SRS) are affected.

Path for service and maintenance in VIDA:

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information / Repair / 1 Service programs / 17 Standard parts, service and maintenance material / Service and maintenance / Maintenance service / Service program A + B

VIDA will be updated regarding repair methods from MY 2007 onward.

Path for repair methods in VIDA:

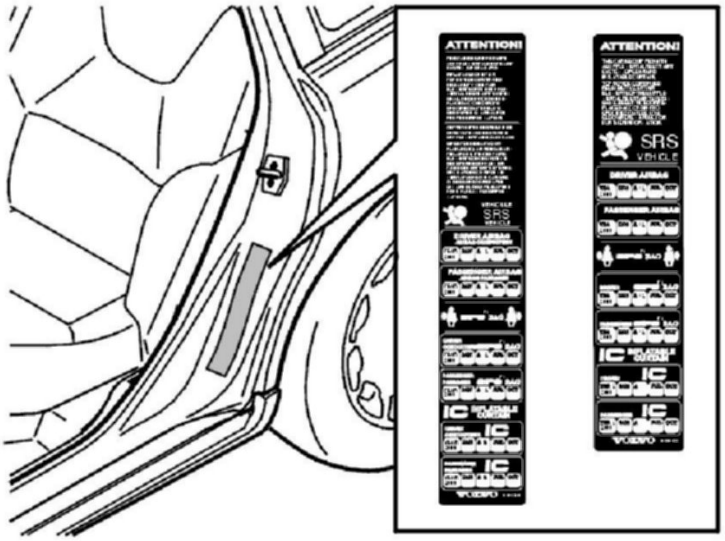
Information / Repair / Removal, replacement and installation / 8 Body and interior / 88 Interior equipment / Seat belts and other retention systems

Note!

From MY 2007, the SRS Airbag Service Decal on the B or C pillar will no longer be fitted at Volvo (concerns all models/variants).

SRS Airbag Service Decal Removal Instruction

General



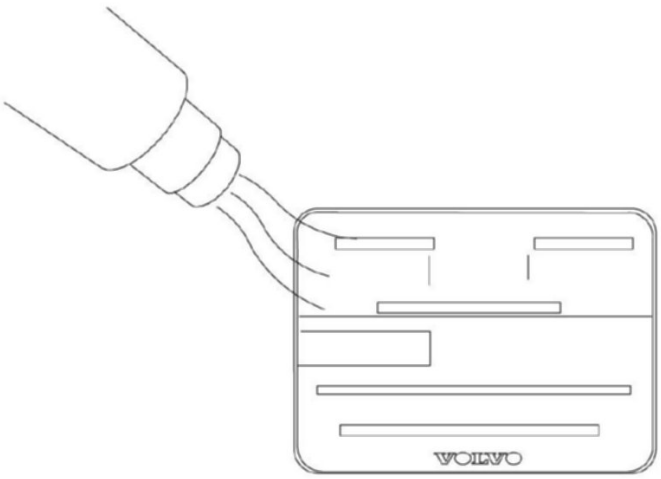
M8802638

Note!

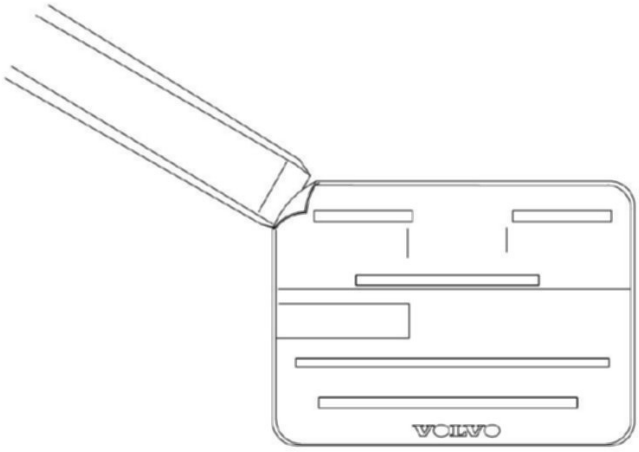
Since the illustrations are used for different model years and/or model variants, there may be certain deviations. However, the essential information in the illustrations is always correct.

The SRS Airbag Service Decal is found on either the B or the C pillar, depending on model/variant.

Removal

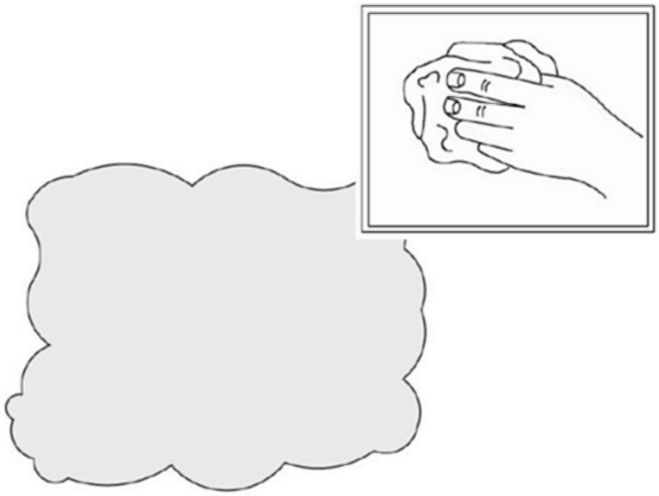


Warm the SRS Airbag Service Decal carefully using a hot air gun.



Scrape up a corner using a plastic scraper and pull off the SRS Airbag Service Decal.

Cleaning



Clean the area using a mixture of 50% isopropanol and 50% water.

Technical Service Bulletin # **TNN37-35** Date: **060523**

Central Electrical Module - DTC's Set/Systems Errors

NO: 37-35
DATE: 5-23-2006
MODEL: All P2X (S60 S80 V70 XC70 XC90)
YEAR: 2005-2006 (structure week 200425-200540)
CHASSIS:
XC90 FC1 134000-256551
V70 FC1 459000-555060
S60 FC2 425000-522407
S80 FC1 390000-435423
XC70 FC1 173000-220845
V70 FC2 459000-554206

(FC = Factory code) 11TH position of the VIN number

SUBJECT:
CEM harness terminal corrosion due to water entrance in plenum
(Instruction for new harness installation)

REFERENCE: VIDA repair instruction

DESCRIPTION:
Various electrical function and communication symptoms may occur in M/Y 2005-2006 vehicles caused by wet corrosion in the CEM (Central Electrical Module) connector. The grommet that seals the harness entrance to the Plenum box may not seal properly if it has been incorrectly assembled.

This may cause a number of different functionality symptoms and DTC's to be set.

Examples include but not limited to:
> Headlight on, even if ignition key is taken out of ignition lock.
> Warning messages in DIM (Driver's Information Module) display.
> Warning lamps lit up.
> Brake lights always on.
> No start condition.

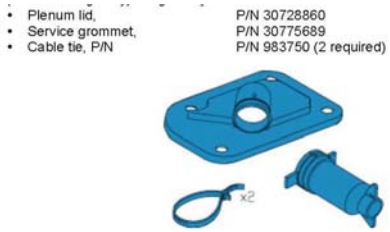
Modified replacement harness (Method1)

Production and supe harness with integrat cover (Method 2)

PRODUCT MODIFICATION:
A new plenum sealing strategy with integrated rubber grommet was introduced in production from structure week 200540. See photo below. This new sealing strategy will be carried over to the replacement engine bay harnesses on the chassis numbers indicated, either by modification of the replacement harness (method 1), or by a superseded harness P/N with an integrated cover and grommet (method 2).

SERVICE:
If there are signs of water penetration in plenum box and/or wet corrosion at the CEM connectors, it will be necessary to install a new CEM and replace the engine bay cable harness according to one of the 2 Methods below:

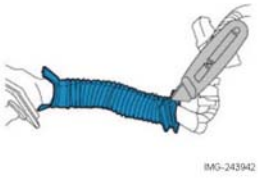
METHOD 1 (modification of the original type replacement harness)



Parts required;
^ Engine bay cable harness, check VIDA parts catalogue

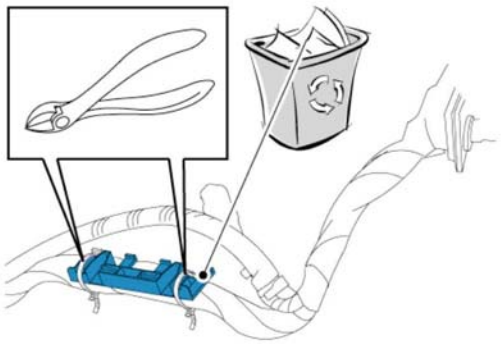
(This is the original type engine bay harness which will be modified with the instruction below)

Removing the existing rubber grommet



Remove the old rubber grommet using a knife.

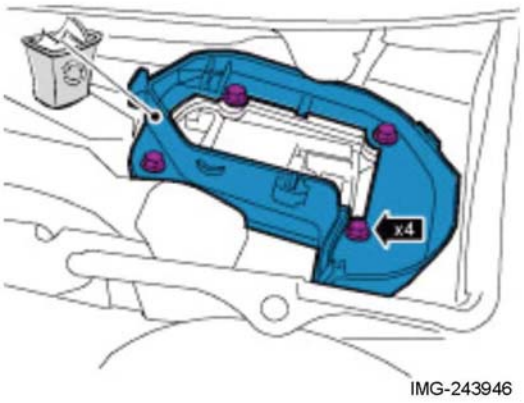
Caution! Make sure that no hoses or cables are damaged.



IMG-244520

Remove and discard the holder from the new cable harness.

Remove and discard the existing surround.



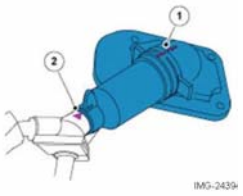
IMG-243946

Save the attachment screws to attach the new cover to the plenum floor.

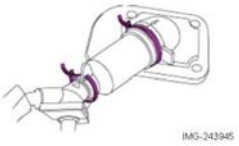
Installing the new seal

Route the cable harness through the new rubber grommet and cover.

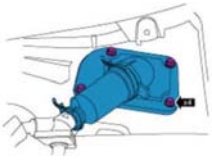
Caution! Exercise caution so that the rubber grommet is not damaged when the connectors are threaded through.



Align the arrows (1) towards each other.
Arrow (2) must point towards the handle on the rubber grommet.



Installing the cable ties



Installing the cover

Note:
After installation, the cable harness under the cover will be slightly over length. Clamp it up in a suitable manner to prevent chaffing.

Tighten the screws to 10 Nm.

Note;
There is a risk of altering the brake light switch adjustment when working in the pedal box area. Please verify that the brake light adjustment is correct after the work is performed.

Use the method in VIDA/ Vehicle communication/ BCM/ Advanced/ checking brake light switch adjustment.

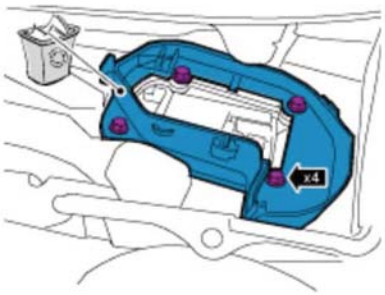
Method 2 (installation of superceded harness)

Parts required;

^ Engine bay cable harness, check VIDA parts catalogue

(This will be superseded engine bay harness with an integrated cover and grommet)

Remove and discard the existing surround.



Save the screws to attach the new cover to the plenum floor.

Install the harness as per VIDA instruction

Install the integrated harness cover

Tighten the screws to 10 Nm.

Note; There is a risk of altering the brake light switch adjustment when working in the pedal box area. Please verify that the brake light adjustment is correct after the work is performed using the method in VIDA/ Vehicle communication/ BCM/ Advanced/ checking brake light switch adjustment

LABOR OP	LABOR DESCRIPTION	LABOR TIME
37349-2	**Harness Engine comp/dashboard repair**	**See note below**

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

NOTE! General labor time based on technician time required for repair. This repair is subjected to all the audit requirements outlined in the warranty Policy & Procedure manual.

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN43-51** Date: **060606**

A/T, M/T - Parts Transfer When Replacing Trans Assembly

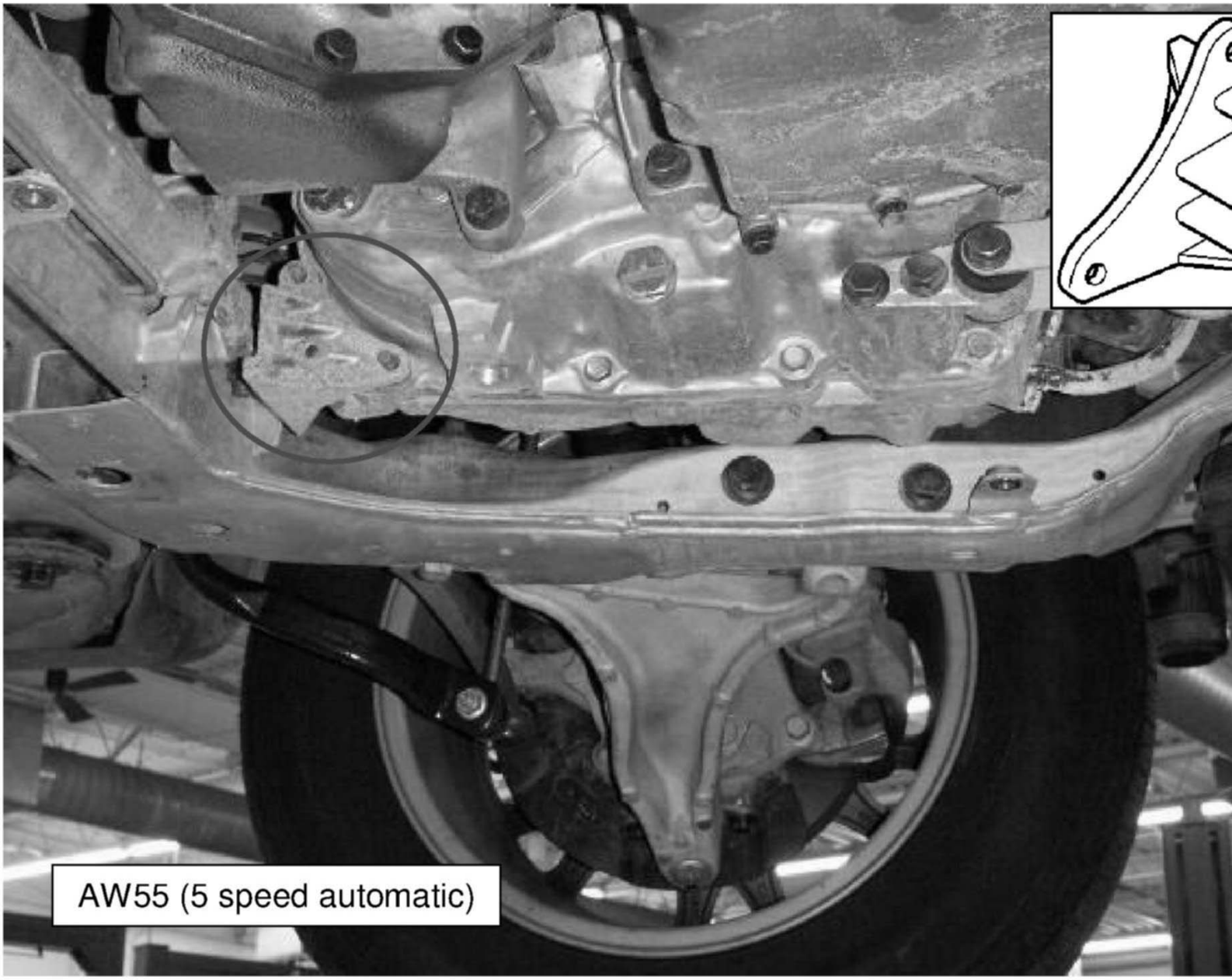
No: 43-51

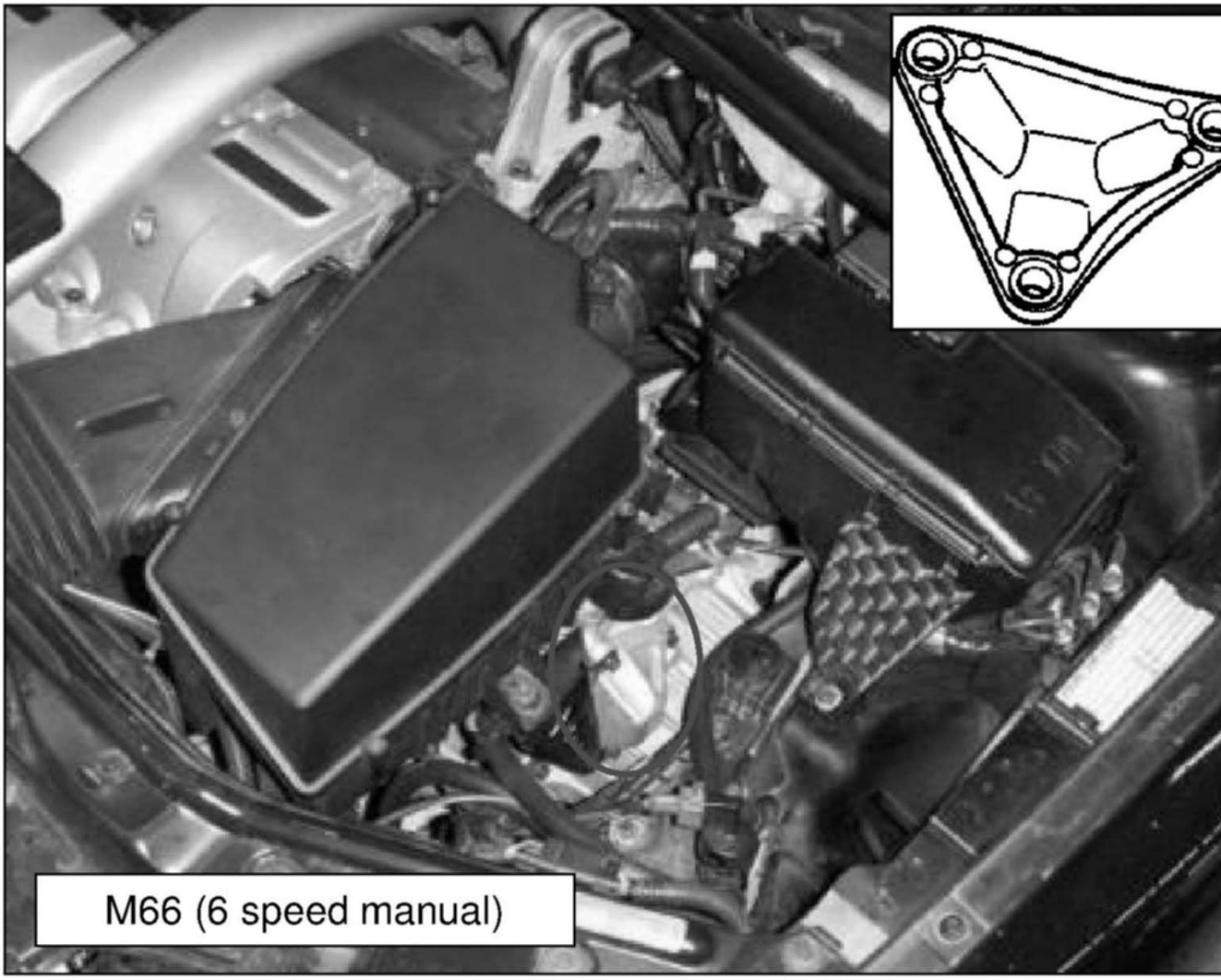
DATE: 6-6-2006

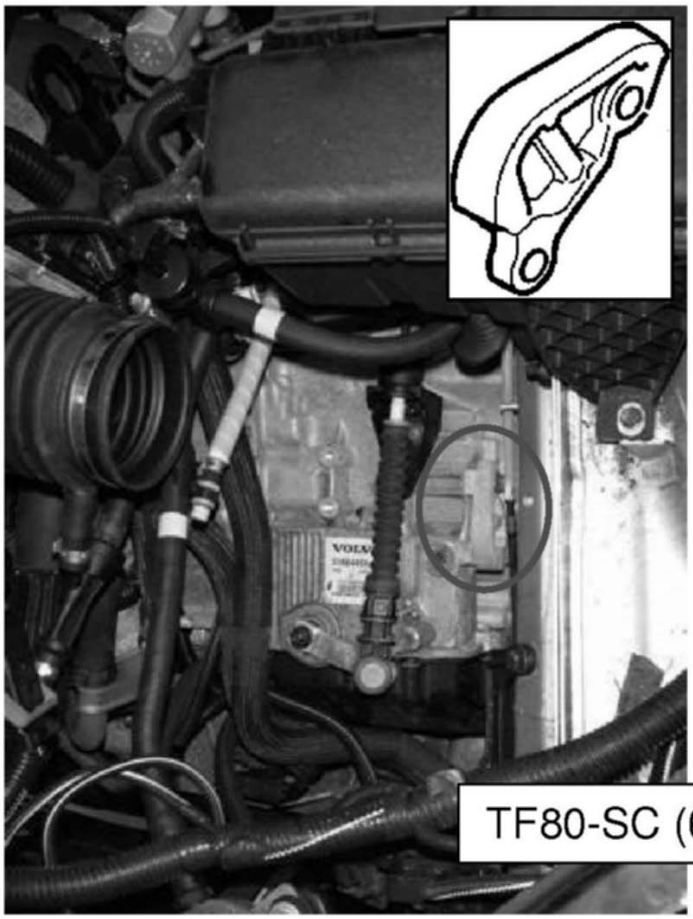
MODEL:
S60, V70, XC70, S80, XC90

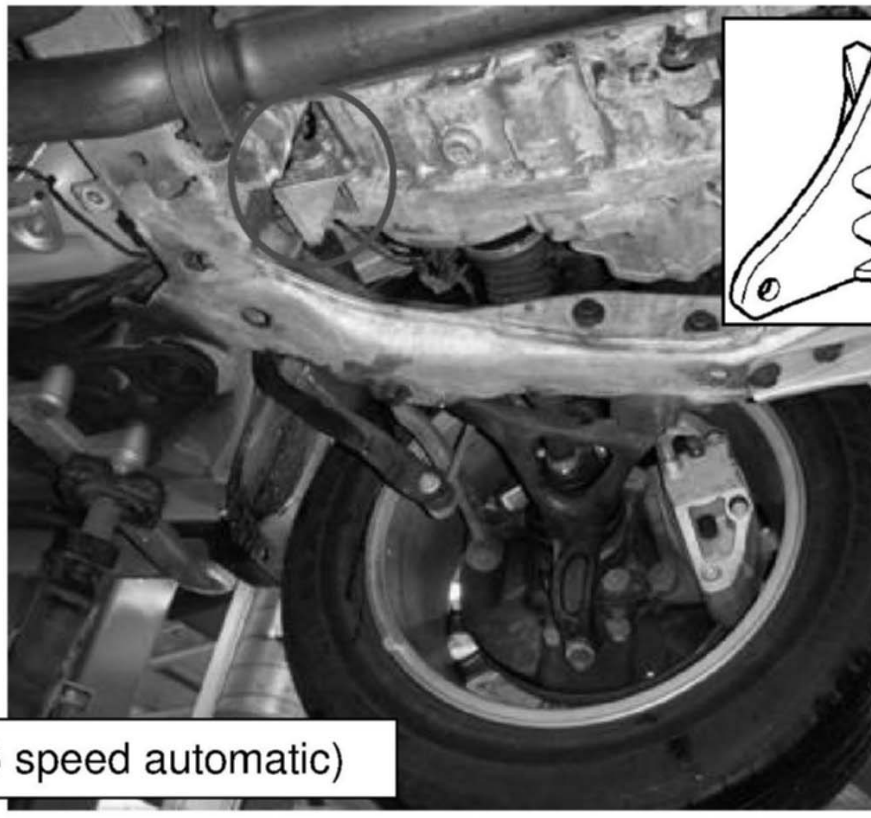
YEAR:
2001-

SUBJECT:
Transferring Components during Transmission Replacement


AW55 (5 speed automatic)







When replacing a transmission, follow the VIDA instructions for transferring parts to the new unit. The brackets highlighted in the images are part

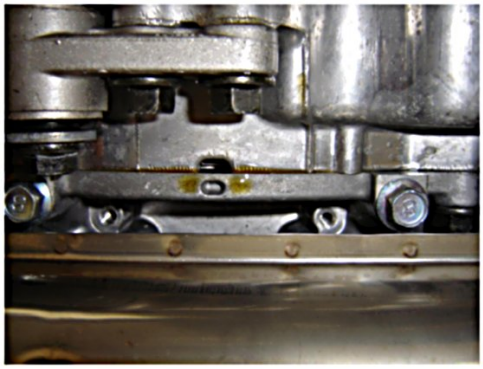
of the passive safety system designed to improve crash performance by helping to steer the powertrain in the correct direction during some crash situations.

Technical Service Bulletin # **TNN21-19** Date: **060922**

Engine - Fluid Weepage at Bell Housing Weep Hole

NO: 21-19
DATE: 09-22-2006
MODEL: All Models
MODEL YEAR: 2005 -
SUBJECT: Fluid Dripping from Weep Hole at Rear of Engine

This TNN has been updated to cover all Models from 2005 and on.
This TNN supersedes the previous 21-19 dated 2-9-05. Please update your files.



DESCRIPTION:

During inspection of the vehicle on a lift, a drip of fluid might be seen under the vehicle at the rear of the engine between the bell housing and the transmission. This fluid is the rust protection used on the torque converter during production. No action is needed.

Technical Service Bulletin # **TNN20-04** Date: **070122**

Engine Controls - Engine Management Software Usage

NO: 20-04
DATE: 1-22-2007
MODEL: C70, V70, S70, S60, S80, XC90, XC70, S40 (All new), V50, C30.
M. YEAR: 1999-
SUBJECT: Engine Management Software Usage
REFERENCE: VIDA

This TNN supersedes the previous TNN 20-04 dated 9-22-2003, please update your files

Description

In 2003 VADIS migrated from the PIE1 software ordering system to the PIE 2 software ordering system. Subsequently VIDA has replaced VADIS as the workshop diagnostic tool and information center, and has continued to use the PIE 2 software ordering system.

Service information that pre dated the migration to PIE 2 (e.g. TNN's, Service Bulletins), still refer to software ordering in the PIE 1 environment using software part numbers and Function ID's (FID). Where older service information indicates that a software upgrade should be performed for an engine management control unit (e.g. ECM, ETM), the PIE 2 software product number for that nodes software upgrade should be ordered. PIE 1 part numbers and function ID's will not be recognized by VIDA.

One software product number will be used for each control unit across all variants in a product platform. E.g. ECM upgrade for S60, S80, XC70 2001-, V70 2001- all share the same SW product number, 30677021, as they are all on the P2 platform.

Software product numbers for engine management upgrades:

C70	ECM	30677000	1999-2004
C70	ETM	30677001	1999-2002
X70	ECM	30677005	
X70	ETM	30677007	
P1	ECM	30668282	
P2	ECM	30677021	
P2	ETM	30677023	1999-2001/2

P3 ECM 30785201

An ECM/ETM upgrade is not an incremental upgrade to part of the control modules software, or to only parts of the control module memory, but a complete replacement of the control modules operating software. A confirmed download of an upgrade assures that all of the latest software for the specified control module has been delivered to the vehicle.

If a customer's vehicle required more than one service specifying an upgrade to the ECM or any other control module in the vehicle, the software download of an upgrade would only need to be done once, as an upgrade contains ALL changes or enhancements that were in prior software versions.

A "Reload" software product should only be used when installing a brand new control module in a vehicle, and at the direction of the Volvo Technical Hotline, or a Volvo Field Technical Specialist.Technical Service Bulletin # **TNN88-45** Date: **070208**

Air Bag System - 'PASSENGER AIR BAG OFF' Displayed

NO: 88-45
DATE: 2-8-2007
MODEL: S40, V50, C70, S60, S80, V70, XC70, XC90
MODEL YEARS: See below
CHASSIS: See below
SUBJECT: Lit PASSENGER AIRBAG OFF indication with belted adult passenger
REFERENCE: VIDA

DESCRIPTION:

Customers may experience a lit PASSENGER AIRBAG OFF indication in the overhead console (S40, V50, C70, S80 MY07) or interior rear view mirror (S60, S80 MY06, V70, XC70, XC90) with a belted adult passenger in the front passenger seat. When this happens, the PASSENGER AIRBAG OFF indication will typically remain lit until the passenger unbuckles the seat belt or moves out of the seat.

This could be caused by vibrations on the bracket for the Occupant Weight Sensor (OWS) control module. Follow the attached instructions only after all other root causes (e.g. the hose from the OWS bladder must not be kinked, twisted or otherwise restricted) have been ruled out using the fault tracing in VIDA.

MODEL	MODEL YEARS	CHASSIS NO. RANGE
S80	2007 (all new S80)	000850 – 024942
S80	2006	426000 – 446916
XC90	2005 – 2007	134000 – 379474
V70	2005 – 2007	459000 – 649851 (plant code 21) 459000 – 652379 (plant code 22)
XC70	2005 – 2007	173000 – 272176
S60	2006 – 2007	500000 – 631186
C70	2006 – 2007	000001 – 019268
S40	2004 – 2007	000295 – 294470
V50	2005 – 2007	000133 – 311051

Affected models, model years and chassis numbers:

MODEL	SEAT VARIANT	UPHOLSTERY CODES	CHASSIS NOS.
S80 MY07	Non-ventilated leather	240000, 210000, 240200, 210200, 241200, 211200	000850-24325
XC90	Sport	CB0B00	328000-378208
S60	Comfort	998000, 998100, 997000, 995100	500000-631019
S60	R-line	957600, 957700, 967500	500000-633235
V70	R-line	A57600, A57700, A67500	500000-655194

Additional seat and upholstery information:

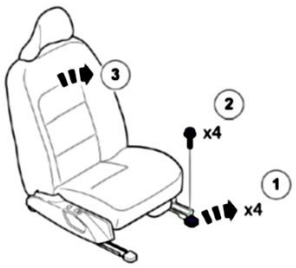
Material	Quantity	Part No.
Spring kit, OWS	1	30767457

SERVICE:

If the vehicle's chassis number is within the chassis number ranges above, install spring kit p/n 30767457 according to the instruction below.

General

The illustrations may contain some discrepancies, but the essential information is always correct.



IMG-259231

1. Preparations
   Remove:
   - covers over seat rails, 4 pcs (1)
   - the screws, 4 pcs (2)Fold the backrest forward (3).

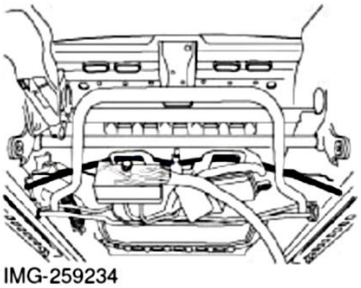
IMG-259232

2. Tilt the entire seat backward in the vehicle.

   NOTE: Do not disconnect any connections.

IMG-259233

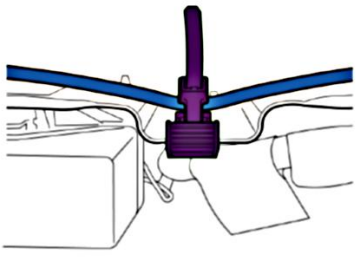
3. Install the service kit
   The service kit p/n 30767457 contains tie straps, 3 pcs and a spring. See image.



IMG-259234

4. Install the service kit p/n 30767457. See image.

   Important: Ensure that the spring does not conflict with any parts under the seat, such as the cable harness or the OWS hose.

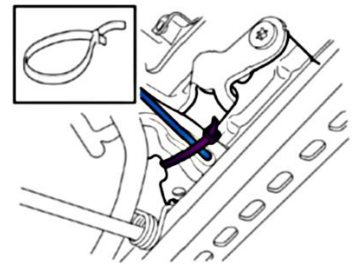


IMG-259235

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

5. **NOTE:** On certain vehicle models, there may be a tie strap from before. See location in image. Install the new tie strap close to the old one.

   Install tie strap on the bracket and tighten.



IMG-259236

6. Install the spring ends in the front groove (most forward in the vehicle, under the bracket that goes across the seat frame) and lock using the tie strap on each side. Tighten the tie straps. See image.

WARRANTY CLAIM INFORMATION			
LABOR OP	LABOR DESCRIPTION	LABOR TIME	VEHICLE MODEL
99444-2	Service kit (OWS) passenger side install	0.3 h	S40, V50, C70, S80 MY07
99444-2	Service kit (OWS) passenger side install	0.4 h	S60, S80 MY06, V70, XC70, XC90

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

7. Install seat in reverse order.
   Tightening torque front seat: **50 Nm (37 lb ft)**.Technical Service Bulletin # **TNN25-25** Date: **070201**

BULLETIN CANCELLATION NOTIFICATION

NO: 25-25
DATE: 2-1-2007
MODEL: 20N/A
M.YEAR: N/A
CHASSIS:
SUBJECT: Cancel Notice / 25-25
REFERENCE: See info in VIDA

This Tech Note supersedes the previous 25-25 dated 8-10-2006. Please update your files.

CANCELLATION NOTICE

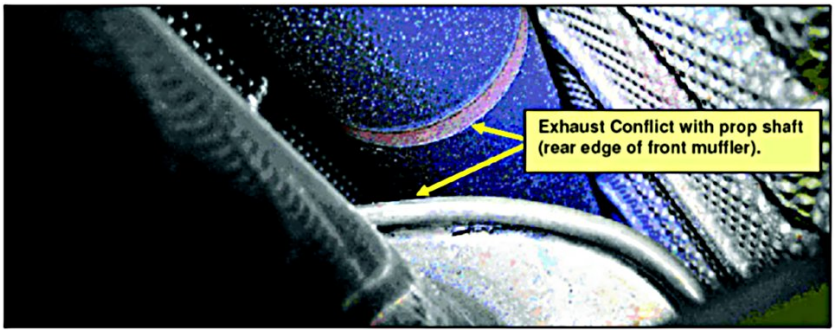
Tech Net Note 25-25, "Exhaust Clamp Kits Available for Repair" dated 8-10-2006

25-25 has been deleted from the TNN database
as the information is now obsolete
and the same information can now be found in VIDA.Technical Service Bulletin # **TNN25-26** Date: **070125**

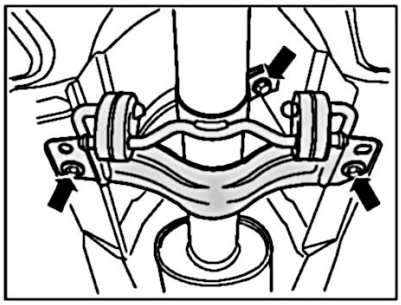
Exhaust System - Squealing/Pinging Noises

NO: 25-26
DATE: 1-25-2007
MODEL: 850 / S60 / S70 / V70 / XC70 / S80 / XC90
YEAR: 1993-
SUBJECT: Exhaust System Mounting

1. **2001- AWD Cars (S60/V70/XC70/S80/XC90)**



When driving through puddles of water, slush or snow, the exhaust may cool down fast enough to change shape and touch the propeller shaft, causing a high pitched squealing noise. This noise will be noticed by the driver for only a short time; once the exhaust temperature equalizes the noise will disappear. A tell-tale mark will be left on the propeller shaft. Should the customer experience this condition, install an exhaust support kit.



Remove the existing cross-member and install the new one. Tighten bolts to **25 Nm (18 ft/lbs)**.

Install the clamp on the exhaust pipe with the screw hand-tight.

Install the rubber blocks and adjust the clamp so that the rubber blocks are vertical.

Tighten bolts to **25 Nm (18 ft/lbs)**.

Kit for 2001- S60 / V70 / XC70 / S80 / XC90 cars except S60R/V70R....PN 30742265
Kit for S60R/V70R.....PN 30793619

WARRANTY CLAIM INFORMATION

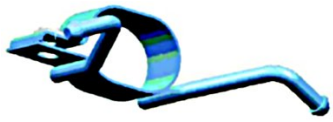
LABOR OP	LABOR DESCRIPTION	LABOR TIME
25293-2	Cross-member rear exhaust system	0.2 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

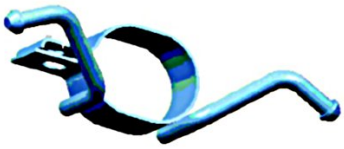
2. 850/S60/S70/V70/XC70/C70/S80

1993-1997 850 PN: 30681832

1998-2000 S70/V70 1998-2004 C70 PN: 30681638



2001- AWD (S60/V70/XC70/S80)
PN: 30681625



2001- FWD (S60/V70) 1999- FWD S80
PN: 30681626

Exhaust clamp kits are available as a service solution for damaged or missing hangers. These kits allow a repair to be made without replacing the entire exhaust system.The kits are designed to fit directly on the pipe without any welding. Install the new clamp in place of the old hanger. Remaining pieces of the old hanger may need to be cut off before the new part can be installed.

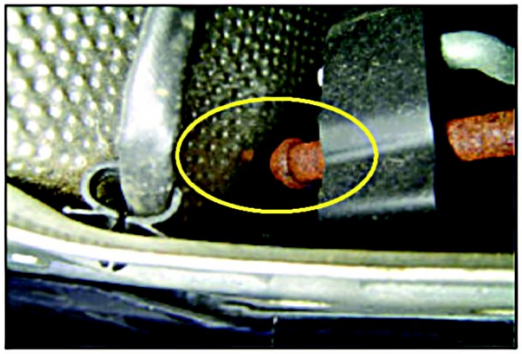
Kits are not currently available for 1998-2000 V70 XC, 2004-S60R/V70R, and XC90.

Kit for 2001- S60/V70/XC70/S80/XC90 cars except S60R/V70R.....PN 30742265
Kit for S60R/V70R.....PN 30793619

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99421-2	Exhaust clamp kit, install	0.2 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

3. **2001- AWD Cars (S60/V70/XC70/S80/XC90)**
   A single 'knock' or 'ping' may be heard at engine start. In the case of a customer complaint, adjust the shields on each side of the front exhaust mount.

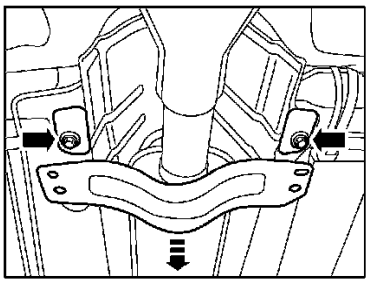


Press the shields on each side in toward the body by hand to increase clearance for the exhaust brace.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99273	Adjusting Shields	O.1 hrs

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

4. **2001- S60R/V70R**
   The bracket underneath the exhaust can be removed at a customer's request for increased ground clearance. This prevents the bracket from bottoming-out on uneven road surfaces. Install plates, P/N 30789011 (2 required) between the bolt heads and heat shields. Use the existing bolts.



Remove the bracket. Install the two plates. Tighten the bolts to **24 Nm (18 ft/lbs)**

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99163	Removing Bracket	0.1 hrs

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Technical Service Bulletin # **TNN87-56** Date: **061211**

A/C, Interior - Whistle From Right Side of Dash

NO: 87-56
DATE: 12-11-2006
MODEL:
XC90 2003 -
XC70 2001 -
V70 2001 -
S80 1999 -
S60 2001 -
SUBJECT: Whistling Sound from Windshield / Dashboard Area, Passenger Side

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

REFERENCE: VIDA, TNN 84-11 (Roof Rails Front Attachment)

Description	Quantity	Part Number
Seal (necessary only if missing)	1	8665647
Felt Tape (shop supply / used as needed)		9511099
Cleaner (shop supply / used as needed)		1161436

DESCRIPTION:

If a whistling sound or wind noise is heard from the passenger side dashboard area of the cabin. One reason for this may be that the foam sealing between the body and climate unit (air inlet) is incorrectly positioned. The sound may vary in strength but is more audible at higher speeds; **50 mph (80kph)** and above.

NOTE: This issue seems to be mainly XC90 related but other variants may be affected.

SERVICE:

Identify location of noise. Inspect the seal and reposition as described in the following.

Identify location of noise

If this is an XC90 and is within chassis numbers 003400 - 235925 ensure the noise is not from the upper windshield / roof rails front attachment area. If the noise is from this area refer to TNN 84-11 (if still applicable).

Inspect / Correct the Seal Position

In VIDA see: Remove wiper arms.
Remove cowl (plenum) cover. Remove water protection housing (snapped into the inlet).

Inspect seal and adjust if incorrectly positioned.

Make sure the foam seal is airtight all around the opening between the body and plastic housing.

If needed; with your hand reposition the seal to ensure any gap is filled.

Correct position of front area shown with dotted line here.

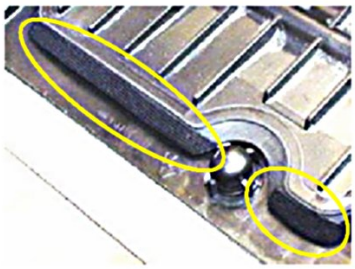
NOTE: This shape is normal in the rear area.

Hint: Use a mirror for this check.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Also inspect the alignment of the climate box housing and the collar so that there is no gap as indicated here.

If necessary; reposition for better sealing.



Inspect / Modify the Recirculation Seal

A similar sound may be heard with recirculation ON (door closed) if there is a small gap between the rubber door seal and plastic housing.

This may happen if the recirculation door has a rounded shape or if the pressure of the door is insufficient.

If needed; clean the rubber surface with P/N 1161436 or similar and apply felt tape (P/N 9511099) onto the rubber seal of the door as shown.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION		LABOR TIME
99418-2	Foam sealing adjustment	S60 / S80 / V70 / XC70	.7
		XC90	.6
99420-3	Felt tape assembly	All	.1

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Reassemble

Reinstall parts in reverse order

Technical Service Bulletin # **TNN64-23** Date: **070125**

Steering - ZF System Fault Tracing & Repair

NO: 64-23
DATE G01-25-2007
MODEL: S60, V70, XC70, S80, XC90
MODEL YEAR:
2003- (XC90)
2004- (all other listed models)
SUBJECT: ZF Power Steering System Fault Tracing and Repair
REFERENCE: TNN 64-24; 64-09; TNN 64-20; TNN 64-21; VIDA

THIS TNN SUPERSEDES TNN 64-23 DATED 07-31-2006. A REFERENCE TO TNN 64-24 HAS BEEN ADDED, AND THE MODEL YEAR RANGE FOR THE S60/V70 HAS BEEN CORRECTED. PLEASE UPDATE YOUR FILES.

WARNING: These vehicles have pyrotechnical airbags and seat belt tensioners. The components in the SRS system must be treated very carefully during repair. This is to help prevent: 1.Personal injury when carrying out repairs 2.Damage to or malfunction of the SRS

system.

Refer to VIDA (Information > Repair > General Safety Information) for SRS warnings, information, and instructions.

MODEL	MODEL YEAR	CHASSIS NO.
S60	2004-	315000-
V70	2004-	349000-
XC70	2004-	123000-
S80	2004-2006	335000-
XC90	2003-	000001-

This Tech Net Note is designed to assist with overall identification and repair of various problems with ZF-manufactured steering systems. ZF steering gears were factory-equipped on the following models:

This TNN is divided into three major sections:

1. The first section, 'Overview', provides a simple description of the power steering system.
2. The second section, 'Description', defines the various problems, such as noise, leakage, and functionality.
3. The third section, 'Repair', defines the specific repairs for each Description.

The purpose of this TNN is to guide the technician through the proper diagnosis and repair of the ZF power steering system. As a general guideline, a complete customer description of the concern, followed by confirmation of that concern, are key.

The customer should be asked the following questions:

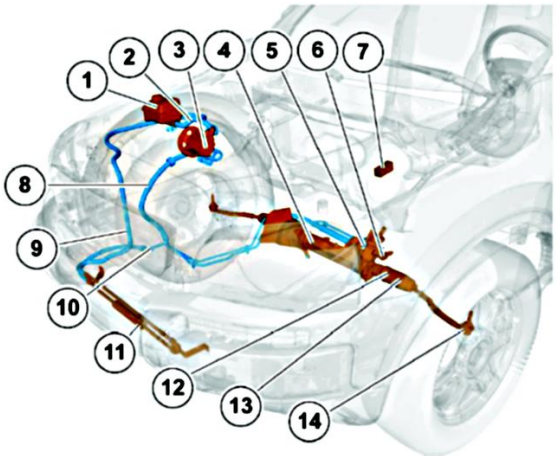
- What is the specific problem?
- How long has the problem existed?
- Is it intermittent or permanent?
- Is the steering complaint affected by any of the following conditions:
  - Stationary vehicle or while driving (and at what speed)?
  - Temperature (outdoor temperature and/or vehicle temperature)?
  - Condition of the road surface?
  - Engine speed?
  - Steering wheel position?

Answers to these questions should be incorporated into the text on the Repair Order as much as possible.

If the complaint is noise-related, a thorough check of the vehicle's entire front end is necessary, with a focus on components which may be worn or loose, before repairing the steering system. Likewise, a fluid leak complaint should be verified by cleaning and testing the affected area first, before any disassembly is begun.

The Section Table of Contents below allows the technician to turn to the appropriate section of this TNN as needed.
It should not be necessary to read the entire TNN every time a steering-related repair is made.

Section 1



Power steering system overview

1	Power steering fluid reservoir	6	Solenoid (ECPS only)	11	Oil cooler
2	Suction line	7	Power Steering Control Unit (PSU) (ECPS only)	12	Bellows
3	Pump	8	Delivery line	13	Inner tie rod end
4	Steering gear	9	Return hose	14	Outer tie rod end
5	Valve	10	Return line		

Overview

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

A simple description of the power steering system.

There are two types of steering gears: Standard power steering or electronically controlled power steering (ECPS). ECPS adapts power steering assistance based on vehicle speed.

Fluid is suctioned from the fluid reservoir (1) through the suction line (2) to the pump (3), which is a rotary vane pump. Pressure is increased in the pump through compression and supplies the steering gear (4) power steering fluid under pressure through the delivery line (8).

The power steering fluid then passes through the return line (10) [and optionally in some models, to the oil cooler (11)] and the return hose (9) back to the fluid reservoir.

The pump is mounted on the engine and is driven by the auxiliaries belt.

NOTE: The system is extremely sensitive to contaminants.

Section 2

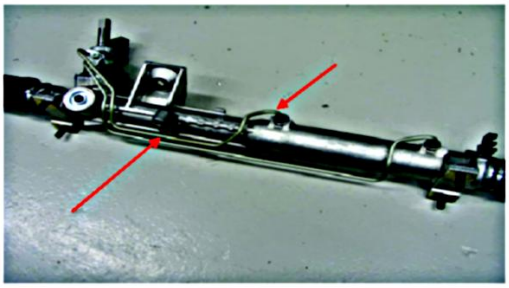
Hydraulic noise		
Problem	Definition	Repair
Grunting/ trumpeting	Loud hydraulic resonance that is heard when the steering wheel is turned when the car is stationary (engine running) or in sharp turns when driving slowly. This noise can also occur when the driver releases the steering wheel after a turn. Worsens at high engine speed. This noise primarily occurs in systems with speed-dependent steering gears (Servotronic; see TNN 64-20 for identification). The trumpeting noise may cause a light vibration in the steering wheel.	1
Hydraulic knock	**Note!** This only applies to speed-dependent steering gears (Servotronic; see TNN 64-20 for identification). Occurs when the car is stationary (engine running) and during quick steering wheel movements back and forth. Loud hydraulic knocking. The hydraulic knocking can also be felt in the steering wheel.	2

Mechanical noise		
Problem	Definition	Repair
Knocking noise	Low pitched metallic knocking/striking when driving over uneven road surfaces, potholes or the like. The problem worsens when turning right.	3
Squeak/ grinding	Metallic friction/squeaking/scraping from steering gear area. The noise occurs during steering wheel movement when the car is stationary or during slow driving.	4
Click	High pitched metallic clicking/striking noise. Occurs when car is stationary or during slow driving when the steering wheel is moved back and forth quickly. **Note!** This noise can also be heard when the engine is off. Large steering wheel movements make the problem worse.	5

Description - Noise

Section 2

Pump leakage		
Problem	Definition	Repair
Suction hose coupling	Leakage between suction hose and pump. Also applies to leakage between suction hose and reservoir.	6
Power steering pump shaft seal	Leakage at pump's output shaft.	7

Steering gear leakage		
Problem	Definition	Repair
Internal pipes	Fluid leak at steering gear's internal pipes. Note! Internal pipes move fluid from the steering gear's valve to its cylinder area, and are routed alongside the gear assembly (see arrows). 	8
Bellows	Fluid leak into steering gear's rubber bellows at tie rods. For left-hand drive vehicles, fluid leaks into the right bellows. Careful removal of the bellows is required to locate and verify this leakage.	9

Description - Leakage

Section 2

Power steering fluid		
Problem	Definition	Repair
Fluid level	Fluid type: use Volvo synthetic power steering fluid (Pentosin CHF 11 S) or equivalent. Fluid level in reservoir: Measure when cold, with engine off. Fill the oil until the level is halfway between the 'cold' and 'hot' marks on the dipstick.	10

Sluggish steering		
Problem	Definition	Repair
Parking/driving	The driver must use a lot of force to turn the steering wheel when driving or parking or when the vehicle is stationary. Insufficient assistance from the power steering system.	11

Freeplay		
Problem	Definition	Repair
Play between steering wheel and front wheels	Too much steering wheel movement before the front wheels start to turn.	12
Play in tie rods	Play in steering gear's outer or inner steering tie rods that can be seen or felt.	13
Radial rack bar play.	**Note!** There is no noise associated with this freeplay. Radial rack bar play without play in tie rod ends. Detected by standing beneath the vehicle and pulling and pressing on the left side steering arm outside of the bellows. If noise is heard during this check, see repair number 5.	14

Description - Functionality

Section 3
Repair - Noise

Repair	Grunting / Trumpeting	
1	A	Some grunting is natural and unavoidable in a hydraulic system. Compare the problem to similar vehicles from the same model year to verify if the noise is abnormal. In the event of abnormal noise, replace the steering gear. **Note!** You must also replace the lower steering shaft if the car was built ***before*** the chassis numbers specified below: S60: 384-499999 V70: 285-529999 XC70: 295-207999 S80: 184-426007 XC90: 275-223999 See: VIDA Removing, replacing, installing Suspension, steering Steering gear, replacing > Steering wheel, steering wheel lock, steering column, shaft

Hydraulic Noise

Section 3
Repair - Noise

Repair	Hydraulic Knock	
2	A	Some hydraulic knocking is natural and unavoidable in a hydraulic system. Compare the problem to similar vehicles from the same model year to verify if the noise is abnormal.
	B	Adjust the yoke as necessary. See TNN 64-21.
	C	If Step B does not help, replace the steering gear. **Note!** You must also replace the lower steering shaft if the car was built ***before*** the chassis numbers specified below: S60: 384-499999 V70: 285-529999 XC70: 295-207999 S80: 184-426007 XC90: 275-223999 See: VIDA Removing, replacing, installing Suspension, steering Steering gear, replacing > Steering wheel, steering wheel lock, steering column, shaft

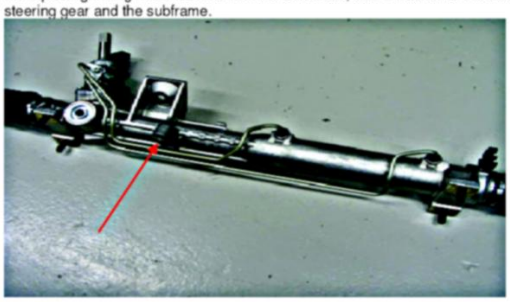
Hydraulic Noise

Section 3
Repair - Noise

Repair	Knocking Noise	
3	A	Some striking noise is normal. Compare the problem to similar vehicles from the same model year to verify if the noise is abnormal.
	B	Before focusing on the steering system, perform a complete inspection of the front end for obvious mechanical problems. Confirm the source of the noise before any disassembly or repair. As a general guideline, follow the checklist in Step C:
	C	i. Check the front suspension, including all bushings and mounting points. ii. Check the drive shafts. iii. Check the lower steering shaft and its coupling to the steering gear. iv. Check the steering column, including universal joints and bearings. **Note!** Refer to TNN 64-09. v. Check the inner and outer tie rods of the steering gear (take care when removing the rubber bellows of the inner tie rods). vi. If any loose, worn, or broken components are found during the above checks, make the needed repairs first before continuing with the steering diagnosis.
	D	If there is confirmation of a knocking noise in the steering gear, adjust the yoke as described in TNN 64-21.
	E	If Steps A-D do not help, replace the steering gear. **Note!** You must also replace the lower steering shaft if the car was built ***before*** the chassis numbers specified below: S60: 384-499999 V70: 285-529999 XC70: 295-207999 S80: 184-426007 XC90: 275-223999 See: VIDA Removing, replacing, installing Suspension, steering Steering gear, replacing > Steering wheel, steering wheel lock, steering column, shaft

Mechanical Noise

Section 3
Repair - Noise

Repair	Squeak / Grinding	
4	A	Before focusing on the steering system, perform a complete inspection of the front end for obvious mechanical problems. Confirm the source of the noise before any disassembly or repair. As a general guideline, follow the checklist in Step B:
	B	i. Check the front suspension, including all bushings and mounting points. ii. Check the drive shafts. iii. Check the lower steering shaft and its coupling to the steering gear. iv. Check the steering column, including universal joints and bearings. Note! Refer to TNN 64-09. v. Check the inner and outer tie rods of the steering gear (take care when removing the rubber bellows of the inner tie rods). vi. If any loose, worn, or broken components are found during the above checks, make the needed repairs first before continuing with the steering diagnosis.
	C	Check the seal in the firewall. Repair as necessary.
	D	Loosen the center bolt (located at arrow) which secures the steering gear to the subframe. If the squeak/grinding noise lessens with the bolt loose, add a washer to the bolt between the steering gear and the subframe. 
	E	Detach the steering gear from the steering column and wheel spindles. **Warning!** Normally, the steering wheel should be locked when making repairs or replacing components. If it is necessary to unlock the steering wheel in order to locate the source of the noise, ensure that the steering wheel is not turned more than two full turns in either direction, or the SRS contact reel may be damaged. Locate the problem. Make necessary repairs. Note! Ensure that the steering wheel is centered when reattaching the steering column.

Mechanical Noise

Section 3
Repair - Noise

Repair	Click	
5	A	Some clicking noise is normal. Compare the problem to similar vehicles from the same model year to verify if the noise is abnormal.
	B	Before focusing on the steering system, perform a complete inspection of the front end for obvious mechanical problems. Confirm the source of the noise before any disassembly or repair. As a general guideline, follow the checklist in Step C:
	C	i. Check the front suspension, including all bushings and mounting points. ii. Check the drive shafts. iii. Check the lower steering shaft and its coupling to the steering gear. iv. Check the steering column, including universal joints and bearings. Note! Refer to TNN 64-09. v. Check the inner and outer tie rods of the steering gear (take care when removing the rubber bellows of the inner tie rods). vi. If any loose, worn, or broken components are found during the above checks, make the needed repairs first before continuing with the steering diagnosis.
	D	Try to reproduce the noise by tugging and pulling the steering arm on the valve (left) side. If reproduced, adjust the yoke as described in TNN 64-21. Clicking noise, if reproduced in this manner, will be repaired via the yoke adjustment.

Mechanical Noise

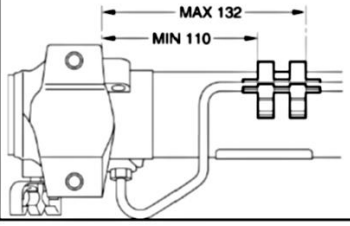
Section 3
Repair - Leakage

Repair	Suction Hose Coupling	
6	A	Check the fluid level in the reservoir. See Repair 10.
	B	Clean the pump, reservoir and hose to confirm the location and source of the leak.
	C	Make sure that the hose clamps are properly fitted. Replace clamps if necessary.
	D	Check the condition of the suction hose. Replace hose if necessary.
	E	Do not replace the pump or reservoir unless there are clear defects in the pump, pump nipple, or reservoir.

Repair	Power Steering Pump Shaft Seal	
7	A	Check the fluid level in the reservoir. See Repair 10.
	B	Verify that the pump leakage is from the pump shaft. Clean the pump and pulley to confirm the location and source of the leak. Apply leak tracer Volvo part #1161560 on the pump. Start the engine and turn the steering wheel back and forth.
	C	**Note!** Do not replace the pump unless there is verified leakage. Replace the pump if shaft leakage has been verified.
	D	If no shaft seal leakage can be found, check the hose connections and other potential leakage points around the pump.

Pump Leakage

Section 3
Repair - Leakage

Repair	Internal Pipes	
8	A	Check the fluid level in the reservoir. See Repair 10.
	B	Verify that the leakage is from the internal pipes (see photo on page 4).
	C	If the leakage is from the internal pipes, replace the internal pipes, by following steps i. through v. below:
		i. Remove the steering gear, see VIDA: Removing, replacing and installing > Suspension, steering > Steering gear > Steering gear, replacement
		ii. Note! Seal the inlet and outlet connections from the servo pump with plastic plugs immediately after removal.
		iii. To remove the old pipes: Remove the protective plate from over the pipes. Seal the inlet and outlet connections using plastic plugs. Carefully clean around the oil pipe connections and blow dry. Remove the pipes. Carefully check that there is no residue of the old sealing rings in the connections on the steering gear.
		iv. To install the new pipes: Install the new sealing rings on the oil pipes. Lubricate the sealing rings using power steering fluid. Carefully install the new pipes with the sealing rings to the steering gear. **Note!** Use a new bolt for the pipe's holder. Tighten the pipe nuts to 7 Nm (5 Lb-Ft) and the holder screw to 12 Nm (9 Lb-Ft). Install the protective panel over the pipes.
		v. A support must be installed on the longer of the two oil pipes as illustrated. The illustration shows the location of the support on the steering gear: it should be installed a minimum of 110 mm (4 3/8 in.) and a maximum of 132 mm (5 3/16 in) from the point indicated in the illustration. **Note!** Only **one** support must be used, the illustration shows the support in its minimum and maximum positions. 

Steering Gear Leakage

Section 3
Repair - Leakage

Repair	Bellows	
9	A	Check the fluid level in the reservoir. See Repair 10.
	B	Verify that fluid is leaking into the bellows by carefully detaching the right side bellows.
	C	If there is obvious leakage of fluid into the bellows, replace the steering gear. **Note!** You must also replace the lower steering shaft if the car was built ***before*** the chassis numbers specified below: S60: 384-499999 V70: 285-529999 XC70: 295-207999 S80: 184-426007 XC90: 275-223999 See: VIDA Removing, replacing, installing Suspension, steering Steering gear, replacing > Steering wheel, steering wheel lock, steering column, shaft

Steering Gear Leakage

Section 3
Repair Functionality

Repair	Fluid Level	
10	A	Fill the fluid if it is below specification. Fluid type: use Volvo synthetic power steering fluid (Pentosin CHF 11 S) or equivalent. Fluid level in reservoir: Measure when cold, with engine off. Fill the oil until the level is halfway between the 'cold' and 'hot' marks on the dipstick.
	B	Check the system for leakage. See Repairs 6, 7, 8, and 9.

Power Steering Fluid

Repair	Parking / driving	
11	A	Compare the problem to similar vehicles from the same model year to verify if the effort is abnormal. **Note!** Determine first if vehicle has speed-sensitive steering. See TNN 64-20.
	B	Check the fluid level in the reservoir. See Repair 10.
	C	If the fluid level is low, check for leaks in the system. See Repairs 6, 7, 8, and 9.
	D	Check the belt tensioner and the belt that drives the pump. Repair if necessary.
	E	Check the steering column and other wheel suspension components that move during steering. Make sure that nothing is binding or seizing.
	F	If nothing is binding or seizing, detach the steering gear from the steering column and wheel spindles. **Warning!** Normally, the steering wheel should be locked when making repairs or replacing components. If it is necessary to unlock the steering wheel in order to locate the source of the sluggishness, ensure that the steering wheel is not turned more than two full turns in either direction, or the SRS contact reel may be damaged. Examine the systems and components separately to locate any potential problem. **Note!** Ensure that the steering wheel is centered when reattaching the steering column.
	G	If the steering gear is speed sensitive (see TNN 64-20), check the cables and connections between the PSU and the steering gear. Repair as necessary.
	H	Measure the current strength of the signal from the PSU to the steering gear. Make the measurements at the cable connections on the steering gear valve. When the vehicle is stationary, current strength should be 860 mA (AC). Replace the PSU if the current strength is not within the range of 830-890 mA (AC).
	I	Measure pump pressure. See VIDA: Cleaning, checking and adjusting > Suspension, steering > Servo balance/pump pressure, checking Pumps marked 110 bar (on black label on pump): Max should be between 93 and 110 bar. Pumps marked 120 bar (on black label on pump): Max should be between 102 and 120 bar. **Note!** All XC90s, all S60R/V70R, and S80 MY04- use 120 bar pump. All other vehicles referenced in this TNN use 110 bar pump. Replace the pump if pressure levels lie below the specification.

Sluggish Steering

Section 3
Repair - Functionality

Repair	Freeplay between steering wheel and front wheels	
12	A	Compare the problem to similar vehicles from the same model year to verify if the freeplay is abnormal.
	B	Raise the vehicle on a front end alignment rack or similar, so that the front tires are loaded, with the engine off. Have another technician assist by turning the steering wheel back and forth. Check the play in the moving parts beneath the vehicle and in the steering column, including the wheel suspension and lower steering shaft. Remedy any problems found. If the problem remains, continue to step C below.
	C	Detach the steering gear from the steering column and wheel spindles. **Warning!** Normally, the steering wheel should be locked when making repairs or replacing components. If it is necessary to unlock the steering wheel in order to locate the source of the freeplay, ensure that the steering wheel is not turned more than two full turns in either direction, or the SRS contact reel may be damaged. Examine the systems and components separately to locate any potential problem. **Note!** Ensure that the steering wheel is centered when reattaching the steering column.
	Note! Do not replace the steering gear if radial play is found in the steering gear's rack. See Repair 14.	

Repair	Freeplay in tie rods	
13	A	Verify the problem using Steps B and C in Repair 12. Remove the rubber bellows to correctly assess the inner tie rods.
	B	Replace the tie rod in question.

Repair	Radial rack bar play	
14	A	Some radial rack bar movement on the left side, without an associated noise, is normal. This will not affect steering function. Compare the play to similar vehicles from the same model year to verify if the rack bar play is abnormal.
	B	Verify that there is no play in the steering gear's tie rods, steering column, lower steering shaft or other front assembly components. See Repairs 12 and 13.
	C	Some elastic play in the steering gear's rack is design related. Do not replace the steering gear because of this type of play. If there is a clicking noise during this check, see Repair 5.

FreeplayTechnical Service Bulletin # **TNN85-30** Date: **070209**

Interior - Holes in Passenger Side Carpet

NO: 85-30

DATE: 2-9-2007

MODEL / YEAR: S60 (2001-) 000172 - 622972

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

CHASSIS:
S80 (1999 - 2006) 000500 -
S80 (2007-) 000850 - 015099
V70 (2000-) 000259 - 643520
XC70 (2001-) 000160 - 267282

SUBJECT:
Openings in Front Passenger Side Floor Carpet

REFERENCE:
VIDA

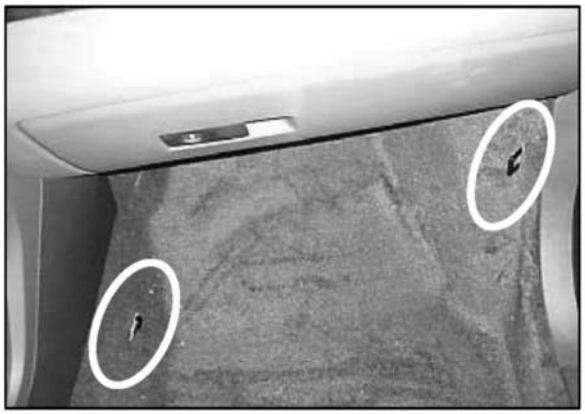
DESCRIPTION:

Other markets have optional child seat consoles installed from the factory; openings in the front passenger side floor carpet are there to accommodate this installation. Regardless of whether the vehicle was equipped from the factory with the child seat option, all models built in the above chassis ranges have the carpet openings. Over time, these openings may begin to become noticeable.

Note:
After these chassis ranges, variants without child seat consoles will no longer have the carpet openings.

SERVICE:

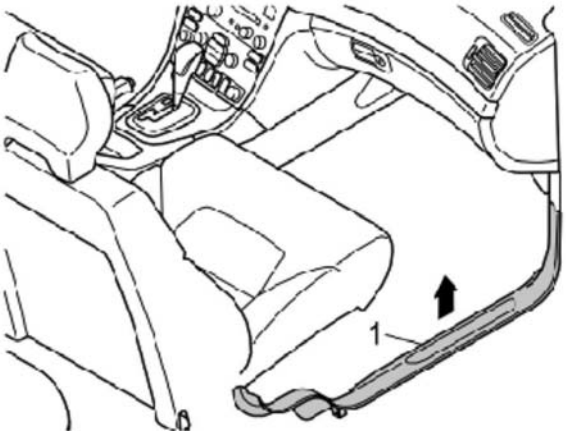
If the opening has become noticeable place a piece of strong tape on the backside to keep the opening tight and minimize the visibility as described in the following.



Note:
For reference / location of the openings, this sample picture shows the child seat consoles mounts installed.

The North American Market vehicles will not have these mounts.

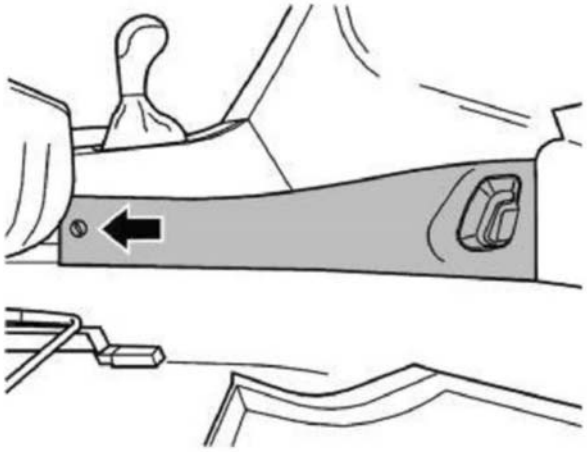
The front sill trim panel



Pull the sill trim panel straight up.

Pull out the sill trim panel at the front and rear edges.

Console side panel



Move the front seat to the rearmost position.

Turn the clip a 1/4 turn.

Slide the panel backwards.

Remove the panel.

Install tape

Pull the carpet to the side and place a piece of strong tape on the backside to keep the openings tight and minimize the visibility.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
07003	Taping carpet openings	.2

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION
Technical Service Bulletin # **TNN39-58** Date: **070214**

DVD Player - Won't Accept/Eject DVD's/Inoperable

NO: 39-58

DATE: 02-14-2007

MODEL: All with Factory Equipped RSE (Rear Seat Entertainment Systems)

SUBJECT:
Multiple discs inserted into RSE DVD player

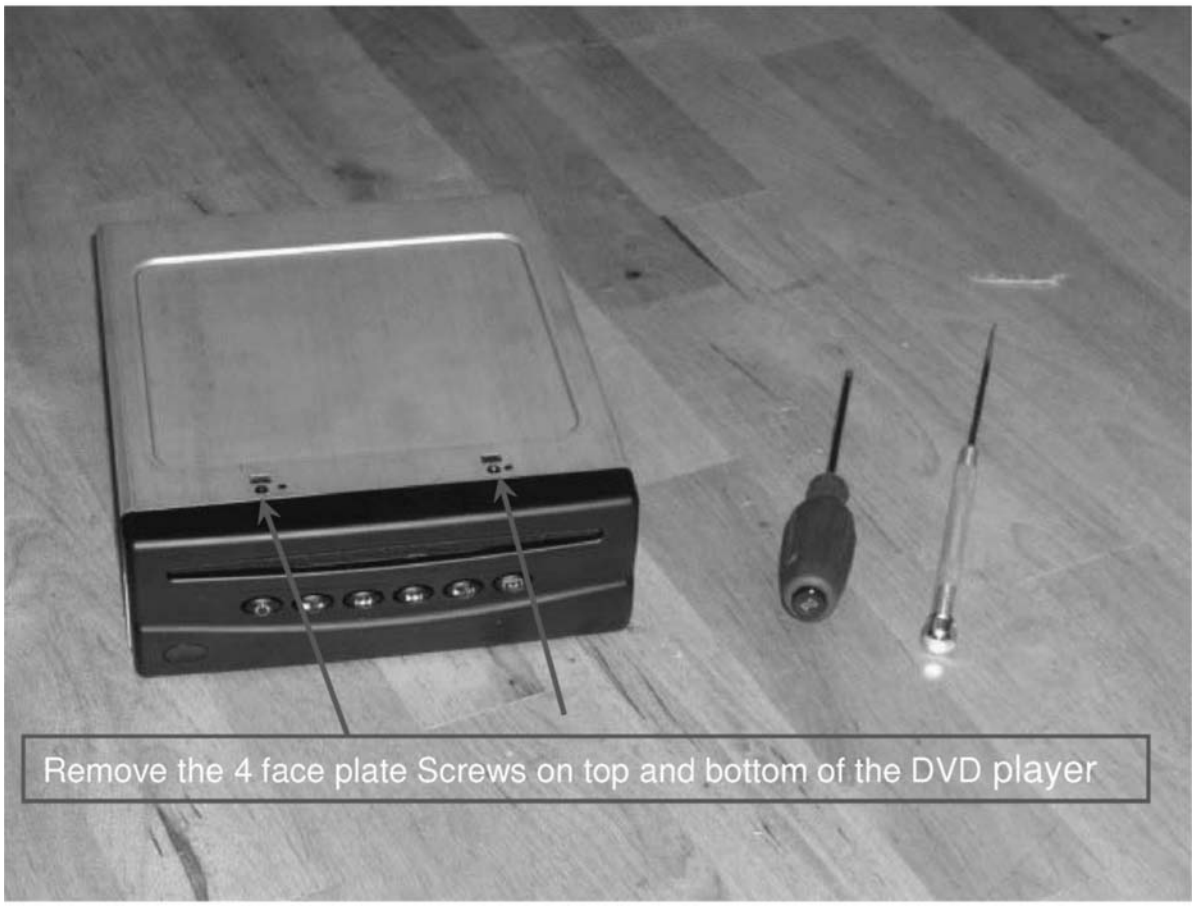
REFERENCE:
VIDA fault tracing information

DESCRIPTION:

Customers may report that their RSE Rear Seat Entertainment DVD Player will not accept DVDs (DVD player will not allow DVD discs to be inserted; DVD Player is inoperable or will not eject the DVD disc).

One possibility for this condition is that there may be 2 or more discs inserted into the DVD player. If multiple discs are found in the DVD player please do not submit the unit for warranty. If a DVD player is returned for warranty with 2 discs inside, the claim and part will be denied.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Refer to the illustration for a method to remove stuck multiple discs with customer approval.

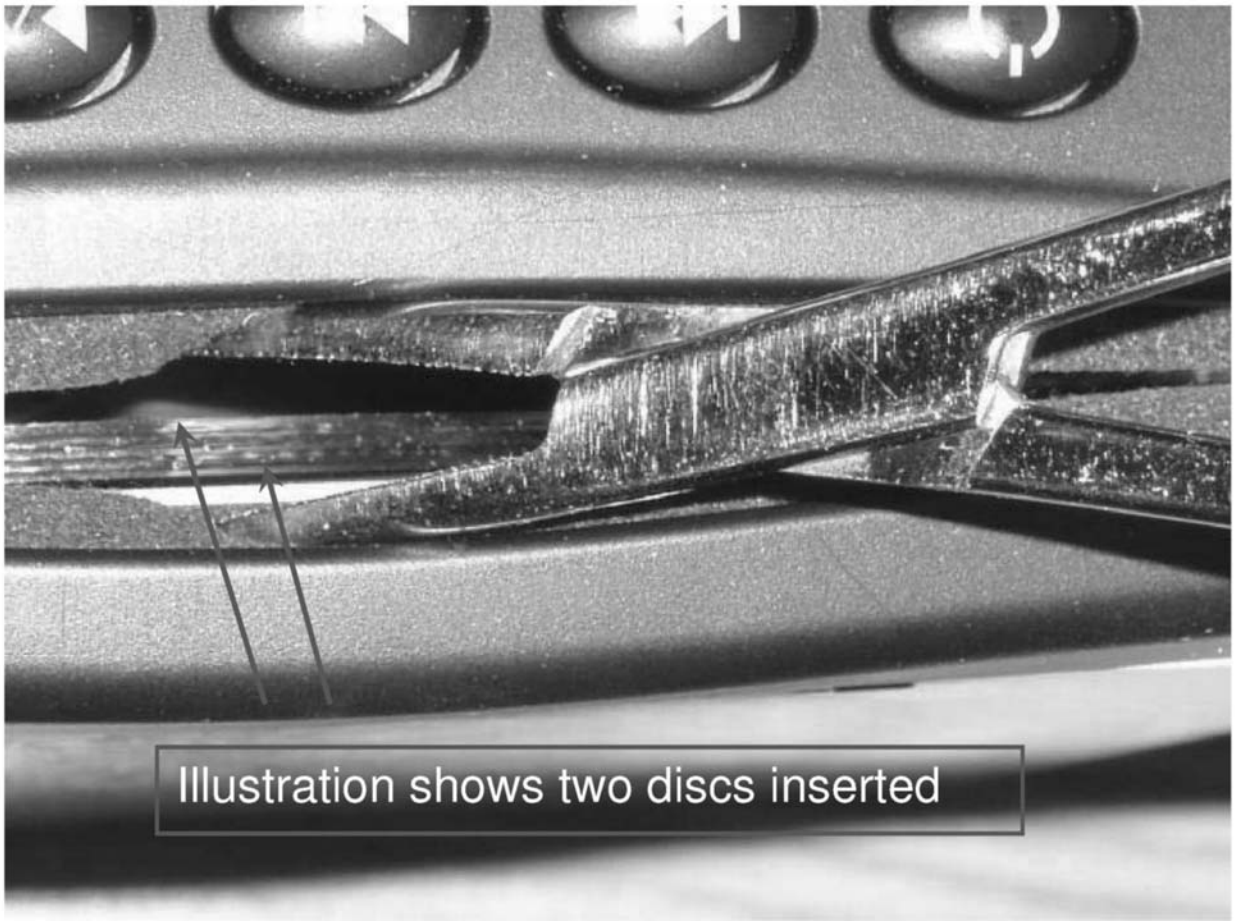
Note:
Any DVD Players returned to TMA disassembled or tampered with, will not be covered under warranty.

This TNN describes the method to inspect the DVD player for multiple disc insertion.

It is not necessary to remove the DVD player for inspection.

Carefully spread the protective dust cover apart using a hemostat or similar tool as described in this procedure. Be careful not to scratch the unit or damage the opening of the DVD Player or damage the customer's DVDs inside the unit.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



DO NOT ATTEMPT TO REMOVE THE DISCS WITH THE TOOL ABOVE. THE DVD PLAYER AND THE DISCS WILL BE DAMAGED

If there is one DVD stuck inside the unit and you were not able to eject the discs using the player's external control buttons, leave the disc in the unit and return the DVD Player to TMA under the normal warranty return program. Disc will be removed and returned to the Retailer.

The procedure below describes the method to remove the stuck DVDs from the player that has had multiple disc insertion if the customer so decides.

Note:

If you decide to remove the stuck Discs, please follow the procedure below. (DVD player must be removed to perform this operation)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Pull back the faceplate exposing the 2 Disc

Important:

Once the unit is opened it is no longer covered under warranty and will be denied if submitted. Please advise your customer of this before proceeding. Volvo Cars of North America assumes no responsibility for damage to the player or discs if this method is used.

^ Carefully Insert pick as shown (without scratching the disc surface) below the spindle.

^ Gently lift up on the discs close the center hole so they will clear the spindle.

^ Grip the discs with your fingers and pull back to remove from player.

Return Discs to customers.

Technical Service Bulletin # **TNN21-25** Date: **070501**

Engine - Exchange Cylinder Block Modification

NO: 21-25

DATE: 05-01-2007

MODEL/YEAR:
S60/V70/V70-XC 2001- (C70 2002)

ENGINE:
B52X4T

SUBJECT:
Exchange Cylinder Block Modification.

REFERENCE:
Parts

Background:

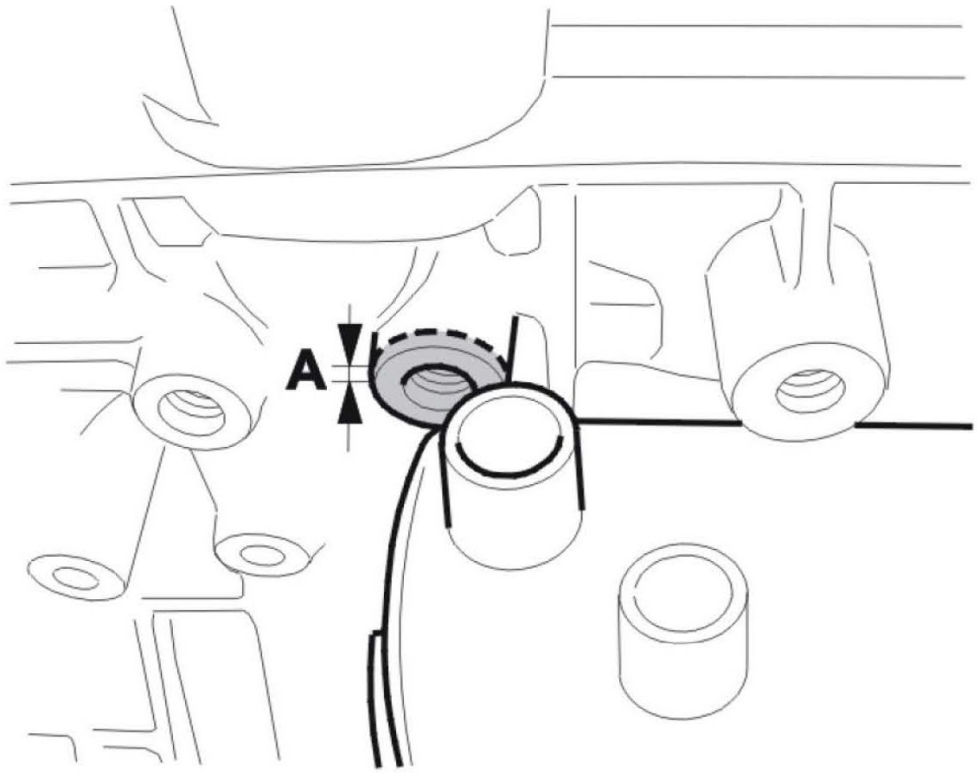
A new cylinder block was introduced in August 2003. The changes were also included on exchange engines for the above vehicles.

The exchange engines are supplied with oil separator box (Oil Trap) 8692211 and hose 8692217. On the S60/S80/V70 (00-)/V70XC (01-) up to model year 2001, and on the C70 up to model year 2002, there is a conflict between oil separator box and ETM.

The solution is to remove the oil separator box and hose supplied with the exchange engine & transfer the oil separator box 1271988 and hose 1271654 from the old engine after grinding down the attachment lug in accordance with the service bulletin.

Description

Remove the oil separator box from the old engine.



Cover the openings in the new block so that no grindings enter the engine. Grind down the attachment lug at least A = 5 mm (13/64 inch).

Align the oil separator box on the cylinder block and check that there is a clearance of 1-2 mm between the oil separator box with hose and clamp installed and the newly ground attachment lug. Install the old oil separator box on the new engine.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
21918-3	Mounting Point, Oil trap, Cylinder block.	0.2hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN77-18** Date: **070515**

Tires - Pressure Requirements/Recommendations

NO: 77-18

DATE: 5-15-2007

MODEL:
All

MODEL YEAR:
All

SUBJECT:
Tire Pressures, Requirements and Recommendations

REFERENCE:
VIDA, SMB 17-006, owners' manuals

Description

Tire pressure is a critical element of vehicle performance. Correct tire pressure is important for:

^ achieving good fuel economy

^ achieving optimum comfort and good driving characteristics

^ helping to prevent flat-spotted tires due to low tire pressures

As stated in the Model Year 2007 owners' manuals:

^ Under-inflation is the most common cause of tire failure and may result in severe tire cracking, tread separation, or 'blow-out,' with unexpected loss of vehicle control and increased risk of injury.

^ Under-inflated tires reduce the load carrying capacity of your vehicle.

Over-inflation is also undesirable. Over-inflated tires can be stiff and unyielding, and will cause the vehicle to ride more harshly and loudly.

Under-inflation or over-inflation may cause uneven treadwear patterns.

There are many opportunities for the Volvo retailer to check and maintain proper tire pressure, from new vehicle storage, to delivery, through the service life of the vehicle. This TNN is designed to summarize and highlight Volvo's requirements and recommendations regarding tire pressures.

Service

GENERAL:

Tire pressures should always be checked cold. Tires are considered to be cold when they have the same temperature as the surrounding (ambient) air. This temperature is normally reached after the vehicle has been parked for at least 3 hours.

After driving a distance of approximately 1 mile (1.6 km), tires are considered to be hot.

When the weather temperature changes, tire inflation pressures also change. A 10-degree F (5-degree C) temperature drop causes a corresponding drop of 1 psi (7 kPa) in inflation pressure.

TRANSPORT PRESSURE:

All new Volvo vehicles are delivered from the port to the retail facility with tires at 'transport pressure', which is 43 psi (300 kPa). As indicated in Service Manager Bulletin 17-006, Retail Car Delivery Process, Stock Maintenance checks require that tire pressure be checked every 60 days, and be maintained at 43 psi (300 kPa). This is also true for vehicles on static display, such as the showroom or outside display areas. This transport pressure must be maintained until just before retail delivery.

Note!
Failure to maintain transport pressure in tires may result in tire damage not covered by the tire manufacturer's warranty.

CPS (CUSTOMER PREPARATION SERVICE):

SMB 17-006 also gives detailed information regarding operations to conduct during the CPS (Customer Preparation Service).

Note!
CPS should only be completed just prior to actual retail delivery of the vehicle to the customer.

Model Year 2007 U.S. specification vehicles have only one recommended tire pressure. This is the case whether the vehicle is equipped with a Tire Pressure Monitoring System (TPMS) or not. It is critical during CPS (and whenever tire pressures are checked and set) that all 4 tires be set exactly to the tire pressure indicated on the tire pressure label. This will assure that the customer has the best combination of ride, handling, and tire life.

Canadian specification vehicles continue to use labels with both a cold tire pressure and an optional tire pressure.

In all cases:

Use the recommended cold inflation pressure for optimum tire performance and wear.

NITROGEN:

There have been reports in the industry regarding the use of nitrogen for inflating tires. Volvo's position is that nitrogen is not required when servicing tires. While it is not harmful to use, it is also not necessary. This is true even for vehicles with TPMS.

CALIBRATION OF TIRE PRESSURE MEASURING EQUIPMENT:

VIDA can be used to check a vehicle's tire pressures.

This is the path in VIDA to follow:

Diagnostics > Vehicle communication > UEM> Advanced > Quick Test

As the tire pressure displayed in VIDA is extremely accurate, this display can be used to 'calibrate' tire pressure measuring equipment in the service

workshop. Compare the VIDA reading with a tire pressure gauge, and compensate accordingly.

TPMS (TIRE PRESSURE MONITORING SYSTEM):

TPMS (Tire Pressure Monitoring System) was optional on certain Model Year 2005 and 2006 vehicles fitted with SST (self-supporting tires). TPMS is standard equipment on all U.S. specification Model Year 2007 S60 (except S60R), V70 (except V70R), XC70, XC90, and S80 vehicles. It is planned to be standard equipment on 100% of the U.S. specification Model Year 2008 vehicles. TPMS is optional on Model Year 2007 Canadian specification vehicles.

The system must be regarded as a driver aid to maintain the correct tire pressure. TPMS does not take the place of good vehicle maintenance which requires that tire pressure be checked on a regular basis. The owners' manual recommends to the owner that tire pressures be checked monthly. When inflating the tire with air, you must, as much as possible, ensure that the tires are at same temperature as the outside temperature. When inflating with air, the tires must be filled to the pressure stated on the decal located on the car body. These pressures MUST be followed.

Technical Service Bulletin # **TNN36-59** Date: **070504**

Antitheft - No Start/DTC's CEM-6C48 or CEM-6C49

NO: 36-59

DATE: 5-04-2007

MODEL:
S80, XC90, V70, XC70, S60

MODEL YEAR:
2005-2006

CHASSIS:
See below

SUBJECT:
No Crank No Start: CEM-6C48, CEM-6C49, ECM-710B, ECM-720A, ECM-P160200, ECM-U014100

REFERENCE:
VIDA

DESCRIPTION:

Note:
This TNN covers two related concerns with different affected chassis ranges.

Affected chassis range:	
S60	425000 – 469337
S80	390000 – 408815
V70	459000 – 504618
XC70	173000 – 195007
XC90	134000 – 194801

1. MY 2005: DTC CEM-6C48, CEM-6C49

The customer may experience a no crank no start condition (starter motor not activated. An error message saying "Start prohibited, try again" will be displayed in the Driver Information Module (DIM) display and Diagnostic Trouble Codes (DTC) CEM-6C48 or CEM-6C49 will be stored in the Central Electronic Module (CEM). The engine will usually not start even after several attempts.

Note:
If DTC ECM-710B, ECM-720A, ECM-P160200 or ECM-U014100 is set in the Engine Control Module (ECM), please refer to 2) below.

Affected chassis range:	
S60	425000 – 545090
S80	390000 – 446916
V70	459000 – 584349
XC70	173000 – 235477
XC90	134000 – 290450

2. MY2005 - 2006: CEM-6C48 + ECM-710B, ECM-720A, ECM-P160200, ECM-U014100

The CEM may lose its EPROM memory. When this condition occurs, it will not be possible to start the car, since all security codes are lost including the Immobilizer PIN codes.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Involved DTCs:

Turbo engines: ECM-710B, CEM-6C48

Normally aspirated engines except V8: ECM-720A, CEM-6C48

Normally aspirated V8 engines: ECM-P160200, ECM-U014100, CEM-6C48

SERVICE:

Perform a CEM SW reload. Refer to VIDA for correct software product number.

Note:
Answer 'YES' at the question 'Has the CEM been replaced?'

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	Control module downloading	0.3 h

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN37-22** Date: **011207**

Computers/Controls - CANbus Network Information

NO: 37-22
DATE: 12/07/2001
MODEL: All Models 1998 -->
SUBJECT: CANbus Network Information
REFERENCE:
CHASSIS: N/A:

This Tech Notes supercedes the previous 37-22 dated 11/30/2001. Please update your files.

DESCRIPTION:
This Tech Net Note is an explanation of how the CAN network is set up and functioning, including network diagnostics. It also describes conditions for DTCs to be set and some tips on how to fault trace the CANbus. CANbus errors are often complicated to fault-trace simply because it is a distributed system and error codes may be or may not be set in multiple nodes.

This information is best used as background information to understand the CANbus or system diagnostics and to fault trace the CAN network, and may not help to immediately find the root cause of a specific problem. This document will supplement the normal training material and it is recommended for technicians who have completed and thoroughly understand the training on "Volvo Automotive Networks"

The structure of this document is: general information on what role the CEM plays in CANbus faults, then each of the major types of DTCs are described. Each type of DTC has a description, explanatory picture, and some typical scenarios when it can be set.

CEM diagnostic functionality
Fault-codes for CANbus errors
  DTC CEM-DF03 to CEM-DF16
  DTC CEM-1A51 to CEM-1A64
  DTC E003 set in nodes other than CEM
  E000 and E001 DTCs set in any node (E000=HS-CAN / E001=LS-CAN)
  Codes posted due to signal missing, quick detection of CANbus error
Multiple codes and extended diagnostic (counters and freeze frames)
Limp home modes and characteristics of CAN faults
Tips for fault-tracing
CANbus hardware and measurement
Appendix. List of DTC codes for CAN bus errors
Appendix Data communication wiring diagram
  Denso EMS and Bosch EMS up until MY01
  Bosch EMS from MY02

SERVICE:

CEM diagnostic functionality

The CEM is the only node that truly monitors the voltage levels on the CANbus. Only the CEM can post the diagnostic trouble codes for CANbus

short-circuit to ground or 12V (e.g. DTC CEM-DF14), even though many nodes can post codes caused by the short circuit, e.g. E003 (this is a very subtle, but important difference).

Note:
The fact that the CEM has more diagnostics for the CANbus faults does not mean that the CEM is the root cause of the fault! Do NOT replace the CEM for CANbus failure unless there is a confirmed hardware internal error based on the fault tracing in VADIS and this TNN.

The CEM also has the functionality of detecting the absence of other nodes.

All nodes on the CANbus need to send and receive information. More specifically, all other nodes need to receive information from the CEM, and the CEM needs to receive information from all other nodes. If a node does not receive information from the CEM, it will set the code DTC-E003, and if the CEM does not receive information from a node it will post a code CEM-1A51 to CEM-1A64 for that node.

As an example, if the CCM does not receive information from CEM it will post DTC CCM-E003, and if the CEM does not receive information from CCM it will post DTC CEM-1A55. Further, if the DDM does not receive information from CEM, it will post DDME003, and if the CEM does not receive information from DDM it will post the code CEM-1A52.

If there is an open circuit on the CANbus, codes are thus posted in pairs, one in the CEM and one in the corresponding node. Note that this can mean that the CEM posts a lot of codes reaching its maximum number of codes (10).

These codes will be explained in detail under sections DTC CEM-1A51 to CEM-1A64.

Fault-codes for CANbus errors

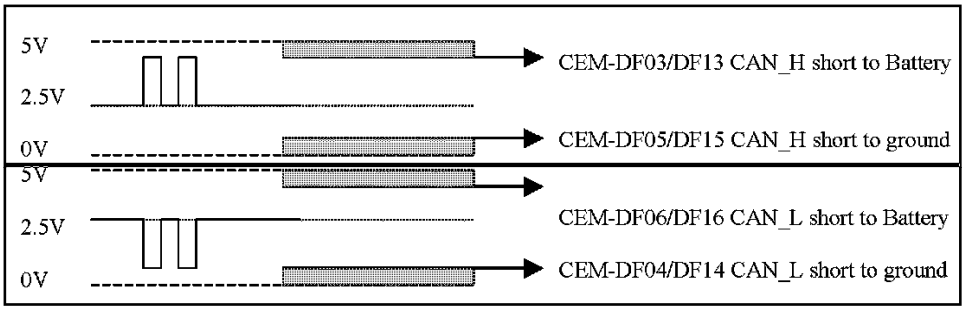
A list of different DTCs most related to CANbus errors can be found at the end of this TNN.

DTC CEM-DF03 to CEM-DF16.

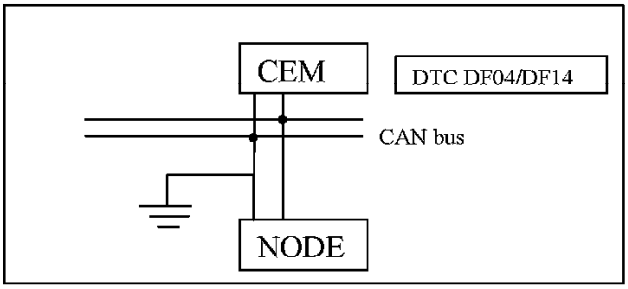
The CEM is the only node that has diagnostic functions to detect short circuit to ground or short circuit to voltage (B+). This is done by monitoring the electrical signal levels on the CANbus by an internal voltage measurement circuit in the CEM, and the DTCs CEM-DF03 to CEM-DF16 can be set.

Note. There are separate codes for low speed and high speed network. DF03, DF04, DF05, DF06 refer to the low speed net work and DF13, DF14, DF15, DF16 refer to the high speed network.

There is no strict electrical detection function for open circuit, but there will be a number of codes posted as a result of an open circuit.
DTCs CEM-DF03 to CEM-DF16 are the strongest evidence for a network fault, but the code does not locate the fault. Due to the detection criteria for these codes, they can in rare cases also be posted when driving in very high electromagnetic field areas.



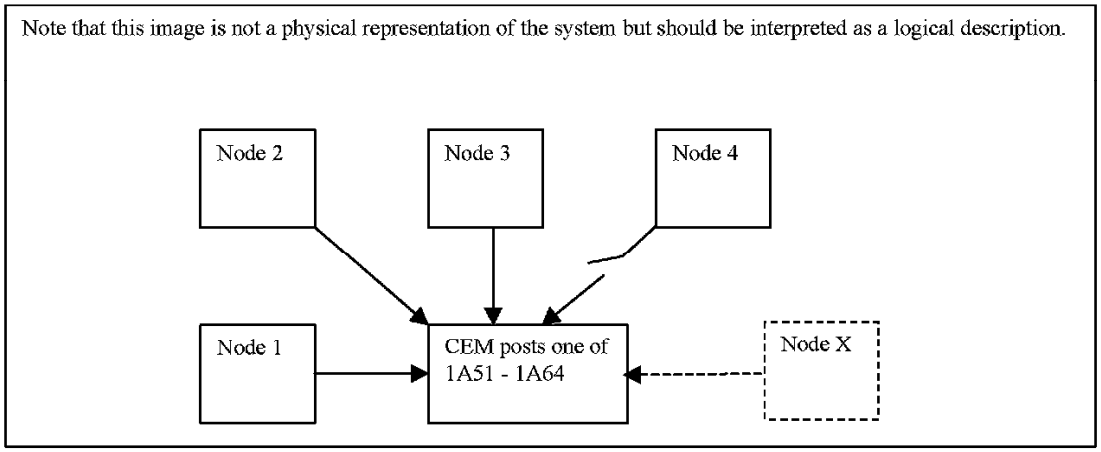
The detection for these codes is continuous. The detection time for a permanent fault can be up to 10 sec. CEM-DF03 to CEM-DF16 are posted when the voltage on the CAN lines are more than 4.5V or less than 0.5V respectively. See graph below.



A typical scenario when these codes are set is a pinched CAN wire to either ground or pinched together with a 12V wire, see illustration below.

Different combinations of codes are possible, and the codes mentioned in the graph are only examples.

DTC CEM-1A51 to CEM-1A64.

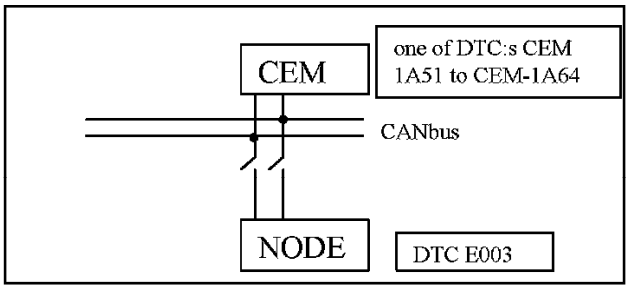


The CEM expects a signal sent from every node on the network. The CEM will post a code for communication with control module, or "Node not alive", if there is no communication from the concerned node for more than 10 seconds. See illustration.

Typically these codes come together with DTC E003 in the corresponding node. Depending on where the error occurs, there may be many CEM-1A51 to CEM-1A64 codes posted at the same time and the CEM reaches maximum number of DTCs stored (10). In this case not all codes will be represented even if the criteria for posting the code was met.

The codes will generally be posted when network is open-circuit, short-circuit, node is not powered, or if a node stops communicating to the CEM for other reasons.

Combinations of CEM-1A51 to CEM-1A64 codes are very useful for locating open circuit faults, see "Multiple codes and extended diagnostic (counters and Freeze Frames.)".



If there are intermittent CEM-1A51 to CEM-1A64 codes but not the corresponding E003 codes, first verify that, at the time of repair, communication can be established with all nodes. Then look at the power supply for the nodes. The reason is that the node will of course not post the E003 code if it lacked power when the intermittent fault occurred. The CEM however will post the CEM-1A5x code even if the other node lacks power or has a CAN communication problem. See illustration below for an example.

Different combinations of codes are possible, and the codes mentioned in the illustration are only examples.

DTC E003 set in nodes other than CEM

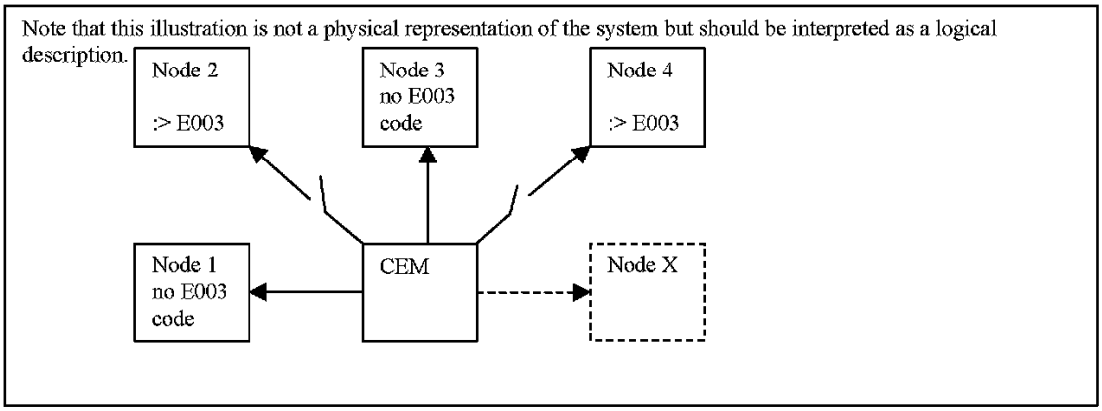
The DTC E003 code is posted when the incorrect CAN Configuration ID is received during 5 sec after Power up. This means that the nodes do not receive the data frame containing the correct master configuration ID from the CEM. Normally this is due to the CANbus has an open circuit or other disturbance.

This code is intended to detect if the CEM has the wrong software, but is more common for a network/power error. Combinations of E003 codes are useful to locate the fault, see section about multiple faults. However not all nodes set this code at the same fault time due to different power-on conditions as e.g. X / 15 / 15I / 30 powered nodes.

An E003 can be the result if a node gets the wrong signal configuration downloaded to it or as a result of swapping a node from another car. That is one of the reasons that swapping of nodes is prohibited.
If several or all nodes have E003 it can be a result of an incorrect signal configuration being downloaded to the CEM. In practice, this is however not likely to happen, it is more commonly a physical CANbus fault.

X / 15I / 15 powered nodes detect the fault 5 second after the node is powered up (IGN ON).
The nodes compare their internal CAN configuration ID (SW version) with CAN configuration ID continuously sent out from CEM. If the CEM ID is missing or not equal to the expected value at 5 sec after powered up, the E003 code is set. A wrong ID may come from swapping node between vehicle types, but most often this code is due to signal missing completely.
A node that has battery (30) feed does not get that hardwired power up, but gets its information about ignition position via CAN bus. This means that a 30 fed node will not post the E003 at that time if the error is permanent at power up. Instead it will be posted after an approximate 10 min timeout.

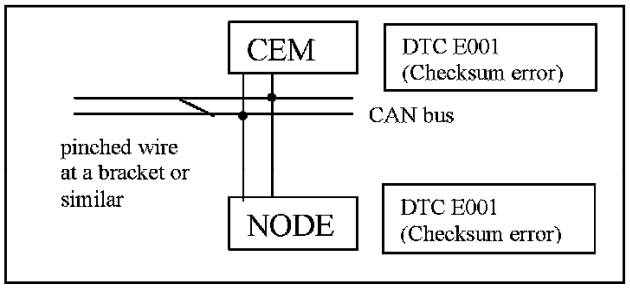
NOTE:
This means that for a 30 fed node the code may or may not be posted, all depending on when the error occurred.



The typical scenario when this code is set is an open circuit in the CANbus, and often together with the CEM-1A51 to CEM-1A64 codes.
See the illustration under "CEM-DTC CEM-1A51 to CEM-1A64." above.

E000 and E001 DTCs set in any node (E000=HS-CAN / E001=LS-CAN).

E001 code is an error in the data communication. It can be due to any disturbance on the CANbus or if a node is not sending correct data. The detection for these codes is continuous. It is originally designed to detect contact bouncing fault and corrupted message, but are also posted when there is a short circuit between CAN H and CAN L or when there is communication on only one of the two CANbus wires. Detection time for a permanent fault is within a few seconds.



Different combinations of codes are possible, and the codes mentioned in the illustration are only examples.

Other common causes for these DTCs is if a node is disconnected without first disconnecting the battery (Does not help if IGN key is out), or if CAN-message is "weak" or disturbed. That can happen if only one of the two CAN wires is operational or if one of the two network resistors is inoperative. Low speed network resistors are located in the UEM and REM. For the high speed network, the resistors are located in the ABS/BCM and
ETM, except for Bosch EMS MY02 and later where the resistors are in BCM and ECM.

Special cases with permanent E000/E001 exist, e.g. if one node is transmitting with slightly wrong baud rate, or if the crystal in a node is faulty.

Codes posted due to signal missing, quick detection of CANbus error

Some nodes, typically ECM, ETM, ABS and TCM, are checking each other's presence and are setting codes for absent signals. These codes are driving condition dependent and often combinations of codes can be set which may confuse fault-tracing. When trying to duplicate the driving condition / fault, it is not necessarily the same combination of codes that are set.
These are often more sensitive and are set more quickly than 1A51 - 1A64 or DF03 DF16 codes and can therefore be an indication that an intermittent quick error condition has occurred on the CAN bus.

Below you will find a sample of codes that may or may not be set in case of a CAN intermittent failure:

ECM 928C (Bosch), 922A (Denso), only with running engine. The codes are for cruise control signal missing and indicate that the cruise control signals were not received by ECM.

ECM 901A, 901E, 902A, 911A, 912A 913F for Bosch and 901A, 902A, 902B, 911A 912A, for Denso
SRS 00D6, Buckle signal timeout, indicate that the SRS have not received the buckle status from the CEM. (The buckle sensor is hardwired to the CEM)
SRS 00D5 bulb status signal from DIM.

ECM Bosch.

959F	AP12T APU (Analog Pedal Unit) Analog/PWM (via ETM) comparison fault

ECM DENSO

9520	ETS, APM, PWM, Electrical fault, low

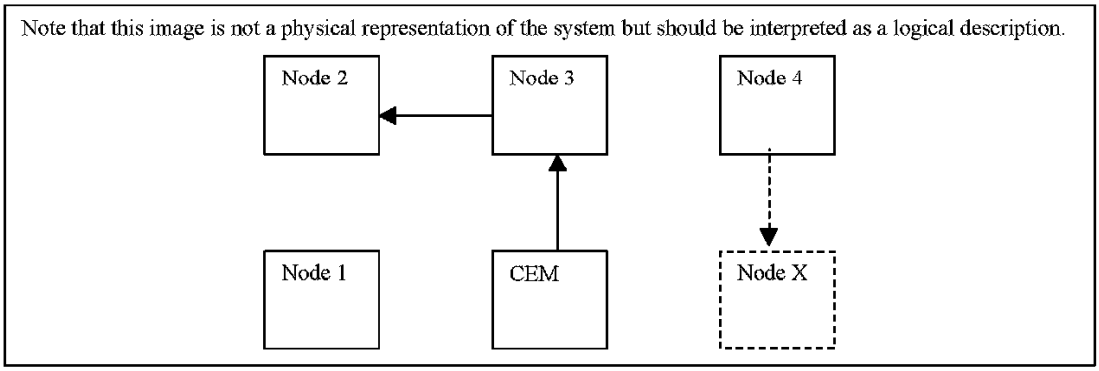
ECM monitoring:
Bosch:

510F	Vehicle speed signal

Denso:

510D	Vehicle speed signal missing
A02B	Signal missing from ABS/BCM
902A	Throttle Communication signal missing

Pedal sensor signal discrepancy between hardwired signal and CAN signal:



See the illustration below for a rough picture of how signals may or may not involve several nodes.

Multiple codes and extended diagnostic (counters and freeze frames)

The detection time for CANbus error DTCs differ for different codes. This means that for a specific error condition there may be a number of DTCs set in different nodes. Multiple codes in different systems can be confusing, but should be reviewed at the beginning of fault tracing to find a common link between all the codes.

Now it is possible in VADIS to read off extended diagnostics, typically counters and freeze frames. This is valuable also for CANbus diagnostics since it gives a possibility to determine which faults were posted at the same time. Remember that the counters are implemented in different ways in different control units which may make a comparison of driving cycles between different nodes difficult.

When fault-tracing a vehicle with many intermittent E003 and CEM-1A51 to CEM-1A64 codes it is useful to identify which nodes are affected. Print a copy of the "Data communication" wiring diagram in the appendix and write down all the DTCs and counters at each node. Analyze if there is a pattern that can describe where the fault can be located e.g. if the codes are grouped at one end of the CANbus. That will give a good indication where the fault is.

Limp home modes and characteristics of CAN faults

When a node does not receive any data frames from the CEM, it will enter a limp home mode. This mode may have different level of functionality depending on node.

If the error has occurred after the startup of the nodes, the nodes will normally keep the last recorded values as limp home values. Exceptions do exist though, e.g. fuel gauge for DIM.

For the Low speed network there are some distinct characteristics:

DIM: Since the DIM is a display of signals on the CANbus, it will quickly be visible if signals are missing. Depending on the filtering of signals internally in DIM, the displayed information will disappear at slightly different times. Normally the gauges freeze for 10 seconds and then they go to 0 and the DIM goes dark.

If only one node has disappeared, the DIM may give the first indication of that. An example is if the REM stops communicating, the first indication would be that the fuel gauge goes to zero.

CCM: This module has to keep a certain functionality in the absence of CAN communication. It is also a very good indicator that the CAN communication is lost, since it will light the diodes exactly ten seconds after ignition position 1 or 2 is chosen.
Other symptoms: if the AC-compressor is not cycling, except for the initial 1 sec activation controlled by ECM on power up, it can indicate a communication problem in the chain CCM>CEM>ECM. An obvious symptom is also that fan is running for one to ten minutes when IGN key turned off. This is due to that CCM is powered by Extended-X from CEM and it normally turns fan and other functionality off based on a CAN

command from CEM notifying ignition key out. If there is no CAN communication, the CCM will run until the power is lost.

DDM: The DDM will operate the functions in the driver's door but not in other areas of the car such as window lifts for rear windows and door locks for rear and passenger doors. Also the memory mirror will not work but it will be possible to maneuver the driver side mirror with the knob.

PSM: The seat memory functionality will not work. Stored seat and mirror locations will not function for the remote and seat memory.

UEM: Buckle up is displayed even when the seat belts are buckled if no communication from CEM to UEM. Also no remote function since there is no communication UEM to CEM.

AUM: Audio has most functionality left, except e.g. steering wheel switches control.

PDM: Windows and locks will not operate from driver side switches.

REM: The fuel gauge does not function and the rear doors will not lock with the central lock button. Also Defroster and foldable headrests will be inoperative.

SAS: No DSTC functionality

SWM: The steering wheel switches and turn signals do not work, but the horn works due to a redundant hardwired signal to CEM.

And for high speed network:
Engine: no start can be caused by no communication CEM>ECM+TCM.

ETM: has three levels of limp home:
Level 1. Cruise inoperative
Level 2. Throttle dull, no quick response.
Level 3. Default limp home. The RPM is controlled by means of the injectors.

TCM: GSM functions inoperative, only certain gears active. Note that once the TCM goes into its limp home mode for no CAN communication, it will not come back in that driving cycle even if the error disappears.

ABS/BCM: Generally limp home modes depend on fault. AYC sensor fault gives loss of DSTC and lamp lit. Wheel sensor fault gives lamp lit, loss of anti-lock but power assist still functions. May lose diagnostic possibility if in limp home mode.

CEM: Major loss of functionality. Note that the CEM has separate buses for CAN H and CAN L, which means that it is possible to communicate to e.g. the CEM via high speed bus even if the low speed network has an interruption.

Tips for fault-tracing

If the CEM has DTC CEM-DF14, CAN low short to ground, it does NOT mean that the CEM is shorting the CANbus. The short is from any point on CAN low to ANY grounding point, either in the wiring harness, which is most common, or in any control unit. Note that an E001 can be set in certain nodes but not others, and the short-circuit can still be far from the control unit.

Statistically there is a high likelihood it is a cable harness problem (check behind radio, by the SRS control unit, TCM/ECM CANbus female terminals).

Note that a male terminal p/n 9441394 can successfully be used to probe the tension at the female CANbus terminals. If the female terminal does not provide the proper tension it should be replaced by p/n 9442486.

If E001 occurs permanently and the cable harness is OK, a good tip is to remove all nodes having E001 in them (except the CEM) , clear the codes in the remaining nodes and read them again to see if the code disappears. Then reinstall them one by one until the code reappears. If it is possible to communicate with the vehicle in ignition position 0 and 1 but not in 2, look for a 15 fed node corrupting the CANbus.

The above method is also useful in another error scenario. At rare occasions a node can start sending irrelevant information on the CAN bus. This may block the correct messages from coming through. The result may be one or more E003 or 1A51 to 1A64 codes. It is very difficult to know which node is disturbing so the above method can be the only way to find the root cause.

If there is no response from any of the low speed nodes, but the high speed nodes respond...

The CEM protects the CANbus from short-circuits occurring by the Data Link Connector. This is achieved by four relays internally in the CEM, one for each wire on CAN high speed bus and CAN low speed bus. The relays are closed when CEM receives a command on the K-line from VADIS.

So if you encounter this, check the following:

1. VCT2000 cable, this has caused problems before. Try another cable and VCT200.

2. Continuity and signal level of K-line wire.

3. Continuity on CAN wires between Data Link Connector and CEM.

If 1-3 check OK, there is most likely a permanent CANbus failure in the wires or a node. Continue fault-tracing according to CANbus hardware and measurement below.

CANbus hardware and measurement

The CAN network system is set up with network resistors of 120 Ohms placed inside some nodes, and connected between the two CAN wires (Green(GN) for CAN low and White(W) for CAN high)

The two nodes in the low speed network (basically passenger compartment) that have the network resistors are REM and UEM. For the high speed network (basically engine compartment) it depends on engine type and model year. For MY99-MY01 the nodes that have the network resistor are ABS and ETM. From MY02 and later vehicles with Bosch EMS, the ETM is no longer on the high speed network.

Instead that end resistor is in the ECM.

Method

To identify a permanent fault condition in the CANbus it is possible to measure the CANbus resistance. The CANbus must be measured with the negative battery cable off and should be close to 60 Ohms. An open in one or both of the CAN wires will result in a reading of 120 Ohms. It is recommended to measure the resistance with the CEM breakout box connected. That gives the following advantages:

1. The networks will be tested including the CEM. Note however that open circuits in ABS/BCM, SAS, PSM, PDM, DDM and AUM will still not affect the 60 Ohm measurement since these nodes are not connected in series. A short between the green and white will however be detected.

2. You will have easy access to the low-speed network, high-speed network and the wires between CEM and the data link connector.

3. Having the multimeter in the footwell area, wiggle the cables/connectors in the bulkhead above the CEM and look for changes in Ohm reading.

4. As under 3. wiggle also the cables/splice behind radio where radio cables meet firewall harness.

5. As under 3. wiggle cables/connector at A pillar that connects the roof harness.

6. As under 3. have someone wiggle the cables under the coolbox for ECM and TCM.

If for some reason the CEM breakout box can not be used, the low speed network can either be measured using a breakout box or on the cable side of the connector to the PSM, with the PSM disconnected.

These measurements are particularly useful when CEM-1A51to CEM-1A64 and E003 or E001 codes are present without CEM-DF03 to CEM-DF16 codes.

When making the resistance measurement, also verify that none of the wires has a short-circuit to ground or battery which could post the CEM-DF03 to CEM-DF16 codes. That resistance should be > kOhms.

For intermittent faults and for CEM-DF03 to CEM-DF16 codes, the oscilloscope is useful. This measurement should be made with all nodes powered up and using a breakout box. Verify that the CAN H voltage does not at any point exceed 4.5V and that the CAN L voltage does not go under 0.5V. Note that the VADIS oscilloscope is not useful (too slow sampling rate) for detailed CANbus data measurement but it will give an indication of voltage levels and whether there is communication or not.

Note:

NEVER test any female terminal with a multimeter probe. This may result in damage to the female terminal, causing an improper contact when the connection is reinstalled. It is often useful to use the male pin mentioned in this TNN to probe.

Appendix. List of DTC codes for CAN bus errors[1]:

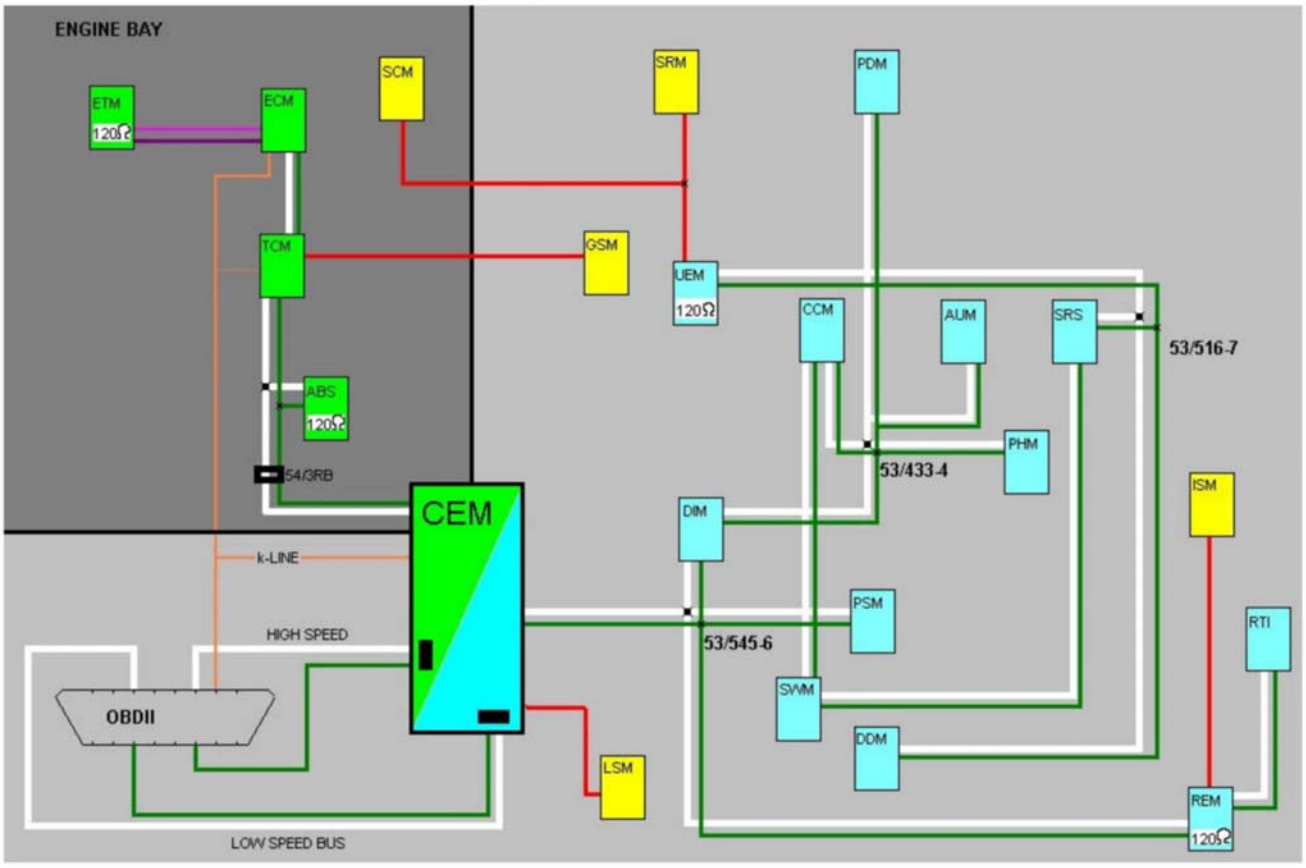
NODE	Code	Comment
CEM	1A51	Communication with SRS control unit
CEM	1A52	Communication with DDM
CEM	1A53	Communication with PDM
CEM	1A54	Communication with Power Seat Module
CEM	1A55	Communication with CCM
CEM	1A56	Communication with DIM
CEM	1A57	Communication with RTI
CEM	1A58	Communication with PHM
CEM	1A59	Communication with AUM
CEM	1A5A	Communication with Rear Electronic Module
CEM	1A5B	Communication with Steering Wheel Module
CEM	1A5C	Communication with UEM
CEM	1A5D	Communication with Electronic Throttle Module
CEM	1A5E	Communication with SAS
CEM	1A5F	Communication with ABS
CEM	1A61	Communication with TCM
CEM	1A62	Communication with ECM
CEM	1A64	Communication with DEM
CEM	DF03	CAN_H (or CAN_L) short to battery low speed network
CEM	DF04	CAN_L short to ground, low speed network
CEM	DF05	CAN_H short to ground, low speed network
CEM	DF06	CAN_L or CAN_H short to battery , low speed network
CEM	DF13	CAN_H or CAN_L short to battery, high speed network
CEM	DF14	CAN_L short to ground, high speed network
CEM	DF15	CAN_H short to ground, high speed network
CEM	DF16	CAN_L or CAN_H short to battery, high speed network
CEM	E000	Communication with the control module, (CAN High speed checksum error)
CEM	E001	Communication with the control module, (CAN Low speed checksum error)
PSM	E001, E003	Communication problems with control module
AUM, DDM, PDM, AEM, DIM, CCM, REM, RTI, SRS, SWM, UEM	E001	Control module communication (LS CAN transmit / receive error)
AUM, DDM, PDM, AEM, DIM, CCM, REM, RTI, SRS, SWM, UEM	E003	Configuration fault ("Control module communication" for RTI)
ABS	0090	Control module communication
ABS	0091	Control module communication
ABS	0092	Control module communication
ABS	0093	Control module communication
ABS	0094	Control module communication
ABS	0095	Control module communication
SAS	E000	Communication fault with control unit
SAS	E003	Communication fault with control unit
TCM	E000	Control module communication
TCM	E003	Configuration fault
ECM	E000	Control module internal fault (CAN High speed checksum error)
ECM	E003	Control module internal fault (CAN configuration fault)

Note that the description in "Comment" is not always consistent. They are mostly taken from the Vadis description.

[1] Not including the codes that are posted as a consequence of lack of communication, e.g. 928C.

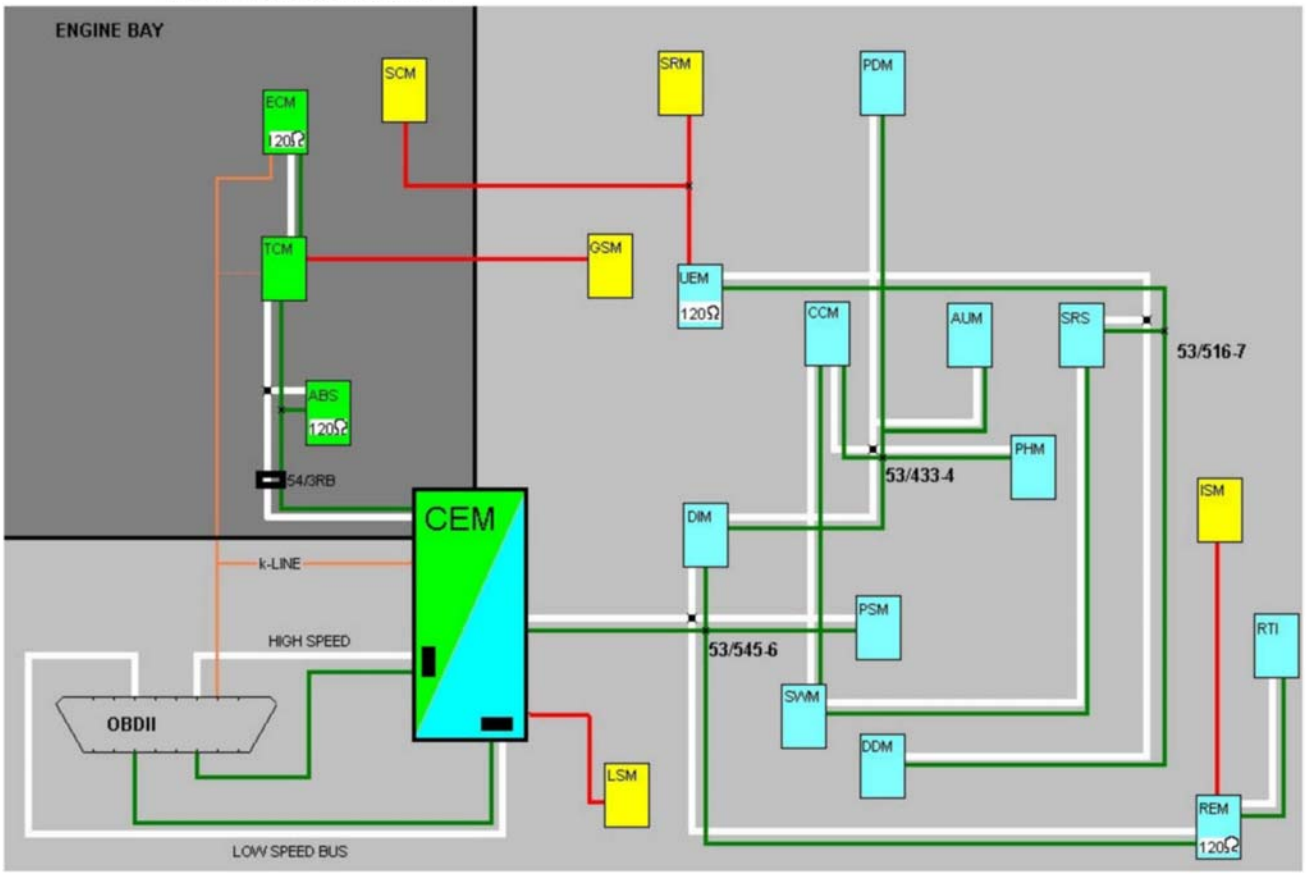
Appendix Data communication wiring diagram

Denso EMS and Bosch EMS up until MY01



Appendix Data Communication Wiring Diagram

Bosch EMS from MY02



Bosch EMS From MY02

Technical Service Bulletin # **TNN88-44** Date: **070403**

Air Bag Systems - Occupant Weight Sensor Installation

NO: 88-44
DATE: 4-3-2007
MODEL: S40, V50, C70, S60, S80, V70, XC70, XC90
M. YEAR:
C30 2007-->
S40 2004.5-->
V50 2005-->
C70 2006-->
S60 2006-->
S80 2006
S80 2007--> (All New S80)
V70 2005-->
XC70 2005-->
XC90 2005-->

SUBJECT:
Occupant Weight Sensor (OWS) Installation Installation

This Tech-Net Note supersedes the previous TNN 88-44 dated 8-21-2006. Please update your files.

DESCRIPTION:
The hose between the Occupant Weight Sensor (OWS) bladder and pressure sensor must not get twisted, kinked, pinched, stuck under the spring wires or otherwise restricted during installation of the OWS spare part kit. Incorrect installation may lead to calibration problems and related Diagnostic Trouble Codes (DTCs):

S40, V50, C70, C30	SRS-0112, STS-0114
S60, S80*, V70, XC70, XC90	SRS-0250, SRS-0258
S80**	SRS-B00A054

*) MY 2006
**) MY 2007

SERVICE:
When installing an OWS spare part kit, make sure that the hose between the OWS bladder and pressure sensor is not twisted, kinked, pinched, stuck under the spring wires or otherwise restricted. Follow the instructions below in addition to the instructions in VIDA.

Repair > Removal, replacement and installation > 8 Body and interior > 85 Interior > Front seat, driver's seat, front seat > Occupant weight sensor (OWS), replacing

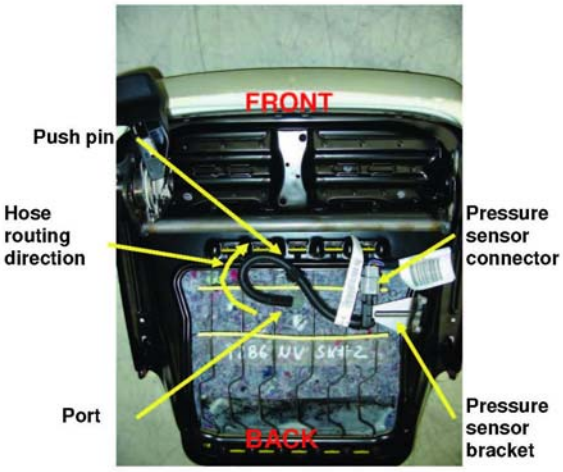
Information > Parts > Parts catalog > 8 Body and interior > 85 Interior > 852 front seat, drivers seat, seat bench type > Front seat padding, panels

Note:
Photos show MY2007 S80 installation. Installations in other car models are similar and the same principles apply.

1. OWS spare part kit and seat frame.

2. Route the wire harness with OWS ECU and pressure sensor through the 3rd and 4th spring wires.

3. Lay the bladder package on the springs with the hose below them.



4. Attach the push pin and attach the pressure sensor in the bracket. The hose port shall face the right outboard side of the seat (see photo above). Make sure that the port is not pushed up into the seat. The hose shall be looped in a smooth curve to the front of the seat in a clockwise direction (see photo above) and the pressure sensor shall be mounted with its connector facing the front of the seat.

5. Make sure that the hose is correctly installed (routed in a smooth curve below the spring wires) and the pressure sensor is attached in the bracket without external interference.

Note:
For vehicles with seat heating, install a new heating pad along with the OWS spare part kit. This is required in order to maintain a proper mechanical interface in the seat.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
85226-2	Occupant Weight Sensor Replace S40, V50	1.0 h
85226-2	Occupant Weight Sensor Replace C70	0.9 h
85226-2	Occupant Weight Sensor Replace V70, XC70	1.2 h
85226-2	Occupant Weight Sensor Replace XC90	1.3 h
85226-2	Occupant Weight Sensor Replace S60, S80 → MY06	1.2 h
85226-2	Occupant Weight Sensor Replace C30	1.0 h
85226-2	Occupant Weight Sensor Replace S80 MY07 →	1.0 h
36001-2	Diagnostic Trouble Code Read/Reset	0.2 h

Claims may be submitted under the New Car Warranty when there is a verified customer complaint using claim type 01.

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN85-28** Date: **070618**

Interior - Play/Knocking Noise In Front Seat Backs

NO: 85-28

DATE: 6-18-2007

MODEL / MY:
See chart below

SUBJECT:
Front Seats, Play in Lower Part of Backrest / Adjust

REFERENCE:
VIDA

NOTE:
This TNN superceded the previous 85-28, dated March 3, 2006. Please update your files.

DESCRIPTION:

Some customers may complain about play in the lower part of the front seat backrest. The concern occurs mainly during stop and go driving. Sometimes the play is combined with a knocking noise that can be heard from the recliner area.

Type	Model	MY	Chassis	Plant
544	S40	2005 -	091836 -	22
545	V50	2005 -	090835 -	22
384	S60	2005 -	457937 -	22
184	S80	2005 - 2006	404529 - 446916	21
285	V70	2005 - 2007	493766 – End of Production TBD	21 & 22
295	XC70	2005 - 2007	189843 - 288671	21
275	XC90	2005 -	181227 -	21

For vehicles within the listed chassis range, follow the service method in this document.

Material	Quantity	Part No.
Anti-squeak tape	0.1	9511099*
Isopropanol	Shop Supply	1161721

* Included in anti-squeak repair kit, part number 9511025.

MATERIAL AND TOOLING

SERVICE:

This service solution reduces the concern with play and related noise in the lower part of the seat backrest. However, due to the Whiplash Protection System (WHIPS) assembly, there will always be a nominal play, as there is no fixed connection between the backrest and the seat frame.

Steps 1 through 10 are for the driver's seat adjustment
Steps 11 through 15 are for the passenger seat adjustment.

1. Adjustment of driver's seat

Move the seat to the most forward position. Raise the rear edge of the seat cushion to maximum height.

Remove:

- Screw on the inside at the front end of the side panel (1).
- Pull the side panel straight up in the rear (2). Fold the panel away.

2. Release seat belt

Release the quick fit connection from the seat belt fitting by pressing the catch pin (indicated in the picture).

3. Remove plastic cover, outer side

Remove:

- screw
- plastic cover.

4. Remove tunnel console.

Remove the complete tunnel tray on cars equipped with a removable tunnel tray (XC90) to gain better access to right side of the seat. Pull the release handle at the bottom and pull the console to the rear.

For cars not equipped with removable tunnel console: the correct combination of tools will allow sufficient access to right side of the seat.

5. Remove plastic cover, inner side.

Remove:

- screw
- plastic cover.

6. Pull seat backrest up.

Note!
One additional technician is needed for this step.

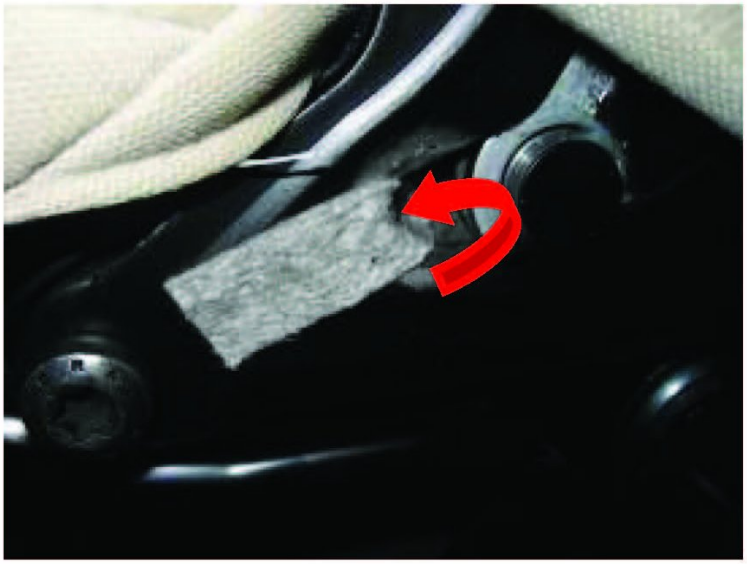
- Grab the backrest between the seat cushion and backrest and pull straight up (about two inches).

Note!
This requires some force. Hold the backrest in this position while the tape is being applied.

7. Degrease WHIPS slot.

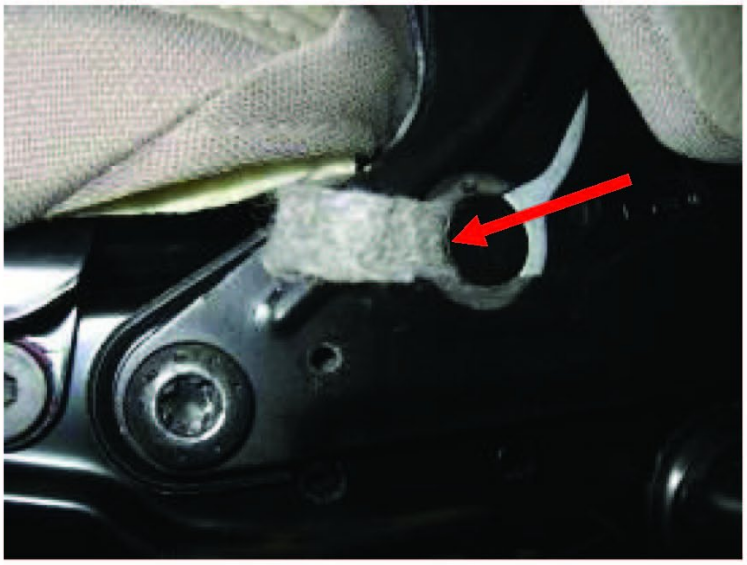
- Clean the slot area with isopropanol and wipe dry as indicated in the picture.

8. Applying felt tape on both sides.



- Cut a piece of felt tape - 1/2 x 2 inches (13 x 51 mm) Tape PN 9511099.
- Insert the felt tape strip in the exposed slot from the WHIPS assembly and fold the strip as indicated in the picture.
- Repeat the same operation on the opposite side of the seat.

9. Lowering the backrest.



- Lower the backrest and check if the pin slides back into the slot as indicated by the picture.

10. Re-assembly

Assemble:

- The cover on the inner side of the seat
- The screw for the cover. Tighten.
- The complete tunnel tray (only XC90)
- The cover on the outer side of the seat.
- The screw for the cover. Tighten.
- The seat belt to the seat belt fitting.

Attention:
A clicking noise MUST be heard when the seat belt quick-fit connection is snapped in the connection. Check by pulling several times to

be sure that the seat belt is correctly assembled into the end connection.

Assemble: Side panel. Press the side panel down in the rear.

- Screw at the front end on the inside of the side panel. Tighten.
- Re-adjust the seat into "normal" operation position.

11. Adjustment of passenger seat.

1) Move seat to the most rearward position.
2) Recline backrest to the most rearward position.
3) Bring backrest back to most forward position.
4) Tilt the whole seat frame forward (raising the rear end).
5) Move whole seat as far forward as possible.

12. Access to WHIPS slot.

- Press the seat backrest up in order to expose the slots in the WHIPS assembly as indicated in the picture.

13. Degrease WHIPS slot.

Clean the slot area with isopropanol and wipe dry as indicated in the picture.

14. Applying felt tape on both sides.

- Cut a piece of felt tape - 1/2 x 2 inches (13 x 51 mm) Tape PN 9511099.

- Insert the felt tape strip in the exposed slot from the whips assembly and fold the strip as indicated in the picture.
- Repeat the same operation on the other side of the seat.

15. Lowering the backrest.

- Lower the backrest and check that the pin slides back in the slot as indicated by the picture.
- Re-adjust the seat into "normal" operation position.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION		LABOR TIME
99338-2	Front driver seat adjust	S40/V50	0.7 hr
		S60/V70/XC70/S80	0.8 hr
		XC90	0.9 hr
99350-2	Front passenger seat adjust	S40/V50	0.3 hr
		S60/V70/XC70/S80	0.3 hr
		XC90	0.3 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN39-57** Date: **070404**

Entertainment System - 'Input Password' Displayed

NO: 39-57
DATE: 4-4-2007
MODEL:
V70 All w/ RSE
XC70 All w/ RSE
XC90 258729 - 371138

SUBJECT:
Generation 4 RSE, password request displayed on screen

REFERENCE:
VIDA fault tracing information

This Tech Note supersedes the previous 39-57 dated 1-31-07. Please update your files. Changes to this document from the previous version are, Supply disc re-ordering info.

DESCRIPTION:
Customers may report that "input password" is displayed on the screen of the Generation 4 RSE (Rear Seat Entertainment) system. This condition is permanent and in the past could only be recovered by replacing the RSE control unit (DVD player). A Firmware upgrade CD has been developed to recover the system and to avoid this portion of the menu from being accessed in the future. This CD was delivered to retailers on the week of January 29, 2007, along with a wiring diagram update for the Generation 4 RSE system.

Additional copies of the upgrade disc can be ordered through the website. The publication number is SP0386 and can be found under; Service Information/Model.

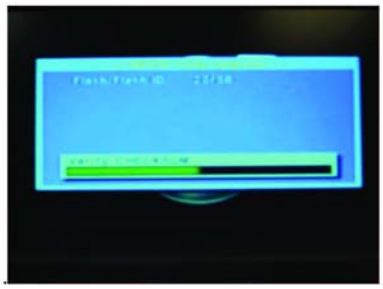
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

SERVICE:
if the screen below is being displayed
DO NOT REPLACE THE RSE CONTROL UNIT (DVD player). Follow the instructions below to recover the system and to upgrade the RSE firmware which will prevent the condition from occurring again.

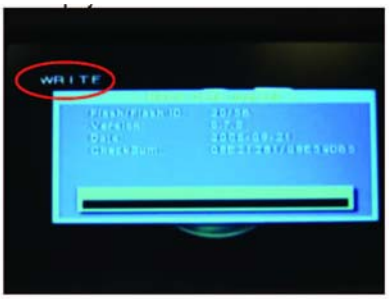
1. Turn on the RSE system and insert firmware upgrade CD

2. Select yes using the RSE remote "OK" button when the screen below appears.

3. This screen will appear while the system is checking the current version of the firmware



4. Once the version is identified as needing an upgrade~ this screen will appear as the firmware is upgraded. The text "WRITE" and 11ERASE11 will be seen flashing in the upper left corner of the display



5. Once the Firmware upgrade is complete, (apx. 45 seconds) the screen will go black. This is the only indication that the upgrade is completed.

6. Eject the upgrade disc with the following method.

   ^ Shut down the RSE system using either the remote or the power button on the DVD player

   ^ Eject the disc using the eject button on the DVD player.

NOTE:
The upgrade disc will not eject unless the RSE is shutdown after the upgrade

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99353	Upgrade RSE firmware	0.1 hr

Claims may be submitted under the New Car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TNN64-17** Date: **070824**

Steering - Power Steering Reservoir Fluid Leak

NO: 64-17

DATE: 8-24-2007

MODEL & MODEL YEAR:
S60 2001-
S80 1999-2006
V70 2001-2007
XC70 2001-2007
XC90 2003-

SUBJECT:
Power steering fluid leak at reservoir

REFERENCE:
VIDA

THIS TNN SUPERSEDES TNN 64-17 DATED 6-27-2007. THE CLAMP PART NUMBERS HAVE CHANGED. PLEASE UPDATE YOUR FILES.

Description

Under certain conditions the power steering may leak fluid at the reservoir suction hose connection. An improved suction hose was introduced into production in December 2004.

Service

If there is leakage at the reservoir/suction hose connection on the above vehicles, replace the suction hose and clamps only, according to VIDA.

Use the following parts:

^ Hose: as per VIDA

^ Clamps: quantity (2) pn 988024

Note!
These hose clamps are screw-type clamps. Do not use a crimp-style hose clamp for this repair.

After replacing the hose and clamps, top up the fluid level (see below), and check for leaks. If the leakage is still present, only then should you replace the reservoir.

When checking and topping up the fluid level in the reservoir after the repair, measure when cold and with the engine turned off. Fill the oil until the level is halfway between the 'cold' and 'hot' marks on the dipstick.

Note!
The Service Advisor and Warranty Administrator should include as much customer information on the Repair Order and warranty claim text as possible. Warranty claims which lack sufficient detail regarding 3 C's (complaint/cause/correction) may be subject to further warranty review and debit.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
64537-2	replace suction hose, fluid reservoir, PS pump	0.4 hr.

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty Information

Technical Service Bulletin # **TNN87-53** Date: **071005**

A/C - System Odors/Afterblow Function

NO.: 87-53

DATE: October 5, 2007

MODEL/YEAR

S60	2001 -
S80	1999-2006
V70, XC70	2001 - 2007
XC90	2003 -

SUBJECT:
Air Conditioning System Odor / Afterblow Function

REFERENCE:
VIDA

DESCRIPTION:

MY 2005 and later:

MATERIAL for 2005 and later:

Description	Quantity	Part Number
Activate afterblow software	1	30782577
Deactivate afterblow software (if needed to turn off)	1	30782664

Activation / Deactivation through VIDA:
- Software Tab
- Software product
- Select 30782577 (or 30782664 to deactivate if needed). *Enter part number if not listed*
- Download software

Read - Out the status "active / not active" in VIDA:
- Diagnostics
- Vehicle communication
- CCM / Advanced
- After - run passenger control status (wording may change in future VIDA updates.)
  Note: Active or Not-Activated

When certain criteria are met the interior fan will start to blow 50 minutes after the car has gone into the sleep mode. The fan will blow for ***15 minutes at half speed*** with the air directed to the dashboard air outlets.

Make sure the customer is informed of this new function.

ACTIVATION CRITERIA:
Battery voltage greater than 11.9 V
Ambient temp greater than 75°F (24°C) when engine is turned off.
Runs only one time every 20 hrs.

MY's 1999 – 2004:

Activation and Read - Out the status "active / passive" in VIDA:
- Diagnostics
- Vehicle communication
- CCM / Advanced
- Programming the Climate Control Module (CCM).

When certain criteria are met the interior fan will start to blow 50 minutes after the car has gone into the sleep mode. The fan will blow for ***7 minutes at full speed*** with the air directed to the dashboard air outlets.

Make sure the customer is informed of this new function.

There may be cases of odor from climate system vents on the vehicles listed above. Ensure the odor is not from some other source and all other A/C system checks have been completed. If necessary the Afterblow function can be activated to dry out the ventilation system and evaporator. There are two ways to activate the Afterblow function depending on the Model Year (MY). For MYs 2005 and later and for MYs 1999 - 2004 refer to image above.

NOTE:
Up through 2002 Afterblow was activated from the factory, 2003 and later Afterblow will be Retailer activated only.

SERVICE:

In all cases basic fault tracing needs to be performed prior to the afterblow activation. Once this has been completed see the appropriate instructions for Afterblow activation.

Check / Verify that:

- There are no refrigerant leakages (not PAG oil causing the odor).
- AC drain is not clogged - drains sufficiently i.e. no water standing in the climate box.
- No water standing underneath the floor carpets.
- Cabin air filter inspected / verify it's been replaced according to the maintenance schedule.
- Battery is in good condition.

If all the above has been checked and confirmed that they are not the cause of the odor then the Afterblow function should be activated to minimize the risk of odor.

NOTE:
MY 2005 and later it is only necessary to activate / deactivate Afterblow one time per vehicle. If ANY new software is downloaded the Afterblow function will stay activated.

Technical Service Bulletin # **TNN40-02** Date: **071218**

Computers/Controls - TCM/DEM Software Updates

NO: 40-02

DATE: 12-18-2007

MODEL/YEAR: See chart below.

SUBJECT:
TCM (Transmission Control Module) & DEM (Differential Electronic Module) SW

REFERENCE:
VIDA, TNN 43-38

Note:
This supersedes the previous 40-02, dated 2/12/2007. New DEM Upgrade SW has been added. Please update your files.

Vehicle	Complaint / Symptom	Reset Adaptation to Zero	Adaptive Test Drive
AW 5 Speed (AW55-50/51)			
2007 S60/V70/XC70/XC90 (New, February 2007)	Slip / Flare / Harsh Shifts during first few accelerations after a cold start.	Yes	Yes
2002-2006 S60/S80/V70/XC70/XC90	General Shift Quality 2-3 Flare, especially when cold or after Highway Driving 3-2 Power-On Downshift Quality, after coastdown Power-On Downshift Response TCM DTC 002E, 002F Slip / Flare / Harsh Shifts during first few accelerations after a cold start. Applies to 2005-2006 (New, Feb. 2007)	2002-2004 No 2005-2006 Yes	2002-2004 No 2005-2006 Yes
2001 S60/V70/V70XC	General Shift Quality Shift Pattern Power-On Downshift Response Neutral Control Symptoms (Described in TNN 43-38)	Yes	Yes
2000 S/V70	General Shift Quality Harsh 4-2 and 3-2 downshifts 1st gear engine braking with shifter in 'L' position Harsh Coast Down Shifts	Yes	Yes
2001 C70	General Shift Quality Shift Pattern 2-3 Upshift Flare	Yes	Yes
2002 C70	General Shift Quality 2-3 Upshift Flare Readiness (Comprehensive Flag Not Ready)	No	No
2004.5 - 2006 S40/V50	General Shift Quality Power-On Downshift Response 3-2 Power-On Downshift Quality, after coastdown Torque Converter Lock-Up Shudder TCM DTC 002E, 002F	No	No

Vehicle	Complaint / Symptom	Reset Adaptation to Zero	Adaptive Test Drive
AW 6 Speed (TF80SC)			
2005-2007 XC90 V8	General Shift Quality Soft, harsh or long 1-2 Upshift Delayed engagement when moving shifter to 'R' or 'D' Power-On Downshift Response, especially after coast-down (ECM should also be upgraded for maximum response improvement) TCM DTC P074400 (This DTC indicates that the engine has stalled on one or more occasion. Fault trace the vehicle accordingly.) TCM DTC P073000	No	No
2007 XC90 3.2	Delayed upshifts after releasing the accelerator pedal. Excessive engine braking during coasting. (The ECM should also be upgraded for maximum driveability improvement.)	No	No
AW 4 Speed (AW50-42)			
1999 S/V/C 70	Delayed 3-4 Upshift Harsh 4-3-4 Shift Hunting Between Gears While Using Cruise Control TCM DTC 0045 ECM DTC 530D	Yes	No
GM4T65			
1999-2001 S80	TCM DTCs 0028, 002F, 0045, 0053, 008D, 0099 ECM 530D DIM (Driver Information Module) message with no DTC Harsh 1-2 upshift, 4-2-4 shift and garage shifts Geartronic Downshift Shudder Engine RPM Oscillations During Highway Driving	Yes	No
2002-2004 S80 2003-2005 XC90	TCM DTC 0028 TCM DTC 0099 (Reset Adaptation to Zero before clearing code) 1-2 Upshift Quality: Slipping, Harshness, Delay, Hesitation 2-1 Downshift Shock	Yes	No

The "Power-On Downshift Response" Upgrade makes Kickdown / Passing Gear downshifts faster.

DEM	
Vehicle	**Complaint / Symptom**
2003 AWD Vehicles	DEM DTC 0003
2003-2005 AWD Vehicles	DEM DTC 000B
2005-2006 AWD S60/V70/XC70/S80/XC90	CEM DTC 1A64 The CEM & DEM should be upgraded.
2006 AWD S60/V70/XC70/S80/XC90	DEM DTC 0001,0005,0006,0008,000A
2006-2008 S60/XC90 2005-2008 XC90 V8 2006-2007 V70/XC70	A harsh jolt may be felt in the drive line when cruising at speeds approx 70 - 110Km/h (40 - 70 mph). This SW will allow for a greater difference between front & rear axle speeds.

The TCM and DEM Upgrades are available to correct the complaints/symptoms shown.

If the message "Invalid" is received when ordering an Upgrade, and Status 134 is shown under the details, the control module already contains the

latest software.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	Software Download	.3 hr.

Claims may be submitted under the New Car warranty when there is a documented customer complaint using claim type: 01

Warranty Claim Information

Technical Service Bulletin # **TNN23-29** Date: **080117**

Fuel System - Installing Extra Fuel Pump Feed Cable

NO: 23-29

DATE: 1-17-2008

MODEL: See chart below

M. YEAR: 2005-2007

SUBJECT:
Installing Extra Fuel Pump Feed Cable

REFERENCE:
VIDA, TNN 23-28

THIS TNN SUPERSEDES THE PREVIOUS VERSION DATED 8-23-2007. THE ENGINE CODE LIST HAS BEEN MODIFIED AND STEP 10 HAS BEEN CLARIFIED. PLEASE UPDATE YOUR FILES.

Note!
If using a printed version of this TNN, first check for the latest online version.

Description

Certain S60, S80, V70, XC70, and XC90 vehicles use a demand-controlled fuel system with a fuel pump control module (FP control module, or Pump Electronic Module [PEM]) and a fuel pump with two pump motors. The fuel system design was modified in production during the summer of 2006. Each motor within the pump was given its own fused electrical circuit.

Model Year	Type	Model	Chassis range	Engine Code
2005-2006	184	S80	390000-446919	59
2005-2007	275	XC90	134000-347345	59, 85, 98
2005-2007	285	V70	459000-630805	52, 54, 59
2005-2007	295	XC70	173000-262446	59
2005-2007	384	S60	425000-620296	52, 54, 59

If the fuel pump fuse is blown and it is determined that the fuel pump is defective, the additional circuit should be added for vehicles within the chassis range shown above. This TNN provides instructions for installing this circuit.

Note!
Always first check if there is a fuse in position 29 in the CEM, as the chassis ranges above may be approximate, depending on engine code.

Note!
This repair is not applicable to the following variants:

^ S80 T6 and XC90 T6 (engine code 91)

^ Model year 2004 S60R and V70R

^ S60 and V70 vehicles with steel fuel tanks

Material	Quantity	Part No.
Rear electronic module (REM): All above vehicles **excluding** XC90 **Note! Do Step 1 first to determine if REM replacement is needed**	1	30786646
REM reload (if REM is replaced)	1	As per VIDA
REM upgrade	1	30677030
Service cable	1	30773851
Tie strap	2	983748
Fuse	1	8688644
Electrical insulation tape	As needed	

Material

Special Tool	Part No.
Removal tool	9512638

Special Tool

Service

1. Read the rear control module (REM)

   Step 1 applies to all cars excluding the XC90.

   Read the control module's hardware number in accordance with VIDA:

   Diagnostics
   Network
   REM hardware number.

   If the REM responds with either part numbers 8676391 or 30728512, proceed to Step 2. If the REM does not respond with either of the part numbers 8676391 or 30728512, then it must be replaced according to VIDA:

   Information
   Repair
   Removal, Replacement, and Installation
   Cables and Fuses
   REM, replacing
   If REM is replaced, reload REM with software as per VIDA.

2. Perform REM upgrade

   Note!
   Step 2 applies to all cars whether REM is replaced in Step 1 or not.

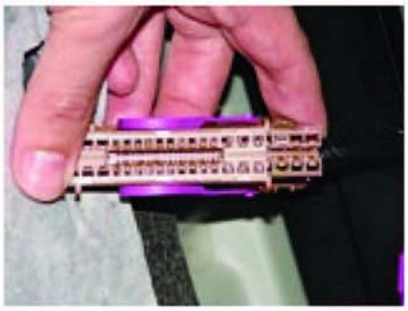
   Perform REM upgrade, P/N 30677030.

3. Access the cable harness

   Access the cable harness between the rear control module (REM) and the right-hand inspection cover for the fuel tank. See VIDA for information. Depending on model, this will include removal of trunk floor, trunk side panels, plastic cover along inside bottom of trunk, and right rear seatback. Remove the inspection cover (at arrows in photo) over fuel pump connector.

4. Disassemble the connector

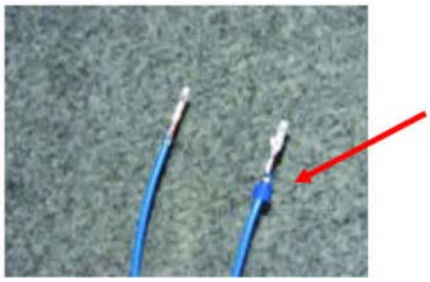
Remove the brown 32-pin connector on the rear control module (REM)



Cut the tie strap securing the wiring to the connector housing (red arrow in photo).

Using two small screwdrivers (see photo above), remove the housing from the connector block.

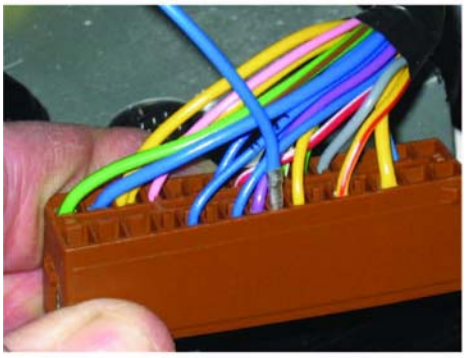
5. Install new cable at REM



Note!

The service cable, p/n 30773851, has identical metal terminals, but one terminal has a rubber seal. The end with the rubber seal goes to the fuel pump. The end without the seal is installed here:

Install the service cable (P/N 30773851), terminal without seal in position 25.

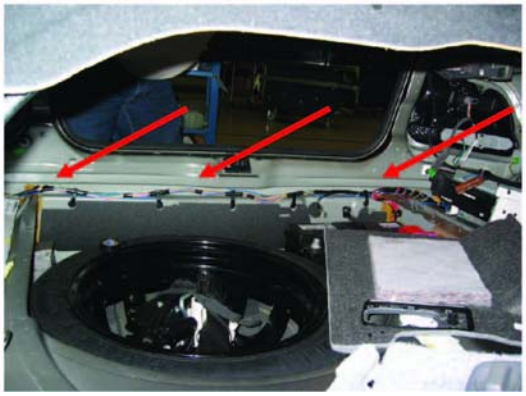


Reinstall the connector block into the housing, and resecure the cables to the connector using a new tie strap.

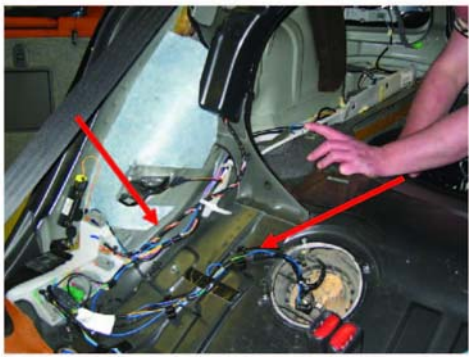
Reinstall the connector onto the REM.

6. Route New Cable

Open the cover on the cable duct (see photo in Step 3).



Route the new cable from the REM to the fuel pump inspection cover, along the existing cable harness. Secure the new cable with electrical insulating tape.

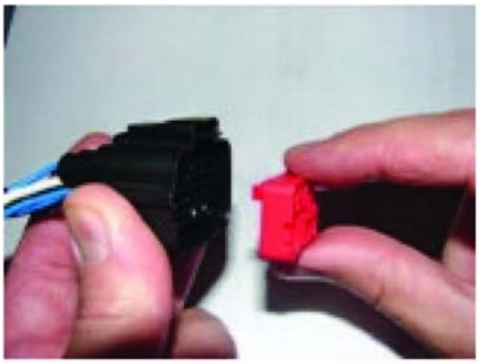


Note!

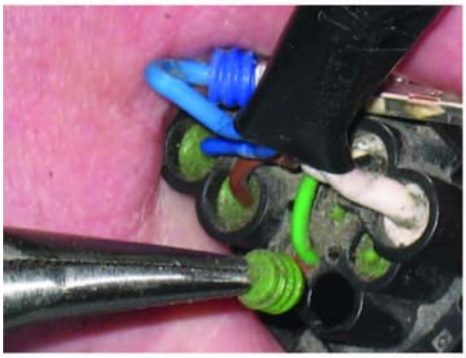
Both of these photos are taken from the interior of the vehicle, looking back toward the trunk area.

7. Install new cable at fuel pump

Remove the 12-pin connector on the fuel pump.



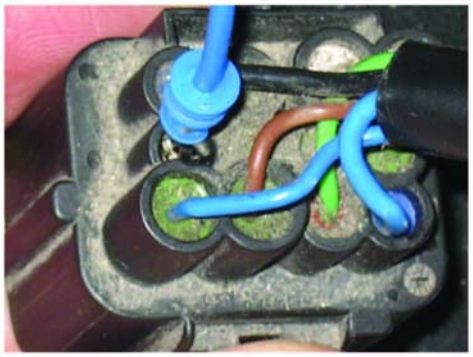
Remove the secondary catch on the connector (red piece in photo; remove by carefully prying upward with small screwdriver).



Remove the cover plug in position 1 on the connector.

Move the blue cable from position 8 to position 1, use tool 9512638.

Install the service cable terminal with seal in position 8.



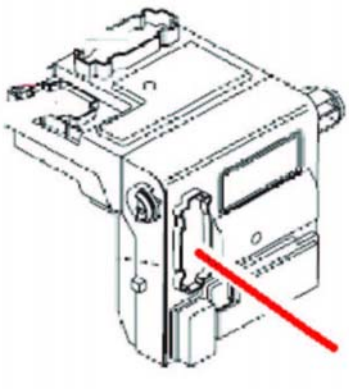
Reinstall the secondary catch and reinstall the connector onto the fuel pump.

8. Access the CEM (Central Electronic Module)

Remove the soundproofing panel under driver's side dashboard, see VIDA for information.

Note!
It should not be necessary to remove CEM from its position. Access to the connector in the next step is easier if the small connector below it in the CEM is unplugged, and if the ODBII access plug is unscrewed from its mounting.

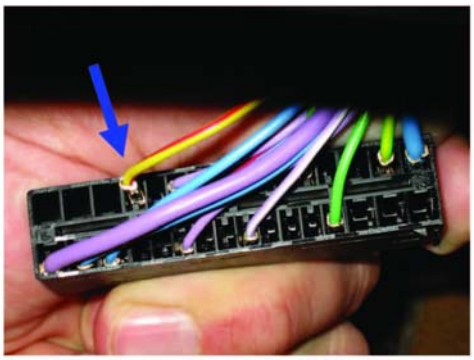
9. Disassemble the CEM connector



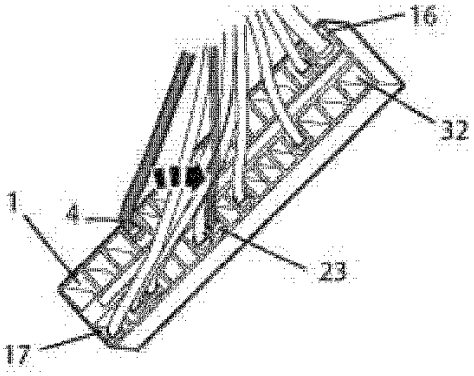
Remove the black 32-pin connector from the CEM.

Remove the tie strap and the housing from the connector. Follow the same procedure as shown in Step 4.

10. Move the cable at the CEM



Move the yellow/red cable from position 4 to position 23, use tool 9512638.



This photo shows the terminals in the connector block. The yellow/red cable was originally in position 4, which is the 4th position from the bottom in the left row. Position 23 is 7th from the bottom in the right row.

Reinstall the housing and use a new tie strap.

Reinstall the connector onto the CEM.

11. Install the fuse in the CEM

Install a new 7.5A fuse in position 29 in the GEM

12. Finishing steps

Reinstall all removed panels and seats, see VIDA for information.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99416-3	cable REM fuel pump install incl CEM adjustment	0.8 hr (S60, XC90)
		0.9 hr (S80, V70, XC70)
37201-2	fuse in CEM, replace	0.1 hr
36002-3	software download	0.1 hr
Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01		

Warranty Claim Information

Technical Service Bulletin # **TNN60-10** Date: **071025**

Steering - Vehicle Pull On Acceleration/Cruise

NO.: 60-10

DATE: 10-25-2007

MODEL & M. YEAR:
MY99-06 S80
MY01-07 V70, V70XC, & XC70
MY01-S60
MY03-XC90

SUBJECT:
Repair of pulling condition during driving or acceleration

REFERENCE:
Service Bulletin 60-5500, TNN 60-09, VIDA

Description

STEP NO.	ACTIVITY	RESULTS OK	RESULTS NOT OK
1.	Check/adjust tire pressures in accordance with the specifications on the tire pressure label. Ensure there is minimal difference between left and right side.	Go to #2 a.	Adjust tire pressures, go to #2 a.
2 a.	Test drive on a level, smooth road. ***See* "TEST DRIVE NOTES" *on page 2.*** Check for pulling under: • Acceleration • Steady driving • Freewheeling	Completed.	NOK during acceleration, go to #2 c. NOK during other conditions, go to #2 b.
2 b.	Check the position of the steering wheel when driving straight ahead. If it is not centered, could this be the root cause for the complaint?	Completed.	Adjust steering wheel. If still NOK, go to #3.
2 c.	Does the fault occur ***only*** during acceleration?		Go to #7.
3.	Remove and mark the car's wheels (LF, RF, LR, RR) and rotate from front to rear on each side. ***Then test drive as in #2 a.***	Correct tire pull as necessary.	Go to #4.

STEP NO.	ACTIVITY	RESULTS OK	RESULTS NOT OK
4.	Check the wheel alignment. Adjust the camber angles to the maximum tolerances described below by using the play of the holes in the knuckles and strut. • When pulling LEFT: adjust left side camber to maximum negative and right side camber to maximum positive. • When pulling RIGHT: adjust right side camber to maximum negative and left side camber to maximum positive. ***Then test drive as in #2 a.***	Completed.	Go to #5.
5.	Check that the original springs are correct as per specifications. If incorrect or non-original springs are installed, correct as per VIDA. ***Then test drive as in #2 a.***	Completed.	Go to #6.
6.	Change the front springs according to the **"LIFT HEIGHT TABLE"** on page 4. First determine the springs assembled on the car based on color and number of dots. Find that spring in the table on page 4. • If the car is pulling to the *right*: ○ Go up one step in lifting force on the RIGHT side, and down one step on the LEFT side. • If the car is pulling to the *left*: ○ Go up one step in lifting force on the LEFT side, and down one step on the RIGHT side. If you cannot go up in lifting forces on that side which the car pulls to, you go down on the other side. Start with one step, and go to two steps if necessary. ***Then test drive as in #2 a.***	Completed.	Problem is beyond scope of this TNN, and may likely be worn or damaged suspension components.
7.	If the fault ONLY occurs under acceleration and if the car pulls to the right: • Fit spacer plate P/N 9485617 between the engine mount and the subframe on the right hand side. Start with one spacer. (Max. 2 spacers, or 4 mm in total.) • Check/adjust the alignment as described in step #4. ***Then test drive as in #2 a.***	Completed.	Problem is beyond scope of this TNN, and may likely be worn or damaged suspension components.

LIFT HEIGHT TABLE FOR FRONT SPRINGS

Color marking of Springs			S60, S80, V70		
Pos	Stiffness	P/N	Lift force	Color	No of dots
	N/mm		N		
F	17	9492226	3750	white	I
F	17	9492227	3890	white	II
F	18	30639212	3850	purple	III
F	18	9465464	4000	brown	I
F	18	8624883	4150	brown	II
F	18	9465472	4300	brown	III
F	18	8634328	4450	purple	I
F	18	8634329	4600	purple	II

S60, V70	All engines
S80	5 Cyl
S80	6 Cyl 2.9

F	20	30639016	4000	green	III
F	20	9492228	4150	blue	I
F	20	9492178	4300	blue	II
F	20	9492179	4450	blue	III

S80 6 Cyl T6

Color marking of Springs			V70XC/XC70 only		
Pos	Stiffness	P/N	Lift force	Color	No of dots
	N/mm		N		
F	18	8634378	4400	orange	I
F	18	8634377	4550	orange	II
F	18	8634376	4700	orange	III
F	18	30639173	4850	orange	I

Color marking of Springs			XC 90 only		
Pos	Stiffness	P/N	Lift force	Color	No of dots
	N/mm		N		
F	31	30648138	5307	White Blue	I I
F	32.5	30648139	5568	White Green	I I
F	34	30648140	5829	White Red	I I

There may be complaints about vehicles which pull during steady driving or during acceleration. If an alignment is performed as per VIDA, using the specifications in Service Bulletin 60-5500, and this does not resolve the complaint, you may use the diagnosis & repair flow chart shown above to try to remedy the condition.

This flow chart presumes that the front and rear suspension are in good condition, without worn bushings, connections, etc. Tires must be checked to verify that they have tread life remaining, and are not worn unevenly which can cause pulling. There must be no existing accident damage, and any previous accident damage must have been properly repaired to Volvo standards.

Note!

The use of any alignment equipment, whether retailer-owned or sublet, presumes that the equipment is in good working order and has been calibrated to the alignment equipment manufacturer's specifications within the last 12 months. Volvo Cars of North America ("Volvo") reserves the right to request evidence of such calibration. Repeat repairs due to use of non-calibrated equipment, or failure to provide calibration documentation upon request, may result in warranty claim denial by Volvo.

Service

TEST DRIVE NOTES:

The test drive should be done as follows: Accelerate rapidly up to 50 mph, noting how the car behaves during acceleration. Then hold the car at 50 mph long enough to note how it behaves during steady driving.

Then place the transmission in neutral and let the car freewheel, carefully noting how the car behaves the instant you put the gear in neutral: do the side forces reduce or disappear, or are they the same?

Vehicles always have a tendency to veer towards the edge of a crowned road. This tendency will make the car pull towards the side when driving in the "normal" traffic lane. To verify if there is a fault in the car, drive it on a perfectly flat road, or on a road which is crowned in the other direction. This might best be accomplished on a multi-lane road which has road crowns in both the left lane (to the left) and right lane (to the right).

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
72308-2	Coil spring front 2 sides, replace:	
	S60, S80, V70, XC70, XC90	1.7 hr.
	S60/S80/V70/XCX70 with 4-C chassis	1.9 hr.

Alignment claims may be submitted during the adjustment period when there is a documented customer complaint using claim type: 01.
Spring replacements may be submitted during the new car warranty when there is a documented customer complaint using claim type: 01.

Warranty Claim Information
Technical Service Bulletin # **TNN39-59** Date: **071001**

Navigation System - RTI Identification Guide

NO.: 39-59

DATE: 10-1-2007

MODEL:
All variants equipped with RTI (Navigation system)

SUBJECT:
RTI system identification guide

REFERENCE:
VIDA design and function information

This TNN supersedes the previous 39-59 dated 5/4/07. Please update your files. This document has been updated to reflect the addition of MMM+ to MY 2008 S40, V50, C30 and C70.

DESCRIPTION:

System	Model year/variant	Supplier	Communication Type
CD based (with 6 disc changer)	MY 1999 – 2001 S80 MY 2001 V70 MY 2001 S60	MELCO	MELBUS (DIN)
DVD based Called "MMM" On MOST vehicles	MY 2002 - 2006 S80 MY 2002 - 2007 V70, XC70 MY 2002 → S60	MELCO	MELBUS (DIN)
	MY 2003 - 2006 XC90 MY 2004.5 → S40, V50 MY 2006 -2007 C70, C30	MELCO	MOST (Fiber Optic)
MMM+ HDD (Hard disc drive) *Reference TNN 39-55*	MY 2007→ XC90 MY 2008→ S40 V50 C30 C70	MELCO	MOST (Fiber Optic)
MMM2 (DVD based)	MY 2007 → S80 MY 2008 → V70, XC70	DENSO	MOST (Fiber Optic)

NOTE: ***Each one of the 4 systems identified above have unique CD or DVD map discs as applicable. They are not interchangeable.***

To avoid confusion when working with Volvo RTI systems please use the quick guide shown above.

Technical Service Bulletin # **TNN20-05** Date: **070131**

Engine - Lubrication System Contamination Cleaning

NO: 20-05
DATE: 1-31-2007
MODEL: All Models
YEAR: 1999-
SUBJECT:
Procedure for Cleaning Engine Oil System Contamination.
REFERENCE: VIDA

DESCRIPTION:

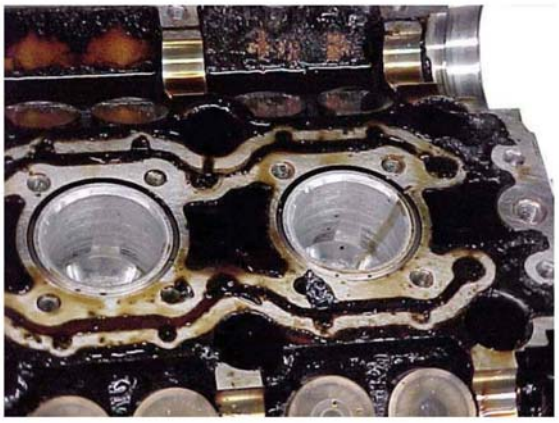
Material	Quantity	Part No.
ACEA A1/B1,SAE 5W-30 Synthetic oil	*	
Oil filter	1	*
Oil decal	1	30748024
Oil trap	**	*
Hose, oil trap/engine block	**	*
Oil sump	**	*
Big-end bearing	**	*
Cylinder head gasket	**	*
Liquid gasket	**	*
Camshaft seal	**	*
Induction gasket	**	*
Manifold gasket	**	*
Valve stem seal	**	*
VVT solenoid filter	**	*
Oil suction line	**	*
Oil pressure switch	**	*
Pressure oil line (turbo)	**	*

* depending on variant
** depending on diagnosis and variant

This TNN provides the customer with an alternative lower cost repair rather than engine replacement. It may be required to perform such cleaning if the engine has been contaminated due to the use of engine oil additives, use of engine oils that do not meet the manufacture's requirements, or not following the manufacture's recommended oil change intervals. Any engine related damage caused by the conditions stated is not considered warrantable.

SERVICE:

Introduction



One or more of the following conditions could cause the engine oil to thicken and leave deposits in the engine:

- wrong oil grade, quality and/or viscosity
- cars driven too many miles between oil changes
- cars frequently driven short distances with many cold starts
- excessive idling
- fuels of low quality and/or with high alcohol content
- additives added to oil or fuel
- high ambient temperature
- high air humidity

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Symptom

Possible symptoms are indicated as follows:

- Illuminated oil pressure lamp. Due to clogged oil suction strainer
  to oil pump and/or oil filter (see illustration)

- Noise (whistling)
  Noise due to high pressure in crankcase. Stops when the oil filler cap is removed. For model year 99-02, see TNN 25-149B

- Poor driveability
  Clogged crankcase ventilation can reduce the engine performance

- Uneven/oscillating idling
  Caused by clogged crankcase ventilation.

- Oil leak
  from engine seals due to restricted crankcase ventilation

- Noise (knocking)
  Low oil pressure can cause premature bearing wear

- High oil consumption / noise from turbo.
  Damaged bearing or seals in the turbo can cause these symptoms

If one or more of these symptoms presents itself, and an extremely dirty oil filler cap or screen is found, troubleshoot in the following order.

Diagnostics

IMG-245347

The first step is to inspect the oil filter to see if it is abnormally dirty.
An abnormally dirty filter is easily recognized by its thick, black deposits.
Engines with spin-on oil filters can be inspected by sawing the filter in half.

Oil trap check

IMG-245348

If the engine has a problem with carbon deposits, the passageways in the engine block and oil trap may be completely or partially clogged. See illustration. Remove and check the oil trap, hoses and their passageways in the engine block. There should not be any major collections of carbon deposits in the hoses or in the passageways in the block.

Oil sump/crankcase check

See information in VIDA for engine variant in question.
Drain the engine oil.
Remove the oil sump and check the oil sump and crankcase for deposits.
Normally, there should not be any deposits. A slight light brown discoloration is however normal.

IMG-245349

IMG-245350

The figures show an engine with heavy deposits.
Check the suction strainer on the oil suction line for contaminants and deposits.

If no trace of deposits has been found, no further checks are necessary and fault tracing can be considered complete.

If deposits have been detected in any of the above steps, follow the instructions below to remedy the problem.

Checking big-end bearings

See information in VIDA for engine variant in question.

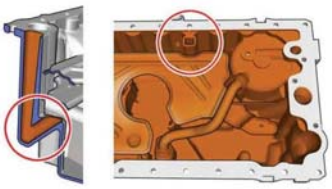
Note!
Mark the position of the big-end bearing caps.

Remove and check the big-end bearings for cylinder 2.
If the bearings are undamaged, reinstall the bearings and caps as marked.

If big-end bearing no.2 is damaged, replace all big-end bearings.

Note!
If any bearing is damaged, check the crankshaft for scratches.

If the crankshaft is damaged, discontinue troubleshooting and replace the engine.



Cleaning the oil sump

Clean the inside of the oil sump by removing any loose deposits.

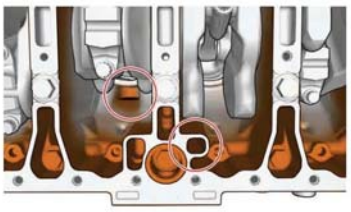
Note!
Make sure that the oil sump passageway from the oil trap is fully cleaned. See illustration. Blow clear with compressed air to ensure the duct is thoroughly cleaned.

Then clean the oil sump as described in the next step.
If it is not possible to properly clean the oil sump, oil sump replacement should be considered.

Cleaning/Washing

Washing should be done in a parts cleaning machine at no less than 70°C / 158°F for at least 30 minutes. Repeat if necessary. It is a good idea to change the position of the components several times during the cleaning/washing procedure.

Blow dry with compressed air after washing.



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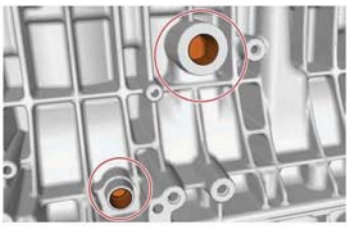


IMG-245354

Cleaning the engine block

Clean the engine block passageway from the oil trap and the oil trap passageway in the block.
Use a screwdriver or similar small scraping tool and blow the passageways clean with compressed air.
Perform a general cleaning of the crankcase to remove all the carbon deposits. All loose deposits must be thoroughly cleaned.

Cleaning cylinder head

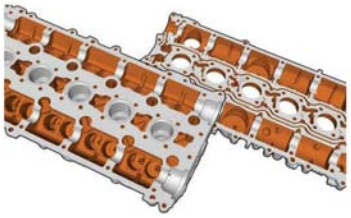
Note!
Remove the cylinder head from the engine before cleaning.

With the cylinder head removed from the engine. Use the information in VIDA for the variant in question.

Remove:

- valves
- springs

- valve stem seals.



Remove carbon deposits with a suitable tool, knife, scraper or the like. Then wash the cylinder head and cam carrier cover in a parts cleaning machine as described in step 8.

Note!
The VVT (Variable Valve Timing) unit and VVT solenoid must not be washed in a parts cleaning machine. Blow clean only.

Caution!
Be sure to lubricate the valve guides after washing in a parts cleaning machine to prevent the risk of corrosion!

Install the cylinder head

Install

- new valve stem seals
- valves
- springs
- new filter for VVT solenoid. (Does not apply to S40 (04-)/V50).

Install the cylinder head. Use information in VIDA for the variant in question.

Rebuilding the engine

Note!
Use new components.

Install:

- new oil suction line
- well cleaned or new oil sump
- new oil trap with new hoses and clamps
- new oil pressure switch
- new oil delivery line for turbocharger when applicable.

Engine oil, first change

Clean the oil filter casing and install the new oil filter.
Fill with new Synthetic Oil; this will assist in continuing the cleaning process. ACEA A1/B1, viscosity SAE 5W-30

Note:
Engines subjected to extreme driving conditions are to be filled with ACEA A1/B3, viscosity SAE 5W-30 Synthetic oil.
"Extreme" regards driving conditions that generate abnormally high oil temperature or oil consumption, such as driving in mountains with a lot of engine braking or when driving at high speeds on highways.
ACEA A3/B3, viscosity SAE 5W-30 Synthetic oil.

Customer information

Affix the oil decal (part no.30748024) on the upper radiator member. Remove any existing decal.

Caution!
Make sure that the customer is aware of the importance of following the prescribed oil change intervals and the benefits of using Synthetic oil to prevent engine oil deposits from reoccurring. Use the Synthetic oil grades specified in step 13.

Follow up oil and filter change

Drive 2,000 km/1,200 miles and then replace the oil and filter. Use one of the Synthetic oil grades specified at step 13.

Caution!
Follow the recommended oil change interval that applies to the vehicle in question.

Technical Service Bulletin # **TNN23-31** Date: **080416**

Fuel System - Starting Problems Parked on a Downhill

NO: 23-31
DATE: 04-16-2008
MODEL/MODEL YR:
S60 2001-
S80 1999-2006
V70 2001-2007
V7OXC, XC70 2001-2007, XC90 2003-
SUBJECT:
New Fuel Pump for Starting Problems When Parked Downhill
REFERENCE: VIDA

THIS TNN SUPERSEDES THE PREVIOUS VERSION DATED 11-28-2007. THE PART NUMBER LIST HAD BEEN UPDATED. PLEASE UPDATE YOUR FILES.

Note!
If using a printed version of this TNN, first check for the latest online version.

Description:
A vehicle may be difficult to start if it is parked facing downhill with a very small amount of fuel in the fuel tank. The vehicle will start normally if fuel is added to the tank or if the vehicle is moved to level ground.

Service:
A new style fuel pump has been introduced with an improved anti-siphon valve. If there is a customer complaint of this condition, use one of the new pumps listed in the chart below.

Old part no.	New part no.
30792852	31261127
30769013	31261128
30792854	31261130
30792477	31261131
30792857	31261133
30792859	31261135
30792861	31261137

Note!
See VIDA for the correct vehicle application. VIDA 2008A has been updated with the correct fuel pump application information.

Technical Service Bulletin # **TNN23-32** Date: **080430**

Fuel System - Fuel Pump Control Module Replacement

NO: 23-32
DATE: 4-30-2008
MODEL: See chart below
M. YEAR: See chart below
SUBJECT:
Fuel Pump Control Module Replacement
REFERENCE: VIDA

Note!
If using a printed version of this TNN, first check for the latest online version.

Description:
A new fuel pump control module (also referred to as Pump Electronic Module, or PEM) has been introduced as a spare part, which requires a new location if it is replaced. This TNN applies to vehicles manufactured up to the chassis number in the chart below. If the PEM needs to be replaced, install the PEM in the new location as per the Service method below.

Model	Model Year	Type	Factory code*	Chassis No
S60 (plastic tank)	2005-2006	384	2	-509560
S60 R-line	2004-2006	384	2	-509560
S80	2005-2006	184	1	-430120
V70 (plastic tank)	2005-2006	285	1	-541131
V70 (plastic tank)	2005-2006	285	2	-539327
V70 R-line	2004-2006	285	1	-541131
V70 R-line	2004-2006	285	2	-539327
V70XC / XC70	2005-2006	295	1	-214136
* Factory code is position #11 in the vehicle's VIN.				
Note! S60/V70 cars with steel fuel tanks are not included in this method.				

Vehicles:

Description	Quantity	Part No.
PEM	1	30769225
Cable harness, **2004 S60R and V70R only**	1	30798698
Cable harness, **all other listed vehicles**	1	30798596
Flange screw	1	985191
Flange screw	1	985055
Flange lock nut	1	985869
Washer	1	960143

Parts:

Service

Information on new location

Note!
The pump electronic module (PEM) has a new location. The PEM has been moved from its previous location on the fuel tank, as illustrated. The new location is on the right rear edge of the spare wheel well.

Preparatory work

Removal of interior components

Ignition key in position 0.
Open the trunk lid/tailgate

Remove:
- the cargo compartment mat/floor hatches
- the rear seat cushion

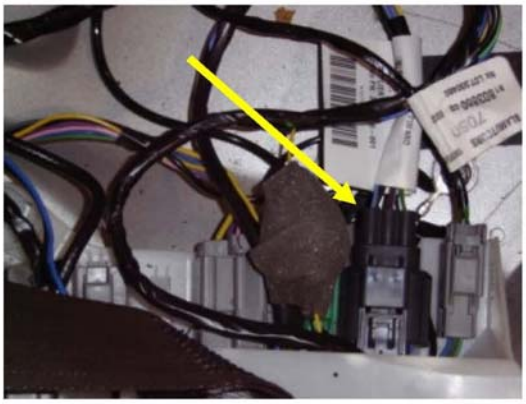
Fold forward the backseat's backrest.
Remove the side cushion. See:
> Removal, replacement and installation
> Body and interior
> Interior
> Rear seat, passenger seat, seat
> Upholstery, side cushion, replacing

Remove the right part of the backrest

Removing the child seat bracket:
- Remove the bracket from the floor
- Place the insulation to one side

Cable harness removal

Remove the right floor hatch over the fuel tank
Remove:



- the cable harness connector by the wheel housing/sill (arrow in photo)
- the cable harness connector at the fuel pump
- the cable from its mountings

Cut the cable harness as illustrated. This makes the cable harness easier to remove from the vehicle. Remove the remaining part of the cable harness with connector.

Removing the old PEM

Raise the vehicle. PEM is located at the fuel tank on the right side.
Remove:
- the connector from the PEM
- the PEM from the vehicle
- the cable harness from its mountings
- the cable harness from the vehicle

Check that the fuel line sits in its clamps.

Installation

Replacing the cable harness

Replace the rear cable harness with a new one according to the Parts chart on page 1.

Note!

Harness terminals for Model Year 2004 S60R/V70R only

Harness terminals for all other listed vehicles

The photos at left illustrate the two different types of terminals on the two harnesses. Ensure that the correct parts are used.

Cable harness installation

Connect the connectors at the sill and fuel pump.

Position the cable harness in the sealing ring socket and in the mounting on the body (arrow in photo).
Install the floor hatch. Tighten to 6 Nm (4.5 lb. ft.).
Carefully check that the seal is in place when the hatch is installed.

New PEM installation

The new PEM is to be positioned on the rear part of the spare wheel well on the right side between the two stampings and below the bead of sealant, as shown in the photo.
Remove the backing tape from the self-adhesive Velcro strap and install the PEM. Connect the cable's connector from the cable harness to the PEM.

Finishing work

Reposition the insulating mat.
Install:
- the child seat bracket to the floor.
  Use new screws:
  - 1 M1O tightened to 50 Nm (37 lb. ft.)
  - 1 M12 tightened to 80 Nm (60 lb. ft.).
- the backrest. Use new screw:
  - 1 M10, tightened to 50 Nm (37 lb. ft.)
- side cushion
- seat cushion
- cargo compartment carpeting/floor hatches.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
28911-2	fuel pump control module, relocate	0.9 hr.

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty Claim Information

Technical Service Bulletin # **TNN77-21** Date: **080331**

Tire Monitor - Service Kit Part Numbers/Applications

NO: 77-21
DATE: 3-31-2008
MODEL: All with TPMS (Tire Pressure Monitoring System)
M. YEAR: 2005-
SUBJECT:
TPMS Sensor and Service Kit Part Numbers and Applications
REFERENCE: VIDA, TNN 77-18

Note!
If using a printed version of this TNN, first check for the latest online version.

Description

A Tire Pressure Monitoring System (TPMS) is required by the U.S. government to be fitted to 100% of the Model Year 2008 and newer vehicles. It is an optional system in Canada. TPMS was phased in during Model Years 2005-2007.

The parts information in VIDA regarding TPMS sensor part numbers is missing or incorrect. A future version of VIDA will be updated with the correct information. The most current information regarding TPMS sensor and service kit part numbers and model applications is below.

Service

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

For S40, V50, C70, C30 vehicles, and for MYO7- S80, MYO8- V70, and MYO8- XC70:

TPMS sensor with service kit pn: 30681555

Service kit alone (without sensor) pn: 31201796

For S60, -MYO6 S80, -MYO7 V70IXC70, and XC9O:
The original version of the TPMS sensor (pictured left) was used on:

^ -MY06 S60
^ -MY07 V70/XC7O
^ S60 up to chassis number -688292
^ XC90 up to chassis number -456766

This TPMS sensor pn: 30748991

For these models, the TPMS service kit pn: 30736598.

A newer version of the TPMS sensor (pictured left), with a rubber valve stem and a snap-in transmitter, was introduced in production from the following chassis numbers:

^ S60: 688293-
^ XC90: 456767- This TPMS sensor pn: 31200923

Note!
On Model Year 2008 S60 and XC90 vehicles, the appearance of a rubber valve stem does not indicate lack of TPMS sensors. As stated above, the sensor design changed. There is no need to replace the rubber valve stem type sensors with the earlier versions. Also, if service replacement is required, the two designs are compatible on the same vehicle.

Technical Service Bulletin # **TJ16094** Date: **080620**

Restraints - Front Seat Belt Rattling Noise

Retailer Technical Journal 16094
Noise from front seat belt - B-Pillar

Date 6/20/2008

Reference: VIDA

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

AFFECTED VEHICLES:

Out of Production Models*	Type	Model year	Chassis range
S80	184	2005 - 2006	390000 - 446916
V70	285	2005 - 2007	459000 - 693560
XC70	295	2005 - 2007	173000 - 288671
Current Production Models*	**Type**	**Model year**	**Chassis range**
C30	533	2007 - 2008	000261 - 066944
S40	544	2005 -	045000 -
V50	545	2005 -	004000 -
S60	384	2005 -	425000 -
XC90	275	2005 -	134000 -
All New S80	124	2007 - 2008	000850 - 067973
All New V70	135	2008	000359 - 027892
All New XC70	136	2008	000400 - 021605

* At the time of this writing

AFFECTED VEHICLES:

DESCRIPTION:

There may be a slight rattling noise from the front seat belts heard in the B-pillar area. This noise is caused by the metallic ball in the vehicle sensor (within the seatbelt). The vehicle sensor is used to detect the movements of the car. Example: (steep inclination and hard braking). The purpose is to activate the mechanical seat belt retractor locking unit.

If you have a documented and confirmed complaint of this noise, DO NOT replace the seat belt; proceed with the method on the following.

In order to avoid a repeat repair, be sure there is no other cause for this complaint.

SERVICE:

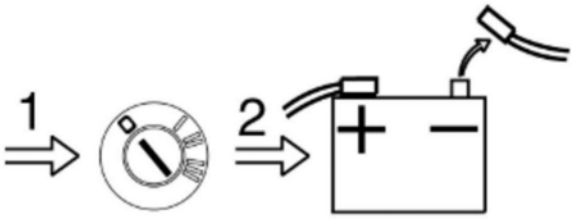
MATERIAL:

Description	Quantity	Part Number
Sound Absorber	2*	31267430

*1 per side

In documented and confirmed cases of seat belt rattle in the B-post area, install the sound absorber to the seat belt assembly according to the following.

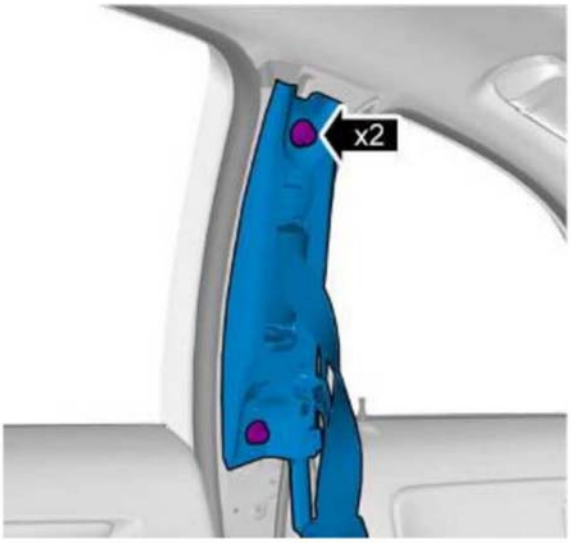
1. Preparation



Key in the off position

Disconnect the negative battery lead.

2. Removal

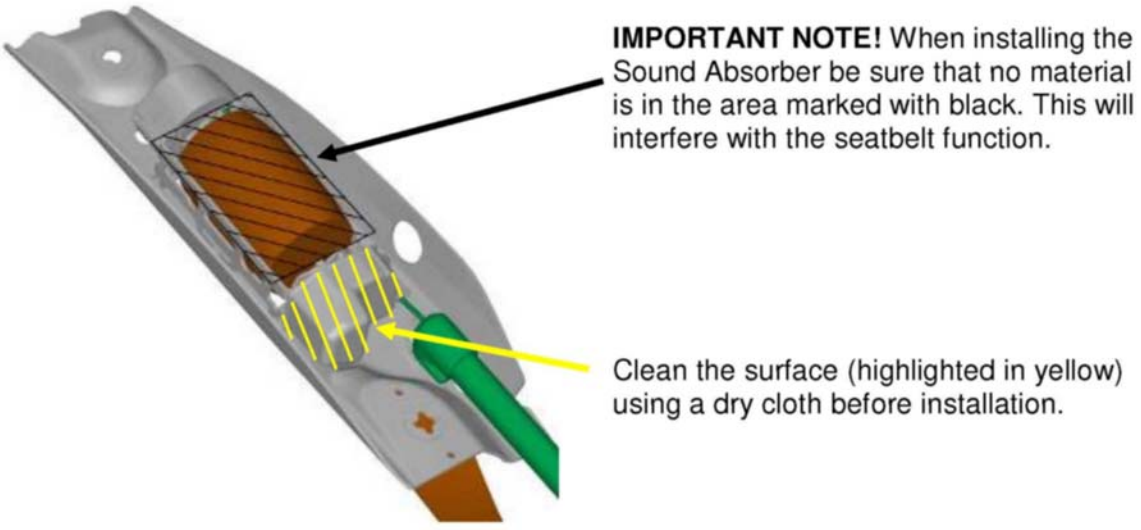


IMPORTANT NOTE!
DO NOT remove the SRS connector for this procedure.

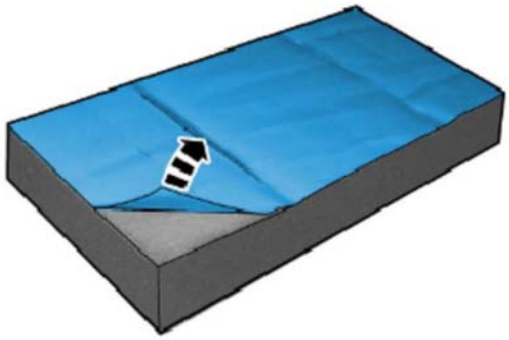
Remove the B-pillar panel, according to VIDA:

Removal, replacement, and installation

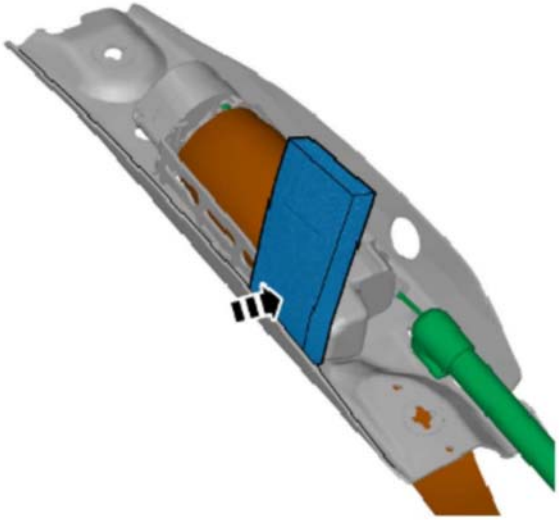
- 8 Body and interior
- 85 Interior
- Upholstery for wall/door, side, rear shelf, luggage rack
- Interior trim
- B-pillar trim panel



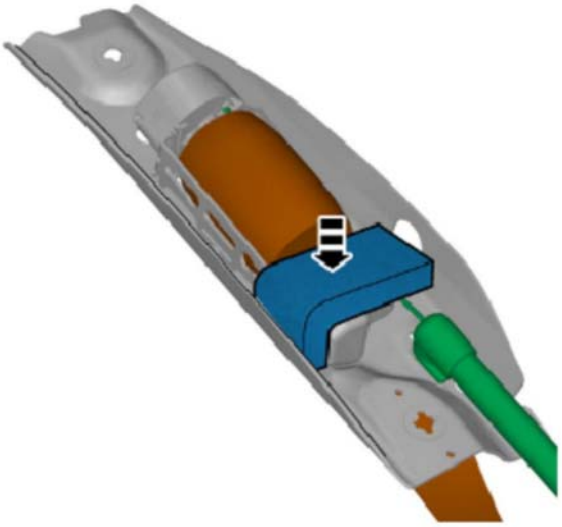
3. Sound Absorber Installation



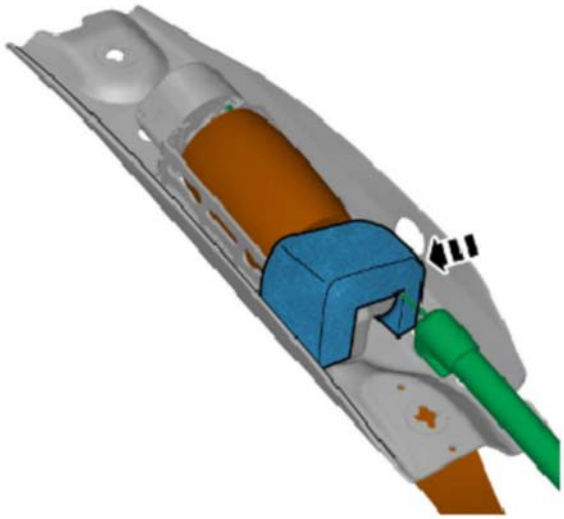
4. Peel the backing from the Sound Absorbing material and expose the adhesive.



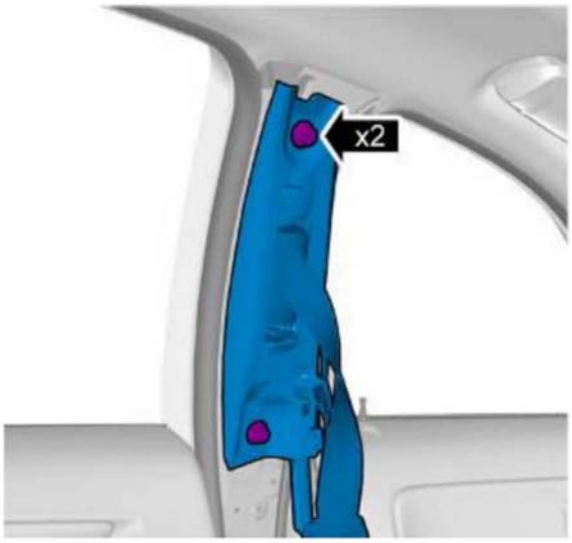
5. Position and adhere the Sound Absorber as shown.



6. Fold the Sound Absorber as shown and continue to apply to the seatbelt assembly.



7. Continue to fold the Sound Absorber as shown and apply to the seatbelt assembly.
8. Reinstall the seat belt assembly



Reposition the seat belt in the B-pillar as shown and torque to 29.5 lbs ft (40 Nm).

Install the B-pillar panel according to VIDA:

Removal, replacement, and installation

- 8 Body and interior
- 85 Interior
- Upholstery for wall/door, side, rear shelf, luggage rack
- Interior trim
- B-pillar trim panel

Verify operation of seatbelt by fully extending the belt and allowing it to retract.

Be sure the belt does not bind in any way when it is extended or retracted during this operation!

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
99526-2	Seat belt remove-install soundproofing foam install C30	.7 hrs
	S40 (2005 -), V50	.8 hrs
	S60, V70 (2005 – 2007), V70XC (2005 – 2007), S80 (2005 – 2006)	.6 hrs
	XC90	.7 hrs
	All New V70, XC70 (2008)	.7 hrs
	All New S80 (2007 – 2008)	.8 hrs
Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01		

WARRANTY CLAIM INFORMATION Technical Service Bulletin # **TJ18513** Date: **080919**

Drivetrain - Fluid Leakage From The Angle Gear

Retailer Technical Journal 18513
Angle gear leakage and resealing
5 cylinder AWD only
Date: 09-19-2008

Reference: VIDA, VSTG

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL 18513, DATED 07-08-2008. THE LABOR OPERATION CODES HAVE BEEN EDITED. PLEASE UPDATE YOUR FILES.

Model	Type	Model year	Chassis Range
S60	384	2002 - 2006	315000 - 502866
S80	184	2004 - 2006	335000 - 427792
V70	285	2001 - 2006	000000 - 533030
V70 XC / XC70	295	2001 - 2006	000000 - 209852
XC90	275	2003 - 2006	000000 - 228445

AFFECTED VEHICLES:

Description:

Oil leakage/moisture from the angle gear halves can be resolved by resealing the housing and replacing the seals. The angle gear itself does not normally need to be replaced.

There are two reasons an angle gear should not be resealed and instead should be replaced:

1.) There is angle gear noise/binding while driving.

2.) There is angle gear backlash, bearing damage, or excessive pinion shaft play found during disassembly.

Service:

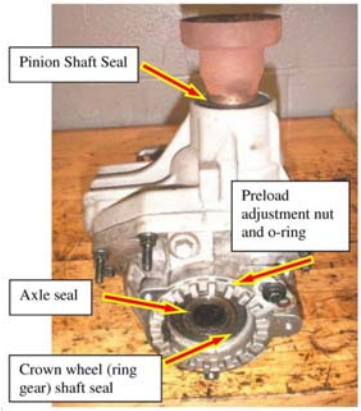
Material	Quantity	Part No.
Flange screw	10	985039
Flange screw	5	987985
3 studs	3	986701
Spacer sleeve, XC90 ch.no -196897 excl 188643, 188659	1	30714142
Spacer sleeve, XC90 ch.no 196988- incl 188643, 188659	1	30748388
Flange screw (ball joint) XC90	1	985878
Sems screw, V70 (01-08)/XC70 (-07) ch.no -278380/ S60 ch.nr -266328/S80 (-06)	1	30776055
Sems screw, V70 (01-08)/XC70 (-07) ch.no 278381-/S60 ch.nr 266329-	1	30741287
Sems nut (ball joint) V70 (01-08)/XC70 (-07)/S60/S80 (-06)	1	31201020
Hex socket screw, propeller shaft	6	988143
Grease, Splines Joint	1	1161748
Chemical gasket	0.1	1161771
Gasket remover	0.1	1161847/1161436
Cleaning agent, Isopropanol	0.3	1161721*
Abrasive cloth	1	9511024**
Sealing ring	1	9183891 (outer diameter 39mm) ***OR*** 30684243 (outer diameter 45 mm)
Sealing ring	2	30735126
Drive shaft seal	1	9143885
O-ring	1	977023
Gasket	1	11998
Gear oil	0.65	1161648*
Filter	1	30681138***
Wheel Bearing Grease	0.1	1161689*
Bleeder pipe	1	8689527***
Emory cloth	1	*
Tools	**Part number/description**	
Adjuster nut/angle gear seal drift	999 5655	
Ring gear shaft seal puller	999 7086	
Ring gear shaft seal drift	999 7087	
Protractor (angle torque gauge)	951 2050	

** Part of the standard for Consumables/Chemicals.*
*** Items will be used for more than 1 repair.*
**** The filter and bleeder pipe will only be used if the angle gear does not already have the improved angle gear vent.*

If the leak is only from the angle gear vent, only replace the vent with the new style vent. If the leak is from the angle gear halves, separate and reseal the angle gear housing according to the following procedure in conjunction with the removal and replacement procedures in VIDA.

1. Remove the angle gear according to VIDA.

2. Drain the oil from the angle gear.



3. Remove the axle seal, right side crown wheel shaft seal, and preload adjustment nut o-ring from the angle gear according to VIDA under Sealing rings bevel gear, replacing.

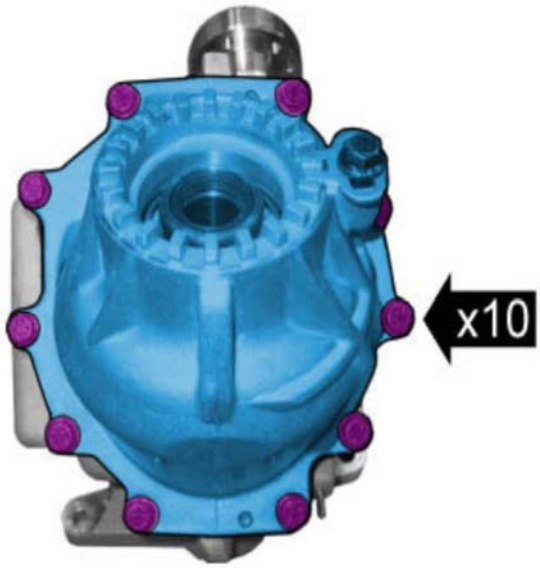
   Remove the pinion shaft seal according to VIDA under Pinion seal bevel gear, replacing.

Note!
The ring gear will be referred to as a crown wheel in this document.

4. **Warning!**
   Use protective eyewear.

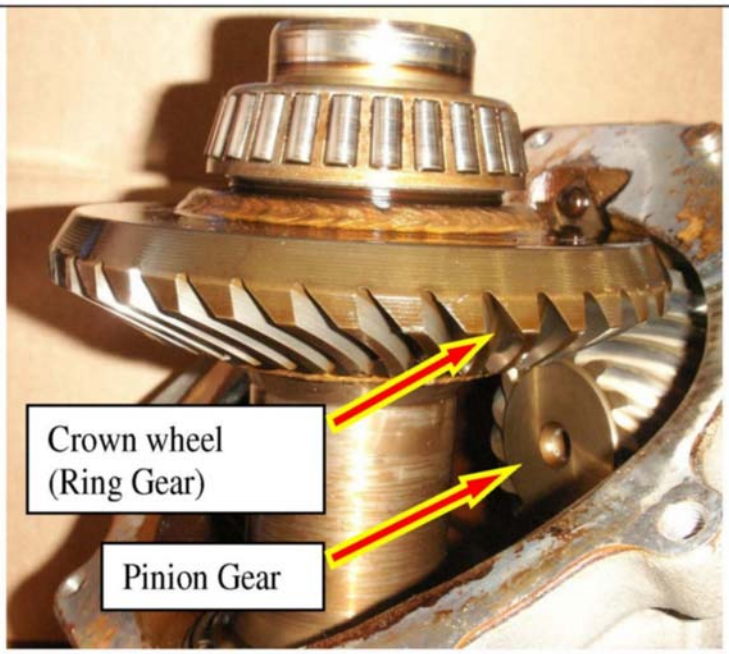
   Clean the angle gear using isopropanol 1161721 around the mating flange.

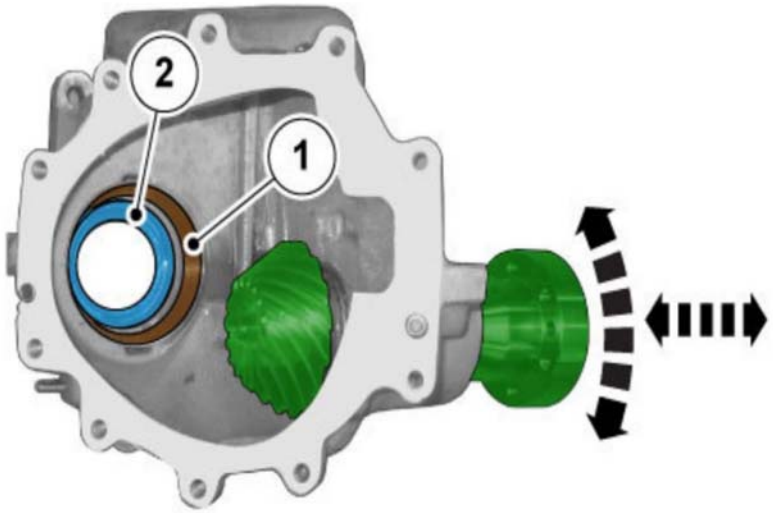
   Blow clean with compressed air.



   Remove the 10 screws and the cover. Carefully tap the cover using a plastic hammer to release it.

5. Remove the crown wheel.

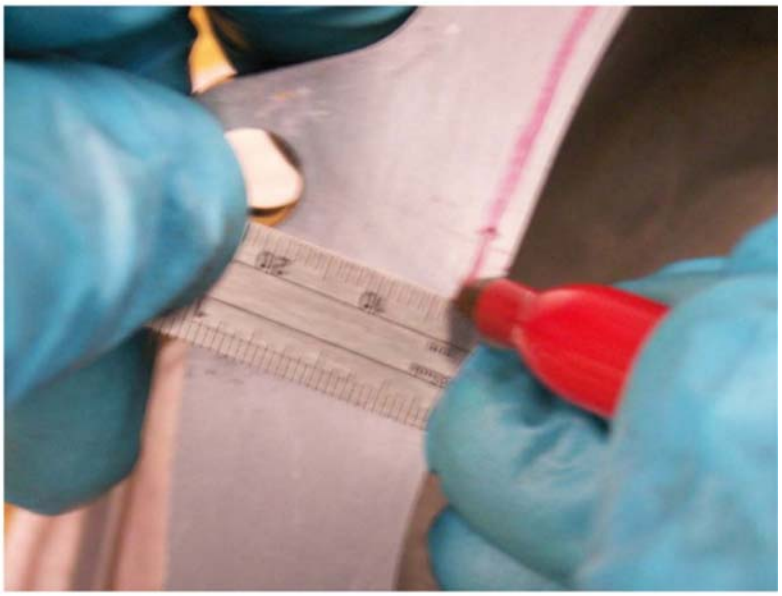


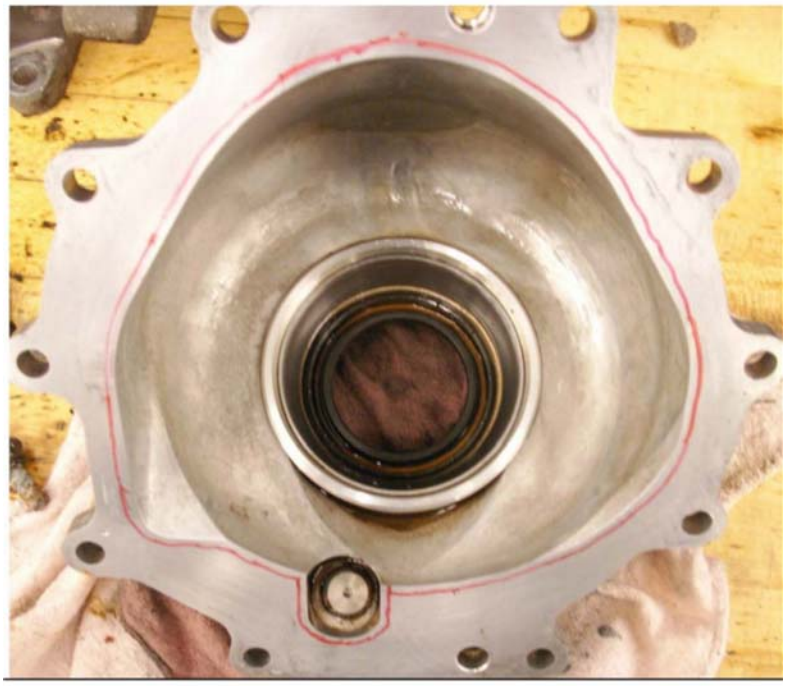


Check the pinion gear and crown wheel teeth for abnormal wear or damage. Check pinion shaft for axial play or any kind of binding. Check the bearing races (1) in both halves of the angle gear.

If a bearing race is damaged the pinion shaft has play, there is abnormal gear wear, or if there is any kind of binding, replace the angle gear.

If OK, remove the left side crown wheel shaft seal (2) according to VIDA under sealing ring, crown wheel shaft, left-hand side, replace and continue with the Step 6 of the resealing method.





6. Measure 3 mm (approx. 1/8") from the inside of the flange and make a line with a permanent marker.

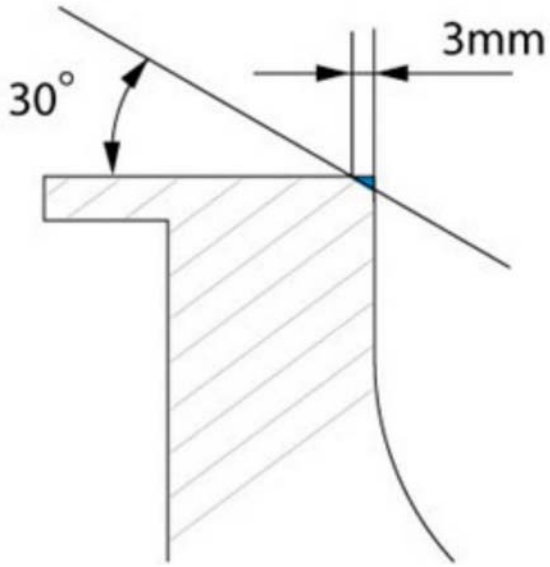
Note!

This procedure can be made easier by making a template which can be reused for several repairs.

7. **Caution!**
   Care must be taken to avoid damage to the bearing race while filing. A coffee cup can be used to cover the bearing race.

8. **Warning!**
   Use protective eyewear!

Flat-tail file (left) and half round file (right).



File off the inner edge of the cover as illustrated, following the marker line, using a file.

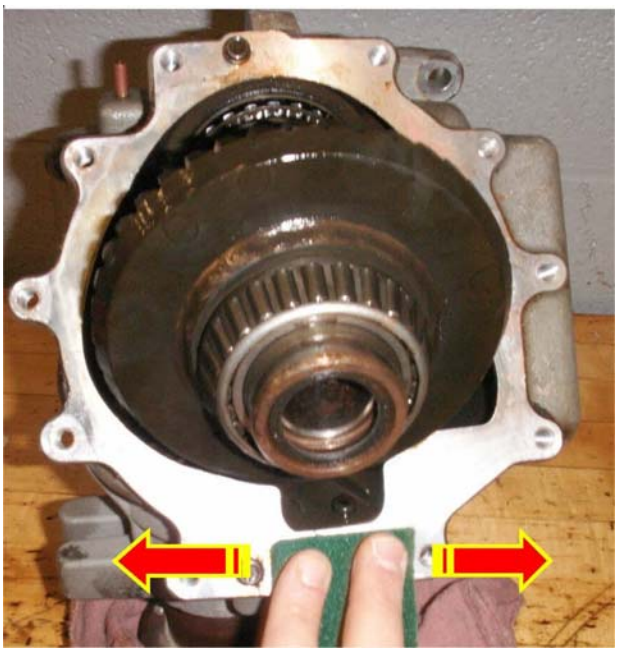
The finished product should look like this.

9. After filing, polish the chamfer using a fine emery cloth so that scoring in the chamfer goes along the chamfered edge.

Note!
Use the emery cloth radially, along the flange just as the arrows indicate.

10. Clean out filing swarf.

11. Clean the gasket from both flanges using gasket remover 1161847 and abrasive cloth 9511024. Cleaner H, 1161436 can be used as an alternative.



Note!
Use the abrasive cloth radially, along the flange.

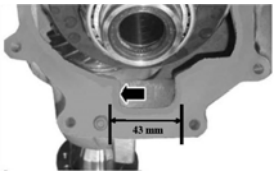
Clean the flange using isopropanol 1161721.

Cleaner H, 1161436 can be used as an alternative.

12. Apply a 5mm (approx. 3/16") bead of chemical gasket 1161771 approx. 1 mm (approx. 1/32") from the chamfered edge.

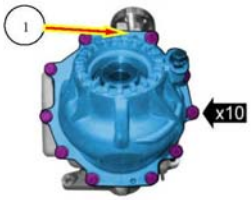
Note!
The next few steps should be done within 5 minutes so that the angle gear halves are torqued together while the sealant is still wet.

Pay close attention to the route of the sealant at **Note 1** in photo. This is for the opening on the opposite half of the angle gear case.



This is the opening that requires the 43 mm (approx. 1 - 11/16") spacing in the silicone.

Do not apply sealant to both halves.

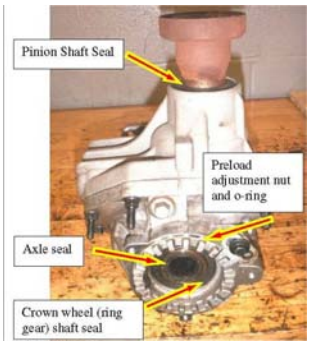


13. In order to aid in installation and to avoid affecting the silicone bead when reassembling the cover, set the cover over the locating pin marked "1" first, then carefully lay the cover down to lay flat on the flange.

    Use new screws and tighten the 10 screws crosswise to 18 Nm (13.25 ft. lbs.).

    Then angle tighten the 10 screws crosswise 85º.

    Note!
    Some models may use studs in place of 3 of the screws.



14. Install the axle seal and preload adjustment nut o-ring from the angle gear according to VIDA under Sealing rings bevel gear, replacing.

    Install the pinion shaft seal according to VIDA under Pinion seal bevel gear, replacing.

    Install new left side and right side crown wheel shaft seal according to VIDA under sealing ring, crown wheel shaft, left-hand side, replace.

    Note!
    Be sure to lubricate the sealing ring lips with wheel bearing grease, P/N 1161689 before installation.

15. If the angle gear does not have the improved vent in place, as shown, install new bleeder pipe and filter.

Note!
Some models may not use a vent.

16. Fill the angle gear with 0.65L (22 oz.) of oil P/N 1161648.

Install new drain plug gasket P/N 11998.

17. Install the angle gear according to VIDA.

Note!
New screws must be used to install the angle gear to the transmission.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
43330	Bevel Gear, remove-install/replacement	See VSTG
46907	Bevel Gear Sealing of Parting Flange	1.1 hrs
08001	Angle Gear Cleaning and Preparation	0.2 hrs
08004	Angle Gear Seals Replacement	0.2 hrs

WARRANTY CLAIM INFORMATION Technical Service Bulletin # **TJ19636** Date: **080903**

Lighting - Halogen Headlamp Bulb Replacement Info.

Retailer Technical Journal 19636
Halogen Headlamp Bulb Replacements
Date: 9-03-2008

Reference: N/A

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES THE PREVIOUS TECH - NET NOTE 35-09 HEADLAMP BULB REPLACEMENTS, DATED 1-26-2004. S / V 40 (2000 - 2004) & C70 (1998 - 2004) MODELS HAVE BEEN REMOVED AND XC90 HAS BEEN ADDED. PLEASE UPDATE YOUR FILES.

Out of Production Models*	**Type**	**Model year**	**Chassis range**
S80	184	1999 - 2006	ALL
V70	285	2000 - 2007	ALL
XC70	295	2001 - 2007	ALL
Current Production Models*	**Type**	**Model year**	**Chassis range**
S60	384	2001 -	ALL
XC90	275	2003 -	ALL

* At the time of this writing

AFFECTED VEHICLES:

DESCRIPTION:

When replacing a failed halogen type low beam bulb on a vehicle, the low beam on the opposite side of the vehicle should also be replaced. When available, long-life halogen headlamp bulbs should be used.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
35125	Headlight bulb, both sides replaced	
	S60, V70, XC70(- 2004)	0.2 hrs
	S60, (2005 -)	0.5 hrs
	V70, XC70 (2005 - 2007)	0.5 hrs
	S80 (1999 - 2004)	0.2 hrs
	S80 (2005 - 2006)	0.4 hrs
	XC90 (2003 -)	0.3 hrs
Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01		

WARRANTY CLAIM INFORMATIONTechnical Service Bulletin # **TJ19292** Date: **081007**

A/C - Climate Control System Cleaning

Retailer Technical Journal 19292

Climate control system, cleaning

Date: 10-07-2008

Reference:

VIDA, Special Tools Bulletin 163

Retailer Technical Journal 17865

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL (RTJ) 19292, DATED 6-23-2008. THE OPERATION TIME FOR C30, S40, V50 AND C70 HAS BEEN INCREASED TO 0.4 HRS; ALSO ADDED, IS INFORMATION CONCERNING THE REMOVAL / REINSTALLATION OF THE ACCELERATOR PEDAL ON C30, S40, V50, AND C70. PLEASE UPDATE YOUR FILES.

Models	Type	Model year	Chassis range
ALL	ALL	ALL	ALL

AFFECTED VEHICLES:

DESCRIPTION:

A new tool and cleaning treatment designed to disinfect the climate system has been introduced. Should a customer report a climate system odor, the following should be treated, checked, and replaced. Included in this document is information related to the tool, treatment, and how to locate the instructions for use.

- Ensure the odor is not from some other source and all other A/C system checks have been completed. (No water standing underneath the floor carpets.)
- There are no refrigerant leakages (not PAG oil causing the odor).
- Climate housing drain hose is installed correctly, not clogged - drains sufficiently.
- Aircomatic treatment; tool and treatment agent listed.
- After the treatment is completed; replace the climate system (pollen) filter.
- Engage the Afterblow function on applicable vehicles, instructions for afterblow engagement can be found in RTJ 17865.

S60	2001 -
S80	1999 - 2006
V70, XC70	2001 - 2007
XC90	2003 –

Up through 2002 Afterblow was activated from the factory, 2003 and later Afterblow will be Retailer activated only.

NOTE:
At the time of this writing, afterblow is applicable to these vehicles:

Description	Quantity	Part Number
Cleaning Agent	1 per vehicle treatment	1161837

NOTE: To order additional cleaning agent use the part number listed above, stock order only, quantity 1 equals 1 case (12 bottles) and 1 bottle = 1 treatment.

MATERIAL:

Description	Quantity	Part Number
Aircomatic II	1	9814105

TOOLS:

SERVICE:

To complete the treatment with the Aircomatic unit and cleaning agent, see VIDA instructions.

IMPORTANT:
See Accelerator Pedal Removal / Installation; C30, S40, and C70 for information specific to C30, S40, V50, and C70.

NOTE:
At the time of this writing, not all vehicles / model years are included in VIDA 2008 C. Additional vehicles will be added with new versions of VIDA. The general instructions apply to all vehicles.

- Vehicle Profile / choose the appropriate vehicle - select OK
- Information
- Cleaning, Inspection and Adjustment
- 8 Body and Interior
- 87 Climate units
- 870 general

- Climate control system, general

- Climate control system, cleaning

IMPORTANT:
This treatment is designed to last 6 - 12 months, and may need to be completed again sometime in the future.

As noted in VIDA: "An odor is present for a few days after cleaning, which is usual". The odor is of a perfume type and be sure to advise the customer of this.

Accelerator pedal Removal / Installation; C30, S40, V50, and C70

In order to remove / replace the climate system (pollen) filter on C30, S40, V50, and C70 vehicles, the accelerator pedal needs to be removed / reinstalled. While removing the pedal, the bolts (studs) used to hold the accelerator pedal assembly in place may become loose when the "compressed nuts" are removed by the technician. The installation process of the bolts (studs) was modified to reduce the possibility of this from the following chassis numbers; S40-92141 / V50-91193. The nuts holding the accelerator pedal changed from compressed nuts to "regular" M6 nuts from the following chassis numbers; 544-276806 / 545-291234 / 542-14430.

IMPORTANT NOTE:
Many of the bolts (studs) loosened from their mounts have been caused by the use of pneumatic tools (i.e. air ratchets). Regardless of the chassis number or production modifications, pneumatic tools should never be used to remove / install the accelerator pedal mounting nuts!

During accelerator pedal reinstallation, any previously installed compressed nuts should be replaced with regular M6 nuts, P/N 985919 (x3).

LABOR OP	LABOR DESCRIPTION	LABOR TIME
87376	Climate control system, cleaning C30, S40 (2004.5-), V50, C70 (2006-)	0.4 hrs
	Includes removal / installation of accelerator pedal	
	S60	0.5 hrs
	XC90, S80 (1999 – 2006), V70 (2000 – 2007), XC70 (2001 – 2007)	0.6 hrs
	All New S80 (2007 -), All New V70 & XC70 (2008 -)	0.3 hrs
Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01		

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TJ11280** Date: **090130**

Steering - ZF Steering Gear Fluid Line Replacement

Retailer Technical Journal 11280
ZF steering gear,
Oil pipes replacement procedure

Date 01-30-2009
Reference: VIDA, VSTG

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Model	Type	Factory Code*	Model year	Chassis range
S80	184	1	2004 – 2006	335000 – 436803
XC90	275	1	2004 – 2006	032124 – 260610
V70	285	1	2004 – 2006	350636 – 558182
V70	285	2	2004 – 2006	349395 – 557371
XC70	295	1	2004 – 2006	123067 – 222169
S60	384	2	2004 – 2006	315516 – 524710

*Factory Code is in the 11th digit of the VIN (Vehicle Identification Number).

AFFECTED VEHICLES:

DESCRIPTION:
The procedure for removal and replacement of the oil pipes on the steering gear (rack) is missing in VIDA. These are not the power steering pressure and return hoses that route power steering fluid to and from the power steering pump/reservoir. These are the metal pipes on the steering gear itself. Also, a new clip has been implemented into production after
chassis limits listed above to hold the pipes to the steering gear.

Material	Part No.
Servo oil*	30741424

*Part of shop supply

MATERIALS:

Special tools	Part No.
Puller	999 5259
Lifting hook	999 5460
Lifting beam	999 5716
Fixture	999 5972
Lifting eyelet	999 7018

These tools will be used during removal and replacement of the steering gear per VIDA.

TOOLS:

SERVICE:
The oil pipes can be replaced according to the following instructions. A new clip comes with the pipes as part of a "pipe kit" (found in VIDA parts catalog).

Preparations

Remove the steering gear according to VIDA:
-Removing, replacing and installing
-Suspension, steering
-Steering gear
-Steering gear, replacement

Note!
Seal the intake and exhaust connections from the servo pump with plastic plugs immediately after removal.

Replacing the oil pipes

Remove the protective plate from over the pipes.

Seal the intake and exhaust connections using plastic plugs.

Carefully clean around the oil pipe connections and blow dry.

Remove the pipes.

Carefully check that there is no residue of the old sealing rings in the connections on the steering gear.

Install the new sealing rings on the oil pipes. Lubricate the sealing rings using servo oil 30741424 (1 litre).

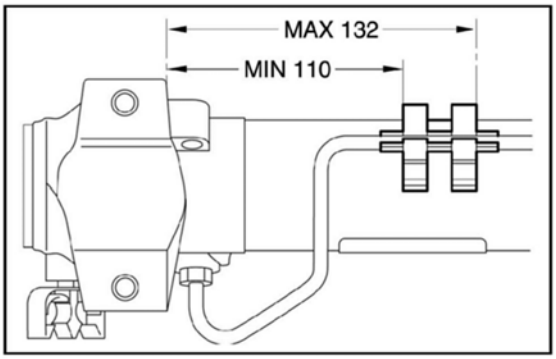
Carefully install the new pipes with the sealing rings to the steering gear.

Note!
Use a new screw for the pipe's holder.

Tighten the pipe nuts to 7 Nm (5.2 ft. lbs. or 62 in. lbs.) and the holder screw to 12 Nm (8.9 ft. lbs. or 106.2 in. lbs).

Install the protective panel over the pipes.

Install the support clip for the oil pipe



A support must be positioned on the longer of the two oil pipes as illustrated.
MAX 132 mm (5.2")
MIN 110 mm (4.3")

Note!
Only one support must be used, the illustrations show the support in its relevant outer positions.

Install the steering gear

Install the steering gear in reverse order.

Note!
Checking and adjusting Toe-in must not be carried out since no adjustable joints have been loosened.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
64216-2	Steering gear oil pipes replacement (includes steering gear, remove and install)	See VSTG

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TJ16724** Date: **081008**

A/T - Coolant Contamination Information

Retailer Technical Journal 16724

Coolant contamination in automatic transmissions

Date: 10-8-2008

Reference: VIDA

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES THE PREVIOUS VERSION OF RTJ 16724 (TNN 43-48) DATED 4-18-2007. Changes have been made to the cooler and hose replacement guidelines. PLEASE UPDATE YOUR FILES.

Model	Type	Model year	Chassis range
ALL	ALL	ALL	ALL

AFFECTED VEHICLES:

BACKGROUND:

The root cause for some automatic transmission failures is glycol contamination from the engine/transmission cooling system. Severe cases of contamination are easy to detect by a visual inspection. The transmission fluid will have a milky appearance and there may be signs of transmission fluid in the coolant reservoir. Less severe cases are impossible to detect without doing a chemical analysis of the transmission fluid. This slight contamination is easy to overlook and will result in a repeat transmission failure.

A small leak from the cooling system into the transmission can cause driveability problems long before there are any visual signs of contamination.

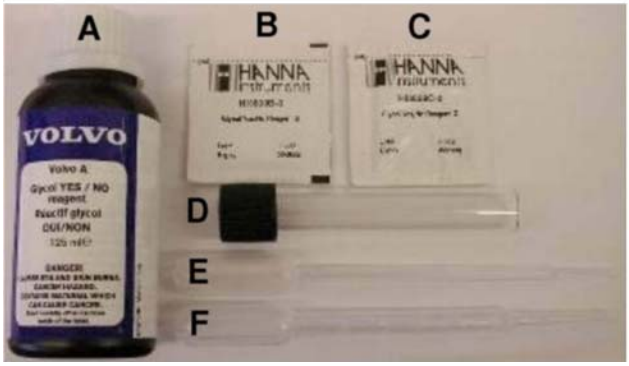
SYMPTOMS OF COOLANT CONTAMINATION:

The most common symptom of coolant contamination is shudder; a high frequency vibration.

^ On AW55 transmissions, the shudder normally occurs while in torque converter slipping lock-up mode. It is most easily reproduced by driving slightly uphill at about 40 MPH (65KPH) in 4th or 5th gear with light pedal at 122°-158°F (50-70°C) transmission oil temperature.

^ On the GM4T65 transmission, the shudder normally occurs during upshifts.

^ On all transmissions, other symptoms such as harsh shifts, slipping, flare, loss of drive, other DTCs, etc... are possible but not likely.



A: Volvo A reagent (clear liquid)
B: Reagent B (white powder)
C: Reagent C (purple powder)
D: Glass test tube with cap
E: Small pipette
F: Large pipette

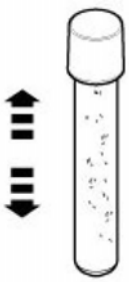
The Volvo test kit, PN 30783360, will accurately detect even very low levels of glycol contamination in transmission oil. One test kit contains materials to perform 25 tests.

1. Start with a clean test tube. Wash it with a soap solution and the brush which is supplied in the kit.

   Use the large pipette to put 5 ml (2 x 2.5 ml) of Volvo A (clear fluid) into the test tube.

2. Add 0.5 ml of the oil to be tested using the small pipette.

3. Add one packet of reagent B (white powder) to the test tube.

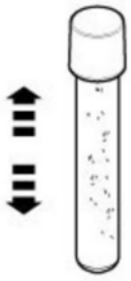


4. Screw on the cap & shake the tube until all the powder has dissolved.

5. Place the test tube in hot tap water for 5 minutes.

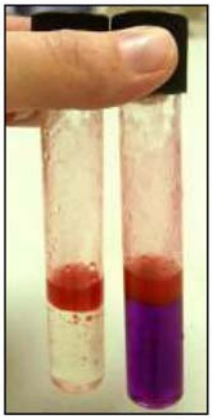
   (A coffee cup full of tap water which has been microwaved for 2 minutes is suitable.)

6. Unscrew the cap and add one packet of reagent C (purple powder) to the test tube.



7. Screw on the cap & shake the tube until all the powder has dissolved.

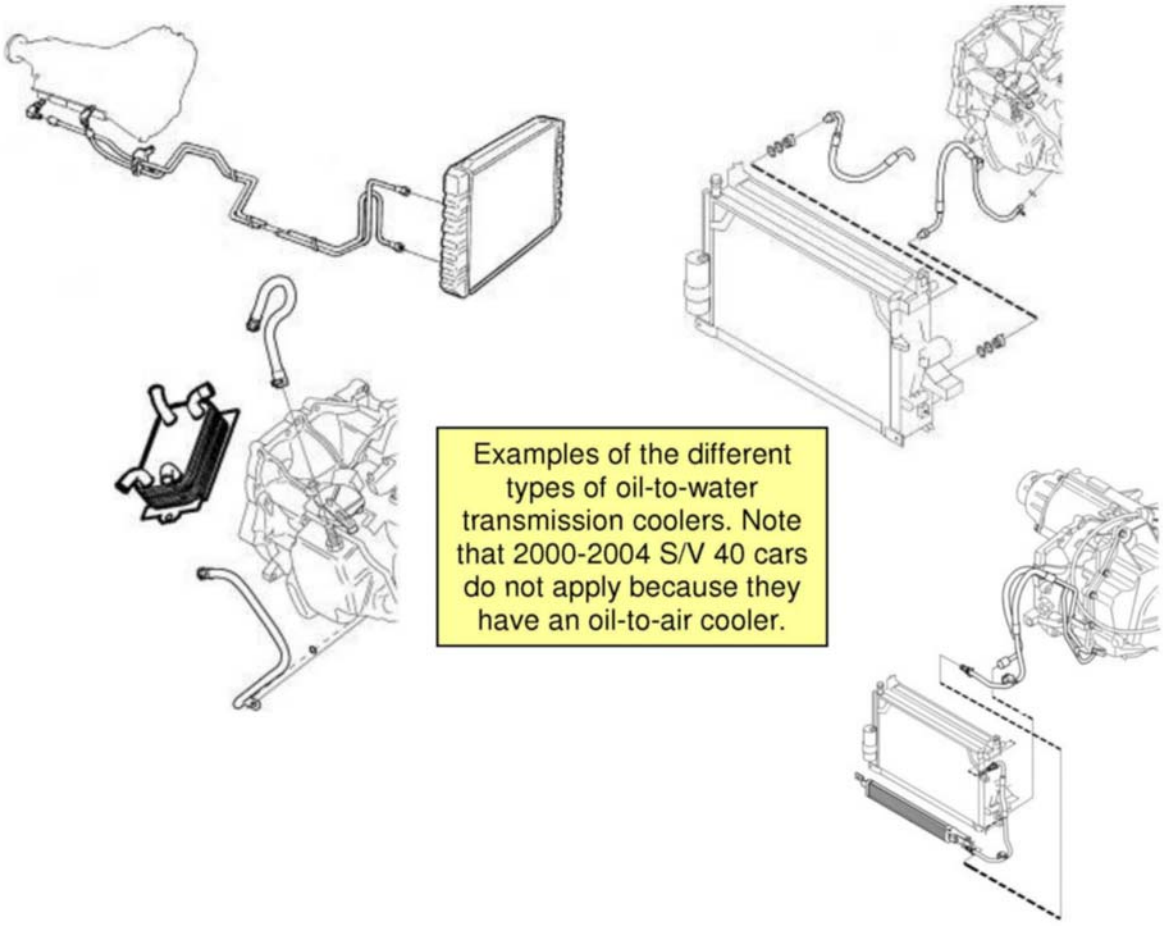
8. Place the test tube in hot tap water for 20 minutes.



9. A clear (no color) result indicates no glycol contamination.

   A purple result indicates glycol contamination.

SERVICE:



Examples of the different types of oil-to-water transmission coolers. Note that 2000-2004 S/V 40 cars do not apply because they have an oil-to-air cooler.

If the sample tests positive for glycol, the transmission and cooler will need to be replaced. The cooler hoses will need to be flushed with clean transmission fluid or replaced. For 1999- 2006 S80s and 2003-2005 XC90s with the GM4T65 transmission, replace the radiator, auxiliary cooler (if applicable), and all three cooler hoses in the case of glycol contamination.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
04732-6	Coolant Contamination Test	0.2 hr

MATERIAL PART NUMBER	MATERIAL DESCRIPTION	COST
30783360	Test Kit	1/25th of kit cost

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

In the event of needing to test for coolant contamination as part of a warranty repair, the labor and part description shown above can be used.

Note:

The following kit is also available as an alternative, but not via a Volvo part or tool number. It can be purchased directly from the manufacturer. Each kit includes material to test 10 transmissions.

Nelco Company LLC, Glyt-Tek Test Kit
1047 McKnight Rd S, Saint Paul, MN 55119
Phone: 651.738.2014 Fax: 651.738.9447
E-mail: Cvnelco@aol.com
www.aviceda.com/nelco/index.htm

TESTING FOR GLYCOL CONTAMINATION WITH NELCO GLY-TEK KIT:

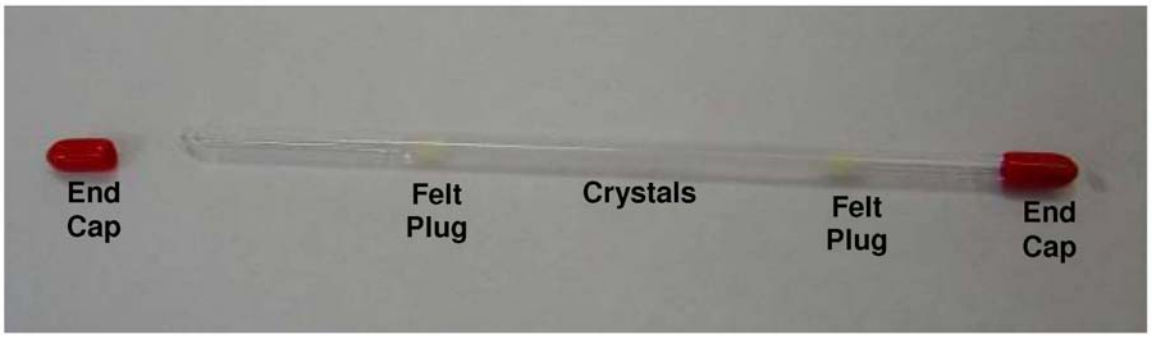
1. Let the vehicle sit for several minutes. Using a clean bottle, take a small sample of oil from the sump via the drain plug.

2. Open one vial. Twist the cap while removing it. Do not use the one with the red cap (it is a sample already containing glycol).

3. Using a new syringe, add oil to the vial. The vial should now have about 50% oil, 50% clear liquid.

4. Cap the vial and shake it vigorously for 20 seconds.

5. Remove the cap and let the vial sit until the liquids separate.



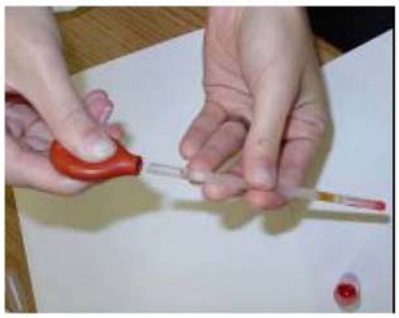
6. Remove the red caps from both ends of one glass tube. Note that for the remaining steps (7-12), care must be taken not to allow the crystals or felt plugs from coming out of the tube.

7. Protect your eyes and hands from any small pieces of glass by wrapping the tube in a paper towel. While holding the tube horizontally, break off both ends at the score marks.

8. While holding the tube horizontally, install the rubber bulb onto one end. Twist it while pushing it on.

9. While holding the tube horizontally, slowly squeeze the bulb to remove the majority of the liquid from the crystals.

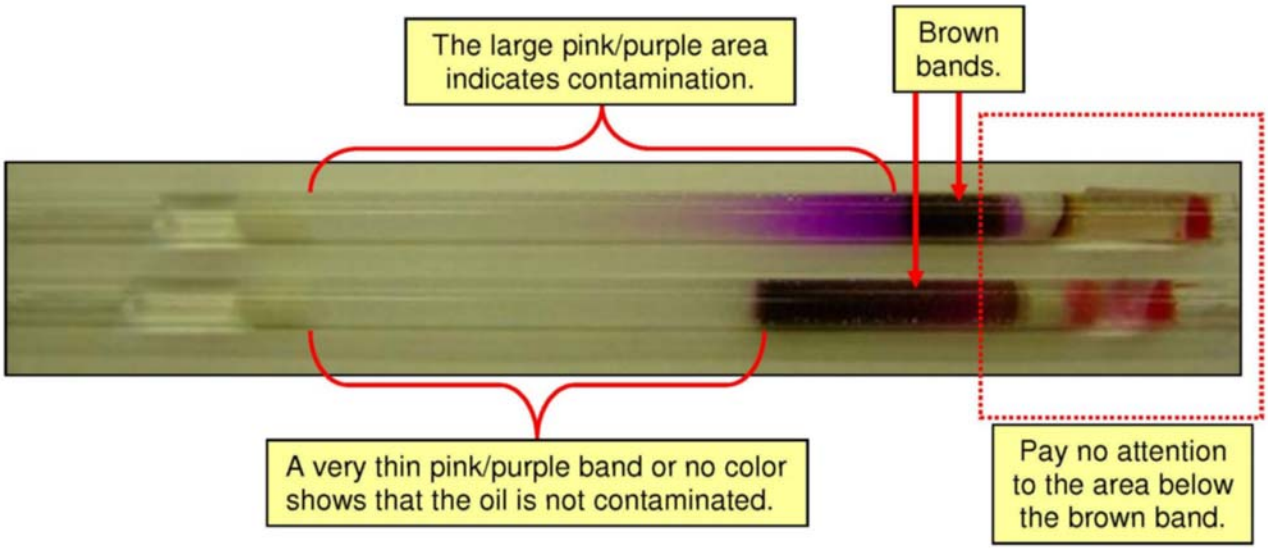
10. With the bulb squeezed, insert the open end of the tube into the bottom of the vial (through the oil, into the clear liquid).



11. Slowly release the bulb to draw liquid into the tube. Stop when the liquid is just past the top felt plug and remove the bulb. Do not draw liquid into the rubber bulb, as it will need to be kept clean for future tests.

12. Immediately lay the tube down flat and let it sit for exactly 15 minutes.

ANALYZING THE RESULTS:



After the tube has been laying flat for 15 minutes a brown band will have formed in the crystals above the bottom felt plug. A large pink/purple area above this brown band indicates the presence of glycol. A very thin pink/purple band or no color above this brown band shows that the oil is not contaminated.

MATERIAL PART NUMBER	MATERIAL DESCRIPTION	COST
16	Test Kit	1/10th of kit cost ($7)

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

INFORMATION FOR NELCO GLY-TEK KITTechnical Service Bulletin # **TJ20057** Date: **081112**

Cell Phone - Bluetooth(R) Software Upgrade Information

Retailer Technical Journal 20057
Accessory Bluetooth Software Upgrade information and procedures

Date 11-12-2008

REFERENCE:
VRC2/ Bluetooth SW compatibility matrix
Note! If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

AFFECTED VEHICLES:
All with accessory installed Bluetooth hands free telephone system

Background:
To be able to upgrade the Accessory Bluetooth hand free system with improved compatibility and functions, a new SW download procedure has been developed. By identifying the version of the present Accessory Bluetooth hand free control unit and its SW version, it may be possible to upgrade the Bluetooth system without replacing the control unit.

SW upgrade of the Bluetooth control module is not possible for all systems. See instruction at "SERVICE"

REASONS FOR UPGRADING THE CONTROL MODULE:

1. Customer has bought a new mobile phone that does not work together with the Accessory Bluetooth hand free system. (It did function with previous mobile phone) Please check that the new mobile phone is compatible with the Accessory Bluetooth hand free system before

performing the SW Upgrade.

2. Customer claims that it only is possible to call the 9 first phonebook entries, but it should be possible to call any of the present phonebook entries.

3. Customer wants the Russian or Portuguese language to be present in the Accessory Bluetooth hand free system

4. Customer wants to transfer new contacts from his mobile phone to the phonebook list in the Accessory Bluetooth hand free system.

Refer to the Accessory Bluetooth compatibility matrix on VRC2. Service tab / Business development / Bluetooth compatibility matrix

NOTE!

Performing a software upgrade for the following reasons will NOT be accepted for warranty:

^ Customer requests more functions

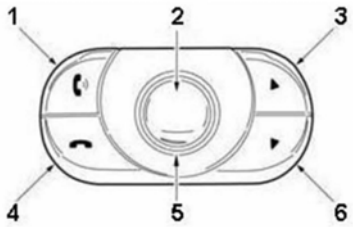
^ The customer has purchased a new mobile phone that is not compatible with the existing SW version in the vehicle.

Before any actions are performed, please check that the Bluetooth control module is programmable, See below control instruction at SERVICE.

SERVICE:

1. Check if the Bluetooth control module version is possible to upgrade by performing the following control steps:

^ Turn ignition off.



^ Press the "End-button" (4), see picture above, and keep it depressed while the ignition is turned on. Keep the button depressed for another 10 seconds until a voice confirmation stating "Language Menu" on the desired language. Release button (4).

^ Count the number of languages by pressing the "Volume Up" button (3) and wait for the voice confirmation stating the different languages.

^ Turn the ignition off

^ If the Accessory Bluetooth hand free system contains only 6 languages, it CANNOT be upgraded with a later software version.

^ If the Accessory Bluetooth hand free system contains 10 or 11 languages, it CAN be upgraded with a later software version.

2. Once it has been determined that the control unit is programmable, download the 2 attached upgrade software files as per the instructions.

Important: Please read the "reflashing overview" in it's entirety before proceeding.

Important: When you flash your hand free system, all contacts in your Contacts list, and devices in your Device list may be deleted.

^ The system can be put into reflash mode using the control panel.

^ While in reflash mode, the Blue LED flashes slowly indicating it is waiting for a file to be sent over Bluetooth.

^ While a file is being transferred over Bluetooth, the Blue LED flashes rapidly indicating a file is being downloaded.

^ Once the file is transferred, the Blue LED will continue to flash fast for several seconds while file is being written to memory.

^ You can flash only one image file at a time.

^ Once the file is written, the Blue LED is fully lit for 10 seconds indicating success.

^ An audio indicator of the flashing status is also supported for convenience, (turn on the radio with appropriate volume). Early bootloader SW does not support this feature

^ Reflash will automatically be exited if no files are transferred in a 10 minute period or simply by turning on and off the vehicle ignition.

The software files will be delivered to the Accessory Bluetooth control unit via Bluetooth communication from a properly prepared PC. *See setting up the PC for reflash*

USB Bluetooth unit, part number: **9513005**

USB cable **9513007**

Tools:

Software Reflash Files

The software files for downloading are provided as an attachment to this RTJ in TIE (Technical Information Exchange). Please save the attached software files to the desktop before starting the software download process.

There are 2 types of files:

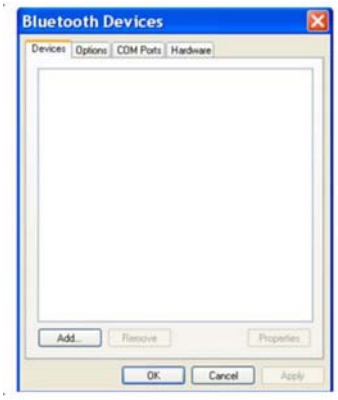
^ Bootloader - This is the software that bootups the control unit and controls the reflash process. It has the following naming format: xxxxxxxx_boot.mrf, where "xxxxxxxx" is the version number. The bootloader file takes 1 minute to flash.

^ Combined Application - This file contains the main application, configuration settings for your vehicle type e.g. hand free settings for different installation configurations and various languages of the system.

It has the following naming format: xxxxxxxx_comb.mrf, where "xxxxxxxx" is the version number. The combined file can take up to 10 minutes to flash.

Using the Bluetooth Reflash Feature

1. Setting up the PC for Reflash



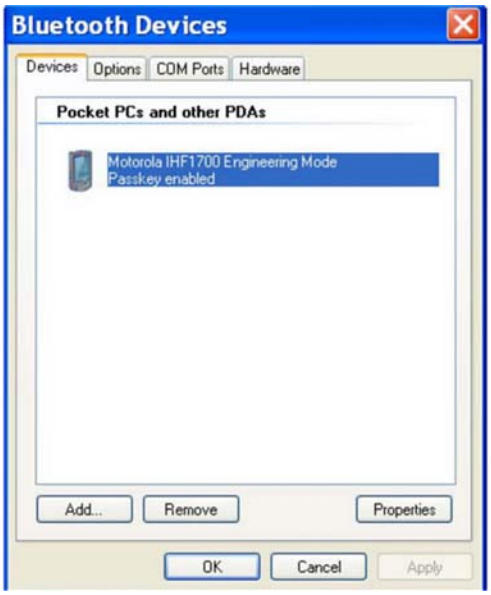
1:1 Click Start->Control Panel and double click on Bluetooth Devices. The "Bluetooth Devices' panel is displayed.

1:2 In the "Options' tab enable the "Show the Bluetooth icon in the notification area' box and click "Apply'. Click on "OK' to close the panel. Close the control panel.

1:3 A Bluetooth icon is now visible in the task bar.

2. Removing paired devices

2.1 Right click on the Bluetooth icon in the task bar and select "Show Bluetooth Devices'

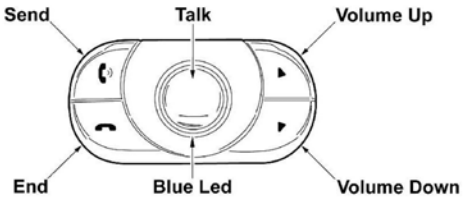


2:2 The "Bluetooth Devices' tab is now displayed. If any device called "Motorola IHF1700 Engineering Mode'. appear. Highlight the device and click "remove' (all other paired devices, including DICE, should remain). Click on "OK' to close the panel.

Flashing the Handsfree System Software

!!! Warning !!!
Do not turn ignition off or remove the battery while flashing the bootloader.
Use a battery charger to secure the power supply

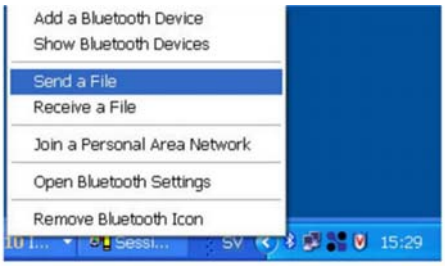
3. Setting the Handsfree System into Reflash mode



3.1 Turn off the vehicle ignition and wait until the blue led stops flashing.

3.2 Press and hold the "Send' button, turn on the vehicle ignition, and continue holding the "Send' button for at least 10 seconds until a voice prompt "Reflashing' will be heard and the blue led starts to flash slowly.

4. Flashing the bootloader

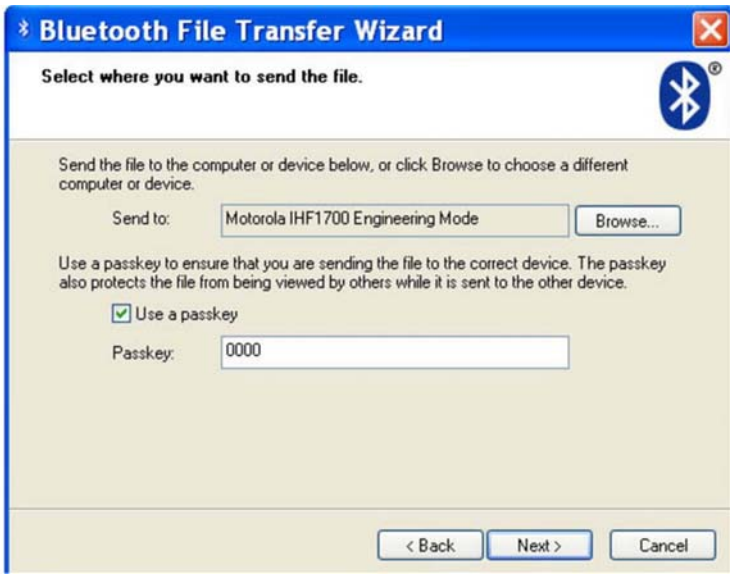


4:1 Right click on the Bluetooth icon in the task bar and click "Send a file'.

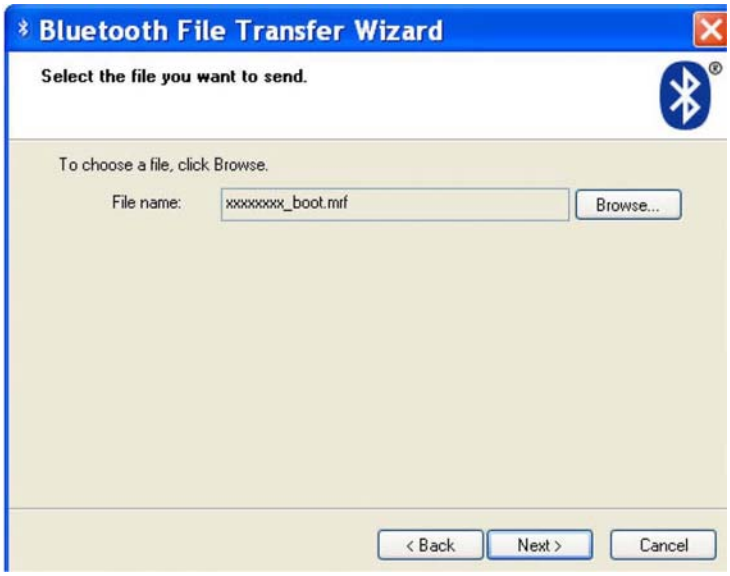
4:2 The following panel is displayed. Click "Browse'

4:3 The PC will now search for discoverable Bluetooth devices.

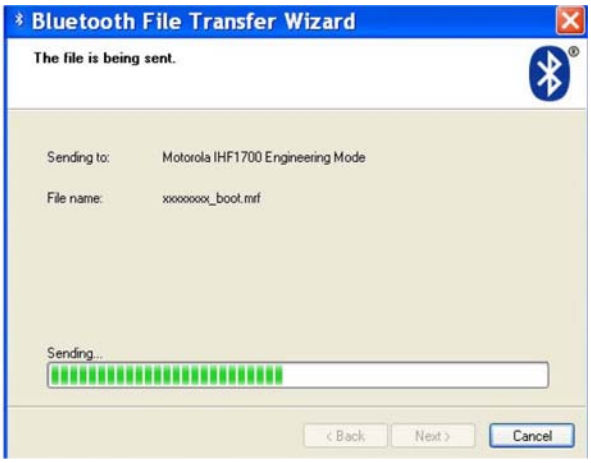
4:4 When the search is finished, a list of discovered devices is displayed. Click on "Motorola IHF1700 Engineering Mode' and click "OK'. If a device called "Motorola IHF1700 Engineering Mode' is not found, make sure the system is in reflash mode and go back to step 4:1.



4:5 Select the "Use a passkey' box and enter "0000' as the passkey. Click "Next'.

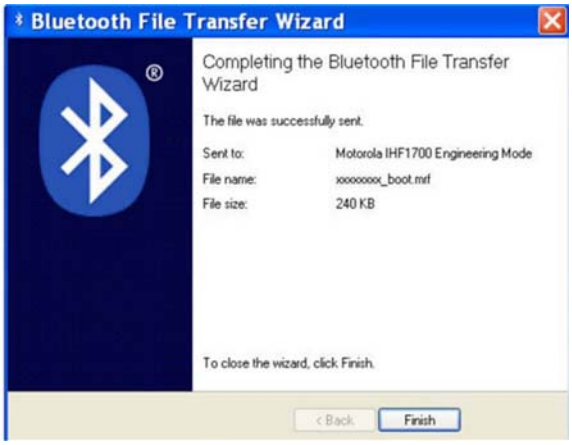


4:6 The hand free system will be paired and you will be asked to choose a file. Click "Browse', locate and Choose the bootloader file: "XXXXXXXX_boot.mrf' and click "Open'. Click "Next'.



4:7 The file transfer is started. The Blue LED will flash fast and the system will start to emit a continuous tone, while the file is being transferred.

Important: The audio indicator is a feature of the bootloader. Some old bootloader software may not contain this feature and hence this audio indicator will not be heard.



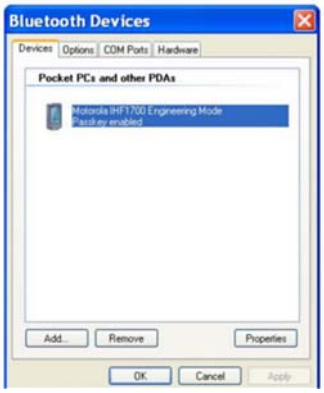
4:8 Once the file is fully transferred, the hand free system will write the data to memory. Once the file is fully programmed, the Blue LED will flash slowly and the tone will change to a slow beep. Click "Finish'.

Important: The audio indicator is a feature of bootloader. Some old bootloader software may not contain this feature and hence this audio indicator will not be heard.

4:9 **Turn ignition off.**

Bootloader SW delivery is complete.

4:10 Right click on the Bluetooth icon in the task bar and select "Show Bluetooth Devices'

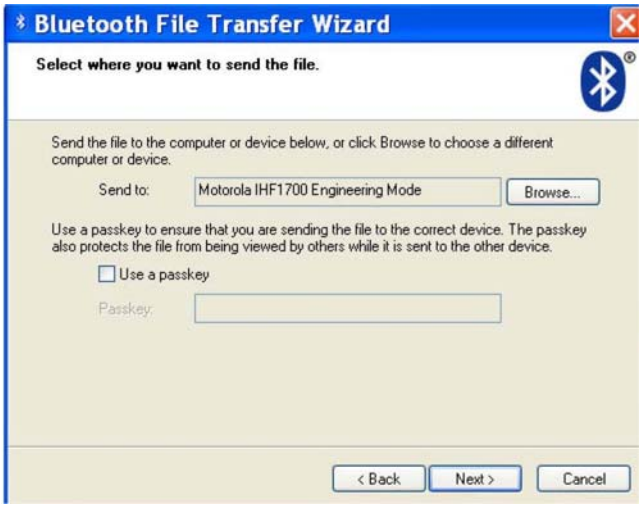


4:11 The "Bluetooth Devices' tab is now displayed. If any devices called "Motorola IHF1700 Engineering Mode'. appear. Highlight the device and click "remove'. Click on "OK' to close the panel.

5. Flashing the Combined Application

5:1 Put the hand free system into reflash mode.(See step 3:2)

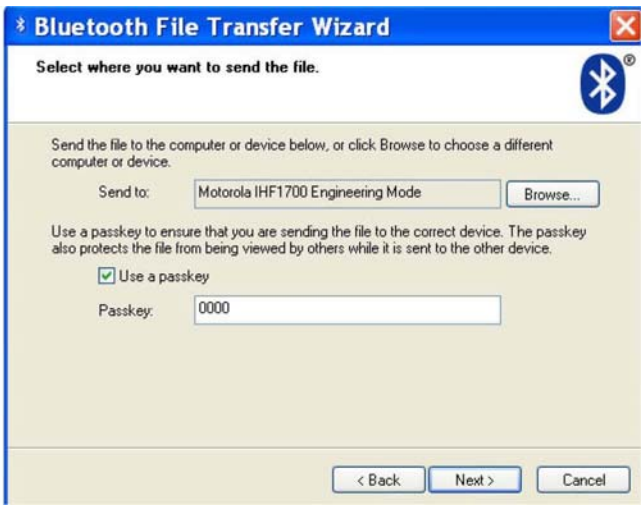
5:2 Right click on the Bluetooth icon in the task bar and click "Send a file'.



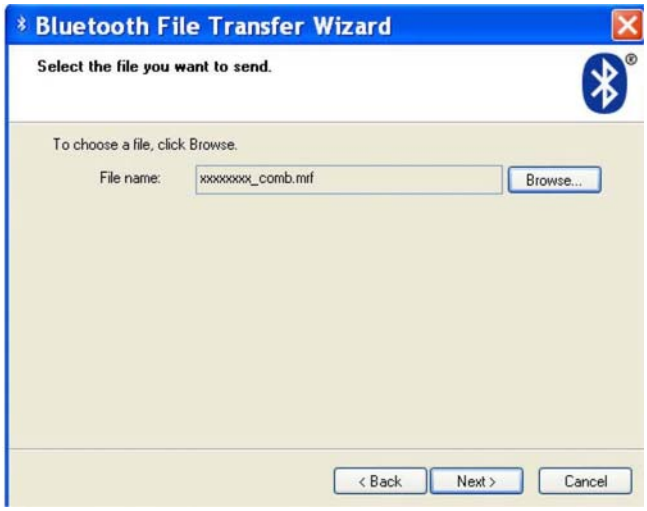
5:3 The following panel is displayed

5:4 Click "Browse'. The PC will now search for discoverable Bluetooth devices.

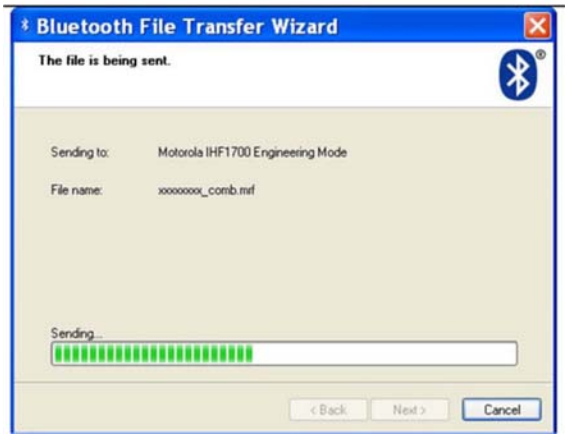
5:5 When the search is finished, a list of discovered devices is displayed. Click on "Motorola IHF1700 Engineering Mode' and click "OK'. If a device called "Motorola IHF1700 Engineering Mode' is not found, make sure the system is in reflash mode and go back to step5:2.



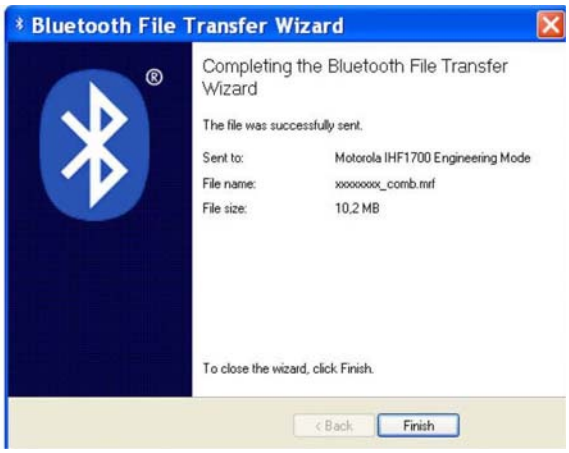
5:6 Select the "Use a passkey' box and enter "0000' as the passkey. Click "Next'.



5:7 The hand free system will be paired and you will be asked to choose a file. Click "Browse', locate and Choose the combined file: "XXXXXXXX_comb.mrf' and click "Open'. Click "Next'.



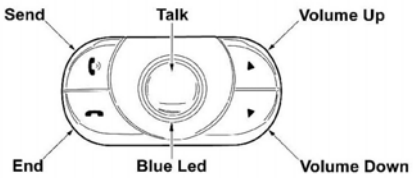
5:8 The file transfer is started. The Blue LED will flash fast and the system will start to emit a fast beeping tone while the file is being transferred.



5:9 Click "Finish'

5:10 Once the file is fully transferred, the hand free system will continue write the data to the unit's memory. Once the file is fully programmed, the Blue LED will flash slowly and the tone will change from a fast to a slow beep.

5:11 When the Blue LED starts to flash slowly and the tone changes to a slow beep, turn ignition off. Wait until the beep stops and the Blue LED is lit continuously.



5:12 Turn ignition on. Wait 20 seconds. Press the "Talk' button and verify the"Setup menu' voice prompt is heard. Press the "End' button and turn the ignition off

Note: It may be necessary to remove and re-add the DiCE bluetooth after performing this task. For guidance, reference DICE Tool Installation Instructions in VRC2 under the VIDA Information tab.

Q&A

Why can't I find the hand free system?

a. Make sure the hand free system is in reflash mode.

b. Remove any paired "Motorola IHF1700 Engineering Mode' devices before searching.

Why can't I pair to the hand free system?

a. Make sure the hand free system is in reflash mode.

b. Remove any paired "Motorola IHF1700 Engineering Mode' devices before searching so the correct device is being paired to.

c. Verify you are using the correct passkey.

Why can't I send a file to the hand free system?

a. Make sure the hand free system is in reflash mode. If not remove the device and pair again.

b. Verify you are using the correct files.

Why do I need to restart system after flashing the bootloader?

a. Bootloader may contain upgrades to speed up and aid the Reflashing process.

In order to use these upgrades system must be restarted.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
99400-2	Check of Bluetooth control module version.	0.1 hrs
99567-3	Software download to Bluetooth control module	0.7 hrs

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION
Technical Service Bulletin # **TJ19254** Date: **081208**

Lighting - Headlamp Low-Beam Connector Replacement

Retailer Technical Journal 19254
Headlamp low beam connector replacement

Date 12-08-2008
Reference: VIDA, Retailer Technical Journal 19636

Note! If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE! THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL 19254 - HEADLAMP LOW BEAM CONNECTOR REPLACEMENT, DATED 12-02-2008.

- OPERATION NUMBER 99400-2 / CONNECTOR LOW BEAM, REPLACEMENT (each side) 0.1 hrs, HAS BEEN CHANGED TO INCLUDE BOTH SIDES.

- THE XC90 NOW HAS AN END CHASSIS NUMBER INCLUDED. PLEASE UPDATE YOUR FILES.

- TWO TYPES OF REPLACEMENT CONNECTORS, SHARING THE SAME PART NUMBER, CAN BE USED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Models	Type	Model year	Chassis range
XC90	275	2003 - 2009	000690 – 516280
V70	285	2005 - 2007	459000 – 675318
XC70	295	2005 - 2007	173000 – 288668
S60	384	2005 -	425000 -

AFFECTED VEHICLES:

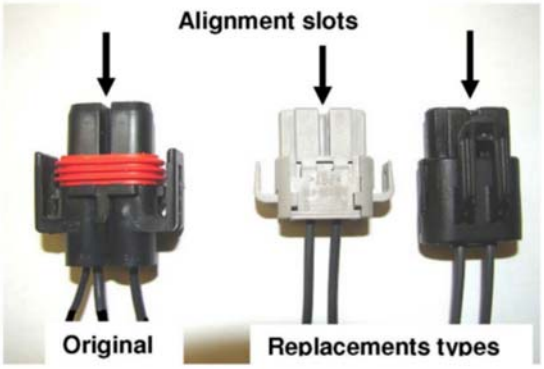
DESCRIPTION: In an effort to reduce warranty and customer expense for Halogen type low-beam headlamps, a new method of repair has been developed to address complaints for the vehicles listed above.

Description	Quantity	Part Number
Cable harness*	2	31294092
Splice	4	9130467

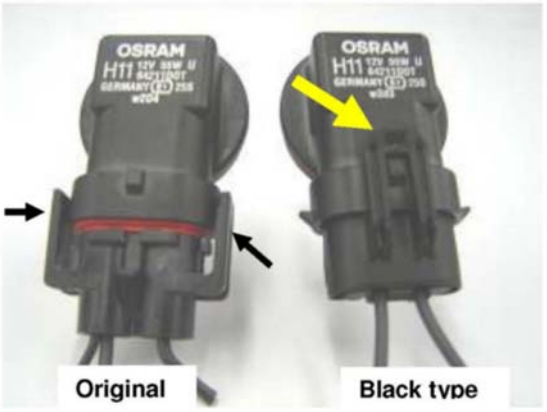
*This part number has been used for two replacement connector types, see the following page.

MATERIAL:

SERVICE: If the cause of the customer complaint is a bad Halogen low-beam bulb, replace both bulbs per Retailer Technical Journal 19636; dated 9/2/2008. If the cause of the complaint is that the harness within the headlamp assembly is damaged, DO NOT replace the headlamp assembly. Replace the low-beam harness on BOTH headlamps as described in the following. Read this complete document prior to beginning repair.



For reference here is a photo of the original and replacement connectors.



The original connector shown has three wires to it. The number of wires to the connector will vary based on the model.

See the instructions for two wire or three wire repair as needed.

Both the original and replacement connectors have an "alignment slot". This should be used to determine the position of the spliced wires

On the original and the "grey" replacement type; each terminal has an identification of "A" and "B"; they are not consistent from the original to the replacement. Disregard the labelling of the terminal and pay attention to the physical locations.

NOTE: The "black" type replacement does not have any terminal identification marks.

The black type also has a different locking tab. The original and the grey replacement types lock onto the bulb at the sides, the black type locks onto the bulb at the back as shown here.

ADDITIONAL NOTE: the orange seal (shown in these pictures) installed with the original connector should not be used when installing the replacement type connectors!

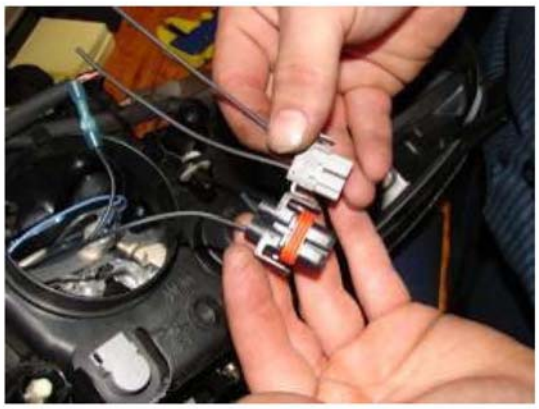
Remove Headlight Assembly

Remove headlamp according to VIDA:

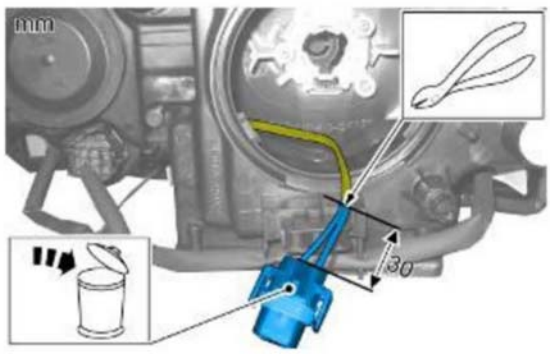
- Removal, replacement and installation
- 3 Electrical system
- 35 Lighting
- Lighting, front
- Headlight / bulb, replacing

Caution! The plastic lens on the headlight scratches easily. Do not place the headlight on a hard surface with the lens downwards. Original Replacements types Alignment slots Original Black type

For vehicles with two wire harness:

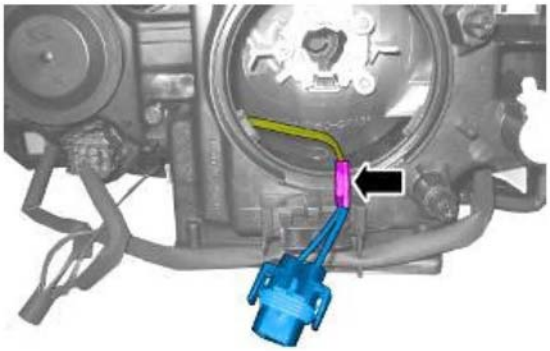


TIP: To simplify the process, cut and splice one wire at a time. Be aware of the physical location of the wire in the connector. Placing both original and replacement connectors next to each other, slot up and cutting and splicing the wires one at a time will ensure correct locations.



Cut off the original low beam headlight connector and up to 1 inch (30mm) of the replacement harness as shown here.

Discard the old connector.



Install the new connector; join the cables according to VIDA:

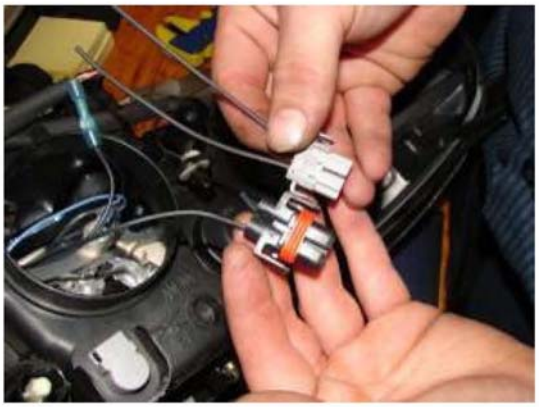
- Removal, replacement and installation
- 3 Electrical system
- 37 Cables and fuses
- Wiring
- Joining the cables

NOTE: These butt connectors are the heat-shrink type, be sure you heat shrink to install completely.

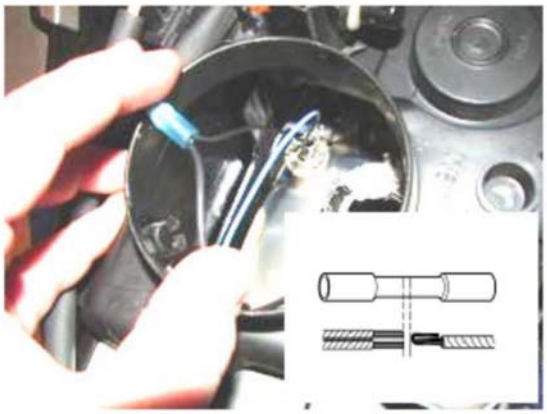
REMINDER: Replace the connector on both headlamps.

For vehicles with three wire harness:

IMPORTANT: For vehicles with three wires to the connector, as shown here, it is important that the wires are installed in their correct locations. Be sure when cutting and splicing that you follow the instructions below.



TIP: To simplify the process, cut and splice one wire at a time. Be aware of the physical location of the wire in the connector. Placing both original and replacement connectors next to each other, slot up and cutting and splicing the wires one at a time will ensure correct locations.



Cut off the original low beam headlight connector and up to 1 inch (30mm) of the replacement harness.

Discard the old connector.

Install the new connector; join the cables according to VIDA:

- Removal, replacement and installation
- 3 Electrical system
- 37 Cables and fuses
- Wiring
- Joining the cables

NOTE: T This picture shows the splicing of the two wires into one connector as shown in VIDA. Once this has been completed the replacement connector can be added as well.

These butt connectors are the heat-shrink type, be sure you heat shrink to install completely.

REMINDER: Replace the connector on both headlamps.

Reinstall Headlamp

Install the headlamp according to VIDA:

- Removal, replacement and installation
- 3 Electrical system
- 35 Lighting
- Lighting, front
- Headlight / bulb, replacing

Test the function.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
35208-2	Headlamp (x2) remove / install XC90	0.3 hrs
	XC70 (2005 -)	1.4 hrs
	S60, V70 (2005 -)	1.5 hrs
	S60, V70 w/ B5254T4 engine	1.9 hrs
99400-2	Connector low beam, replacement (both sides)	0.1 hrs

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **SMB39-004** Date: **090116**

Audio System - Stuck CDs in Audio System

GROUP:
39

NO:
004

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

TITLE:
Stuck CDs in Audio Units

ISSUING DEPARTMENT:
Warranty TMA

CAR MARKET:
United States, Canada

DATE:
01/16/2009

REFERENCE BULLETINS:
SMB 00-170

This SMB supersedes TNN 39-51 dated 04-16-2008 and RTJ 16506 issued 06-18-2008. Both will be deleted.

Description:

This document describes the process for returning audio units diagnosed with stuck CDs. Following are two basic procedures to use as applicable.

IMPORTANT:

IF A COMPACT DISC UNIT HAS BEEN DIAGNOSED WITH A DEFECT OTHER THAN STUCK CDs, PLEASE BE SURE TO EJECT THE CDs FROM THE UNIT WHILE IT IS STILL CONNECTED TO THE VEHICLE BEFORE RETURNING TO TMA OR YOUR LOCAL DC. PLEASE ENSURE THAT THE CD'S ARE PROMPTLY RETURNED TO THE CUSTOMER.

Procedure # 1: TMA WARRANTY RETURNS

For All Audio units that are requested to be returned to TMA for Testing and Analysis.

Compact Discs may get stuck in the CD-Changer drive. If this occurs, DO NOT ATTEMPT to remove them.

ATTENTION PARTS MANAGER

CUSTOMER CD RETURN FORM

For Audio Components Diagnosed with Stuck CDs

Please ensure all information is filled out and attach to the defective unit

Retailer Code _____

RO# _____

VIN _____

Part # _____

Contact Person _____

Phone _____

PLEASE FILL IN THE CUSTOMER'S SHIPPING ADDRESS BELOW

Customer Return
Shipping address _____

_____

_____

_____

IMPORTANT NOTE!
IT IS IMPORTANT THAT YOU INCLUDE THE CD RETURN FORM WITH THE DEFECTIVE UNIT.
IF THE CD RETURN FORM IS NOT INCLUDED WITH AN AUDIO UNIT DIAGNOSED WITH STUCK CDs, AND YOU DO NOT INCLUDE THE CUSTOMER'S RETURN ADDRESS, YOU WILL BE RESPONSIBLE FOR REIMBURSING THE CUSTOMER FOR THE COST OF THEIR CDs. VOLVO WILL ONLY OPEN AND REMOVE CDs FROM CHANGERS THAT ARE RETURNED WITH THE CD REMOVAL FORM.

Please fill out the CD Return Form shown completely and legibly.

The form must be visible inside the audio box.

IT IS MANDATORY THAT YOU OR THE CUSTOMER FILL IN THE CUSTOMER'S FULL NAME AND COMPLETE ADDRESS ON THE CD RETURN FORM.

Return the CD return form and the audio unit to TMA per established shipping instructions as detailed in SMB 00-170.

Upon removal, customer's CDs will be mailed to the Customer per the information on the CD Return Form within 2-3 weeks of receipt.

IMPORTANT NOTE!

IT IS IMPORTANT THAT YOU INCLUDE THE CD RETURN FORM WITH THE DEFECTIVE UNIT.

IF THE CD RETURN FORM IS NOT INCLUDED WITH AN AUDIO UNIT DIAGNOSED WITH STUCK CDs, AND YOU DO NOT INCLUDE THE CUSTOMER'S RETURN ADDRESS, YOU WILL BE RESPONSIBLE FOR REIMBURSING THE CUSTOMER FOR THEIR CDs. VOLVO WILL ONLY OPEN AND REMOVE CDs FROM CHANGERS THAT ARE RETURNED WITH THE CD REMOVAL FORM.

Note:
Audio units tampered with or opened, or damaged from foreign objects inserted into mechanism drives (e.g., coins, business cards or visibly evident peeling CD-R labels) will not be covered under warranty.

IMPORTANT

Please wait for the TMA Parts Return Request before returning these units.
Please ensure that all TMA Warranty claims, TMA Warranty Core reports and the CD Form are included with the unit.

Procedure # 2:
STRAIGHT CORE RETURNS

For returning a non requested or non-warranty audio core unit to your local Distribution Center with a CD Changer diagnosed with stuck CDs.

Please fill out the attached CD Return Form completely and legibly.

The form must be visible inside the audio box.

IT IS MANDATORY THAT YOU OR THE CUSTOMER FILL IN THE CUSTOMER'S FULL NAME AND COMPLETE ADDRESS ON THE CD RETURN FORM.

Continue to include all applicable Core Reports with the units. Return the unit to your local Distribution Center.

The local Distribution Center will process the units and forward the units to the refurbishment facility. CDs will be removed by the refurbishment facility. The CDs will be returned to the customer per the information on the CD Return Form. This process may require more than 3 weeks, depending upon the audio unit type and the refurbishment facility.

In order for this process to be successful, the CD Return form must be filled out and visible inside of the audio box with the audio unit and the customer's name and complete address filled out.

IMPORTANT NOTE!

IT IS IMPORTANT THAT YOU INCLUDE THE CD RETURN FORM WITH THE DEFECTIVE UNIT.

IF THE CD RETURN FORM IS NOT INCLUDED WITH AN AUDIO UNIT DIAGNOSED WITH STUCK CDs, AND YOU DO NOT INCLUDE THE CUSTOMER'S RETURN ADDRESS, YOU WILL BE RESPONSIBLE FOR REIMBURSING THE CUSTOMER FOR THE COST OF THEIR CDs. VOLVO WILL ONLY OPEN AND REMOVE CDs FROM CHANGERS THAT ARE RETURNED WITH THE CD REMOVAL FORM.

Note:
Audio units damaged from foreign objects inserted into mechanism drives (e.g., coins, business cards or visibly evident peeling CD-R labels) may result in a loss of core credit.

Technical Service Bulletin # **TJ16773** Date: **090123**

Transmission/Drivetrain - Lubricants And Fluids

Retailer Technical Journal 16773
Transmission and AWD lubricants
Date 1-23-2009

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES RTJ 16773, DATED 1-16-2009. A new manual transmission fluid has been added to page 2 and a note has been added to avoid confusion. PLEASE UPDATE YOUR FILES.

Models	Type	Model year	Chassis range
ALL	ALL	ALL	ALL

Application	Note	Part Number
• 5 and 6 Speed Automatic Transmissions -AW55 -TF80-SC This fluid is also recommended to address two complaints on the AW 50-42: •Harsh Lock-Up engagement/disengagement (SB 43-0029) •Squeaking noise during low speed turns (TNN 43-11)	JWS 3309 The only oil approved for the 5 and 6 speed automatic transmissions is JWS 3309. None of the other fluids available on the market have been evaluated by Volvo to meet the requirements of these specific transmissions regarding: shift quality, slipping lock-up functionality and transmission durability.	1161540 (1 liter) 1161640 (4 liter)
• 4 Speed Automatic Transmissions -GM4T65EV -AW50-42 -AW30-40/43 -AW70/71/72 -ZF22	Dexron IIIG or IIIH	1161621 (4 liter)
• 5 and 6 Speed Manual Transmissions -M56 -M66 • Chain Housing -XC90 T6	API GL-4, Synthetic This oil can be used in any M56 or M66 up to chassis numbers listed for BOT350 oil (below).	1161745 (1liter)
• 5 and 6 Speed Manual Transmissions -M56 -M66	Low friction oil: BOT 350 M3. API GL-4, SAE 75W This oil is backwards compatible to 1996, but the oil above can also be used before the chassis numbers below. Factory fill from 2008W46 (see model type and chassis below) is Castrol BOT 350 M3. S60 (384) chassis 732730- S40 (544) chassis 430001- C70 (542) chassis 350045- V50 (545) chassis 447003- C30 (533) chassis 120002-	31280771 (1 liter) 31280772 (4 liter)
• Angle Gears (All)	API GL-5, BOT	31259380 (1 liter)
• AOC (Active On-Demand Coupling)	Specific oil for the AWD clutch	30759648 (300 ml)
• Rear Differential (200/700/900 with optional limited slip)	API GL-5, with limited slip additive	1161619 (1 liter)
• Rear Differential (All Others)	API GL-5, low friction	1161620 (1 liter)
• Cleaning Manual Transmission Input Shafts	Sprayable mineral based grease	1161657 (200 ml)
• Lubricating Manual Transmission Input Shafts	Sprayable PFPE grease	30759651 (150 ml) 1161614 (200 ml)
• Lubricating AWD spline interface -splines between transmission and angle gear	Lithium grease with PAO base	1161748 (10 ml)

AFFECTED VEHICLES

Technical Service Bulletin # **TJ19624** Date: **081208**

Wheels/Tires - Vibration While Driving

Retailer Technical Journal 19624
Wheels and tires, vibration fault tracing

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Date 12-8-2008

Reference: VIDA

Note! If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

THIS DOCUMENT SUPERSEDES THE PREVIOUS VERSION OF RETAILER TECHNICAL JOURNAL 19624 DATED 10-6-2008. C70 and XC60 have been added.

Model	Type	Model year
C30	533	2007-
S40	544	2004-
V50	545	2005-
C70	542	2006-
S80	184	-2006
S60	384	2001-
S60R	384	2004-
V70	285	2001-2007
V70R	285	2004-
V70 XC / XC70	295	2001-2007
XC90	275	2003-
S80	124	2007-
V70	135	2008-
XC70	136	2008-
XC60	156	2010-
C70	872	1998-2005
C70	873	1998-2002

AFFECTED VEHICLES:

DESCRIPTION:

This fault tracing is based on the vehicle having Volvo original rims, hub caps, as well as Volvo recommended tire types.

This document presents fault tracing of vibrations that are connected to the vehicle's speed. The suggested method in this bulletin only applies to vibrations that are connected to wheels and tires. Some vibrations that are generated by the driveline can be mixed up with vibrations connected to wheels and tires. This document is used to differentiate between wheel vibrations and the driveline/chassis vibrations.

SERVICE
Test driving the vehicle, fill in the fault tracing card together with the customer and allow the customer to drive if possible. Use the check list to identify the origin of the problem.

Safety precautions:

All corrective action requires the safety precautions to be followed, which prevent damage to materials and people. The test drives described in this document must be carried out with regard to the local, state, and federal road & traffic regulations.

Possible sources of imbalance

Hub caps

^ Foreign object on or inside the hub caps (dirt, snow, asphalt, etc)
^ Damaged hub caps

Rims

^ Foreign object on or inside the rim (dirt, snow, asphalt, etc)
^ Deformed rim
^ Not Volvo original rims
^ Tightness of the wheel

Tires

^ Tire pressure
^ General status of tire wear, out-of-round etc
^ Volvo recommended tire types not used

The vibrations may come from a manufacturing defect in the tire's internal structure. This fault is not visible. To find this, a test drive must be performed.

Note! In the event of structure problems with tires, large balancing weights on the rim are often found from a previous attempt to eliminate a vibration.

Note! In the event of too high tire pressure, the vehicle feels jerky and can cause vibrations.

Note! The brakes are a source that can affect the analysis of the wheel balance. Ensure that all brakes work correctly.

Wheel imbalance is connected to the vehicle's speed* Speed +/- 3 MPH (+/- 5 km/h)		
VEHICLE	**SPEED (MPH)**	**SPEED (km/h)**
C30	68 – 75	110 – 120
S40	56 – 59	90 – 95
V50	75	120
S80 (07-)	65	105
S80 (-06)	68 – 71	110 – 115
S60	56 – 62	90 – 110
S60R	68 – 71	110 – 115
V70 (00-08)	75	120
V70 (08-)	59 – 65	95 – 105
V70R(01-07)	71 – 75	115 – 120
XC70(08-)	65 – 68	105 – 110
XC70(-07)	62 – 84	100 – 135
XC90	81 – 90	130 – 145
C70 (06-)	62 – 71	100 – 115
C70(-05)	71 - 75	115 – 120
XC60	65 - 68	105 - 110

Start from the remarks of the customer, regarding the type of fault (see the fault tracing card that the customer filled in). If possible, confirm during a recreation of the fault, e.g. the speed at which the vibrations occur (as near as possible). Compare the speed with the one in the table.

*NOTE: Observe all traffic rules including local speed limits and drive safely. The driver is responsible for safety at all times.

The table above shows the values that are directly connected to wheel imbalance. If the vibration or imbalance occurs at about half the indicated speeds, the wheel is probably defective or damaged.

Remarks regarding the Wheel imbalance table.

FAULT TRACING CARD - for fault tracing vibrations caused by wheels/tires

Date: _____

Vehicle type: _____

Chassis number: _____

When did the vibrations start?

Time, odometer reading, workshop visit or other event:
_____

Connected to speed?

YES / NO, don't know.

Occurred at: _____km/h, or between _____and_____km/h,

Other remarks: _____

_____
_____

_____
_____

Fault found:
_____

_____
_____

Performed adjustments:
_____

_____
__

If the customer has not indicated a speed, but the vehicle is included in the table, perform a test drive and fill in the fault tracing card.

THE FOLLOWING ARE JUST EXAMPLES FOR YOUR REFERENCE:

EXAMPLE 1 - Describes imbalance Customers with a C30 complain about vibrations at 110 km/h (68 MPH). This speed corresponds directly to the speed in the table for wheel imbalance and must be rectified.

EXAMPLE 2 - Describes probable defective/damaged wheel or tire Customers with a C30 complain about vibrations at about 55 km/h (34 MPH). This speed corresponds directly to half of the speed in the table for wheel imbalance and must be rectified.

TEST

Note! Perform test drives according to Road traffic regulations.

TEST 1 - Test drive to characterize any faults

1. Recreate the fault by performing a test drive. Check that the vibrations are connected to the vehicle speed.
2. Note within what speed range the vibrations occur and the speed for the highest vibration stop.
3. Read off the speeds that correspond to imbalance according to the.

ACTIONS

Checking for damage Wheel sides

Check:

- that no foreign objects are on or inside the hub caps (dirt, snow, asphalt etc)
- that the wheels sides are intact.

RIMS

Check:

- that no foreign objects are inside or on the outside of the rims (dirt, snow, asphalt etc)
- that the rims are not deformed
- rim type (Volvo rims are used?)
- tightness of the wheel.

TIRES

Check:

- tire pressure (follow the recommended air pressure values in the vehicle's user manual)
- general status of the tires, wear etc.
- tire type (are Volvo recommended tire types).

Check the vehicle's wheel balance. Perform wheel balancing on all 4 wheels and test drive again.

If the imbalance remains, replace all the vehicle's wheels with reference wheels and test drive again.

Reference wheels:
Wheels available at the workshop for checking purposes. Rims and tires must meet all requirements regarding roundness, balance and force vibrations. This wheels must be tested on a similar vehicle and must not cause any vibrations.

Alternatively, the workshop borrows four wheels from a problem free vehicle.

If the vehicle is now OK, replace one wheel at a time until the faulty wheel can identified.

If the vehicle no longer seems to have a wheel imbalance, but some form of vibration remains, during the test drive disengage/engage neutral and note any changes.

If changes occur, the fault source may trace back to other rotating parts in the driveline.

FAULT TRACING CARD
Technical Service Bulletin # **TJ304** Date: **090105**

Body - Front/Rear Door Weatherstrips Come Loose

Retailer Technical Journal 304
Door primary seal adhesion

Date 1-5-2009

Reference: n/a

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Out of Production Models*	Type	Model year	Chassis range
S80	184	2001 - 2006	213267 -
V70 *(plant 21)*	285	2001 - 2007	135739 -
V70 *(plant 22)*	285	2001 - 2007	130165 -
XC70	295	2001 - 2007	043667 -
Current Production Models*	**Type**	**Model year**	**Chassis range**
S60	384	2001 -	086593 -
S80	124	2007 -	000001 -
V70	135	2008 -	000001 -
XC70	136	2008 -	000001 -
XC90	275	2003 -	000001 -

* At the time of this writing

AFFECTED VEHICLES:

DESCRIPTION:
We have discovered that in some cases the adhesion of the primary door
seal may deteriorate over time. If the customer has reported this condition, do not replace the door seal, see the instructions for how to correctly reinstall.

IMPORTANT NOTE:
The method / material currently listed in VIDA are incorrect.

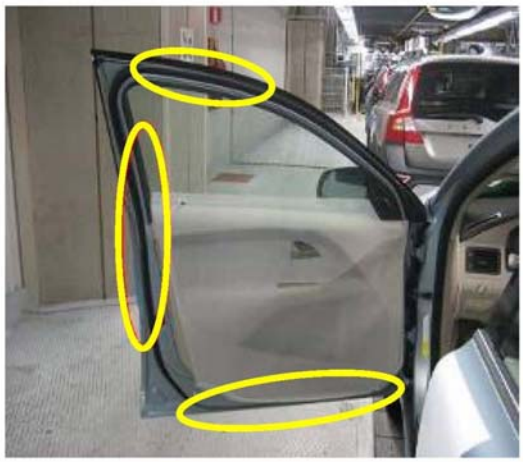
Description	Quantity	Part Number
Glue	shop supply	1161519

MATERIAL:

SERVICE: Reinstall the door seal as described on the following pages.
- identify the position of the loosened primary seal.
- carefully fold the primary seal so the surface to be glued becomes accessible.
- apply a small amount of glue.
- push the primary seal back in the original position, and hold it for 60 seconds.

NOTE:
Use a limited amount of glue in order to avoid spilling. Spilled glue needs to be removed immediately!

NOTE:
The areas of concern are shown in these pictures and would apply to any of the vehicle types affected.



Pictured here are areas of a front door that the seal may become unglued.

Pictured here are areas of a rear door that the seal may become unglued.

If the adhesive has failed the seal will look similar to these shown.

To reinstall; gently pull and twist the seal to apply the glue (PN 1161519) to the back of the seal. Be sure to cover as much of the loose area as possible.

Quickly reposition the seal and hold for 60 seconds.

NOTE:
Use a limited amount of glue in order to avoid spilling. Spilled glue needs to be removed immediately!!

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
99400-2	Sealing strip side doors check (check all doors)	0.1 hrs
99585-2	Sealing side door re-gluing (1X per door)	0.1 hrs

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TJ21232** Date: **090727**

Blind Spot Information Sys.(BLIS) - Function/Diag. Guide

RETAILER TECHNICAL JOURNAL 21232
BLIS Functionally and Diagnostic Guide

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

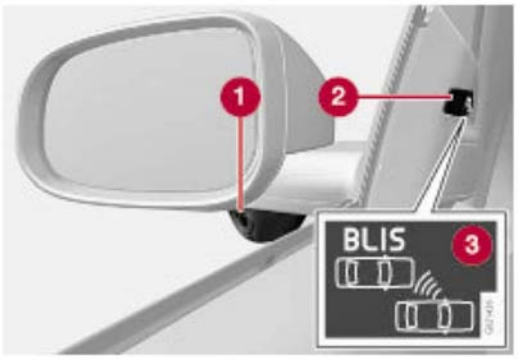
Date: 7-27-2009

Reference: VIDA, TIE

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

This document is applicable to all Vehicles equipped with the Blind Spot Information System (BLIS).



1 = BLIS camera
2 = BLIS indicator (LED)
3 = BLIS symbol

BLIS is an information system that's designed to alert the driver of another vehicle possibly in the "blind spot". BLIS is intended mainly as a driver aid for dense traffic on multi-lane highway driving. When another vehicle enters the detection area, such as the BLIS equipped vehicle is passing or being passed by another, the driver will get a continuous light from one of the two indicators (LED's) while an object is being detected. The purpose of this indication is to alert the driver of the possibility of another vehicle in the detection area and for them to check prior to taking action.

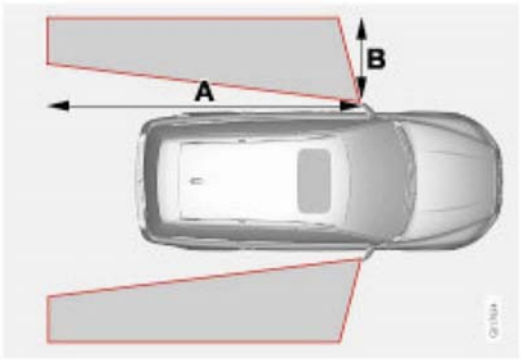
System limitations:

- BLIS does not work in sharp curves.
- BLIS does not function when the vehicle is backing up
- If you are towing a wide trailer, this may prevent the BLIS cameras from detecting other vehicles in adjacent lanes.
- BLIS does not react to cyclists or mopeds.
- BLIS is designed to alert the driver of vehicles driving alongside going in the same direction.
- The BLIS cameras have the same limitations as the human eye. In other words, their "vision is impaired" by adverse weather conditions such as heavy snowfall/rain, dense fog, etc.

Functional description

Detection area

The picture below shows the critical area that may not be seen in the outer rear view mirrors which also is the area where BLIS, is designed to at minimum, detect other vehicles.



A = approximately 31 ft. (9,5 m)
B = approximately 10 ft. (3,0 m)

Day/Night mode

In daylight the system reacts to the shape of the surrounding vehicles. The system is designed to help detect motor vehicles such as cars, trucks, buses and motorcycles.

In darkness the system reacts to the headlamps of surrounding vehicles. If the headlamps of surrounding vehicles are not switched on then the system does not detect the vehicles. This means for example that the system does not react to a trailer without headlamps which is towed behind another vehicle

When is BLIS operational

The system is "default on" (set to be on each time the vehicle is started). At vehicle speeds of 6 mph (10 km/h) and above the system will indicate another vehicle in the blind spot.

The system is designed to indicate another vehicle in the blind spot if:

- you pass another vehicle at a speed of up to 6 mph (10 km/h) faster than the other vehicle.
- another vehicle passes you travelling up to 43 mph (70 km/h) faster than you are travelling.

It is possible to stop the BLIS indications to the driver by selecting the "BLIS OFF/ON button".

When BLIS "OFF" is selected the LED in the button goes out and a text message is shown on the Driver Information Module (DIM).

IMPORTANT NOTE: this only turns off the communication to the driver, the system is still be operating in the background.

If there is a need to reset the system you need to turn the engine off and restart.

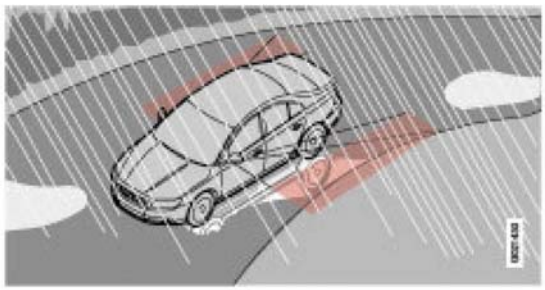
Technical description

BLIS is a camera based system; the camera's take 25 pictures per second and compares them to a pre-determined algorithm (step-by-step problem-solving procedure) based on picture size/shape and delta (changes in) velocity.

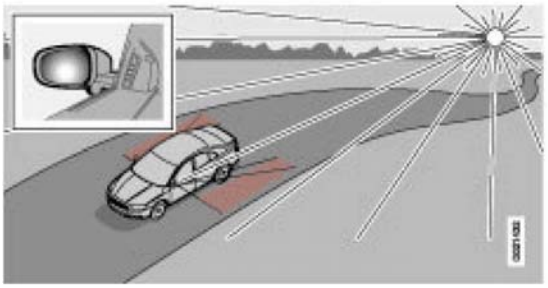
False indications

The system detection algorithm is designed to read sharp contoured shapes that are in the detection area (cars, busses, trucks, motorcycles). Light reflections and shadows can trigger warnings since the camera can't always distinguish these from real objects. Advise the customer the system is operating as intended. Inform the customer why and how the continuous light from one of the two indicators (LED's) is present and that BLIS is an information system.

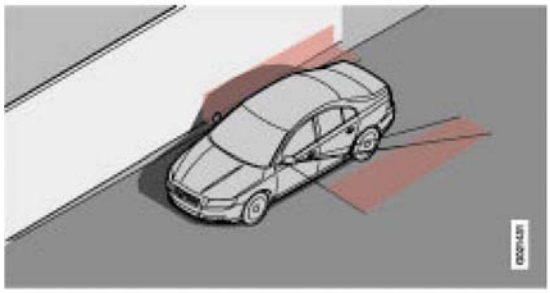
Here are some examples of situations where the BLIS indicator lamp may illuminate even if there is no other vehicle within the blind spot.



Reflections from shiny wet road surface or puddle.



Low sun shining into the camera.



Own shadow on large light smooth surface, e.g. noise barrier or concrete road surface.

Decreased system functionality / Messages in DIM

The BLIS system has a self diagnostic system to inform the driver about potential decreased system functionality. The diagnostic system software (SW) is included in the camera module units and the LH - RH cameras operate independently of each other. If either one of the camera's meet the criteria for decreased functionality the driver will be informed via flashing LED indicators and/or DIM message.

In addition to the "OFF/ON" indications there are three possible DIM messages to the driver:

1. BLIS Reduced function

This message informs the driver that the light conditions for either of the cameras is reduced and that the camera may not detect all objects due to low contrast conditions. The camera resets itself when the environment has returned to "normal". The "counters" in the diagnostic algorithms are reset to zero automatically when the light conditions are back to normal or an object with the headlamps on (night mode) is entering the BLIS detection area. The DIM message is removed automatically. Each of the cameras will continuously monitor the images and reset themselves when considered normal.

Examples of conditions that may give "Reduced function" message in DIM:

1. During dusk/dawn due to low light (most common cause of "reduced function").

2. Driving in complete darkness for longer than 10 minutes (safety reason since the cameras can not decide whether they are blocked or that there is no objects to detect).

3. Heavy rain or snow due to low light

4. Moisture on the Lens

5. Thin layer of dirt caused by dust, salt, etc

6. Strong light that saturates the image in a way that objects can not be recognized

What to do?

- Verify outside conditions noting amount of sunlight, weather, driving direction (North, South, East, West), time of day.

- Ensure the lens is clean: Clean with a soft cloth or a damp sponge. Clean the lenses carefully so that they are not scratched.

- Check the function of the lens defroster: The heater is active in temperatures below 82°F (28°C). You should be able to feel the heater with your finger; the area around the chrome ring/lens should be "warm to the touch", or use ice spray (PN 1161731) spray on the lens and see if the ice melts.

If the system does not reset, turn the engine off and restart.

AGAIN NOTE! The BLIS system will not be reset by selecting the OFF/ON button. This will only stop/start the LED indication to the driver. The

system will still work under the same conditions in the background.

Inform the customer that the system is OK. The message is to inform the driver of the actual status of the system in the current driving conditions.

2. Camera blocked

When the camera has been reporting "Reduced function" in excess of 10 minutes without change the system shifts over to the "Camera Blocked" message in the DIM, and will be displayed together with a constant flashing from the BLIS LED's. This is the BLIS systems way to inform the driver that the BLIS system can't work under the current driving conditions.

Examples of conditions that may give Camera Blocked message in DIM

- During dawn / dusk - Low sun, it's dark on one side of the car and bright on the other.
- Heavy rain or snow - The camera gets blocked.
- Moisture on the Lens

What to do?

- Verify outside conditions noting amount of sunlight, weather, driving direction (North, South, East, West), time of day.
- Ensure the lens is clean - Clean with a soft cloth or a damp sponge. Clean the lenses carefully so that they are not scratched.
- Check the function of the lens defroster: The heater is active in temperatures below 82°F (28°C). You should be able to feel the heater with your finger; the area around the chrome ring/lens should be "warm to the touch", or use ice spray (PN 1161731) spray on the lens and see if the ice melts.

If the system does not reset, turn the engine off and restart.

AGAIN NOTE! The BLIS system will not be reset by selecting the OFF/ON button. This will only stop/start the LED indication to the driver. The system will still work under the same conditions in the background.

Inform the customer that the system is OK. The message is to inform the driver of the actual status of the system in the current driving conditions.

3. BLIS Service Required

"BLIS Service Required" message in the DIM informs the driver that there can be an internal failure within the system. i.e. communication internally within the camera, between the cameras and car communication system or a short circuit of one of the indicator LED's. This means that there is a risk that the camera may not correctly identify another vehicle in the detection area or being able to inform the driver.

What to do?

- Check the function of the lens defroster: The heater is active in temperatures below 82°F (28°C). You should be able to feel the heater with your finger; the area around the chrome ring/lens should be "warm to the touch", or use ice spray (PN 1161731) spray on the lens and see if the ice melts.
- Check for any relevant Retailer Technical Journals and follow the instructions
- Read out fault codes and consult the CSC symptom based fault tracing in VIDA; take appropriate action.
- Reset the system and see if the message returns, if the message returns; replace the mirror.

Technical Service Bulletin # **TJ21507** Date: **090930**

Engine - Pressure Washing Precautions

Retailer Technical Journal 21507
Pressure washing engines

Date 09-30-2009

Reference: VIDA

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Model	Type	Model year	Chassis range
ALL	ALL	ALL	ALL

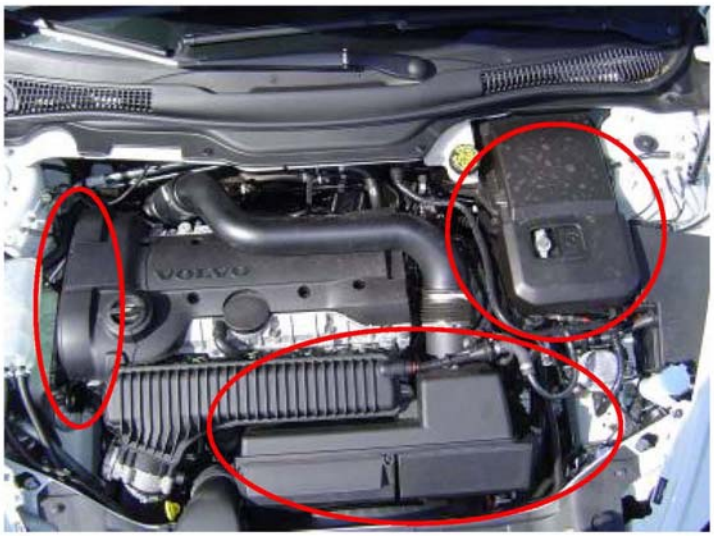
AFFECTED VEHICLES:

DESCRIPTION:
VCNA suggests that in general engines and engine compartments not be washed with high pressure water due to the following points:

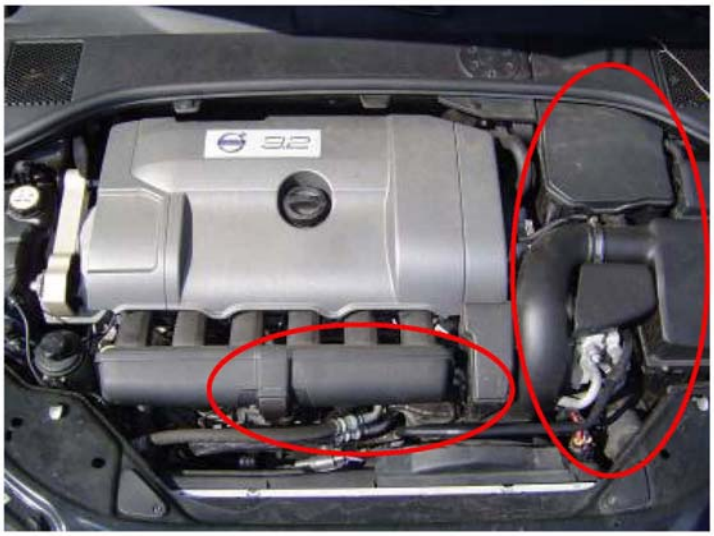
- Increased amount of electronic equipment installed in the compartment.
- Run off water could be contaminated with toxic fluids if there are leaks present.

The components are protected from road water spray with various devices such as the lower splash shield and weather proof seals on the protective covers, but are not designed to prevent high pressure water from getting in.

The areas circled are very sensitive to direct water pressure and should be avoided.



5 Cylinder



S16Technical Service Bulletin # **TJ22103** Date: **091223**

Drivetrain - Rear Differential Leaking And Resealing

22103

Rear differential housing, Leakage and resealing

Date 12-23-2009

Reference: VIDA, VSTG

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Model	Type	Model year	Chassis range
XC90	275	2003 –	ALL
V70	285	2001 – 2007	ALL
V70 XC / XC70	295	2001 – 2007	ALL
S60	384	2001 –	ALL
S40	544	2004 –	ALL
V50	545	2005 –	ALL

AFFECTED VEHICLES

DESCRIPTION:

Oil leakage/moisture from the rear differential housing halves can be resolved by resealing the housing and replacing the seals. The rear differential itself does not normally need to be replaced.

Description	Quantity	Part No.
Drill	1	9814112

TOOLS

Description	Quantity	Part No.
Cleaning agent	0.3	1161721*
Gasket remover	0.1	1161847
Abrasive cloth	0.1	9511024
Chemical gasket	0.1	1161771
Rear axle oil	1	1161620
Gasket	1	11998
Drive shaft seal	1	8653928
Filter (applies to S40/V50)	1	30681138 **

* Part of the standard for Consumables/Chemicals

** As necessary

MATERIALS

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
99707-2	Final drive sealing of parting flange acc. to TJ 22103	
		S40/V50: 4.9 hrs
		S60/V70/XC70/V70 XC: 4.6 hrs
		XC90: 4.7 hrs

-Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01
-Labor times are valid at the time of release and are subject to change.

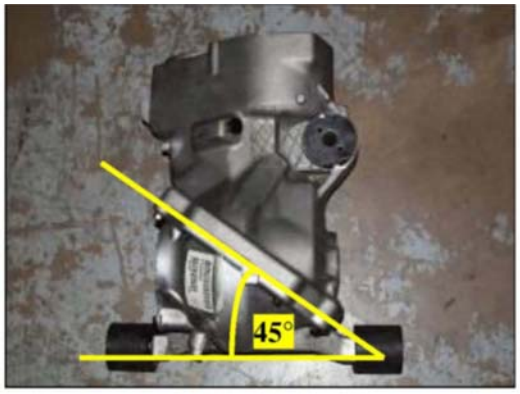
WARRANTY CLAIM INFORMATION

Service

If the leak is confirmed to be coming from the rear differential housing halves, separate and reseal the rear differential housing according to the following procedure in conjunction with the removal and replacement procedures in VIDA.

1. **Note!** Some variation in the illustrations may occur, but the essential information is always correct.

Final drive, removal



2. This method applies to all final drives with a 45° mating flange.

Remove the final drive from the vehicle according to VIDA:

INFORMATION

REPAIR

Removal, replacement and installation

Power transmission

Rear axle, drive shafts

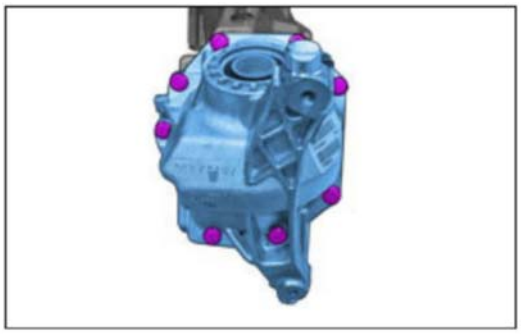
Final drive

Drain the oil from the final drive.

General (applies to all models)

3. **Warning!** Use protective eyewear.

Clean the final drive using isoproponal PN 1161721 around the mating flange.



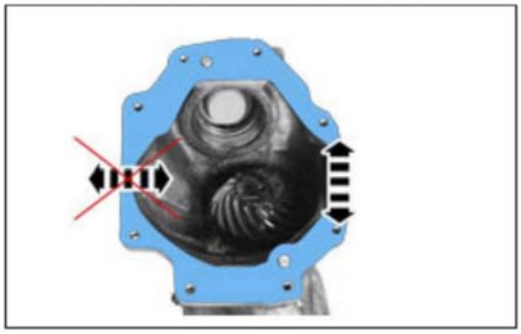
Blow clean with compressed air.

Remove:

- The screws, quantity (qty) 8 or 9, depending on model.

Final drive, cleaning

4. Clean the oil from the flange using isoproponal PN 1161721.



Clean all gasket material from the flange using gasket remover PN 1161847 and abrasive cloth PN 9511024.

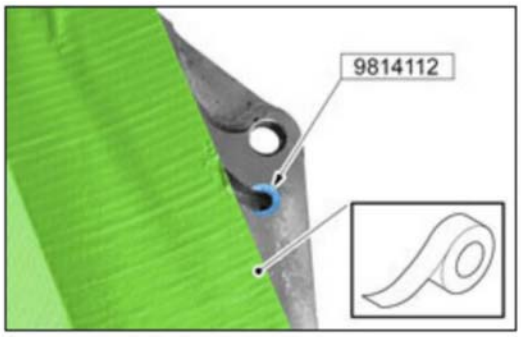
Note!

Use the abrasive cloth along the flange as the arrows indicate.

Clean the flange using isoproponal PN 1161721.

Caution!

Ensure that gasket residue does not end up in the final drive.

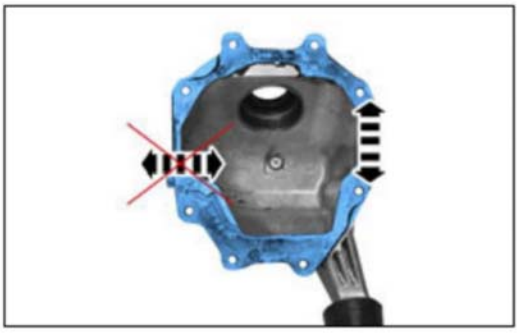


5. Cover the opening in the case with masking tape.

Countersink the surface at the bleed hole to prevent the hole from becoming blocked by sealing compound. Use special tool 9814112.

Check that the hole is open with 1 mm (approx 1/32") welding rod or similar.

Cover, cleaning



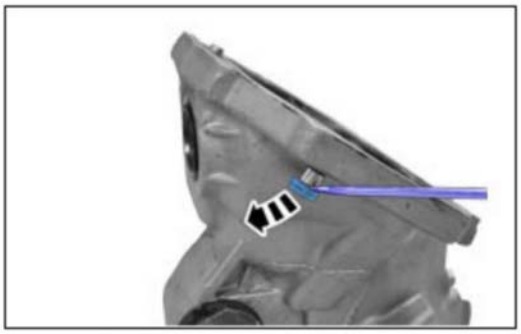
6. Clean the oil from the flange using isoproponal PN 1161721.

Clean all gasket material from the flange using gasket remover PN 1161847 and abrasive cloth PN 9511024.

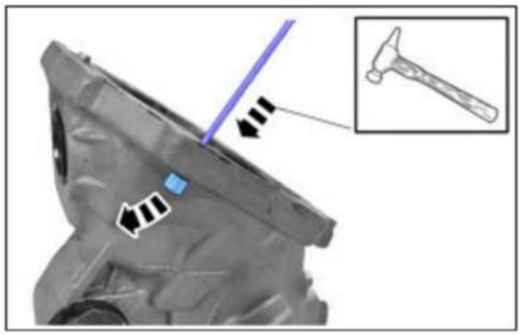
Note!

Use the abrasive cloth along the flange as the arrows indicate.

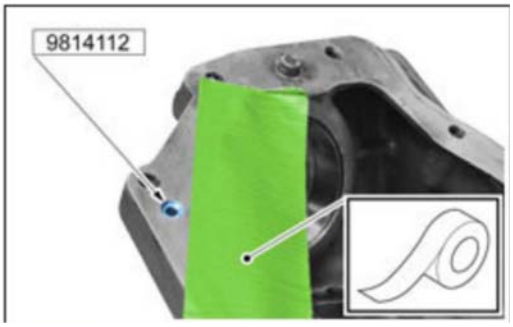
Steps 7-9 apply only to S40/V50



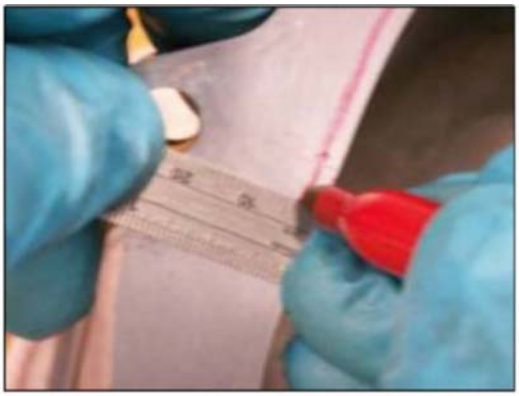
7. Remove the filter on the bleed nipple.



8. Remove the bleed nipple. Use a mandrel and a hammer.



9. Countersink the surface at the bleed hole to prevent the hole from becoming blocked by sealing compound. Use special tool 9814112.



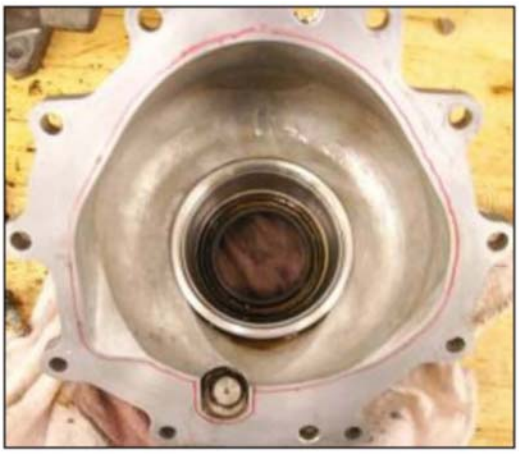
10. Measure 3 mm (approx 1/8") from the inside of the flange and make a line with a permanent marker.

Note!

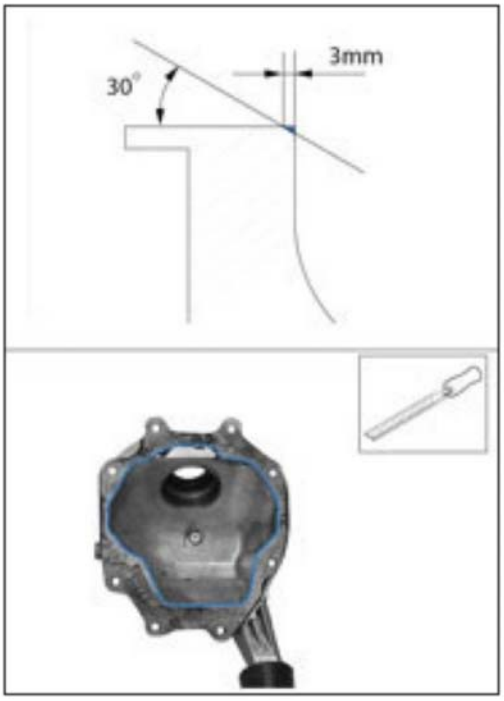
This procedure can be made easier by making a template which can be reused for several repairs.

Note!

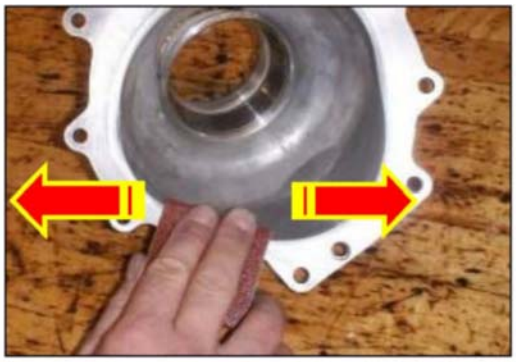
General illustrations were used for steps 10, 11, and 12, but the method is the same.



11. **Caution!** Care must be taken to avoid damage to the bearing race while filing. A coffee cup can be used to cover the bearing race.



12. File off the inner edge of the cover as illustrated, approx. 3 mm (approx 1/8").

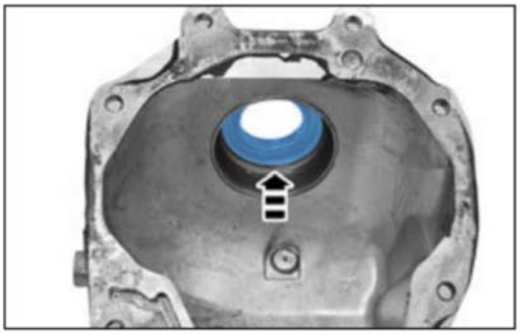


After filing, polish the chamfer using a fine emery cloth so that scoring in the chamfer goes along the chamfered edge.

Note!

Use the emery cloth radially, along the flange just as the arrows indicate.

The finished product should look like this.



13. Remove the seal.

Warning!

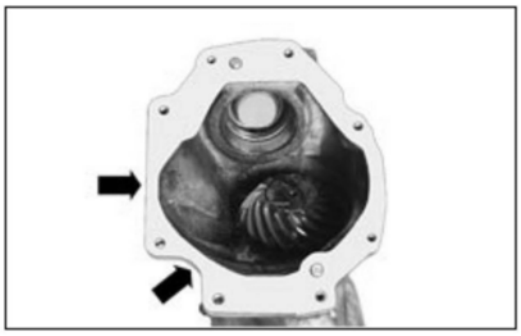
Use protective eyewear.

Clean the cover and blow clean using compressed air.

Note!

Ensure that there are no metal filings in the cover.

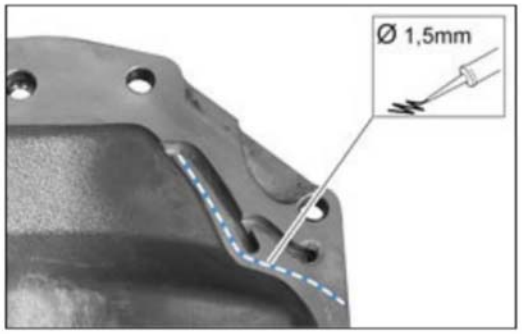
S40/V50 only: Install the bleed nipple and filter.



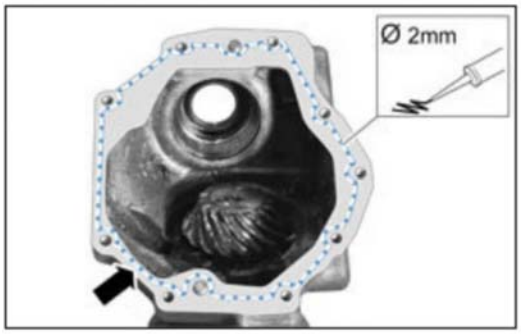
14. The mating surface between the cover and the final drive housing is narrow at certain places.

There are 2 critical areas, see the arrows. It is important that the sealant bead is applied correctly at these locations.

Apply a short bead of sealing compound at these locations only and install the cover. Remove the cover and check that the bead is not outside the cover's mating surface. Wipe away the sealing compound and clean using isoproponal PN 1161721.



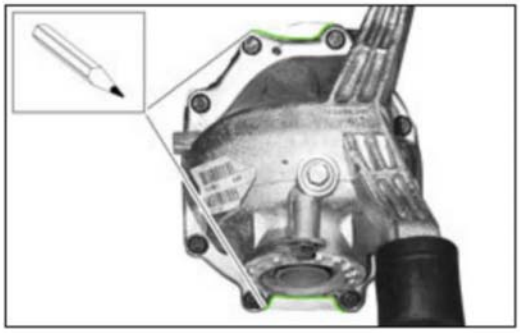
15. Applies to covers on all vehicles: Apply a 1.5 mm (approx 1/16") bead of sealing compound to the cover.



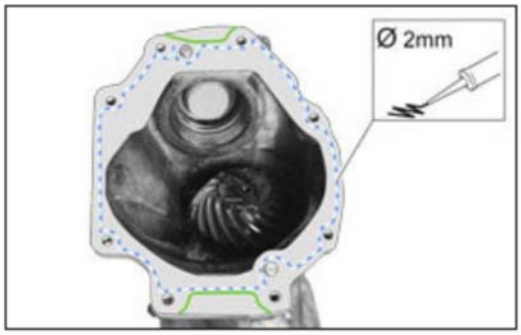
16. **Applies to XC90:** Apply a bead of 2.0mm (approx 5/64") sealing compound as illustrated.

Note!

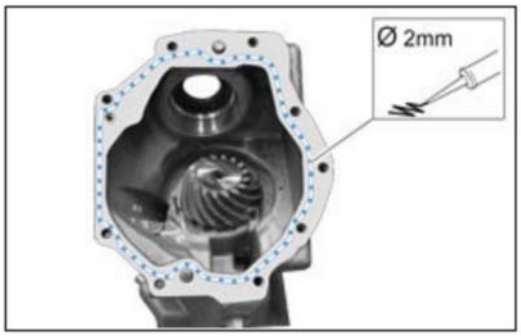
Note where the bead is to be applied at the arrow.



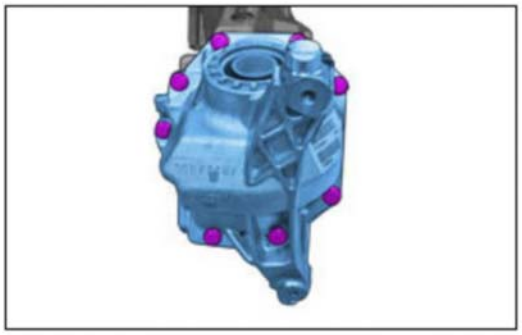
17. Steps 17 and 18 apply to XC70/V70/S60: Mark up the mating surface for the cover using a marker pen.



18. Apply a bead of 2.0mm (approx 5/64") sealing compound as illustrated.



19. **Applies to S40/V50:** Apply a bead of 2.0mm (approx 5/64") sealing compound as illustrated.



20. **Applies to all vehicles:** Request the assistance of a colleague to align the differential housing and install the cover.

Tightening torque, 29 Nm (21.4 lbf-ft).

Seal ring, installation

21. Install a new seal ring (removed in step 13) according to VIDA:

INFORMATION

REPAIR

Removal, replacement and installation

Power transmission

Rear axle, drive shafts

Drive shaft

Oil, filling

22. Fill with oil according to VIDA:

For oil filling, see:

Removal, replacement and installation

INFORMATION

REPAIR

Power transmission

Rear axle, drive shafts

Center differential

Final drive, replacing

Final drive, installation

23. Install the final drive according to VIDA:

INFORMATION

REPAIR

Removal, replacement and installation

Power transmission

Rear axle, drive shafts

Center differential

A/T - Cooler/Line Flushing Information

Retailer Technical Journal 19495
Automatic transmission
cooler/lines flushing

Date 09-11-2009

Reference: VIDA, VSTG, RTJ 16724

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS RTJ SUPERSEDES THE PREVIOUS VERSION OF RTJ 19495 RELEASED 10-8-2008. A LABOR OPERATION HAS BEEN REMOVED. THE DESCRIPTION OF BURNT OIL HAS BEEN EDITED. PLEASE UPDATE YOUR FILES.

Model	Type	Model year	Chassis range
ALL	ALL	ALL	ALL

AFFECTED VEHICLES:

DESCRIPTION:

The purpose of this RTJ is to work as a guideline for technicians when an automatic transmission is being replaced. In order for modern automatic transmissions to properly adapt to transmission wear while maintaining comfortable shift quality, the pressure control is closely monitored. For this reason, the automatic transmission fluid (ATF) must meet the transmission manufacturer's specifications.

A faulty transmission often has debris in the ATF, the coolers, the lines, and throughout the transmission. This debris must be properly flushed out before a new transmission is installed. Flushing the ATF using the transmission oil pump of the newly installed transmission will not suffice and can possibly cause damage to the new unit. Depending on the condition of the ATF, the transmission coolers and lines may need to be replaced. The information below is copied directly from VIDA.

SERVICE:

Once a transmission is properly diagnosed to be faulty and needs to be replaced, it is important that the proper procedures are followed for flushing out the used ATF from the ATF coolers and lines. Note that some vehicles have two coolers; the cooler in the side of the radiator and the auxiliary cooler.

When an automatic transmission is replaced, follow VIDA to reset adaptive memory. Simply disconnecting the TCM (Transmission Control Module) or power from the TCM does not reset adaptive memory!

On all vehicles, always flush the radiator, coolers, and lines before installing the new transmission. The guidelines and procedures for flushing vary with each model.

There is a procedure for flushing coolers and lines found in a hyperlink in the VIDA transmission/gearbox installation procedure called Transmission, preparations before installing for AW (Aisin Warner) 5- and 6- speed automatics and in the VIDA transmission replacement procedure for the AW 4-speed automatic.

The guidelines for flushing coolers on a GM 4T65 4-speed automatic are in VIDA/Information/Repair/Transmission, removing and there is a hyperlink in VIDA/Information/Repair/Transmission, installing for a flushing procedure called Oil cooler, flush cleaning. The guidelines for the 1999-2005 S80 will be updated to match the XC90.

More details about these guidelines can be found below.

On a GM 4T65 (2003-2005 XC90 T6 and 1999-2005 580 6-cyl), if there is:

^ glycol in the transmission fluid (refer to RTJ 16724 for more information on checking for glycol contamination), this would indicate an internal leak in the radiator requiring complete replacement of the ATF cooling system (radiator, auxiliary cooler [if applicable*], and cooler lines).

^ metal in the transmission fluid, this would indicate an internal transmission problem. **Note!** Metal in the ATF is nearly impossible to flush out completely. In order to be rid of all metal particles, complete replacement of the ATF cooling system (radiator, auxiliary cooler [if applicable*], and cooler lines) is required. See photo.

^ fine black sediment in the pan or on the pan magnet, this is normal. This can be flushed out according to VIDA. See photo.

^ dirty oil or burnt oil, this would indicate friction component (band or clutch disc) breakdown and in order to be sure all of the debris is out of the ATF cooling system, complete replacement of the ATF cooling system (radiator, auxiliary cooler [if applicable*], and cooler lines) is required. See photo.

***Note!** All 2003-2005 XC90 T6 vehicles have an auxiliary automatic transmission fluid cooler.

Labor operation code 49115 should be used when the ATF cooling system is flushed, not replaced.

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
49115	Oil cooler and piping clean	See VSTG

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TJ18299** Date: **091112**

Interior - Door Switch Buttons Cracking

Retailer Technical Journal 18299
DDM/PDM, Cracks on the switch surface

Date 11-12-2009

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Reference: VIDA repair instruction

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Model	Type	Model year	Chassis range
S80 (P2)	184	2005 - 2006	390000 - 446916
XC90 (P2)	275	2005 – 2008	134000 – 436241
V70 (P2)	285	2005 – 2008	459000 – 687719
XC70 (P2)	295	2005 – 2007	173000 – 288671
S60	384	2005 – 2008	425000 - 677840

AFFECTED VEHICLES:

PLEASE UPDATE YOUR FILES.

DESCRIPTION:

Cracks in buttons on DDM (Drivers door module), rear door switches and PDM (Passenger Door module) have been found on vehicles after 1-2 years, mostly in high humidity markets. The button is manufactured in several steps with different material layers. The material used in the button is required for good illumination properties, but has also low chemical resistance.

PRODUCT MODIFICATION:

After August 18, 2007 (date code 18/08/07) the melt temperature was increased to relieve residual stress in the button molding process.

SERVICE:

Replace the button according to the VIDA repair instruction. Group 36/other electrical equipment/Electrical connector/Window control switch button. There is one kit with 4 buttons P/N 31295247 and a single button with P/N 31295164.

Description	Quantity	Part No.
Repair kit (4 buttons)	As required	31295247
Repair kit (1button)	As required	31295164

Note: Use Volvo cleaning products such as P/N 1161721 Cleaner 1 liter or 9192678 cleaning agent / serviette fabric when cleaning the switches. The use of any other compound may damage the button surface.

MATERIALS:

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36074-2	Buttons control module front door replace	See VSTG

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATIONTechnical Service Bulletin # **TJ16629** Date: **091118**

Emissions - Improved EVAP Leak Detection Diagnostics

Retailer Technical Journal 16629

Leakage Detection Diagnostics

improvements to remedy DTC's

Date 11-18-2009

Reference: VIDA

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
This document supersedes the previous version of Retailer Technical Journal 16629 as well as all versions of TNN 28-74 released 11212008, 1210412007 1012212007, 812412007, 711312007, 61112007, 51112007, 51712007, 111212007 & 511512009.

Volvo Cars of North America is continuing its prior approval process for any claims submitted for the replacement of a Leakage Diagnostic Pump (LDP/DM-TL).

Claims for repairs including a Leakage Diagnostic Pump with a repair order date on or after May 15th 2009 require a Prior Approval Department authorization code. Authorization codes for leakage diagnostic pumps will only be available via the Prior Approval Dept., M-F 8:30 am - 6:00 pm Eastern Time. See below for details.

Prior Authorization is not required for customer pay replacement of the LDP.

Technicians who think they need to replace an LDP to make a repair, should contact the Prior Approval Dept before installing an LDP and have the information detailed below ready to discuss with the Prior Approval Department agent.

Model	Type	Model year	Chassis range
All	All	2003-2010	All

NOTE: Excluding body Type S40 (644) and V40 (645)

Vehicles:

All material referenced in this document must be followed before contacting the Prior Approval Department.

Retailer	Repair order #	Ro date	Model Type	
Model Year	**Last 6 of the VIN**	**Miles on vehicle**	**Latest ECM Software**	
			Yes	No
Technician name			**Technician phone number (required)**	
Email address to send authorization number (Required)			**What Version of VIDA?**	
Fault codes in ECM				
Result of leakage diagnostic test (be specific)				

Have the information completely filled out and ready to be discussed. A printed copy of the Quick Test and the DTC's frozen values should be on hand for reference.

DO NOT fax or email any documentation unless requested by the Prior Approval Department.

Description

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The diagnostic monitor for the evaporative emission system small leak from model year 2003 to present, has used a software function that calculates leakage based on a pressure inferred from the current consumed by an electric pump that pumps air into the fuel tank system. Our analysis has shown that the current consumption characteristic of the pumps electric motor which is part of the DM-TL (Diagnostic Mode-Tank Leakage) can change as the pump ages. This can cause a small leak to be falsely detected and the Malfunction Indicator Lamp (Check Engine Light) to illuminate with one of the following DTCs: ECM - 4308, ECM - 434C or ECM - P044200.

Solution

A new functionality has been developed which uses a new method to accurately diagnose the leakage status of the tank system, independent of any fluctuations or aging in the DMTL or other components. This new method calculates the pressure in the tank and the mass air flow through the fixed displacement pump and uses these values together with the common gas law to make an accurate calculation of the actual leak size.

Service:

The quick test won't work properly unless the improved ECM software is installed. Therefore, the first step with the new quick test is to check if the ECM software includes the improved leakage detection functionality software.

Note:
All model year 2009 and UD vehicles have the improved functionality from production.

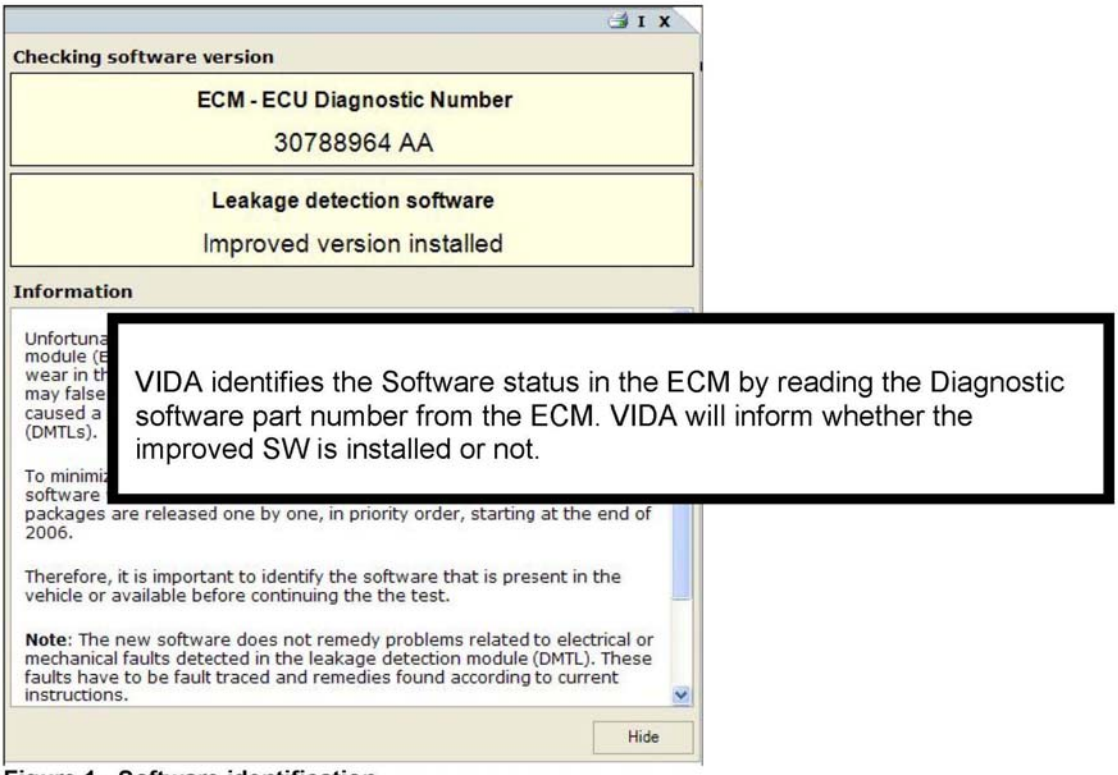


Figure 1 - Software identification

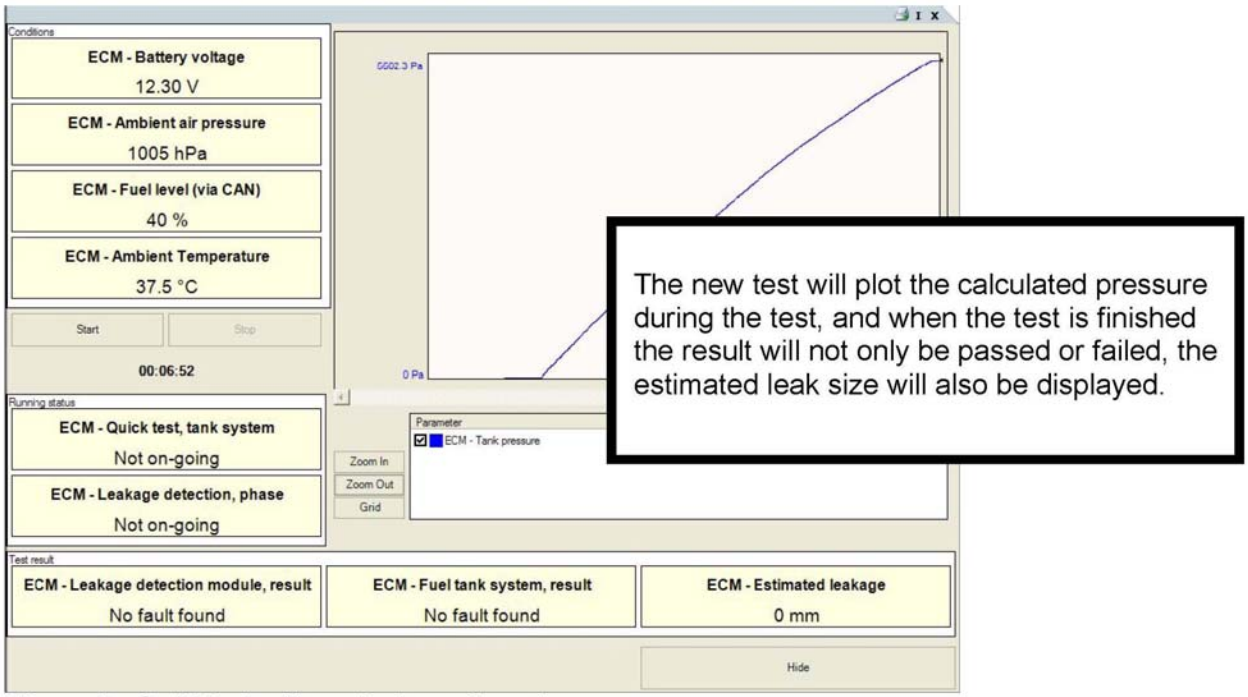


Figure 2 - Swift test with no leakage found

Important Note!

After an ECM upgrade VIDA will correctly identify the improved software is installed, but in order for the correct diagnostic database to be used, VIDA will need to read out the part numbers from the control modules again. Reading out the control modules can be best achieved by clicking the "UPDATE" button under the Network tab and must be done before the quick test is attempted. The test will display confusing and conflicting data in its output windows if VIDA uses the wrong diagnostic database.

Important Note:

The engine must NOT be running even though the old test in some cases advises so. The Midtronics Constant Voltage power supply PSC-550 (Tech Journal # 16405) should be used to maintain the battery voltage during the test, because in the most extreme cases the test could take up to 15 minutes to complete.

This is not a parts restriction process. Parts availability questions should be directed to the Parts Retailer Services Department.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	SOFTWARE DOWNLOAD	See VSTG

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

WARRANTY CLAIM INFORMATION

Technical Service Bulletin # **TJ21291** Date: **090924**

Global Positioning - Erratic Garmin(R) 765 Operation

Retailer Technical Journal 21291
Garmin(R) 765 power issue and SW updates

Date 09-24-2009

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

This Document was created as information only. SW updates to the Garmin accessory units are to be performed by the Customer.

AFFECTED VEHICLES:
All vehicles with accessory installed Garmin 765 portable navigation unit

DESCRIPTION:
It has been brought to our attention that there is a bug in the Garmin 765 Software.

If the Garmin 765 displays the message "Updating GPS firmware" or "GPS Update Complete" and will no longer power on when plugged into a computer, a home charger or a car charger, the Garmin unit will require replacement to correct this issue.

PLEASE NOTE:
If your unit will power on when using battery power, or when plugged into a computer, a home charger or a car charger, a software update is now available to correct this issue. Please use Garmin's WebUpdater program to install this update onto your Garmin 765.

PRODUCT MODIFICATION:
The SW is being upgraded in the units at parts stock.

SERVICE: There are 2 Service scenarios:

1) The unit displays a message "Updating GPS firmware" or "GPS Update Complete" and will no longer power on when plugged into a computer, a home charger or a car charger. In this case, the unit must be sent to Garmin for servicing.

2) THE UNITS CAN BE SAVED if the customer loads new software to the units before the message "Updating GPS firmware" or "GPS Update Complete" is displayed.

This can be done by visiting: https://buy.garmin.com/shop/store/downloadsUpdates.jsp?product=010-00715-70&cID=134&pID=14926

Follow the directions on the website. This upgrade is free of charge.

Mandatory Software Update

Today, Garmin released a free, mandatory GPS software update to correct a software issue that has been discovered to cause the nuvi 7x5 devices to repeatedly attempt to update GPS firmware, and then either shut down or no longer acquire GPS satellite signals.

Garmin nüvi 7x5 series products that are no longer able to acquire a GPS satellite signal may download a firmware update immediately that will correct the software issue. This firmware update may be downloaded using Garmin's WebUpdater program.

Garmin nüvi 7x5 customers who are no longer able to power on their GPS device will need to visit www.garmin.com/support, and select the first FAQ titled "My nüvi 755T, 765T, 775T or 785T is giving me the message 'Updating GPS Firmware' or will no longer power on..." Customers will then need to follow the instructions to request a return authorization so that the device may be repaired under warranty.

We know our customers rely upon their Garmin GPS device(s), especially during the summer travel season, and we regret any inconvenience this situation may have caused. We are committed to developing products that are known for their quality and reliability and will continue to work diligently to earn the trust of our customers.

NOTE:
All customers who have registered their 765 would have received the e-mail notifying them that they would need to use the Web Updater to download a critical software update.

Cooling System - Engine Oil/A/T Fluid Contamination

Retailer Technical Journal 21965
New cleaning method developed for
Oil in cooling system

Date 02-08-2010

Reference: VIDA

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE! THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL 21965 DATED 01-19-2010. PLEASE UPDATE YOUR FILES.

Model	Type	Model year	Chassis range
S80	124	ALL	ALL
V70	135	ALL	ALL
XC70	136	ALL	ALL
XC60	156	ALL	ALL
S80	184	ALL	ALL
XC90	275	ALL	ALL
V70	285	ALL	ALL
V70 XC / XC70	295	ALL	ALL
S60	384	ALL	ALL
C30	533	ALL	ALL
C70	542	ALL	ALL
S40	544	ALL	ALL
V50	545	ALL	ALL

AFFECTED VEHICLES:

DESCRIPTION:

If engine oil or automatic transmission fluid is found in the cooling system, there is a new cleaning method using a flush gun.

Description	Quantity	Part No.
Cleaning gun	1	9814122
Radiator hose	1	30776224
Radiator hose	1	30761633

TOOLS:

Description	Quantity	Part No.
Radiator hoses		See parts catalog in VIDA
Expansion tank and cap		See parts catalog in VIDA
Thermostat / Thermostat kit		See parts catalog in VIDA
Coolant	See relevant engine in VIDA	See parts catalog in VIDA

MATERIALS:

SERVICE:

The root cause of the oil contamination must be remedied prior to performing this cleaning procedure. Some examples of where to start looking are:

-Defective engine oil cooler

-Defective radiator

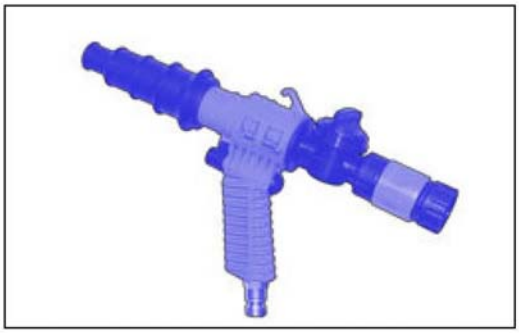
-Defective cylinder head gasket

Once the root cause of the oil contamination is remedied, use the following instructions in order to clean the cooling system.

1.

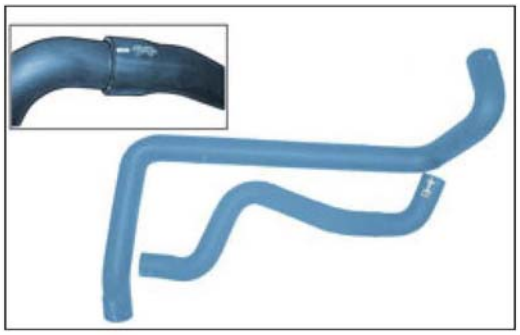
Note! Some variation in the illustrations may occur, but the essential information is always correct.

General



2. Special tool, PN 9814122, has been introduced for flushing the cooling system. The tool uses water and compressed air. After flushing, the thermostat, all rubber radiator hoses and the expansion tank with cover must be replaced.

   Note! The thermostat must be removed from the thermostat housing and the thermostat housing reinstalled for flushing to be effective.



3. The hose that is connected to the thermostat housing during flushing must reach outside of the engine compartment.

   Tip! Use radiator hoses PN 30776224 and PN 30761633 as tools. These are suitable for the different diameters on the outgoing connector on the thermostat housings. These can be reused for multiple jobs.

   Thermostat removal

4. Drain the cooling system.

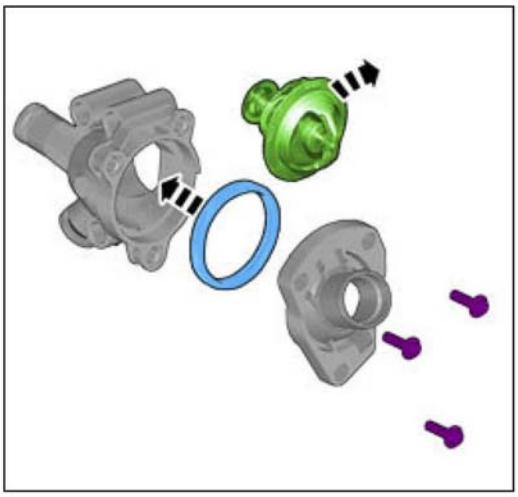
   Remove the thermostat according to VIDA:
   INFORMATION
   REPAIR

   Removal, replacement and installation Engine with mountings and equipment Cooling system Thermostat/temperature sensor coolant, replacement

5. On most engines the thermostat housing with thermostat is only available as a spare part. In these cases, the thermostat must be removed from the thermostat housing The following steps show how to do this.

   Removal of the thermostat from the thermostat housing

6. Step 6 applies to vehicles with B6324S or B630412 engines. Step 7 applies to C301S40N50 vehicles with B5254Sx/Tx engines.



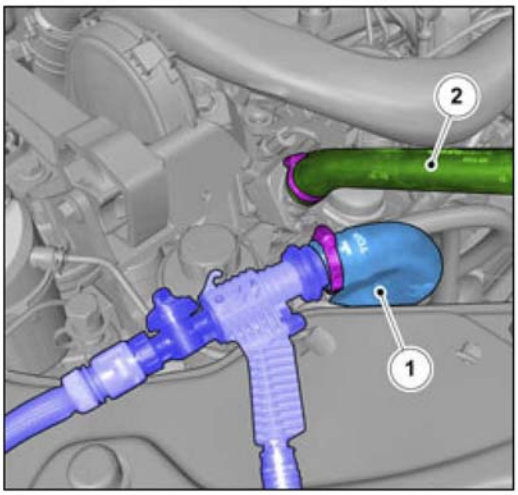
7. Remove the thermostat.

   Remove the rubber gasket from the thermostat.

   Install the rubber gasket in the thermostat housing.

   Assemble the thermostat housing. Reinstall the thermostat housing on the engine.

   Other engines not shown in steps 6 or 7:
   See relevant model and engine in VIDA.
   Flushing cooling system



11. Connect the cleaning gun to hose (1). Connect the water hose and compressed air to the cleaning gun.
Connect a long hose (2) to the thermostat housing, which extends outside the engine compartment.
Suggestion: use radiator hose 30776224 and 30761633.

    Hot water is recommended. Use skin protection to prevent burns.

    Note! When flushing, the first 20 litres (5.25 gallons) must be flushed out into a container because the fluid contains coolant that must not be flushed out into the drainage network. Flushing can then occur over a flush plate with oil separation.

    Flush the cooling system for at least 10 minutes if hot water is used. If hot water is not available, extend the time to 20 minutes.

12. After flushing, the thermostat, all rubber radiator hoses and the expansion tank with cover must be replaced.

    For thermostat replacement, see VIDA:
    INFORMATION
    REPAIR
    Removal, replacement and installation Engine with mountings and equipment Cooling system Thermostat/temperature sensor coolant, replacement

    To replace radiator hoses and expansion tank, see the spare parts catalogue for the relevant model and engine. There is no method to be followed for the replacement of radiator hoses and expansion tank.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
99703-2	Cooling system, flushing	
	XC90 B6294T	2.6 hrs
	XC90 B5254T2 and 2002 - S60/V70/S80 B52X4T	2.2 hrs
	S80 B6284T/B6294S/B6304S	2.1 hrs
	XC60/V70/XC70/S80 B6324SX and XC90 B6324S	2.0 hrs
	C30/S40/V50/C70 B5254TX, XC60/V70/XC70/S80 B6304T2, and S80 B6294T	1.9 hrs
	C30/S40/V50/C70 B5244S	1.8 hrs
	XC90 B8444S	1.7 hrs
	2003 - S60/V70 B5244S	1.6 hrs
	S60/V70/S80 exc B5244S and B52X4T	1.5 hrs
	S80 B8444S	1.4 hrs

-Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01
-Labor times are valid at the time of release and are subject to change.

WARRANTY CLAIM INFORMATION Technical Service Bulletin # **TJ22403** Date: **100217**

Wheels/Hubs - Vibrations While Driving

Retailer Technical Journal 22403
Incorrect wheel hub, Wheel vibrations

Date 02-17-2010

Reference: VIDA, VSTG

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Model	Type	Model year	Chassis range
S80	184	1999 – 2006	ALL
V70	285	2001 – 2007	ALL
V70 XC / XC70	295	2001 – 2007	ALL
S60	384	2001 – 2009	ALL

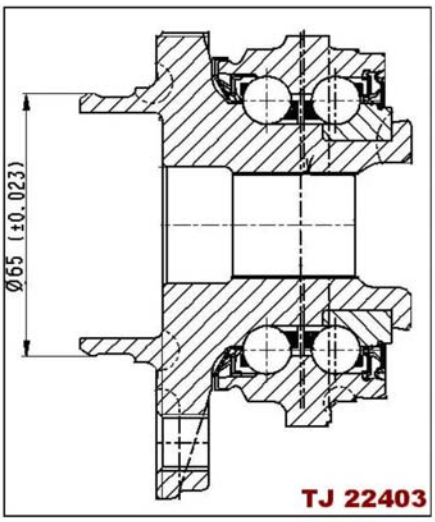
AFFECTED VEHICLES:

DESCRIPTION:

Wheel vibrations may occur if the wheel is not installed in the exact center position on the wheel hub. To avoid radial misalignment between the wheel and the hub, they must have the same diameters.

It has been discovered on some cars that the wheel hubs (spare parts as well as production parts) may have a center cone with a too small outer diameter. If a wheel is installed on such a hub, it is possible that the wheel is installed with an offset of 1.5 mm (0.059"), which can cause wheel vibrations while driving.

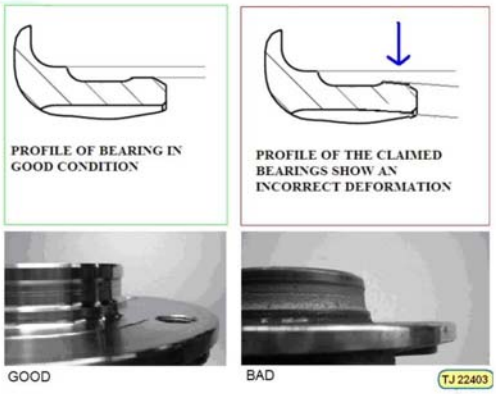
SERVICE:



1. If a customer complains about wheel vibrations and it is hard or impossible to remedy the vibration with normal wheel balancing, then check and measure the center cone diameter on the wheel hub.

   Correct diameter = 65.0 mm (2.559")

   Incorrect diameter found on some cars = 63.5 mm (2.500")



2. Check that the hub is not deformed, regardless of diameter.

   If this is the case, replace both, the hub and the wheel on the corner of the vehicle where this deformation is found. It is possible that the wheel, in this case, caused the deformation of the hub.

   For replacing the wheel, follow VIDA:
   INFORMATION

REPAIR
Springs and wheels
Wheels, tyres, hubs
Wheels

For replacing the hub, see step 3.

3. If a hub with the incorrect diameter is found, replace only the hub with the incorrect diameter according to VIDA:

   INFORMATION REPAIR
   Springs and wheels Wheels, tyres, hubs Hub and bearing

4. Check that the wheels have a center diameter of approximately 65 mm (approximately 2.6").

5. If a wheel with the incorrect center diameter is found, replace only the wheel with the incorrect diameter.

6. When replacing a hub for any reason, first measure the center cone diameter of the new hub in order to prevent repeat repairs. If a new hub is found with incorrect center cone diameter, send in a Service Product Report (SPR) and do not use that hub. Do not send in an SPR for an original hub that has the incorrect diameter.

Note! Include in the repair order text if the hub is original from the factory or if it is a spare Part. Also include if the wheel was replaced.

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
98216-2	Front wheel hub (1 side), replace acc. to TJ22403	S60/V70/S80: 1.5 hrs
98217-2	Front wheel hub (2 sides), replace acc. to TJ22403	S60/V70: 2.7 hrs S80: 2.8 hrs
98218-2	Rear wheel hub (1 side), replace acc. to TJ22403	S60/V70/S80 (2WD): 0.8 hrs S60/V70/S80 (AWD): 0.9 hrs
98220-2	Rear wheel hub (2 sides), replace acc. to TJ22403	S60/V70/S80: 1.5 hrs S60/V70/S80 (AWD): 1.6 hrs
77201	Tire x1 Replace (only use if wheel is replaced)	See VSTG

- Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01
- Labor times are valid at the time of release and are subject to change.

WARRANTY CLAIM INFORMATION
Technical Service Bulletin # **TJ22294** Date: **100203**

Instruments - Fuel Gauge Reads '0' With Fuel In Tank

Retailer Technical Journal 22294

Fuel level shows 0 even with fuel in tank

Date 02-03-2010

Reference:
VIDA DTC information

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Model	Type	Model year	Chassis range
S80	184	2005-2006	390000-446916
XC90	275	2005-2010	134000-553921
V70	285	2005-2008	459000-693560
XC70	295	2005-2008	173000-288671
S60	384	2005-2009	425000-741211

AFFECTED VEHICLES

DESCRIPTION:
The fuel gauge may intermittently show 0 in the DIM (Drivers Information Module). Customers may also report that the fuel level will show correctly after a key cycle. The following DTCs (Diagnostic Trouble Codes) will be set with an intermittent status:

DIM 0001 Driving distance. Incorrect value

CEM 4A31 Ejector sensor. Faulty signal (ejector side) Only posted on cars with 2 sensors.

CEM 4A35 Fuel level sensor. Faulty signal (pump side)

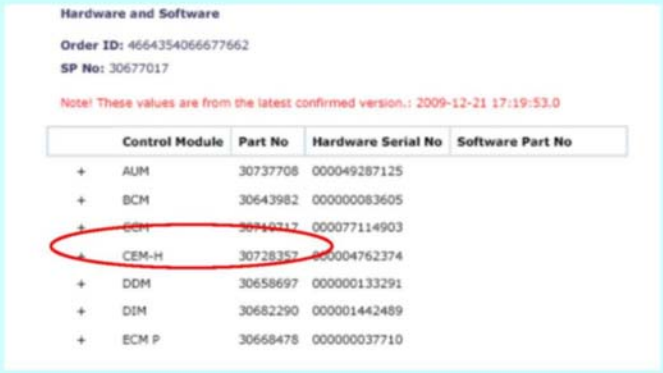
PRODUCT MODIFICATION: The root cause has been found within the CEM (Central Electronics Module) software. The CEM looses the distance information for 0.2 seconds and then goes back to its correct value. DTC CEM-4A35 and/or 4A31 will be set as a result of the CEM not being able to see the fuel level drop during a set distance. This will cause CEM to send out a low quality value for the fuel level signal that the DIM cannot interpret.

New CEM software has been introduced for service and production for all affected vehicles at the chassis end limits above.

NOTE:
There are vehicles built between Structure weeks 200425 and 200448 equipped with CEM Hardware part numbers (HW PN) that will not accept the SW correction package. Those CEM Hardware part numbers are:

- 30728357
- 30682981
- 30682982

The CEM HW PN can be identified in VIDA **Vehicle Details / HARDWARE and SOFTWARE**



Hardware and Software

Order ID: 4664354066677662
SP No: 30677017

Note! These values are from the latest confirmed version.: 2009-12-21 17:19:53.0

	Control Module	Part No	Hardware Serial No	Software Part No
+	AUM	30737708	000049287125	
+	BCM	30643982	000000083605	
+	ECM	30749717	000077114903	
+	CEM-H	30728357	000004762374	
+	DDM	30658697	000000133291	
+	DIM	30682290	000001442489	
+	ECM P	30668478	000000037710	

In this case, there will be a SW package delivered and loaded; however, the package will **not** include the correction for the fuel gauge symptoms.

If the vehicle is equipped with one of the CEM hardware P/Ns mentioned, the CEM must be replaced and reloaded to correct the symptoms described above.

SERVICE: If the customer reports the symptoms described above and the vehicle is within the chassis number limits in the affected vehicle table, Please perform a CEM upgrade P/N 30677017. Please see note above

WARRANTY CLAIM INFORMATION

LABOR OP	LABOR DESCRIPTION	LABOR TIME
36004-2	Software control module downloading	See VSTG

- Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01
- Labor times are valid at the time of release and are subject to change.

WARRANTY CLAIM INFORMATION

Navigation System - Software Disc SW Upgrade

RETAILER TECHNICAL JOURNAL 16514

NEW SW UPGRADE DISC FOR RTI: QUICK GUIDE
(MMM, MMM+, MMM2)
DATE: 06-30-2010

Reference:
RTJ 23153 RTI, voice guidance suddenly stops during driving.
RTJ 20769 RTI, MMM2, losing various settings.
RTJ 23257 RTI Navigation screen may become black at start-up
RTJ 22398 MMM+, TMC message is not shown for slip road
RTJ 20475; MMM+ navigation system "please insert disc" message
RTJ 17424; RTI System identification guide

Note!

If using a printed copy of this Retailer Technical Journal, first, first

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!

THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL 16514, DATED 01-21-2010. PLEASE UPDATE YOUR FILES. New information is shown with asterisks and red text.

^ *June 2010: New SW upgrade discs for MMM2 (version10w22) and MMM+ (version 10w22)*

^ January 2010: New SW upgrade disc for MMM2 (version 0948). This service disc contains an update to prevent a check sum error which, if it occurs, will permanently disable the MMM. This condition is rare. Once it occurs, it cannot be corrected by loading the service upgrade.

^ July, 2009: New SW upgrade disc for MMM2 (version 0920). Updated Contains 3D map feature and SW optimization for repeated Traffic message audio warning "traffic restrictions may apply, please respect the local traffic regulations"

^ April 2009: New SW upgrade disc P/N for MMM+ only. This kit contains two discs, One for the boot loader SW and the other for the application SW. The old disc P/N 31215588 is still used for the MMM systems (non HDD).

Models	Type	Model year	Chassis range
124	S80 (P3)	2007 -	0000850-
135	V70 (P3)	2008 -	0000001-
136	XC70 (P3)	2008 -	0000001-
156	XC60 (P3)	2010 -	0000001 -
184	S80 (P2)	1999 - 2006	0000001 – 0446916
275	XC90	2003 -	0000690-
285	V70 (P2)	2001 - 2007	0026213 - 0693560
295	XC70 (P2)	2001 - 2007	0000160 - 0288671
384	S60	2001 - 2007	0000148-
533	C30	2007 -	0000261-
542	C70	2006 -	0000590-
544	S40	2004 -	0000295-
545	V50	2004 -	0000133-

AFFECTED VEHICLES

DESCRIPTION

Several software upgrade (SW) discs have been developed to take care of several known bugs in DVD based RTI systems. If the customer reports strange behavior from the RTI system, i.e. system restart, reset, arrow not moving, strange route choices, abnormal ETA (estimated time of arrival) displayed, voice guidance while system is shut down, etc. Always start with upgrading the unit to the latest SW. By doing this, we can eliminate problems from the earlier software.

Note:

Map data is not included in the SW upgrade discs.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

SERVICE:
1) RTI system off and key in position 2
2) Remove the map disc and install the appropriate SW upgrade disc. (See chart below)

3) Turn on RTI system. The screen will indicate "LOADING NEW PROGRAM" and a scroll bar will appear. When the upgrade has finished loading, the screen will go blank and then retract.

4) Remove upgrade disc and reinstall the customer's map disc if needed.

NOTE:

If when installing the upgrade disc, the screen reads "THIS IS NOT A MAP DISC" the system is already loaded with the latest SW indicated in the chart.

System	Model year/variant	Service disc P/N	Service disc upgrades to SW version no.
CD based (with 6 disc changer)	MY 1999 – 2001 S80 MY 2001 V70 MY 2001 S60	*N/A* *Not upgradeable w/ service disc*	*N/A* *Not upgradeable w/ service disc*
MMM (DVD based)	MY 2002 - 2006 S80 MY 2002 - 2007 V70, XC70 MY 2002 - S60	*31266835*	*14.05*
	MY 2003 - 2006 XC90 up to 2006 MY 2004.5- S40, V50 MY 2006 – 2007 C70, C30	*31266835*	*14.04*
MMM+ HDD (Hard disc drive) *(Upgradeable w/2 disc set)*	XC90 2007 – All P1X 2008 -	31310029 Please follow loading instructions contained in package and in RTJ 20475. (see note 1 below) ***Version 1022 31328472***	1404/002400 ***1630/2400***
MMM2 (DVD based)	*All P3x*	version 920 31288884 version 948 31310271 ***version 1022 30630953***	8BA8 8BB7 ***8BC6***

Note 1
Applies to MMM+ and service disc 31310029
CAUTION! It is very important that battery voltage stability is maintained with a vehicle power supply and that no other operations are done on the car while the boot loader disc is being loaded. (i.e. engine start or crank). Failure to so may damage the primary boot loader SW in the MMM's hard drive. It will be necessary to replace the MMM if this occurs.

Service discs can be obtained through the normal parts ordering routine and may be used to upgrade multiple vehicles.

The current SW version can be found in the RTI system menu as follows:

Settings/help/about or, settings/System options/about (depending on variant and model year).

WARRANTY CLAIM INFORMATION		
LABOR OP	LABOR DESCRIPTION	LABOR TIME
39725-2	Software road traffic information module (RTI) upgrade	0.2 hr

Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

Warranty Claim Information

Technical Service Bulletin # **TJ21713** Date: **100507**

Computers/Controls -Intermittent No Start And DTC's

TIE - Technical Journal

Title: Intermittent no start, immobilizer message in DIM

Ref No: US21713.4.0 en-GB

Issuer: -

Partner: 3 US 7510 Volvo Cars North America

Func Group; 3729 Func Desc miscellaneous

Status Released

Status date: 2010-05-12

Issue Date: 2010-05-07

Reference:

Attachment

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
184							2005 -2006		0390000 -0446916	200425 -200609
275							2005 -9999		0173014 -0999999	200425 -999999
285							2005 -2008		0459000 -0693560	200425 -200739
295							2005 -2007		0173000 -0288671	200425 -200719
384							2005 -2009		0425000 -0741211	200425 -200911

Vehicle Type

Code	Description
7B	Starting/Engine does not start/Engine does not turn/No clicking sound at start attempt
BJ	Starting/Engine does not start/Unsure when/at all times
CC	Warning lights and chimes/Immobilizer indication/no indication

CSC

Control Module	Code	Fault Type
ECM	710B	Intermittent
ECM	720A	Intermittent

DTC

Text
CSC = Customer Symptom Code

DTC = Diagnostic Trouble Code

DESCRIPTION:
The engine may not start on the first start attempt and immobilizer message is displayed in the DIM (Driver Information Module).

The engine will always start after a couple of attempts.

PRODUCT MODIFICATION:
New CEM (Central Electronic Module) software

SERVICE:
Perform CEM upgrade software part number: 30677017.

VSTG OPERATION NUMBER:

36004-2 Software control module downloading.

Technical Service Bulletin # **TJ18942** Date: **100426**

Tire Monitor System - Additional Diagnostic Information

TIE - Technical Journal

Title Tire Pressure Monitoring System (TPMS), additional information

Ref No US18942.2.0 en-GB

Issuer -

Partner 3 US 7510 Volvo Cars North America

Func Group 7761

Func Desc pressure control

Status Released

Status Date 2010-04-28

Issue Date 2010-04-26

Reference VIDA, VSTG

File Name	File Size
Attachment TJ 18942.pdf	0.8190 MB

Attachment

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
184							2005 -2006		0390000 -0446913	200425 -200609
275							2005 -9999		0134000 -9999999	200425 -999999
285							2005 -2007		0459000 -9999999	200425 -999999
295							2005 -2007		0173000 -9999999	200425 -999999
384							2005 -2009		0425000 -9999999	200425 -999999

Vehicle Type

Code	Description
LI	Warning lights and chimes/Tire pressure monitoring indication/no indication

CSC

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Control Module	Code	Fault Type
UEM	00A8	Permanent
UEM	00A8	Intermittent
UEM	00A2	Permanent
UEM	00A2	Intermittent
UEM	00A1	Permanent
UEM	00A1	Intermittent
UEM	00A0	Permanent
UEM	00A0	Intermittent

DTC

Text
CSC Customer Symptom Code
DTC Diagnostic Trouble Code

Note!
If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!
THIS DOCUMENT SUPERSEDES THE RETAILER TECHNICAL JOURNALS 19468 and 19316, DATED 07-29-2008 and 07-01-2008 respectively. RTJ 19468 is for parts information and this information can be found in VIDA as well as in this RTJ. RTJ 19316 is no longer valid and the new information can be found in VIDA as well as in this RTJ. PLEASE UPDATE YOUR FILES.

DESCRIPTION:

The purpose of this RTJ is to update the information concerning the criteria to switch off the low tire pressure message and give some additional basic information about the TPMS system and thereby help in fault tracing in order to take the right corrective actions.

TPMS description:

TPMS is a monitoring system for the driver to keep the right tire pressure in the tires. The sensors begin transmitting the signals to the Upper Electronic Module (UEM) when the vehicle's speed is higher than 40 km/h (25mph).

The driver will get a message in the Driver Information Module (DIM) if the tire pressure drops a certain percentage from the recommended tire pressure. Recommended tire pressure is present in the owner's manual and in the fuel filler lid (model specific).

If vehicles with TPMS are driven with the "comfort pressure" set there will be unnecessary tire pressure warnings to the driver (in the DIM) in cold weather conditions. Volvo does not recommend using comfort pressures due to the sensitivity of TPMS.

Criteria to switch on the low tire pressure message:

^ The tire pressure has dropped more that 22% of the recommended pressure see the Table 1 in the attached document.

Criteria to switch off the low tire pressure message:

^ The tire pressure must the filled up at least to 95% of the recommended pressure AND then the vehicle needs to be driven for 5 minutes at a speed higher than 40 km/h (25mph).

OR

^ Fill the pressure to at least 95% of the recommended pressure with ignition on.

Fault tracing:

^ Fault trace according to VIDA by using CSC LI this will guide you to a smart tool that will help you to find the faulty sensor.

OR

^ Use Diagnostic/reference information/UEM and the stored DTC in VIDA.

Example on an XC90	US Front / Rear (psi)	CDN Front / Rear (psi)	CDN Front / Rear (psi)
	Tire Pressure	Tire Pressure	Tire Pressure
	1-5 persons	1-5 persons	1-3 persons
Recommended tire pressure(RTP)	36/36	39/39	35/35
DIM Alarm low tire pressure 22% of RTP	28.08	30.42	27.3
Minimum pressure to switch off message in DIM	34.2	37.05	33.25

Table 1

Photo 1

Note!
When using the special tool to ping the sensor make sure that the tool used matches the tool in the attachment (see Photo 1).

MATERIALS:

A snap-in transmitter has been introduced during structure week 2007W48 in production. This part can be used on all cars that are fitted with Schrader style TPMS (all vehicles in this RTJ).

PN 30748991 = Old PN before 2007W48

PN 31200923 = New PN after 2007W48

SERVICE:

If a customer claims of having a "Low tire pressure warning" message in the DIM fill the tire pressure to the recommended pressure and make a test drive with the criteria above.

VOLVO STANDARD TIMES GUIDE (VSTG) INFO:

Operation number 99562-2 - Sensor (TPMS) tire pressure wheel check acc to TJ 18942 - 0.2 hrs

Operation number 38641-2 Sensor (TPMS) tire pressure wheel xl replace - See VSTG

Operation number 38640-3 Sensor (TPMS) tire pressure wheel following replacement - See VSTG

- Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01
- Labor times are valid at the time of release and are subject to change.
- Labor times are valid at the time of release and are subject to change.

Steering - Scraping Noise When Turning Steering Wheel

TIE - Technical Journal

Title Noise from contact reel when turning steering wheel

Ref No US19096.2.0 en-GB

Issuer -

Partner 3US7510 Volvo Cars North America

Func Group 6419 Func Desc miscellaneous

Status Released

Status Date 2010-07-13

Issuer Date 2010-06-04

Reference VIDA, VSTG, RTJ 19989

File Name	File Size
Attachment TJ 19096.pdf	0.0849 MB

Attachment

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
184							2005 -2006		0390000 -0446916	200425 -200609
275							2005 -2010		0134000 -0550442	200425 -200948
285							2005 -2007		0459000 -0693560	200425 -200739
295							2005 -2007		0173000 -0288671	200425 -200719
384							2005 -2009		0425000 -0741211	200425 -200911

Vehicle Type

Code	Description
H3	Steering wheel/Squeak/rattle/Steering column/wheel

CSC

DTC

Text
CSC = Customer Symptom Code

DTC = Diagnostic Trouble Code

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

DESCRIPTION:
When turning the steering wheel, a scraping or creaking noise may be heard from behind the steering wheel. The contact reel may not be correctly fitted to Steering Wheel Module (SWM), so that the knob on the contact reel will scrape against the SWM housing. See Photo 1 in the attachment.

PRODUCT MODIFICATION:
Plastic washers are fitted to the SWM to center the contact reel towards the steering column.

SERVICE:
Check that the contact reel is correctly fitted to the SWM. Loosen the screws for the SWM and try to center the SWM / contact reel to the steering column. If symptom remains, replace the SWM using procedures in VIDA and RTJ 19989.

VOLVO STANDARD TIMES GUIDE (VSTG) INFO:

Operation number 36020-2 - Contact reel / Steering Wheel Module (SWM) Replace -See VSTG

		Car Customer Service
		TJ Instruction
		TJ No 19096
		Date July-10 Issue 01
Title	Noise from contact reel when turning steering wheel	

Photo 1

Car Customer Service

Technical Service Bulletin # **TJ16761** Date: **100630**

A/T Controls -TCM Updates For Various Issues

TIE - Technical Journal

Title Transmission Control Module (TCM) Software (SW)

Ref No US1676.1.6 en-GB

Issuer -

Partner 3US7510 Volvo Cars North America

Func Group 4376 Func Desc

Status Released

Status Date 2010-07-01

Issue Date 2010-06-30

Reference VIDA, VSTG, RTJs17906, 20857, 23193

File Name	File Size
Attachment TJ 16761.pdf	0.0308 MB

Attachment

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
184							1999 -2006		-	0 -0
275							2003 -2010		-	0 -0
285							2001 -2007		-	0 -0
295							2001 -2007		-	0 -0
384							2001 -2008		-	0 -0
544							2004 -2006		-	0 -0
545							2005 -2006		-	0 -0
872							1999 -2002		-	0 -0
873							1999 -2002		-	0 -0
874							1999 -2000		-	0 -0
875							1999 -2000		-	0 -0
876							1999 -2000		-	0 -0

Vehicle Type

Code	Description
EX	Warning lights and chimes/Automatic transmission indication/no indication
7Y	Automatic transmission/Gear changes take too long to complete/Unsure when/at all times
7Z	Automatic transmission/Shifts occur too early, too late, too often/Unsure when/at all times
MA	Automatic transmission/Shifts rough or jerky/Unsure when/at all times
MD	Automatic transmission/No automatic gearshift
ME	Automatic transmission/Shifts occur too early, too late, too often/When upshifting
MH	Automatic transmission/Kickdown does not work
MO	Automatic transmission/Shifts occur too early, too late, too often/When downshifting
MV	Automatic transmission/Gear changes take too long to complete/When downshifting
NB	Automatic transmission/Gear changes take too long to complete/When upshifting
ND	Automatic transmission/Shifts rough or jerky/When downshifting
NF	Automatic transmission/Shifts rough or jerky/When engaging gear at standstill
NO	Automatic transmission/Shifts occur too early, too late, too often/From Park to Reverse or Drive
NS	Automatic transmission/Shifts rough or jerky/When upshifting
OC	Manual transmission/Gear pops out

CSC

Control Module	Code	Fault Type
TCM	P074400	Intermittent
TCM	P073000	Intermittent
TCM	0099	Intermittent
TCM	008D	Intermittent
TCM	0053	Intermittent
TCM	0045	Intermittent
TCM	002F	Intermittent
TCM	0028	Intermittent
ECM	530D	Intermittent
DEM	000B	Intermittent
DEM	000A	Intermittent
DEM	0008	Intermittent
DEM	0006	Intermittent
DEM	0005	Intermittent
DEM	0003	Intermittent
DEM	0001	Intermittent
CEM	1A64	Intermittent

DTC

Text
CSC = Customer Symptom Code

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

DTC = Diagnostic Trouble Code

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!

THIS DOCUMENT SUPERSEDES THE PREVIOUS VERSION OF RETAILER TECHNICAL JOURNAL 16761 DATED 12-23-2009. New AW TF80SC software has been added for the Winter mode function. PLEASE UPDATE YOUR FILES.

DESCRIPTION:
The TCM Upgrades in the attached document are available to correct the complaints / symptoms listed in the attachment.

SERVICE:
If the vehicle fits in the model year or chassis range for the symptom in the attachment, download a TCM Upgrade.

VOLVO STANDARD TIMES GUIDE (VSTG) INFO:

Operation number 36004-2 - Control module, software download- See VSTG

- Claims may be submitted under the new car warranty when there is a documented customer complaint using claim type: 01

- Labor times are valid at the time of release and are subject to change.

Car Customer Service		
	TJ Instruction	
	TJ No 16761	
		Date June-10 Issue 08
Title	Transmission Control Module (TCM), Software (SW)	

Vehicle	Complaint / Symptom	Reset Adaptation to Zero	Adaptive Test Drive
	GM4T65		
2003-2005 XC90 T6	This TCM SW should be used when the customer is complaining of gearbox related symptoms, when any parts are replaced in the gearbox, or when the complete gearbox is replaced. This TCM SW has modified torque handling at 1-2 and 2-3 shifts to reduce the shift force. With this download, the adaptation in the gearbox is reset, and therefore **it is important to do a re-adaptation of the gearbox.** **IMPORTANT:** Adaptation instruction for GM transmission: 1: Let the car stand on idle until the gearbox temperature have reach 50º C (122 ºF) or higher. 2: Drive the car in D-position with steady acceleration pedal, start from low pedal position, and let the car shift up. 3: Repeat step 2 until the shifts feels ok. 4: Increase the pedal position, and let the car shift up. 5: Repeat step 4 until the shifts feels ok.	Yes	Yes
1999-2001 S80	TCM DTCs (Diagnostic Trouble Code) 0028, 002F, 0045, 0053, 008D, 0099 ECM(Engine Control Module) 530D DIM (Driver Information Module) message with no DTC Harsh 1-2 upshift, 4-2-4 shift and garage shifts Geartronic Downshift Shudder Engine RPM Oscillations During Highway Driving	Yes	No
2002-2004 S80 2003-2005 XC90	TCM DTC 0028 TCM DTC 0099 (Reset Adaptation to Zero before clearing code) 1-2 Upshift Quality: Slipping, Harshness, Delay, Hesitation 2-1 Downshift Shock	Yes	No

Vehicle	Complaint / Symptom	Reset Adaptation to Zero	Adaptive Test Drive
AW 5 Speed (AW55-50/51)			
2007-2008 S60 2007 V70 B5244S ONLY	Transmission shifts normally from 1st to 2nd but does not shift into 3rd. After cycling the ignition, the symptom is gone. This generally occurs after customer comes to a stop and puts the transmission into N while stopped.	Yes	Yes
2007 S60/V70/XC70/XC90 (New, February 2007)	Slip / Flare / Harsh Shifts during the first few accelerations after a cold start.	Yes	Yes
2002-2006 S60/S80/V70/XC70/XC90	General Shift Quality 2-3 Flare, especially when cold or after Highway Driving 3-2 Power-On Downshift Quality, after coastdown Power-On Downshift Response TCM DTC 002E, 002F Slip / Flare / Harsh Shifts during the first few accelerations after a cold start. Applies to 2005-2006	2002-2004 No 2005-2006 Yes	2002-2004 No 2005-2006 Yes
2001 S60/V70/V70XC	General Shift Quality Shift Pattern Power-On Downshift Response Neutral Control Symptoms (Described in TNN 43-38, RTJ 17906)	Yes	Yes
2000 S/V70	General Shift Quality Harsh 4-2 and 3-2 downshifts 1st gear engine braking with shifter in 'L' position Harsh Coast Down Shifts	Yes	Yes
2001 C70	General Shift Quality Shift Pattern 2-3 Upshift Flare	Yes	Yes
2002 C70	General Shift Quality 2-3 Upshift Flare Readiness (Comprehensive Flag Not Ready)	No	No
2004.5 - 2006 S40/V50	General Shift Quality Power-On Downshift Response 3-2 Power-On Downshift Quality, after coastdown Torque Converter Lock-Up Shudder TCM DTC 002E, 002F	No	No
AW 4 Speed (AW50-42)			
1999 S/V/C 70	Delayed 3-4 Upshift Harsh 4-3-4 Shift Hunting Between Gears While Using Cruise Control TCM DTC 0045 ECM DTC 530D	Yes	No

Vehicle	Complaint / Symptom	Reset Adaptation to Zero	Adaptive Test Drive
AW 6 Speed (TF80SC)			
2010 XC90	While the engine is warming up (cold start), the winter mode function on the gear box will not be activated if selected by the driver. There will be no "W" in the Driver information Module (DIM) or any indication on the winter mode button on the shifter panel. Refer to RTJ 23193.	No	No
2005-2007 XC90 V8	General Shift Quality Soft, harsh or long 1-2 Upshift Delayed engagement when moving shifter to 'R' or 'D' Power-On Downshift Response, especially after coast-down (ECM should also be upgraded for maximum response improvement) TCM DTC P074400 (This DTC indicates that the engine has stalled on one or more occasion. Fault trace the vehicle accordingly.) TCM DTC P073000	No	No
2007 XC90 3.2	Delayed upshifts after releasing the accelerator pedal. Excessive engine braking during coasting. (The ECM should also be upgraded for maximum drivability improvement.)	No	No

The "Power-On Downshift Response" Upgrade makes Kickdown / Passing Gear downshifts faster.
If the message 'Invalid' is received when ordering a TCM Upgrade, and Status 134 is shown under the details, the control module already contains the latest software.

Car Customer Service

Technical Service Bulletin # **TJ20402** Date: **100922**

Computers/Controls - CAN Error Frame Finder Info.

TIE Technical Journal

Title Error Frame Finder

Ref No US20402.3 en-US

Issuer -

Partner 3 US 7510 Volvo Cars North America

Func Group 3600

Func Desc other electrical equipment

Status Released

Status Date 2010-09-24

Issue Date 2010-09-22

Reference

File Name	File Size
RTJ 20402 attachment.pdf	1.0664 MB

Attachment

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
124							2007 -9999		0000850 -9999999	200605 -999999
135							2008 -9999		0000395 -9999999	200720 -999999
136							2008 -9999		0000400 -9999999	200720 -999999
156							2009 -9999		0000212 -9999999	200836 -999999
184							2005 -9999		0390000 -9999999	200425 -999999
275							2005 -9999		0134000 -9999999	200425 -999999
285							2005 -9999		0459000 -9999999	200425 -999999
295							2005 -9999		0173000 -9999999	200425 -999999
384							2005 -9999		0425000 -9999999	200425 -999999
533							2007 -9999		0000261 -9999999	200637 -999999
542							2006 -9999		0000590 -9999999	200540 -999999
544							2004 -9999		0000295 -9999999	200338 -999999
545							2004 -9999		0000133 -9999999	200347 -999999

Vehicle Type

Code	Description
2V	Software/Vehicle communication/Software/Vehicle communication/Not for warranty use

CSC

Control Module	Code	Fault Type
CEM	DF03	Intermittent
CEM	DF04	Intermittent
CEM	DF05	Intermittent
CEM	DF06	Intermittent
CEM	DF13	Intermittent
CEM	DF14	Intermittent
CEM	DF15	Intermittent
CEM	DF16	Intermittent
CEM	U000111	Intermittent
CEM	U000112	Intermittent
CEM	U000188	Intermittent
CEM	U001011	Intermittent
CEM	U001012	Intermittent
CEM	U001088	Intermittent
CEM	U010000	Intermittent
CEM	U010100	Intermittent
CEM	U010400	Intermittent
CEM	U012100	Intermittent
CEM	U012600	Intermittent
CEM	U012200	Intermittent
CEM	U012800	Intermittent
CEM	U013100	Intermittent
CEM	U013600	Intermittent
CEM	U015100	Intermittent
CEM	U015500	Intermittent
CEM	U015600	Intermittent
CEM	U015900	Intermittent
CEM	U016400	Intermittent
CEM	U016600	Intermittent
CEM	U018100	Intermittent
CEM	U019800	Intermittent
CEM	U019900	Intermittent
CEM	U020000	Intermittent
CEM	U020800	Intermittent
CEM	U026400	Intermittent
CEM	U025700	Intermittent
CEM	U025200	Intermittent
CEM	U023687	Intermittent
CEM	U023500	Intermittent
CEM	U023187	Intermittent
CEM	U023000	Intermittent
CEM	U021400	Intermittent

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

DTC

Text
CSC = Customer Symptom code

If using a printed copy of this document, always check for the latest online version.

BACKGROUND:

The EFF function can be an aid in fault tracing intermittent CAN network problems by providing a visible indication of error frames that are being transmitted on the network when the fault becomes active. Error frames will be transmitted when there is a critical fault in the network or network wiring such as open circuits i.e. terminal/connector problems broken wiring short circuits i.e. chaffed/pinched wiring and defective nodes i.e. "babbling" nodes.

The advantage of using the EFF function is that error frames are usually transmitted on the network before a vehicle symptom can occur. Hence if the fault is very intermittent in nature it may be possible for example to induce the wiring fault for a short duration by manipulating the vehicle harnesses and connectors. The electrical fault will occur and be detected by the EFF without ever having a vehicle symptom appear.

		Volvo Cars of North America
		TJ attachment
		TJ No 20402
		Date: September 20, 2010 Issue 01
Title	Use and setup of DICE error frame finder	
Recomended Technician level	Expert	

DESCRIPTION:

This document describes how to setup and use the Error Frame Finder (EFF) functionality that is part of DICE.

It is structured into six parts:

1: Installing the CAN recorder Browser to your PC
2: Loading the SD card with the configuration file
Note: steps 1 and 2 are only necessary if a generic SD card is used. Special tool 9513010 is pre loaded with the configuration file for a 500Kb/sec CEM
3. How to use the DICE error Frame Finder mode
4. Tips on CAN fault tracing with the EFF
5. Tips on CAN fault tracing using the multi-meter method

BACKGROUND:

The EFF function can be an aid in fault tracing intermittent CAN network problems by providing a visible indication of error frames that are being transmitted on the network when the fault becomes **ACTIVE**. Error frames will be transmitted when there is a critical fault in the network or network wiring such as open circuits, i.e. terminal/connector problems, broken wiring, short circuits, i.e. chaffed/pinched wiring and defective nodes, i.e. "babbling" nodes.

The advantage of using the EFF function is that error frames are usually transmitted on the network before a vehicle symptom can occur. Hence, if the fault is very intermittent in nature, it may be possible, for example, to induce the wiring fault for a short duration by manipulating the vehicle harnesses and connectors. The electrical fault will occur and be detected by the EFF without ever having a vehicle symptom appear.

NOTE:
For error frames to occur there must be network communication. Error frames will only be generated for a short time during the actual sporadic occurrence of the fault. Once the fault is permanent, for example a network short to ground, the network communication stops and therefore no more error frames will be generated.

More detailed fault tracing information will be provided elsewhere in this document.

TOOLS:

Description	Quantity	Part No.
DICE	1	9513000
Memory card	1	9513010 or locally sourced equivalent SD card with a minimum capacity of 1 Gigabyte. *Note: SD cards over 2GB that are classified as SDHC (high capacity) and have a FAT32 config may not be supported by DICE.*

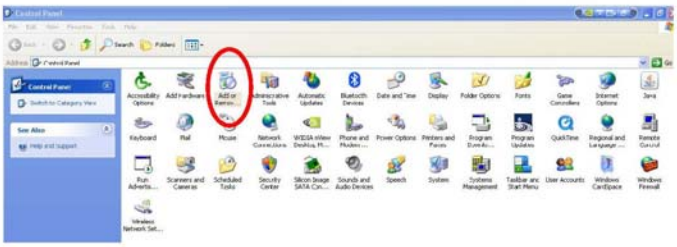
USB communication cable	1	9513003 supplied in the originally allocated DICE kit or equivalent
VIDA application disc	1	VIDA version 2010B or later

1: Installing the CAN recorder Browser to your PC

Note: User must be logged on as an administrator to install programs on a VIDA workstation

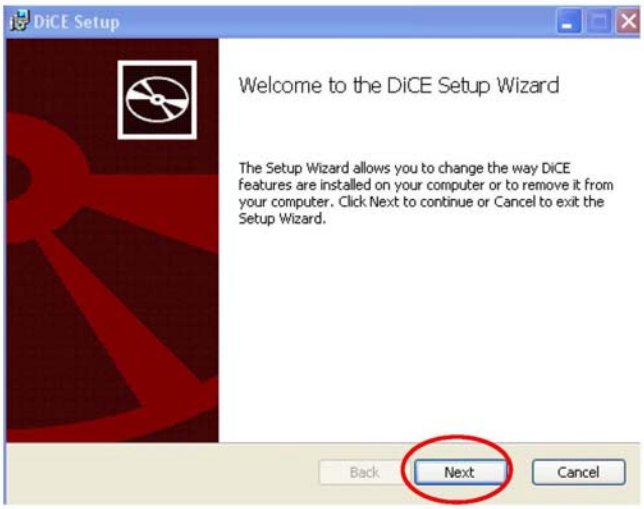
The CAN recorder browser application files are included on all VIDA application discs from version 2010B and later.
This application will enable you to transfer the different EFF configuration files to the SD card via the DICE unit depending on the HS CAN speed (250 Kbit/s or 500Kbit/s). There is also a CAN Flight recorder function included in the application but **it will not be supported**.

1) Make sure to have the VIDA disc in the computer.

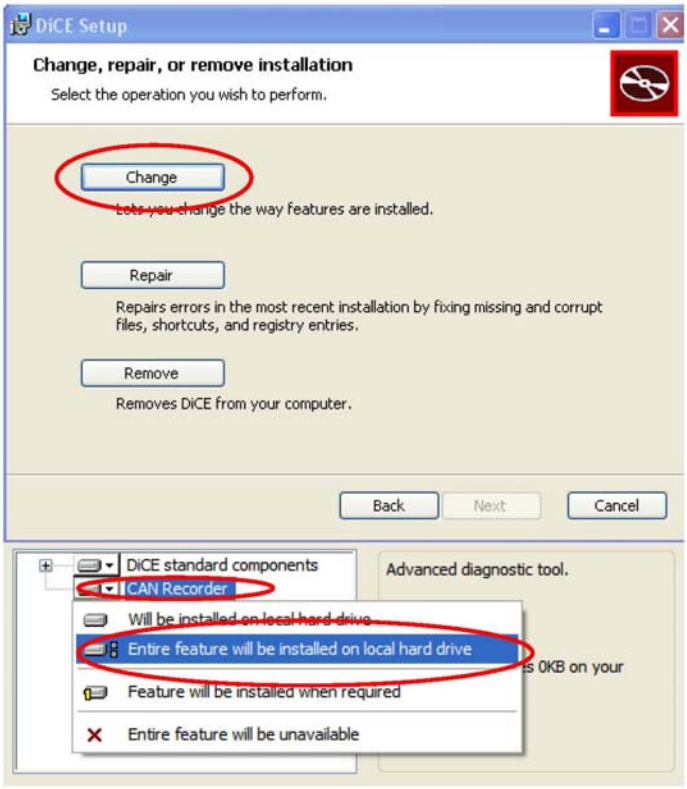


2) Select ***"control panel"*** from the start menu. Then click on *"Add or Remove programs"* in Control Panel

3) Select ***"DICE"*** in the list and click ***"CHANGE"***

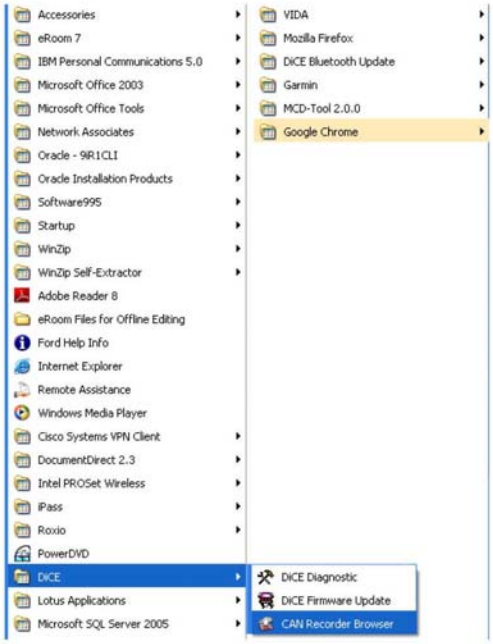


4) Click ***"NEXT"*** to start the installation



5) Click ***"Change"*** to add the browser option

6) Click ***"CAN Recorder"*** and select ***"Entire feature will be installed on local hard drive".***



Done.

The application should now be installed on your computer.
It can be accessed in the start menu/ *All programs / Dice / Can recorder browser.*

2: Loading the SD card with the configuration file

There are different config files used for the EFF function depending on the HS CAN bus speed and vehicle type. There are also files for the CAN recorder function (which is not supported) Use the chart below to select the correct file to load to the SD card.

File name	Application	HS (High Speed) CAN bus speed	Comments
config.cfg	P1X, P2X 2005- and P3X	500 Kb/sec	Preferred
P2X -2004 Key.cfg	P2X up to 2004	250 Kb/sec	Preferred
X70 1999-2000.cfg	X70 1999 – 2000	250 Kb/sec	Preferred
P2X -2004 VBAT.cfg	P2X up to 2004	250 Kb/sec	**Do not use.** The configuration is designed to shut down the dice if the measured voltage is below 13V
Y286,P1,P2x 2005 -.cfg	P1X, P2X 2005- and P3X	500 Kb/sec	The same as config.cfg
Y286,P1,P2x 2005-.cfg	P1X, P2X 2005- and P3X	500 Kb/sec	The same as config.cfg but with some changes for trigger conditions that will not affect the EFF mode

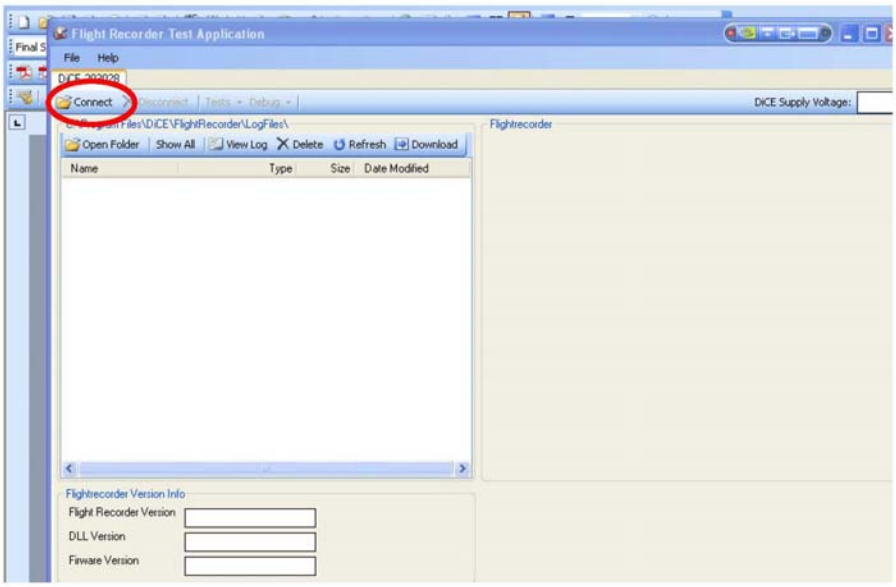
Note: Only one config file can be loaded to an SD card at a time. It may be more convenient to load 3 different SD cards and label them for use as needed.

1) Make sure to have the VIDA disc in the computer

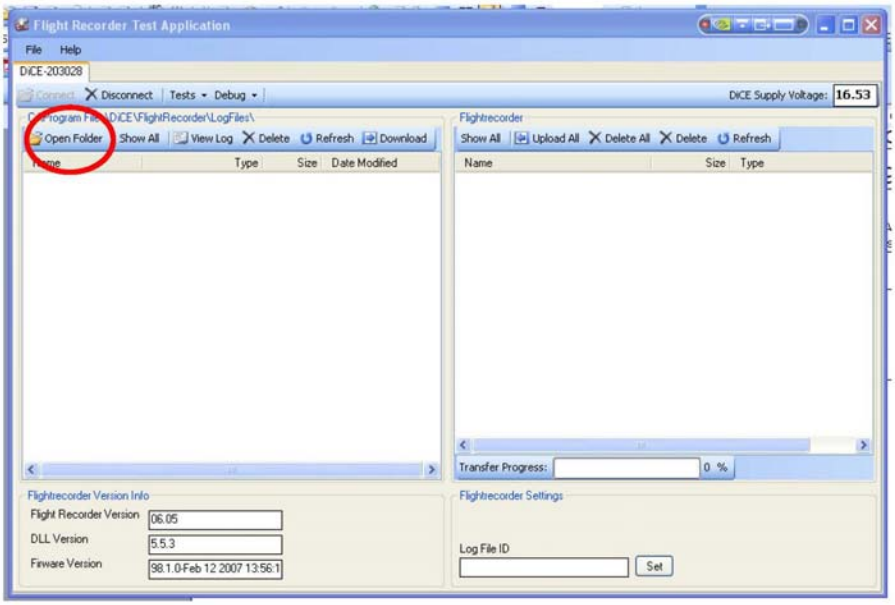
Power up the DICE unit.
Use the power supply plug from the VIDA "toughbook"

- Connect a USB communication cable to the PC and to the DICE unit
- install an SD card

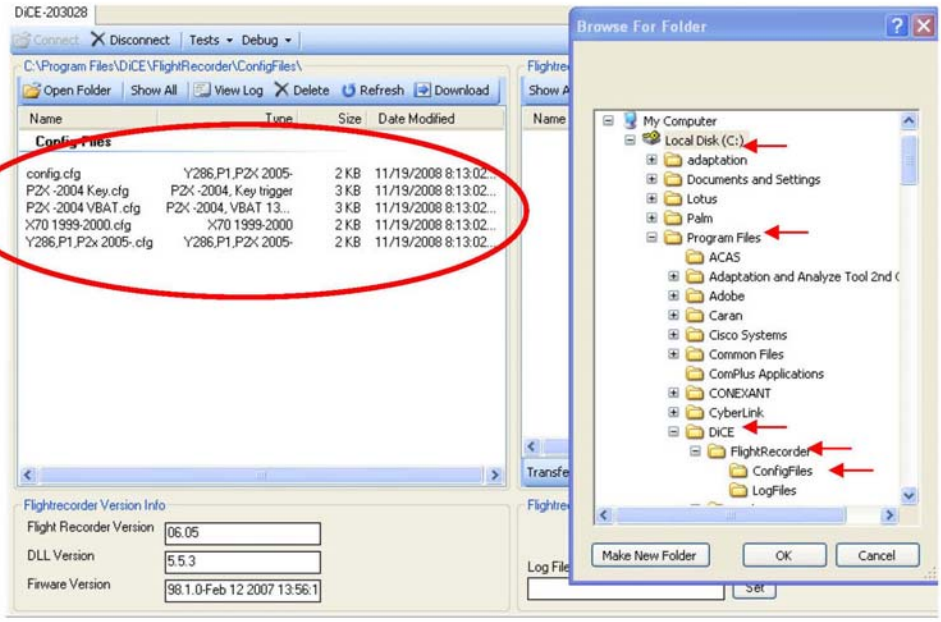
Remove the Bluetooth adapter from the PC as this may cause a communication conflict with the DICE unit.



Open the CAN recorder browser and click on *"connect"*



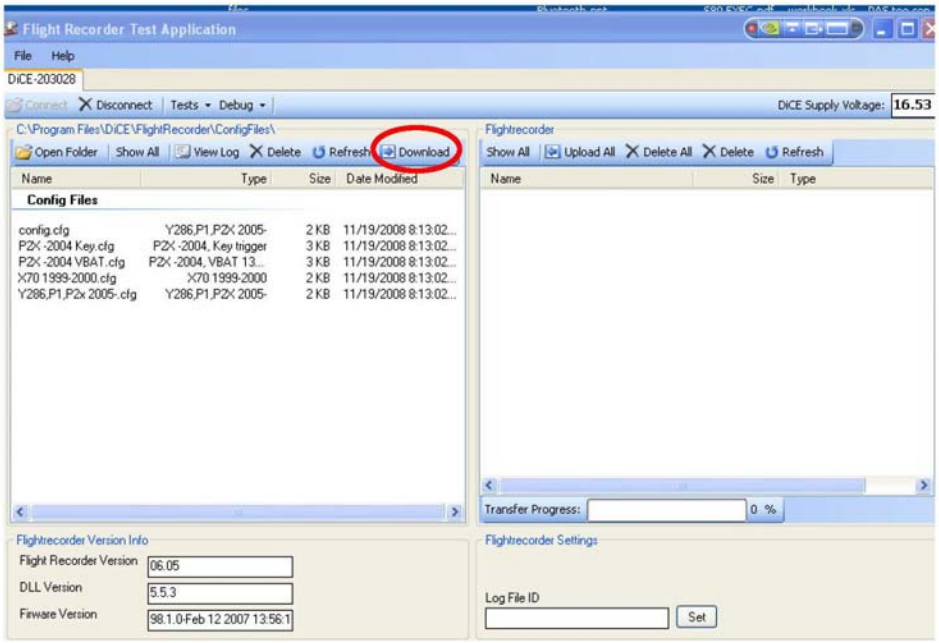
Click *"open folder"* and a file browser window will appear.



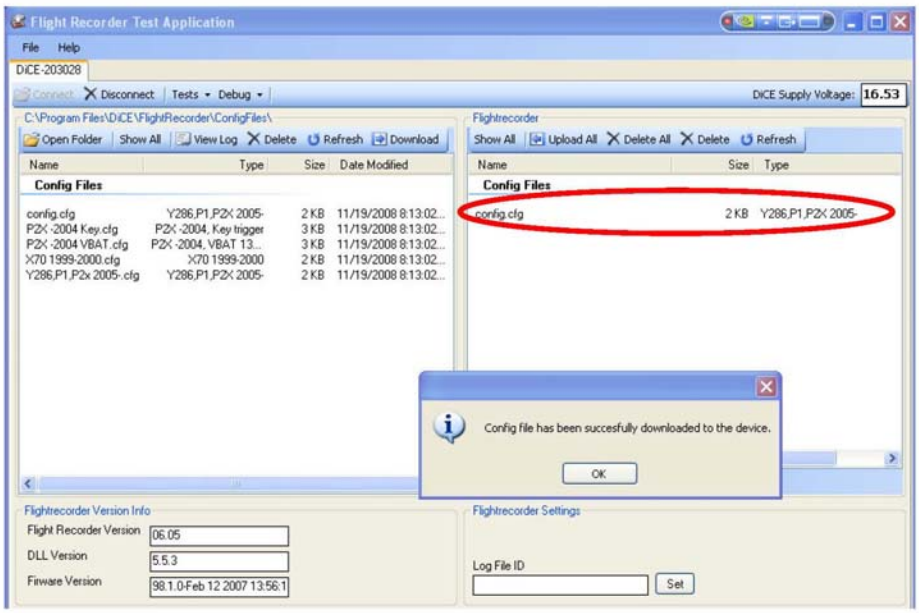
Chose File path;
C/Program files/DICE/flightrecorder/ configfiles

Click OK.

5 different config files will be displayed in the left hand window



Highlight the file to be loaded to the SD card and click "download"

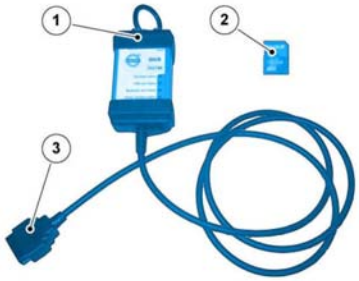


The selected file will appear on the right window when the transfer is complete and a confirmation window will be displayed

DONE !
Your SD card is now configured to start the EFF function.

If you wish to remove the config file from the card, highlight the file in the right window and click "*delete*"

3. How to use the DICE error Frame Finder mode



1,
Insert an SD card with the appropriate config file into the DICE unit.

2.
Remove the Bluetooth adapter from the VIDA workstation.
If the DICE unit is within range of a VIDA workstation it will attempt to pair with it and prevent the EFF from functioning.

3.
Plug the DICE unit into the OBD connector and turn the key to position 2 or start engine.

4.
The following indications will be noticed given a normal operating network.

1. **Flashing at 4 sec intervals**
   DICE in EFF mode
2. **Flashing or continuously lit** data flow on CAN high speed
3. **LED not lit.**

Short flashes of this LED indicate there are error frames being sent on CAN low or high speed network.

4. **Flashing or continuously lit**
   Data flow on CAN low speed network

4.Tips on CAN fault tracing with the EFF

1.

"Error Frame Finder" (EFF)

When using the "Error Frame Finder", There is an indication lamp (blue LED) that flashes if an error frame is discovered on the CAN network.
This does not indicate which network, LS or HS network, has a problem, just that there is a problem.
Connect "Error Frame Finder" to the OBD connector, ignition in position 2.
It is also possible to drive the vehicle with the EFF installed. In this case it is possible that vehicle movement, e.g. chassis twisting, engine movement, braking or acceleration can induce the electrical fault that will cause error frames to be sent.

2.

Fault types that can be found with "Error Frame Finder"

- Problems with cable harnesses
- Communicating/defective modules
- Connector problems
- Ground connections

3.

Cable harness problem

If the problem is suspected to be a cable problem, start by bending, pulling or pushing the cable harnesses back and forth and check whether the blue LED starts to flash. If the blue LED starts to flash, the source of the problem has probably been found.

4.

Communicating/defective modules (babbling nodes)

This is the most difficult type of problem to find.

Connect the "Error Frame Finder" and set the ignition to position 2.

Check to see if the blue LED flashes, if not, the fault is not currently active.

Leave the vehicle in key pos 2 with a power supply connected and wait. It can take hours and in a few cases days before the fault occurs but it usually does occur sooner or later. It may also help to let the network go into sleep mode and wake it up repeatedly to induce the fault.

Once the fault is active, start by removing fuses for the CAN modules (remove module by module) and check when the blue LED stops flashing. When the correct fuse has been found, confirm the fault by inserting the fuse again and checking if the blue LED starts to flash again.

5.

Connector problems

Connect "Error Frame Finder" and if the problem is active, disconnect the connector from module and check if the blue LED stops flashing. If not, check the next connector to another module etc.

Connector problems can consist of:

- Voltage problem, check the voltage at the CAN connector pins. Check for a loose male connection at the connection.
- Oxidised connector pin, this causes poor contact.

6.

Miscellaneous

- Typical behaviour of the "Error Frame Finder" when a problem has occurred:
  The blue LED flashes several times at short intervals and then stops and then starts flashing again.
- **"Error Frames Finder" can sometimes be detected without the vehicle having any faults such as for example, when making a start attempt. This is normal**
- The "Error Frame Finder" can indicate a problem before some symptoms have started to appear on the vehicle.
- The "Error Frame Finder" is best used for detecting CAN faults of intermittent nature. If the network is not operating, use an ohmmeter and measure network resistance first.
- Physically disconnecting a terminating resistor node from the network could result in error frames

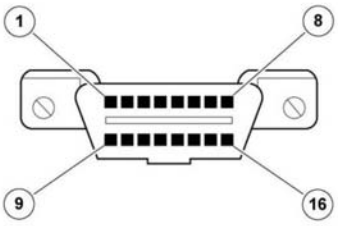
5. Tips on CAN fault tracing using the multi-meter method

Types of fault that can be found when measuring using the multi-meter method

- The resistance value indicates whether there is a permanent cable harness problem or permanent short-circuit inside a module and whether the CAN network is correctly connected.
- The CAN network works with only a terminating resistor connected.
- When the network is active and operating, the voltage indicates that the network is running correctly from an electrical point of view. If the voltage is too high, this is an indication that the network is heavily loaded and there are too many messages on the network. In this case the fault may be due to a "babbling node"

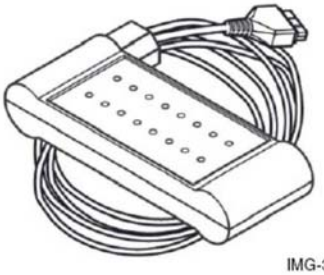
.

Measuring network resistance and operating voltages using a multi-meter



.

#16:	Power supply
#4 and #5:	Ground
#3 and #11:	LS network
#6 and #14:	HS network



IMG-328833

Special tool 9513015 can be an aid in accessing the OBDII connector.
Reference special tool bulletin #168

Breakout box for OBD II connector. The tool has the following 2 functions:
1. Allows measurement of voltage and resistance from the OBD II connector.
2. Allows a safe ground point via OBD II connector.
Suitable for all models with OBD II connector.

LS Low speed network resistance

Disconnect the battery and measure via the OBD connector

- Measure the resistance between terminals #3 and #11, value should be approx. 60 ohm
- Measure the resistance between terminals #3 and #4 (ground), the value should be >1 kohm
- Measure the resistance between terminals #11 and #4 (ground), the value should be >1 kohm
- Measure the resistance between terminals #3 and #16 (power supply), the value should be >1 kohm
- Measure the resistance between terminals #11 and #16 (power supply), the value should be >1 kohm

HS High speed network resistance

Disconnect the battery and measure via the OBD connector

- Measure the resistance between terminals #6 and #14, value should be approx. 60 ohm
- Measure the resistance between terminals #6 and #4 (ground), the value should be >1 kohm
- Measure the resistance between terminals #14 and #4 (ground), the value should be >1 kohm
- Measure the resistance between terminals #6 and #16 (power supply), the value should be >1 kohm
- Measure the resistance between terminals #14 and #16 (power supply), the value should be >1 kohm

LS-Low speed network normal operating voltages

Battery connected, key position 2. Measure via the OBD connector

- Measure the voltage between terminals #3 and #11, the normal value should be between 0.55 - 0.90 V
- Measure the voltage between terminals #3 and #4, the normal value should be approx. 2.8 V
- Measure the voltage between terminals #11 and #4, the normal value should be approx. 2.3 V

HS-High speed network normal operating voltages

Battery connected, Key position 2. Measure via the OBD connector

- Measure the voltage between terminals #6 and #14, the normal value should be between 0.55 - 0.90 V
- Measure the voltage between terminals #6 and #4, the normal value should be approx. 2.8 V
- Measure the voltage between terminals #14 and #4, the normal value should be approx. 2.3 V

See the attached document for use and setup of DICE error frame finder.Technical Service Bulletin # **TJ23502** Date: **100914**

Computers/Controls - Usage of RELOAD Software

TIE - Technical Journal

Title Usage of RELOAD software

Ref No US23502.1.0 en-GB

Issuer -

Partner 3 US 7510 Volvo Cars North America

Func Group 2800 Func Desc ignition and control system

Status Released

Status date 2010-09-16

Issue SDate 2010-09-14

Reference VIDA

ATTACHMENT

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
124							2007 -9999		0000001 -0999999	200605 -999952
134							2011 -9999		0000001 -0999999	201020 -999952
135							2008 -2010		0000001 -0999999	200720 -201019
136							2008 -9999		0000001 -0999999	200720 -999952
156							2010 -9999		0000001 -0999999	200905 -999952
184							1999 -9999		0000001 -0999999	199815 -999952
275							2003 -9999		0000001 -0999999	200232 -999952
285							2001 -9999		0000001 -0999999	200020 -999952
295							2001 -9999		0000001 -0999999	200020 -999952
384							2001 -9999		0000001 -0999999	200031 -999952
533							2007 -9999		0000001 -0999999	200837 -999952
542							2006 -9999		0000001 -0999999	200549 -999952
544							2004 -9999		0000001 -0999999	200339 -999952
545							2005 -9999		0000001 -0999999	200420 -999952

VEHICLE TYPE

Code	Description
3L	Repair information/Repair information/Not for warranty use
2V	Software/Vehicle communication/Software/Vehicle communication/Not for warranty use

CSC

DTC

Text

CSC = Customer Symptom Code

DTC = Diagnostic Trouble Code

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

DESCRIPTION:

This Technical Journal describes the usage of RELOAD software (SW). There are two main types of downloads; RELOAD and UPGRADE. By description a RELOAD shall be used when a node has been replaced and an UPGRADE shall be used when new SW version shall be downloaded to an existing node.

In the SW System Structure there is a blockage which stops you from purchasing an UPGRADE to a node if the node already contains the latest SW. In this case VIDA will show "error 133 - the node to be upgraded already contains the latest SW".

If the node already contains the latest SW there is absolutely no reason to perform a RELOAD to that node. This will only bring down the same SW as the node already contains and will make no difference for the customer concern.

A lot of warranty cost is spent on these unnecessary RELOADs and they do not offer anything to the customer's concern(s).

The warranty department will start looking into these unnecessary RELOADs both to reduce the cost and also to ensure that the correct remedy is performed in order to solve the customer's concern(s).

SERVICE:

Do not use RELOAD SW to solve a SW problem if the node already contain the latest SW (error 133 when trying to perform UPGRADE as described above) as this will not add any extra value.

There are occasions when a reload is necessary even if the node contain the latest SW. For example if a node does not respond at downloading it is sometimes necessary to perform a RELOAD SW even if the node is not replaced. Also on recommendation from Technical Support a RELOAD is sometimes applicable to use.

Technical Service Bulletin # **TJ19674** Date: **100719**

Steering/Suspension - Alignment Specifications

TIE - Technical Journal

Title Wheel alignment specifications

Ref No US19674.3.3 en-GB

Issure SDEGRAZ1

Partner 3US7510 Volvo Cars North America

Func Group 6010 Func Desc wheel alignment

Status Released

Status Date 2010-07-21

Issue Date 2010-07-19

Reference VIDA

File Name	File Size
Attachment TJ 19674.pdf	0.3174 MB

Attachment

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Type	Eng	Eng Desc	Sales	Body	Gear	Steer	Model Year	Plant	Chassis range	Struc Week Range
124							2007 -9999		-	0 -0
134							2011 -9999		-	0 -0
135							2008 -9999		-	0 -0
136							2008 -9999		-	0 -0
156							2010 -9999		-	0 -0
184							1999 -2006		-	0 -0
275							2003 -9999		-	0 -0
285							2001 -2007		-	0 -0
295							2001 -2007		-	0 -0
384							2001 -2009		-	0 -0
533							2007 -9999		-	0 -0
542							2006 -9999		-	0 -0
544							2004 -9999		-	0 -0
545							2005 -9999		-	0 -0

Vehicle Type

Code	Description
QF	Steering/Constant pull to left
QG	Steering/Constant pull to right
8V	Tires/Pulls/drifts

CSC

Text
CSC = Customer Symptom Code
DTC = Diagnostic Trouble Code

Note!

If using a printed copy of this Retailer Technical Journal, first check for the latest online version.

NOTE!

THIS DOCUMENT SUPERSEDES THE PREVIOUS RETAILER TECHNICAL JOURNAL 19674 DATED 02-09-2010. Wheel angle specifications for the 2011 S60 have been added. PLEASE UPDATE YOUR FILES.

DESCRIPTION: Wheel angle specifications must be updated more often than the standard VIDA DVD update. Until further notice, Volvo Cars of North America (VCNA) will use this Retailer Technical Journal (RTJ) to update and publish current wheel angles for Front Wheel Drive (FWD) and All Wheel Drive (AWD) models. This RTJ is updated when the designing department at Volvo Car Corporation (VCC) modifies a value for one or more wheel angles or when a new vehicle model is released.

SERVICE:
For the current wheel alignment specifications, please refer to the attached tables. Be sure the alignment equipment at your facility is updated.

		Car Customer Service
		TJ Instruction
		No. 19674
		Date July -10 Issue 05
Title	Wheel angle specifications	

Issue	Date	Reason
05	July -10	Toe measurement across both wheels, front XC90 2009- Thrust angle S60 (11-)
04	July - 10	Wheel angle specifications for new model – S60
03	Febr -10	Variation and adjustment values are added to all previous control values. A number of specific values are updated.
02	April -09	Wheel angle specifications for new model - S80L

1.

Note! Some variation in the illustrations may occur, but the essential information is always correct.

2.

This instruction will be updated when the designing department at Volvo Car Corporation (VCC) decides to modify a value for one or more wheel angles or when a new vehicle model is released.

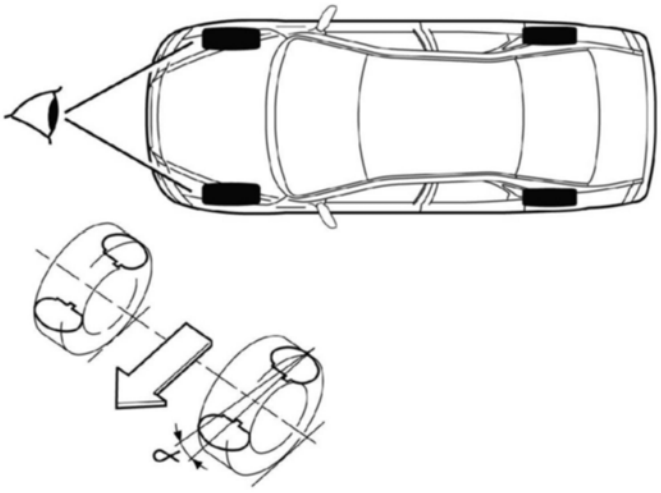
Note! New toe values. The check value is used when measuring wheel angles. When adjusting, use the adjustment value, however, if the value is within the check value, adjustment is not necessary.

3.

Toe

Adjusting to positive values generates toe-in angle while adjusting to negative values generates toe-out angle.

Note! All published toe values are for total toe measurement (left and right wheels together).

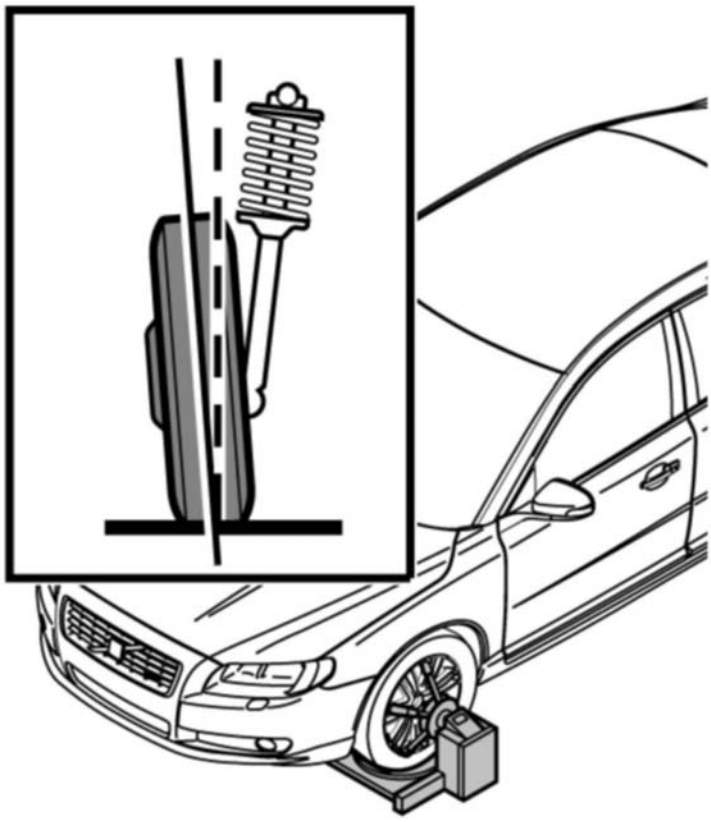


D6400515

4.

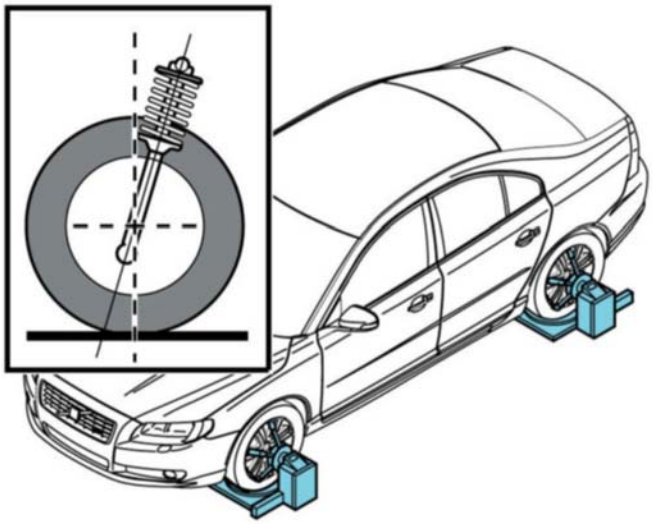
Camber

The graphic shows a positive camber angle, and the dashed line equals the plumb line.



5.

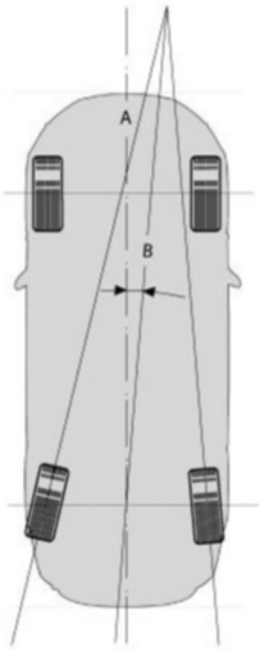
Caster



The graphic shows a positive caster angle.

6.

Thrust angle



A -center line

B -thrust angle

7.

Thrust angle (B)

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
XC90	0° ± 0.25°	0' ± 15'	0° ± 0.10°	0' ± 6'
S60(11-)	0° ± 0.20°	0' ± 12'	0° ± 0.10°	0' ± 6'
Other models	0° ± 0.25°	0' ± 15'	0° ± 0.25°	0' ± 15'

C30/ S40 (04-)/ V50/ C70 (06-)

Camber measurement per side, front

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
S40/V50/C30 std and dynamic	-0.6° ± 0.7°	-36' ± 42'	0° ± 1°	0' ± 60'
S40/V50 AWD	-0.68° ± 0.7°	-40' 48" ± 42'	0° ± 1°	0' ± 60'
S40/V50/C30 Sport chassis	-0.9° ± 0.7°	-54' ± 42'	0° ± 1°	0' ± 60'
S40/V50/C30 ECOCH	-0.75° ± 0.7°	-45' ± 42'	0° ± 1°	0' ± 60'
C70	-0.75° ± 0.7°	-45' ± 42'	0° ± 1°	0' ± 60'

Camber measurement per side, rear

Model	Rear		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
S40/V50/C30 std and dynamic	-1.52° ± 1°	-91' 12" ± 60°	0° ± 1°	0' ± 60'
S40/V50 AWD	-1.52° ± 1°	-91' 12" ± 60°	0° ± 1°	0' ± 60'
C30 Sport chassis	-1.92° ± 1°	-115' 12" ± 60°	0° ± 1°	0' ± 60'
S40/V50/C30 ECOCH	-1.72° ± 1°	-103' 12" ± 60°	0° ± 1°	0' ± 60'
C70	-1.72° ± 1°	-103' 12" ± 60°	0° ± 1°	0' ± 60'

Caster measurement per side, front

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
S40/V50/C30 std and dynamic	3.6° ± 1.5°	216' ± 90'	0° ± 1°	0' ± 60'
S40/V50 AWD	3.7° ± 1.5°	222' ± 90'	0° ± 1°	0' ± 60'
C30 Sport chassis	4.0° ± 1.5°	240' ± 90'	0° ± 1°	0' ± 60'
S40/V50/C30 ECOCH	3.8° ± 1.5°	228' ± 90'	0° ± 1°	0' ± 60'
C70	3.8° ± 1.5°	228' ± 90'	0° ± 1°	0' ± 60'

Toe measurement across both wheels, front *

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
S40/V50/C30 std and dynamic	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
S40/V50 AWD	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
C30 Sport chassis	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
S40/V50/C30 ECOCH	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
C70	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'

* when measuring individual toe, the value should be half of the total toe value

Toe measurement across both wheels, rear *

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
S40/V50/C30 std and dynamic	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'
S40/V50 AWD	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'
C30 Sport chassis	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'
S40/V50/C30 ECOCH	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'
C70	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'

* when measuring individual toe, the value should be half of the total toe value

S80 (-06)/ V70 (00-08)/ V70XC (01-)/ XC70 (-07)/ S60 (-09)/ XC90

Camber measurement per side, front

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
S80 (-06) / V70 (01-07)/ S60 FWD (-09)	-0.3° ± 0.9°	-18' ± 54'	0° ± 1°	0' ± 60'
S80 (-06) / V70 (01-07) / S60 AWD (-09)	-0.3° ± 0.9°	-18' ± 54'	0° ± 1°	0' ± 60'
R-line	-0.5° ± 0.9°	-30' ± 54'	0° ± 1°	0' ± 60'
V70XC (01-)/XC70 (-07)	-0.3° ± 0.9°	-18' ± 54'	0° ± 1°	0' ± 60'
S80 (-06) / V70 (01-07)/ S60 Bi-fuel (-09)	-0.3º ± 0.9º	-18' ± 54'	0° ± 1°	0' ± 60'
XC90	-0.25° ± 0.5°	-15' ± 30'	0° ± 0.5°	0' ± 30'

Camber measurement per side, rear

Model	Rear		Variation left/right	
	Degrees	Degree minutes		Degree minutes
S80 (-06) / V70 (01-07)/ S60 FWD Normal height chassis (-09)	0° ±1.0°	0' ± 60'	0° ± 1°	0' ± 60'
S80 (-06) / V70 (01-07)/ S60 FWD Lowered chassis (-09)	-0.6° ±1.0°	-36' ± 60'	0° ± 1°	0' ± 60'
V70 (01-07) AWD	-0.3° ±1.0°	18' ± 60'	0° ± 1°	0' ± 60'
R-line	0.13° ± 1.0°	7' 48" ± 60'	0° ± 1°	0' ± 60'
V70XC (01-)/XC70 (-07)	0.3° ± 1.0°	18' ± 60'	0° ± 1°	0' ± 60'
XC90	-0.5° ± 0.6°	-30' ± 36'	0° ± 0.6°	0' ± 36'

Caster measurement per side, front

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
S80 (-06) / V70 (01-07)/ S60 (-09)/ R-line	4.0° ± 1 °	240' ± 60'	0° ±0.25°	0' ± 15'
V70XC (01-)/XC70 (-07)	5.0° ± 1.0°	300' ± 60'	0° ±0.25°	0' ± 15'
XC90	5.2° ± 0.5°	312' ± 30'	0° ± 0.50°	0' ± 30'

Toe measurement across both wheels *

Model	Front		Rear	
	Degrees	Degree minutes	Degrees	Degree minutes
S80 (-06) / V70 (01-07)/ S60 (-09)	0.1° ± 0.1°	6' ± 6'	0.2° ±0.2°	12' ± 12'
R-line	0.1° ± 0.1°	6' ± 6'	0.16° ±0.2°	9' 36" ± 12'
V70XC (01-)/XC70 (-07)	0.2° ± 0.1°	12' ± 6'	0.2° ±0.2°	12' ± 12'

* when measuring individual toe, the value should be half of the total toe value

Toe measurement across both wheels, front *

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
XC90 -2008	-0.16° ± 0.2°	-9' 36" ± 12'	-0.16° ± 0.1°	-9' 36" ± 6'
XC90 2009-	0.16° ± 0.2°	9' 36" ± 12'	0.16° ± 0.1°	9' 36" ± 6'

* when measuring individual toe, the value should be half of the total toe value

Toe measurement across both wheels, rear *

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
XC90	0.3° ± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'

* when measuring individual toe, the value should be half of the total toe value

S80 (07-)/ V70 (08-)/ XC70 (08-)/ XC60/ S60 (11-)

Camber measurement per side

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
XC60	-0.65° ± 0.5°	-39' ± 30'	0.0° ± 0.5°	0' ± 30'
V70 (08-)	-0.65° ± 0.5°	-39' ± 30'	0.0° ± 0.5°	0' ± 30'
XC70 (08 -) Chno - 64921	0.0° ± 0.5°	0' ± 30'	0.0° ± 0.5°	0' ± 30'
XC70 (08-) Chno 64922 -	-0.6° ± 0.5°	-36' ± 30'	0.0° ± 0.5°	0' ± 30'
S80 (07-)	-0.6° ± 0.5°	-36' ± 30'	0.0° ± 0.5°	0' ± 30'
S60 (11-)	-0.75 ± 0.5º	-45' ± 30'	0° ± 0.5°	0' ± 30'

* Camber variation left to right has to be positive

Camber measurement per side

Model	Rear		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
XC60	-0.69° ± 0.5°	-41' 24" ± 30'	0.0° ± 0.5°	0' ± 30'
V70 (08-)	-1.13° ± 0.5°	-67' 48" ± 30'	0.0° ± 0.5°	0' ± 30'
XC70 (08-)	-0.75° ± 0.5°	-45' ± 30'	0.0° ± 0.5°	0' ± 30'
S80 (07-)	-1.32° ± 0.5°	-79' 12" ± 30'	0.0° ± 0.5°	0' ± 30'
S60 (11-)	-1.25 ± 0.5º	-75' ± 30'	0° ± 0.5°	0' ± 30'

Caster measurement per side

Model	Front		Variation left/right	
	Degrees	Degree minutes	Degrees	Degree minutes
XC60	2.9° ± 0.5°	174' ± 30'	0.0° ± 0.7°	0' ± 42'
V70 (08-) /XC70 (08-)	3.1° ± 0.5°	186' ± 30'	0.0° ± 1.0°	0' ± 60'
S80 (07-)	3.1° ± 0.5°	186' ± 30'	0.0° ± 1.0°	0' ± 60'
S60 (11-)	3.2° ± 0.5°	192' ± 60'	0° ± 0.7°	0' ± 42'

Toe measurement across both wheels, front *

Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
XC60/ V70 (08-) /XC70 (08-) / S80 (07-)	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
S60 (11-)	0.24°± 0.15°	14.4' ± 9'	0.24° ± 0.1°	14.4' ± 6'

* when measuring individual toe, the value should be half of the total toe value

Toe measurement across both wheels, rear *

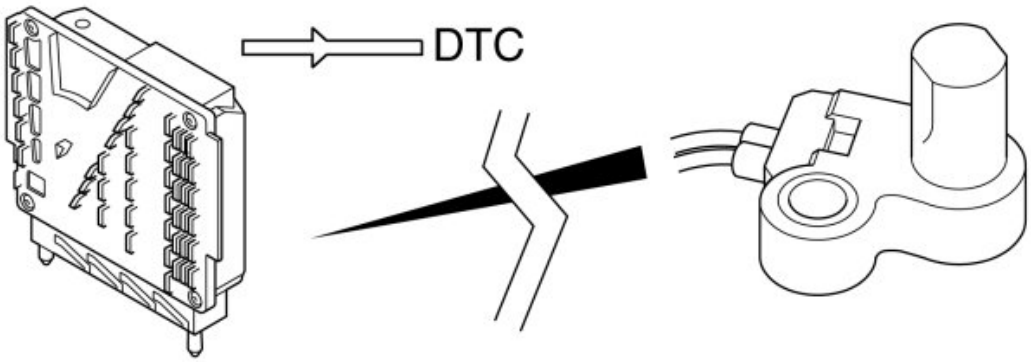
Model	Control value		Adjust value	
	Degrees	Degree minutes	Degrees	Degree minutes
XC60/ V70 (08-) /XC70 (08-)	0.2° ± 0.2°	12' ± 12'	0.2° ± 0.1°	12' ± 6'
S80 (07-)	0.16° ± 0.2°	9.6' ± 12'	0.16° ± 0.1°	9.6' ± 6'
S60 (11-)	0.30°± 0.2°	18' ± 12'	0.3° ± 0.1°	18' ± 6'

* when measuring individual toe, the value should be half of the total toe value

Computers and Control Systems: Testing and Inspection

General

General



A malfunction that is detected is assessed by the control module's self-diagnosis. First after, e.g., a certain time, a certain number of driving cycles, certain driving/operation or other conditions, the control module decides if it is a real malfunction or not.
When self-diagnosis has determined that a real malfunction exists, you can say that the **malfunction is confirmed** and the malfunction is stored in the control module's trouble code memory in the form of diagnostic trouble codes.
If a malfunction disappears, the diagnostic trouble code will remain for a tome in the diagnostic trouble code memory, but the status of the diagnostic trouble code changes. How long the diagnostic trouble code is stored in the diagnostic trouble code memory is different from control module to control module, as well as between different vehicle models (generation of vehicle model).
In some systems the diagnostic trouble code will be stored until it is erased with the diagnostics tool. In other systems the diagnostic trouble code is erased automatically by the control module after, e.g., a certain number of malfunction-free driving cycles. A new driving cycle (operation cycle) is usually started every time the ignition is turned on.

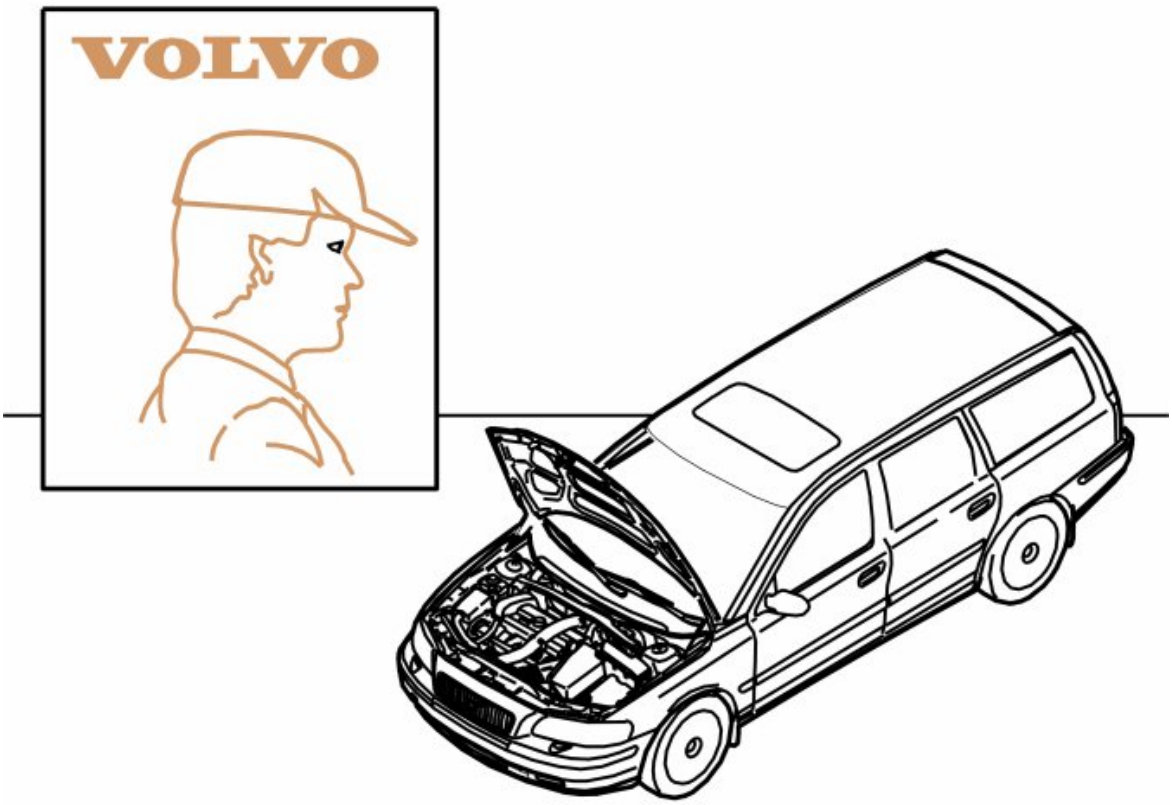
Information about the nature of the malfunction is stored for every diagnostic trouble code:

- when the malfunction was detected (frozen values, counters)
- what the driving conditions were at the time (frozen values)
- status for the test (diagnosis) (status identifier)
- how frequent the malfunction is (counter).

Exactly what is stored is different from control module to control module, , as well as between different vehicle models (generation of vehicle model).
If the system is provided with warning light, it is lit when the ignition key is turned to position II. The warning light will go off after a certain number of seconds when no malfunction is detected on the control system.
The warning light will be on in case of a malfunction of the control system. The warning light will be lit first after the malfunction is confirmed as a real malfunction.

Introduction

Introduction



Volvo has developed a wide range of tools and information for easier and faster troubleshooting of the vehicle and its different systems. The range includes service and troubleshooting information, integrated self-diagnostics in control modules, measuring instrument for exhaust analysis, diagnostic tools, etc.
Troubleshooting or diagnostics are performed by the mechanic using two different concepts; Off Board Diagnostics (diagnostics outside the vehicle) or On Board Diagnostics (diagnostics system in the vehicle).
Off Board Diagnostics (diagnostics outside the vehicle) is done **without** help from the control module's self-diagnosis. Examples of these are:

- Breakout box and multimeter to measure signals.
- Mechanic's troubleshooting using hearing, touch, and vision as well as experience.
- Diagnostic tools that are connected in parallel between control module and connector.
- Cylinder leak tester.

On Board Diagnostics (diagnostic systems in the vehicle) **is done using the control module's self-diagnosis** and is read out and presented using a diagnostics tool.

	Off Board Diagnostics	On Board Diagnostics
Advantages	• A few tools to develop compared to functionality/software in all control modules. • Can probably be used for several models.	• Store information about the nature of the malfunction (malfunction frequency, test status, driving conditions), making it possible to troubleshoot intermittent malfunctions. • Require a diagnostic tool to convey information to the mechanic.
Disadvantages	• If the malfunction has disappeared (intermittent), the malfunction will probably not be found.	• Software and its functionality must be in every control module (great quantity). • If a malfunction in the software is detected, many units must be updated.

The term **Diagnostics** refers to true recognition and designation of an illness. The term comes from the Greek **dia** = through, and **gnosis** =

knowledge. The purpose of a diagnosis is to give a summarized term for the different symptoms that the "sick" describes, and thus be able to give a specific treatment.
The control module in the vehicle includes software to manage intended function (e.g., control all functions of an engine), to monitor the system's components and functions. Monitoring (self-diagnosis) detects any malfunctions, stores these, activates protective actions (back-up modes) and, in some cases, warns the driver.
Monitoring (diagnosis) is always activated when the system is on but tests are started and run according to different pre-defined conditions. A malfunction that is detected is first assessed by monitoring, after, e.g., a certain time, a certain number of driving cycles, certain driving/operation cases or other conditions, the control module decides if it is a real malfunction or not. When monitoring determines that a real malfunction exists, it can be said that the malfunction is confirmed and the malfunction is stored.
The basic goal of self-diagnosis in control modules is to detect and report malfunctions in a control module or its connected components and cables. Part of the goal (found in legal requirements) is also to detect malfunctions that affect emissions as well as malfunctions that may cause subsequent damage to emission-related components.
Self-diagnosis shall also warn for malfunctions that mean a safety risk for drivers, passengers, and vehicles that otherwise would not cause a symptom and thus not be detected. This applies to, e.g., brake system and SRS-system.
Self-diagnosis shall be used by workshops as one of the tools for taking care of the symptom (property/malfunction) that the customer experiences. After the malfunction cause is found (via troubleshooting) and taken care of (via repair), self-diagnosis can also be used to verify that the malfunction cause has been fixed and that the customer's symptom does not exist any longer.

Note! The control module's self-diagnosis (diagnostic trouble code tests) cannot detect all malfunctions that may occur in a vehicle. This primarily applies to mechanical malfunctions but also some electrical malfunctions, e.g., poor connection to battery, or relay spools for a relay are monitored but the function/circuit that the relay controls is not monitored.Unfortunately, sometimes the control module's self-diagnosis can miss to generate a diagnostic trouble code for a malfunction where the customer experiences a symptom (malfunction), and sometimes it may generate a diagnostic trouble code despite the customer not experiencing any symptom (malfunction). This is because customers have different sensitivity to malfunctions (how easily the symptom is detected) and because it is not always to optimize self-diagnosis for all conditions that may occur during the vehicle's life.That is why you should not entirely rely on the vehicle's diagnostic trouble codes.Diagnostic trouble codes should only be regarded as indicators of probably malfunction sources. If the customer experiences a symptom (malfunction) but diagnostic trouble codes are not stored, this does not mean that the vehicle is trouble-free!

Worth keeping in mind when troubleshooting:

- When there is so much electronic equipment in the vehicles, it is easy to blame the "complex" electronics and forget the normal basics for, e.g., an engine's function. But the basics are the same today as when we had carburetor engines!
- A common mistake in troubleshooting is to quickly restricting yourself to a certain area without having checked basic functions, e.g., that the ignition system and engine are in good mechanical condition, the battery is fully charged, fuses are intact.
- Troubleshooting information gives very good guidance when troubleshooting and is almost impossible to do without. By using the customer's symptom, developed troubleshooting methods with, e.g., diagnostic trouble code information, you are quickly guided to being able to pin-point the malfunction.

Note! The electronic components in the control systems are very reliable and seldom cause any malfunctions.

This document describes the following:

- Background to why self-diagnosis is found in the vehicle.
- Diagnostic services, what they do.
- Using the self-diagnosis.
- Diagnostic versions and its communication method.
- Tools for reading out diagnosis.
- Where I find the information.

Background

Background

General

Factors that have improved safety, increased comfort, added functions and increased environmental friendliness, have made modern vehicles more and more complicated.
The more complicated the vehicle is, the more important is the diagnostics system in the vehicle with the diagnostics tool when it comes to ensuring fast, safe and economic test, service and repair.
To reduce emissions from the vehicle, the diagnostic systems shall also, according to legislation, detect emission-influencing problems as well as defects that may cause follow-up damage on emission-related components.

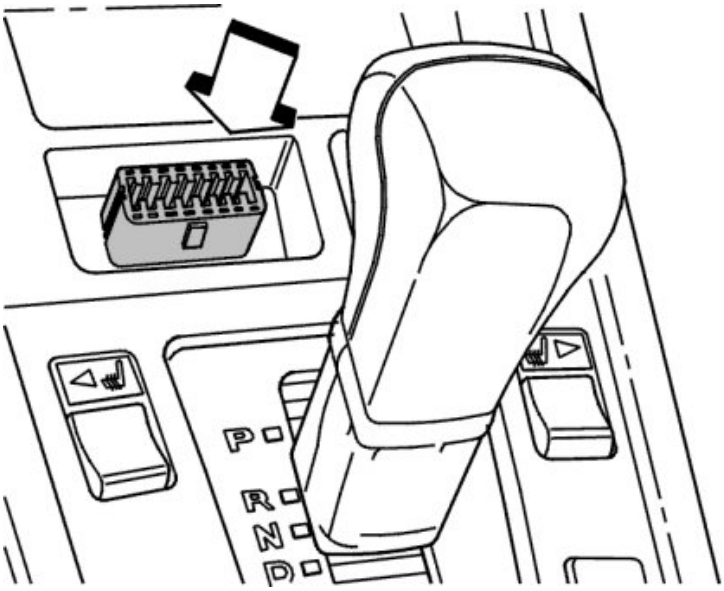
Legal requirements emissions

OBD I - On Board Diagnostic I

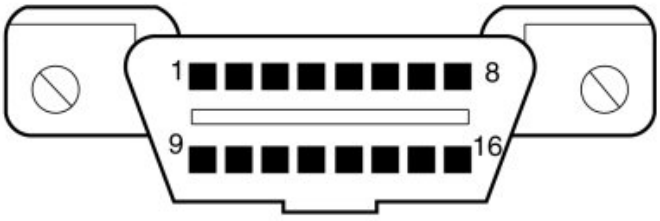
On Board Diagnostic I (diagnostic system in the vehicle) was 1988 a requirement from CARB (California Air Resource Board) which is an air quality board. The purpose of these regulations was to ensure that component or function defects that affected exhaust emissions are detected by the control module's diagnostic functions.
OBD I included diagnosis of control module, emission-related components connected to the control module as well as exhaust gas recirculation. Using the diagnostic socket in the engine compartment, the information about the system was accessible to all, both brand-name workshops and

independent workshops.
In case of a detected emission-related problem, a warning light is activated in the driver information module (MIL= Malfunction Indicator Light), when the problem is confirmed as a real malfunction. Thus, the light is not activated immediately upon detection, only first when the malfunction is confirmed, which may be, e.g., following a few driving cycles.

OBD II - On Board Diagnostic II



On Board Diagnostic II was another requirement from CARB that applied from 1996. CARB demanded additional and refined diagnosis for emission-related component and systems in the drivetrain (engine and transmission).
Also, a standardized communication method was required for reading out of diagnosis (Standard SAE J1979 and J2190, where J2190 is voluntary and includes Enhanced Diagnostics - the vehicle manufacturer's own diagnosis in addition to legal requirements).
It should be possible to read out diagnostic trouble codes and their format, information connected to diagnostic trouble codes as well as parameters*, according to this standard. OBD II's diagnostic trouble codes are five-digit and begin with the letter P followed by four digits.
This standardized communication method means that anyone shall be able to manufacture and sell an instrument for reading out, a so-called Generic Scan Tool. Thus, the vehicle owner is not dependent on using a brand-name workshop.
The standard OBD II requires a standardized diagnostic socket in the passenger compartment near the driver's seat, where this instrument is to be plugged in. This means that the diagnostic socket (connector) is the same on all vehicles regardless of manufacturer or model.
However, there is a difference between manufacturers regarding which pins are used in the connector. This depends on the OBD II standard supports four types of communication protocols.
A protocol may be said to be the "language" that is to be used for communication with the control module.



Standardized pins on OBD II-connector:

- Pin 2 SAE J-1850 bus +
- Pin 4 Chassis ground
- Pin 5 Signal ground
- Pin 6 SAE J-2284, CAN-bus (CAN-H)
- Pin 7 SAE J1979, ISO 9141-2 / ISO14230-4, K-line
- Pin 10 SAE J-1850 bus -
- Pin 14 SAE J.2284, CAN-bus (CAN-L)
- Pin 15 ISO 9141-2 / ISO14230-4, L-line
- Pin 16 Voltage feed

Other pins in the connector are permitted for the vehicle manufacturer's own specific use. On pin 7 (K-line), two-way communication is permitted, on pin 15 (L-line) only one-way communication is permitted to the control module. Therefore, the L-line is missing in many vehicles.
ISO14230-4 = Protocol KWP2000.

OBD II was first introduced for Volvo on engine management system Motronic 4.3, Motronic 4.4, and automatic transmission AW 50 42, AW 30 40/43 in model 850/960 for market USA/CDN.
With time, OBD II-communication with control modules via CAN is introduced.
The legal requirement also includes the function Readiness Monitoring, see other section.
* Parameter refers to, e.g., rpm, engine temperature, battery voltage, etc., with associated value 800 rpm, 87 °C as well as 14,2 V, etc.

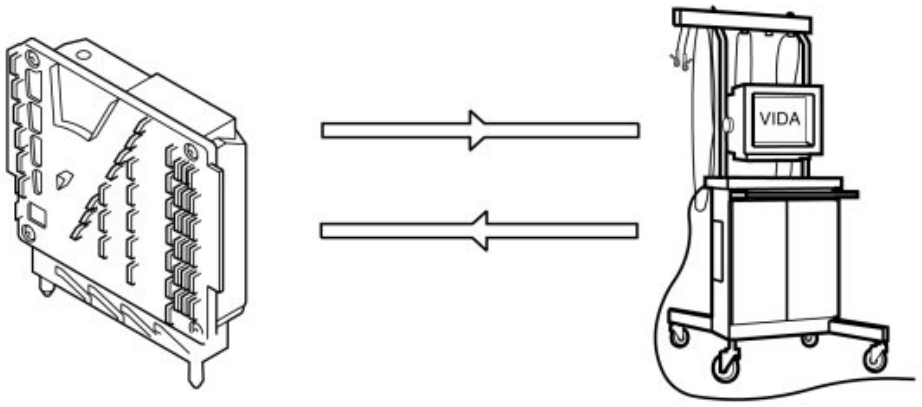
EOBD - European On Board Diagnostic

EOBD, European On Board Diagnostic is a legal requirement in Europe which, in principle, includes the same requirements as OBD II. EOBD applies to spark plug engines (gasoline engines) registered year 2000 and later, and self-igniting engines (diesel engines) registered 2003 and later. For information about, among other diagnostic socket, see OBD II above.

Diagnostics and Services

Diagnostics and services

General



The control module's diagnostics can perform and present the following using a connected diagnostics tool:
- Store malfunction indicator (diagnostic trouble codes) and in certain cases activate warning light or show text message.
- Store information about the nature of the malfunction:
  - Counter that indicates how frequent the malfunction is
  - Status indicators for the diagnostic trouble code test.
  - Frozen values that were generated when malfunction was detected for the first time.
- Erase information about malfunction and its information.
- Present values (parameters) for different connected input signals and output signals from, e.g., components as well as other calculated values.
- Present part number, version number, component number, etc. for both software and hardware.
- Present and change certain special customer settings and configurations.
- Trigger/control (activate) the connected output signals.
- Start special built-in check programs/tester such as, e.g., calibrations of gear position sensor, quick-test of tank system.
- Access check to limit access to certain parameters and functions. Accessible first after unlocking with, e.g., PIN-code.

Exactly what each control module's diagnostics can perform depends both on model year and system.

Diagnostic trouble codes (malfunction indicator)
- General See: Testing and Inspection/Initial Inspection and Diagnostic Overview/General
- Conditions for diagnosis to find a malfunction See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Conditions for Diagnosis to Find a Malfunction
- Driving cycle/operation cycle See: Testing and Inspection/Monitors, Trips, Drive Cycles and Readiness Codes
- Emergency mode, back-up mode "Limp-home" See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Emergency Mode, Back-up Mode "Limp-home"
- Classification of diagnostic trouble codes See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Classification of Diagnostic Trouble Codes
- Designation of trouble codes See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Designation of Trouble Codes
- Status identifier See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Status Identifier
- Counter See: Initial Inspection and Diagnostic Overview/Counter
- Frozen values See: Testing and Inspection/Scan Tool Testing and Procedures/Frozen Values
- Erasing diagnostic trouble codes See: Testing and Inspection/Initial Inspection and Diagnostic Overview/Erasing Diagnostic Trouble Codes
- Readiness Monitor (certain markets only) See: Description and Operation/Engine Management System/Diagnostic Functions/Readiness Monitor (Certain Markets Only)

Parameters

Parameters or values are data that are read out from the control module's memory positions to, e.g., check the signal from a sensor or identify the control module's software version.

In principle, parameters can be divided into two parts:
- one for **dynamic values** continuously updated in the control module
- one for **static values** not changed by the control module and always stored.

Parameters, dynamic

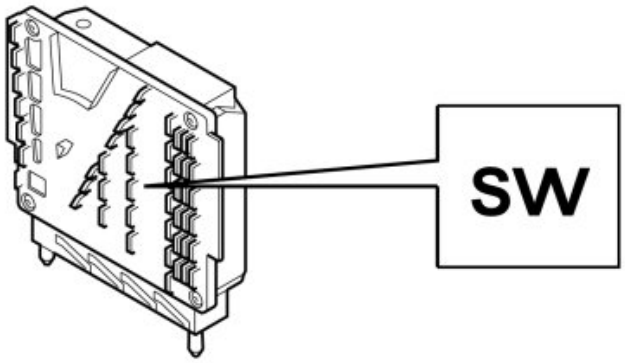
The **dynamic values** are stored in the control module's RAM-memory, which means that the values disappear when the memory's power supply is turned off (control module is turned off). As soon as the control module's power is turned on (ignition on), values are stored again.

Example of values are:
- Outside temperature
- Engine speed
- Load
- Coolant temperature
- Vehicle speed
- Battery voltage

Values are updated continuously after a pre-determined time interval.This means that certain values are updated with very short time interval, while other values are updated more seldom. Update rate is determined by how important the value is to the control module.
By reading off the value from, e.g., a sensor or switch, it can be decided if the signal is correct or not.

Note! When a malfunction is detected and a diagnostic trouble code is stored, it may well be that the displayed value is a replacement value and not the real value. If the value does not change, e.g., if the sensor is disconnected, it may be the replacement value that is shown.

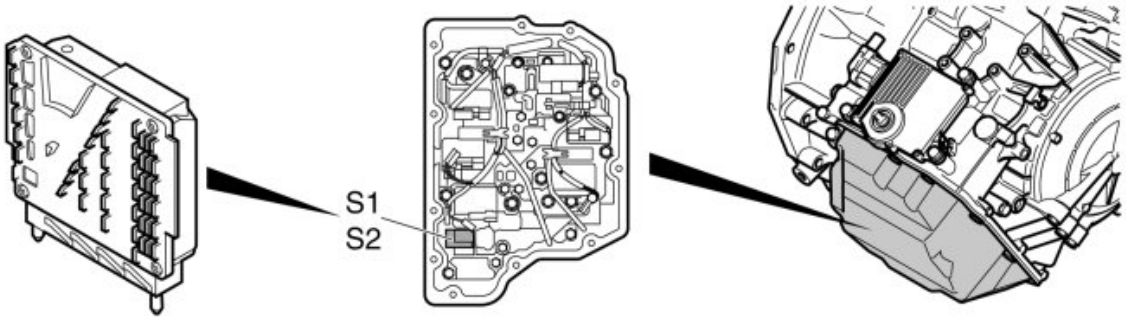
Parameters, static



The **static values** are stored in the control module's EEPROM, which means that these values are always stored regardless of if the control module is on or off. These values are normally not updated by the control module, instead they are only changed using, e.g., the diagnostics tool at vehicle manufacture in the factory or reprogramming during a workshop visit.

Example of values are:
- Hardware P/N (control module without software).
- Hardware serial number (control module without software).
- Software P/N.
- Diagnostic software P/N.
- Customer-programmed values, e.g., passenger compartment temperature, alarm on and off.
- The vehicle's configuration, that is, the vehicle's content and equipment that can be used to compare the vehicle's equipment physically with how the vehicle is configured. The configuration may be affected/changed, e.g., when downloading software.

Activations



Wit this service it is possible to trigger (activate) the components that are connected to the control module. Examples of components are:
- Relays
- Solenoids
- Lock motors
- Damper motors
- Signals to other control modules.

Note! If a malfunction is detected, diagnostic trouble code is stored and emergency functions or modes, etc. are activated to "protect" the system, the control module can prevent activation.

Depending on the system, the control module or diagnostics tool can perform activations in different ways, for some the component is activated according to a certain pattern, e.g., OFF, ON, OFF, ON, OF, ON, etc. in a sequence.
For other systems, the component is activated, e.g., ON, and remain on until the activation is stopped.

Quick-tests, calibrations

Quick-tests or calibrations are functions or checks that are integrated in the control module's software and are started by the control module using commands from the diagnostics tool.
Wit this service it is possible to start certain pre-defined checks or teach-ins. Examples of these are:
- Quick-test of fuel tank system
- Quick-test of camshaft control
- Resetting of adaptations and counter for oil
- Calibration of gear position sensor
- Calibration of components for Brake control module (BCM)

Note! To enable start and running of these services, it is often that certain start conditions must be fulfilled.

Software downloading

New software can be downloaded to the control modules. When ordering software the vehicle software and hardware are compared to Volvo's central database. If the comparison corresponds the new software is downloaded to the control module.
If the comparison between the car and Volvo's central database does not correspond, then the database is updated with the vehicle's configuration. When this is complete the software is downloaded.
For further information regarding downloading, see Design and Function, Downloading Software.

Practical Use Of Diagnostics

Practical use of diagnostics

General

There are several ways to decide if the malfunction is active right now or not as well as when the malfunction occurred:
- **Read off the diagnostic trouble code's counter, status identifier and frozen values.** By interpreting these you can find out when the malfunction was stored, how often the malfunction has occurred (intermittence) and what the driving conditions were when the malfunction was stored.
- **Read off a parameter** for component/system and decide if the value is correct or not. By, e.g., manually affecting the sensor or the switch, you can decide immediately if the parameter (signal) with its circuit is correct.
- **Trigger a component** (activate) and decide if the component/function is affected or not. By triggering, e.g., the relay and listening for its clicking sound or the function which is to be affected, it is possible to decide immediately if the component is correct.
- **Decide if the vehicle shows any symptom (malfunction).** If the vehicle no longer shows the symptom, one may suspect that the malfunction no longer is active.

The following accounts in detail for some of the above.

To decide the intensity of a malfunction

Note! Examples 1-5 (below) are based on counters for diagnostic concept Generic Global Diagnostic (GGD).

When a malfunction is intermittent or has unknown status, the diagnostic trouble code's counter is very useful to decide:

- How many driving cycles that have passed since the malfunction was detected the first time as well as since the malfunction was detected.
- During how many driving cycles that the control module has detected the malfunction during a certain period, as well as how many driving cycles that the control module has not detected the malfunction. That the control module has not detected the malfunction may be due to the control module not having started the test for the malfunction, conditions to detect the malfunction are not fulfilled, or that the malfunction no longer exists.

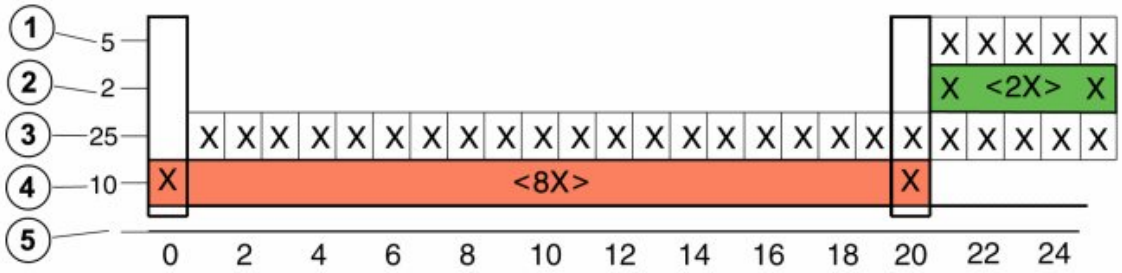
The purpose of interpreting the counters is that it is possible to understand the malfunction's intensity, that is, show "how much" intermittent the malfunction is, as well as help in assessing if the chances to repeat the malfunction and customer symptom, and then succeed with troubleshooting. If you read out the diagnostic trouble code information and it shows that the diagnostic trouble code test runs at least once every driving cycle (e.g., when driving), the counters' value may be very important when assessing the diagnostic trouble code's status and actions. However, if start of diagnostic trouble code test and its conditions are difficult to achieve, the counters' values should be considered to be of less importance. Counters 1 and 3 show driving cycles. Counters 2 and 4 also show driving cycles, but then really a "share" of counters 1 and 3, respectively. In principle, counter 4 shows how many times that the customer should have detected symptoms.

Note! For systems with diagnostic concept Generic Global Diagnostics (GGD). If many diagnostic trouble codes are stored at the same time, then certain diagnostic trouble codes (the oldest) will have these frozen values/counters erased, this to save memory in the control module. These diagnostic trouble codes will then only have counter 2 left. Note also that counter 2 will also be erased when the memory is full, but often later than when other counters are erased.

Note! For system with diagnostic concept Volvo Diagnostics II. If many diagnostic trouble codes are stored at the same time, the control module keeps at least half of the oldest and half of the newest diagnostic trouble codes in the trouble code memory.

Note! For diagnostic trouble codes where the malfunction is not detected for many driving cycles and where the malfunction is detected again, then frozen values and counter values are written over with new values, that is, the diagnostic trouble code is considered "new".

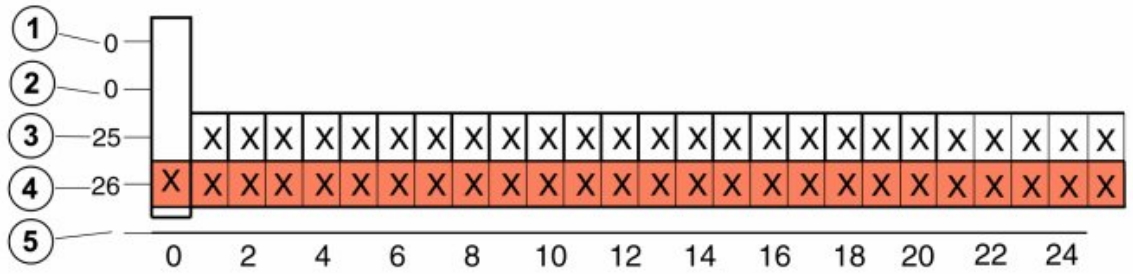
Example 1, Intermittent malfunction



1. Counter 1 = 5
2. Counter 2 = 2
3. Counter 3 = 25
4. Counter 4 = 10
5. Driving cycles

After the malfunction has been detected for the first time (driving cycle 0) the malfunction has been detected again in 9 of the first 20 driving cycles (counter 4 = 10). Using this, the conclusion can be drawn that in 11 driving cycles (20-9=11) the test has not been run or the malfunction has not been found, or a combination of these. After the last time that the malfunction was detected (in driving cycle 20), 5 driving cycles have passed (counter 1 = 5), where the test was run in 2 driving cycles without detecting a malfunction (counter 2 = 2).
Conclusion: Intermittent malfunction
Assessment: Good possibility to repeat the malfunction and customer symptom, and thus succeed with troubleshooting, as the malfunction has been found quite recently in several driving cycles.

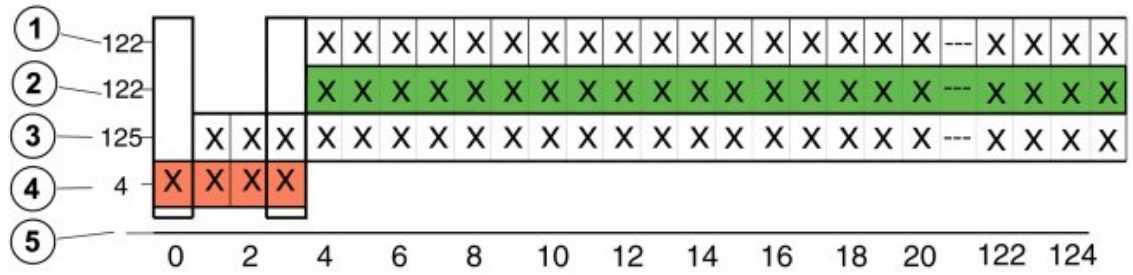
Example 2, Permanent malfunction



1. Counter 1 = 0
2. Counter 2 = 0
3. Counter 3 = 25
4. Counter 4 = 26
5. Driving cycles

After the malfunction has been detected for the first time (driving cycle 0) the malfunction has been detected again in all following driving cycles (counter 3 = 25, and counter 4=26).
Conclusion: Permanent malfunction
Assessment: Very good possibility to repeat the customer symptom and thus succeed with troubleshooting, as the malfunction has been found in every driving cycle. Since the malfunction has been detected during the present driving cycle (no. 26) it does not really matter for troubleshooting if the malfunction has been detected in all previous driving cycles or not.
The counter show more how "sure" the malfunction is as well as that it can confirm if the customer experienced the malfunction as the counter indicates.

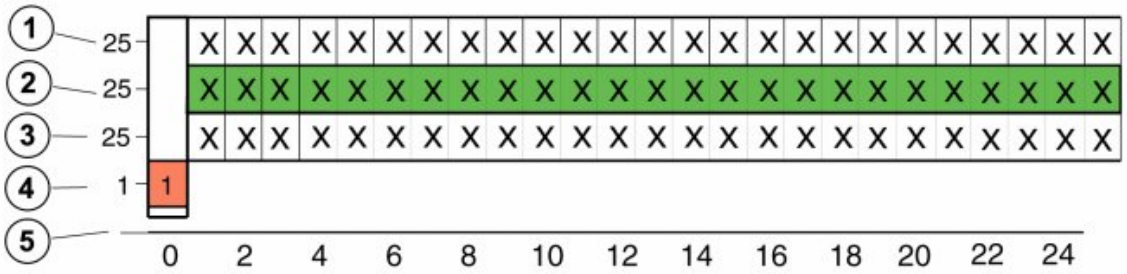
Example 3, Intermittent malfunction



1. Counter 1 = 122
2. Counter 2 = 122
3. Counter 3 = 125
4. Counter 4 = 4
5. Driving cycles

After the malfunction has been detected for the first time (driving cycle 0) the malfunction has been detected again in the 3 following driving cycles (counter 4 = 4). After the last time that the malfunction was detected (in driving cycle 3), 122 driving cycles have passed, where the test has been run in 122 driving cycles without detecting a malfunction.
Conclusion: Intermittent malfunction
Assessment: Not very good chance to repeat the malfunction and the customer symptom and thus succeed with troubleshooting, as the malfunction has only been detected in a few driving cycles a very long time ago.
The less driving cycles a malfunction has been detected in and the greater the number of driving cycles since the malfunction was detected the last time, the more difficult it is expected to be to repeat the malfunction and the customer symptom and thus succeed with troubleshooting.
This can be read off by the lower value is on counter 4 and the higher the value is on counter 1 and 2, as well as the lower the difference is between the value on counter 3 and counter 2, the more difficult it is expected to be to repeat the malfunction and the customer symptom and thus succeed with troubleshooting.

Example 4, Intermittent malfunction



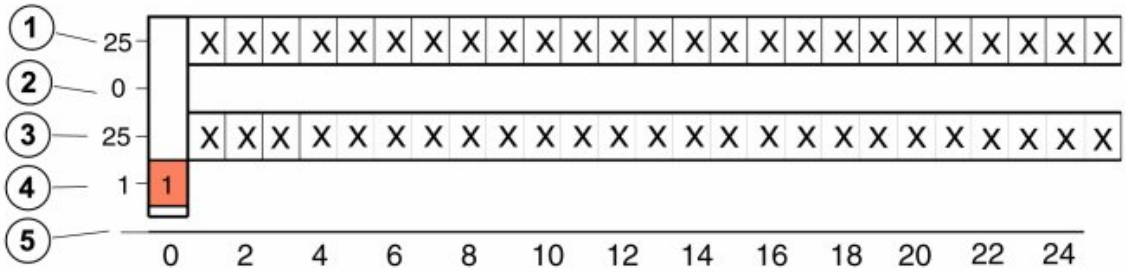
1. Counter 1 = 25
2. Counter 2 = 25
3. Counter 3 = 25
4. Counter 4 = 1
5. Driving cycles

After the malfunction has been detected for the first time (driving cycle 0) (counter 4=1), the malfunction has never been detected again. After the last time that the malfunction was detected, 25 driving cycles have passed, where the test has run in 25 driving cycles without detecting a malfunction.

Conclusion: Intermittent malfunction

Assessment: Not very good chance to repeat the malfunction and the customer symptom and thus succeed with troubleshooting, as the malfunction has only been detected in one driving cycle quite a long time ago.

Example 5 Unknown status



1. Counter 1 = 25
2. Counter 2 = 0
3. Counter 3 = 25
4. Counter 4 = 1
5. Driving cycles

After the malfunction has been detected for the first time (driving cycle 0) (counter 4=1), the malfunction has never been tested and/or detected. After the last time that the malfunction was detected, 25 driving cycles have passed where the test has not been started. Since the diagnostic trouble code test has not started anymore, it cannot be decided if the malfunction exists or not.

Conclusion: Unknown status

Assessment: Read diagnostic trouble code information and try to achieve condition so that the diagnostic trouble code test is started and run, which makes it possible to detect the malfunction. If the malfunction is detected, chances are very good to repeat the customer symptom, and thus succeed with troubleshooting when the malfunction has been found in the current driving cycle.

If the malfunction was not detected even though conditions are fulfilled, then chances are less good to repeat the customer symptom, and thus succeed with troubleshooting as the malfunction has not been found in the current driving cycle.

To decide diagnostic trouble code test's status

By reading out the diagnostic trouble code with associated status identifier, then **status for the diagnostic trouble code test (diagnosis) that detects the malfunction and generates the diagnostic trouble code, is obtained.**

Example 1, Permanent malfunction

Status identifier:

SB00	Malfunction found the last time that the diagnostic trouble code test was run during current driving cycle	=	Yes
SB01	Malfunction found at least once during the current driving cycle	=	Yes
SB02	Malfunction found at least once during the current and previous driving cycles	=	Yes
SB03	Malfunction found recently since erasing of diagnostic trouble codes	=	Yes
SB04	Diagnostic trouble code test run at least once since erasing of diagnostic trouble codes	=	Test run
SB05	Malfunction found at least once since erasing of diagnostic trouble codes	=	Yes
SB06	Diagnostic trouble code test run at least once during the current driving cycle	=	Test run
SB07	Request for lit warning light/text message	=	Yes

The diagnostic trouble code test has been run in both current driving cycle and in earlier driving cycles. Malfunction has been detected both in current driving cycle and in previous driving cycle, which indicates that the malfunction is active right now. The control module has requested lighting of the warning light.
Conclusion: Permanent malfunction.
Assessment: Very good chance to repeat the customer symptom and thus succeed with troubleshooting, as the malfunction has been found in current and in previous driving cycle. Since the malfunction has been detected during the present run cycle, it does not really matter for troubleshooting if the malfunction has been detected in all previous driving cycles or not. If this information is supplemented with the counters' values you can decide how "permanent" the malfunction is.
If the vehicle is stationary, e.g., with the ignition on, this means that the test runs directly when the ignition is turned on. This makes it easier to both fins the malfunction and to verify that the malfunction cause has been take care of.

Example 2, Unknown status

Status identifier:

SB00	Malfunction found the last time that the diagnostic trouble code test was run during current driving cycle	=	No
SB01	Malfunction found at least once during the current driving cycle	=	No
SB02	Malfunction found at least once during the current and previous driving cycles	=	Yes
SB03	Malfunction found recently since erasing of diagnostic trouble codes	=	Yes
SB04	Diagnostic trouble code test run at least once since erasing of diagnostic trouble codes	=	Test run
SB05	Malfunction found at least once since erasing of diagnostic trouble codes	=	Yes
SB06	Diagnostic trouble code test run at least once during the current driving cycle	=	Test not run
SB07	Request for lit warning light/text message	=	No

The diagnostic trouble code test has been run in previous run cycles but not in current driving cycle. Malfunction has been detected in previous run cycle, but not in current driving cycle since the test has not started. Warning light is on.
Conclusion: Unknown status
Assessment: Since the test has not started in the current driving cycle it is not possible to decide if the malfunction is "active" right now. First read the diagnostic trouble code information and try to obtain conditions so that the test is started and run, which enables detection of the malfunction. If the malfunction is detected, chances are very good to repeat the customer symptom, and thus succeed with troubleshooting as the malfunction has been found in the current driving cycle.
If the malfunction was not detected even though conditions are fulfilled, then chances are less good to repeat the customer symptom, and thus succeed with troubleshooting as the malfunction has not been found in the current driving cycle.

To decide operation conditions when the malfunction was detected

Malfunctions in a system may be intermittent. It is important to remember this when troubleshooting a possible malfunction cause. If the malfunction is not in the vehicle when it is in the workshop you can miss a malfunction cause since the values may be correct when troubleshooting takes place. A good indication of when the malfunction first occurred for the first time are the frozen values that can be read out for every diagnostic trouble code.
The frozen values are stored immediately after a malfunction has been detected. Most parameters in the frozen values are the same for all malfunctions and indicate a general condition when a malfunction has been detected, e.g., engine rpm, load, coolant temperature, vehicle speed and battery voltage. Some of them have been selected to give a better understanding of the specific malfunction.
Diagnostic trouble code **ECM-903F Electronic throttle unit, internal malfunction** cam be used as an example of how frozen values can be used. The first possible source indicated in VIDA is the voltage feed to the electronic throttle unit and then continues by suggesting that you check the battery and charging system. However, the battery's condition when the vehicle is in the workshop does not necessarily show the battery voltage when the malfunction was detected.
Instead, the best information is found in the frozen values, that is, voltage that the Engine control module (ECM) detects when Electronic throttle module (ETM) indicated the malfunction.
However, you should remember that this is not an indication of voltage feed to Electronic throttle module (ETM), it is voltage feed to Engine control module (ECM). If Engine control module (ECM) according to frozen values has had good voltage the battery was okay. Therefore, voltage feed to Electronic throttle module (ETM) should be checked separately.

Frozen values for ECM 903F:

- Condition, heated oxygen sensor control bank 1 = LR: Closed circuit with two sensors
- Condition, heated oxygen sensor control bank 2 = LR: Closed circuit with two sensors
- Calculated load = 4.71%

- Engine temperature = 87 °C
- Fuel adaption, quick adjustment, bank 1 = 15.63%
- Fuel adaption, slow adjustment, bank 1 = -0.78%
- Fuel adaption, quick adjustment, bank 2 = 23.44%
- Fuel adaption, slow adjustment, bank 2 = -0.78%
- Engine speed = 760 rpm
- Vehicle speed = 0 km/h
- Boost pressure = 30%
- Battery voltage = 12.50 V
- Throttle angle, desired value = 14.84%
- Air mass = 23.8 kg/h
- Outside temperature = 33 °C

In this case we assume that the vehicle had low battery voltage in the workshop. However, as can be seen in the frozen values, battery voltage was okay when the malfunction occurred, so this was probably not the cause.
This is an example of how frozen values can be used to increase efficiency of troubleshooting and avoid using too much time for incorrect troubleshooting. This prevents troubleshooting and fixing a malfunction that was not the real cause of the problem that was to be solved.
The odometer reading (km) is sometimes included in frozen values in Engine control module (ECM). This enables a quick comparison with the odometer so that you can assess if the malfunction occurred as part of the troubleshooting and can be ignored. For example, CAN-network-related diagnostic trouble codes are saved when the battery voltage drops during work on the vehicle since passenger compartment lighting and other loads drain the battery.
The frozen values indicate odometer reading in km. If you multiply this value by factor 0.62 you obtain driving distance in miles. Current driving distance in both miles and km can be read out with VIDA.
Keep the following in mind when using frozen values for troubleshooting.
The frozen values to be used with care are those stored for the CAN-net and are related to diagnostic trouble codes for Electronic throttle module (ETM).
If Electronic throttle module (ETM) detects that communication to Engine control module (ECM) is interrupted, then malfunction flags will be generated in Electronic throttle module (ETM). These malfunction flags will be sent to Engine control module (ECM) first when communication on the CAN-net works again.
This means that Engine control module (ECM) will store the diagnostic trouble codes first when Electronic throttle module (ETM) delivers them, which in turn means that it is at this point in time that the frozen values are saved. For Electronic throttle module (ETM) this means that the frozen values will be from a point in time after the malfunction first occurred.

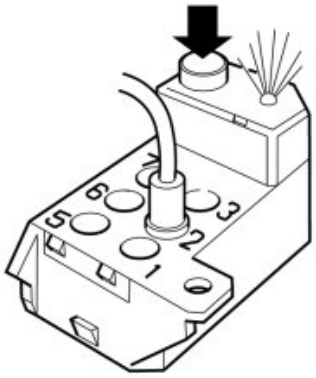
Diagnostic Versions and Communication Methods

Diagnostic versions and communication methods

General

Since the end of the 1980s, the control module's diagnosis has developed from detecting simple problems and storing a small amount of information to including more complicated tests and checks.
Today a large amount of information can be read out both about the detected problem as well as parameters from the control module's input and output signals.
The following accounts for the main principles for this development.

Volvo Diagnostics I - first version



A Volvo standard was introduced **(Volvo Diagnostics I) 1988**, which means diagnosis of several on-board systems (On Board Diagnostic).
This Volvo Diagnostics included:

- Store problem indicators (diagnostic trouble codes) for various components as well as delete them (check function 1).
- Confirmation of activating components or functions (check function 2).
- Cyclic activation of components/functions (check function 3).

A diagnostic tool (diagnostic socket with light-emitting diode) was located in the engine compartment for reading out a Volvo Diagnosis from the various control modules.
Volvo Diagnostics, the first version is found on, e.g., fuel control system LH 2.4 and ignition system EZ 116K for model 240 and 740.

Volvo Diagnostics I - second version

Volvo Diagnostics, the second version, was introduced in 1991 meant that additional services were made available, such as:

- Possibility to control transfer rate for data between the control module and the diagnostic socket.
- Individual activation of components/functions (check function 4).
- Read in and out signals (check function 5), where every value is represented by a three-digit code.
- Enter data (check function 6), where you could enter data via three-digit codes.

Services are introduced to varying extent on the different control modules.
The diagnostic socket with light-emitting diode is used to read out Volvo Diagnostics from the various control modules.
The tool Volvo Diagnostic Key and then Volvo System Tester were introduced to make communication easier with the control module.
Volvo Diagnostics, the second version is found on, e.g., Transmission control module (TCM)a AW 30-40/43 in model 960 and AW 50-42 in model 850.
For further information on the diagnostic socket and its functions, see service information for each system.

Non-standardized serial communication

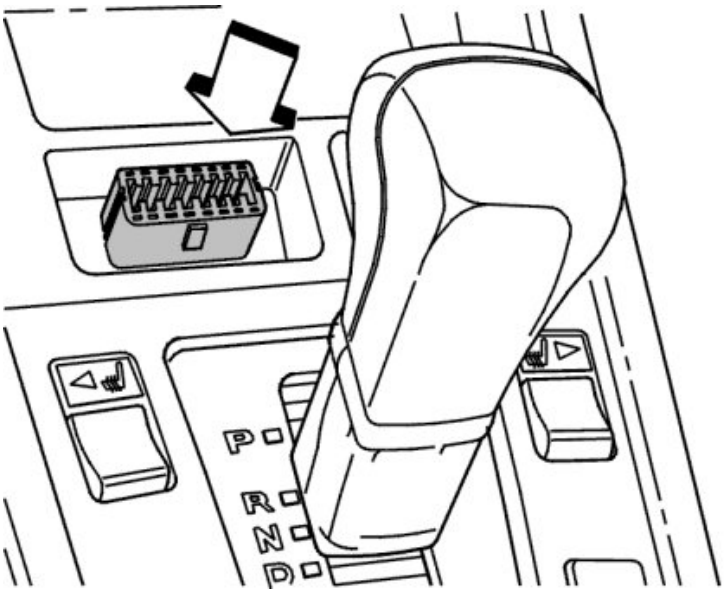
As a supplement to Volvo Diagnostics - first and second version, the supplier of engine management systems developed their own diagnostic and communication methods (On Board Diagnostic). These were introduced during **1991**/**92**.
These serial* communication methods were supplier-specific and varied a lot between systems. To communicate quickly and directly with control modules was a pre-condition for developing the control system and opened for new possibilities.
The access to more information about the detected problem as well as the possibility to, e.g., quickly read out parameters, enabled improvement of troubleshooting methods. Therefore, these communication methods were used by the workshops' diagnostics tools.
The cable in the vehicle used for this serial communication is connected to the diagnostic socket in the engine compartment and is the same one used for Volvo Diagnostics, first and second version.

Included functions are, among others:

- Reading out and erasing diagnostic trouble codes.
- Reading off frozen values.
- Reading off values of signals such as coolant temperature, voltage on heated oxygen sensor, etc.
- Activating components and functions.
- Programming of customer parameters and functions.
- Calibration of functions.
- Resetting of adaptations.

The tool Volvo System Tester was developed to make communication easier with the control module.
Non-standardized serial communication was introduced on engine management system Motronic 1.8 in model 960 and engine management system Fenix 5.2, Motronic 4.3, and LH3.2/EZ129K in model 850.
* Serial means that the information is sent as a series of signals in the form pulse trains (= series of pulses) via a cable between the tool and control module.

Volvo Diagnostics II - first version



Volvo Diagnostics II - first version was a new Volvo standard introduced in **1996**. This meant that control modules communicated serially in the same way, and that diagnostic functions in the different systems were designed in a similar manner.
The communication cable in the vehicle used for this communication is common to all control modules in question. The control modules are connected to the same connection in the diagnostic socket (pin 7).
The diagnostic socket is located in the passenger compartment and for certain markets it is common with the diagnostics system OBD II.

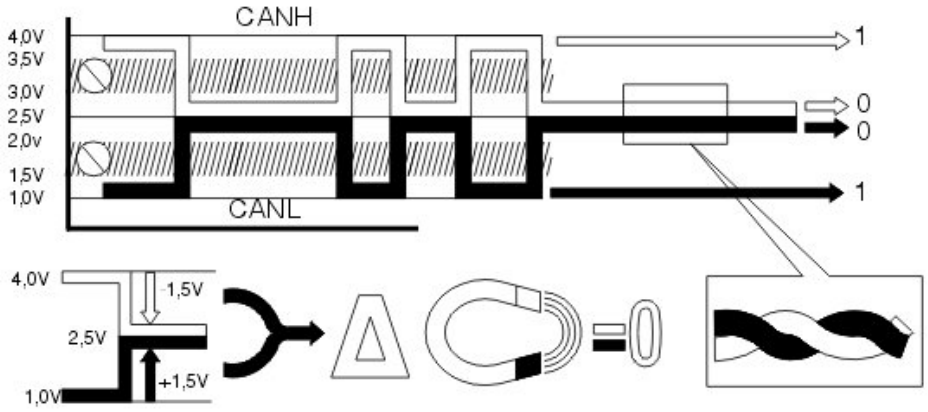
Volvo Diagnostics II, first version, was introduced in 1996 on, among others:

- Engine management system Motronic 4.4
- Automatic transmission AW 50 42/AW 30 40/43

- Control module Airbag SRS6.2
- Immobilizer
- Control module Brakes ABS 850
- Combined instrument panel 850
- Power seat 850/960
- and was gradually introduced for additional systems and car models.

For certain models, the diagnostics tool for this diagnosis is still Volvo System Tester (car models from and incl. model year 1998 as well as certain systems for model year 1999).
The diagnostics tool VIDA, now replacing VADIS, is used for car models of model year 1999 and later.

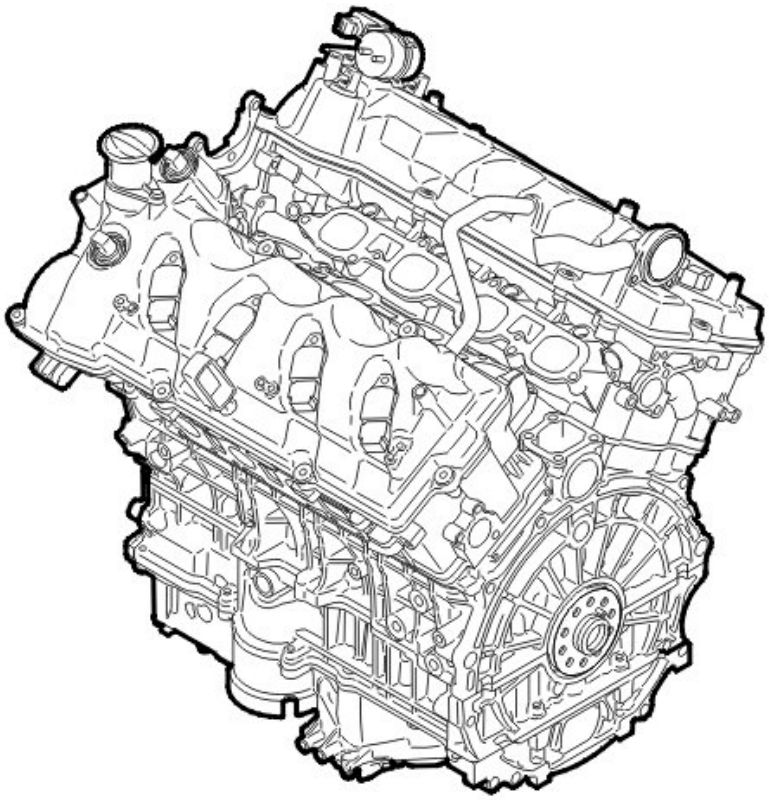
Volvo Diagnostics II - second version



Volvo Diagnostics II - second version was introduced in **1999** and is a development of the first version. The major difference is that communication between the diagnostics tool and the control modules takes place via CAN-communication instead of on a communication cable. The control modules also communicate with each other to exchange information on the CAN-net instead of via separate cables between the control modules.
This version introduced the possibility to download software to the control modules.
With the introduction of this version, the rate in the low-speed network was (LS CAN) 125 kbit/s and the rate in the low-speed network was (HS CAN) 250 kbit/s. Depending on model and model year, the speed of the network has increased with time.
For further information about CAN, see Design and Function, CAN-net as well as Design and Function, Downloading Software.
Volvo Diagnostics II, second version, was introduced in model S80/S60/V70 (00-)/V70 XC (01-)/XC70/XC90 model year 1999- as well as S70/V70 (-00)/V70 XC (-00)/C70 for model year 1999 and thereafter in future models.
The diagnostics tool VIDA, now replacing VADIS, is used for car models of model year 1999 and later.

Generic Global Diagnostics (GGD)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Generic Global Diagnostics (GGD) is a mutually developed diagnostics concept within the Ford company.
Communication and services are similar to Volvo Diagnostics II - first version. Communication between the diagnostics tool and control modules takes place via CAN-communication. The services that can be performed are similar.
Designation of trouble codes adheres to standard ISO/DIS 15031-6.4 and consist of a letter and six characters.
The control modules also communicate on the CAN-net with each other to exchange information.
It is also possible to download other software to the control modules.
Volvo Diagnostics, fifth version, was introduced in model XC90 model year **2005** with engine B8444S (only high-speed network) and then in model S80 (07-).
The diagnostics tool VIDA, now replacing VADIS, is used for car models of model year 2005 and later.

Tools For Diagnostics

Tools for diagnostics

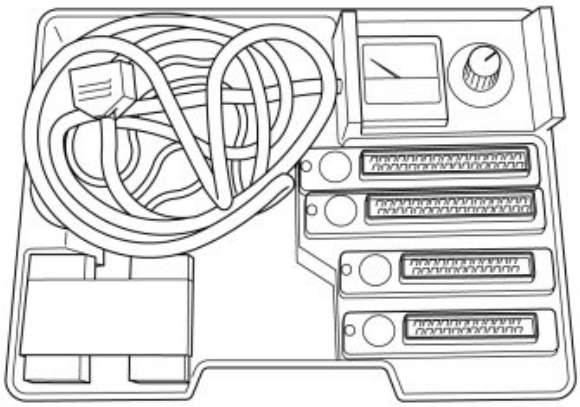
General

Tools used for troubleshooting and diagnostics are divided into two different types, tools for **Off Board Diagnostic** (diagnostics outside the vehicle) or **On Board Diagnostic** (diagnostics system in the vehicle) where the control module's diagnosis is used.
There are several tools used for Off Board Diagnostics, a few intended for diagnosis of a control module and its systems are mentioned in this document.

Note! There are control modules with integrated diagnosis, where read-out of diagnosis only is possible with a built-in "tool". This applies to, e.g., climate control module MCC for model S70/V70/C70, where read-out takes place via light-emitting diode on the front of the panel. For, e.g., audio unit HU 1205 for model S40/V40, the audio unit is not connected to the diagnostics socket in the vehicle. All diagnostics as well as other settings are controlled directly by menus in the display.

Tools for Off Board Diagnostics

Troubleshooting instrument ("Carpenter's toolbox")

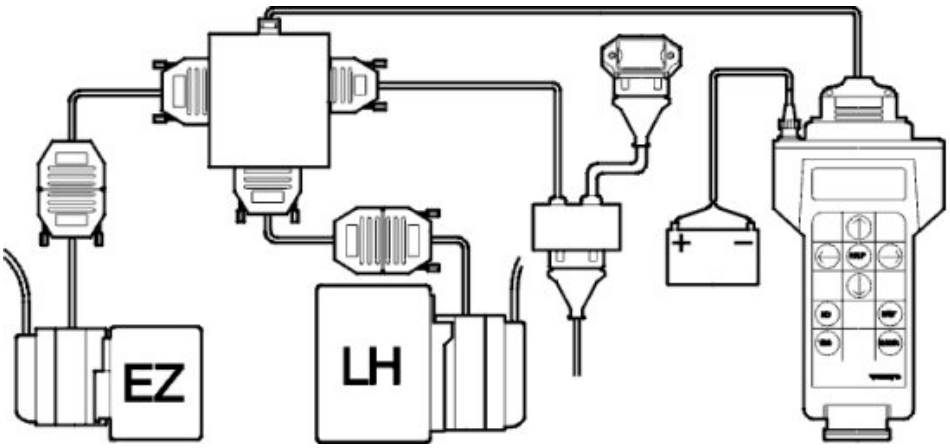


This troubleshooting instrument ("Carpenter's toolbox") (998-8195) is connected in parallel with the fuel control module and the vehicle's cable harness. Using the control on the box itself, you choose which values that the analogue display is to show.
The box also contains two light-emitting diodes, one green and one red which are turn on/off, e.g., at released or pressed down accelerator (check of throttle switch).
A number of different adapters made it possible to connect to different control modules.

Example of fuel systems where the tool can be used:

- LH-Jetronic, B200/230-engines for model 200/700.
- LE/LU-Jetronic, for model 360.
- Fenix, model 400.
- Motronic, model 740/760 Turbo.

Volvo System Tester - parallel connection



Volvo System Tester - parallel connection was introduced for model year 1986, as a troubleshooting instrument where you connected in parallel between the control module and the cable harness.
Volvo System Tester measured input and output signals in analogue mode and signals were then shown in Volvo System Tester. It was also possible to detect intermittent malfunctions.

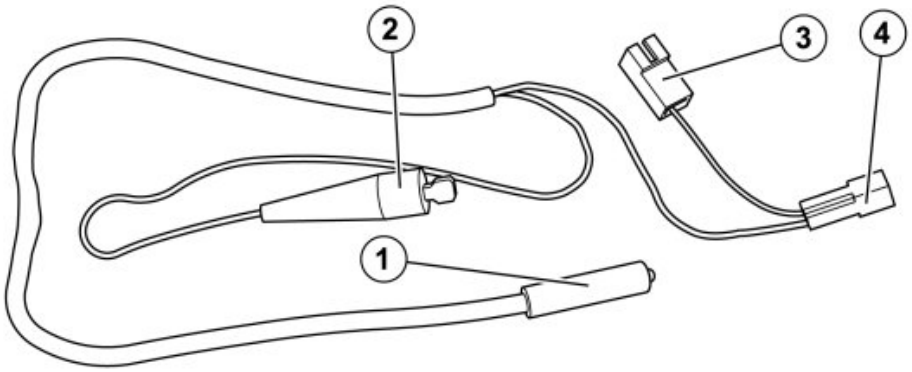
With Volvo System Tester connected, it was possible to:

- Reading off values of signals such as coolant temperature, voltage on heated oxygen sensor, etc.
- Monitor certain signals and compare with pre-programmed values as well as register and store deviations.

A number of different adapters made it possible to connect to different control modules.
Thus, at parallel connection, diagnosis is performed of Volvo System Tester.

Tools for On Board Diagnostics

Test diode



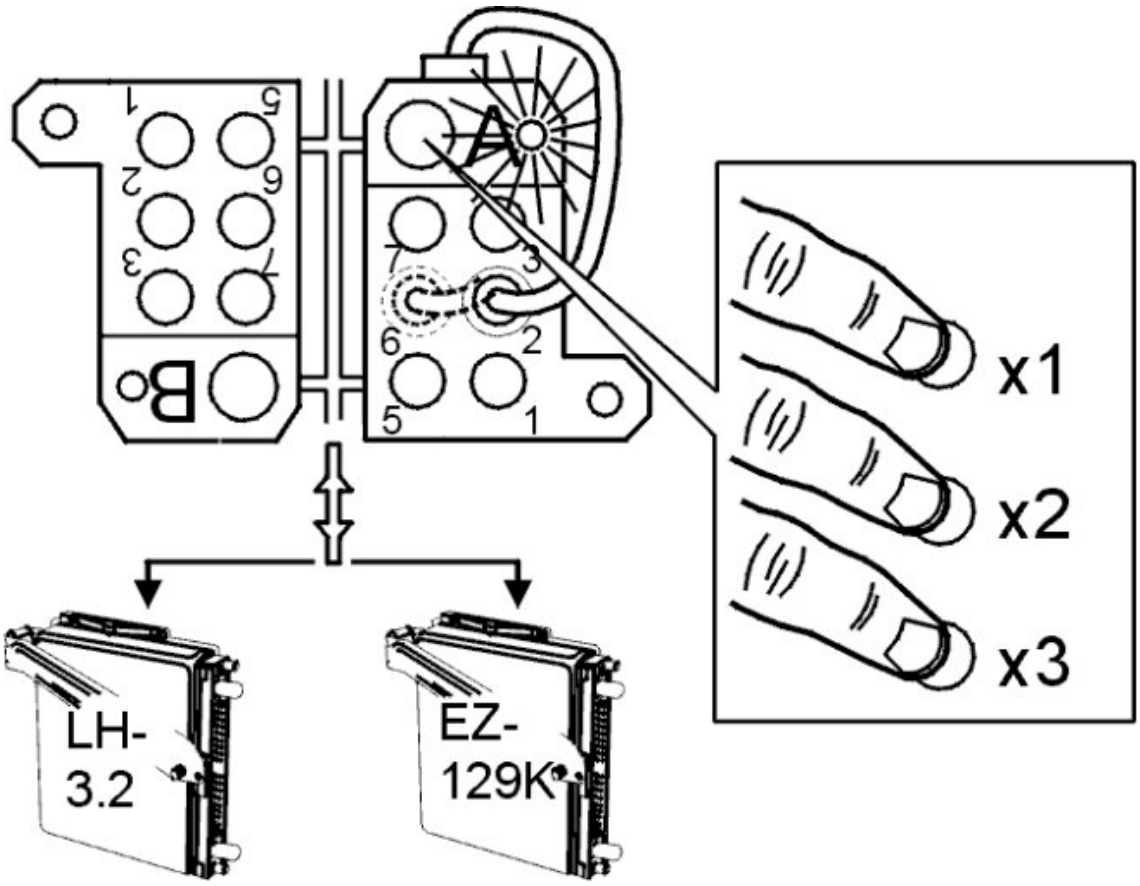
The test diode (999-5280) is used to "flash" diagnostic trouble codes. The test diode is connected to a connector (located in engine compartment on certain vehicles) and using this, the control module "flashes" diagnostic trouble codes from certain ignition systems.
The test diode can also for some vehicles be used to check the CO-content from the engine. Then the test diode is connected to another connector than when reading out diagnostic trouble codes.

1. Light-emitting diode
2. Connection to voltage feed.
3. Connection control module for reading out diagnostic trouble codes
4. Connection control module for checking CO-content.

Example of ignition systems where diagnostic trouble codes can be read out:

- Rex, model 240 with engine 230K (4 diagnostic trouble codes).
- EZ 102K, model 760 Turbo-84 engine B23 FT (5 diagnostic trouble codes).
- EZ 115K, model 760/780 engine B280E/F (6 diagnostic trouble codes).

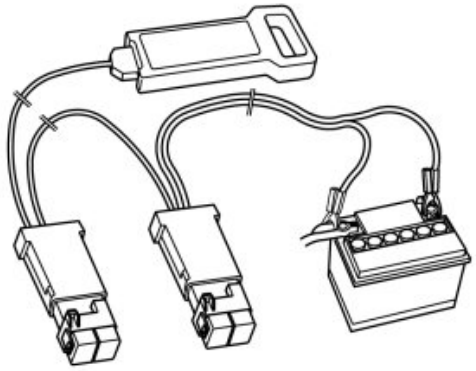
Diagnostic socket with light-emitting diode



A diagnostic socket with light-emitting diode was located in the engine compartment for reading out Volvo Diagnostics from the various systems. It was introduced for model year 1988. Every control module in the vehicle was connected to one of the diagnostic socket's six positions.
As the number of control modules in the vehicles increased and one diagnostics socket was not enough for all control modules, later on two diagnostics sockets were introduced, marked A and B.
For communication with a certain control module, the portable connector is connected to the control module's position in the diagnostics socket. Then the different checking functions are activated by pressing down the diagnosis button a different number of times.
When the button is pressed down, the cable to the control module is grounded, the ground pulse indicates to the control module that communication is initiated and the diode is lit. Then you release the button. Then control module then answers by grounding the cable in different patterns, making

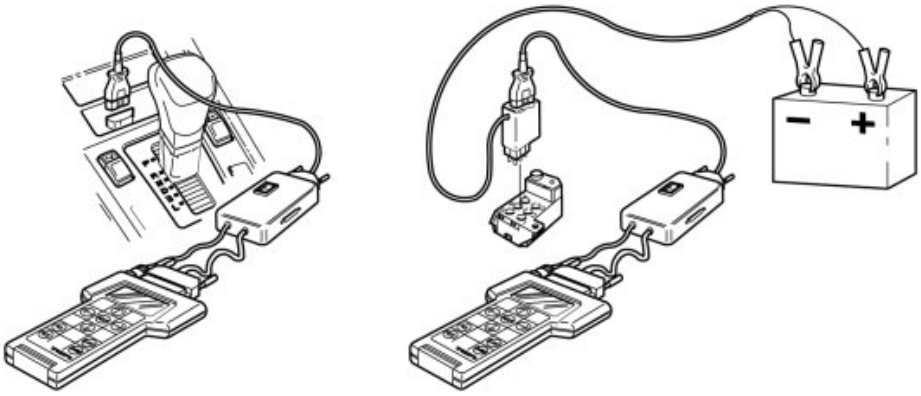
the diode turn on and off. Then these "flash codes" must be translated.
Volvo Diagnostics I, the first version is found on, e.g., fuel control system LH 2.4 and ignition system EZ 116K for model 240 and 740.
This diagnostics socket is found in car models 240, 440/460, 740, 940/960 and 850 until model year 1995. For the 400-model, this diagnostics socket is still used after model year 1995.
For further information on the diagnostic socket and its functions, see service information for each system.

Volvo Diagnostic Key



All communication performed using the diagnostics socket with light-emitting diode requires both knowledge about which commands are to be sent as well as how flashes from the control module should be interpreted.
Volvo Diagnostic Key - plain text reading was introduced for model year 1991 to facilitate reading out, interpreting and entering flash codes when communicating.
The tool is connected to the diagnostics socket/sockets with the light-emitting diode and sends, via menu selections, the right commands, then translates the control module's answer (light-emitting diode's flashes) to plain text.

Volvo System Tester

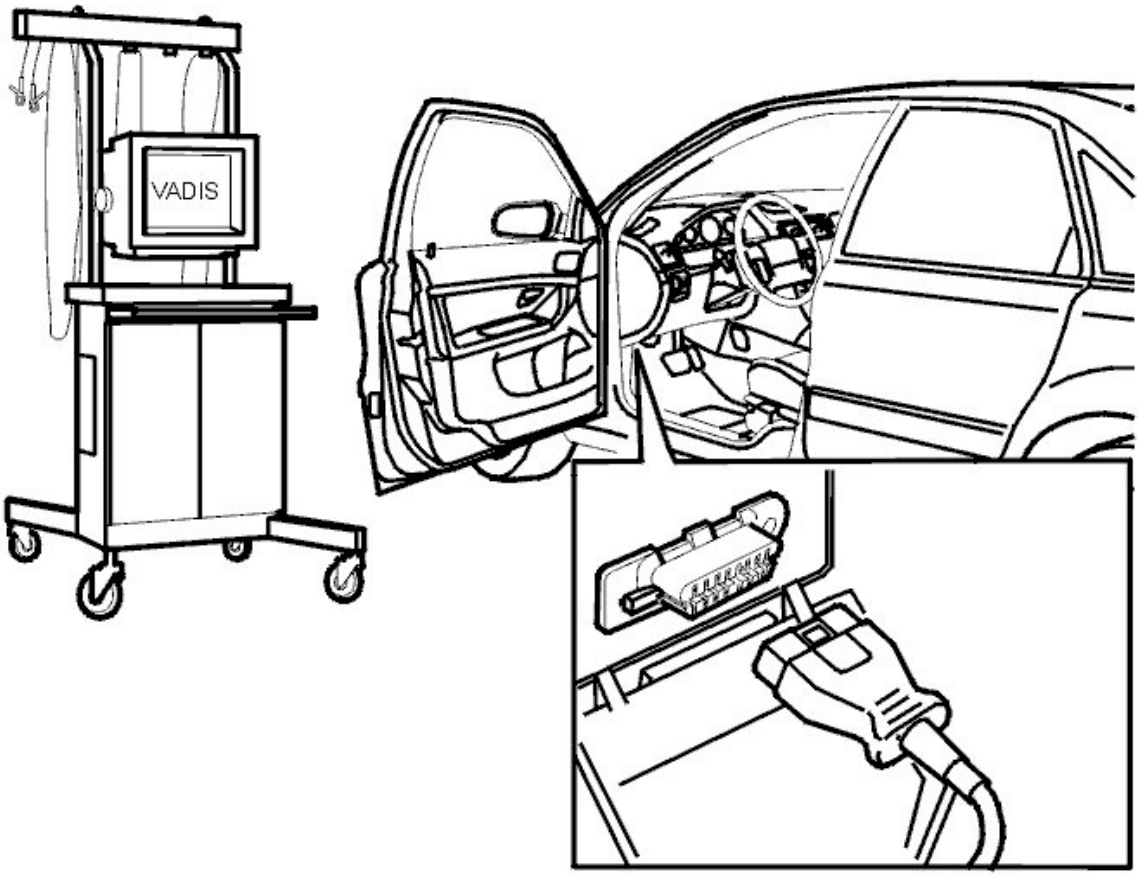


Serial communication

When non-standardized serial communication was introduced in 1991/1992, Volvo System Tester was developed to communicate serially with the control modules. This was so that the new possibilities with serial communication could be used, that is, use the built-in diagnosis in the control module (On Board Diagnostic).
In connection with the introduction of Volvo Diagnostics II, model year 1996, the Volvo System Tester was also developed for this standard.
Plain text reading

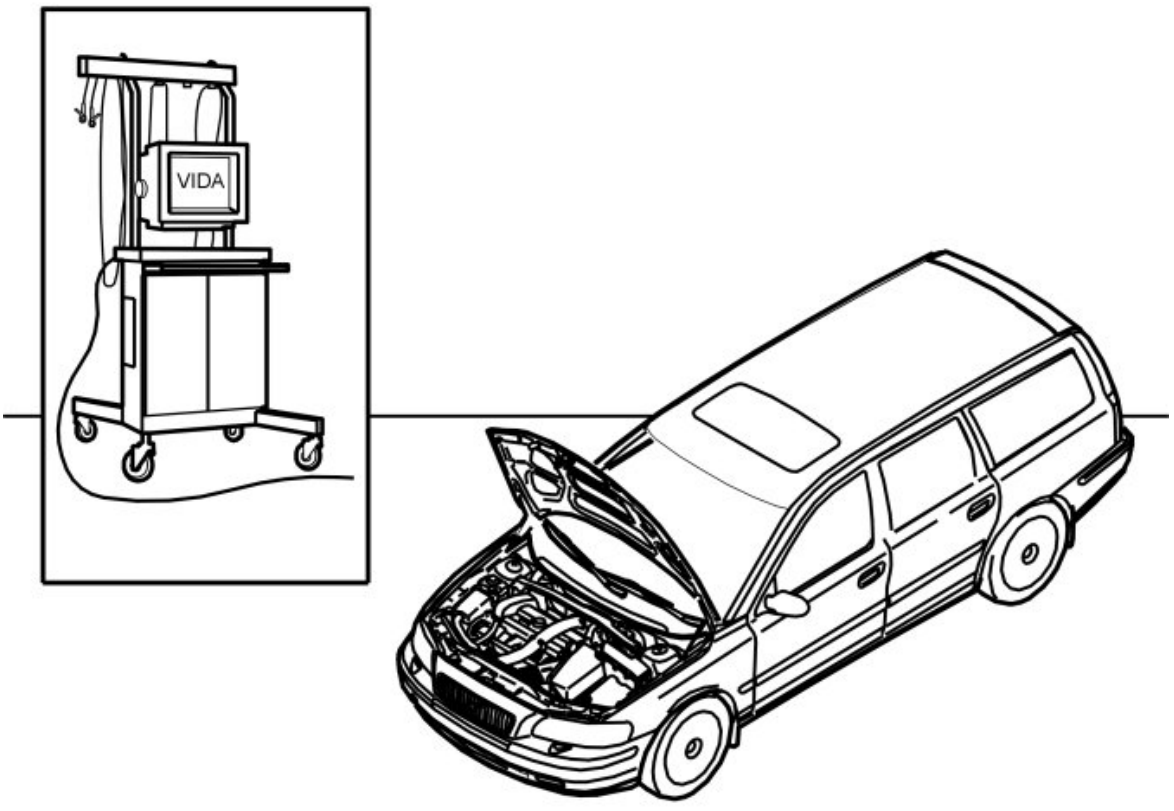
Volvo System Tester was also developed to handle the same functionality as Volvo Diagnostic Key, that is, to work as a plain text reader.
Volvo System Tester can be connected to diagnostic socket (OBD II) as well as to diagnostic socket with light-emitting diode via an adapter.

VADIS - Volvo Aftersales Diagnostic and Information System

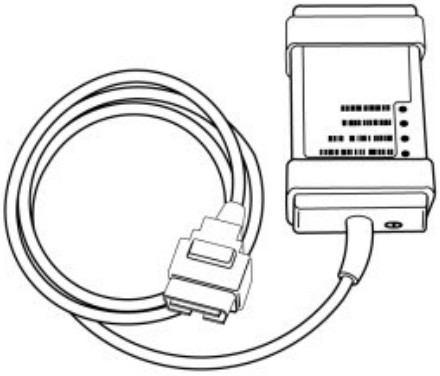


At the end of the 1990s, VADIS was introduced as diagnostics tool. Volvo System Tester was first used as communication tool between the vehicle and PC, thereafter Volvo Communication Tool 2000 (VCT2000).
For a time both tools were used, depending on which system and model year you worked with. From 2005, VADIS is replaced by the tool VIDA.

VIDA - Vehicle Information & Diagnostic for Aftersales



During 2005, VADIS was replaced by VIDA as the mandatory tool for diagnostics, among other things. Volvo Communication Tool 2000 (VCT2000) is used as communication tool between the vehicle and PC.



Beginning in 2007, VCT2000 will be replaced by DiCE (Diagnos Communication Equipment).

Where Do I Find the Information In VIDA

Where do I find the information in VIDA

Information is found in VIDA.

Note! Information for older cars (model year -1998) is read out using Volvo System Tester, Diagnostic socket with light-emitting diode or Volvo Diagnostic Key.

Counter, status identifier and frozen values

Counter, status identifier and frozen values are always found in VIDA/DIAGNOSTICS/DIAGNOSTICTROUBLECODE. Can also be found in certain troubleshooting.

Parameters
Parameters, dynamic are always found in VIDA/DIAGNOSTICS/CARCOMMUNICATION. Normally also found in troubleshooting.
Parameters, static are always found in VIDA/DIAGNOSTICS/DETAILS, VIDA/DIAGNOSTICS/NETWORK or VIDA/DIAGNOSTICS/CARCOMMUNICATION. Can also be found in troubleshooting.

Activations, Quick-tests
Activations and Quick-tests are found in VIDA/DIAGNOSTICS/CARCOMMUNICATION. Normally also found in troubleshooting.

Conditions for Diagnosis to Find a Malfunction

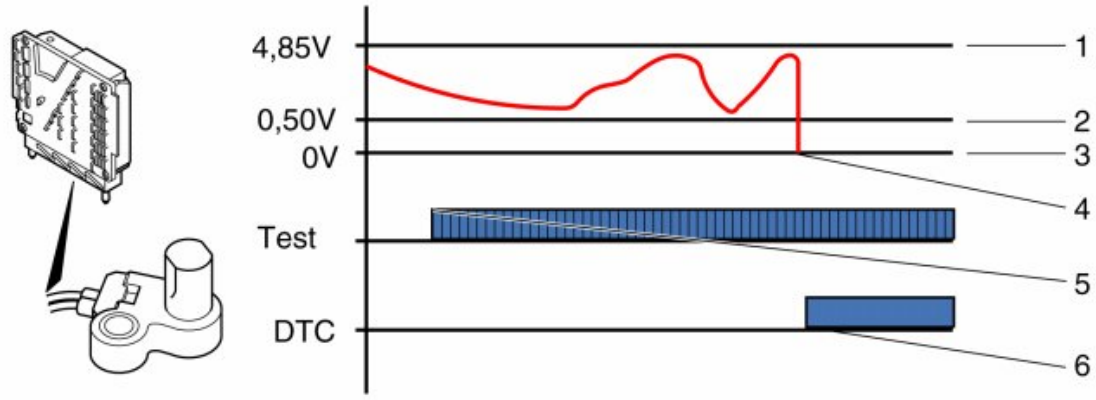
Conditions for diagnosis to find a malfunction

For the control module's self-diagnosis of a component or function to start and run (one or several times) special conditions must be fulfilled. Conditions for diagnosis varies depending on which component or function is to be monitored. When the diagnosis has started and is run, the signal, value or function must go above or below the limit value for the control module to detect a malfunction.

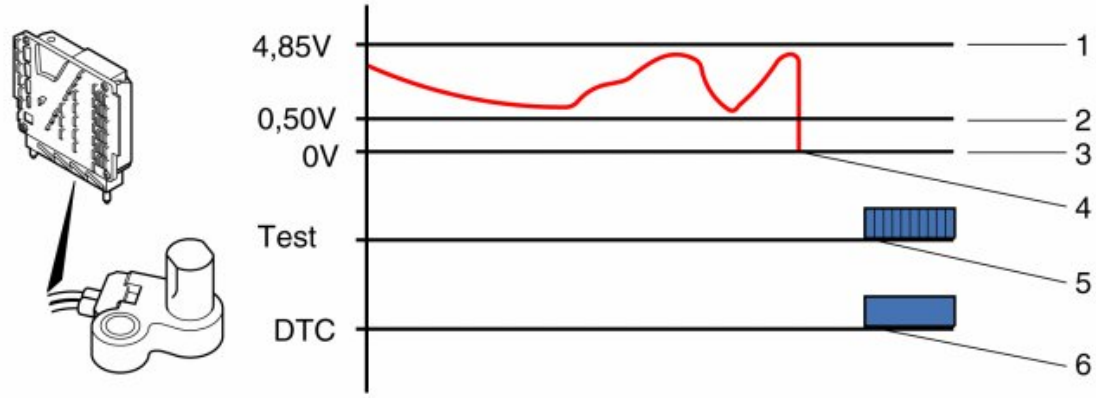
Example of conditions for the control module to start the diagnosis/test:
- Engine speed higher than 500 rpm.
- Ignition position II.
- Speed above 40 km/h.
- 4th gear selected.

Example of limit values for detecting malfunction:
- Direct voltage from outside temperature sensor lower than 0.495 V for a time longer than 1 second.
- After the engine has run for approx. 10 minutes, the control module receives an unchanged signal from the oil temperature sensor even though the signal should have changed according to a set pattern.
- Malfunction shall be active (permanent) for at least 2 driving cycles.

Example



The illustration shows an imagined scenario when a malfunction occurs in a circuit for a signal.
First the signal varies normally during driving. The diagnostic trouble code test starts after some time (5), is then run cyclically in a pre-defined pattern and monitors the signal. Limit values for monitoring to consider the signal as incorrect is a voltage lower than 0.50 V (2) or higher than 4.85 V (1). An open circuit occurs in the circuit and the signal becomes 0 V (4). Monitoring detects this, waits so that the malfunction is confirmed and then stores a diagnostic trouble code (6).



If the diagnostic trouble code test (5) starts after the malfunction (4) occurs, then monitoring will detect the malfunction fist when the test starts. Then monitoring waits so that the malfunction is confirmed and then stores a diagnostic trouble code (6). If you want the control module to detect a malfunction in the vehicle, you have to make sure that the control module's diagnostic trouble code test starts or is started.

Hint: If a malfunction occurs which has not yet been detected by the control module's monitoring, since the diagnostic trouble code test has not started, the vehicle may still exhibit a symptom!

Note! Conditions for diagnosis are described in the diagnostic trouble code information for every diagnostic trouble code.

Most diagnosis (at least non-emission-related diagnosis) are repeated periodically during the driving cycle, and every time they are repeated, a test is run that either results in a malfunction being detected or no malfunction being detected.
To enable the emission-related diagnosis to be completed and the diagnostic trouble code to be confirmed (with MIL-light activated as a result), several driving cycles in a row must be completed with a detected malfunction.
To enable the non-emission-related diagnosis to be completed (at least once), in principle the start conditions must be fulfilled for a certain time (from fractions of a second to a number of seconds).
Certain diagnoses require a completed driving cycle (e.g., ignition on, ignition off, and ignition on again) for the diagnosis to be considered as complete. Other diagnoses requires several other conditions to be fulfilled, e.g., with regards to:

- vehicle speed
- engine coolant temperature (ECT)
- time since start
- different load and engine speed relationships in the same trip
- a certain event (for example, that the component operates).

Hint: To assess if a test/diagnosis for the diagnostic trouble code is started or completed, status identifiers can be used. Turning off the ignition and then turning it on again often results in start of a new driving cycle/operation cycle, which results in update of status identifiers. See also section Driving cycle/Operation cycle below.

When, e.g., the engine control module (ECM) has run all diagnostics, the control module has completed a "trip". An extensive driving schedule in various conditions is required to complete a trip. The engine may also need to be shut off for a certain amount of time and then switched on again to complete a trip.
Emissions related diagnostic functions

Control modules that have and control emission-related components or functions, e.g., Engine control module (ECM) and Transmission control

module (TCM), check that emission-related systems work. These systems are checked by running a diagnostic function. The diagnostic function checks the included components and that the function itself works in the system.

Lighting the malfunction indicator lamp (MIL)

In the event of emissions related diagnostic trouble codes (DTCs), a counter counts down to determine when to light the malfunction indicator lamp (MIL). The conditions for lighting the malfunction indicator lamp (MIL) vary depending on which diagnostic trouble code (DTC) is stored.

Note! If a malfunction becomes intermittent or the malfunction disappears, then the MIL-light turns off first after 3 driving cycles in a row are completed with malfunction detection.

Self-erasing of emission-related diagnostic trouble codes

After 40 driving cycles without detected malfunction with start of cool engine, where the engine temperature (coolant temperature) increases more than 5 °C (approx. 9 °F) and the final temperature is above approx. +71 °C (159.8 °F), then the diagnostic trouble code is erased. Diagnoses (diagnostic trouble code tests) for misfire and fuel adaptations require 80 driving cycles. These driving cycles are defined as a "warm-up cycle".

Emergency Mode, Back-Up Mode "Limp-Home"

Emergency mode, back-up mode "Limp-home"

When a malfunction has occurred in the system that is confirmed (permanent malfunction) and is registered by the control module, modes are activated for certain systems and functions to handle the malfunction.
The purpose of these actions is to "protect" the control system and at the same time retain as much functionality or driving function as possible.
The minor malfunctions do not activate any back-up modes, there are different programs depending on type of malfunction and which control system to which it applies. All control systems do not have emergency modes or back-up modes.
Sometimes emergency modes must be activated immediately when a malfunction is detected, even if there has been no time to confirm and store any diagnostic trouble code. This is to maintain certain function, e.g., in case of malfunction of the mass air floe sensor for the engine management system, when the emergency program tries to prevent the engine from stopping.

Hint: Limp-home, emergency mode or back-up mode that may appear in case of malfunction is described in diagnostic trouble code information under replacement values.

For, e.g., automatic transmission TF-80SC AWD (XC90, B8444S) there are two back-up modes:

- Failsafe action (temporary action)
- Emergency/limp-home mode

Failsafe action is activated at the first detection of the malfunction, if the malfunction disappears the system returns to normal function.
Emergency mode is activated in case of less serious malfunctions Limp-home mode is activated for the most serious malfunctions.
The warning light in the driver information module lights up, and a text message is shown in the text window in the driver information module that emergency/limp-home mode has been activated. When the ignition is turned off and on again, no text is shown until the malfunction is detected again.

Note! If the malfunction disappears (intermittent malfunction) the control module returns to normal function first when the ignition is turned on the next time.

For automatic transmission's emergency mode, the following may take place, e.g.:

- Adaption function is blocked.
- Lock-up function is blocked.
- Function slipping lock-up is blocked.
- Function neutral check is blocked.
- The transmission only shifts to 3rd gear and reverse gear. All other shifting is blocked.

The above actions will be noticed by the driver since only one gear can be sued. Some may also notice that lock-up is not engaged. Then the vehicle comes to the workshop with a **symptom** for some form of lost driving function, probably also with the warning light on.
This symptom shall not be confused with the malfunction itself, instead it is a symptom of the back-up mode. The symptom that the malfunction itself causes (it it causes any) may be noticed briefly or not at all.

Note! If the malfunction is confirmed (permanent) it may be that the control module resumes normal function at ignition off and on again (symptom does not exist any longer). First when the malfunction is detected again (diagnostic trouble code test started and conditions fulfilled), the back-up mode is activated. The malfunction may then first be interpreted as if it was intermittent (non-existent or not active).

Status Identifier

Status identifier

General

There are status indicator (status identifiers) that can be read out for every diagnostic trouble code. The control module tests every connection (signal) or function more or less periodically, depending on the self-diagnosis' conditions for start.
By reading out the diagnostic trouble code with associated status identifier, then you obtain **status for the diagnostic trouble code test that detects the malfunction, as well as if the malfunction exists now or not.**

Note! Status identifier, Counter and Frozen values are the most important factors to deciding the malfunction's nature, that is, to decide:

- when the malfunction was detected (frozen values, counters)
- what the driving conditions were at the time (frozen values)
- status for the test (self-diagnosis) (status identifier)
- how frequent the malfunction is (counter).

All status identifiers (or malfunction detection counters) do not have to be introduced in one control module, this varies from system too system. All status identifiers restarts the count every time a new driving cycle/operation cycle starts or when erasing diagnostic trouble codes. Status identifiers should be read off continuously as the different identifiers can be updated later on.
The following describes possible status identifiers.

Note! Status identifiers for systems with diagnostics Volvo Diagnos II is slightly different from status identifiers for diagnostic version Generic Global Diagnostics (GGD). See below.

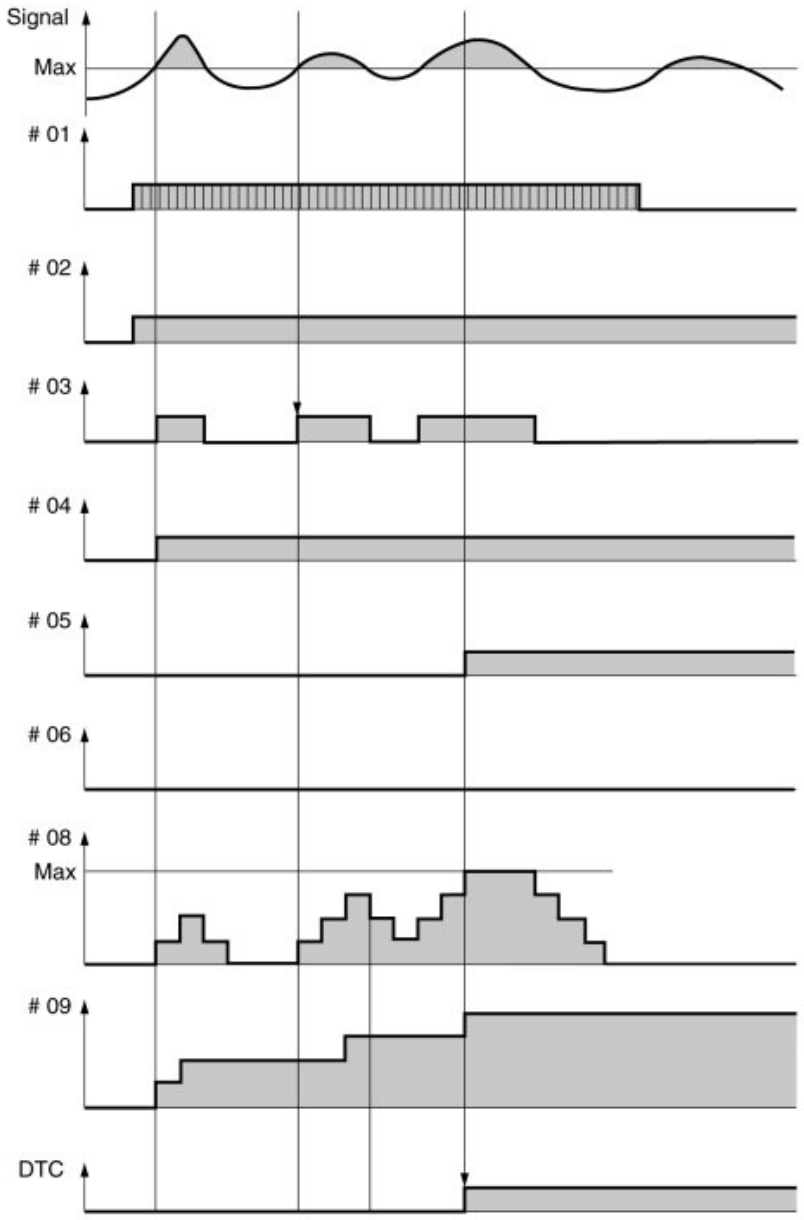
When erasing diagnostic trouble codes, the diagnostic trouble code's status identifier is erased.

Status identifier Volvo Diagnostics II

The following identifiers are available (showed values apply until updated with a new read-out):

- SB 01 Diagnostic trouble code test run in progress.
- SB 02 Diagnostic trouble code test run at least once during current driving cycle.
- SB 03 Sporadic/single malfunctions found the last time diagnostic trouble code test was run during current driving cycle/operation cycle.
- SB 04 Sporadic/single malfunctions found at least once during current driving cycle.
- SB 05 Request light warning light/text message due to detected malfunction.
- SB 06 Diagnostic trouble code test blocked due to malfunction found by another diagnostic trouble code test.
- SB 08 Malfunction detection counter, current value.
- SB 09 Malfunction detection counter, maximum value reached some time during current operation cycle.

Abbreviation SB is from the English 'Status Bit'.



The upper graph shows a varying signal value. If the signal value exceeds a max. value, which is considered a malfunction by the control module, then a sporadic malfunction is registered, that is, a malfunction is about to occur. Then the grey-marked surface indicates the signal considered to be incorrect.
The text below uses the term Driving cycle, which may also be called Operation cycle.

Note! If the diagnostic trouble codes are erased, the status identifiers are also erased!

SB01 Diagnostic trouble code test run in progress (second paragraph from top).

Shows if the diagnostic trouble code test runs or not right now (in current driving cycle). It is only when the test runs that the control module can detect malfunctions and generate diagnostic trouble codes.
Grey-marked surface means that the test runs and can detect a malfunction if it occurs. The surface is "dashed", showing that when the diagnostic trouble codes runs, it runs in a cyclic, pre-determined pattern.
Status identifier 03 and 04 shows if a malfunction is detected or not. In this case, a malfunction is detected 3 times, see status identifier 03.
Status alternative when reading out is Yes (test runs now) or No (test is not run now).
SB02 Diagnostic trouble code test run at least once during current driving cycle (third graph from the top).

Shows if the diagnostic trouble code test has been run or not during the current driving cycle. If it has been possible for the control module to detect malfunctions and generate diagnostic trouble code any time during the current driving cycle.
Grey-marked surface means that the diagnostic trouble code test has been run at some time. If the diagnostic trouble code test has been run at some time in this driving cycle, status will always be Yes and remain so until the ignition is turned on off and a new driving cycle starts. When a new driving cycle starts, status identifiers are "reset" and is initially No.
Status identifier 03 and 04 shows if a malfunction is detected or not.
Status alternative when reading out is Yes (test completed) or No (test not completed).
SB03 Sporadic/single malfunctions found the last time diagnostic trouble code test was run during current driving cycle (fourth graph

from the top).

A sporadic malfunction (intermittent malfunction) has been detected 3 times **the last** time the diagnostic trouble code test was run during current driving cycle. During the diagnostic trouble code test run the last time (see status identifier 01) a malfunction has been detected 3 times.
Status alternative when reading out is Yes (sporadic malfunction found) or No (no sporadic malfunction found).

Note! When the control module detects the malfunction for the first time(status identifier 03 and 04), a diagnostic trouble code has not yet been stored (see last graph). It is first when the malfunction detection counter 08 reaches a certain value that the control module considers that a real malfunction exists (a confirmed malfunction) and the diagnostic trouble code is stored.

SB 04 Sporadic/single malfunctions found at least once during current driving cycle (fifth graph from the top).

A sporadic malfunction (intermittent malfunction) has been detected at some time during current driving cycle. Grey.marked surface means that a malfunction has been detected at some time.
If the diagnostic trouble code test has been run at some time in this driving cycle, status will always be Yes and remain so until the ignition is turned on off and a new driving cycle starts. When a new driving cycle starts, status identifiers are "reset" and is initially No. Status identifier 03 and 04 shows if a malfunction is detected or not.
Status alternative when reading out is Yes (test has been run earlier) or No (test has not been run).
SB 05 Request light warning light/text message due to detected malfunction (sixth paragraph from the top).

Information that diagnostic trouble code activates a warning light or text message in driver information module. In this case, lighting of warning light is requested when the diagnostic trouble code has been confirmed and stored.
Status alternative when reading out is Yes (request performed) or No (no request).
SB06 Diagnostic trouble code test blocked (seventh graph from top).

Information that diagnostic trouble code test is turned off as a result of another malfunction and diagnostic trouble code is generated where the root cause is detected. If this in turn results in subsequent malfunctions, it prevents generation of subsequent diagnostic trouble codes. In this case, the diagnostic trouble code test is not blocked.
Status alternative when reading out is Yes (diagnostic trouble code test blocked) or No (diagnostic trouble code test not blocked).
SB08 Malfunction detection counter, current value (eight graph from top).

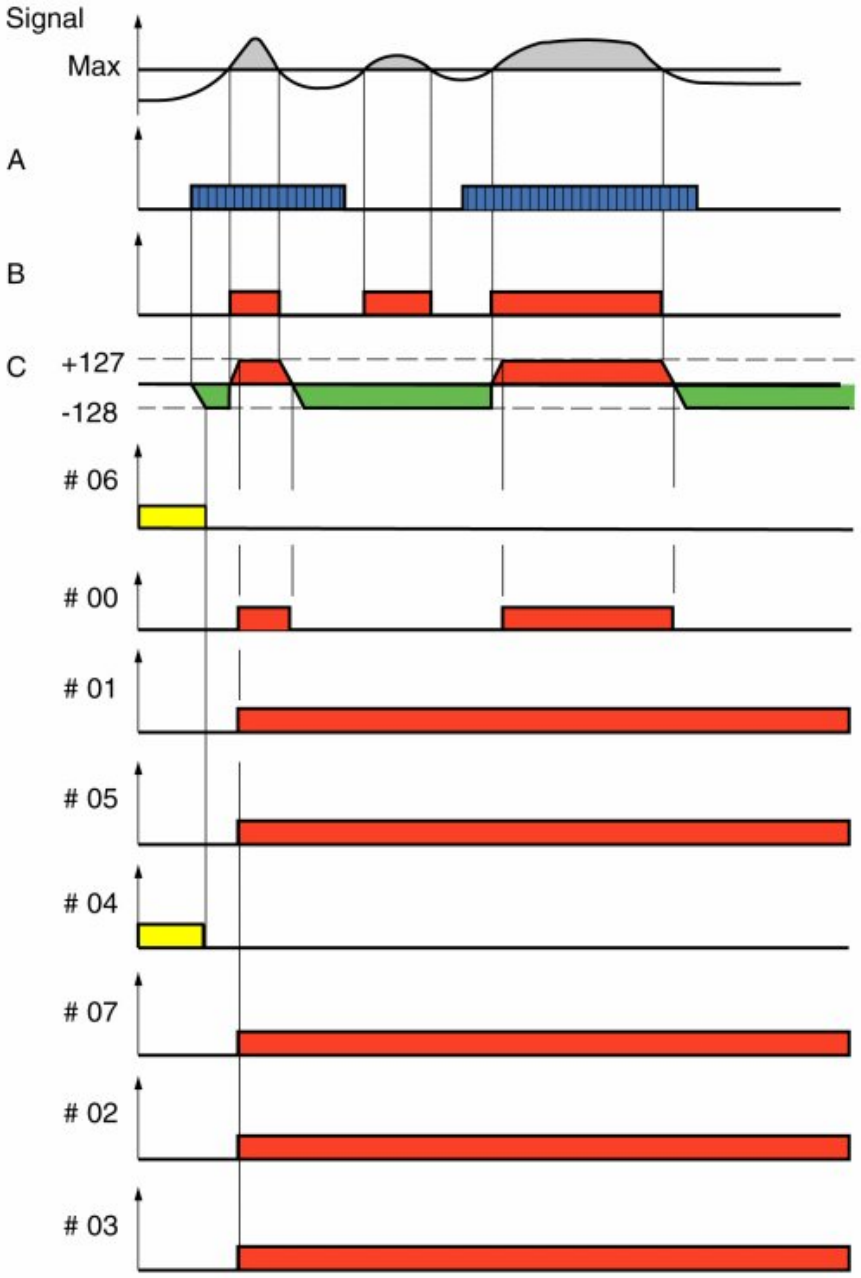
When a sporadic malfunction is detected by the control module the malfunction detection counter counts up as long as the malfunction exists. When the malfunction no longer exists the counter counts down again. This is the basis for the control module's decision to store the diagnostic trouble code and the diagnostic trouble code is stored in the vehicle first when the counter reaches a certain max. value. This max. value varies between different diagnostic trouble codes.
Count rate of the counter is controlled as long as the malfunction exists before it causes customer symptom. The counter is used to decide if it is a real malfunction that has occurred and that has existed for some time. It is the control module's way of confirming the diagnostic trouble code, that is, confirming that a real malfunction exists.
SB09 Malfunction detection counter, max. value during current operation cycle

Shows max. value that status identifier 08 has reached during current driving cycle. When a new driving cycle starts, the counter is "reset".

Status identifier Generic Global Diagnostics (GGD)

The following identifiers are available (showed values apply until updated with a new read-out):

- SB 00 Malfunction found the last time that the diagnostic trouble code test was run during current driving cycle
- SB 01 Malfunction found at least once during the current driving cycle
- SB 02 Malfunction found at least once during the current and previous driving cycles
- SB 03 Malfunction found recently since erasing of diagnostic trouble codes
- SB 04 Diagnostic trouble code test run at least once since erasing of diagnostic trouble codes
- SB 05 Malfunction found at least once since erasing of diagnostic trouble codes
- SB 06 Diagnostic trouble code test run at least once during current operation cycle.
- SB 07 Request light warning light/text message due to detected malfunction.



The upper graph shows a varying signal value. If the signal value exceeds a max. value, which is considered a malfunction by the control module, then a sporadic malfunction is registered, that is, a malfunction is about to occur. Then the grey-marked surface indicates the signal considered to be incorrect.
The text below uses the term Driving cycle, which may also be called Operation cycle. The order of status identifiers in illustration and in the list below are presented as they belong to each other, not in numerical order!

Note! If the diagnostic trouble codes are restored, the status identifiers are also restored!

Graph A Diagnostic trouble code test active

Shows if the control module's diagnostic trouble code test is active or not. The blue surface indicates when the test is active. The surface is "dashed", which shows when the diagnostic trouble code test runs it runs in a cyclically pre-determined pattern. Not included as a status identifier.
Graph B Malfunction active

Shows if the malfunction in the vehicle is active or not. The red surface indicates when the malfunction is present (active). Not included as a status identifier.
Graph C Counter 6 malfunction detection (C#6)

The counter counts the number of internal detections of the malfunction that have been performed for the diagnostic trouble code. Not included as a status identifier, see section further on in the information. When this counter reaches value +127 the control module considers the malfunction to be active right now.
When the counter is at value -128, the malfunction is not active. The value is reset for every new driving cycle.
If the value increases towards +127, the control module has detected a malfunction and for every internal test the value is counted up. When the malfunction no longer exists, the control module counts down to minimum -128.
The value on the control module can only be changed when it has started the test for the diagnostic trouble code. How big each step is that the

control module counts up or down the value by to reach the limits +127 or -128 may vary between control modules. Limits +127 and -128 are pre-defined limits in the control module.
In the graph, the counter first counts down to -128 when the diagnostic trouble code test starts (graph A). When a malfunction occurs (graph B) and the diagnostic trouble code test detects the malfunction, first the counter's value is reset to 0, then it scrolls up to +127. Only then the malfunction is considered to exist. If the malfunction disappears and the diagnostic trouble code test is active, the counter counts down to -128.
SB**06 Diagnostic trouble code test run at least once during current operation cycle**

Shows if the control module has performed diagnostic trouble code test for this diagnostic trouble code in **current** driving cycle. When the diagnostic trouble code test starts and counter 6 (malfunction detection) counts down to -128 (no malfunction found) or up to +127 (malfunction found), the control module considers that diagnostic trouble code test has been run.
Yellow-marked surface means that diagnostic trouble code test **is not yet** run.
Status alternative when reading out is Run or Not run.
SB**00 Malfunction found the last time that the diagnostic trouble code test was run during current driving cycle**

Shows if the control module detects the malfunction right now. It is only when the test runs that the control module can detect malfunctions and generate diagnostic trouble codes. A malfunction has been detected 2 times during the current driving cycle. Note that only when counter 6 (malfunction detection) reaches the value +127 is it considered to be a malfunction. When the value gas dropped from +127 to 0, it is considered that there is no longer a malfunction.
Status alternative when reading out is Yes (malfunction detected right now) or No (no malfunction detected right now).
SB**01 Malfunction found at least once during the current driving cycle**

Shows if the control module has detected the malfunction**anytime during the current driving cycle.** It is only when the test runs that the control module can detect malfunctions and generate diagnostic trouble codes. The diagnostic trouble code test has started and a malfunction has been detected at least 1 time during the current driving cycle.
Status alternative when reading out is Yes (malfunction found) or No (malfunction not found).
This status identifier is generated at the same time as status identifier SB00 and will remain in status Yes for the rest of the current driving cycle. At start of a new driving cycle, it has changed to status No until a malfunction is detected again.
SB**05 Malfunction found at least once since erasing of diagnostic trouble codes**

Shows if the control module has detected the malfunction during **earlier** driving cycle. A malfunction has been detected at least 1 time since the diagnostic trouble code was erased the last time.

Status alternative when reading out is Yes (malfunction found) or No (malfunction not found).
This status identifier is generated at the same time as status identifier SB 00 and will remain in status Yes until diagnostic trouble codes are erased once again.
SB**04 Diagnostic trouble code test run at least once since erasing of diagnostic trouble codes**

Shows if the control module has performed diagnostic trouble code test for this diagnostic trouble code in **current and/or earlier driving cycle** since the diagnostic trouble code was erased the last time. This means that if diagnostic trouble code test has been run after erasing of diagnostic trouble codes, it will remain in Run until diagnostic trouble codes are erased once again.
Yellow-marked surface means that diagnostic trouble code test **has been** run.
Status alternative when reading out is Run or Not run.
This status identifier is generated at the same time as status identifier SB 06.
SB**07 Request for lit warning light/text message**

Information about the diagnostic trouble code activates a warning light or text message. In this case, lighting of the warning light is requested when a diagnostic trouble code is stored.
Status alternative when reading out is Yes (request performed) or No (no request).
SB**02 Malfunction found at least once during the current and previous driving cycles**

Pending not yet confirmed diagnostic trouble code.
Status alternative when reading out is Yes (malfunction found but not confirmed) or No (no malfunction found).
This status identifier is generated at the same time as status identifier SB 00 is generated for the first time and will remain in status Yes until certain driving cycle conditions are fulfilled and no malfunctions are detected. After a certain number of driving cycles without detected malfunction, it returns to status No. Number of driving cycles required depends on the system.
SB**03 Malfunction found recently since erasing of diagnostic trouble codes**

Confirmed diagnostic trouble code.
Status alternative when reading out is Yes (malfunction found and confirmed) or No (no malfunction found).
This status identifier is generated at the same time as status identifier SB 00 is generated for the first time and will remain in status Yes until certain driving cycle conditions are fulfilled and no malfunctions are detected. After a certain number of driving cycles without detected malfunction, it returns to status No. That is, if a malfunction becomes intermittent and no longer is detected, the status will change to No. Number of driving cycles required depends on the system.

Note! For emission-related control system, this status identifier is generated to status Yes (Malfunction found and confirmed), first after status identifier SB02 has had status Yes (Malfunction found but not confirmed) for 2 driving cycles in a row with malfunction detected.

Counter

Counter

General

For every diagnostic trouble code , the control modules stores a number of counters. These counters count the number of driving cycles that have been performed in the control module with or without malfunctions, if the malfunction is detected or not. In control systems older than model year 1999, there may be control systems, depending on control system, without counters or with few counters. From model year 1999, there are systems with several counters. The following counters may appear:

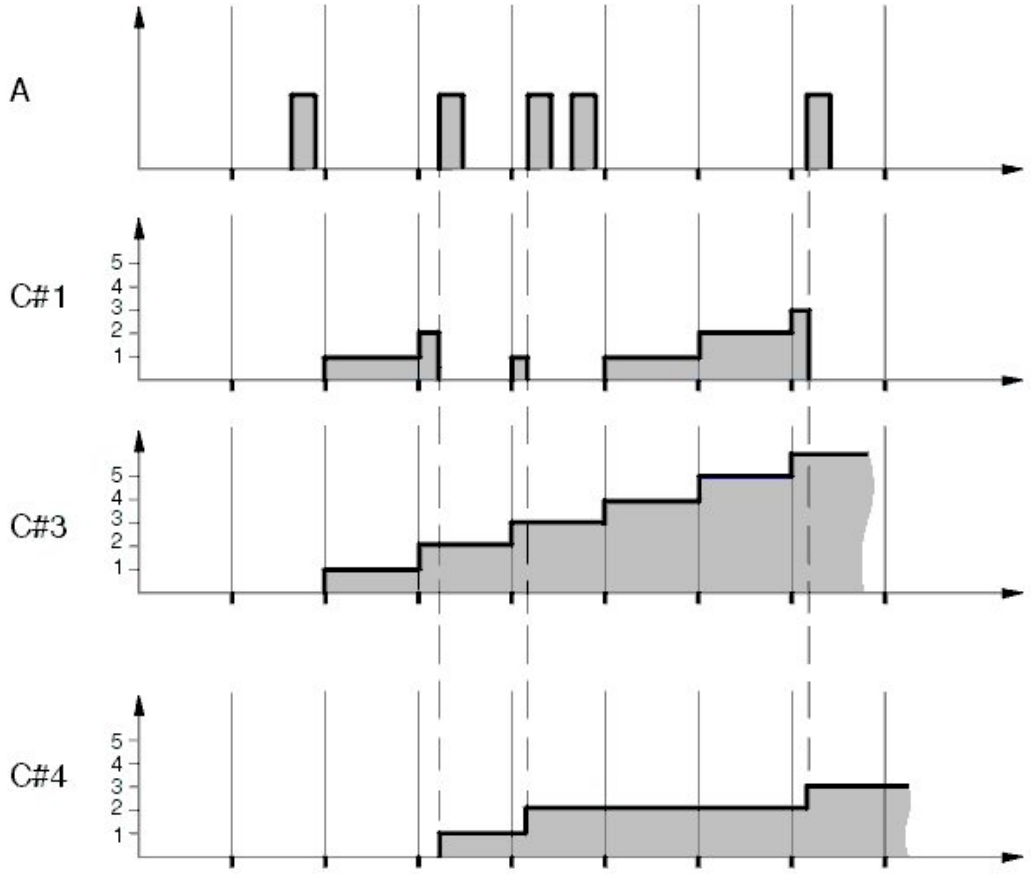
- Counter 1
- Counter 2 *
- Counter 3
- Counter 4
- Counter 5**
- Counter 6
- Counter 7
- Counter 8

The text uses the term driving cycle, which may also be called Operation cycle.
* In principle, only systems with the diagnostic concept Generic Global Diagnostic (GGD).
** Only for emission-related systems.
When erasing diagnostic trouble codes, the diagnostic trouble code's counter is erased.

Note! Status identifier, Counter and Frozen values are the most important factors to deciding the malfunction's nature, that is, to decide:

- when the malfunction was detected (frozen values, counters)
- what the driving conditions were at the time (frozen values)
- status for the test (self-diagnosis) (status identifier)
- how frequent the malfunction is (counter).

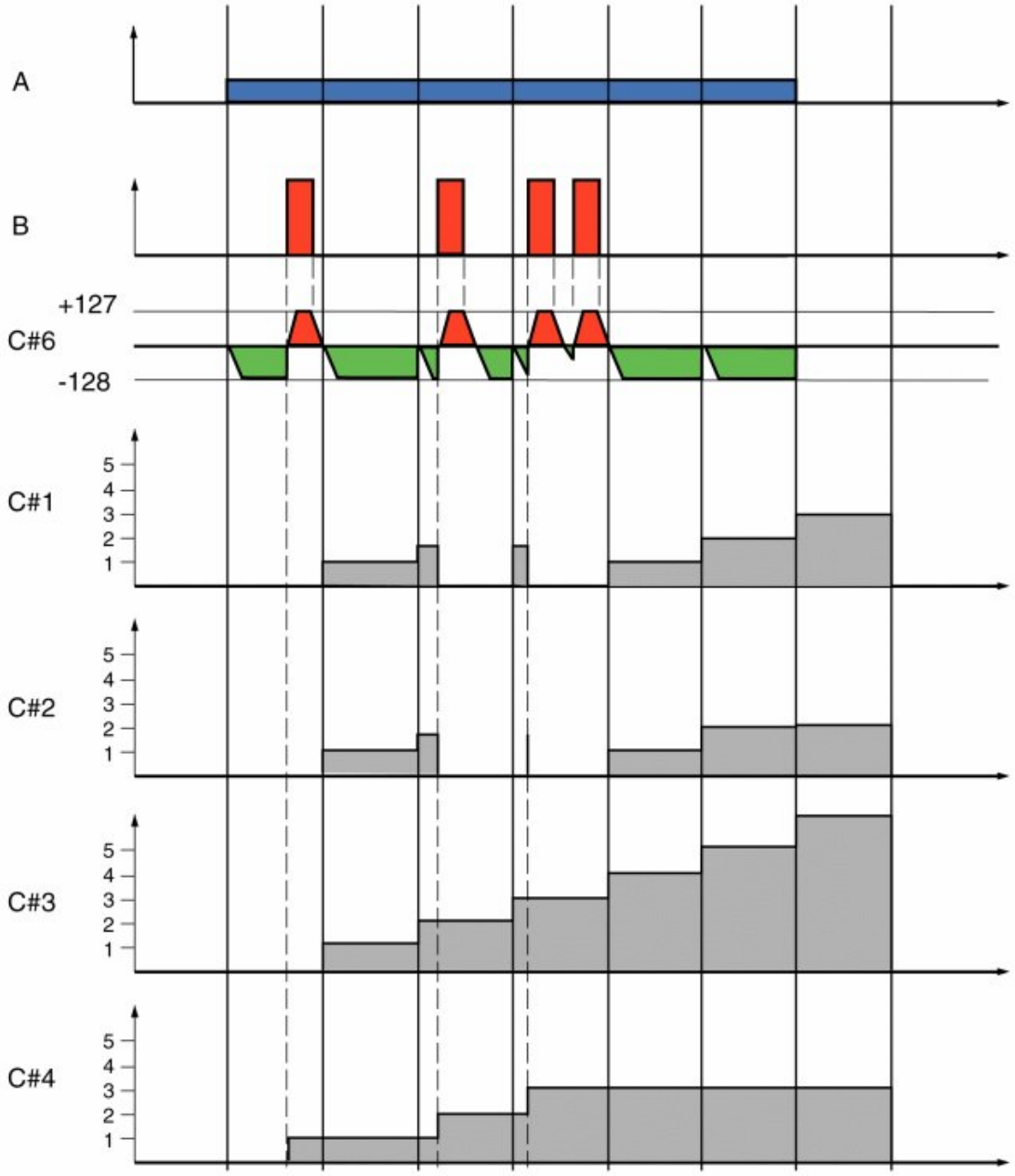
Counter Volvo Diagnostics II



Graph A illustrates when in time that the malfunction occurs. In the illustration, the control module has detected a malfunction in the second driving cycle (graph's x-axis) and this malfunction then appears 4 more times, a total of 5 times. Counters can be read out for every diagnostic trouble code in the control module which have this introduced. Driving cycles are marked with vertical lines. A driving cycle often begins with ignition on and ends with ignition off.
Counter 1 (C#1). Counts number of cycles performed since the malfunction was confirmed **last**. As soon as a malfunction is detected and confirmed, the value is reset.
When the malfunction is both detected and disappears in the second driving cycle (graph A), counter 1 will count up to 1 first in the following driving cycle (driving cycle 3), that is, a driving cycle has been run through since the last time the malfunction was confirmed.
In driving cycle 4, the counter is updated again, now to value 2. Just after that, the malfunction is detected (graph A), the malfunction is confirmed

and the counter's value is reset. This sequence is repeated once again in driving cycle 5.
With other words, one can say that if the value is zero, the malfunction exists now or has existed earlier in the current driving cycle. If the vehicle is restarted so that a new driving cycle is initiated (often requires ignition off and on again) in this position and the counter's value still is 0, then you probably have a permanent malfunction.
Values near zero indicate that the malfunction has been detected recently. It may also be that the malfunction exists but the diagnostic trouble code test has not started in these driving cycles, which means that the counter has not been reset. A high counter value indicates that the malfunction was last detected a number of driving cycles ago.
Counter 3 (C#3) (see graph). Counts the number of driving cycles performed since the malfunction was confirmed the **first** time. When a malfunction is confirmed the first time, the counter will count up by 1 for every subsequent driving cycle, regardless of if the malfunction is detected or not. Thus, the counter tracks the the number of driving cycles since the malfunction was detected the first time. See graph where the counter increases by 1 for every subsequent driving cycle and the value of the counter is finally 6.
A low value indicates that the malfunction was detected for the first time relatively recently. However, a high value indicates that a first detection was performed some time ago.
Counter 4 (C#4) (see graph). Counts the number of driving cycles in which the malfunction has been confirmed since it was confirmed the first time. The graph shows that after the malfunction was detected the first time, the malfunction has been detected in 3 driving cycles. Thus, after the malfunction was detected the first time, another 6 driving cycles (counter 3), have passed and in these the malfunction has been detected 3 times (counter 3). Simplified, one can say that in this example, the malfunction has occurred/been detected in every other driving cycle, and the malfunction can be assessed as relatively frequent.
A certain indication of a malfunction's intensity can be obtained if you compare the value for counter 4 with counter 3. The closer the value for counter 4 the value is to the value of counter 3, the more frequent the malfunction.
If counters 3 and 4 have the same value, the malfunction has been detected in every driving cycle, which means that the malfunction is frequent.
Counter 5 (C#5). The counter sums up the time in seconds that **the control module has been operating** since the malfunction first was confirmed and the diagnostic trouble code was stored. The time that the control module has been operating is only counted when it is active, not in "sleep mode". The counter is not shown in the illustration.
Counter 6 (C#6). The counter sums up the time in seconds that **the diagnostic trouble code test has been in progress** since the malfunction first was confirmed and the diagnostic trouble code was stored. The counter is not shown in the illustration.
Counter 7 (C#7). The counter sums up the time in seconds that **malfunction has been confirmed** since it first was confirmed and the diagnostic trouble code was stored. The counter is not shown in the illustration.

Counter Generic Global Diagnostics (GGD)



Graph A. Diagnostic trouble code test active

Shows if the control module's diagnostic trouble code test is active or not. The blue surface indicates when the test is active. Not included as a status identifier.

Graph B. Malfunction active

Shows if the malfunction in the vehicle is active or not. The red surface indicates when the malfunction is present (active). Not included as a status identifier.

In the illustration, the control module has detected a malfunction in the second driving cycle, and this malfunction occurs a total of 4 times. Counters can be read out for every diagnostic trouble code in the control module which has this implemented. Driving cycles are indicated with vertical lines. A driving cycle often begins with ignition on and ends with ignition off.

Counter 1 (C#1). Counts number of driving cycles performed since the malfunction was confirmed **last**. As soon as a malfunction is detected and confirmed, the value is reset. When the malfunction is both detected and disappears in the second driving cycle (graph A), counter 1 will count up to 1 first in the following driving cycle (driving cycle 3), that is, a driving cycle has been run through since the last time the malfunction was confirmed.

In driving cycle 4, the counter is updated again, now to value 2. Just after that, the malfunction is detected (graph A), the malfunction is confirmed and the counter's value is reset. This sequence is repeated once again in driving cycle 5.

With other words, one can say that if the value is zero, the malfunction exists now or has existed earlier in the current driving cycle. If the vehicle is restarted (often requires ignition off and on again) in this position and the counter's value still is 0, then you probably have a permanent malfunction.

Values near zero indicate that the malfunction has been detected recently. It may also be that the malfunction exists but the diagnostic trouble code test has not started in these driving cycles, which means that the counter has not been reset. A high counter value indicates that the malfunction was last detected a number of driving cycles ago.

Counter 2 (C#2). Counts the number of driving cycles since the last confirmation of the malfunction and where the diagnostic trouble code was

performed **without** detecting malfunction and confirmation of malfunction. Thus, when diagnostic trouble code is performed and no malfunction is detected, the counter will count up by 1 for every driving cycle. As soon as a malfunction is detected and confirmed, the value is reset.
When the malfunction is detected and disappears in the second driving cycle (graph A), counter 2 will count up to 1 first in the following driving cycle (run cycle 3). In driving cycle 4 the counter is updated again (diagnostic trouble code test has been run without detecting malfunction), now to value 2. Immediately after that the malfunction is detected (graph A), the malfunction is confirmed and the counter's value is reset. This sequence is repeated once again in driving cycle 5.
During driving cycle 6 and 7, the diagnostic trouble code test was run without detecting malfunction and the counter receives the value 2. In driving cycle 8, the diagnostic trouble code test is not run and thus the counter is not updated.
Counter 3 (C#3). Counts the number of driving cycles performed since the malfunction was confirmed the **first** time. When a malfunction is confirmed the first time, the counter will count up by 1 for every subsequent driving cycle, regardless of if the malfunction is detected or not. Thus, the counter tracks the the number of driving cycles since the malfunction was detected the first time. See graph where the counter increases by 1 for every subsequent driving cycle and the value of the counter is finally 6.
A low value indicates that the malfunction was detected for the first time relatively recently. However, a high value indicates that a first detection was performed some time ago.
Counter 4 (C#4). Counts the number of driving cycles in which the counter's value has been updated first when the malfunction was detected in the driving cycle. The counter has a final value of 3.
A certain indication of a malfunction's intensity can be obtained if you compare the value for counter 4 with counter 3. The closer the value for counter 4 the value is to the value of counter 3, the more frequent the malfunction.
Counter 5 warm-up (C#5). Counts the number of warm-up cycles that have been run since the malfunction light (MIL) has gone off. The counter is not shown in the illustration. Note! Only applies to emission-related systems.
Counter 6 malfunction detection (C#6). The counter counts the number of internal detections of the malfunction that have been run for the diagnostic trouble code. When this counter reaches value +127, the control modules decides that the malfunction is active right now.
When the counter is at value -128, the malfunction is not active. The value is reset for every new driving cycle.
If the value increases towards +127, the control module has detected a malfunction, and for every internal test the value is counted up. When the malfunction no longer exists, the control module counts down to minimum -128.
The value on the control module can only be changed when it has started the test for the diagnostic trouble code. How big each step is that the control module counts up or down the value by to reach the limits +127 or -128 may vary between control modules. Limits +127 and -128 are pre-defined limits in the control module.
In the graph, the counter first counts down to -128 when the diagnostic trouble code test starts. When a malfunction occurs (graph B) and the diagnostic trouble code test detects the malfunction, first the counter's value is reset to 0, then it scrolls up to +127. Only then the malfunction is considered to exist. If the malfunction disappears and the diagnostic trouble code test is active, the counter counts down to -128.
Counter 7 malfunction detection - max. current (C#7). Shows maximal value that counter 6 has in the present driving cycle.
The counter is not shown in the illustration.
Counter 8 malfunction detection - max. earlier (C#8). Shows maximal value that counter 6 has in the present and/or has had in earlier driving cycle.
The counter is not shown in the illustration.

Visual and Physical Check

Visual and physical check

Large and slow leaks will often result in air conditioning (A/C) compressor oil being drawn out with the refrigerant.
A visual inspection can localize the point where the oil gathers and identify the source of the leak.

- Check the system for corrosion which could cause refrigerant to leak
- Check that there are no loose components.

Frozen Values

Frozen values

For every diagnostic trouble code, pre-defined parameters are frozen and stored in the control module. The frozen values are stored immediately after the malfunction has been detected and gives a "picture" of the conditions when the malfunction was stored.

Note! Status identifier, Counter and Frozen values are the most important factors to deciding the malfunction's nature, that is, to decide:

- when the malfunction was detected (frozen values, counters)
- what the driving conditions were at the time (frozen values)
- status for the test (self-diagnosis) (status identifier)
- how frequent the malfunction is (counter).

In newer car models, frozen values consist of a number of global (common) general parameters as well as a number of control model-unique parameters. Global may be:

- Road distance
- Battery voltage
- Passenger compartment temperature
- Outside temperature
- Engine running

In addition to these, the diagnostic trouble code-unique parameters are stored which are especially selected parameters for the diagnostic trouble code.
Most parameters in the frozen values are the same for all malfunctions and indicate a general condition when a malfunction was detected, for

example:

- Road distance
- Outside temperature
- Engine speed
- Load
- Coolant temperature
- Vehicle speed
- Battery voltage
- etc.

Some of them have been selected to give a better understanding of the specific malfunction.

Note! When erasing diagnostic trouble codes, stored frozen values are also erased.

Hint: Reading out and interpreting these frozen values make it easier to understand when in time the malfunction occurred, as well as under what driving and environment conditions the malfunction was detected, related to when and how the customer experienced the symptom.

VIDA (Vehicle Information & Diagnostics For Aftersales)

VIDA (Vehicle Information & Diagnostics for Aftersales)

During the second half of 2004, VADIS (Volvo Aftersales Diagnostic and Information System) was phased out and replaced by VIDA (Vehicle Information & Diagnostics for Aftersales). The purpose of VIDA is to support service providers in repairing and servicing Volvo vehicles. VIDA provides Service and Parts information, as well as diagnostic fault tracing, and software downloads. As in VADIS, these areas are integrated into one single application. All functionality that could be found in VADIS will be found in VIDA. However, in some particular areas, e.g., the diagnostic work flow, search functionality, and the Parts catalogue, VIDA contains considerable enhancements when compared to VADIS.

Volvo's VIDA (Vehicle Information & Diagnostics for Aftersales) system ties together service and repair data, parts data, service bulletins, software (firmware) downloads, fault tracing and on-board diagnostic as well as other related information to decrease service time.

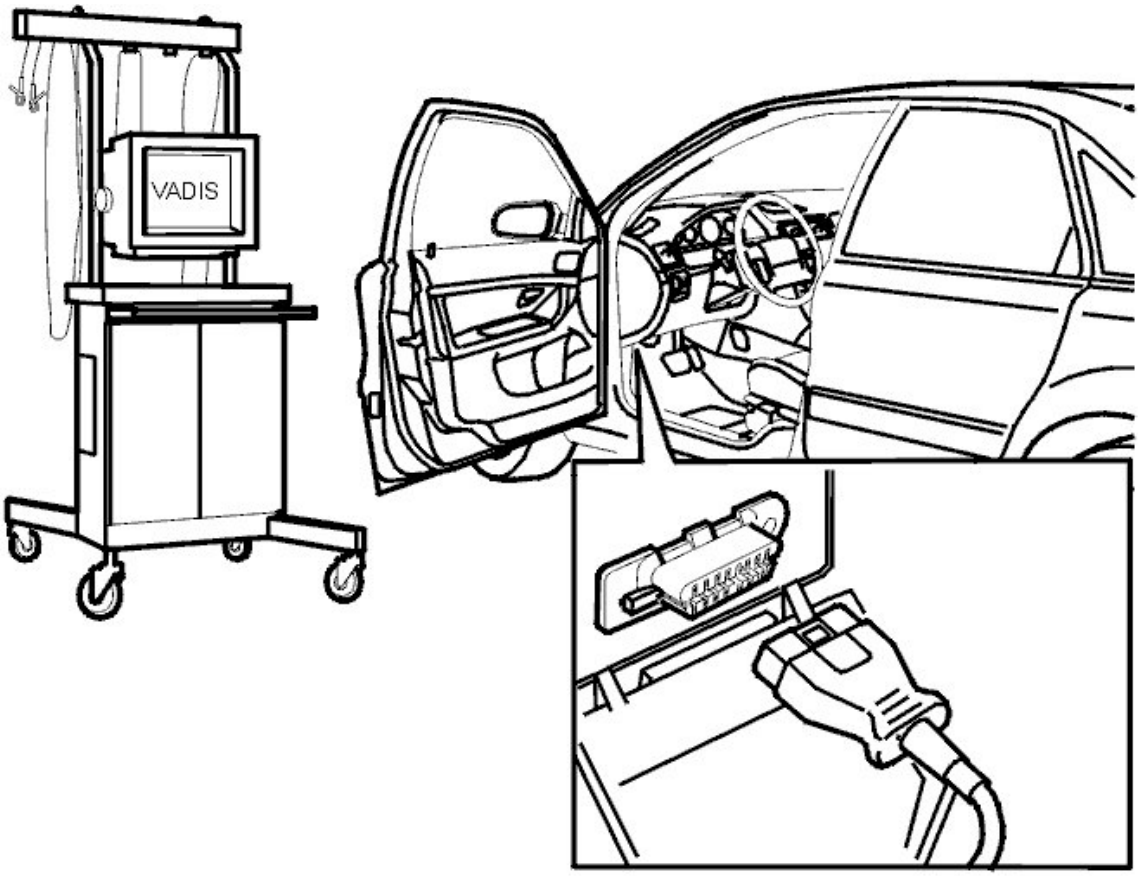
Much of the diagnostic information provided here is presented in a manner that assumes the technician is using the web-based Volvo diagnostic system (VIDA) to diagnose the vehicle. Volvo does not provide any information based on performing diagnosis with a third party diagnostic tool aside from a conversion from P Codes to Volvo ECM Codes for some systems.

Connecting the Volvo Communication Tool 2000 (VCT 2000)

Connecting the Volvo Communication Tool 2000 (VCT 2000)

Connecting the Volvo Communication Tool 2000 (VCT 2000)

In order to be able communicate with the car control modules, the VCT 2000 must be connected to both the VIDA PC and the car data link connector (DLC).
For further information about connection see Connecting VCT2000 See: Reading and Clearing Diagnostic Trouble Codes/Scan Tool Connecting/Connecting VCT2000.



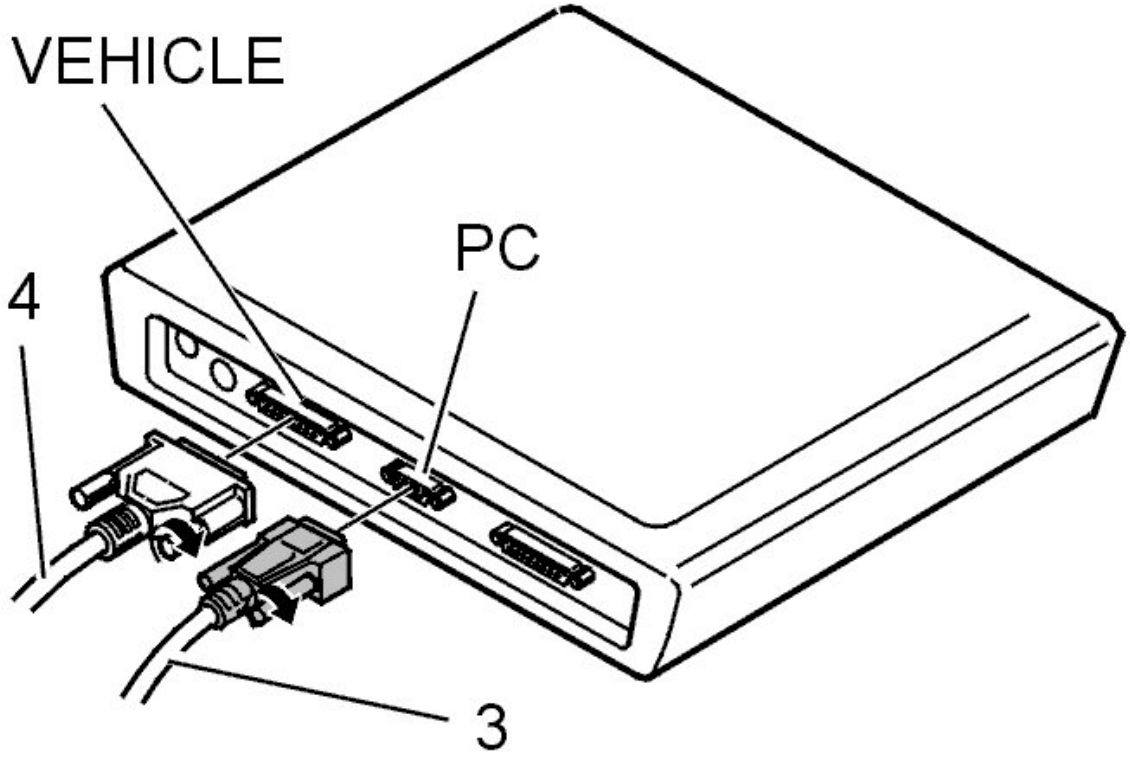
Continue - DONE

Connecting VCT2000

Connecting VCT2000

Connecting the wiring to VCT2000

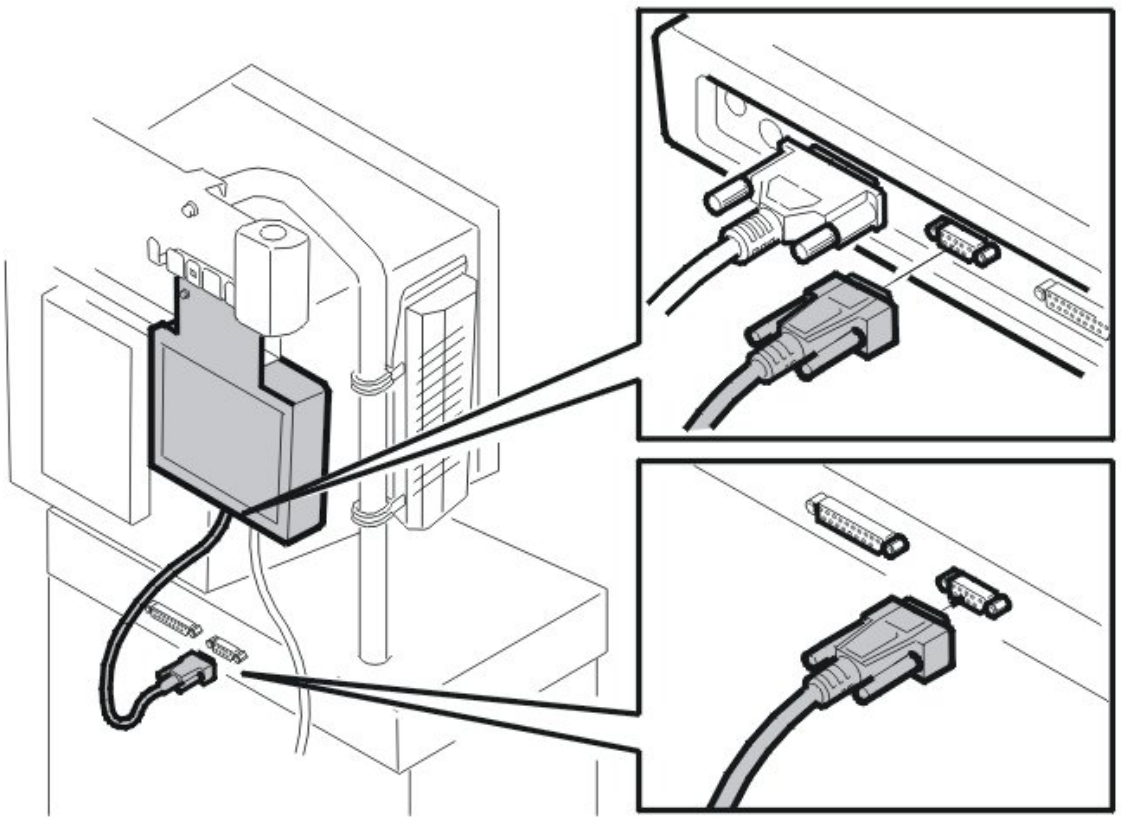
Warning! When connecting the VCT2000 to a car via vehicle cable951 1477 Cable See: Tools and Equipment/951 1477 Cable , must always be connected to the VCT2000 before it is connected to the car (supplied with power). This is to prevent damage to the electronic systems.



Connect:

- long PC cable951 2715 cable See: Tools and Equipment/951 2715 Cable (3) to the PC socket on the VCT2000
- vehicle cable (4)951 1477 Cable See: Tools and Equipment/951 1477 Cable to the VEHICLE socket on the VCT2000.

Connecting VCT2000 to the VIDA station



- Position the VCT2000 on the VIDA station as illustrated
- Connect the cable to the socket on the reverse of the VIDA station.

Note! Make sure that the vehicle cable is correctly connected to the VCT2000 before connecting the cable to the car.

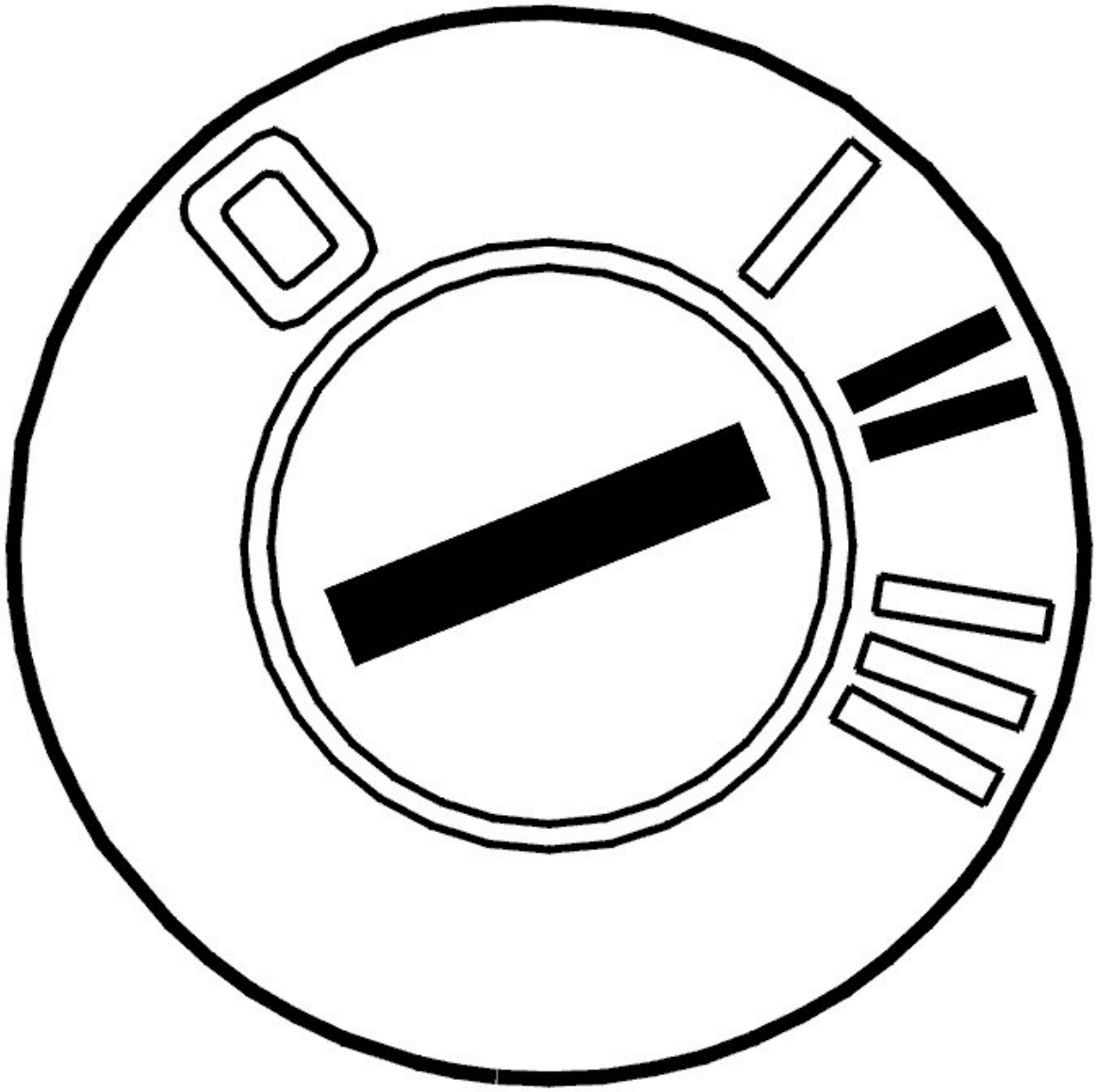
Erasing Diagnostic Trouble Codes (DTCs) for All Systems

Erasing diagnostic trouble codes (DTCs) for all systems

Reading off diagnostic trouble codes (DTCs) from all systems before erasing

Caution! This function erases all diagnostic trouble codes (DTCs) in all the systems in the car.The procedure begins with the reading off and display of diagnostic trouble codes (DTCs). The diagnostic trouble codes (DTCs) can then be erased.

Note! When erasing diagnostic trouble codes (DTCs) in all systems, alarm causes are also erased.



- Check that the transmission and engine type have been selected
- Ignition on.

Note! The engine must not be running.

Click on the VCT2000 symbol to **read off** the diagnostic trouble codes (DTCs).
After the read off, it will be possible to access the function for erasing diagnostic trouble codes (DTCs).

Hint: The read off may take up to 1 minute.

Note! Always fault-trace any stored diagnostic trouble codes (DTCs) via the VIDA symptom input before diagnostic trouble codes (DTCs) are erased.

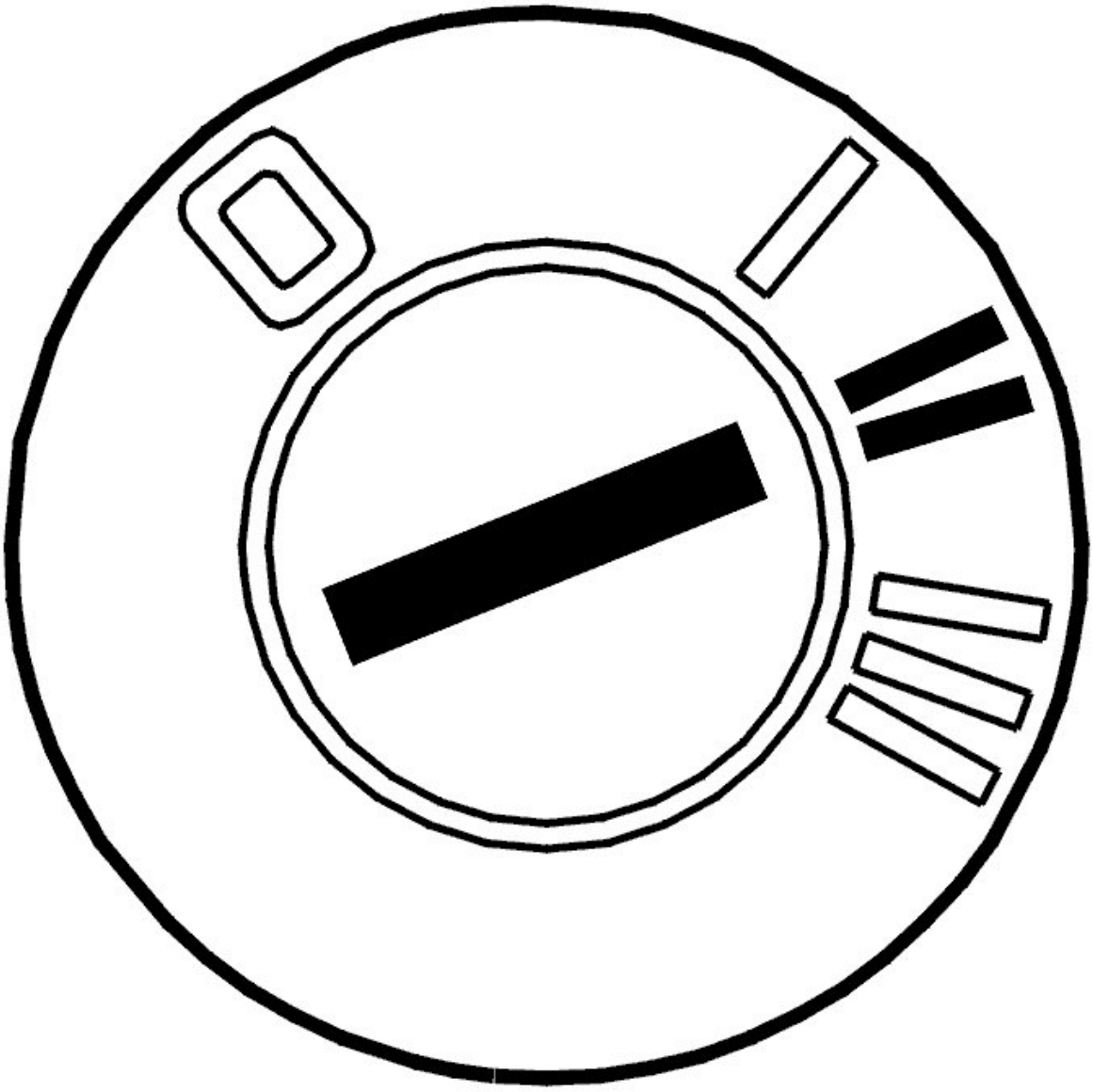
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

A - Erasing diagnostic trouble codes (DTCs) in all systems

B - **DONE**

Numeric Result 0 - Communication fault

Erasing diagnostic trouble codes (DTCs) in all systems



- Ignition on.

Note! The engine must not be running.

Click on the VCT2000 symbol to **erase** the diagnostic trouble codes (DTCs).

Hint: The read off may take up to 1 minute.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Continue - DONE

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Reading off diagnostic trouble codes (DTCs) from all systems before erasing

2 - Checking communication faults

3 - **FAILED**

Checking communication faults

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

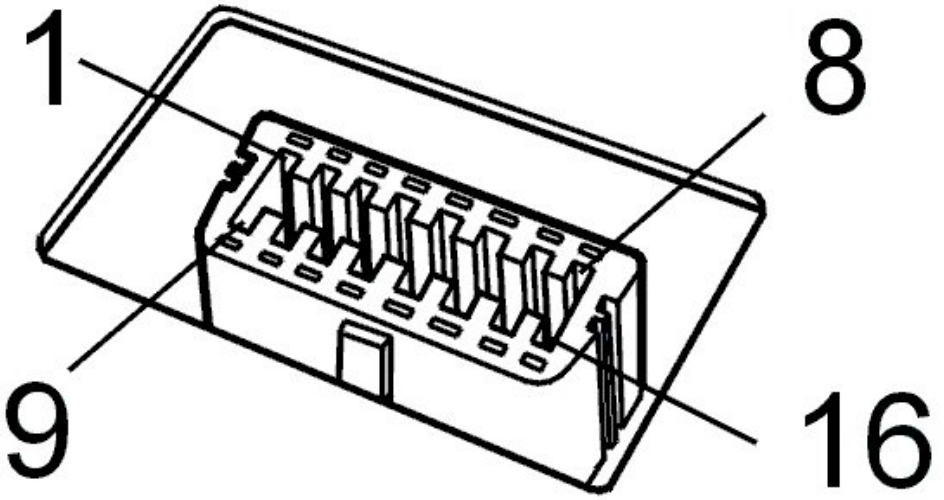
Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.
- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:
- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

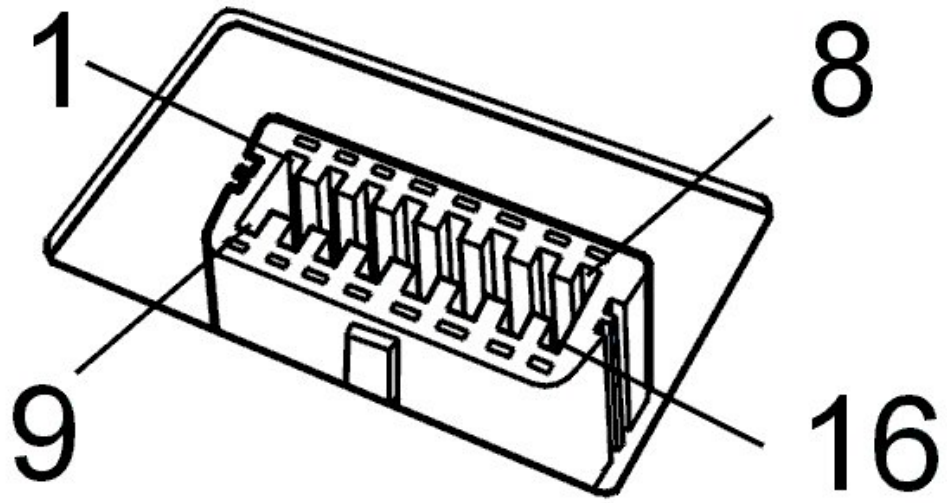
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2

- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

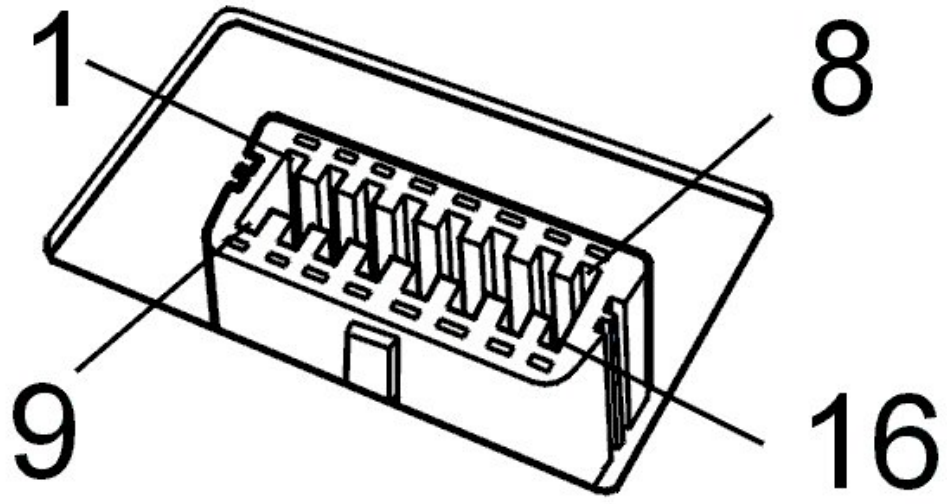
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

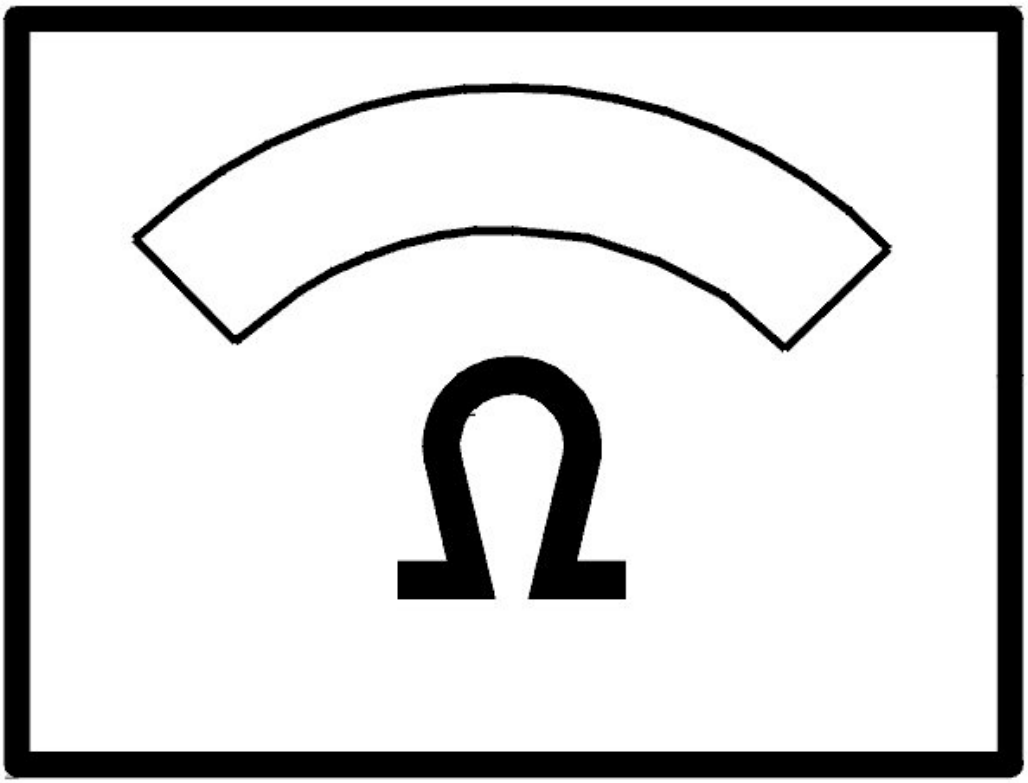
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

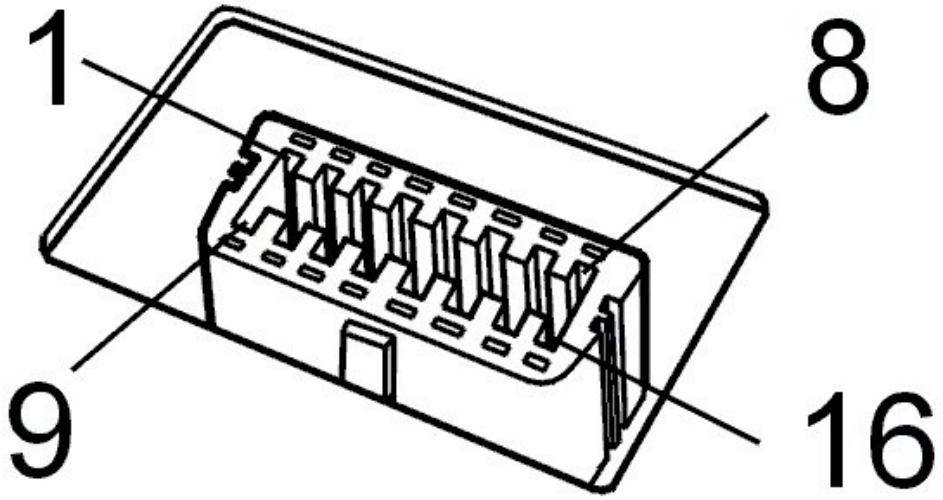
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

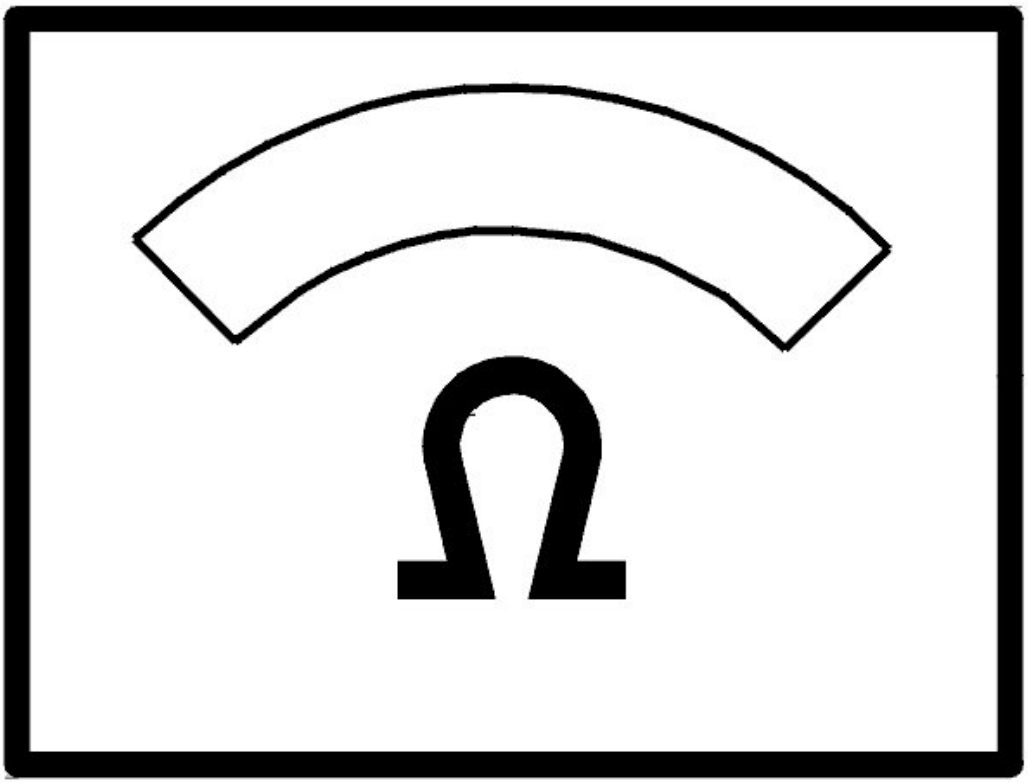
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

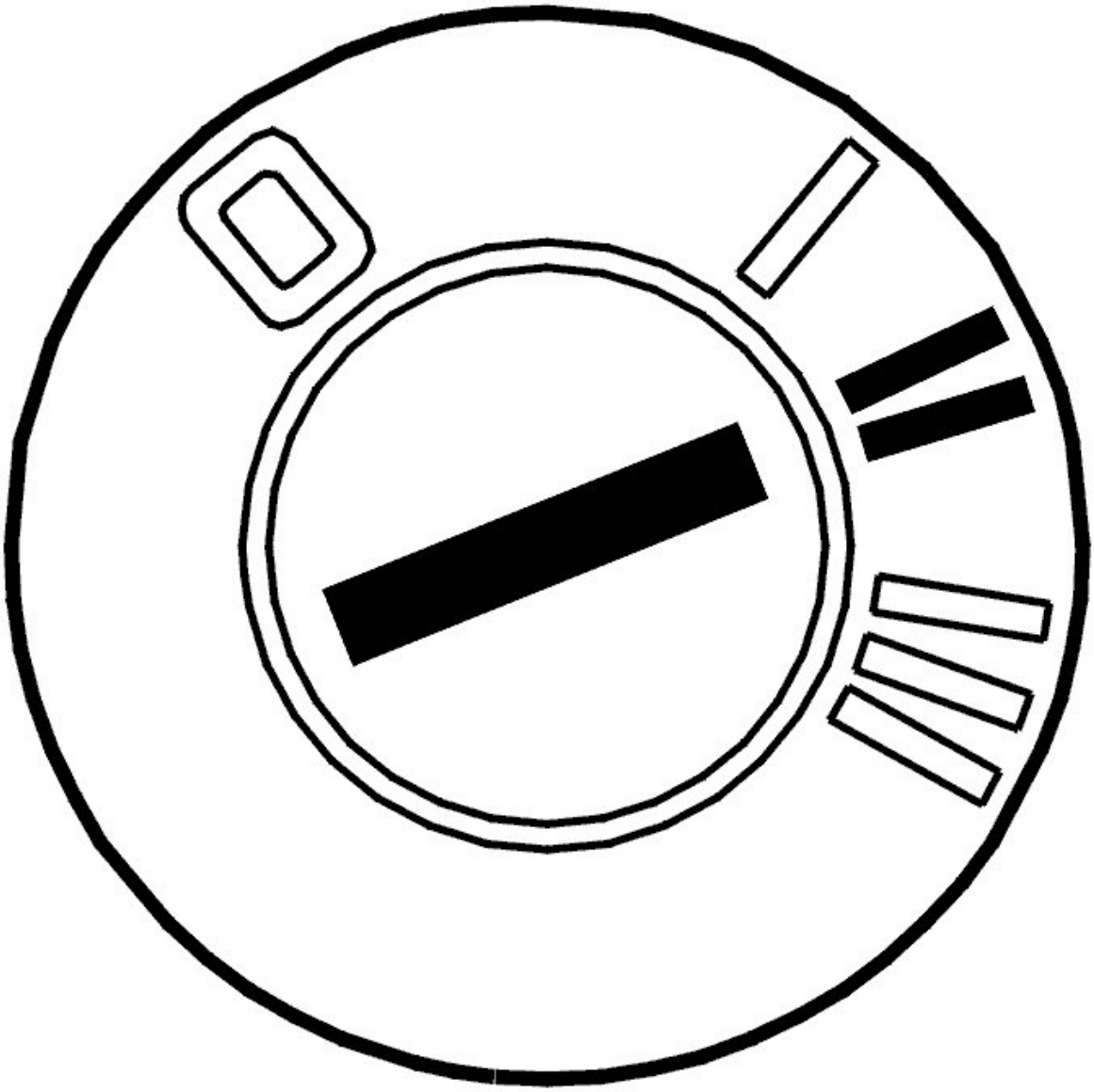
YES - Reading off diagnostic trouble codes (DTCs) from all systems before erasing

NO - FAILED

Reading Off Diagnostic Trouble Codes (DTCs)

Reading off diagnostic trouble codes (DTCs)

Reading off diagnostic trouble codes (DTCs), engine control module (ECM)



- Ignition on.

Read off diagnostic trouble codes (DTCs) by clicking on the VCT 2000 symbol.

Continue - Fault Found

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:

- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:

- That the control module power supply and ground terminal are fault-free.

- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging

- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information

- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.

1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - engine control module (ECM)

2 - Checking communication problems

3 - **FAILED**

Checking communication problems

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives

1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then

the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

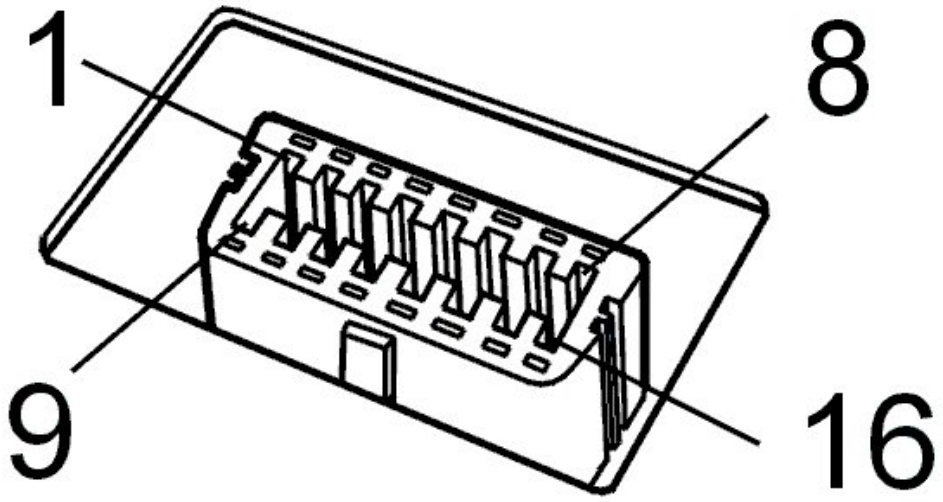
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.

- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally

done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:

- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:

- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

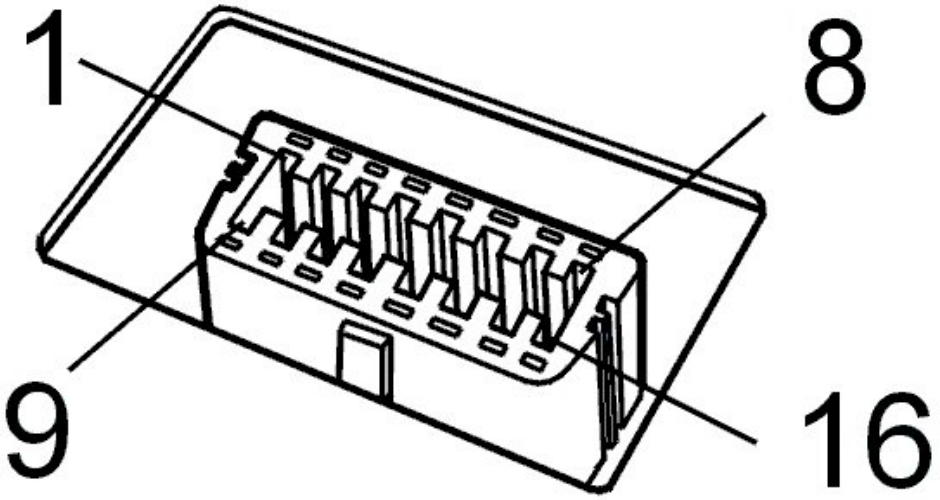
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates

a malfunction.

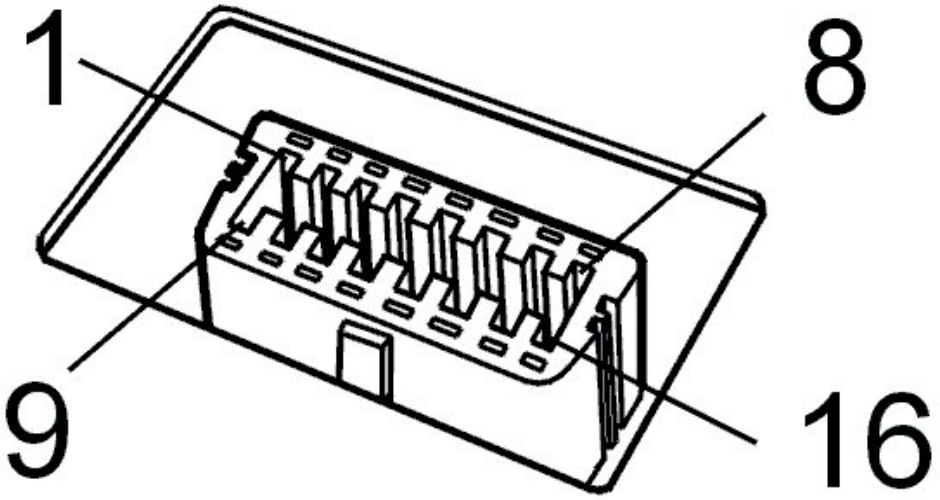
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

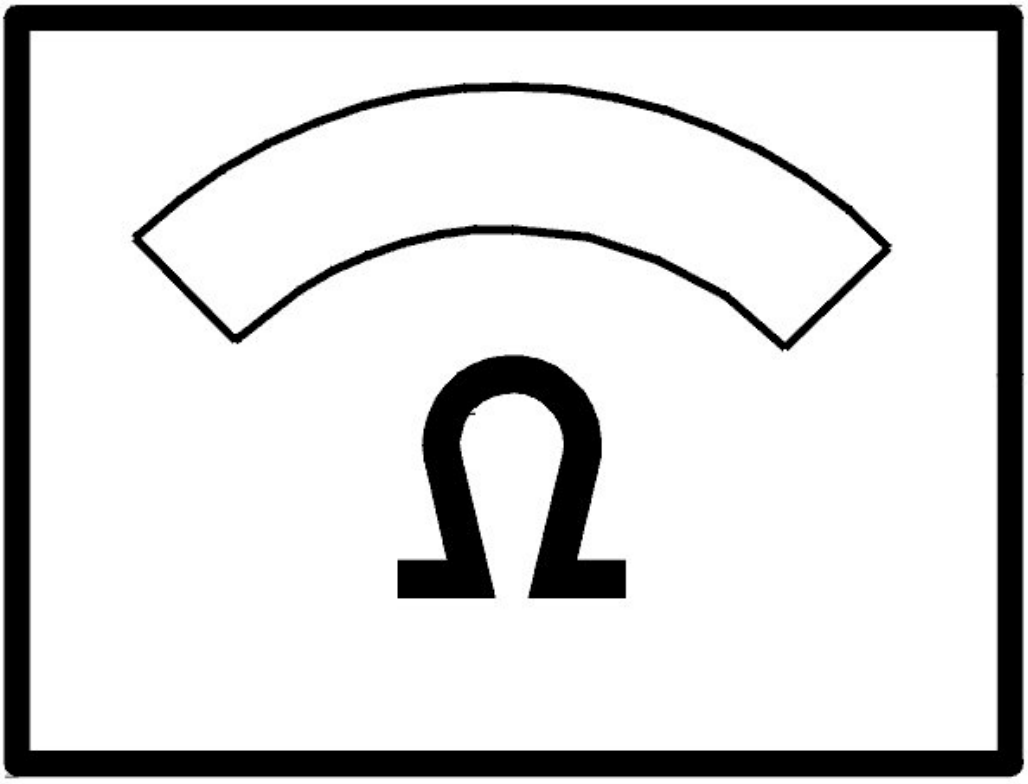
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line
- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

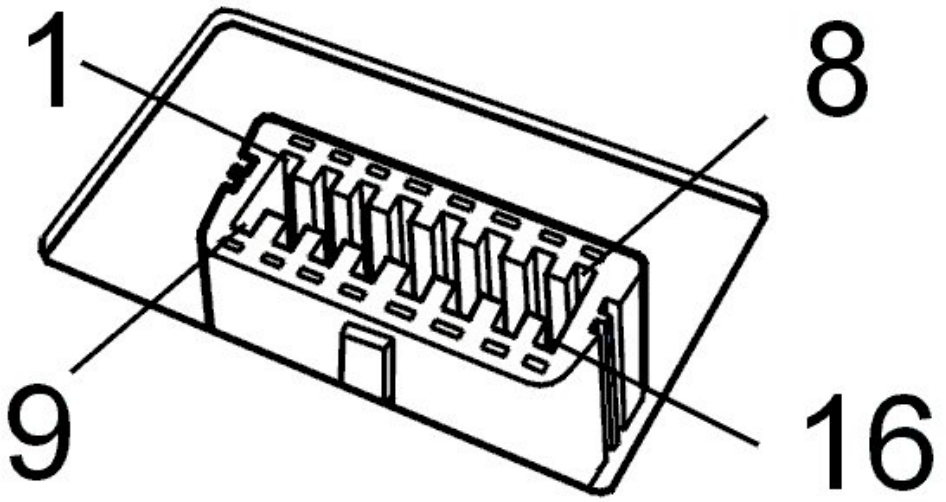
Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)
- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

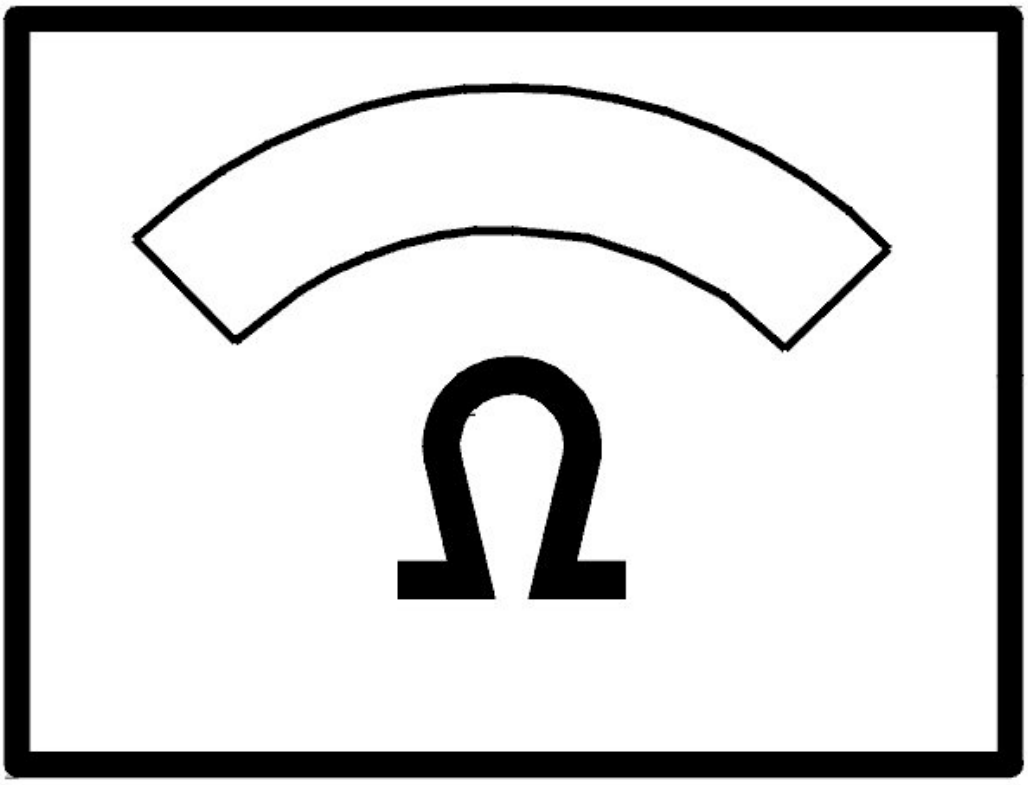
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - engine control module (ECM)

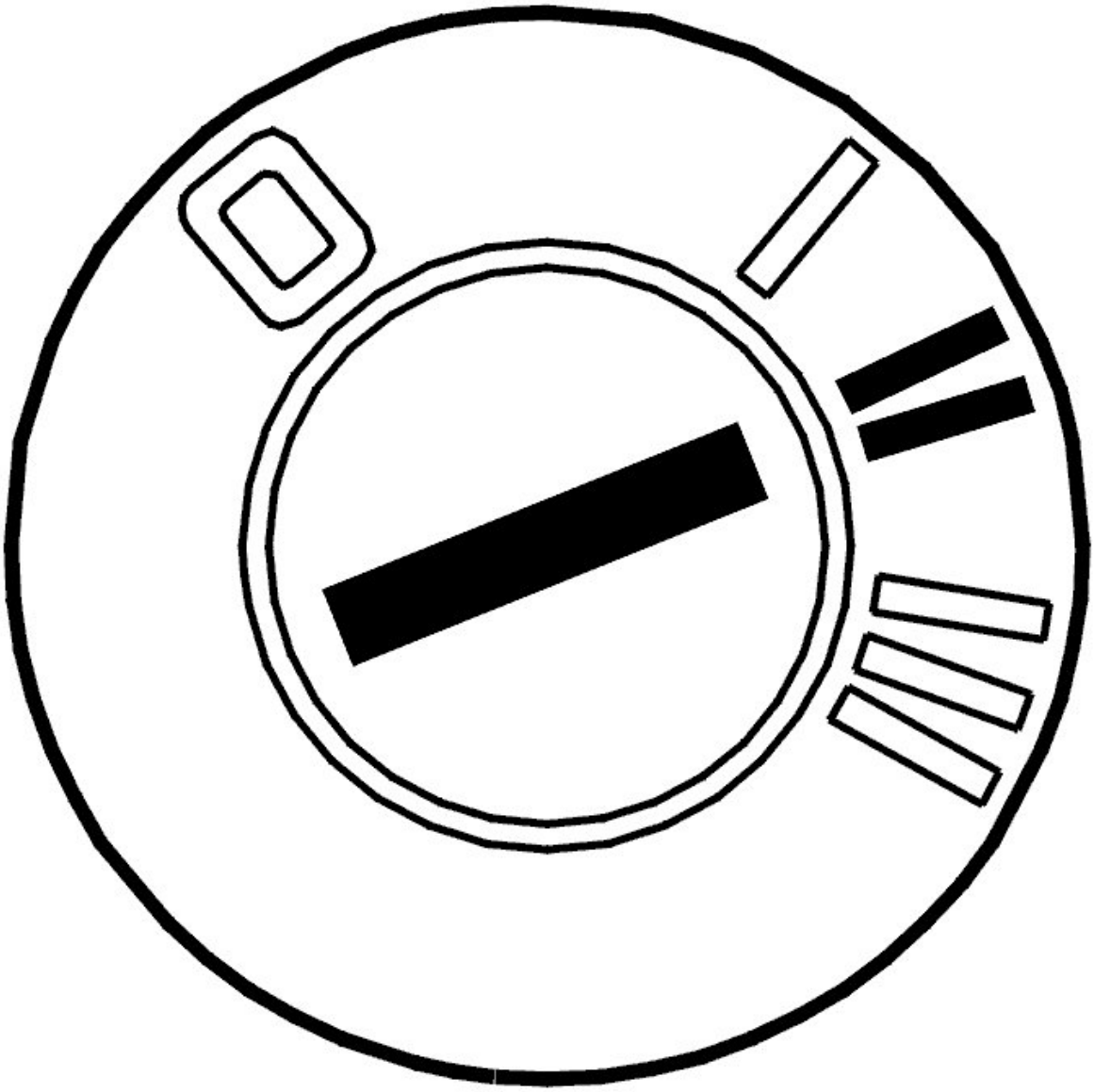
NO - FAILED

Reading Off Extended Diagnostic Trouble Code (DTC) Information, Engine control Module (ECM)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Detailed diagnostic trouble code information readout

Detailed diagnostic trouble code information readout, engine control module (ECM)



This service is an expanded air to fault tracing intermittent faults. It is primarily intended for use when the fault cannot be found using standard fault tracing for the diagnostic trouble code (DTC).

1. Ignition on.
2. Click the VCT2000 to activate the readout.
3. Read off stored diagnostic trouble codes (DTCs) in the upper list window.
4. Select the diagnostic trouble code from the upper list window to read the information on the code.

Description of detailed diagnostic trouble code information readout, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Detailed Diagnostic Trouble Code Information Readout

Continue - **DONE**

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:

- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Engine Control Module

2 - Checking a communication fault

3 - **FAILED**

Checking a communication fault

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
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Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
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Control modules

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VCT2000 and cable harness

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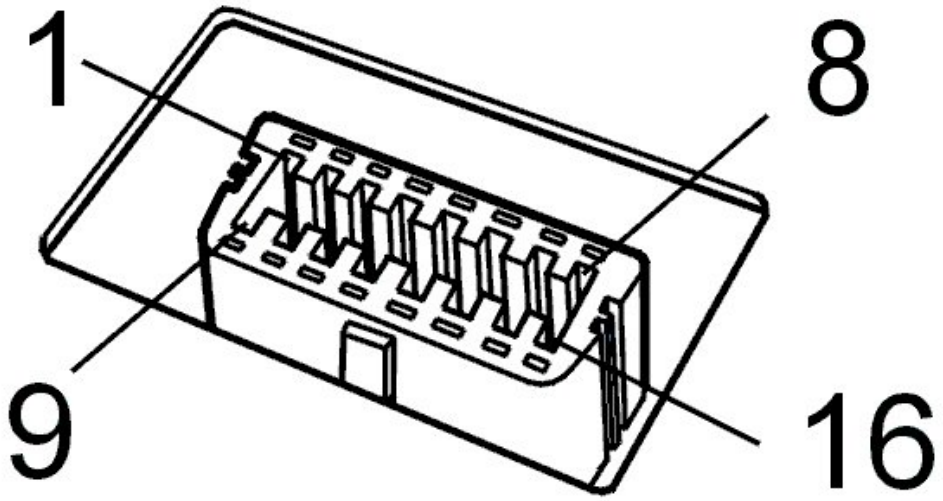
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

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- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

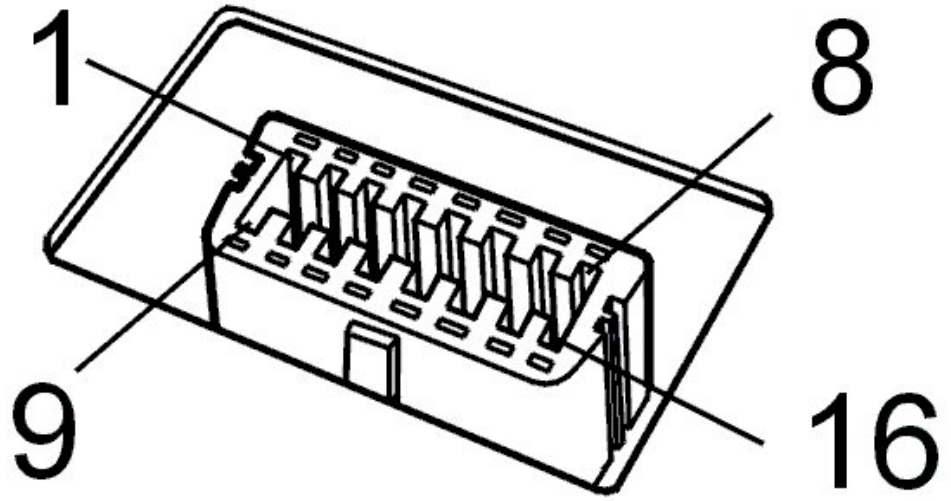
Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

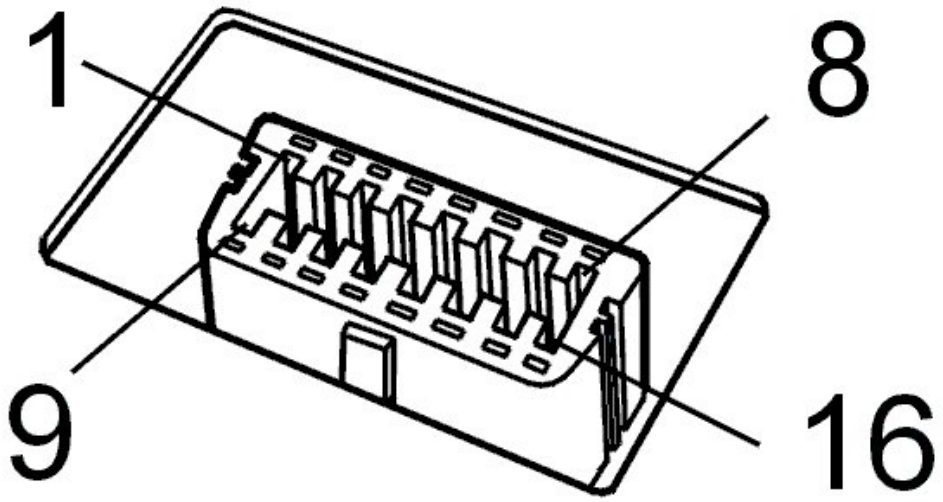
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

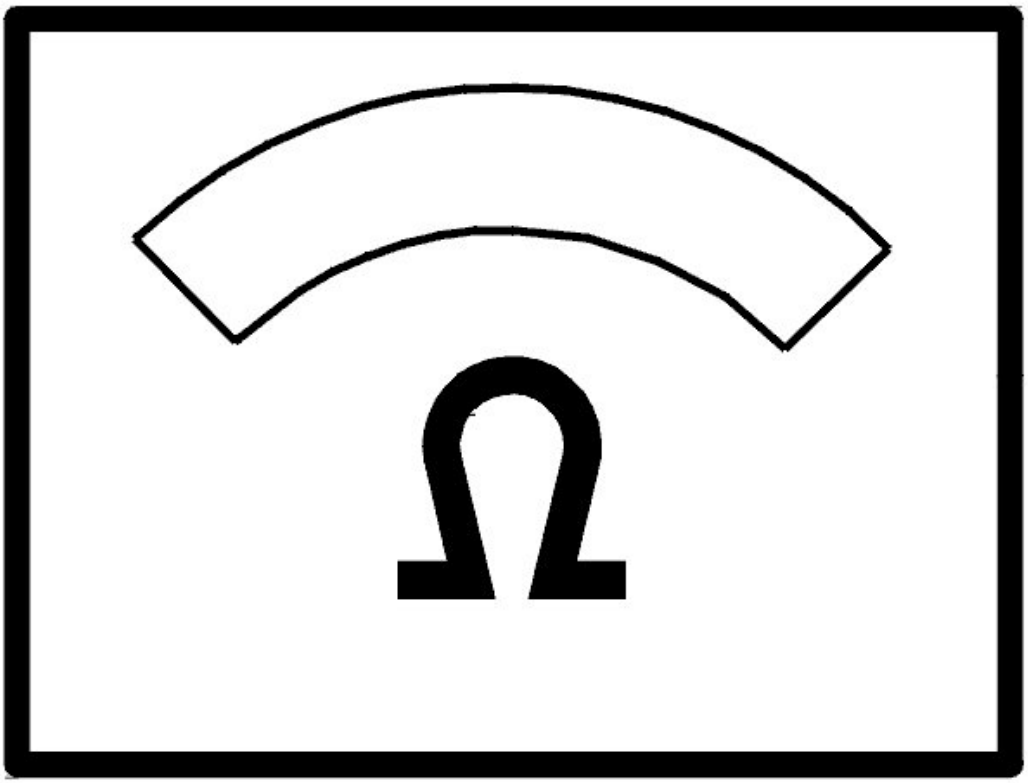
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

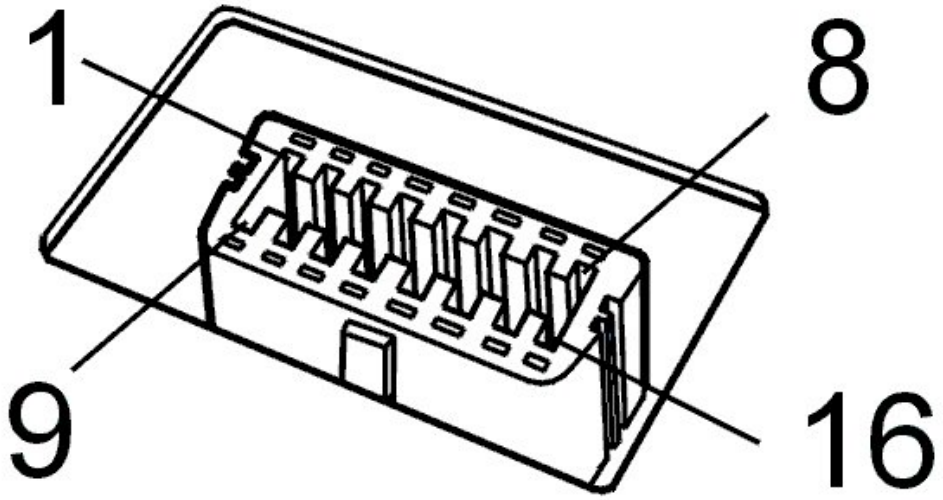
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

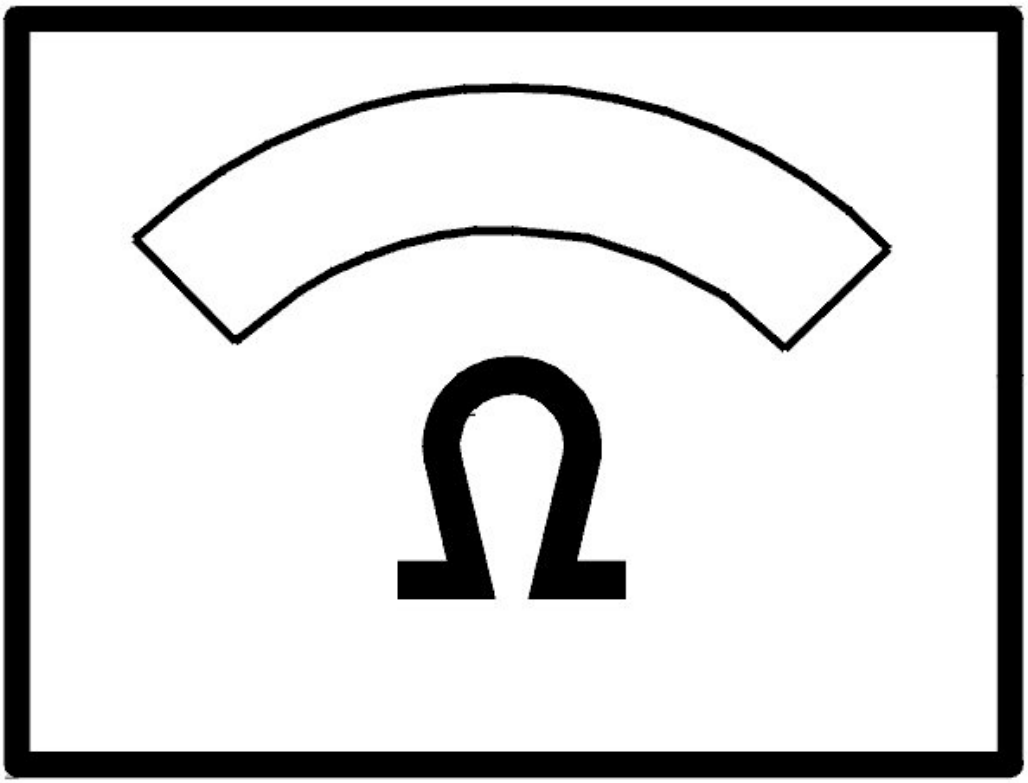
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault tracing information

Fault tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - Engine Control Module (ECM)

NO - FAILED

Vehicle Communication Information, Engine Control Module (ECM)

Description of detailed diagnostic trouble code information readout

Content

Select type of description:

- Description of frozen values See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Frozen Values
- Status identifier, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Status identifier, Description

- Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Classification of Diagnostic Trouble Codes

Classification of diagnostic trouble codes

In principle, malfunctions can be classified in two categories, intermittent or permanent.
Permanent malfunctions.

The easiest malfunctions to identify and confirm as a malfunction are the permanent malfunctions. A permanent malfunction is a malfunction when something has "broken" and remains like that until it is repaired.
Intermittent malfunctions.

The intermittent malfunctions are, as opposed to the permanent malfunctions, are both difficult to identify and confirm. The malfunction exists but is neither active nor present all the time. The malfunction comes and goes briefly under very rare conditions.
For the intermittent malfunctions, the degree of intermittence can also be determined, that is, how intermittent the malfunction is (how often/seldom the malfunction appears).

Hint: For assessment of intermittence, stored counters are used together with the diagnostic trouble code.

Common permanent malfunction causes are:

- Open circuits or short-circuits on cables or in connectors caused by mechanical damage, vibrations, corrosion, oxidation, moisture, etc.

Common intermittent malfunction causes are:

- Loose connections or contact resistance caused by vibrations, corrosion, oxidation, moisture, etc.
- Brief short-circuits to both ground and voltage caused by damage to cables, moisture in connectors, etc.
- Electro-magnetic interference.

Malfunction causes may be both electrical, mechanical or related to software.
Intermittent malfunctions (or malfunctions that occur under unknown conditions) may also be malfunctions that only occur during certain operation or ambient conditions.
E.g., that the window or seat for some reason jams in its end-position when using automatic function, or that the climate control unit supplies poor heat in a certain position when it rains outside.

Designation of Trouble Codes

Designation of trouble codes

The diagnostics tool VIDA shows the diagnostic trouble code in plain text according to the following example:
TCM-001F Speed sensor Signal missing Permanent malfunction

This diagnostic trouble code consists of the following parts:

- Prefix for control system in question (**TCM**) to show what system the diagnostic trouble code belongs to. *
- Diagnostic trouble code number (**001F**) to decide which diagnostic trouble code is stored. Number of digits in the diagnostic trouble code number may vary. *, **
- Title (**Speed sensor**) is a text that shows to which component/function the diagnostic trouble code refers. *
- Qualifier (**Signal missing**) is used to show **how the control module has perceived the signal from, e.g., the sensor, or how it detected the monitored function.** In this case, the control module has perceived that the signal is missing. There a re a number of other qualifiers for, e.g., too high signal, incorrect signal, too high flow, too low flow, etc. *, **.
  - If the qualifier is, e.g., "Too high signal", the control module interprets that the signal from the sensor is too high. This may mean that, e.g., the voltage is too high, current is too high, frequency is too high, or the pulse ratio (% duty) is too high, all depending on which type of signal it is. Malfunction causes may be, e.g., open circuit or short-circuiting to voltage.
  - If the qualifier is "Too low signal", the control module interprets that the signal from the sensor is too low. Malfunction causes may be, e.g., open circuit, shirt-circuiting to ground, contact resistance in connections.
  -

Note! Information about which type of signal that the control module detects and what conditions are required to detect that a malfunction is found again in the diagnostic trouble code information.

- Status (**Permanent malfunction**) to show the malfunction's status, that is, if the malfunction has been detected in the present driving cycle or not. There are two different status texts, permanent or intermittent. When the control module's diagnosis cannot decide the malfunction's

status, the diagnostic trouble code is shown without status text. *
* When reading out diagnostic trouble codes using diagnostic socket with light-emitting diode, you get a three-digit flash code. Then this code is translated to a diagnostic trouble code text using the service information.
For example, if the control module flashes the code 1-2-3 from Engine control module (ECM), it can be translated to, e.g., diagnostic trouble code 1-2-3 Engine temperature sensor. Volvo Diagnostic Key and Volvo System Tester translate these flash codes directly to plain text (add a title). In these diagnostic systems it is not possible to show qualifier or status.
** For systems with diagnostic version called Generic Global Diagnostics (GGD) (adheres to standard ISO/DIS 15031-6.4) the diagnostic trouble code number consists of a letter and six characters. The letter alternatives are B, C, P and N, which means Body, Chassis, Powertrain and Network and indicate to which "function" in the vehicle the diagnostic trouble code belongs. The six following characters may consist of both letters (A-F) and digits (0-9) and indicate the component to which the malfunction refers as well as what type of malfunction. See following example.
BCM-C006A16 Multi-axial acceleration sensor. General electric malfunction. Too low voltage

Status For Diagnostic Trouble Codes (DTCs)

Overview

Status for diagnostic trouble codes (DTCs)

When one or more faults occur in the component signals used by the engine control module (ECM), the control module sometimes encounters problems distinguishing the root cause of the fault. This is because certain diagnostic functions cannot be run due to physical factors. In addition there are internal causes for other diagnostic trouble codes (DTCs). Therefore, it is now possible to read the diagnostic trouble codes (DTCs) before they have been finally validated, in a prioritized order as follows.

Hint: Depending on the status and the internal connections between the diagnostic functions, the engine control module (ECM) can check the validation (differentiate between a root cause and a secondary cause) if the car is driven again. (The majority of diagnostic functions can be checked by switching the ignition on and off 2-3 times) This gives the control module time to compare all the diagnostic functions. It is possible to read the conditions for each diagnostic trouble code (DTC) and diagnostic functions in the section.

Note! Carry out fault-tracing first on the diagnostic trouble codes (DTCs) that correspond to the symptom.

Stored

(Stored)
The engine control module (ECM) has validated this as a root cause. Fault-tracing can be carried out.

NYS-VRC

(Not Yet Stored-Validated to Root Cause)
(Not Yet Stored-Validated to Root Cause)
This status may change to Stored after the next operating cycle (waits for other diagnostic trouble code(s) (DTC)).
Fault-tracing can be carried out when difficulties are experienced when dealing with this diagnostic trouble code (DTC).

NYS-NV

(Not Yet Stored-Not Validated)
(Not Yet Stored-Not Validated)
This status can change to Stored after the next operating cycle (the ignition or engine is switched off-> on).
Fault-tracing can be carried out when difficulties are experienced when dealing with this diagnostic trouble code (DTC).

Temporary

(Temporary)
Indicates if there is a fault, only in this duty cycle. (If the fault disappears, the status changes to Erased).
Carry out fault-tracing if no other diagnostic trouble codes (DTCs) correspond to the fault symptom.

Stored-VNR

(Stored-Validated to Not Root cause)
(Stored-Validated to Not Root Cause)
Fault-tracing must not be carried out.

NYS-VNR

(Not Yet Stored-Validated to Not Root cause)
(Not Yet Stored-Validated to Not Root Cause)
Fault-tracing must not be carried out.

Hint: "Not validated" indicates that the diagnostic function for the diagnostic trouble code (DTC) has still not been completed.

Erased

(Erased)
Only fault traced in cases when there is a connection to a symptom reported by the customer and no other diagnostic trouble codes (DTCs) are stored.

Note! Erased status is indicated when a fault occurs in every other operating cycle.

Conversion Table Standardized Diagnostic Trouble Codes (DTCs)/Volvo Diagnostic Trouble Codes

Conversion table standardized diagnostic trouble codes/Volvo diagnostic trouble codes

Information

Background

OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.
Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations

The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).
SAE/ISO DTC: Standardized diagnostic trouble code as per SAE J2012/ISO 15031-6. The DTC can be read out from the vehicle using a standardized diagnostics system for emission-related faults certified as per OBD II. The readout is taken with a generic scantool, a fault tracing instrument standardized as per SAE J1978/ISO 15031-4.
Volvo DII DTC: Volvo-specific diagnostic trouble code as per Volvo Onboard Diagnostics protocol. Can be read out from cars from model year 1999 using VIDA.

DTC designation: Volvo DTC designation. Used in VIDA.
Fault type: Volvo's method of specifying the fault. Used in VIDA.

Note! An SAE/ISO diagnostic trouble code can correspond to several DII diagnostic trouble codes. All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code to disappear.Several SAE/ISO diagnostic trouble codes may also refer to the same DII diagnostic trouble code.There are DII diagnostic trouble codes for non emission-related malfunctions that do not correspond to any SAE/ISO diagnostic trouble code.

Table

SAE/ISO DTCs	Volvo DII DTCs	Diagnostic trouble code (DTC) designation	Fault type
P0016	ECM-670C	Camshaft position, inlet	High
P0016	ECM-670D	Camshaft position, inlet	Low
P0017	ECM-671C	Camshaft position, exhaust	High
P0017	ECM-671D	Camshaft position, exhaust	Low
P0026	ECM-6110	Camshaft control, inlet	Slow
P0026	ECM-611B	Camshaft control, inlet	Faulty
P0027	ECM-6140	Camshaft control exhaust	Slow
P0027	ECM-614B	Camshaft control exhaust	Faulty
P0030	ECM-244B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0031	ECM-244D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0032	ECM-244C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0036	ECM-223B	Rear heated oxygen sensor, bank 1	Signal missing
P0037	ECM-223D	Rear heated oxygen sensor, bank 1	Signal too low
P0038	ECM-223C	Rear heated oxygen sensor, bank 1	Signal too high
P0040	ECM-24A0	Front heated oxygen sensors mixed up	Faulty signal
P0041	ECM-2240	Rear heated oxygen sensors, mixed up	Faulty signal
P0050	ECM-254B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0051	ECM-254D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0052	ECM-254C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0053	ECM-2400	Front heated oxygen sensor, bank 1 heating	Faulty signal
P0053	ECM-240B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0053	ECM-240C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0053	ECM-240D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0056	ECM-233B	Rear heated oxygen sensor, bank 2	Signal missing
P0057	ECM-233D	Rear heated oxygen sensor, bank 2	Signal too low
P0058	ECM-233C	Rear heated oxygen sensor, bank 2	Signal too high
P0059	ECM-2500	Front heated oxygen sensor, bank 2 heating	Faulty signal
P0059	ECM-250B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0059	ECM-250C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0059	ECM-250D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0071	ECM-1410	Ambient temperature sensor	Faulty signal
P0071	ECM-141B	Ambient temperature sensor	Signal missing
P0072	ECM-140D	Ambient temperature sensor	Signal too low
P0073	ECM-140C	Ambient temperature sensor	Signal too high
P0075	ECM-612B	Intake camshaft reset valve	Signal missing
P0076	ECM-612D	Intake camshaft reset valve	Signal too low
P0077	ECM-612C	Intake camshaft reset valve	Signal too high
P0078	ECM-616B	Exhaust camshaft reset valve	Signal missing
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0080	ECM-616C	Exhaust camshaft reset valve	Signal too high
P0087	ECM-290D	Fuel pressure	Signal too low
P0088	ECM-290C	Fuel pressure	Signal too high

DTC Table (P Codes / ECM Codes) Part 1

P0089	ECM-2900	Fuel pressure	Faulty signal
P0090	ECM-290B	Fuel pressure	Signal missing
P0100	ECM-120C	Air mass	Signal too high
P0100	ECM-120D	Air mass	Signal too low
P0101	ECM-1210	Mass air flow sensor	Flow too high
P0101	ECM-121B	Mass air flow sensor	Flow too low
P0102	ECM-121D	Mass air flow sensor	Signal too low
P0103	ECM-121C	Mass air flow sensor	Signal too high
P0110	ECM-132D	Intake air temperature (IAT) sensor inlet	Signal too low
P0111	ECM-1320	Intake air temperature (IAT) sensor inlet	Faulty signal
P0111	ECM-132C	Intake air temperature (IAT) sensor inlet	Signal too high
P0112	ECM-131C	Intake air temperature (IAT) sensor inlet	Signal too high
P0113	ECM-131D	Intake air temperature (IAT) sensor inlet	Signal too low
P0117	ECM-273C	Engine coolant temperature (ECT) sensor	Signal too high
P0118	ECM-273D	Engine coolant temperature (ECT) sensor	Signal too low
P0121	ECM-9210	Electronic throttle unit, potentiometer 1	Faulty signal
P0122	ECM-921D	Electronic throttle unit, potentiometer 1	Signal too low
P0123	ECM-921C	Electronic throttle unit, potentiometer 1	Signal too high
P0125	ECM-270B	Engine coolant temperature (ECT) sensor	Signal missing
P0128	ECM-2B00	Thermostat	Faulty signal
P0131	ECM-248D	Front heated oxygen sensor, bank 1	Signal too low
P0132	ECM-248C	Front heated oxygen sensor, bank 1	Signal too high
P0133	ECM-242D	Front heated oxygen sensor, bank 1	Signal missing
P0136	ECM-222B	Rear heated oxygen sensor, bank 1	Signal missing
P0137	ECM-222D	Rear heated oxygen sensor, bank 1	Signal too low
P0138	ECM-222C	Rear heated oxygen sensor, bank 1	Signal too high
P0140	ECM-221B	Rear heated oxygen sensor aging, bank 1	Signal missing
P0140	ECM-221C	Rear heated oxygen sensor aging, bank 1	Signal too high
P0140	ECM-221D	Rear heated oxygen sensor aging, bank 1	Signal too low
P0141	ECM-2200	Rear heated oxygen sensor bank 1, heating	Faulty signal
P0151	ECM-258D	Front heated oxygen sensor, bank 2	Signal too low
P0152	ECM-258C	Front heated oxygen sensor, bank 2	Signal too high
P0153	ECM-252D	Front heated oxygen sensor, bank 2	Signal missing
P0156	ECM-232B	Rear heated oxygen sensor, bank 2	Signal missing
P0157	ECM-232D	Rear heated oxygen sensor, bank 2	Signal too low
P0158	ECM-232C	Rear heated oxygen sensor, bank 2	Signal too high
P0160	ECM-231B	Rear heated oxygen sensor aging, bank 2	Signal missing
P0160	ECM-231C	Rear heated oxygen sensor aging, bank 2	Signal too high
P0160	ECM-231D	Rear heated oxygen sensor aging, bank 2	Signal too low
P0161	ECM-2300	Rear heated oxygen sensor bank 2, heating	Faulty signal
P0182	ECM-2A0D	Fuel temperature sensor	Signal too low
P0183	ECM-2A0C	Fuel temperature sensor	Signal too high
P0190	ECM-280B	Fuel pressure sensor	Signal too high
P0191	ECM-2800	Fuel pressure sensor	Signal too low

DTC Table (P Codes / ECM Codes) Part 2

P0192	ECM-280D	Fuel pressure sensor	Signal too low
P0193	ECM-280C	Fuel pressure sensor	Signal too high
P0197	ECM-540D	Oil quality, level and temperature sensor	Signal too low
P0198	ECM-540C	Oil quality, level and temperature sensor	Signal too high
P0199	ECM-540B	Oil quality, level and temperature sensor	Faulty signal
P0201	ECM-2C0B	Injector cyl 1	Signal missing
P0202	ECM-2C1B	Injector cyl 2	Signal missing
P0203	ECM-2C2B	Injector cyl 3	Signal missing
P0204	ECM-2C3B	Injector cyl 4	Signal missing
P0205	ECM-2C4B	Injector cyl 5	Signal missing
P0206	ECM-2C5B	Injector cyl 6	Signal missing
P0221	ECM-9220	Electronic throttle unit, potentiometer 2	Faulty signal
P0222	ECM-922D	Electronic throttle unit, potentiometer 2	Signal too low
P0223	ECM-922C	Electronic throttle unit, potentiometer 2	Signal too high
P0234	ECM-601C	Turbo control defective boost pressure	Signal too high
P0237	ECM-125D	Charge pressure sensor	Signal too low
P0238	ECM-125C	Charge pressure sensor	Signal too low
P0240	ECM-1260	Charge pressure sensor	Faulty signal
P0240	ECM-126B	Charge pressure sensor	Signal missing
P0240	ECM-126C	Charge pressure sensor	Signal too high
P0240	ECM-126D	Charge pressure sensor	Signal too low
P0243	ECM-600B	Turbocharger (TC) control valve	Signal missing
P0245	ECM-600D	Turbocharger (TC) control valve	Signal too low
P0246	ECM-600C	Turbocharger (TC) control valve	Signal too high
P0261	ECM-2C0D	Injector cyl 1	Signal too low
P0262	ECM-2C0C	Injector cyl 1	Signal too high
P0264	ECM-2C1D	Injector cyl 2	Signal too low
P0265	ECM-2C1C	Injector cyl 2	Signal too high
P0267	ECM-2C2D	Injector cyl 3	Signal too low
P0268	ECM-2C2C	Injector cyl 3	Signal too high
P0270	ECM-2C3D	Injector cyl 4	Signal too low
P0271	ECM-2C3C	Injector cyl 4	Signal too high
P0273	ECM-2C4D	Injector cyl 5	Signal too low
P0274	ECM-2C4C	Injector cyl 5	Signal too high
P0276	ECM-2C5D	Injector cyl 6	Signal too low
P0277	ECM-2C5C	Injector cyl 6	Signal too high
P0299	ECM-602D	Turbo control defective flow	Signal too low
P0300	ECM-3100	Misfire, at least one cylinder	Start-up
P0300	ECM-310C	Misfire, at least one cylinder	Catalytic converter damage
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0301	ECM-3210	Misfire cylinder 1, start-up	Start-up
P0301	ECM-321C	Misfire cylinder 1, catalytic converter damage	Catalytic converter damage
P0301	ECM-321D	Misfire cylinder 1, emissions impact	Emissions impact

DTC Table (P Codes / ECM Codes) Part 3

P0302	ECM-3220	Misfire cylinder 2, start-up	Start-up
P0302	ECM-322C	Misfire cylinder 2, catalytic converter damage	Catalytic converter damage
P0302	ECM-322D	Misfire cylinder 2, emissions impact	Emissions impact
P0303	ECM-3230	Misfire cylinder 3, start-up	Start-up
P0303	ECM-323C	Misfire cylinder 3, catalytic converter damage	Catalytic converter damage
P0303	ECM-323D	Misfire cylinder 3, emissions impact	Emissions impact
P0304	ECM-3240	Misfire cylinder 4, start-up	Start-up
P0304	ECM-324C	Misfire cylinder 4, catalytic converter damage	Catalytic converter damage
P0304	ECM-324D	Misfire cylinder 4, emissions impact	Emissions impact
P0305	ECM-3250	Misfire cylinder 5, start-up	Start-up
P0305	ECM-325C	Misfire cylinder 5, catalytic converter damage	Catalytic converter damage
P0305	ECM-325D	Misfire cylinder 5, emissions impact	Emissions impact
P0306	ECM-3260	Misfire cylinder 6, start-up	Start-up
P0306	ECM-326C	Misfire cylinder 6, catalytic converter damage	Catalytic converter damage
P0306	ECM-326D	Misfire cylinder 6, emissions impact	Emissions impact
P0324	ECM-3000	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3010	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3020	Engine control module (ECM), Internal fault	Faulty signal
P0327	ECM-303D	Knock sensor front	Signal too low
P0328	ECM-303C	Knock sensor front	Signal too high
P0332	ECM-304D	Knock sensor rear	Signal too low
P0333	ECM-304C	Knock sensor rear	Signal too high
P0335	ECM-500B	Engine speed (RPM) sensor signal	Signal missing
P0336	ECM-5000	Engine speed (RPM) sensor signal	Faulty signal
P0337	ECM-500D	Engine speed (RPM) sensor signal	Signal too low
P0338	ECM-500C	Engine speed (RPM) sensor signal	Signal too high
P0340	ECM-340B	Camshaft position (CMP) sensor, intake	Signal missing
P0342	ECM-340D	Camshaft position (CMP) sensor, intake	Signal too low
P0343	ECM-340C	Camshaft position (CMP) sensor, intake	Signal too high
P0344	ECM-3400	Camshaft position (CMP) sensor, intake	Faulty signal
P0345	ECM-341B	Camshaft position (CMP) sensor, exhaust	Signal missing
P0347	ECM-341D	Camshaft position (CMP) sensor, exhaust	Signal too low
P0348	ECM-341C	Camshaft position (CMP) sensor, exhaust	Signal too high
P0349	ECM-3410	Camshaft position (CMP) sensor, exhaust	Faulty signal
P0351	ECM-360B	Ignition coil cyl 1	Signal missing
P0352	ECM-361B	Ignition coil cyl 2	Signal missing
P0353	ECM-362B	Ignition coil cyl 3	Signal missing
P0354	ECM-363B	Ignition coil cyl 4	Signal missing
P0355	ECM-364B	Ignition coil cyl 5	Signal missing
P0356	ECM-365B	Ignition coil cyl 6	Signal missing
P0420	ECM-400C	Catalytic converter efficiency, bank 1	Signal too high
P0430	ECM-401C	Catalytic converter efficiency, bank 2	Signal too high
P0442	ECM-439C	Tank system, leakage	Major leak
P0443	ECM-421B	Evaporative emission system (EVAP) valve	Signal missing

DTC Table (P Codes / ECM Codes) Part 4

P0444	ECM-421C	Evaporative emission system (EVAP) valve	Signal too high
P0445	ECM-421D	Evaporative emission system (EVAP) valve	Signal too low
P0456	ECM-434C	Tank system, leakage	Minor leak
P0457	ECM-430C	Tank system, leakage	Fuel tank cap missing
P0457	ECM-4380	Tank cap	Missing
P0460	ECM-440C	Fuel level sensor	Signal too high
P0461	ECM-4400	Fuel level sensor	Faulty signal
P0464	ECM-440B	Fuel level sensor	Signal missing
P0480	ECM-650B	Engine cooling fan (FC)	Signal missing
P0483	ECM-6200	Engine cooling fan (FC) control module	Faulty signal
P0484	ECM-620C	Engine cooling fan (FC) control module	Signal too high
P0485	ECM-620D	Engine cooling fan (FC) control module	Signal too low
P0496	ECM-420C	EVAP-system	Signal too high
P0497	ECM-420D	EVAP-system	Signal too high
P0500	ECM-530C	Speed signal	Signal too high
P0501	ECM-5300	Speed signal	Faulty signal
P0502	ECM-530D	Speed signal	Signal too low
P0503	ECM-A12B	Speed signal	Signal missing
P0503	ECM-A12C	Speed signal	Signal too high
P0503	ECM-530B	Speed signal	Signal missing
P0506	ECM-951D	Engine control module (ECM), idle control	Signal too low
P0507	ECM-951C	Engine control module (ECM), idle control	Signal too high
P0530	ECM-520B	A/C pressure sensor	Signal missing
P0531	ECM-5200	A/C pressure sensor	Faulty signal
P0532	ECM-520D	A/C pressure sensor	Signal too low
P0533	ECM-520C	A/C pressure sensor	Signal too high
P0560	ECM-8200	Battery voltage	Faulty signal
P0561	ECM-800B	System relay	Signal too low
P0562	ECM-820D	Battery voltage	Signal too low
P0563	ECM-820C	Battery voltage	Signal too high
P0564	ECM-930B	Control module, communication fault	Signal missing
P0571	ECM-900B	Brake pedal sensor	Signal missing
P0573	ECM-900C	Brake pedal sensor	Signal too low
P0579	ECM-9300	Control module, communication fault	Faulty signal
P0580	ECM-930D	Control module, communication fault	Signal too low
P0581	ECM-930C	Control module, communication fault	Signal too high
P0602	ECM-5110	Malfunction indicator light CEM	Faulty signal
P0604	ECM-9970	Memory error RAM	Faulty signal
P0605	ECM-9980	Memory error ROM	Faulty signal
P0606	ECM-9990	Engine control module (ECM)	Faulty signal
P0607	ECM-9800	Engine control module (ECM), torque signal	Internal fault
P0607	ECM-9810	Engine control module (ECM), engine rpm	Internal fault
P0607	ECM-9820	Engine control module (ECM), load signal	Internal fault
P0607	ECM-983B	Engine control module (ECM)	Internal fault

DTC Table (P Codes / ECM Codes) Part 5

P0607	ECM-983C	Engine control module (ECM)	Internal fault
P0607	ECM-983D	Engine control module (ECM)	Internal fault
P0607	ECM-9840	Engine control module (ECM)	Internal fault
P0607	ECM-984B	Engine control module (ECM)	Internal fault
P0607	ECM-9860	Engine control module (ECM)	Internal fault
P0607	ECM-720B	Engine control module (ECM) internal fault	Signal missing
P0607	ECM-9850	Engine control module (ECM)	Internal fault
P0627	ECM-291B	Fuel pump control module	Signal missing
P0628	ECM-291D	Fuel pump control module	Signal too low
P0629	ECM-291C	Fuel pump control module	Signal too high
P0634	ECM-7010	Engine control module high temperature	Faulty signal
P0634	ECM-7020	Engine control module high temperature	Faulty signal
P0638	ECM-9270	Throttle unit	Faulty signal
P0642	ECM-810D	Power supply (5 volt)	Signal too low
P0643	ECM-810C	Power supply (5 volt)	Signal too high
P0645	ECM-630B	Air conditioning (A/C) relay	Signal missing
P0646	ECM-630D	Air conditioning (A/C) relay	Signal too low
P0647	ECM-630C	Air conditioning (A/C) relay	Signal too high
P0650	ECM-660B	Malfunction indicator lamp (MIL)	Signal missing
P0650	ECM-660C	Malfunction indicator lamp (MIL)	Signal too high
P0650	ECM-660D	Malfunction indicator lamp (MIL)	Signal too low
P0668	ECM-700D	Engine control module (ECM), Internal fault	Signal too low
P0669	ECM-700C	Engine control module (ECM), Internal fault	Signal too high
P0700	ECM-5100	Malfunction indicator light TCM	Faulty signal
P0700	ECM-5130	Malfunction indicator light TCM	Faulty signal
P0700	ECM-513B	Malfunction indicator light TCM	Signal missing
P0727	ECM-330B	Engine speed (RPM) sensor	Faulty signal
P0805	ECM-910B	Clutch pedal sensor	Signal missing
P0806	ECM-9100	Clutch pedal sensor	Faulty signal
P0807	ECM-910D	Clutch pedal sensor	Signal too low
P0808	ECM-910C	Clutch pedal sensor	Signal too high
P0863	ECM-512B	Malfunction indicator light communication	Signal missing
P1124	ECM-92B0	Throttle unit	Faulty signal
P1124	ECM-92D0	Throttle unit	Faulty signal
P1136	ECM-680B	Cooling fan for control modules	Signal missing
P1136	ECM-680C	Cooling fan for control modules	Signal too high
P1136	ECM-680D	Cooling fan for control modules	Signal too low
P1167	ECM-92CC	Throttle unit	Signal too high
P1167	ECM-92CD	Throttle unit	Signal too low
P1480	ECM-620B	Engine cooling fan (FC) control module	Signal too low
P1481	ECM-650D	Engine cooling fan (FC)	Signal too low
P1482	ECM-650C	Engine cooling fan (FC)	Signal too high
P1526	ECM-960C	Engine control module (ECM), torque signal	Internal fault
P1646	ECM-2450	Front heated oxygen sensor, bank 1	Faulty signal

DTC Table (P Codes / ECM Codes) Part 6

P1646	ECM-245B	Front heated oxygen sensor, bank 1	Signal missing
P1646	ECM-245C	Front heated oxygen sensor, bank 1	Signal too high
P1646	ECM-245D	Front heated oxygen sensor, bank 1	Signal too low
P1647	ECM-2550	Front heated oxygen sensor, bank 2	Faulty signal
P1647	ECM-255B	Front heated oxygen sensor, bank 2	Signal missing
P1647	ECM-255C	Front heated oxygen sensor, bank 2	Signal too high
P1647	ECM-255D	Front heated oxygen sensor, bank 2	Signal too low
P2065	ECM-440D	Fuel level sensor	Signal too low
P2096	ECM-24BC	Front heated oxygen sensor, bank 1	Signal too high
P2097	ECM-24BD	Front heated oxygen sensor, bank 1	Signal too low
P2098	ECM-25BC	Front heated oxygen sensor, bank 2	Signal too high
P2099	ECM-25BD	Front heated oxygen sensor, bank 2	Signal too low
P2101	ECM-9240	Engine control module (ECM)	Faulty signal
P2108	ECM-929C	Engine control module (ECM)	Signal too high
P2108	ECM-929D	Engine control module (ECM)	Signal too low
P2108	ECM-9290	Engine control module (ECM)	Faulty signal
P2109	ECM-92E0	Engine control module (ECM)	Internal fault
P2111	ECM-925C	Throttle unit	Signal too high
P2111	ECM-925D	Throttle unit	Signal too low
P2112	ECM-926C	Throttle unit	Signal too high
P2112	ECM-926D	Throttle unit	Signal too low
P2119	ECM-9280	Throttle unit	Faulty signal
P2121	ECM-9700	Accelerator pedal position sensor, digital signal	Faulty signal
P2121	ECM-970B	Accelerator pedal position sensor, digital signal	Signal missing
P2122	ECM-941D	Accelerator pedal position sensor, digital signal	Signal too low
P2123	ECM-941C	Accelerator pedal position sensor, digital signal	Signal too high
P2126	ECM-9400	Accelerator pedal position sensor, analog signal	Faulty signal
P2127	ECM-940D	Accelerator pedal position sensor, analog signal	Signal too low
P2128	ECM-940C	Accelerator pedal position sensor, analog signal	Signal too high
P2131	ECM-9000	Brake pedal sensor	Faulty signal
P2135	ECM-9200	Throttle position sensor	Faulty signal
P2177	ECM-21EC	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2177	ECM-212C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2178	ECM-21ED	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2178	ECM-212D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2179	ECM-213C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2179	ECM-21FC	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2180	ECM-213D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2180	ECM-21FD	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2187	ECM-21EB	Adaptive heated oxygen sensor control, bank 1	Signal missing
P2187	ECM-216C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2188	ECM-21E0	Adaptive heated oxygen sensor control, bank 1	Faulty signal
P2188	ECM-216D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2189	ECM-217C	Adaptive heated oxygen sensor control, bank 2	Signal too high

DTC Table (P Codes / ECM Codes) Part 7

P2189	ECM-21FB	Adaptive heated oxygen sensor control, bank 2	Signal missing
P2190	ECM-217D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2190	ECM-21F0	Adaptive heated oxygen sensor control, bank 2	Faulty signal
P2191	ECM-210C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2192	ECM-210D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2193	ECM-211C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2194	ECM-211D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2195	ECM-24B0	Front heated oxygen sensor, bank 1	Faulty signal
P2196	ECM-24BB	Front heated oxygen sensor, bank 1	Signal missing
P2197	ECM-25B0	Front heated oxygen sensor, bank 2	Faulty signal
P2198	ECM-25BB	Front heated oxygen sensor, bank 2	Signal missing
P2227	ECM-1130	Atmospheric pressure sensor	Faulty signal
P2227	ECM-113B	Atmospheric pressure sensor	Signal missing
P2227	ECM-113C	Atmospheric pressure sensor	Signal too high
P2227	ECM-113D	Atmospheric pressure sensor	Signal too low
P2228	ECM-112D	Atmospheric pressure sensor	Signal too low
P2229	ECM-112C	Atmospheric pressure sensor	Signal too high
P2231	ECM-243B	Front heated oxygen sensor, bank 1	Signal missing
P2232	ECM-2220	Rear heated oxygen sensor, bank 1	Faulty signal
P2234	ECM-253B	Front heated oxygen sensor, bank 2	Signal missing
P2235	ECM-2320	Rear heated oxygen sensor, bank 2	Faulty signal
P2237	ECM-247B	Front heated oxygen sensor, bank 1	Signal missing
P2238	ECM-2470	Front heated oxygen sensor, bank 1	Faulty signal
P2239	ECM-247C	Front heated oxygen sensor, bank 1	Signal too high
P2240	ECM-257B	Front heated oxygen sensor, bank 2	Signal missing
P2241	ECM-2570	Front heated oxygen sensor, bank 2	Faulty signal
P2242	ECM-257C	Front heated oxygen sensor, bank 2	Signal too high
P2243	ECM-249B	Front heated oxygen sensor, bank 1	Signal missing
P2247	ECM-259B	Front heated oxygen sensor, bank 2	Signal missing
P2251	ECM-24AB	Front heated oxygen sensor, bank 1	Signal missing
P2254	ECM-25AB	Front heated oxygen sensor, bank 2	Signal missing
P2281	ECM-640C	Turbocharger (TC) control	Signal too high
P2281	ECM-640D	Turbocharger (TC) control	Signal too low
P2300	ECM-360D	Ignition coil cyl 1, signal	Signal too low
P2301	ECM-360C	Ignition coil cyl 1, signal	Signal too high
P2303	ECM-361D	Ignition coil cyl 2, signal	Signal too low
P2304	ECM-361C	Ignition coil cyl 2, signal	Signal too high
P2306	ECM-362D	Ignition coil cyl 3, signal	Signal too low
P2307	ECM-362C	Ignition coil cyl 3, signal	Signal too high
P2309	ECM-363D	Ignition coil cyl 4, signal	Signal too low
P2310	ECM-363C	Ignition coil cyl 4, signal	Signal too high
P2312	ECM-364D	Ignition coil cyl 5, signal	Signal too low
P2313	ECM-364C	Ignition coil cyl 5, signal	Signal too high
P2315	ECM-365D	Ignition coil cyl 6, signal	Signal too low

DTC Table (P Codes / ECM Codes) Part 8

P2316	ECM-365C	Ignition coil cyl 6, signal	Signal too high
P2400	ECM-433B	Leakage diagnostic unit, pump	Signal missing
P2401	ECM-433D	Leakage diagnostic unit, pump	Signal too low
P2402	ECM-433C	Leakage diagnostic unit, pump	Signal too high
P2404	ECM-4360	Leak diagnostic unit	Faulty signal
P2405	ECM-436D	Leak diagnostic unit	Signal too low
P2406	ECM-436C	Leak diagnostic unit	Signal too high
P2407	ECM-436B	Leak diagnostic unit	Signal missing
P240A	ECM-431B	Leakage diagnostic unit, preheating	Signal missing
P240B	ECM-431D	Leakage diagnostic unit, preheating	Signal too low
P240C	ECM-431C	Leakage diagnostic unit, preheating	Signal too high
P2414	ECM-24C0	Front heated oxygen sensor, bank 1	Faulty signal
P2415	ECM-25C0	Front heated oxygen sensor, bank 2	Faulty signal
P2418	ECM-432B	Leak diagnostic unit, valve	Signal missing
P2419	ECM-432D	Leak diagnostic unit, valve	Signal too low
P2420	ECM-432C	Leak diagnostic unit, valve	Signal too high
P250B	ECM-5500	Oil level	Faulty signal
P250C	ECM-550D	Oil level	Signal too low
P2510	ECM-8210	System relay	Faulty signal
P2511	ECM-821B	System relay	Signal missing
P2626	ECM-246B	Front heated oxygen sensor, bank 1	Signal missing
P2629	ECM-256B	Front heated oxygen sensor, bank 2	Signal missing
U0001	ECM-A130	Communication control module	Signal missing
U0002	ECM-E000	Communication control module	Internal fault
U0073	ECM-E003	Configuration error	Faulty signal
U0103	ECM-7300	Gear-shift position sensor	Faulty signal
U0167	ECM-710B	Communication Immobilizer	Signal missing
U0401	ECM-A020	Configuration error	Signal missing
U0426	ECM-7100	Communication Immobilizer	Faulty signal

DTC Table (P Codes / U Codes / ECM Codes) Part 9

NOTE: If the diagnostic trouble code is not hyperlinked, then:
- Either the code may not be valid for this vehicle or year.
- Or the information published by the OEM does not include this code for this vehicle or year.

P Code Charts

Conversion Table Standardized Diagnostic Trouble Codes (DTCs)/Volvo Diagnostic Trouble Codes (DTCs)

Information

Background
OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.

Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations
The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).

SAE/ISO diagnostic trouble code (DTC): Standardized diagnostic trouble code (DTC) according to SAE J2012/ISO 15031-6. The diagnostic trouble code (DTC) can be read off on vehicles with standardized on-board diagnostic systems for emissions related faults, certified in accordance with OBD II. Reading off is performed with a generic scan tool, an instrument for fault-tracing standardized in accordance with SAE J1978/ISO 15031-4.

Volvo DII diagnostic trouble code (DTC): Volvo-specific diagnostic trouble code (DTC) in accordance with the Volvo On-Board Diagnostic protocol. Can be read off using VIDA on cars from model year 1999.

Diagnostic trouble code (DTC) designation: Volvo diagnostic trouble code (DTC) designation. Used in VIDA.

Fault type: Volvo method for specifying the actual fault. Used in VIDA.

NOTE: An SAE/ISO diagnostic trouble code (DTC) can correspond to several DII diagnostic trouble codes (DTCs). All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code (DTC) to disappear.

Several SAE/ISO diagnostic trouble codes (DTCs) may also refer to the same DII diagnostic trouble code (DTC).

There are DII diagnostic trouble codes (DTCs) for non emissions-related faults that do not correspond to any SAE/ISO diagnostic trouble code (DTC).

Engine Control System

VOLVO ECM CODE LIST AND DEFINITIONS

ECM-112C Atmospheric pressure sensor. Signal too high
ECM-112D Atmospheric pressure sensor. Signal too low
ECM-1130 Atmospheric pressure sensor. Faulty signal
ECM-113B Atmospheric pressure sensor. Signal missing
ECM-113C Atmospheric pressure sensor. Signal too high
ECM-113D Atmospheric pressure sensor. Signal too low
ECM-120C Mass air flow. Signal too high
ECM-120D Mass air flow. Signal too low
ECM-1210 Mass air flow (MAF) sensor. Flow too high
ECM-121B Mass air flow (MAF) sensor. Flow too low
ECM-121C Mass air flow (MAF) sensor. Signal too high
ECM-121D Mass air flow (MAF) sensor. Signal too low
ECM-125C Boost pressure sensor. Signal too high
ECM-125D Boost pressure sensor. Signal too low
ECM-1260 Boost pressure sensor. Faulty signal
ECM-126B Boost pressure sensor. Signal missing
ECM-126C Boost pressure sensor. Signal too high
ECM-126D Boost pressure sensor. Signal too low
ECM-131C Intake air temperature (IAT) sensor. Signal too high
ECM-131D Intake air temperature (IAT) sensor. Signal too low
ECM-1320 Intake Air Temperature (IAT) Sensor. Faulty signal
ECM-132C Intake air temperature (IAT) sensor. Signal too high
ECM-132D Intake air temperature (IAT) sensor. Signal too low
ECM-140C Outside temperature sensor. Signal too high
ECM-140D Outside temperature sensor. Signal too low
ECM-1410 Outside temperature sensor. Faulty signal
ECM-141B Outside temperature sensor. Signal missing
ECM-200B Injector cyl 1. Signal missing
ECM-200C Injector cyl 1. Signal too high
ECM-200D Injector cyl 1. Signal too low
ECM-201B Injector cyl 2. Signal missing
ECM-201C Injector cyl 2. Signal too high
ECM-201D Injector cyl 2. Signal too low
ECM-202B Injector cyl 3. Signal missing
ECM-202C Injector cyl 3. Signal too high
ECM-202D Injector cyl 3. Signal too low
ECM-203B Injector cyl 4. Signal missing
ECM-203C Injector cyl 4. Signal too high
ECM-203D Injector cyl 4. Signal too low
ECM-204B Injector cyl 5. Signal missing
ECM-204C Injector cyl 5. Signal too high
ECM-204D Injector cyl 5. Signal too low
ECM-210C Long-term fuel trim, bank 1. Signal too high
ECM-210D Long-term fuel trim, bank 1. Signal too low
ECM-212C Long-term fuel trim, bank 1. Signal too high
ECM-212D Long-term fuel trim, bank 1. Signal too low
ECM-216C Long-term fuel trim, bank 1. Signal too high
ECM-216D Long-term fuel trim, bank 1. Signal too low
ECM-217C Long-term fuel trim, bank 2. Signal too high
ECM-21E0 Long-term fuel trim, bank 1. Faulty signal
ECM-21EB Long-term fuel trim, bank 1. Signal missing
ECM-21EC Long-term fuel trim, bank 1. Signal too high
ECM-21ED Long-term fuel trim, bank 1. Signal too low
ECM-2200 Rear heated oxygen sensor (HO2S), bank 1, heating. Faulty signal

ECM-221B Rear heated oxygen sensor (HO2S), aging, bank 1. Signal missing
ECM-221C Rear heated oxygen sensor (HO2S) aging, bank 1. Signal too high
ECM-221D Rear heated oxygen sensor (HO2S) aging, bank 1. Signal too low
ECM-2220 Rear heated oxygen sensor (HO2S), bank 1. Faulty signal
ECM-222B Rear heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-222C Rear heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-222D Rear heated oxygen sensor (HO2S), bank 1. Signal too low
ECM-223B Rear heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-223C Rear heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-223D Rear heated oxygen sensor (HO2S), bank 1. Signal too low
ECM-2240 Rear heated oxygen sensors (HO2S), switched. Faulty signal
ECM-2400 Front heated oxygen sensor (HO2S), bank 1, heating. Faulty signal
ECM-240B Front heated oxygen sensor (HO2S), bank 1, heating. Signal missing
ECM-240C Front heated oxygen sensor (HO2S), bank 1, heating. Signal too high
ECM-242D Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-243B Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-244B Front heated oxygen sensor (HO2S), bank 1, heating. Signal missing
ECM-244C Front heated oxygen sensor (HO2S), bank 1, heating. Signal too high
ECM-244D Front heated oxygen sensor (HO2S), bank 1, heating. Signal too low
ECM-2450 Front heated oxygen sensor (HO2S), bank 1. Faulty signal
ECM-245B Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-245C Front heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-245D Front heated oxygen sensor (HO2S), bank 1. Signal too low
ECM-246B Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-2470 Front heated oxygen sensor (HO2S), bank 1. Faulty signal
ECM-247B Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-247C Front heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-248C Front heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-248D Front heated oxygen sensor (HO2S), bank 1. Signal too low
ECM-249B Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-24A0 Switched front heated oxygen sensors (HO2S). Faulty signal
ECM-24AB Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-24B0 Front heated oxygen sensor (HO2S), bank 1. Faulty signal
ECM-24BB Front heated oxygen sensor (HO2S), bank 1. Signal missing
ECM-24BC Front heated oxygen sensor (HO2S), bank 1. Signal too high
ECM-24BD Front heated oxygen sensor (HO2S), bank 1. Signal too low
ECM-24C0 Front heated oxygen sensor (HO2S), bank 1. Faulty signal
ECM-2720 Engine coolant temperature (ECT) sensor. Faulty signal
ECM-272D Engine coolant temperature (ECT) sensor. Signal too low
ECM-273C Engine coolant temperature (ECT) sensor. Signal too high
ECM-273D Engine coolant temperature (ECT) sensor. Signal too low
ECM-274D Engine coolant temperature (ECT) sensor. Signal too low
ECM-2800 Fuel pressure sensor. Signal too low
ECM-280B Fuel pressure sensor. Signal missing
ECM-280C Fuel pressure sensor. Signal too high
ECM-280D Fuel pressure sensor. Signal too low
ECM-2900 Fuel pressure. Faulty signal
ECM-290B Fuel pressure. Signal missing
ECM-290C Fuel pressure. Signal too high
ECM-290D Fuel pressure. Signal too low
ECM-291B Fuel pump control module. Signal missing
ECM-291C Fuel pump control module. Signal too high
ECM-291D Fuel pump control module. Signal too low
ECM-2A0C Fuel temperature sensor. Signal too high
ECM-2A0D Fuel temperature sensor. Signal too low
ECM-2B00 Thermostat. Faulty signal
ECM-3000 Engine control module (ECM), internal fault. Faulty signal
ECM-3010 Engine control module (ECM), internal fault. Faulty signal
ECM-3020 Engine control module (ECM), internal fault. Faulty signal
ECM-303C Front knock sensor (KS). Signal too high
ECM-303D Front knock sensor (KS). Signal too low
ECM-304C Rear knock sensor (KS). Signal too high
ECM-304D Rear knock sensor (KS). Signal too low
ECM-3100 Misfire, at least one cylinder. Start up
ECM-310C Misfire, at least one cylinder. Catalytic converter damage
ECM-310D Misfire, at least one cylinder. Affects emissions
ECM-3110 Misfire cylinder 1. Start up
ECM-311C Misfire cylinder 1. Catalytic converter damage
ECM-311D Misfire cylinder 1. Emissions impact
ECM-3120 Misfire cylinder 2. Start up

ECM-312C Misfire cylinder 2. Catalytic converter damage
ECM-312D Misfire cylinder 2. Emissions impact
ECM-3130 Misfire cylinder 3. Start up
ECM-313C Misfire cylinder 3. Catalytic converter damage
ECM-313D Misfire cylinder 3. Emissions impact
ECM-3140 Misfire cylinder 4. Start up
ECM-314C Misfire cylinder 4. Catalytic converter damage
ECM-314D Misfire cylinder 4. Emissions impact
ECM-3150 Misfire cylinder 5. Start up
ECM-315C Misfire cylinder 5. Catalytic converter damage
ECM-315D Misfire cylinder 5. Emissions impact
ECM-330B Engine speed (RPM) sensor. Signal missing
ECM-3400 Camshaft position (CMP) sensor, intake. Faulty signal
ECM-340B Camshaft position (CMP) sensor, intake. Signal missing
ECM-340C Camshaft position sensor, intake. Signal too high
ECM-340D Camshaft position sensor, intake. Signal too low
ECM-3410 Camshaft position (CMP) sensor, exhaust. Faulty signal
ECM-341B Camshaft position (CMP) sensor, exhaust. Signal missing
ECM-341C Camshaft position sensor, exhaust. Signal too high
ECM-341D Camshaft position sensor, exhaust. Signal too low
ECM-350B Ignition coil cylinder 1, signal. Signal missing
ECM-350C Ignition coil cylinder 1, signal. Signal too high
ECM-350D Ignition coil cylinder 1, signal. Signal too low
ECM-351B Ignition coil cylinder 2, signal. Signal missing
ECM-351C Ignition coil cylinder 2, signal. Signal too high
ECM-351D Ignition coil cylinder 2, signal. Signal too low
ECM-352B Ignition coil cylinder 3, signal. Signal missing
ECM-352C Ignition coil cylinder 3, signal. Signal too high
ECM-352D Ignition coil cylinder 3, signal. Signal too low
ECM-353B Ignition coil cylinder 4, signal. Signal missing
ECM-353C Ignition coil cylinder 4, signal. Signal too high
ECM-353D Ignition coil cylinder 4, signal. Signal too low
ECM-354B Ignition coil cylinder 5, signal. Signal missing
ECM-354C Ignition coil cylinder 5, signal. Signal too high
ECM-354D Ignition coil cylinder 5, signal. Signal too low
ECM-400C Three-way catalytic converter (TWC) efficiency, bank 1. Signal too high
ECM-401C Three-way catalytic converter (TWC) efficiency, bank 2. Signal too high
ECM-420C Evaporative emission system (EVAP) valve. Open
ECM-420D Evaporative emission system (EVAP). Closed
ECM-421B Canister purge (CP) valve. Signal missing
ECM-421C Evaporative emission system (EVAP) valve. Signal too high
ECM-421D Evaporative emission system (EVAP) valve. Signal too low
ECM-430C Fuel tank system, leakage. Fuel tank filler cap missing
ECM-431B Leak diagnostic unit, preheating. Signal missing
ECM-431C Leak diagnostic unit, preheating. Signal too high
ECM-431D Leak diagnostic unit, preheating. Signal too low
ECM-432B Leak diagnostic unit, valve. Signal missing
ECM-432C Leak diagnostic unit, preheating. Signal too high
ECM-432D Leak diagnostic unit, preheating. Signal too low
ECM-433B Leak diagnostic unit, pump. Signal missing
ECM-433C Leak diagnostic unit, pump. Signal too high
ECM-433D Leak diagnostic unit, pump. Signal too low
ECM-434C Fuel tank system, leakage. Minor leak
ECM-4360 Leak diagnostic unit. Faulty signal
ECM-436B Leak diagnostic unit. Signal missing
ECM-436C Leak diagnostic unit. Signal too high
ECM-436D Leak diagnostic unit. Signal too low
ECM-4380 Fuel tank filler cap. Missing
ECM-439C Fuel tank system, leakage. Major leak
ECM-4400 Fuel level sensor. Faulty signal
ECM-440B Fuel level sensor. Signal missing
ECM-440C Fuel level sensor. Signal too high
ECM-440D Fuel level sensor. Signal too low
ECM-5000 Engine speed (RPM) sensor signal. Faulty signal
ECM-500B Engine speed (RPM) sensor signal. Signal missing
ECM-500C Engine speed (RPM) sensor signal. Signal too high
ECM-500D Engine speed (RPM) sensor signal. Signal too low
ECM-5100 Malfunction indicator lamp (MIL), TCM. Faulty signal
ECM-5110 Malfunction indicator lamp (MIL), CEM. Faulty signal
ECM-512B Malfunction indicator lamp (MIL) communication. Signal missing

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ECM-5130 Malfunction indicator lamp (MIL), TCM. Faulty signal
ECM-513B Malfunction indicator lamp (MIL), transmission control module (TCM). Signal missing
ECM-5200 Air conditioning (A/C) pressure sensor. Faulty signal
ECM-520B Air conditioning (A/C) pressure sensor. Signal missing
ECM-520C Air conditioning (A/C) pressure sensor. Signal too high
ECM-520D Air conditioning (A/C) pressure sensor. Signal too low
ECM-5300 Vehicle speed signal. Faulty signal
ECM-530B Vehicle speed signal. Signal missing
ECM-530C Speed signal. Signal too high
ECM-530D Speed signal. Signal too low
ECM-540B Oil grade, level and temperature sensor. Faulty signal
ECM-540C Oil grade, level and temperature sensor. Signal too high
ECM-540D Oil grade, level and temperature sensor. Signal too low
ECM-5500 Oil level. Faulty signal
ECM-550D Oil level. Signal too low
ECM-600B Turbocharger (TC) control valve. Signal missing. Intermittent fault
ECM-600B Turbocharger (TC) control valve. Signal missing. Permanent fault
ECM-600C Turbocharger (TC) control valve. Signal too high. Intermittent fault
ECM-600C Turbocharger (TC) control valve. Signal too high. Permanent fault
ECM-600D Turbocharger (TC) control valve. Signal too low. Intermittent fault
ECM-600D Turbocharger (TC) control valve. Signal too low. Permanent fault
ECM-601C Turbocharger (TC) control system, boost pressure fault. Signal too high
ECM-602D Turbocharger (TC) control system, flow fault. Signal too low
ECM-6110 Camshaft position control, intake. Slow
ECM-611B Camshaft control, intake. Faulty
ECM-612B Camshaft reset valve, intake. Signal missing
ECM-612C Camshaft reset valve, intake. Signal too high
ECM-612D Camshaft reset valve, intake. Signal too low
ECM-6140 Camshaft control, exhaust. Slow
ECM-614B Camshaft control, exhaust. Faulty
ECM-616B Camshaft reset valve, exhaust. Signal missing
ECM-616C Camshaft reset valve, exhaust. Signal too high
ECM-616D Camshaft reset valve, exhaust. Signal too low
ECM-6200 Engine cooling fan (FC) control module. Faulty signal
ECM-620B Engine cooling fan control module. Signal too low
ECM-620C Engine cooling fan (FC) control module. Signal too high
ECM-620D Engine cooling fan (FC) control module. Signal too low
ECM-630B A/C relay. Signal missing. Intermittent fault
ECM-630B A/C relay. Signal missing. Permanent fault
ECM-630C A/C relay. Signal too high. Intermittent fault
ECM-630C A/C relay. Signal too high. Permanent fault
ECM-630D A/C relay. Signal too low. Intermittent fault
ECM-630D A/C relay. Signal too low. Permanent fault
ECM-640C Turbocharger (TC) control system. Signal too high
ECM-640D Turbocharger (TC) control system. Signal too low
ECM-650B Engine cooling fan (FC). Signal missing
ECM-650C Engine cooling fan (FC). Signal too high
ECM-650D Engine cooling fan (FC). Signal too low
ECM-660B Malfunction indicator lamp (MIL). Signal missing
ECM-660C Malfunction indicator lamp (MIL). Signal too high
ECM-660D Malfunction indicator lamp (MIL). Signal too low
ECM-670C Camshaft position, intake. High
ECM-670D Camshaft position, intake. Low
ECM-671C Camshaft position, exhaust. High
ECM-671D Camshaft position, exhaust. Low
ECM-680B Engine cooling fan (FC) control modules. Signal missing
ECM-680C Engine cooling fan (FC) control modules. Signal too high
ECM-680D Engine cooling fan (FC) control modules. Signal too low
ECM-700C Engine control module (ECM), internal fault. Signal too high
ECM-700D Engine control module (ECM), internal fault. Signal too low
ECM-7010 Engine control module (ECM), high temperature. Faulty signal
ECM-7020 Engine control module (ECM), high temperature. Faulty signal
ECM-7100 Immobilizer communication. Faulty signal
ECM-710B Immobilizer communication. Signal missing
ECM-720B Engine control module (ECM) internal fault. Signal missing
ECM-7300 Gear position sensor. Faulty signal
ECM-800B System relay. Signal too low
ECM-810C 5 volt power supply. Signal too high
ECM-810D 5 volt power supply. Signal too low
ECM-8200 Battery voltage. Faulty signal

ECM-820C Battery voltage. Signal too high
ECM-820D Battery voltage. Signal too low
ECM-8210 System relay. Faulty signal
ECM-821B System relay. Signal missing
ECM-9000 Brake pedal sensor. Faulty signal
ECM-900B Brake pedal sensor. Signal missing
ECM-900C Brake pedal sensor. Signal too high
ECM-9100 Clutch pedal position sensor. Faulty signal
ECM-910B Clutch pedal sensor. Signal missing
ECM-910C Clutch pedal sensor. Signal too high
ECM-910D Clutch pedal sensor. Signal too low
ECM-9200 Throttle position (TP) sensor. Faulty signal
ECM-9210 Electronic throttle unit, potentiometer 1. Faulty signal
ECM-921C Electronic throttle unit, potentiometer 1. Signal too high
ECM-921D Electronic throttle unit, potentiometer 1. Signal too low
ECM-9220 Electronic throttle unit, potentiometer 2. Faulty signal
ECM-922C Electronic throttle unit, potentiometer 2. Signal too high
ECM-922D Electronic throttle unit, potentiometer 2. Signal too low
ECM-9240 Engine control module (ECM). Faulty signal
ECM-925C Electronic throttle unit. Signal too high
ECM-925D Electronic throttle unit. Signal too low
ECM-926C Electronic throttle unit. Signal too high
ECM-926D Electronic throttle unit. Signal too low
ECM-9270 Throttle unit. Faulty signal
ECM-9280 Throttle unit. Faulty signal
ECM-9290 Engine control module (ECM). Faulty signal
ECM-929C Engine control module (ECM). Signal too high
ECM-929D Engine control module (ECM). Signal too low
ECM-92B0 Electronic throttle unit. Faulty signal
ECM-92CC Electronic throttle unit. Signal too high
ECM-92CD Electronic throttle unit. Signal too low
ECM-92D0 Electronic throttle unit. Faulty signal
ECM-92E0 Engine control module (ECM). Internal fault
ECM-9300 Control module communication problems. Faulty signal
ECM-930B Control module communication problems. Signal missing
ECM-930C Control module, communication problems. Signal too high
ECM-930D Control module communication problems. Signal too low
ECM-9400 Accelerator pedal (AP) position sensor, analog signal. Faulty signal
ECM-940C Accelerator pedal (AP) position sensor, analog signal. Signal too high
ECM-940D Accelerator pedal (AP) position sensor, analog signal. Signal too low
ECM-941C Accelerator pedal (AP) position sensor, digital signal. Signal too high
ECM-941D Accelerator pedal (AP) position sensor, digital signal. Signal too low
ECM-951C Engine control module (ECM), idle air trim. Signal too high
ECM-951D Engine control module (ECM), idle air trim. Signal too low
ECM-960C Engine control module (ECM), torque signal. Internal fault
ECM-9700 Accelerator pedal (AP) position sensor, digital signal. Faulty signal
ECM-970B Accelerator pedal (AP) position sensor, digital signal. Signal missing
ECM-9800 Engine control module (ECM), torque signal. Internal fault
ECM-9810 Engine control module (ECM), engine speed (RPM). Internal fault
ECM-9820 Engine control module (ECM), load signal. Internal fault
ECM-983B Engine control module (ECM). Internal fault
ECM-983C Engine control module (ECM). Internal fault
ECM-983D Engine control module (ECM). Internal fault
ECM-9840 Engine control module (ECM). Internal fault
ECM-984B Engine control module (ECM). Internal fault
ECM-9850 Engine control module (ECM). Internal fault
ECM-9860 Engine control module (ECM). Internal fault
ECM-9970 Memory fault in RAM. Faulty signal
ECM-9980 Memory fault in ROM. Faulty signal
ECM-9990 Engine control module (ECM). Faulty signal
ECM-A12B Speed signal. Signal missing
ECM-A12C Speed signal. Signal too high
ECM-A130 Control module communication
ECM-E000 Control module communication. Internal fault
ECM-E003 Configuration fault. Faulty signal
ECM-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

Brake Control Module (BCM)

BCM CODE CHARTS

BCM-0010 Left front wheel sensor. Signal missing
BCM-0011 Left front wheel sensor. Faulty signal

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BCM-0012 Left front wheel sensor. Faulty signal
BCM-0020 Right front wheel sensor. Signal missing
BCM-0021 Right front wheel sensor. Faulty signal
BCM-0022 Right front wheel sensor. Faulty signal
BCM-0030 Left rear wheel sensor. Signal missing
BCM-0031 Left rear wheel sensor. Faulty signal
BCM-0032 Left rear wheel sensor. Faulty signal
BCM-0040 Right rear wheel sensor. Signal missing
BCM-0041 Right rear wheel sensor. Faulty signal
BCM-0042 Right rear wheel sensor. Faulty signal
BCM-0050 Control module. Faulty signal
BCM-0052 Control module. Internal fault
BCM-0057 Power supply. Voltage too low
BCM-0058 Power supply. Voltage too high
BCM-0061 Brake discs. Temperature too high
BCM-0065 Stop lamp switch. Faulty signal
BCM-0068 Sensor power supply. Faulty signal
BCM-0070 Power supply for the pump motor. Faulty signal
BCM-0071 Pump motor. Signal missing
BCM-0072 Pump motor. Mechanical fault
BCM-0074 Hydraulic valves. Faulty signal
BCM-0076 Control module. Faulty configuration
BCM-0080 Lateral accelerometer. Incorrect offset value
BCM-0081 Accelerometer. Incorrect offset value
BCM-0082 Yaw rate sensor. Incorrect offset value
BCM-0083 Angle of lean sensor. Incorrect offset value
BCM-0090 Lateral accelerometer. Faulty signal
BCM-0091 Accelerometer. Faulty signal
BCM-0092 Yaw rate sensor. Faulty signal
BCM-0093 Angle of lean sensor. Faulty signal
BCM-0094 Communication between control modules. Communication problems with Active on Demand Coupling
BCM-0095 Communication between control modules. Communication problems with Active on Demand Coupling
BCM-0097 Communication between control modules. Communication problems with the central electronic module (CEM)
BCM-0100 Communication between control modules. Communication problems with the engine control module (ECM)
BCM-0101 Communication between control modules. Communication problems with the engine control module (ECM)
BCM-0103 Pedal position sensor. Faulty signal
BCM-0106 Steering wheel or wheel alignment. Incorrect steering wheel or wheel alignment
BCM-0108 Communication between control modules. Communication with the steering angle sensor. Control module not initiated
BCM-0109 Communication between control modules. Communication with the steering angle sensor. Internal fault
BCM-0111 Communication between control modules. Check of the steering angle sensor tolerances has not been run
BCM-0112 Active yaw control sensor. Sensor not calibrated
BCM-0113 Back-up (reversing) signal. Signal missing
BCM-0114 Communication with the active yaw control sensor. Signal missing
BCM-0115 Communication between control modules. Communication with the steering angle sensor. Signal missing
BCM-0116 Communication with the active yaw control sensor. Communication problems
BCM-0117 Communication with the active yaw control sensor. An incorrect active yaw control sensor had been installed
BCM-0118 Power supply for the active yaw control sensor. Voltage too high
BCM-0119 Power supply for the active yaw control sensor. Voltage too low
BCM-0121 Yaw rate sensor. Signal outside its permitted range
BCM-0123 Active yaw control sensor. Internal fault
BCM-0125 Lateral accelerometer. Signal outside its permitted range
BCM-0127 Angle of lean sensor. Signal outside its permitted range
BCM-0129 Accelerometer. Signal outside its permitted range
BCM-0130 Brake pressure sensor 1. Signal too low
BCM-0133 Brake pressure sensor 2. Signal too low
BCM-0136 Brake pressure sensor 1 and 2. Signal outside its permitted range
BCM-0138 Power supply for the active yaw control sensor. Faulty voltage
BCM-0139 Pressure build-up valve, power brake booster. Signal outside its permitted range
BCM-0140 Pedal pressure sensor. Signal outside its permitted range
BCM-0145 Stability control. Too long stability control
BCM-0146 Factory test, dynamic stability and traction control (DSTC). Test cycle not approved
BCM-0147 Pedal position sensor. Signal outside its permitted range
BCM-0148 Communication between control modules. Faulty configuration ID
BCM-0150 Stop lamp switch. Signal outside its permitted range
BCM-0151 Control module. Internal memory fault
BCM-A030 Communication between control modules. Steering angle sensor. Initialization check not run
BCM-A031 Communication between control modules. Steering angle sensor. Tolerance check not run
BCM-A032 Stability function. Too long stability control
BCM-E000 Control module communication. Faulty communication
BCM-E003 Configuration fault. Faulty configuration

BCM-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

Differential Electronic Module (DEM)

VOLVO DEM CODE LIST AND DEFINITIONS

DEM 0006 Feed pump. Faulty signal
DEM 000B Oil pressure. Incorrect value
DEM-0001 Temperature sensor. Faulty signal
DEM-0002 Pressure sensor. Faulty signal
DEM-0003 System voltage. Faulty voltage
DEM-0005 Control valve. Internal fault
DEM-0007 Hydraulic pressure. Incorrect value
DEM-0008 Control module, calibration fault. Internal fault
DEM-0009 Control module Analog/Digital converter. Internal fault
DEM-000A Power supply. Faulty voltage
DEM-000C Control module. Faulty hardware
DEM-E000 Control module communication. Faulty communication
DEM-E003 Configuration fault. Faulty configuration
DEM-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

Steering Angle Sensor Module (SAS)

VOLVO SAS CODE DESCRIPTIONS

SAS-0001 Control module. Faulty voltage
SAS-0002 Control module. Internal fault
SAS-0003 Steering wheel angle sensor. Signal outside its permitted range
SAS-0004 Steering wheel angle sensor. Signal outside its permitted range
SAS-0005 Control module. Internal fault
SAS-0006 Control module. Internal fault
SAS-0007 Control module. Internal fault
SAS-0008 Steering wheel angle sensor. Internal fault
SAS-0009 Control module. Internal fault
SAS-000A Steering wheel angle sensor. Internal fault
SAS-000B Control module. Internal fault
SAS-000C Control module. Internal fault
SAS-000E Steering wheel angle sensor. Internal fault
SAS-000F Steering wheel angle sensor. Internal fault
SAS-0010 Steering wheel angle sensor. Internal fault
SAS-0011 Steering wheel angle sensor. Internal fault
SAS-0014 Steering wheel angle sensor. Internal fault
SAS-0015 Steering wheel angle sensor. Internal fault
SAS-0016 Control module. Communication fault
SAS-0017 Control module. Faulty signal
SAS-0018 Control module. Signal missing
SAS-0019 Control module. Internal fault
SAS-E000 Control module communication. Faulty communication
SAS-E003 Configuration fault
SAS-E010 Control module. Voltage too low
SAS-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

Suspension Module (SUM)

VOLVO SUM CODE DESCRIPTIONS

SUM-0011 Acceleration sensor, suspension left front. Signal too low
SUM-0012 Acceleration sensor, suspension left front. Signal too high
SUM-00125 Solenoid, suspension right front. Current too low
SUM-00126 Solenoid, suspension right front. Current too high
SUM-00127 Solenoid, suspension right front. Current too high
SUM-0013 Acceleration sensor, suspension left front. Signal missing
SUM-0021 Acceleration sensor, suspension right front. Signal too low
SUM-0022 Acceleration sensor, suspension right front. Signal too high
SUM-0023 Acceleration sensor, suspension right front. Signal missing
SUM-0031 Position sensor, suspension left rear. Signal too low
SUM-0032 Position sensor, suspension left rear. Signal too high
SUM-0033 Position sensor, suspension left rear. Signal missing
SUM-0041 Position sensor, suspension right rear. Signal too low
SUM-0042 Position sensor, suspension right rear. Signal too high
SUM-0043 Position sensor, suspension right rear. Signal missing
SUM-0051 Bodywork acceleration sensor body, left front. Signal too low

SUM-0052 Bodywork acceleration sensor body, left front. Signal too high
SUM-0053 Bodywork acceleration sensor, left front. Signal missing
SUM-0061 Bodywork acceleration sensor, right front. Signal too low
SUM-0062 Bodywork acceleration sensor, right front. Signal too high
SUM-0063 Bodywork acceleration sensor, right front. Signal missing
SUM-0071 Bodywork acceleration sensor body, left rear. Signal too low
SUM-0072 Bodywork acceleration sensor body, left rear. Signal too high
SUM-0073 Bodywork acceleration sensor body, left rear. Signal missing
SUM-0081 Supply, sensor. Signal too low
SUM-0082 Supply, sensor. Signal too high
SUM-0091 Supply, sensor. Signal too low
SUM-0092 Supply, sensor. Signal too high
SUM-0111 Solenoid, suspension left front. Signal too low
SUM-0112 Solenoid, suspension left front. Signal too high
SUM-0113 Solenoid, suspension left front. Signal missing
SUM-0115 Solenoid, suspension left front. Current too low
SUM-0116 Solenoid, suspension left front. Current too high
SUM-0117 Solenoid, suspension left front. Current too high
SUM-0118 Solenoid, suspension left front. Temperature too high
SUM-0121 Solenoid, suspension right front. Signal too low
SUM-0122 Solenoid, suspension right front. Signal too high
SUM-0123 Solenoid, suspension right front. Signal missing
SUM-0128 Solenoid, suspension right front. Temperature too high
SUM-0131 Solenoid, suspension left rear. Signal too low
SUM-0132 Solenoid, suspension left rear. Signal too high
SUM-0133 Solenoid, suspension left rear. Signal missing
SUM-0135 Solenoid, suspension left rear. Current too low
SUM-0136 Solenoid, suspension left rear. Current too high
SUM-0137 Solenoid, suspension left rear. Current too high
SUM-0138 Solenoid, suspension left rear. Temperature too high
SUM-0141 Solenoid, suspension right rear. Signal too low
SUM-0142 Solenoid, suspension right rear. Signal too high
SUM-0143 Solenoid, suspension right rear. Signal missing
SUM-0145 Solenoid, suspension right rear. Current too low
SUM-0146 Solenoid, suspension right rear. Current too high
SUM-0147 Solenoid, suspension right rear. Current too high
SUM-0148 Solenoid, suspension right rear. Temperature too high
SUM-0151 Keypad. Signal too low
SUM-0152 Keypad. Signal too high
SUM-0153 Keypad. Signal missing
SUM-0171 Keypad, COMFORT indication. Signal too low
SUM-0172 Keypad, COMFORT indication. Signal too high
SUM-0181 Keypad, SPORT indication. Signal too low
SUM-0182 Keypad, SPORT indication. Signal too high
SUM-0191 Keypad, ADVANCED indication. Signal too low
SUM-0192 Keypad, ADVANCED indication. Signal too high
SUM-0201 Control module. Signal too low
SUM-0202 Control module. Signal too high
SUM-0203 Control module
SUM-0204 Control module. Internal fault
SUM-0205 Control module. Internal fault
SUM-0206 Control module. Internal fault
SUM-0207 Control module
SUM-0208 Control module. Internal fault
SUM-0209 Control module
SUM-0211 Control module. Faulty software
SUM-0212 Control module. Internal fault
SUM-0213 Control module. Internal fault
SUM-0220 Position sensor, calibrating
SUM-0221 Position sensor, calibrating
SUM-0222 Solenoids, calibrating
SUM-0223 Solenoids, calibrating
SUM-0230 Control module. Faulty configuration
SUM-0243 Control module. Internal fault
SUM-0244 Control module. Internal fault
SUM-0245 Control module. Internal fault
SUM-0246 Control module. Internal fault
SUM-0251 Control module
SUM-0261 Control module
SUM-0262 Control module

SUM-0263 Control module
SUM-0322 Communication, Central Electronic Module (CEM)
SUM-0324 Communication, Brake Control Module (BCM)
SUM-0326 Communication, Engine Control Module (ECM)
SUM-0327 Communication, Steering Wheel Angle Sensor Module (SAS)
SUM-0328 Communication, Climate Control Module (CCM)
SUM-0332 Communication, Central Electronic Module (CEM)
SUM-0334 Communication, Brake Control Module (BCM)
SUM-0336 Communication, Engine Control Module (ECM)
SUM-0337 Communication, Steering Wheel Angle Sensor Module (SAS)
SUM-E000 Control module communication
SUM-E003 Control module communication
SUM-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

Transmission Control Module (TCM)

VOLVO TCM CODE LIST AND DEFINITIONS

TCM-0001 Shift solenoid S1. Signal too high
TCM-0002 Shift solenoid S1. Signal missing
TCM-0003 Shift solenoid S1. Signal too low
TCM-0007 Shift solenoid S2. Signal too high
TCM-0008 Shift solenoid S2. Signal missing
TCM-0009 Shift solenoid S2. Signal too low
TCM-001F Vehicle speed sensor (VSS). Signal missing. Intermittent fault
TCM-001F Vehicle speed sensor (VSS). Signal missing. Permanent fault
TCM-0020 Transmission output speed sensor. Faulty signal. Intermittent fault
TCM-0020 Transmission output speed sensor. Faulty signal. Permanent fault
TCM-0023 Transmission input speed sensor. Signal missing. Intermittent fault
TCM-0023 Transmission input speed sensor. Signal missing. Permanent fault
TCM-0024 Transmission input speed sensor. Faulty signal. Intermittent fault
TCM-0024 Transmission input speed sensor. Faulty signal. Permanent fault
TCM-0027 Back-up (reverse) gear. Incorrect gear ratio
TCM-0028 1st gear. Incorrect gear ratio
TCM-0029 2nd gear. Incorrect gear ratio
TCM-002A 3rd gear. Incorrect gear ratio
TCM-002B 4th gear. Incorrect gear ratio
TCM-002C 5th gear. Incorrect gear ratio
TCM-002E Lock-up. The transmission jerks when lock-up engages
TCM-002F Lock-up function. Slipping or not engaged
TCM-0039 Gear-shift position sensor. Faulty signal
TCM-0042 Oil temperature. Temperature too high
TCM-0043 Oil temperature sensor. Signal too low
TCM-0044 Oil temperature sensor. Signal too high
TCM-0045 Oil temperature sensor. Faulty signal
TCM-0046 Oil temperature. Oil temperature too high
TCM-0048 Control module. Faulty software
TCM-0049 Control module. Internal fault. Intermittent fault
TCM-0049 Control module. Internal fault. Permanent fault
TCM-0060 Control unit. Internal fault
TCM-0081 Transmission output speed sensor. Signal too high
TCM-0083 Transmission output speed sensor. Signal too low
TCM-0087 Transmission input speed sensor. Signal too high
TCM-0089 Transmission input speed sensor. Signal too low
TCM-0090 Shift lock solenoid. Signal too high
TCM-0091 Shift lock solenoid. Signal missing
TCM-0092 Shift lock solenoid. Signal too low
TCM-0093 Gear selector lever control module communication. Signal too high
TCM-0094 Gear selector lever control module communication. Signal missing
TCM-0095 Gear selector lever control module communication Signal too low
TCM-0096 Quickshift sensor. Faulty signal
TCM-0097 Faulty software
TCM-0098 Faulty software
TCM-0099 Control module. Internal fault
TCM-009A Battery voltage. Signal too low
TCM-0100 Poor gear shifting quality
TCM-0101 Shift solenoid S3. Signal too high
TCM-0102 Shift solenoid S3. Signal missing
TCM-0103 Shift solenoid S3. Signal too low
TCM-0107 Shift solenoid S4. Signal too high
TCM-0108 Shift solenoid S4. Signal missing
TCM-0109 Shift solenoid S4. Signal too low

TCM-010A Shift solenoid S5. Signal too high
TCM-010B Shift solenoid S5. Signal missing
TCM-010C Shift solenoid S5. Signal too low
TCM-010D Lock-up solenoid SLU. Signal too high. Intermittent
TCM-010D Lock-up solenoid SLU. Signal too high. Permanent fault
TCM-010F Lock-up solenoid SLU. Signal missing. Intermittent fault
TCM-010F Lock-up solenoid SLU. Signal missing. Permanent fault
TCM-0110 Lock-up solenoid SLU. Signal too low. Intermittent fault
TCM-0110 Lock-up solenoid SLU. Signal too low. Permanent fault
TCM-0112 Line pressure solenoid SLS. Signal too high. Intermittent fault
TCM-0112 Line pressure solenoid SLS. Signal too high. Permanent fault
TCM-0113 Line pressure solenoid SLS. Signal missing. Intermittent fault
TCM-0113 Line pressure solenoid SLS. Signal missing. Permanent fault
TCM-0114 Line pressure solenoid SLS. Signal too low. Intermittent fault
TCM-0114 Line pressure solenoid SLS. Signal too low. Permanent fault
TCM-0115 Shift solenoid S3. Hydraulic fault
TCM-0116 Throttle solenoid SLT. Signal too high. Intermittent fault
TCM-0116 Throttle solenoid SLT. Signal too high. Permanent fault
TCM-0117 Throttle solenoid SLT. Signal missing. Intermittent fault
TCM-0117 Throttle solenoid SLT. Signal missing. Permanent fault
TCM-0118 Throttle solenoid SLT. Signal too low. Intermittent fault
TCM-0118 Throttle solenoid SLT. Signal too low. Permanent fault
TCM-0120 Control unit. Internal fault
TCM-0121 Control unit. Internal fault
TCM-0122 Control unit. Internal fault
TCM-0123 Control unit. Internal fault
TCM-0124 Control unit. Internal fault
TCM-012A Neutral check Faulty connection
TCM-012B Neutral check No neutral check
TCM-012C Neutral check. The engine speed (RPM) oscillates
TCM-E000 Control module communication. Faulty communication
TCM-E003 Configuration fault. Faulty configuration
TCM-XXXX Unknown diagnostic trouble code (DTC) for the current control module version

All Other P Codes

For diagnosis of all P codes - See: Diagnostic Trouble Code Tests and Associated Procedures/P Code Charts

Conversion Table Standardized Diagnostic Trouble Codes (DTCs)/Volvo Diagnostic Trouble Codes

Conversion table standardized diagnostic trouble codes/Volvo diagnostic trouble codes

Information

Background

OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.
Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations

The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).
SAE/ISO DTC: Standardized diagnostic trouble code as per SAE J2012/ISO 15031-6. The DTC can be read out from the vehicle using a standardized diagnostics system for emission-related faults certified as per OBD II. The readout is taken with a generic scantool, a fault tracing instrument standardized as per SAE J1978/ISO 15031-4.
Volvo DII DTC: Volvo-specific diagnostic trouble code as per Volvo Onboard Diagnostics protocol. Can be read out from cars from model year 1999 using VIDA.

DTC designation: Volvo DTC designation. Used in VIDA.
Fault type: Volvo's method of specifying the fault. Used in VIDA.

Note! An SAE/ISO diagnostic trouble code can correspond to several DII diagnostic trouble codes. All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code to disappear.Several SAE/ISO diagnostic trouble codes may also refer to the same DII diagnostic trouble code.There are DII diagnostic trouble codes for non emission-related malfunctions that do not correspond to any SAE/ISO diagnostic trouble code.

Table

SAE/ISO DTCs	Volvo DII DTCs	Diagnostic trouble code (DTC) designation	Fault type
P0016	ECM-670C	Camshaft position, inlet	High
P0016	ECM-670D	Camshaft position, inlet	Low
P0017	ECM-671C	Camshaft position, exhaust	High
P0017	ECM-671D	Camshaft position, exhaust	Low
P0026	ECM-6110	Camshaft control, inlet	Slow
P0026	ECM-611B	Camshaft control, inlet	Faulty
P0027	ECM-6140	Camshaft control exhaust	Slow
P0027	ECM-614B	Camshaft control exhaust	Faulty
P0030	ECM-244B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0031	ECM-244D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0032	ECM-244C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0036	ECM-223B	Rear heated oxygen sensor, bank 1	Signal missing
P0037	ECM-223D	Rear heated oxygen sensor, bank 1	Signal too low
P0038	ECM-223C	Rear heated oxygen sensor, bank 1	Signal too high
P0040	ECM-24A0	Front heated oxygen sensors mixed up	Faulty signal
P0041	ECM-2240	Rear heated oxygen sensors, mixed up	Faulty signal
P0050	ECM-254B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0051	ECM-254D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0052	ECM-254C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0053	ECM-2400	Front heated oxygen sensor, bank 1 heating	Faulty signal
P0053	ECM-240B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0053	ECM-240C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0053	ECM-240D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0056	ECM-233B	Rear heated oxygen sensor, bank 2	Signal missing
P0057	ECM-233D	Rear heated oxygen sensor, bank 2	Signal too low
P0058	ECM-233C	Rear heated oxygen sensor, bank 2	Signal too high
P0059	ECM-2500	Front heated oxygen sensor, bank 2 heating	Faulty signal
P0059	ECM-250B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0059	ECM-250C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0059	ECM-250D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0071	ECM-1410	Ambient temperature sensor	Faulty signal
P0071	ECM-141B	Ambient temperature sensor	Signal missing
P0072	ECM-140D	Ambient temperature sensor	Signal too low
P0073	ECM-140C	Ambient temperature sensor	Signal too high
P0075	ECM-612B	Intake camshaft reset valve	Signal missing
P0076	ECM-612D	Intake camshaft reset valve	Signal too low
P0077	ECM-612C	Intake camshaft reset valve	Signal too high
P0078	ECM-616B	Exhaust camshaft reset valve	Signal missing
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0080	ECM-616C	Exhaust camshaft reset valve	Signal too high
P0087	ECM-290D	Fuel pressure	Signal too low
P0088	ECM-290C	Fuel pressure	Signal too high

DTC Table (P Codes / ECM Codes) Part 1

P0089	ECM-2900	Fuel pressure	Faulty signal
P0090	ECM-290B	Fuel pressure	Signal missing
P0100	ECM-120C	Air mass	Signal too high
P0100	ECM-120D	Air mass	Signal too low
P0101	ECM-1210	Mass air flow sensor	Flow too high
P0101	ECM-121B	Mass air flow sensor	Flow too low
P0102	ECM-121D	Mass air flow sensor	Signal too low
P0103	ECM-121C	Mass air flow sensor	Signal too high
P0110	ECM-132D	Intake air temperature (IAT) sensor inlet	Signal too low
P0111	ECM-1320	Intake air temperature (IAT) sensor inlet	Faulty signal
P0111	ECM-132C	Intake air temperature (IAT) sensor inlet	Signal too high
P0112	ECM-131C	Intake air temperature (IAT) sensor inlet	Signal too high
P0113	ECM-131D	Intake air temperature (IAT) sensor inlet	Signal too low
P0117	ECM-273C	Engine coolant temperature (ECT) sensor	Signal too high
P0118	ECM-273D	Engine coolant temperature (ECT) sensor	Signal too low
P0121	ECM-9210	Electronic throttle unit, potentiometer 1	Faulty signal
P0122	ECM-921D	Electronic throttle unit, potentiometer 1	Signal too low
P0123	ECM-921C	Electronic throttle unit, potentiometer 1	Signal too high
P0125	ECM-270B	Engine coolant temperature (ECT) sensor	Signal missing
P0128	ECM-2B00	Thermostat	Faulty signal
P0131	ECM-248D	Front heated oxygen sensor, bank 1	Signal too low
P0132	ECM-248C	Front heated oxygen sensor, bank 1	Signal too high
P0133	ECM-242D	Front heated oxygen sensor, bank 1	Signal missing
P0136	ECM-222B	Rear heated oxygen sensor, bank 1	Signal missing
P0137	ECM-222D	Rear heated oxygen sensor, bank 1	Signal too low
P0138	ECM-222C	Rear heated oxygen sensor, bank 1	Signal too high
P0140	ECM-221B	Rear heated oxygen sensor aging, bank 1	Signal missing
P0140	ECM-221C	Rear heated oxygen sensor aging, bank 1	Signal too high
P0140	ECM-221D	Rear heated oxygen sensor aging, bank 1	Signal too low
P0141	ECM-2200	Rear heated oxygen sensor bank 1, heating	Faulty signal
P0151	ECM-258D	Front heated oxygen sensor, bank 2	Signal too low
P0152	ECM-258C	Front heated oxygen sensor, bank 2	Signal too high
P0153	ECM-252D	Front heated oxygen sensor, bank 2	Signal missing
P0156	ECM-232B	Rear heated oxygen sensor, bank 2	Signal missing
P0157	ECM-232D	Rear heated oxygen sensor, bank 2	Signal too low
P0158	ECM-232C	Rear heated oxygen sensor, bank 2	Signal too high
P0160	ECM-231B	Rear heated oxygen sensor aging, bank 2	Signal missing
P0160	ECM-231C	Rear heated oxygen sensor aging, bank 2	Signal too high
P0160	ECM-231D	Rear heated oxygen sensor aging, bank 2	Signal too low
P0161	ECM-2300	Rear heated oxygen sensor bank 2, heating	Faulty signal
P0182	ECM-2A0D	Fuel temperature sensor	Signal too low
P0183	ECM-2A0C	Fuel temperature sensor	Signal too high
P0190	ECM-280B	Fuel pressure sensor	Signal too high
P0191	ECM-2800	Fuel pressure sensor	Signal too low

DTC Table (P Codes / ECM Codes) Part 2

P0192	ECM-280D	Fuel pressure sensor	Signal too low
P0193	ECM-280C	Fuel pressure sensor	Signal too high
P0197	ECM-540D	Oil quality, level and temperature sensor	Signal too low
P0198	ECM-540C	Oil quality, level and temperature sensor	Signal too high
P0199	ECM-540B	Oil quality, level and temperature sensor	Faulty signal
P0201	ECM-2C0B	Injector cyl 1	Signal missing
P0202	ECM-2C1B	Injector cyl 2	Signal missing
P0203	ECM-2C2B	Injector cyl 3	Signal missing
P0204	ECM-2C3B	Injector cyl 4	Signal missing
P0205	ECM-2C4B	Injector cyl 5	Signal missing
P0206	ECM-2C5B	Injector cyl 6	Signal missing
P0221	ECM-9220	Electronic throttle unit, potentiometer 2	Faulty signal
P0222	ECM-922D	Electronic throttle unit, potentiometer 2	Signal too low
P0223	ECM-922C	Electronic throttle unit, potentiometer 2	Signal too high
P0234	ECM-601C	Turbo control defective boost pressure	Signal too high
P0237	ECM-125D	Charge pressure sensor	Signal too low
P0238	ECM-125C	Charge pressure sensor	Signal too low
P0240	ECM-1260	Charge pressure sensor	Faulty signal
P0240	ECM-126B	Charge pressure sensor	Signal missing
P0240	ECM-126C	Charge pressure sensor	Signal too high
P0240	ECM-126D	Charge pressure sensor	Signal too low
P0243	ECM-600B	Turbocharger (TC) control valve	Signal missing
P0245	ECM-600D	Turbocharger (TC) control valve	Signal too low
P0246	ECM-600C	Turbocharger (TC) control valve	Signal too high
P0261	ECM-2C0D	Injector cyl 1	Signal too low
P0262	ECM-2C0C	Injector cyl 1	Signal too high
P0264	ECM-2C1D	Injector cyl 2	Signal too low
P0265	ECM-2C1C	Injector cyl 2	Signal too high
P0267	ECM-2C2D	Injector cyl 3	Signal too low
P0268	ECM-2C2C	Injector cyl 3	Signal too high
P0270	ECM-2C3D	Injector cyl 4	Signal too low
P0271	ECM-2C3C	Injector cyl 4	Signal too high
P0273	ECM-2C4D	Injector cyl 5	Signal too low
P0274	ECM-2C4C	Injector cyl 5	Signal too high
P0276	ECM-2C5D	Injector cyl 6	Signal too low
P0277	ECM-2C5C	Injector cyl 6	Signal too high
P0299	ECM-602D	Turbo control defective flow	Signal too low
P0300	ECM-3100	Misfire, at least one cylinder	Start-up
P0300	ECM-310C	Misfire, at least one cylinder	Catalytic converter damage
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0301	ECM-3210	Misfire cylinder 1, start-up	Start-up
P0301	ECM-321C	Misfire cylinder 1, catalytic converter damage	Catalytic converter damage
P0301	ECM-321D	Misfire cylinder 1, emissions impact	Emissions impact

DTC Table (P Codes / ECM Codes) Part 3

P0302	ECM-3220	Misfire cylinder 2, start-up	Start-up
P0302	ECM-322C	Misfire cylinder 2, catalytic converter damage	Catalytic converter damage
P0302	ECM-322D	Misfire cylinder 2, emissions impact	Emissions impact
P0303	ECM-3230	Misfire cylinder 3, start-up	Start-up
P0303	ECM-323C	Misfire cylinder 3, catalytic converter damage	Catalytic converter damage
P0303	ECM-323D	Misfire cylinder 3, emissions impact	Emissions impact
P0304	ECM-3240	Misfire cylinder 4, start-up	Start-up
P0304	ECM-324C	Misfire cylinder 4, catalytic converter damage	Catalytic converter damage
P0304	ECM-324D	Misfire cylinder 4, emissions impact	Emissions impact
P0305	ECM-3250	Misfire cylinder 5, start-up	Start-up
P0305	ECM-325C	Misfire cylinder 5, catalytic converter damage	Catalytic converter damage
P0305	ECM-325D	Misfire cylinder 5, emissions impact	Emissions impact
P0306	ECM-3260	Misfire cylinder 6, start-up	Start-up
P0306	ECM-326C	Misfire cylinder 6, catalytic converter damage	Catalytic converter damage
P0306	ECM-326D	Misfire cylinder 6, emissions impact	Emissions impact
P0324	ECM-3000	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3010	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3020	Engine control module (ECM), Internal fault	Faulty signal
P0327	ECM-303D	Knock sensor front	Signal too low
P0328	ECM-303C	Knock sensor front	Signal too high
P0332	ECM-304D	Knock sensor rear	Signal too low
P0333	ECM-304C	Knock sensor rear	Signal too high
P0335	ECM-500B	Engine speed (RPM) sensor signal	Signal missing
P0336	ECM-5000	Engine speed (RPM) sensor signal	Faulty signal
P0337	ECM-500D	Engine speed (RPM) sensor signal	Signal too low
P0338	ECM-500C	Engine speed (RPM) sensor signal	Signal too high
P0340	ECM-340B	Camshaft position (CMP) sensor, intake	Signal missing
P0342	ECM-340D	Camshaft position (CMP) sensor, intake	Signal too low
P0343	ECM-340C	Camshaft position (CMP) sensor, intake	Signal too high
P0344	ECM-3400	Camshaft position (CMP) sensor, intake	Faulty signal
P0345	ECM-341B	Camshaft position (CMP) sensor, exhaust	Signal missing
P0347	ECM-341D	Camshaft position (CMP) sensor, exhaust	Signal too low
P0348	ECM-341C	Camshaft position (CMP) sensor, exhaust	Signal too high
P0349	ECM-3410	Camshaft position (CMP) sensor, exhaust	Faulty signal
P0351	ECM-360B	Ignition coil cyl 1	Signal missing
P0352	ECM-361B	Ignition coil cyl 2	Signal missing
P0353	ECM-362B	Ignition coil cyl 3	Signal missing
P0354	ECM-363B	Ignition coil cyl 4	Signal missing
P0355	ECM-364B	Ignition coil cyl 5	Signal missing
P0356	ECM-365B	Ignition coil cyl 6	Signal missing
P0420	ECM-400C	Catalytic converter efficiency, bank 1	Signal too high
P0430	ECM-401C	Catalytic converter efficiency, bank 2	Signal too high
P0442	ECM-439C	Tank system, leakage	Major leak
P0443	ECM-421B	Evaporative emission system (EVAP) valve	Signal missing

DTC Table (P Codes / ECM Codes) Part 4

P0444	ECM-421C	Evaporative emission system (EVAP) valve	Signal too high
P0445	ECM-421D	Evaporative emission system (EVAP) valve	Signal too low
P0456	ECM-434C	Tank system, leakage	Minor leak
P0457	ECM-430C	Tank system, leakage	Fuel tank cap missing
P0457	ECM-4380	Tank cap	Missing
P0460	ECM-440C	Fuel level sensor	Signal too high
P0461	ECM-4400	Fuel level sensor	Faulty signal
P0464	ECM-440B	Fuel level sensor	Signal missing
P0480	ECM-650B	Engine cooling fan (FC)	Signal missing
P0483	ECM-6200	Engine cooling fan (FC) control module	Faulty signal
P0484	ECM-620C	Engine cooling fan (FC) control module	Signal too high
P0485	ECM-620D	Engine cooling fan (FC) control module	Signal too low
P0496	ECM-420C	EVAP-system	Signal too high
P0497	ECM-420D	EVAP-system	Signal too high
P0500	ECM-530C	Speed signal	Signal too high
P0501	ECM-5300	Speed signal	Faulty signal
P0502	ECM-530D	Speed signal	Signal too low
P0503	ECM-A12B	Speed signal	Signal missing
P0503	ECM-A12C	Speed signal	Signal too high
P0503	ECM-530B	Speed signal	Signal missing
P0506	ECM-951D	Engine control module (ECM), idle control	Signal too low
P0507	ECM-951C	Engine control module (ECM), idle control	Signal too high
P0530	ECM-520B	A/C pressure sensor	Signal missing
P0531	ECM-5200	A/C pressure sensor	Faulty signal
P0532	ECM-520D	A/C pressure sensor	Signal too low
P0533	ECM-520C	A/C pressure sensor	Signal too high
P0560	ECM-8200	Battery voltage	Faulty signal
P0561	ECM-800B	System relay	Signal too low
P0562	ECM-820D	Battery voltage	Signal too low
P0563	ECM-820C	Battery voltage	Signal too high
P0564	ECM-930B	Control module, communication fault	Signal missing
P0571	ECM-900B	Brake pedal sensor	Signal missing
P0573	ECM-900C	Brake pedal sensor	Signal too low
P0579	ECM-9300	Control module, communication fault	Faulty signal
P0580	ECM-930D	Control module, communication fault	Signal too low
P0581	ECM-930C	Control module, communication fault	Signal too high
P0602	ECM-5110	Malfunction indicator light CEM	Faulty signal
P0604	ECM-9970	Memory error RAM	Faulty signal
P0605	ECM-9980	Memory error ROM	Faulty signal
P0606	ECM-9990	Engine control module (ECM)	Faulty signal
P0607	ECM-9800	Engine control module (ECM), torque signal	Internal fault
P0607	ECM-9810	Engine control module (ECM), engine rpm	Internal fault
P0607	ECM-9820	Engine control module (ECM), load signal	Internal fault
P0607	ECM-983B	Engine control module (ECM)	Internal fault

DTC Table (P Codes / ECM Codes) Part 5

P0607	ECM-983C	Engine control module (ECM)	Internal fault
P0607	ECM-983D	Engine control module (ECM)	Internal fault
P0607	ECM-9840	Engine control module (ECM)	Internal fault
P0607	ECM-984B	Engine control module (ECM)	Internal fault
P0607	ECM-9860	Engine control module (ECM)	Internal fault
P0607	ECM-720B	Engine control module (ECM) internal fault	Signal missing
P0607	ECM-9850	Engine control module (ECM)	Internal fault
P0627	ECM-291B	Fuel pump control module	Signal missing
P0628	ECM-291D	Fuel pump control module	Signal too low
P0629	ECM-291C	Fuel pump control module	Signal too high
P0634	ECM-7010	Engine control module high temperature	Faulty signal
P0634	ECM-7020	Engine control module high temperature	Faulty signal
P0638	ECM-9270	Throttle unit	Faulty signal
P0642	ECM-810D	Power supply (5 volt)	Signal too low
P0643	ECM-810C	Power supply (5 volt)	Signal too high
P0645	ECM-630B	Air conditioning (A/C) relay	Signal missing
P0646	ECM-630D	Air conditioning (A/C) relay	Signal too low
P0647	ECM-630C	Air conditioning (A/C) relay	Signal too high
P0650	ECM-660B	Malfunction indicator lamp (MIL)	Signal missing
P0650	ECM-660C	Malfunction indicator lamp (MIL)	Signal too high
P0650	ECM-660D	Malfunction indicator lamp (MIL)	Signal too low
P0668	ECM-700D	Engine control module (ECM), Internal fault	Signal too low
P0669	ECM-700C	Engine control module (ECM), Internal fault	Signal too high
P0700	ECM-5100	Malfunction indicator light TCM	Faulty signal
P0700	ECM-5130	Malfunction indicator light TCM	Faulty signal
P0700	ECM-513B	Malfunction indicator light TCM	Signal missing
P0727	ECM-330B	Engine speed (RPM) sensor	Faulty signal
P0805	ECM-910B	Clutch pedal sensor	Signal missing
P0806	ECM-9100	Clutch pedal sensor	Faulty signal
P0807	ECM-910D	Clutch pedal sensor	Signal too low
P0808	ECM-910C	Clutch pedal sensor	Signal too high
P0863	ECM-512B	Malfunction indicator light communication	Signal missing
P1124	ECM-92B0	Throttle unit	Faulty signal
P1124	ECM-92D0	Throttle unit	Faulty signal
P1136	ECM-680B	Cooling fan for control modules	Signal missing
P1136	ECM-680C	Cooling fan for control modules	Signal too high
P1136	ECM-680D	Cooling fan for control modules	Signal too low
P1167	ECM-92CC	Throttle unit	Signal too high
P1167	ECM-92CD	Throttle unit	Signal too low
P1480	ECM-620B	Engine cooling fan (FC) control module	Signal too low
P1481	ECM-650D	Engine cooling fan (FC)	Signal too low
P1482	ECM-650C	Engine cooling fan (FC)	Signal too high
P1526	ECM-960C	Engine control module (ECM), torque signal	Internal fault
P1646	ECM-2450	Front heated oxygen sensor, bank 1	Faulty signal

DTC Table (P Codes / ECM Codes) Part 6

P1646	ECM-245B	Front heated oxygen sensor, bank 1	Signal missing
P1646	ECM-245C	Front heated oxygen sensor, bank 1	Signal too high
P1646	ECM-245D	Front heated oxygen sensor, bank 1	Signal too low
P1647	ECM-2550	Front heated oxygen sensor, bank 2	Faulty signal
P1647	ECM-255B	Front heated oxygen sensor, bank 2	Signal missing
P1647	ECM-255C	Front heated oxygen sensor, bank 2	Signal too high
P1647	ECM-255D	Front heated oxygen sensor, bank 2	Signal too low
P2065	ECM-440D	Fuel level sensor	Signal too low
P2096	ECM-24BC	Front heated oxygen sensor, bank 1	Signal too high
P2097	ECM-24BD	Front heated oxygen sensor, bank 1	Signal too low
P2098	ECM-25BC	Front heated oxygen sensor, bank 2	Signal too high
P2099	ECM-25BD	Front heated oxygen sensor, bank 2	Signal too low
P2101	ECM-9240	Engine control module (ECM)	Faulty signal
P2108	ECM-929C	Engine control module (ECM)	Signal too high
P2108	ECM-929D	Engine control module (ECM)	Signal too low
P2108	ECM-9290	Engine control module (ECM)	Faulty signal
P2109	ECM-92E0	Engine control module (ECM)	Internal fault
P2111	ECM-925C	Throttle unit	Signal too high
P2111	ECM-925D	Throttle unit	Signal too low
P2112	ECM-926C	Throttle unit	Signal too high
P2112	ECM-926D	Throttle unit	Signal too low
P2119	ECM-9280	Throttle unit	Faulty signal
P2121	ECM-9700	Accelerator pedal position sensor, digital signal	Faulty signal
P2121	ECM-970B	Accelerator pedal position sensor, digital signal	Signal missing
P2122	ECM-941D	Accelerator pedal position sensor, digital signal	Signal too low
P2123	ECM-941C	Accelerator pedal position sensor, digital signal	Signal too high
P2126	ECM-9400	Accelerator pedal position sensor, analog signal	Faulty signal
P2127	ECM-940D	Accelerator pedal position sensor, analog signal	Signal too low
P2128	ECM-940C	Accelerator pedal position sensor, analog signal	Signal too high
P2131	ECM-9000	Brake pedal sensor	Faulty signal
P2135	ECM-9200	Throttle position sensor	Faulty signal
P2177	ECM-21EC	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2177	ECM-212C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2178	ECM-21ED	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2178	ECM-212D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2179	ECM-213C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2179	ECM-21FC	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2180	ECM-213D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2180	ECM-21FD	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2187	ECM-21EB	Adaptive heated oxygen sensor control, bank 1	Signal missing
P2187	ECM-216C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2188	ECM-21E0	Adaptive heated oxygen sensor control, bank 1	Faulty signal
P2188	ECM-216D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2189	ECM-217C	Adaptive heated oxygen sensor control, bank 2	Signal too high

DTC Table (P Codes / ECM Codes) Part 7

P2189	ECM-21FB	Adaptive heated oxygen sensor control, bank 2	Signal missing
P2190	ECM-217D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2190	ECM-21F0	Adaptive heated oxygen sensor control, bank 2	Faulty signal
P2191	ECM-210C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2192	ECM-210D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2193	ECM-211C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2194	ECM-211D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2195	ECM-24B0	Front heated oxygen sensor, bank 1	Faulty signal
P2196	ECM-24BB	Front heated oxygen sensor, bank 1	Signal missing
P2197	ECM-25B0	Front heated oxygen sensor, bank 2	Faulty signal
P2198	ECM-25BB	Front heated oxygen sensor, bank 2	Signal missing
P2227	ECM-1130	Atmospheric pressure sensor	Faulty signal
P2227	ECM-113B	Atmospheric pressure sensor	Signal missing
P2227	ECM-113C	Atmospheric pressure sensor	Signal too high
P2227	ECM-113D	Atmospheric pressure sensor	Signal too low
P2228	ECM-112D	Atmospheric pressure sensor	Signal too low
P2229	ECM-112C	Atmospheric pressure sensor	Signal too high
P2231	ECM-243B	Front heated oxygen sensor, bank 1	Signal missing
P2232	ECM-2220	Rear heated oxygen sensor, bank 1	Faulty signal
P2234	ECM-253B	Front heated oxygen sensor, bank 2	Signal missing
P2235	ECM-2320	Rear heated oxygen sensor, bank 2	Faulty signal
P2237	ECM-247B	Front heated oxygen sensor, bank 1	Signal missing
P2238	ECM-2470	Front heated oxygen sensor, bank 1	Faulty signal
P2239	ECM-247C	Front heated oxygen sensor, bank 1	Signal too high
P2240	ECM-257B	Front heated oxygen sensor, bank 2	Signal missing
P2241	ECM-2570	Front heated oxygen sensor, bank 2	Faulty signal
P2242	ECM-257C	Front heated oxygen sensor, bank 2	Signal too high
P2243	ECM-249B	Front heated oxygen sensor, bank 1	Signal missing
P2247	ECM-259B	Front heated oxygen sensor, bank 2	Signal missing
P2251	ECM-24AB	Front heated oxygen sensor, bank 1	Signal missing
P2254	ECM-25AB	Front heated oxygen sensor, bank 2	Signal missing
P2281	ECM-640C	Turbocharger (TC) control	Signal too high
P2281	ECM-640D	Turbocharger (TC) control	Signal too low
P2300	ECM-360D	Ignition coil cyl 1, signal	Signal too low
P2301	ECM-360C	Ignition coil cyl 1, signal	Signal too high
P2303	ECM-361D	Ignition coil cyl 2, signal	Signal too low
P2304	ECM-361C	Ignition coil cyl 2, signal	Signal too high
P2306	ECM-362D	Ignition coil cyl 3, signal	Signal too low
P2307	ECM-362C	Ignition coil cyl 3, signal	Signal too high
P2309	ECM-363D	Ignition coil cyl 4, signal	Signal too low
P2310	ECM-363C	Ignition coil cyl 4, signal	Signal too high
P2312	ECM-364D	Ignition coil cyl 5, signal	Signal too low
P2313	ECM-364C	Ignition coil cyl 5, signal	Signal too high
P2315	ECM-365D	Ignition coil cyl 6, signal	Signal too low

DTC Table (P Codes / ECM Codes) Part 8

P2316	ECM-365C	Ignition coil cyl 6, signal	Signal too high
P2400	ECM-433B	Leakage diagnostic unit, pump	Signal missing
P2401	ECM-433D	Leakage diagnostic unit, pump	Signal too low
P2402	ECM-433C	Leakage diagnostic unit, pump	Signal too high
P2404	ECM-4360	Leak diagnostic unit	Faulty signal
P2405	ECM-436D	Leak diagnostic unit	Signal too low
P2406	ECM-436C	Leak diagnostic unit	Signal too high
P2407	ECM-436B	Leak diagnostic unit	Signal missing
P240A	ECM-431B	Leakage diagnostic unit, preheating	Signal missing
P240B	ECM-431D	Leakage diagnostic unit, preheating	Signal too low
P240C	ECM-431C	Leakage diagnostic unit, preheating	Signal too high
P2414	ECM-24C0	Front heated oxygen sensor, bank 1	Faulty signal
P2415	ECM-25C0	Front heated oxygen sensor, bank 2	Faulty signal
P2418	ECM-432B	Leak diagnostic unit, valve	Signal missing
P2419	ECM-432D	Leak diagnostic unit, valve	Signal too low
P2420	ECM-432C	Leak diagnostic unit, valve	Signal too high
P250B	ECM-5500	Oil level	Faulty signal
P250C	ECM-550D	Oil level	Signal too low
P2510	ECM-8210	System relay	Faulty signal
P2511	ECM-821B	System relay	Signal missing
P2626	ECM-246B	Front heated oxygen sensor, bank 1	Signal missing
P2629	ECM-256B	Front heated oxygen sensor, bank 2	Signal missing
U0001	ECM-A130	Communication control module	Signal missing
U0002	ECM-E000	Communication control module	Internal fault
U0073	ECM-E003	Configuration error	Faulty signal
U0103	ECM-7300	Gear-shift position sensor	Faulty signal
U0167	ECM-710B	Communication Immobilizer	Signal missing
U0401	ECM-A020	Configuration error	Signal missing
U0426	ECM-7100	Communication Immobilizer	Faulty signal

DTC Table (P Codes / U Codes / ECM Codes) Part 9

NOTE: If the diagnostic trouble code is not hyperlinked, then:
- Either the code may not be valid for this vehicle or year.
- Or the information published by the OEM does not include this code for this vehicle or year.

DTC Conversion Table Notes

Conversion Table Standardized Diagnostic Trouble Codes (DTCs)/Volvo Diagnostic Trouble Codes (DTCs)

Information

Background
OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.

Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations
The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).

SAE/ISO diagnostic trouble code (DTC): Standardized diagnostic trouble code (DTC) according to SAE J2012/ISO 15031-6. The diagnostic trouble code (DTC) can be read off on vehicles with standardized on-board diagnostic systems for emissions related faults, certified in accordance with OBD II. Reading off is performed with a generic scan tool, an instrument for fault-tracing standardized in accordance with SAE J1978/ISO 15031-4.

Volvo DII diagnostic trouble code (DTC): Volvo-specific diagnostic trouble code (DTC) in accordance with the Volvo On-Board Diagnostic protocol. Can be read off using VIDA on cars from model year 1999.

Diagnostic trouble code (DTC) designation: Volvo diagnostic trouble code (DTC) designation. Used in VIDA.

Fault type: Volvo method for specifying the actual fault. Used in VIDA.

NOTE: An SAE/ISO diagnostic trouble code (DTC) can correspond to several DII diagnostic trouble codes (DTCs). All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code (DTC) to disappear.

Several SAE/ISO diagnostic trouble codes (DTCs) may also refer to the same DII diagnostic trouble code (DTC).

There are DII diagnostic trouble codes (DTCs) for non emissions-related faults that do not correspond to any SAE/ISO diagnostic trouble code (DTC).

U Code Charts

Conversion table standardized diagnostic trouble codes/Volvo diagnostic trouble codes

Information

Background

OBD II is a diagnostics system designed to meet statutory requirements. A standardized instrument for fault-tracing can be plugged in to the data link connector (DLC) (OBD II socket) to read diagnostic trouble codes (DTCs) and system parameters. OBD II contains only emissions related diagnostic trouble codes (DTCs) and parameters. It cannot provide the comprehensive range of information available from the Volvo On-board diagnostics system.
Volvo has its own diagnostic trouble code (DTC) designations that adhere to the in-house Volvo On-board Diagnostics protocol (called DII from model year 1999).

Table explanations

The table below is a conversion table between standardized diagnostic trouble codes (DTCs) (SAE/ISO) and the equivalent Volvo diagnostic trouble codes (DTCs) (DII).
SAE/ISO DTC: Standardized diagnostic trouble code as per SAE J2012/ISO 15031-6. The DTC can be read out from the vehicle using a standardized diagnostics system for emission-related faults certified as per OBD II. The readout is taken with a generic scantool, a fault tracing instrument standardized as per SAE J1978/ISO 15031-4.
Volvo DII DTC: Volvo-specific diagnostic trouble code as per Volvo Onboard Diagnostics protocol. Can be read out from cars from model year 1999 using VIDA.

DTC designation: Volvo DTC designation. Used in VIDA.
Fault type: Volvo's method of specifying the fault. Used in VIDA.

Note! An SAE/ISO diagnostic trouble code can correspond to several DII diagnostic trouble codes. All of these must therefore by rectified in order for the corresponding SAE/ISO diagnostic trouble code to disappear.Several SAE/ISO diagnostic trouble codes may also refer to the same DII diagnostic trouble code.There are DII diagnostic trouble codes for non emission-related malfunctions that do not correspond to any SAE/ISO diagnostic trouble code.

Table

SAE/ISO DTCs	Volvo DII DTCs	Diagnostic trouble code (DTC) designation	Fault type
P0016	ECM-670C	Camshaft position, inlet	High
P0016	ECM-670D	Camshaft position, inlet	Low
P0017	ECM-671C	Camshaft position, exhaust	High
P0017	ECM-671D	Camshaft position, exhaust	Low
P0026	ECM-6110	Camshaft control, inlet	Slow
P0026	ECM-611B	Camshaft control, inlet	Faulty
P0027	ECM-6140	Camshaft control exhaust	Slow
P0027	ECM-614B	Camshaft control exhaust	Faulty
P0030	ECM-244B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0031	ECM-244D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0032	ECM-244C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0036	ECM-223B	Rear heated oxygen sensor, bank 1	Signal missing
P0037	ECM-223D	Rear heated oxygen sensor, bank 1	Signal too low
P0038	ECM-223C	Rear heated oxygen sensor, bank 1	Signal too high
P0040	ECM-24A0	Front heated oxygen sensors mixed up	Faulty signal
P0041	ECM-2240	Rear heated oxygen sensors, mixed up	Faulty signal
P0050	ECM-254B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0051	ECM-254D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0052	ECM-254C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0053	ECM-2400	Front heated oxygen sensor, bank 1 heating	Faulty signal
P0053	ECM-240B	Front heated oxygen sensor, bank 1 heating	Signal missing
P0053	ECM-240C	Front heated oxygen sensor, bank 1 heating	Signal too high
P0053	ECM-240D	Front heated oxygen sensor, bank 1 heating	Signal too low
P0056	ECM-233B	Rear heated oxygen sensor, bank 2	Signal missing
P0057	ECM-233D	Rear heated oxygen sensor, bank 2	Signal too low
P0058	ECM-233C	Rear heated oxygen sensor, bank 2	Signal too high
P0059	ECM-2500	Front heated oxygen sensor, bank 2 heating	Faulty signal
P0059	ECM-250B	Front heated oxygen sensor, bank 2 heating	Signal missing
P0059	ECM-250C	Front heated oxygen sensor, bank 2 heating	Signal too high
P0059	ECM-250D	Front heated oxygen sensor, bank 2 heating	Signal too low
P0071	ECM-1410	Ambient temperature sensor	Faulty signal
P0071	ECM-141B	Ambient temperature sensor	Signal missing
P0072	ECM-140D	Ambient temperature sensor	Signal too low
P0073	ECM-140C	Ambient temperature sensor	Signal too high
P0075	ECM-612B	Intake camshaft reset valve	Signal missing
P0076	ECM-612D	Intake camshaft reset valve	Signal too low
P0077	ECM-612C	Intake camshaft reset valve	Signal too high
P0078	ECM-616B	Exhaust camshaft reset valve	Signal missing
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0079	ECM-616D	Exhaust camshaft reset valve	Signal too low
P0080	ECM-616C	Exhaust camshaft reset valve	Signal too high
P0087	ECM-290D	Fuel pressure	Signal too low
P0088	ECM-290C	Fuel pressure	Signal too high

DTC Table (P Codes / ECM Codes) Part 1

P0089	ECM-2900	Fuel pressure	Faulty signal
P0090	ECM-290B	Fuel pressure	Signal missing
P0100	ECM-120C	Air mass	Signal too high
P0100	ECM-120D	Air mass	Signal too low
P0101	ECM-1210	Mass air flow sensor	Flow too high
P0101	ECM-121B	Mass air flow sensor	Flow too low
P0102	ECM-121D	Mass air flow sensor	Signal too low
P0103	ECM-121C	Mass air flow sensor	Signal too high
P0110	ECM-132D	Intake air temperature (IAT) sensor inlet	Signal too low
P0111	ECM-1320	Intake air temperature (IAT) sensor inlet	Faulty signal
P0111	ECM-132C	Intake air temperature (IAT) sensor inlet	Signal too high
P0112	ECM-131C	Intake air temperature (IAT) sensor inlet	Signal too high
P0113	ECM-131D	Intake air temperature (IAT) sensor inlet	Signal too low
P0117	ECM-273C	Engine coolant temperature (ECT) sensor	Signal too high
P0118	ECM-273D	Engine coolant temperature (ECT) sensor	Signal too low
P0121	ECM-9210	Electronic throttle unit, potentiometer 1	Faulty signal
P0122	ECM-921D	Electronic throttle unit, potentiometer 1	Signal too low
P0123	ECM-921C	Electronic throttle unit, potentiometer 1	Signal too high
P0125	ECM-270B	Engine coolant temperature (ECT) sensor	Signal missing
P0128	ECM-2B00	Thermostat	Faulty signal
P0131	ECM-248D	Front heated oxygen sensor, bank 1	Signal too low
P0132	ECM-248C	Front heated oxygen sensor, bank 1	Signal too high
P0133	ECM-242D	Front heated oxygen sensor, bank 1	Signal missing
P0136	ECM-222B	Rear heated oxygen sensor, bank 1	Signal missing
P0137	ECM-222D	Rear heated oxygen sensor, bank 1	Signal too low
P0138	ECM-222C	Rear heated oxygen sensor, bank 1	Signal too high
P0140	ECM-221B	Rear heated oxygen sensor aging, bank 1	Signal missing
P0140	ECM-221C	Rear heated oxygen sensor aging, bank 1	Signal too high
P0140	ECM-221D	Rear heated oxygen sensor aging, bank 1	Signal too low
P0141	ECM-2200	Rear heated oxygen sensor bank 1, heating	Faulty signal
P0151	ECM-258D	Front heated oxygen sensor, bank 2	Signal too low
P0152	ECM-258C	Front heated oxygen sensor, bank 2	Signal too high
P0153	ECM-252D	Front heated oxygen sensor, bank 2	Signal missing
P0156	ECM-232B	Rear heated oxygen sensor, bank 2	Signal missing
P0157	ECM-232D	Rear heated oxygen sensor, bank 2	Signal too low
P0158	ECM-232C	Rear heated oxygen sensor, bank 2	Signal too high
P0160	ECM-231B	Rear heated oxygen sensor aging, bank 2	Signal missing
P0160	ECM-231C	Rear heated oxygen sensor aging, bank 2	Signal too high
P0160	ECM-231D	Rear heated oxygen sensor aging, bank 2	Signal too low
P0161	ECM-2300	Rear heated oxygen sensor bank 2, heating	Faulty signal
P0182	ECM-2A0D	Fuel temperature sensor	Signal too low
P0183	ECM-2A0C	Fuel temperature sensor	Signal too high
P0190	ECM-280B	Fuel pressure sensor	Signal too high
P0191	ECM-2800	Fuel pressure sensor	Signal too low

DTC Table (P Codes / ECM Codes) Part 2

P0192	ECM-280D	Fuel pressure sensor	Signal too low
P0193	ECM-280C	Fuel pressure sensor	Signal too high
P0197	ECM-540D	Oil quality, level and temperature sensor	Signal too low
P0198	ECM-540C	Oil quality, level and temperature sensor	Signal too high
P0199	ECM-540B	Oil quality, level and temperature sensor	Faulty signal
P0201	ECM-2C0B	Injector cyl 1	Signal missing
P0202	ECM-2C1B	Injector cyl 2	Signal missing
P0203	ECM-2C2B	Injector cyl 3	Signal missing
P0204	ECM-2C3B	Injector cyl 4	Signal missing
P0205	ECM-2C4B	Injector cyl 5	Signal missing
P0206	ECM-2C5B	Injector cyl 6	Signal missing
P0221	ECM-9220	Electronic throttle unit, potentiometer 2	Faulty signal
P0222	ECM-922D	Electronic throttle unit, potentiometer 2	Signal too low
P0223	ECM-922C	Electronic throttle unit, potentiometer 2	Signal too high
P0234	ECM-601C	Turbo control defective boost pressure	Signal too high
P0237	ECM-125D	Charge pressure sensor	Signal too low
P0238	ECM-125C	Charge pressure sensor	Signal too low
P0240	ECM-1260	Charge pressure sensor	Faulty signal
P0240	ECM-126B	Charge pressure sensor	Signal missing
P0240	ECM-126C	Charge pressure sensor	Signal too high
P0240	ECM-126D	Charge pressure sensor	Signal too low
P0243	ECM-600B	Turbocharger (TC) control valve	Signal missing
P0245	ECM-600D	Turbocharger (TC) control valve	Signal too low
P0246	ECM-600C	Turbocharger (TC) control valve	Signal too high
P0261	ECM-2C0D	Injector cyl 1	Signal too low
P0262	ECM-2C0C	Injector cyl 1	Signal too high
P0264	ECM-2C1D	Injector cyl 2	Signal too low
P0265	ECM-2C1C	Injector cyl 2	Signal too high
P0267	ECM-2C2D	Injector cyl 3	Signal too low
P0268	ECM-2C2C	Injector cyl 3	Signal too high
P0270	ECM-2C3D	Injector cyl 4	Signal too low
P0271	ECM-2C3C	Injector cyl 4	Signal too high
P0273	ECM-2C4D	Injector cyl 5	Signal too low
P0274	ECM-2C4C	Injector cyl 5	Signal too high
P0276	ECM-2C5D	Injector cyl 6	Signal too low
P0277	ECM-2C5C	Injector cyl 6	Signal too high
P0299	ECM-602D	Turbo control defective flow	Signal too low
P0300	ECM-3100	Misfire, at least one cylinder	Start-up
P0300	ECM-310C	Misfire, at least one cylinder	Catalytic converter damage
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0300	ECM-310D	Misfire, at least one cylinder	Emissions impact
P0301	ECM-3210	Misfire cylinder 1, start-up	Start-up
P0301	ECM-321C	Misfire cylinder 1, catalytic converter damage	Catalytic converter damage
P0301	ECM-321D	Misfire cylinder 1, emissions impact	Emissions impact

DTC Table (P Codes / ECM Codes) Part 3

P0302	ECM-3220	Misfire cylinder 2, start-up	Start-up
P0302	ECM-322C	Misfire cylinder 2, catalytic converter damage	Catalytic converter damage
P0302	ECM-322D	Misfire cylinder 2, emissions impact	Emissions impact
P0303	ECM-3230	Misfire cylinder 3, start-up	Start-up
P0303	ECM-323C	Misfire cylinder 3, catalytic converter damage	Catalytic converter damage
P0303	ECM-323D	Misfire cylinder 3, emissions impact	Emissions impact
P0304	ECM-3240	Misfire cylinder 4, start-up	Start-up
P0304	ECM-324C	Misfire cylinder 4, catalytic converter damage	Catalytic converter damage
P0304	ECM-324D	Misfire cylinder 4, emissions impact	Emissions impact
P0305	ECM-3250	Misfire cylinder 5, start-up	Start-up
P0305	ECM-325C	Misfire cylinder 5, catalytic converter damage	Catalytic converter damage
P0305	ECM-325D	Misfire cylinder 5, emissions impact	Emissions impact
P0306	ECM-3260	Misfire cylinder 6, start-up	Start-up
P0306	ECM-326C	Misfire cylinder 6, catalytic converter damage	Catalytic converter damage
P0306	ECM-326D	Misfire cylinder 6, emissions impact	Emissions impact
P0324	ECM-3000	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3010	Engine control module (ECM), Internal fault	Faulty signal
P0324	ECM-3020	Engine control module (ECM), Internal fault	Faulty signal
P0327	ECM-303D	Knock sensor front	Signal too low
P0328	ECM-303C	Knock sensor front	Signal too high
P0332	ECM-304D	Knock sensor rear	Signal too low
P0333	ECM-304C	Knock sensor rear	Signal too high
P0335	ECM-500B	Engine speed (RPM) sensor signal	Signal missing
P0336	ECM-5000	Engine speed (RPM) sensor signal	Faulty signal
P0337	ECM-500D	Engine speed (RPM) sensor signal	Signal too low
P0338	ECM-500C	Engine speed (RPM) sensor signal	Signal too high
P0340	ECM-340B	Camshaft position (CMP) sensor, intake	Signal missing
P0342	ECM-340D	Camshaft position (CMP) sensor, intake	Signal too low
P0343	ECM-340C	Camshaft position (CMP) sensor, intake	Signal too high
P0344	ECM-3400	Camshaft position (CMP) sensor, intake	Faulty signal
P0345	ECM-341B	Camshaft position (CMP) sensor, exhaust	Signal missing
P0347	ECM-341D	Camshaft position (CMP) sensor, exhaust	Signal too low
P0348	ECM-341C	Camshaft position (CMP) sensor, exhaust	Signal too high
P0349	ECM-3410	Camshaft position (CMP) sensor, exhaust	Faulty signal
P0351	ECM-360B	Ignition coil cyl 1	Signal missing
P0352	ECM-361B	Ignition coil cyl 2	Signal missing
P0353	ECM-362B	Ignition coil cyl 3	Signal missing
P0354	ECM-363B	Ignition coil cyl 4	Signal missing
P0355	ECM-364B	Ignition coil cyl 5	Signal missing
P0356	ECM-365B	Ignition coil cyl 6	Signal missing
P0420	ECM-400C	Catalytic converter efficiency, bank 1	Signal too high
P0430	ECM-401C	Catalytic converter efficiency, bank 2	Signal too high
P0442	ECM-439C	Tank system, leakage	Major leak
P0443	ECM-421B	Evaporative emission system (EVAP) valve	Signal missing

DTC Table (P Codes / ECM Codes) Part 4

P0444	ECM-421C	Evaporative emission system (EVAP) valve	Signal too high
P0445	ECM-421D	Evaporative emission system (EVAP) valve	Signal too low
P0456	ECM-434C	Tank system, leakage	Minor leak
P0457	ECM-430C	Tank system, leakage	Fuel tank cap missing
P0457	ECM-4380	Tank cap	Missing
P0460	ECM-440C	Fuel level sensor	Signal too high
P0461	ECM-4400	Fuel level sensor	Faulty signal
P0464	ECM-440B	Fuel level sensor	Signal missing
P0480	ECM-650B	Engine cooling fan (FC)	Signal missing
P0483	ECM-6200	Engine cooling fan (FC) control module	Faulty signal
P0484	ECM-620C	Engine cooling fan (FC) control module	Signal too high
P0485	ECM-620D	Engine cooling fan (FC) control module	Signal too low
P0496	ECM-420C	EVAP-system	Signal too high
P0497	ECM-420D	EVAP-system	Signal too high
P0500	ECM-530C	Speed signal	Signal too high
P0501	ECM-5300	Speed signal	Faulty signal
P0502	ECM-530D	Speed signal	Signal too low
P0503	ECM-A12B	Speed signal	Signal missing
P0503	ECM-A12C	Speed signal	Signal too high
P0503	ECM-530B	Speed signal	Signal missing
P0506	ECM-951D	Engine control module (ECM), idle control	Signal too low
P0507	ECM-951C	Engine control module (ECM), idle control	Signal too high
P0530	ECM-520B	A/C pressure sensor	Signal missing
P0531	ECM-5200	A/C pressure sensor	Faulty signal
P0532	ECM-520D	A/C pressure sensor	Signal too low
P0533	ECM-520C	A/C pressure sensor	Signal too high
P0560	ECM-8200	Battery voltage	Faulty signal
P0561	ECM-800B	System relay	Signal too low
P0562	ECM-820D	Battery voltage	Signal too low
P0563	ECM-820C	Battery voltage	Signal too high
P0564	ECM-930B	Control module, communication fault	Signal missing
P0571	ECM-900B	Brake pedal sensor	Signal missing
P0573	ECM-900C	Brake pedal sensor	Signal too low
P0579	ECM-9300	Control module, communication fault	Faulty signal
P0580	ECM-930D	Control module, communication fault	Signal too low
P0581	ECM-930C	Control module, communication fault	Signal too high
P0602	ECM-5110	Malfunction indicator light CEM	Faulty signal
P0604	ECM-9970	Memory error RAM	Faulty signal
P0605	ECM-9980	Memory error ROM	Faulty signal
P0606	ECM-9990	Engine control module (ECM)	Faulty signal
P0607	ECM-9800	Engine control module (ECM), torque signal	Internal fault
P0607	ECM-9810	Engine control module (ECM), engine rpm	Internal fault
P0607	ECM-9820	Engine control module (ECM), load signal	Internal fault
P0607	ECM-983B	Engine control module (ECM)	Internal fault

DTC Table (P Codes / ECM Codes) Part 5

P0607	ECM-983C	Engine control module (ECM)	Internal fault
P0607	ECM-983D	Engine control module (ECM)	Internal fault
P0607	ECM-9840	Engine control module (ECM)	Internal fault
P0607	ECM-984B	Engine control module (ECM)	Internal fault
P0607	ECM-9860	Engine control module (ECM)	Internal fault
P0607	ECM-720B	Engine control module (ECM) internal fault	Signal missing
P0607	ECM-9850	Engine control module (ECM)	Internal fault
P0627	ECM-291B	Fuel pump control module	Signal missing
P0628	ECM-291D	Fuel pump control module	Signal too low
P0629	ECM-291C	Fuel pump control module	Signal too high
P0634	ECM-7010	Engine control module high temperature	Faulty signal
P0634	ECM-7020	Engine control module high temperature	Faulty signal
P0638	ECM-9270	Throttle unit	Faulty signal
P0642	ECM-810D	Power supply (5 volt)	Signal too low
P0643	ECM-810C	Power supply (5 volt)	Signal too high
P0645	ECM-630B	Air conditioning (A/C) relay	Signal missing
P0646	ECM-630D	Air conditioning (A/C) relay	Signal too low
P0647	ECM-630C	Air conditioning (A/C) relay	Signal too high
P0650	ECM-660B	Malfunction indicator lamp (MIL)	Signal missing
P0650	ECM-660C	Malfunction indicator lamp (MIL)	Signal too high
P0650	ECM-660D	Malfunction indicator lamp (MIL)	Signal too low
P0668	ECM-700D	Engine control module (ECM), Internal fault	Signal too low
P0669	ECM-700C	Engine control module (ECM), Internal fault	Signal too high
P0700	ECM-5100	Malfunction indicator light TCM	Faulty signal
P0700	ECM-5130	Malfunction indicator light TCM	Faulty signal
P0700	ECM-513B	Malfunction indicator light TCM	Signal missing
P0727	ECM-330B	Engine speed (RPM) sensor	Faulty signal
P0805	ECM-910B	Clutch pedal sensor	Signal missing
P0806	ECM-9100	Clutch pedal sensor	Faulty signal
P0807	ECM-910D	Clutch pedal sensor	Signal too low
P0808	ECM-910C	Clutch pedal sensor	Signal too high
P0863	ECM-512B	Malfunction indicator light communication	Signal missing
P1124	ECM-92B0	Throttle unit	Faulty signal
P1124	ECM-92D0	Throttle unit	Faulty signal
P1136	ECM-680B	Cooling fan for control modules	Signal missing
P1136	ECM-680C	Cooling fan for control modules	Signal too high
P1136	ECM-680D	Cooling fan for control modules	Signal too low
P1167	ECM-92CC	Throttle unit	Signal too high
P1167	ECM-92CD	Throttle unit	Signal too low
P1480	ECM-620B	Engine cooling fan (FC) control module	Signal too low
P1481	ECM-650D	Engine cooling fan (FC)	Signal too low
P1482	ECM-650C	Engine cooling fan (FC)	Signal too high
P1526	ECM-960C	Engine control module (ECM), torque signal	Internal fault
P1646	ECM-2450	Front heated oxygen sensor, bank 1	Faulty signal

DTC Table (P Codes / ECM Codes) Part 6

P1646	ECM-245B	Front heated oxygen sensor, bank 1	Signal missing
P1646	ECM-245C	Front heated oxygen sensor, bank 1	Signal too high
P1646	ECM-245D	Front heated oxygen sensor, bank 1	Signal too low
P1647	ECM-2550	Front heated oxygen sensor, bank 2	Faulty signal
P1647	ECM-255B	Front heated oxygen sensor, bank 2	Signal missing
P1647	ECM-255C	Front heated oxygen sensor, bank 2	Signal too high
P1647	ECM-255D	Front heated oxygen sensor, bank 2	Signal too low
P2065	ECM-440D	Fuel level sensor	Signal too low
P2096	ECM-24BC	Front heated oxygen sensor, bank 1	Signal too high
P2097	ECM-24BD	Front heated oxygen sensor, bank 1	Signal too low
P2098	ECM-25BC	Front heated oxygen sensor, bank 2	Signal too high
P2099	ECM-25BD	Front heated oxygen sensor, bank 2	Signal too low
P2101	ECM-9240	Engine control module (ECM)	Faulty signal
P2108	ECM-929C	Engine control module (ECM)	Signal too high
P2108	ECM-929D	Engine control module (ECM)	Signal too low
P2108	ECM-9290	Engine control module (ECM)	Faulty signal
P2109	ECM-92E0	Engine control module (ECM)	Internal fault
P2111	ECM-925C	Throttle unit	Signal too high
P2111	ECM-925D	Throttle unit	Signal too low
P2112	ECM-926C	Throttle unit	Signal too high
P2112	ECM-926D	Throttle unit	Signal too low
P2119	ECM-9280	Throttle unit	Faulty signal
P2121	ECM-9700	Accelerator pedal position sensor, digital signal	Faulty signal
P2121	ECM-970B	Accelerator pedal position sensor, digital signal	Signal missing
P2122	ECM-941D	Accelerator pedal position sensor, digital signal	Signal too low
P2123	ECM-941C	Accelerator pedal position sensor, digital signal	Signal too high
P2126	ECM-9400	Accelerator pedal position sensor, analog signal	Faulty signal
P2127	ECM-940D	Accelerator pedal position sensor, analog signal	Signal too low
P2128	ECM-940C	Accelerator pedal position sensor, analog signal	Signal too high
P2131	ECM-9000	Brake pedal sensor	Faulty signal
P2135	ECM-9200	Throttle position sensor	Faulty signal
P2177	ECM-21EC	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2177	ECM-212C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2178	ECM-21ED	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2178	ECM-212D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2179	ECM-213C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2179	ECM-21FC	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2180	ECM-213D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2180	ECM-21FD	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2187	ECM-21EB	Adaptive heated oxygen sensor control, bank 1	Signal missing
P2187	ECM-216C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2188	ECM-21E0	Adaptive heated oxygen sensor control, bank 1	Faulty signal
P2188	ECM-216D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2189	ECM-217C	Adaptive heated oxygen sensor control, bank 2	Signal too high

DTC Table (P Codes / ECM Codes) Part 7

P2189	ECM-21FB	Adaptive heated oxygen sensor control, bank 2	Signal missing
P2190	ECM-217D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2190	ECM-21F0	Adaptive heated oxygen sensor control, bank 2	Faulty signal
P2191	ECM-210C	Adaptive heated oxygen sensor control, bank 1	Signal too high
P2192	ECM-210D	Adaptive heated oxygen sensor control, bank 1	Signal too low
P2193	ECM-211C	Adaptive heated oxygen sensor control, bank 2	Signal too high
P2194	ECM-211D	Adaptive heated oxygen sensor control, bank 2	Signal too low
P2195	ECM-24B0	Front heated oxygen sensor, bank 1	Faulty signal
P2196	ECM-24BB	Front heated oxygen sensor, bank 1	Signal missing
P2197	ECM-25B0	Front heated oxygen sensor, bank 2	Faulty signal
P2198	ECM-25BB	Front heated oxygen sensor, bank 2	Signal missing
P2227	ECM-1130	Atmospheric pressure sensor	Faulty signal
P2227	ECM-113B	Atmospheric pressure sensor	Signal missing
P2227	ECM-113C	Atmospheric pressure sensor	Signal too high
P2227	ECM-113D	Atmospheric pressure sensor	Signal too low
P2228	ECM-112D	Atmospheric pressure sensor	Signal too low
P2229	ECM-112C	Atmospheric pressure sensor	Signal too high
P2231	ECM-243B	Front heated oxygen sensor, bank 1	Signal missing
P2232	ECM-2220	Rear heated oxygen sensor, bank 1	Faulty signal
P2234	ECM-253B	Front heated oxygen sensor, bank 2	Signal missing
P2235	ECM-2320	Rear heated oxygen sensor, bank 2	Faulty signal
P2237	ECM-247B	Front heated oxygen sensor, bank 1	Signal missing
P2238	ECM-2470	Front heated oxygen sensor, bank 1	Faulty signal
P2239	ECM-247C	Front heated oxygen sensor, bank 1	Signal too high
P2240	ECM-257B	Front heated oxygen sensor, bank 2	Signal missing
P2241	ECM-2570	Front heated oxygen sensor, bank 2	Faulty signal
P2242	ECM-257C	Front heated oxygen sensor, bank 2	Signal too high
P2243	ECM-249B	Front heated oxygen sensor, bank 1	Signal missing
P2247	ECM-259B	Front heated oxygen sensor, bank 2	Signal missing
P2251	ECM-24AB	Front heated oxygen sensor, bank 1	Signal missing
P2254	ECM-25AB	Front heated oxygen sensor, bank 2	Signal missing
P2281	ECM-640C	Turbocharger (TC) control	Signal too high
P2281	ECM-640D	Turbocharger (TC) control	Signal too low
P2300	ECM-360D	Ignition coil cyl 1, signal	Signal too low
P2301	ECM-360C	Ignition coil cyl 1, signal	Signal too high
P2303	ECM-361D	Ignition coil cyl 2, signal	Signal too low
P2304	ECM-361C	Ignition coil cyl 2, signal	Signal too high
P2306	ECM-362D	Ignition coil cyl 3, signal	Signal too low
P2307	ECM-362C	Ignition coil cyl 3, signal	Signal too high
P2309	ECM-363D	Ignition coil cyl 4, signal	Signal too low
P2310	ECM-363C	Ignition coil cyl 4, signal	Signal too high
P2312	ECM-364D	Ignition coil cyl 5, signal	Signal too low
P2313	ECM-364C	Ignition coil cyl 5, signal	Signal too high
P2315	ECM-365D	Ignition coil cyl 6, signal	Signal too low

DTC Table (P Codes / ECM Codes) Part 8

P2316	ECM-365C	Ignition coil cyl 6, signal	Signal too high
P2400	ECM-433B	Leakage diagnostic unit, pump	Signal missing
P2401	ECM-433D	Leakage diagnostic unit, pump	Signal too low
P2402	ECM-433C	Leakage diagnostic unit, pump	Signal too high
P2404	ECM-4360	Leak diagnostic unit	Faulty signal
P2405	ECM-436D	Leak diagnostic unit	Signal too low
P2406	ECM-436C	Leak diagnostic unit	Signal too high
P2407	ECM-436B	Leak diagnostic unit	Signal missing
P240A	ECM-431B	Leakage diagnostic unit, preheating	Signal missing
P240B	ECM-431D	Leakage diagnostic unit, preheating	Signal too low
P240C	ECM-431C	Leakage diagnostic unit, preheating	Signal too high
P2414	ECM-24C0	Front heated oxygen sensor, bank 1	Faulty signal
P2415	ECM-25C0	Front heated oxygen sensor, bank 2	Faulty signal
P2418	ECM-432B	Leak diagnostic unit, valve	Signal missing
P2419	ECM-432D	Leak diagnostic unit, valve	Signal too low
P2420	ECM-432C	Leak diagnostic unit, valve	Signal too high
P250B	ECM-5500	Oil level	Faulty signal
P250C	ECM-550D	Oil level	Signal too low
P2510	ECM-8210	System relay	Faulty signal
P2511	ECM-821B	System relay	Signal missing
P2626	ECM-246B	Front heated oxygen sensor, bank 1	Signal missing
P2629	ECM-256B	Front heated oxygen sensor, bank 2	Signal missing
U0001	ECM-A130	Communication control module	Signal missing
U0002	ECM-E000	Communication control module	Internal fault
U0073	ECM-E003	Configuration error	Faulty signal
U0103	ECM-7300	Gear-shift position sensor	Faulty signal
U0167	ECM-710B	Communication Immobilizer	Signal missing
U0401	ECM-A020	Configuration error	Signal missing
U0426	ECM-7100	Communication Immobilizer	Faulty signal

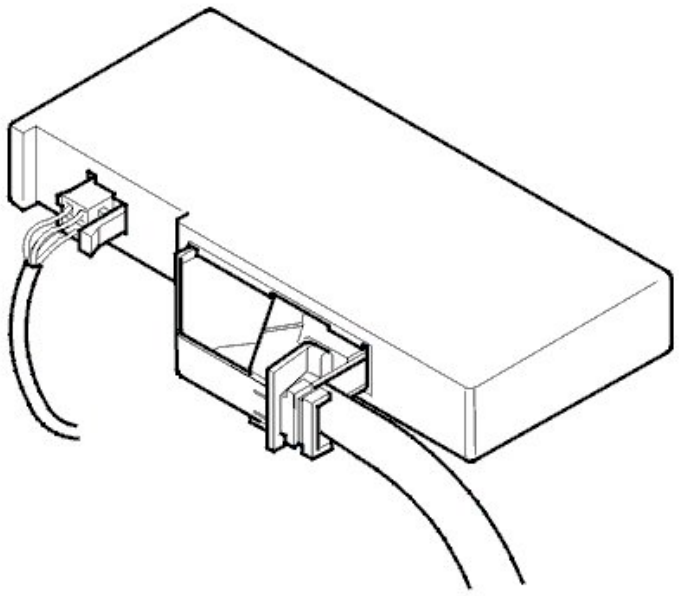
DTC Table (P Codes / U Codes / ECM Codes) Part 9

NOTE: If the diagnostic trouble code is not hyperlinked, then:
- Either the code may not be valid for this vehicle or year.
- Or the information published by the OEM does not include this code for this vehicle or year.

AEM-E001

Diagnostic trouble code (DTC) information AEM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value

- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source

- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

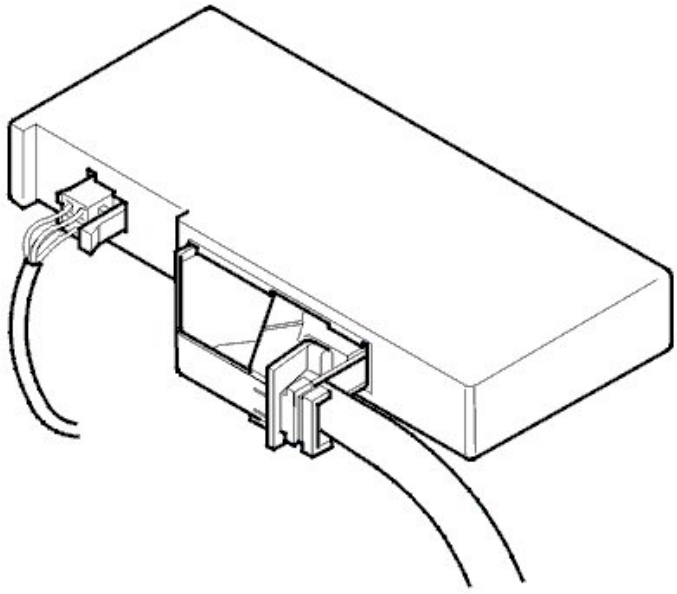
Fault symptom[s]

- Accessories connected to the control module do not function.

AEM-E003

Diagnostic trouble code (DTC) information AEM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- Accessories connected to the control module do not function.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-1A01 is stored if the control module registers that the power supply to the auxiliary electronic module differs by more than two volts from the power supply to the central electronic module.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

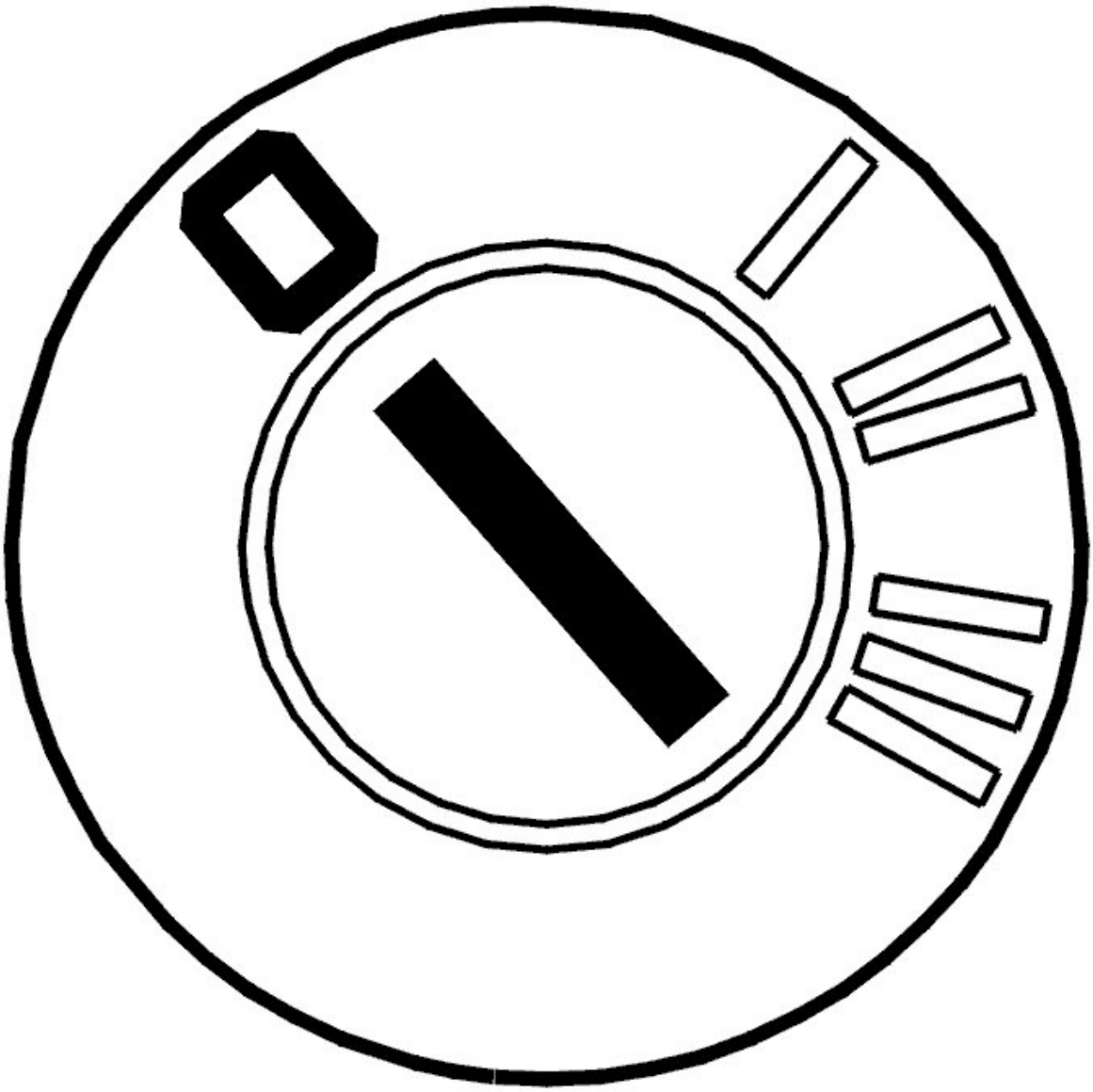
Possible source
- Open-circuit or short-circuit to ground in the 30-supply to the accessory electronic module
- Contact resistance, oxidation or loose connections in the 30-supply to the accessory electronic module.

Fault symptom[s]
- Accessories connected to the control module do not function.

Signal Too Low

Signal too low

Checking the power supply



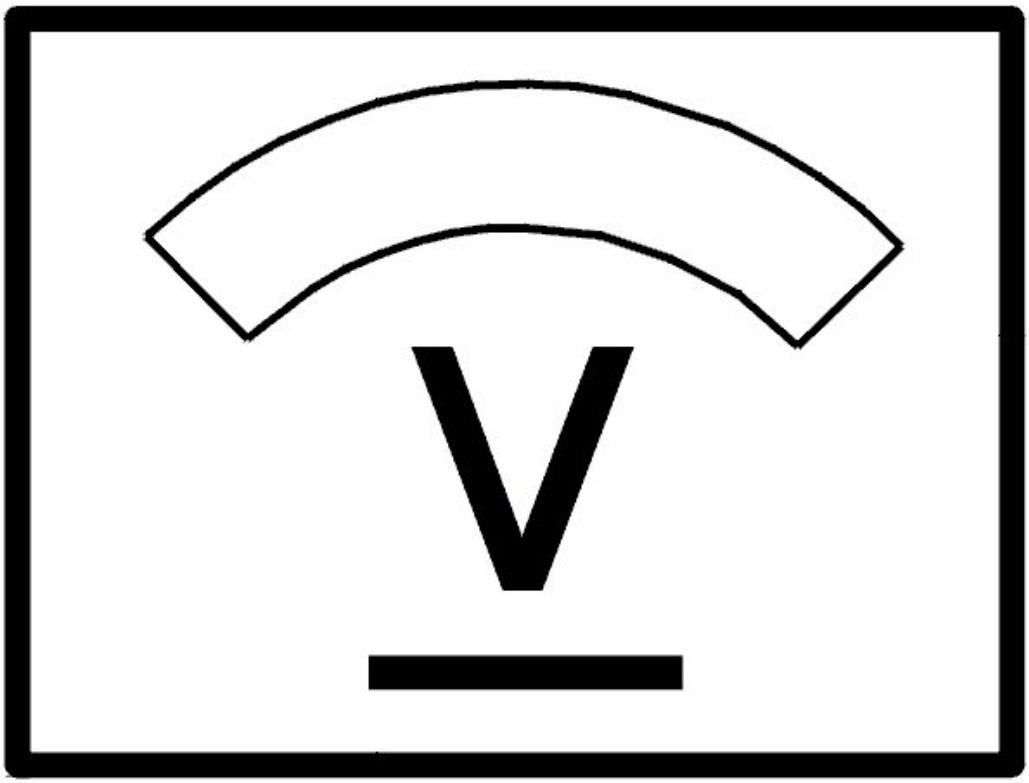
- Ignition off.

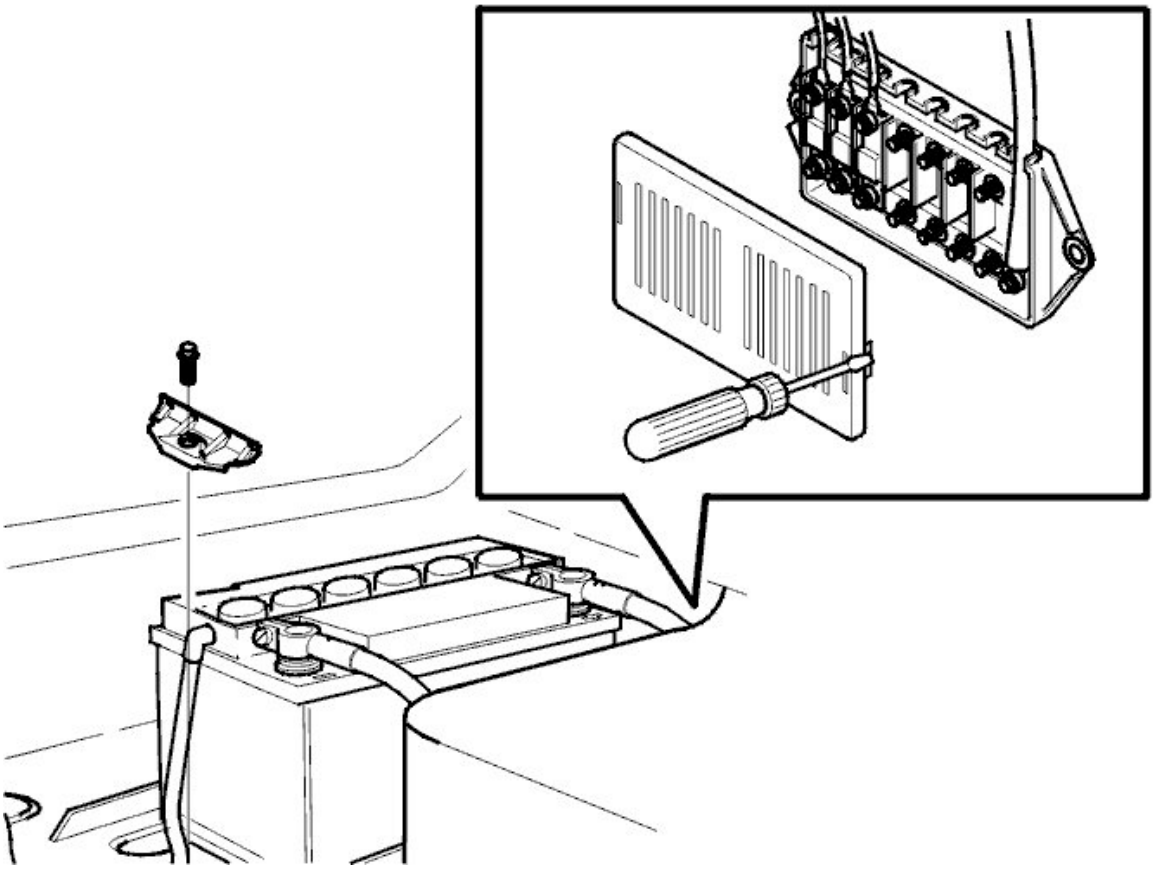
Check the voltage to ground at the following points:

Rear main fuse.
Rear fuse.
The voltage must be at least battery voltage minus 3 V.
Check that the fuses are intact.
Remedy as necessary.

Other information:

- For information about the fuses and ground terminals, see the applicable wiring diagram.


V



Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Was the fault found?

Yes - Verification

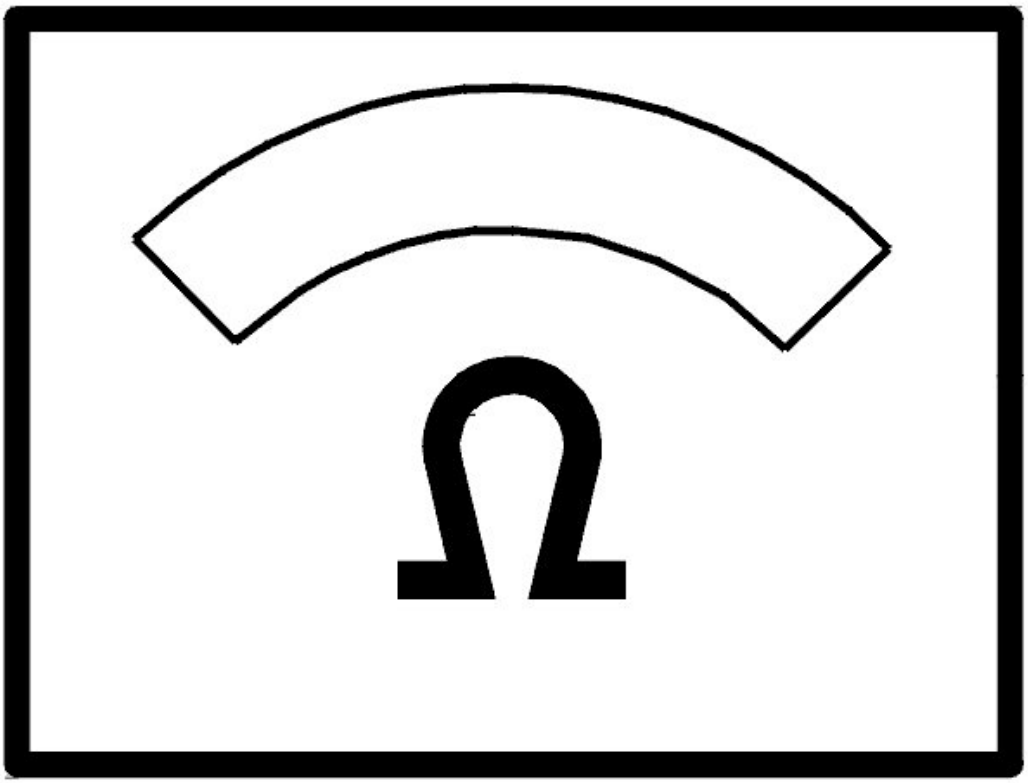
No - Checking the power supply and ground on the Accessory Electronic Module (AEM)

Checking the power supply and ground on the Accessory Electronic Module (AEM)

Check the power supply to the Accessory Electronic Module (AEM). Check between the breakout box terminals for the power supply (#52) and ground (#51). The voltage must be at least battery voltage minus 3 V.
Check the control module connector. Check for contact resistance and oxidation. Check for loose connections. Check for damage carefully.
Check the wiring between the Accessory Electronic Module (AEM) (breakout box for ground terminal #51) and ground. Check for an open-circuit.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For information about the fuses and ground terminals, see the applicable wiring diagram.



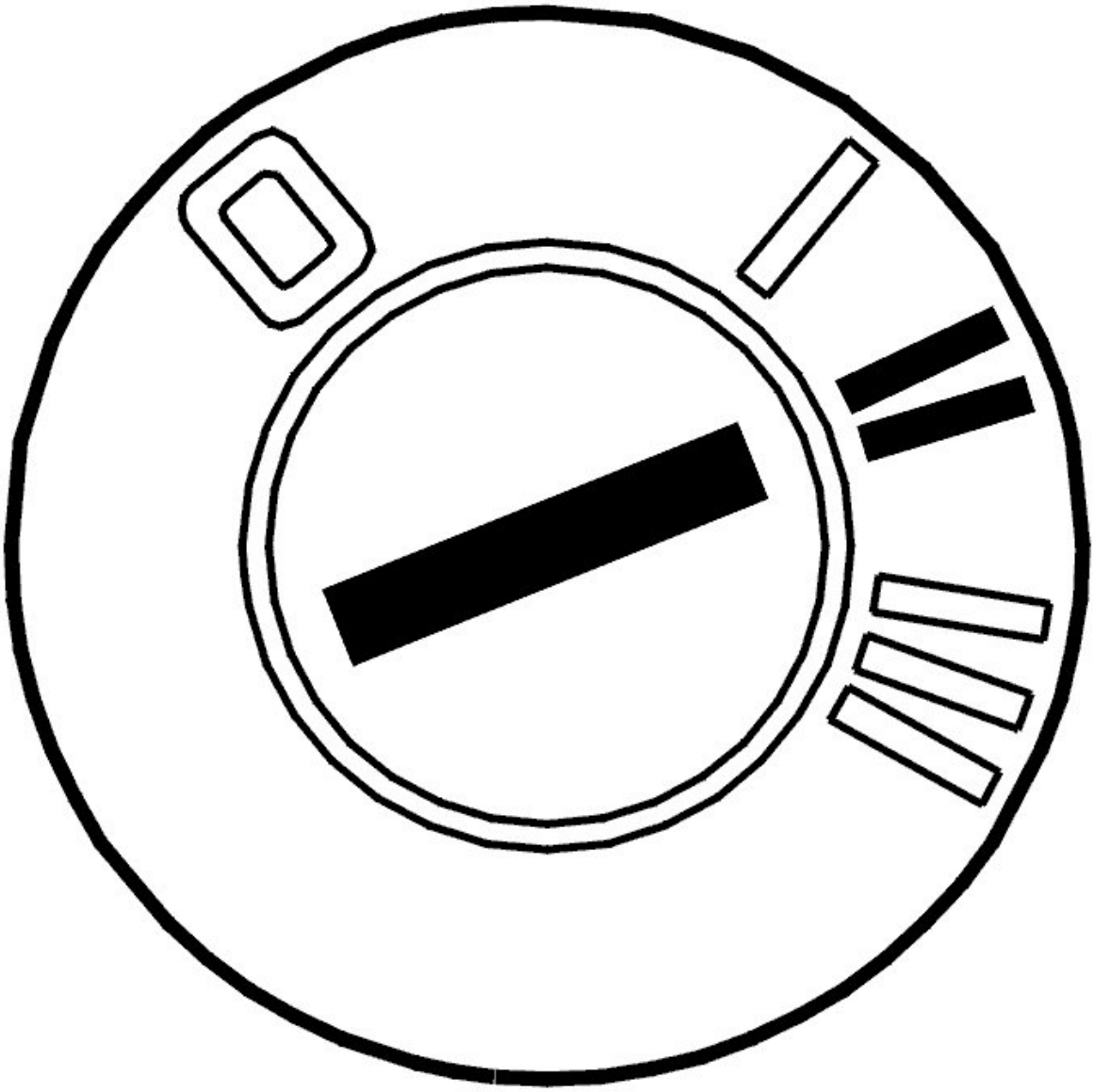
Continue - Verification

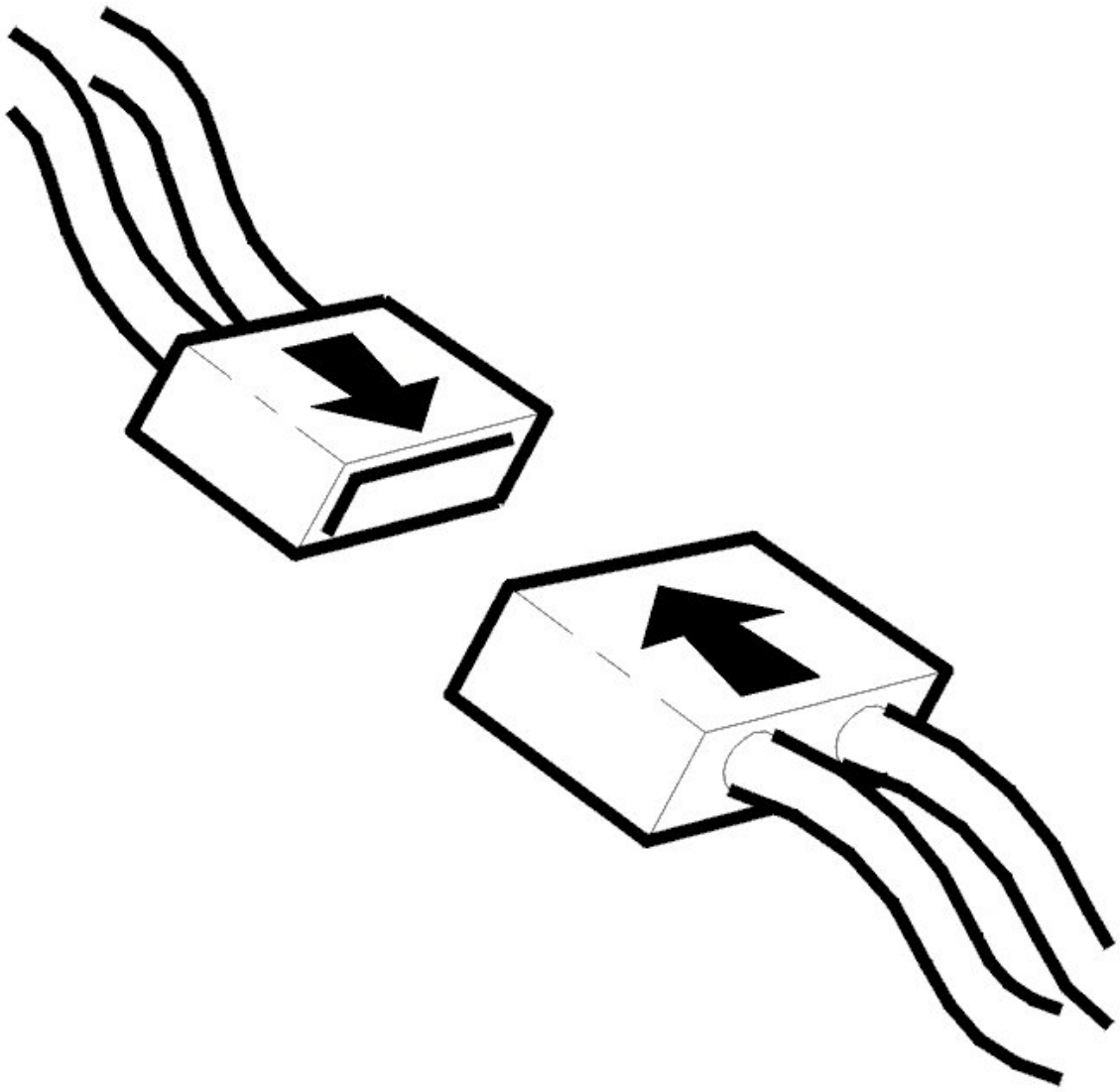
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Read off the power supply for the accessory electronic module by clicking on the VCT2000 symbol.
The voltage must be at least battery voltage minus three volts.

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

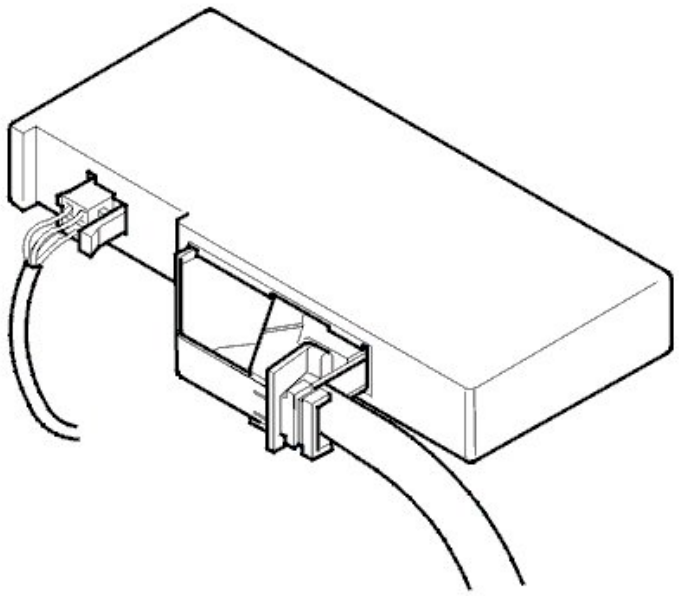
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the power supply

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D0A

Condition



The diagnostic trouble code (DTC) is stored if the control module registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is off. Therefore the ignition must be switched on again so that the diagnostic trouble code (DTC) can be read off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- Accessories connected to the control module do not function.

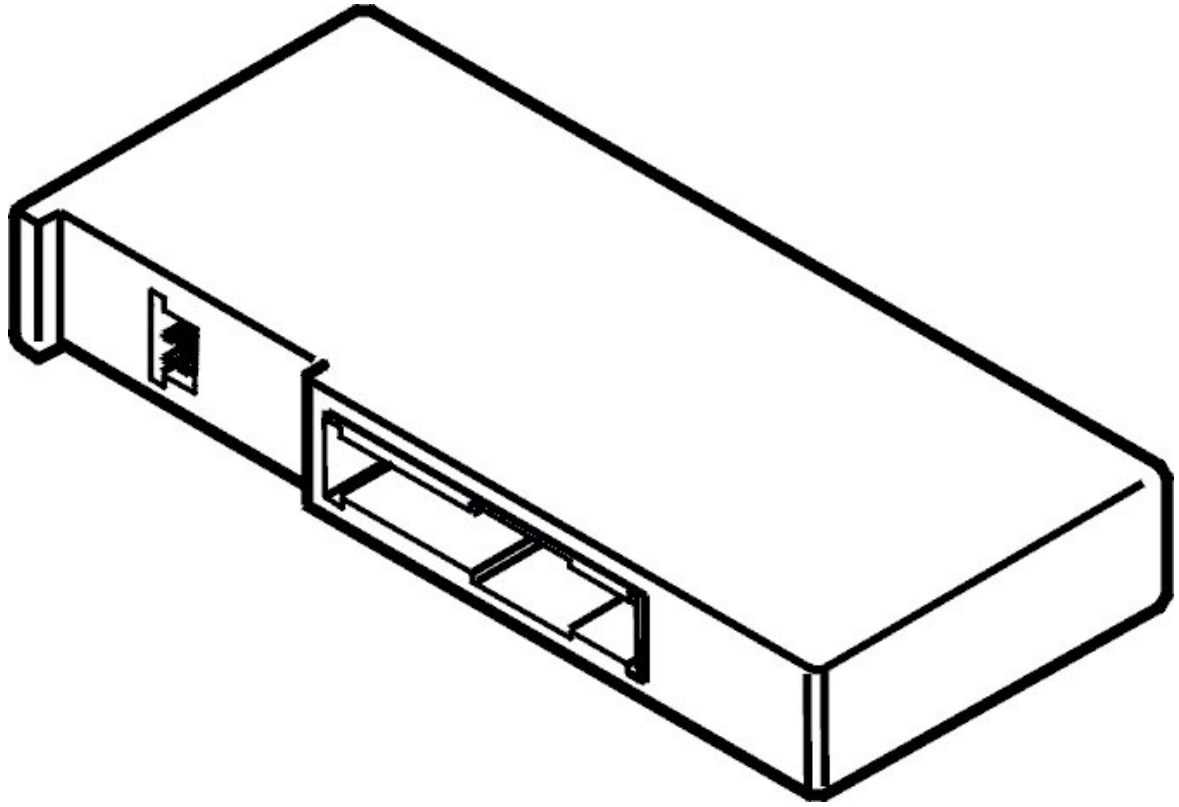
Internal Fault

Internal fault

Replacing the Accessory Electronic Module (AEM)

The Accessory Electronic Module (AEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can occur for a number of different reasons.

The fault is evaluated depending on how it occurs. Replace the Accessory Electronic Module (AEM) if the fault recurs.
Replace the Accessory Electronic Module (AEM) if the fault is permanent. See Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module.
Remedy as necessary.

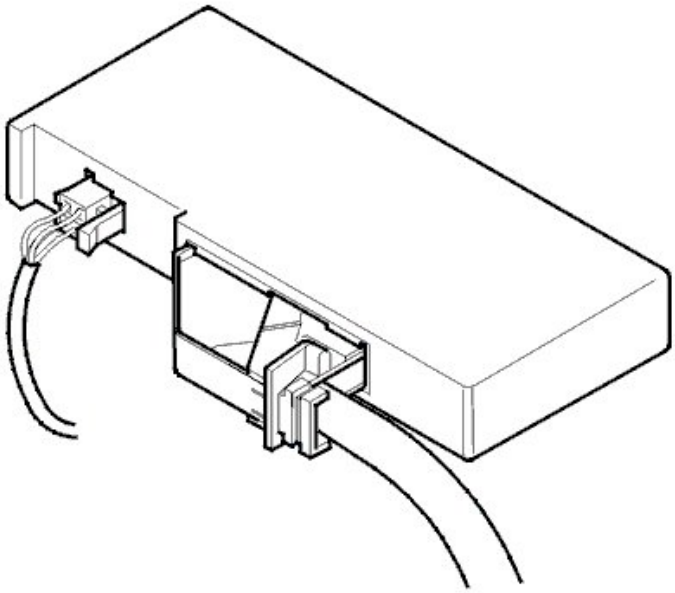


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D01

Condition



The diagnostic trouble code (DTC) is stored if the control module registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is off. Therefore the ignition must be switched on again so that the diagnostic trouble code (DTC) can be read off.

Substitute value

- None.

Possible source
- Internal fault in the control module.

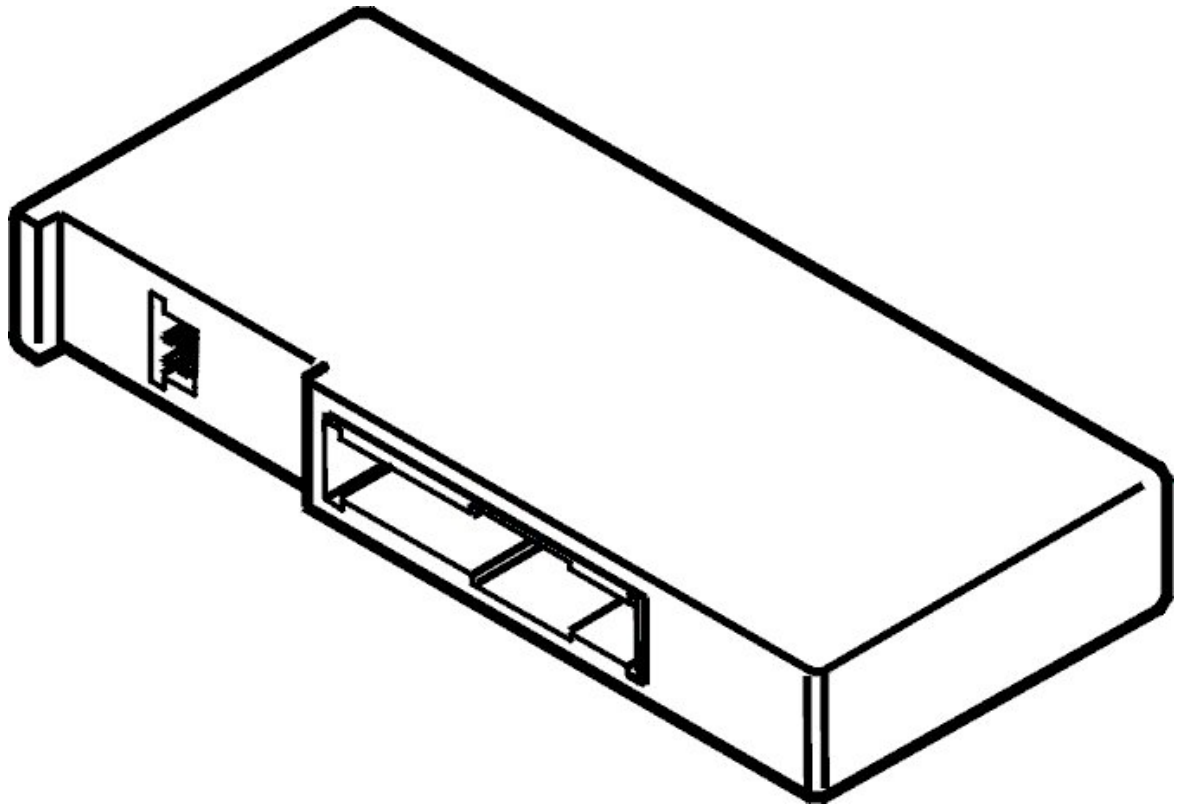
Fault symptom[s]
- Accessories connected to the control module do not function.

Internal Fault

Internal fault

Replacing the Accessory Electronic Module (AEM)

The Accessory Electronic Module (AEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can occur for a number of different reasons. The fault is evaluated depending on how it occurs. Replace the Accessory Electronic Module (AEM) if the fault recurs.
Replace the Accessory Electronic Module (AEM) if the fault is permanent. See Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module.
Remedy as necessary.

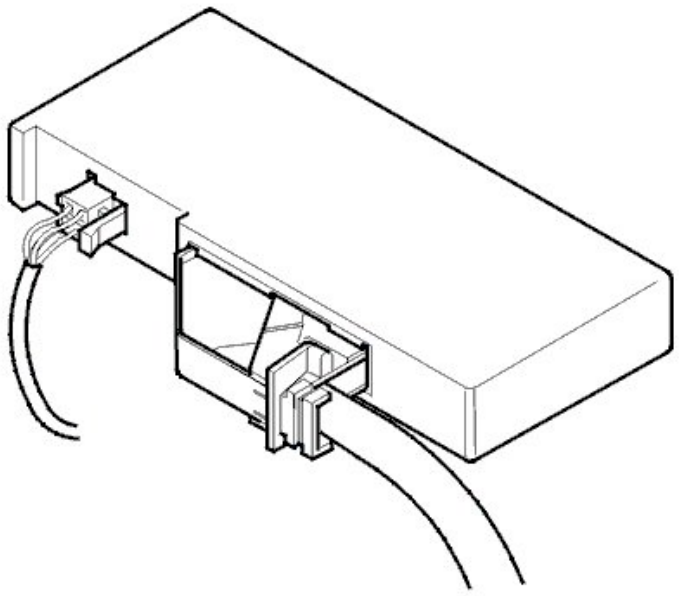


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D02

Condition



The diagnostic trouble code (DTC) is stored if the control module registers a fault in the software.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- Accessories connected to the control module do not function.

Internal Fault

Internal fault

Reloading the software in the control module

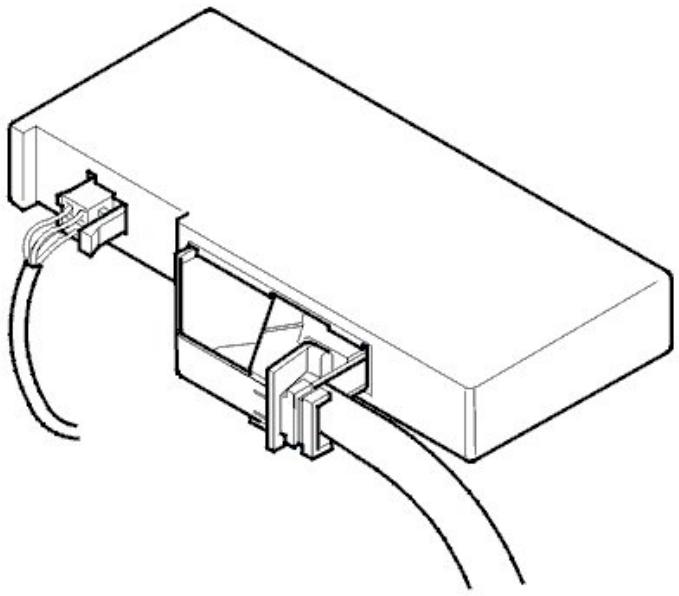
The control module has registered an internal fault in the software.
Remedy the fault by reloading the software. First download the software for the accessory electronic module. Then download the software for the connected accessories.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D03

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the programming is faulty or incomplete.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Software download not complete.

Fault symptom[s]
- Accessories connected to the control module do not function.

Internal Fault

Internal fault

Reloading the software in the control module

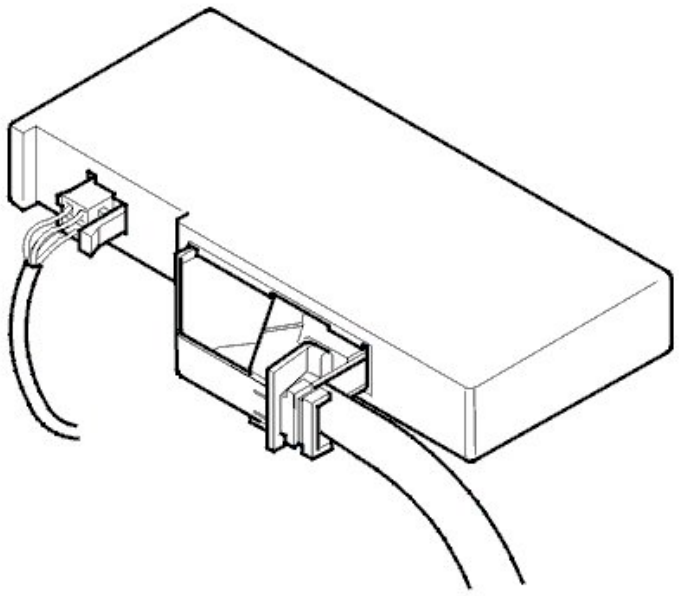
The control module has registered an internal fault in the software.
Remedy the fault by reloading the software. First download the software for the accessory electronic module. Then download the software for the connected accessories.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D07

Condition



The diagnostic trouble code (DTC) is stored if the control module registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is off. Therefore the ignition must be switched on again so that the diagnostic trouble code (DTC) can be read off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

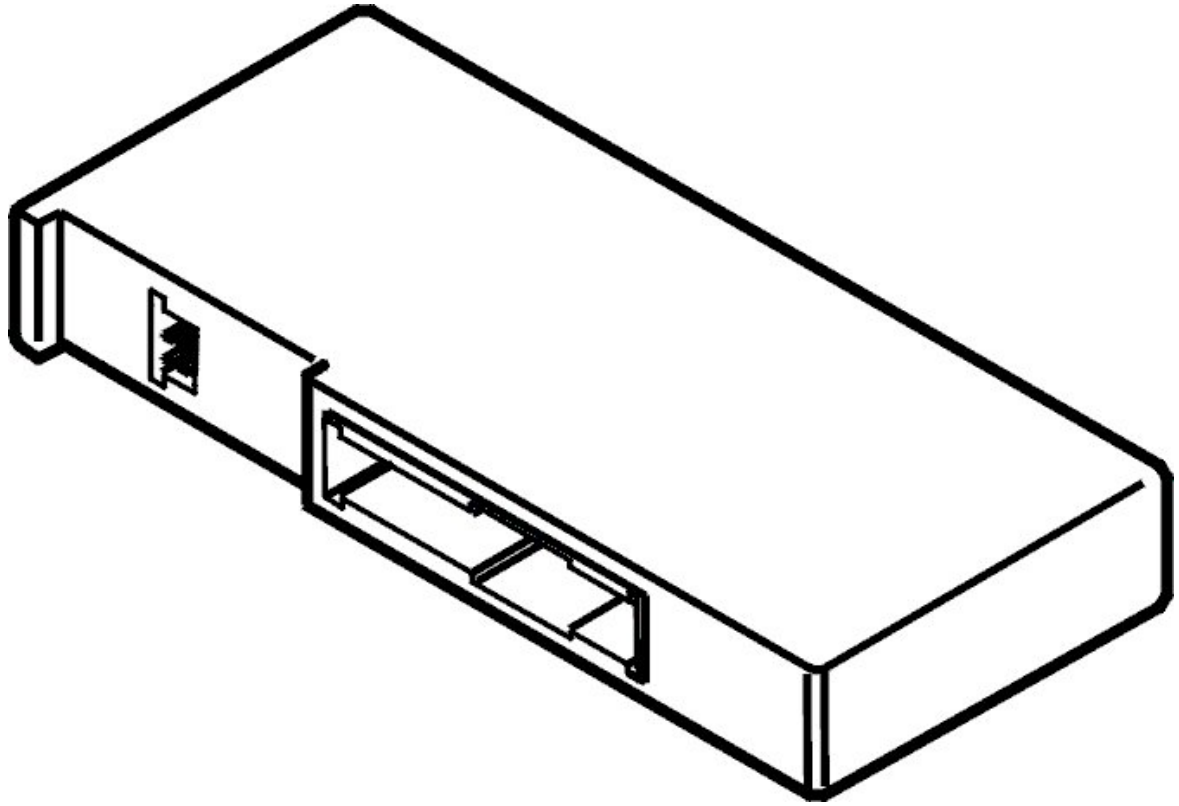
Fault symptom[s]
- Accessories connected to the control module do not function.

Internal Fault

Internal fault

Replacing the Accessory Electronic Module (AEM)

The Accessory Electronic Module (AEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can occur for a number of different reasons. The fault is evaluated depending on how it occurs. Replace the Accessory Electronic Module (AEM) if the fault recurs.
Replace the Accessory Electronic Module (AEM) if the fault is permanent. See Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module.
Remedy as necessary.

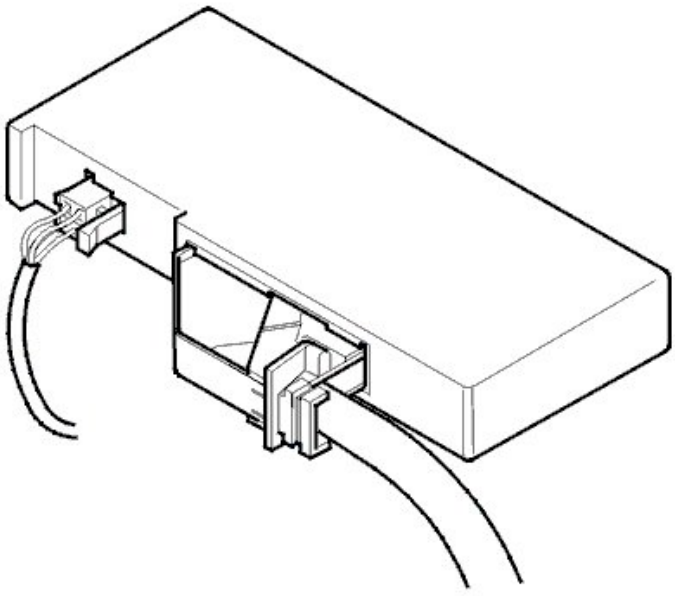


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-1D08

Condition



The diagnostic trouble code (DTC) is stored if the control module registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]

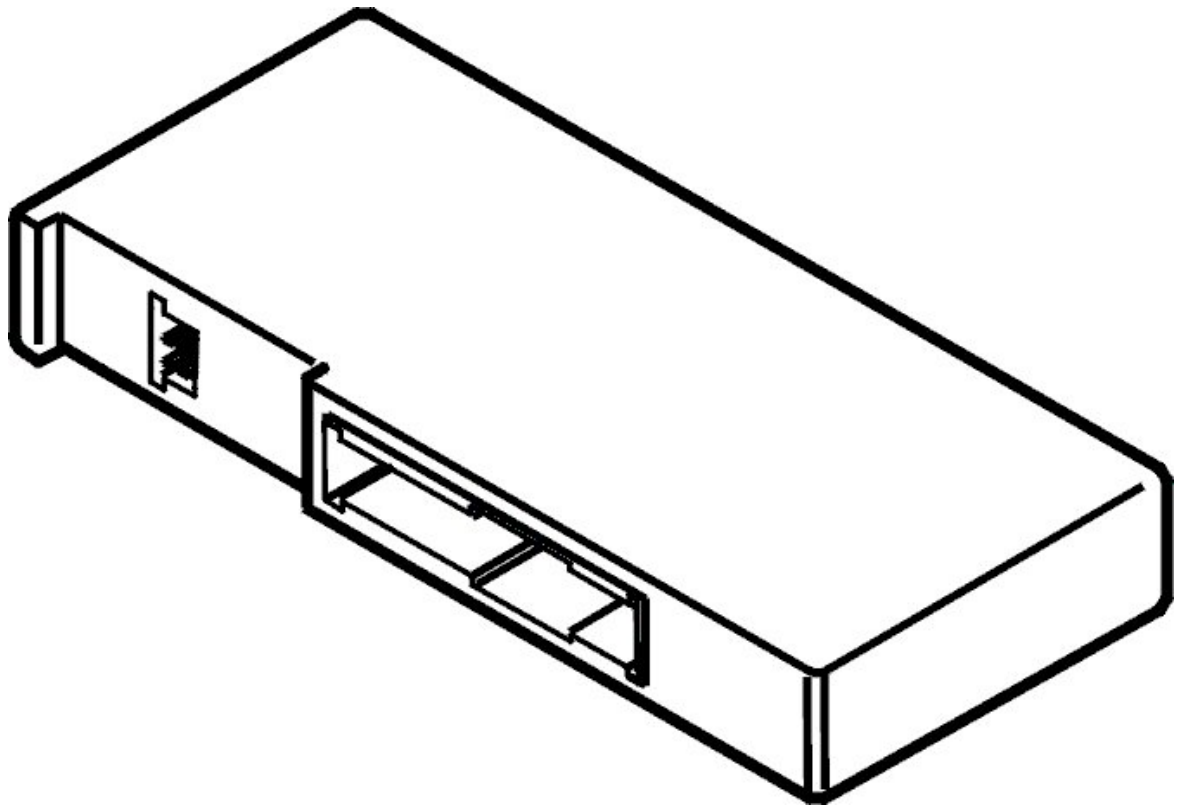
- Accessories connected to the control module do not function.

Internal Fault

Internal fault

Replacing the Accessory Electronic Module (AEM)

The Accessory Electronic Module (AEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can occur for a number of different reasons. The fault is evaluated depending on how it occurs. Replace the Accessory Electronic Module (AEM) if the fault recurs.
Replace the Accessory Electronic Module (AEM) if the fault is permanent. See Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module.
Remedy as necessary.



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-5F10 is stored if the control module registers that the signal is too low in the signal cable to the relay for the electrical engine block heater.
Diagnostic trouble codes (DTCs) can be diagnosed when the ignition is on and the relay for the electrical engine block heater is activated.

Substitute value
- The relay for the electrical engine block heater shuts down until the next time the ignition is switched on.

Possible source
- Short-circuit to ground in the signal cable to the relay for the electrical engine block heater
- Defective relay for the electrical engine block heater.

Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too Low

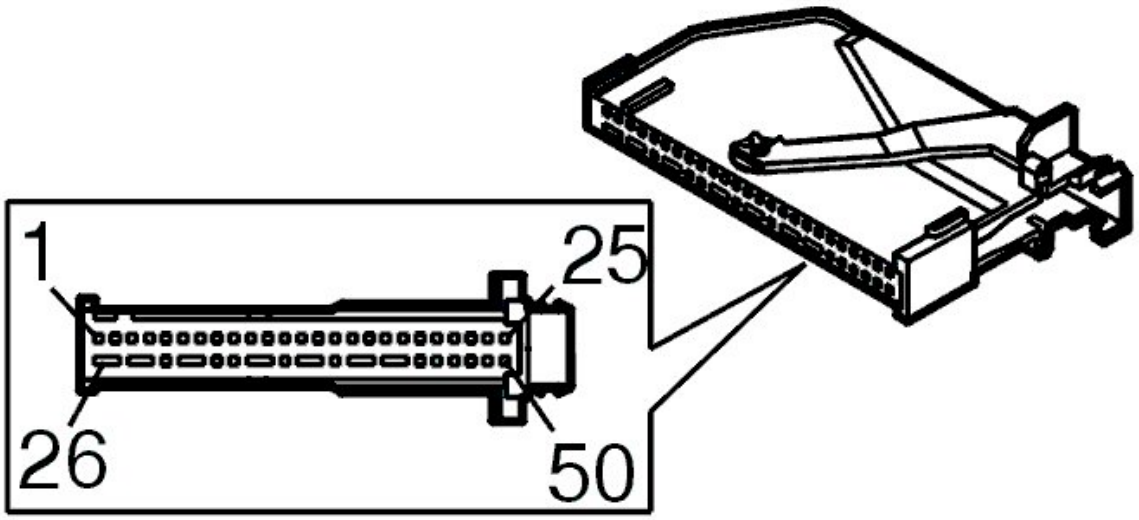
Signal too low

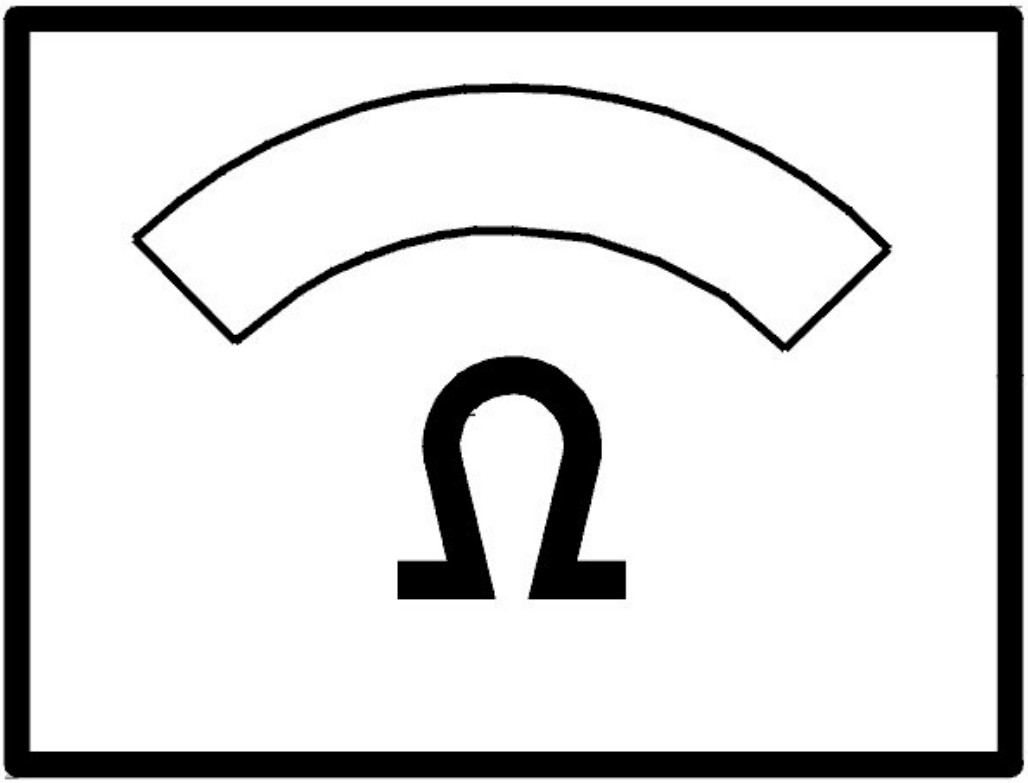
Checking components and wiring

Check the signal cable to the relay for the electric engine block heater. Check between accessory control module terminal #B5 and the connector for the relay. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To access and replace the relay for the electric engine block heater, see Relay electrical engine block heater, replacing See: Engine, Cooling and Exhaust/Engine/Cylinder Block Assembly/Engine Block Heater/Service and Repair
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





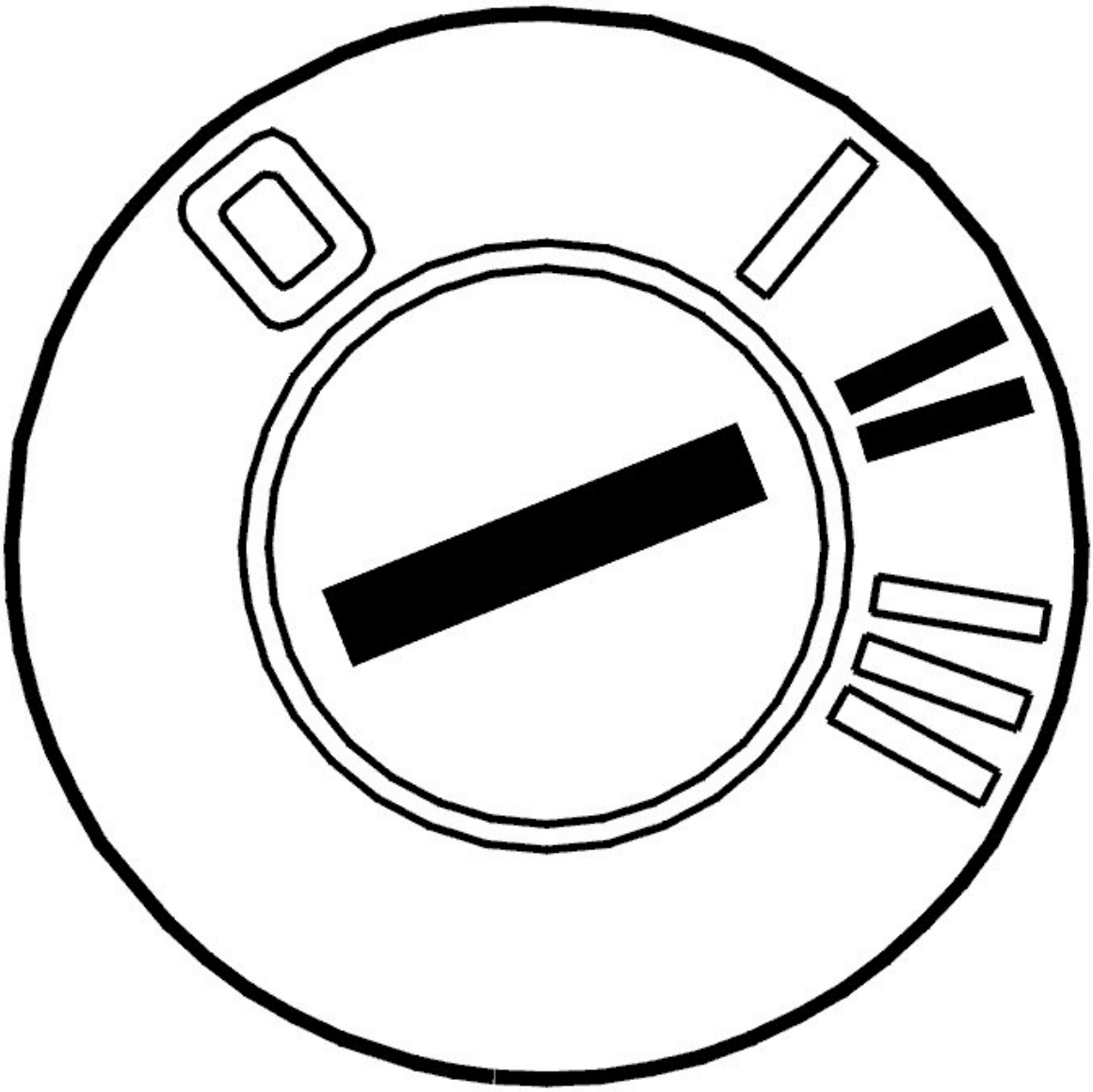
Continue - Verification

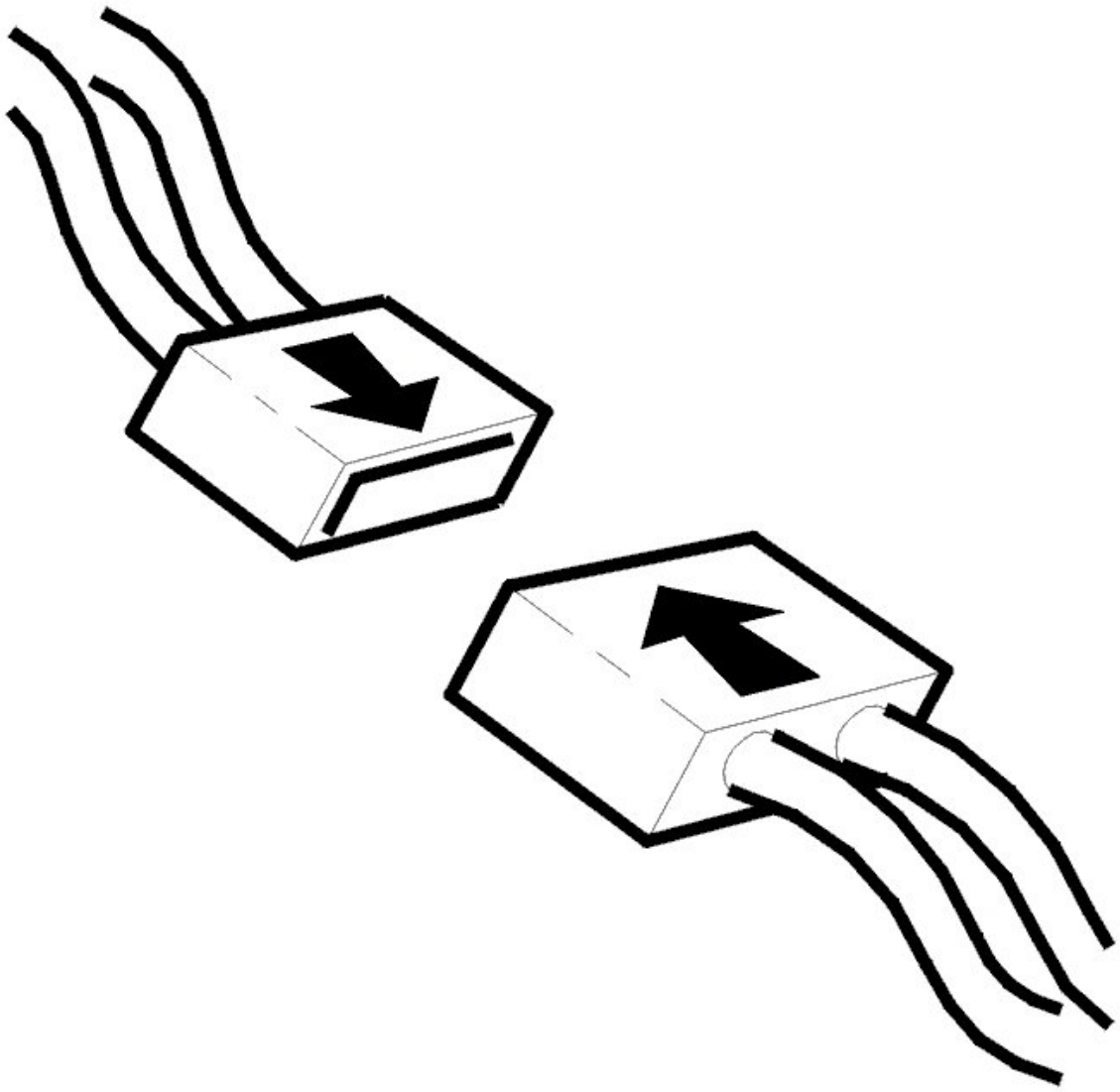
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the electric engine block heater.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-5F11 is stored if the control module registers that the signal is too high or if there is an open-circuit in the cable to the relay for the electrical engine block heater.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the relay for the electrical engine block heater is not activated.

Substitute value
- The relay for the electrical engine block heater is switched off.

Possible source
- Short-circuit to supply voltage in the signal cable for the relay for the electrical engine block heater
- Open-circuit in the signal cable for the relay for the electrical engine block heater
- Open-circuit in the ground cable for the relay for the electrical engine block heater
- Defective relay for the electrical engine block heater.

Fault symptom[s]
- Poor heating in the passenger compartment.

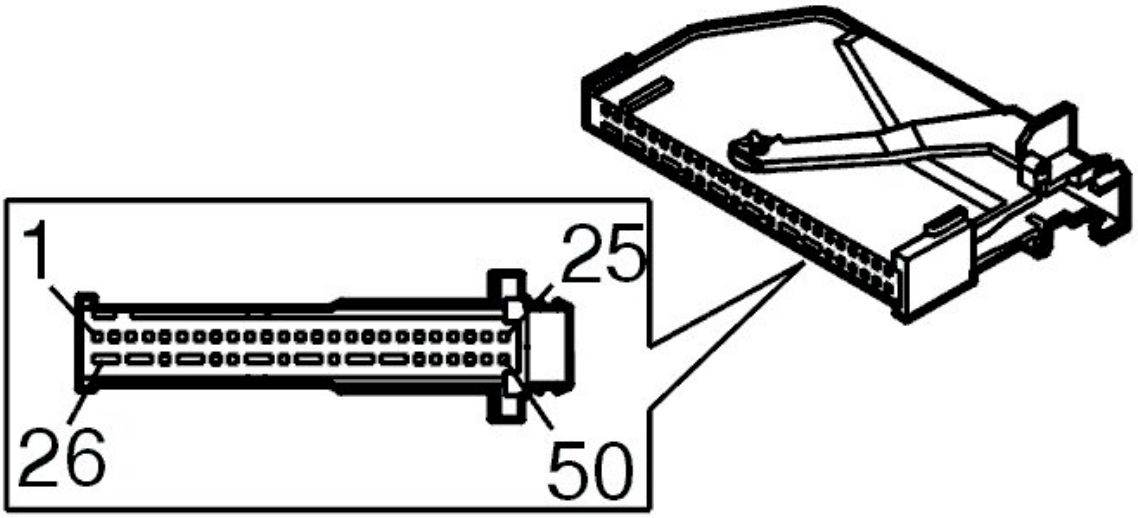
Signal Too High / Signal Missing

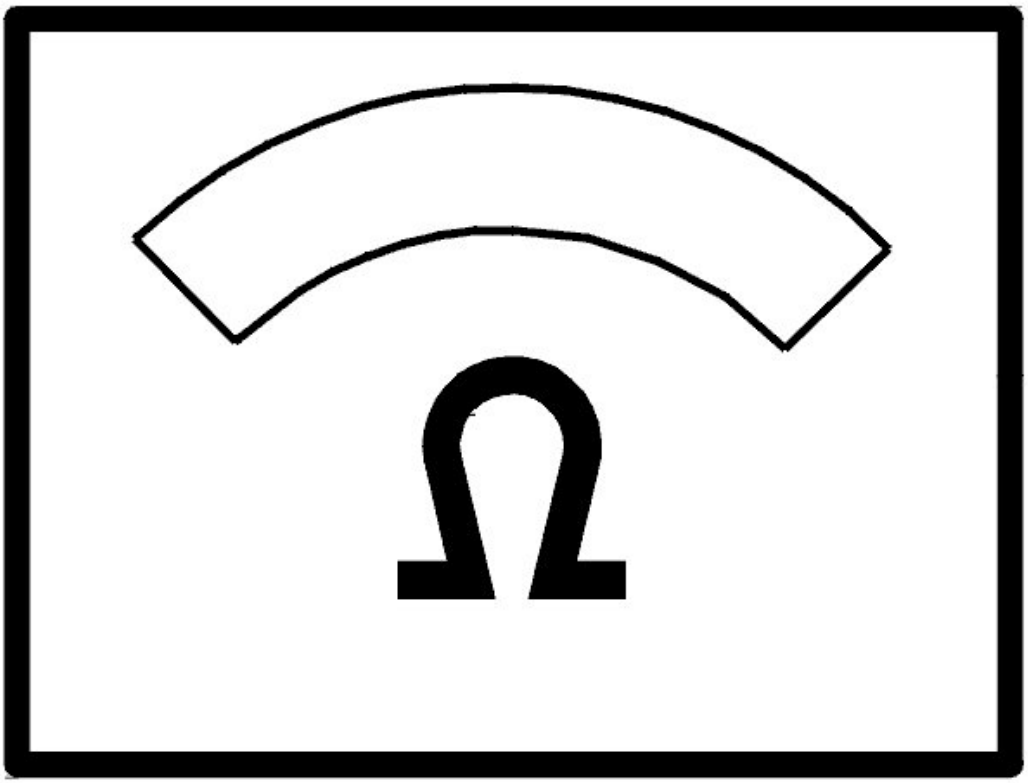
Signal too high / Signal missing

Checking components and wiring

Check the signal cable for the relay for the electric engine block heater. Check between accessory control module terminal #B5 and the connector for the relay. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead for the relay for the electric engine block heater. Check between accessory control module terminal #B4 and the connector for the relay. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To access and replace the relay for the electric engine block heater, see Relay electrical engine block heater, replacing See: Engine, Cooling and Exhaust/Engine/Cylinder Block Assembly/Engine Block Heater/Service and Repair
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





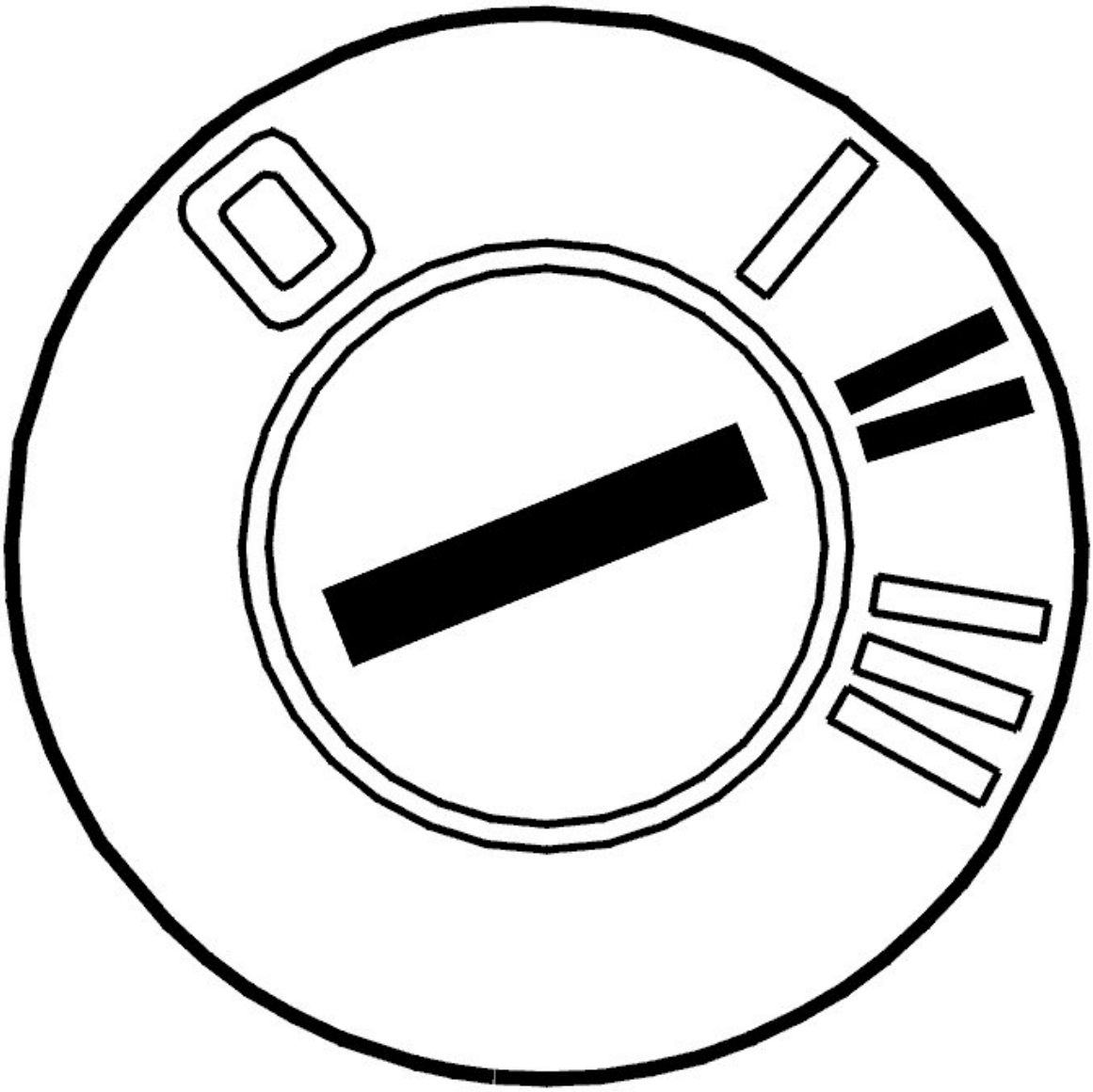
Continue - Verification

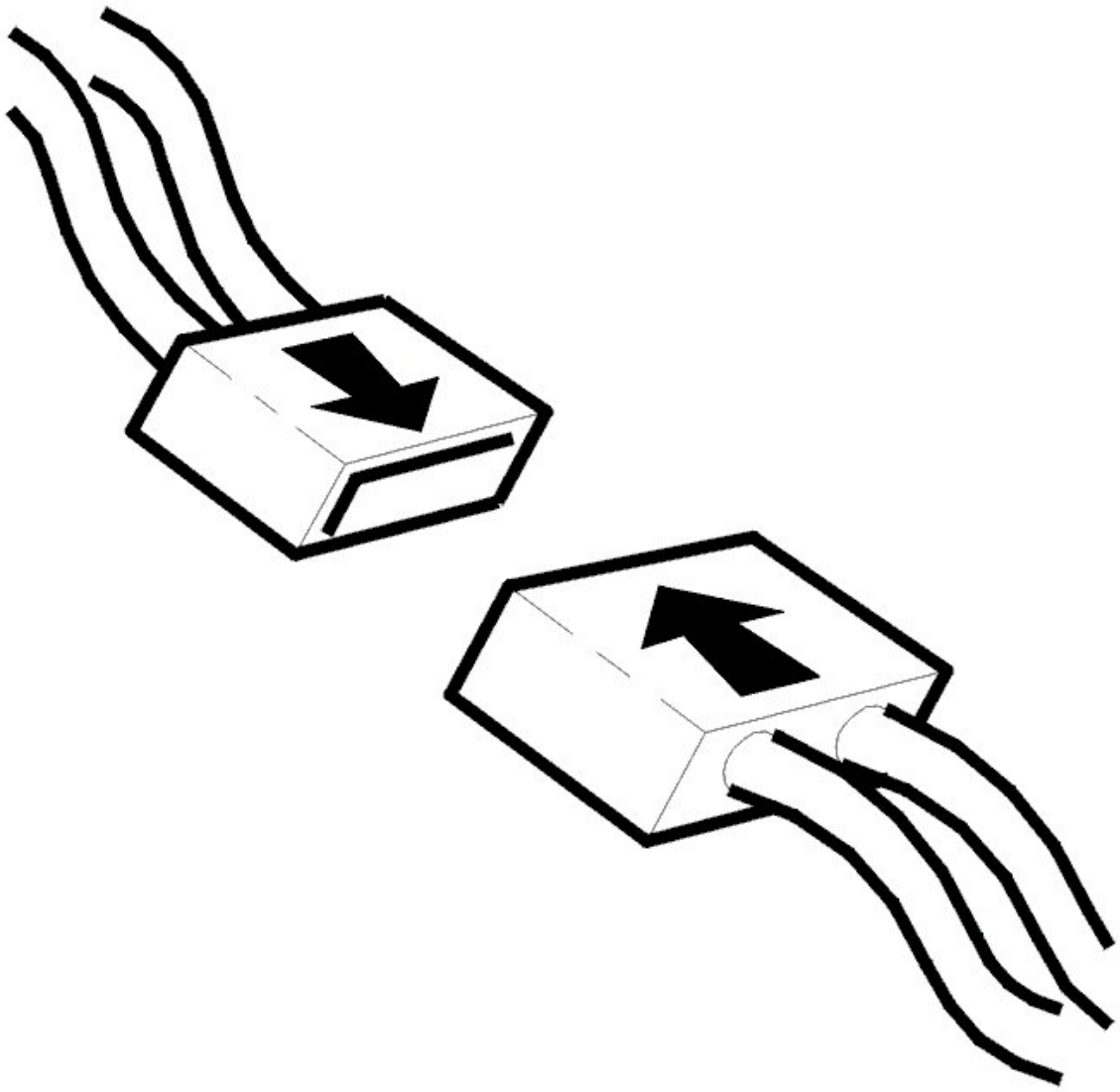
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the electric engine block heater.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-5F20 is stored if the control module registers that the signal is too low in the power supply for the remote start unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the remote start unit is activated (the remote start unit is always activated).

Substitute value
- None.

Possible source
- Short-circuited to ground in the power supply cable for the remote start unit
- Defective remote start unit.

Fault symptom[s]
- The parking heater does not operate.

Signal Too Low

Signal too low

Checking components and wiring

Check the power supply cable between accessory control module terminal #B1 and the remote start unit connector. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the accessory electronic module and connector, see Replacing the accessory electronic module, B5244T5, B5254T2 See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
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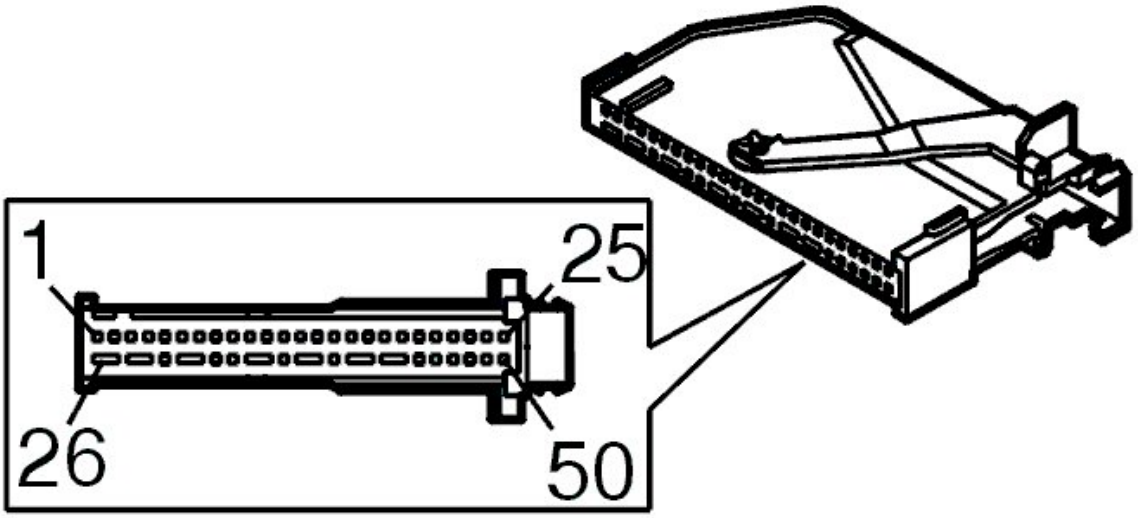
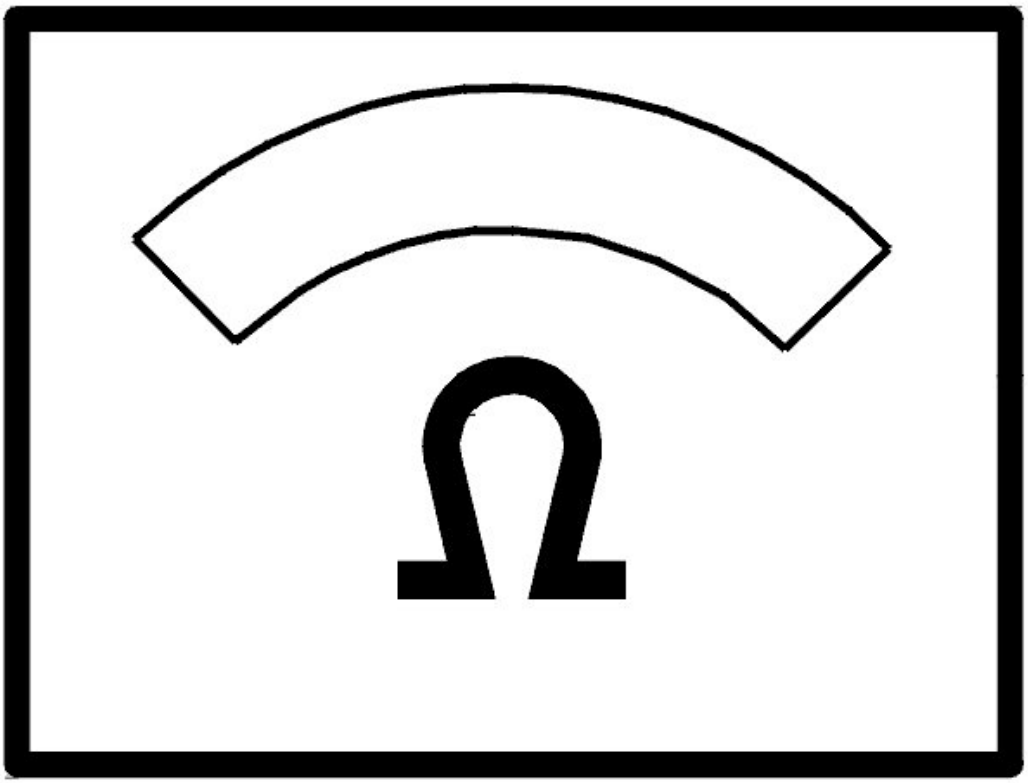
- To access or replace the remote start unit, see Replacing the remote starter unit See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Transceiver/Service and Repair
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





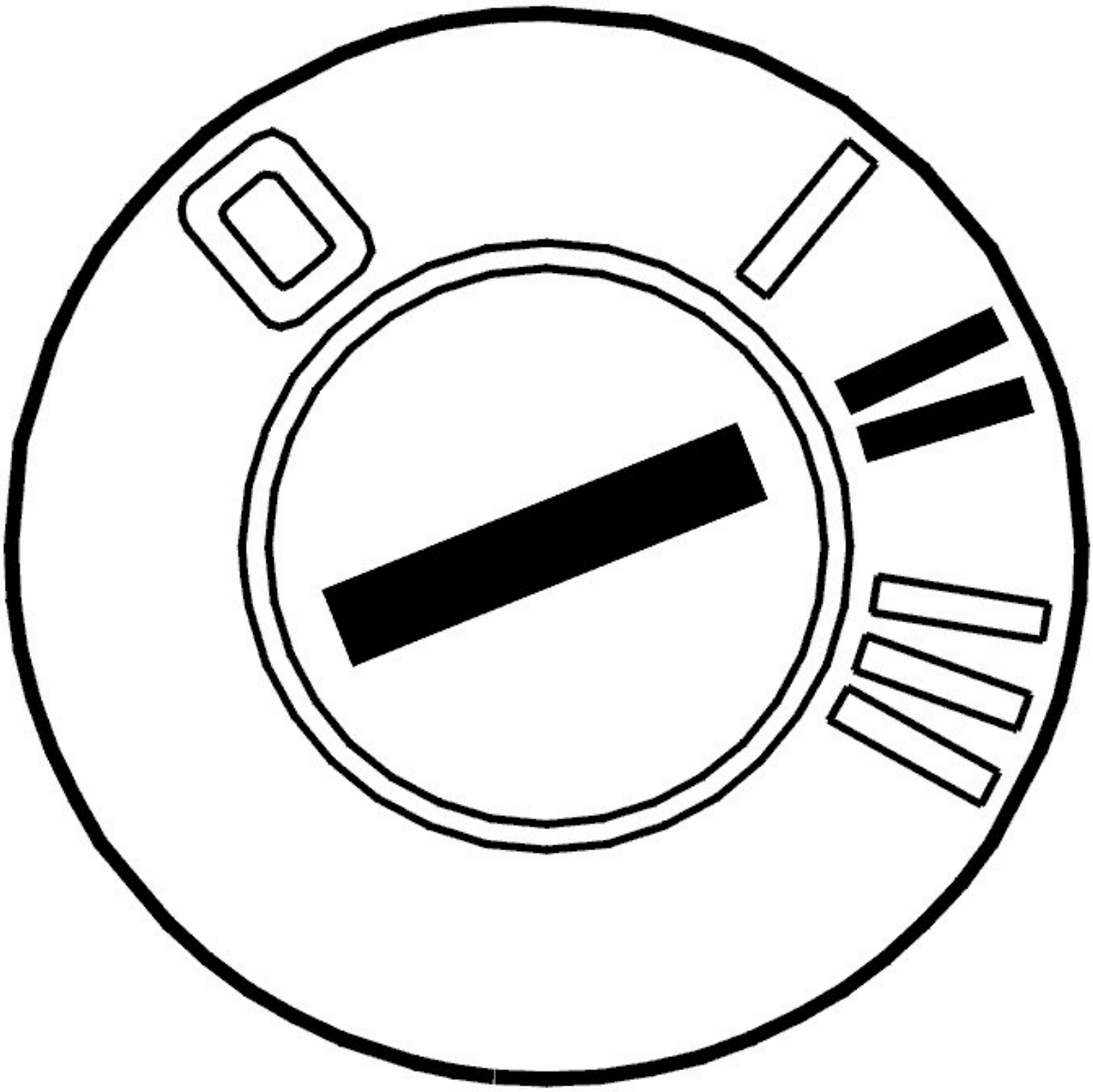
Continue - Verification

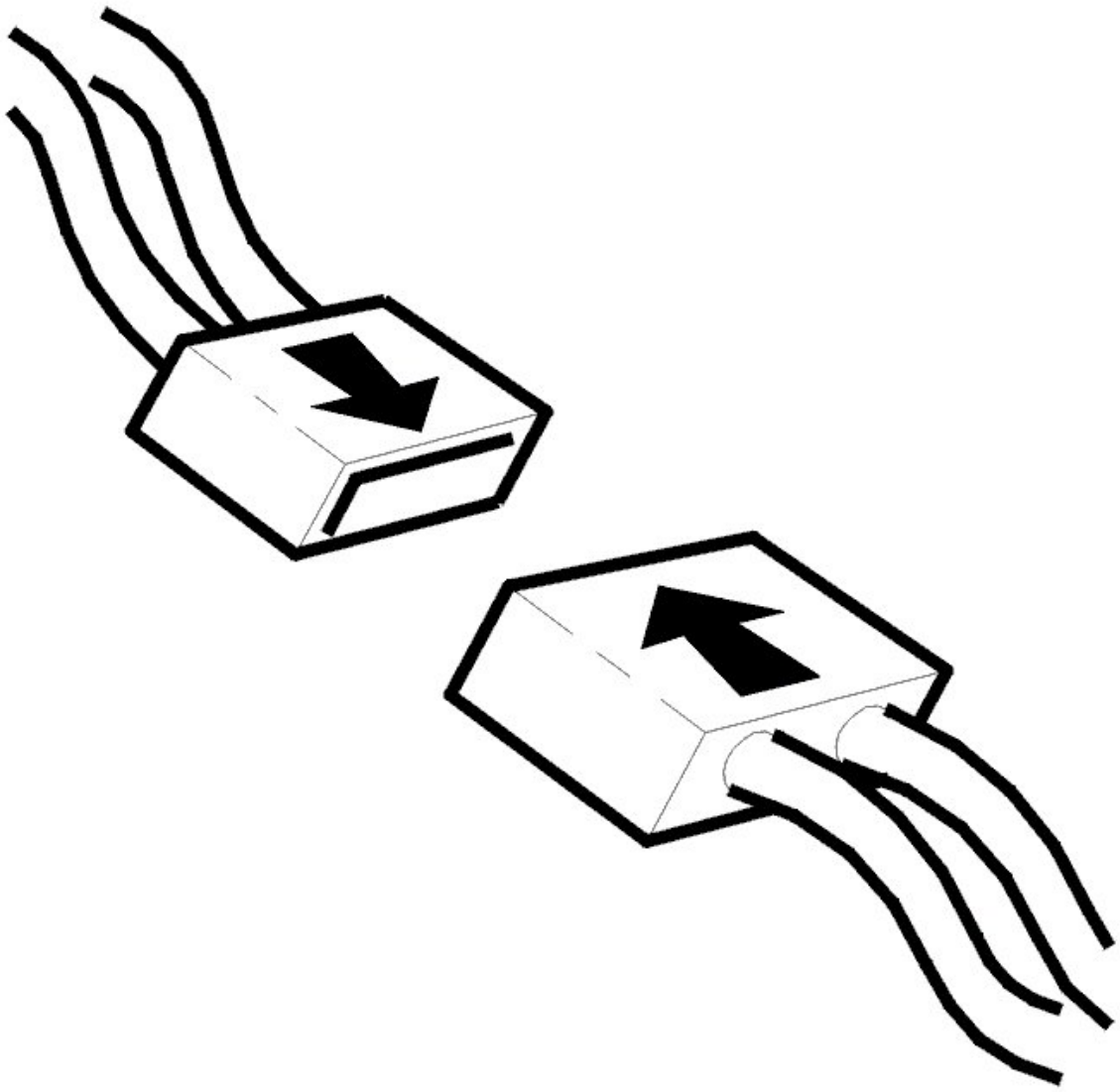
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the remote start function in the accessory electronic module by clicking on the VCT2000 symbol.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-5F22 is stored if the control module registers that the signal is too low in the signal cable from the remote start unit for more than 3 seconds, when the function is activated. The function is activated when the remote start unit receives a start signal from an external transmitter.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable for the remote start unit
- Defective remote start unit.

Fault symptom[s]
- The parking heater does not operate.

Signal Too Low

Signal too low

Checking components and wiring

Check the signal cable to the remote start unit. Check between accessory control module terminal #B3 and the remote start unit connector. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the accessory electronic module and connector, see Replacing the accessory electronic module, B5244T5, B5254T2 See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
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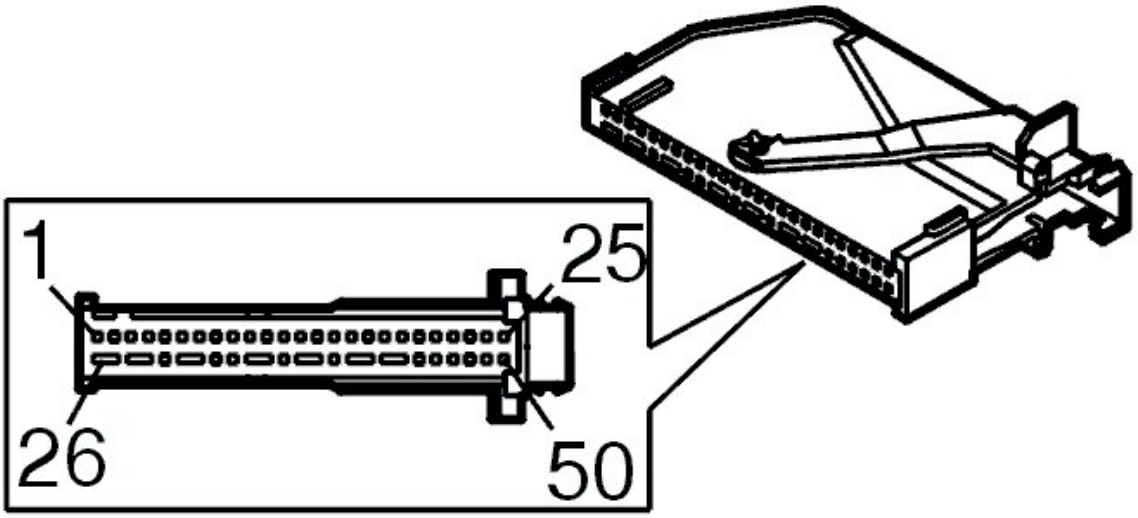
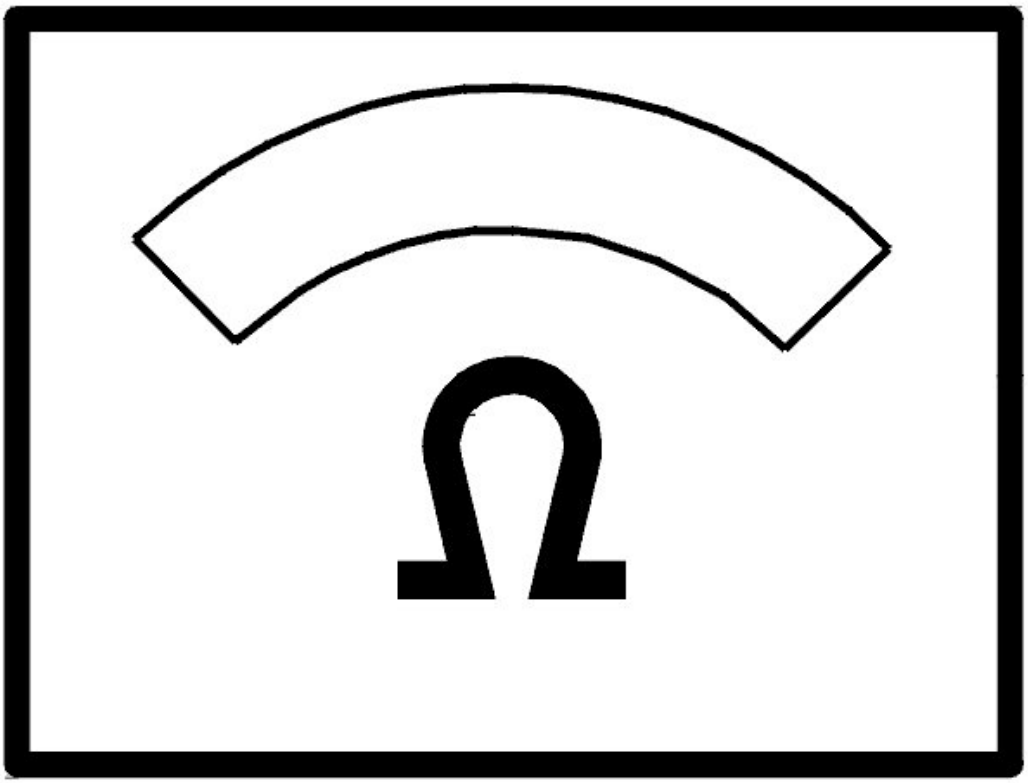
- To access the remote start unit, see Replacing the remote starter unit See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Transceiver/Service and Repair
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





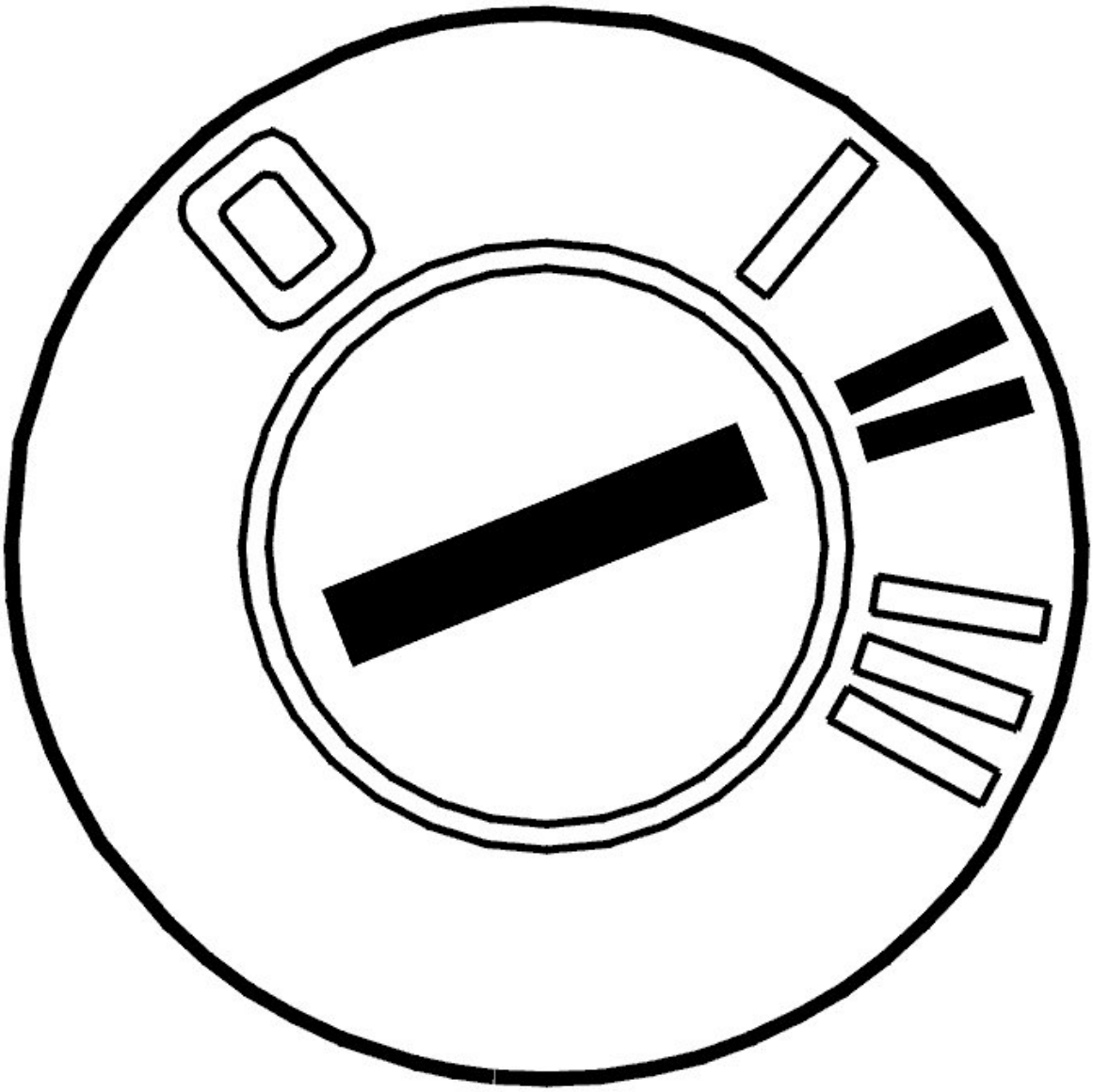
Continue - Verification

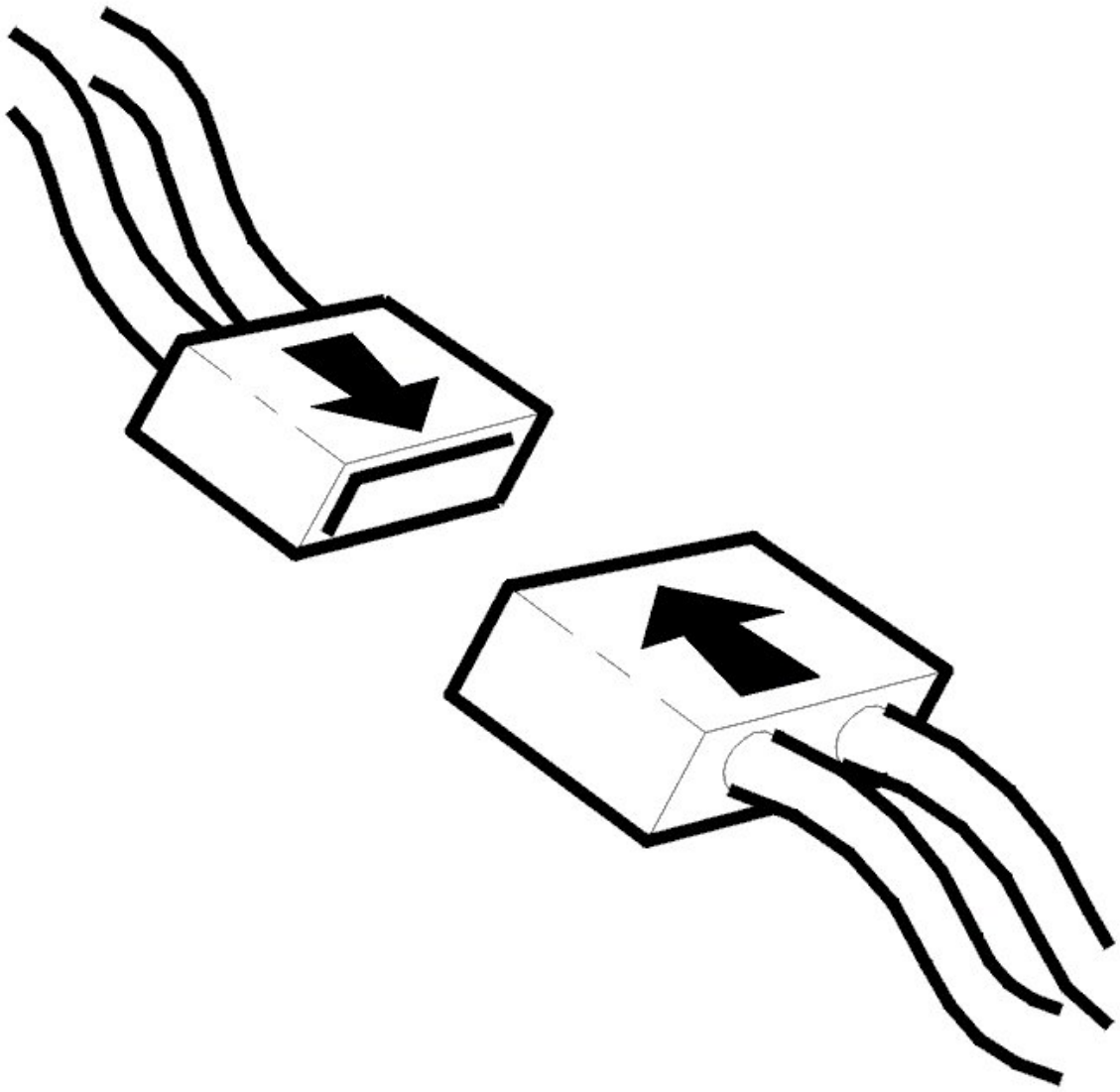
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the remote start function in the accessory electronic module by clicking on the VCT2000 symbol.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-5F23 is stored if the control module registers that the signal is too high in the signal cable from the remote start unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable for the remote start unit
- Defective remote start unit.

Fault symptom[s]
- The parking heater does not operate.

Signal Too High

Signal too high

Checking components and wiring

Check the signal cable for the remote start unit. Check between accessory control module terminal #B3 and the remote start unit connector. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
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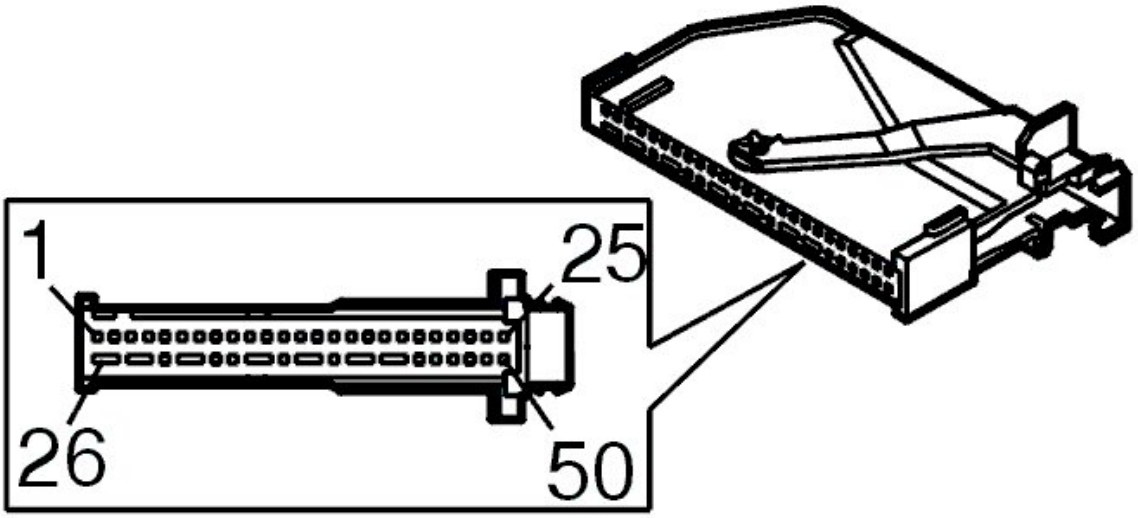
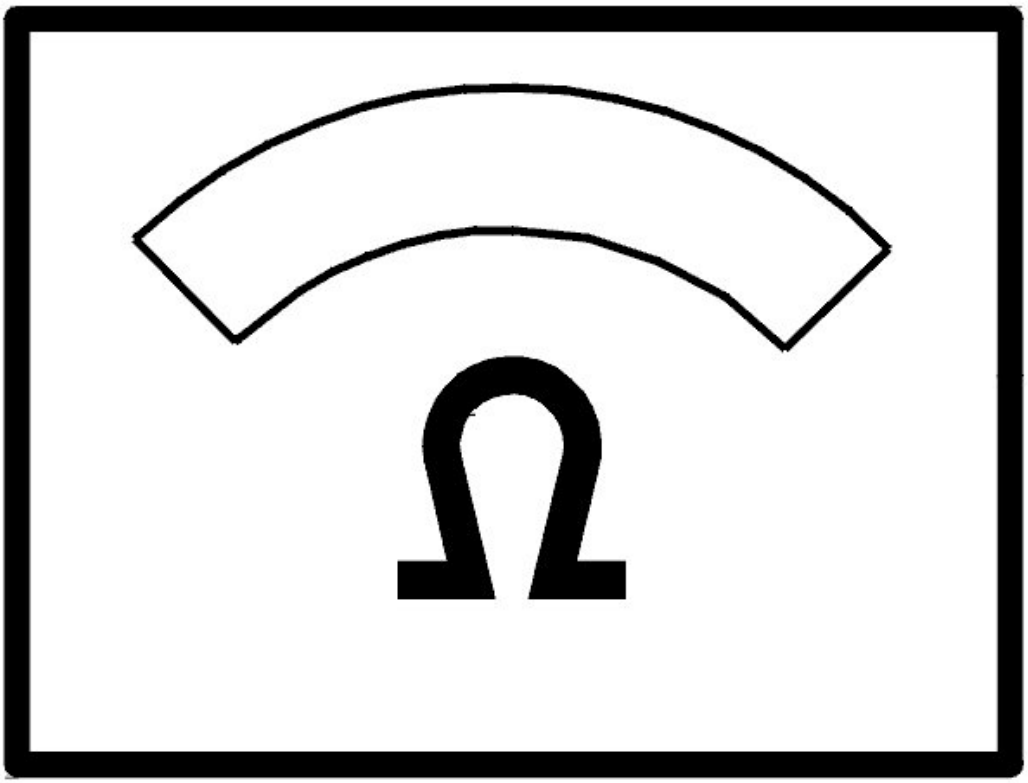




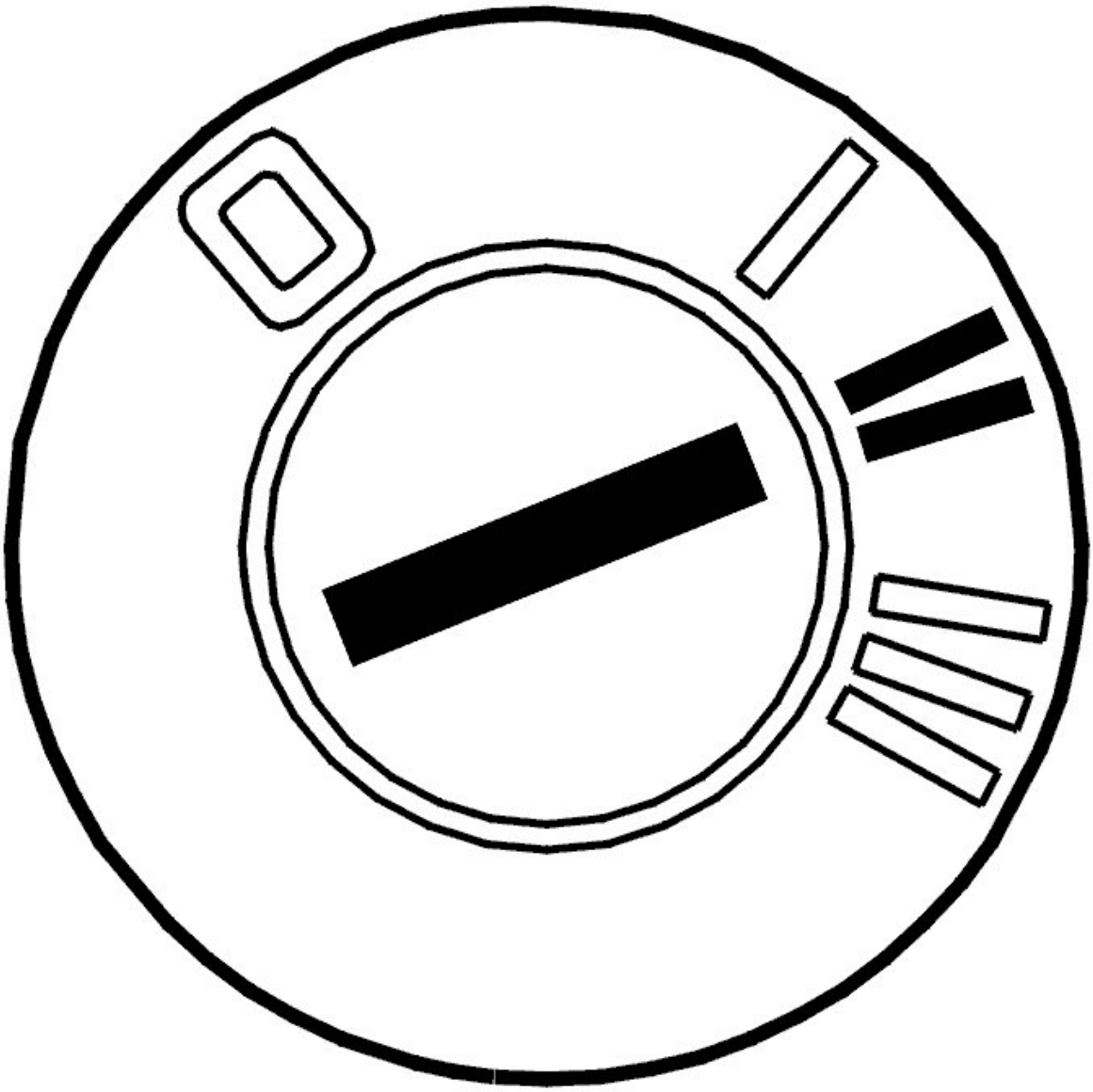
Continue - Verification

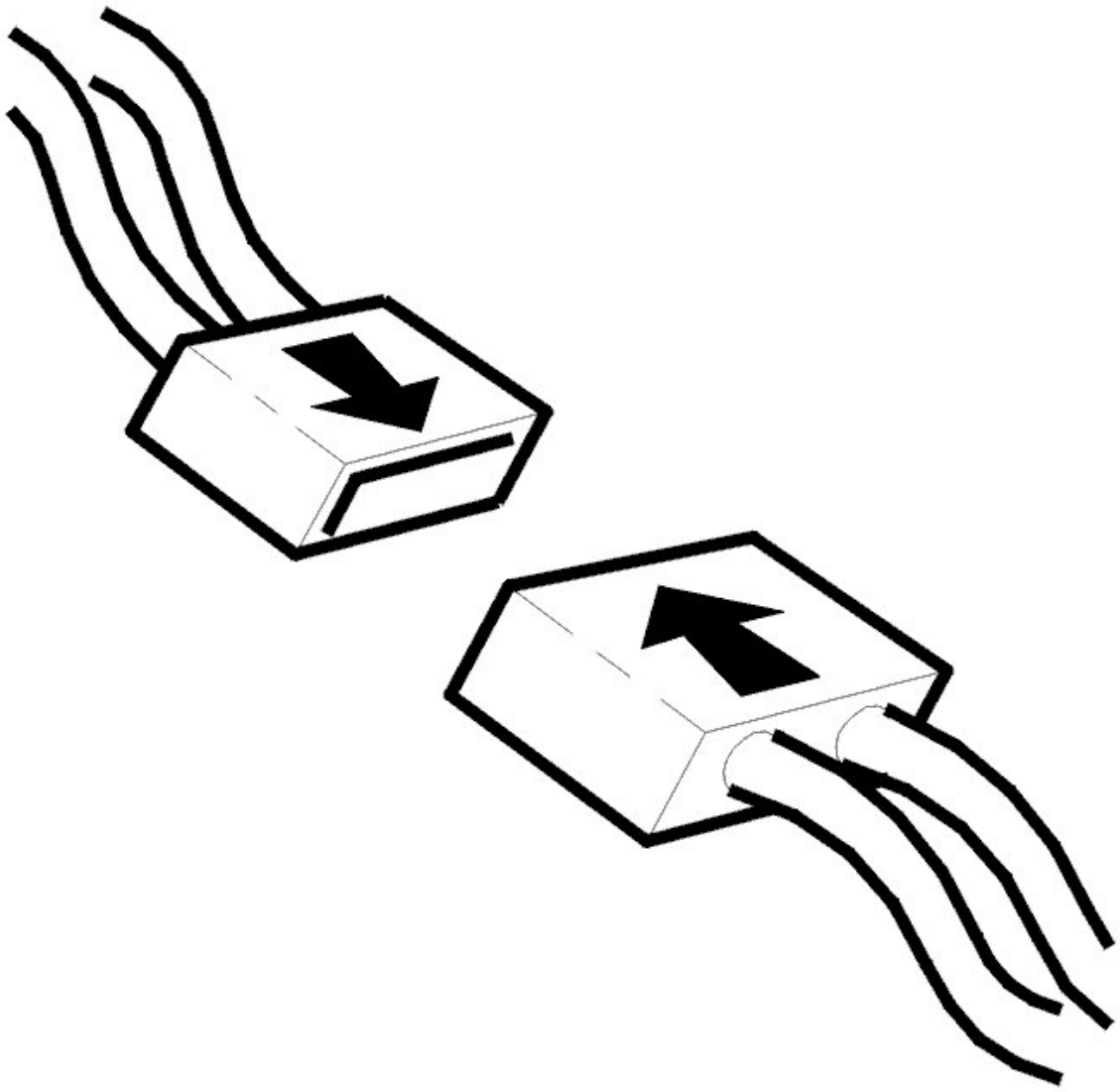
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the remote start function in the accessory electronic module by clicking on the VCT2000 symbol.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

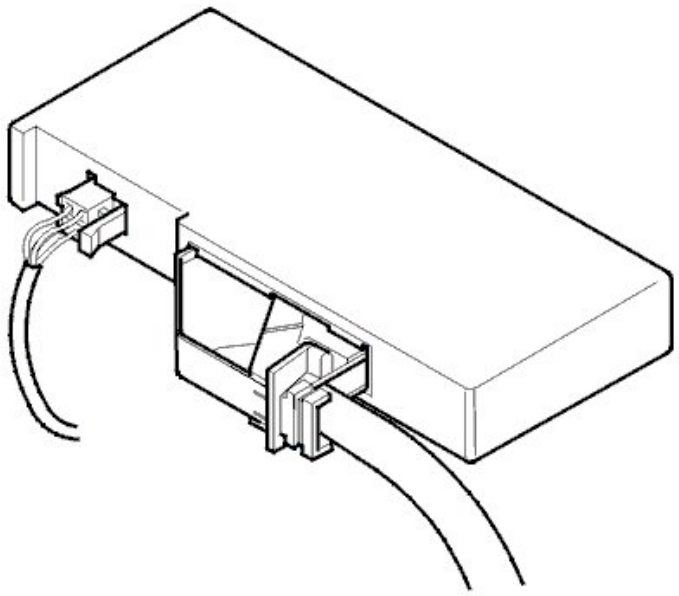
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C50

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too low or there is an open-circuit in the signal cable for alarm output P0.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and alarm output P0 is not activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable for alarm output P0
- Open-circuit in the signal cable for alarm output P0
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking components and wiring

Check the signal cable for alarm output P0. Check between accessory control module terminal #B15 and the alarm unit connector. Check for a short-circuit to ground. Check for an open-circuit.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
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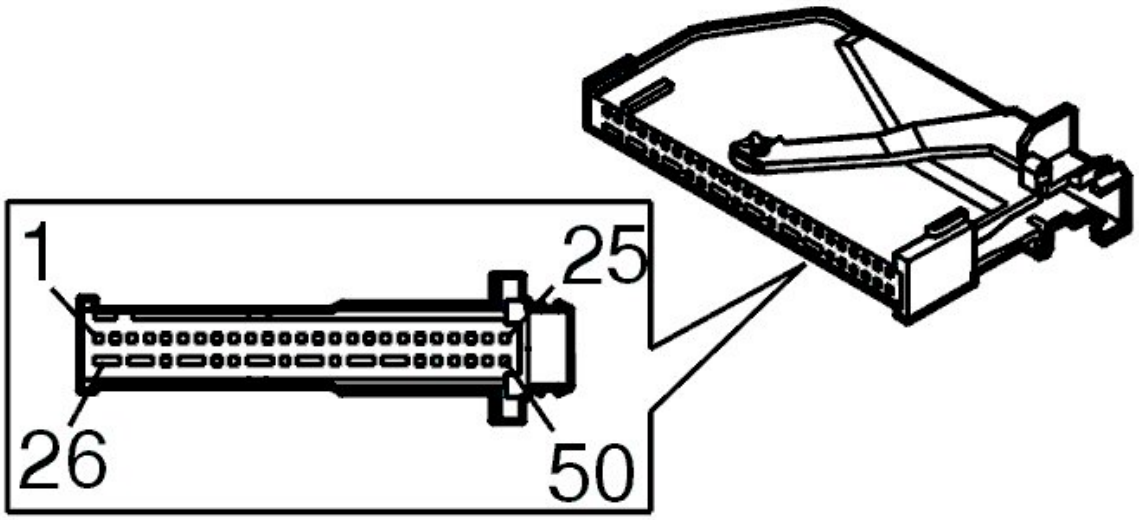
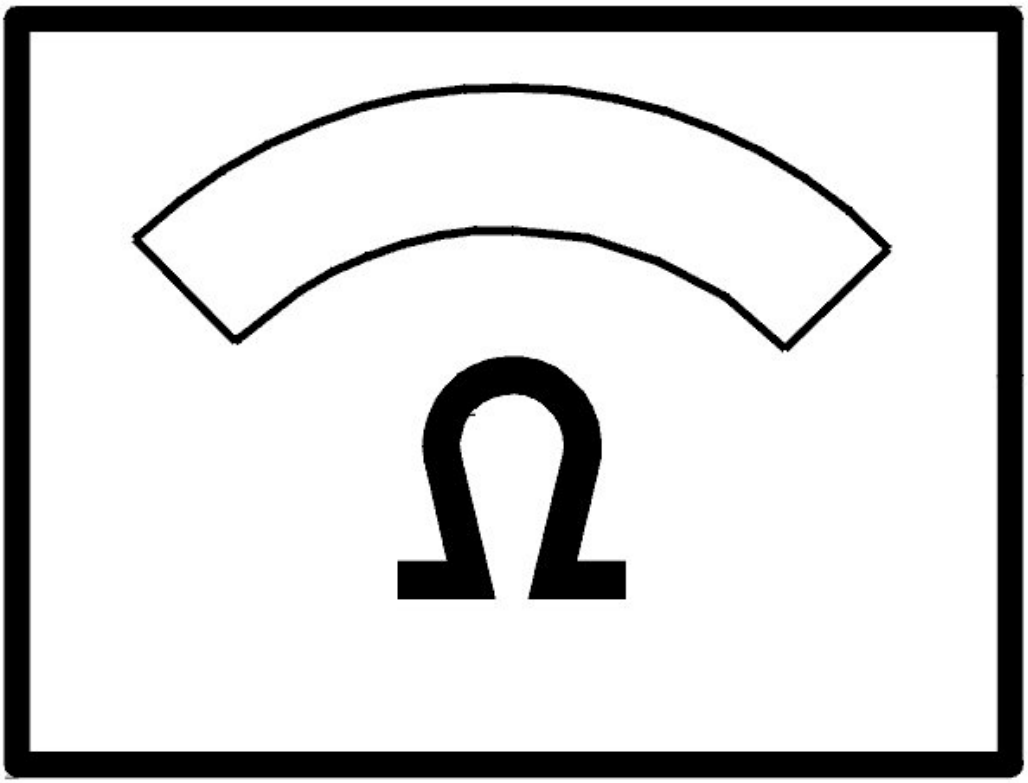




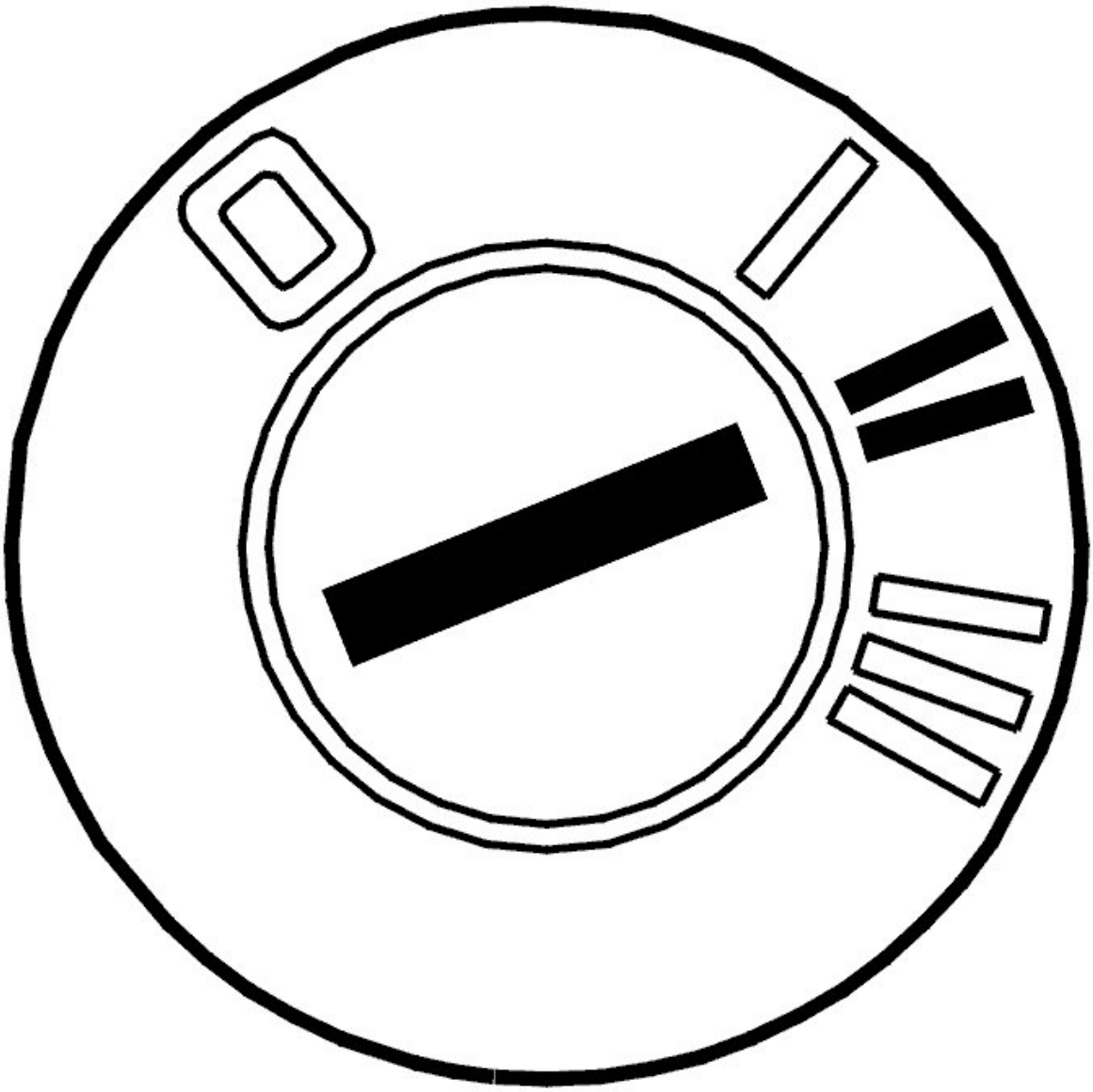
Continue - Verification

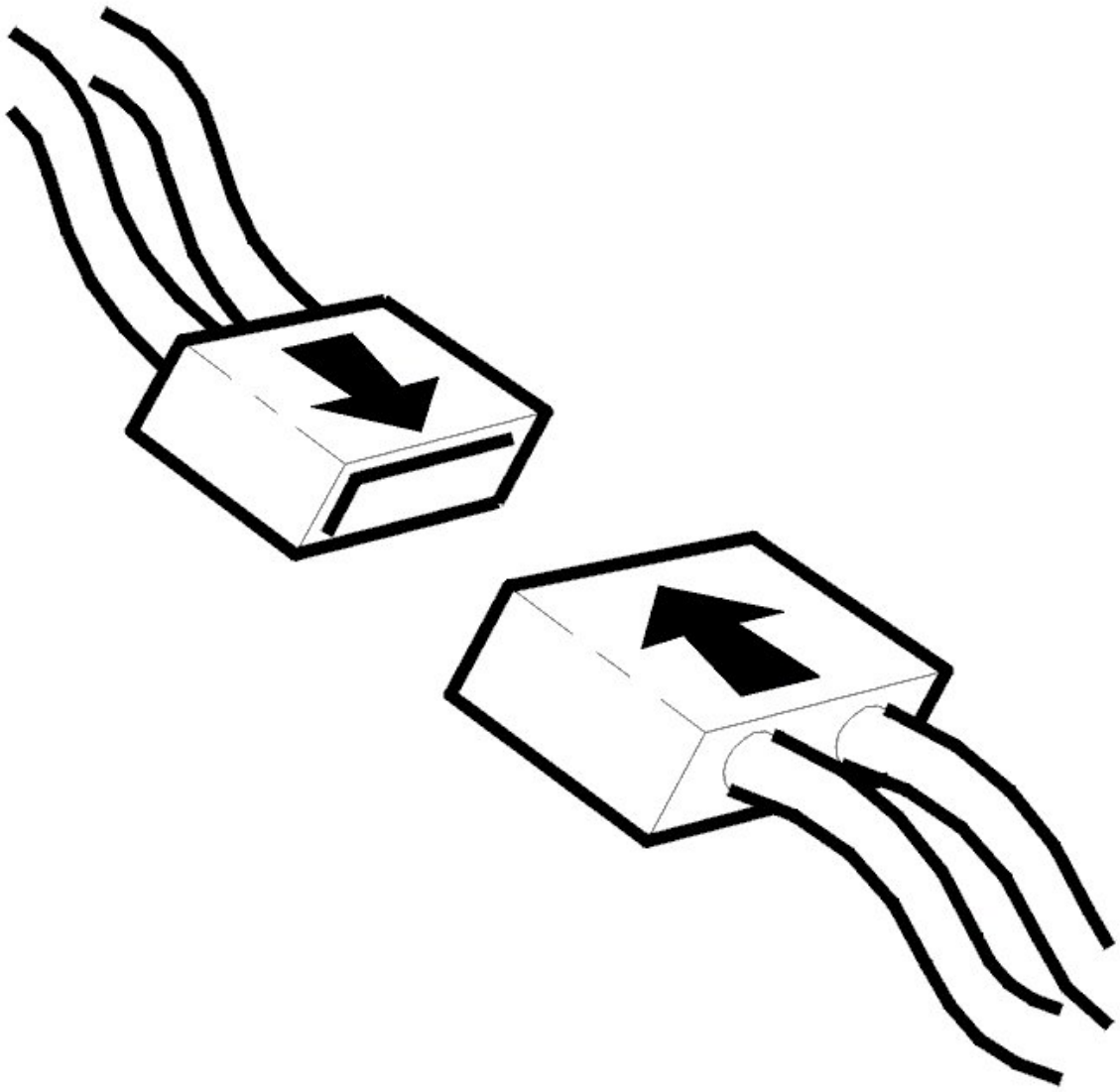
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

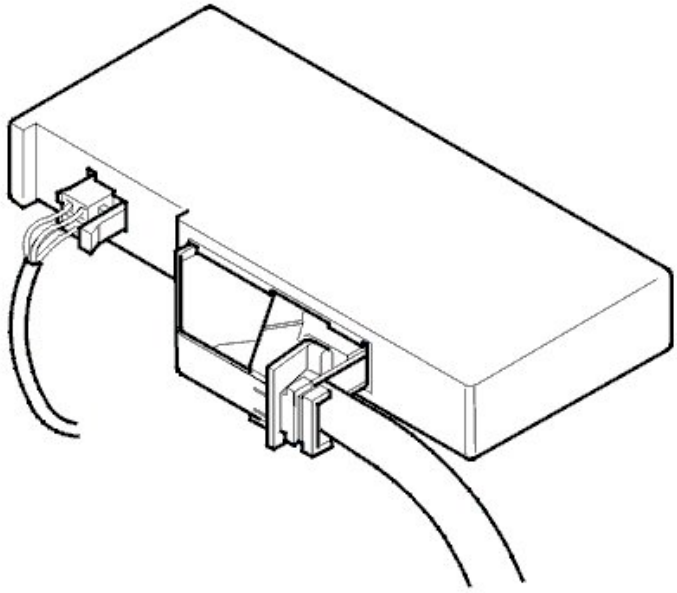
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C51

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too high on the signal cable for alarm output P0.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and alarm output P0 is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable for alarm output P0
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too High

Signal too high

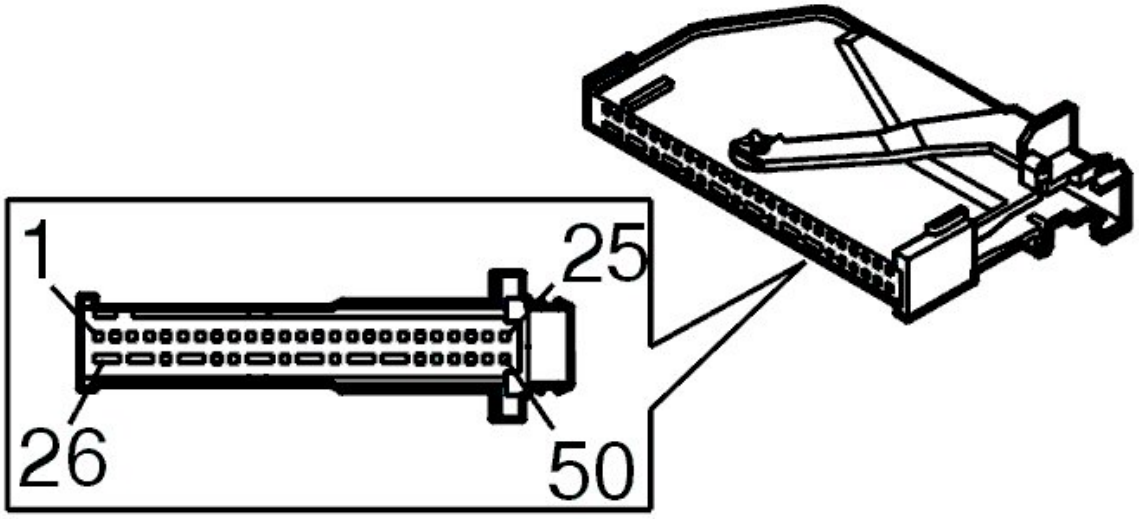
Checking components and wiring

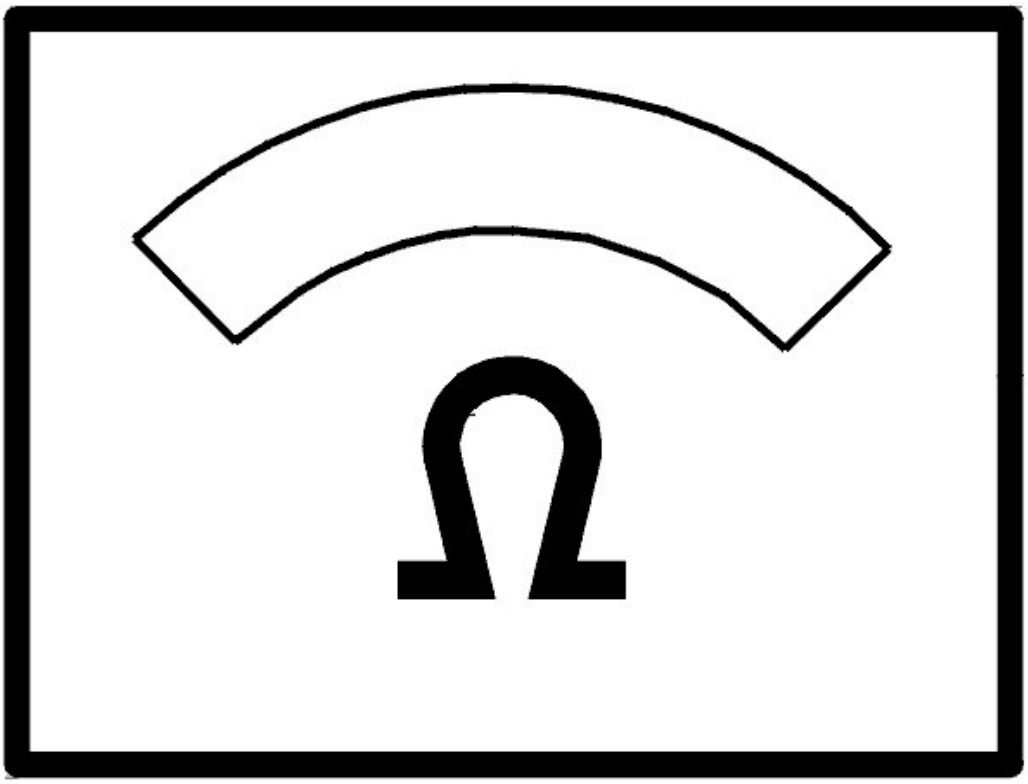
Check the signal cable for alarm output P0. Check between accessory control module terminal #B15 and the alarm unit connector. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body

Control Module/Service and Repair/Replacing the Accessory Electronic Module

- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





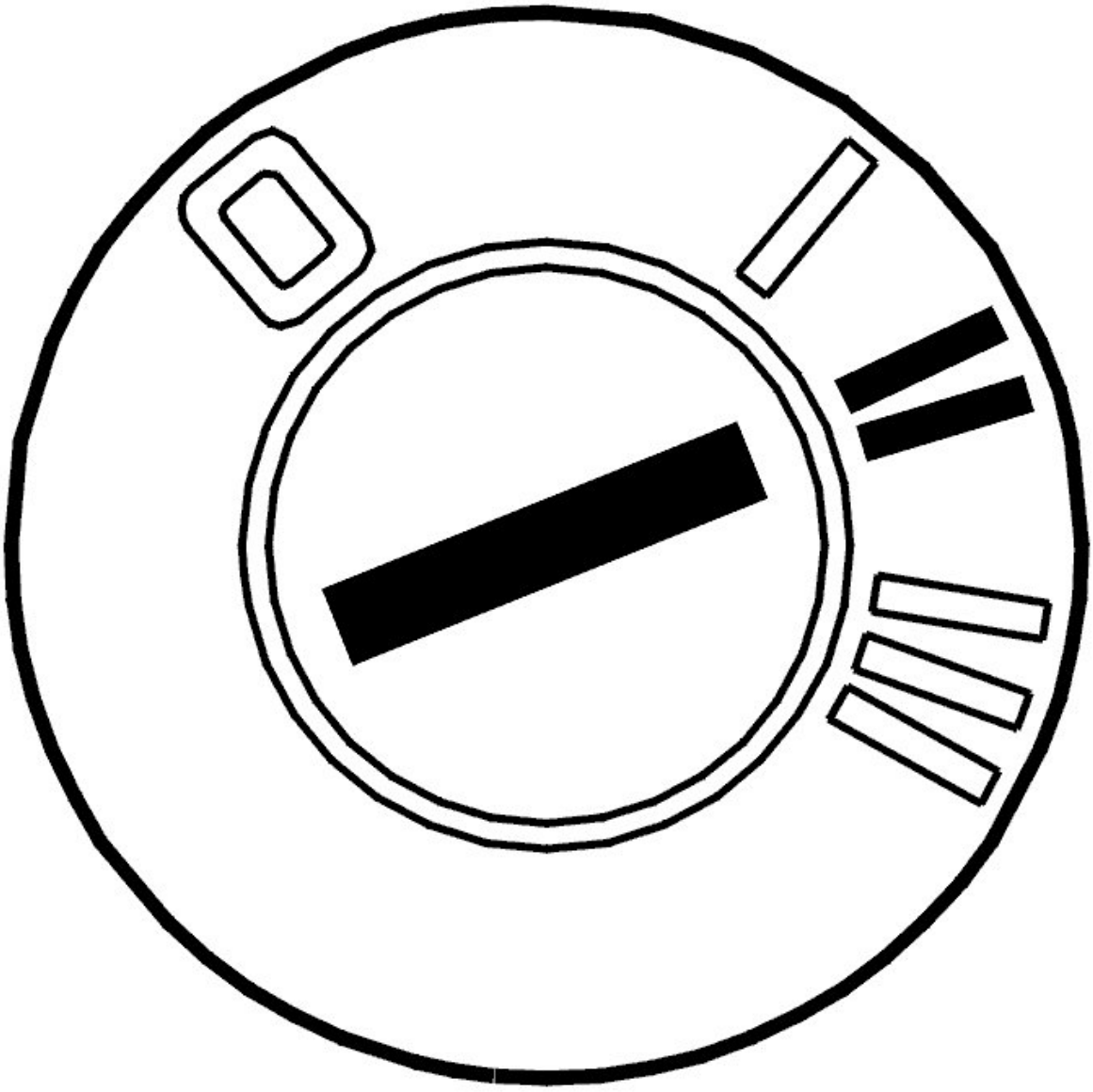
Continue - Verification

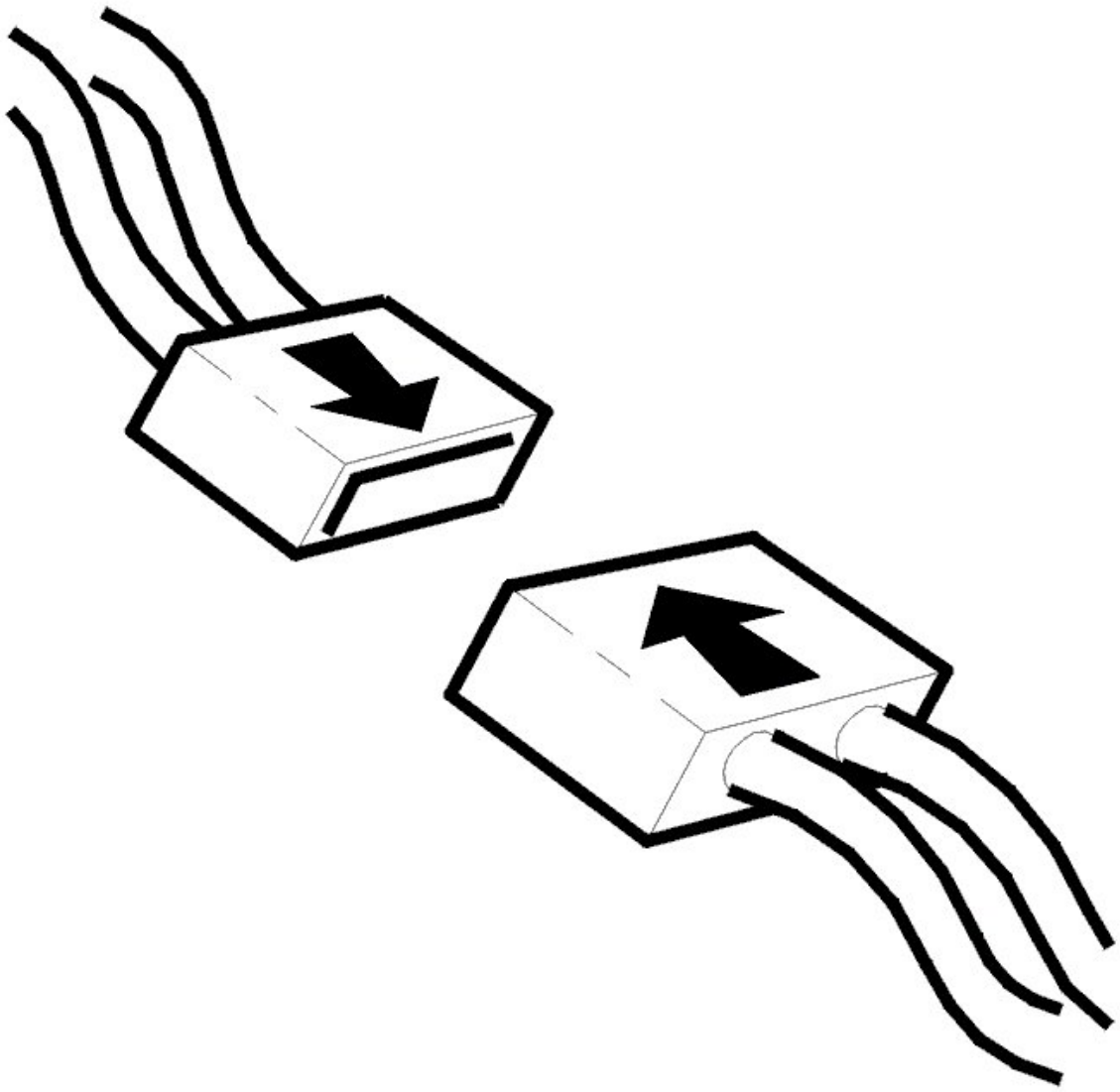
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

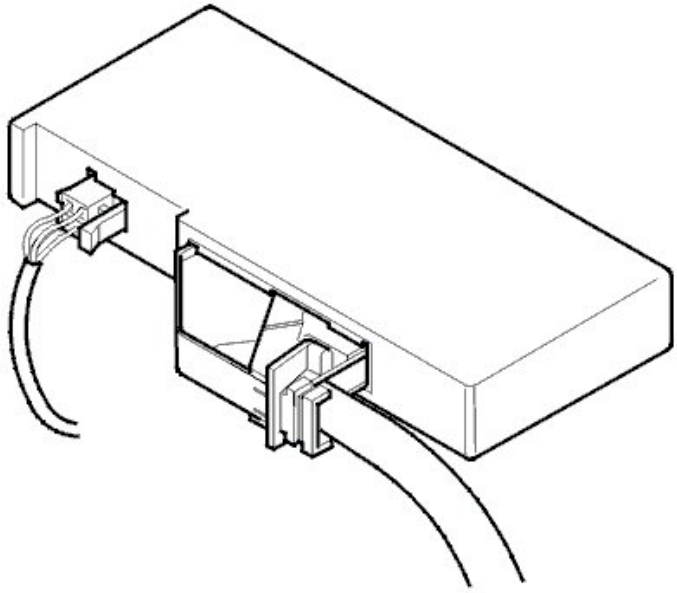
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C52

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too low or there is an open-circuit in the signal cable for alarm output P1.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and alarm output P1 is not activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable for alarm output P1
- Open-circuit in the signal cable for alarm output P1
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too Low or Signal Missing

Signal too low or signal missing

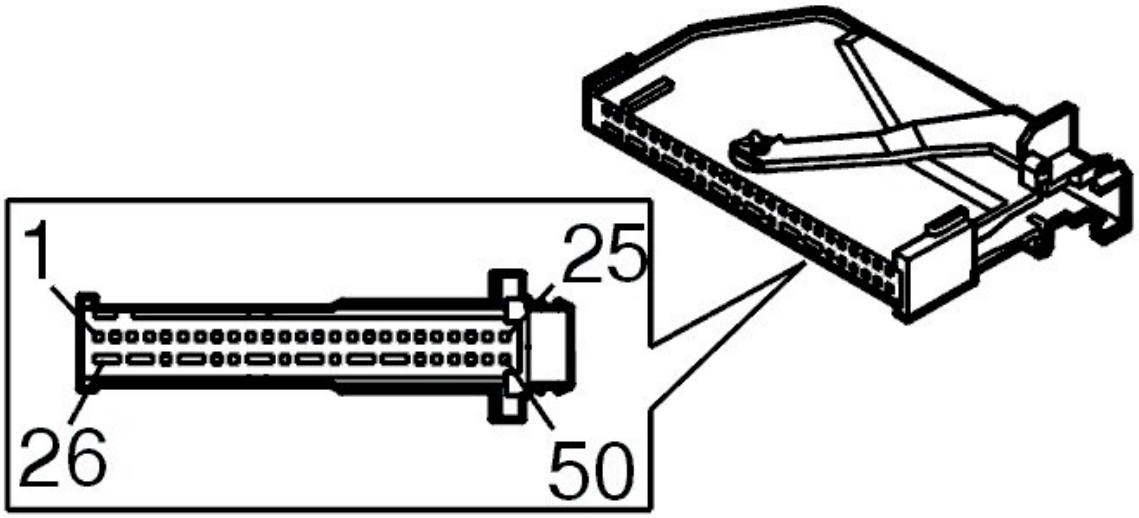
Checking components and wiring

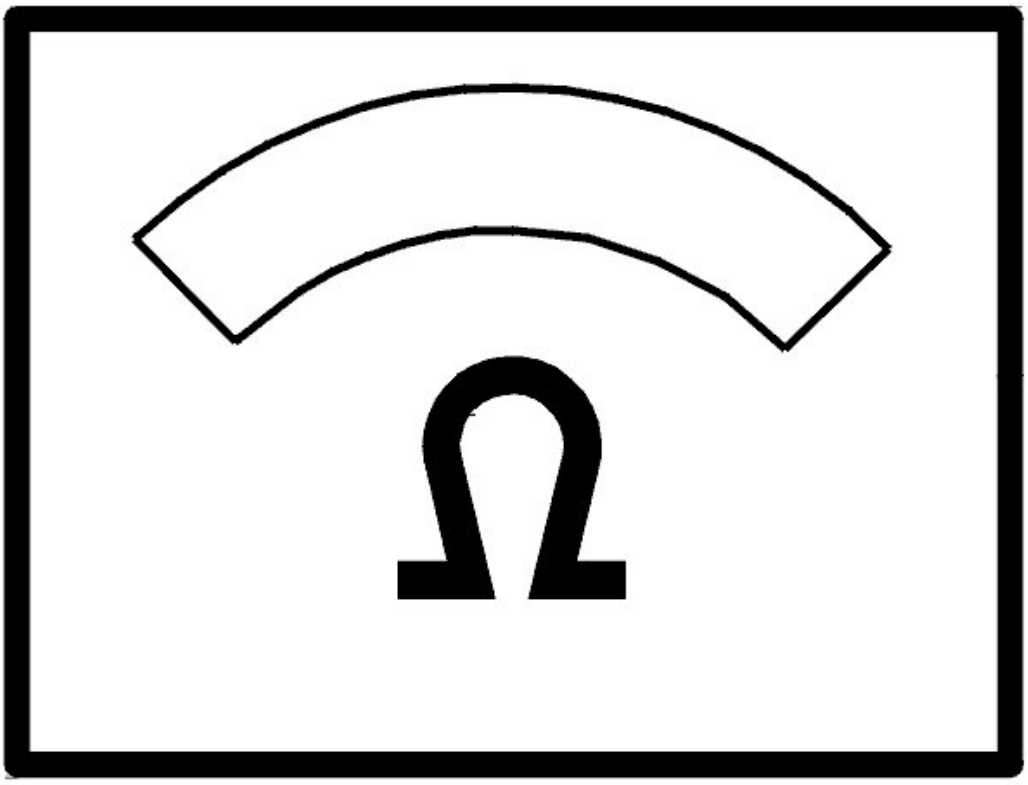
Check the signal cable for alarm output P1. Check between accessory control module terminal #B16 and the alarm unit connector. Check for a short-circuit to ground. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box,

Accessory Electronic Module (AEM)

- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





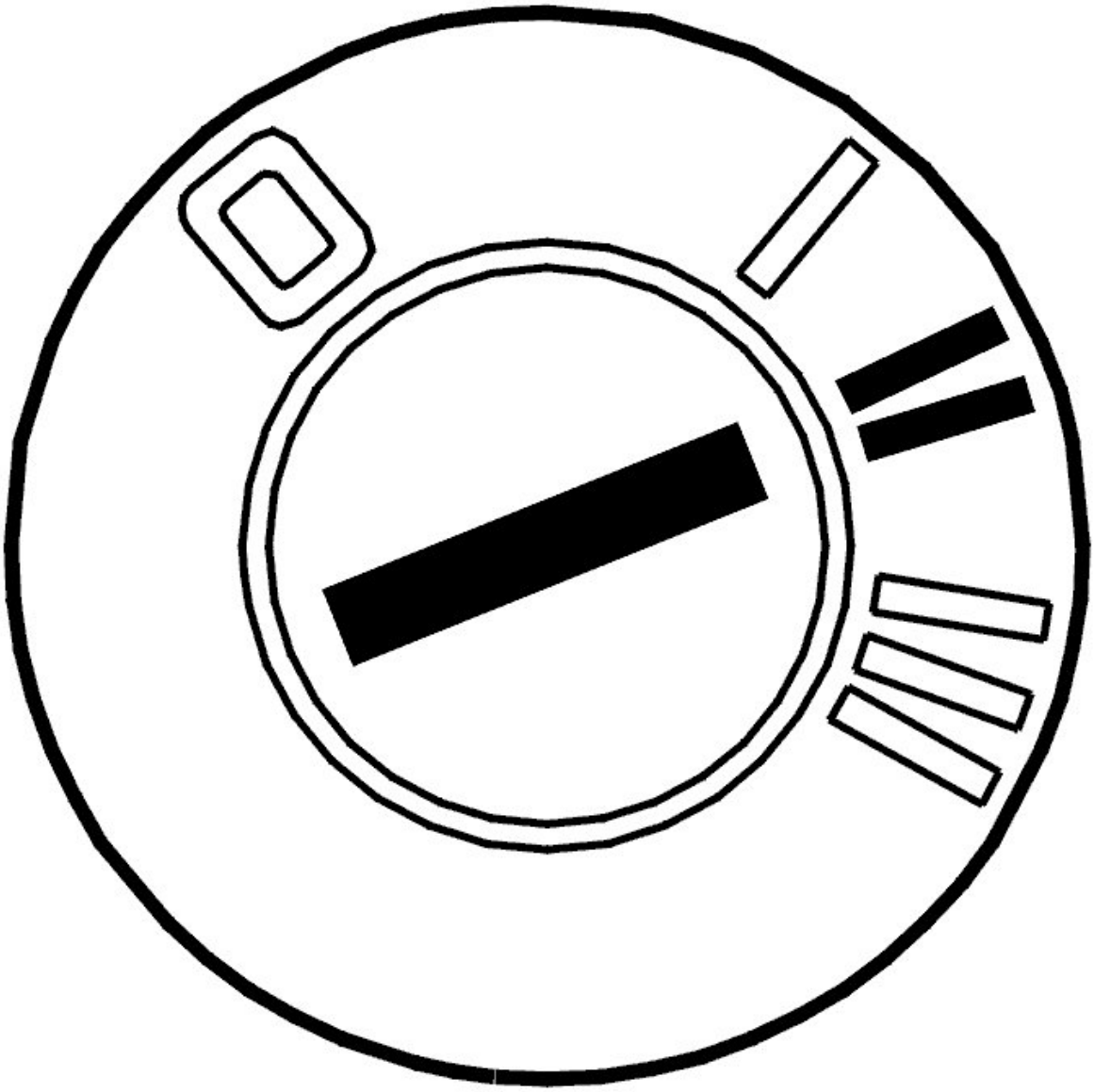
Continue - Verification

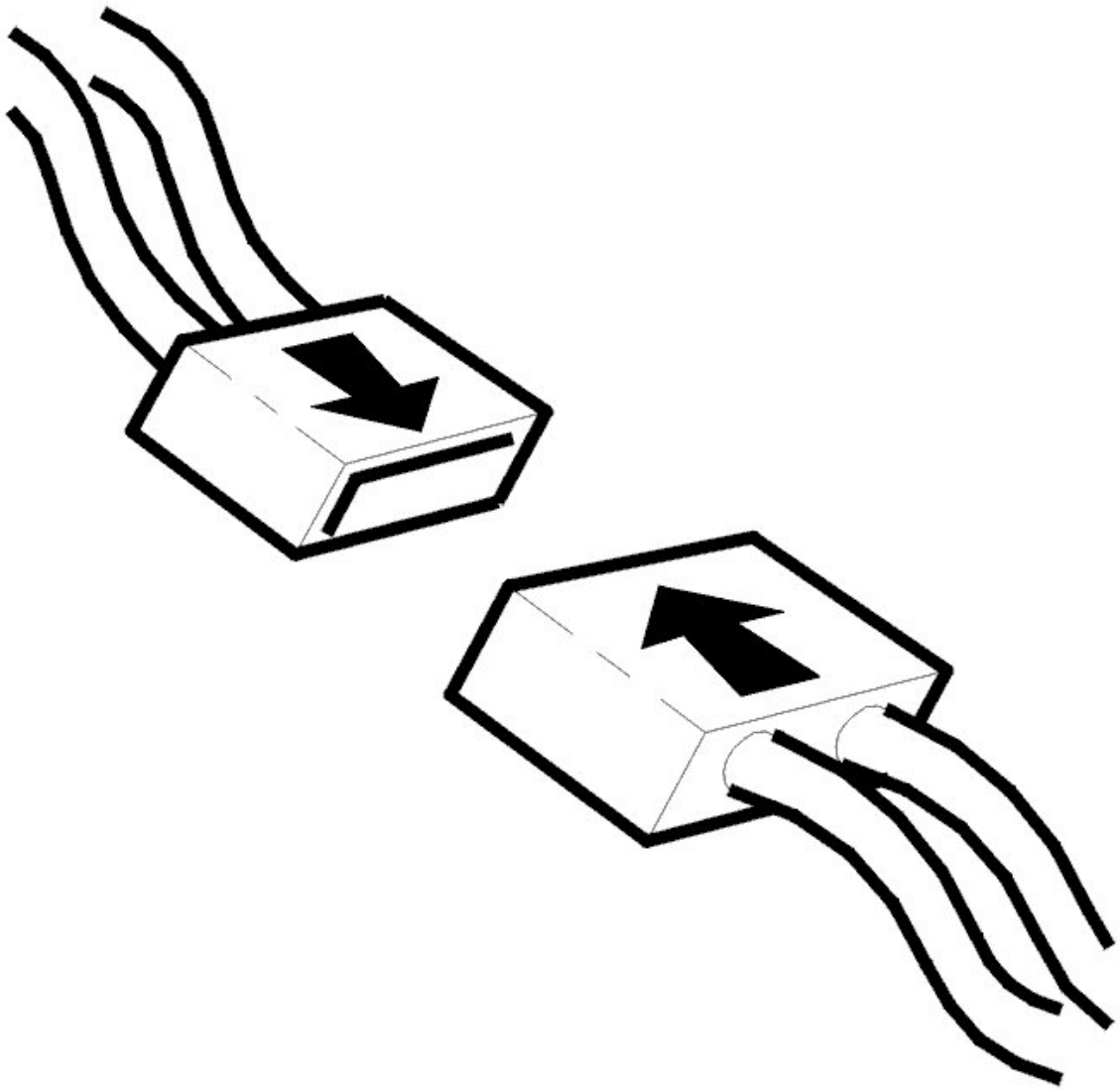
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

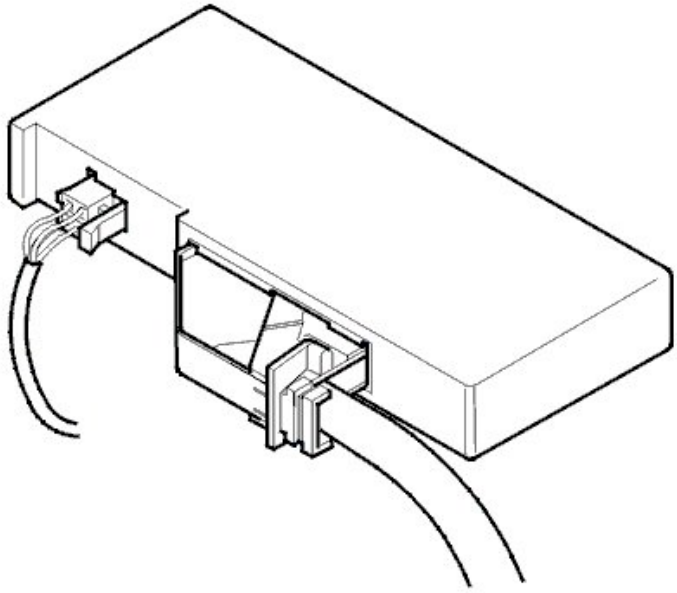
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C53

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too high on the signal cable for alarm output P1.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and alarm output P1 is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable for alarm output P1
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too High

Signal too high

Checking components and wiring

Check the signal cable for alarm output P1. Check between accessory control module terminal #B16 and the alarm unit connector. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
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- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
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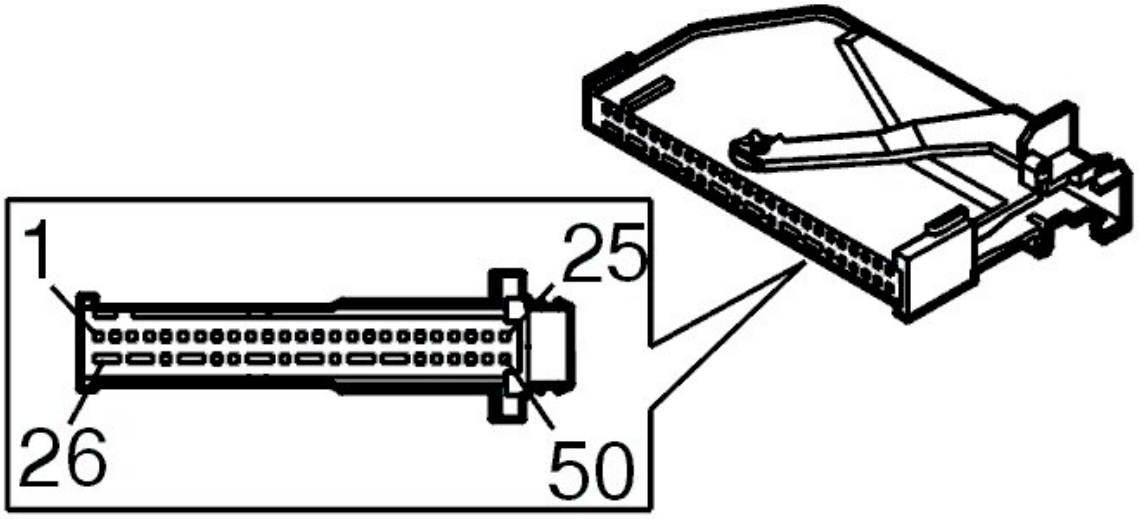
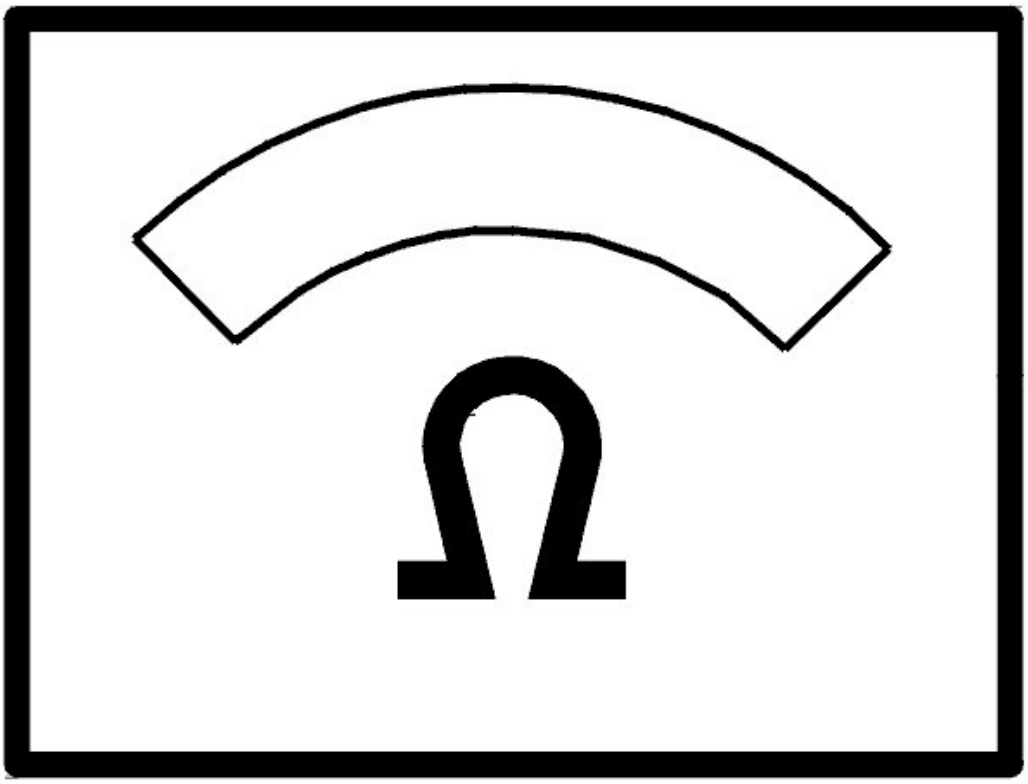




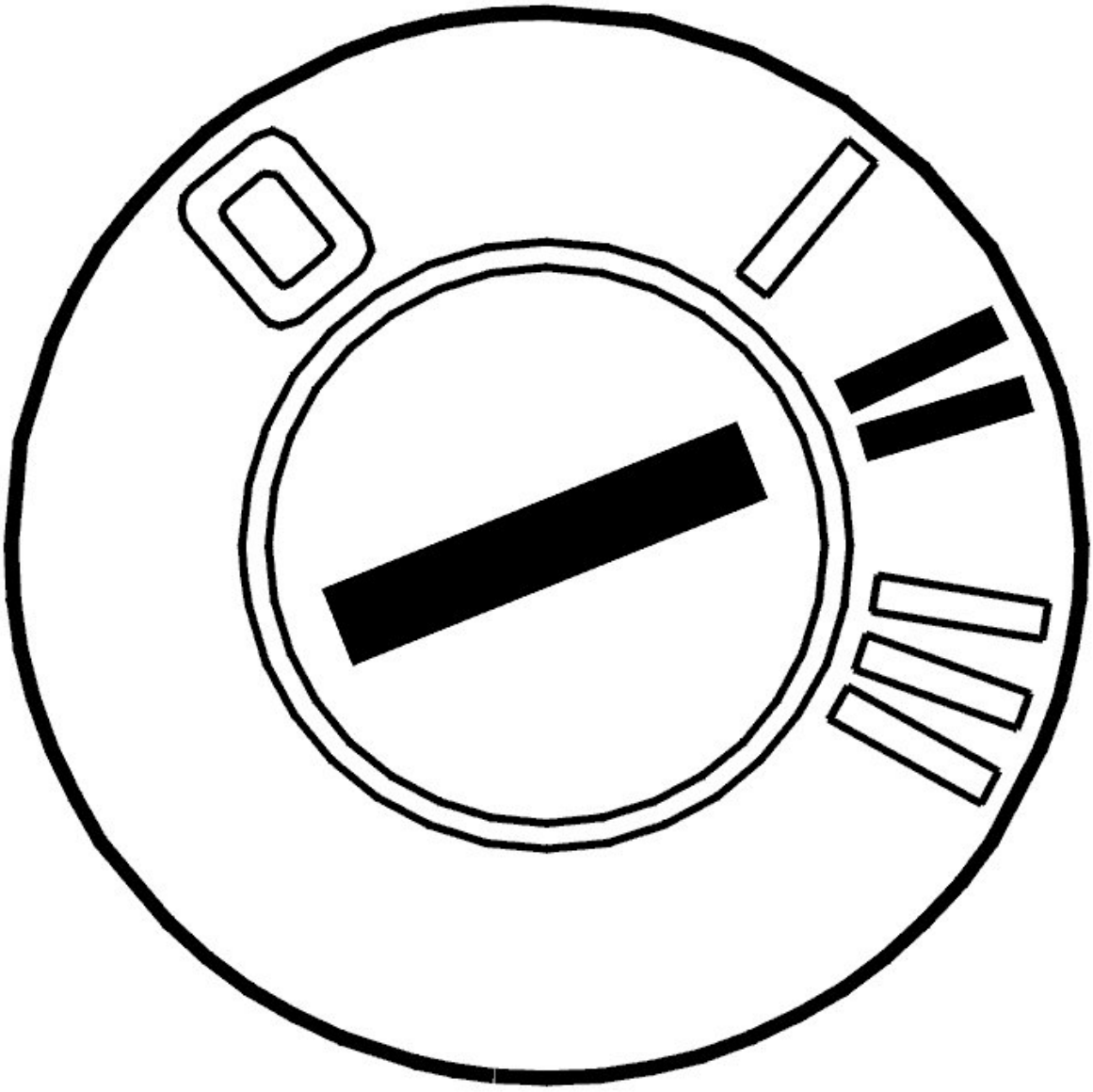
Continue - Verification

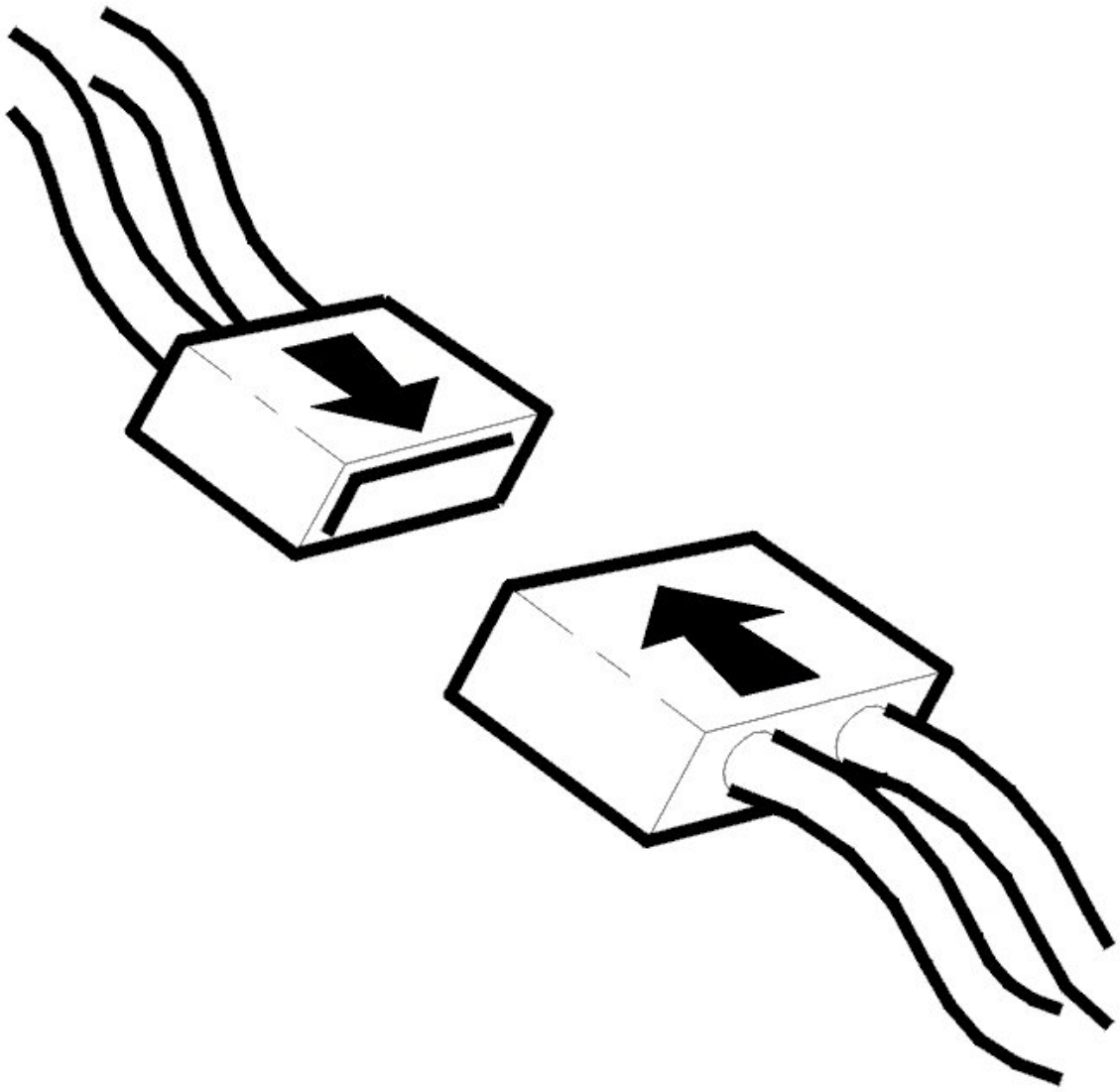
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

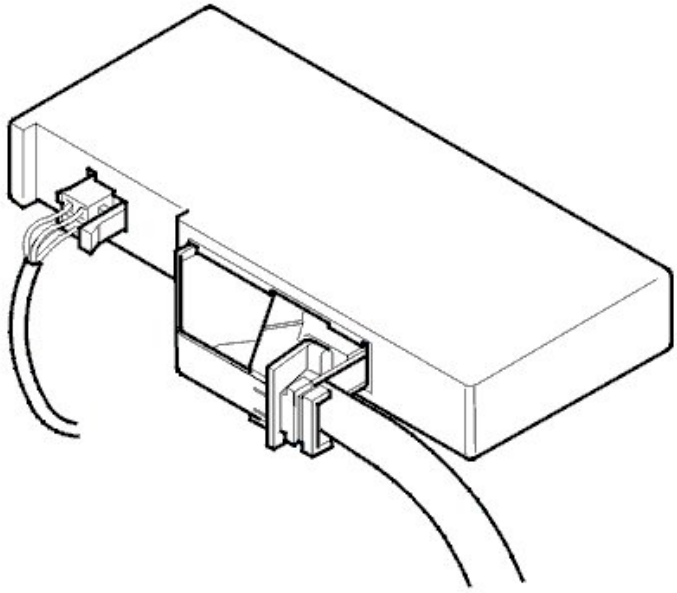
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C54

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too low or there is an open-circuit in the signal cable for alarm output S0.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and alarm output S0 is not activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in signal cable alarm output S0
- Open-circuit in signal cable alarm output S0
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking components and wiring

Check the signal cable for the alarm output S0. Check between accessory control module terminal #B33 and the alarm unit connector. Check for a short-circuit to ground. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box,

Accessory Electronic Module (AEM)

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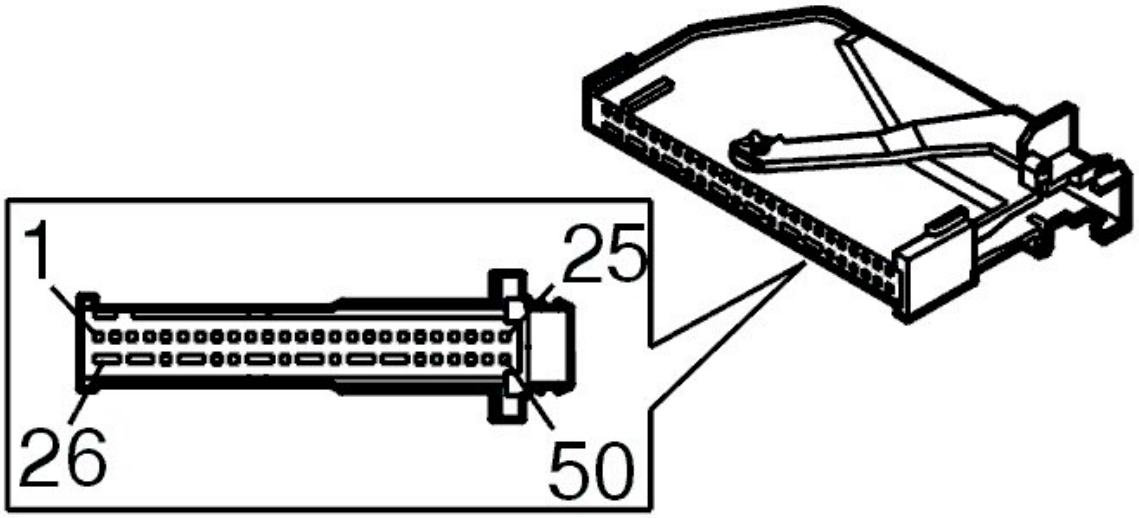
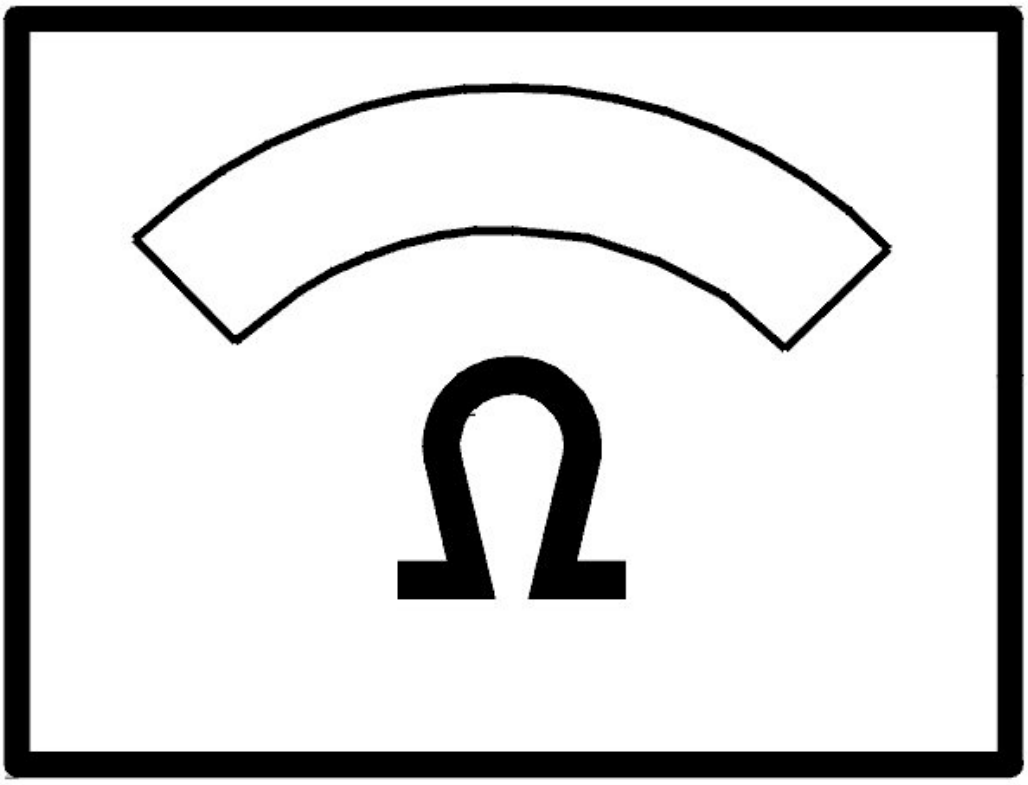




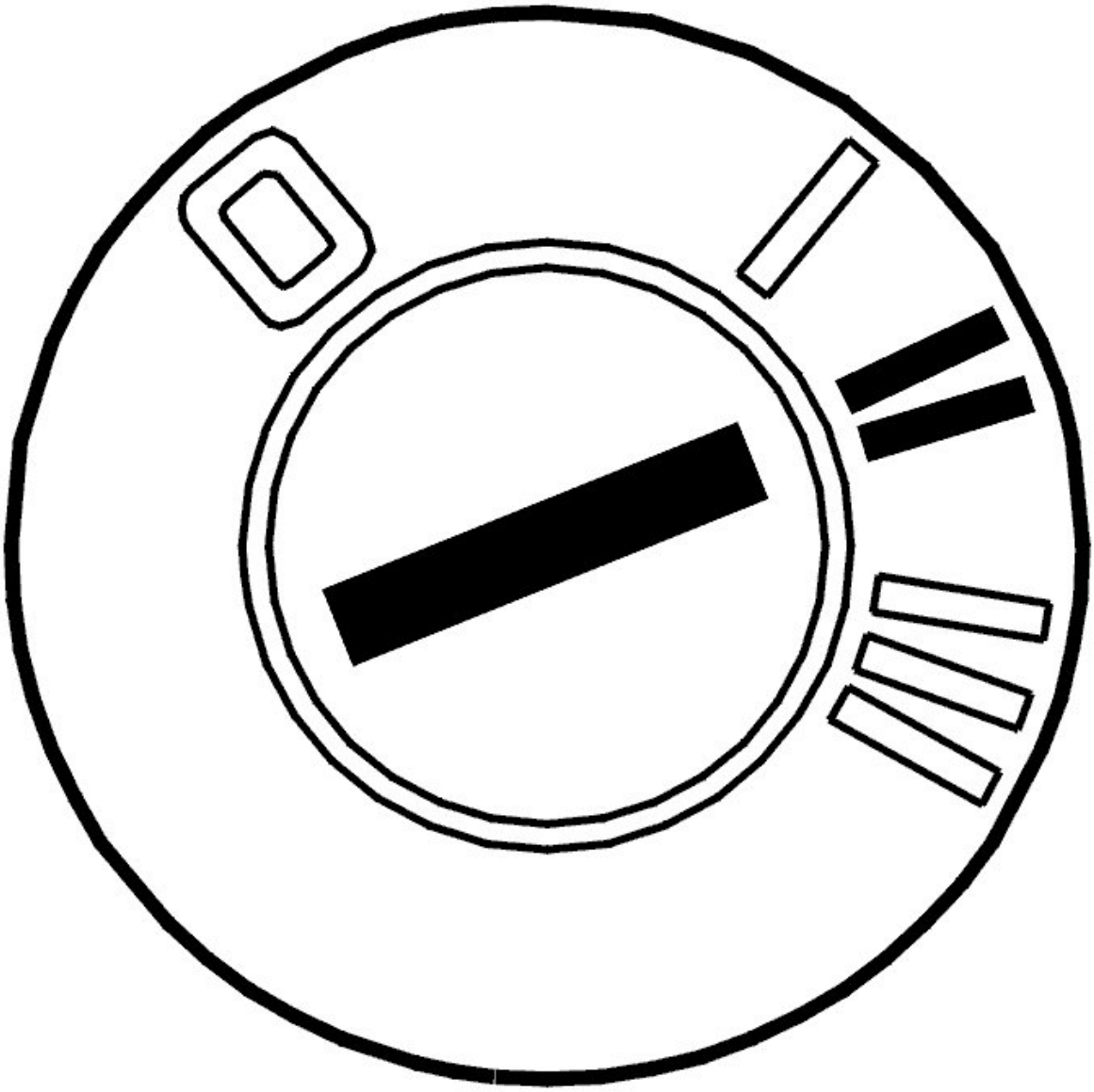
Continue - Verification

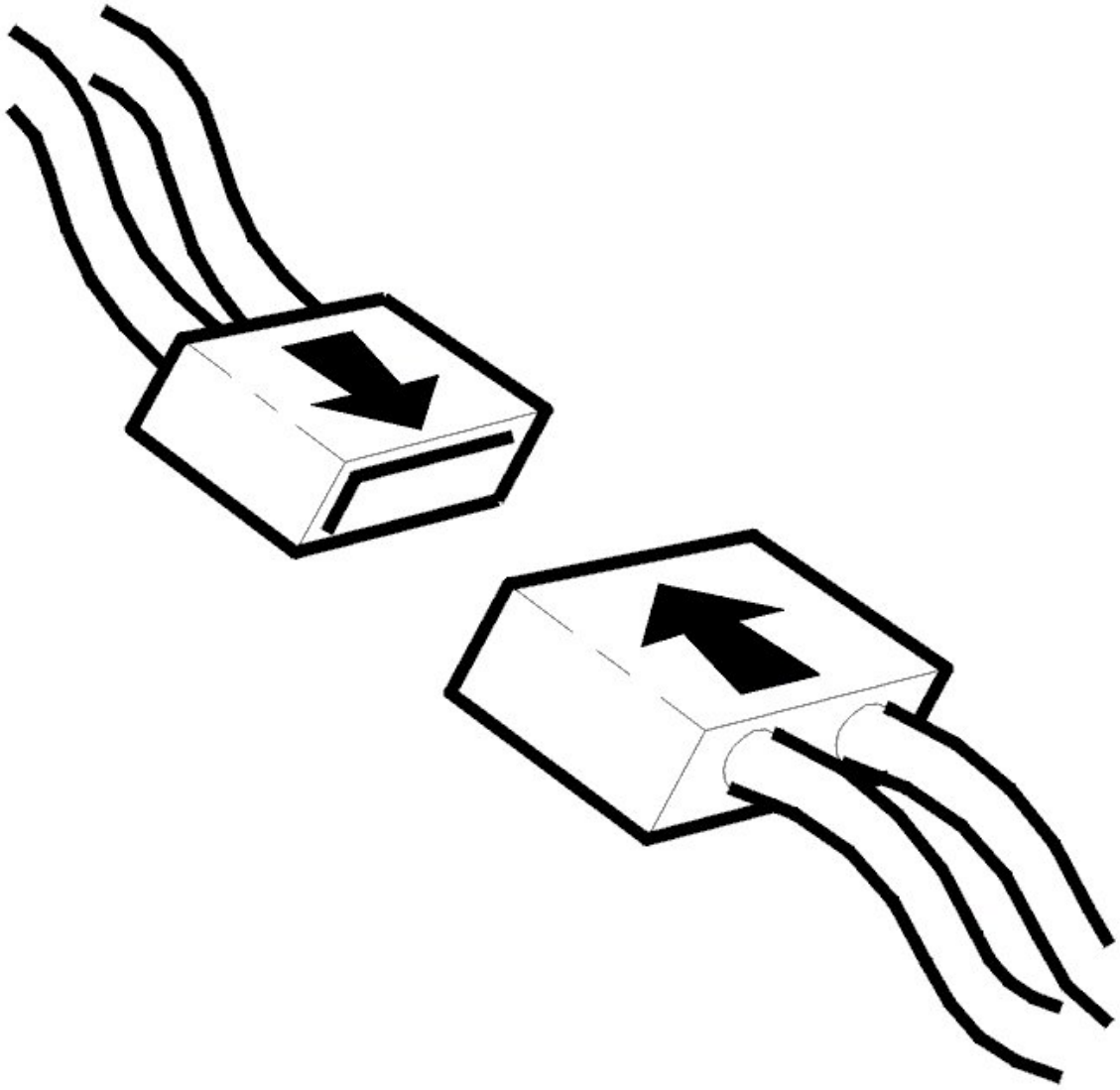
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

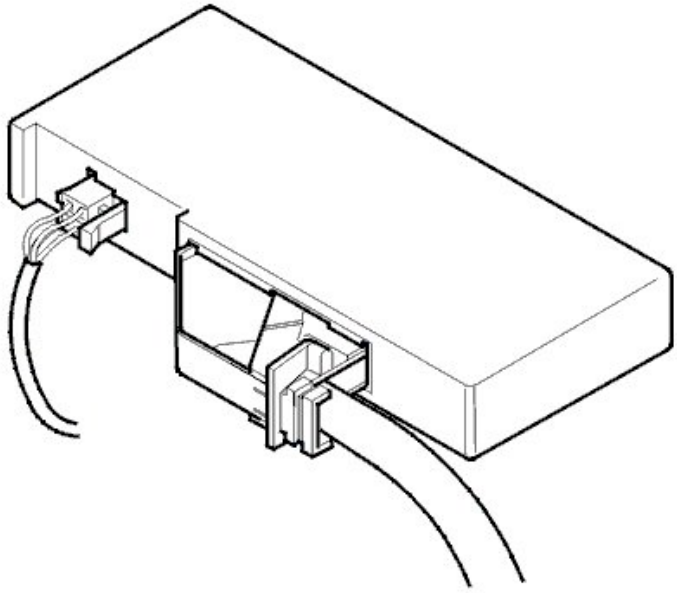
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C55

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too high on the signal cable for alarm output S0.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and alarm output S0 is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in signal cable alarm output S0
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too High

Signal too high

Checking components and wiring

Check the signal cable for alarm output S0. Check between the accessory control module terminal #B33 and the alarm unit connector. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body

Control Module/Service and Repair/Replacing the Accessory Electronic Module

- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
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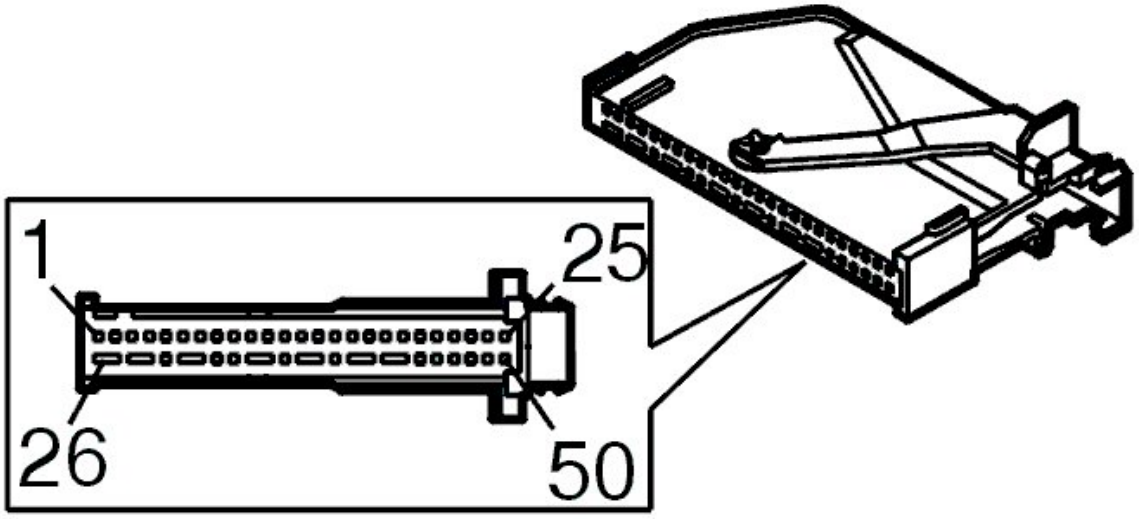
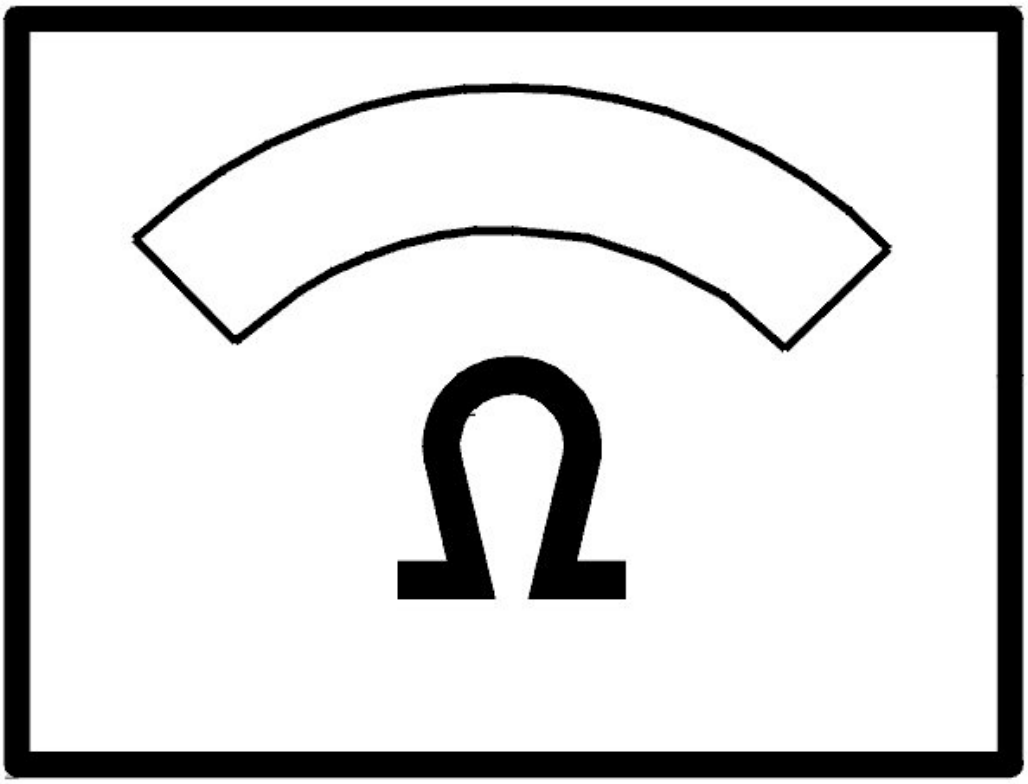




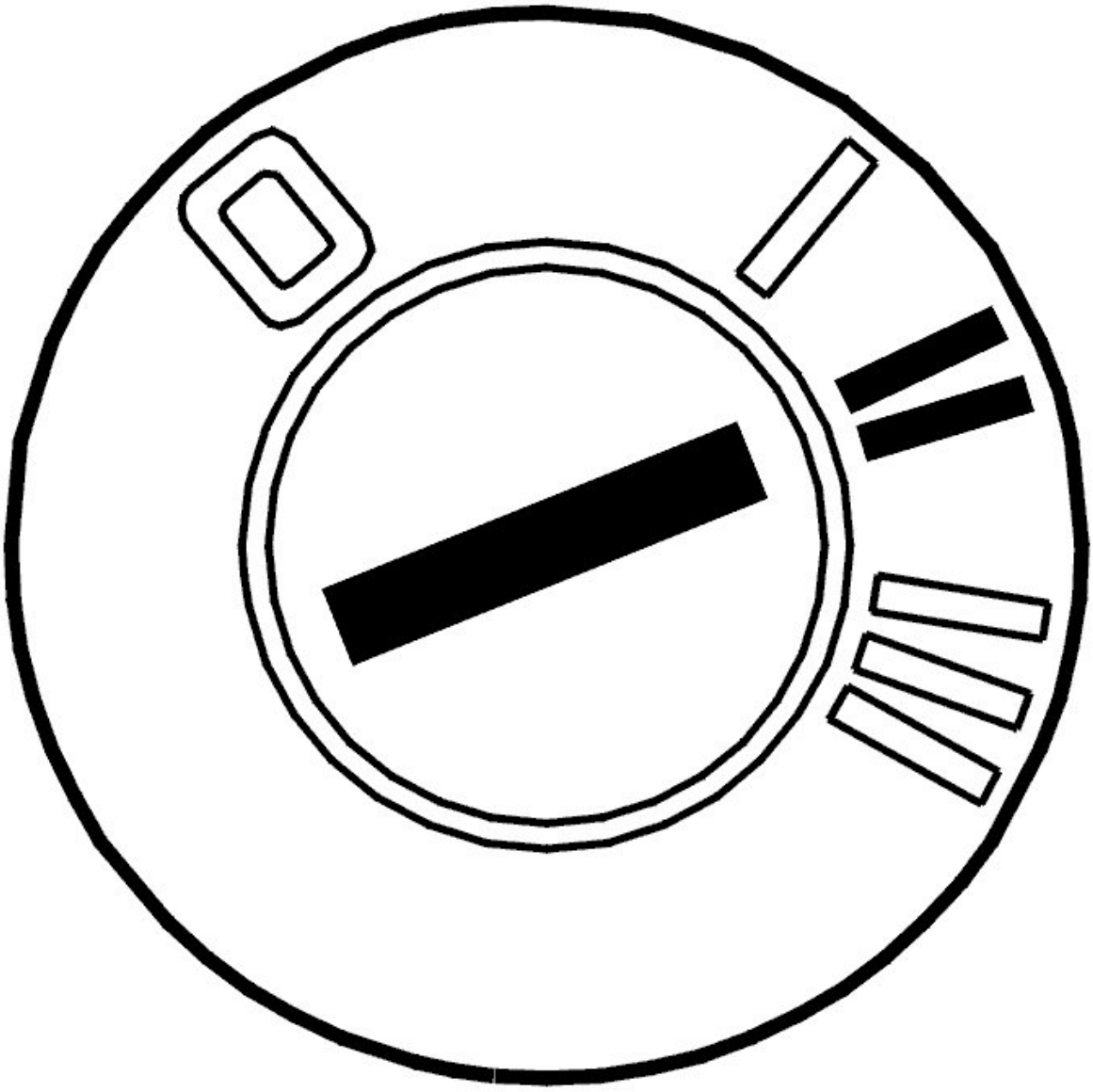
Continue - Verification

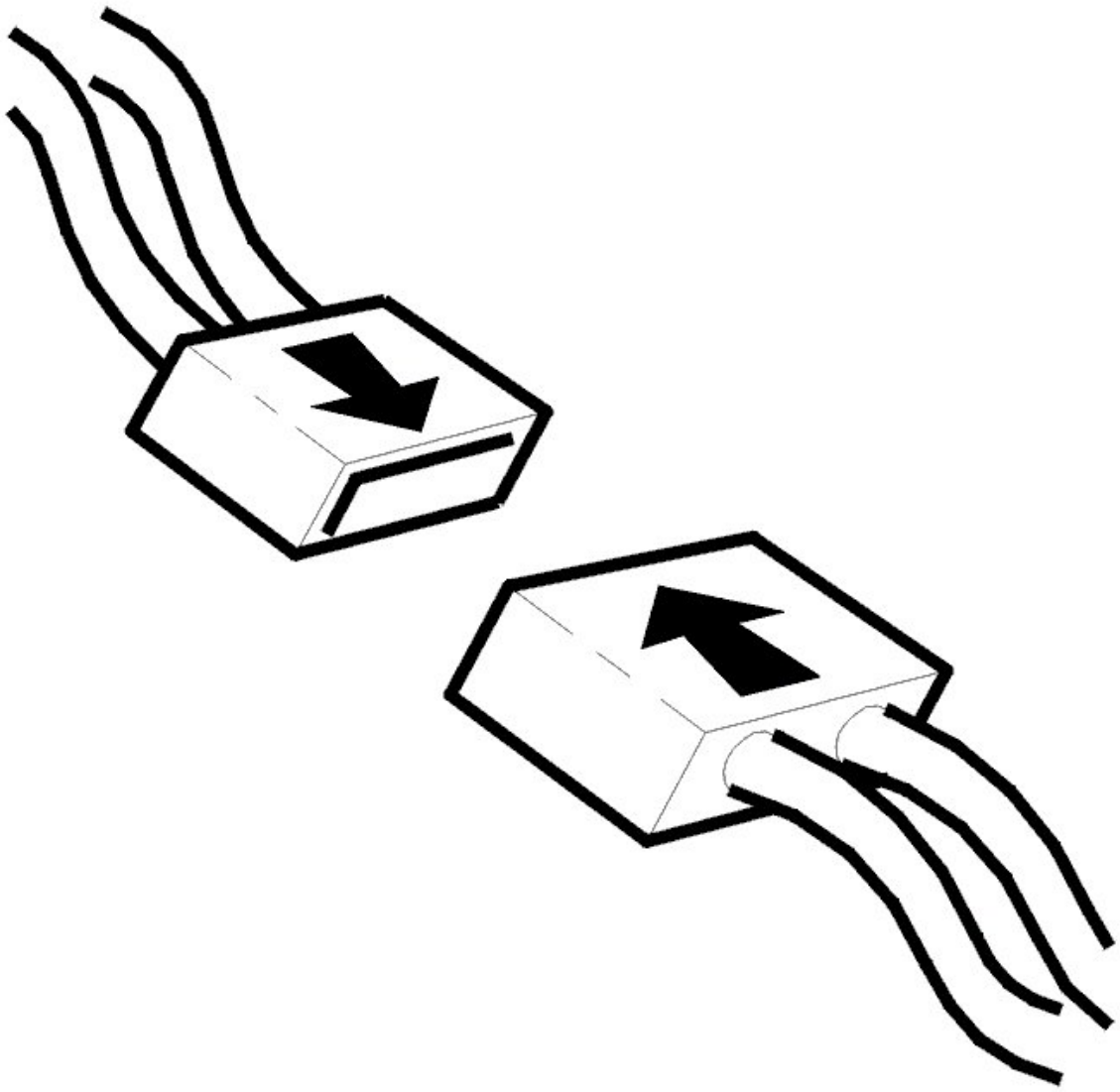
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

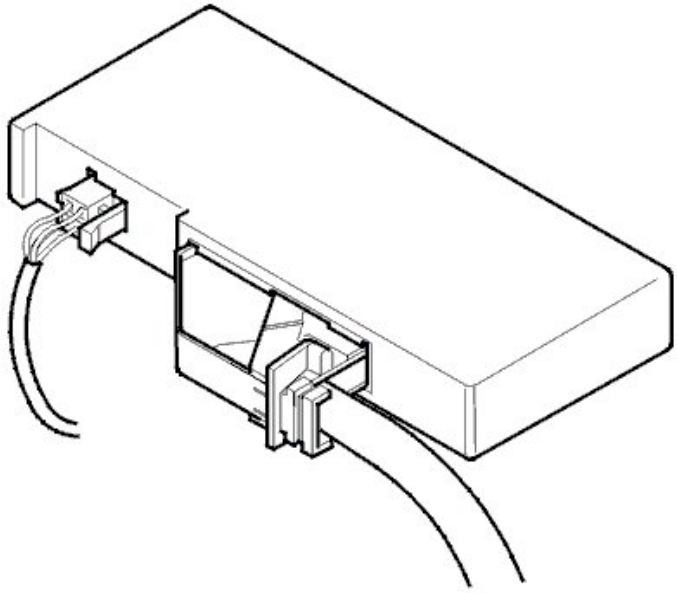
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C56

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too low on the signal cable for alarm output S1.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and alarm output S1 is activated.

Substitute value
- Alarm output S1 is switched off until the next time the ignition is switched on.

Possible source
- Short-circuit to ground in signal cable alarm output S1
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too Low

Signal too low

Checking components and wiring

Check the signal cable for the alarm output S1. Check between accessory control module terminal #B34 and the alarm unit connector. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body

Control Module/Service and Repair/Replacing the Accessory Electronic Module

- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
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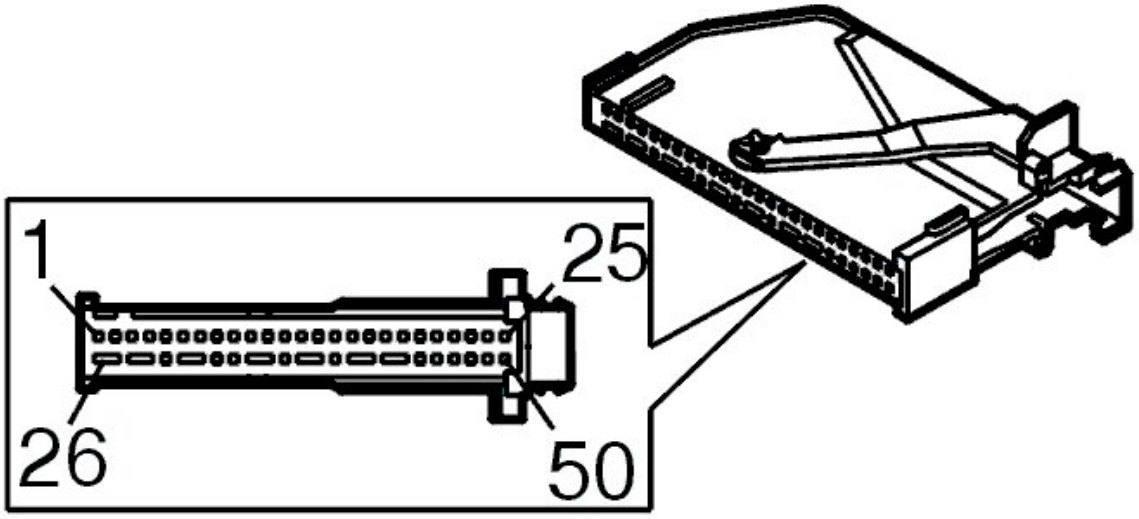
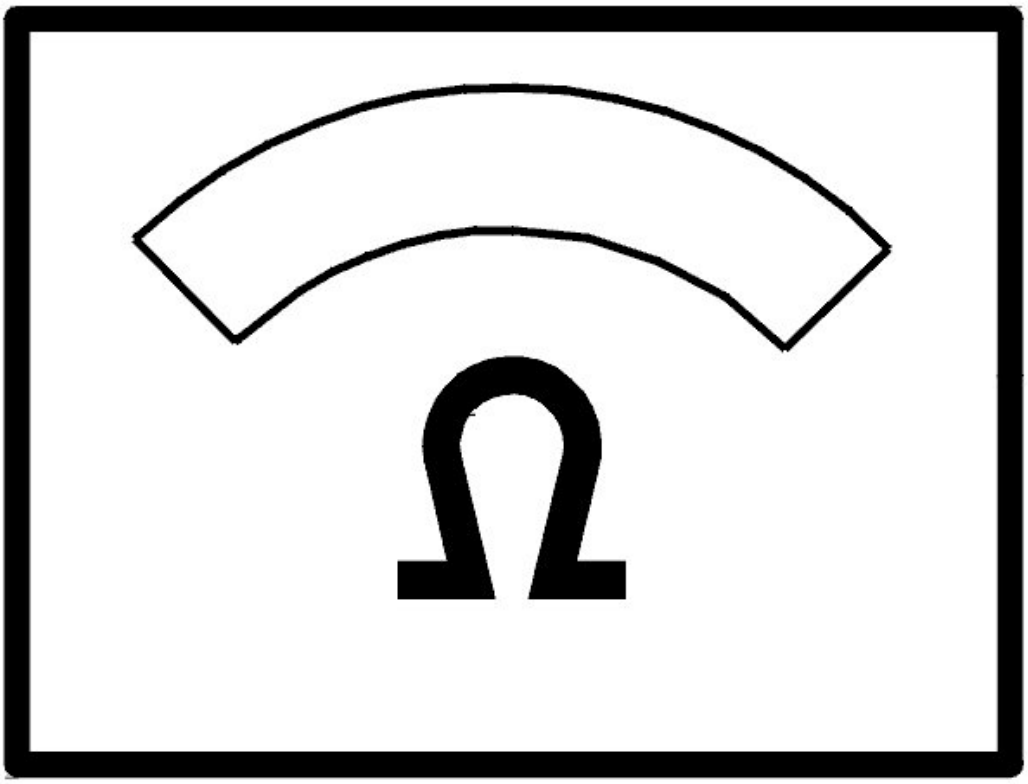




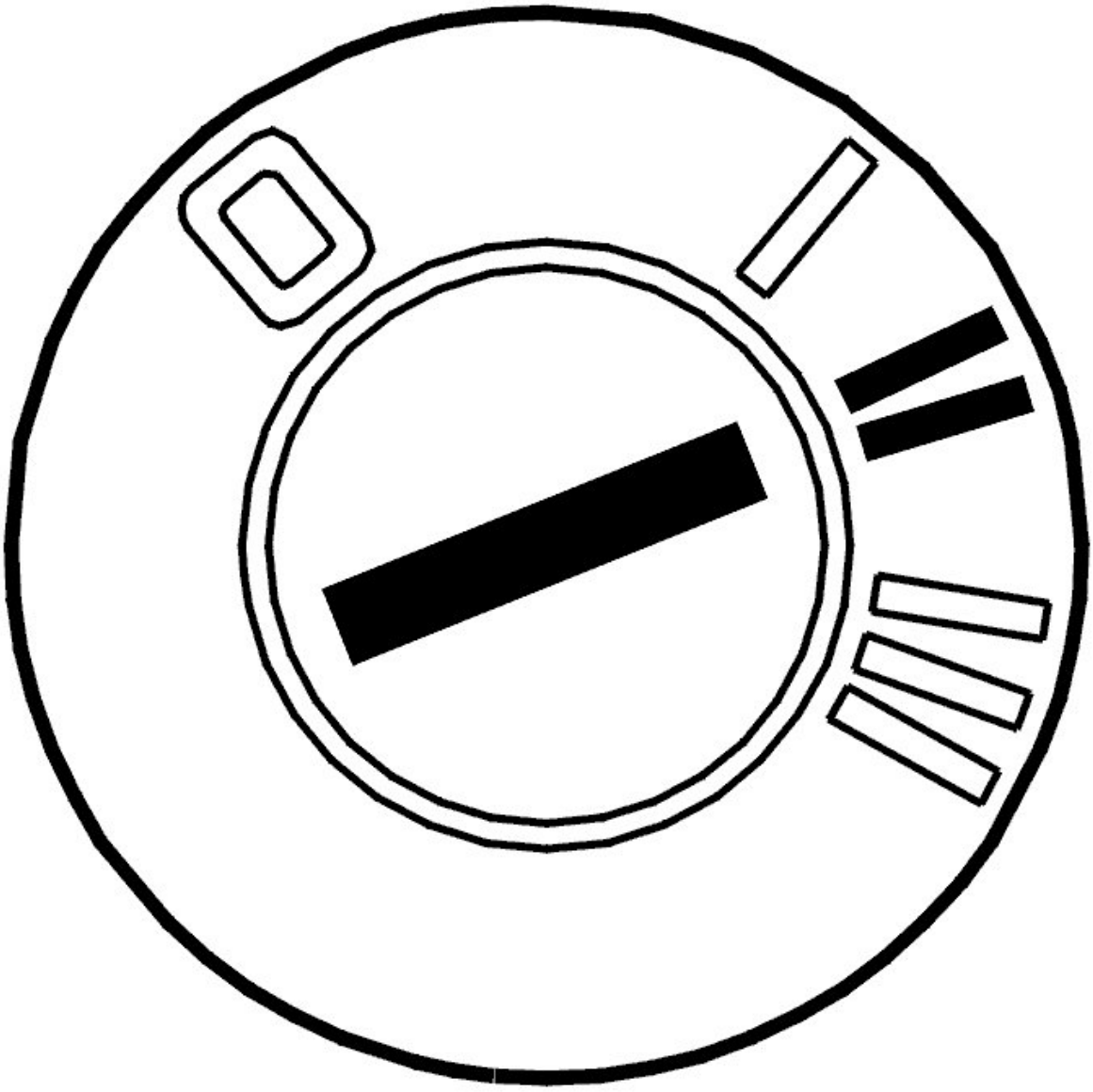
Continue - Verification

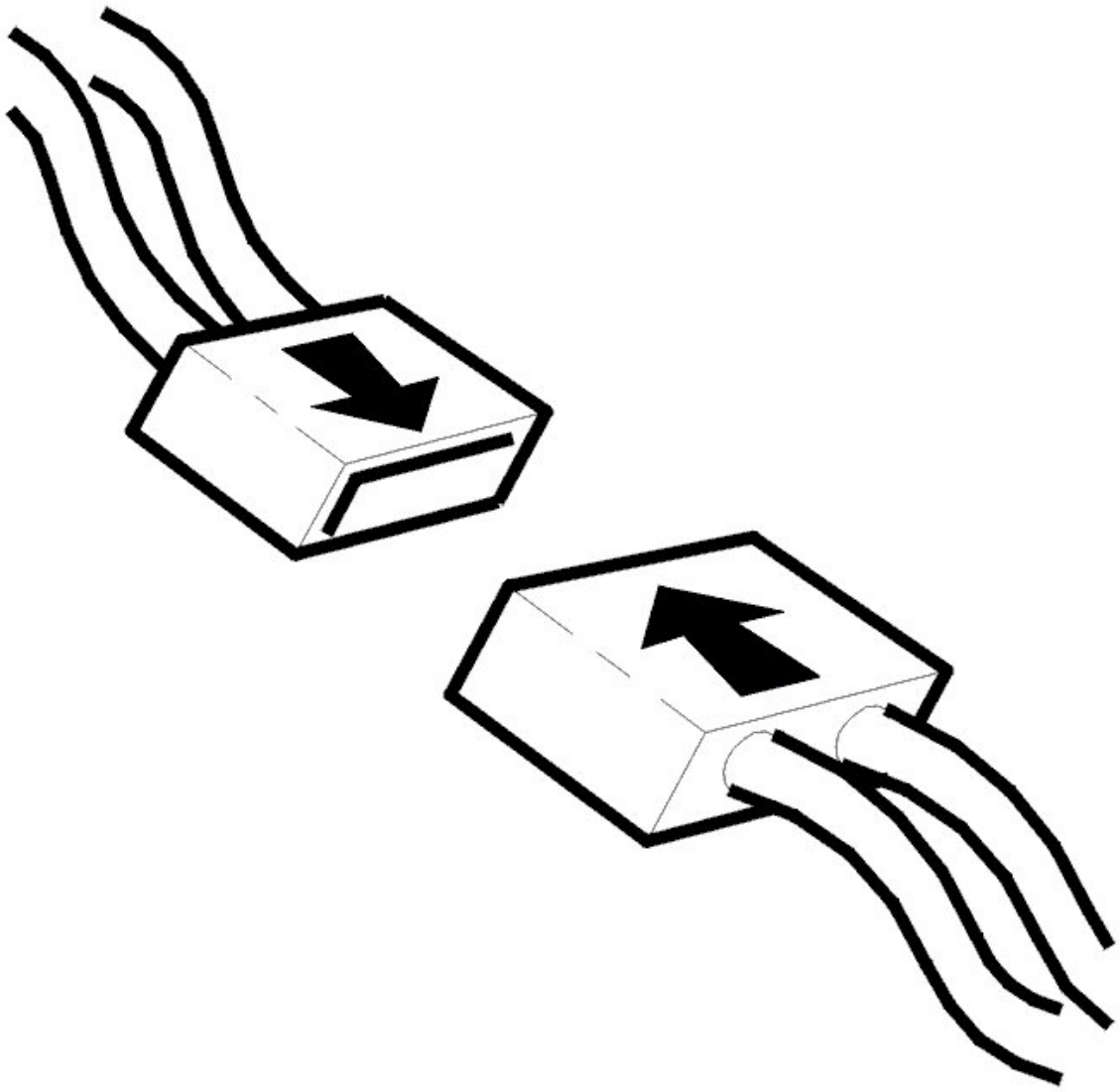
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

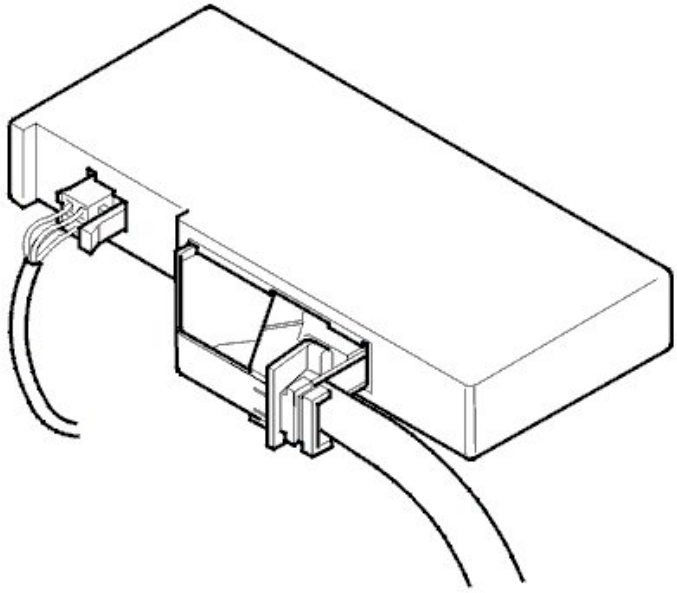
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AEM-6C57

Condition



The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too high or there is an open-circuit in the signal cable for alarm output S1.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and alarm output S1 is not activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in signal cable alarm output S1
- Open-circuit in signal cable alarm output S1
- Damaged alarm.

Fault symptom[s]
- The alarm does not function at all.

Signal Too High / Signal Missing

Signal too high / Signal missing

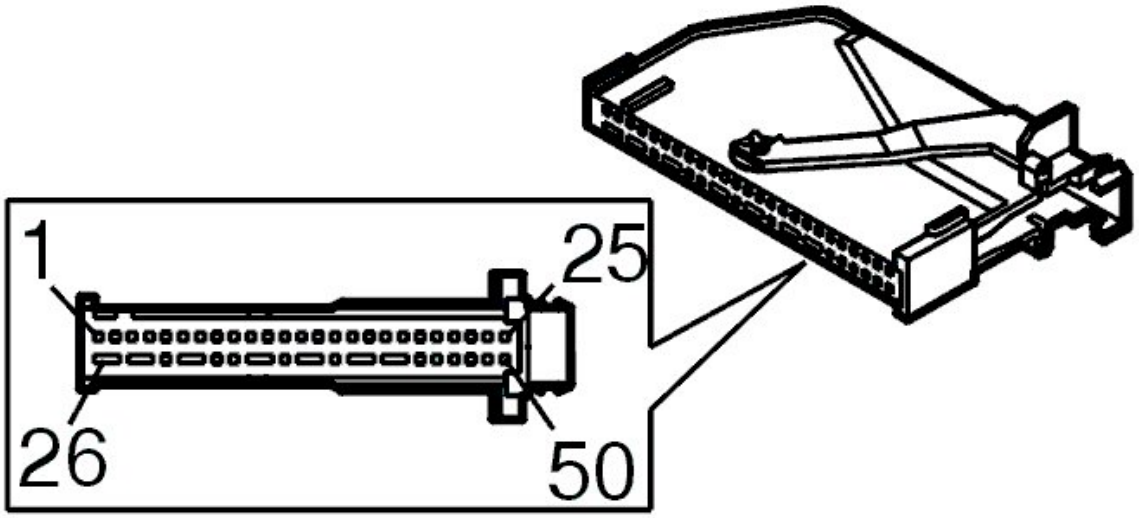
Checking components and wiring

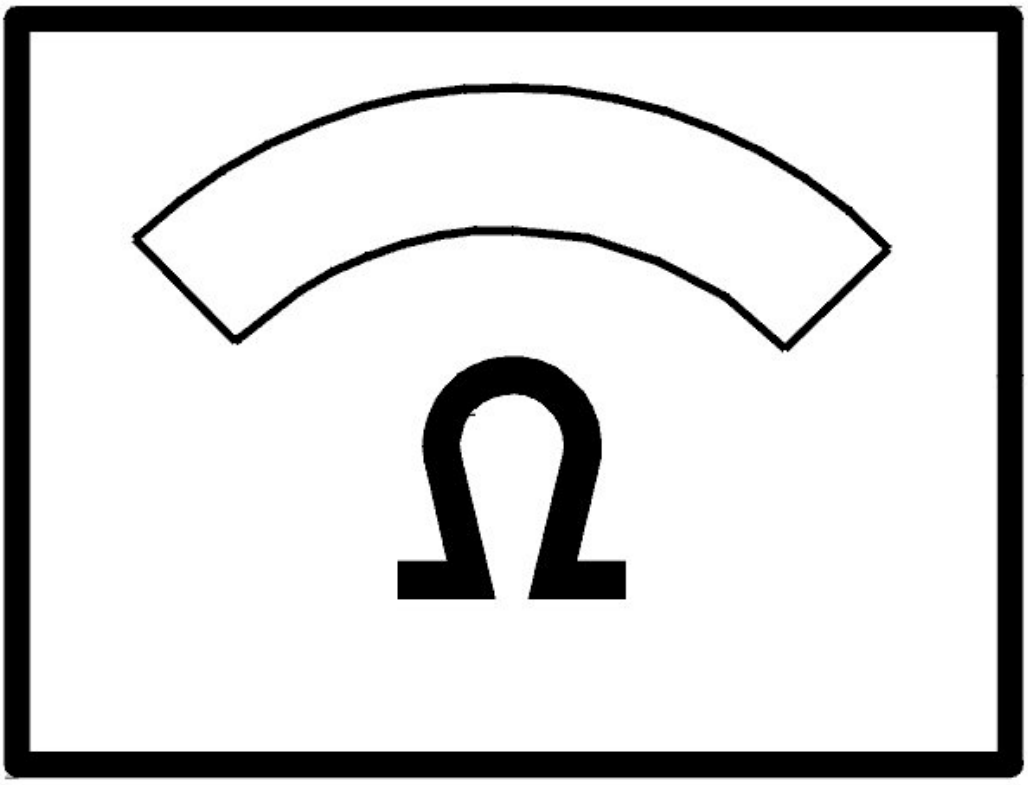
Check the signal cable for the alarm output S1. Check between accessory control module terminal #B34 and the alarm unit connector. Check for a short-circuit to ground. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box,

Accessory Electronic Module (AEM)

- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





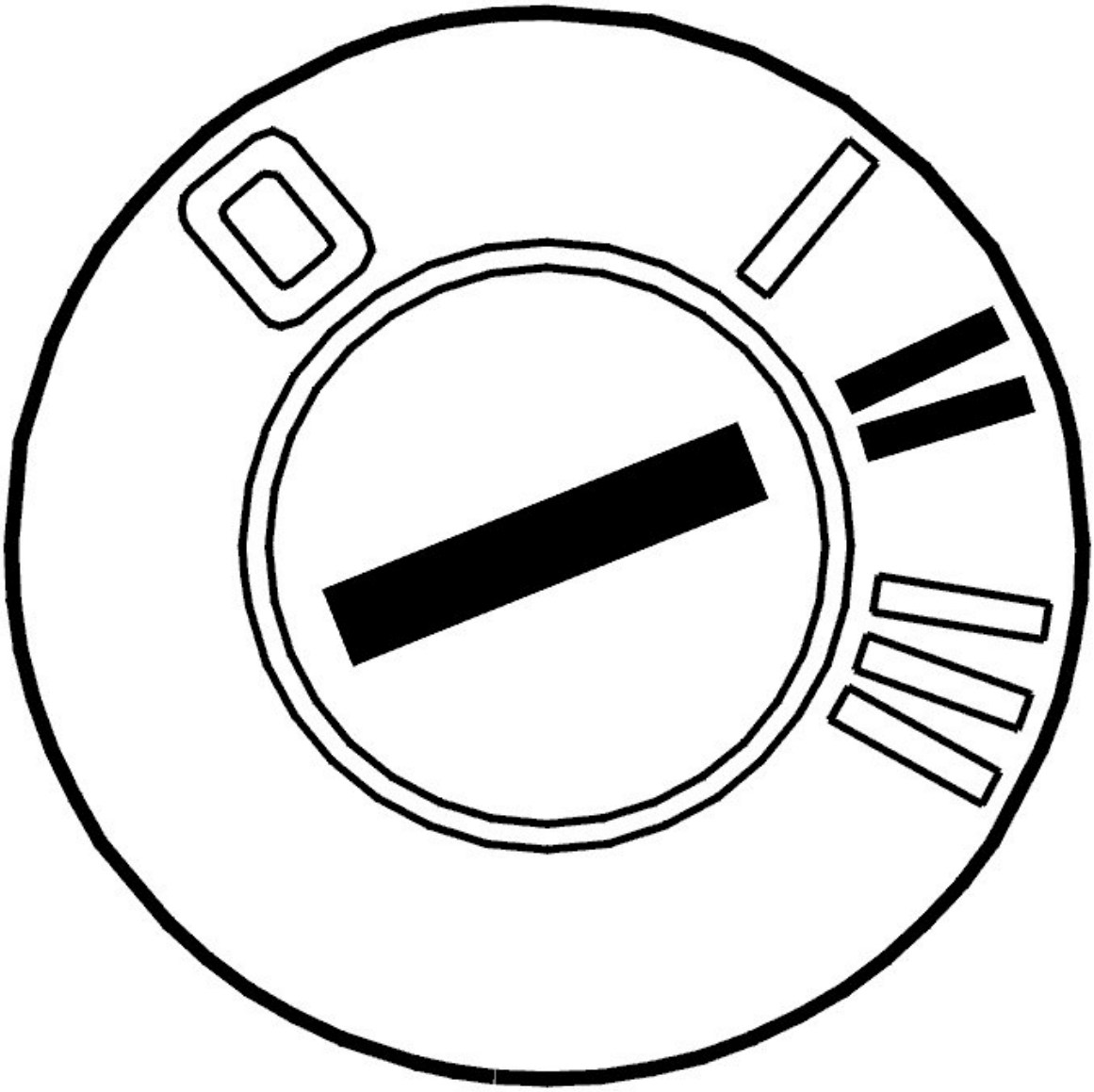
Continue - Verification

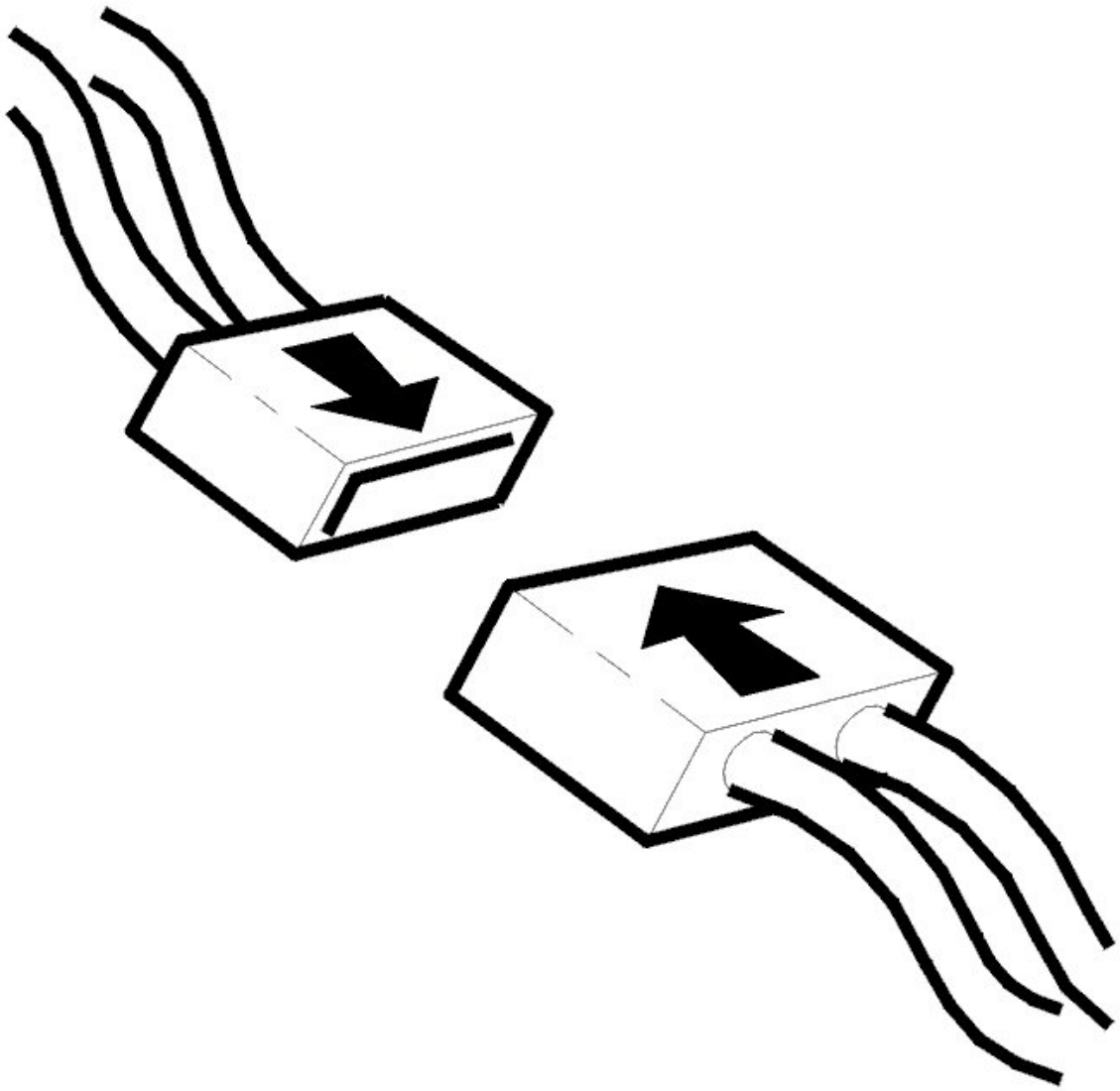
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the alarm by activating it appropriately.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A10 is stored if the control module registers that the signal is too low or there is an open-circuit in the signal cable (carphone mute) for the radio.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the signal cable (carphone mute) is not activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable (carphone mute) for the radio
- Open-circuit in the signal cable (carphone mute) for the radio
- Defective radio.

Fault symptom[s]
- Carphone mute on the radio does not function.

Signal Too Low

Signal too low

Checking components and wiring

Check the signal cable (carphone mute). Check between accessory control module terminal #B12 and the radio connector. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the Accessory Electronic Module (AEM) and connector, see Accessory electronic module (AEM), replacing See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
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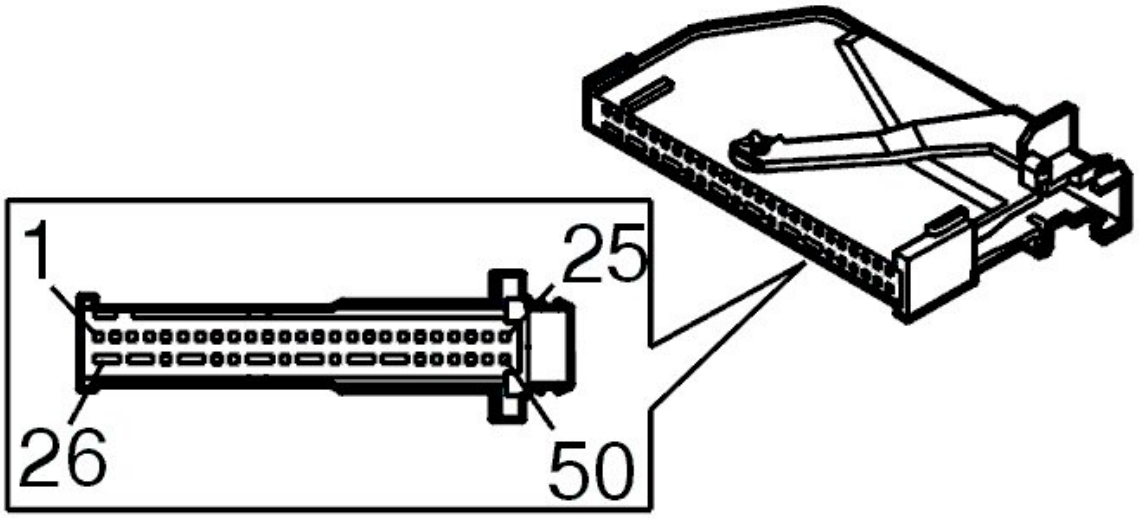
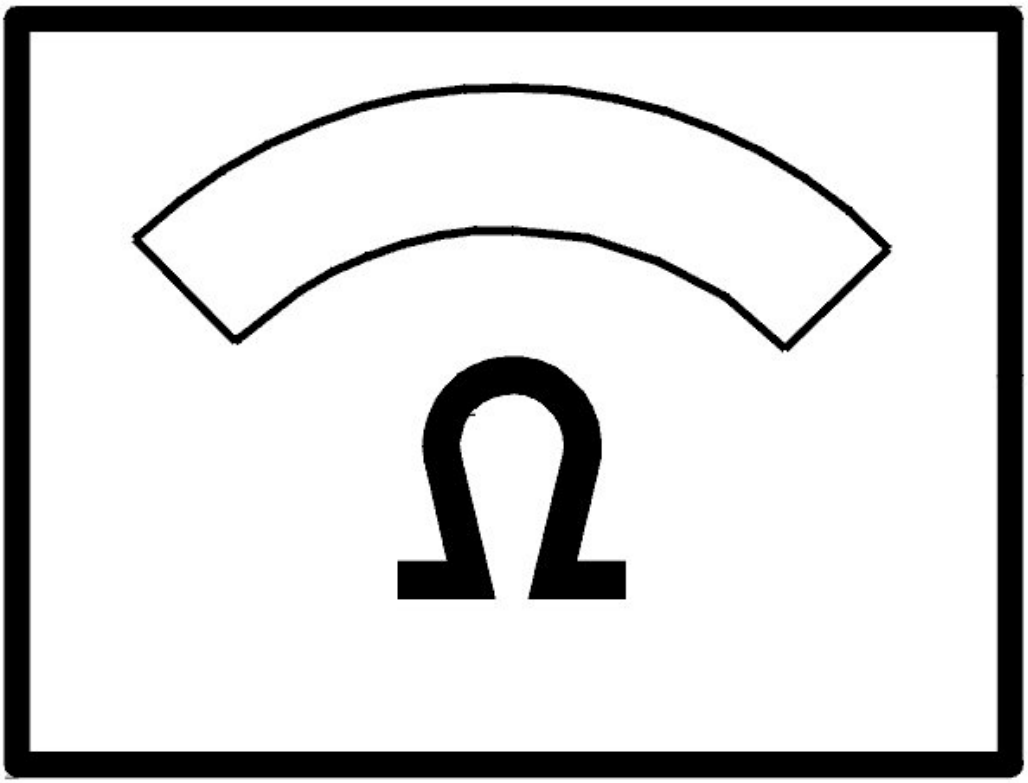




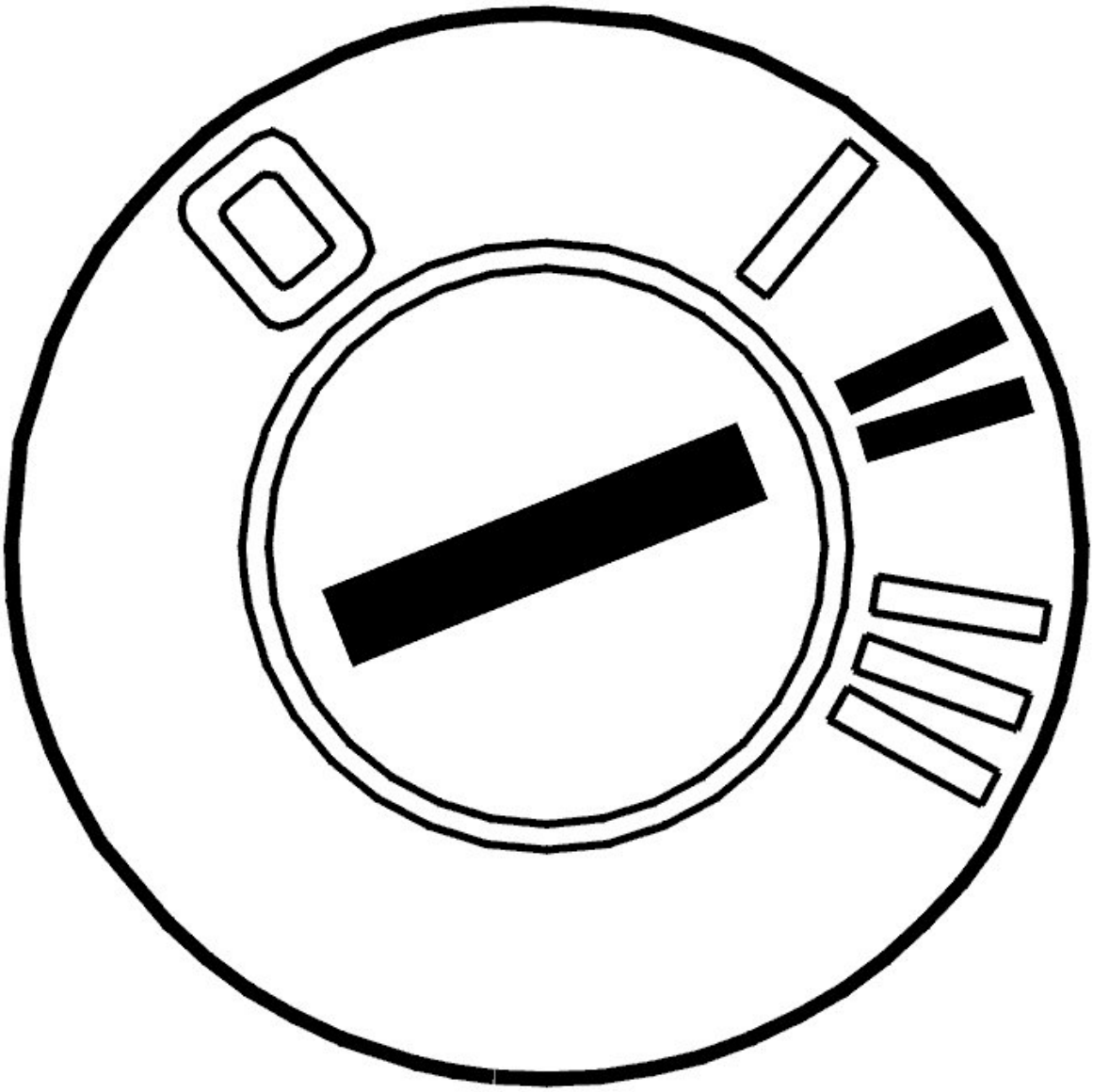
Continue - Verification

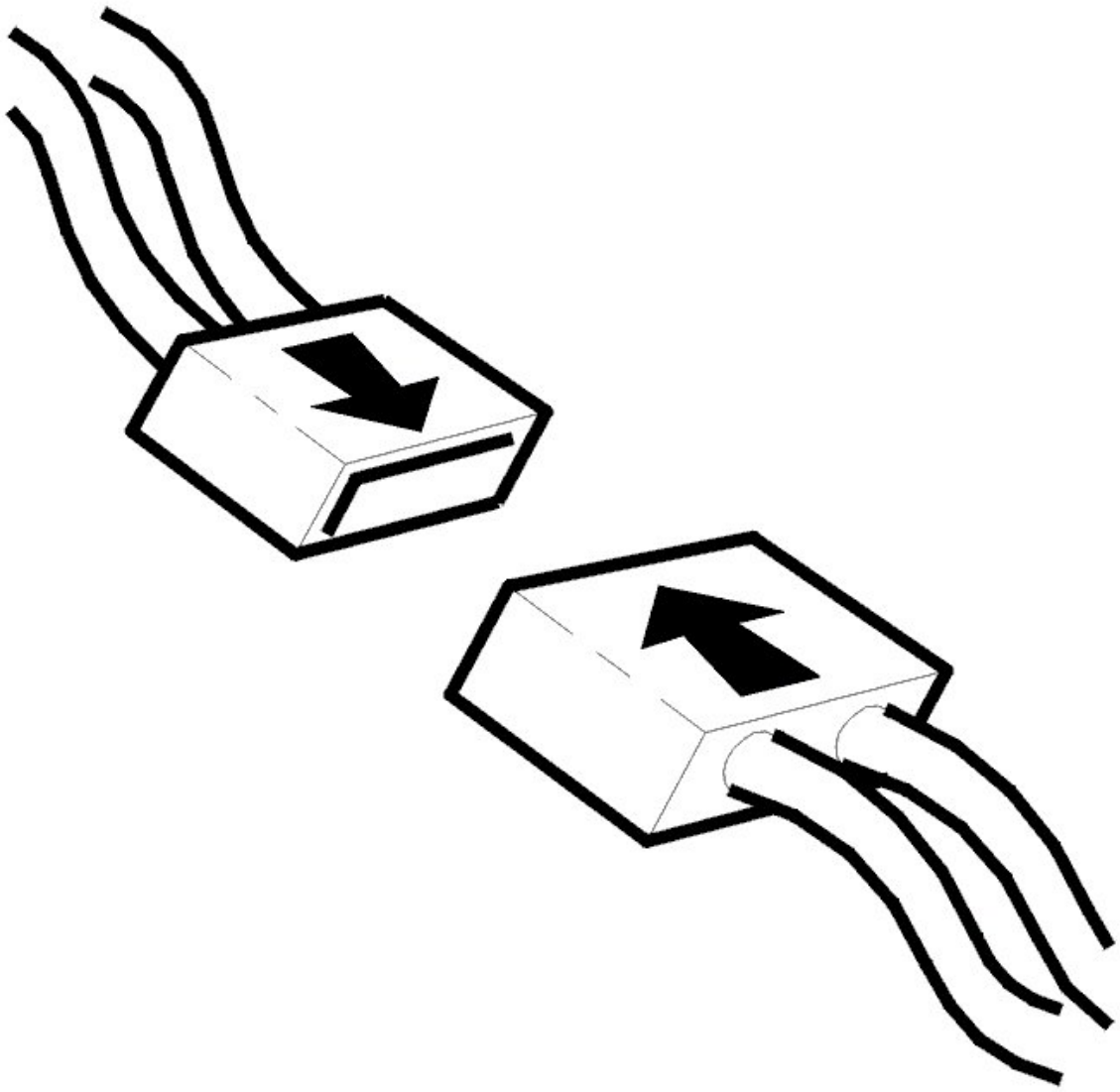
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

If the car is equipped with an original Volvo radio, check the carphone mute function in the accessory electronic module by clicking on the VCT2000 symbol while the radio is on.
If the car is not equipped with an original Volvo radio, the carphone mute function is tested by making a call to the carphone while the radio is on.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A11 is stored if the control module registers that the signal is too high in the signal cable (carphone mute) for the radio.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the signal cable (carphone mute) is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable (carphone mute) for the radio
- Defective radio.

Fault symptom[s]
- Carphone mute on the radio does not function.

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking components and wiring

Check the signal cable (carphone mute). Check between accessory control module terminal #B12 and the radio connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
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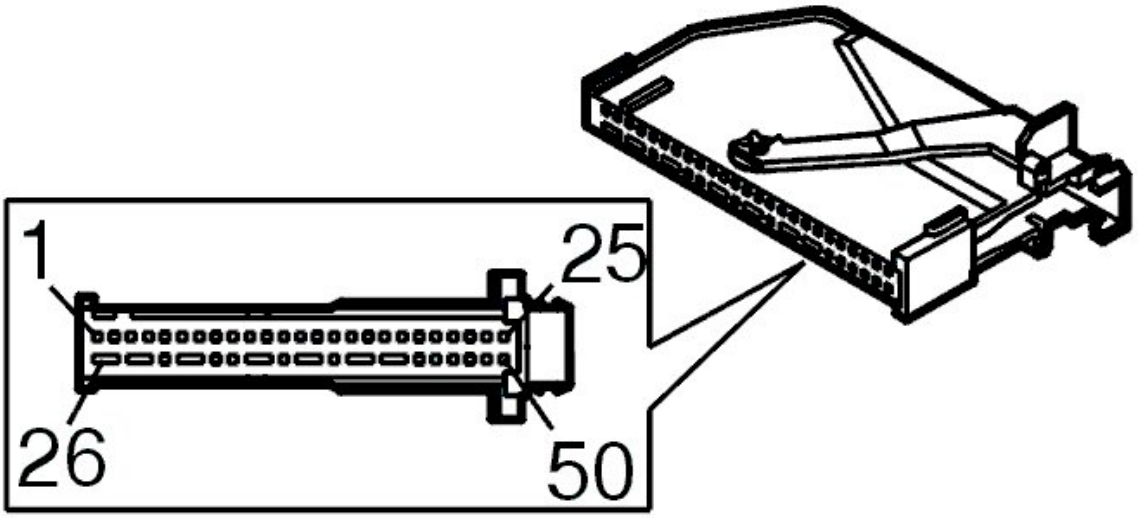
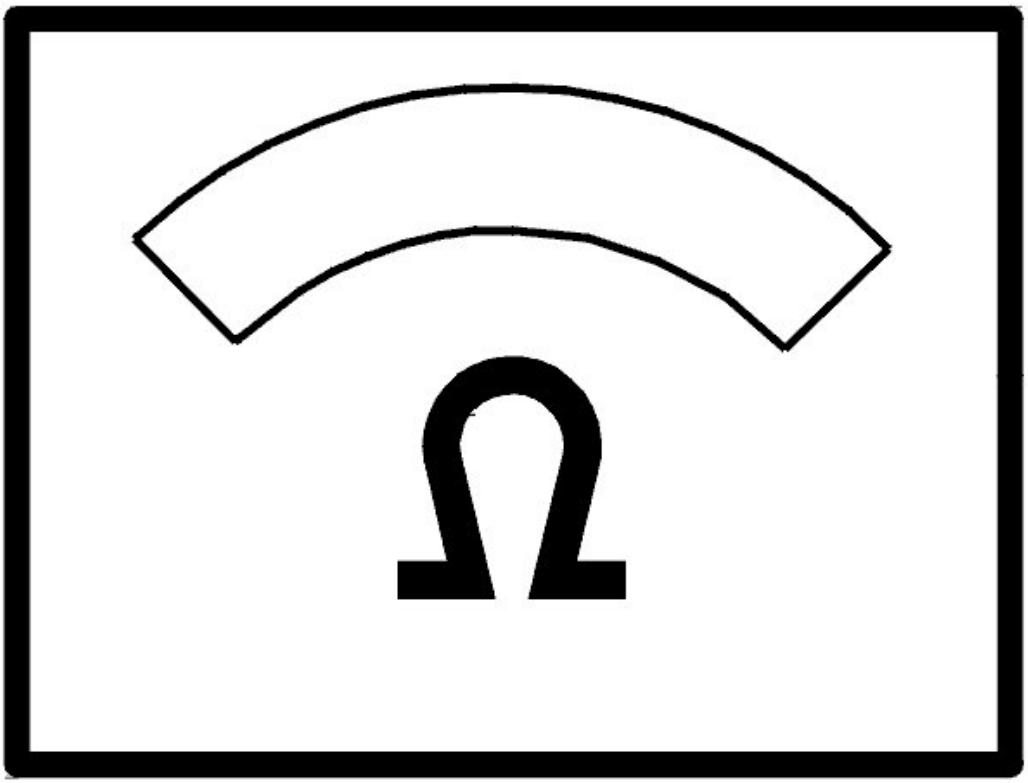




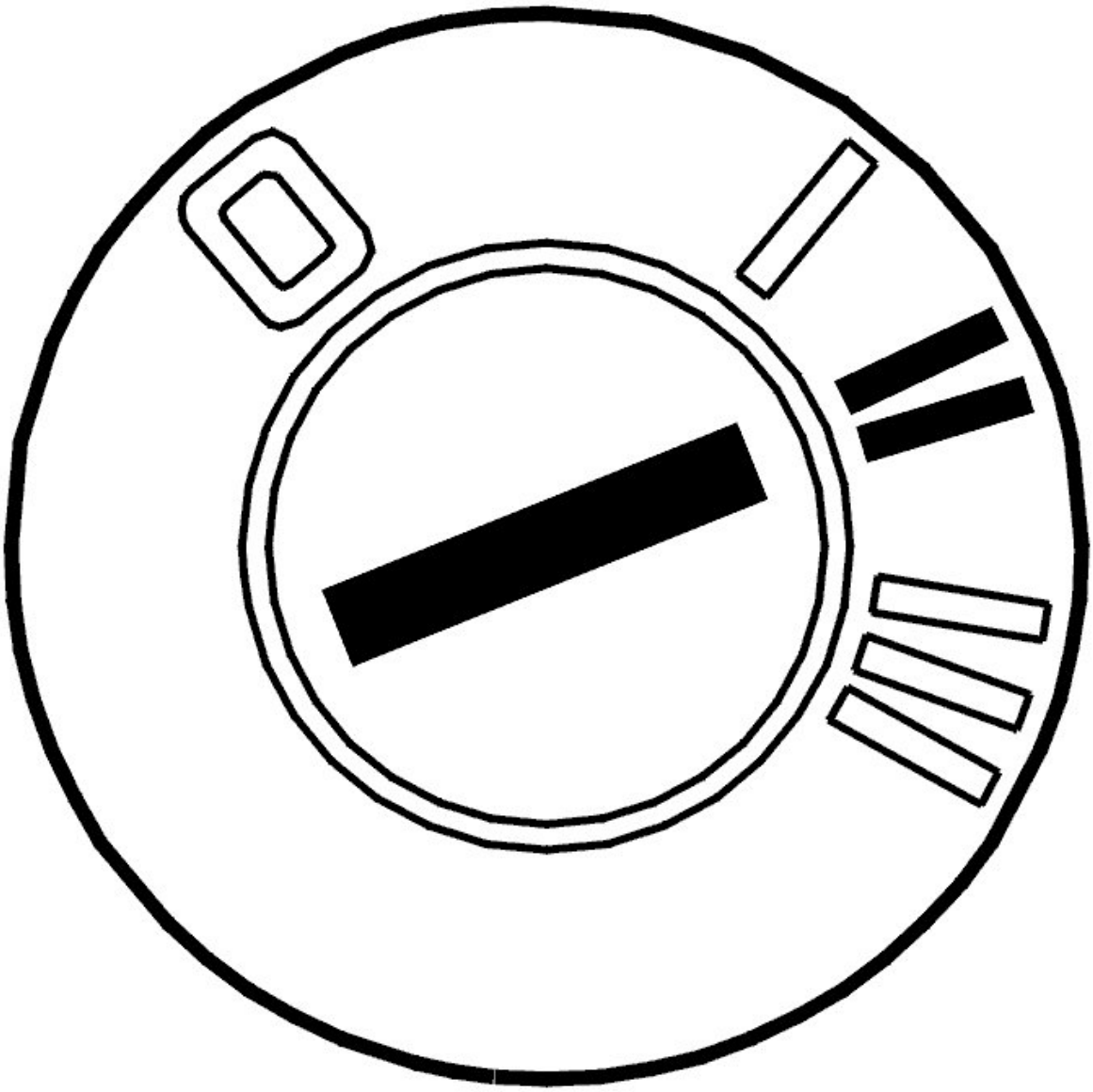
Continue - Verification

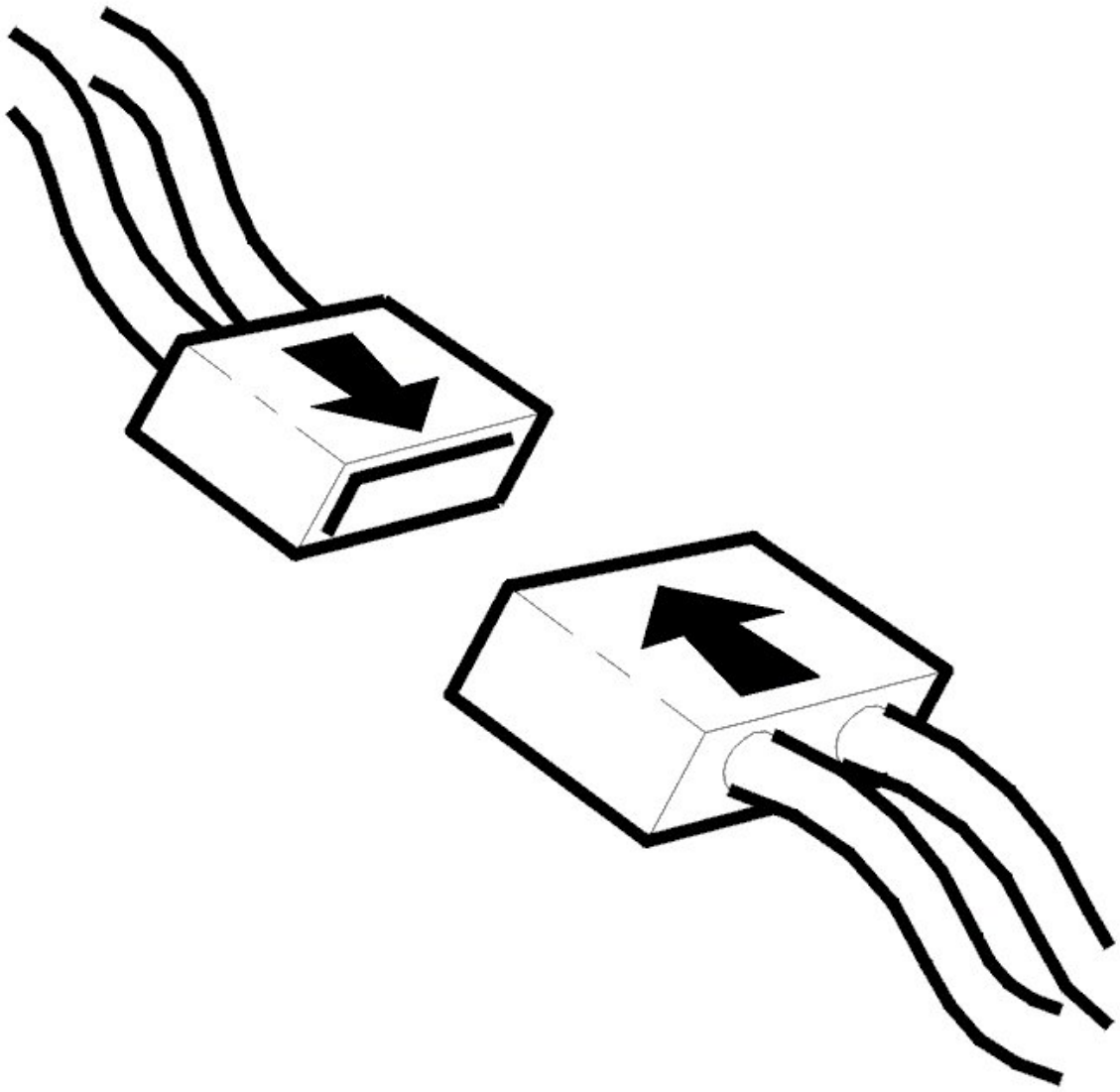
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

If the car is equipped with an original Volvo radio, check the carphone mute function in the accessory electronic module by clicking on the VCT2000 symbol while the radio is on.
If the car is not equipped with an original Volvo radio, the carphone mute function is tested by making a call to the carphone while the radio is on.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A12 is stored if the control module registers that the signal is too low, too high or if there is an open-circuit in the signal cable (rheostat) for the radio.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the signal cable (rheostat) is activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable (rheostat) for the radio
- Short-circuit to supply voltage in the signal cable (rheostat) for the radio
- Open-circuit in the signal cable (rheostat) for the radio
- Defective radio.

Fault symptom[s]
- The rheostat function on the audio system is not working.

Signal Too Low / High or Signal Missing

Signal too low / high or signal missing

Checking components and wiring

Check the signal cable (rheostat). Check between accessory control module terminal #B13 and the connector for the radio. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the accessory electronic module and connector, see Replacing the accessory electronic module, B5244T5, B5254T2 See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
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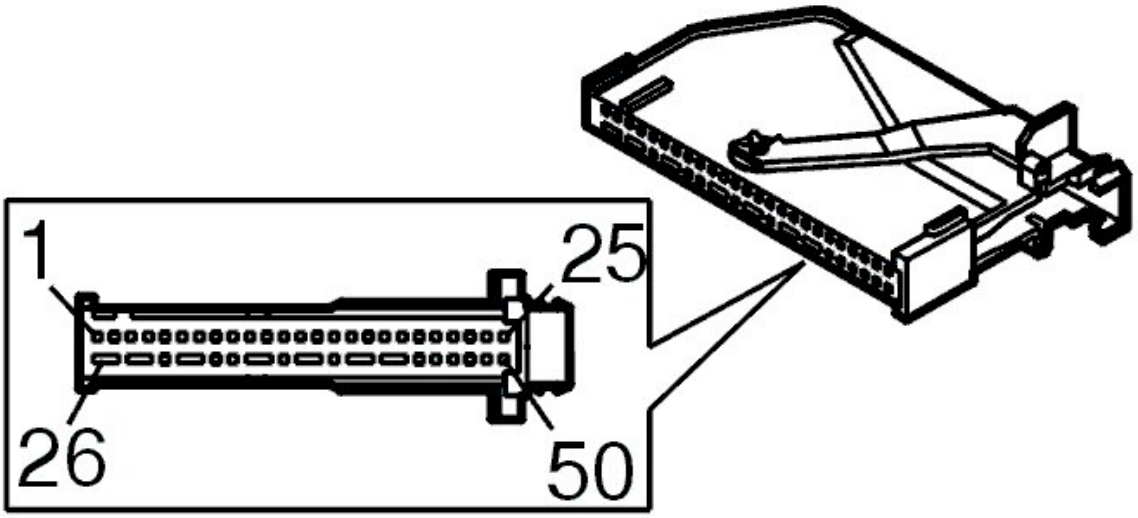
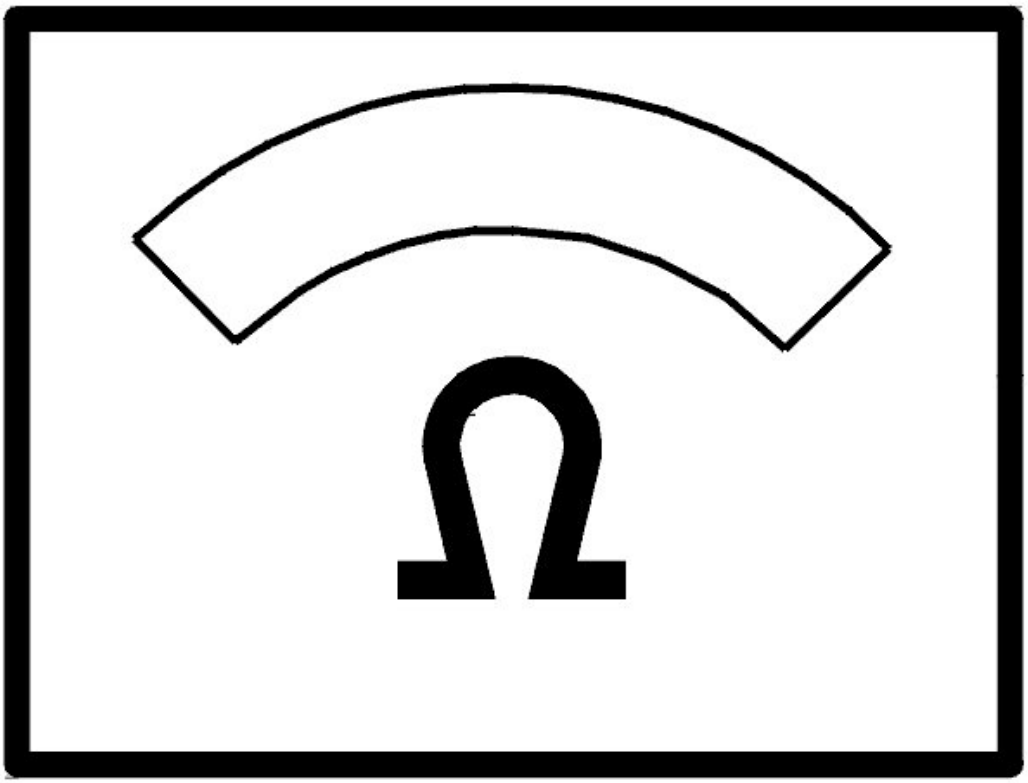




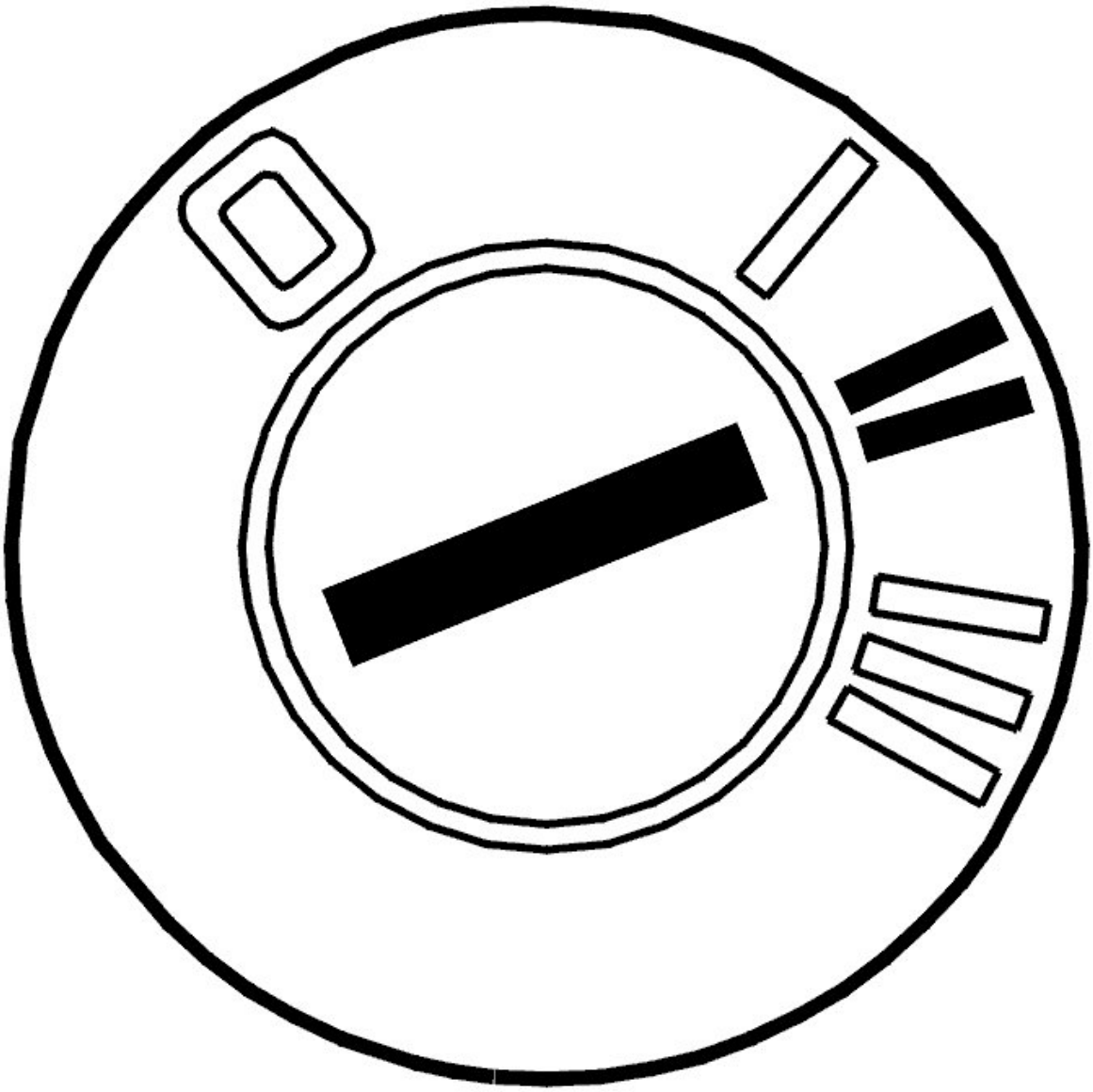
Continue - Verification

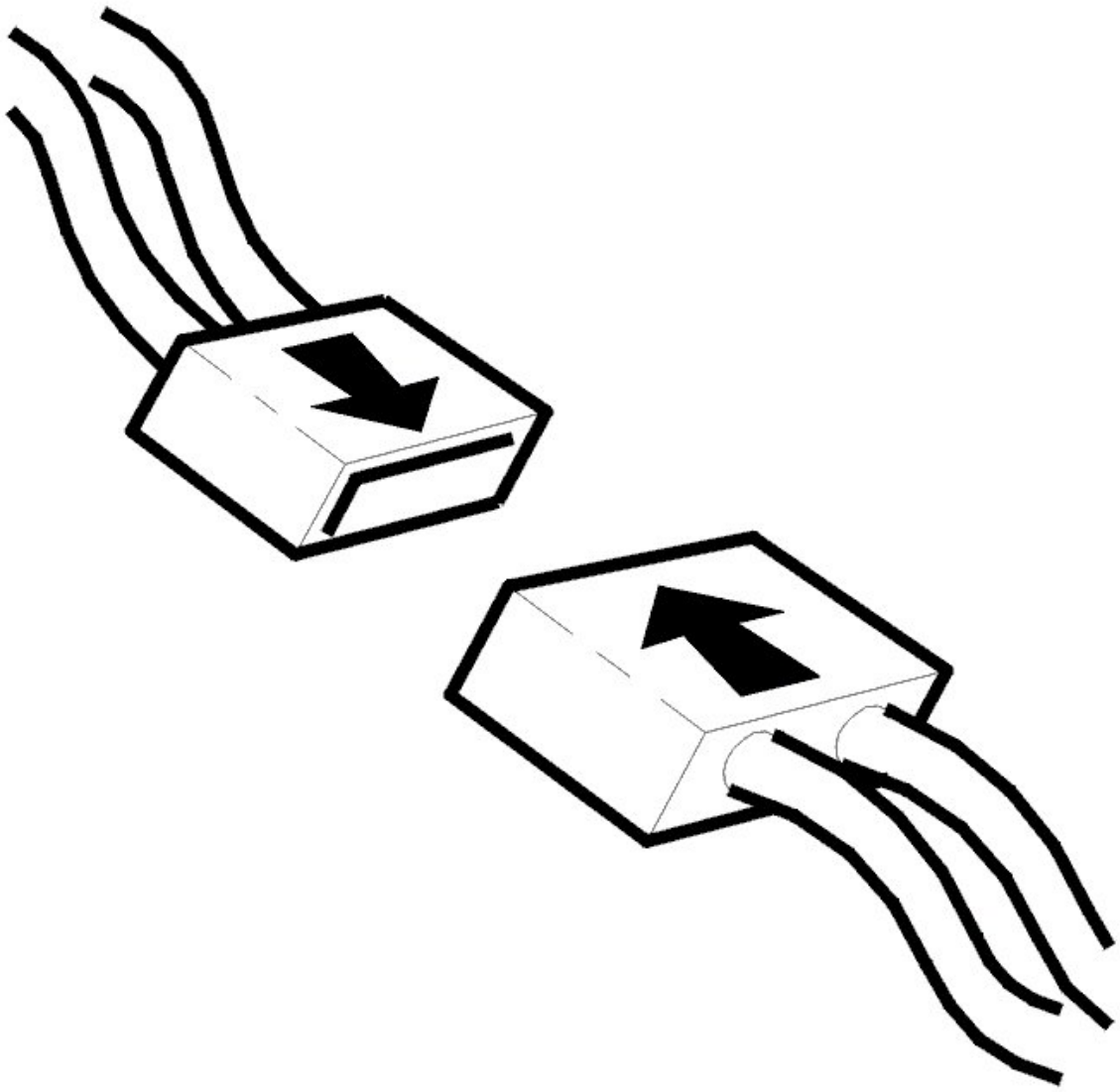
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the rheostat function by clicking on the VCT2000 symbol while the radio is on.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A14 is stored if the control module registers that the signal is too low, too high or if there is an open-circuit in the signal cable (speed) for the radio.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the signal cable (speed) is activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable (speed) for the radio
- Short-circuit to supply voltage in the signal cable (speed) for the radio
- Open-circuit in the signal cable (speed) for the radio
- Defective radio.

Fault symptom[s]
- None.

Signal Too Low / High or Signal Missing

Signal too low / high or signal missing

Checking components and wiring

Check the signal cable (speed). Check between accessory control module terminal #B14 and the connector for the radio. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the accessory electronic module and connector, see Replacing the accessory electronic module, B5244T5, B5254T2 See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
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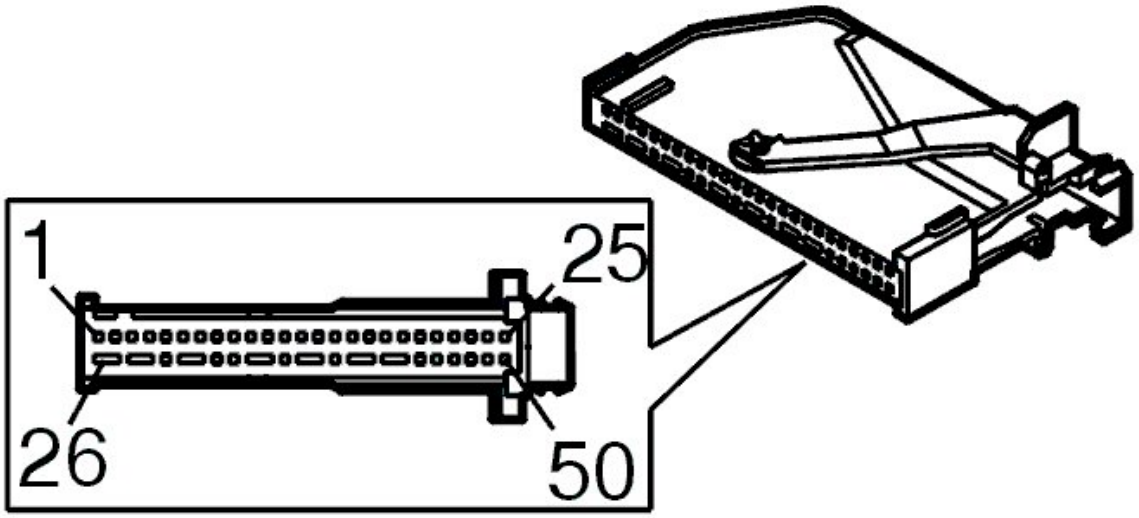
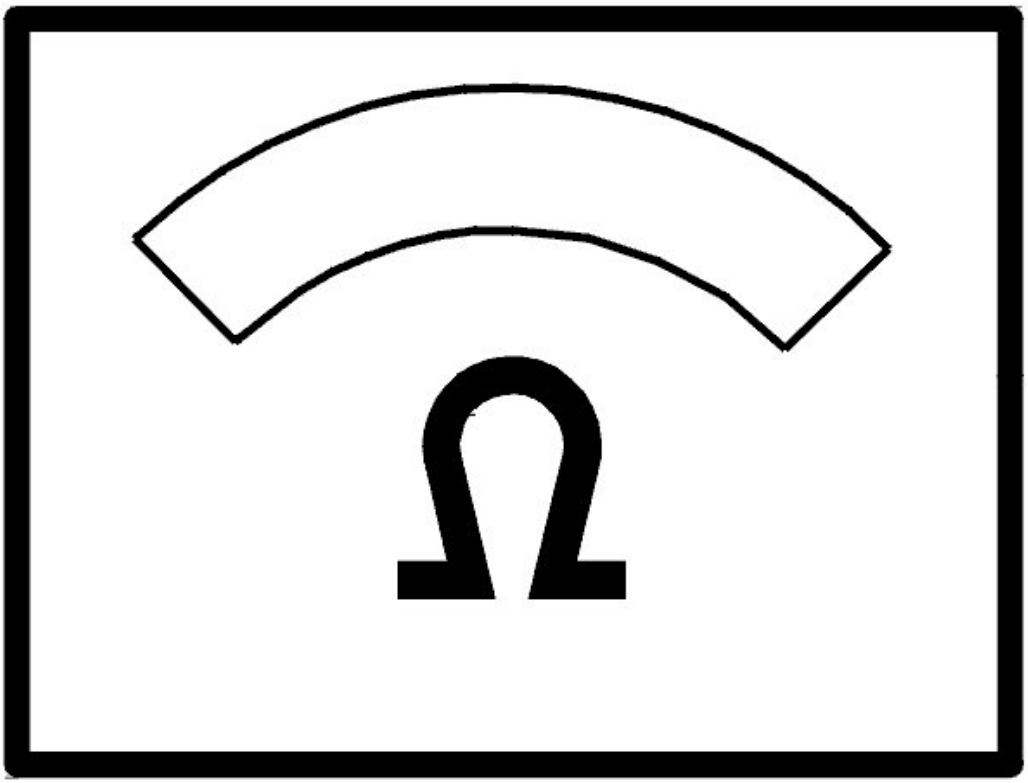




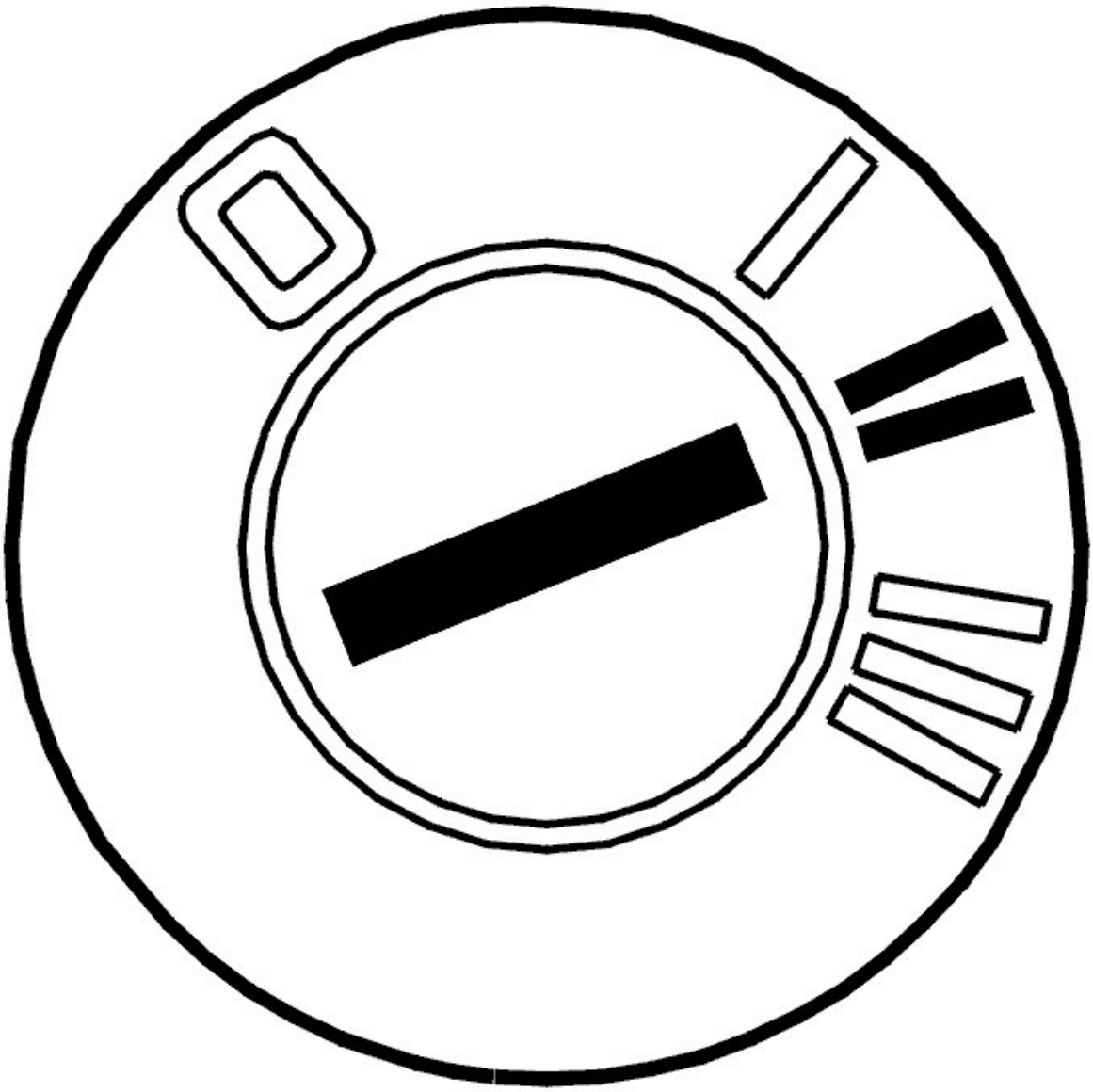
Continue - Verification

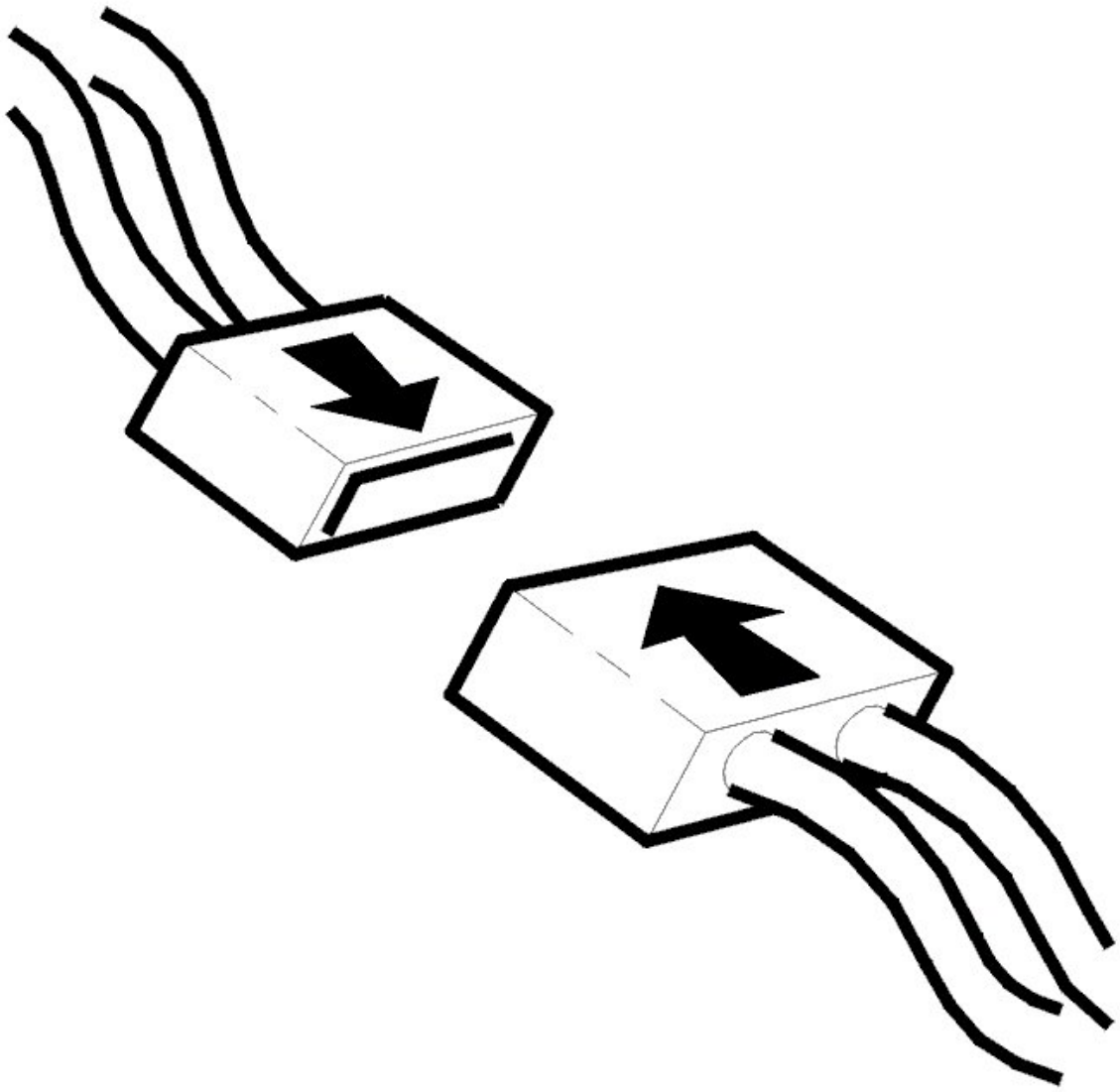
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the speed function by clicking on the VCT2000 symbol while the radio is on.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A16 is stored if the control module registers that the signal is too low in the power supply for the antenna amplifier.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the power supply for the antenna amplifier is activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the power supply cable for the antenna amplifier
- Defective antenna amplifier.

Fault symptom[s]
- Poor radio reception.

Signal Too Low

Signal too low

Checking components and wiring

Check the power supply cable between accessory control module terminal #B30 and the antenna amplifier connector. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
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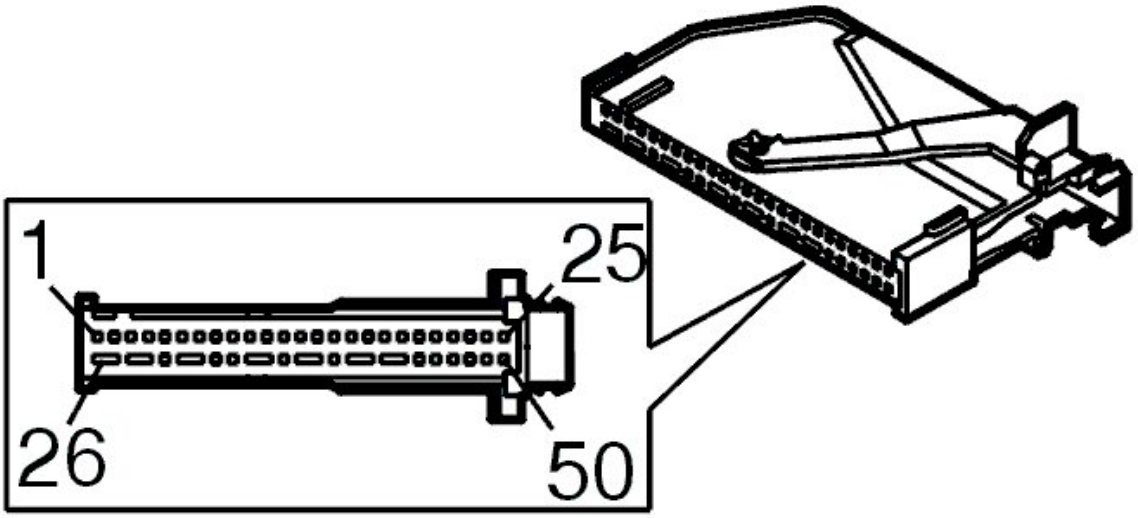
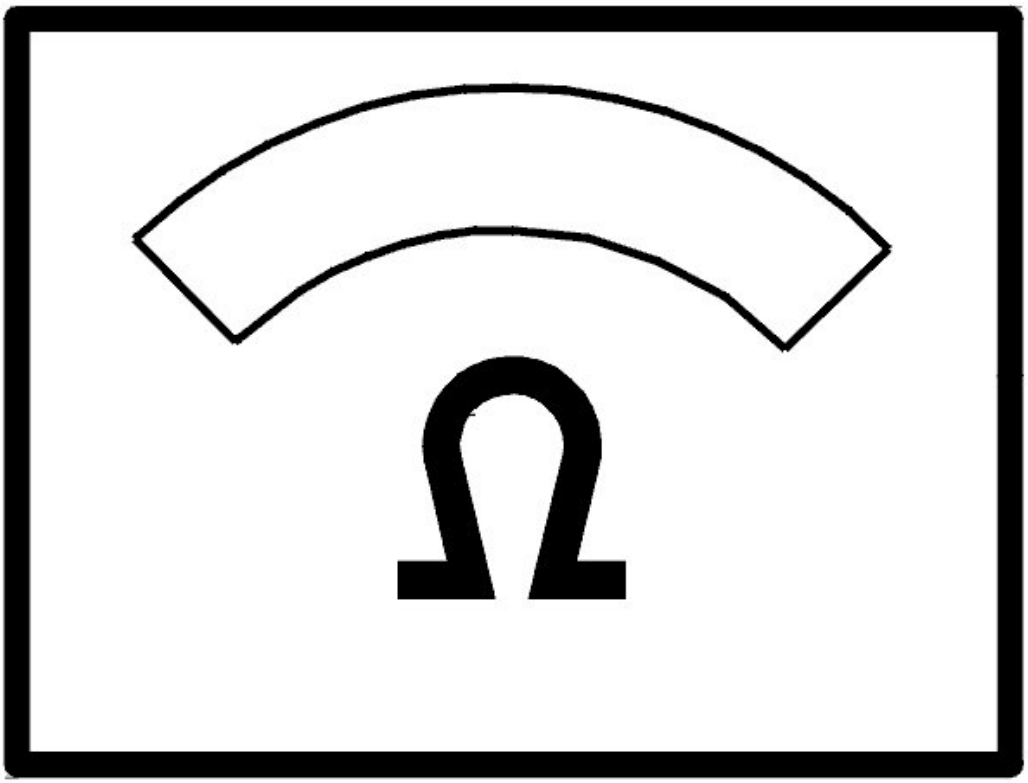




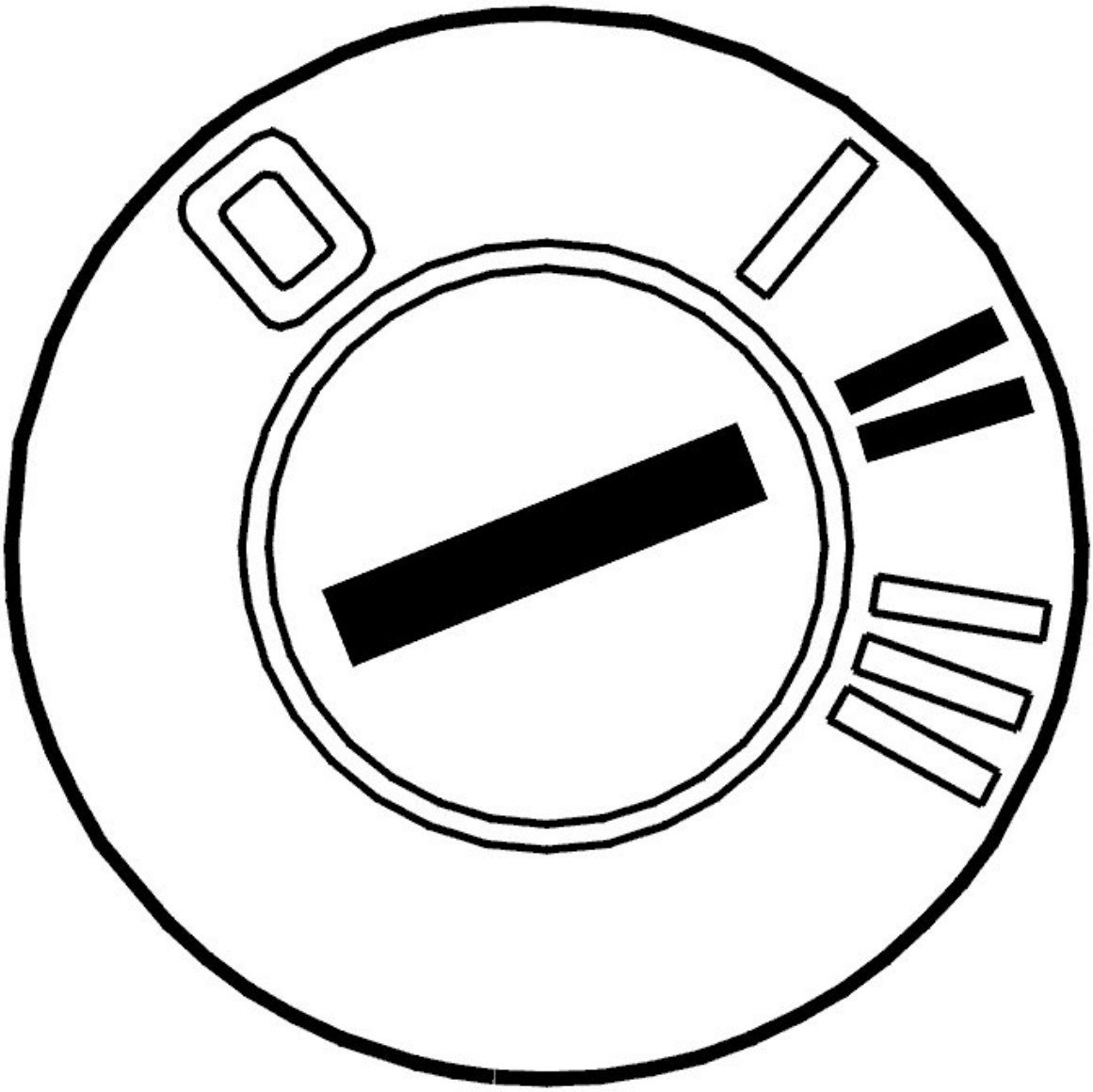
Continue - Verification

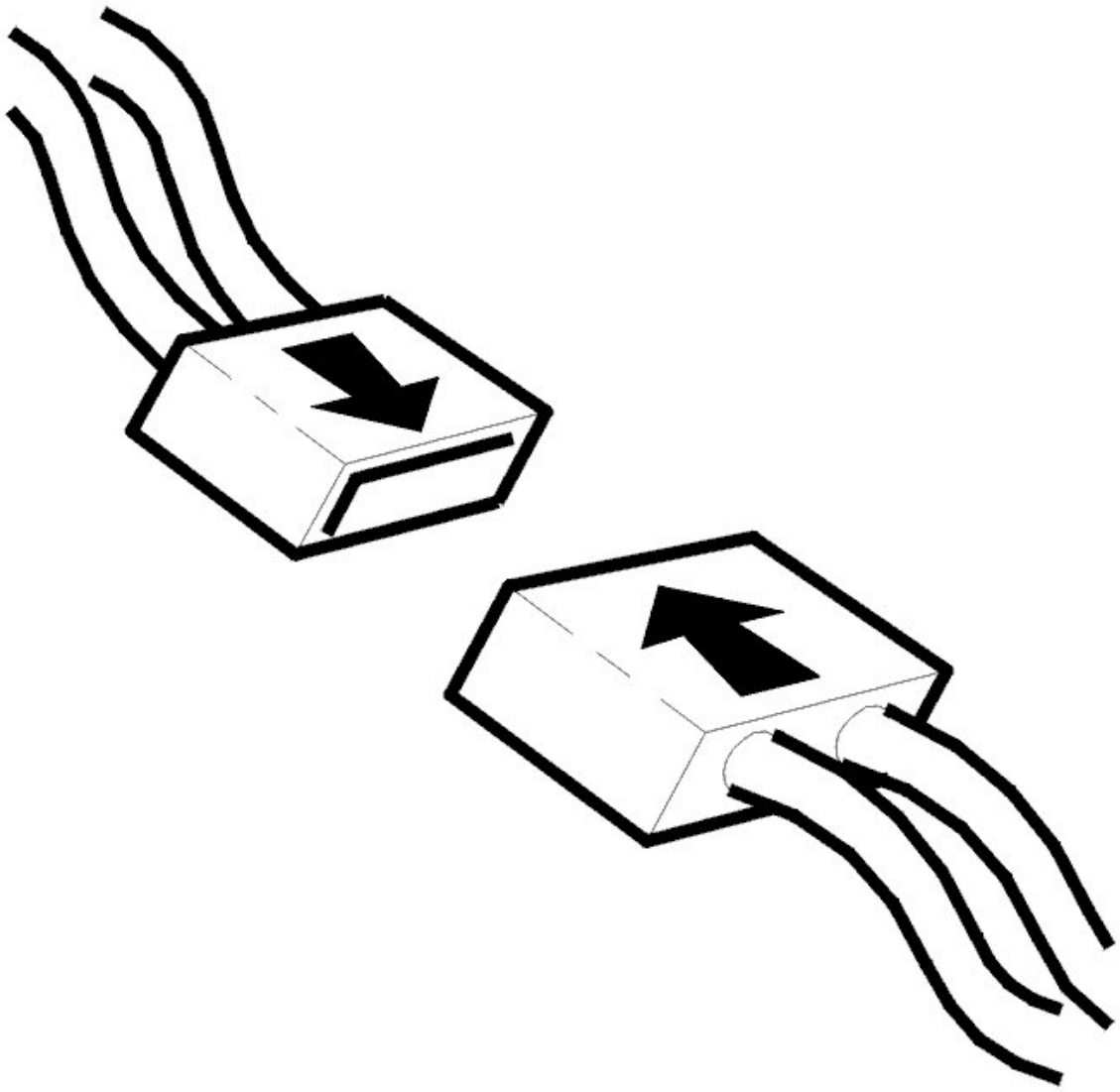
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the antenna amplifier.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AEM-7A17 is stored if the control module registers that the signal is too high or there is an open-circuit in the power supply for the antenna amplifier.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is on and the power supply for the antenna amplifier is not activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the power supply cable for the antenna amplifier
- Open-circuit in the power supply cable for the antenna amplifier
- Open-circuit in the ground lead for the antenna amplifier
- Defective antenna amplifier.

Fault symptom[s]
- Poor radio reception.

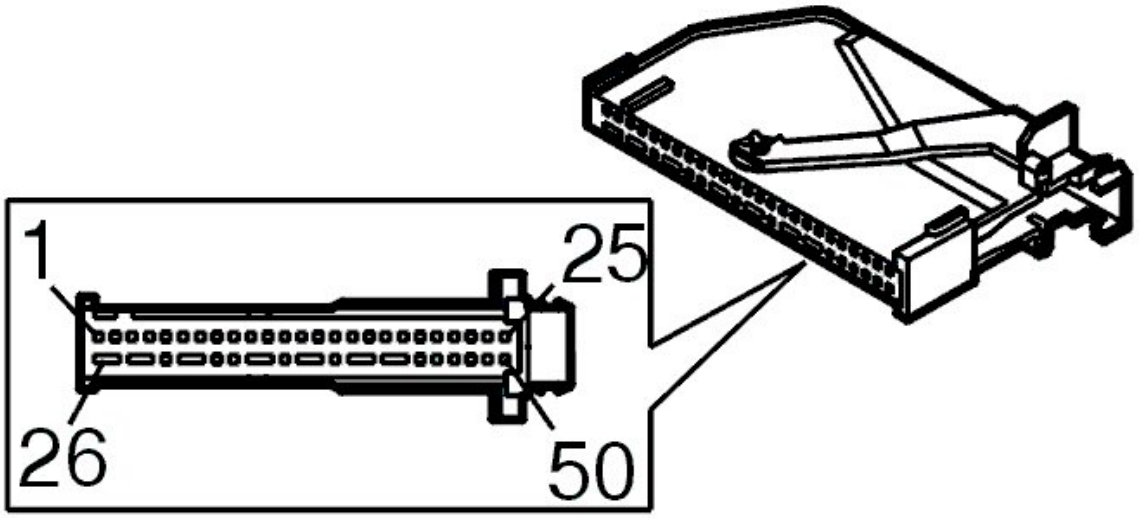
Signal Too High / Signal Missing

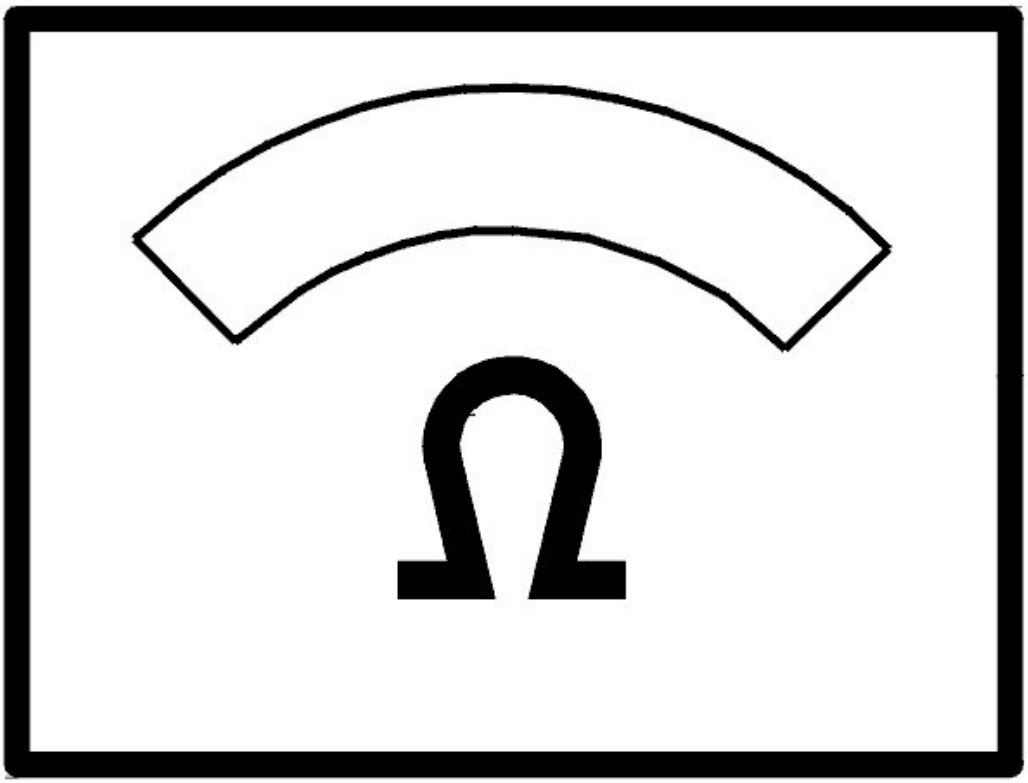
Signal too high / Signal missing

Checking components and wiring

Check the power supply cable between accessory control module terminal #B30 and the antenna amplifier connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box. Accessory electronic module See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Accessory Electronic Module (AEM)
- To access or replace the accessory electronic module and connector, see Replacing the accessory electronic module, B5244T5, B5254T2 See: Body Control Module/Service and Repair/Replacing the Accessory Electronic Module
- For information about signals, see Signal description. Accessory electronic module (AEM) See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Accessory Electronic Module (AEM)
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





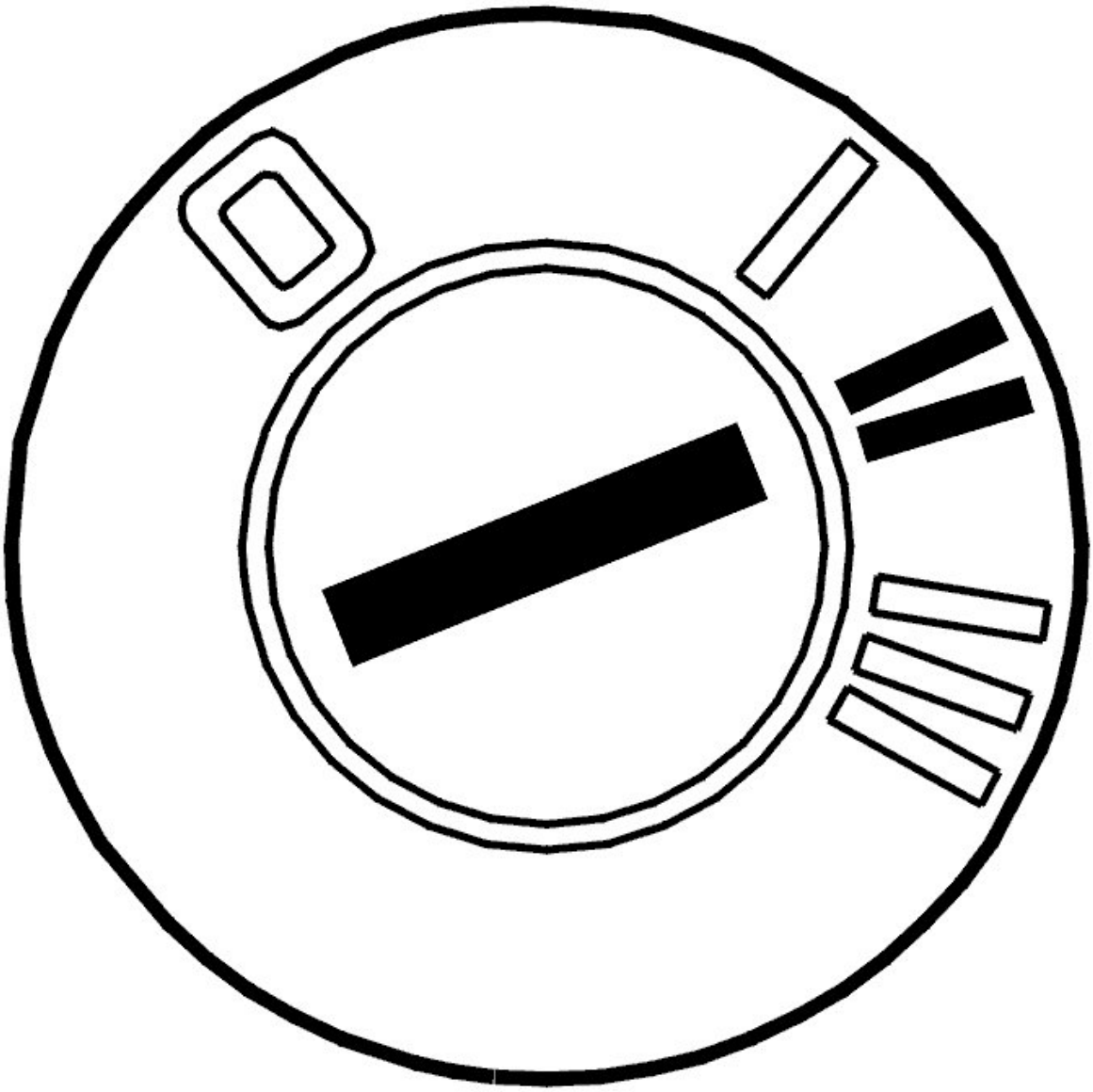
Continue - Verification

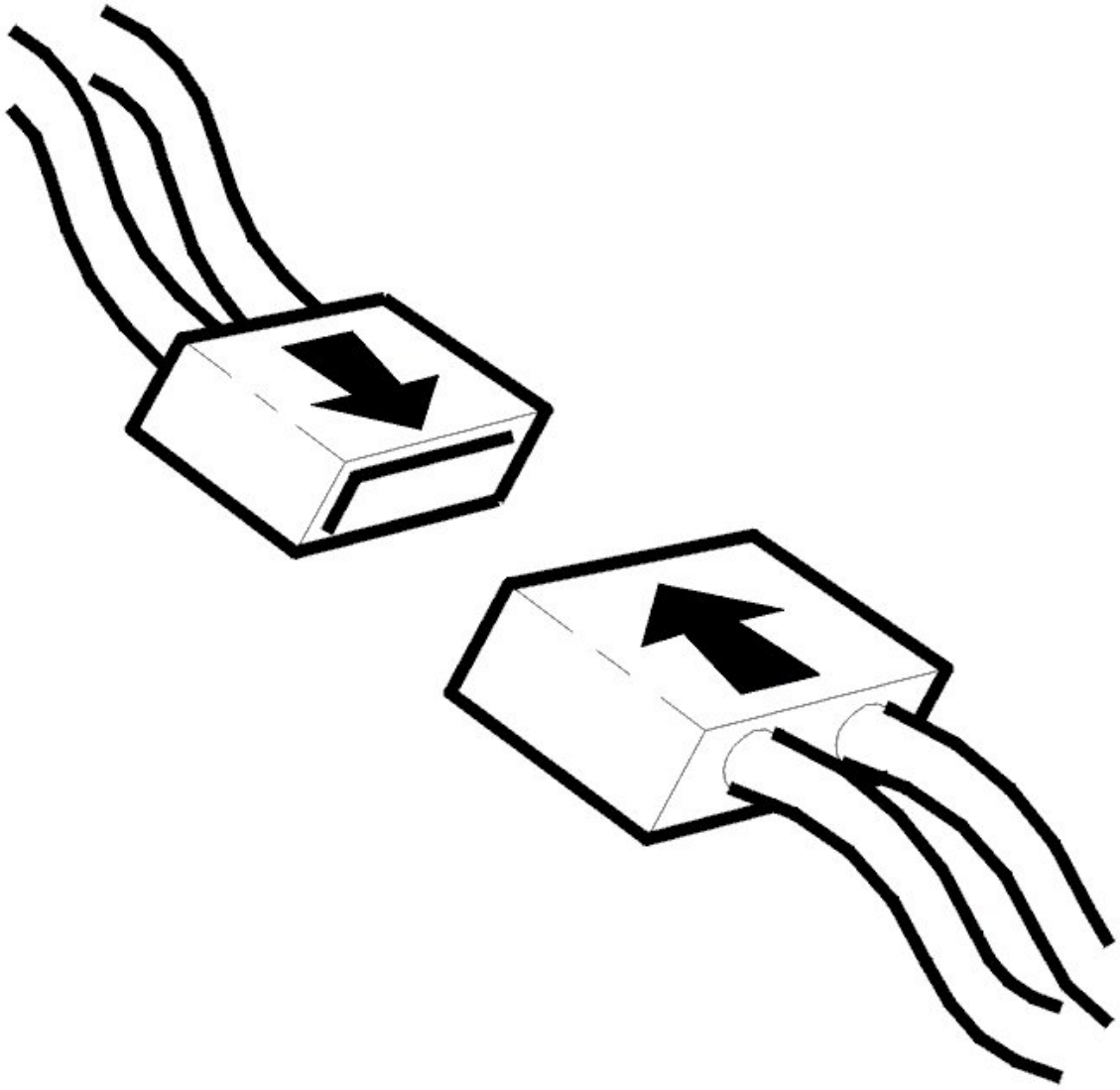
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the function of the antenna amplifier.

Does the system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

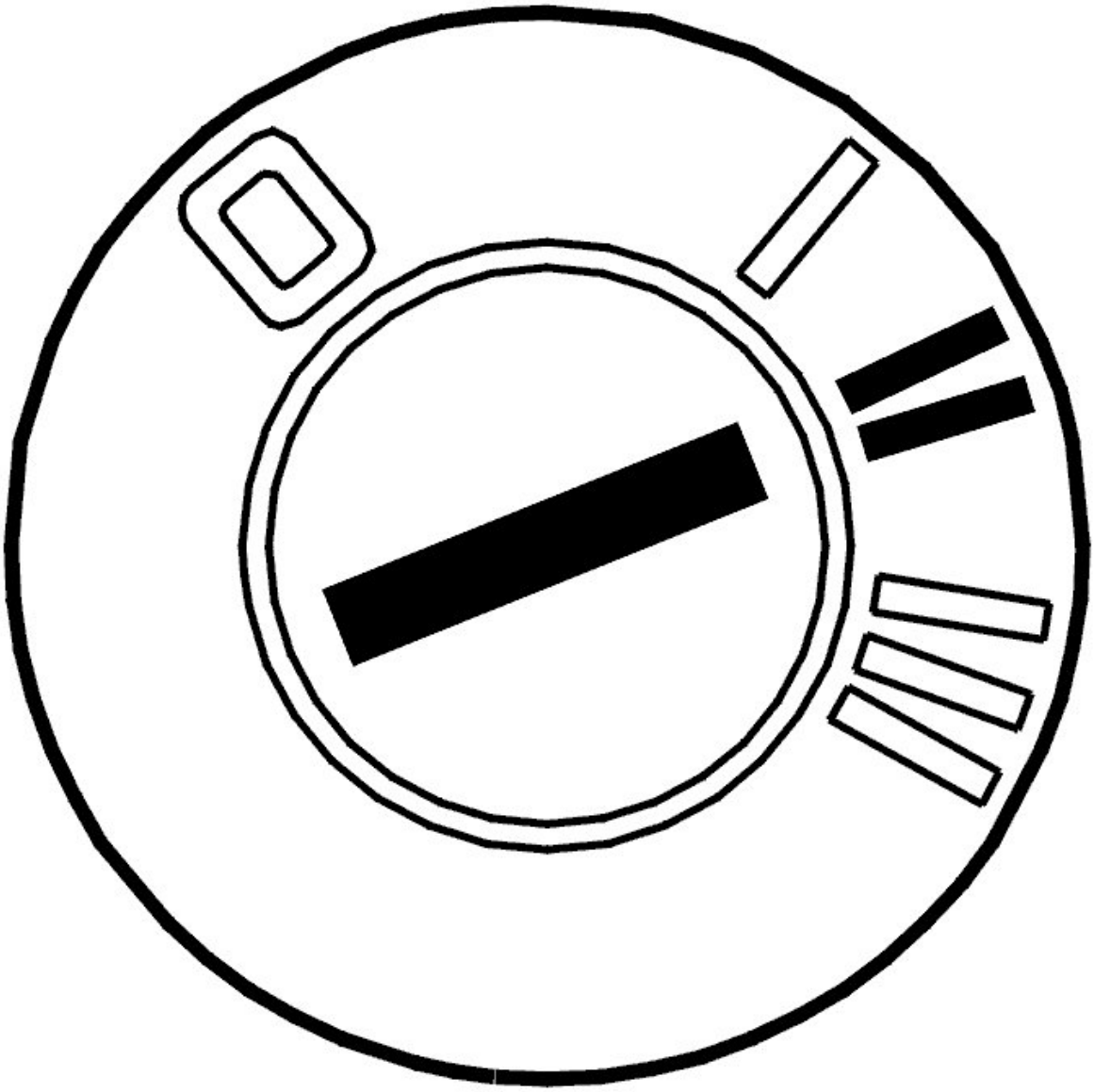
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

AEM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTC)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4BFF is stored if the control module registers that there was a fault when the software was downloaded.

Possible source
- Fault when downloading new software.

Fault symptom[s]
- The rheostat does not function.
- Keypad lighting not operating.
- The carphone mute does not function.

Internal program Fault. Intermittent Fault

Internal program fault. Intermittent fault

Fault-tracing information

An internal program fault has been found in the head unit/audio control module. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4BFF is stored if the control module registers that there was a fault when the software was downloaded.

Possible source
- Fault when downloading new software.

Fault symptom[s]
- The rheostat does not function.
- Keypad lighting not operating.
- The carphone mute does not function.

Internal program Fault. Permanent Fault

Internal program fault. Permanent fault

Downloading new software

Download new software because an internal program fault has been discovered in the head unit / audio control module.

Other information:
- For information about programming the head unit / audio control module see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

Select "Continue" when the fault has been remedied.

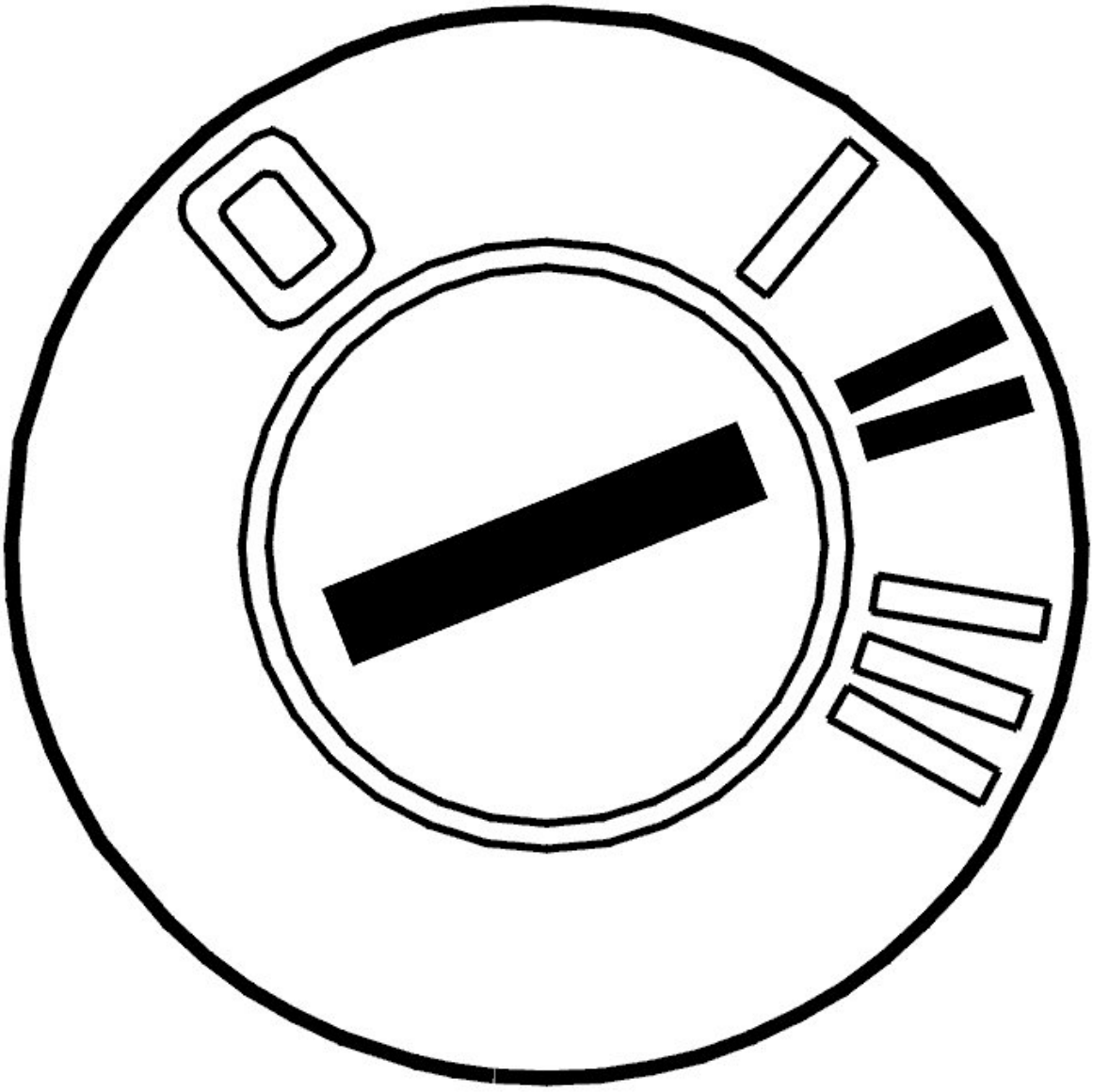
Continue - Verification

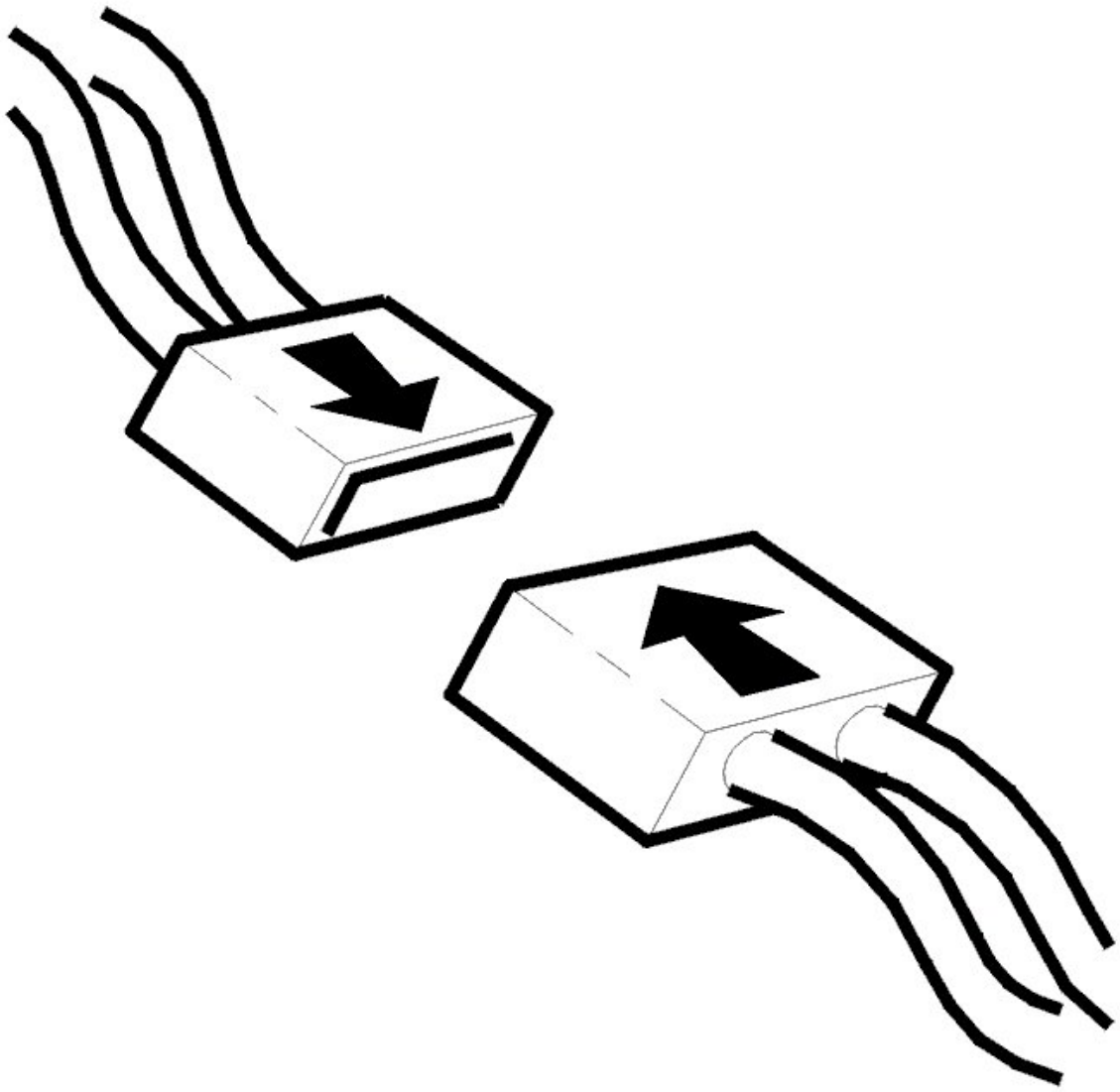
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that sound reproduction is OK.

Is sound reproduction OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Downloading new software

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AUM-36EF

Condition

Audio module (AUM) checks the signal on the leads from the satellite antenna. The diagnostic trouble code (DTC) is stored if the control module registers an open-circuit in the signal cable.
The diagnostic trouble code can be diagnosed upon start-up of the control module.

Substitute value
- Nothing.

Possible source
- Open circuit on signal cable.

Fault symptom[s]
- Poor radio reception

Fault-tracing

Fault-tracing

Checking satellite antenna

Check the cables for open circuit and short circuit to ground.
For further information see:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault-tracing information

Fault-tracing information

FAULT FOUND - DONE

Attempt New Test - Checking satellite antenna

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information AUM-36E1

Condition

Audio module (AUM) checks the signal on the leads from the satellite antenna. The diagnostic trouble code (DTC) is stored if the control module registers that the signal is too low.
The diagnostic trouble code can be diagnosed upon start-up of the control module.

Substitute value
- Nothing.

Possible source

- The signal cable is short-circuited to ground.

Fault symptom[s]
- Poor radio reception

Fault-tracing

Fault-tracing

Checking satellite antenna

Check the cables for open circuit and short circuit to ground.
For further information see:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault-tracing information

Fault-tracing information

FAULT FOUND - DONE

Attempt New Test - Checking satellite antenna

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-40FF is stored if the head unit/audio control module registers that there is an open-circuit in the power supply to the main antenna or a faulty installation.

Possible source
- Open-circuit in the power supply from the head unit/audio control module to the main antenna.
- Main antenna not installed.
- Defective antenna amplifier.

Fault symptom[s]
- Poor radio reception (AM).

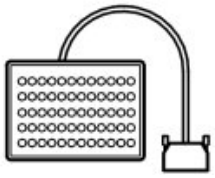
Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Checking contact resistance, oxidation and wiring

Check the antenna amplifier and the head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy if necessary.
Check the cables between the antenna amplifier terminal #C1 and head unit / audio control module terminal #A9 for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-40FF is stored if the head unit/audio control module registers that there is an open-circuit in the power supply to the main antenna or a faulty installation.

Possible source
- Open-circuit in the power supply from the head unit/audio control module to the main antenna.
- Main antenna not installed.
- Defective antenna amplifier.

Fault symptom[s]
- Poor radio reception (AM).

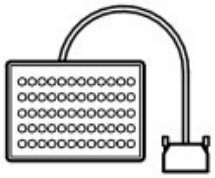
Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking the wiring and component

Check the cable between the window antenna amplifier (thin pin) and head unit / audio control module terminal #A9 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the wiring between the window antenna amplifier (center pin on the coaxial cable) and terminal #HC1 (center pin).
Remedy as necessary.
If no fault is found, replace the antenna amplifier.

Other information
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Select "Continue" when the fault has been remedied.

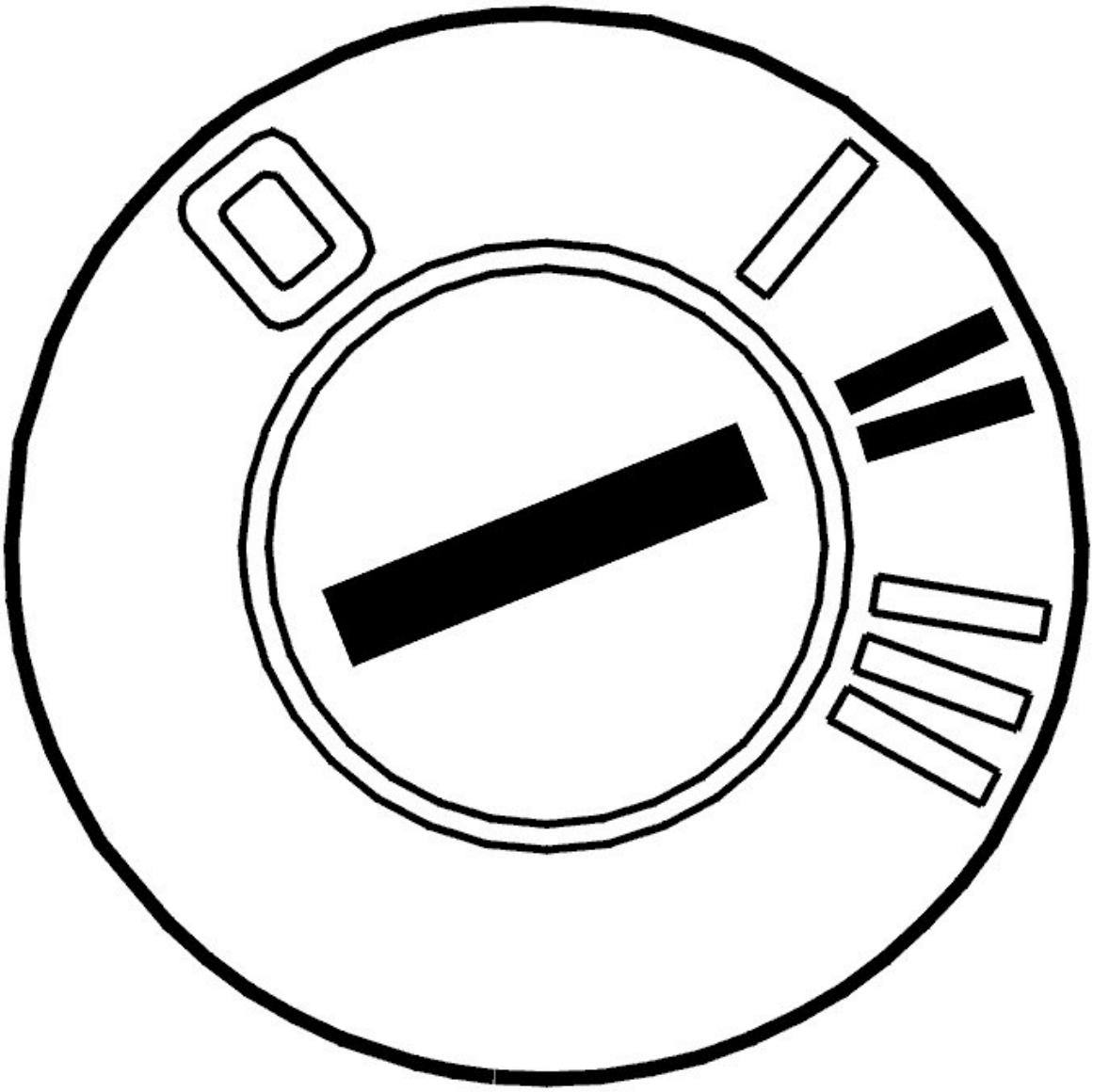
Continue - Verification

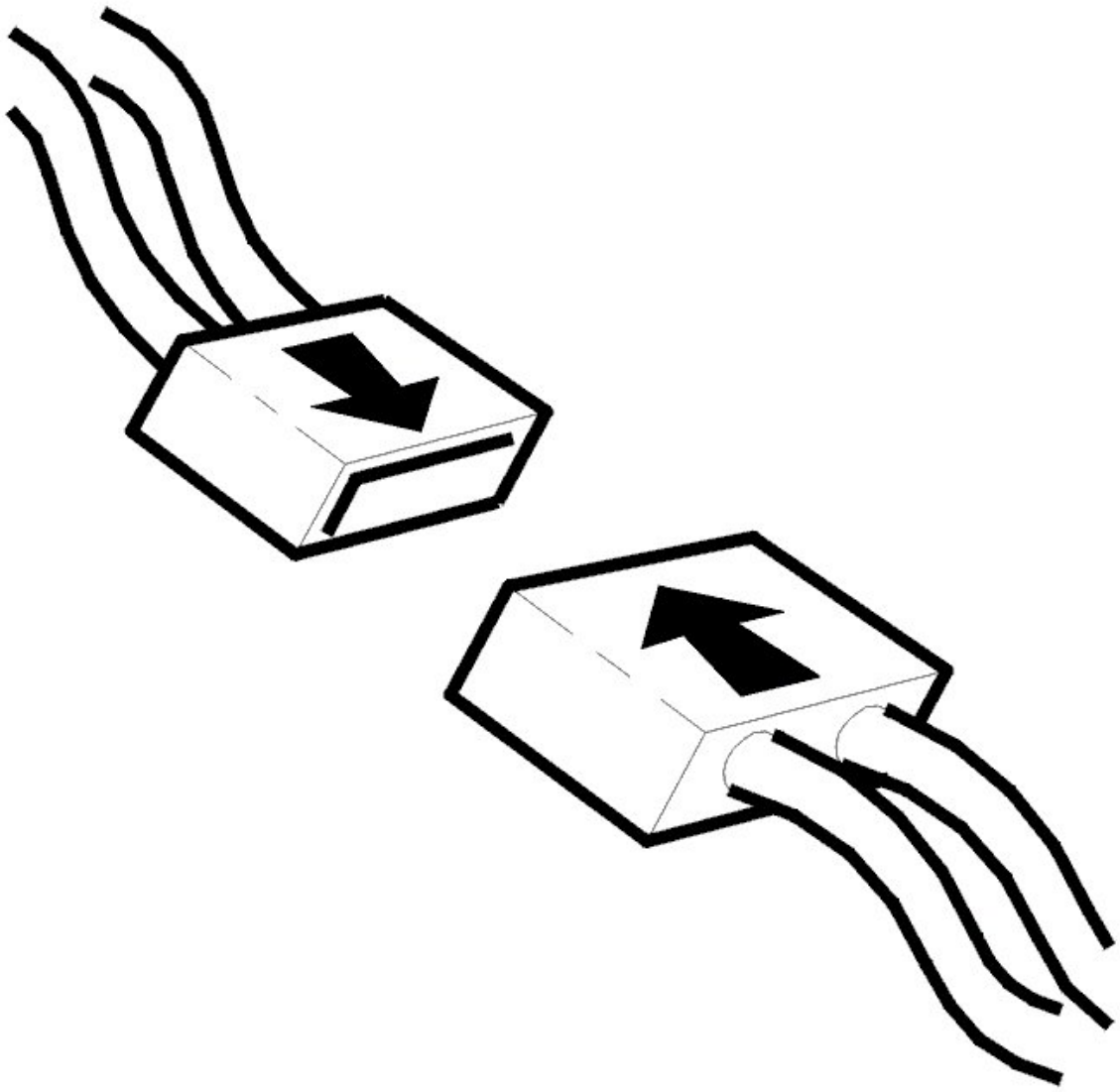
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that radio reception functions.

Does radio reception function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-41FF is stored if the head unit/audio control module registers that there is an open-circuit in the power supply to the sub-antenna or a faulty installation.

Possible source
- Open-circuit in the power supply from the head unit/audio control module to the sub-antenna.
- Sub-antenna not installed.
- Defective sub-antenna amplifier.

Fault symptom[s]
- Bad radio reception.

No Signal. Permanent Fault

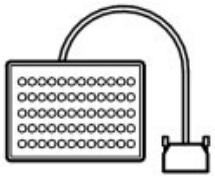
No signal. Permanent fault

Checking for contact resistance and oxidation

Repair or replace the connectors of the sub-antenna and the audio module (AUM), checking for contact resistance and oxidation:
Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
If radio reception is now OK, the fault was poor contact in the connectors.

Other information:
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- To access/replace the sub-antenna:

Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Is the radio reception OK?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component

Check the cables between the sub-antenna and control module connector terminal #C2 for open circuit:

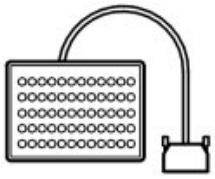
Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
Remedy as necessary.
If no fault is found, replace the sub-antenna amplifier.

Other information:

- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.
- To access/replace the sub-antenna:

Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing

- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Select "Continue" when the fault has been remedied.

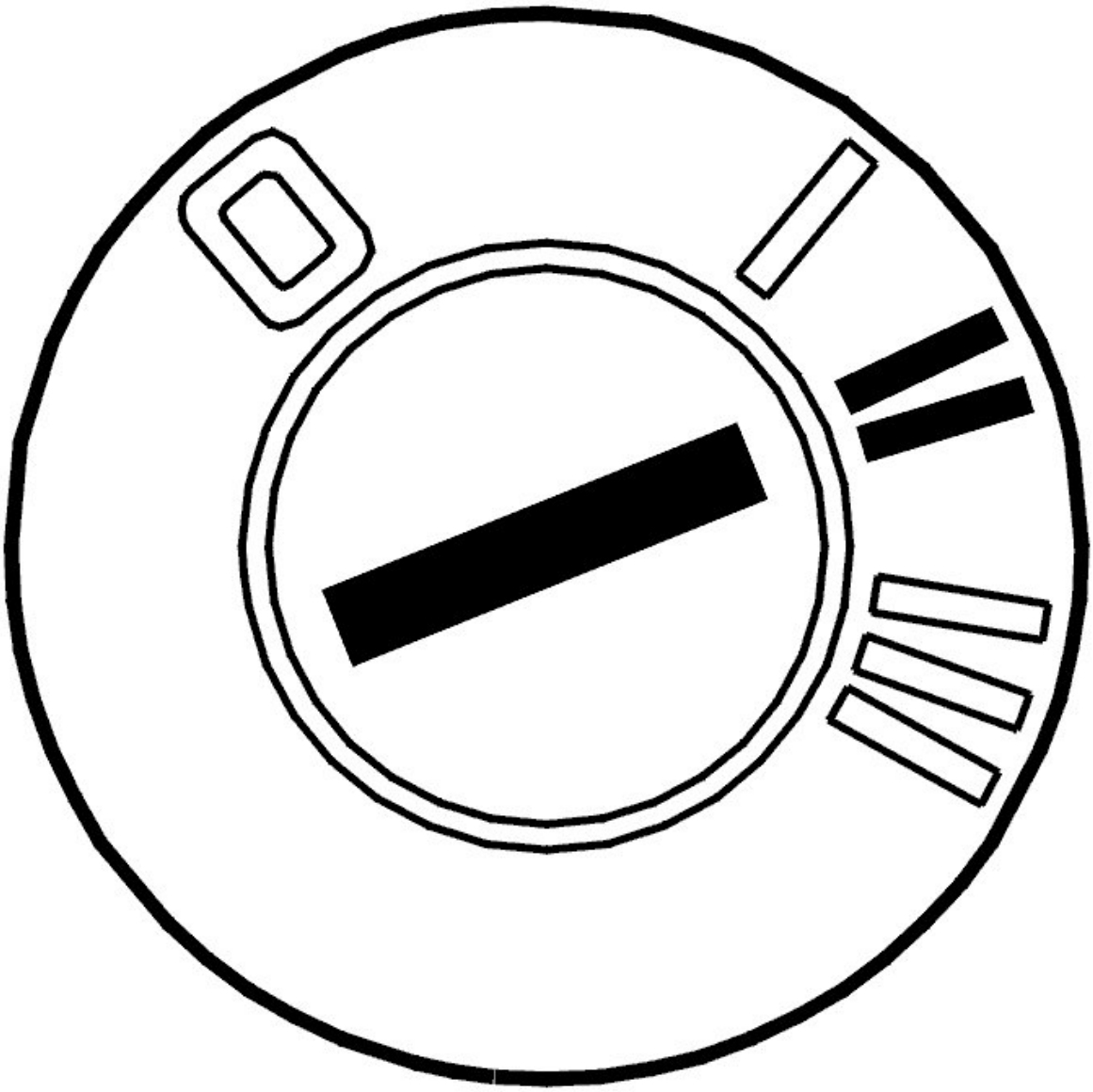
Continue - Verification

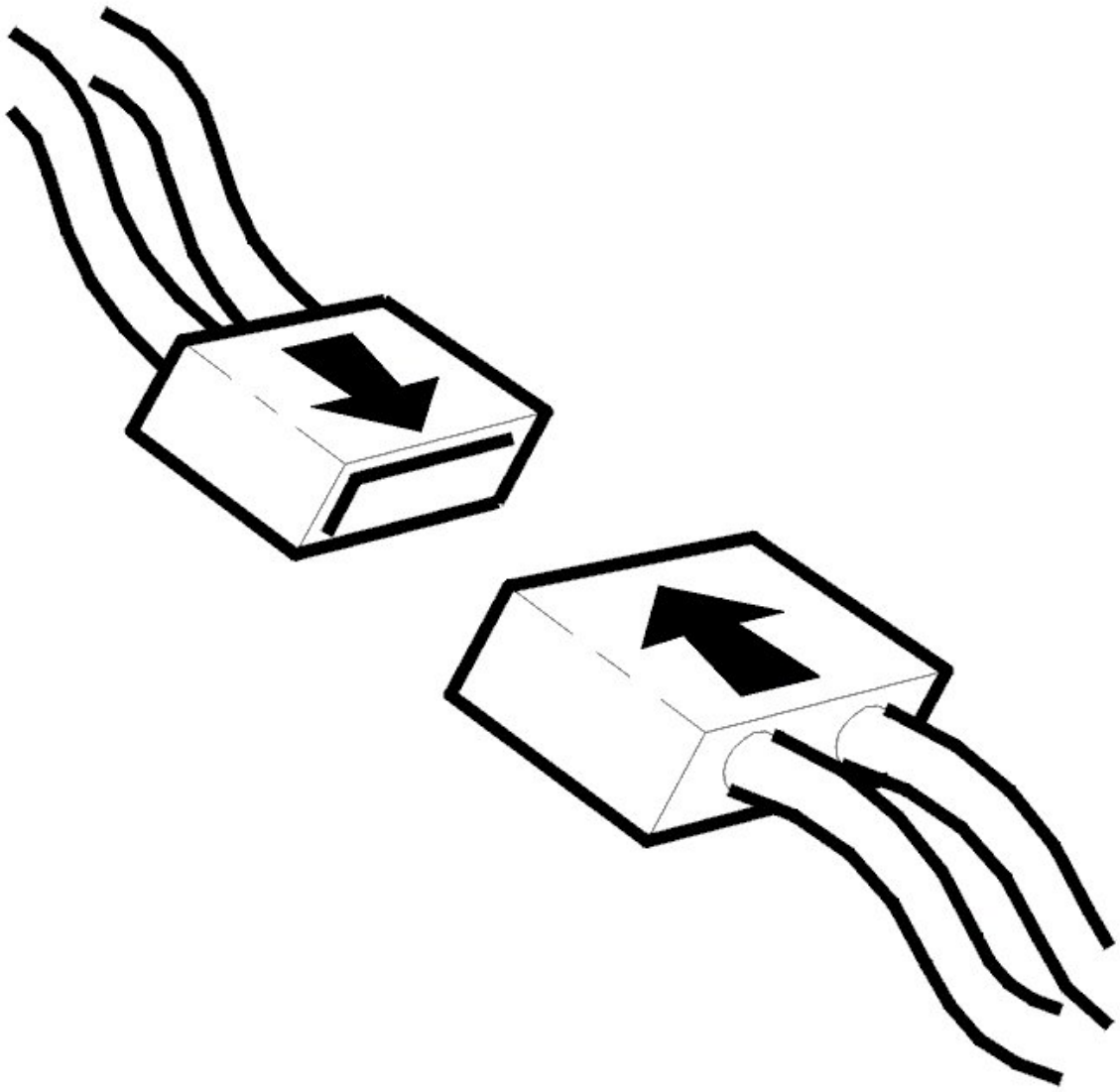
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that radio reception functions.

Does radio reception function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for contact resistance and oxidation

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-41FF is stored if the head unit/audio control module registers that there is an open-circuit in the power supply to the sub-antenna or a faulty installation.

Possible source
- Open-circuit in the power supply from the head unit/audio control module to the sub-antenna.
- Sub-antenna not installed.
- Defective sub-antenna amplifier.

Fault symptom[s]
- Bad radio reception.

No Signal. Intermittent Fault

No signal. Intermittent fault

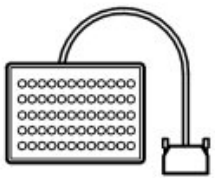
Checking contact resistance, oxidation and wiring

Repair or replace the connectors of the audio module (AUM) and antenna amplifier, checking for contact resistance and oxidation:
Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults
Check the cables between the sub-antenna and control module connector terminal #C2 for open circuit:
Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults
Remedy as necessary.

Other information:
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- To access/replace the sub-antenna:

Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information on signals and connectors:

Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-42FF is stored if the CD player is not detected by the head module/audio control module.

Possible source
- Defective CD player.

Fault symptom[s]
- CD player does not function.

Not Connected or Communication problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is an internal fault in the head unit/audio unit. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-42FF is stored if the CD player is not detected by the head module/audio control module.

Possible source
- Defective CD player.

Fault symptom[s]
- CD player does not function.

Not Connected or Communication problems. Permanent Fault

Not connected or communication problems. Permanent fault

Replacing the head unit / audio module

An internal program fault has been found in the head unit / audio control module.

Caution! New head unit / audio control modules are supplied without software. The head unit / audio control module must be programmed after it has been replaced.

Other information:
- For information about programming and replacing the head unit / audio control module see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

Select "Continue" when the fault has been remedied.

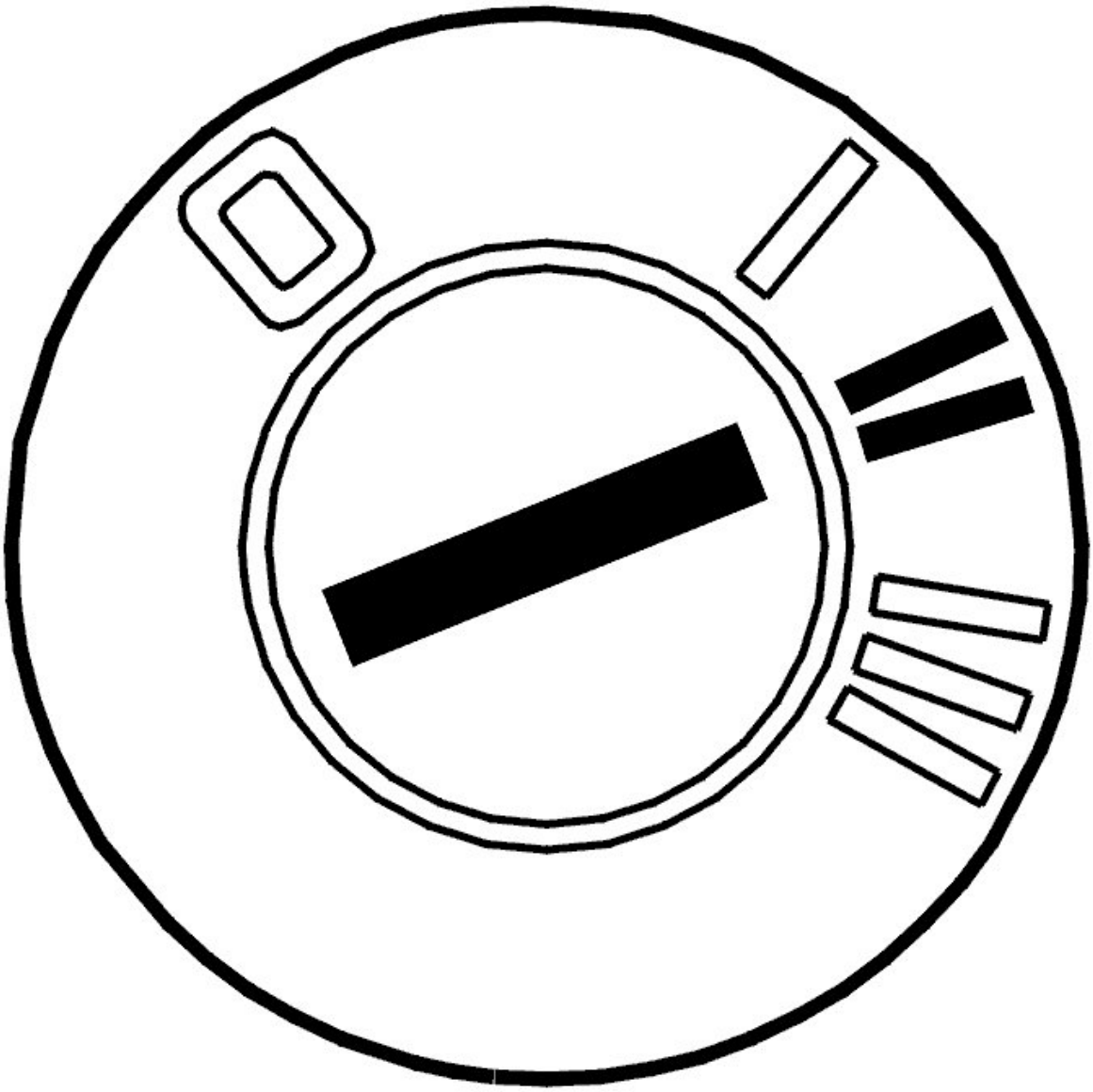
Continue - Verification

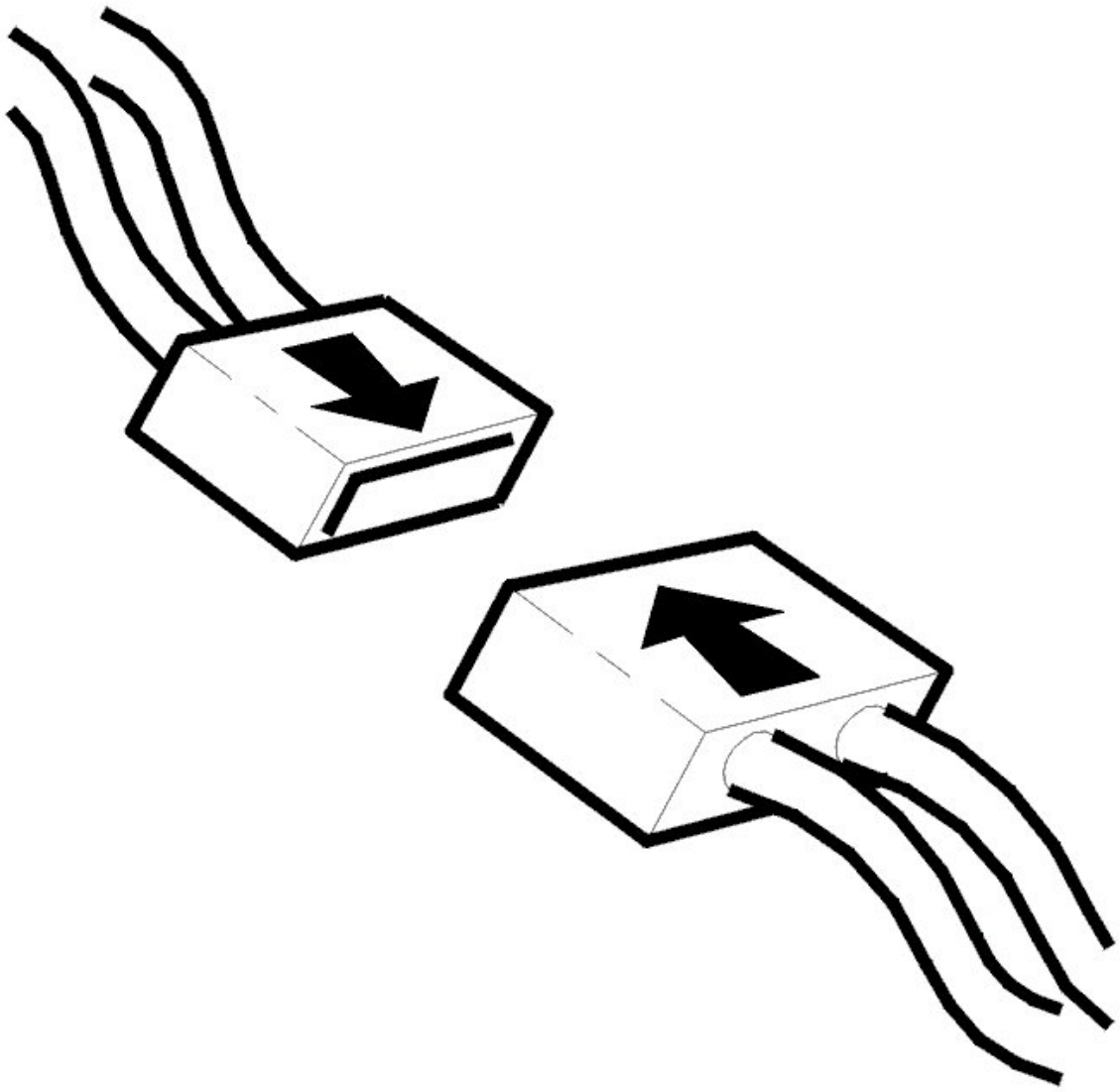
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that the MD/CD player functions.

Does the MD/CD player?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the head unit / audio module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-43FF is stored if the MD player is not detected by the head module/audio control module.

Possible source
- Defective MD player.

Fault symptom[s]
- MD player does not function.

Not Connected or Communication problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is an internal fault in the head unit/audio unit. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-43FF is stored if the MD player is not detected by the head module/audio control module.

Possible source
- Defective MD player.

Fault symptom[s]
- MD player does not function.

Not Connected or Communication problems. Permanent Fault

Not connected or communication problems. Permanent fault

Replace the head unit / audio module

An internal program fault has been found in the head unit / audio control module.

Caution! New head unit / audio control modules are supplied without software. The head unit / audio control module must be programmed after it has been replaced.

Other information:
- For information about programming and replacing the head unit / audio control module see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

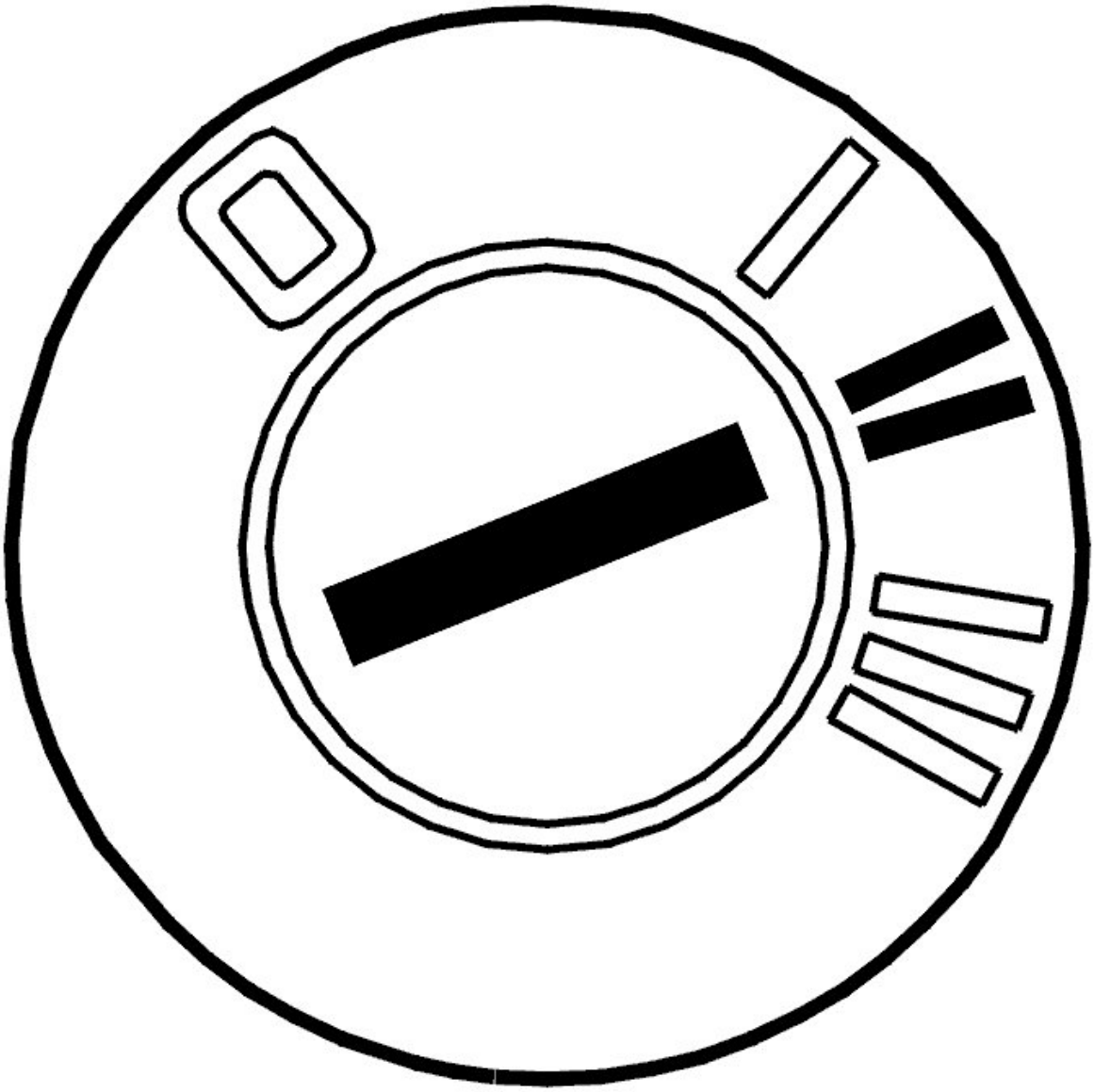
Continue - Verification

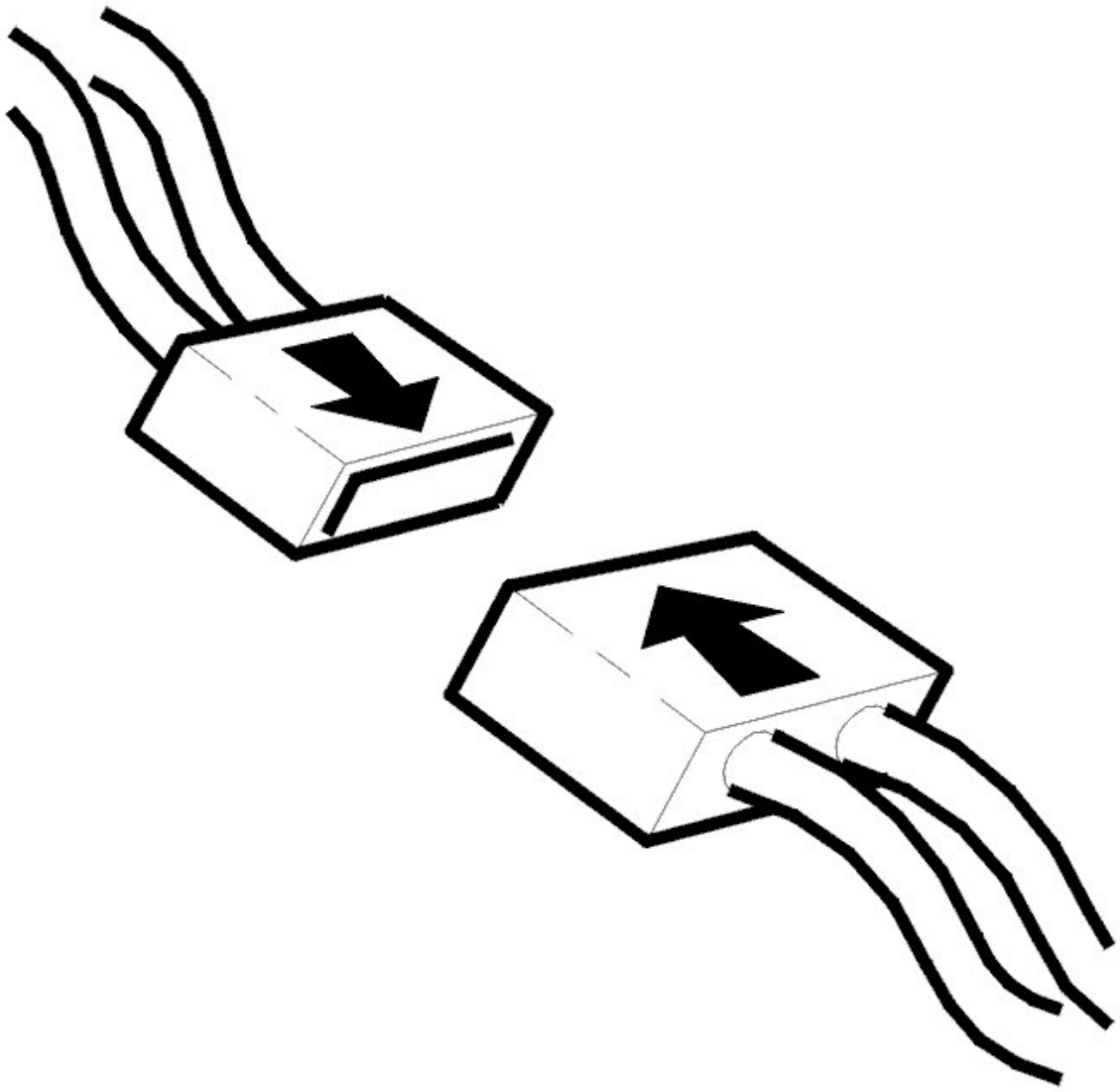
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that the MD/CD player functions.

Does the MD/CD player?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Replace the head unit / audio module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-44FF is stored if the 4CD changer is not detected by the head unit/audio control module.

Possible source
- Defective 4 CD changer.

Fault symptom[s]
- 4 CD changer does not function.

Not Connected or Communication problems. Permanent Fault

Not connected or communication problems. Permanent fault

Replace the head unit / audio module

An internal program fault has been found in the head unit / audio control module.

Caution! New head unit / audio control modules are supplied without software. The head unit / audio control module must be programmed after it has been replaced.

Other information:
- For information about programming and replacing the head unit / audio control module see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

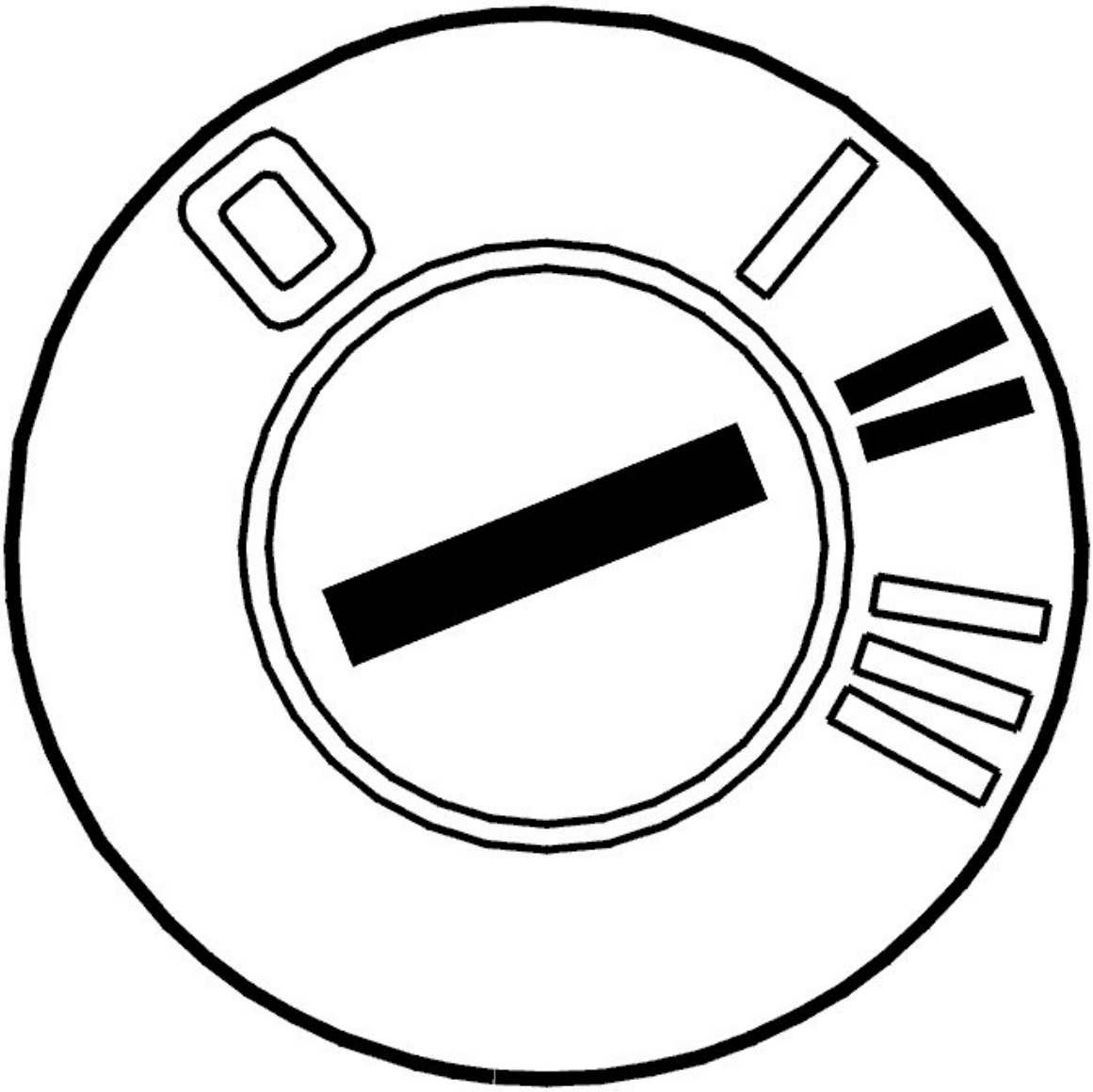
Continue - Verification

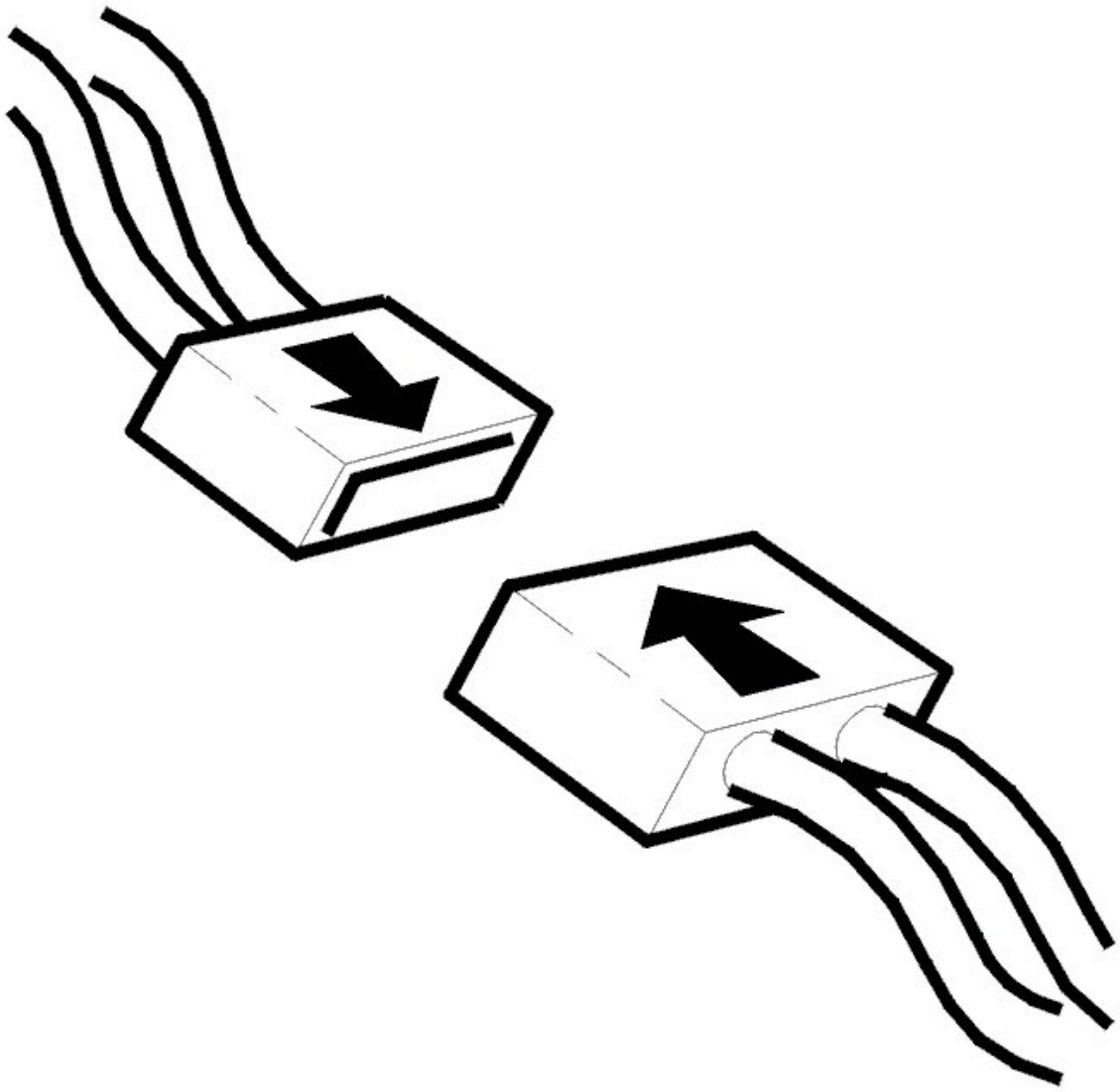
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that the MD/CD player functions.

Does the MD/CD player?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replace the head unit / audio module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-44FF is stored if the 4CD changer is not detected by the head unit/audio control module.

Possible source
- Defective 4 CD changer.

Fault symptom[s]
- 4 CD changer does not function.

Not Connected or Communication problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is an internal fault in the head unit/audio unit. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-45FF is stored if the cassette player is not detected by the head module/audio control module.

Possible source
- Defective cassette player.

Fault symptom[s]
- Cassette player not working.

Not Connected or Communication problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is an internal fault in the main unit/audio unit. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-45FF is stored if the cassette player is not detected by the head module/audio control module.

Possible source
- Defective cassette player.

Fault symptom[s]
- Cassette player not working.

Not Connected or Communication problems. Permanent Fault

Not connected or communication problems. Permanent fault

Replace the head unit / audio module

An internal fault has occurred in the cassette player.

Caution! New head unit / audio control modules are supplied without software. The head unit / audio control module must be programmed after it has been replaced.

Other information:
- For information about programming and replacing the head unit / audio control module see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

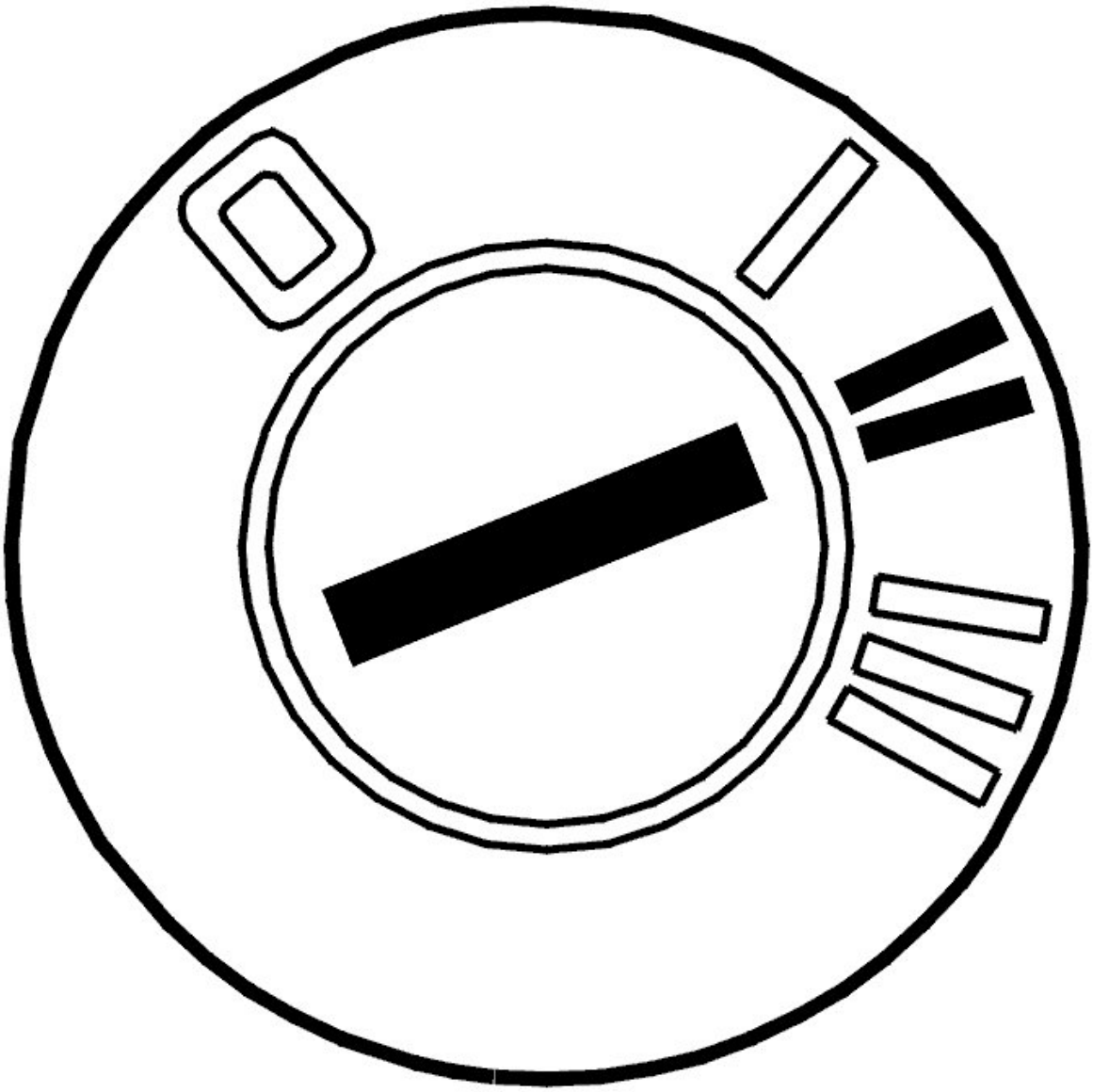
Continue - Verification

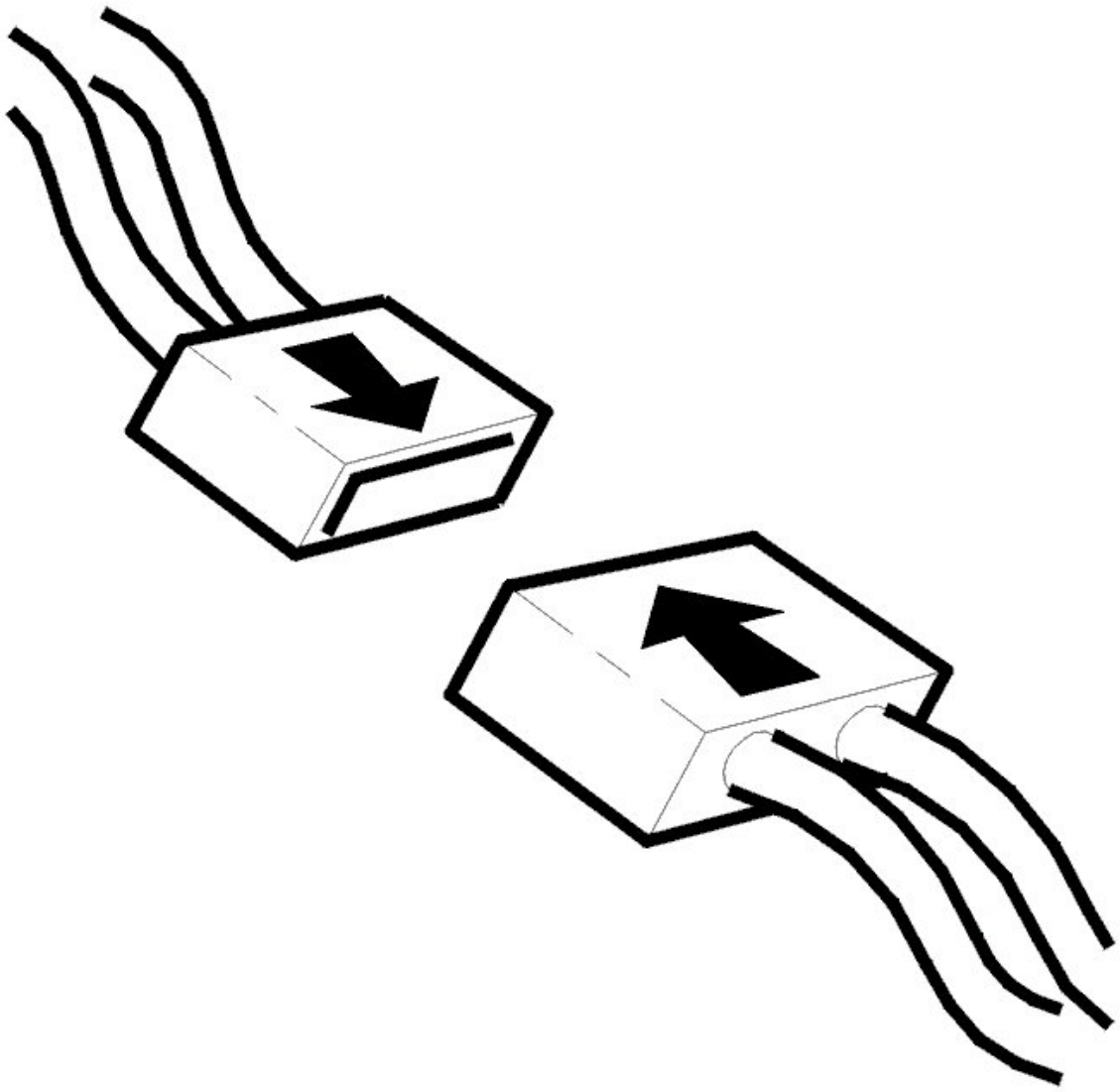
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that cassette player functions.

Does the cassette player function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Replace the head unit / audio module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-46FE is stored if the 10 CD changer is incorrectly installed.

Possible source
- The 10 CD changer is in the car at the same time that the CAN data states that there is no 10 CD changer.

Fault symptom[s]
- 10 CD changer and CAN-data are not compatible.

Faulty installation. Permanent Fault

Faulty installation. Permanent fault

Downloading new software

The radio unit software does not correspond when the 10CD changer is installed.
Down load the software for the 10CD changer. The software can be ordered from the replacement parts catalogue.

Other information:
- For information about programming the head unit / audio control module, see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

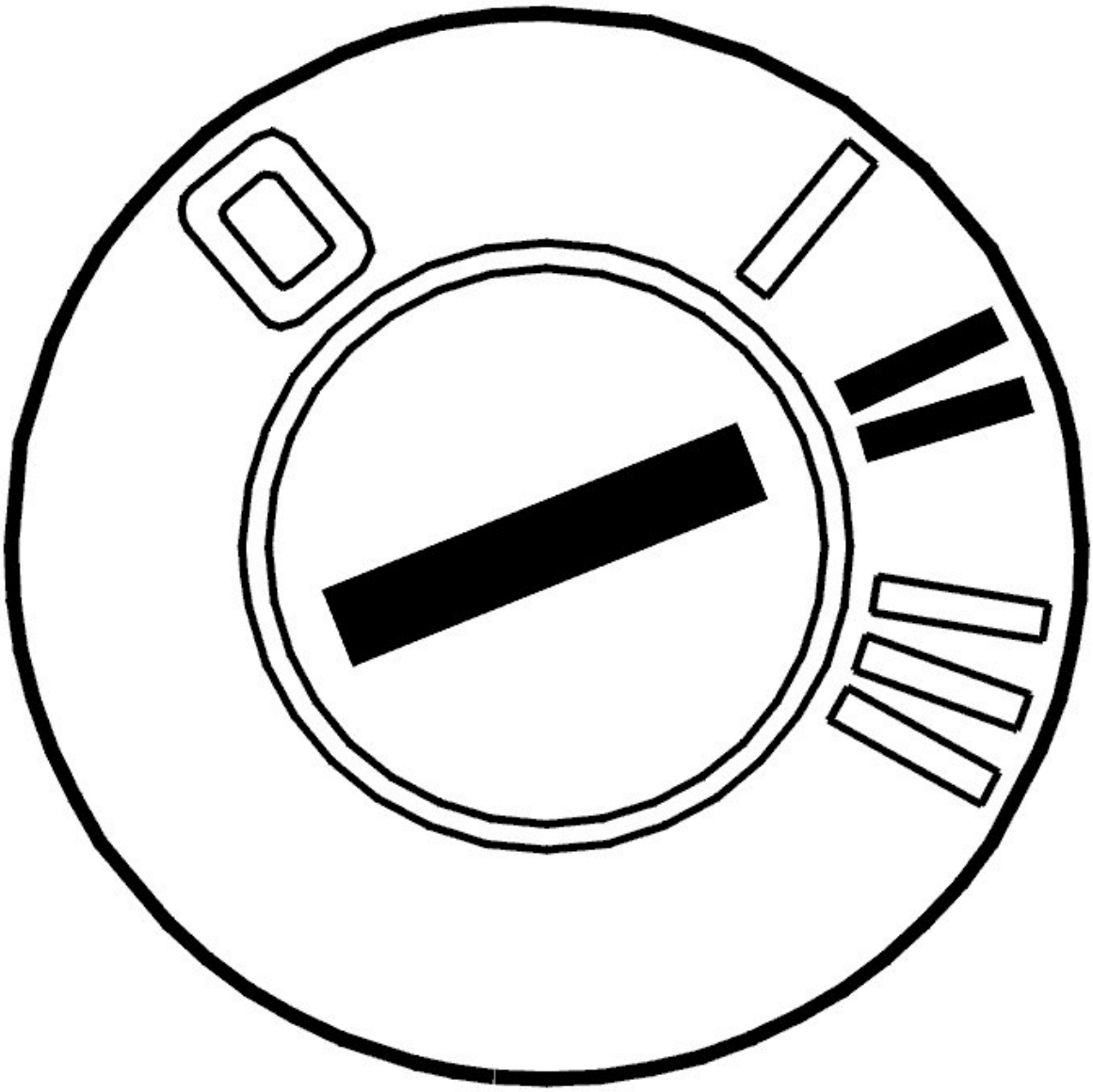
Continue - Verification

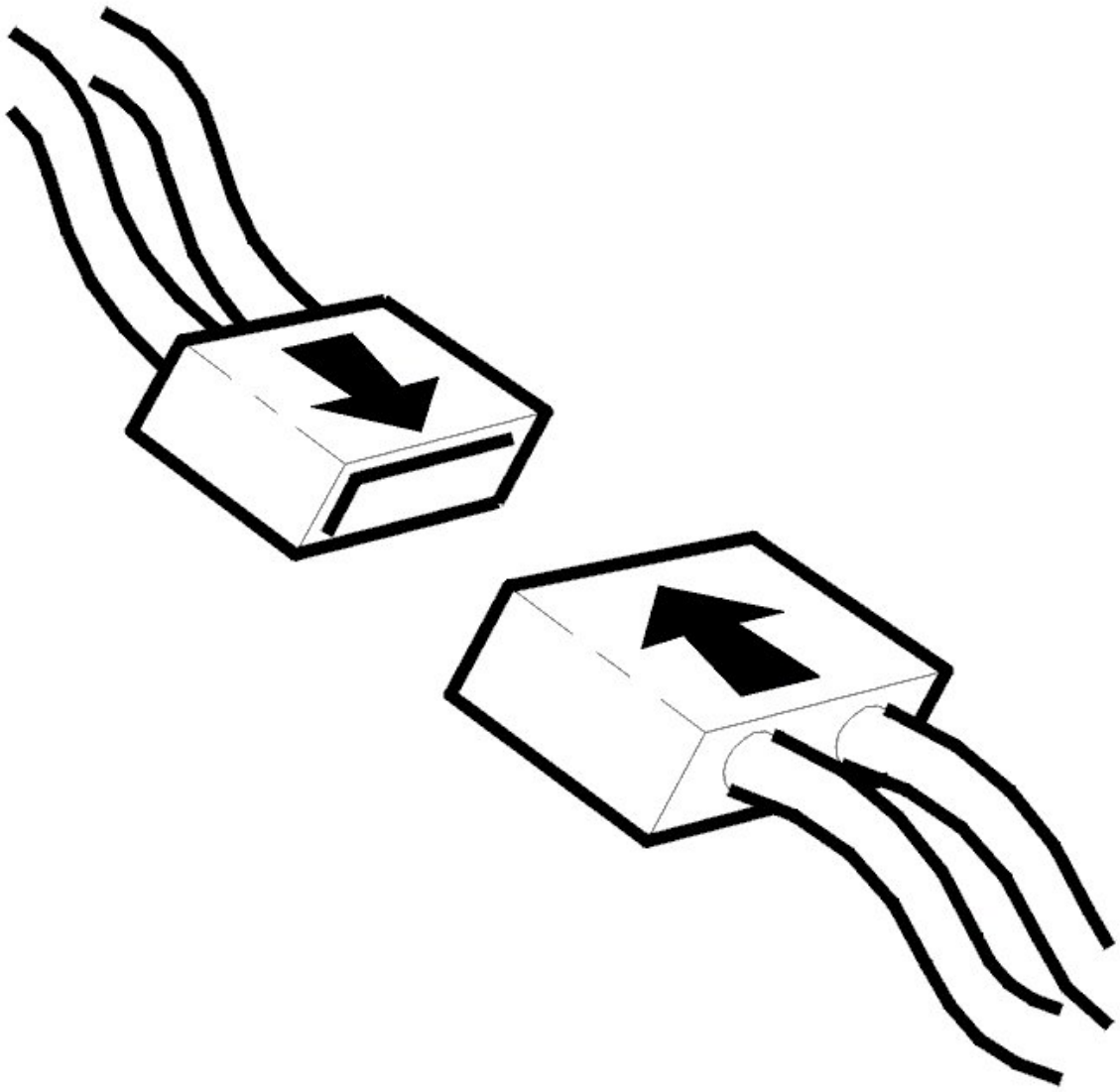
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that CD changer functions.

Does the CD changer function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Downloading new software

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-46FE is stored if the 10 CD changer is incorrectly installed.

Possible source
- The 10 CD changer is in the car at the same time that the CAN data states that there is no 10 CD changer.

Fault symptom[s]
- 10 CD changer and CAN-data are not compatible.

Faulty installation. Intermittent Fault

Faulty installation. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored when the software in the head unit/audio control module agrees with the units installed. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-46FF is stored if the 10 CD changer is not detected by the head unit or incorrectly installed.

Possible source
- Incorrectly installed 10 CD changer.
- Defective 10 CD changer.

Fault symptom[s]
- 10 CD changer does not function.

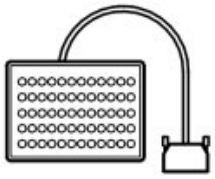
Not Connected or Communication Problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Checking contact resistance, oxidation and wiring

Check the 10CD changer and head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy if necessary.
Check the cable between amplifier terminals #D1, #D2, #D3, #D4 and #D5 and head unit / audio control module terminals #E1, #E2, #E3, #E4 and #E5 for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- CD player, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Compact Disc Player (CD)/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-46FF is stored if the 10 CD changer is not detected by the head unit or incorrectly installed.

Possible source
- Incorrectly installed 10 CD changer.
- Defective 10 CD changer.

Fault symptom[s]
- 10 CD changer does not function.

Not Connected or Communication Problems. Permanent Fault

Not connected or communication problems. Permanent fault

Checking for contact resistance and oxidation

Check that the eject function of the 10CD changer operates. If the eject function does not operate, check fuse #10 in the cargo compartment. Take readings between terminals #G1 and #G2. The voltage should be approximately 12 V.

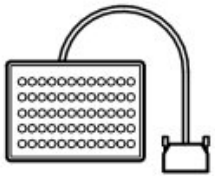
Hint: If the car is equipped with road traffic information (RTI) connect the CD changer directly to the Melbus cable.

Check terminals #E1, #E2, #E3, #E4 and #E5 between the audio control module and the 10CD changer. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check all the connectors on the Melbus cable. On a fully equipped car the units are placed in the following order: Audio control module-RTI-TV-10CD changer.
Check the 10CD changer and head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the 10CD changer terminal #D6 and head unit / audio control module terminal #D6 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:
- CD player, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Compact Disc Player (CD)/Service and Repair
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair

- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification

If the 10CD changer is now OK, the fault was due to a bad connection in the connectors.



Is the 10CD changer OK?

Yes - **Fault Found**

No - Checking the wiring and component

Checking the wiring and component

Check the cable between 10CD changer terminals #1, #2, #3, #4 and #5 and head unit / audio module terminals #E1, #E2, #E3, #E4 and #E5 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- CD player, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Compact Disc Player (CD)/Service and Repair
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
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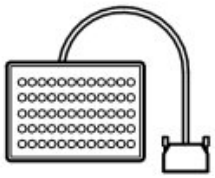


Select "Continue" when the fault has been remedied.

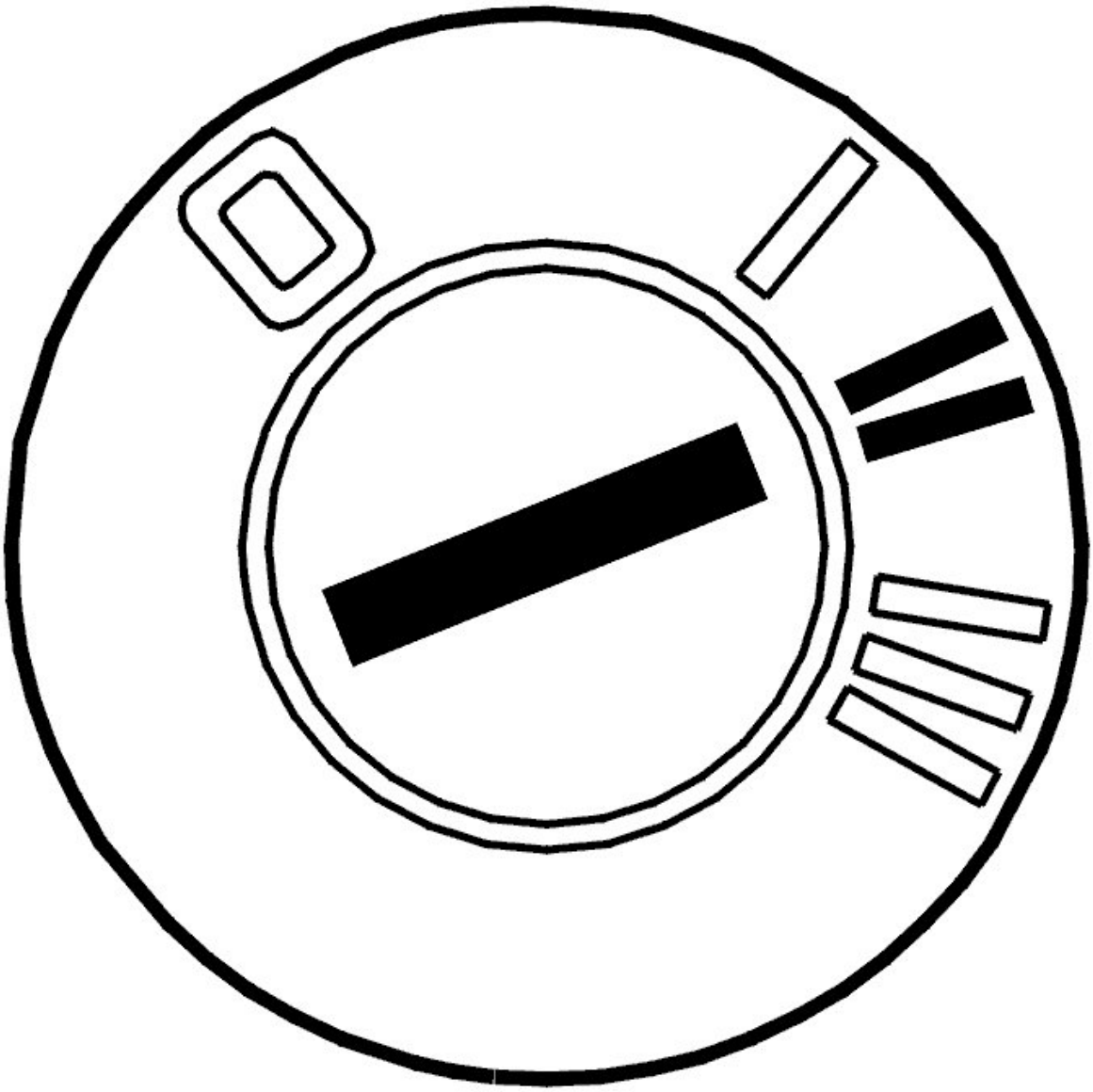
Continue - Verification

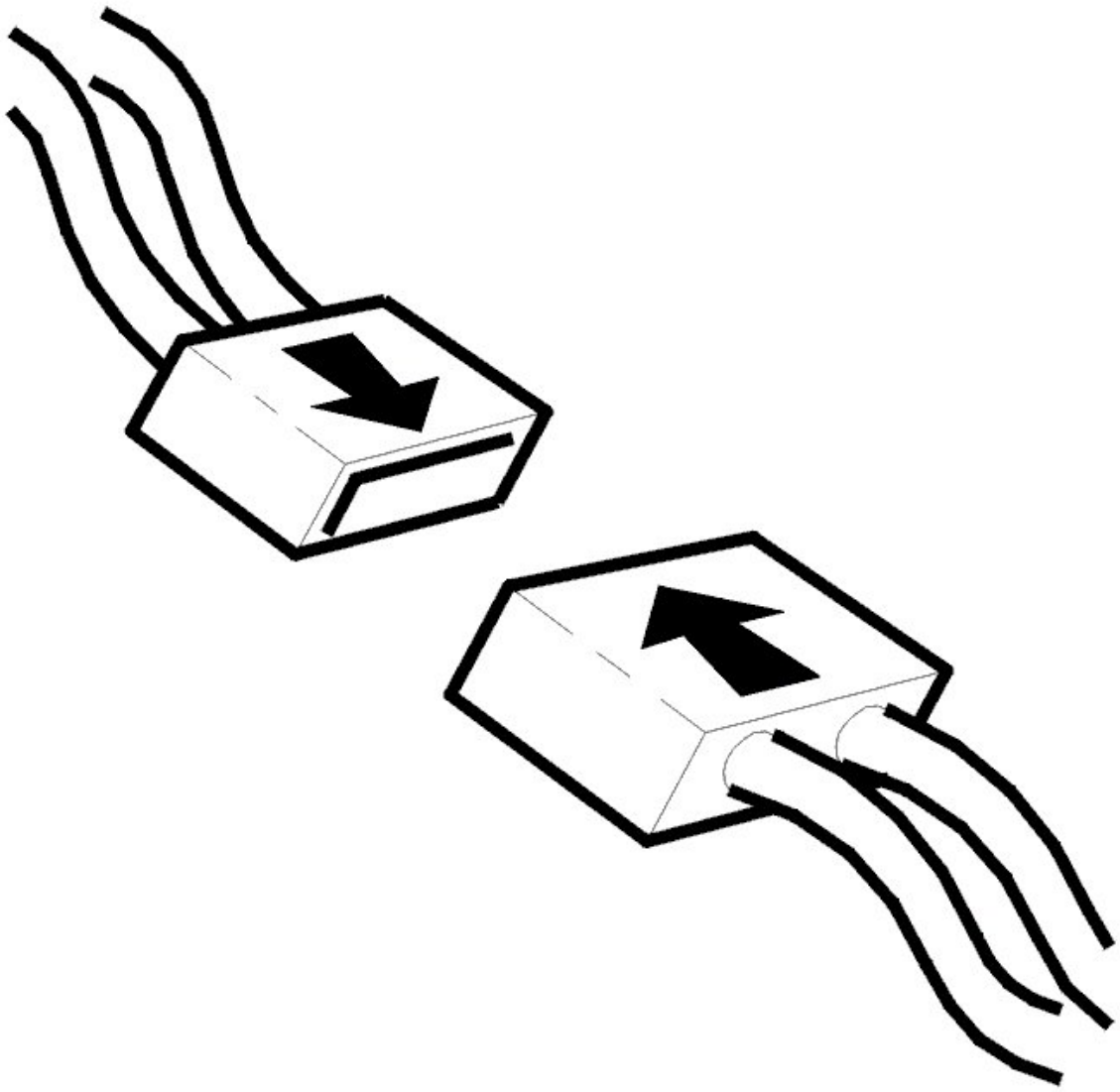
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that CD changer functions.

Does the CD changer function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking for contact resistance and oxidation

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-47FE is stored if the amplifier is incorrectly installed.

Possible source
- The amplifier is in the car at the same time that the CAN data states that there is no amplifier.

Fault symptom[s]
- Amplifier and CAN-data are not compatible.

Faulty installation. Permanent Fault

Faulty installation. Permanent fault

Downloading new software

The radio unit software does not correspond when an amplifier is installed.

Other information:
- For information about programming the head unit / audio control module, see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

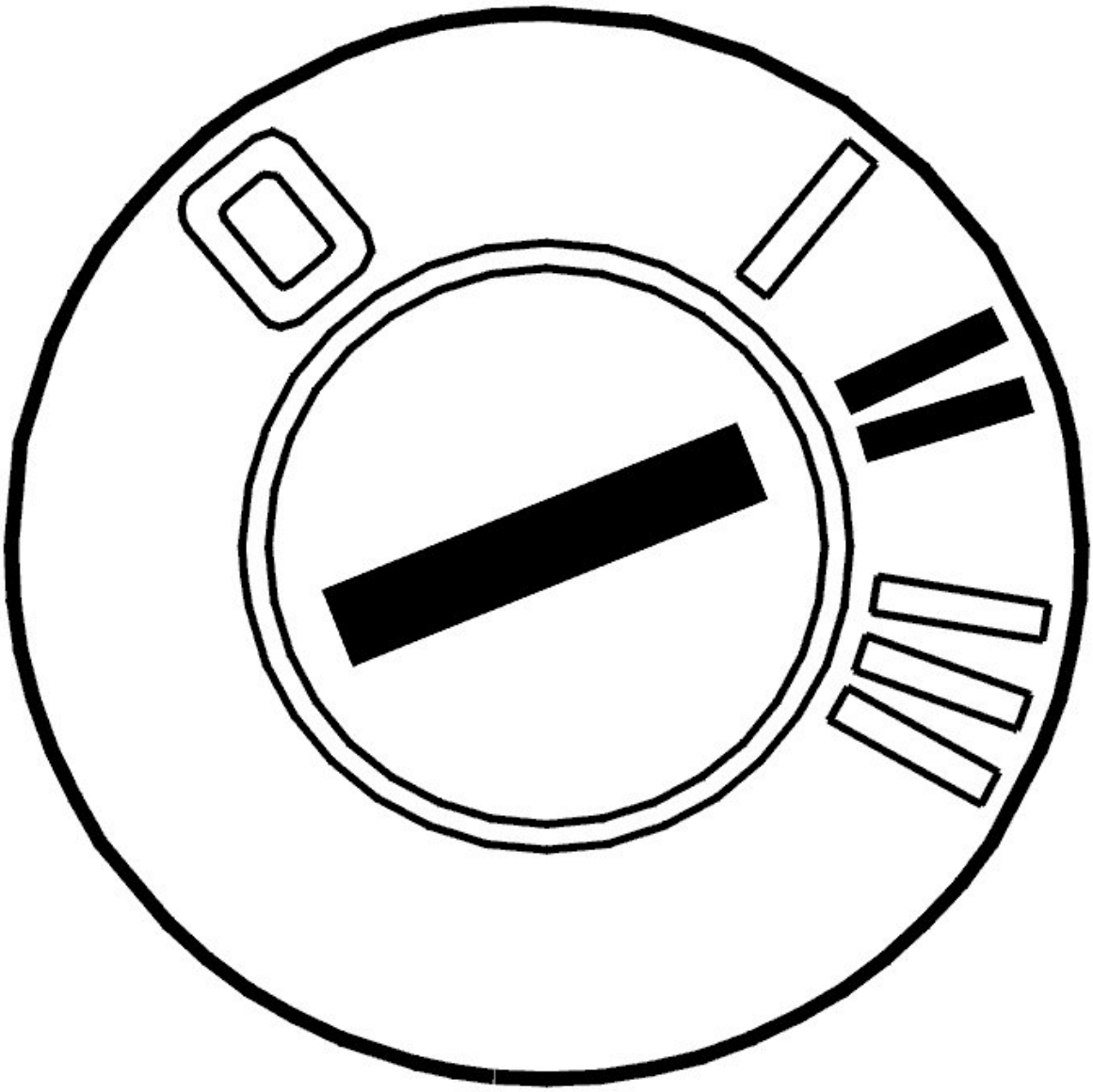
Continue - Verification

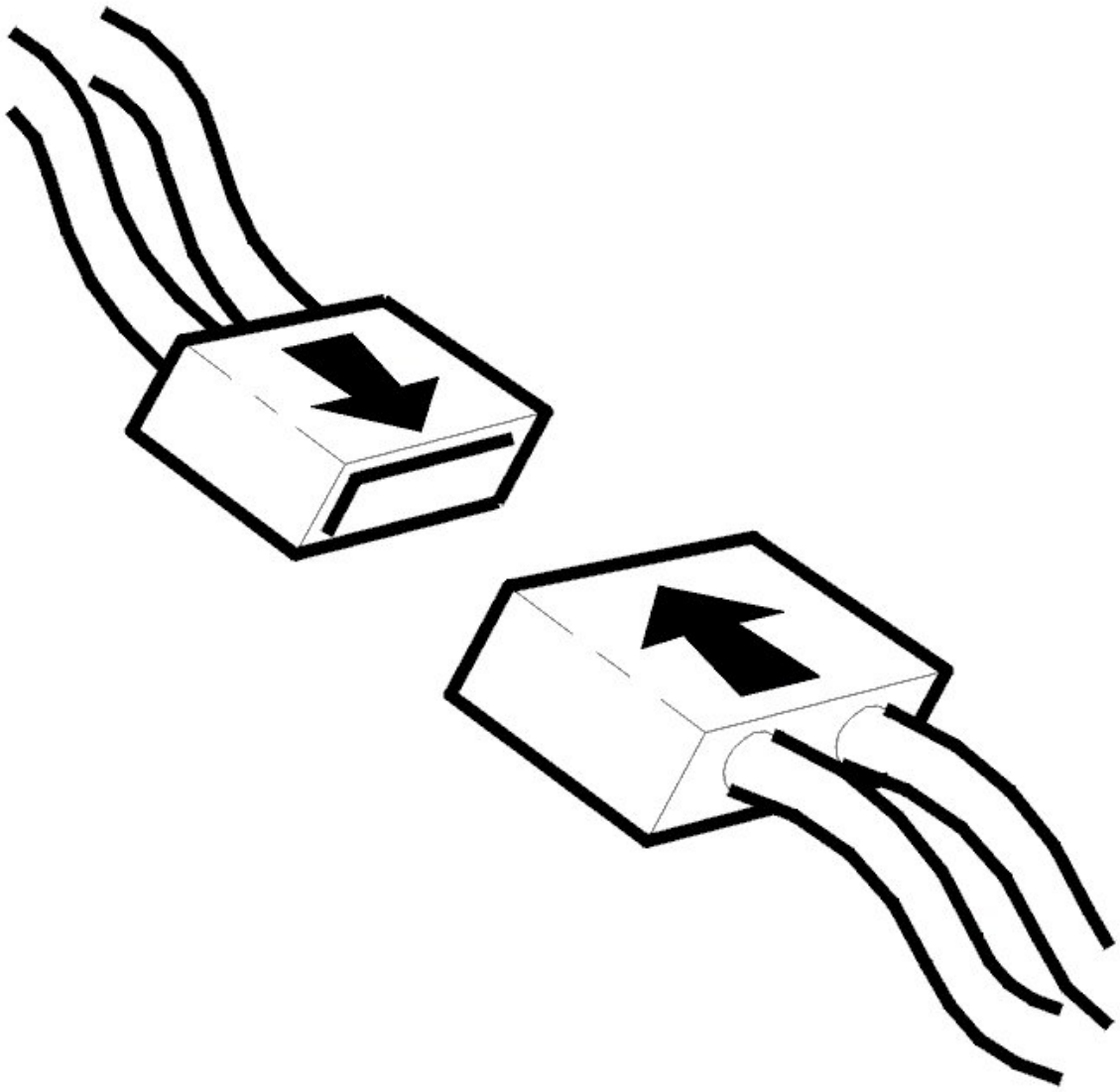
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that sound reproduction is OK.

Is sound reproduction OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Downloading new software

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-47FE is stored if the amplifier is incorrectly installed.

Possible source
- The amplifier is in the car at the same time that the CAN data states that there is no amplifier.

Fault symptom[s]
- Amplifier and CAN-data are not compatible.

Faulty installation. Intermittent Fault

Faulty installation. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored when the software in the head unit/audio control module agrees with the units installed. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-47FF is stored if the amplifier is not detected by the head unit/audio control module or if it is incorrectly installed.

Possible source
- Incorrectly installed amplifier.
- Defective amplifier.

Fault symptom[s]
- No sound from audio equipment.

Not Connected or Communication Problems. Permanent Fault

Not connected or communication problems. Permanent fault

Checking for contact resistance and oxidation

Check the amplifier and head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary.

Other information:
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and

Repair/Radio Equipment, Replacing
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification

If the sound reproduction is now OK, the fault was due to a bad connection in the connectors.

Is sound reproduction OK?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component

Check the cable between the amplifier terminal #D6 and head unit terminal #D6 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
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- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification

Select "Continue" when the fault has been remedied.

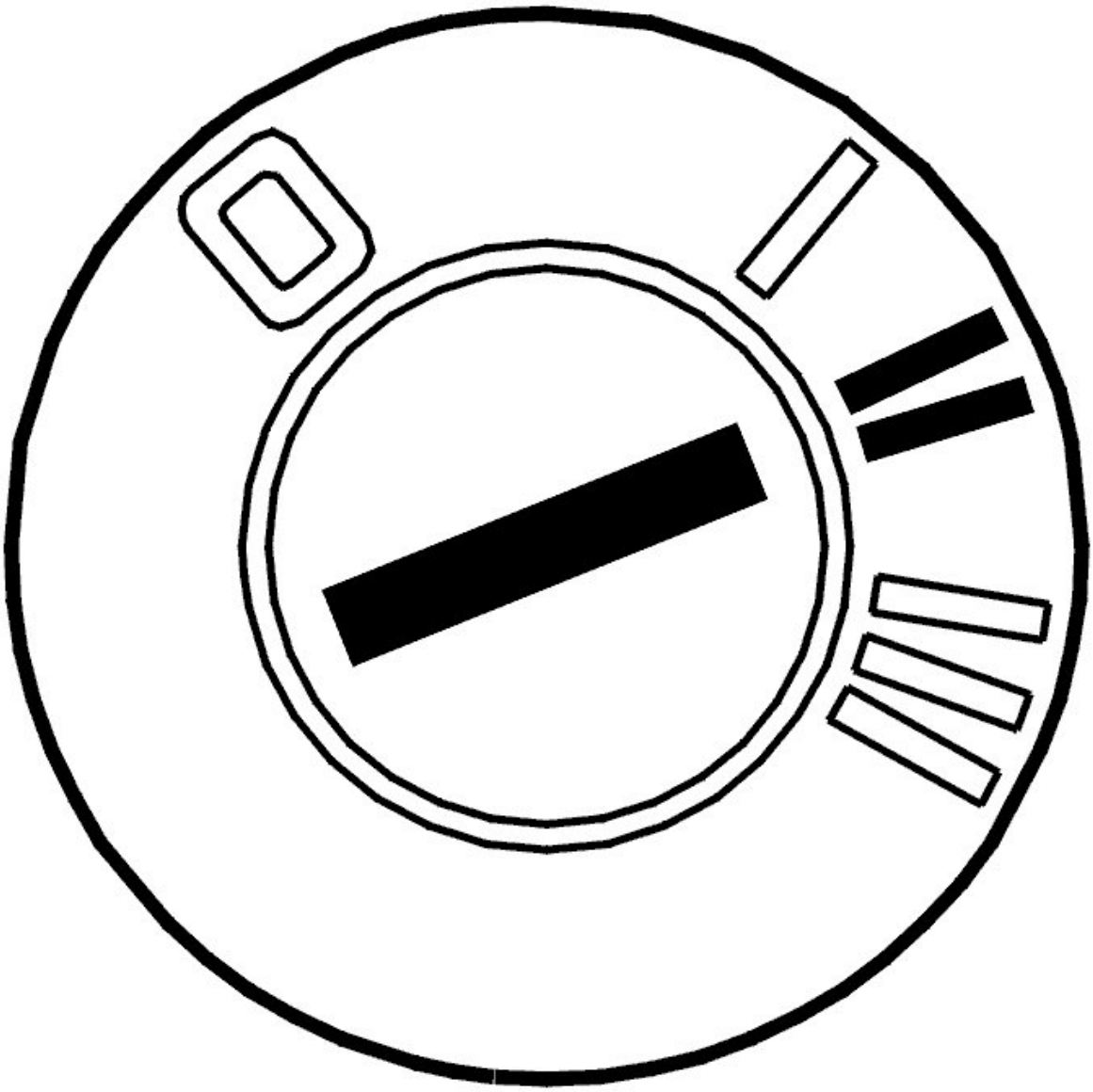
Continue - Verification

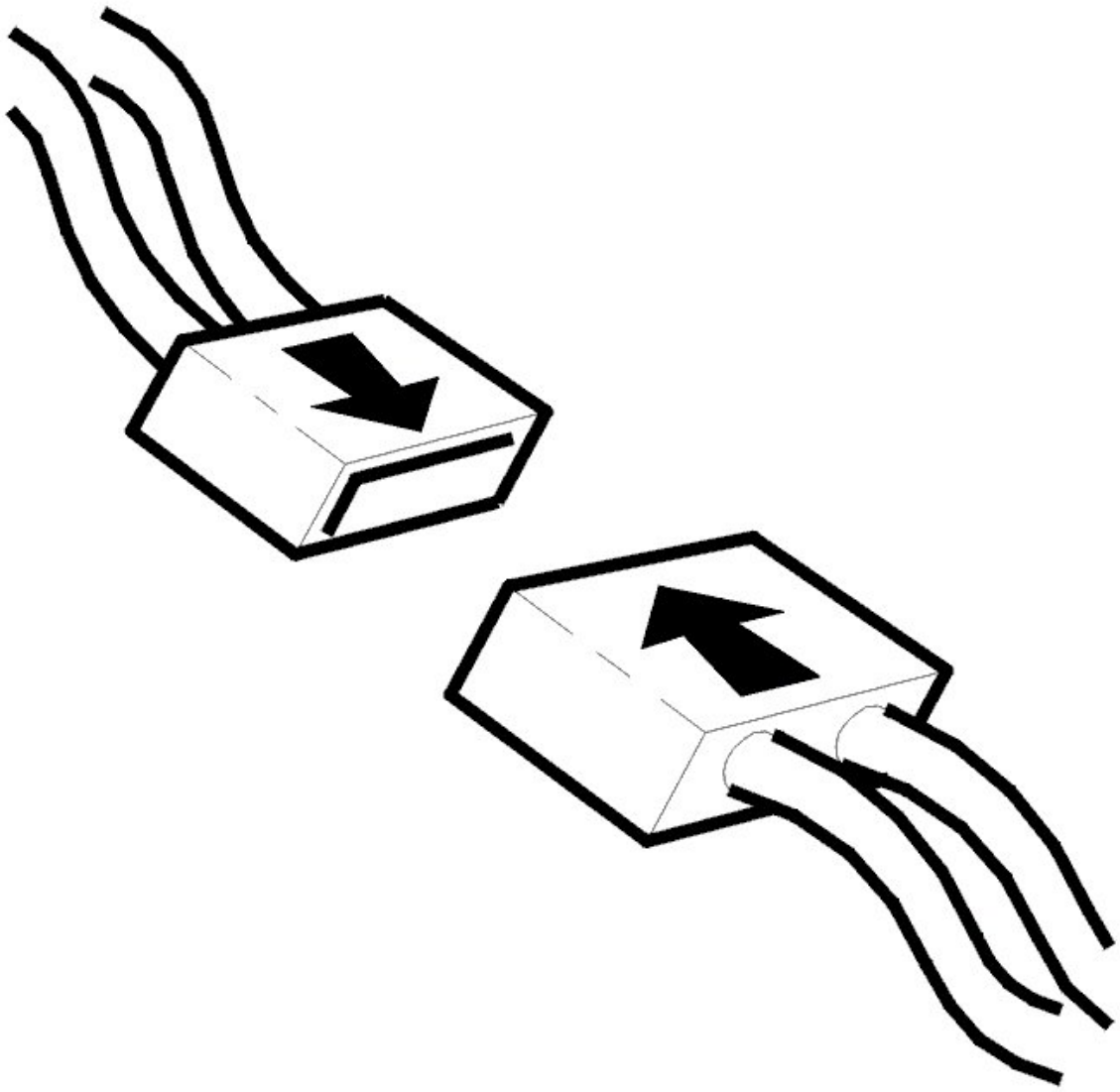
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that sound reproduction is OK.

Is sound reproduction OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for contact resistance and oxidation

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-47FF is stored if the amplifier is not detected by the head unit/audio control module or if it is incorrectly installed.

Possible source
- Incorrectly installed amplifier.
- Defective amplifier.

Fault symptom[s]
- No sound from audio equipment.

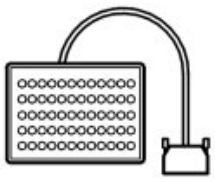
Not Connected or Communication Problems. Intermittent Fault

Not connected or communication problems. Intermittent fault

Checking contact resistance, oxidation and wiring

Check the amplifier and head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy if necessary.
Check the cable between the amplifier terminal #D6 and head unit / audio control module terminal #E6 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-48FD is stored if the radio frequency band does not correspond with the car data in the central electronic module.

Possible source
- Incorrectly installed head unit.
- Faulty configuration of the Central electronic module (CEM).

Fault symptom[s]
- Desired frequency cannot be retained.

Faulty frequency setting. Intermittent Fault

Faulty frequency setting. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored when the head unit/audio control module (AUM) does not correspond to the car market settings. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-48FD is stored if the radio frequency band does not correspond with the car data in the central electronic module.

Possible source
- Incorrectly installed head unit.
- Faulty configuration of the Central electronic module (CEM).

Fault symptom[s]
- Desired frequency cannot be retained.

Faulty frequency setting. Permanent Fault

Faulty frequency setting. Permanent fault

Replacing the audio unit

The diagnostic trouble code (DTC) is stored when the head unit / audio control module frequency settings do not correspond to the car market settings.

Caution! A new head unit / audio control module is delivered without software. The head unit / audio control module must be programmed after it has been replaced.

Other information:
- For further information about programming and replacing the audio unit see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

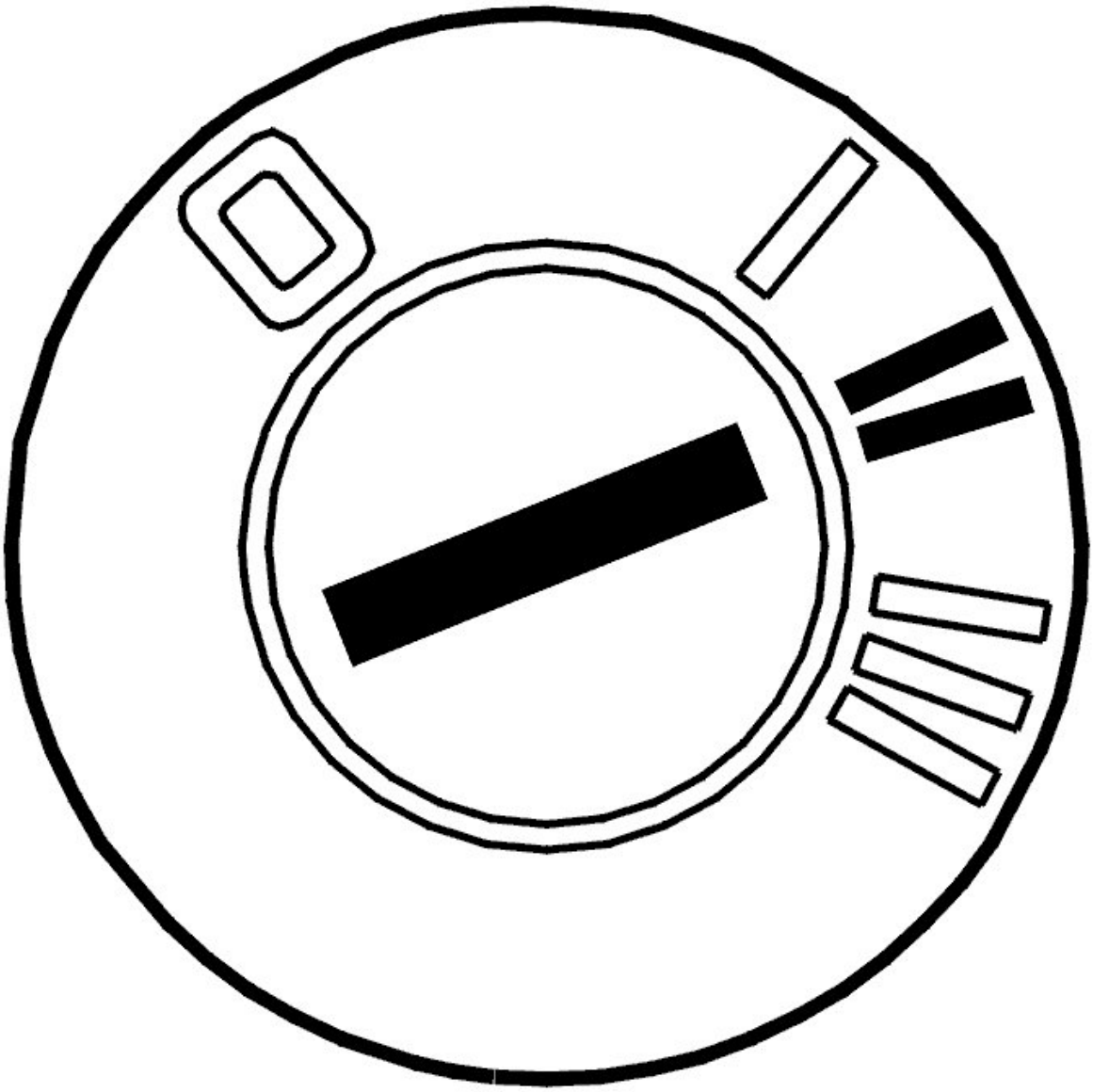
Continue - Verification

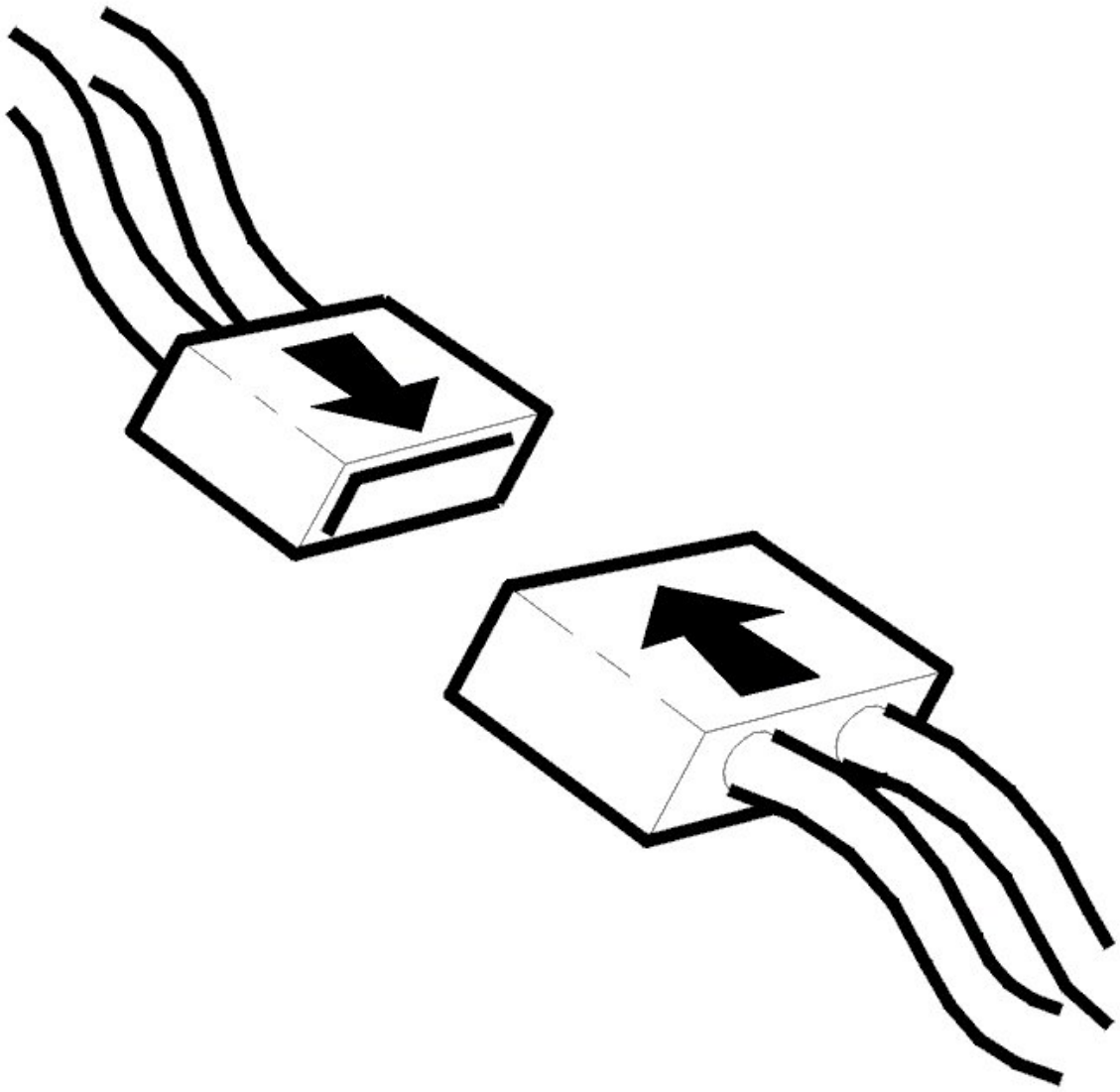
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that radio reception functions.

Does radio reception function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Replacing the audio unit

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-49FD is stored if the radio configuration does not correspond with the car data in the central electronic module.

Possible source
- Incorrectly installed head unit/audio module.
- Faulty configuration of the Central electronic module (CEM).

Fault symptom[s]
- Desired frequency cannot be retained.

Faulty installation. Permanent Fault

Faulty installation. Permanent fault

Downloading new software

The diagnostic trouble code (DTC) is stored when the head unit / audio control module software does not correspond to the car market settings.

Other information:
- For information about programming the head unit / audio control module, see Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair.

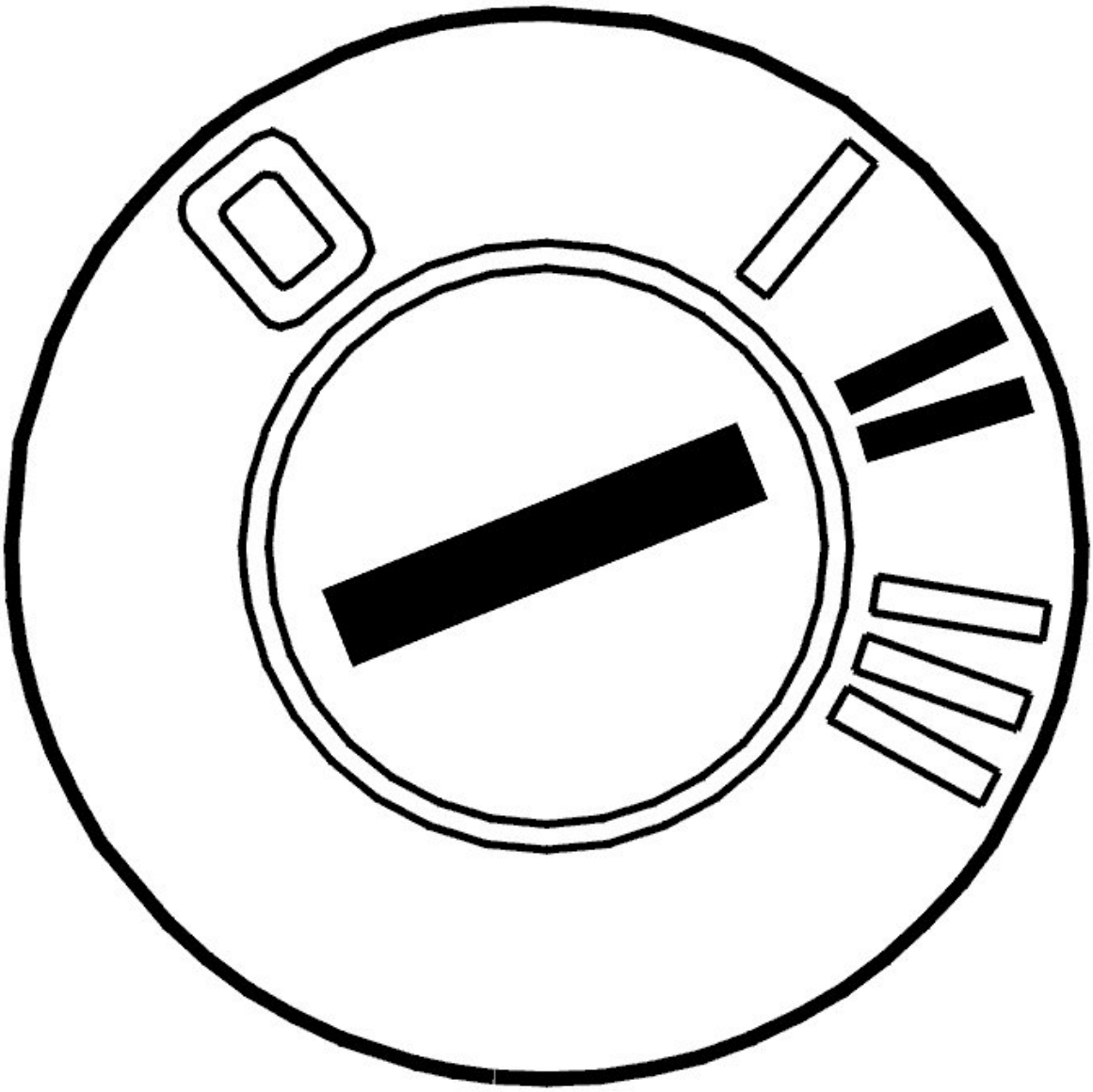
Continue - Verification

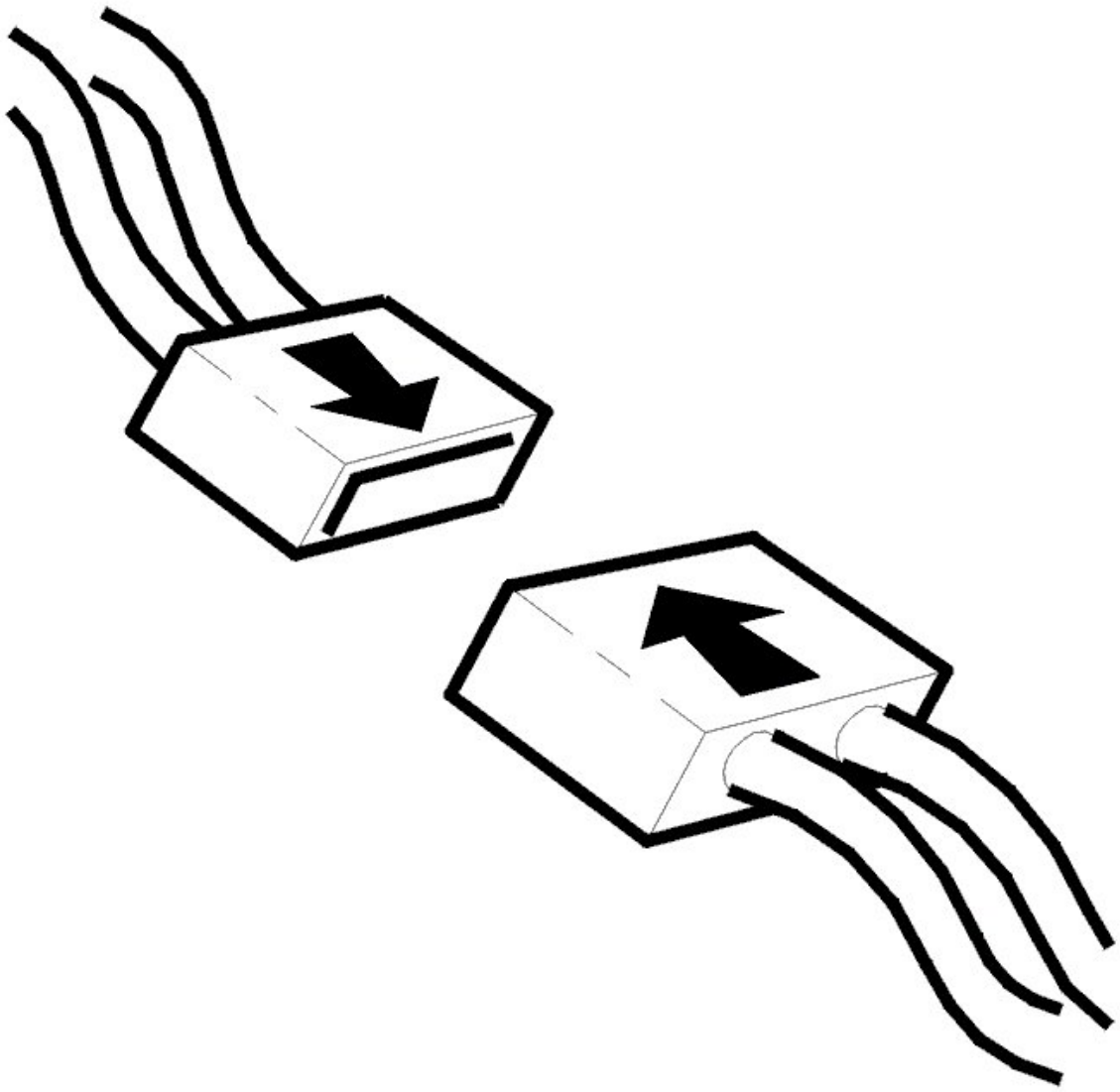
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that sound reproduction is OK.

Is sound reproduction OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Downloading new software

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-49FD is stored if the radio configuration does not correspond with the car data in the central electronic module.

Possible source
- Incorrectly installed head unit/audio module.
- Faulty configuration of the Central electronic module (CEM).

Fault symptom[s]
- Desired frequency cannot be retained.

Faulty installation. Intermittent Fault

Faulty installation. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored when the head unit/audio control module does not correspond to the car settings. If the diagnostic trouble code (DTC) does not recur no further corrective action is required.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4001 is stored if the ignition is on, main antenna supplied with power and the head unit/audio module detects low voltage on the main antenna output voltage.

Possible source
- The power supply from head unit to the main antenna is short-circuited to ground.
- Defective antenna amplifier

Fault symptom[s]
- Poor radio reception (AM).

Signal Too Low. Permanent Fault

Signal too low. Permanent fault

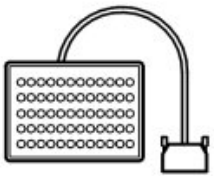
Checking the wiring and component

Check the cable between the antenna amplifier #C1 and head unit/audio control module #A9 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

If no fault is found, replace the antenna amplifier.

Other information

- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Select "Continue" when the fault has been remedied.

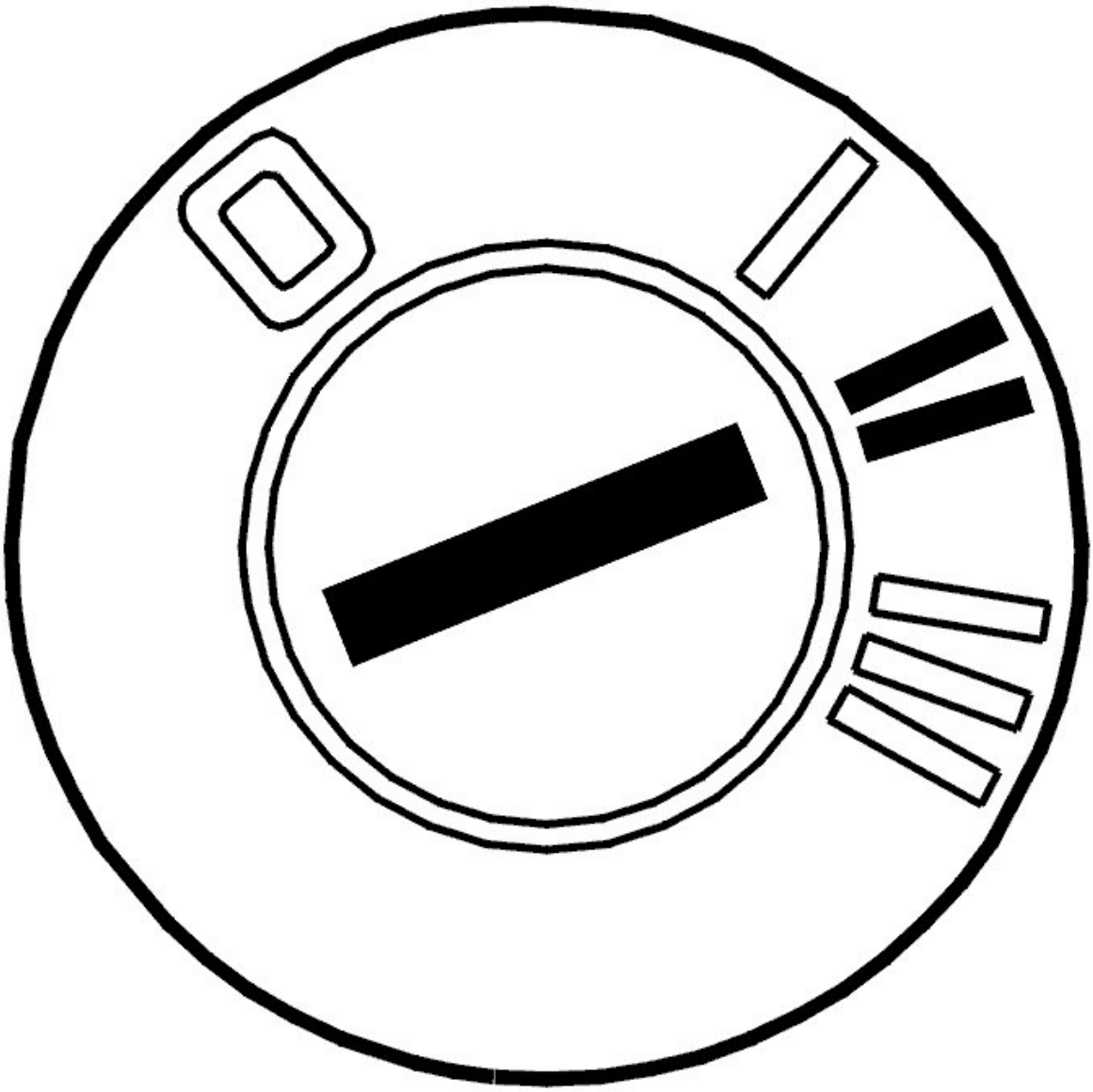
Continue - Verification

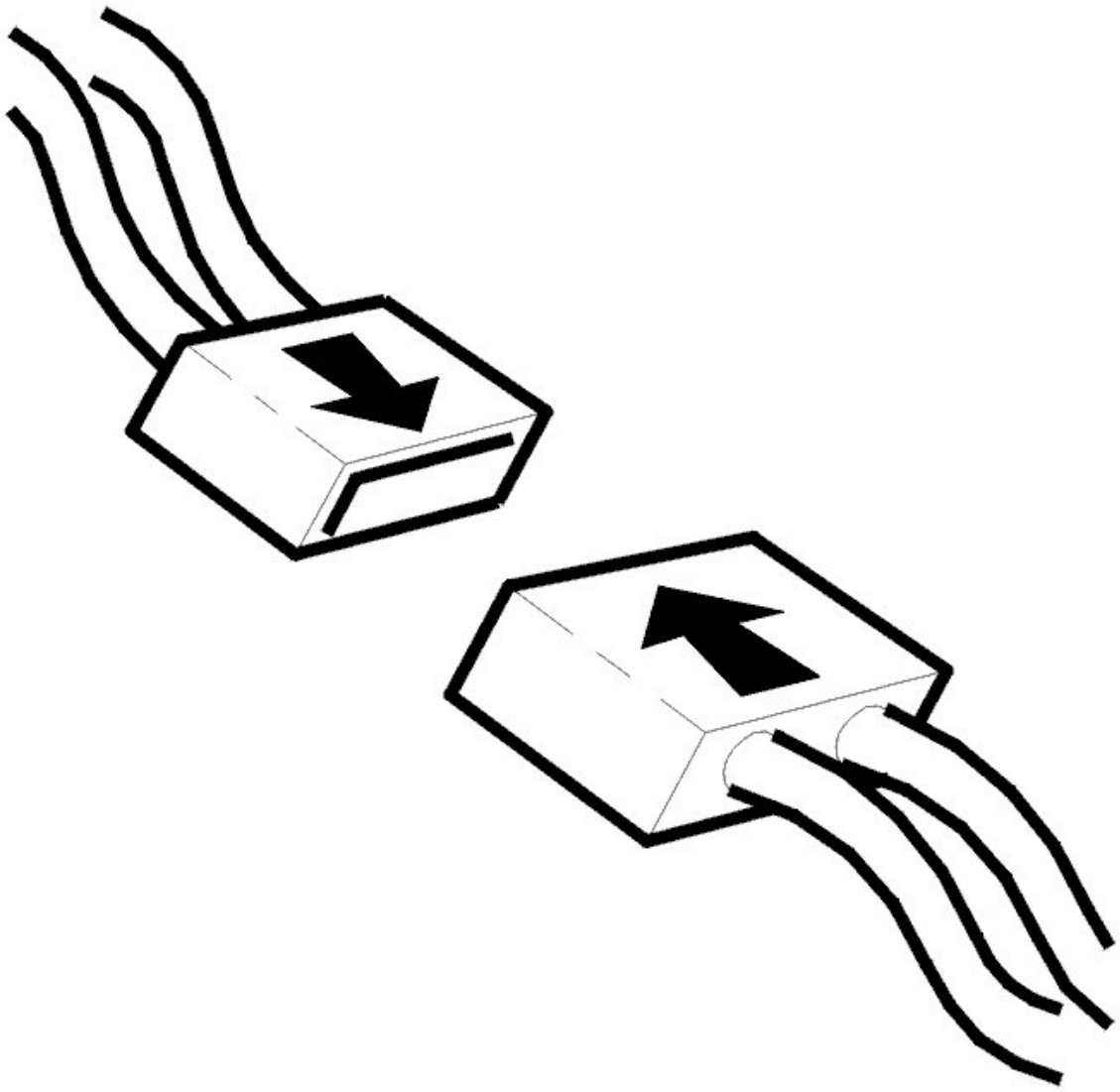
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that radio reception functions.

Does radio reception function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4001 is stored if the ignition is on, main antenna supplied with power and the head unit/audio module detects low voltage on the main antenna output voltage.

Possible source
- The power supply from head unit to the main antenna is short-circuited to ground.
- Defective antenna amplifier

Fault symptom[s]
- Poor radio reception (AM).

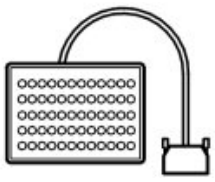
Signal Too Low. Intermittent Fault

Signal too low. Intermittent fault

Checking contact resistance, oxidation and wiring

Check the antenna amplifier and the head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy if necessary.
Check the cables between the antenna amplifier terminal #C1 and head unit / audio control module terminal #A9 for a short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Windshield antenna / amplifier, replacing See: Accessories and Optional Equipment/Antenna/Antenna Amplifier/Service and Repair/Windshield Antenna / Amplifier, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4002 is stored if the ignition is off, main antenna supplied with power and the head unit/audio module detects high voltage on the main antenna output voltage.

Possible source

- The power supply from the head unit/audio module to the main antenna is short circuited to +12 V.
- Defective antenna amplifier.

Fault symptom[s]

- None.

Signal Too High. Permanent Fault

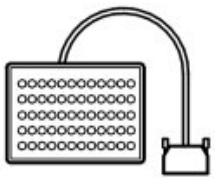
Signal too high. Permanent fault

Checking the wiring and component

Check the cable between the antenna amplifier terminal #D1 and head unit / audio control module terminal #A9 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found, replace the antenna amplifier.

Other information

- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification



Select "Continue" when the fault has been remedied.

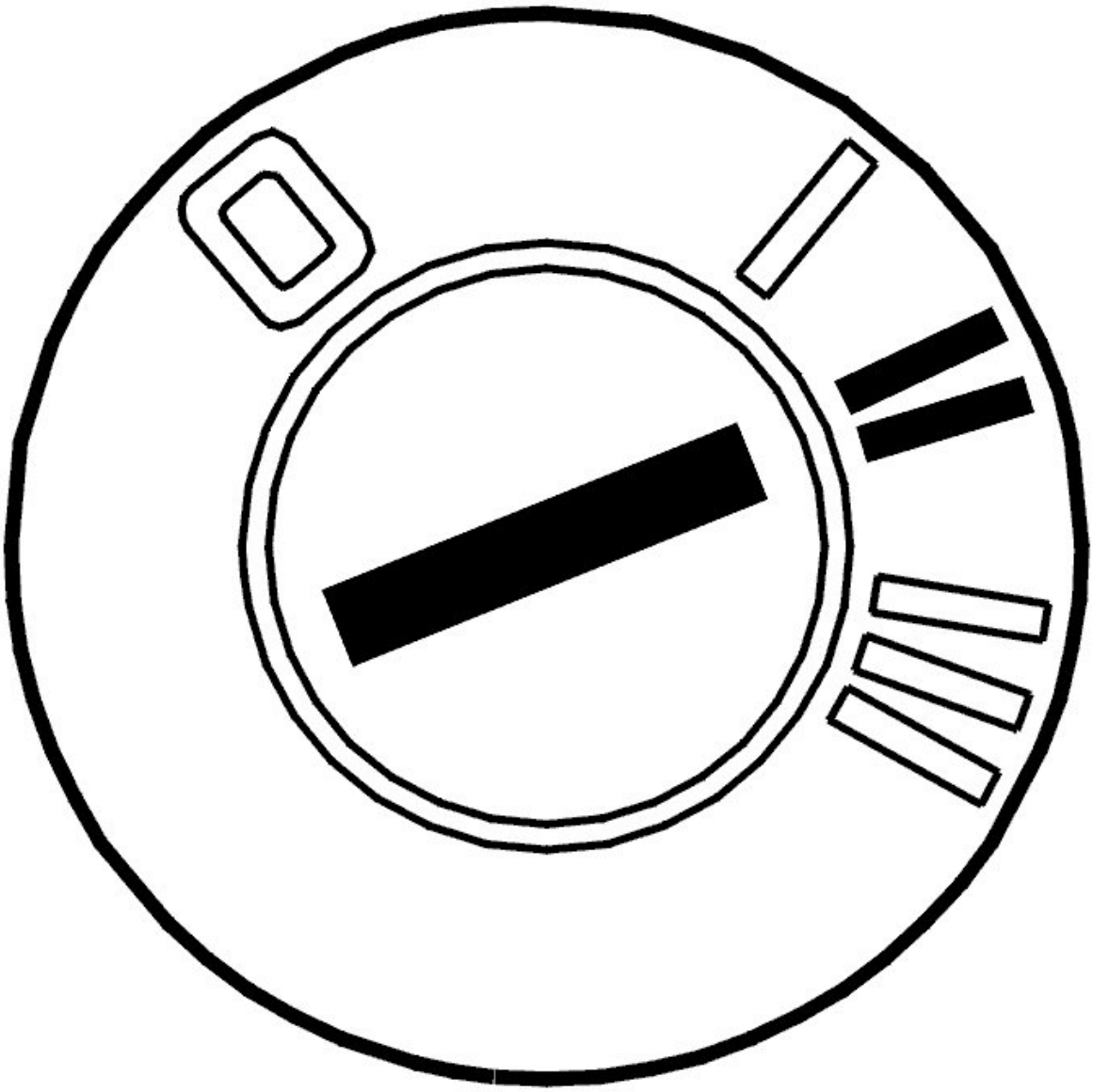
Continue - Verification

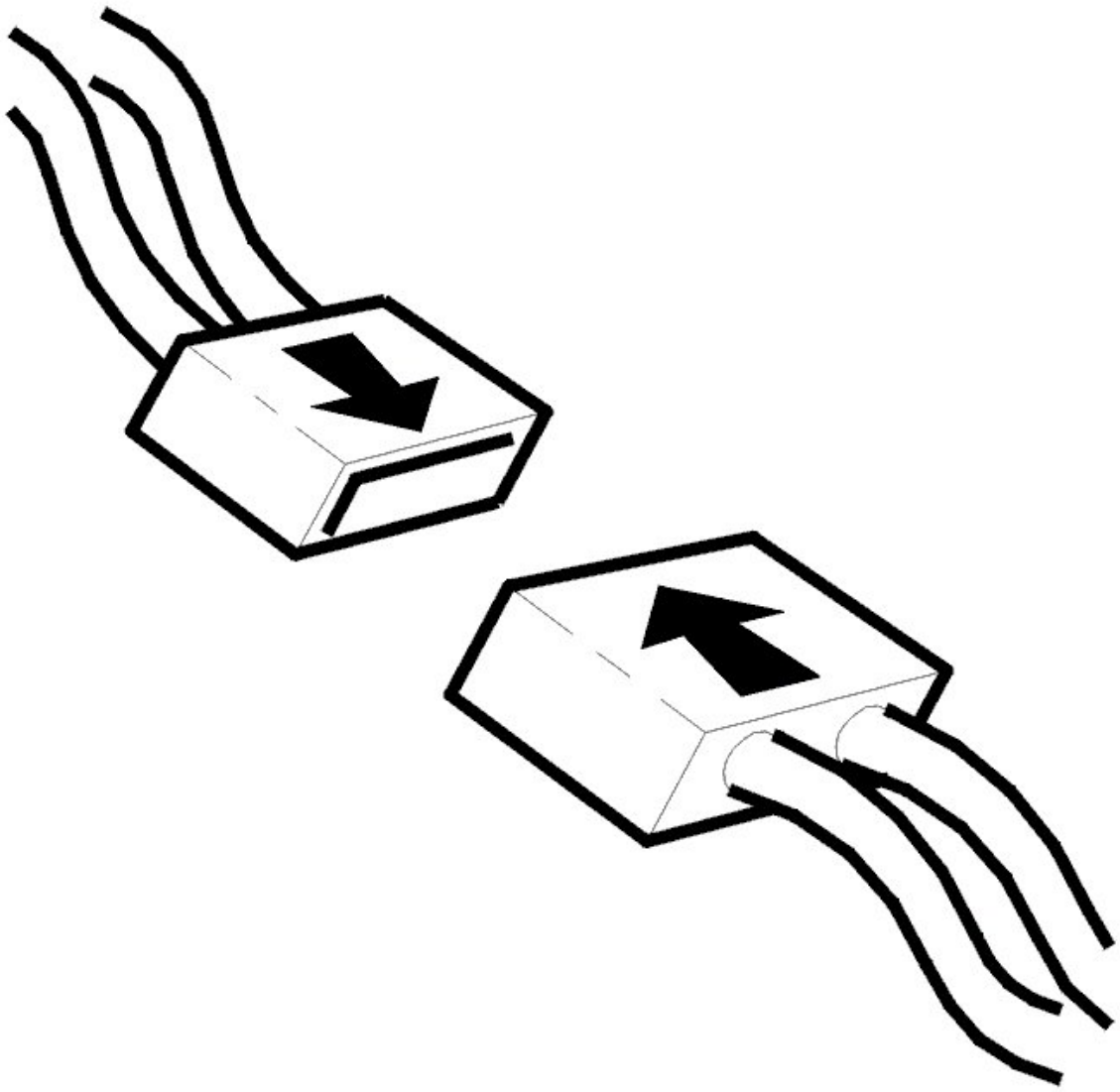
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.

Check that radio reception functions.

Does radio reception function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) AUM-4002 is stored if the ignition is off, main antenna supplied with power and the head unit/audio module detects high voltage on the main antenna output voltage.

Possible source
- The power supply from the head unit/audio module to the main antenna is short circuited to +12 V.
- Defective antenna amplifier.

Fault symptom[s]
- None.

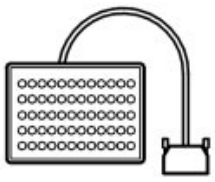
Signal Too High. Intermittent Fault

Signal too high. Intermittent fault

Checking contact resistance, oxidation and wiring

Check the antenna amplifier and the head unit / audio control module connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy if necessary.
Check the cables between the antenna amplifier terminal #C1 and head unit / audio control module terminal #A9 for a short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information
- Radio/telephone, changing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair
- Radio equipment, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio Equipment, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification

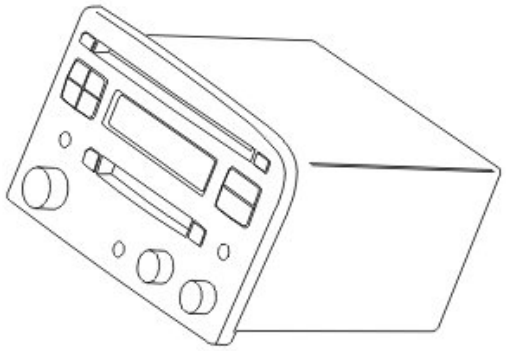


Continue - DONE

AUM-E001

Diagnostic trouble code (DTC) information AUM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

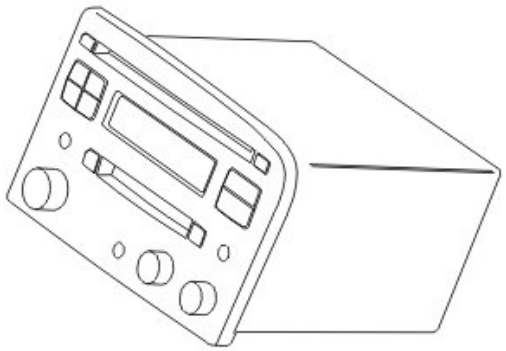
Possible source
- Short-circuit between Control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the Control area network (CAN).

Fault symptom[s]
- The rheostat function on the audio system is not working
- The radio buttons on the steering wheel do not function
- Carphone mute on the radio does not function.

AUM-E003

Diagnostic trouble code (DTC) information AUM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

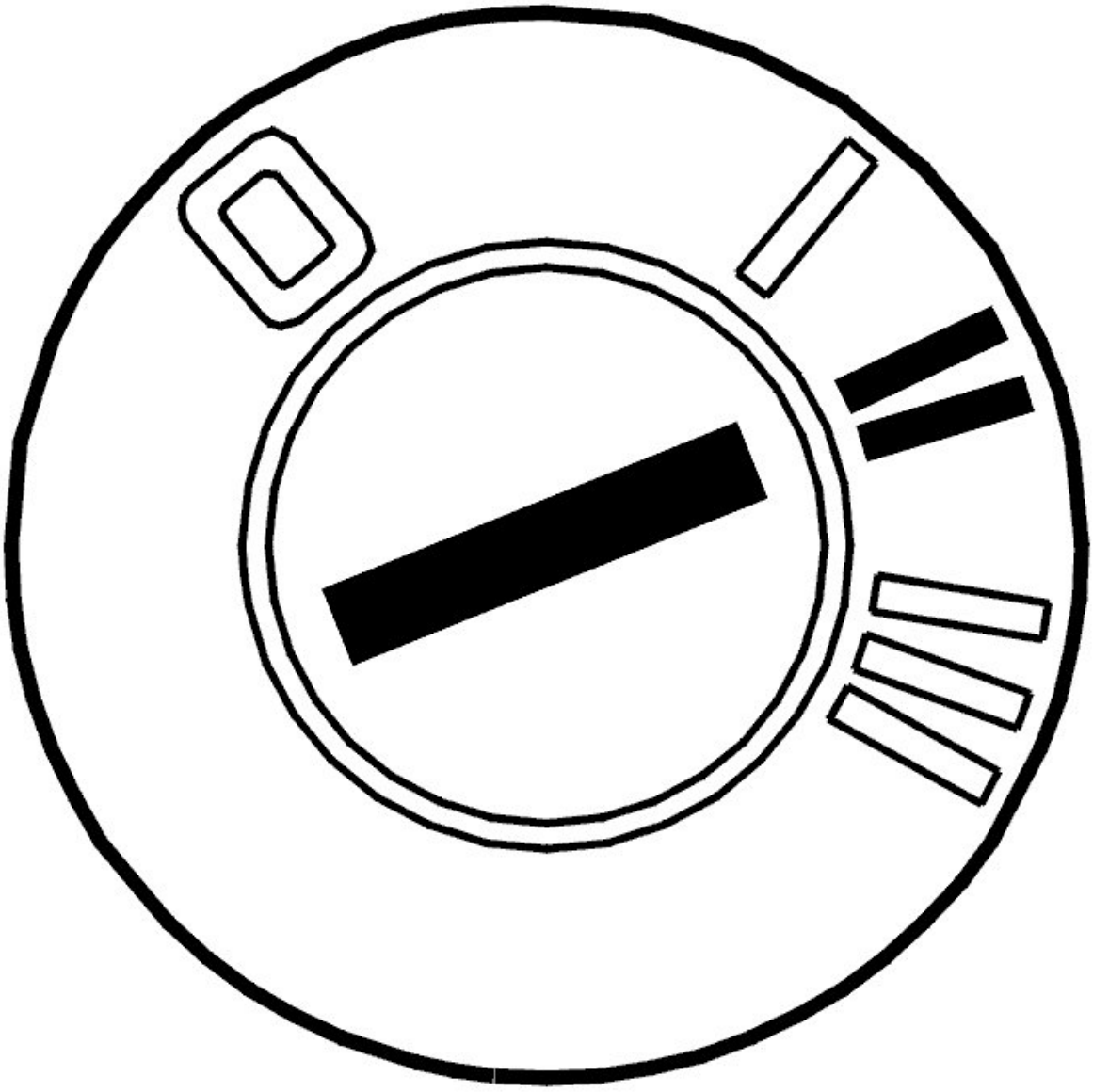
Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The rheostat function on the audio system is not working
- The radio buttons on the steering wheel do not function
- Carphone mute on the radio does not function.

AUM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

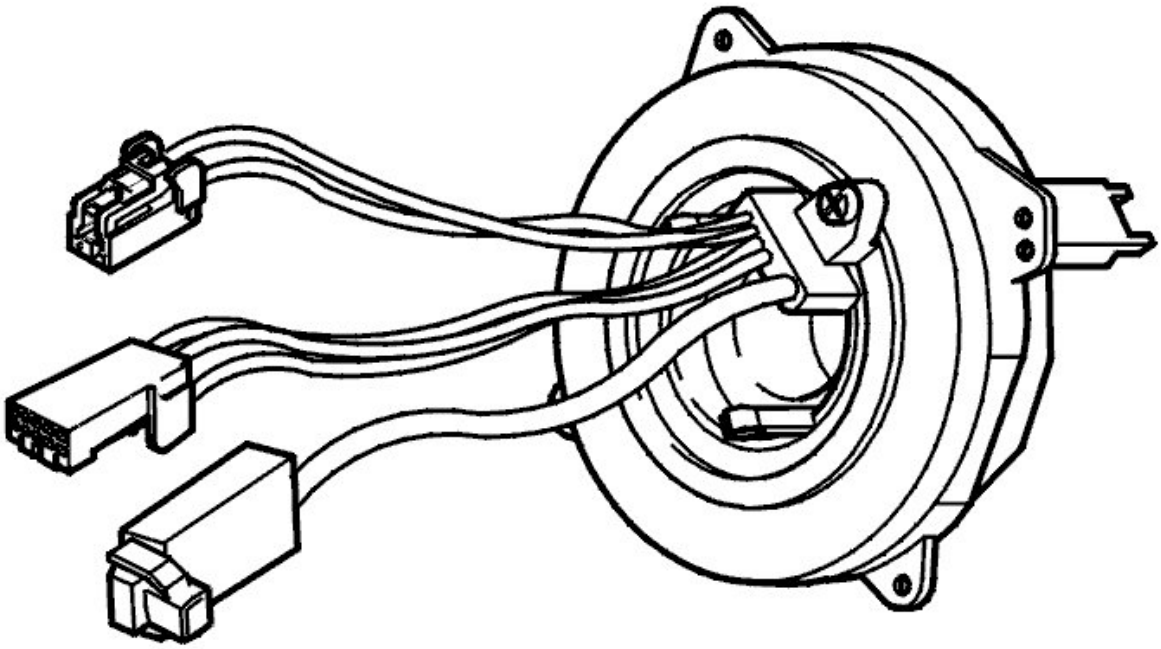
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The steering wheel angle sensor is initialized when the steering wheel is moved at least ±5° within a certain amount of time of the ignition being switched on.
Diagnostic trouble code (DTC) BCM-A030 is stored if the steering angle is not initialized after 2 minutes driving at a speed above 10 km/h.
The initialization can be run before the ignition is switched off even after diagnostic trouble code (DTC) BCM-A030 has been stored. The anti spin warning lamp then goes out. Diagnostic trouble code (DTC) BCM-0108 is also stored if the initialization is not completed before the ignition is switched off.

Substitute value
- Active yaw control is blocked.

Possible source
- The steering wheel angle sensor is uninitiated after two minutes driving above 10 km/h.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- The traction control system does not function.

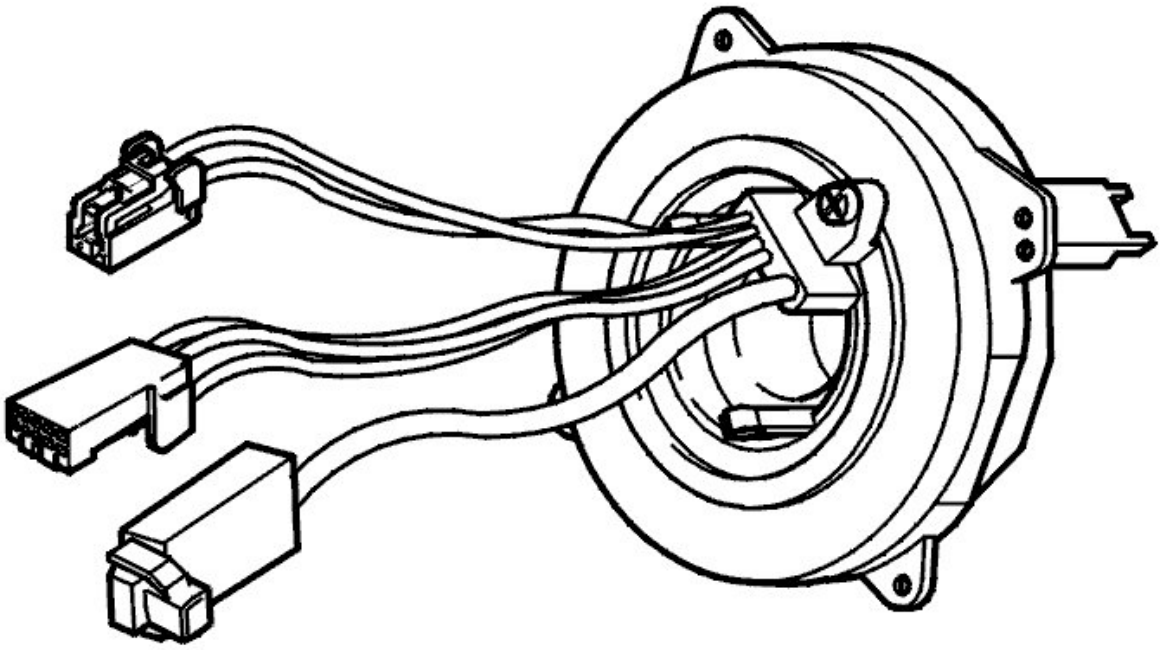
The Initialization Check Has Not Been Run

The initialization check has not been run

Checking diagnostic trouble codes (DTCs)

If diagnostic trouble code (DTC) BCM-A030 is stored on its own it must be erased.
If diagnostic trouble code (DTC) BCM-0108 is stored at the same time as BCM-A030, read off the diagnostic trouble codes (DTCs) from the control module for the steering angle sensor. Fault-trace the system.
Select an option:

1. Diagnostic trouble code (DTC) BCM-A030 is stored on its own
2. Diagnostic trouble codes (DTCs) BCM-0108 and BCM-A030 are stored at the same time.



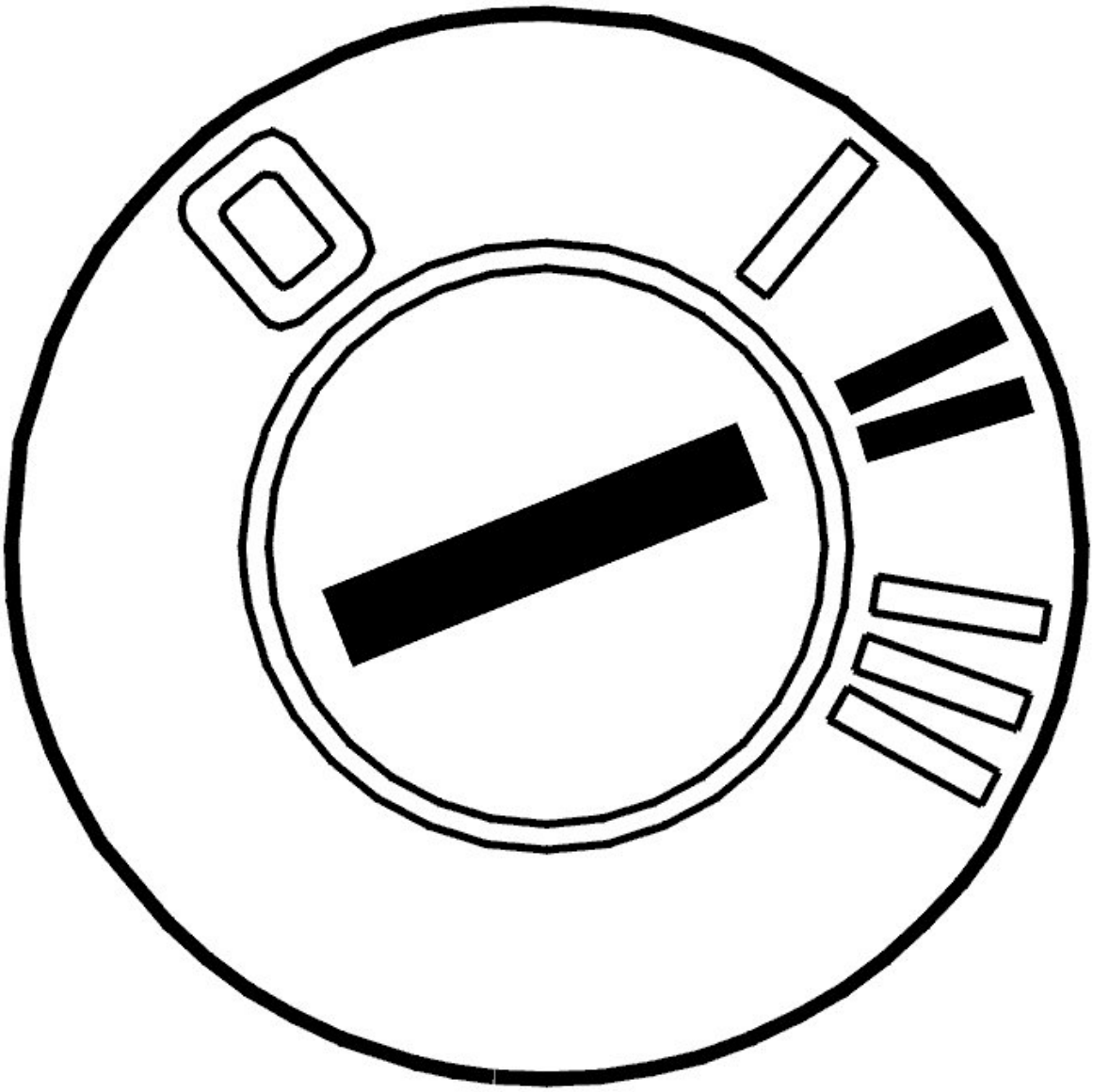
1 - Erasing diagnostic trouble code (DTC)

2 - **DONE**

Erasing diagnostic trouble code (DTC)

Erasing diagnostic trouble codes (DTCs)

Erasing diagnostic trouble codes (DTCs)



- Ignition on.

Erase diagnostic trouble codes (DTCs).

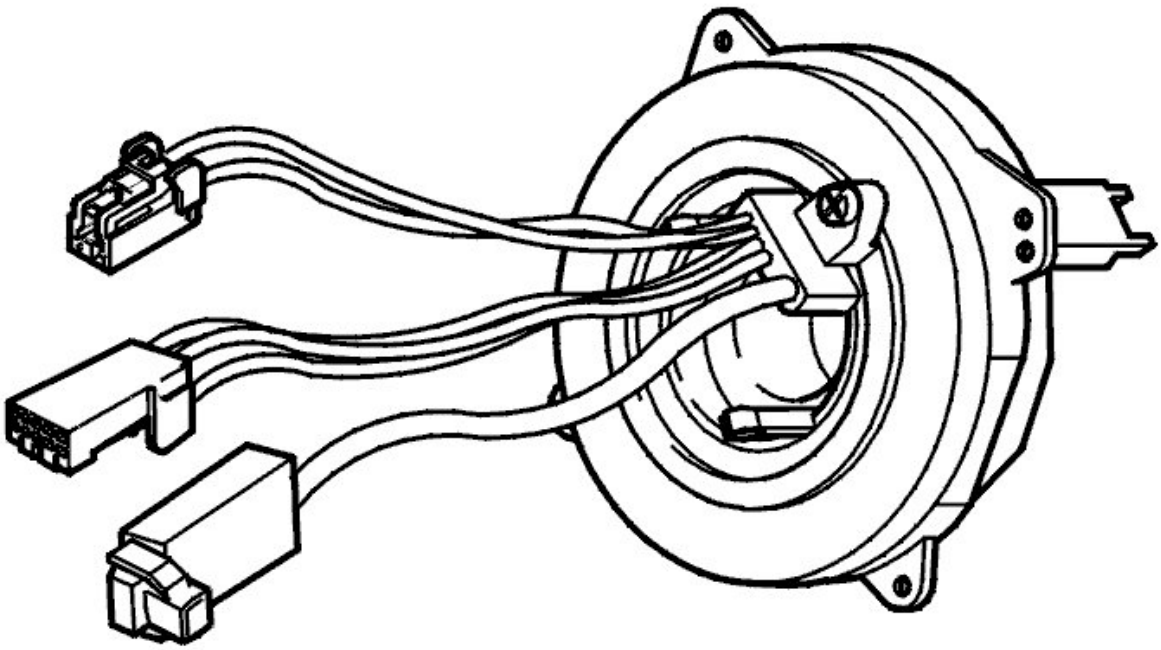
Continue - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information BCM-A031

Condition



After the steering wheel angle sensor has been initialized, a check of the plausibility of the steering wheel angle is run.
The diagnostic trouble code (DTC) is stored if the check is not approved and speed exceeds 50 km/h.
The feasibility check can be performed after the relevant diagnostic trouble code is generated, but before the ignition is switched off. If the check is not complete within one minute, BCM-0111 is also generated.

Substitute value
- Active yaw control is blocked.

Possible source
- The plausibility check of the steering wheel angle is not approved.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

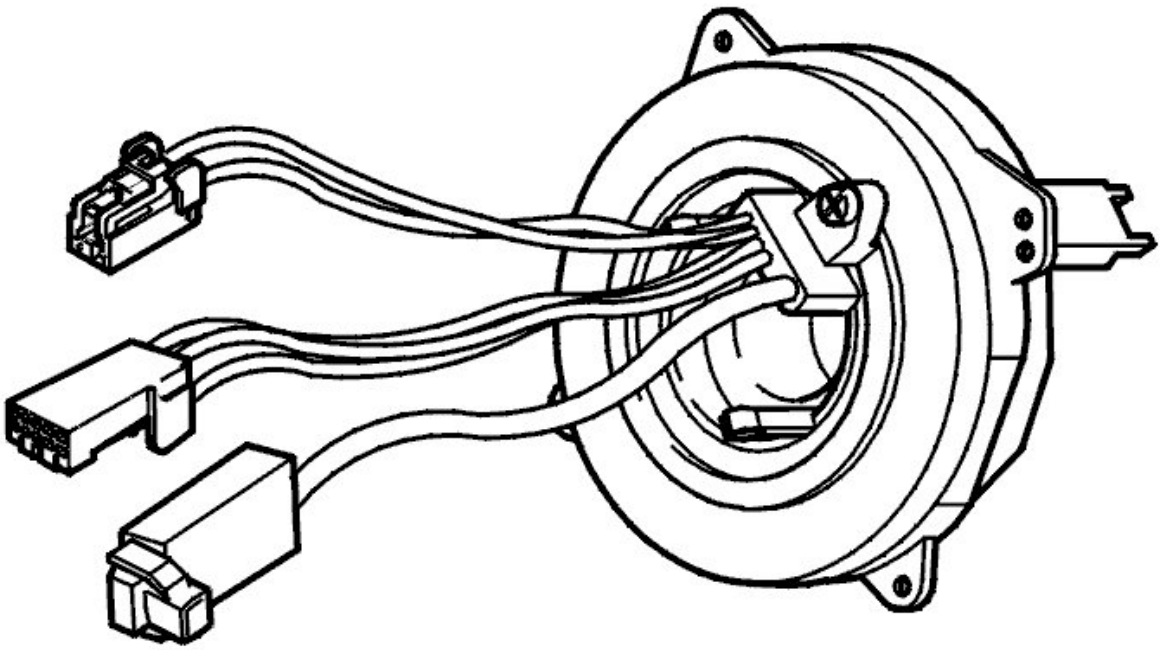
Fault symptom[s]
- -2002Anti-spin warning lamp lit
- 2003-General warning lamp lit
- Anti skid function is not working

Plausibility Check Not Run

Plausibility check not run

Checking diagnostic trouble codes (DTCs)

If diagnostic trouble code (DTC) BCM-A031 is stored on its own it must be erased.
If diagnostic trouble code (DTC) BCM-0111 is stored at the same time as BCM-A031, read off the diagnostic trouble codes (DTCs) from the control module for the steering angle sensor. Fault-trace the system.
Select an option:
1. Diagnostic trouble code (DTC) BCM-A031 is stored on its own
2. Diagnostic trouble codes (DTCs) BCM-0111 and BCM-A031 are stored at the same time.



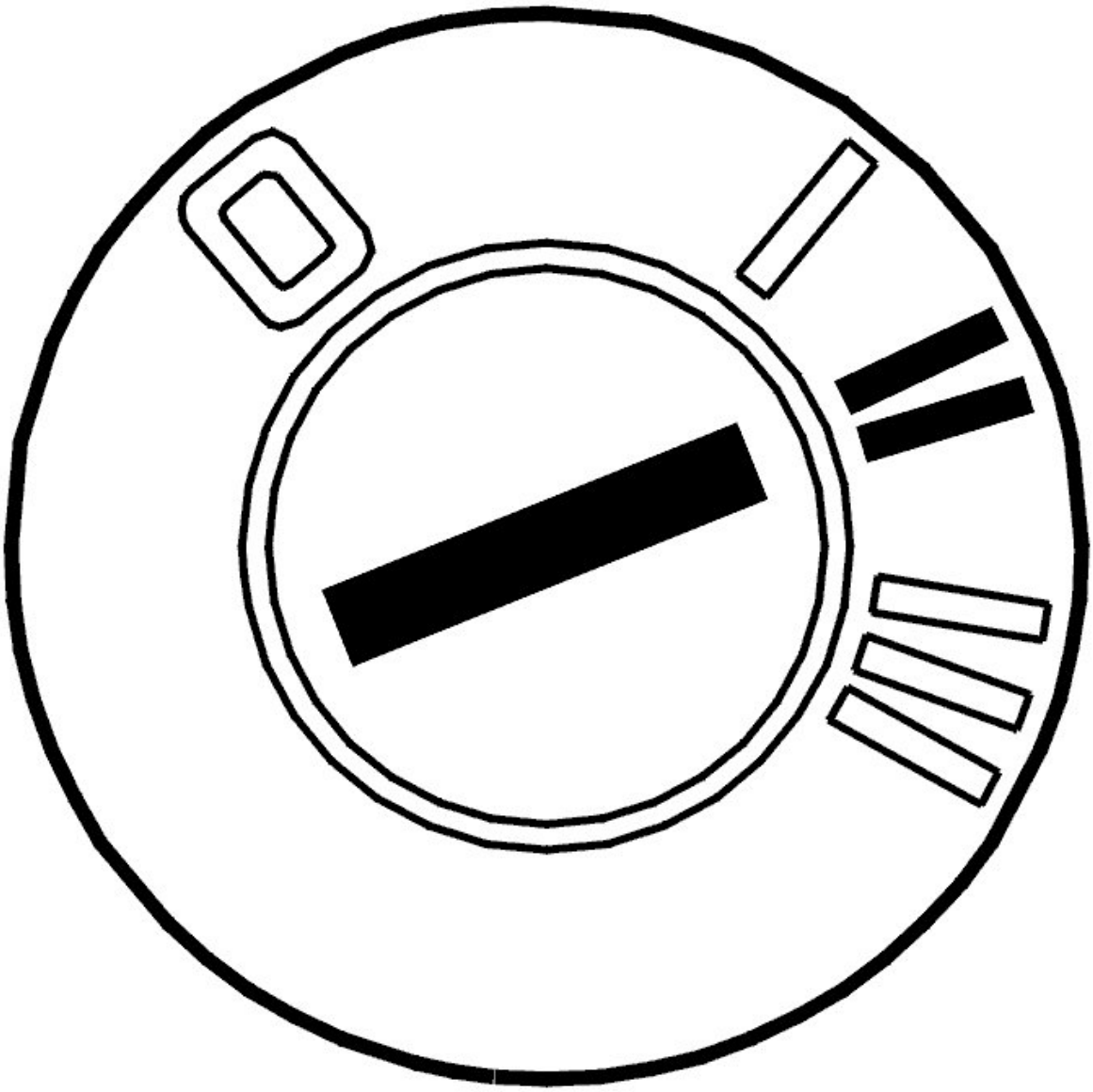
1 - Erasing diagnostic trouble code (DTC)

2 - **DONE**

Erasing diagnostic trouble code (DTC)

Erasing diagnostic trouble codes (DTCs)

Erasing diagnostic trouble codes (DTCs)



- Ignition on.

Erase diagnostic trouble codes (DTCs).

Continue - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information BCM-A032

Condition

The diagnostic trouble code (DTC) is stored in the subsequent operating cycle (ignition off and ignition on) if the brake control module (BCM) performs an extended start up check of the DSTC system due to a number of different faults during the previous operating cycle.

Substitute value

- None.

Possible source

- The diagnostic trouble code (DTC) has been stored in the previous operating cycle.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

- The information lamp is lit.

Too Long Stability Control

Too long stability control

Checking the diagnostic trouble codes (DTCs)

If diagnostic trouble code (DTC) BCM-A032 is stored on its own it must be erased.
If diagnostic trouble code (DTC) BCM-0145 is stored at the same time as BCM-A032, fault-tracing must be carried out according to the relevant information for diagnostic trouble code (DTC) BCM-0145.
Select an option:

1. Only BCM-A032 stored
2. Diagnostic trouble codes (DTCs) BCM-0145 and BCM-A032 are stored at the same time.

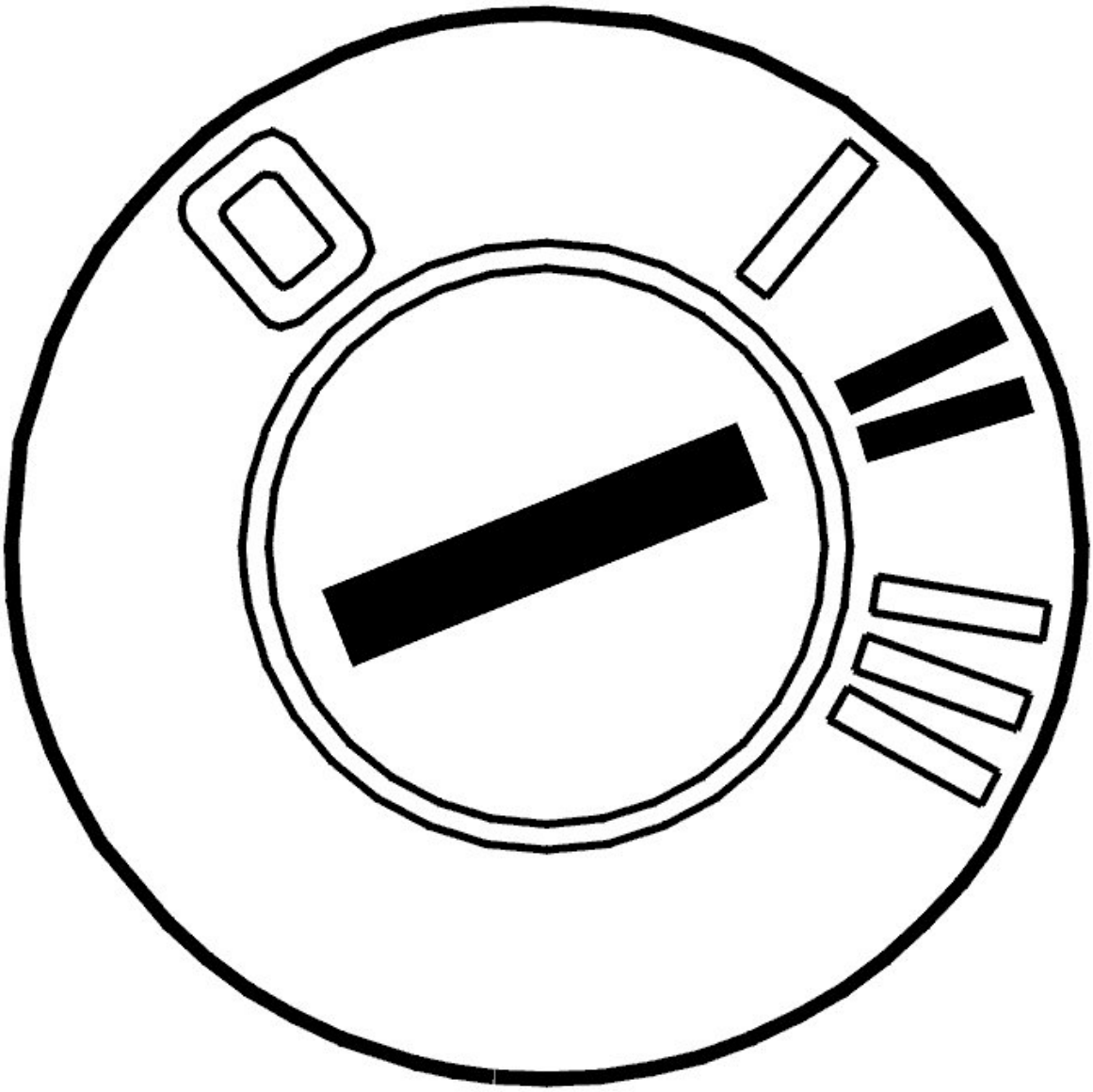
1 - Erasing diagnostic trouble code (DTC)

2 - **DONE**

Erasing diagnostic trouble code (DTC)

Erasing diagnostic trouble codes (DTCs)

Erasing diagnostic trouble codes (DTCs)



- Ignition on.

Erase diagnostic trouble codes (DTCs).

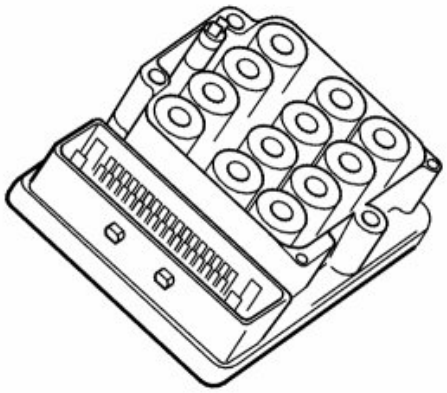
Continue - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information BCM-E000

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off")

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- The ABS warning lamp is lit
- No ABS function
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

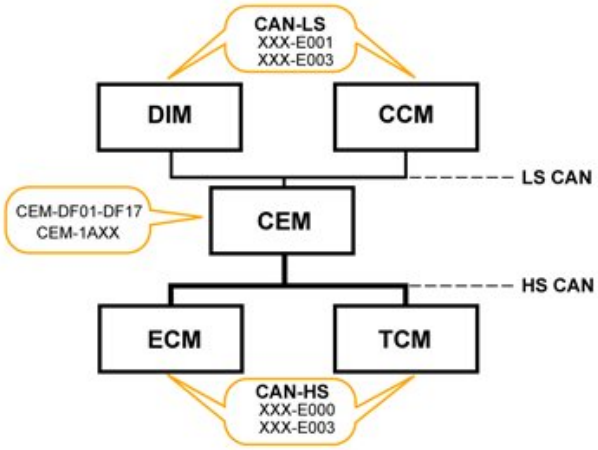
If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

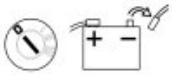
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

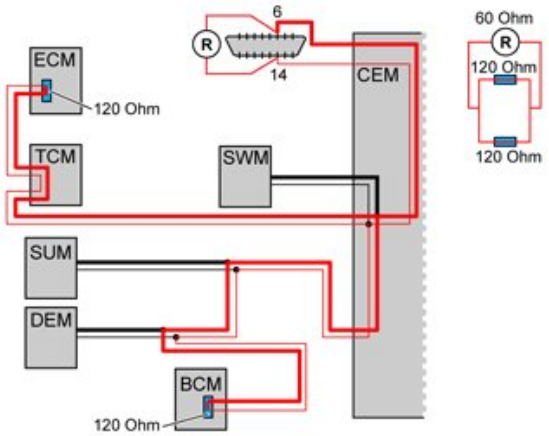
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they

work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

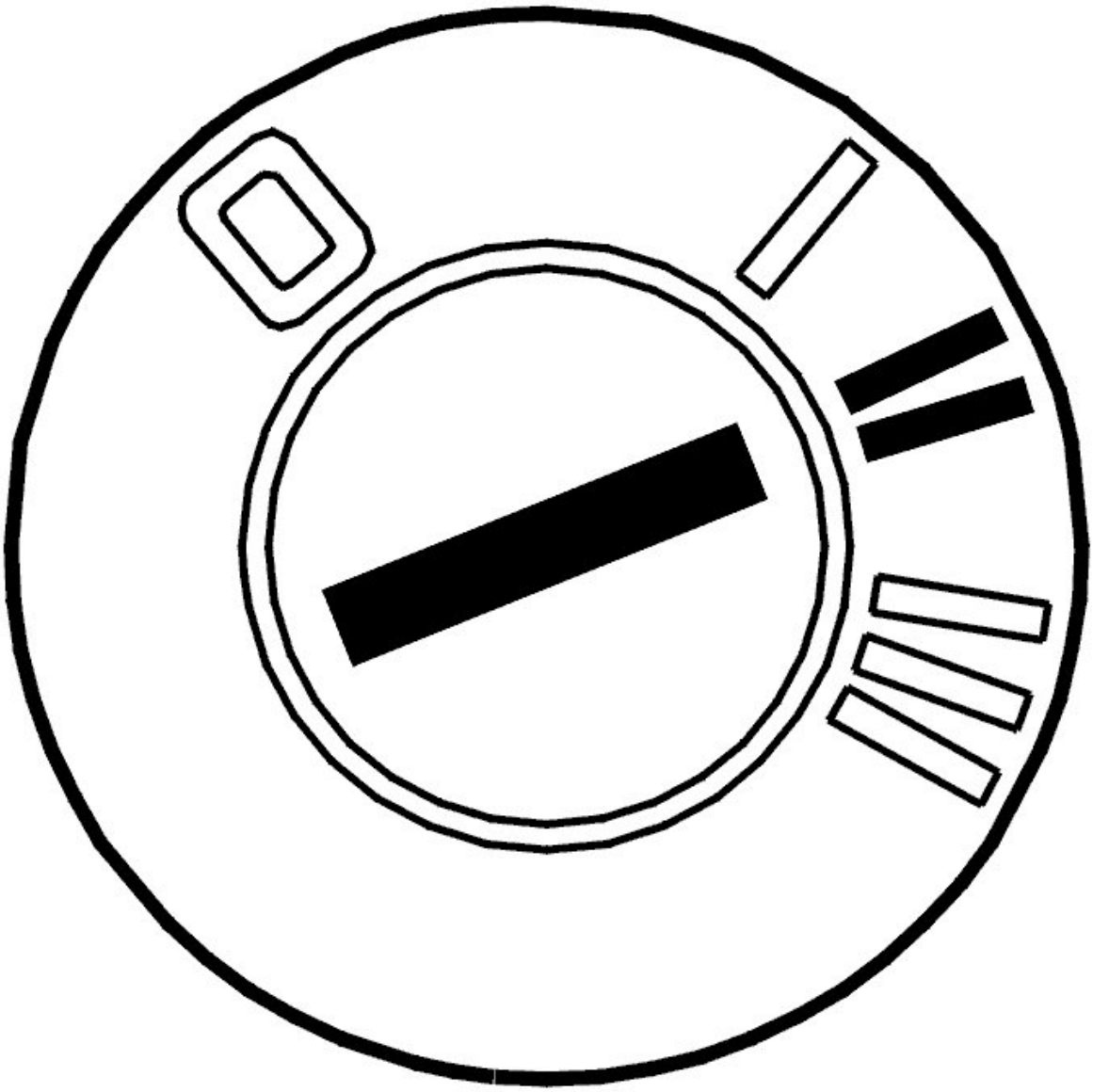


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

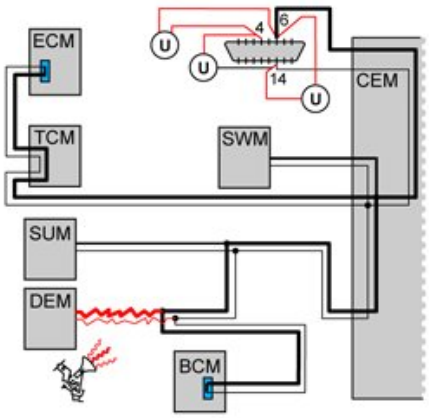
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

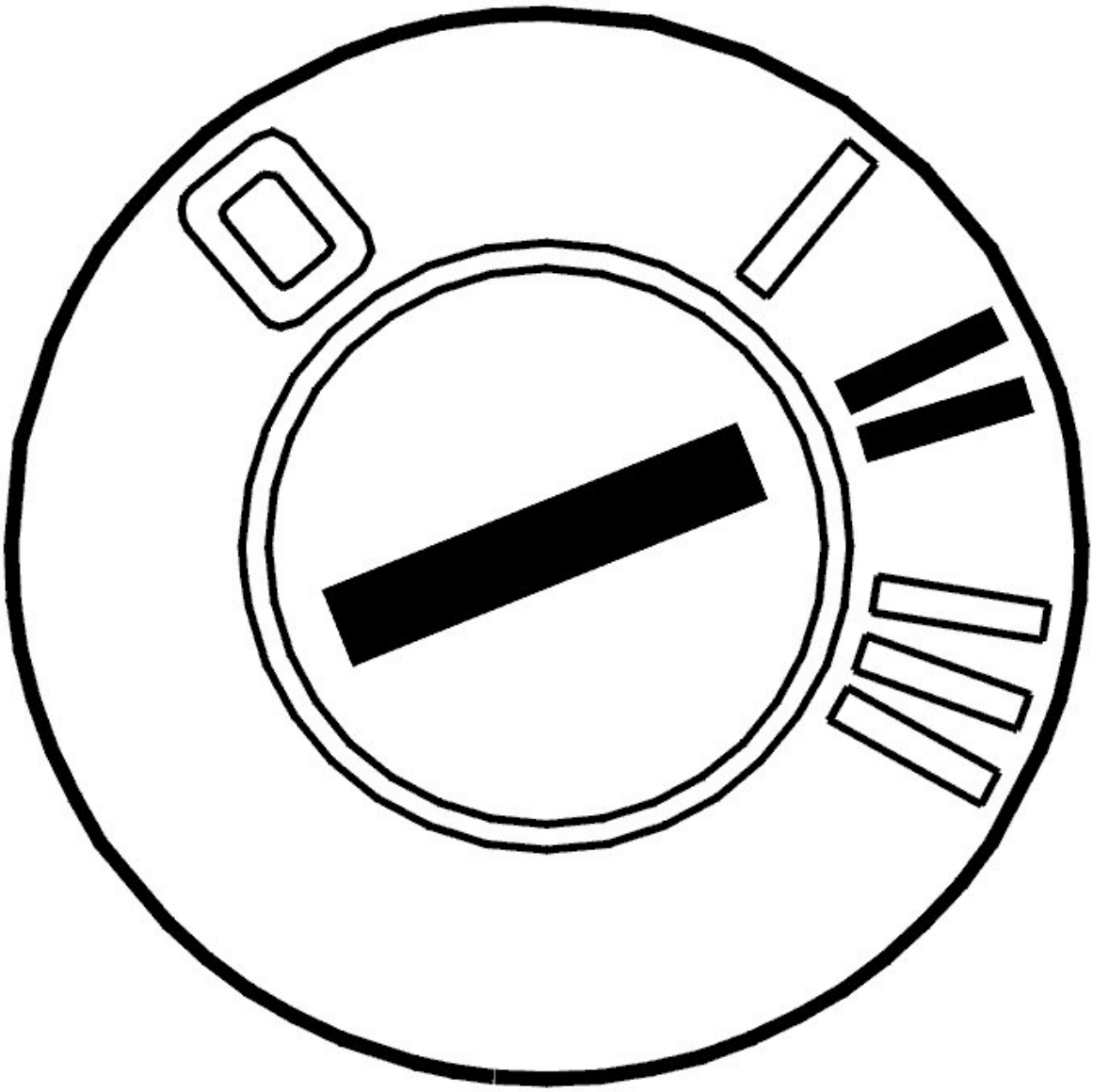


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

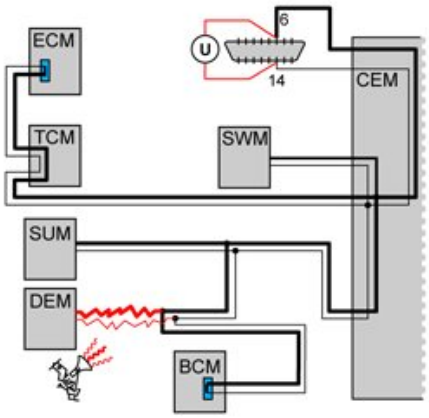
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

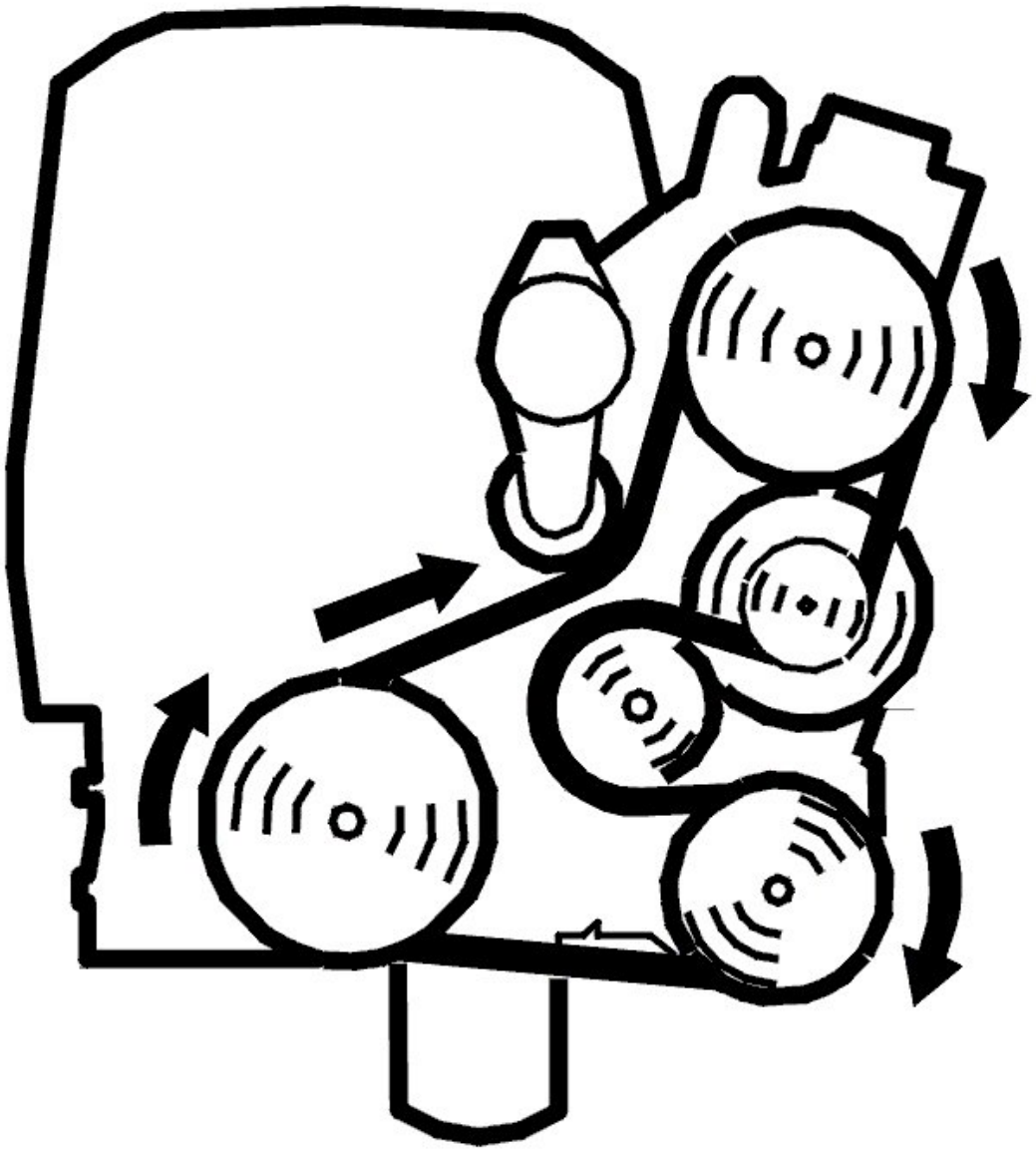
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

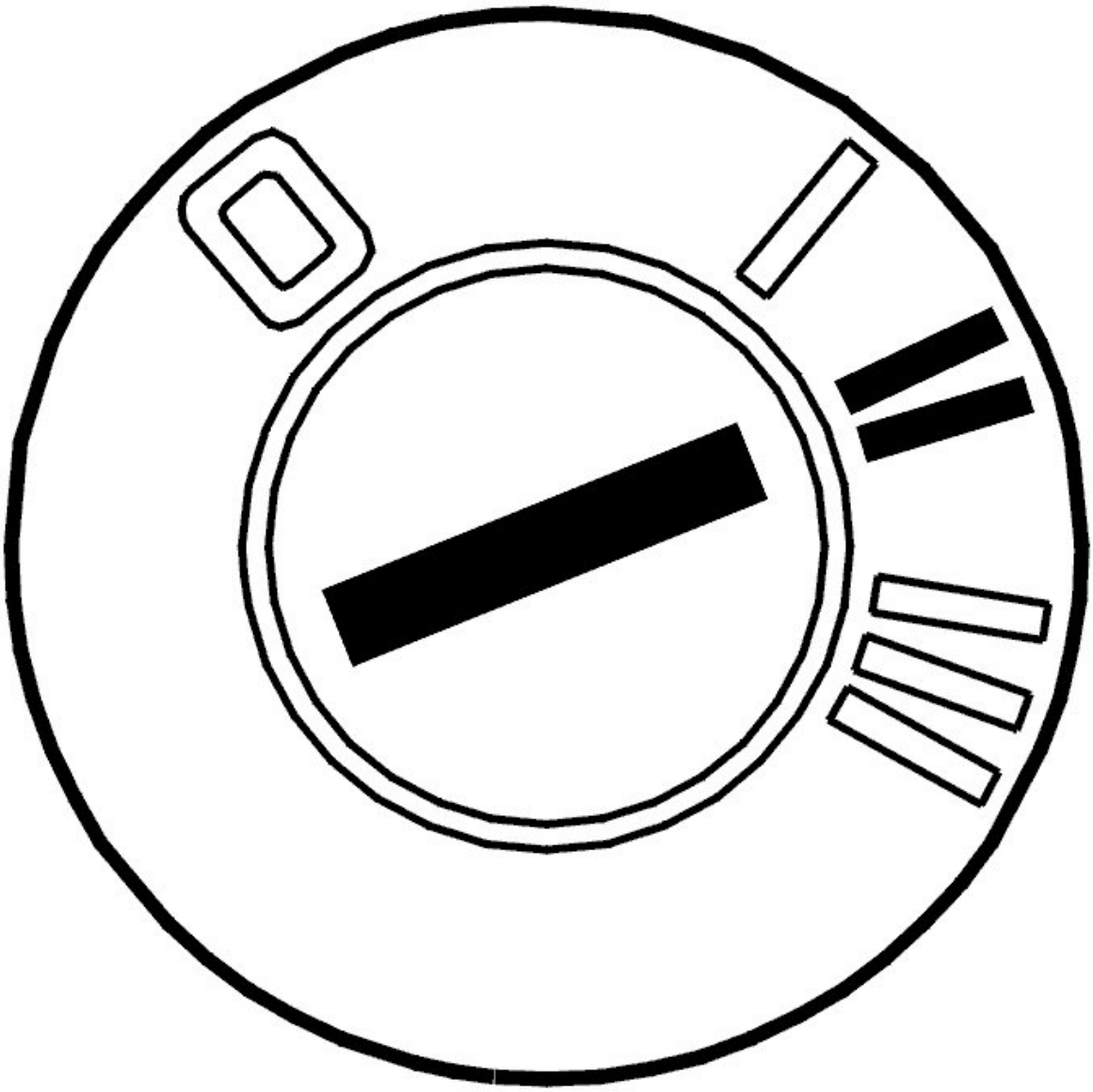


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

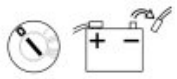
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

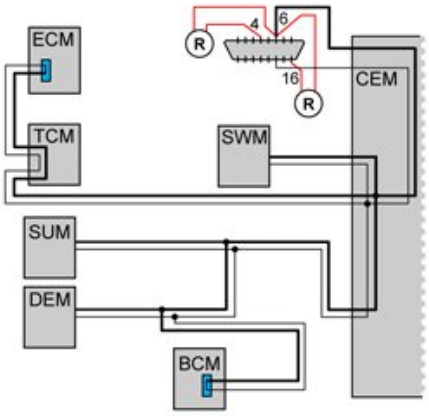
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

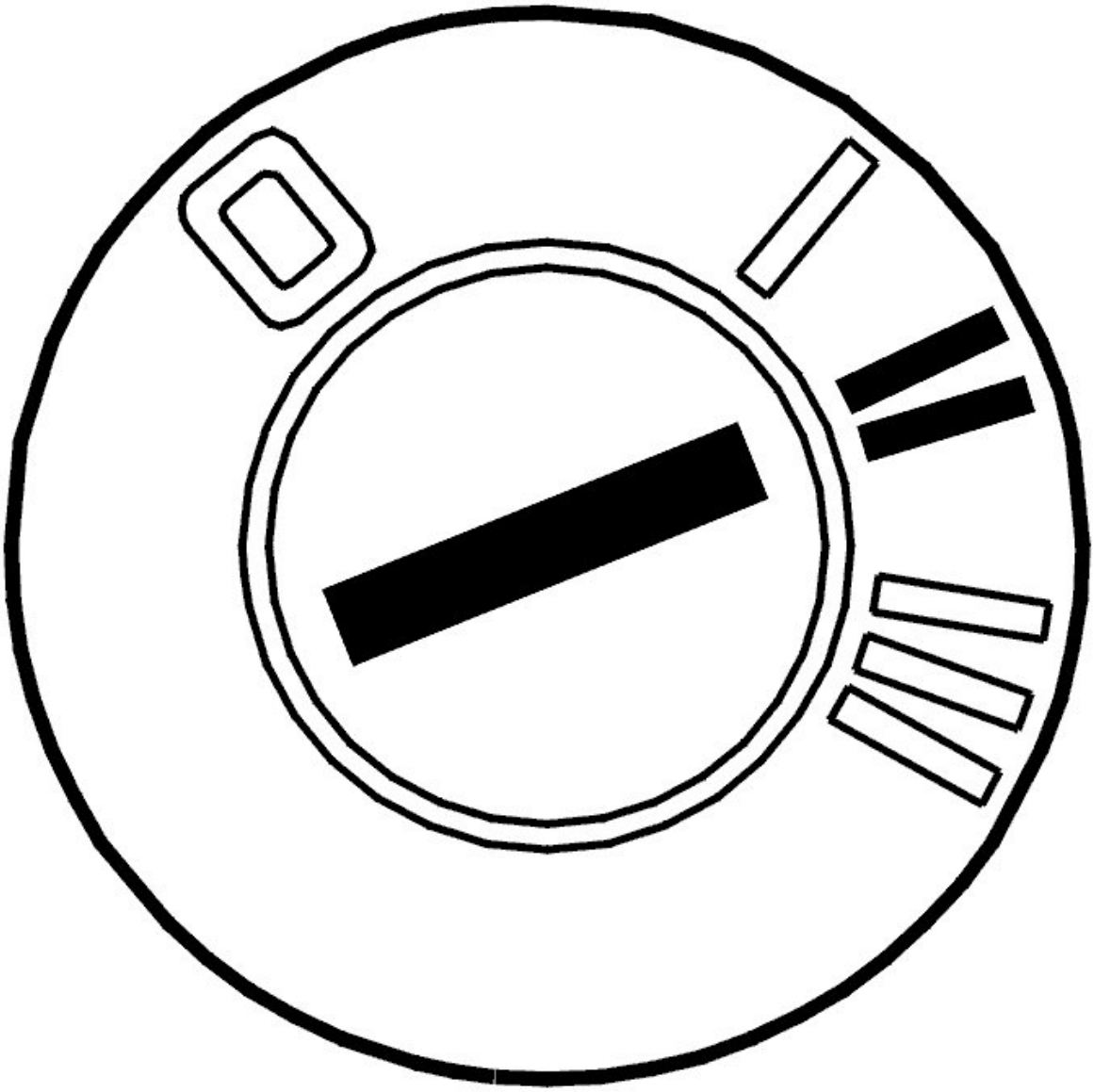


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

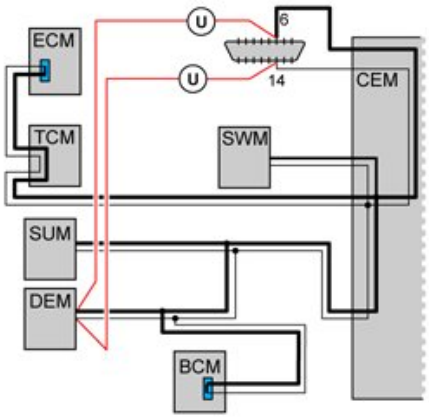
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

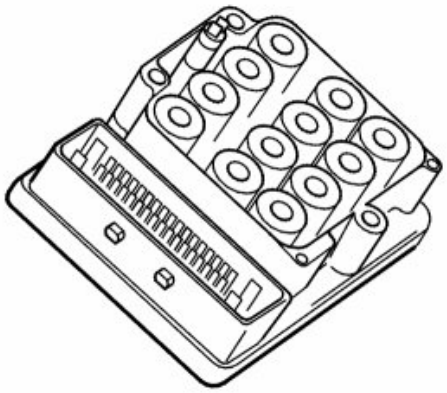


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information BCM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The ABS warning lamp is lit
- No ABS function
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

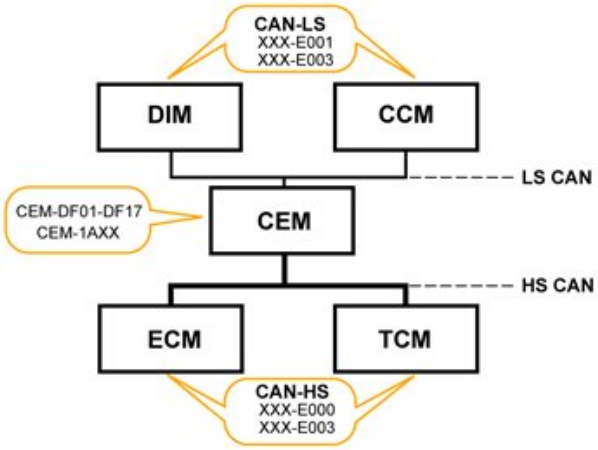
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

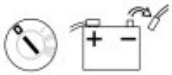
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

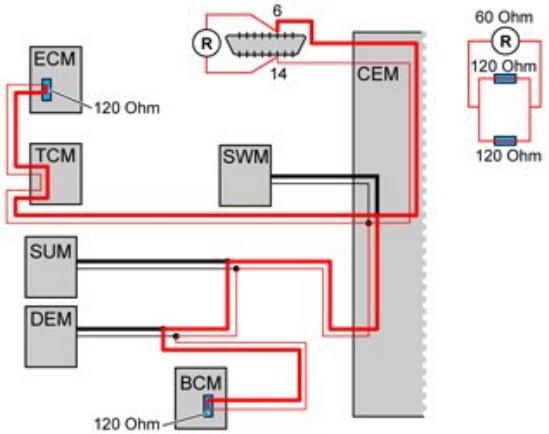
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

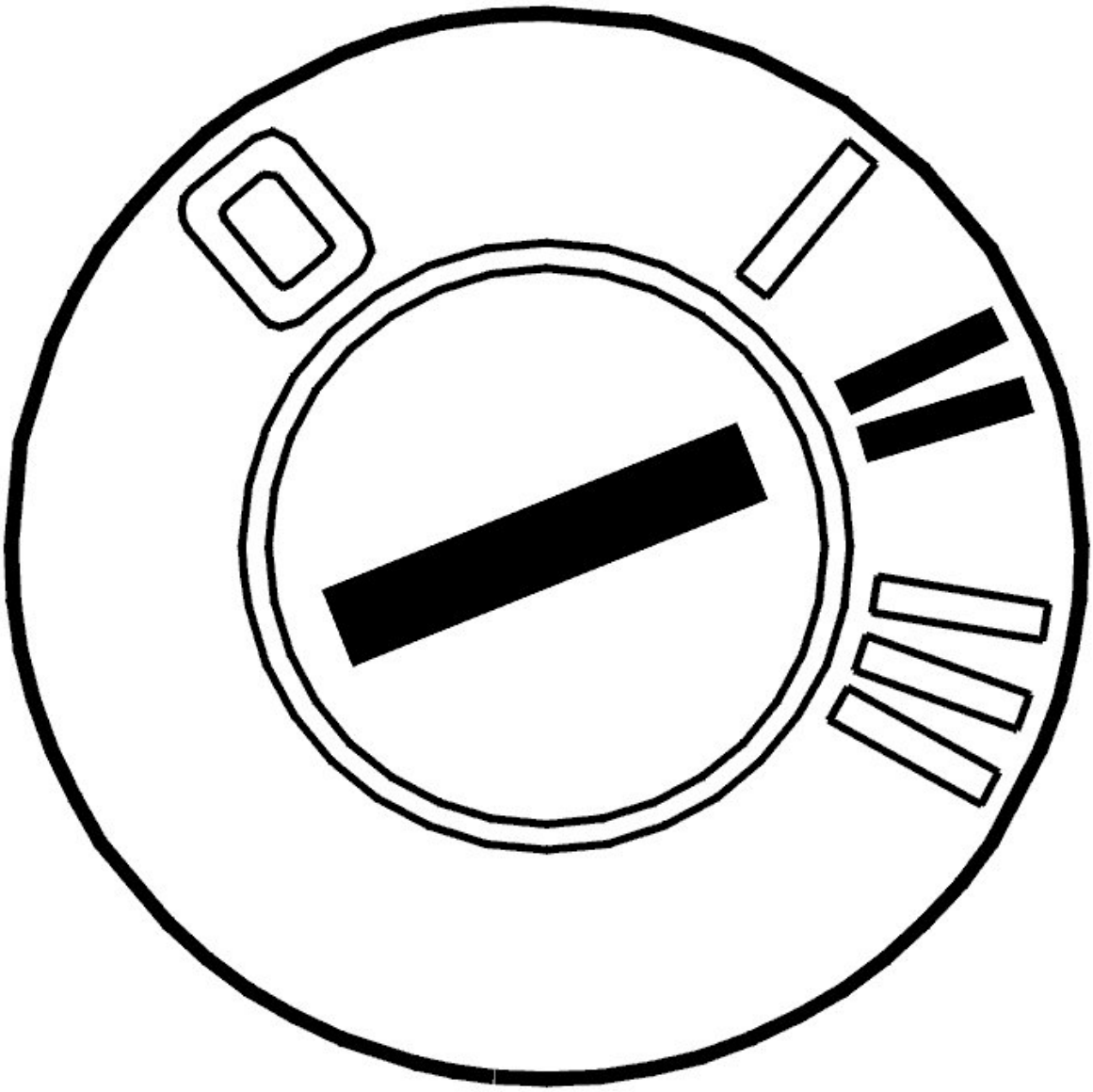


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

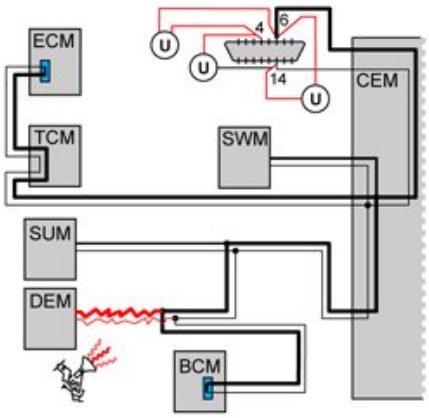
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

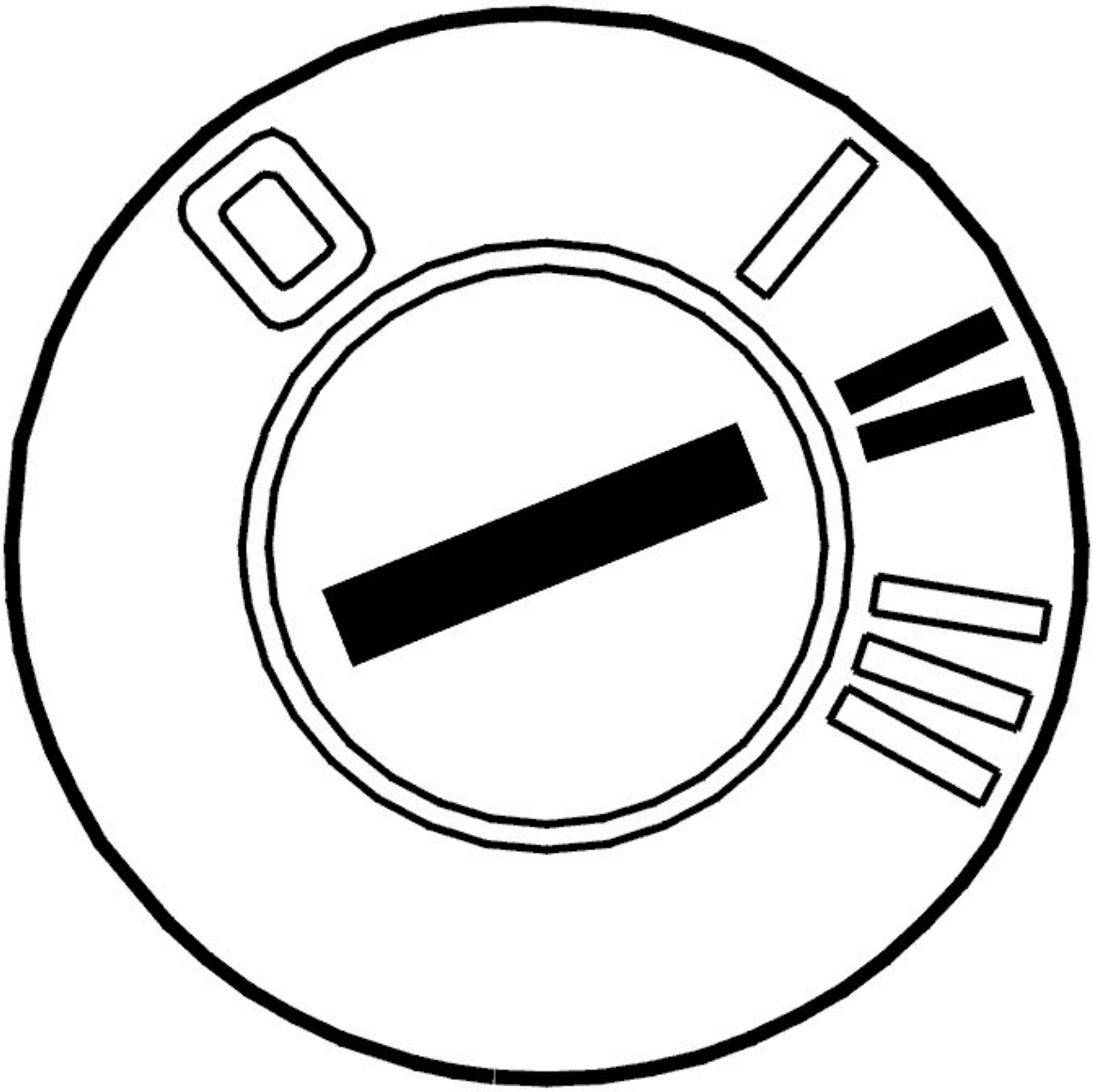


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

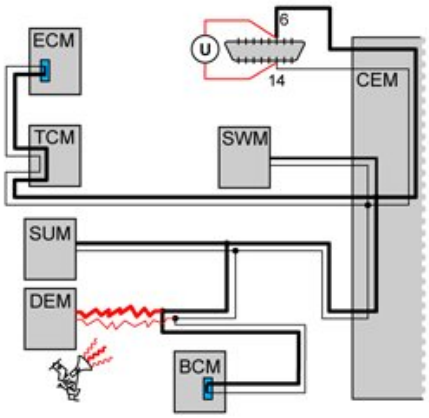
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

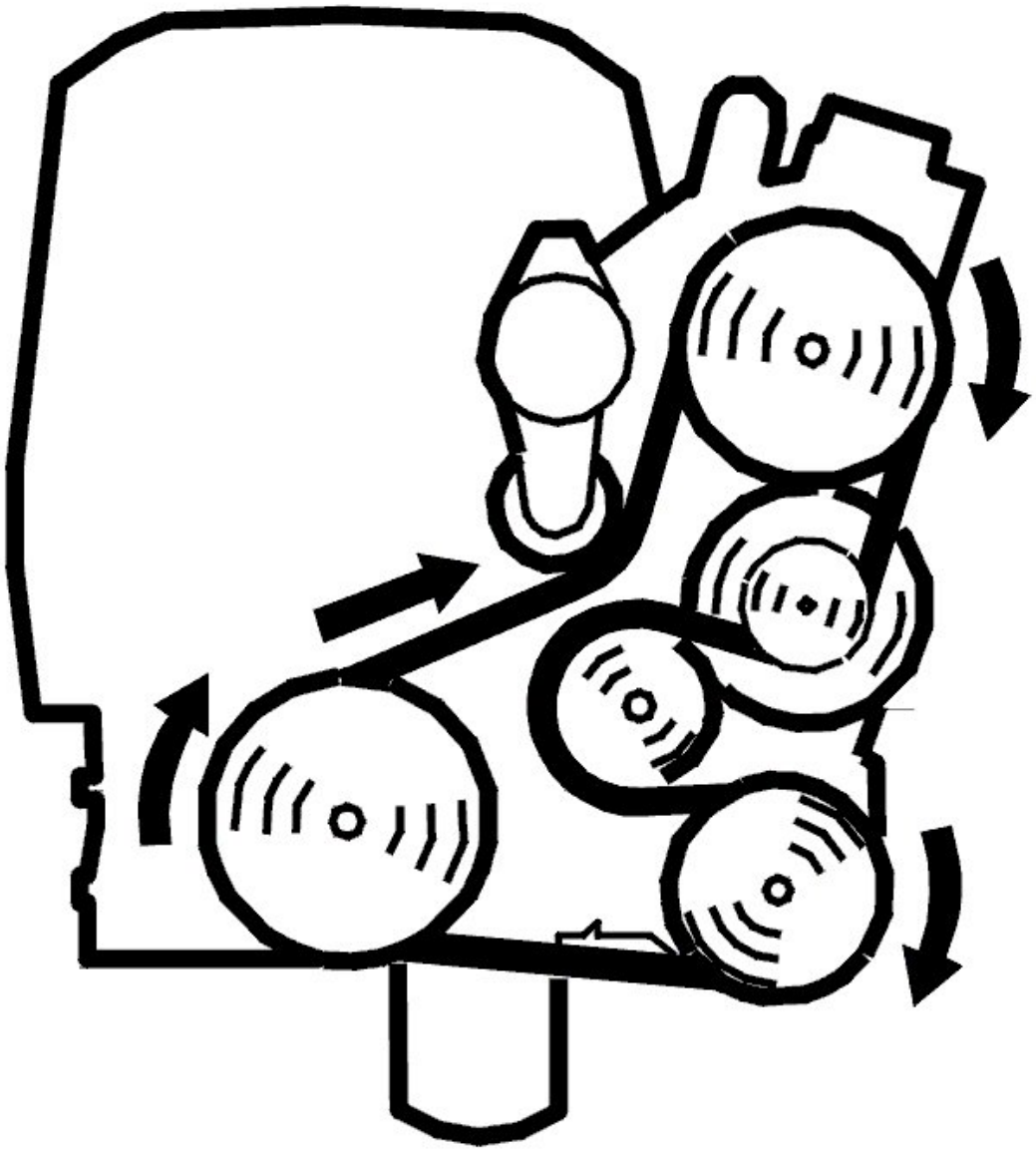
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

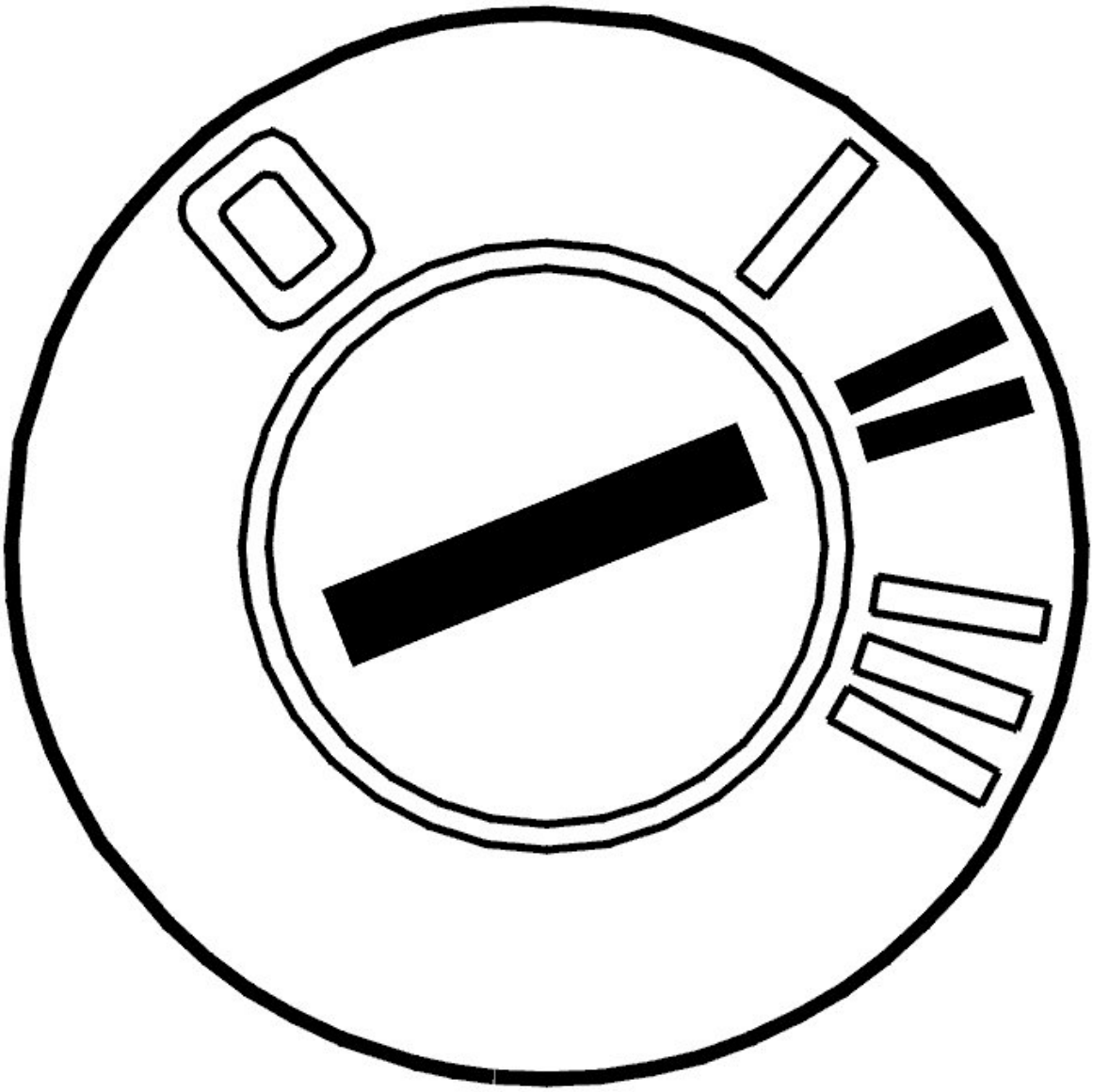


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

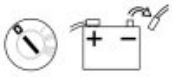
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

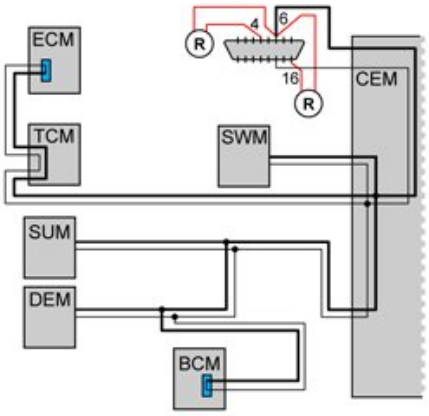
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

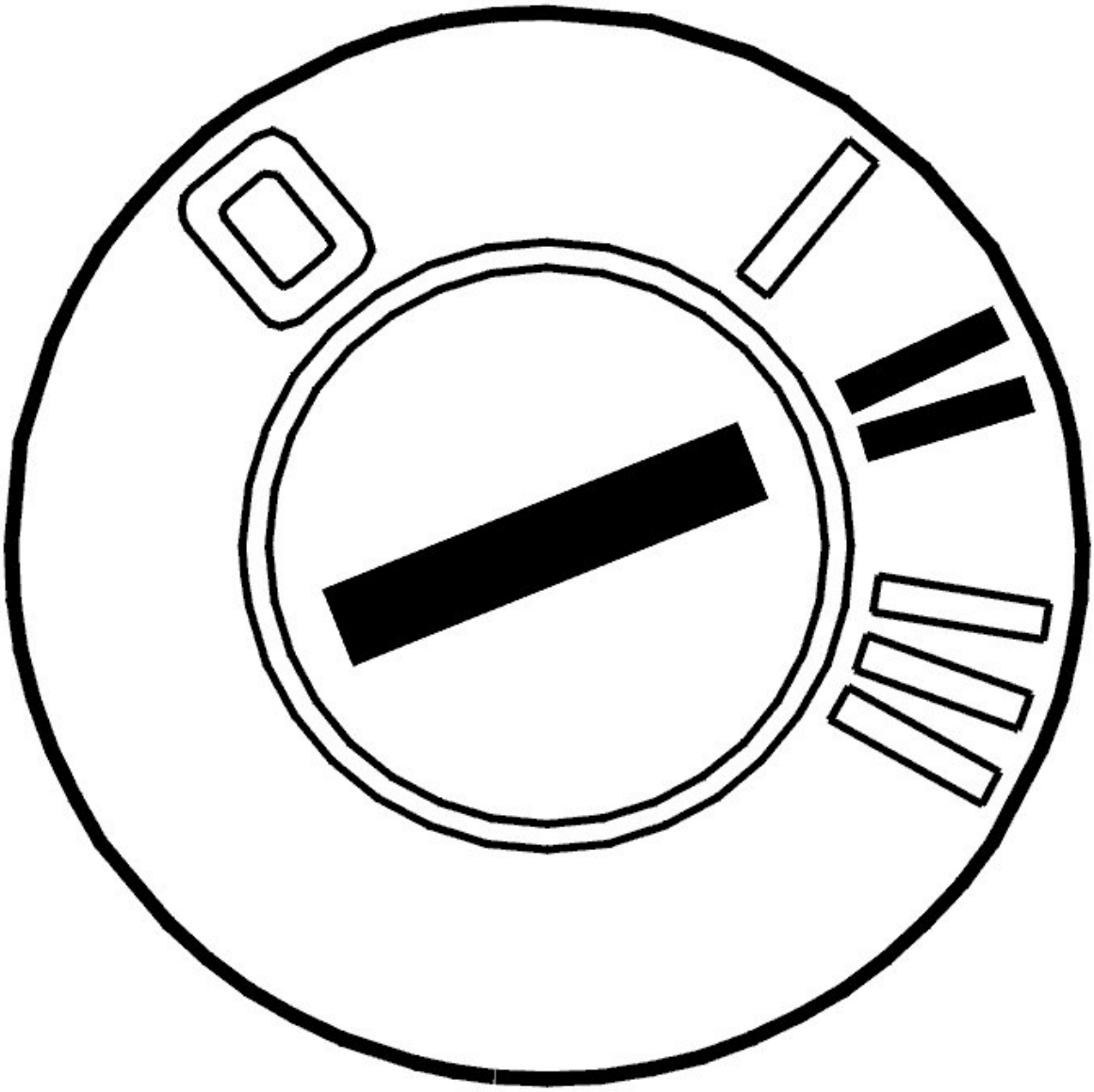


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

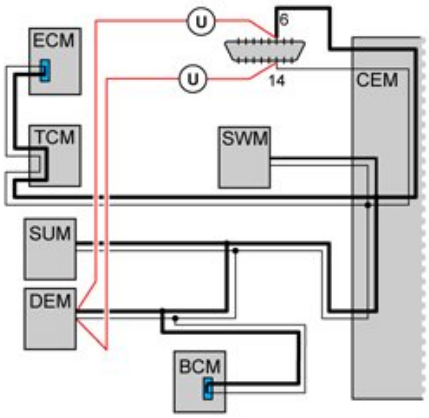
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

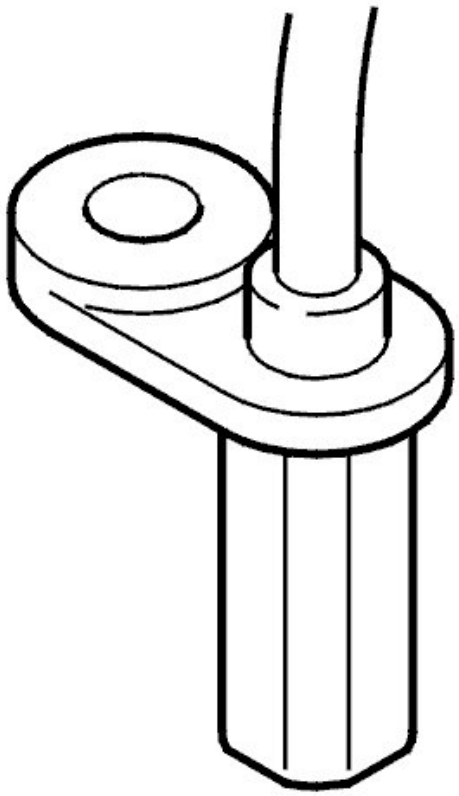


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about wheel speed from the wheel sensors. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle. Diagnostic trouble code (DTC) BCM-0010, BCM-0020, BCM-0030 or BCM-0040 is stored, depending on the wheel sensor, if the control module registers that the signal from any of the wheel sensors is distorted or missing too many times.

- BCM-0010: Wheel sensor, left front
- BCM-0020: Wheel sensor, right front
- BCM-0030: Wheel sensor, left rear
- BCM-0040: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Electronic Brake force Distribution is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Contact resistance in the terminals
- Open-circuit, short-circuit to ground or supply voltage in the power supply to the wheel sensor
- The signal cables are short-circuited to each other
- Short-circuit to supply voltage or ground in the signal cable
- Open-circuit in the signal cable
- Defective wheel sensor
- Internal fault in the control module.

Fault symptom[s]

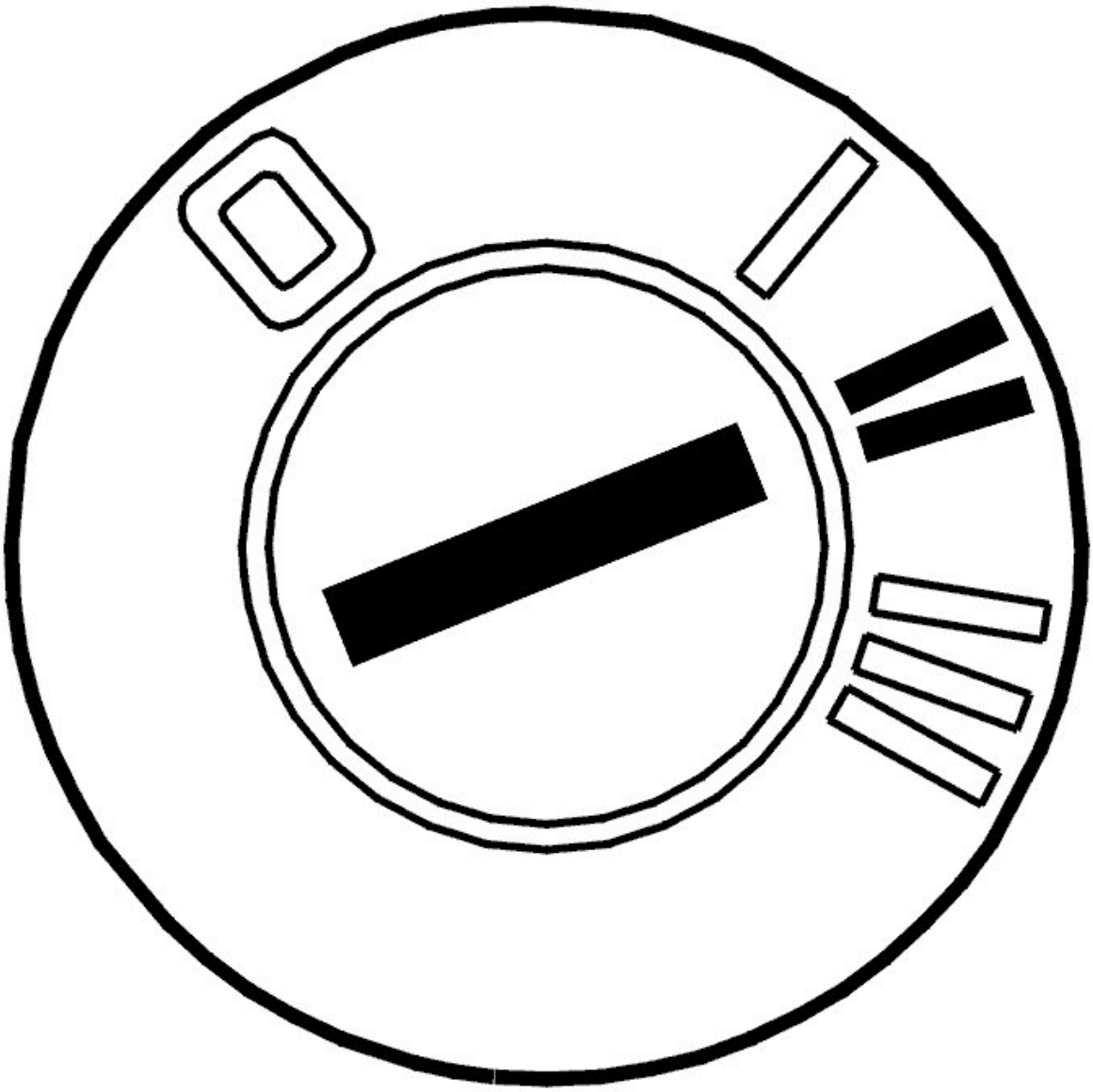
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The warning lamp for brake circuit not functioning is lit
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

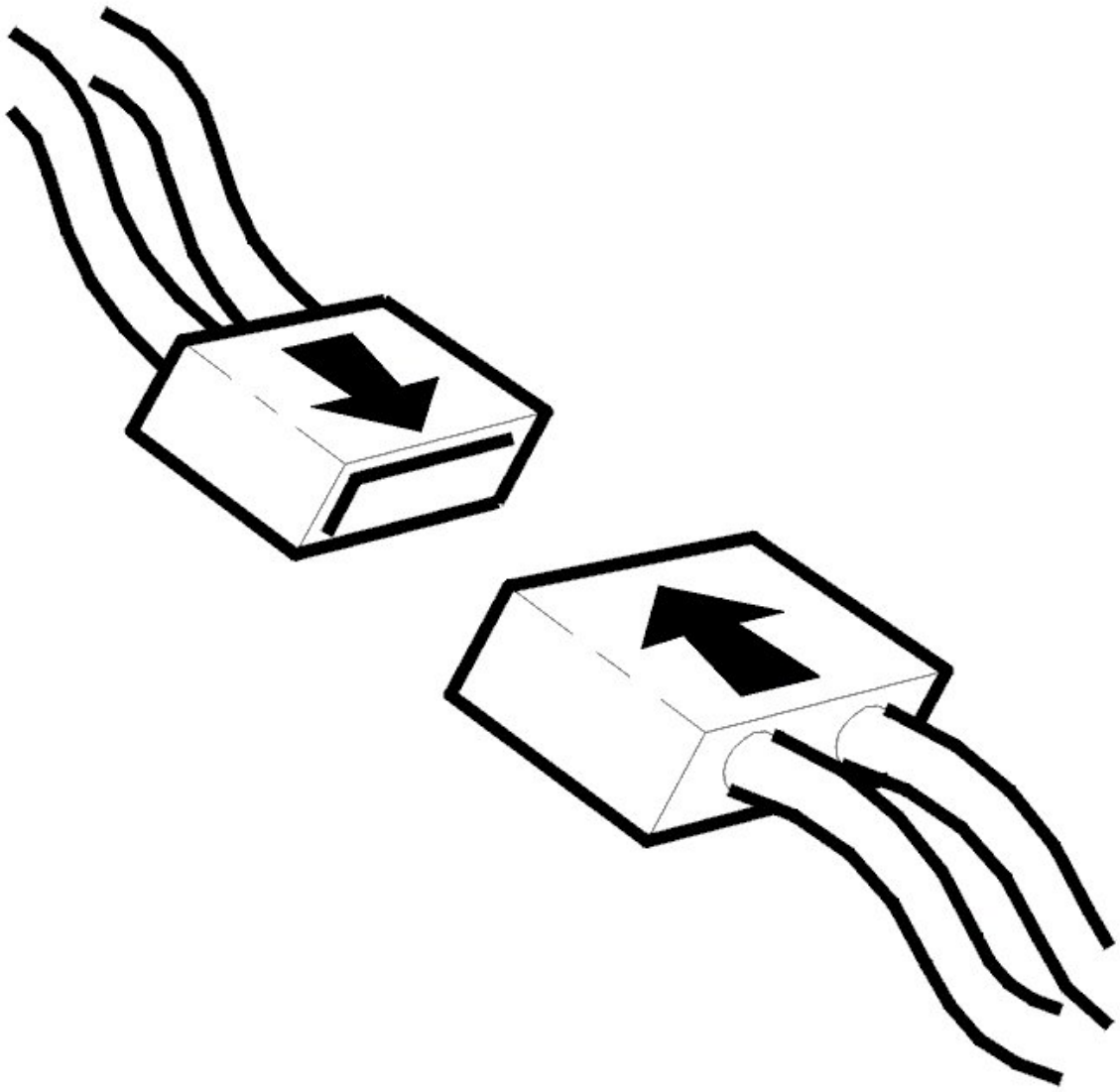
Note! If the fault is intermittent the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Signal Missing

Signal missing

Checking the connectors for the control module and wheel sensor





- Ignition off
- Check the wheel sensor and control module connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.
If the wheel speed is updated, the cause of the fault was loose connections in the connectors for the control module or wheel sensor.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Other information

- To disconnect the wheel sensor connector, see Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- To disconnect the connector for the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

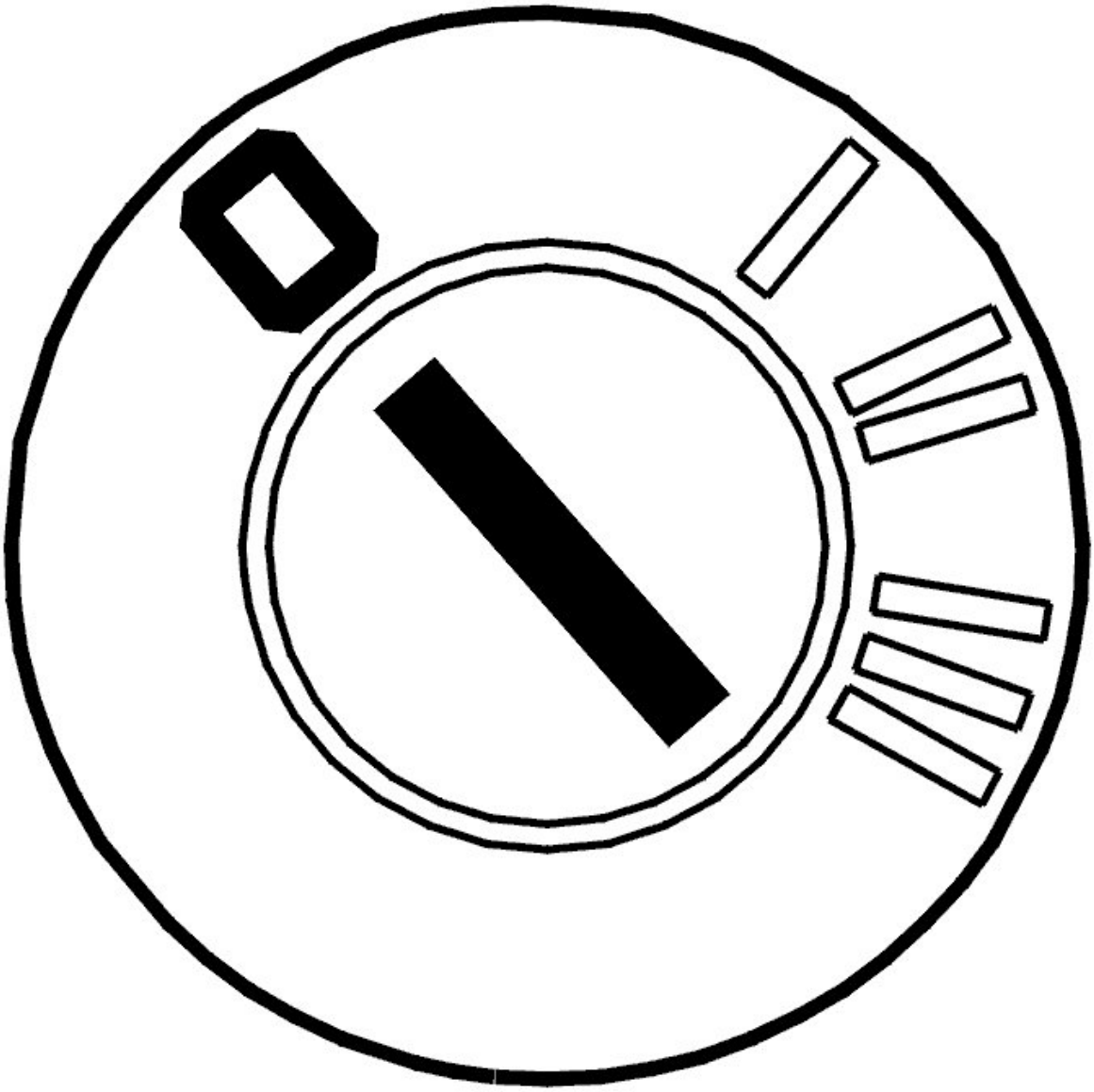
Is the wheel speed updated?

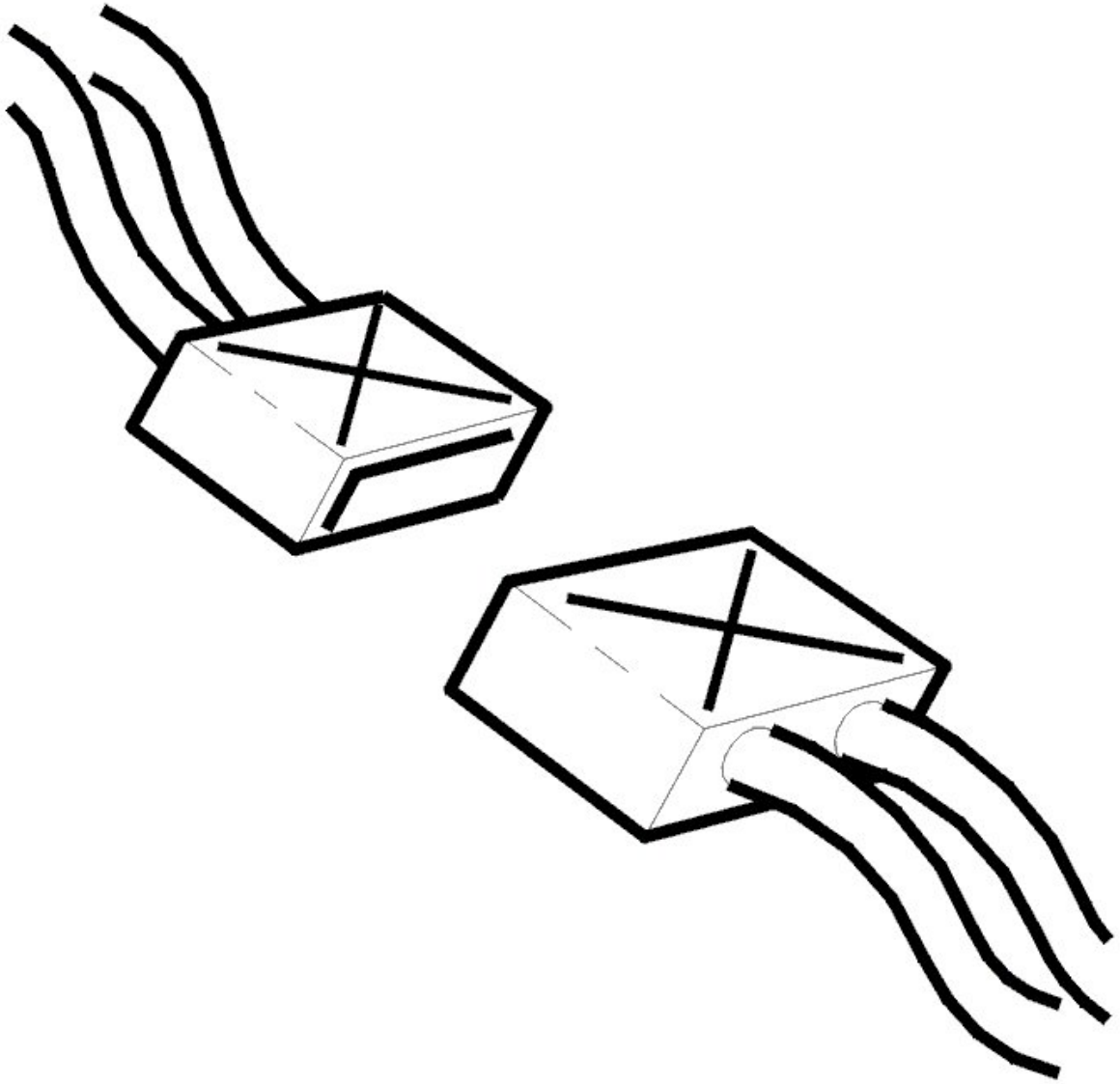
Yes - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Checking wiring and sensors

Checking wiring and sensors





Checking the power supply

Check the signal cable between control module
- terminal #45 (#A45) (left front)
- #34 (#A34) (right front).

and terminal #1 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Checking the signal cable

Check the signal cable between control module
- terminal #46 (#A46) (left front)
- #33 (#A33) (right front).

and terminal #2 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Checking the function of the sensor

Check the sensor. Ensure that the breakout box is connected, the sensor is connected and the ignition is on. Measure the signal from the sensor. Connect a voltmeter between:
- terminals #45 (#A45) and #46 (#A46) (left front)
- terminals #34 (#A34) and #33 (#A33) (right front).

on the breakout box. The voltage should vary by approximately 1 V when the pulse wheel is rotating. Replace the wheel sensor if the voltage is faulty.

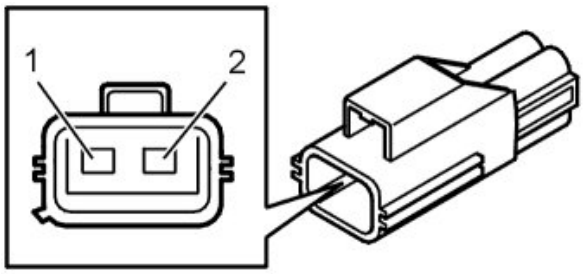
Hint: Particularly check the wiring at the steering shaft.

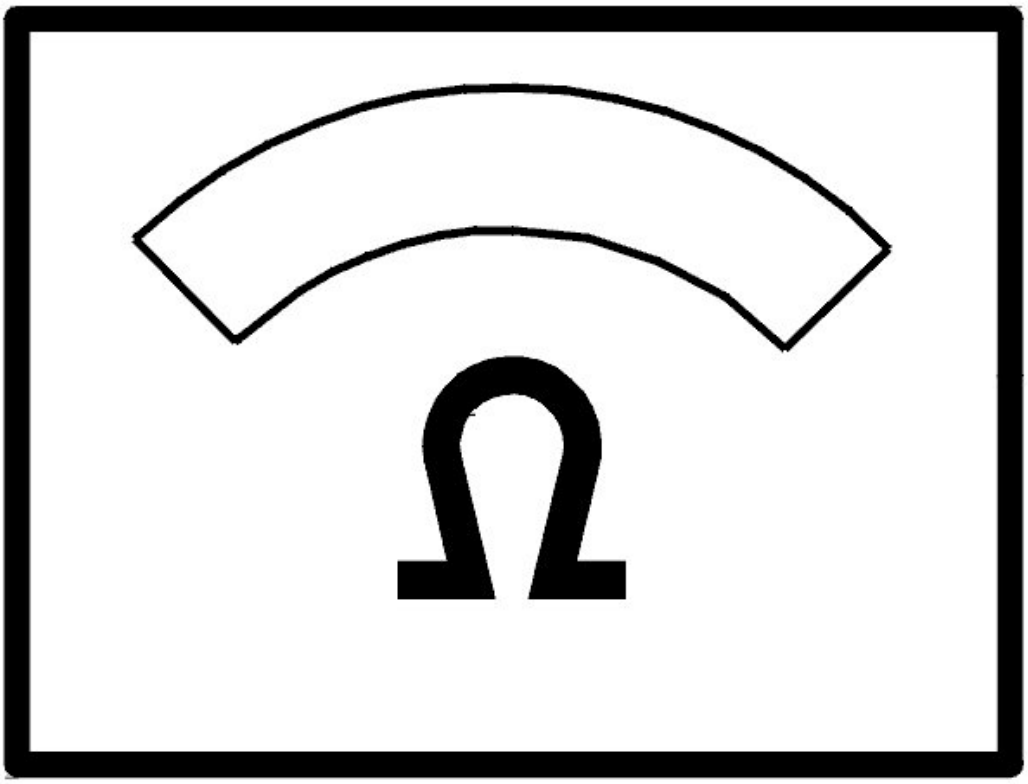
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the wheel sensor, see Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control

Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing

- For information about signals, see and
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





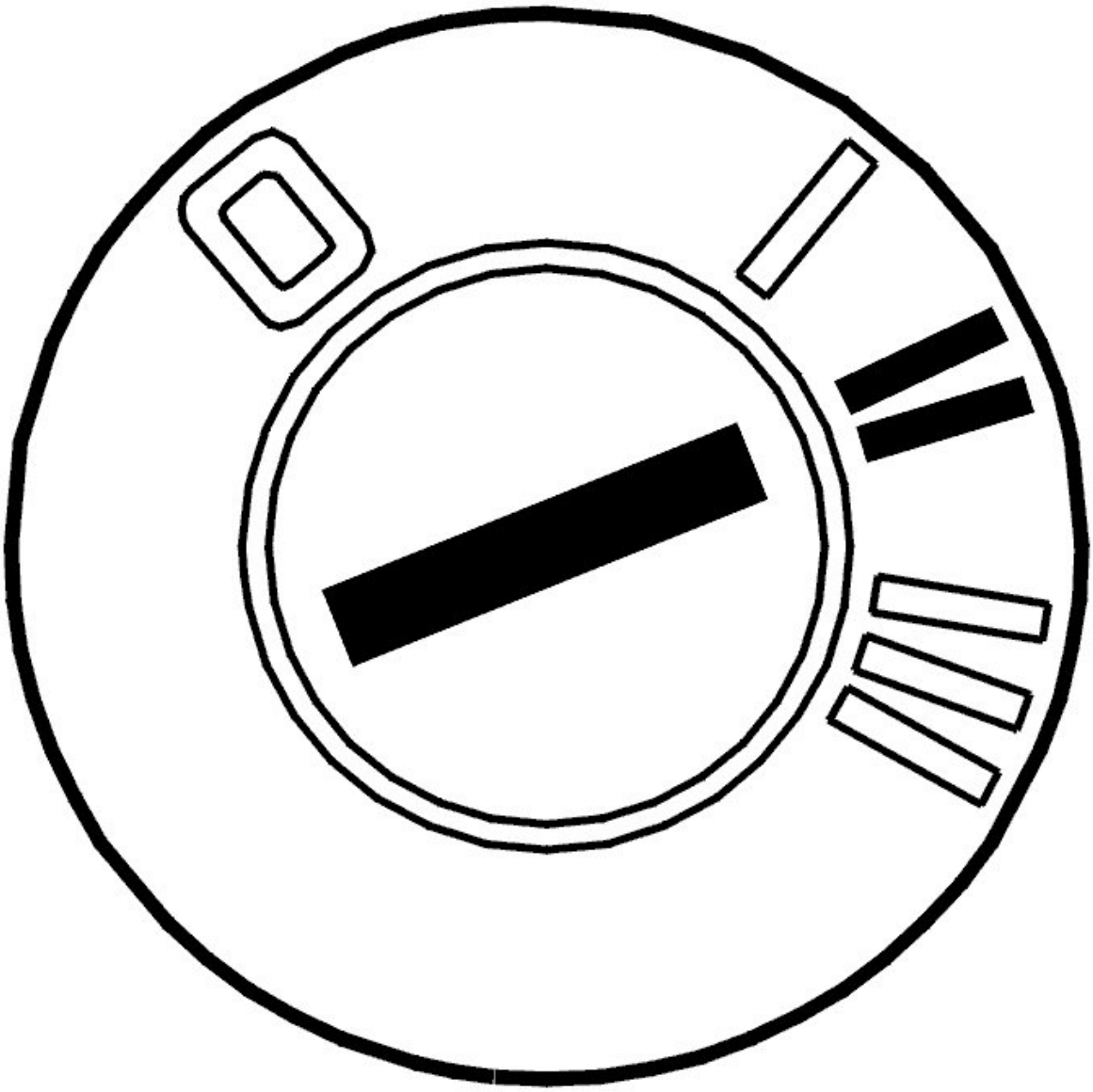
Continue - Verification

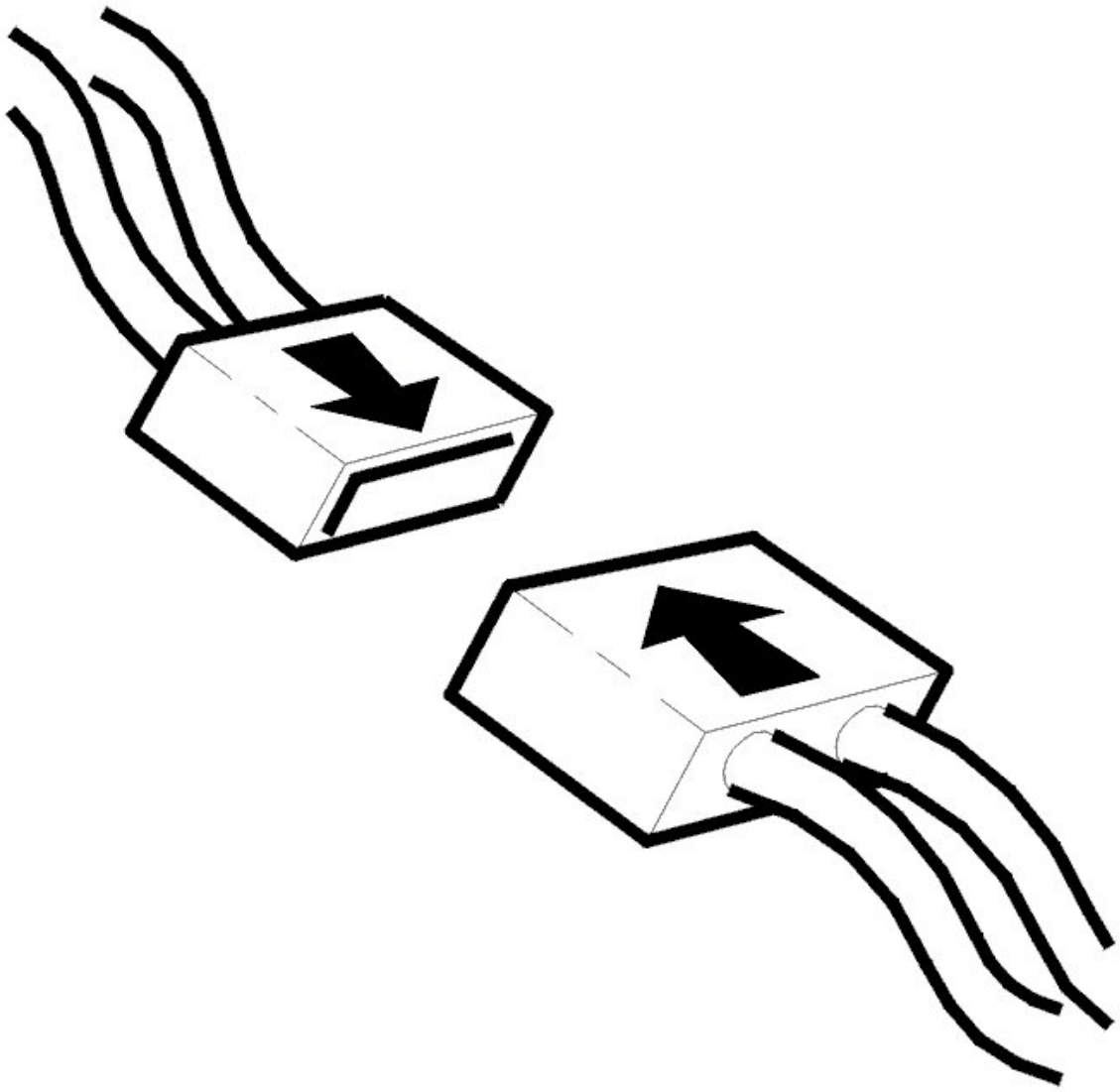
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Is the wheel speed updated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors for the control module and wheel sensor

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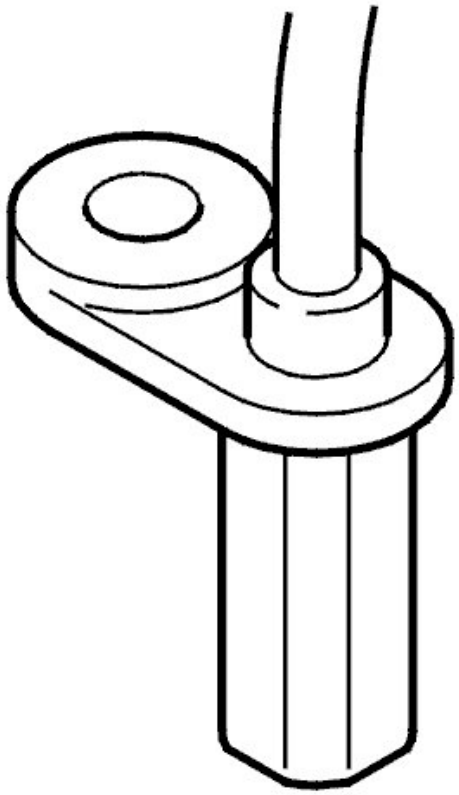
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) can register this diagnostic trouble code (DTC) for a number of different fault causes.

1. The diagnostic trouble code is generated if the Brake control module (BCM) registers that the wheel stops or rotates too slowly in relation to the vehicle's reference speed while driving or ABS-control when speed is above 20 km/h.
2. Brake control module (BCM) has a counter, extrapolation counter, which counts the number of times that the speed change on the wheel is too big compared to that which is allowed (calculated). The diagnostic trouble code (DTC) is stored if wheel acceleration on one of the wheel sensors is greater than on other wheel sensors.
3. The diagnostic trouble code (DTC) is stored if the slowest wheel rotates at a speed that is less than 40-60 % of the fastest wheel (depending on the vehicle's speed) but finds that the wheel sensor circuit is unbroken.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- One of the wheels has been blocked while the car has being driven
- Loose wheel sensor
- The gap between the wheel sensor and the pulse wheel is too large or too small
- Hub vibrations or play in the wheel bearings
- Defective pulse wheel
- Defective wheel sensor.
- Dirt between wheel sensor and pulse wheel.

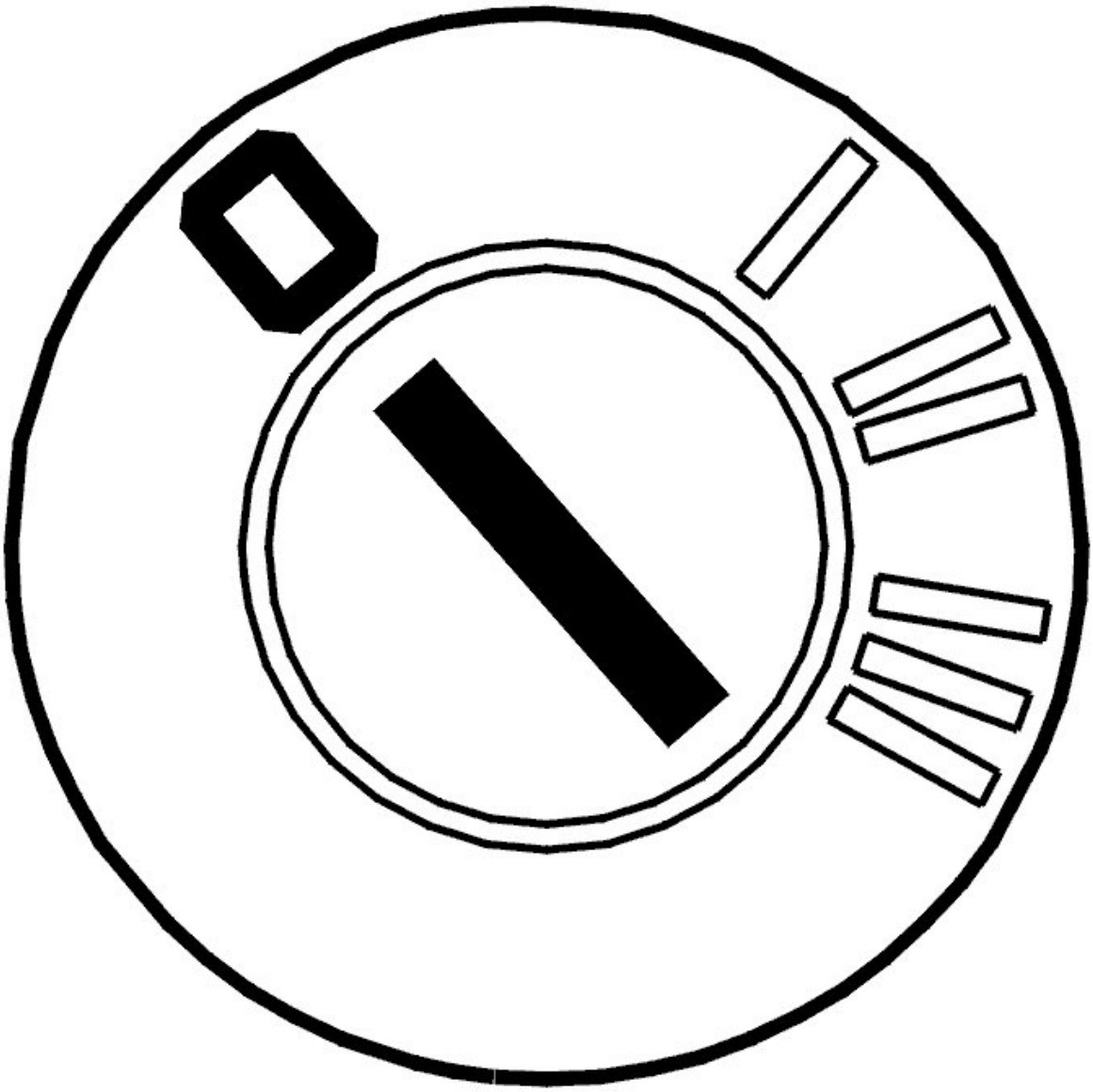
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

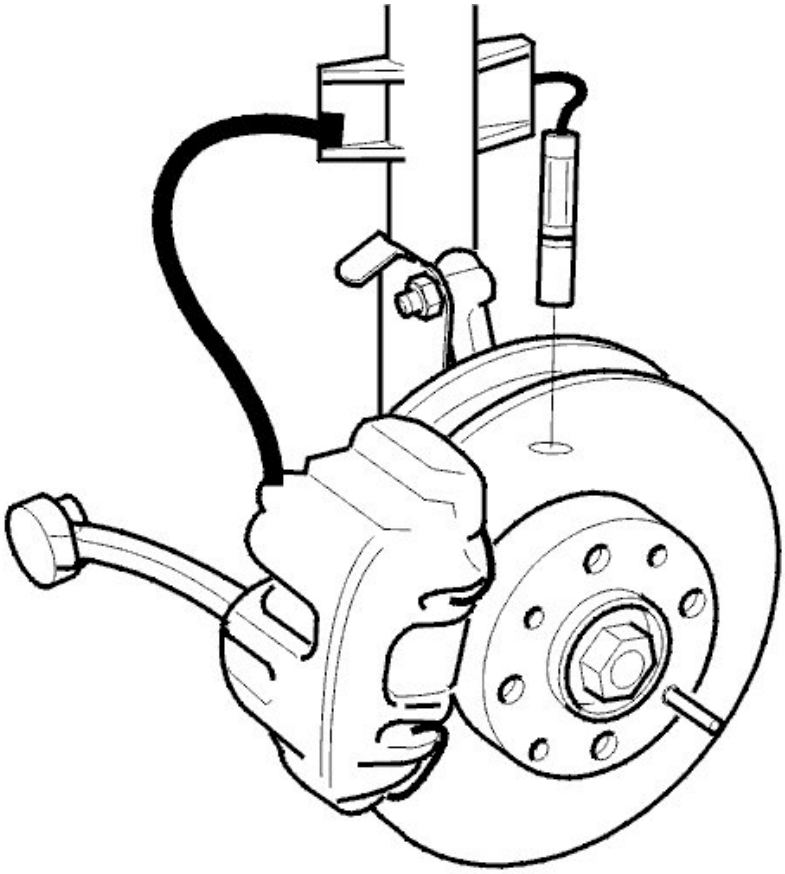


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

No - Checking the brakes and wheel bearings

Checking the brakes and wheel bearings

Hint: A binding brake may block some or both wheels when driving. This will mean that the wheel sensor signal is not transmitted.

Check that the brake calipers are not sticking and locking the wheels.
Check the wheel bearing on the relevant wheel for play. Check that the wheel rotates freely and is not sticking.
Remedy as necessary.

Other information

- Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Brake calipers rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Front wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Front Wheel Hub, Replacing
- Rear wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Rear Wheel Hub, Replacing

Select Continue when the fault has been remedied.

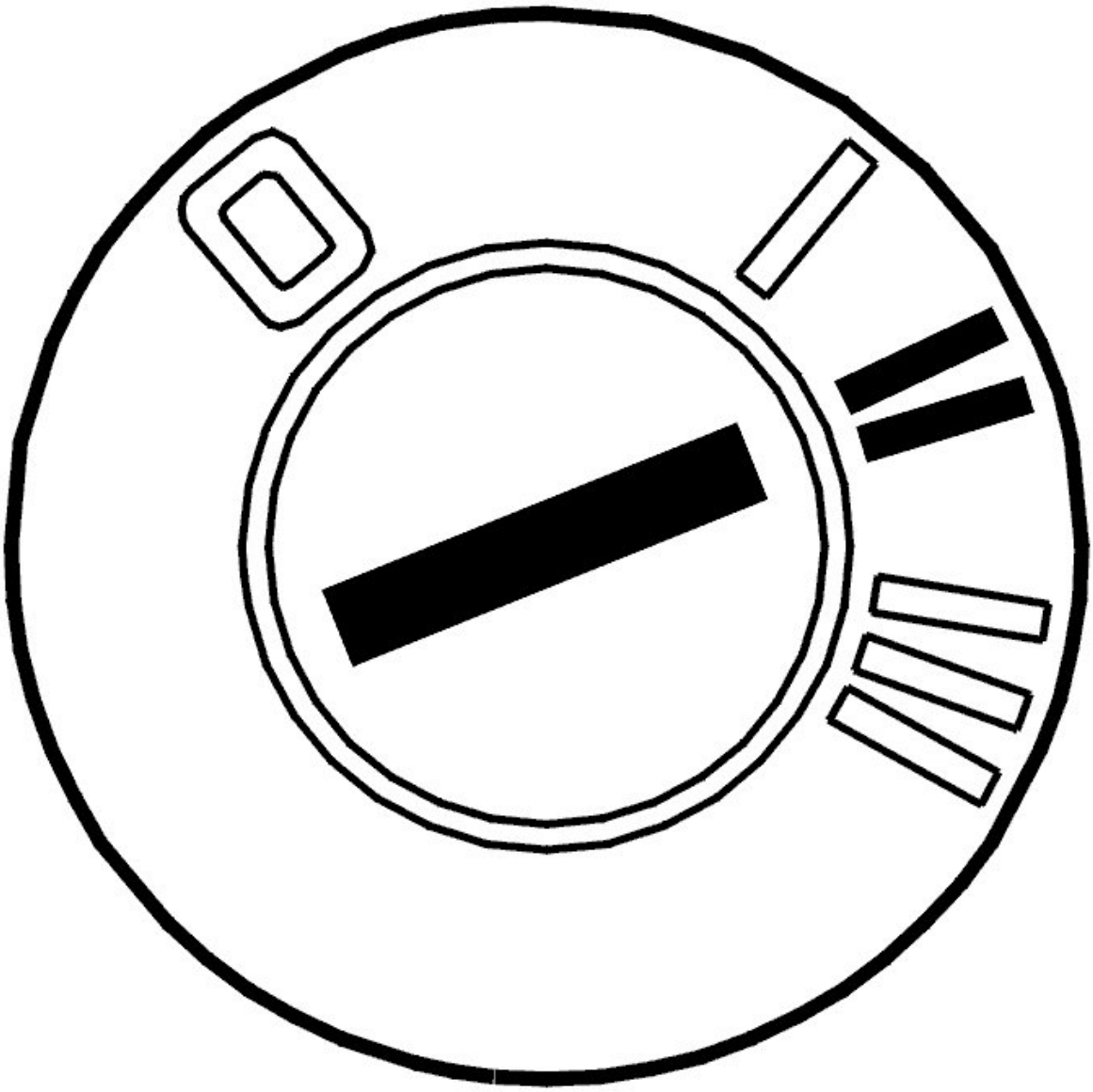
Continue - Verification

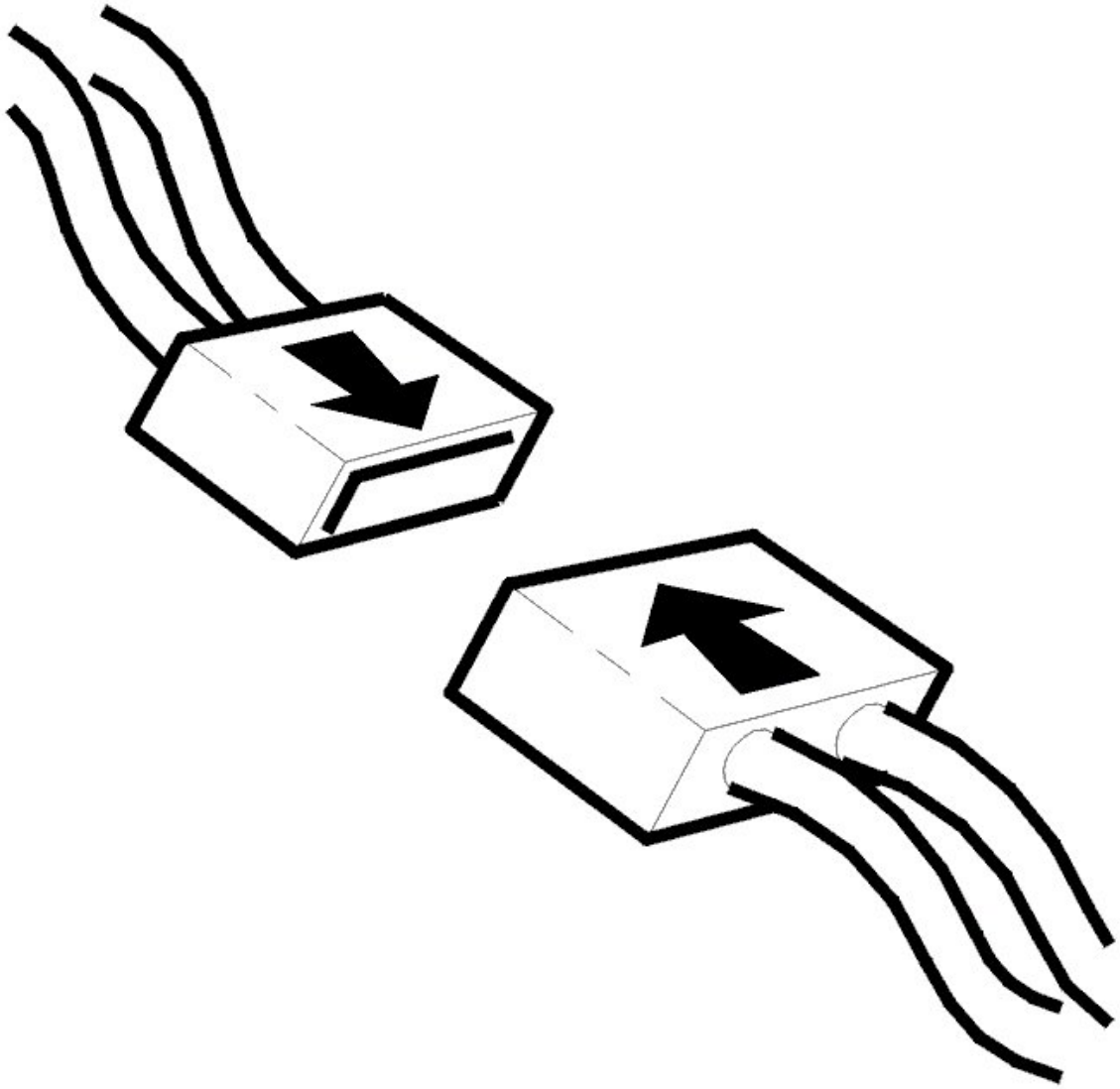
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

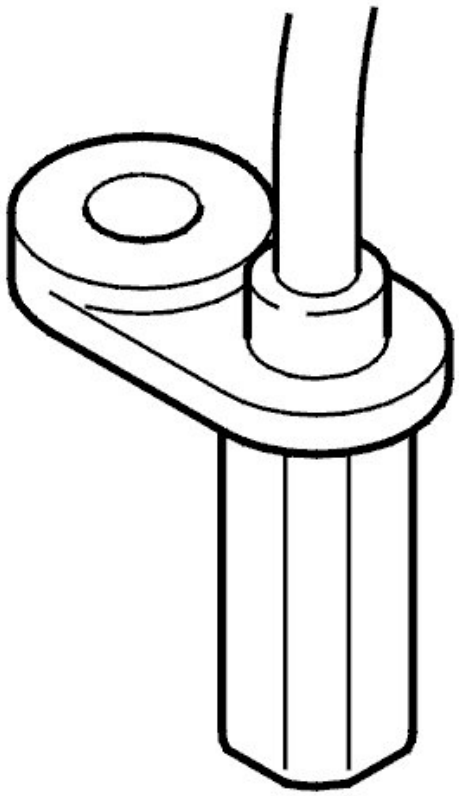
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about the wheel speed for each wheel. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle.
Diagnostic trouble code (DTC) BCM-0012, BCM-0022, BCM-0032 or BCM-0042 is stored, depending on the wheel sensor, if the control module registers that the signal from the wheel sensor is distorted or missing too many times.

- BCM-0012: Wheel sensor, left front
- BCM-0022: Wheel sensor, right front
- BCM-0032: Wheel sensor, left rear
- BCM-0042: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Traction control is blocked

- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Loose wheel sensor
- Damaged wiring
- Defective pulse wheel.
- Dirt between wheel sensor and pulse wheel.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

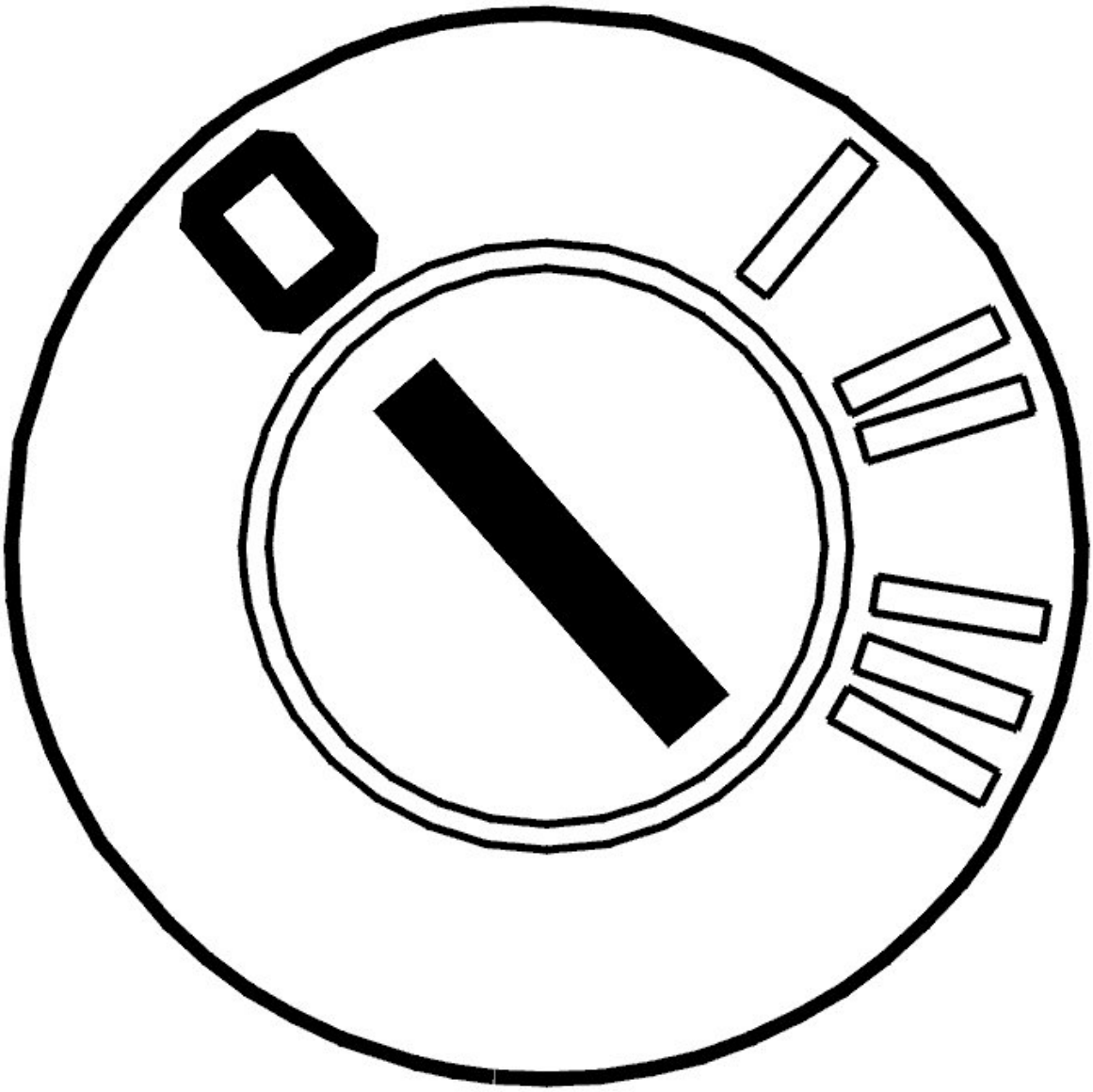
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General warning lamp lit
- No ABS function
- Anti-spin does not function
- The traction control system does not function.

Note! If the fault becomes intermittent, the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

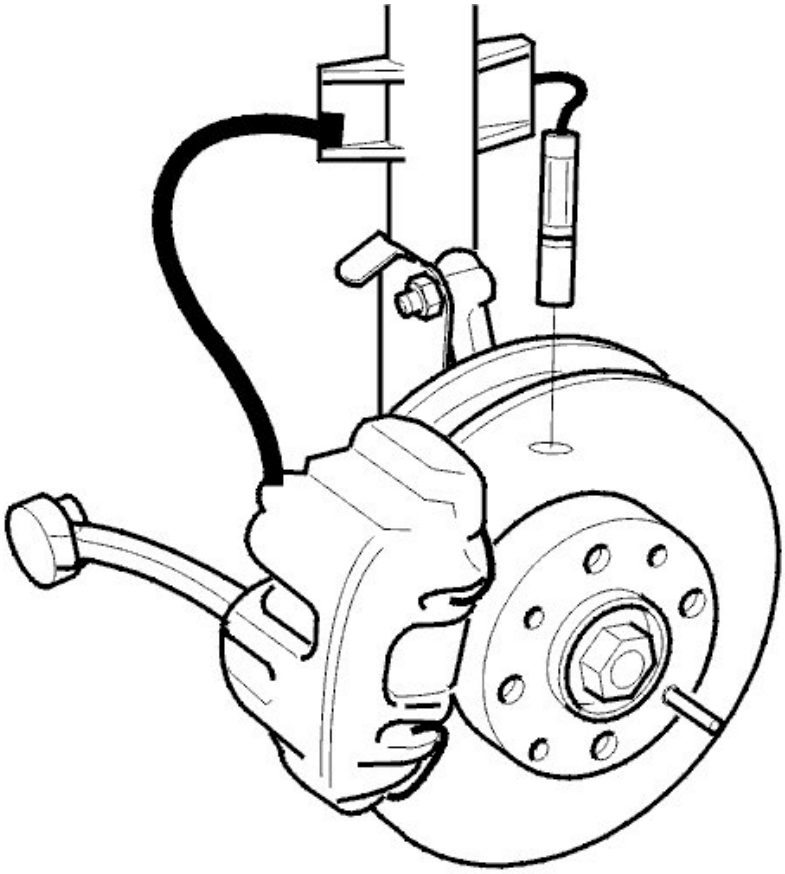


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

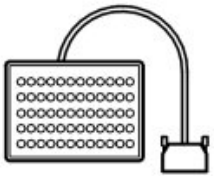
No - Checking the connectors and cables

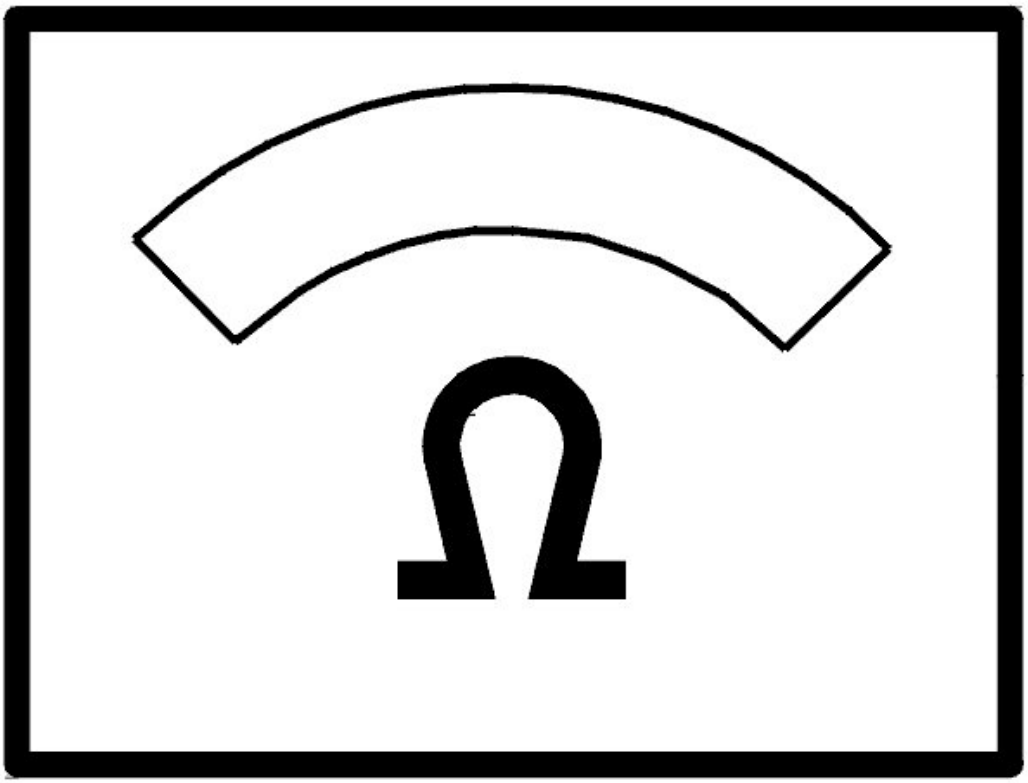
Checking the connectors and cables

Check the connectors of the brake control module (BCM) and the relevant wheel sensors for contact resistance and oxidation.
Check the connectors and cable insulation for damage.
Check that the wheel sensor cables are not too close to sources of interference.
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

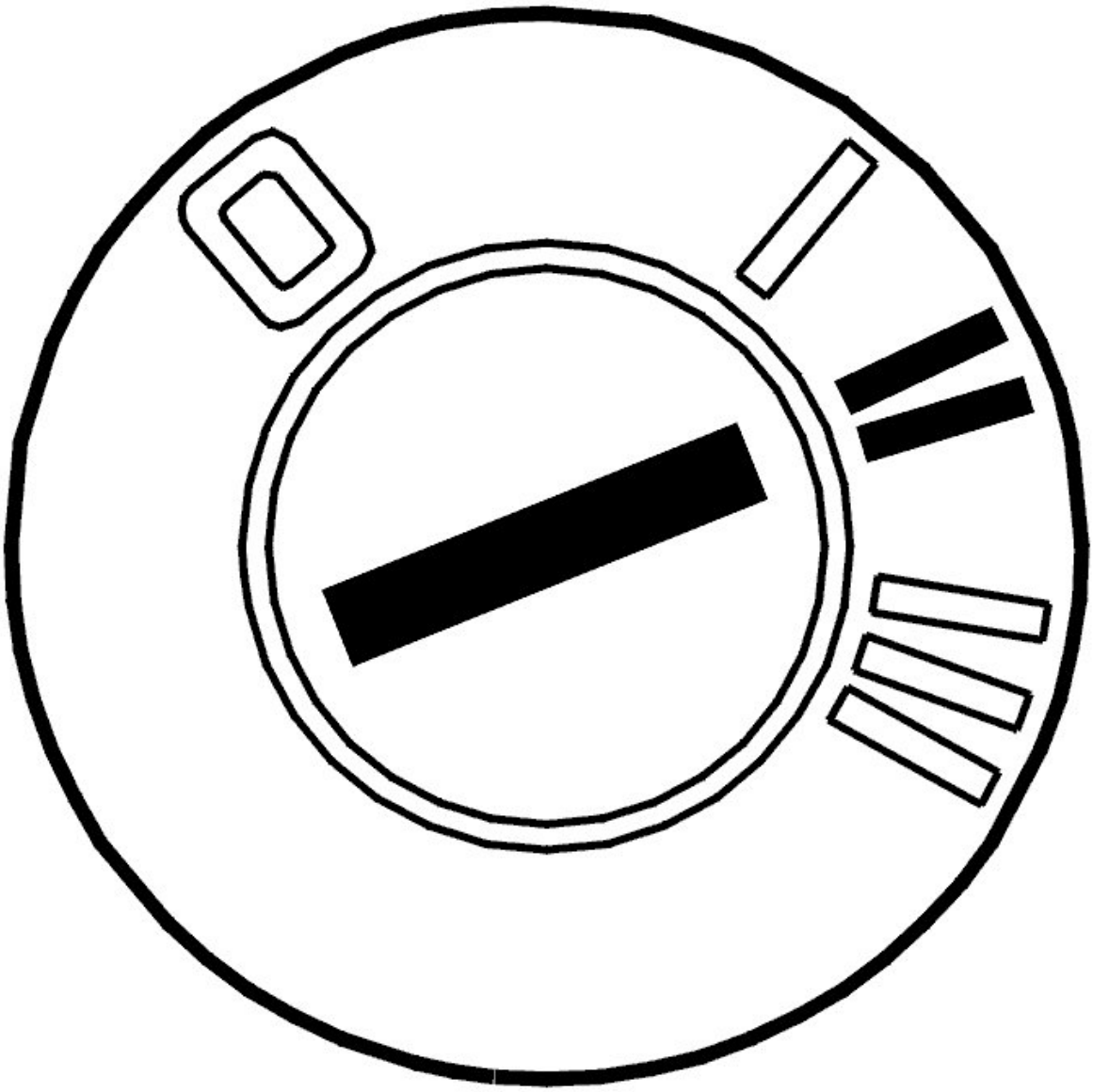
No - No Fault Found

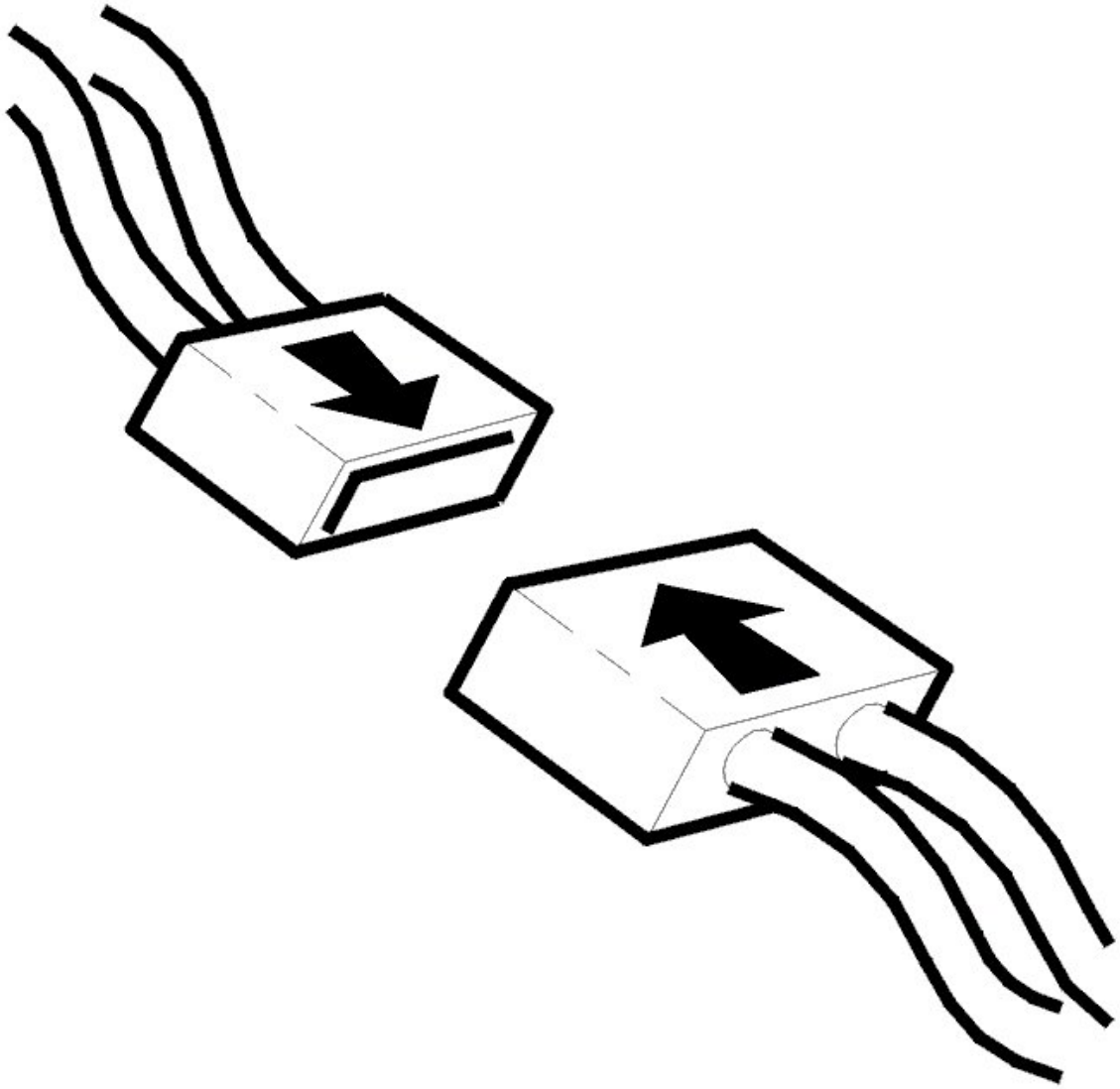
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

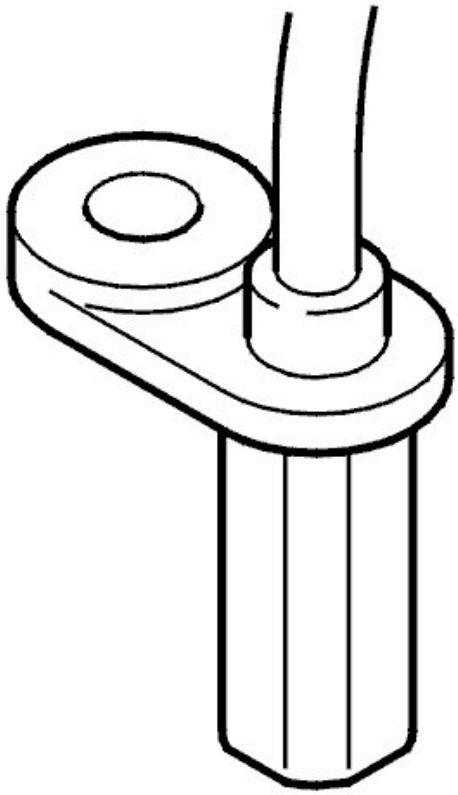
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about wheel speed from the wheel sensors. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle. Diagnostic trouble code (DTC) BCM-0010, BCM-0020, BCM-0030 or BCM-0040 is stored, depending on the wheel sensor, if the control module registers that the signal from any of the wheel sensors is distorted or missing too many times.

- BCM-0010: Wheel sensor, left front
- BCM-0020: Wheel sensor, right front
- BCM-0030: Wheel sensor, left rear
- BCM-0040: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Electronic Brake force Distribution is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked

- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals
- Open-circuit, short-circuit to ground or supply voltage in the power supply to the wheel sensor
- The signal cables are short-circuited to each other
- Short-circuit to supply voltage or ground in the signal cable
- Open-circuit in the signal cable
- Defective wheel sensor
- Internal fault in the control module.

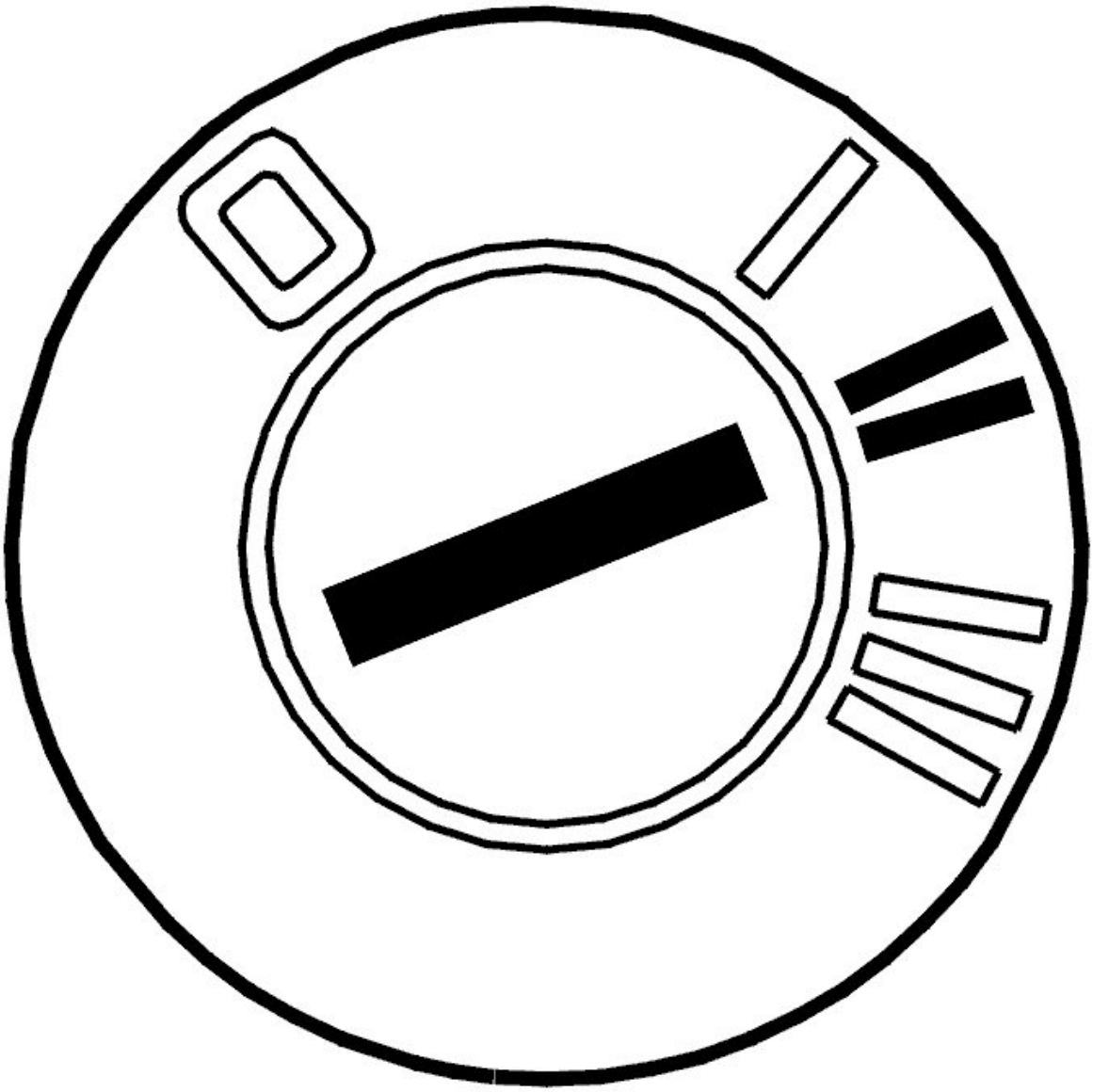
Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The warning lamp for brake circuit not functioning is lit
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

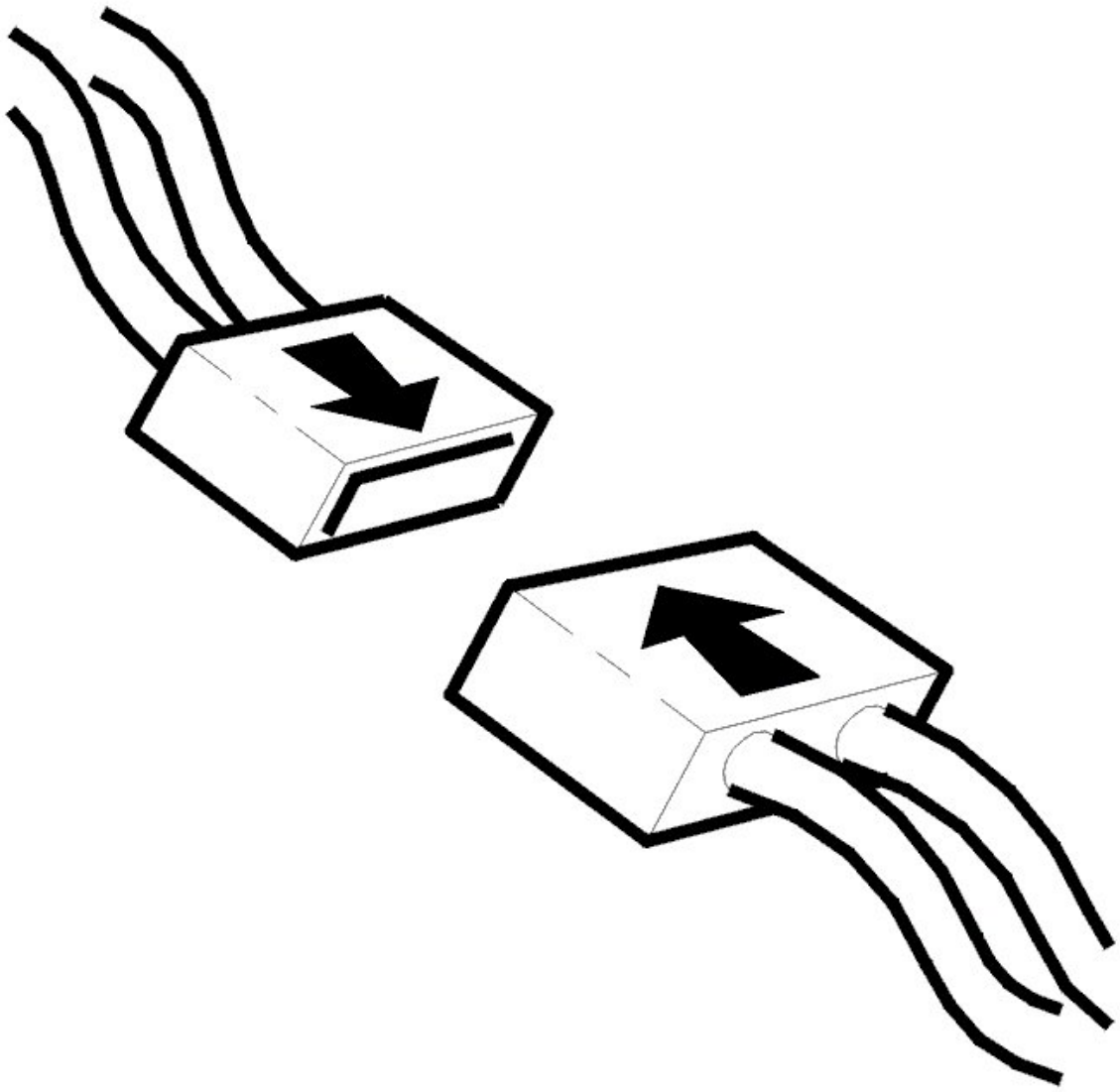
Note! If the fault is intermittent the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Signal Missing

Signal missing

Checking the connectors for the control module and wheel sensor





- Ignition off
- Check the wheel sensor and control module connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.
If the wheel speed is updated, the cause of the fault was loose connections in the connectors for the control module or wheel sensor.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Other information

- To disconnect the wheel sensor connector, see Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- To disconnect the connector for the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

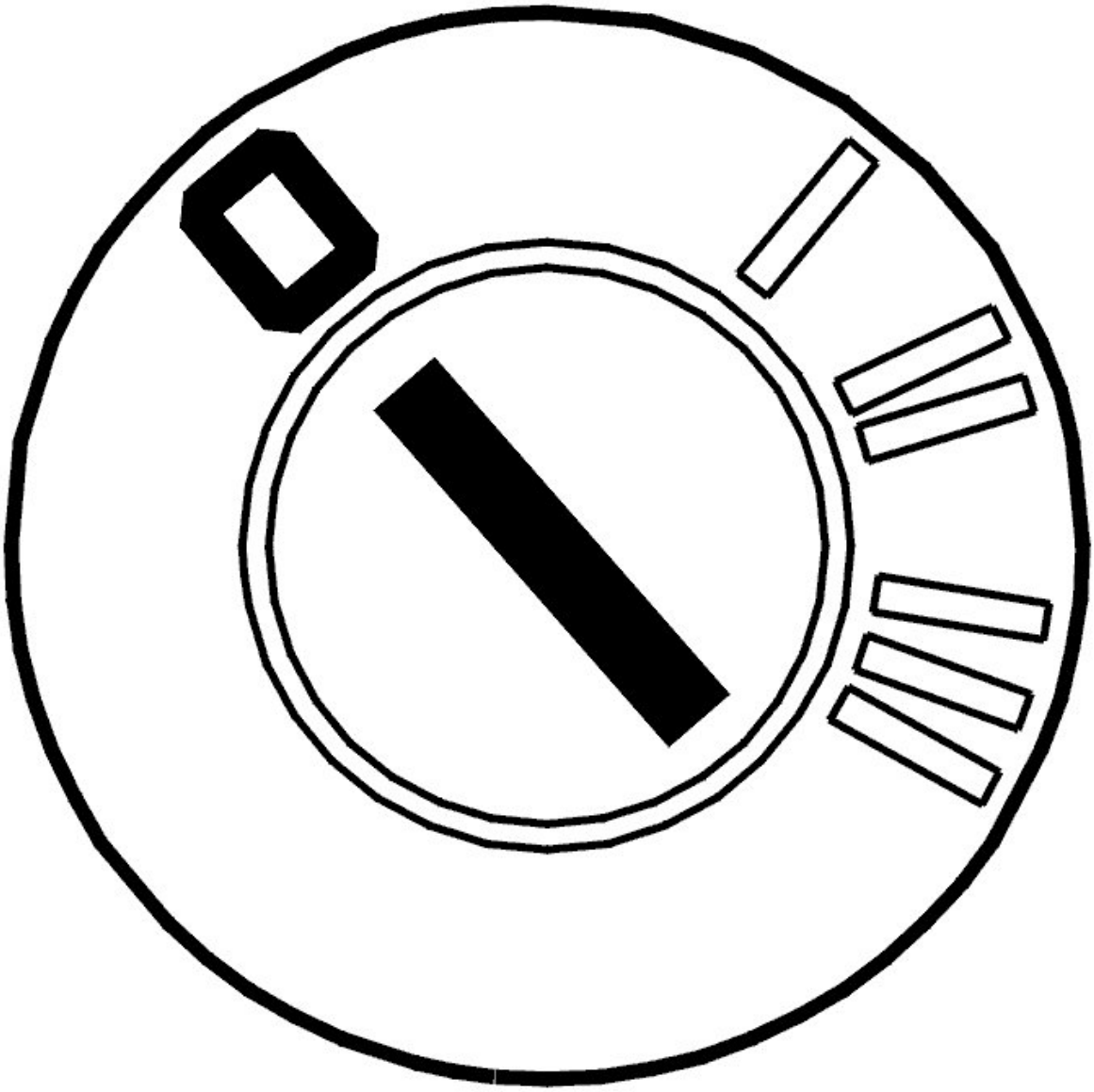
Is the wheel speed updated?

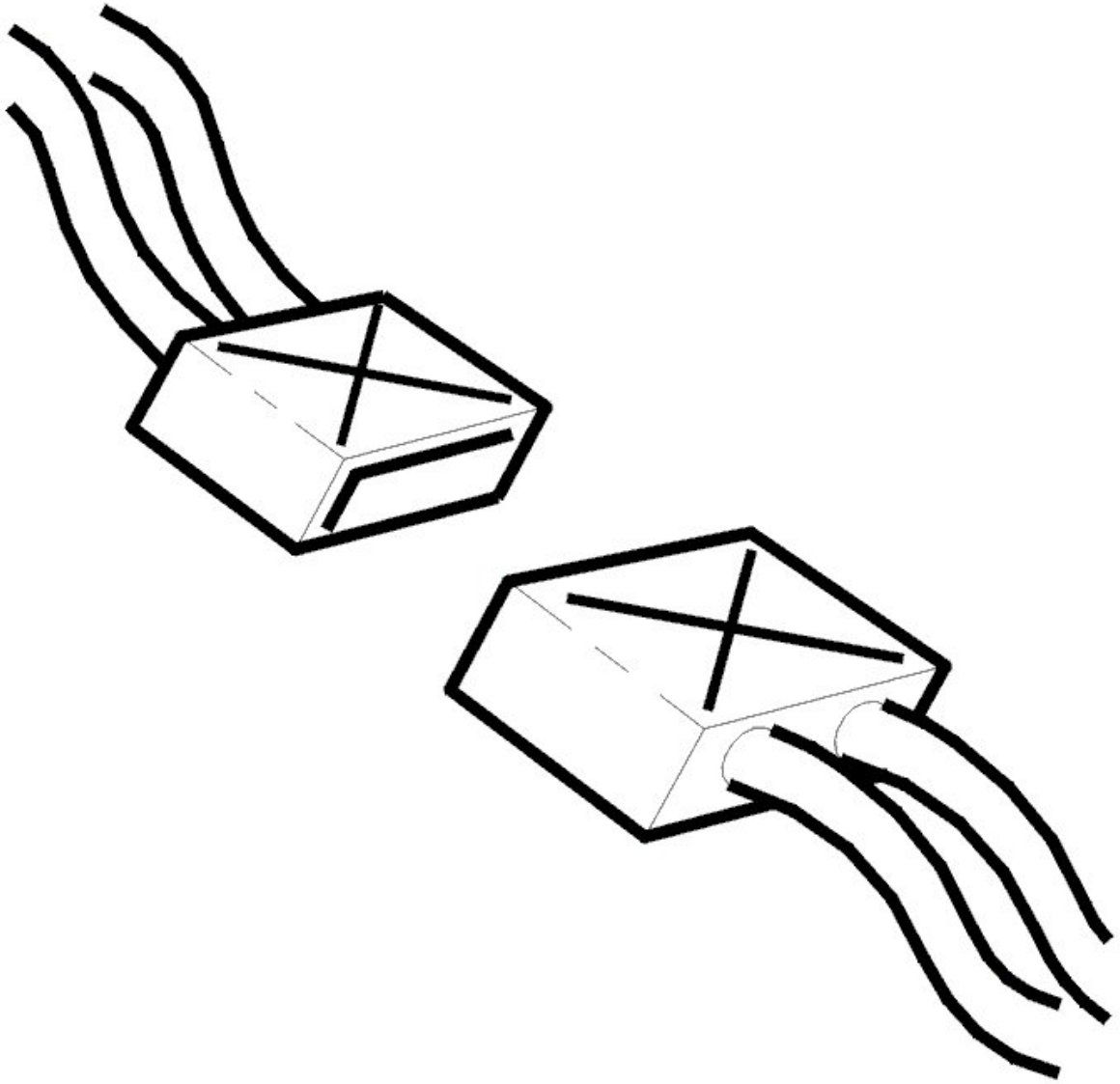
Yes - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Checking wiring and sensors

Checking wiring and sensors





Checking the power supply

Check the signal cable between control module
- terminal #45 (#A45) (left front)
- #34 (#A34) (right front).

and terminal #1 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Checking the signal cable

Check the signal cable between control module
- terminal #46 (#A46) (left front)
- #33 (#A33) (right front).

and terminal #2 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Checking the function of the sensor

Check the sensor. Ensure that the breakout box is connected, the sensor is connected and the ignition is on. Measure the signal from the sensor. Connect a voltmeter between:
- terminals #45 (#A45) and #46 (#A46) (left front)
- terminals #34 (#A34) and #33 (#A33) (right front).

on the breakout box. The voltage should vary by approximately 1 V when the pulse wheel is rotating. Replace the wheel sensor if the voltage is faulty.

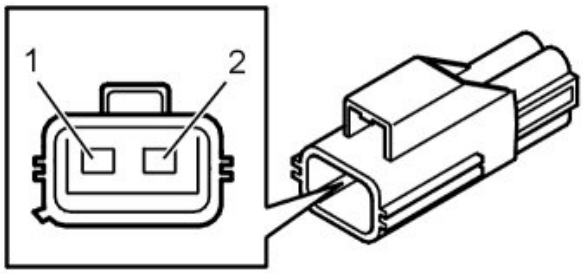
Hint: Particularly check the wiring at the steering shaft.

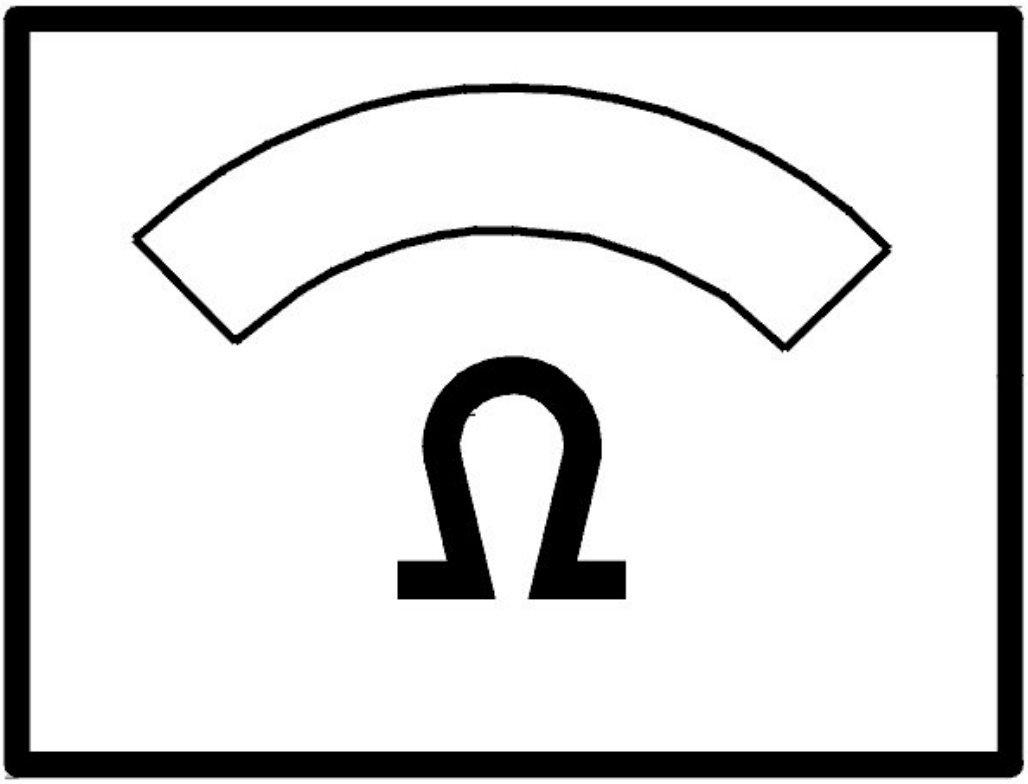
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the wheel sensor, see Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control

Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing

- For information about signals, see and
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





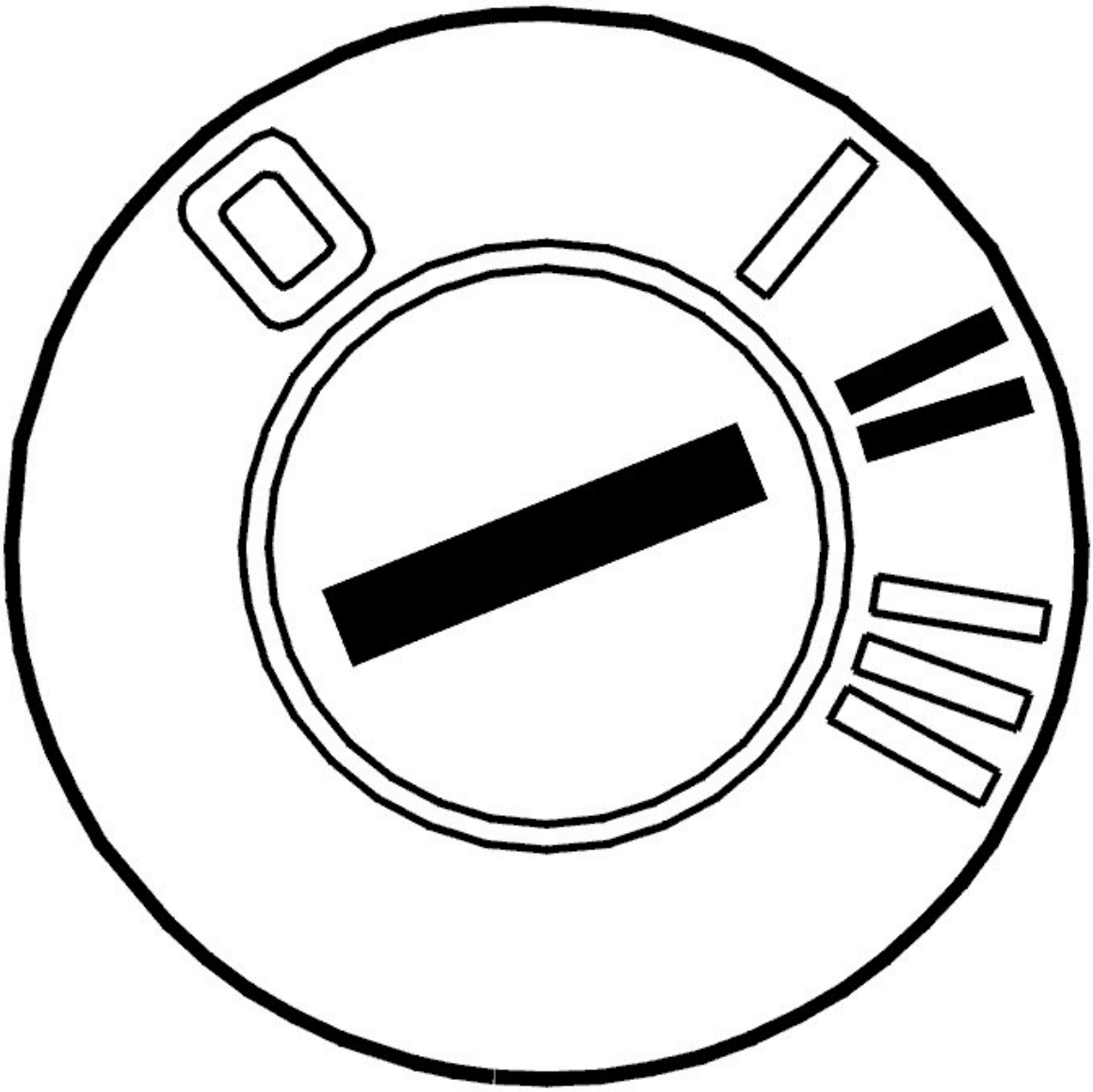
Continue - Verification

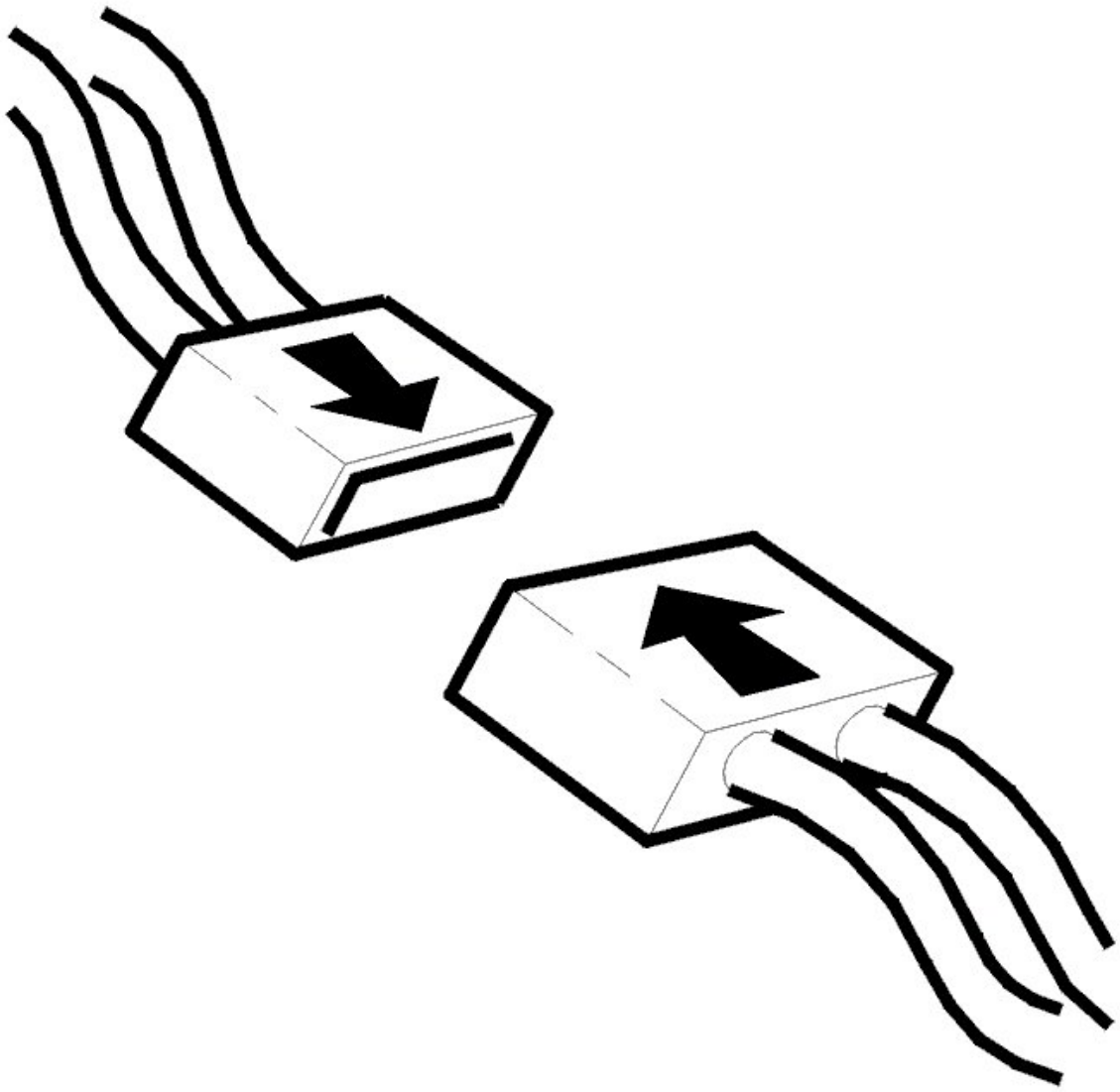
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Is the wheel speed updated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors for the control module and wheel sensor

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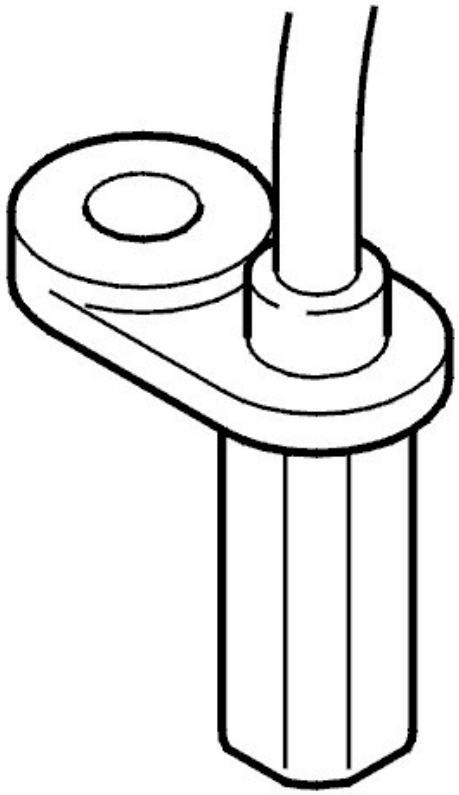
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) can register this diagnostic trouble code (DTC) for a number of different fault causes.

1. The diagnostic trouble code is generated if the Brake control module (BCM) registers that the wheel stops or rotates too slowly in relation to the vehicle's reference speed while driving or ABS-control when speed is above 20 km/h.
2. Brake control module (BCM) has a counter, extrapolation counter, which counts the number of times that the speed change on the wheel is too big compared to that which is allowed (calculated). The diagnostic trouble code (DTC) is stored if wheel acceleration on one of the wheel sensors is greater than on other wheel sensors.
3. The diagnostic trouble code (DTC) is stored if the slowest wheel rotates at a speed that is less than 40-60 % of the fastest wheel (depending on the vehicle's speed) but finds that the wheel sensor circuit is unbroken.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- One of the wheels has been blocked while the car has being driven
- Loose wheel sensor
- The gap between the wheel sensor and the pulse wheel is too large or too small
- Hub vibrations or play in the wheel bearings
- Defective pulse wheel
- Defective wheel sensor.
- Dirt between wheel sensor and pulse wheel.

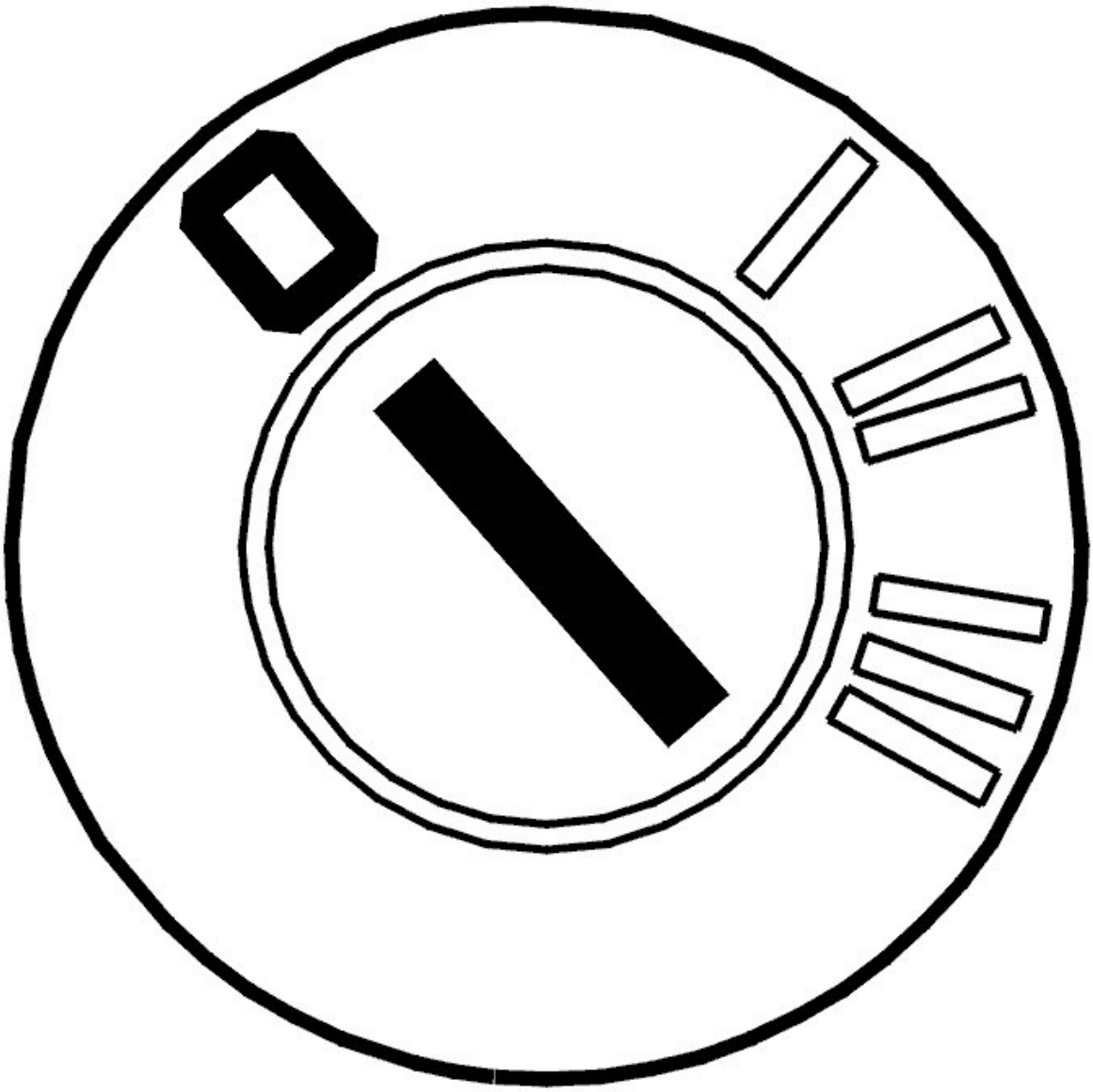
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

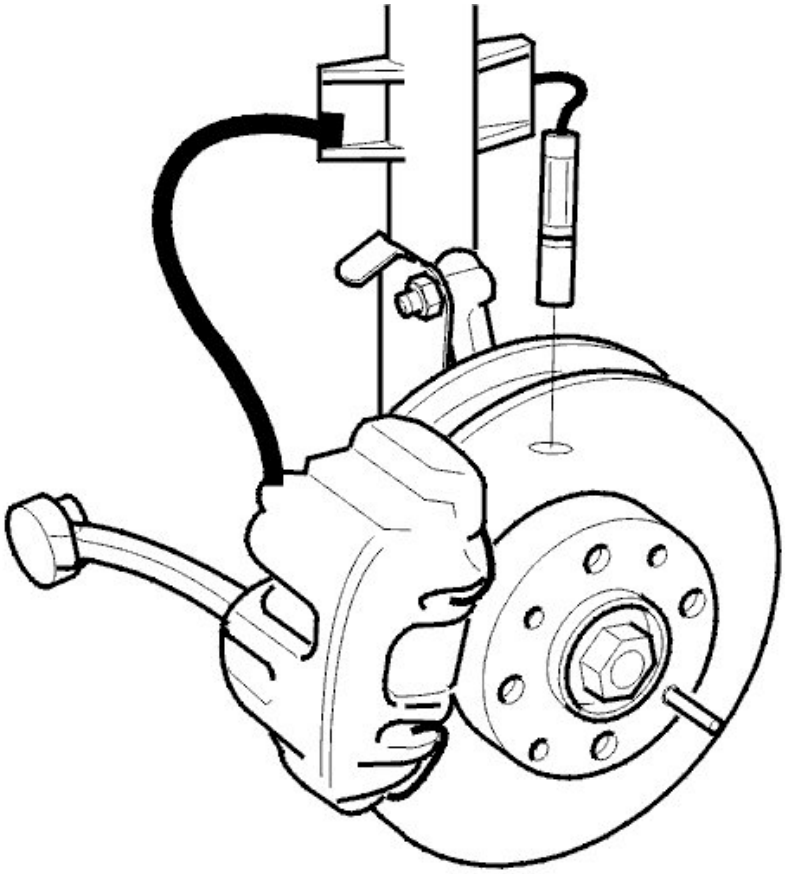


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

No - Checking the brakes and wheel bearings

Checking the brakes and wheel bearings

Hint: A binding brake may block some or both wheels when driving. This will mean that the wheel sensor signal is not transmitted.

Check that the brake calipers are not sticking and locking the wheels.
Check the wheel bearing on the relevant wheel for play. Check that the wheel rotates freely and is not sticking.
Remedy as necessary.

Other information

- Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Brake calipers rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Front wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Front Wheel Hub, Replacing
- Rear wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Rear Wheel Hub, Replacing

Select Continue when the fault has been remedied.

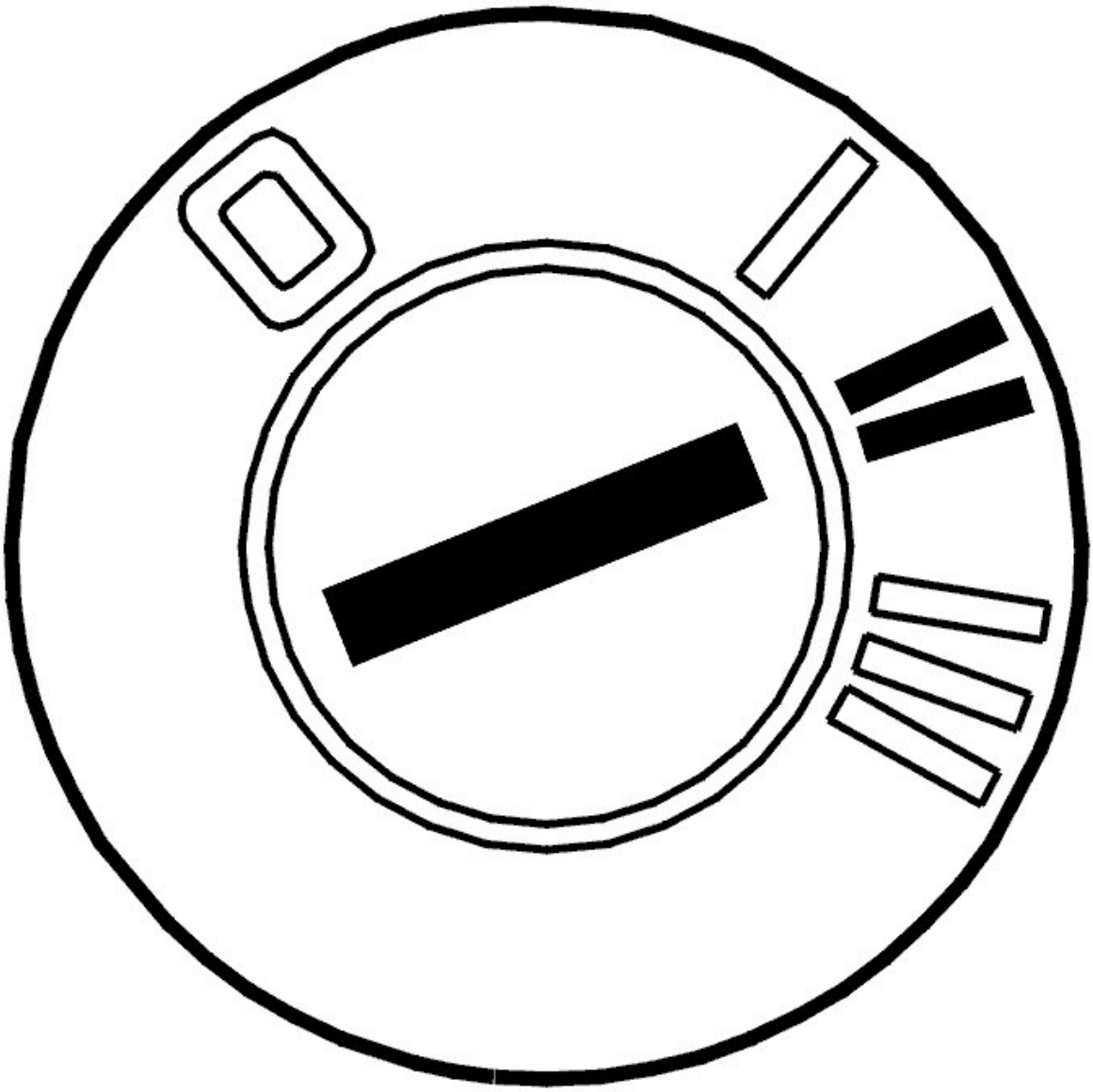
Continue - Verification

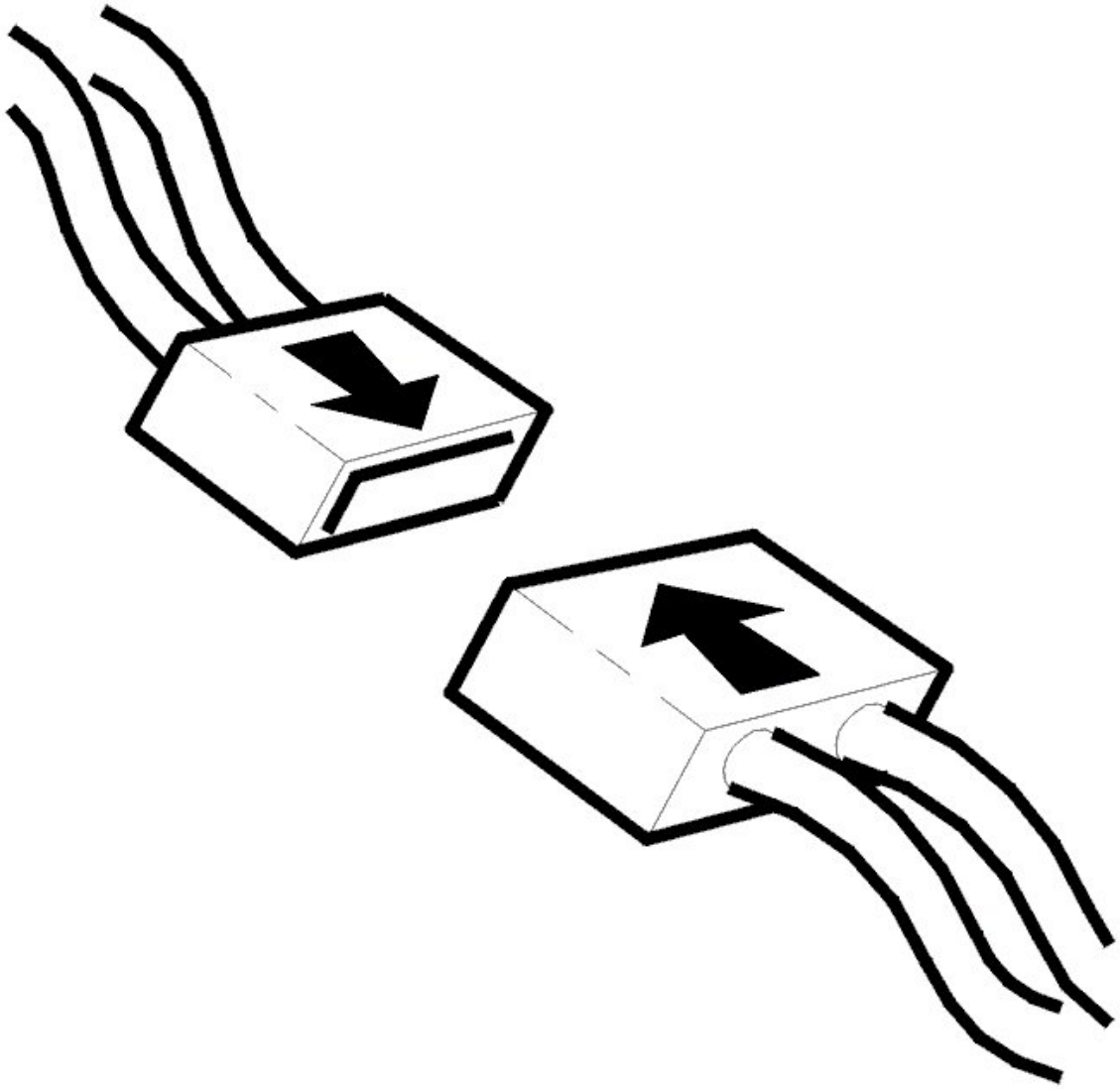
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

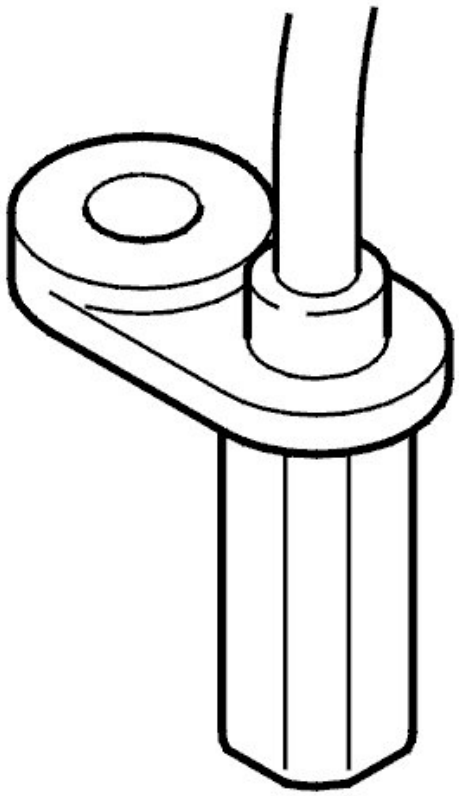
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about the wheel speed for each wheel. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle.
Diagnostic trouble code (DTC) BCM-0012, BCM-0022, BCM-0032 or BCM-0042 is stored, depending on the wheel sensor, if the control module registers that the signal from the wheel sensor is distorted or missing too many times.

- BCM-0012: Wheel sensor, left front
- BCM-0022: Wheel sensor, right front
- BCM-0032: Wheel sensor, left rear
- BCM-0042: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Traction control is blocked

- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Loose wheel sensor
- Damaged wiring
- Defective pulse wheel.
- Dirt between wheel sensor and pulse wheel.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

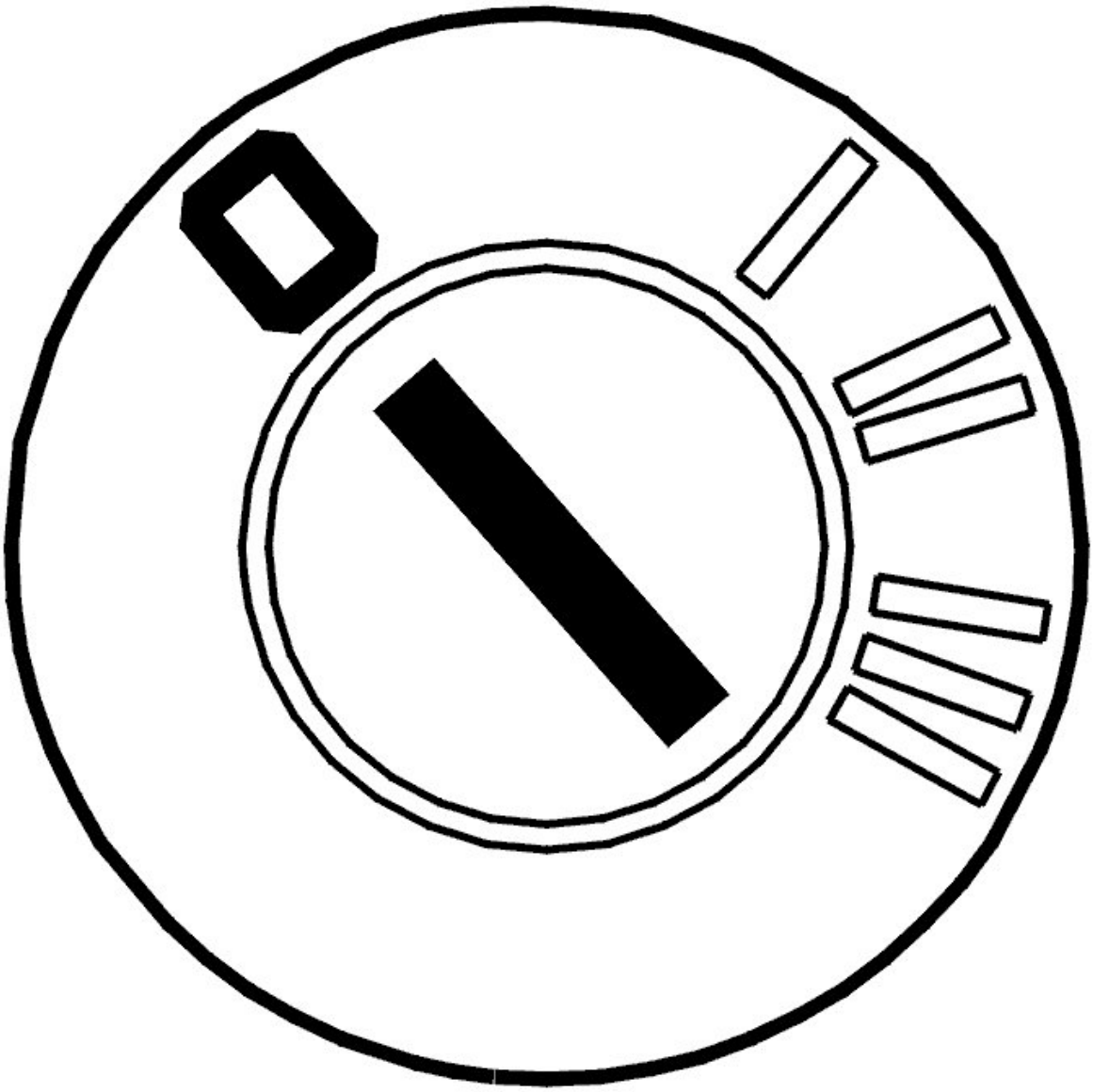
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General warning lamp lit
- No ABS function
- Anti-spin does not function
- The traction control system does not function.

Note! If the fault becomes intermittent, the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

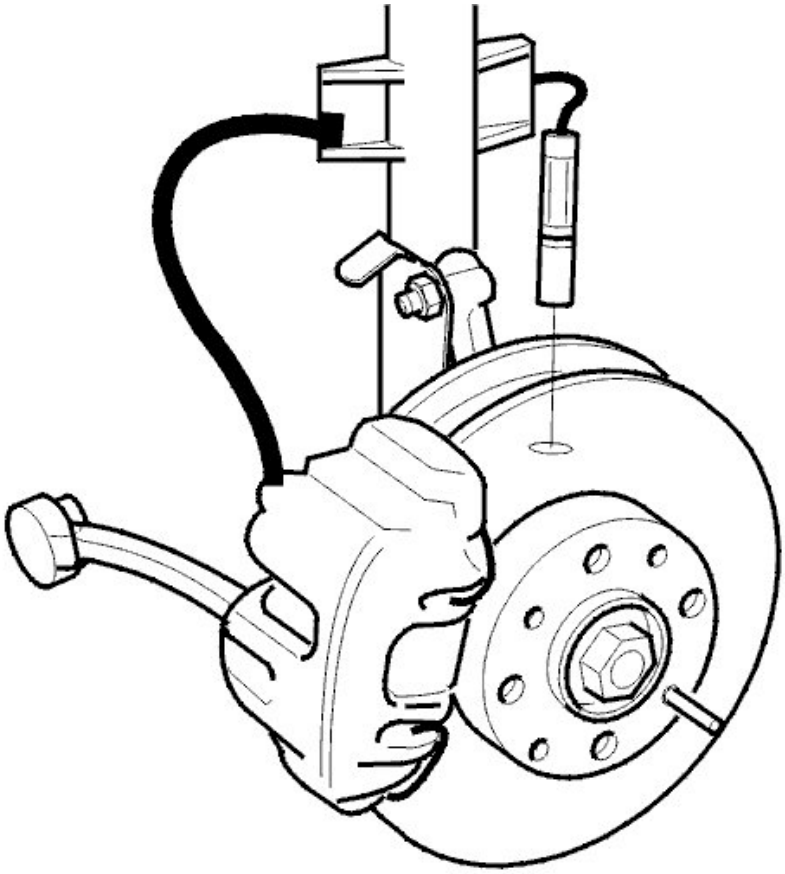


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

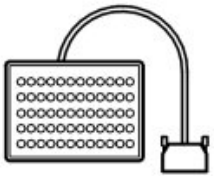
No - Checking the connectors and cables

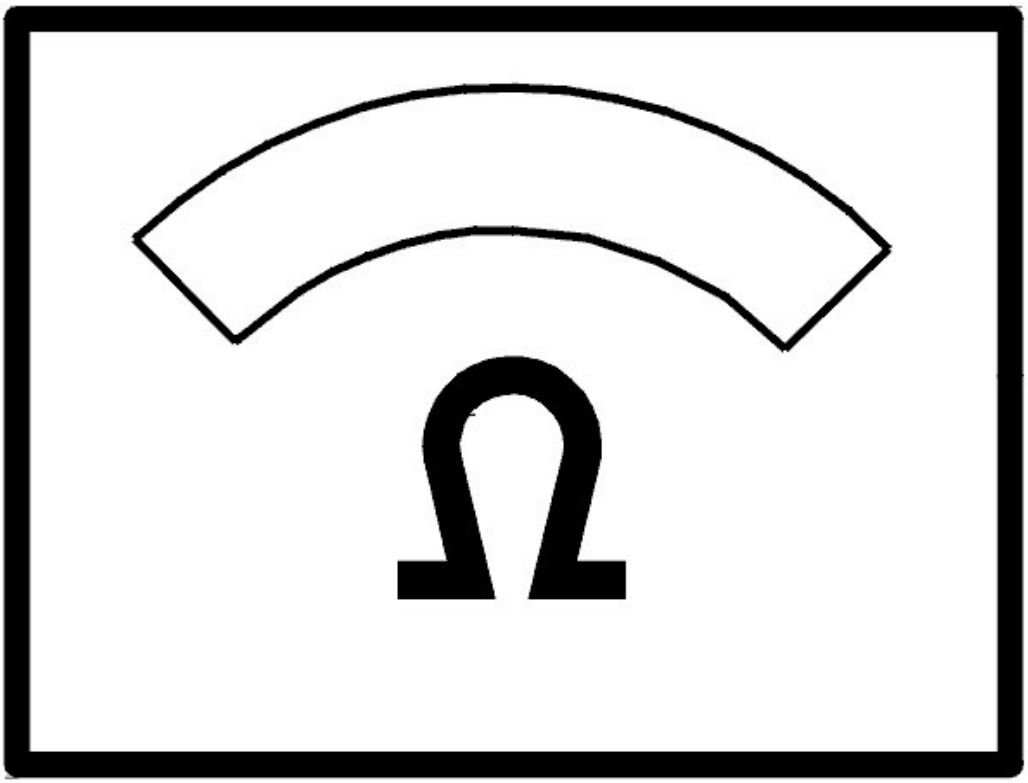
Checking the connectors and cables

Check the connectors of the brake control module (BCM) and the relevant wheel sensors for contact resistance and oxidation.
Check the connectors and cable insulation for damage.
Check that the wheel sensor cables are not too close to sources of interference.
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

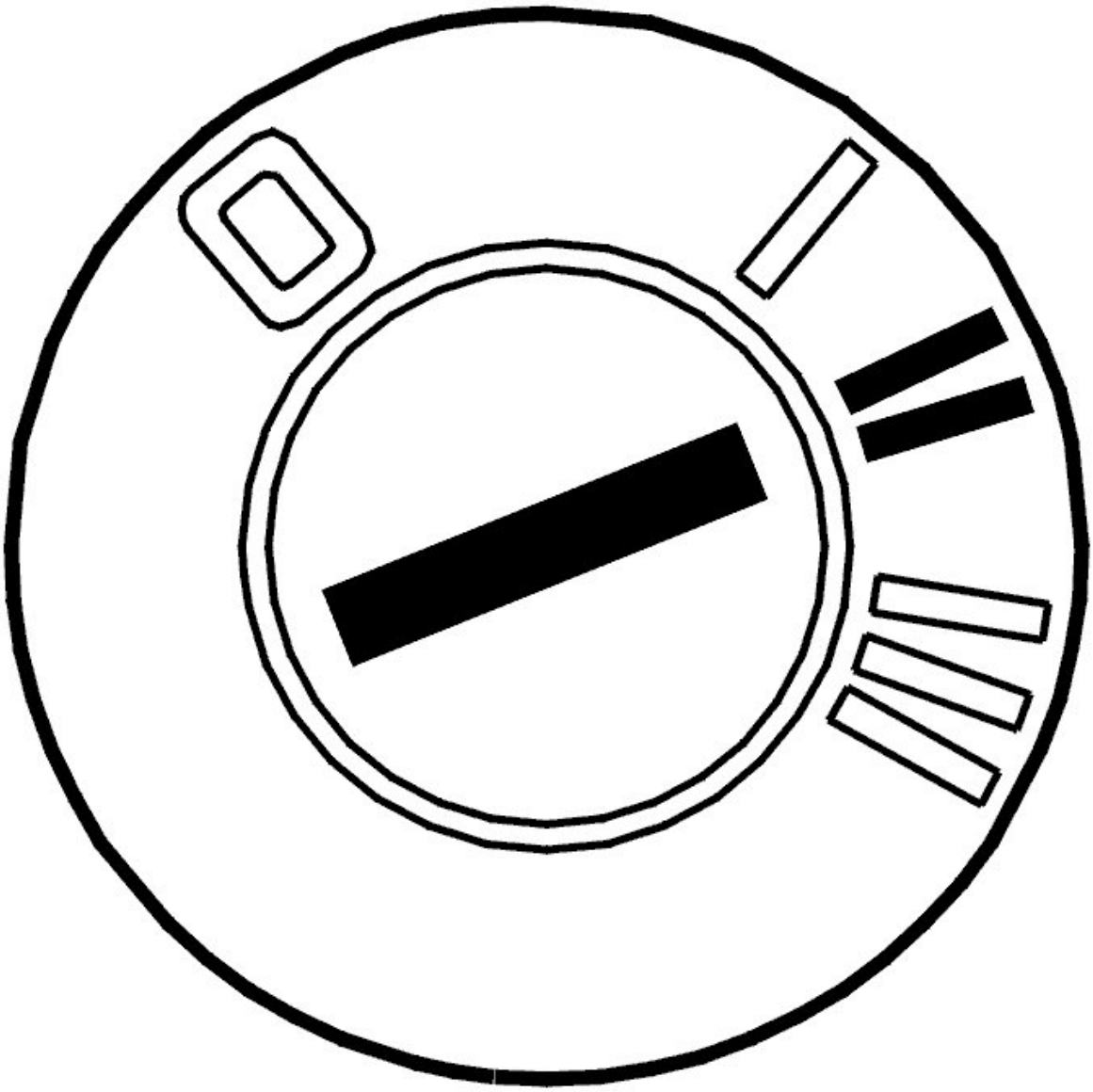
No - No Fault Found

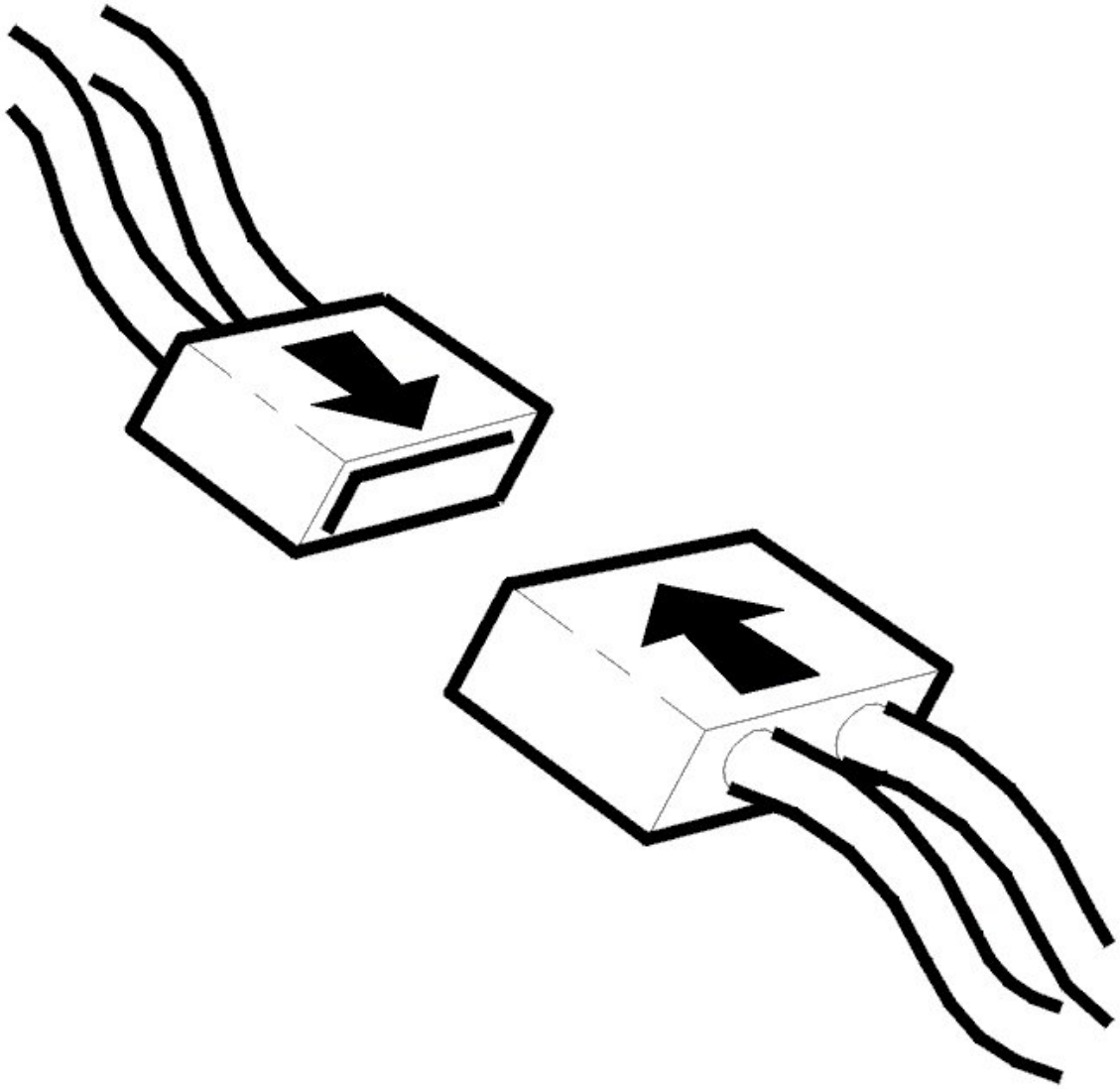
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

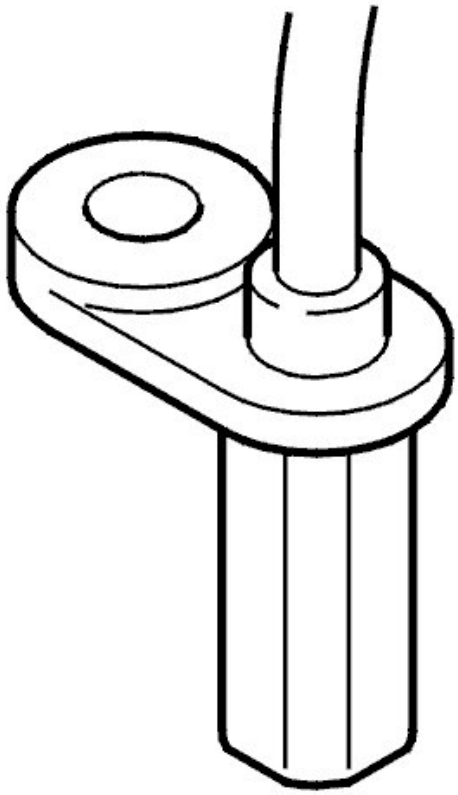
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about wheel speed from the wheel sensors. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle. Diagnostic trouble code (DTC) BCM-0010, BCM-0020, BCM-0030 or BCM-0040 is stored, depending on the wheel sensor, if the control module registers that the signal from any of the wheel sensors is distorted or missing too many times.

- BCM-0010: Wheel sensor, left front
- BCM-0020: Wheel sensor, right front
- BCM-0030: Wheel sensor, left rear
- BCM-0040: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Electronic Brake force Distribution is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked

- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals
- Open-circuit, short-circuit to ground or supply voltage in the power supply to the wheel sensor
- The signal cables are short-circuited to each other
- Short-circuit to supply voltage or ground in the signal cable
- Open-circuit in the signal cable
- Defective wheel sensor
- Internal fault in the control module.

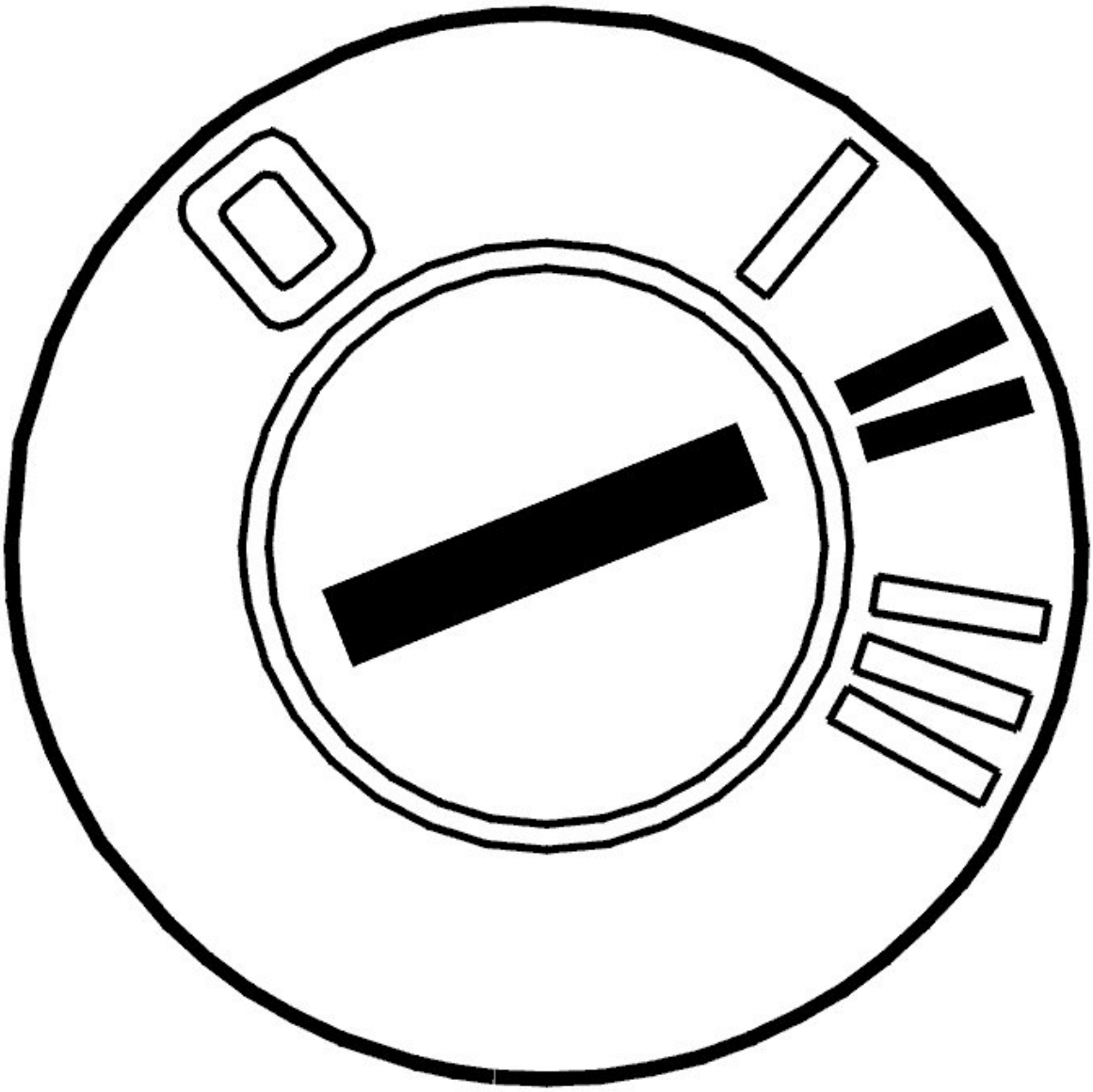
Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The warning lamp for brake circuit not functioning is lit
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

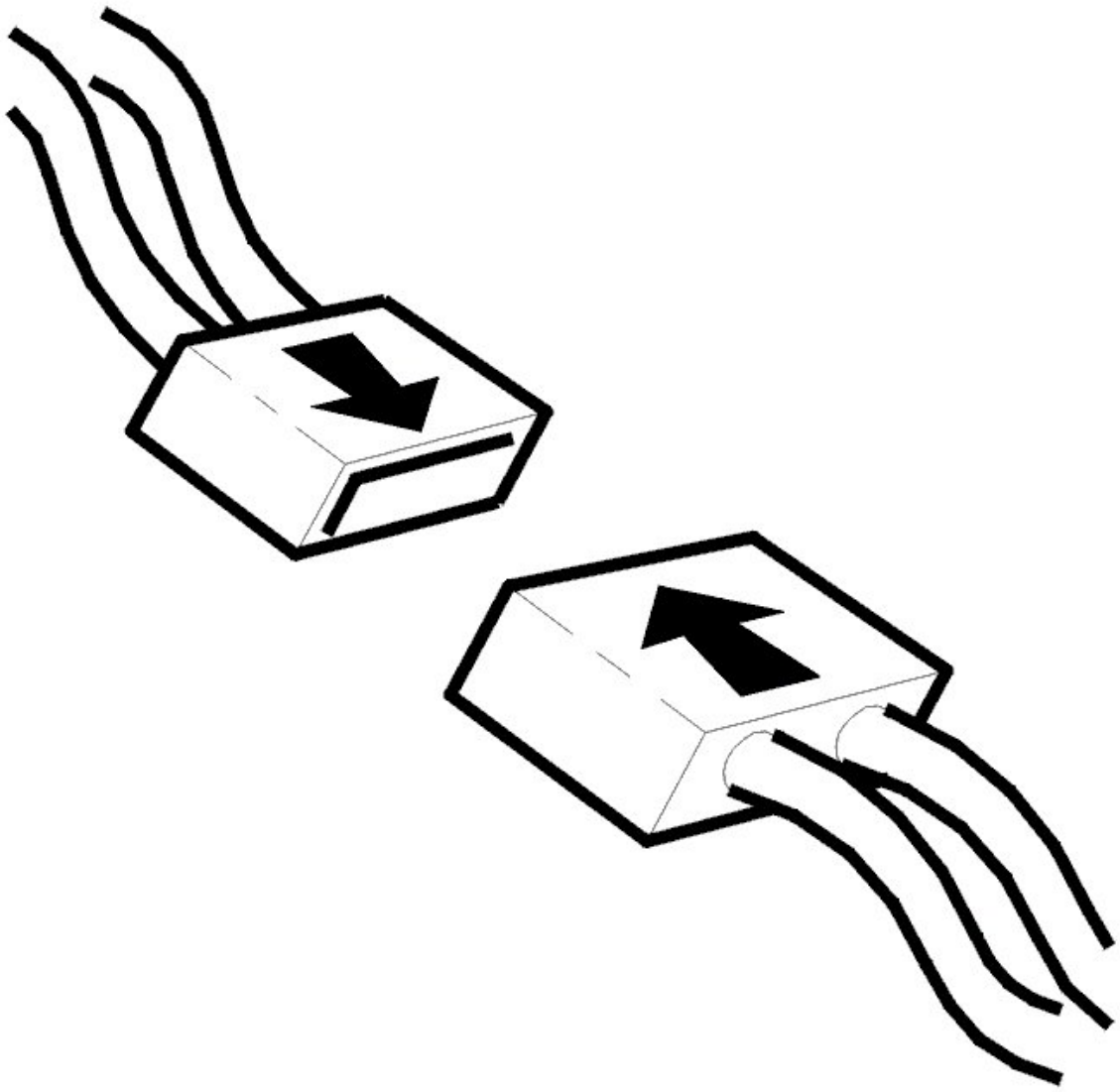
Note! If the fault is intermittent the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Signal Missing

Signal missing

Checking the connectors for the control module and wheel sensor





- Ignition off
- Check the wheel sensor and brake control module (BCM) connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.
If the wheel speed is updated, the cause of the fault was loose connections in the connectors for the control module or wheel sensor.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Other information

- To disconnect the wheel sensor connector, see Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- To disconnect the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the wheel speed updated?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors
Checking the power supply

Check the power supply cable between the control module
- terminal #36 (#A36) (left rear)
- terminal #43 (#A43) (right rear).

and terminal #1 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: With the ignition on, the voltage should be approximately 1 V under Ubat measured at the ground terminal.

Checking the signal cable

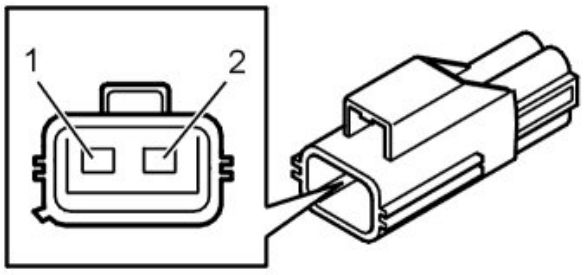
Check the power supply cable between the control module
- terminal #37 (#A37) (left rear)
- terminal #42 (#A42) (right rear).

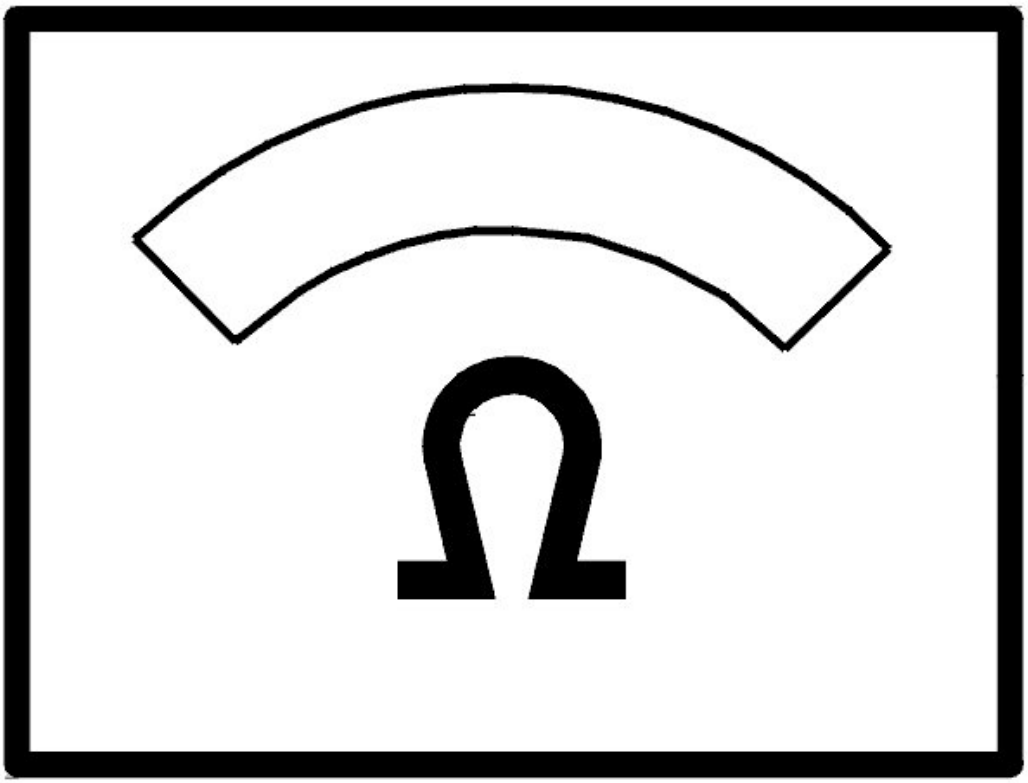
and terminal #2 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Checking the function of the sensor

Check the sensor. Ensure that the breakout box is connected, the sensor is connected and the ignition is on. Measure the signal from the sensor. Connect a voltmeter between:
- terminals #36 (#A36) and #37 (#A37) (left front)
- terminals #43 (#A43) and #42 (#A42) (right front).

on the breakout box. The voltage should vary by approximately 1 V when the pulse wheel is rotating. Replace the wheel sensor if the voltage is faulty.
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the wheel sensor, see Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification and Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Select Continue when the fault has been remedied.

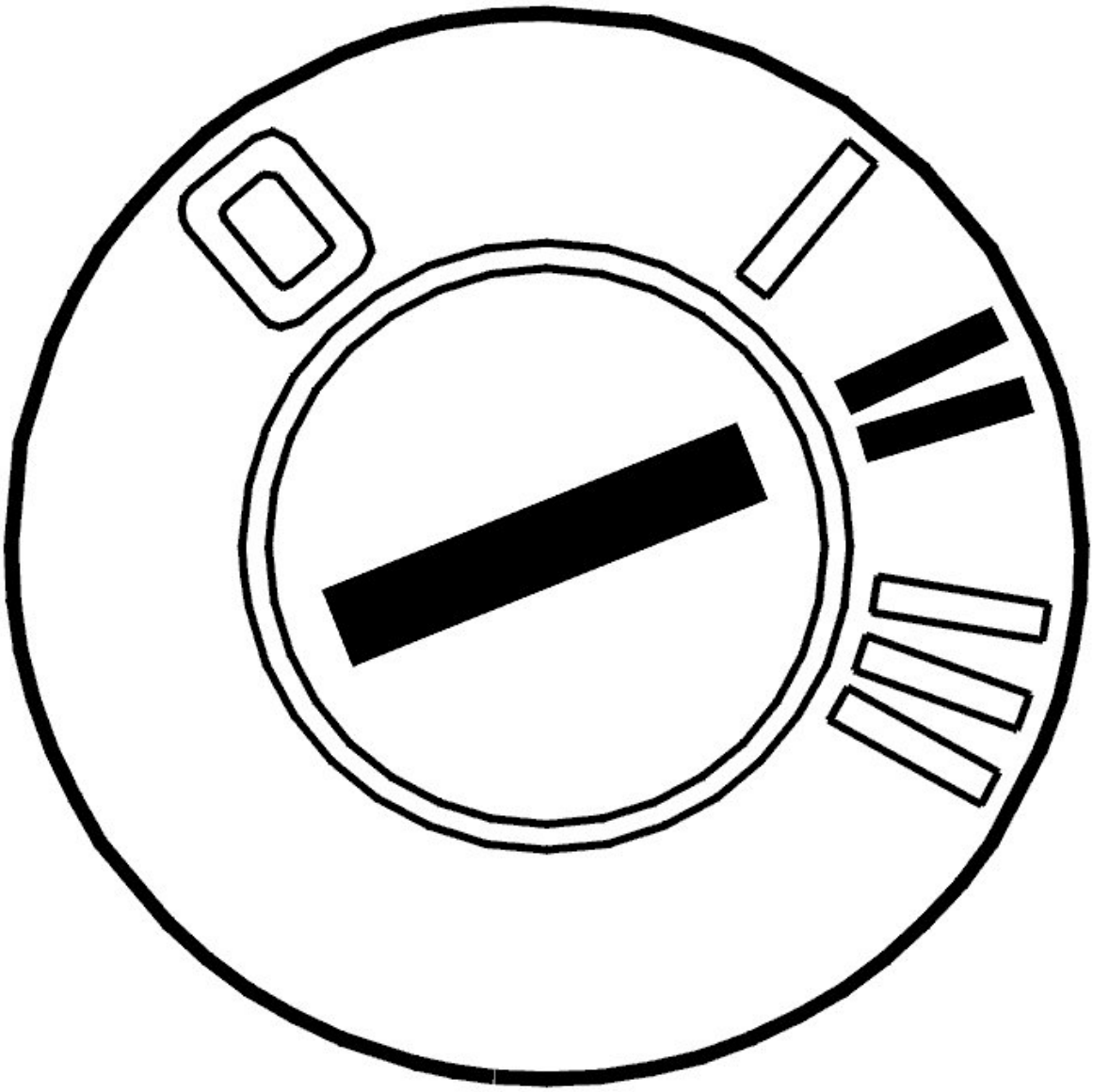
Continue - Verification

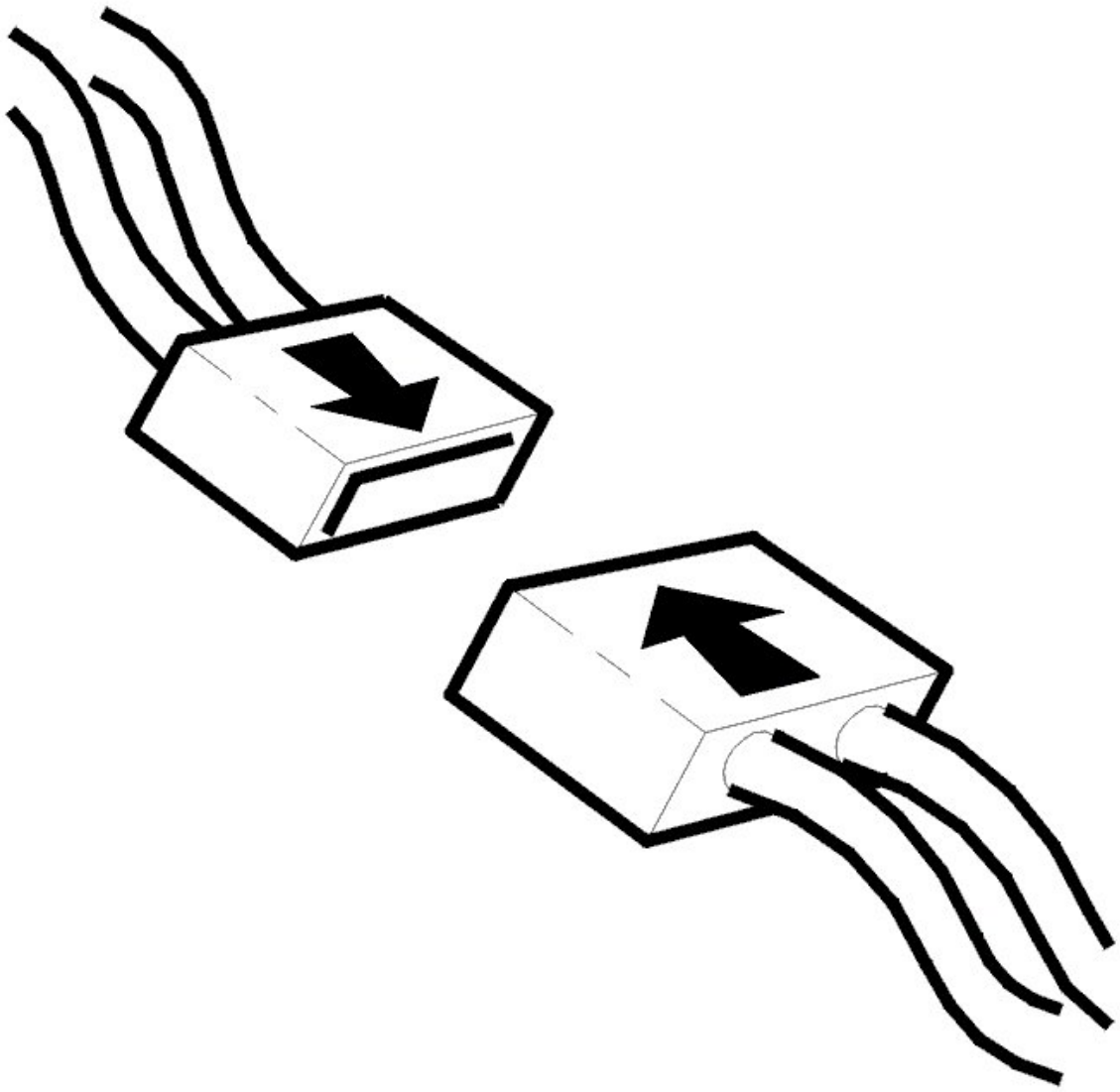
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Is the wheel speed updated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors for the control module and wheel sensor

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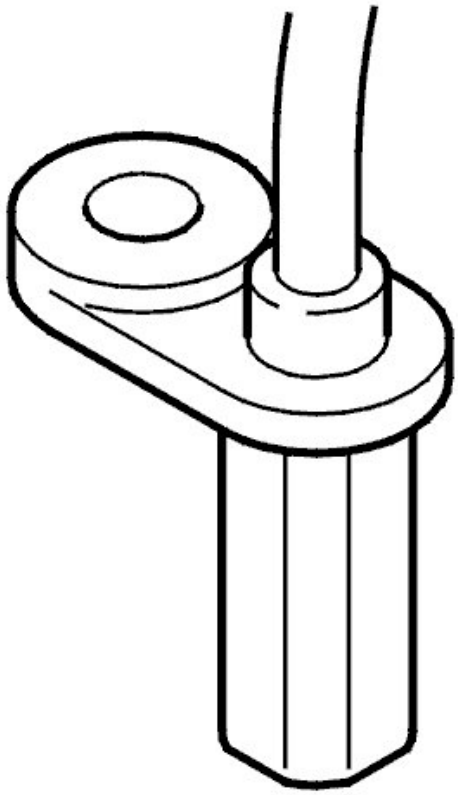
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) can register this diagnostic trouble code (DTC) for a number of different fault causes.

1. The diagnostic trouble code is generated if the Brake control module (BCM) registers that the wheel stops or rotates too slowly in relation to the vehicle's reference speed while driving or ABS-control when speed is above 20 km/h.
2. Brake control module (BCM) has a counter, extrapolation counter, which counts the number of times that the speed change on the wheel is too big compared to that which is allowed (calculated). The diagnostic trouble code (DTC) is stored if wheel acceleration on one of the wheel sensors is greater than on other wheel sensors.
3. The diagnostic trouble code (DTC) is stored if the slowest wheel rotates at a speed that is less than 40-60 % of the fastest wheel (depending on the vehicle's speed) but finds that the wheel sensor circuit is unbroken.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- One of the wheels has been blocked while the car has being driven
- Loose wheel sensor
- The gap between the wheel sensor and the pulse wheel is too large or too small
- Hub vibrations or play in the wheel bearings
- Defective pulse wheel
- Defective wheel sensor.
- Dirt between wheel sensor and pulse wheel.

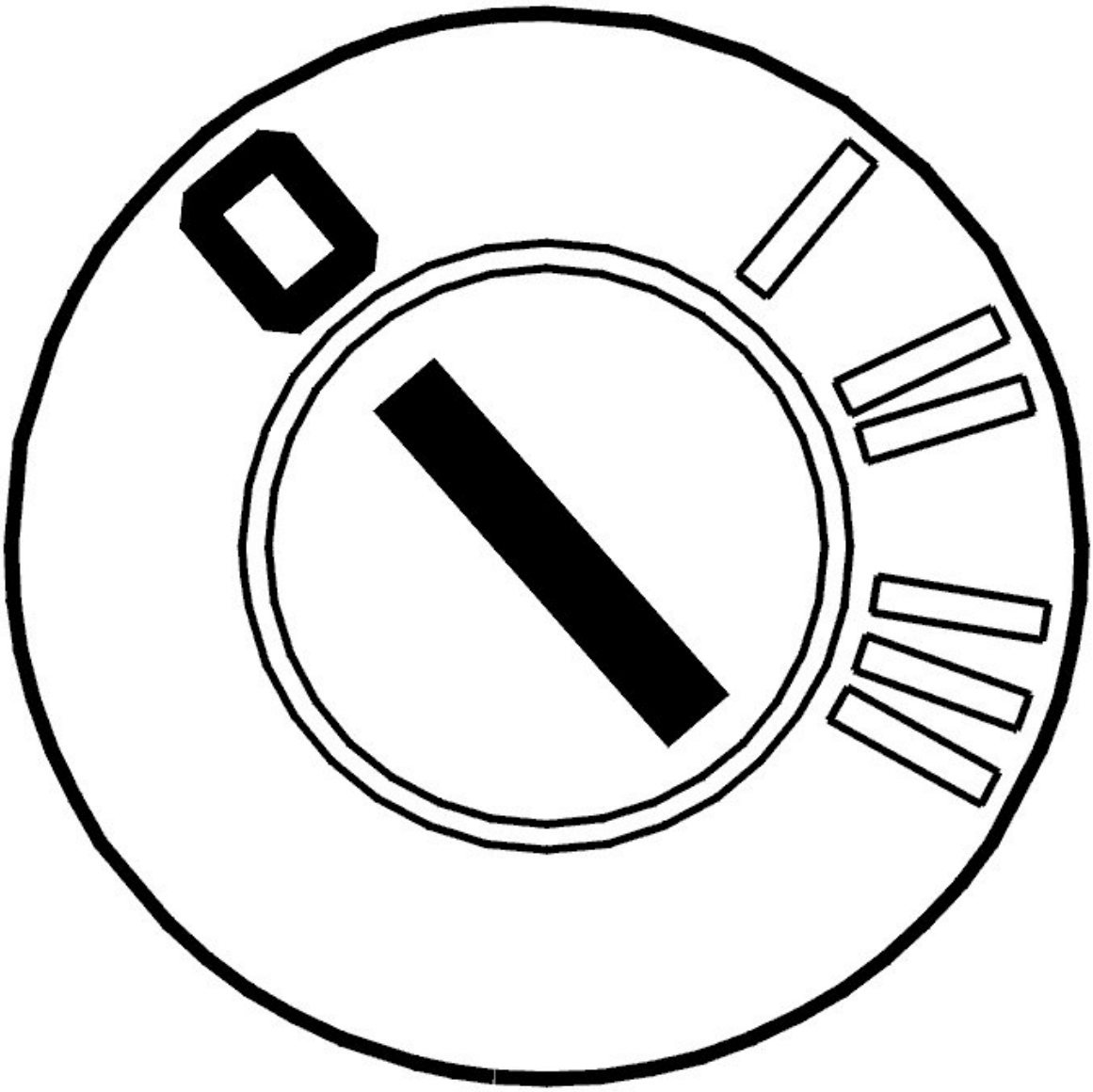
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

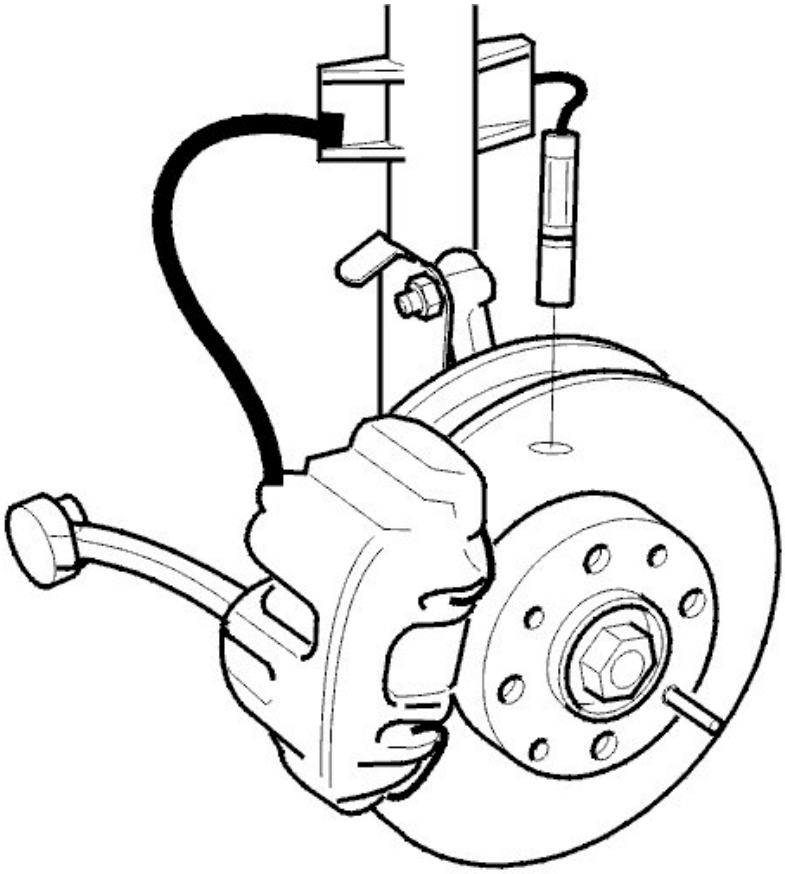


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

No - Checking the brakes and wheel bearings

Checking the brakes and wheel bearings

Hint: A binding brake may block some or both wheels when driving. This will mean that the wheel sensor signal is not transmitted.

Check that the brake calipers are not sticking and locking the wheels.
Check the wheel bearing on the relevant wheel for play. Check that the wheel rotates freely and is not sticking.
Remedy as necessary.

Other information

- Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Brake calipers rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Front wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Front Wheel Hub, Replacing
- Rear wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Rear Wheel Hub, Replacing

Select Continue when the fault has been remedied.

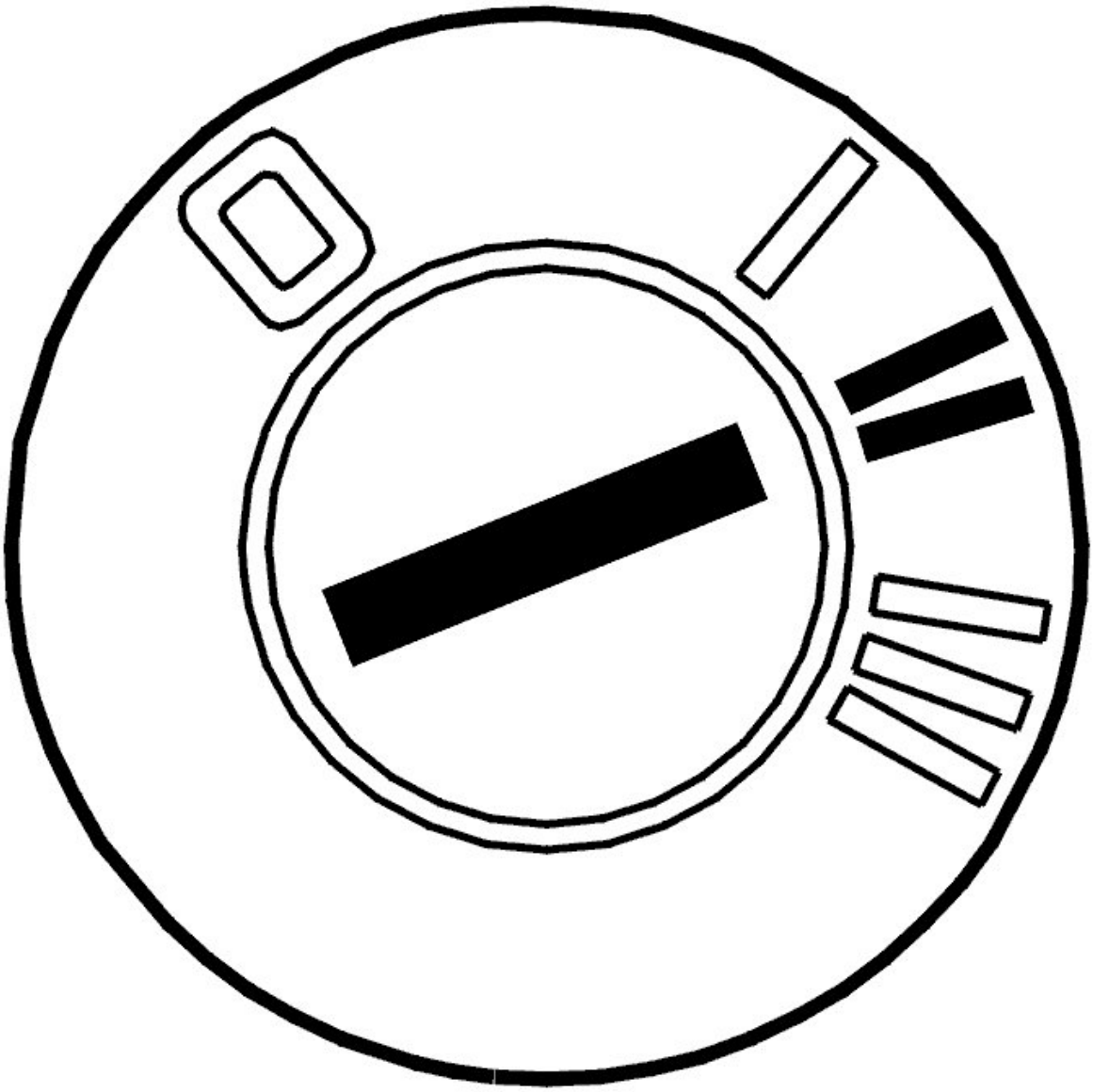
Continue - Verification

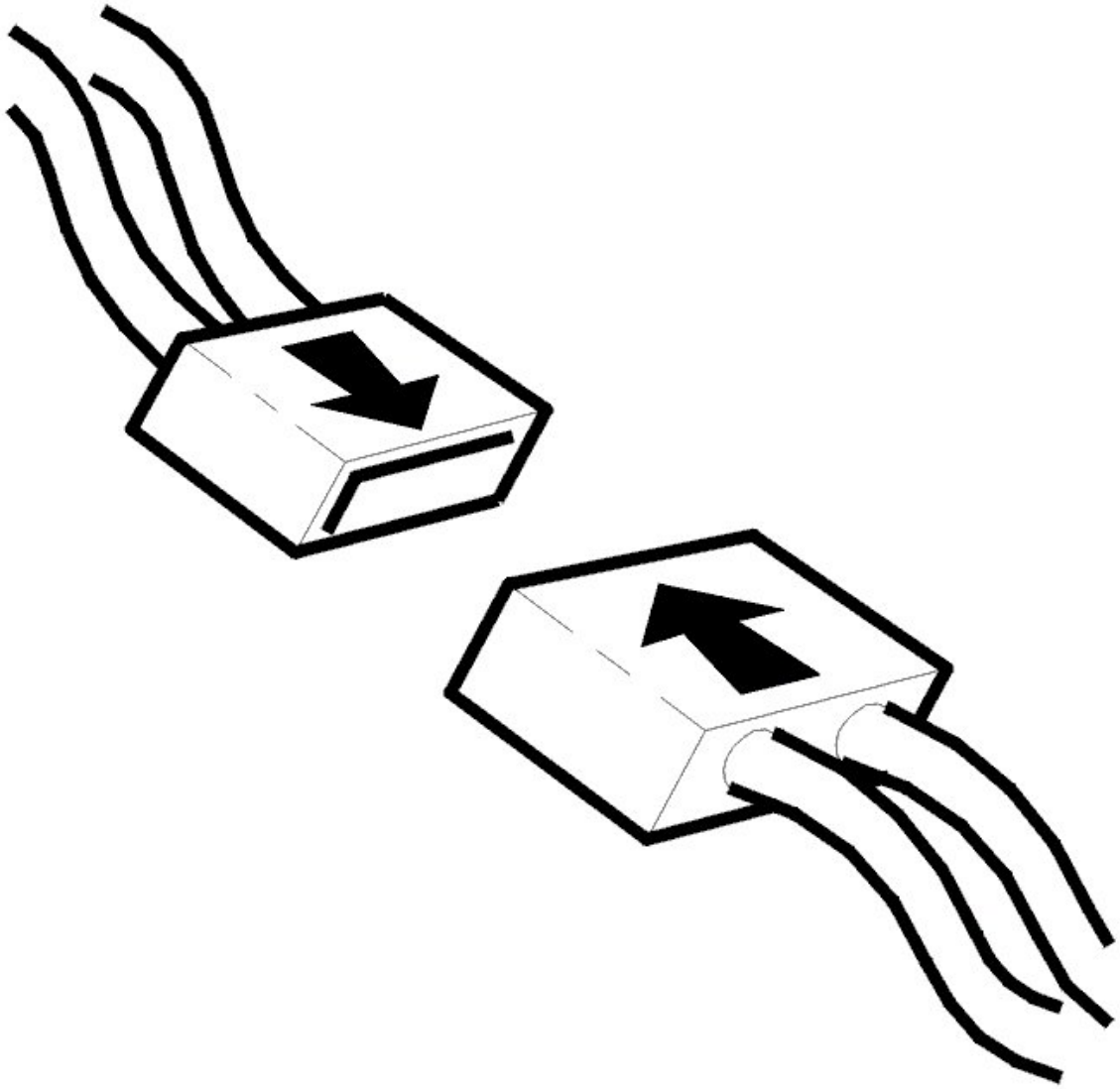
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

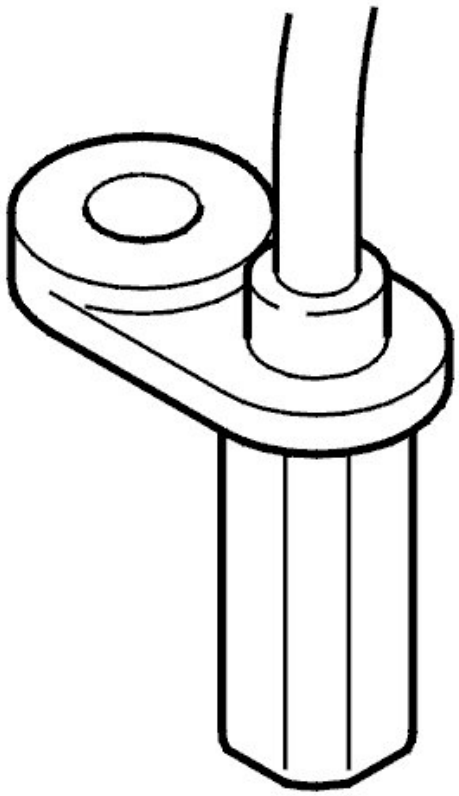
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about the wheel speed for each wheel. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle.
Diagnostic trouble code (DTC) BCM-0012, BCM-0022, BCM-0032 or BCM-0042 is stored, depending on the wheel sensor, if the control module registers that the signal from the wheel sensor is distorted or missing too many times.

- BCM-0012: Wheel sensor, left front
- BCM-0022: Wheel sensor, right front
- BCM-0032: Wheel sensor, left rear
- BCM-0042: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Traction control is blocked

- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Loose wheel sensor
- Damaged wiring
- Defective pulse wheel.
- Dirt between wheel sensor and pulse wheel.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

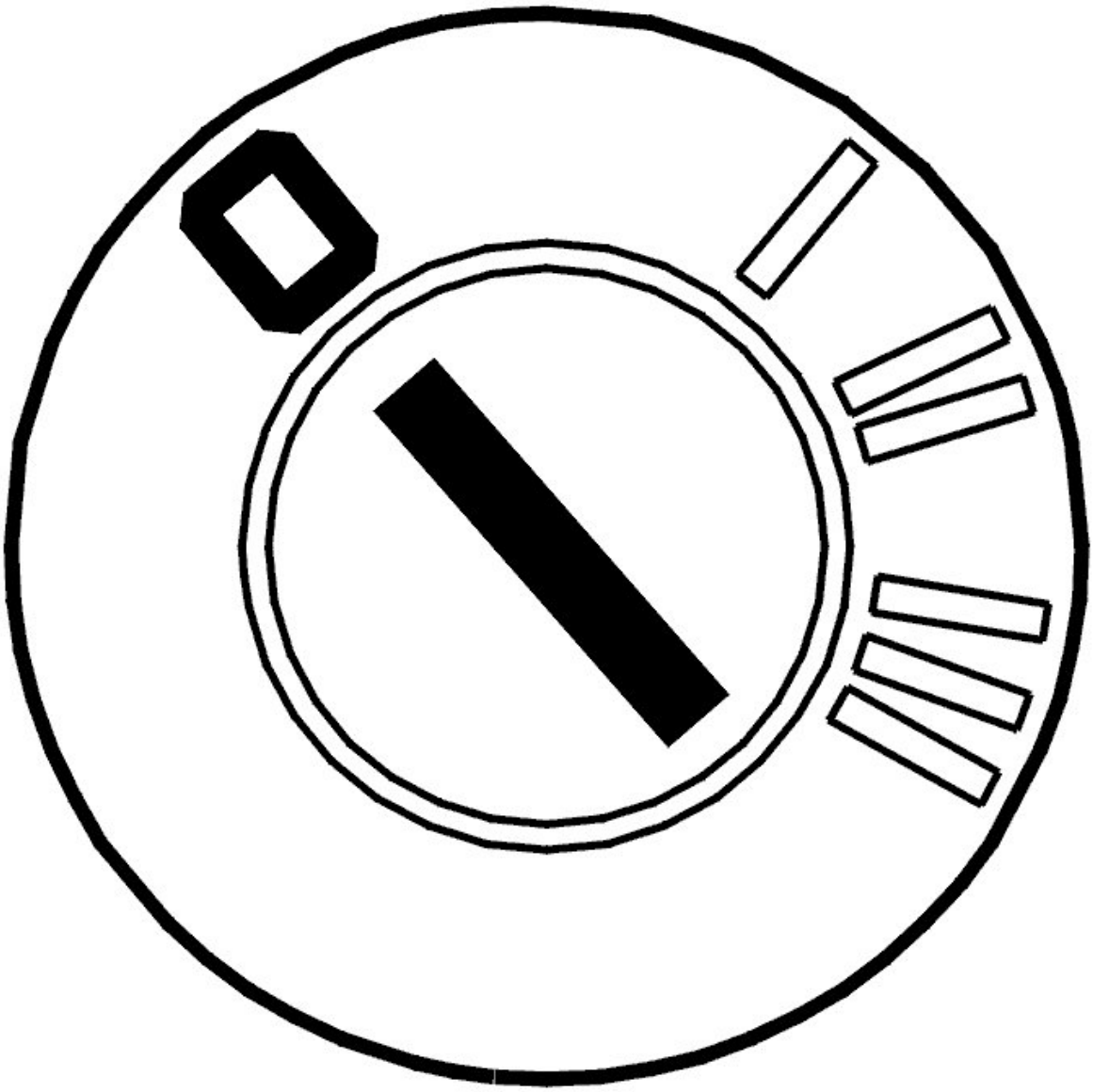
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General warning lamp lit
- No ABS function
- Anti-spin does not function
- The traction control system does not function.

Note! If the fault becomes intermittent, the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

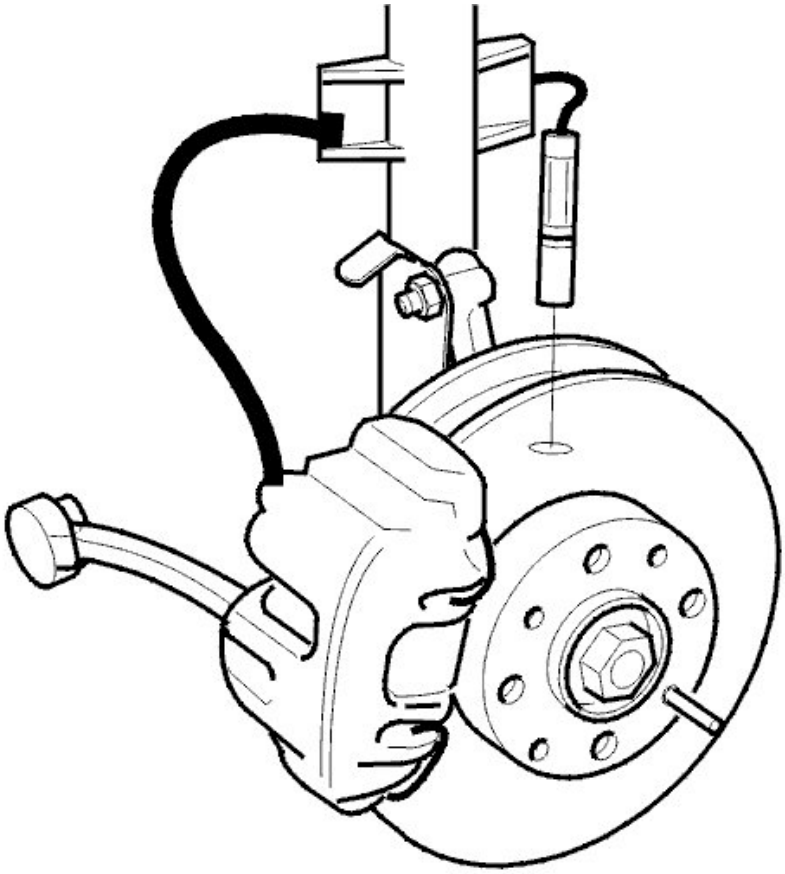


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

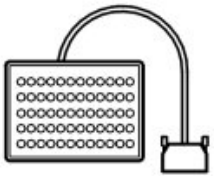
No - Checking the connectors and cables

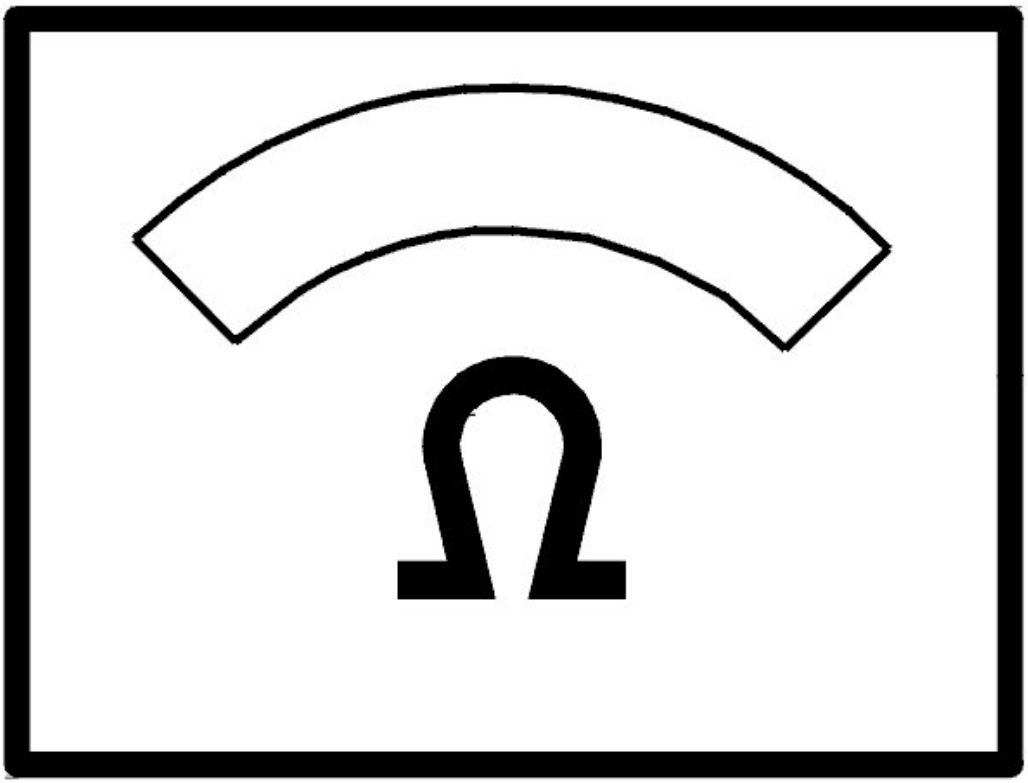
Checking the connectors and cables

Check the connectors of the brake control module (BCM) and the relevant wheel sensors for contact resistance and oxidation.
Check the connectors and cable insulation for damage.
Check that the wheel sensor cables are not too close to sources of interference.
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

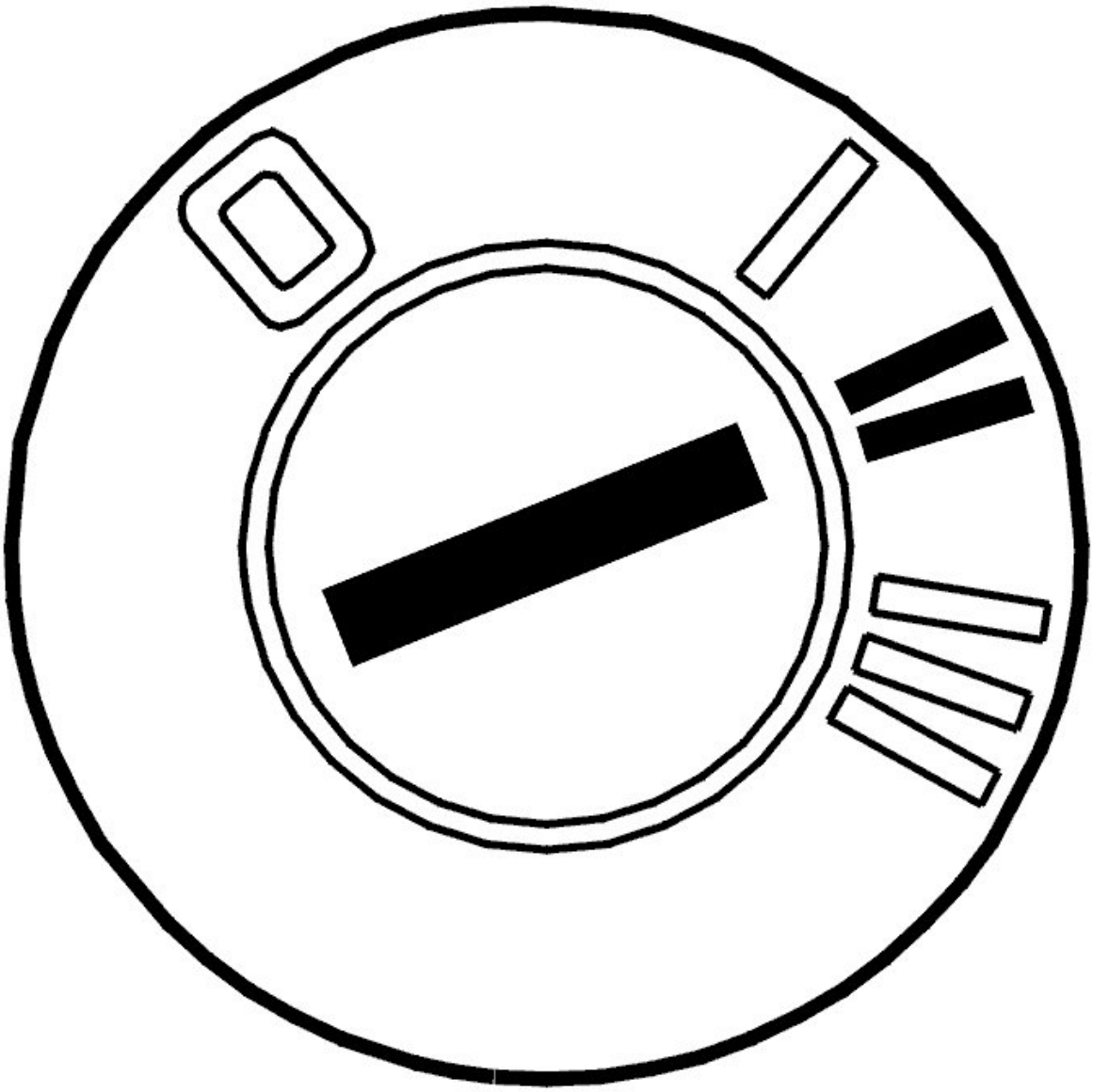
No - No Fault Found

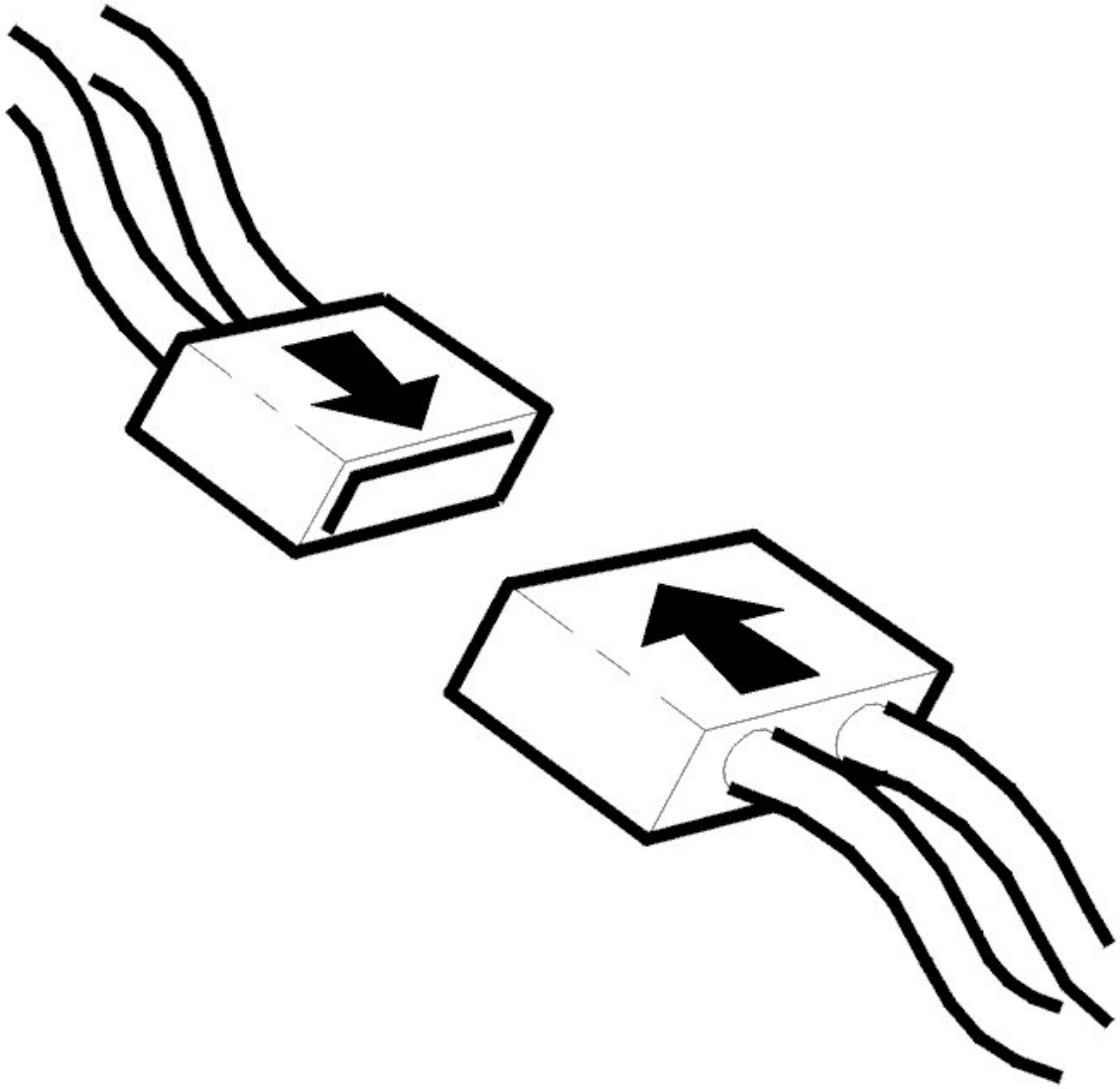
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

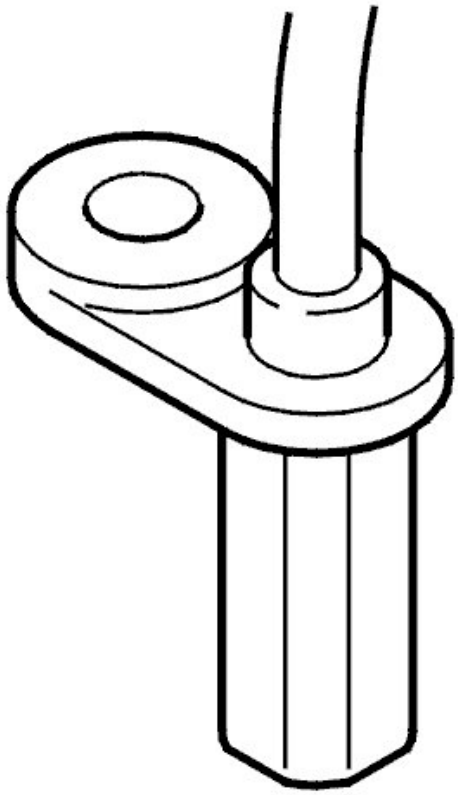
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about wheel speed from the wheel sensors. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle. Diagnostic trouble code (DTC) BCM-0010, BCM-0020, BCM-0030 or BCM-0040 is stored, depending on the wheel sensor, if the control module registers that the signal from any of the wheel sensors is distorted or missing too many times.

- BCM-0010: Wheel sensor, left front
- BCM-0020: Wheel sensor, right front
- BCM-0030: Wheel sensor, left rear
- BCM-0040: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Electronic Brake force Distribution is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked

- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals
- Open-circuit, short-circuit to ground or supply voltage in the power supply to the wheel sensor
- The signal cables are short-circuited to each other
- Short-circuit to supply voltage or ground in the signal cable
- Open-circuit in the signal cable
- Defective wheel sensor
- Internal fault in the control module.

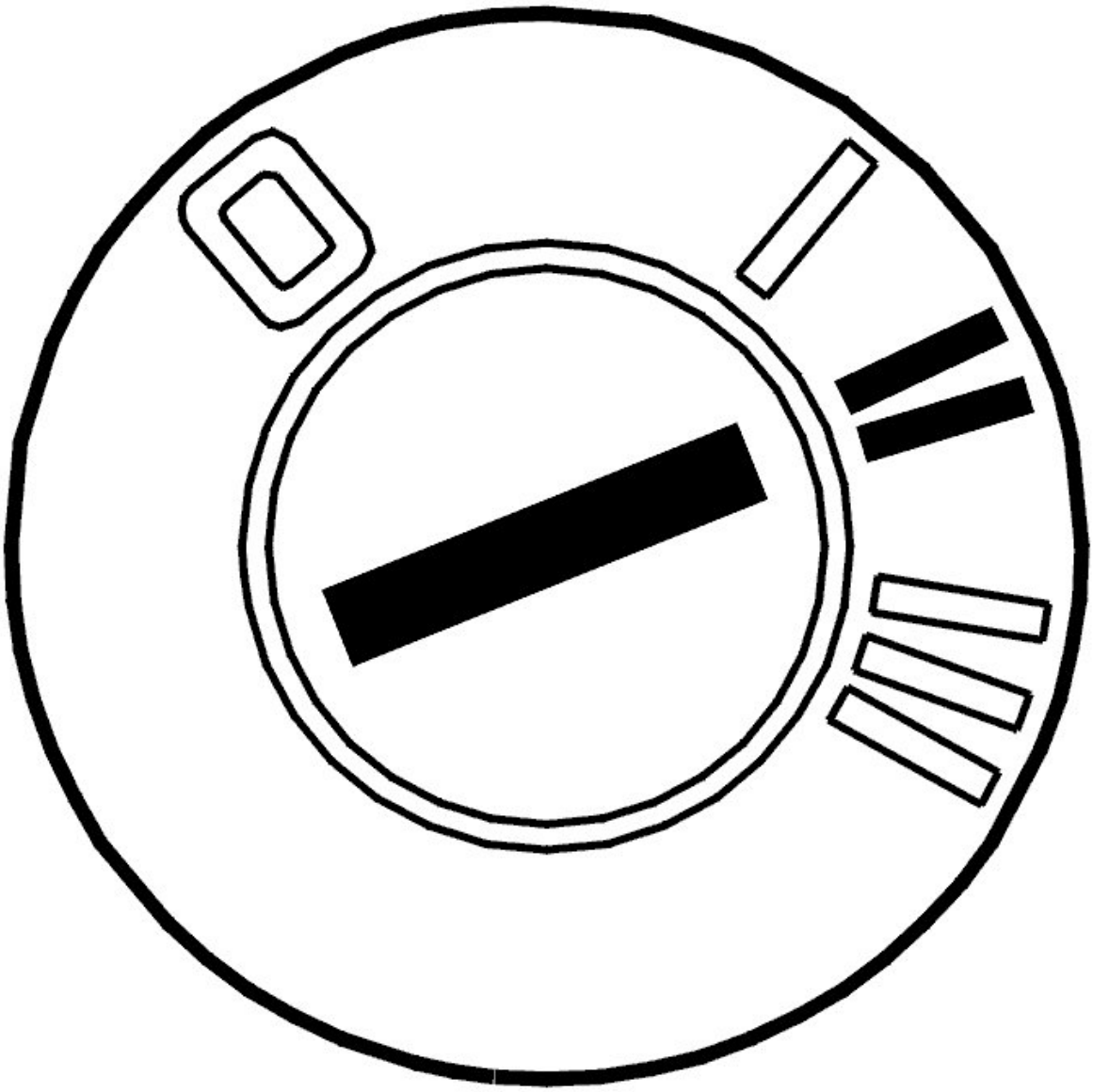
Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The warning lamp for brake circuit not functioning is lit
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

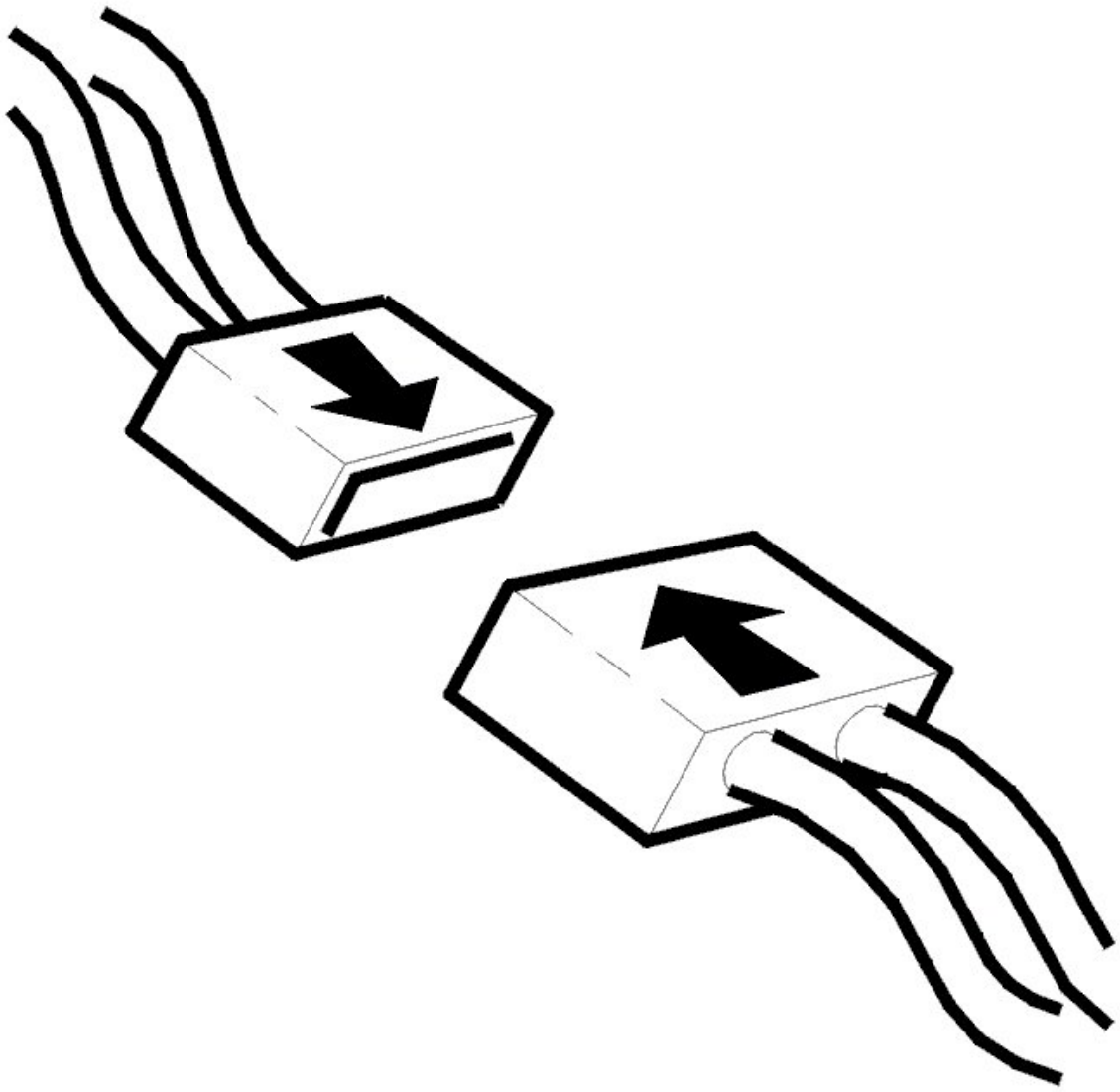
Note! If the fault is intermittent the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Signal Missing

Signal missing

Checking the connectors for the control module and wheel sensor





- Ignition off
- Check the wheel sensor and brake control module (BCM) connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.
If the wheel speed is updated, the cause of the fault was loose connections in the connectors for the control module or wheel sensor.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Other information

- To disconnect the wheel sensor connector, see Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- To disconnect the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the wheel speed updated?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors
Checking the power supply

Check the power supply cable between the control module
- terminal #36 (#A36) (left rear)
- terminal #43 (#A43) (right rear).

and terminal #1 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: With the ignition on, the voltage should be approximately 1 V under Ubat measured at the ground terminal.

Checking the signal cable

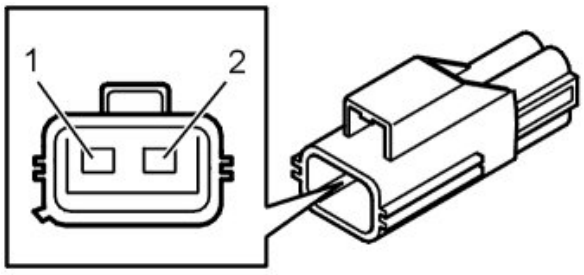
Check the power supply cable between the control module
- terminal #37 (#A37) (left rear)
- terminal #42 (#A42) (right rear).

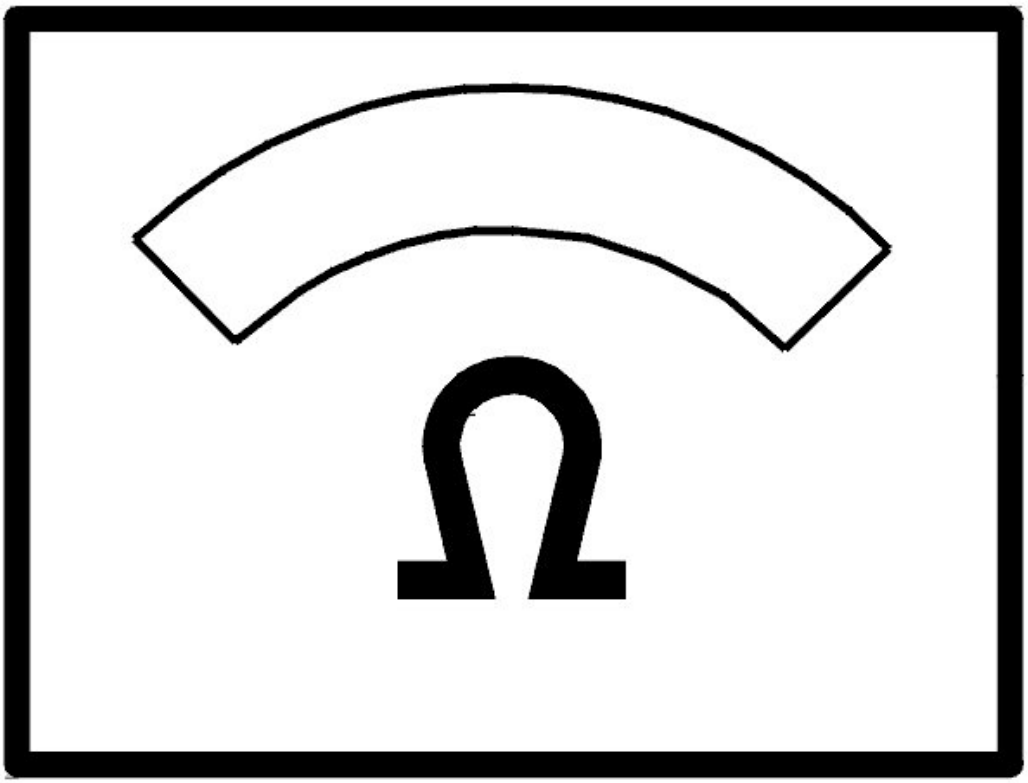
and terminal #2 on the relevant sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Checking the function of the sensor

Check the sensor. Ensure that the breakout box is connected, the sensor is connected and the ignition is on. Measure the signal from the sensor. Connect a voltmeter between:
- terminals #36 (#A36) and #37 (#A37) (left front)
- terminals #43 (#A43) and #42 (#A42) (right front).

on the breakout box. The voltage should vary by approximately 1 V when the pulse wheel is rotating. Replace the wheel sensor if the voltage is faulty.
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the wheel sensor, see Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification and Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Select Continue when the fault has been remedied.

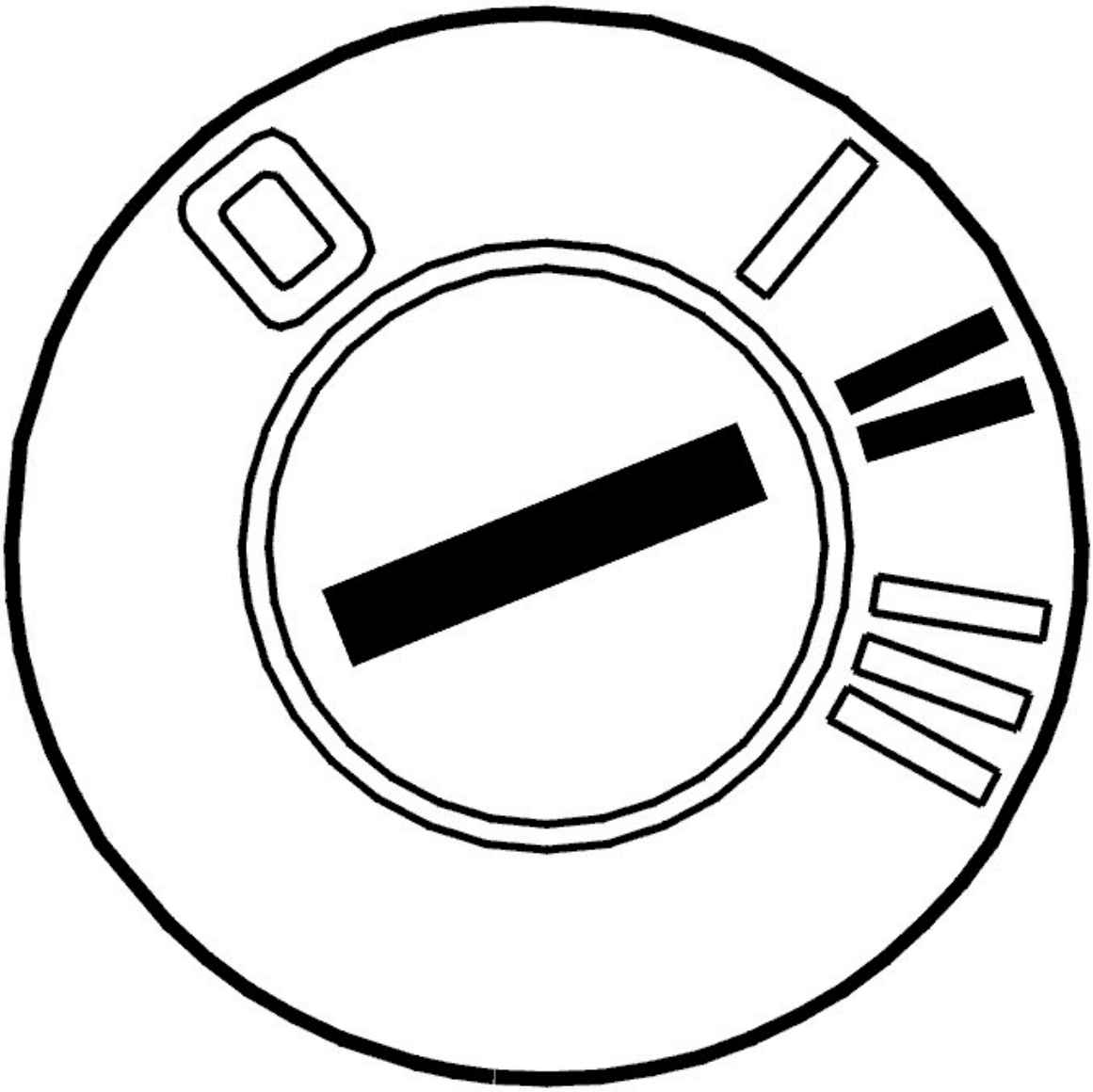
Continue - Verification

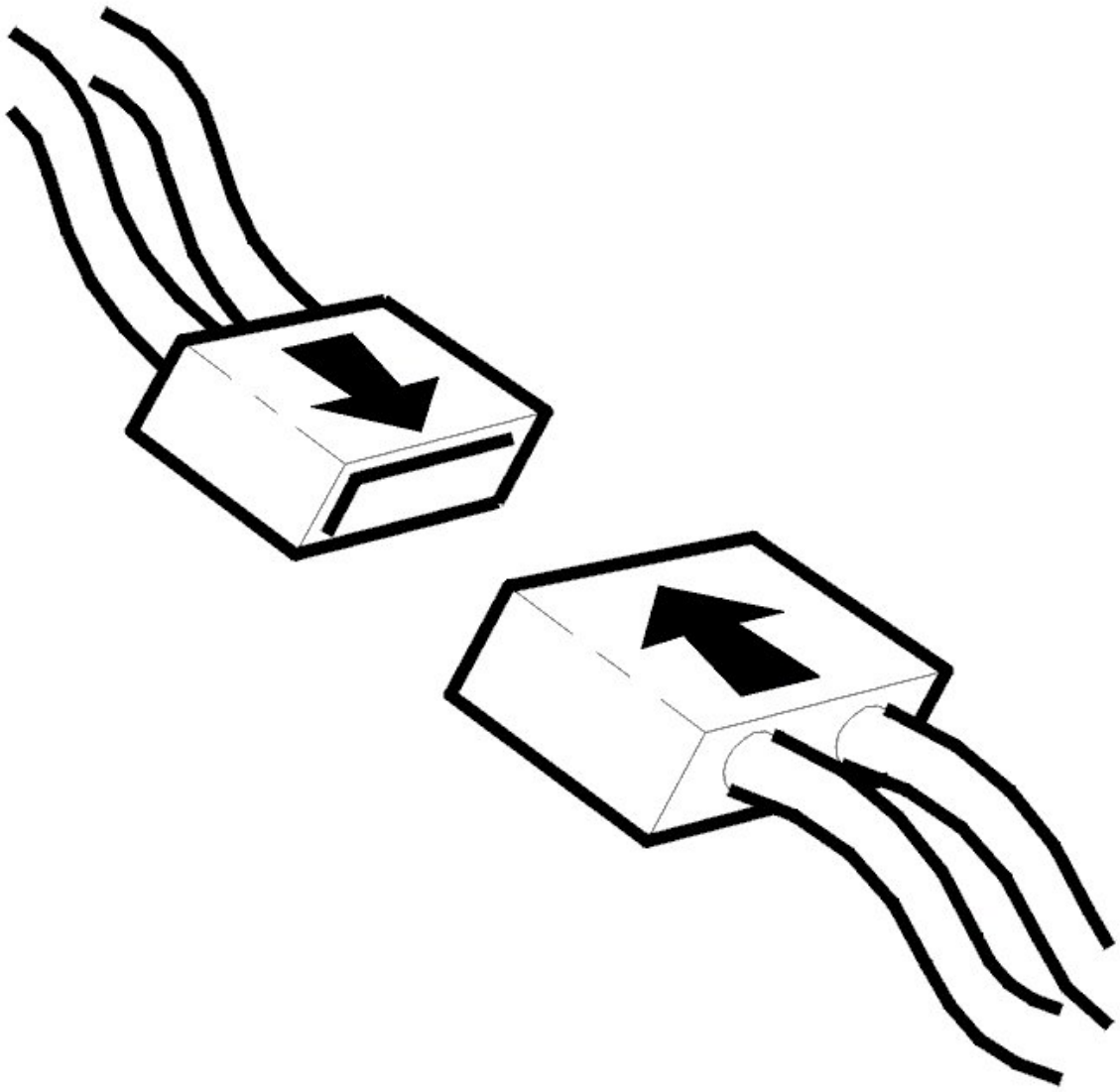
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the relevant wheel is clear of the ground
- Ignition on
- Read off the wheel speed for the relevant wheel.

Spin the relevant wheel and check that the wheel speed is updated.

Note! The speed signal will only be active for approximately 20 seconds. Activate the function again if necessary.

Is the wheel speed updated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors for the control module and wheel sensor

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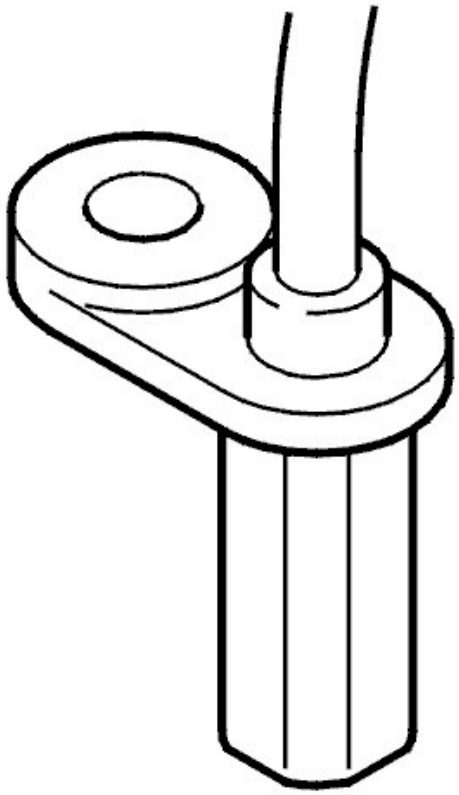
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) can register this diagnostic trouble code (DTC) for a number of different fault causes.

1. The diagnostic trouble code is generated if the Brake control module (BCM) registers that the wheel stops or rotates too slowly in relation to the vehicle's reference speed while driving or ABS-control when speed is above 20 km/h.
2. Brake control module (BCM) has a counter, extrapolation counter, which counts the number of times that the speed change on the wheel is too big compared to that which is allowed (calculated). The diagnostic trouble code (DTC) is stored if wheel acceleration on one of the wheel sensors is greater than on other wheel sensors.
3. The diagnostic trouble code (DTC) is stored if the slowest wheel rotates at a speed that is less than 40-60 % of the fastest wheel (depending on the vehicle's speed) but finds that the wheel sensor circuit is unbroken.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- One of the wheels has been blocked while the car has being driven
- Loose wheel sensor
- The gap between the wheel sensor and the pulse wheel is too large or too small
- Hub vibrations or play in the wheel bearings
- Defective pulse wheel
- Defective wheel sensor.
- Dirt between wheel sensor and pulse wheel.

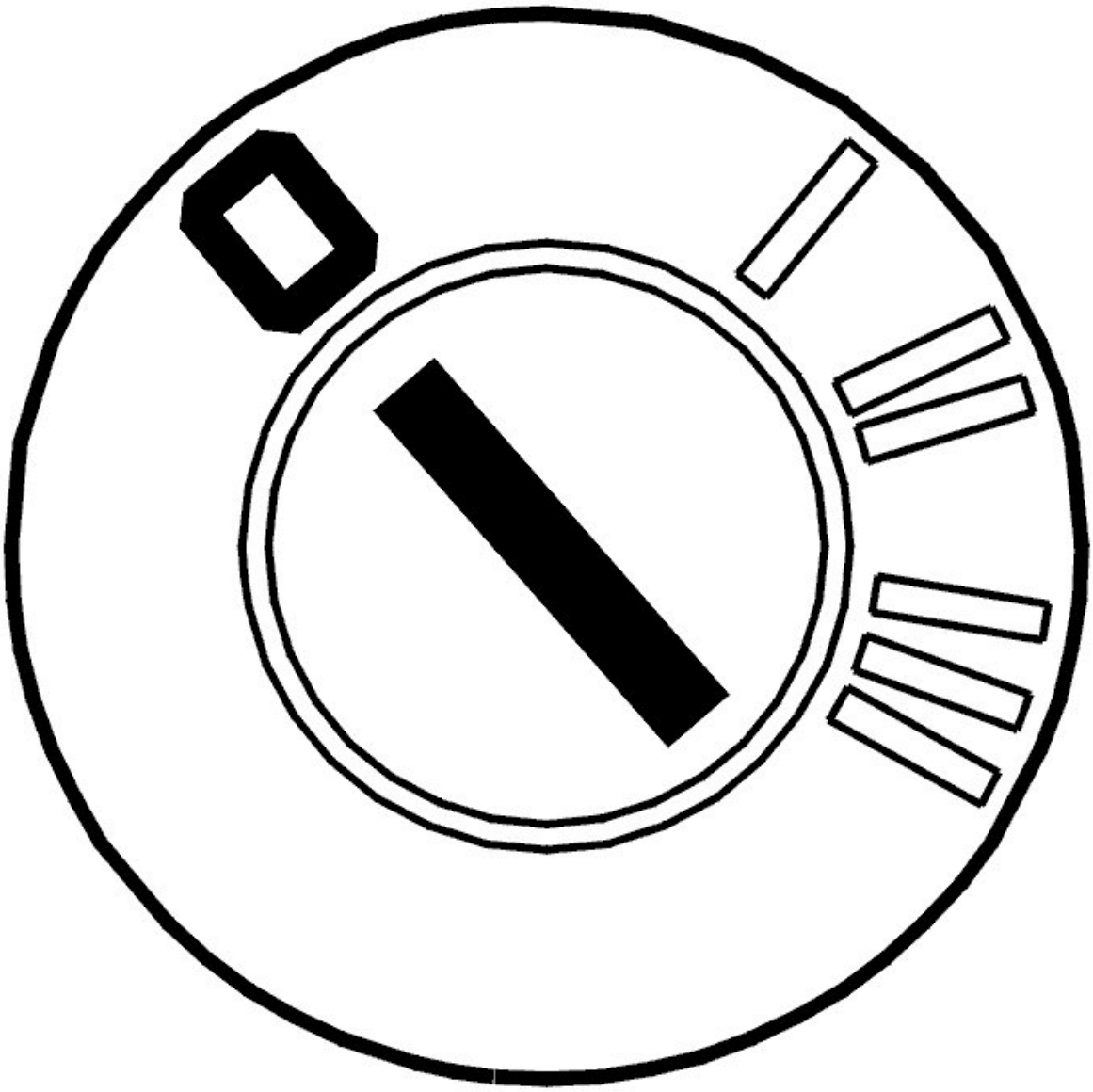
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

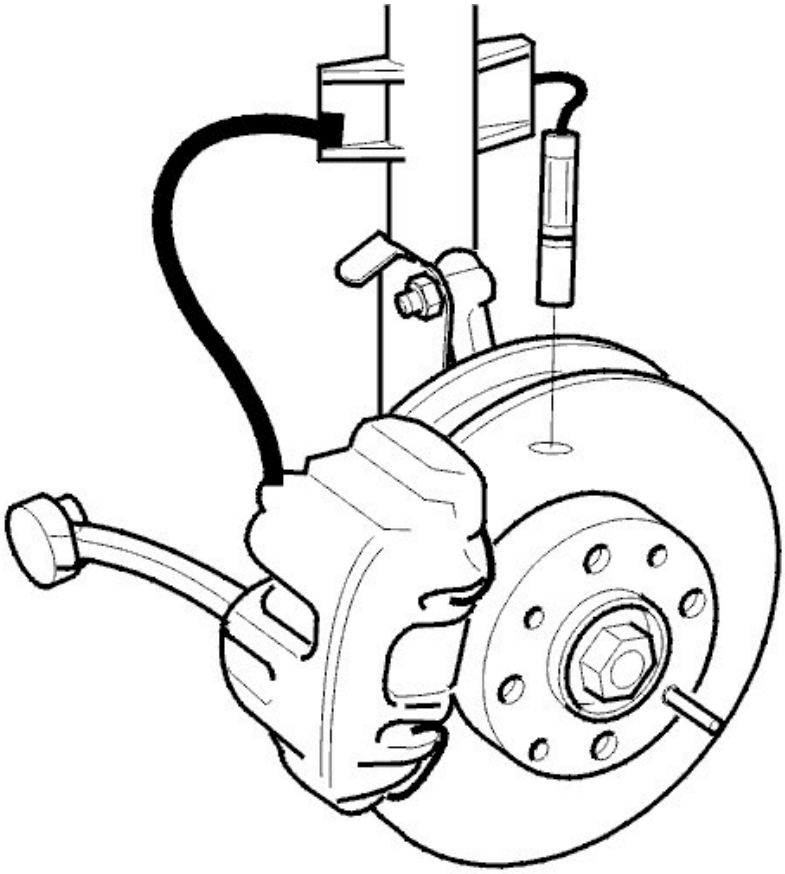


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

No - Checking the brakes and wheel bearings

Checking the brakes and wheel bearings

Hint: A binding brake may block some or both wheels when driving. This will mean that the wheel sensor signal is not transmitted.

Check that the brake calipers are not sticking and locking the wheels.
Check the wheel bearing on the relevant wheel for play. Check that the wheel rotates freely and is not sticking.
Remedy as necessary.

Other information

- Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Brake calipers rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- Front wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Front Wheel Hub, Replacing
- Rear wheel hub, replacing See: Maintenance/Wheels and Tires/Wheel Hub/Service and Repair/Rear Wheel Hub, Replacing

Select Continue when the fault has been remedied.

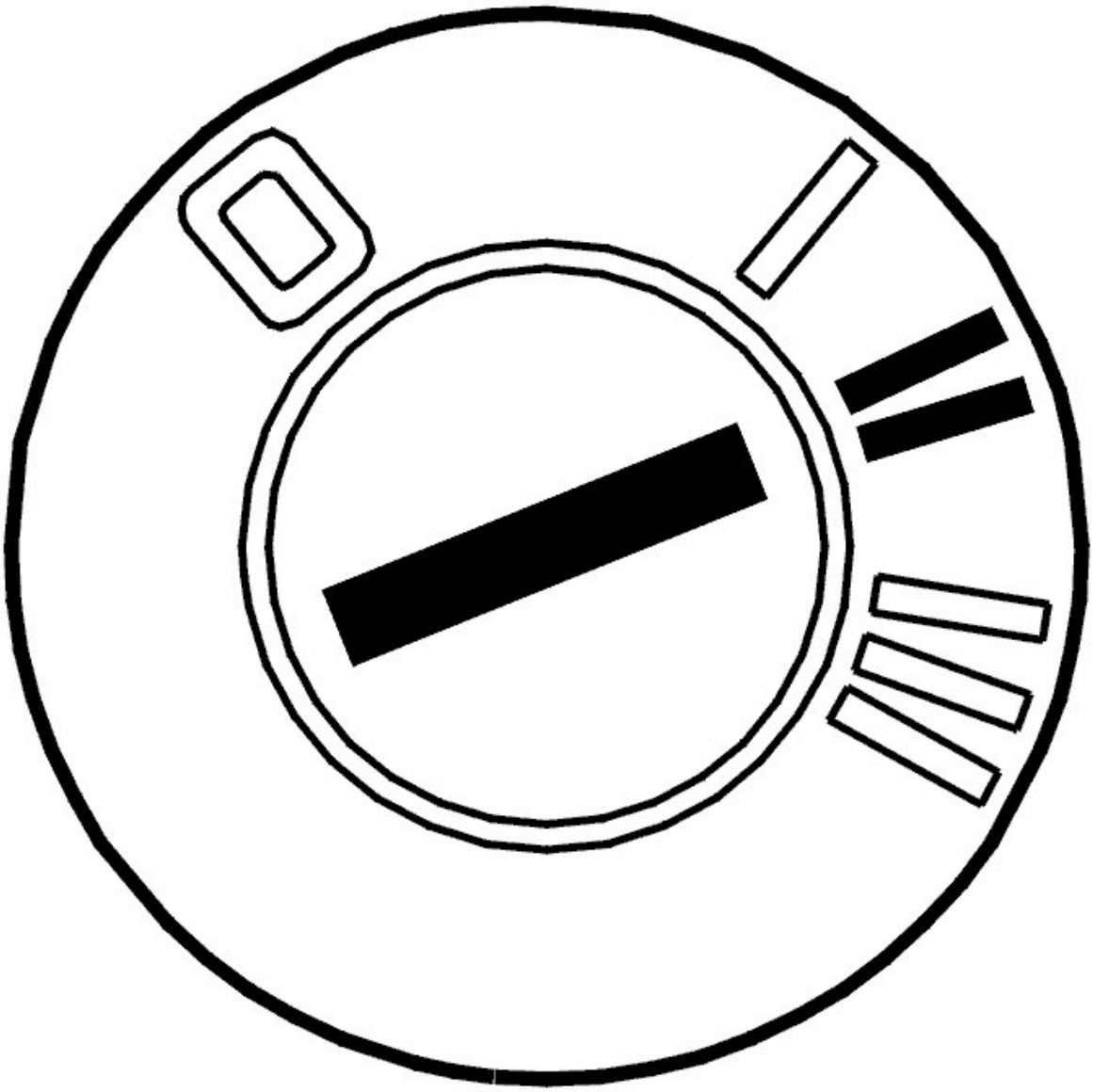
Continue - Verification

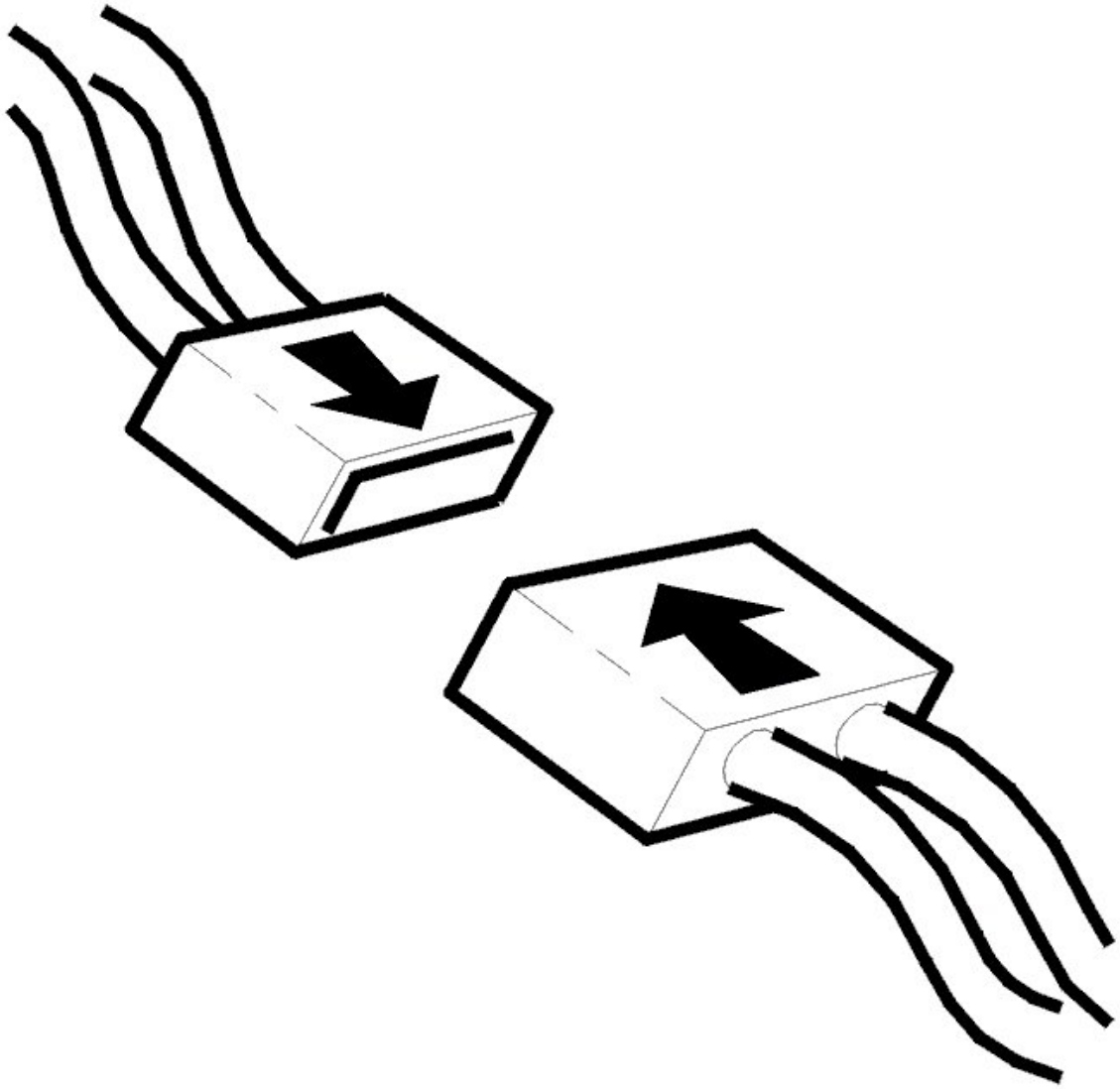
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

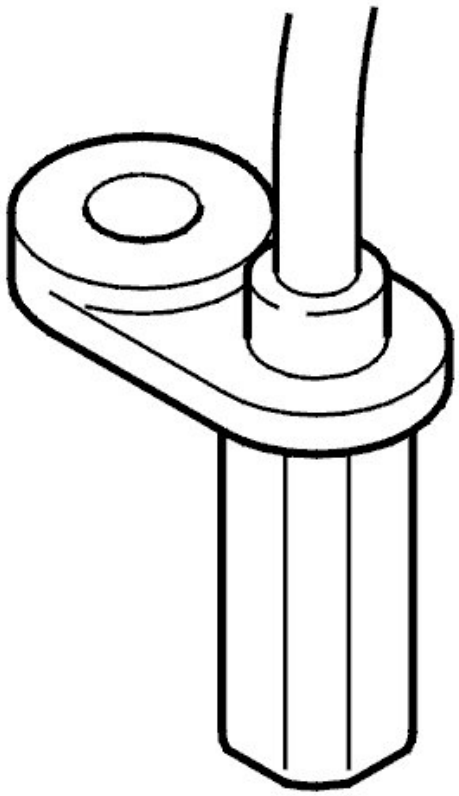
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) receives information about the wheel speed for each wheel. The wheel sensors, which are on the wheel mounting, read off a pulse wheel on the wheel spindle.
Diagnostic trouble code (DTC) BCM-0012, BCM-0022, BCM-0032 or BCM-0042 is stored, depending on the wheel sensor, if the control module registers that the signal from the wheel sensor is distorted or missing too many times.

- BCM-0012: Wheel sensor, left front
- BCM-0022: Wheel sensor, right front
- BCM-0032: Wheel sensor, left rear
- BCM-0042: Wheel sensor, right rear.

The diagnostic trouble code (DTC) can be diagnosed at speeds above 10 km/h.

Substitute value

- The ABS is blocked
- Traction control is blocked

- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked
- Electronic Brake force Distribution (EBD) is blocked if two or more wheel sensors are not working.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Loose wheel sensor
- Damaged wiring
- Defective pulse wheel.
- Dirt between wheel sensor and pulse wheel.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

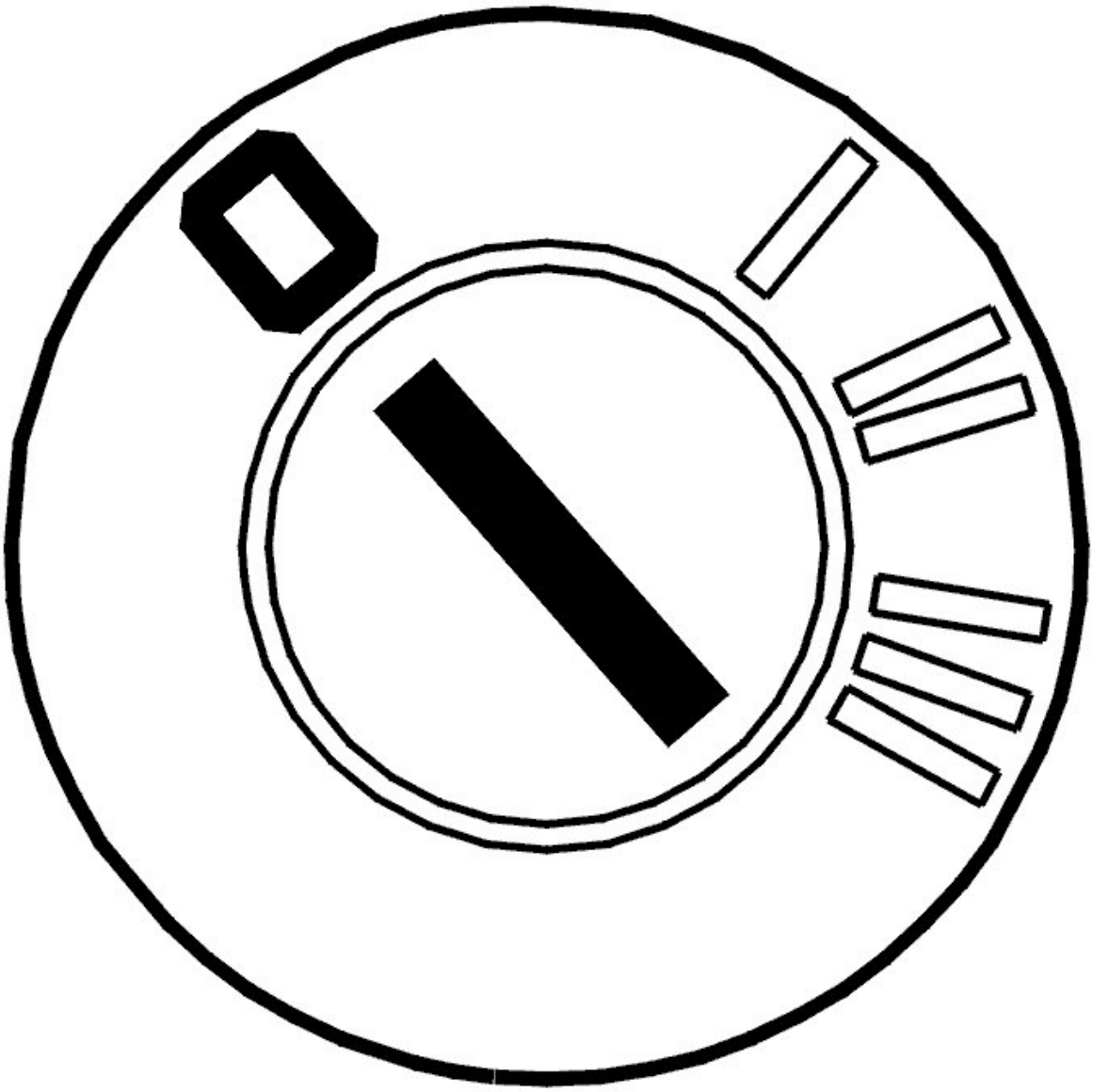
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General warning lamp lit
- No ABS function
- Anti-spin does not function
- The traction control system does not function.

Note! If the fault becomes intermittent, the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Faulty Signal

Faulty signal

Checking the wheel sensor and pulse wheel

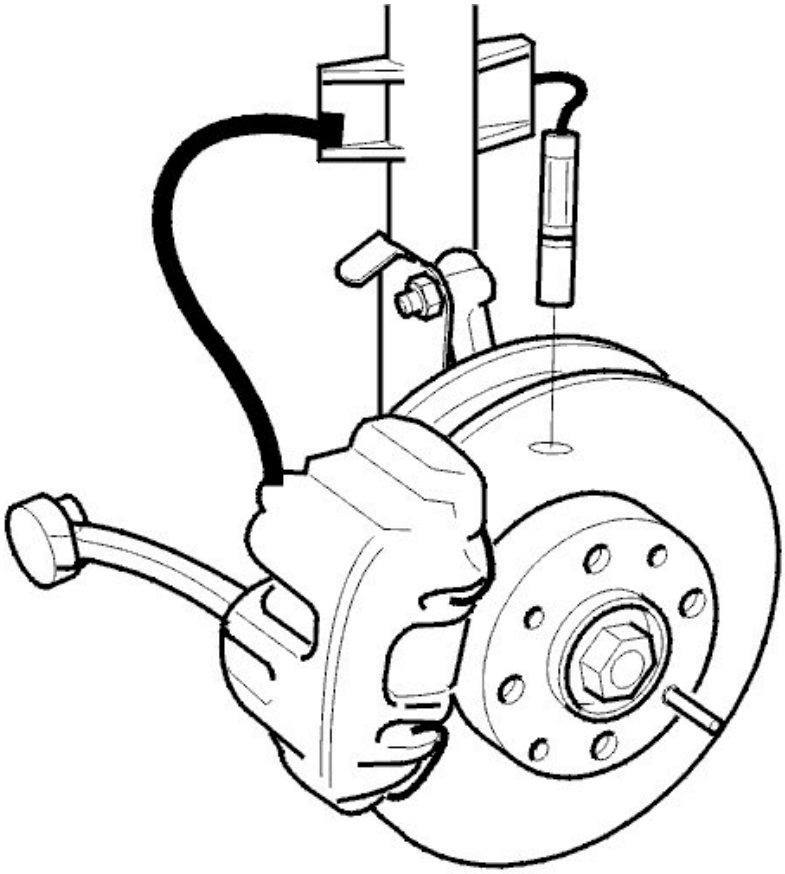


- Ignition off.
- Remove the wheel for better access.

Check that the relevant wheel sensor is mounted tightly against the shaft/hub. Check that there is no dirt between the sensor and mating surface.
Check that the toothed wheel is properly mounted and is free from damage (all teeth intact, no scratches or deformity, etc.)
Remedy as necessary.

Other information

- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing



Was a fault detected?

Yes - Verification

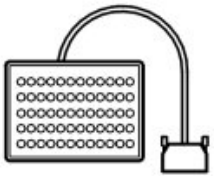
No - Checking the connectors and cables

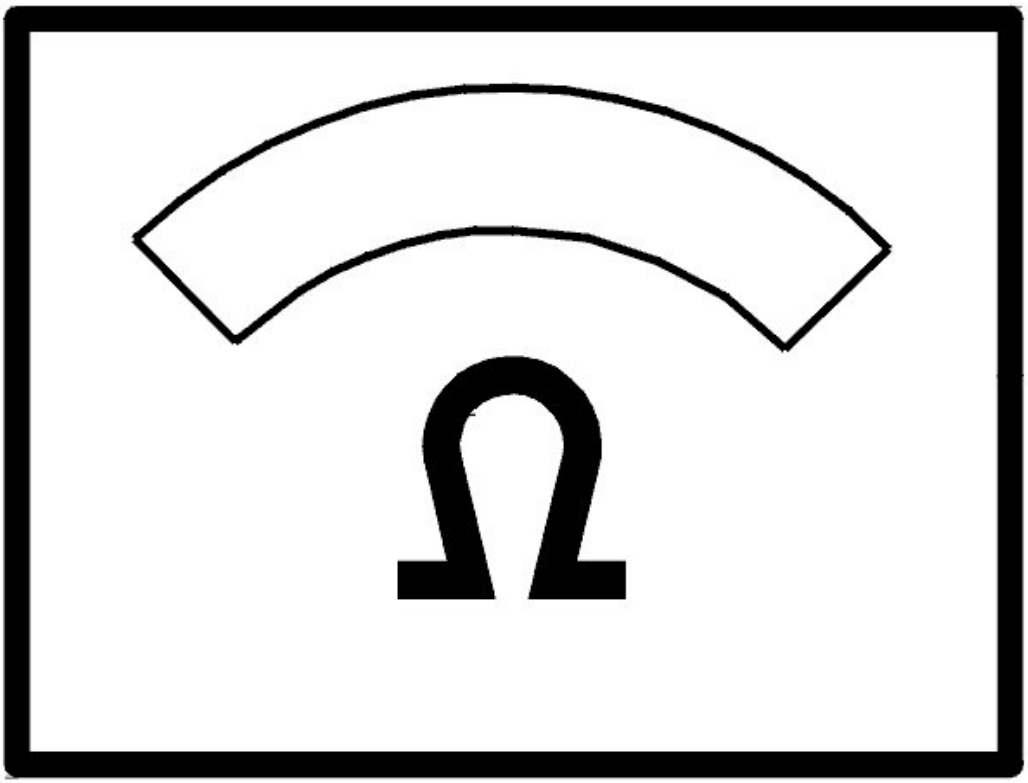
Checking the connectors and cables

Check the connectors of the brake control module (BCM) and the relevant wheel sensors for contact resistance and oxidation.
Check the connectors and cable insulation for damage.
Check that the wheel sensor cables are not too close to sources of interference.
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Wheel sensor front, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Front, Replacing
- Wheel sensor rear, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Wheel Speed Sensor/Service and Repair/Wheel Sensor Rear, Replacing
- Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

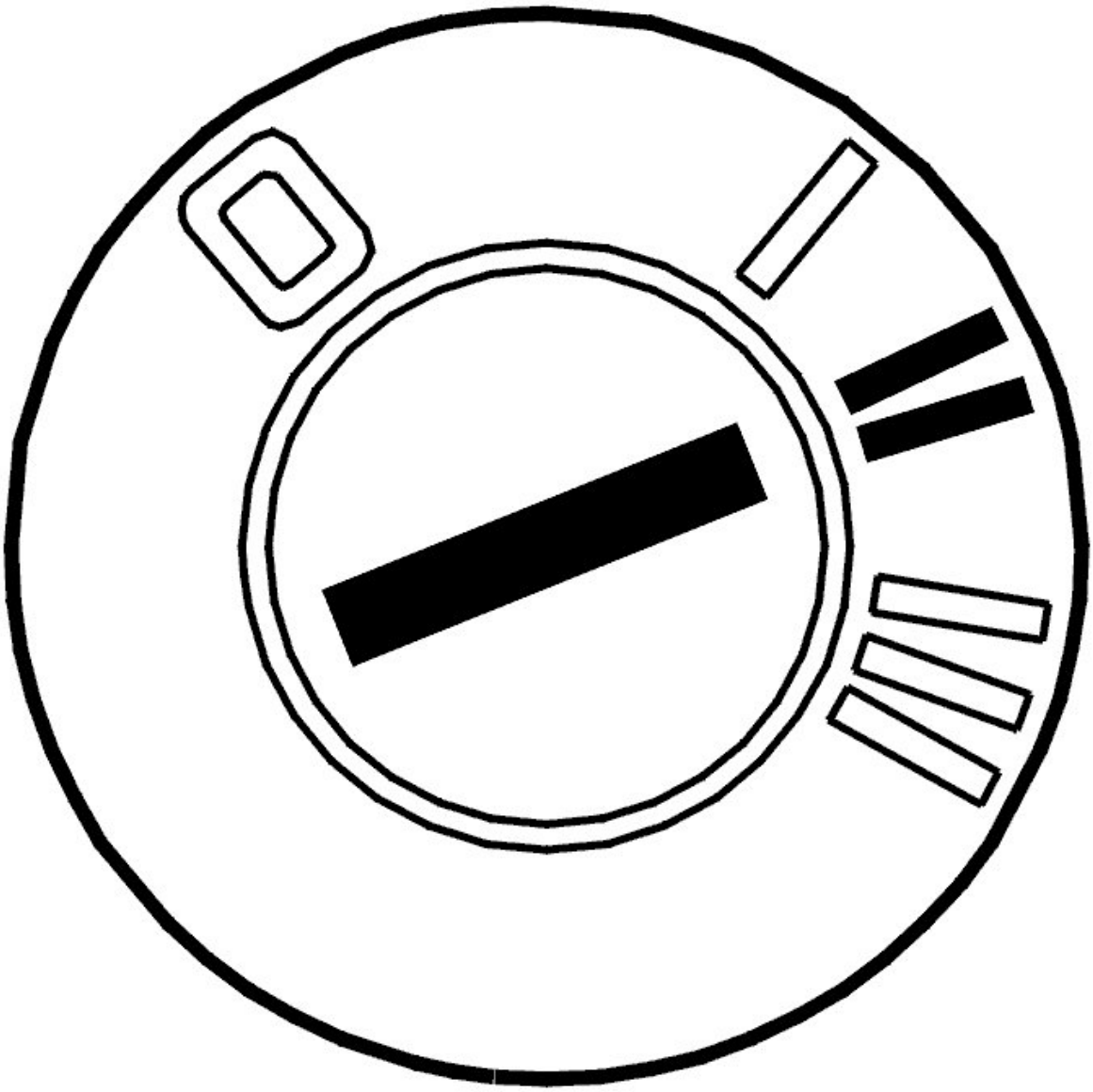
No - No Fault Found

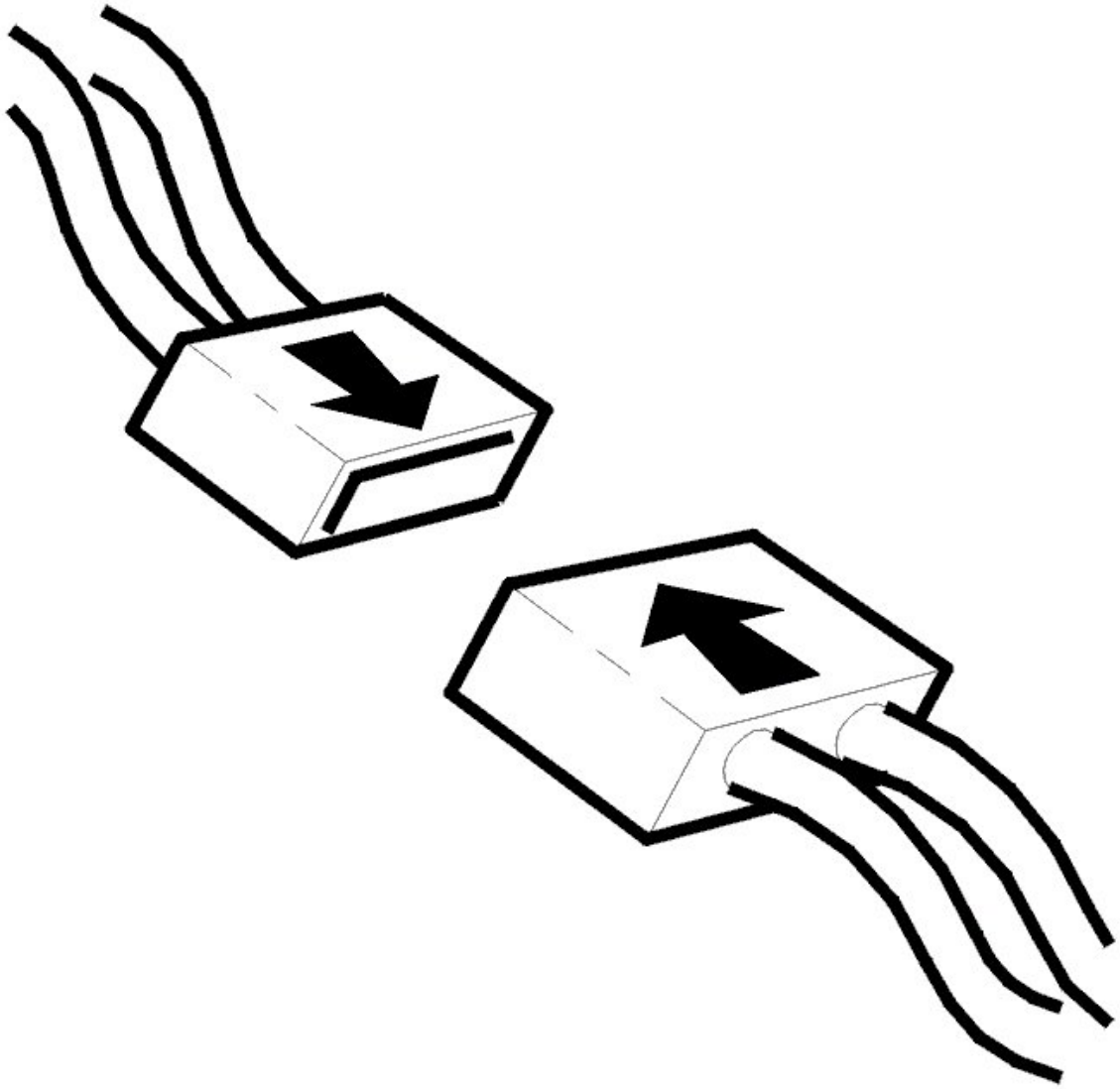
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.

Check the ABS warning lamp during the test drive.
If the fault has been remedied the lamp will go out when the speed exceeds 20 km/h.
If the warning lamp does not go out, return to the workshop and read off the diagnostic trouble codes (DTCs).

Does the ABS warning lamp go out and remain unlit?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

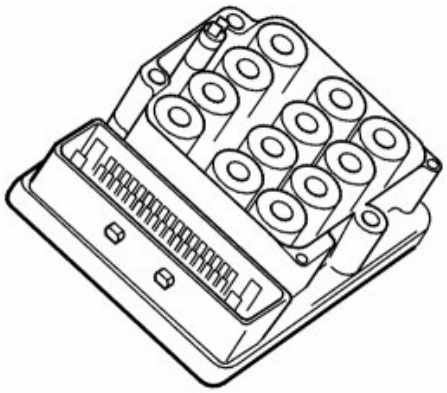
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wheel sensor and pulse wheel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0050 is stored if the brake control module (BCM) registers an internal fault, such as distortion or an open-circuit in the circuit for the hydraulic valves.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution is blocked
- Stability control is blocked
- Traction control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

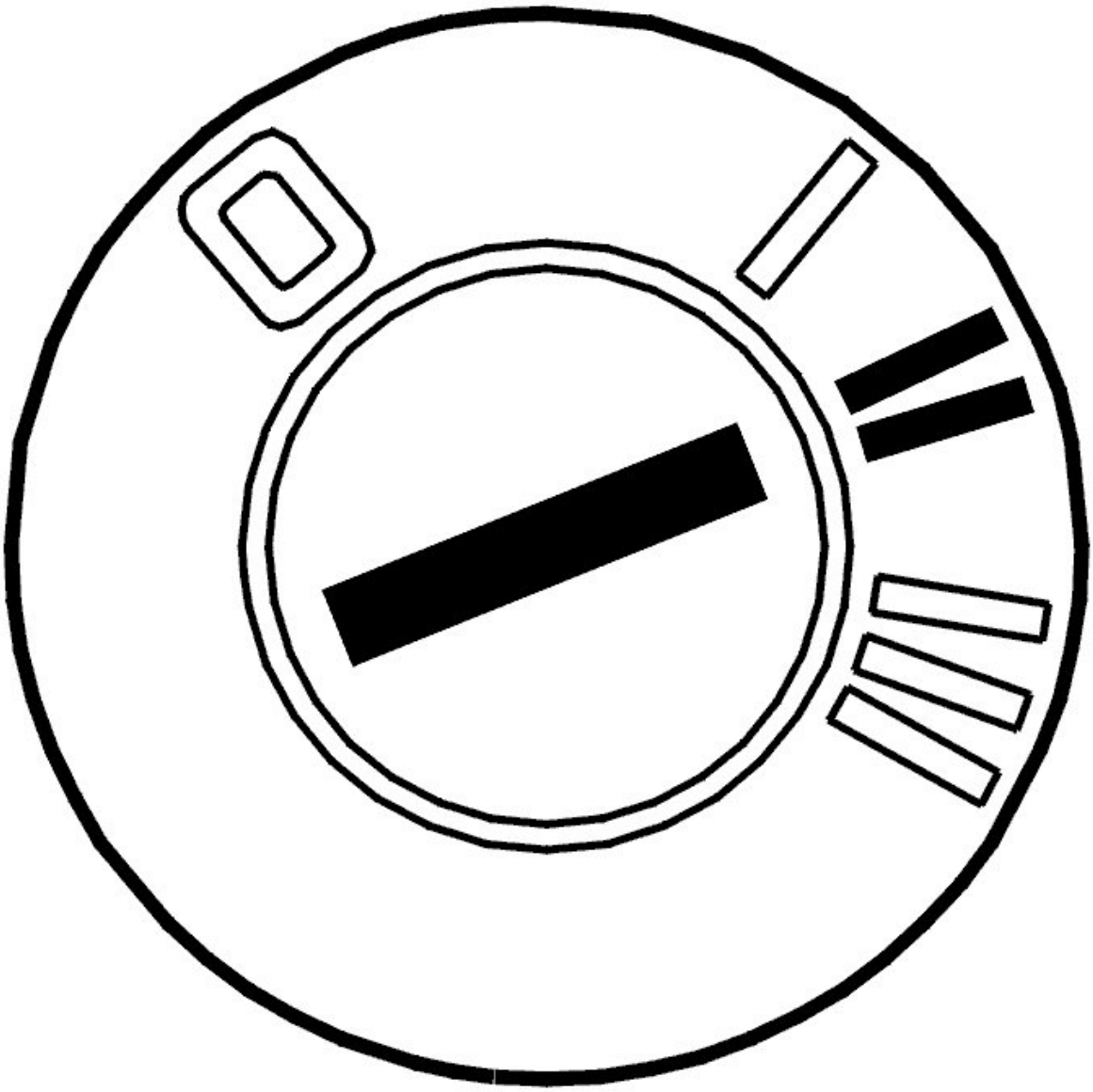
Possible source
- Interference that has affected control module calculations
- Internal fault in the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The warning lamp for brake circuit not functioning is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Internal Fault

Internal fault

Reading off diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

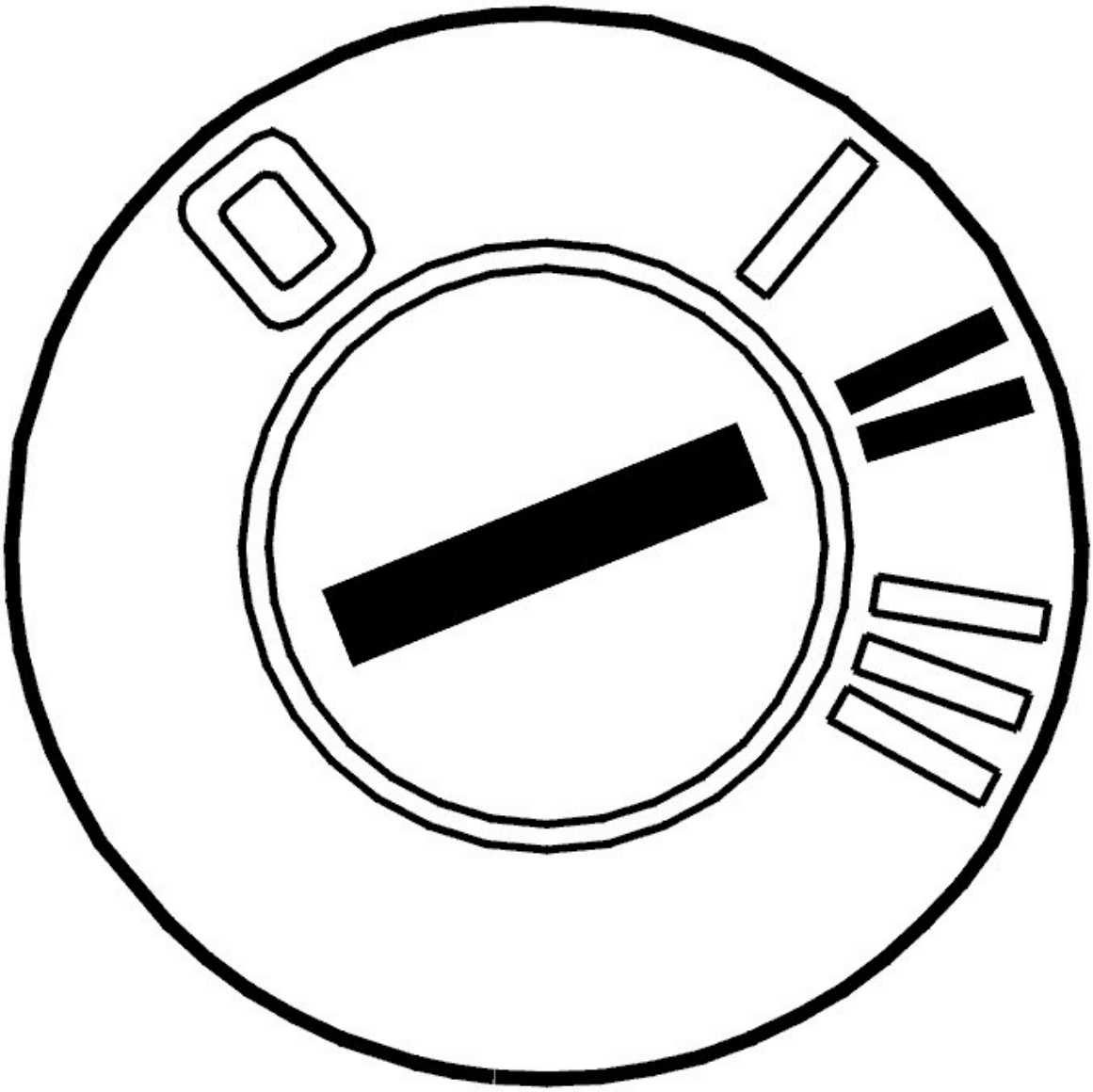
If any other codes than BCM-0050 are stored, these must be fault-traced first.

Were any diagnostic trouble codes (DTCs) other than BCM-0050 stored?

Yes - DONE

No - Erasing diagnostic trouble code (DTC)

Erasing diagnostic trouble code (DTC)

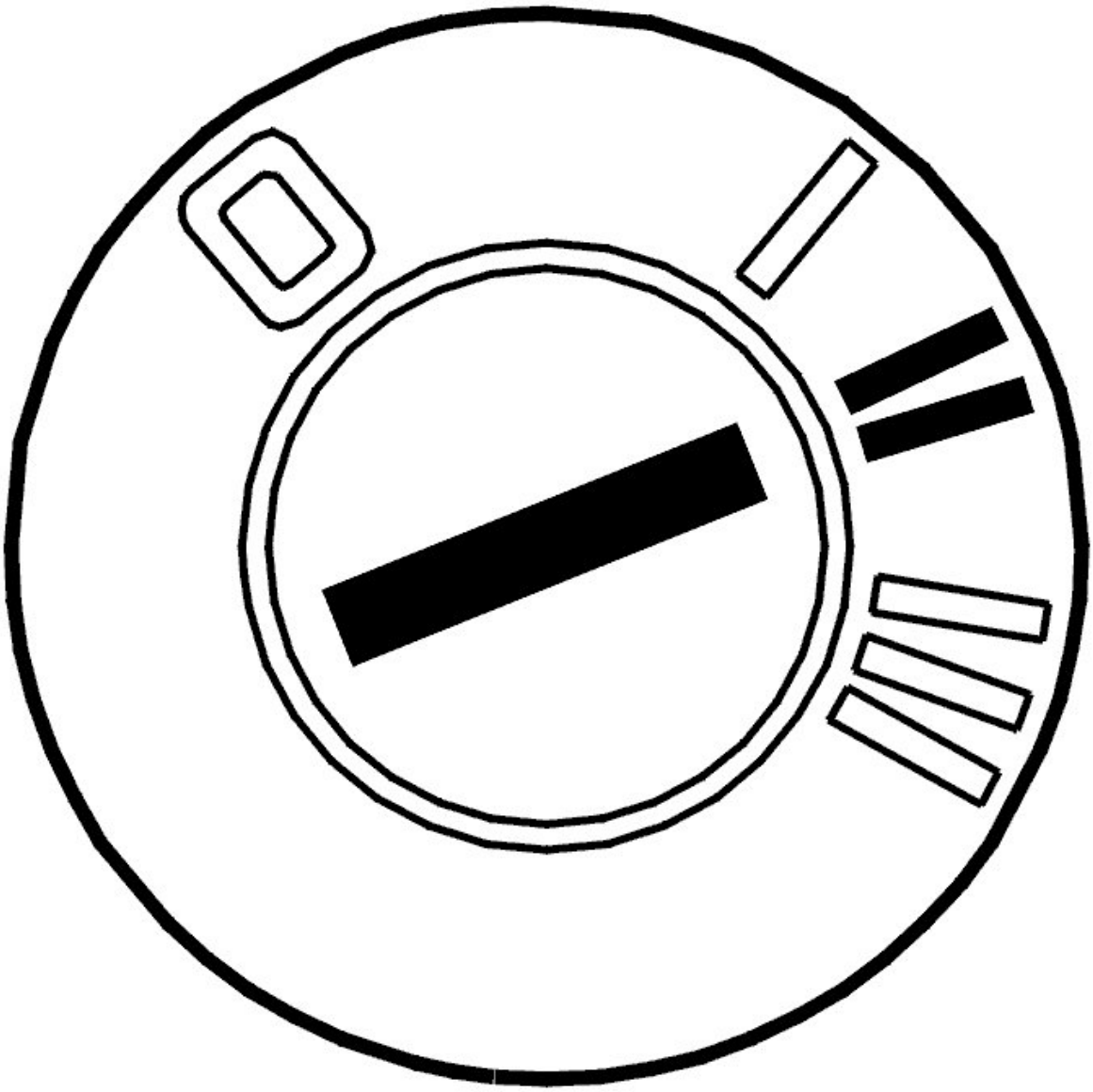


- Ignition on.

Erase the diagnostic trouble codes (DTC).

Continue - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition off
- Check the brake control module (BCM) connector. Check for contact resistance and oxidation
- Wait a couple of seconds
- Ignition on
- Read off diagnostic trouble codes (DTCs).

Replace the brake control module (BCM) if diagnostic trouble code (DTC) BCM-0050 is still stored as a permanent fault.

Other information

- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was diagnostic trouble code (DTC) BCM-0050 stored as a permanent fault?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

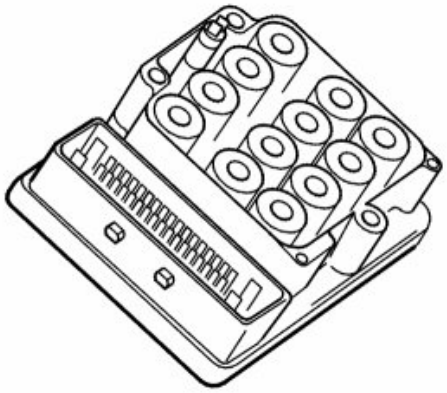
The control module has previously registered a fault but the fault is no longer active. Check that the wiring is not too close to a source of interference such as a carphone etc.

Yes - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0052 is stored if the brake control module (BCM) detects an internal fault.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

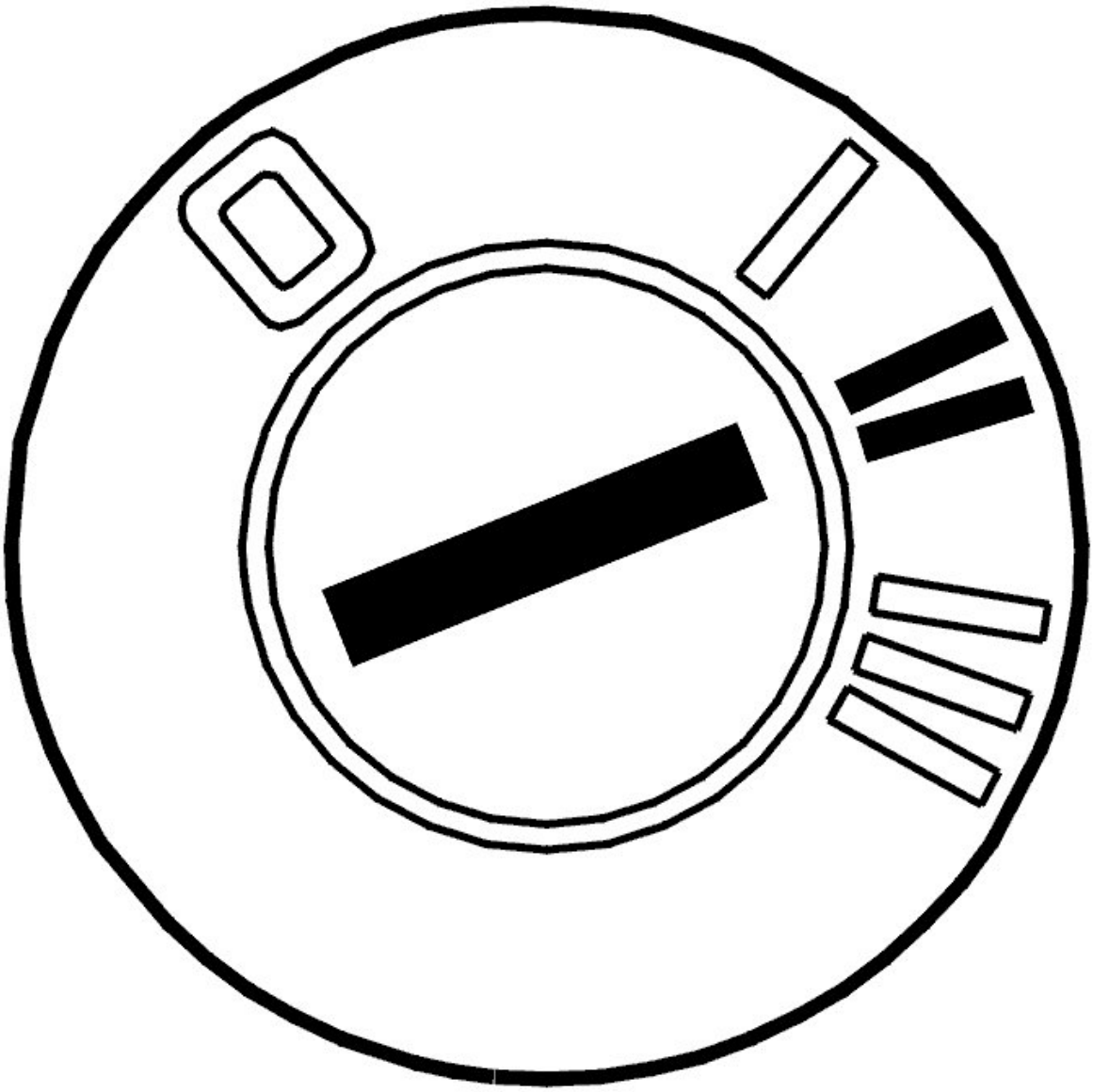
Possible source
- Interference that has affected control module calculations
- Internal fault in the control module.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The warning lamp for brake circuit not functioning is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Internal Fault

Internal fault

Reading off diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

If any other codes than BCM-0052 are stored, these must be fault-traced first.

Were any diagnostic trouble codes (DTCs) other than BCM-0052 stored?

Yes - DONE

No - Replacing the control module and programming

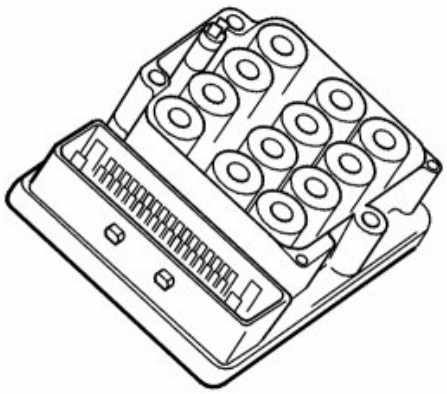
Replacing the control module and programming

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) BCM-0057 is stored if the brake control module (BCM) registers that the battery voltage is less than 9.5 V and the speed of the quickest rotating wheel is over 20 km/h.
The diagnostic trouble code (DTC) can be diagnosed when the speed is above 20 km/h and too low voltage has been detected for longer than approximately 0.5 ms.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution is blocked if the voltage is below 8 V
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals
- Battery voltage too low
- Fault in the charging system
- Open-circuit or short-circuit to ground in the cable for the power supply
- Defective fuse in the circuit
- Interference in the wiring
- Defective control module.

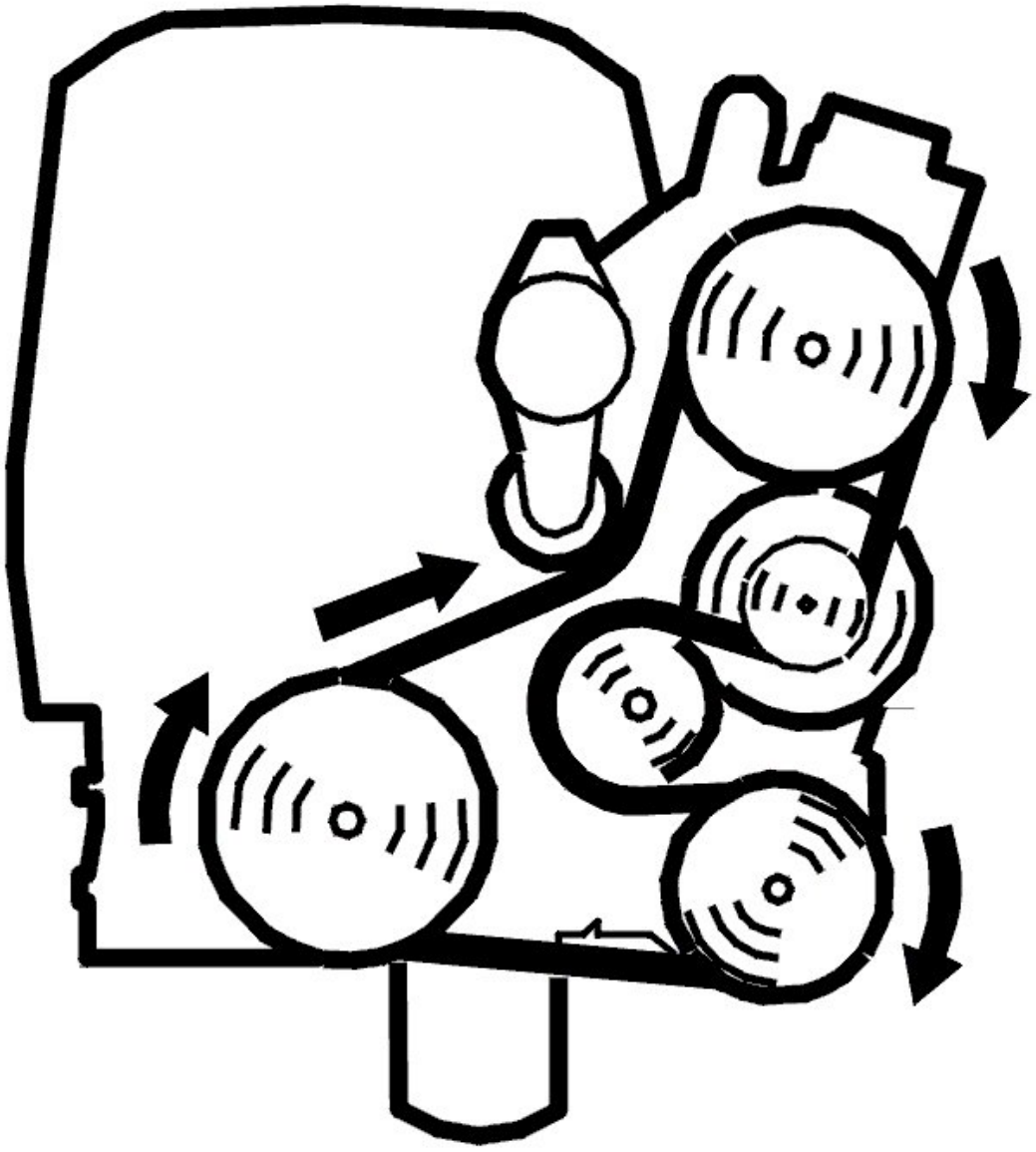
Fault symptom[s]
- General warning lamp lit

- The ABS warning lamp is lit
- The warning lamp for brake circuit not functioning is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Voltage Too Low

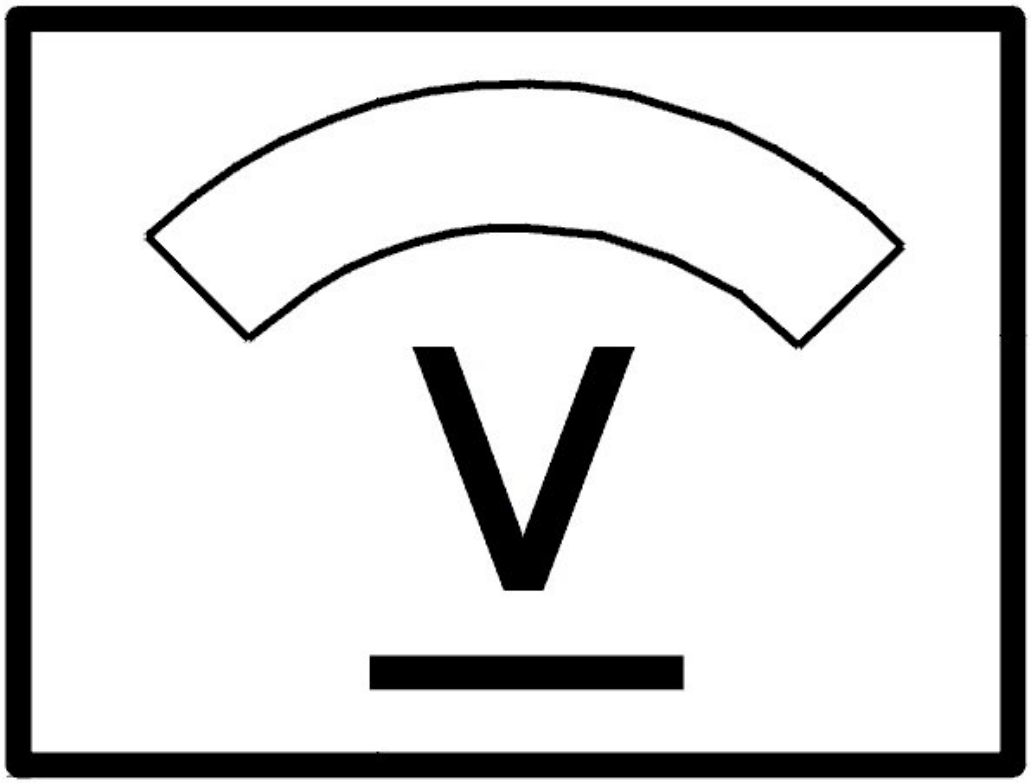
Voltage too low

Checking the battery voltage



- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

The voltage must be normal system voltage.
If the voltage is too low, check the charging system according to the relevant information.

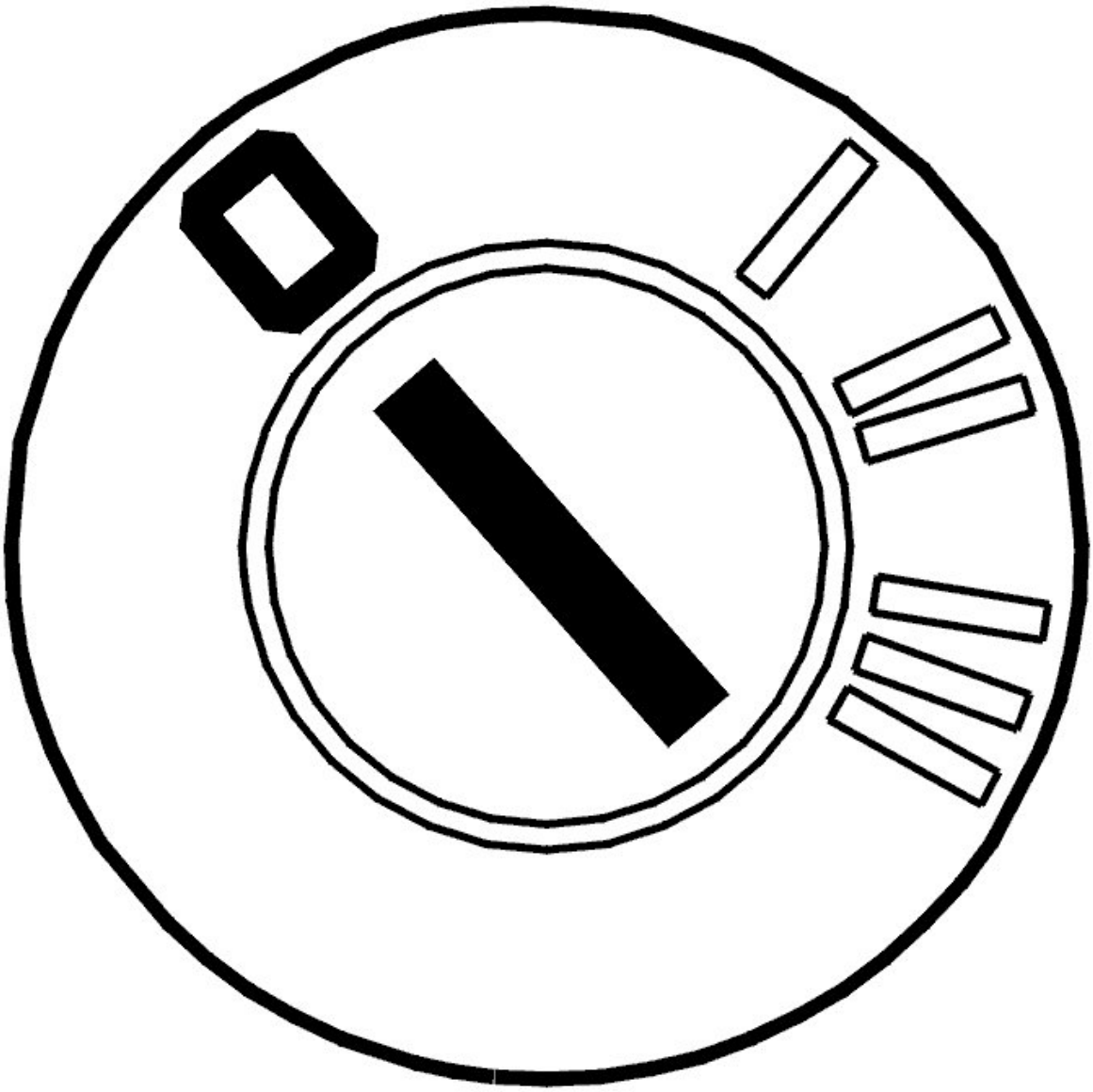


Was the voltage too low?

Yes - DONE

No - Checking the power supply

Checking the power supply



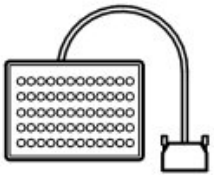
- Ignition off.

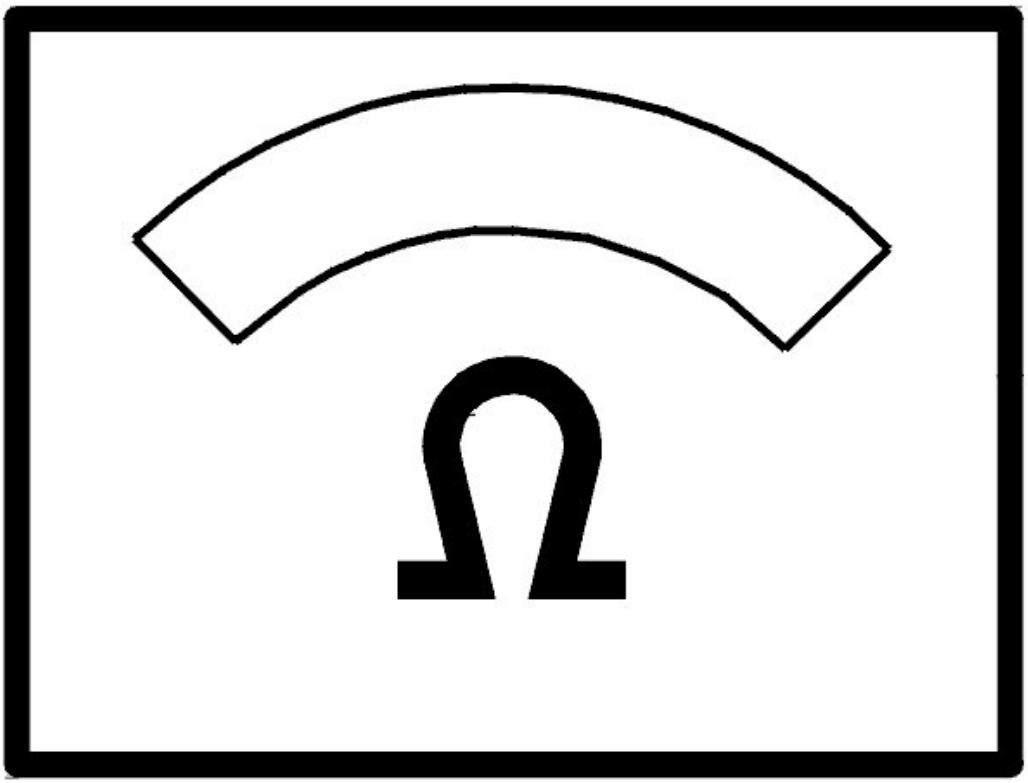
Check the brake control module connector. Check for contact resistance and oxidation.
Check the cable for power supply between the fuse for the brake control module in the integrated relay/fusebox in the engine compartment and terminal #A32 (#32) in the connector for the brake control module. Check for a short-circuit to ground.

Hint: With the ignition on and the voltmeter connected between terminals #A32 (#32) and #A47 (#A47) on the breakout box, the voltmeter should read battery voltage.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For information about signals, see Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification and Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram.



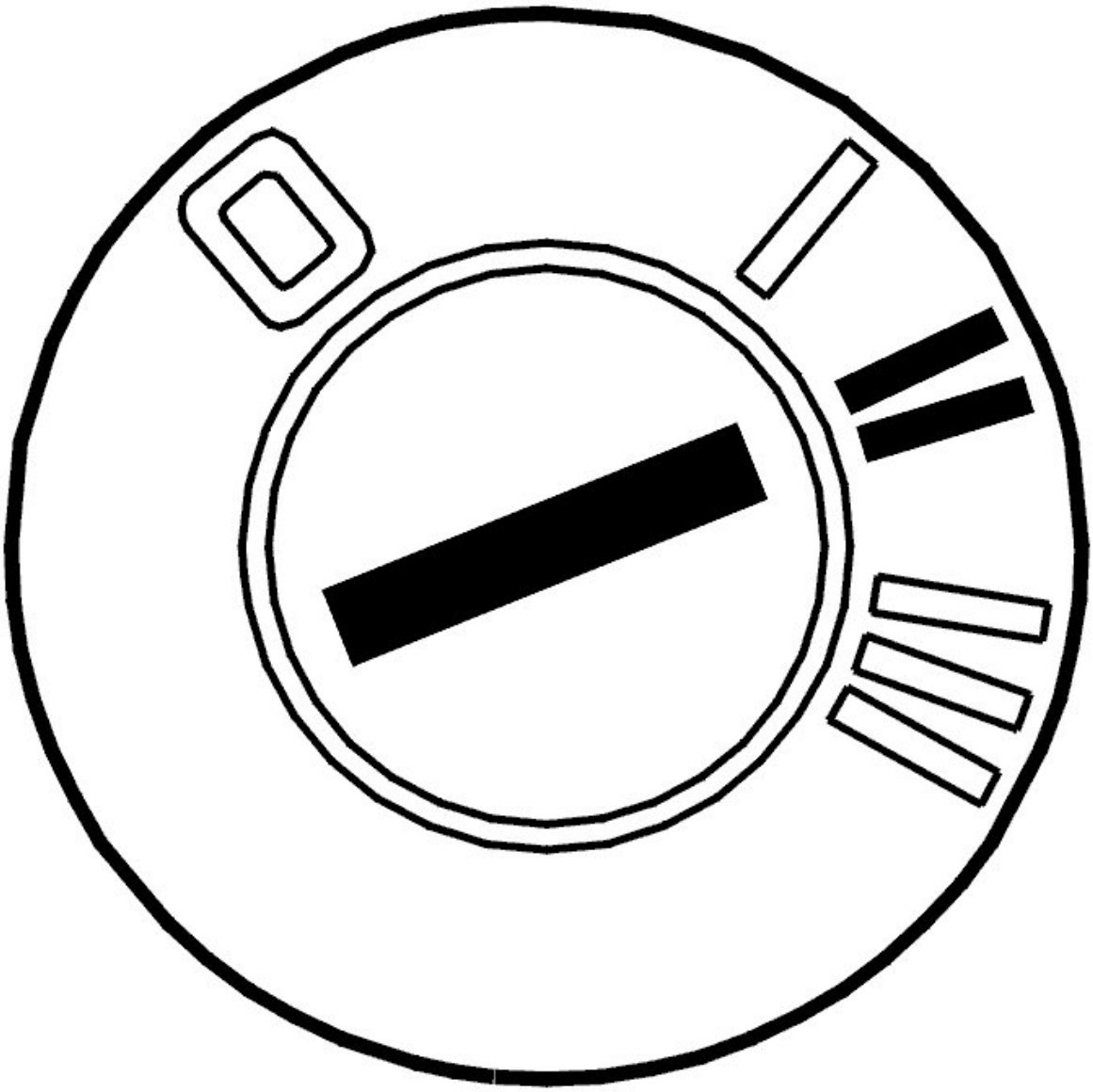


Was a fault detected?

Yes - Verification

No - Checking the supply voltage to the system

Checking the supply voltage to the system



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply to the brake control module.

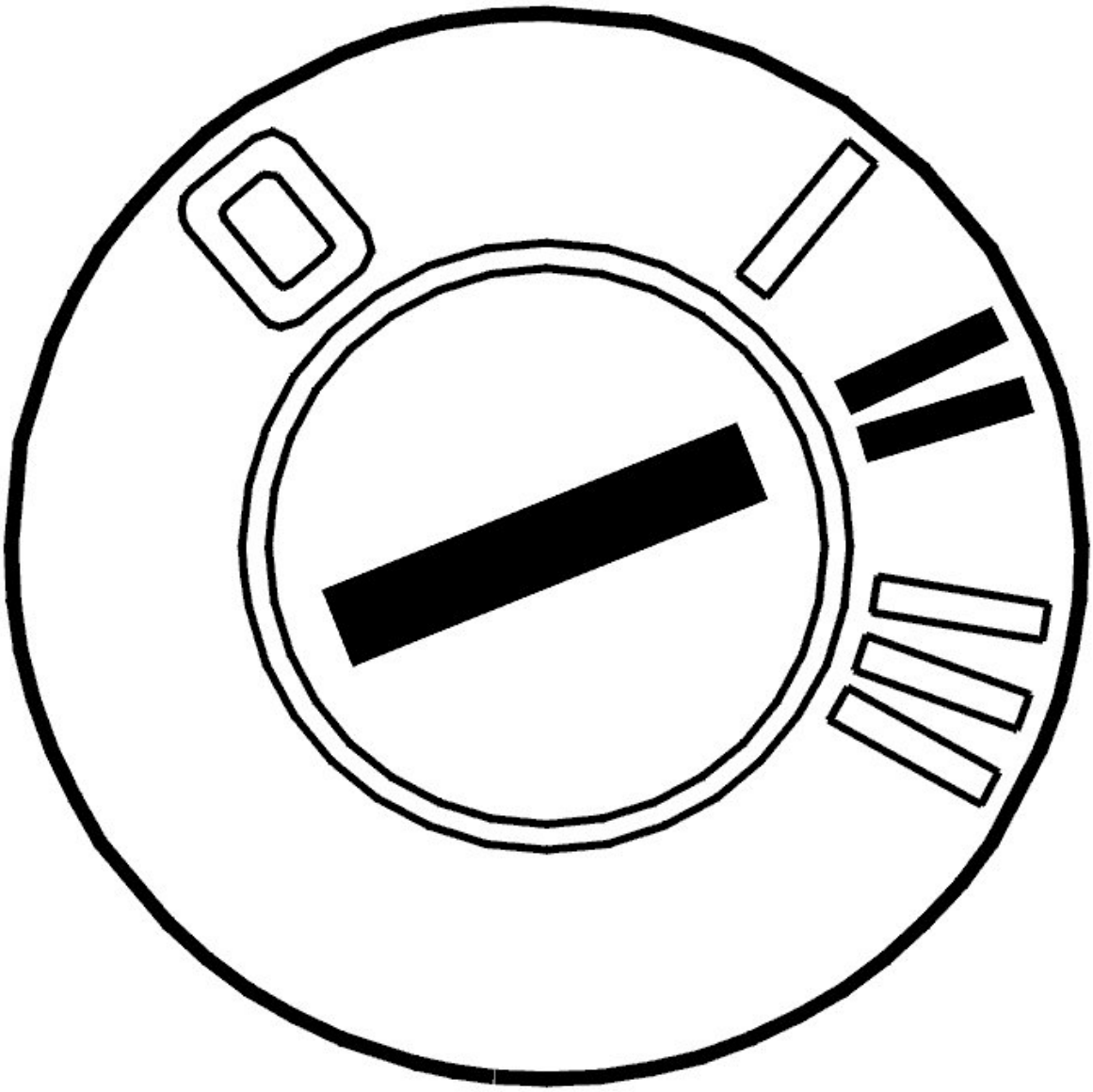
The voltage must be normal system voltage.

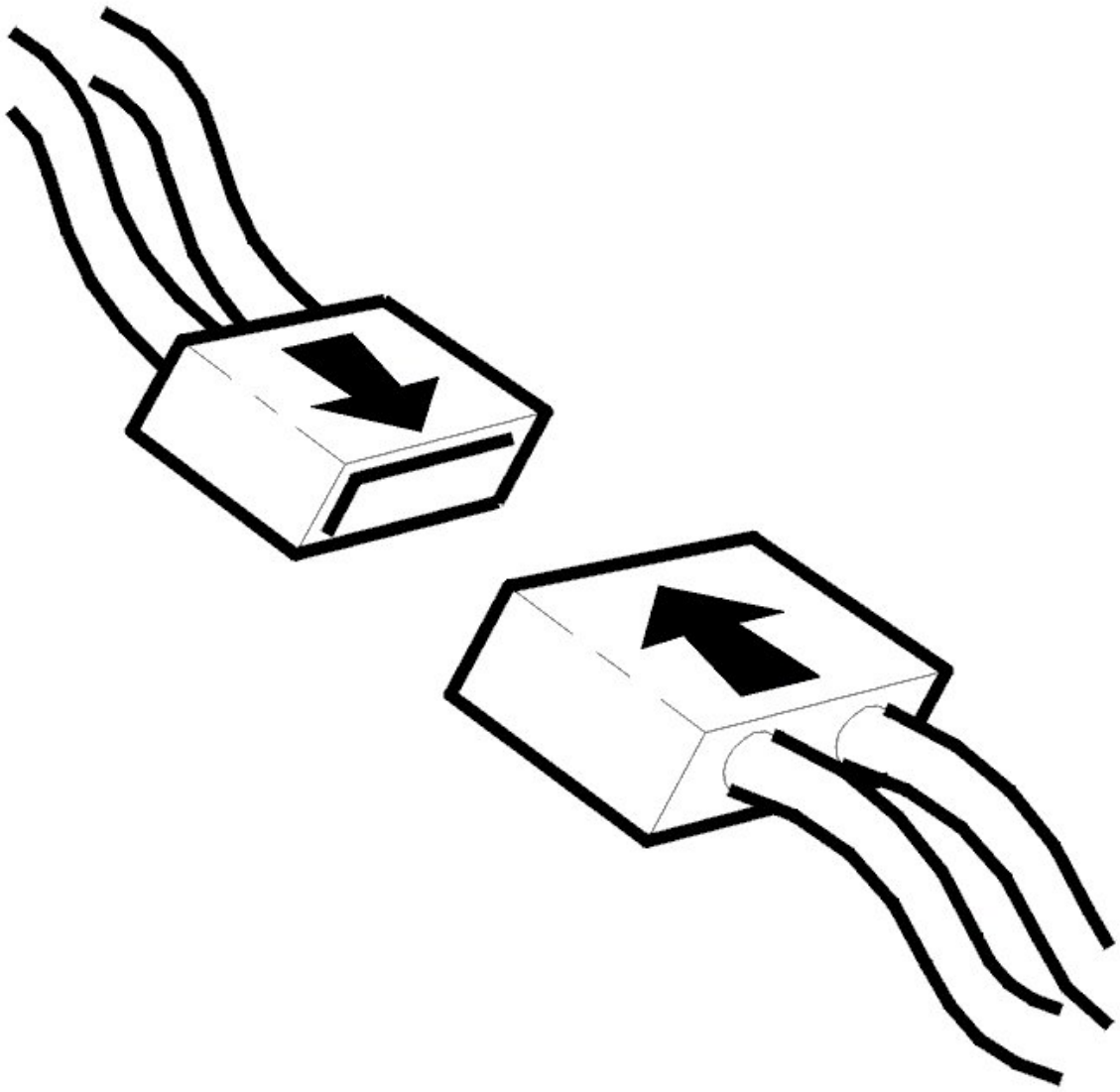
OK - Fault Found

Not OK - Fault-tracing information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage to the brake control module.

The voltage should be battery voltage.

OK - Fault Found

Not OK - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the battery voltage

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) BCM-0058 is stored if the control module registers that the battery voltage is above 18 V.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The ABS is blocked
- Electronic Brake force Distribution is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

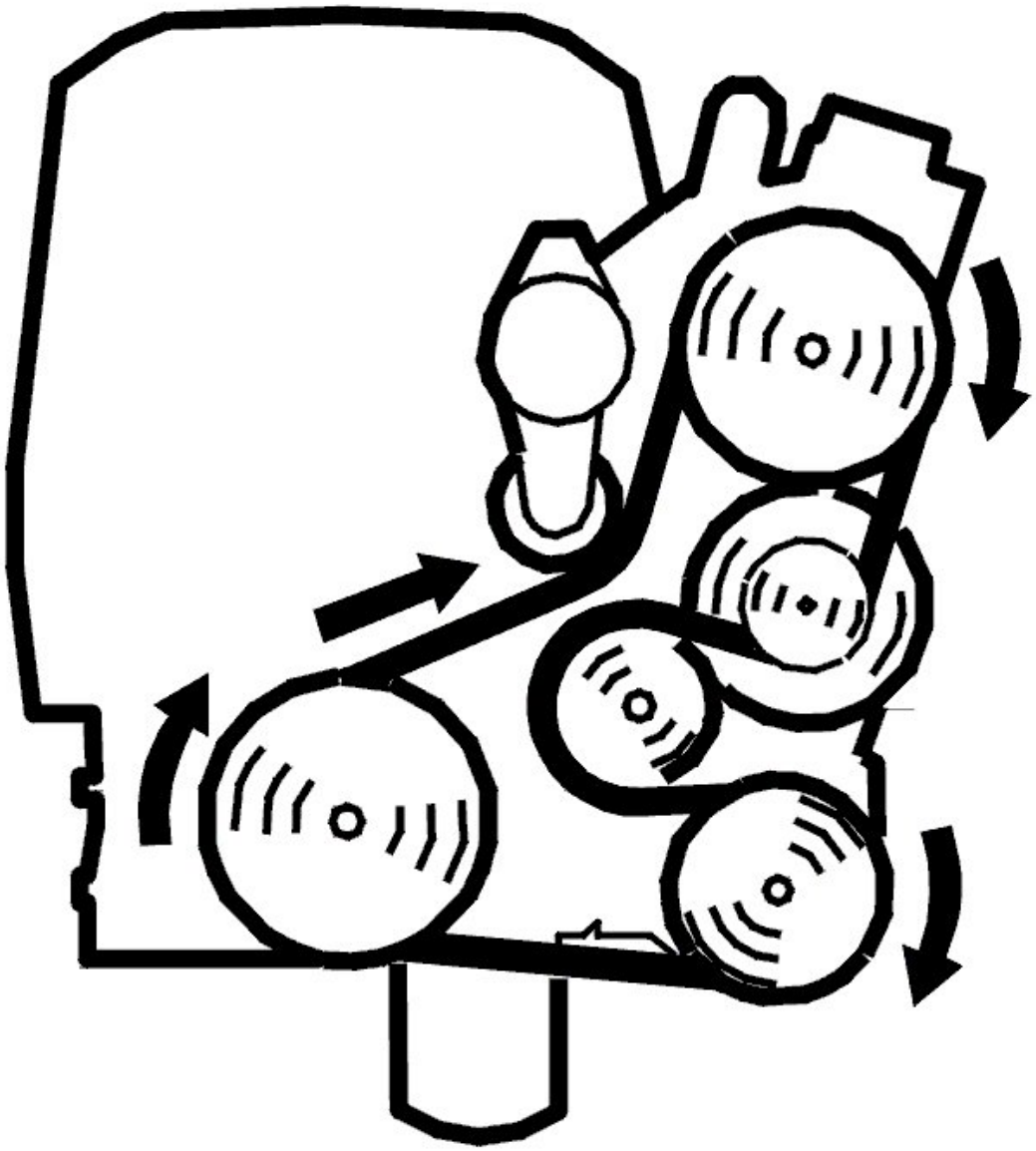
Possible source
- Fault in the charging system.

Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The warning lamp for brake circuit not functioning is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Voltage Too High

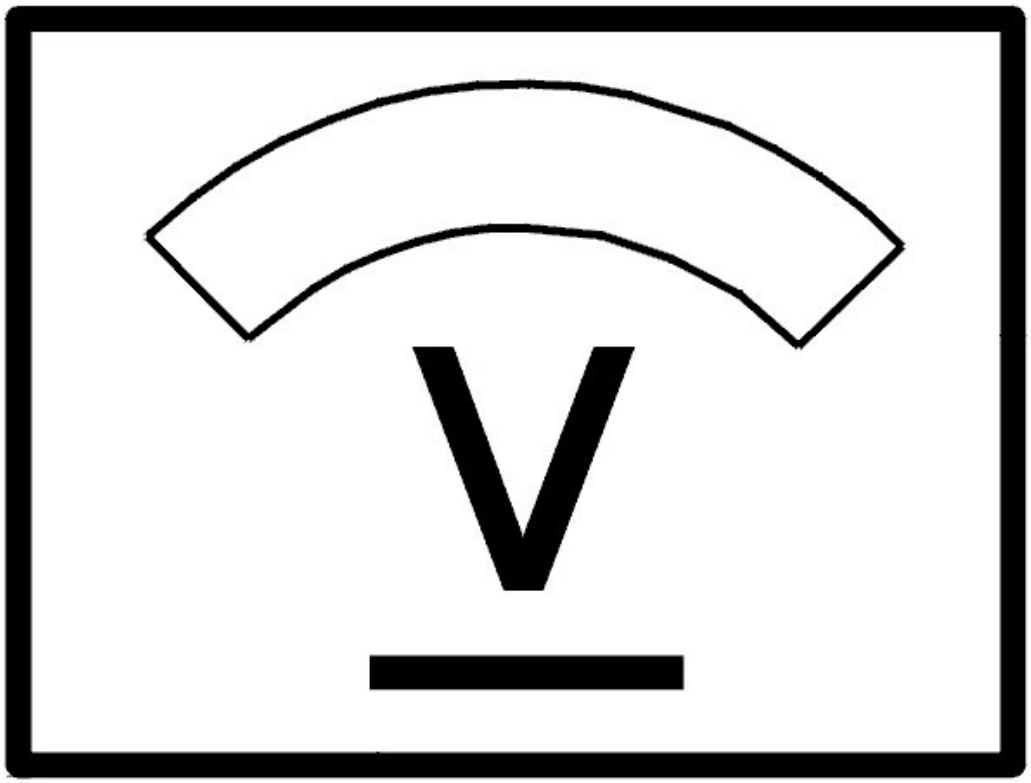
Voltage too high

Checking the battery voltage



- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

The voltage must be normal system voltage.
If the voltage is too high, check the charging system according to the relevant information.



Was the voltage too high?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

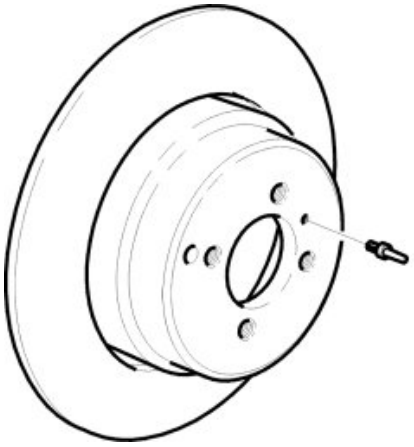
The fault-tracing indicates that the control module has previously registered a fault but that the fault is no longer active.

Continue - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



In cars with traction control (STC/DSTC/TRACS), the brake control module registers how much the brakes are used and then calculates the temperature of all brake discs. Diagnostic trouble code (DTC) BCM-0061 is stored if the calculated temperature exceeds 450°C.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- Traction control is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Excessive anti-spin control
- Brakes applied too long (brakes have been used so much that brake disc temperature has become too high).

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- Anti-spin does not function.

Note! The anti-spin function is deactivated until the temperature of the brake discs is below 300°C.

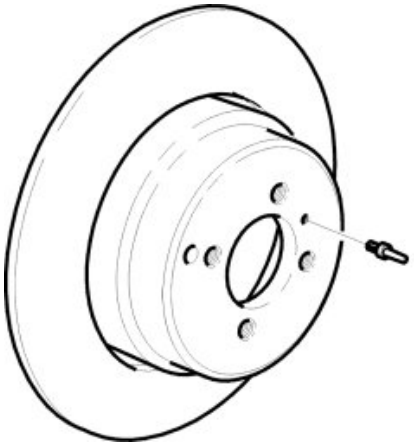
Temperature Too High

Temperature too high

Visual inspection of brakes
- Remove the front wheels.

Check the brakes for the front wheel visually.
Check there is no overheating damage to brake caliper, brake pads or brake disc. Replace damaged components.
Tell the customer why the anti-spin function was temporarily blocked and why the ABS warning lamp was lit.
Remedy as necessary.

Other information
- To remove or replace brake calipers, see Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- To remove or replace brake pads, see Brake pads front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Pad/Service and Repair
- To remove or replace brake discs, see Brake disc front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Rotor/Disc/Service and Repair.

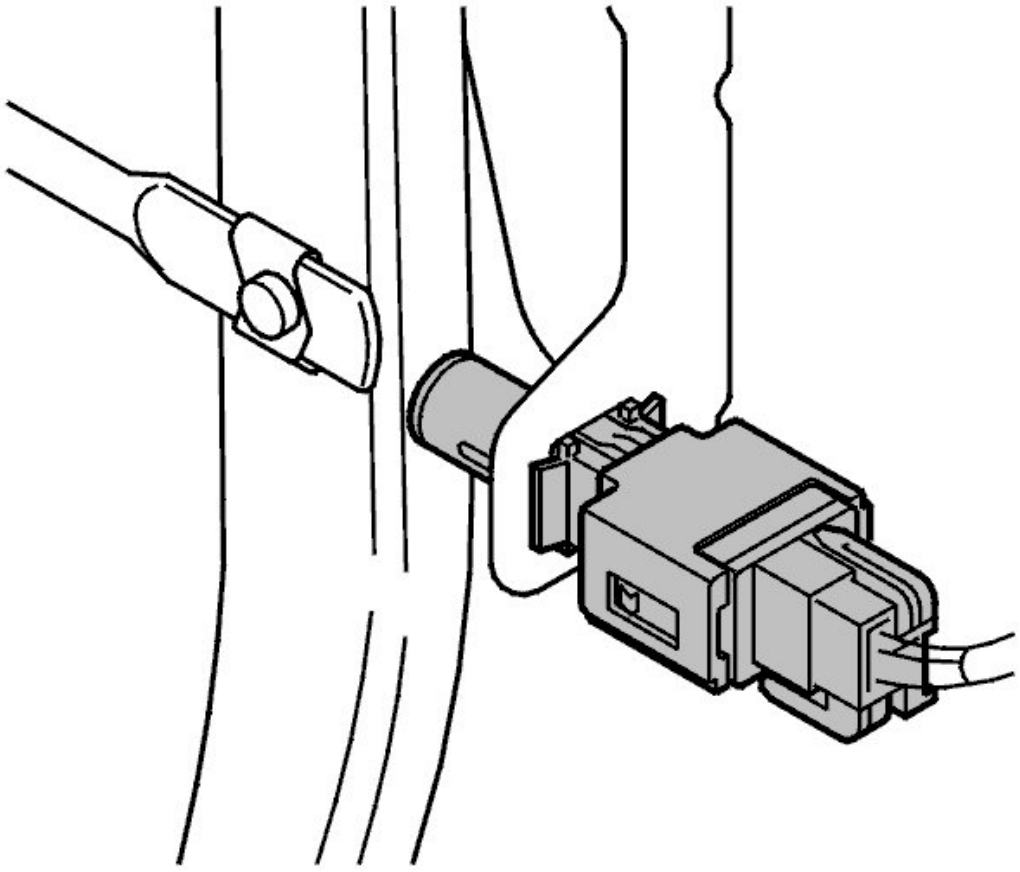


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! Only applies to four wheel drive cars with TRACS (traction control system).

The brake control module compares the signals with each other in order to detect a faulty signal from the stop lamp switch or the pedal position sensor. Diagnostic trouble code (DTC) BCM-0065 is stored if the control module registers a faulty signal from the stop lamp switch or the pedal position sensor.

Substitute value

- Traction control is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Short-circuit to ground or supply voltage in the signal cable for the stop lamp switch

- Defective stop lamp switch
- Defective pedal position sensor.

Fault symptom[s]
- Anti-spin does not function.

Faulty Signal

Faulty signal

Checking diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM)

If there are diagnostic trouble codes (DTCs) for the brake pedal position sensor or stop lamp switch stored in the engine control module (ECM) or central electronic module (CEM), these must be fault traced first.

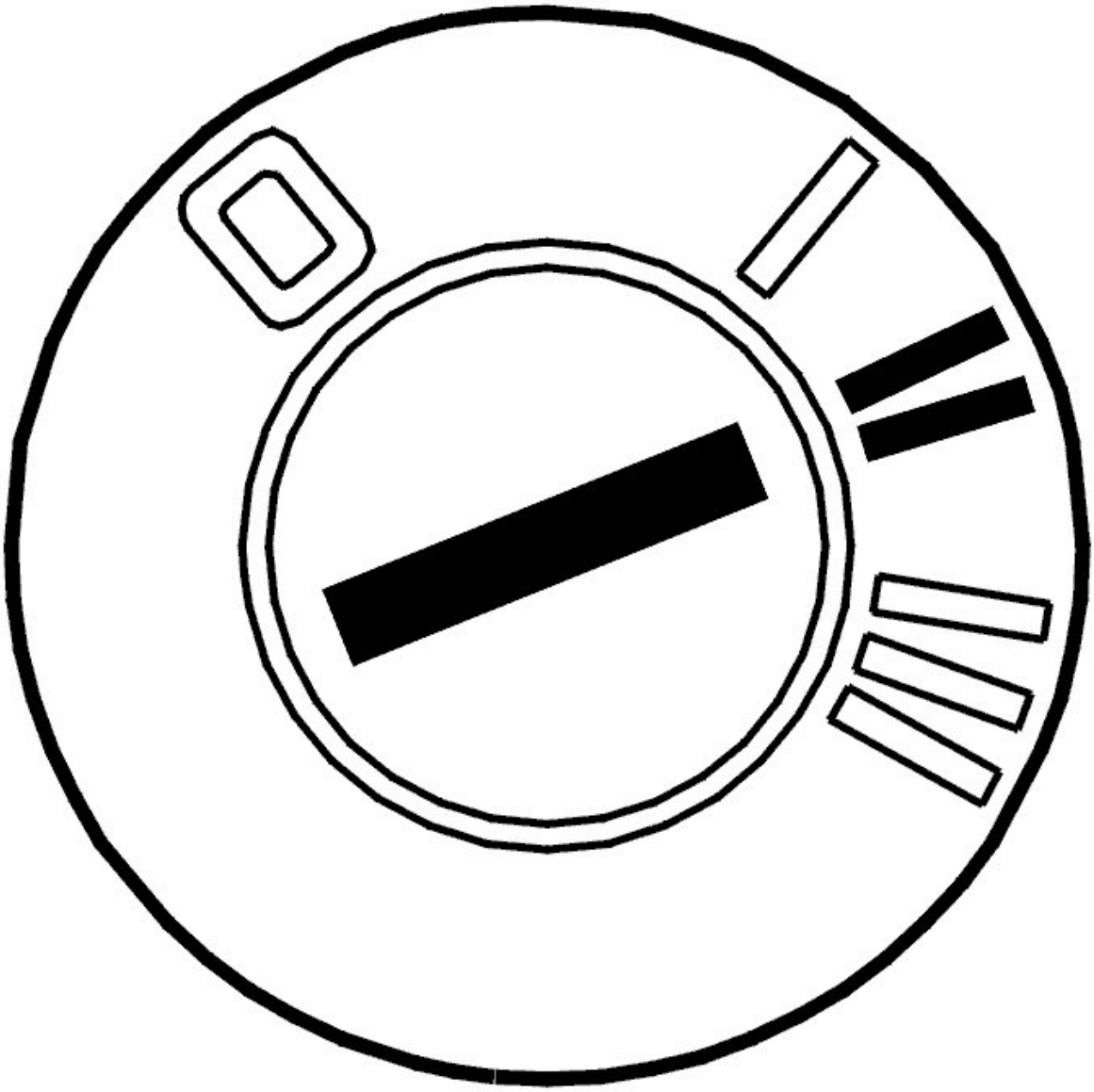
Were diagnostic trouble codes (DTCs) stored for the pedal position sensor or the stop lamp switch?

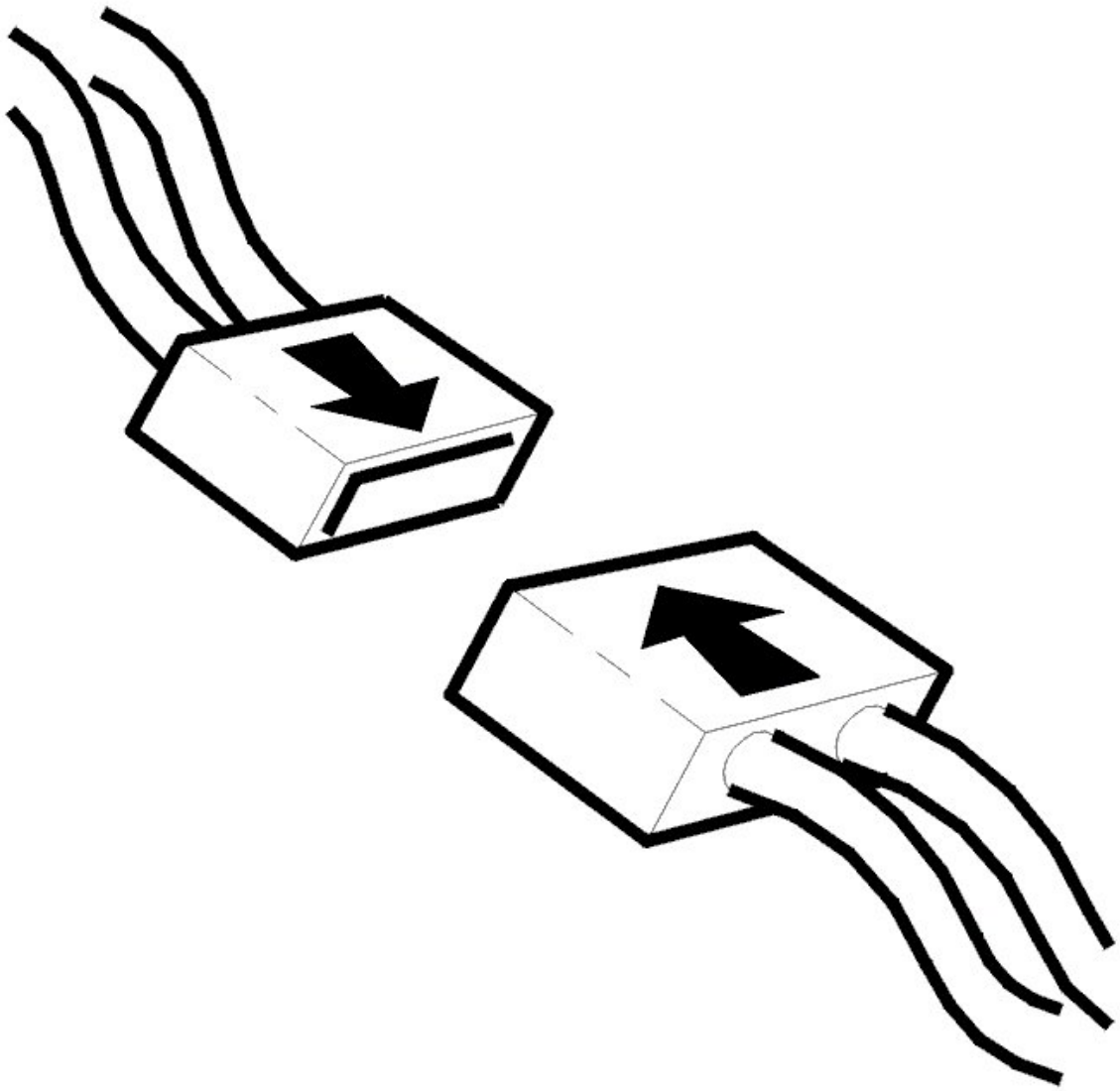
Yes - DONE

No - Checking the control module and sensor connectors

Checking the control module and sensor connectors

Hint: The cause of the diagnostic trouble code (DTC) may be in the circuit for the stop lamp switch or for the pedal position sensor.





- Ignition off
- Check the connectors for the brake control module (BCM), the stop lamp switch and the pedal position sensor. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the status of the stop lamp switch and the position of the pedal position sensor.

Depress and release the brake pedal. The value must change between OFF and ON and the position of the pedal position sensor must be updated.

Other information

- To disconnect the connector for the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access the stop lamp switch, see Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- To access the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select an option:

1. The value for the stop lamp switch does not change
2. The value for the pedal position sensor is not updated
3. These values are OK.

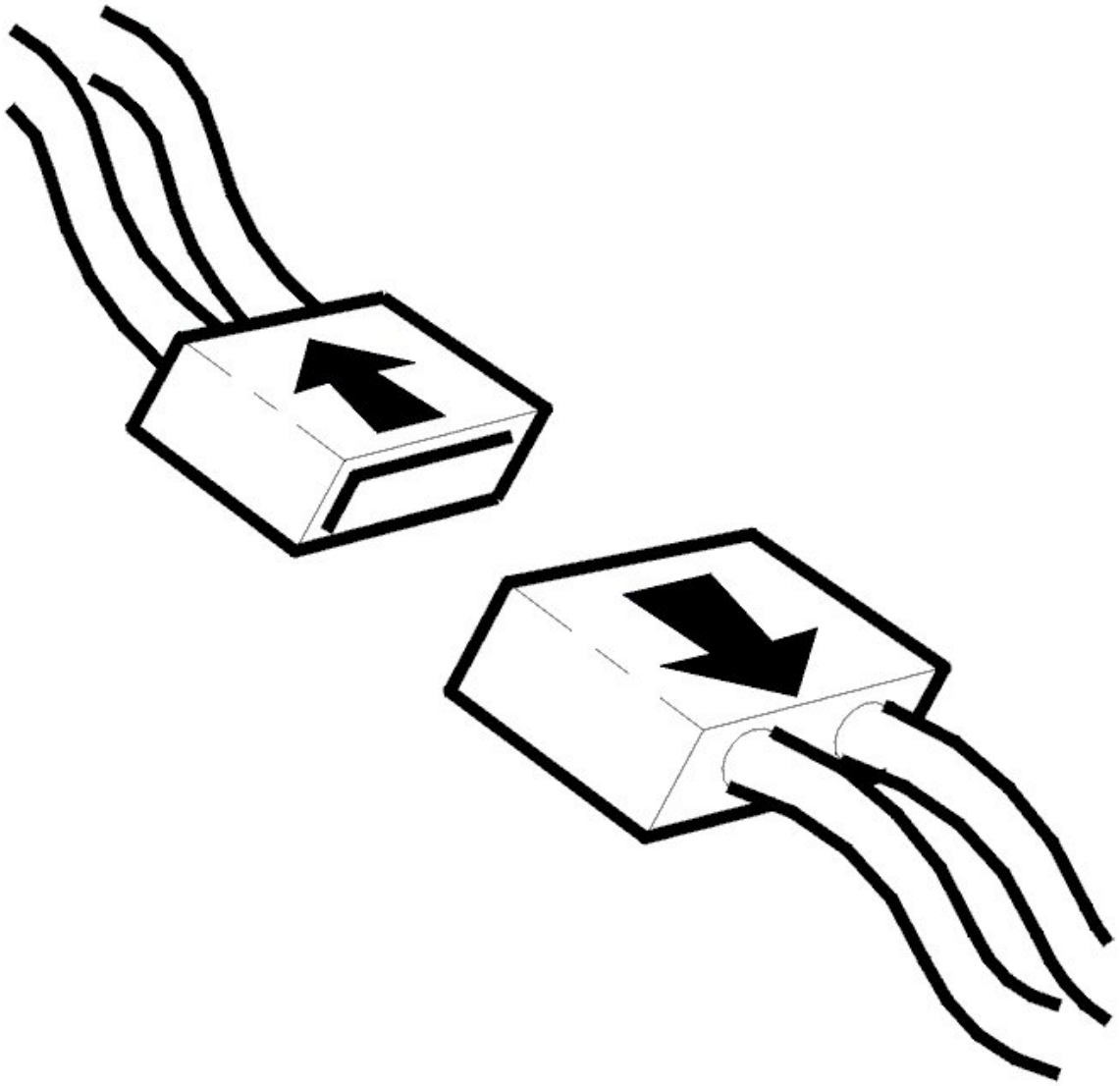
Does the value change?

1 - Checking the fuse, wiring and sensors

2 - Signal outside its permitted range

3 - **No Fault Found**

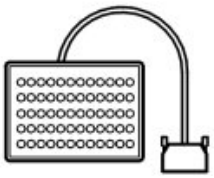
Checking the fuse, wiring and sensors



Check that the fuse for the stop lamp circuit is intact. If the fuse is blown, first check the circuit for the stop lamp switch before replacing the fuse. Check for a short-circuit to supply.
If the fuse is intact, check the circuit for the stop lamp switch. Check for an open-circuit and a short-circuit to ground.
Remedy as necessary.

Other information

- To connect the breakout box to the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To connect the breakout box to the Engine control module (ECM), see: Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- See Connecting breakout box for Central Electronic Module (CEM). Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- To replace the stop lamp switch, see Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



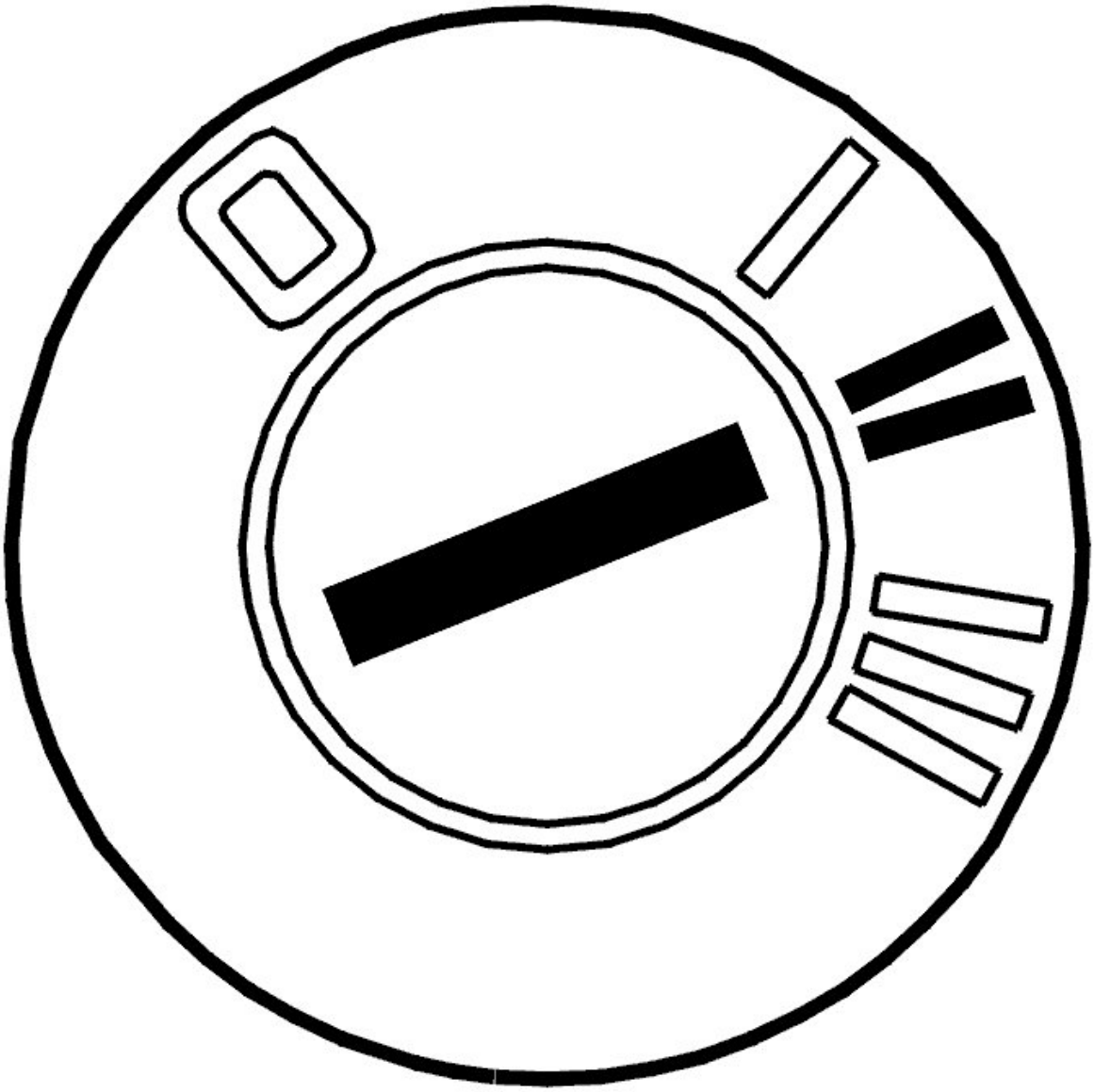
Was a fault detected?

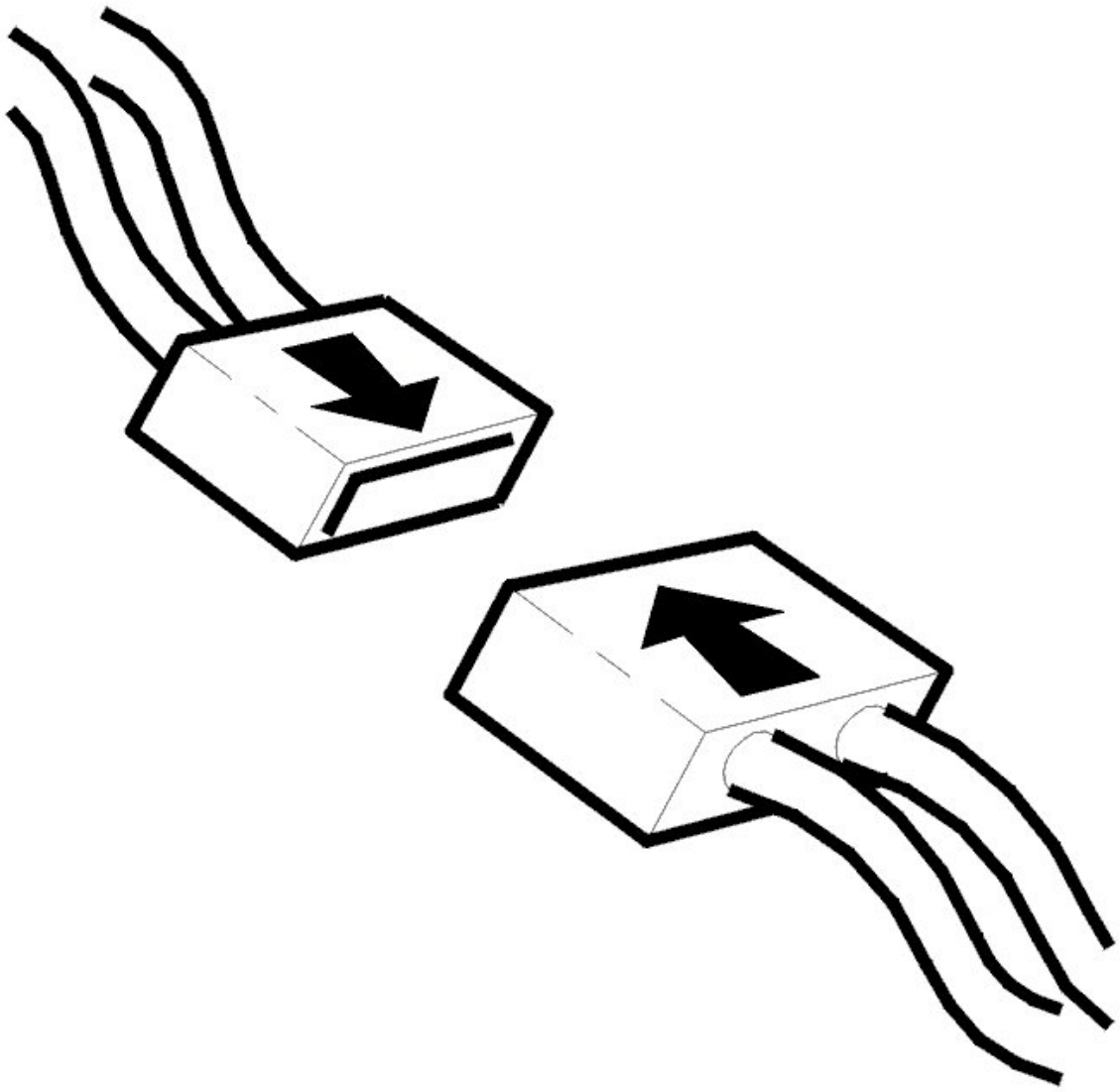
Yes - Verification

No - No Fault Found

Signal outside its permitted range

Checking the connectors



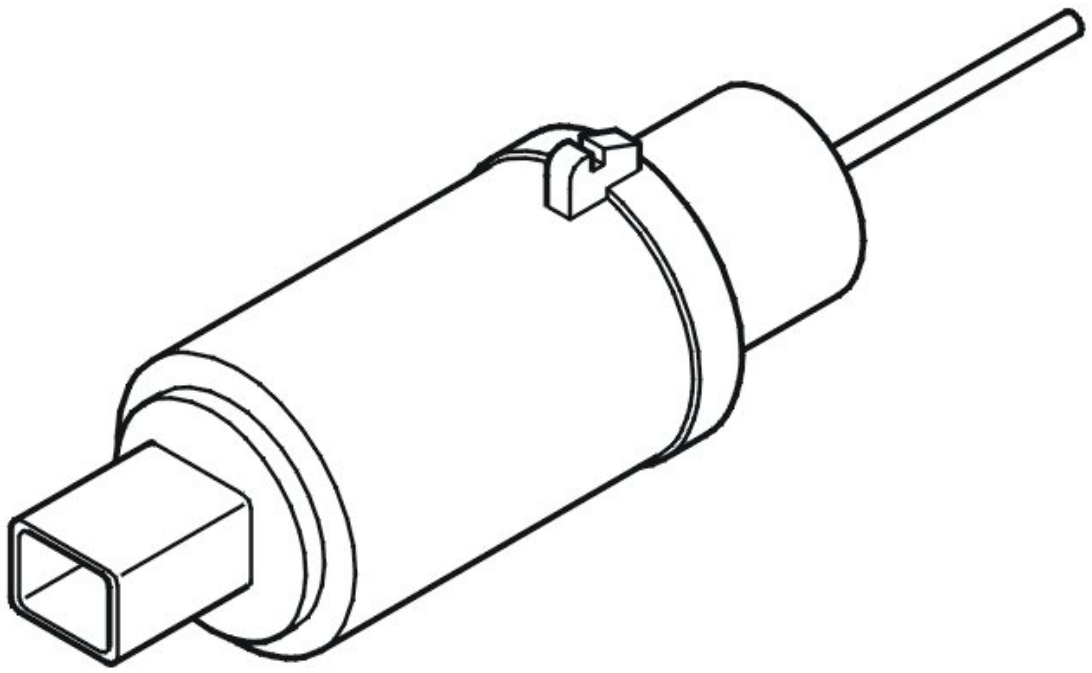


- Ignition off
- Check the brake control module (BCM) and pedal position sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Connect the breakout box
- Ignition on
- Read off the signal from the pedal position sensor.

Depress the brake pedal. Check that the pedal signal is updated.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Was the signal updated?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors

Check the wiring between the pedal position sensor:
- terminal #1 and control module terminal #7 (#A7)
- terminal #2 and control module terminal #5 (#A5)
- terminal #3 and control module terminal #3 (#A3).

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.

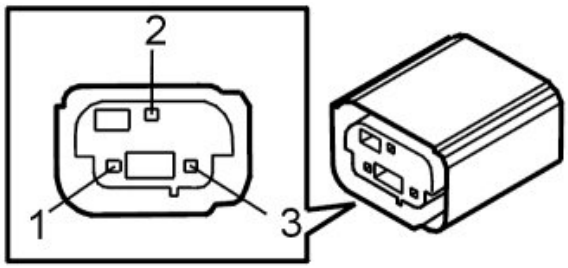
Hint: Connect an ohmmeter between terminals #2 and #3 on the pedal position sensor connector.
The resistance must be approximately 0.5 kohms with the brake pedal unaffected and approximately 2.5-3 kohms when the brake pedal is depressed.

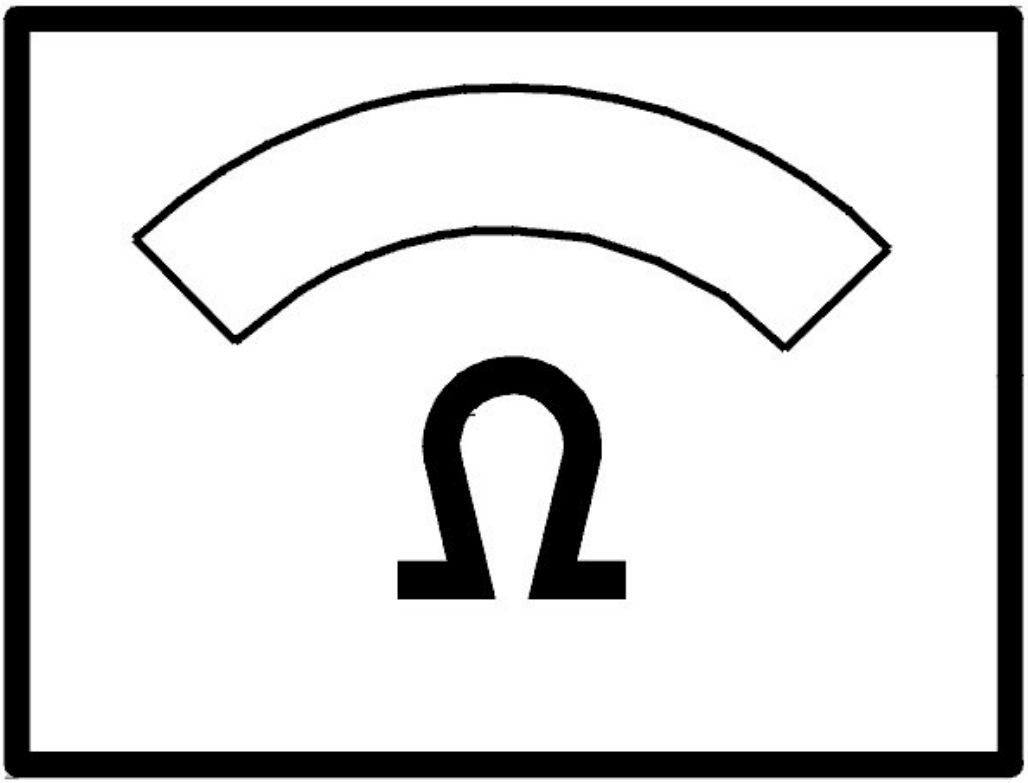
Connect an ohmmeter between terminals #1 and #3 on the pedal position sensor connector.
The resistance must be approximately 2.5-3 kohms with the brake pedal unaffected and approximately 0.5 kohms with depressed brake pedal.

Replace the pedal position sensor if the resistance is incorrect.

Replace the pedal position sensor if no fault is found.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

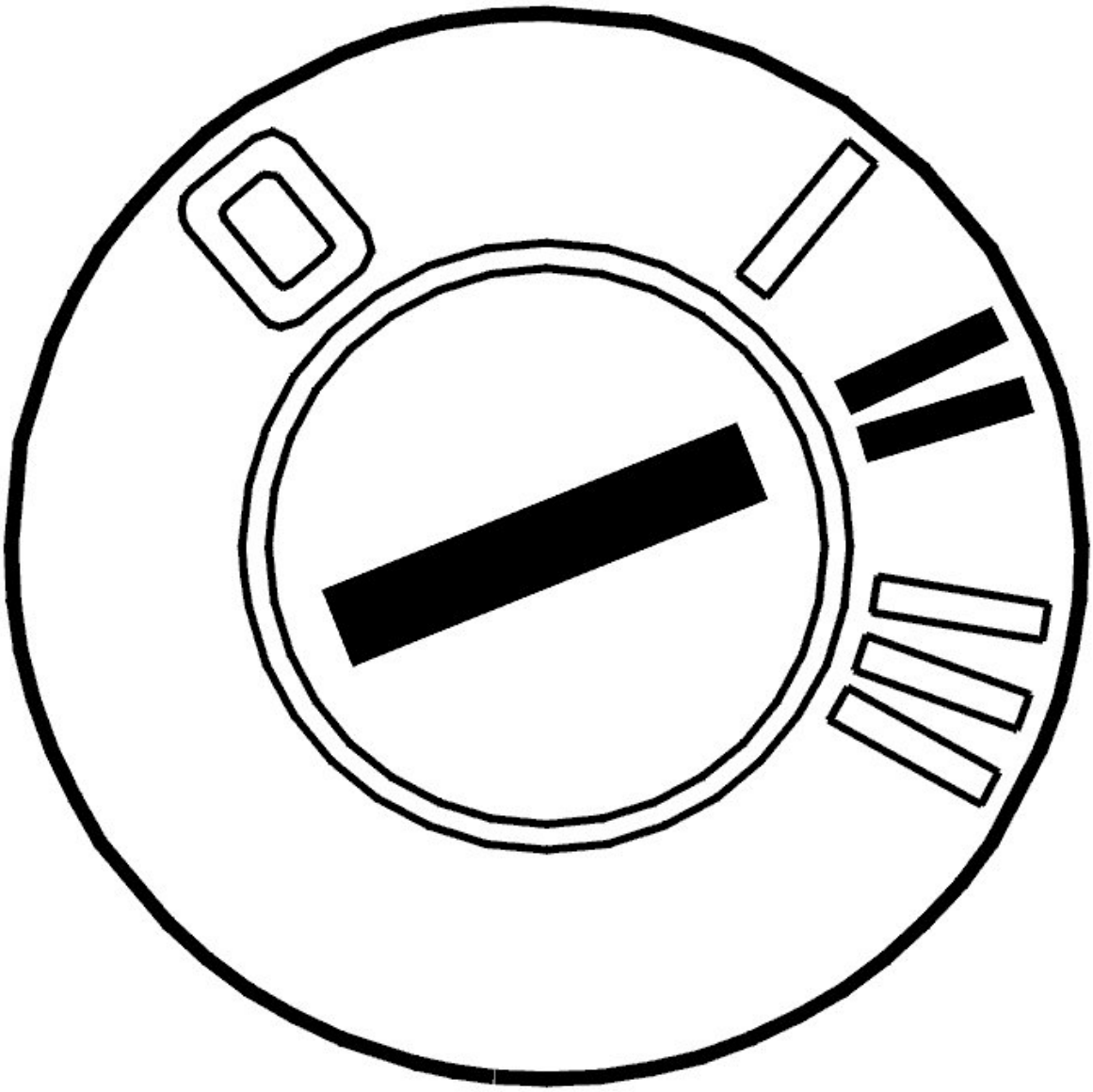


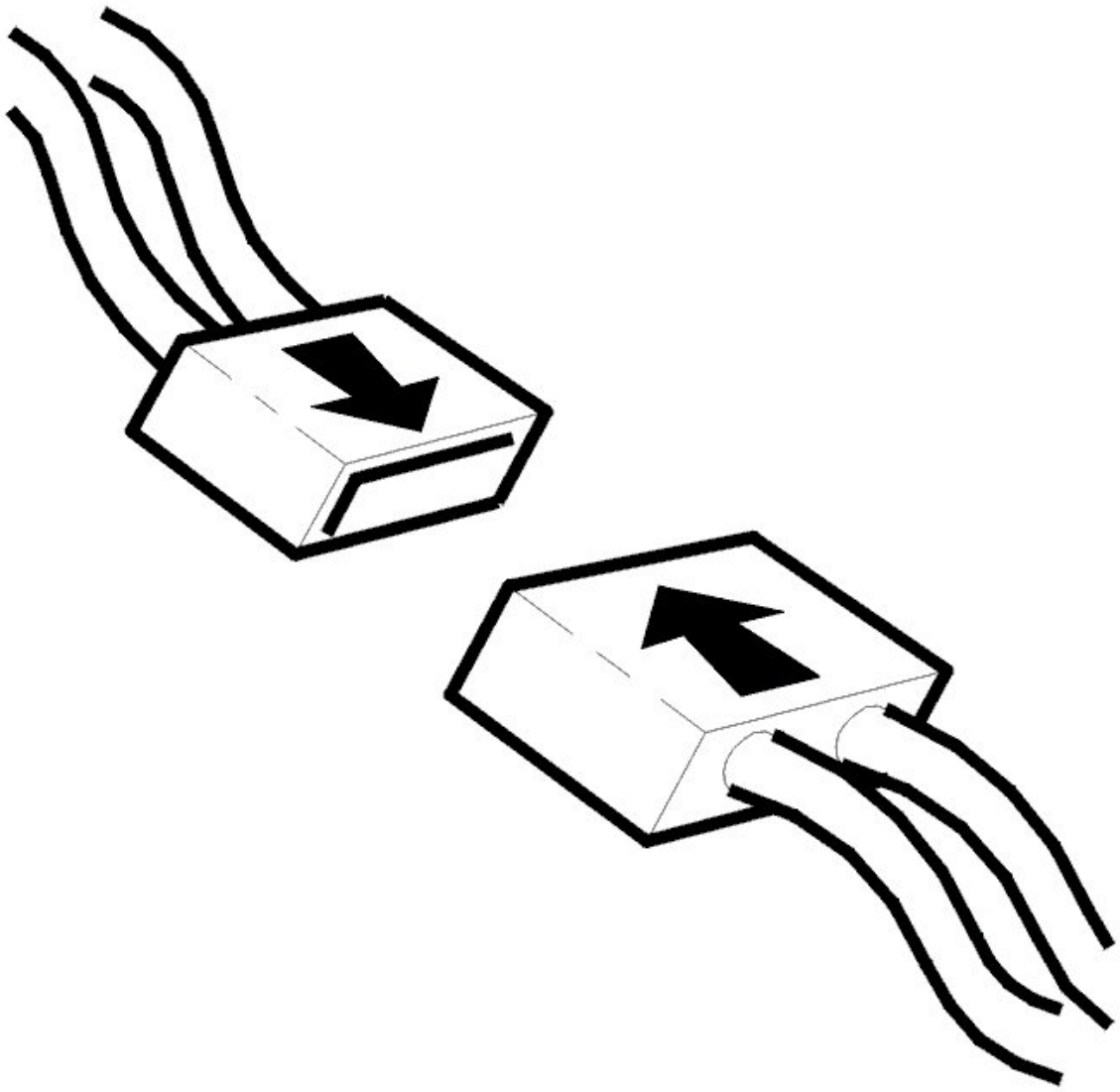


Continue - Verification

Verification

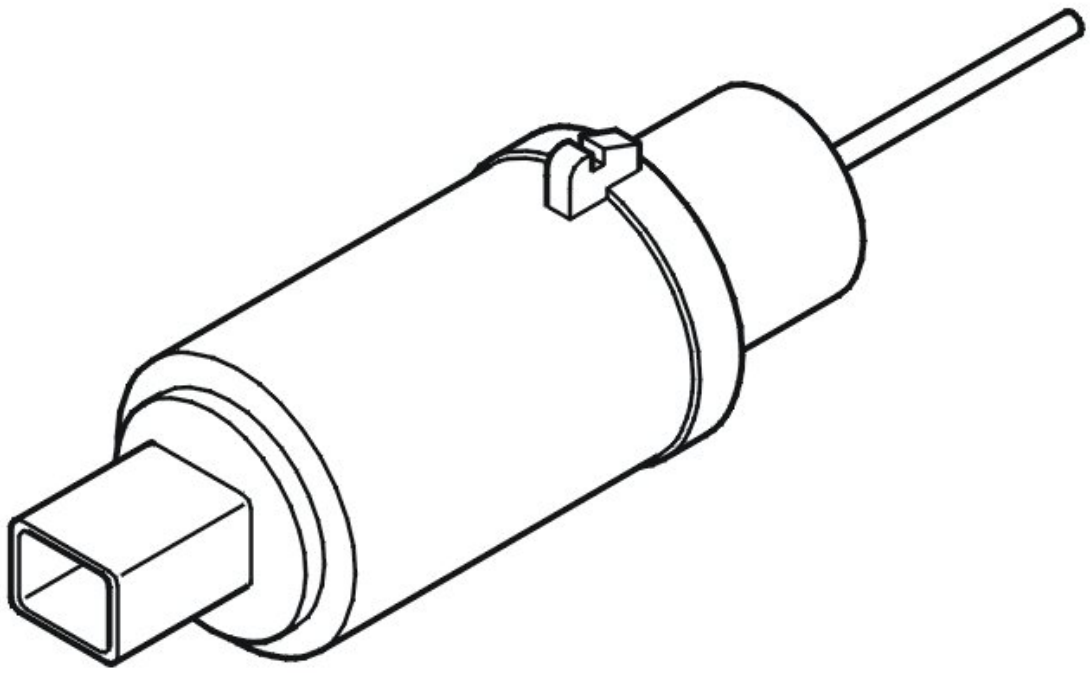
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the signal from the pedal position sensor.

Depress the brake pedal. Check that the pedal signal is updated.



Was the signal updated?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

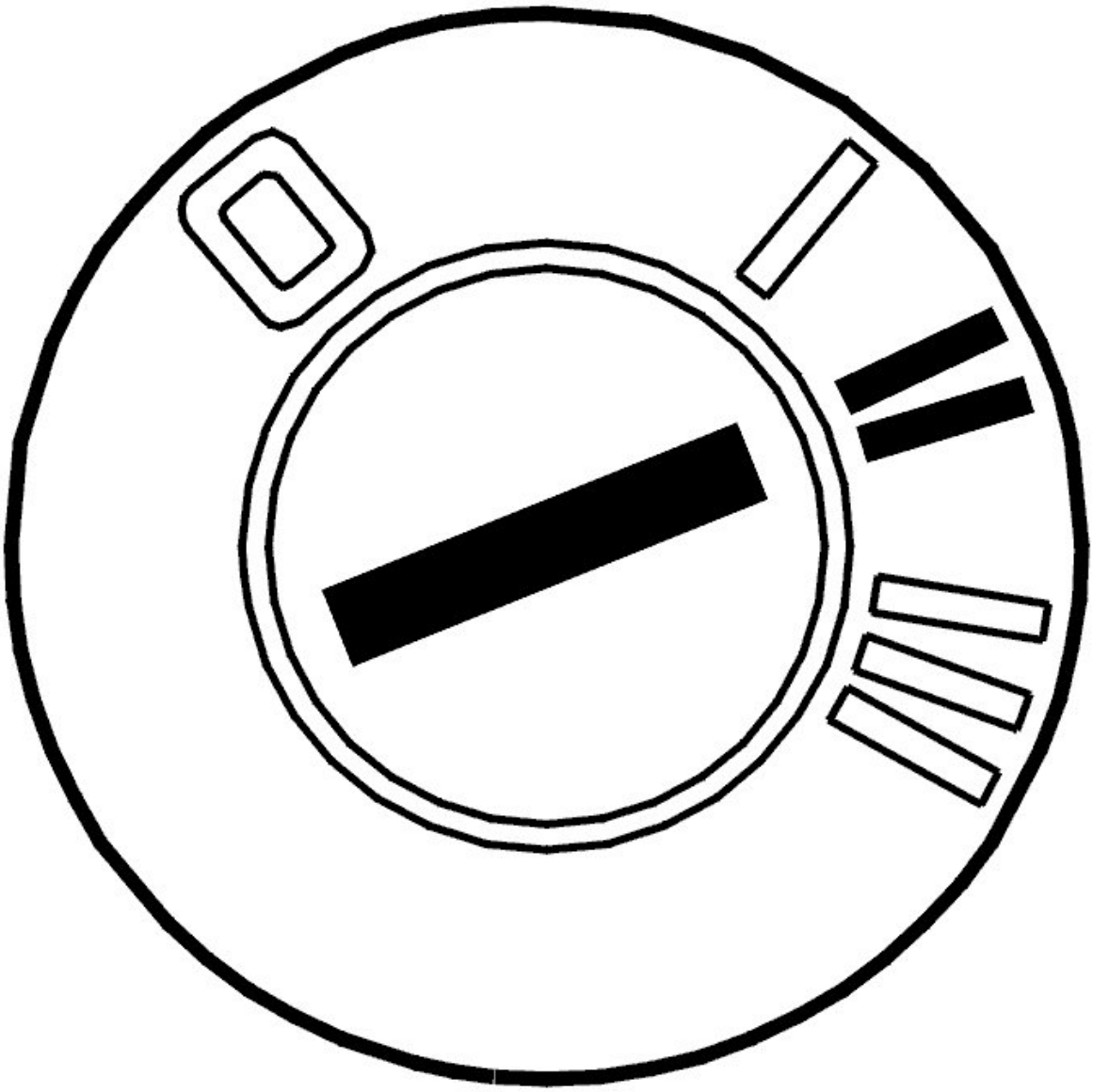
No - Attempt New Test

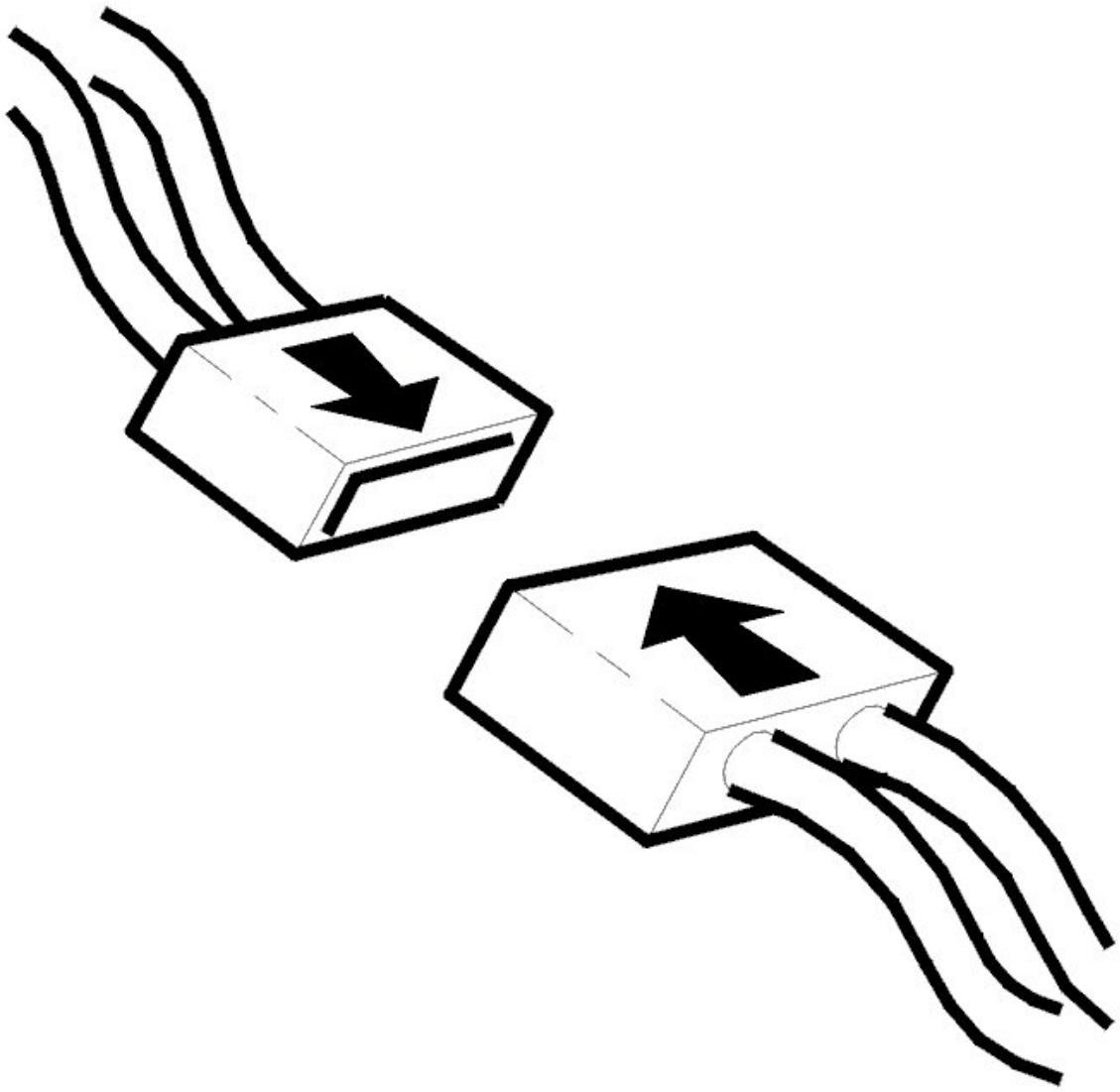
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the status of the stop lamp switch.

Depress and release the brake pedal. The value must change between OFF and ON.

Does the value change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The brake pressure sensors and pedal position sensor have a common internal power supply in the control module.
Diagnostic trouble code (DTC) BCM-0068 is stored if the brake control module (BCM) detects that the voltage to the sensors is incorrect.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- Stability control is blocked
- Traction control is blocked
- Active yaw control is blocked
- TRACS (traction control system) is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

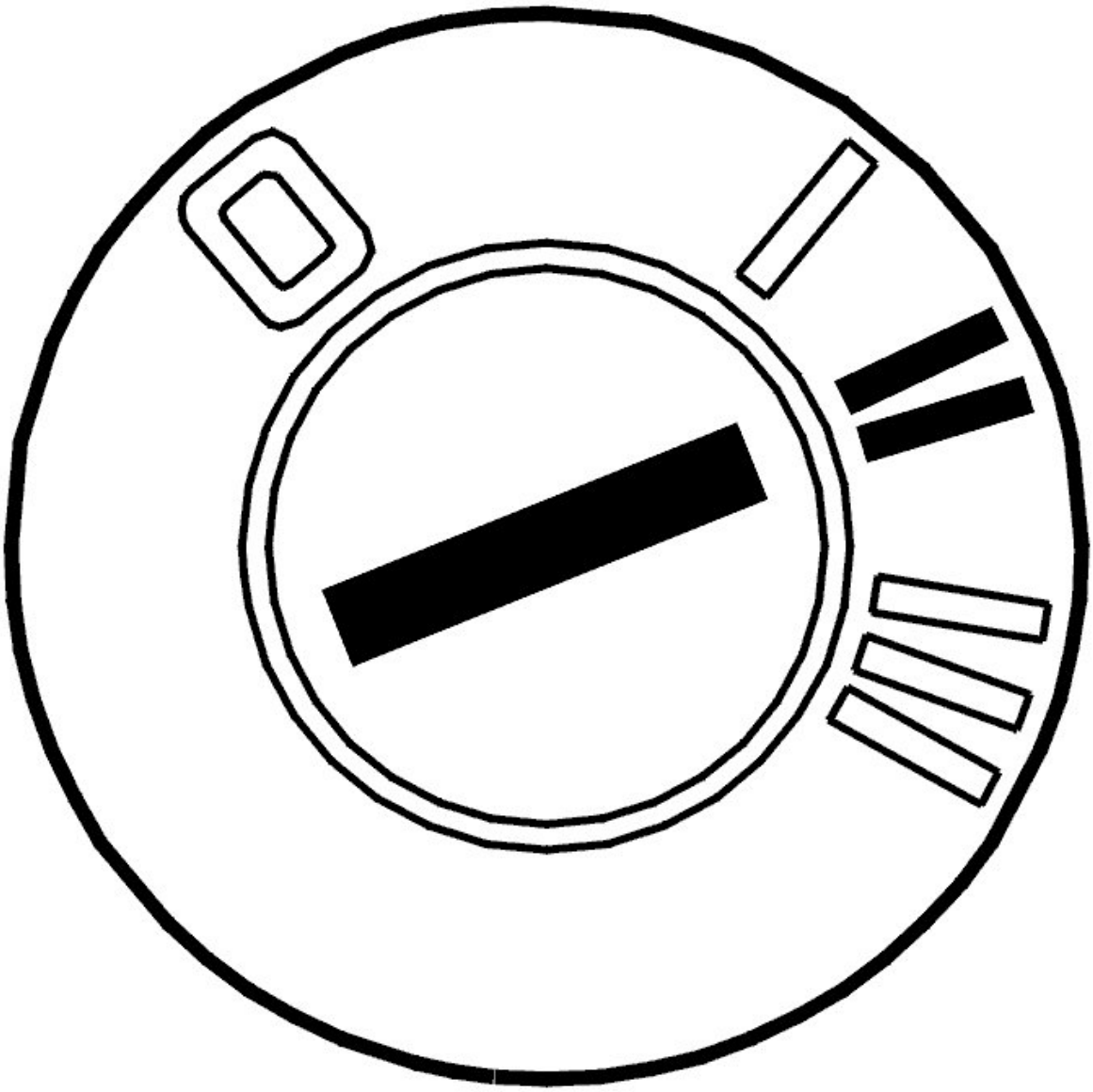
Possible source
- Short-circuit to ground or supply voltage in the wiring
- Defective sensor
- Defective brake control module (BCM).

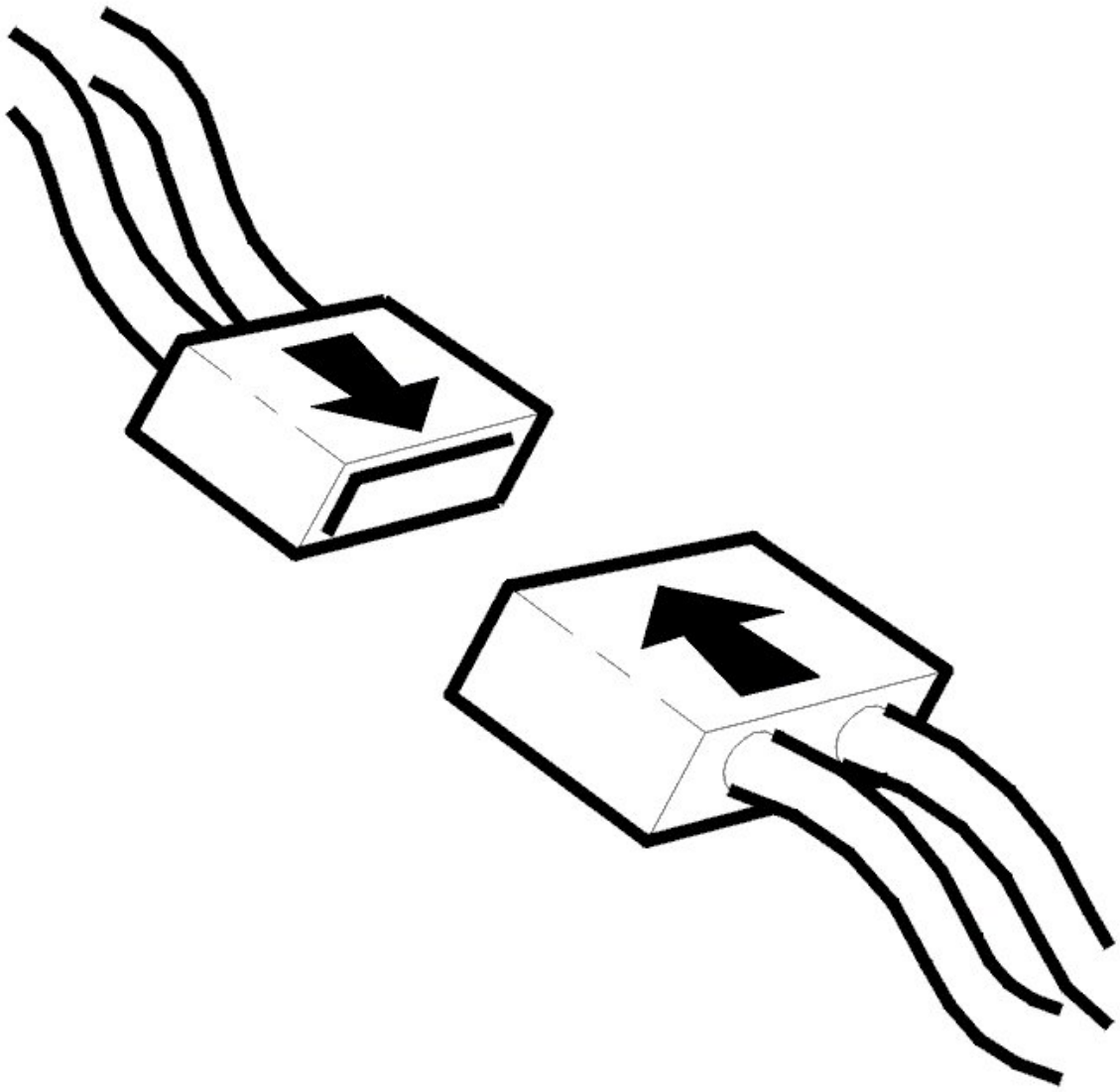
Fault symptom[s]
- General warning lamp lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the connectors





- Ignition off
- Check the connectors for the brake control module (BCM), pedal position sensor and brake pressure sensor. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description.
Read off the status of the diagnostic trouble code (DTC).

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To disconnect the pedal position sensor connector, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- To disconnect the connectors for the brake pressure sensors, see Pressure sensor, master cylinder, replacing See: Brakes and Traction Control/Hydraulic System/Brake Fluid Pressure Sensor/Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - Fault Found

No - Checking the wiring and component

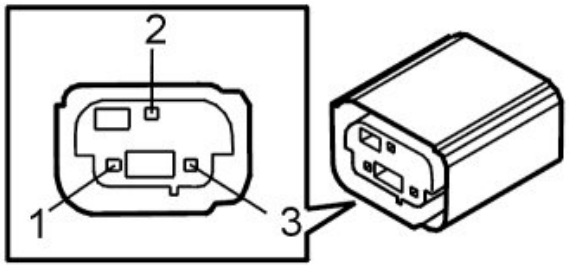
Checking the wiring and component

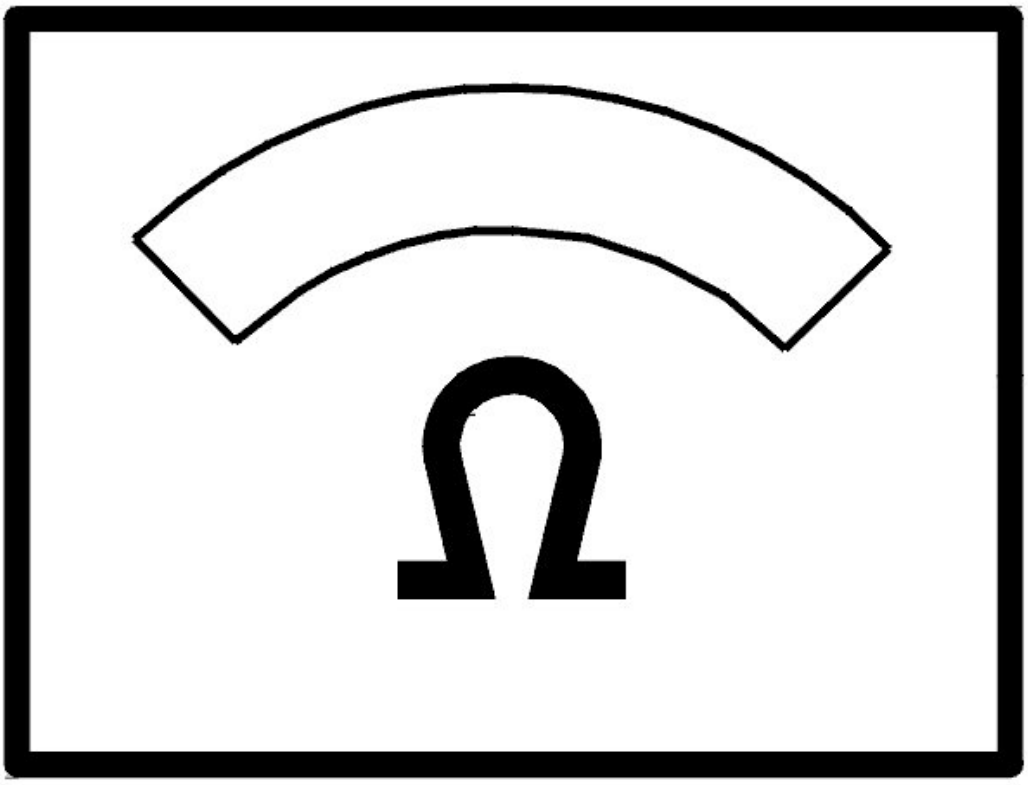
Check the wiring between pedal position sensor
- terminal #1 and brake control module (BCM) terminal #7 (#A7)
- terminal #2 and brake control module (BCM) terminal #5 (#A5)
- terminal #3 and brake control module (BCM) terminal #3 (#A3).

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.
Check the pedal position sensor as follows
- ignition off
- connect the breakout box to the wiring
- the control module disconnected.

measure the resistance at the pedal position sensor.
The resistance between terminals #3 (#A3) and #5 (#A5) must be approximately 0.5 kohms when the brake pedal is unaffected. The resistance must increase when the brake pedal is pressed.
The resistance between terminals #3 (#A3) and #7 (#A7) must be approximately 2.5 kohms when the brake pedal is unaffected. The resistance must decrease when the brake pedal is pressed.
Replace the pedal position sensor if the resistance is incorrect.
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.





Was a fault detected?

Yes - Verification

No - Checking wiring and sensors

Checking wiring and sensors

Check the wiring between the control module and the connectors for the brake pressure sensors.

For brake pressure sensor 1:
- terminal #1 and control module terminal #19 (terminal #A19)
- terminal #2 and control module terminal #20 (#A20)
- terminal #3 and control module terminal #18 (#A18).

For brake pressure sensor 2:
- terminal #1 and control module terminal #21 (#A21)
- terminal #2 and control module terminal #23 (terminal #A23)
- terminal #3 and control module terminal #22 (terminal #A22).

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.

Hint: Check the brake pressure sensors. First connect the breakout box and the connectors for the sensors. Switch on the ignition. Measure the signal from the sensor:

Brake pressure sensor 1:
- terminal #A19 and terminal #A20 on the breakout box. The voltage must be between approximately 0.25- 4.75 V, depending on the brake pressure
- terminal #A18 and terminal #A19 on the breakout box. The voltage must be approximately 5 V.

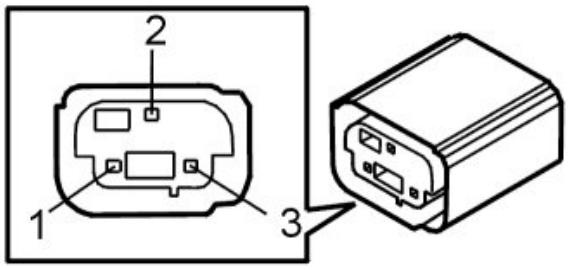
Brake pressure sensor 2:

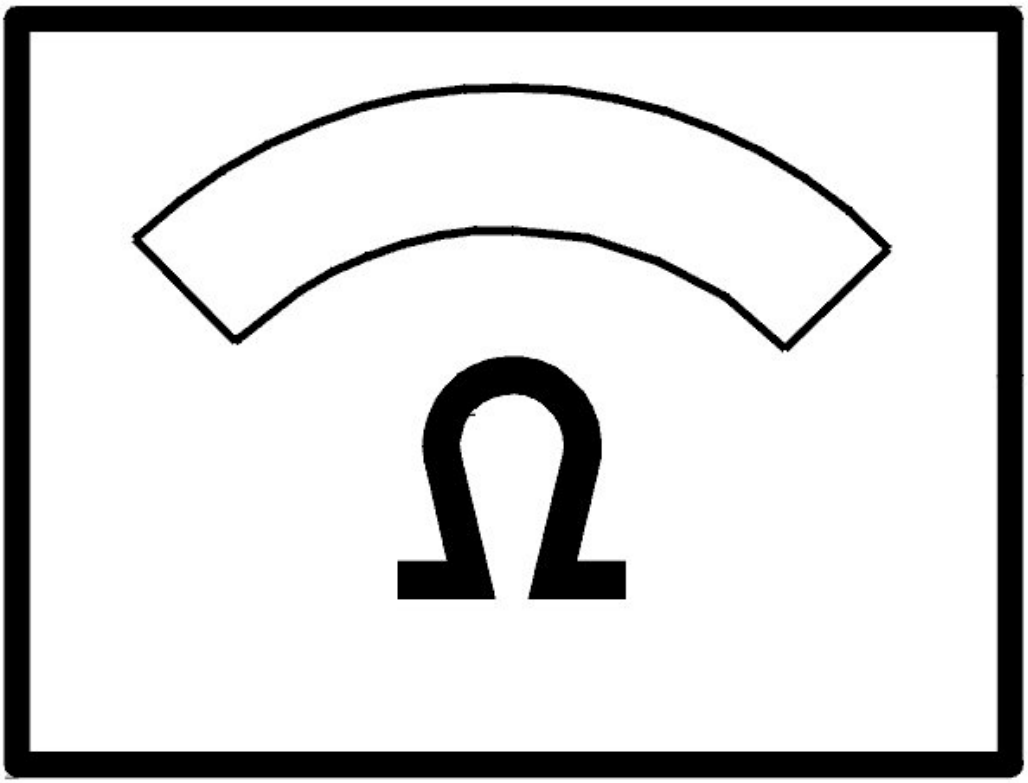
- terminal #A21 and terminal #A23 on the breakout box. The voltage must be between approximately 0.25- 4.75 V, depending on the brake pressure
- terminal #A21 and terminal #A22 on the breakout box. The voltage must be approximately 5 V.

Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace brake pressure sensors 1 and 2, see Pressure sensor, master cylinder, replacing See: Brakes and Traction Control/Hydraulic System/Brake Fluid Pressure Sensor/Switch/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





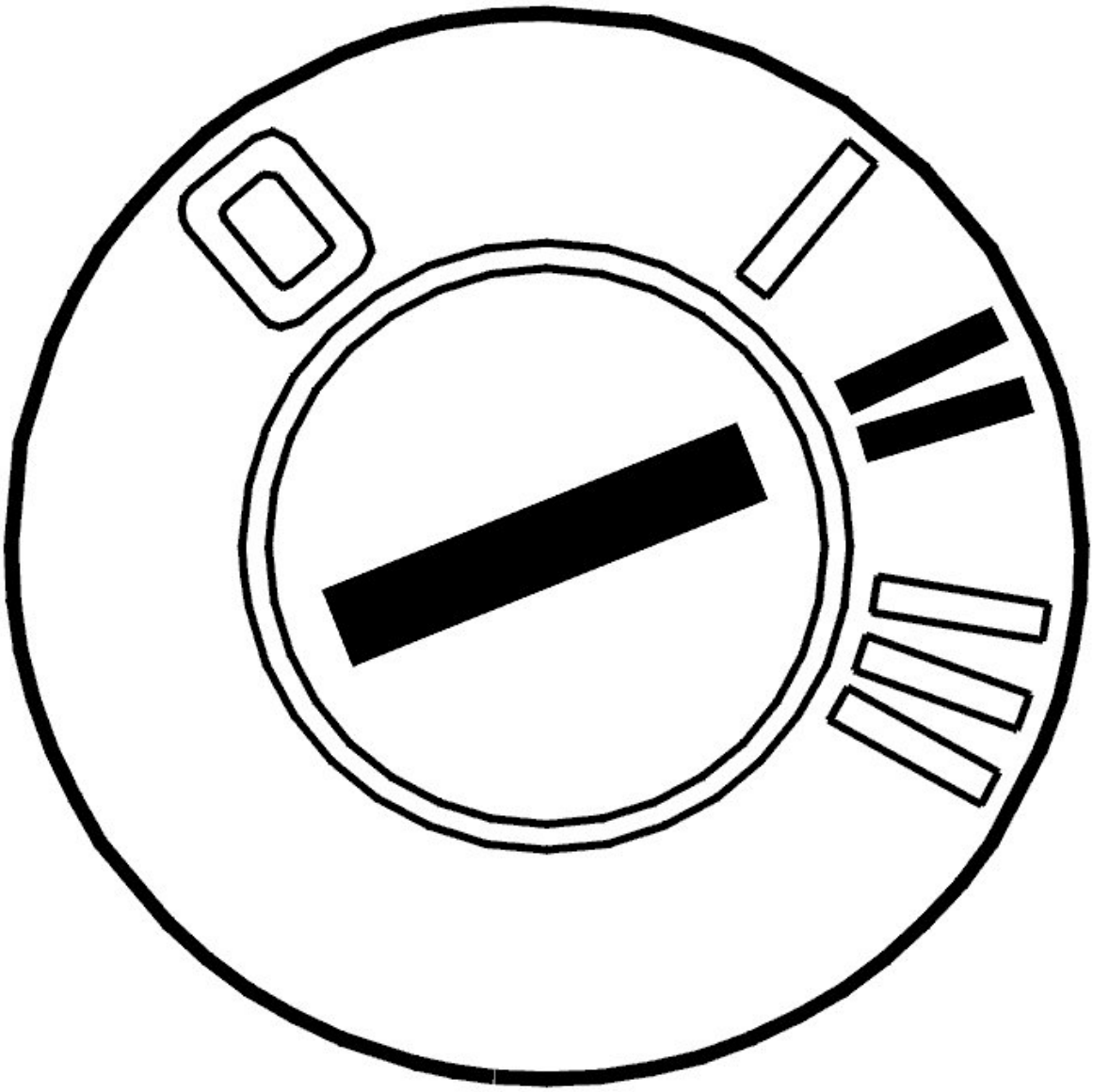
Was a fault detected?

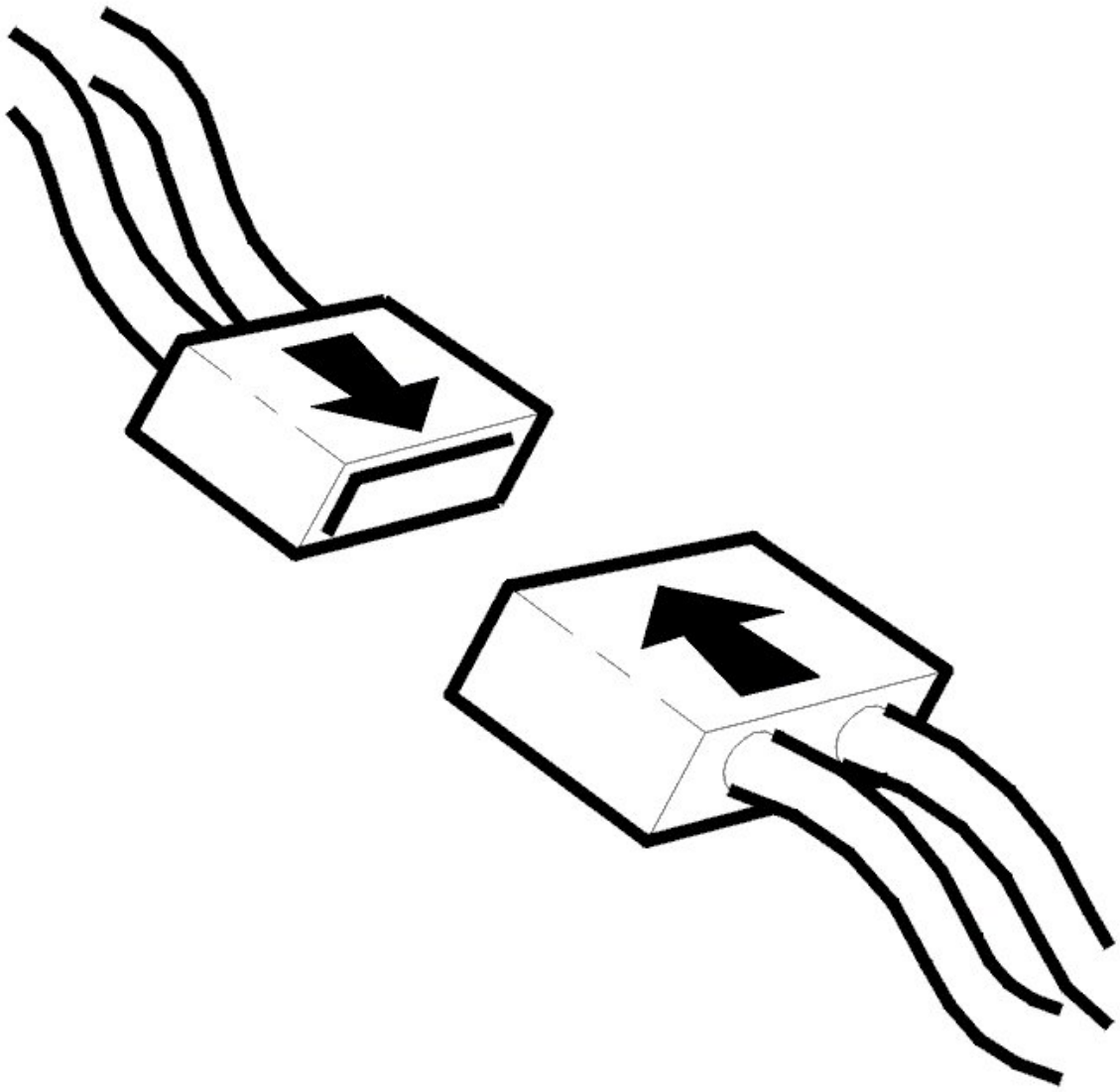
Yes - Verification

No - Fault Tracing Information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Information

Fault-tracing information

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.
Complete the fault-tracing for those fault or try again.

Do you want to terminate fault-tracing at this time?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

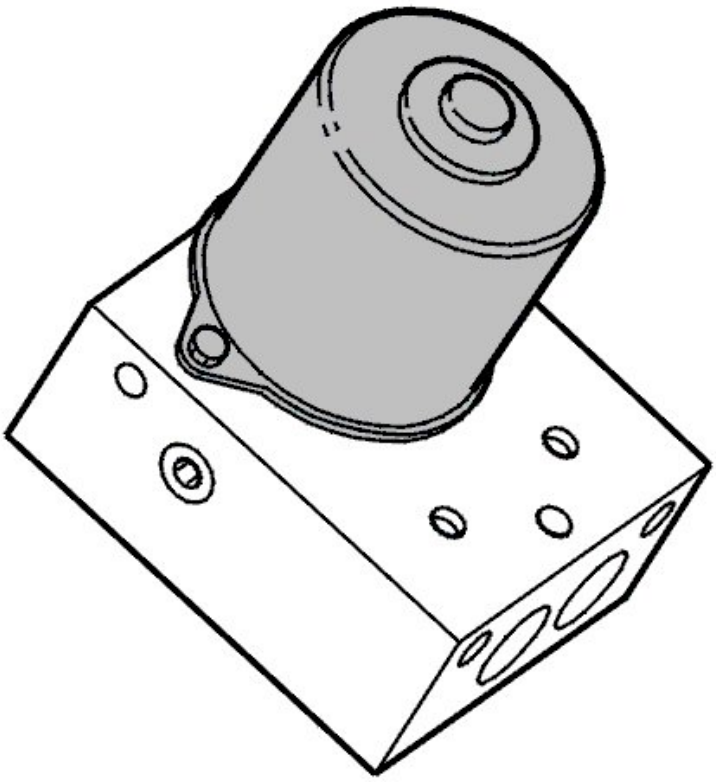
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0070 is stored if the brake control module (BCM) detects that the voltage to the pump motor is incorrect. The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- The ABS is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

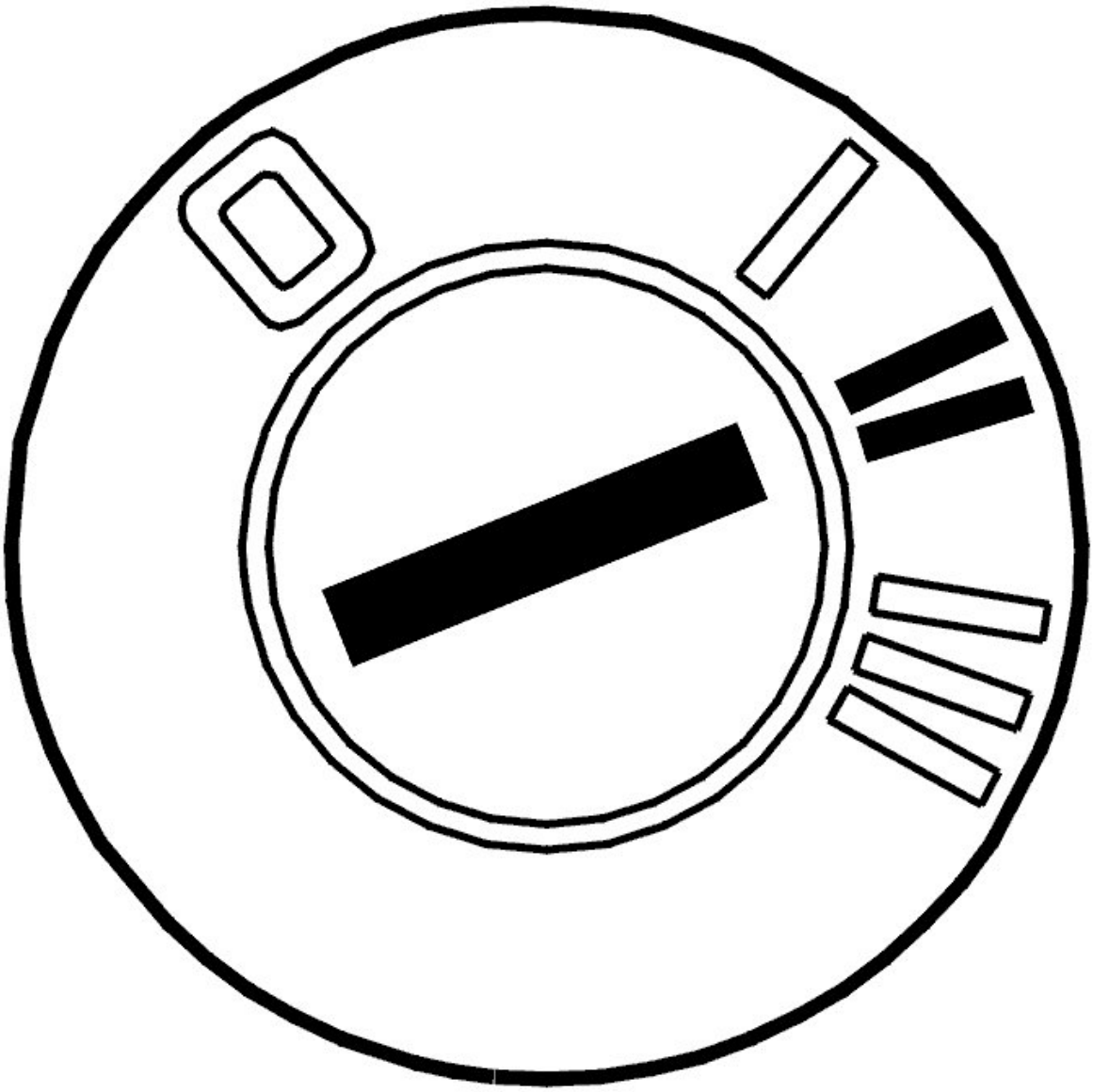
Possible source
- Contact resistance in the terminals
- The fuse for the pump motor is defective
- Open-circuit in the power supply to the pump motor
- Open-circuit in the ground lead for the pump motor
- Open-circuit in the power supply (30-supply) to the control module for the pump motor
- Defective pump motor
- Defective control module.

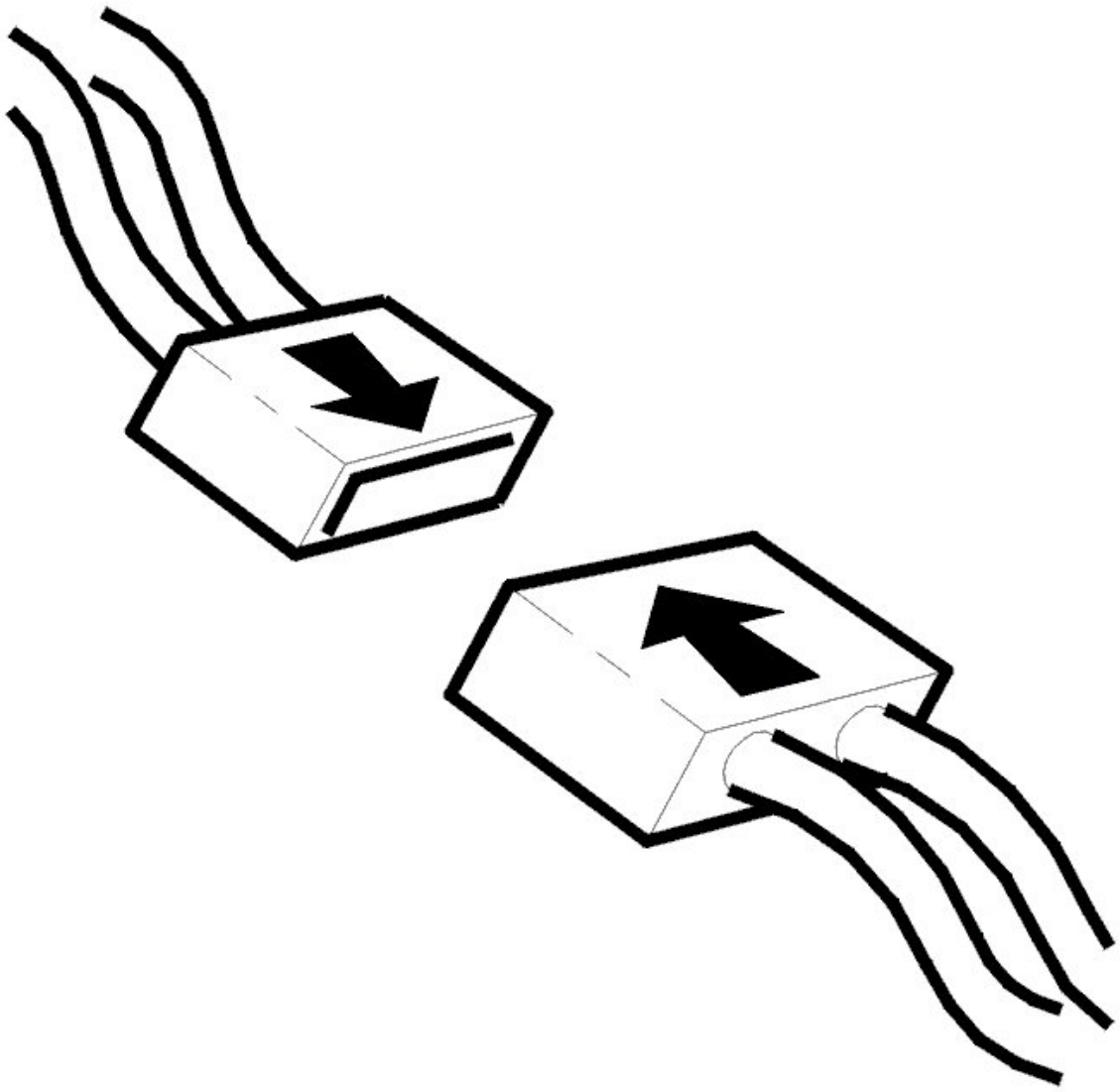
Fault symptom[s]
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the operation of the pump motor





- Ignition off
- Check the brake control module (BCM) and pump motor connectors. Check for contact resistance and oxidation
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.
If the pump motor starts and seems to operate normally, the cause of the fault was probably contact resistance and oxidation in the control module or pump motor connectors.

Other information

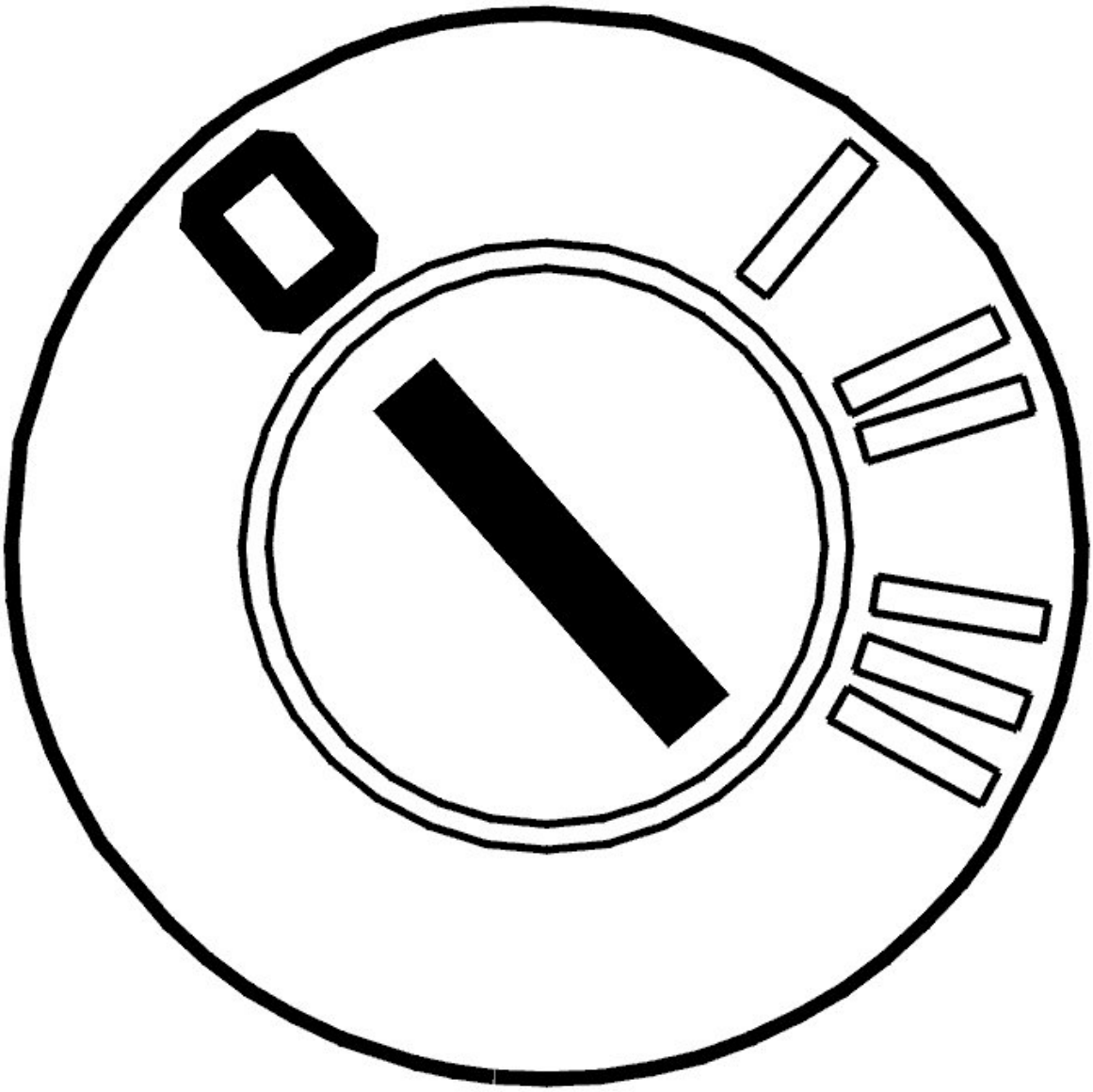
- To disconnect the control module and pump motor, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the pump OK?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component

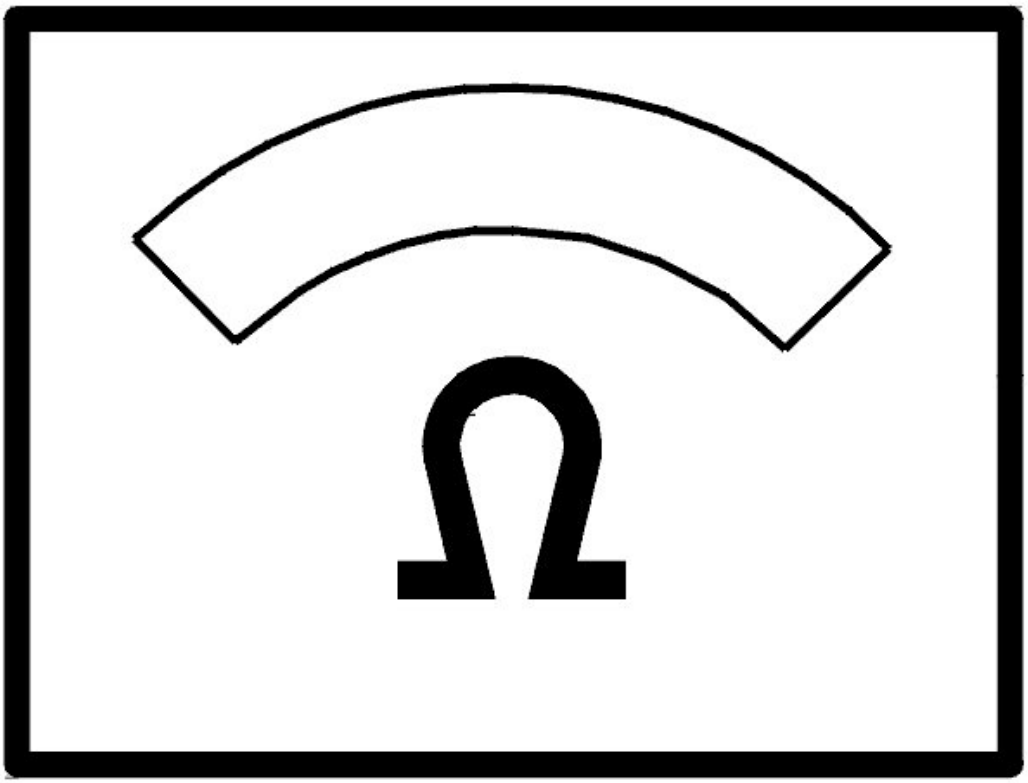


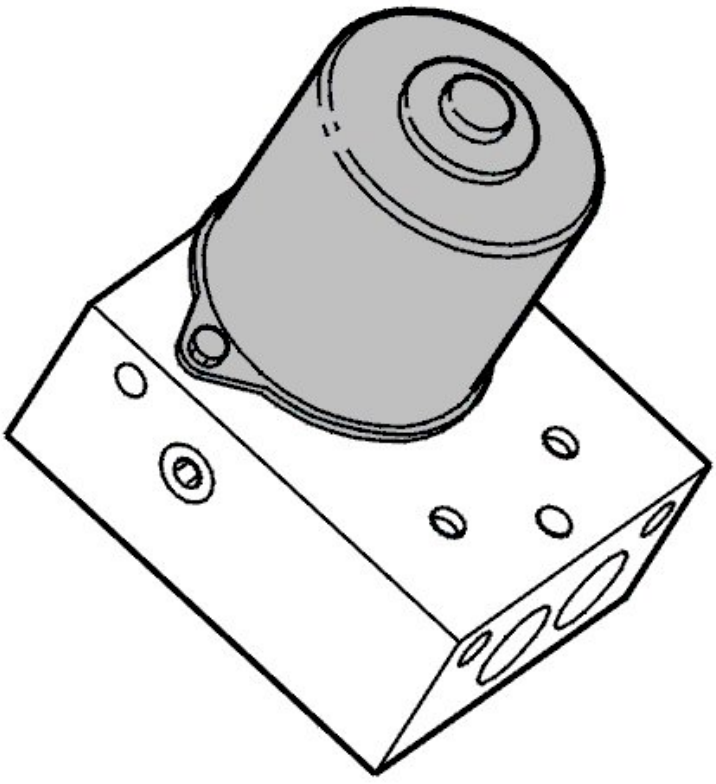
- Ignition off.

Check the circuit for the pump motor between brake control module (BCM) terminal #1 (#A1) and the fuse in the integrated relay/fusebox in the engine compartment. Check for an open-circuit. Check for a short-circuit to ground.
Check the fuse for the brake system in the integrated relay / fusebox in the engine compartment. If the fuse is blown, check the cable between the fuse and control module terminal #1 (#A1). Check for a short-circuit to ground. Then replace the fuse.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram.



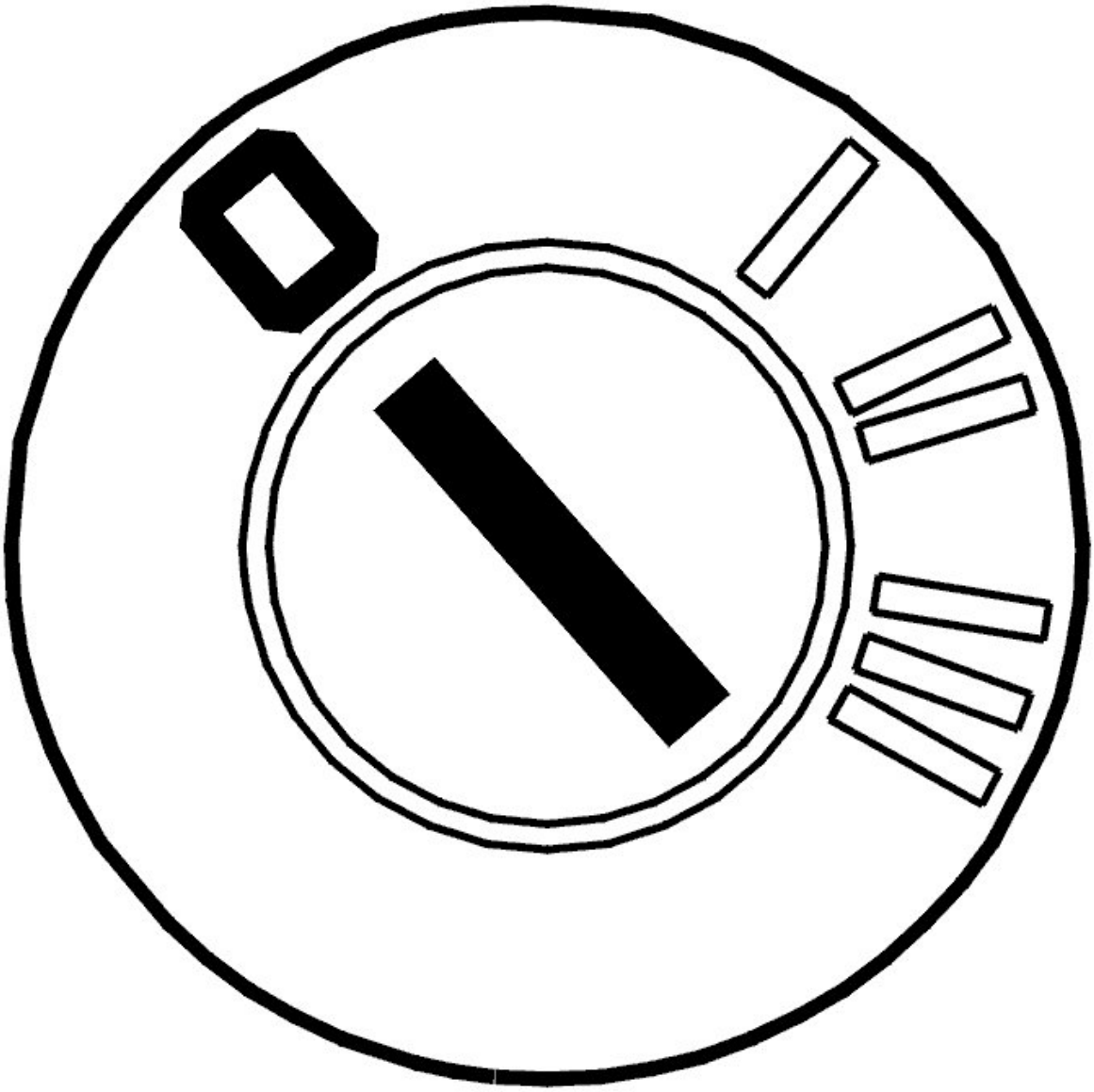


Was a fault detected?

Yes - Verification

No - Checking the pump motor circuit

Checking the pump motor circuit

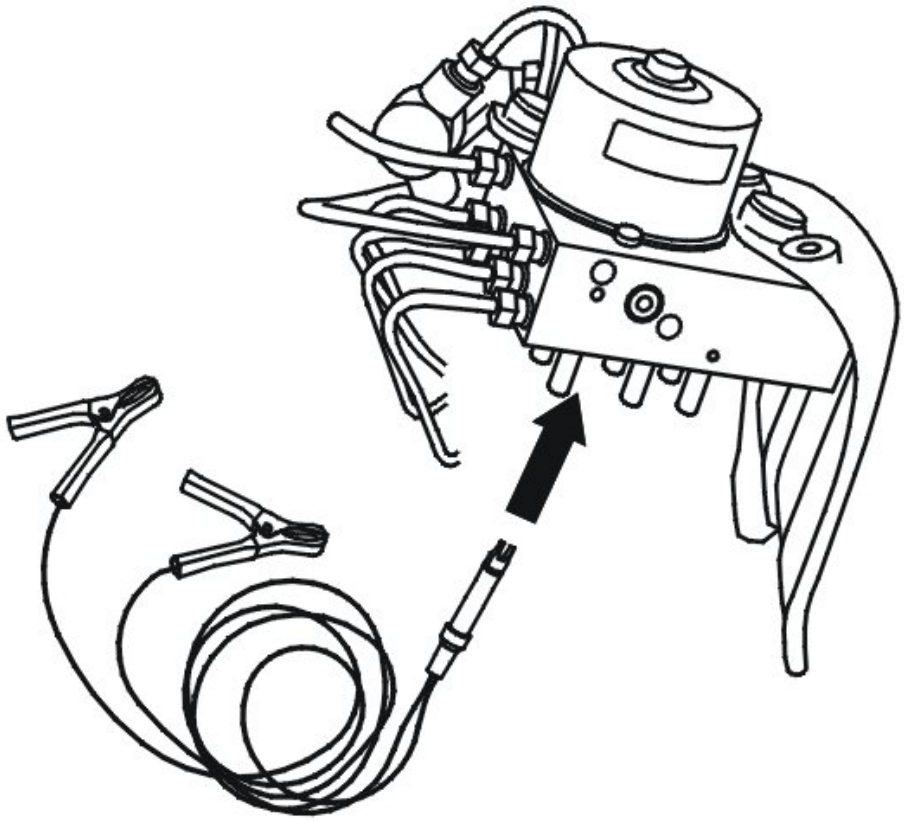


- Ignition off
- Remove the brake control module (BCM)
- Connect adapter 951 2856 Test cable See: Tools and Equipment/951 2856 Test Cable to the power supply terminal on the pump motor
- Connect the red fused cable to battery voltage. The black cable must be connected to ground.

The pump motor must start when the cable is connected. Run for a maximum of 10 seconds.
Replace the control module if the pump motor starts and seems to run normally.
Replace the hydraulic unit if the pump motor does not start.

Other information

- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- To replace the hydraulic unit, see Hydraulic unit, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Hydraulic Control Assembly - Antilock Brakes/Service and Repair.



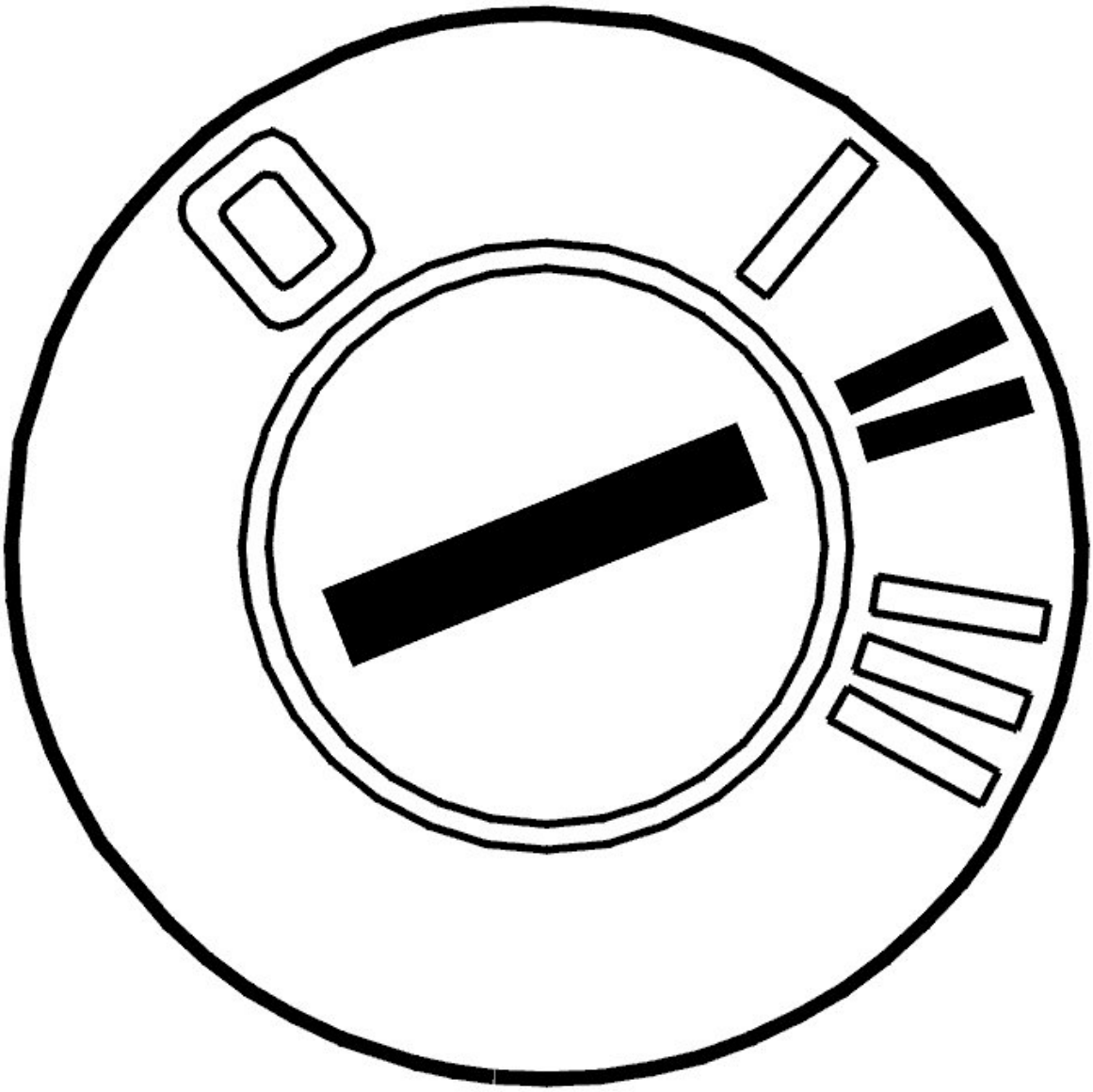
Continue - Verification

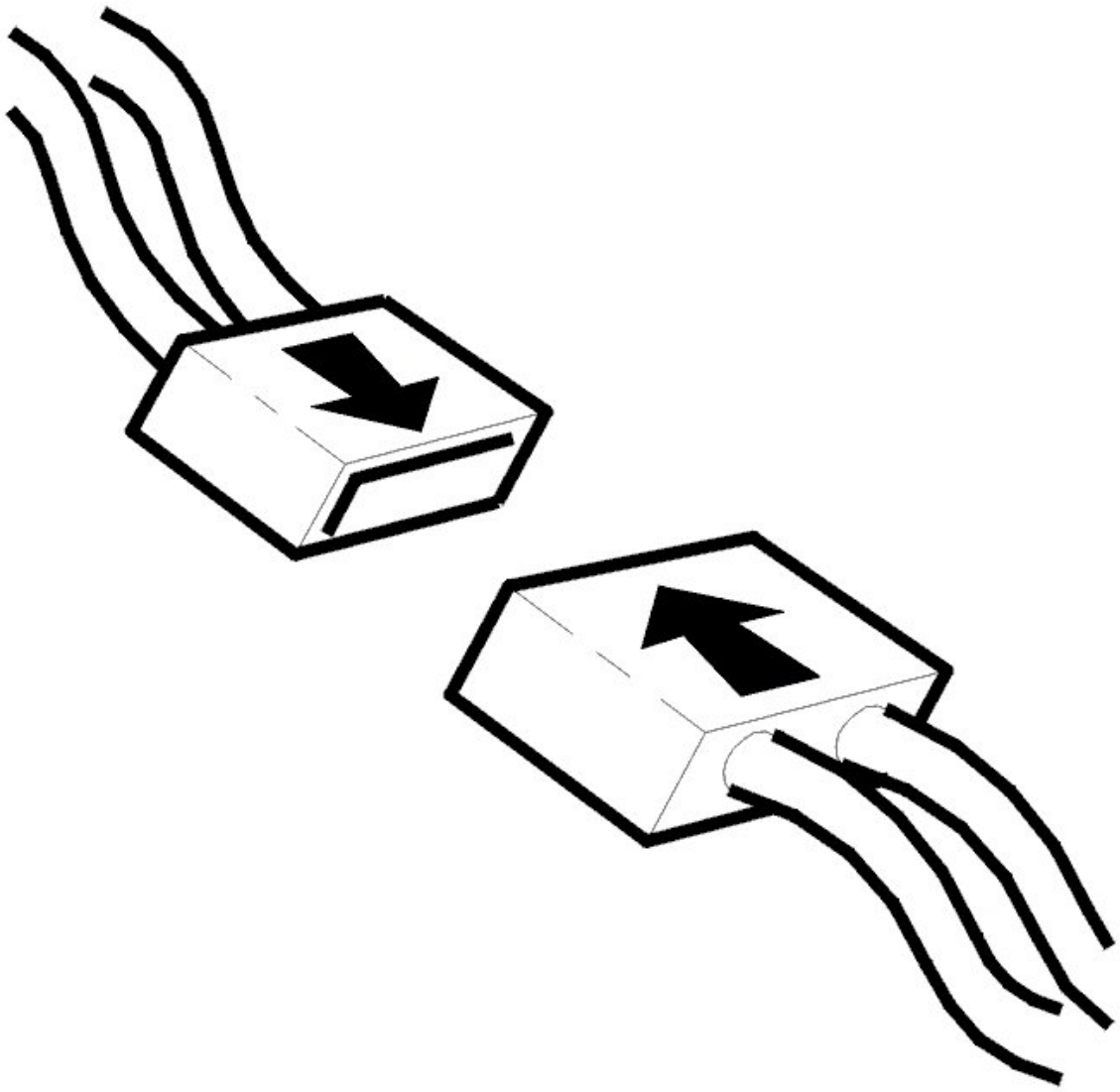
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.

Is the pump OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

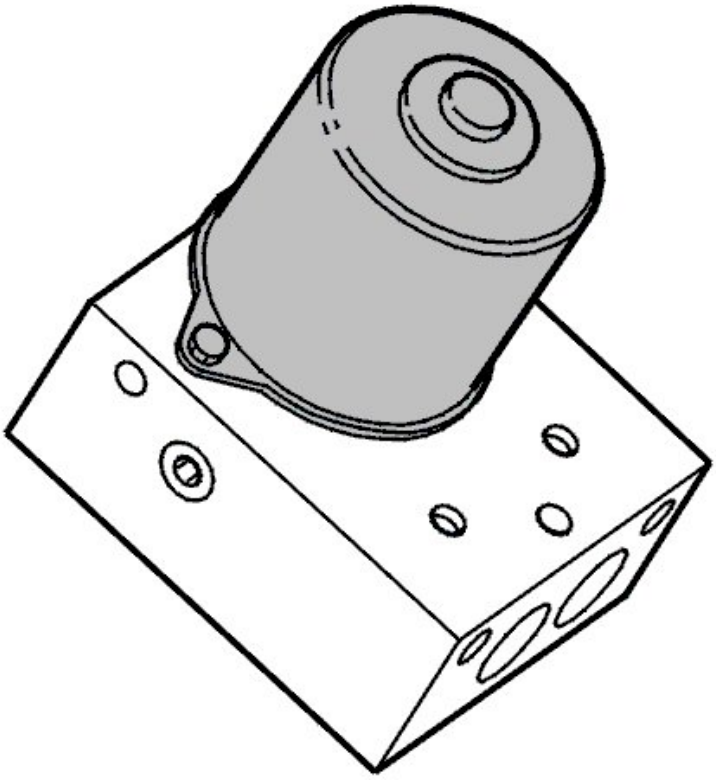
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the operation of the pump motor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0071 is stored if the brake control module (BCM) registers that the pump motor does not start or that the signal from the pump motor is missing.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- The ABS is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Contact resistance in the terminals
- The fuse for the pump motor is defective
- Open-circuit in the power supply to the pump motor
- Open-circuit in the ground lead for the pump motor
- Defective pump motor
- Defective control module.

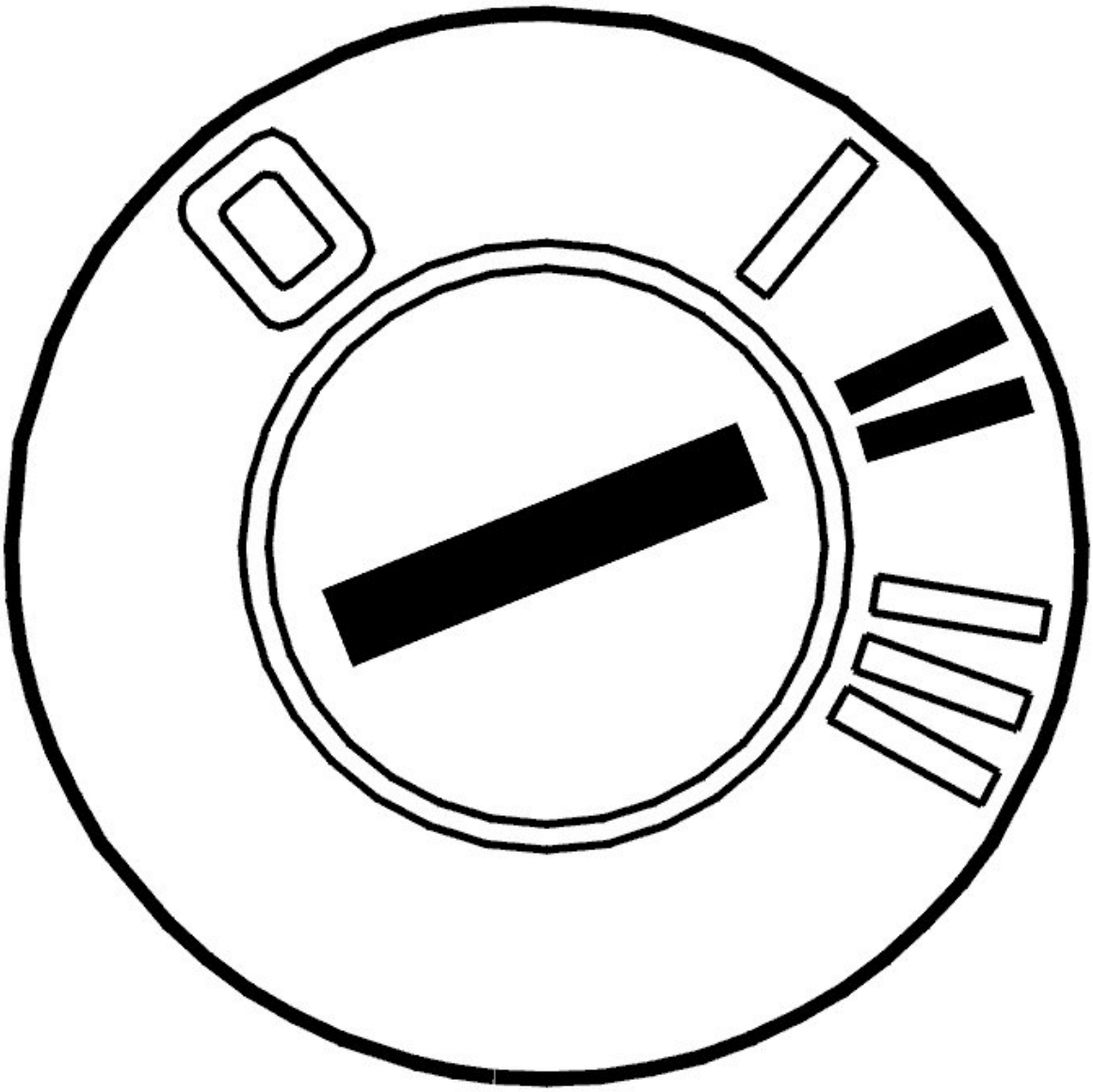
Fault symptom[s]

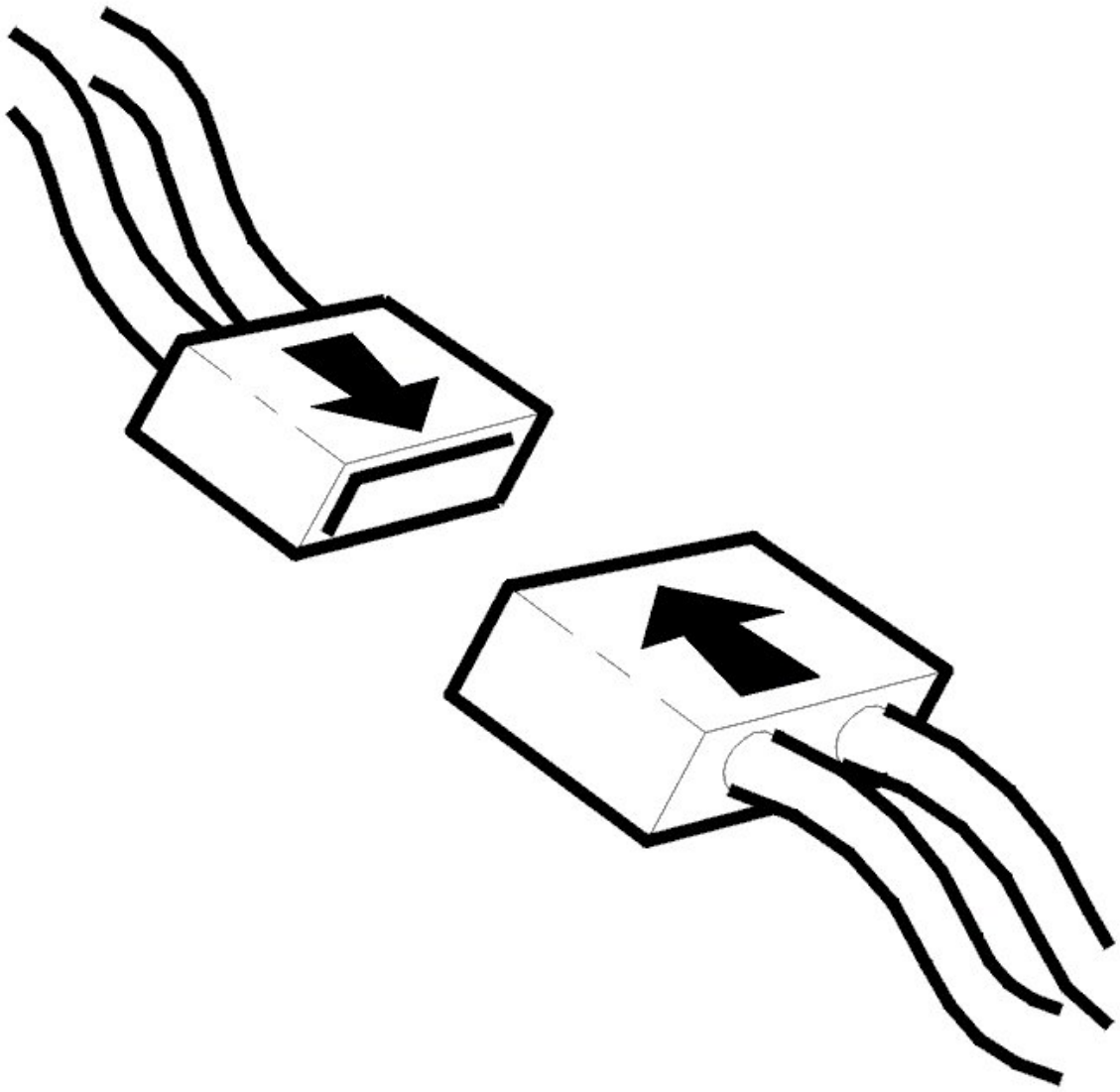
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Missing

Signal missing

Checking the operation of the pump motor





- Ignition off
- Check the brake control module (BCM) and pump motor connectors. Check for contact resistance and oxidation
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.
If the pump motor starts and seems to operate normally, the cause of the fault was probably contact resistance and oxidation in the control module or pump motor connectors.

Other information

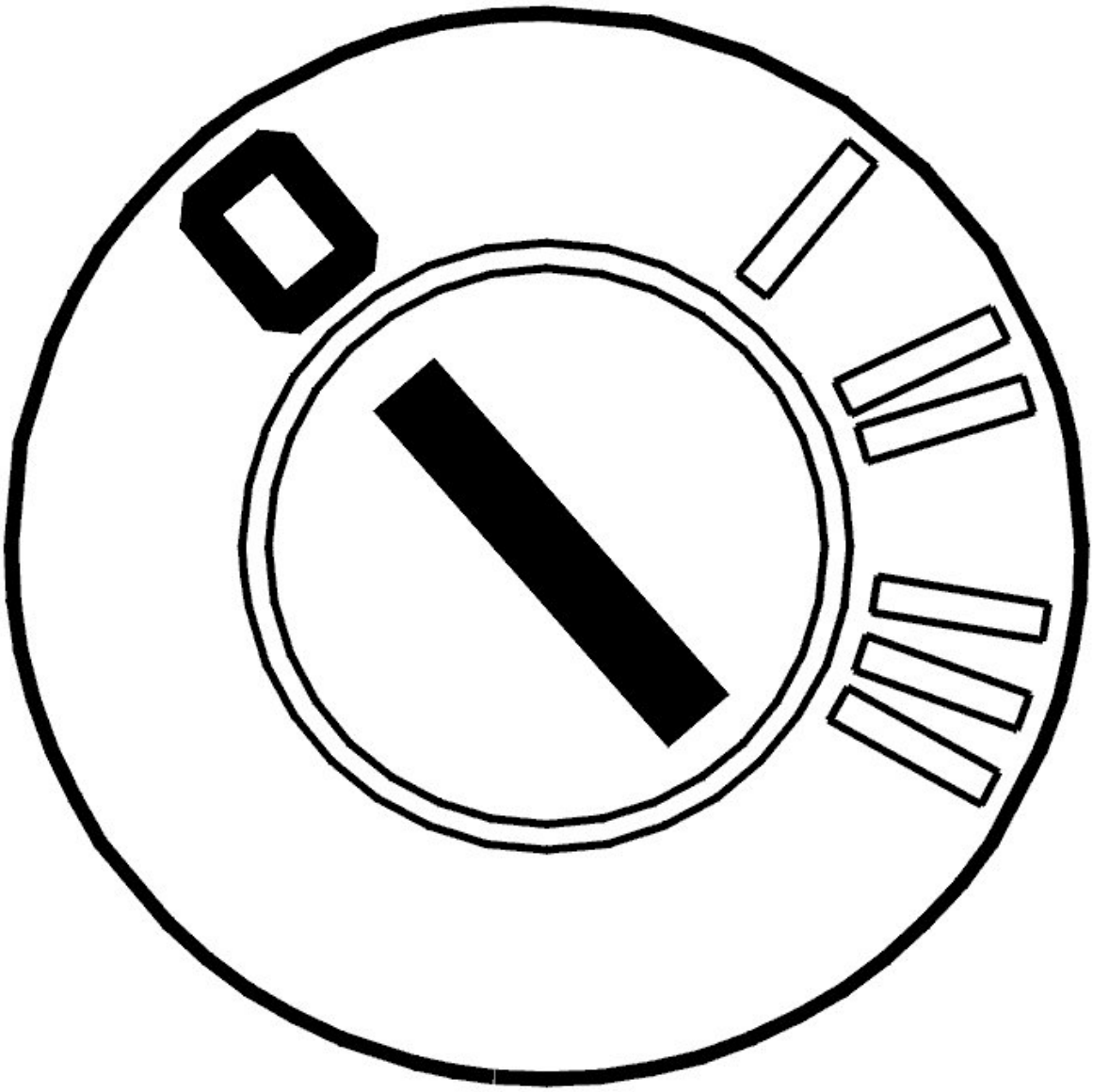
- To disconnect the control module and pump motor, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the pump OK?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component

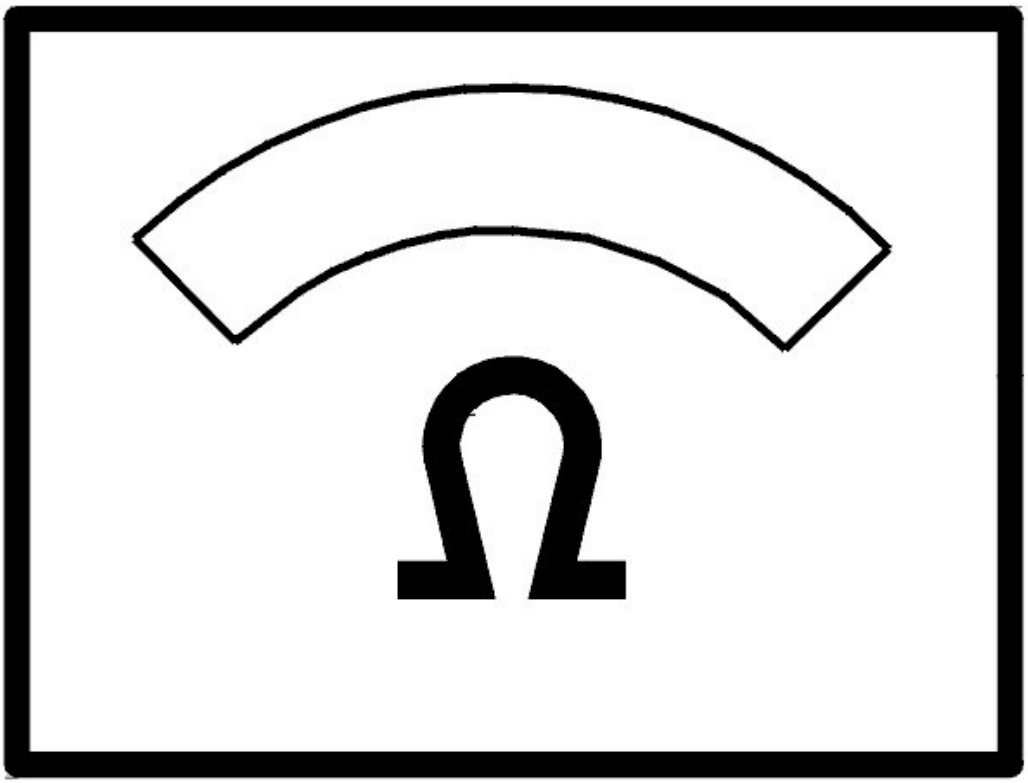


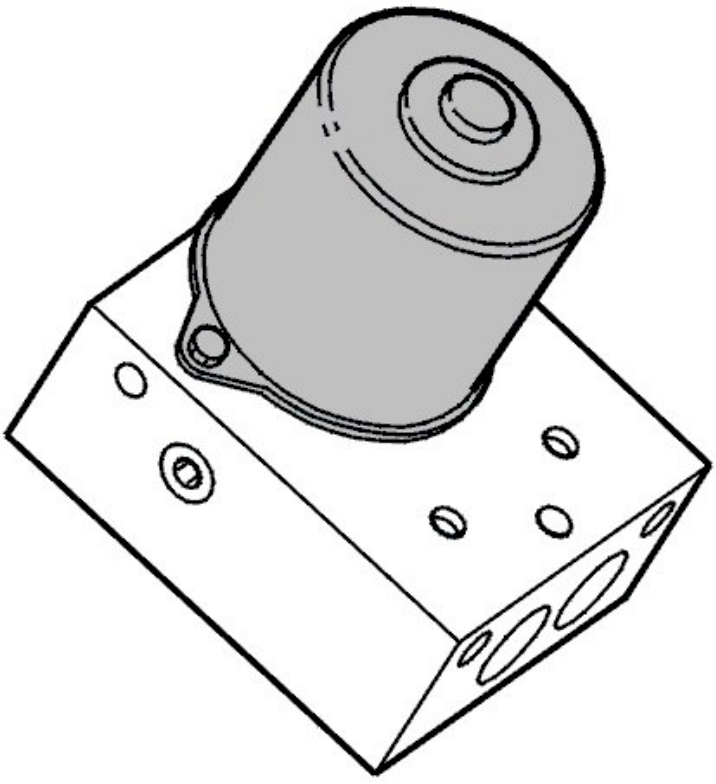
- Ignition off.

Check the circuit for the pump motor between brake control module (BCM) terminal #1 (#A1) and the battery. Check for an open-circuit. Check for a short-circuit to ground.
Check if the fuse for the brake system is defective. If the fuse has blown, check the cable between the fuse and control module terminal #1 (#A1). Check for a short-circuit to ground. Then replace the fuse.
Check the pump motor circuit by connecting an ohmmeter between pump motor connector terminal #2 and ground. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram.



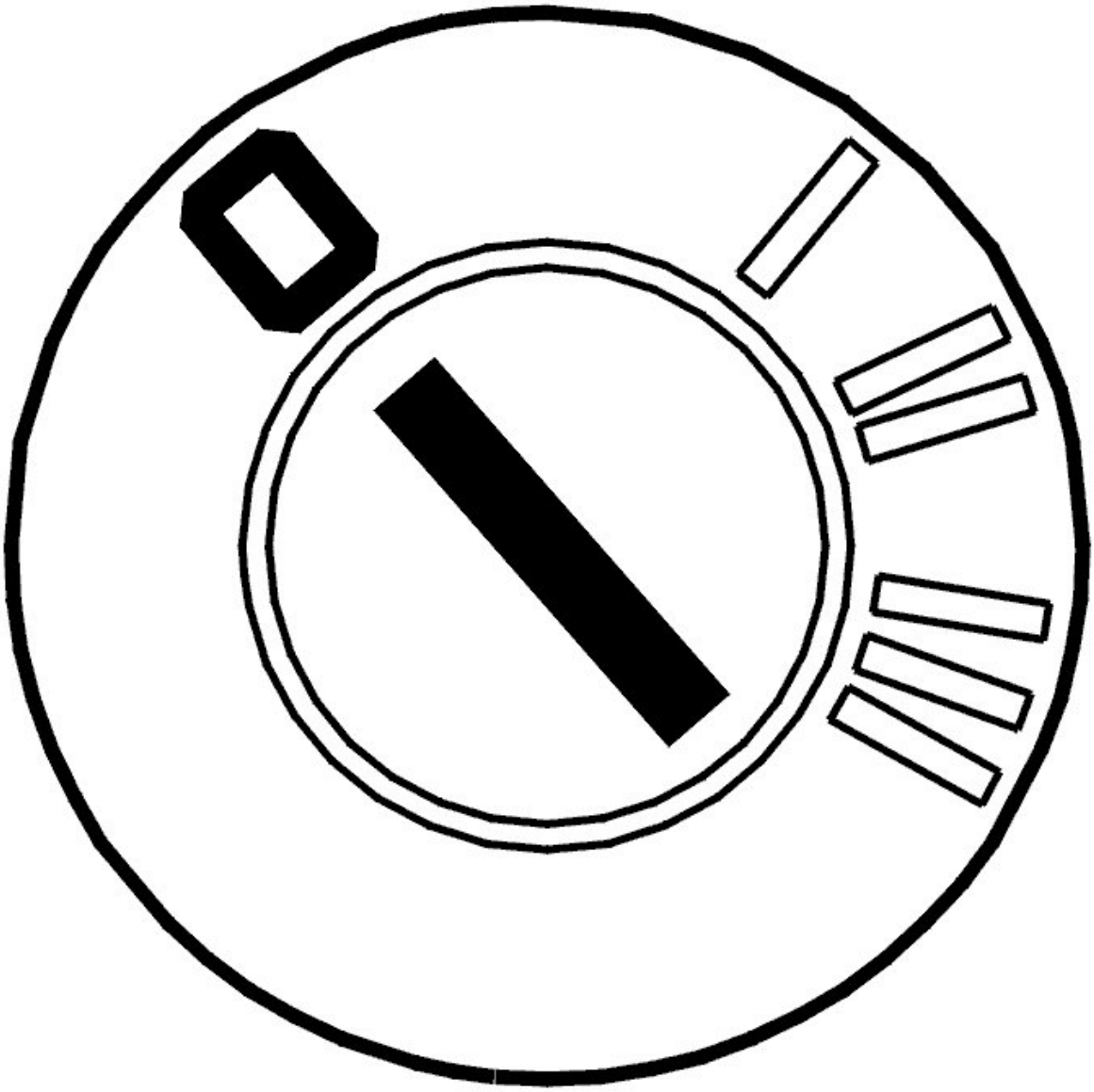


Was a fault detected?

Yes - Verification

No - Checking the pump motor circuit

Checking the pump motor circuit

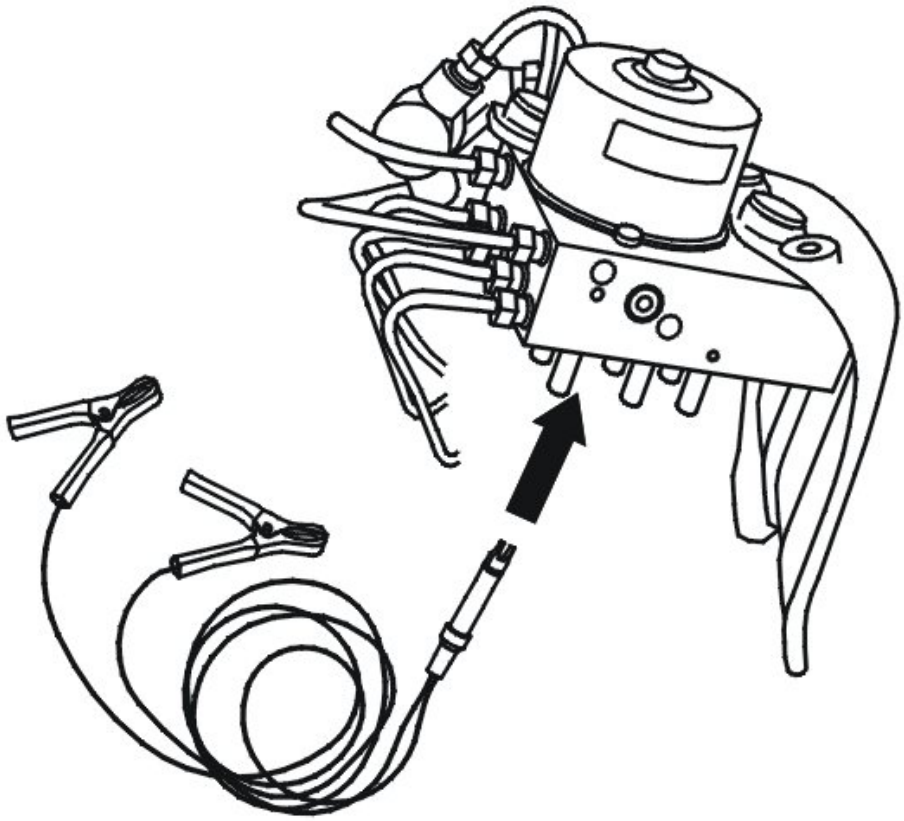


- Ignition off
- Remove the brake control module (BCM)
- Connect adapter 951 2856 Test cable See: Tools and Equipment/951 2856 Test Cable to the power supply terminal on the pump motor
- Connect the red fused cable to battery voltage. The black cable must be connected to ground.

The pump motor must start when the cable is connected. Run for a maximum of 10 seconds.
Replace the control module if the pump motor starts and seems to run normally.
Replace the hydraulic unit if the pump motor does not start.

Other information

- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- To replace the hydraulic unit, see Hydraulic unit, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Hydraulic Control Assembly - Antilock Brakes/Service and Repair.



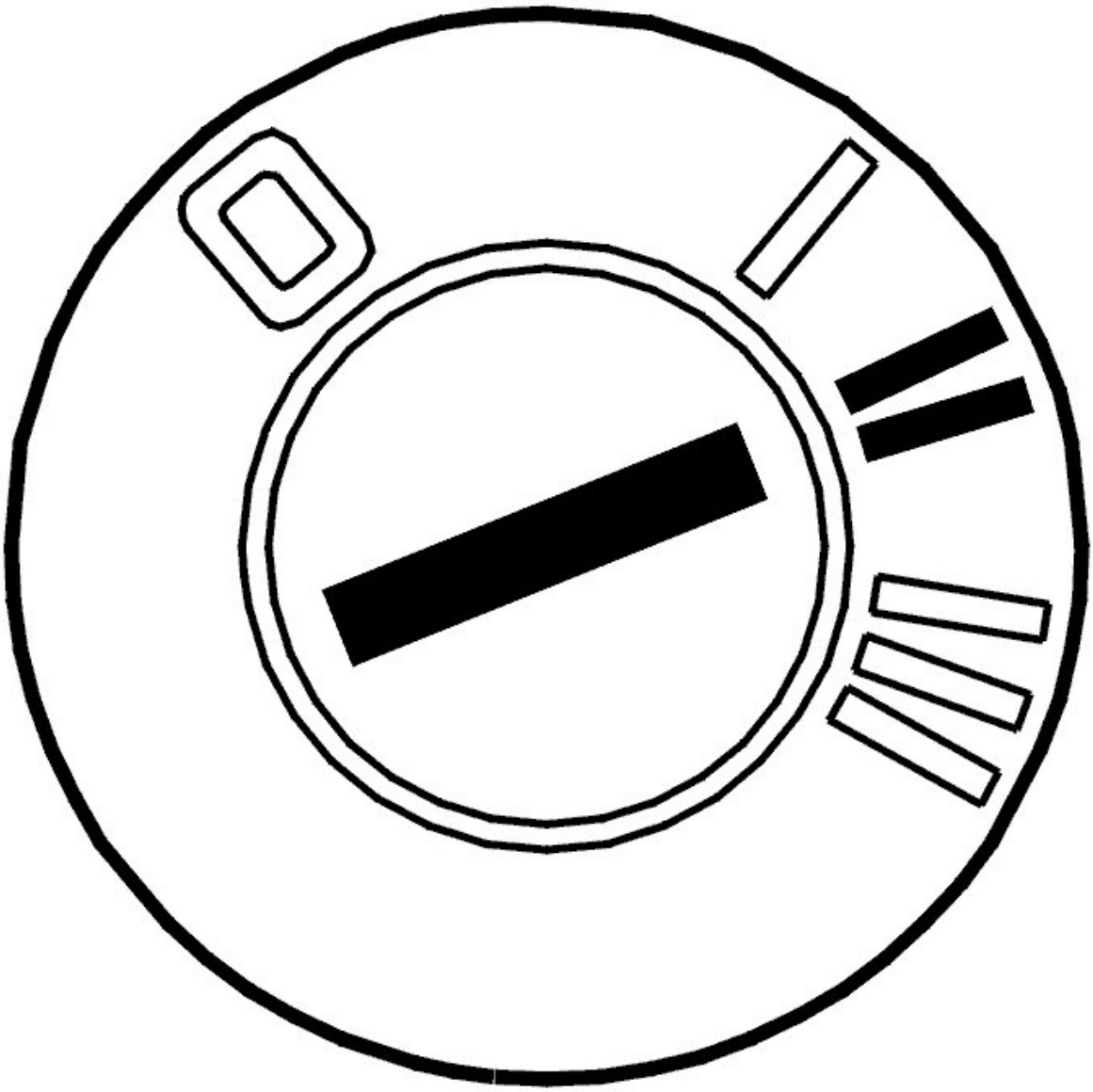
Continue - Verification

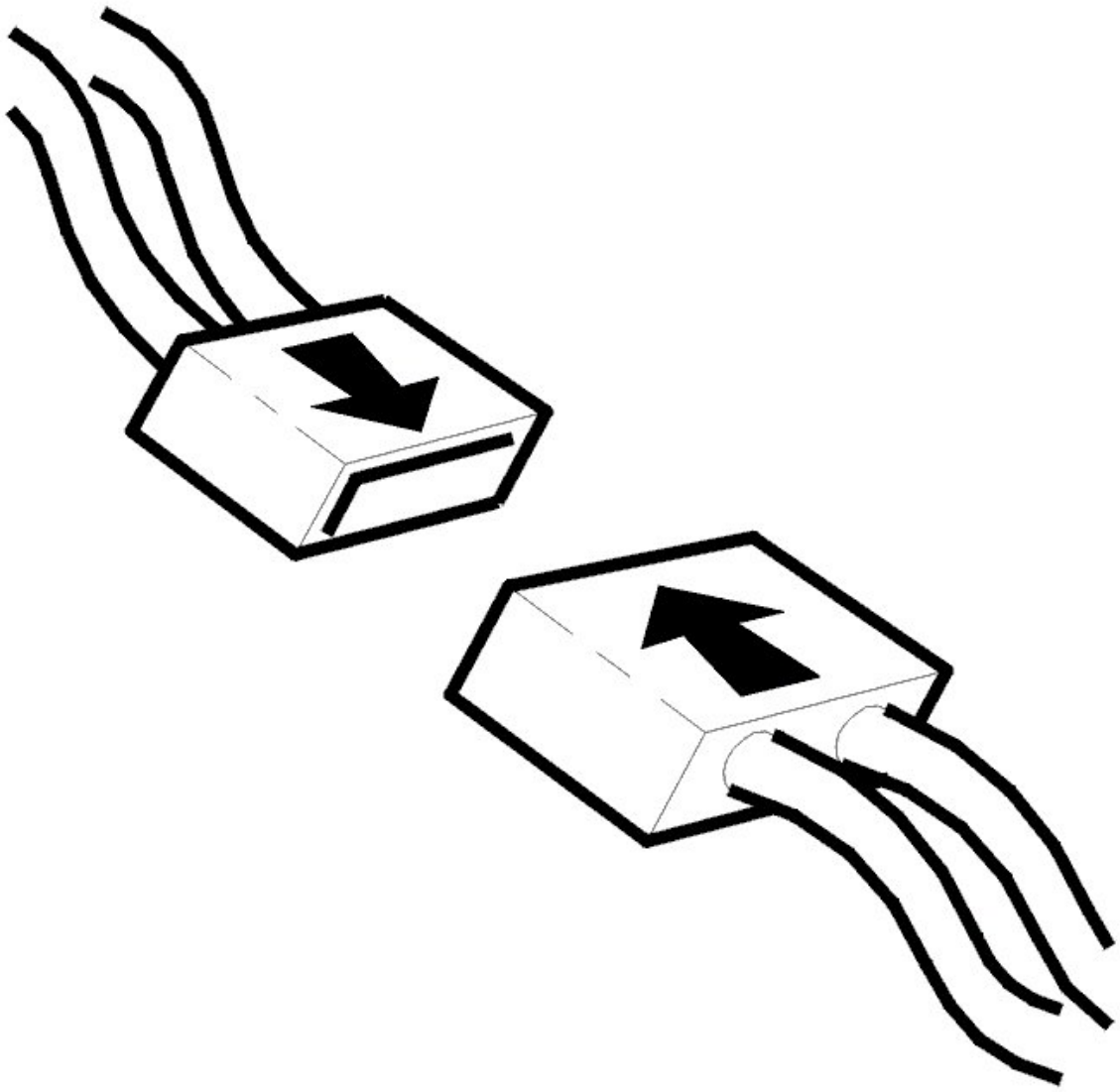
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.

Is the pump OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

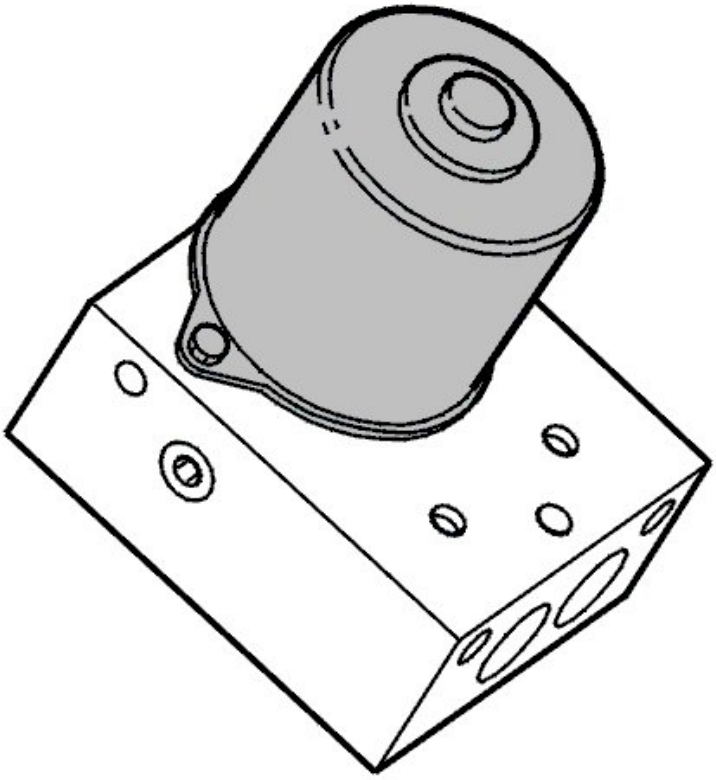
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the operation of the pump motor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0072 is stored if the brake control module (BCM) registers that the pump motor does not start.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- The ABS is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Contact resistance in the terminals
- Defective fuse for the pump motor
- Open-circuit in the power supply to the pump motor
- Open-circuit in the ground lead for the pump motor
- Defective pump motor
- Defective control module.

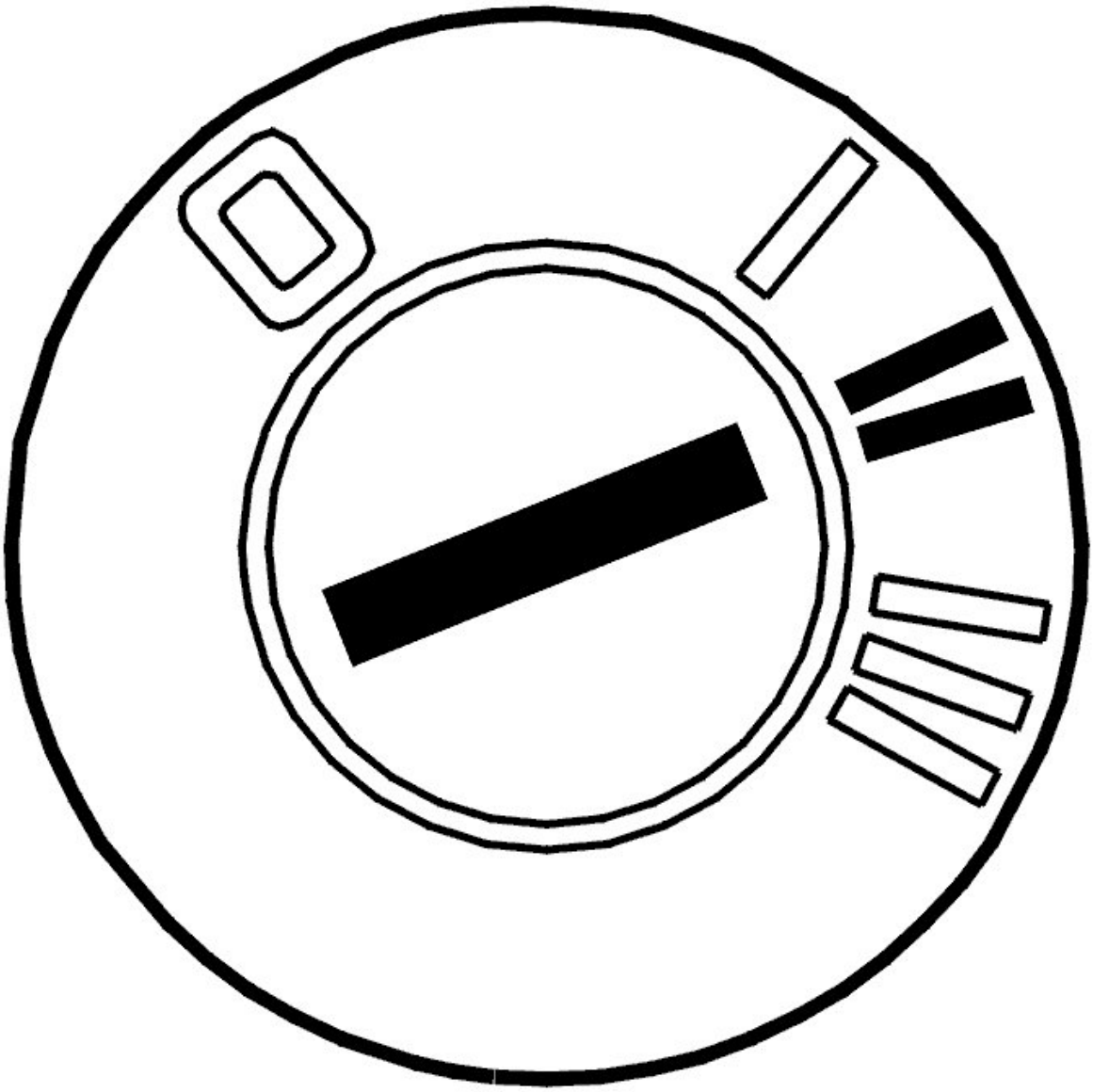
Fault symptom[s]

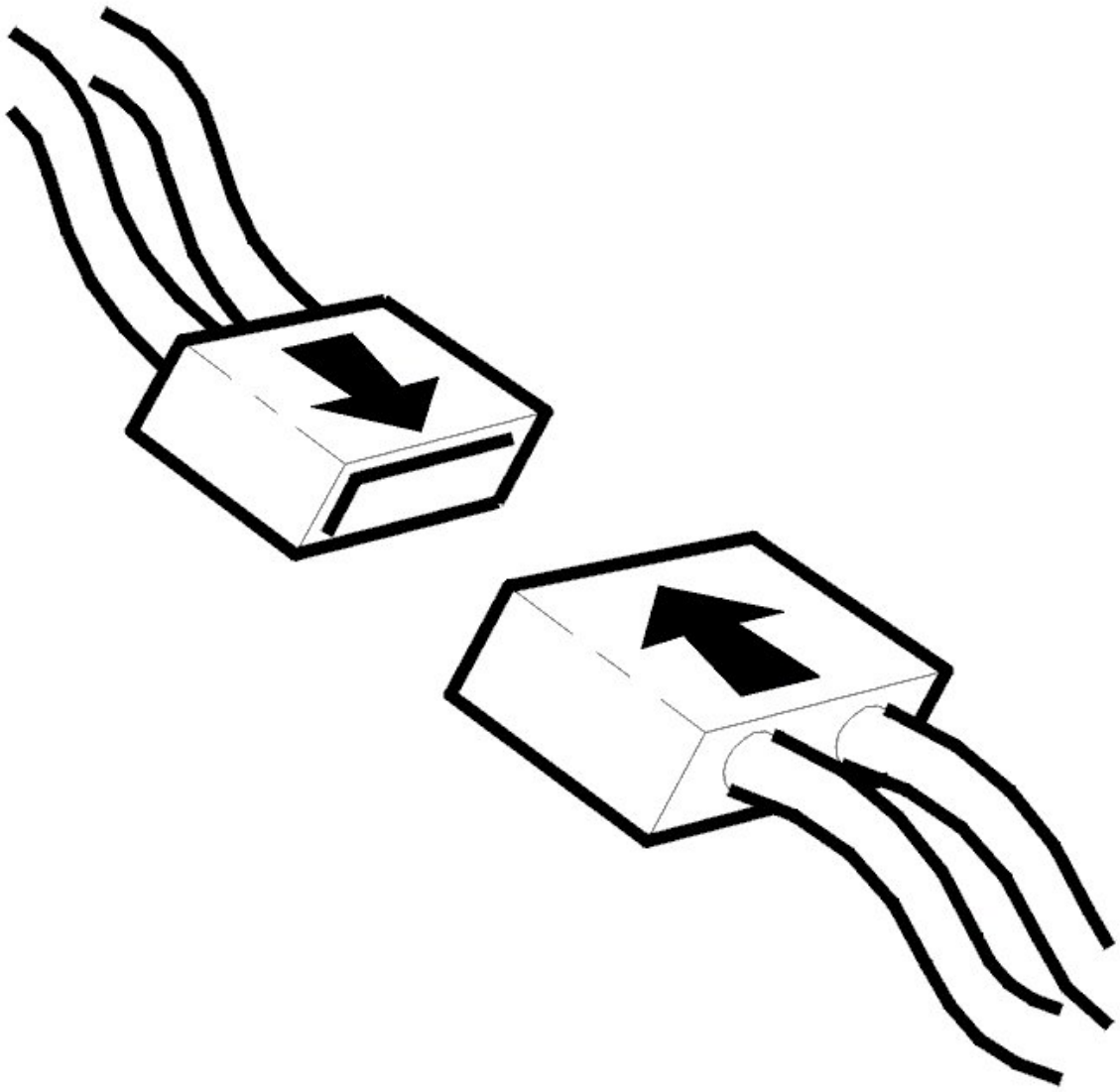
- General warning lamp lit
- The ABS warning lamp is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Mechanical Fault

Mechanical fault

Checking the operation of the pump motor





- Ignition off
- Check the brake control module (BCM) and pump motor connectors. Check for contact resistance and oxidation
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.
If the pump motor starts and seems to operate normally, the cause of the fault was contact resistance and oxidation in the brake control module (BCM) or pump motor connectors.

Other information

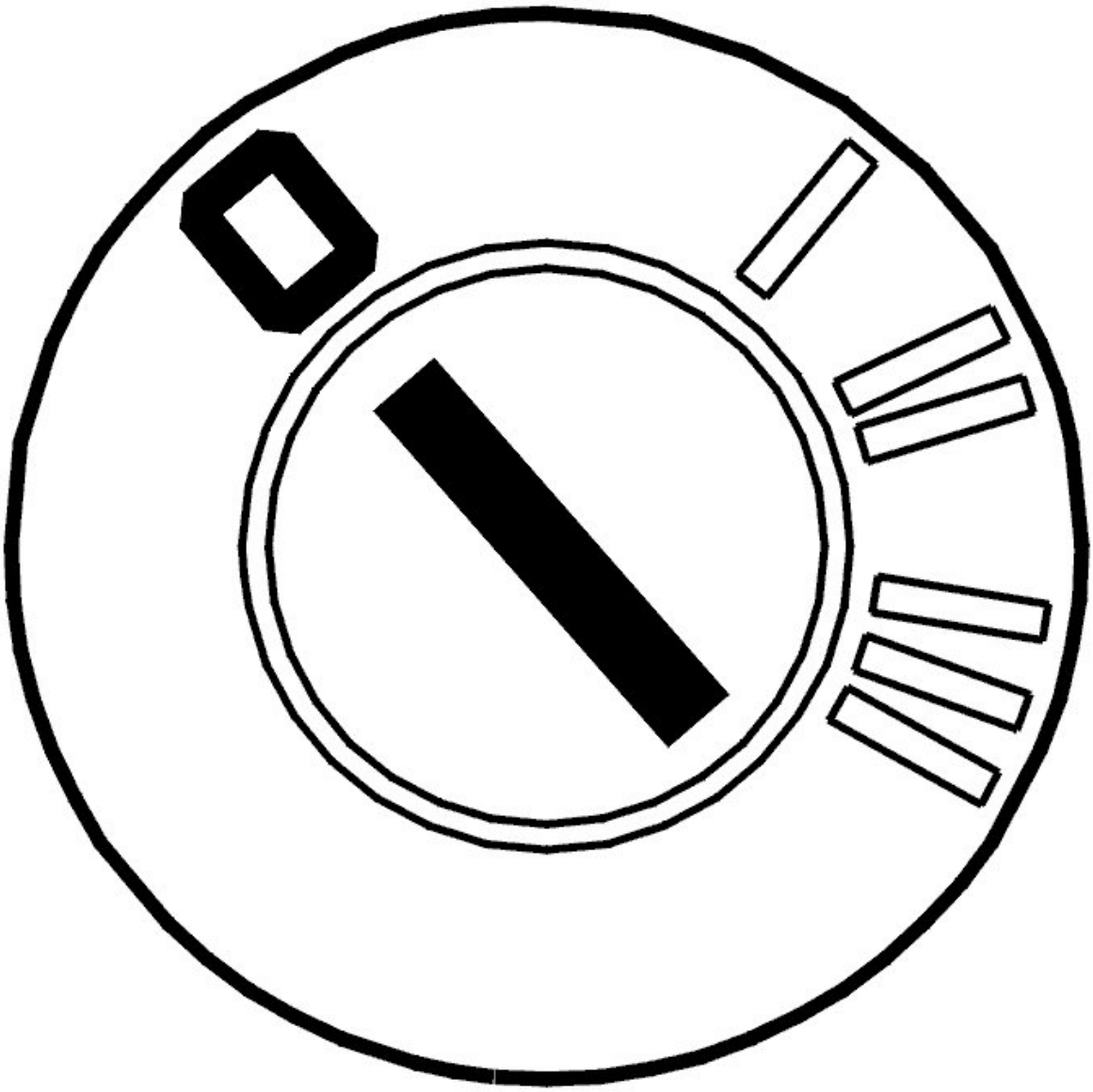
- To disconnect the control module and pump motor, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the pump OK?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component

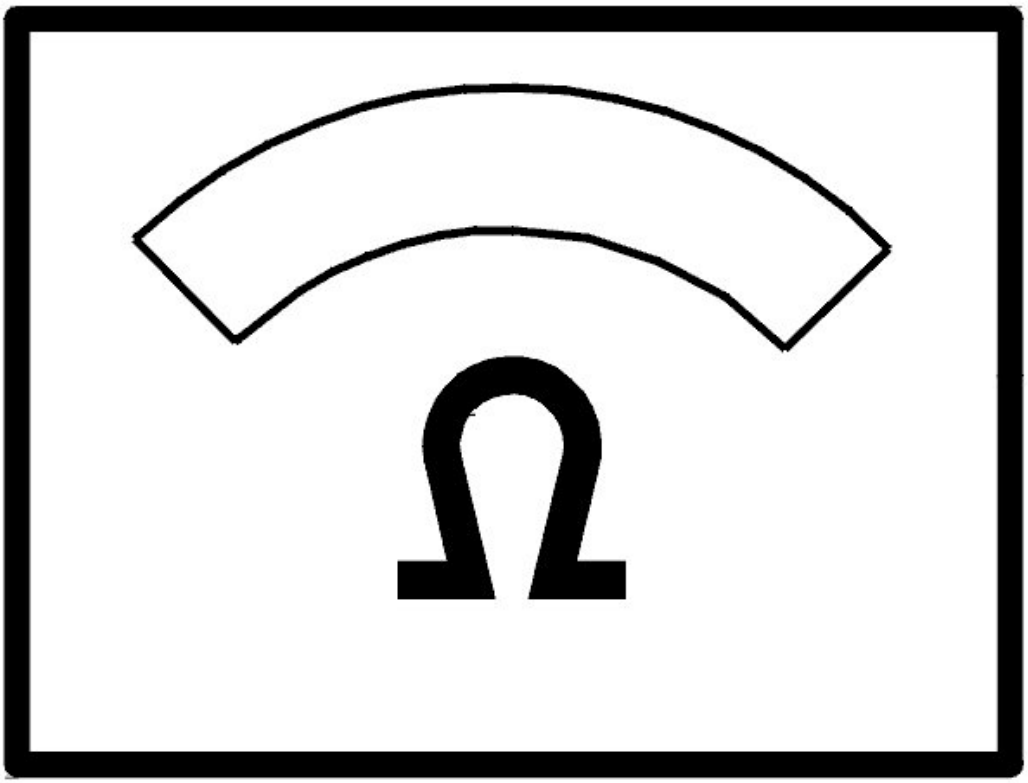


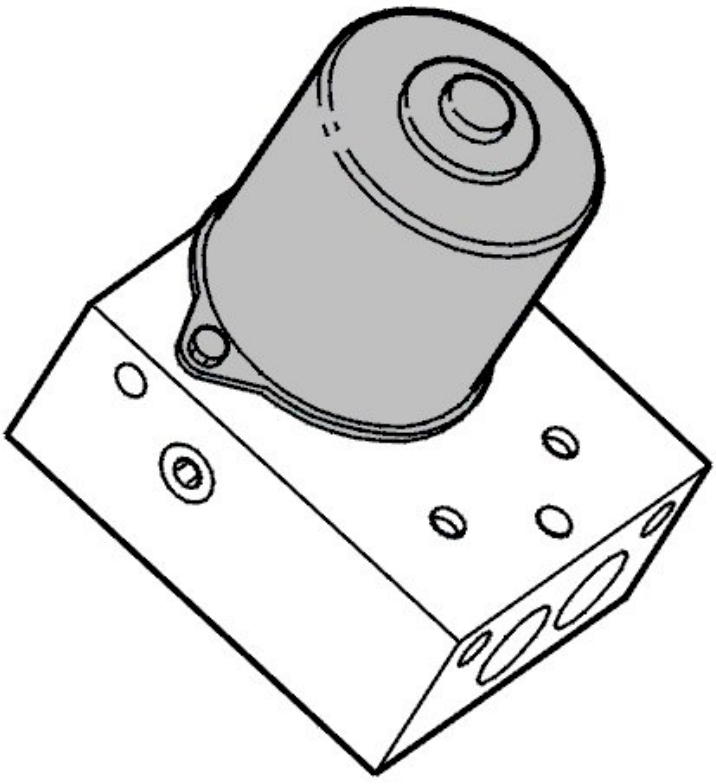
- Ignition off.

Check the wiring between brake control module (BCM) terminal #1 (#A1) and the battery. Check for an open-circuit. Check for a short-circuit to ground.
Check if the fuse for the brake system in the integrated relay / fusebox in the engine compartment has blown. If the fuse is blown, check the cable between the fuse and control module terminal #1 (#A1). Check for a short-circuit to ground. Then replace the fuse.
Check the pump motor circuit by connecting an ohmmeter between pump motor connector terminal #2 and ground. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram.



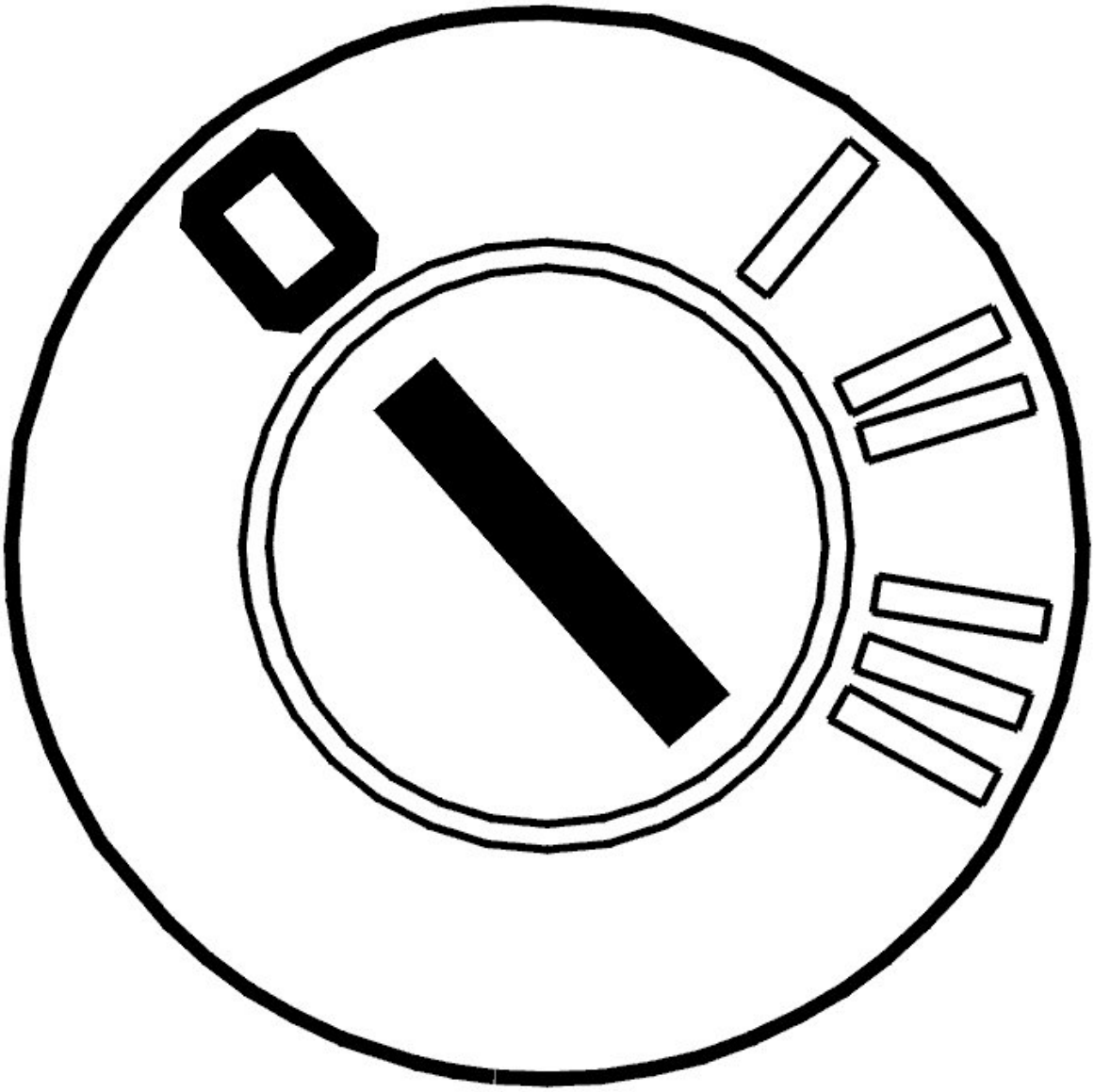


Was a fault detected?

Yes - Verification

No - Checking the pump motor circuit

Checking the pump motor circuit

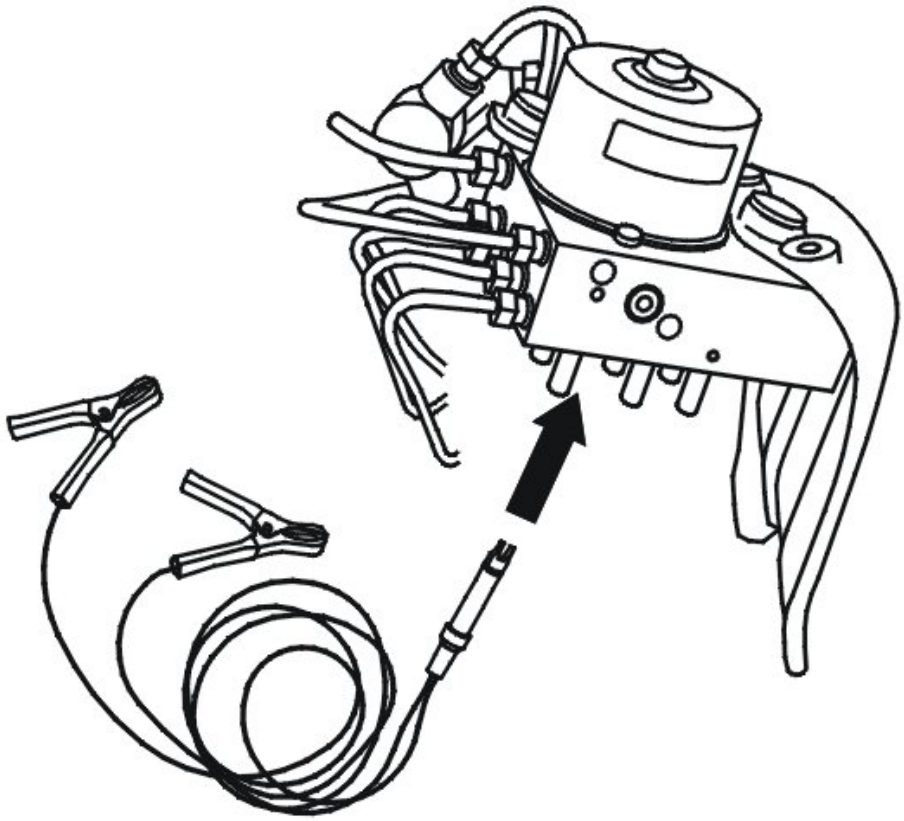


- Ignition off
- Remove the brake control module (BCM)
- Connect adapter 951 2856 Test cable See: Tools and Equipment/951 2856 Test Cable to the power supply terminal on the pump motor
- Connect the red fused cable to battery voltage. The black cable must be connected to ground.

The pump motor must start when the cable is connected. Run for a maximum of 10 seconds.
Replace the control module if the pump motor starts and seems to run normally.
Replace the hydraulic unit if the pump motor does not start.

Other information

- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- To replace the hydraulic unit, see Hydraulic unit, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Hydraulic Control Assembly - Antilock Brakes/Service and Repair.



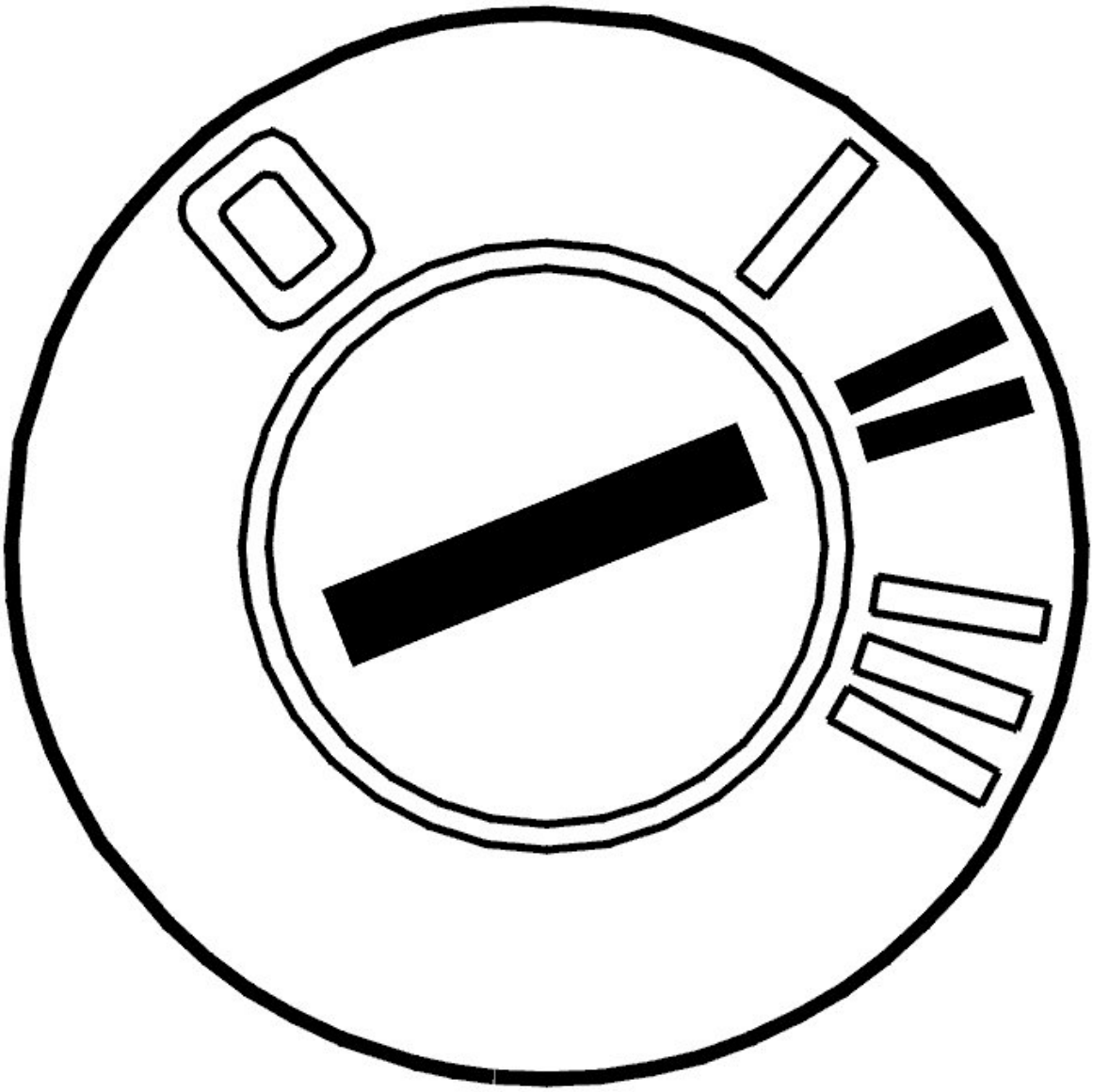
Continue - Verification

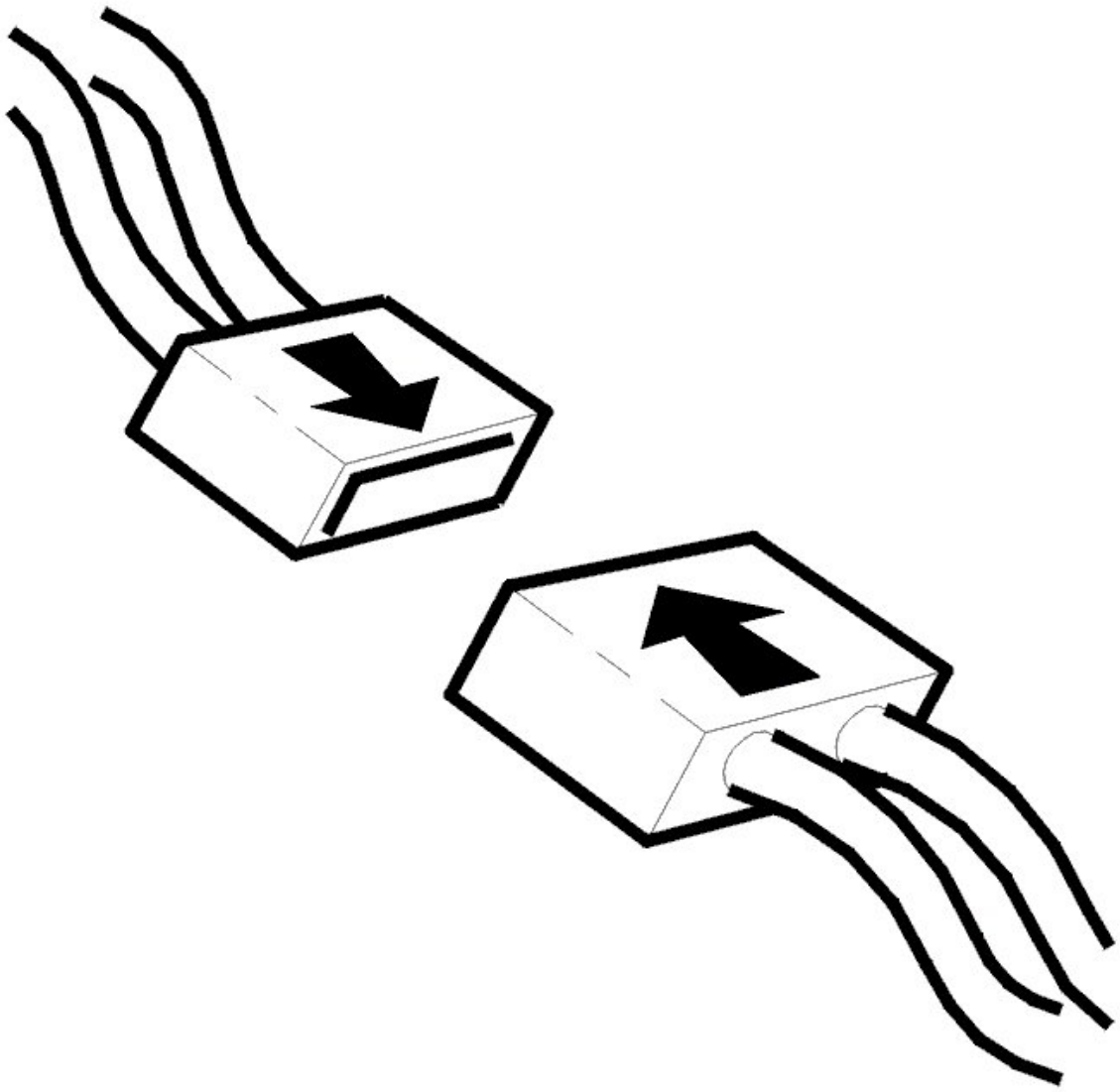
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on
- Activate the pump motor.

Check that the pump motor starts and operates normally.

Is the pump OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

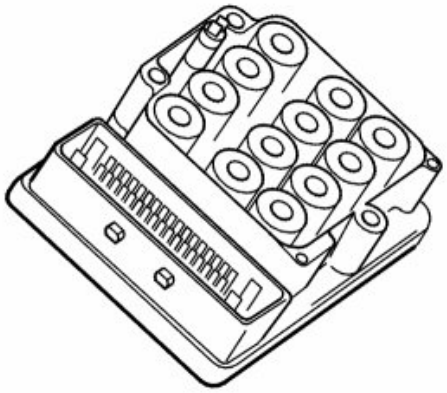
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the operation of the pump motor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) can register diagnostic trouble code (DTC) BCM-0074 for a number of different fault causes. Diagnostic trouble code (DTC) BCM-0074 is stored:

- if there is a short-circuit to ground or open-circuit in the control module inlet or outlet valve circuits
- if the control module is subject to interference so that its calculations are incorrect
- if the control module registers a fault in its internal inlet and outlet valve circuits
- if there is a short-circuit to ground, short-circuit to supply voltage or an open-circuit in the inlet valve in the anti-spin circuit
- if the control module registers an open-circuit or short-circuit in one of its internal circuits.

Substitute value

- The ABS is blocked
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Electronic Brake force Distribution is blocked
- Brake assistance is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Internal fault in the control module.

Fault symptom[s]

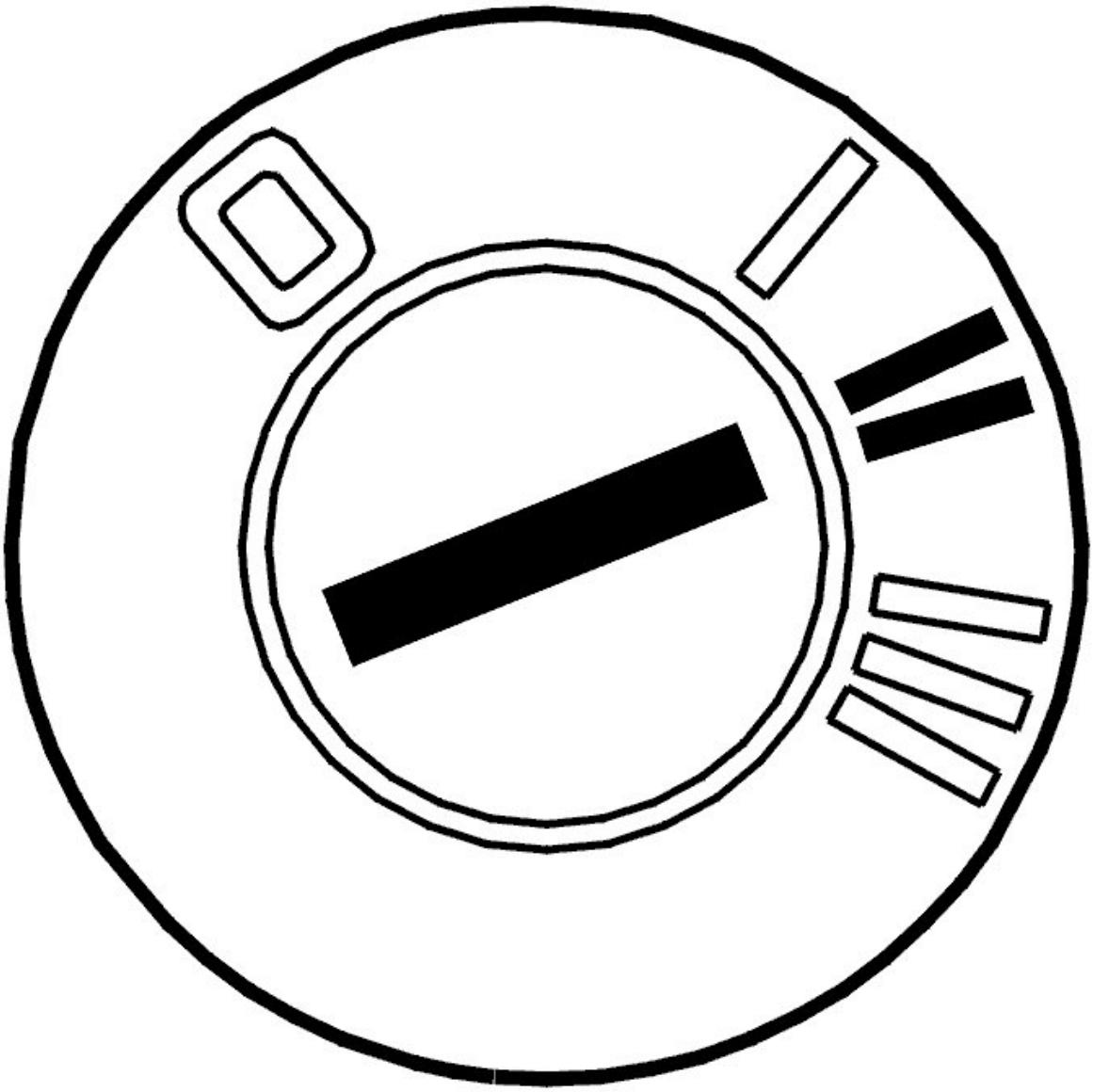
- The ABS warning lamp is lit
- The warning lamp for brake circuit not functioning is lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- The ABS system does not function
- Anti-spin does not function

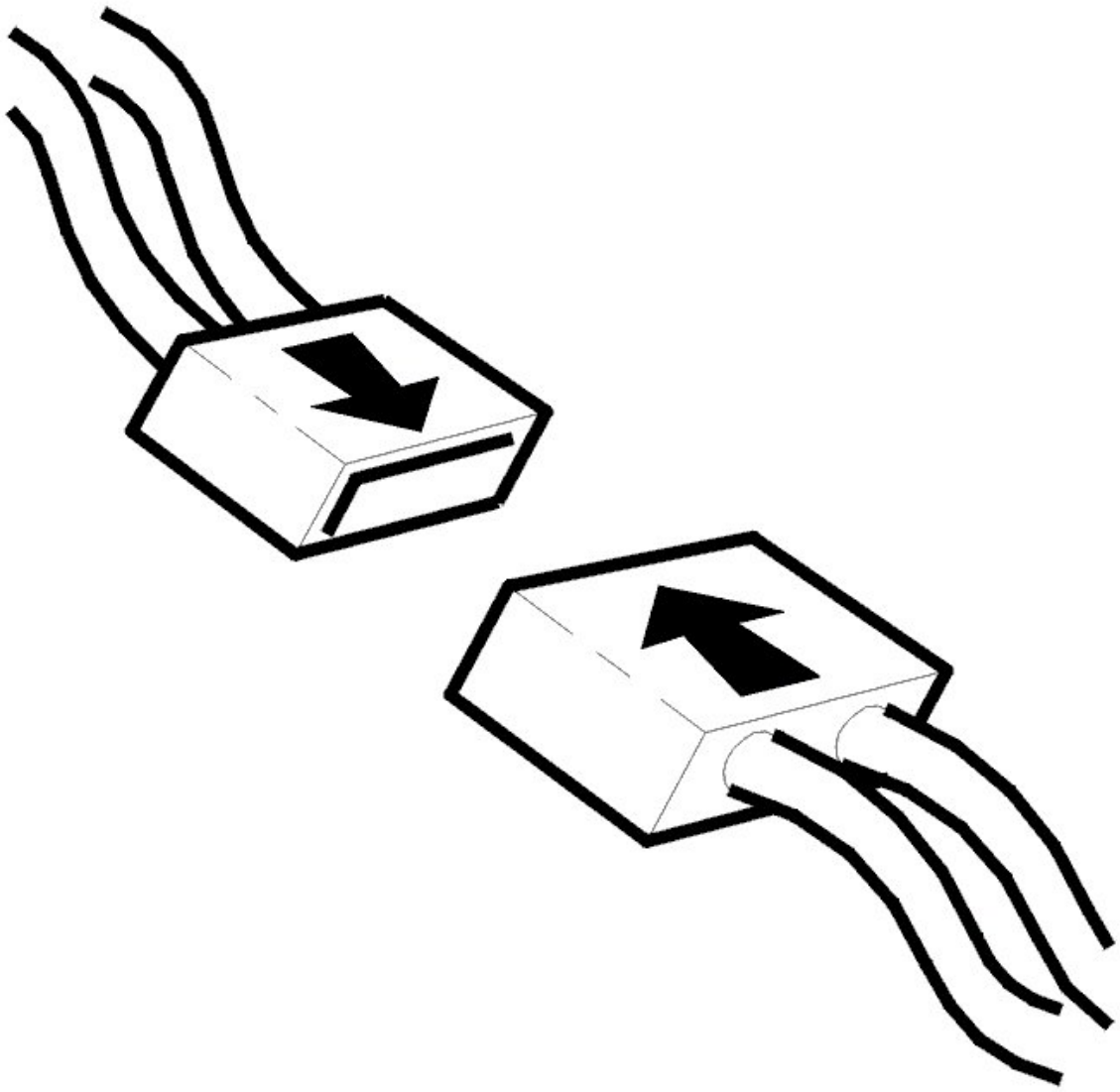
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the function of the hydraulic valves





- Ignition off
- Check the brake control module (BCM) connector. Check for contact resistance and oxidation
- Reconnect the components, connectors etc.
- Ignition on.

Try to activate the hydraulic valves.
There should be a "ticking" noise.

Other information

- To disconnect the control module, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Can the valves be activated?

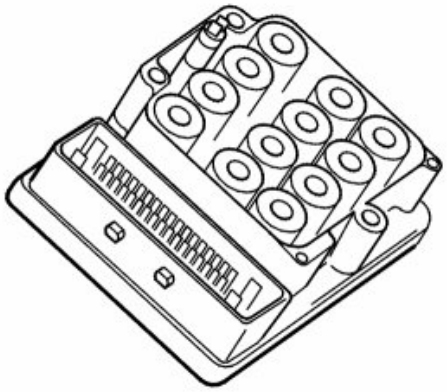
Yes - Fault Found

No - Replacing the control module and programming

Replacing the control module and programming

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing.

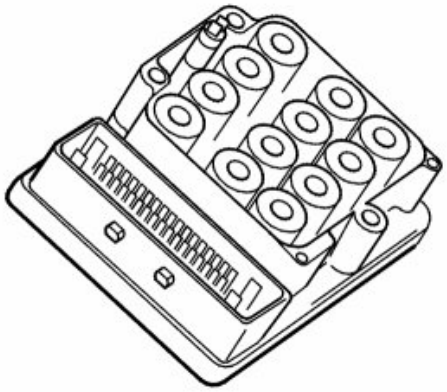


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake control module (BCM) is programmed at the factory with software for several car models. During the first ignition cycle, the control module reads the vehicle configuration data from the central electronic module (CEM). The brake control module (BCM) then configures itself according to the car model and equipment.
Diagnostic trouble code (DTC) BCM-0076 may be stored if

- a brake control module (BCM) is installed that has previously been used in another car
- a central electronic module (CEM) is installed that has previously been used in another car
- software for another car is downloaded into the brake control module (BCM).

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- A brake control module (BCM) from another model has been installed
- A central electronic module (CEM) from another model has been installed
- Software for another car is downloaded into the brake control module (BCM).

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Configuration

Faulty configuration

Fault-tracing information
The diagnostic trouble code (DTC) can be generated in some cases after the brake control module (BCM) has been reprogrammed. If this is the case, the brake control module (BCM) must be configured.

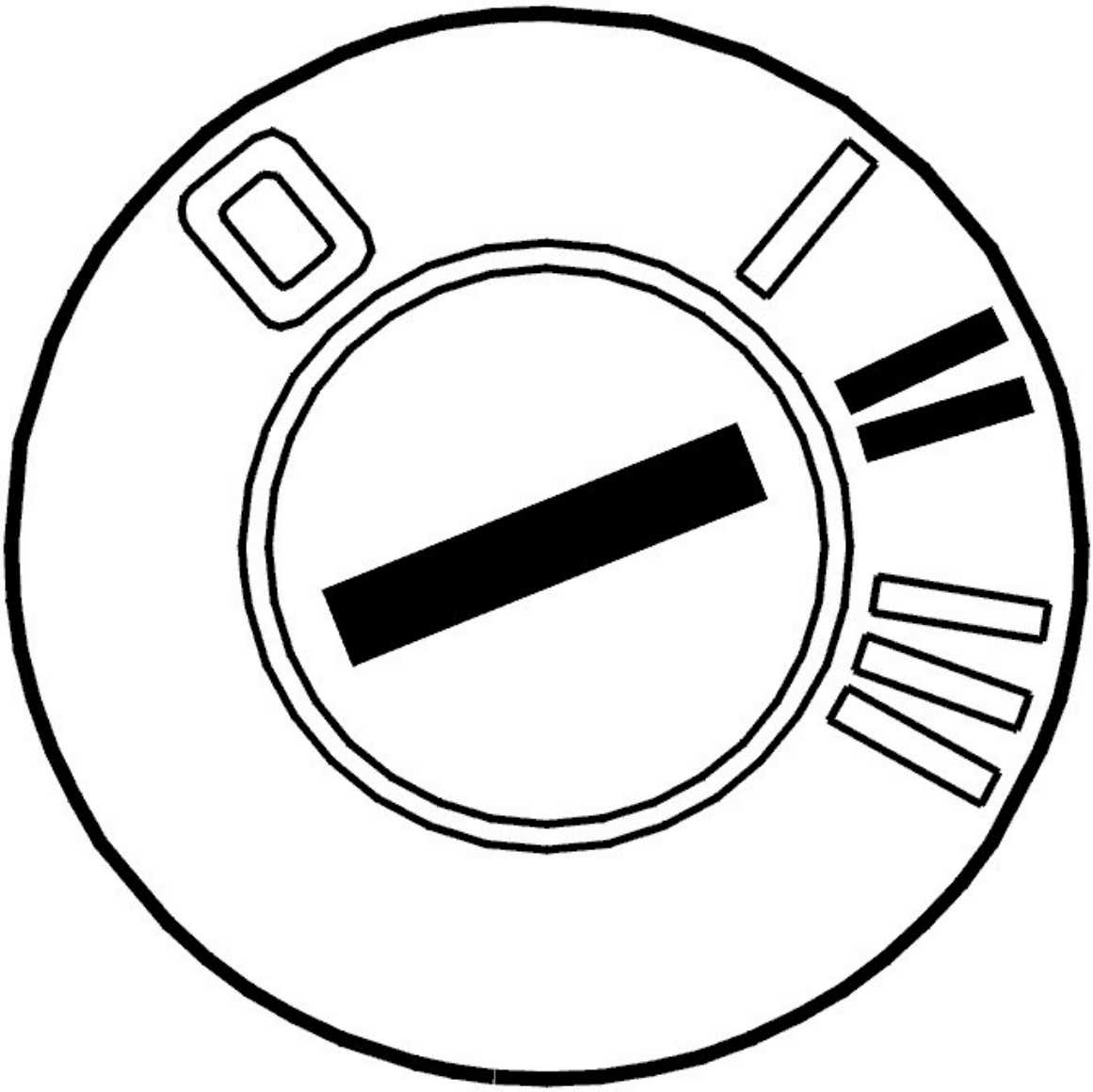
Was the diagnostic trouble code (DTC) generated after the brake control module (BCM) was reprogrammed?

Yes - Checking the car configuration

No - Checking diagnostic trouble codes (DTCs) in the central electronic module (CEM)

Checking diagnostic trouble codes (DTCs) in the central electronic module (CEM)

Note! If the central electronic module (CEM) is incorrectly configured it may affect the brake control module (BCM). Fault-trace the central electronic module (CEM) first if there are diagnostic trouble codes (DTCs) stored in both the control modules.



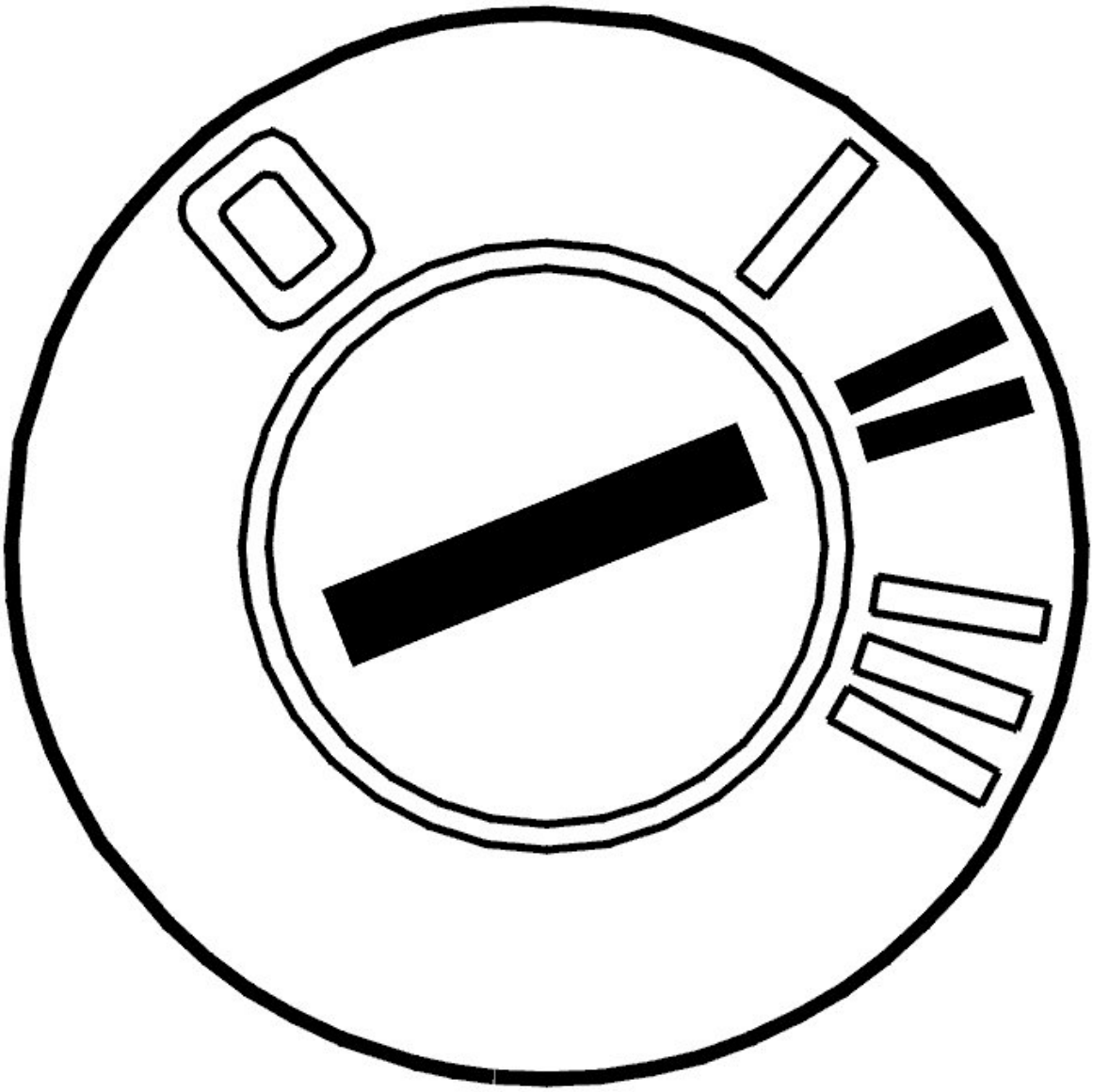
- Ignition on
- Read off diagnostic trouble codes (DTCs).

Are diagnostic trouble codes (DTCs) stored in the central electronic module (CEM)?

Yes - DONE

No - Checking the software

Checking the software



- Ignition on
- Read off the software version from the brake control module (BCM).

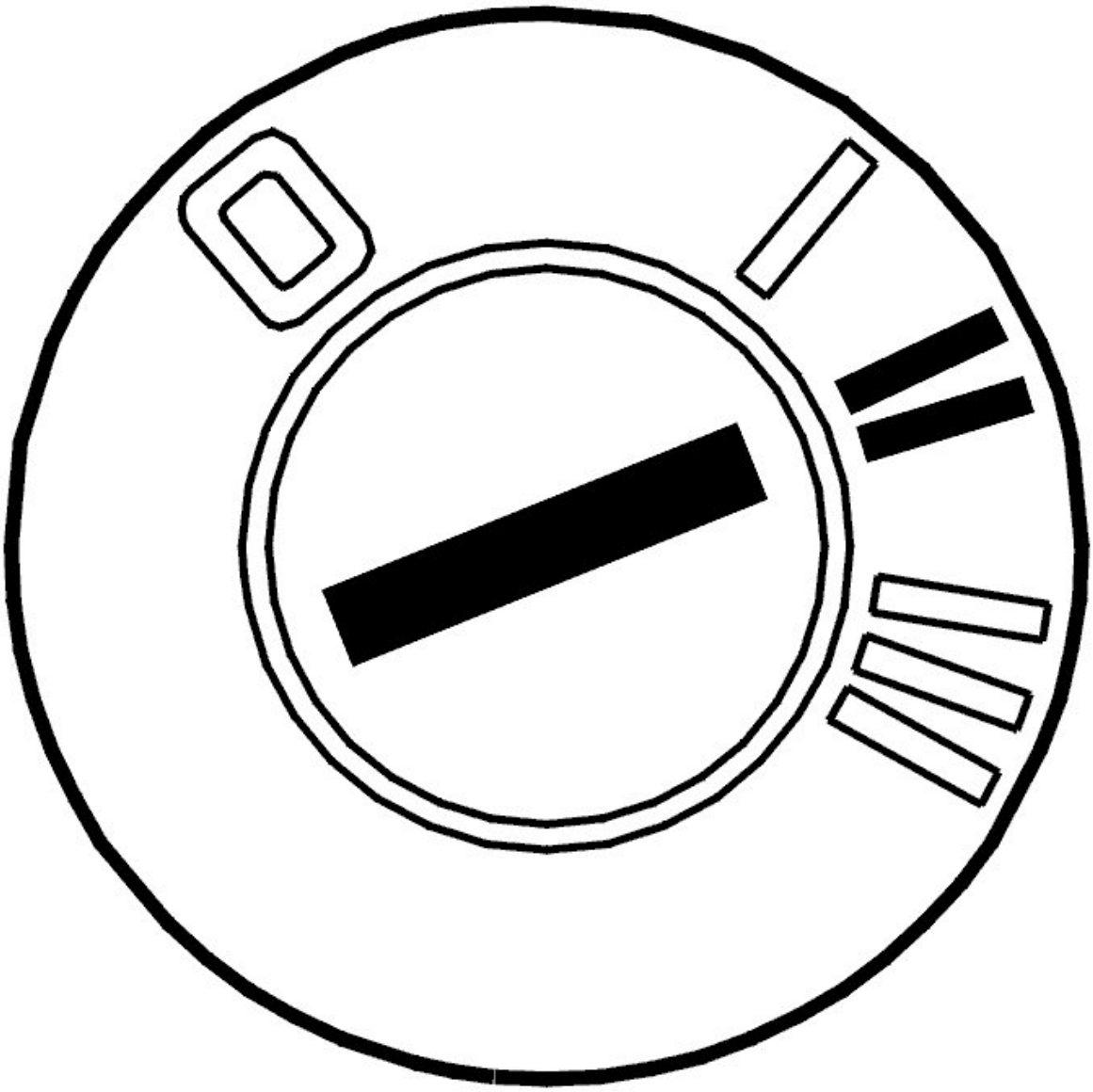
Check that the diagnostic number corresponds to the car configuration. If the software does not correspond to the car configuration, make a bookmark and cancel the fault-tracing. Then go to the software manager and download the correct software. Then resume the fault-tracing.

Was the control module programmed with the correct software?

Yes - Checking the car configuration

No - Erasing diagnostic trouble codes (DTCs)

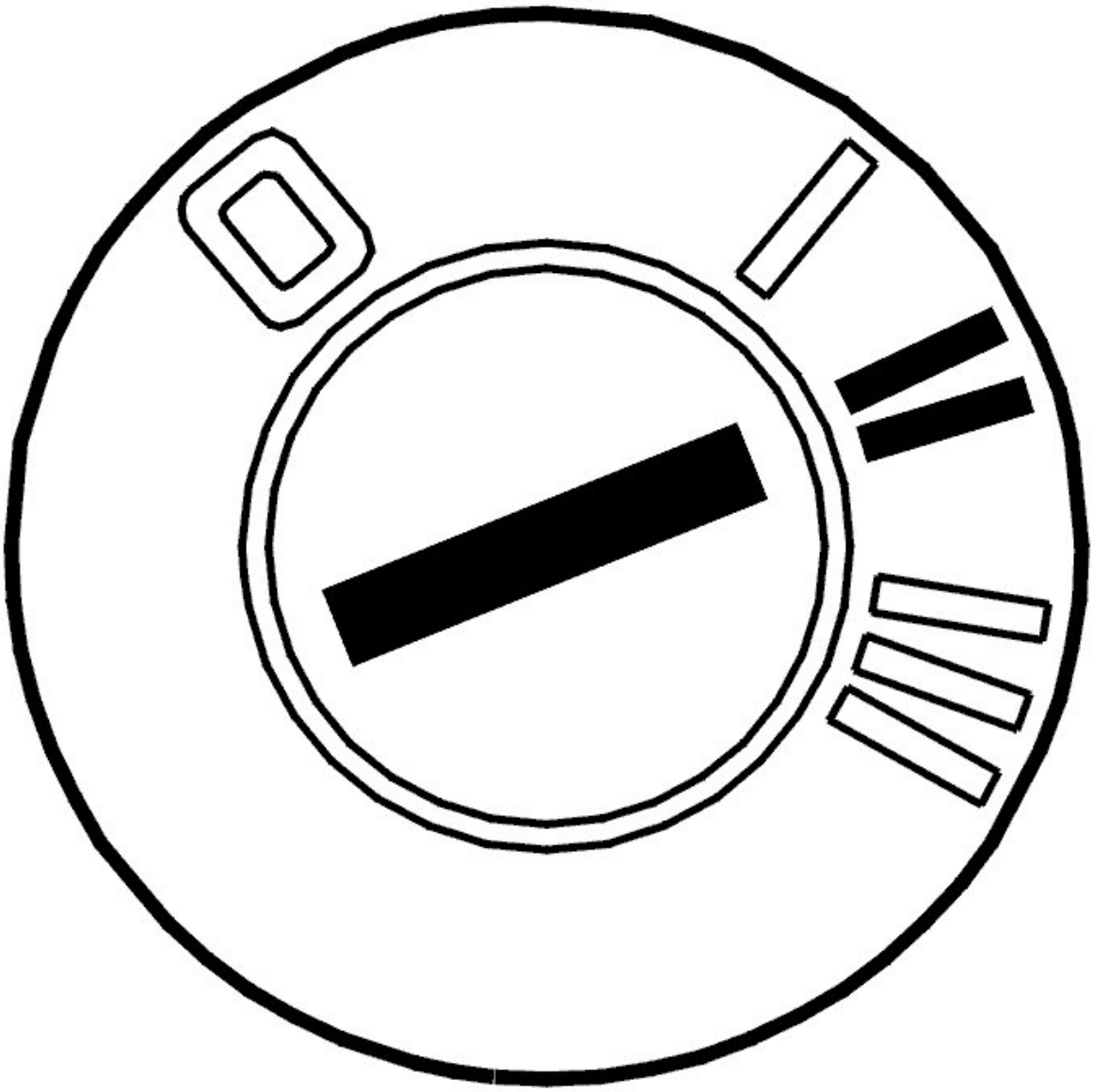
Erasing diagnostic trouble codes (DTCs)



- Ignition on
- Erase diagnostic trouble codes (DTCs) from the brake control module (BCM).

Continue - Reading off diagnostic trouble codes (DTCs)

Reading off diagnostic trouble codes (DTCs)



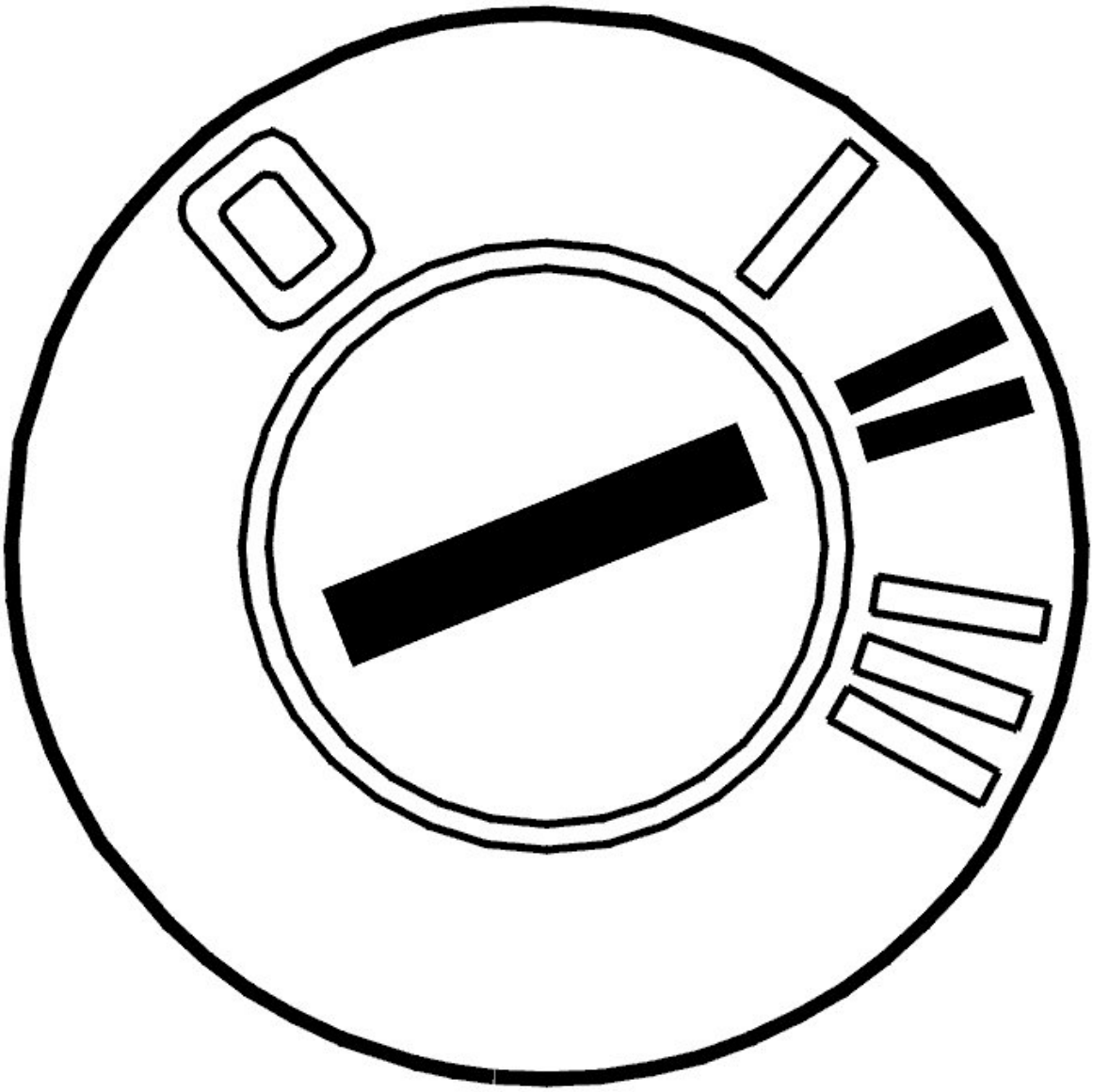
- Ignition off
- Wait approximately 15 seconds.
- Ignition on
- Read off diagnostic trouble codes (DTCs).

Is diagnostic trouble code (DTC) BCM-0076 stored?

Yes - Checking the car configuration

No - **Fault Found**

Checking the car configuration



- Ignition on
- Read off the car configuration from the central electronic module (CEM).

Check that the all the car functions are in the list, e.g. type of brake system, four wheel drive etc. See the example below for cars with DSTC.
Anti-lock brakes = ABS DSTC.

Does the car equipment correspond to the car configuration?

Yes - No Fault Found

No - Checking the brake system

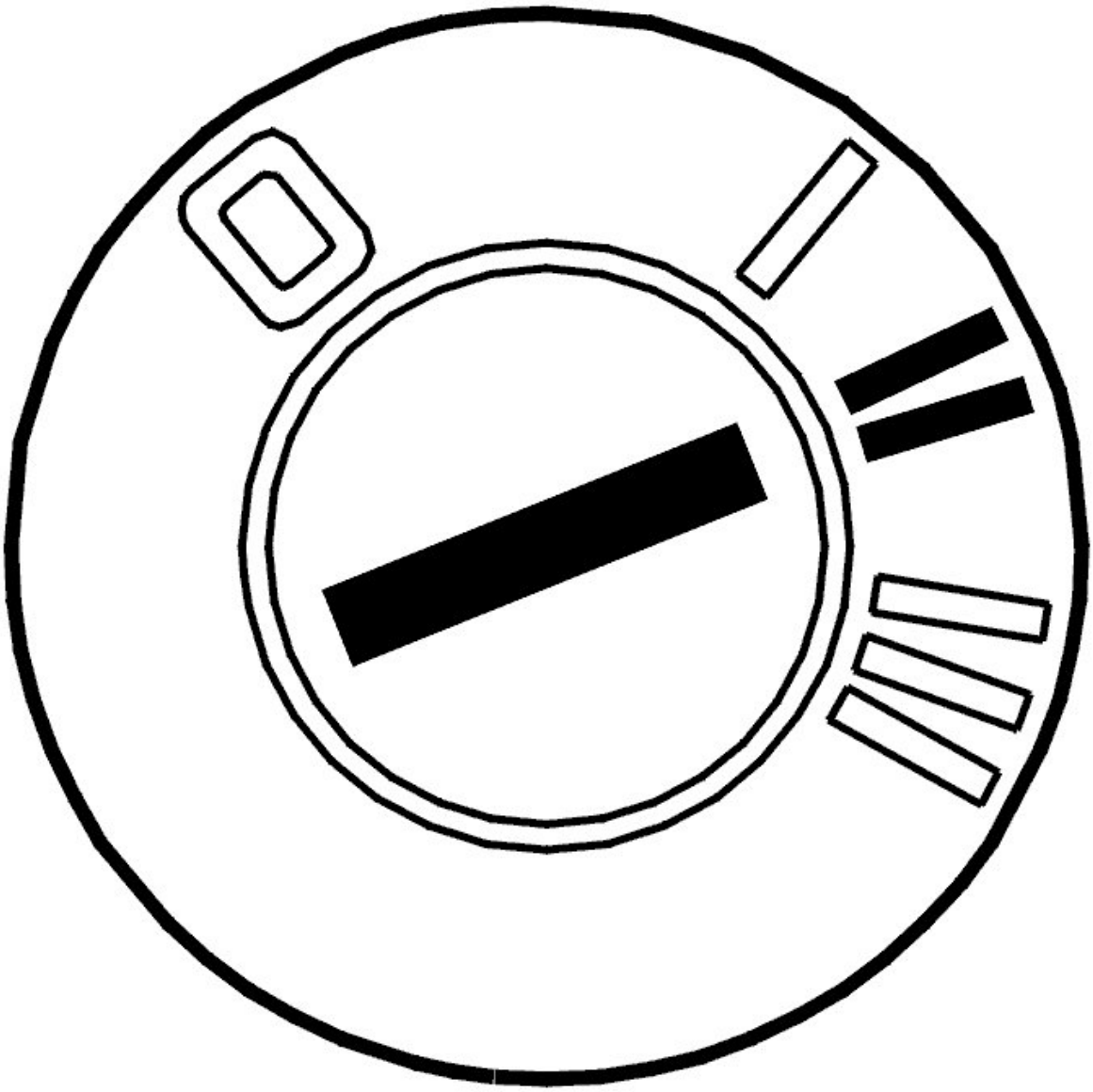
Checking the brake system

Does the car have TRACS, STC or DSTC?

Yes - Resetting and configuring the brake control module (BCM)

No - Resetting and configuring the control module

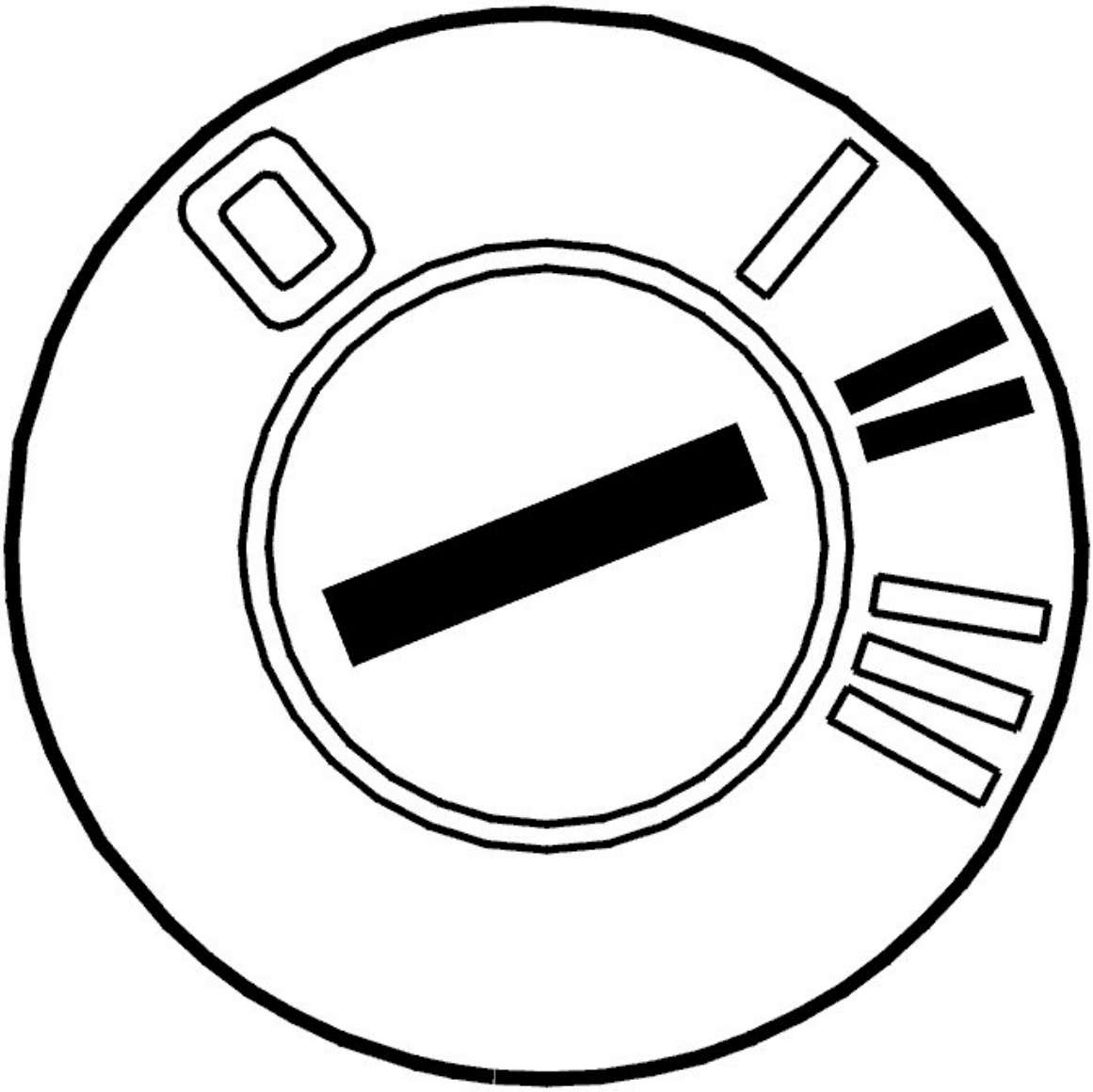
Resetting and configuring the brake control module (BCM)



- Ignition on
- Reset the configuration
- Wait 1 minute.

Continue - Fault-tracing information

Resetting and configuring the control module



- Ignition on
- Reset the configuration
- Wait 1 minute.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

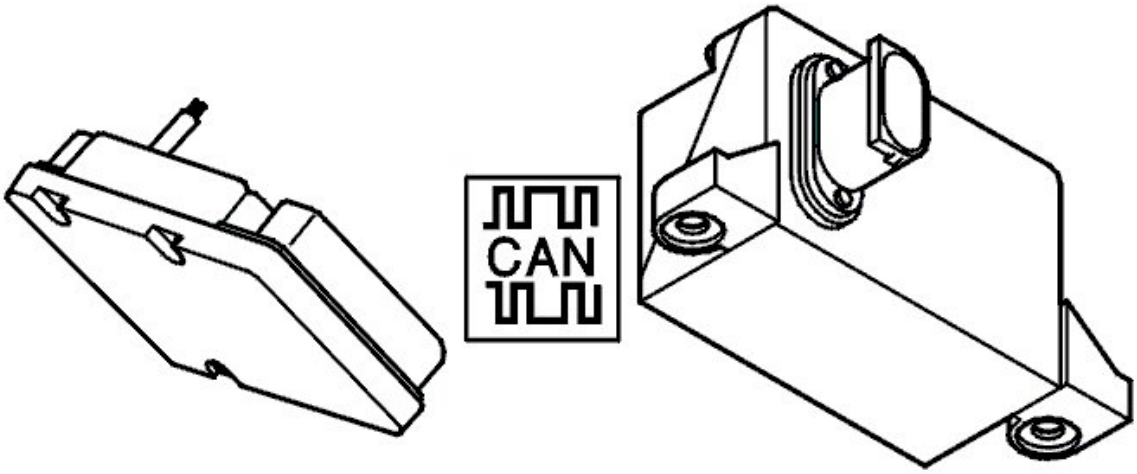
Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module (CEM)

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via its own internal Control area network (CAN). Each sensor has an offset value, correction value, for the individual sensor offset.
Diagnostic trouble code (DTC) BCM-0080, BCM-0081, BCM-0082 or BCM-0083 is stored, depending on the sensor, if the control module registers an incorrect offset value from any of the sensors.

- BCM-0080: Lateral accelerometer
- BCM-0081: Accelerometer
- BCM-0082: Yaw rate sensor
- BCM-0083: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Active yaw control sensor incorrectly installed
- The active yaw control sensor is loose
- The bracket for the active yaw control sensor is bent
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

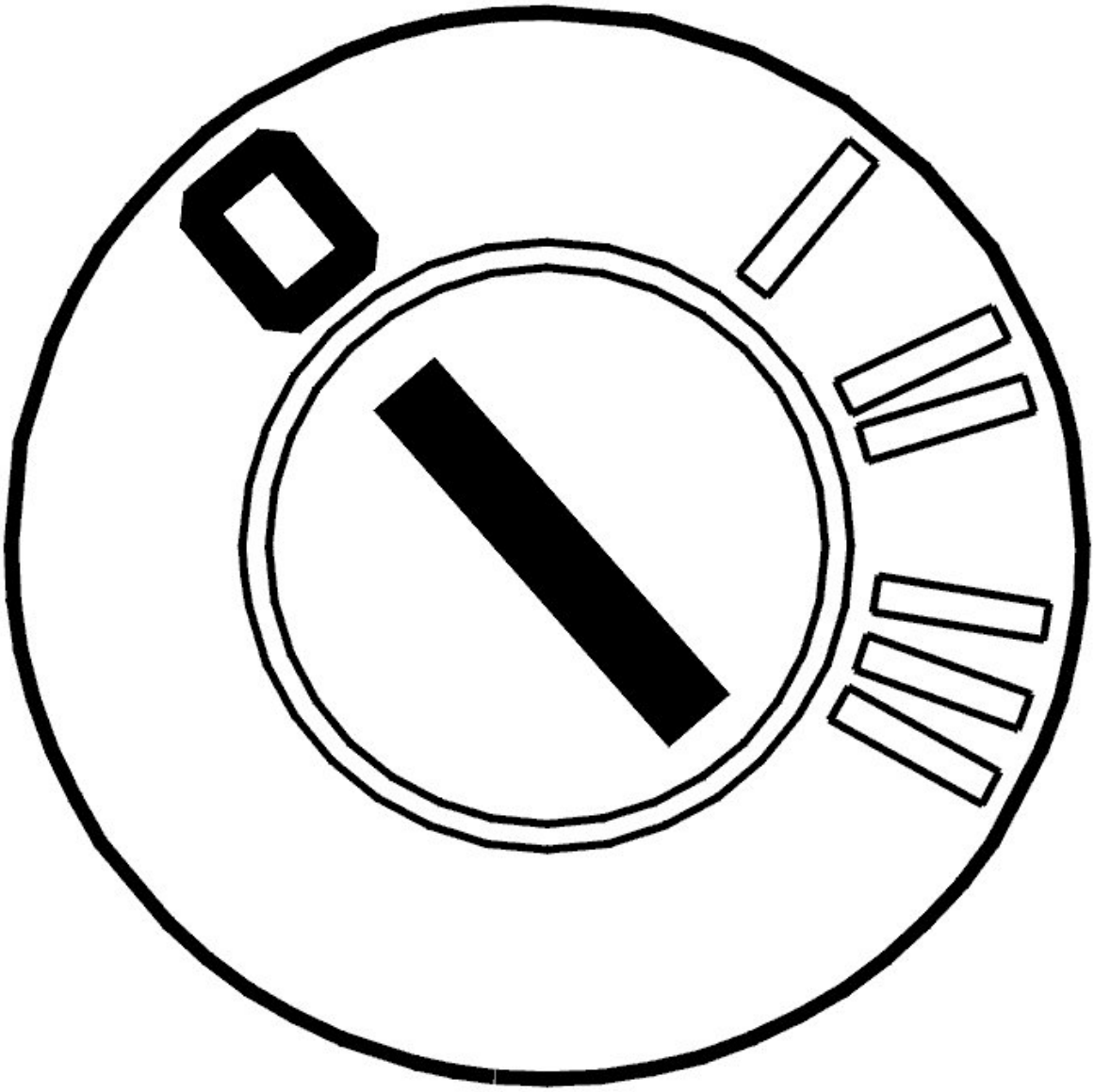
- The anti-spin warning lamp is lit (up to and including 2002 model year)

- General yellow warning lamp lit (from model year 2003)
- Text window and warning symbol/Red symbol and text message
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Incorrect offset value

Incorrect offset value

Checking the component

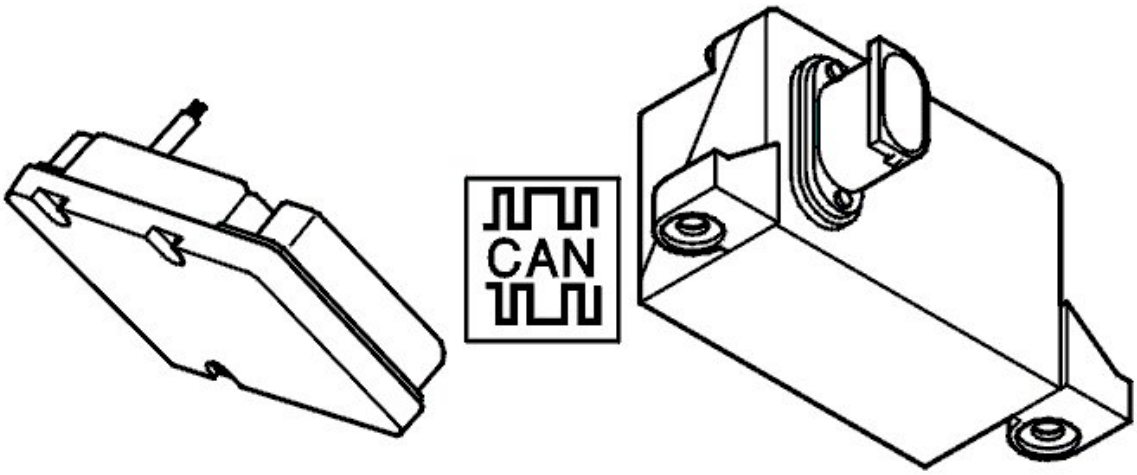


- Ignition off.

Check that the active yaw control sensor is securely installed on the bracket under the passenger seat.
Check that the bracket is not bent or damaged in any other way.
Remedy as necessary.

Other information

- To access or replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.



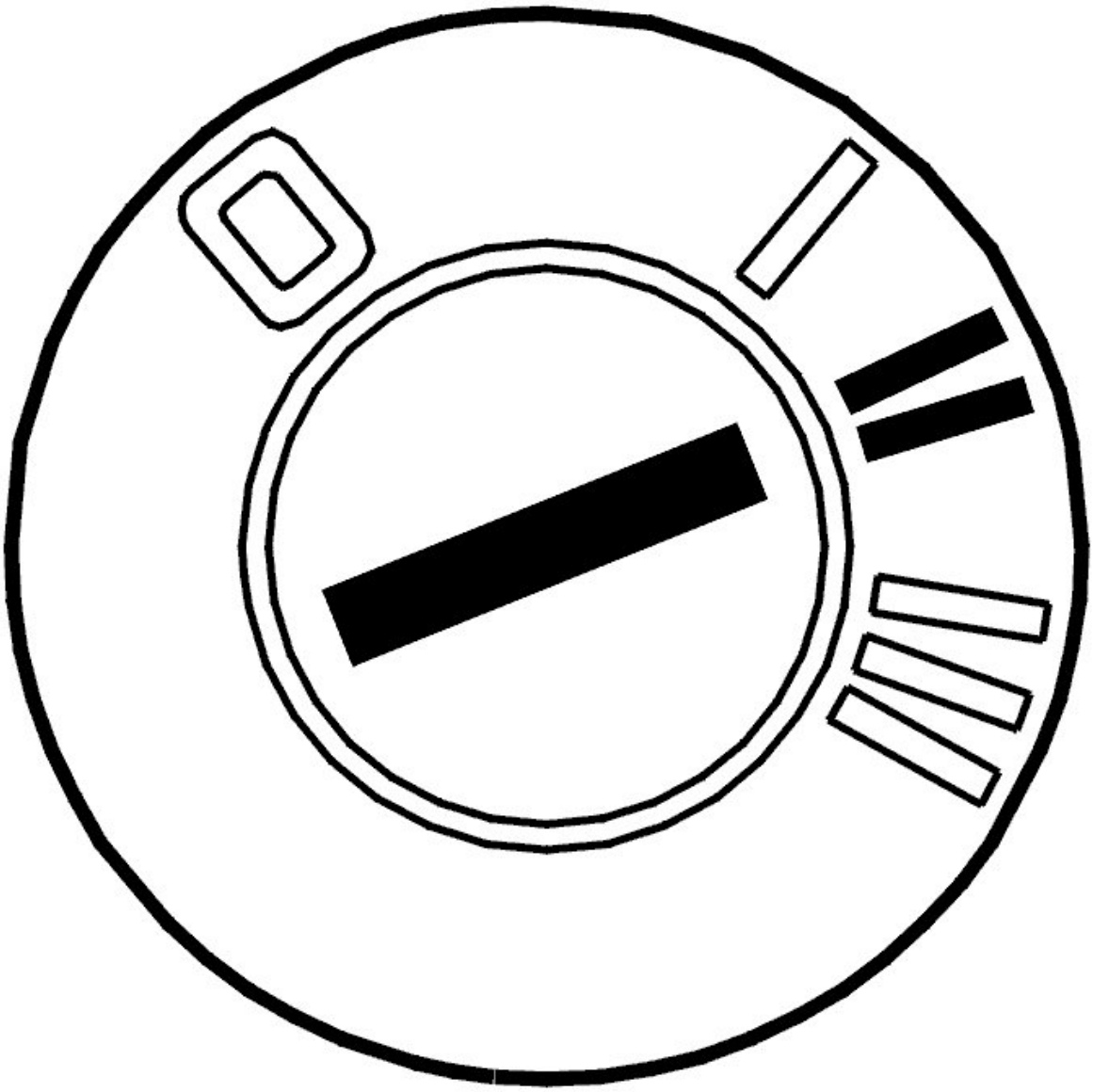
Continue - Verification

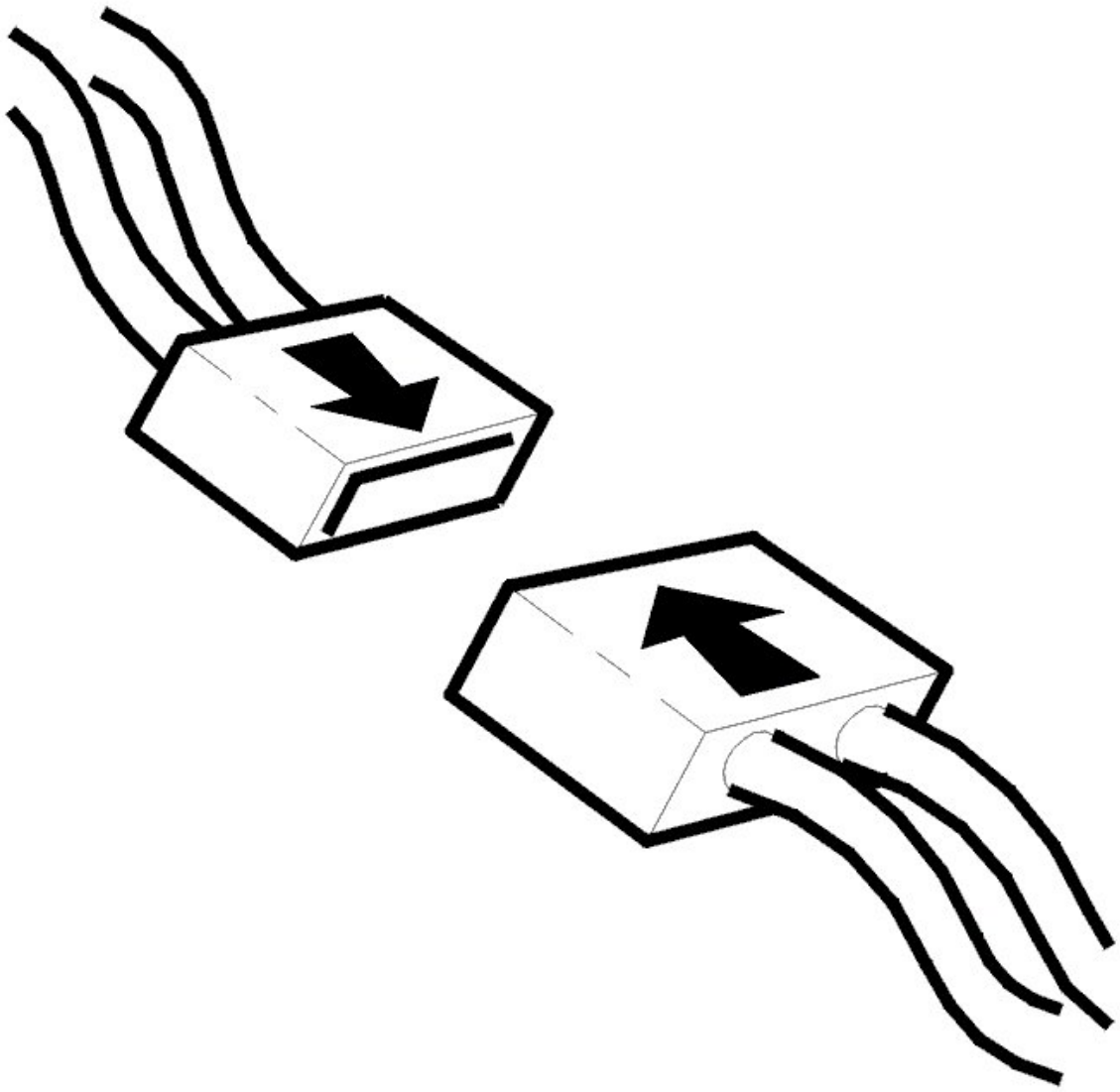
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

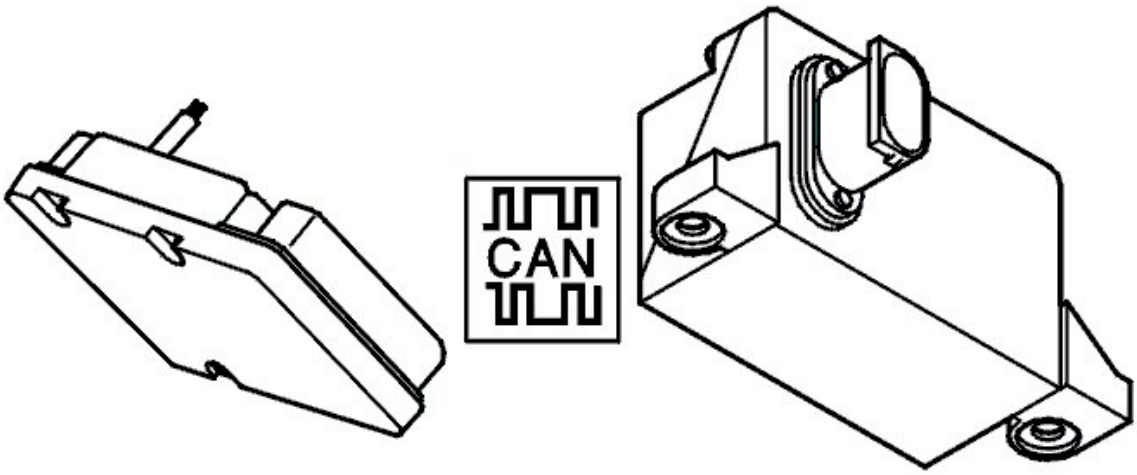
Attempt New Test - Checking the component

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via its own internal Control area network (CAN). Each sensor has an offset value, correction value, for the individual sensor offset.
Diagnostic trouble code (DTC) BCM-0080, BCM-0081, BCM-0082 or BCM-0083 is stored, depending on the sensor, if the control module registers an incorrect offset value from any of the sensors.

- BCM-0080: Lateral accelerometer
- BCM-0081: Accelerometer
- BCM-0082: Yaw rate sensor
- BCM-0083: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes /

Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Active yaw control sensor incorrectly installed
- The active yaw control sensor is loose
- The bracket for the active yaw control sensor is bent
- Internal fault in the active yaw control sensor.

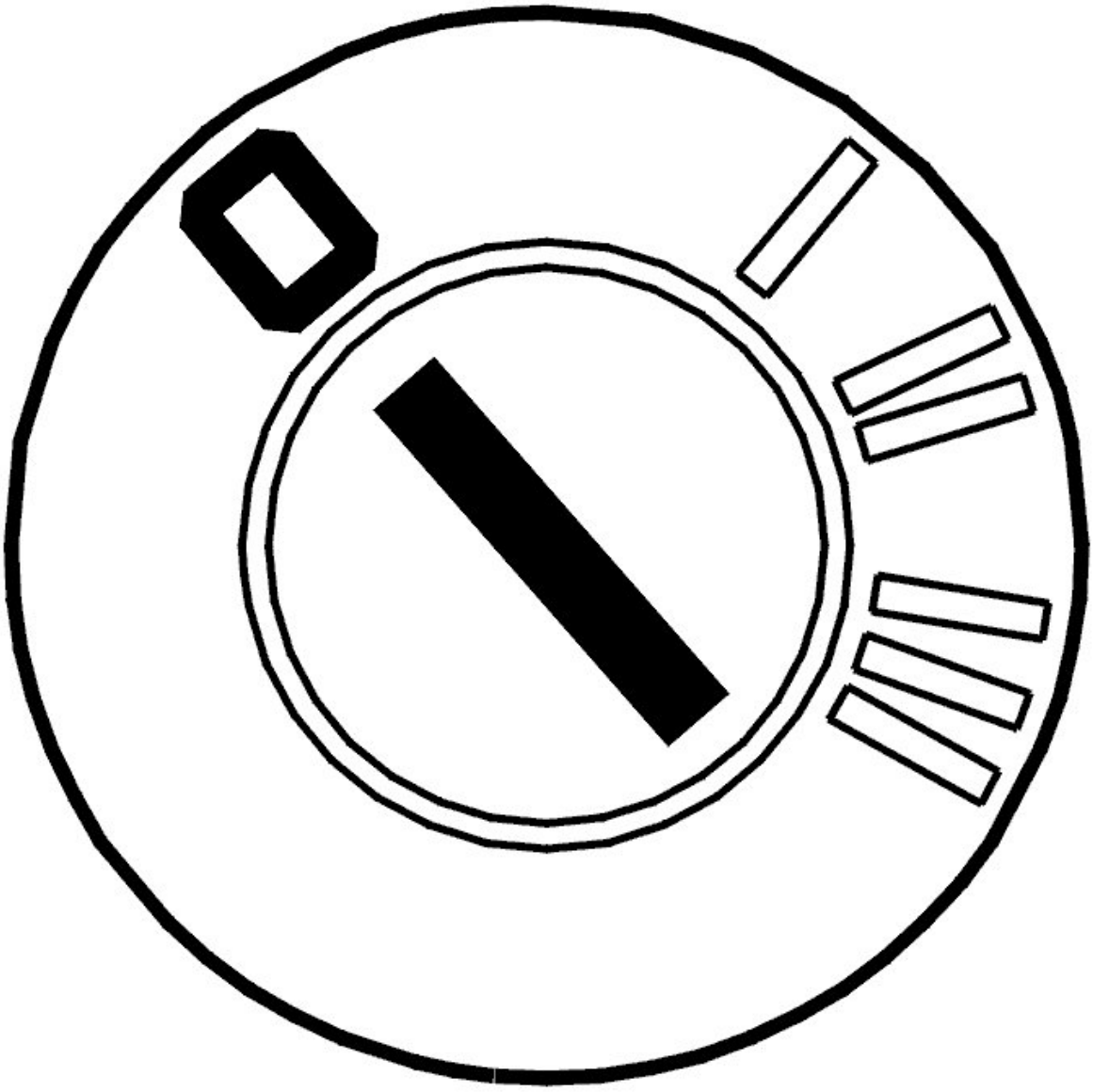
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Text window and warning symbol/Red symbol and text message
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Incorrect Offset Value

Incorrect offset value

Checking the component

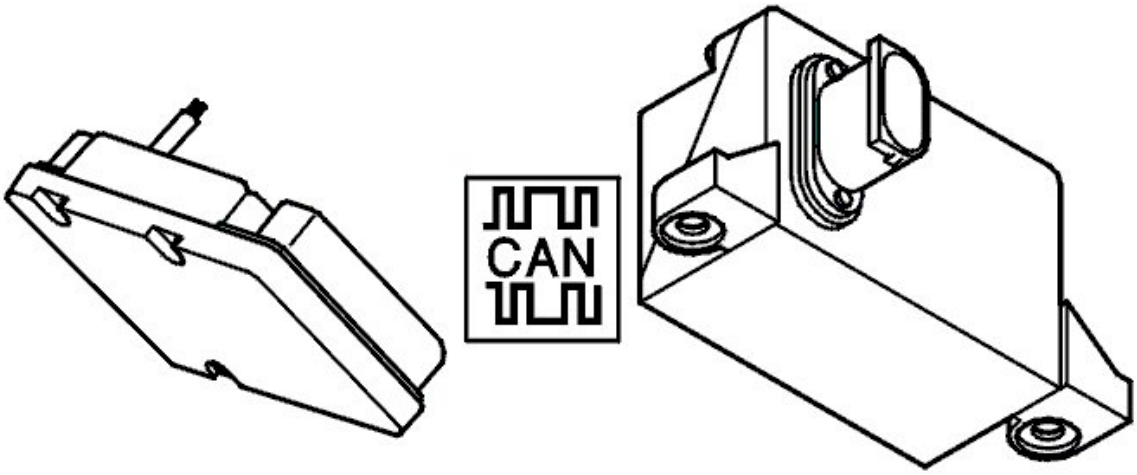


- Ignition off.

Check that the active yaw control sensor is securely installed on the bracket under the passenger seat.
Check that the bracket is not bent or damaged in any other way.
Remedy as necessary.

Other information

- To access or replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.



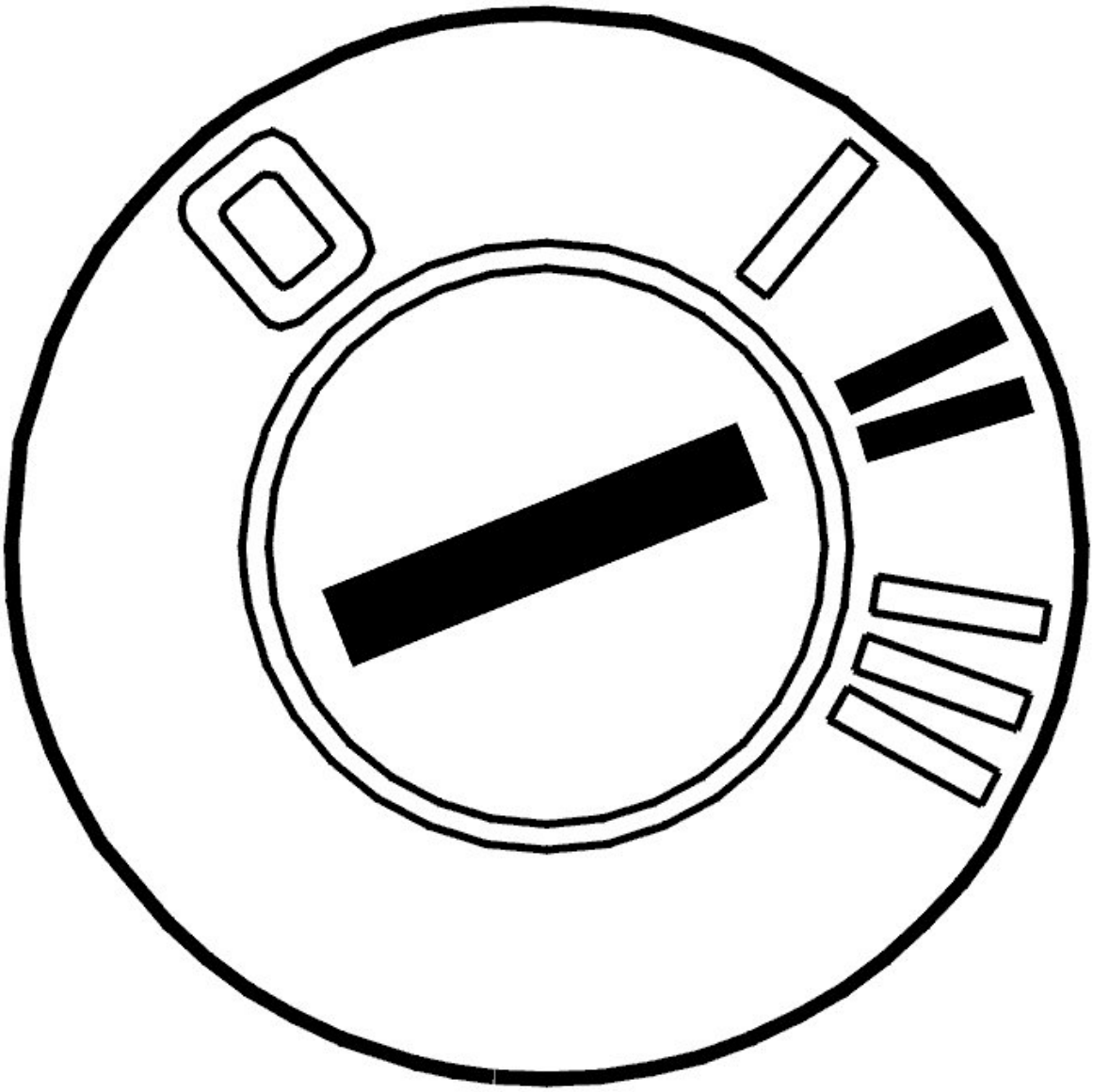
Continue - Verification

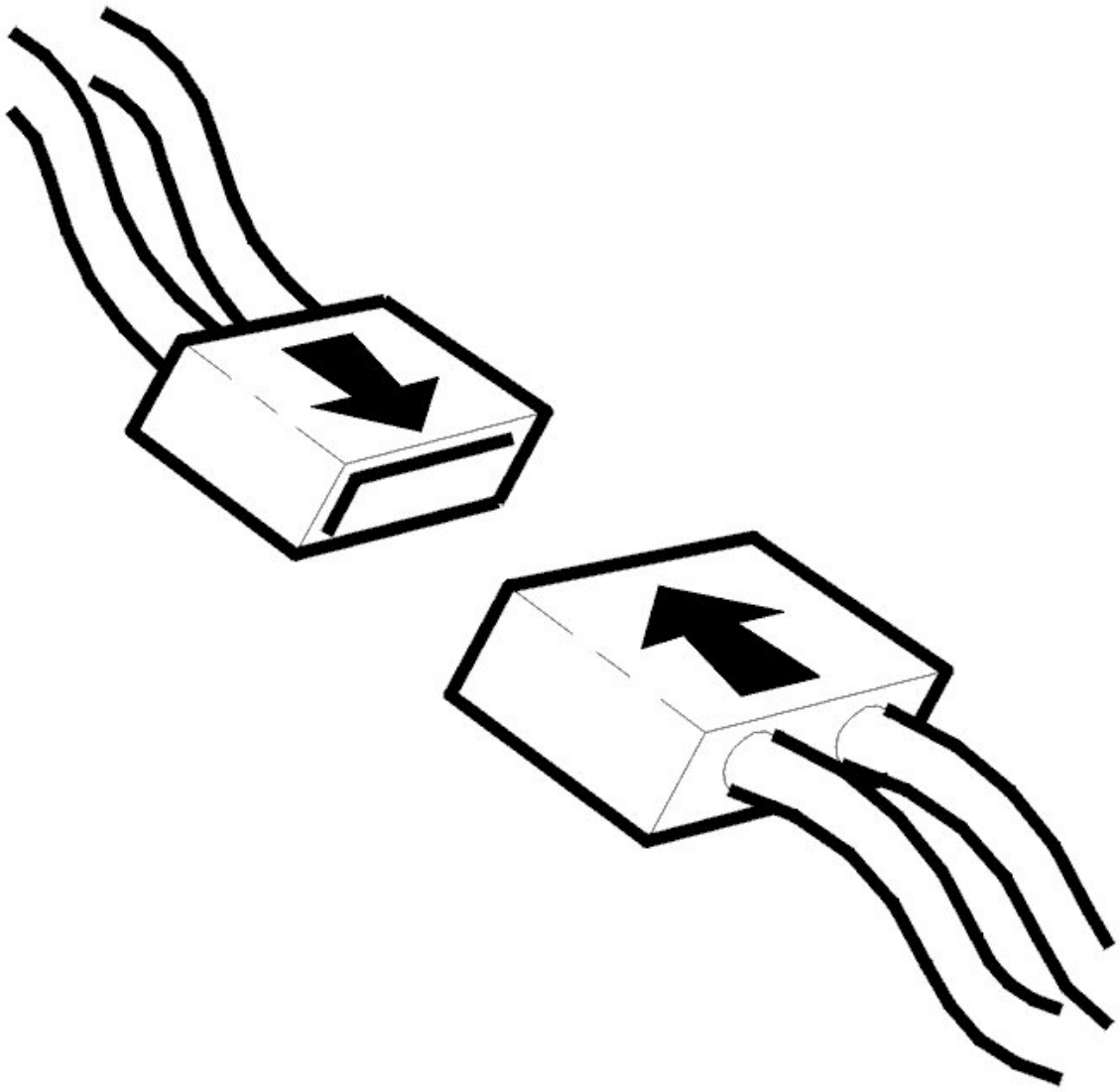
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

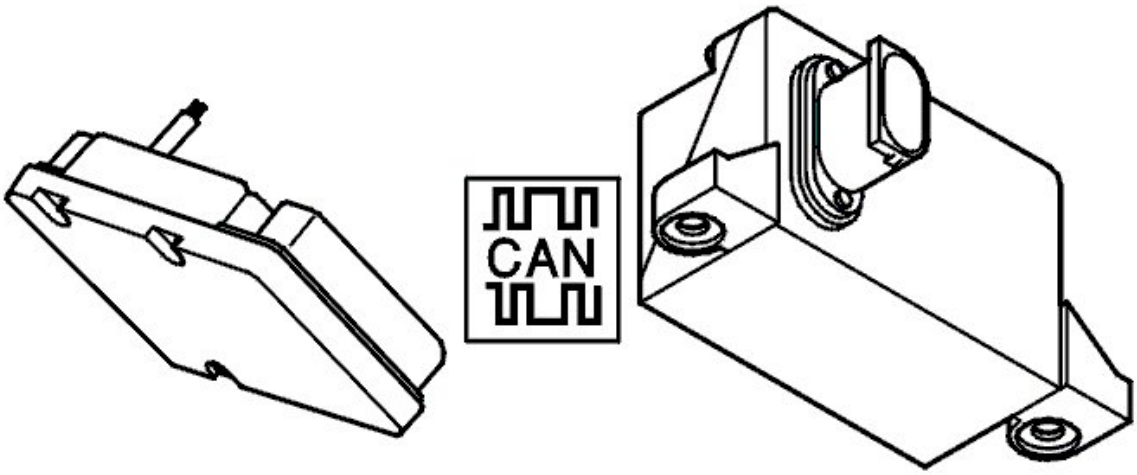
Attempt New Test - Checking the component

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via its own internal Control area network (CAN). Each sensor has an offset value, correction value, for the individual sensor offset.
Diagnostic trouble code (DTC) BCM-0080, BCM-0081, BCM-0082 or BCM-0083 is stored, depending on the sensor, if the control module registers an incorrect offset value from any of the sensors.

- BCM-0080: Lateral accelerometer
- BCM-0081: Accelerometer
- BCM-0082: Yaw rate sensor
- BCM-0083: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes /

Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Active yaw control sensor incorrectly installed
- The active yaw control sensor is loose
- The bracket for the active yaw control sensor is bent
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

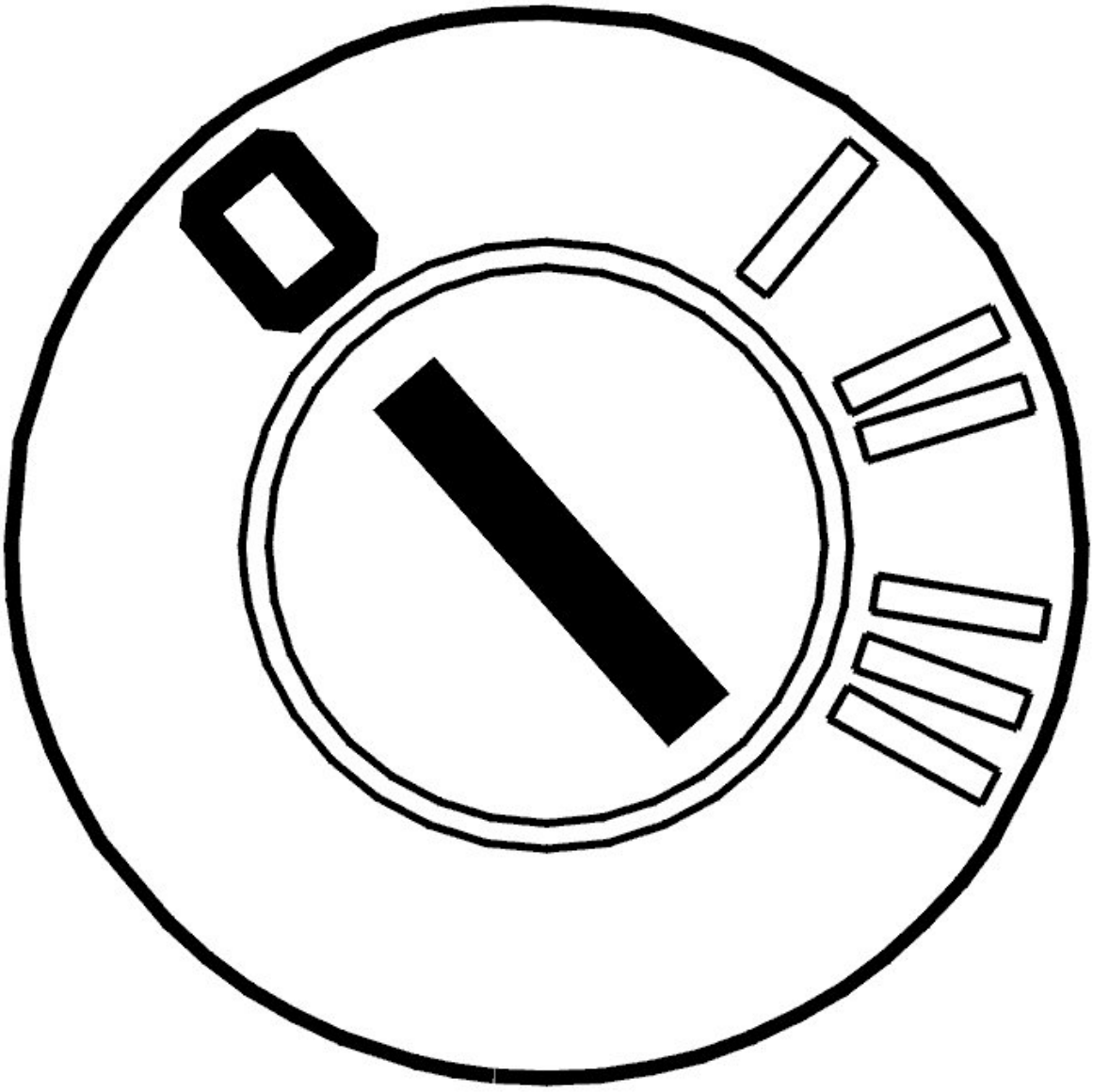
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Text window and warning symbol/Red symbol and text message
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Incorrect Offset Value

Incorrect offset value

Checking the component

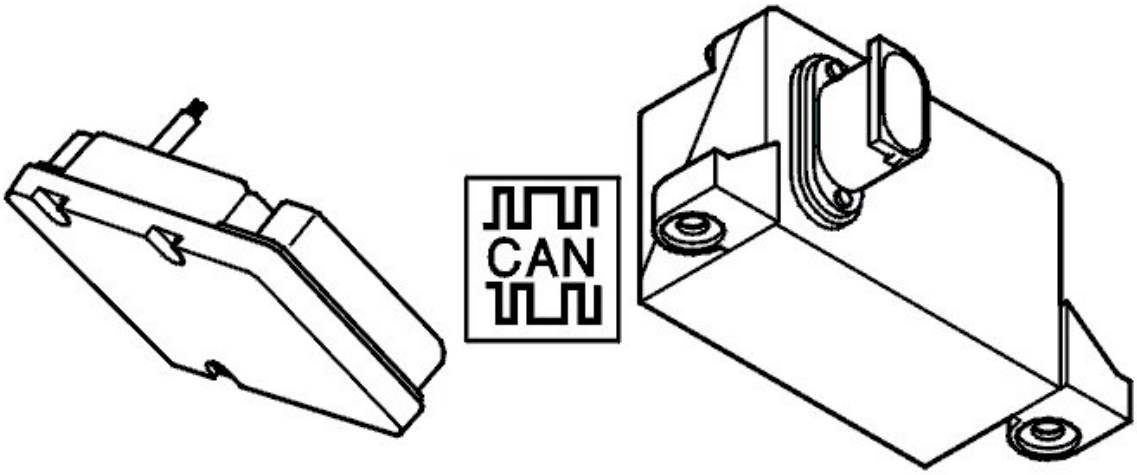


- Ignition off.

Check that the active yaw control sensor is securely installed on the bracket under the passenger seat.
Check that the bracket is not bent or damaged in any other way.
Remedy as necessary.

Other information

- To access or replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.



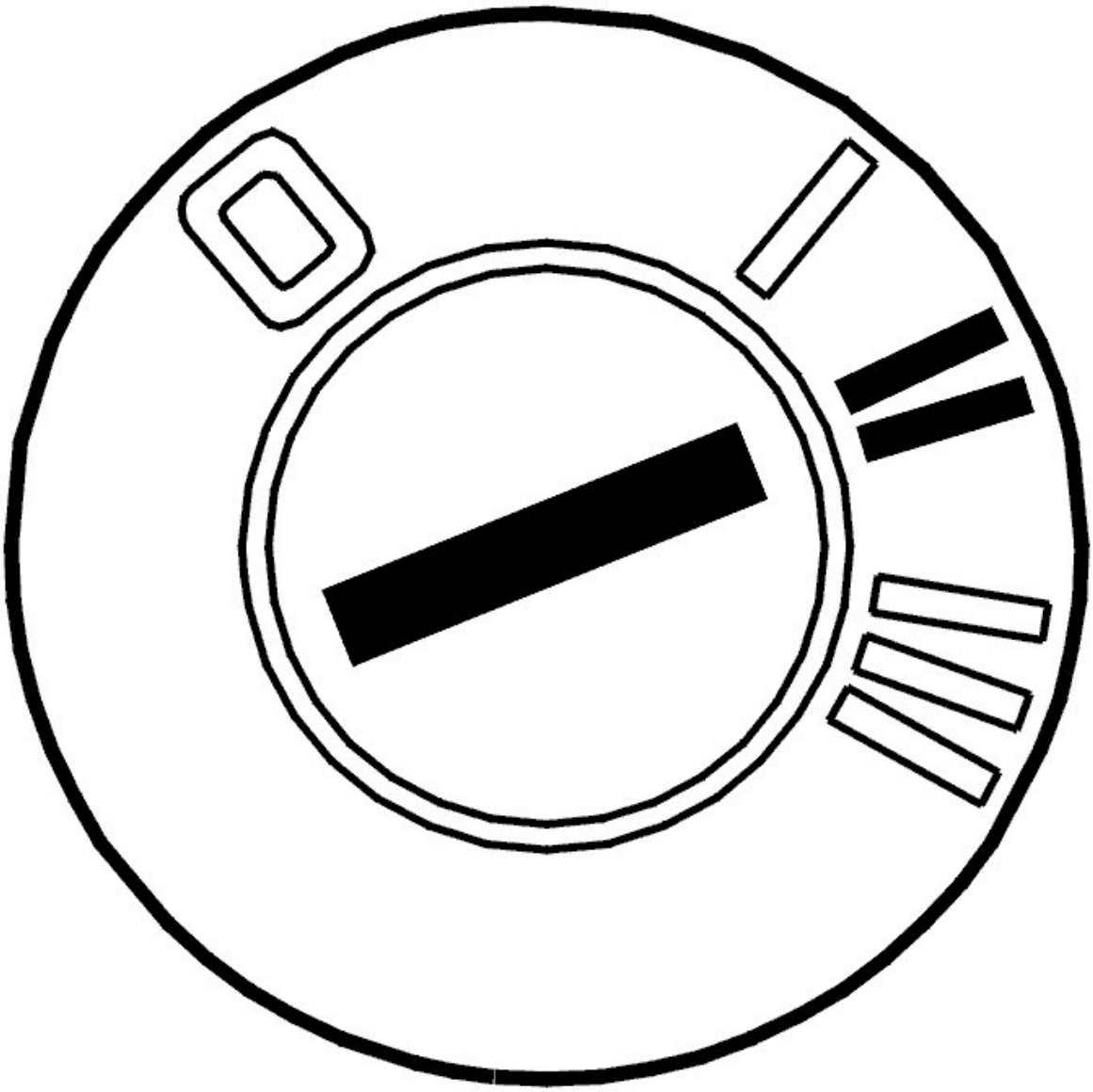
Continue - Verification

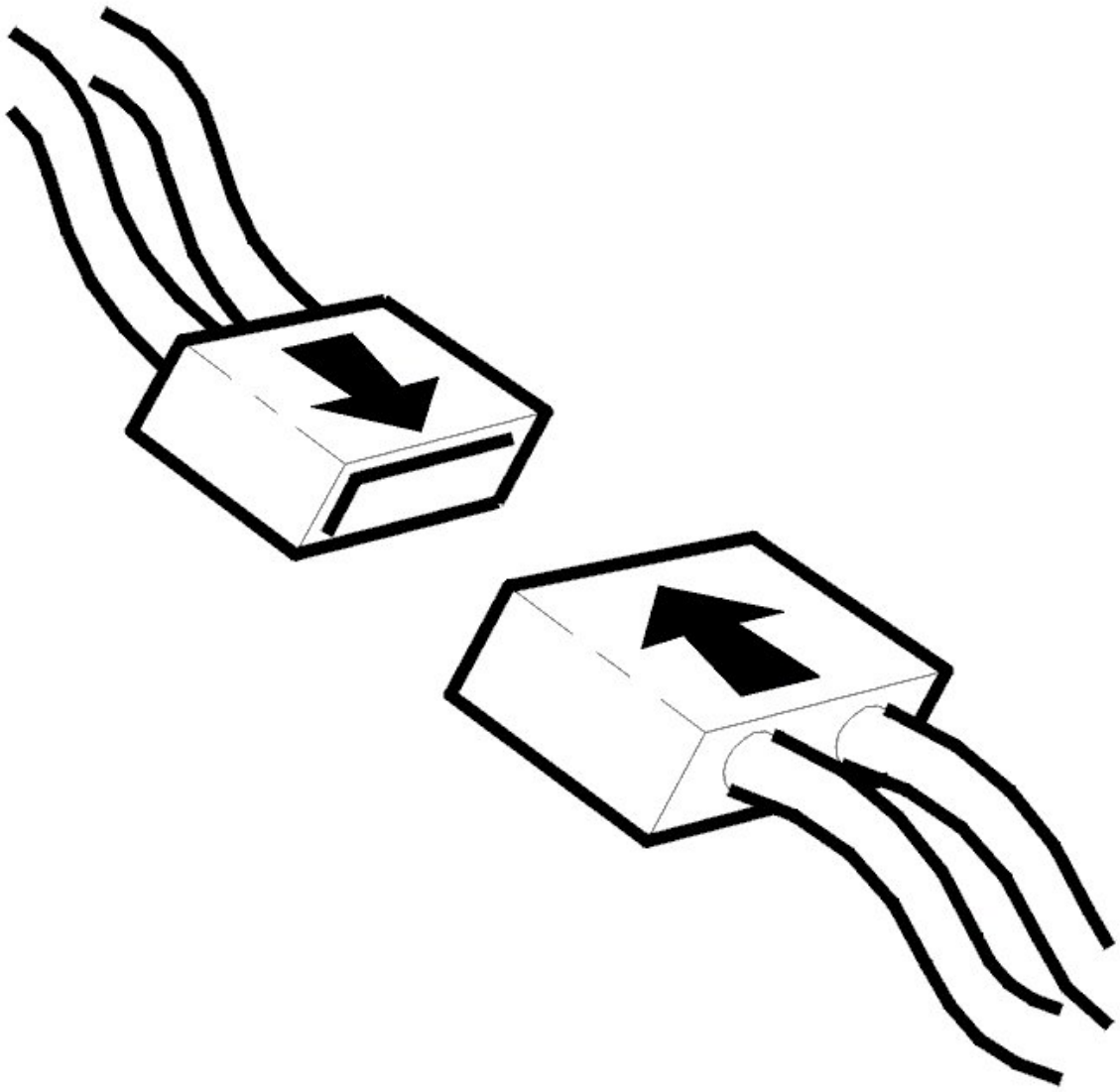
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

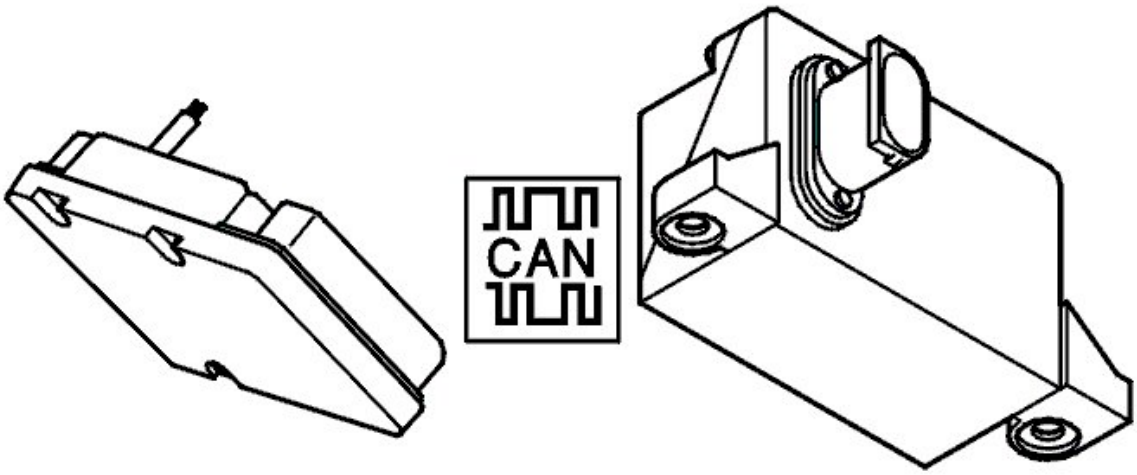
Attempt New Test - Checking the component

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



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Diagnostic trouble code (DTC) BCM-0080, BCM-0081, BCM-0082 or BCM-0083 is stored, depending on the sensor, if the control module registers an incorrect offset value from any of the sensors.

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- BCM-0082: Yaw rate sensor
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The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes /

Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Active yaw control sensor incorrectly installed
- The active yaw control sensor is loose
- The bracket for the active yaw control sensor is bent
- Internal fault in the active yaw control sensor.

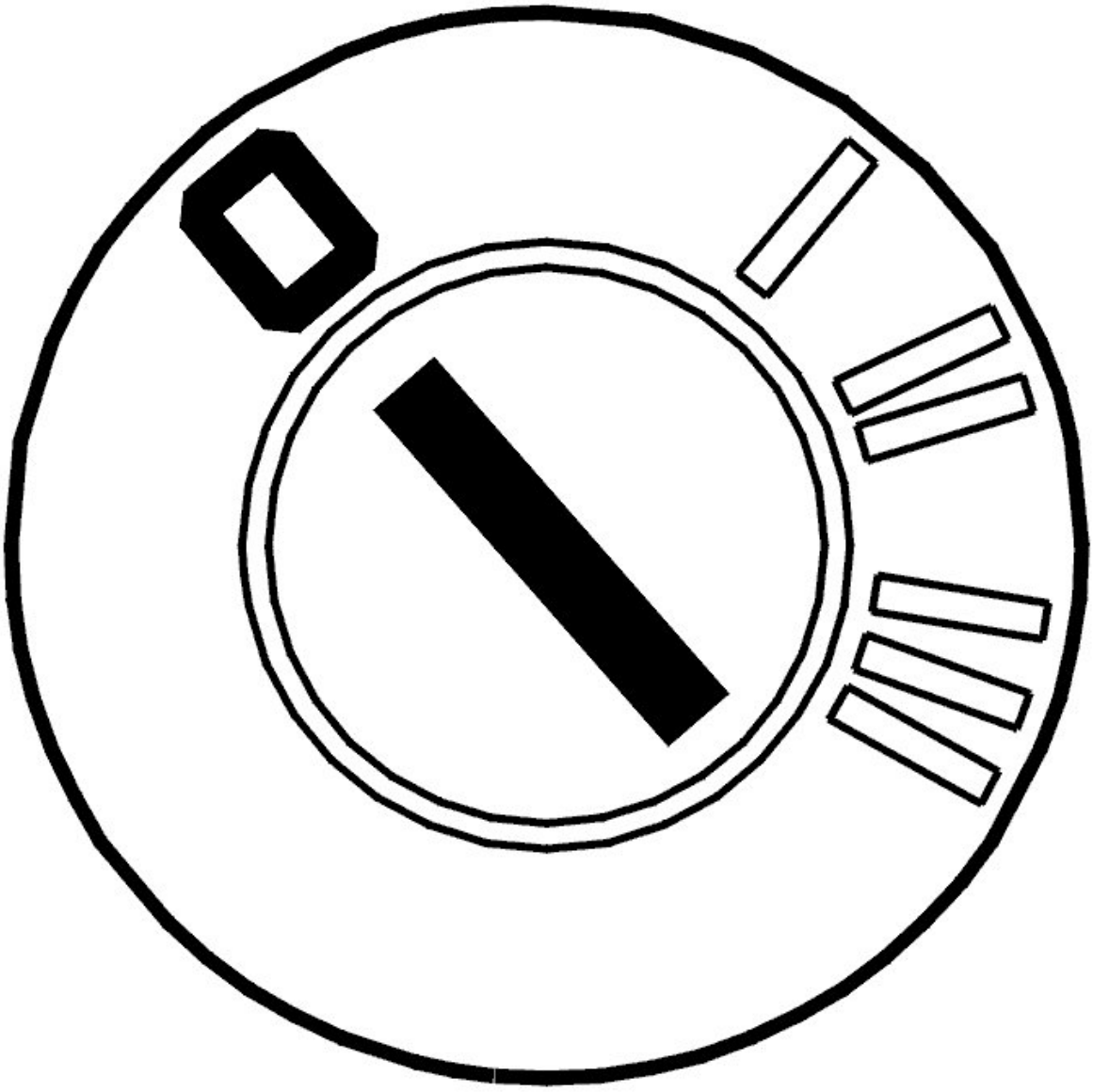
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Text window and warning symbol/Red symbol and text message
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Incorrect Offset Value

Incorrect offset value

Checking the component

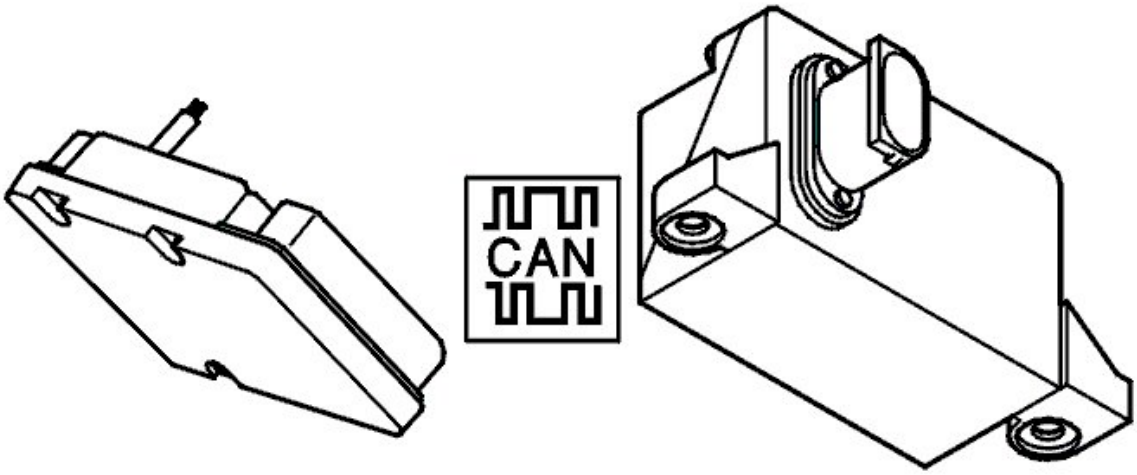


- Ignition off.

Check that the active yaw control sensor is securely installed on the bracket under the passenger seat.
Check that the bracket is not bent or damaged in any other way.
Remedy as necessary.

Other information

- To access or replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.



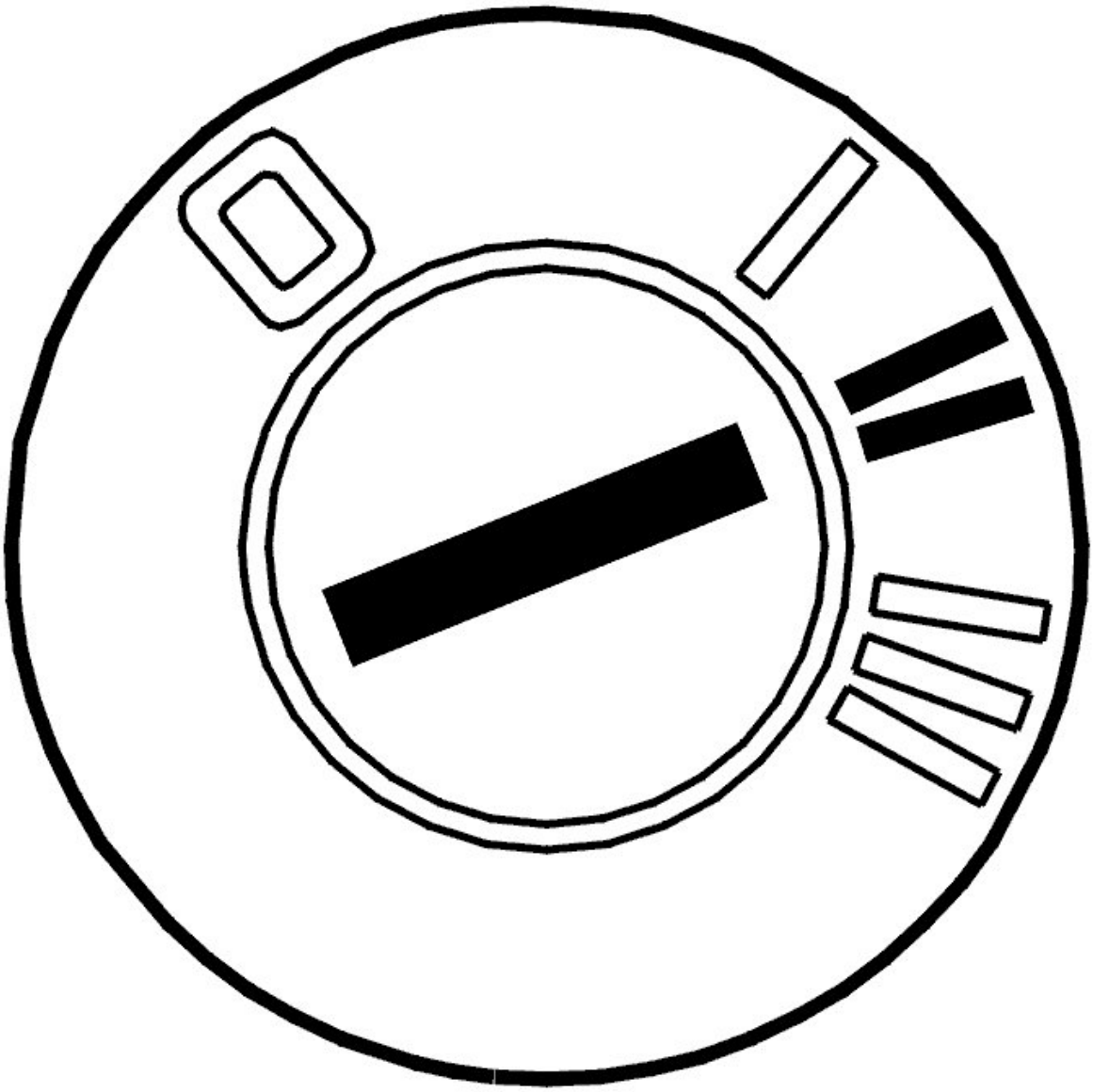
Continue - Verification

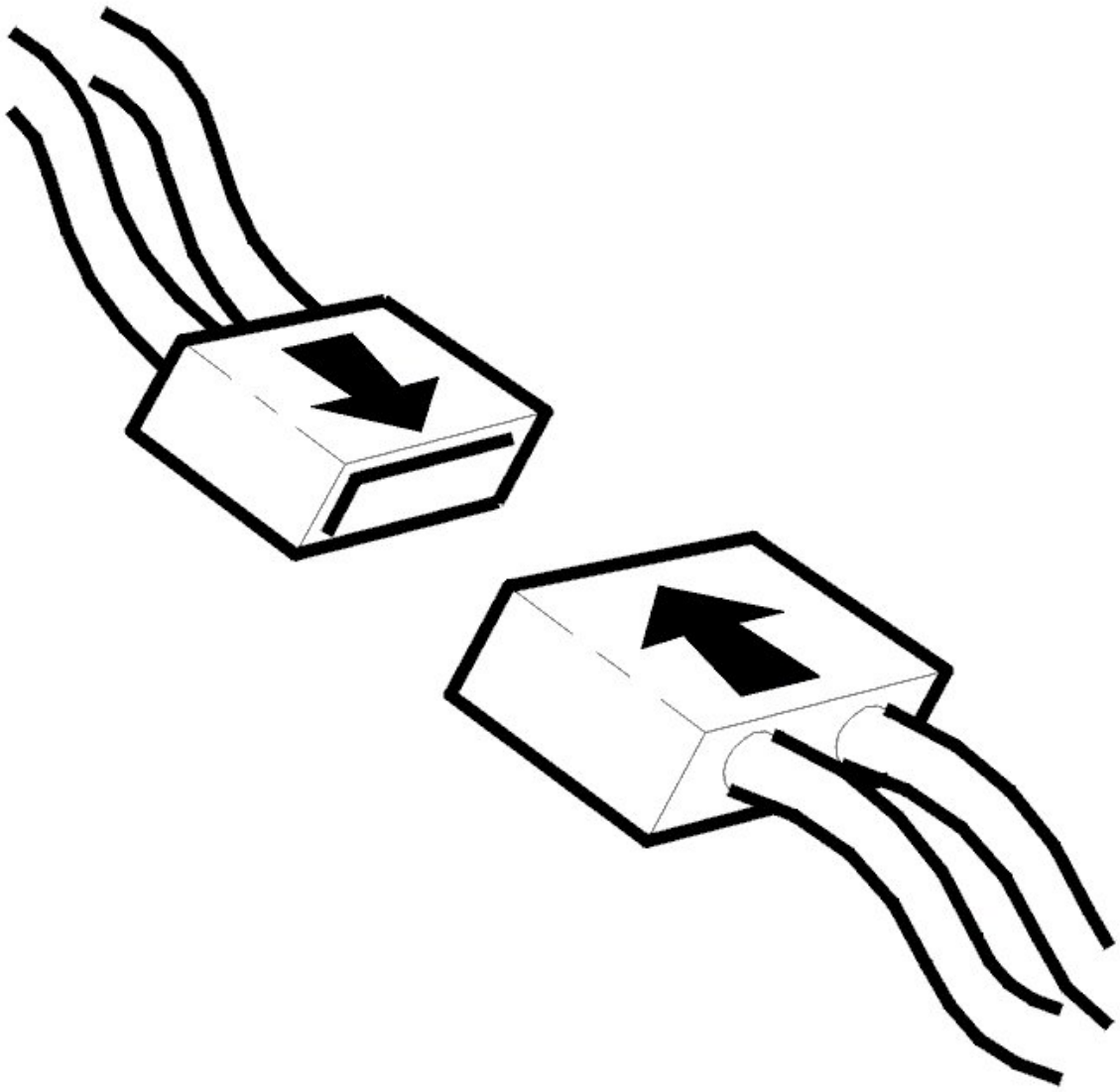
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

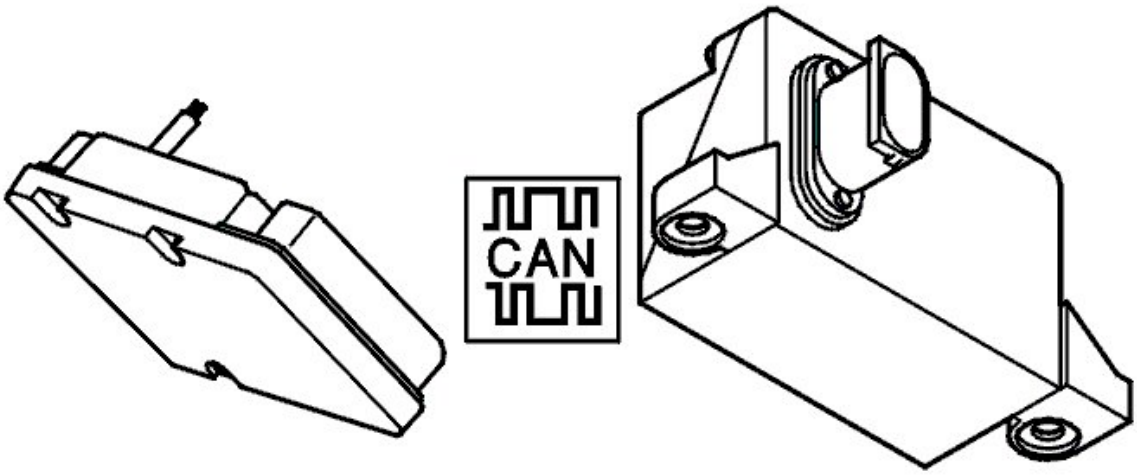
Attempt New Test - Checking the component

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



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The yaw rate sensor, lateral accelerometer, accelerometer and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC (dynamic stability and traction control). The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via the Control area network (CAN).
Diagnostic trouble code (DTC) BCM-0090, BCM-0091, BCM-0092 or BCM-0093 is stored, depending on the sensor, if the control module registers a faulty signal from any of the sensors.

- BCM-0090: Lateral accelerometer
- BCM-0091: Accelerometer
- BCM-0092: Yaw rate sensor
- BCM-0093: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Open-circuit or short-circuit to ground in the wiring for the active yaw control sensor
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

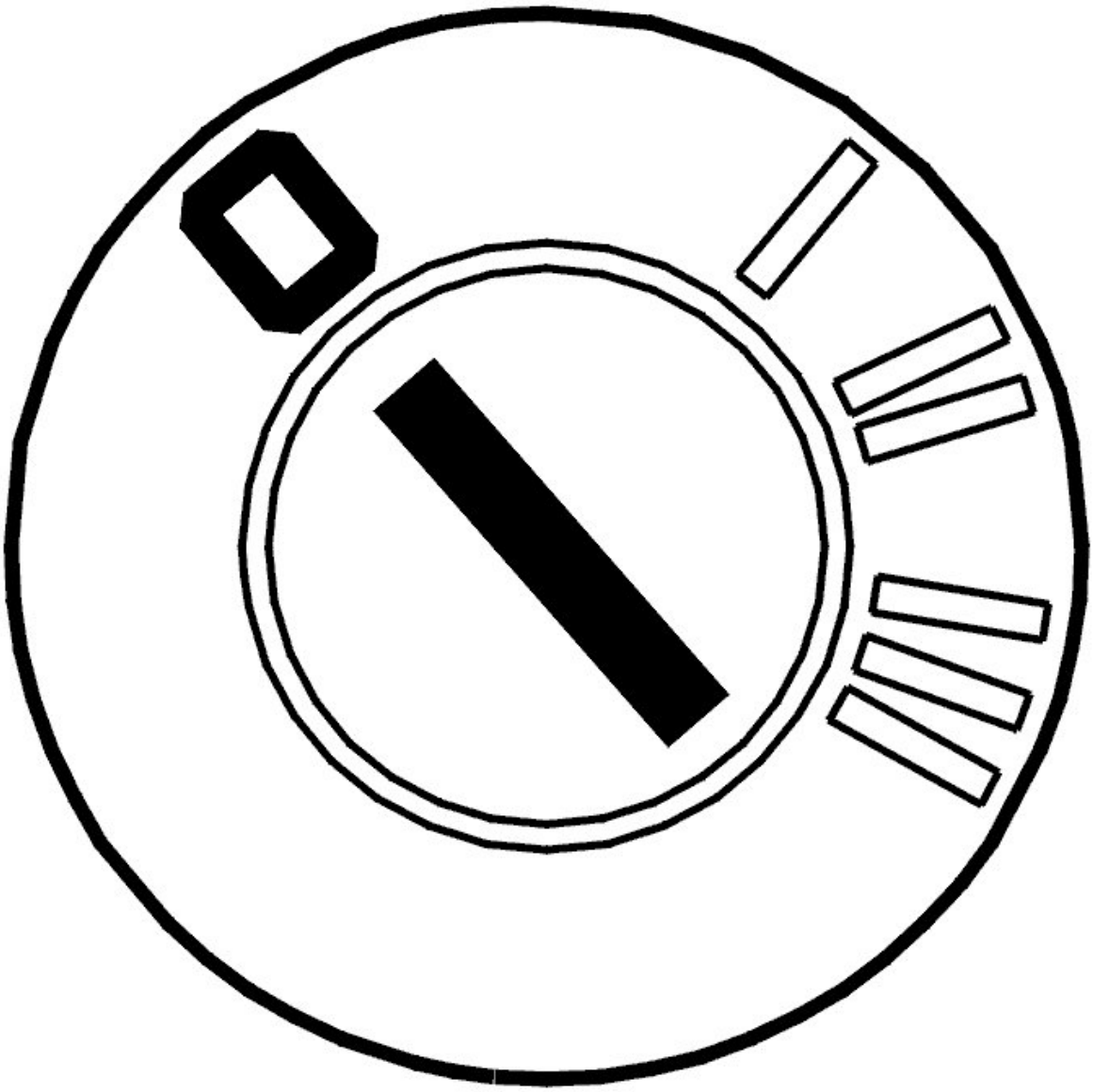
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off.

Check the wiring between the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

check for an open-circuit.

Hint: Read off the relevant signal for the diagnostic trouble code (DTC). Check that the value is within its permitted range.

- Steering wheel angle sensor, offset value. The value must be 0° ±17 °/s.
- Yaw rate sensor, offset value. The value must be 0° ±6.0 °/s.
- Lateral accelerometer, offset value. The value must be 0° ±1.7 m/s.
- Accelerometer, offset value. The value must be 0° ±1.7 m/s.

If the value is incorrect, this can mean a damaged AYC sensor.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
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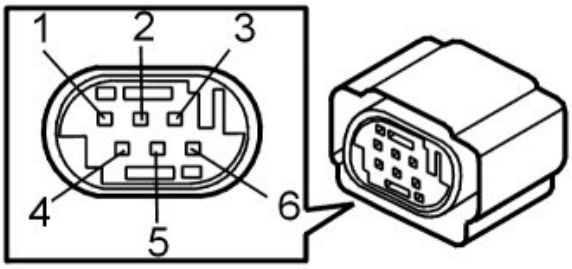
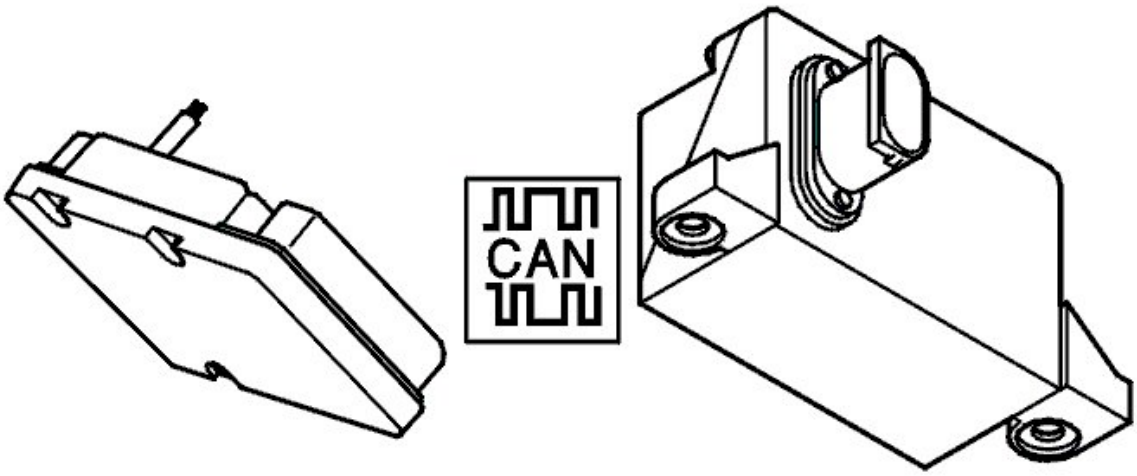
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





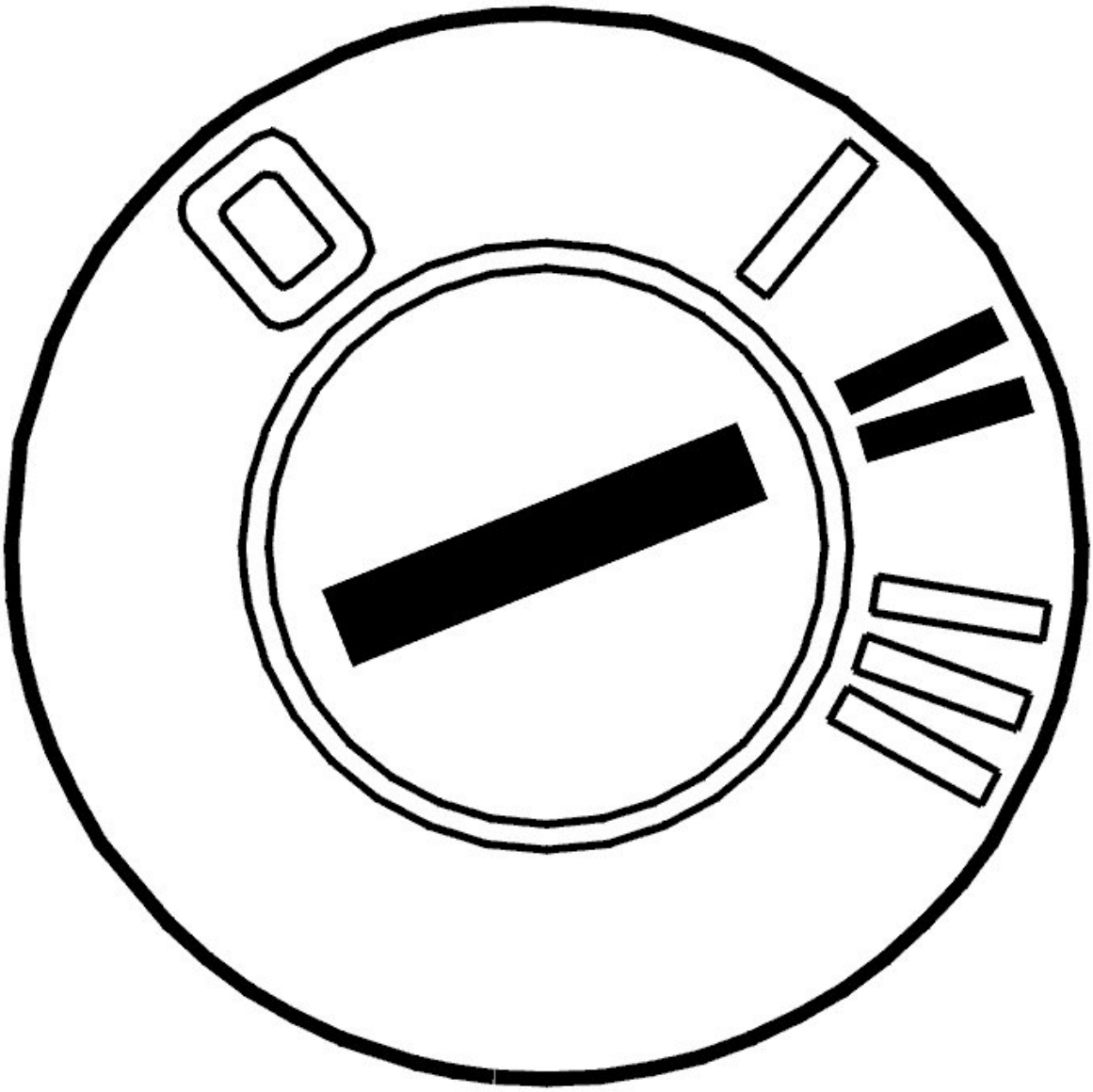
Continue - Verification

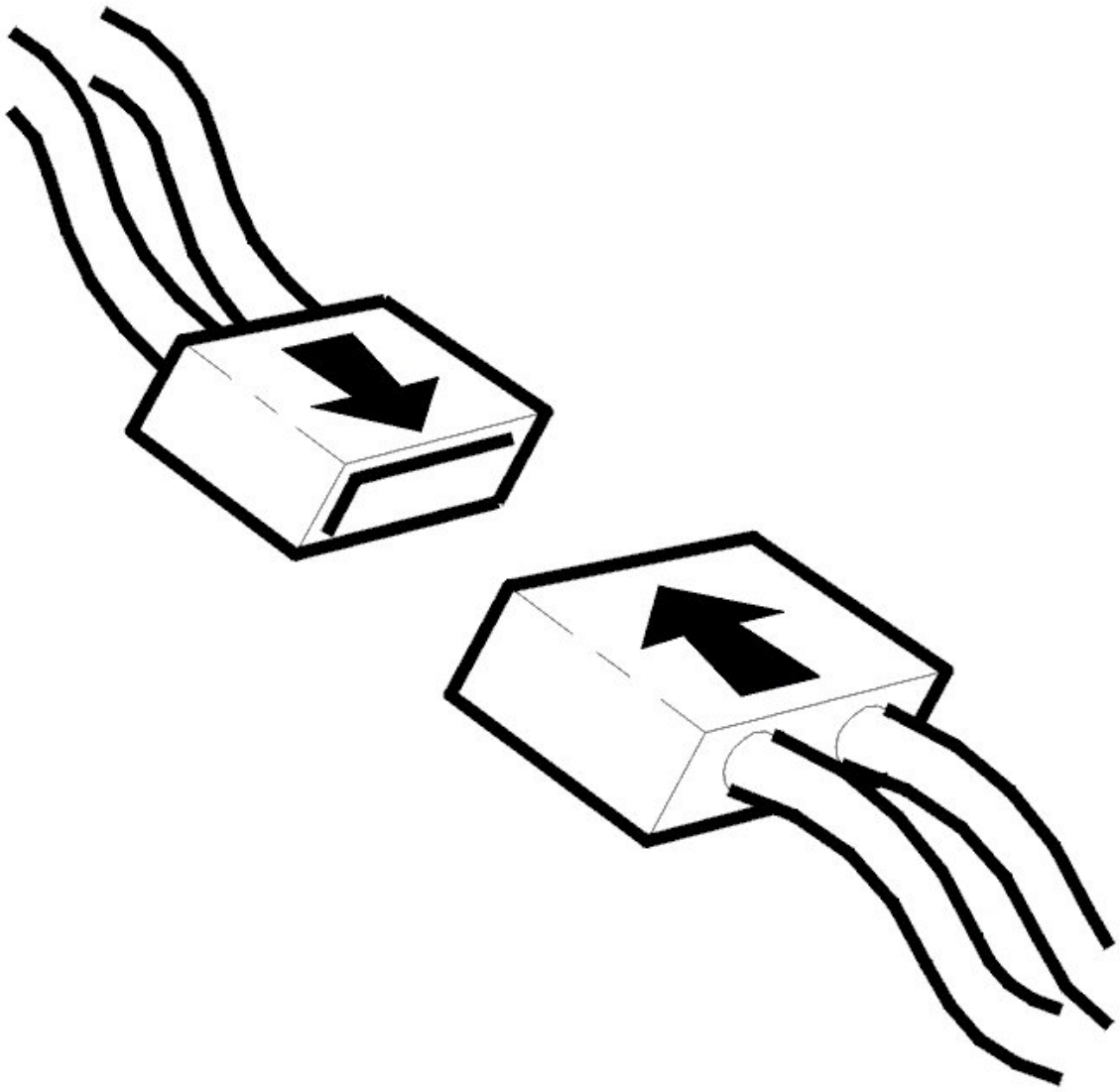
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





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- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

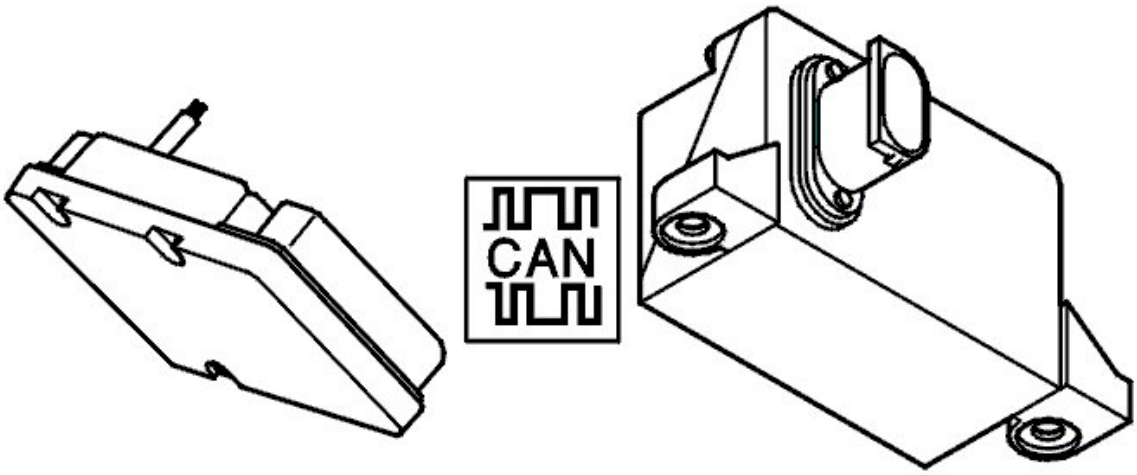
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



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Substitute value

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Possible source

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Fault symptom[s]

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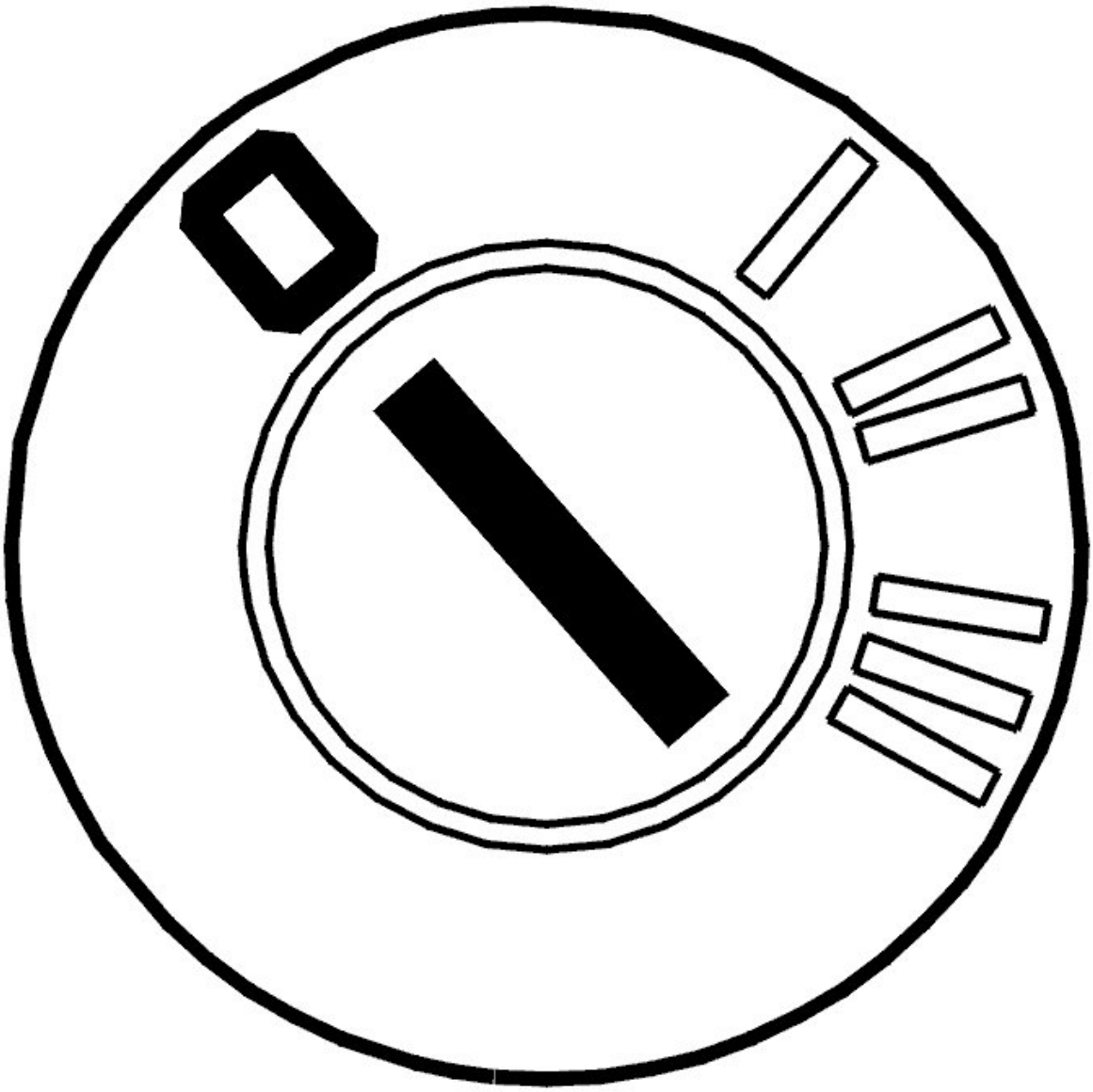
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off.

Check the wiring between the active yaw control sensor:

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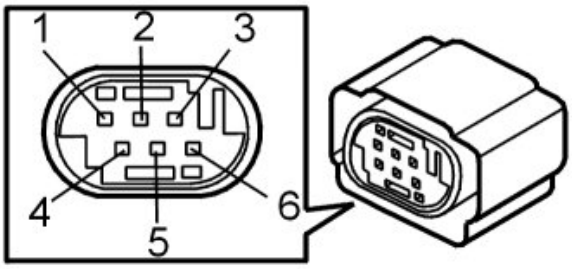
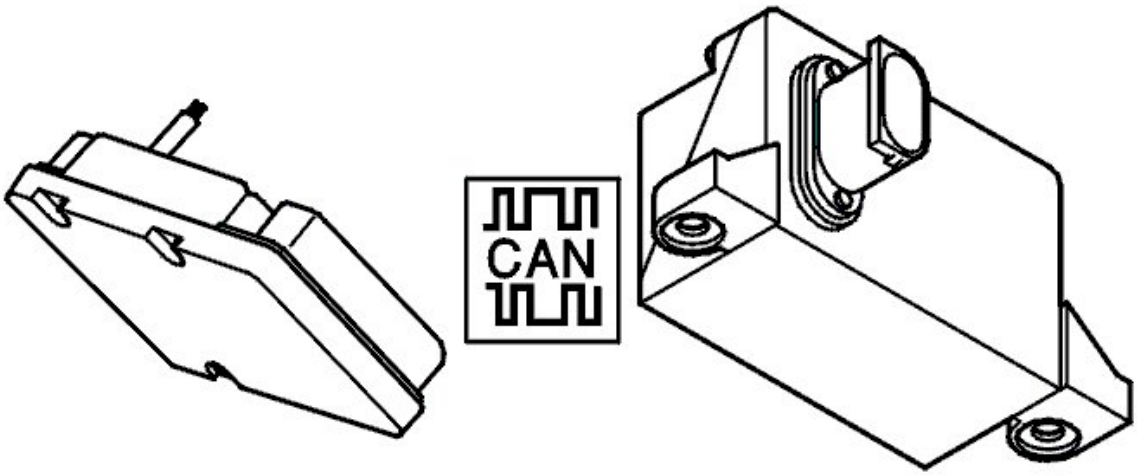




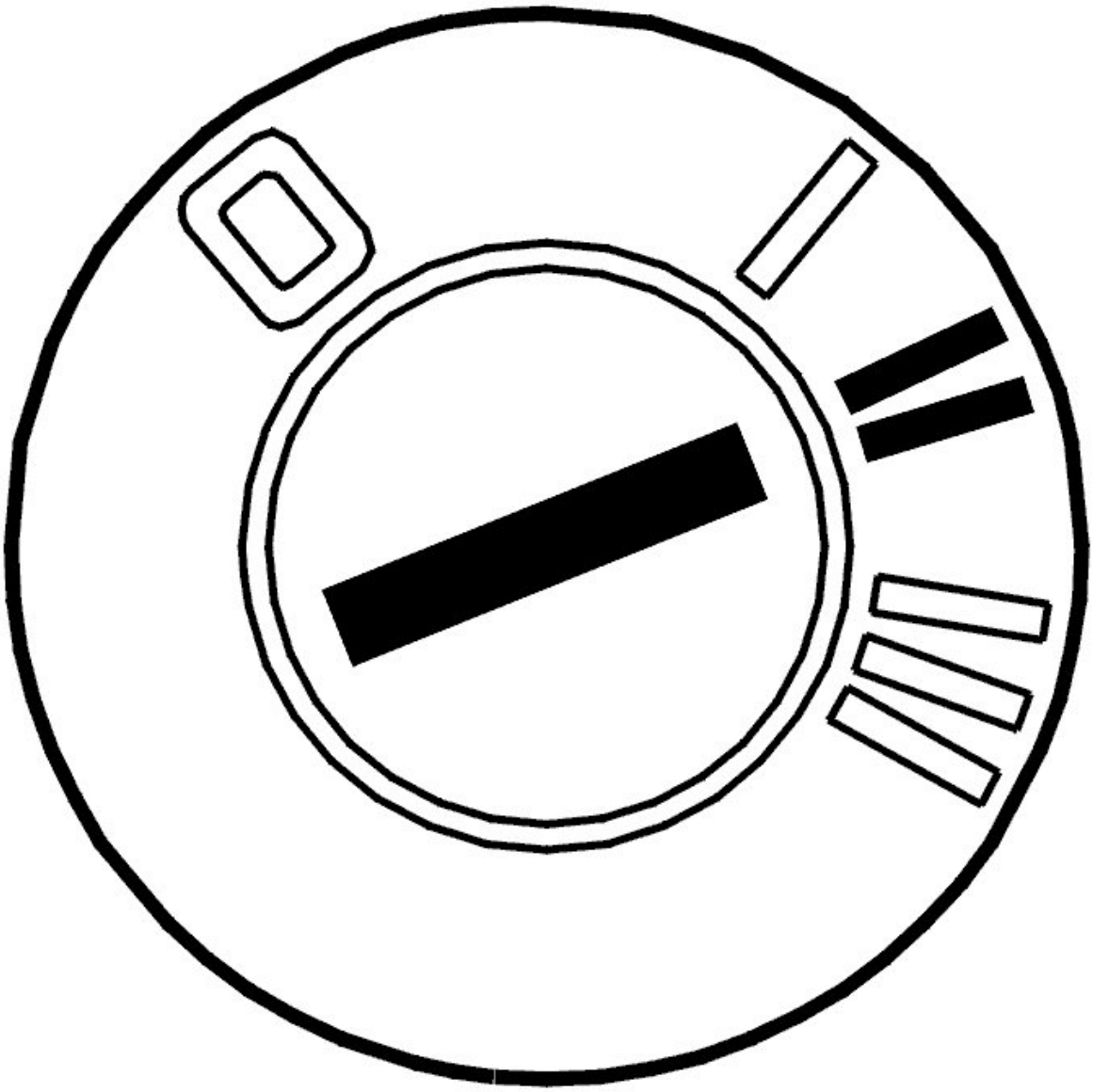
Continue - Verification

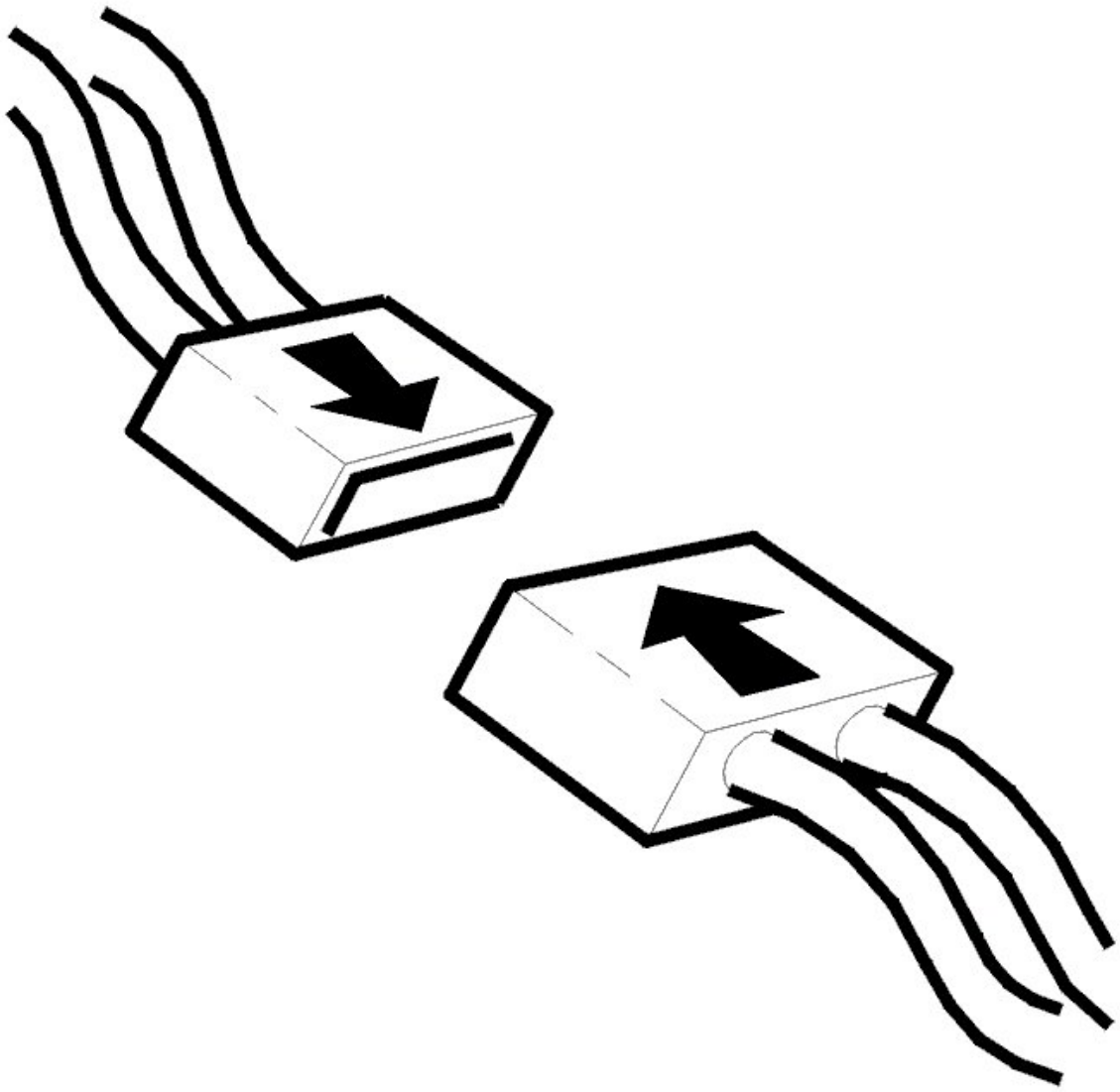
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

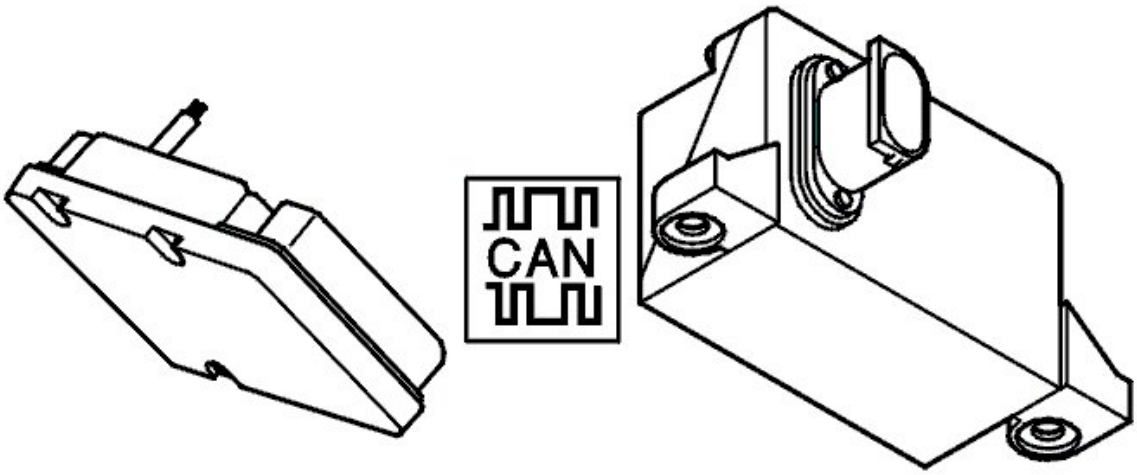
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC (dynamic stability and traction control). The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via the Control area network (CAN).
Diagnostic trouble code (DTC) BCM-0090, BCM-0091, BCM-0092 or BCM-0093 is stored, depending on the sensor, if the control module registers a faulty signal from any of the sensors.

- BCM-0090: Lateral accelerometer
- BCM-0091: Accelerometer
- BCM-0092: Yaw rate sensor
- BCM-0093: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Open-circuit or short-circuit to ground in the wiring for the active yaw control sensor
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

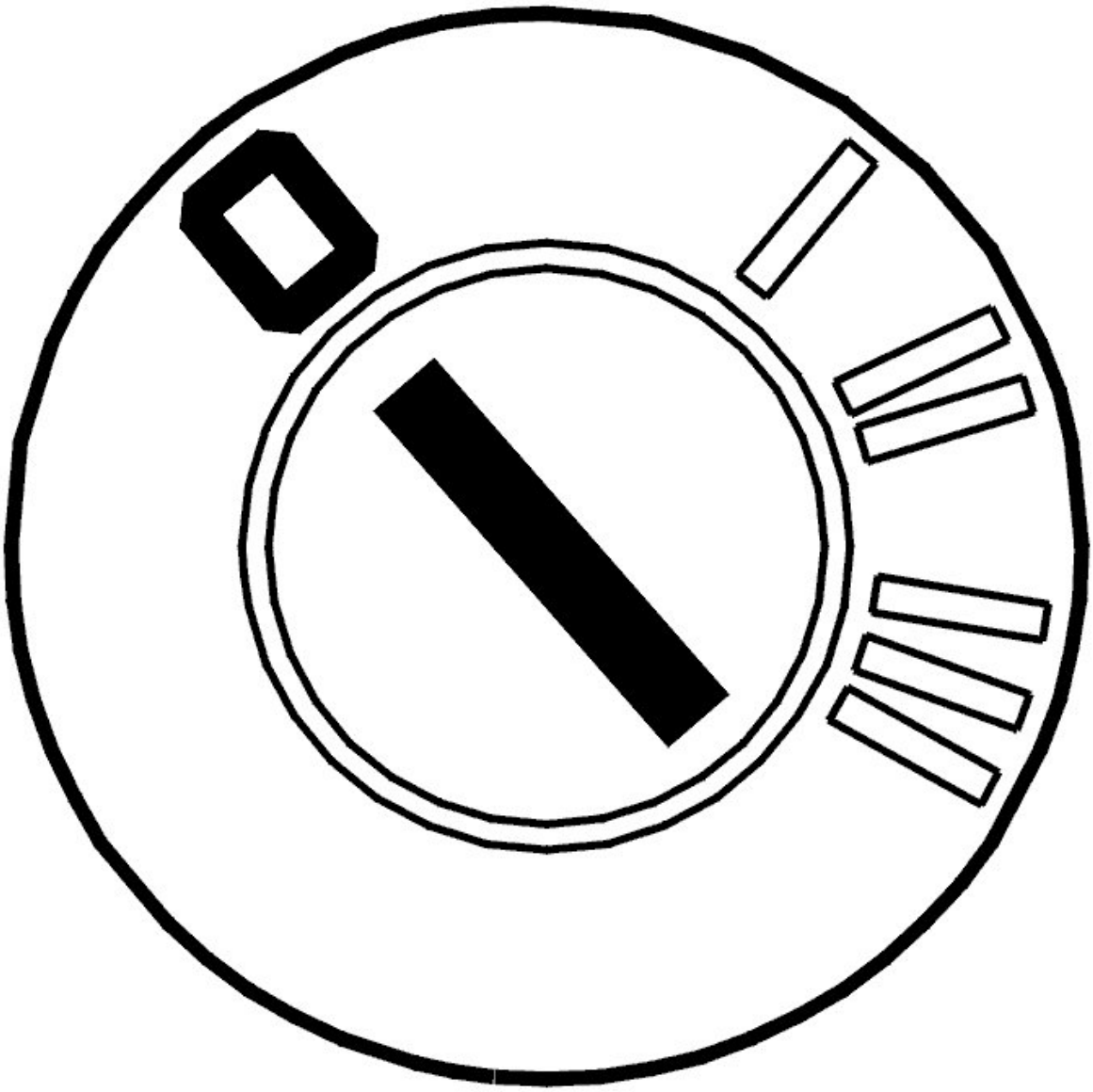
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off.

Check the wiring between the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

check for an open-circuit.

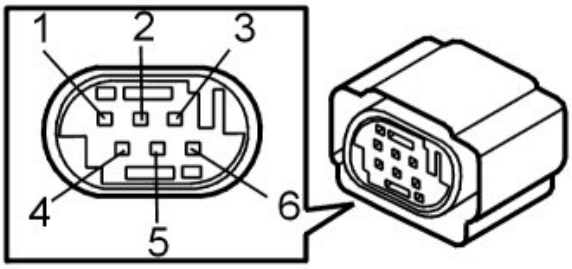
Hint: Read off the relevant signal for the diagnostic trouble code (DTC). Check that the value is within its permitted range.

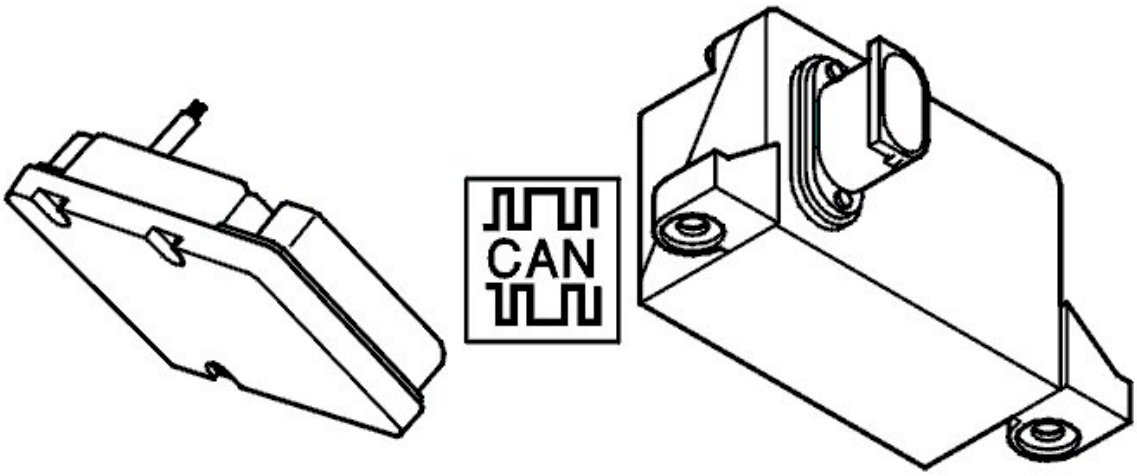
- Steering wheel angle sensor, offset value. The value must be 0° ±17 °/s.
- Yaw rate sensor, offset value. The value must be 0° ±6.0 °/s.
- Lateral accelerometer, offset value. The value must be 0° ±1.7 m/s.
- Accelerometer, offset value. The value must be 0° ±1.7 m/s.

If the value is incorrect, this can mean a damaged AYC sensor.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





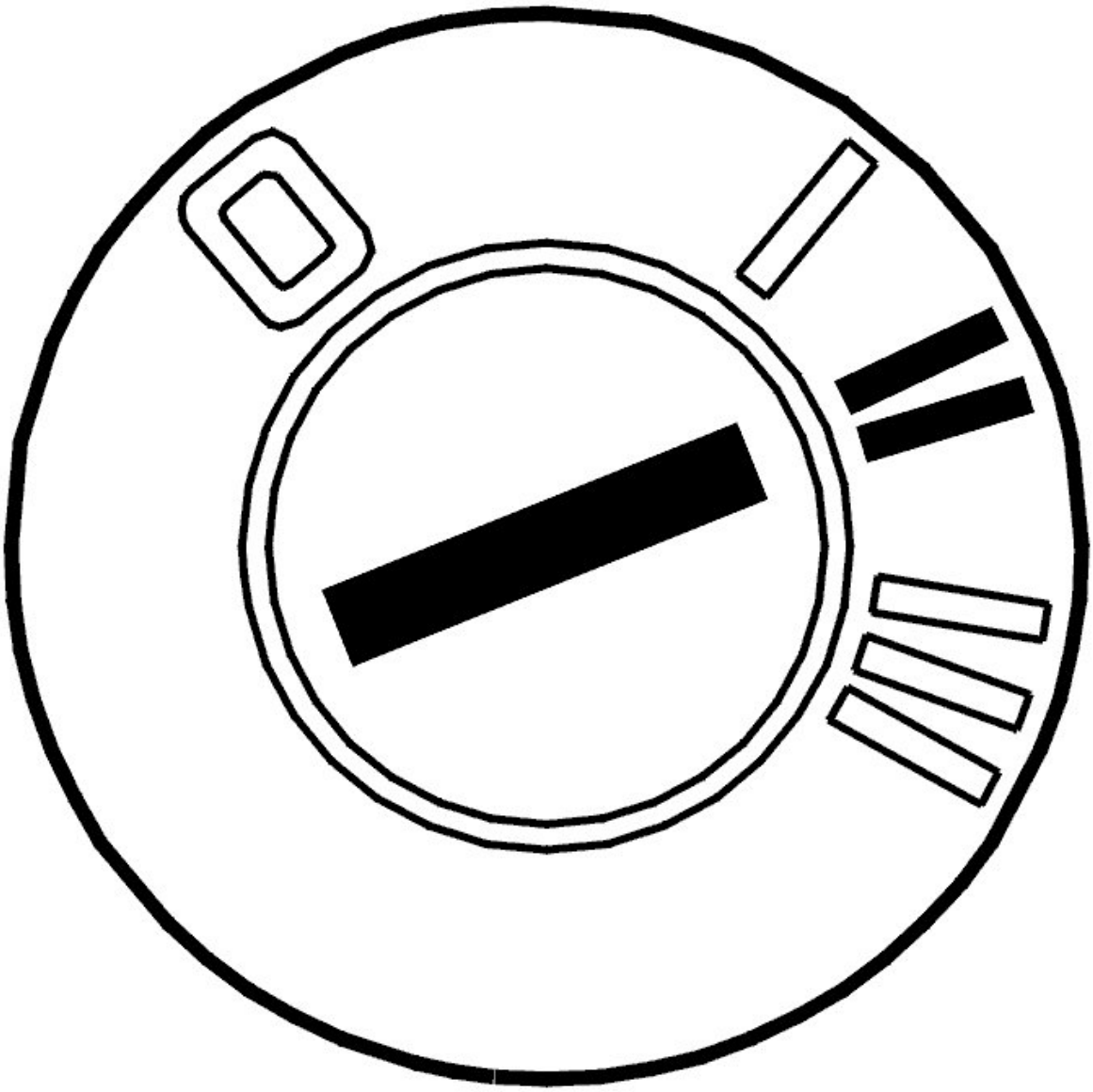
Continue - Verification

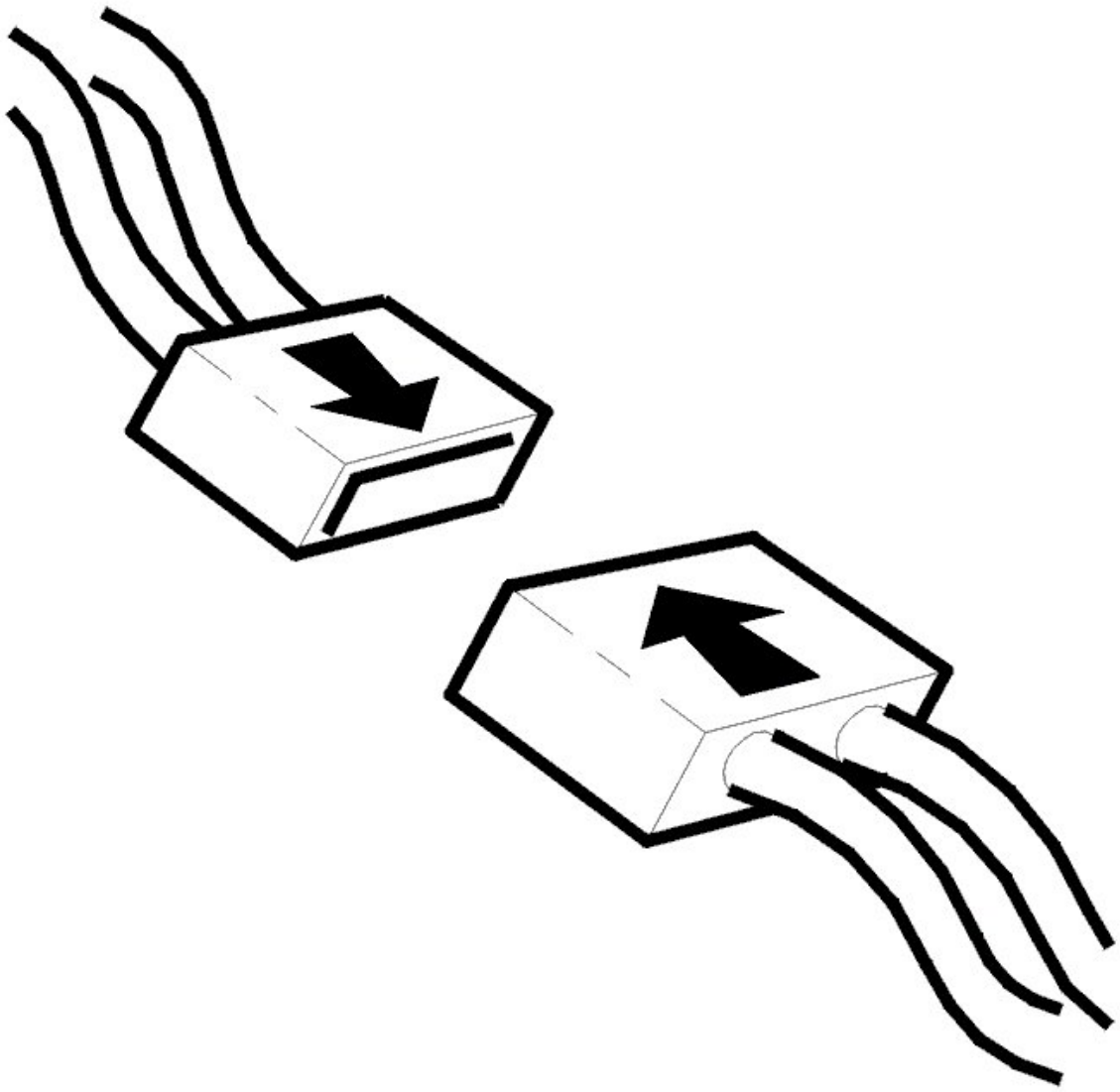
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

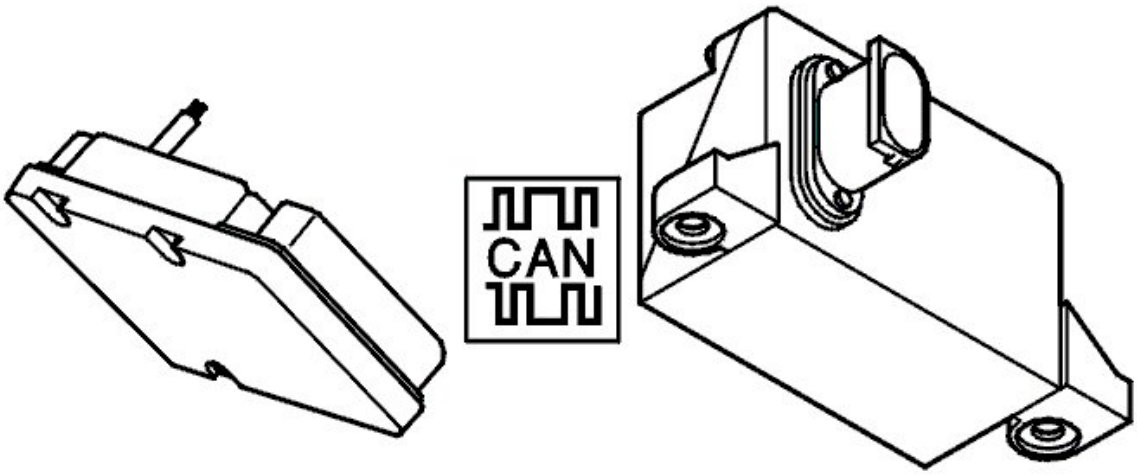
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer and angle of lean sensor (only RSC) are integrated in the active yaw control sensor for DSTC (dynamic stability and traction control). The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the lateral angle of lean via the Control area network (CAN).
Diagnostic trouble code (DTC) BCM-0090, BCM-0091, BCM-0092 or BCM-0093 is stored, depending on the sensor, if the control module registers a faulty signal from any of the sensors.

- BCM-0090: Lateral accelerometer
- BCM-0091: Accelerometer
- BCM-0092: Yaw rate sensor
- BCM-0093: Angle of lean sensor.

The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC system is blocked (cars equipped with RSC only).

Hint: For information about brake system abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Open-circuit or short-circuit to ground in the wiring for the active yaw control sensor
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

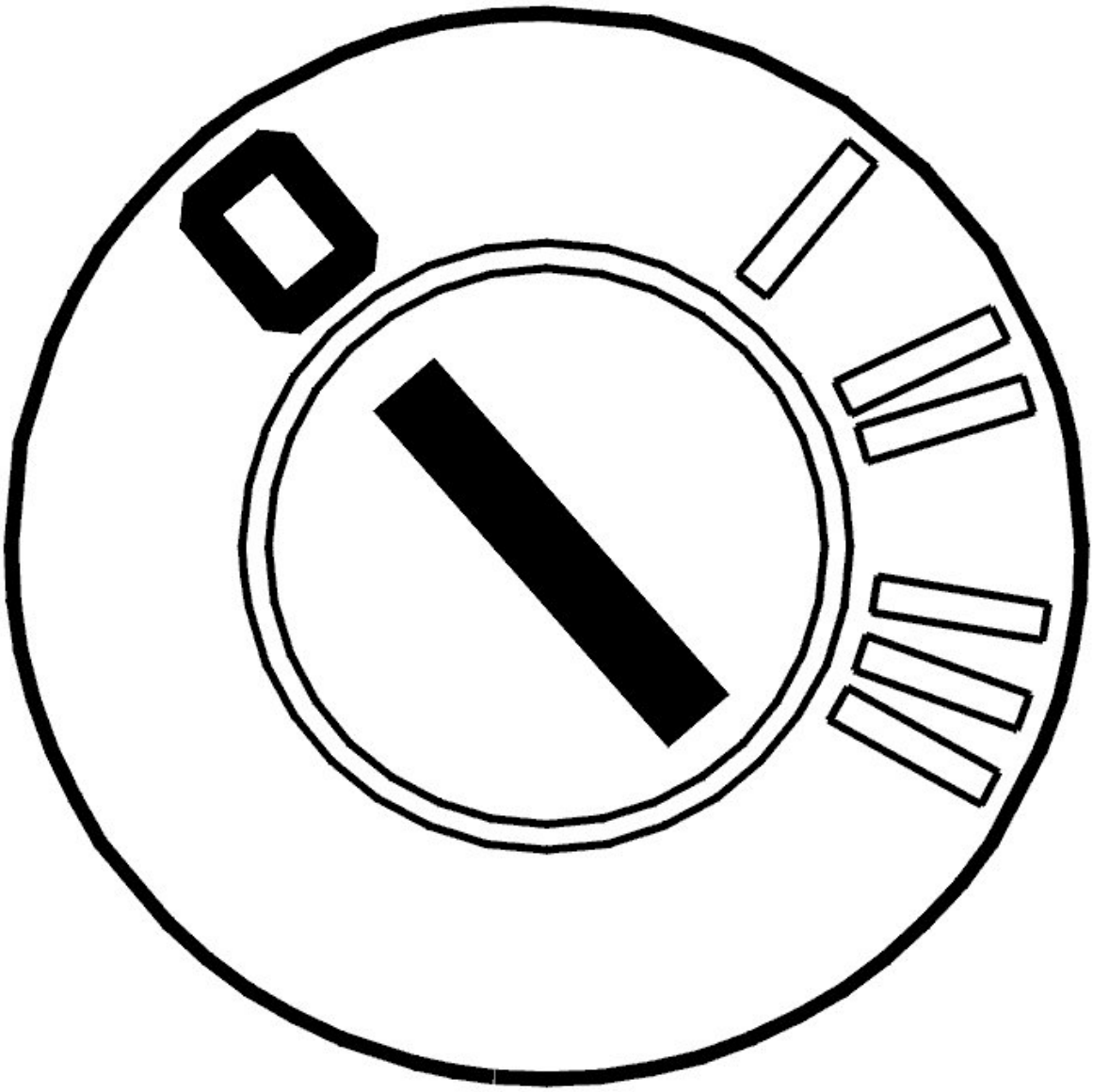
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off.

Check the wiring between the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

check for an open-circuit.

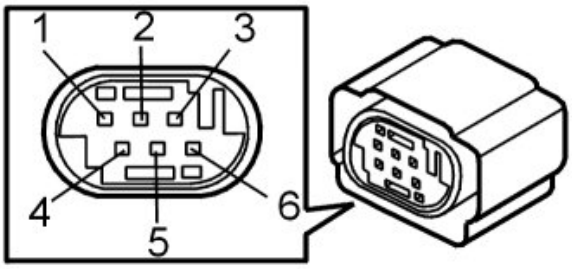
Hint: Read off the relevant signal for the diagnostic trouble code (DTC). Check that the value is within its permitted range.

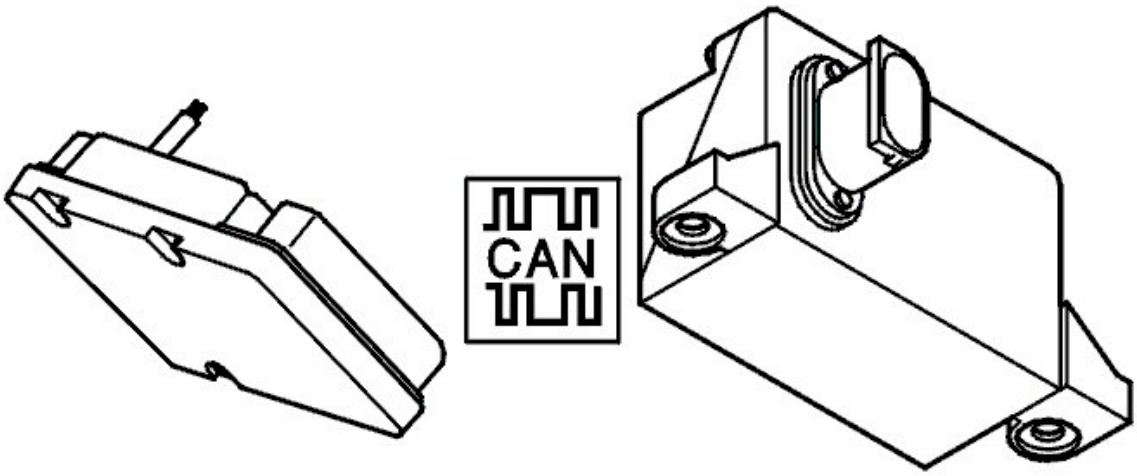
- Steering wheel angle sensor, offset value. The value must be 0° ±17 °/s.
- Yaw rate sensor, offset value. The value must be 0° ±6.0 °/s.
- Lateral accelerometer, offset value. The value must be 0° ±1.7 m/s.
- Accelerometer, offset value. The value must be 0° ±1.7 m/s.

If the value is incorrect, this can mean a damaged AYC sensor.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





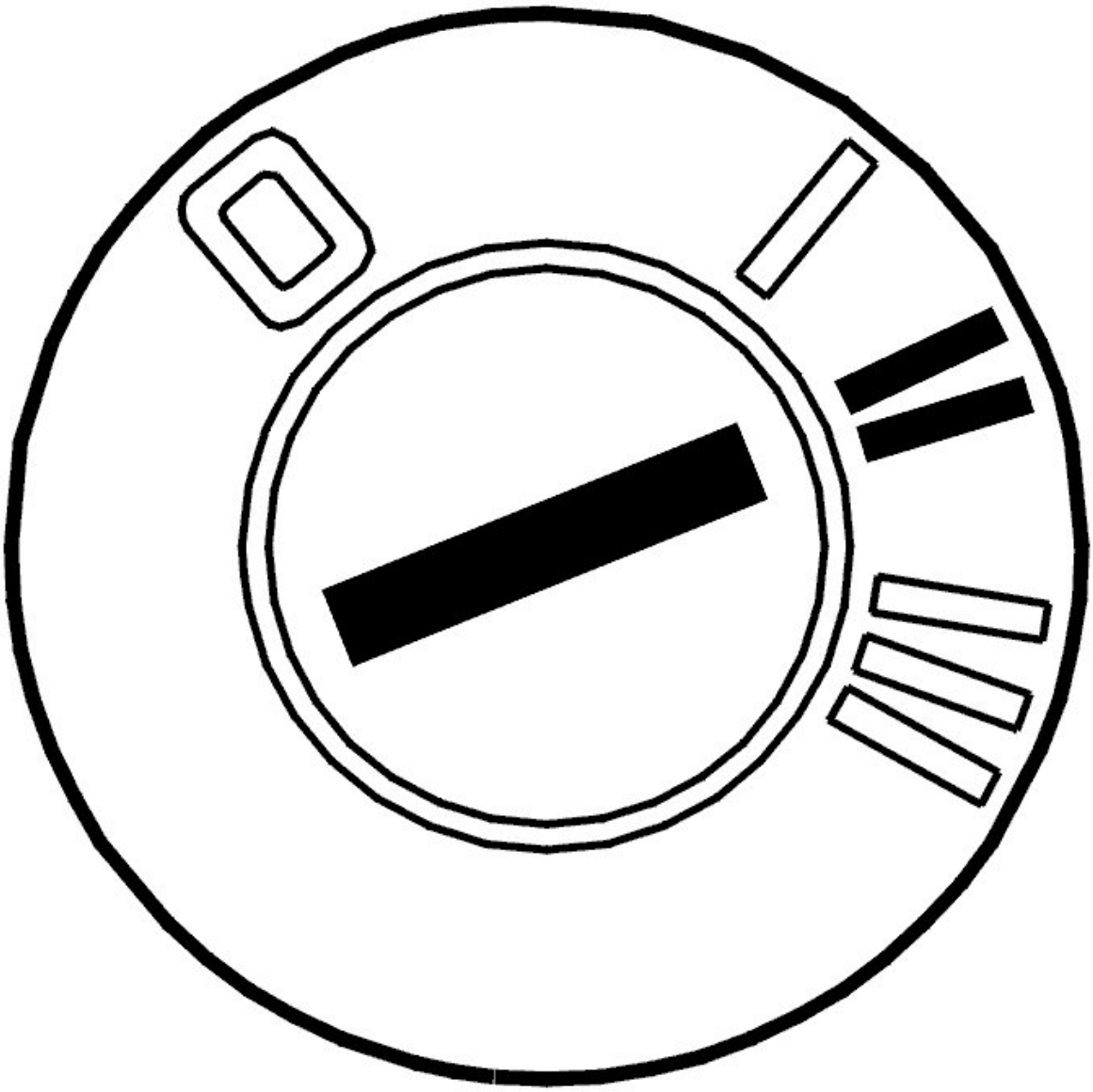
Continue - Verification

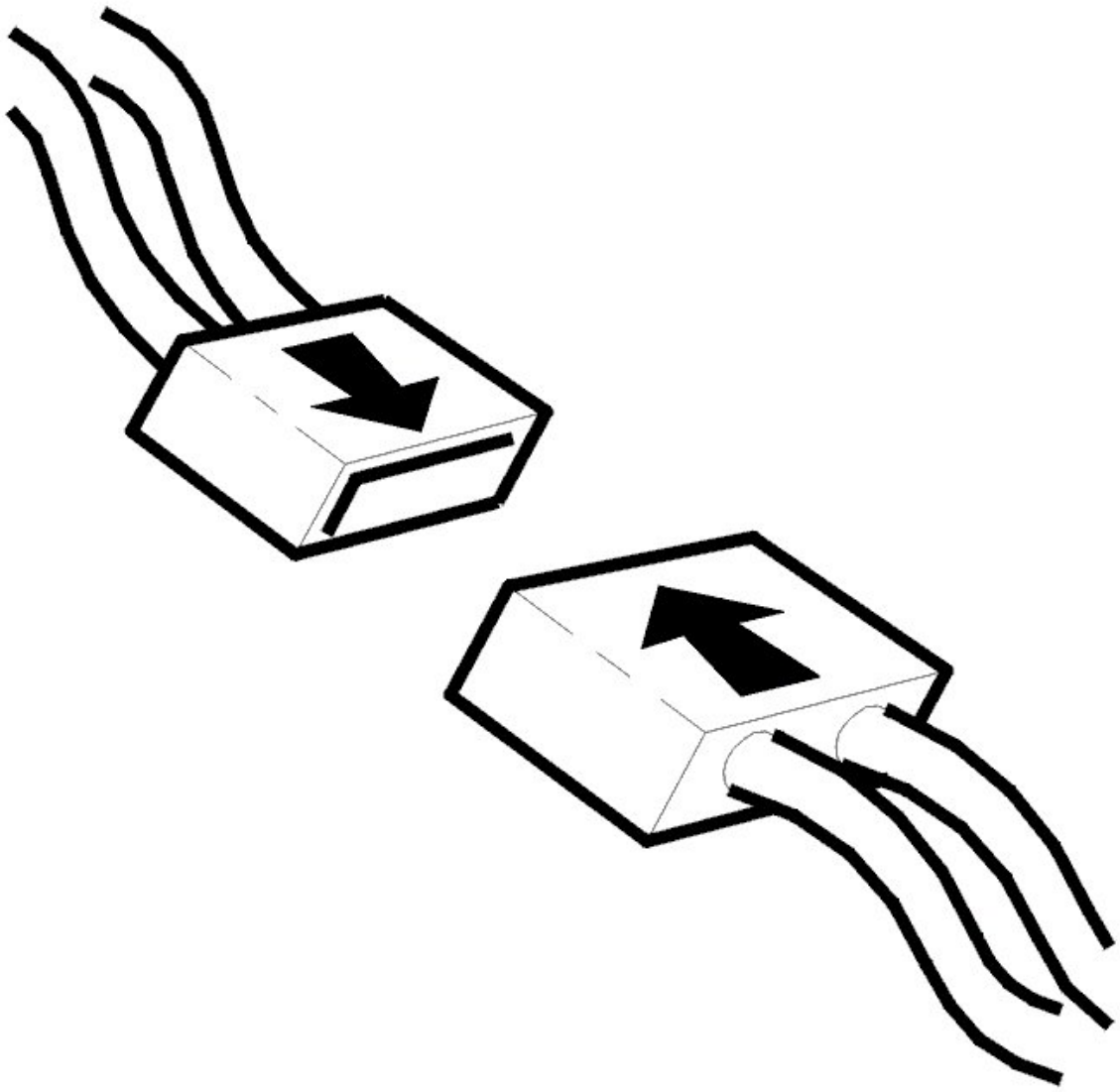
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Note! The diagnostic trouble code (DTC) applies only to cars with all-wheel drive (AWD) and dynamic stability and traction control (DSTC).

The differential electronic module (DEM) indicates to the brake control module (BCM) when four wheel drive is activated. During four wheel drive the brake control module (BCM) must not activate the stability function due to the risk of disrupting the differential electronic module (DEM). A DTC is stored if the Brake control module (BCM) registers that the signal from the Differential electronic module (DEM) is missing, or if the signal indicates that four wheel drive is not working.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Stability control is blocked
- Traction control is blocked (All-wheel drive (AWD) TRACS (Traction Control System) is blocked without a warning lamp lighting)
- Active yaw control is blocked.

Hint: Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations

Possible source
- Open-circuit or short-circuit in the wiring for the control area network (CAN)
- Damaged Differential Electronic Module (DEM).

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication Problems With the Differential Electronic Module (DEM)

Communication problems with the differential electronic module (DEM)

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.

If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

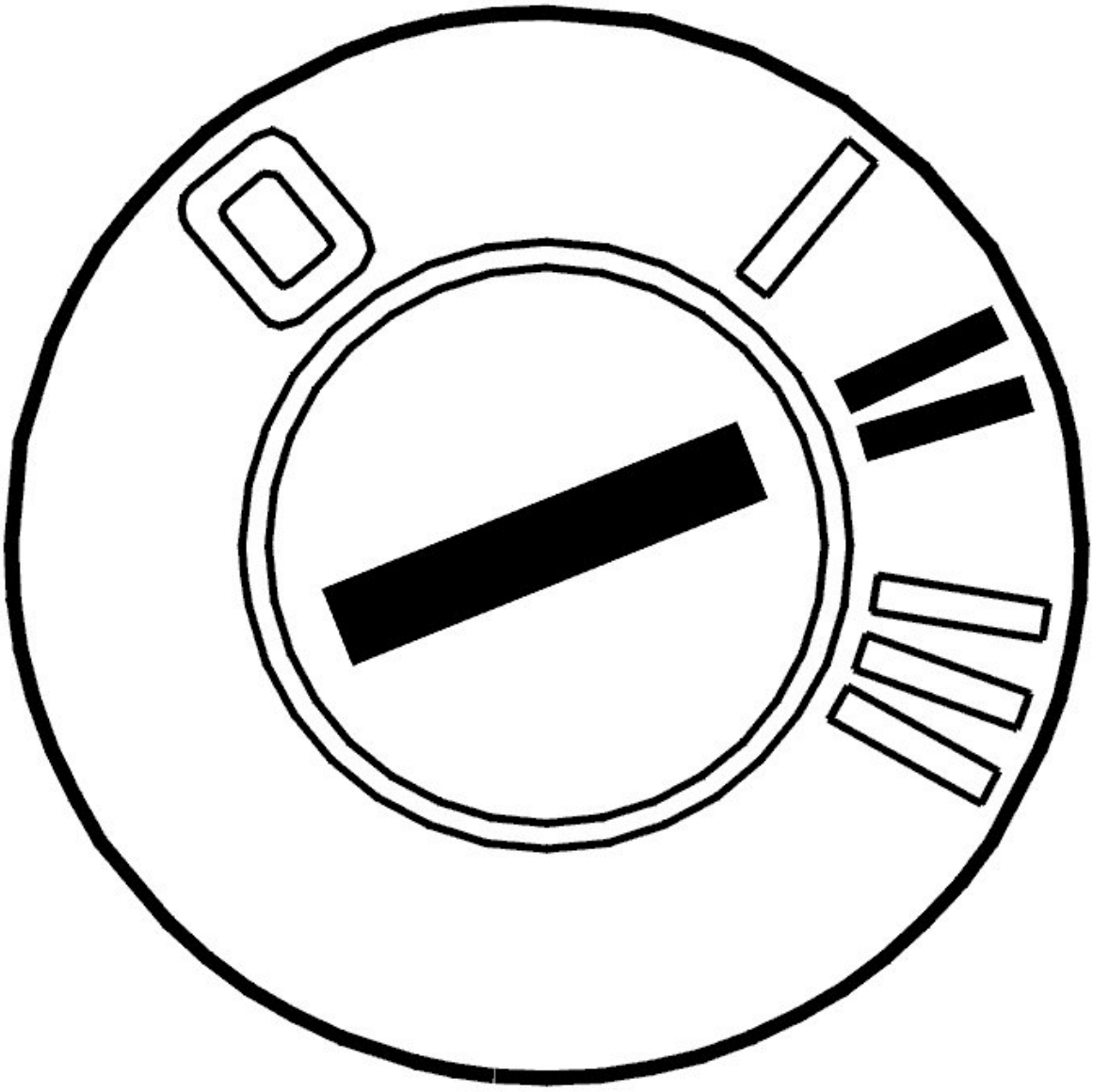
Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition on
- Wait approximately 60 seconds
- Read off the status of the diagnostic trouble code (DTC).

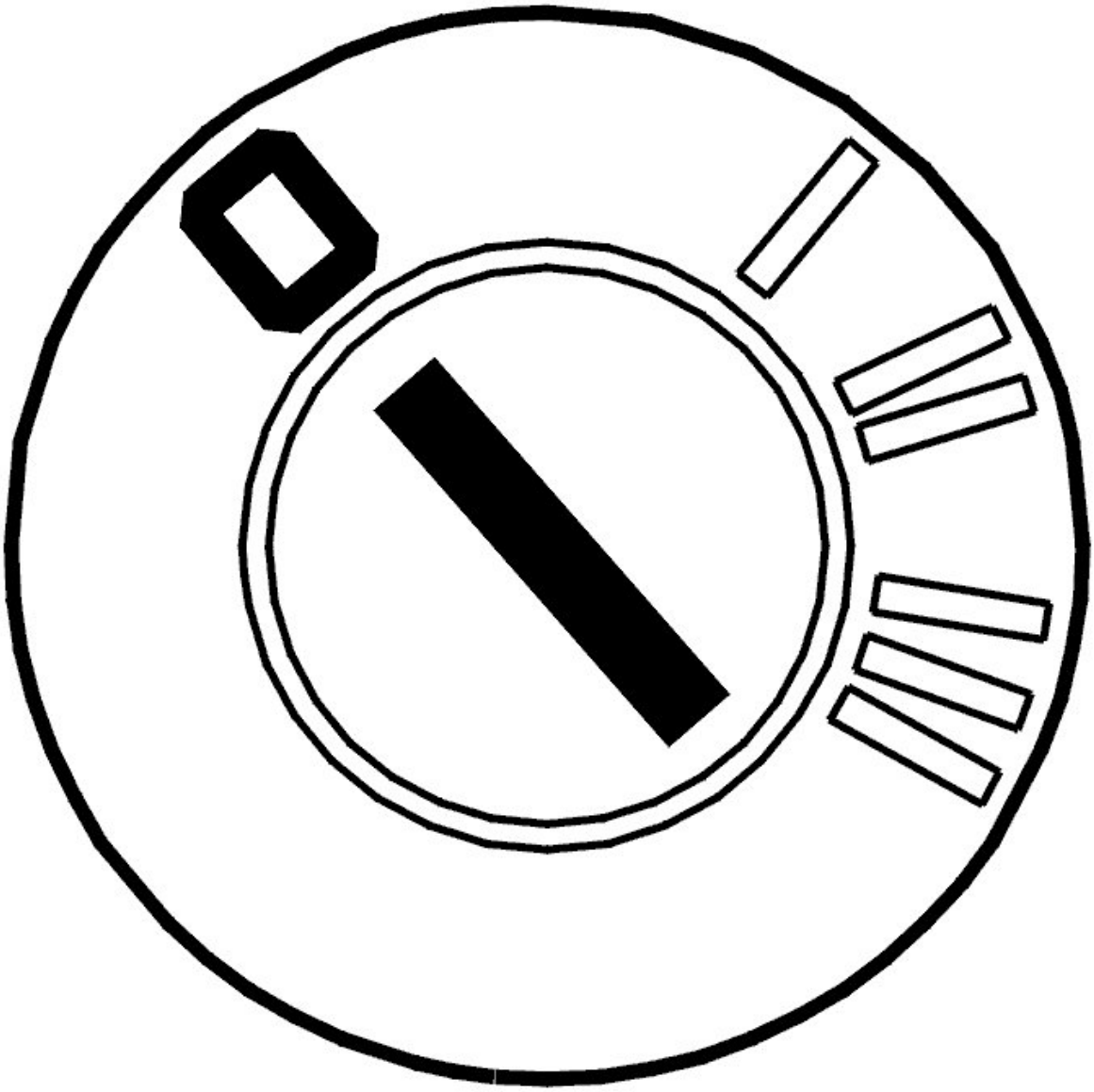
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Is the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking wiring and terminals

No - Intermittent fault

Checking wiring and terminals

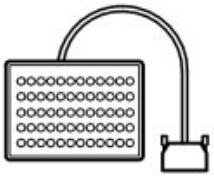


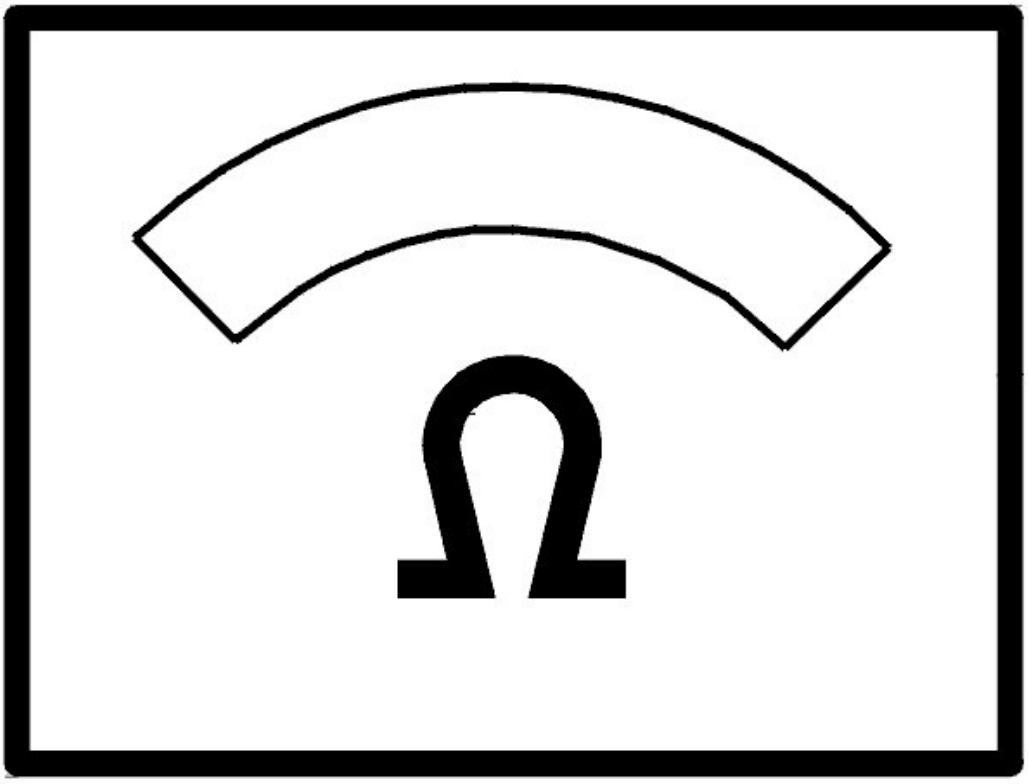
- Ignition off.

Check the connector to the brake control module (BCM). Check for damaged or bent pins as well as contact resistance and oxidation.
Check the cable between Brake control module (BCM)terminal #11 (#A11) and Differential electronic module (DEM) terminal #7. Check for an open-circuit and short-circuit to ground or voltage.
Check the cable between Brake control module (BCM)terminal #15 (#A15) and Differential electronic module (DEM) terminal #8. Check for an open-circuit and short-circuit to ground or voltage.
Check that the wiring is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module

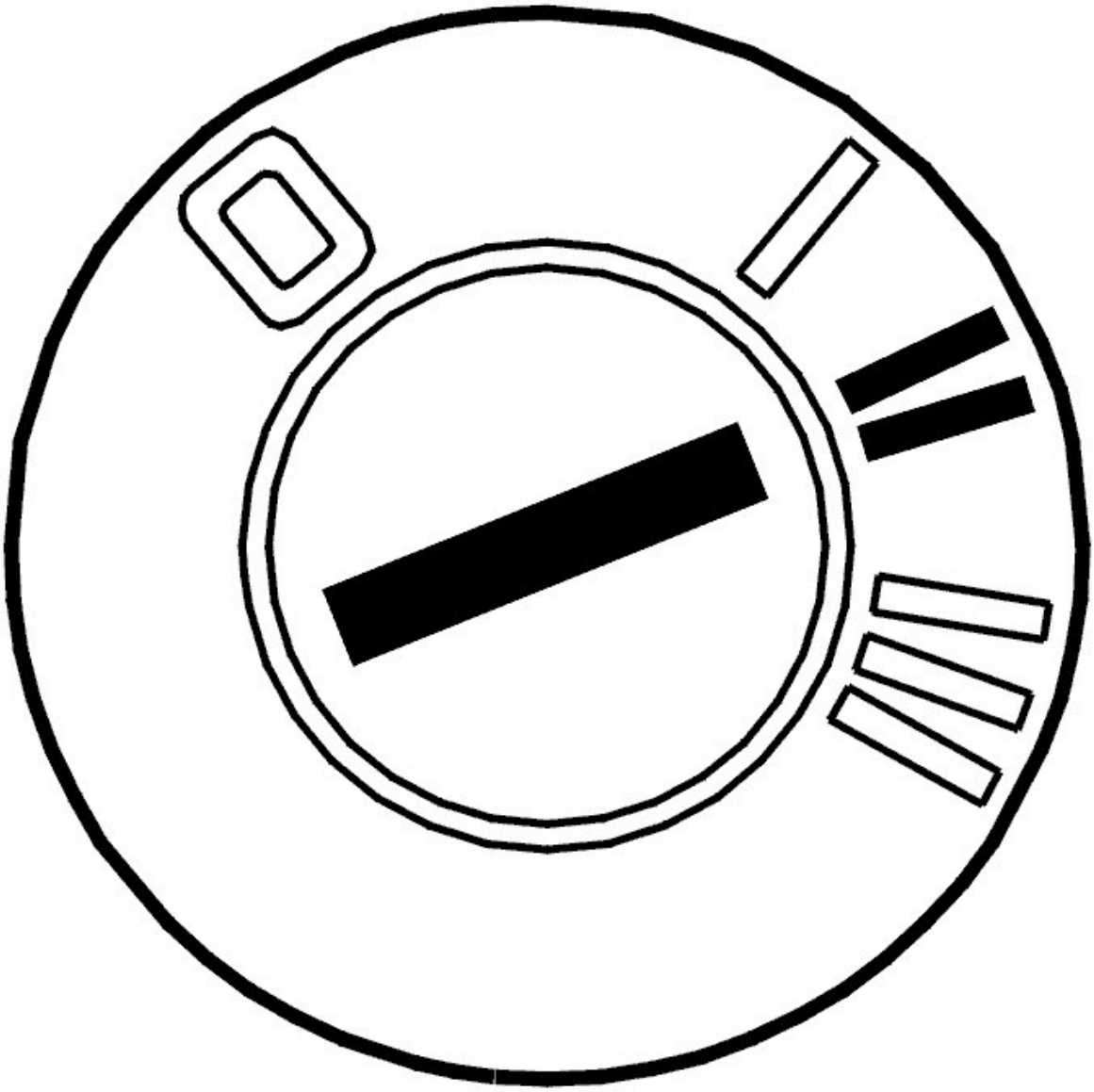
FAULT-TRACING FAILED - FAULT-TRACING FAILED

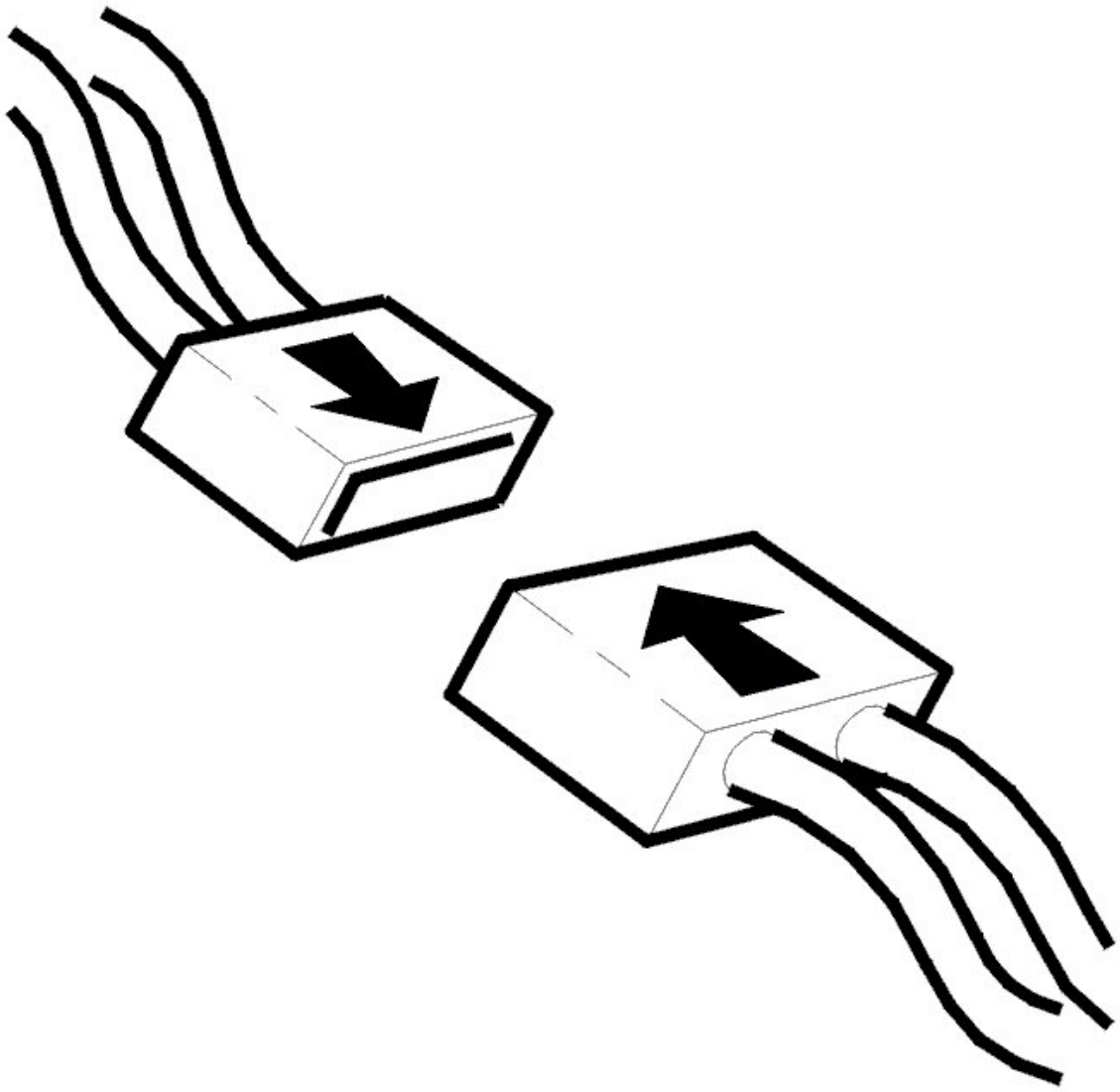
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

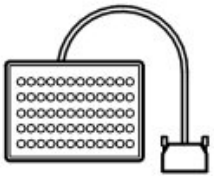
Intermittent fault

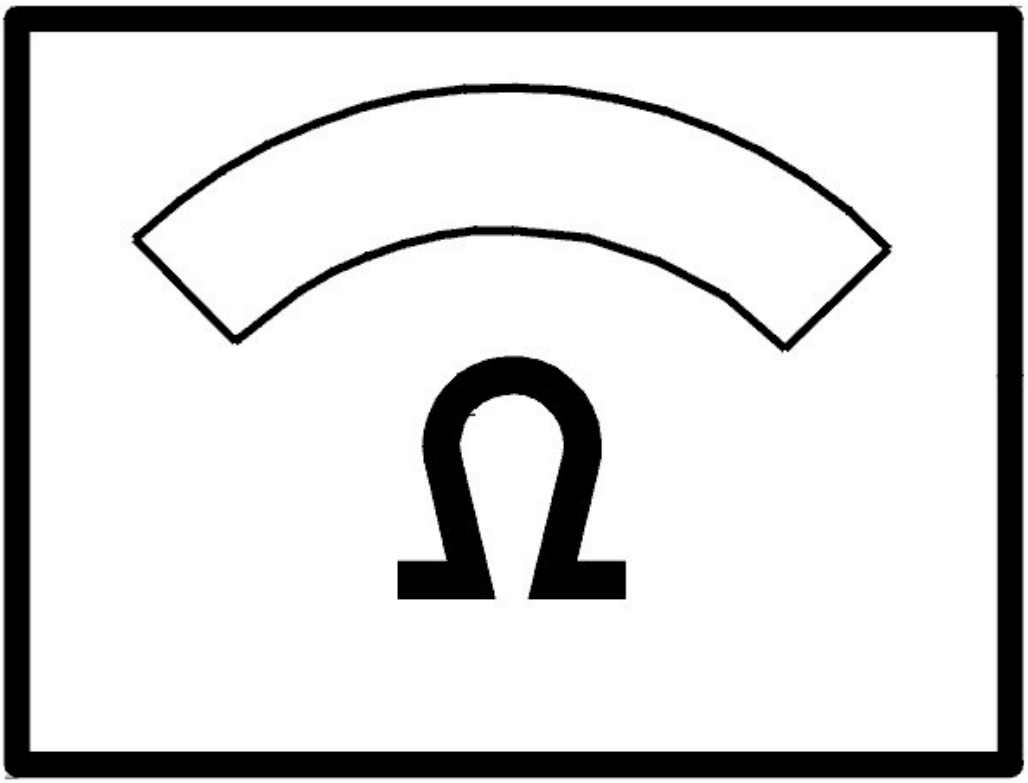
Hint: The status of the diagnostic trouble code (DTC) indicates that the brake control module has previously registered a fault but that the fault is not active.

Check the connectors of the brake control module (BCM) and the differential electronic module (DEM) for contact resistance and oxidation.
Also check that the wiring for CAN communication is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- To connect the breakout box, see: Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module

FAULT-TRACING FAILED - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Note! The diagnostic trouble code (DTC) applies only to cars with all-wheel drive (AWD) and dynamic stability and traction control (DSTC).

The differential electronic module (DEM) indicates to the brake control module (BCM) when four wheel drive is activated. During four wheel drive the brake control module (BCM) must not activate the stability function due to the risk of disrupting the differential electronic module (DEM). A DTC is stored if the Brake control module (BCM) registers that the difference in speed between the front and rear wheels is too great. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Stability control is blocked
- Active yaw control is blocked.

Hint: Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations

Possible source
- Damaged Differential Electronic Module (DEM).

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function.

Communication Problems With the Differential Electronic Module (DEM)

Communication problems with the differential electronic module (DEM)

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Fault-tracing information

Fault-tracing information

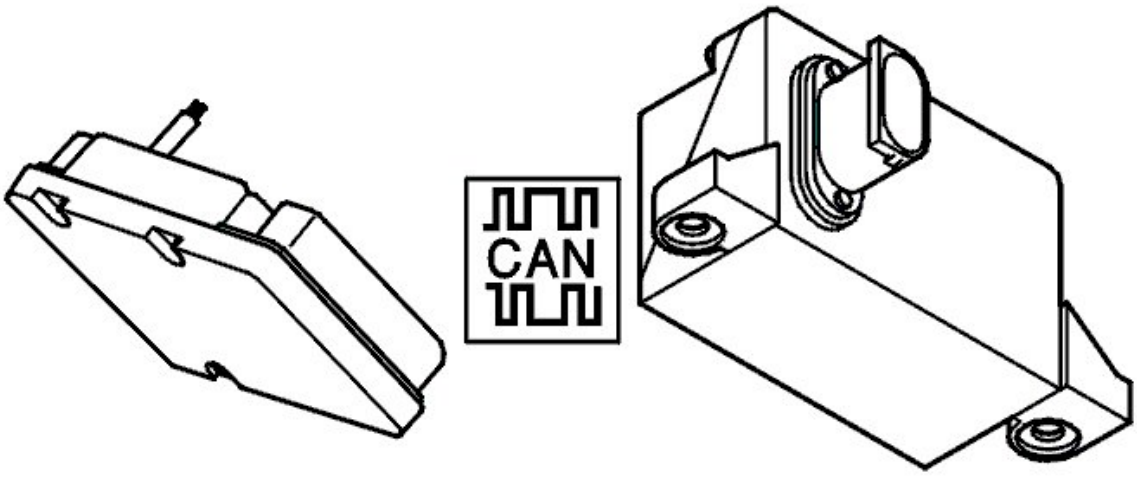
The diagnostic trouble code (DTC) indicates a fault in the Differential electronic module (DEM) or associated components. Fault trace DTC for Differential electronic module (DEM). If no DTC is stored, select **INFORMATION/FAULT TRACING/SYMPTOM RELATED TESTS/465 CENTRE DIFFERENTIAL**, and fault-trace Checking the differential electronic module (DEM) and associated components.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The control modules in the car continually transmit and receive information over the data network (Controller Area Network).
Diagnostic trouble code (DTC) BCM-0097 is stored if the brake control module (BCM) registers that the signal from the central electronic module (CEM), which contains information about the vehicle type, has been absent for more than 27 seconds after the ignition is switched on.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- A brake control module (BCM) from another model has been installed
- A central electronic module (CEM) from another model has been installed.

Fault symptom[s]

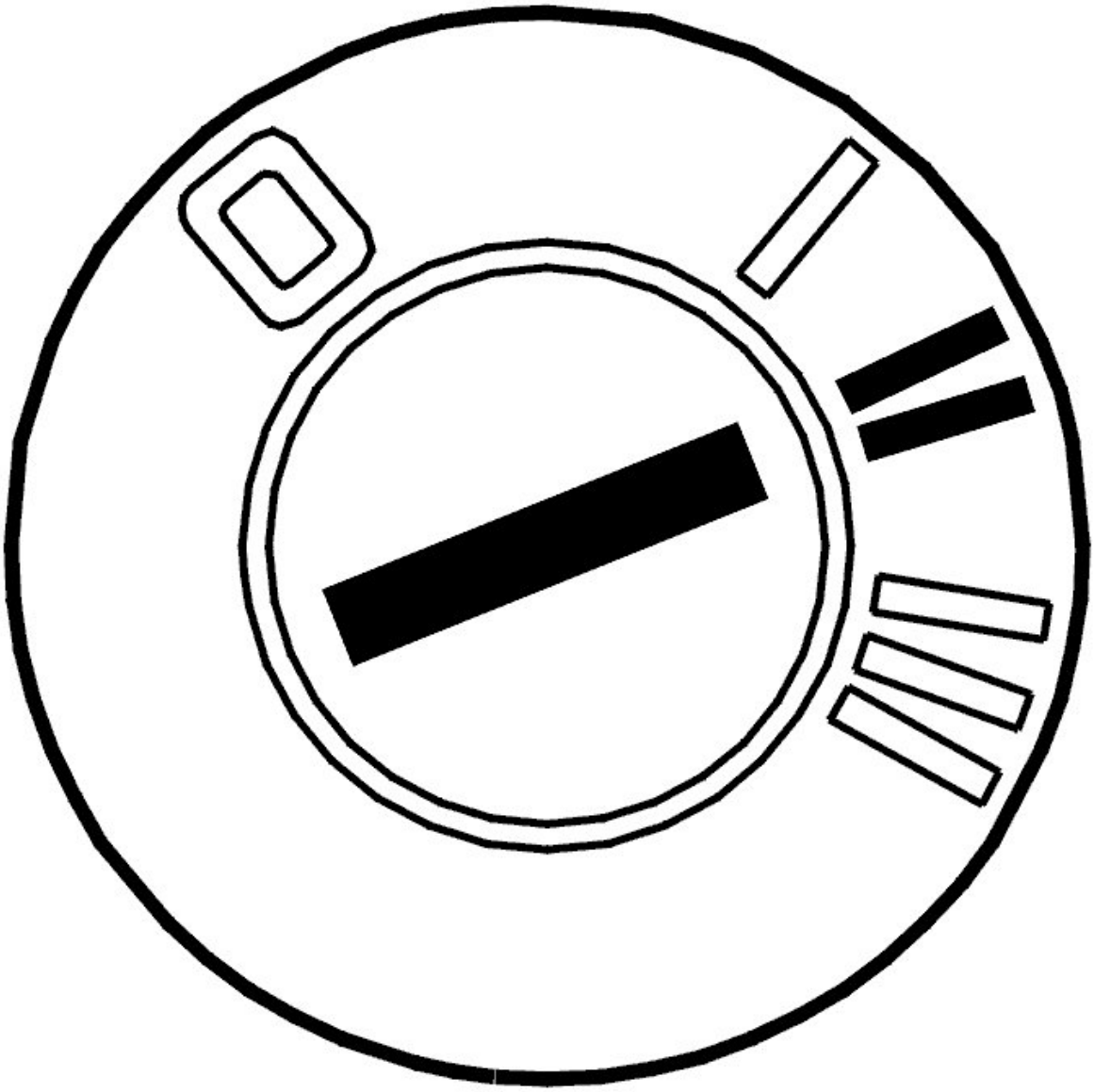
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication Problems With the Central Electronic Module

Communication problems with the central electronic module

Checking other diagnostic trouble codes (DTCs)

Hint: In the event of communication problems, the fault may exist in other parts of the communications network. The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTC) stored in the central electronic module these must be fault traced accordingly.



- Ignition on
- Wait approximately 60 seconds
- Read off diagnostic trouble codes (DTCs).

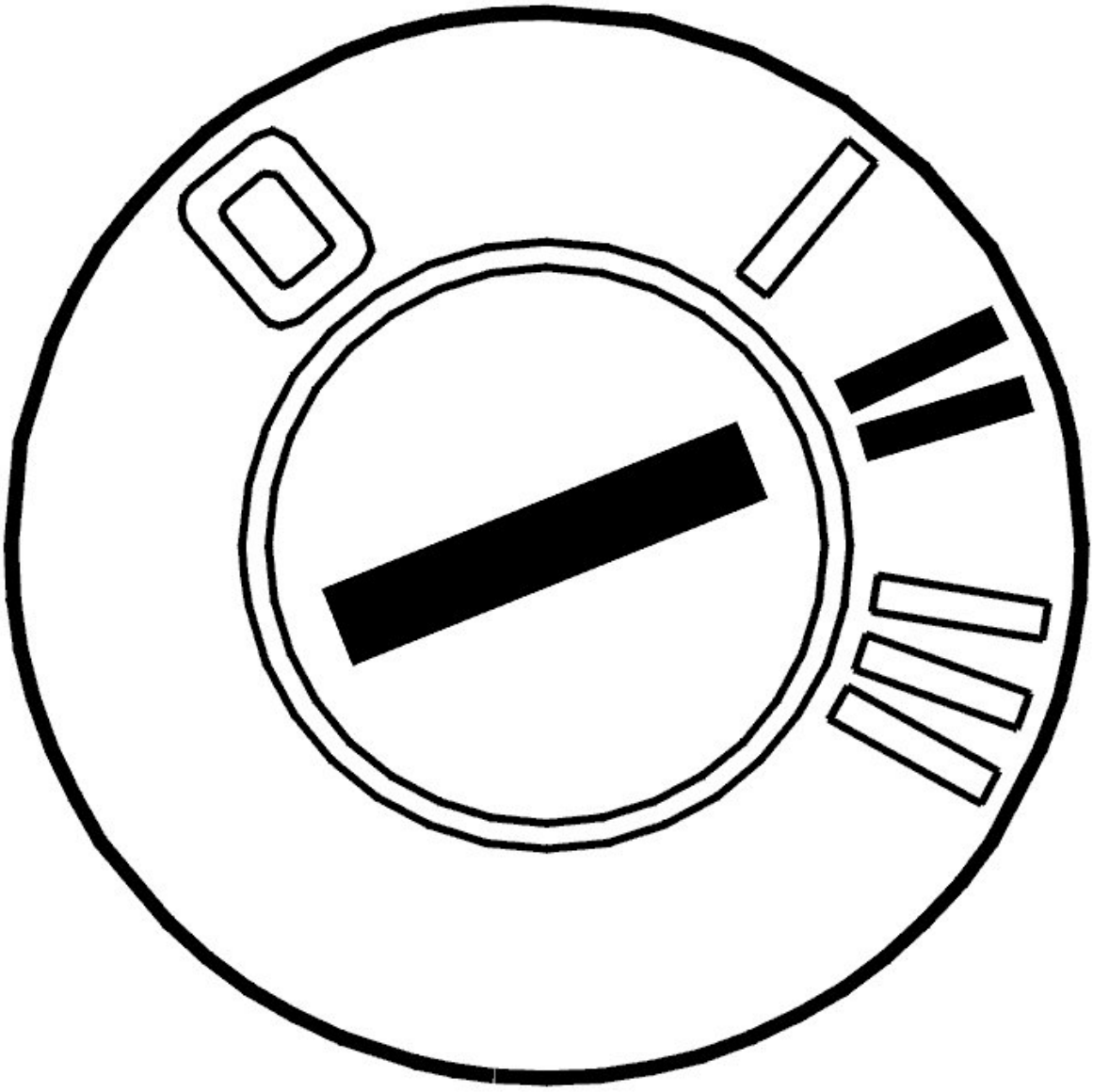
If there are diagnostic trouble codes (DTCs) for communication problems stored for the brake control module in the central electronic module, these must be fault traced first.

Were diagnostic trouble codes (DTCs) stored in the central electronic module?

Yes - **DONE**

No - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



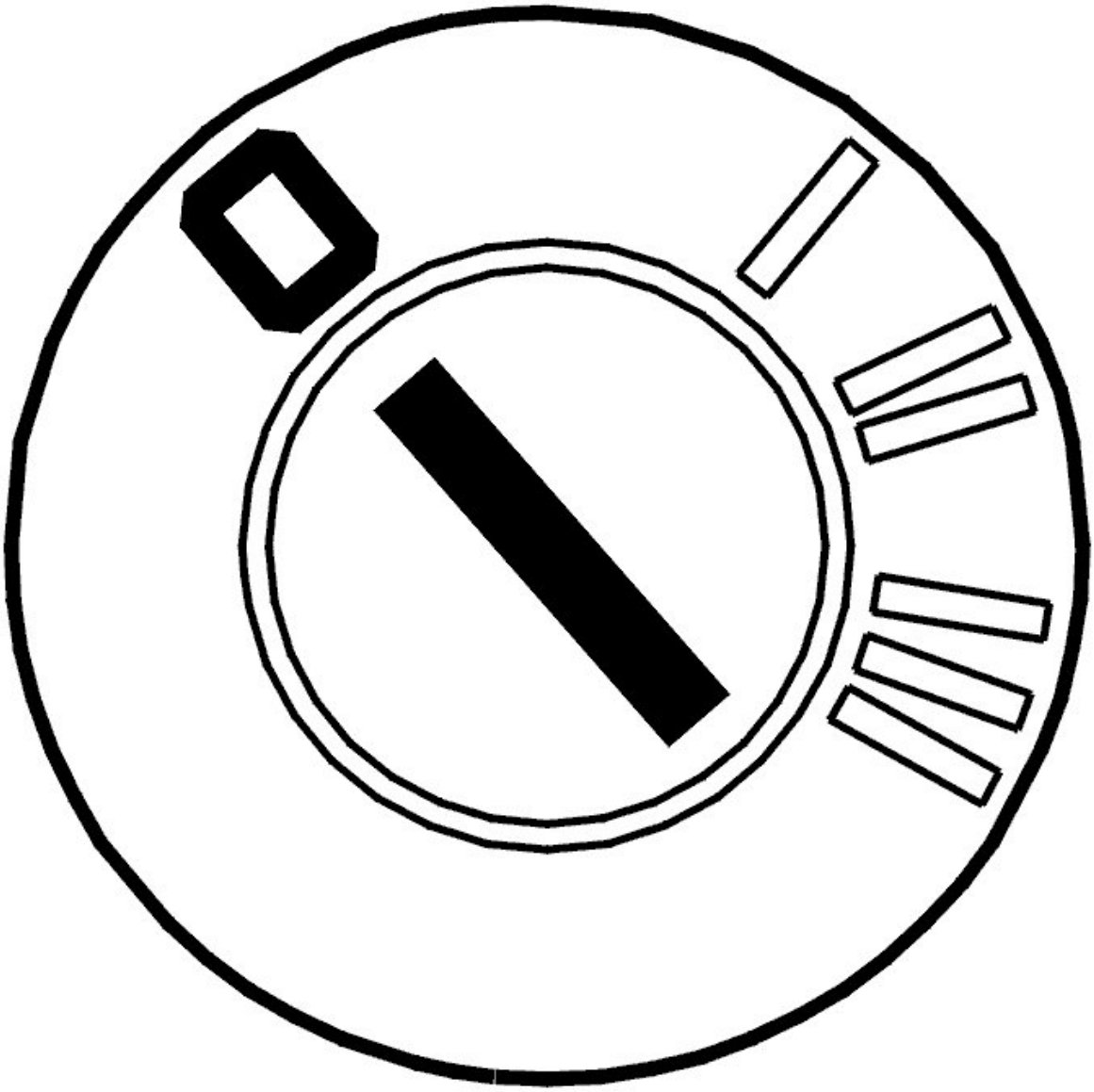
- Ignition on
- Wait approximately 60 seconds
- Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking wiring and terminals

- Intermittent fault

Checking wiring and terminals



- Ignition off.

Check the brake control module connector. Check for damaged or bent terminal pins. Check for contact resistance and oxidation.
Check the wiring for CAN communication between brake control module terminal #11 (#A11) and central electronic module terminal #17B and between brake control module terminal #15 (#A15) and central electronic module (CEM) terminal #18B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check that the wiring is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- To check the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking other diagnostic trouble codes (DTCs)

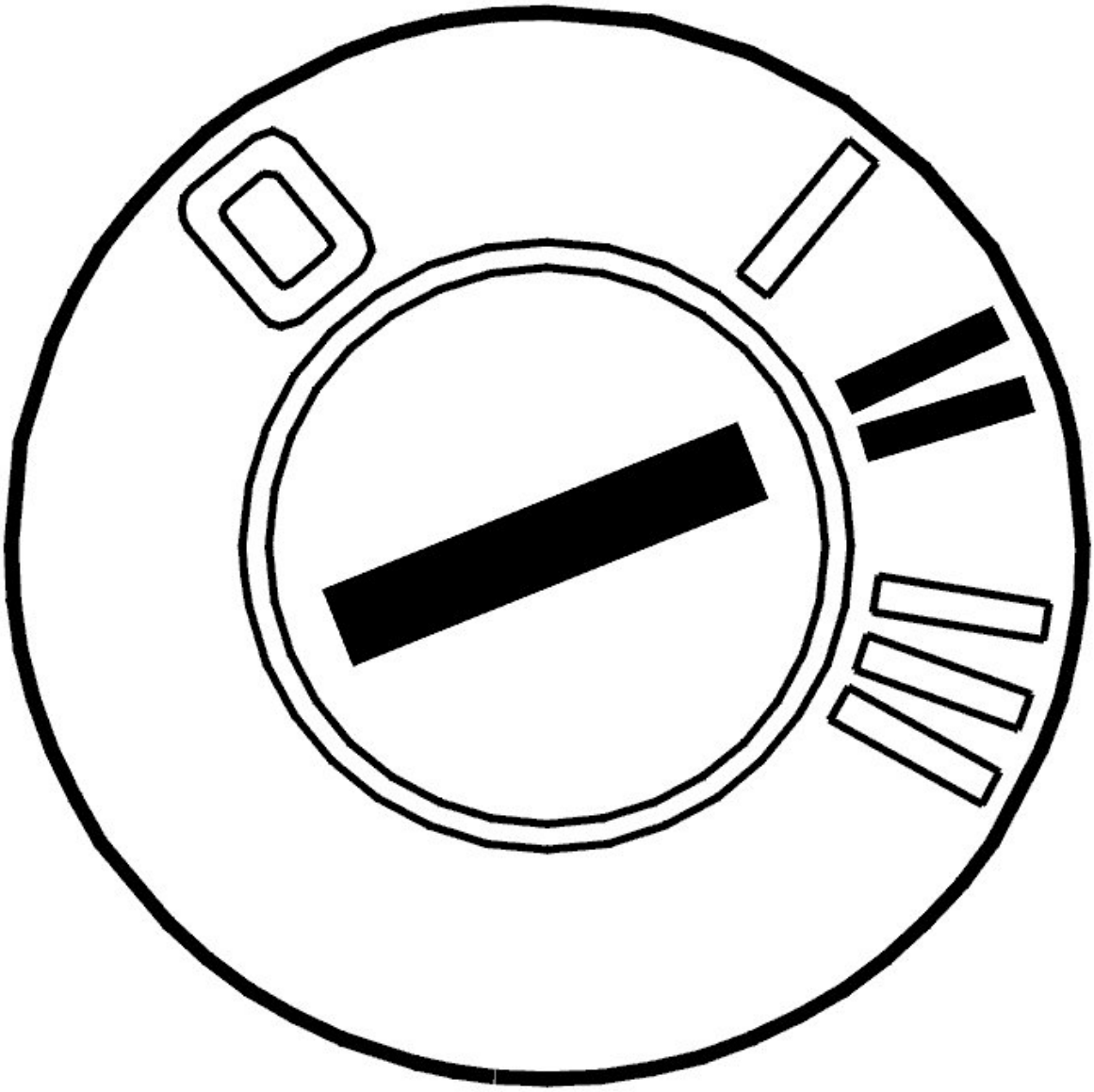
FAULT-TRACING FAILED - FAULT-TRACING FAILED

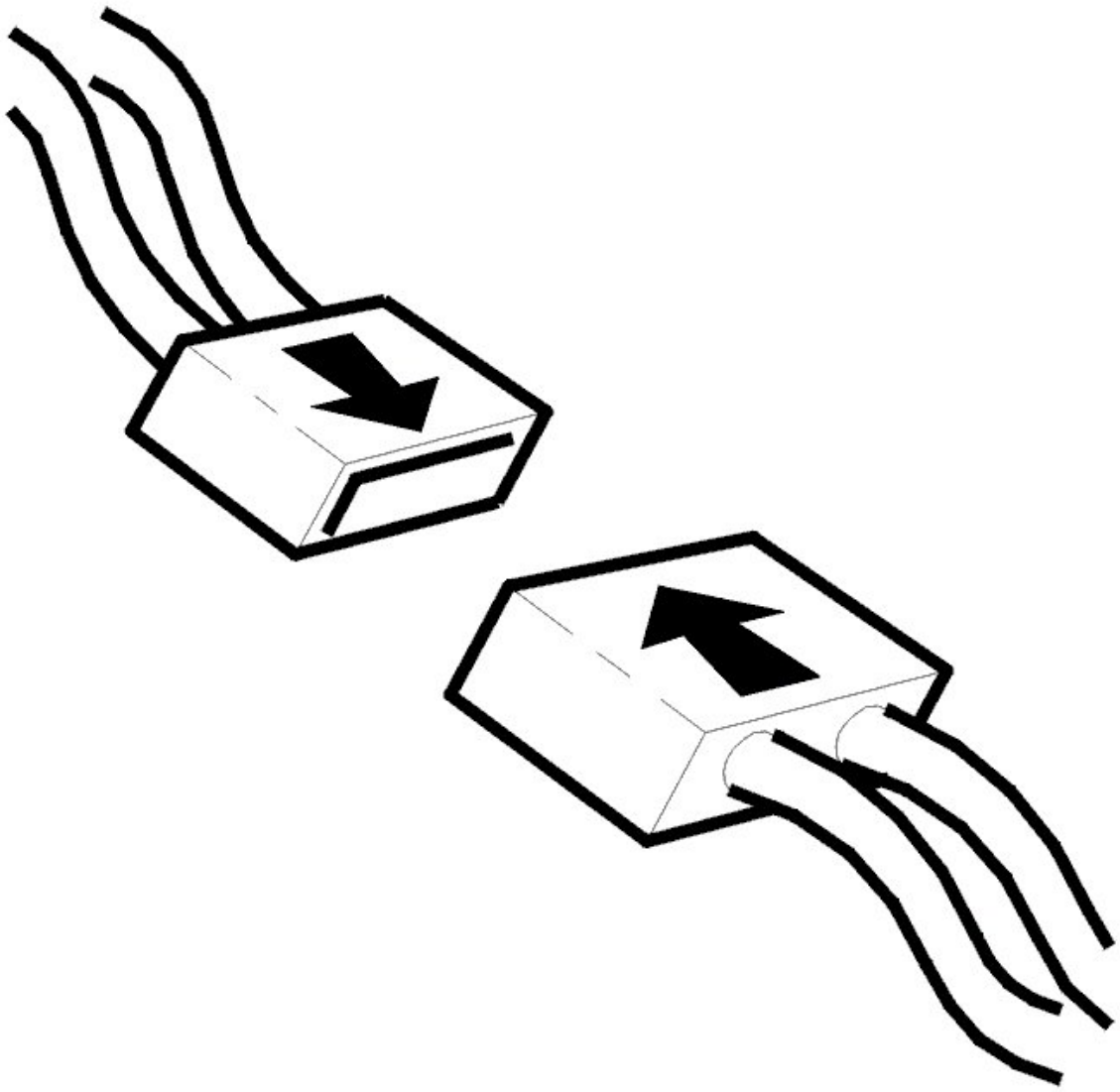
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Intermittent fault

Hint: The status of the diagnostic trouble code (DTC) indicates that the brake control module has previously registered a fault but that the fault is not active.

Check the connectors for the brake control module and the central electronic module. Check for contact resistance and oxidation.
Also check that the wiring for CAN communication is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

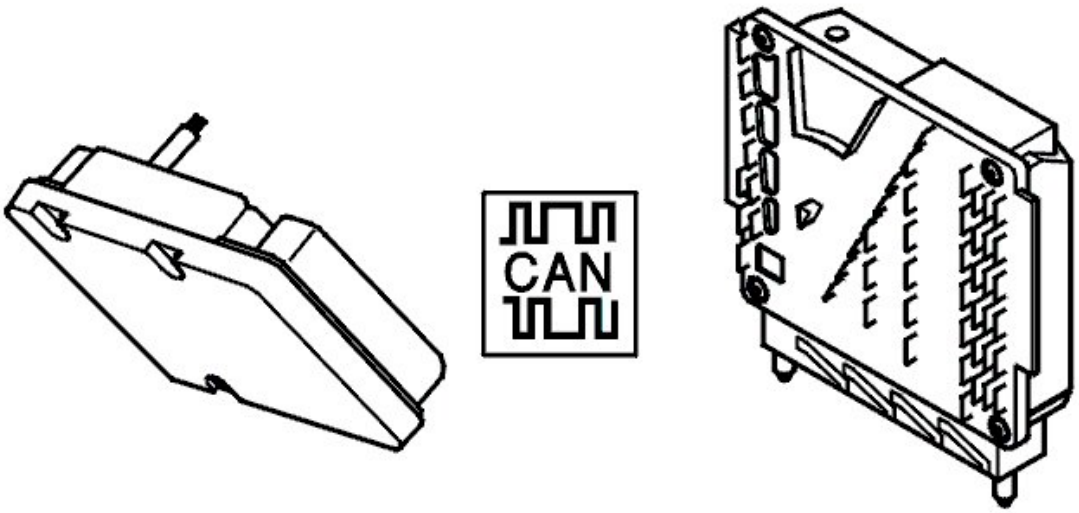
Attempt New Test - Checking other diagnostic trouble codes (DTCs)

FAULT-TRACING FAILED - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with stability and traction control (STC) / dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0100 is stored if the brake control module (BCM) registers that the engine speed or torque signal from the engine control module (ECM) is missing for more than 500 ms.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Open-circuit or short-circuit in the cable for the control area network (CAN)
- Fault in the engine management system.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication Problems With the Engine Control Module (ECM)

Communication problems with the engine control module (ECM)

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Checking diagnostic trouble codes (DTCs) in the engine control module (ECM)

Checking diagnostic trouble codes (DTCs) in the engine control module (ECM)

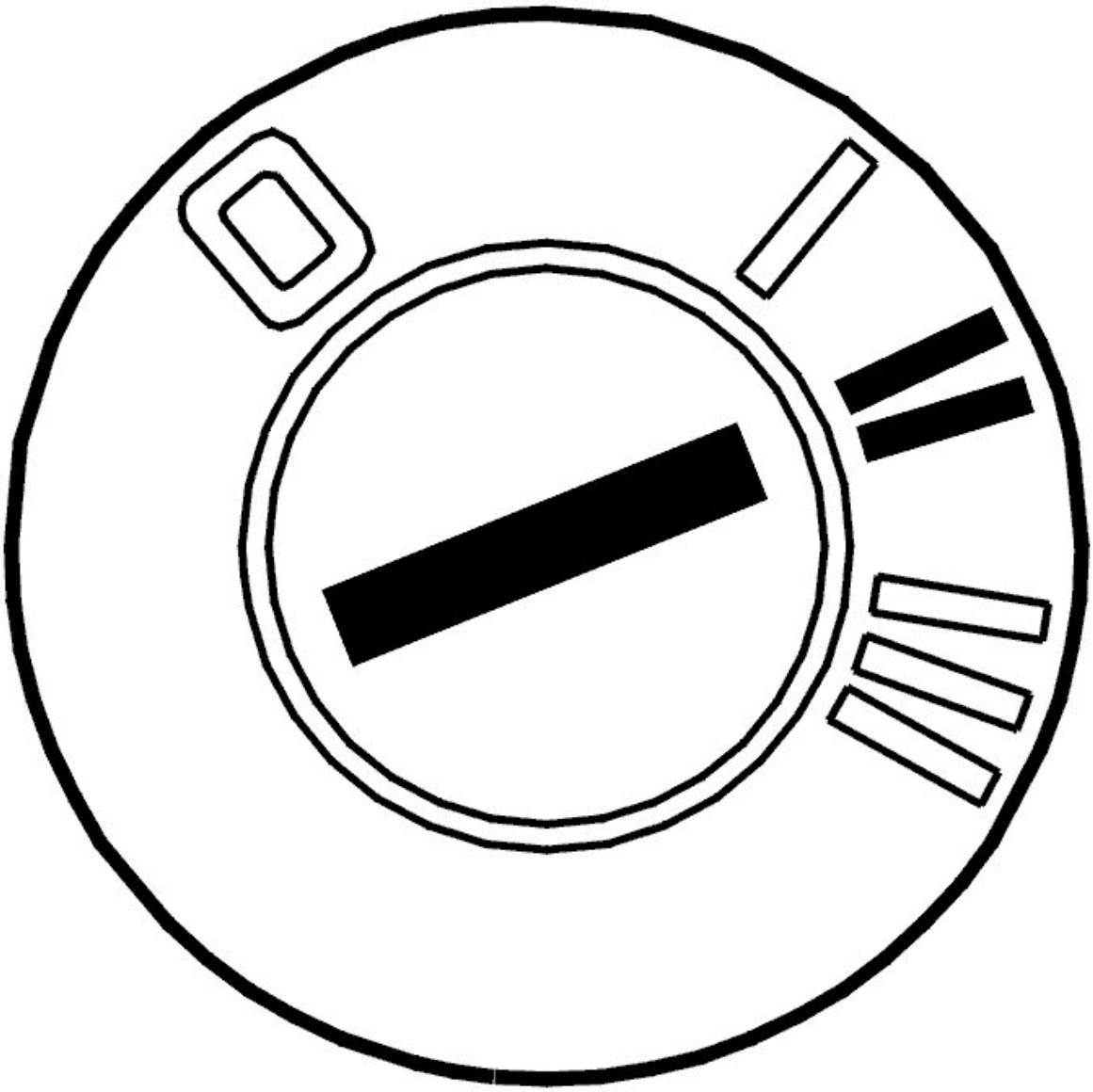
The diagnostic trouble code (DTC) is stored because the torque signal or engine speed signal from the engine has been missing for more than 500 ms. The signals are used by the brake control module for control the stability function.
If there are any diagnostic trouble codes (DTCs) stored for the engine control module (ECM), these must be fault traced first.

Were diagnostic trouble codes (DTCs) for the engine control module (ECM) stored?

Yes - DONE

No - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



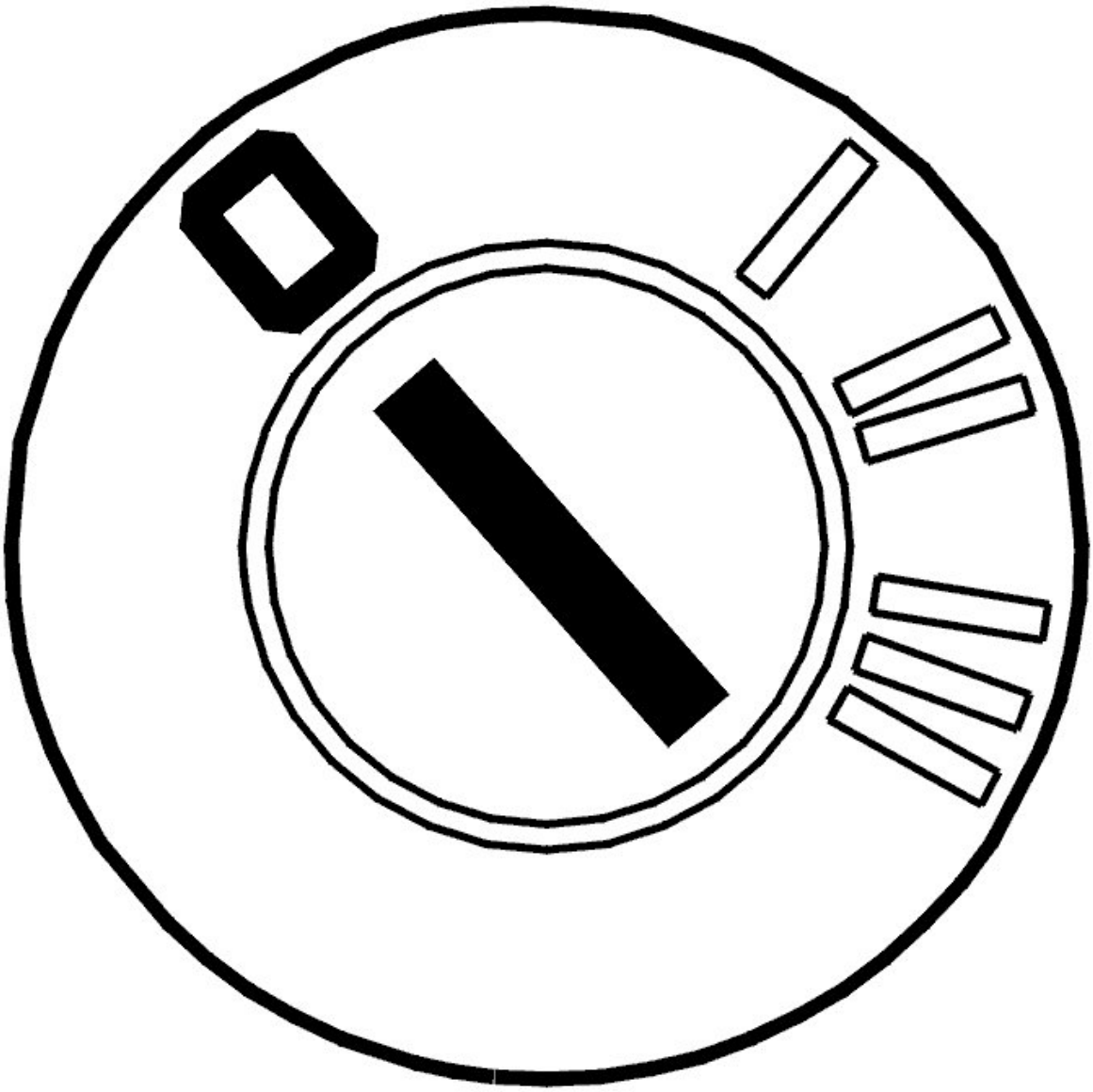
- Ignition on
- Wait approximately 60 seconds
- Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking wiring and terminals

No - Intermittent fault

Checking wiring and terminals



- Ignition off.

Check the brake control module connector. Check for damaged or bent terminal pins. Check for contact resistance and oxidation.
Check the wiring for CAN communication between terminals #A11 (#A11) and #B13 (#B13) and between terminal #15 (#A15) and #B1 (#B11).
Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check that the wiring is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- To check the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module

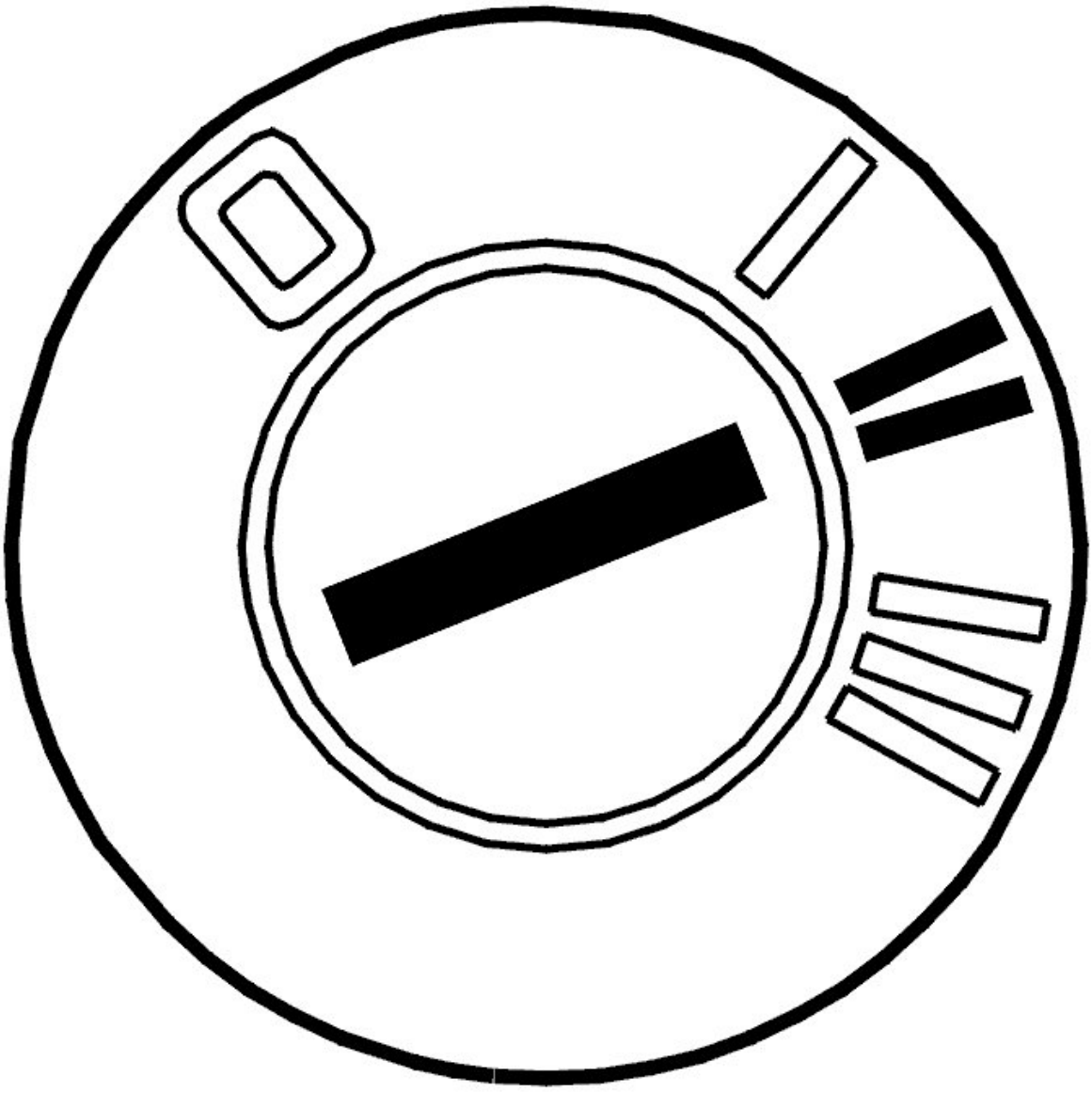
FAULT-TRACING FAILED - FAULT-TRACING FAILED

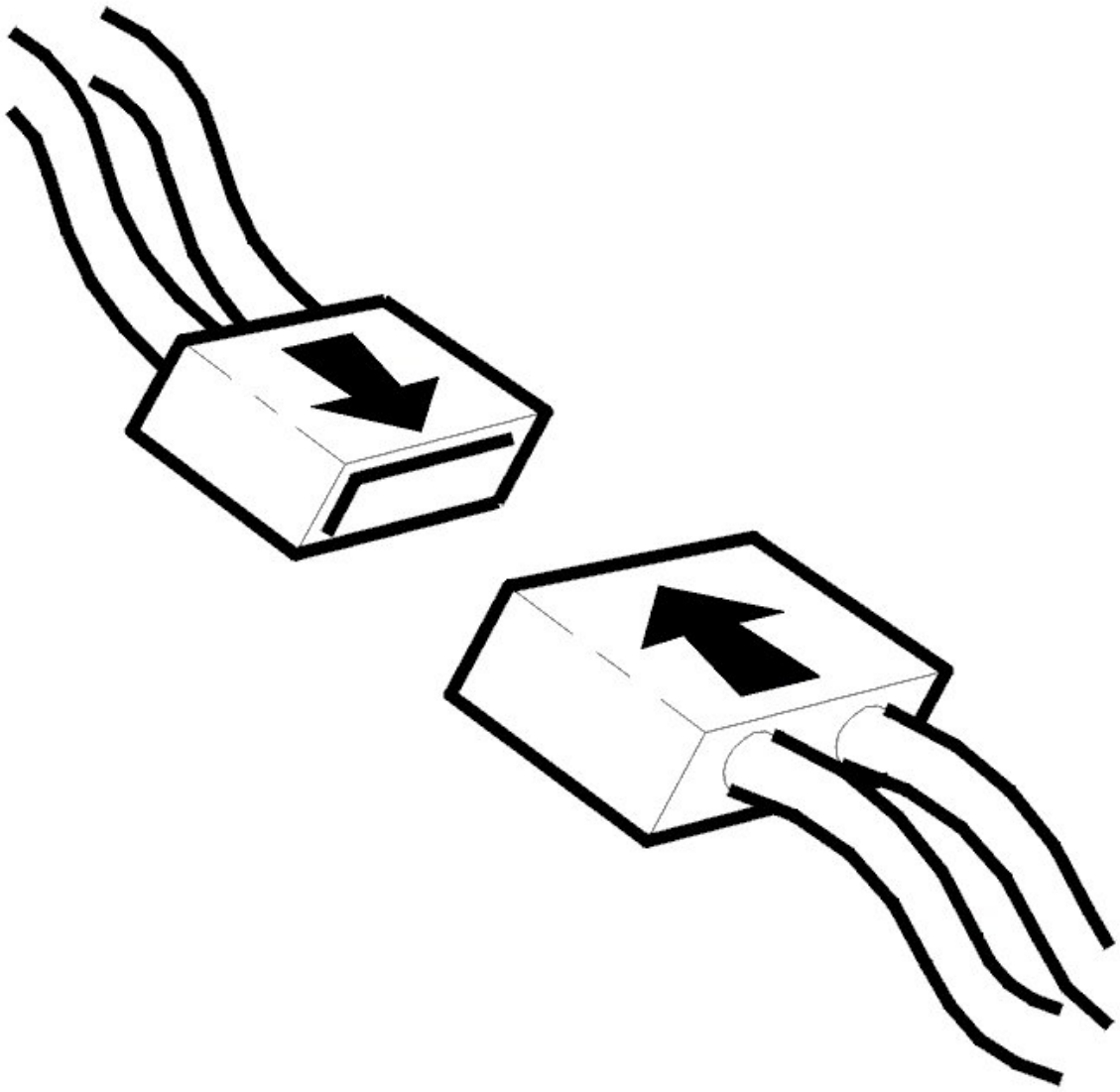
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Intermittent fault

Hint: The status of the diagnostic trouble code (DTC) indicates that the brake control module has previously registered a fault but that the fault is not active.

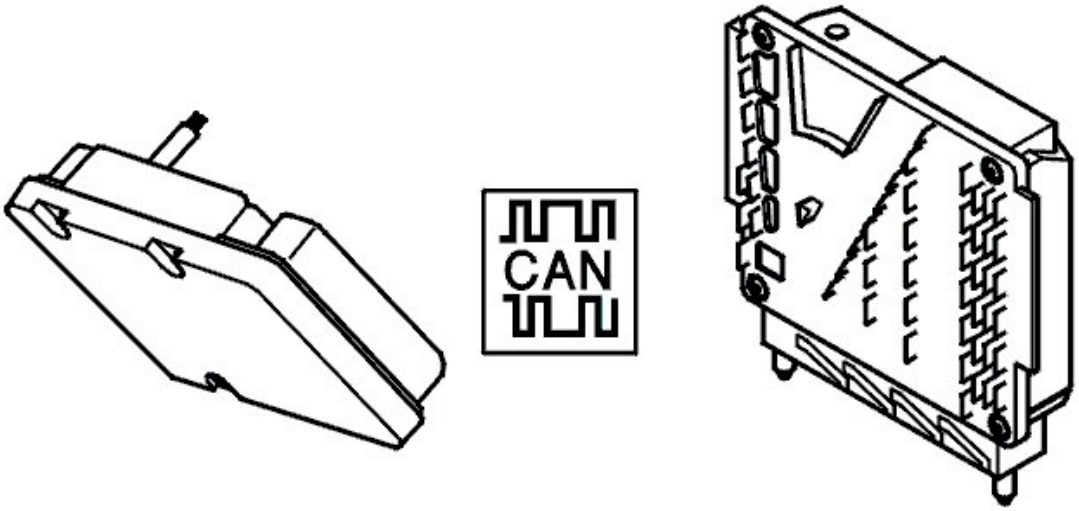
Check the connectors for the brake control module and the engine control module (ECM). Check for contact resistance and oxidation.
Also check that the wiring for CAN communication is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with stability and traction control (STC) / dynamic stability and traction control (DSTC).

The engine control module (ECM) transmits a signal via the Control area network (CAN) which indicates whether the engine speed signal to the brake control module (BCM) is correct or not. The brake control module (BCM) uses the engine speed (RPM) signal during control of the stability function.
Diagnostic trouble code (DTC) BCM-0101 is stored if the brake control module (BCM) registers that the engine control module (ECM) has transmitted a signal indicating that the engine speed (RPM) signal is implausible.
The diagnostic trouble code (DTC) can be diagnosed after the engine has been started.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Fault in the engine management system.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication Problems With the Engine Control Module (ECM)

Communication problems with the engine control module (ECM)

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Fault-tracing information

Fault-tracing information

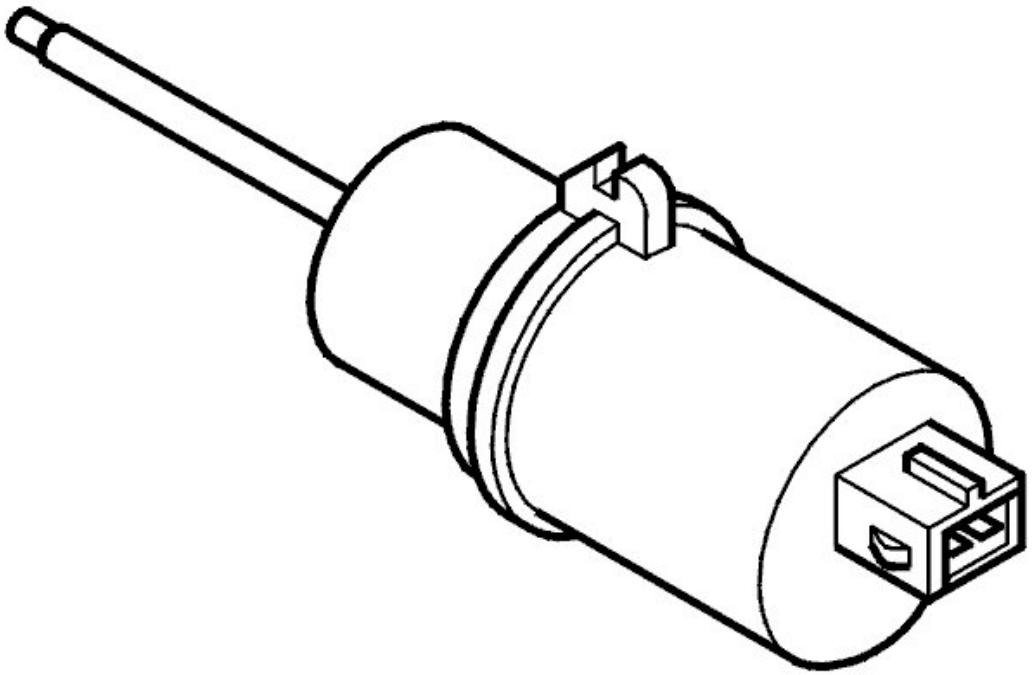
The diagnostic trouble code (DTC) indicates that the fault is engine related.
Read off diagnostic trouble codes (DTCs) from the engine control module (ECM) and fault-trace according to the relevant information.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake pedal position sensor transmits a signal to the brake control module about the position of the brake pedal and the speed at which it is pressed. The brake control module uses the signal to activate the brake assistance function during emergency braking.
Diagnostic trouble code (DTC) BCM-0103 is stored if the control module registers a faulty signal from the pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switch on and if the signal from the pedal position sensor is more than 4.85 V or less than 0.15 V for too long.

Substitute value
- Brake assistance is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

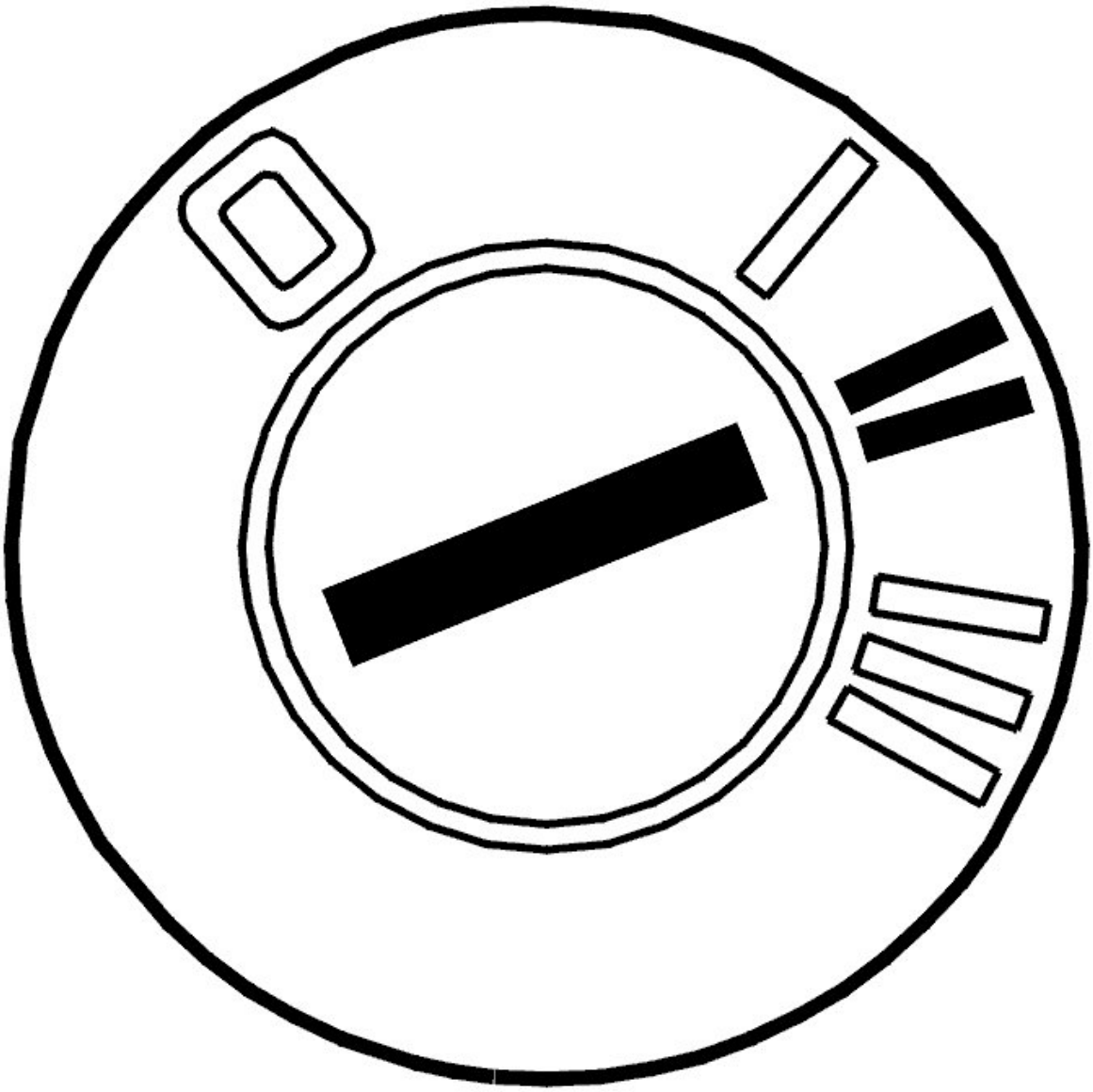
Possible source
- Open-circuit in the signal cable
- Short-circuit to ground or supply voltage in the wiring
- Incorrectly installed sensor
- Defective sensor
- Internal fault in the control module.

Fault symptom[s]
- General warning lamp lit.

Faulty Signal

Faulty signal

Checking the connectors



- Ignition off
- Check the brake control module (BCM) and pedal position sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Connect the breakout box to the brake control module (BCM)
- Ignition on
- Read off the position and speed of the pedal position sensor.

Depress the brake pedal. Check that the signals are updated.
The signal for the pedal position sensor must increase as the brake pedal is pressed further.
Press the brake pedal at different speeds. Check that the speed signal is updated.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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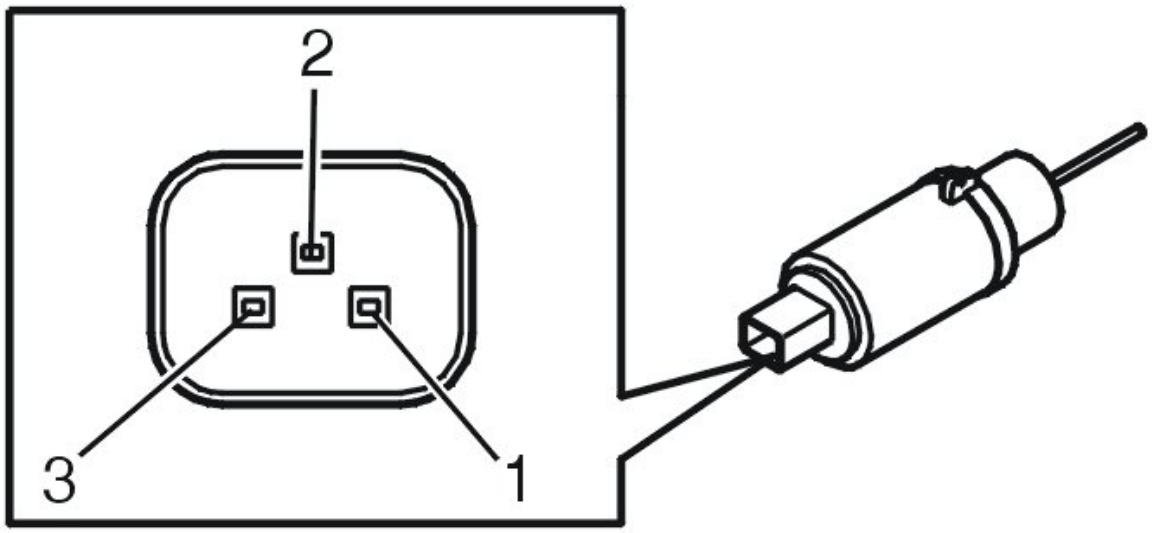
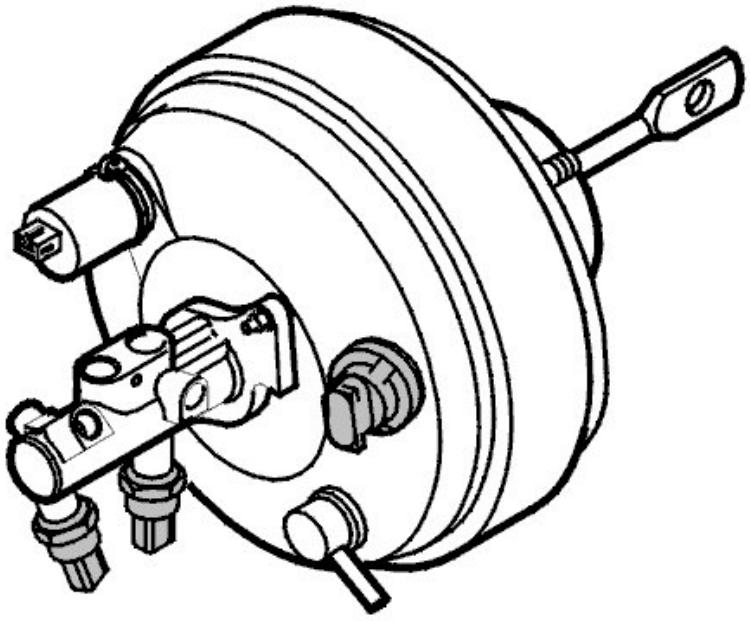


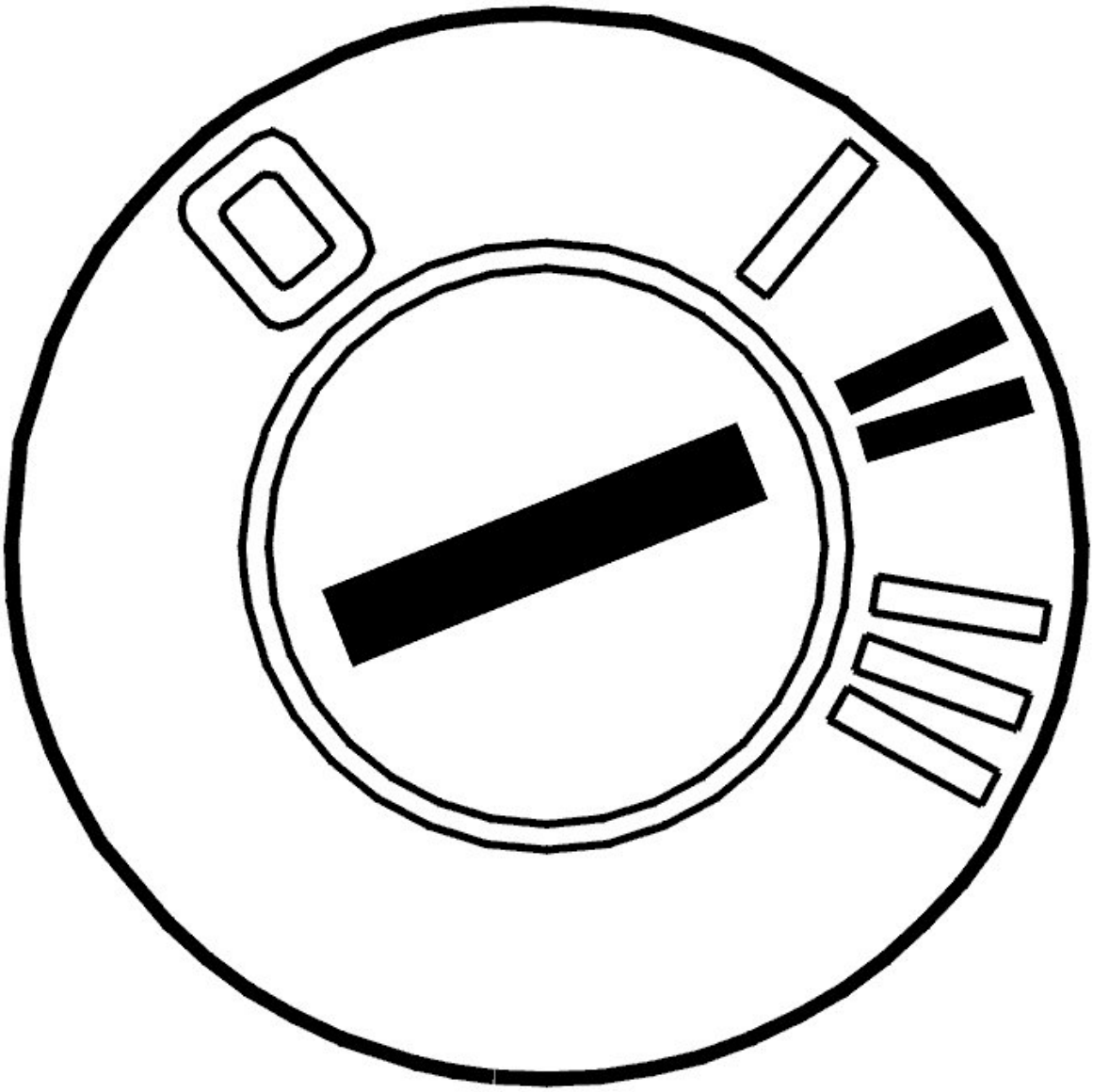


Was the signal updated?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off.

Check the wiring between pedal position sensor

- terminal #1 and control module terminal #7 (#A7)
- terminal #2 and control module terminal #5 (#A5)
- terminal #3 and control module terminal #3 (#A3).

Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Check the pedal position sensor as follows
- ignition off
- connect the breakout box to the wiring
- control module disconnected

measure the resistance at the pedal position sensor.

The resistance between breakout box terminals #3 (#A3) and #5 (#A5) must be approximately 0.5 kohms when the brake pedal is unaffected. The resistance must increase when the brake pedal is pressed.

The resistance between breakout box terminals #3 (#A3) and #7 (#A7) must be approximately 2.5 kohms when the brake pedal is unaffected. The resistance must decrease when the brake pedal is pressed.

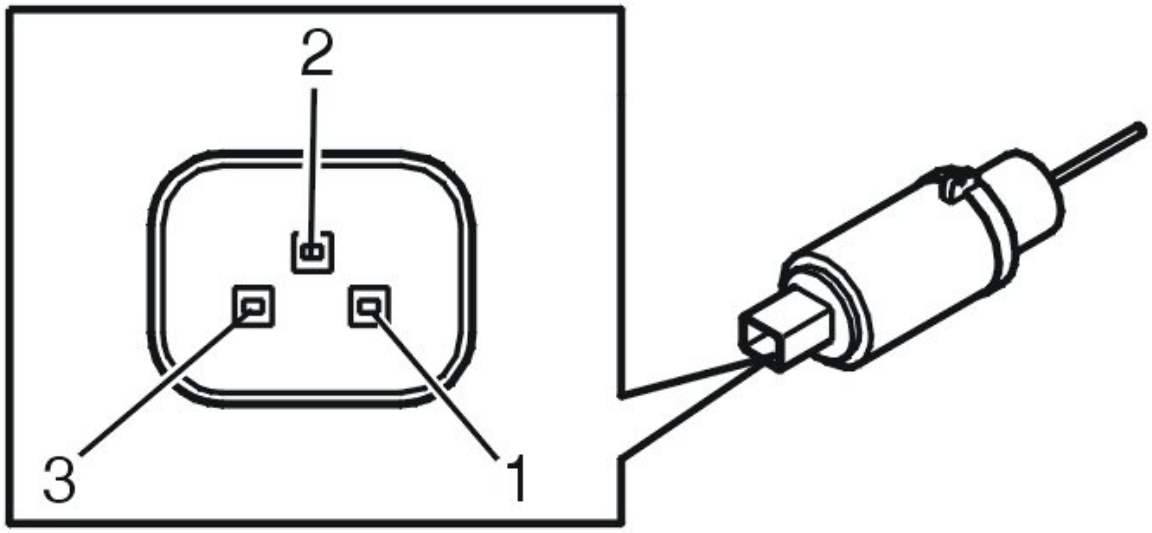
Remedy as necessary.

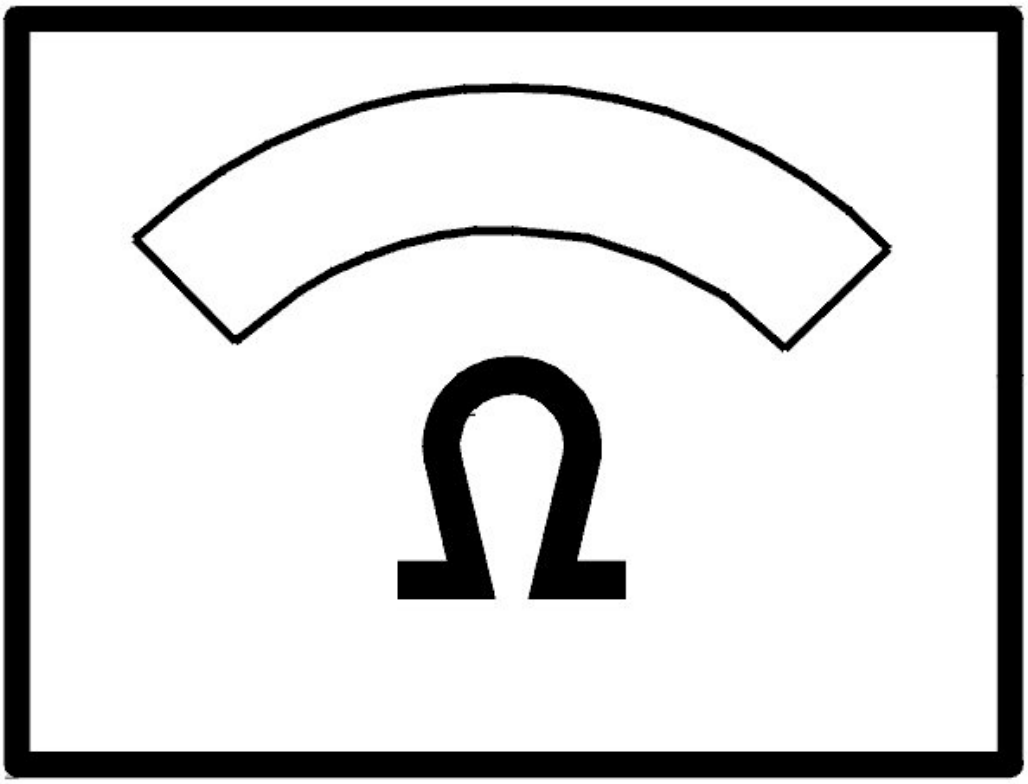
Other information

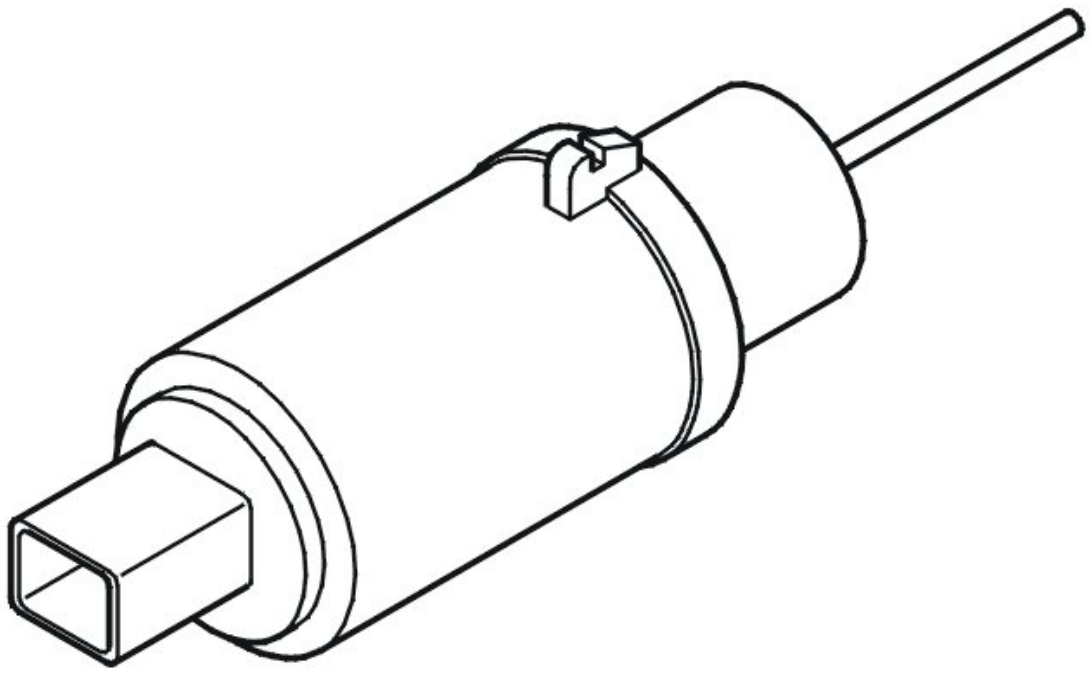
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with STC/ TRACS See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification and Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction

Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals







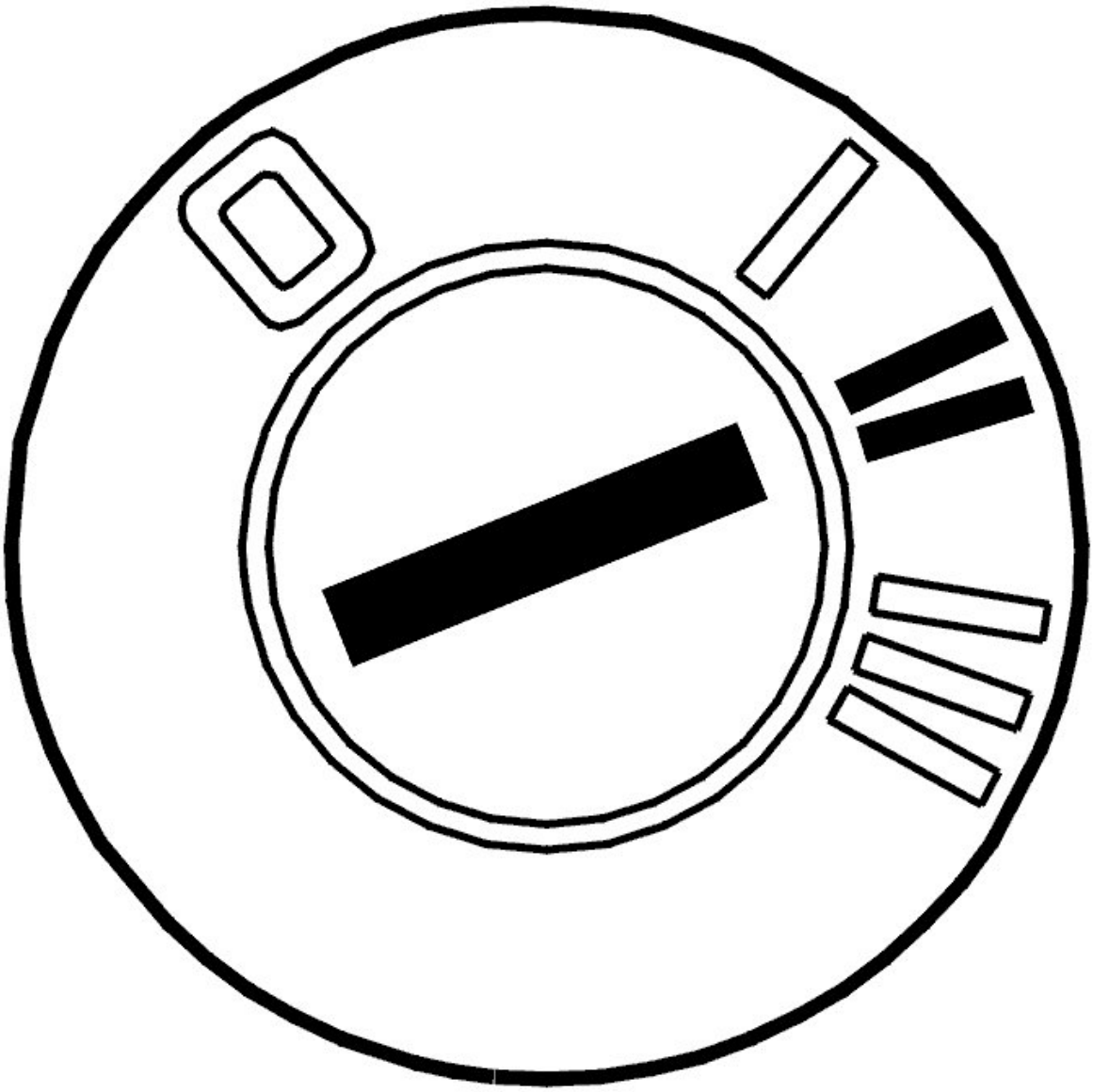
Was a fault detected?

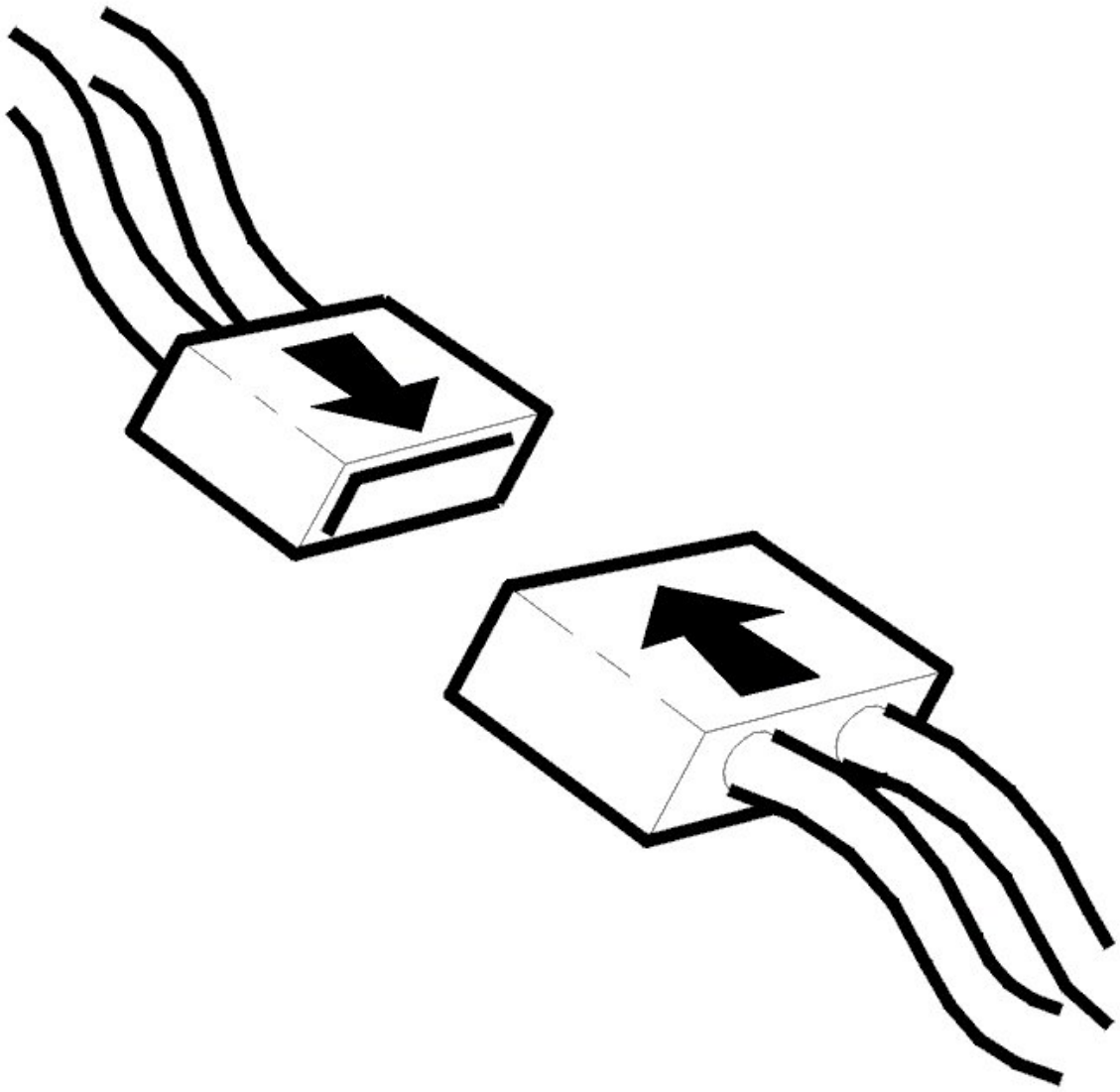
Yes - Verification

No - Fault-tracing information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the signal from the pedal position sensor.

Depress the brake pedal. Check that the signal is updated.
The signal must increase as the brake pedal is pressed further. Depress the brake pedal at different speeds. Check that the signal is updated.

Was the signal updated?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Information

Fault-tracing information

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.
Complete the fault-tracing for those fault or try again.

Do you want to terminate fault-tracing at this time?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

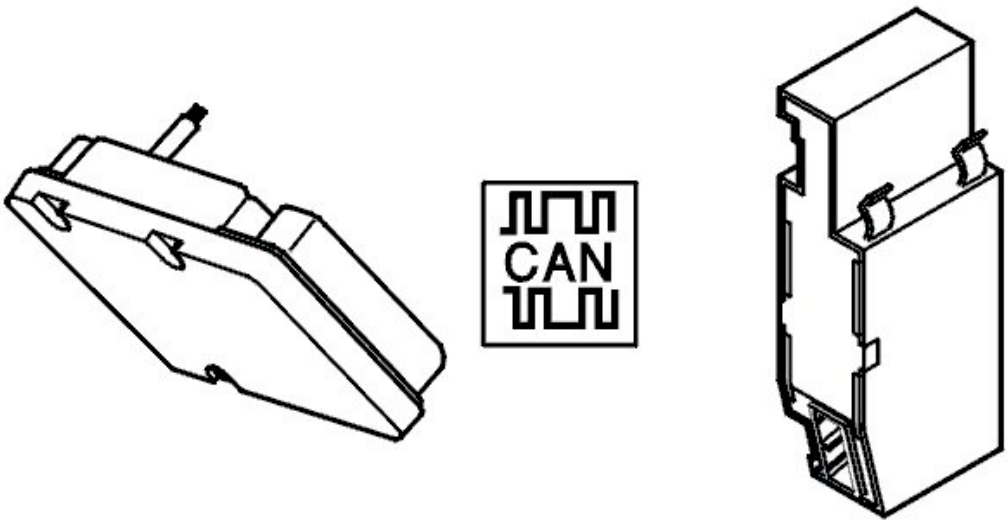
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The control module for the steering angle sensor transmits signals from the steering wheel angle sensor on the Control area network (CAN) from where it is retrieved by the brake control module (BCM). A reference signal is calculated using the signals from the wheel sensors, the yaw rate sensor and the lateral accelerometer. Diagnostic trouble code (DTC) BCM-0106 is stored if the brake control module (BCM) registers that the reference signal is outside its permitted range.

Substitute value
- Stability control is blocked
- Active yaw control is blocked
- Traction control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Incorrect front wheel alignment
- Incorrectly installed steering wheel angle sensor
- Defective steering wheel angle sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- Anti-spin does not function
- The stability control does not function
- The traction control system does not function.

Incorrect Steering Wheel or Wheel Alignment

Incorrect steering wheel or wheel alignment

Checking diagnostic trouble codes (DTCs)

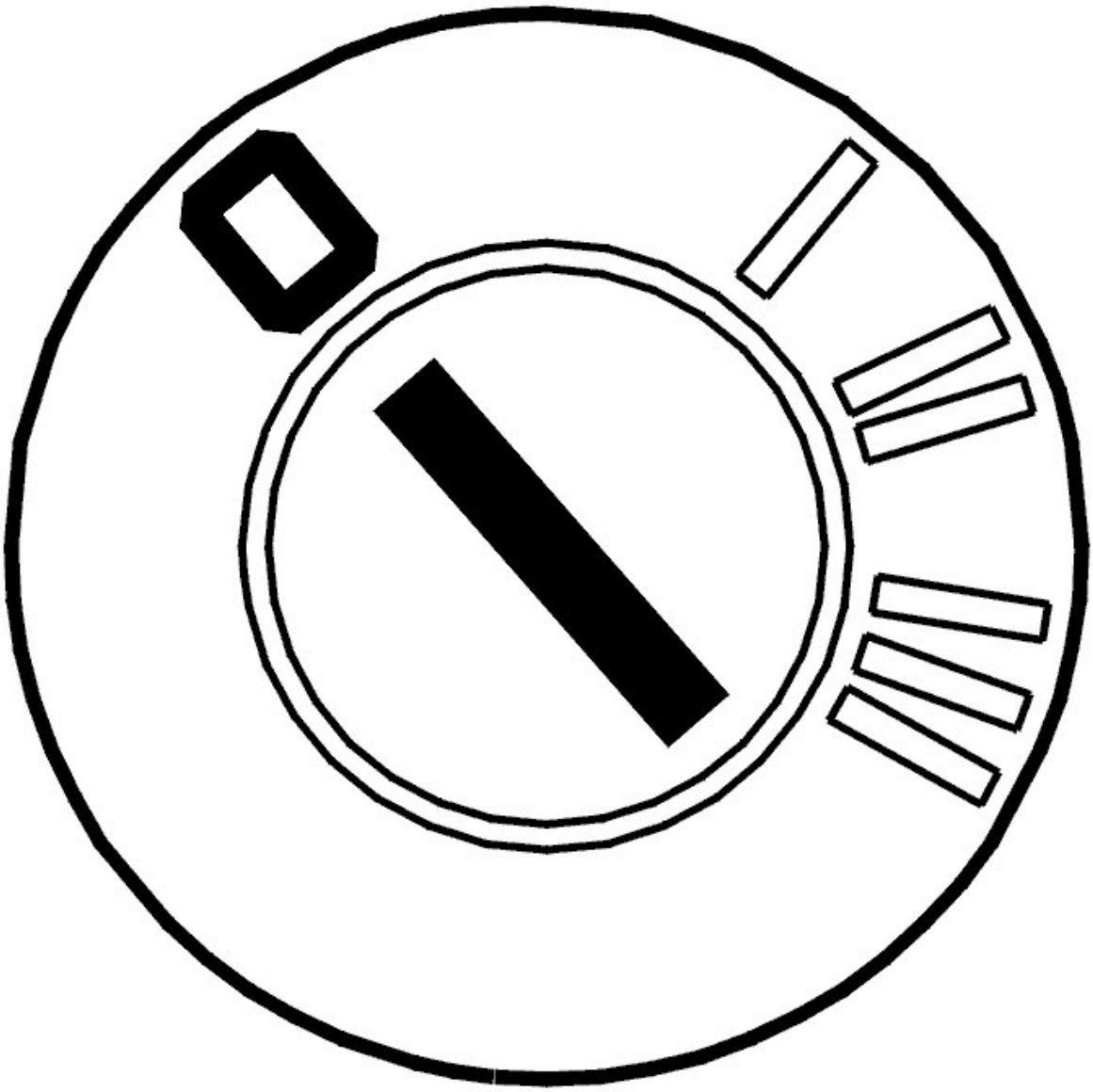
Note! If diagnostic trouble codes (DTCs) are stored for the control module for the steering angle sensor, wheel sensors or active yaw control sensor (including the yaw sensor and lateral accelerometer), these must be fault traced first.

Are diagnostic trouble codes (DTCs) stored for the steering angle sensor, wheel sensors or active yaw control sensor?

Yes - DONE

No - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition off.

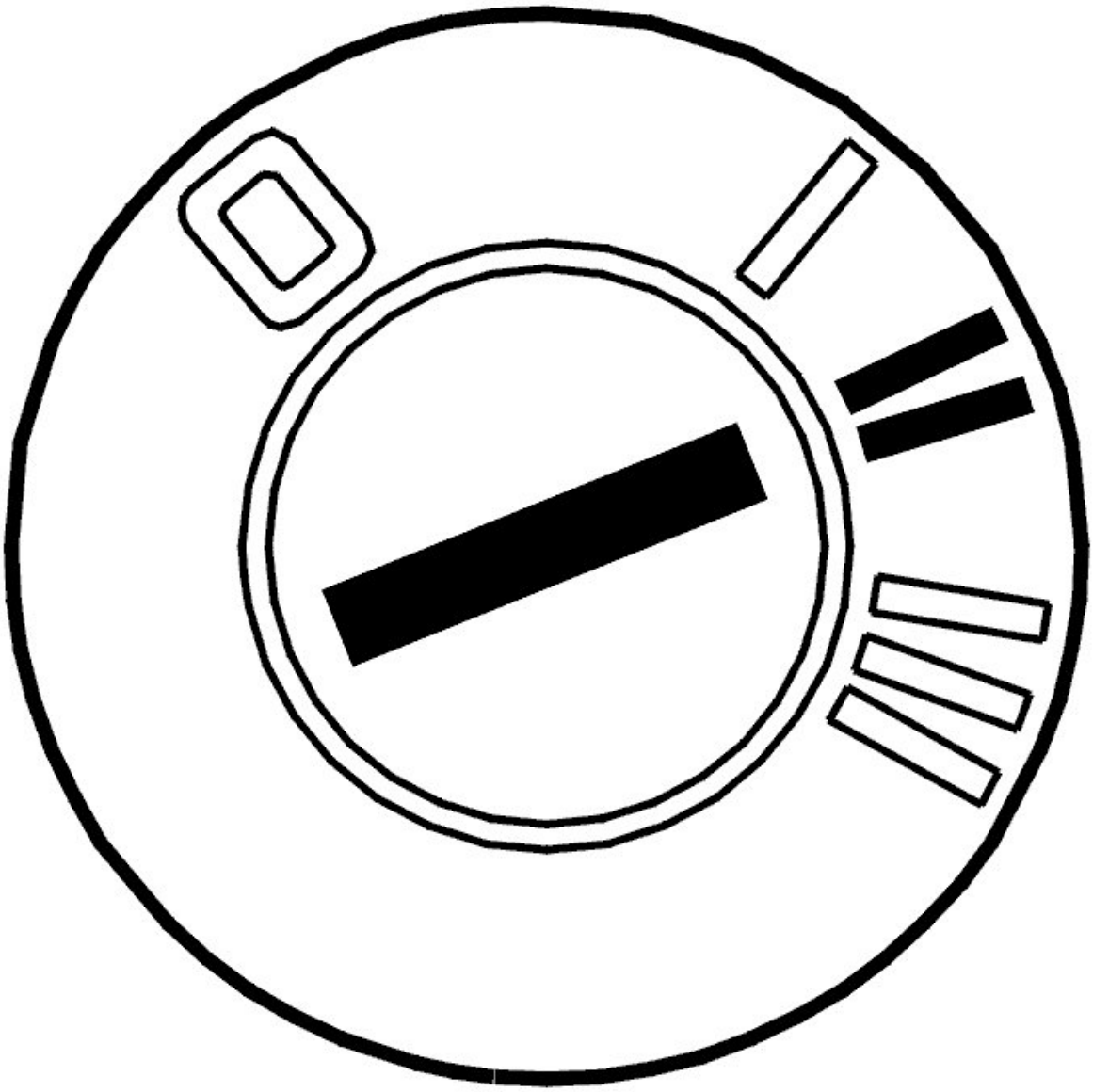
Check whether the active yaw control sensor is loose or incorrectly installed. See Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.

Is the active yaw control sensor secure?

Yes - Checking the connectors

No - Verification

Checking the connectors



- Ignition on
- Set the steering wheel to the straight forward position
- Read off the steering wheel angle.

With the steering wheel and the front wheels in the straight ahead position, the value for the steering wheel angle must be approximately 0°.
If the steering wheel angle does not correspond to the position of the steering wheel, reset the steering wheel angle and calibrate the dynamic stability and traction control (DSTC) system.
If the front wheel alignment does not correspond to the position of the steering wheel, adjust the front end and calibrate the dynamic stability and traction control (DSTC) system.

Other information

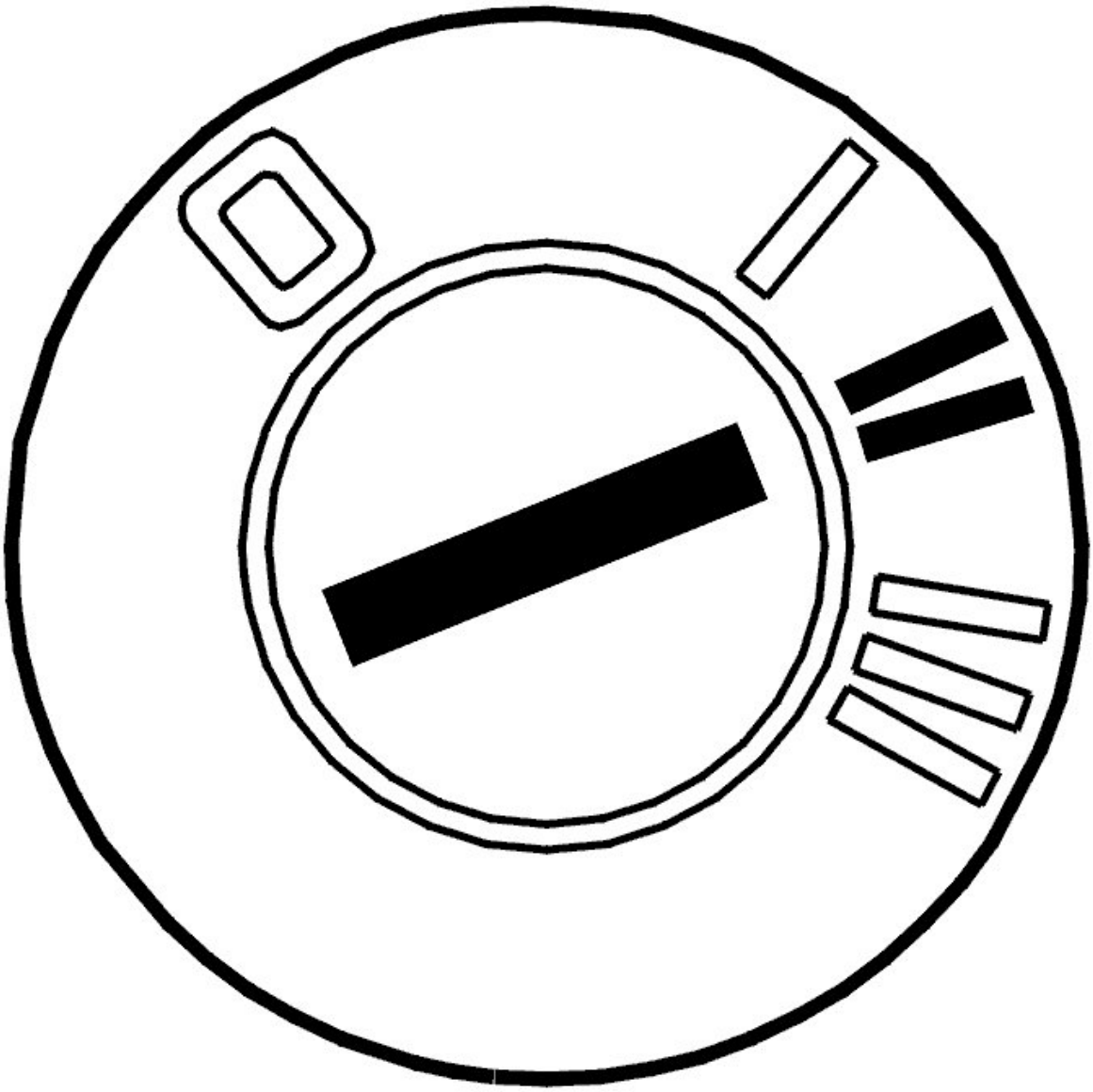
- To reset the steering wheel angle sensor, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To adjust the front end, see Wheel alignment, checking / adjusting See: Maintenance/Alignment/Service and Repair.

Were the steering wheel and front wheel alignment OK?

Yes - Intermittent fault

No - Calibration

Calibration



- Ignition on.

Calibrate the brake control module (BCM).

Continue - Verification

Intermittent fault

Hint: The status of the diagnostic trouble code (DTC) indicates that the brake control module (BCM) has previously registered a fault but that the fault is not active.

Check the connectors for the brake control module (BCM) and the control module for the steering wheel angle sensor. Check for contact resistance and oxidation.
Also check that the wiring for CAN communication is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

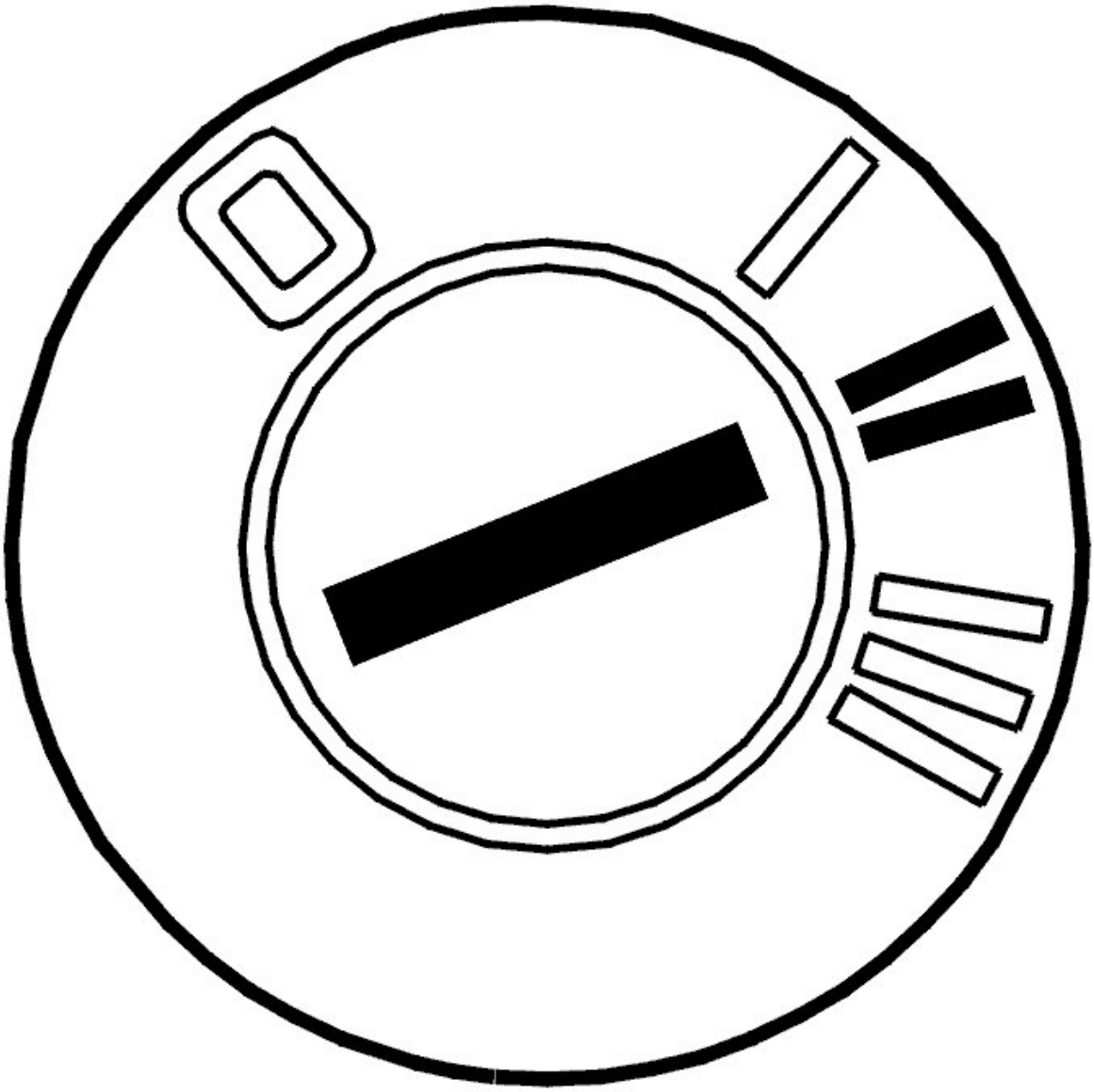
Continue - Fault-tracing information

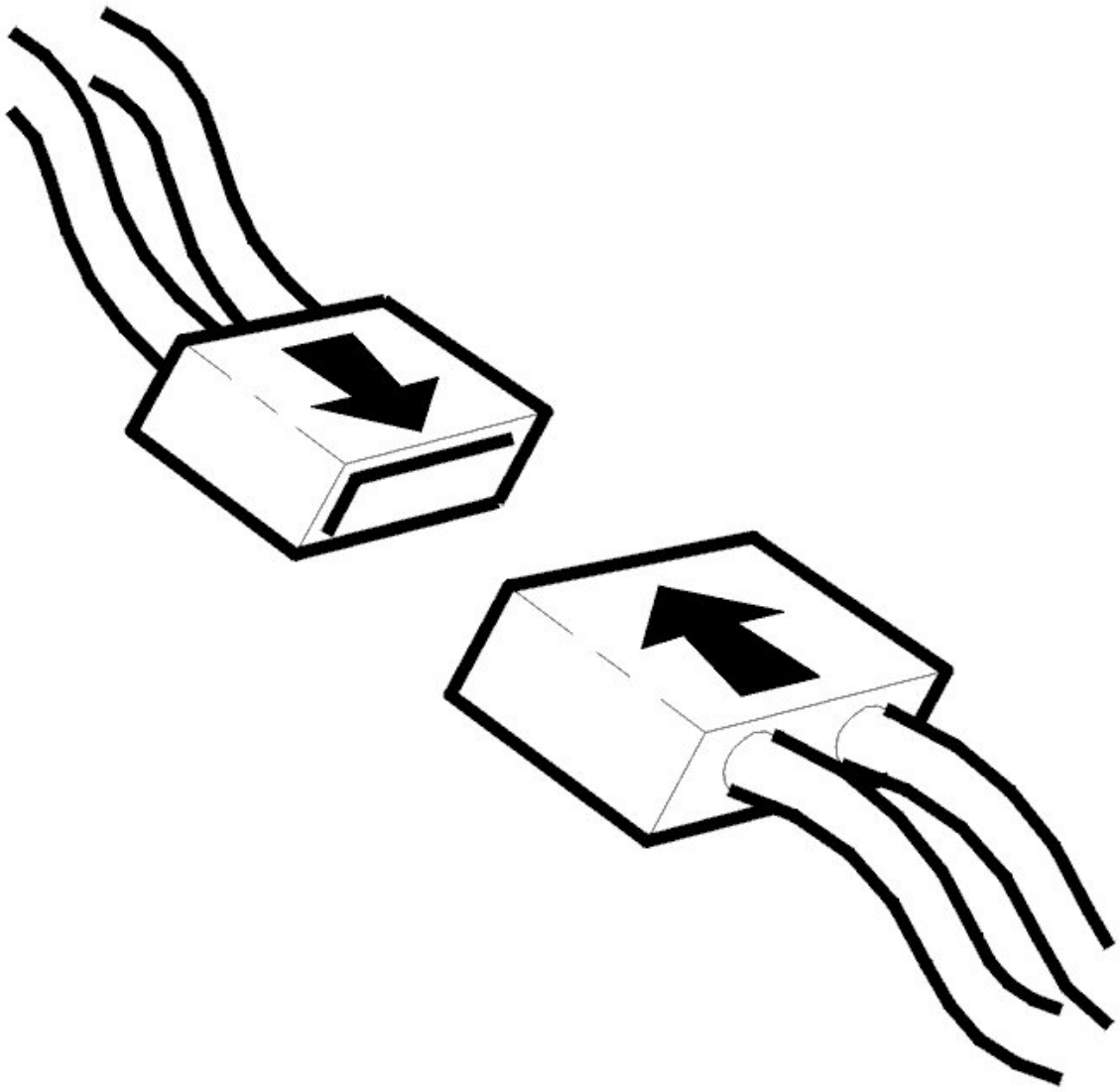
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking diagnostic trouble codes (DTCs)

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

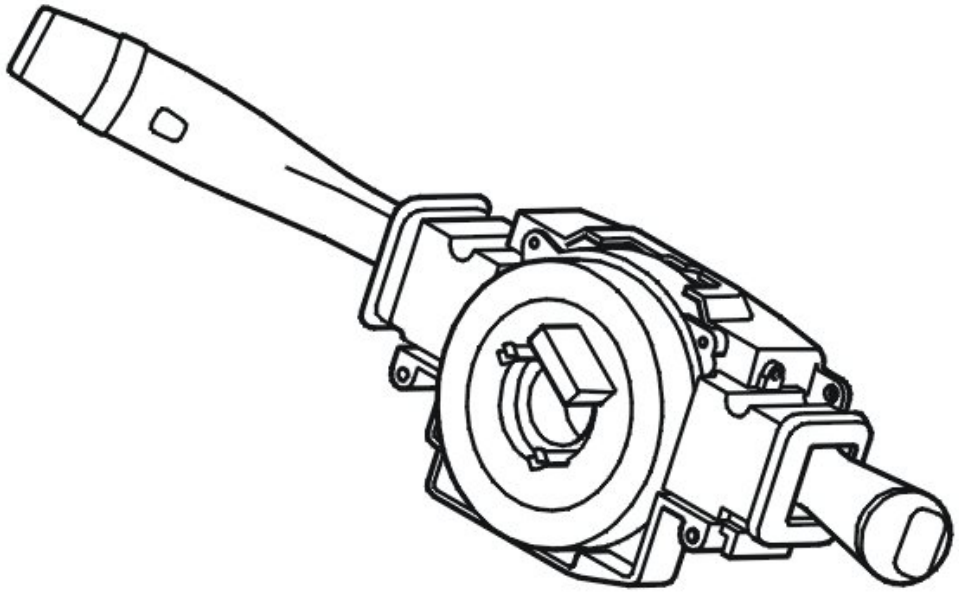
FAULT-TRACING FAILED - Fault Found

Attempt New Test - Checking diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The control module for the steering angle sensor is initiated by turning the steering wheel in either direction within 120 seconds of the car being started. The brake control module (BCM) retrieves the signals from the steering wheel angle sensor on the Control area network (CAN). Diagnostic trouble code (DTC) BCM-0108 is stored if the brake control module (BCM) registers that the control module for the steering wheel angle sensor has not be initialized within 120 seconds of start and the vehicle speed exceeds 10 km/h.

Substitute value
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- After starting the driver has driven straight ahead for more than two minutes and then switched off the ignition which has led to the steering wheel angle sensor not being initiated
- Internal fault in the steering angle sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- The traction control system does not function.

Communication With the Steering Angle Sensor

Communication with the steering angle sensor. Control module not initiated

Fault-tracing information

The control module for the steering angle sensor is initiated when the steering wheel is turned more than 5° in any direction. Diagnostic trouble code (DTC) BCM-0108 may be stored if the car has been turned for more than 2 minutes without turning the steering wheel. Ask the customer whether this is the case.
If this is not the case, read off diagnostic trouble codes (DTCs) from the steering angle sensor and fault trace according to the information for this system.

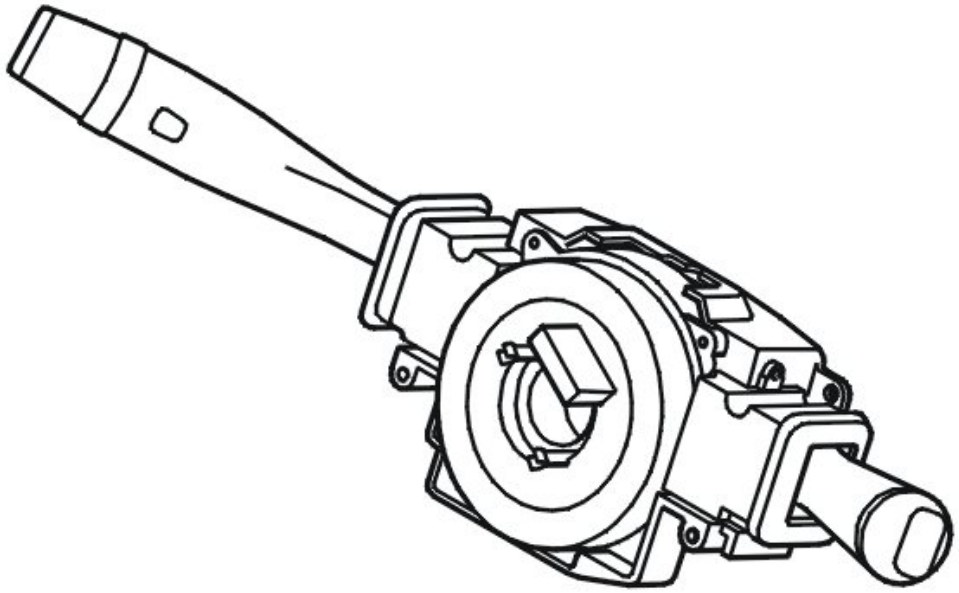
Continue - DONE

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The control module for the steering angle sensor transmits a status signal to the brake control module (BCM).
Diagnostic trouble code (DTC) BCM-0109 is stored if the brake control module (BCM) receives a message from the steering angle sensor indicating an internal fault.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Internal fault in the control module for the steering wheel angle sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

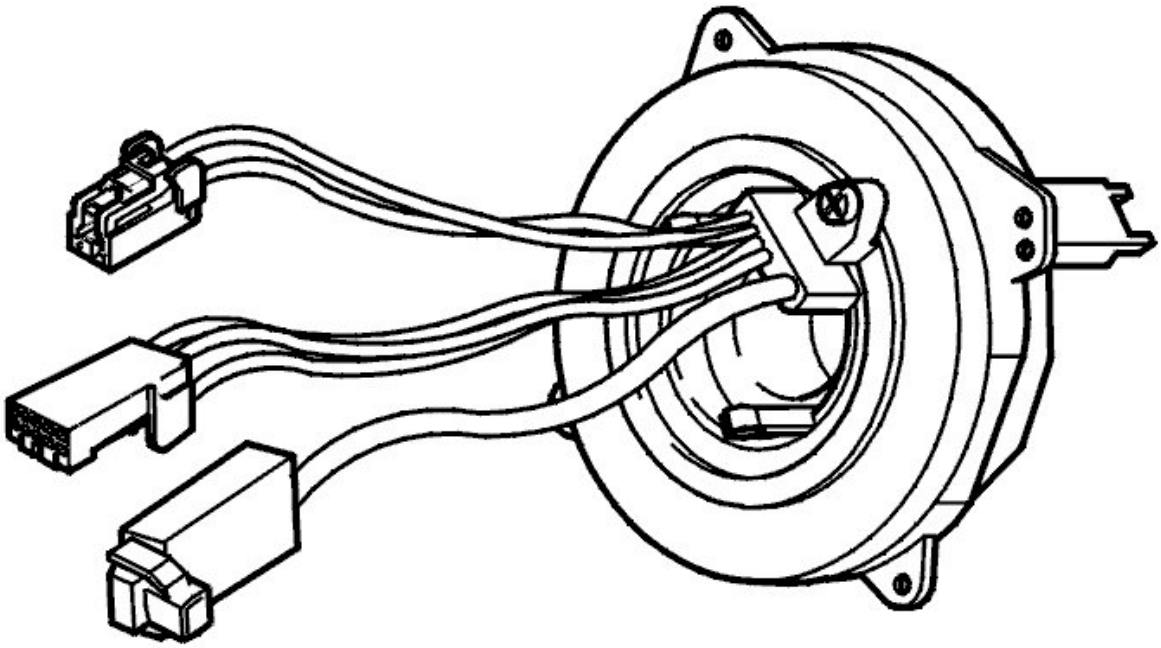
Control Unit for the Steering Wheel Angle Sensor (SAS)

Control unit for the steering wheel angle sensor (SAS). Internal fault

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

The diagnostic trouble code shows that there is an internal fault in the control unit for the steering wheel angle sensor (SAS). Read the diagnostic trouble codes from the control unit for the steering wheel angle sensor (SAS) and troubleshoot as described by the information for the system.

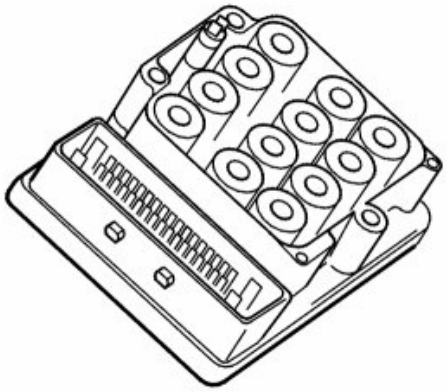


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0111 is stored if the brake control module (BCM) registers that the wheel or steering wheel alignment is incorrect.

Substitute value

- Traction control is blocked
- Stability control is blocked

- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Incorrect wheel alignment
- Incorrect steering wheel alignment
- Defective steering wheel angle sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

AYC Stabilization Takes Too Long

AYC stabilization takes too long

Information

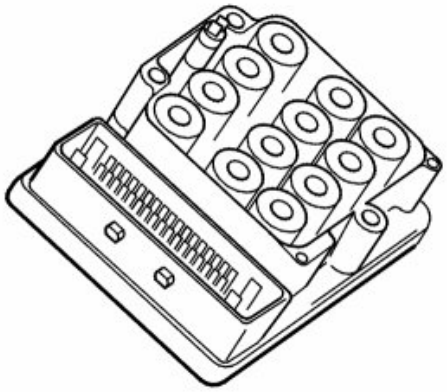
This diagnostic trouble code shows that the stabilizing function has been activated for too long.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

When calibrating the sensors included in the stability function (active yaw control), a check sum is controlled in the brake control module (BCM). At start up, the control module checks the stored check sum against a calculated check sum.
Diagnostic trouble code (DTC) BCM-0112 is stored if the check sums do not correspond.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Interference or static that has affected the brake control module (BCM).
- Defective control module.

Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

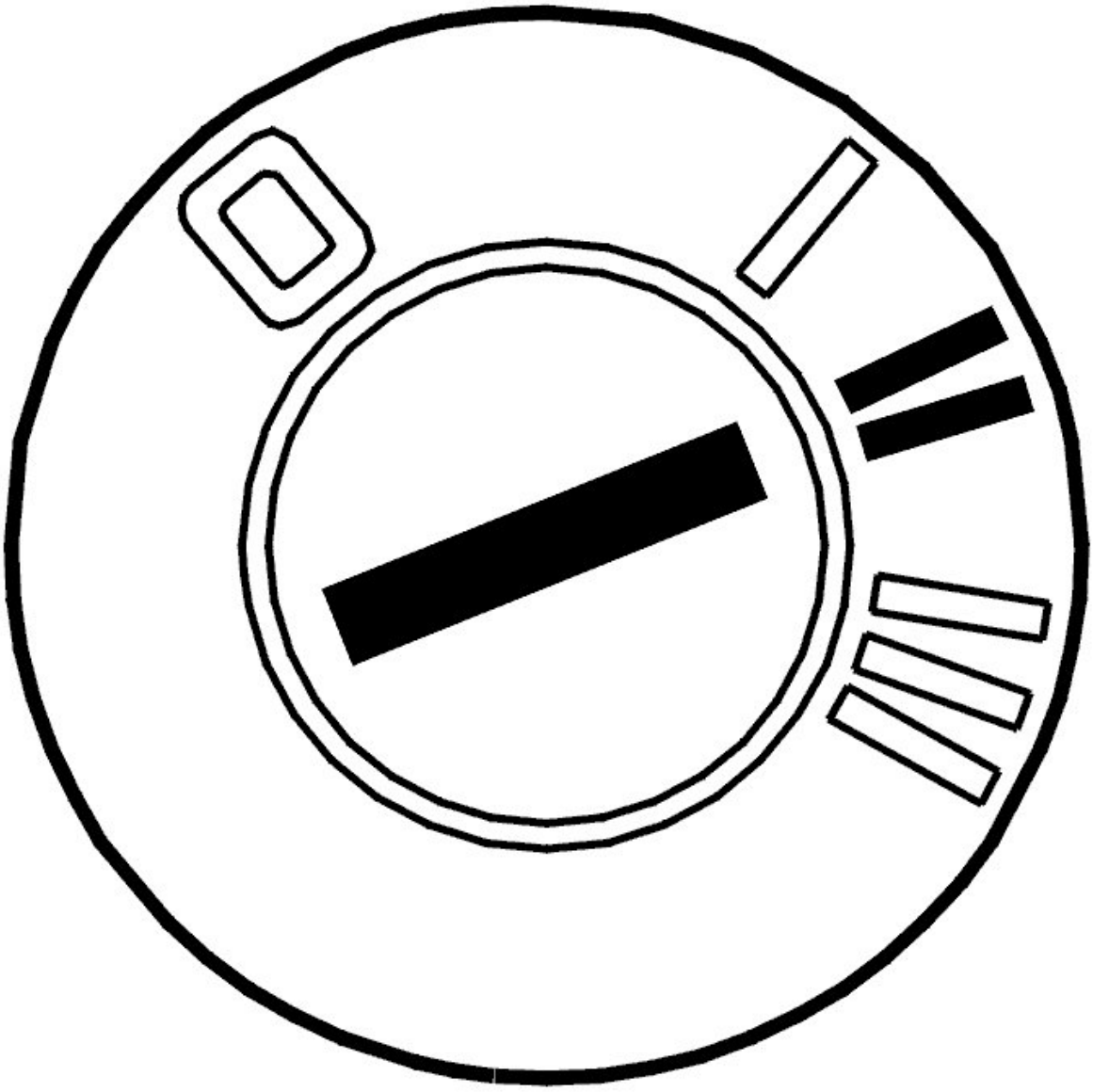
Sensor Not Calibrated

Sensor not calibrated

Fault-tracing information

Hint: The diagnostic trouble code (DTC) may be stored when downloading software, in which case it only needs to be erased.

Note! Only erase the diagnostic trouble code (DTC) if it was stored when downloading software.

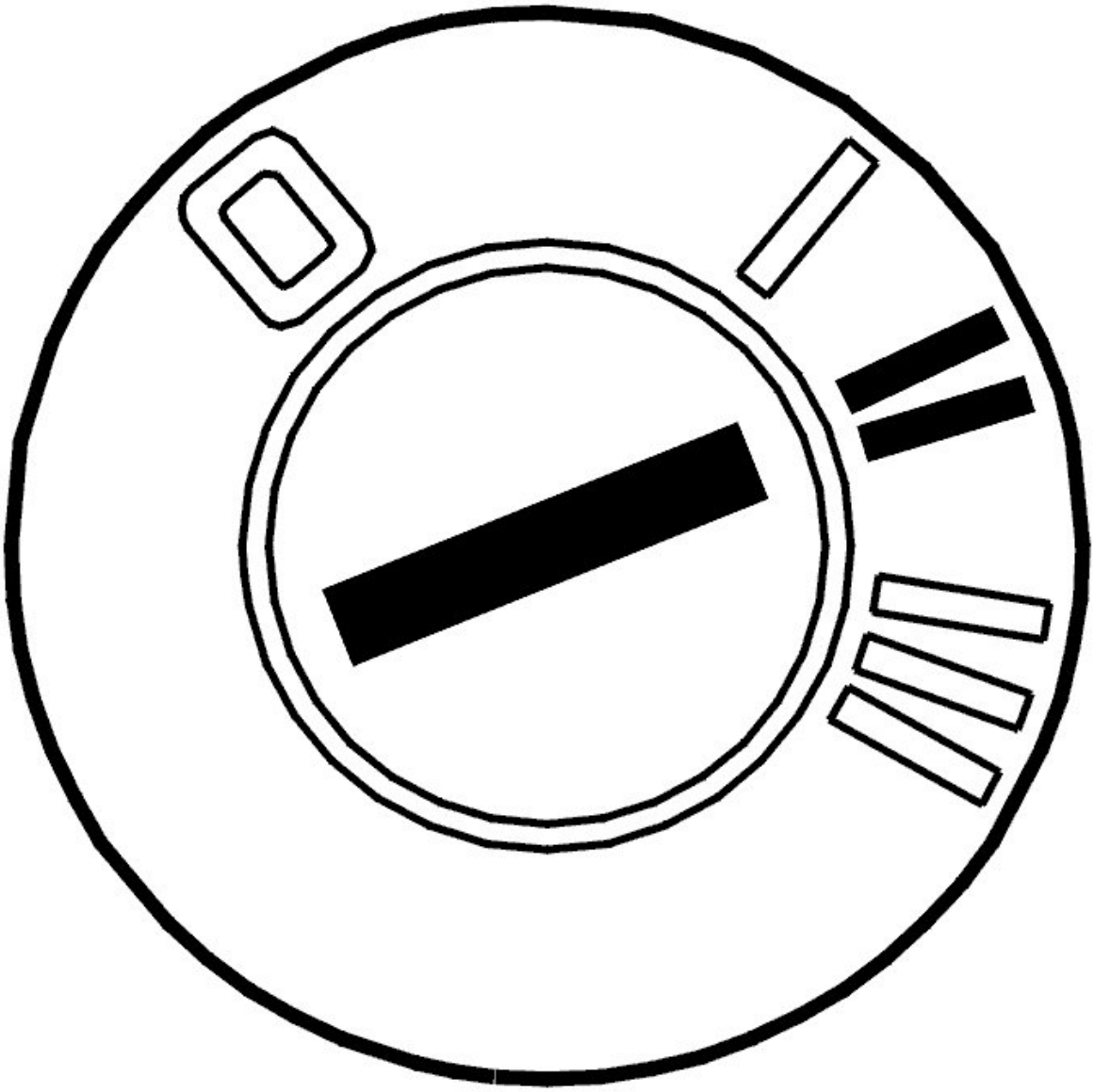


- Ignition on.

Erase diagnostic trouble codes (DTCs).

Continue - Calibrating the sensor

Calibrating the sensor



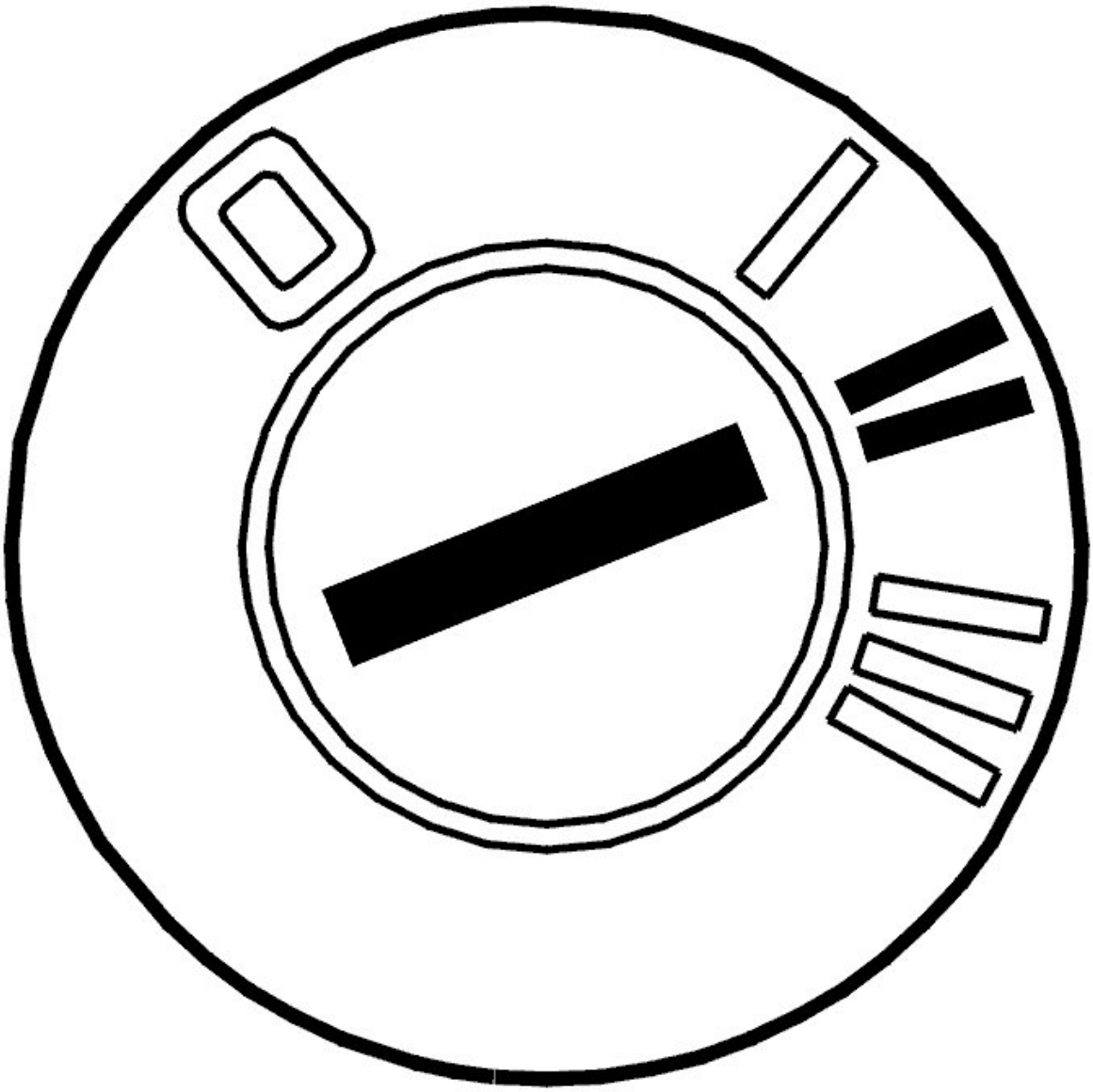
- Ignition on
- Calibrate the brake system.

Note! When calibrating, the car must be on a level surface. Do not touch the brake pedal.The accelerometer can only be calibrated on cars with All-wheel drive (AWD).

Caution! For the XC90, the yaw rate sensor and tilt sensor must also be calibrated.

Continue - Reading off the status of the diagnostic trouble code (DTC)

Reading off the status of the diagnostic trouble code (DTC)



- Ignition on
- Wait approximately 60 seconds
- Read off diagnostic trouble codes (DTCs).

If the status of the diagnostic trouble code (DTC) has changed from permanent to intermittent the fault is no longer active.
Try a new active yaw control sensor if the status of the diagnostic trouble code (DTC) is permanent.

Other information

- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - **Fault Found**

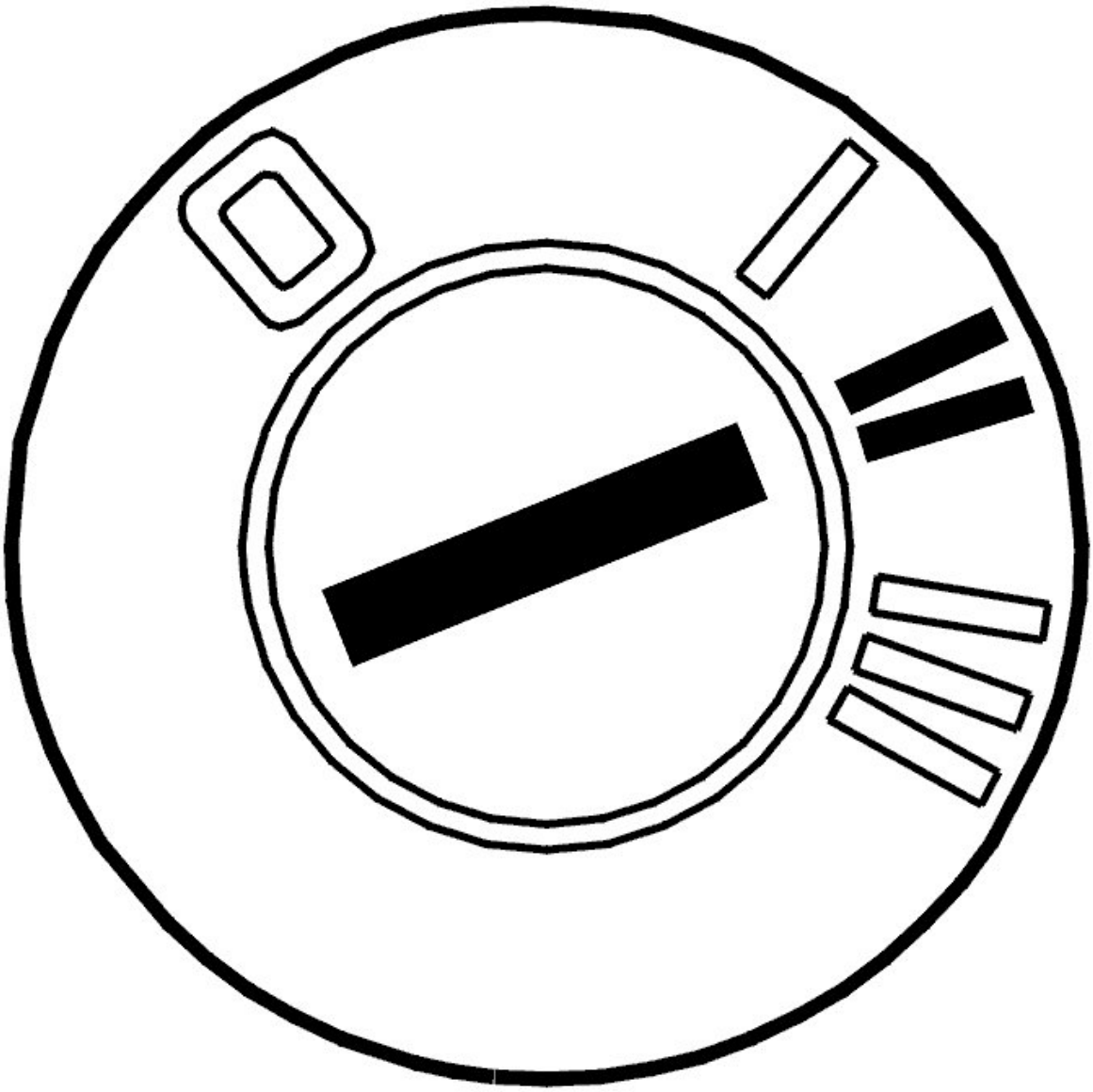
No - Verification

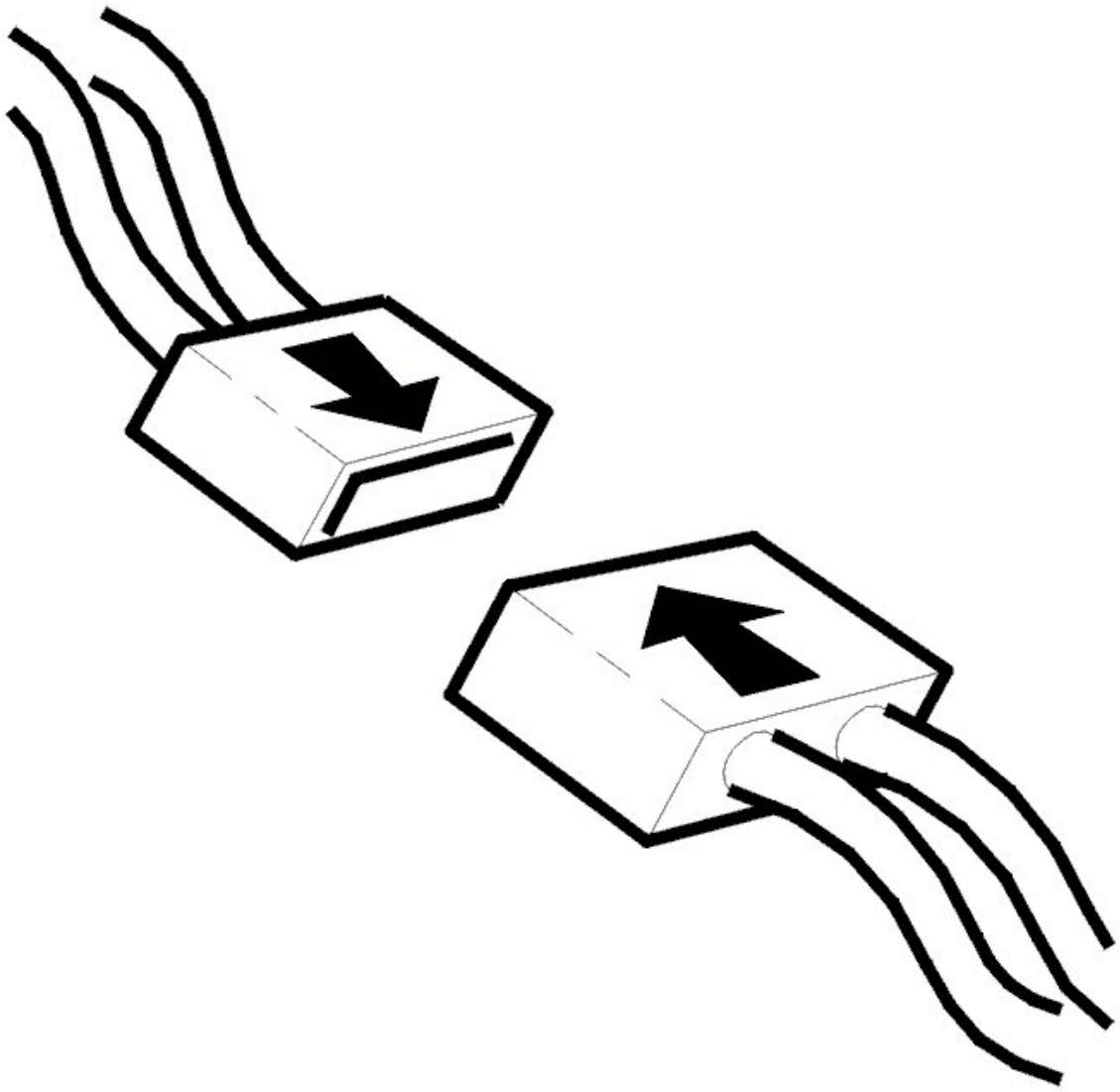
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

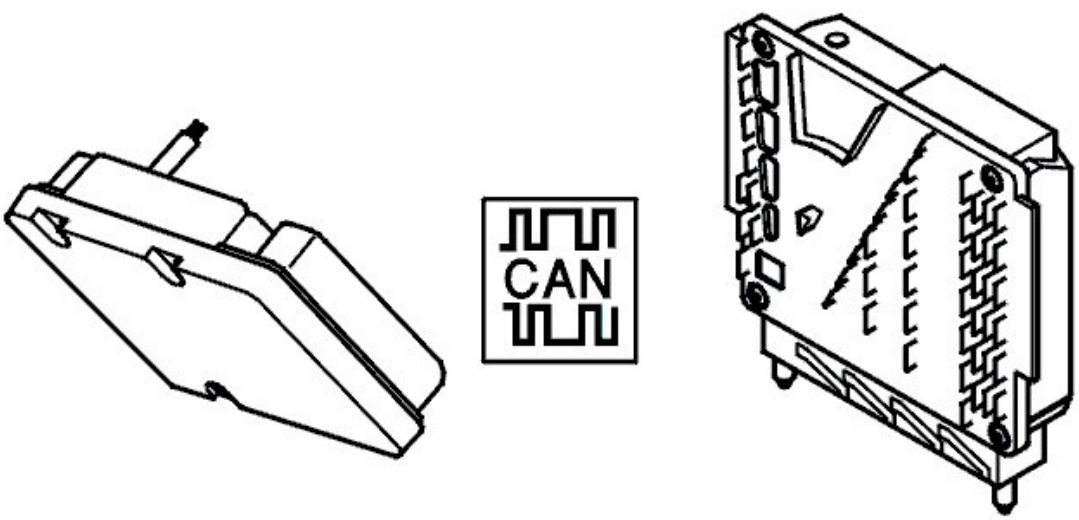
Attempt New Test - Fault-tracing information

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The brake control module receives a signal from the central electronic module (manual transmissions) or from the transmission control module (TCM) (automatic transmission) with information about the selected gear. If back-up (reverse) gear is selected, the stability function cannot be activated.
Diagnostic trouble code (DTC) BCM-0113 is stored if the brake control module registers that the signal is distorted, missing or receives a signal indicating that back-up (reverse) gear is selected when the car is being driven forward for more than one second.
The diagnostic trouble code (DTC) can be diagnosed when speed exceeds 40 km/h and the vehicle is driven straight ahead followed by a turn.

Substitute value
- None.

Possible source
- Open-circuit or short-circuit in the circuit for the back-up (reversing) lamp switch (manual transmission)
- Interference in the Control area network (CAN)
- Short-circuit or open-circuit on the Control area network (CAN).

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]

- None.

Signal Missing

Signal missing

Checking diagnostic trouble codes (DTCs) in the central electronic module

If there are diagnostic trouble codes (DTCs) stored in the central electronic module for communication problems or for the back-up (reversing) lamp, these must be fault traced first.

Were diagnostic trouble codes (DTCs) stored for communication problems or for the back-up (reversing) lamp in the central electronic module?

Yes - **Troubleshooting completed.**

No - Checking the transmission

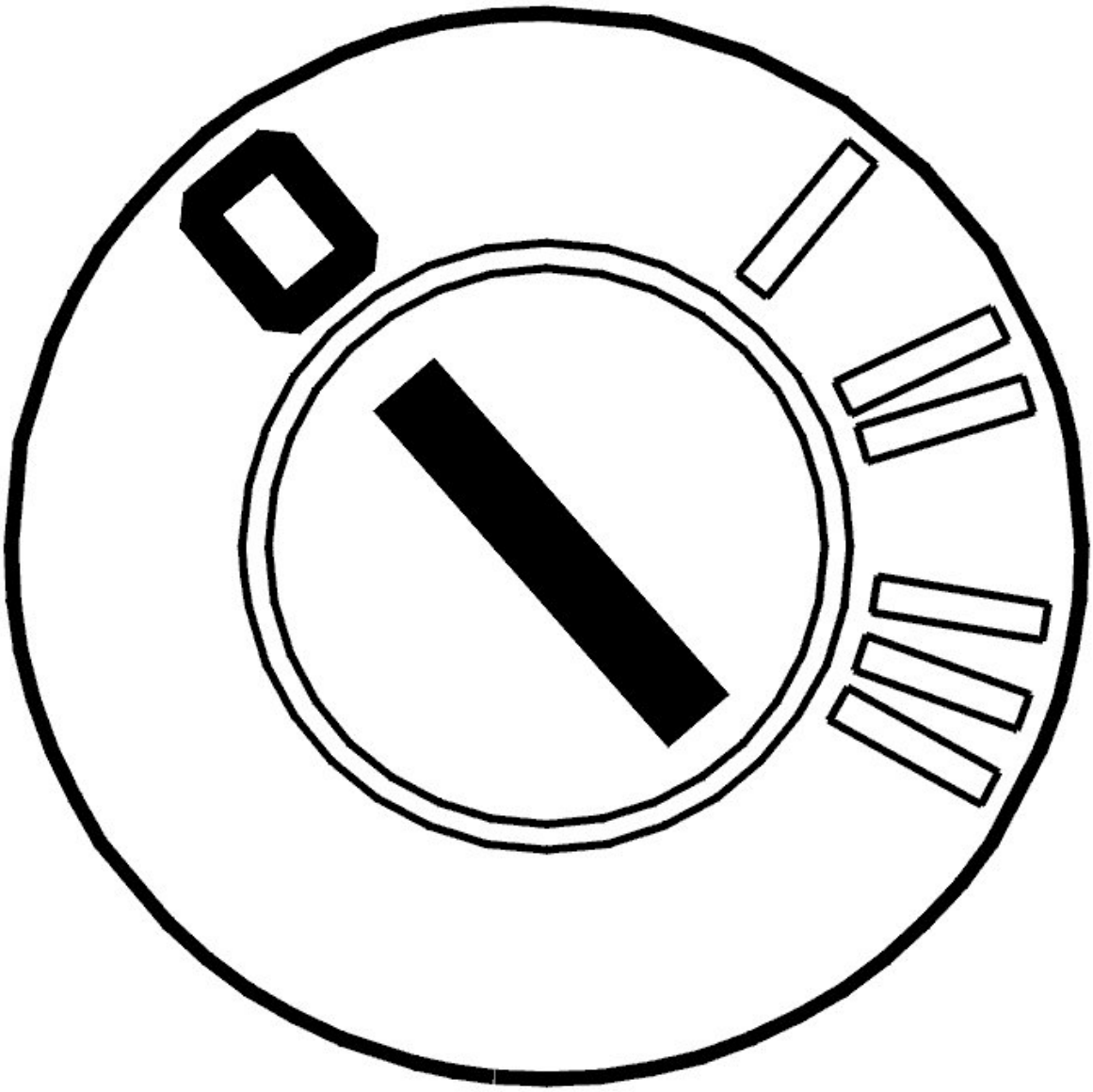
Checking the transmission

Is the car equipped with automatic transmission?

Yes - Checking wiring and terminals (automatic transmissions)

No - Checking back-up (reversing) lamp switch

Checking wiring and terminals (automatic transmissions)



- Ignition off.

Check the brake control module and transmission control module (TCM) connectors. Check for damaged or bent terminal pins. Check for contact resistance and oxidation.
Check the wiring for CAN communication between brake control module terminal #11 (#A11) and terminal #2 (#B12) on the transmission control module (TCM) and between brake control module terminal #15 (#A15) and terminal #14 (#B24) on the transmission control module (TCM). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Remedy as necessary.

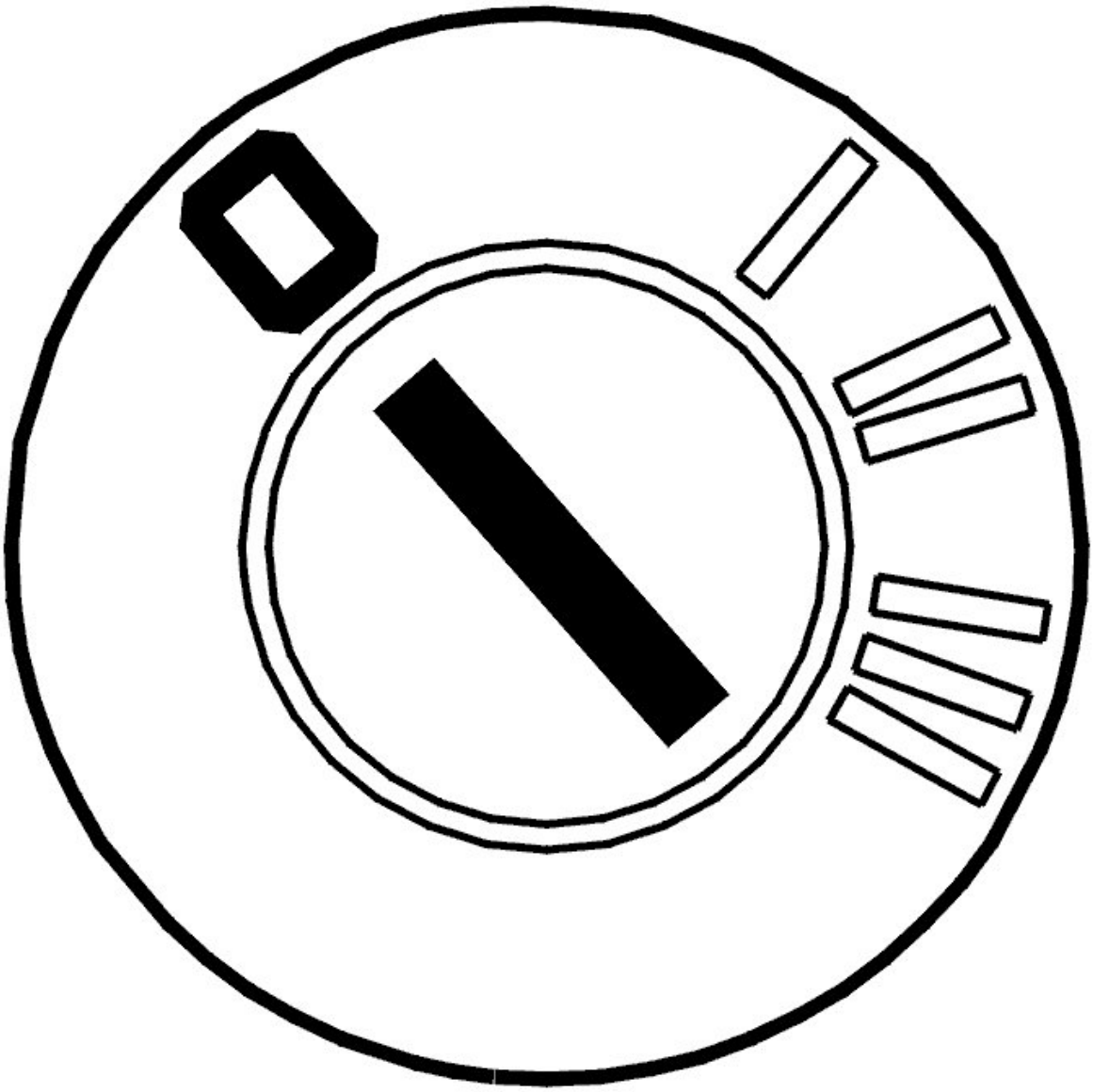
Other information

- To connect the breakout box to the brake control module, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To fault-trace the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Continue - Verification

Signal too low. Permanent fault

Checking back-up (reversing) lamp switch



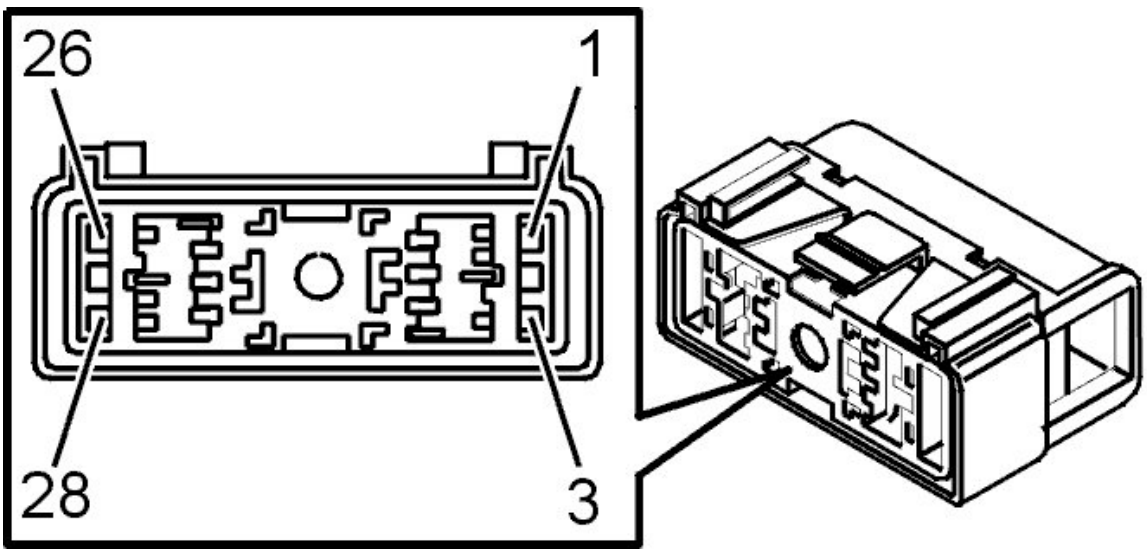
- Ignition off.

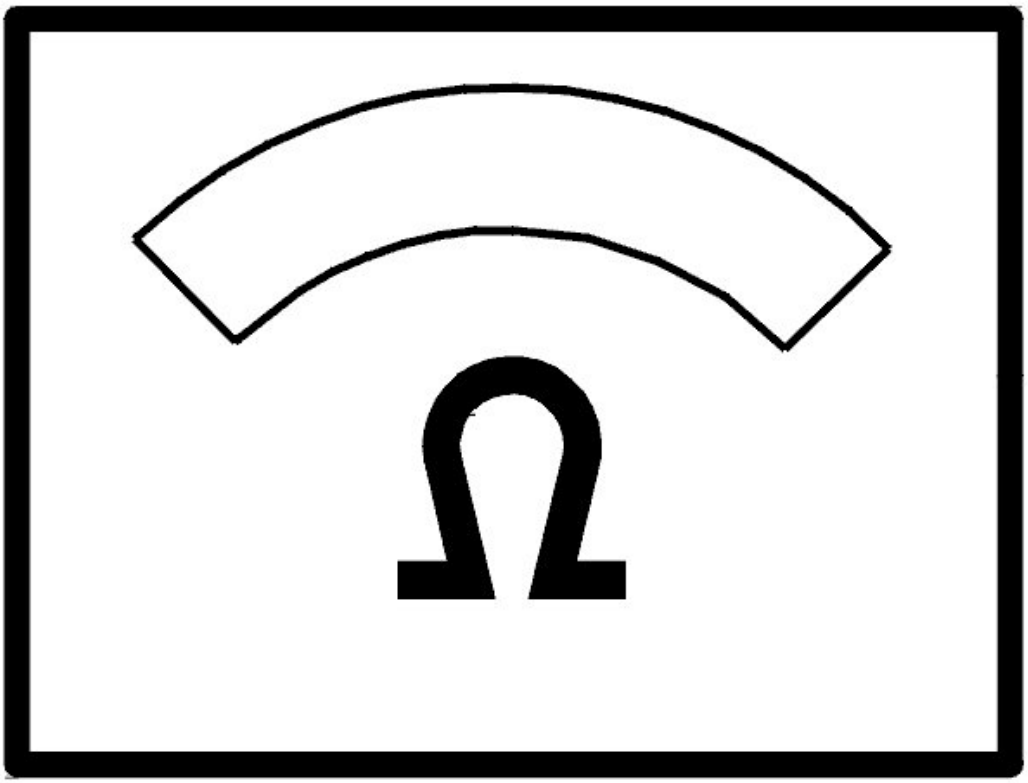
Hint: Check the back-up (reversing) light switch resistance between connector 54/1 terminal #24 and ground with gears 1 to 5 engaged. Resistance should be high.

The back-up gear switch should be open in all gear positions except back-up gear.
Remedy as necessary.

Other information:

- To access the back-up (reversing) lamp switch, see Back-up lamp switch, replacing See: Lighting and Horns/Backup Lamp/Backup Lamp Switch/Service and Repair.





Was a fault detected?

Yes - Verification

No - Checking the cable

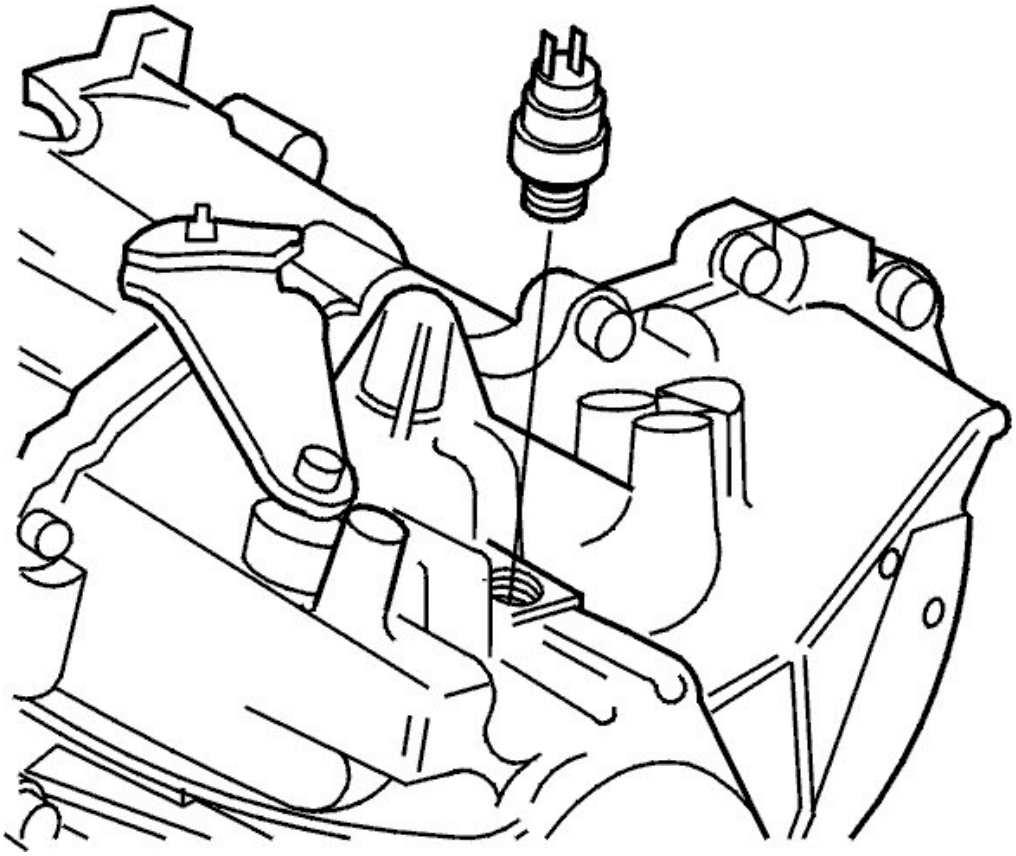
Checking the cable

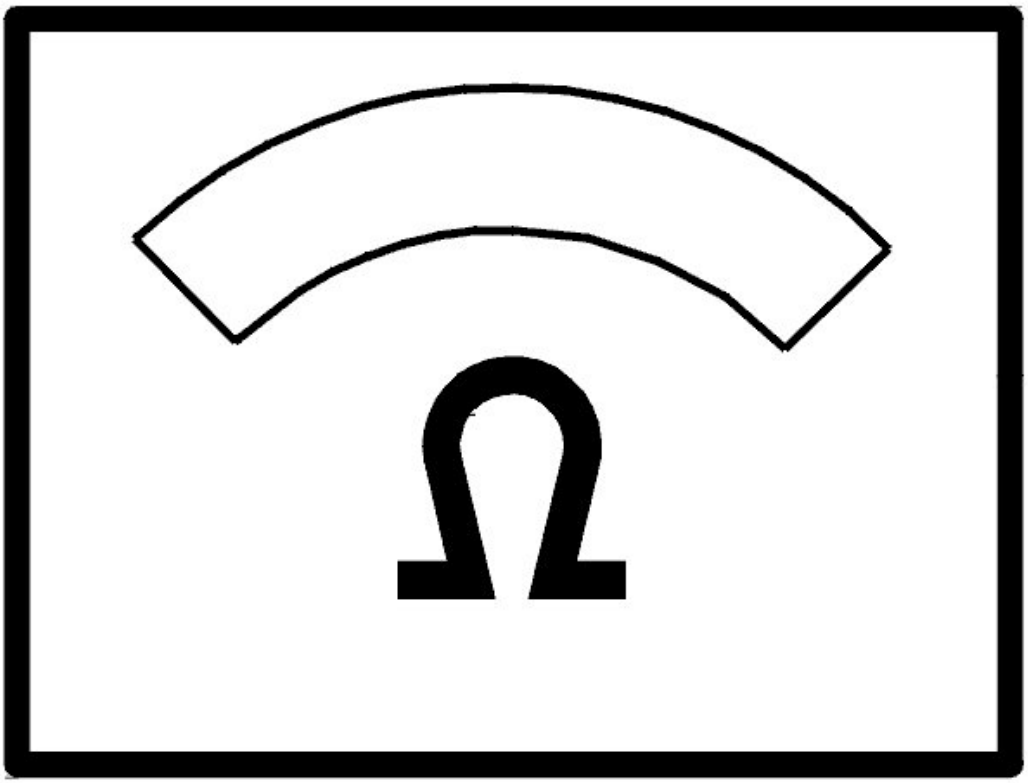
Check the cable between the central electronic module (CEM) terminal #1A and the back-up (reversing) lamp switch terminal #2 (3/10). Check for

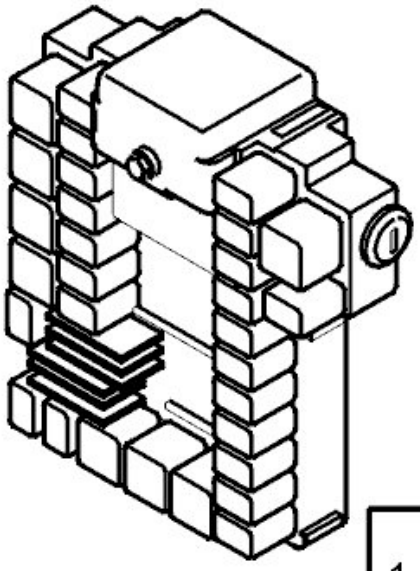
a short-circuit to ground.
Remedy as necessary.

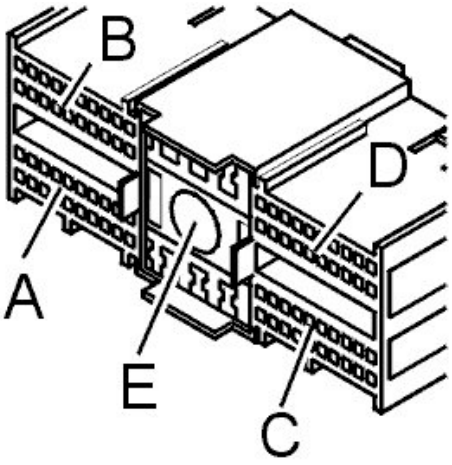
Other information:

- For information about the central electronic module (CEM), see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To access the back-up (reversing) lamp switch, see Back-up lamp switch, replacing See: Lighting and Horns/Backup Lamp/Backup Lamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





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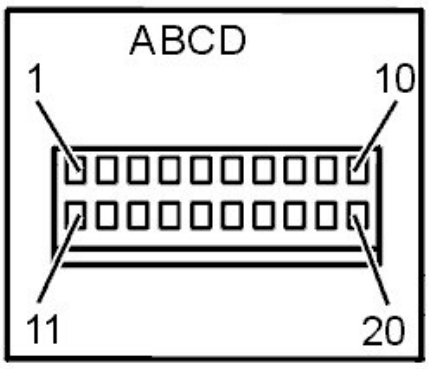
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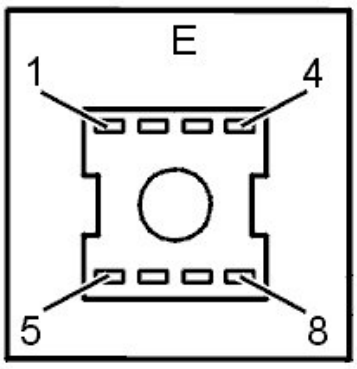

E
1
4
5
8

Was a fault detected?

Yes - Verification

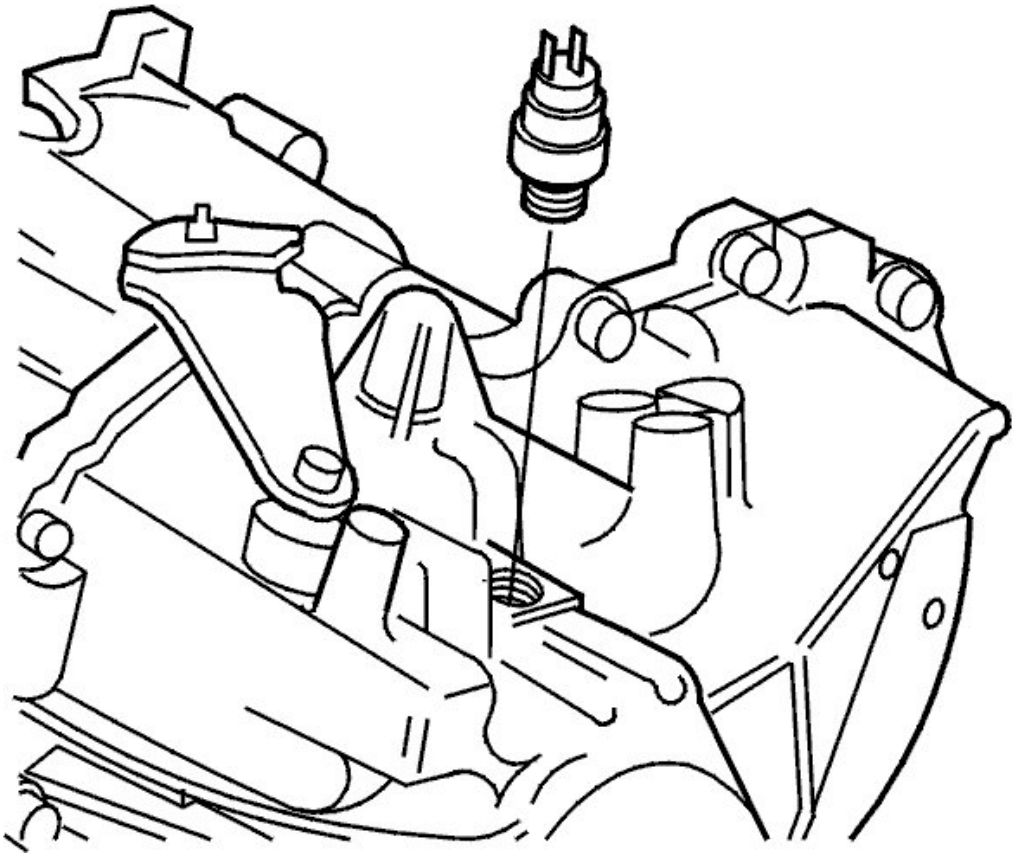
No - Replacing the component

Replacing the component

Try replacing the back-up (reversing) lamp switch.

Other information:

- To access the back-up (reversing) lamp switch, see Back-up lamp switch, replacing See: Lighting and Horns/Backup Lamp/Backup Lamp Switch/Service and Repair.



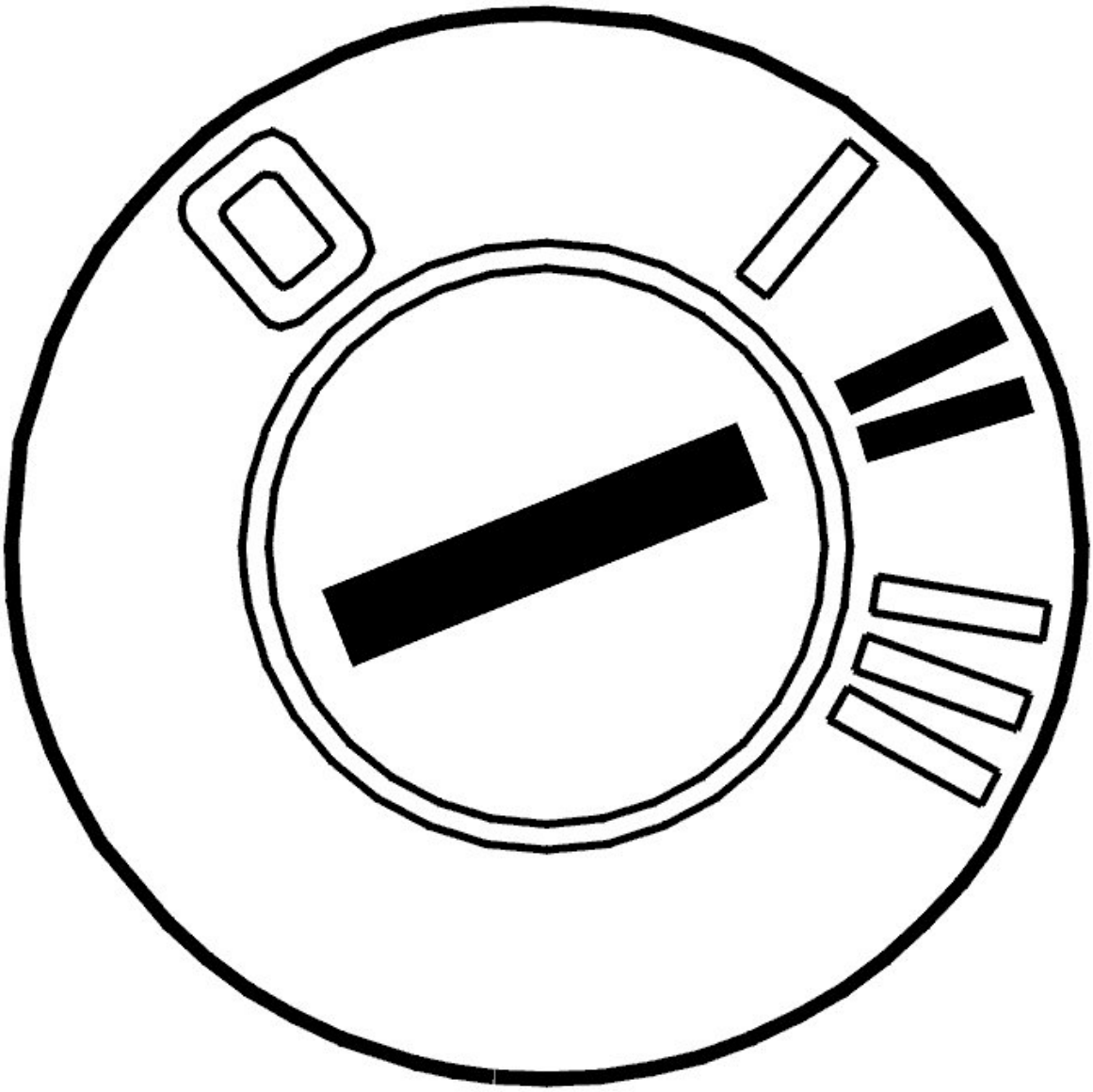
Continue - Verification

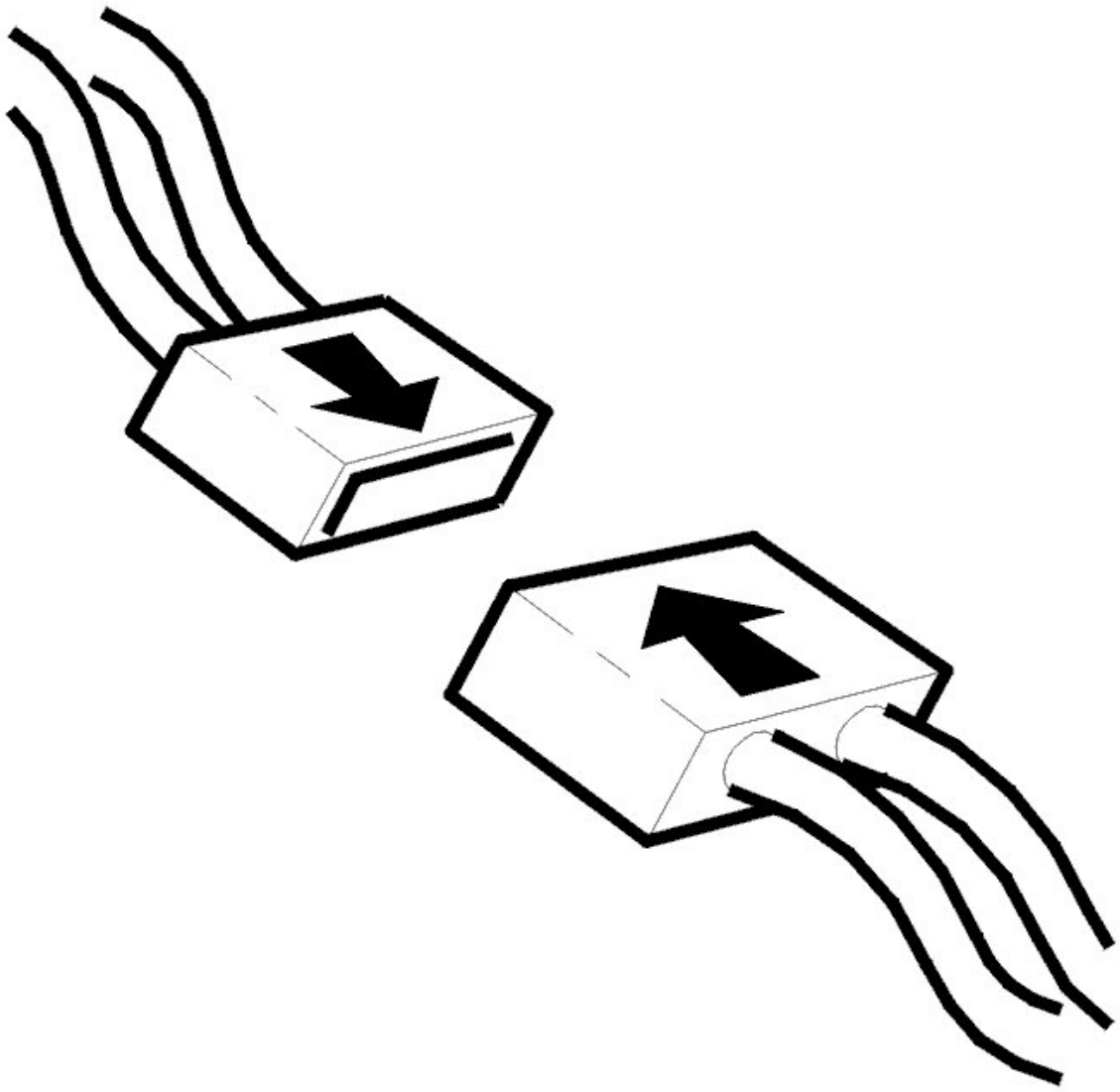
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components etc.
- Ignition on.

Reversing light should not come on when gears 1 to 5 are selected.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **No Fault Found**

Attempt New Test - Checking back-up (reversing) lamp switch

FAULT FOUND - **Fault Found**

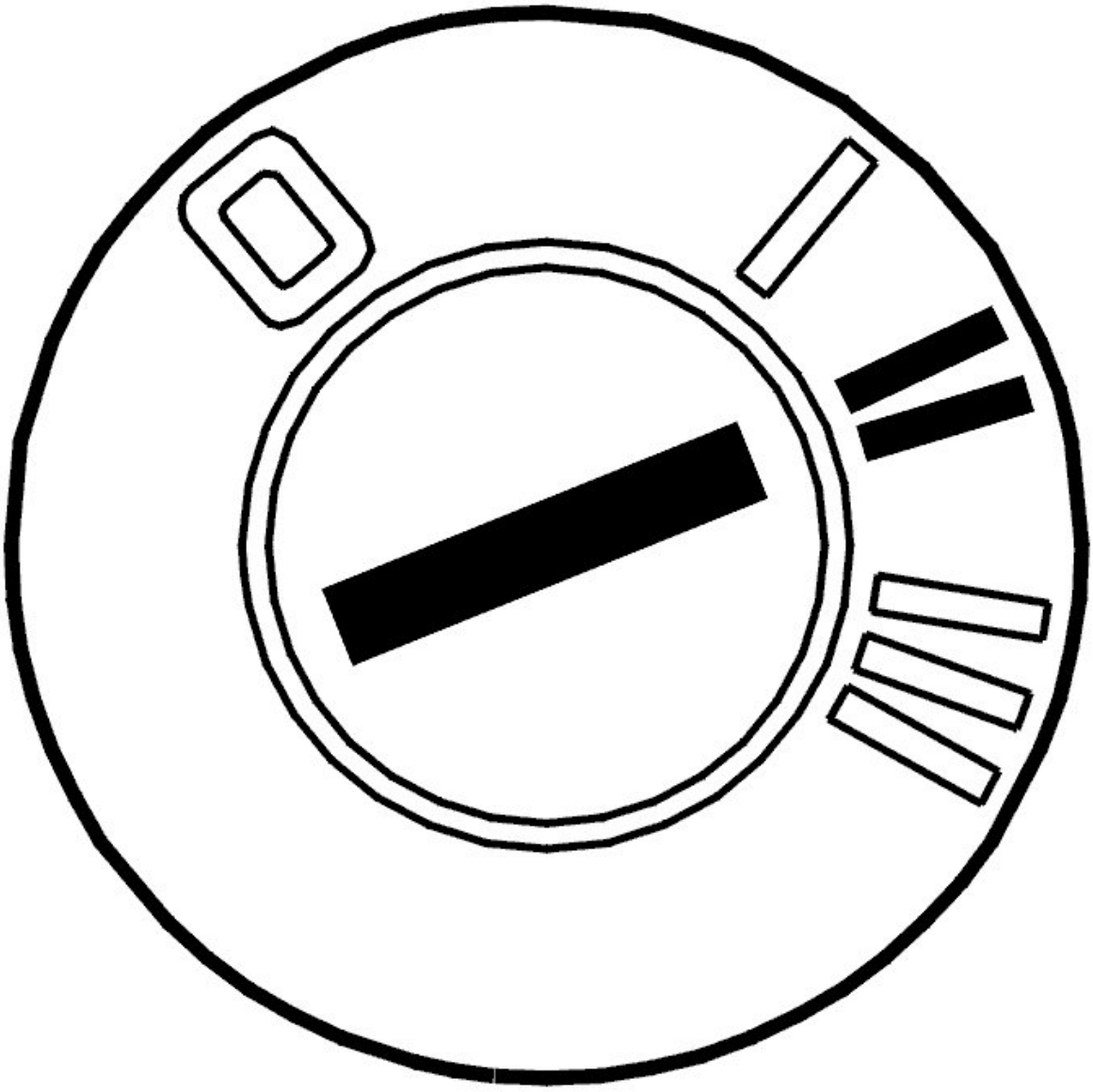
No Fault Found - **No Fault Found**

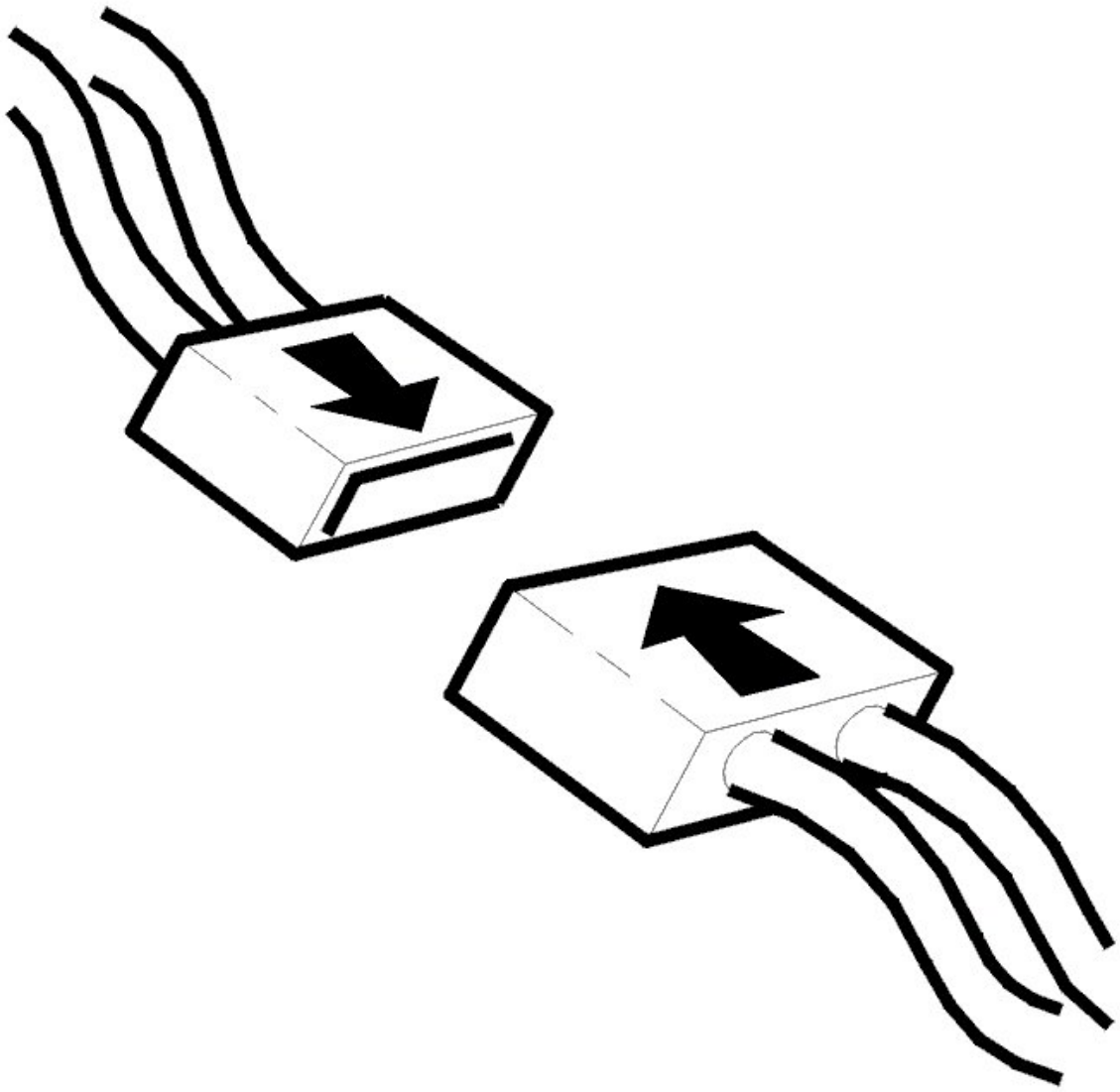
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

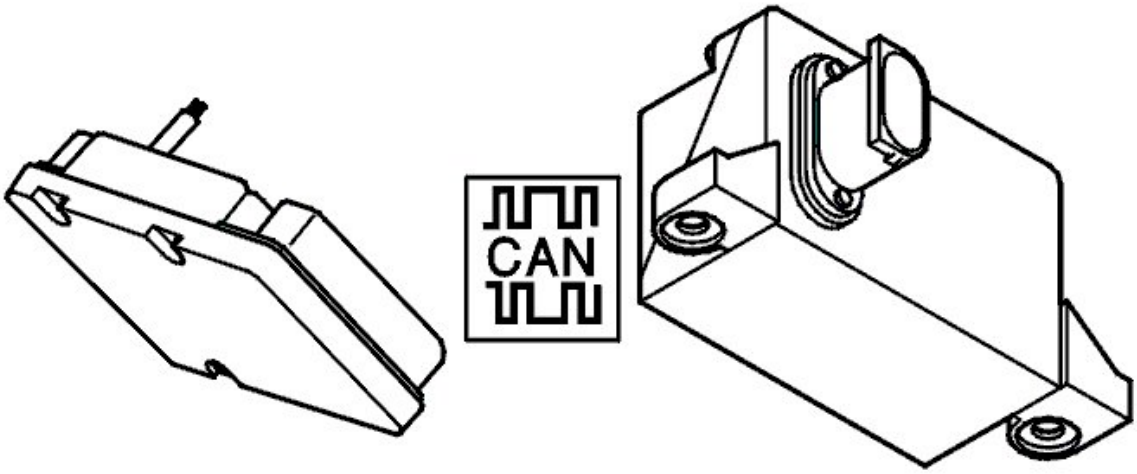
Information
Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0114 is stored if the brake control module (BCM) registers that the signal from the active yaw control sensor is missing or faulty.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals
- Open-circuit in the wiring between the brake control module (BCM) and the active yaw control sensor
- The active yaw control sensor is not connected
- Internal fault in the active yaw control sensor.

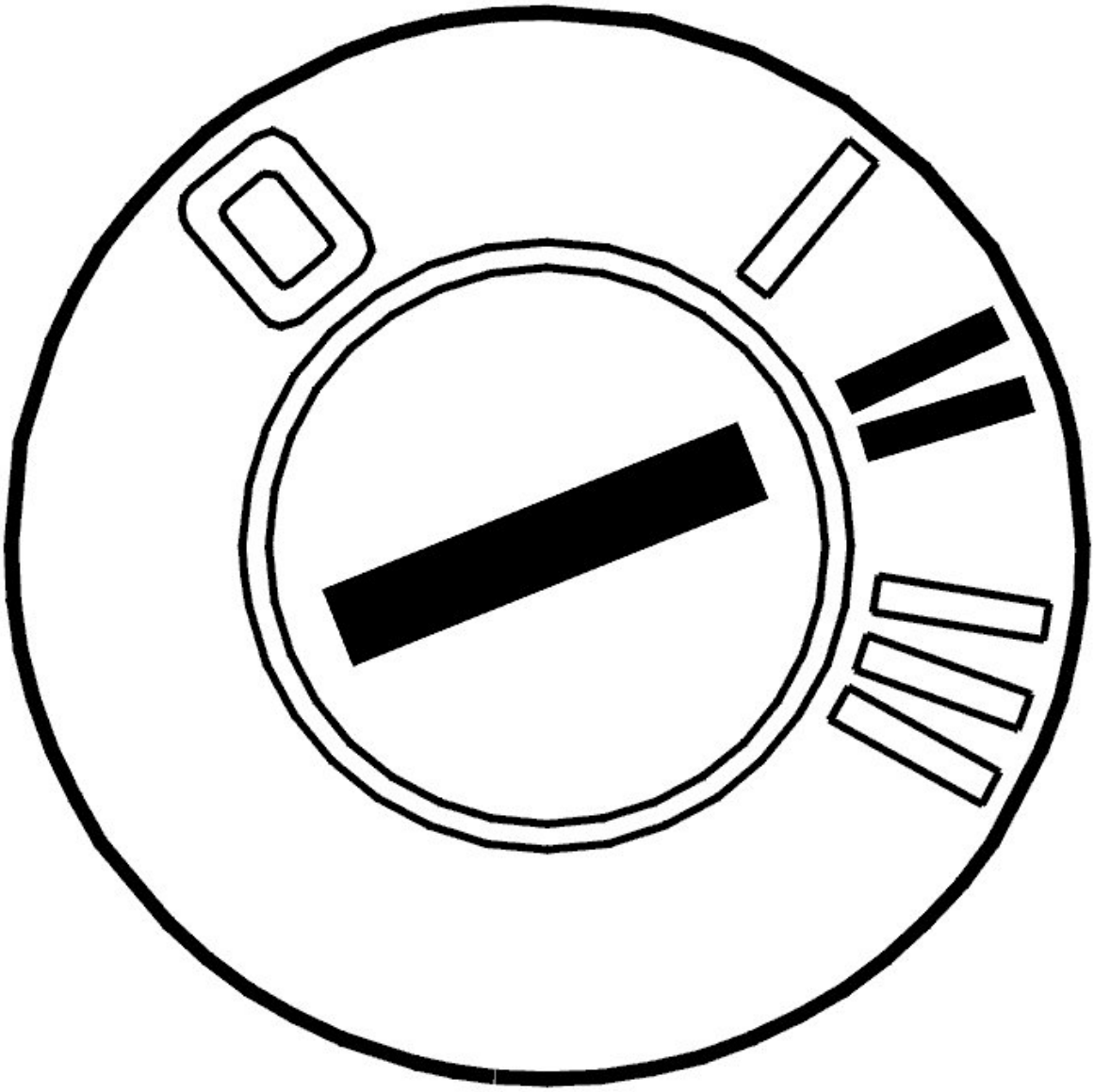
Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Missing

Signal missing

Checking for contact resistance and oxidation



- Ignition off
- Check the connectors for the brake control module (BCM) and the active yaw control sensor. Check for contact resistance and oxidation
- Ignition on
- Test drive. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Read off diagnostic trouble codes (DTCs).

If the status of the diagnostic trouble code (DTC) is intermittent, the cause of the fault was probably contact resistance or oxidation in the connectors for the control module or the active yaw control sensor.

Other information

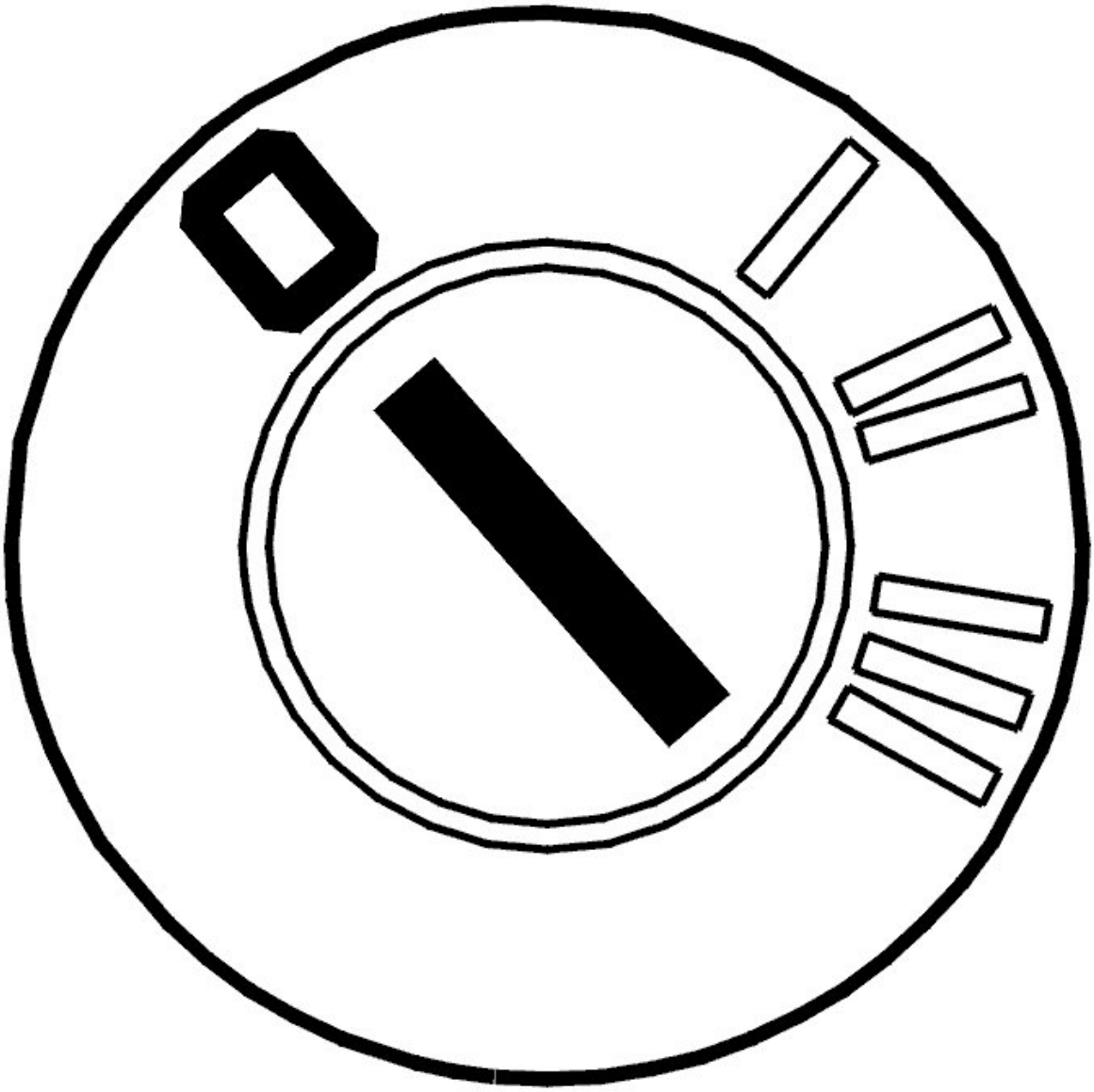
- To access the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - Fault Found

No - Checking the wiring

Checking the wiring



- Ignition off.

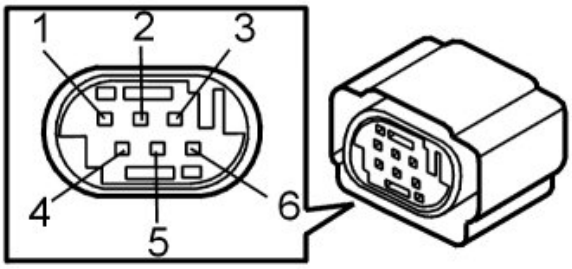
Check the wiring between the active yaw control sensor:

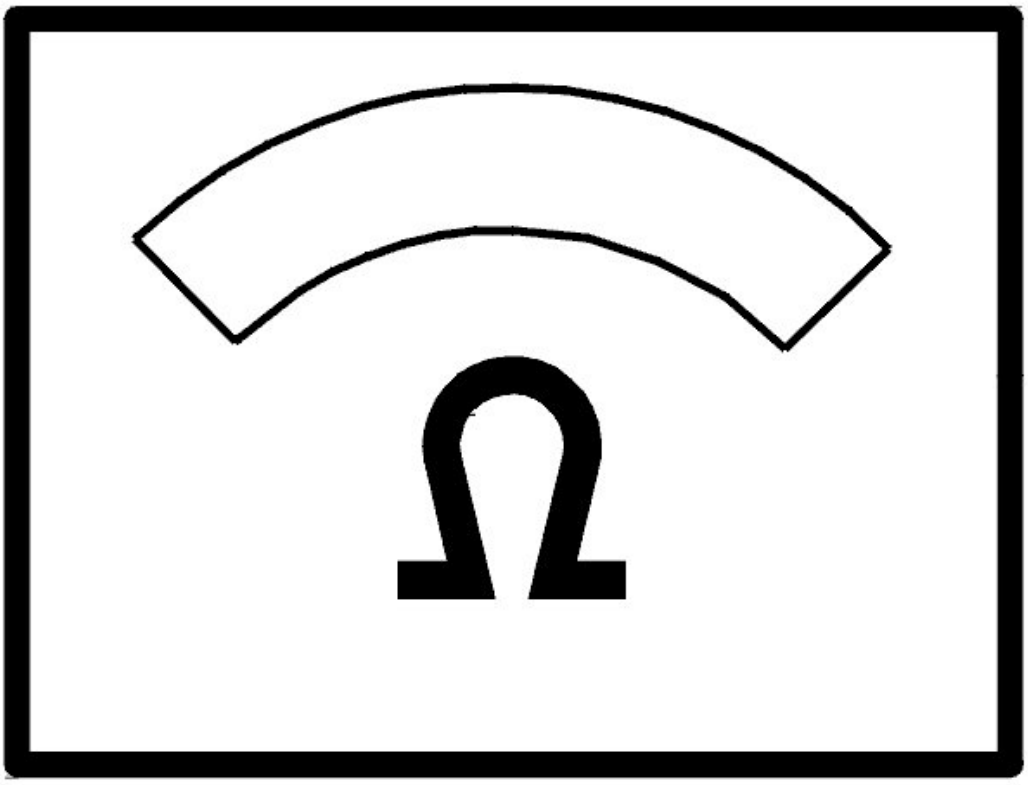
- terminal #1 and control module terminal #25 (terminal #A25)
- terminal #2 and control module terminal #29 (terminal #A29)
- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

check for an open-circuit.
Also check that the active yaw control sensor is correctly installed and that the bracket is secured.
Replace the active yaw control sensor if the wiring is OK and the sensor is correctly installed.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





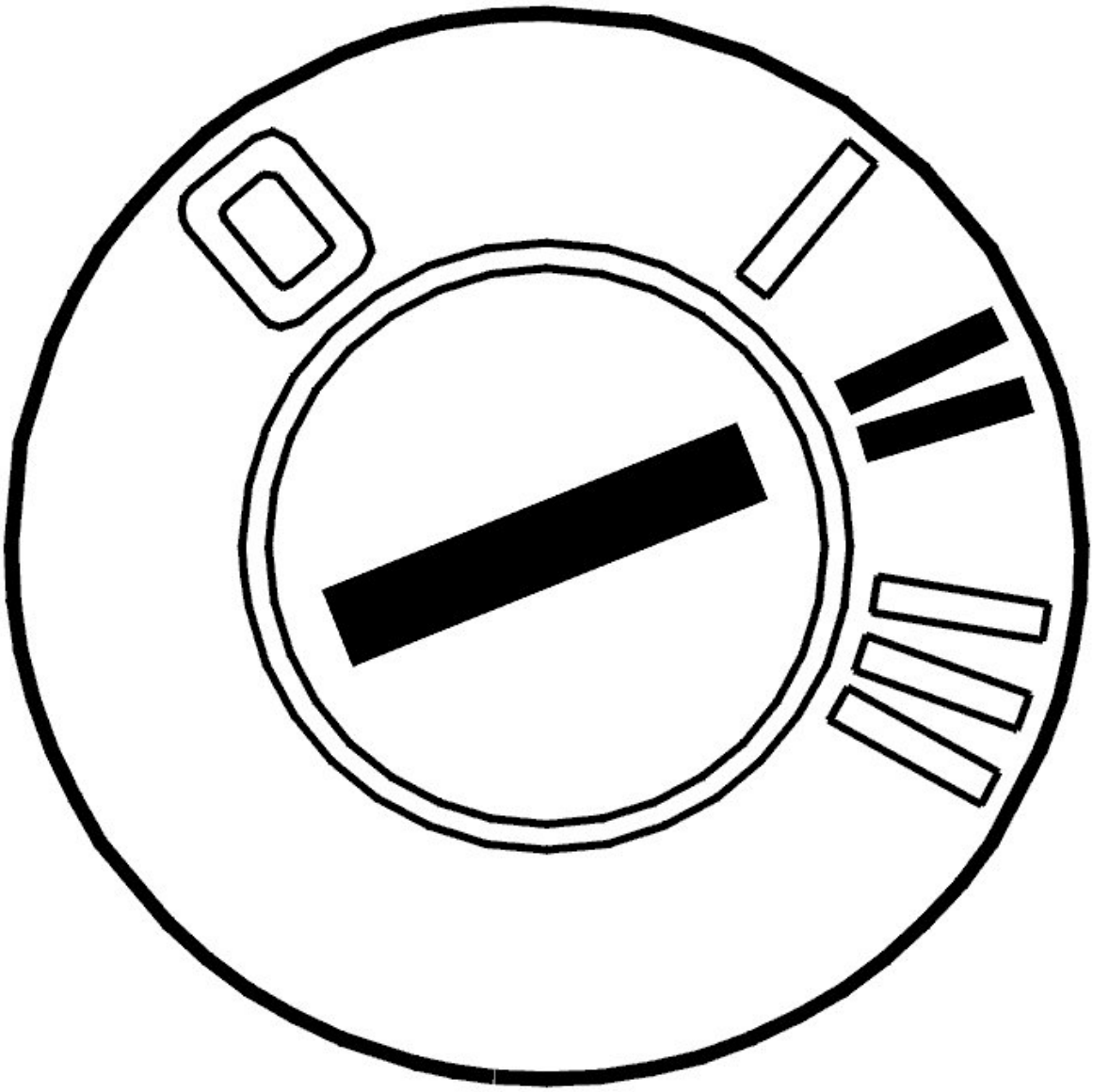
Continue - Verification

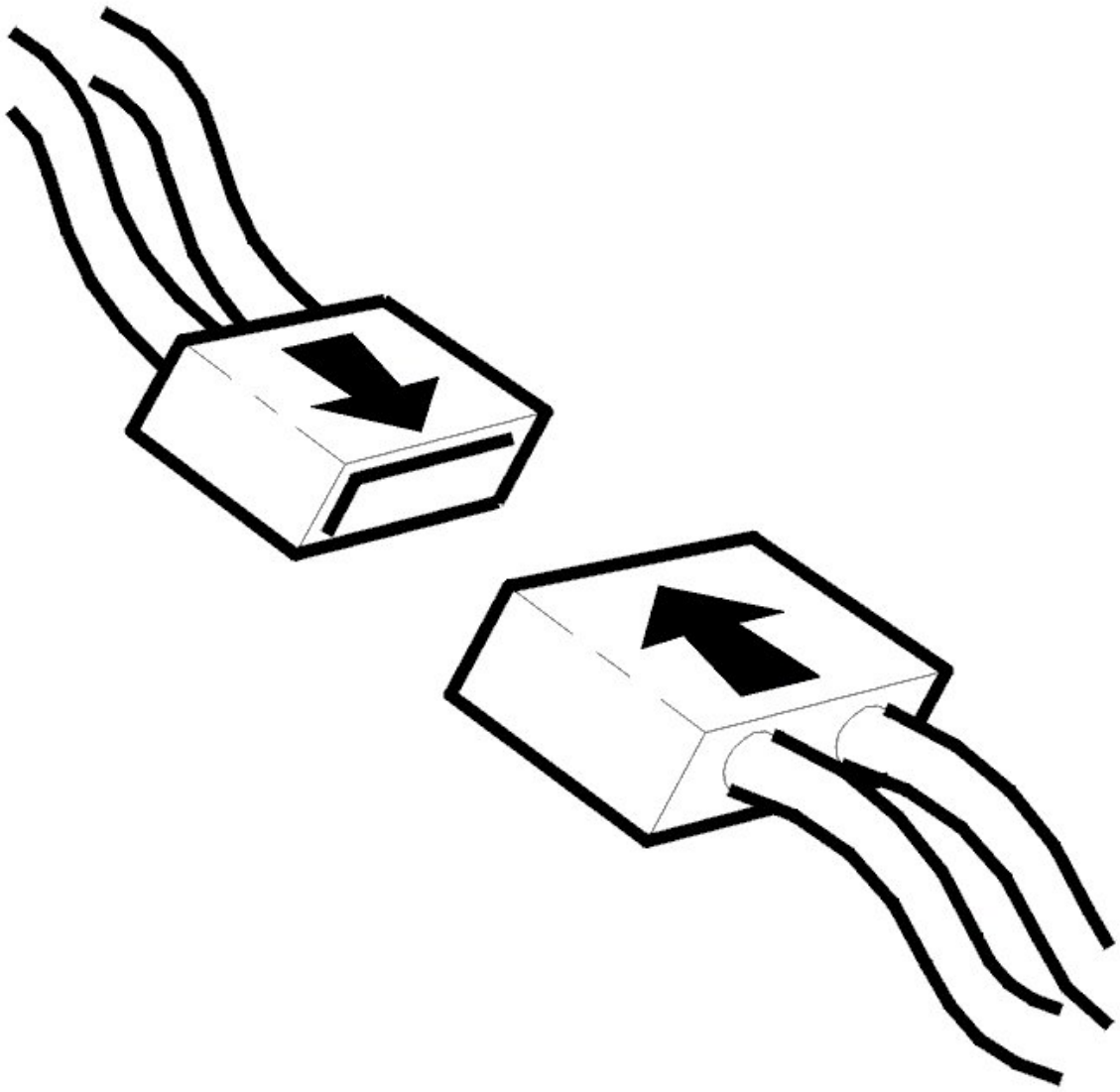
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for contact resistance and oxidation

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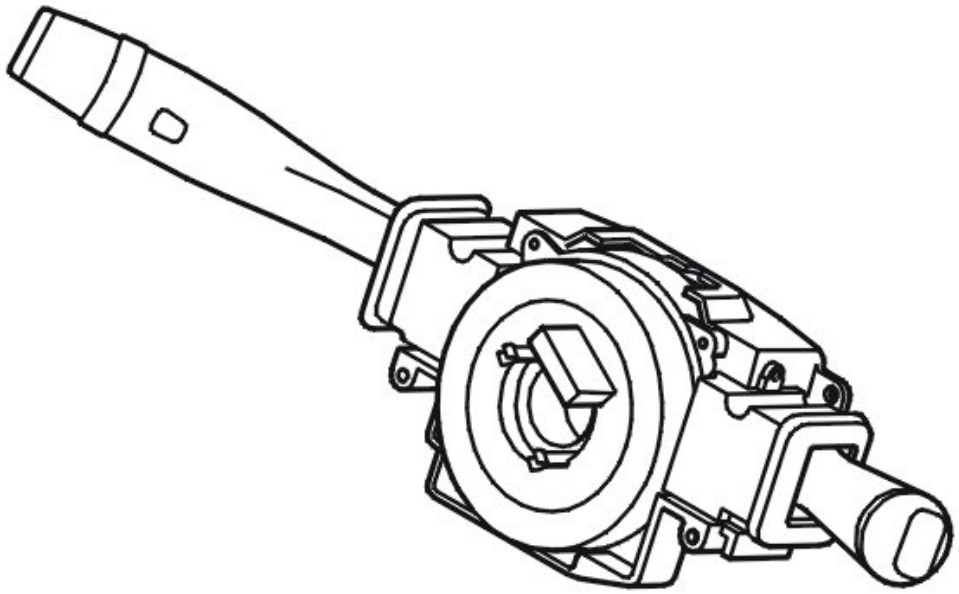
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The control module for the steering angle sensor transmits a signal via the Control area network (CAN) which indicates to the brake control module (BCM) whether the function of the steering wheel angle sensor is correct or not.
Diagnostic trouble code (DTC) BCM-0115 is stored if the brake control module (BCM) registers that the signal from the steering angle sensor is missing.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Traction control is blocked
- Stability control is blocked

- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Disruption or open-circuit on the Control area network (CAN)
- The steering angle sensor is not connected on the Control area network (CAN)
- Internal fault in the steering angle sensor.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication With the Steering Angle Sensor. Signal Missing

Communication with the steering angle sensor. Signal missing

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Checking diagnostic trouble codes (DTCs) in the control module for the steering angle sensor

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Checking diagnostic trouble codes (DTCs) in the control module for the steering angle sensor

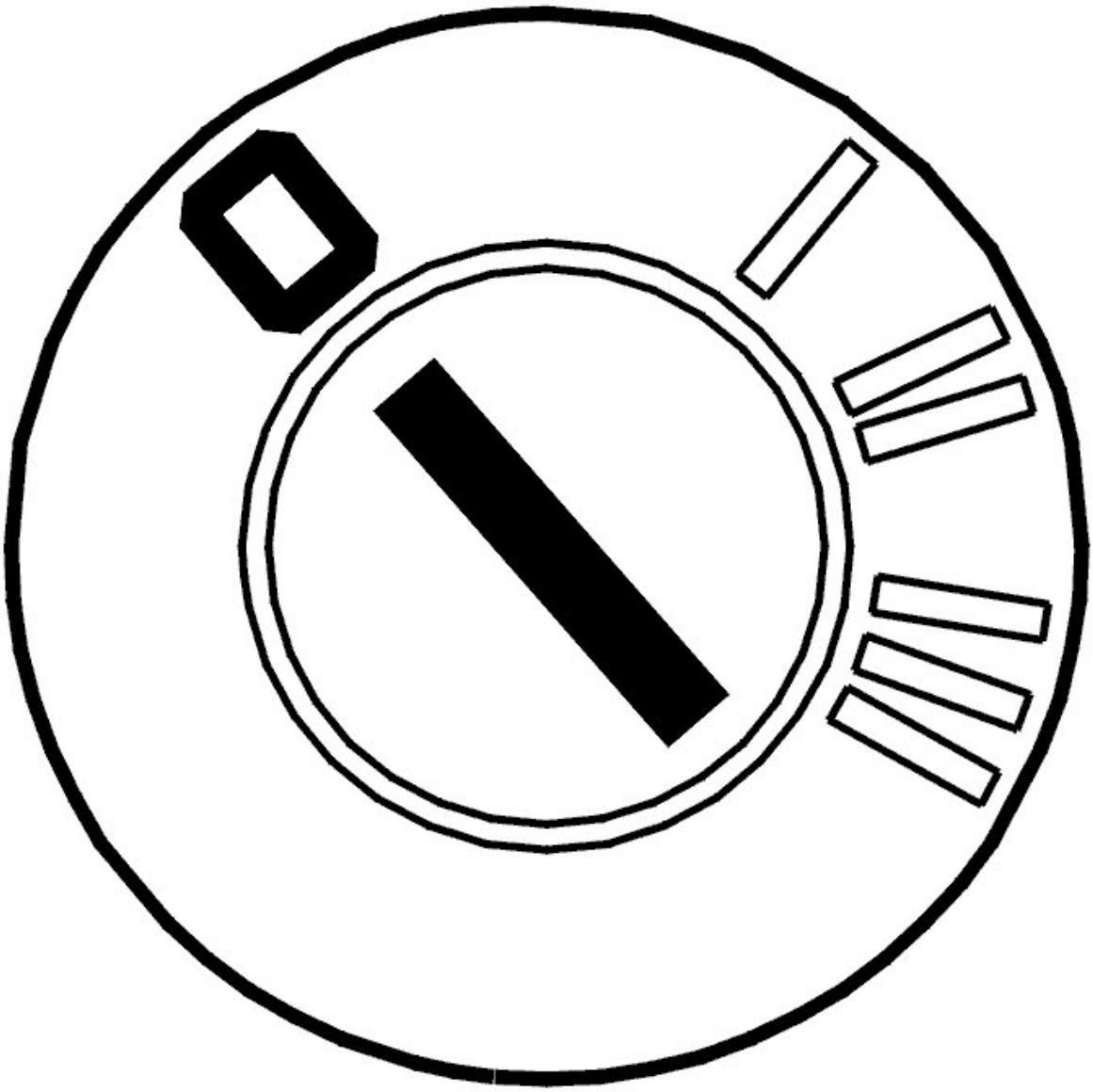
If there are diagnostic trouble codes (DTCs) stored in the control module for the steering angle sensor, these must be fault-traced first.

Were diagnostic trouble codes (DTCs) stored in the control module for the steering angle sensor?

Yes - DONE

No - Checking wiring and terminals

Checking wiring and terminals



- Ignition off.

Check the brake control module connector. Check for damaged or bent terminal pins. Check for contact resistance and oxidation.
Check the wiring for CAN communication between brake control module terminal #11 (#A11) and terminal #6 (#A36) on the control module for the steering angle sensor and between brake control module terminal #15 (#A15) and terminal #15 (#A45) on the control module for the steering angle sensor. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check that the wiring is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- To connect the breakout box to the brake control module, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Connecting the breakout box See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Steering Wheel Angle Sensor Module (SAS)

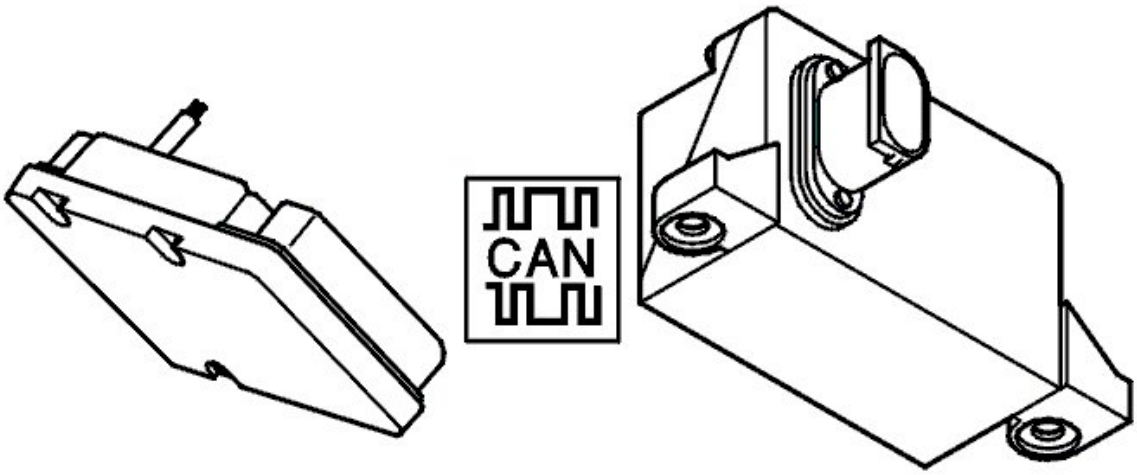
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0116 is stored if the brake control module (BCM) registers that the communication with the active yaw control sensor is not functioning.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

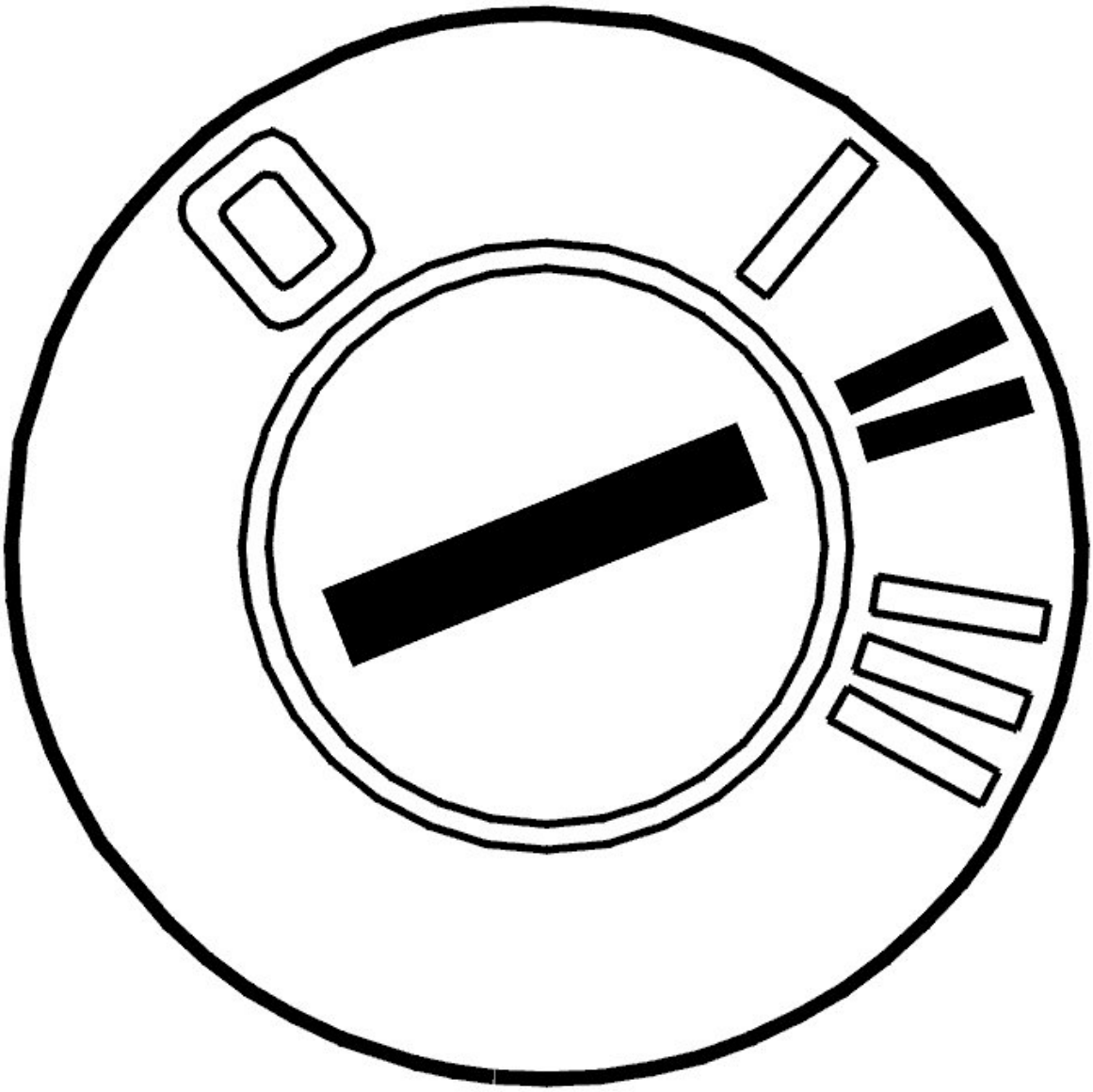
Possible source
- The cables for Control area network (CAN) communication are short-circuited to each other
- Short-circuit to ground or supply voltage in the cables for Control area network (CAN) communication
- Internal fault in the active yaw control sensor
- Internal fault in the brake control module (BCM).

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Communication Problems

Communication problems

Checking diagnostic trouble codes (DTCs)



- Ignition off
- Check the connectors for the brake control module (BCM) and the active yaw control sensor. Check for contact resistance and oxidation
- Ignition on
- Wait approximately 60 seconds
- Read off the status of the diagnostic trouble code (DTC).

If the status of the diagnostic trouble code (DTC) is intermittent, the cause of the fault was probably contact resistance or oxidation in the connectors for the control module or the active yaw control sensor.

Other information

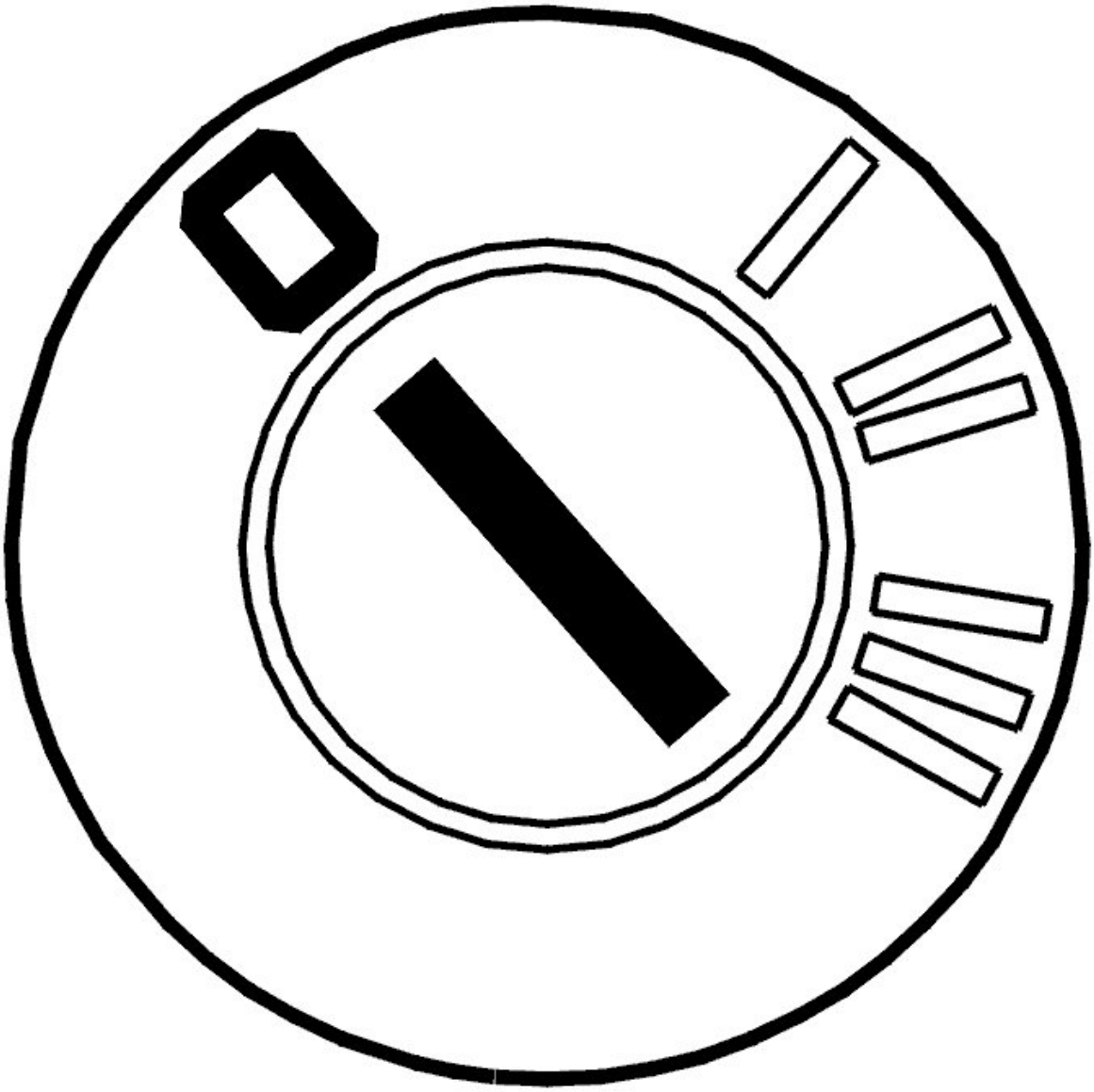
- To disconnect the connector for the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Is the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking the wiring

No - Fault Found

Checking the wiring



- Ignition off
- Connect the breakout box.

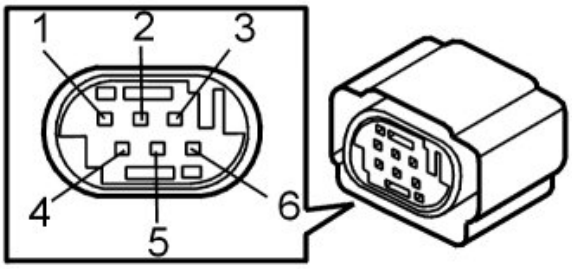
Check the wiring between the connector for the active yaw control sensor

- terminal #1 and control module terminal #25 (terminal #A25)
- terminal #2 and control module terminal #29 (terminal #A29)
- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

check for an open-circuit or short-circuit to ground and for a short-circuit to each other.
Also check that the active yaw control sensor is correctly installed and that the bracket is secured.
If the cables are OK, try a new active yaw control sensor.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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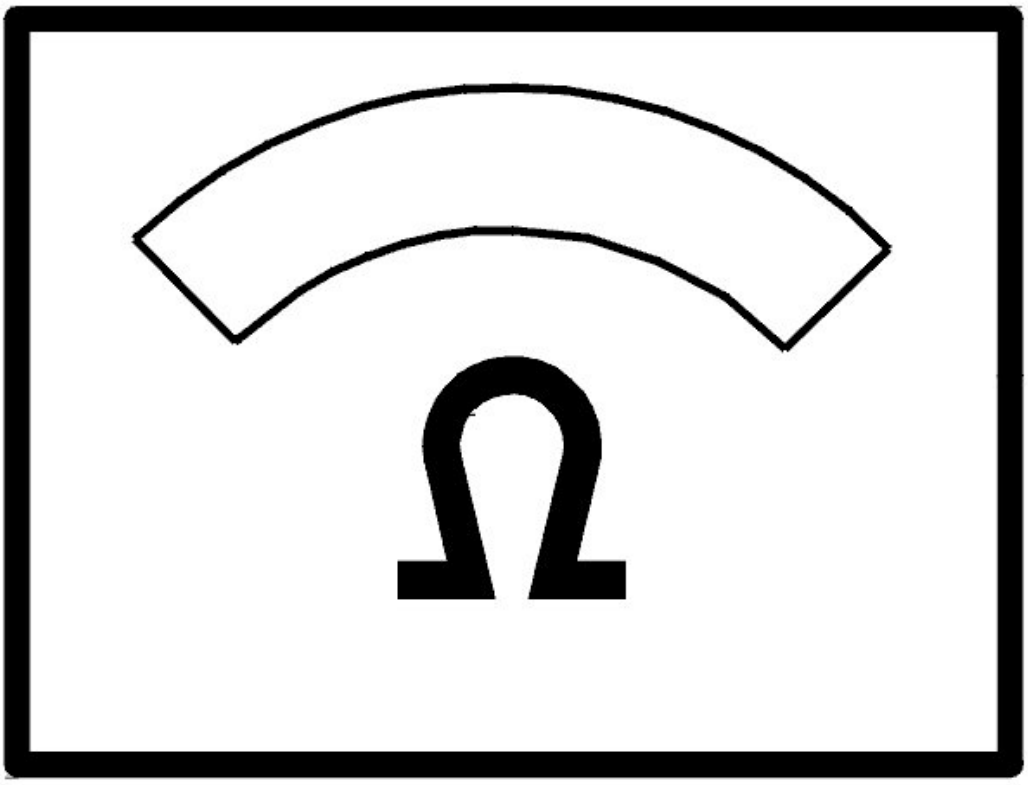
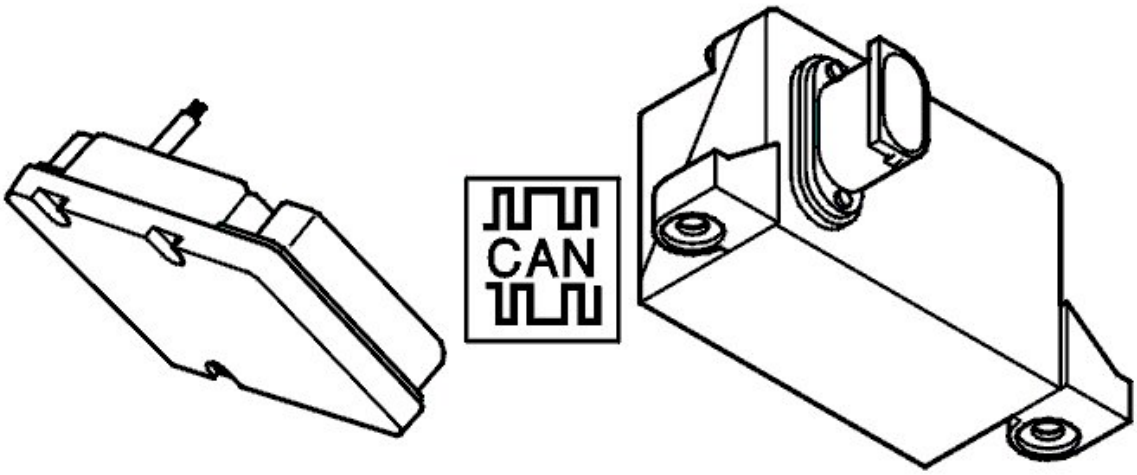
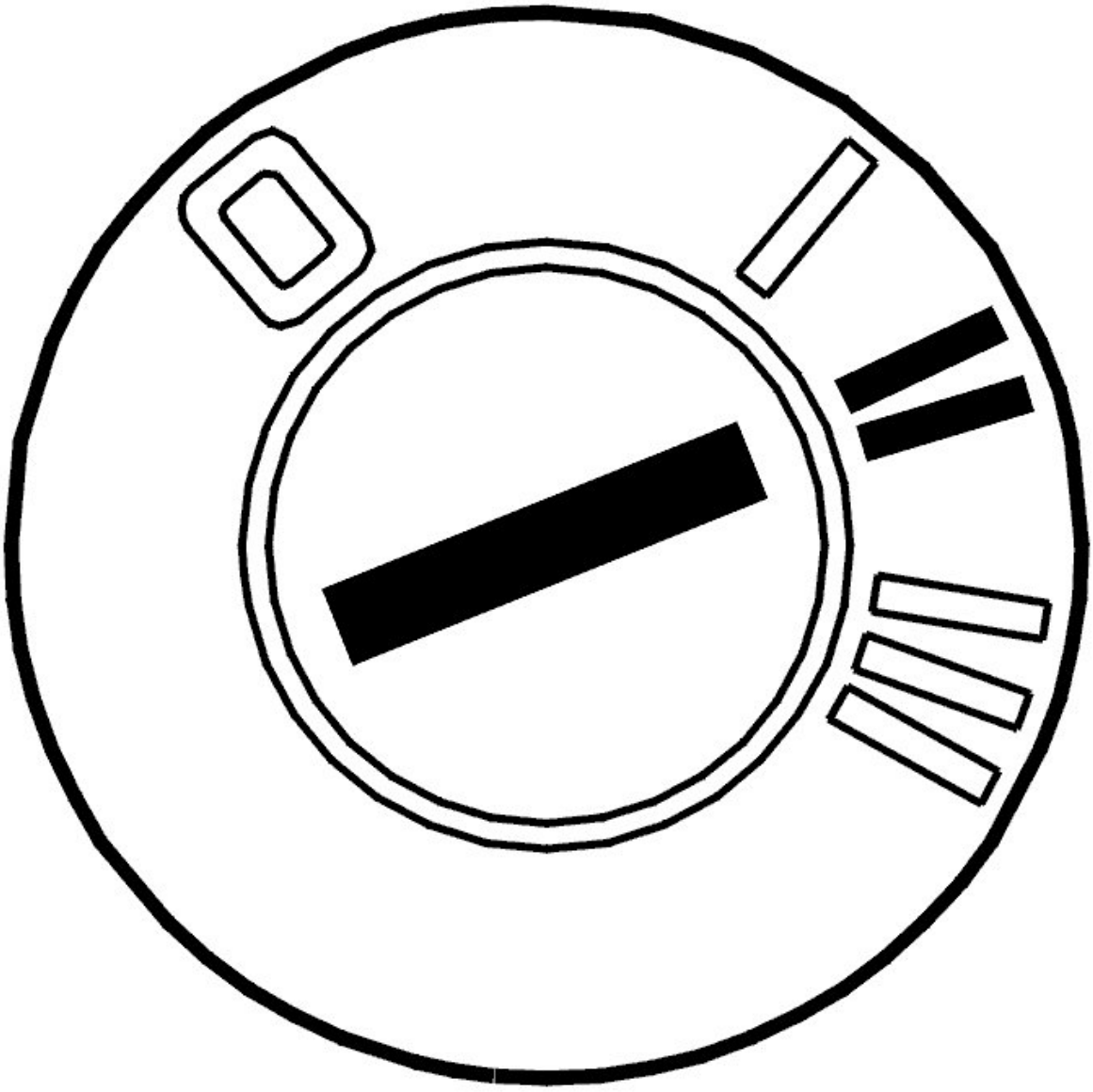


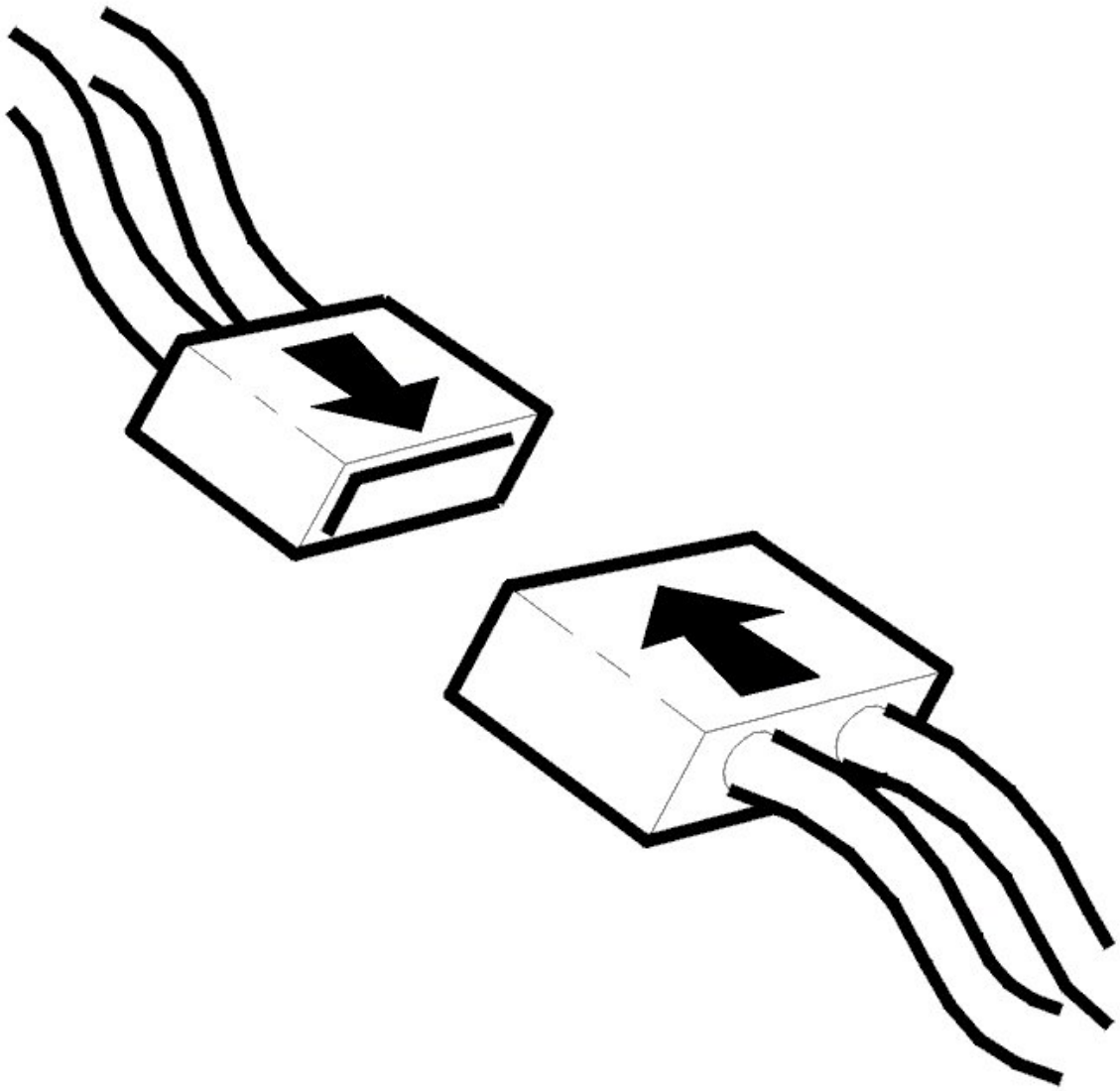


Were there any faults in the wiring or in the installation of the active yaw control sensor?

Yes - Verification
No - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)





- Ignition off
- Reconnect the components, connectors etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Read off diagnostic trouble codes (DTCs).

The brake control module (BCM) is faulty if the status of the diagnostic trouble code (DTC) is still permanent.
Install the old active yaw control sensor and replace the control module

Other information

- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing.

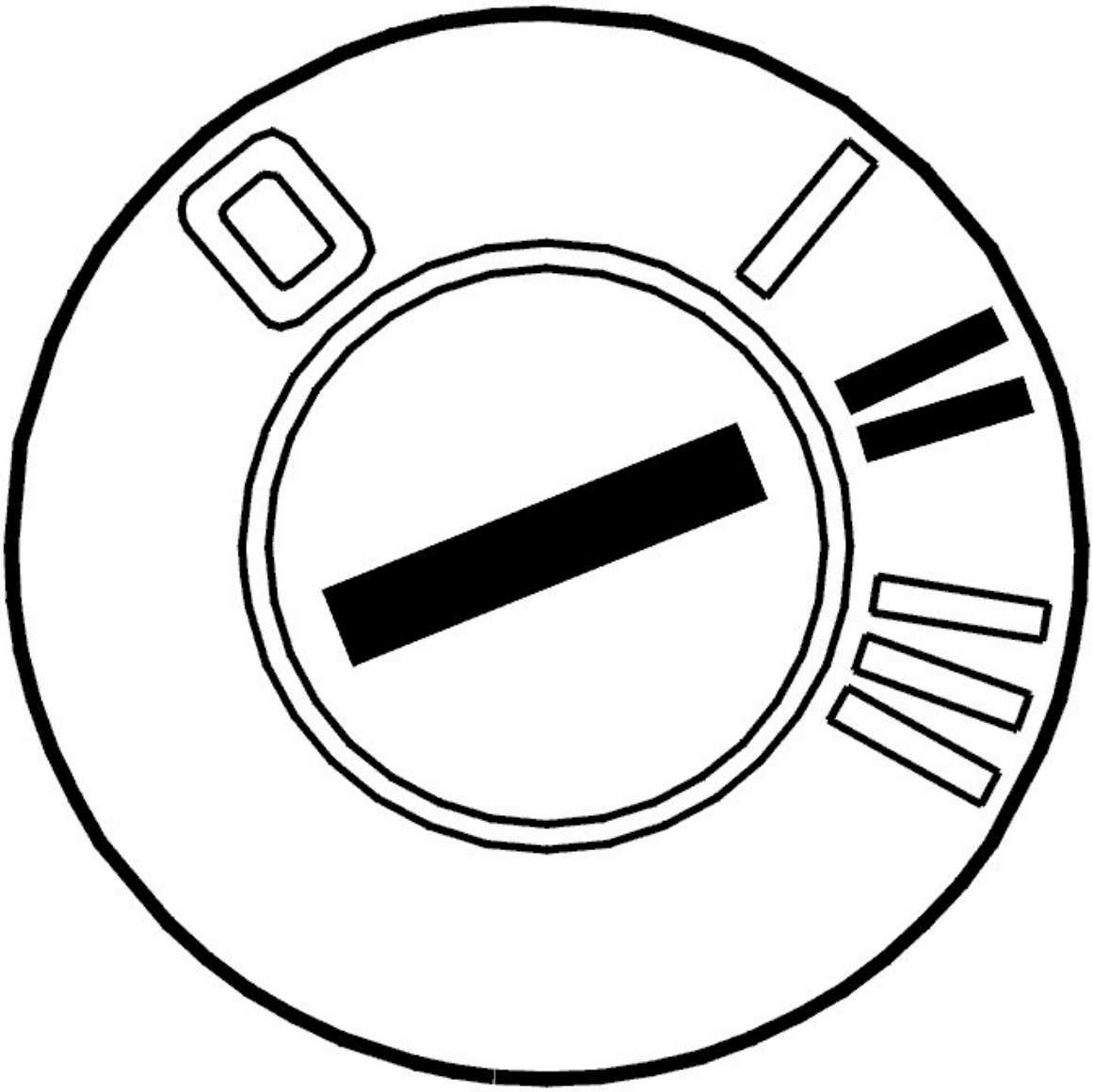
Is the status of the diagnostic trouble code (DTC) permanent?

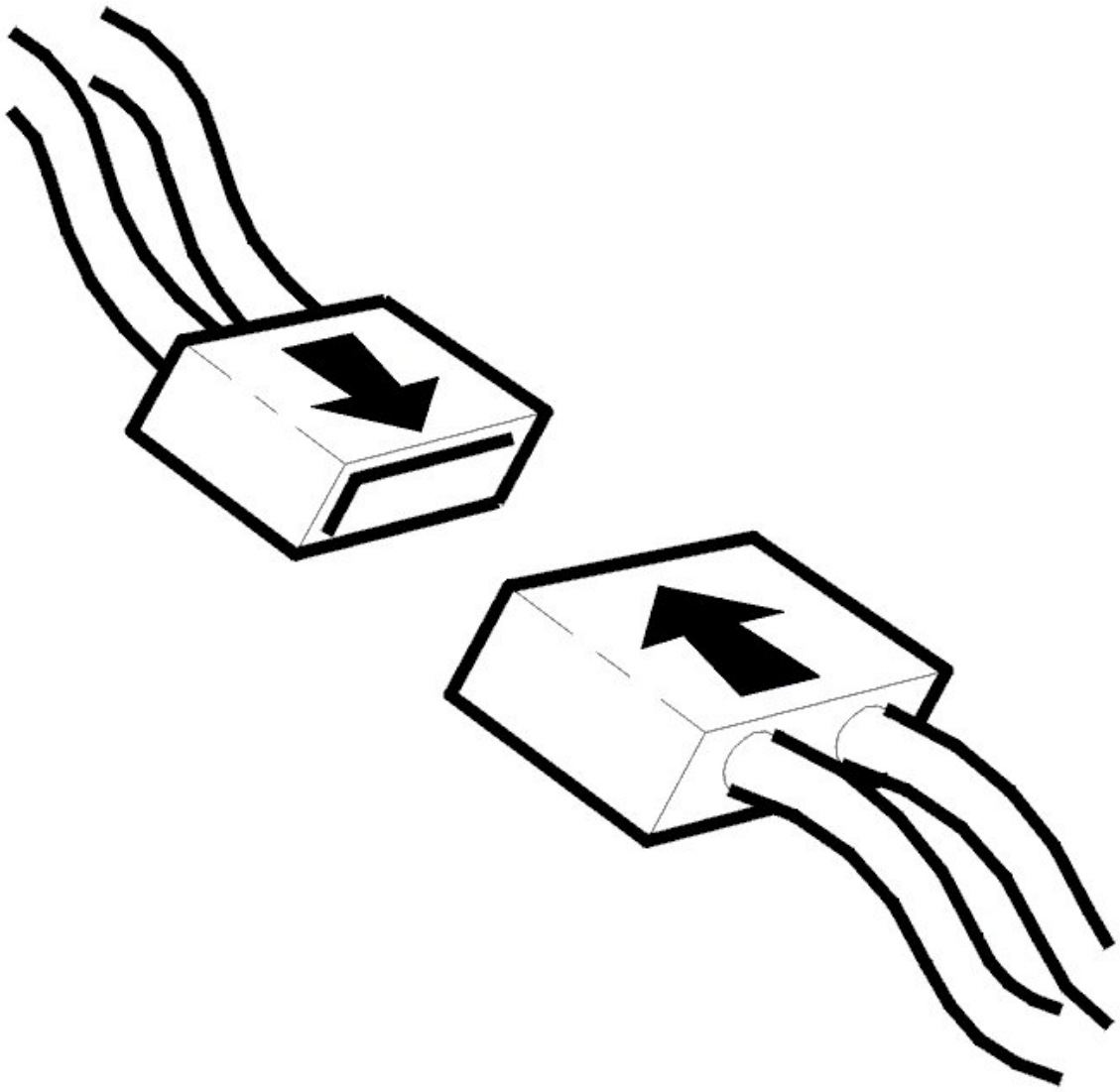
Yes - Fault Found

No - Fault-tracing information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking diagnostic trouble codes (DTCs)

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Information

Fault-tracing information

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.
Complete the fault-tracing for those fault or try again.

Do you want to terminate fault-tracing at this time?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

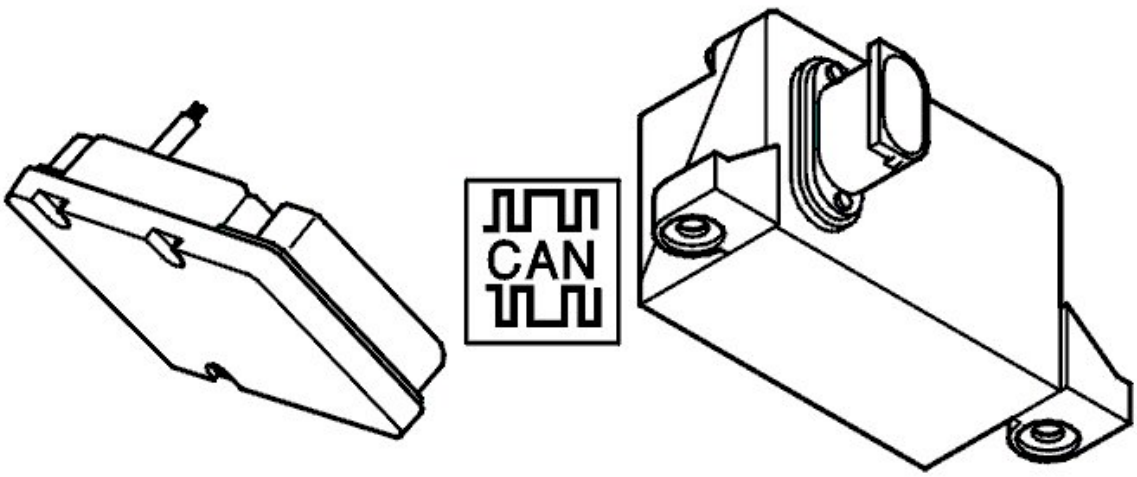
Attempt New Test - Checking diagnostic trouble codes (DTCs)

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



There are two different active yaw control sensors. One is for two wheel drive cars, the other is for four wheel drive cars. Diagnostic trouble code (DTC) BCM-0117 is stored if the brake control module (BCM) registers that the installed active yaw control sensor is not correct for this car.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- An incorrect active yaw control sensor had been installed.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

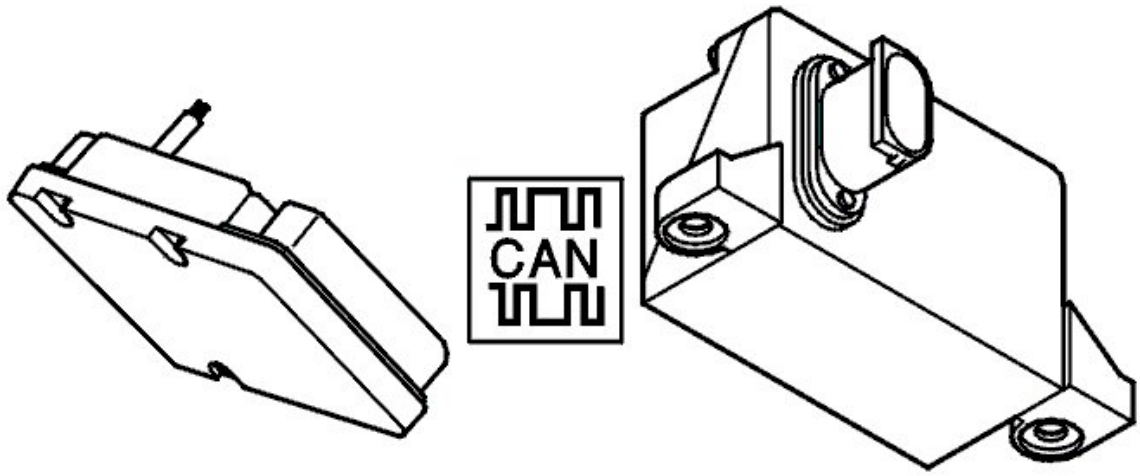
Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

An Incorrect Active Yaw Control Sensor Had Been Installed

An incorrect active yaw control sensor had been installed

checking the active yaw control sensor

The diagnostic trouble code (DTC) indicates that an active yaw control sensor for a four wheel drive car has been installed in a two wheel drive car or vice-versa.
Replace with the correct sensor. See Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing.



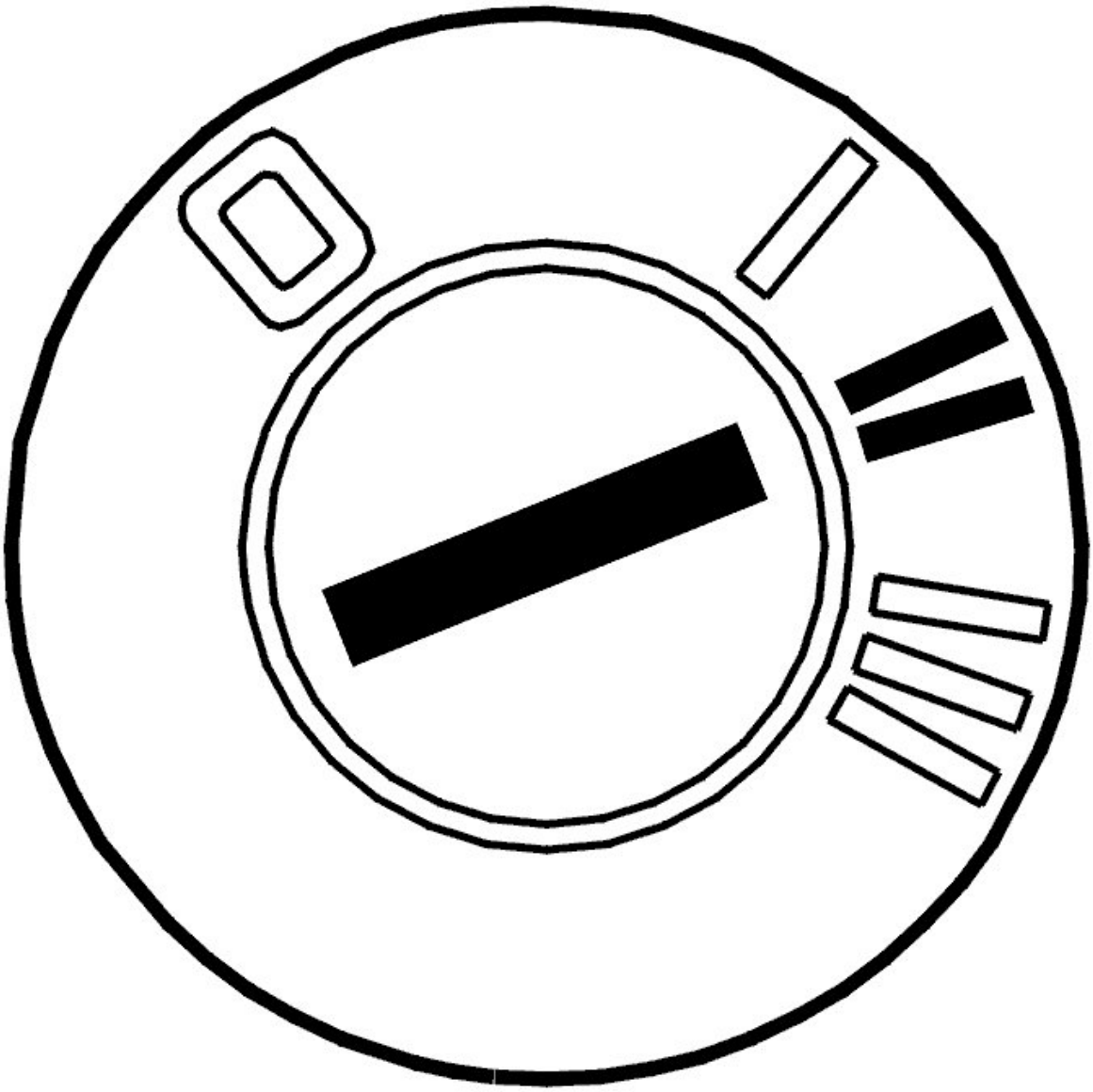
Continue - Verification

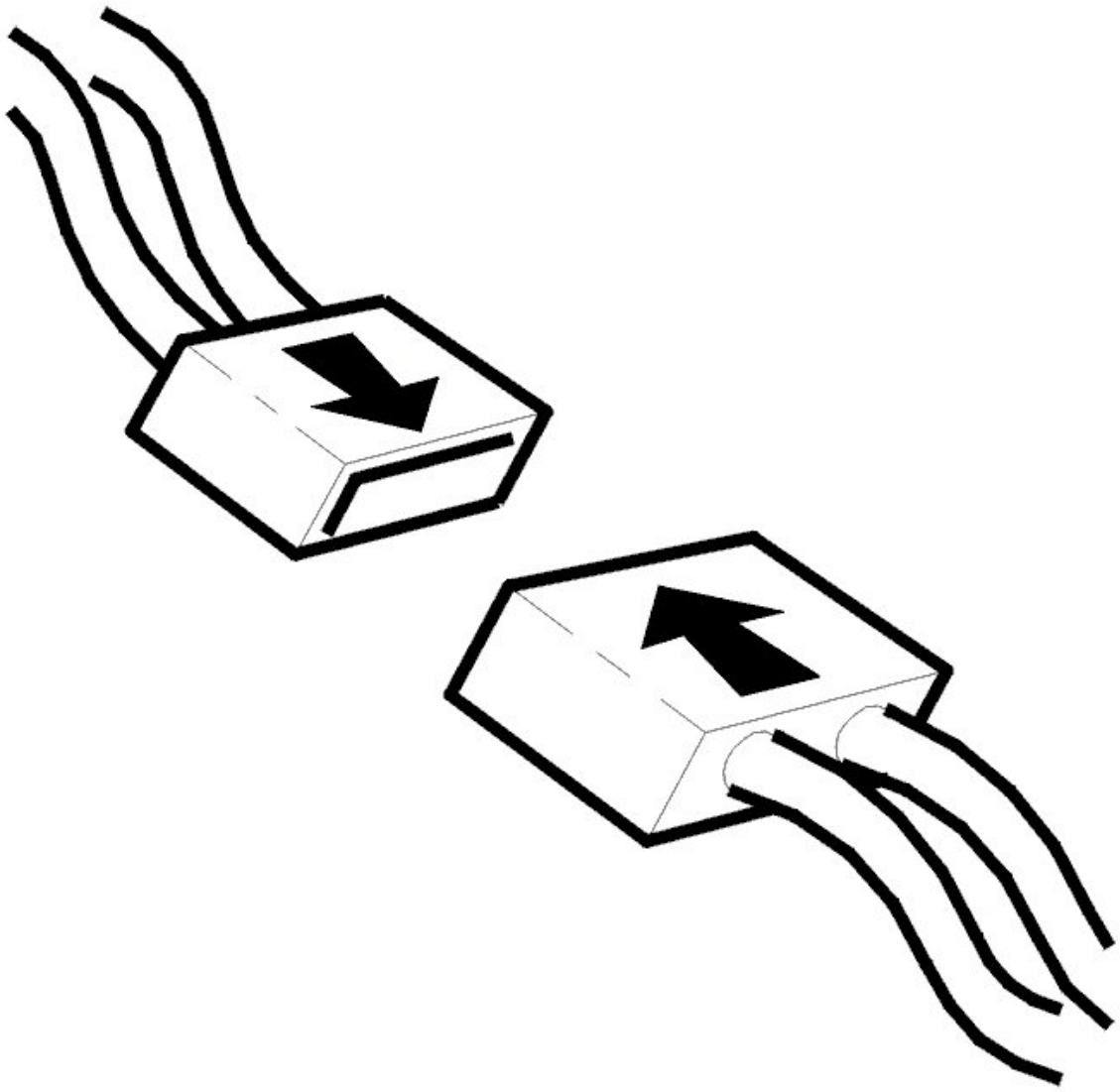
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

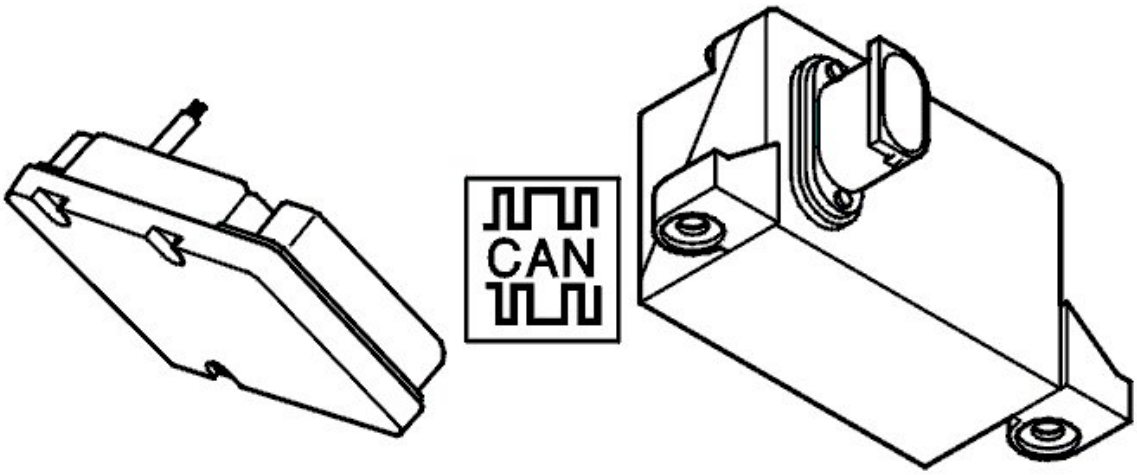
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - checking the active yaw control sensor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0118 is stored if the brake control module (BCM) registers that the power supply from the active yaw control sensor exceeds 17 V.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Short-circuit to supply voltage in the power supply cable
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

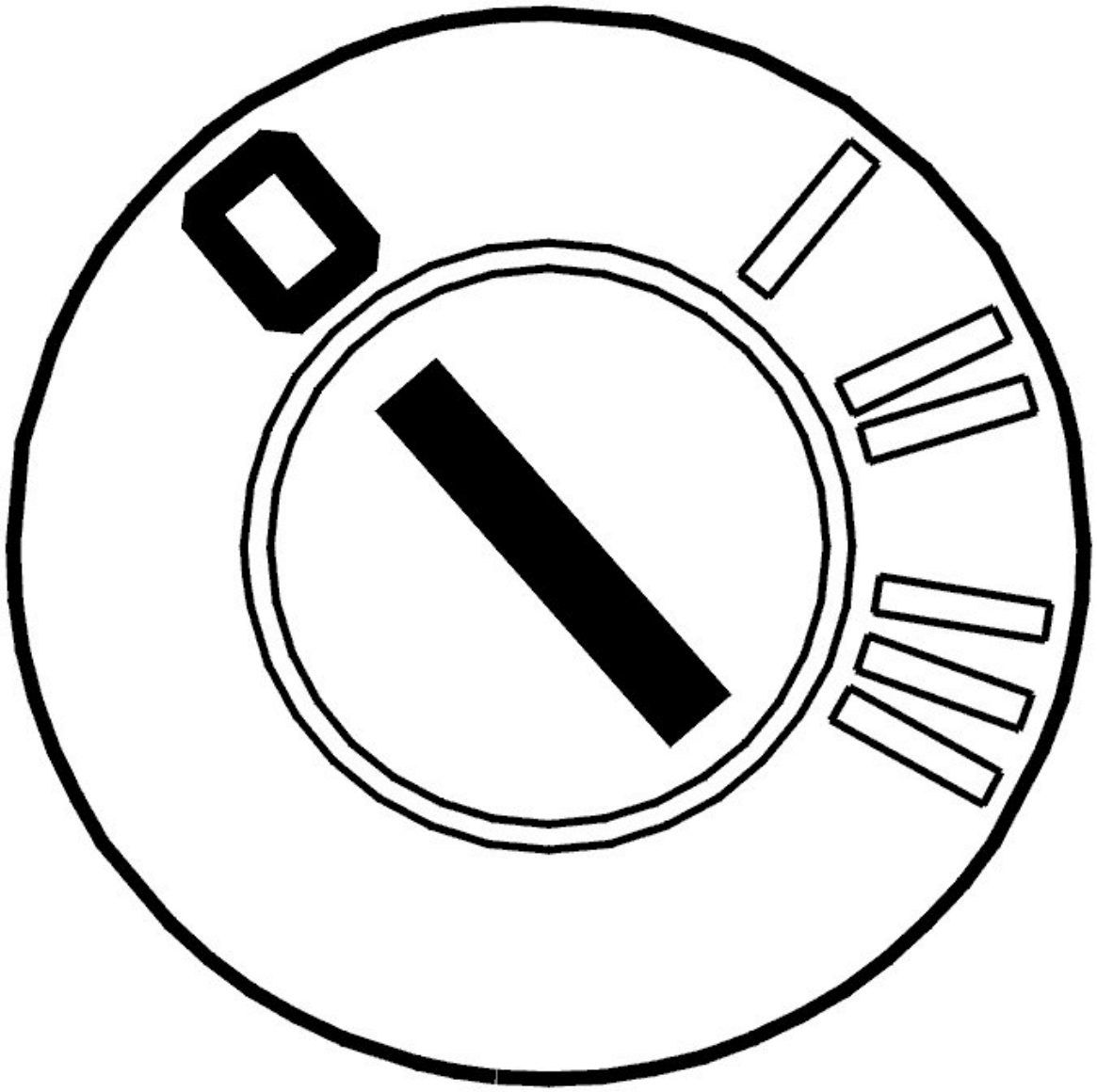
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Voltage Too High

Voltage too high

Checking the wiring



- Ignition off
- Connect the breakout box.

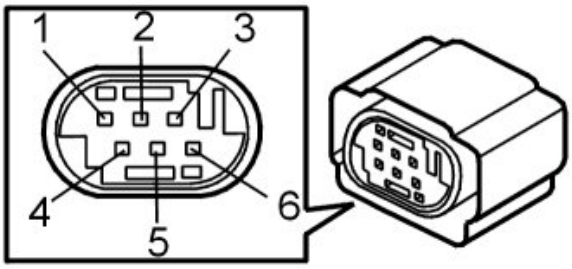
Check the wiring between the connector for the active yaw control sensor

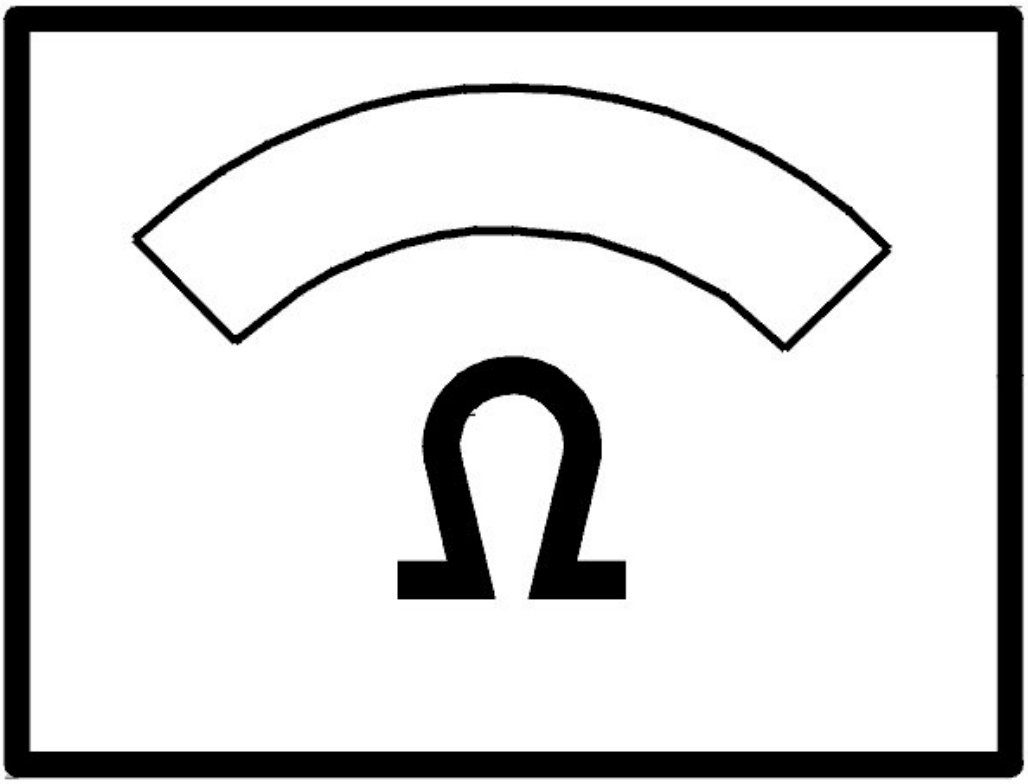
- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

check for a short-circuit to supply voltage.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



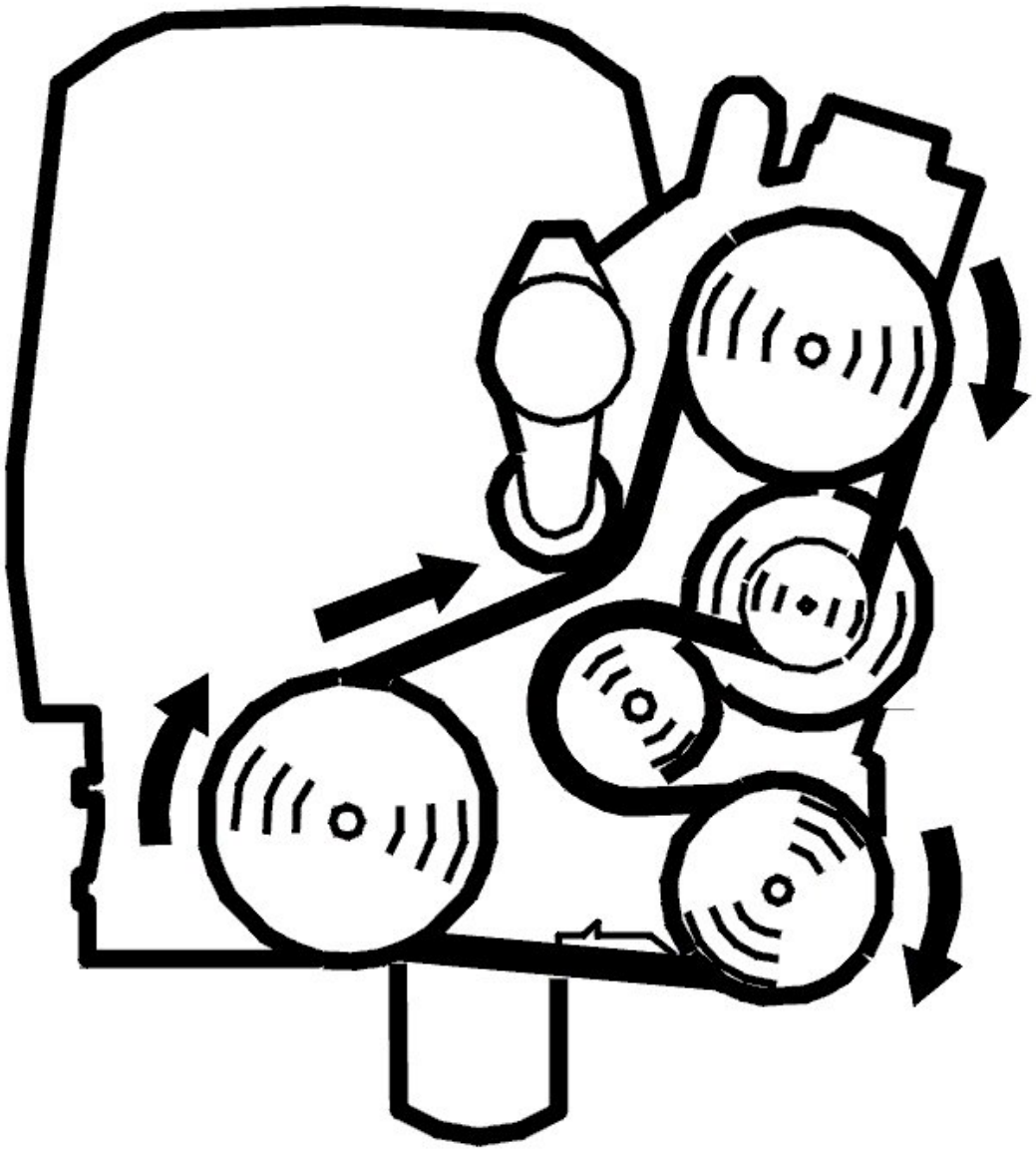


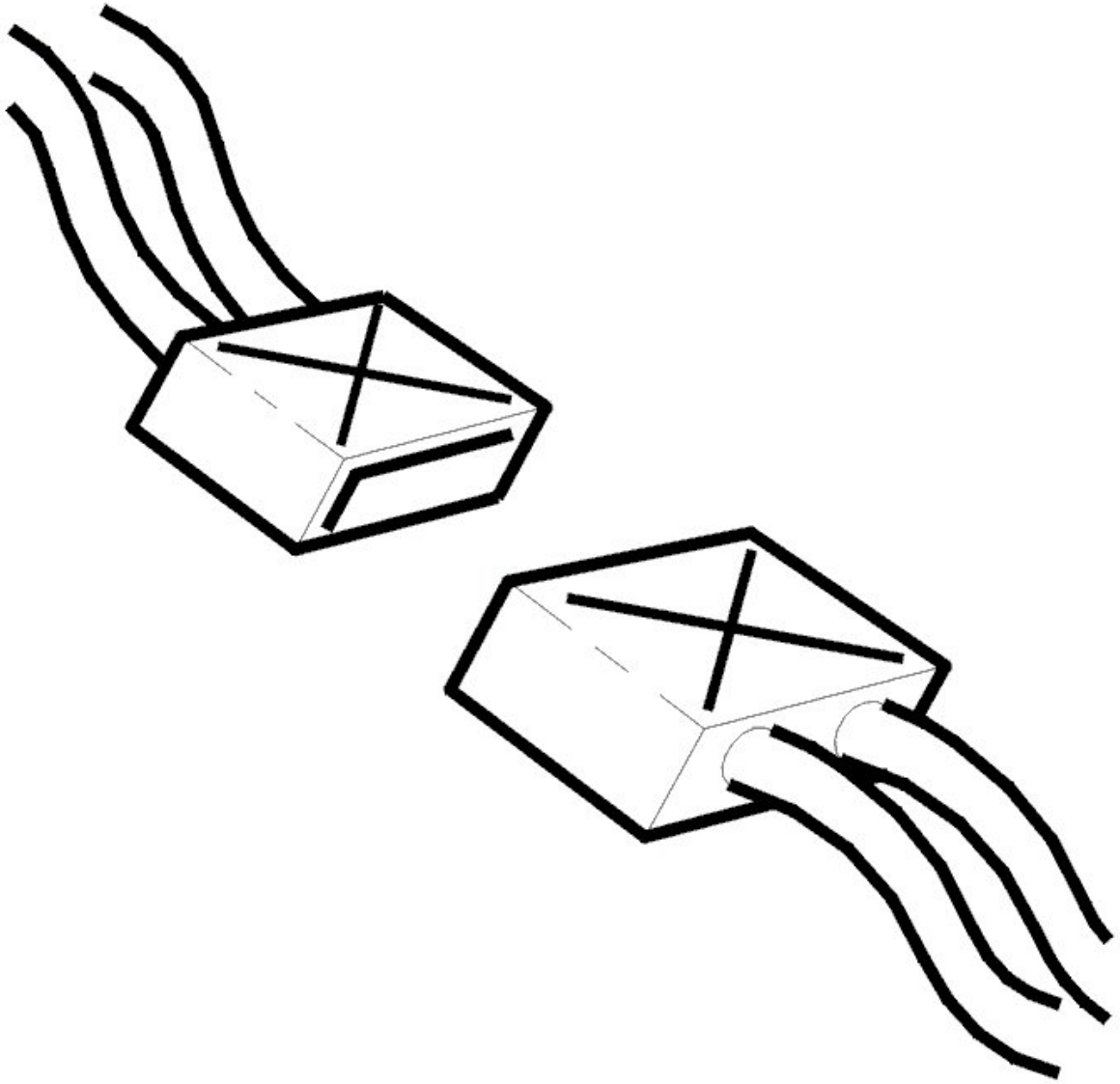
Was a fault detected?

Yes - Verification

No - Checking the control module

Checking the control module





- Ignition off
- Breakout box connected to the brake control module (BCM)
- The active yaw control sensor disconnected
- Start the engine
- Read off the power supply to the brake control module (BCM).

Check the power supply to the active yaw control sensor by connecting a voltmeter between brake control module (BCM) terminals #6 (#A6) and #39 (#A39).
Check that the voltage is approximately the same as the value read from the brake control module (BCM).
Replace the active yaw control sensor if the power supply to the sensor is OK.
Check the charging system if the voltage to the brake control module (BCM) is too high.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.

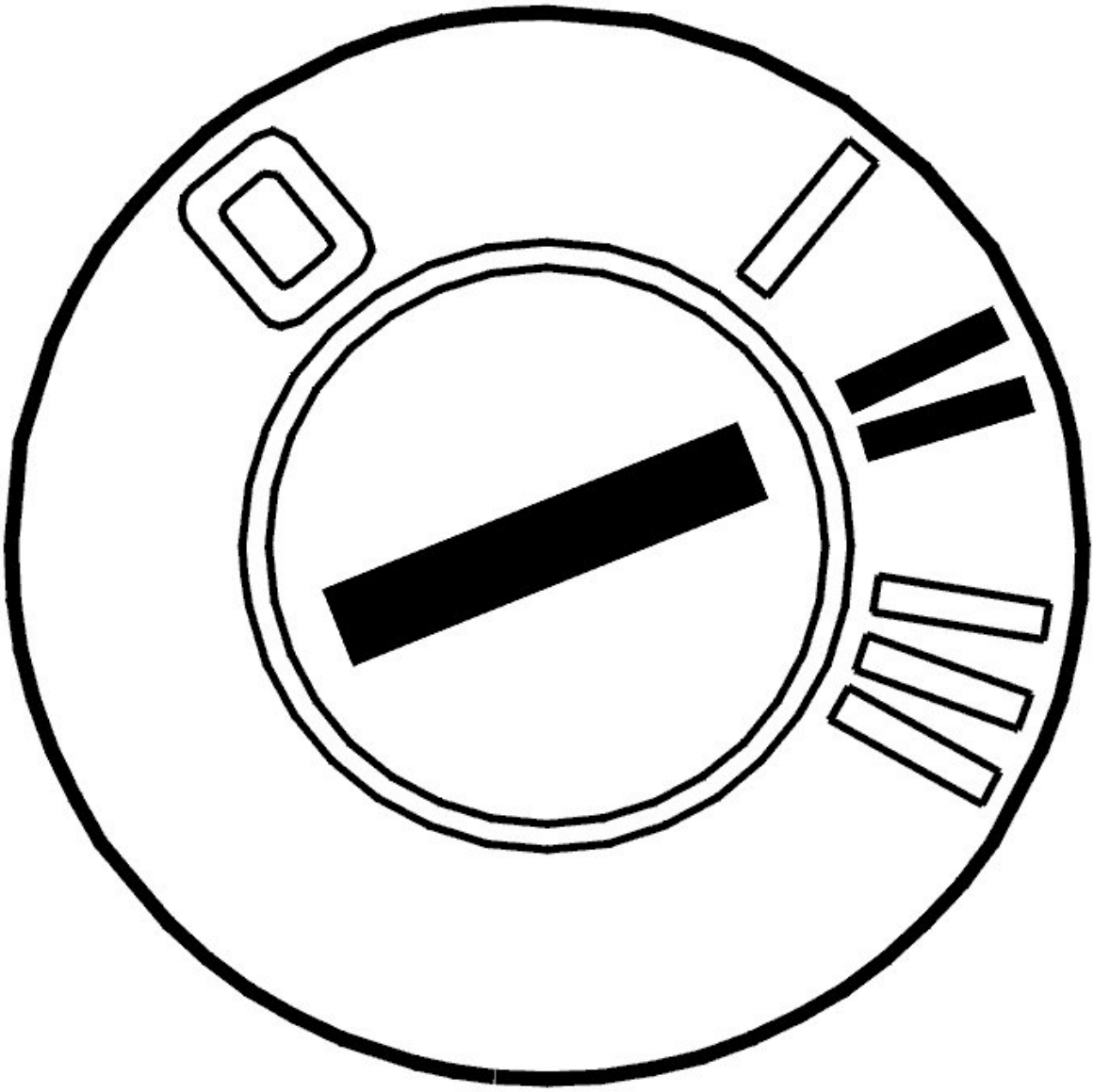
Continue - Verification

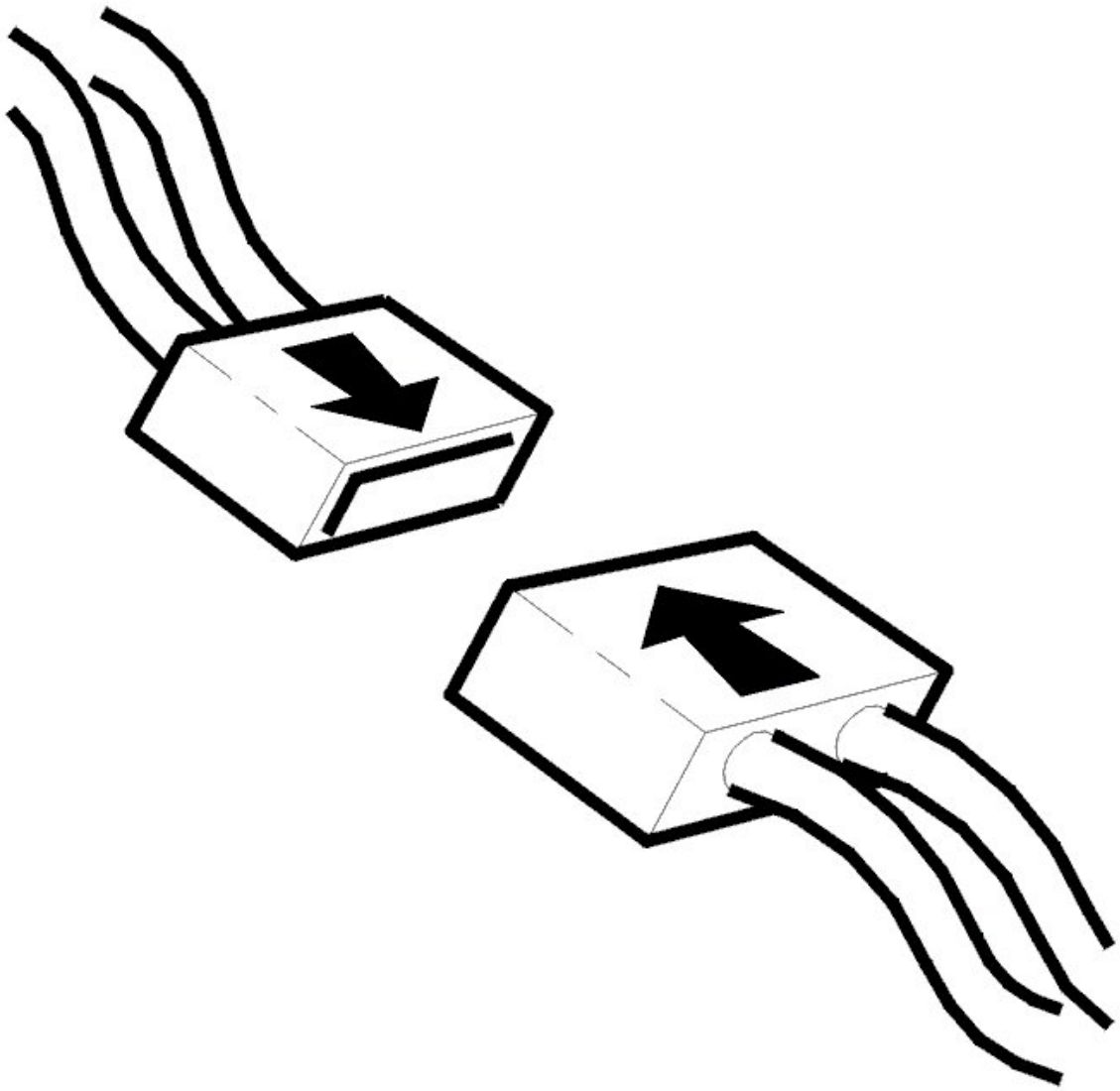
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

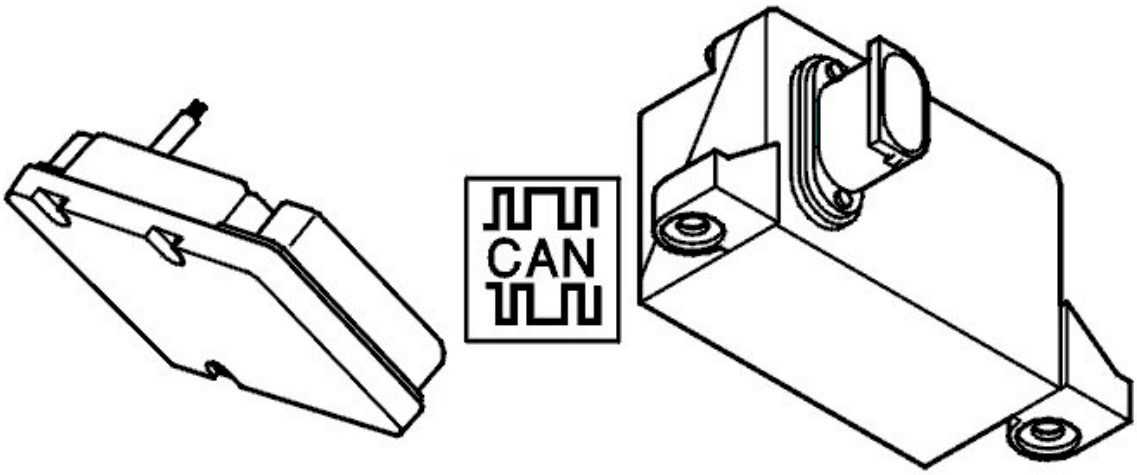
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0119 is stored if the brake control module (BCM) registers that the power supply to the active yaw control sensor is below 6 V ±0.5 V.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Contact resistance in the terminals on the active yaw control sensor
- Short-circuit to ground in the wiring
- Open-circuit in the wiring
- Internal fault in the active yaw control sensor

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

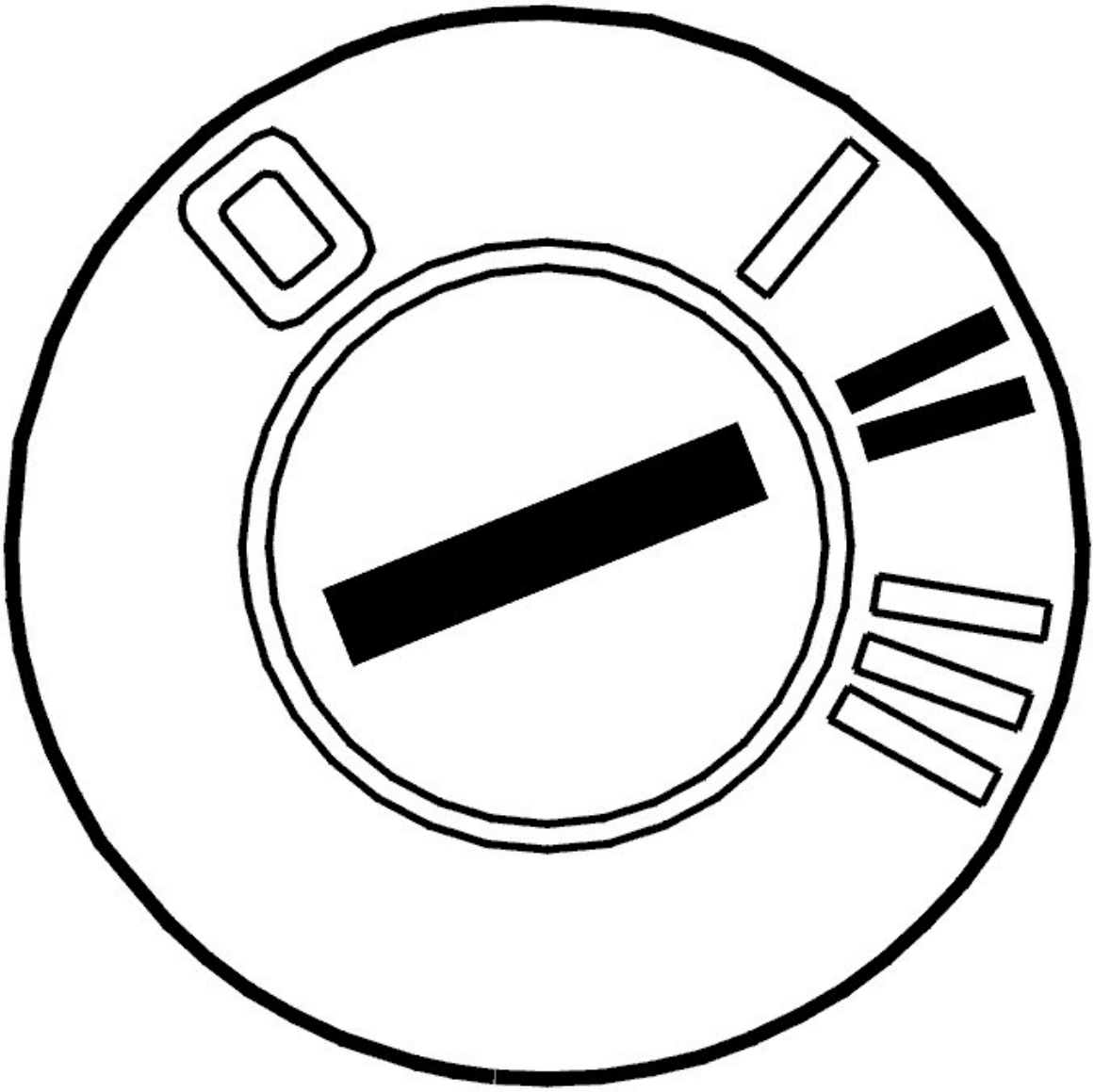
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Voltage Too Low

Voltage too low

Checking the status of the diagnostic trouble code (DTC)



- Ignition off
- Check the connectors for the brake control module (BCM) and the active yaw control sensor. Check for contact resistance and oxidation
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Wait approximately 60 seconds
- Read off diagnostic trouble codes (DTCs).

If the status of the diagnostic trouble code (DTC) intermittent, the cause of the fault was probably contact resistance or oxidation in the connectors for the control module or the active yaw control sensor.

Other information

- To remove the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes /

Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing

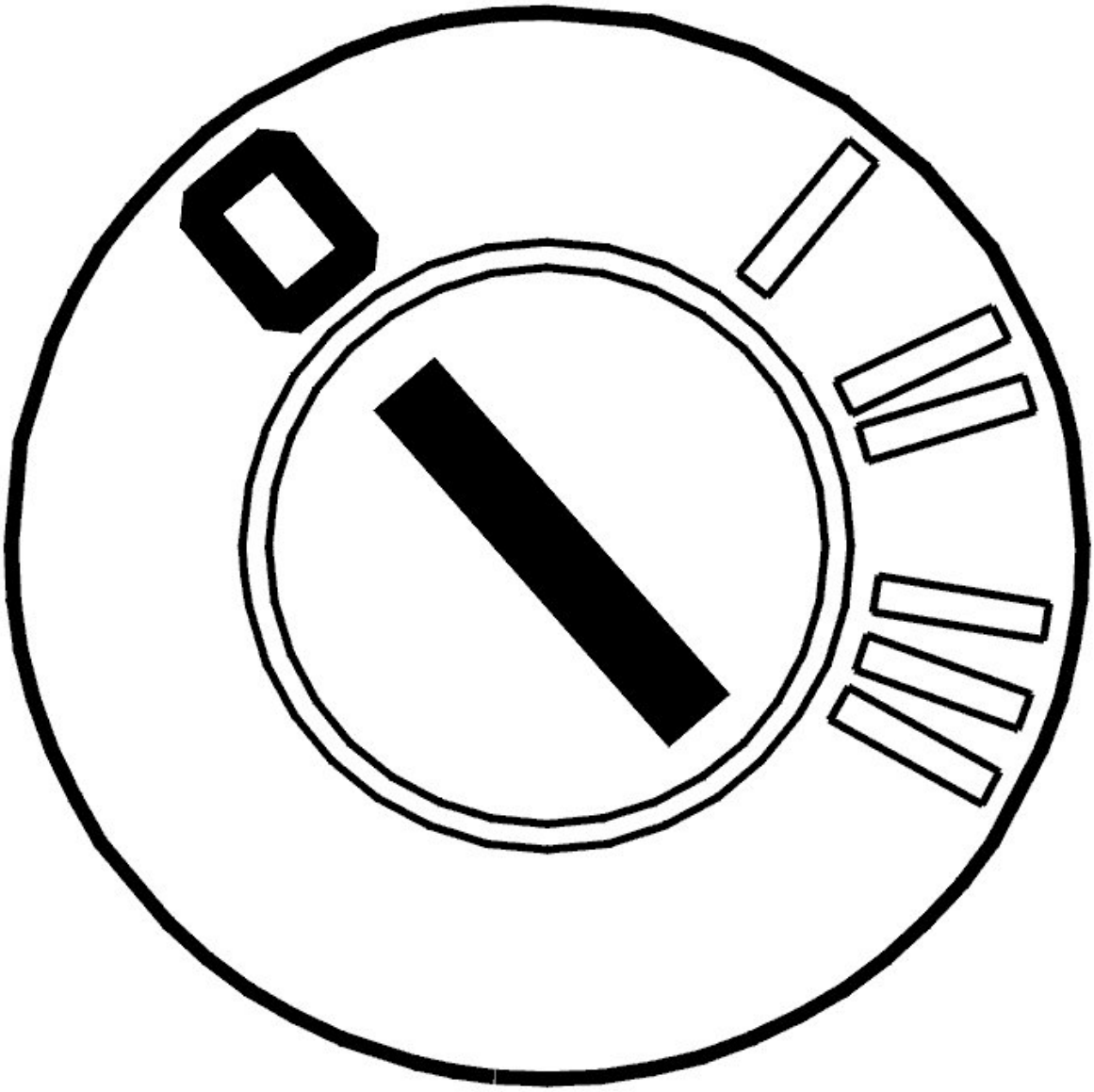
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - Fault Found

No - Checking the wiring

Checking the wiring



- Ignition off
- Connect the breakout box.

Check the wiring between the connector for the active yaw control sensor:

- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

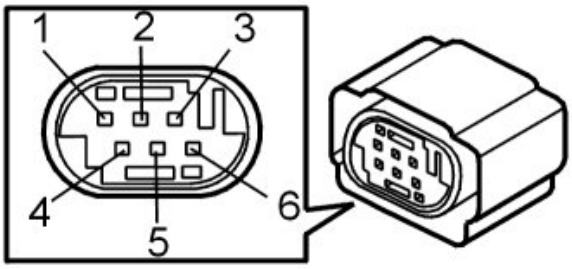
check for an open-circuit or short-circuit to ground.

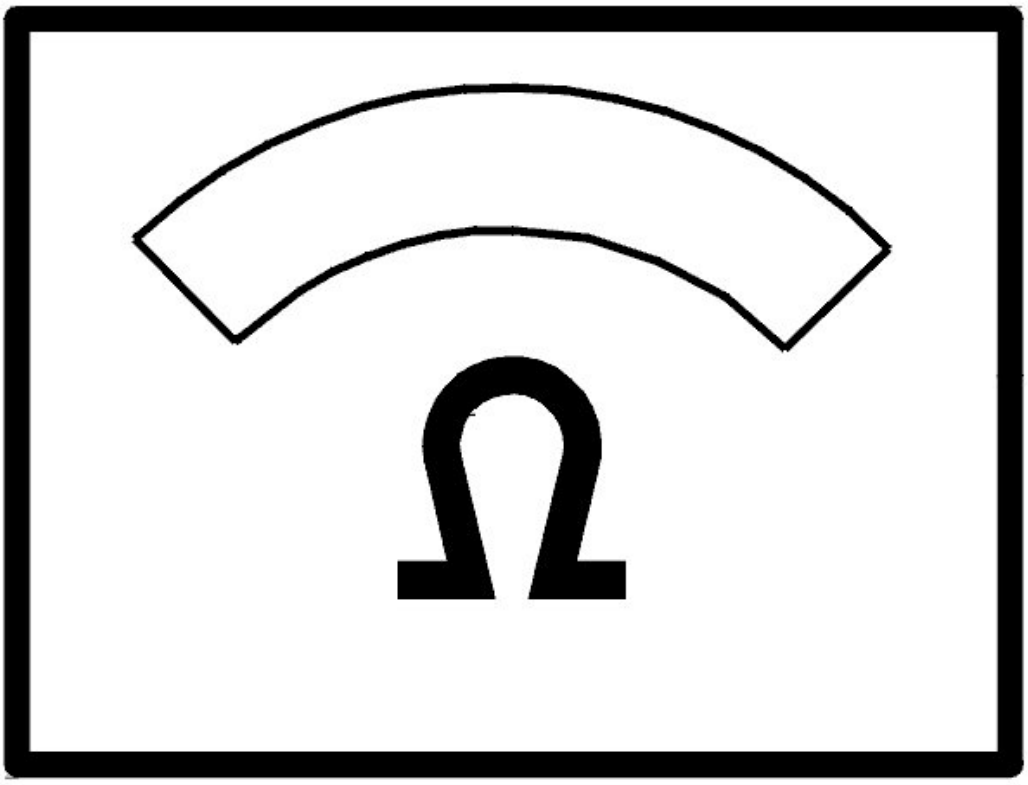
Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock

Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)

- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





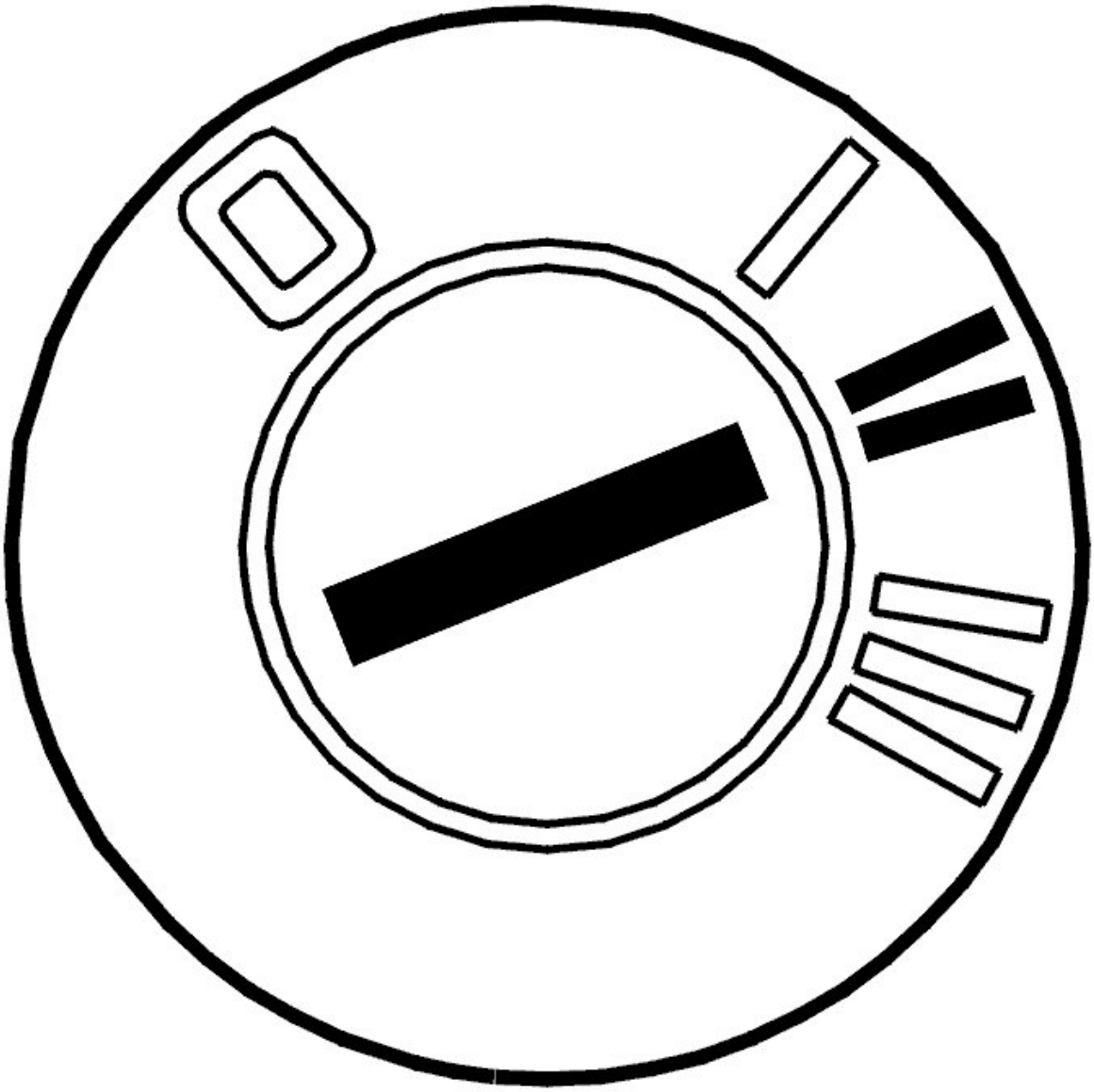
Was a fault detected?

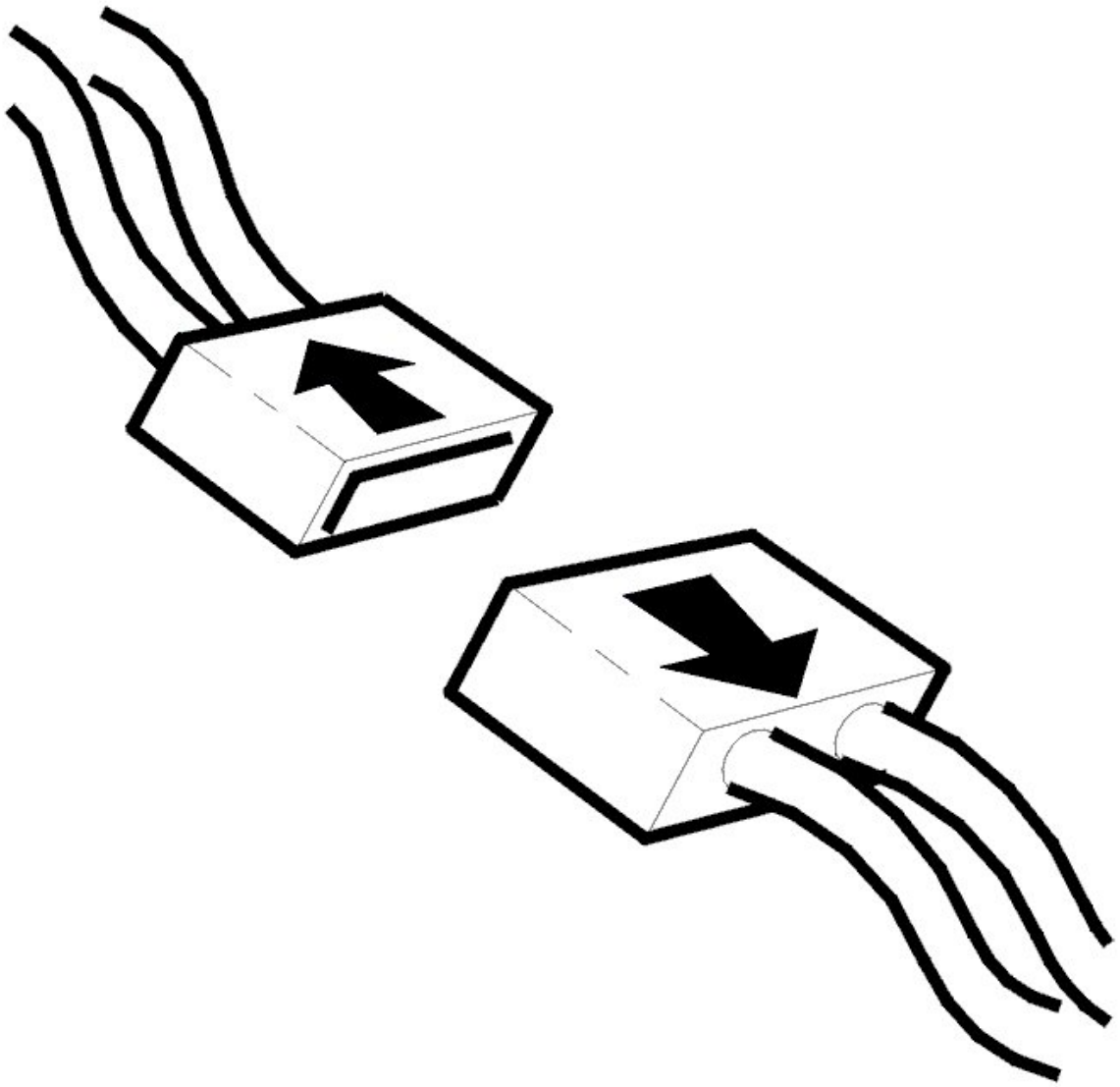
Yes - Verification

No - Checking the power supply

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking the power supply



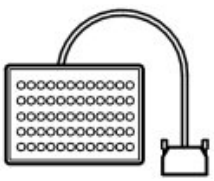


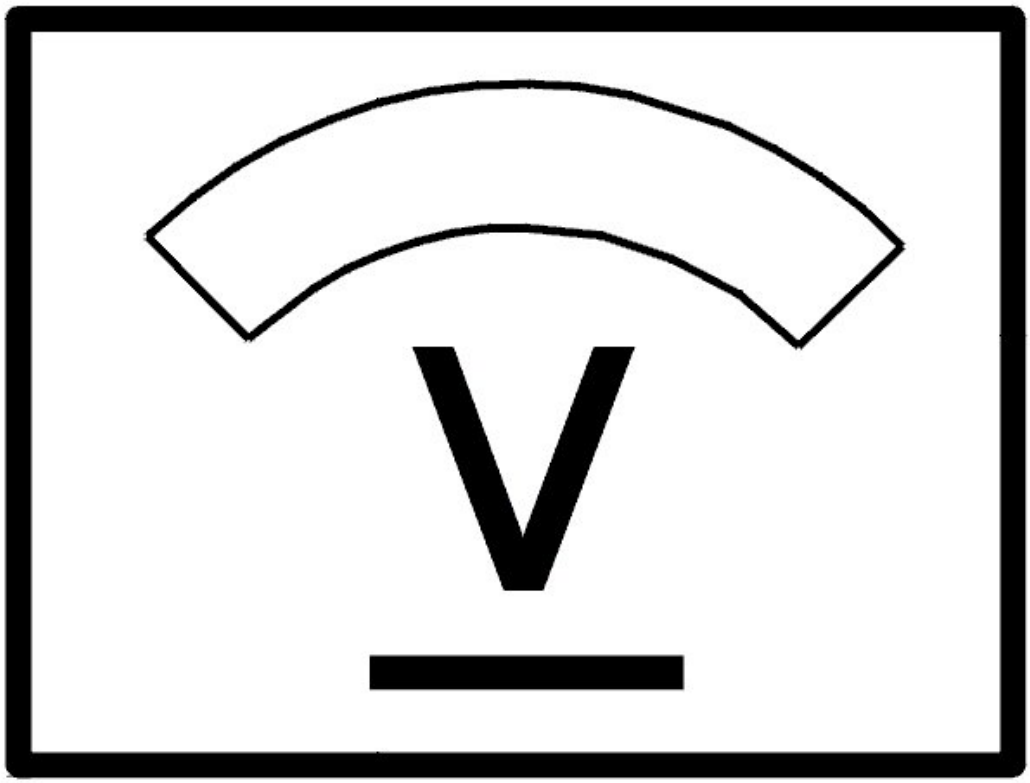
- Ignition off
- The breakout box connected
- Disconnect the connector for the active yaw control sensor
- Ignition on.

Connect a voltmeter to terminals #6 (#A6) and #39 (#A39) on the breakout box.
The voltage must be normal system voltage.
Replace the active yaw control sensor if the voltage is OK.
Replace the control module if the voltage is incorrect.

Other information

- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- To access or replace the brake control module (BCM), see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.





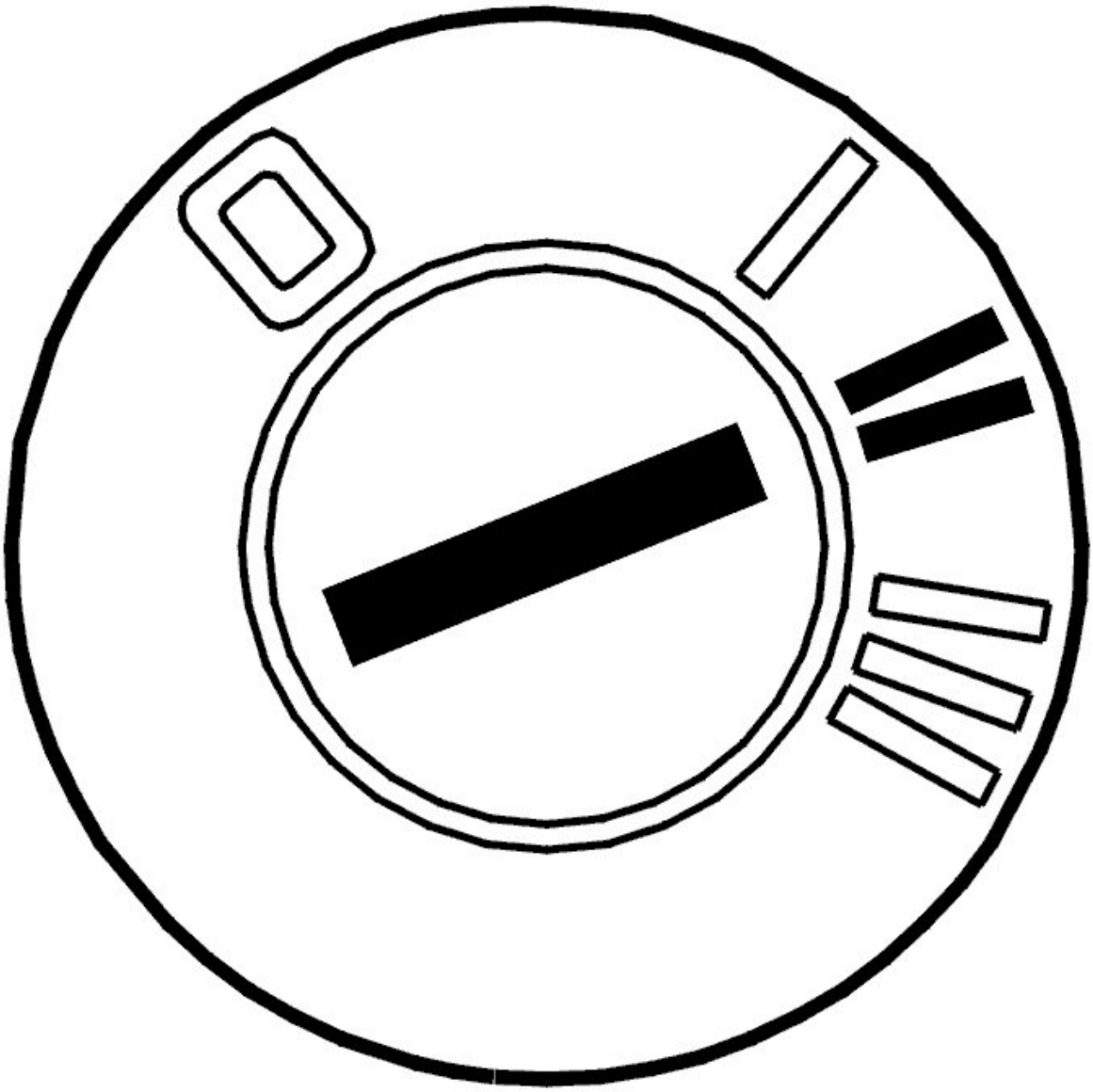
Continue - Verification

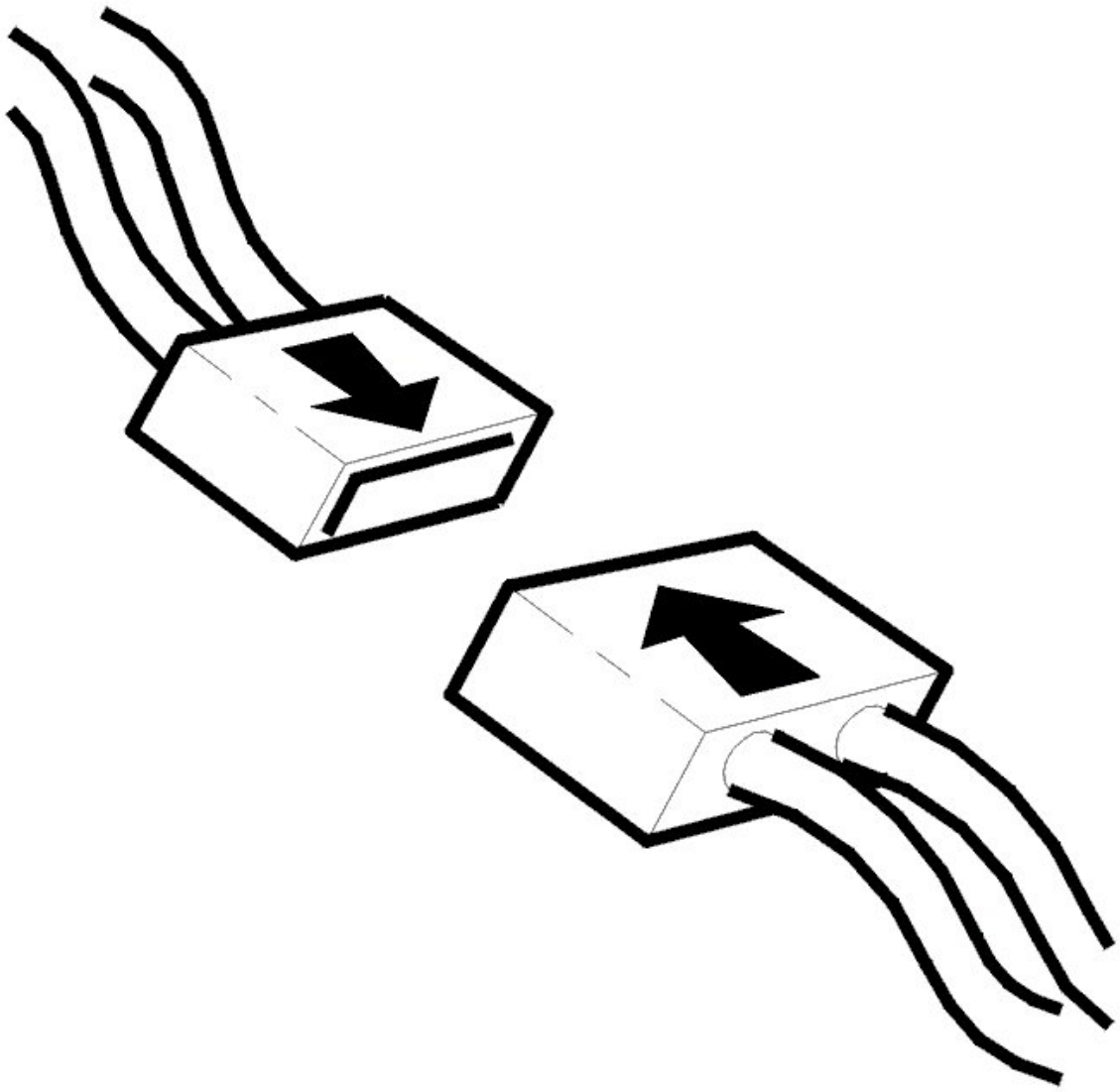
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

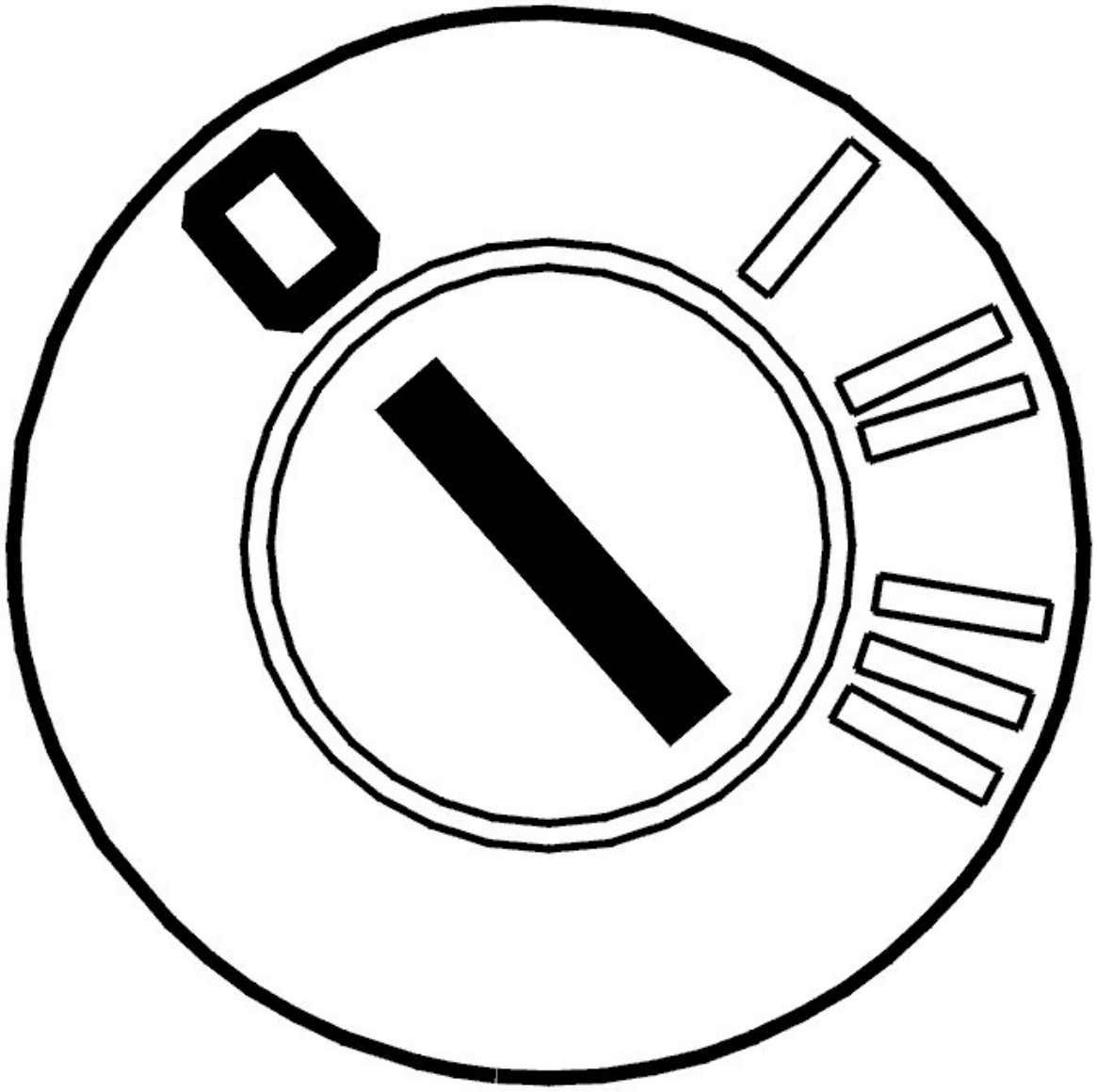
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status of the diagnostic trouble code (DTC)

Intermittent fault

Hint: The status of the diagnostic trouble code (DTC) indicates that the control module has previously registered a fault but that the fault is not now active.



- Ignition off.

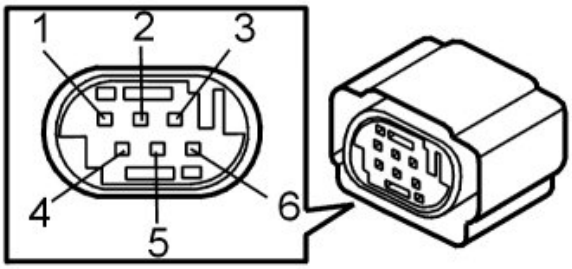
Check the connectors for the brake control module (BCM) and the active yaw control sensor. Check for contact resistance and oxidation.
Check the wiring between the connector for the active yaw control sensor:

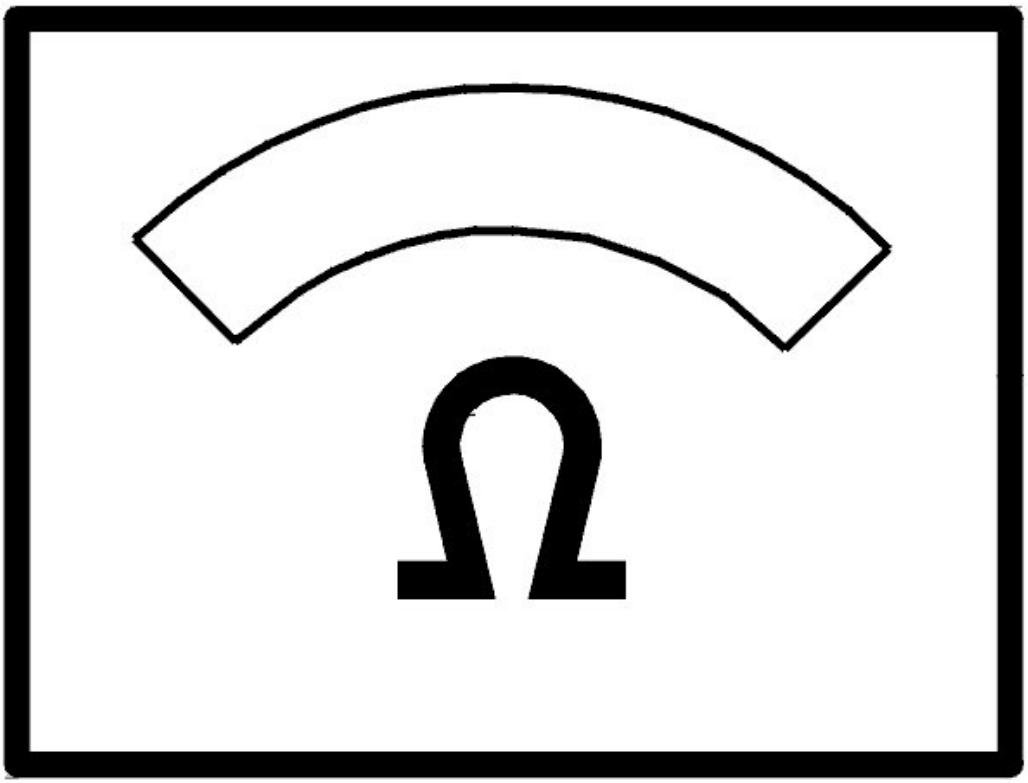
- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

check for an intermittent open-circuit or short-circuit to ground.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access and replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the status of the diagnostic trouble code (DTC)

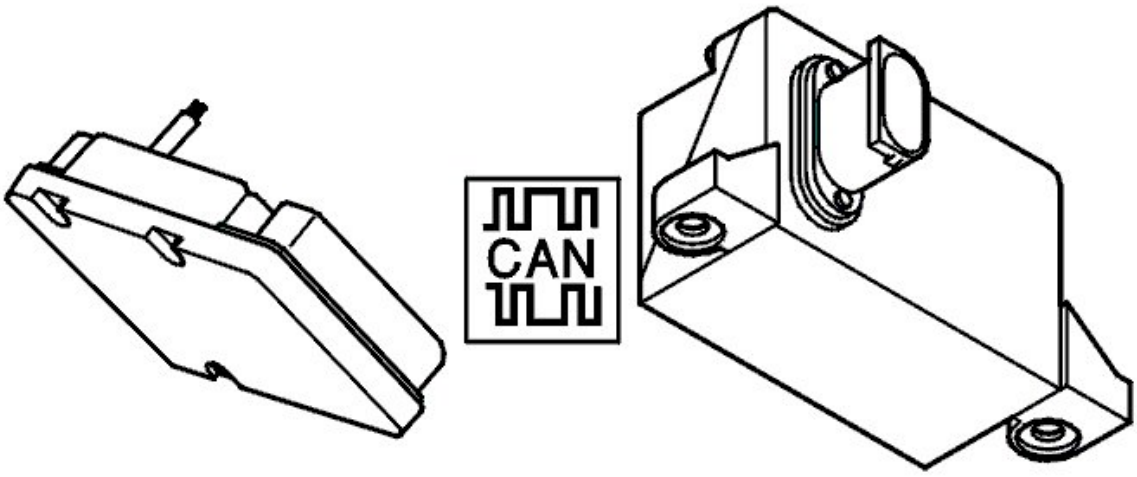
FAULT-TRACING FAILED - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor. This in turn is connected to the brake control module (BCM) via its own Control area network (CAN) cable. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the car's lateral angle of lean.
Diagnostic trouble code (DTC) BCM-0121, BCM-0125, BCM-0127 or BCM-0129 is stored, depending on the sensor, if the control module registers that the signal from any of the sensors is outside its permitted range.

- BCM-0121: Yaw rate sensor
- BCM-0125: Lateral acceleration sensor
- BCM-0127: Tilt angle sensor
- BCM-0129: Accelerometer.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC is blocked (cars equipped with RSC only).

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Interference or noise on the wiring has disrupted the active yaw control sensor calculations
- The power supply to the active yaw control sensor is too low
- Incorrect wheel alignment
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

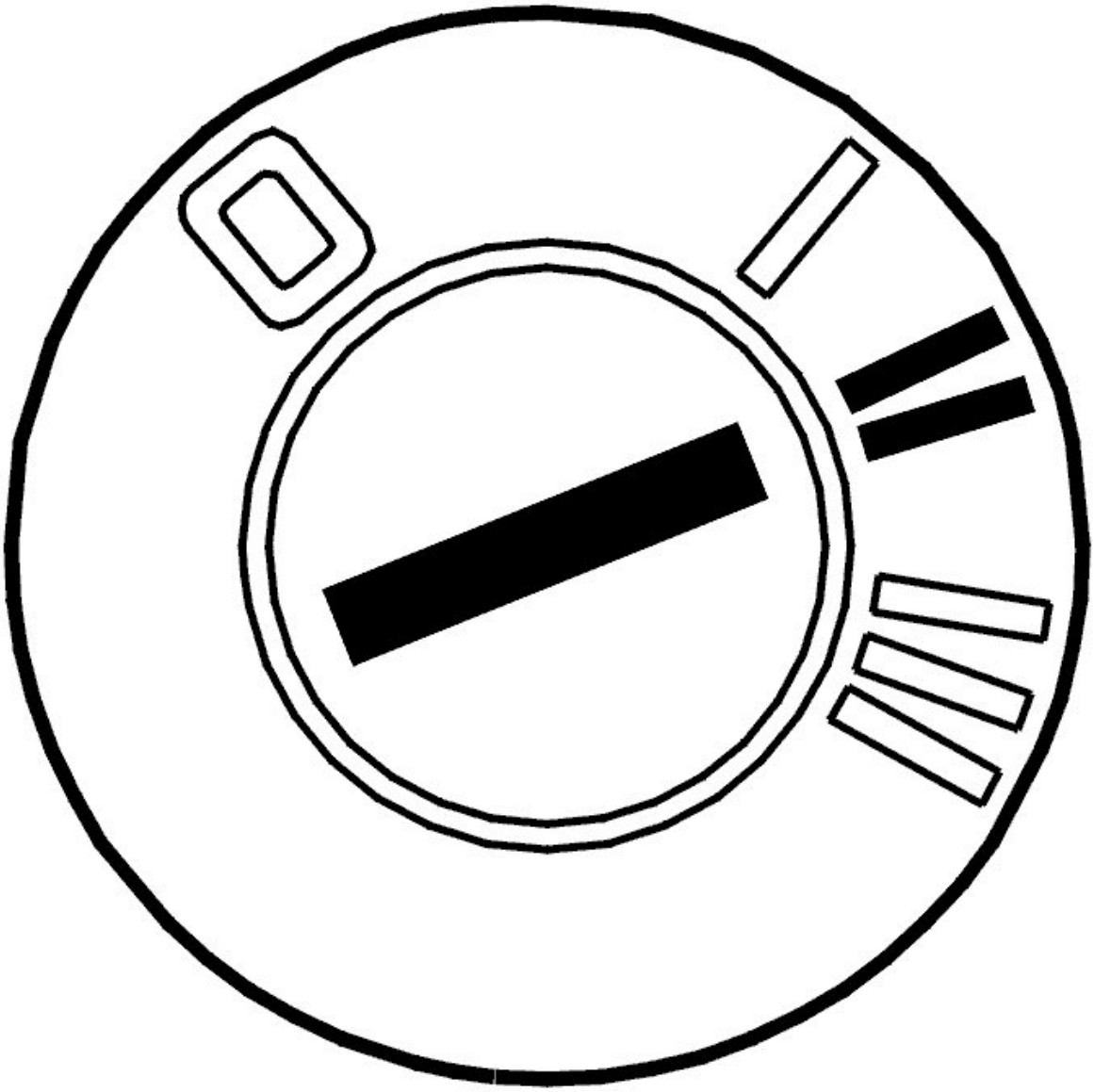
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors

Note! If diagnostic trouble codes (DTCs) other than BCM-0121, BCM-0125, BCM-0127 or BCM-0129 are stored in the brake control module (BCM), select cancel and fault trace these diagnostic trouble codes (DTCs) first.

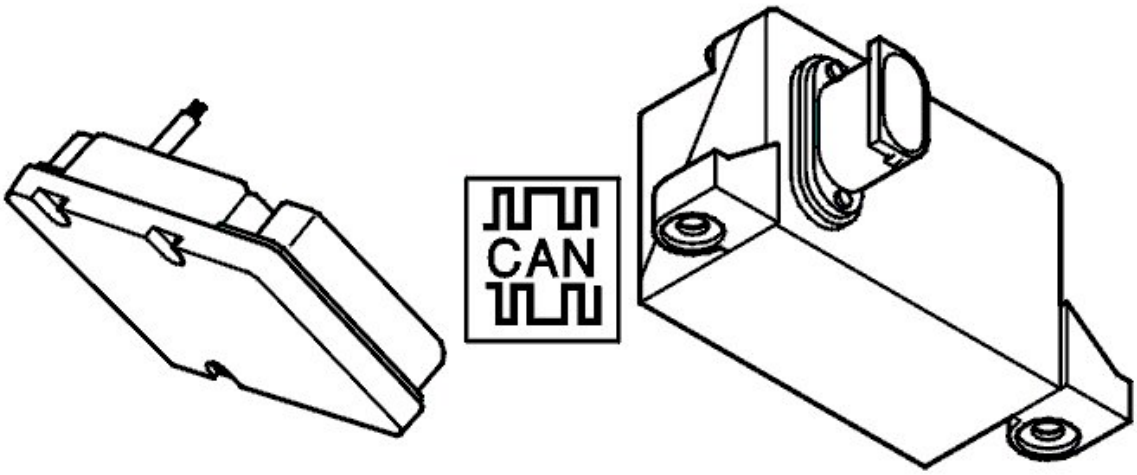


- Ignition off
- Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation
- Ensure that no sources of interference, such as a mobile telephone or radio receiver, are in the vicinity of the active yaw control sensor
- Test drive the car. See the test drive schedule. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Read off diagnostic trouble codes (DTCs).

If the diagnostic trouble code (DTC) status is intermittent the cause of the fault was probably either contact resistance in the control module or active yaw control sensor connectors, or a source of interference too close to the sensor.

Other information

- To remove the connector for the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- To remove the brake control module (BCM) connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM).

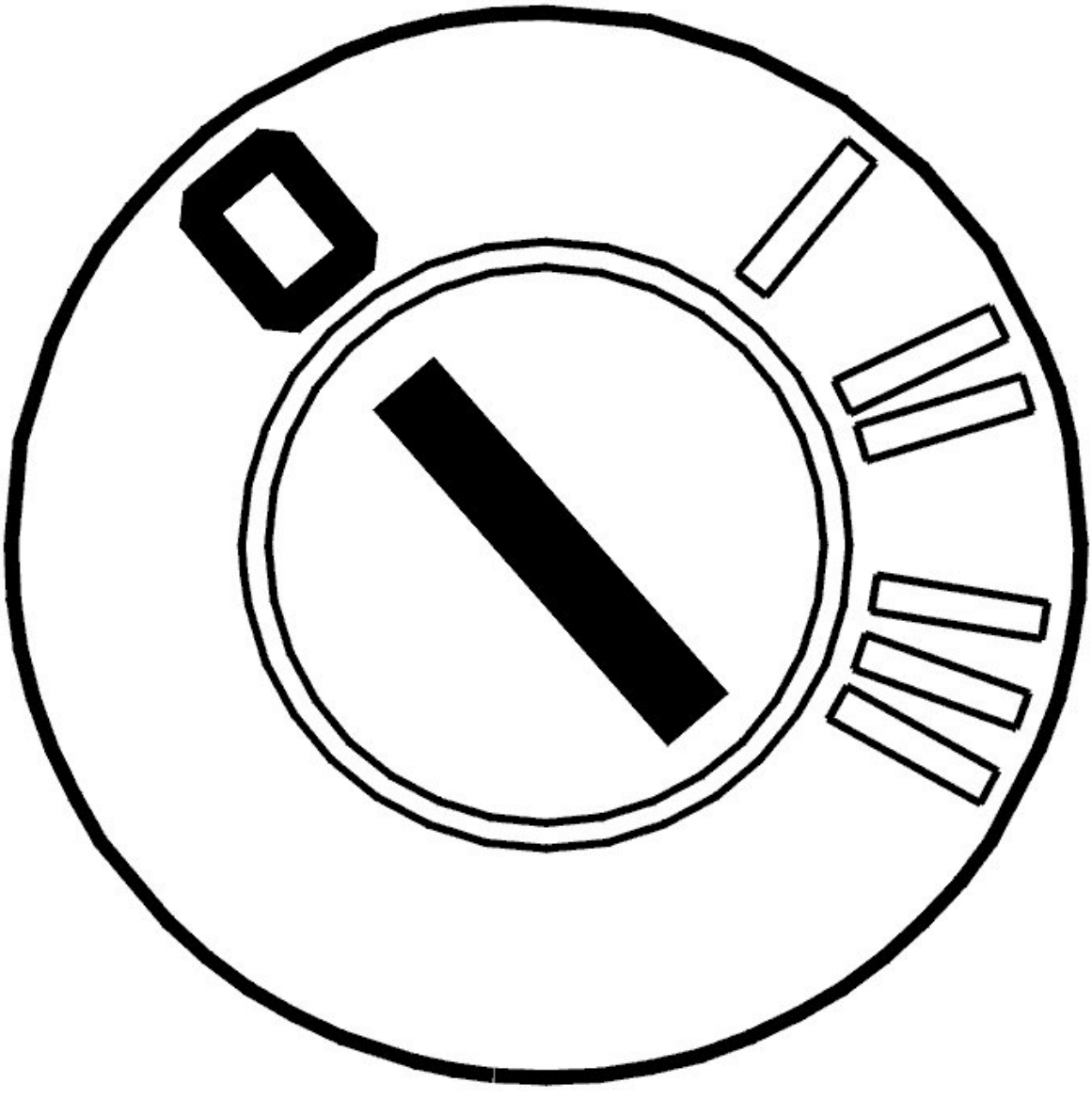


Was the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking the wiring

No - Fault Found

Checking the wiring



- Ignition off.

Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation.
Check the wiring between the connector for the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

Check for an open-circuit.
Check the wheel alignment.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- To check the wheel alignment, see Wheel alignment, checking / adjusting See: Maintenance/Alignment/Service and Repair
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

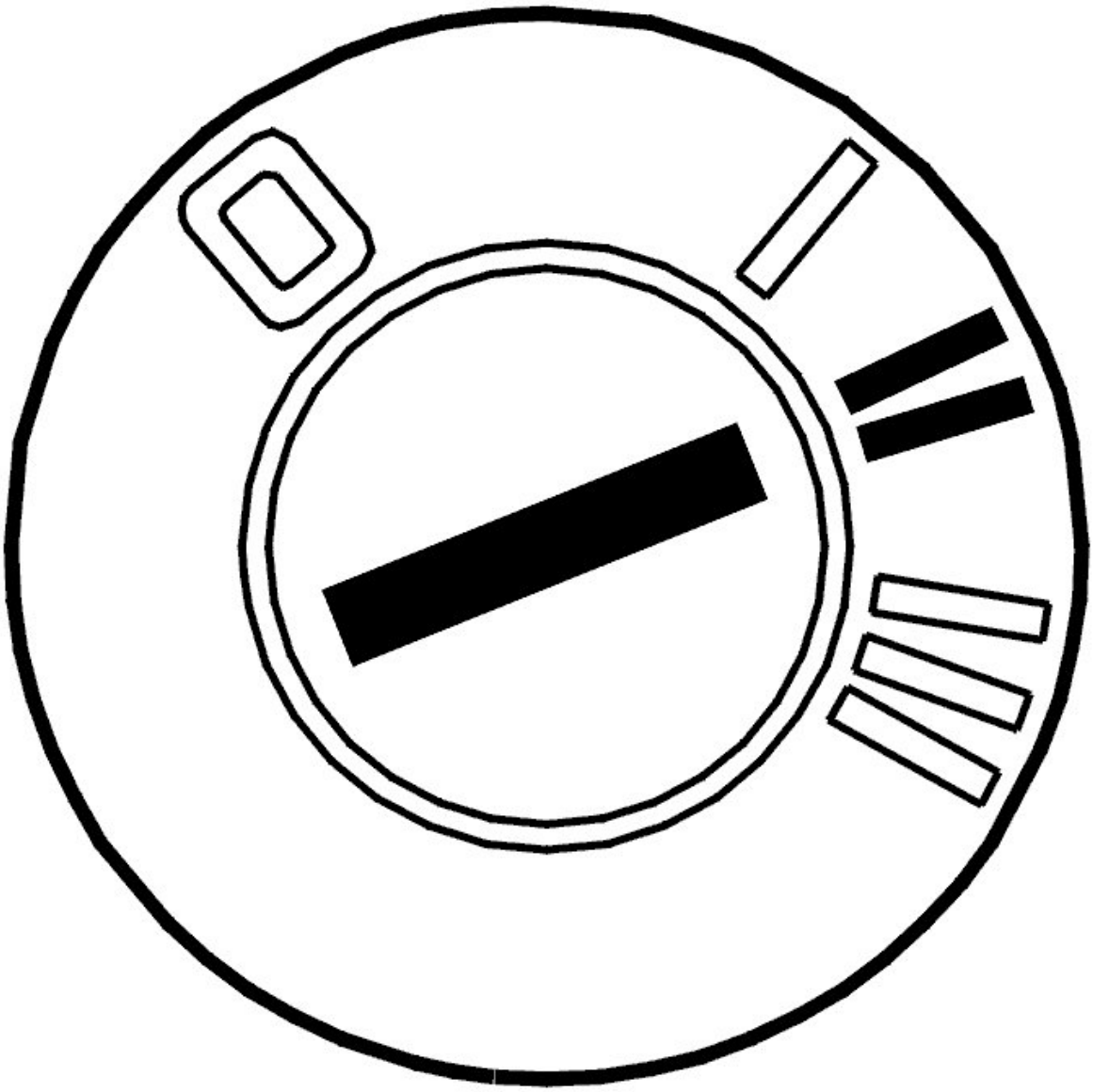
Continue - Verification

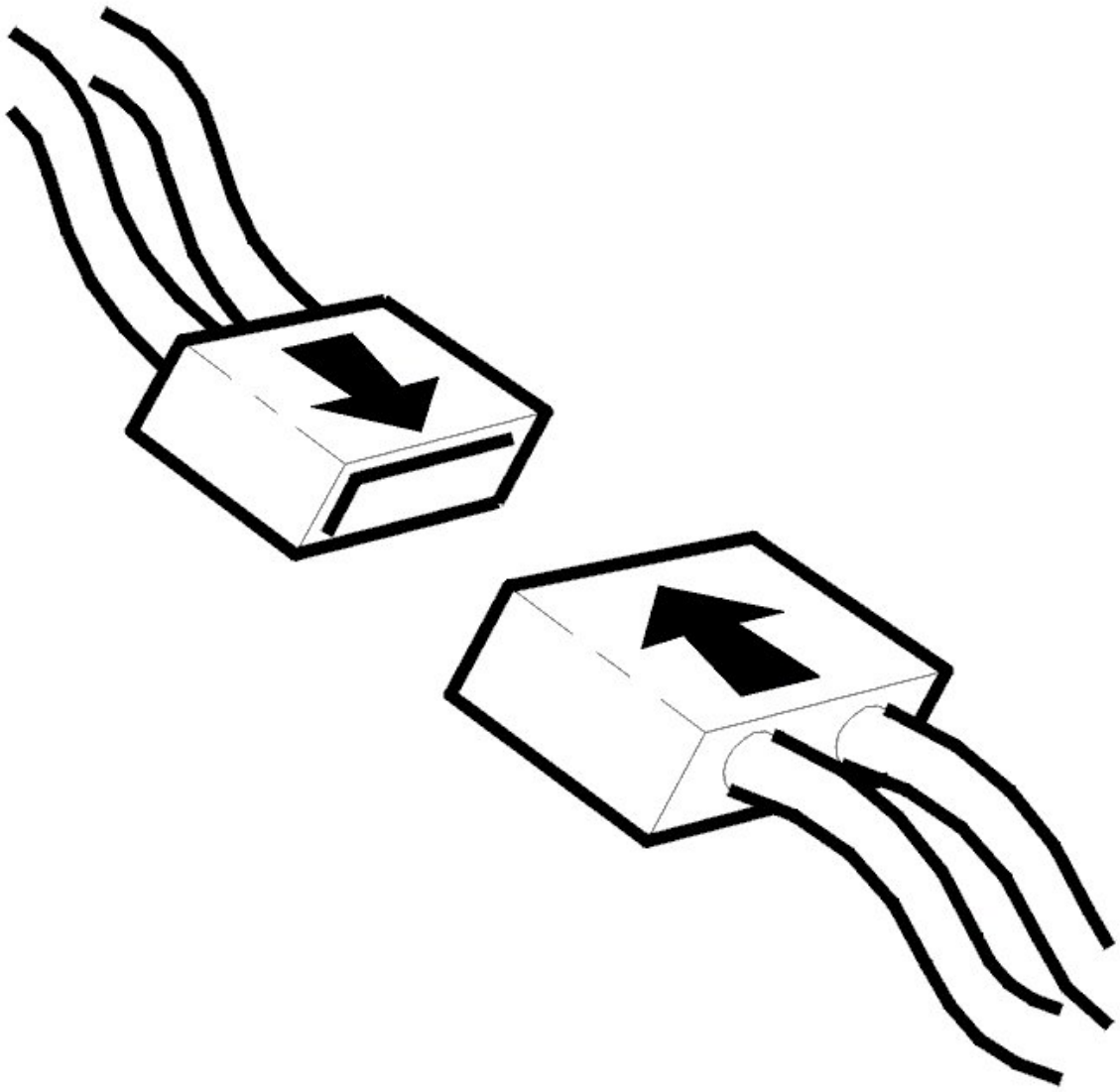
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

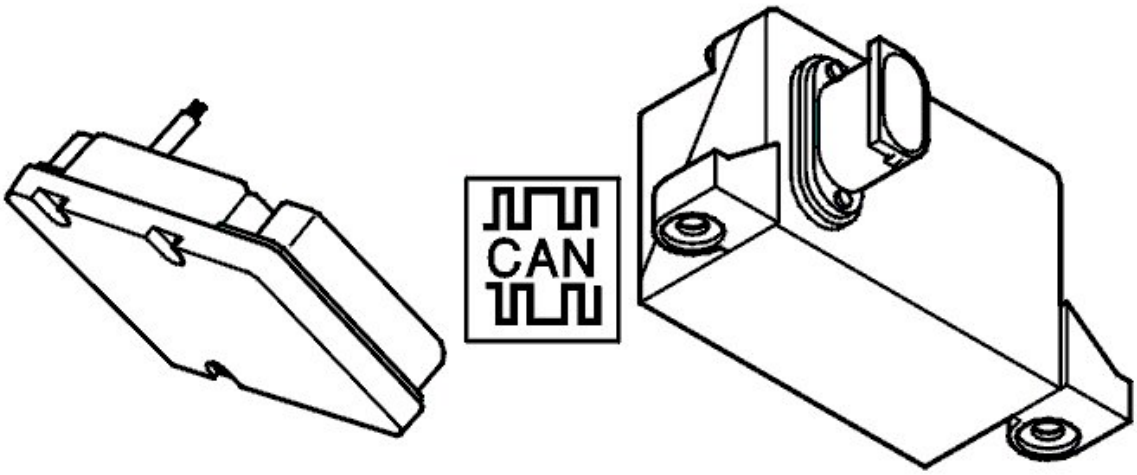
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The active yaw control sensor is supplied with 12 V. The signal voltage of the sensors to the brake control module (BCM) is approximately 2.5 V for a stationary car. The control module compares the voltage with a reference value.
Diagnostic trouble code (DTC) BCM-0123 is stored if the voltage is outside the reference value or if an internal fault in the active yaw control sensor is registered.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Signals which disrupt the active yaw control sensor
- Voltage to the active yaw control sensor is too low
- Internal fault in the active yaw control sensor.

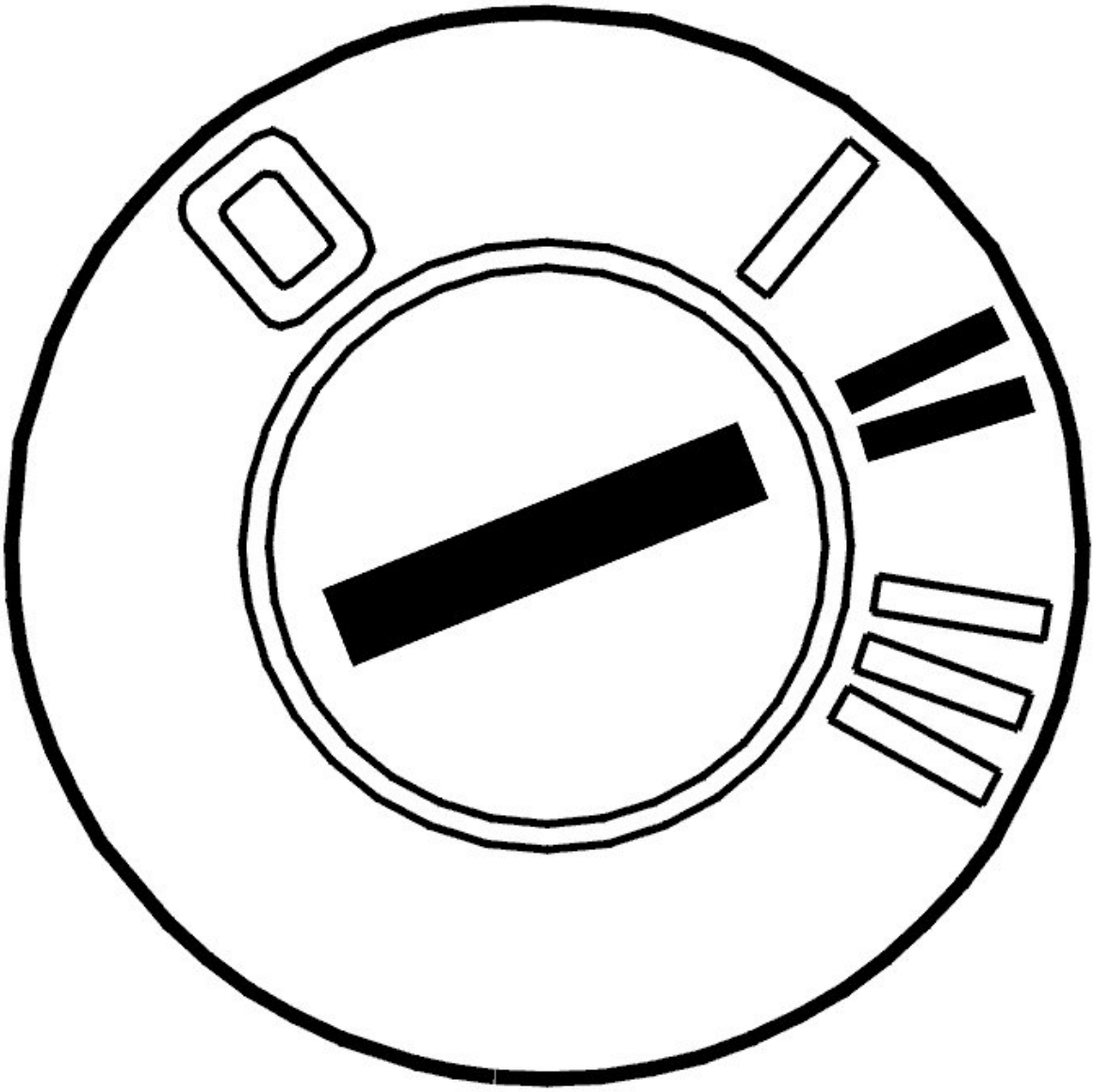
Fault symptom[s]

- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Internal Fault

Internal fault

Checking the present value of the sensors

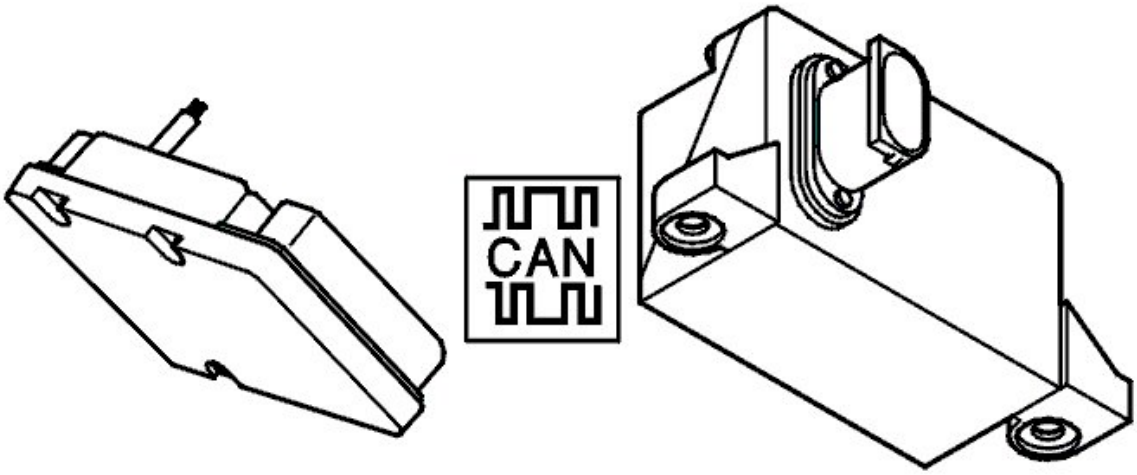


- Ignition off
- Check the connectors for the brake control module (BCM) and the active yaw control (AYC) sensor. Check for contact resistance. Check for oxidation
- Ignition on
- Read off the present value.

Check the read off value for the relevant component against the value in the table.

Component	Value
Yaw rate sensor	-6°/s - +6°/s
Lateral accelerometer	-1.7 m/s^2 - +1.7 m/s^2
Accelerometer	-1.7 m/s^2 - +1.7 m/s^2

Note! The accelerometer can only be read off if the car is four wheel drive.

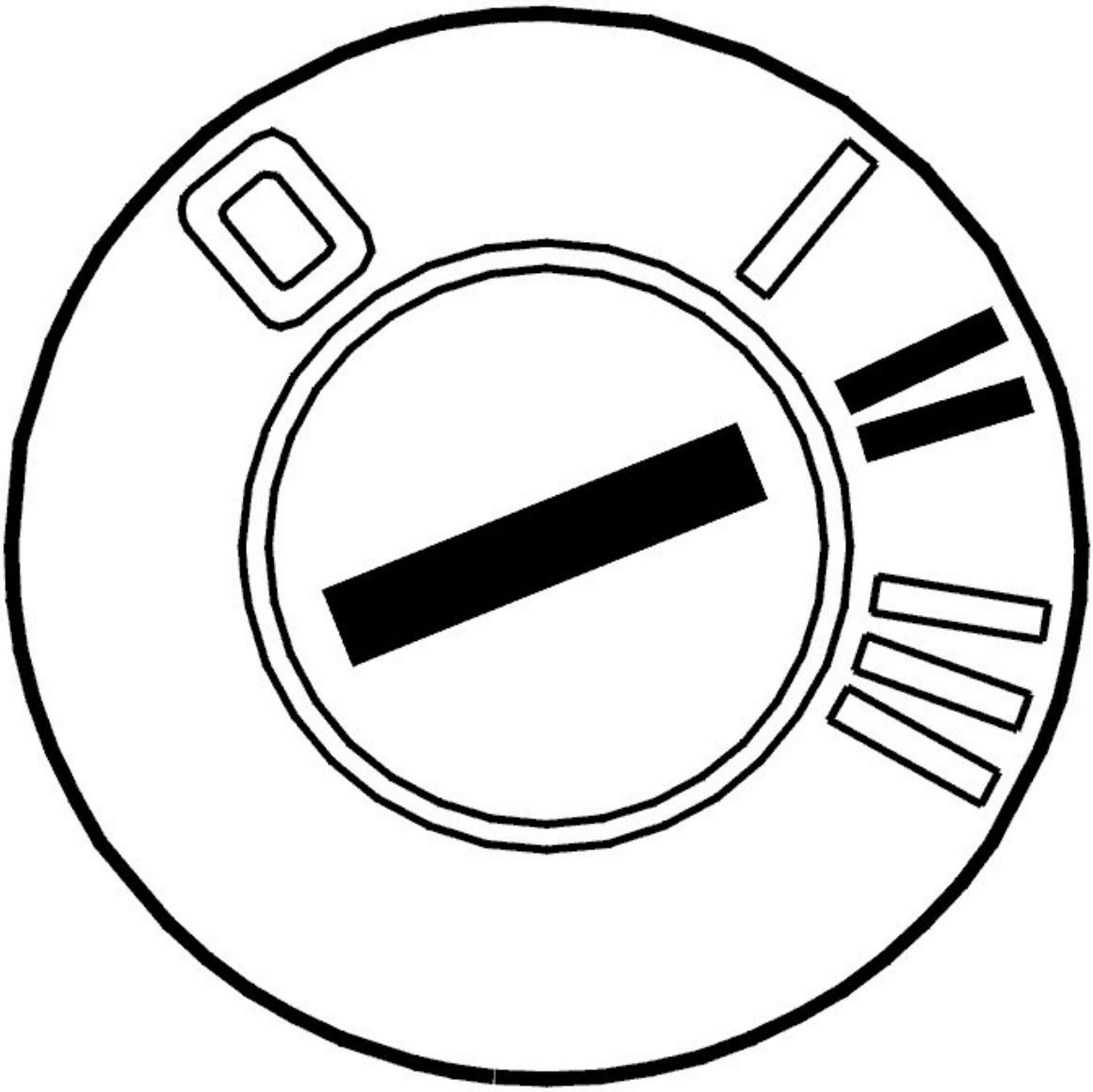


Are the present values OK?

Yes - Fault Found

No - Checking the power supply

Checking the power supply



- Ignition off
- Connect the breakout box to the brake control module (BCM)
- Ignition on.

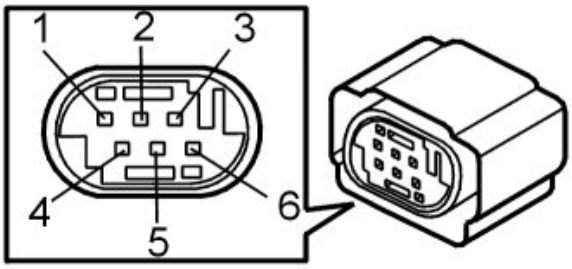
Check the power supply to the active yaw control sensor by connecting a voltmeter between terminals #6 (#A6) and #39 (#A39) on the breakout box. The voltage must be normal system voltage.
Replace the control module if the voltage is incorrect.
If the voltage is OK, check the power supply cables between the active yaw control sensor (AYC):

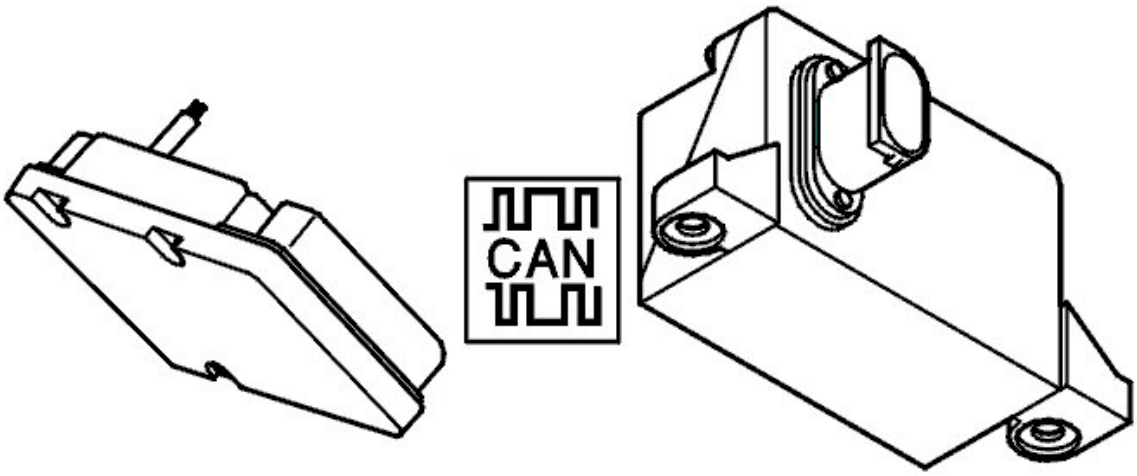
- terminal #3 and control module terminal #6 (#A6)
- terminal #5 and control module terminal #39 (terminal #A39).

check for an open-circuit.
Replace the active yaw control sensor if the wiring is OK.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- To access and replace the active yaw control sensor (AYC), see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





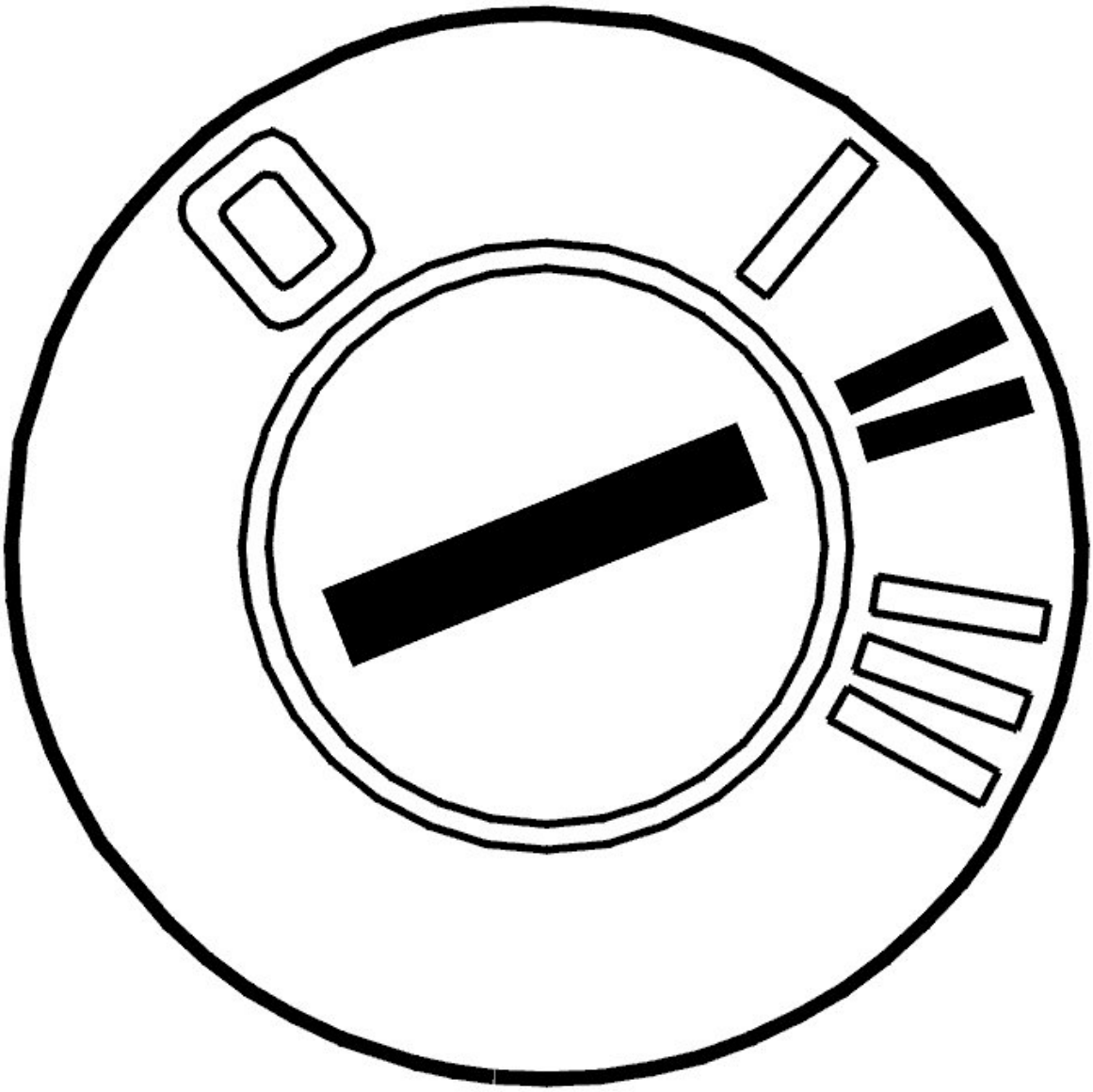
Continue - Verification

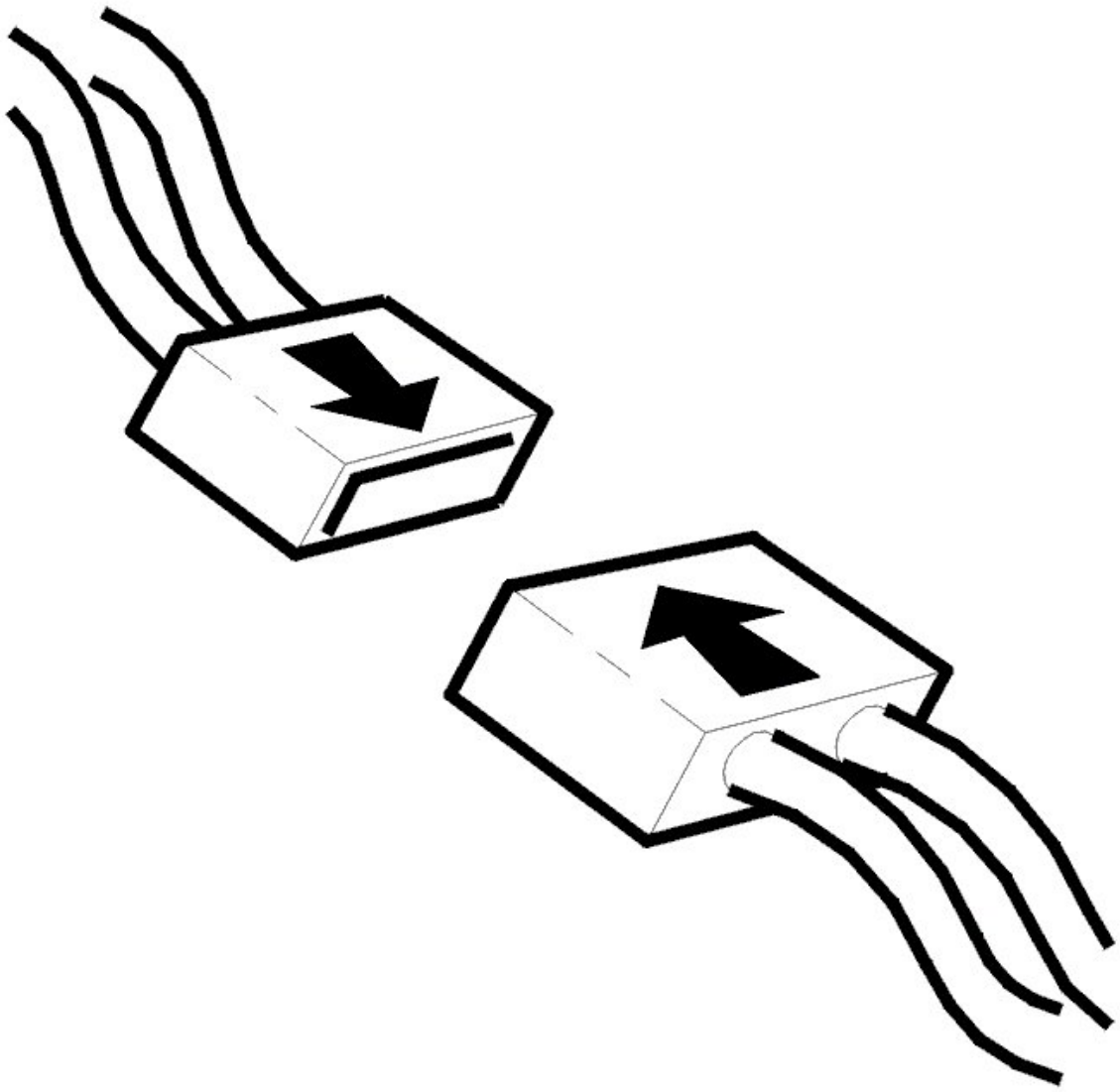
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

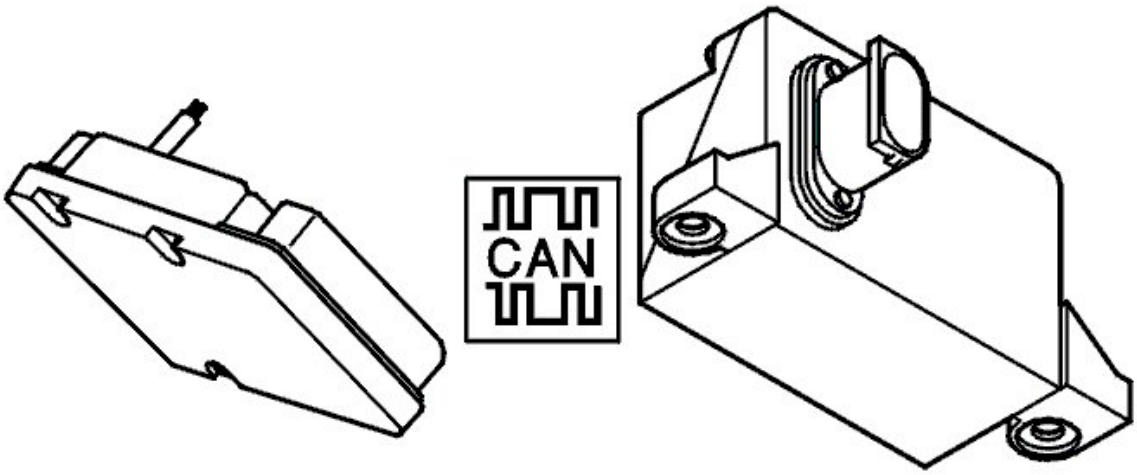
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the present value of the sensors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor. This in turn is connected to the brake control module (BCM) via its own Control area network (CAN) cable. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the car's lateral angle of lean.
Diagnostic trouble code (DTC) BCM-0121, BCM-0125, BCM-0127 or BCM-0129 is stored, depending on the sensor, if the control module registers that the signal from any of the sensors is outside its permitted range.

- BCM-0121: Yaw rate sensor
- BCM-0125: Lateral acceleration sensor
- BCM-0127: Tilt angle sensor
- BCM-0129: Accelerometer.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC is blocked (cars equipped with RSC only).

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Interference or noise on the wiring has disrupted the active yaw control sensor calculations
- The power supply to the active yaw control sensor is too low
- Incorrect wheel alignment
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

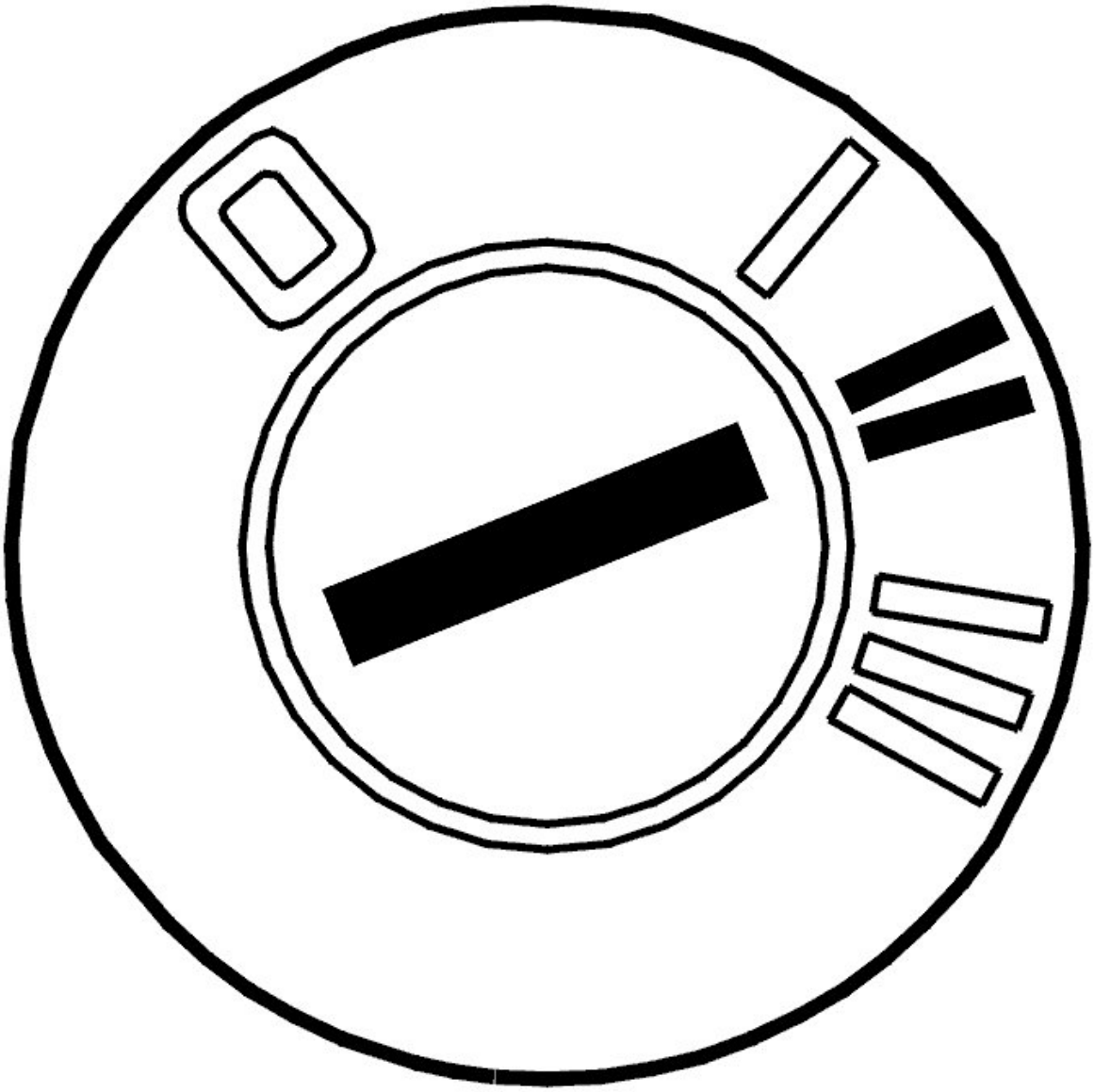
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors

Note! If diagnostic trouble codes (DTCs) other than BCM-0121, BCM-0125, BCM-0127 or BCM-0129 are stored in the brake control module (BCM), select cancel and fault trace these diagnostic trouble codes (DTCs) first.

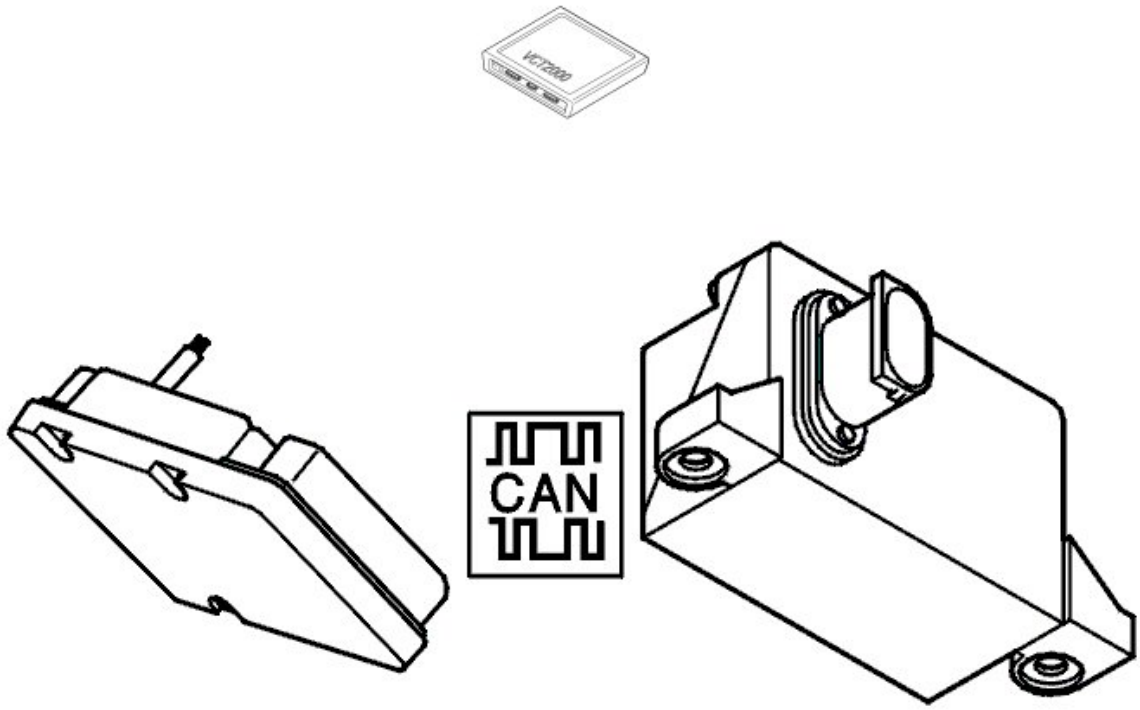


- Ignition off
- Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation
- Ensure that no sources of interference, such as a mobile telephone or radio receiver, are in the vicinity of the active yaw control sensor
- Test drive the car. See the test drive schedule. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module),

description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Read off diagnostic trouble codes (DTCs).

If the diagnostic trouble code (DTC) status is intermittent the cause of the fault was probably either contact resistance in the control module or active yaw control sensor connectors, or a source of interference too close to the sensor.

Other information
- To remove the connector for the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- To remove the brake control module (BCM) connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM).

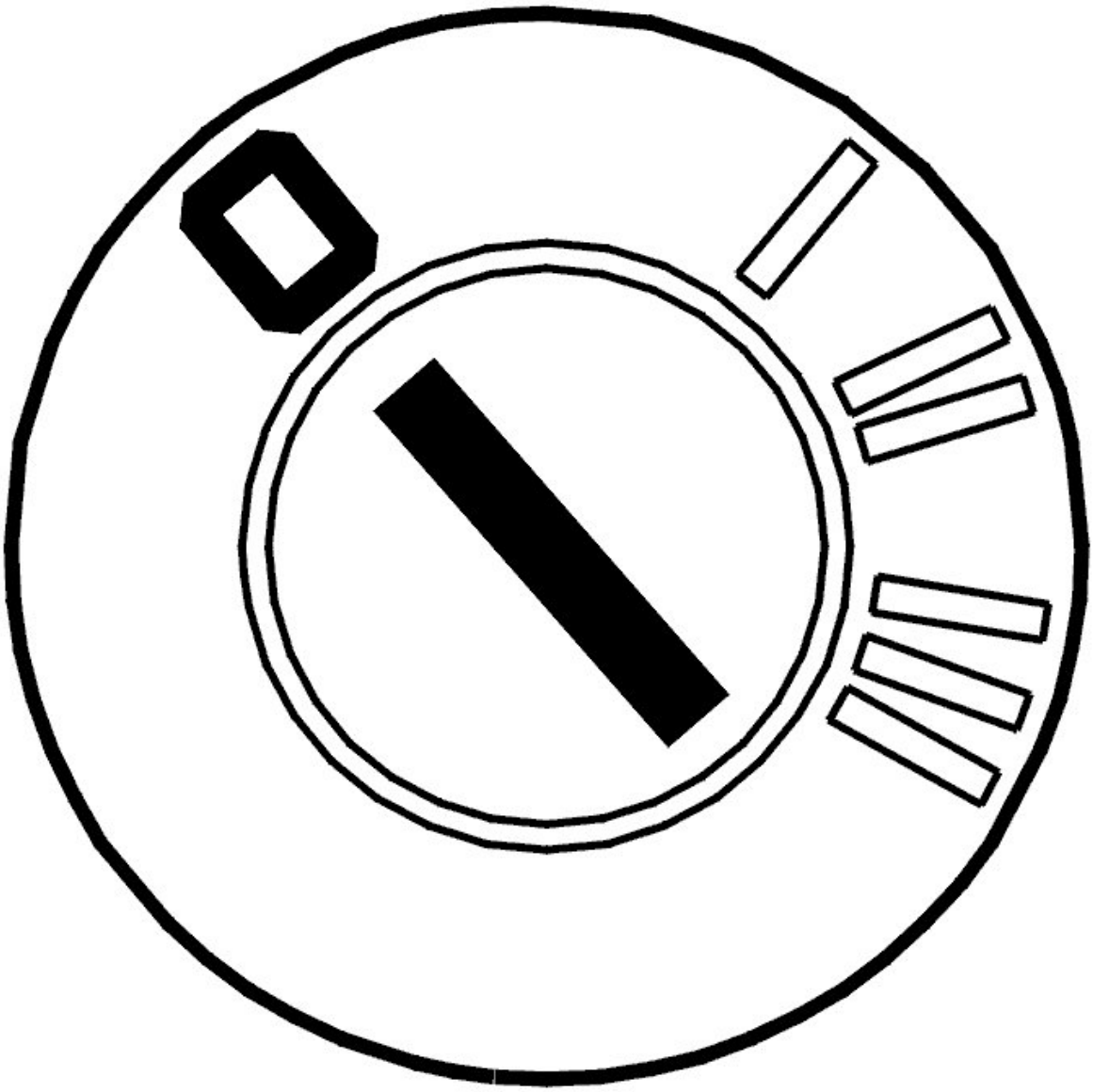


Was the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking the wiring

No - **Fault Found**

Checking the wiring



- Ignition off.

Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation.
Check the wiring between the connector for the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

Check for an open-circuit.
Check the wheel alignment.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- To check the wheel alignment, see Wheel alignment, checking / adjusting See: Maintenance/Alignment/Service and Repair
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

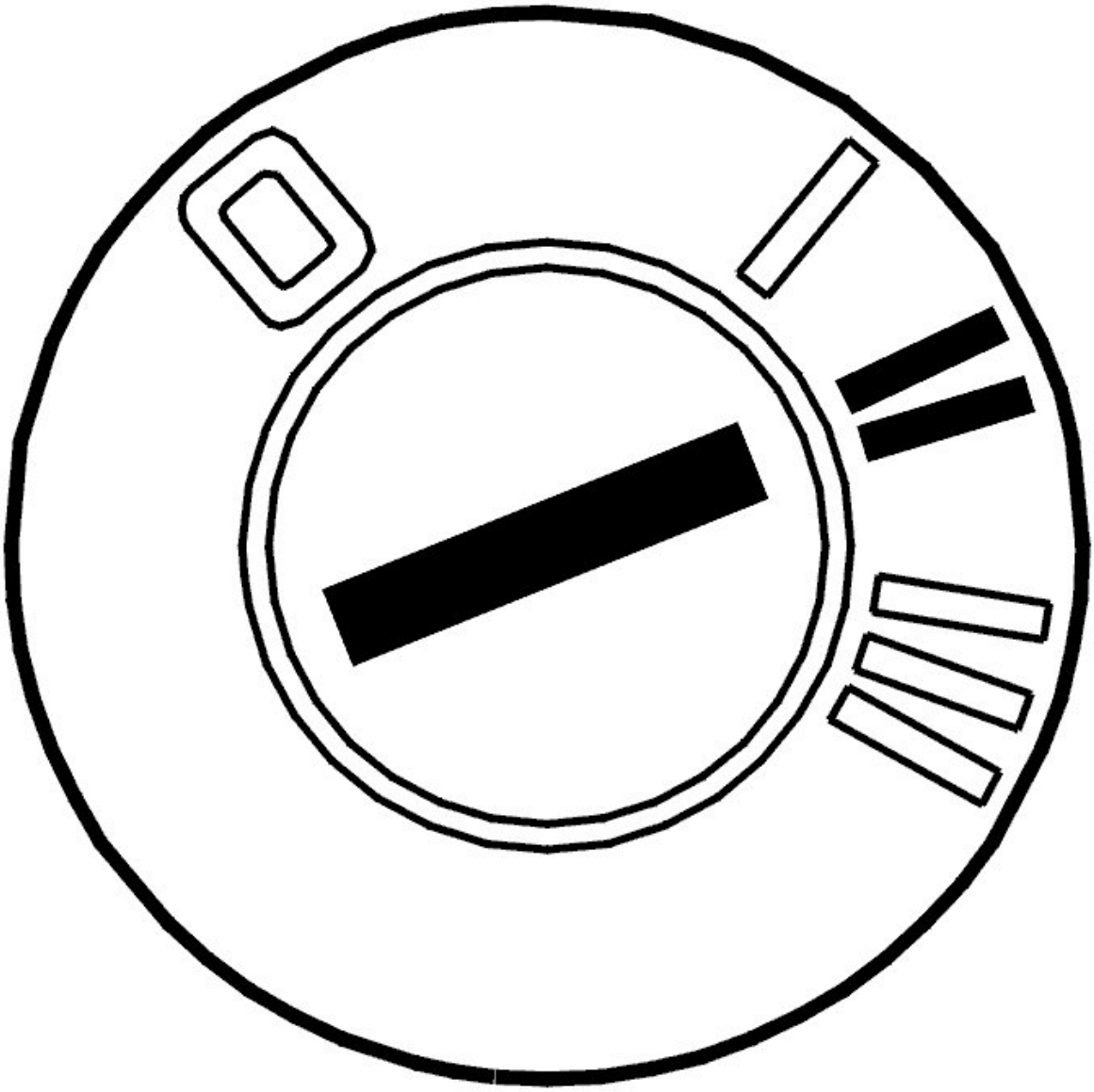
Continue - Verification

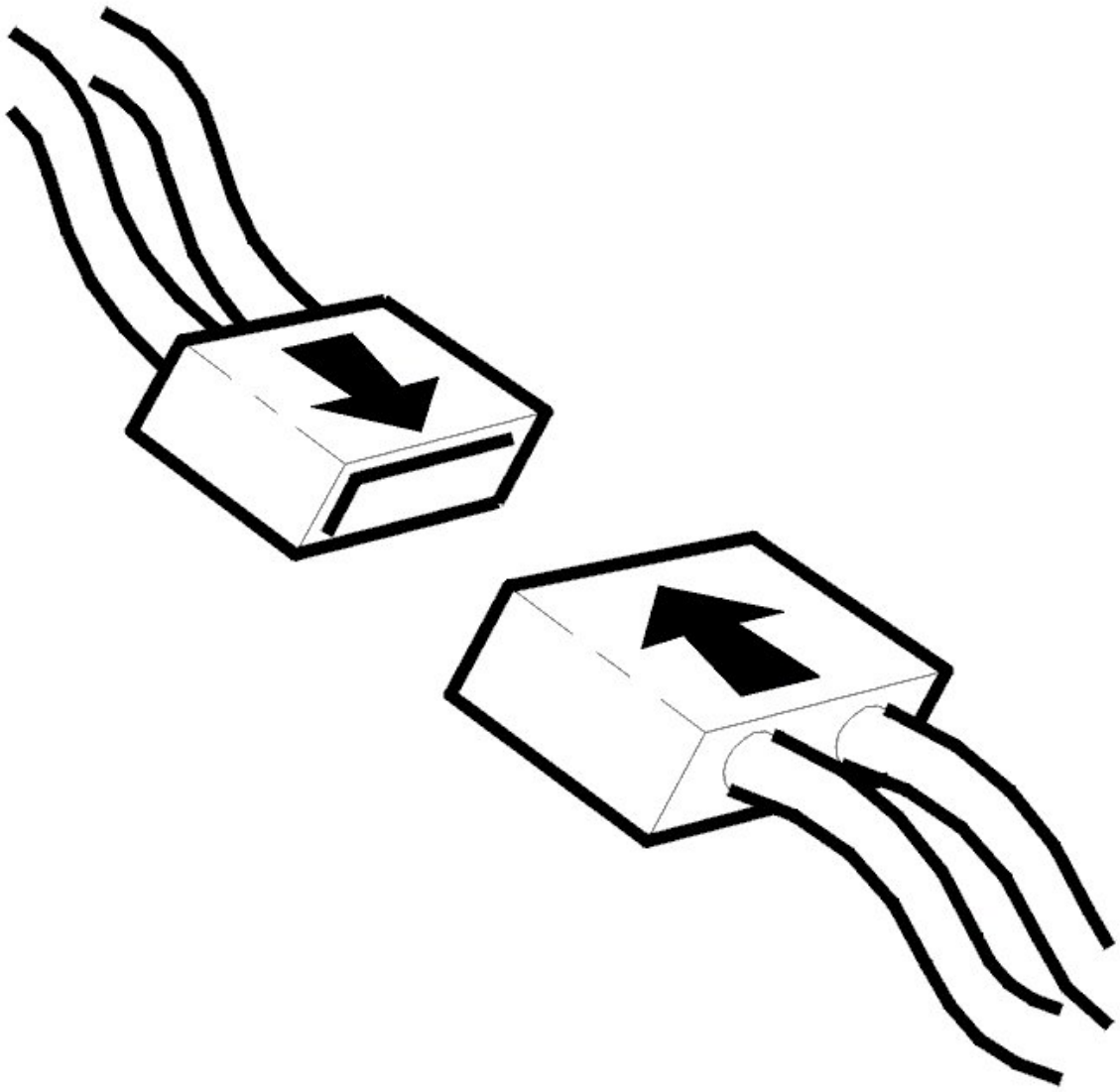
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

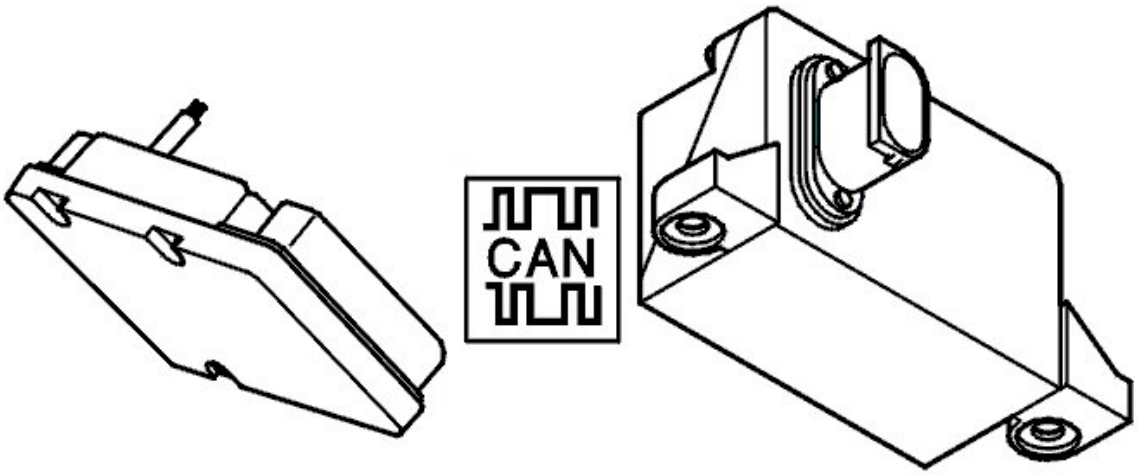
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor. This in turn is connected to the brake control module (BCM) via its own Control area network (CAN) cable. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the car's lateral angle of lean.
Diagnostic trouble code (DTC) BCM-0121, BCM-0125, BCM-0127 or BCM-0129 is stored, depending on the sensor, if the control module registers that the signal from any of the sensors is outside its permitted range.

- BCM-0121: Yaw rate sensor
- BCM-0125: Lateral acceleration sensor
- BCM-0127: Tilt angle sensor
- BCM-0129: Accelerometer.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC is blocked (cars equipped with RSC only).

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Interference or noise on the wiring has disrupted the active yaw control sensor calculations
- The power supply to the active yaw control sensor is too low
- Incorrect wheel alignment
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

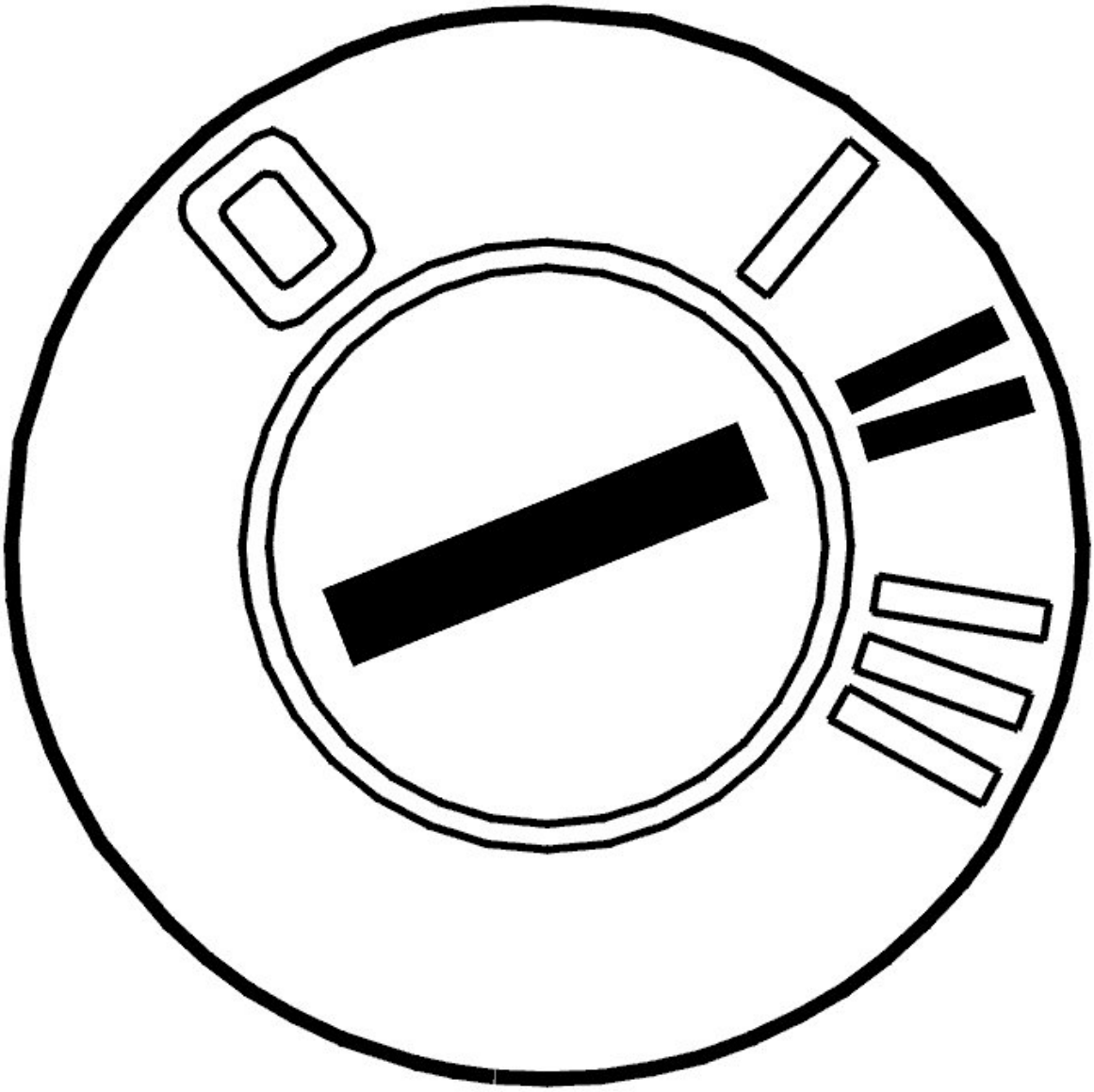
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors

Note! If diagnostic trouble codes (DTCs) other than BCM-0121, BCM-0125, BCM-0127 or BCM-0129 are stored in the brake control module (BCM), select cancel and fault trace these diagnostic trouble codes (DTCs) first.

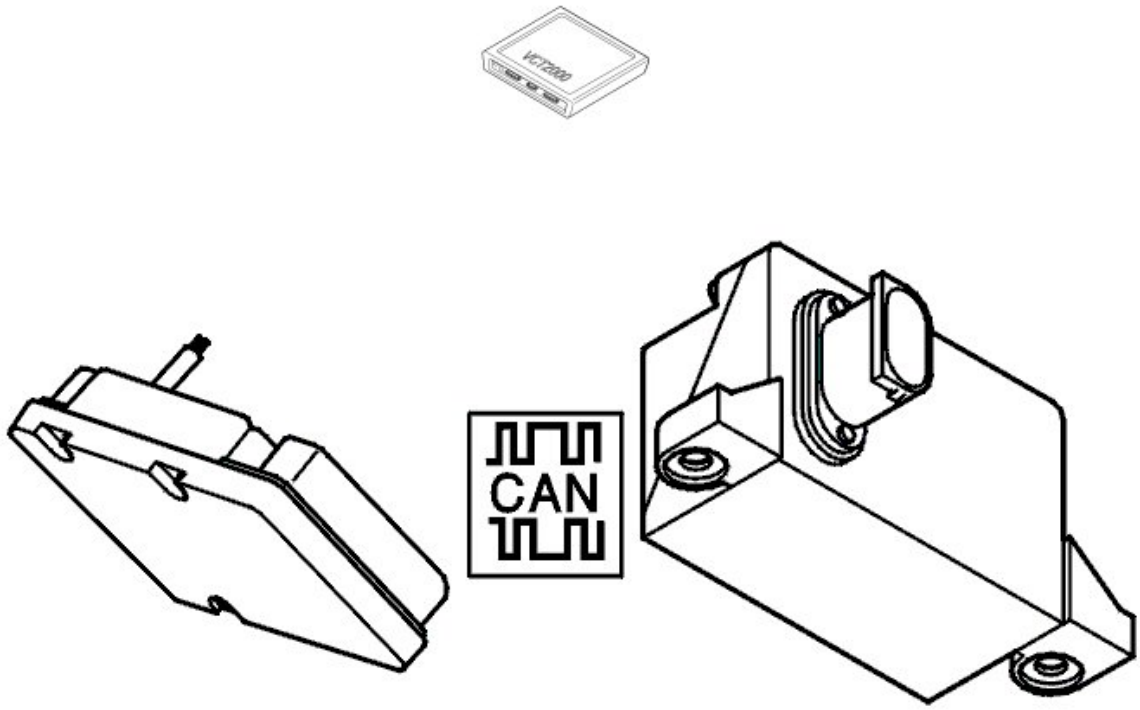


- Ignition off
- Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation
- Ensure that no sources of interference, such as a mobile telephone or radio receiver, are in the vicinity of the active yaw control sensor
- Test drive the car. See the test drive schedule. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module),

description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Read off diagnostic trouble codes (DTCs).

If the diagnostic trouble code (DTC) status is intermittent the cause of the fault was probably either contact resistance in the control module or active yaw control sensor connectors, or a source of interference too close to the sensor.

Other information
- To remove the connector for the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- To remove the brake control module (BCM) connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM).

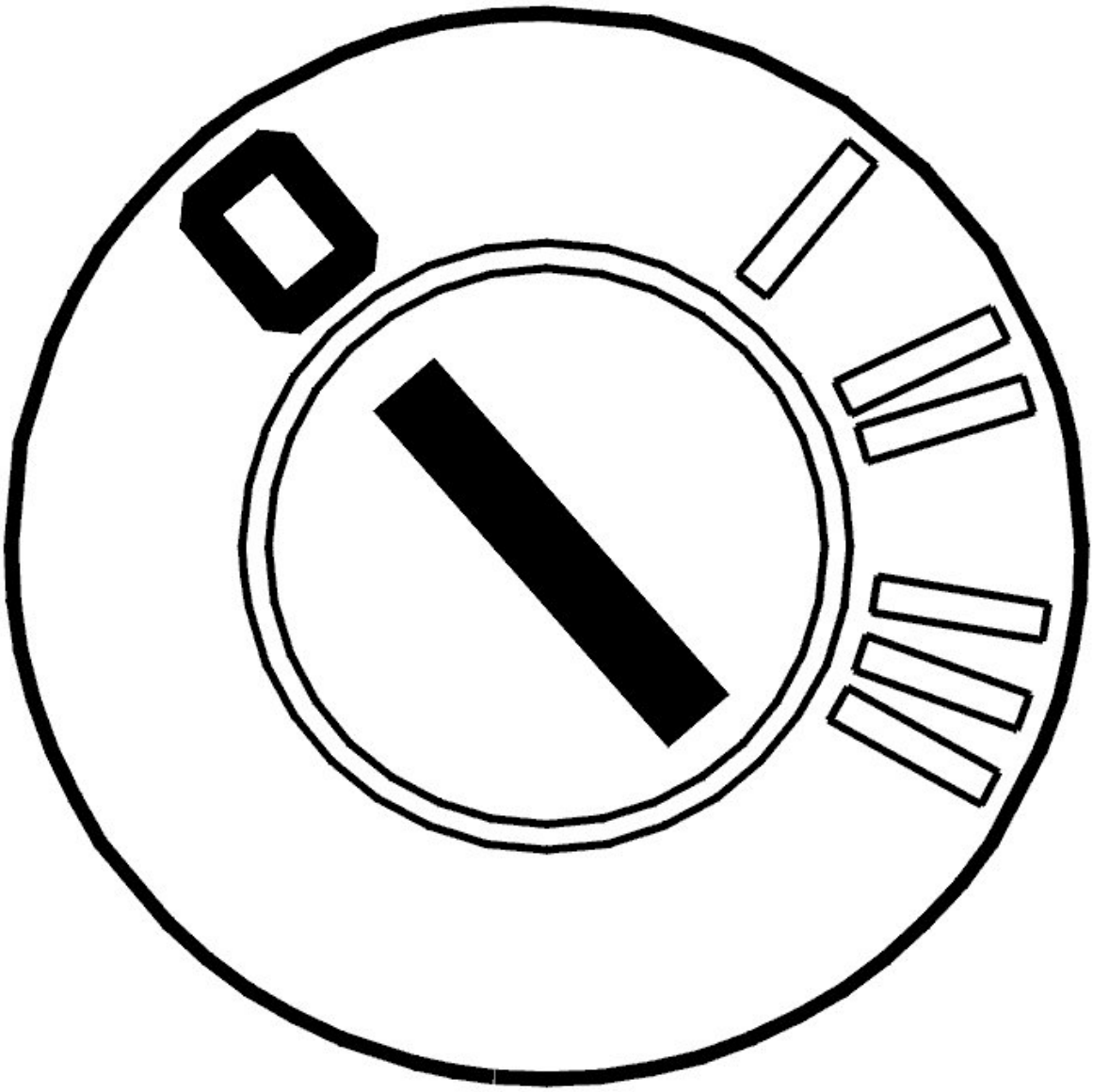


Was the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking the wiring

No - **Fault Found**

Checking the wiring



- Ignition off.

Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation.
Check the wiring between the connector for the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

Check for an open-circuit.
Check the wheel alignment.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- To check the wheel alignment, see Wheel alignment, checking / adjusting See: Maintenance/Alignment/Service and Repair
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

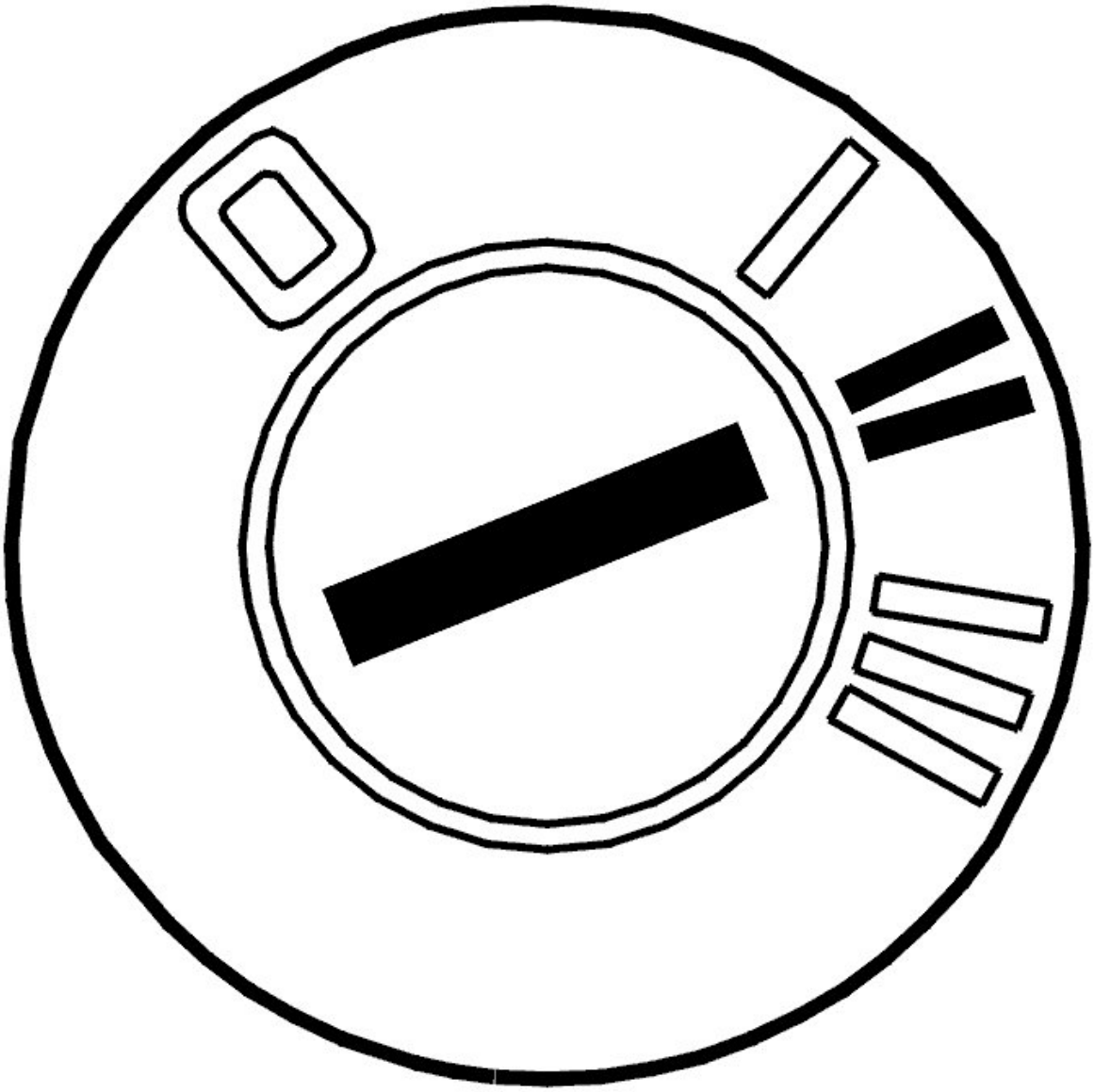
Continue - Verification

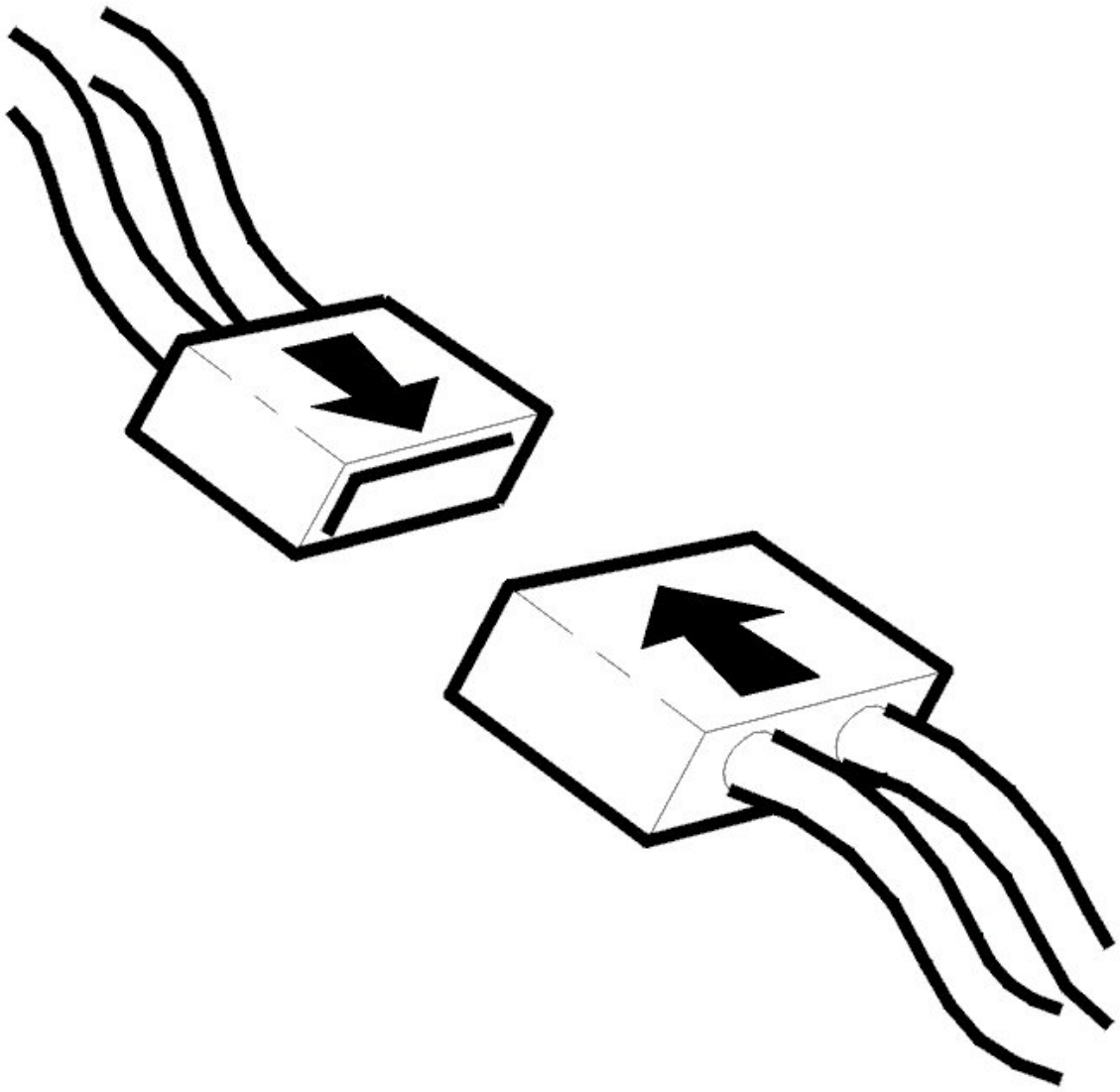
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

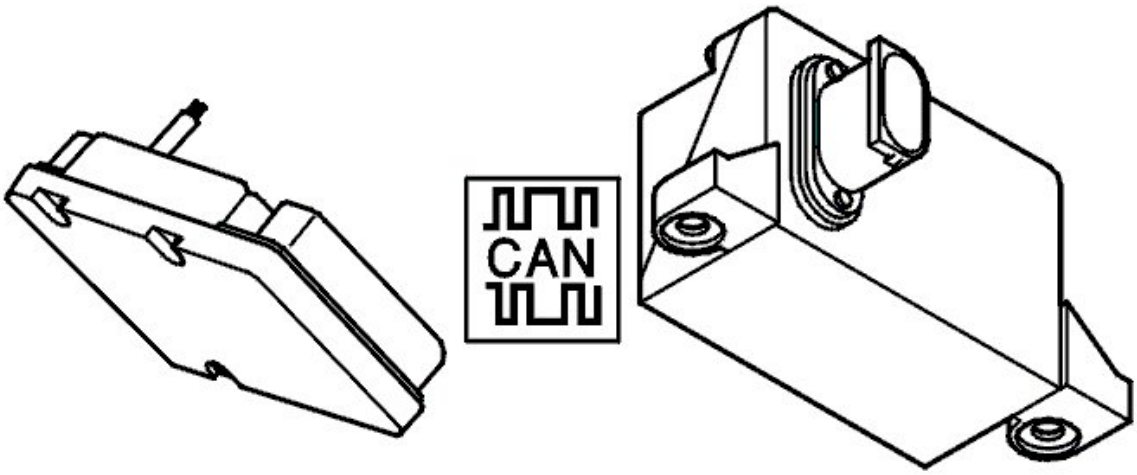
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

The yaw rate sensor, lateral accelerometer, accelerometer (only AWD) and angle of lean sensor (only RSC) are integrated in the active yaw control sensor. This in turn is connected to the brake control module (BCM) via its own Control area network (CAN) cable. The sensors transmit information to the brake control module (BCM) indicating the size of the yaw angle, the lateral acceleration of the car, the forward acceleration and the car's lateral angle of lean.
Diagnostic trouble code (DTC) BCM-0121, BCM-0125, BCM-0127 or BCM-0129 is stored, depending on the sensor, if the control module registers that the signal from any of the sensors is outside its permitted range.

- BCM-0121: Yaw rate sensor
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- BCM-0129: Accelerometer.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- RSC is blocked (cars equipped with RSC only).

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Interference or noise on the wiring has disrupted the active yaw control sensor calculations
- The power supply to the active yaw control sensor is too low
- Incorrect wheel alignment
- Internal fault in the active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]

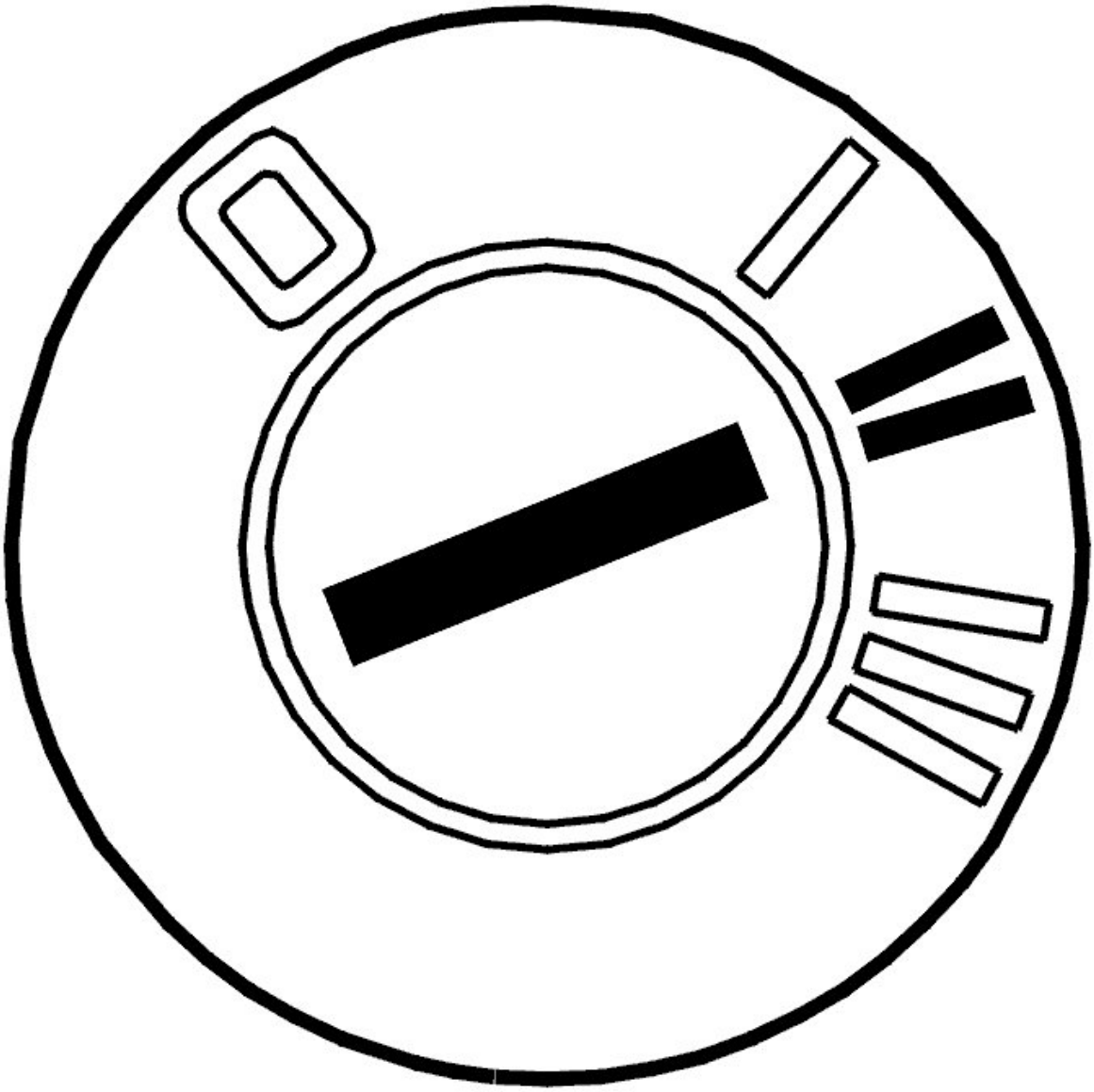
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors

Note! If diagnostic trouble codes (DTCs) other than BCM-0121, BCM-0125, BCM-0127 or BCM-0129 are stored in the brake control module (BCM), select cancel and fault trace these diagnostic trouble codes (DTCs) first.

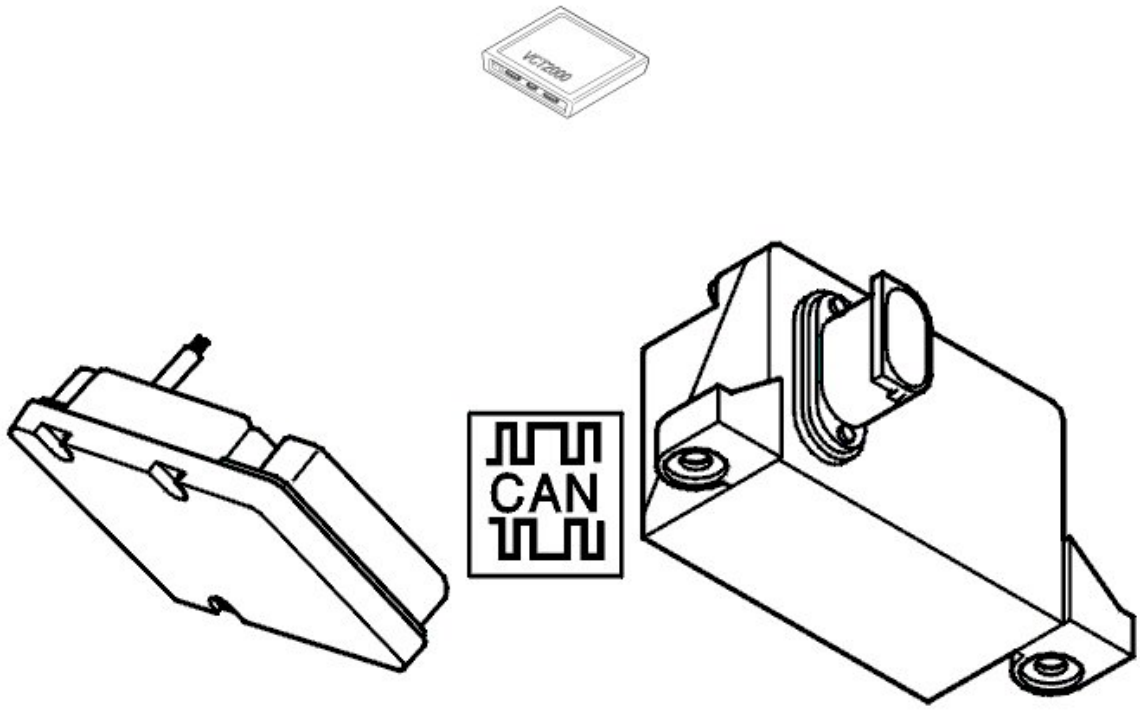


- Ignition off
- Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation
- Ensure that no sources of interference, such as a mobile telephone or radio receiver, are in the vicinity of the active yaw control sensor
- Test drive the car. See the test drive schedule. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module),

description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on
- Read off diagnostic trouble codes (DTCs).

If the diagnostic trouble code (DTC) status is intermittent the cause of the fault was probably either contact resistance in the control module or active yaw control sensor connectors, or a source of interference too close to the sensor.

Other information
- To remove the connector for the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- To remove the brake control module (BCM) connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM).

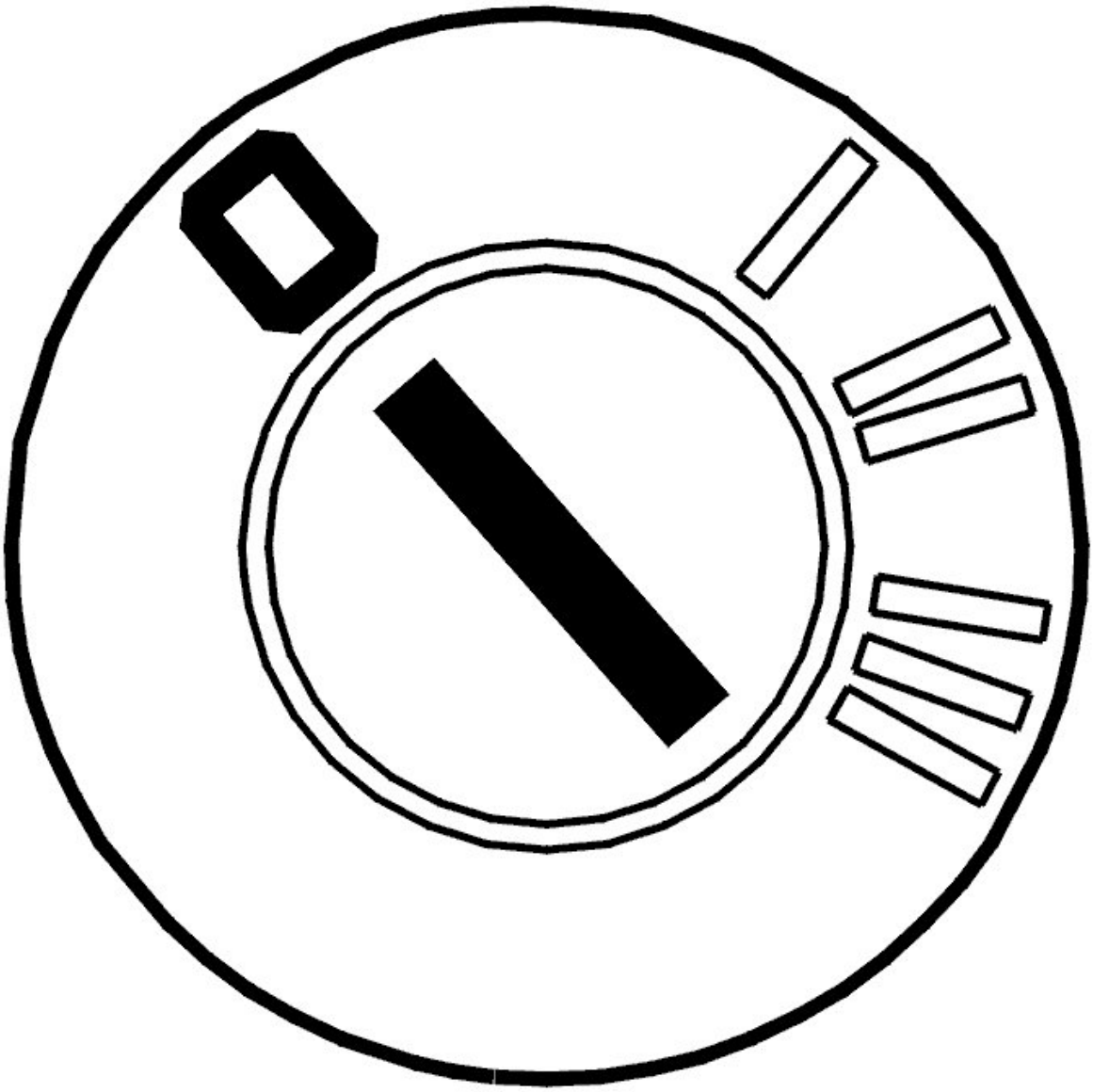


Was the status of the diagnostic trouble code (DTC) permanent?

Yes - Checking the wiring

No - **Fault Found**

Checking the wiring



- Ignition off.

Check the brake control module (BCM) and the active yaw control sensor connectors. Check for contact resistance and oxidation.
Check the wiring between the connector for the active yaw control sensor:

- terminal #1 and control module terminal #A25 (#A25)
- terminal #2 and control module terminal #A29 (#A29)
- terminal #3 and control module terminal #A6 (#A6)
- terminal #5 and control module terminal #A39 (#A39).

Check for an open-circuit.
Check the wheel alignment.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- To check the wheel alignment, see Wheel alignment, checking / adjusting See: Maintenance/Alignment/Service and Repair
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

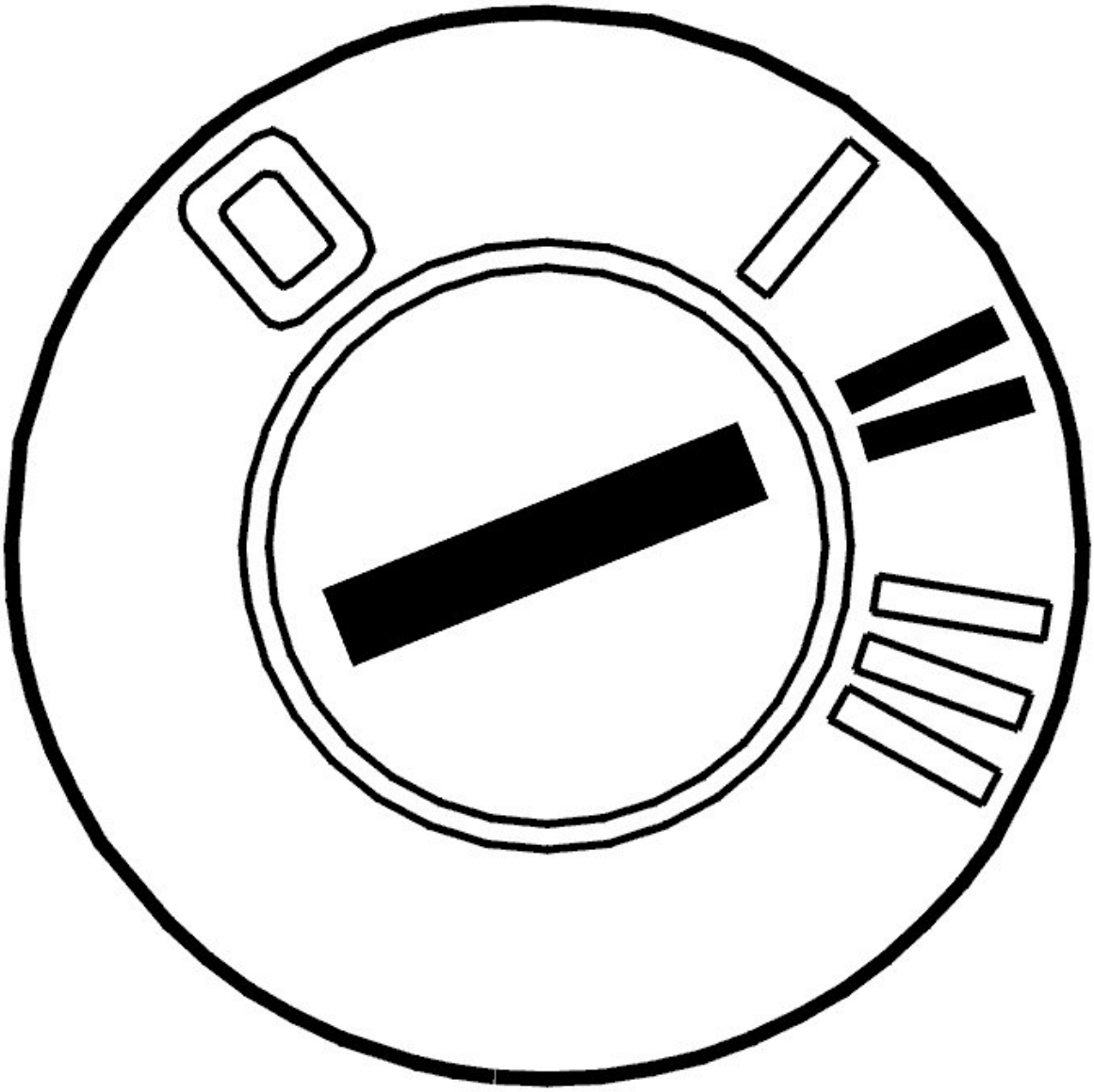
Continue - Verification

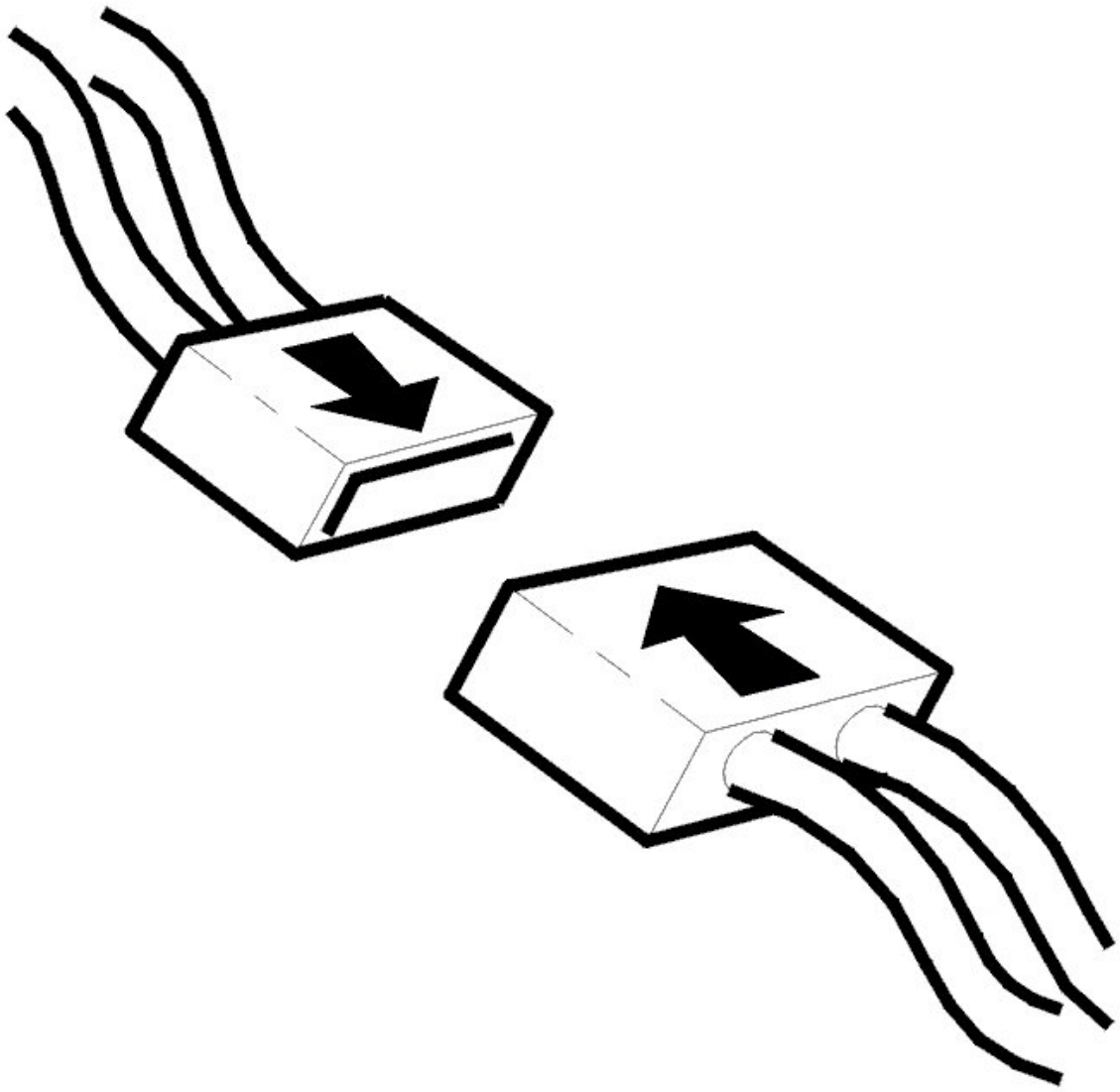
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

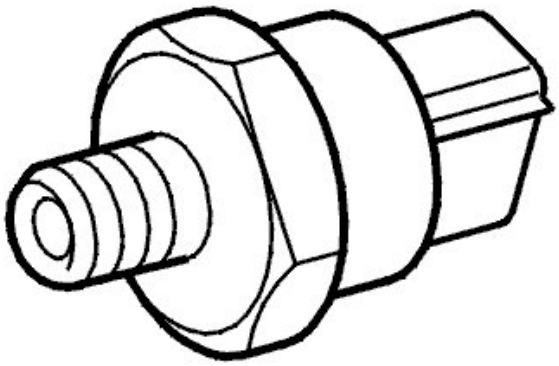
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! This diagnostic trouble code (DTC) applies only to vehicles with dynamic stability and traction control (DSTC).

The brake pressure sensors transmit signals to the brake control module (BCM) indicating the pressure in the brake system. If the control module registers an incorrect signal from any brake pressure sensor, then trouble code BCM-0130 or BCM-0133 is generated depending on sensor.

Note! When cables to the brake pressure sensors are physically interchanged when installing, troubleshoot both sensors when trouble code BCM-0130 or BCM-0133 is detected.

Substitute value
- Traction control is blocked.
- SC is blocked.

- Active yaw control is blocked.

Hint: For more information about abbreviations, see: Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations

Possible source
- Open-circuit in the wiring.
- Wiring is short-circuited to ground or supply voltage.
- Damaged pressure sensor.
- Internal fault in the control module.

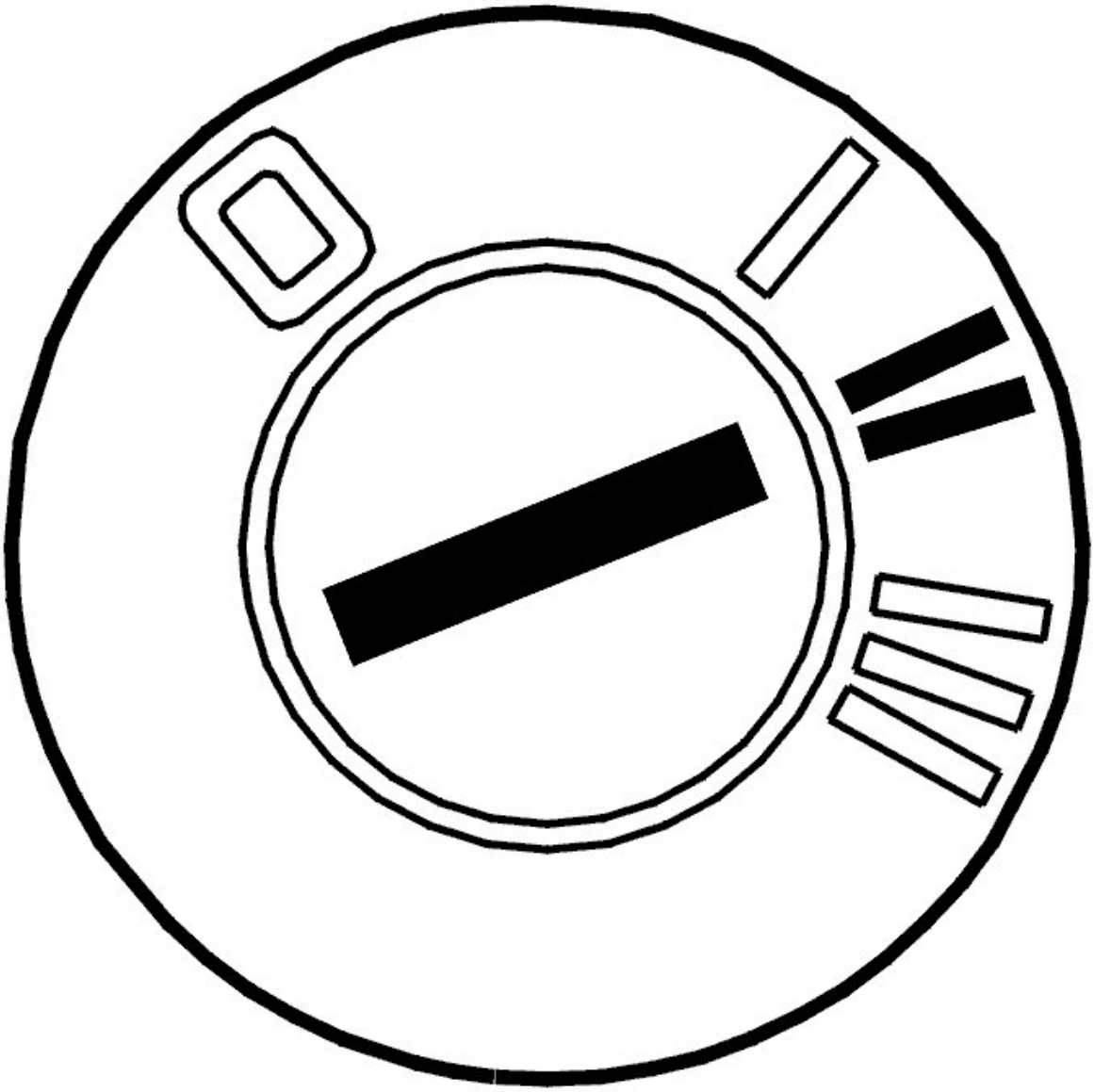
Fault symptom[s]
- Warning light anti-spin on (applies to model year -2002)
- General yellow warning light on (applies to model year 2003-)
- Anti-spin not working
- Stability function is not working
- Anti skid function is not working

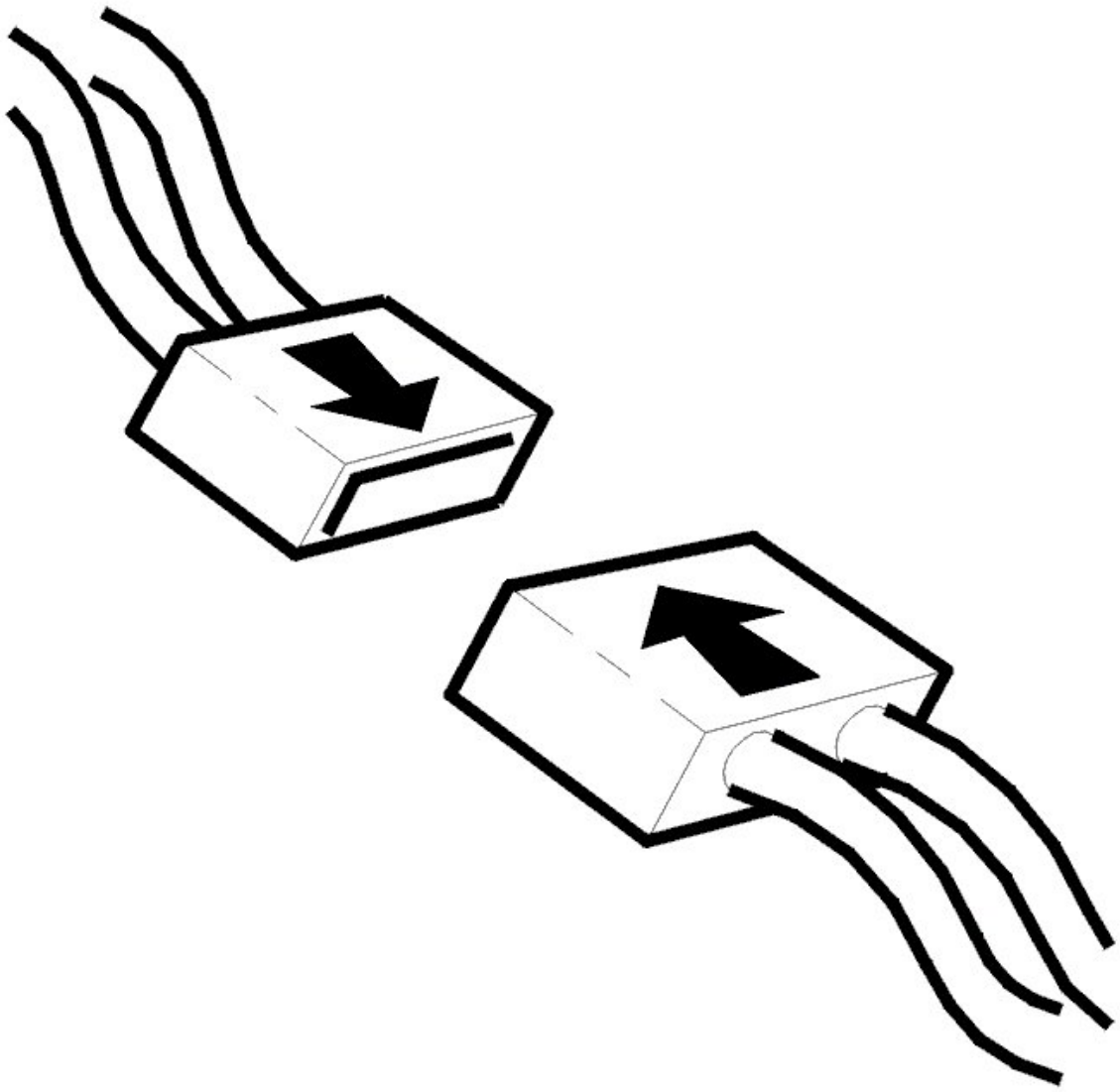
Signal Too Low

Signal too low

Checking the connectors

Note! When cables to the brake pressure sensors are physically interchanged when installing, troubleshoot both sensors when trouble code BCM-0130 or BCM-0133 is detected.



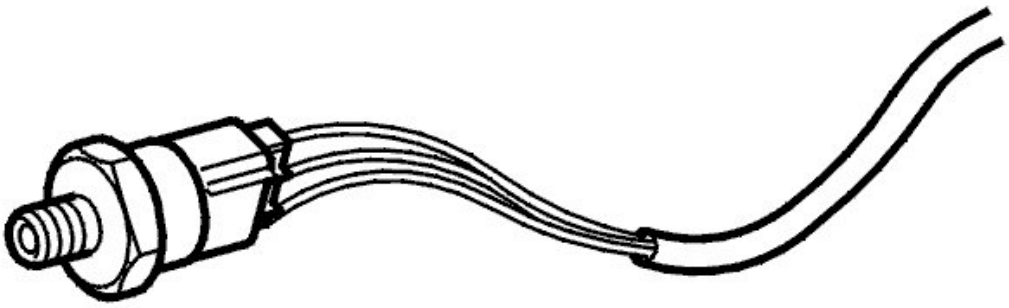


- Ignition off
- Check the brake control module (BCM) and the brake pressure sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure. If the brake pressure increases the cause of the fault was probably contact resistance or oxidation in the control module or pressure sensor connectors.

Other information

- To remove the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

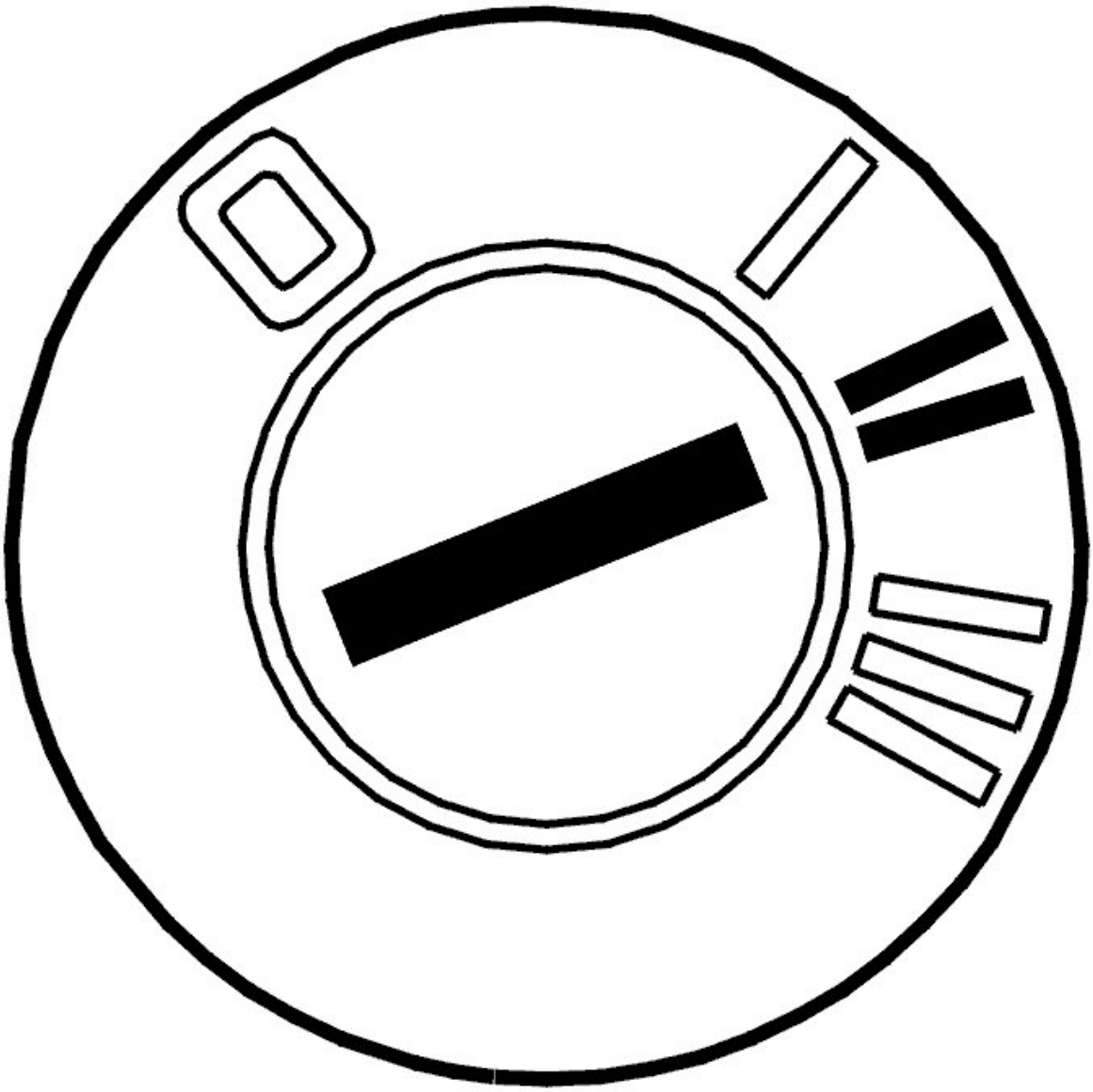


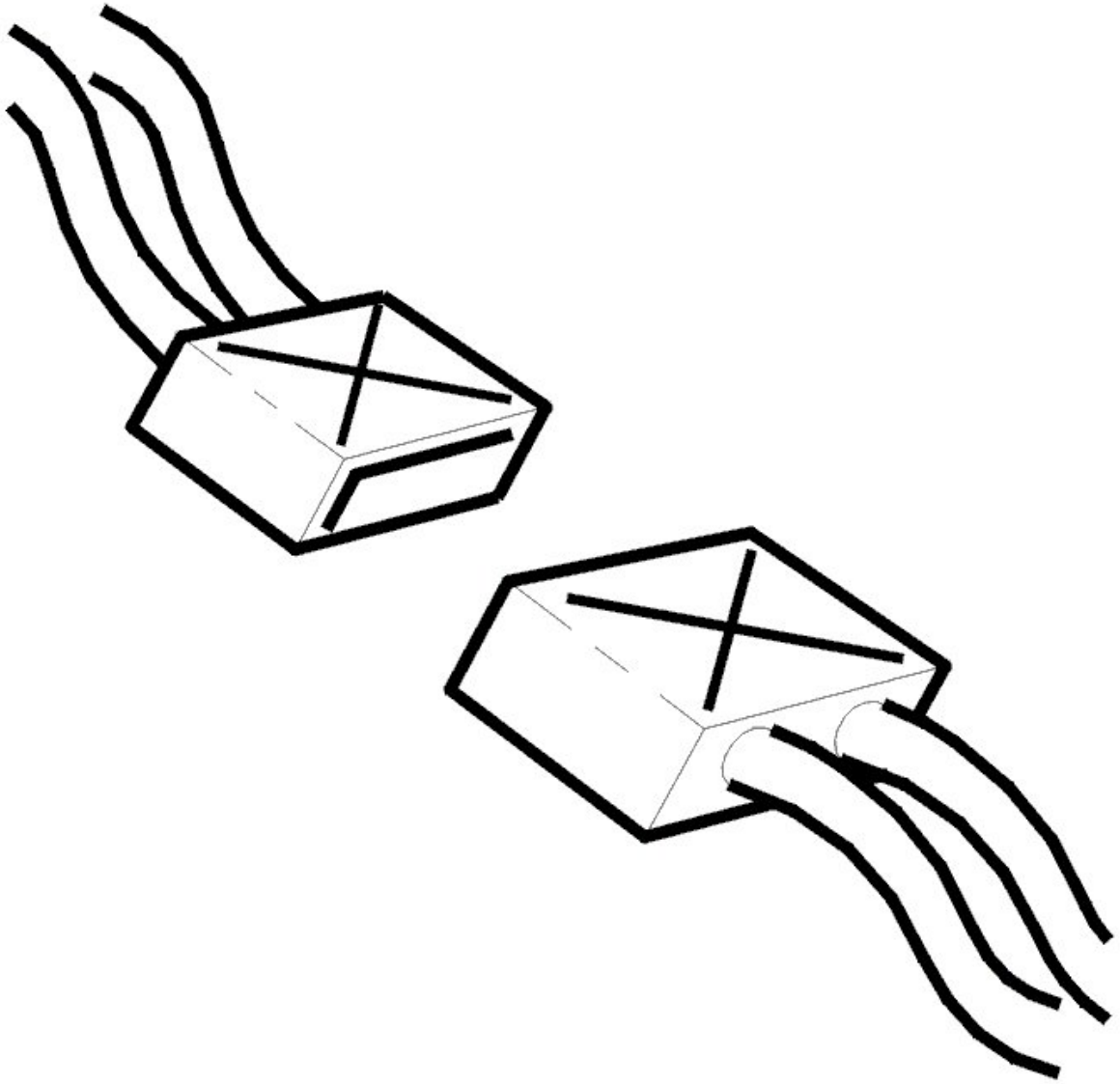
Does the brake pressure increase?

Yes - Fault Found

No - Checking the control module

Checking the control module





- Ignition on
- Pressure sensor connector disconnected
- The breakout box connected.

Check the voltage supply using a voltmeter:

Pressure sensor 1

- between terminal #A21 and terminal #A22 on the breakout box.

Pressure sensor 2

- between terminal #A18 and terminal #A19 on the breakout box.

The voltage must be approximately 5 V. Replace the brake control module (BCM) if the voltage is incorrect.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
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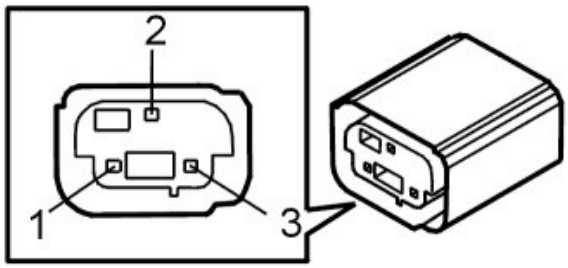
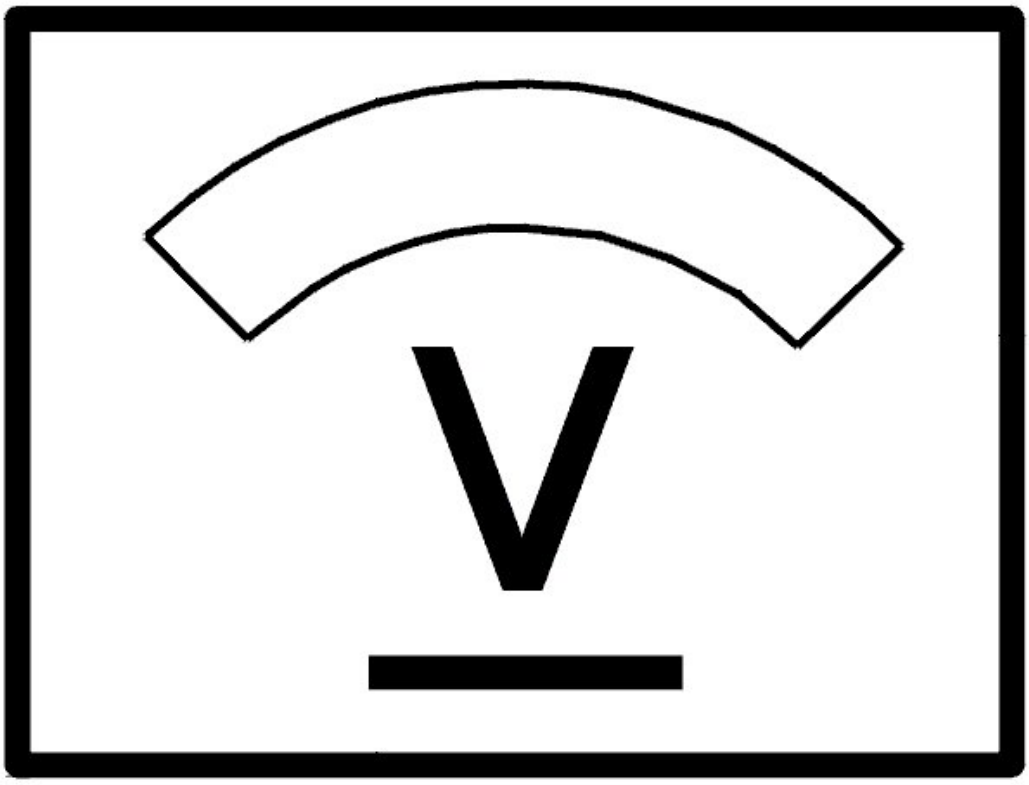


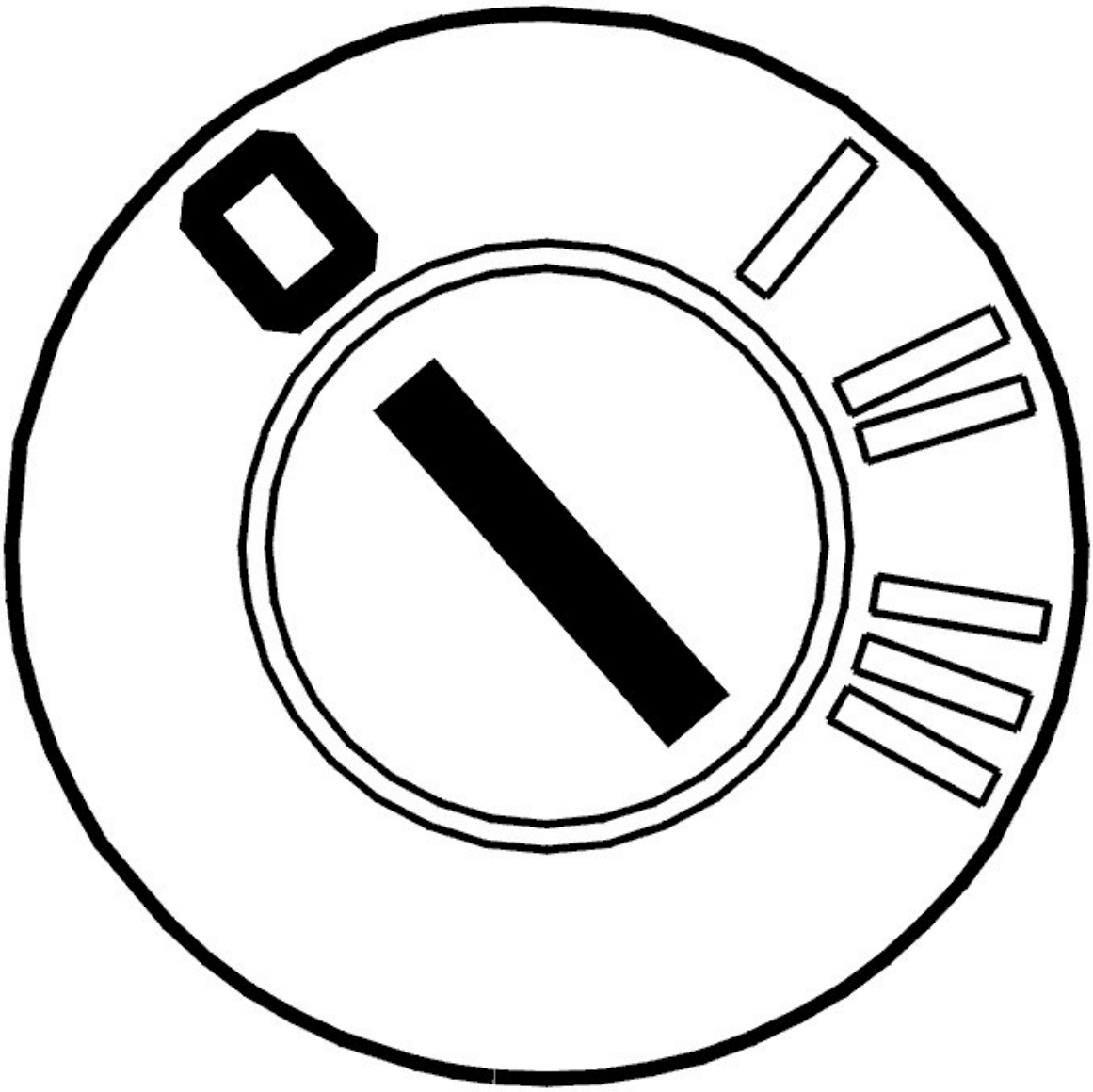


Was the voltage OK?

Yes - Checking wiring and sensors

No - Verification

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the wiring between the pressure sensor and the control module. Check for an open-circuit. Check for a short-circuit to ground.

For pressure sensor 1, check the wiring

- between pressure sensor terminal #1 and control module terminal #21 (#A21)
- between pressure sensor terminal #2 and control module terminal #23 (#A23)
- between pressure sensor terminal #3 and control module terminal #22 (#A22).

For pressure sensor 2, check the wiring

- between pressure sensor terminal #1 and control module terminal #19 (#A19)
- between pressure sensor terminal #2 and control module terminal #20 (#A20)
- between pressure sensor terminal #3 and control module terminal #18 (#A18).

Hint: Check the relevant brake pressure sensor by measuring the signal from the sensor, with the ignition switched on and the breakout box connected:

Pressure sensor 1

- between terminal #A21 and terminal #A22 on the breakout box. The voltage must be approximately 5 V
- between terminal #A21 and terminal #A23 on the breakout box. Voltage must be between 0.25- 4.75 V, depending on brake pressure.

Pressure sensor 2

- between terminal #A18 and terminal #A19 on the breakout box. The voltage must be approximately 5 V
- between terminal #A19 and terminal #A20 on the breakout box. Voltage must be between 0.25- 4.75 V, depending on brake pressure.

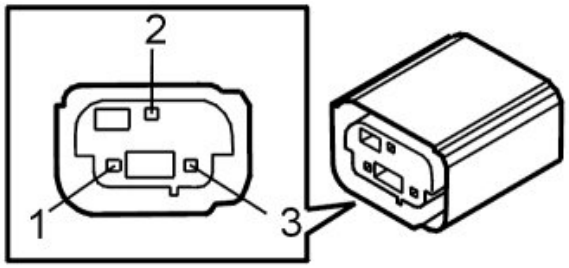
Replace the pressure sensor if the voltage does not change when the brake pedal is depressed.

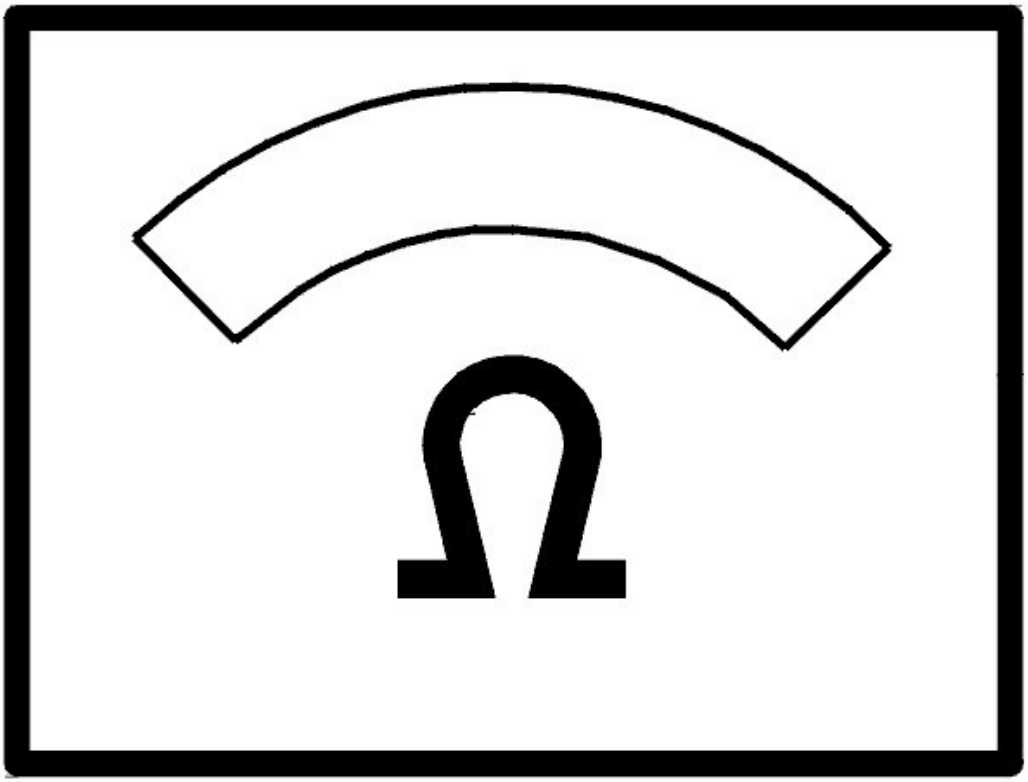
Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout

Box/Connecting the Breakout Box, Brake Control Module (BCM)

- To replace the pressure sensor, see Pressure sensor, master cylinder, replacing See: Brakes and Traction Control/Hydraulic System/Brake Fluid Pressure Sensor/Switch/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.





Was a fault detected?

Yes - Verification

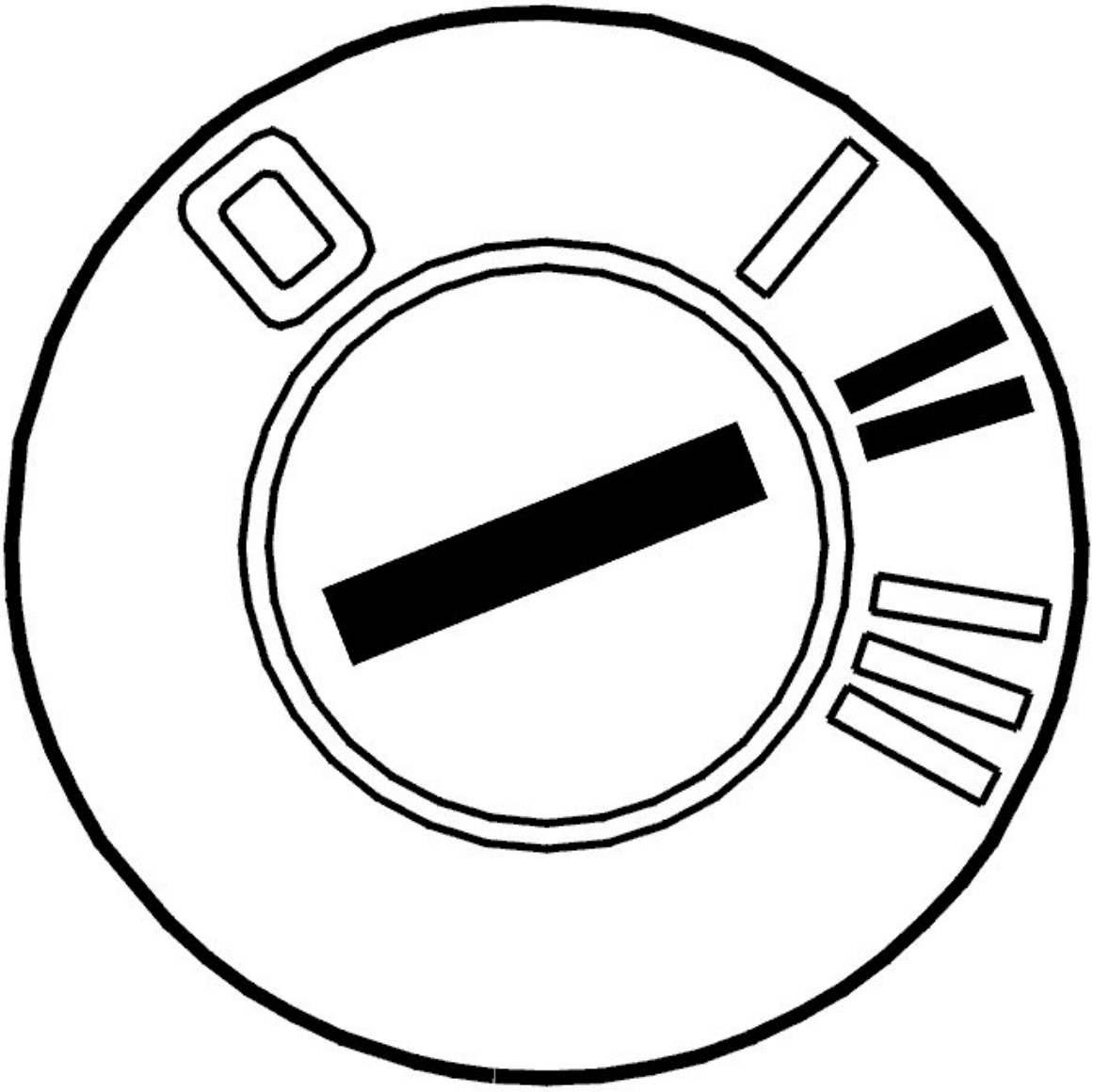
No - No Fault Found

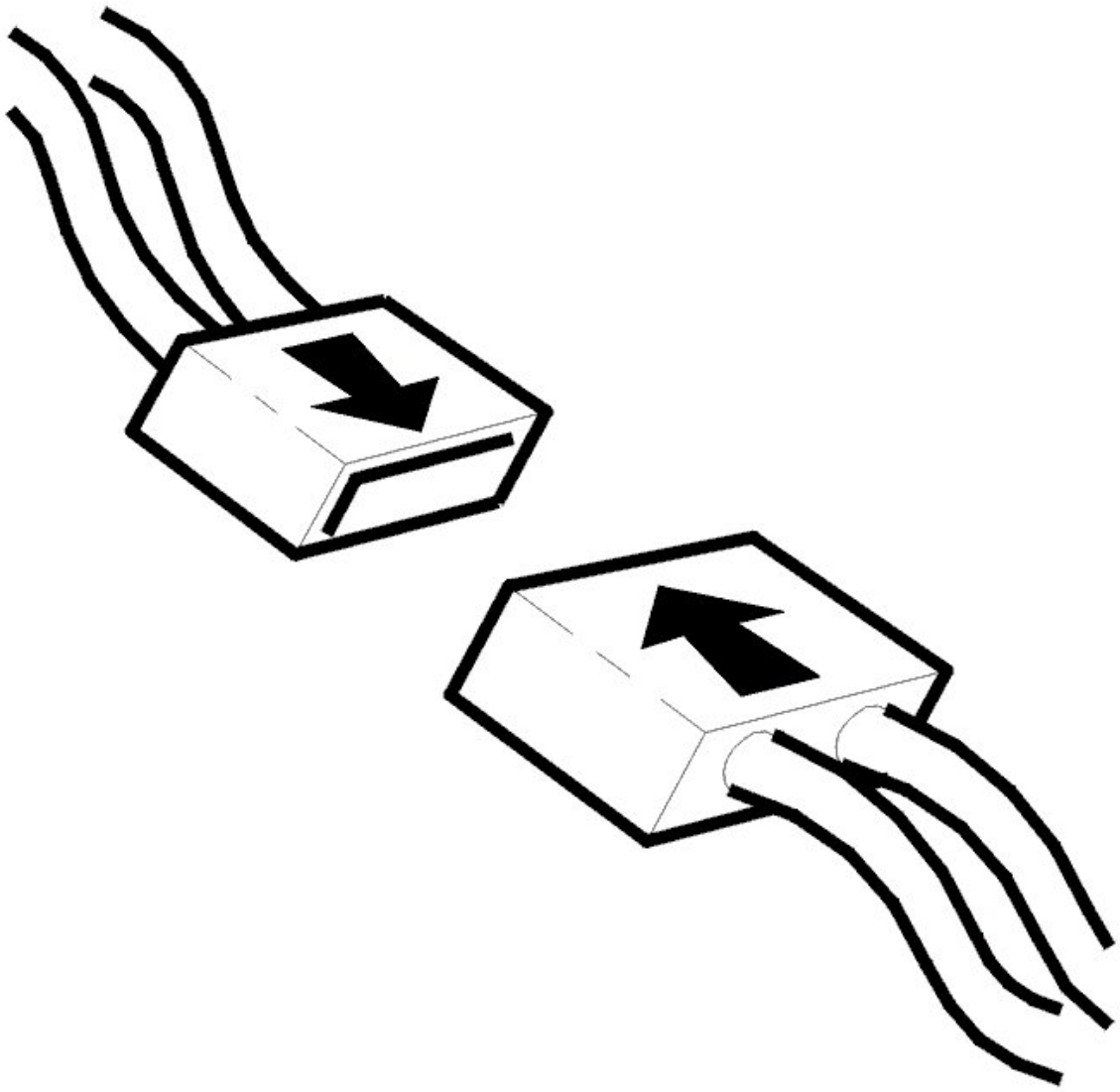
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure.

Does the brake pressure increase?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

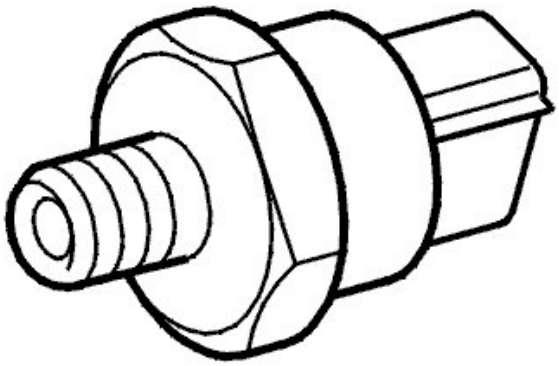
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! This diagnostic trouble code (DTC) applies only to vehicles with dynamic stability and traction control (DSTC).

The brake pressure sensors transmit signals to the brake control module (BCM) indicating the pressure in the brake system. If the control module registers an incorrect signal from any brake pressure sensor, then trouble code BCM-0130 or BCM-0133 is generated depending on sensor.

Note! When cables to the brake pressure sensors are physically interchanged when installing, troubleshoot both sensors when trouble code BCM-0130 or BCM-0133 is detected.

Substitute value
- Traction control is blocked.
- SC is blocked.

- Active yaw control is blocked.

Hint: For more information about abbreviations, see: Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations

Possible source
- Open-circuit in the wiring.
- Wiring is short-circuited to ground or supply voltage.
- Damaged pressure sensor.
- Internal fault in the control module.

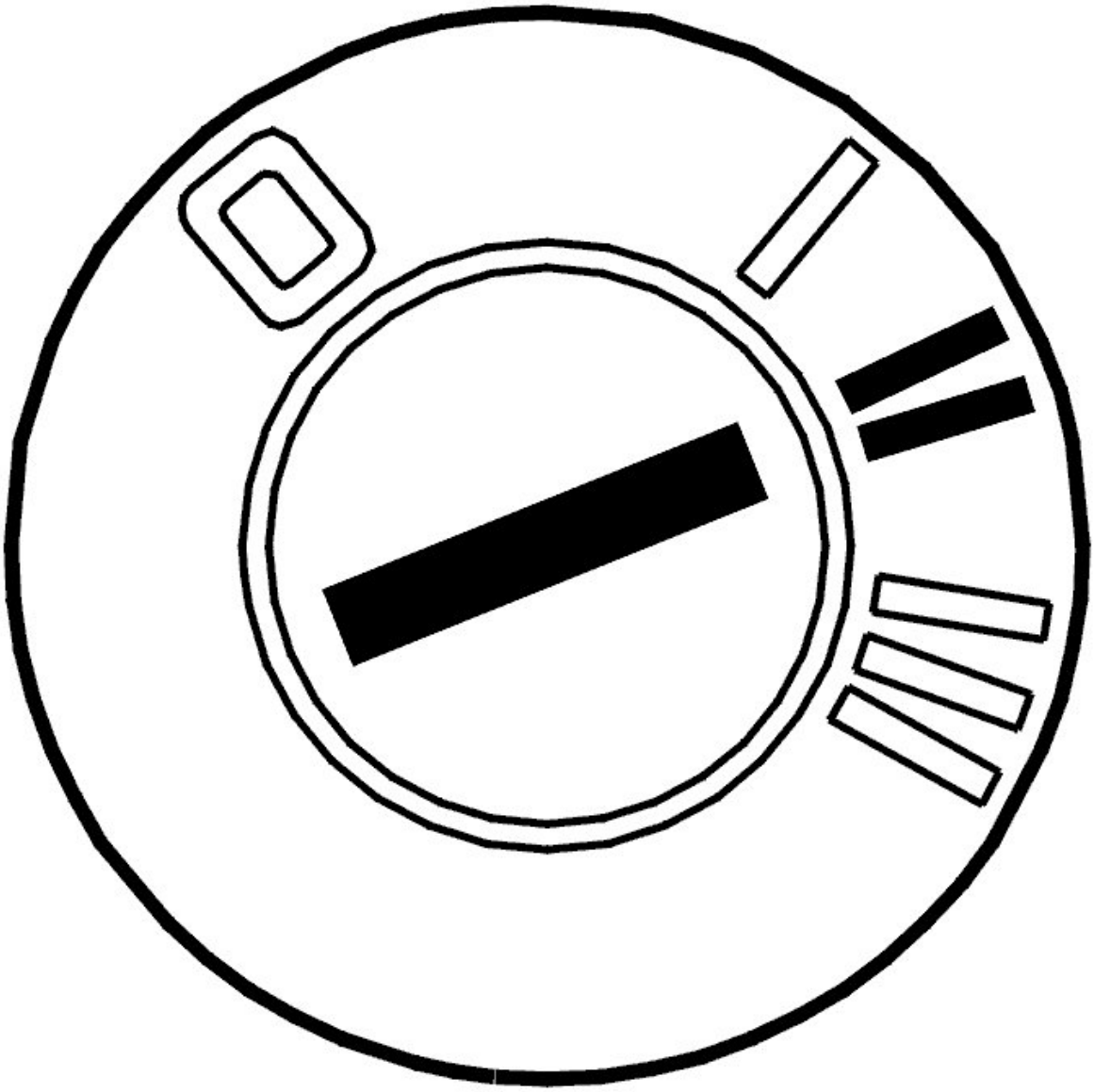
Fault symptom[s]
- Warning light anti-spin on (applies to model year -2002)
- General yellow warning light on (applies to model year 2003-)
- Anti-spin not working
- Stability function is not working
- Anti skid function is not working

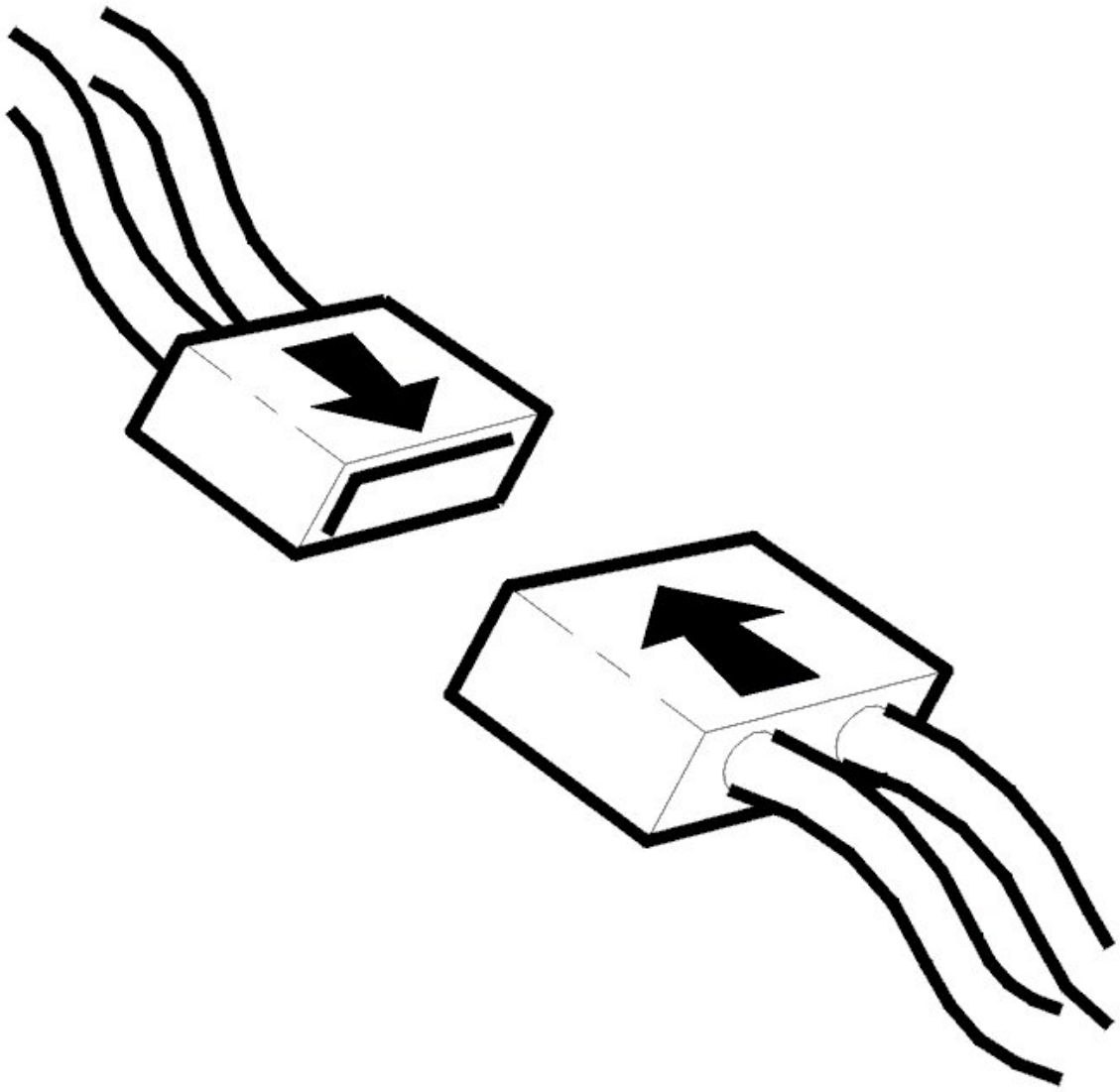
Signal Too Low

Signal too low

Checking the connectors

Note! When cables to the brake pressure sensors are physically interchanged when installing, troubleshoot both sensors when trouble code BCM-0130 or BCM-0133 is detected.



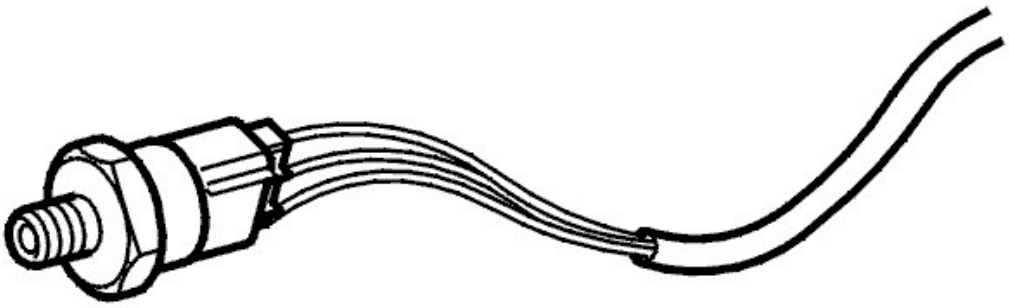


- Ignition off
- Check the brake control module (BCM) and the brake pressure sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure. If the brake pressure increases the cause of the fault was probably contact resistance or oxidation in the control module or pressure sensor connectors.

Other information

- To remove the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

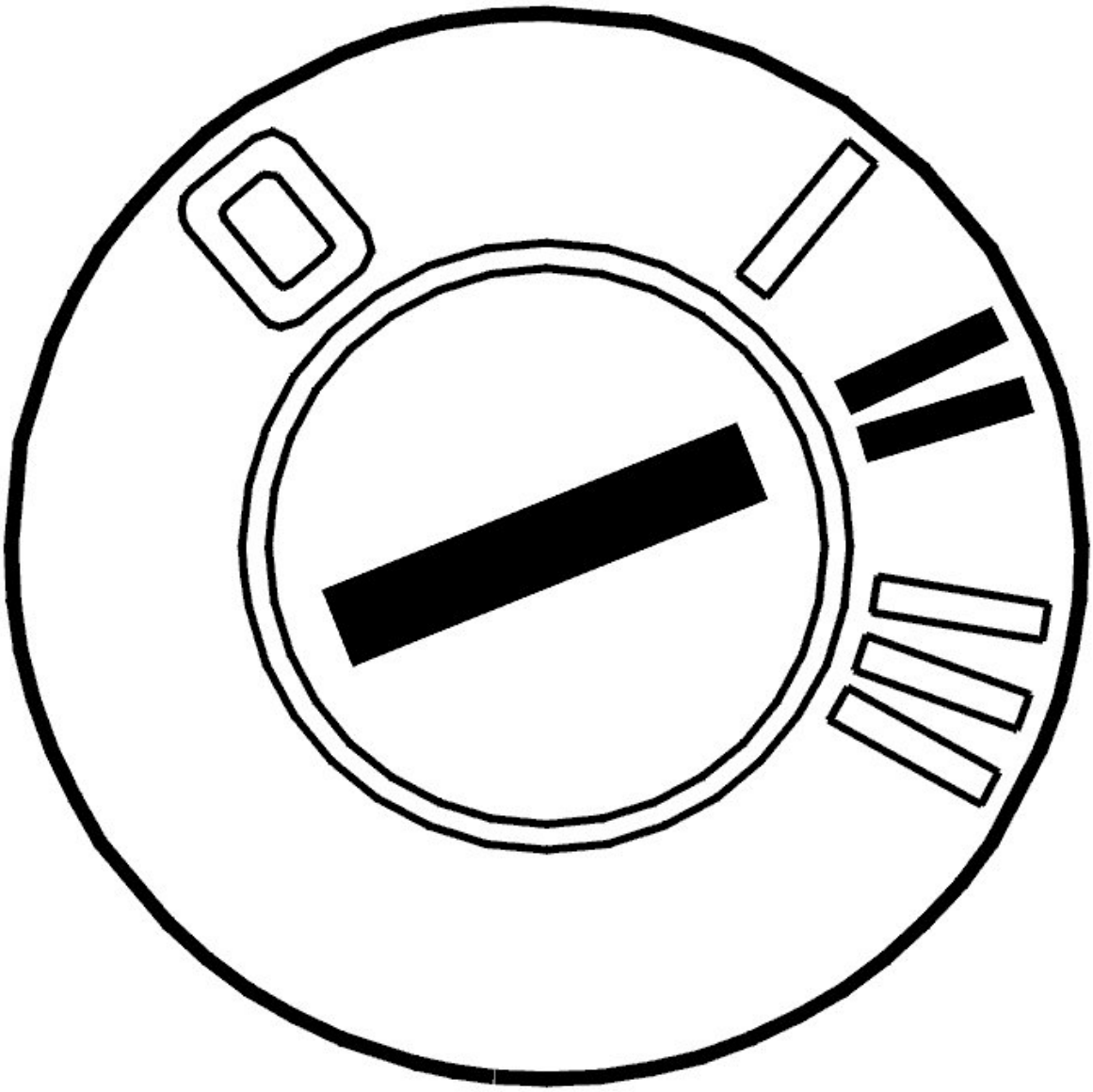


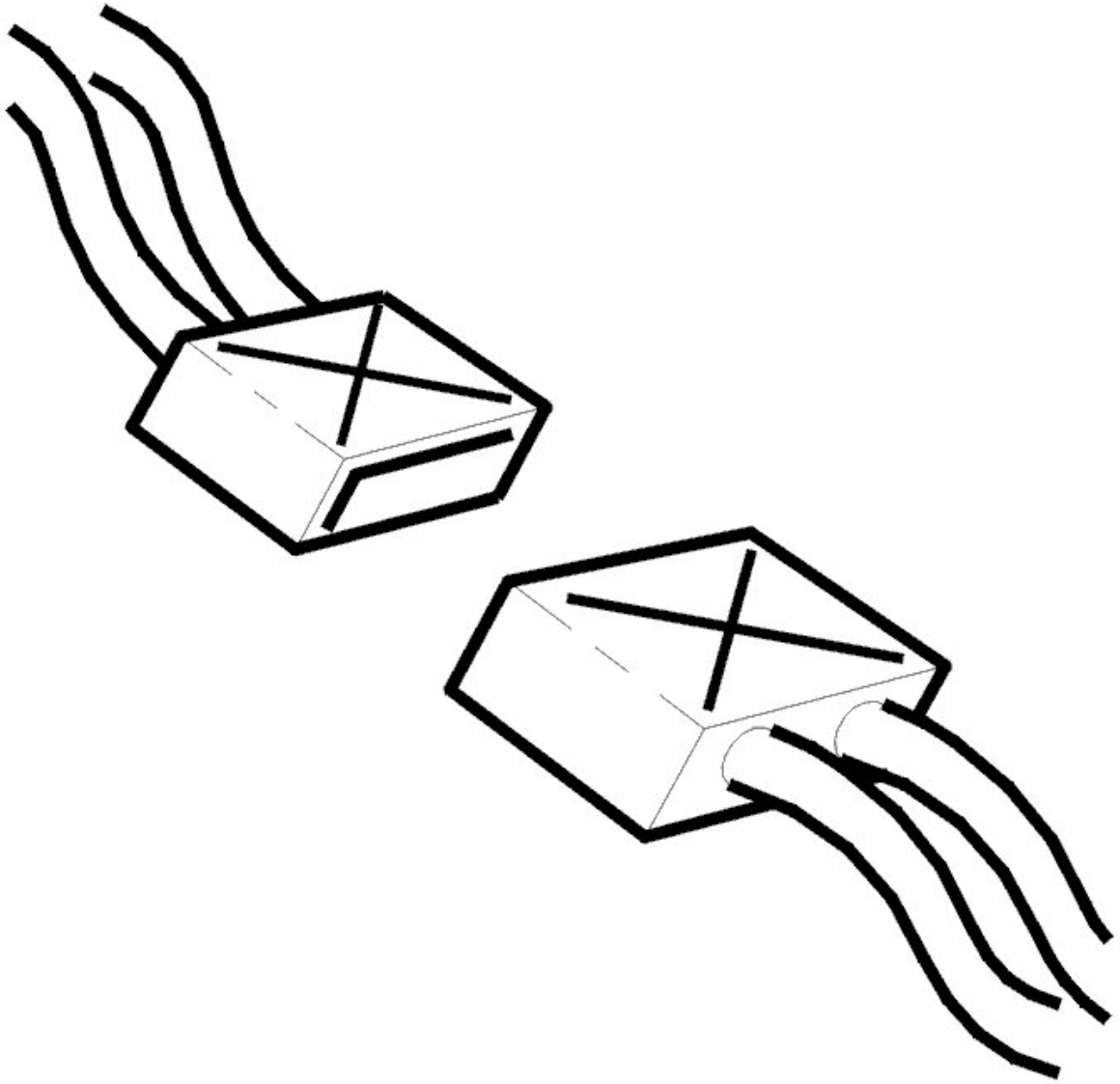
Does the brake pressure increase?

Yes - Fault Found

No - Checking the control module

Checking the control module





- Ignition on
- Pressure sensor connector disconnected
- The breakout box connected.

Check the voltage supply using a voltmeter:

Pressure sensor 1

- between terminal #A21 and terminal #A22 on the breakout box.

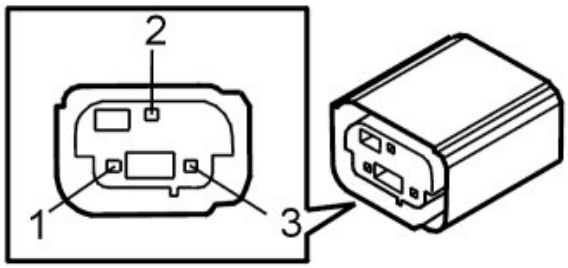
Pressure sensor 2

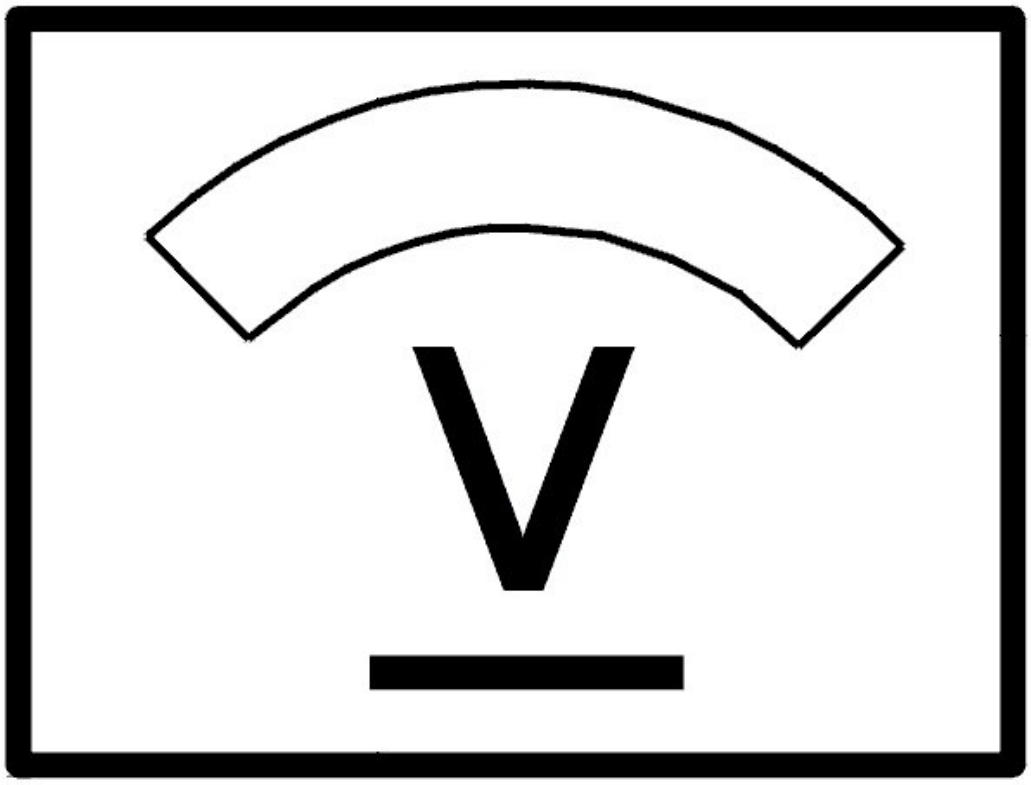
- between terminal #A18 and terminal #A19 on the breakout box.

The voltage must be approximately 5 V. Replace the brake control module (BCM) if the voltage is incorrect.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.



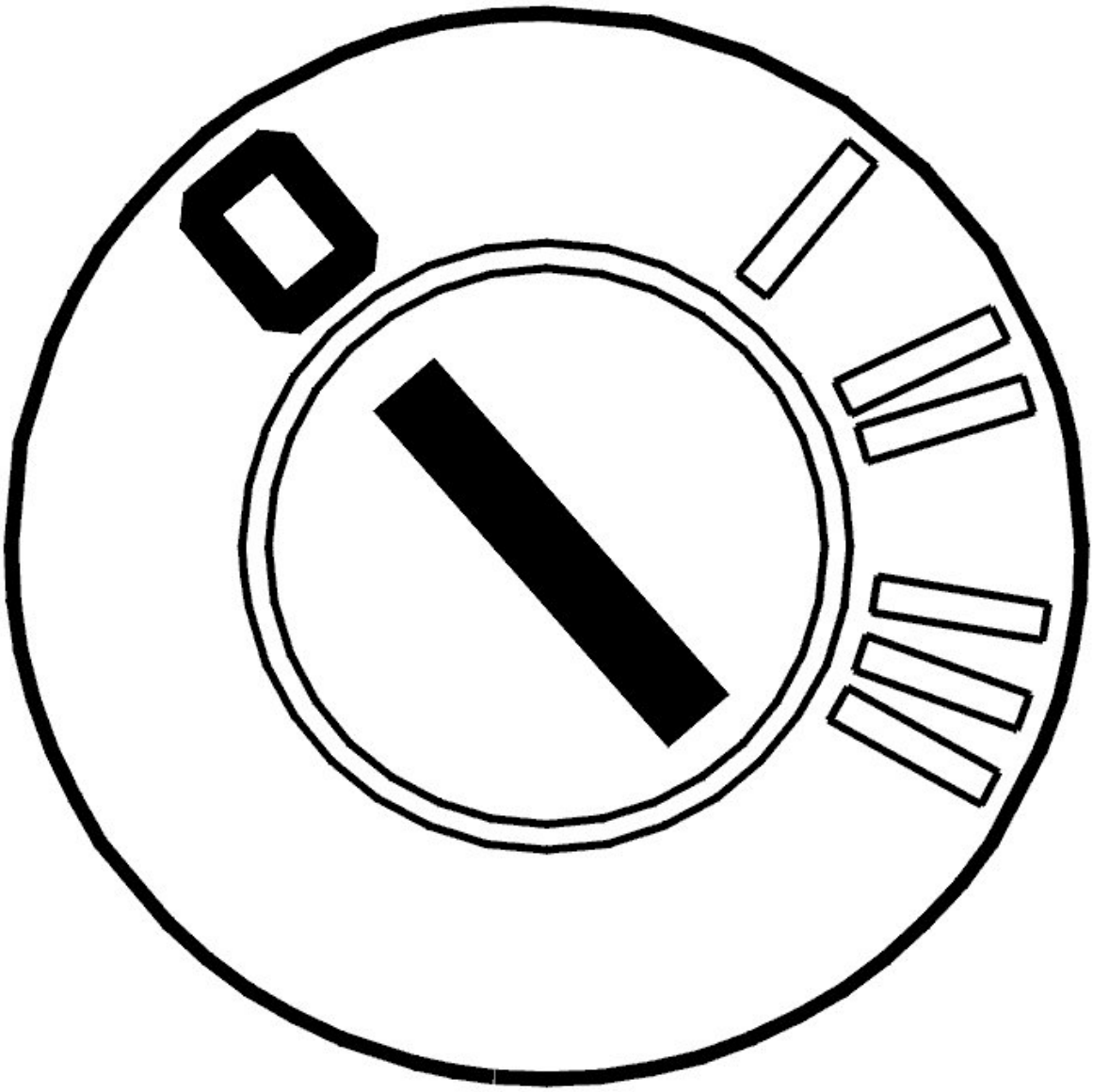


Was the voltage OK?

Yes - Checking wiring and sensors

No - Verification

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the wiring between the pressure sensor and the control module. Check for an open-circuit. Check for a short-circuit to ground.

For pressure sensor 1, check the wiring

- between pressure sensor terminal #1 and control module terminal #21 (#A21)
- between pressure sensor terminal #2 and control module terminal #23 (#A23)
- between pressure sensor terminal #3 and control module terminal #22 (#A22).

For pressure sensor 2, check the wiring

- between pressure sensor terminal #1 and control module terminal #19 (#A19)
- between pressure sensor terminal #2 and control module terminal #20 (#A20)
- between pressure sensor terminal #3 and control module terminal #18 (#A18).

Hint: Check the relevant brake pressure sensor by measuring the signal from the sensor, with the ignition switched on and the breakout box connected:

Pressure sensor 1

- between terminal #A21 and terminal #A22 on the breakout box. The voltage must be approximately 5 V
- between terminal #A21 and terminal #A23 on the breakout box. Voltage must be between 0.25- 4.75 V, depending on brake pressure.

Pressure sensor 2

- between terminal #A18 and terminal #A19 on the breakout box. The voltage must be approximately 5 V
- between terminal #A19 and terminal #A20 on the breakout box. Voltage must be between 0.25- 4.75 V, depending on brake pressure.

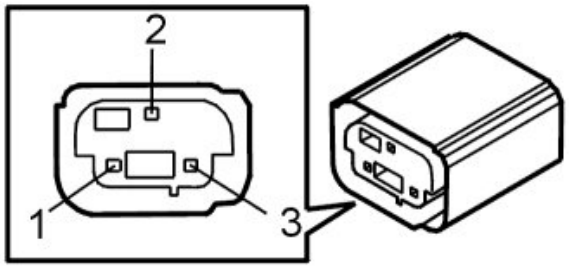
Replace the pressure sensor if the voltage does not change when the brake pedal is depressed.

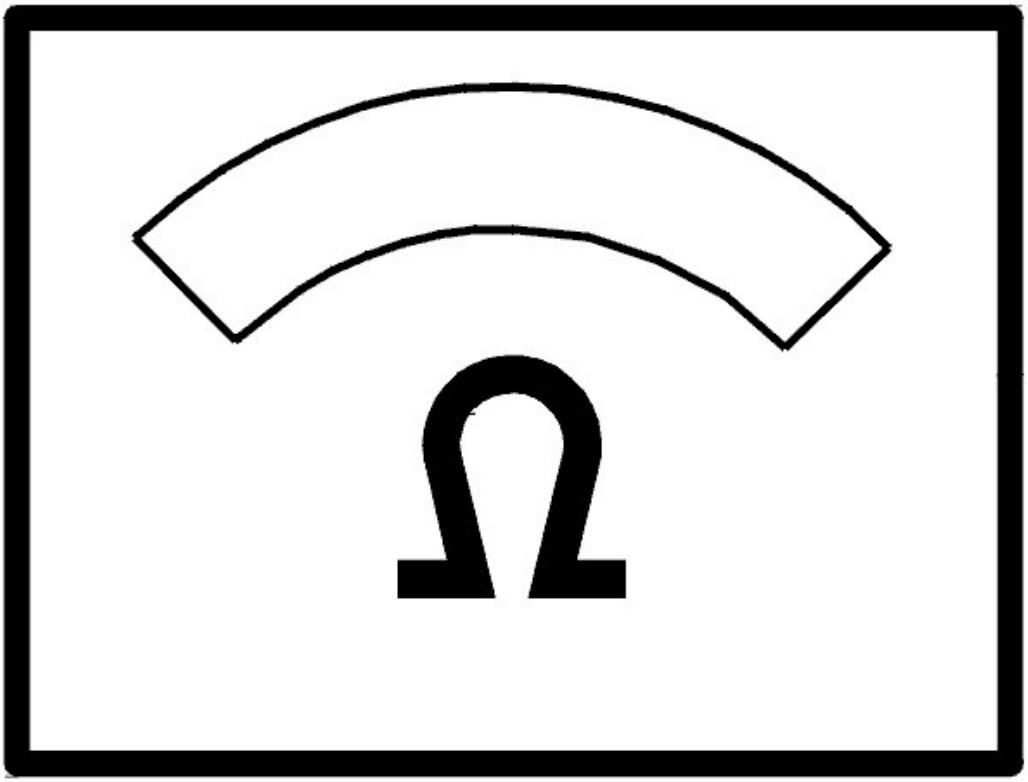
Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout

Box/Connecting the Breakout Box, Brake Control Module (BCM)

- To replace the pressure sensor, see Pressure sensor, master cylinder, replacing See: Brakes and Traction Control/Hydraulic System/Brake Fluid Pressure Sensor/Switch/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.





Was a fault detected?

Yes - Verification

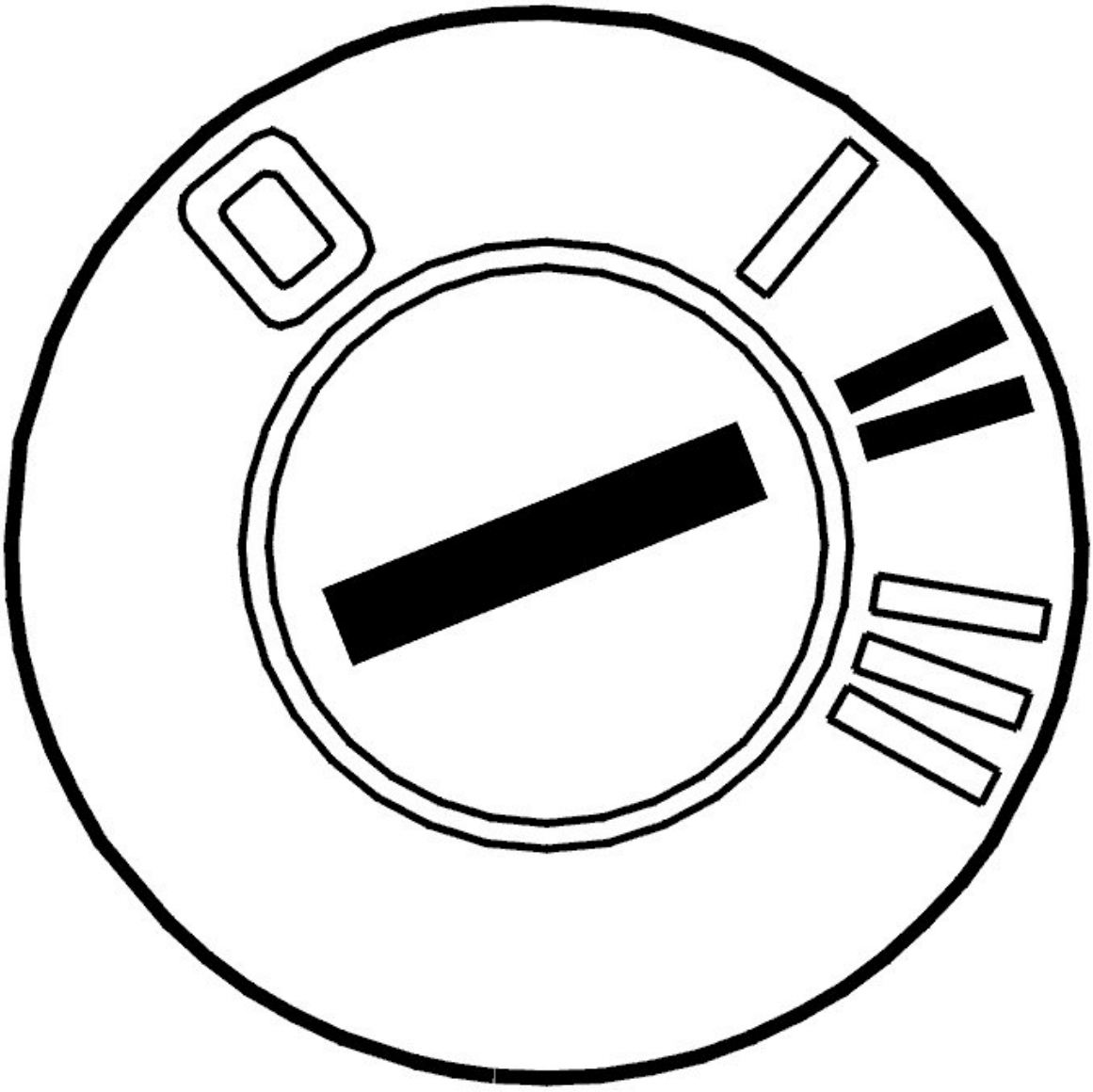
No - No Fault Found

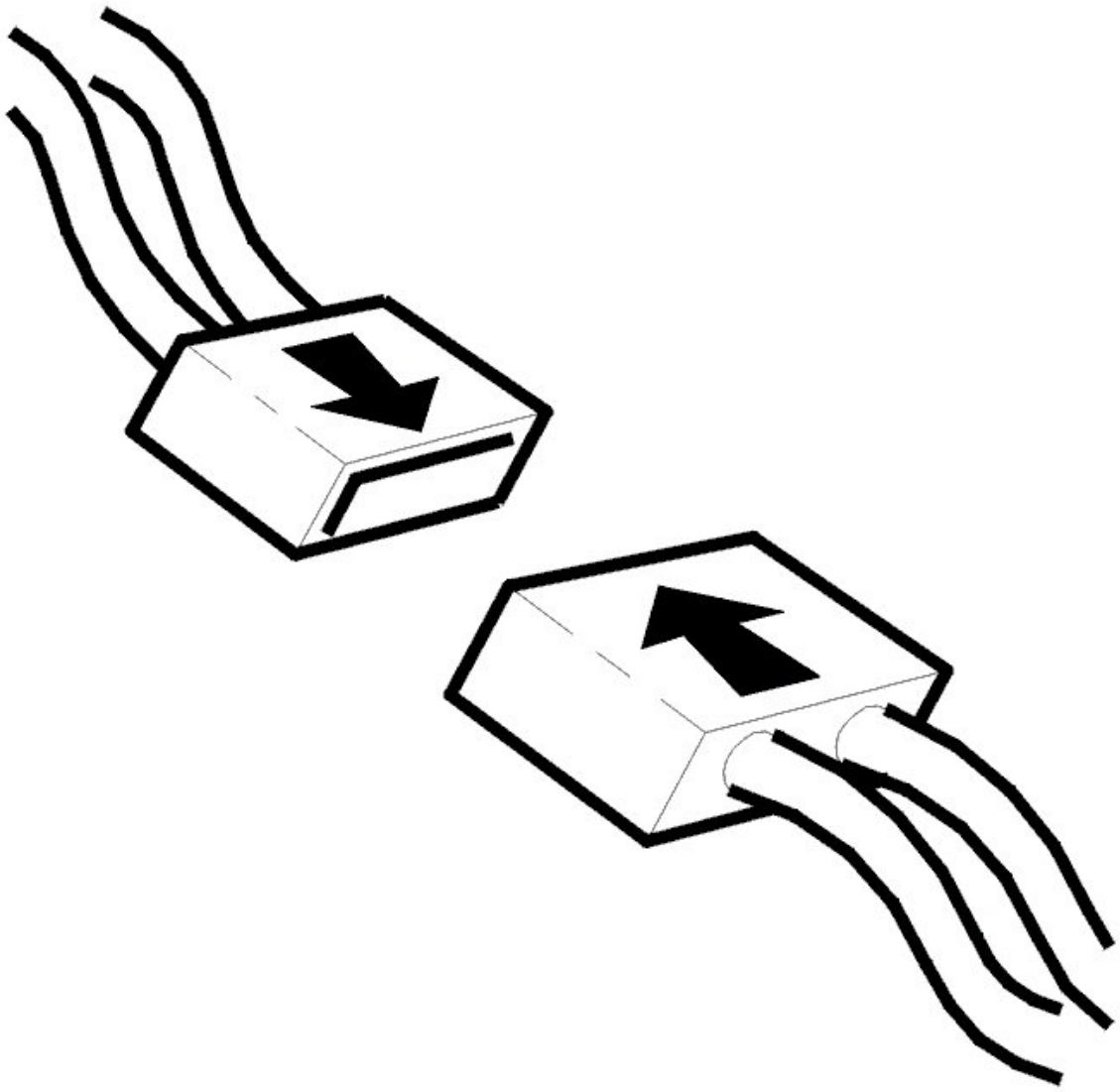
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure.

Does the brake pressure increase?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

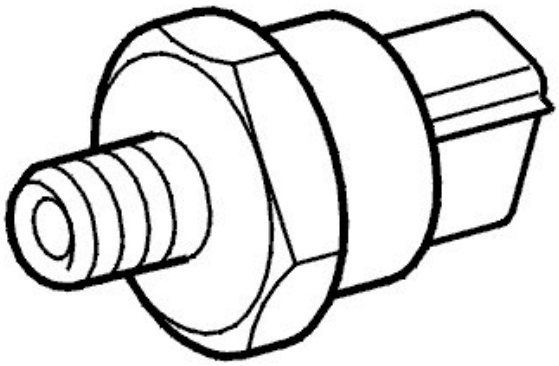
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to ABS systems equipped with dynamic stability and traction control (DSTC).

Brake pressure sensors 1 and 2 provide a signal with the brake system pressure to the brake control module (BCM). Diagnostic trouble code (DTC) BCM-0136 is stored if the control module registers that the signal from any of the pressure sensors is outside its permitted range.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control

Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Open-circuit in the ground lead
- Fault in the brake circuit
- Defective pressure sensor.

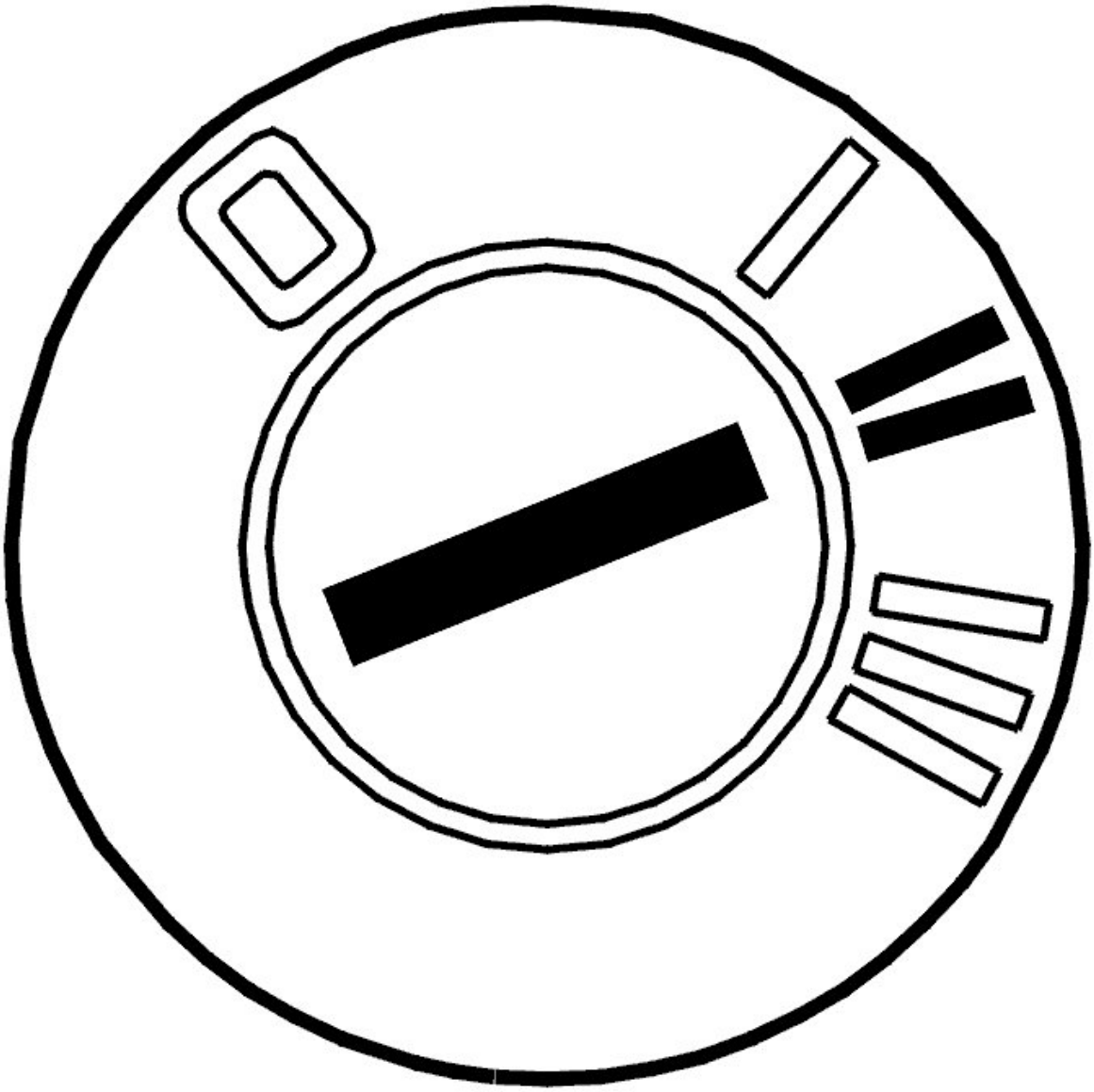
Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

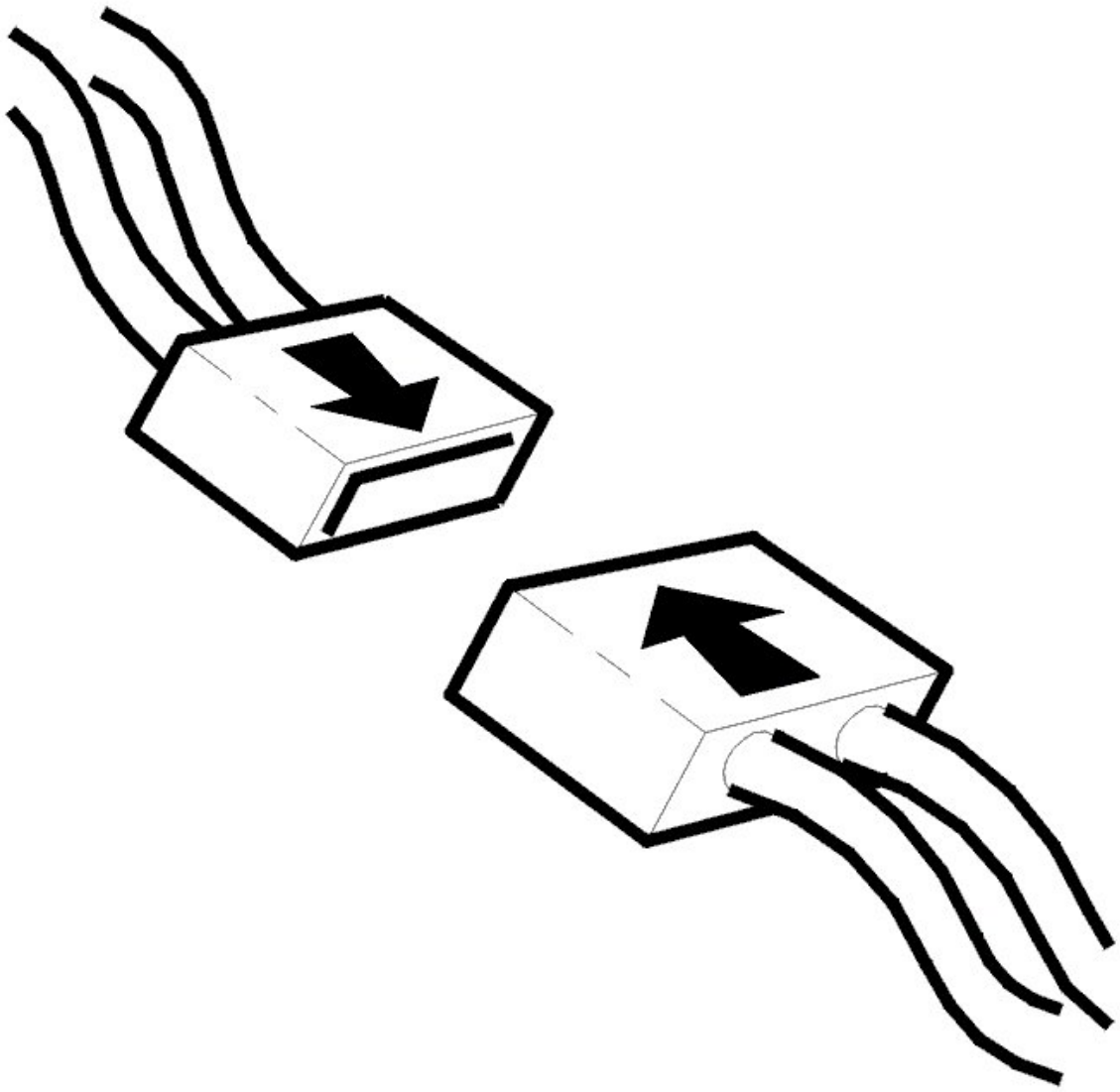
Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors

Note! When cables to the brake pressure sensors are physically interchanged when installing, troubleshoot both sensors when trouble code BCM-0136.



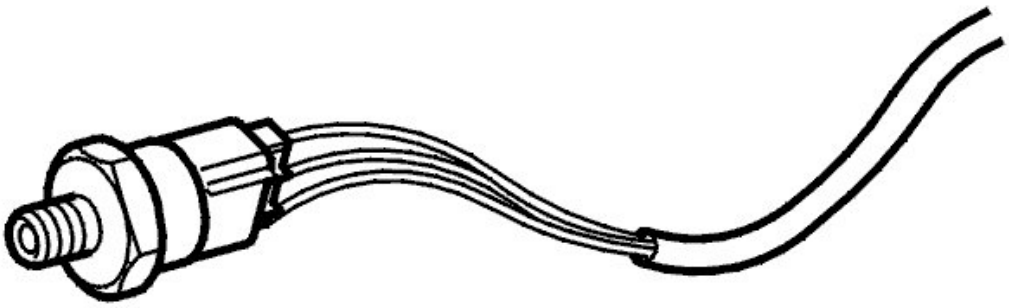


- Ignition off
- Check the brake control module (BCM) and the brake pressure sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the pressure from the brake system
- Depress the brake pedal.

The brake pressure must increase in both pressure sensors with increased pedal pressure. If the brake pressure increases for both pressure sensors, the cause of the fault was probably contact resistance or oxidation in the control module or pressure sensor connectors.

Other information

- To access the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

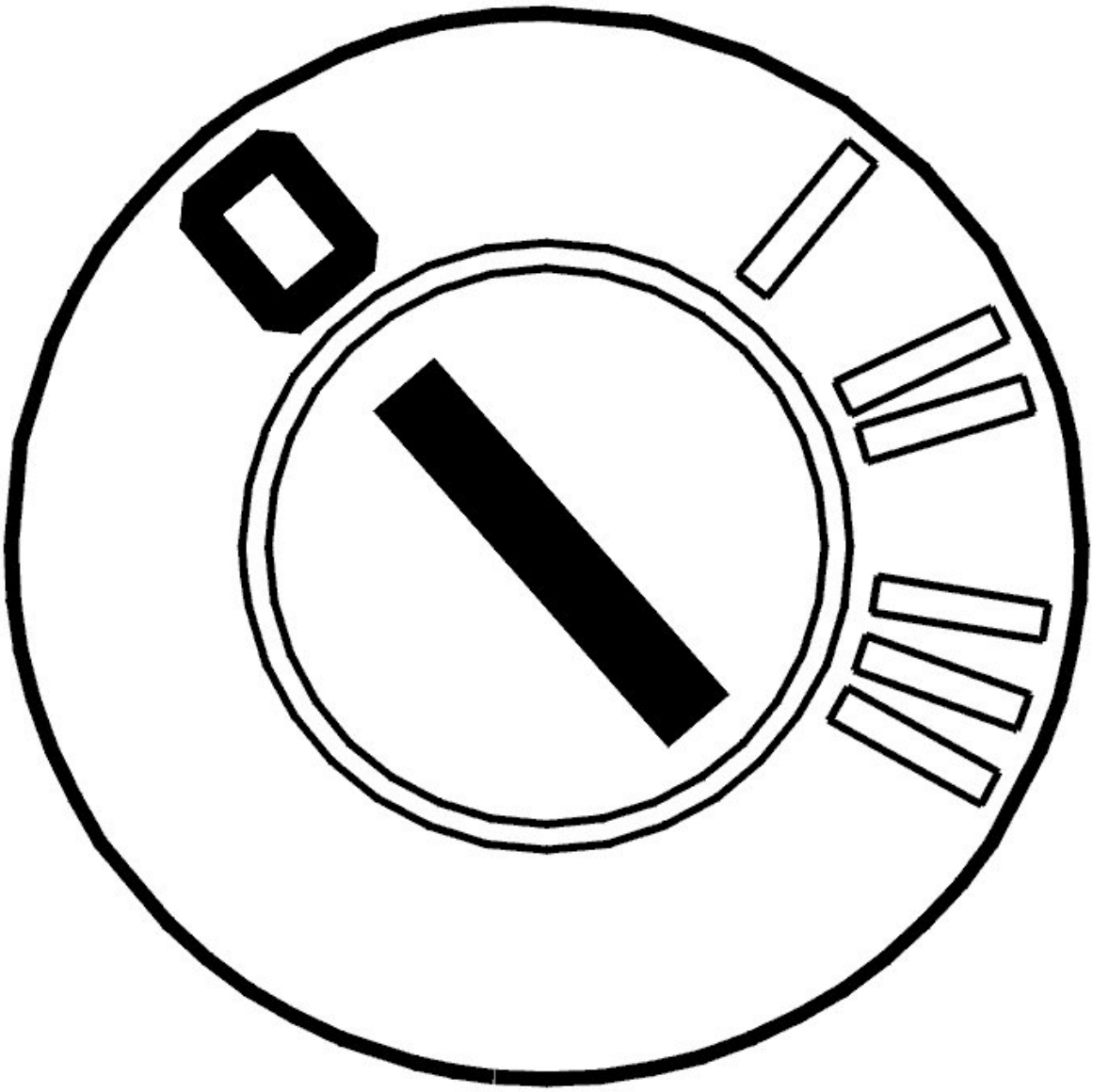


Does the pressure increase?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors

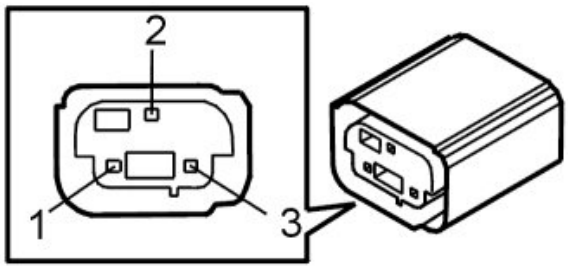


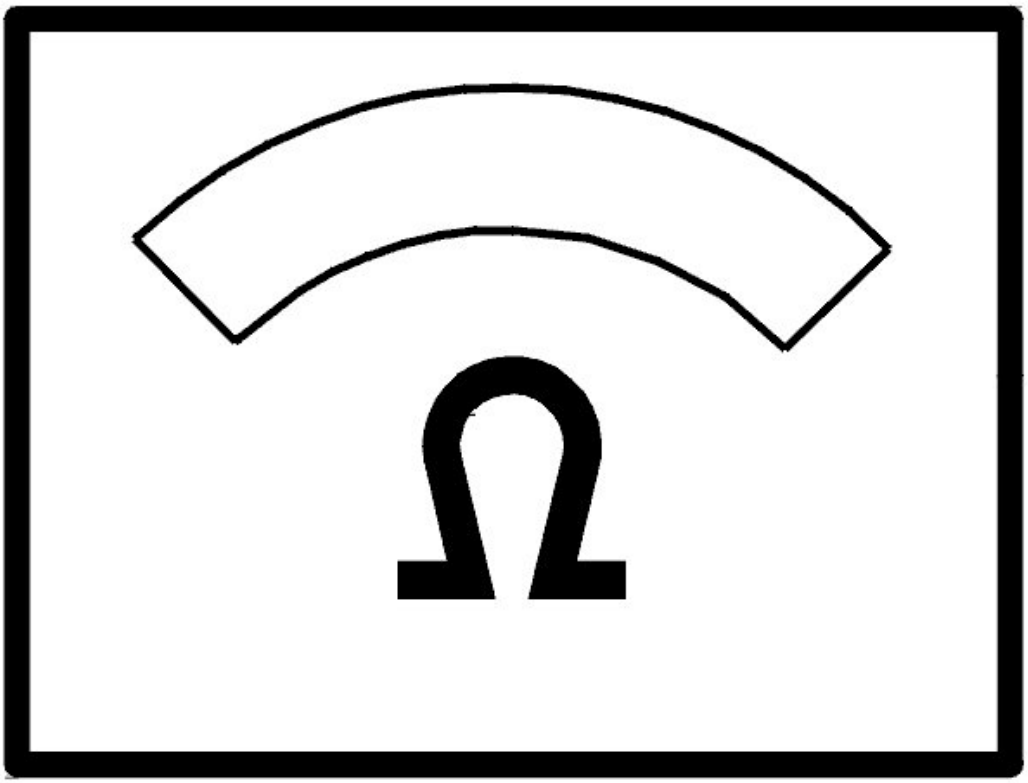
- Ignition off
- Connect the breakout box.

Check the ground lead between the relevant brake pressure sensor and the brake control module (BCM). Check for an open-circuit.
For pressure sensor 1, check the cable between pressure sensor terminal #1 and brake control module (BCM) terminal #19 (#A19).
For pressure sensor 2, check the cable between pressure sensor terminal #1 and control module terminal #21 (#A21).
Try another pressure sensor if the cable is OK.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the pressure sensor, see Pressure sensor, master cylinder, replacing See: Brakes and Traction Control/Hydraulic System/Brake Fluid Pressure Sensor/Switch/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.



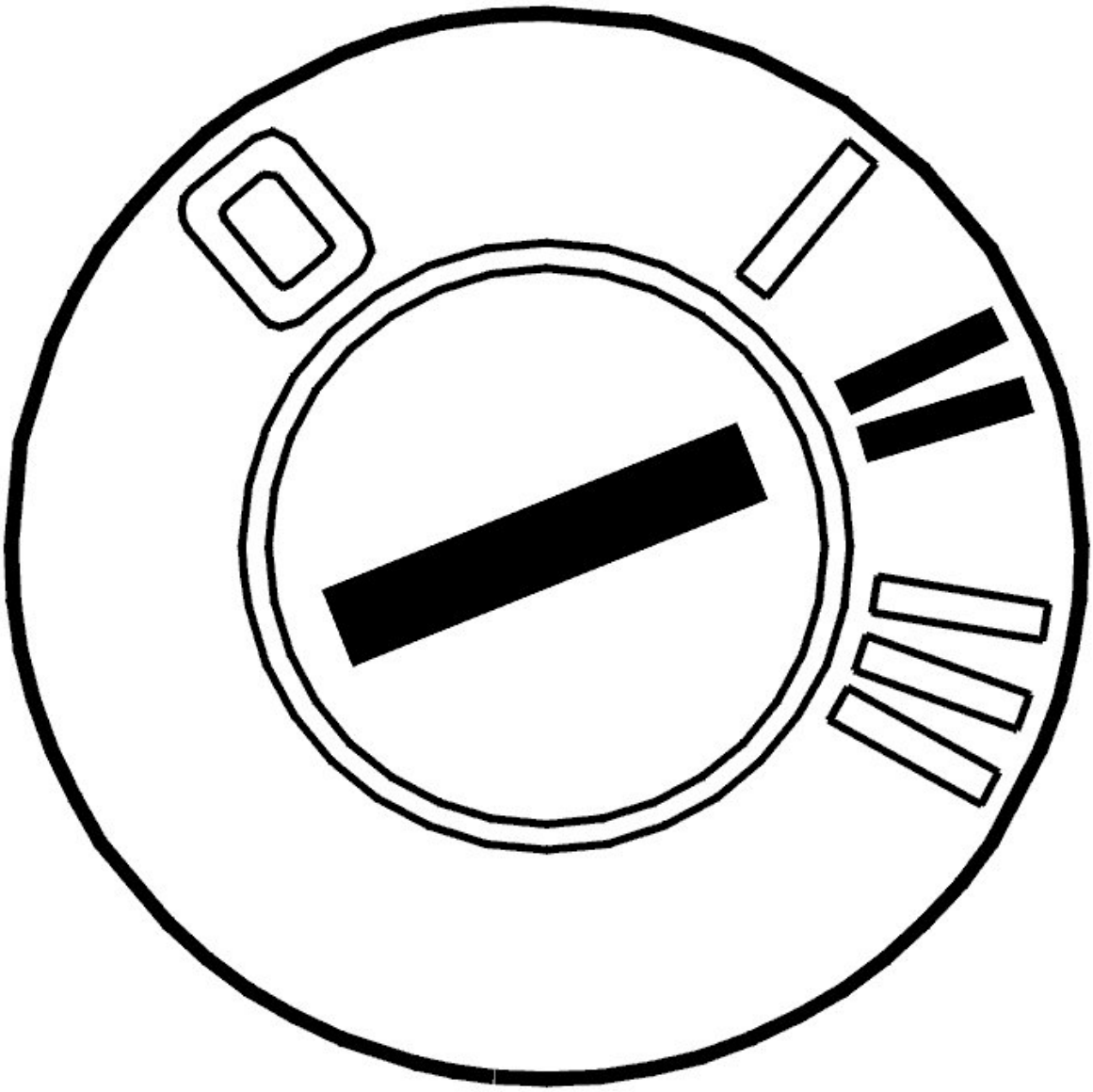


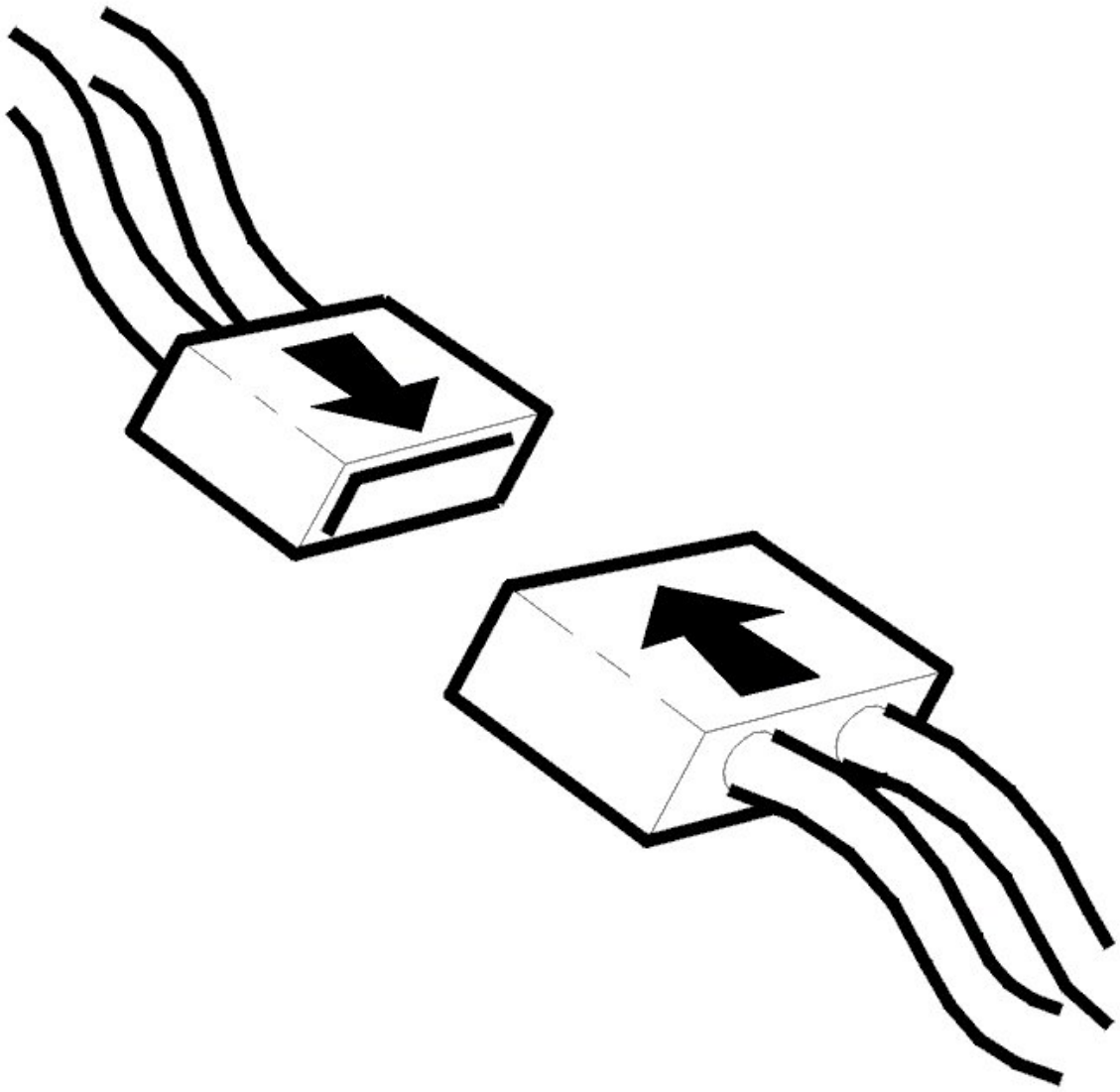
Were any faults found in the cable?

Yes - Verification

No - Checking the control module

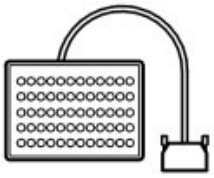
Checking the control module

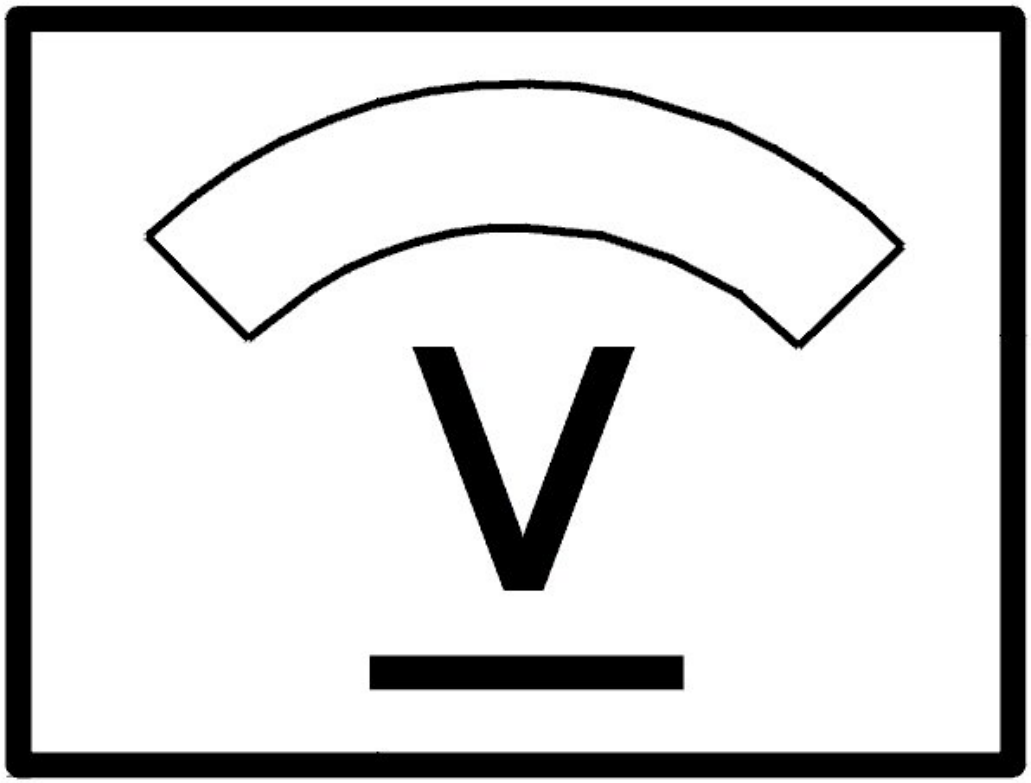




- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure.





Does the brake pressure increase?

Yes - Verification

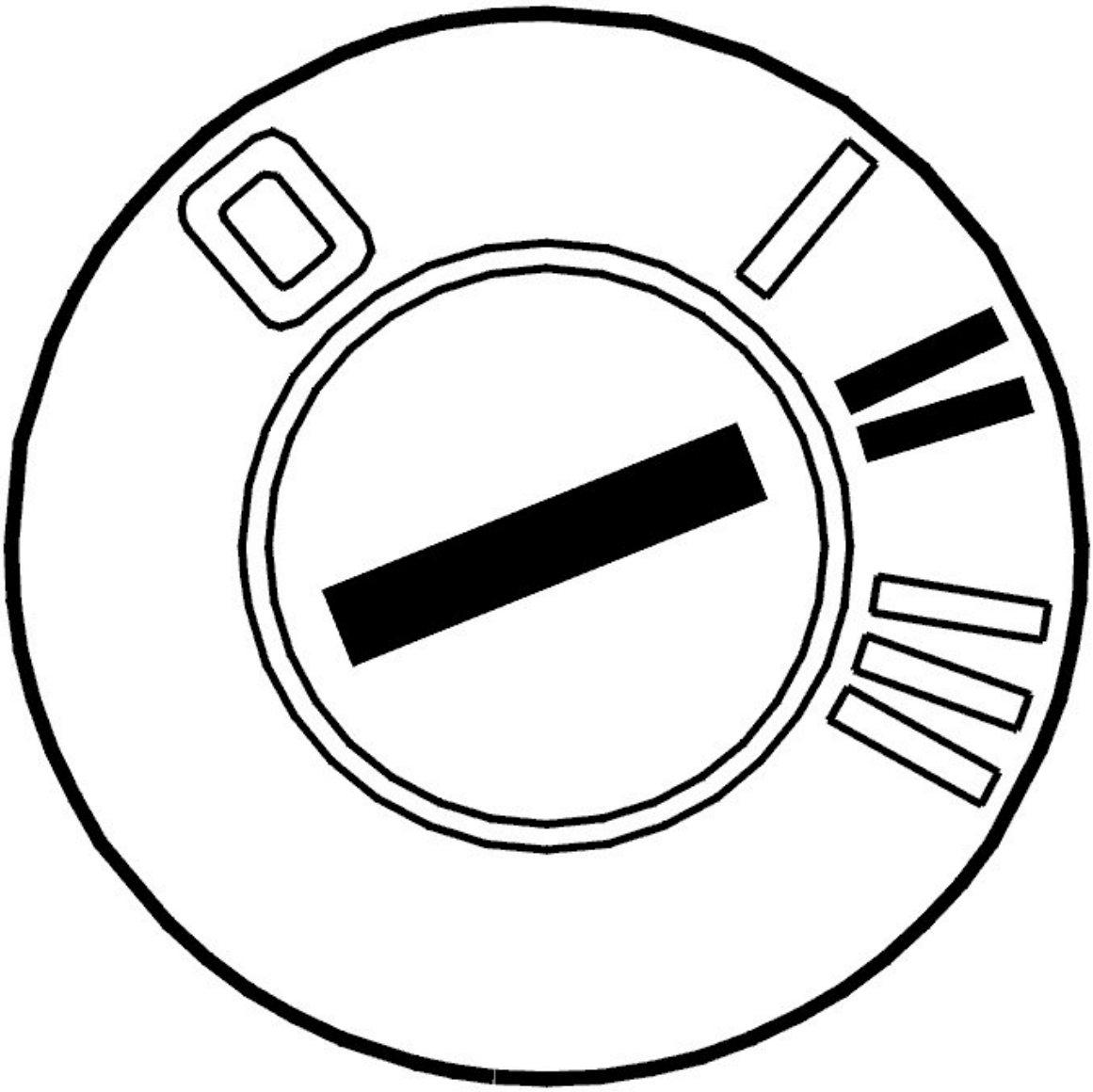
No - Fault-tracing information

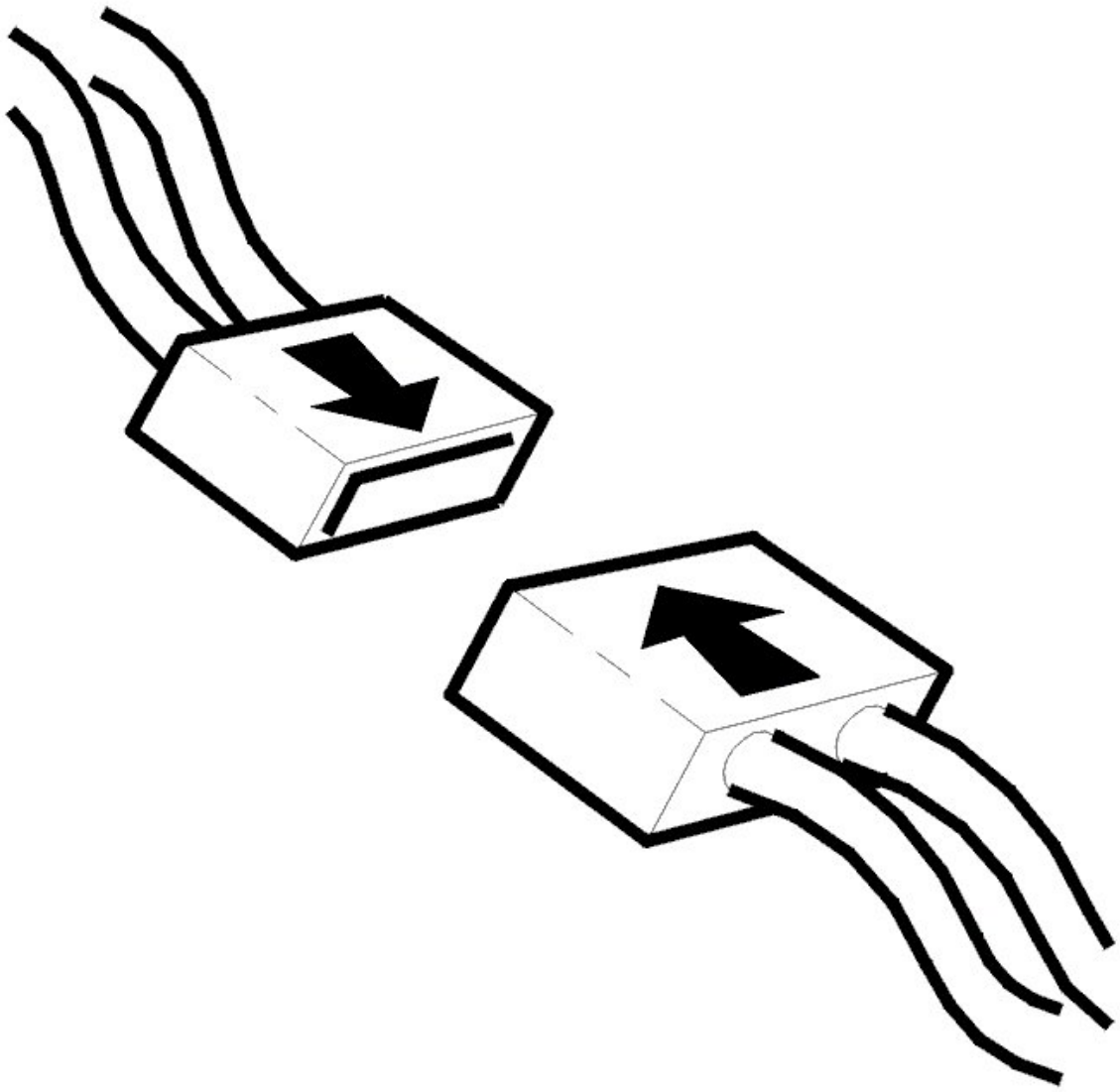
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the pressure in the brake system from the relevant pressure sensor
- Depress the brake pedal.

The brake pressure must increase with increased pedal pressure.

Does the brake pressure increase?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Fault-tracing information

Information

Fault-tracing information

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.
Complete the fault-tracing for those fault or try again.

Do you want to terminate fault-tracing at this time?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

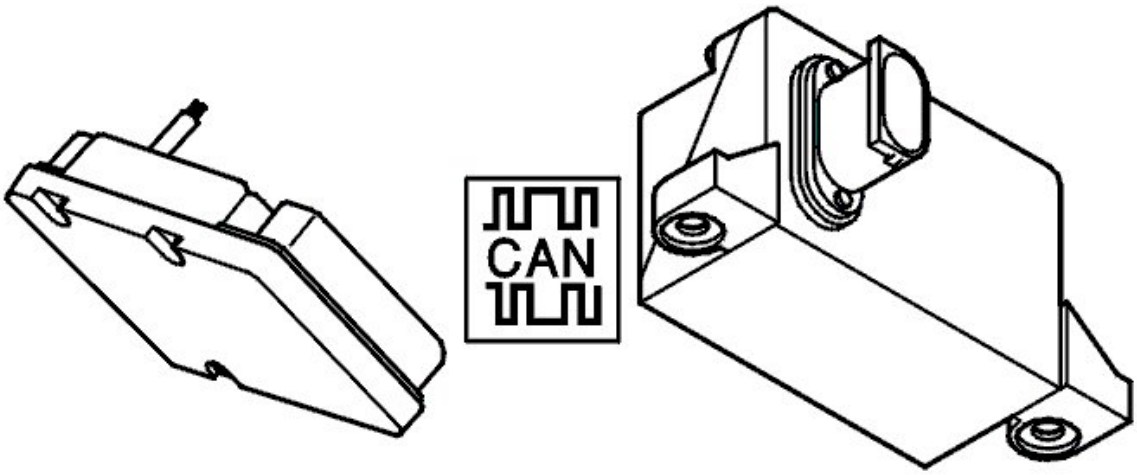
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! This diagnostic trouble code (DTC) applies only to brake systems with dynamic stability and traction control (DSTC).

The active yaw control sensor is supplied with 12 V.
Diagnostic trouble code (DTC) BCM-0138 is stored if the brake control module (BCM) registers that the supply voltage to the active yaw control sensor is too high or too low.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

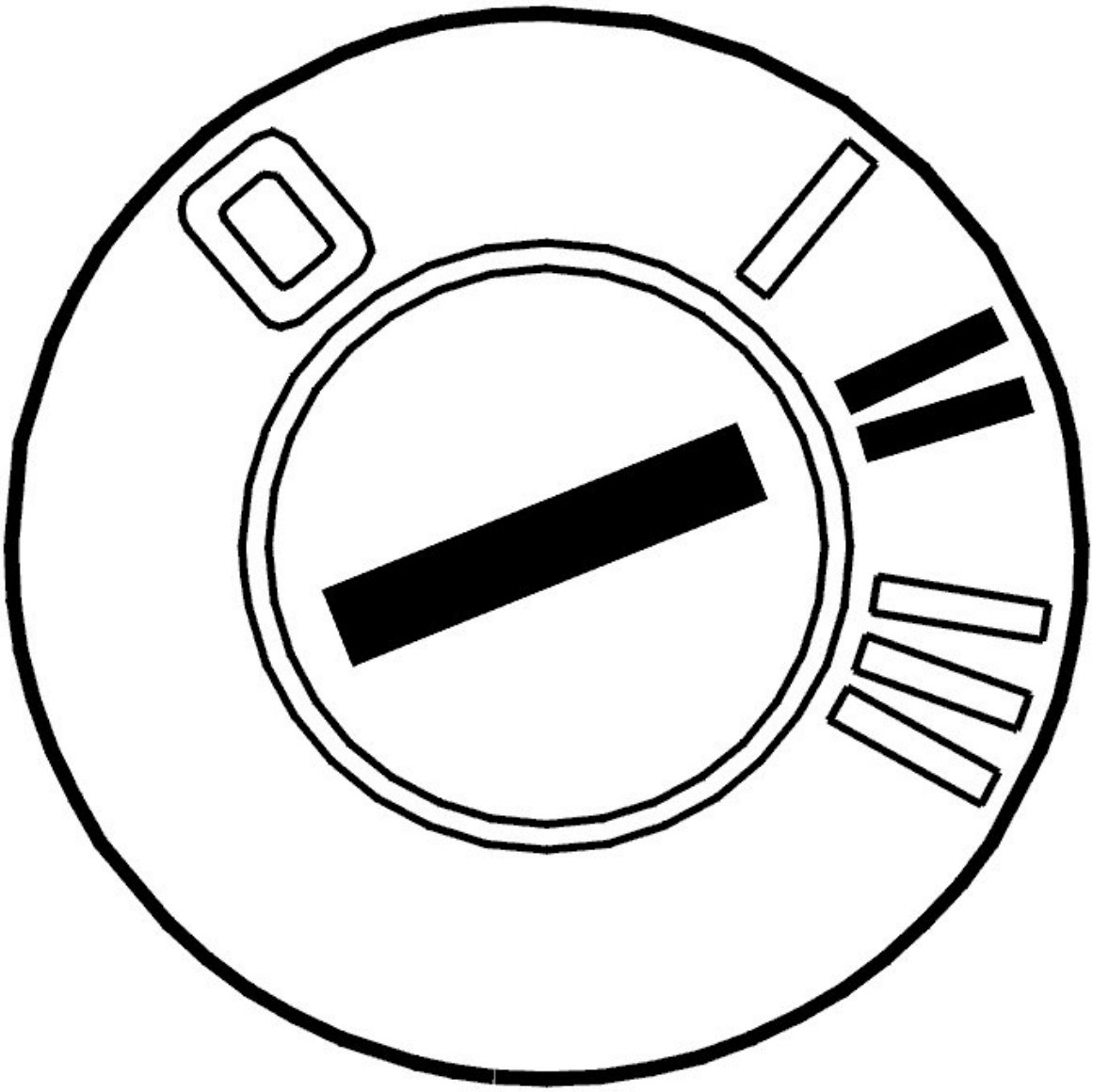
Possible source
- Contact resistance or oxidation in the terminals or connections
- Short-circuit to ground or to supply voltage in the power supply wiring for the active yaw control sensor
- Open-circuit in the power supply cable for the active yaw control sensor
- Internal fault in the active yaw control sensor
- Internal fault in the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Voltage

Faulty voltage

Checking the connectors



- Ignition off
- Check the connectors for the brake control module (BCM) and the active yaw control sensor. Check for contact resistance and oxidation
- Ignition on
- Wait approximately 60 seconds
- Read off diagnostic trouble codes (DTCs).

If the status of the diagnostic trouble code (DTC) is intermittent, the cause of the fault was probably contact resistance or oxidation in the connectors for the control module or the active yaw control sensor.

Other information

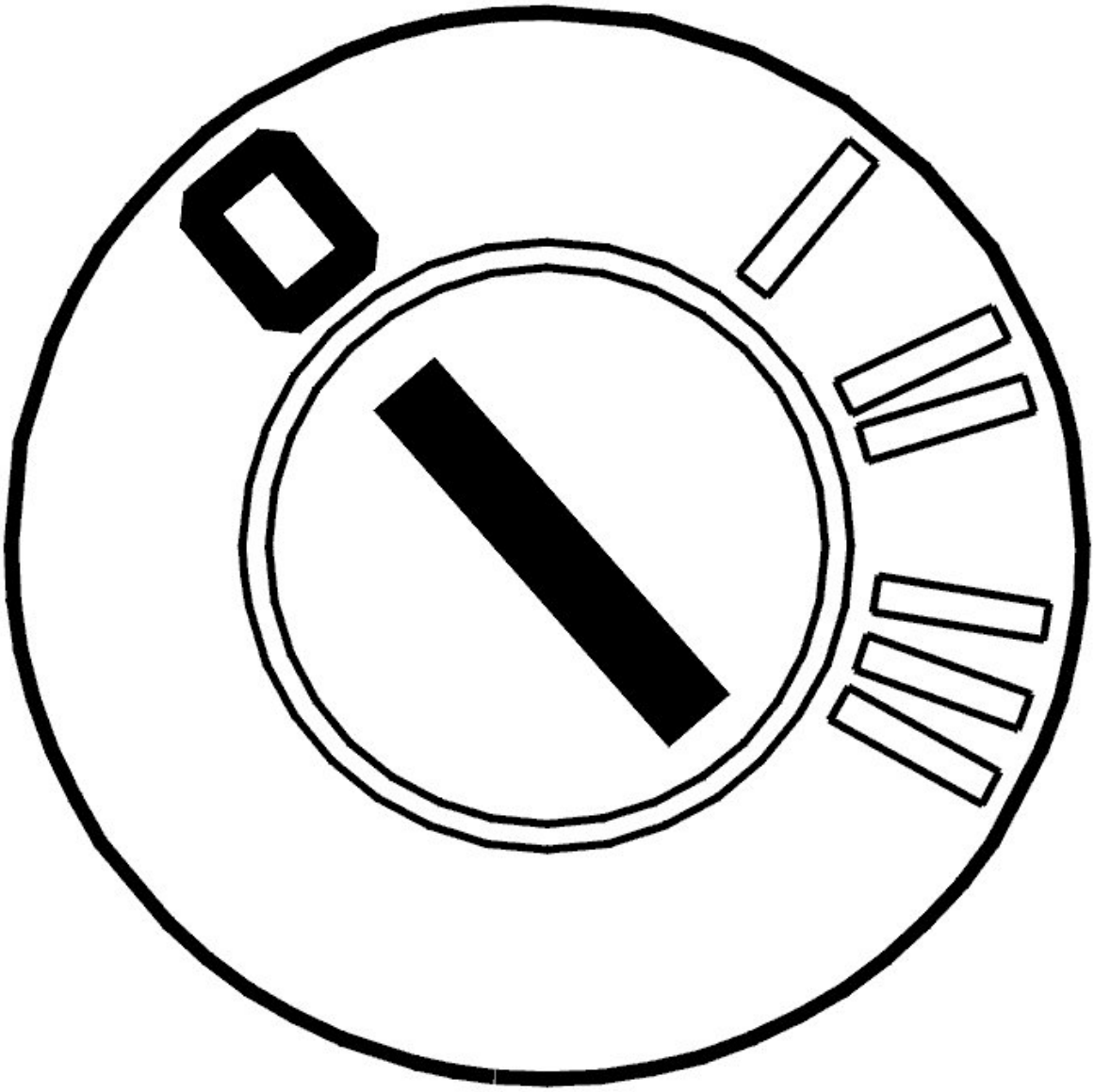
- To access the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

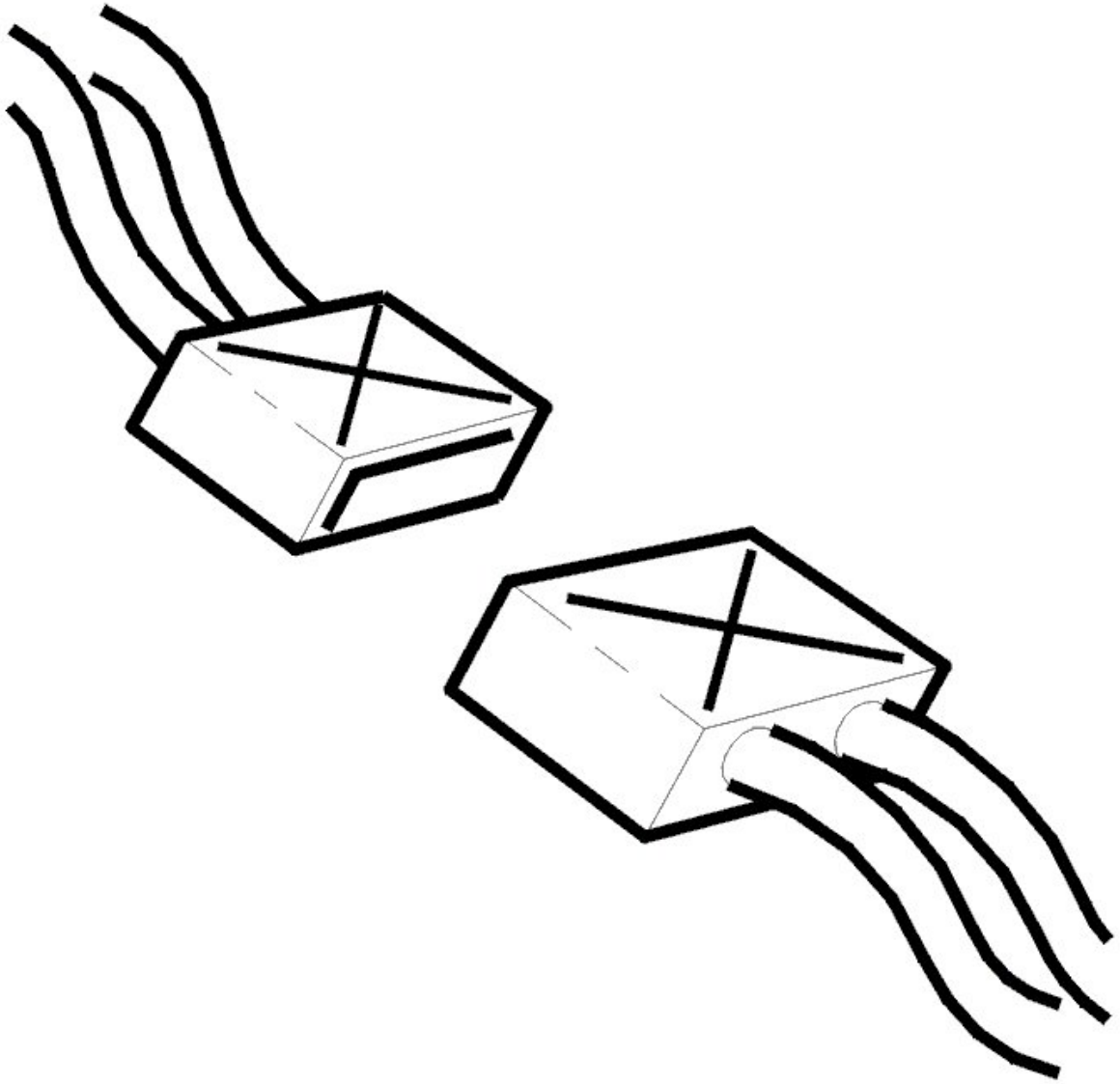
Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - Fault Found

No - Checking the active yaw control sensor

Checking the active yaw control sensor



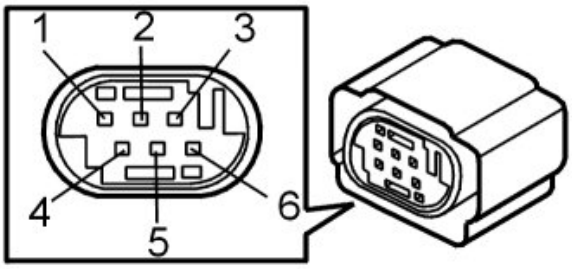


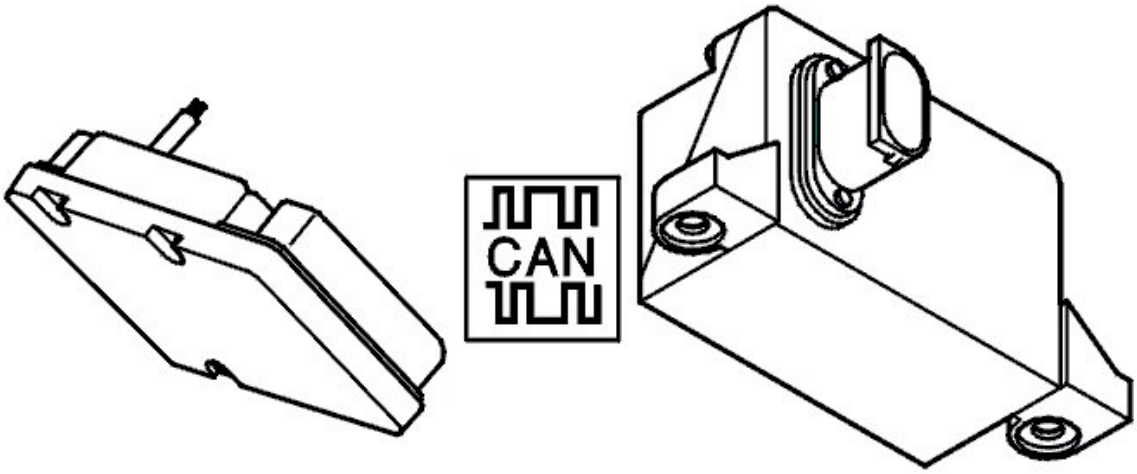
- Ignition off
- Breakout box connected to the brake control module (BCM)
- Ignition on
- Read off the power supply to the brake control module (BCM).

Check the power supply to the active yaw control sensor by connecting a voltmeter between control module terminals #6 (#A6) and #39 (#A39).
The voltage must be approximately the same as the read off value for the brake control module (BCM).
Replace the active yaw control sensor if the power supply to the sensor is OK.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the active yaw control sensor, see Active yaw control sensor, replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Yaw Rate Sensor/Service and Repair/Active Yaw Control Sensor, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.



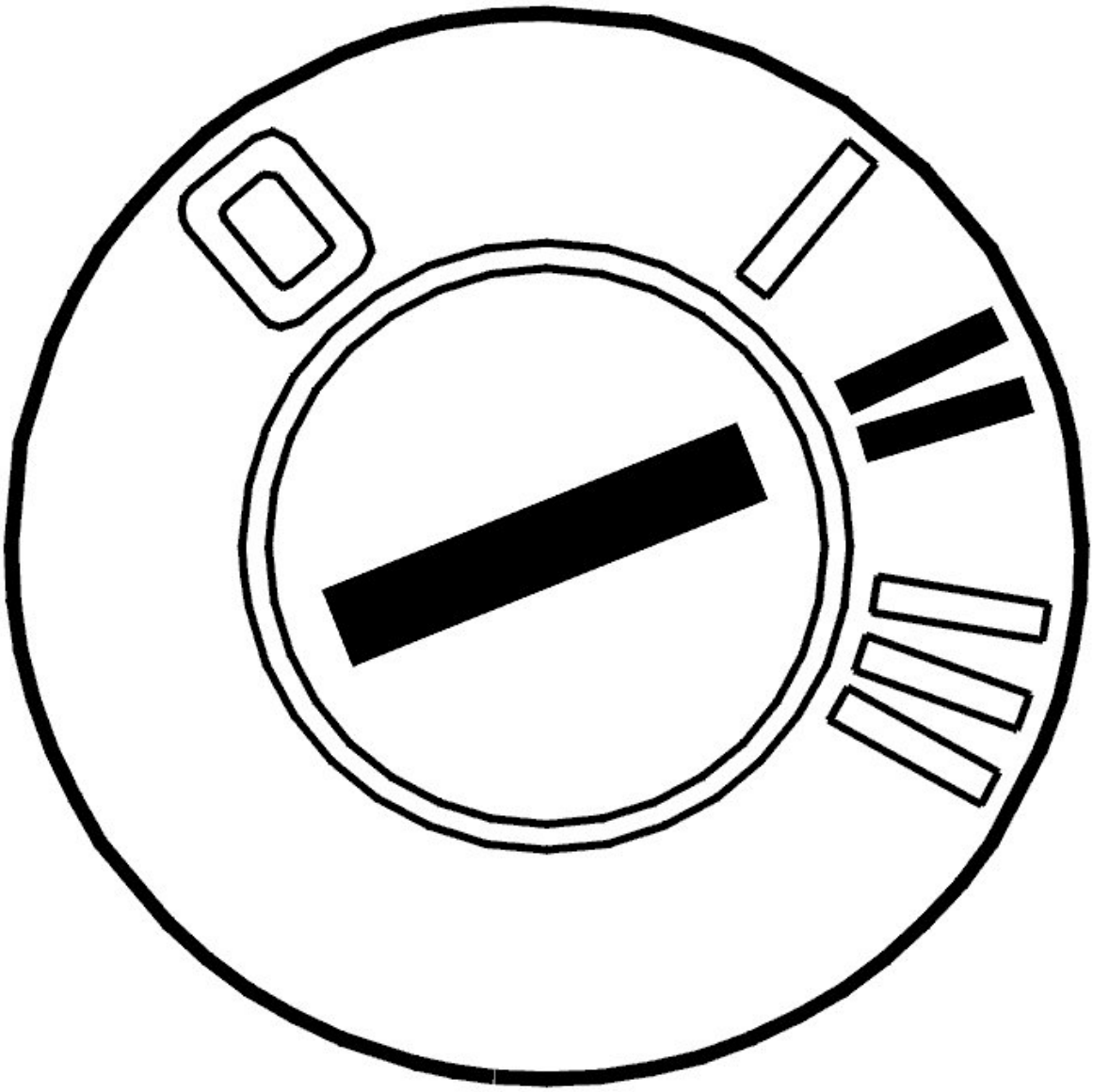


Was the voltage OK?

Yes - Checking the wiring

No - Verification

Checking the wiring



- Ignition off.

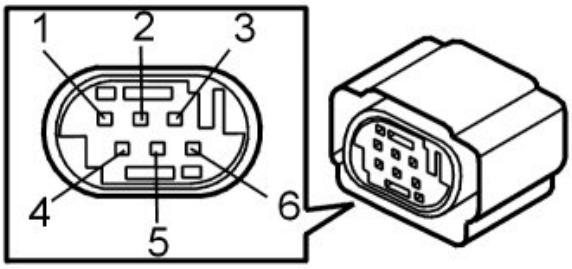
Check the power supply wiring between the active yaw control sensor:

- terminal #3 and brake control module (BCM) terminal #6 (#A6)
- terminal #5 and brake control module (BCM) terminal #39 (#A39).

check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Replace the control module if the wiring is OK.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the control module, see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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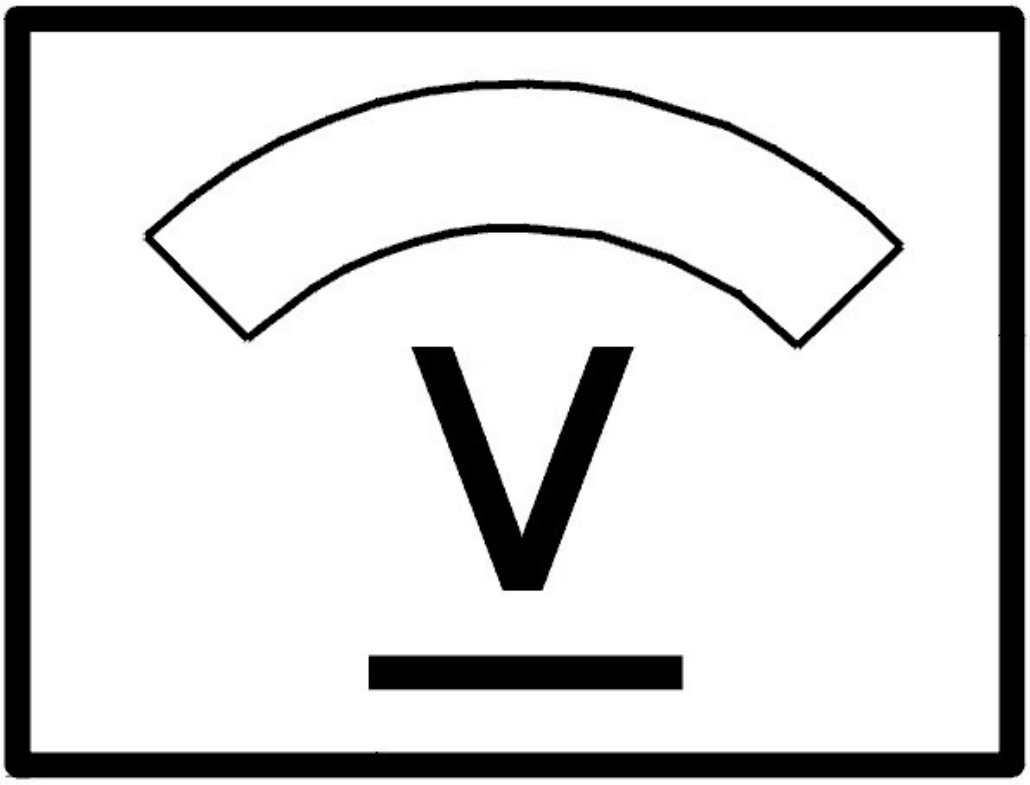
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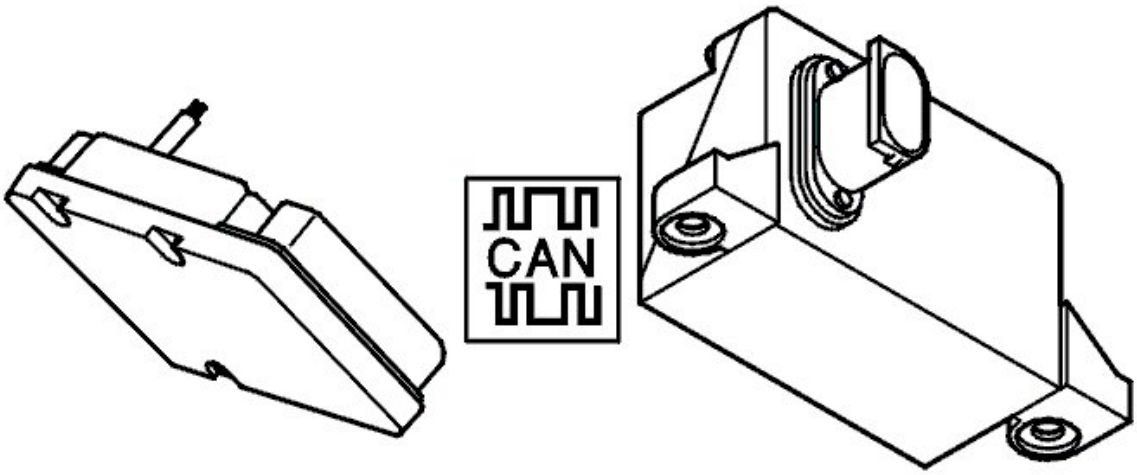


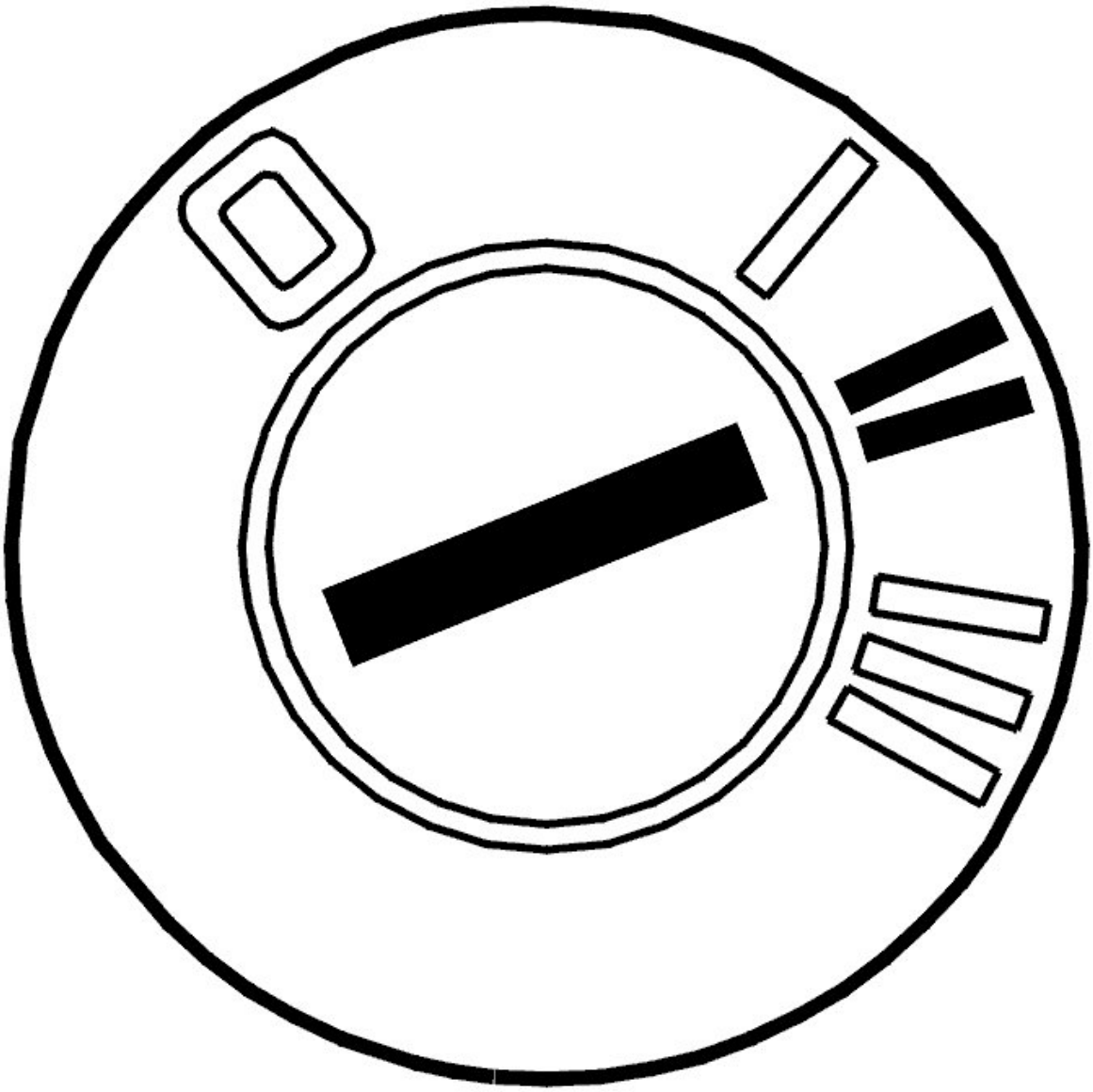
Continue - Verification

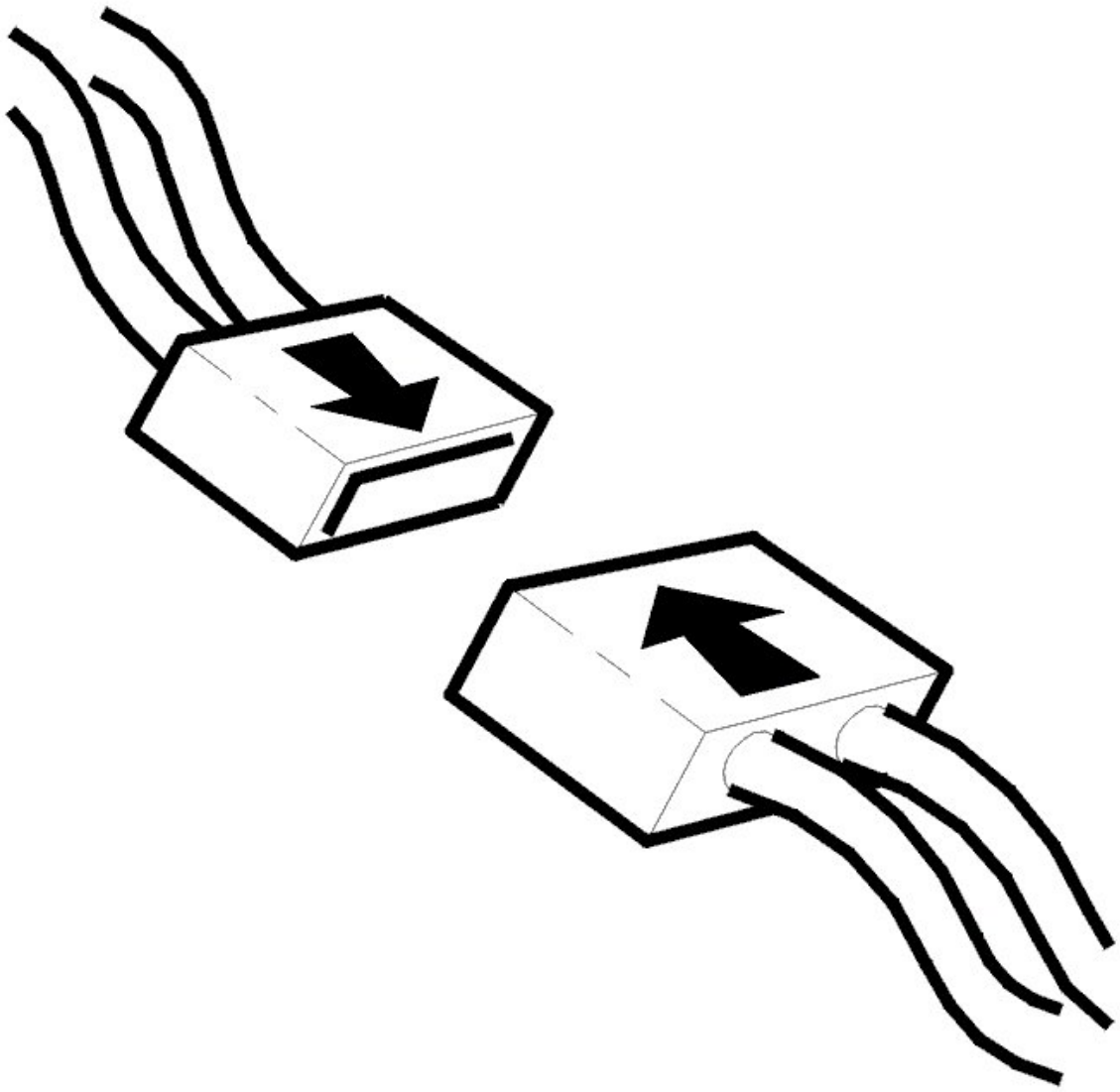
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

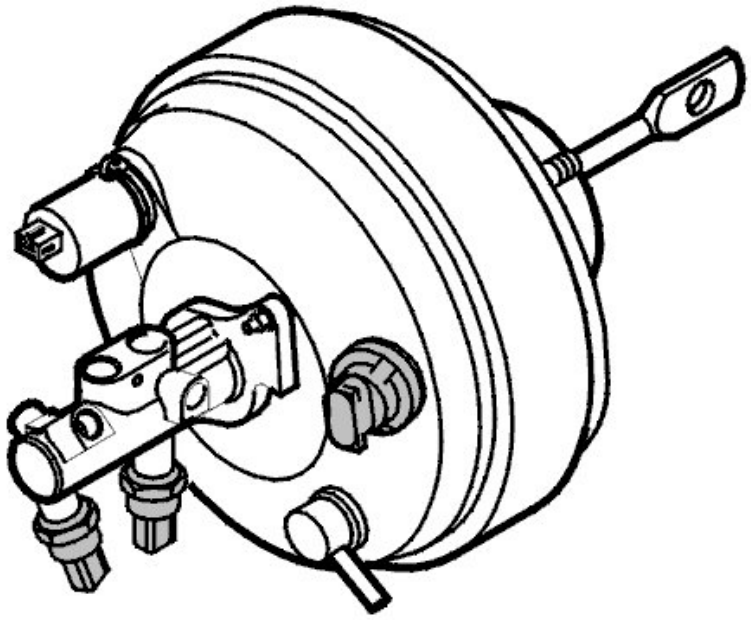
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! This diagnostic trouble code (DTC) applies only to brake systems with dynamic stability and traction control (DSTC).

During stability control the brake control module (BCM) transmits a signal to the pressure build-up valve. The valve opens and releases atmospheric pressure into the brake power booster. This increases the brake pressure in the brake system automatically. The function is used for traction control and in active brake assistance.
Diagnostic trouble code (DTC) BCM-0139 is stored if the control module registers an implausible signal from the pressure build-up valve.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked

- Brake assistance is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

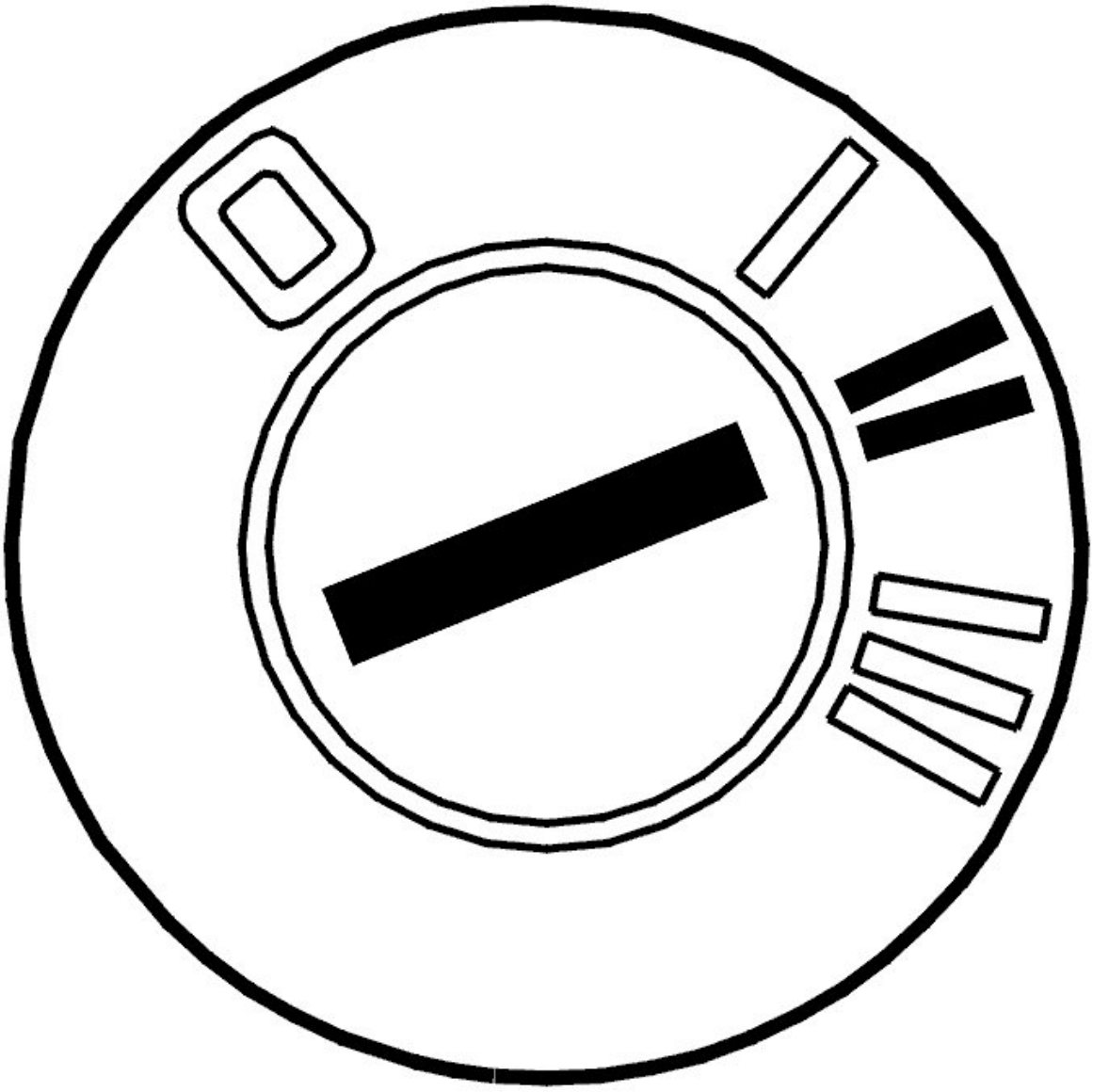
Possible source
- Contact resistance or oxidation in the terminals or connections
- Short-circuit to ground or supply voltage in the wiring
- Incorrectly installed sensor
- Defective pressure build-up valve
- Internal fault in the control module.

Fault symptom[s]
- General warning lamp lit
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the connectors



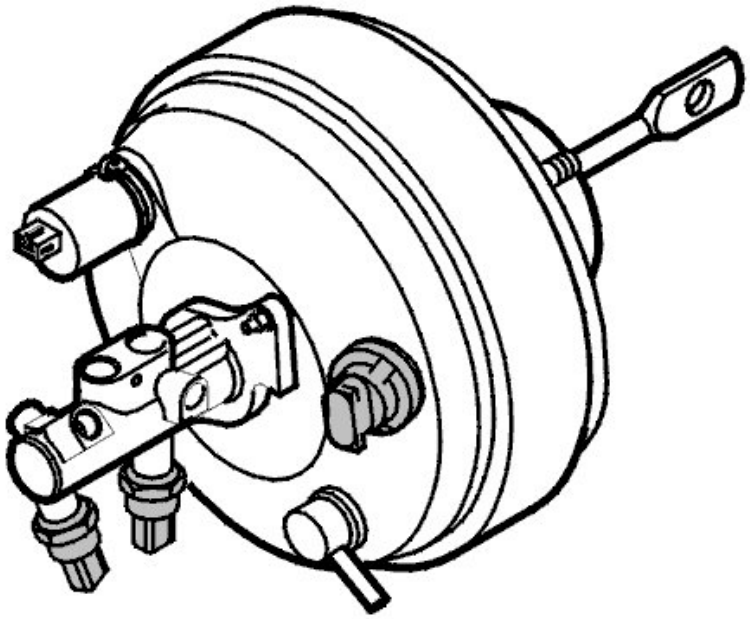
- Ignition off
- Check the connectors of the brake control module (BCM) and the pressure build-up valve/pedal pressure sensor for contact resistance and oxidation.
- Reinstall the components, reconnect the connectors etc.
- Ignition on

- Use the Activation function to activate the pressure build-up valve.

A mechanical pumping sound should be audible from the engine compartment and the pedal should move slightly.

Other information

- For removal of the control module connectors: Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was the function OK?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors

Check the cables between the pressure build-up valve:

- #3 and brake control module (BCM) #31 (#A31)
- #4 and brake control module (BCM) #17 (#A17)

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.

Hint: Check the pressure build-up valve by, with the ignition off and the breakout box connected, reading the resistance between terminals #17 and #31 on the breakout box. Resistance must be approximately 3ohms.

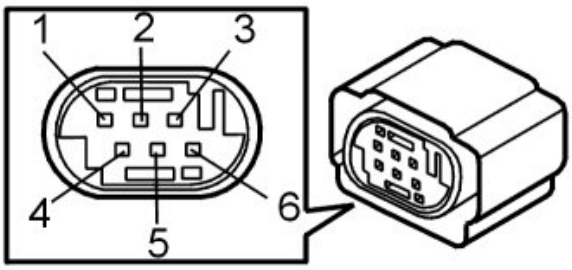
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box,

Brake Control Module (BCM)

- For replacing the pressure build-up valve (brake booster): Power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Vacuum Brake Booster/Service and Repair/Power Brake Booster, Replacing



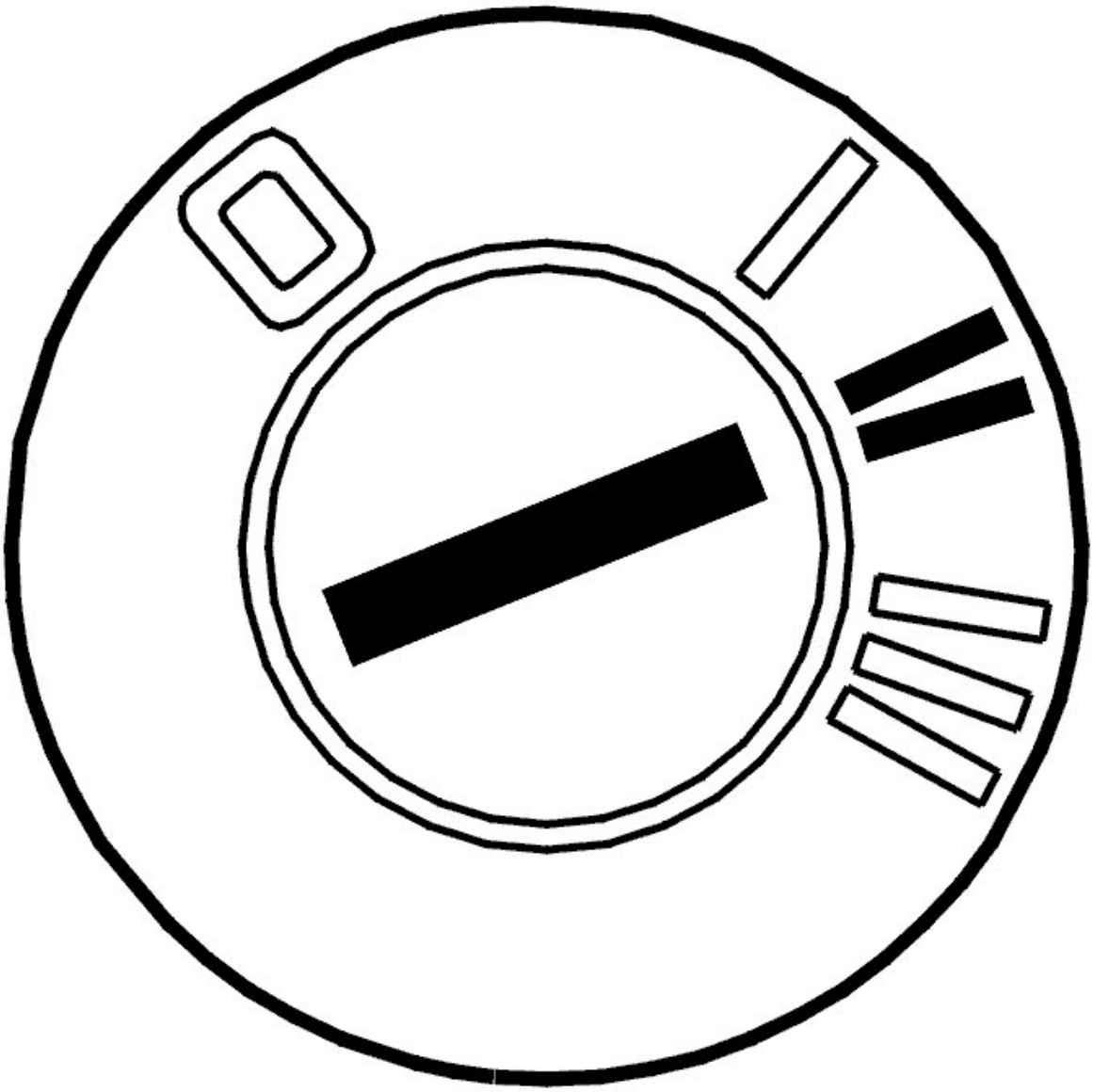
Was a fault detected?

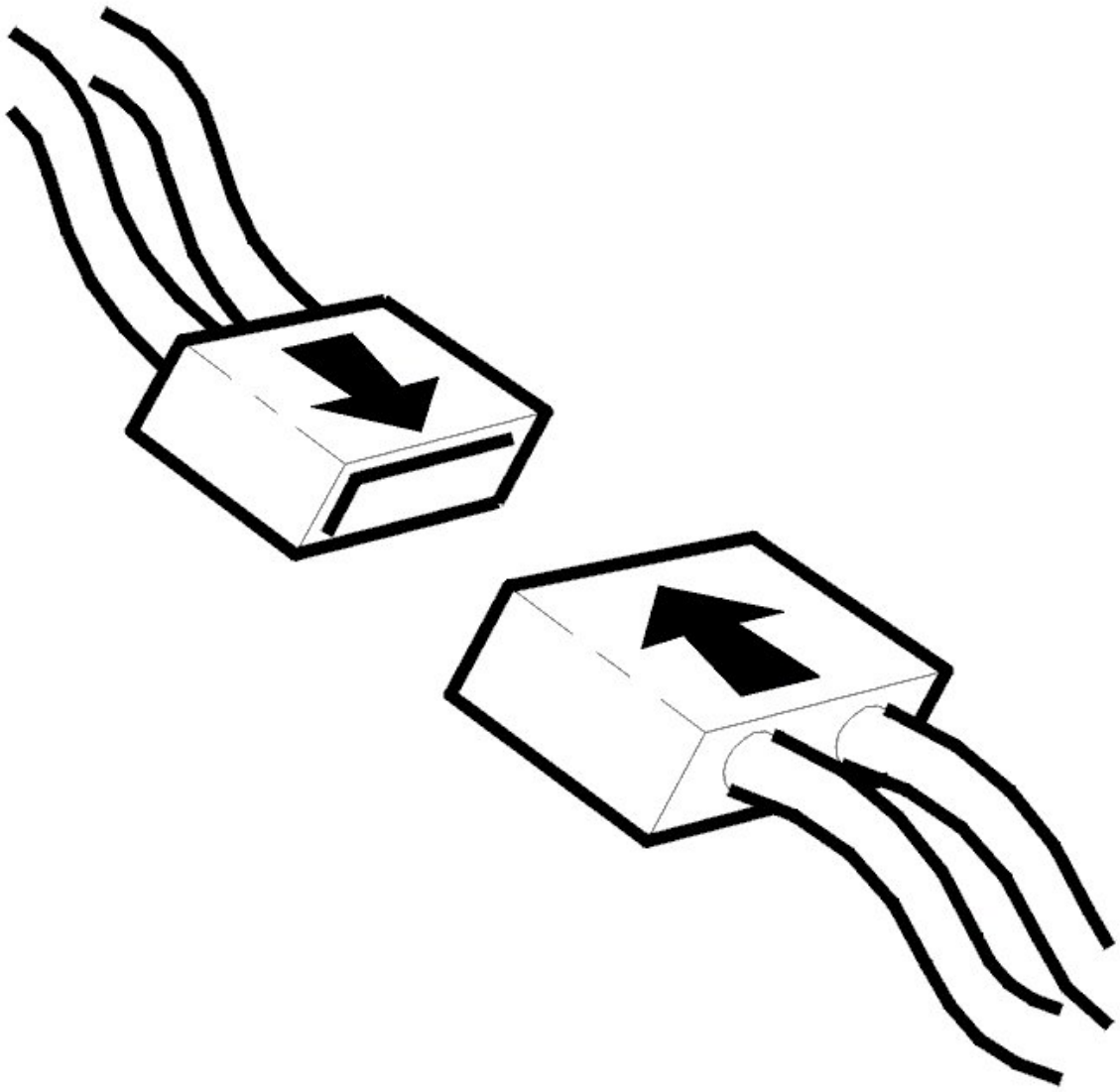
Yes - Verification

No - No Fault Found

Verification

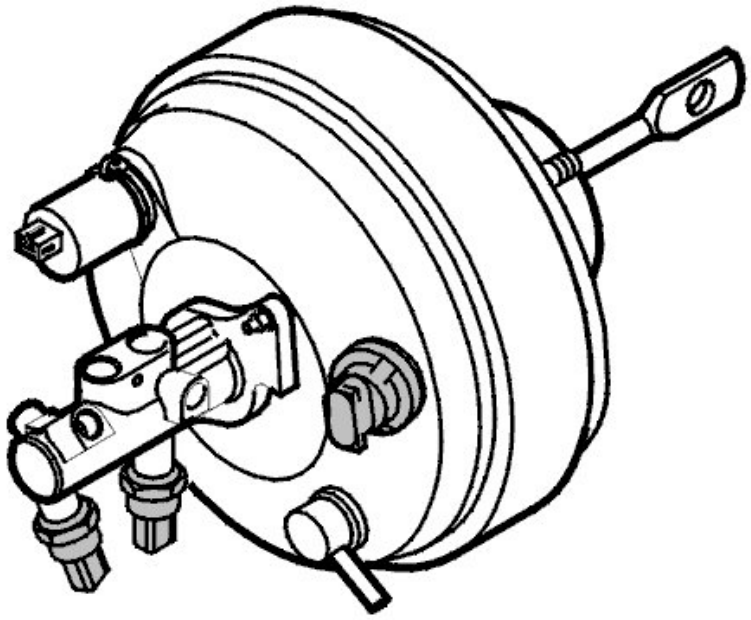
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Use the Activation function to activate the pressure build-up valve.

A mechanical pumping sound should be audible from the engine compartment and the pedal should move slightly.



Was the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

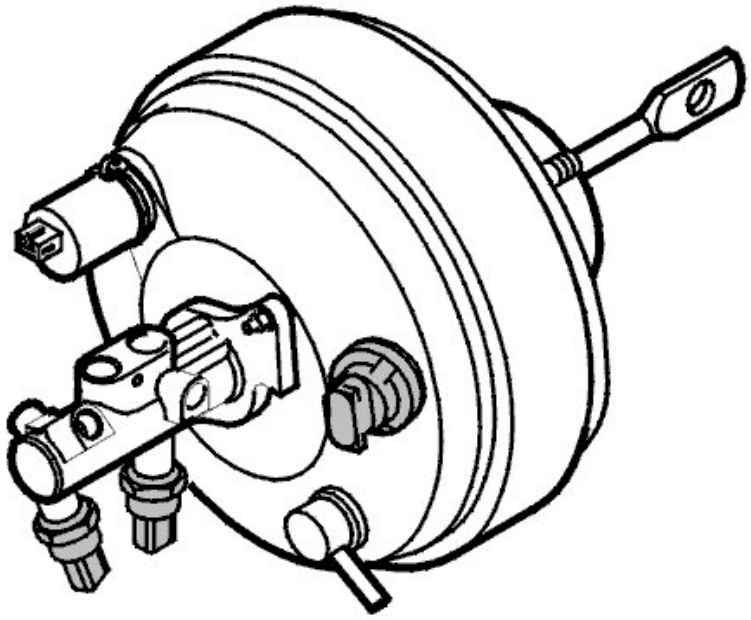
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! This diagnostic trouble code (DTC) applies only to brake systems with dynamic stability and traction control (DSTC).

The pedal pressure sensor is located in the power brake booster and informs the brake control module (BCM) when the brake pedal is pressed. The control module uses the information to disengage active yaw control and active brake assistance if the functions are activated and the driver presses the brake pedal.
Diagnostic trouble code (DTC) BCM-0140 is stored if the control module registers an implausible signal from the pedal pressure sensor.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- Brake assistance is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

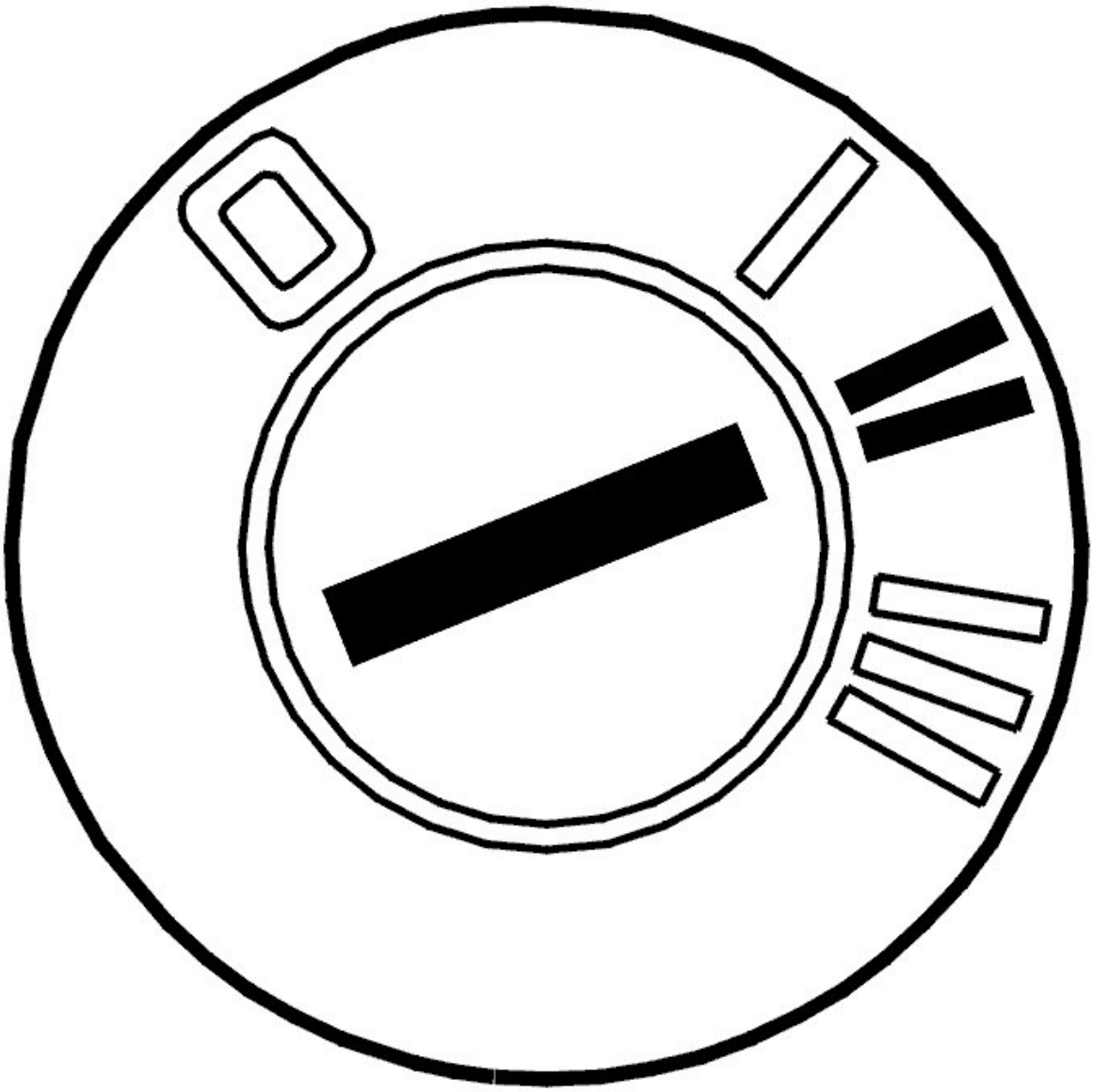
Possible source
- Contact resistance or oxidation in the terminals or connections
- Open-circuit in the wiring
- Short-circuit to ground or supply voltage in the wiring
- Defective pedal pressure sensor
- Defective brake control module (BCM).

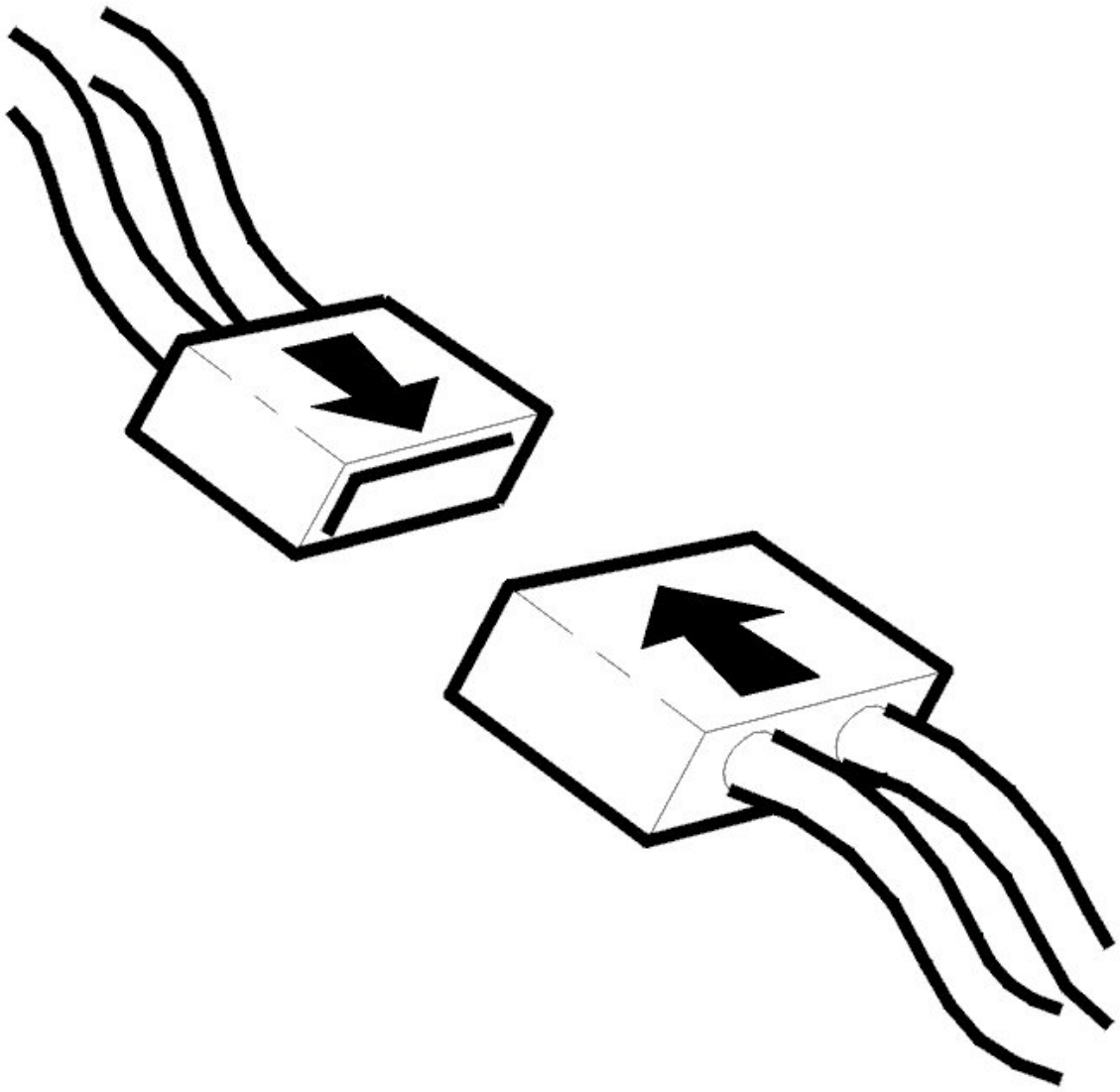
Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General warning lamp lit
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

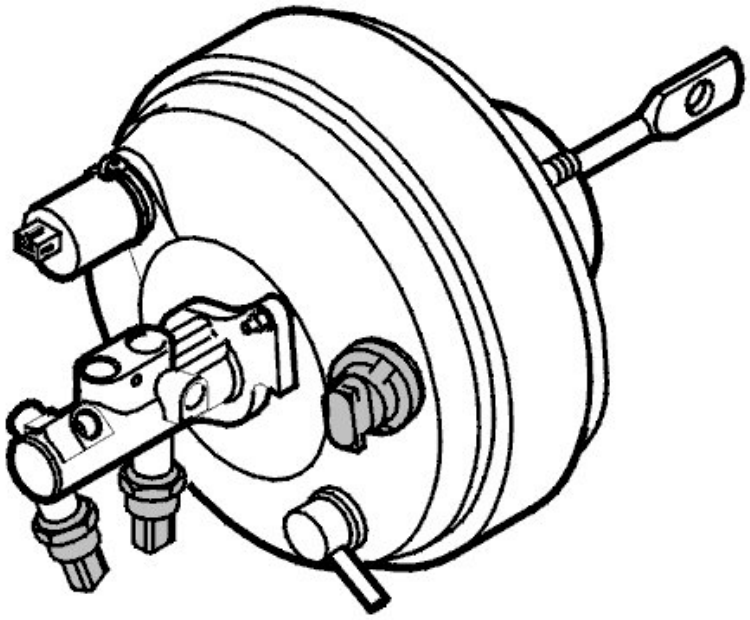
Checking the connectors





- Ignition off
- Check the brake control module (BCM) and pedal pressure sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the status of the pedal pressure sensor.

The status must be OFF with the brake pedal unaffected and change to ON when the brake pedal is pressed. If the status changes, the cause of the fault was probably contact resistance or oxidation in the control module or in the pedal pressure sensor connectors.



Does the status change?

Yes - Fault Found

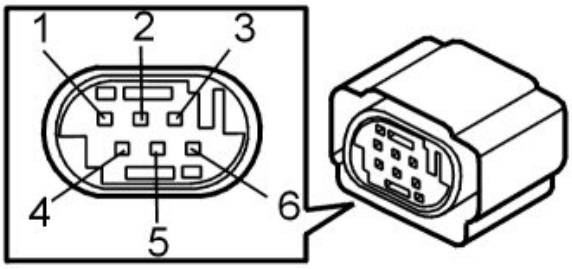
No - Checking the wiring

Checking the wiring

Check the wiring between the pedal pressure sensor:
- terminal #1 and control module terminal #27 (#A27)
- terminal #2 and control module terminal #30 (#A30)
- terminal #5 and control module terminal #28 (#A28).

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To fault-trace the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To replace the pedal pressure sensor (power brake booster), see Power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Vacuum Brake Booster/Service and Repair/Power Brake Booster, Replacing
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification.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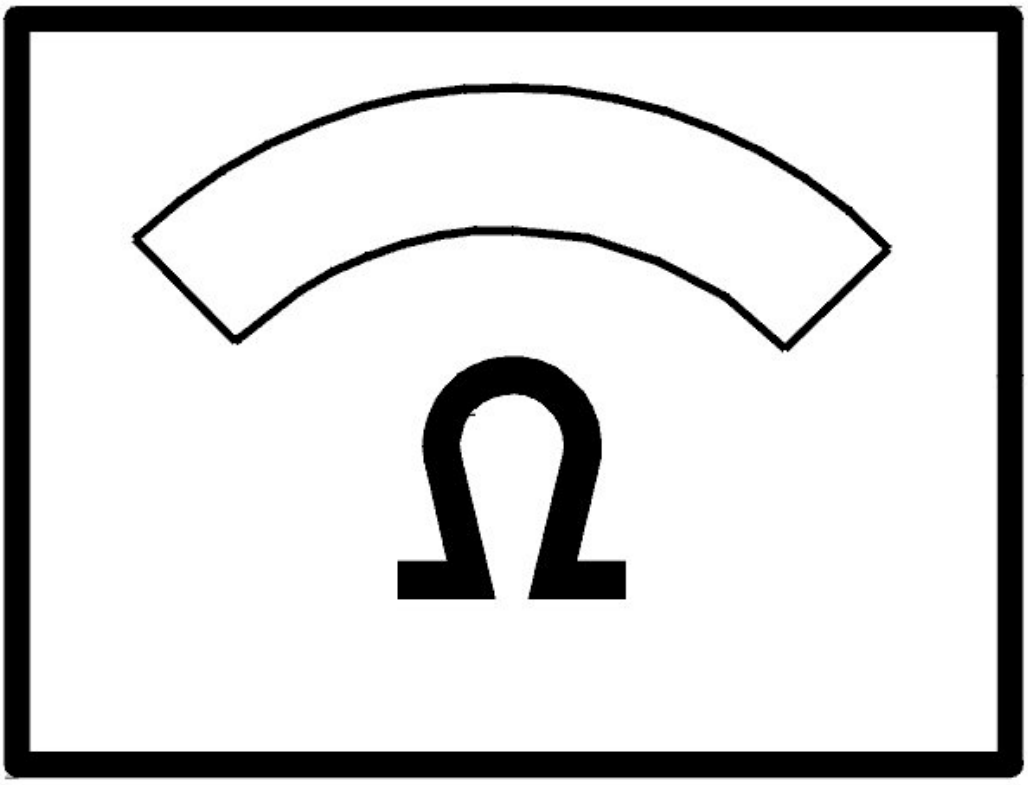
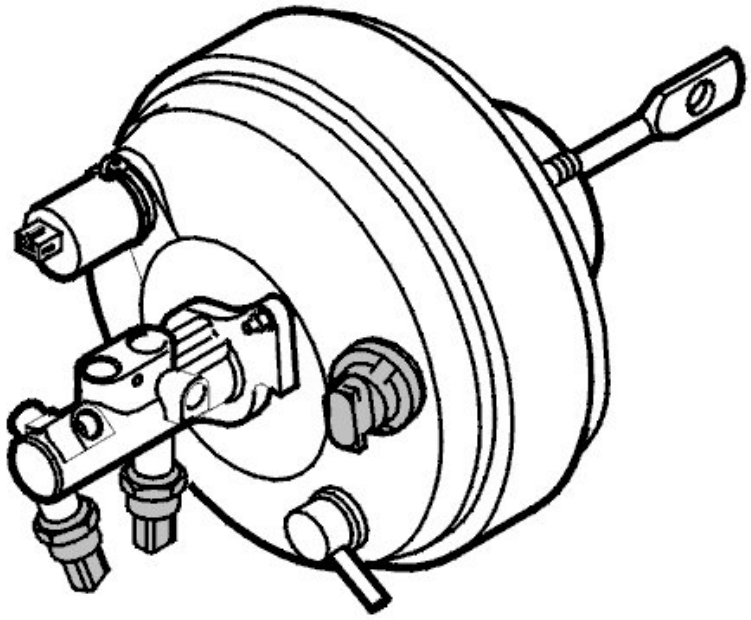


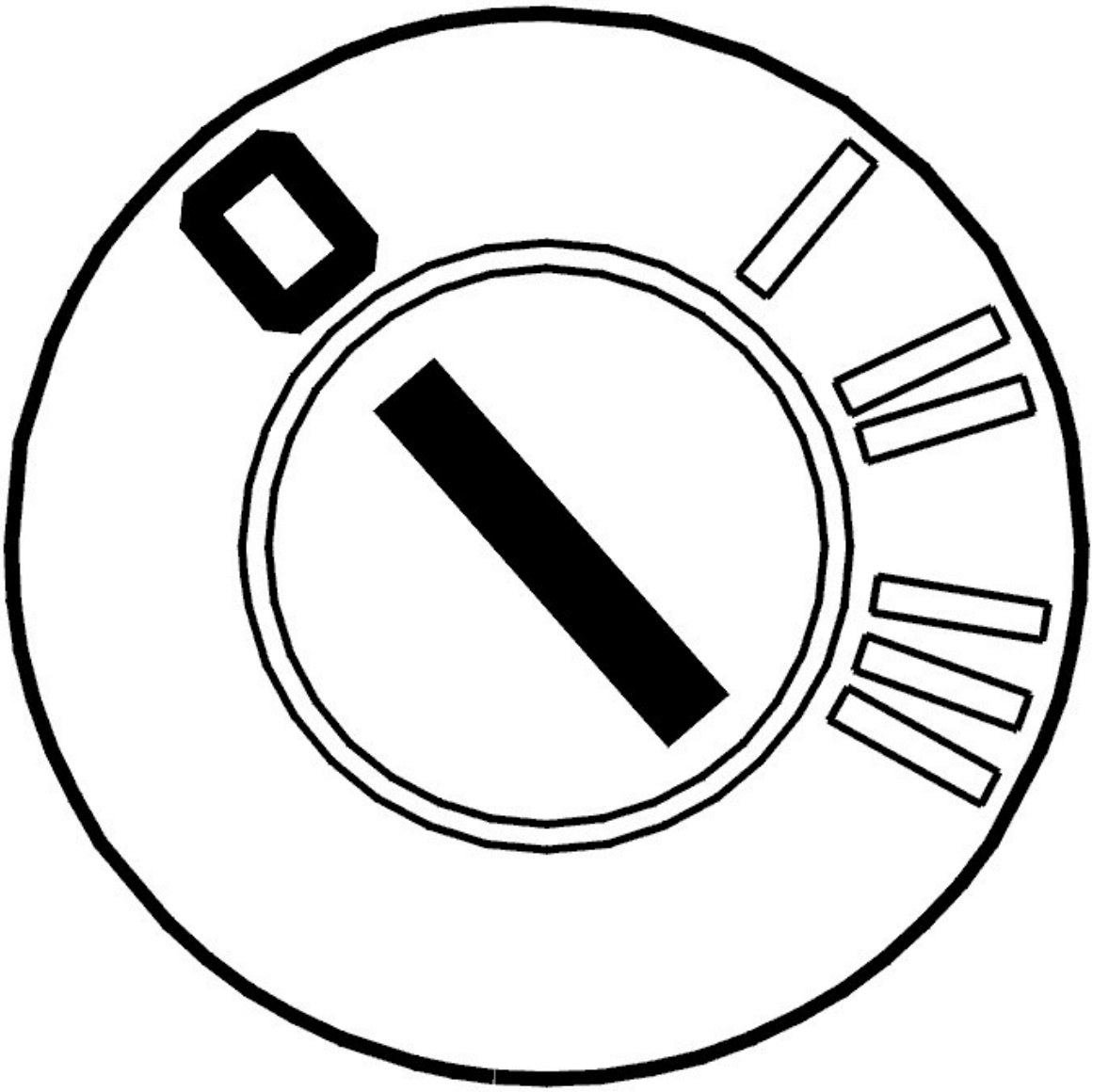


Was a fault detected?

Yes - Verification

No - Checking the connectors

Checking the connectors

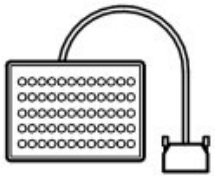


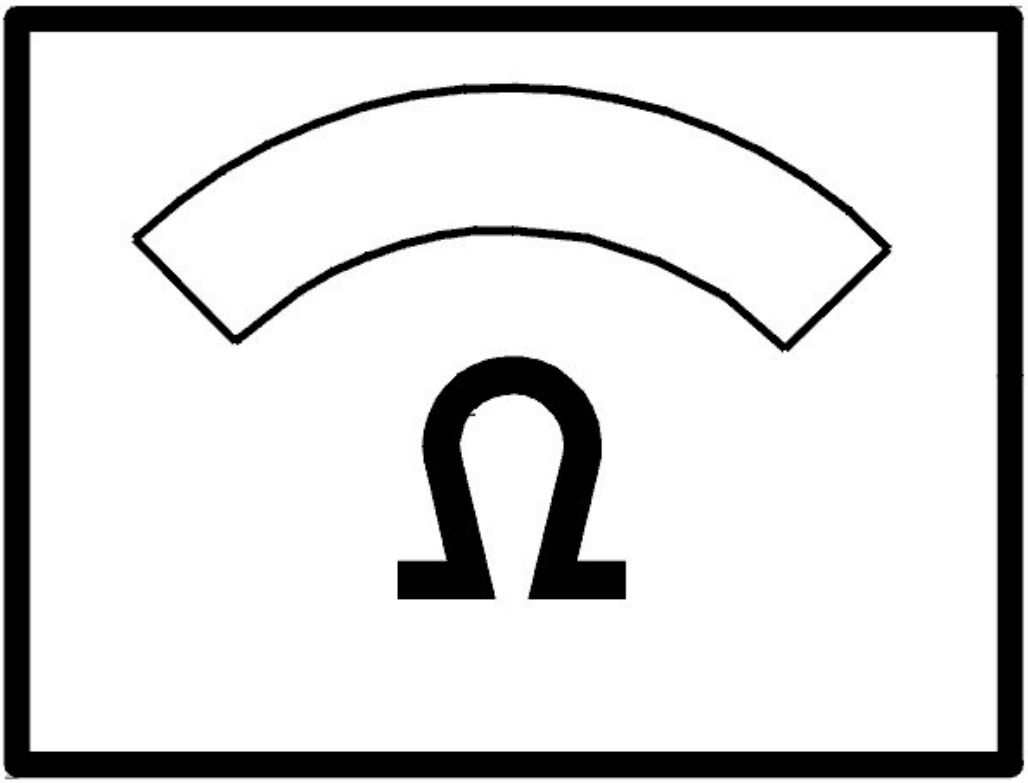
- Ignition off
- Connect the breakout box to the cable harness (not control module side).

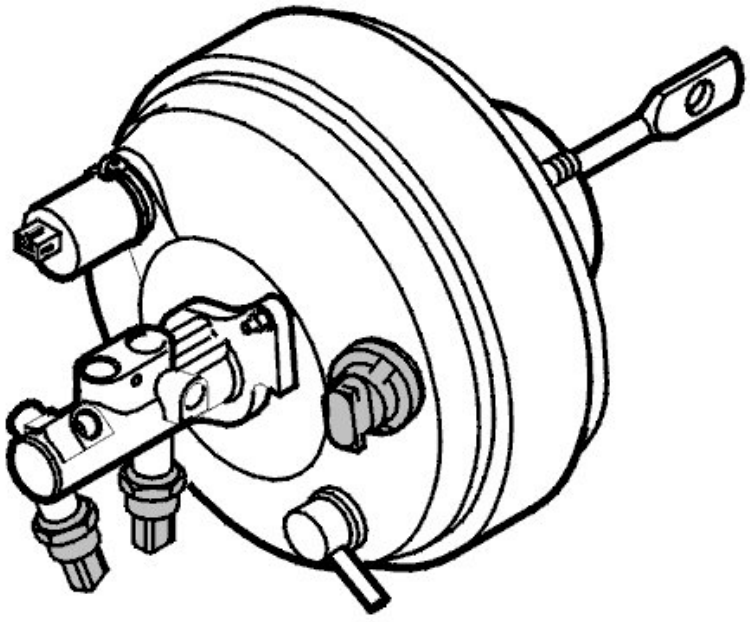
Connect an ohmmeter between terminals #28 and #27 on the breakout box. When the brake pedal is not depressed the resistance must be infinite. When the brake pedal is depressed the resistance must be 0 ohms.
Connect an ohmmeter between terminals #28 and #30 on the breakout box. When the brake pedal is not depressed the resistance should be 0 ohms. When the brake pedal is depressed the resistance should be infinite.
Replace the power brake booster if the resistance is incorrect.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the power brake booster, see Power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Vacuum Brake Booster/Service and Repair/Power Brake Booster, Replacing.







Was the resistance OK?

Yes - No Fault Found

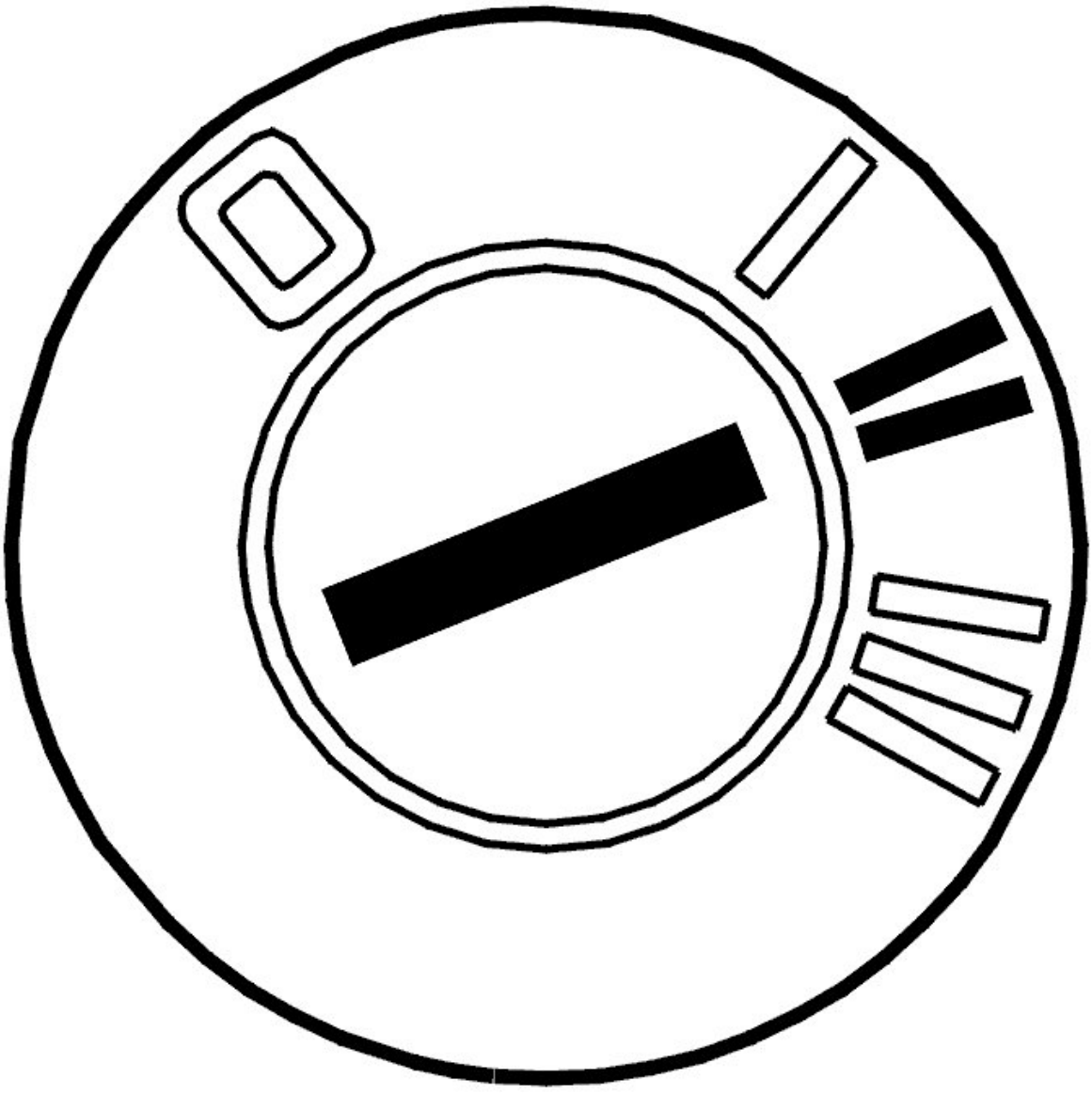
No - Verification

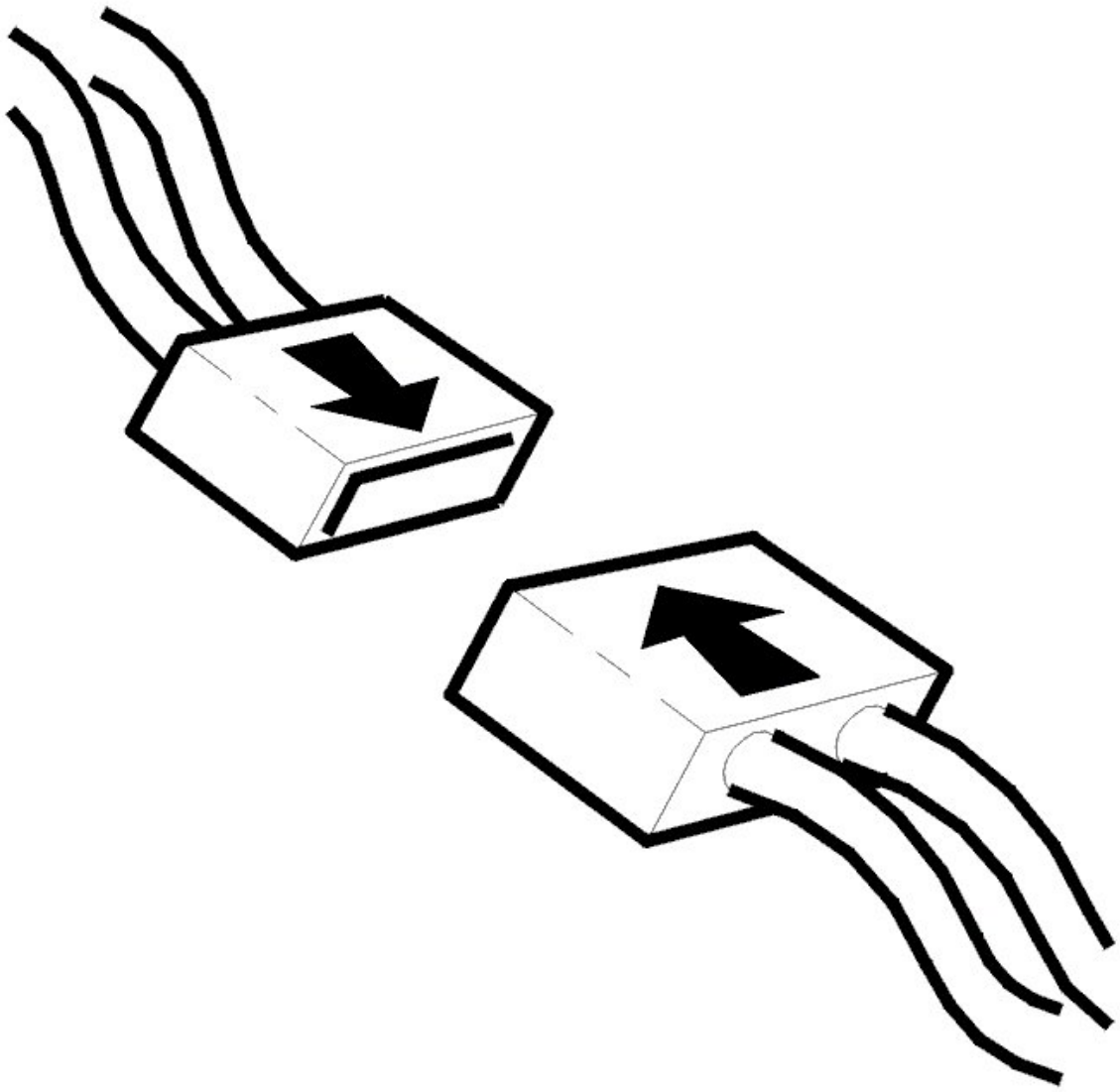
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

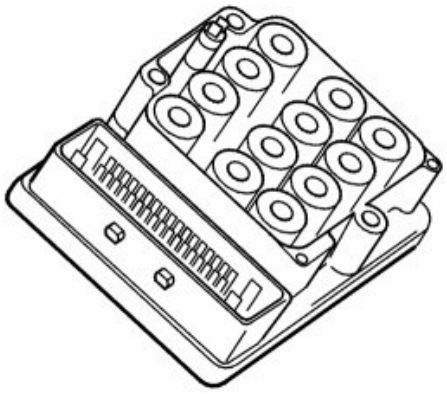
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0145 is stored If the brake control module (BCM) registers that the stability function operates for more than 15 seconds non-stop.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Incorrectly installed steering wheel
- Incorrect wheel alignment
- Loose or incorrectly installed active yaw control sensor
- Defective active yaw control sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)

- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Too Long Stability Control

Too long stability control

Visually checking the brakes

Hint: The diagnostic trouble code (DTC) indicates that the stability function has been active for too long.

Check the front and rear brakes. Check there is no overheating damage to brake caliper, brake pads or brake disc. Replace damaged components. Tell the customer why the anti-spin function was temporarily blocked and why the ABS warning lamp was lit.

Other information

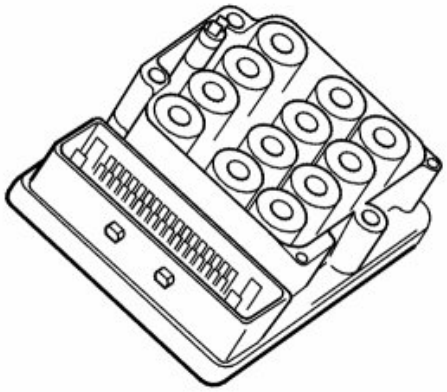
- To remove or replace brake calipers, see Brake calipers front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement and Brake calipers rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Caliper/Service and Repair/Removal and Replacement
- To remove or replace brake pad, see Brake pads front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Pad/Service and Repair and Brake pads rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Pad/Service and Repair
- To remove or replace brake disc, see Brake disc front, replacing See: Brakes and Traction Control/Disc Brake System/Brake Rotor/Disc/Service and Repair and Brake discs rear, replacing See: Brakes and Traction Control/Disc Brake System/Brake Rotor/Disc/Service and Repair.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Note! The diagnostic trouble code (DTC) applies only to cars with dynamic stability and traction control (DSTC).

Diagnostic trouble code (DTC) BCM-0146 is stored if the brake control module (BCM) registers that the factory test was not completed.

Substitute value

- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Active yaw control operation during the factory test
- Factory test not completed satisfactorily.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

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Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Test Cycle Not Approved

Test cycle not approved

Fault-tracing information

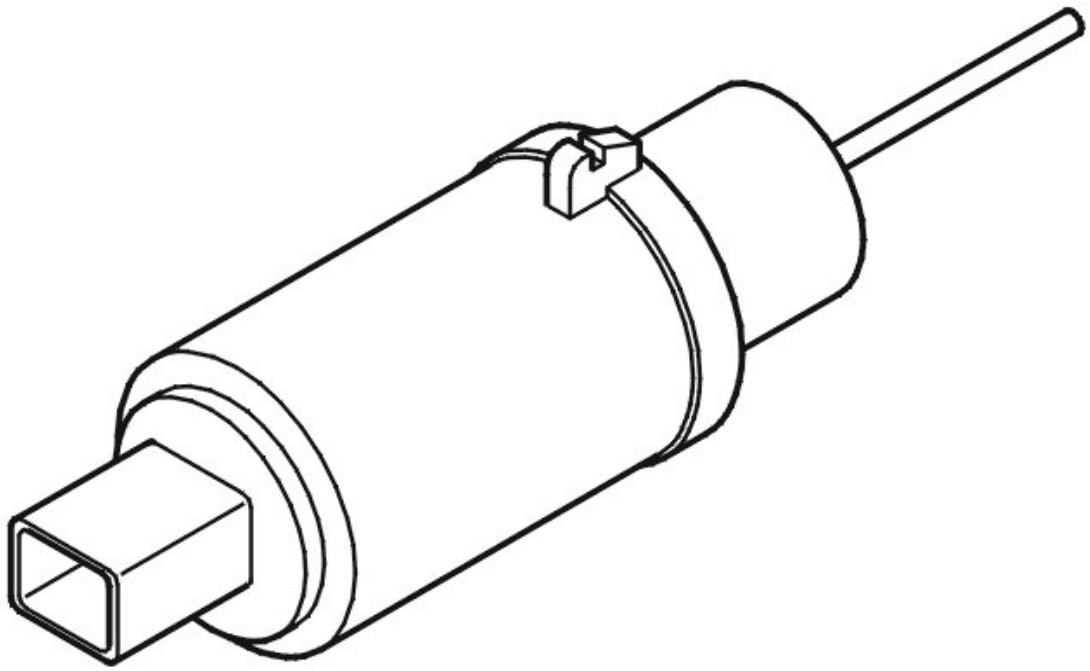
The diagnostic trouble code (DTC) indicates that active yaw control has been active. This means that the test cycle was not completed correctly and must be repeated.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The brake pedal position sensor is part of "Active brake assistance". The sensor transmits a signal to the brake control module about the position of the brake pedal and the speed at which it is pressed. These signals are required to determine how much brake power is required in each brake situation.
The pedal position sensor is included on cars without brake assistance and is then used by the control module to check the operation of the stop lamp switch.
Diagnostic trouble code (DTC) BCM-0147 is stored if the control module registers a faulty signal from the pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed after the brake pedal has been depressed to the maximum, the engine has been started, and the brake pedal released. After having been stationary for approximately 10 seconds and then driven faster than 10 km/h for at least 10 seconds. Then stopped the car by braking.

Substitute value
- Brake assistance is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source

- Open-circuit in the wiring
- Short-circuit to ground or supply voltage in the wiring
- Incorrectly installed pedal position sensor
- Defective pedal position sensor
- Defective brake control module.

Fault symptom[s]

- General yellow warning lamp lit.

Faulty Signal

Faulty signal

Checking diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM)

If there are diagnostic trouble codes (DTCs) for the brake pedal position sensor or stop lamp switch stored in the engine control module (ECM) or central electronic module (CEM), these must be fault traced first.

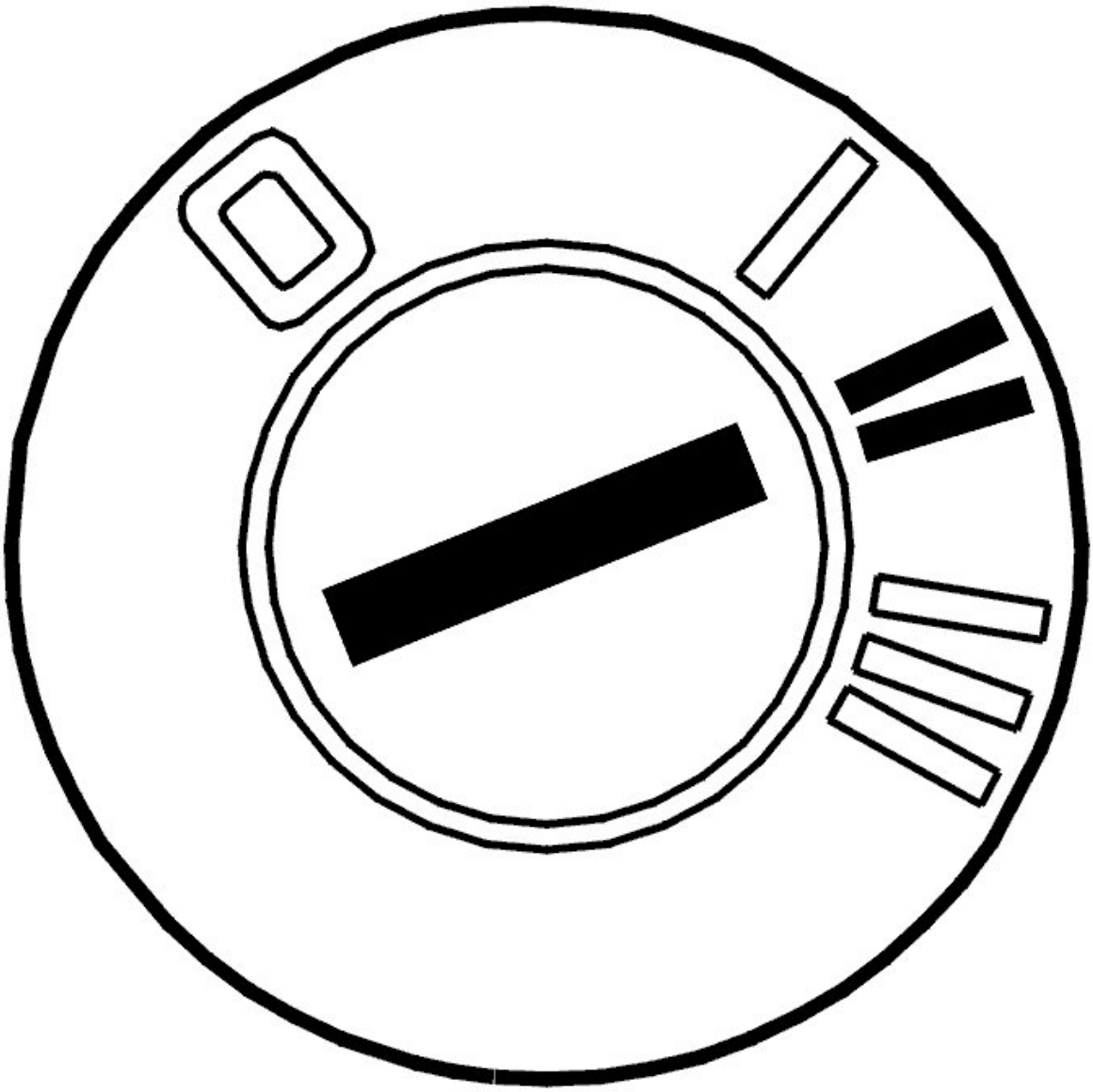
Were diagnostic trouble codes (DTCs) stored for the pedal position sensor or the stop lamp switch?

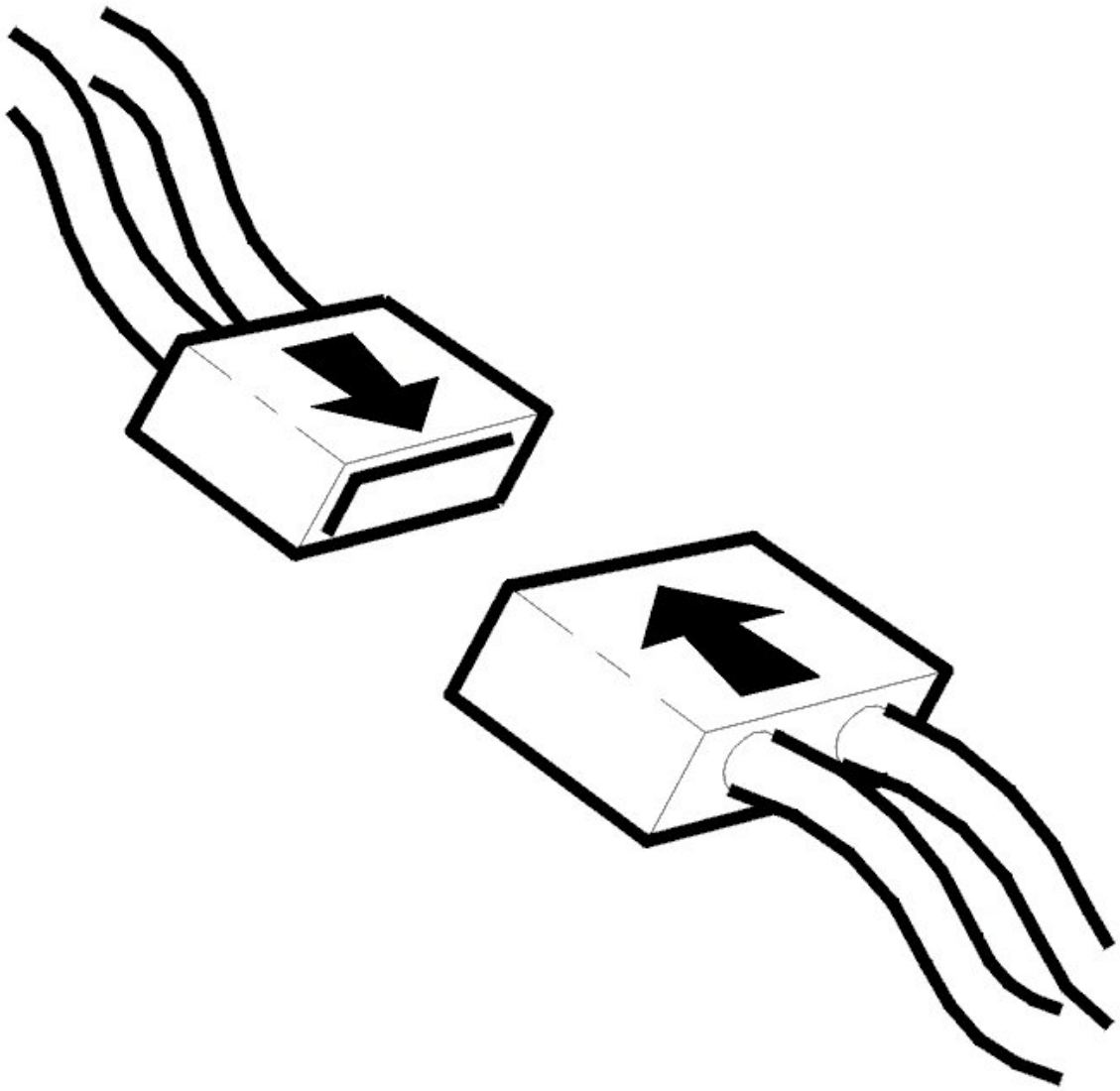
Yes - DONE

No - Checking the control module and sensor connectors

Checking the control module and sensor connectors

Hint: The cause of the diagnostic trouble code (DTC) may be in the circuit for the stop lamp switch or for the pedal position sensor.





- Ignition off
- Check the connectors for the brake control module (BCM), the stop lamp switch and the pedal position sensor. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the status of the stop lamp switch and the position of the pedal position sensor.

Depress and release the brake pedal. The value must change between OFF and ON and the position of the pedal position sensor must be updated.

Other information

- To disconnect the connector for the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To access the stop lamp switch, see Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- To access the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select an option:

1. The value for the stop lamp switch does not change
2. The value for the pedal position sensor is not updated
3. These values are OK.

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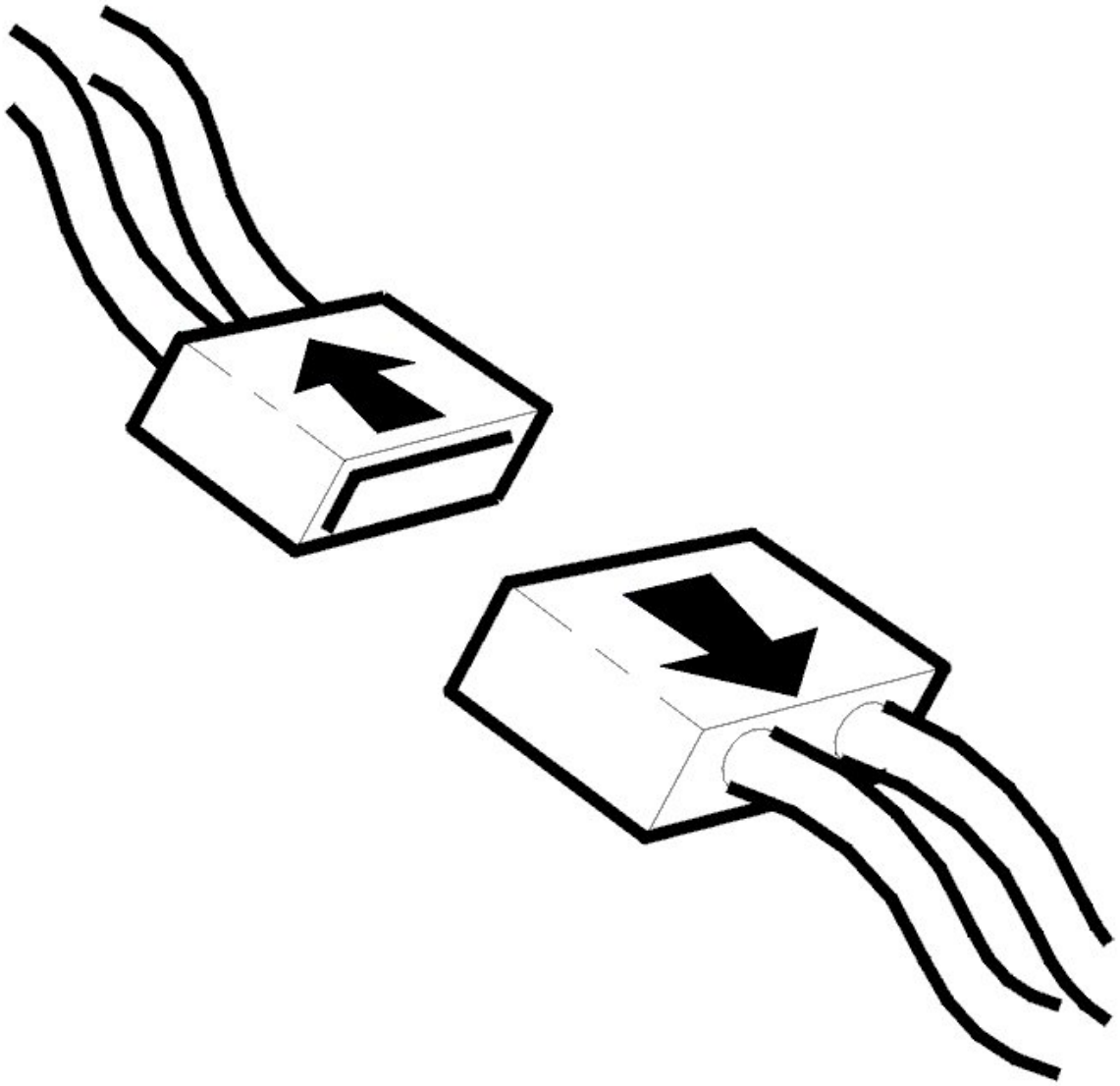
Does the value change?

1 - Checking the fuse, wiring and sensors

2 - Signal outside its permitted range

3 - **No Fault Found**

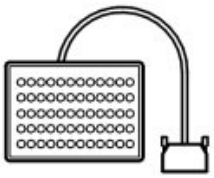
Checking the fuse, wiring and sensors



Check that the fuse for the stop lamp circuit is intact. If the fuse is blown, first check the circuit for the stop lamp switch before replacing the fuse. Check for a short-circuit to supply.
If the fuse is intact, check the circuit for the stop lamp switch. Check for an open-circuit and a short-circuit to ground.
Remedy as necessary.

Other information

- To connect the breakout box to the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To connect the breakout box to the Engine control module (ECM), see: Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- See Connecting breakout box for Central Electronic Module (CEM). Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- To replace the stop lamp switch, see Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



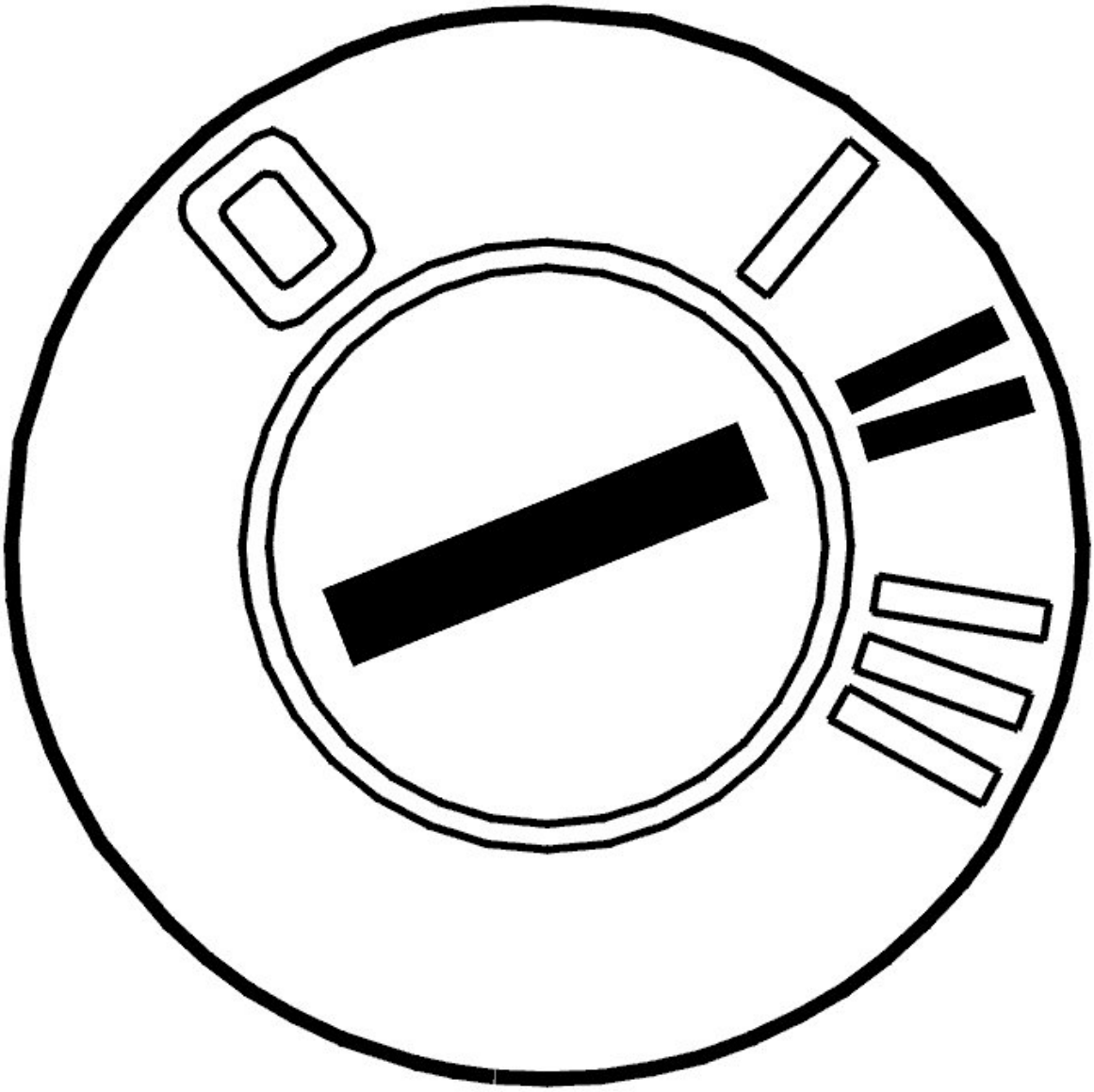
Was a fault detected?

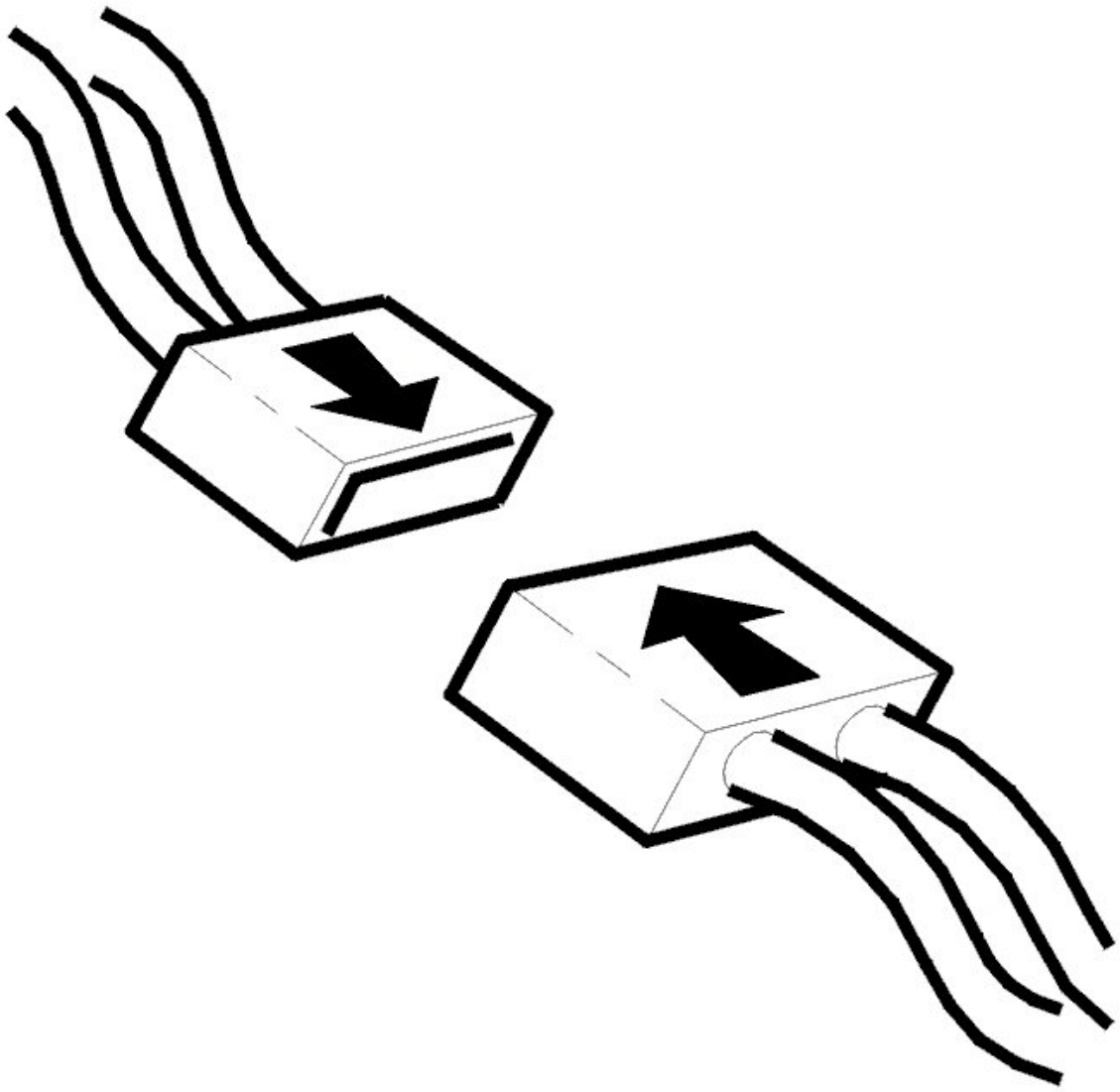
Yes - Verification

No - No Fault Found

Signal outside its permitted range

Checking the connectors



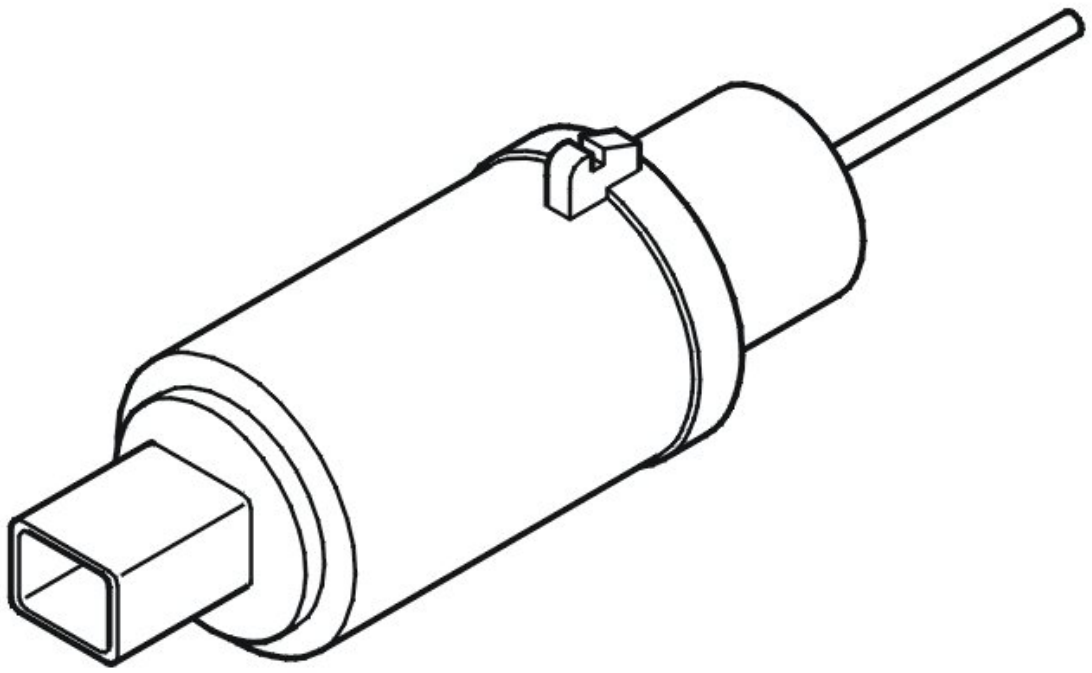


- Ignition off
- Check the brake control module (BCM) and pedal position sensor connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Connect the breakout box
- Ignition on
- Read off the signal from the pedal position sensor.

Depress the brake pedal. Check that the pedal signal is updated.

Other information

- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Was the signal updated?

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors

Check the wiring between the pedal position sensor:
- terminal #1 and control module terminal #7 (#A7)
- terminal #2 and control module terminal #5 (#A5)
- terminal #3 and control module terminal #3 (#A3).

check for an open-circuit, a short-circuit to ground and a short-circuit to supply voltage.

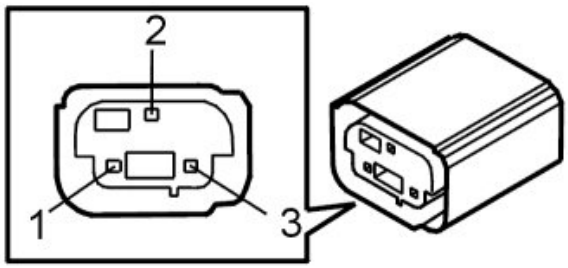
Hint: Connect an ohmmeter between terminals #2 and #3 on the pedal position sensor connector.
The resistance must be approximately 0.5 kohms with the brake pedal unaffected and approximately 2.5-3 kohms when the brake pedal is depressed.

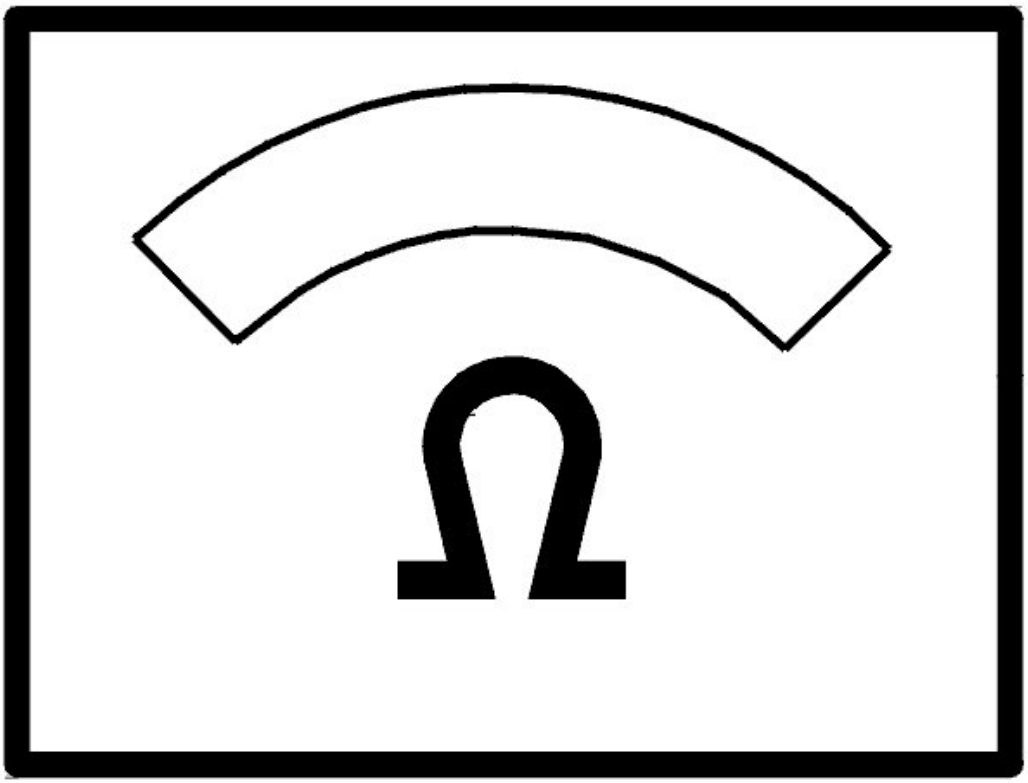
Connect an ohmmeter between terminals #1 and #3 on the pedal position sensor connector.
The resistance must be approximately 2.5-3 kohms with the brake pedal unaffected and approximately 0.5 kohms with depressed brake pedal.

Replace the pedal position sensor if the resistance is incorrect.

Replace the pedal position sensor if no fault is found.

Other information
- To connect the breakout box, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the pedal position sensor, see Pedal sensor power brake booster, replacing See: Brakes and Traction Control/Power Brake Assist/Brake Booster Vacuum Sensor/Service and Repair
- For information about signals, see Signal specification, brake control module (BCM) with DSTC (dynamic stability and traction control) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

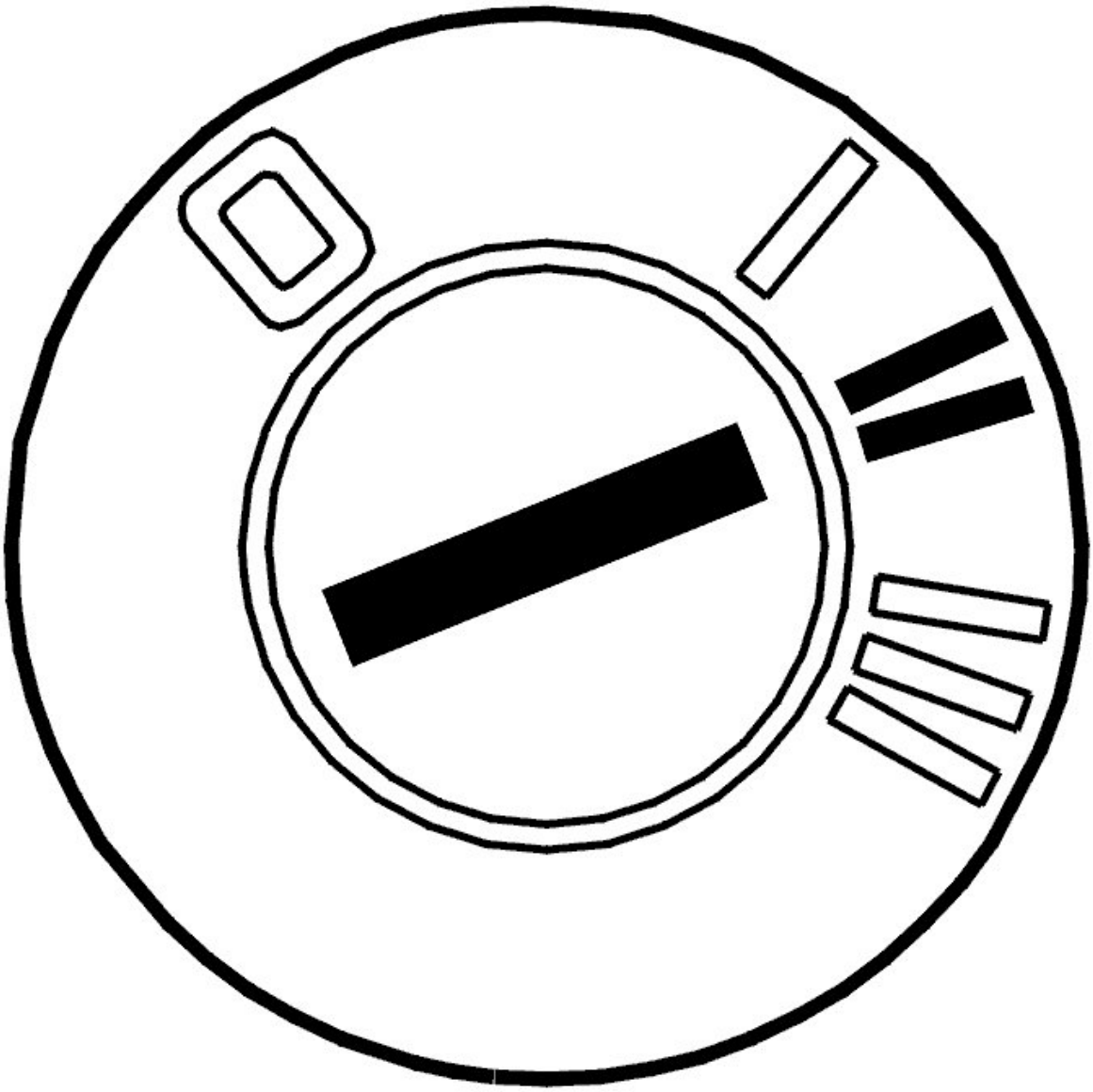


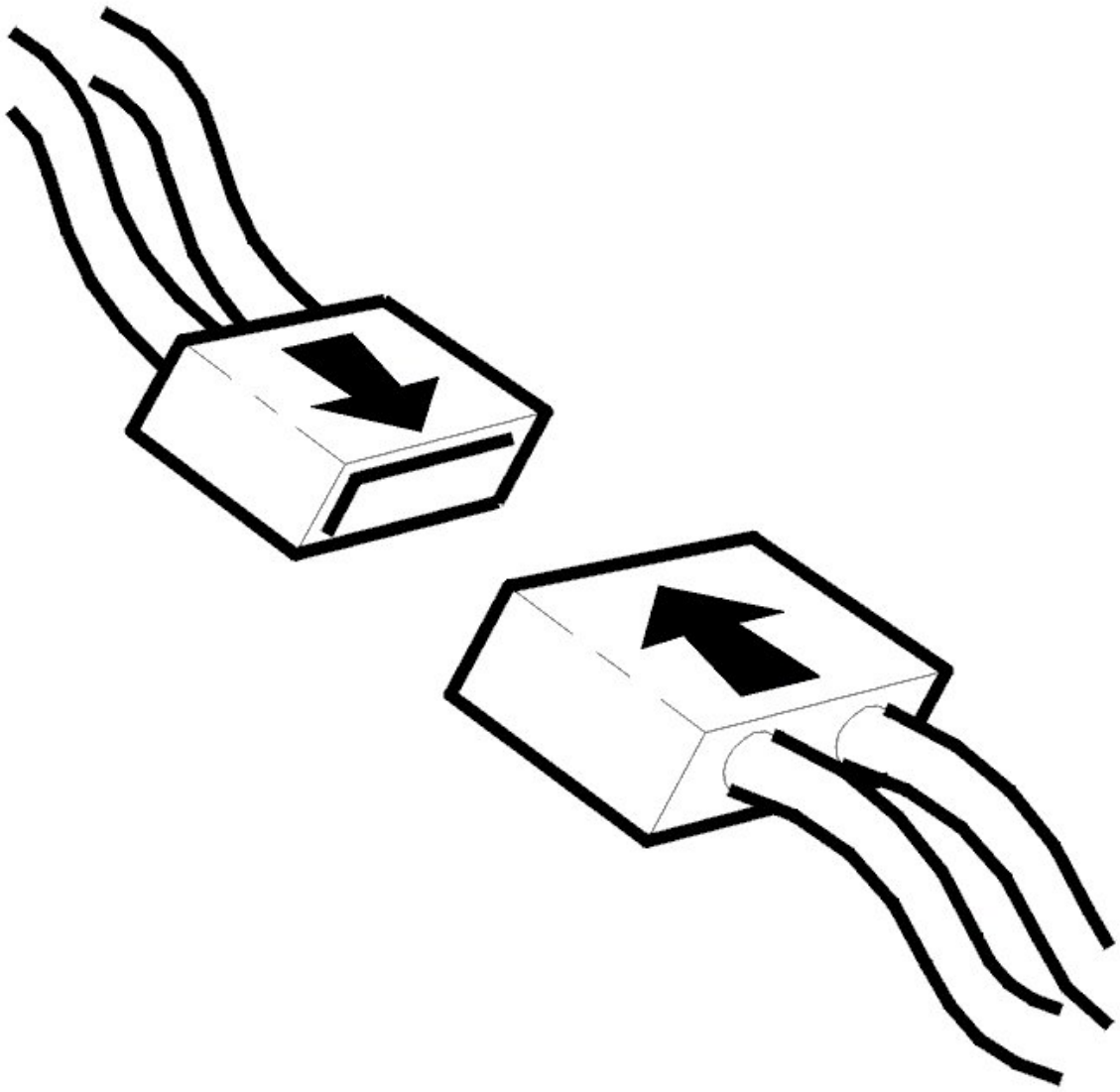


Continue - Verification

Verification

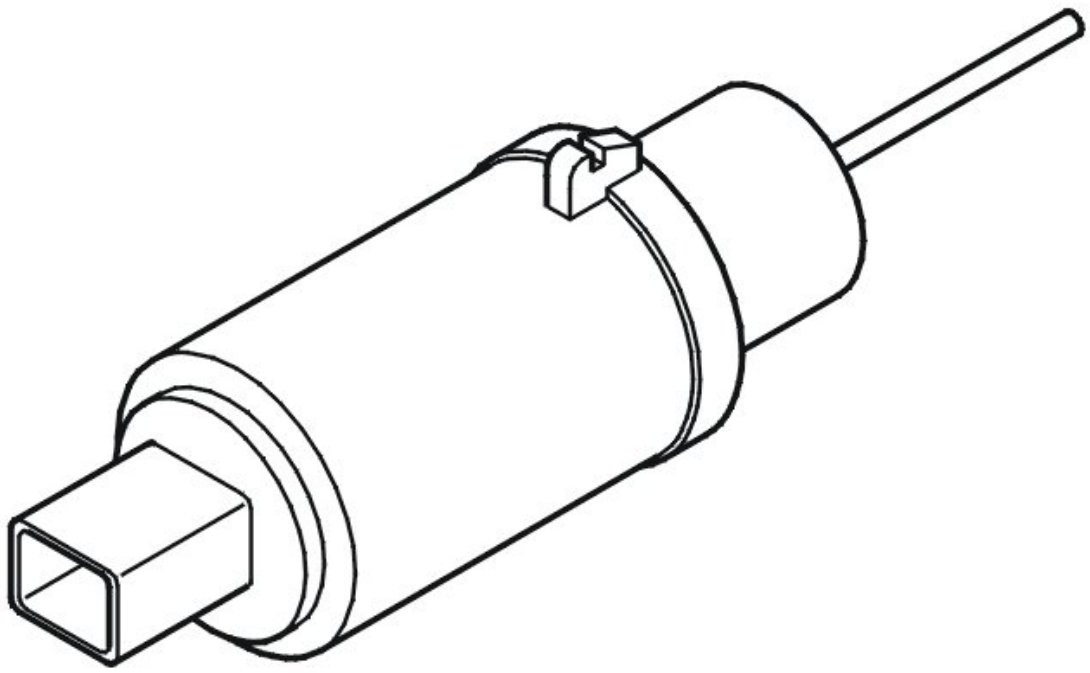
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the signal from the pedal position sensor.

Depress the brake pedal. Check that the pedal signal is updated.



Was the signal updated?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

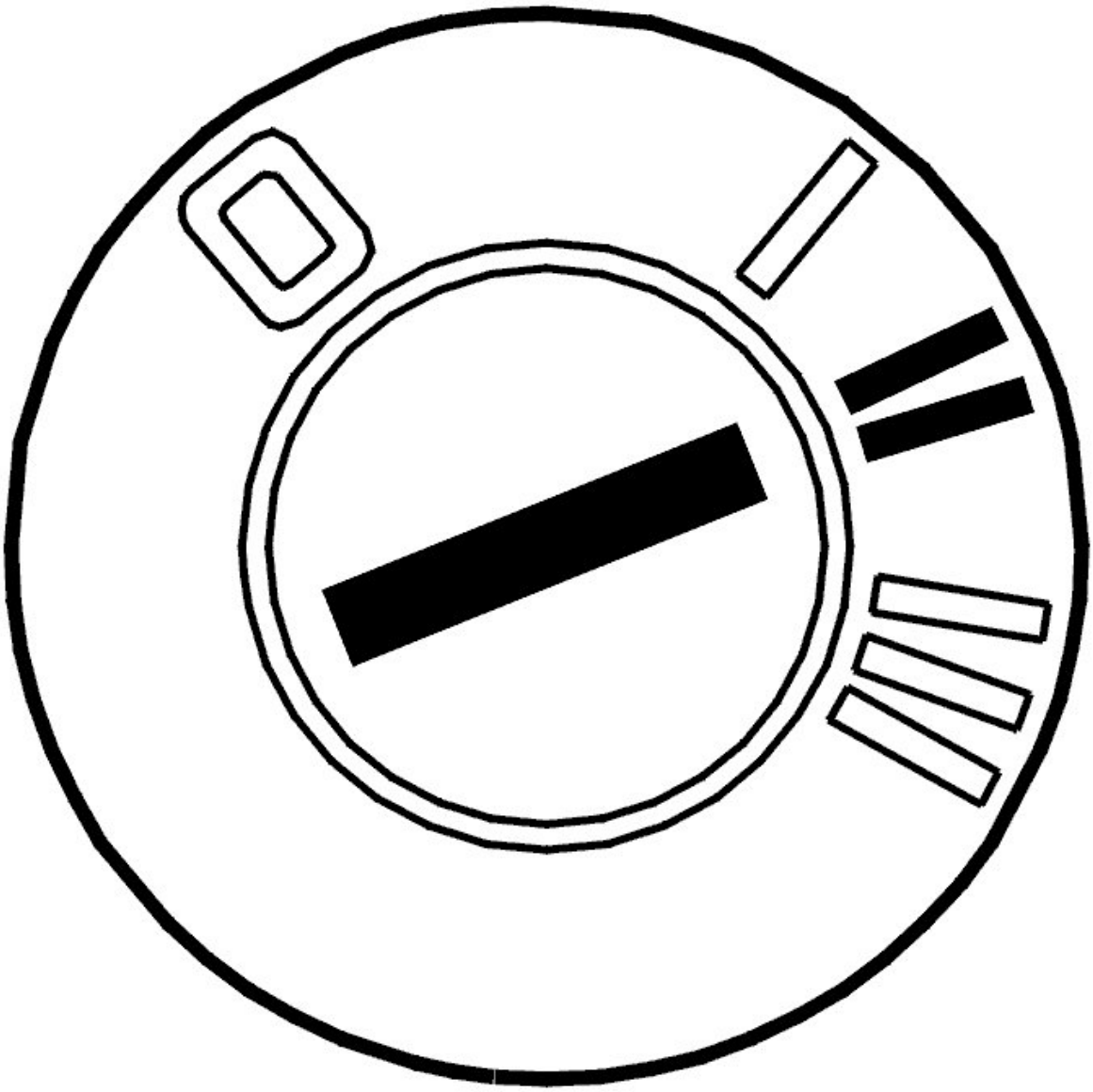
No - Attempt New Test

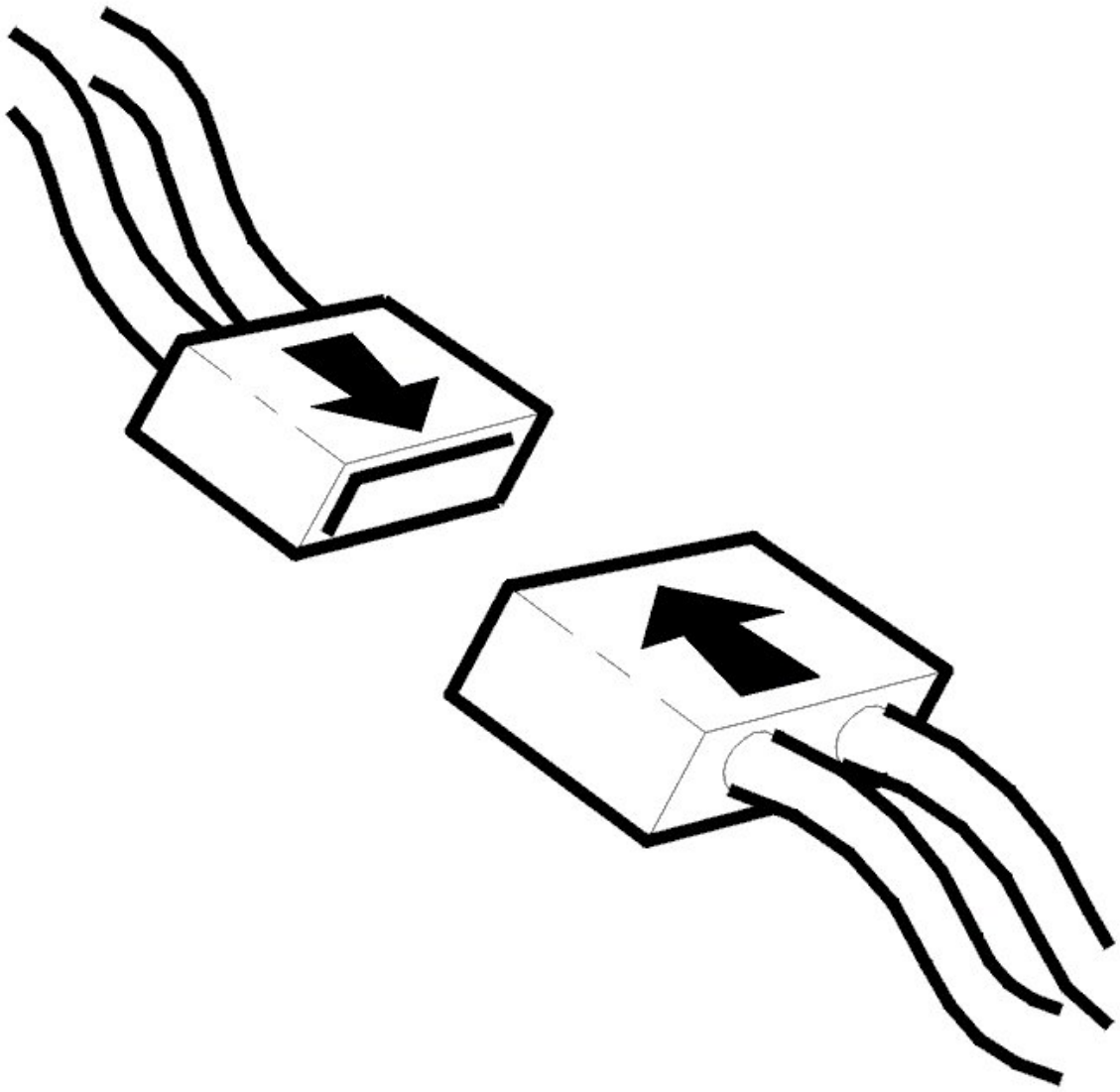
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the status of the stop lamp switch.

Depress and release the brake pedal. The value must change between OFF and ON.

Does the value change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

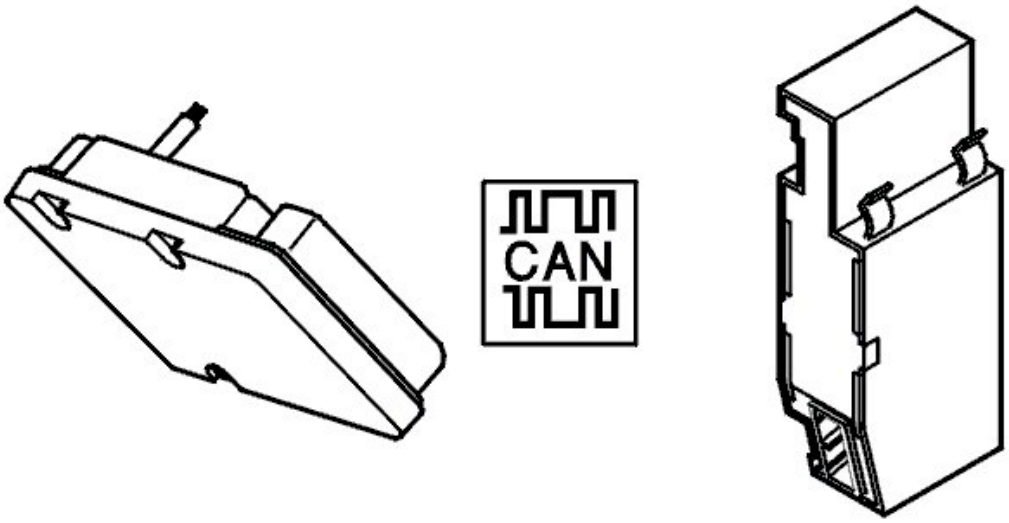
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking diagnostic trouble codes in the central electronic module (CEM) and the engine control module (ECM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The control module for the steering angle sensor communicates with the brake control module (BCM) with data which is transmitted in "small packages". Each package has an ID number.
Diagnostic trouble code (DTC) BCM-0148 is stored if the brake control module (BCM) registers an ID number that does not correspond to what the brake control module (BCM) expects.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

Possible source
- Disruption or intermittent open-circuit on the Control area network (CAN)
- Internal fault in the control module for the steering wheel angle sensor.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

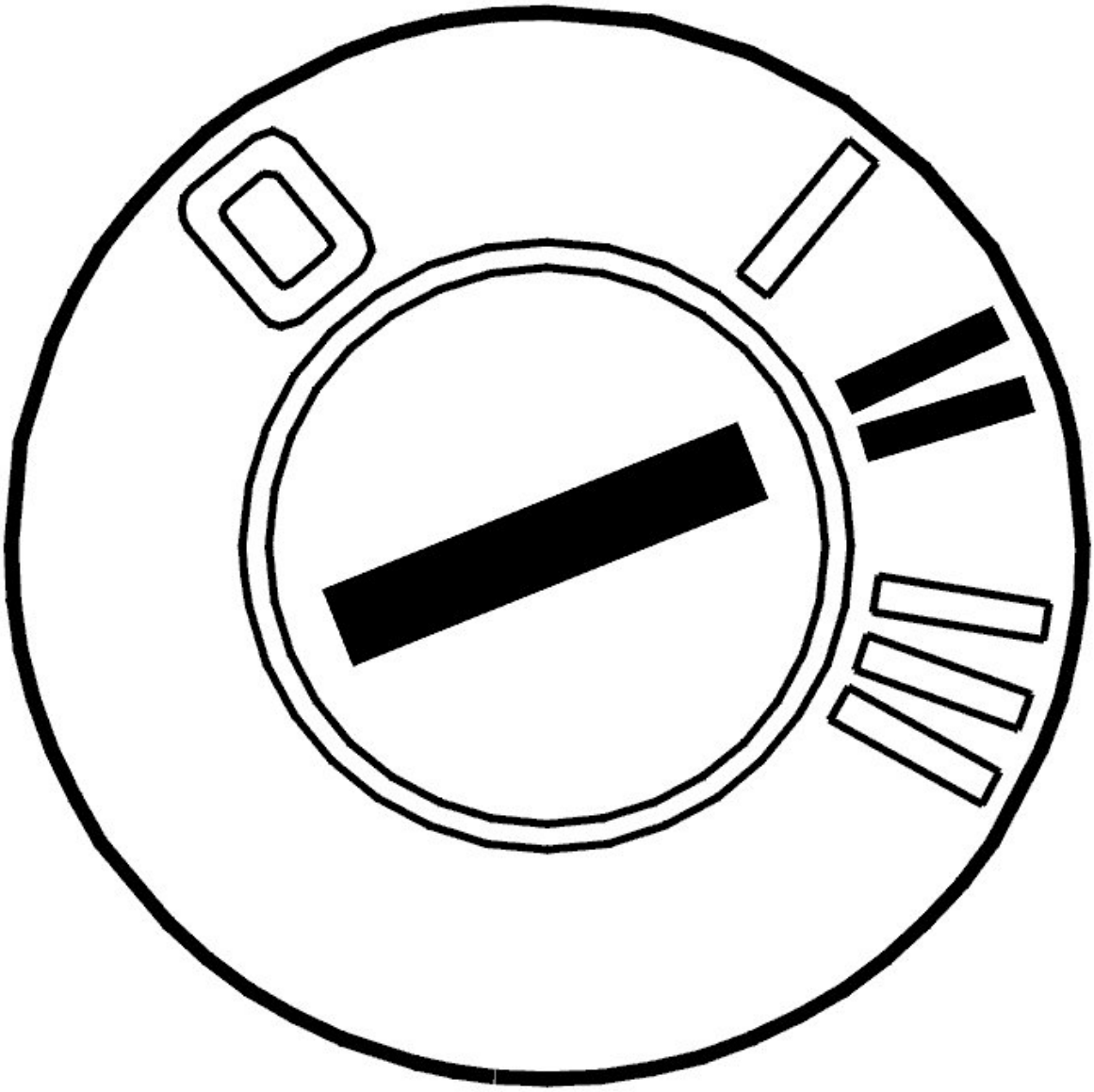
Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- Anti-spin does not function
- The stability control system does not function
- The traction control system does not function.

Faulty Configuration ID

Faulty configuration ID

Information

Hint: Diagnostic trouble code (DTC) BCM-0148 can be stored when programming the brake control module. If this is the case, erase the diagnostic trouble code (DTC).



- Ignition on
- Erase the diagnostic trouble code (DTC) if it was stored during programming.

Was the diagnostic trouble code (DTC) stored when programming the brake control module?

Yes - DONE

No - Checking diagnostic trouble codes (DTCs) in the central electronic module

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Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking diagnostic trouble codes (DTCs) in the central electronic module

Checking other diagnostic trouble codes (DTCs)

In the event of communication problems, the fault may exist in other parts of the communications network.
The role of the central electronic module is to generally control the communications network and to store diagnostic trouble codes (DTCs) in the event of communication problems between control modules.
If there are diagnostic trouble codes (DTCs) stored for communication problems in the central electronic module, stop the fault tracing and fault trace the central electronic module.

Were diagnostic trouble codes (DTCs) for communication problems stored in the central electronic module?

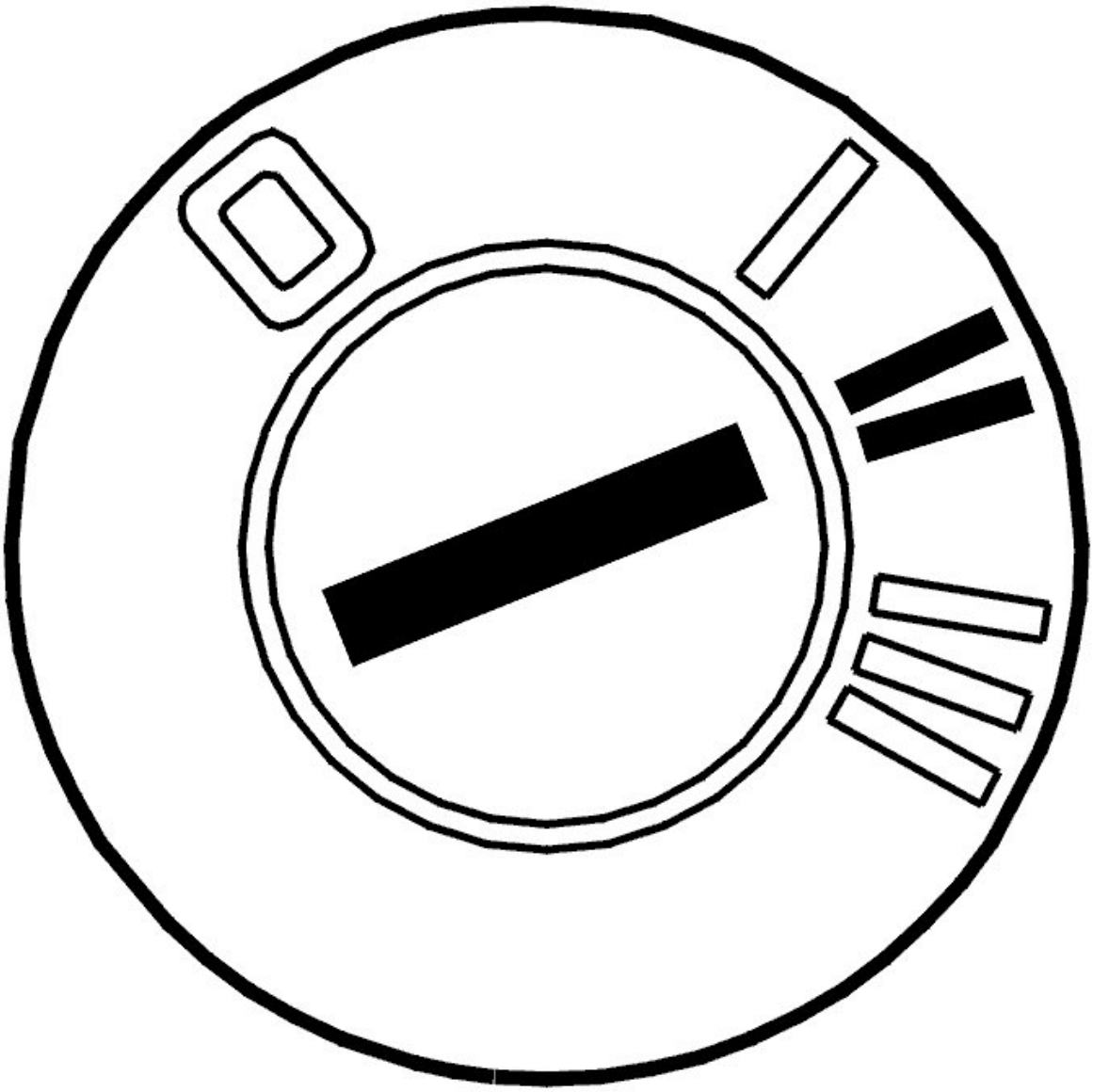
Yes - DONE

No - No Fault Found

DONE - DONE

No Fault Found - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition on
- Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - Intermittent fault

No - Fault-tracing information

Fault-tracing information

The diagnostic trouble code (DTC) indicates that the fault is in the control module for the steering wheel angle sensor.
Fault-trace according to the relevant information. If no fault is found, replace the control module for the steering angle sensor.

Continue - **DONE**

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

Attempt New Test - Information

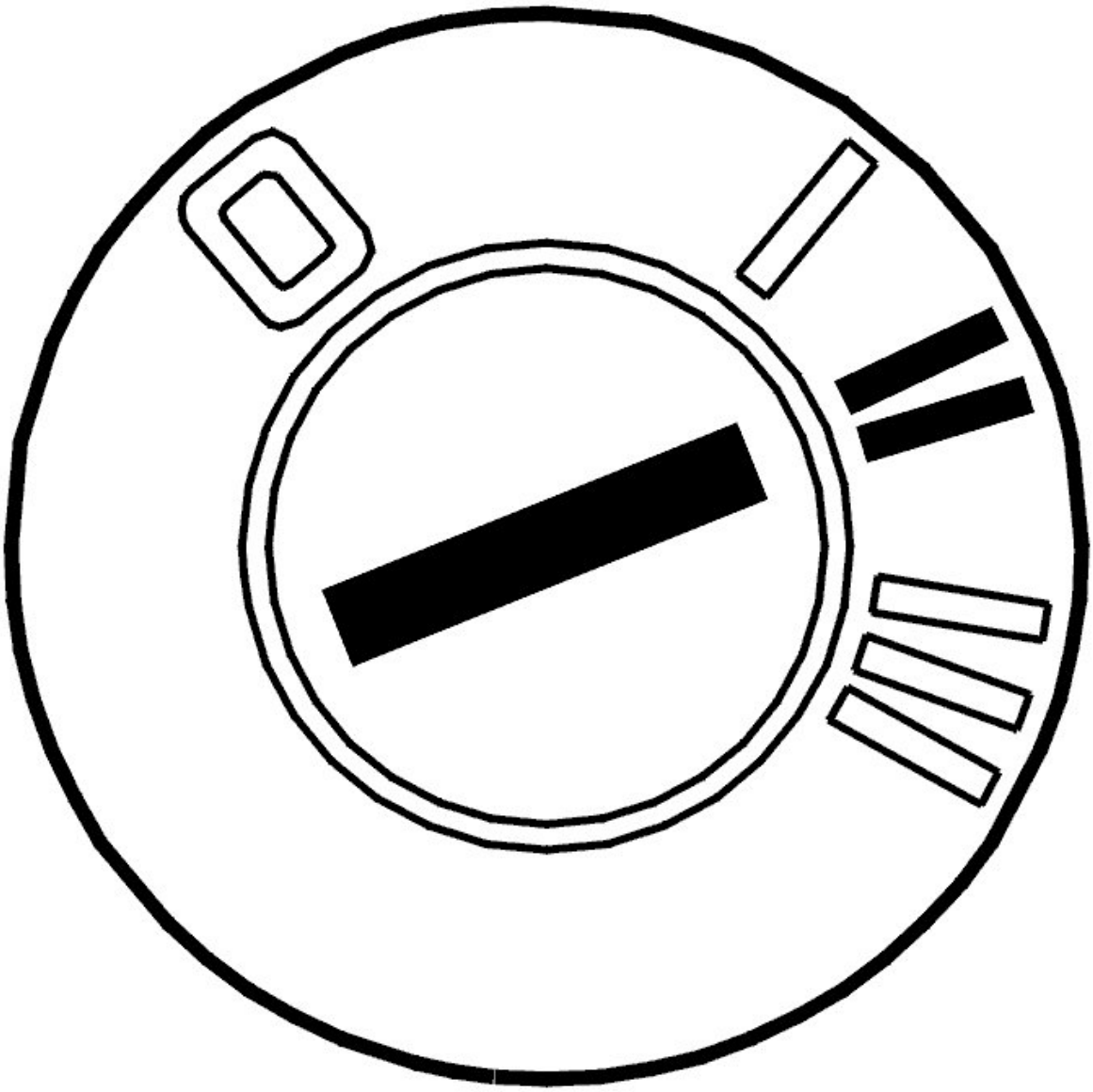
FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

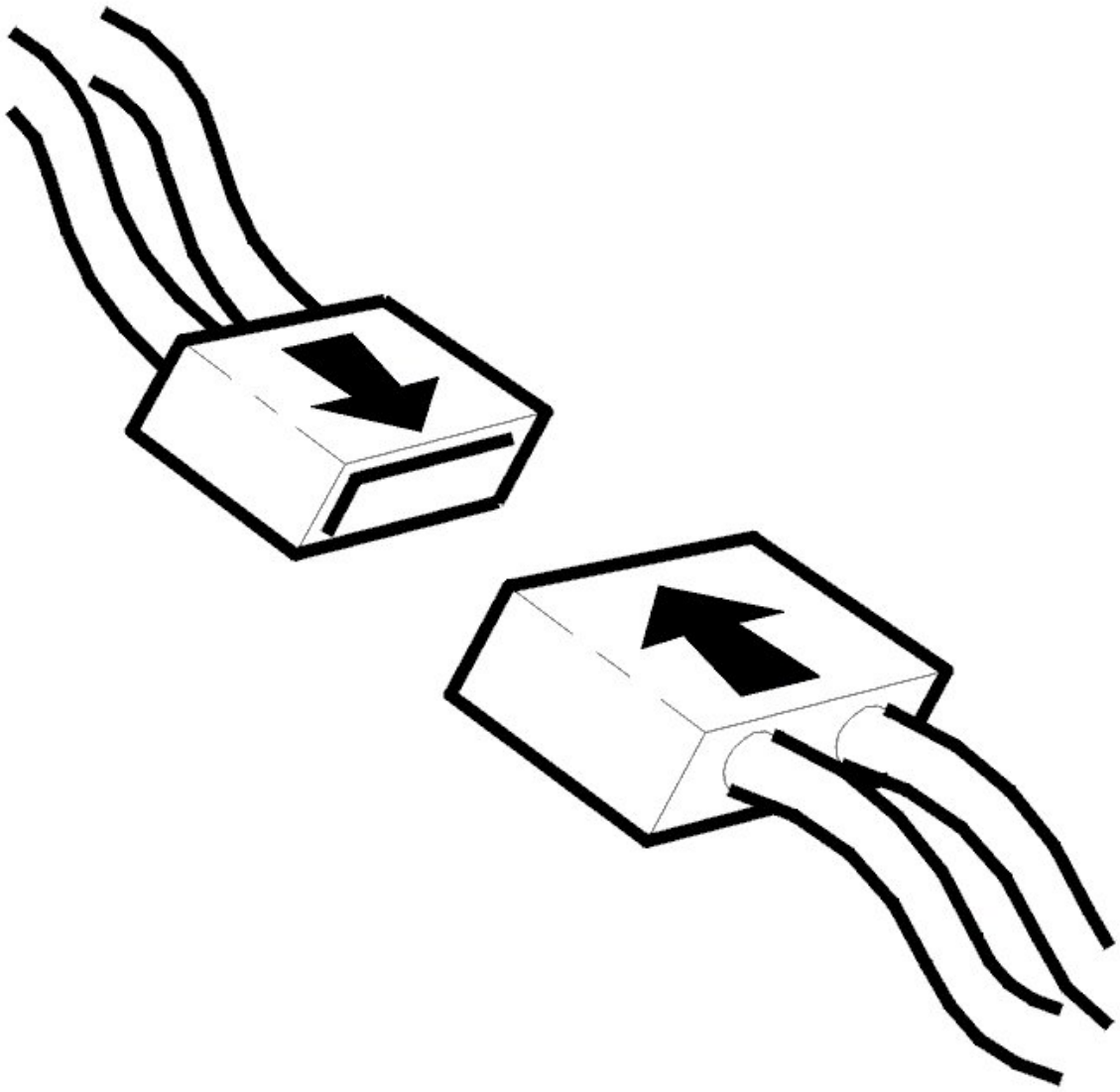
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test Drive Form (DSTC (dynamic stability and traction control) /brake control module), description See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Drive Form (DSTC (Dynamic Stability And Traction Control) /Brake Control Module), Description
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Intermittent fault

Hint: The status of the diagnostic trouble code (DTC) indicates that the control module has previously registered a fault but that the fault is not now active.

Check the connectors for the brake control module and the control module for the steering wheel angle sensor. Check for contact resistance and oxidation.
Check that the communication wiring is not too close to a source of interference such as a carphone etc.
Remedy as necessary.

Other information

- Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- For connection of breakout box to Steering wheel angle sensor module (SAS), see: Connecting the breakout box See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Steering Wheel Angle Sensor Module (SAS)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

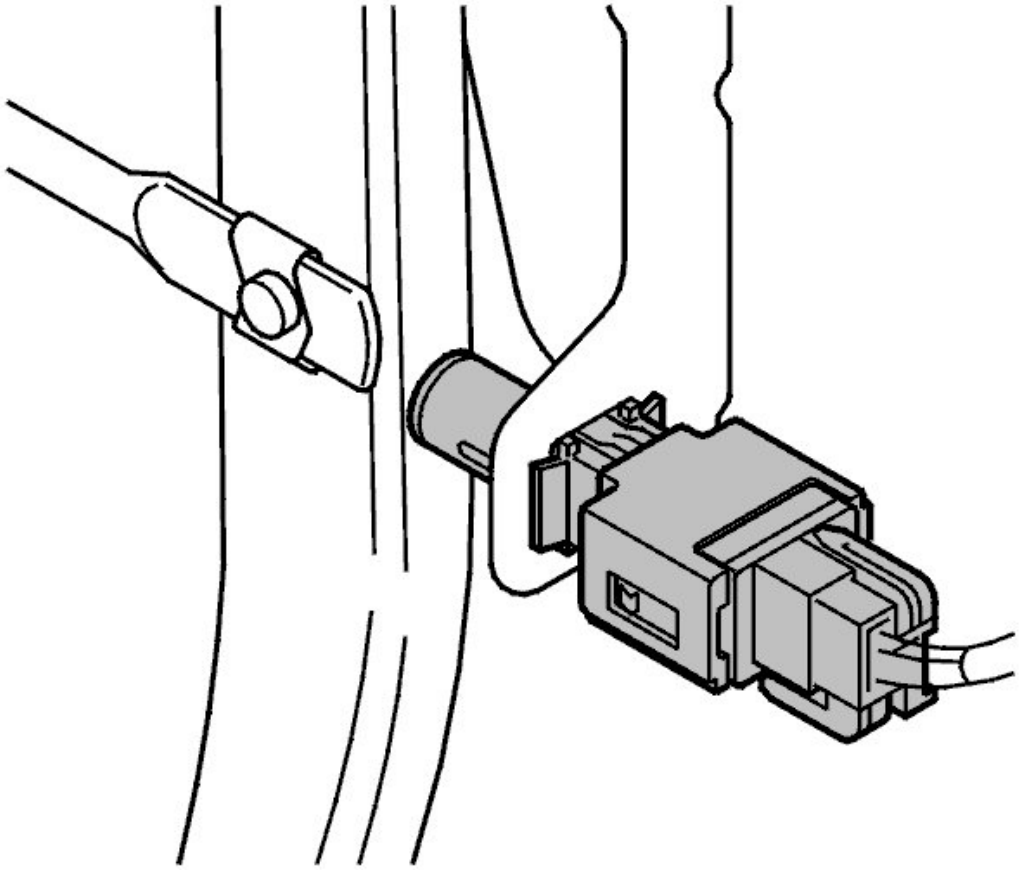
Attempt New Test - Information

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) BCM-0150 is stored if the brake control module (BCM) registers that the stop (brake) lamp switch is not activated when the brake pedal is depressed.
There are diagnostics for this diagnostic trouble code (DTC) when the ignition is on and in the following cases:

- Braking from a speed in excess of 40 km/h to standstill 3 times in succession within the same ignition cycle without control
- The brake pedal is kept pressed down and the stop lamp switch is activated for longer than 6 minutes.

Substitute value

- None.

Possible source

- Mechanical fault in the stop lamp switch.

Note! This diagnostic trouble code (DTC) is not due to an internal hardware fault in the Brake control module (BCM) and must not be remedied by replacing the control module.

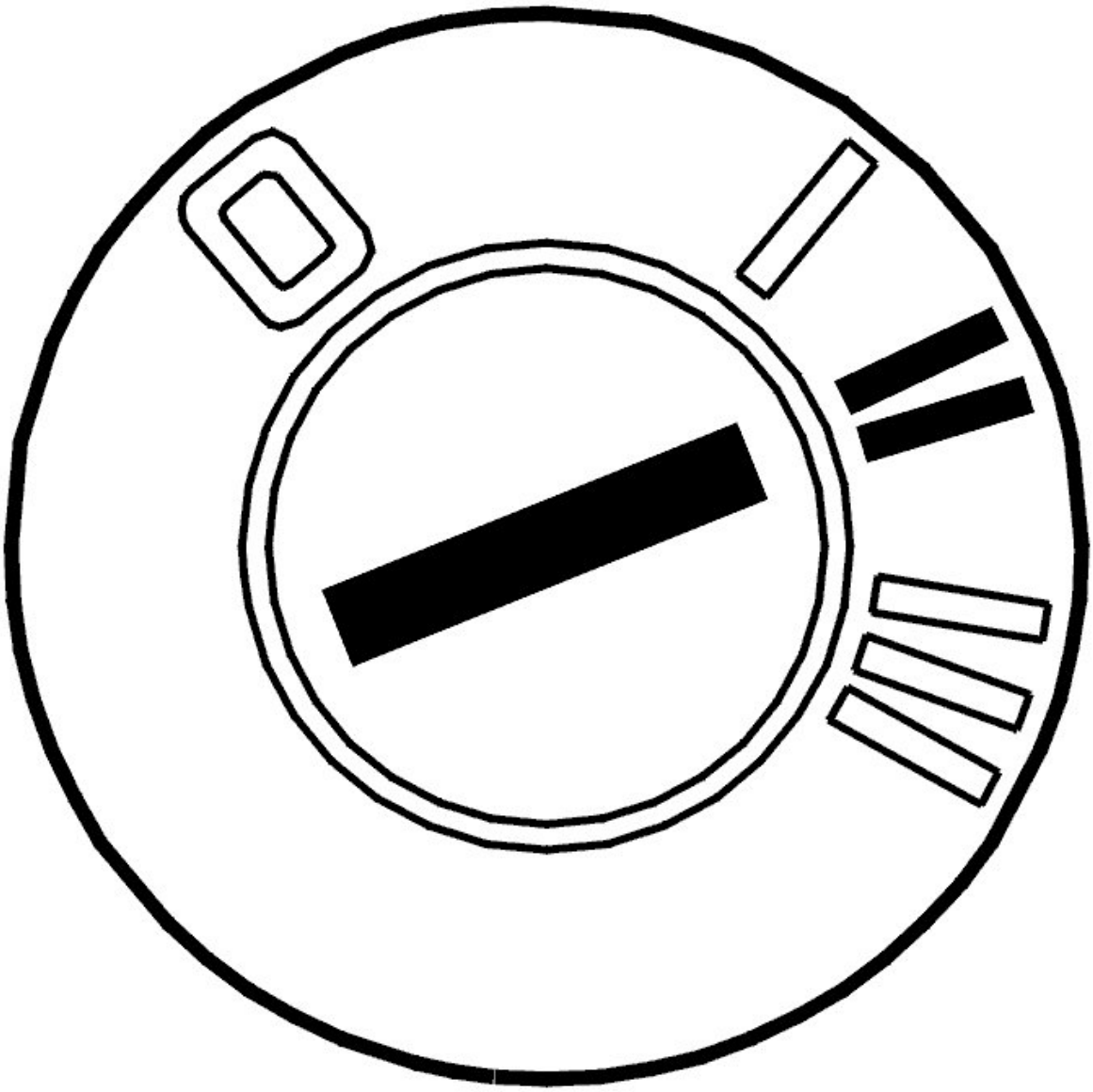
Fault symptom[s]

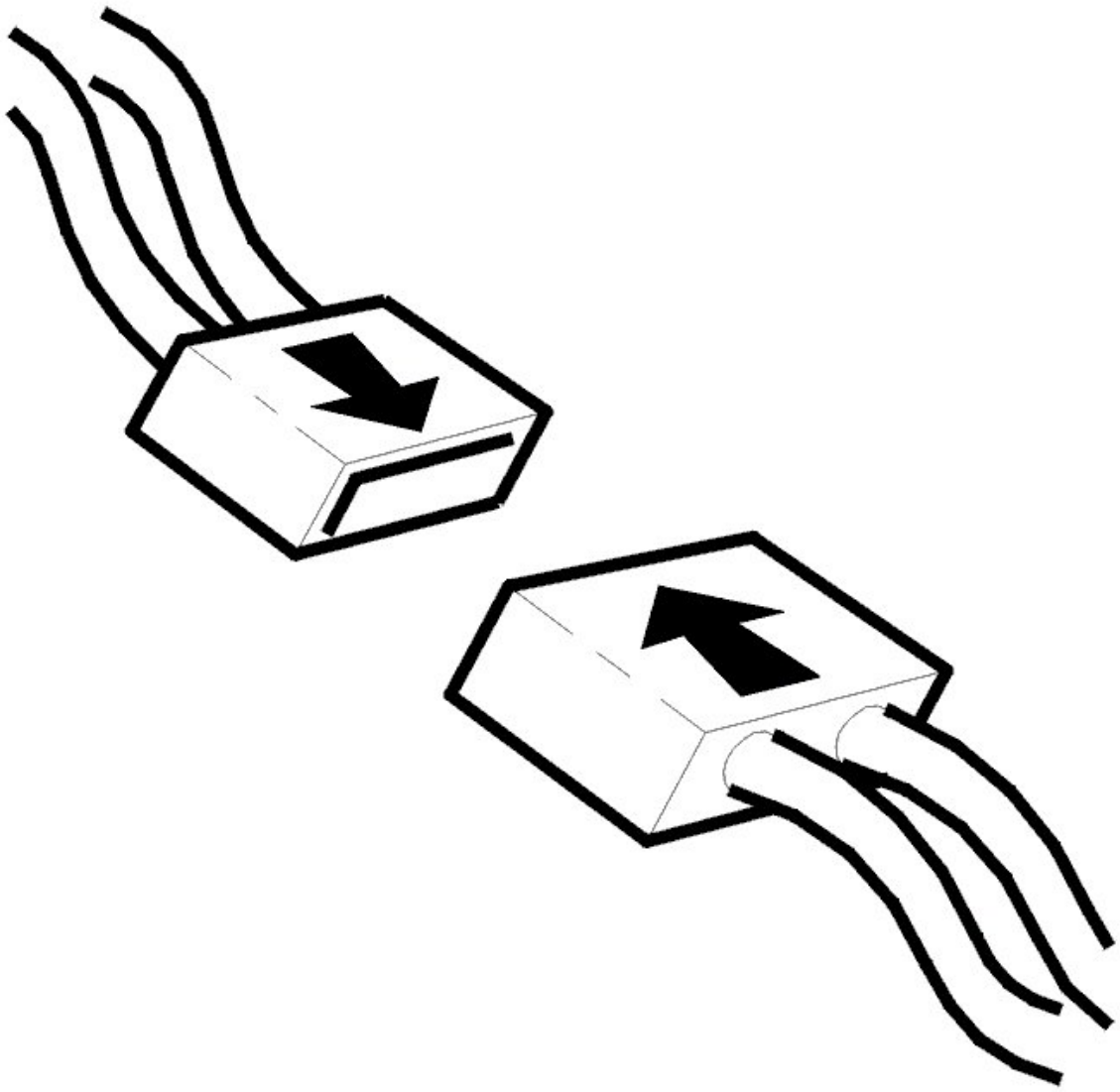
- None.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the control module and wheel sensor connectors





- Ignition off
- Check the brake control module (BCM) and stop (brake) lamp switch connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the status of the stop lamp switch.

Depress and release the brake pedal. The value must change between OFF and ON.
If the value changes, the cause of the fault was loose connections in the control module or wheel sensor connectors.

Other information

- For information about removing the brake control module (BCM) connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To fault-trace the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Does the value change?

Yes - Fault Found

No - wiring and sensors

Checking the fuse, wiring and sensors

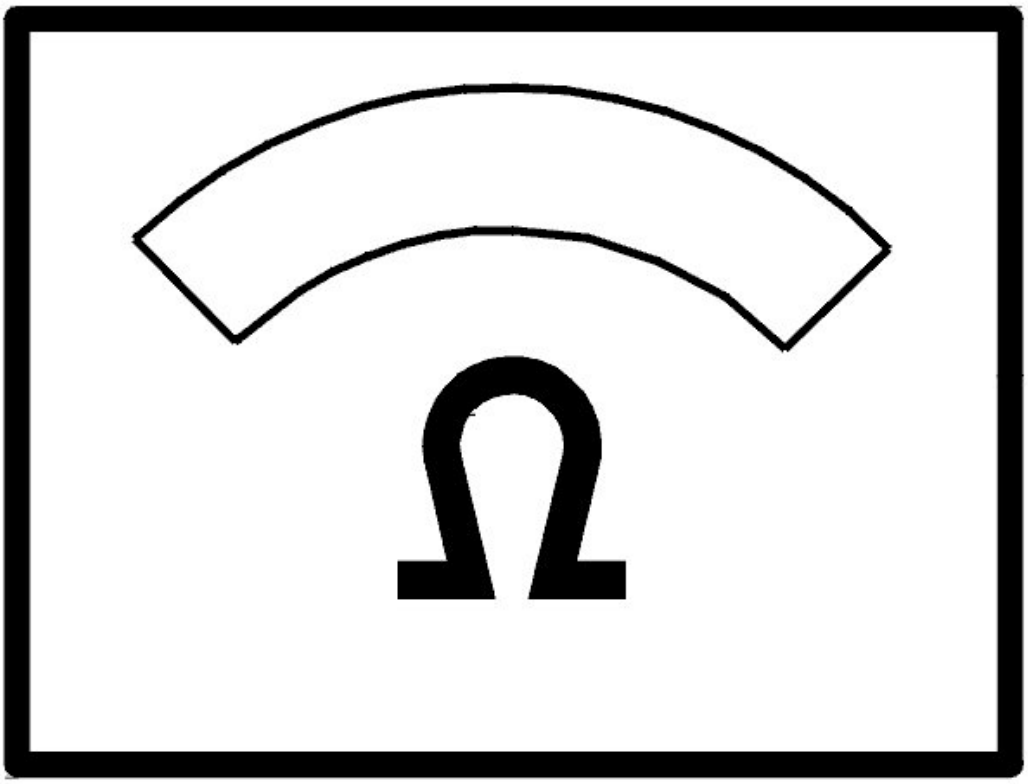
Check that the fuse for the stop (brake) lamp switch in the integrated relay / fusebox in the engine compartment is intact.
Check the cable between stop lamp switch terminal #1 and the fuse in the integrated relay / fusebox in the engine compartment and between stop lamp switch terminal #5 and the splice. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between the splice and central electronic module (CEM) terminal #B4 and between the splice and engine control module (ECM) terminal #B26. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

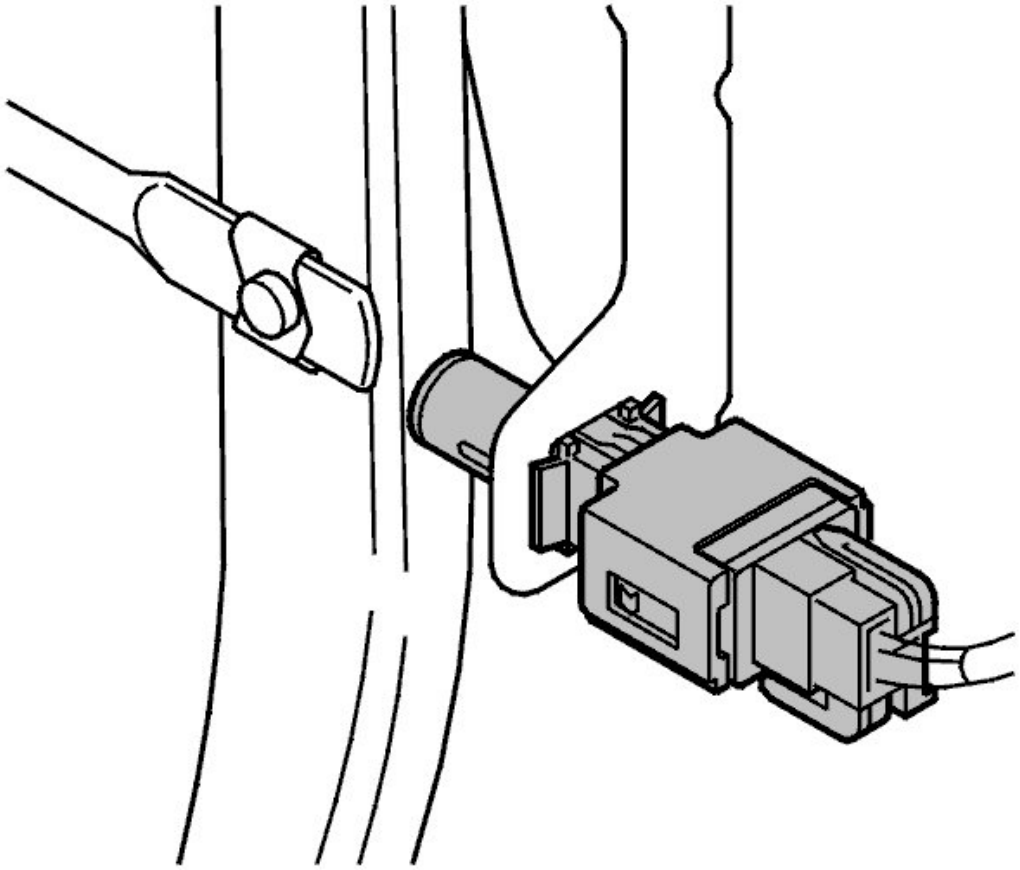
Hint: Check the stop lamp switch by measuring the resistance between terminals #1 and #5 on the stop lamp switch. When the brake pedal is depressed the resistance should be infinite. When the brake pedal is not depressed the resistance should be 0 ohms.

Remedy as necessary.

Other information

- To connect the breakout box to the brake control module (BCM), see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To connect the breakout box to the Engine control module (ECM), see: Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For connection of breakout box to central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- To replace the stop lamp switch, see Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the locations of fuses and relays, see the Wiring Diagram.



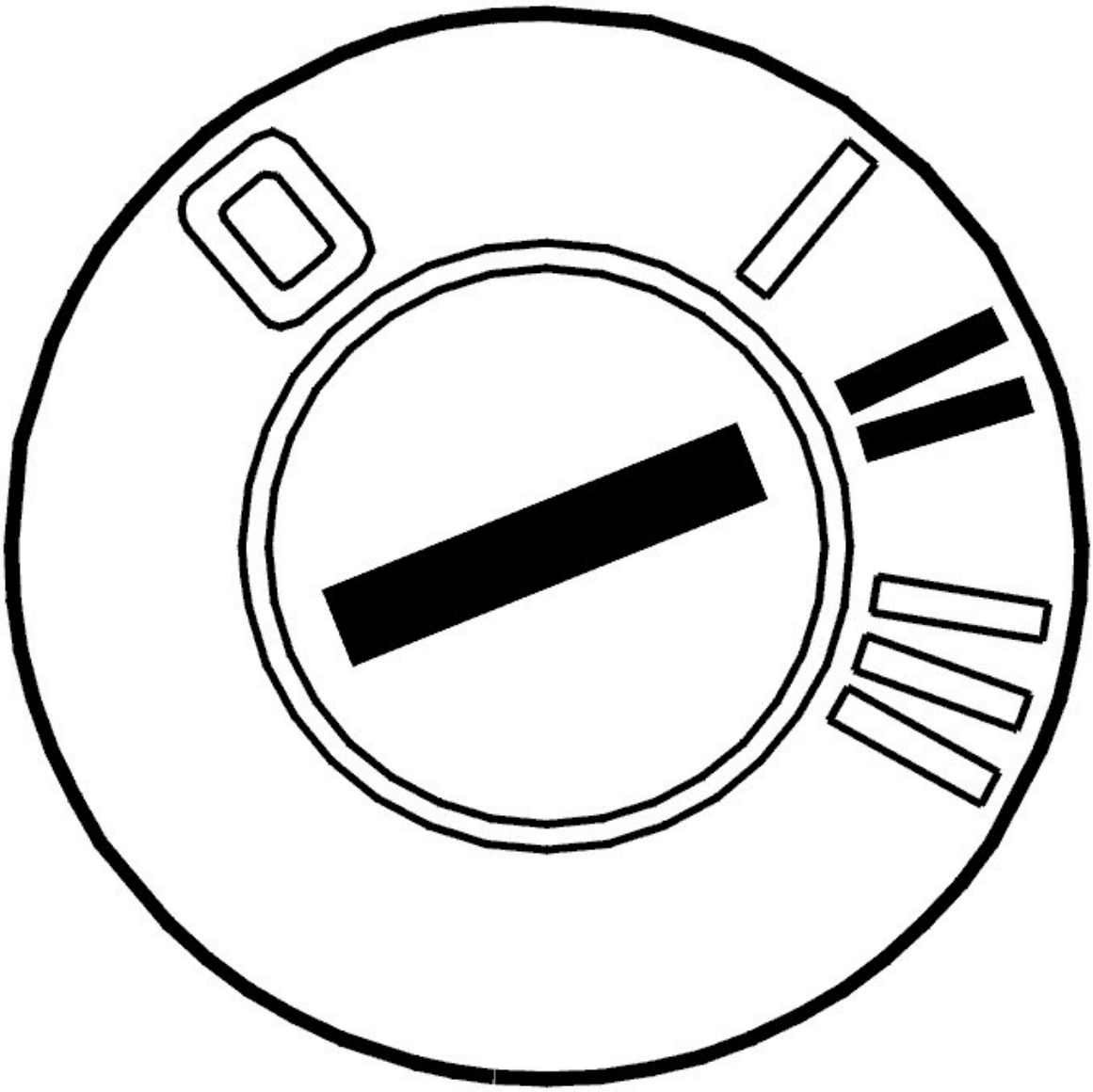


Was a fault detected?

Yes - Verification

No - No Fault Found

Verification



- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the status of the stop lamp switch.

Depress and release the brake pedal. The value must change between OFF and ON.

Does the value change?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control module and wheel sensor connectors

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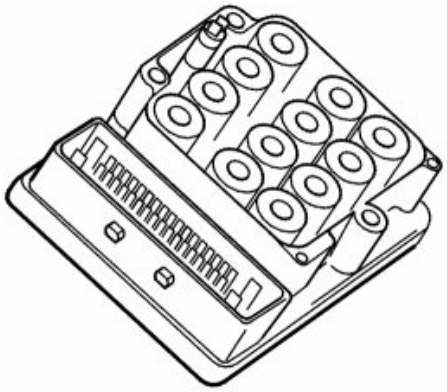
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The control modules in the car continually transmit and receive information over the data network (Controller Area Network). When the brake control module (BCM) is supplied with voltage the CAN controller which handles Controller Area Network communication is initialized. Diagnostic trouble code (DTC) BCM-0151 is stored if initialization of the CAN controller fails.
The diagnostic trouble code (DTC) can be diagnosed while the ignition is switched on.

Substitute value
- Traction control is blocked
- Stability control is blocked
- Active yaw control is blocked
- All communication to and from the brake control module (BCM) is shut off.

Hint: For information about abbreviations, see Brake system, abbreviations See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Description and Operation/Brake System, Abbreviations.

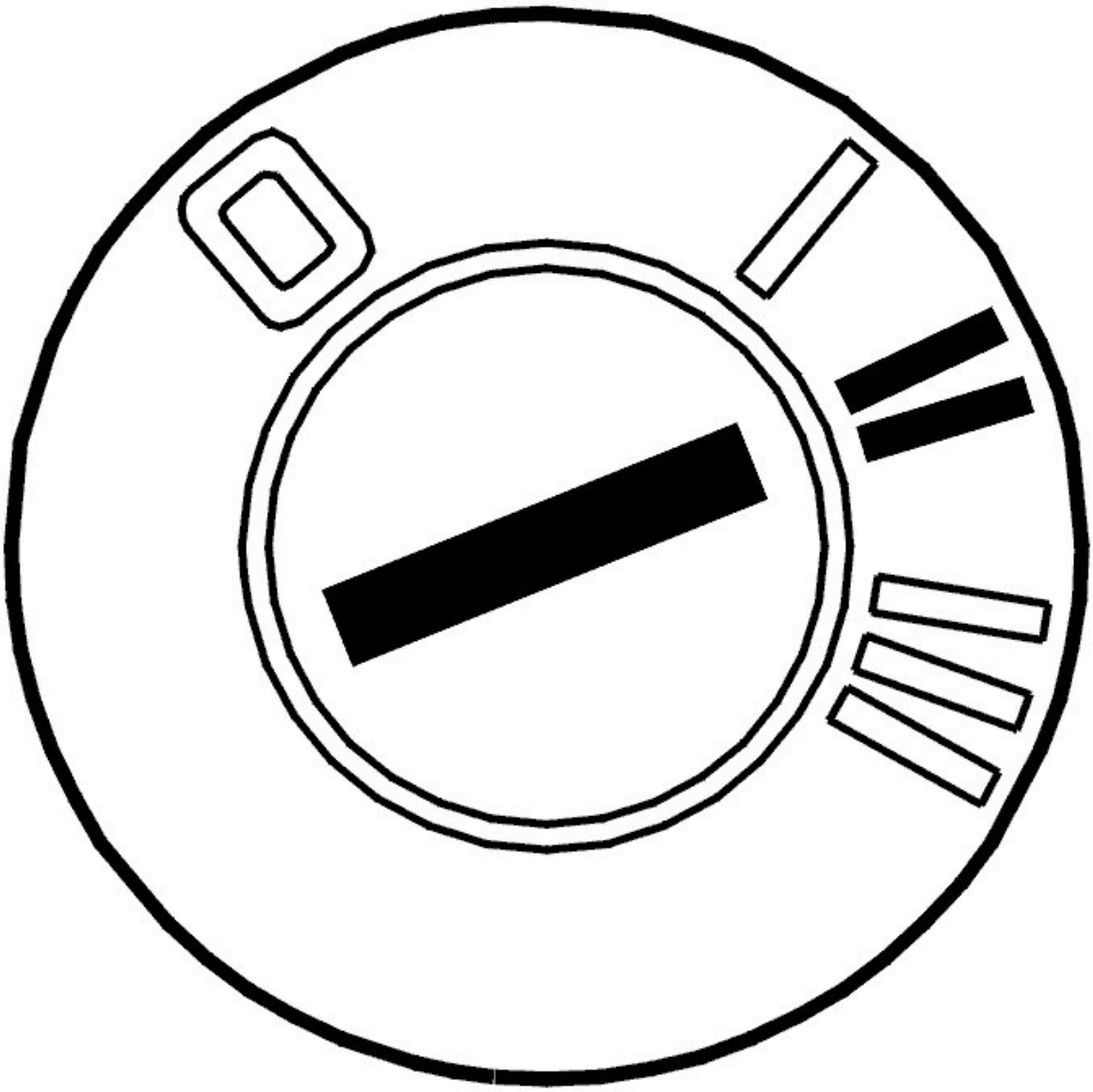
Possible source
- Internal fault in the brake control module (BCM).

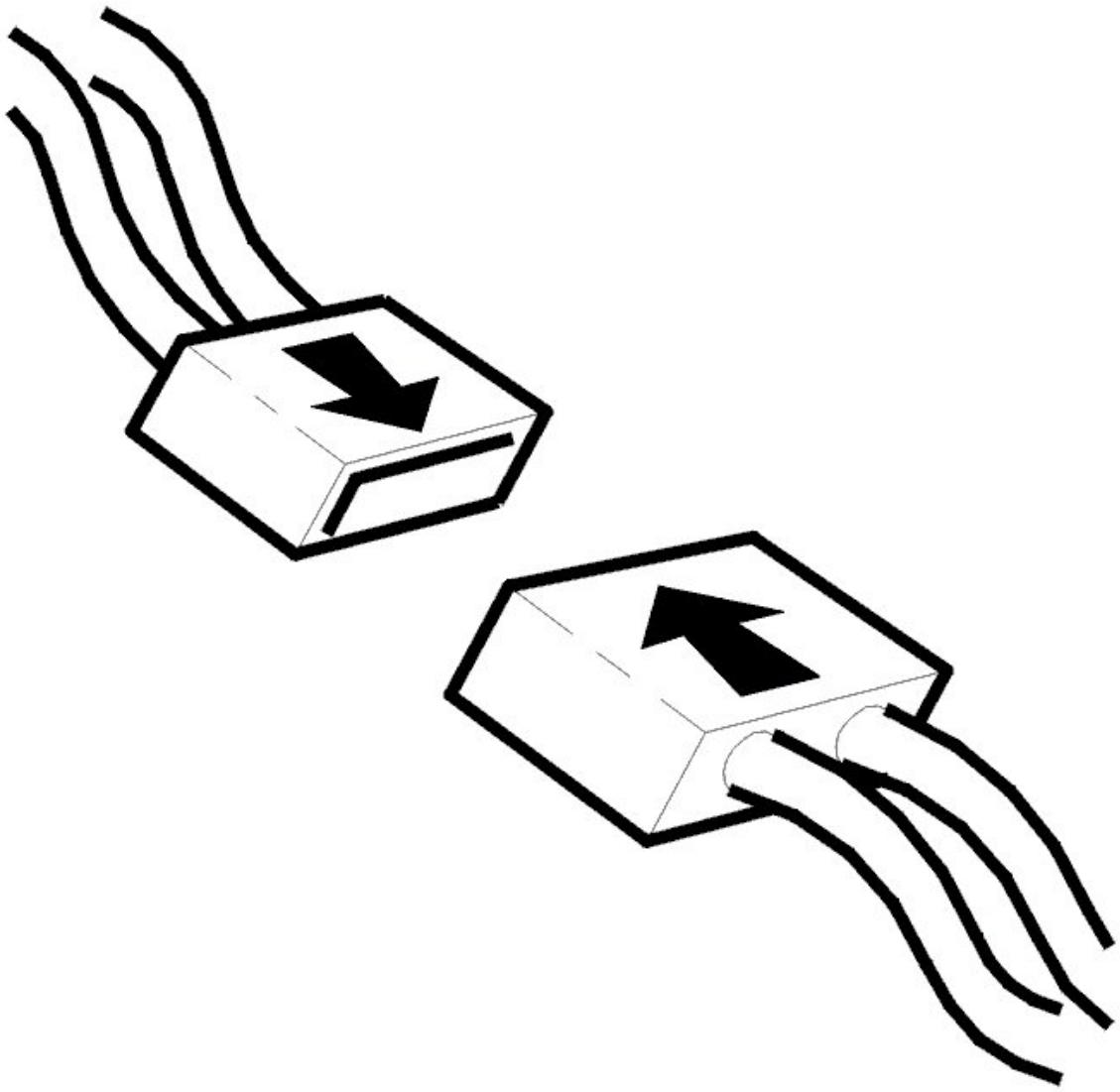
Fault symptom[s]
- The anti-spin warning lamp is lit (up to and including 2002 model year)
- General yellow warning lamp lit (from model year 2003 inclusive)
- The stability control system does not function
- The traction control system does not function.

Internal Memory Fault

Internal memory fault

Checking diagnostic trouble codes (DTCs)





- Ignition off
- Check the brake control module (BCM) connector. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Wait approximately 60 seconds
- Read off the status of the diagnostic trouble code (DTC).

Replace the brake control module (BCM) if the status of the fault is permanent.

Other information

- To access the control module connector, see Connecting the breakout box, brake control module (BCM) See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Brake Control Module (BCM)
- To replace the brake control module (BCM), see Brake Control Module (BCM), replacing See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Electronic Brake Control Module/Service and Repair/Brake Control Module (BCM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was the status of the diagnostic trouble code (DTC) permanent?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

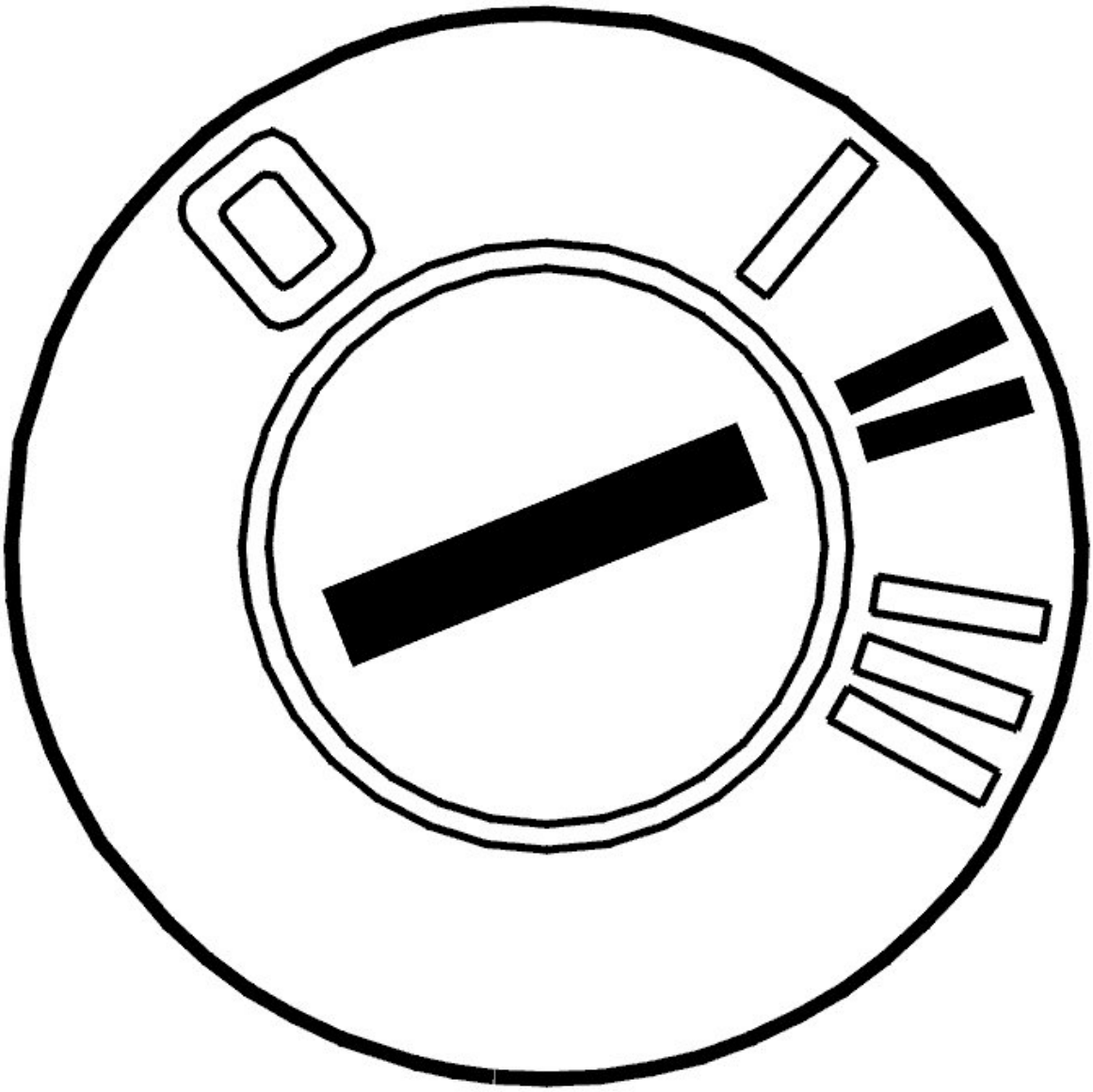
Attempt New Test - Checking diagnostic trouble codes (DTCs)

FAULT-TRACING FAILED - Fault Found

BCM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTC)



- Ignition on.

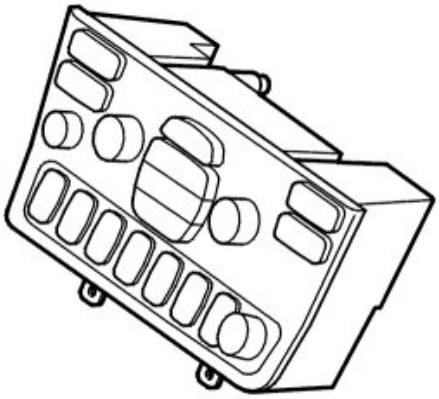
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD00

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that data that is sent on LIN bus 1 is incorrect.
The following components communicate with the climate control module (CCM) via LIN bus 1:

- damper motor module (DMM) air distribution
- damper motor module (DMM) temperature left
- damper motor module (DMM) recirculation (only on right-hand drive cars)
- air quality sensor (AQS) (only on right-hand drive cars)
- seat heating module (SHM) left.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

Possible source

- Incorrect data during communication on LIN bus 1.

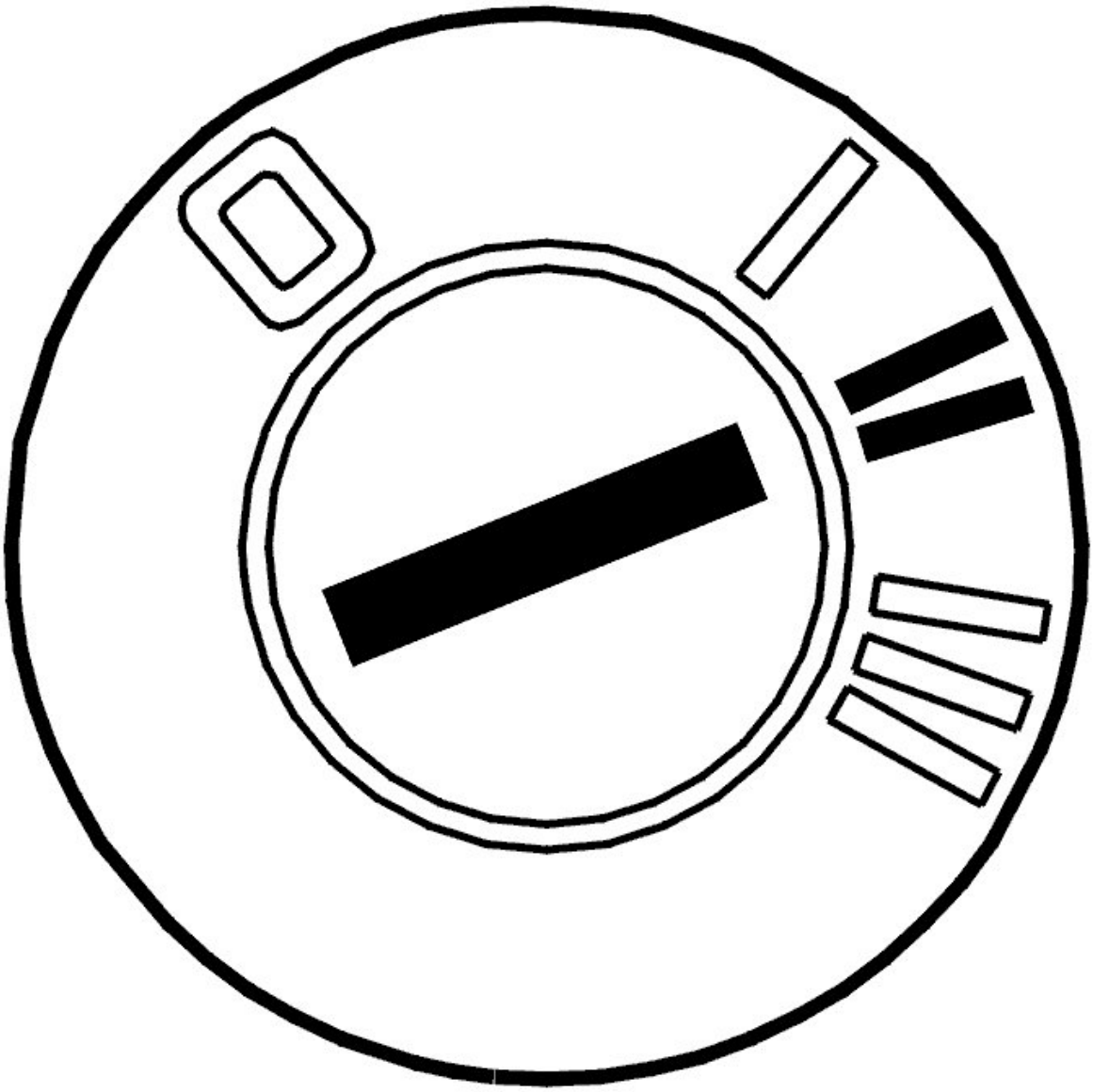
Fault symptom[s]

- Misting on the windows and/or door mirrors.
- Air flow problem.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Incorrect Data

Incorrect data

Checking components



- Ignition off
- Disconnect connector A for the seat heating module (SHM) left
- Ignition on.

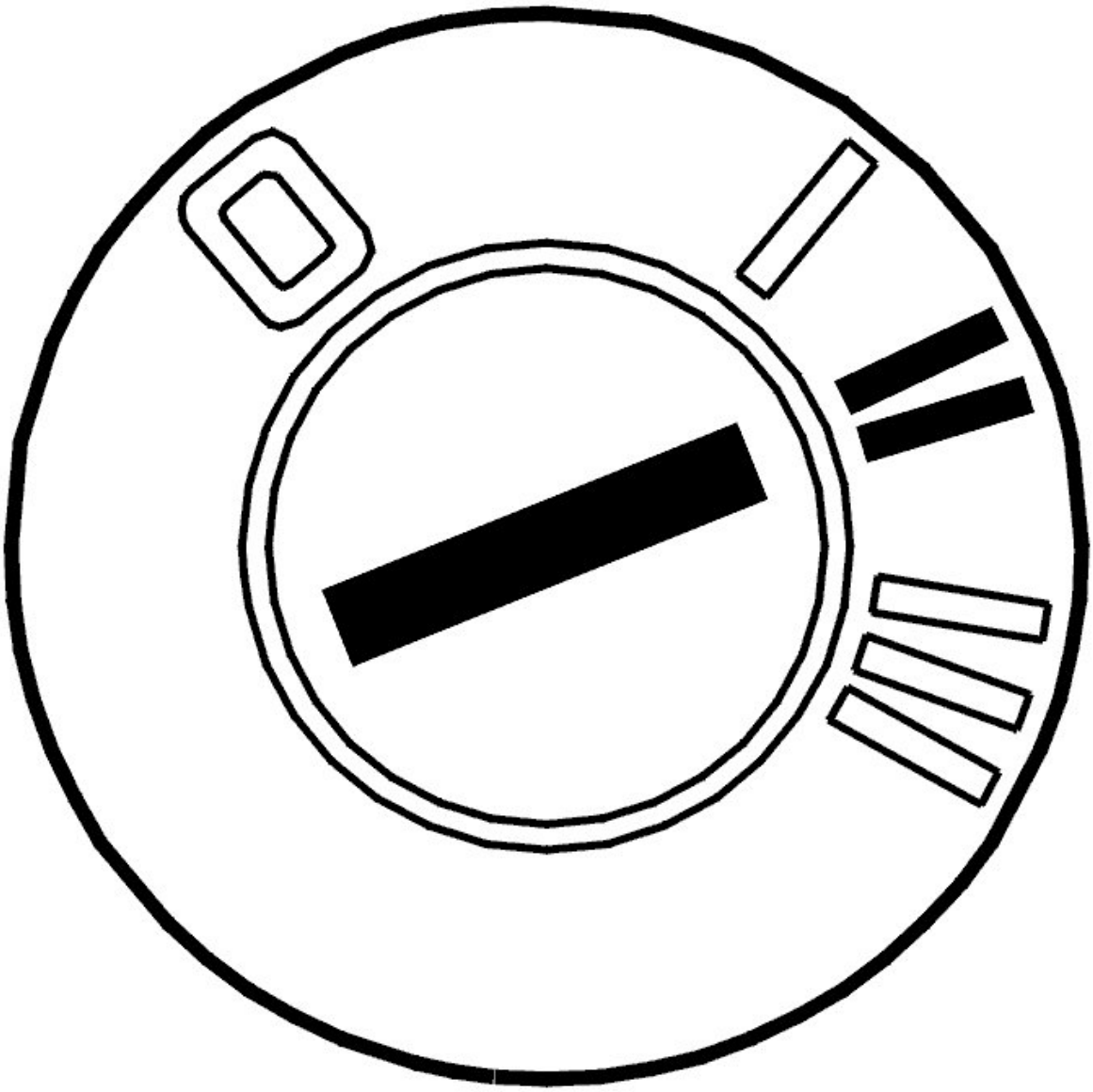
The climate control module (CCM) has detected that a component on LIN bus 1 is transmitting incorrect data and disrupting communication on the LIN bus.
Check the communication by disconnecting the seat heating module (SHM) left.
If other control modules on LIN bus 1 now function, replace the seat heating module (SHM) left.

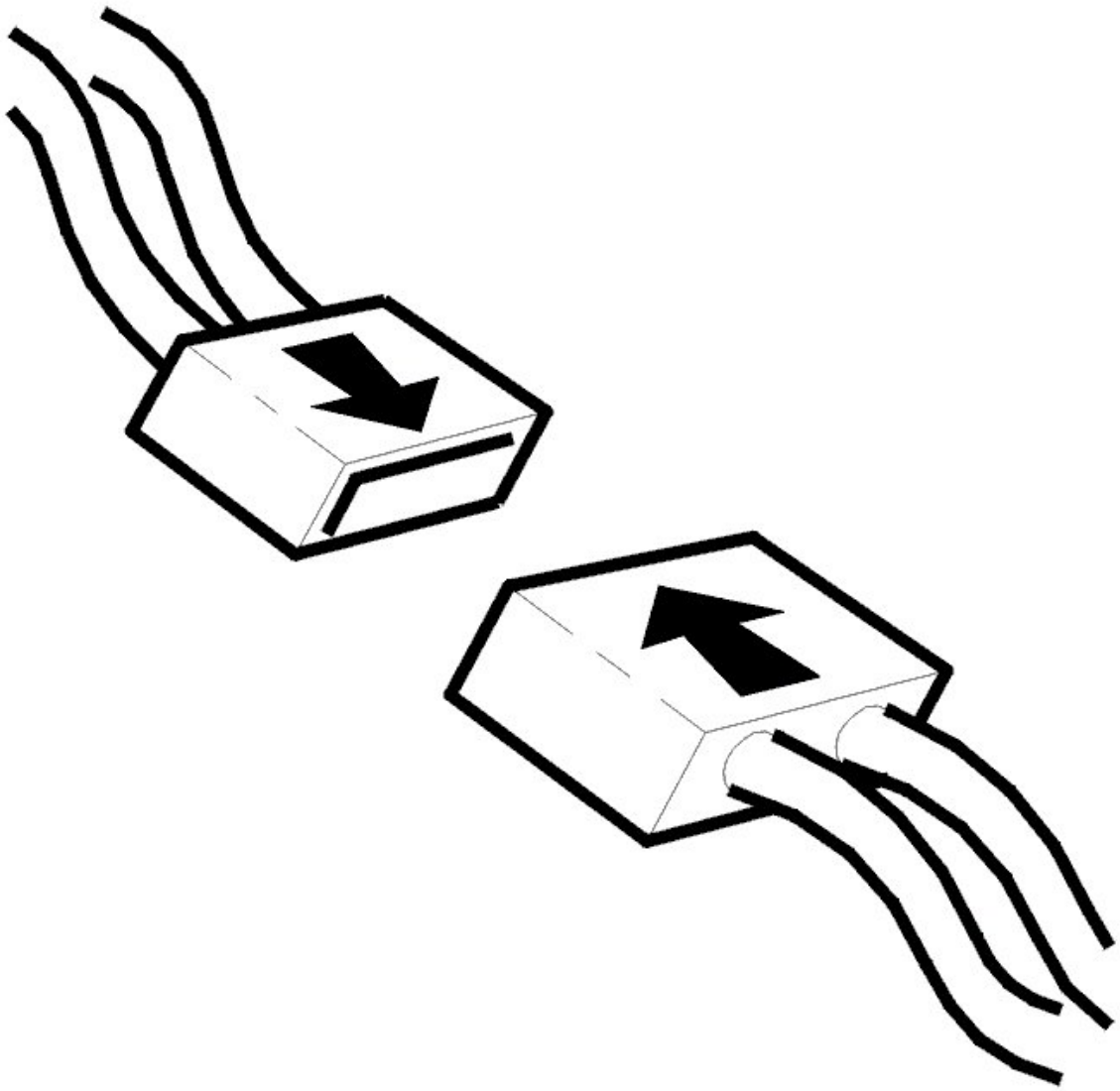
Was a fault detected?

Yes - Verification

No - Checking components

Checking components





- Ignition off
- Reconnect connector A for the seat heating module (SHM)
- Ignition on.

Check the components on the climate control unit as follows:

- Disconnect the connectors for the components one at a time
- Check whether the other components regain functionality, for example by activating seat heating
- If the functionality for the other components returns, the fault is probably in the disconnected components.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Air quality sensor, replacing See: Heating and Air Conditioning/Climate Control Exhaust Gas Sensor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

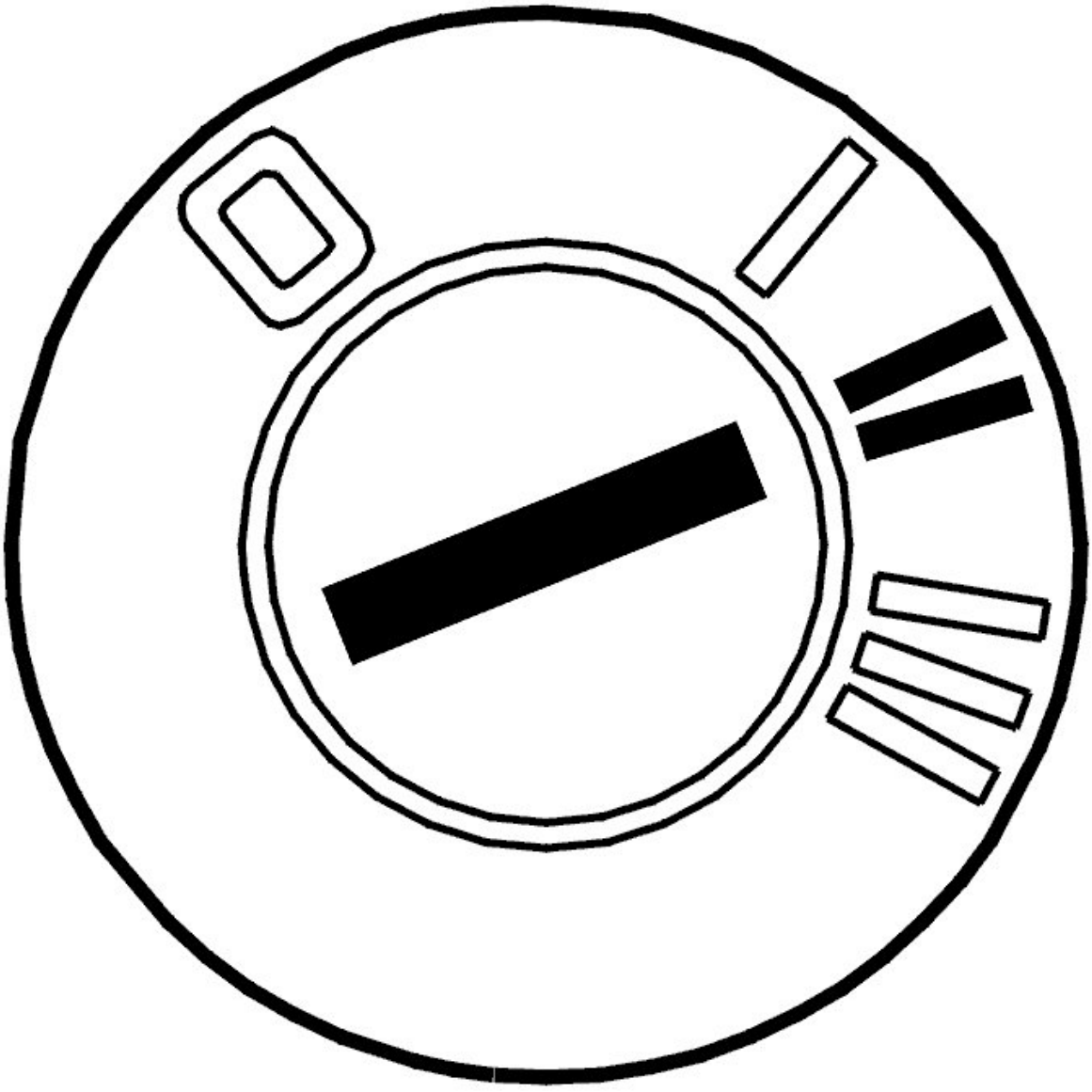
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

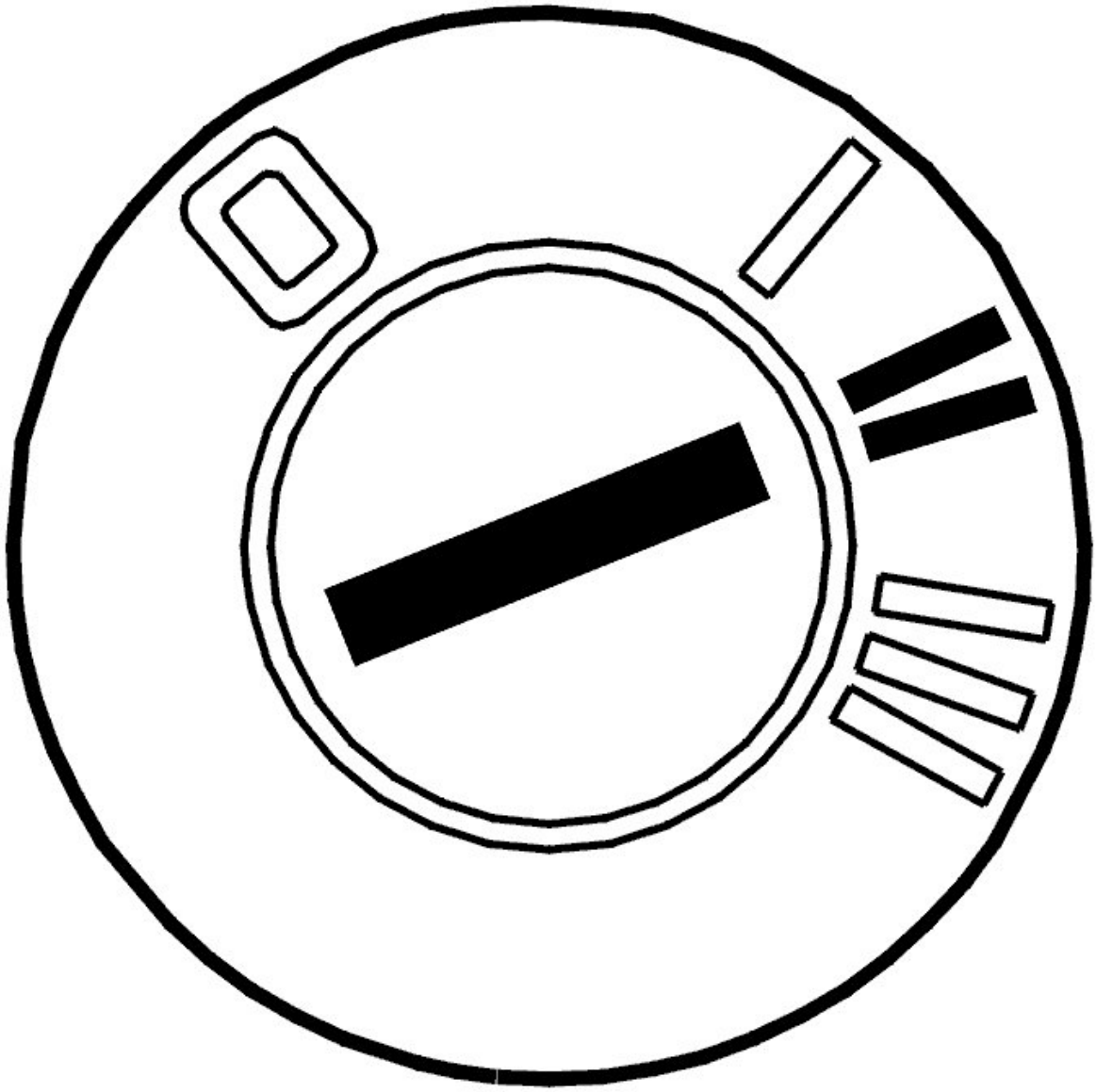
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

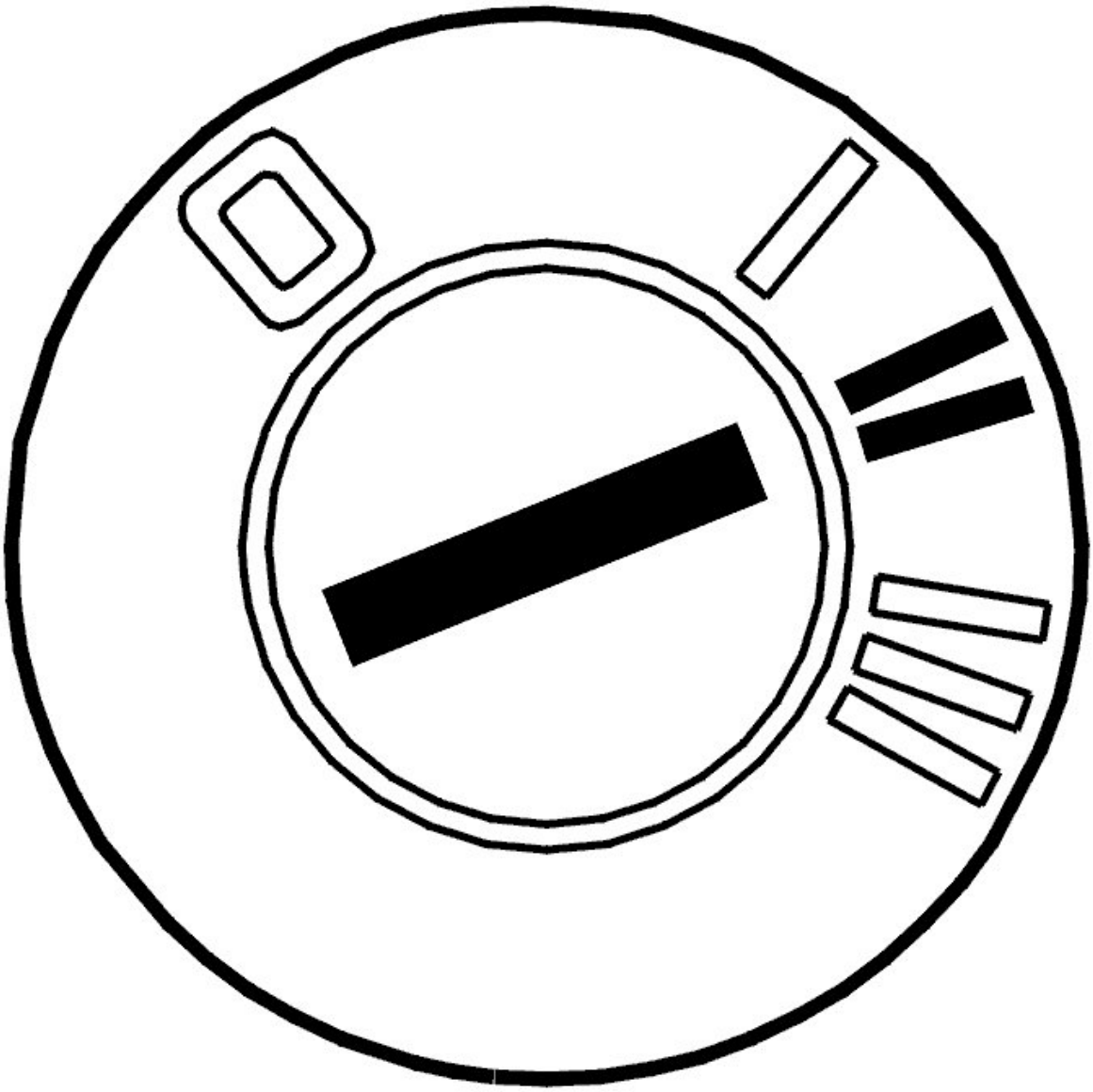
DONE - Verification

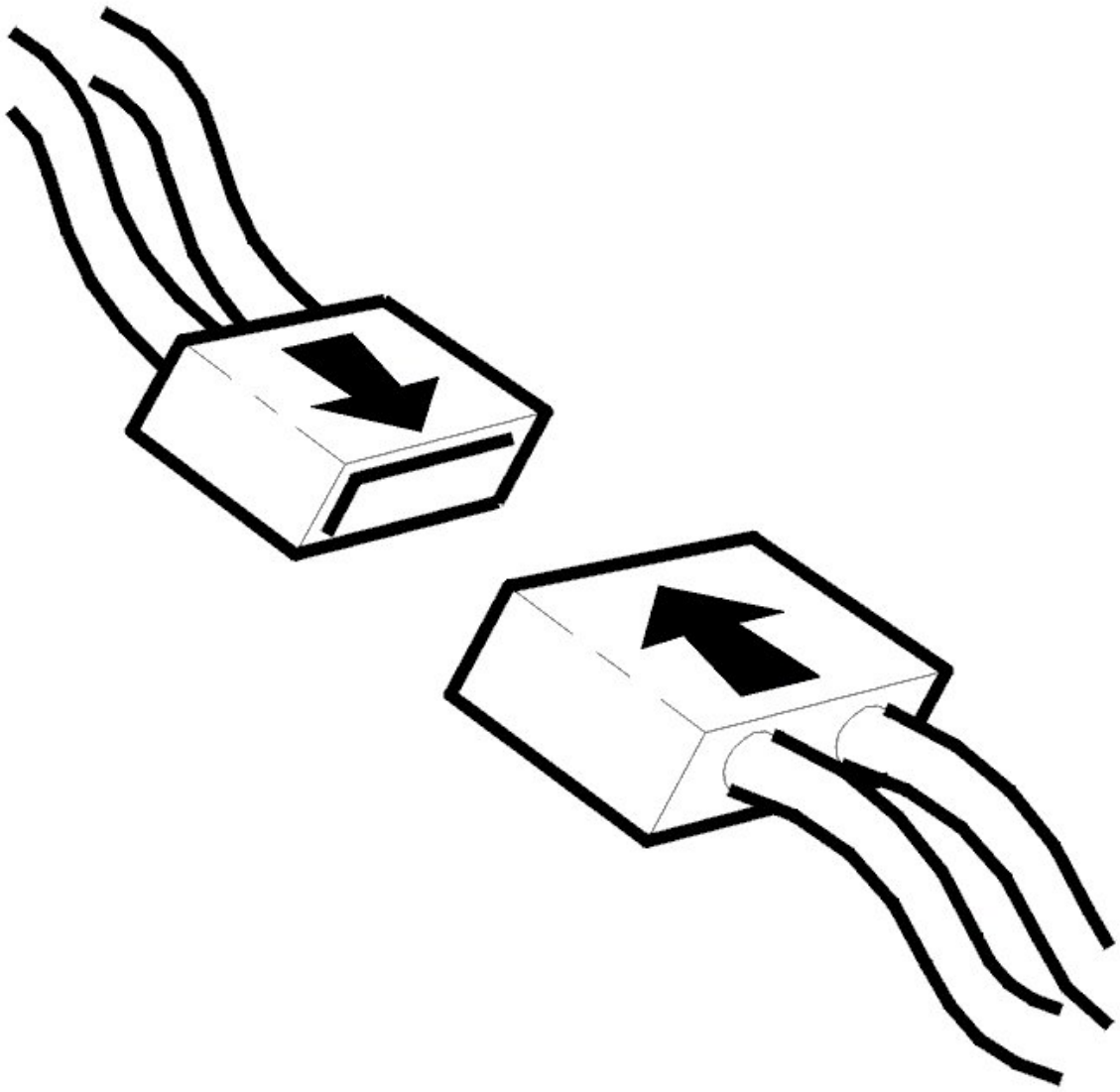
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

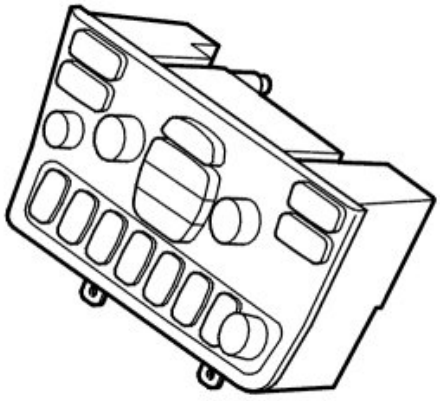
FAULT FOUND - Fault Found

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD01

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a short-circuit to supply voltage or ground in LIN bus 1.
A short-circuit to supply voltage or ground in the LIN bus will affect communications and the function of all the components.
The climate control module (CCM) communicates with damper motors, air quality sensors and seat heating via two LIN buses.

The number of components in LIN bus 1 can vary depending on the vehicle equipment (ECC/MCC and options) and if the vehicle has right-hand drive or left-hand drive.
The following components communicate on LIN bus 1:

- damper motor air distribution
- damper motor, temperature left
- damper motor recirculation (only on right-hand drive cars)
- air quality sensor (AQS) (only on right-hand drive cars)
- left seat heater.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in LIN bus 1
- Short-circuit to ground in LIN bus 1.

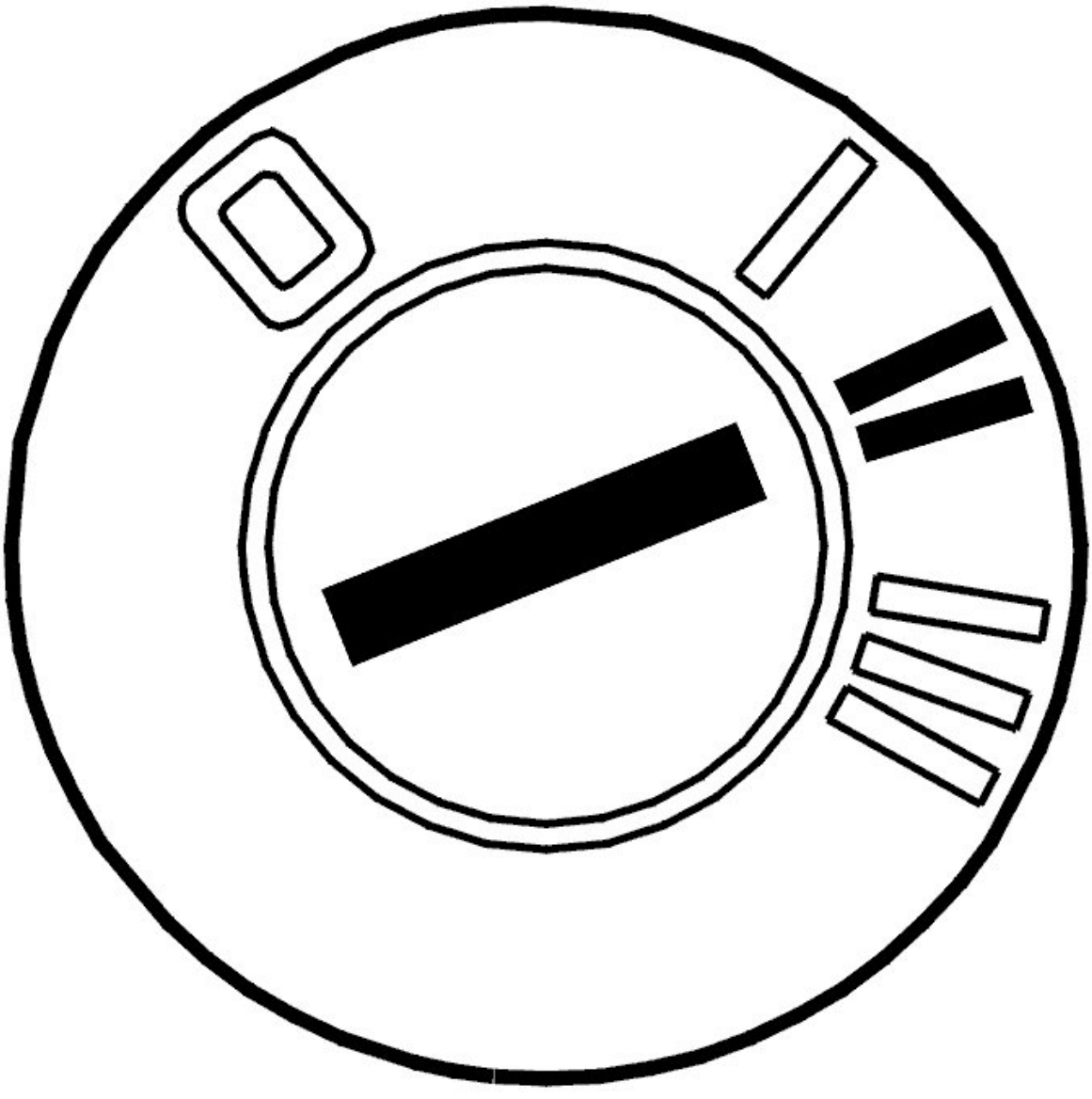
Fault symptom[s]

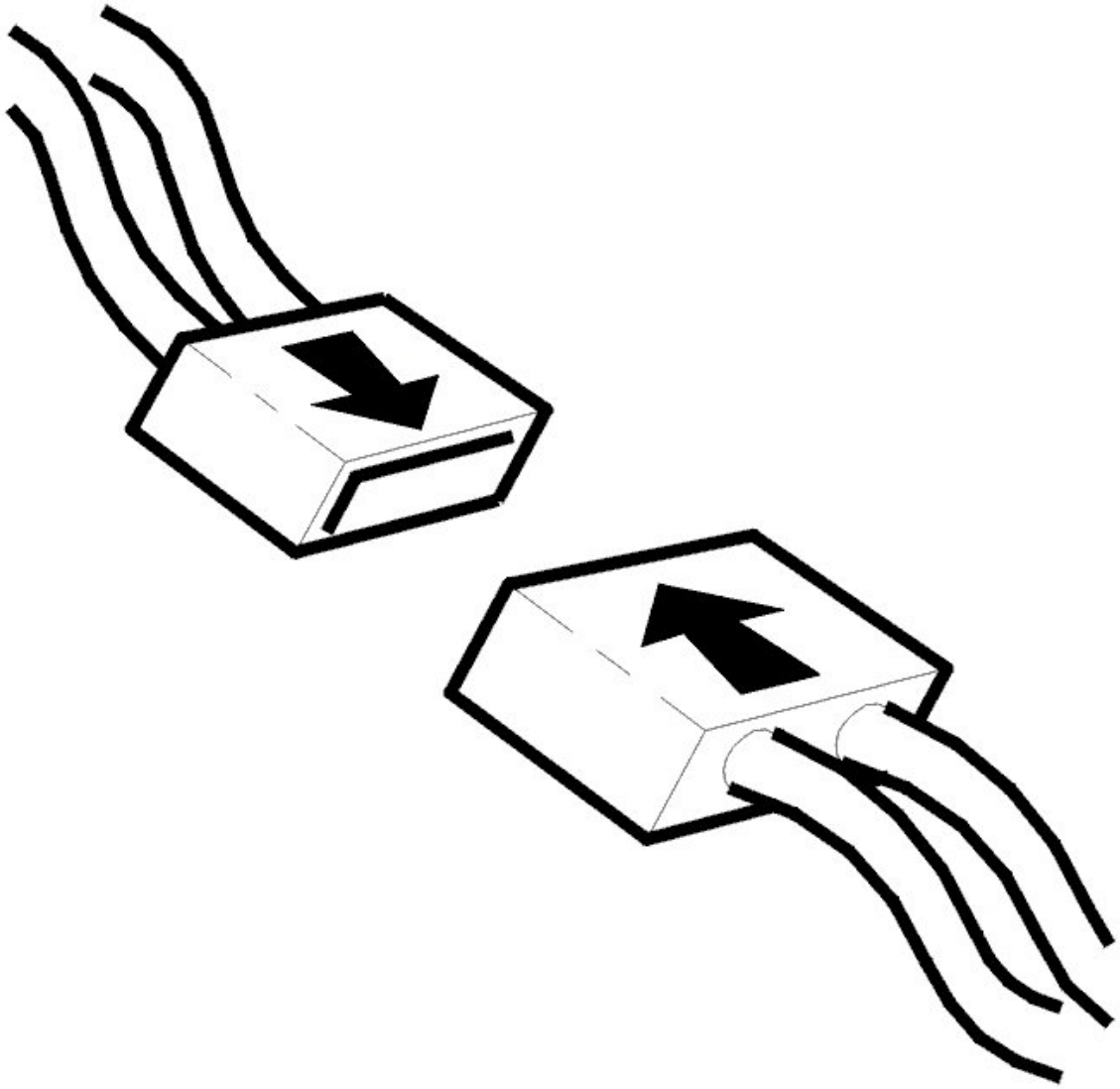
- Misting on the windows and/or door mirrors.
- Air flow problem.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Signal Too High / Signal Too Low

Signal too high / Signal too low

Checking the cable





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Ignition on.

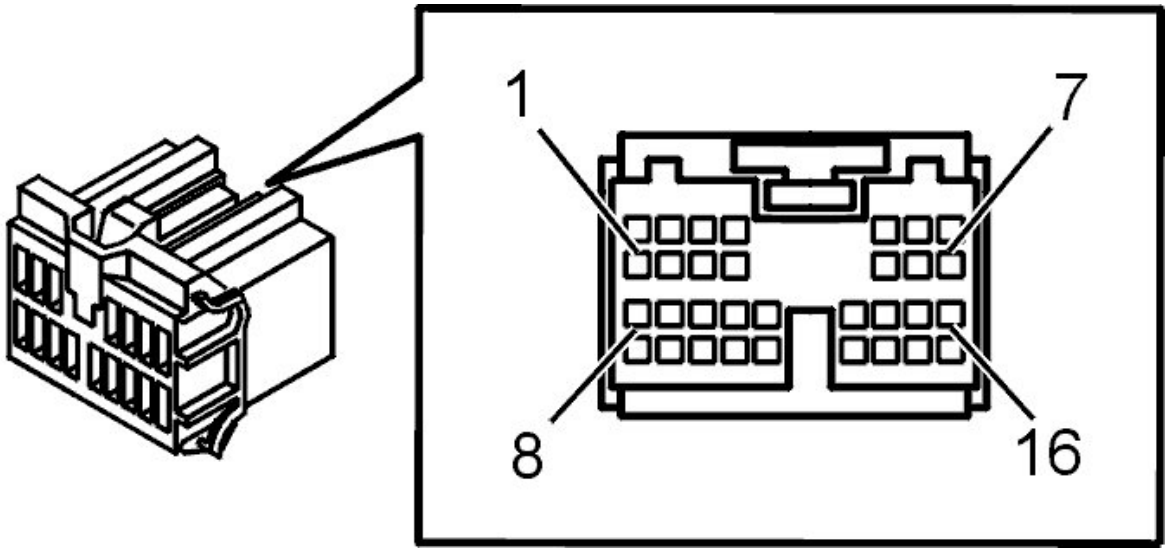
Check LIN bus 1. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #12 (#36) and #1 (#25).
If there is a short-circuit to supply voltage in LIN bus 1, continue fault-tracing by locating where the short-circuit has occurred as follows:

- Disconnect the connector on the climate control unit that connects LIN bus 1 from the climate control module (CCM) to other components on the climate control unit
- Check the section of LIN bus 1 that connects the climate control module (CCM) to the left-hand seat heating module (SHM) and the connector on the climate control unit. Take a reading on the connector for the climate control module (CCM) between terminals #12 (#36) and #1 (#25).

If the fault persists, fault-trace LIN bus 1 between the climate control module (CCM), the left-hand seat heating module (SHM) and the connector for the climate control unit. Check for a short-circuit to supply voltage.
If the fault is no longer present, fault-trace LIN bus 1 between the connector and the components of the climate control unit. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

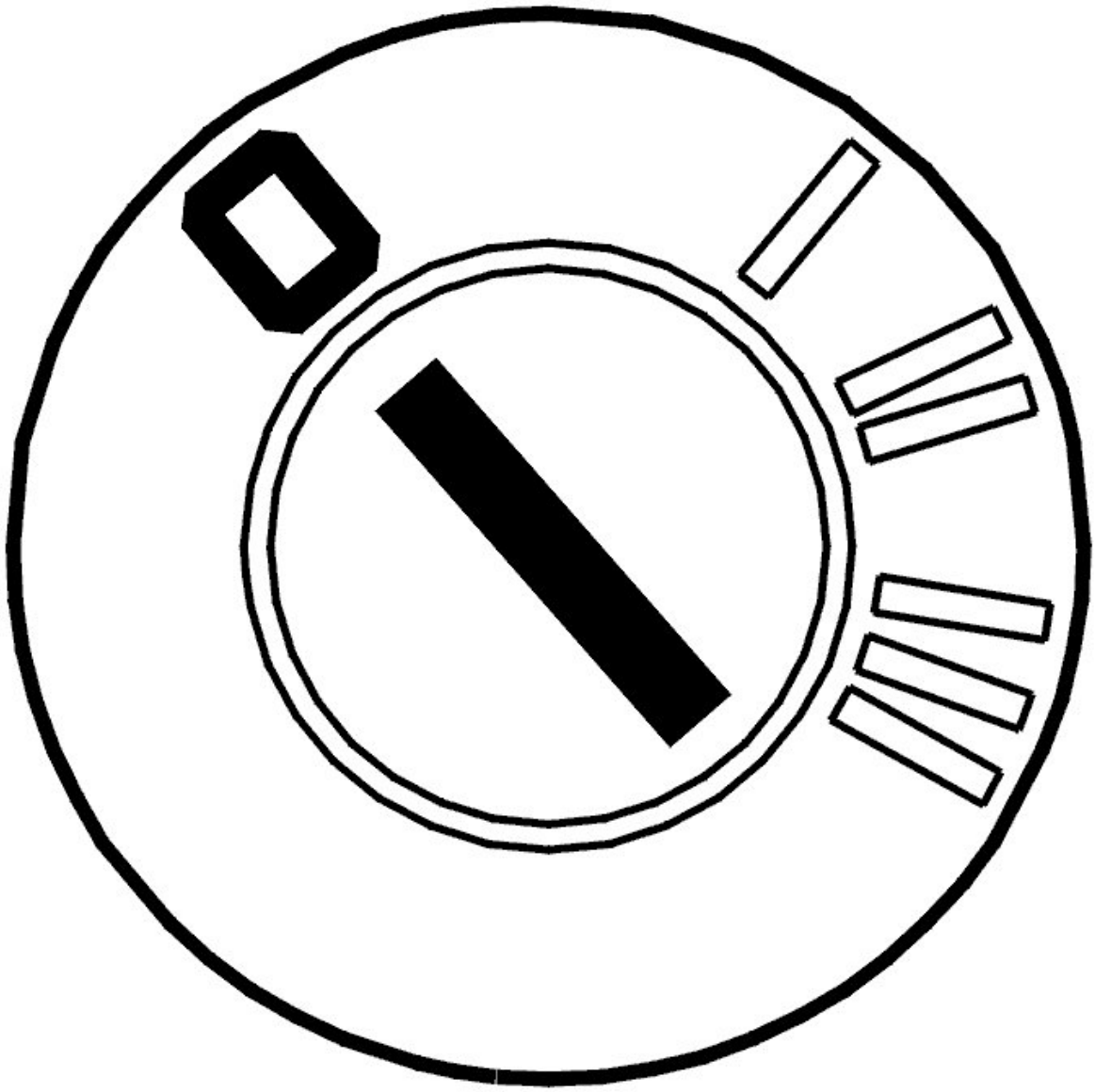


Was a fault detected?

Yes - Verification

No - Checking the cable

Checking the cable



- Ignition off

- Disconnect the connector for the climate control module (CCM).

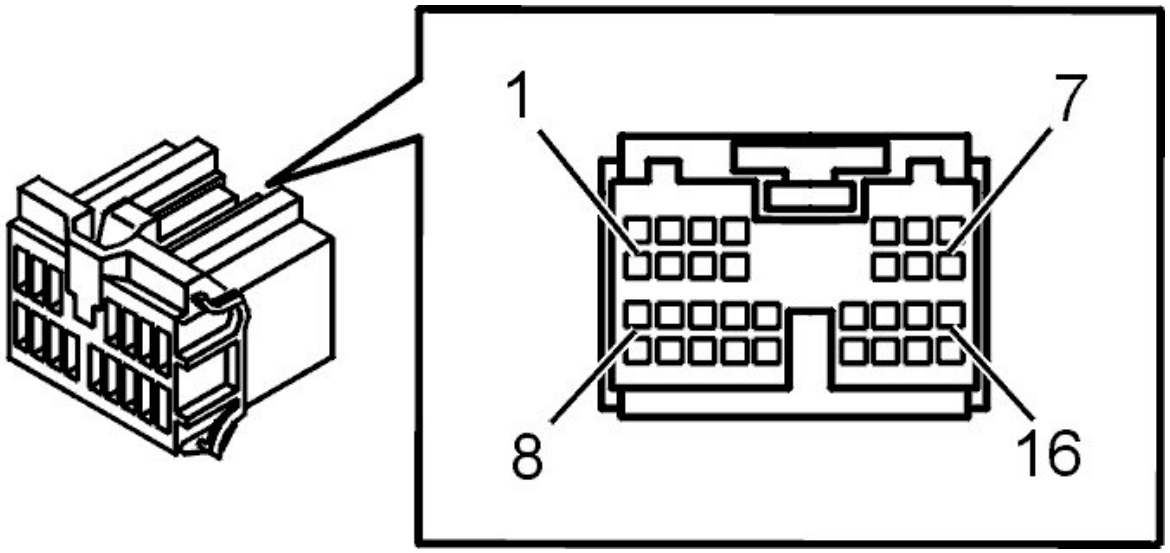
Check LIN bus 1. Check for a short-circuit to ground.
Take a reading on the connector for the climate control module (CCM) between terminals #12 (#36) and #16 (#40).
If there is a short-circuit to ground in LIN bus 1, continue fault-tracing by locating where the short-circuit has occurred as follows:

- Disconnect the connector for the climate control unit that connects LIN bus 1 from the climate control module (CCM) to the other components on the climate control unit
- Check the section of LIN bus 1 that connects the climate control module (CCM) to the left-hand seat heating module (SHM) and the connector on the climate control unit. Take a reading on the connector for the climate control module (CCM) between terminals #12 (#36) and #16 (#40).

If the fault persists, fault-trace LIN bus 1 between the climate control module (CCM), the left-hand seat heating module (SHM) and the connector for the climate control unit. Check for a short-circuit to ground.
If the fault is no longer present, fault-trace LIN bus 1 between the connector and the components of the climate control unit. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



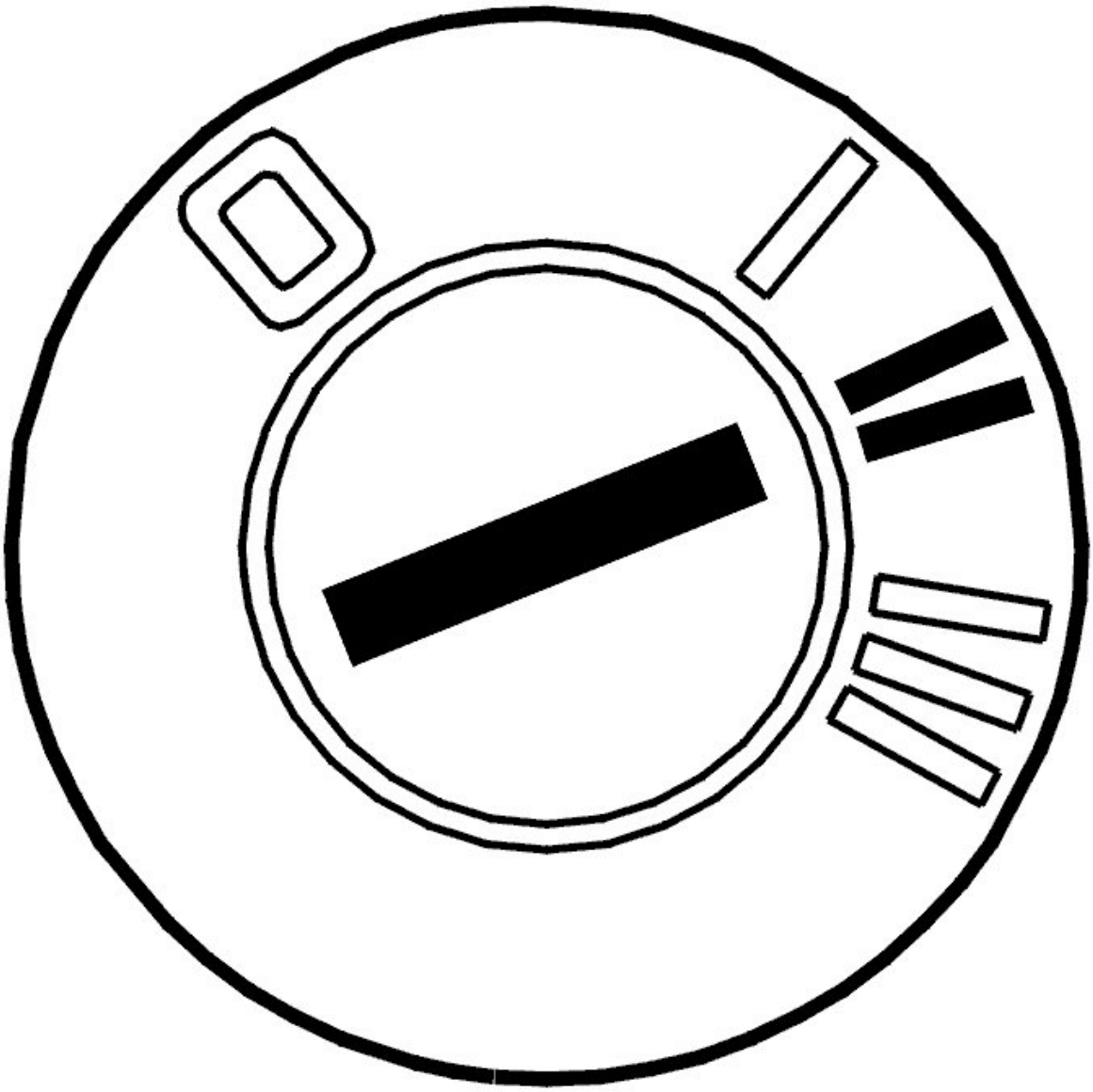
Continue - Verification

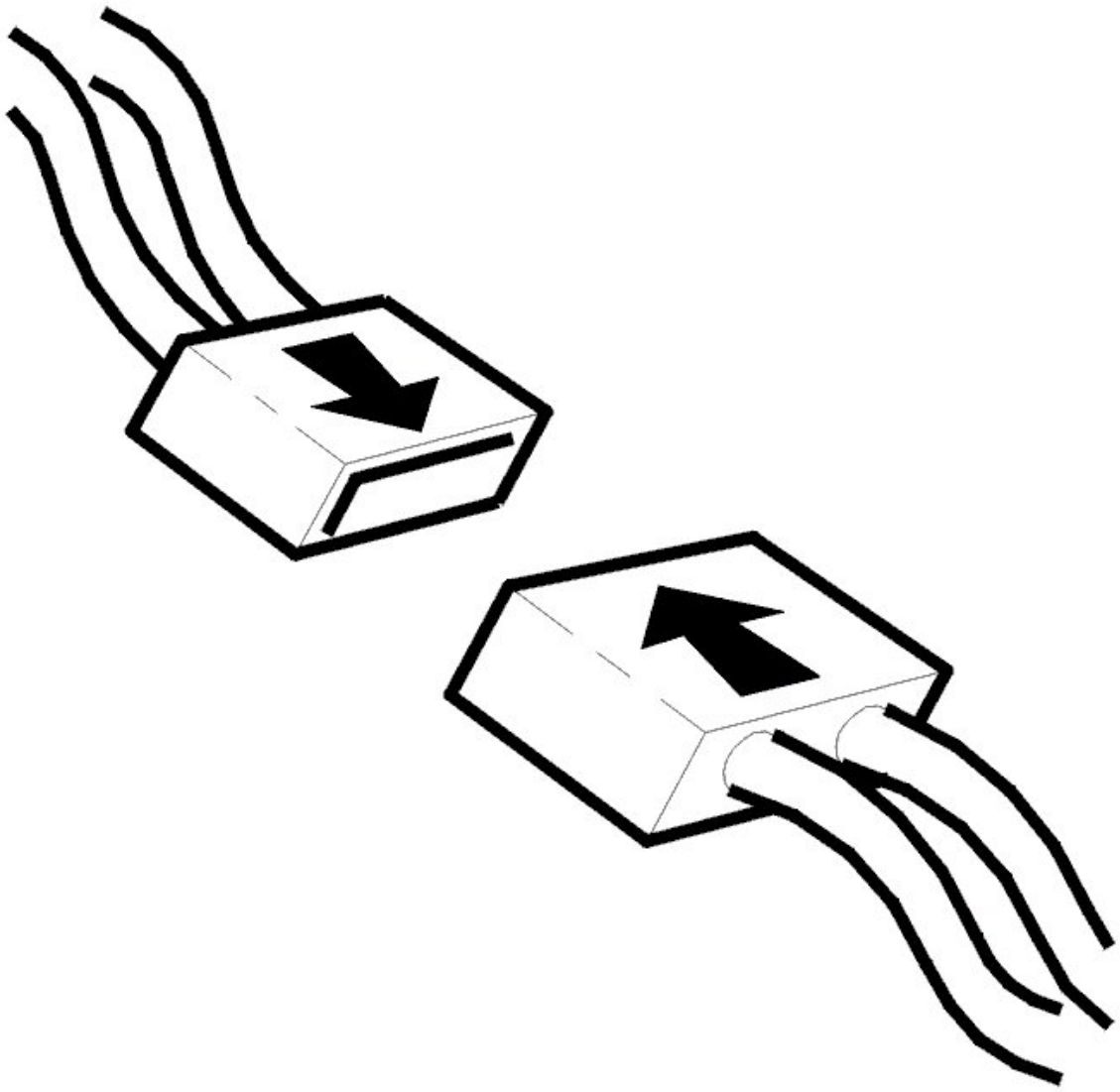
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

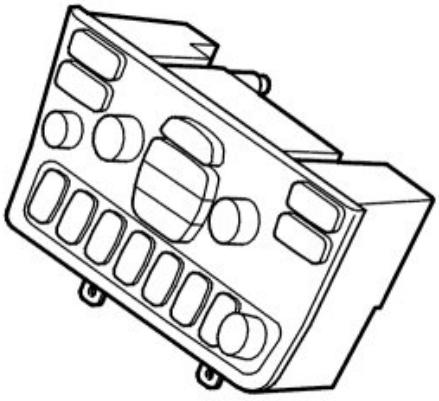
FAULT FOUND - Fault Found

Attempt New Test - Checking the cable

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD02

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that data that is sent on LIN bus 1 is incorrect.
The following components communicate with the climate control module (CCM) via LIN bus 1:

- damper motor module (DMM) air distribution

- damper motor module (DMM) temperature left
- damper motor module (DMM) recirculation (only on right-hand drive cars)
- air quality sensor (AQS) (only on right-hand drive cars)
- seat heating module (SHM) left.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

Possible source

- Incorrect data during communication on LIN bus 1.

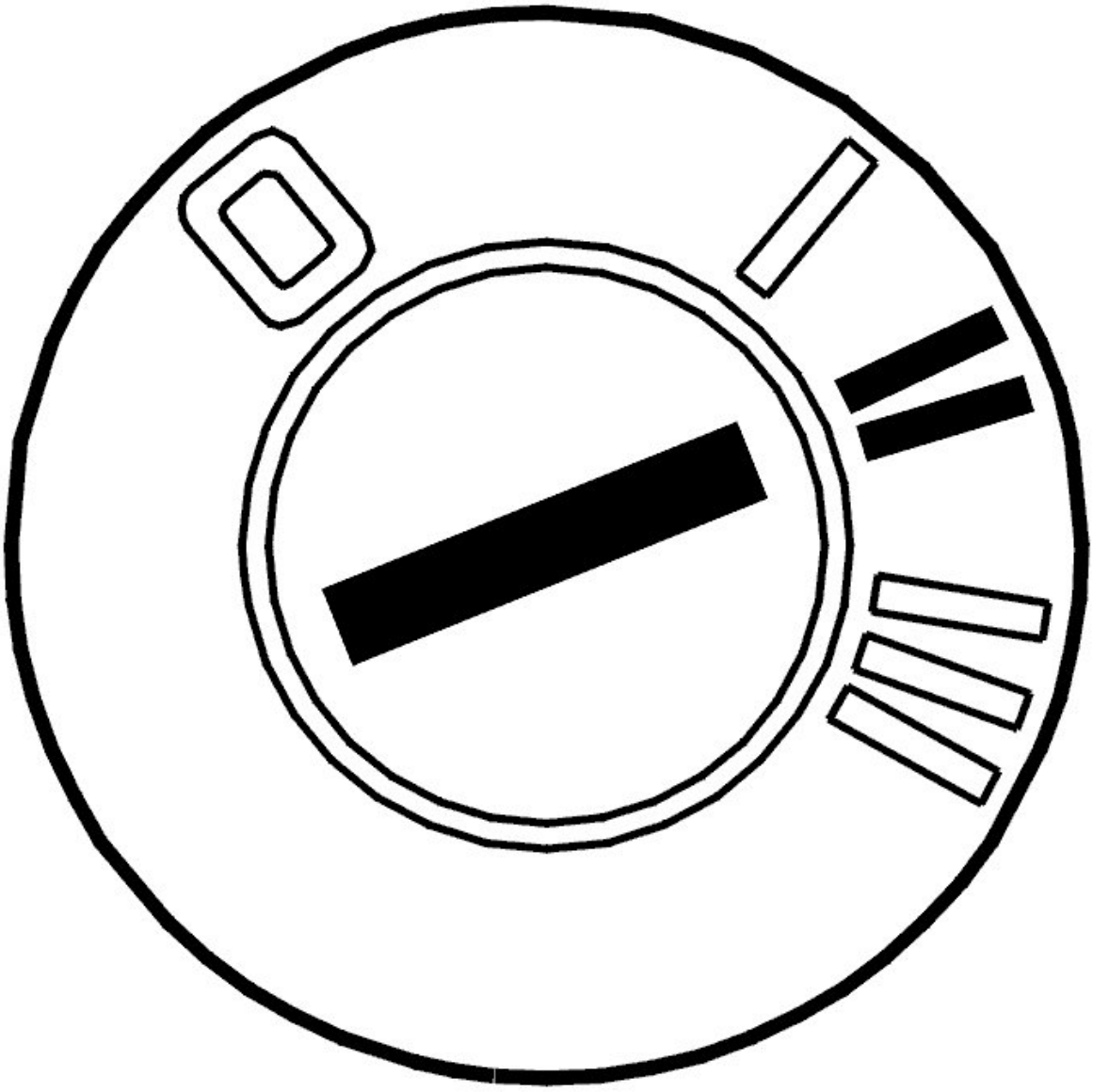
Fault symptom[s]

- Misting on the windows and/or door mirrors.
- Air flow problem.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Faulty Check Sum

Faulty check sum

Checking components



- Ignition on.

The climate control module (CCM) has diagnosed that two or more damper motor modules (DMM) have the same identity on LIN bus 1.
This may be because one damper motor module (DMM) has been installed incorrectly.
After replacing a damper motor module (DMM), it must be allocated a correct identity by the climate control module (CCM). This is performed during identification of the damper motors on the LIN bus.

If a damper motor module (DMM) is installed that already has an identity allocated to it, this can lead to a conflict on the LIN bus. Remedy by correctly identifying the damper motor.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

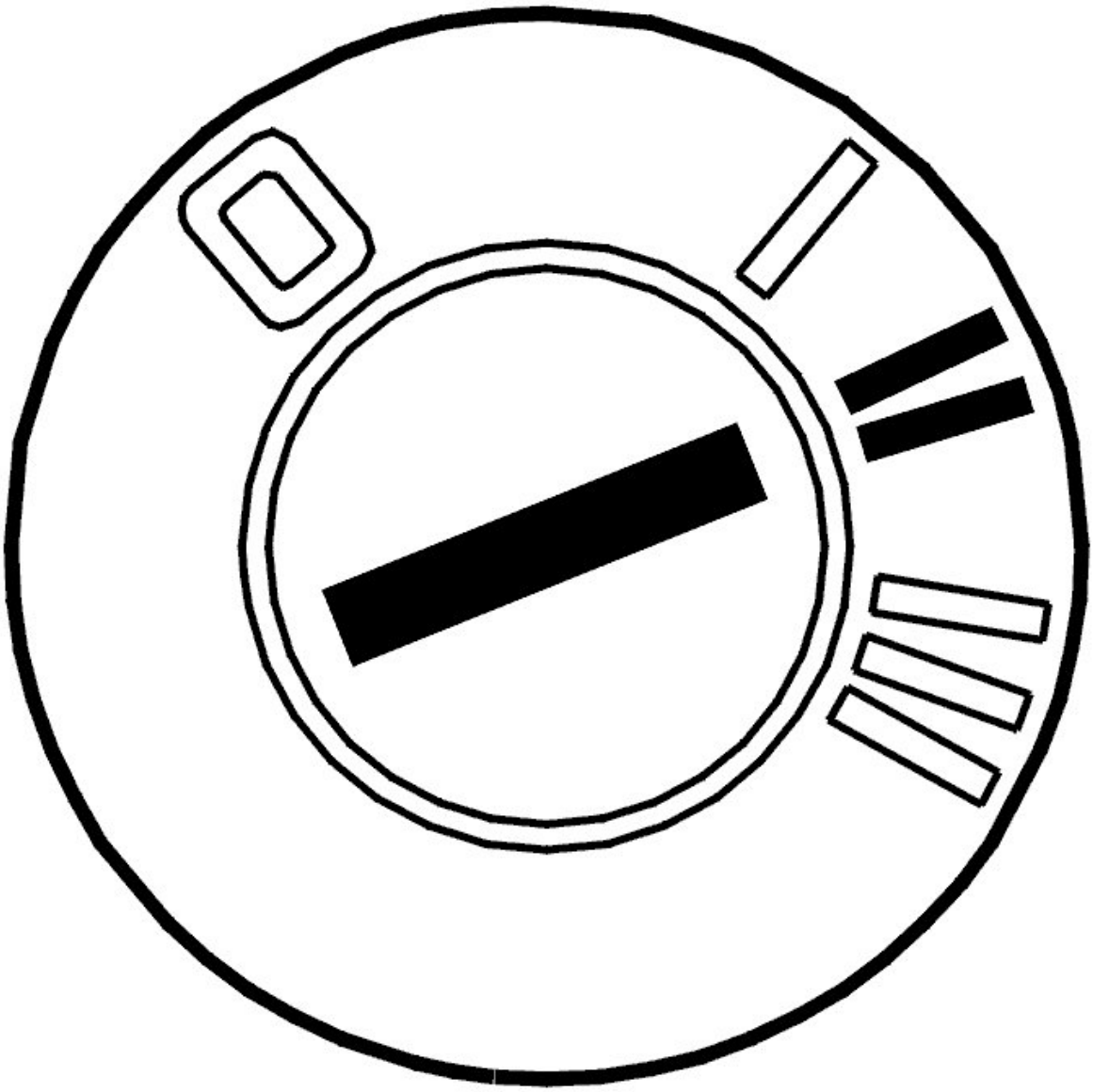
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - **DONE**

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

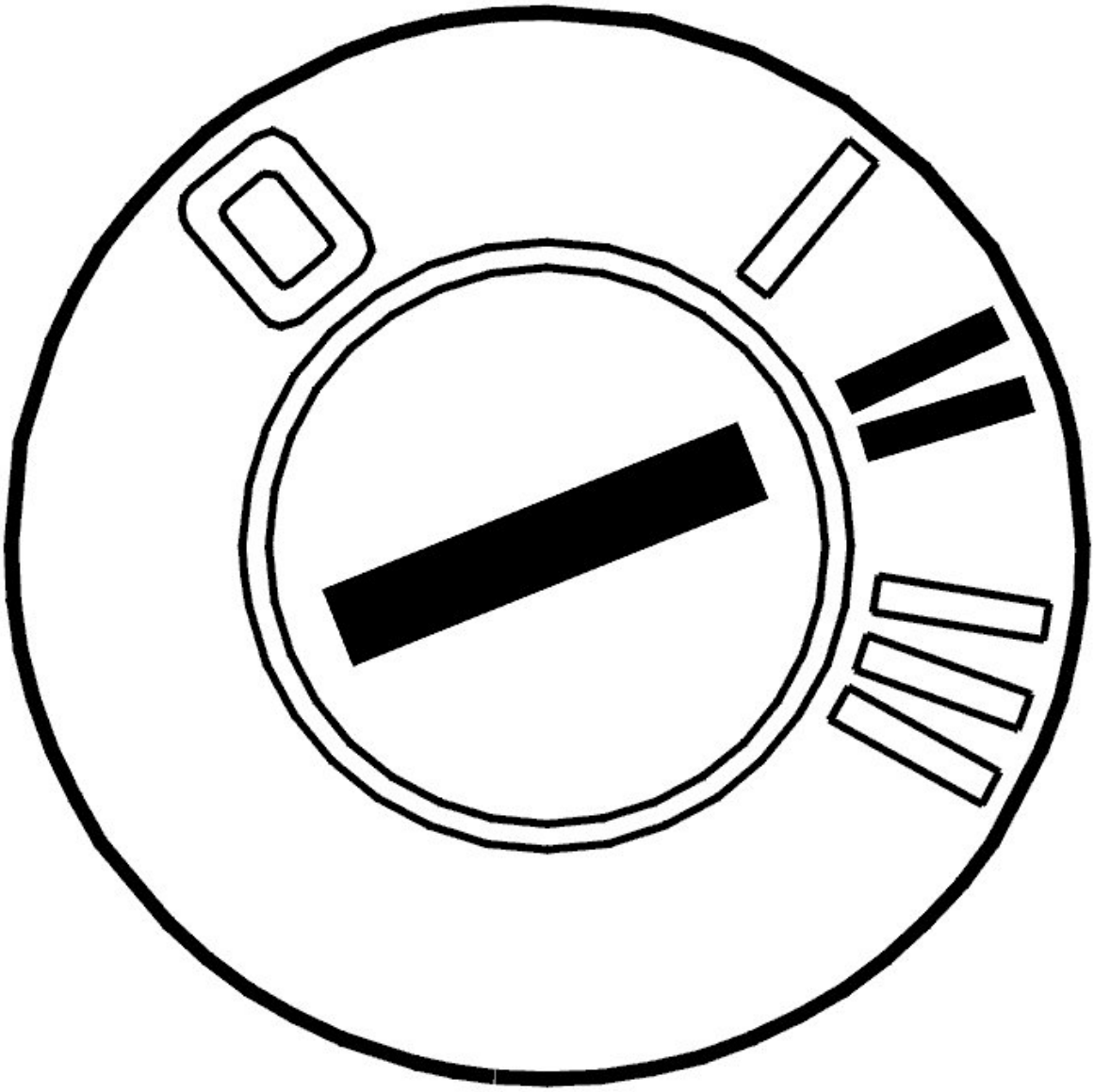
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

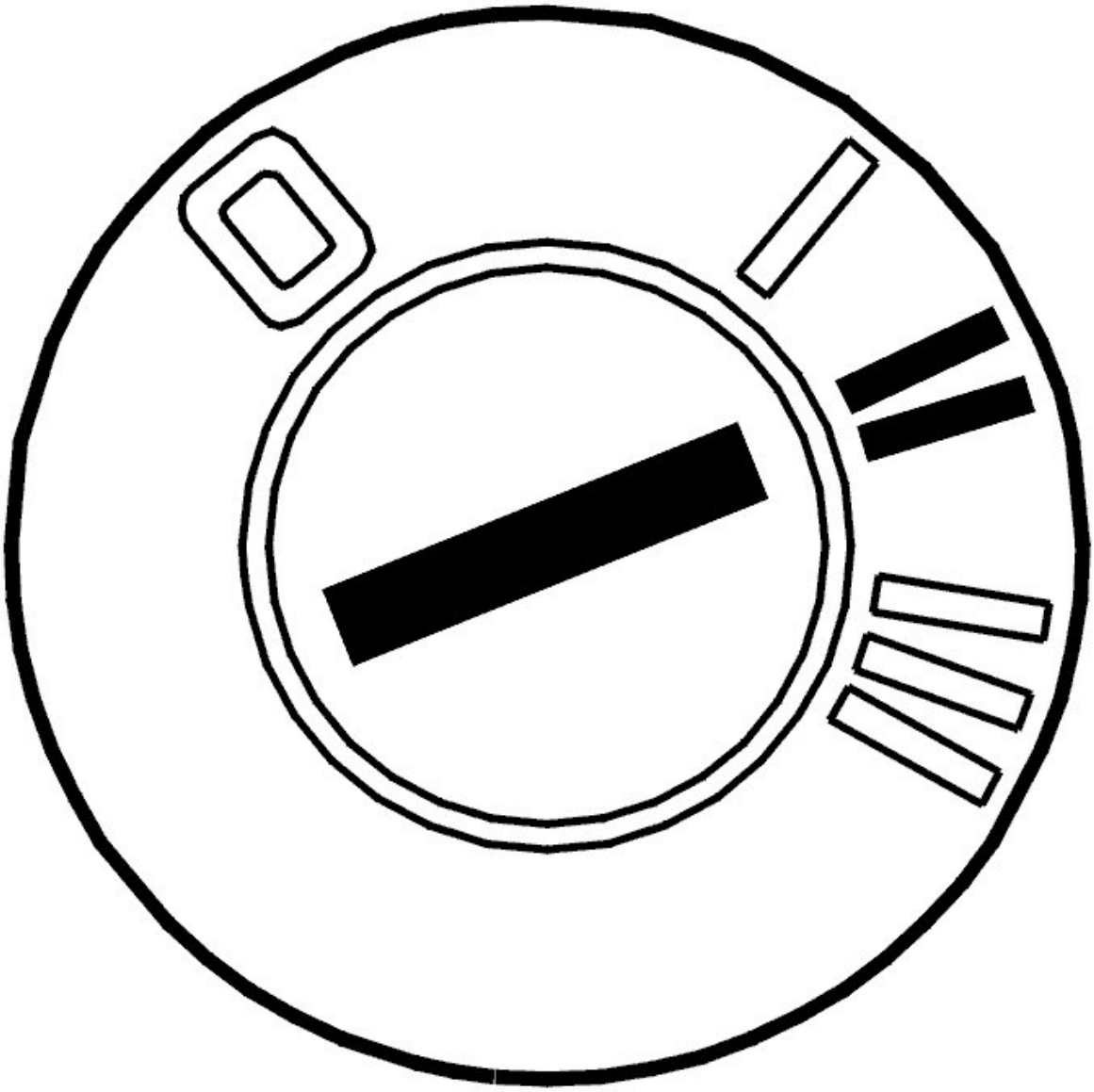
DONE - Verification

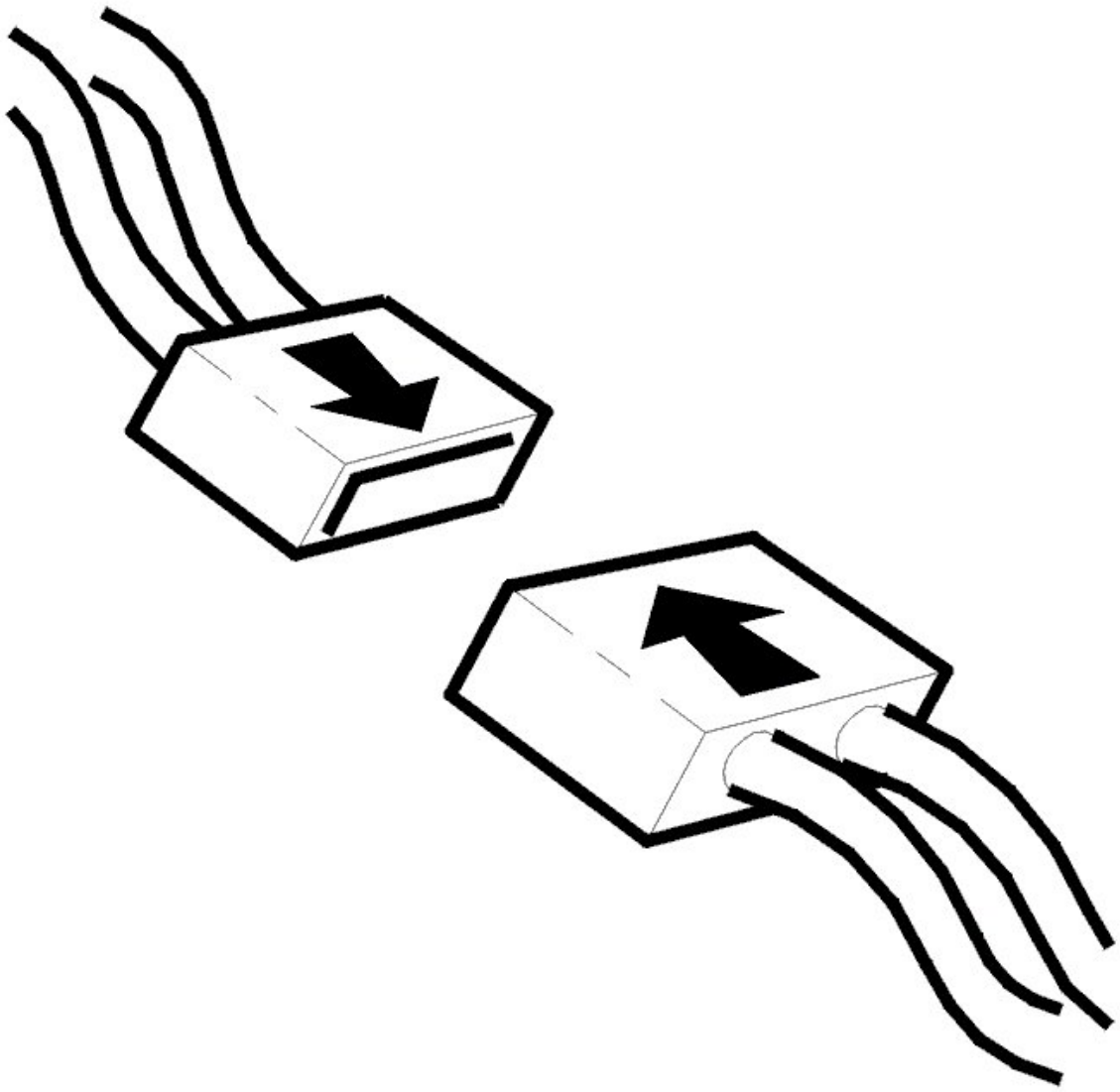
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

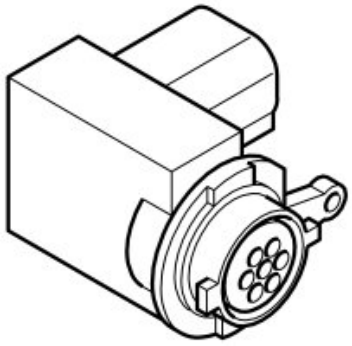
FAULT FOUND - Fault Found

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD10

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the air quality sensor (AQS) and the climate control module (CCM) on LIN bus 1.
The diagnostic trouble code (DTC) can occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 (CCM-DD10 -

CCM-DD16) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value
- None.

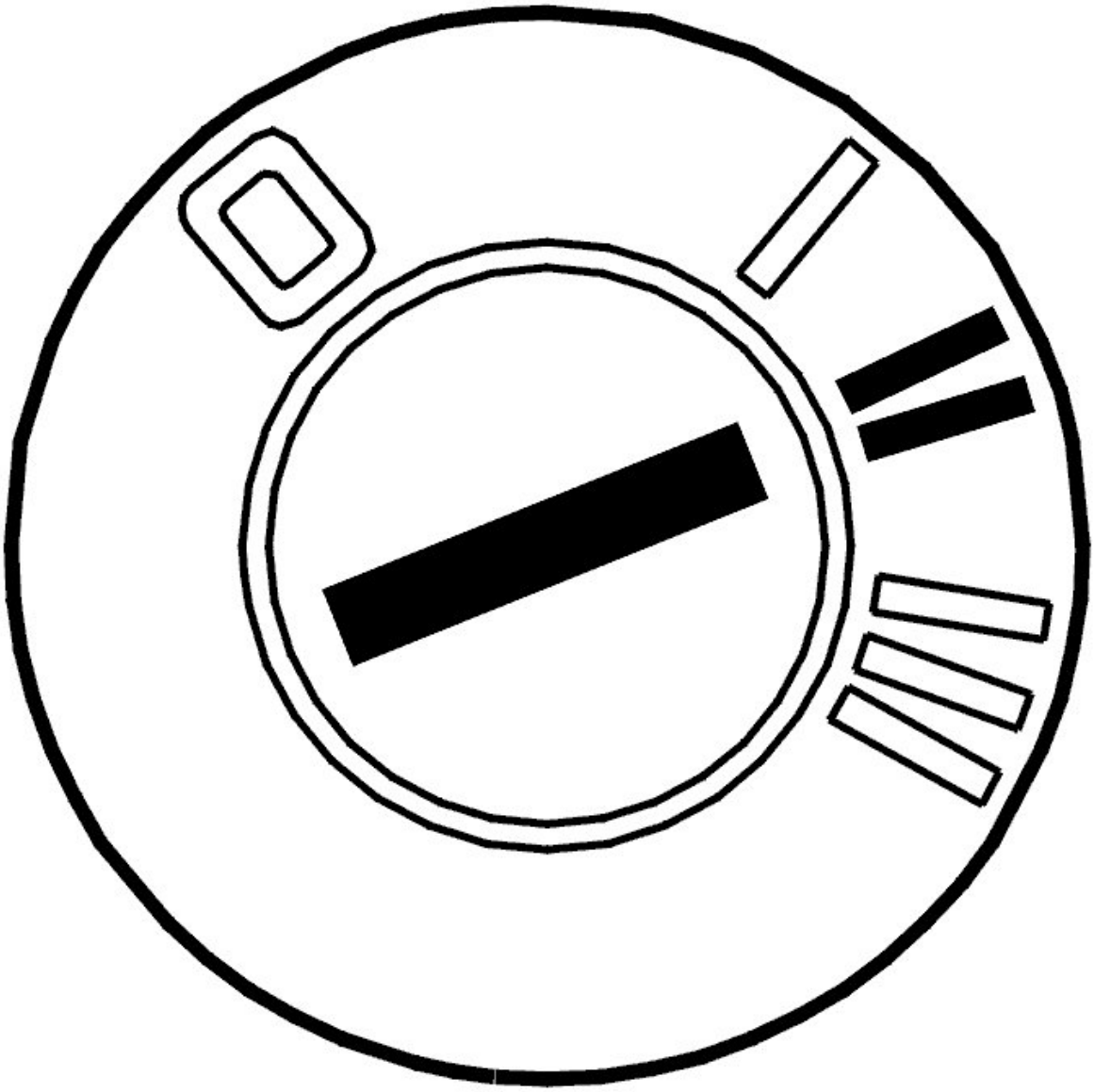
Possible source
- Open-circuit on LIN bus 1 between the climate control module (CCM) and the air quality sensor (AQS)
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- Poor air quality in the passenger compartment.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components only on LIN bus 1 (CCM-DD10 - CCM-DD16)

3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

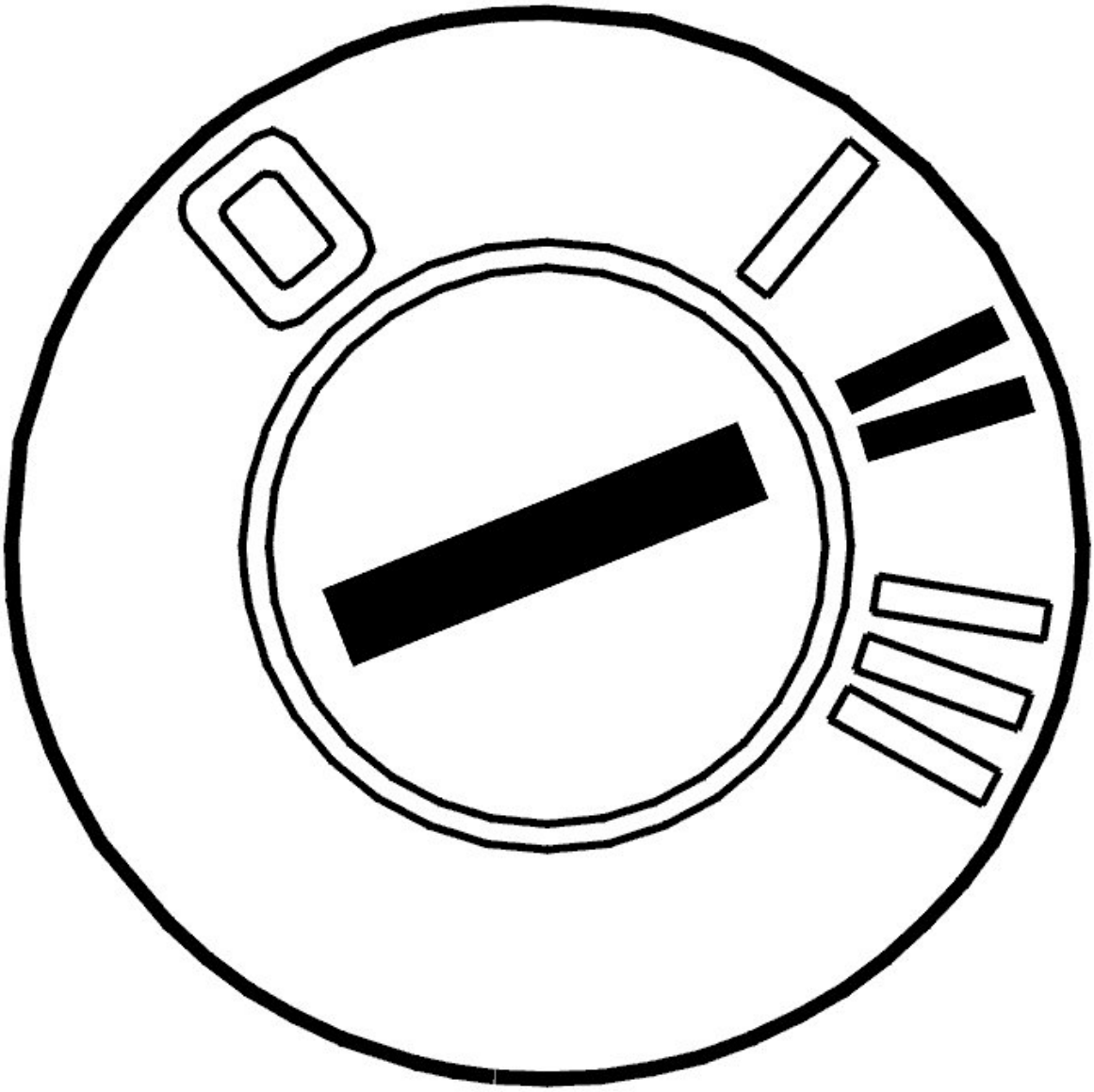
Select an alternative.

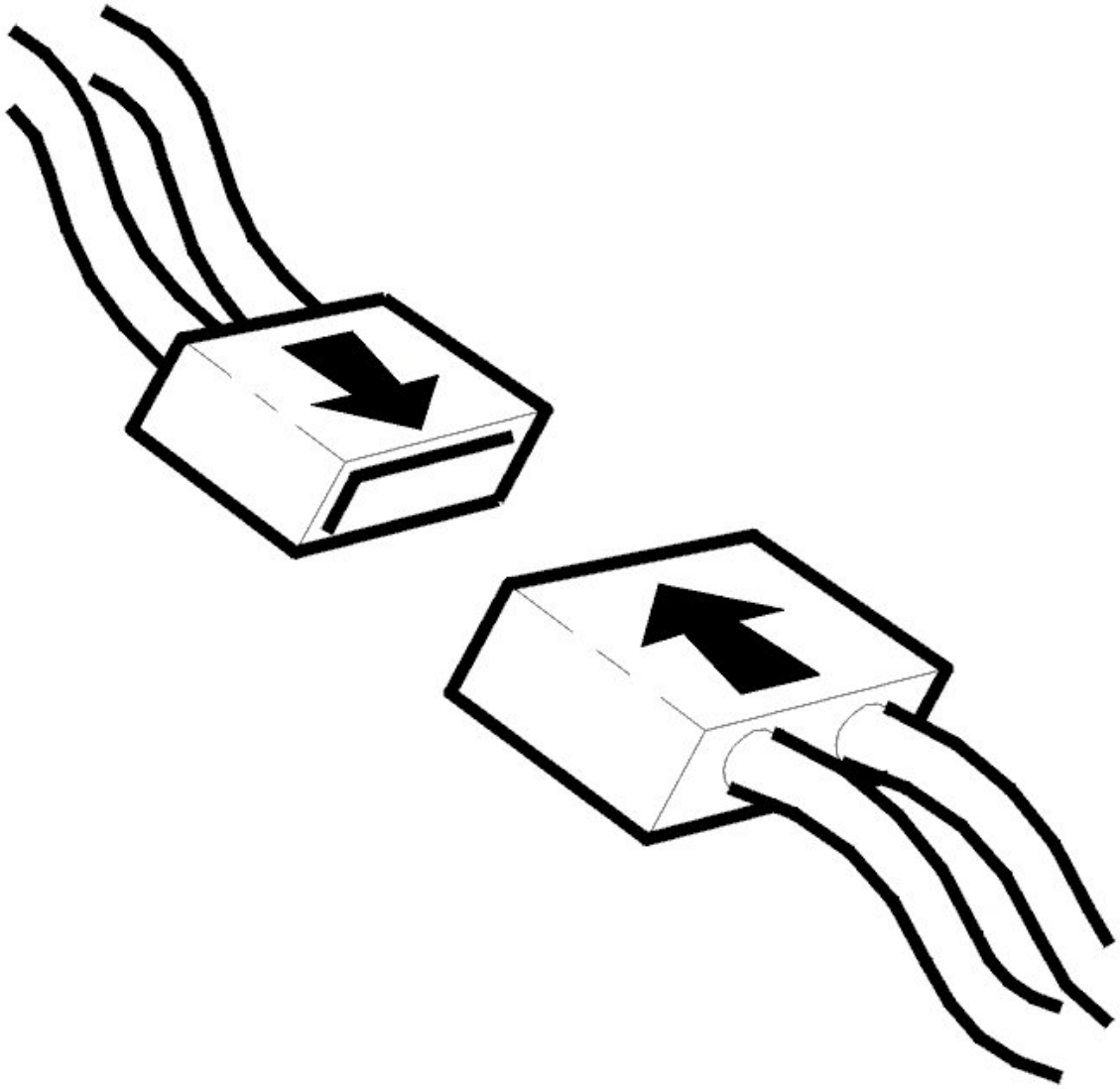
1 - Checking the connectors and wiring

2 - Checking LIN bus 1 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

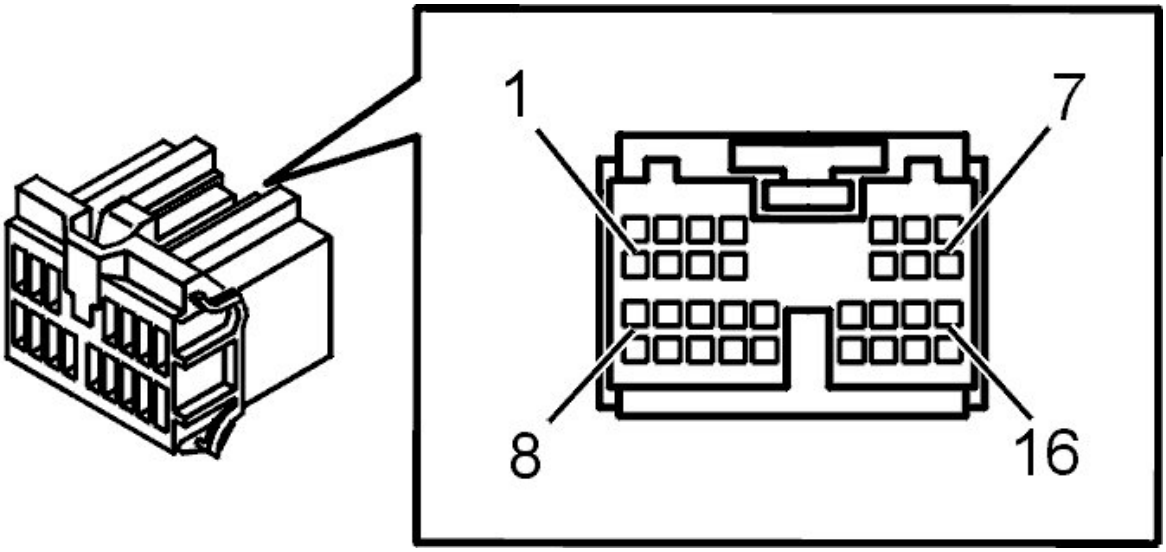
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

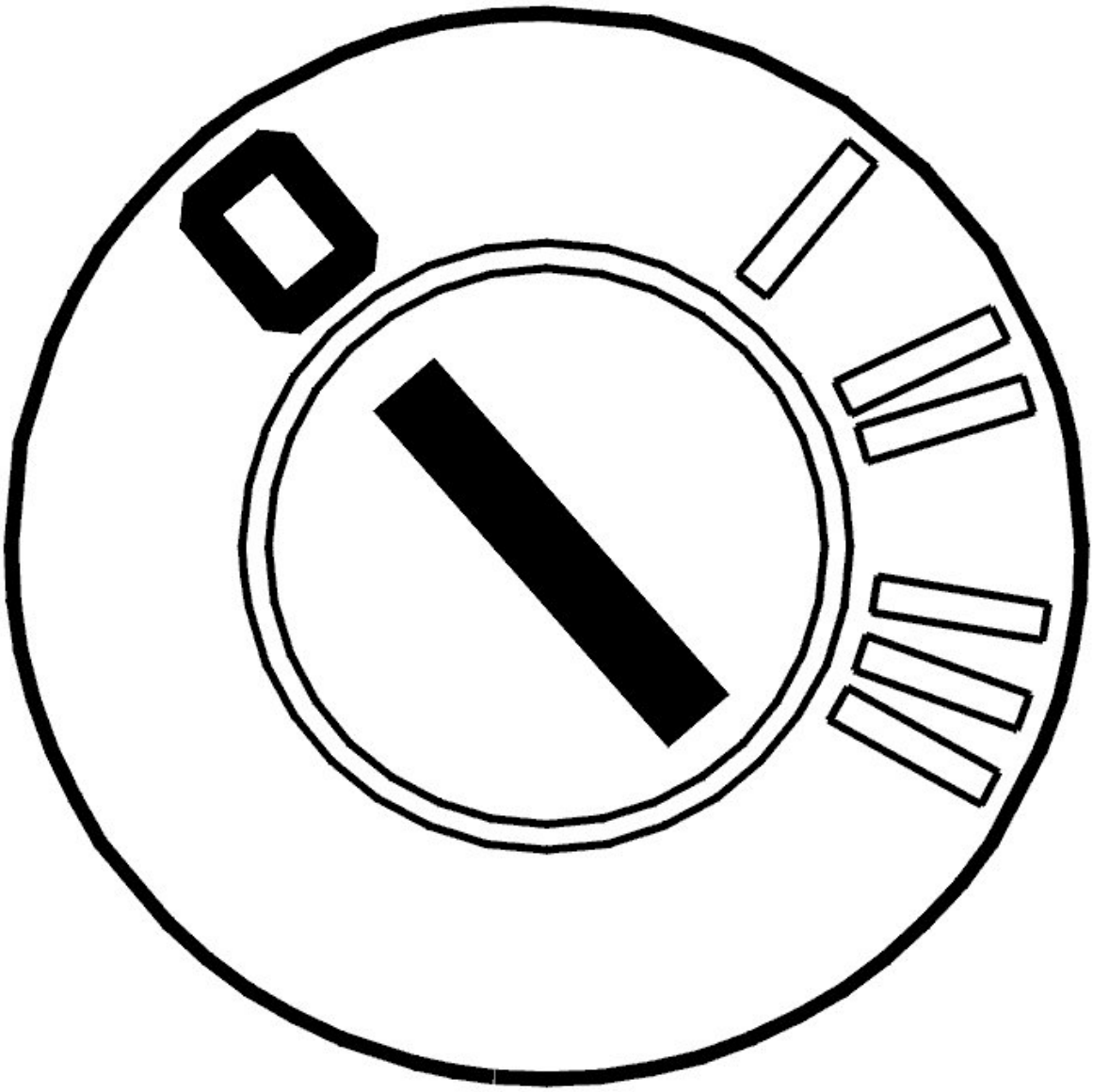
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box to the central electronic module (CEM), see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 1 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

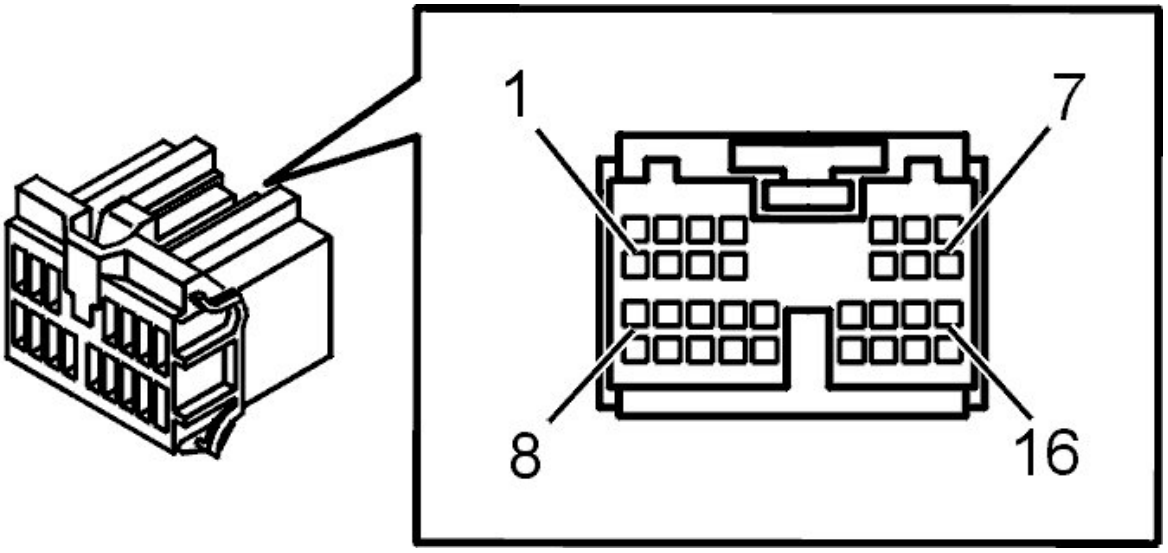
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 1 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) left. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #12 (#36) and connector A for the left-hand seat heating module (SHM) terminal #2.

Check LIN bus 1 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

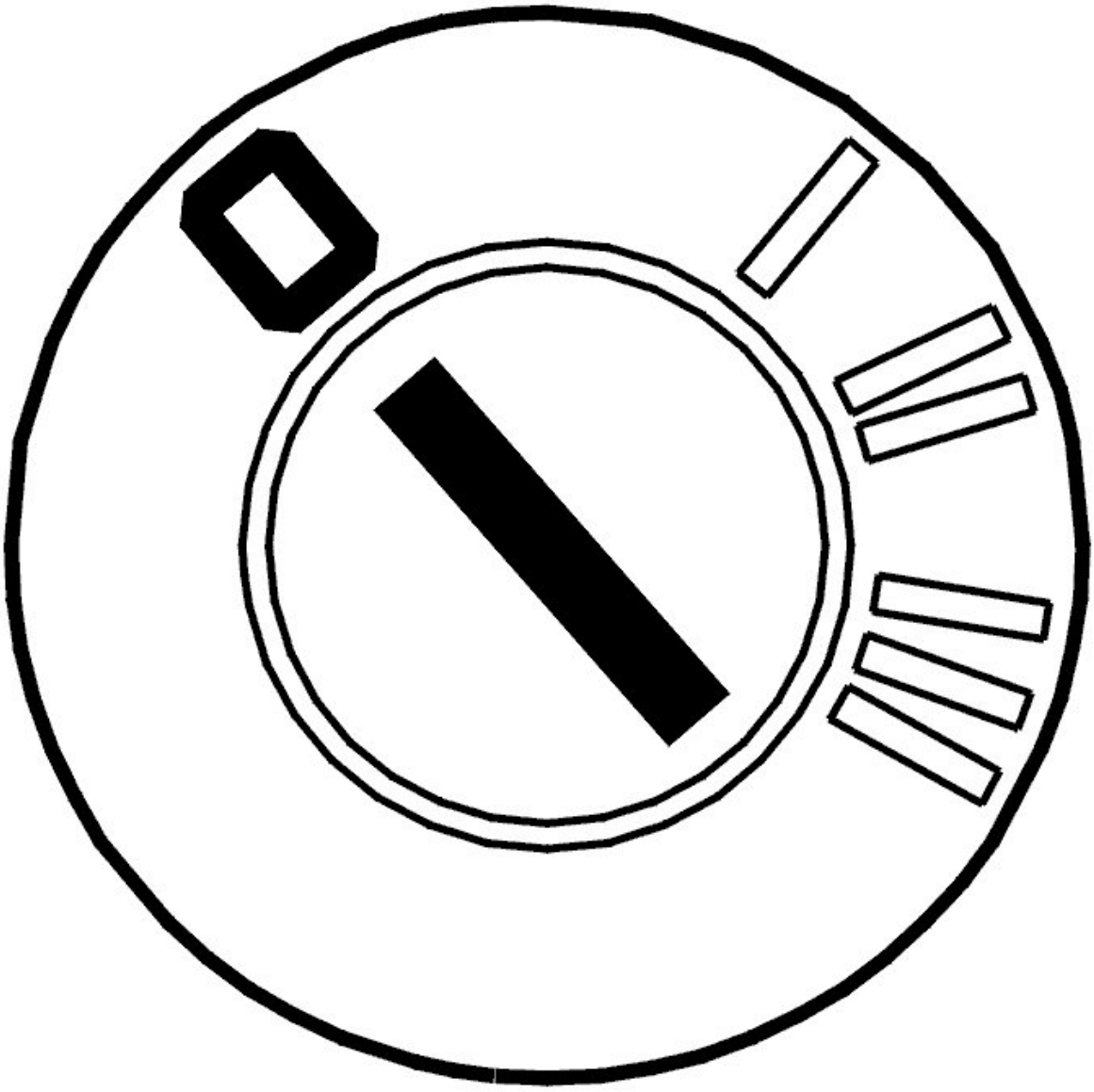
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



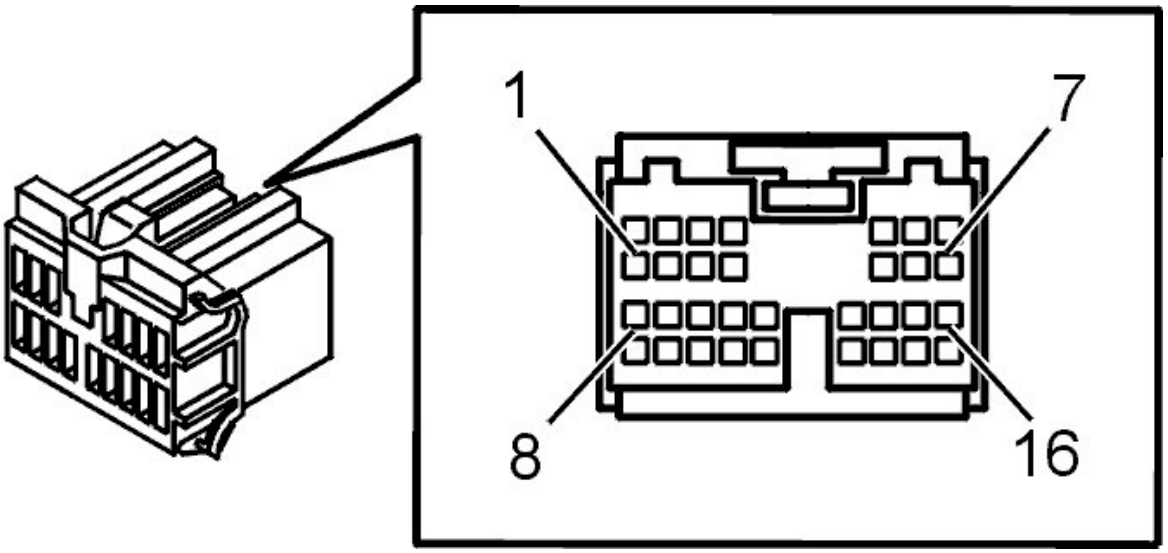
- Ignition off
- Disconnect the connector for the air quality sensor (AQS)
- Ignition on.

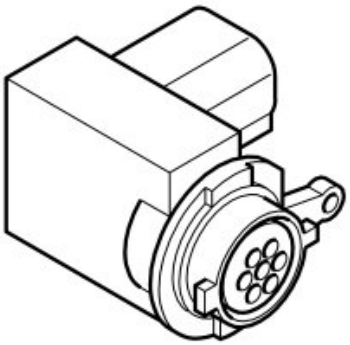
Check the connector for the air quality sensor (AQS). Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the air quality sensor (AQS) is connected to the power supply and ground.

Measure the voltage at the connector for the air quality sensor (AQS) between terminals #1 and #3.
Check LIN bus 1 by taking a reading between sensor connector terminal #2 and the connector for climate control unit terminal #2. Check for an open-circuit.
Try replacing the sensor if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Air quality sensor, replacing See: Heating and Air Conditioning/Climate Control Exhaust Gas Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





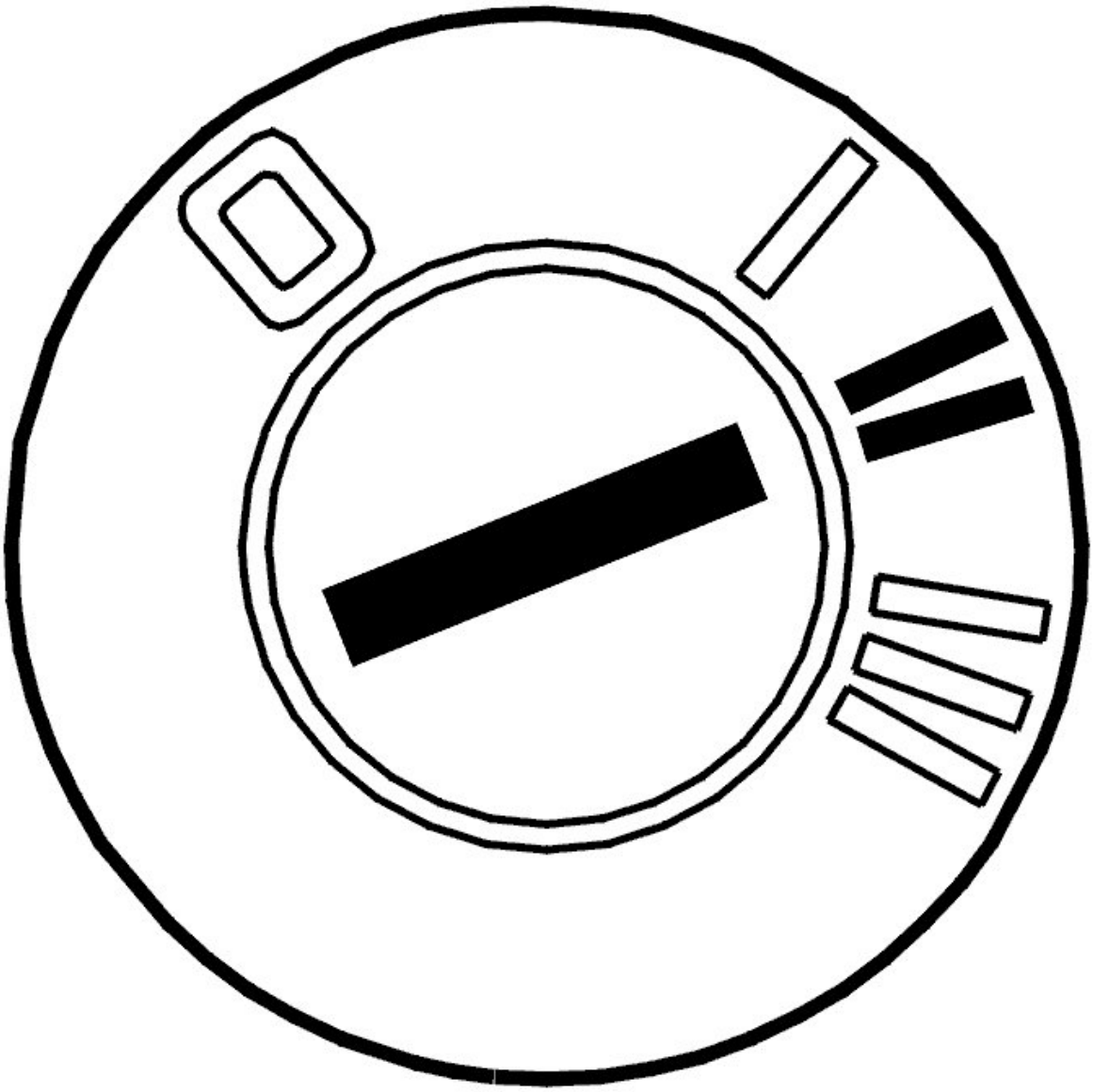
Continue - Verification

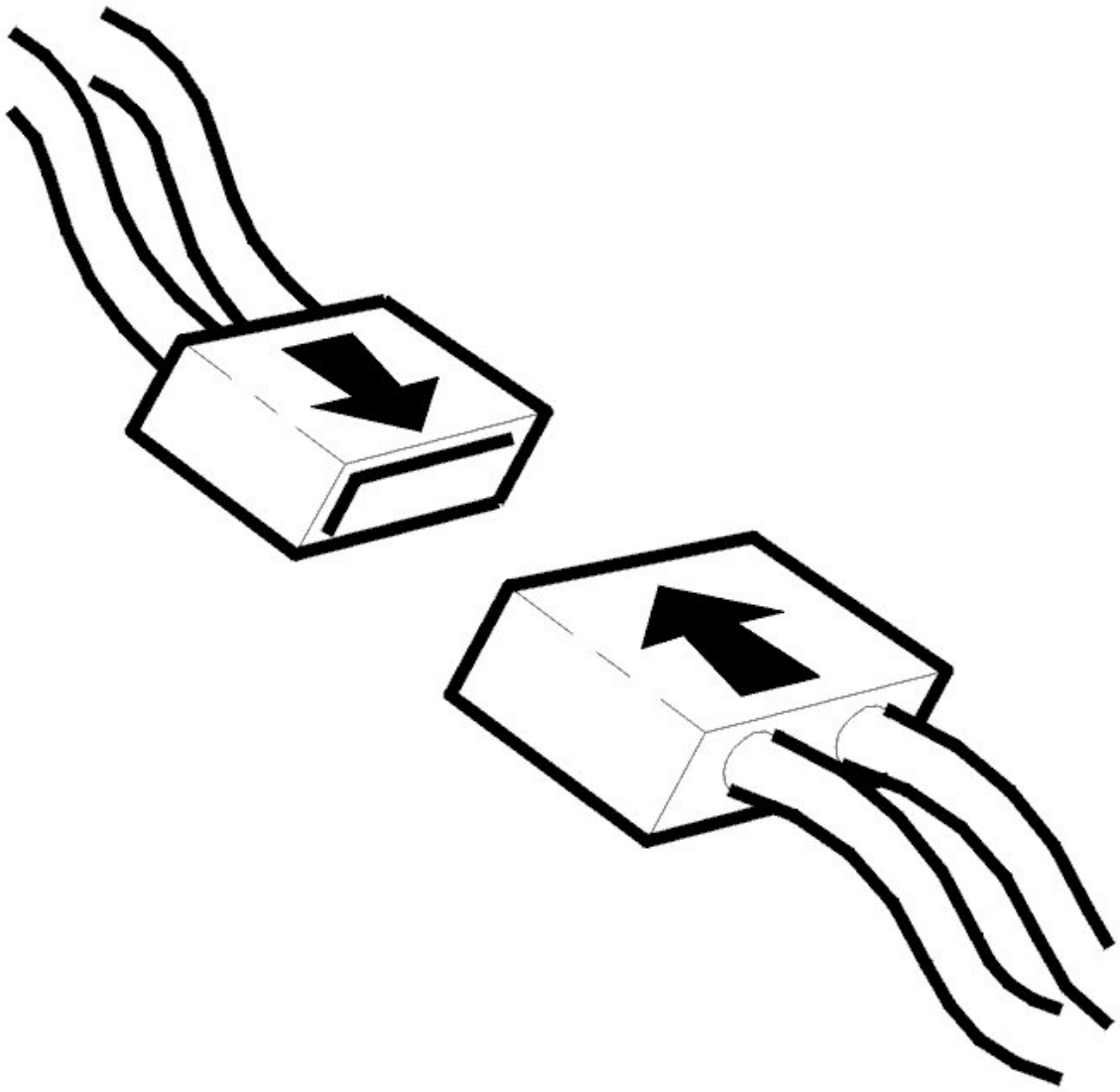
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

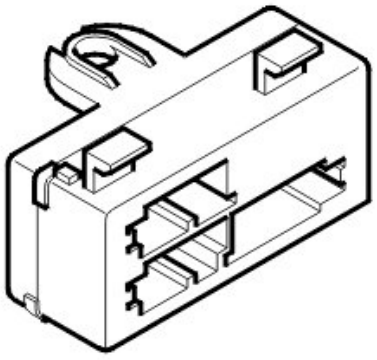
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD12

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the left seat heater and the climate control module (CCM) on LIN bus 1.
The diagnostic trouble code (DTC) can occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 (CCM-DD10 -

CCM-DD16) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.
The diagnostic trouble code (DTC) can only be diagnosed for the climate control module (CCM) when seat heating is installed in the car.

Substitute value
- None.

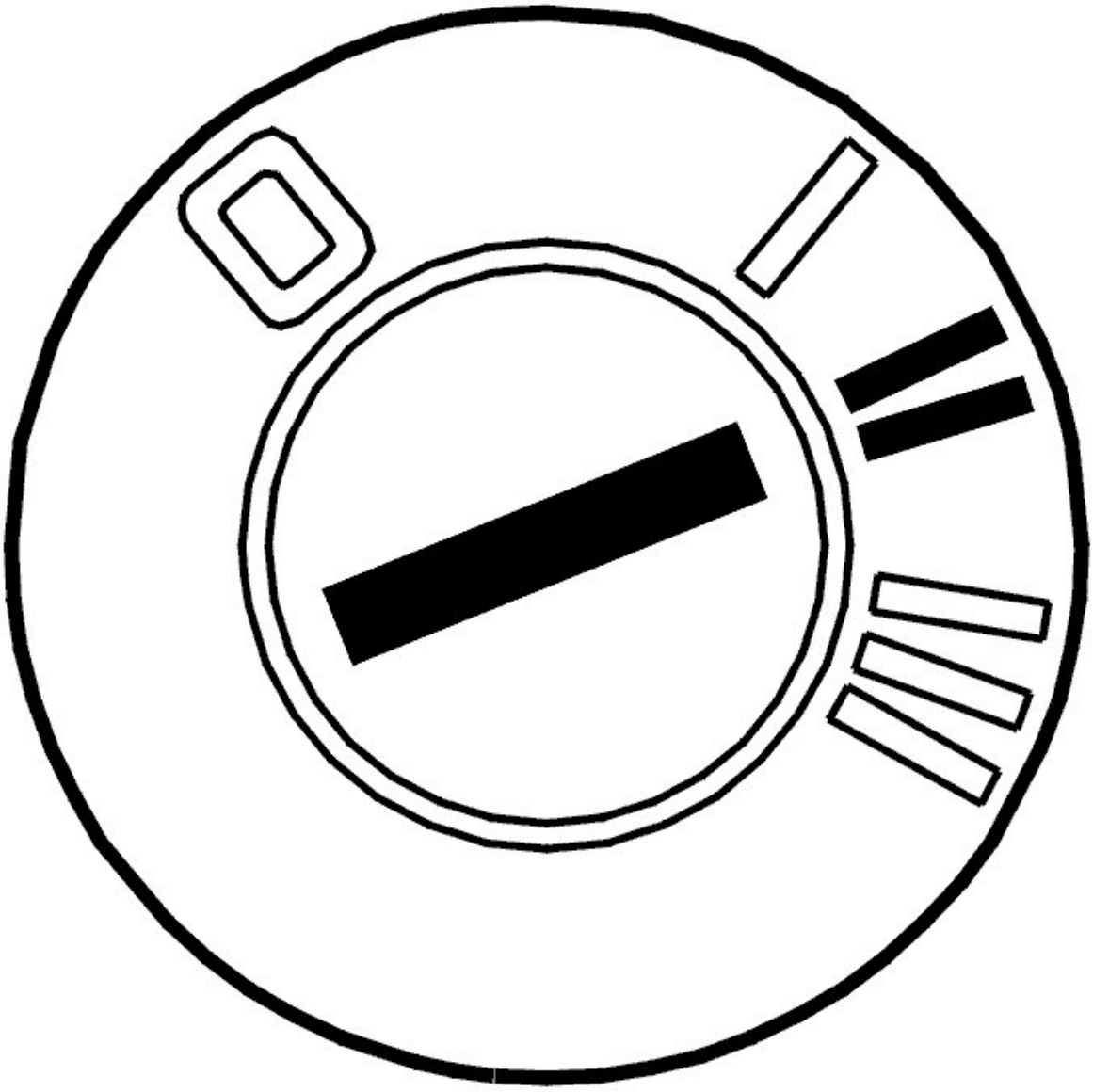
Possible source
- Open-circuit on LIN bus 1 between the climate control module (CCM) and the left seat heater
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- The front seat heating does not function.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

Check that the fuse for the Seat heating module (SHM) is intact.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:
1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components on LIN bus 1 (CCM-DD10 - CCM-DD16)
2. The diagnostic trouble code (DTC) is not stored together with diagnostic trouble codes (DTCs) for other components on LIN bus 1.

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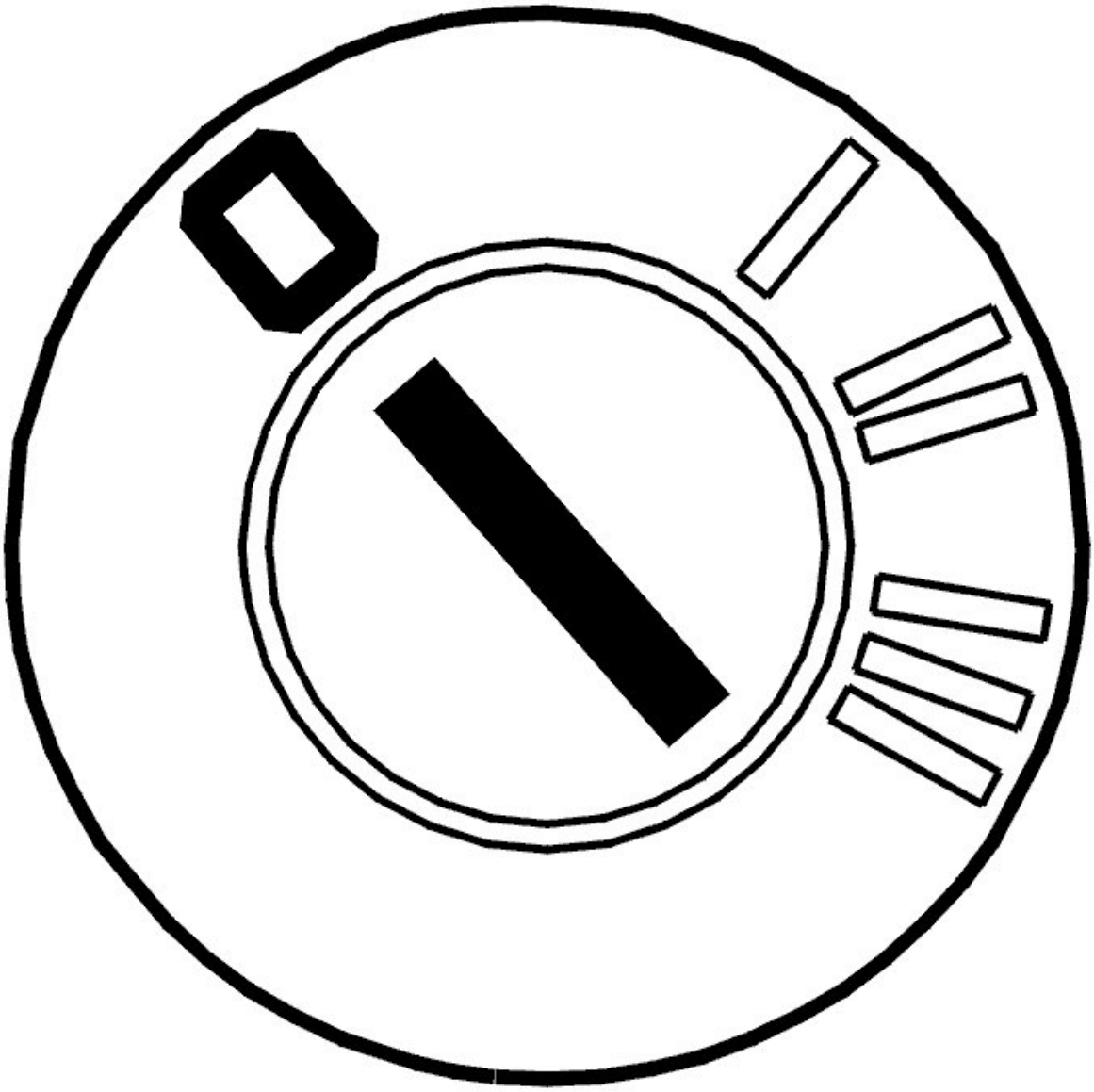
Select an alternative.

1 - Checking LIN bus 1 and connector

2 - Checking the wiring and component

Checking LIN bus 1 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 1 between the climate control module (CCM), the connector for the climate control unit and the left-hand seat heating module (SHM). Check for an open-circuit.
Take readings between:

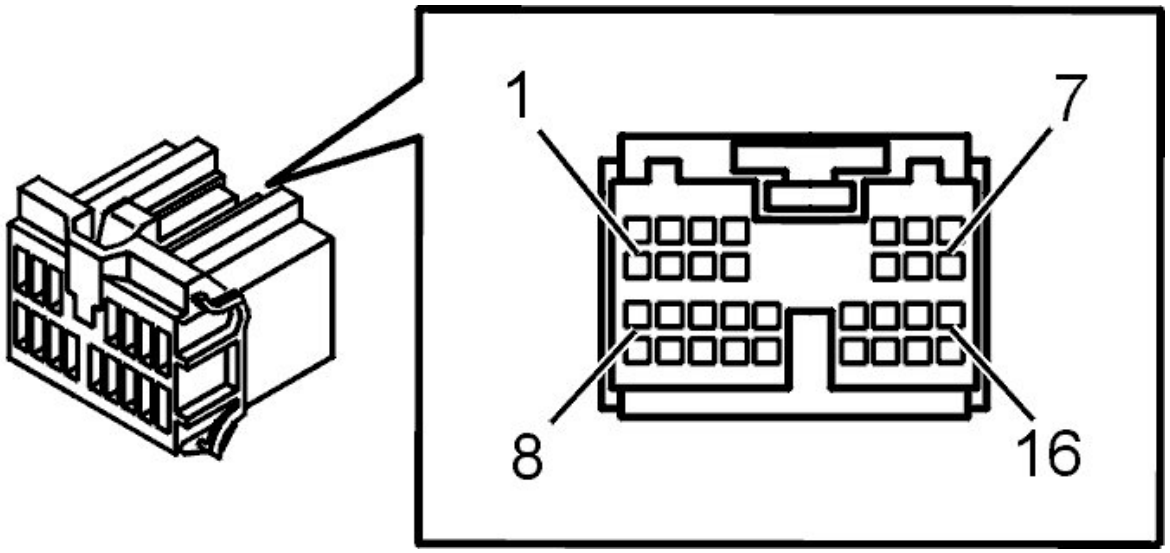
- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #12 (#36) and connector A for seat heating module (SHM) left terminal #2.

Check LIN bus 1 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

Other information:

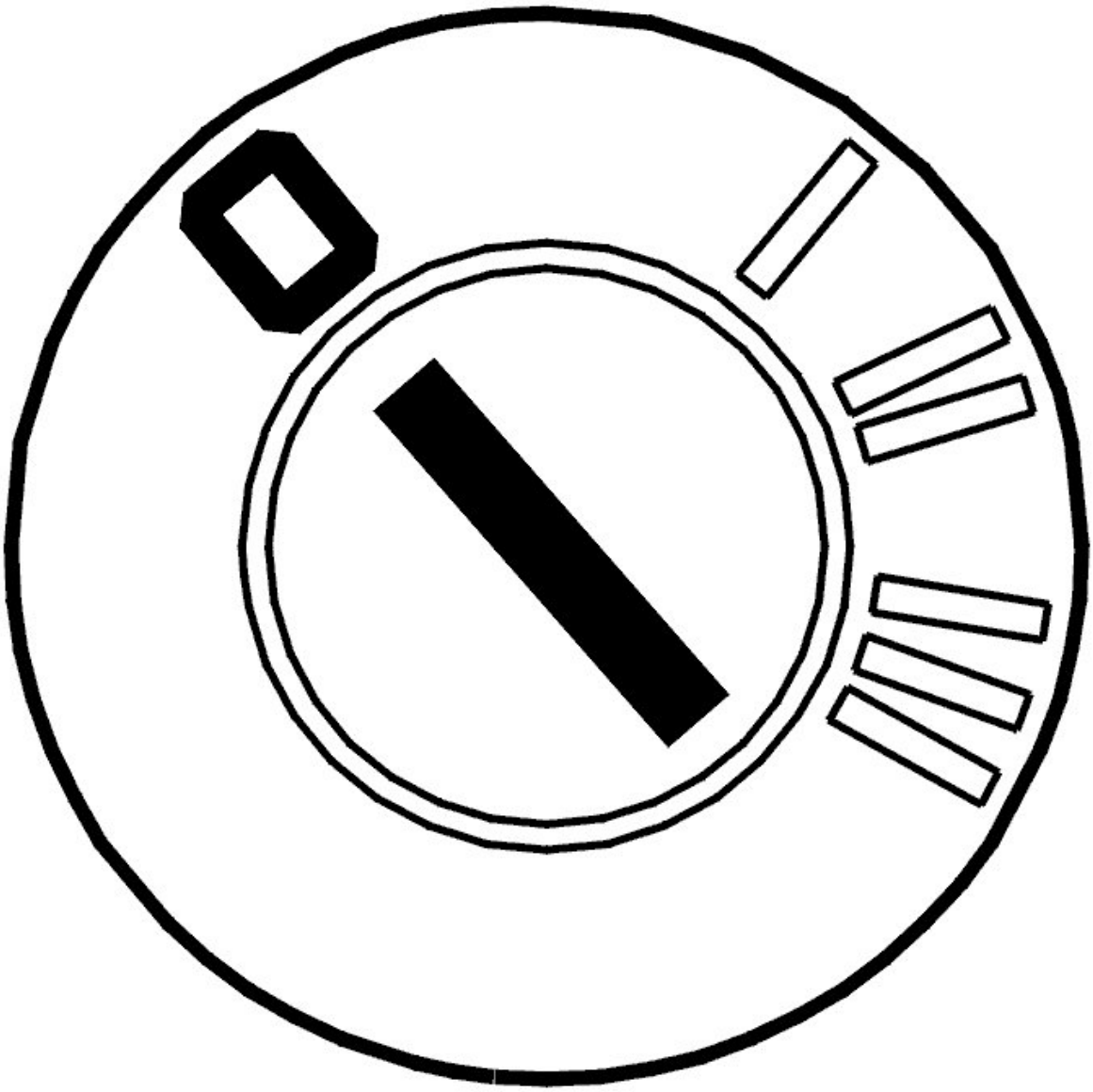
- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component

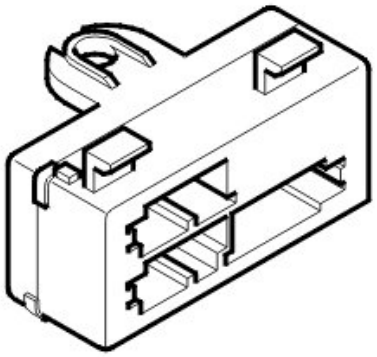


- Ignition off
- Disconnect connector A for the seat heating module (SHM) left.

Check connector A for the seat heating module (SHM). Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the seat heating module (SHM) is connected to power supply and ground.
Measure the voltage at connector A between terminals #1 and #4.
Check LIN bus 1 by taking a reading between connector A for seat heating module (SHM) terminal #2 and the connector for the climate control module (CCM) terminal #12 (#35). Check for an open-circuit.
Try replacing the seat heating module (SHM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



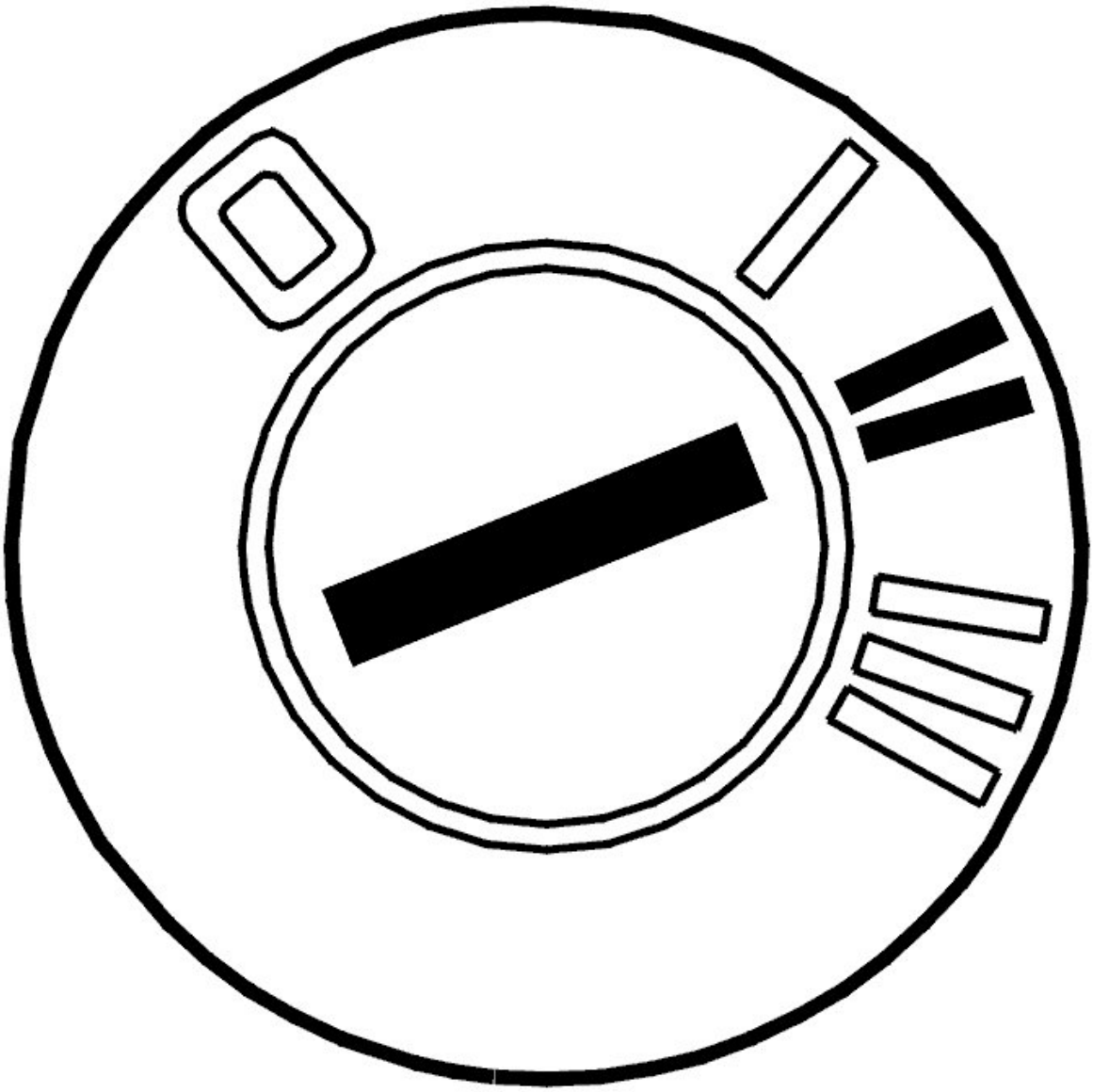
Continue - Verification

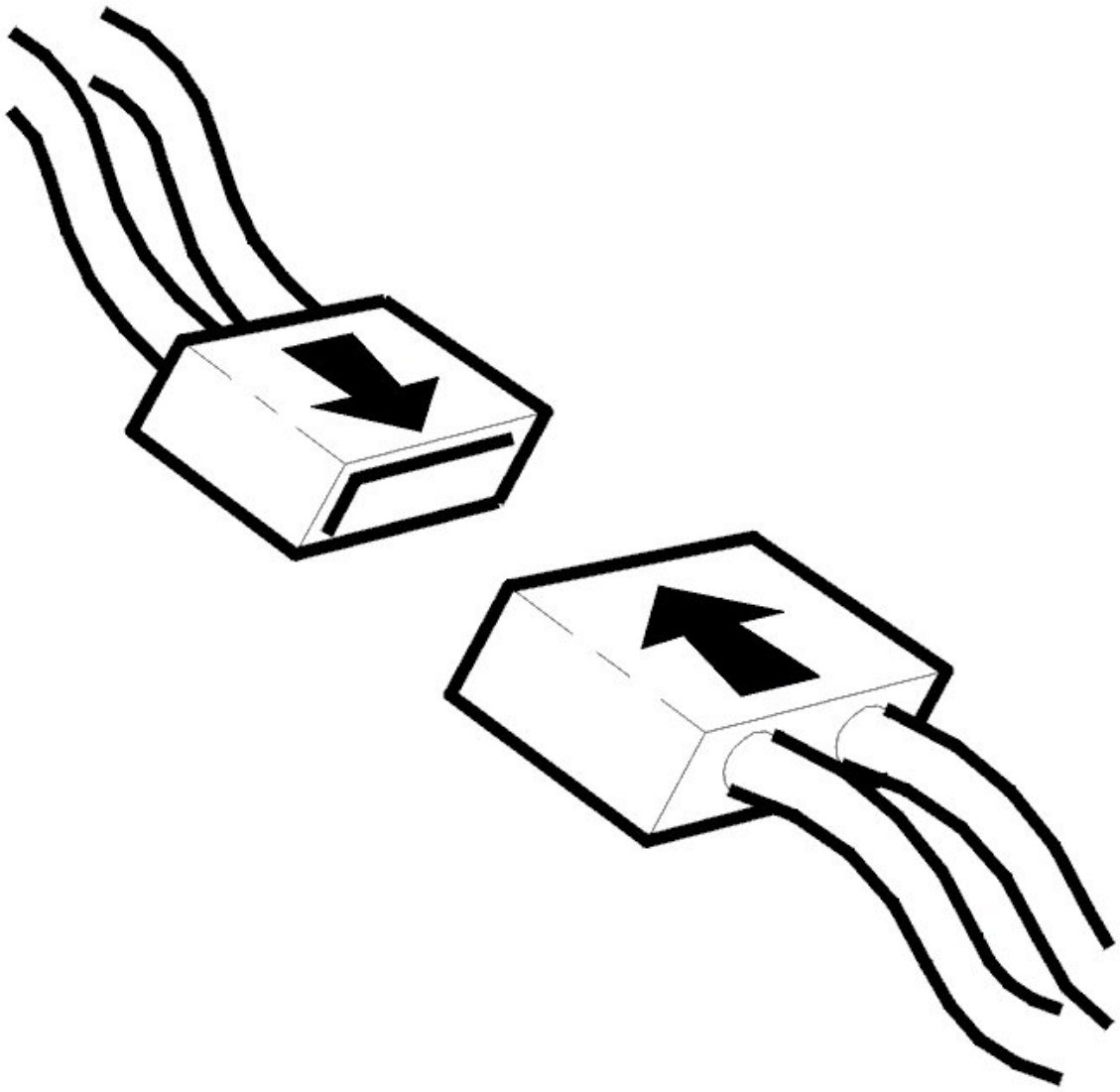
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

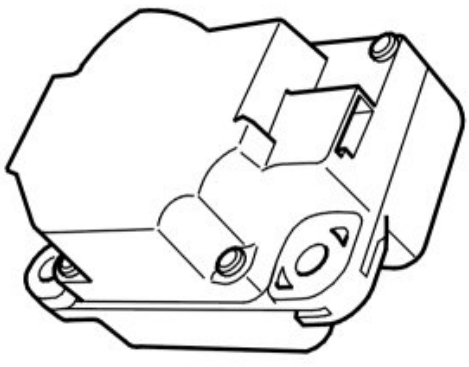
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD14

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the damper motor recirculation and the climate control module (CCM) on LIN bus 1.
The diagnostic trouble code (DTC) can occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 (CCM-DD10 -

CCM-DD16) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

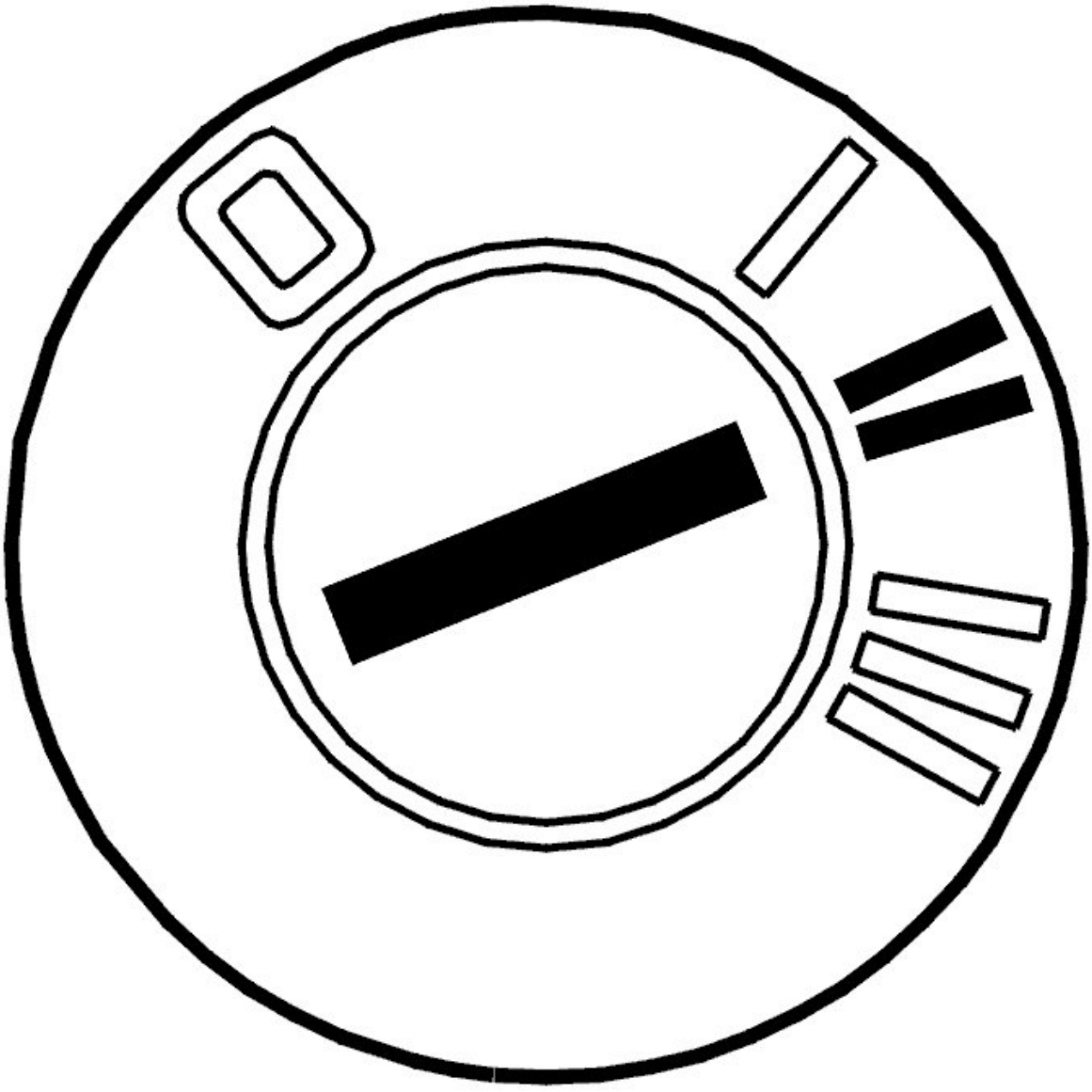
Possible source
- Open-circuit on LIN bus 1 between the climate control module (CCM) and the damper motor module (DMM) recirculation
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- No recirculation.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components only on LIN bus 1 (CCM-DD10 - CCM-DD16)
3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

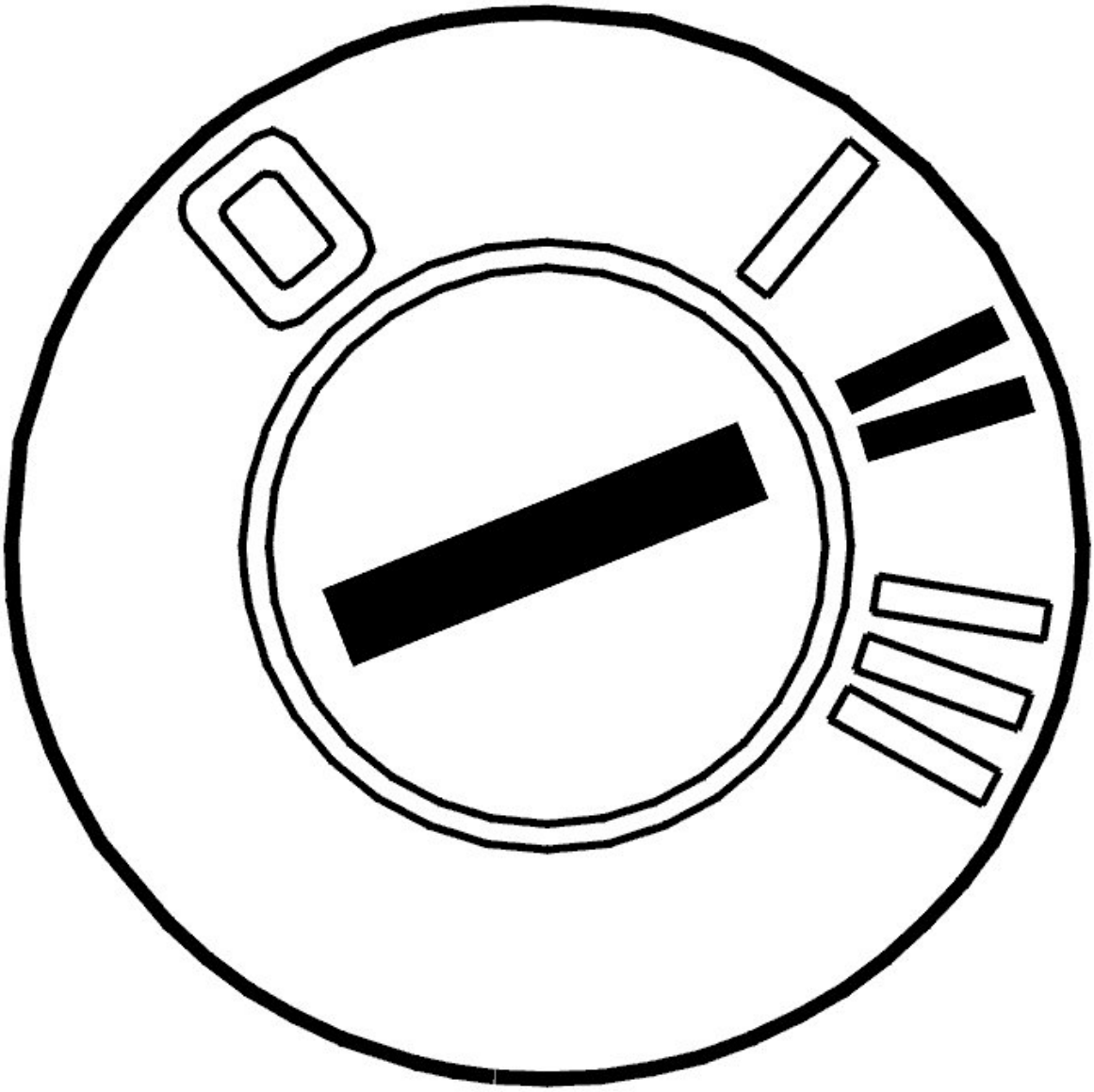
Select an alternative.

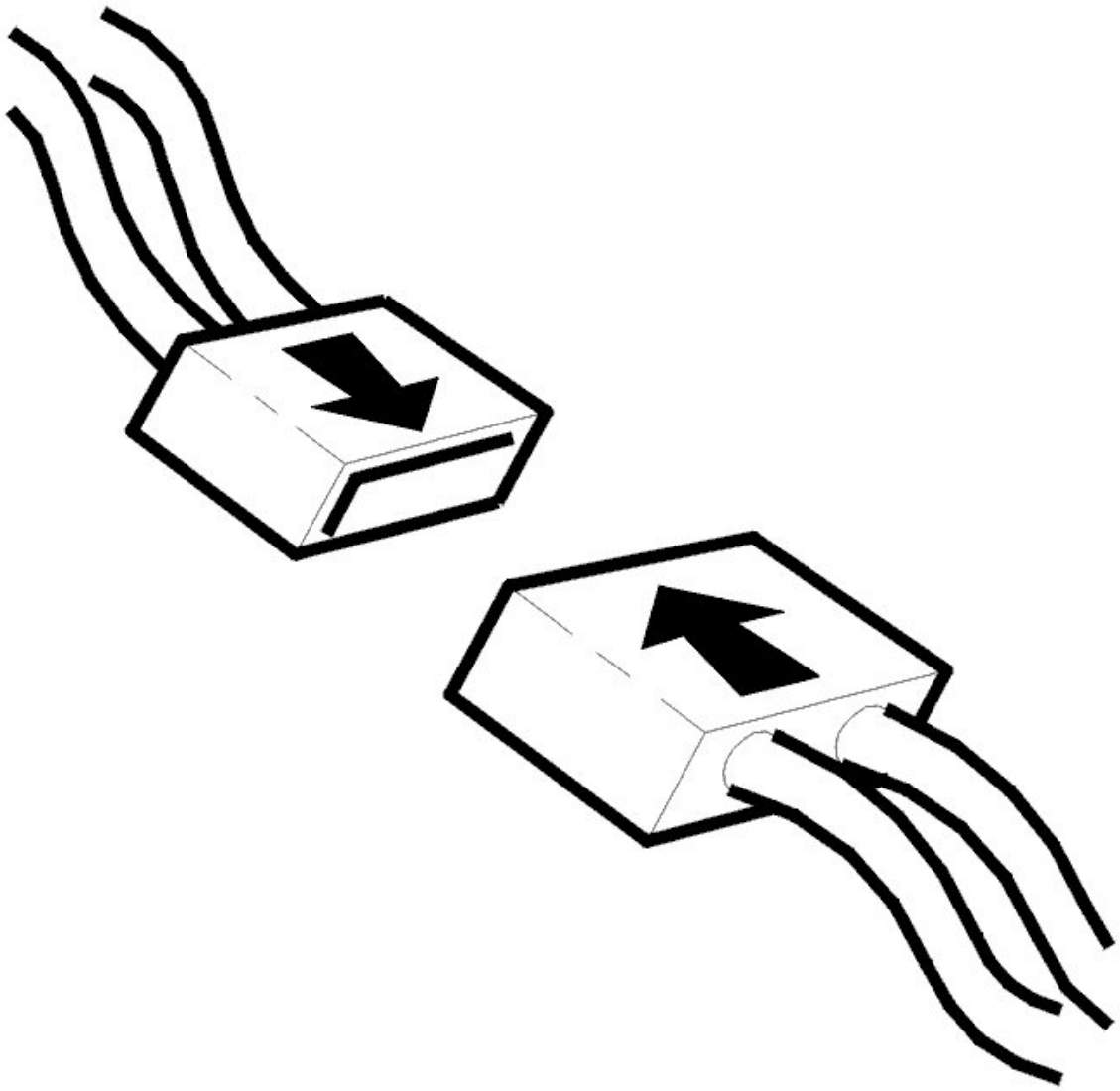
1 - Checking the connectors and wiring

2 - Checking LIN bus 1 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #5 and chassis ground.
Check the connector on the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

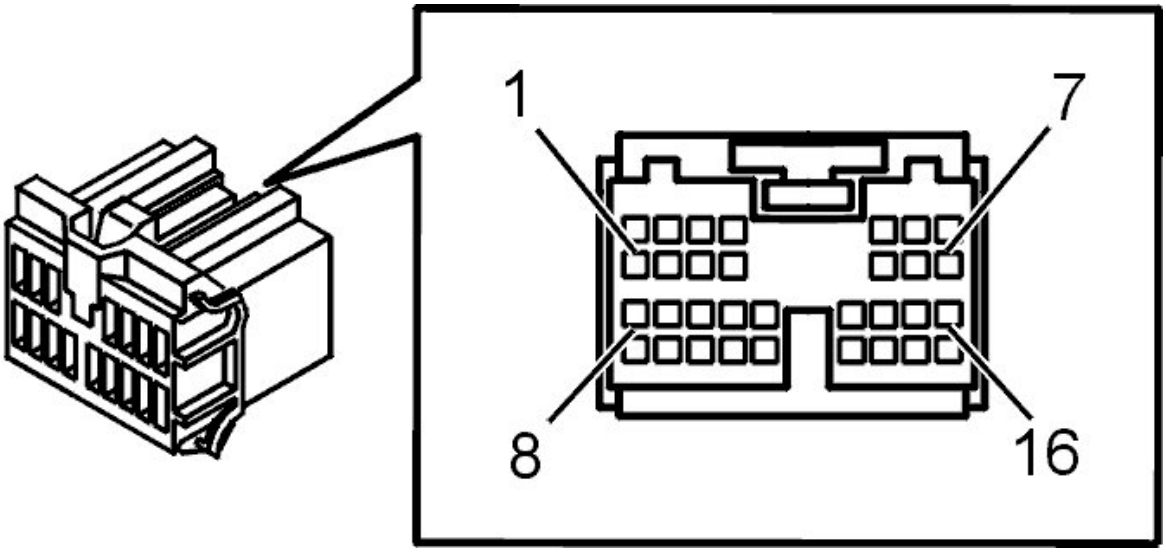
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

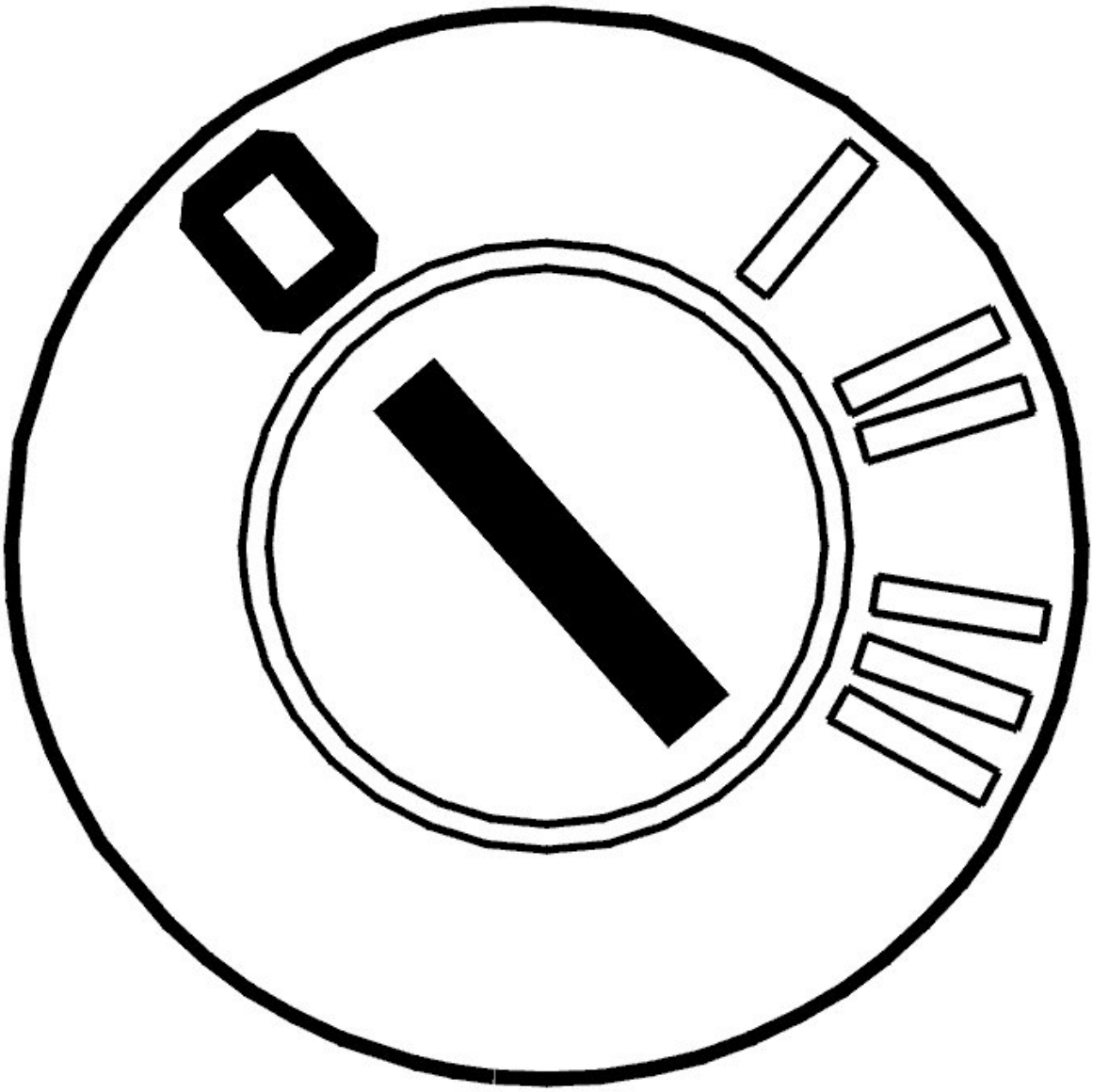
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 1 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

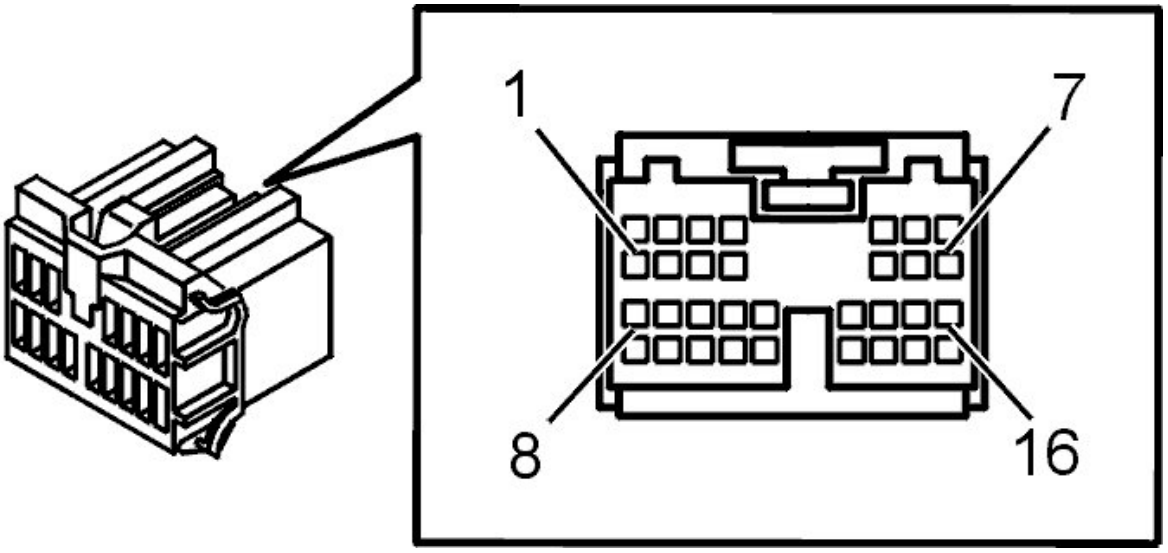
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 1 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) left. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #12 (#36) and connector A for seat heating module (SHM) left terminal #2.

Check LIN bus 1 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

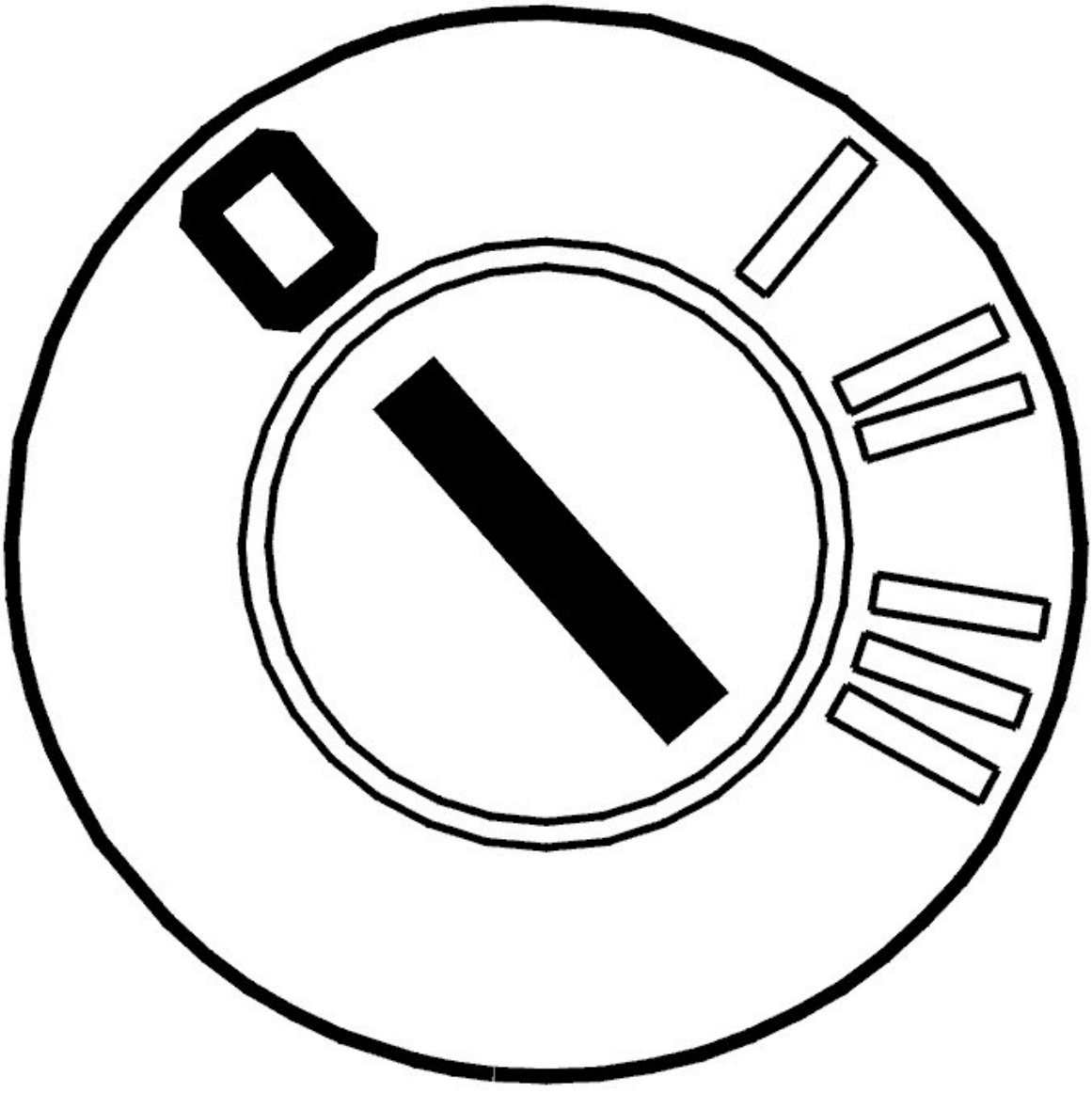
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



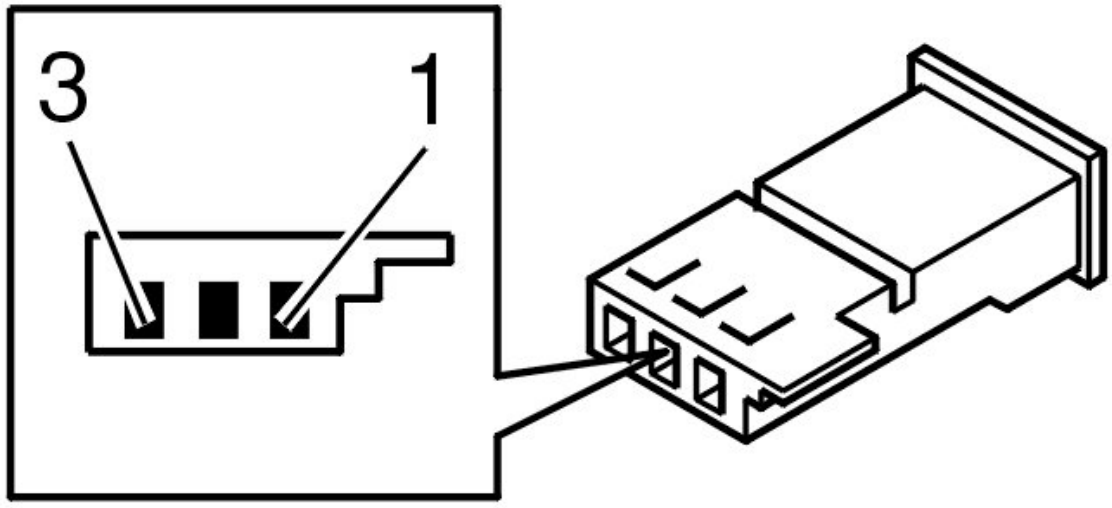
- Ignition off
- Disconnect the connector for the damper motor module (DMM) for recirculation
- Ignition on.

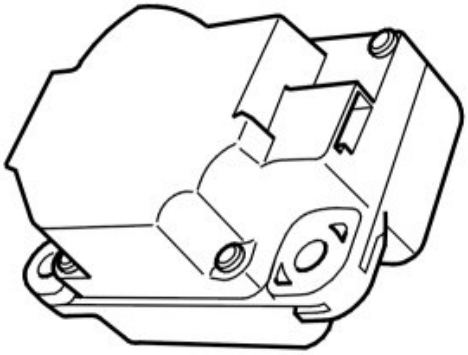
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3
Check LIN bus 1 by taking a reading between damper motor module (DMM) connector terminal #2 and the connector for climate control unit terminal #2. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

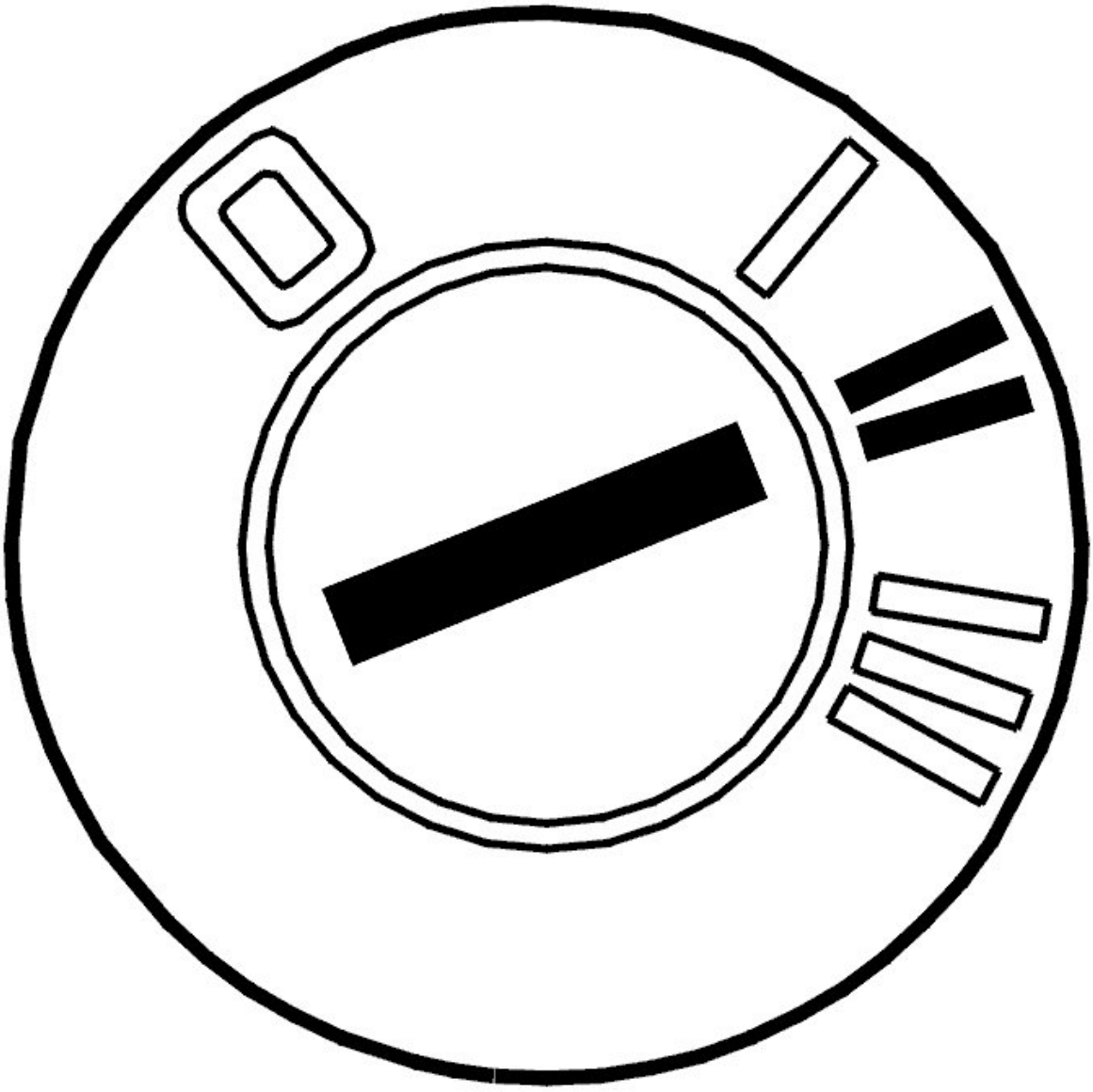
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

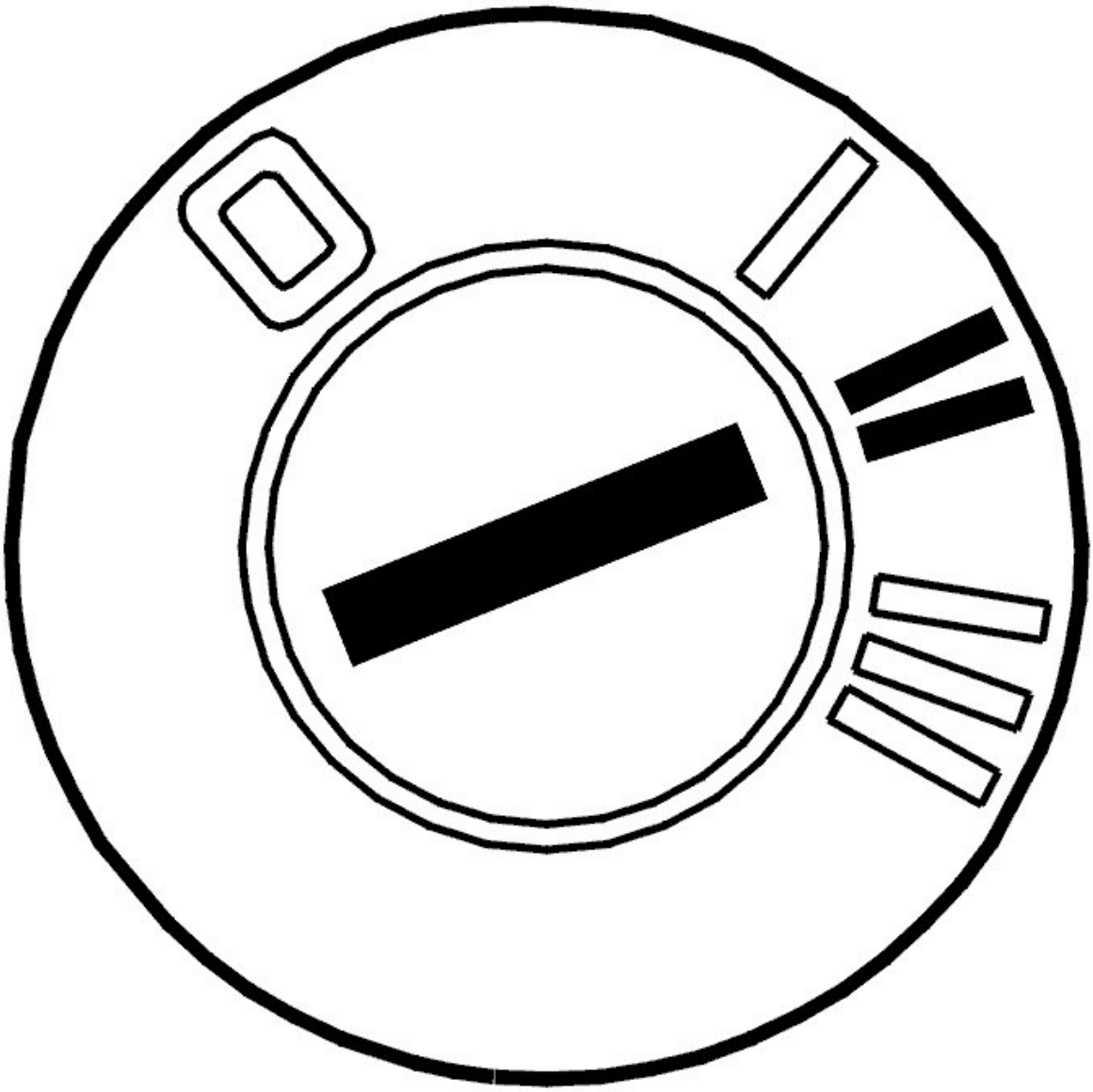
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

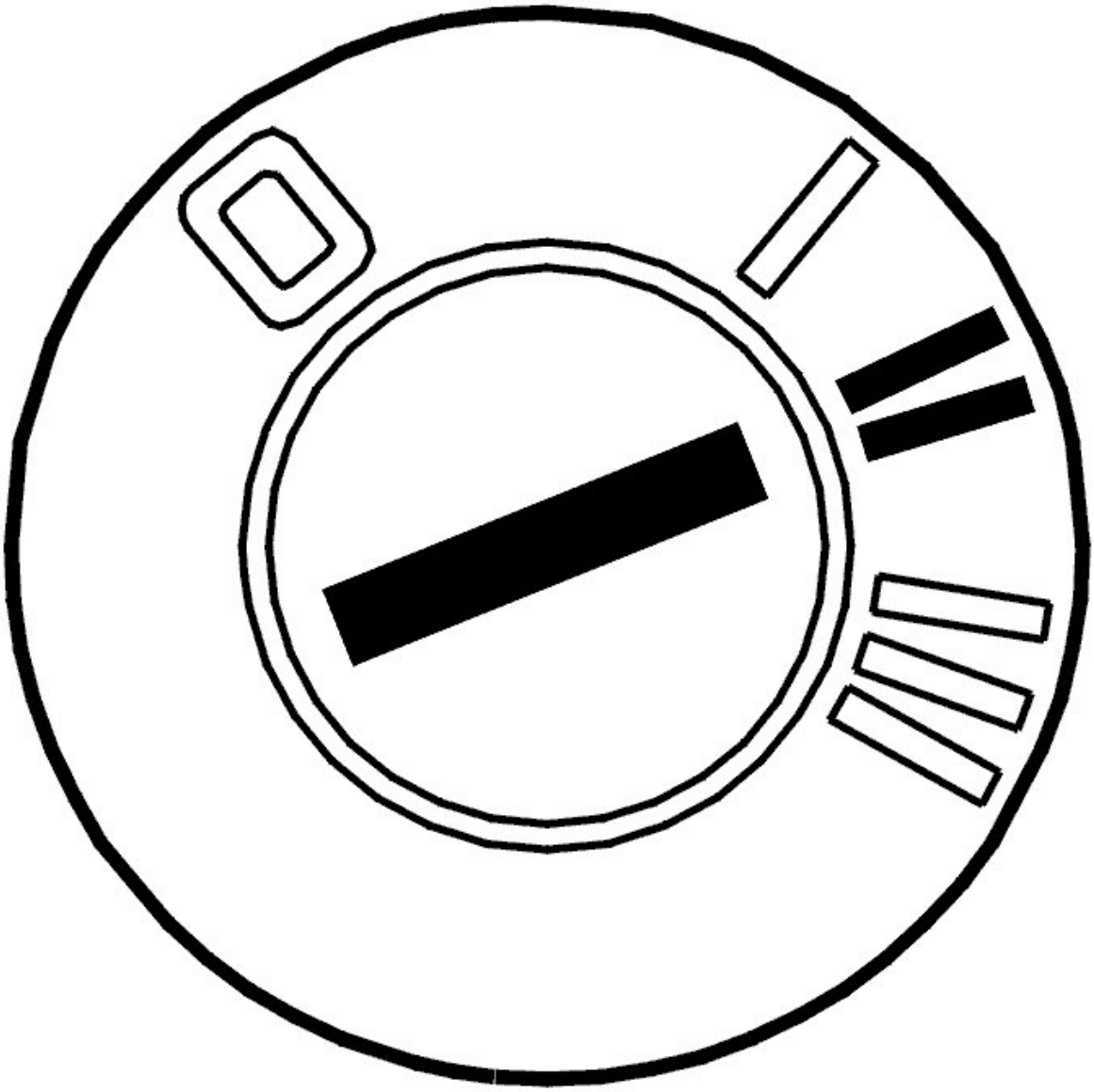
DONE - Verification

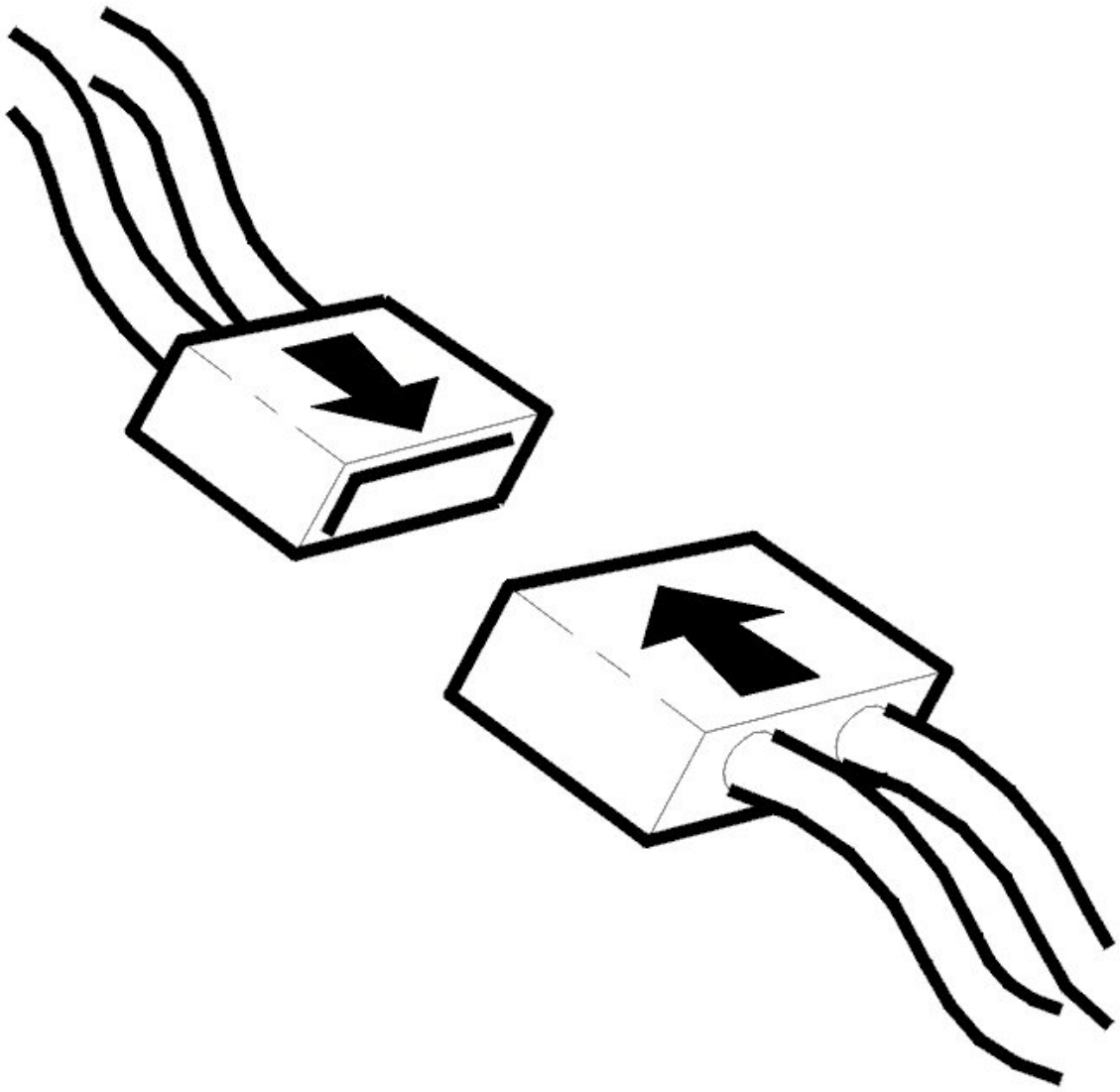
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

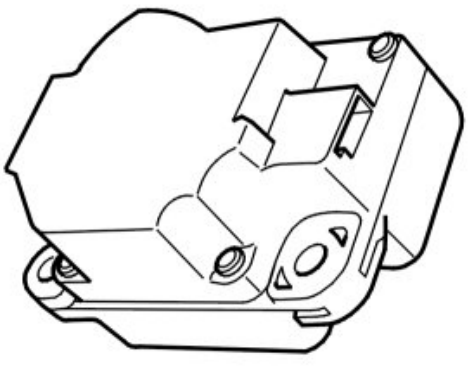
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD15

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the climate control module (CCM) and the damper motor module (DMM) temperature left on LIN bus 1.
The diagnostic trouble code (DTC) can occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 (CCM-DD10 -

CCM-DD16) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

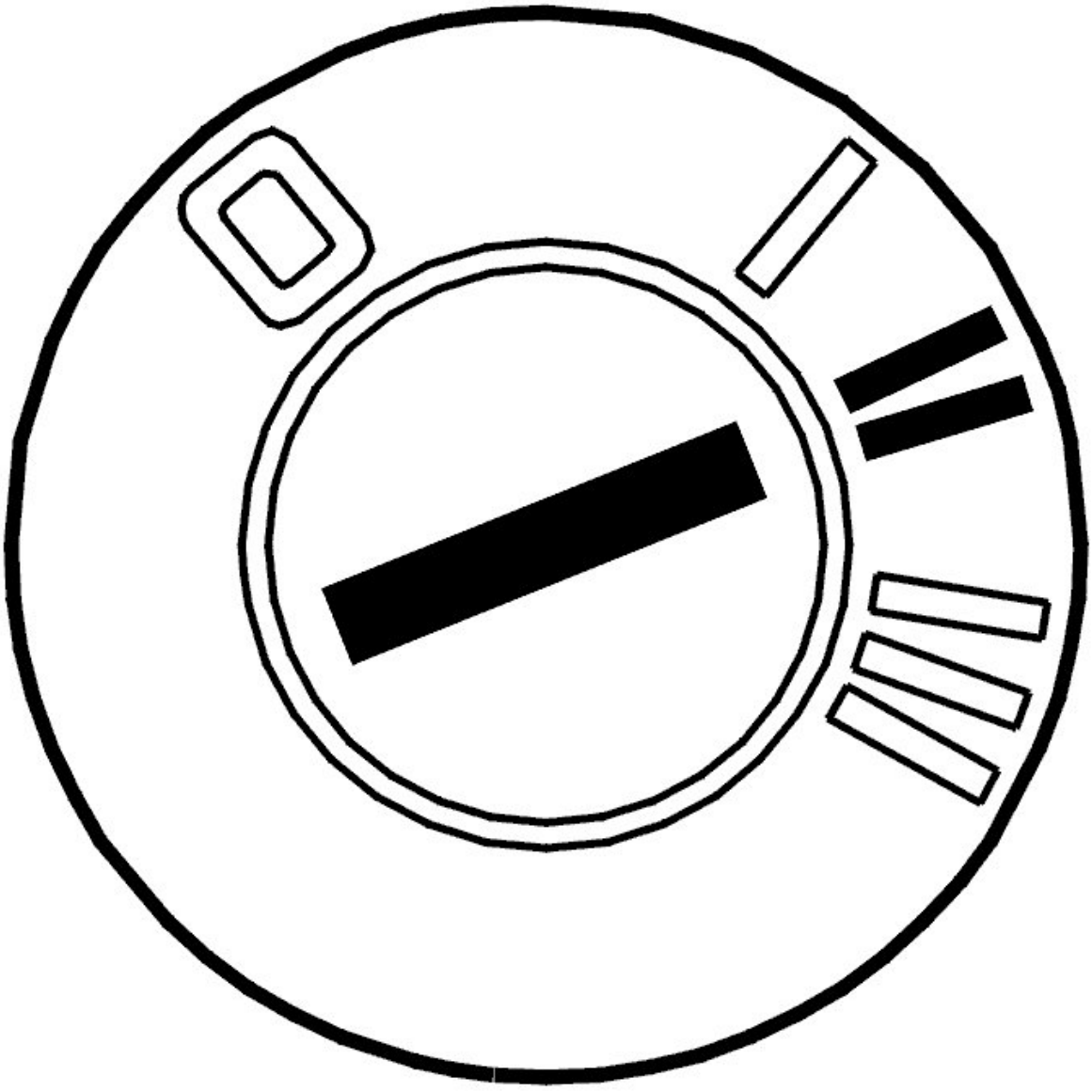
Possible source
- Open-circuit on LIN bus 1 between the climate control module (CCM) and the air quality sensor (AQS)
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components in the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components only on LIN bus 1 (CCM-DD10 - CCM-DD16)
3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

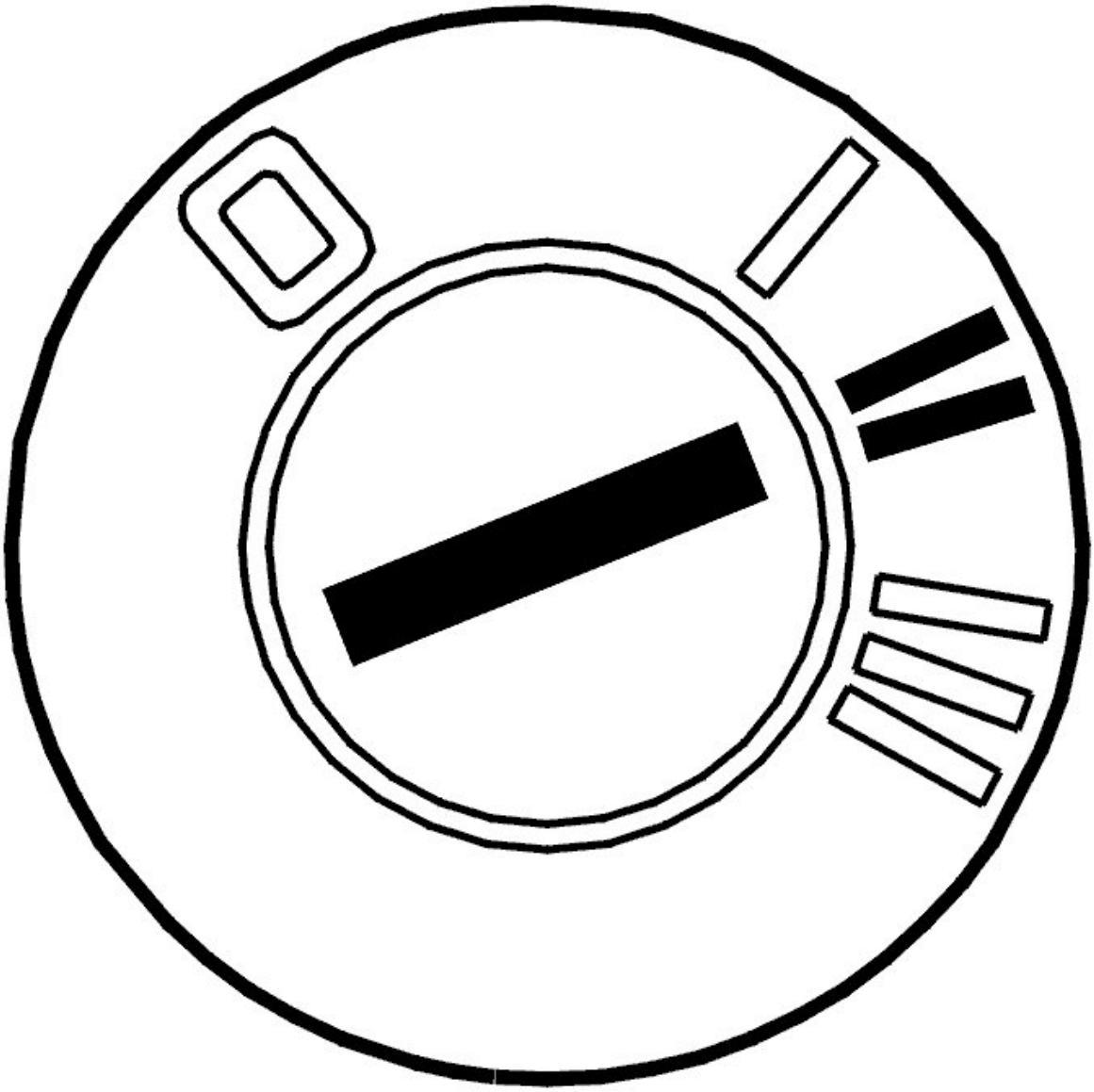
Select an alternative.

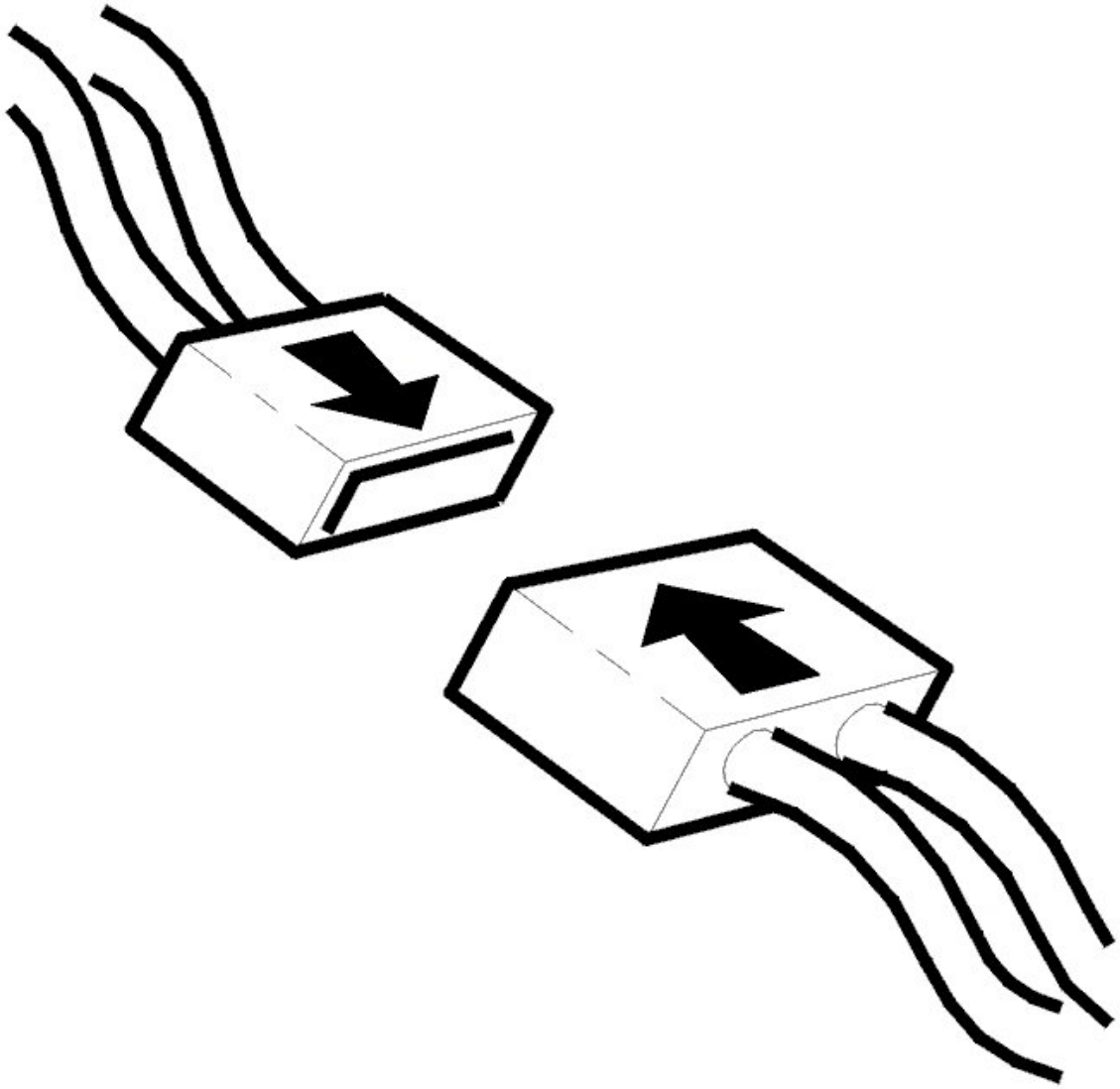
1 - Checking the connectors and wiring

2 - Checking LIN bus 1 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

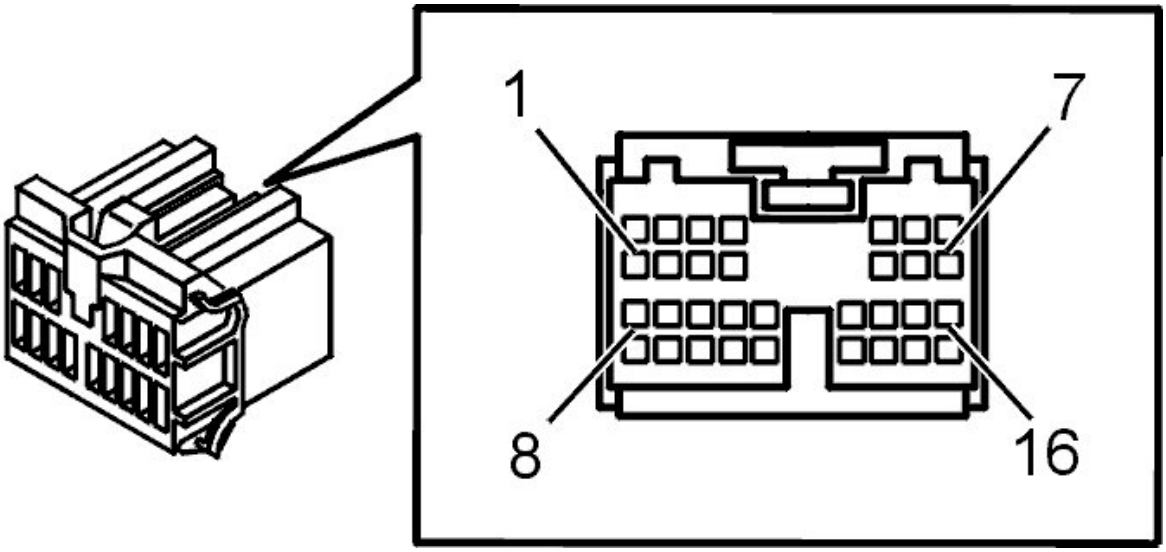
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

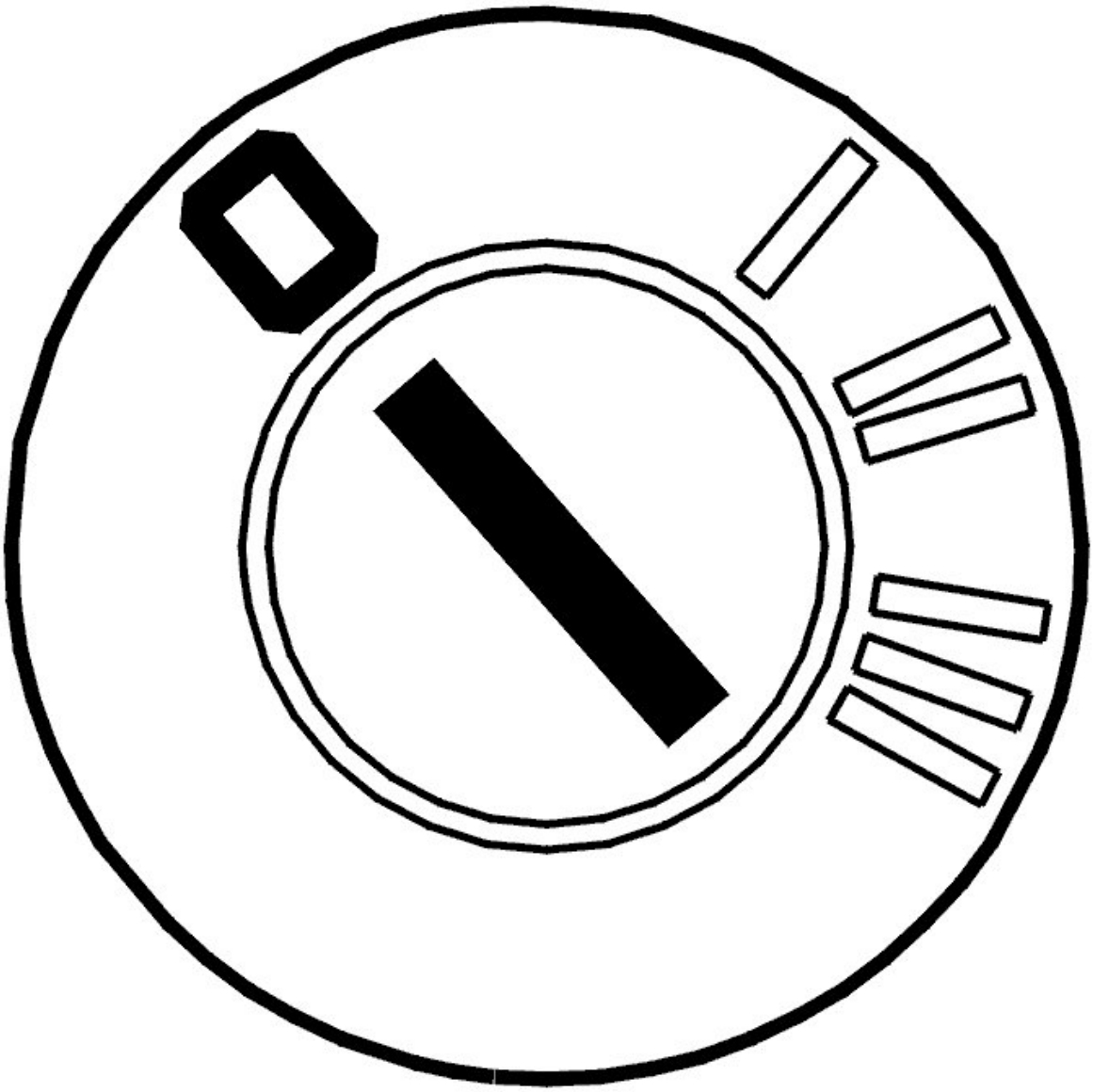
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 1 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

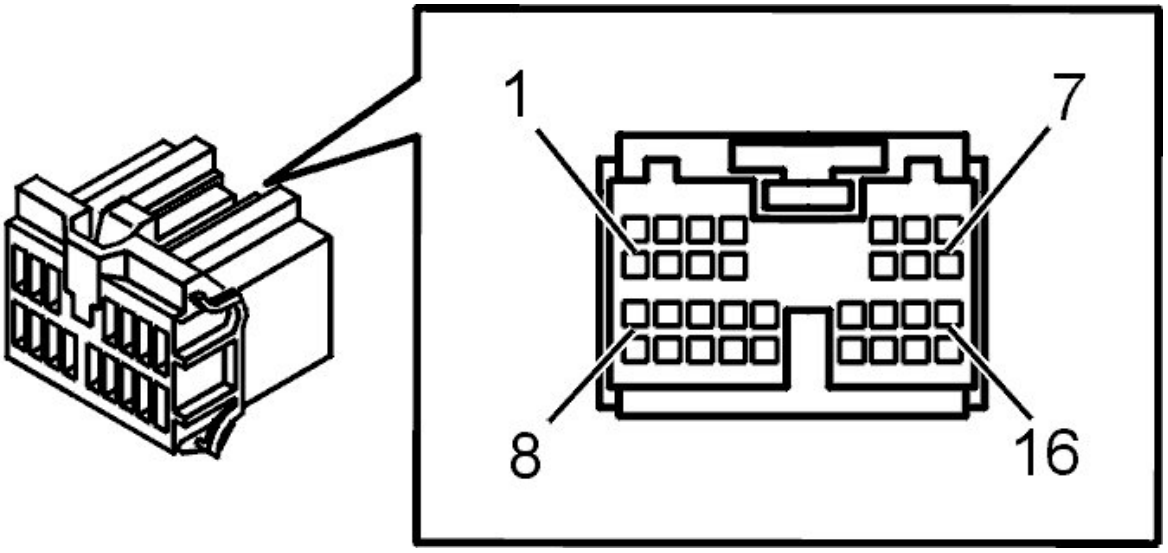
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 1 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) left. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #12 (#36) and connector A for seat heating module (SHM) left terminal #2.

Check LIN bus 1 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

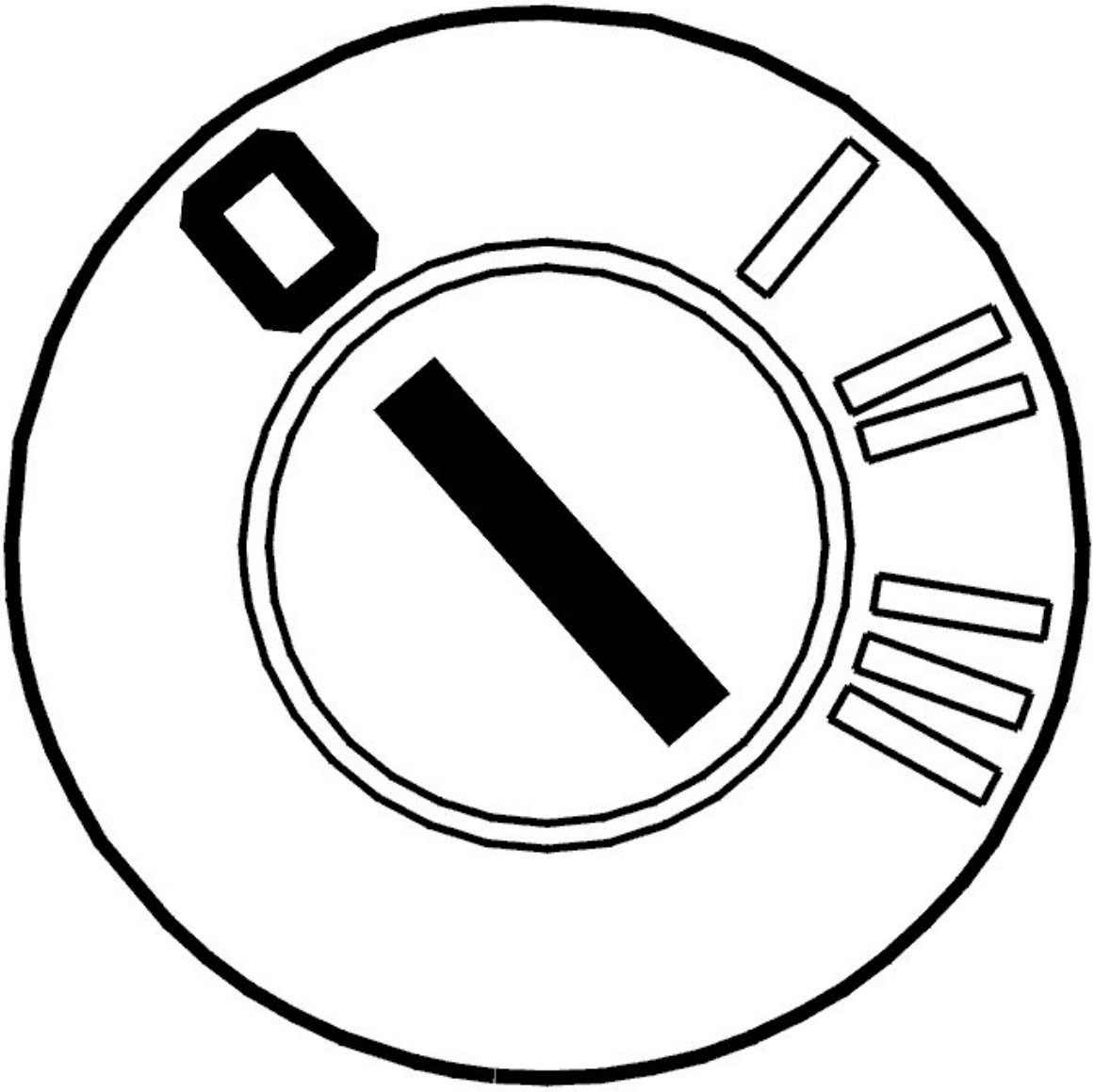
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



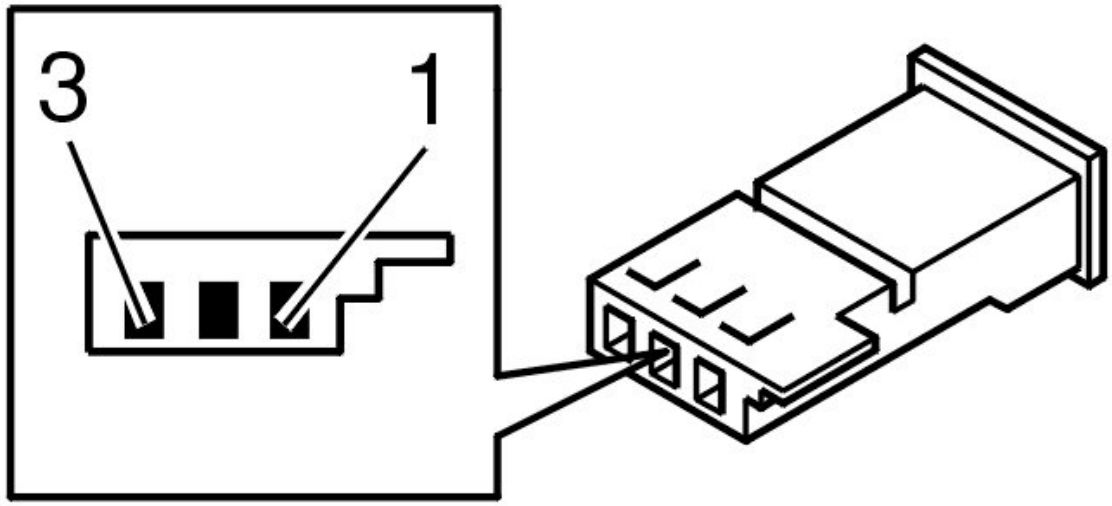
- Ignition off
- Disconnect the connector for the damper motor module (DMM) for temperature left
- Ignition on.

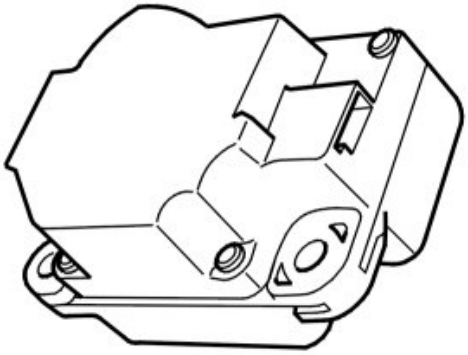
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3
Check LIN bus 1 by taking a reading between damper motor module (DMM) connector terminal #2 and the connector for climate control unit terminal #2. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

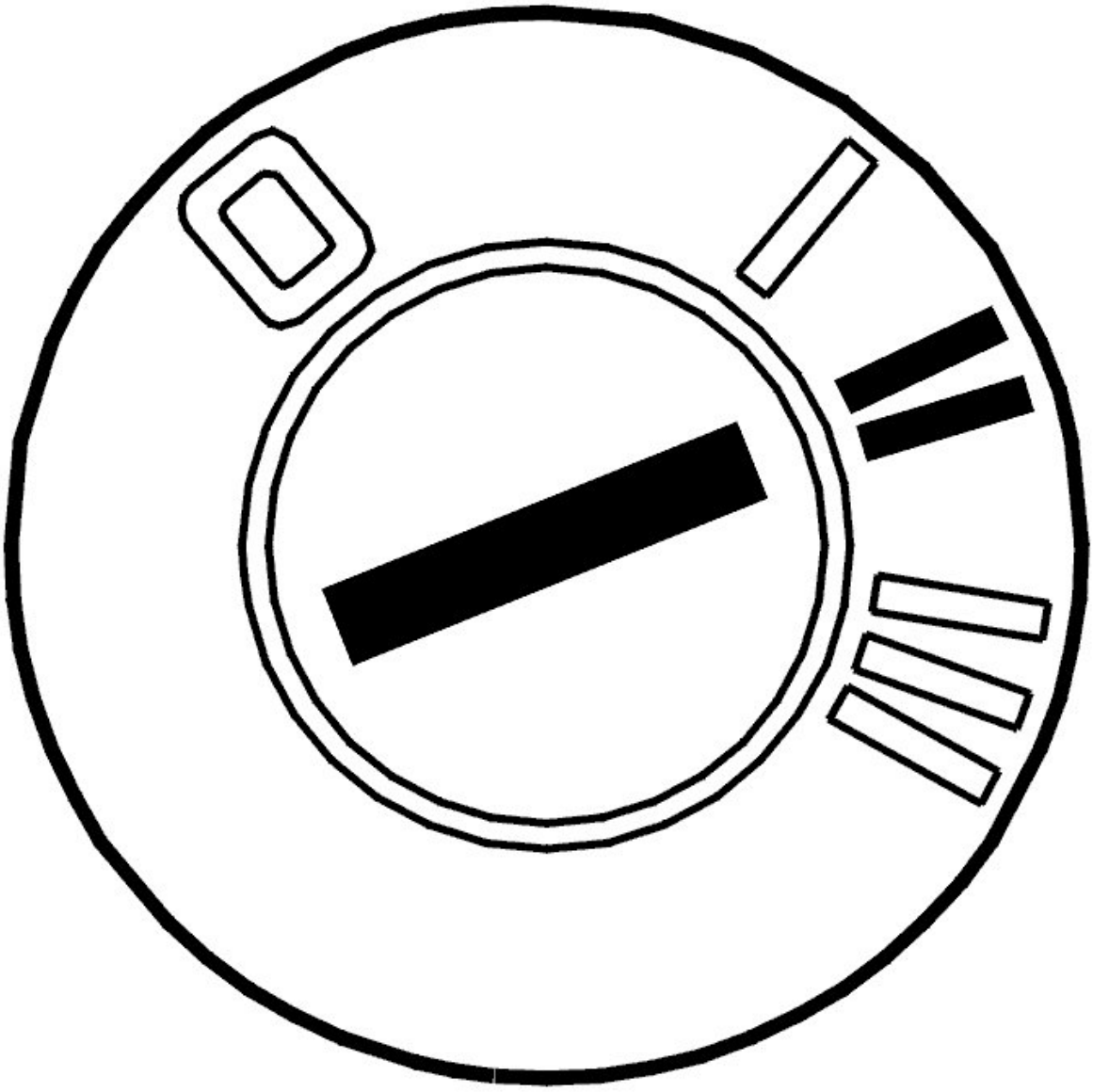
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

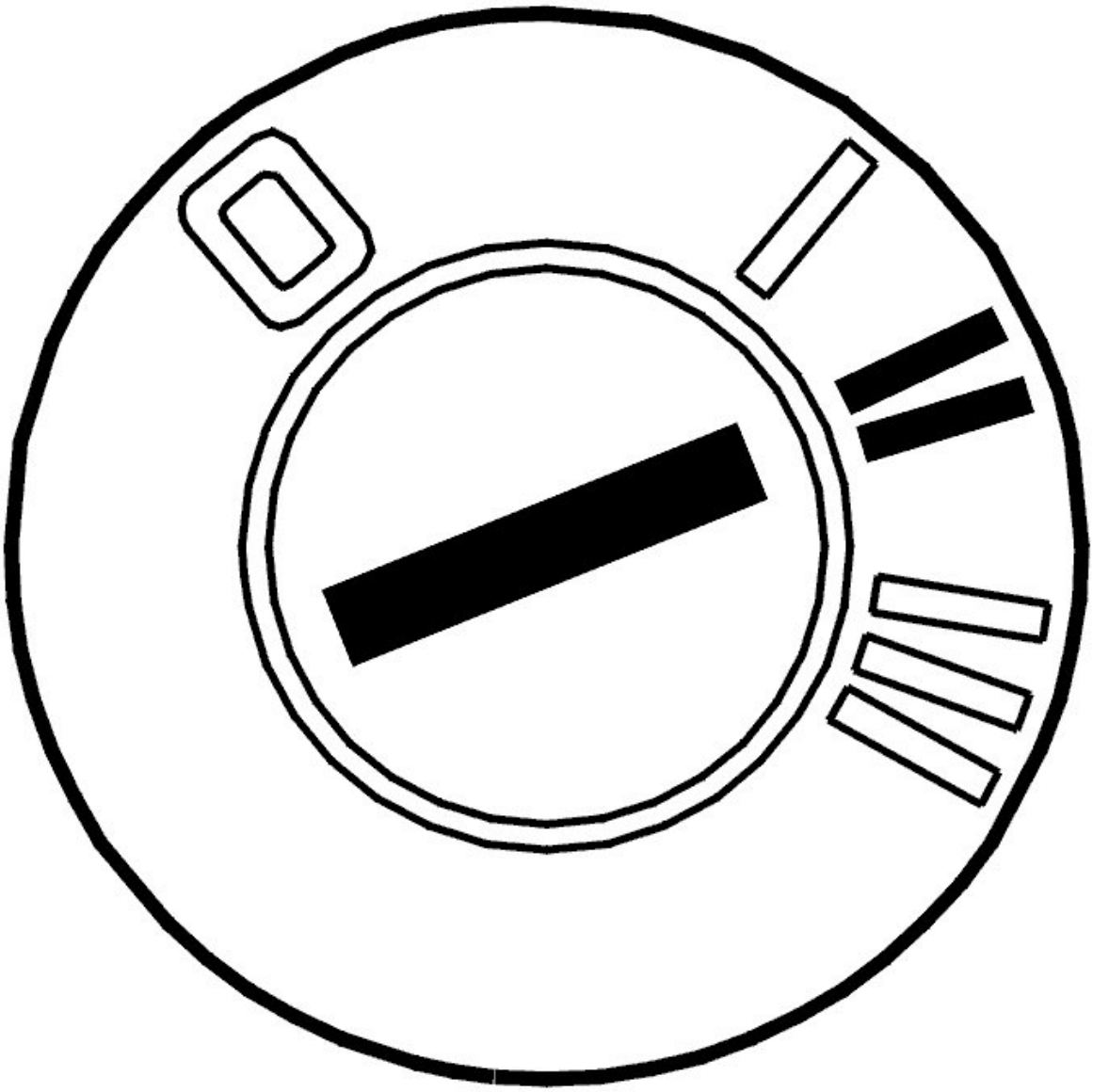
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

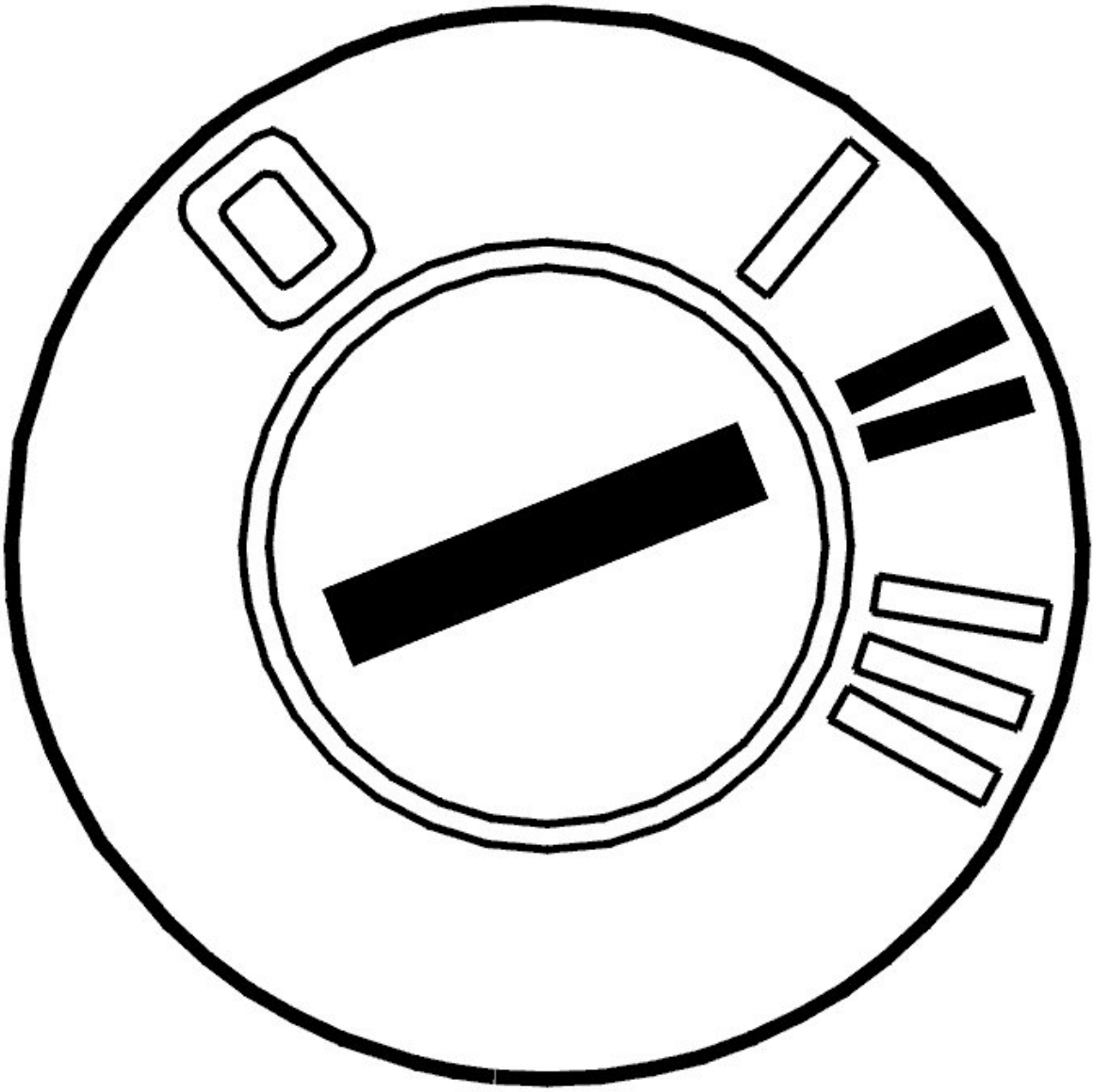
DONE - Verification

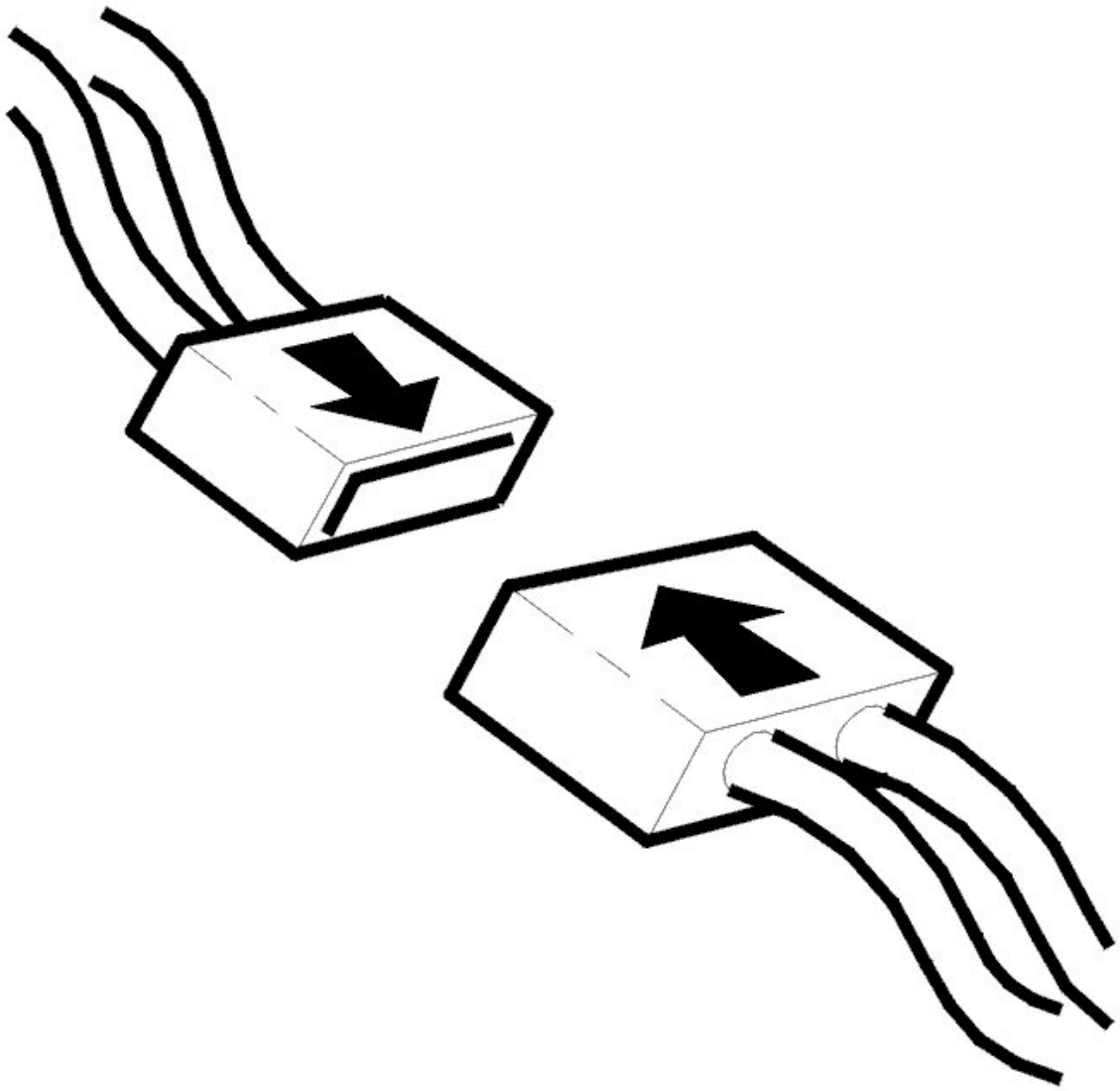
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

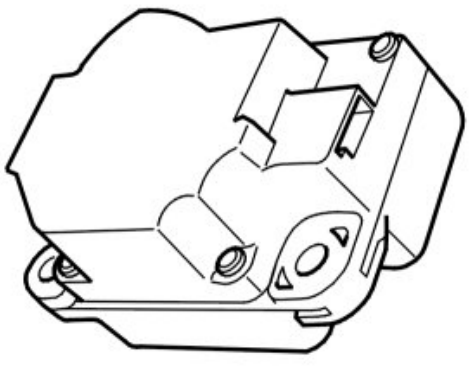
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD16

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the climate control module (CCM) and the damper motor module (DMM) air distribution on LIN bus 1.
The diagnostic trouble code (DTC) can occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 (CCM-DD10 -

CCM-DD16) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

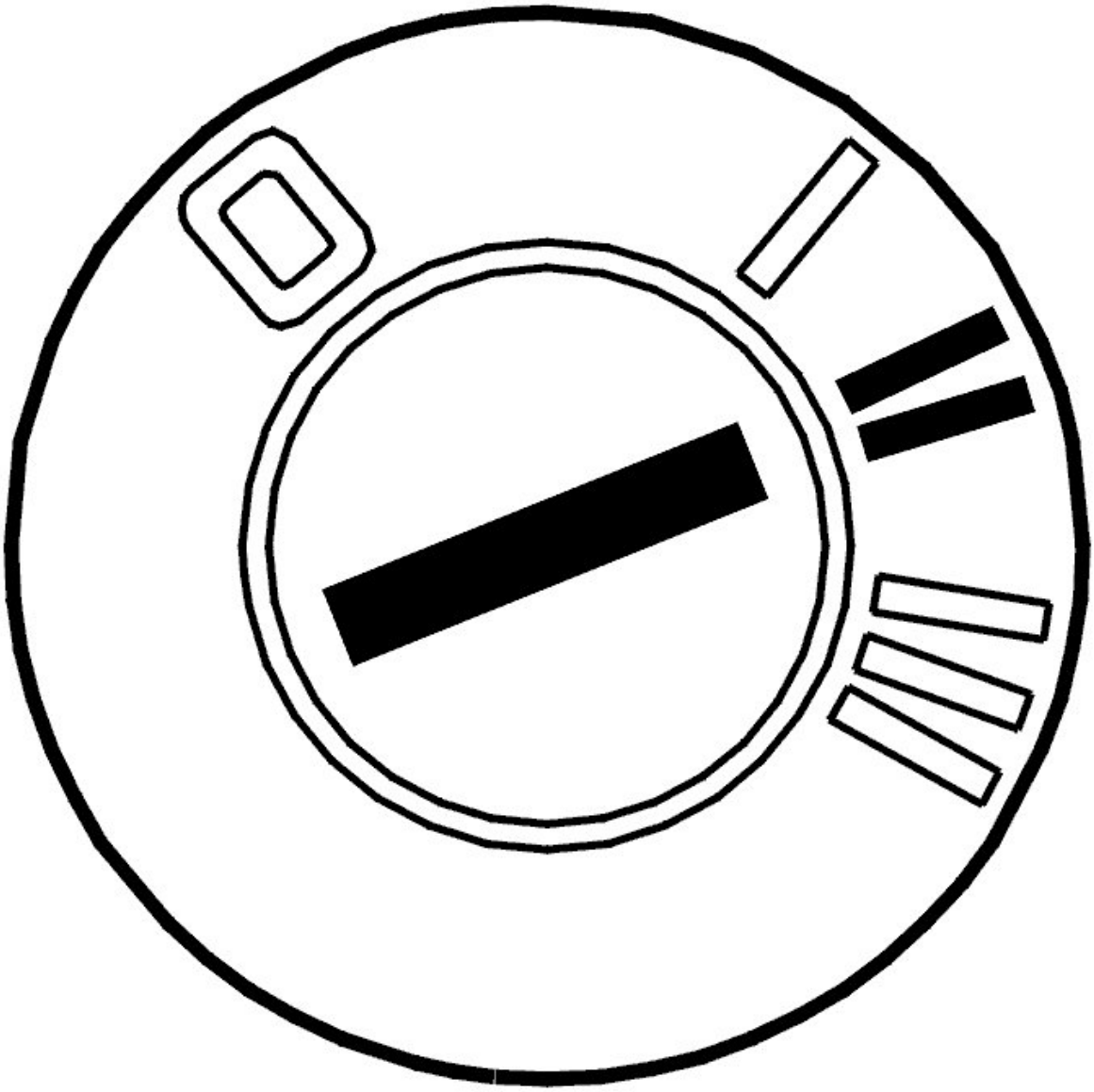
Possible source
- Open-circuit on LIN bus 1 between the climate control module (CCM) and the damper motor module (DMM) air distribution
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components only on LIN bus 1 (CCM-DD10 - CCM-DD16)

3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

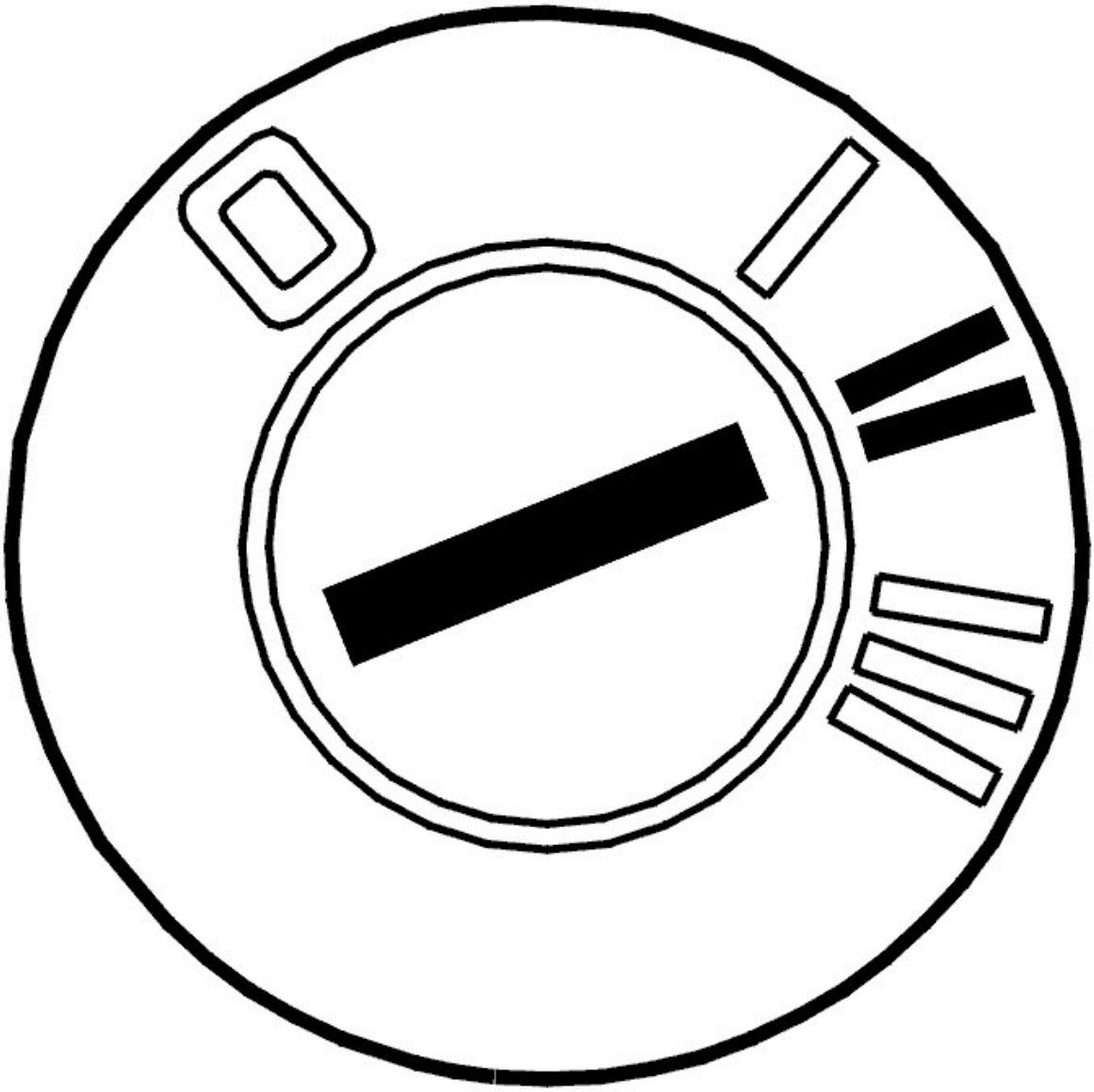
Select an alternative.

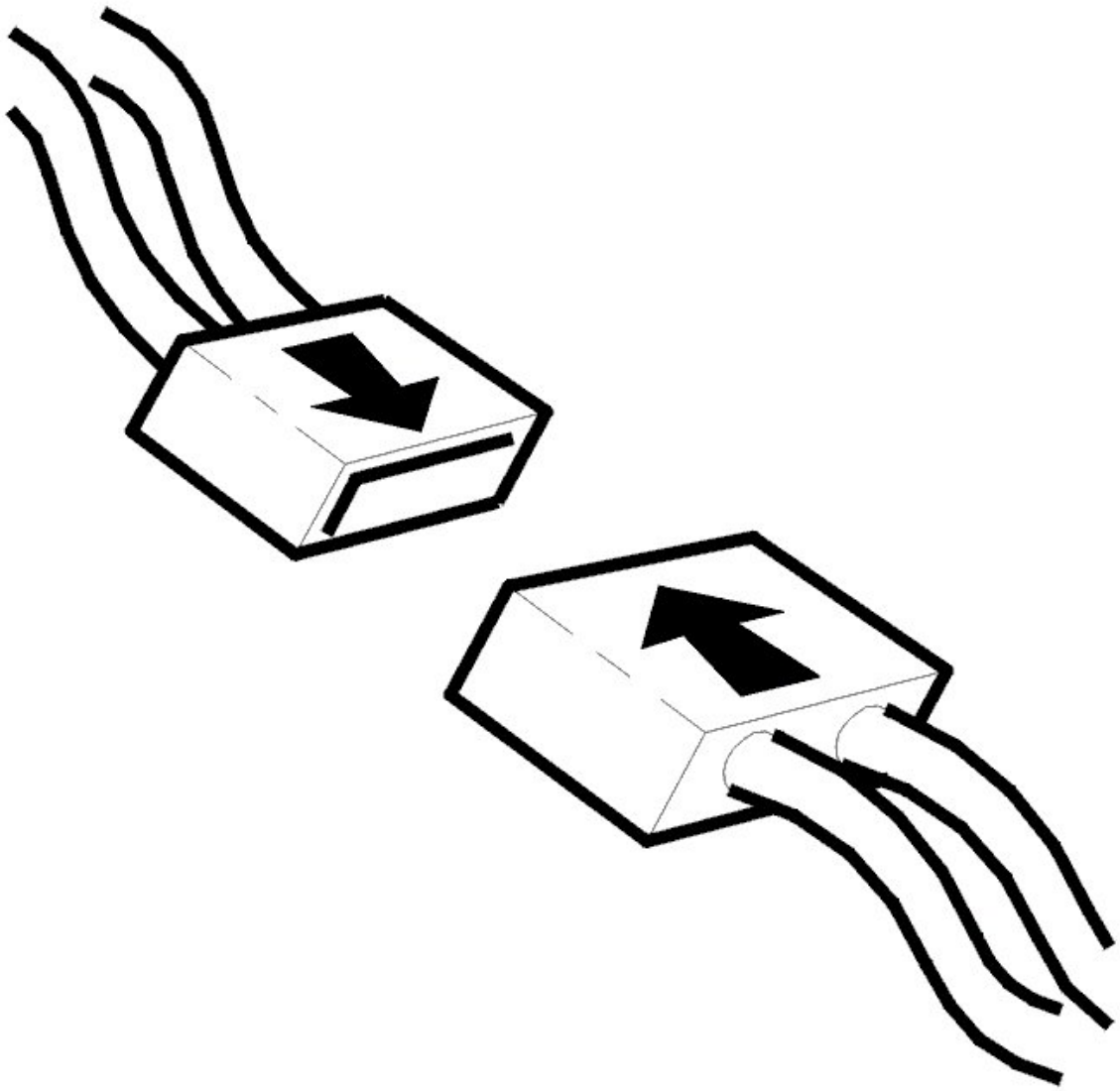
1 - Checking the connectors and wiring

2 - Checking LIN bus 1 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A on the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

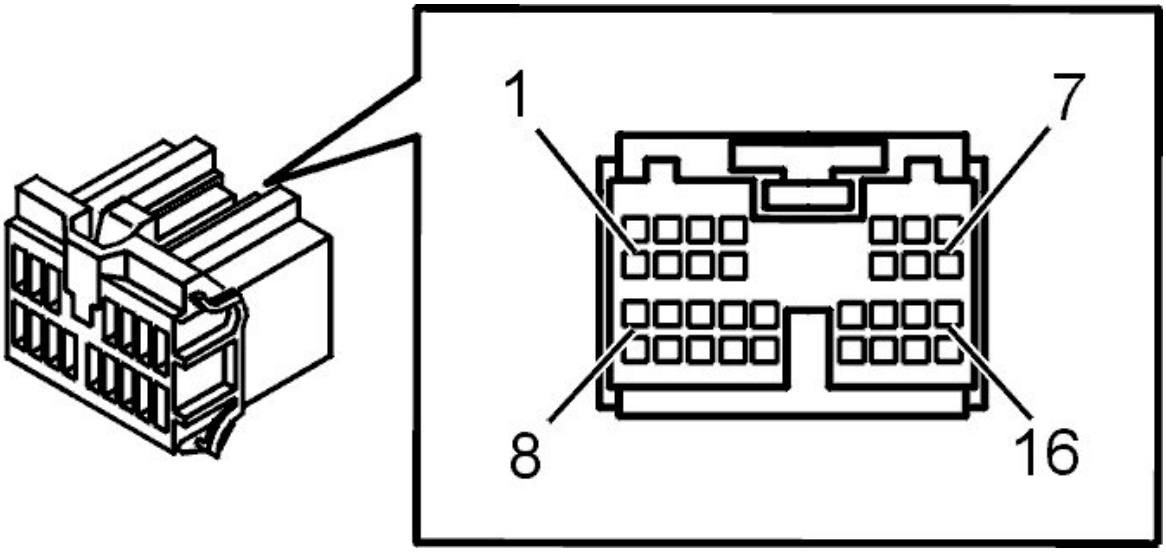
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

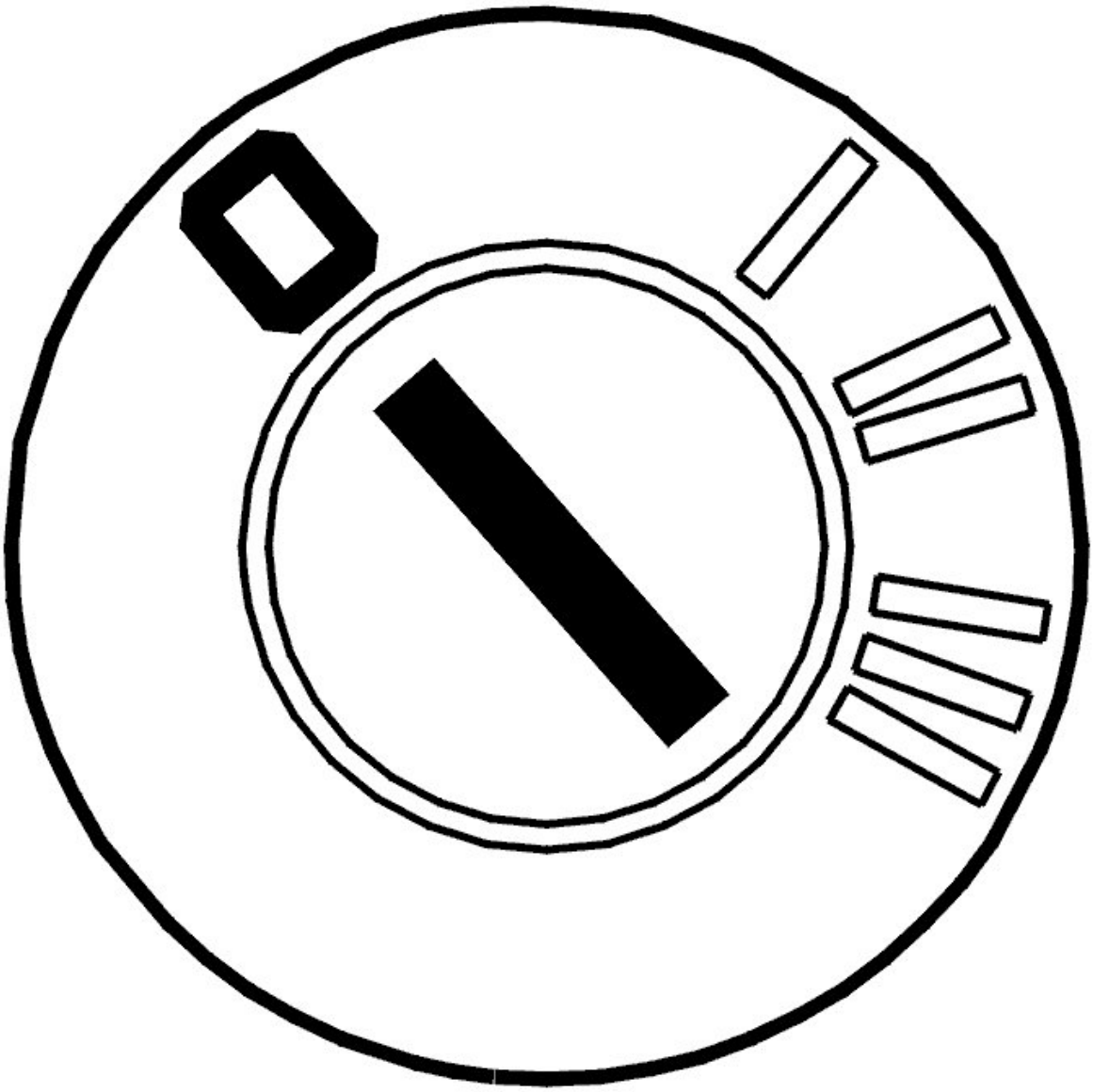
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 1 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

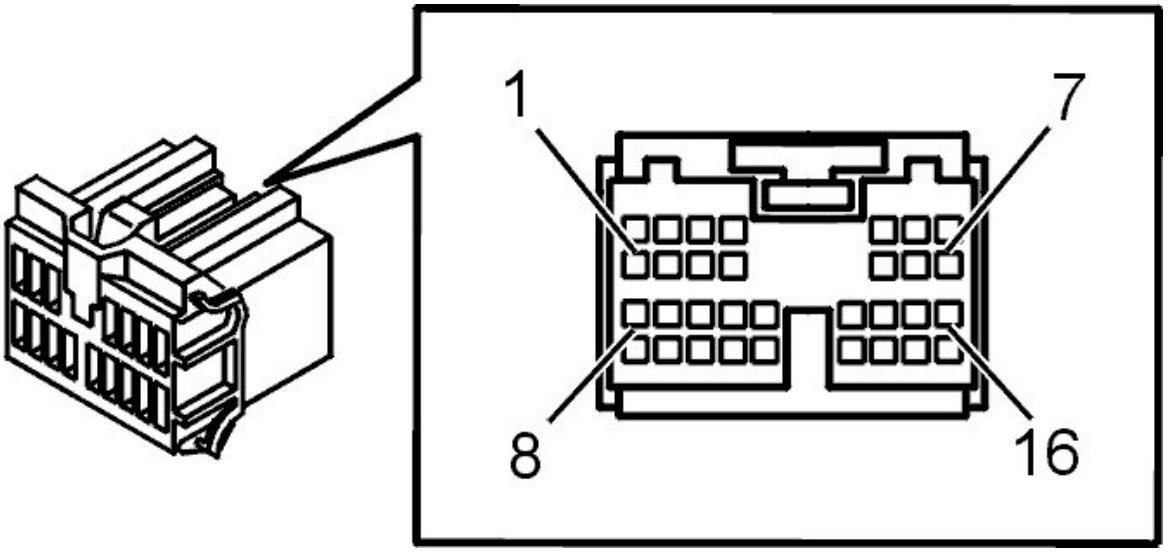
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 1 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) left. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #12 (#36) and connector A for seat heating module (SHM) left terminal #2.

Check LIN bus 1 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections. Remedy as necessary.

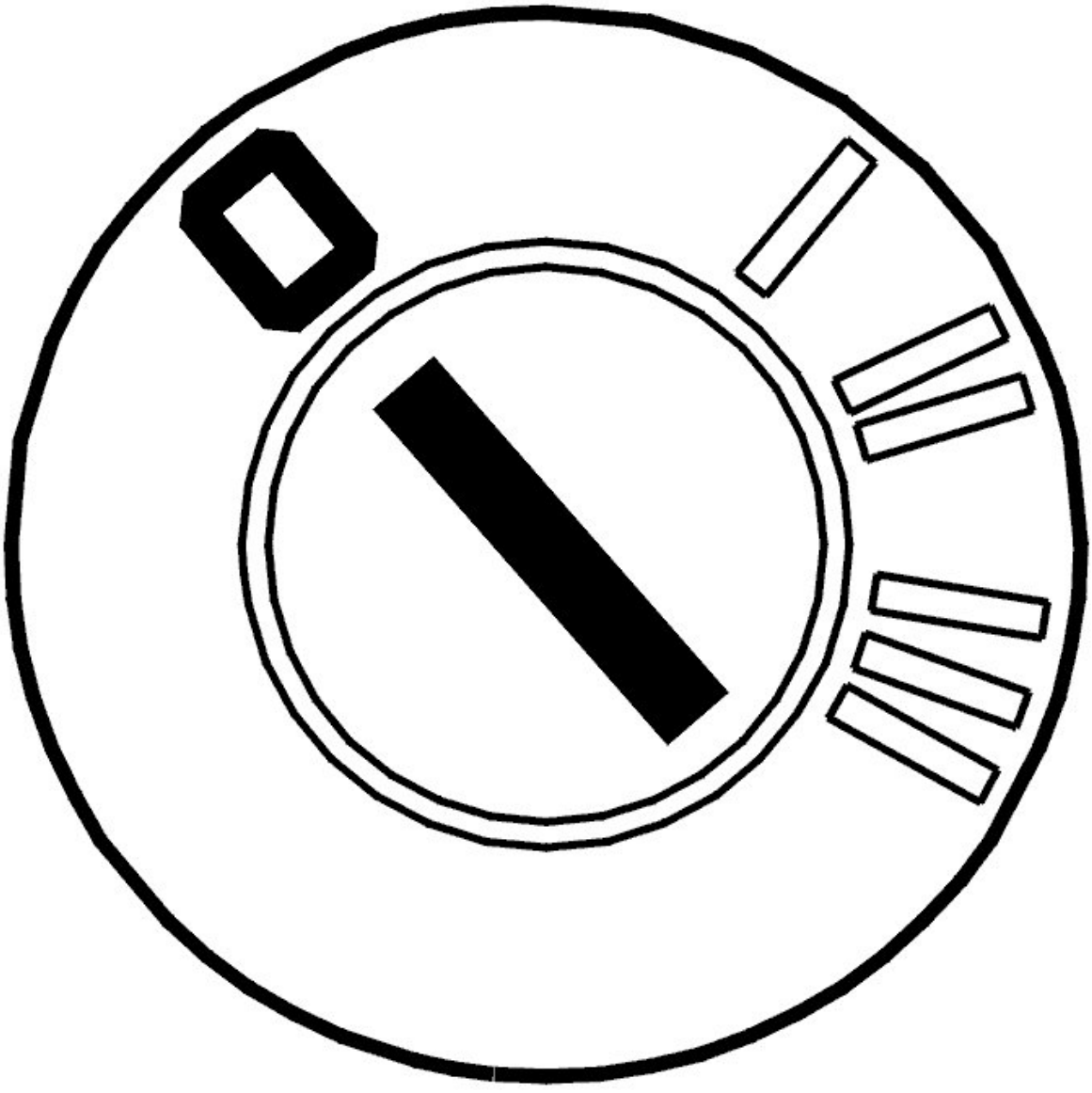
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



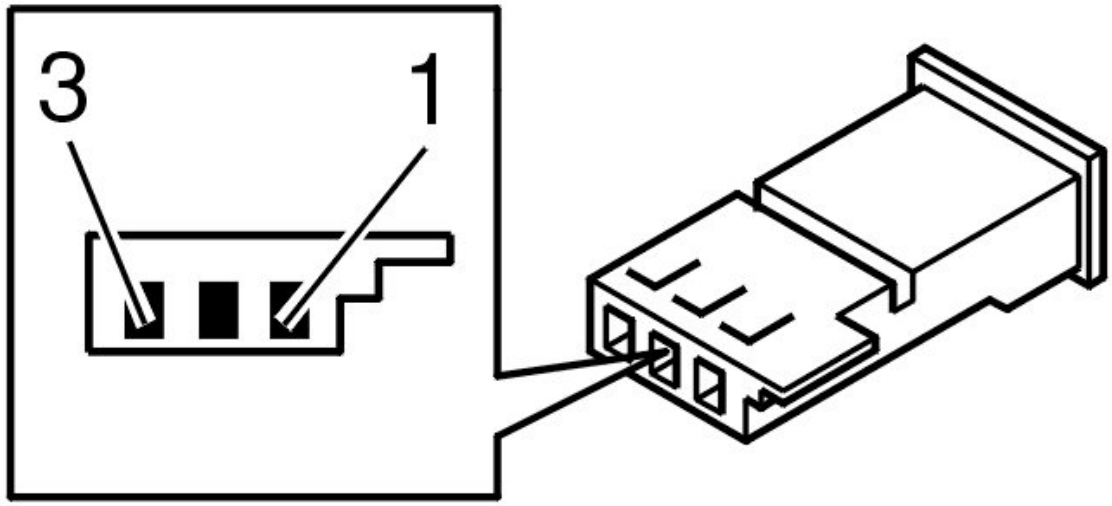
- Ignition off
- Disconnect the connector for the damper motor module (DMM) for air distribution
- Ignition on.

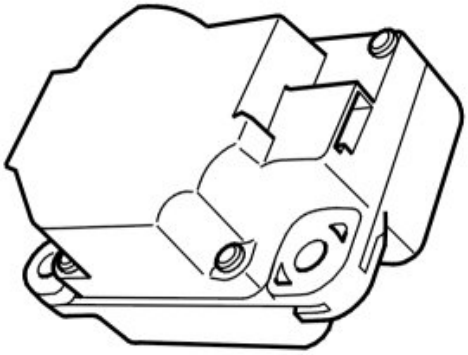
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3
Check LIN bus 1 by taking a reading between the damper motor module (DMM) connector terminal #2 and the connector for the climate control unit terminal #2. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

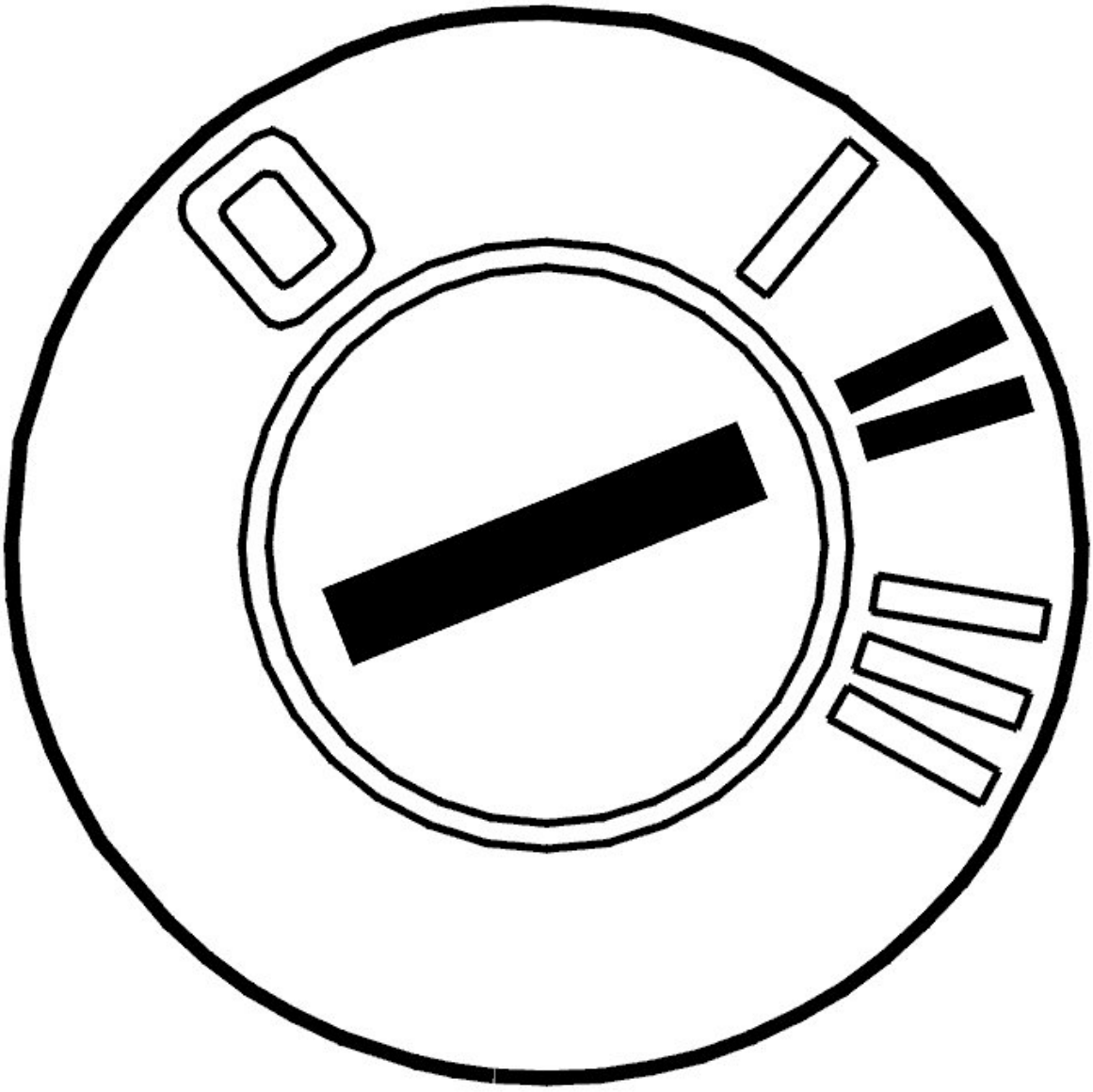
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

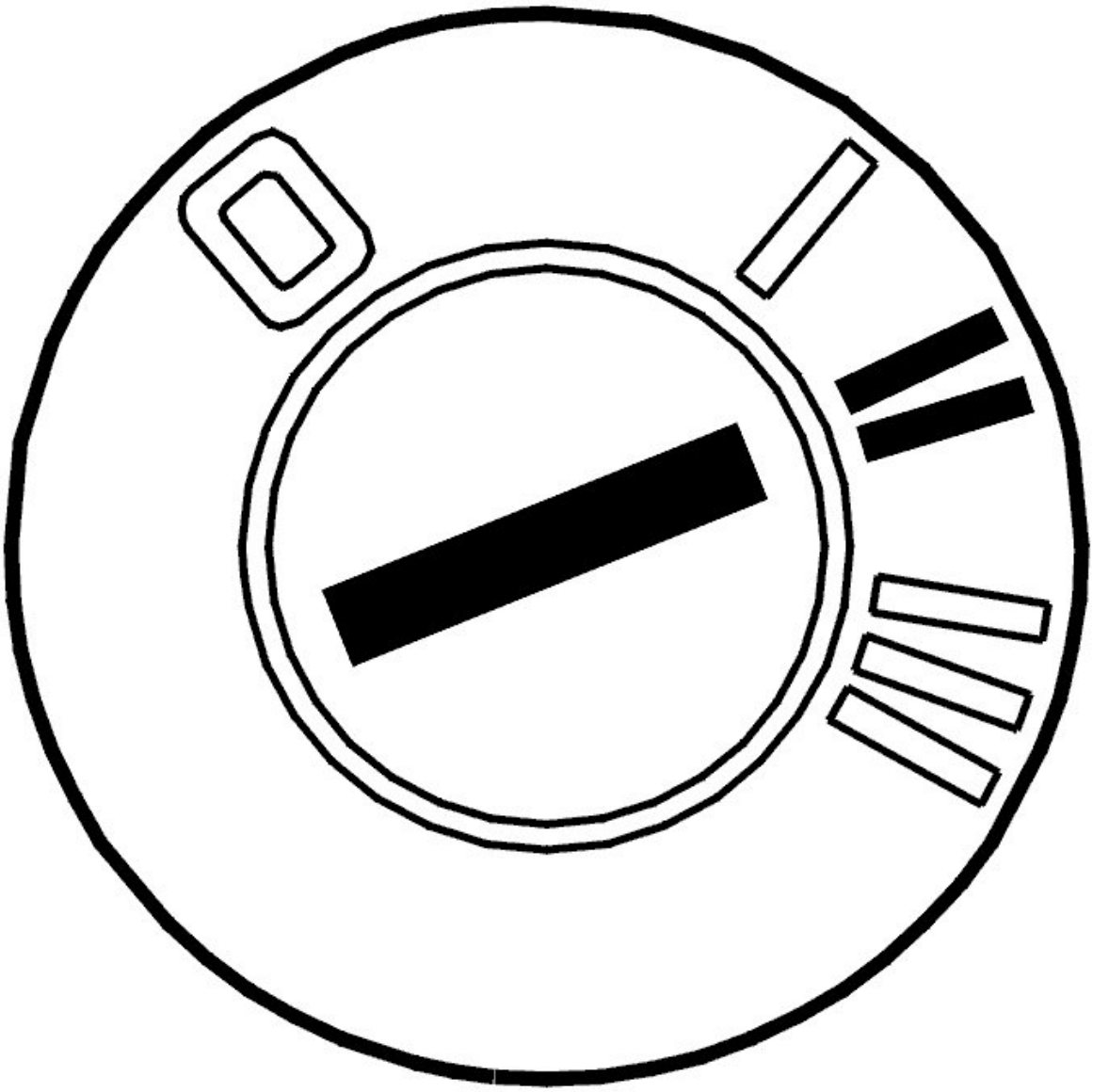
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

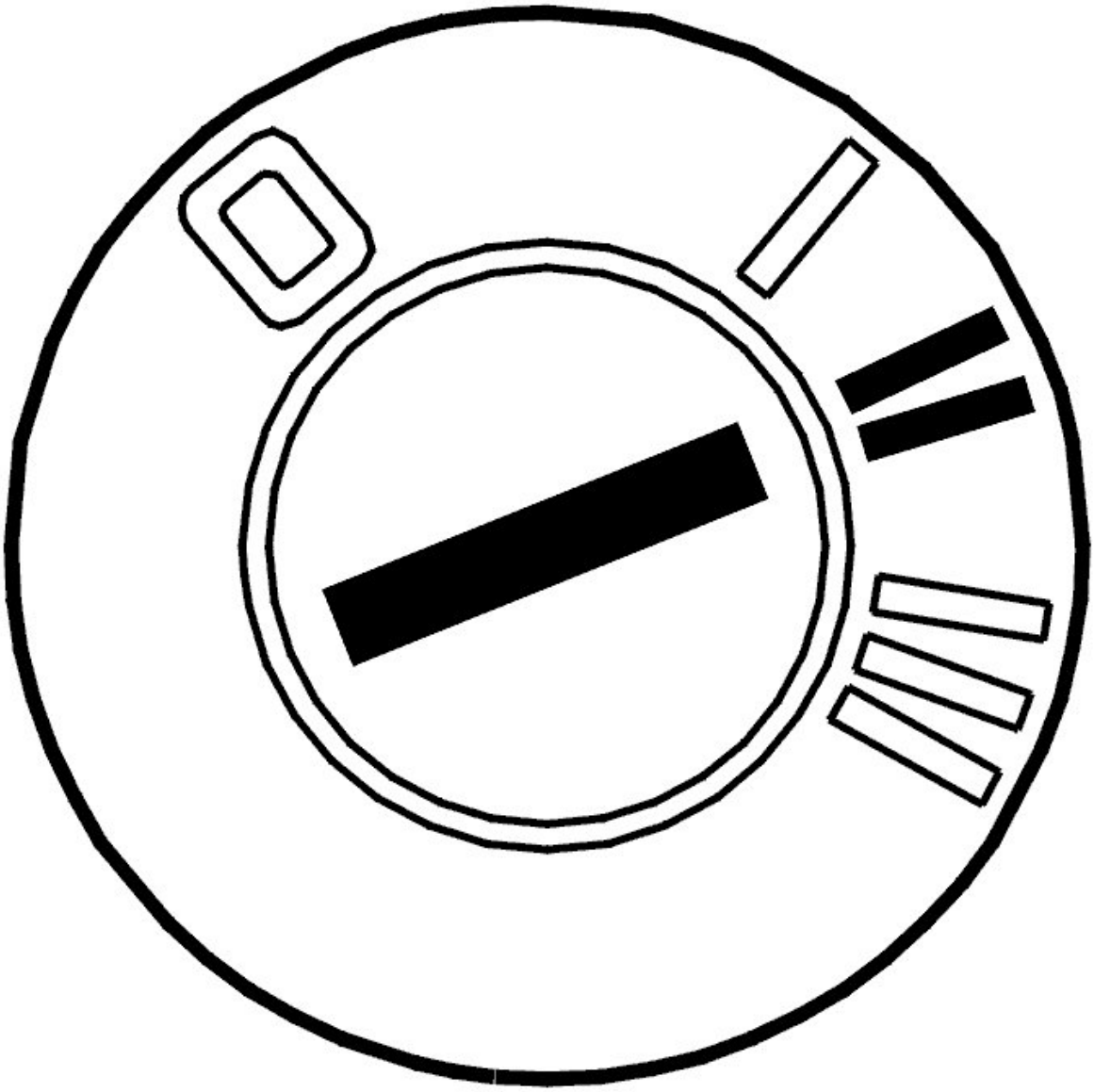
DONE - Verification

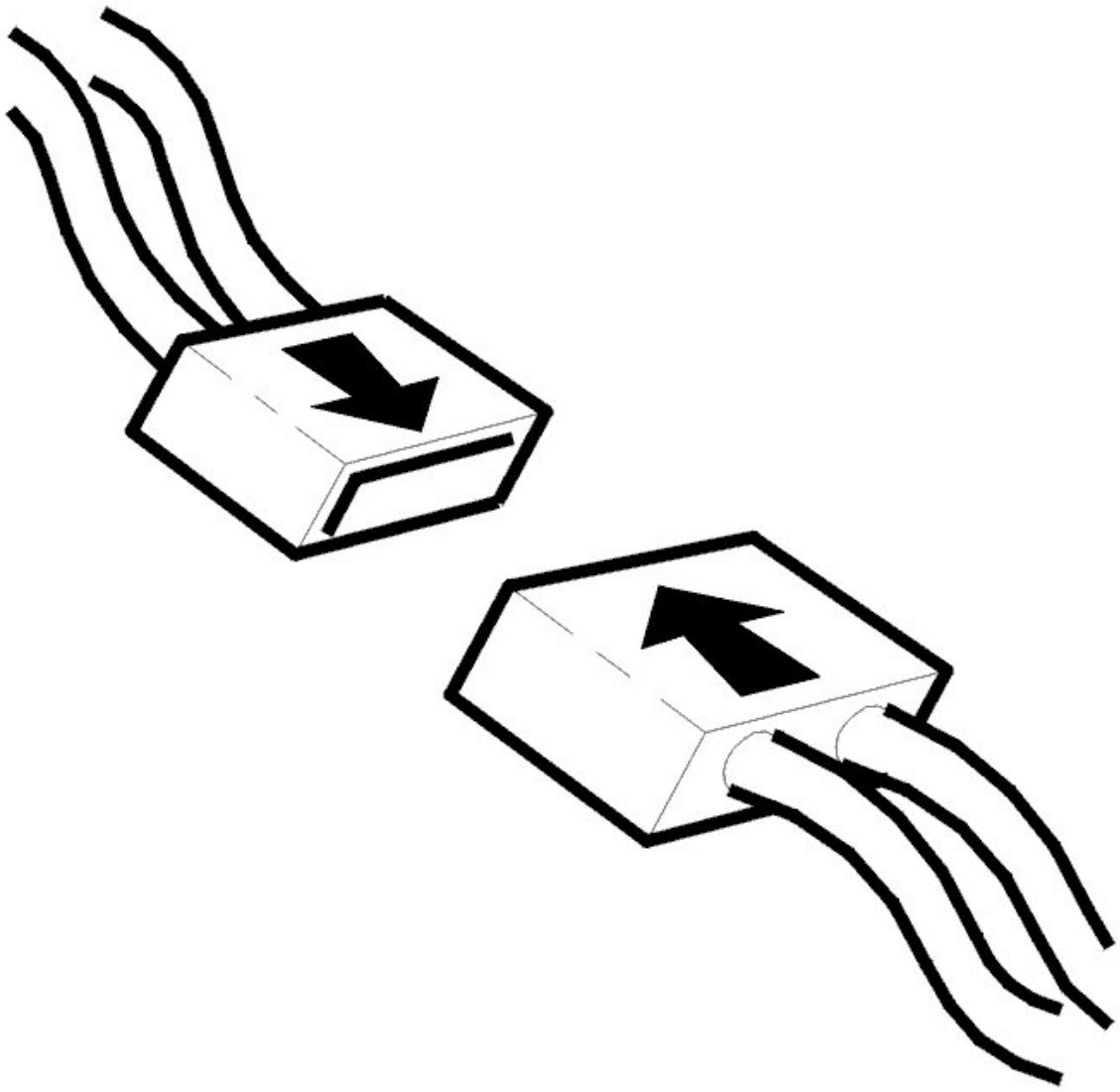
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

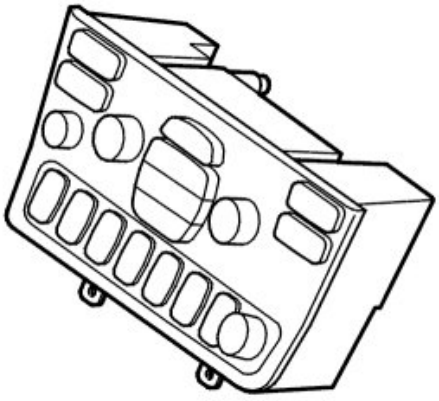
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD20

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that data that is sent on LIN bus 2 is incorrect.
The following components communicate with the climate control module (CCM) via LIN bus 2:

- damper motor module (DMM) defroster

- damper motor module (DMM) temperature right (only ECC)
- damper motor module (DMM) recirculation (only on left-hand drive cars)
- air quality sensor (AQS) (only on left-hand drive cars)
- seat heating module (SHM) right.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

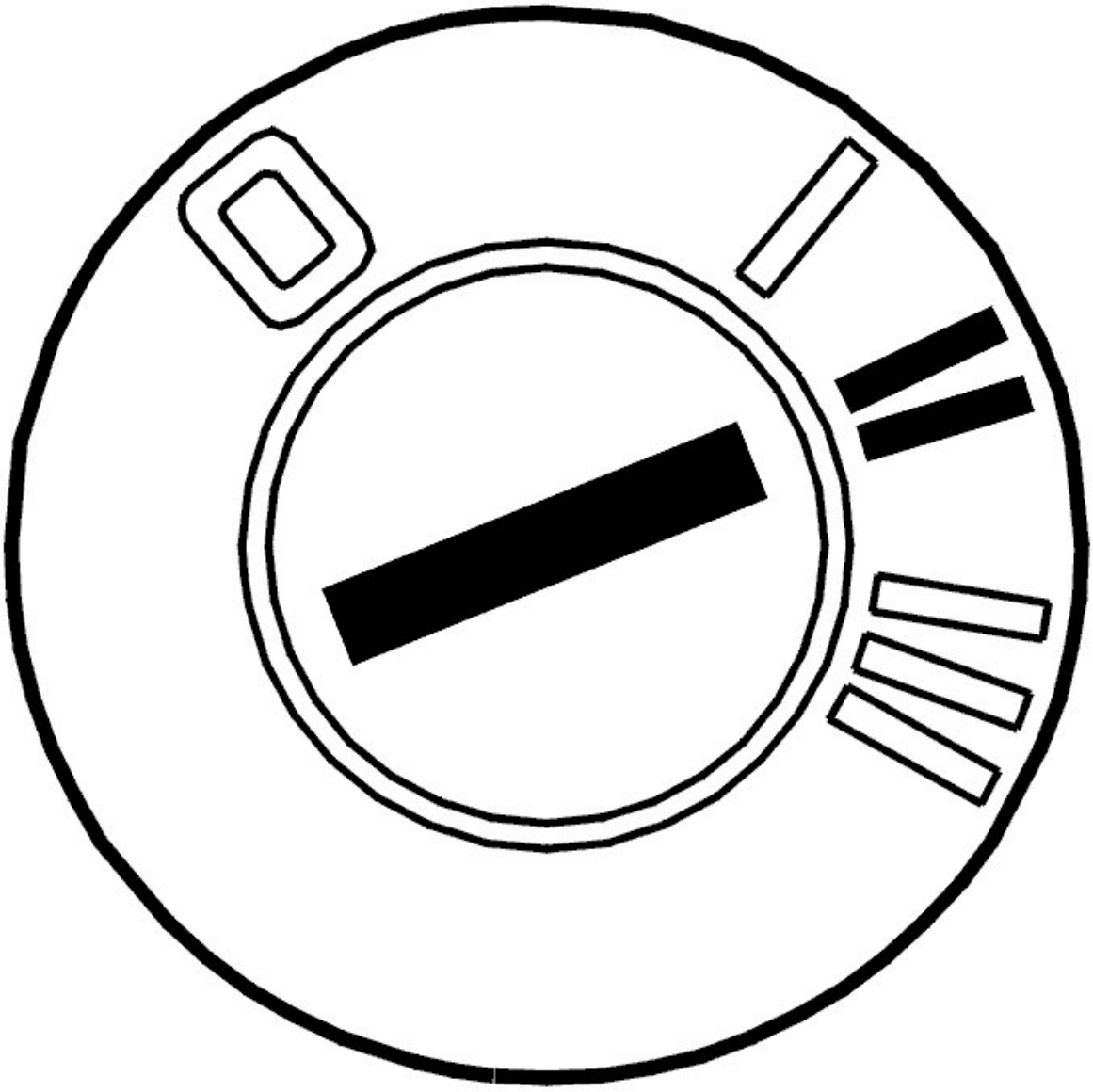
Possible source
- Incorrect data during communication on LIN bus 2.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Incorrect Data

Incorrect data

Checking components



- Ignition off
- Disconnect connector A for the seat heating module (SHM) right
- Ignition on.

The climate control module (CCM) has detected that a component on LIN bus 2 is transmitting incorrect data and disrupting communication on the LIN bus.

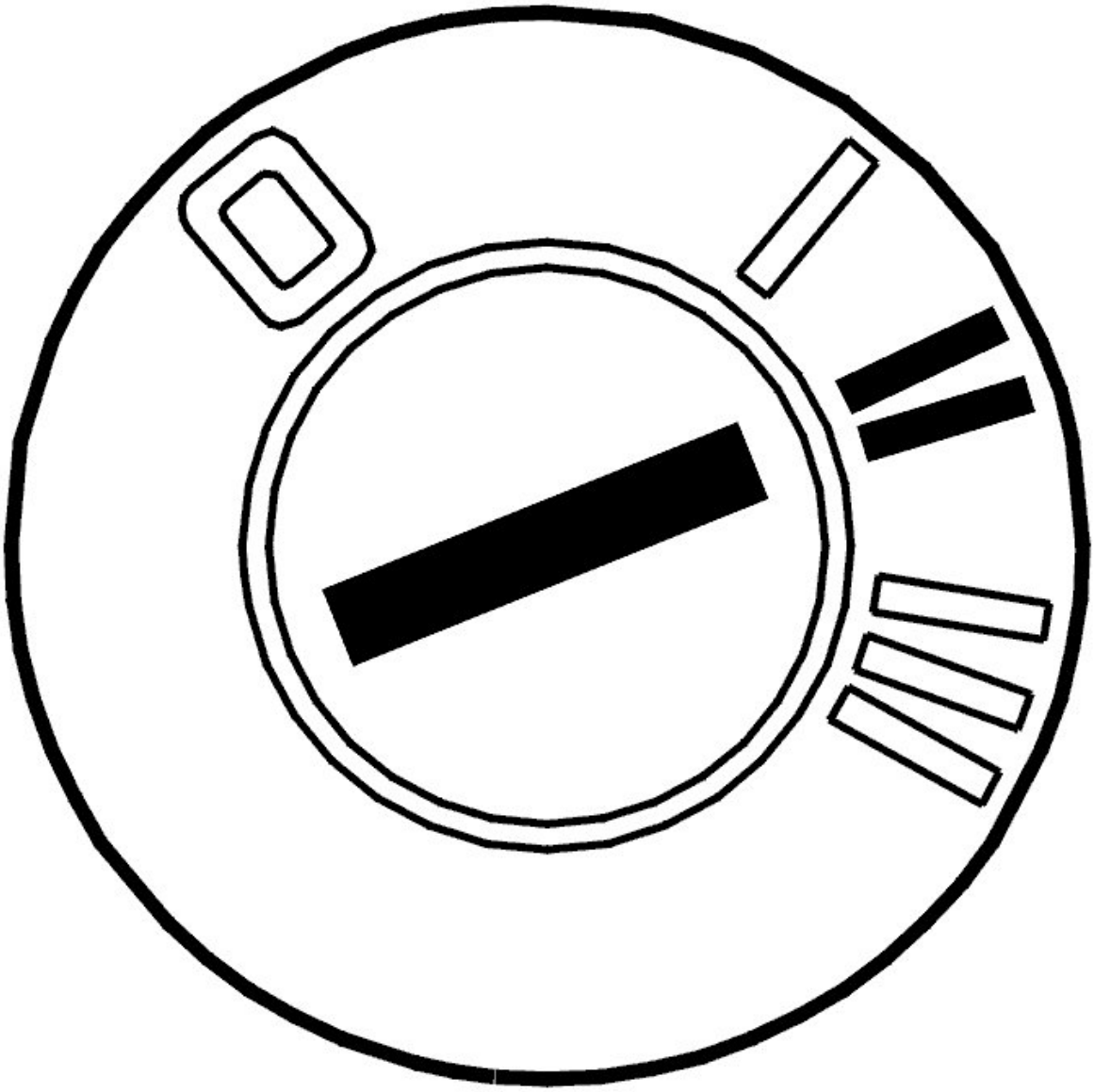
Check the communication by disconnecting the seat heating module (SHM) right.
If other control modules on LIN bus 2 now function, replace the seat heating module (SHM) right.

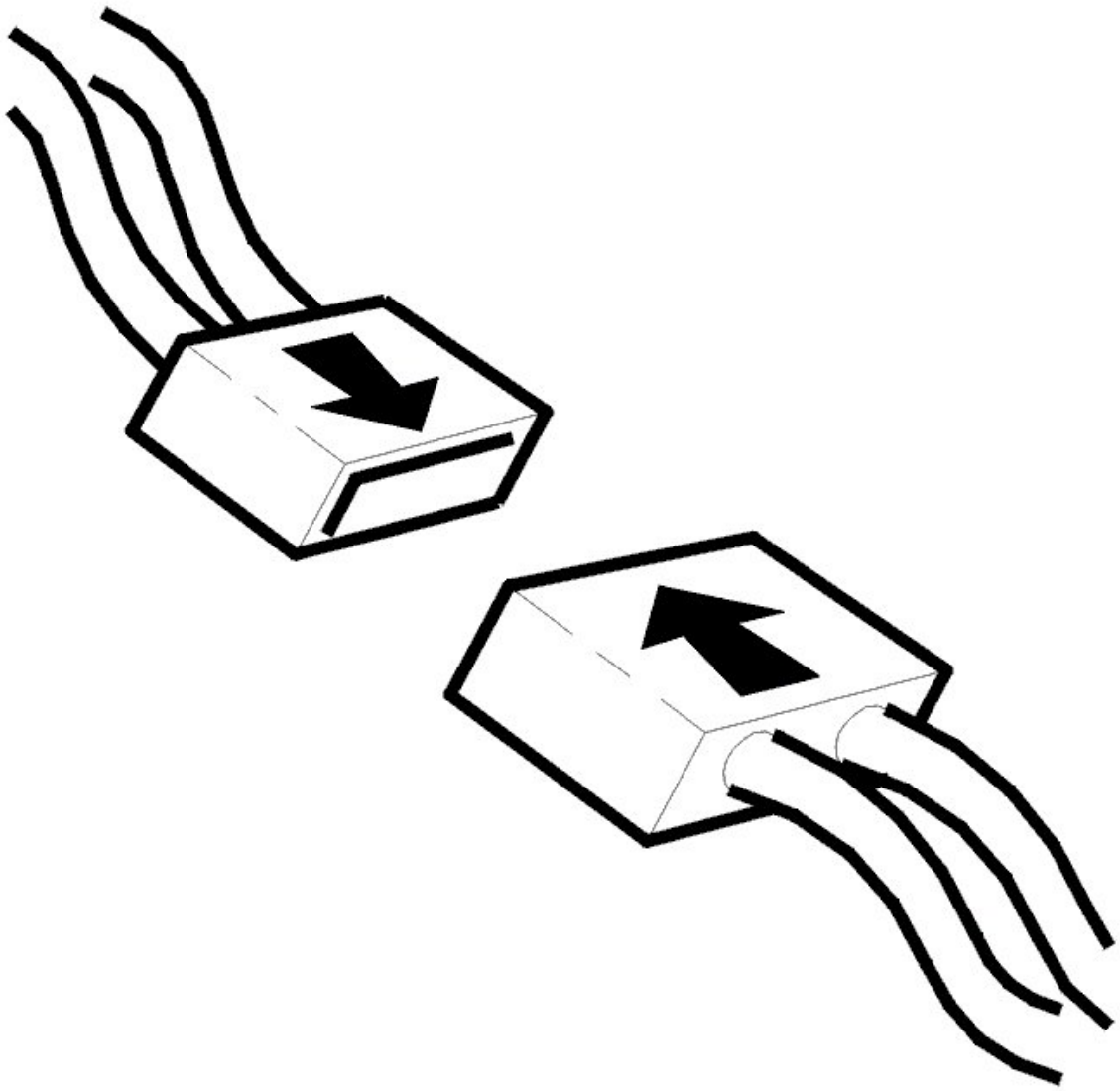
Was a fault detected?

Yes - Verification

No - Checking components

Checking components





- Ignition off
- Reconnect connector A for the seat heating module (SHM)
- Ignition on.

Check the components on the climate control unit as follows:

- Disconnect the connectors for the components one at a time
- Check whether the other components regain functionality, for example by activating seat heating
- If the functionality for the other components returns, the fault is probably in the disconnected components.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Air quality sensor, replacing See: Heating and Air Conditioning/Climate Control Exhaust Gas Sensor/Service and Repair
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

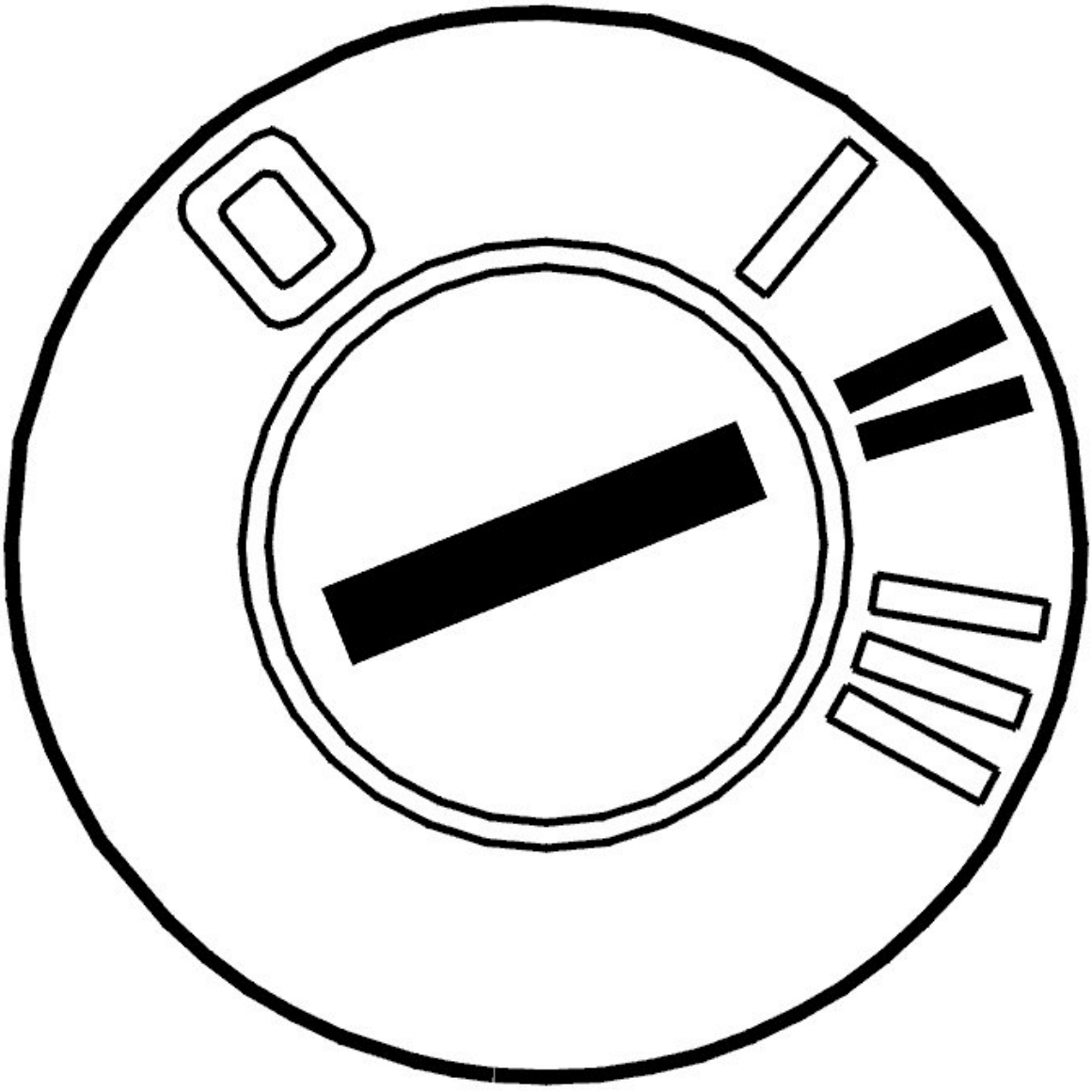
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

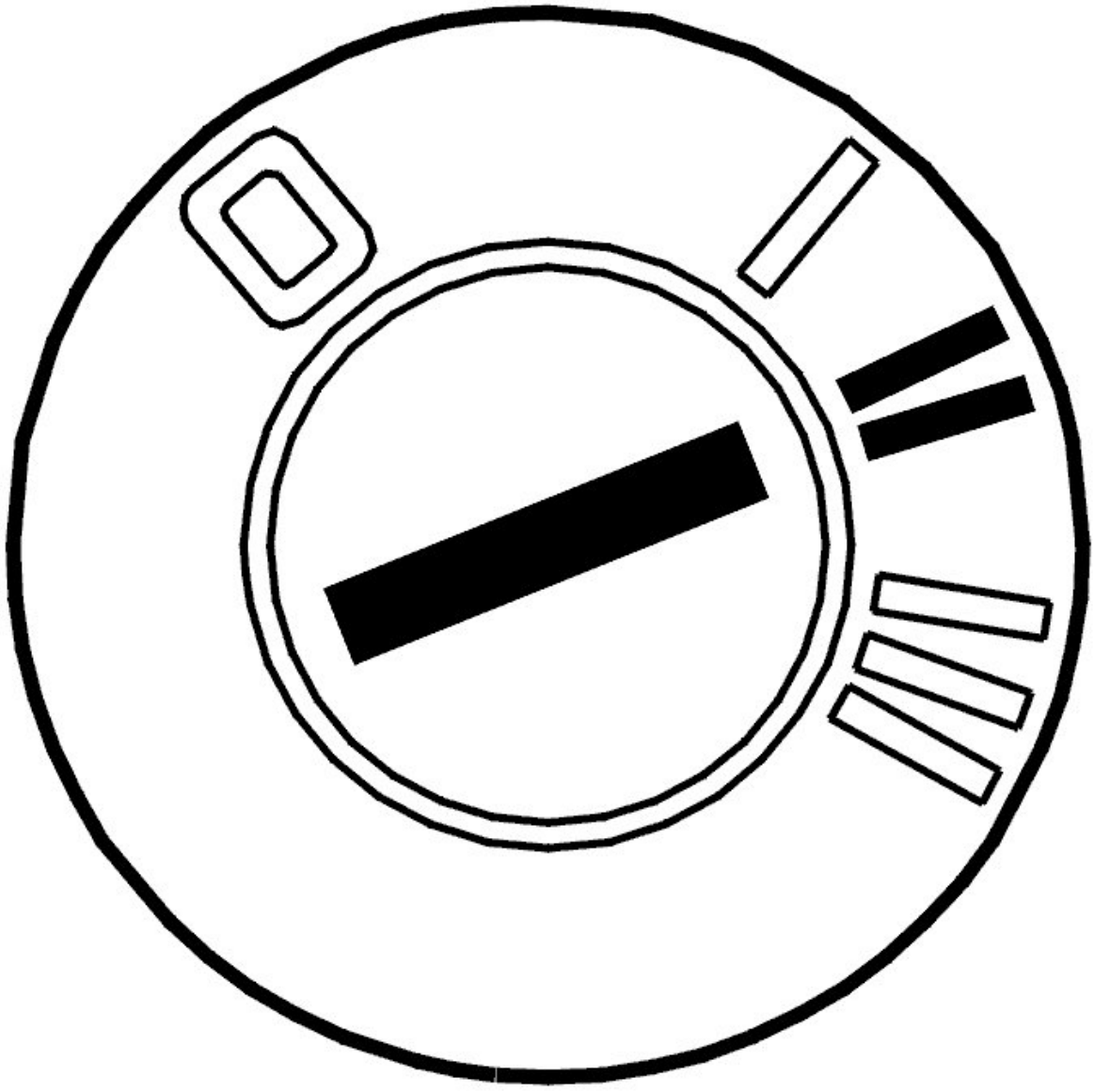
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

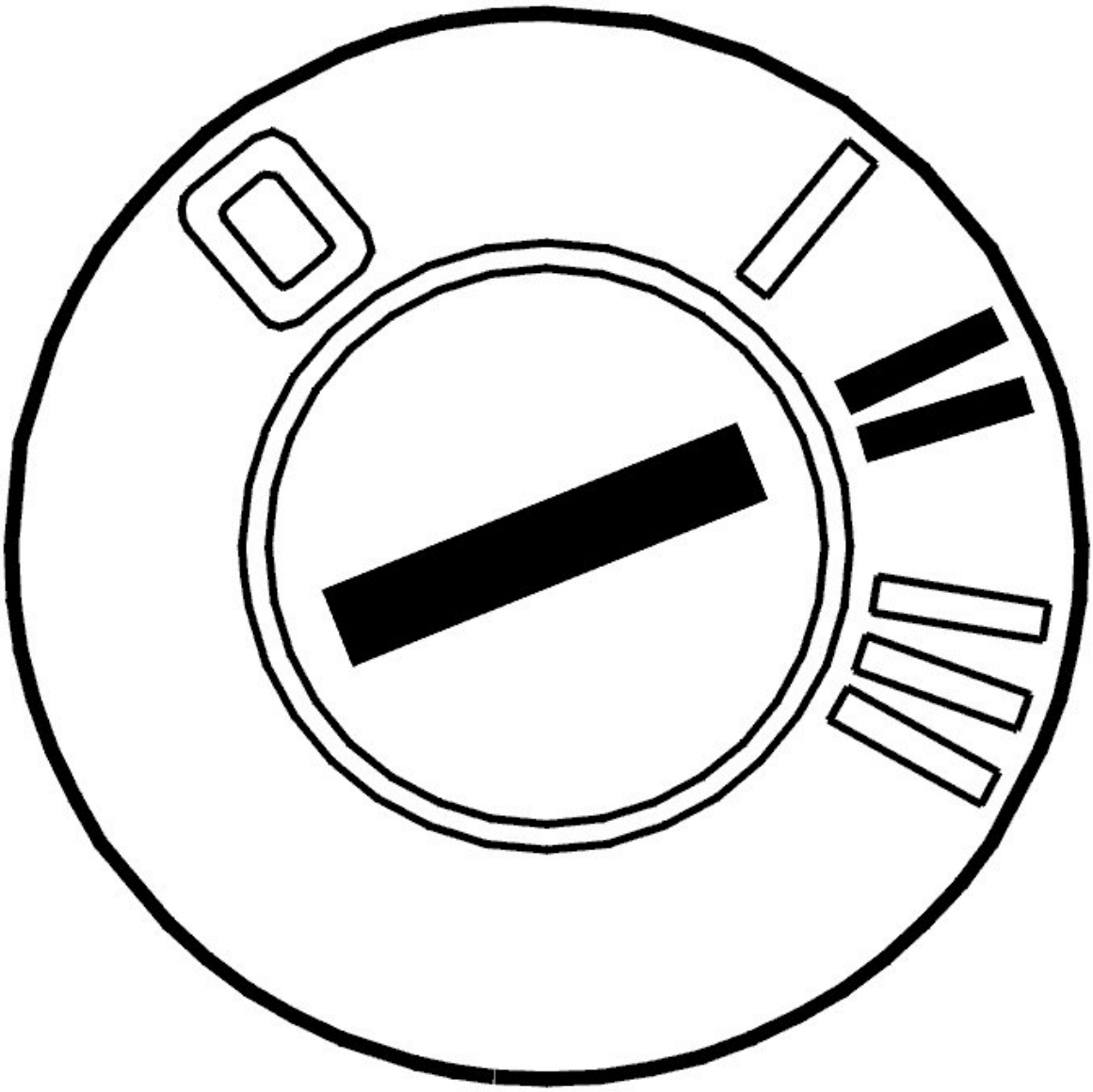
DONE - Verification

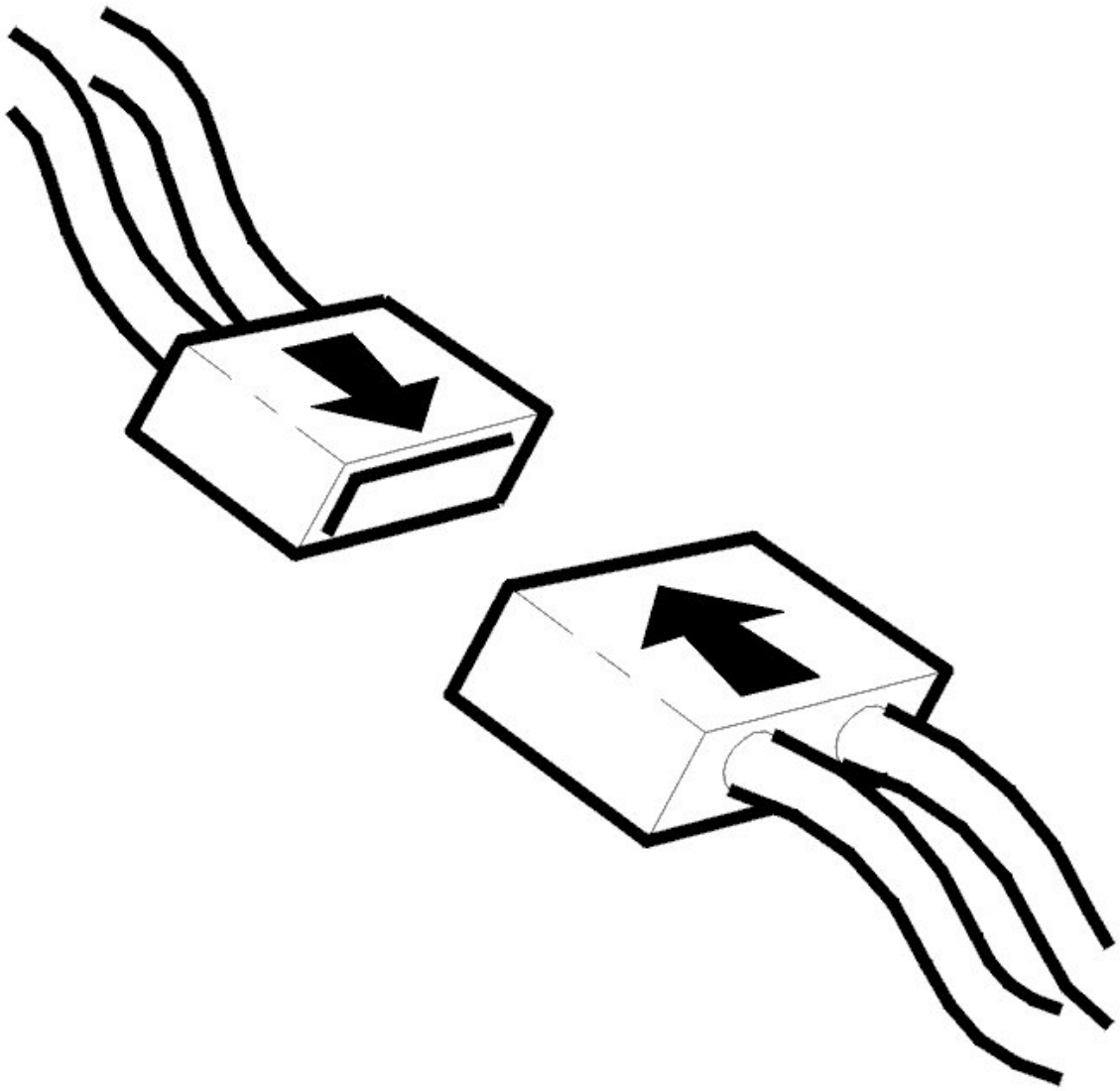
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

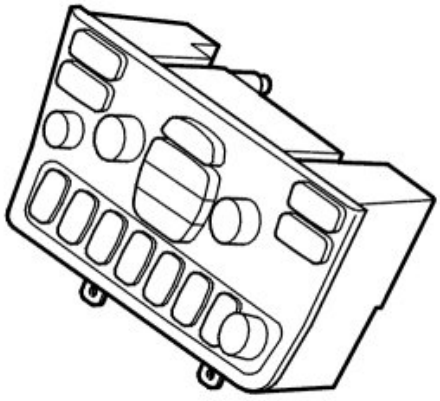
FAULT FOUND - Fault Found

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD21

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a short-circuit to supply voltage or ground in LIN bus 2.
A short-circuit to supply voltage or ground in the LIN bus will affect communications and the function of all the components.
The climate control module (CCM) communicates with the damper motors, air quality sensors and seat heating via two LIN buses.

The number of components in LIN bus 2 can vary depending on the vehicle equipment (ECC/MCC and options) and if the vehicle has right-hand drive or left-hand drive.
The following components communicate on LIN bus 2:

- damper motor module (DMM) defroster
- damper motor module (DMM) temperature right (only ECC)
- damper motor module (DMM) recirculation (only on left-hand drive cars)
- air quality sensor (AQS) (only on left-hand drive cars)
- seat heating module (SHM) right.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

Possible source

- LIN bus 2 short-circuited to supply voltage
- LIN bus 2 short-circuited to ground.

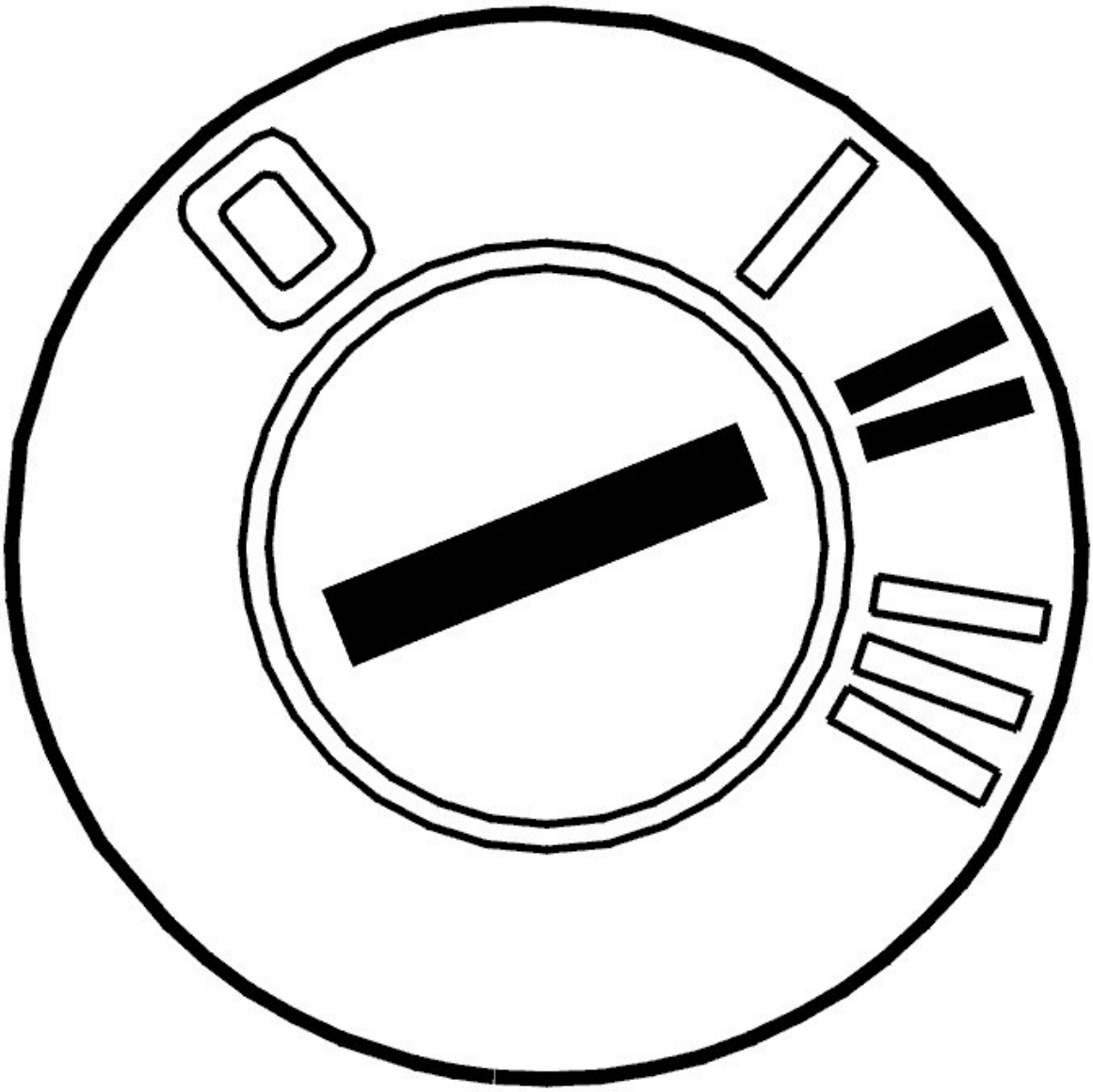
Fault symptom[s]

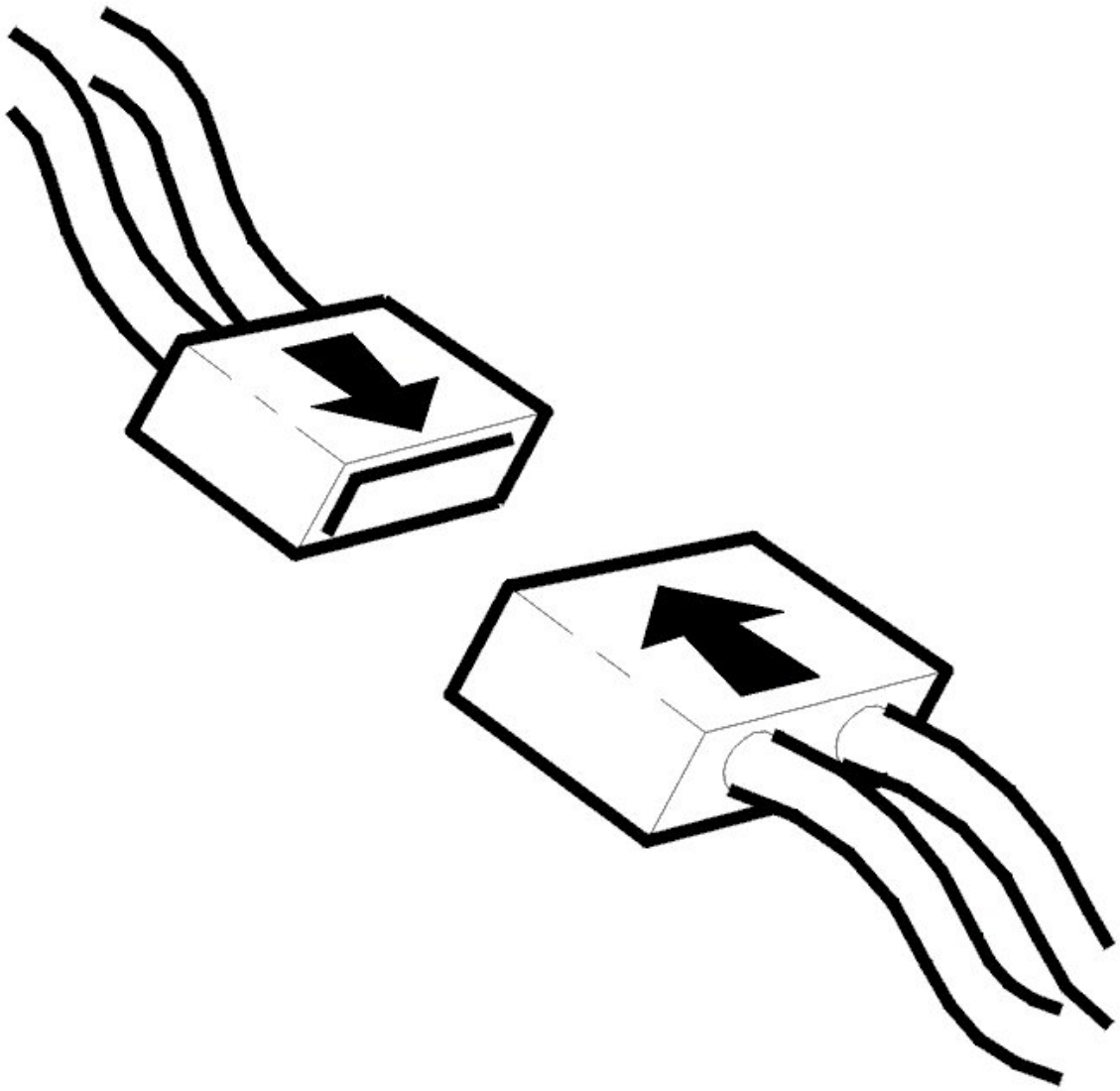
- Misting on the windows and/or door mirrors.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Signal Too High / Signal Too Low

Signal too high / Signal too low

Checking the cable





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Ignition on.

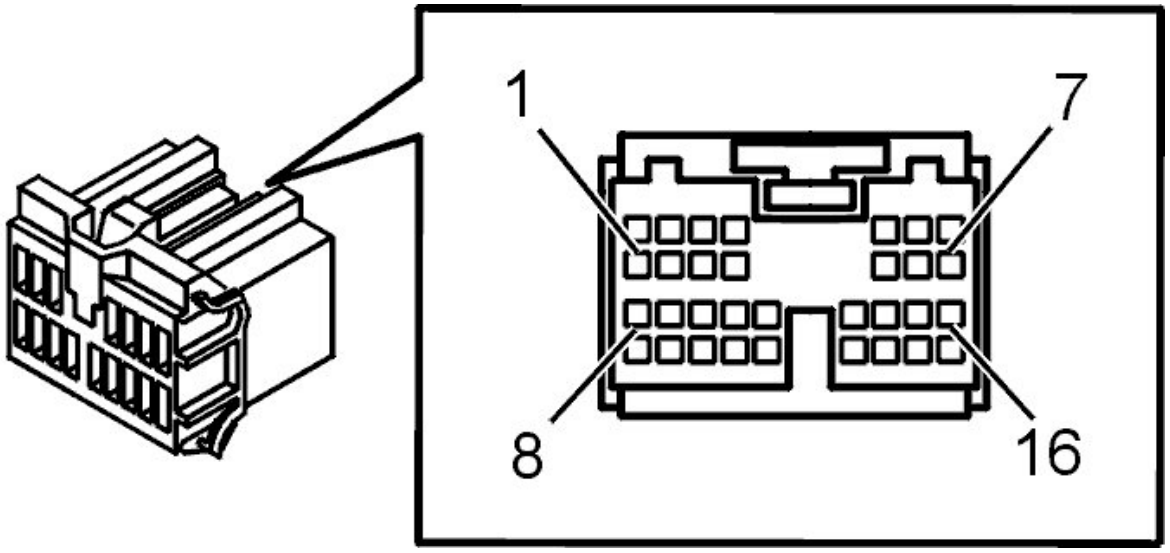
Check LIN bus 2. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #7 (#31) and #1 (#25).
If there is a short-circuit to supply voltage in LIN bus 2, continue fault-tracing by locating where the short-circuit has occurred as follows:

- Disconnect the connector on the climate control unit that connects LIN bus 2 from the climate control module (CCM) to other components on the climate control unit
- Check the section of LIN bus 2 that connects the climate control module (CCM) to the right-hand seat heating module (SHM) and the connector on the climate control unit. Take a reading on the connector for the climate control module (CCM) between terminals #7 (#31) and #1 (#25).

If the fault persists, fault-trace LIN bus 2 between the climate control module (CCM), the right-hand seat heating module (SHM) and the connector on the climate control unit. Check for a short-circuit to supply voltage.
If the fault is no longer present, fault-trace LIN bus 2 between the connector and the components on the climate control unit. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

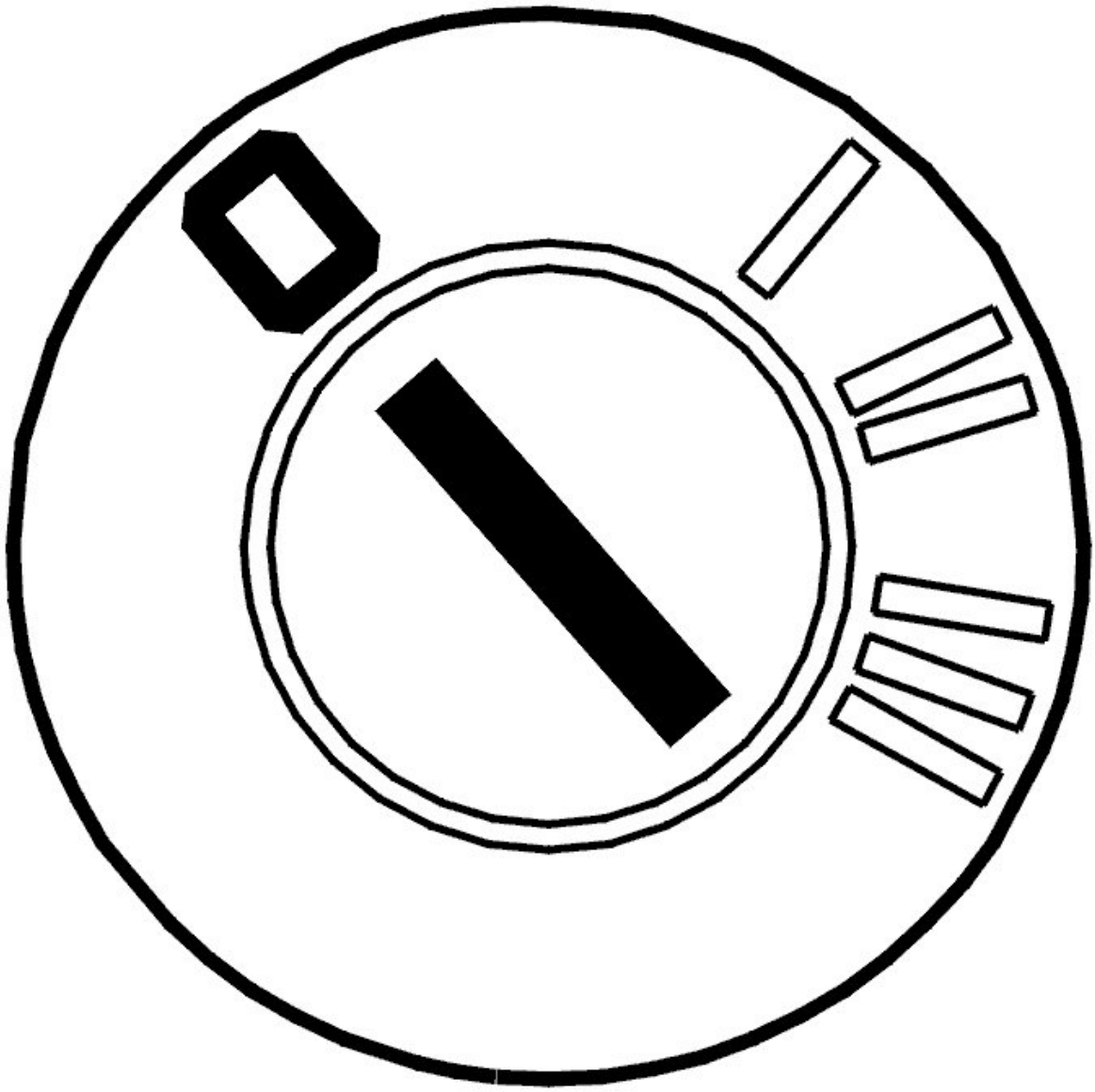


Was a fault detected?

Yes - Verification

No - Checking the cable

Checking the cable



- Ignition off

- Disconnect the connector for the climate control module (CCM).

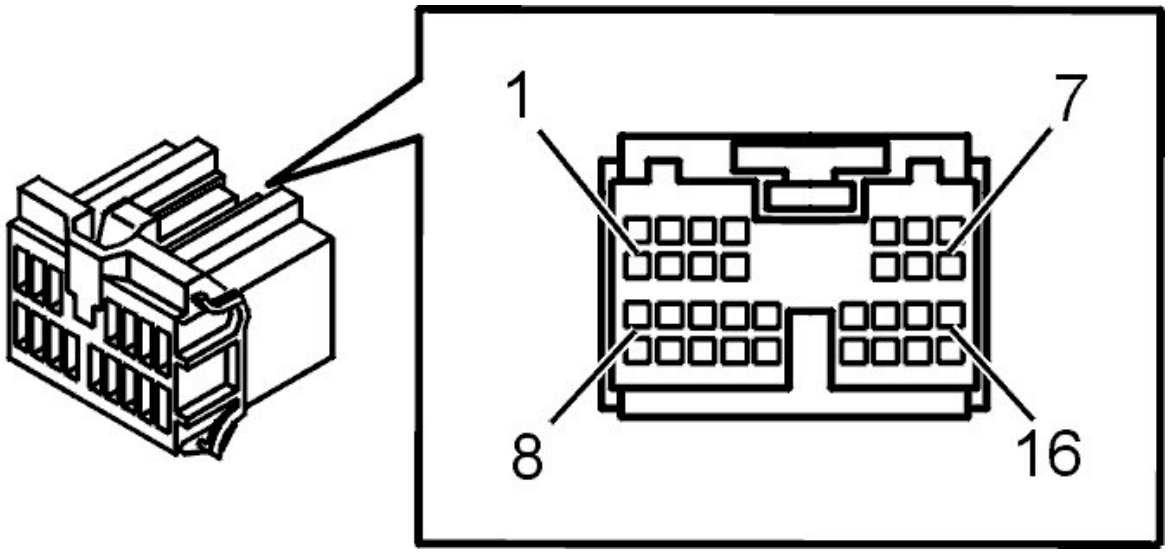
Check LIN bus 2. Check for a short-circuit to ground.
Take a reading on the connector for the climate control module (CCM) between terminals #7 (#31) and #16 (#40).
If there is a short-circuit to ground in LIN bus 2, continue fault-tracing by locating where the short-circuit has occurred as follows:

- Disconnect the connector for the climate control unit that connects LIN bus 2 from the climate control module (CCM) to the other components on the climate control unit
- Check the section of LIN bus 2 that connects the climate control module (CCM) to the left-hand seat heating module (SHM) and the connector on the climate control unit.

Take a reading on the connector for the climate control module (CCM) between terminals #7 (#31) and #16 (#40).
If the fault persists, fault-trace LIN bus 2 between the climate control module (CCM), the left-hand seat heating module (SHM) and the connector on the climate control unit. Check for a short-circuit to ground.
If the fault is no longer present, fault-trace LIN bus 2 between the connector and the components of the climate control unit. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



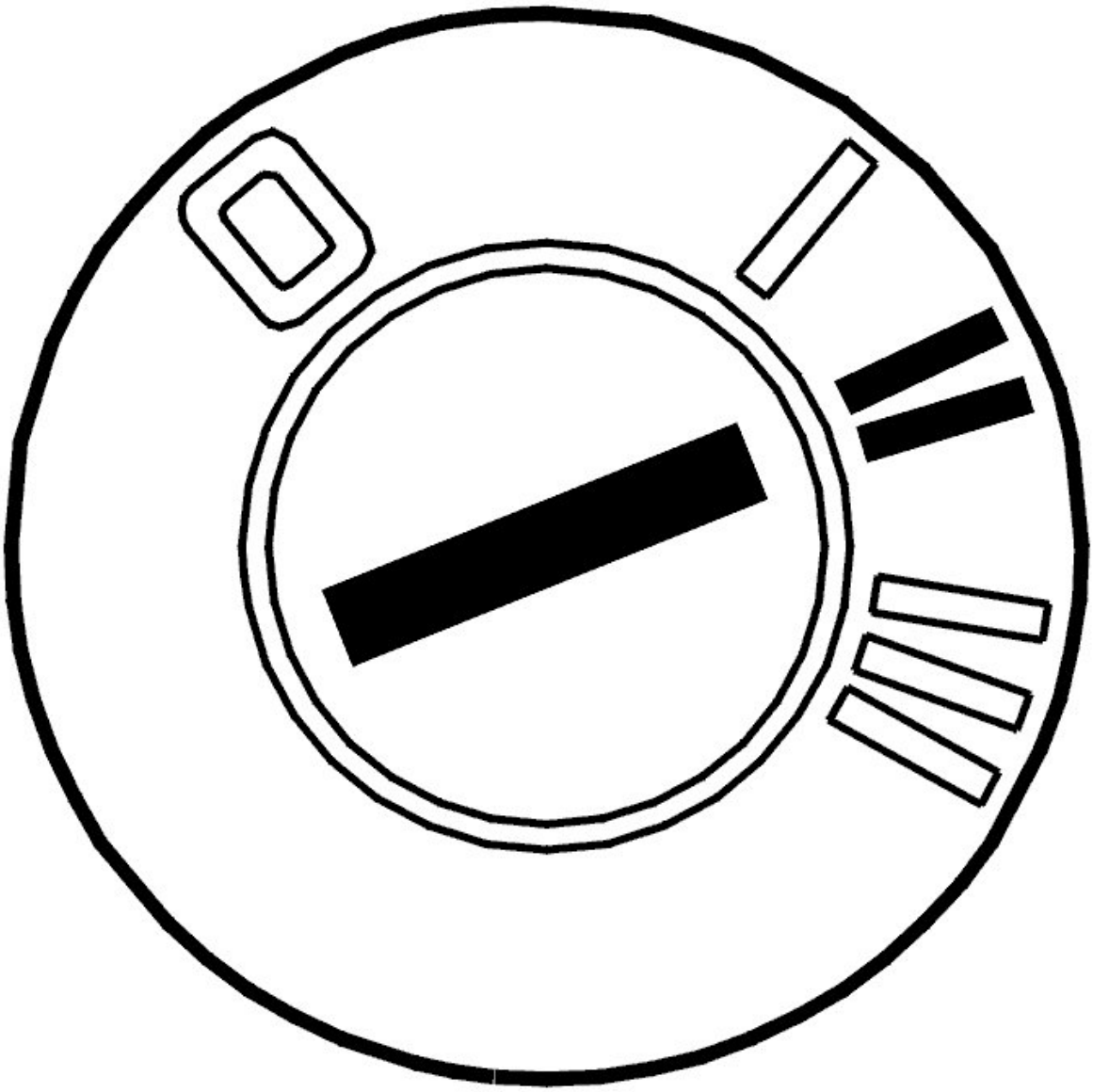
Continue - Verification

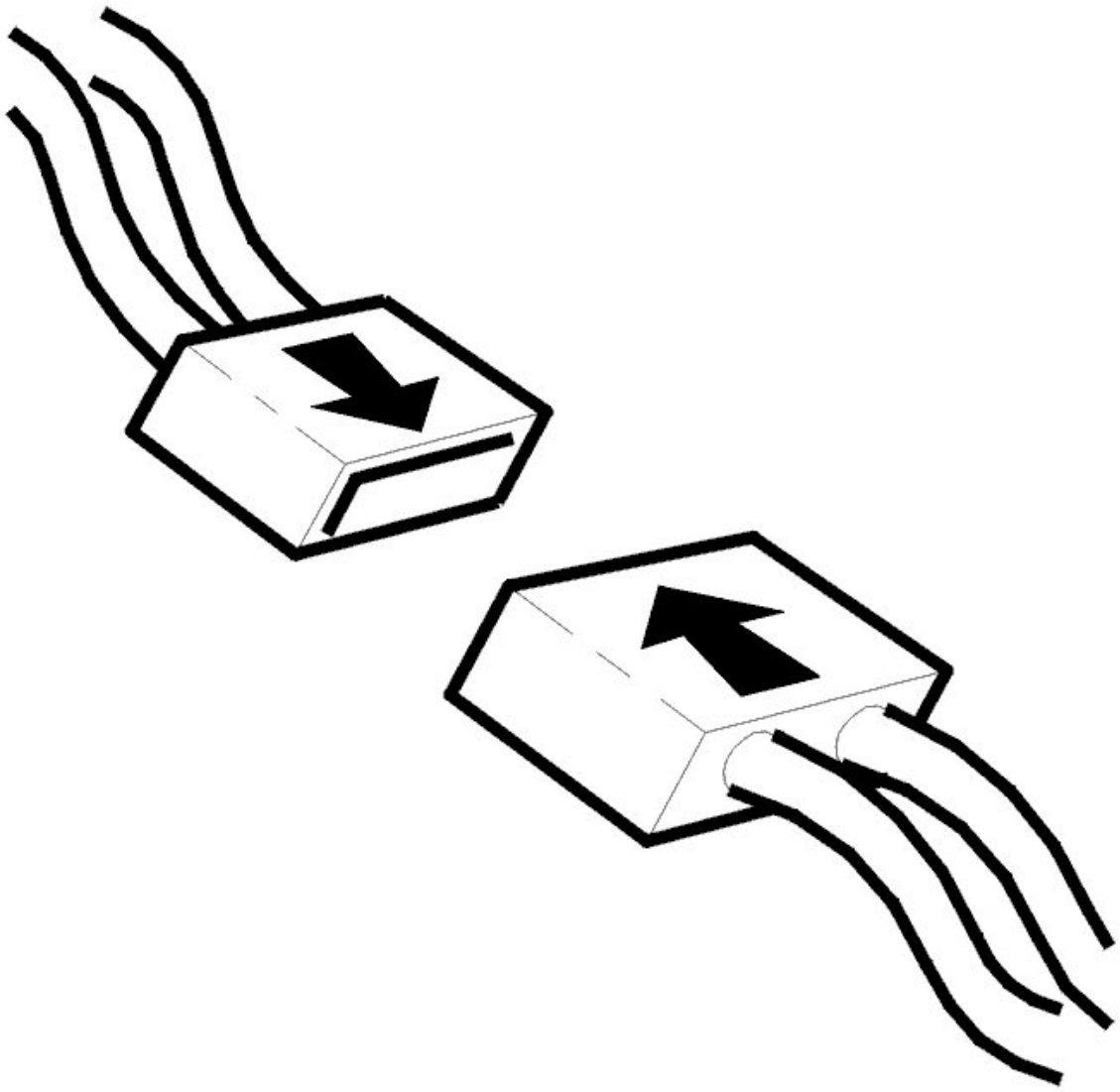
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

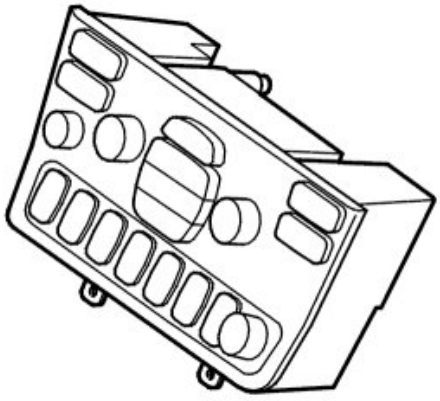
FAULT FOUND - Fault Found

Attempt New Test - Checking the cable

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD22

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that data that is sent on LIN bus 2 is incorrect.
The following components communicate with the climate control module (CCM) via LIN bus 2:

- damper motor module (DMM) defroster

- damper motor module (DMM) temperature right (only ECC)
- damper motor module (DMM) recirculation (only on left-hand drive cars)
- air quality sensor (AQS) (only on left-hand drive cars)
- seat heating module (SHM) right.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

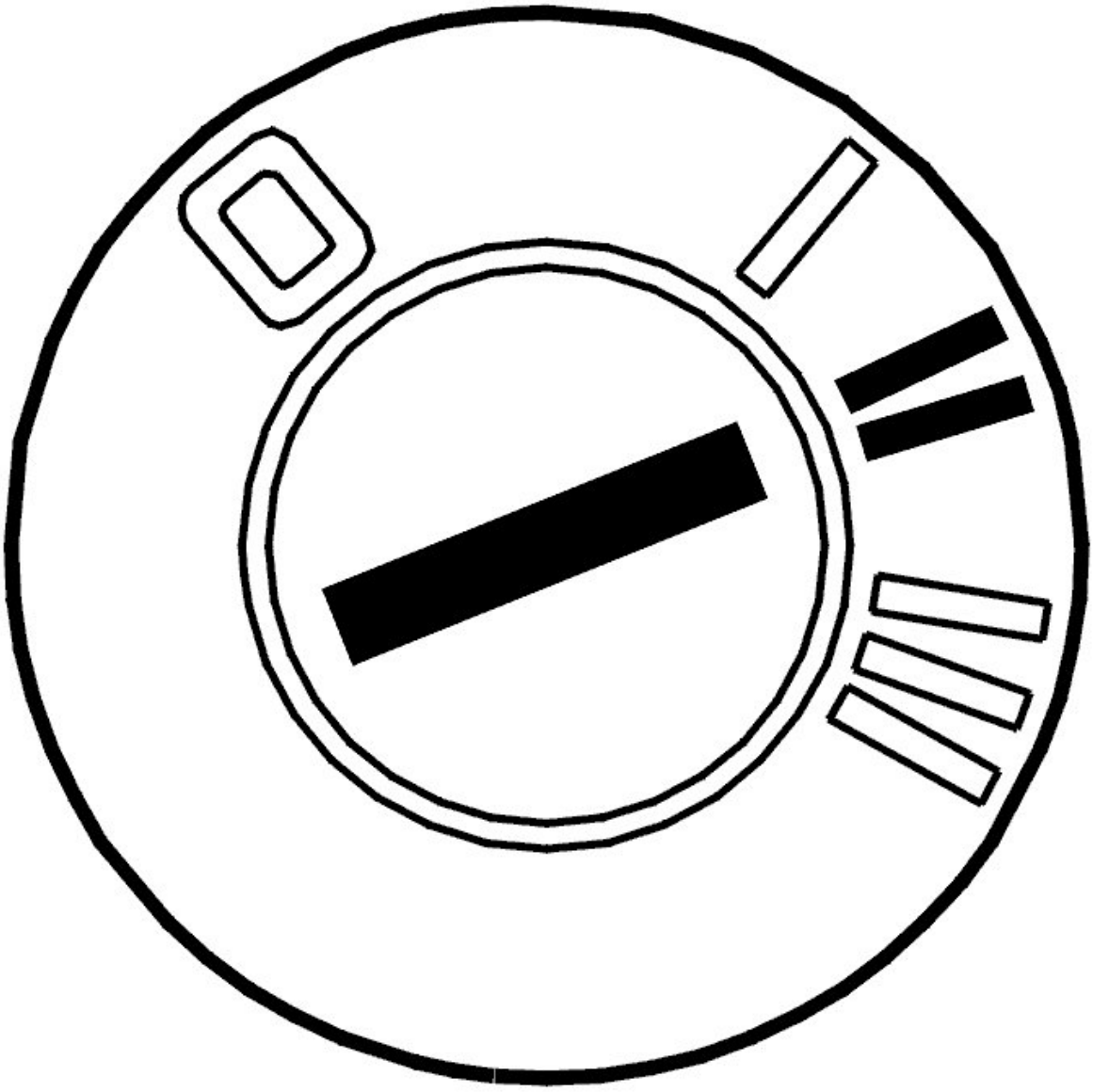
Possible source
- Incorrect data during communication on LIN bus 2.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.
- Poor heating in the passenger compartment.
- The front seat heating does not function.
- Poor air quality in the passenger compartment.

Faulty Check Sum

Faulty check sum

Checking components



- Ignition on.

The climate control module (CCM) has diagnosed that two or more damper motor modules (DMM) have the same identity on LIN bus 2.
This may be because one damper motor module (DMM) has been installed incorrectly.
After replacing a damper motor module (DMM), it must be allocated a correct identity by the climate control module (CCM). This is performed during identification of the damper motors on the LIN bus.

If a damper motor module (DMM) is installed that already has an identity allocated to it, this can lead to a conflict on the LIN bus. Remedy by correctly identifying the damper motor.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

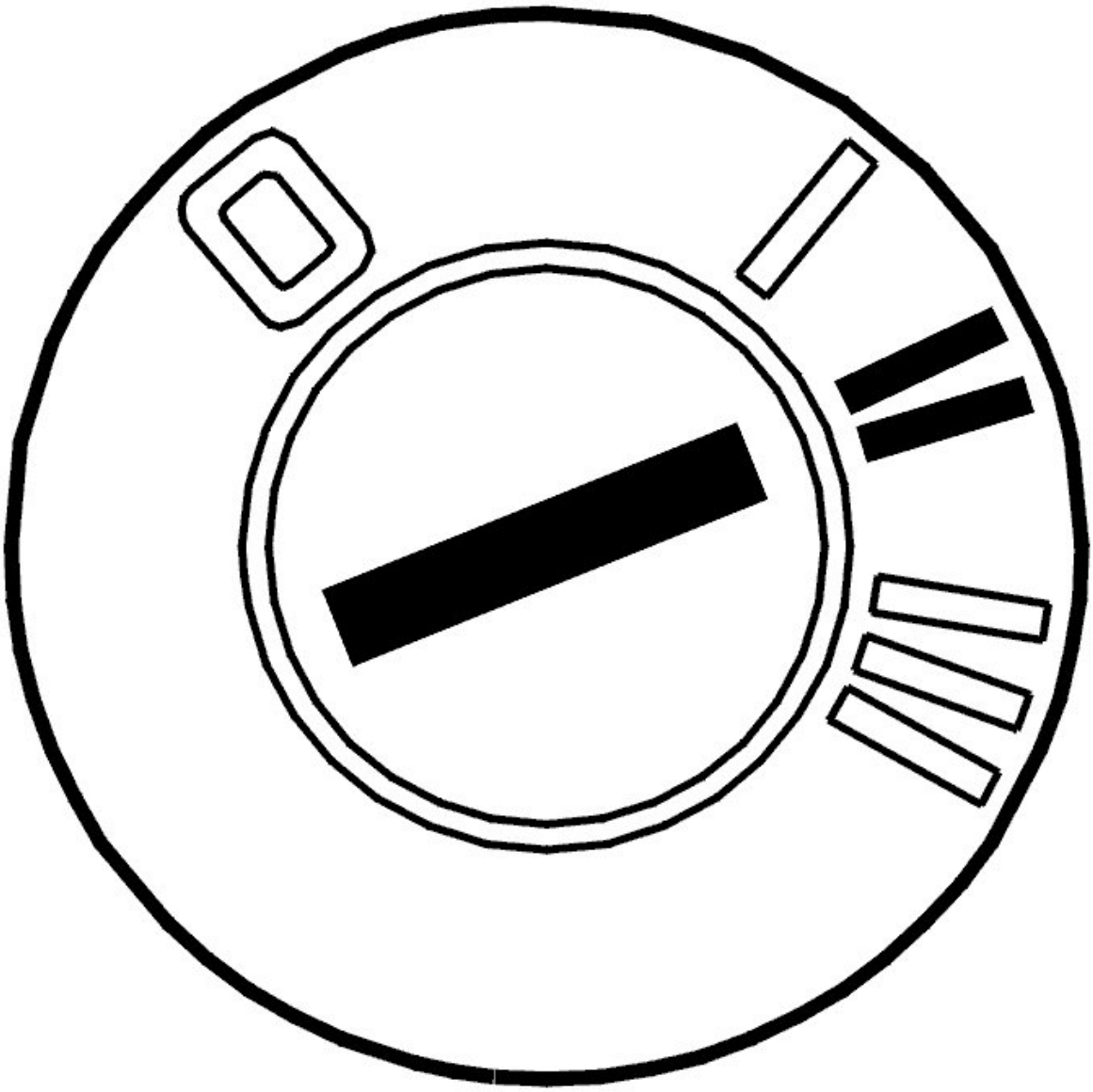
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - **DONE**

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

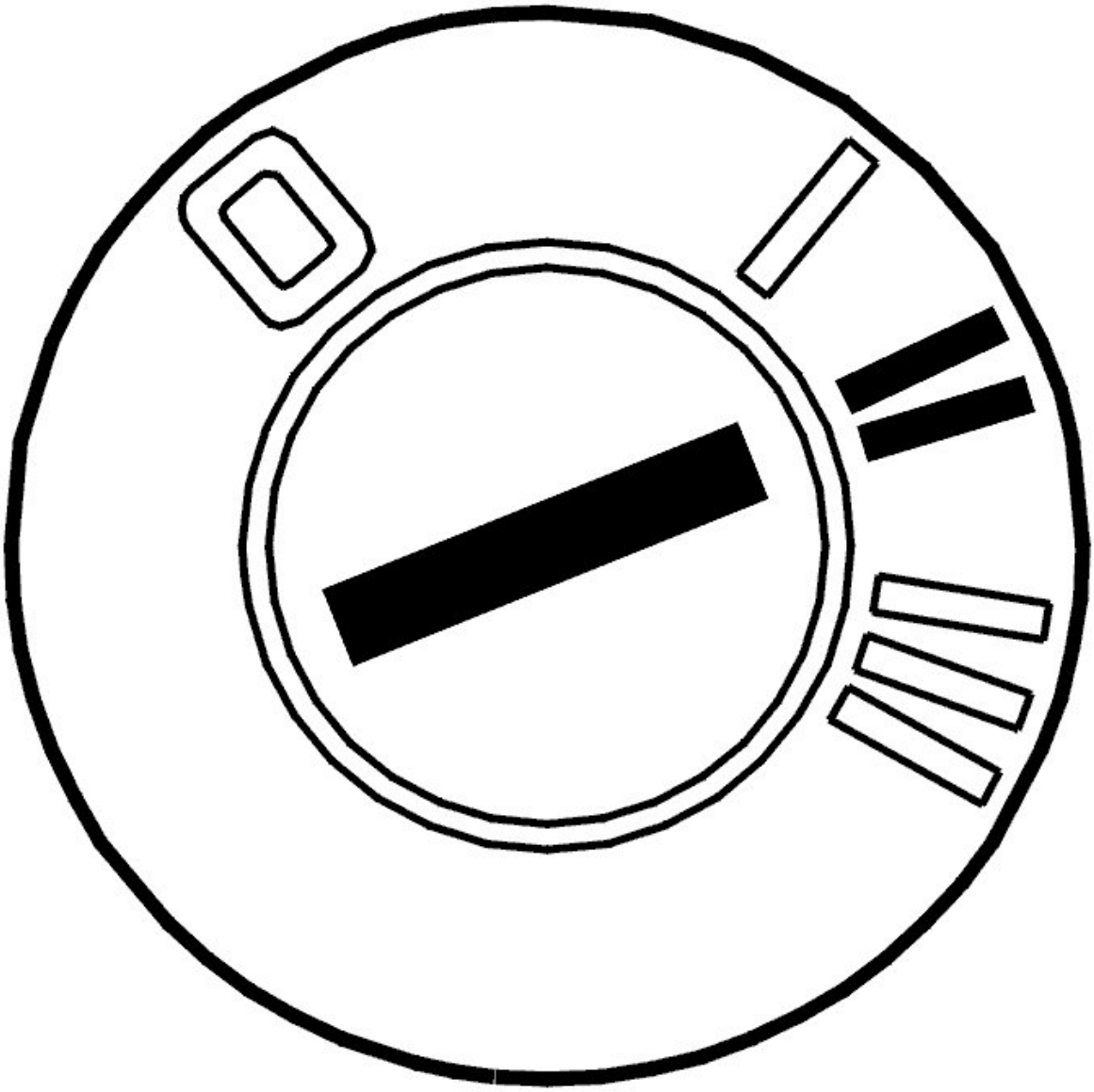
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

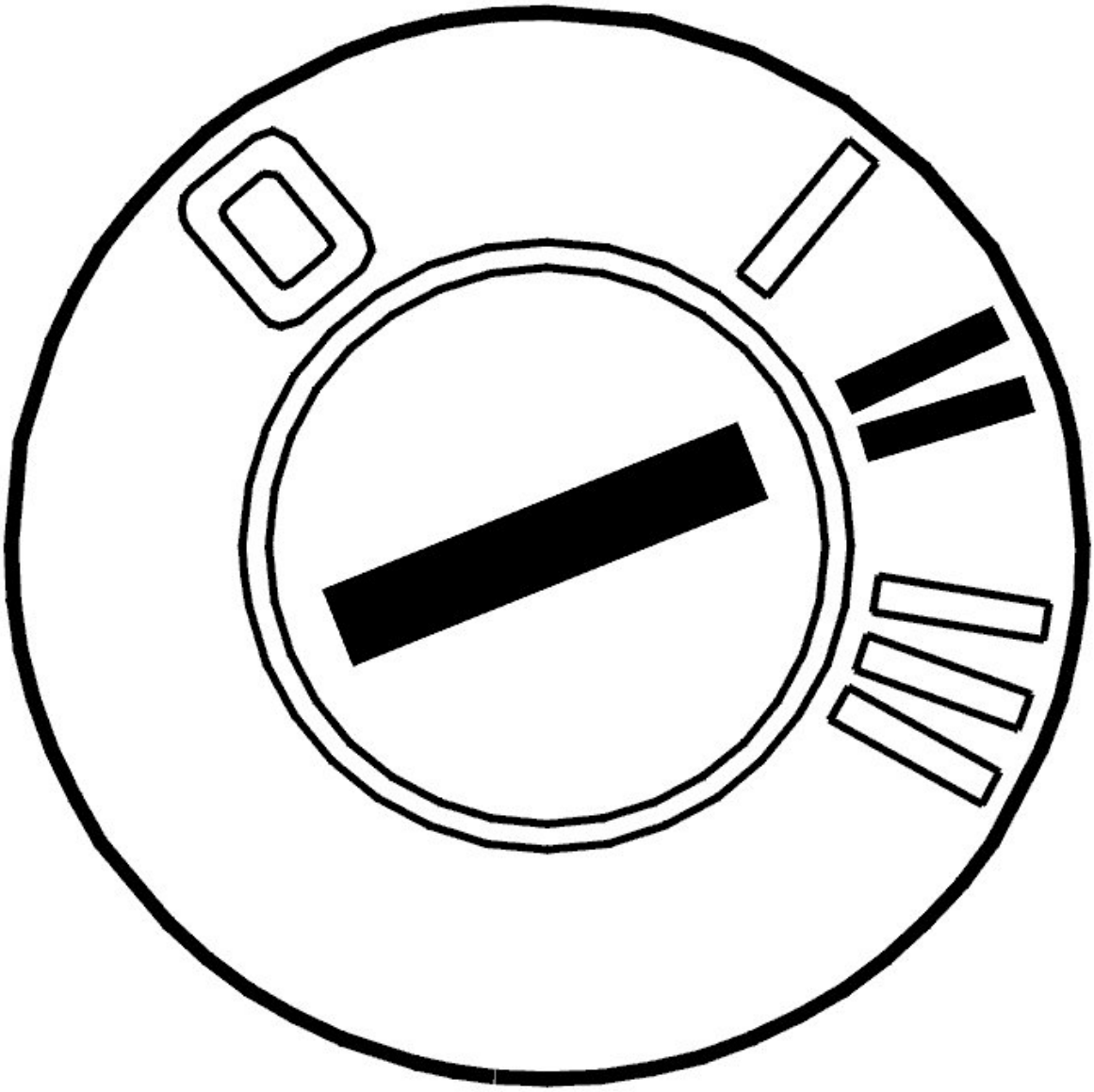
DONE - Verification

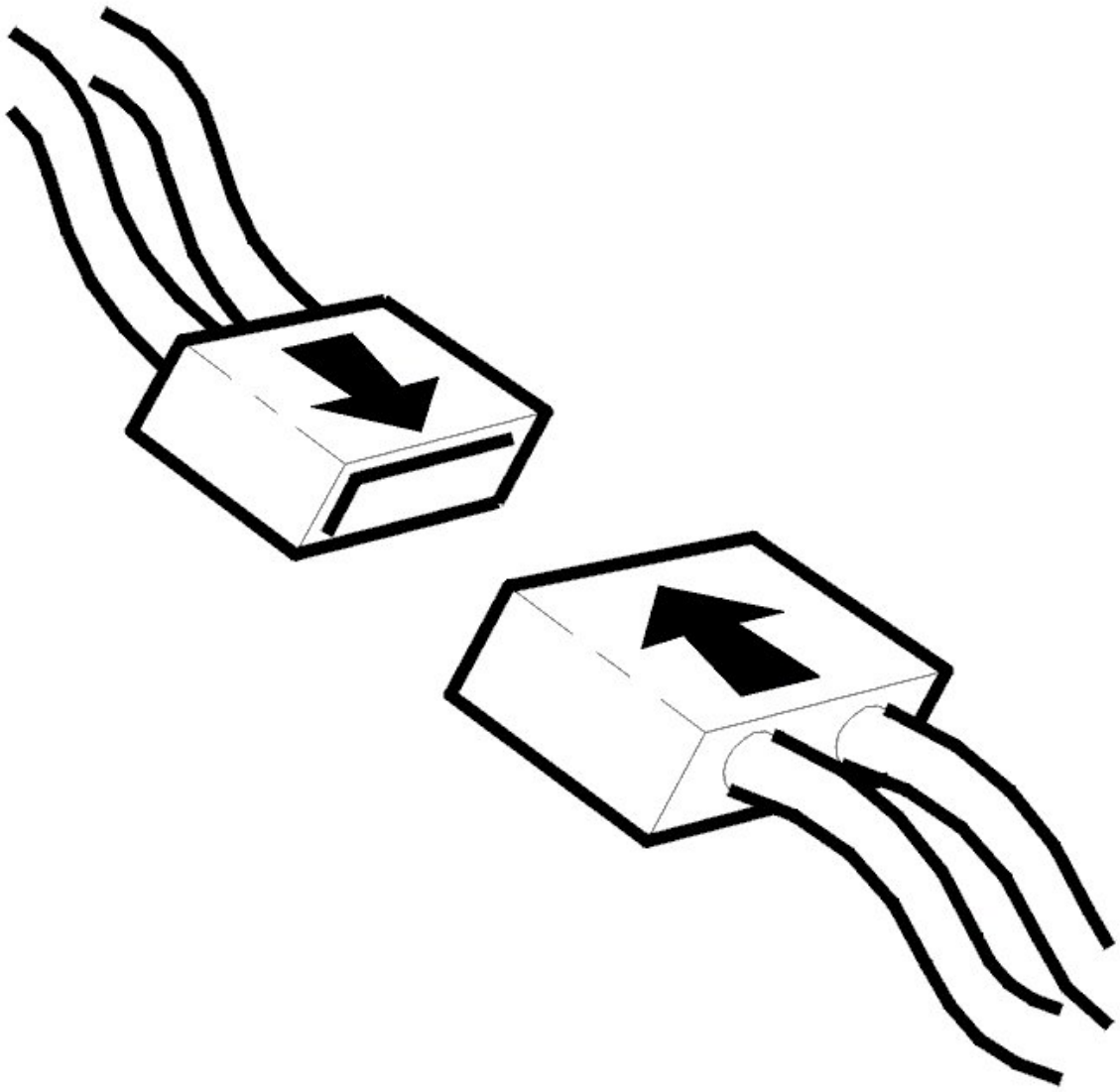
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

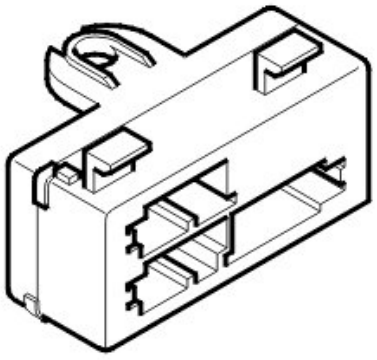
FAULT FOUND - Fault Found

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD30

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the right-hand seat heater and the climate control module (CCM) on LIN bus 2.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 2 (CCM-DD30 -

CCM-DD34) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.
The diagnostic trouble code (DTC) can only be diagnosed for the climate control module (CCM) when seat heating is installed in the car.

Substitute value
- None.

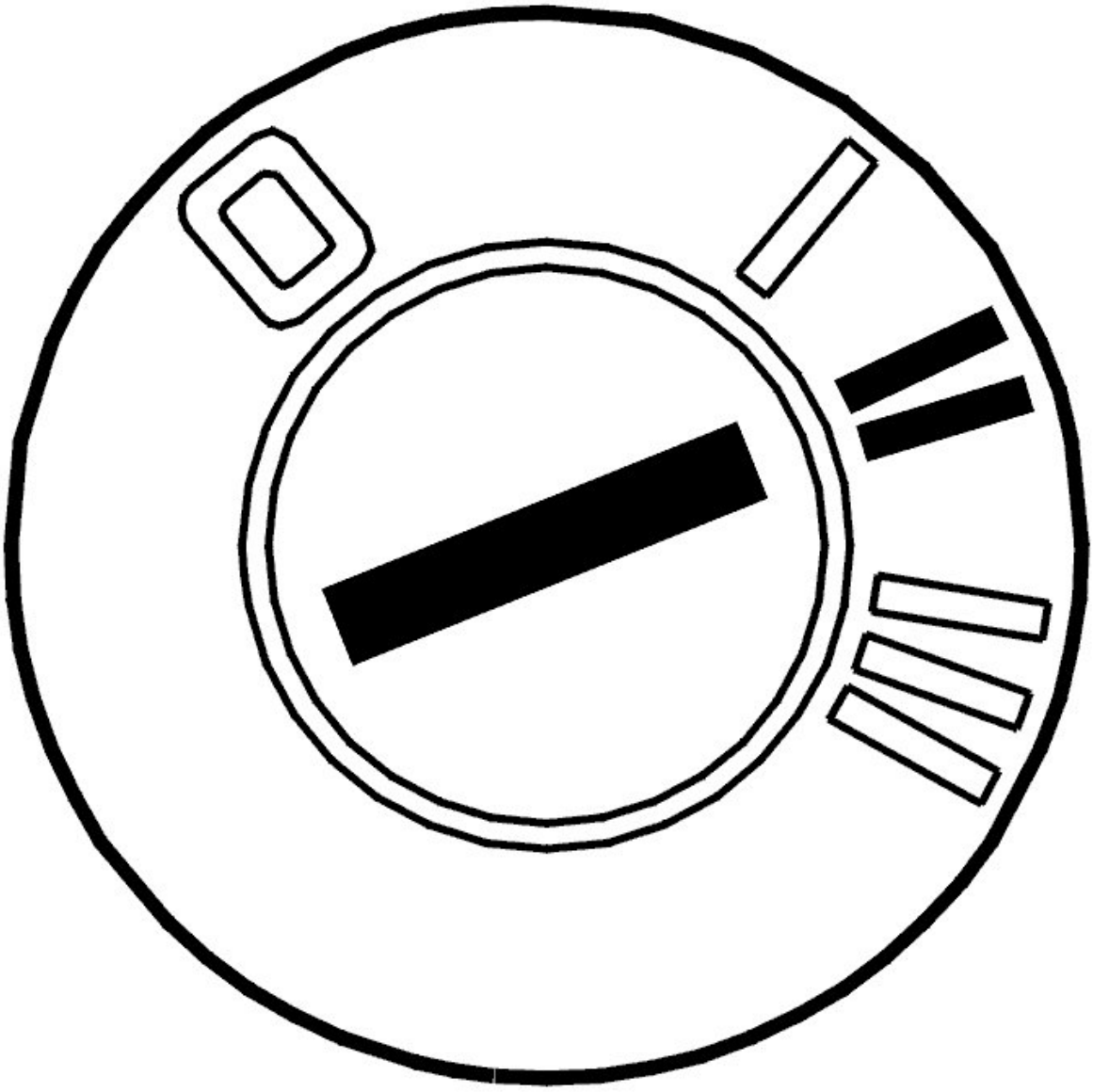
Possible source
- Open-circuit on LIN bus 2 between the climate control module (CCM) and the right-hand seat heating module (SHM)
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- The front seat heating does not function.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

Check that the fuse for the Seat heating module (SHM) is intact.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

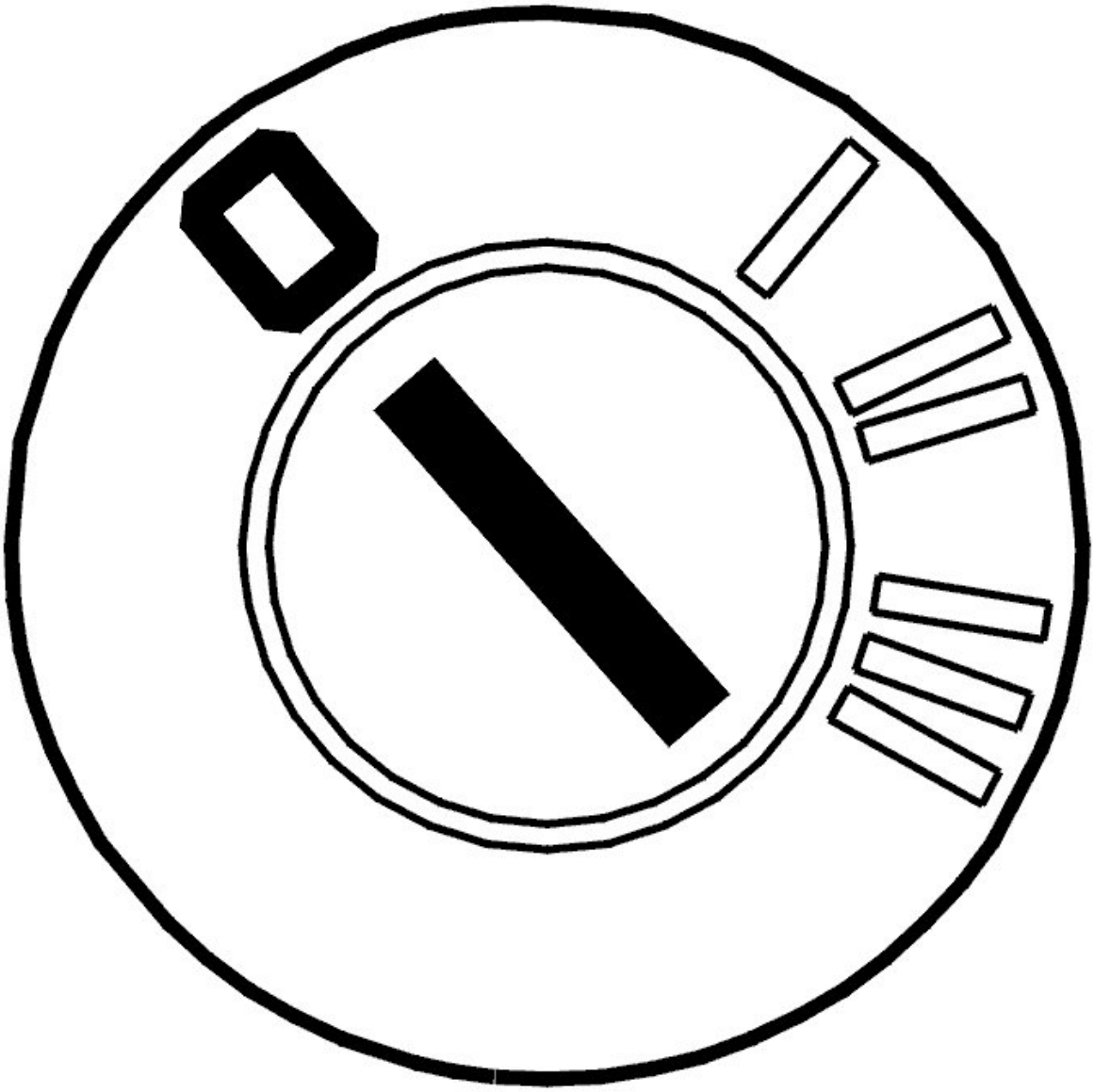
1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components on LIN bus 2 (CCM-DD30-CCM-DD34)
2. The diagnostic trouble code (DTC) is not stored together with diagnostic trouble codes (DTCs) for other components on LIN bus 2.

Select an alternative.

1 - Checking LIN bus 2 and connector

2 - Checking the wiring and component

Checking LIN bus 2 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 2 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) right. Check for an open-circuit.
Take readings between:

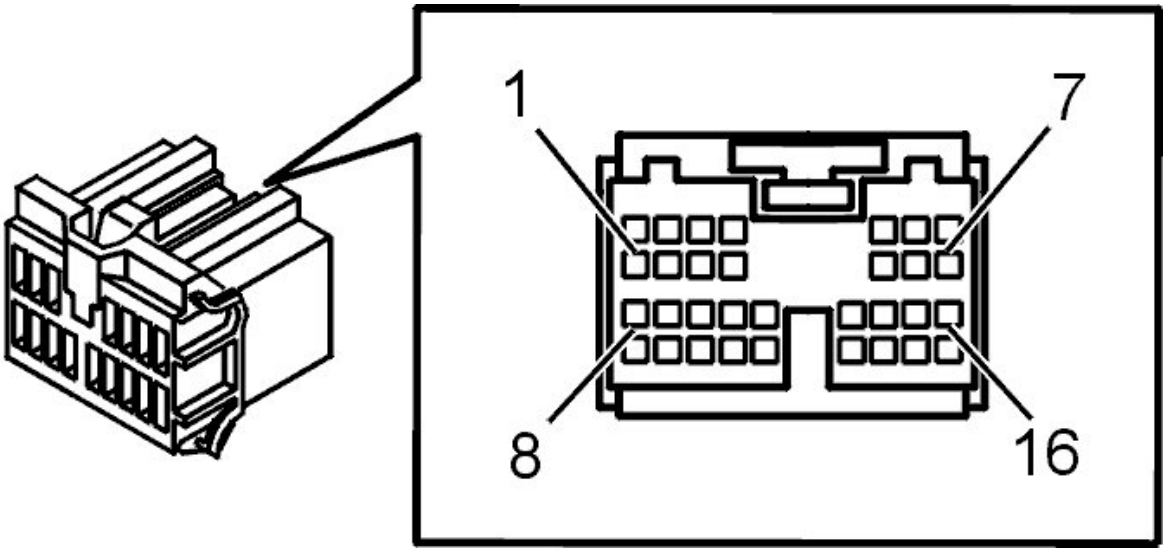
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5
- The connector for the climate control module (CCM) terminal #7 (#31) and connector A for the seat heating module (SHM) right terminal #2.

Remedy as necessary.

Other information:

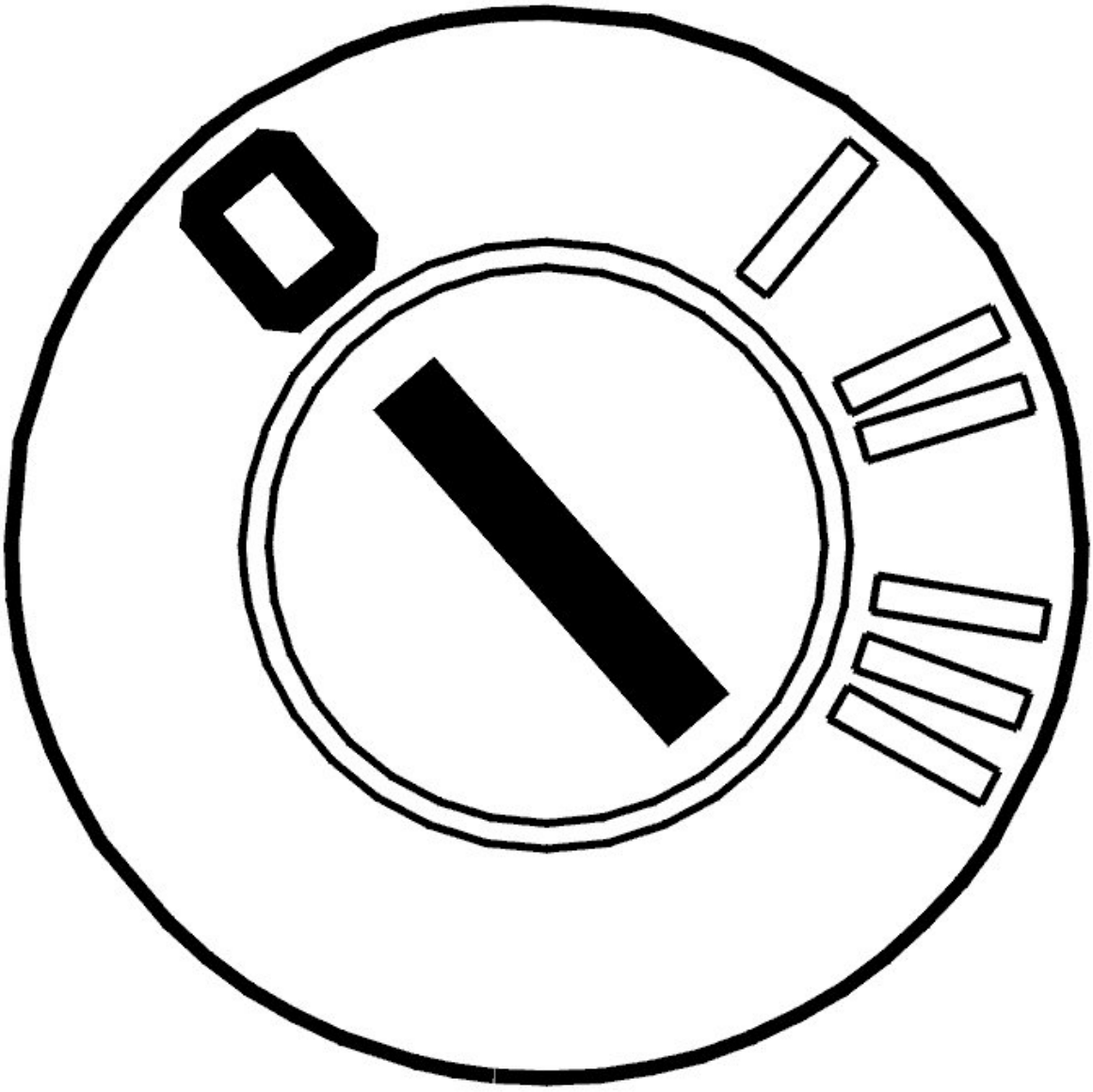
- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Signal too low See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/CEM Codes (Central Electronic Module)/CEM-8A21/Signal Too Low
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair

- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component

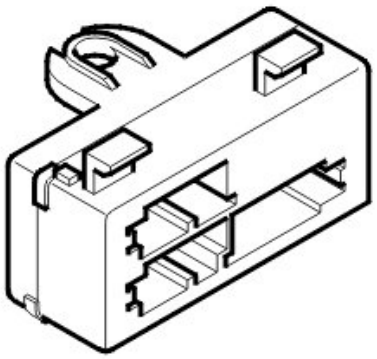


- Ignition off
- Disconnect connector A for the seat heating module (SHM) right.

Check connector A for the seat heating module (SHM). Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the seat heating module (SHM) is connected to power supply and ground.
Measure the voltage at connector A between terminals #1 and #4.
Check LIN bus 2 by taking a reading between connector A for seat heating module (SHM) terminal #2 and the connector for climate control module (CCM) terminal A#7 (#31). Check for an open-circuit.
Try replacing the seat heating module (SHM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



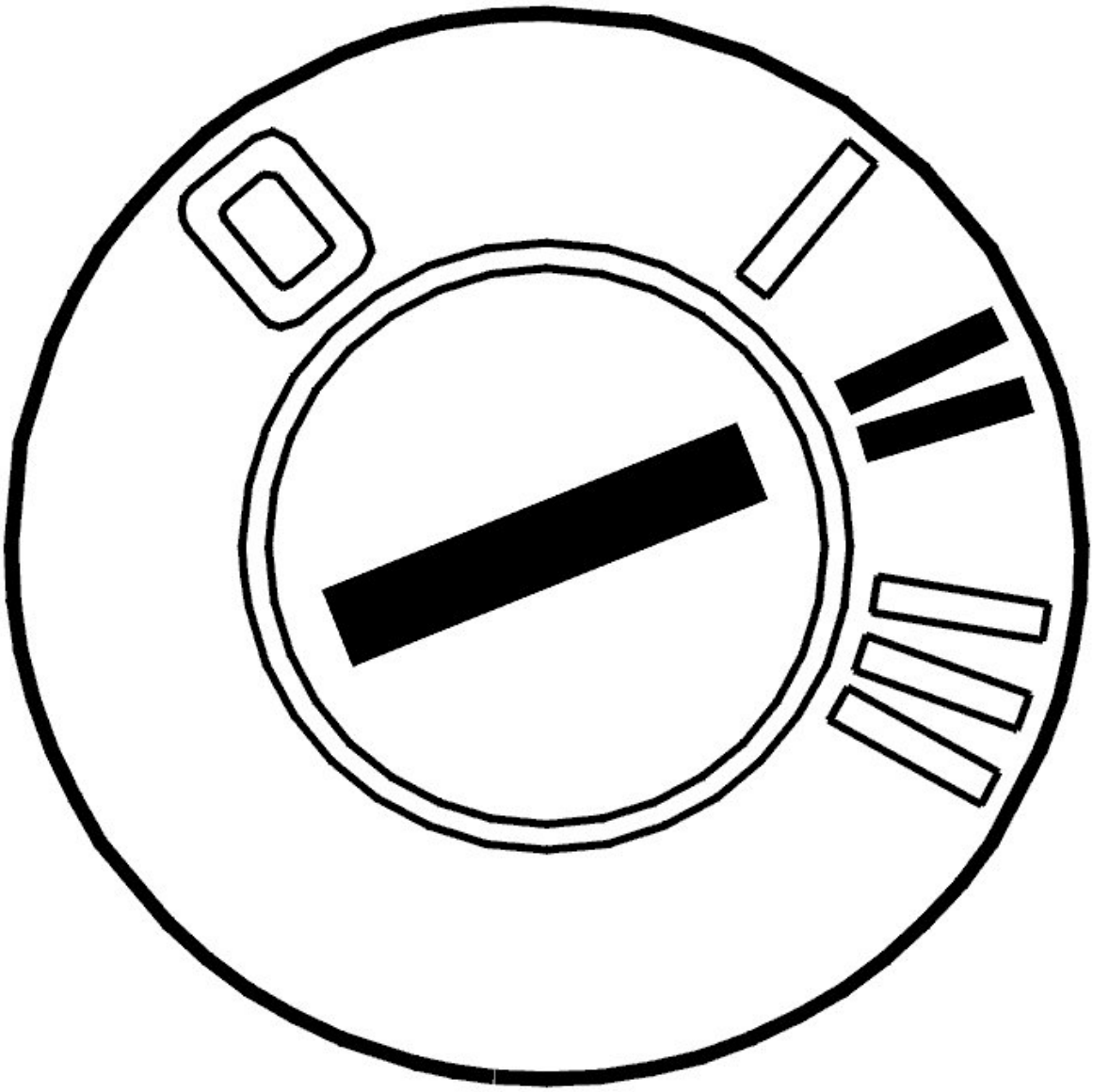
Continue - Verification

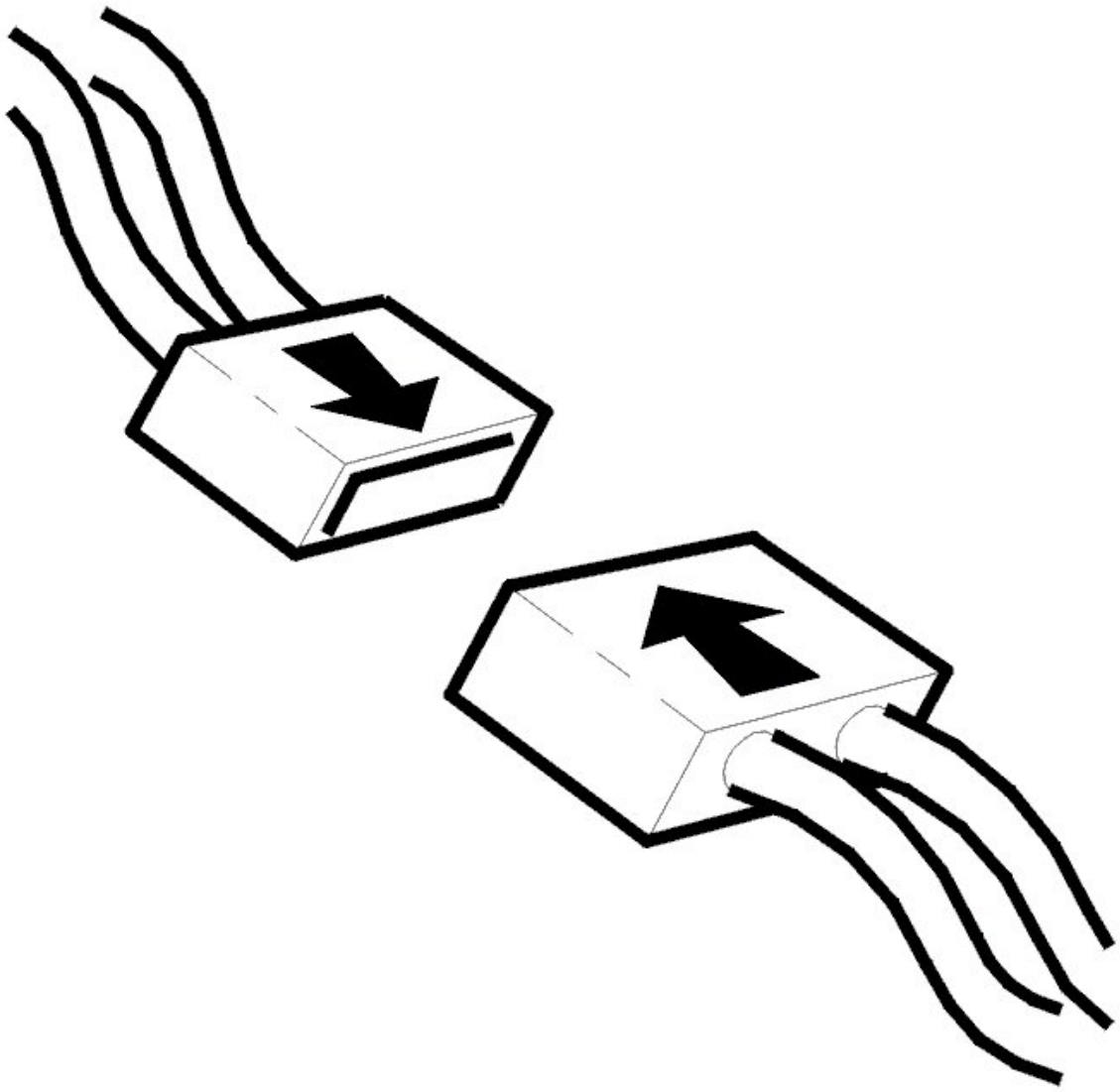
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

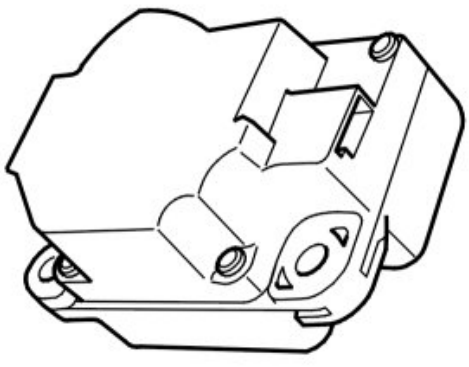
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD31

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the damper motor recirculation and the climate control module (CCM) on LIN bus 2.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 2 (CCM-DD30 -

CCM-DD34) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

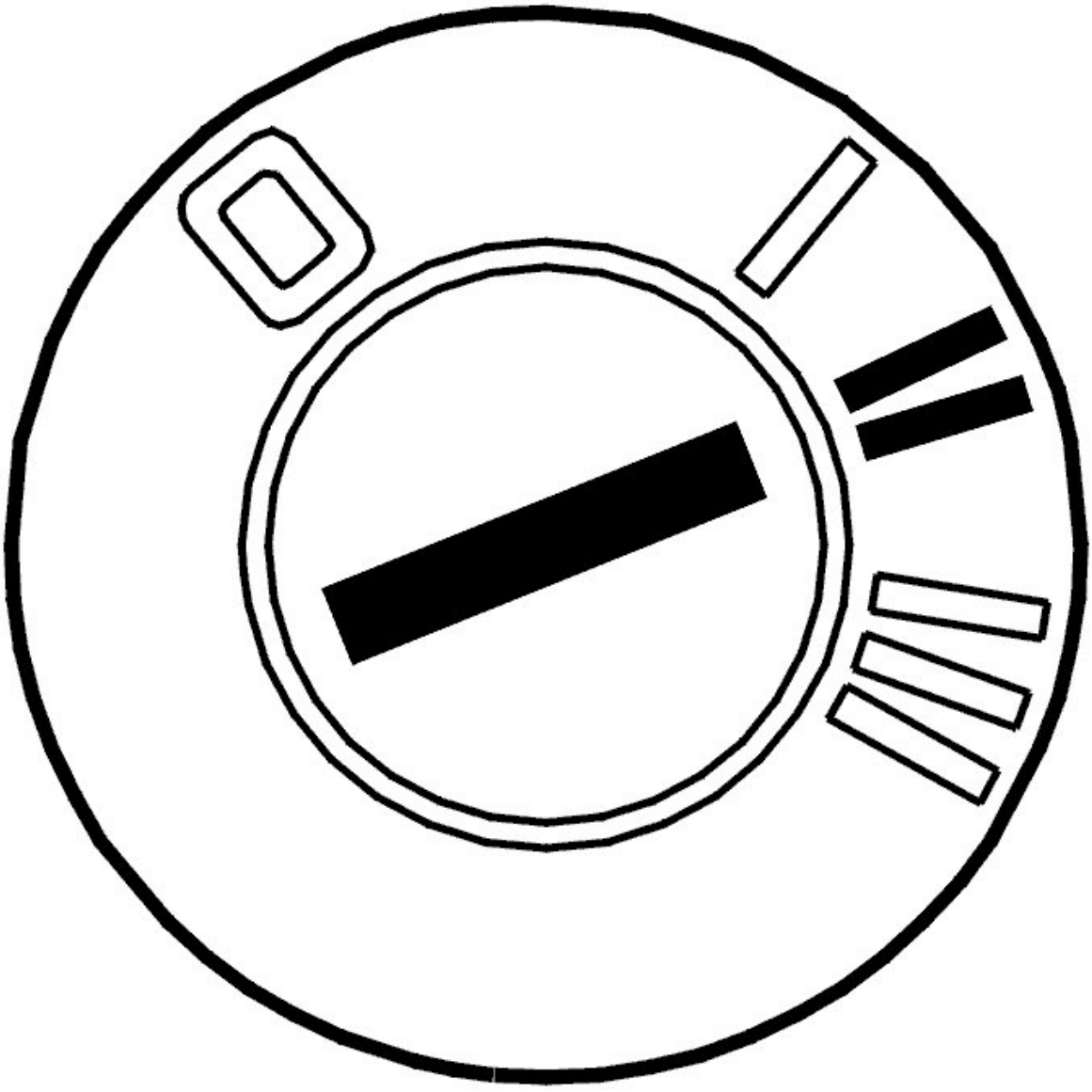
Possible source
- Open-circuit on LIN bus 2 between the climate control module (CCM) and the damper motor module (DMM) recirculation
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- No recirculation.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is together with diagnostic trouble codes (DTCs) for components only on LIN bus 2 (CCM-DD30-CCM-DD34)
3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

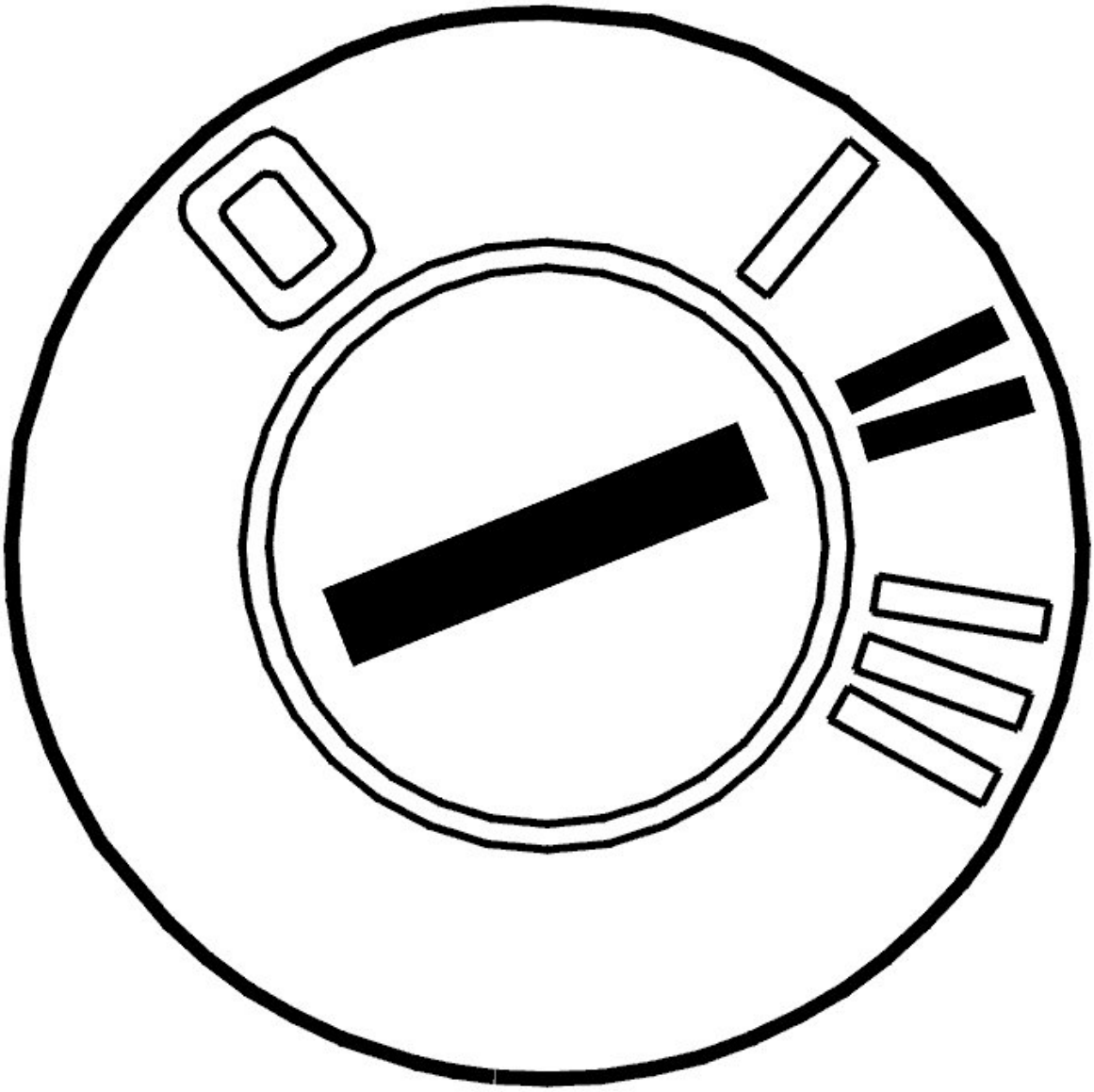
Select an alternative.

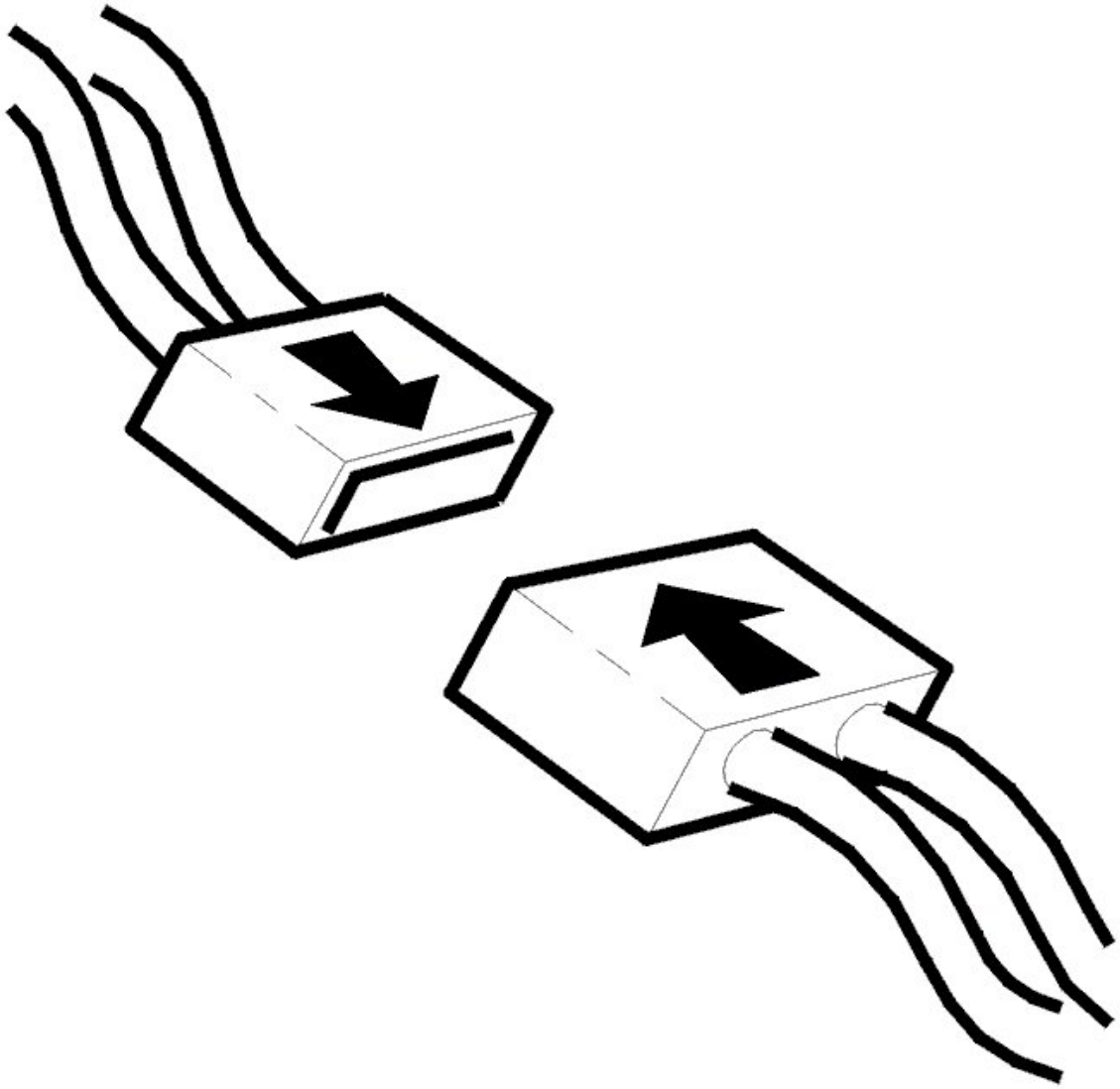
1 - Checking the connectors and wiring

2 - Checking LIN bus 2 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

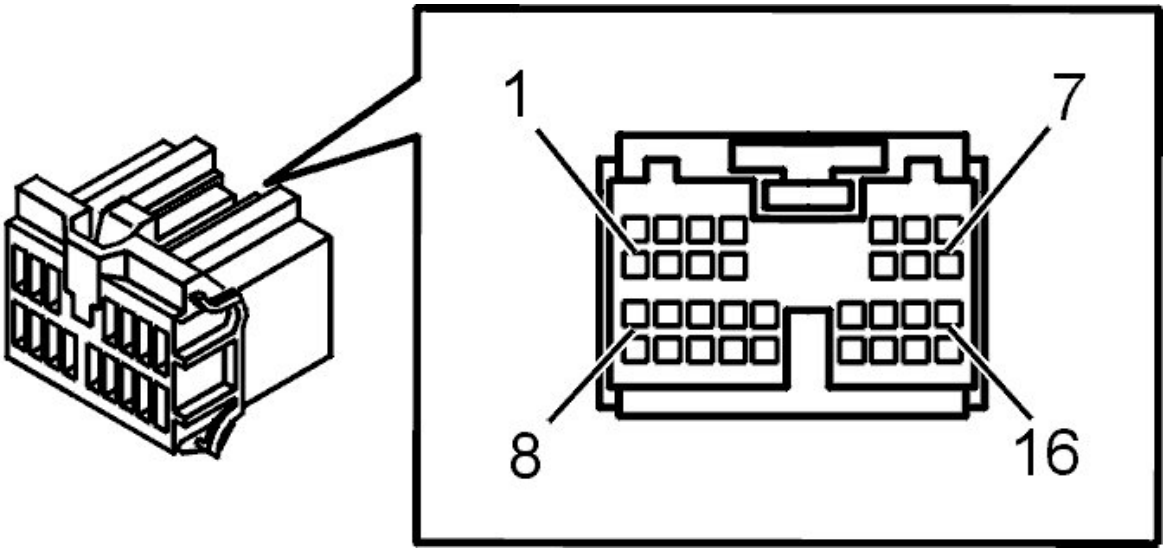
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

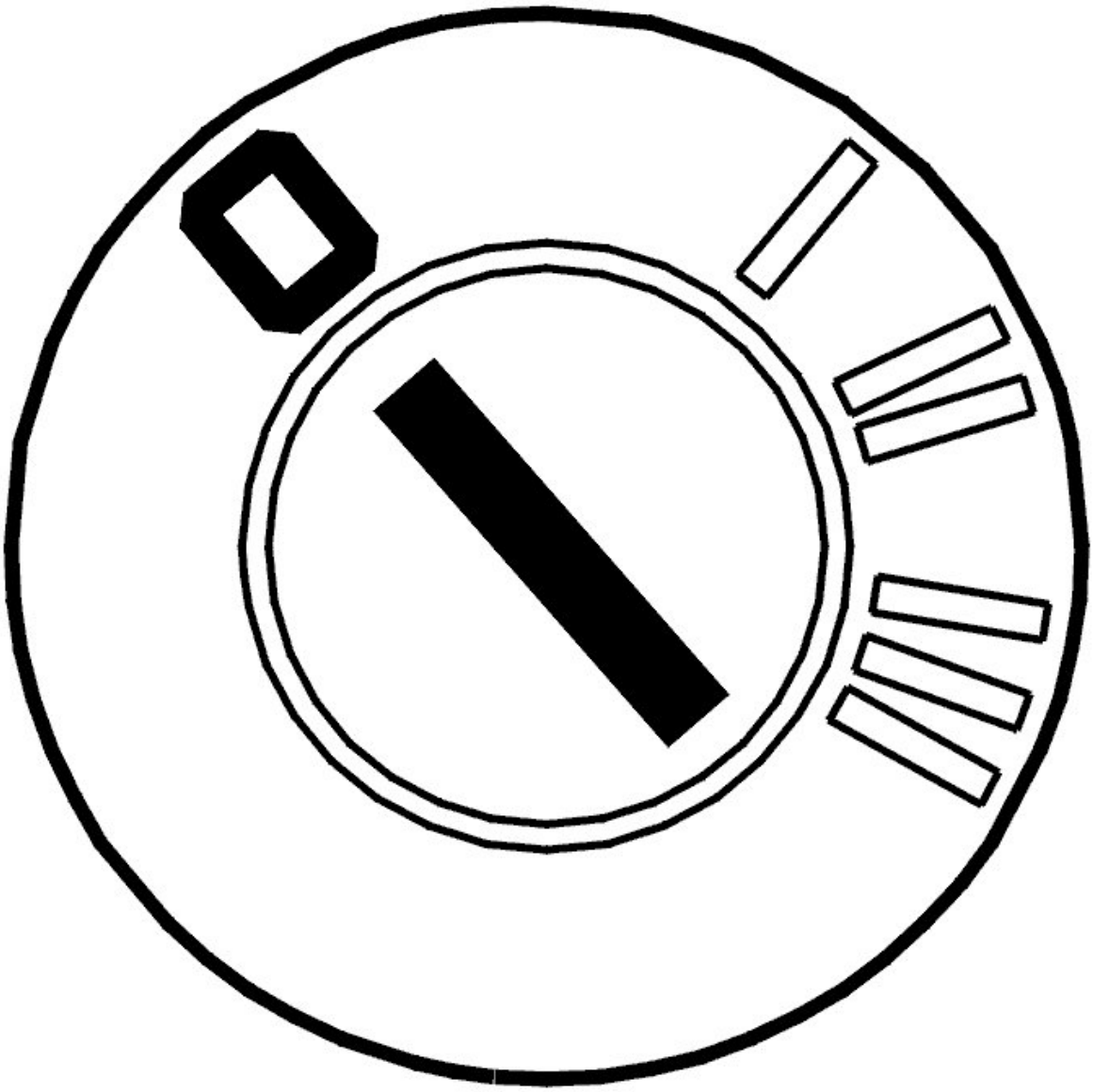
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 2 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

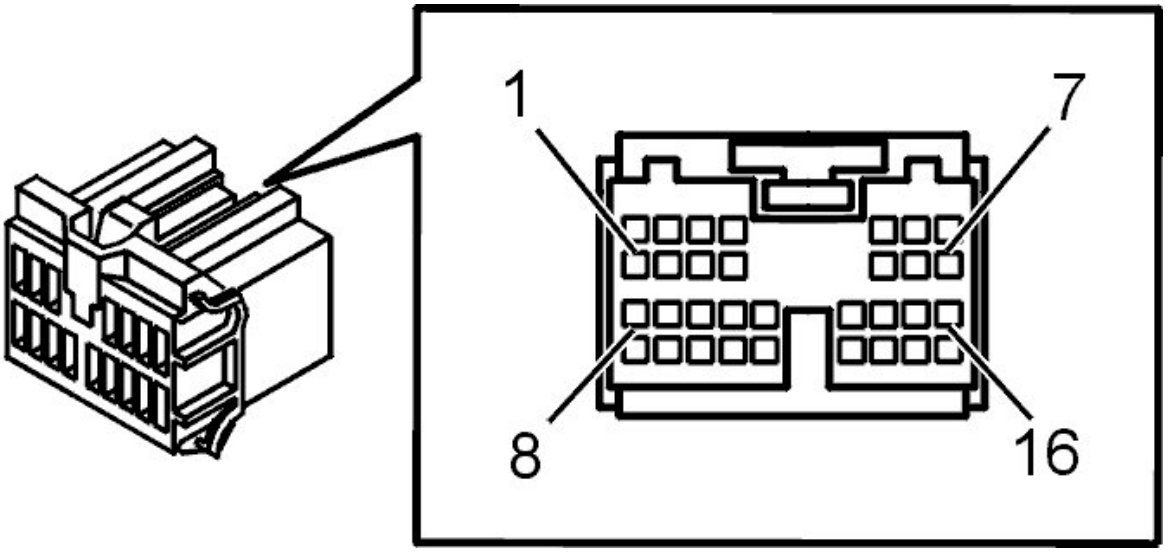
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 2 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) right. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5
- The connector for the climate control module (CCM) terminal #7 (#31) and connector A for the seat heating module (SHM) right terminal #2.

Check LIN bus 2 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

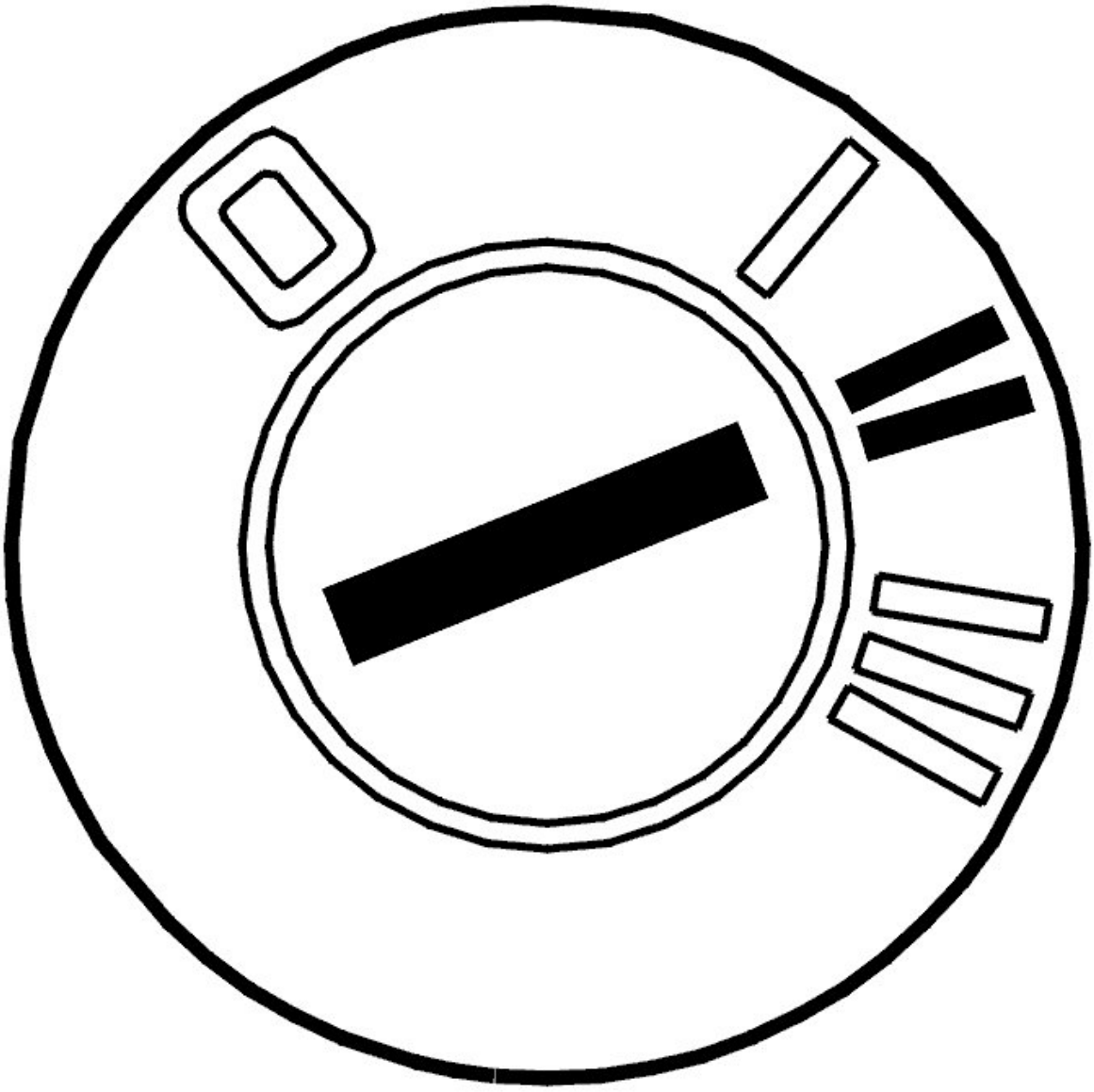
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



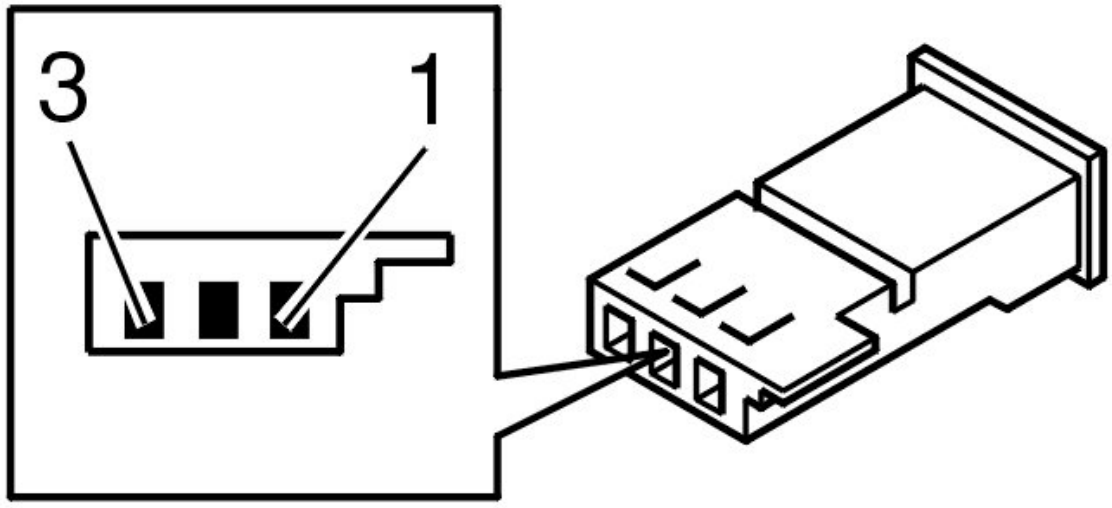
- Ignition off
- Disconnect the connector for the damper motor module (DMM) for recirculation
- Ignition on.

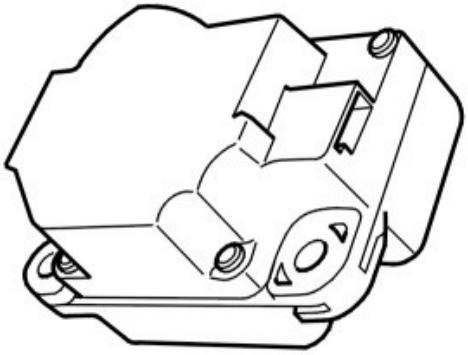
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3
Check LIN bus 2 by taking a reading between the damper motor module (DMM) connector terminal #2 and the connector for the climate control unit terminal #5. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

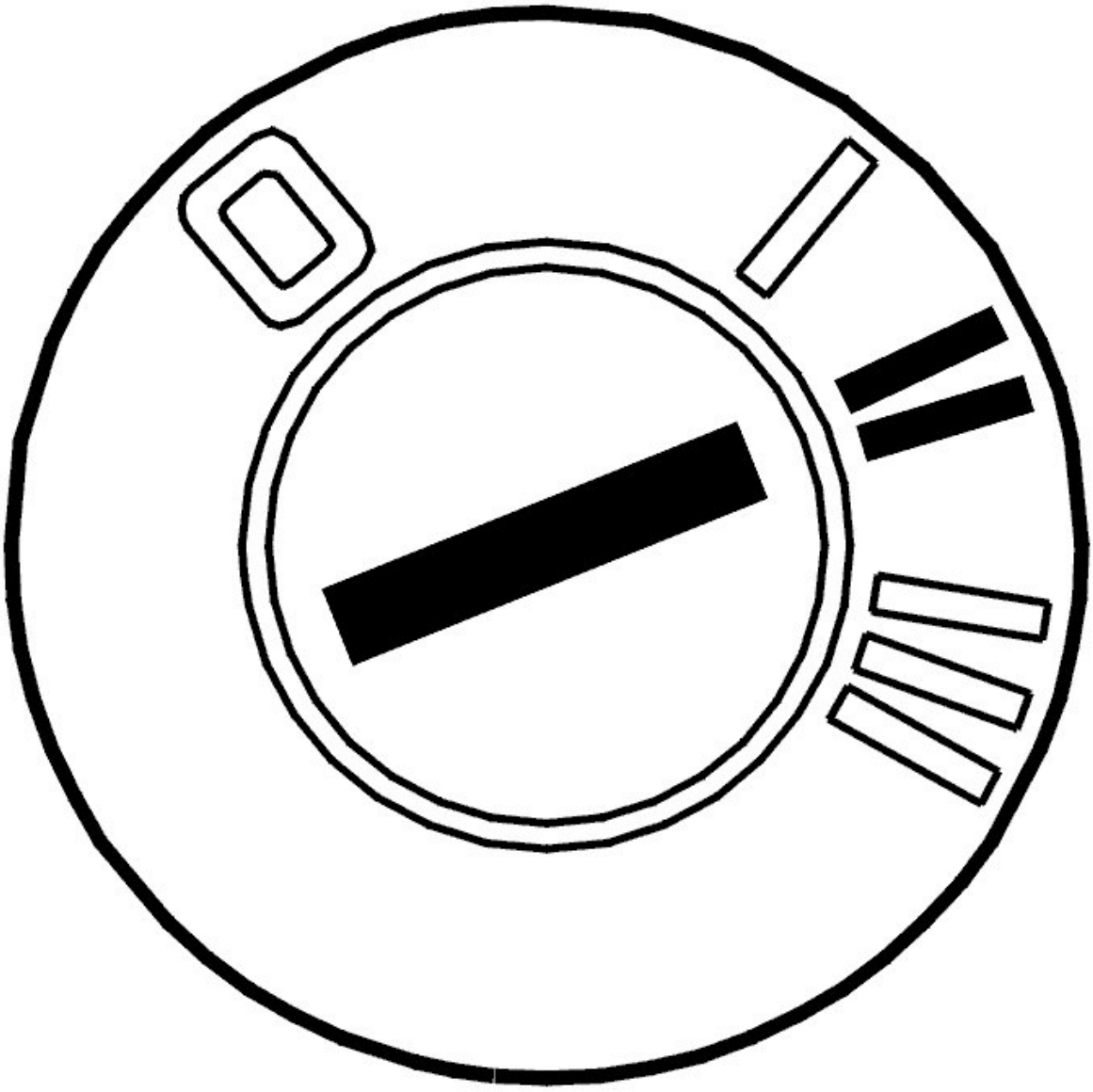
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

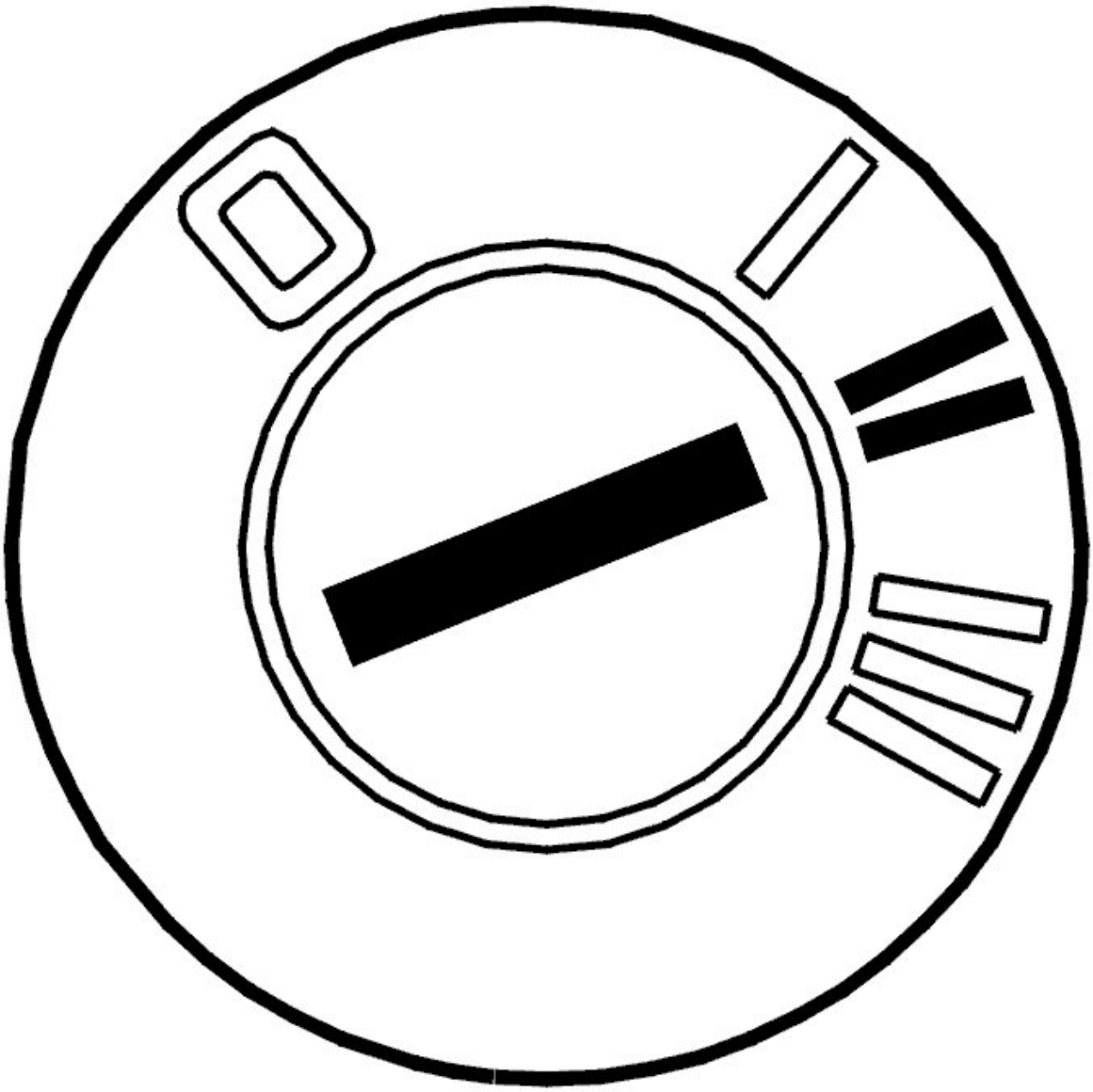
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

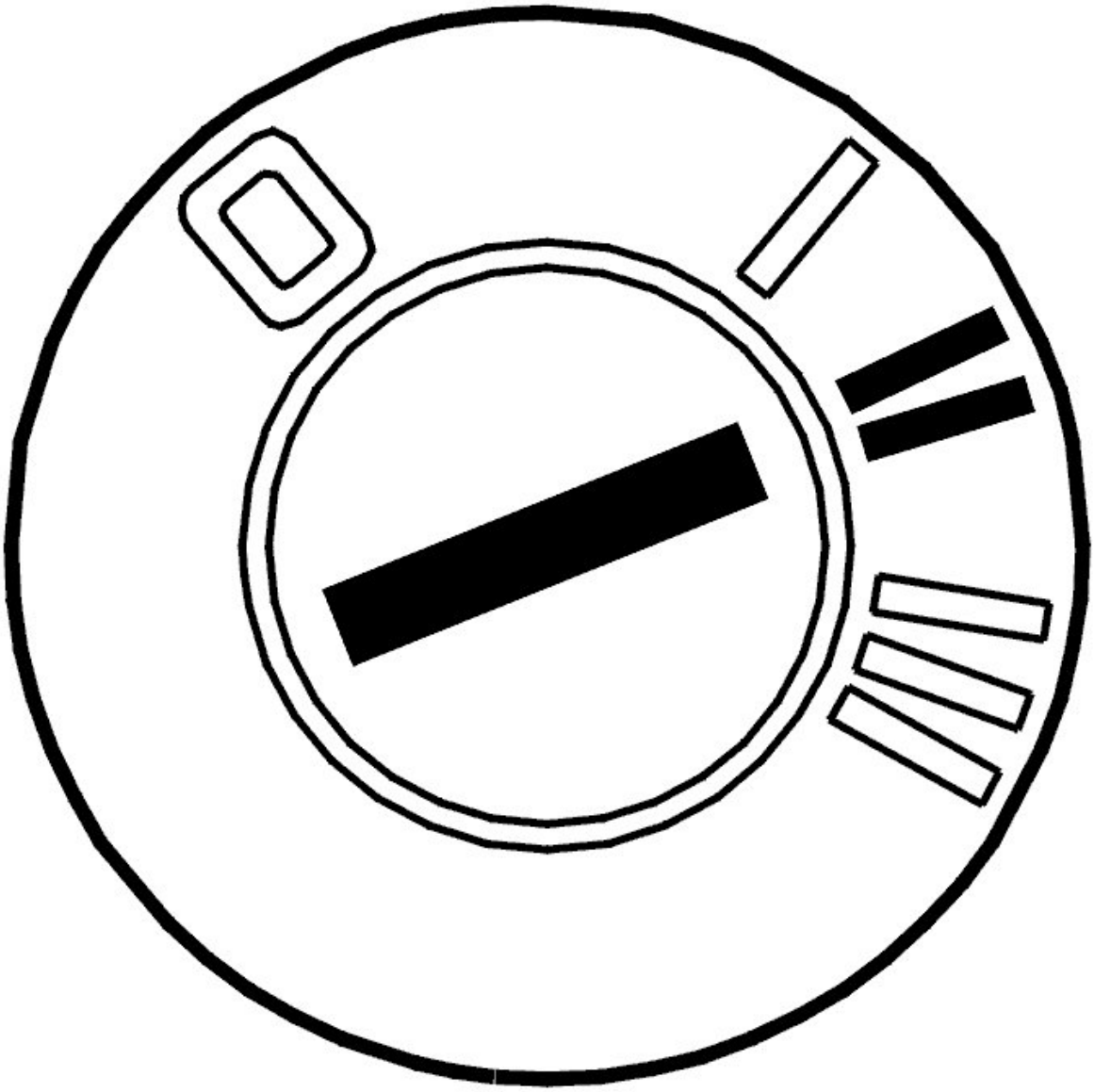
DONE - Verification

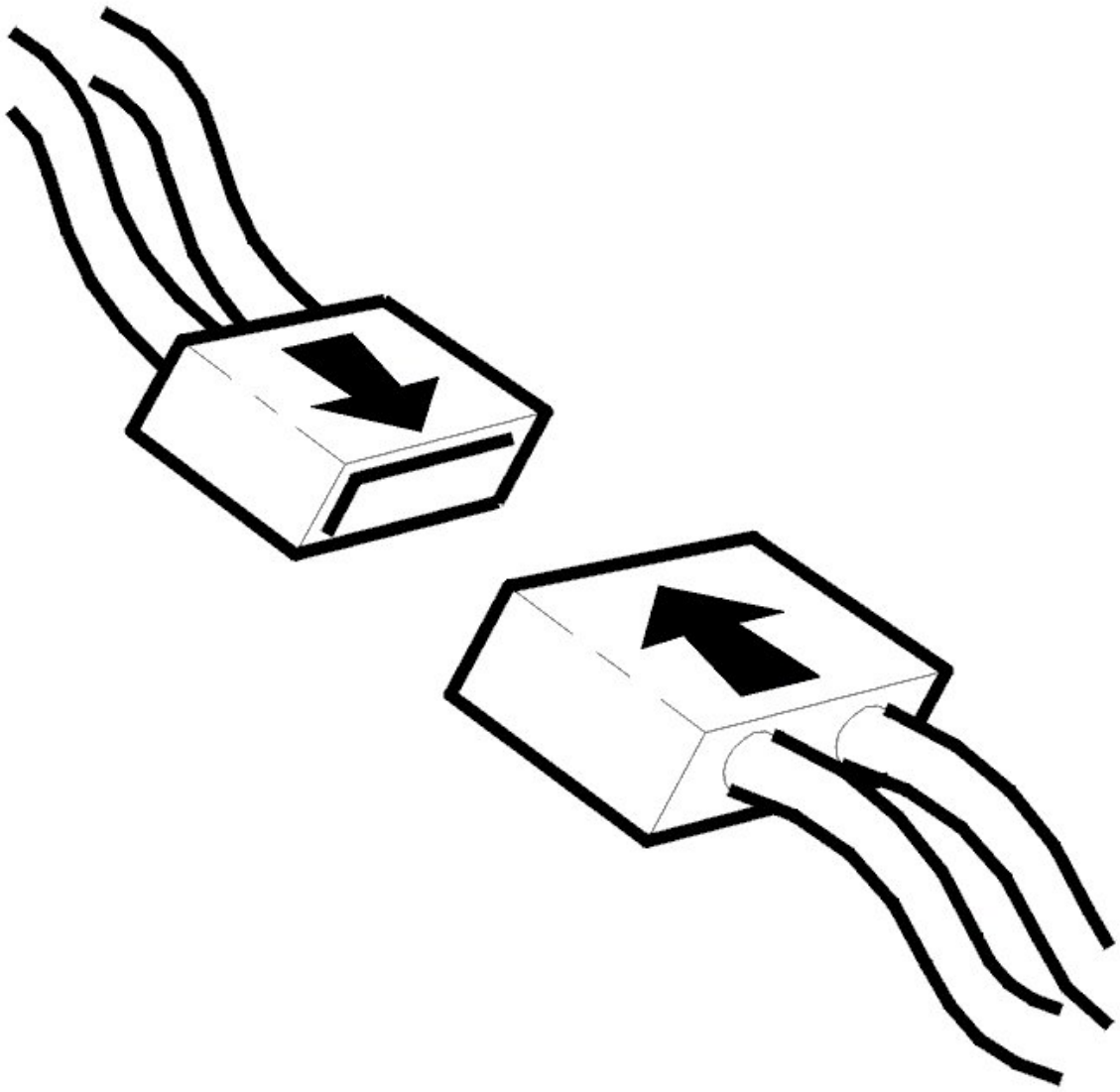
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

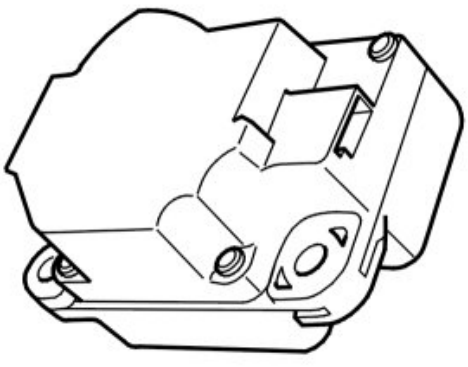
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD32

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the climate control module (CCM) and the damper motor module (DMM) temperature right on LIN bus 2.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 2 (CCM-DD30 -

CCM-DD34) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value
- None.

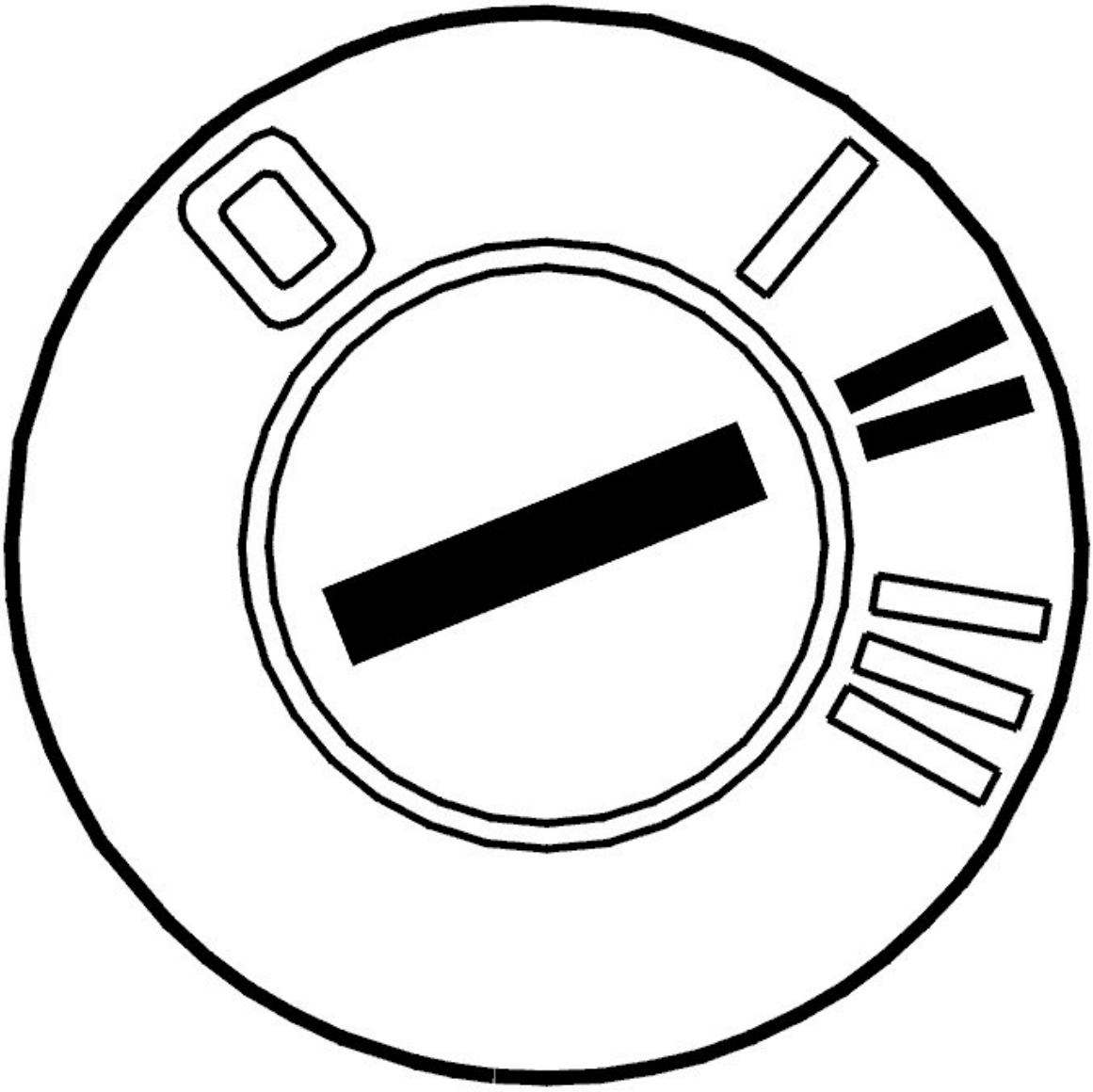
Possible source
- Open-circuit on LIN bus 2 between the climate control module (CCM) and the damper motor module (DMM) temperature right
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is together with diagnostic trouble codes (DTCs) for components only on LIN bus 2 (CCM-DD30-CCM-DD34)

3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

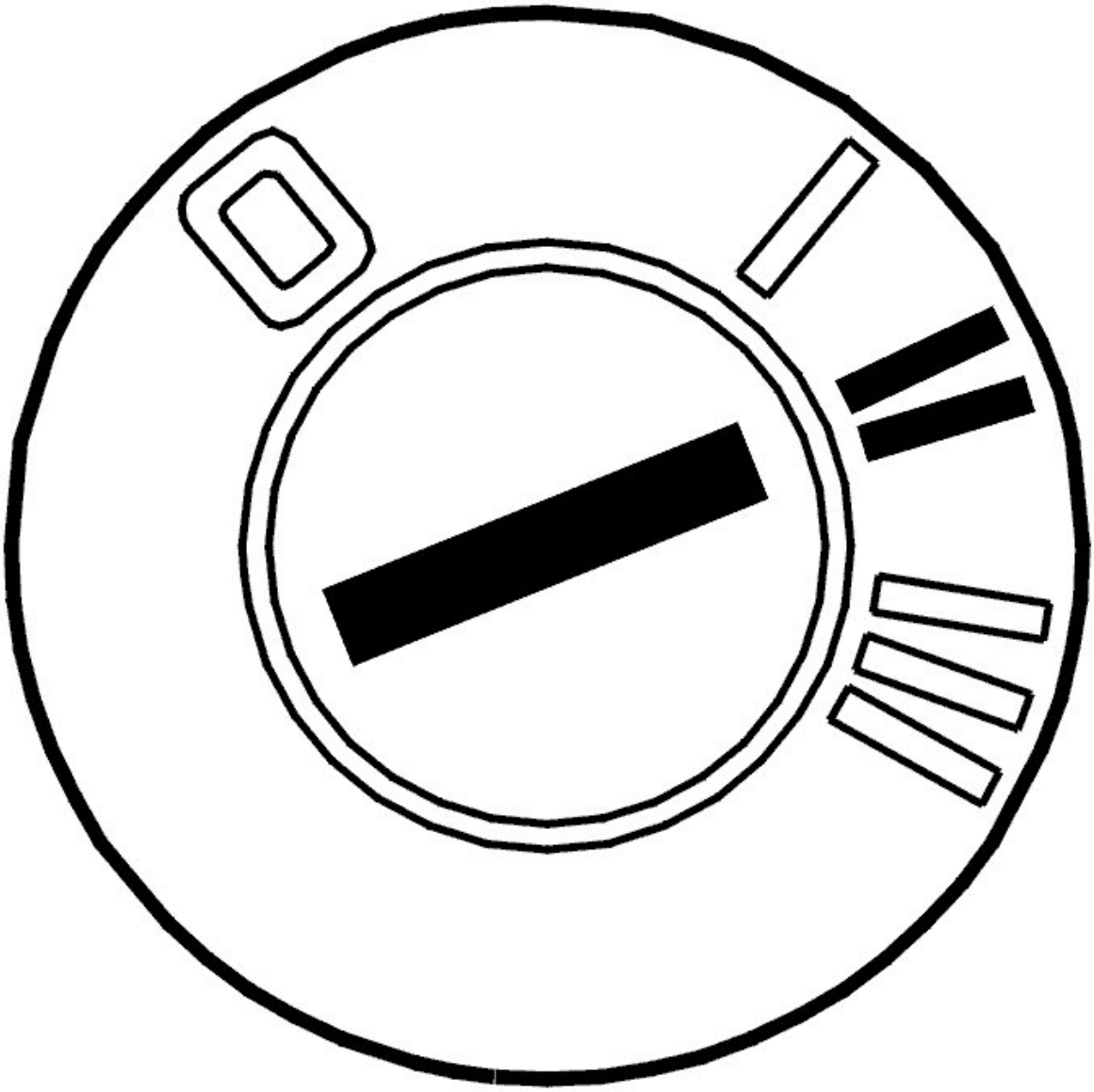
Select an alternative.

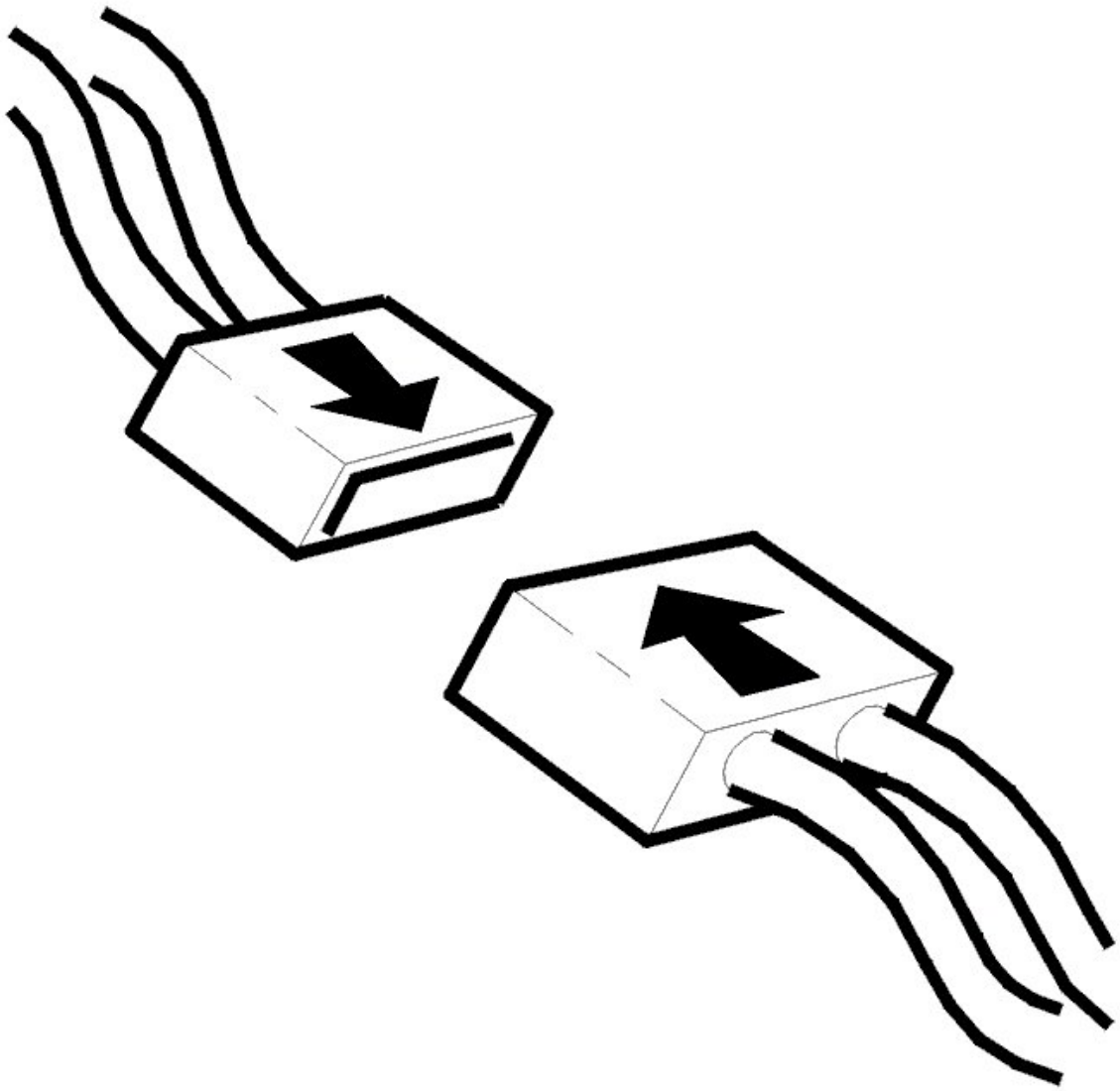
1 - Checking the connectors and wiring

2 - Checking LIN bus 2 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A on the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

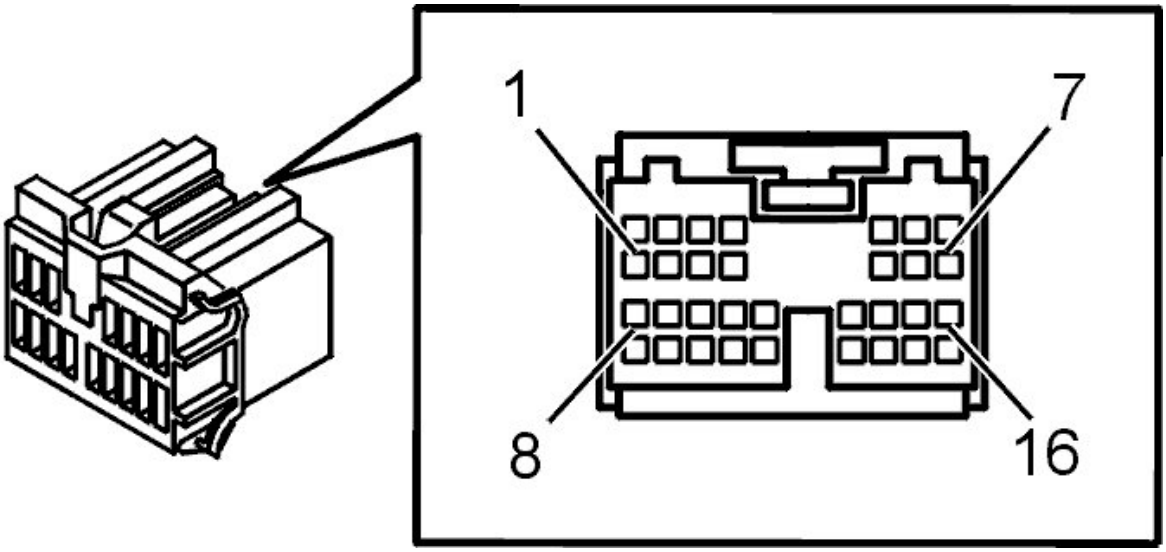
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

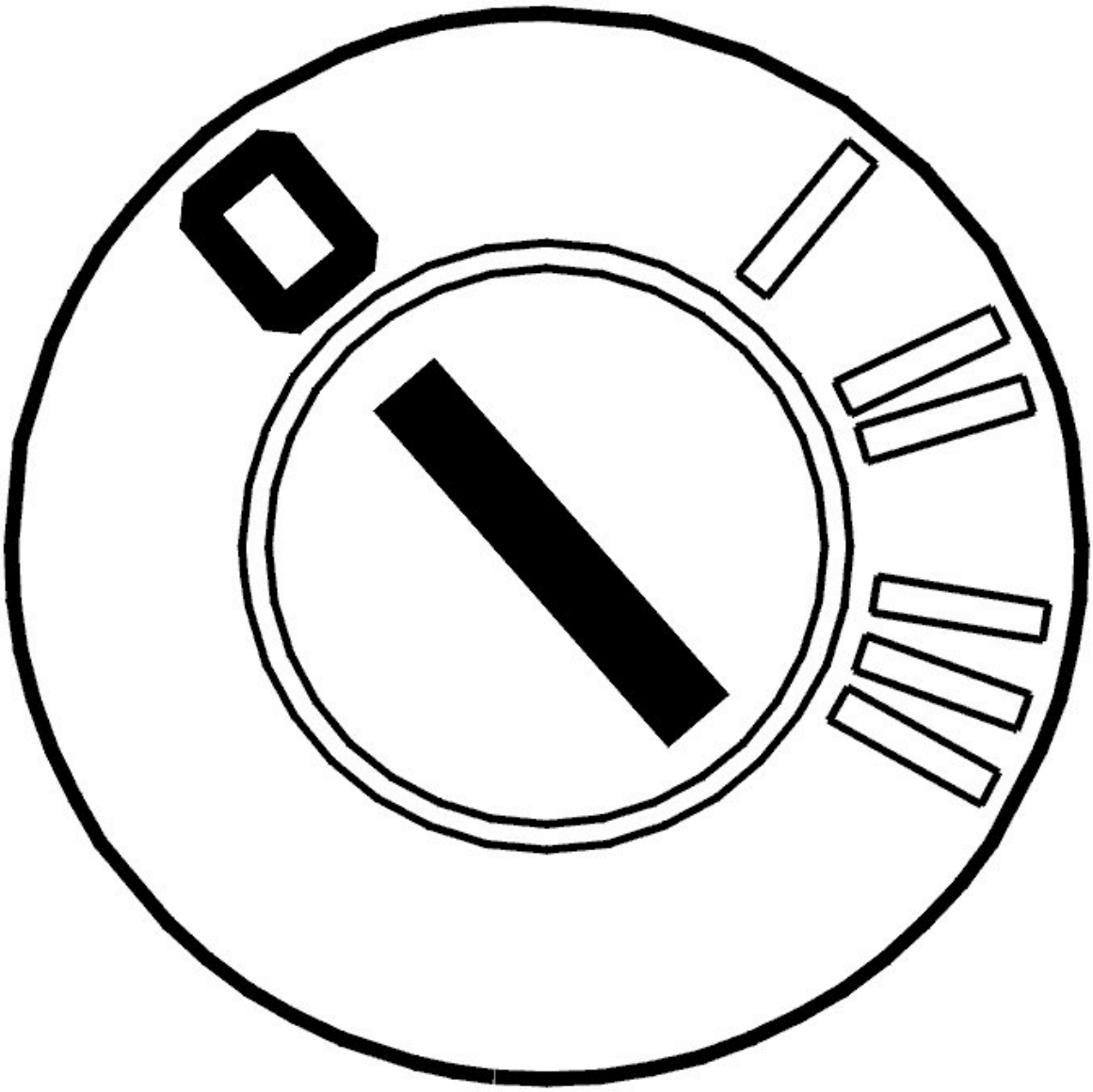
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 2 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

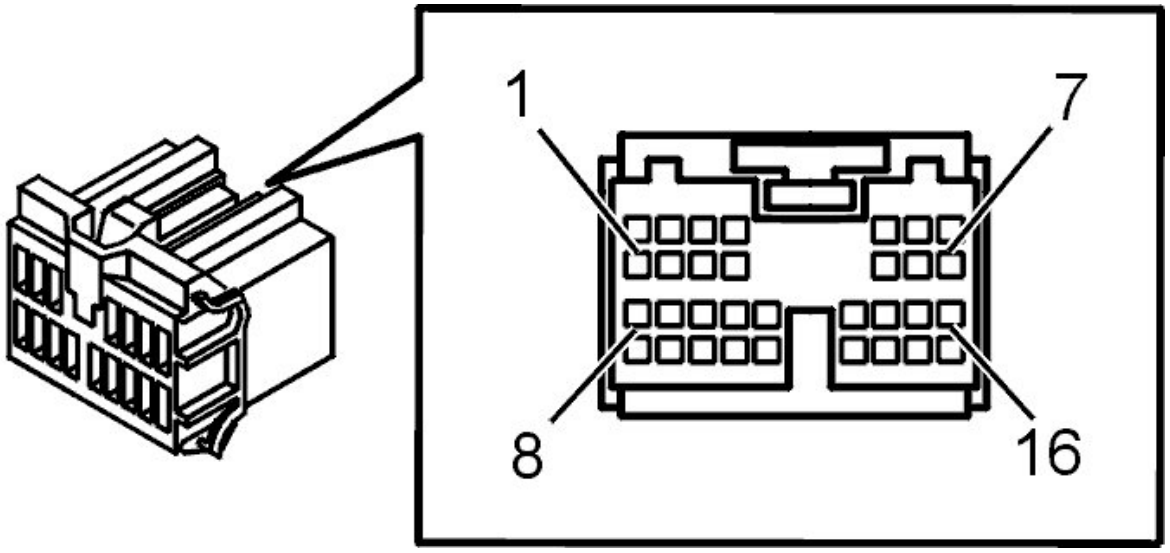
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 2 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) right. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5
- The connector for the climate control module (CCM) terminal #7 (#31) and connector A for the seat heating module (SHM) right terminal #2.

Check LIN bus 2 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

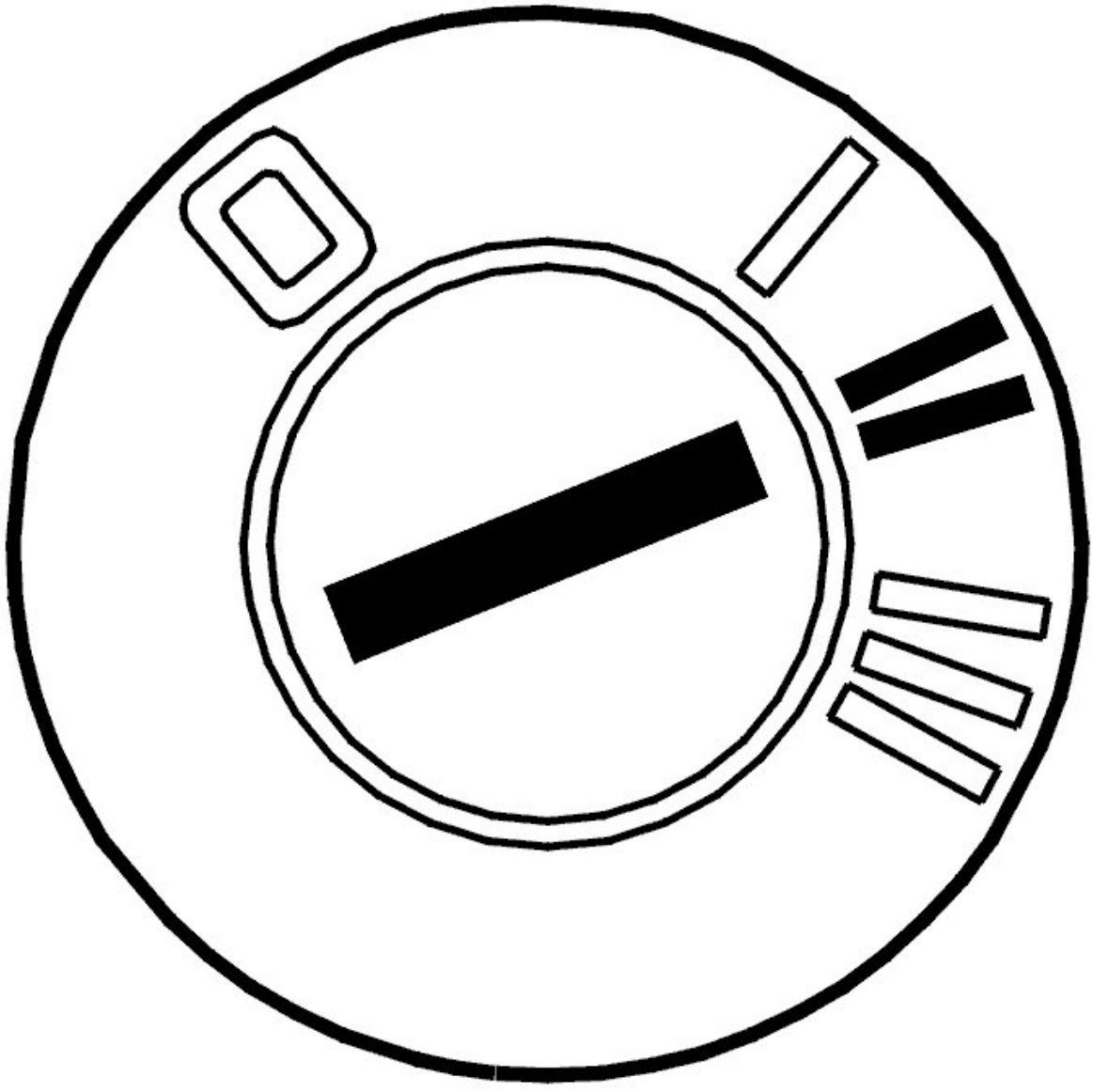
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



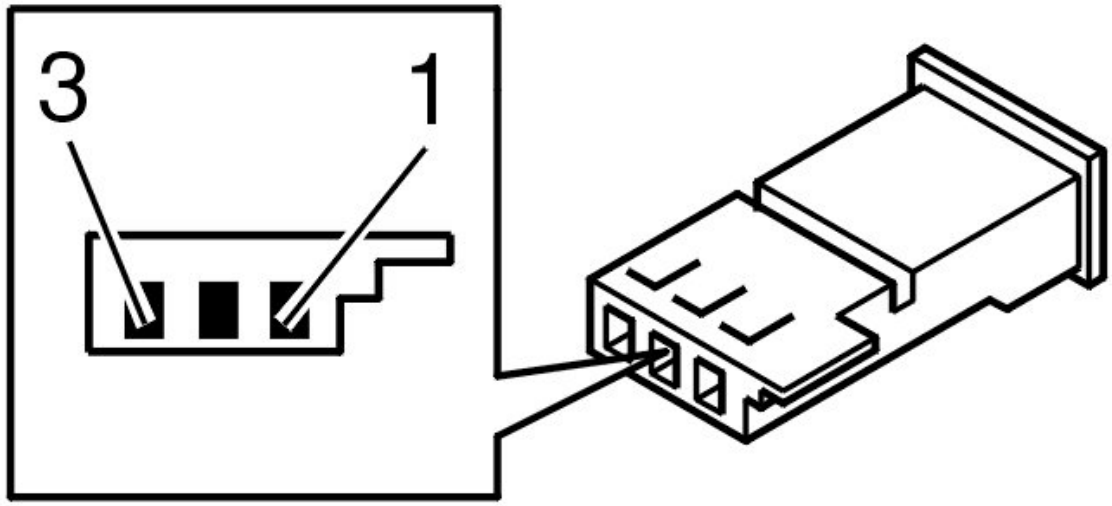
- Ignition off
- Disconnect the connector for the damper motor module (DMM) for temperature right
- Ignition on.

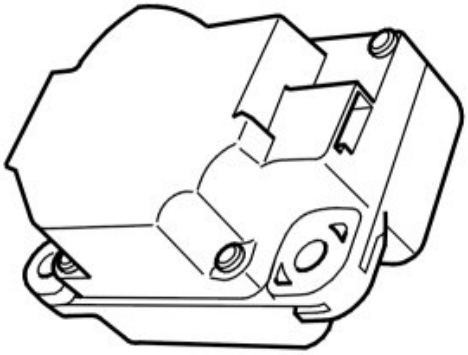
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3.
Check LIN bus 2 by taking a reading between connector terminal #2 on the damper motor module (DMM) and the connector for climate control unit terminal #5. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

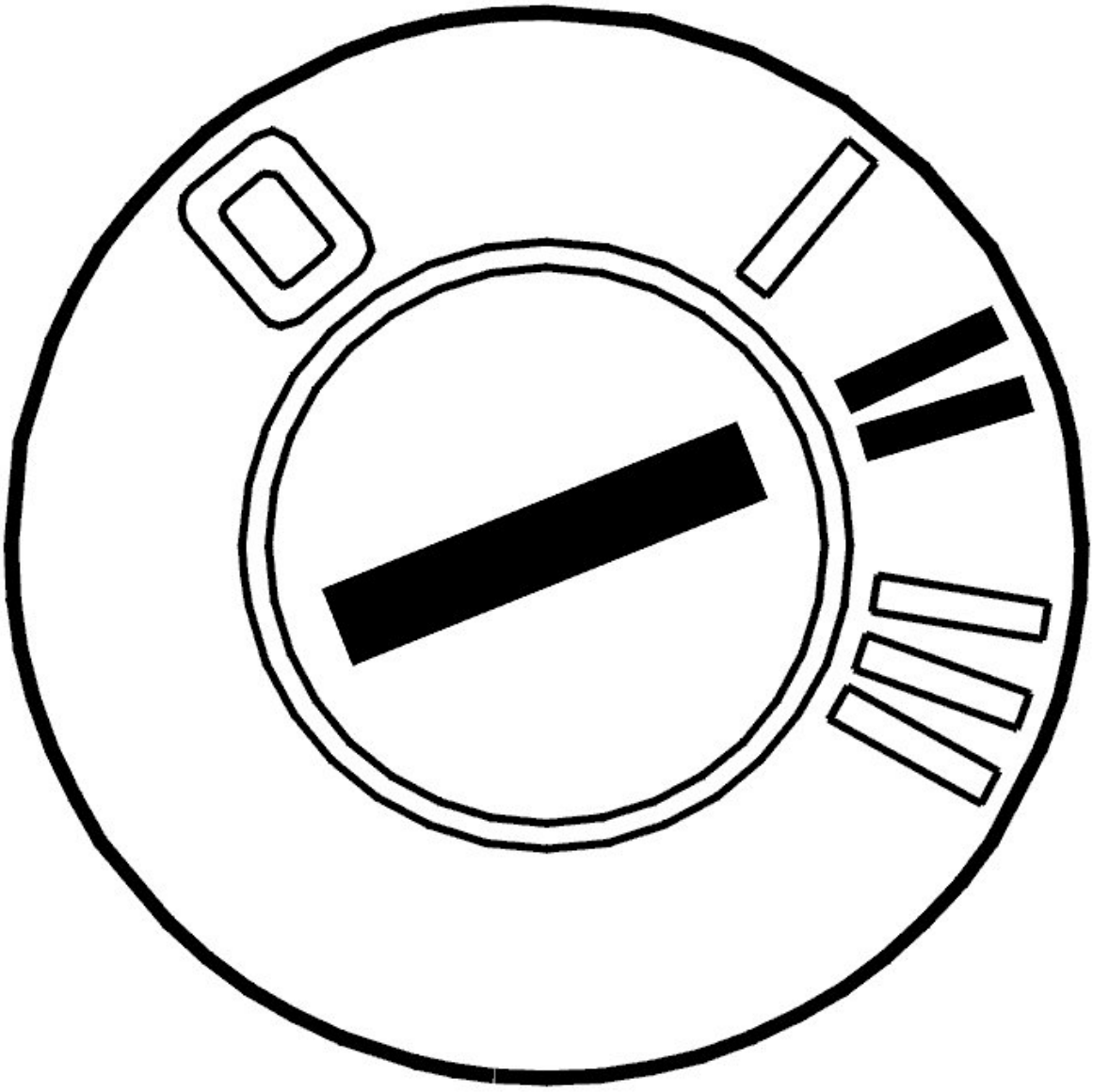
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

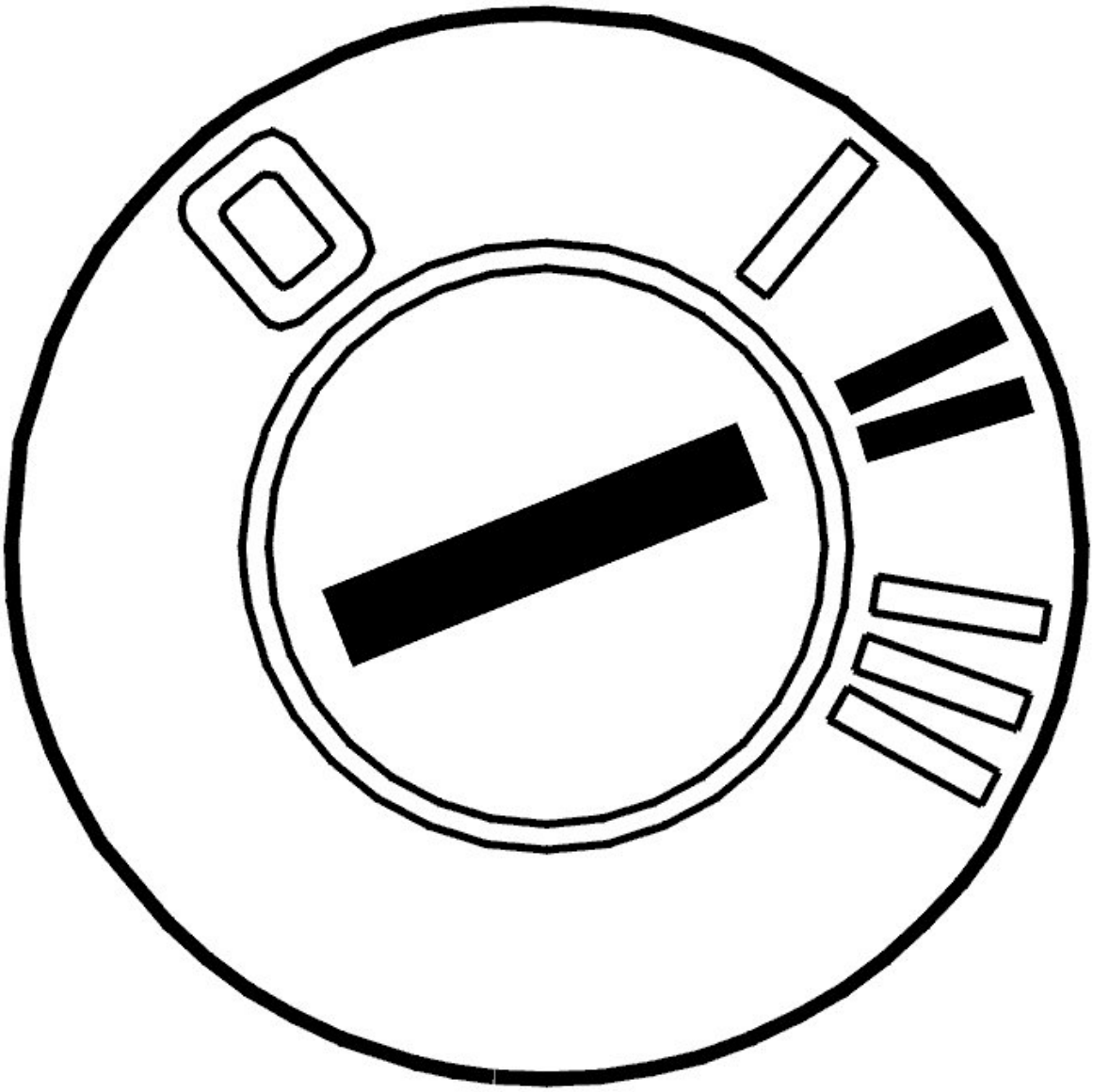
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

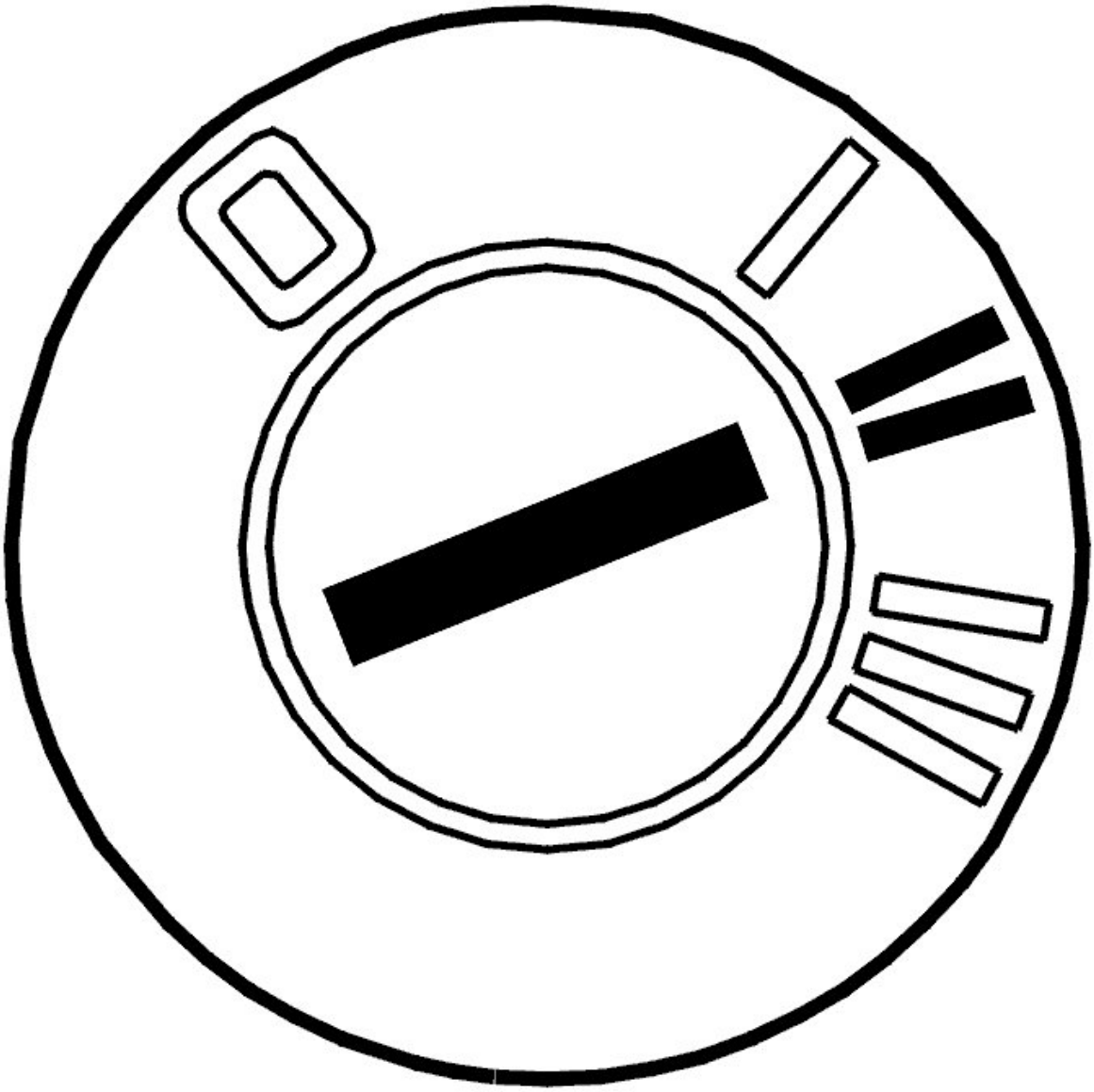
DONE - Verification

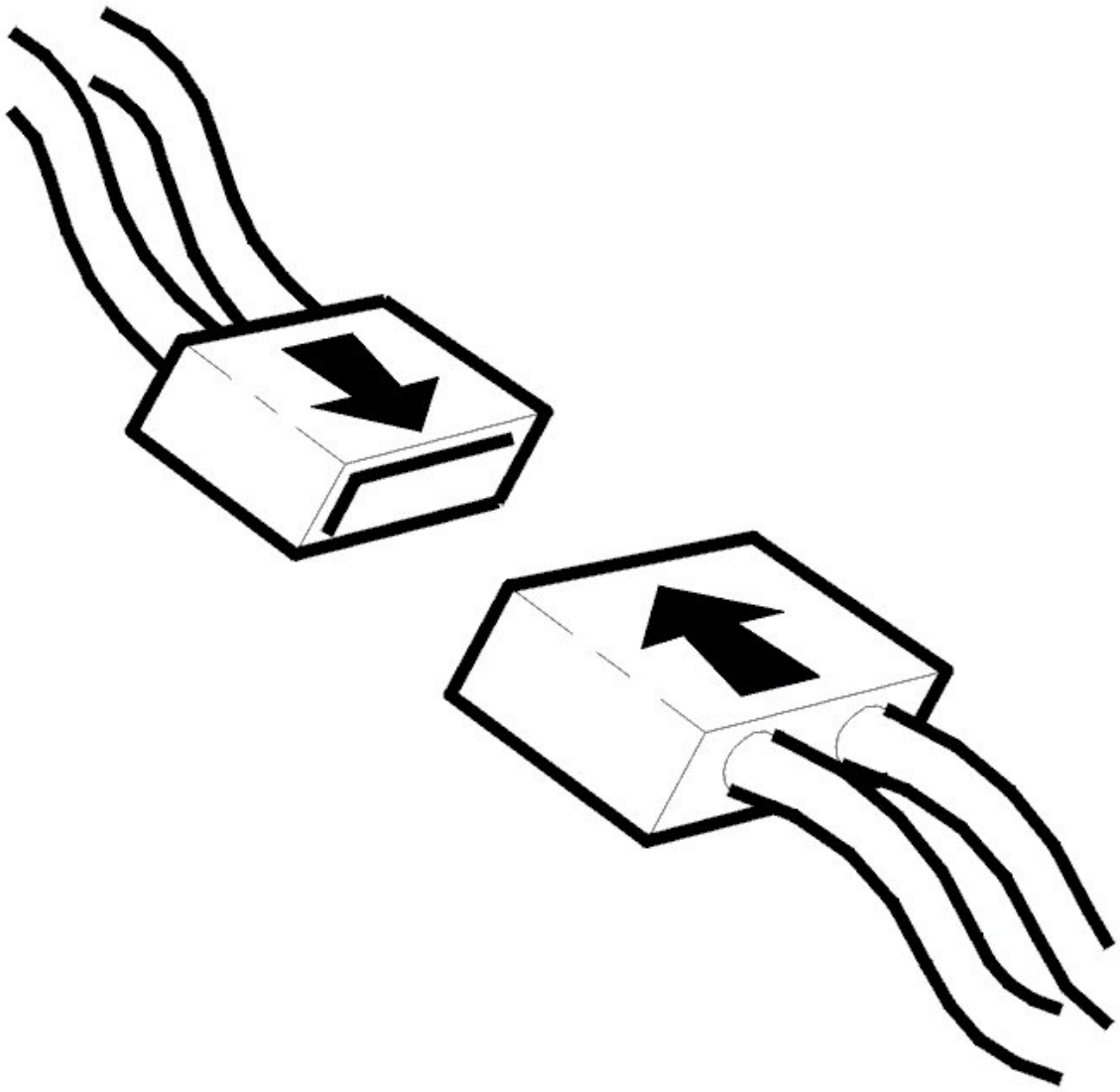
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

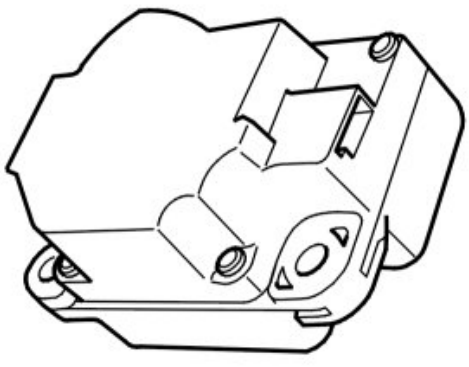
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD33

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the climate control module (CCM) and the damper motor module (DMM) defroster on LIN bus 2.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 2 (CCM-DD30 -

CCM-DD34) depending on where the open-circuit has occurred.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

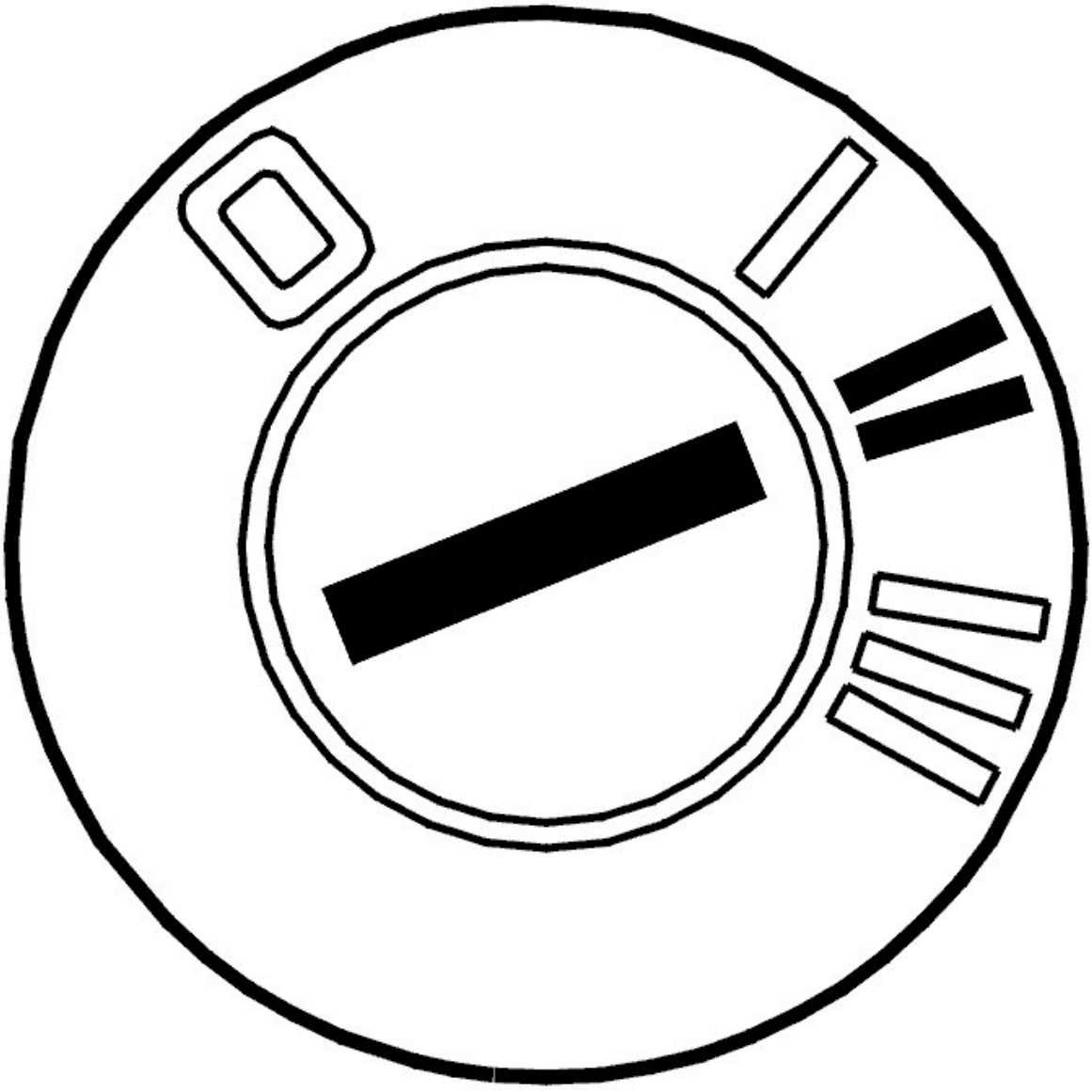
Possible source
- Open-circuit on LIN bus 2 between the climate control module (CCM) and the damper motor module (DMM) defroster
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- Misting on the windows and/or door mirrors.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is together with diagnostic trouble codes (DTCs) for components only on LIN bus 2 (CCM-DD30-CCM-DD34)
3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

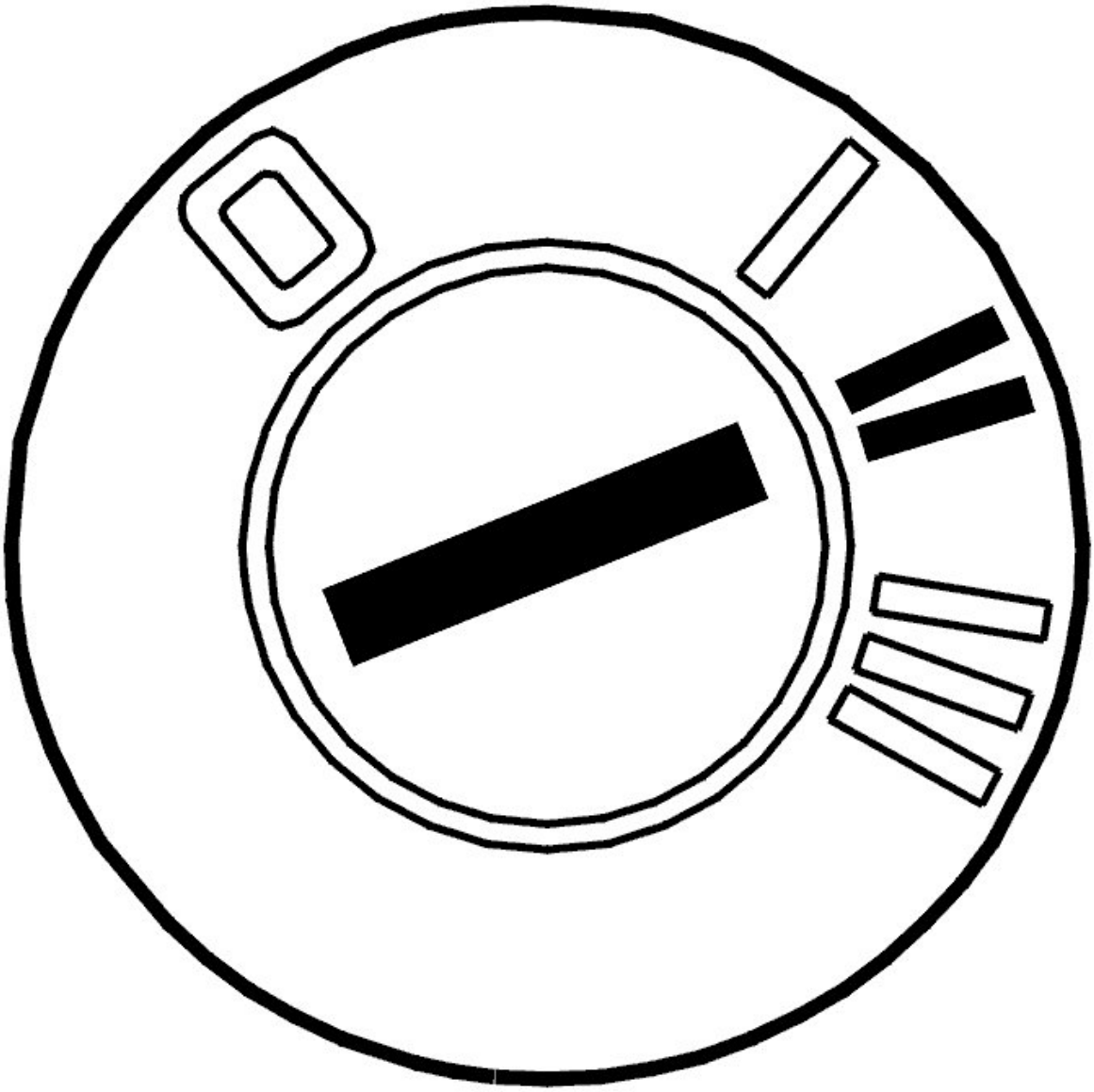
Select an alternative.

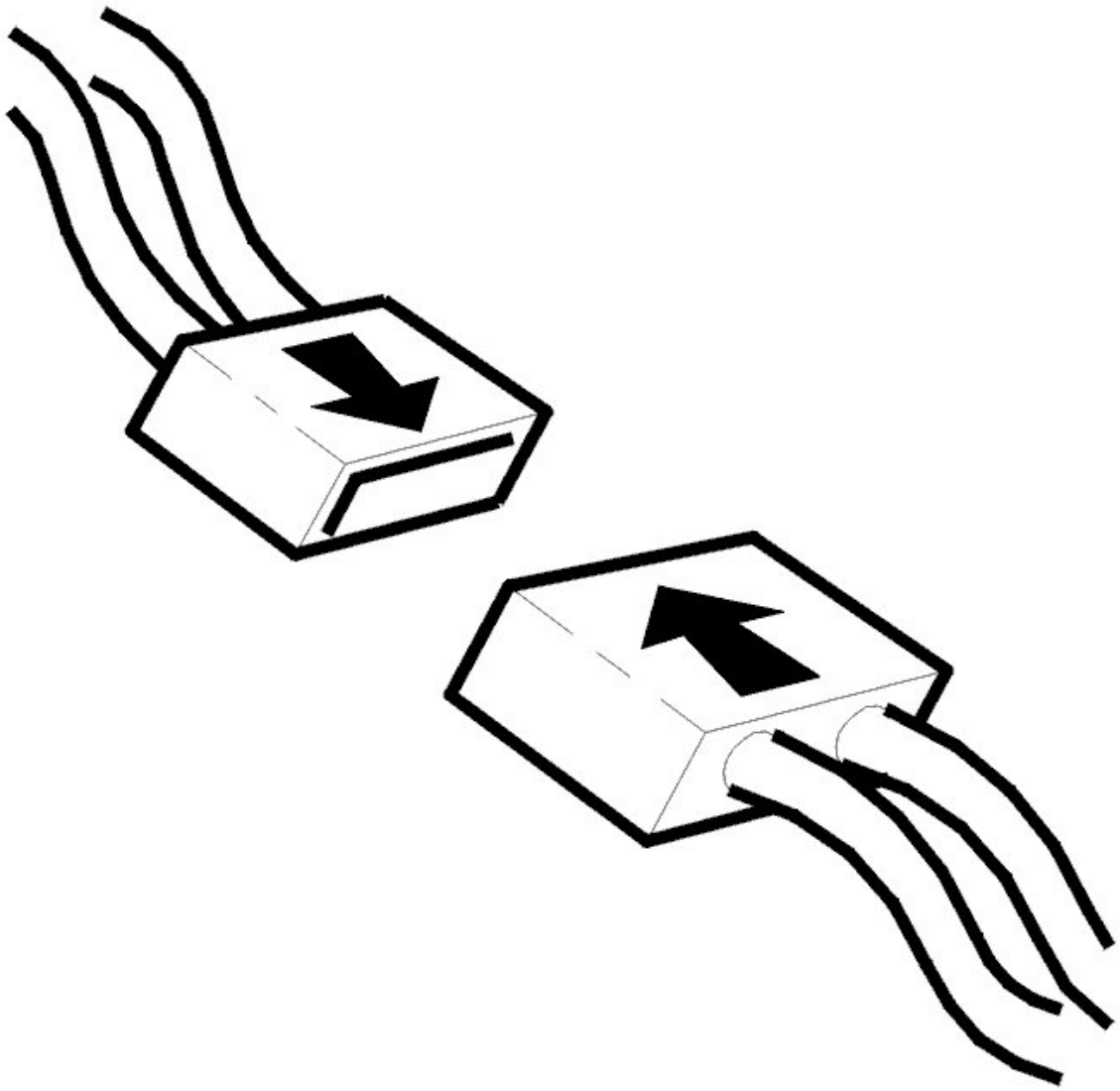
1 - Checking the connectors and wiring

2 - Checking LIN bus 2 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

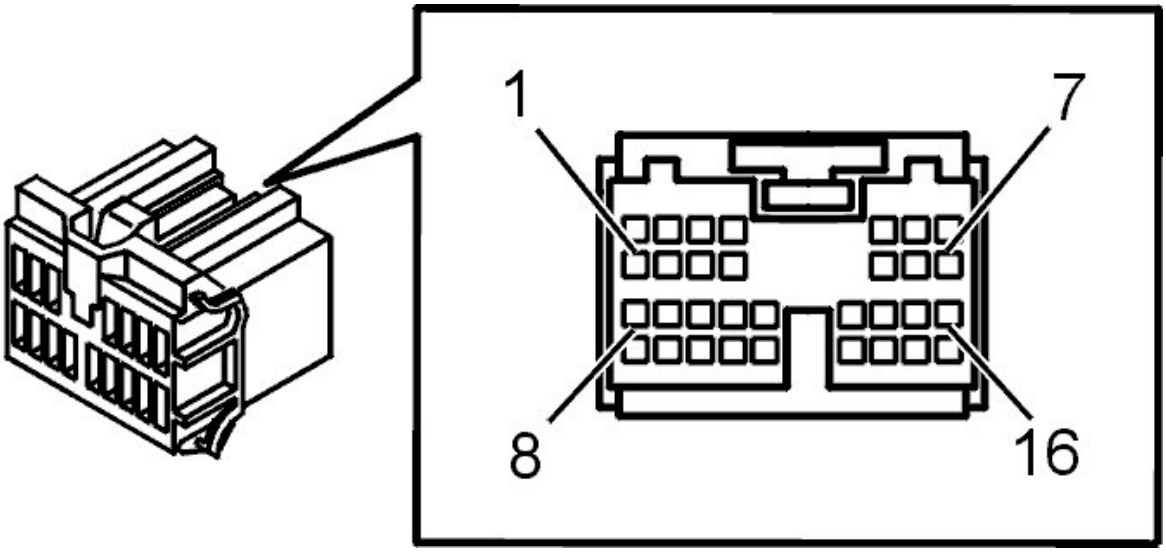
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

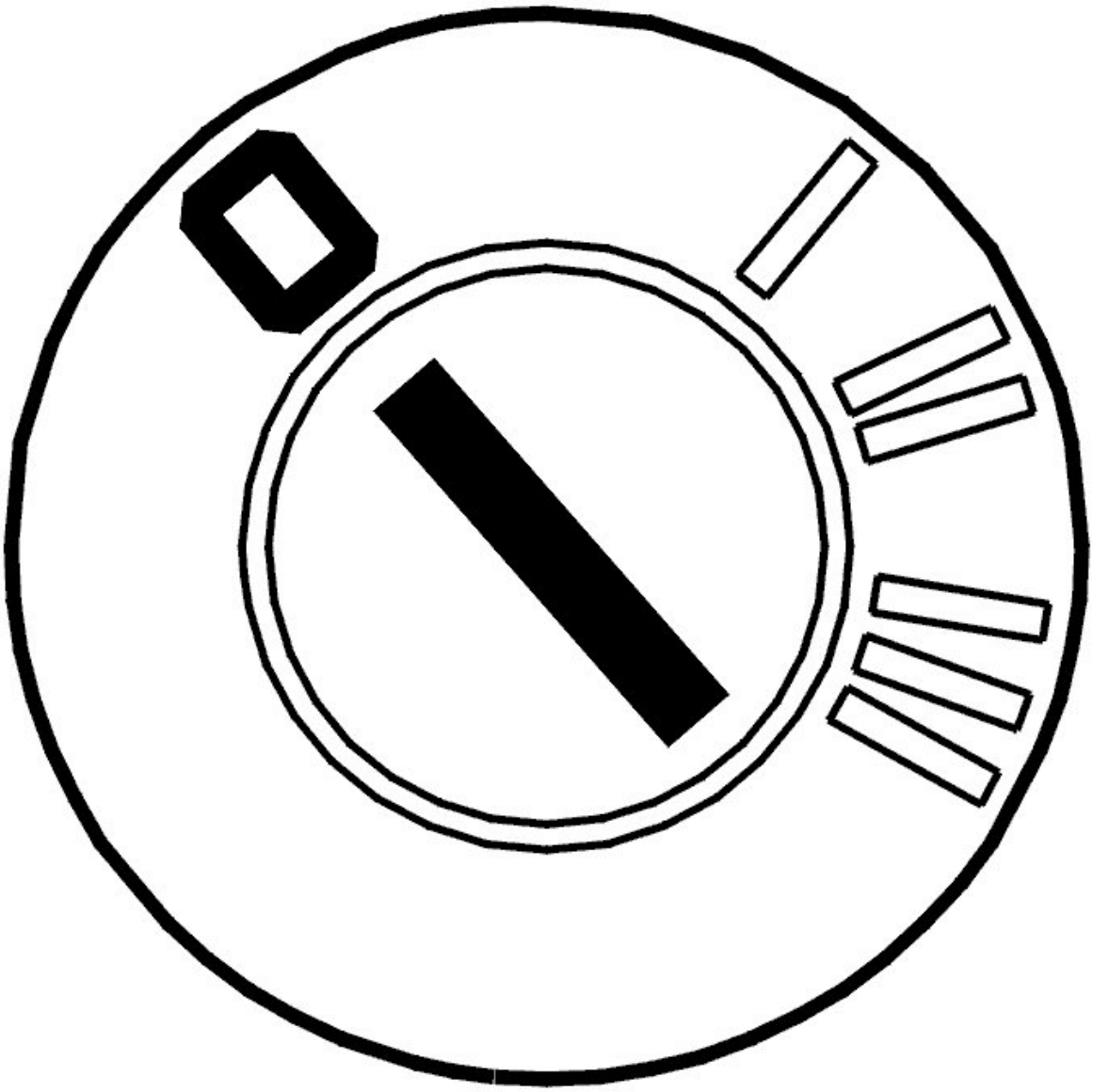
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 2 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

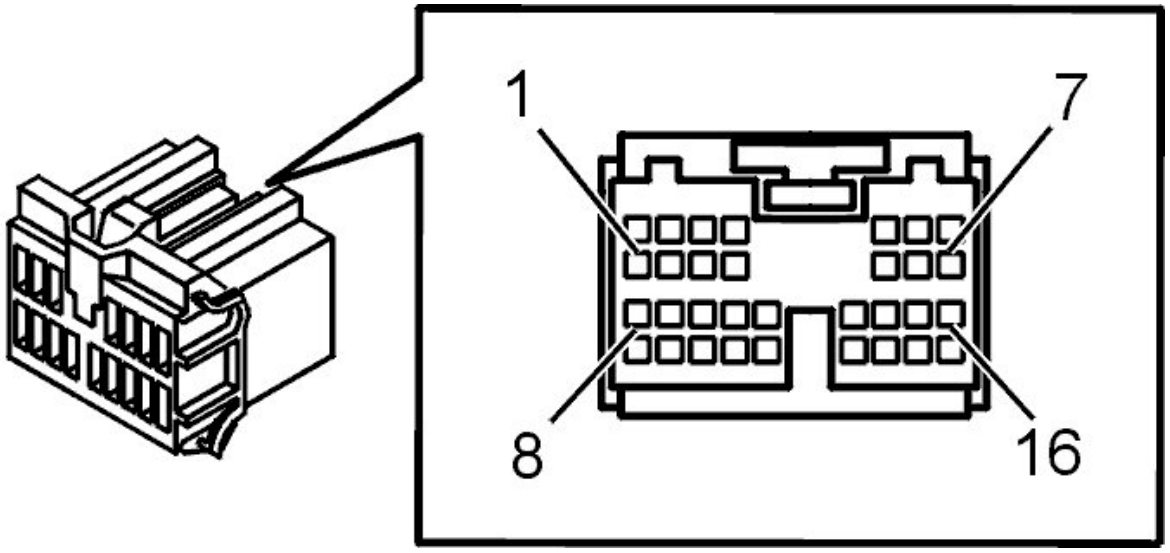
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 2 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) right. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5
- The connector for the climate control module (CCM) terminal #7 (#31) and connector A for the seat heating module (SHM) right terminal #2.

Check LIN bus 2 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

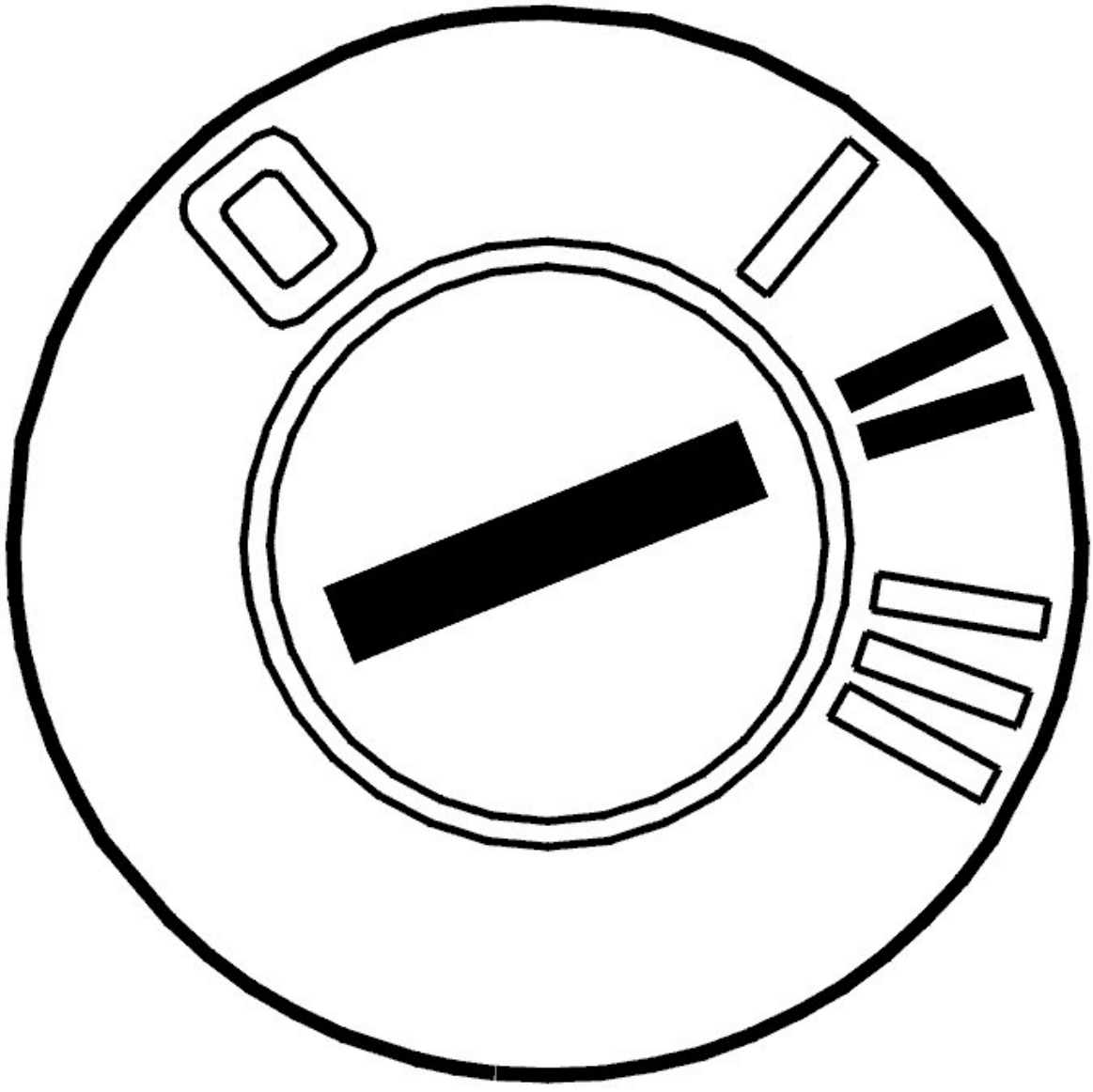
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



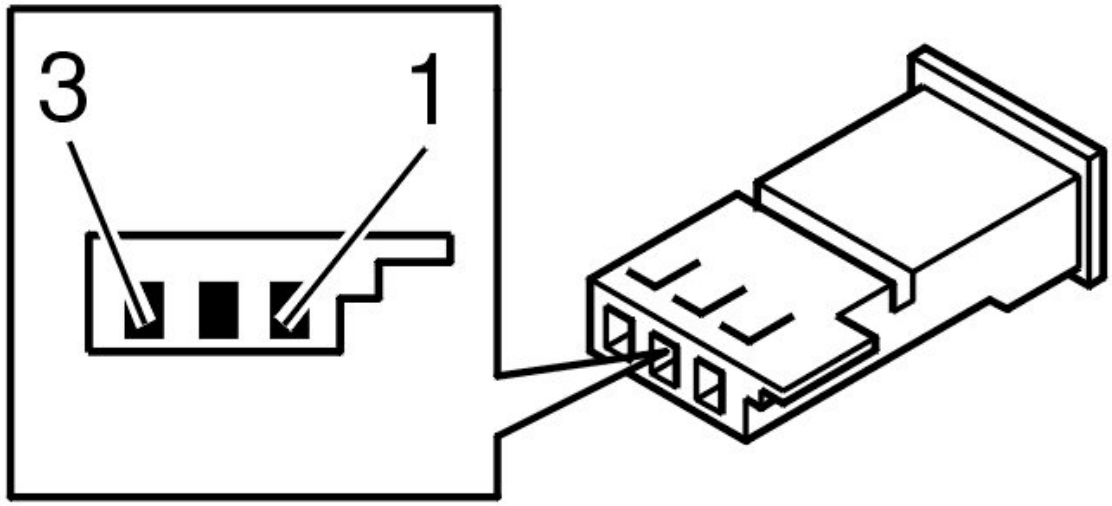
- Ignition off
- Disconnect the connector for the damper motor module (DMM) defroster
- Ignition on.

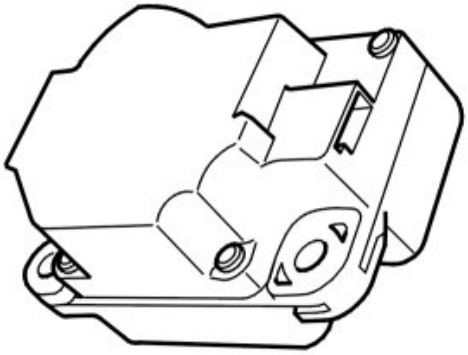
Check the connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the damper motor module (DMM) is connected to power supply and ground.

Measure the voltage on the connector for the damper motor module (DMM) between terminals #1 and #3.
Check LIN bus 2 by taking a reading between the damper motor module (DMM) connector terminal #2 and the connector for the climate control unit terminal #5. Check for an open-circuit.
Try replacing the damper motor module (DMM) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

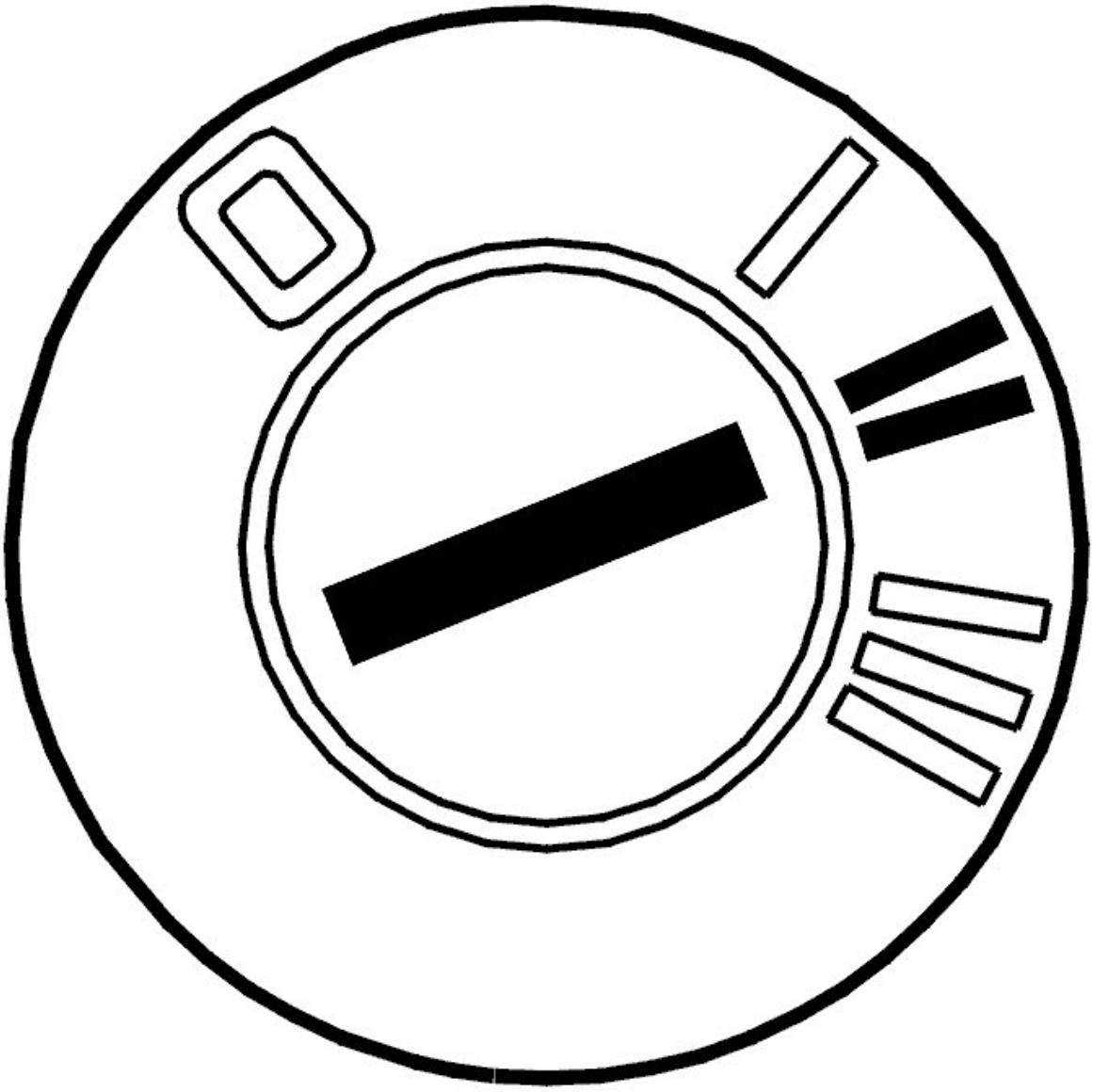
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

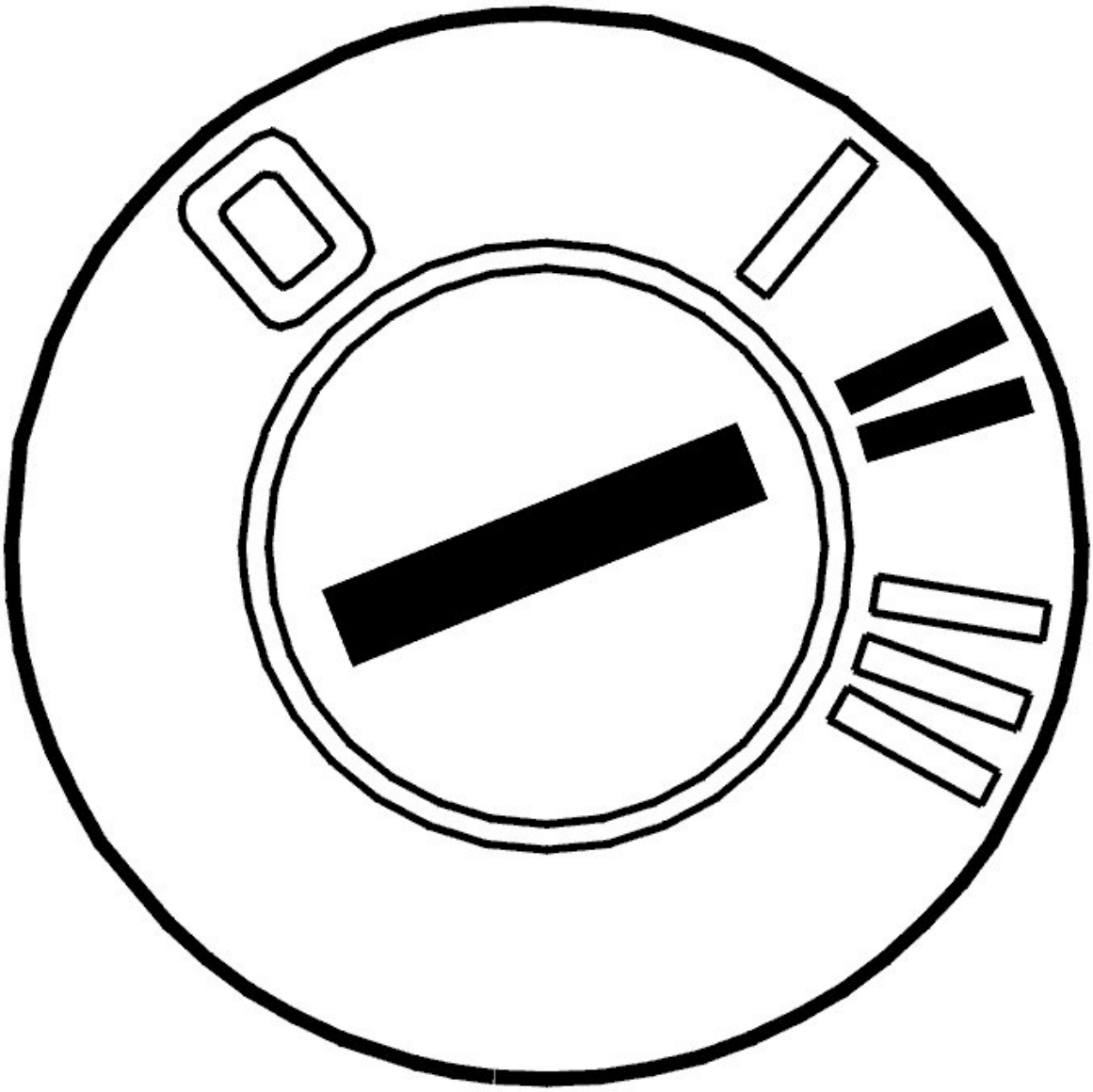
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

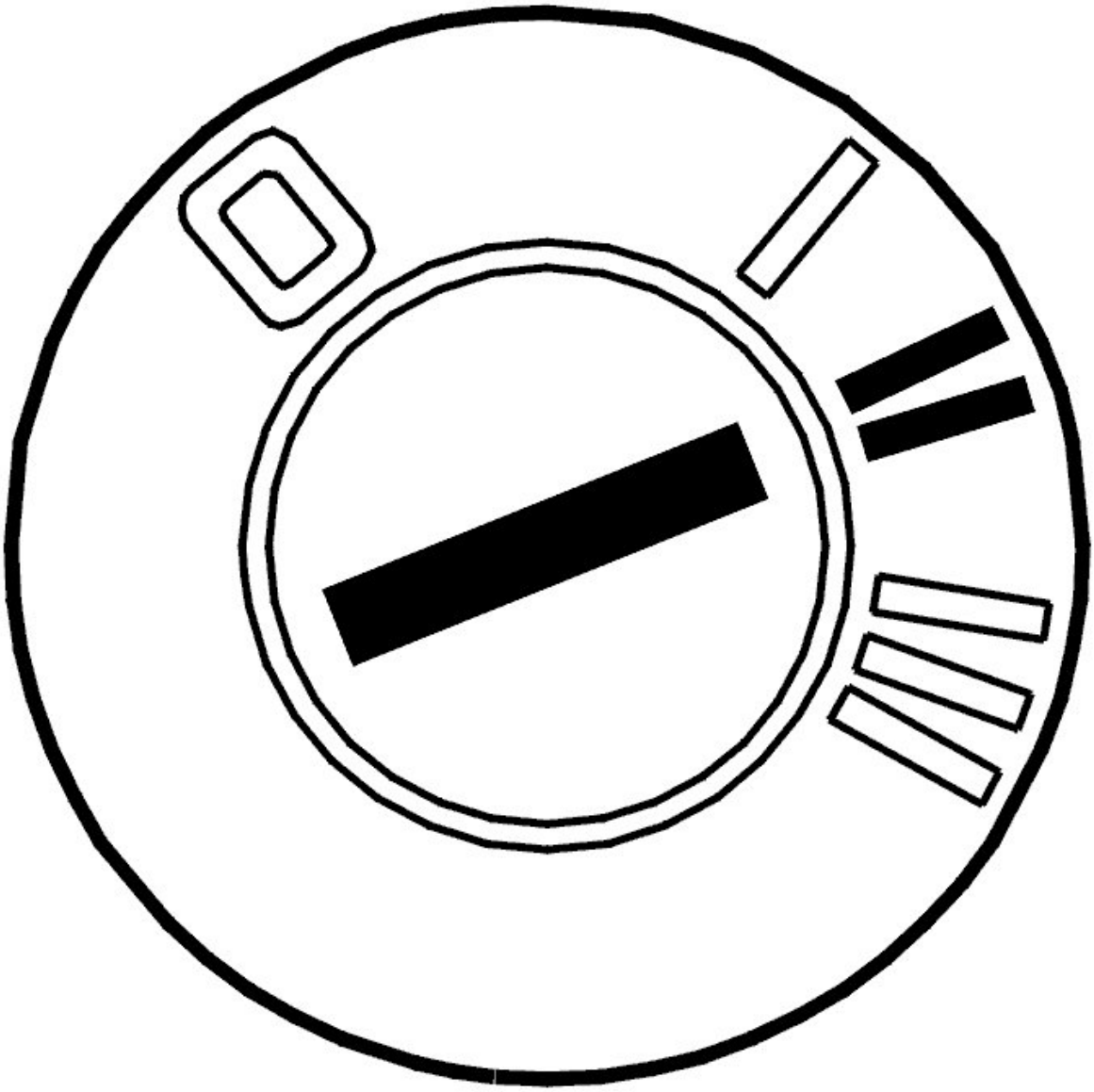
DONE - Verification

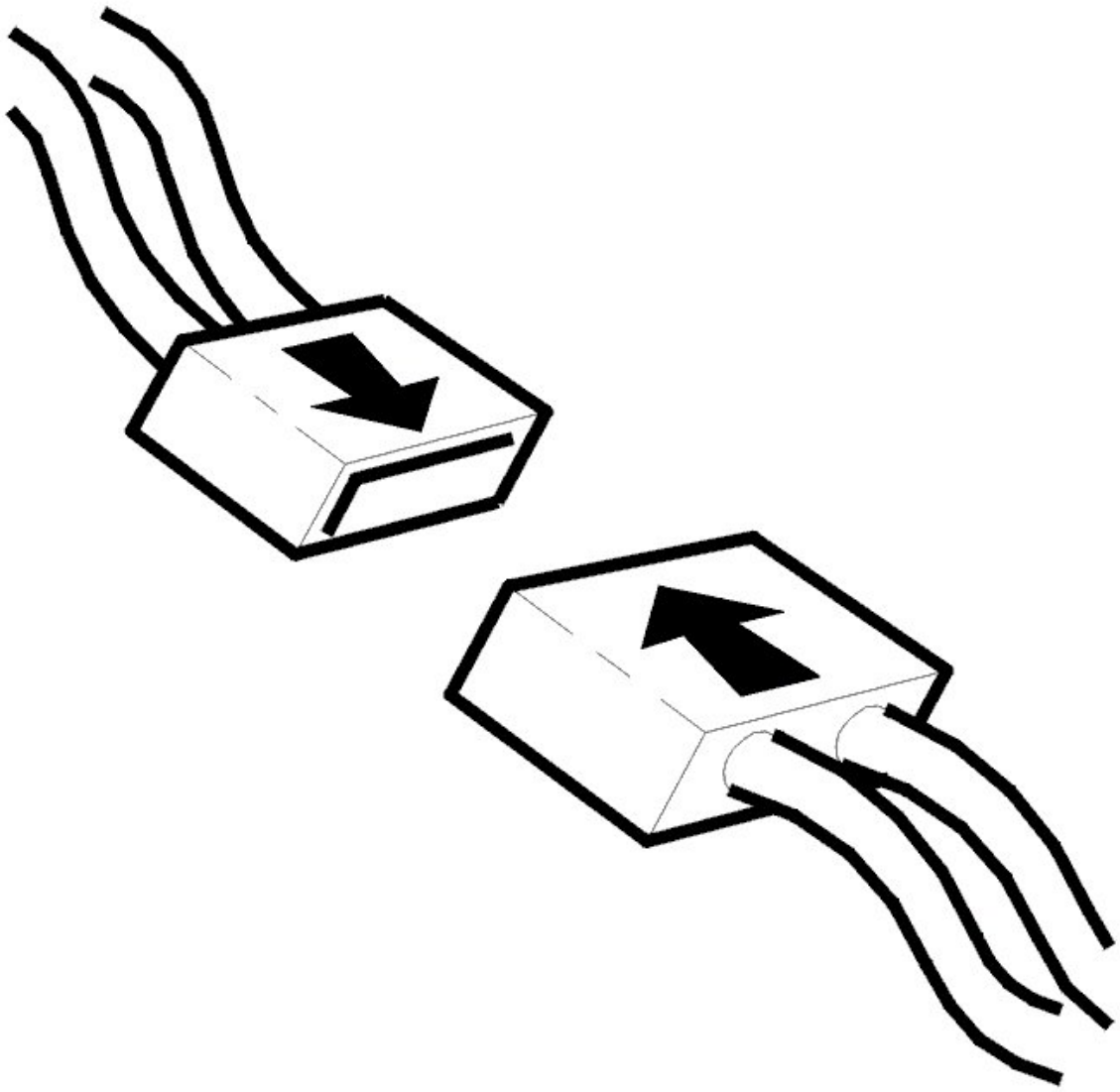
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

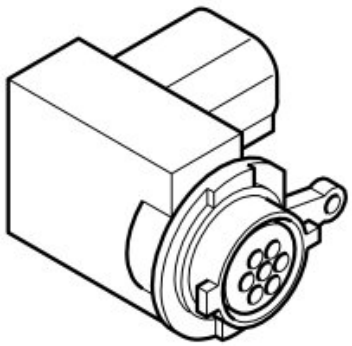
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-DD34

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the communication between the air quality sensor (AQS) and the climate control module (CCM) on LIN bus 2.
The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components on LIN bus 2 (CCM-DD30 -

CCM-DD34) depending on where the open-circuit has occurred
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value
- None.

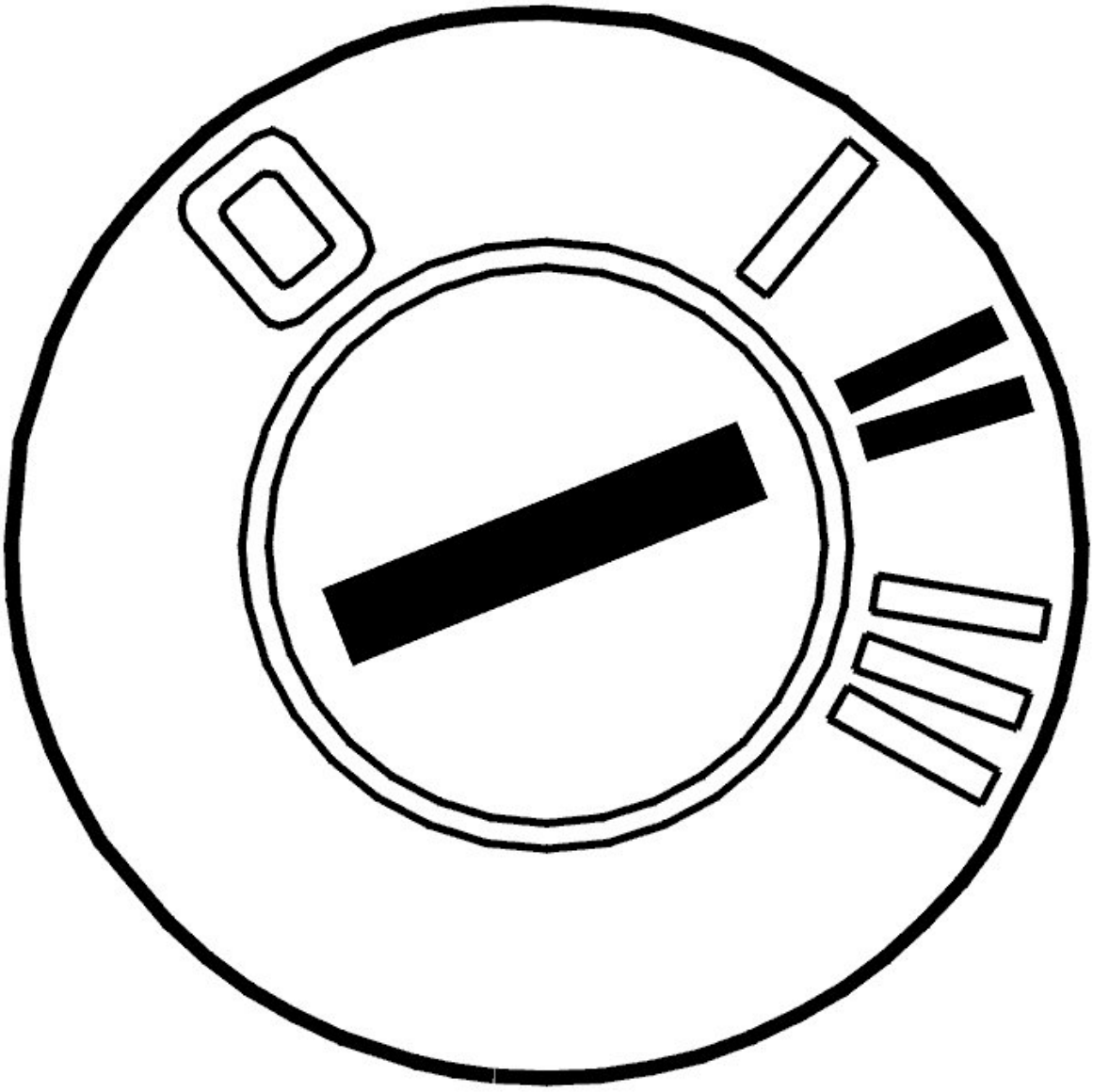
Possible source
- Open-circuit on LIN bus 2 between the climate control module (CCM) and the air quality sensor (AQS)
- Contact resistance, oxidation or loose connections in the connectors.

Fault symptom[s]
- Poor air quality in the passenger compartment.

No Communication

No communication

Checking the diagnostic trouble codes (DTCs)



- Ignition on.

The diagnostic trouble code (DTC) may occur together with diagnostic trouble codes (DTCs) for other components that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2.
Check whether the diagnostic trouble code (DTC) has been stored together with other diagnostic trouble codes (DTCs) for other components on the climate control unit.
Select one of the following options:

1. The diagnostic trouble code (DTC) is stored together with diagnostic trouble codes (DTCs) for components in both LIN bus 1 and LIN bus 2 (CCM-DD10 - CCM-DD16, CCM-DD30 - CCM-DD34)
2. The diagnostic trouble code (DTC) is together with diagnostic trouble codes (DTCs) for components only on LIN bus 1 (CCM-DD31-CCM-DD34)

3. The diagnostic trouble code (DTC) is not together with diagnostic trouble codes (DTCs) for other components on LIN bus 1 and LIN bus 2.

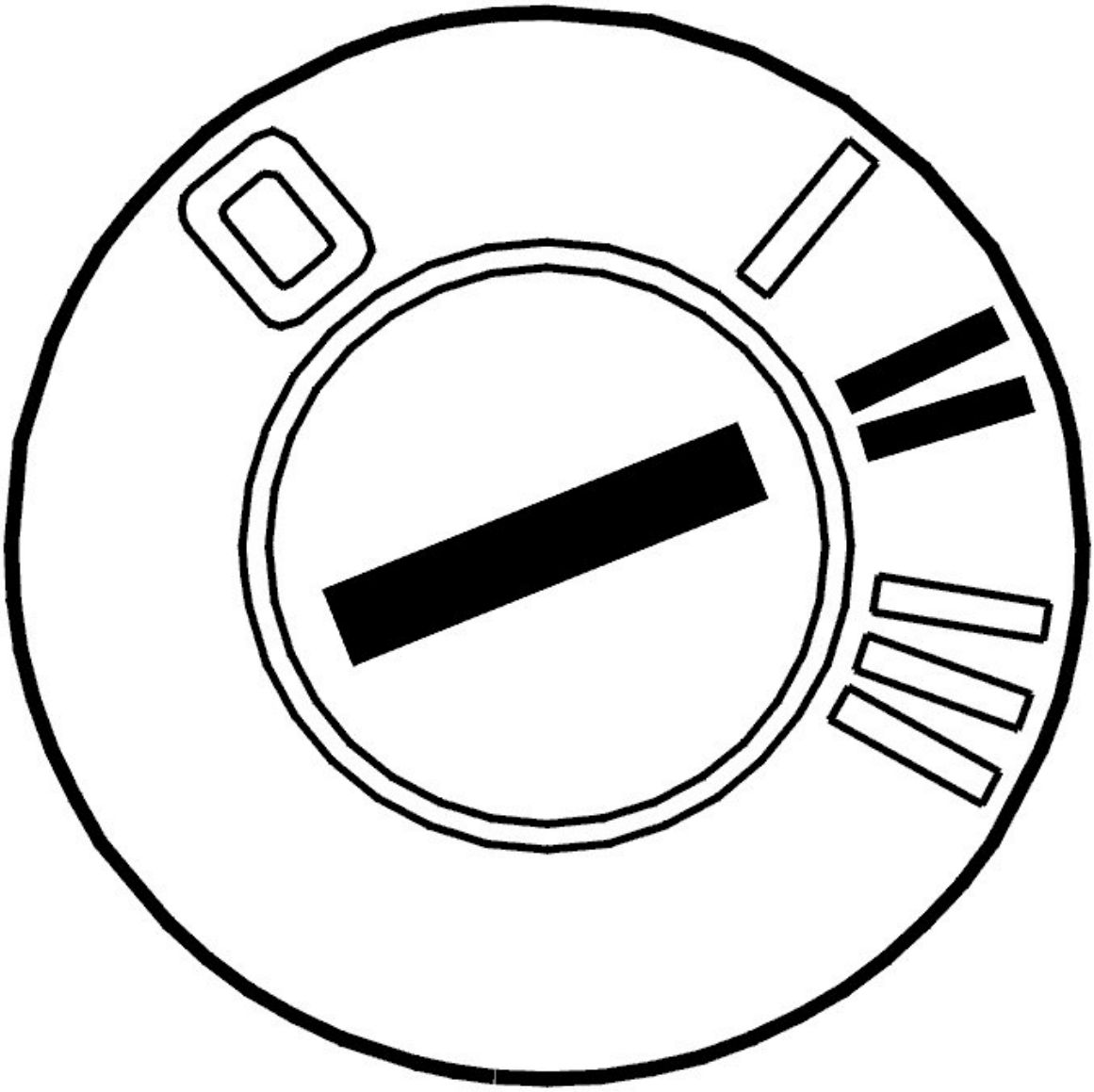
Select an alternative.

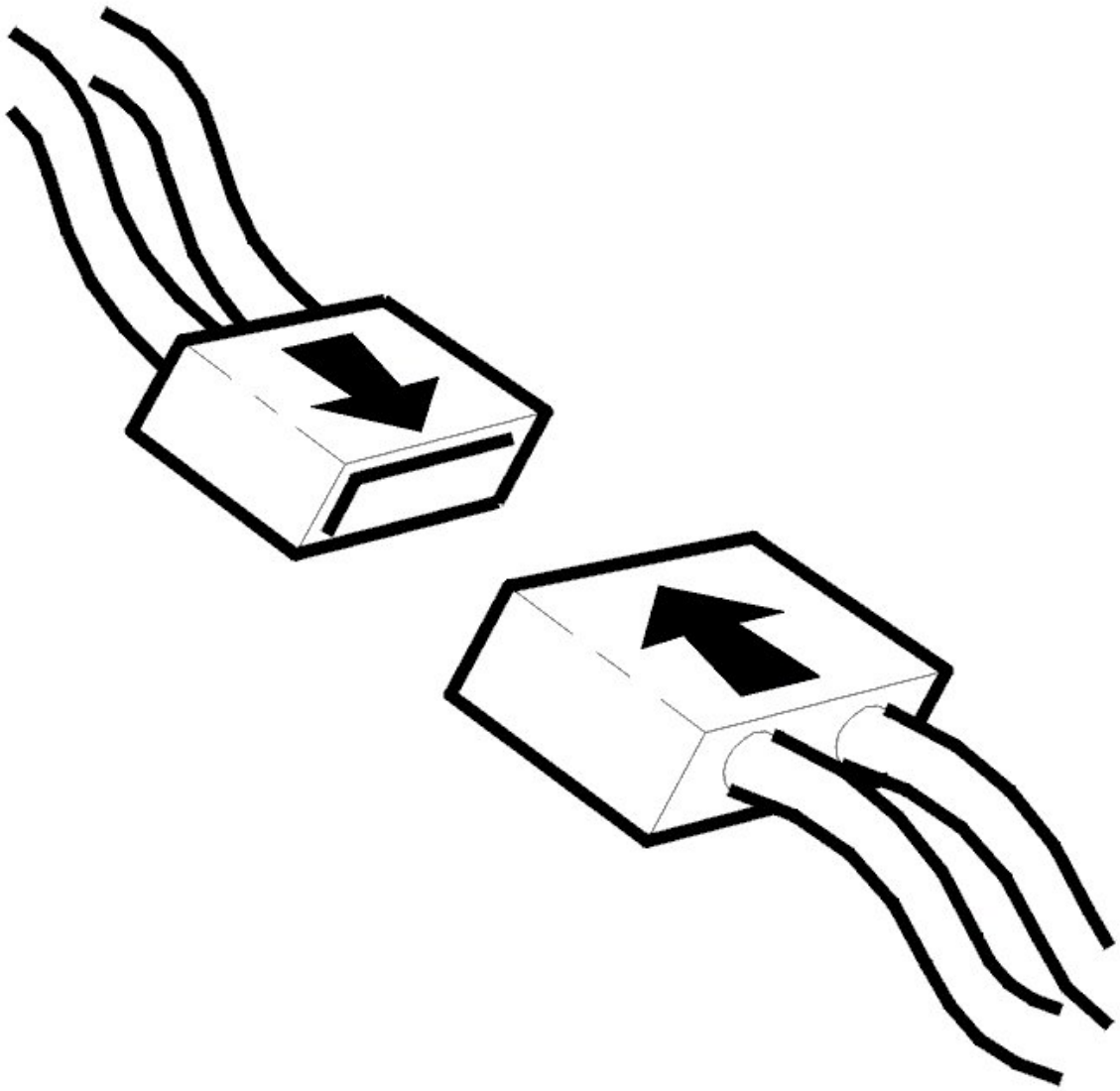
1 - Checking the connectors and wiring

2 - Checking LIN bus 2 and connector

3 - Checking the wiring and component

Checking the connectors and wiring





- Ignition off
- Disconnect the connector for the climate control module (CCM)
- Disconnect the connector for the central electronic module (CEM)
- Ignition on.

Checking the power supply and ground terminals

The following applies to components on the climate control unit that communicate with the climate control module (CCM) via LIN bus 1 and LIN bus 2:

- All components are jointly powered via a fuse from the central electronic module (CEM)
- All components are grounded via a common ground terminal.

Check the power supply to the components on the climate control unit by taking a reading on connector A for the central electronic module (CEM) between terminal #A44 (C44) and chassis ground.
Also check the fuse on the central electronic module (CEM).
Check the power supply cable between the central electronic module (CEM) and the connector for the climate control unit. Check for an open-circuit. Measure between terminal #1 on the connector for the climate control unit and chassis ground.
Check the ground terminal for the components on the climate control unit. Measure between the connector for climate control unit terminal #6 and chassis ground.
Check the connector for the climate control unit and connector A for the central electronic module (CEM). Check for contact resistance. Check for oxidation. Check for loose connections.

Checking LIN bus

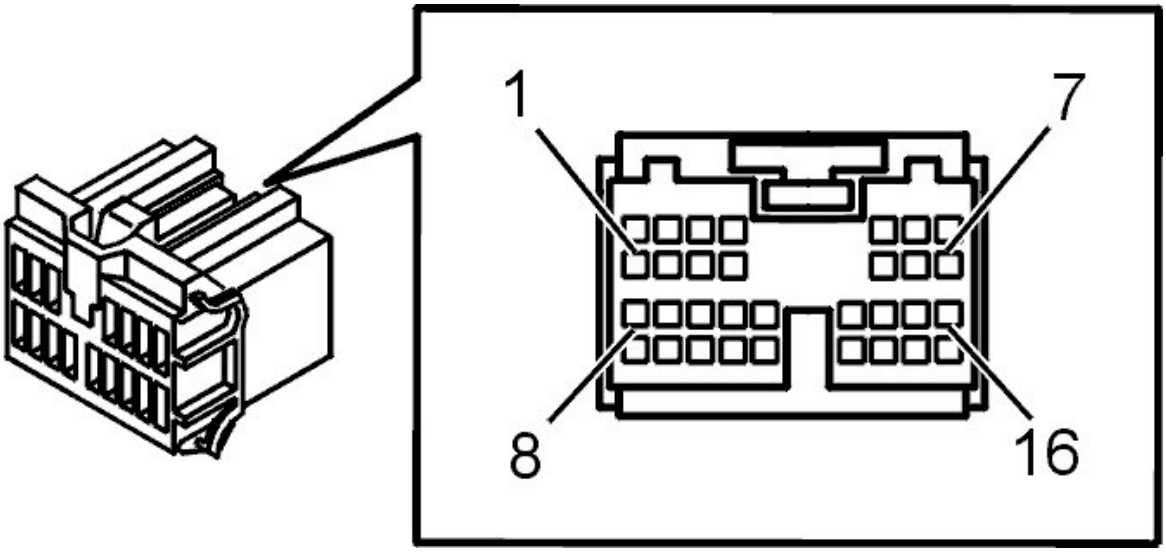
Check both LIN bus 1 and LIN bus 2. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #12 (#36) and the connector for climate control unit terminal #2
- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5.

Check the wiring between the connector and the components on the climate control unit. Check for an open-circuit.
Remedy as necessary.

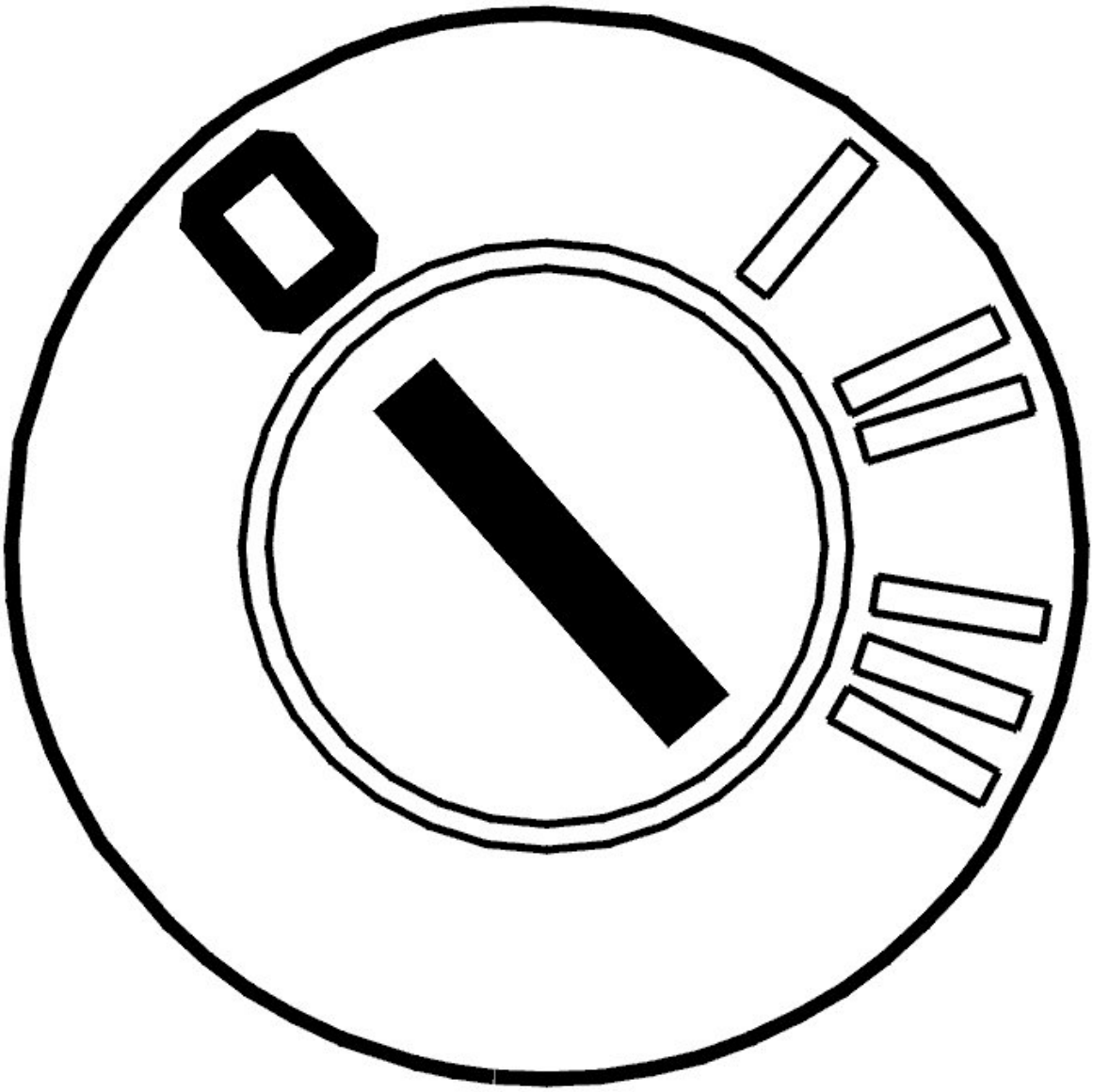
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- To connect the breakout box to the climate control module (CCM), see: Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To connect the breakout box, central electronic module (CEM), see: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking LIN bus 2 and connector



- Ignition off
- Disconnect the connector for the climate control module (CCM).

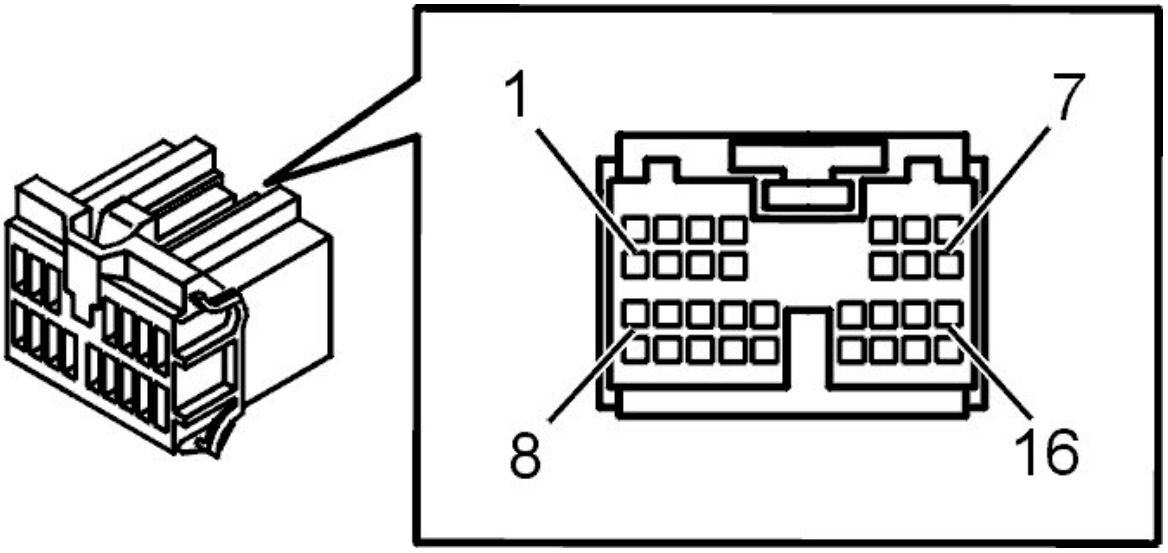
Check the climate control module (CCM) connector. Check for contact resistance. Check for oxidation. Check for loose connections.
Check LIN bus 2 between the climate control module (CCM), the connector for the climate control unit and the seat heating module (SHM) left. Check for an open-circuit.
Take readings between:

- The connector for climate control module (CCM) terminal #7 (#31) and the connector for climate control unit terminal #5
- The connector for climate control module (CCM) terminal #7 (#31) and connector A for seat heating module (SHM) left terminal #2.

Check LIN bus 2 between the components (the damper motors and the air quality sensor (AQS)) and the connector for the climate control unit. Check for an open-circuit.
Check the connector for the climate control unit. Check for contact resistance. Check for oxidation. Check for loose connections.
Remedy as necessary.

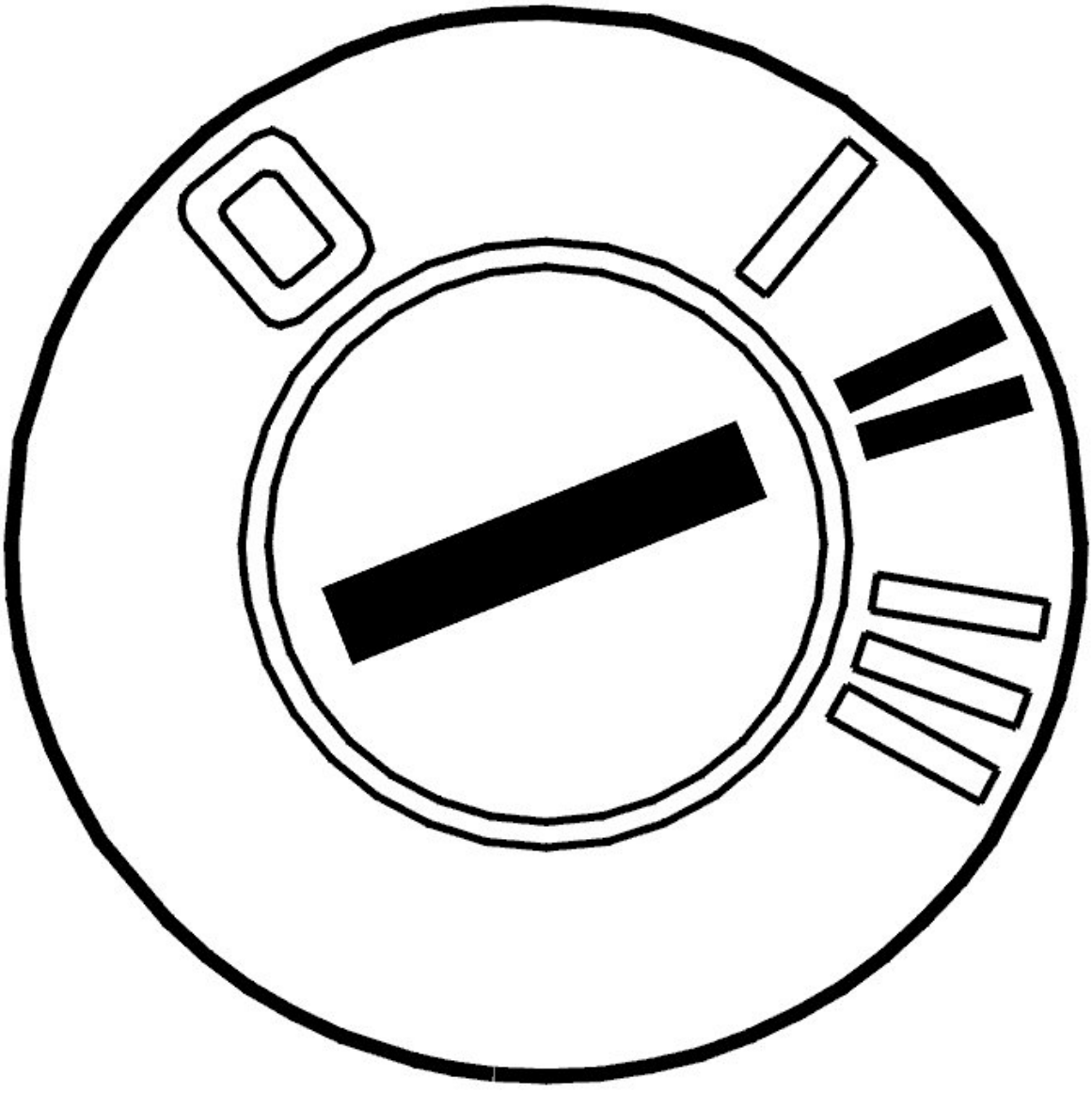
Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking the wiring and component



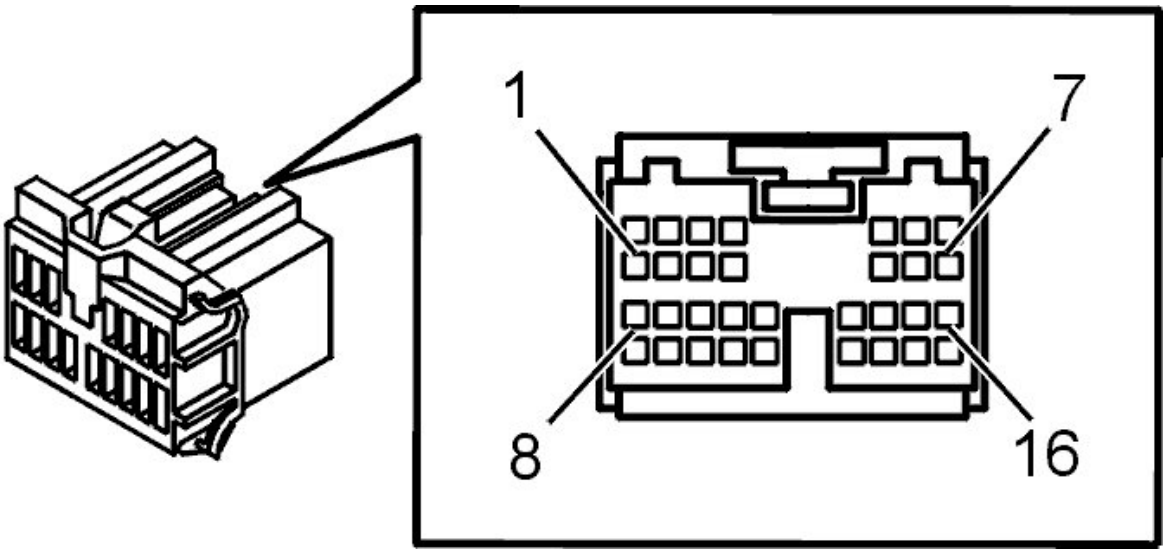
- Ignition off
- Disconnect the connector for the air quality sensor (AQS)
- Ignition on.

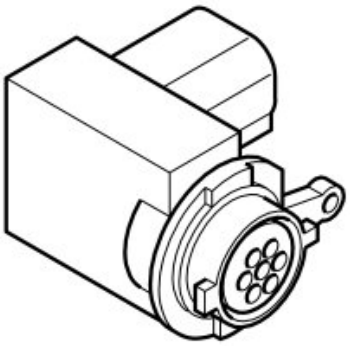
Check the connector for the air quality sensor (AQS). Check for contact resistance. Check for oxidation. Check for loose connections.
Check that the air quality sensor (AQS) is connected to the power supply and ground.

Measure the voltage at the connector for the air quality sensor (AQS) between terminals #1 and #3.
Check LIN bus 2 by taking a reading between sensor connector terminal #2 and the connector for climate control unit terminal #5. Check for an open-circuit.
Try replacing the air quality sensor (AQS) if no fault is found.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Air quality sensor, replacing See: Heating and Air Conditioning/Climate Control Exhaust Gas Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





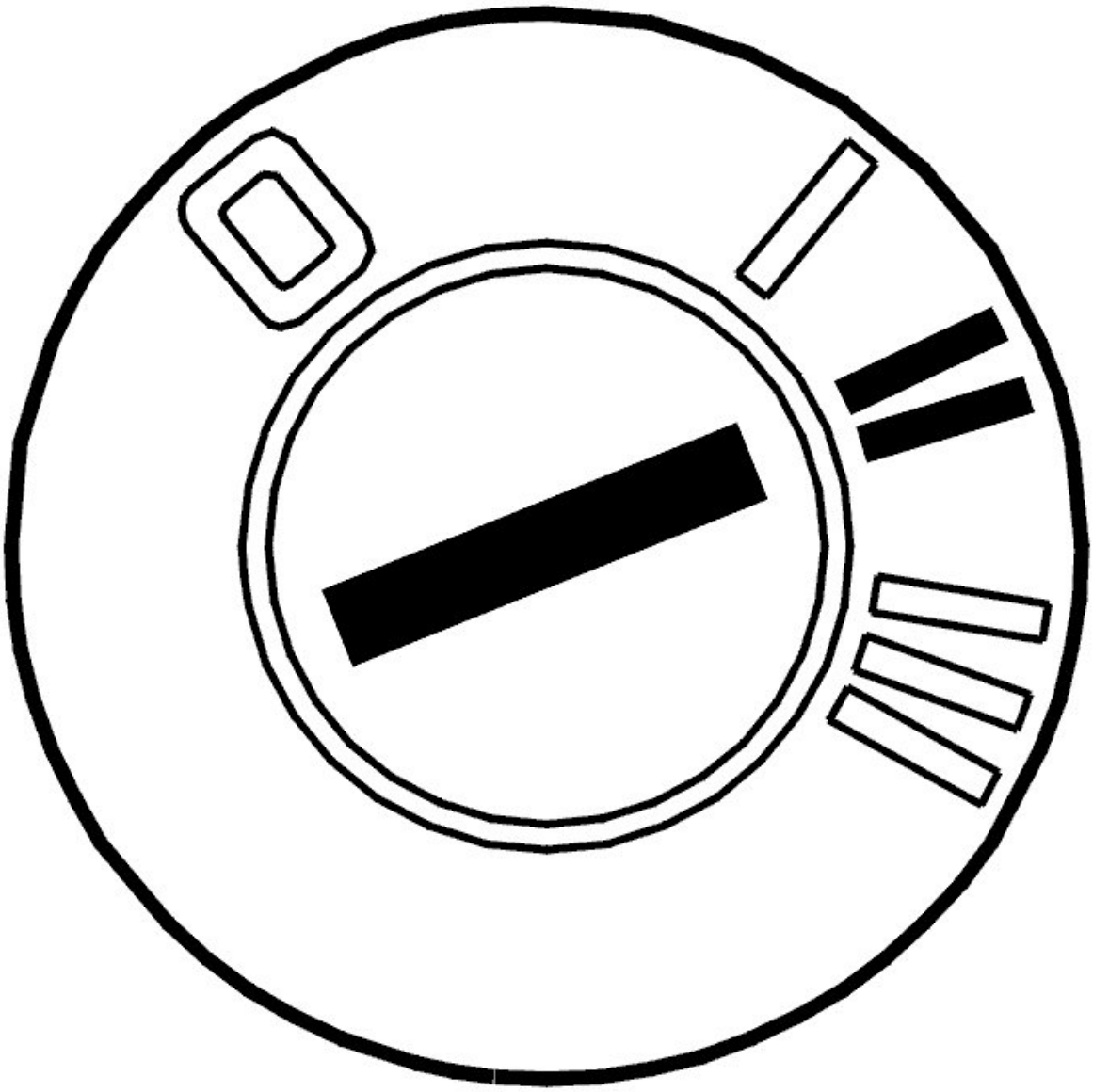
Continue - Verification

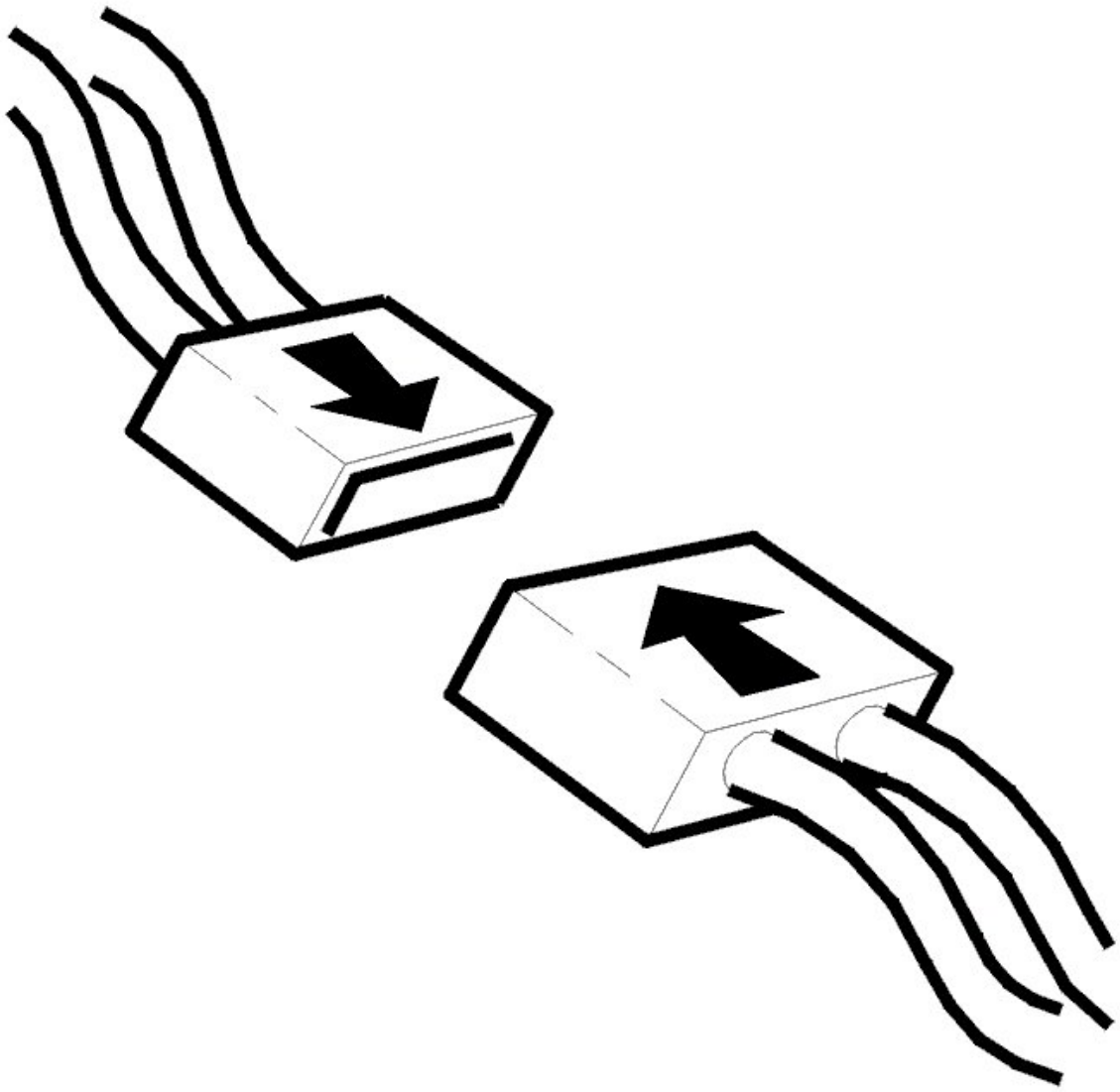
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

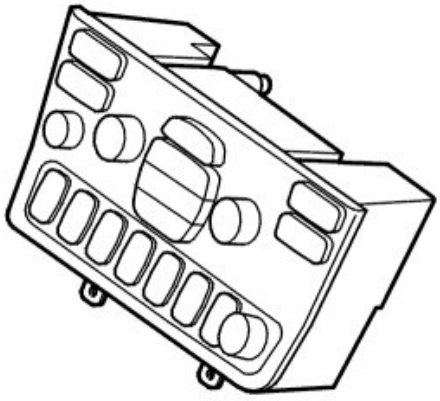
FAULT FOUND - Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

CCM-E001

Diagnostic trouble code (DTC) information CCM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference on the low speed network (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

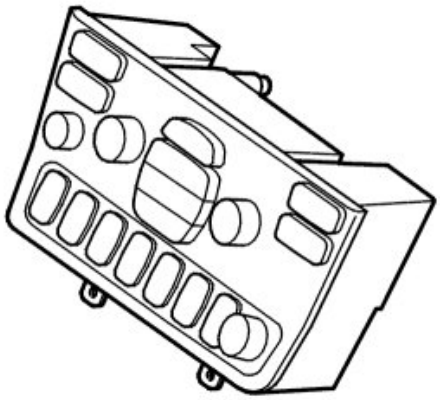
Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- The function button is not working.
- Blower fan not operating.
- The front seat heating does not function.
- Functions in the infotainment system do not work.

CCM-E003

Diagnostic trouble code (DTC) information CCM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic commands. However normal control area network (CAN) communication does not work ("Expulsion mode").

Substitute value
- None.

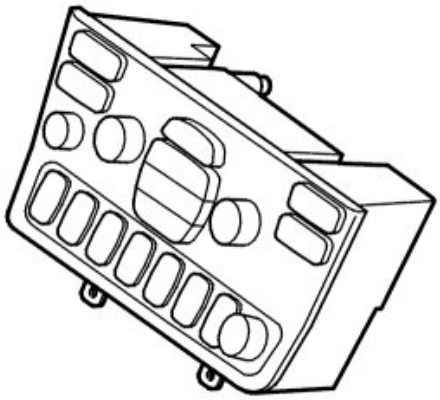
Possible source
- Faulty control area network (CAN) configuration ID. (The control module is not intended for this vehicle, for example, a used control module with different software/hardware)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- The function button is not working.
- Blower fan not operating.
- The front seat heating does not function.
- Functions in the infotainment system do not work.

CCM-E010

Diagnostic trouble code (DTC) information CCM-E010

Condition



The diagnostic trouble code (DTC) is stored if the supply voltage to the climate control module (CCM) differs by more than 2 V from the supply voltage to the central electronic module (CEM).
The climate control module (CCM) receives information about supply voltage from the central electronic module (CEM) via the CAN network.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

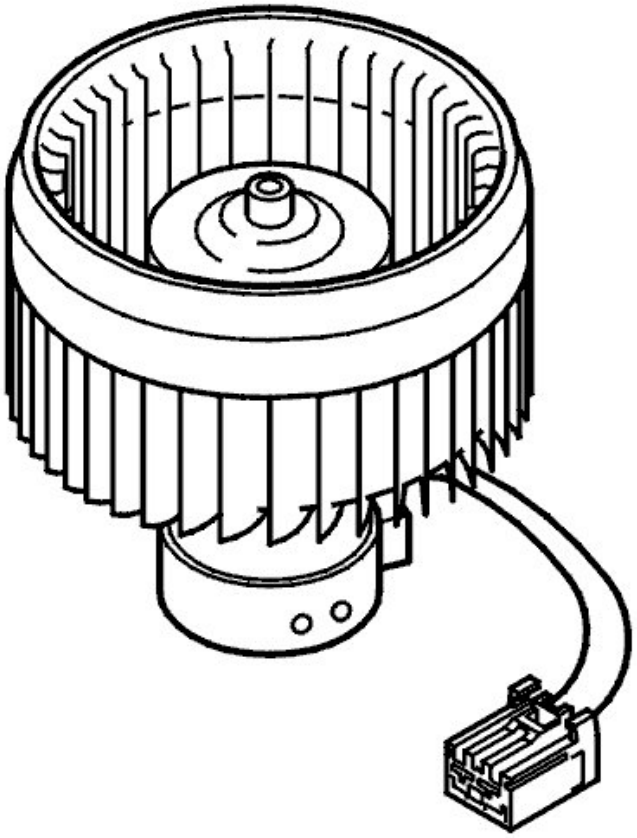
Possible source
- Short-circuit to ground in the cable harness
- Open-circuit in the cable harness
- Contact resistance
- Half-burned fuse to the climate control module (CCM).

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- The function button is not working.
- Blower fan not operating.
- The front seat heating does not function.
- Functions in the infotainment system do not work.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-00A0

Condition



Diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the diagnostic signal from the blower fan power unit is below 1.28 V and the control current to the blower fan power unit is below 0.42 mA.

Substitute value

- The control module will not allow the blower fan motor to start while the fault persists
- The air conditioning (A/C) compressor is not allowed to start.

Possible source

- Short-circuit to ground in the motor signal cable
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the diagnostic signal cable
- Short-circuit to ground in the diagnostic signal cable
- Defective blower fan motor or power unit.

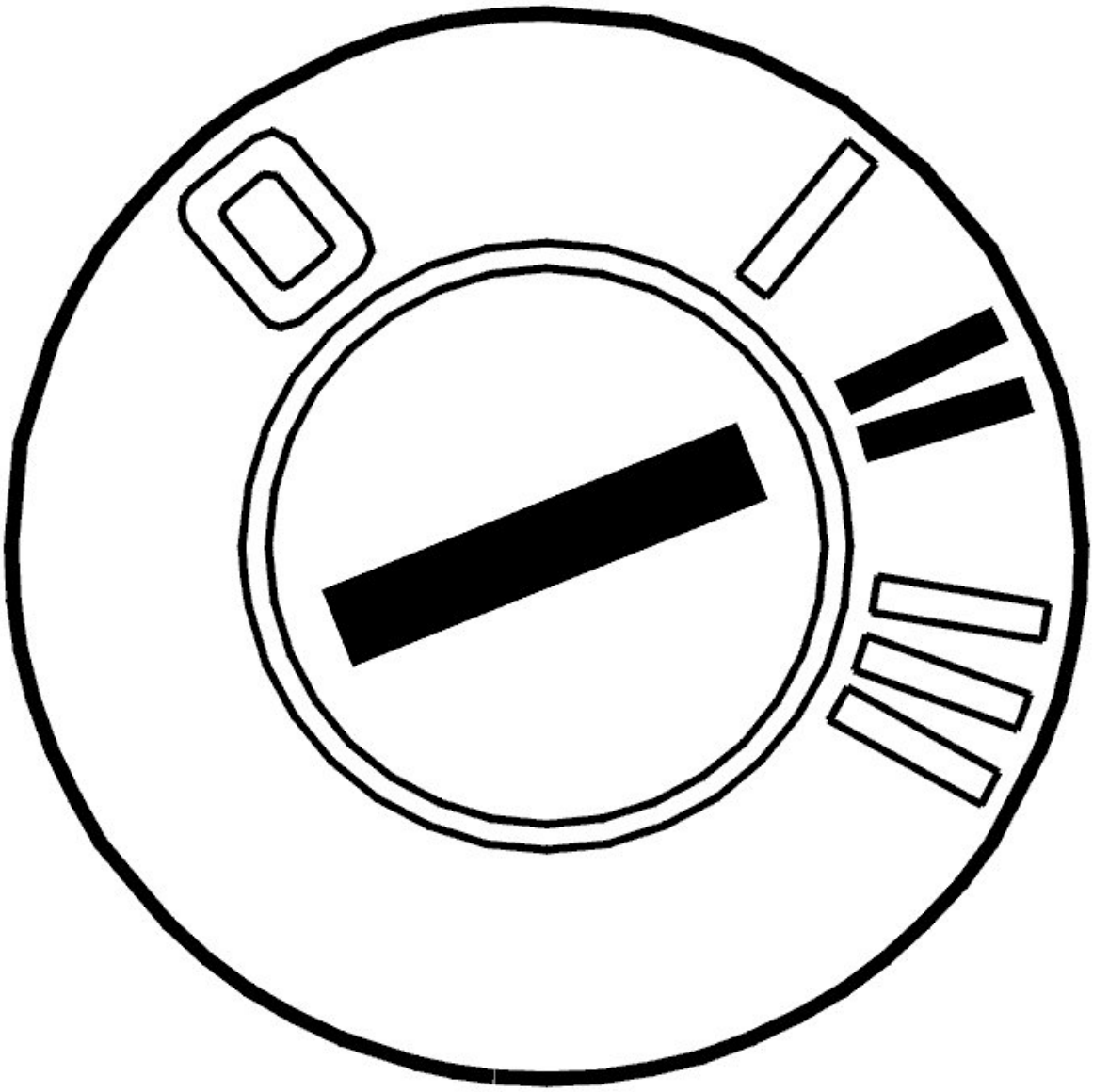
Fault symptom[s]

- Blower fan not operating.
- Air flow problem.
- No cooling from the air conditioning (A/C) system.

Signal Too Low

Signal too low

Checking the blower fan



- Ignition on.

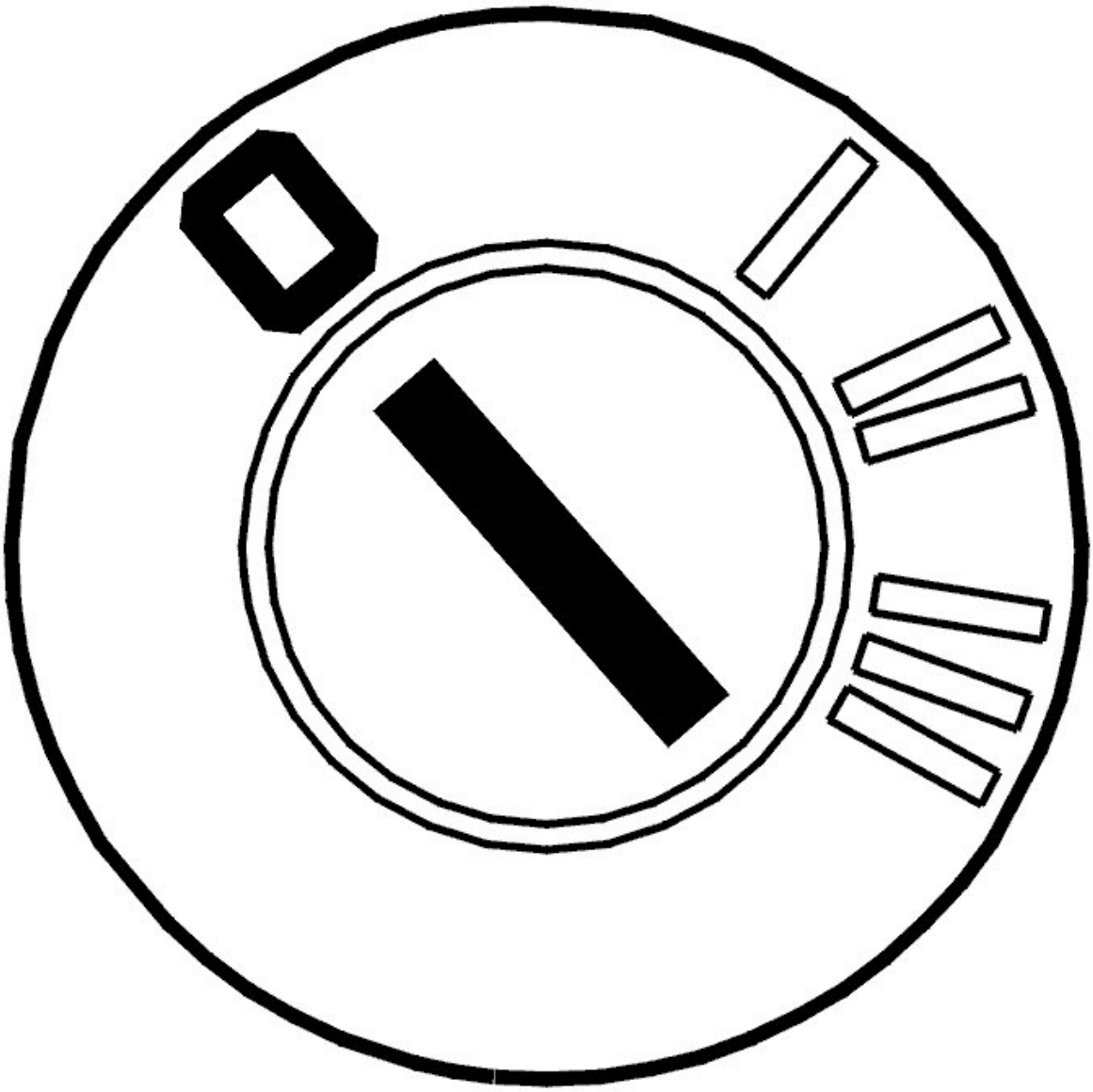
Check that the blower fan functions by turning the blower fan knob to maximum fan speed.

Is the blower fan working?

Yes - Checking the wiring

No - Checking the component and wiring

Checking the component and wiring



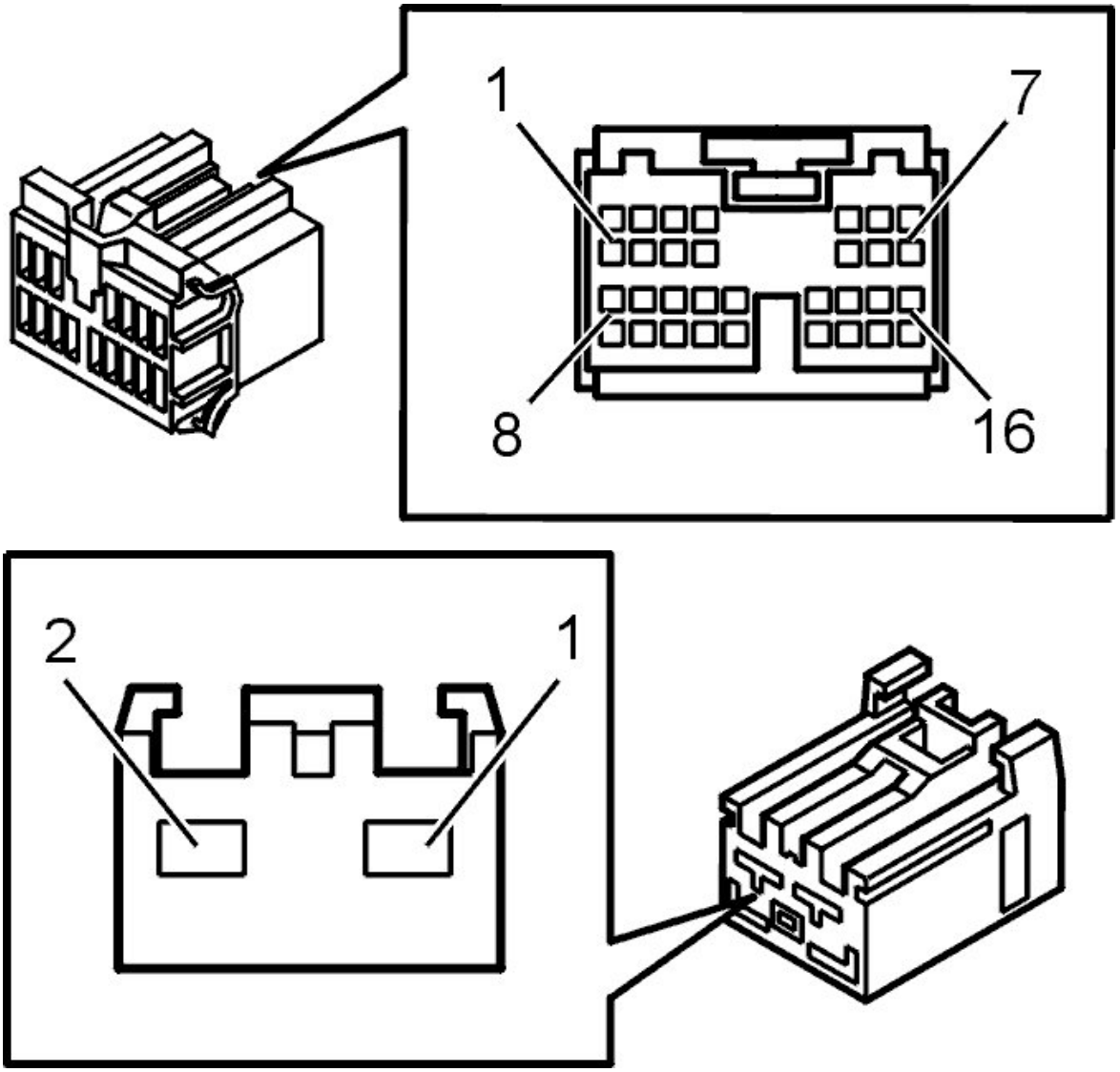
- Ignition off.

Caution! The blower fan motor power unit is very sensitive to short-circuits and excess current. Do not damage the power unit when taking readings.Take readings with the power unit connector disconnected when checking the wiring.

Check if the fuse for the climate control module (CCM) is defective. If the fuse is defective, check:
- the signal cable between the fuse and the power unit terminal #A2. Check for a short-circuit to ground
- the signal cable between the power unit terminal #B2 and the blower fan motor positive terminal. Check for a short-circuit to ground.

Check the control signal cable between control module terminal #A3 and power unit terminal #A1. Check for a short-circuit to supply voltage.
Check the diagnostic signal cable between control module terminal #A2 and power unit terminal #A3. Check for an open-circuit. Check for a short-circuit to ground.
Remedy as necessary.

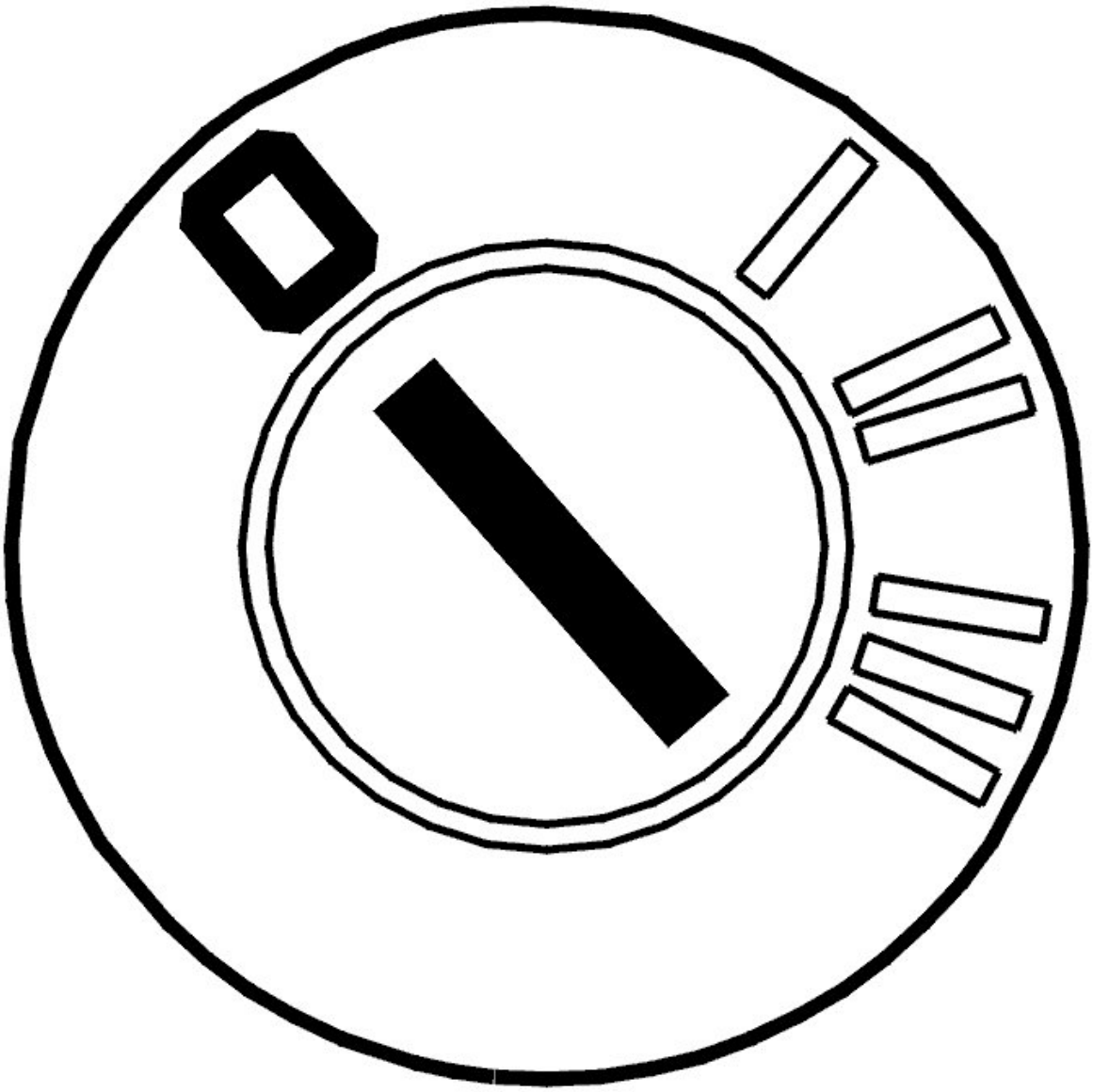
Other information:
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access the control module or connect the breakout box, see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To access or replace the power unit, see Blower fan motor / power unit, replacing See: Heating and Air Conditioning/Blower Motor/Service and Repair
- With the ignition on and the power unit connector disconnected, the voltage between power unit connector terminal #A2 (control module side) and ground must be approximately 13.5 V
- For other values, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select "Continue" when the fault has been remedied.

Continue - Verification

Checking the wiring



- Ignition off.

Caution! The blower fan motor power unit is very sensitive to short-circuits and excess current. Do not damage the power unit when taking readings.Take readings with the power unit connector disconnected when checking the wiring.

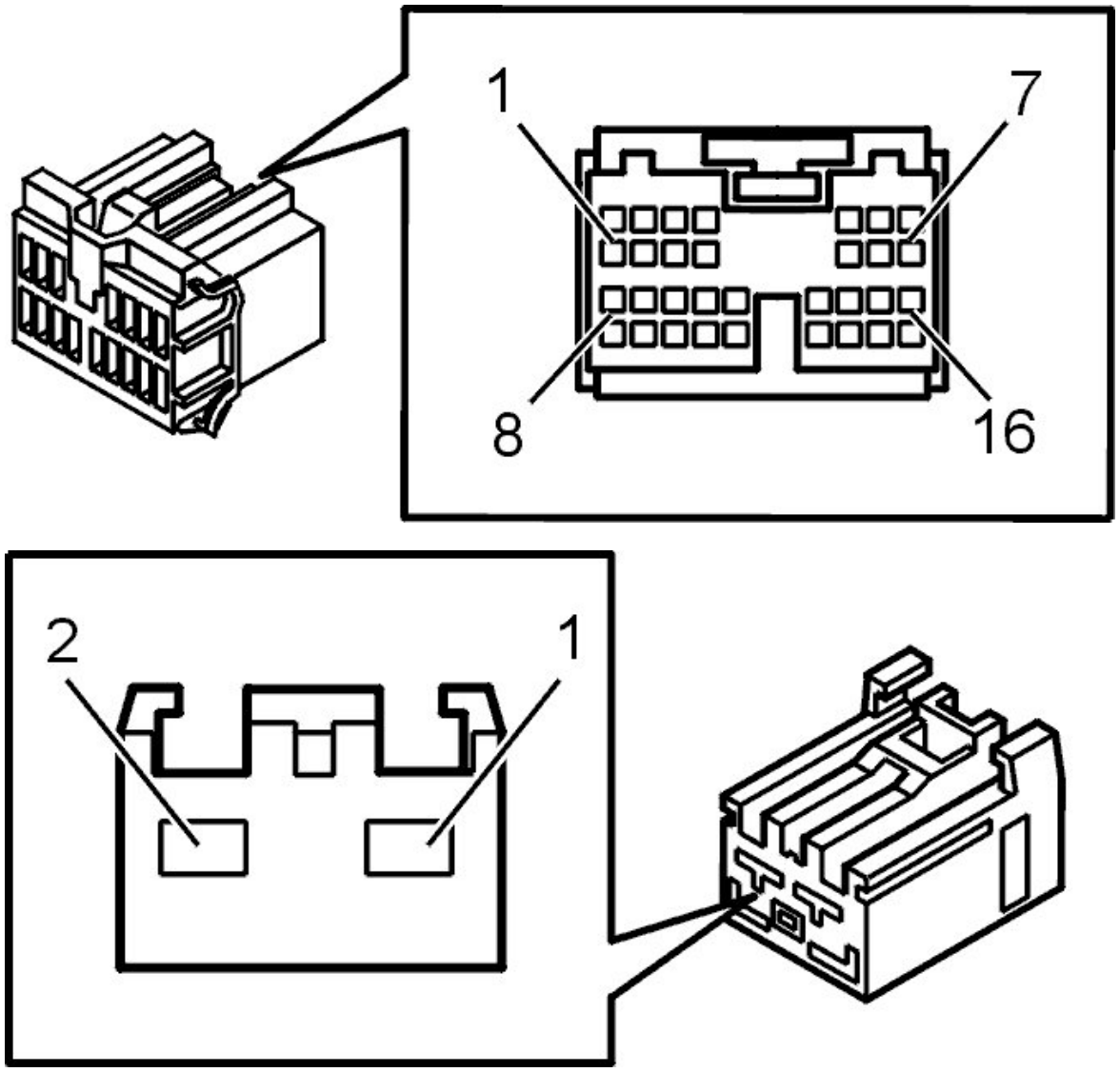
Check the signal cable between the fuse and the power unit terminal #A2. Check for an intermittent short-circuit to ground.
Check the signal cable between power unit terminal #B2 and blower fan motor positive terminal. Check for an intermittent short-circuit to ground.
Check the control signal cable between control module terminal #A3 and power unit terminal #A1. Check for an intermittent short-circuit to supply voltage.
Check the diagnostic signal cable between control module terminal #A2 and power unit terminal #A3. Check for an intermittent open-circuit.
Check for a short-circuit to ground.

Note! If the battery voltage has been interrupted, the blower fan speed must be calibrated. First turn the blower fan speed control to maximum speed and then to minimum speed.

Remedy as necessary.

Other information:

- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To access or replace the power unit, see Blower fan motor / power unit, replacing See: Heating and Air Conditioning/Blower Motor/Service and Repair
- With the ignition on and the power unit connector disconnected, the voltage between power unit connector terminal #A2 (control module side) and ground must be approximately 13.5 V
- For other values, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select "Continue" when the fault has been remedied.

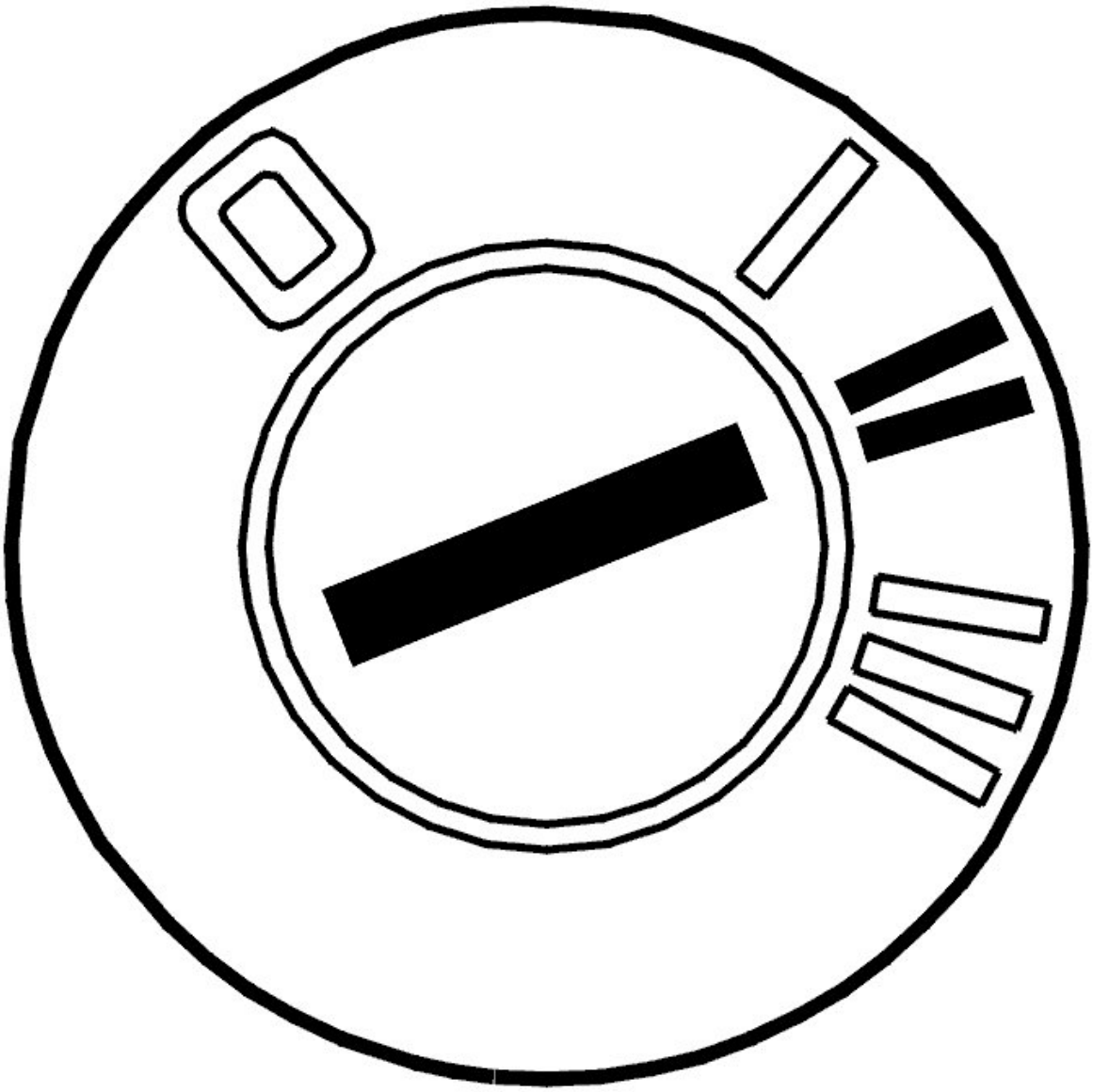
Continue - Fault-tracing information

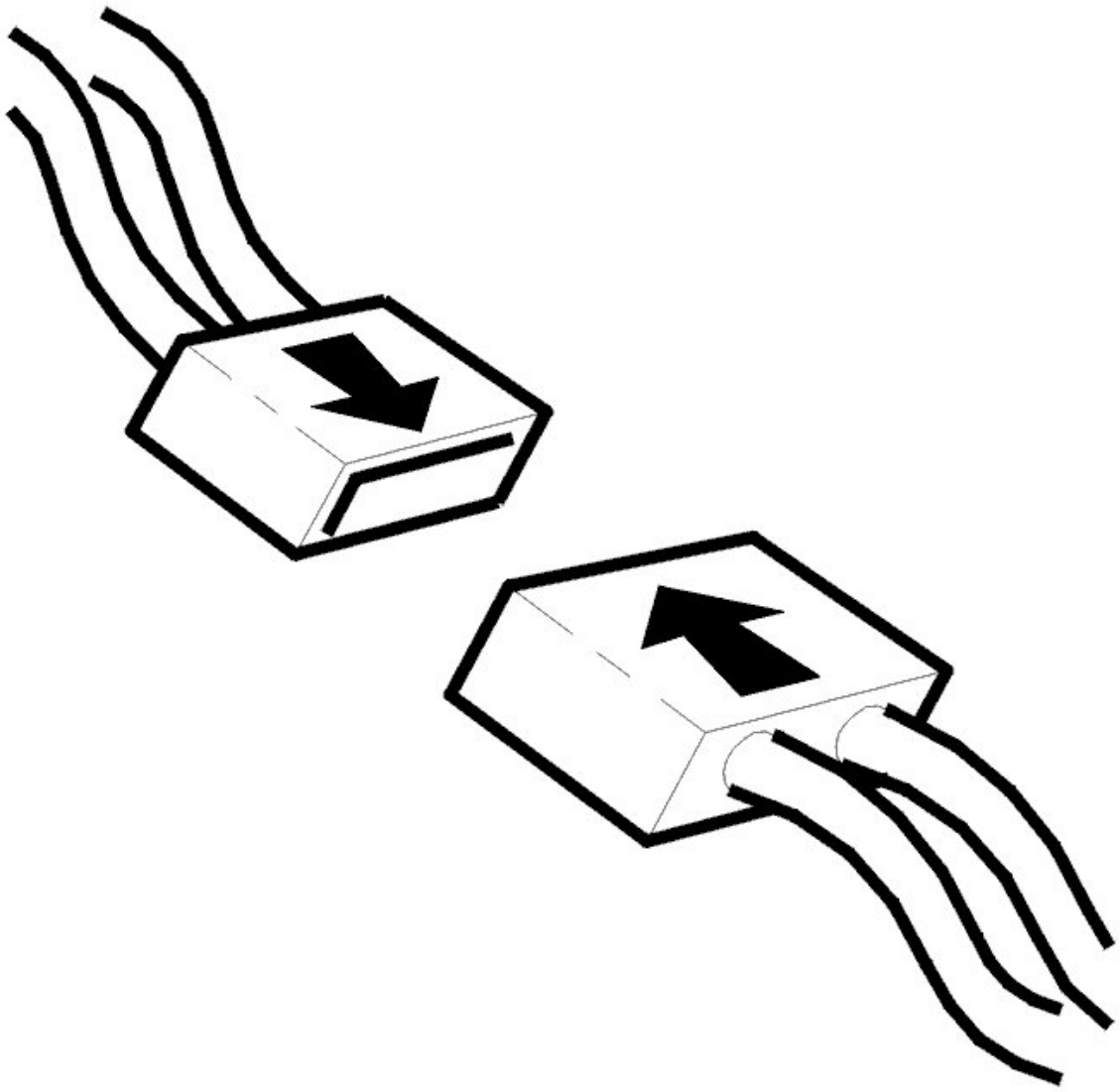
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.
- Read the diagnostic trouble codes.

If the status of the diagnostic trouble code has changed to an intermittent fault this indicates that the fault has been rectified.

Has the status of the diagnostic trouble code changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the blower fan

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

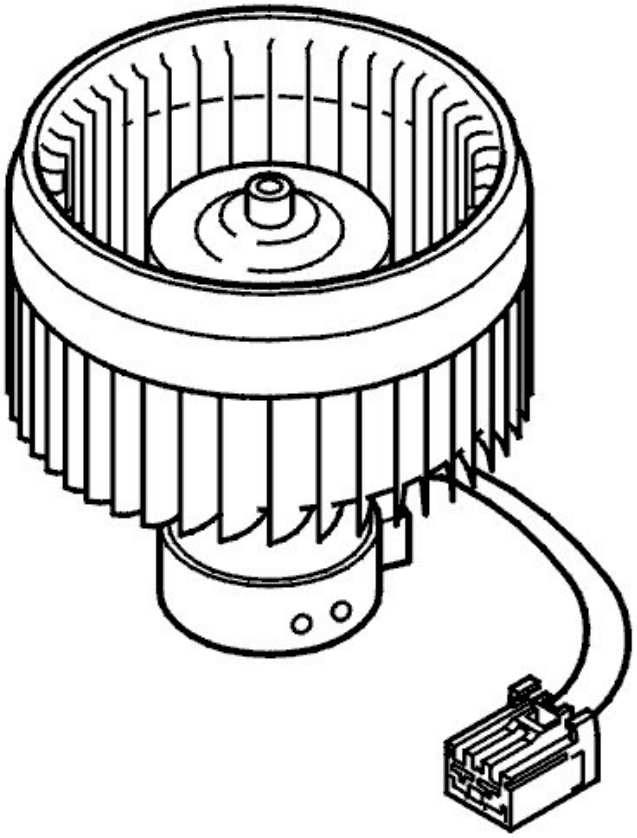
Attempt New Test - Checking the blower fan

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-00A1

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the diagnostic signal from the blower fan power unit is in excess of 10 V and the control current to the blower fan power unit is above 8.56 mA.

Substitute value
- The blower fan cannot start while the fault persists
- The air conditioning (A/C) compressor is not allowed to start.

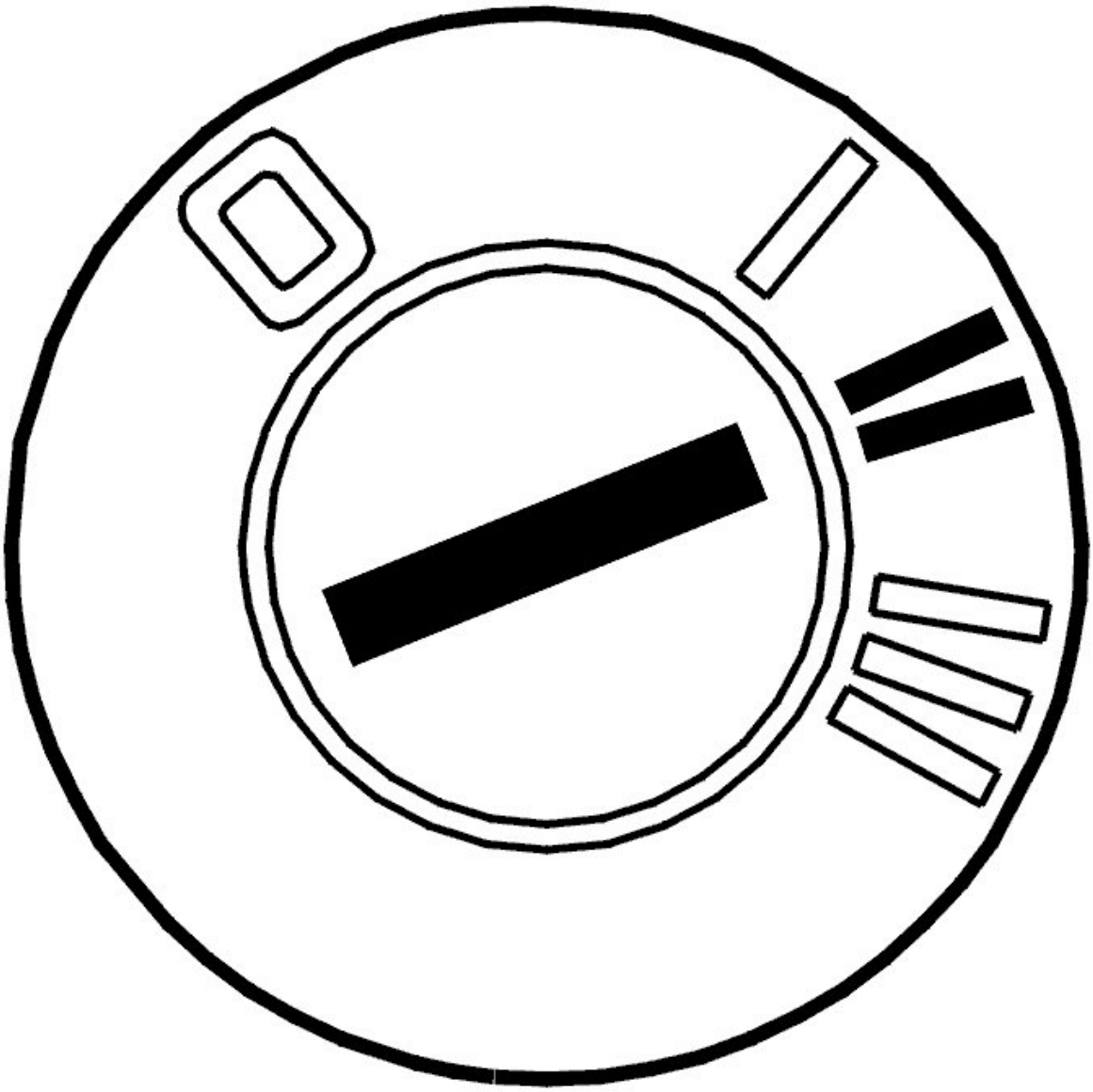
Possible source
- Blocked blower fan motor
- Open-circuit in the signal cable
- Open-circuit in the ground lead for the blower fan motor
- Short-circuit to supply voltage in the ground lead for the blower fan motor
- Short-circuit to ground in the control signal cable
- Open-circuit in the control signal cable
- Short-circuit to supply voltage in the diagnostic signal cable
- Defective blower fan motor or power unit
- Contact resistance.

Fault symptom[s]
- Blower fan not operating.
- Air flow problem.
- No cooling from the air conditioning (A/C) system.

Signal Too High

Signal too high

Checking the blower fan



- Ignition on.

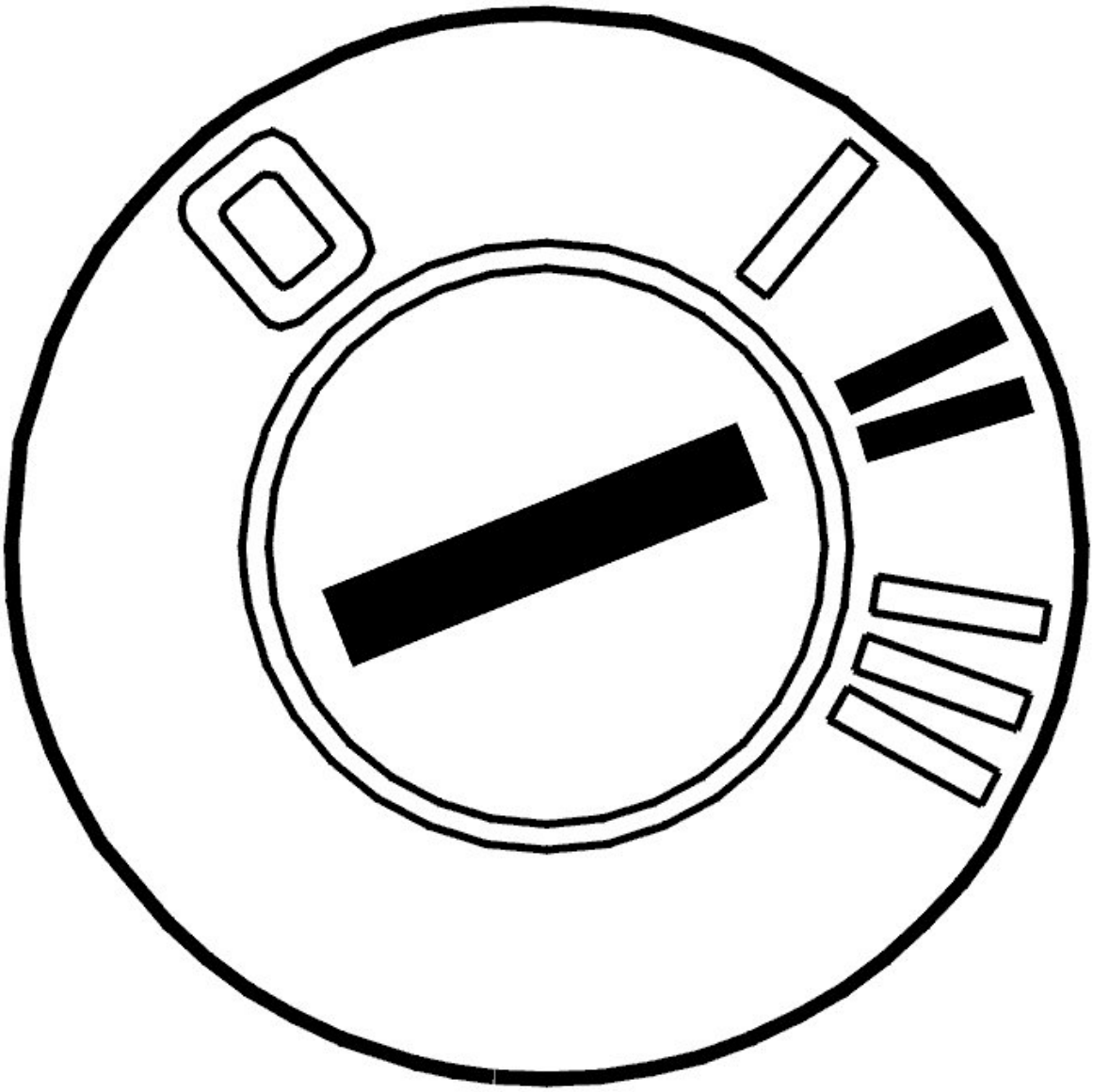
Check that the blower fan functions by turning the blower fan knob to maximum fan speed.

Is the blower fan working?

Yes - Checking the connectors and cables

No - Checking the connectors

Checking the connectors



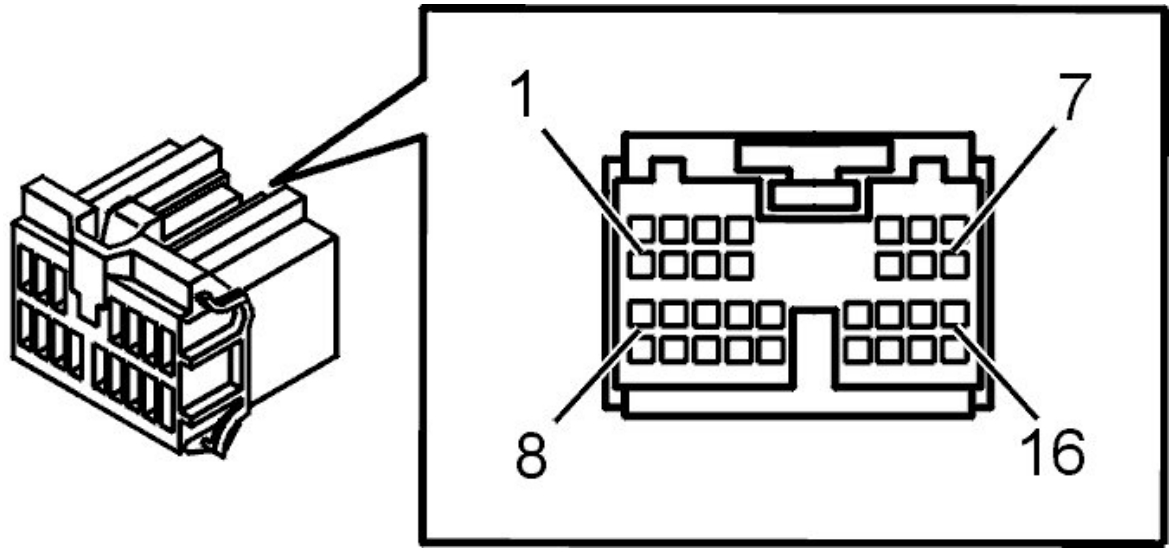
- Ignition off
- Check the connectors on the climate control module (CCM) (terminals #A2, #A3) and the power unit. Check for contact resistance and oxidation. In particular, check for any damage
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

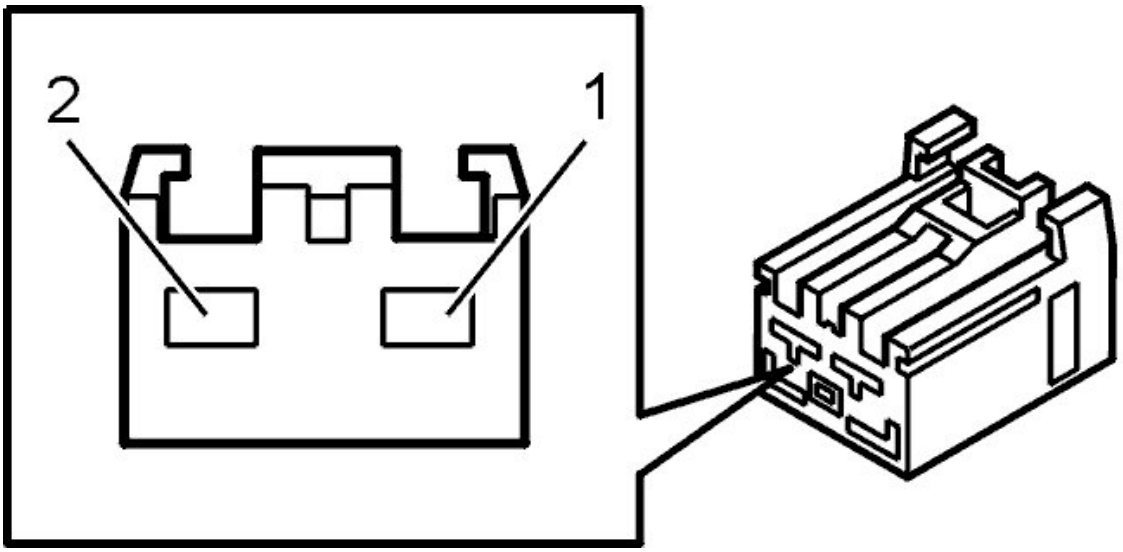
Note! If the battery voltage has been interrupted, the blower fan speed must be calibrated. First turn the blower fan speed control to maximum speed and then to minimum speed.

Check that the blower fan motor functions: Turn the blower fan speed switch.
If the blower fan is now working the cause of the fault was loose connections in the connectors.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access or replace the power unit, see Blower fan motor / power unit, replacing See: Heating and Air Conditioning/Blower Motor/Service and Repair.





Is the blower fan motor functioning?

Yes - Fault Found

No - Checking the component and wiring

Checking the component and wiring

Caution! The blower fan motor power unit is very sensitive to short-circuits and excess current. Do not damage the power unit when taking readings.Take readings with the power unit connector disconnected when checking the wiring.

Checking the engine cooling fan (FC) motor

Check the position of the fan in the climate control system to ensure that nothing is blocking the blower fan rotor. Check by hand whether the blower fan rotor can rotate freely.

Checking the wiring

Check the ground lead between the power unit terminal #A4 and the ground terminal. Check for a short-circuit to supply voltage.
Check the control signal cable between control module terminal #A3 and power unit terminal #A1. Check for an open-circuit. Check for a short-circuit to ground.
Check the diagnostic signal cable between control module terminal #A2 and power unit terminal #A3. Check for a short-circuit to supply voltage.

Note! If the battery voltage has been interrupted, the blower fan speed must be calibrated. First turn the blower fan speed control to maximum speed and then to minimum speed.

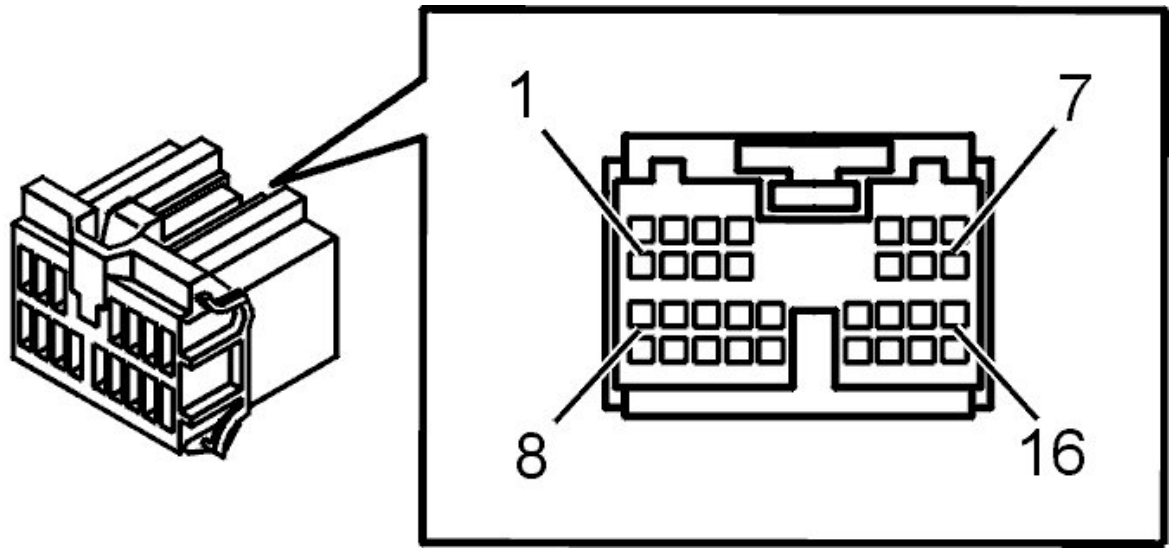
Remedy as necessary.

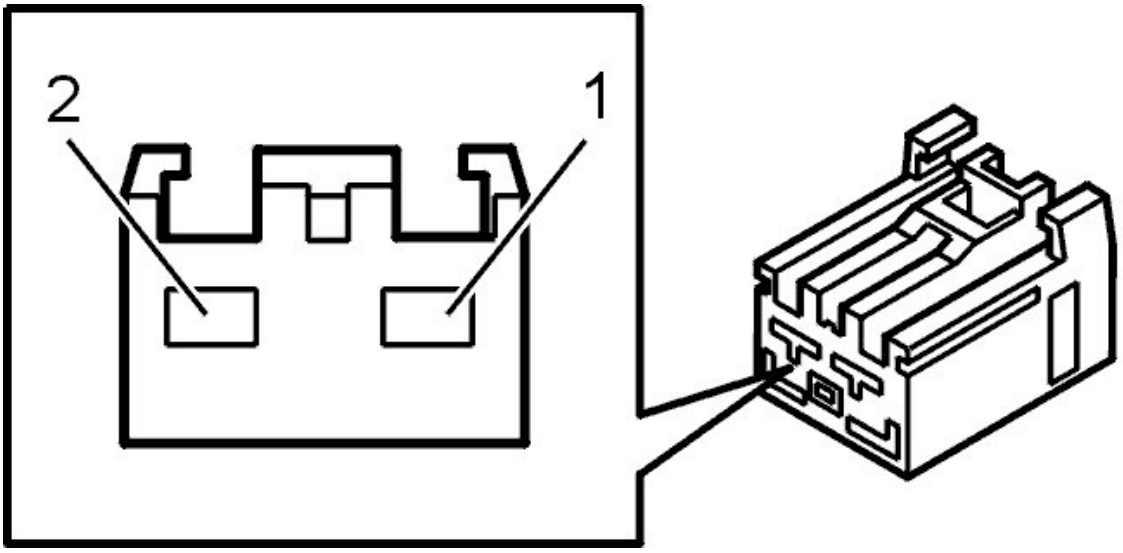
Other information:

- To connect the breakout box, see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and

Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)

- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access or replace the power unit, see Blower fan motor / power unit, replacing See: Heating and Air Conditioning/Blower Motor/Service and Repair
- For other values, see
- For further information about the fuses, relays and ground terminals, see the relevant Wiring Diagram.





Select "Continue" when the fault has been remedied.

Continue - Verification

Checking the connectors and cables

Caution! The blower fan motor power unit is very sensitive to short-circuits and excess current. Do not damage the power unit when taking readings.Take readings with the power unit connector disconnected when checking the wiring.

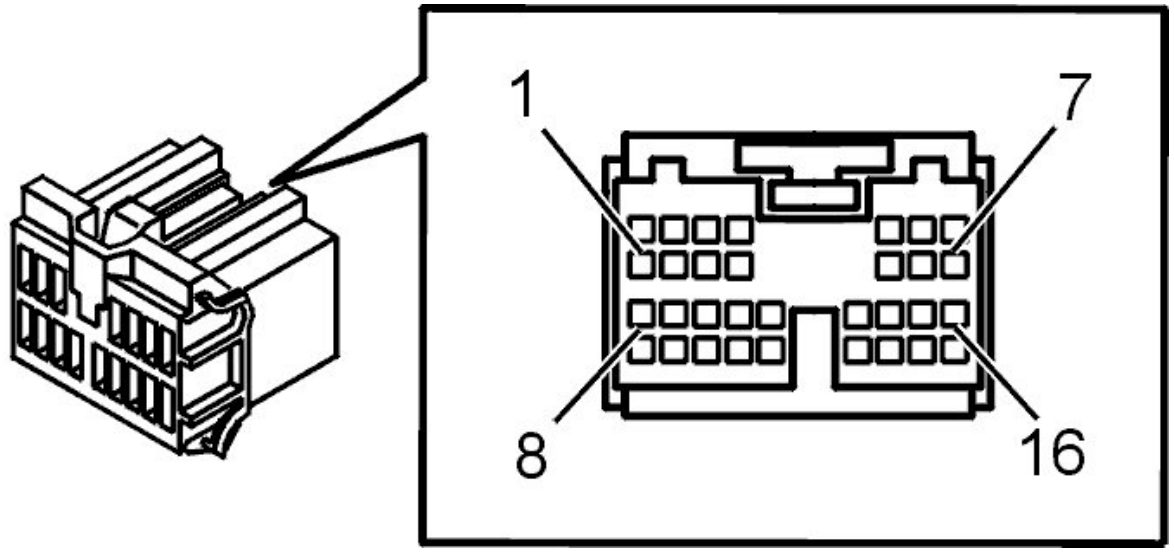
Check the connectors on the control module (terminals #A2, #A3) and the power unit. Check for contact resistance and oxidation. Check for loose connections.
Check the ground lead between the power unit terminal #A4 and the ground terminal. Check for an intermittent short-circuit to supply voltage.
Check the control signal cable between the control module terminal #A3 and power unit terminal #A1. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.
Check the diagnostic signal cable between control module terminal #A2 and power unit terminal #A3. Check for an intermittent short-circuit to supply voltage.

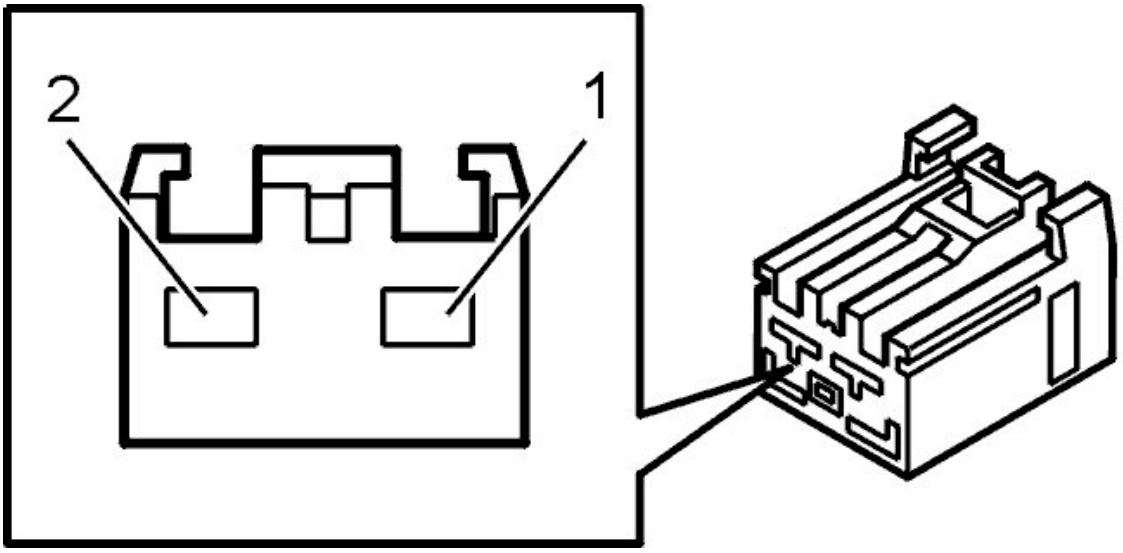
Note! If the battery voltage has been interrupted, the blower fan speed must be calibrated. First turn the blower fan speed control to maximum speed and then to minimum speed.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access or replace the power unit, see Blower fan motor / power unit, replacing See: Heating and Air Conditioning/Blower Motor/Service and Repair
- For other values, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

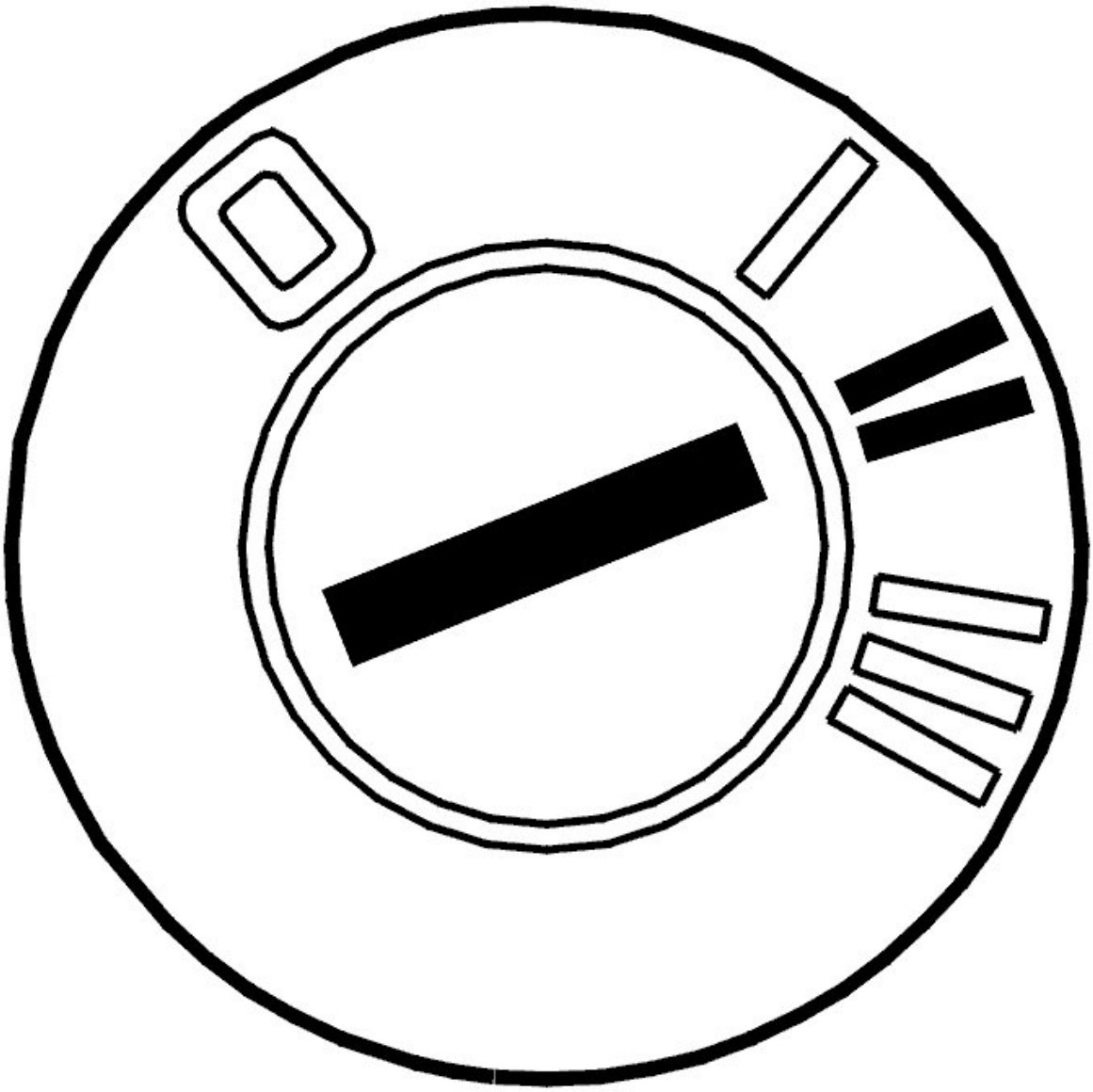
Continue - Fault-tracing information

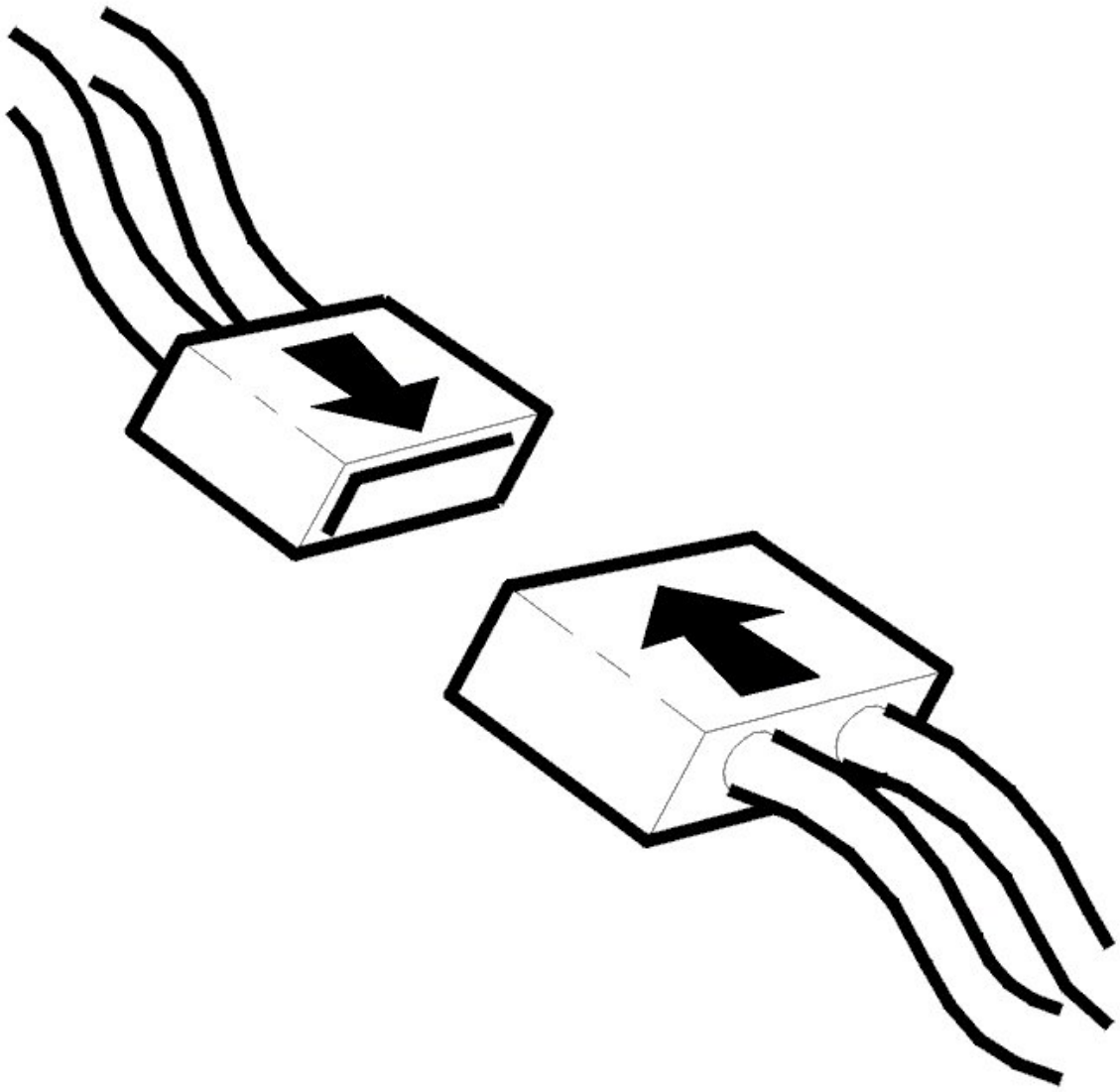
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.
- Read the diagnostic trouble codes.

If the status of the diagnostic trouble code has changed to an intermittent fault this indicates that the fault has been rectified.

Has the status of the diagnostic trouble code changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the blower fan

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

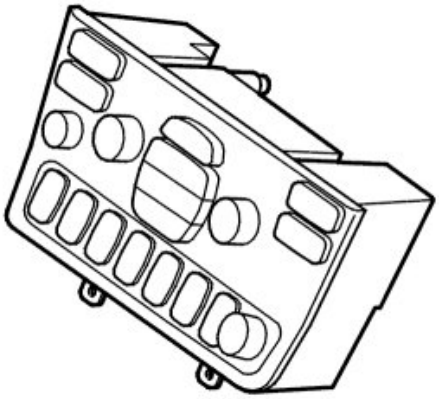
Attempt New Test - Checking the blower fan

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0001

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an incorrect configuration parameter in the Car Configuration File.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

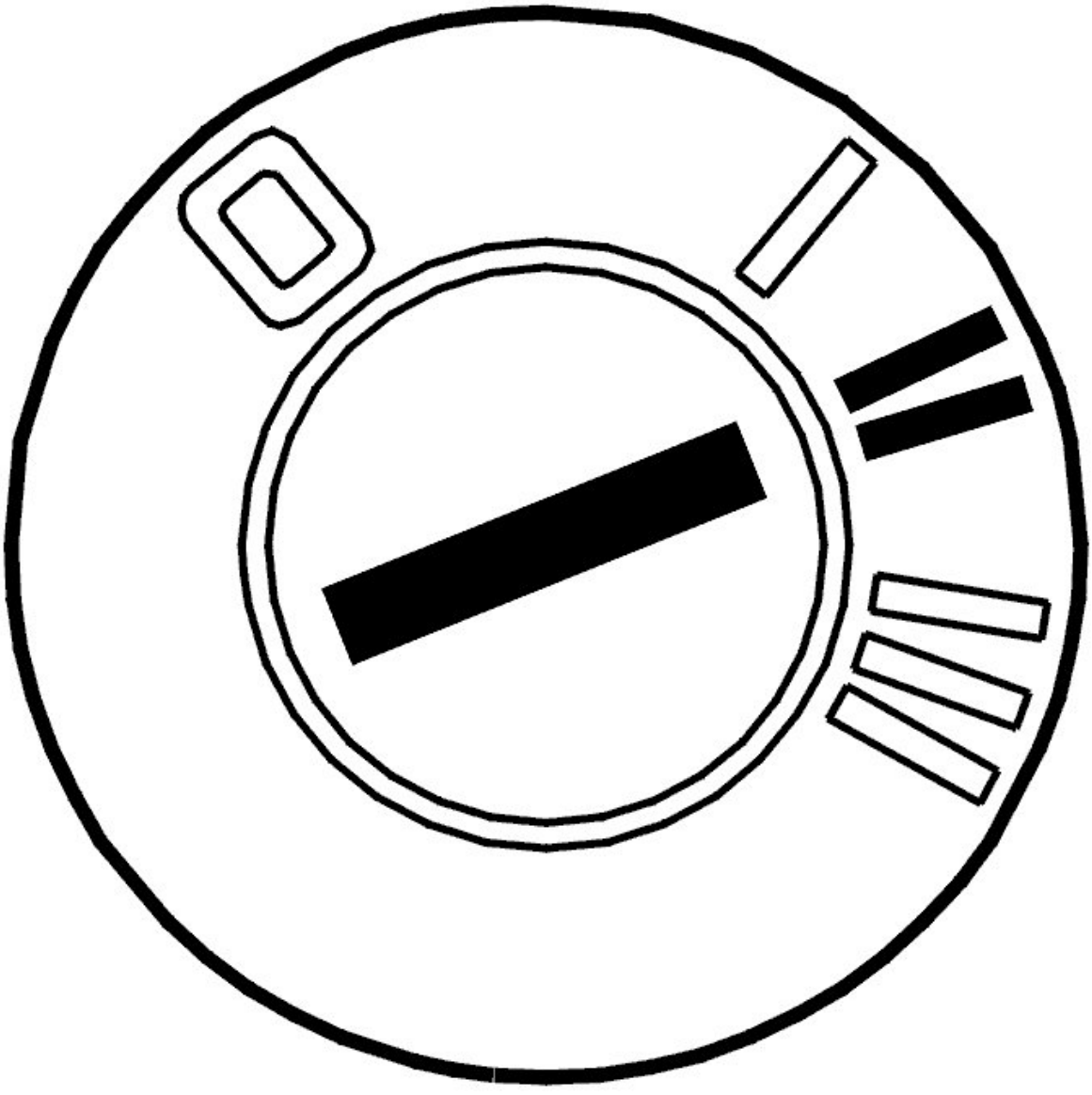
Possible source
- Incorrect configuration parameter.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- The function button is not working.
- Blower fan not operating.
- The front seat heating does not function.
- Functions in the infotainment system do not work.

Non-Approved Value

Non-approved value

Checking data for car configuration



- Ignition on.

The climate control module (CCM) has registered that a parameter in the data for car configuration is incorrect.
Check which parameter is incorrect by clicking on the VCT2000 symbol.
The reason for the parameter being incorrect may be that the climate control module (CCM) has been replaced incorrectly.
Switching the climate control module (CCM) between different cars can result in the data in the car configuration being incorrectly adapted.
If this is the case, remedy by replacing the climate control module (CCM) in the correct way.

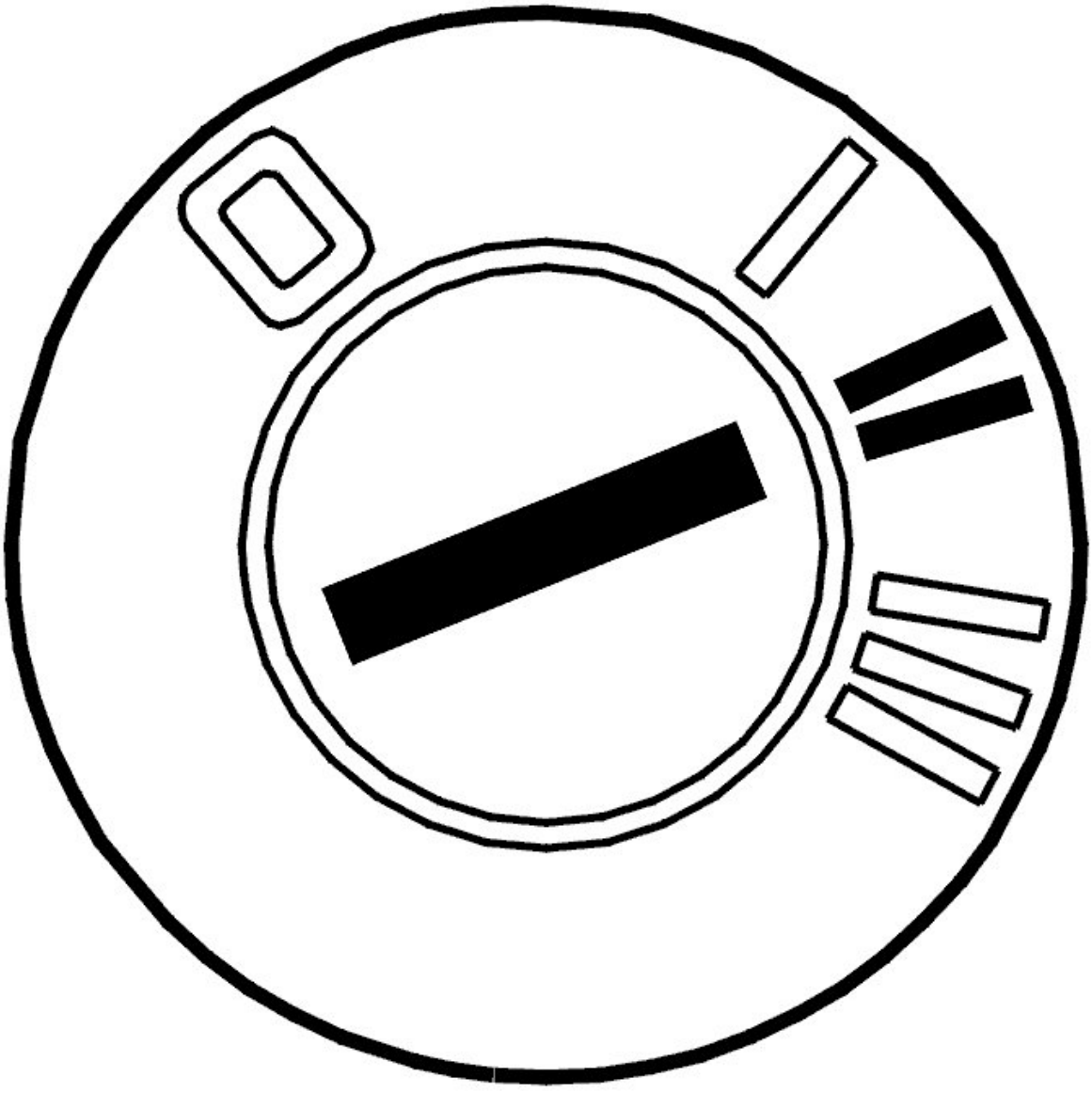
Other information:
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair

Continue - Checking LIN bus

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click the VCT2000 symbol to activate the check.

Continue - **DONE**

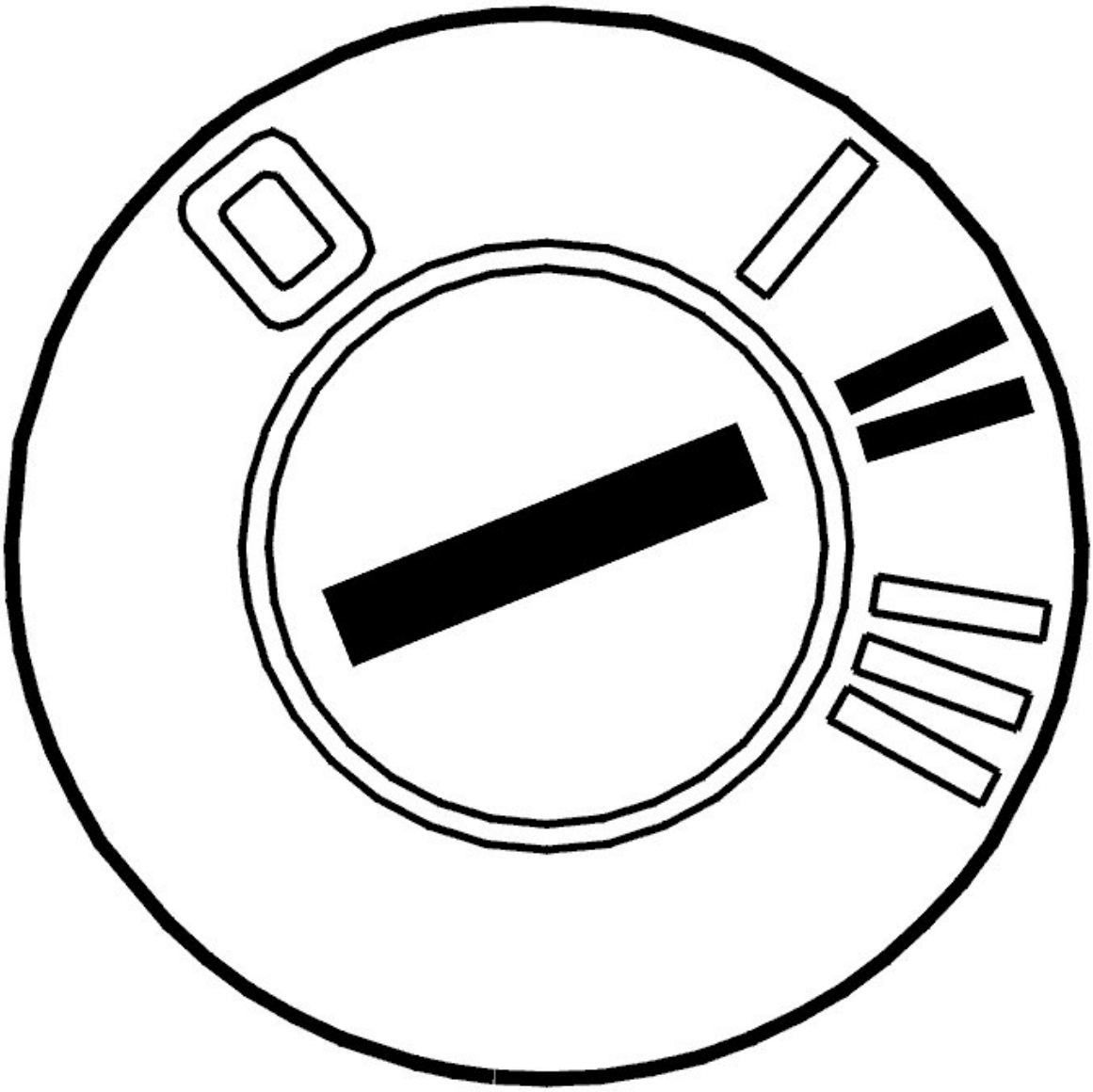
DONE - Verification

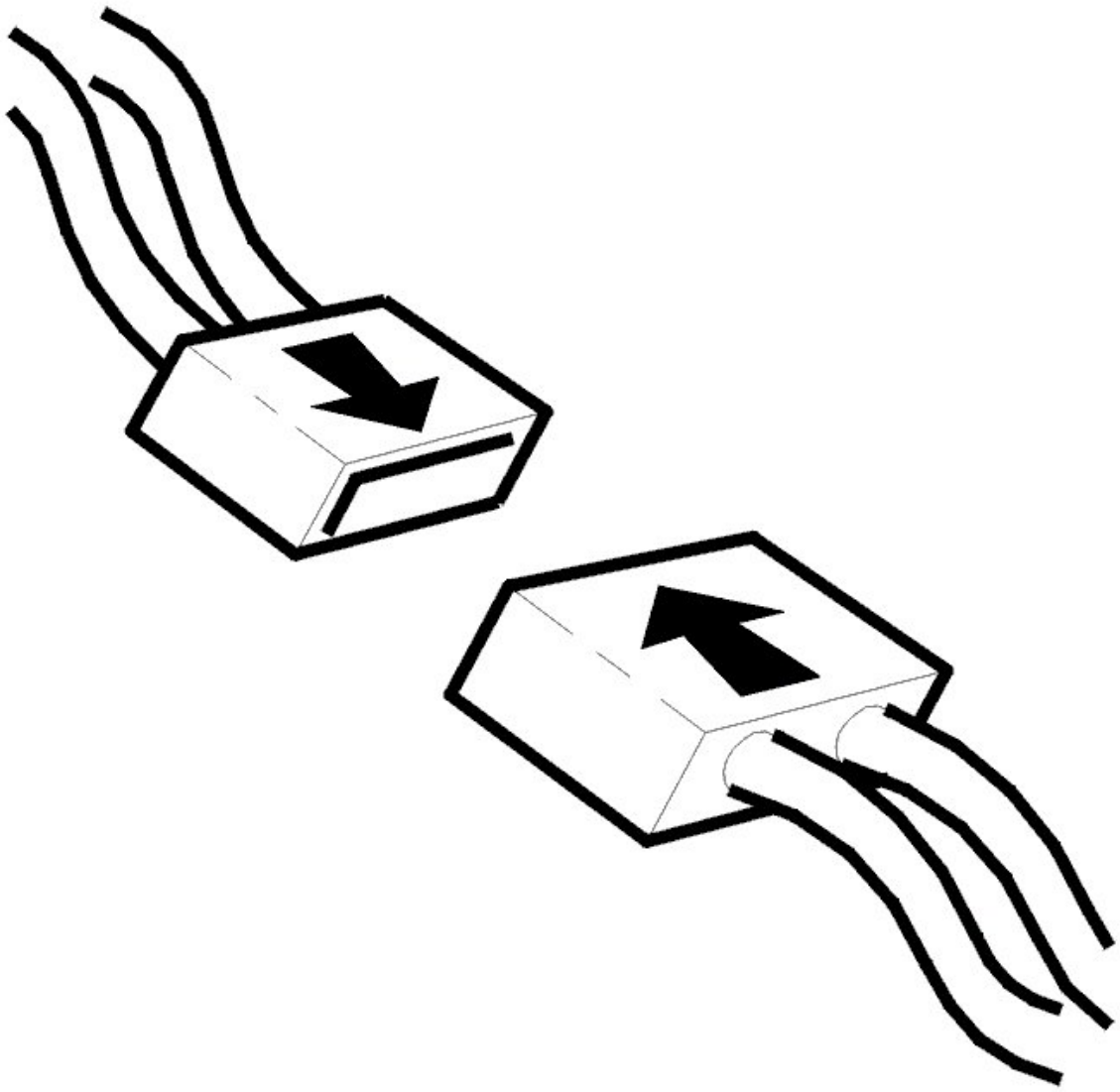
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking data for car configuration

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

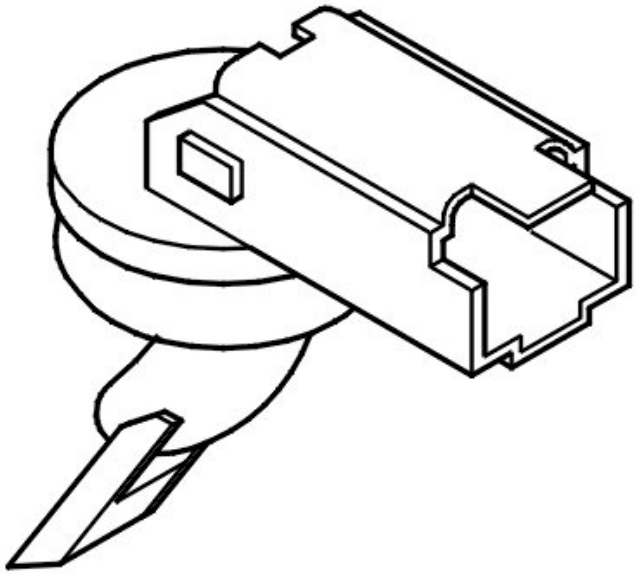
FAULT FOUND - Fault Found

Attempt New Test - Checking data for car configuration

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0002

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a short-circuit to supply voltage in the signal, or an open-circuit in the signal between the control module and the evaporator temperature sensor.
The climate control module (CCM) uses the signal to control the A/C compressor.
At temperatures below 5.5 °C the compressor is not permitted to operate because of the risk of freezing.
In normal operation (engine running and A/C selected) the control module can regulate the compressor in the following way based on the evaporator temperature:

- 10 °C air conditioning (A/C) compressor on
- 5.5 °C air conditioning (A/C) compressor off.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- The control module assumes a replacement value equivalent to 0 °C. The compressor will not then be permitted to operate
- The normal value during operation (engine running and A/C selected) is 5.5-10 °C. If the climate control system has not been operating and the engine has cooled, the temperature must correspond to the ambient temperature.

Possible source

- There is a short-circuit to supply voltage in the signal between the evaporator temperature sensor and the climate control module (CCM)
- Open-circuit in the signal between the evaporator temperature sensor and the climate control module (CCM)
- Contact resistance, oxidation or loose connections in the connectors
- The evaporator temperature sensor does not function.

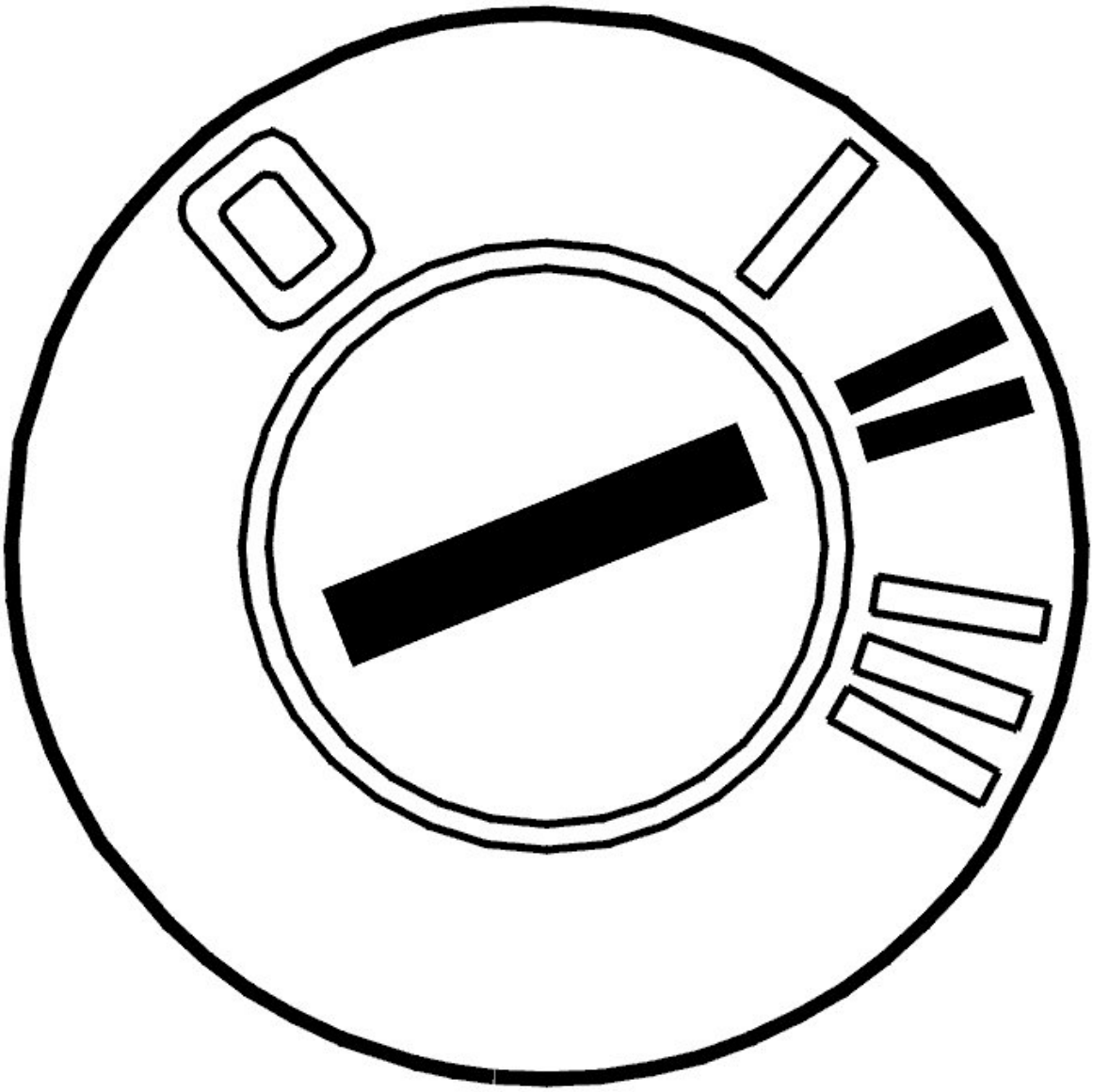
Fault symptom[s]

- No cooling from the air conditioning (A/C) system.
- Irregular cooling from the air conditioning (A/C) system.
- The air conditioning (A/C) compressor does not start, or runs sporadically.

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking the evaporator temperature



- Ignition on.

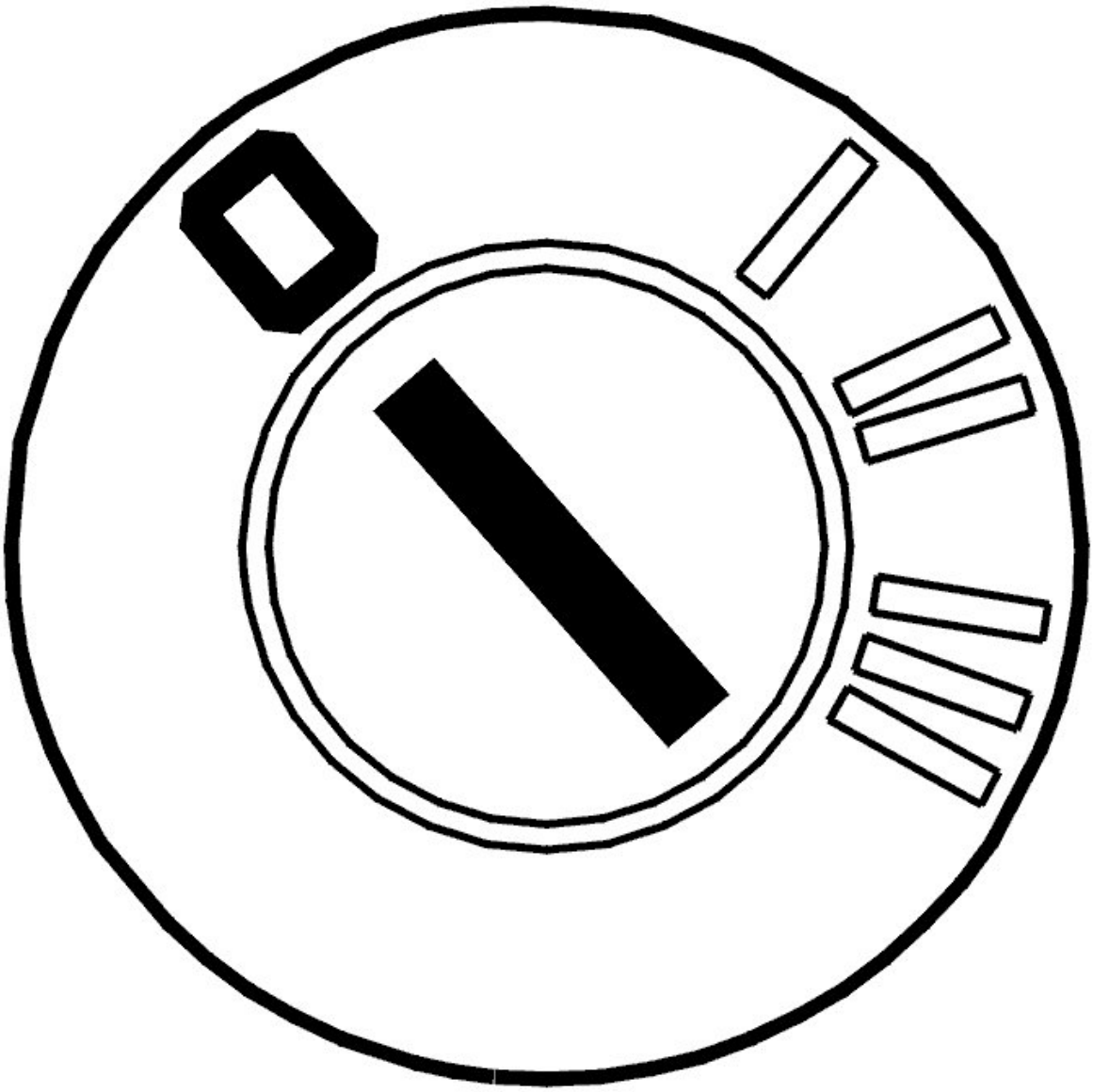
Check that the evaporator temperature is within its permitted range. If the climate control system has not been running and the engine has cooled down, the temperature must be the same as the outside temperature.
If the temperature is now OK, the fault was caused by contact resistance or loose connections.
Read off the evaporator temperature by clicking on the VCT2000 symbol.

Are the temperatures correct?

Yes - Checking the connectors and wiring

No - Checking the component and wiring

Checking the connectors and wiring

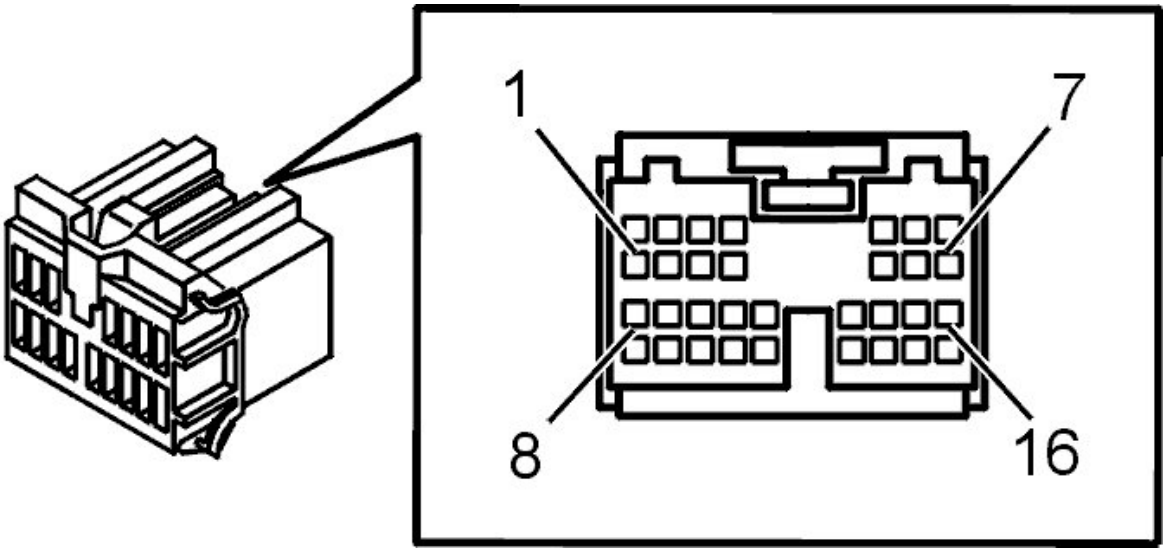


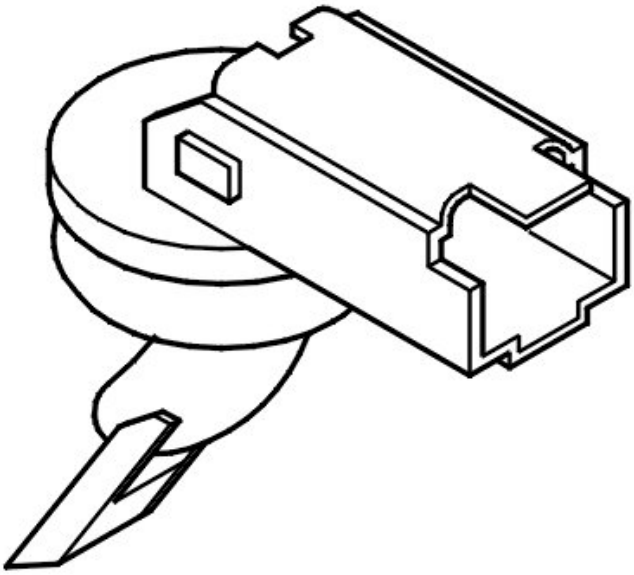
- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the signal cable between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #5 (#29) and #16 (#40).
Check the ground lead between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #13 (#37) and #16 (#40).
The voltage must be approximately 0 V.
Check the signal and ground cables between the climate control module (CCM) and the evaporator temperature sensor. Check for an intermittent open-circuit.
Take a reading between terminals #5 (#29) and #13 (#37) on the connector for the climate control module (CCM).
Check the connectors for contact resistance and oxidation.
Remedy as necessary.

Other information:

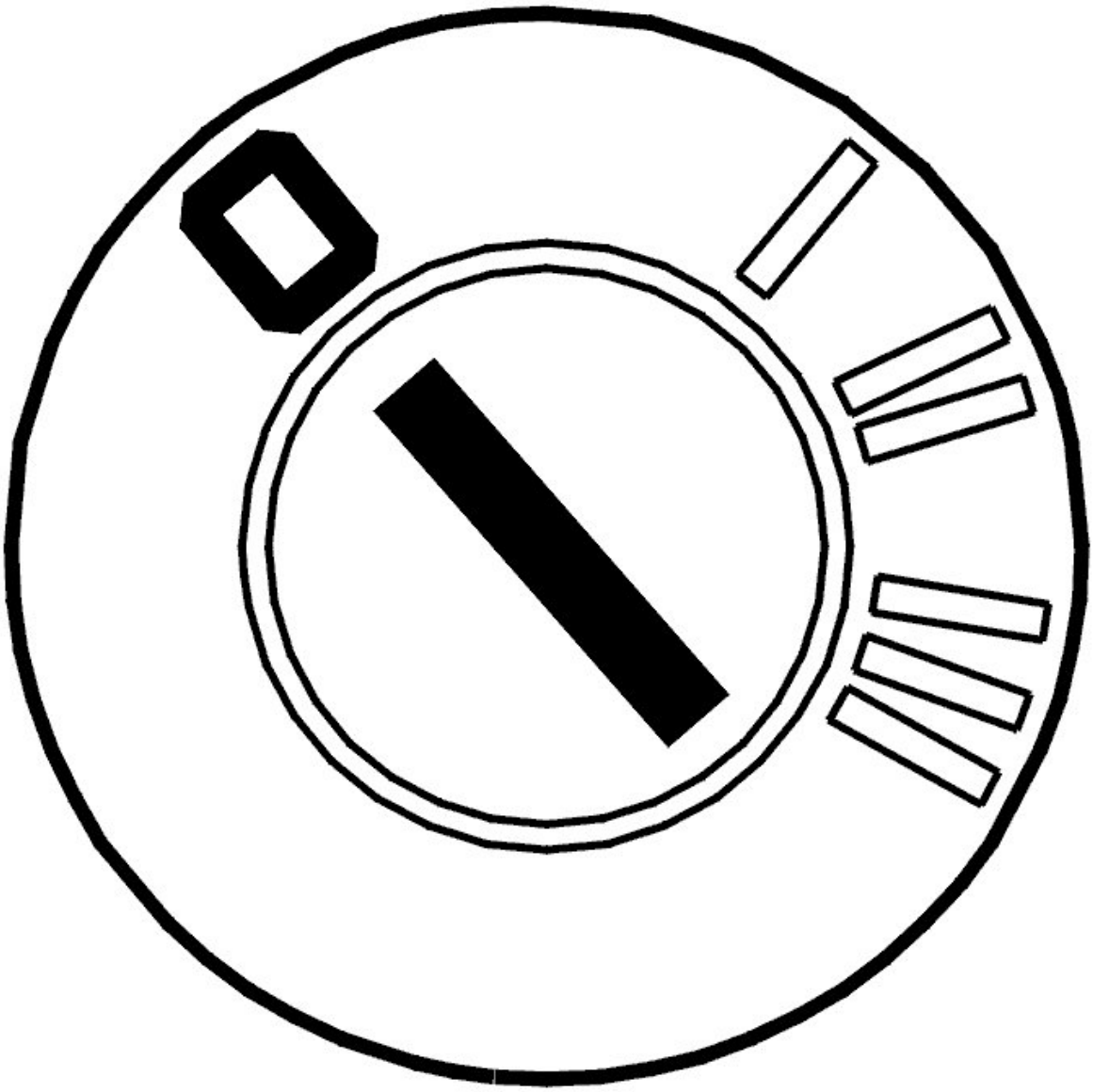
- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Information

Checking the component and wiring

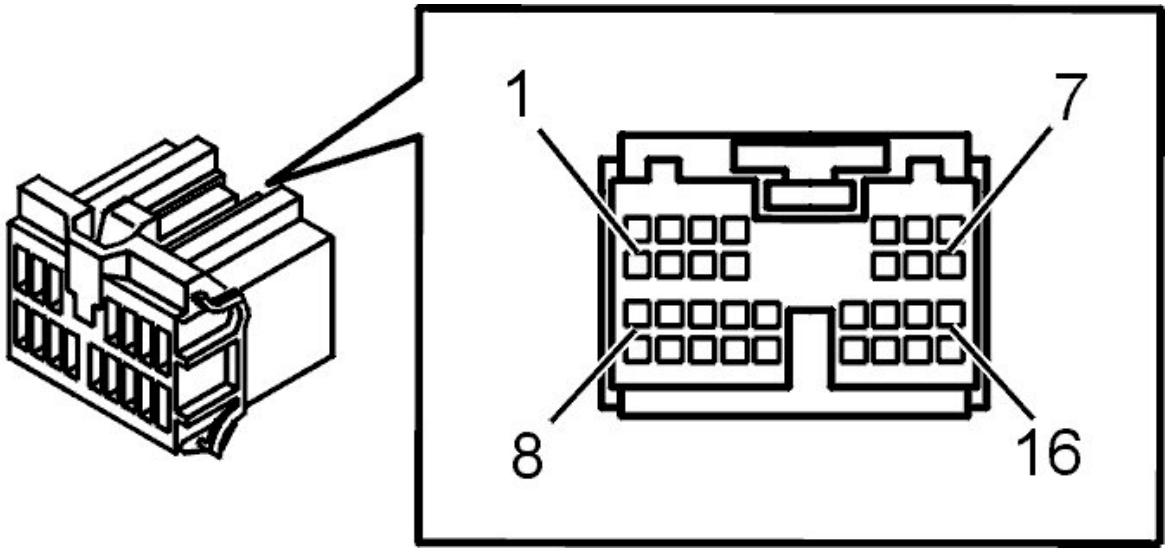


- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the signal cable between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #5 (#29) and #16 (#40).
Check the ground lead between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to supply voltage.
Take a reading on the connector for the climate control module (CCM) between terminals #13 (#37) and #16 (#40).
The voltage must be approximately 0 V.
Check the signal and ground cables between the climate control module (CCM) and the evaporator temperature sensor. Check for an open-circuit.
Take a reading between terminals #5 (#29) and #13 (#37) on the connector for the climate control module (CCM).
The resistance must correspond to the resistance for the evaporator temperature sensor.
Check the connectors for contact resistance and oxidation.
Check that the climate control module (CCM) is receiving a correct value from the evaporator temperature sensor by measuring its resistance and comparing with the values in the table.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications

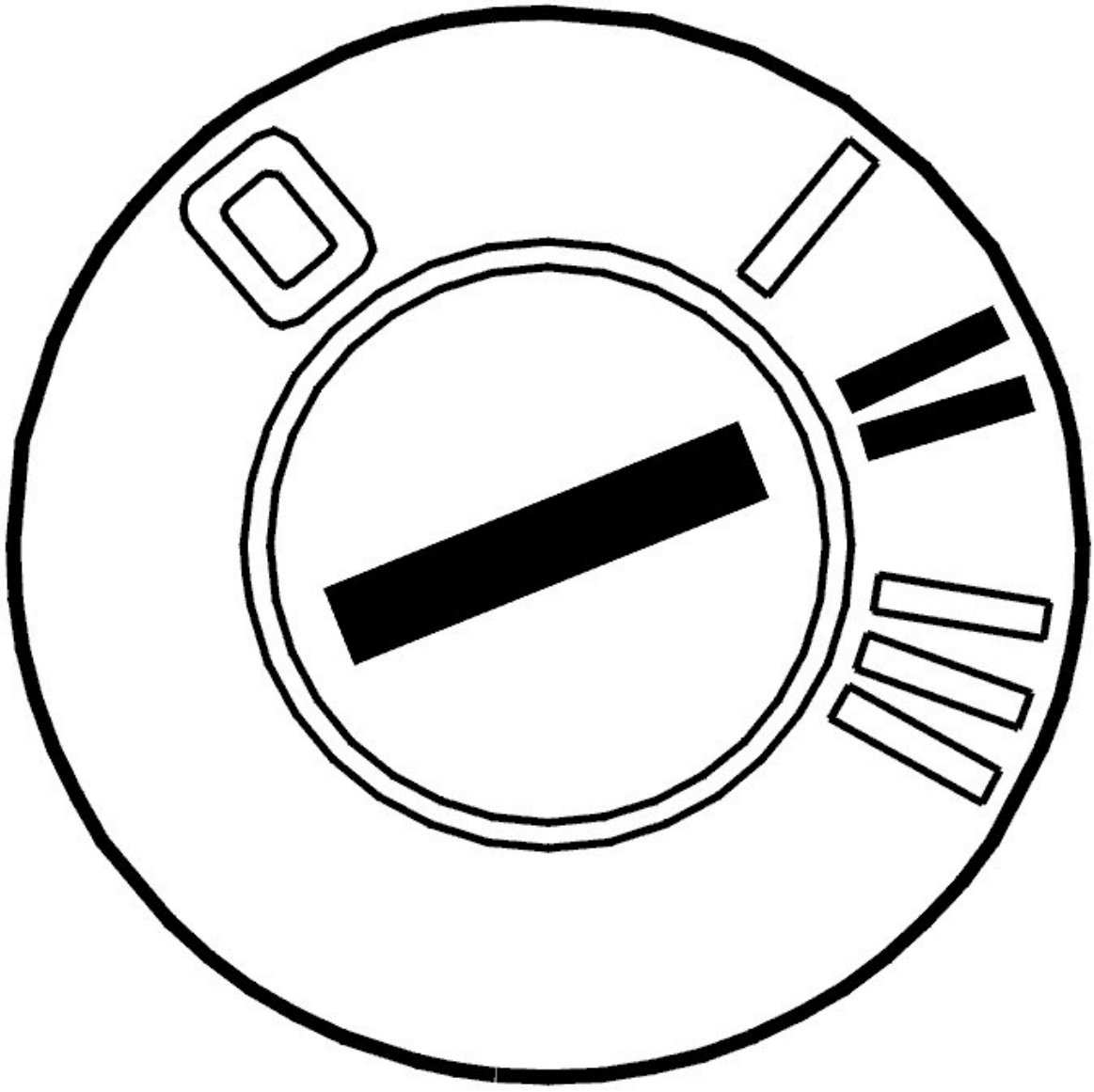


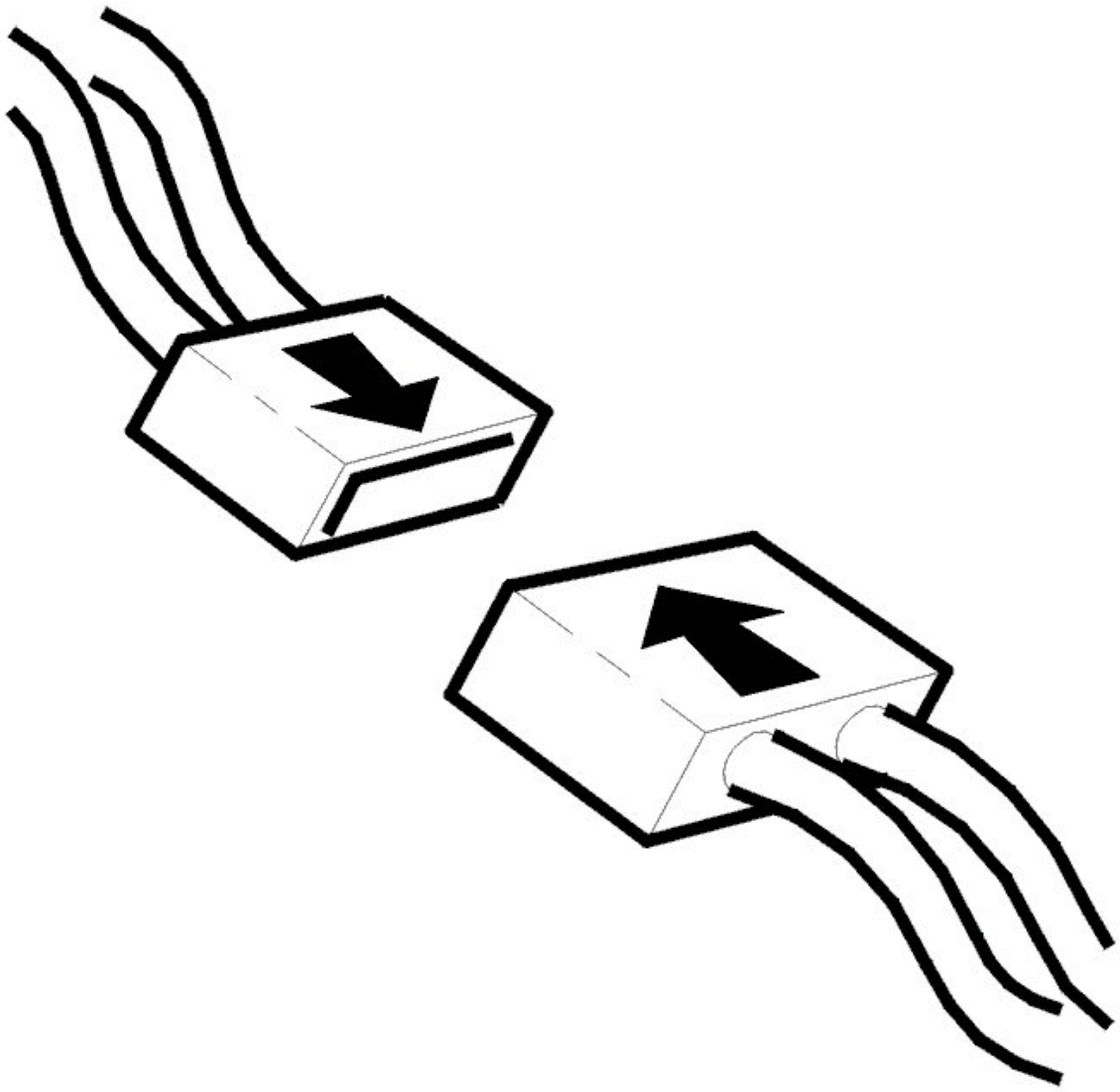
Select "Continue".

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the evaporator temperature sensor by clicking the VCT2000 symbol.
Check that the value from the evaporator temperature sensor corresponds to the ambient temperature.

Are the temperatures correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the evaporator temperature

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

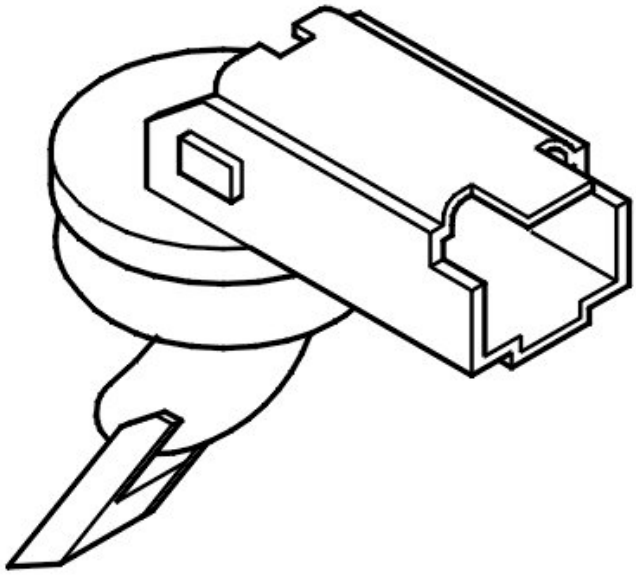
FAULT FOUND - Fault Found

Attempt New Test - Checking the evaporator temperature

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0003

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a short-circuit to ground in the signal between the climate control module (CCM) and the evaporator temperature sensor.
The climate control module (CCM) uses the signal to control the A/C compressor.
At temperatures below 5.5 °C the compressor is not permitted to operate because of the risk of freezing.
In normal operation (engine running and A/C selected) the control module can regulate the compressor in the following way based on the evaporator temperature:

- 10 °C air conditioning (A/C) compressor on
- 5.5 °C air conditioning (A/C) compressor off.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- The control module assumes a replacement value equivalent to 0 °C. The compressor will not then be permitted to operate
- The normal value during operation (engine running and A/C selected) is 5.5-10 °C. If the climate control system has not been operating and the engine has cooled, the temperature must correspond to the ambient temperature.

Possible source

- There is a short-circuit to ground in the signal between the evaporator temperature sensor and the climate control module (CCM)
- The evaporator temperature sensor does not function.

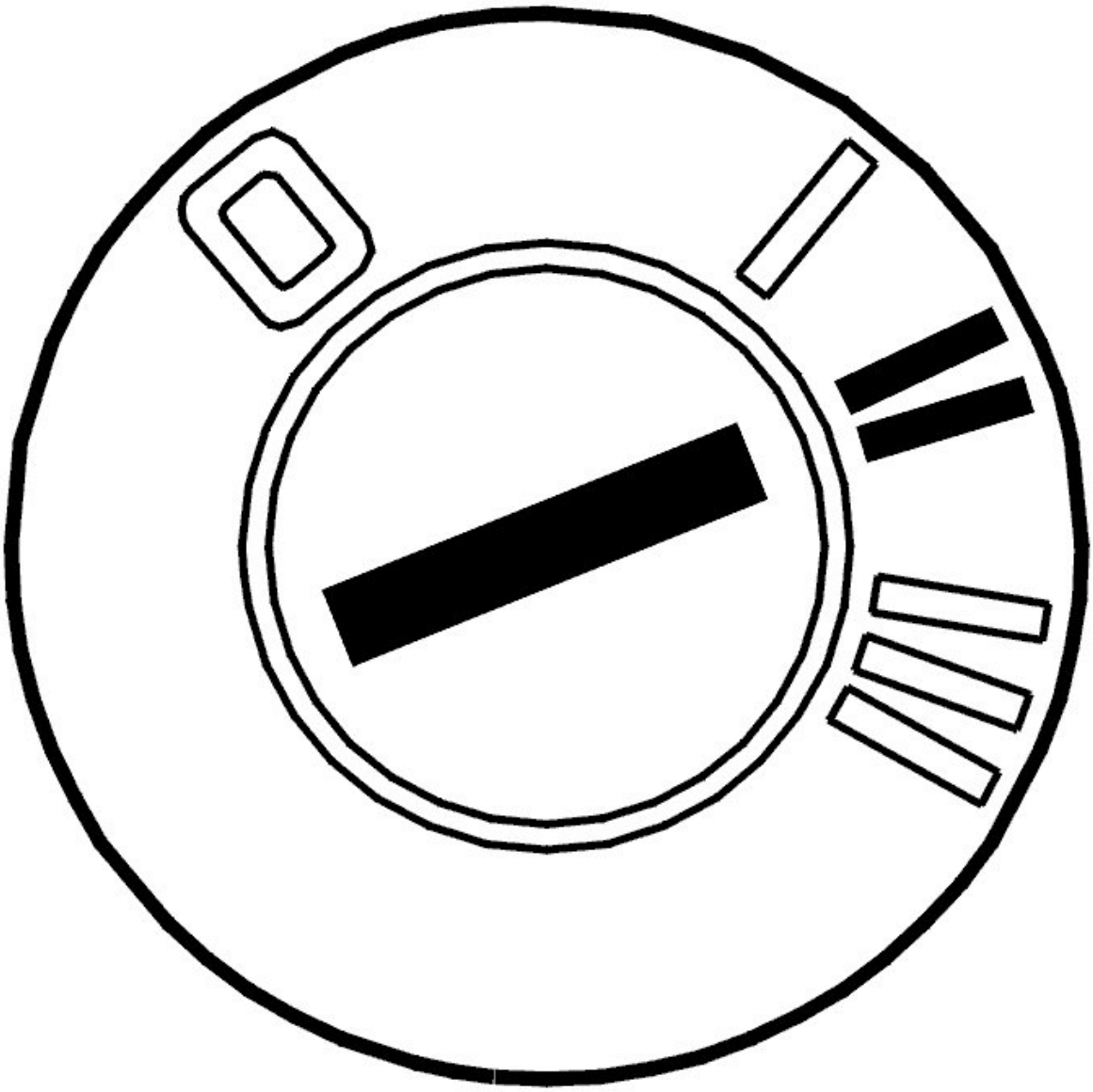
Fault symptom[s]

- No cooling from the air conditioning (A/C) system.
- Irregular cooling from the air conditioning (A/C) system.
- The air conditioning (A/C) compressor does not start, or runs sporadically.

Signal Too Low

Signal too low

Checking the evaporator temperature



- Ignition on.

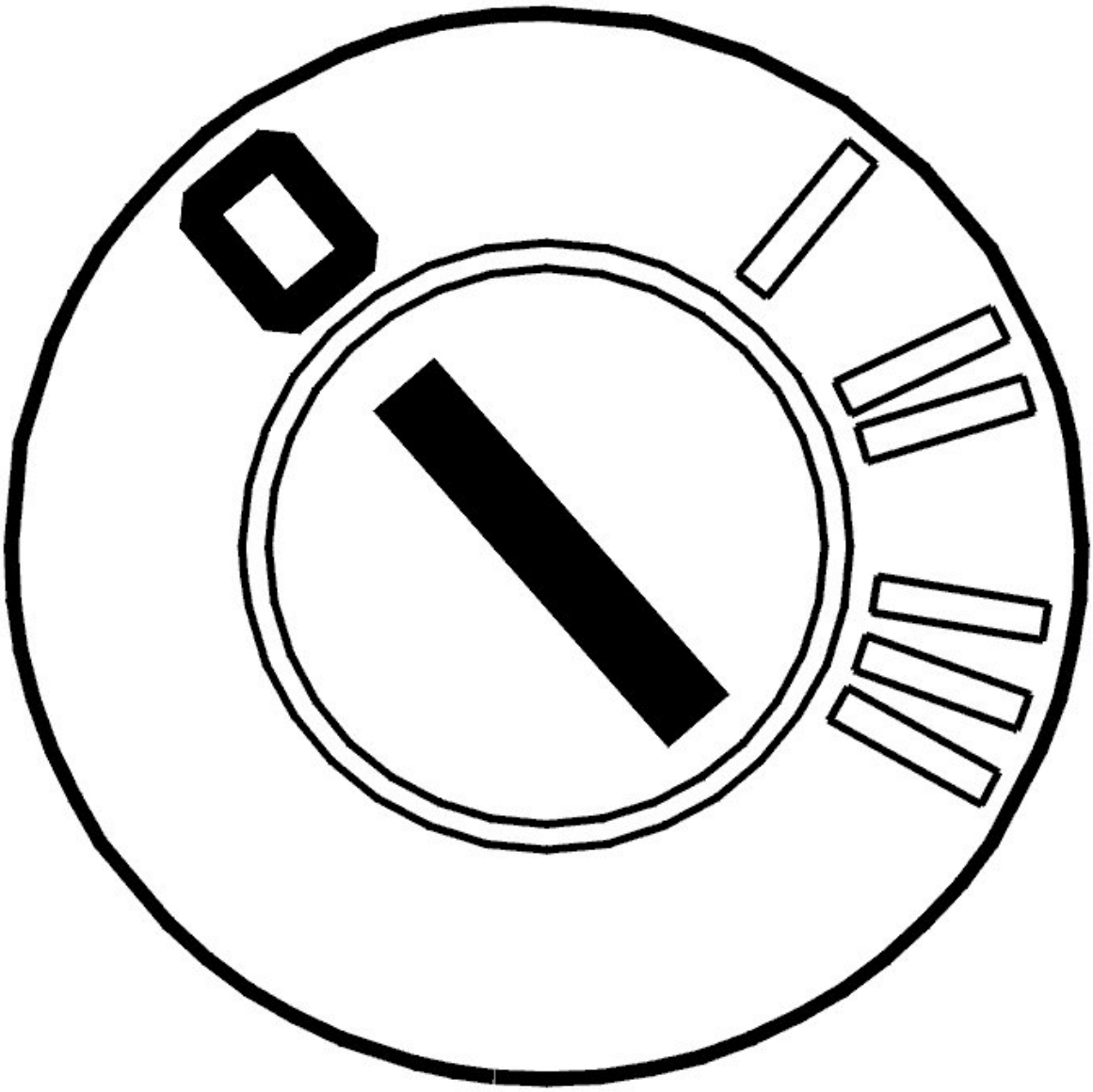
Check that the evaporator temperature is within its permitted range. If the climate control system has not been running and the engine has cooled down, the temperature must be the same as the outside temperature.
The fault is intermittent if the outside temperature is now correct.
Read off the evaporator temperature by clicking on the VCT2000 symbol.

Are the temperatures correct?

Yes - Checking the wiring

No - Checking the component and wiring

Checking the wiring

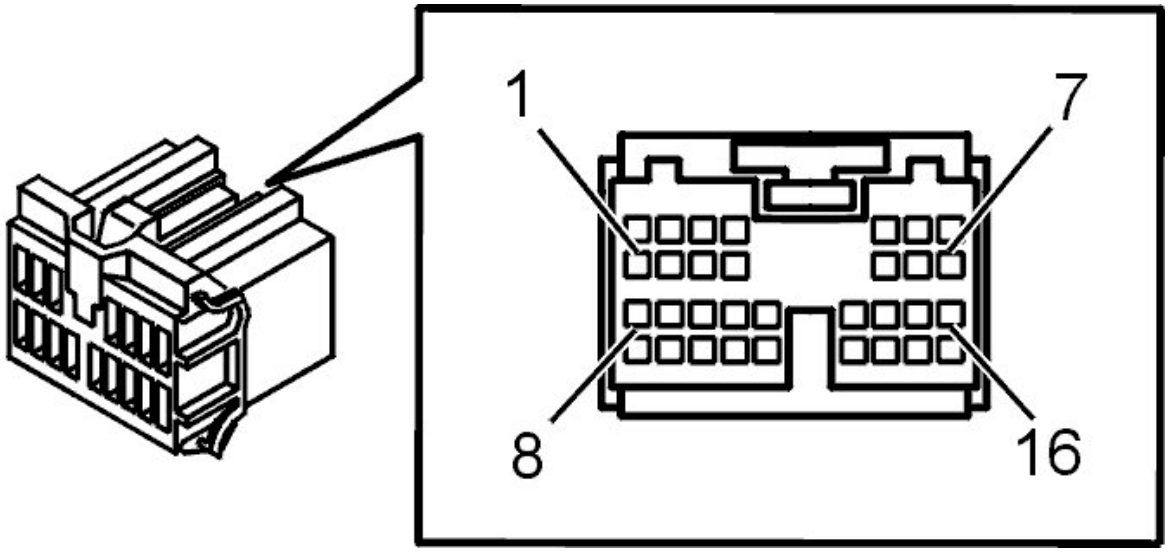


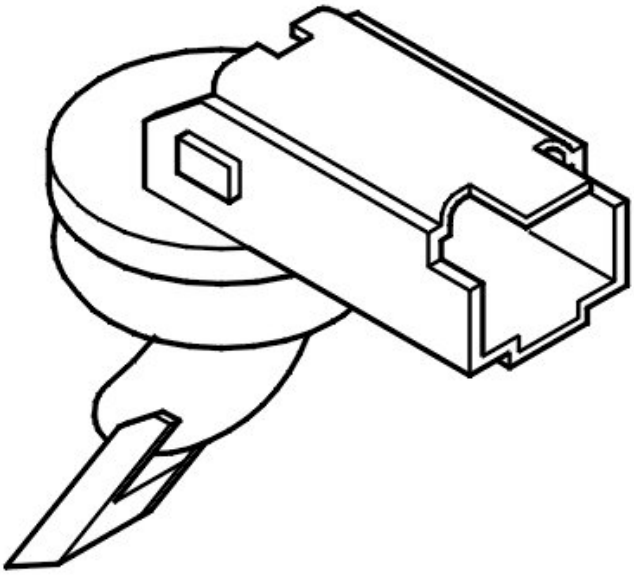
- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the signal cable between the climate control module (CCM) and the evaporator temperature sensor. Check for an intermittent short-circuit to ground.
Take a reading on the connector for the climate control module (CCM) between terminals #5 (#29) and #16 (#40).
Remedy as necessary.

Other information:

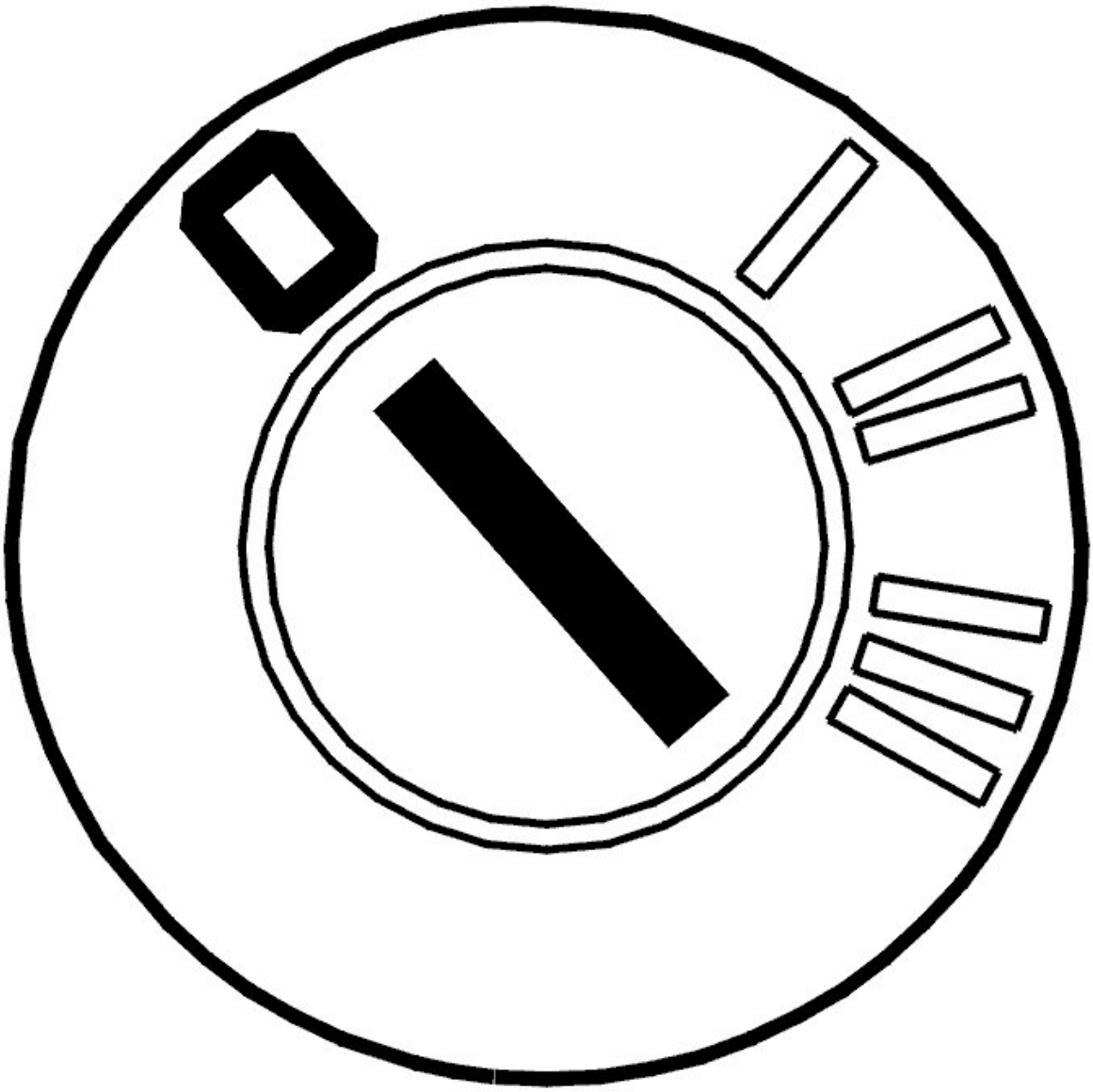
- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Information

Checking the component and wiring



- Ignition off
- Disconnect the connector for the climate control module (CCM).

Check the signal cable between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to ground.
Take a reading on the connector for the climate control module (CCM) between terminals #5 (#29) and #16 (#40).
Check the signal and ground cables between the climate control module (CCM) and the evaporator temperature sensor. Check for a short-circuit to ground.
Take a reading between terminals #5 (#29) and #13 (#37) on the connector for the climate control module (CCM). The resistance must correspond to the resistance for the evaporator temperature sensor.
Check the connectors for contact resistance and oxidation.
Check that the climate control module (CCM) is receiving a correct value from the evaporator temperature sensor by measuring its resistance and comparing with the values in the table.
Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
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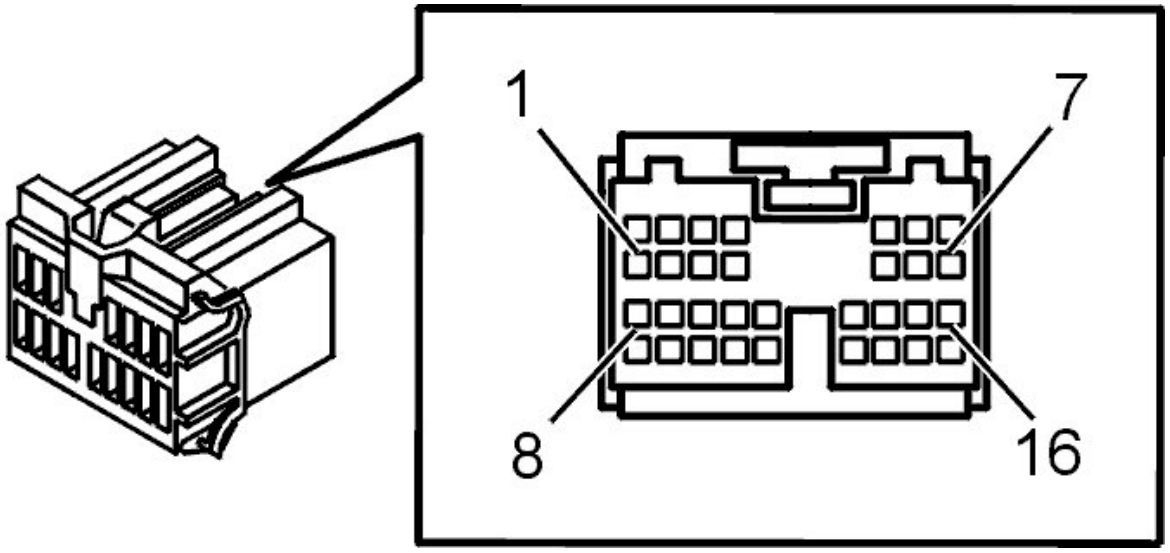
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications

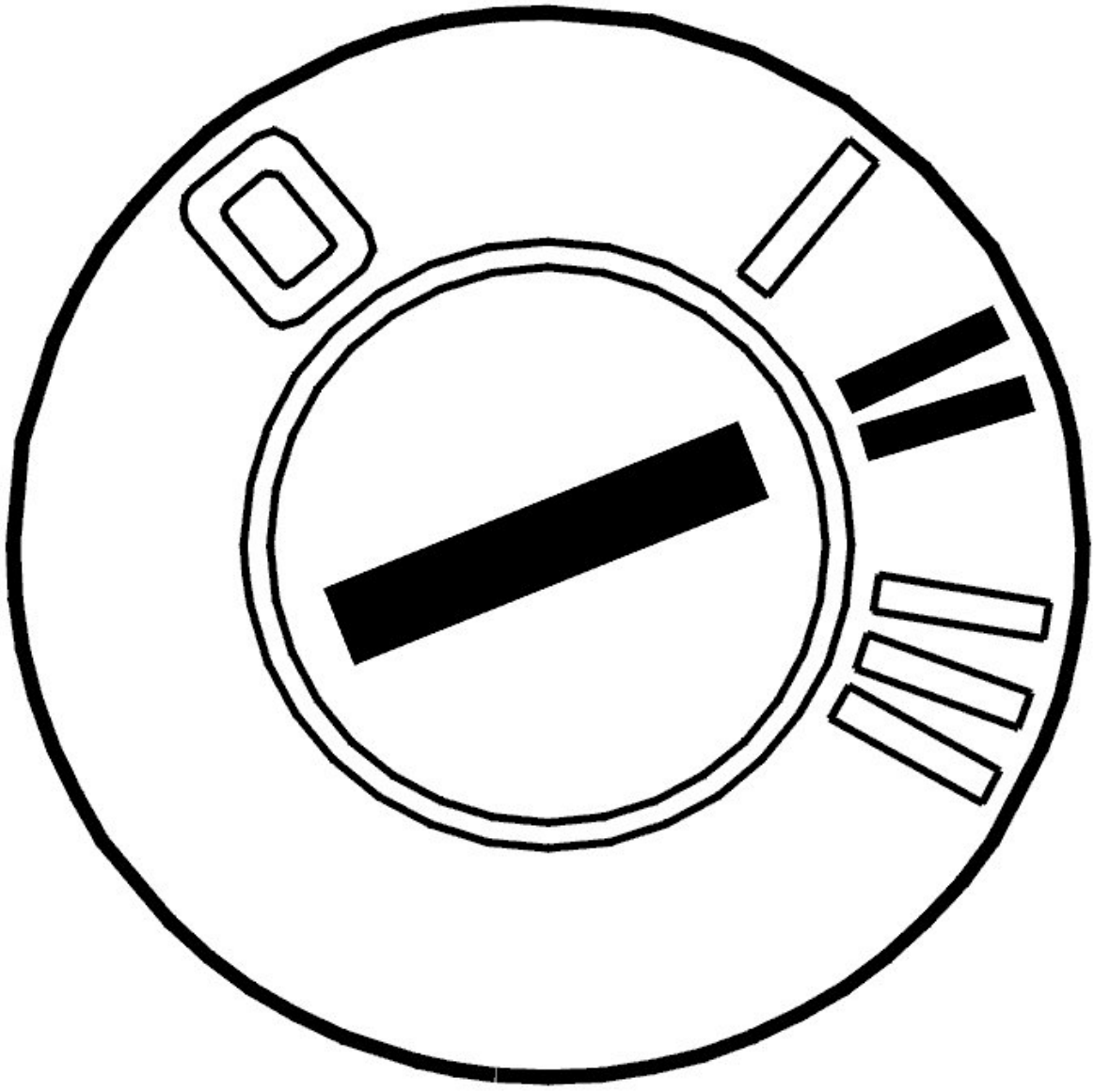


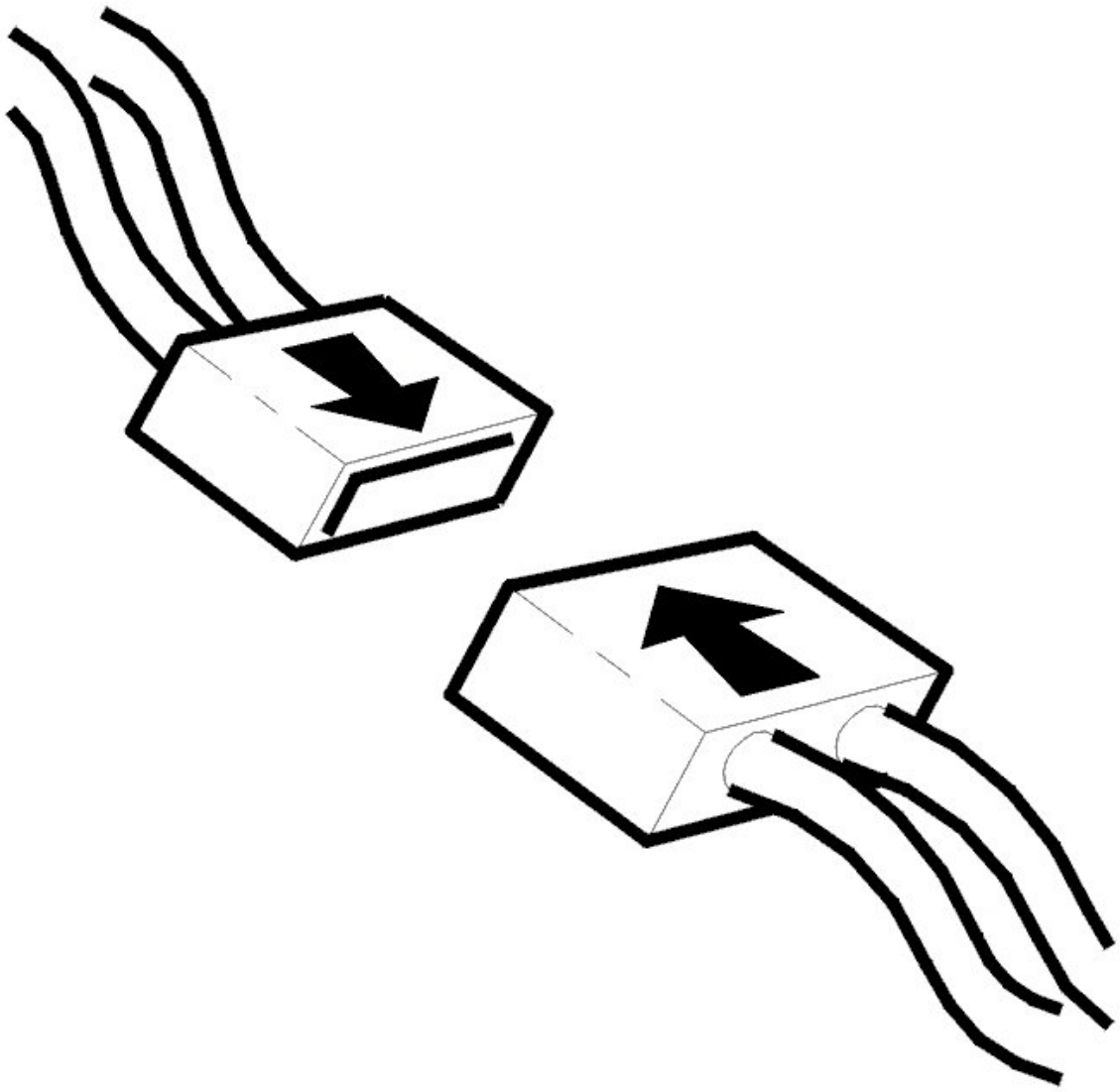
Select "Continue".

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the evaporator temperature sensor by clicking the VCT2000 symbol.
Check that the value from the evaporator temperature sensor corresponds to the ambient temperature.

Are the temperatures correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the evaporator temperature

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

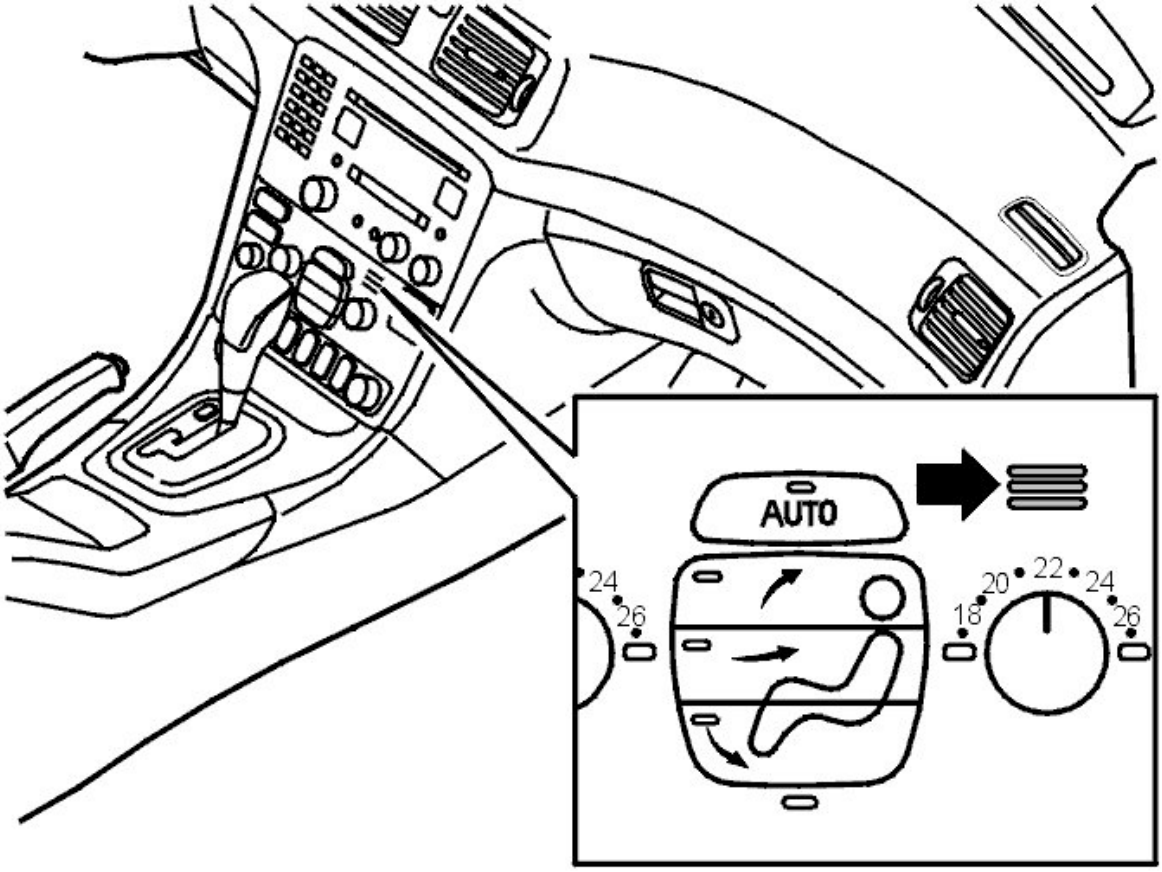
FAULT FOUND - Fault Found

Attempt New Test - Checking the evaporator temperature

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0004

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the signal between the climate control module (CCM) and the passenger compartment temperature sensor, or a short-circuit to supply voltage in the signal.
The climate control module (CCM) uses the signal to control the passenger compartment temperature.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value

- The control module adopts a substitute value corresponding to 25 °C
- The normal value is the passenger compartment temperature.

Possible source

- There is a short-circuit to supply voltage in the signal between the passenger compartment temperature sensor and the climate control module (CCM)
- Open-circuit in the signal between the passenger compartment temperature sensor and the climate control module (CCM)
- Contact resistance, oxidation or loose connections in the connectors
- The passenger compartment temperature sensor is not functioning.

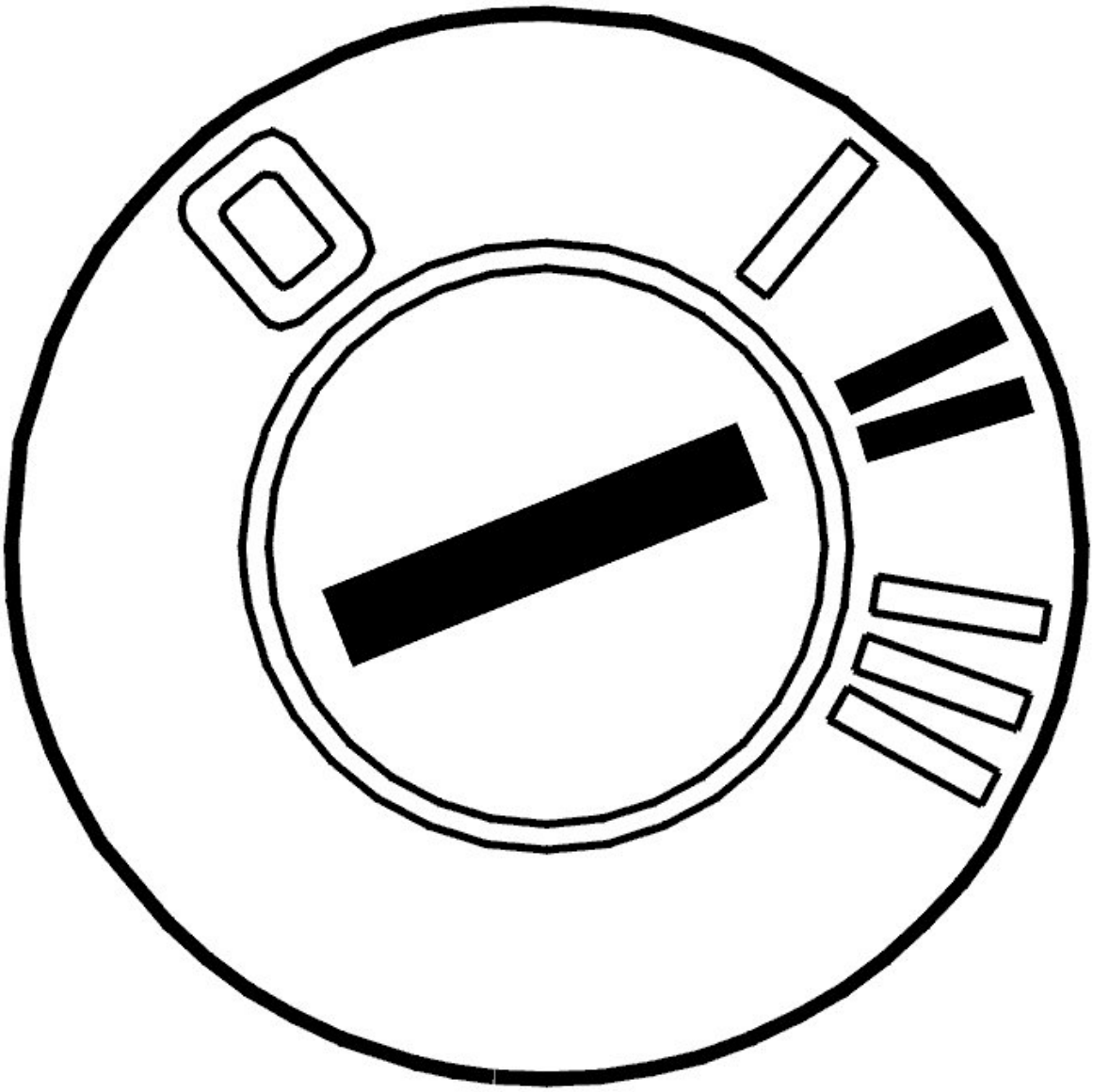
Fault symptom[s]

- The passenger compartment temperature does not correspond to the set position.

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking passenger compartment temperature sensor

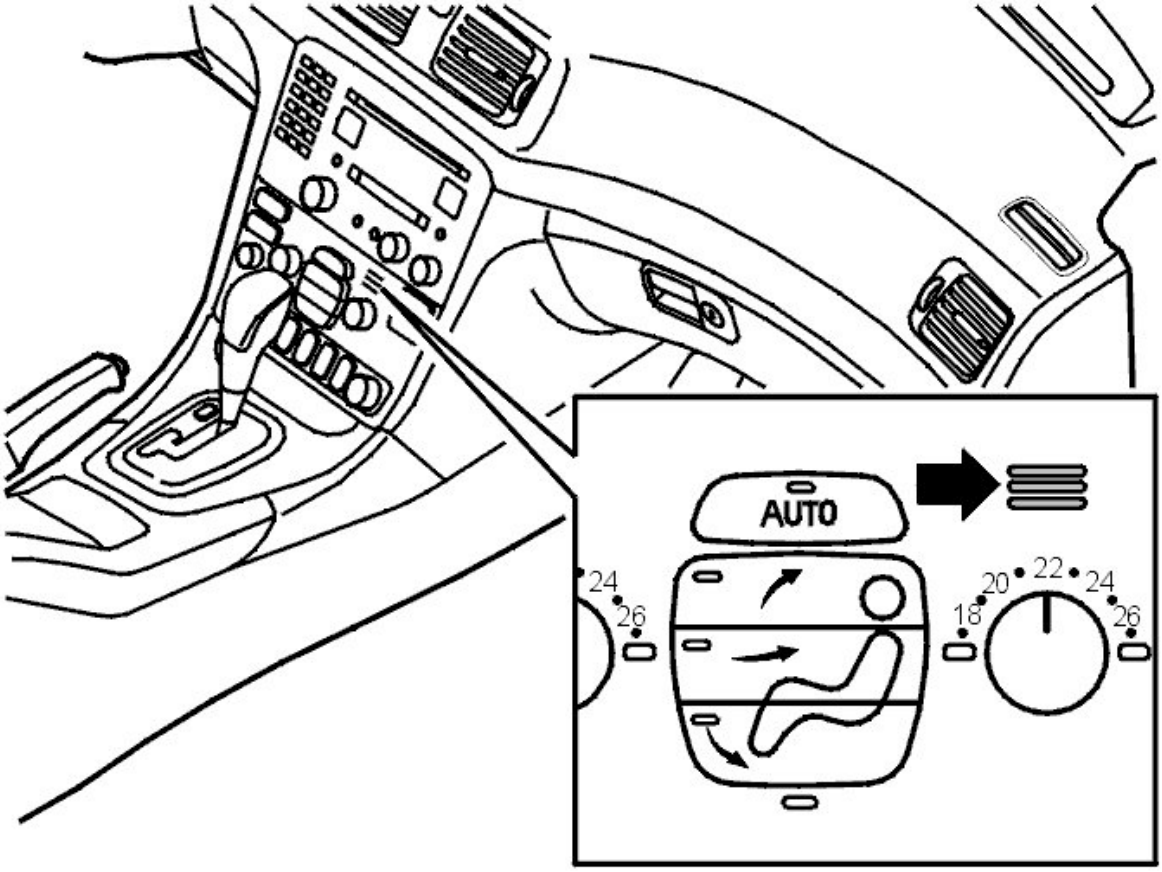


- Ignition on
- Check that the value from the sensor is within its permitted range. Use a thermometer.

Alternately blow hot and cold air onto the sensor. Check that the value displayed on the sensor changes.
Shine a light through the grille over the passenger compartment temperature sensor. Check for anything that could obstruct the airflow through the pipe.
Do not damage the sensor. The sensor is located just inside the grille.
Remedy as necessary.

Other information:

- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair



Is the sensor value correct?

Yes - Fault-tracing information

No - Replacing the component

Replacing the component

The fault is probably a defective passenger compartment temperature sensor. This type of fault means that the entire control module must be replaced. The passenger compartment temperature sensor cannot be replaced separately.
Replace the control module. See Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair

Continue - Checking LIN Bus

Self-adjustment

Limit positions for damper motor self-adjustment

Choice of climate control

1. Electronic climate control
2. Manual climate control (MCC).

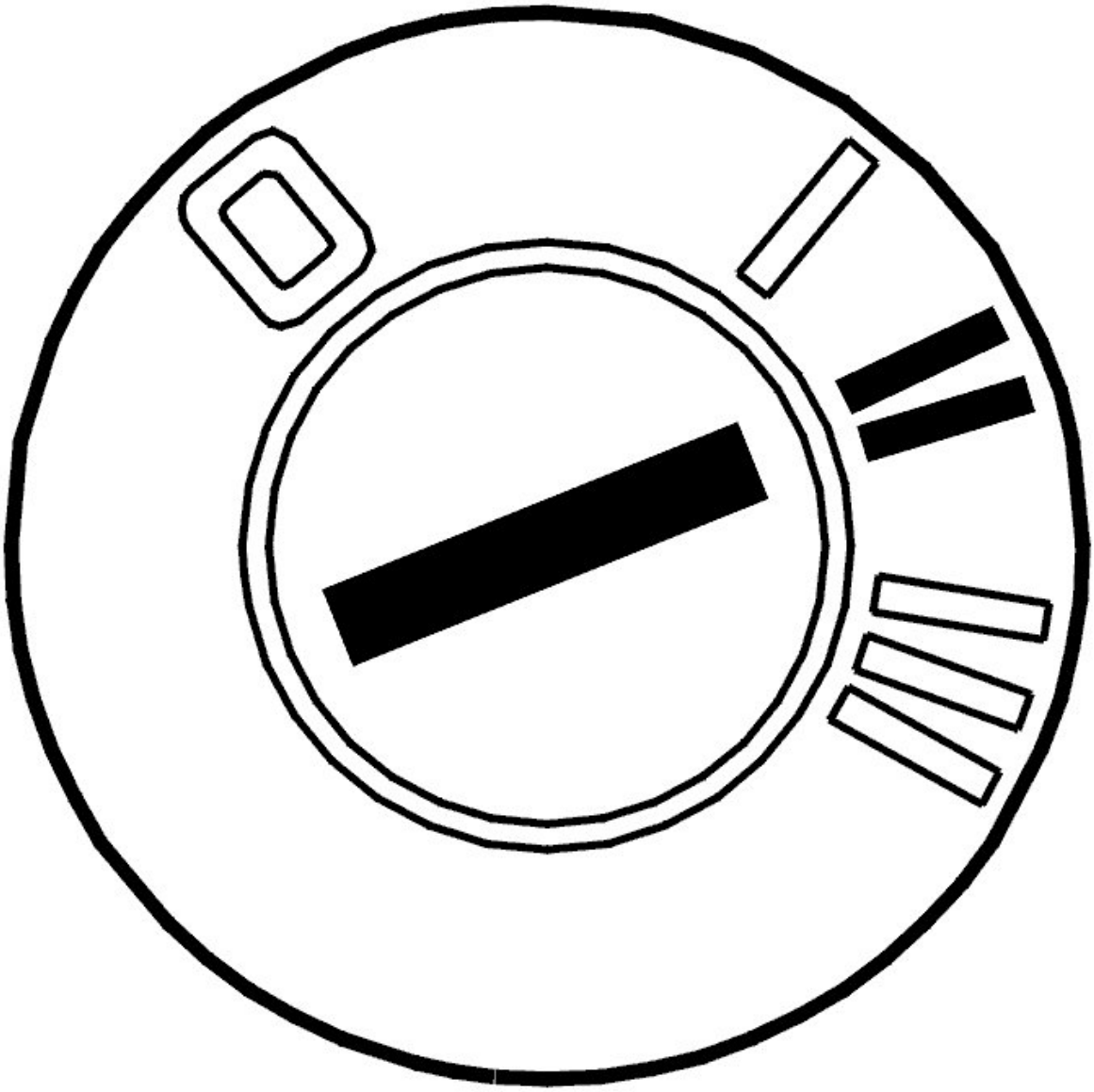
Select the type of climate control.

1 - Limit positions for damper motor self-adjustment

2 - Limit positions for damper motor self-adjustment

Limit positions for damper motor self-adjustment

Hint: Carry out self adjustment to define the shutter motor limit positions after replacing the control module or shutter motors, and when a shutter motor or link has been removed.



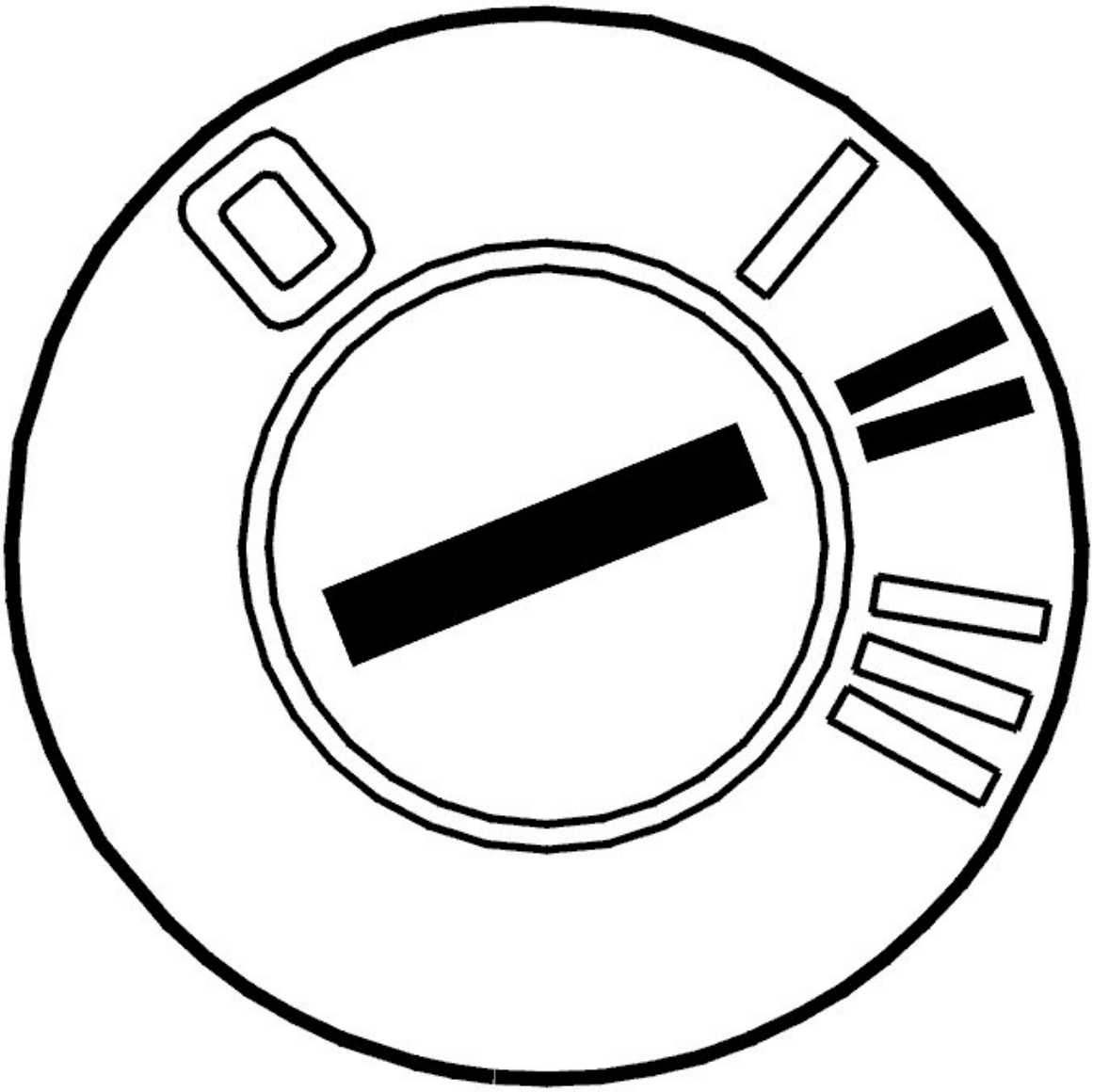
- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the self-adjustment. Wait at least 30 seconds.
Ignition off for at least 1 minute.
Start the engine.

Continue - **DONE**

Limit positions for damper motor self-adjustment

Hint: After replacing the control module or shutter motors, and when a shutter motor or link has been removed, carry out self adjustment to define the shutter motor limit positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the self-adjustment. Wait at least 30 seconds.
Ignition off for at least 1 minute.
Start the engine.

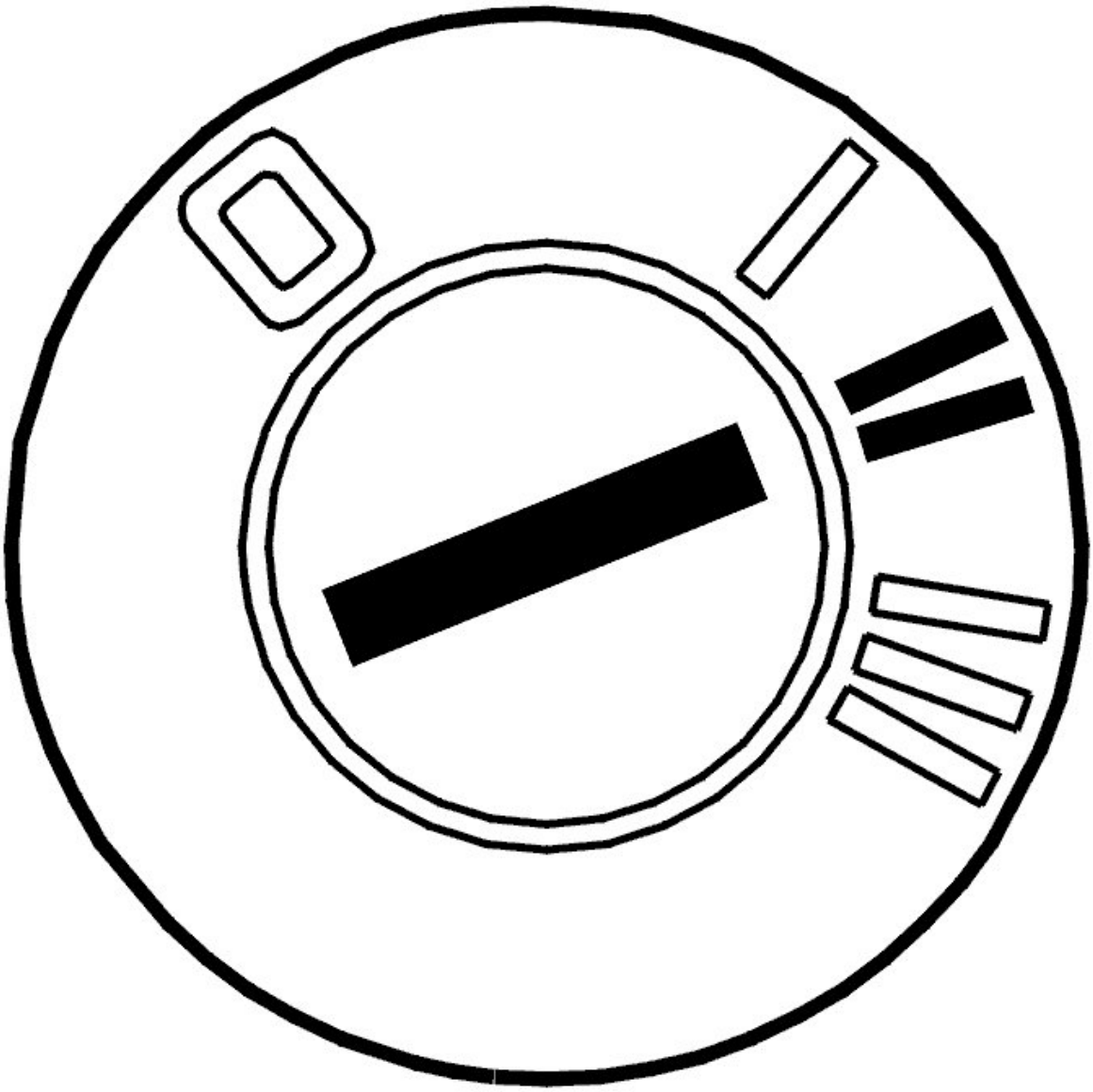
Select Continue

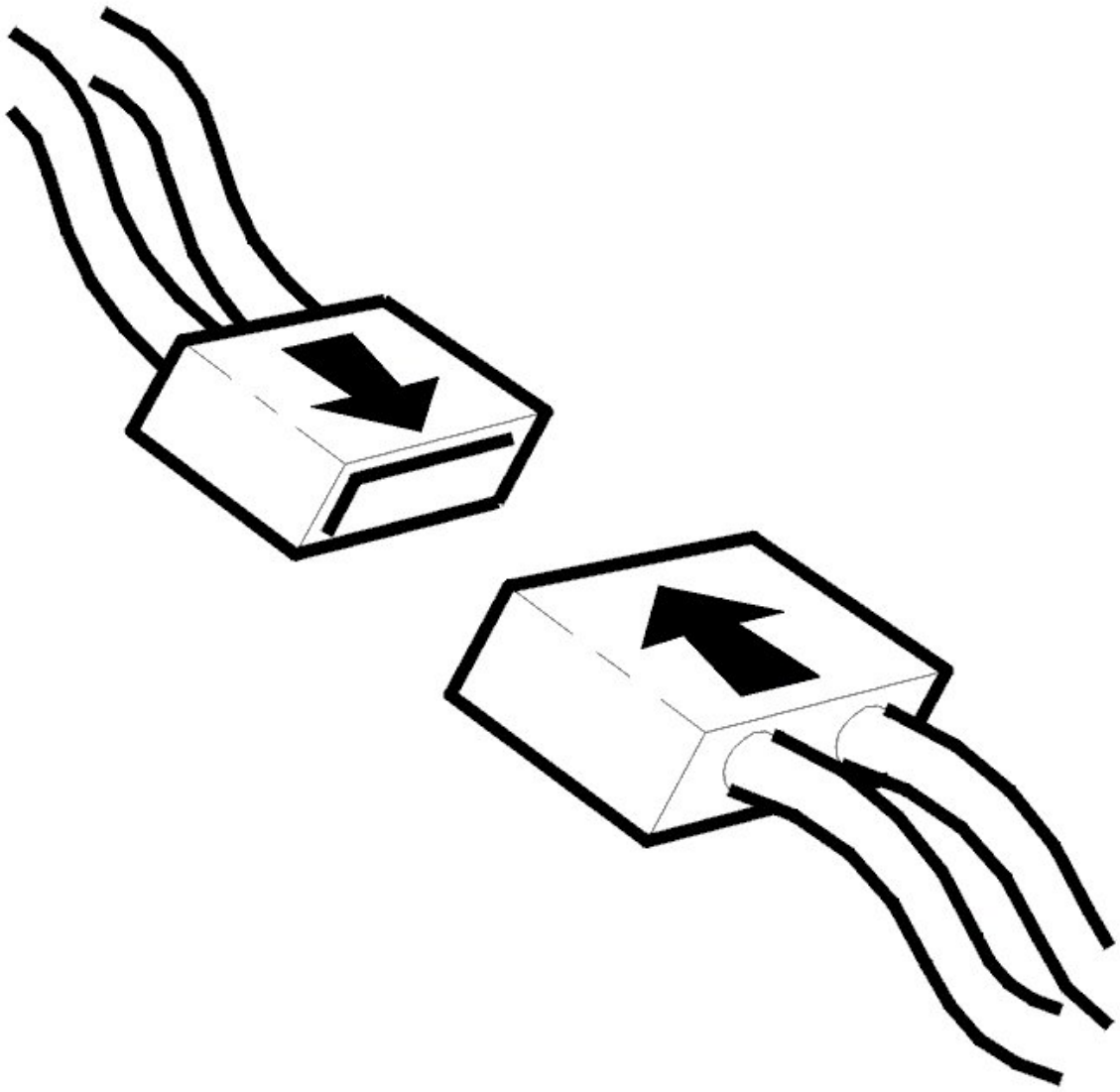
Continue - DONE

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the passenger compartment temperature. Vary the temperature at the passenger compartment temperature sensor to check that the value changes. Also check that the value is within its permitted range. Use a thermometer.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking passenger compartment temperature sensor

---

Fault-tracing information

The fault has probably occurred as a result of a damaged power circuit in the climate control system. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.

Continue - Information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - DONE

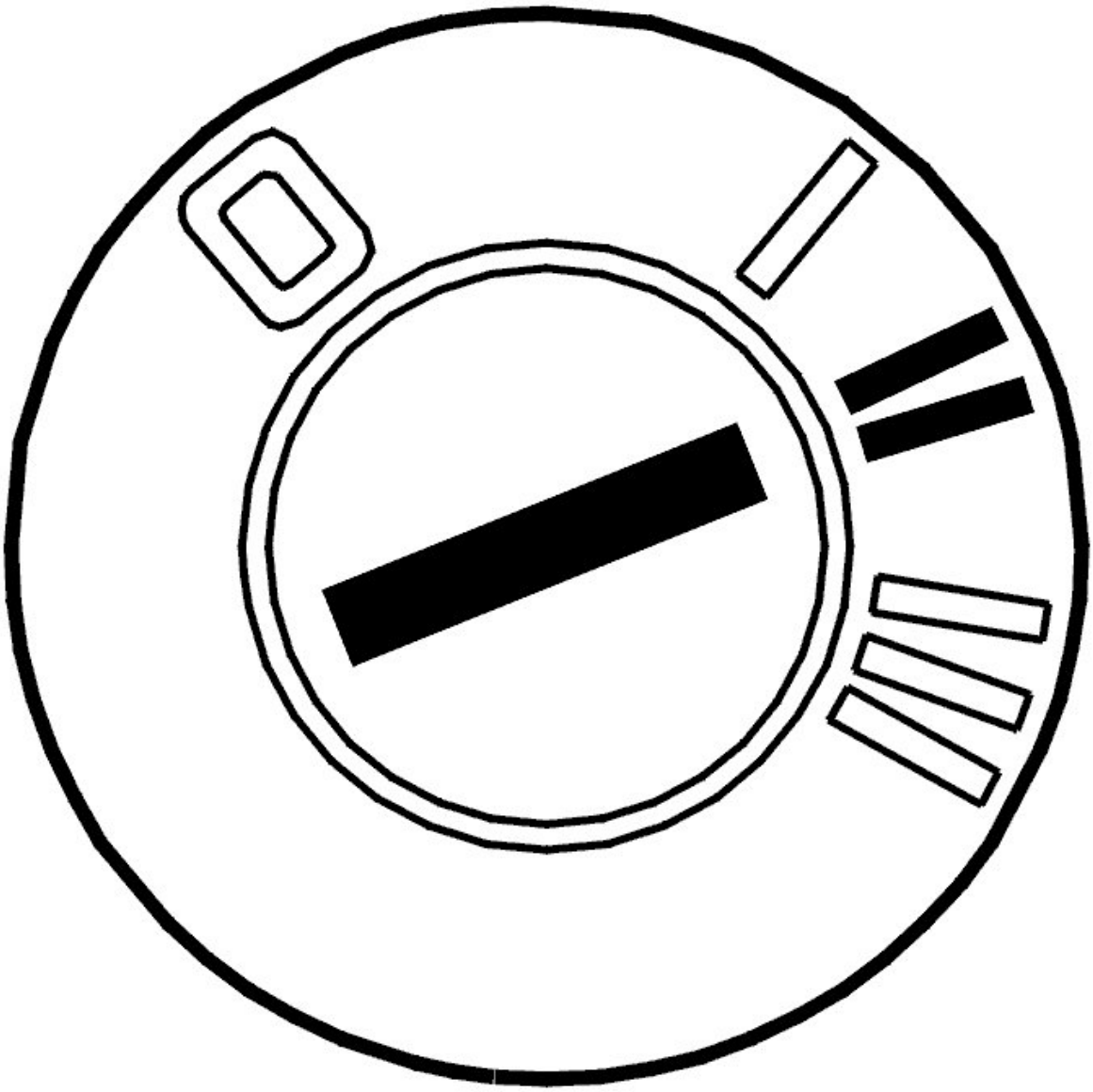
Attempt New Test - Checking passenger compartment temperature sensor

---

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click the VCT2000 symbol to activate the check.

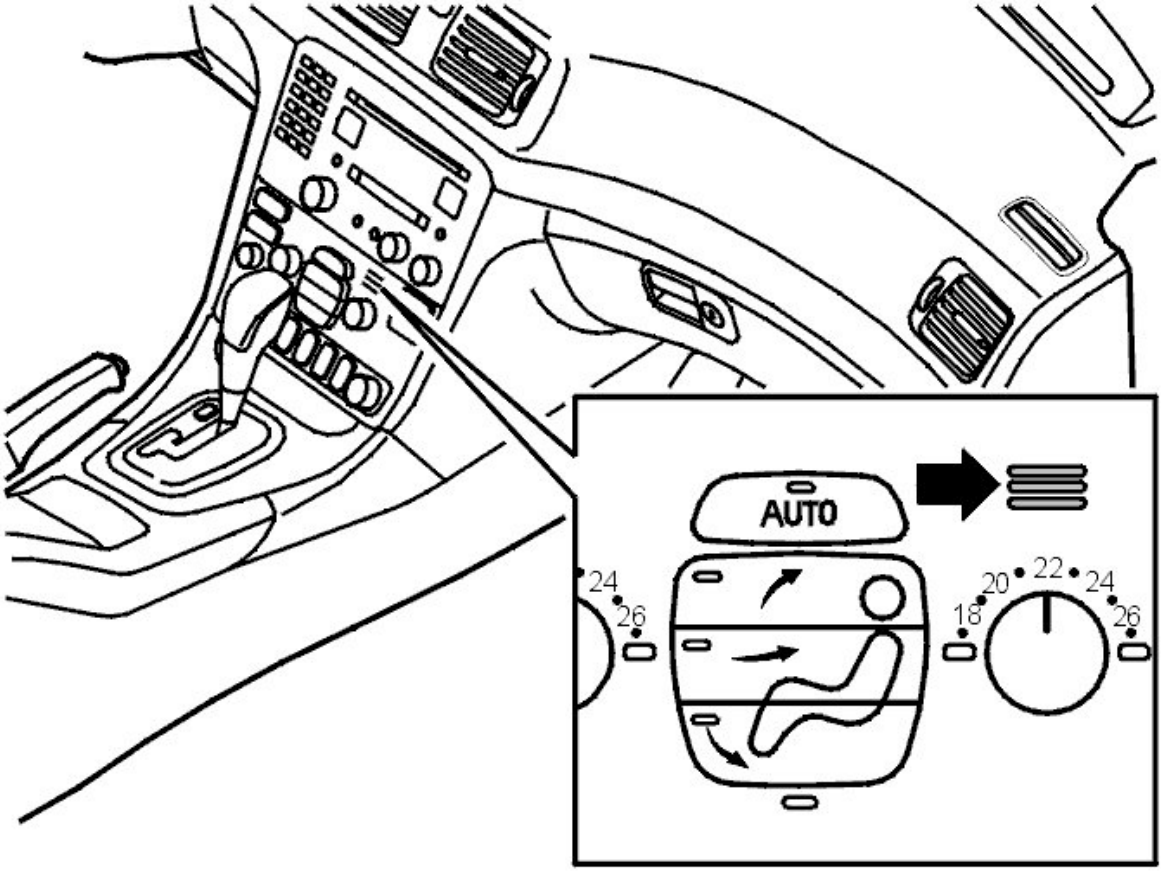
Continue - **DONE**

DONE - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0005

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a short-circuit to ground in the signal between the climate control module (CCM) and the passenger compartment temperature sensor.
The climate control module (CCM) uses the signal to control the passenger compartment temperature.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value

- The control module adopts a substitute value corresponding to 25 °C
- The normal value is the passenger compartment temperature.

Possible source

- There is a short-circuit to ground in the signal between the passenger compartment temperature sensor and the climate control module (CCM)
- The passenger compartment temperature sensor is not functioning.

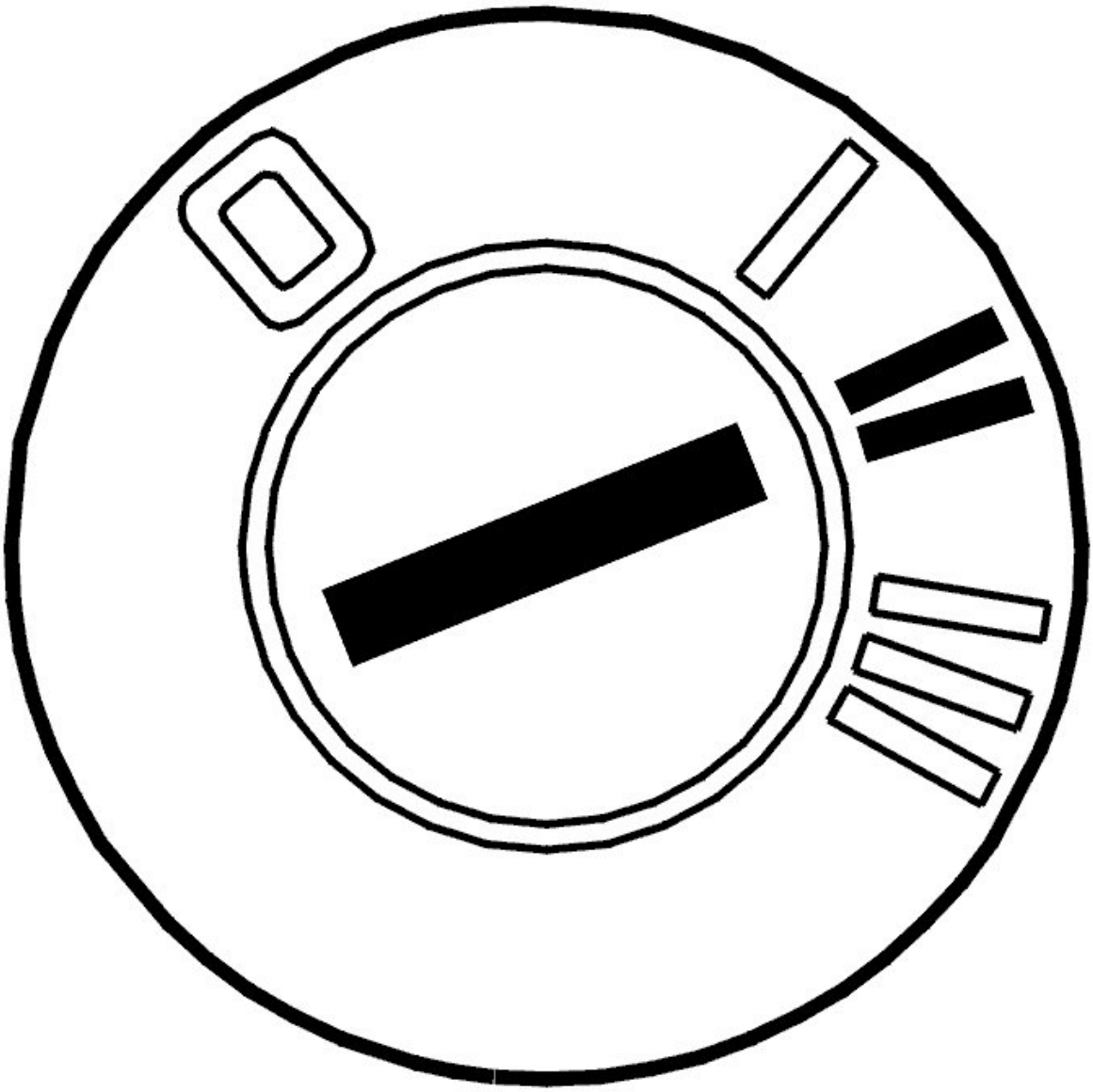
Fault symptom[s]

- The passenger compartment temperature does not correspond to the set position.

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking passenger compartment temperature sensor

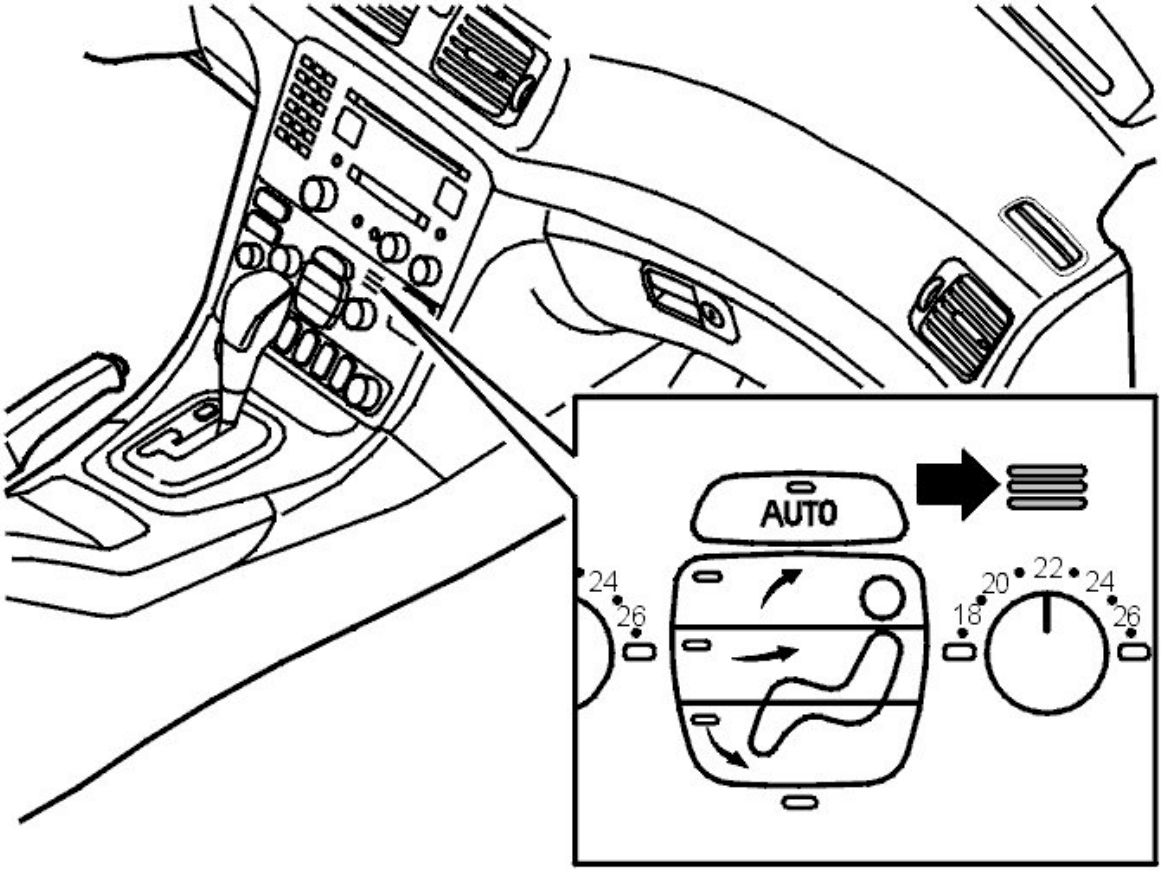


- Ignition on
- Check that the value from the sensor is within its permitted range. Use a thermometer.

Alternately blow hot and cold air onto the sensor. Check that the value displayed on the sensor changes.
Shine a light through the grille over the passenger compartment temperature sensor. Check for anything that could obstruct the airflow through the pipe.
Do not damage the sensor. The sensor is located just inside the grille.
Remedy as necessary.

Other information:

- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair



Is the sensor value correct?

Yes - Fault-tracing information

No - Replacing the component

Replacing the component

The fault is probably a defective passenger compartment temperature sensor. This type of fault means that the entire control module must be replaced. The passenger compartment temperature sensor cannot be replaced separately.
Replace the control module. See Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair

Continue - Checking LIN Bus

Self-adjustment

Limit positions for damper motor self-adjustment

Choice of climate control

1. Electronic climate control
2. Manual climate control (MCC).

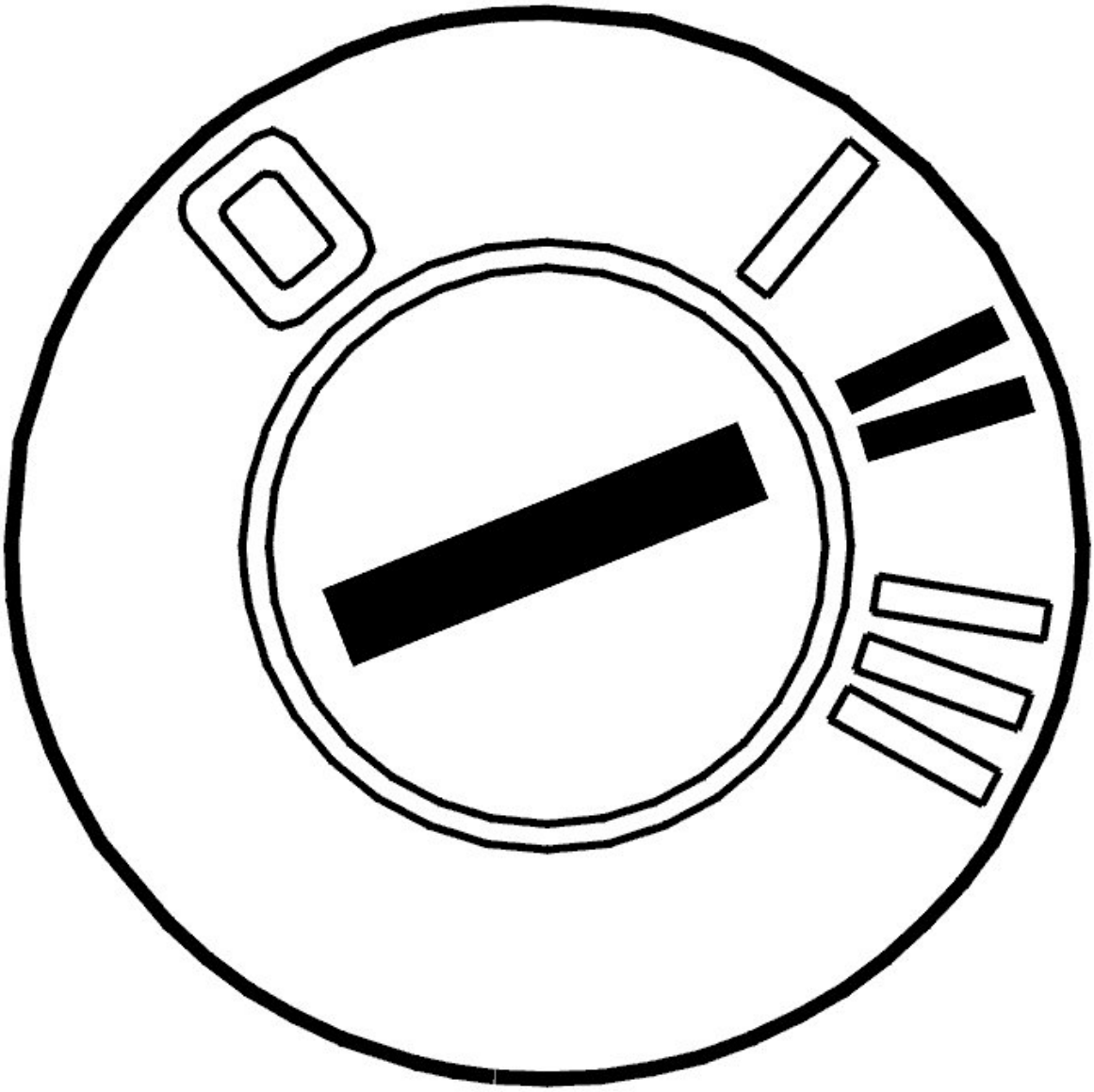
Select the type of climate control.

1 - Limit positions for damper motor self-adjustment

2 - Limit positions for damper motor self-adjustment

Limit positions for damper motor self-adjustment

Hint: Carry out self adjustment to define the shutter motor limit positions after replacing the control module or shutter motors, and when a shutter motor or link has been removed.



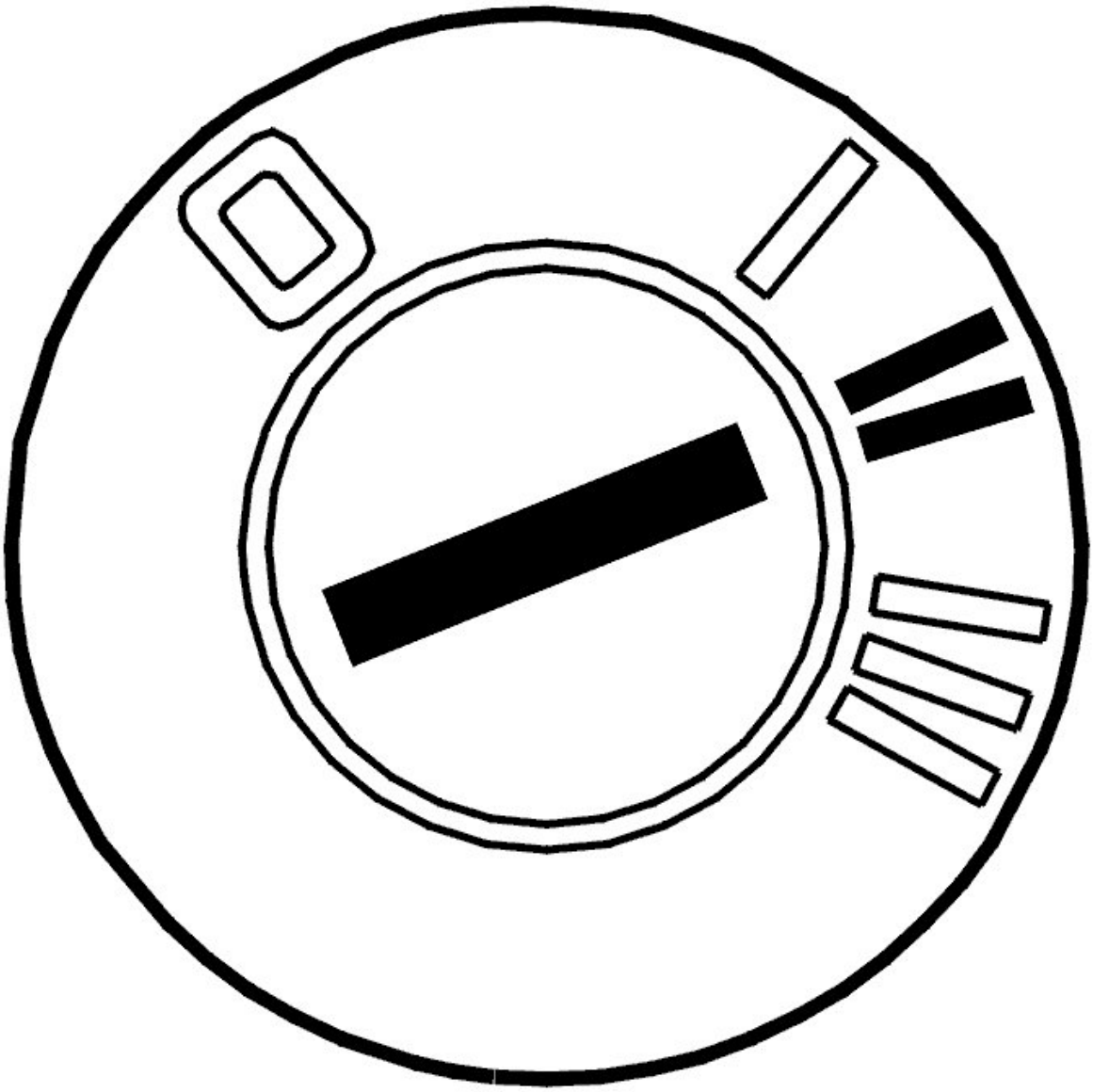
- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the self-adjustment. Wait at least 30 seconds.
Ignition off for at least 1 minute.
Start the engine.

Continue - **DONE**

Limit positions for damper motor self-adjustment

Hint: After replacing the control module or shutter motors, and when a shutter motor or link has been removed, carry out self adjustment to define the shutter motor limit positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the self-adjustment. Wait at least 30 seconds.
Ignition off for at least 1 minute.
Start the engine.

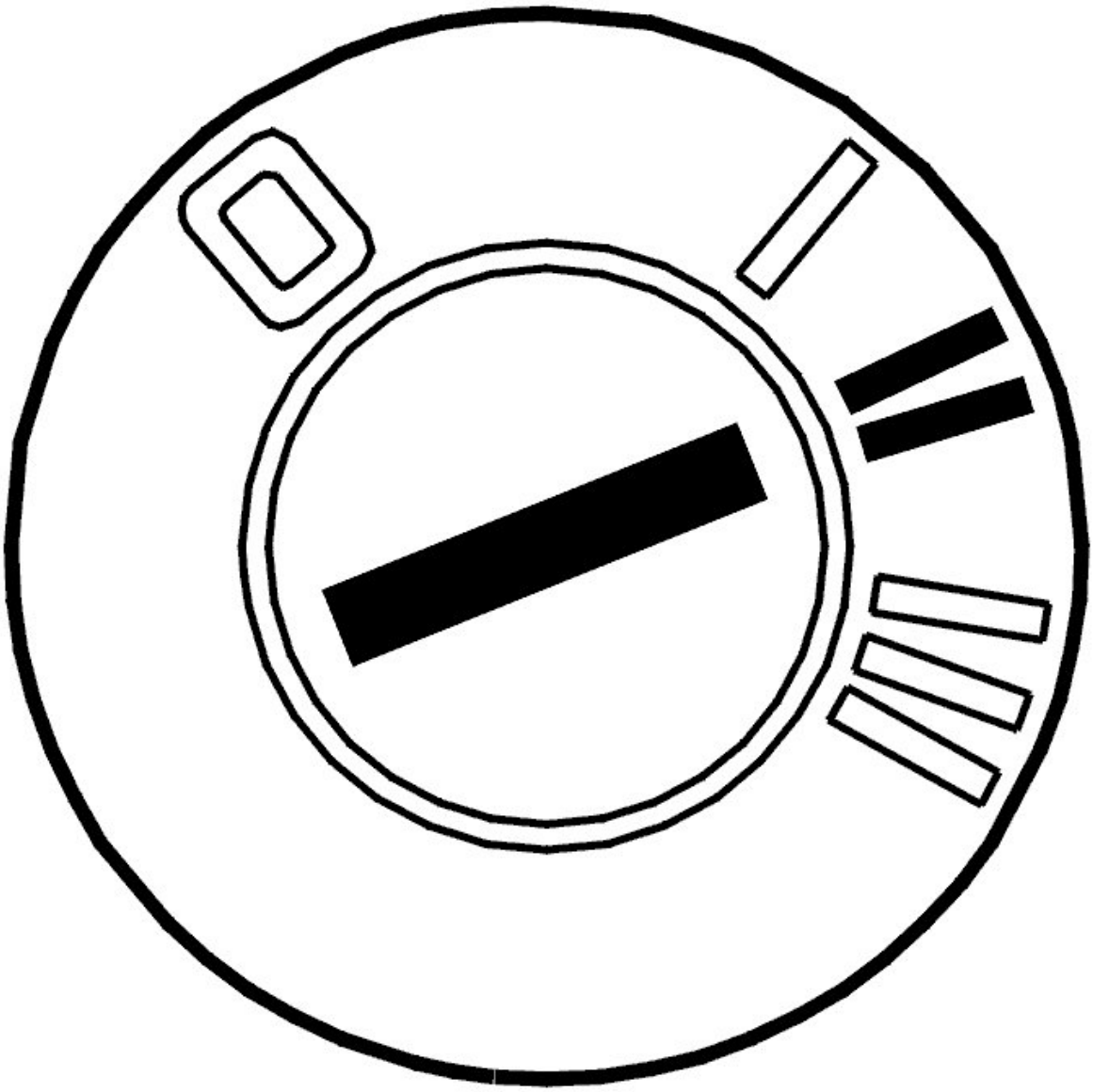
Select Continue

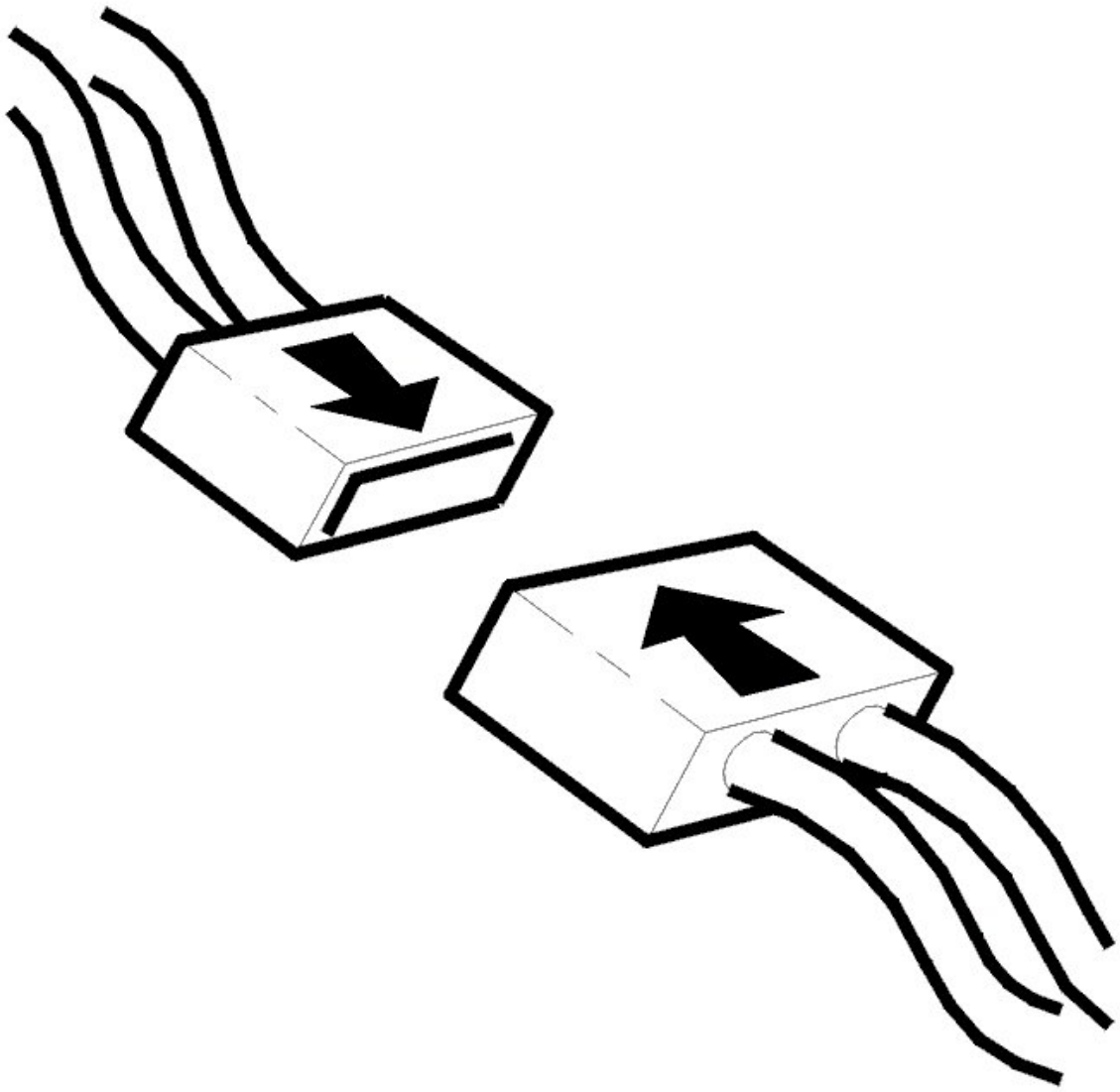
Continue - DONE

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the passenger compartment temperature. Vary the temperature at the passenger compartment temperature sensor to check that the value changes. Also check that the value is within its permitted range. Use a thermometer.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking passenger compartment temperature sensor

---

Fault-tracing information

The fault has probably occurred as a result of a damaged power circuit in the climate control system. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.

Continue - Information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - DONE

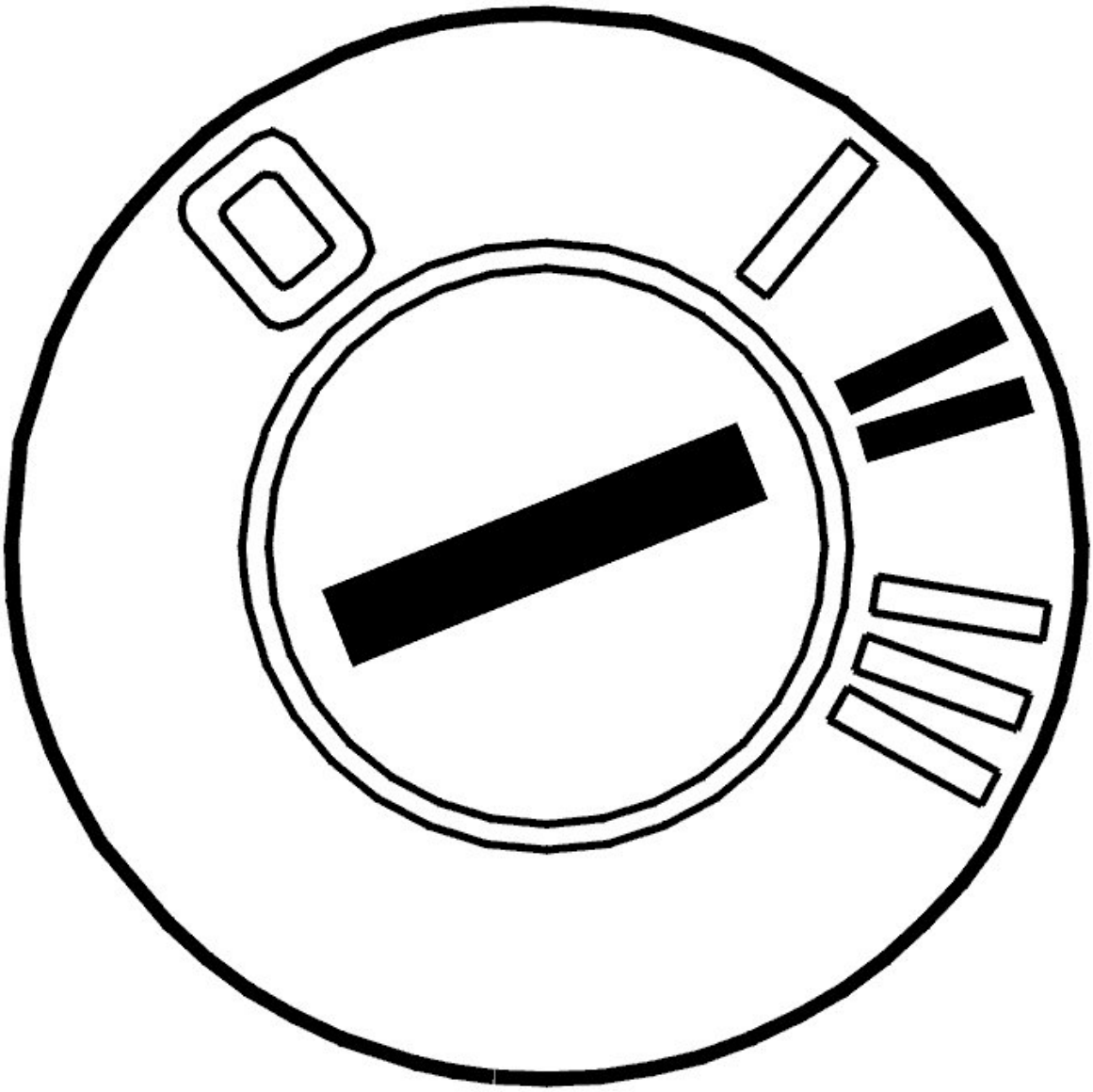
Attempt New Test - Checking passenger compartment temperature sensor

---

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click the VCT2000 symbol to activate the check.

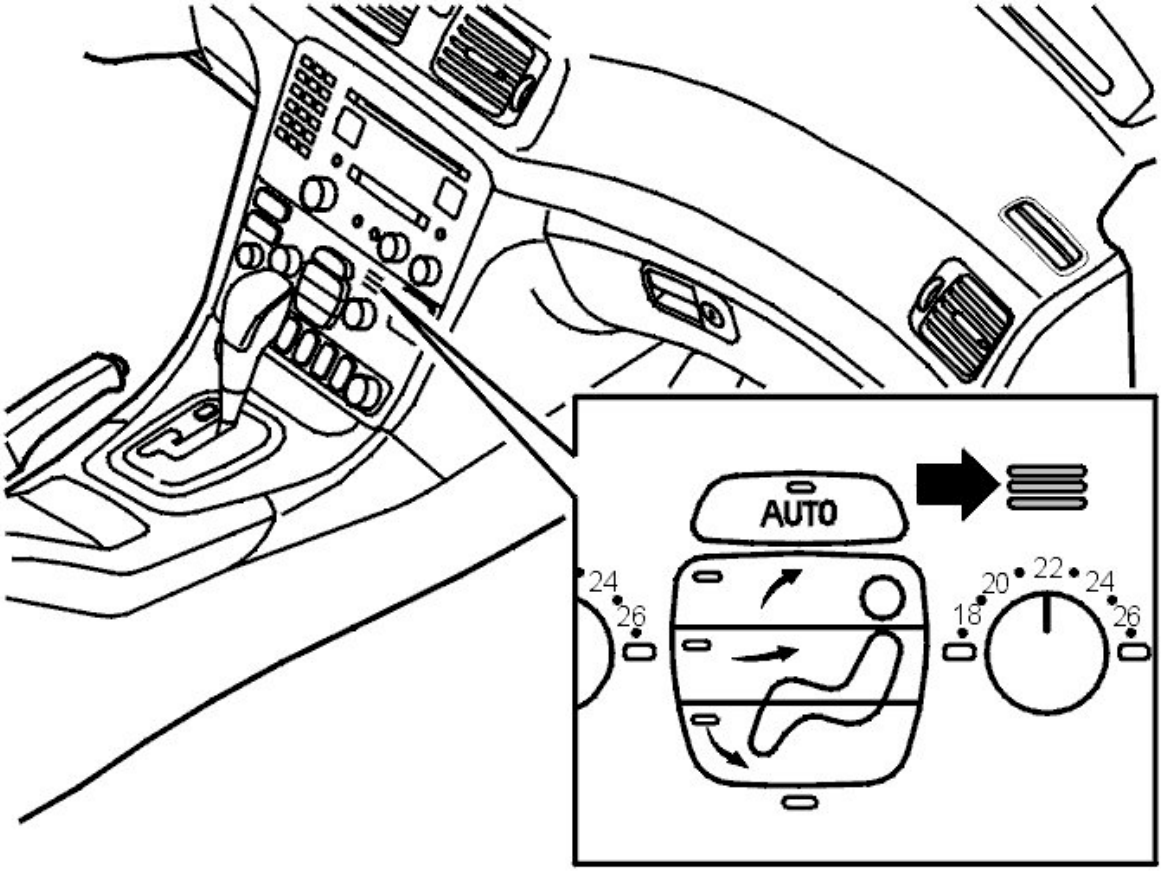
Continue - **DONE**

DONE - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0006

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an open-circuit in the power supply cable to the blower fan for the passenger compartment temperature sensor, or an open-circuit in the ground lead from the blower fan to the control module.
The function of the blower fan is to supply the passenger compartment temperature sensor with air from the passenger compartment. This prevents the sensor reading from being affected by heat from the surrounding electronics.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value
- None.

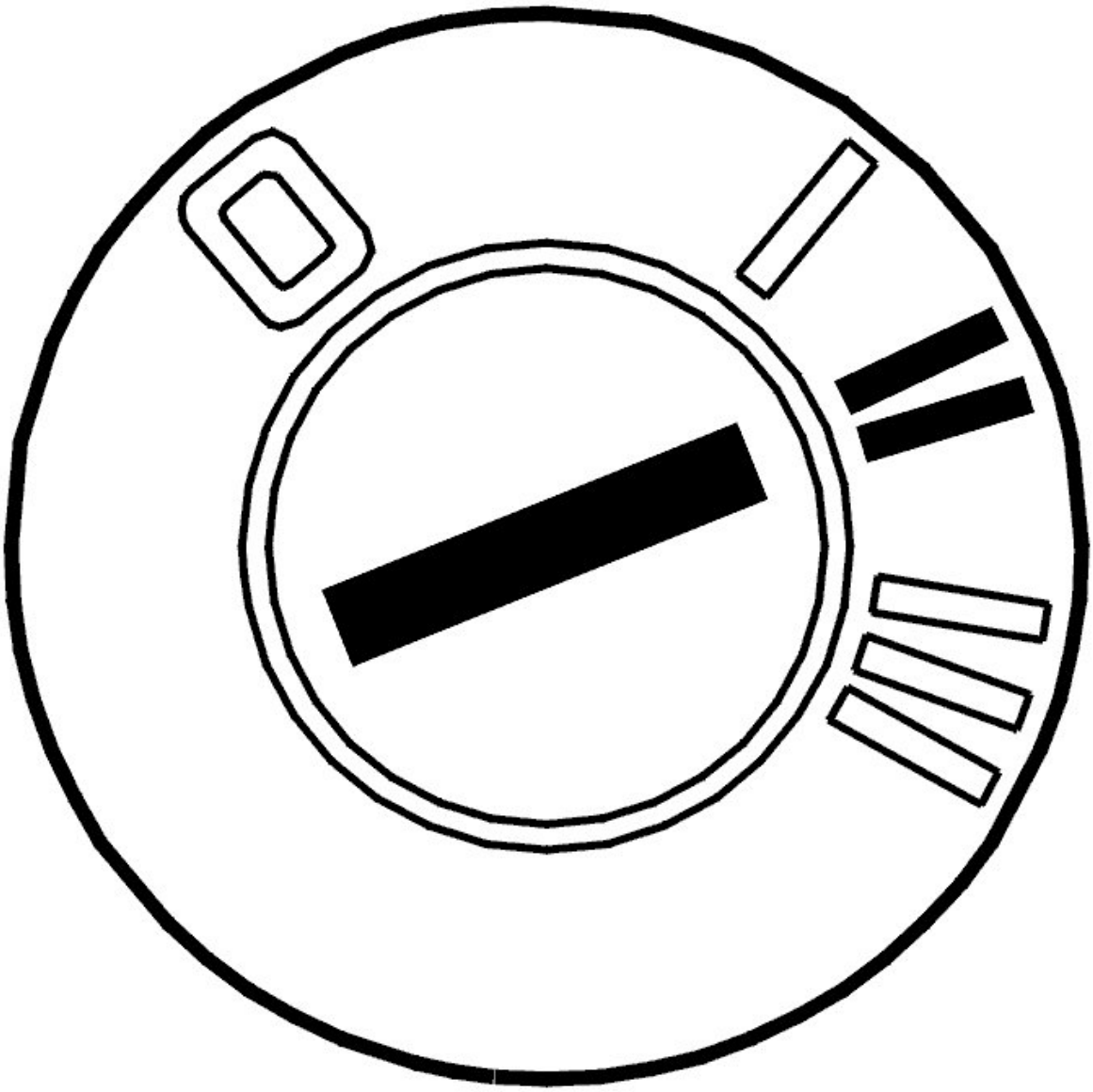
Possible source
- Open-circuit in the power supply cable between the climate control module (CCM) and the blower fan for the passenger compartment temperature sensor
- Open-circuit in the ground lead between the blower fan for the passenger compartment temperature sensor and the climate control module (CCM)
- Contact resistance, oxidation or loose connections in the connectors
- The blower fan for the passenger compartment temperature sensor is not functioning.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.
- Poor heating in the passenger compartment.

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking the fan motor and the passenger compartment temperature sensor



- Ignition on
- Check that the fan is functioning. Place a small, thin piece of paper in front of the ventilation grille for the passenger compartment temperature sensor.

If the paper is sucked against the grille, the fan is working.

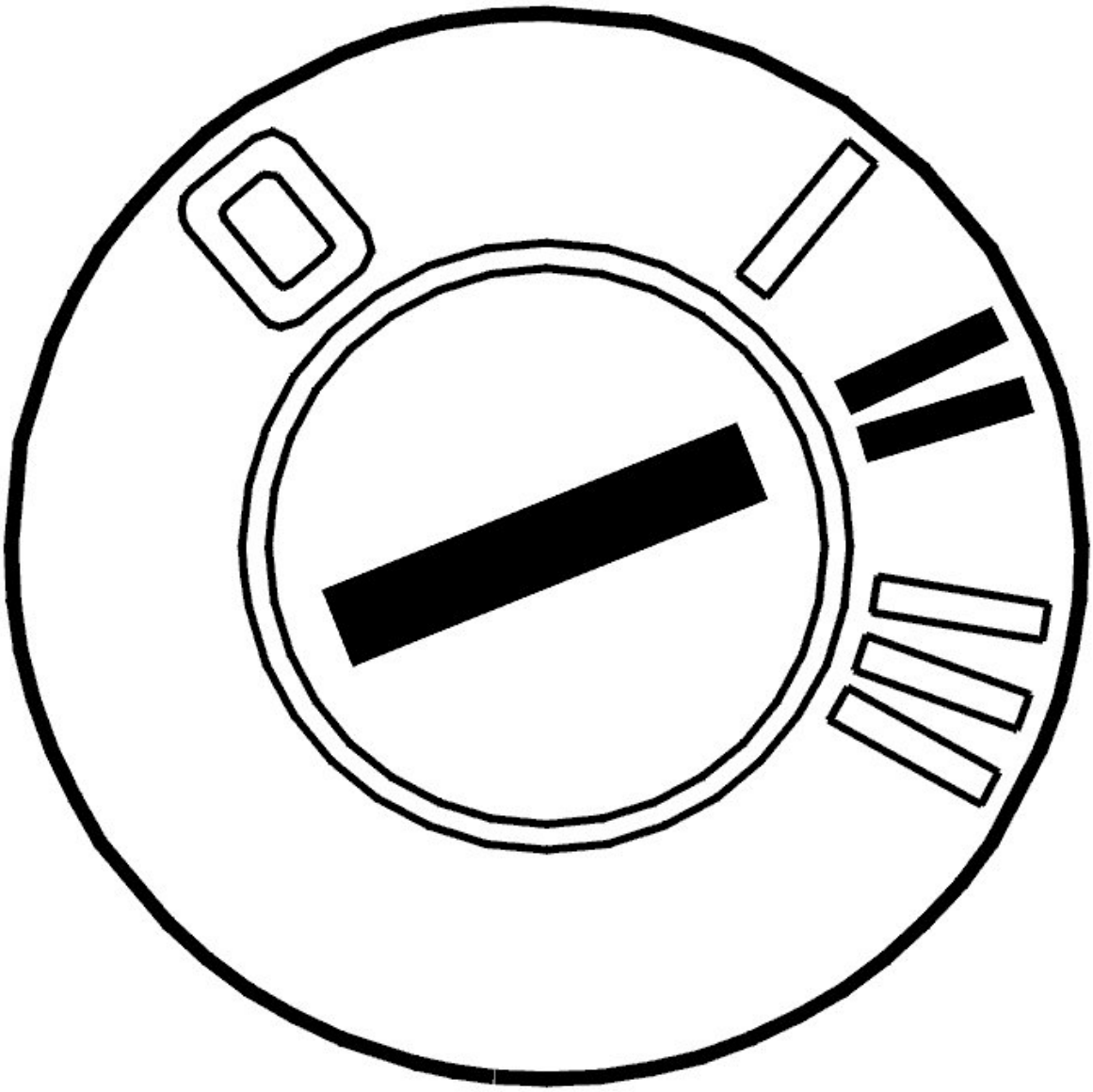
Note! The fan is only activated at passenger compartment temperatures in excess of -10 °C (14 °F).

Is the fan working?

Yes - Checking connectors and wiring

No - Checking components and connectors

Checking components and connectors



- Ignition off
- Disconnect the climate control module (CCM).

Check that the fan rotates freely and is not blocked by any objects.
Check the fan connector. Check for contact resistance and oxidation.

Note! From and including w50 2001, the fan is connected directly to connector C with no wiring in-between.

Try replacing the fan if no other fault is found.
Remedy as necessary.

Other information:

- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access or replace the blower fan motor, see Blower fan motor passenger compartment temperature sensor, replacing See: Heating and Air Conditioning/Cabin Temperature Sensor / Switch/Service and Repair
- For other values, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Select "Continue" when the fault has been remedied.

Continue - Verification

Checking connectors and wiring

Note! From and including w50 2001, the fan is connected directly to connector C with no wiring in-between.

Check the wiring between the climate control module (CCM) and fan motor. Check for an intermittent short-circuit to ground and supply voltage.

Check the wiring for the control module. Check for an intermittent open-circuit.
Check connector C. Check for contact resistance and loose connections.

Other information:

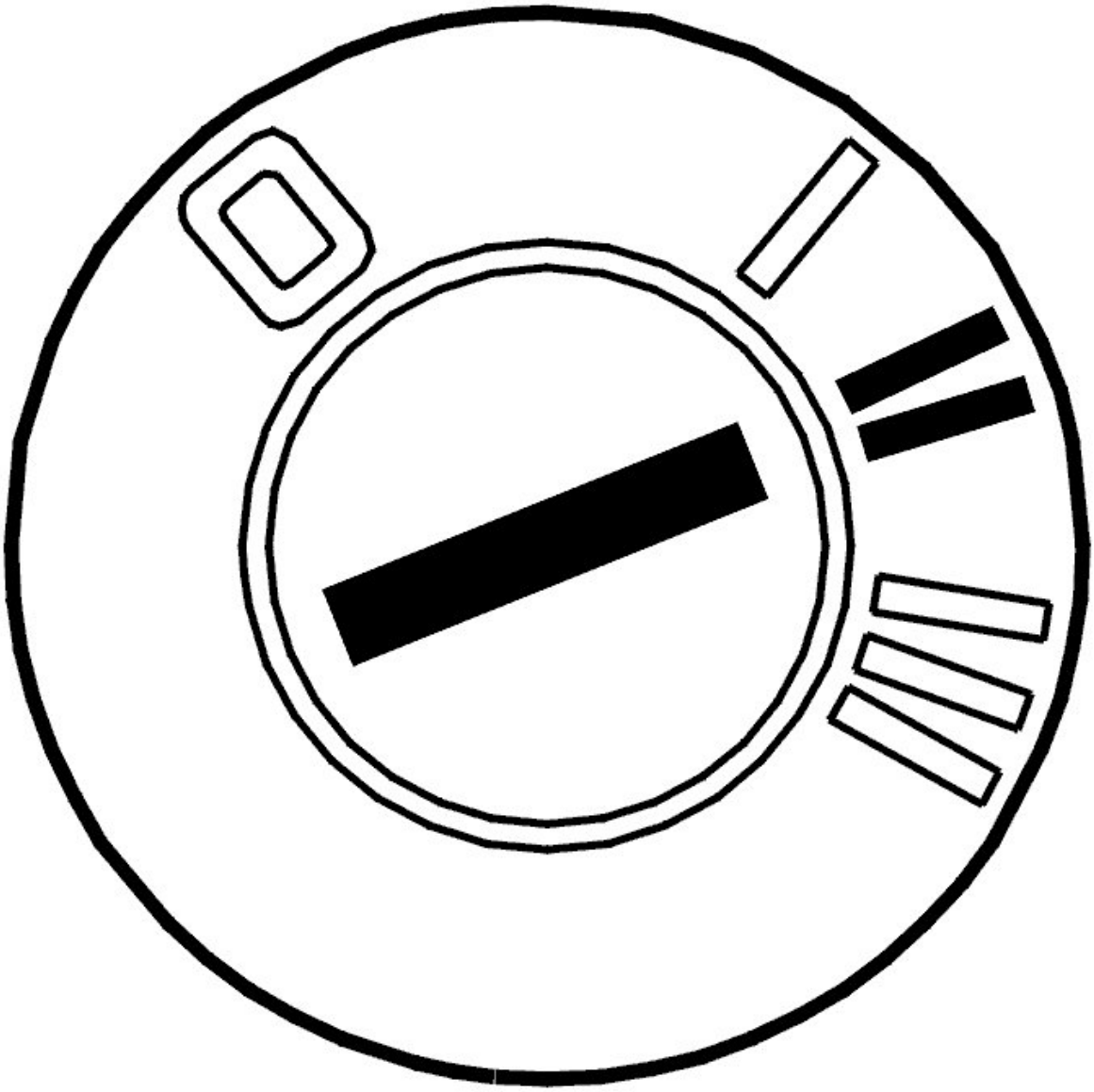
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- To access or replace the blower fan motor, see Blower fan motor passenger compartment temperature sensor, replacing See: Heating and Air Conditioning/Cabin Temperature Sensor / Switch/Service and Repair
- For other values, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

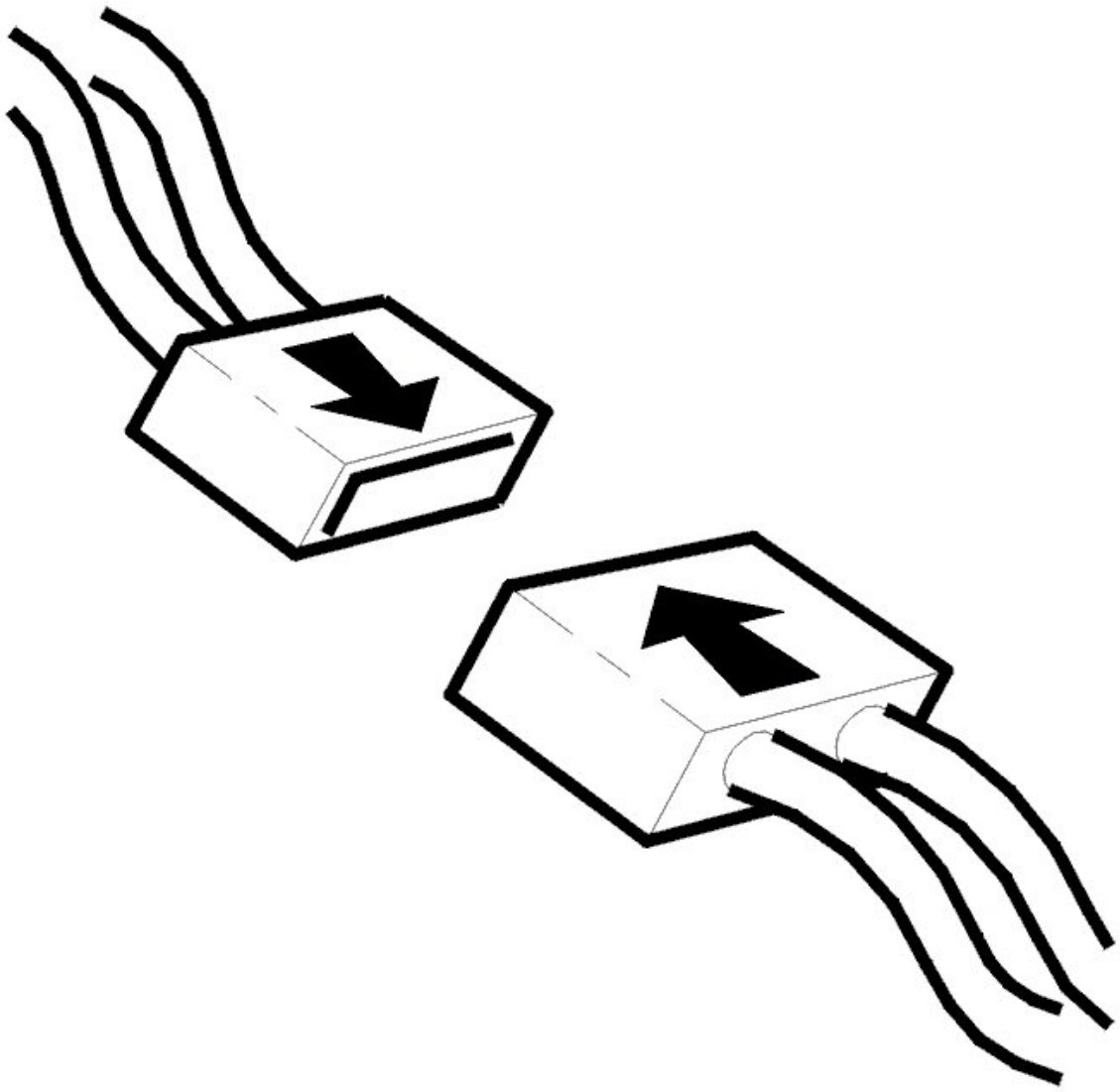
Select "Continue" when the fault has been remedied.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Use a thin piece of paper in front of the fan to see whether the fan is blowing (on the reverse of the control module).

The fan is functioning if the paper moves.

Is the fan working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fan motor and the passenger compartment temperature sensor

---

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

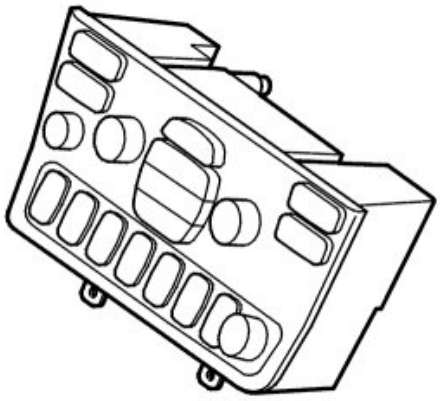
Attempt New Test - Checking the fan motor and the passenger compartment temperature sensor

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0011

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an internal memory fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal memory fault in the climate control module (CCM).

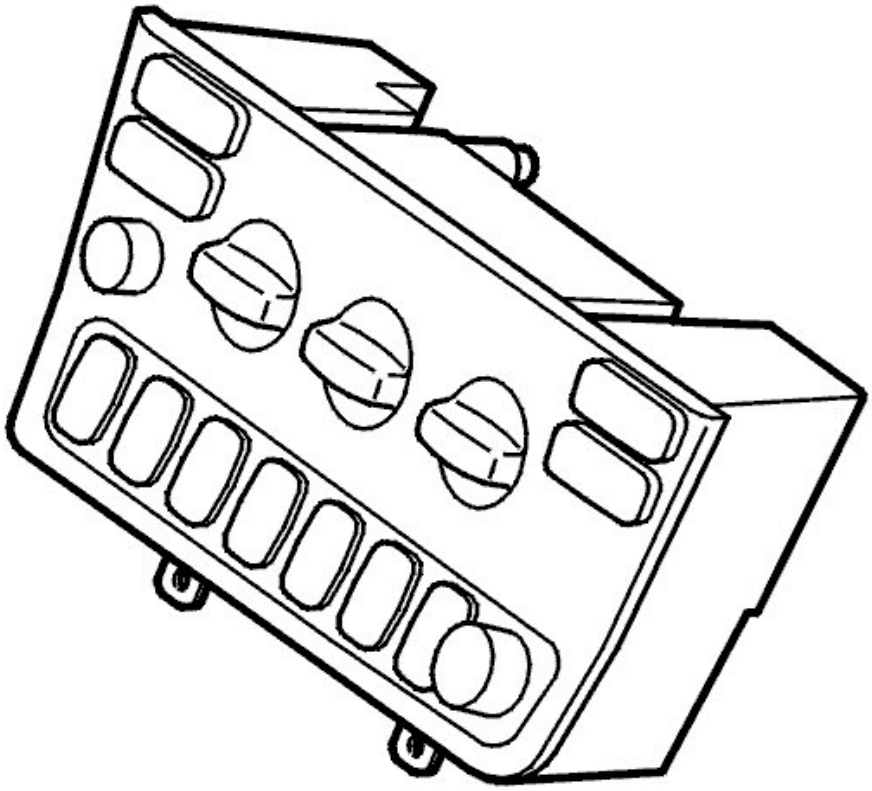
Fault symptom[s]
- The customer settings for the climate disappear.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the climate control module (CCM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the climate control module (CCM).
Replace the climate control module (CCM) in the event of a permanent fault:
Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

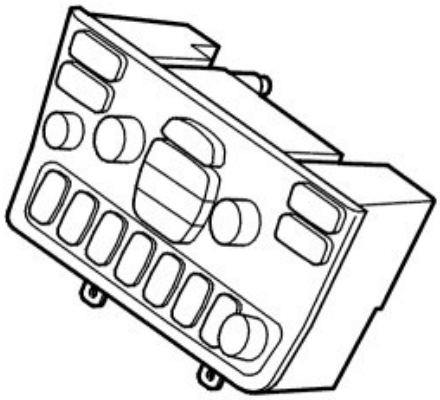
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0020

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that a function button on the dashboard environment panel has been activated for longer than two minutes.
The climate control module (CCM) can detect a maximum of two buttons being pressed simultaneously. If more than two buttons are activated for too long simultaneously, the functionality for all the buttons may be lost.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- The climate control module (CCM) does not permit the button function to be activated before the button has returned to the normal position.

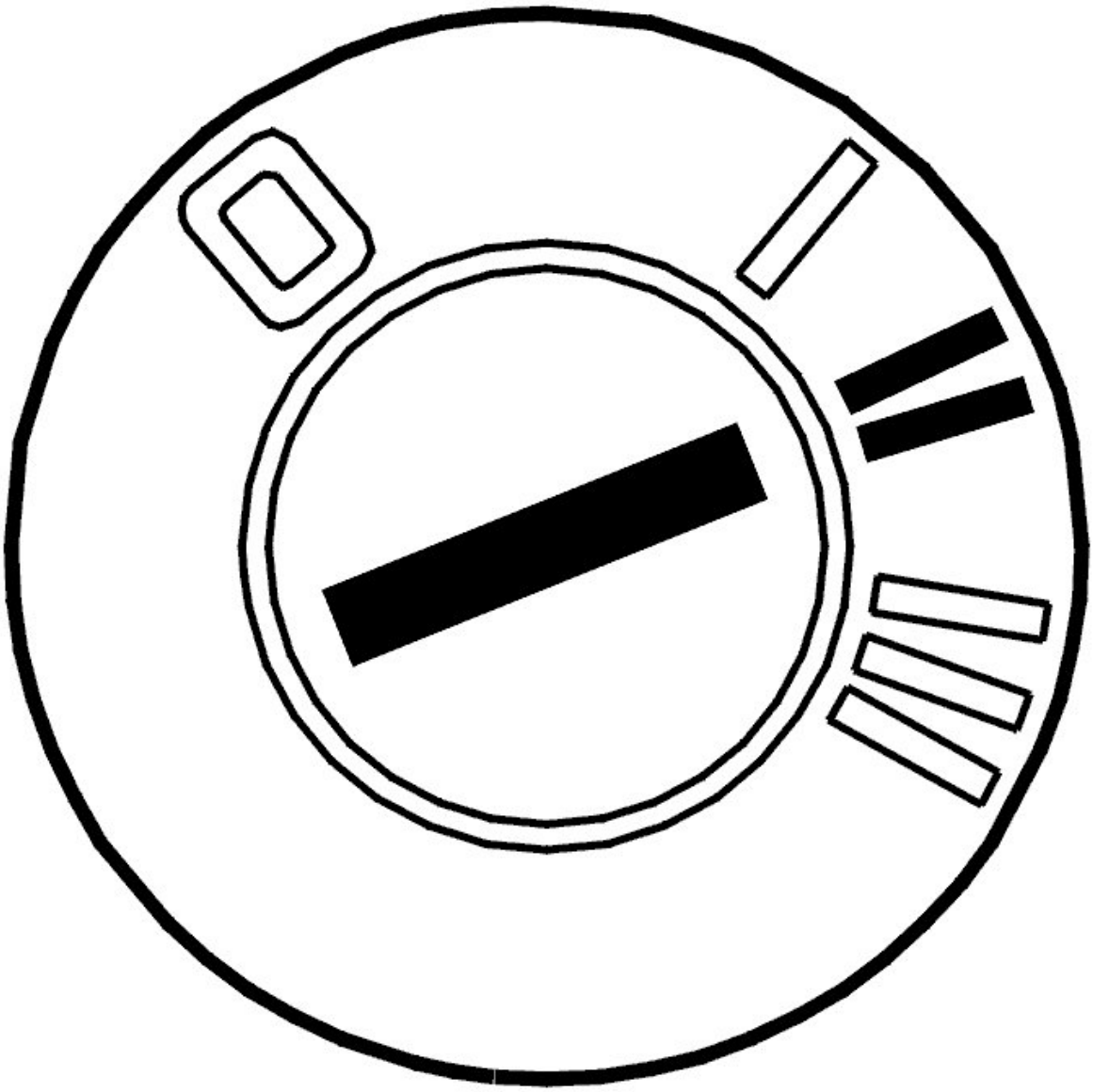
Possible source
- One or more function buttons are stuck in the pressed-in position
- Unintentionally long activation of the function button.

Fault symptom[s]
- The function button is not working.

Activated Too Long

Activated too long

Checking the component



- Ignition on.

Read off which switch was activated when the diagnostic trouble code (DTC) was set by clicking on the VCT2000 symbol.
Check if the switch is sticking due to dirt. Check if there is an obstruction preventing the switch from returning.
Check that the functions that can be controlled via the switch on the climate control module (CCM) are working.
Also check that the LEDs in the switches light and go out when the buttons are pressed.
The keypad must be replaced if the switch does not spring back and the fault is not due to dirt or an external object.

Other information:

- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair

Was a fault detected?

Yes - Verification

No - Fault-tracing information

Fault-tracing information

The fault is probably because a switch has been activated for too long during individual operating cycles. No further corrective action is required if the diagnostic trouble code (DTC) does not recur.

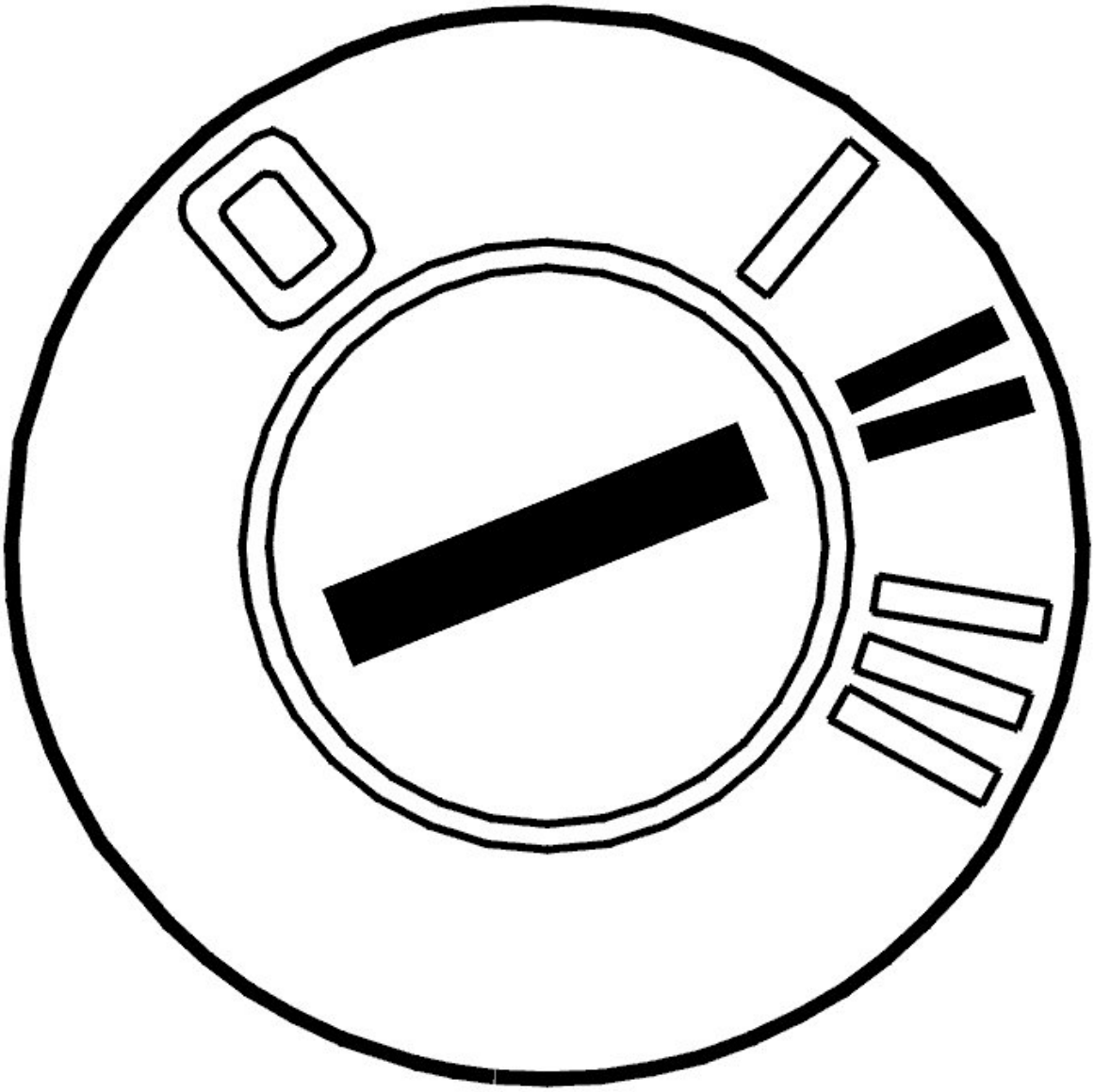
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

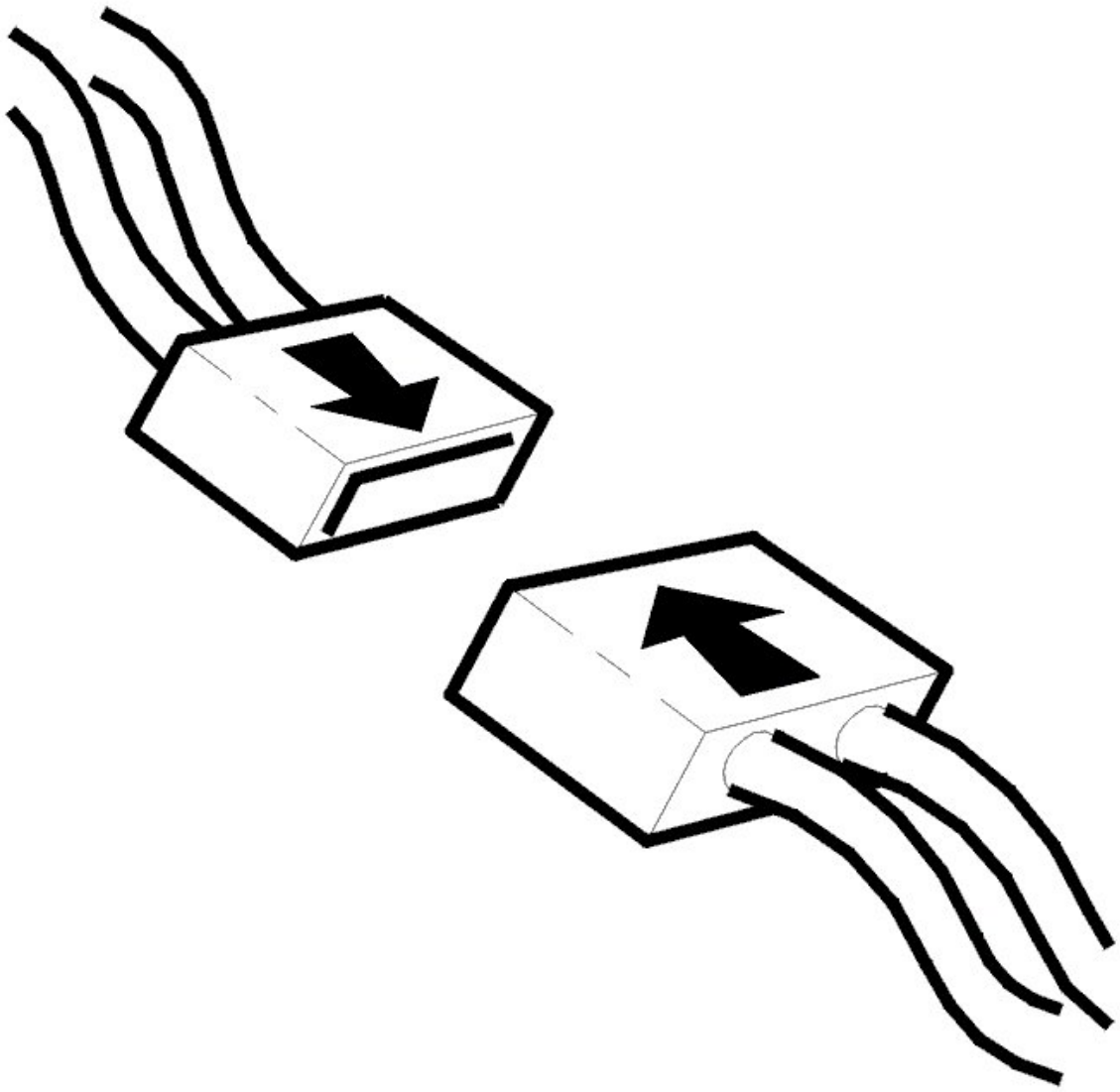
Select Continue

Continue - Information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.

Note! Wait at least 1 minute before "Ignition on". This is to allow the climate control module (CCM) to carry out a new diagnostic.

- Reinstall the connectors, components etc.
- Ignition on
- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the status of the diagnostic trouble code (DTC) has changed to intermittent.

Does the status change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

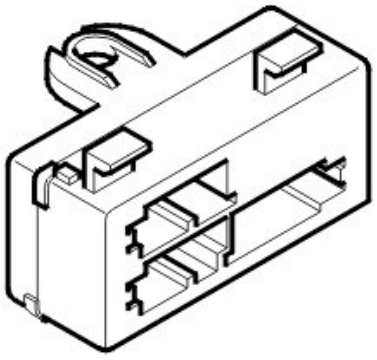
FAULT FOUND - Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0030

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the heater pad for the left seat heating module (SHM).
The climate control module (CCM) communicates with the left seat heating module (SHM) via LIN bus 1.

The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of the seat heater.

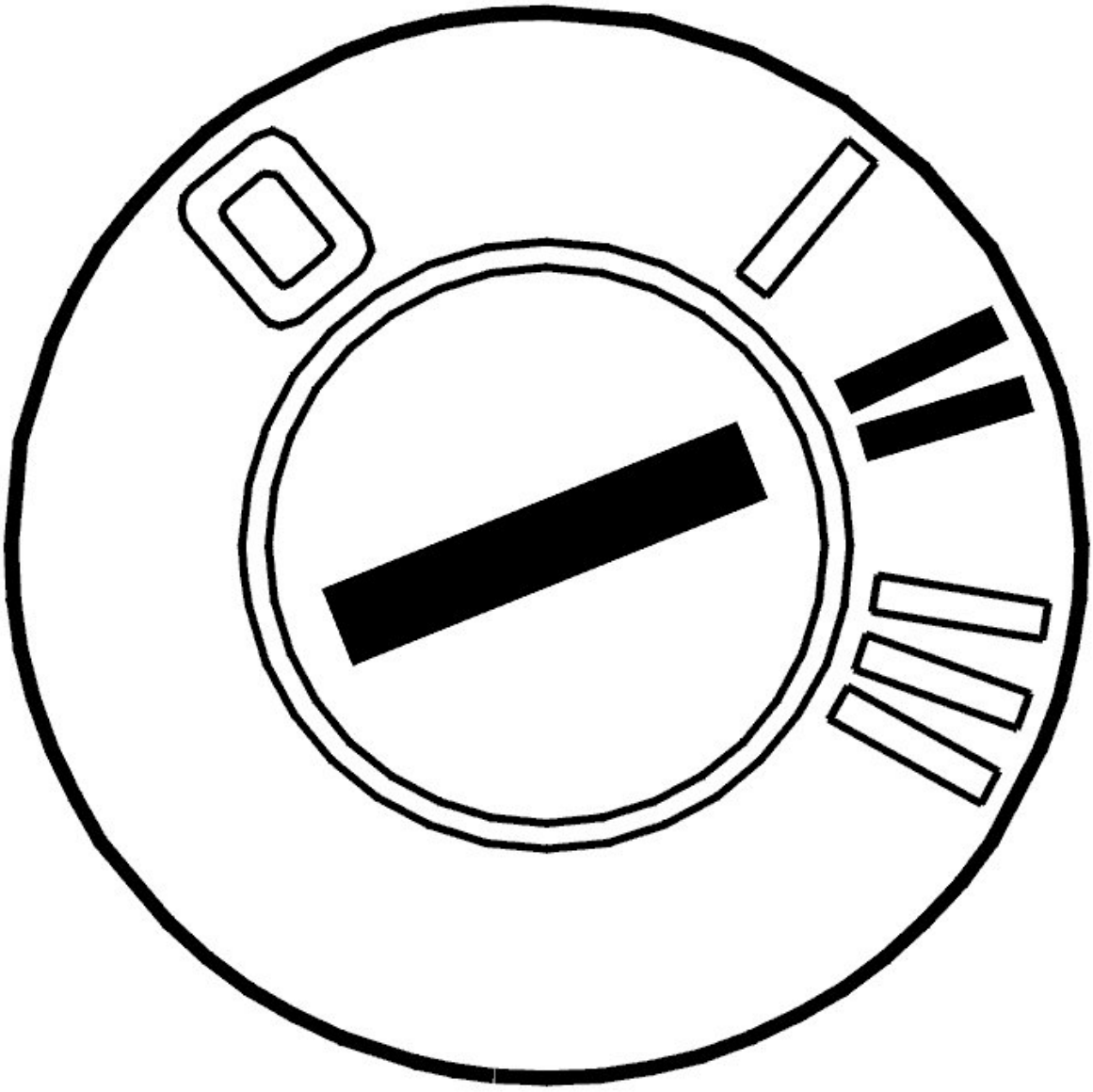
Possible source
- Open-circuit in the cable between the seat heating module (SHM) and the heater pad
- There is a short-circuit to supply voltage in the cable between the seat heating module (SHM) and the heater pad
- There is a short-circuit to ground in the cable between the seat heating module (SHM) and the heater pad.

Fault symptom[s]
- The front seat heating does not function.

Faulty Signal

Faulty signal

Checking heater elements



- Ignition on.

Checking components and connectors

Check the connectors. Check for contact resistance. Check for oxidation. Check for loose connections.
Check the heating loop in the seat. Take readings between:
- terminals #1 and #4 on connector B for the seat heating module (SHM). Check for an open-circuit
- terminal #1 on connector B and chassis ground. Check for a short-circuit to ground
- terminal #1 on connector B and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Check the heating loop in the backrest. Take readings between:

- terminals #1 and #2 on connector C for the seat heating module (SHM). Check for an open-circuit
- terminal #1 on connector C and chassis ground. Check for a short-circuit to ground
- terminal #1 on connector C and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

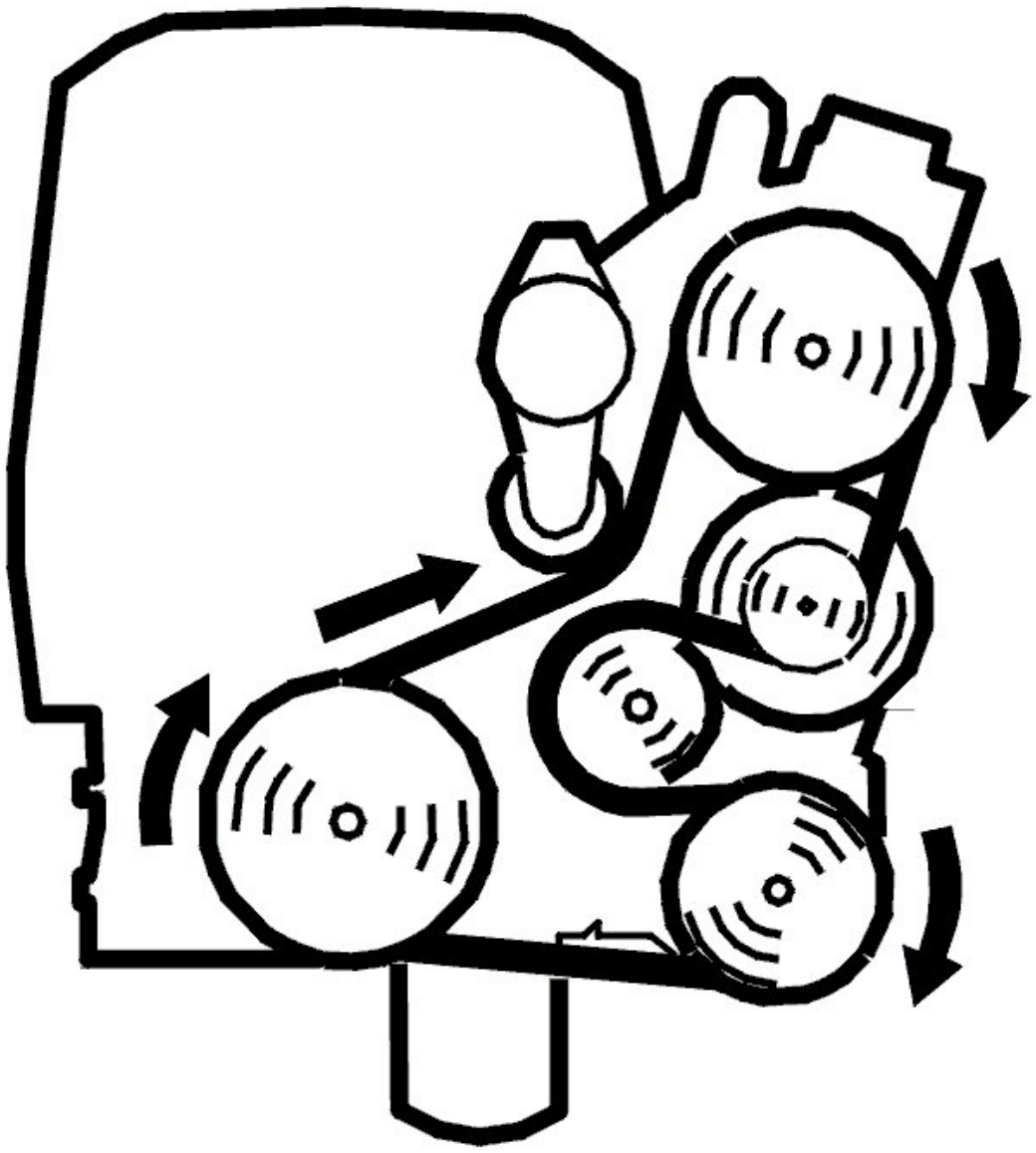
Continue - Verification

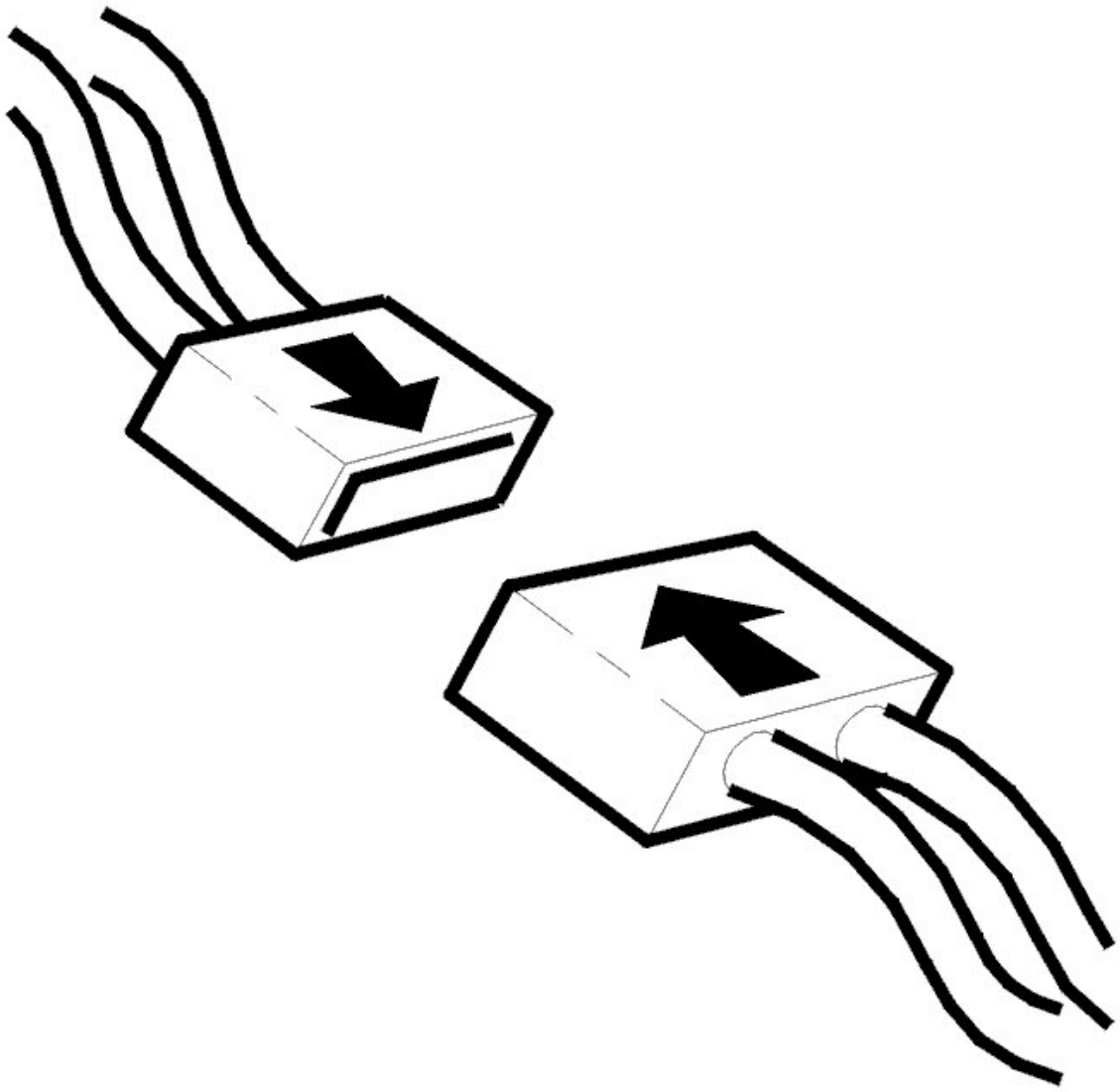
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Engine running.

Activate the seat heating. Check that the seat heats up.

Is the seat heater functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking heater elements

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

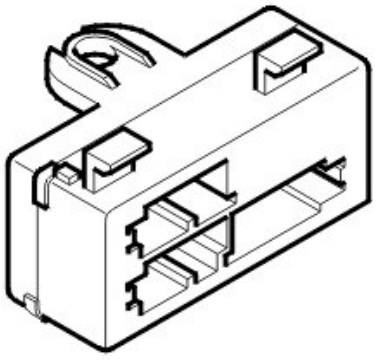
FAULT FOUND - Fault Found

Attempt New Test - Checking heater elements

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0031

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the temperature sensor for the left seat heating module (SHM).
The climate control module (CCM) communicates with the left seat heating module (SHM) via LIN bus 1.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Open-circuit in the cable between the seat heating module (SHM) and the temperature sensor
- There is a short-circuit to supply voltage in the cable between the seat heating module (SHM) and the temperature sensor
- There is a short-circuit to ground in the cable between the seat heating module (SHM) and the temperature sensor.

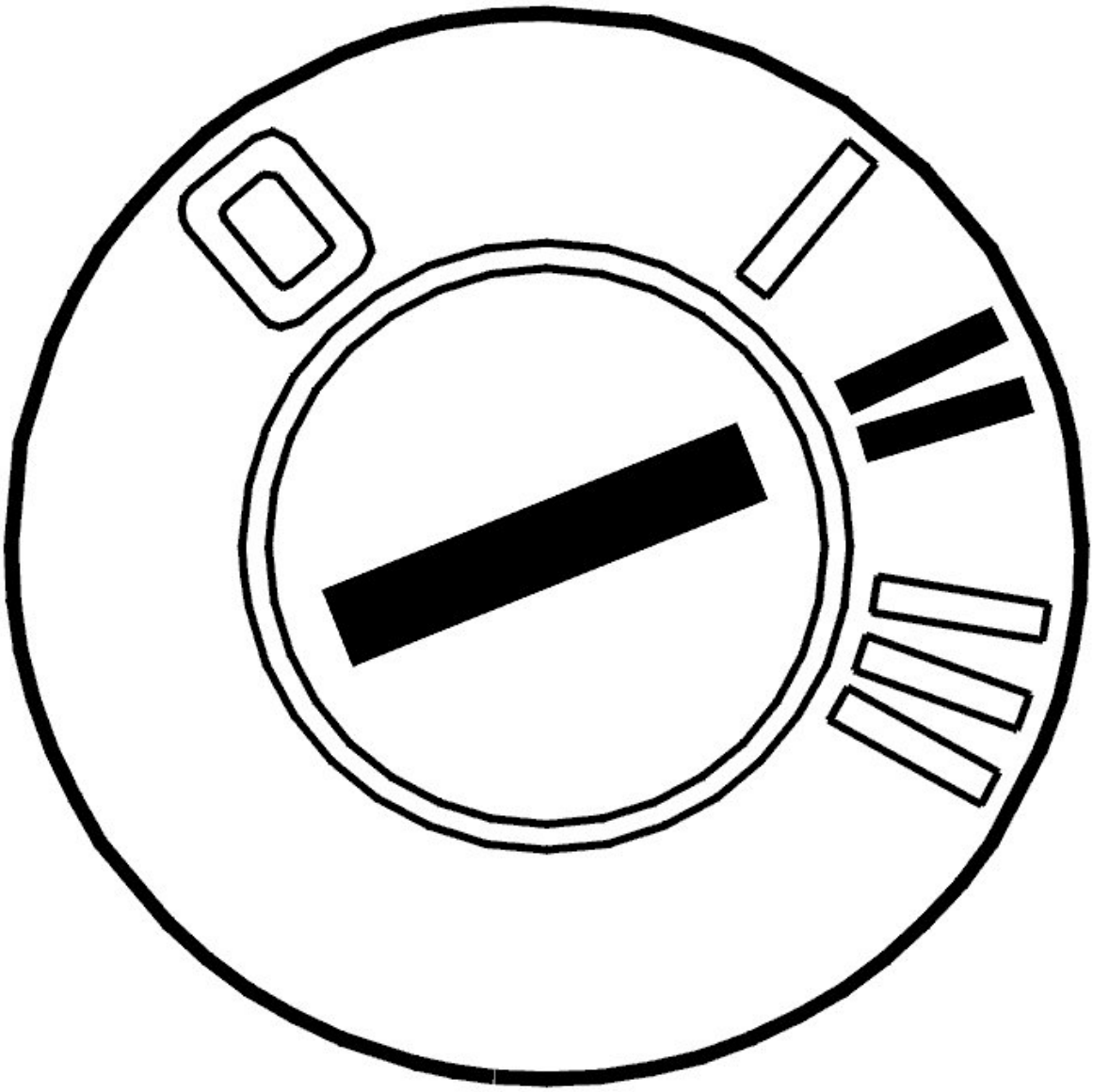
Fault symptom[s]

- The front seat heating does not function.

Faulty Signal

Faulty signal

Checking the sensor



- Ignition on.

Checking components and connectors

Check the connectors. Check for contact resistance. Check for oxidation. Check for loose connections.
Check the sensor in the seat. Take readings between:

- terminals #2 and #3 on connector B for the seat heating module (SHM). Check for an open-circuit
- terminal #2 on connector B and chassis ground. Check for a short-circuit to ground
- terminal #2 on connector B and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

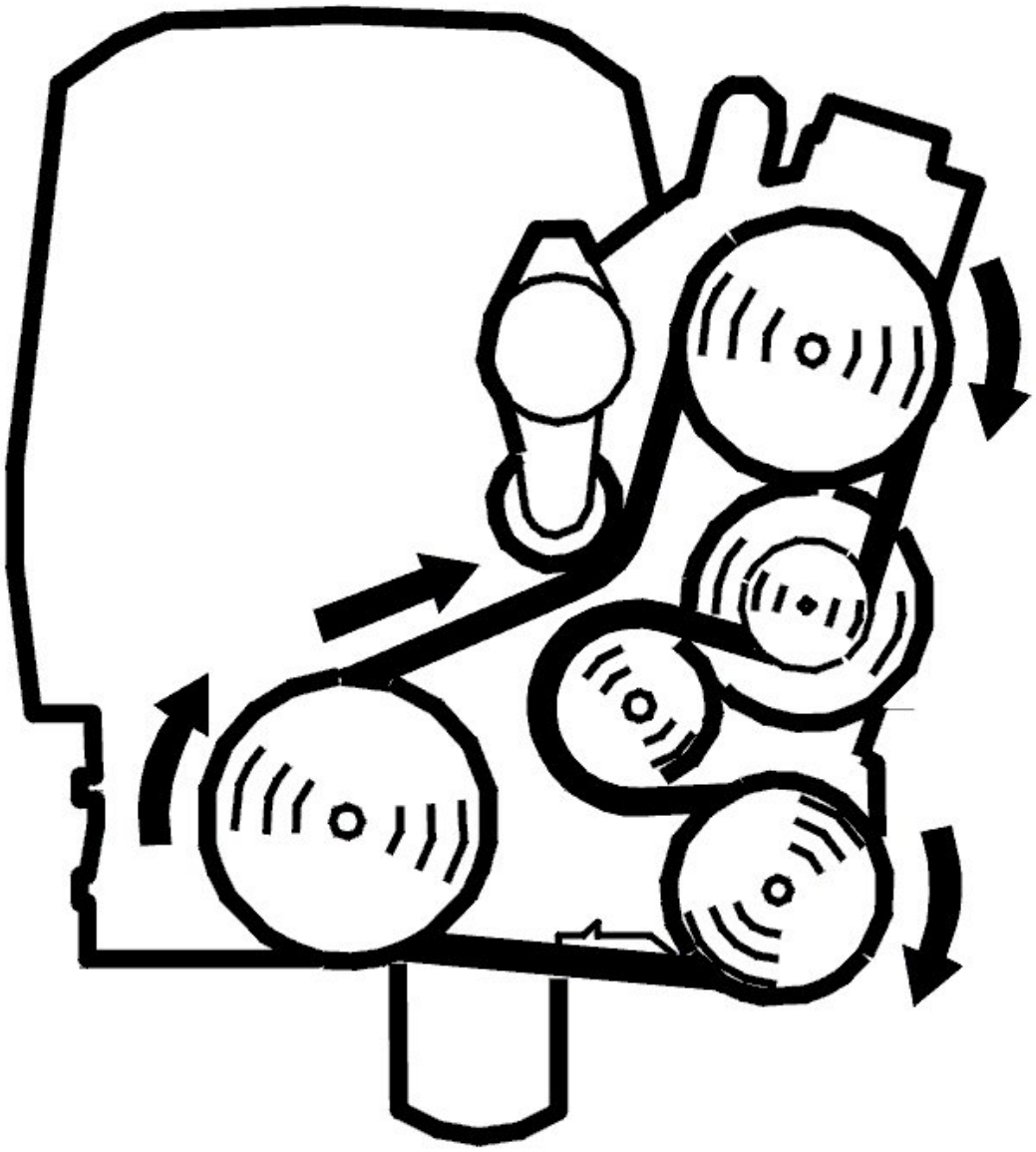
Continue - Verification

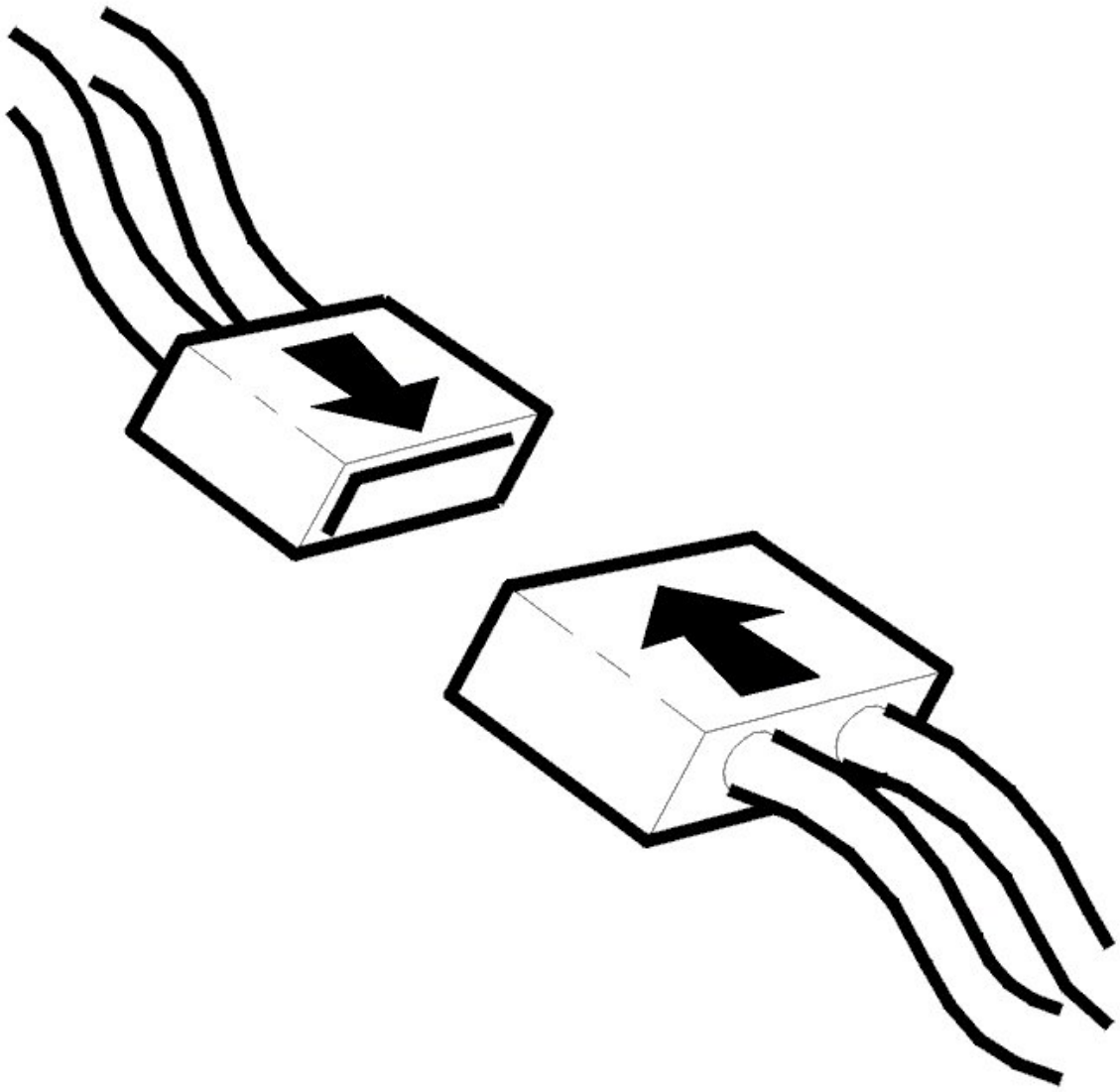
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Engine running.

Activate the seat heating. Check that the seat heats up.

Is the seat heater functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the sensor

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

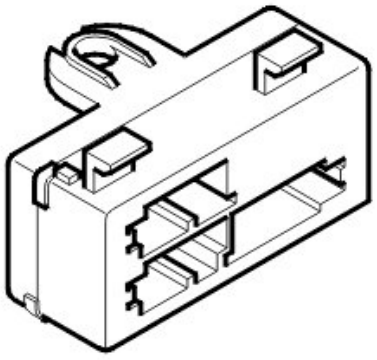
FAULT FOUND - Fault Found

Attempt New Test - Checking the sensor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0032

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an internal fault in the left seat heating module (SHM).
The climate control module (CCM) communicates with the left seat heating module (SHM) via LIN bus 1.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Internal fault in the left seat heating module (SHM).

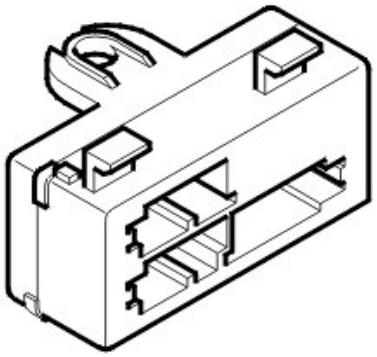
Fault symptom[s]
- The front seat heating does not function.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the left-hand seat heating module (SHM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the left-hand seat heating module (SHM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the left-hand seat heating module (SHM) if the fault recurs.
Replace the left-hand seat heating module (SHM) if the fault is permanent:
Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

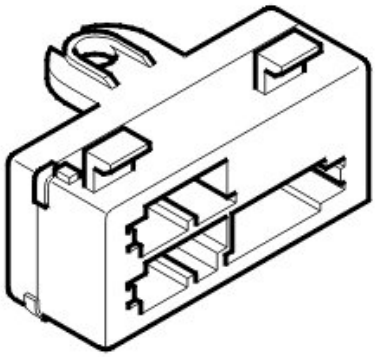
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0033

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an internal fault in the left seat heating module (SHM).
The climate control module (CCM) communicates with the left seat heating module (SHM) via LIN bus 1.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Internal fault in the left seat heating module (SHM).

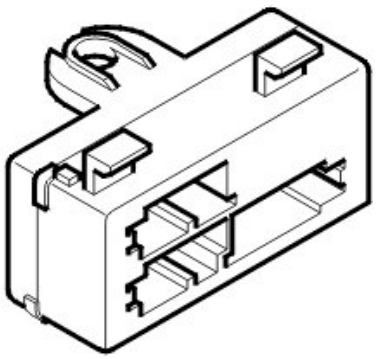
Fault symptom[s]
- The front seat heating does not function.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the left-hand seat heating module (SHM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the left-hand seat heating module (SHM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the left-hand seat heating module (SHM) if the fault recurs.
Replace the left-hand seat heating module (SHM) if the fault is permanent:
Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

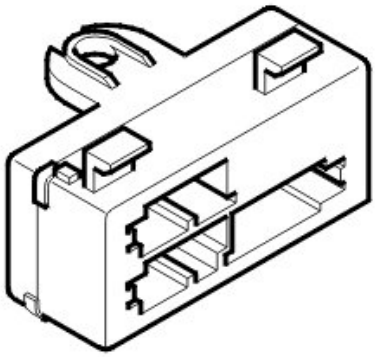
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0034

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the heater pad for the right seat heating module (SHM).
The climate control module (CCM) communicates with the right seat heating module (SHM) via LIN bus 2.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

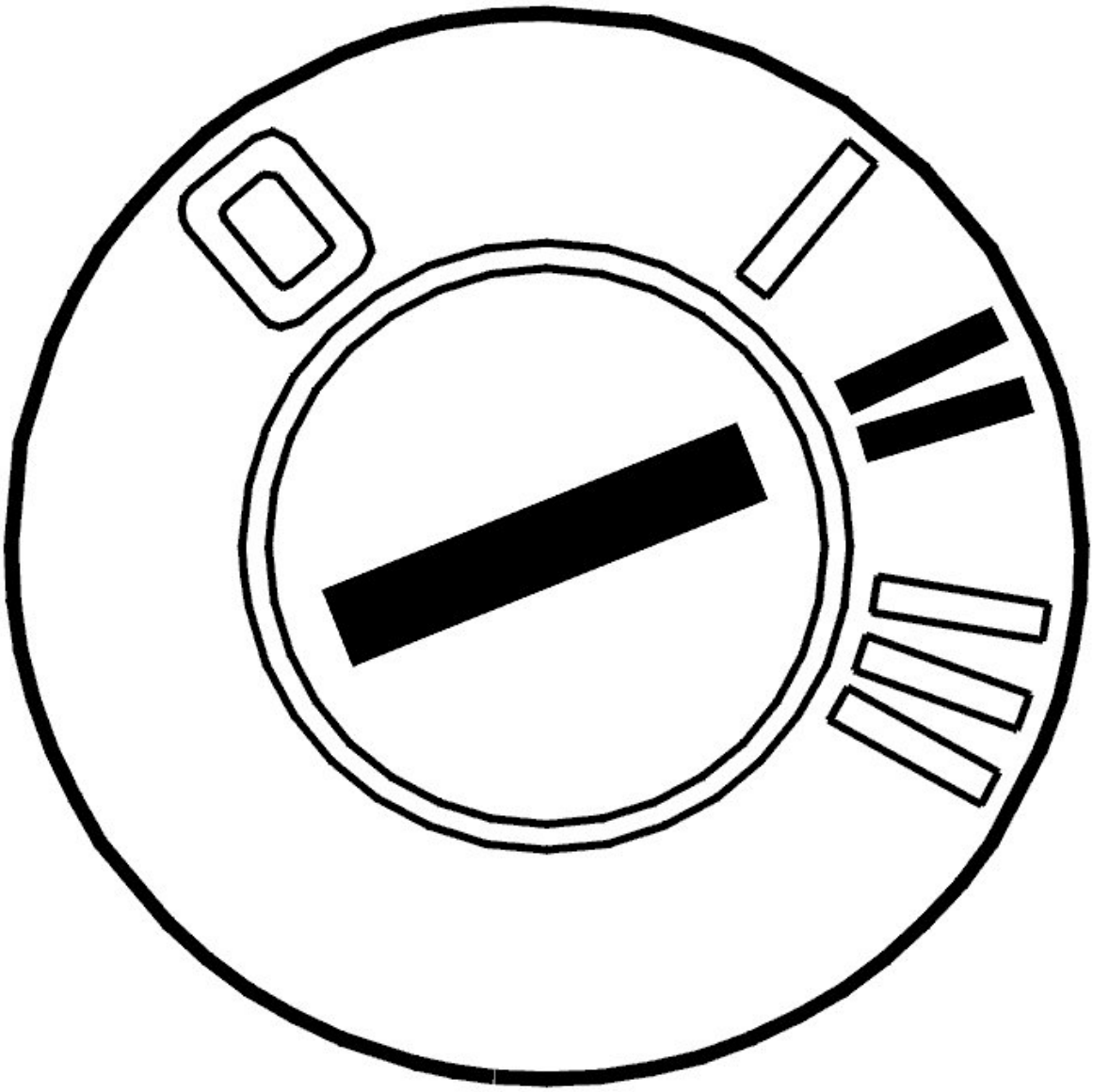
Possible source
- Open-circuit in the cable between the seat heating module (SHM) and the heater pad
- There is a short-circuit to supply voltage in the cable between the seat heating module (SHM) and the heater pad
- There is a short-circuit to ground in the cable between the seat heating module (SHM) and the heater pad.

Fault symptom[s]
- The front seat heating does not function.

Faulty Signal

Faulty signal

Checking heater elements



- Ignition on.

Checking components and connectors

Check the connectors. Check for contact resistance. Check for oxidation. Check for loose connections.
Check the heating loop in the seat. Take readings between:

- terminals #1 and #4 on connector B for the seat heating module (SHM). Check for an open-circuit
- terminal #1 on connector B and chassis ground. Check for a short-circuit to ground
- terminal #1 on connector B and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Check the heating loop in the backrest. Take readings between:

- terminals #1 and #2 on connector C for the seat heating module (SHM). Check for an open-circuit
- terminal #1 on connector C and chassis ground. Check for a short-circuit to ground
- terminal #1 on connector C and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

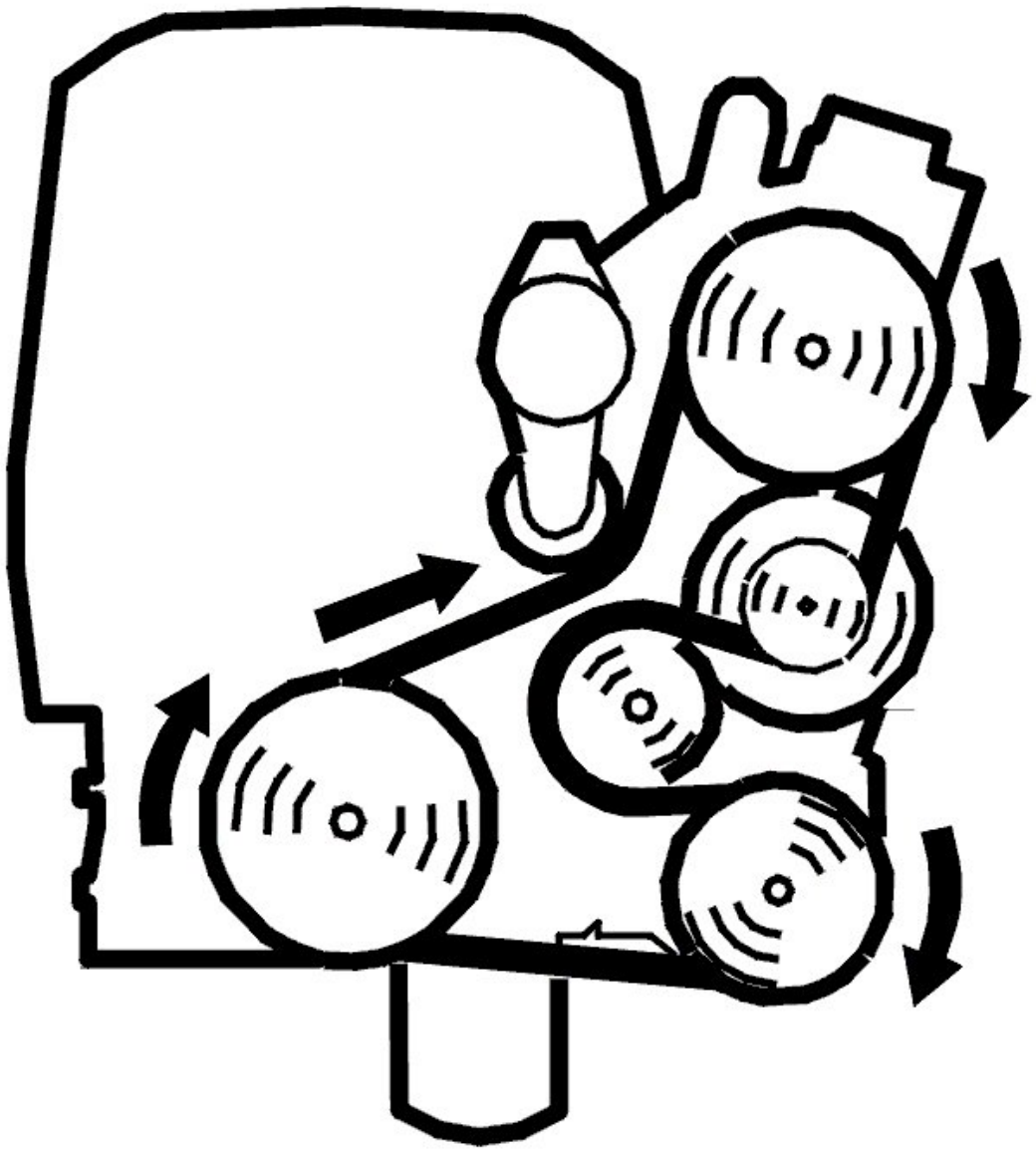
Continue - Verification

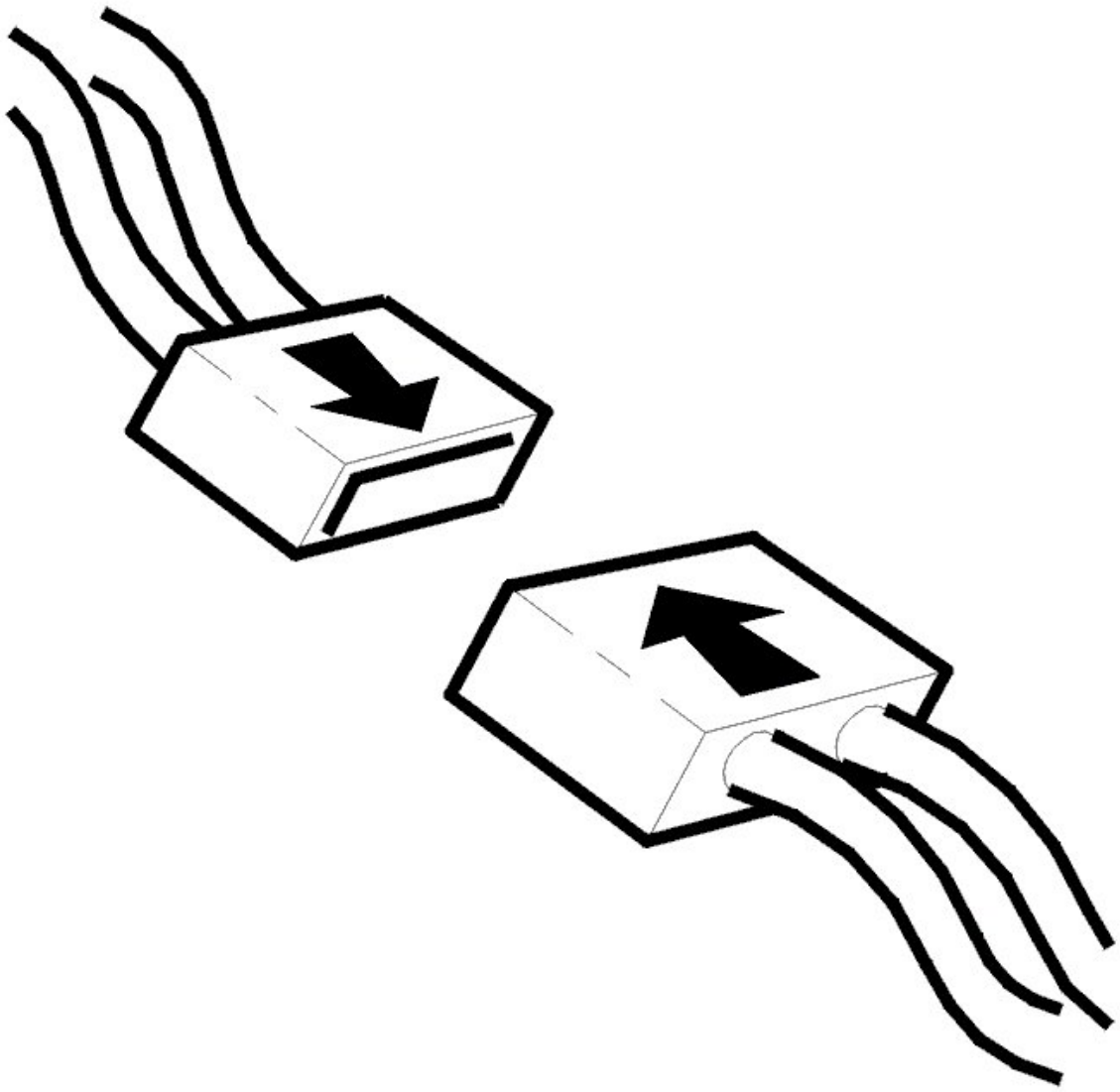
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Engine running.

Activate the seat heating. Check that the seat heats up.

Is the seat heater functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking heater elements

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

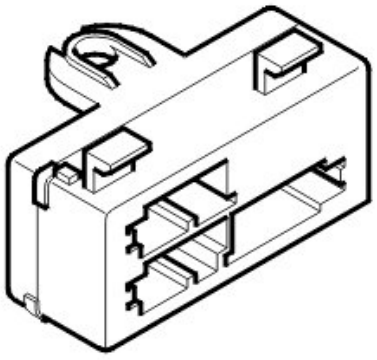
FAULT FOUND - Fault Found

Attempt New Test - Checking heater elements

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0035

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the temperature sensor for the right seat heating module (SHM).
The climate control module (CCM) communicates with the right seat heating module (SHM) via LIN bus 2.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Open-circuit in the cable between the seat heating module (SHM) and the temperature sensor
- There is a short-circuit to supply voltage in the cable between the seat heating module (SHM) and the temperature sensor
- There is a short-circuit to ground in the cable between the seat heating module (SHM) and the temperature sensor.

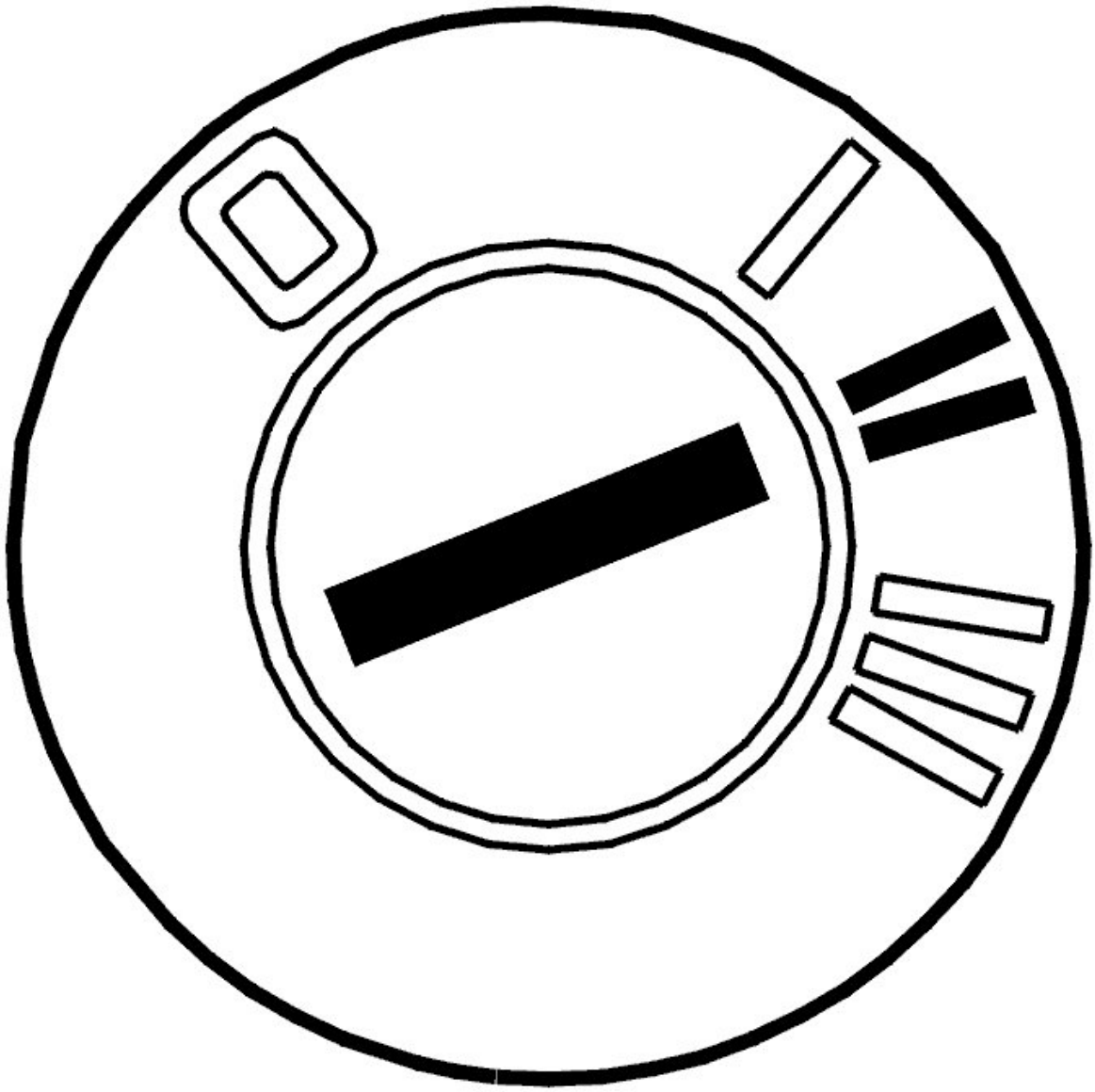
Fault symptom[s]

- The front seat heating does not function.

Faulty Signal

Faulty signal

Checking the sensor



- Ignition on.

Checking components and connectors

Check the connectors. Check for contact resistance. Check for oxidation. Check for loose connections.
Check the sensor in the seat. Take readings between:

- terminals #2 and #3 on connector B for the seat heating module (SHM). Check for an open-circuit
- terminal #2 on connector B and chassis ground. Check for a short-circuit to ground
- terminal #2 on connector B and terminal #4 on connector A. Check for a short-circuit to supply voltage.

Remedy as necessary.

Other information:

- For further information about the connectors, fuses and relays, see the relevant section in the Wiring Diagram
- Connecting the breakout box See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Climate Control Module (CCM)
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

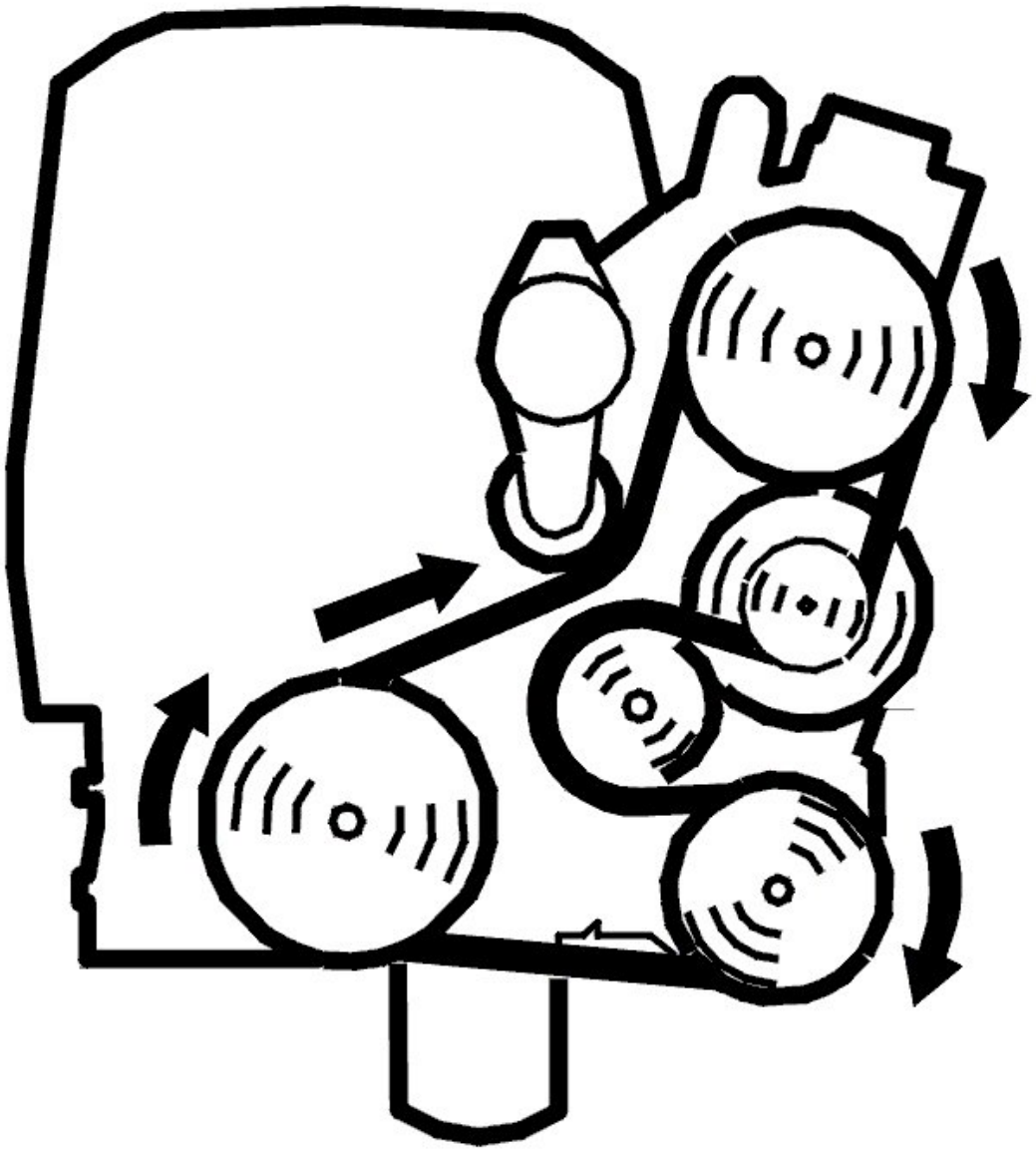
Continue - Verification

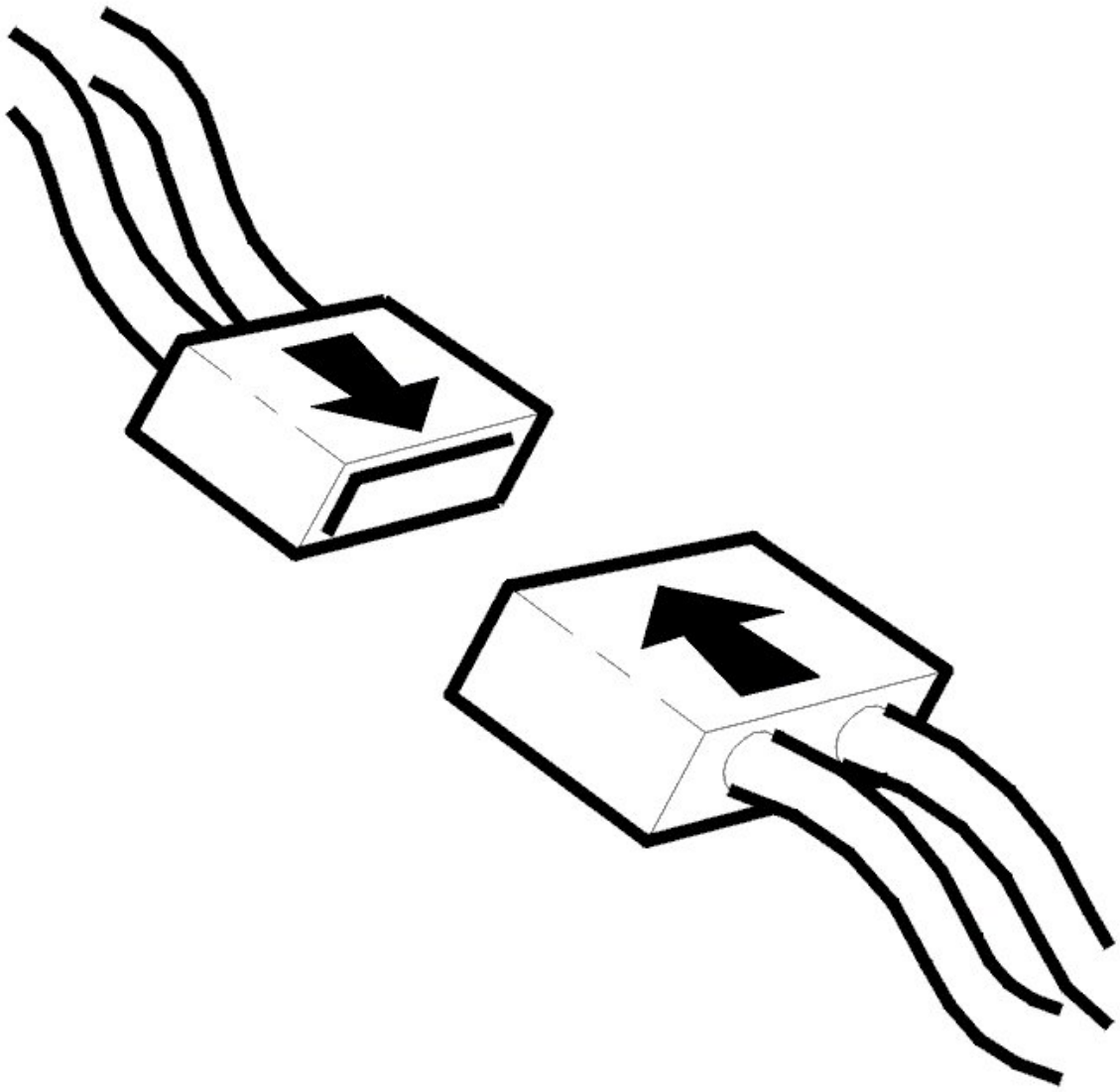
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Engine running.

Activate the seat heating. Check that the seat heats up.

Is the seat heater functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the sensor

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

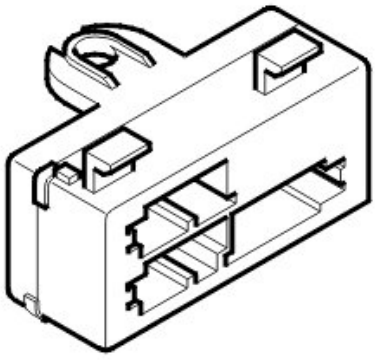
FAULT FOUND - Fault Found

Attempt New Test - Checking the sensor

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0036

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an internal fault in the right-hand seat heating module (SHM).
The climate control module (CCM) communicates with the right seat heating module (SHM) via LIN bus 2.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Internal fault in the right-hand seat heating module (SHM).

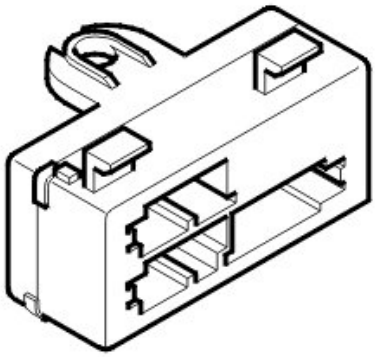
Fault symptom[s]
- The front seat heating does not function.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the right-hand seat heating module (SHM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the right-hand seat heating module (SHM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the right-hand seat heating module (SHM) if the fault recurs.
Replace the right-hand seat heating module (SHM) if the fault is permanent:
Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

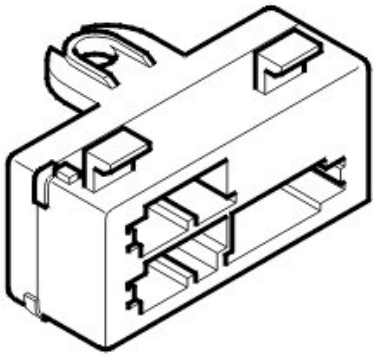
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0037

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects an internal fault in the right-hand seat heating module (SHM).
The climate control module (CCM) communicates with the right seat heating module (SHM) via LIN bus 2.
The seat heating module (SHM) transmits information to the climate control module (CCM) about status and current temperature.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- The climate control module (CCM) does not allow activation of seat heating.

Possible source
- Internal fault in the right-hand seat heating module (SHM).

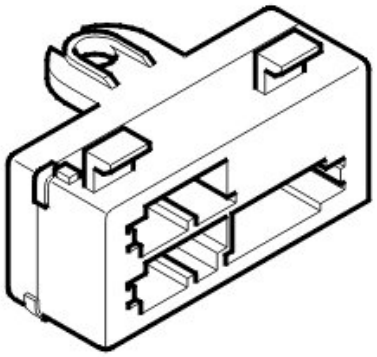
Fault symptom[s]
- The front seat heating does not function.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the right-hand seat heating module (SHM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the right-hand seat heating module (SHM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the right-hand seat heating module (SHM) if the fault recurs.
Replace the right-hand seat heating module (SHM) if the fault is permanent:
Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

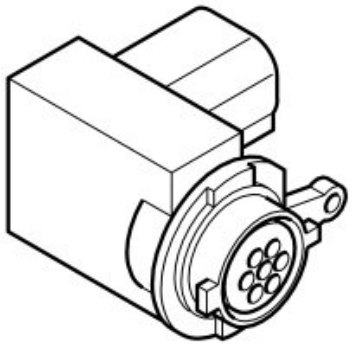
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0040

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the air quality sensor (AQS).
The climate control module (CCM) communicates with the air quality sensor (AQS) via LIN bus 1 for right-hand drive cars and via LIN bus 2 for left-hand drive cars.
The air quality sensor (AQS) sends information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can only be diagnosed for the climate control module (CCM) of electronic climate control (ECC) equipped with the air quality sensor (AQS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- The air quality sensor (AQS) is not functioning.

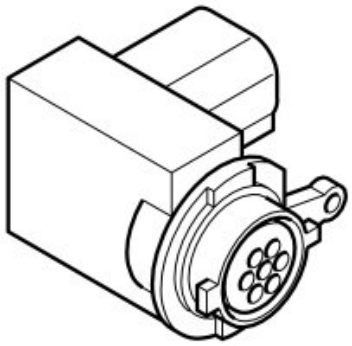
Fault symptom[s]
- Poor air quality in the passenger compartment.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the air quality sensor (AQS).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the air quality sensor (AQS). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the air quality sensor (AQS) if the diagnostic trouble code (DTC) recurs.
Replace the air quality sensor (AQS) if the fault is permanent:
Air quality sensor, replacing See: Heating and Air Conditioning/Climate Control Exhaust Gas Sensor/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

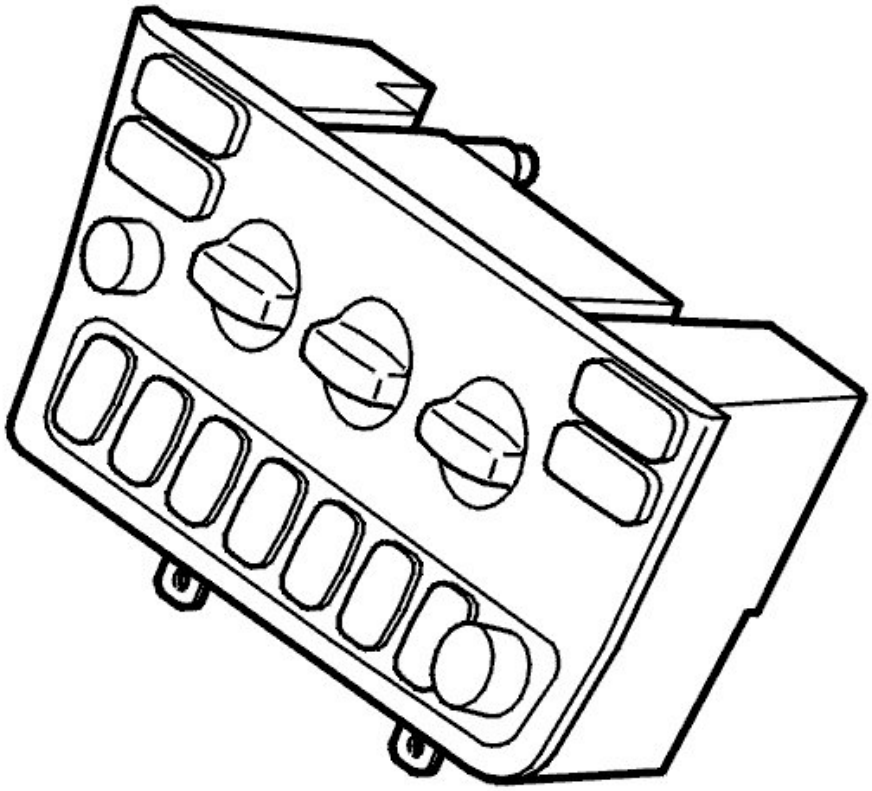
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0050

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the signal from the fan knob exceeds 99%, or is less than 1% of supply voltage (approximately 5 V).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- The climate control module (CCM) adopts a value corresponding to half of the maximum fan knob output.

Possible source
- Defective potentiometer
- Short-circuit to supply voltage or ground in the potentiometer.

Fault symptom[s]
- The blower fan only runs at one speed.

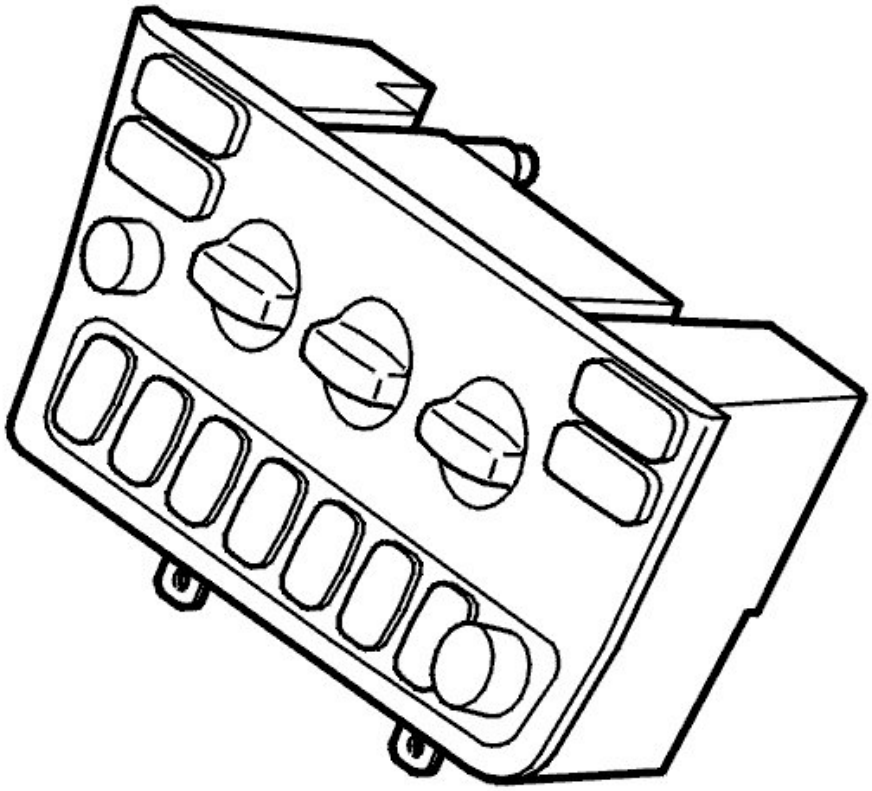
Faulty Signal

Faulty signal

Replacing the component

The fault has probably occurred as a result of a defective potentiometer or a short-circuit in the potentiometer. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.
If the fault persists, replace the climate control module (CCM). The potentiometer cannot be replaced as a separate part.

Other information:
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair.



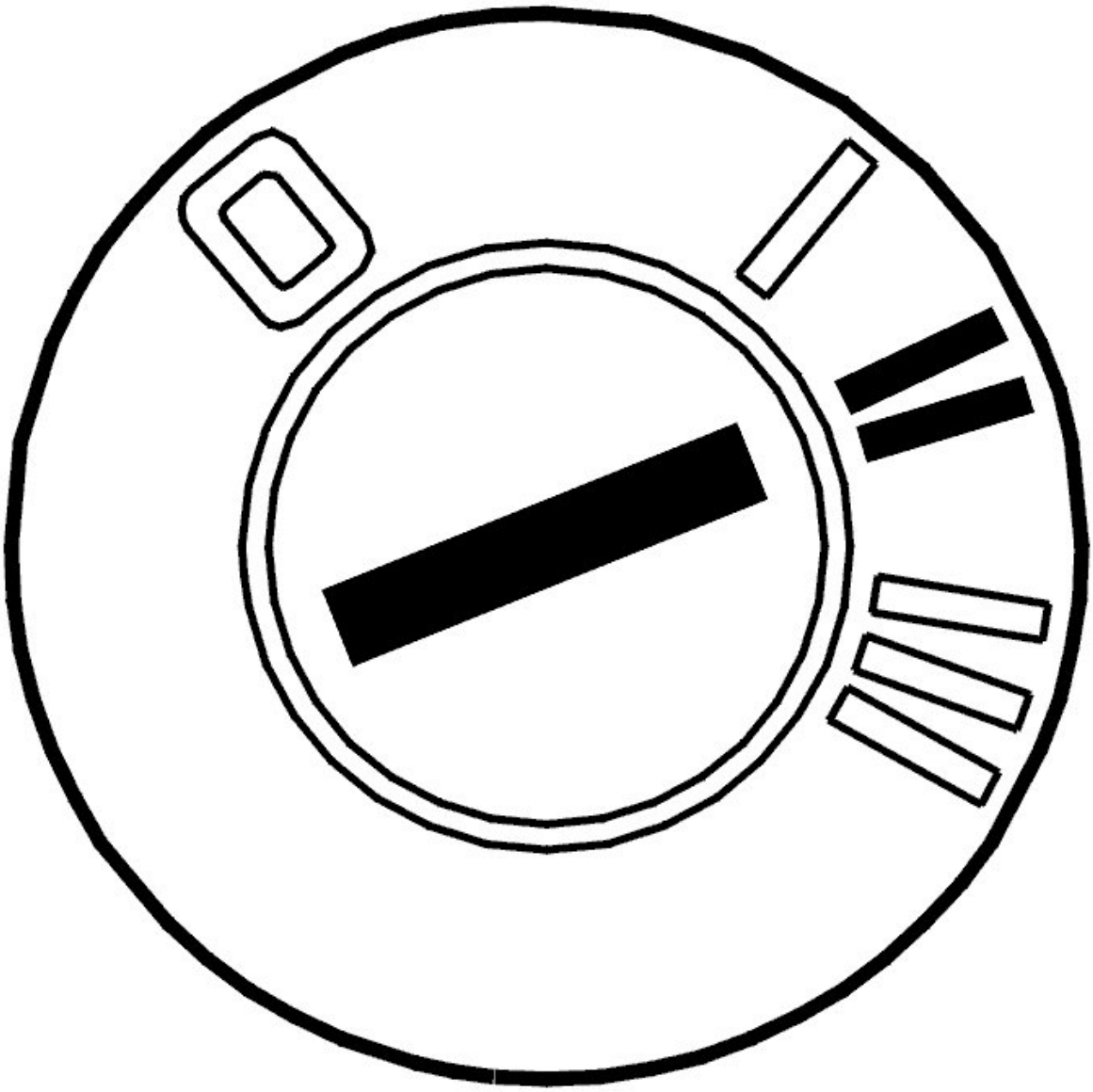
Select "Continue" when the fault has been remedied.

Continue - Checking LIN bus

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

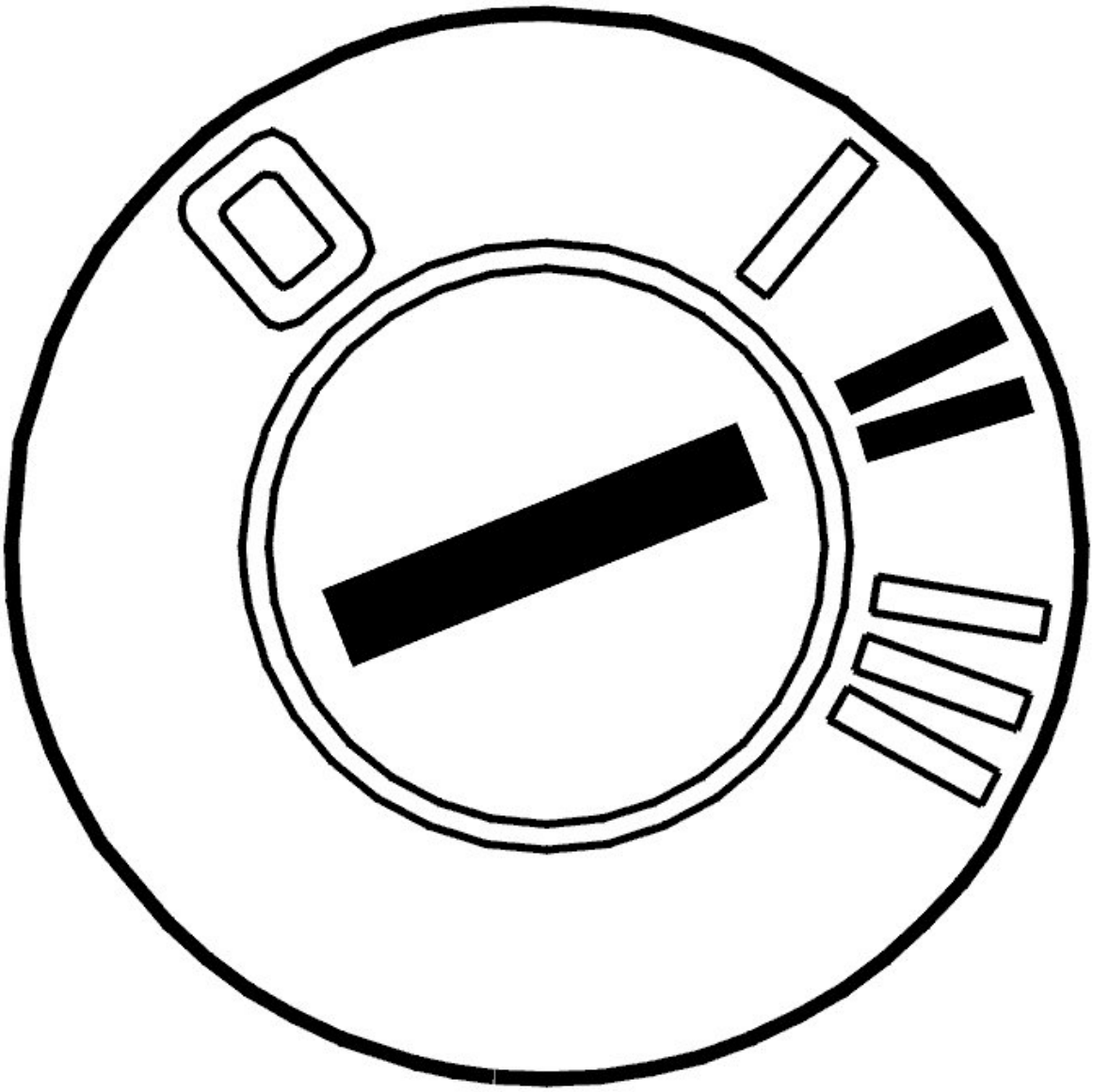
Click the VCT2000 symbol to activate the check.

Continue - **DONE**

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the function of the blower fan control. Turn the control between the minimum and maximum positions.

Does the fan speed change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Information

VERIFIED - Fault Found

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

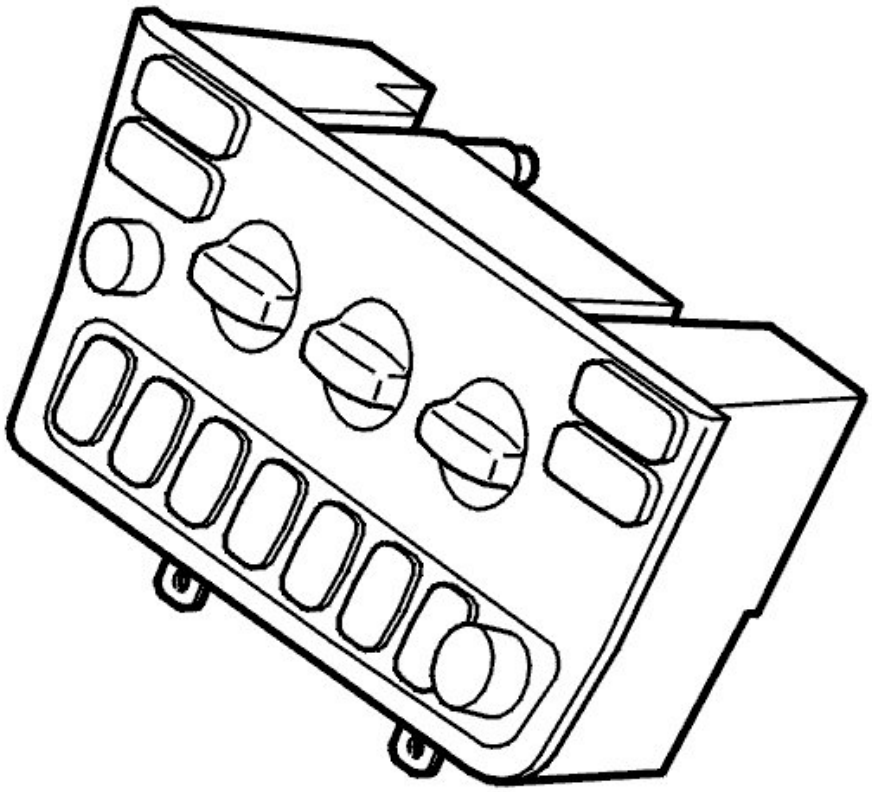
Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0051

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the signal from the temperature control for the left-hand side exceeds 99%, or is less than 1% of supply voltage (approximately 5 V).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- The climate control module (CCM) adopts a value corresponding to half of the maximum output of the temperature control.

Possible source
- Defective potentiometer
- Short-circuit to supply voltage or ground in the potentiometer.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set value.

Faulty Signal

Faulty signal

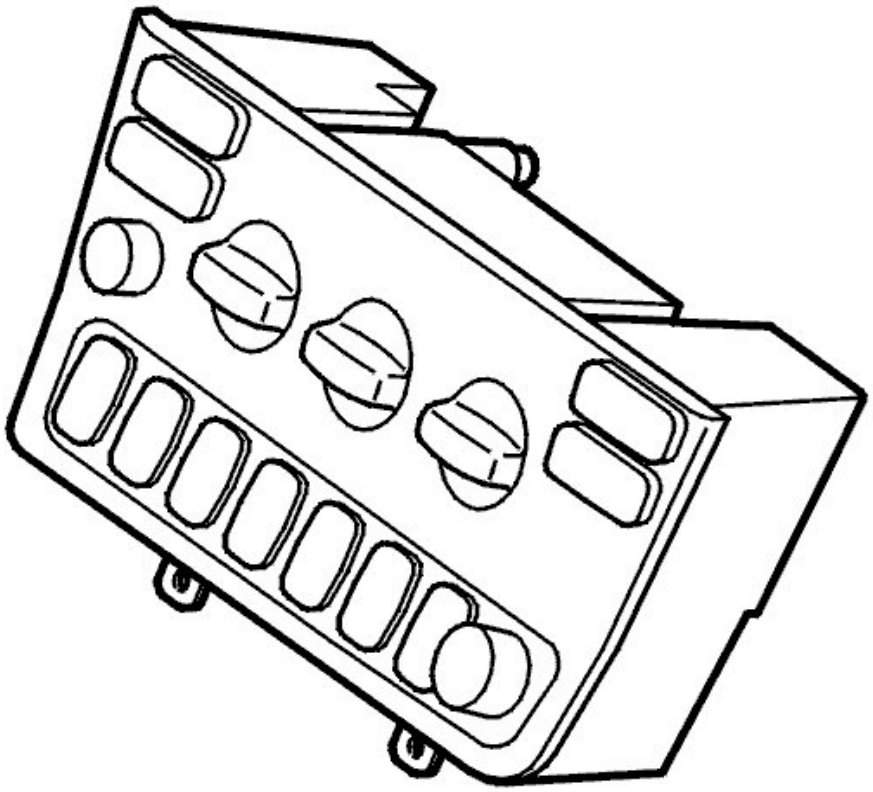
Replacing the component

The fault has probably occurred as a result of a defective potentiometer or a short-circuit in the potentiometer. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults

may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.
If the fault persists, replace the climate control module (CCM). The potentiometer cannot be replaced as a separate part.

Other information:

- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair.



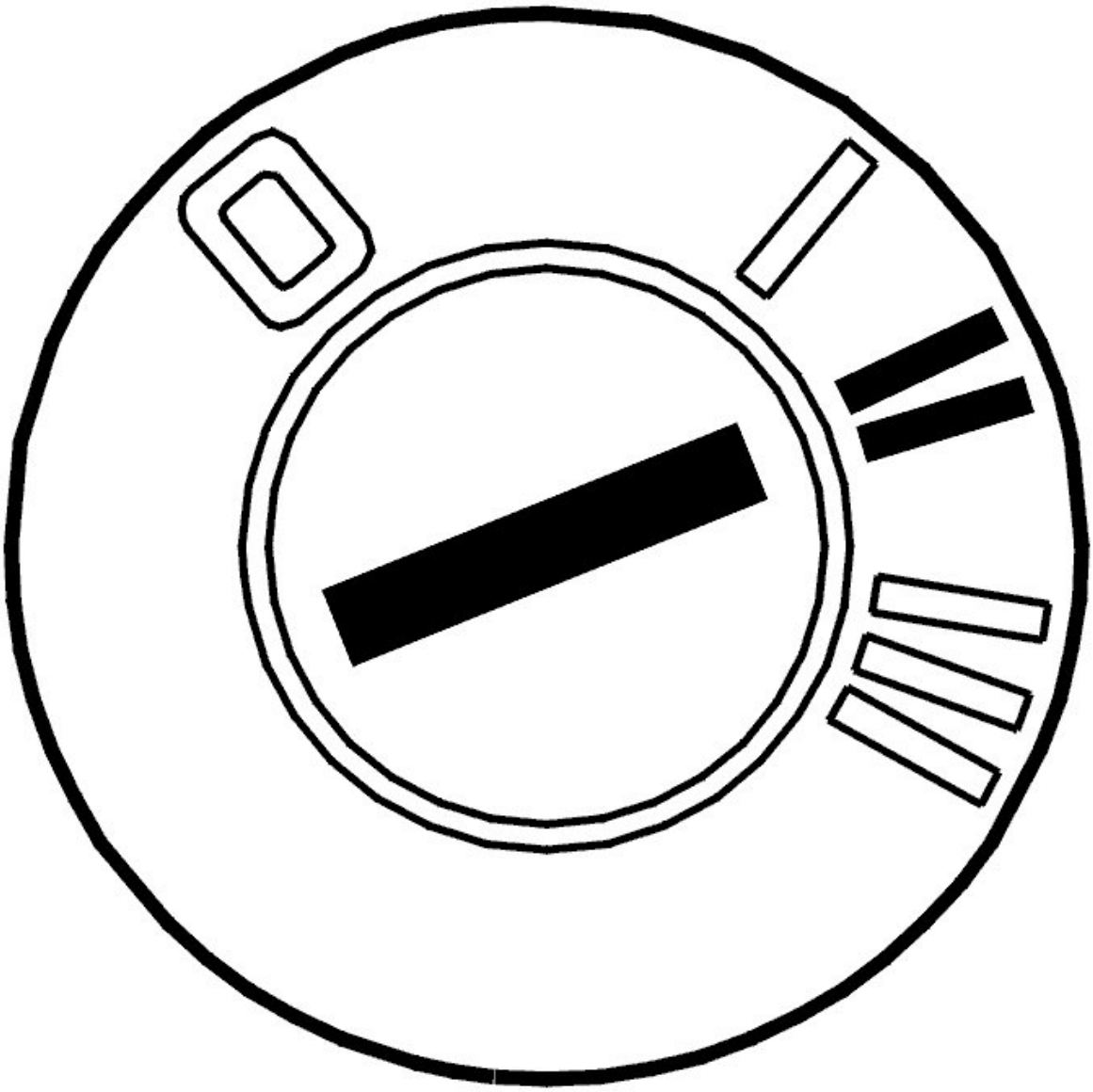
Select "Continue" when the fault has been remedied.

Continue - Checking LIN bus

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

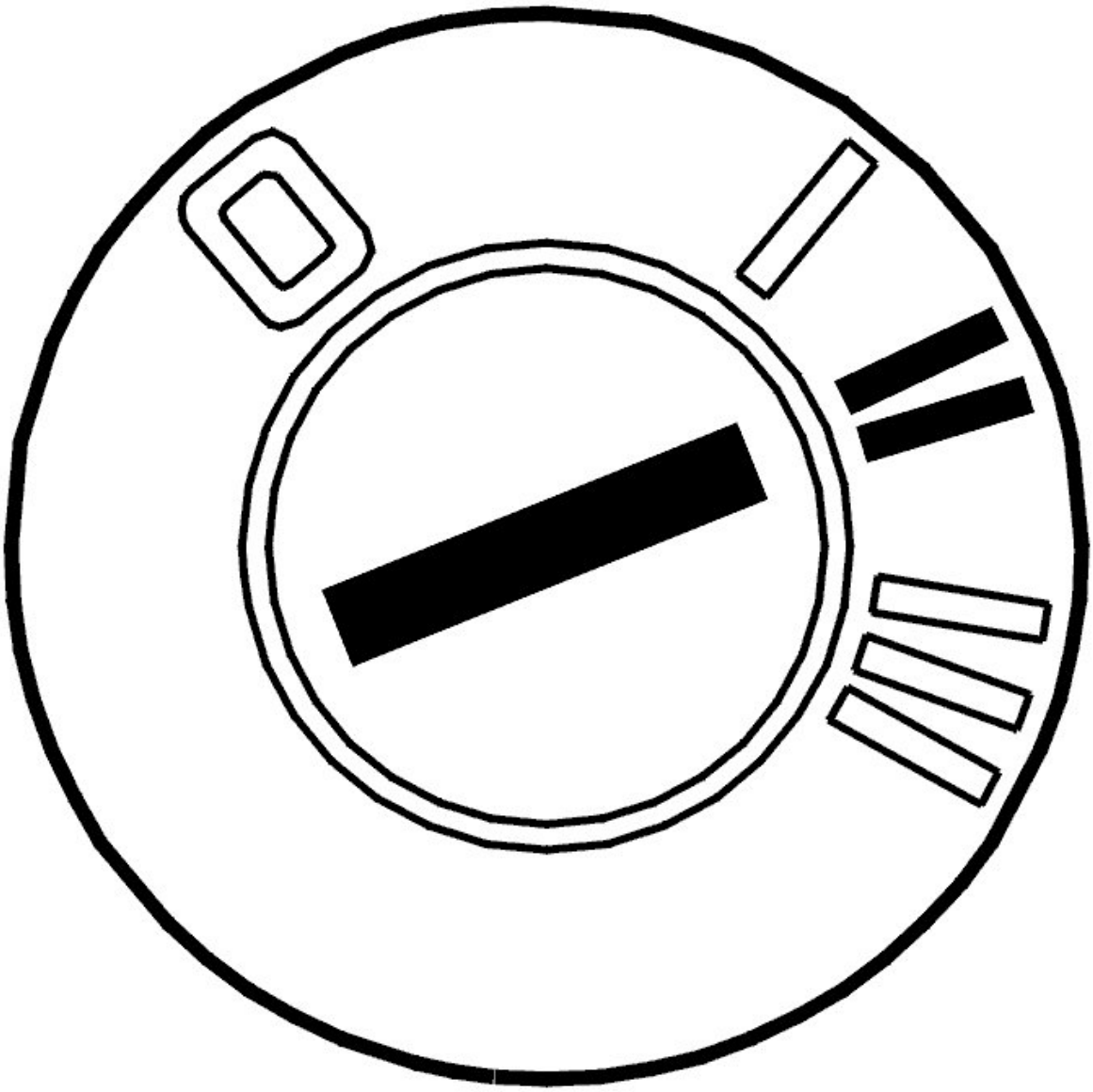
Click the VCT2000 symbol to activate the check.

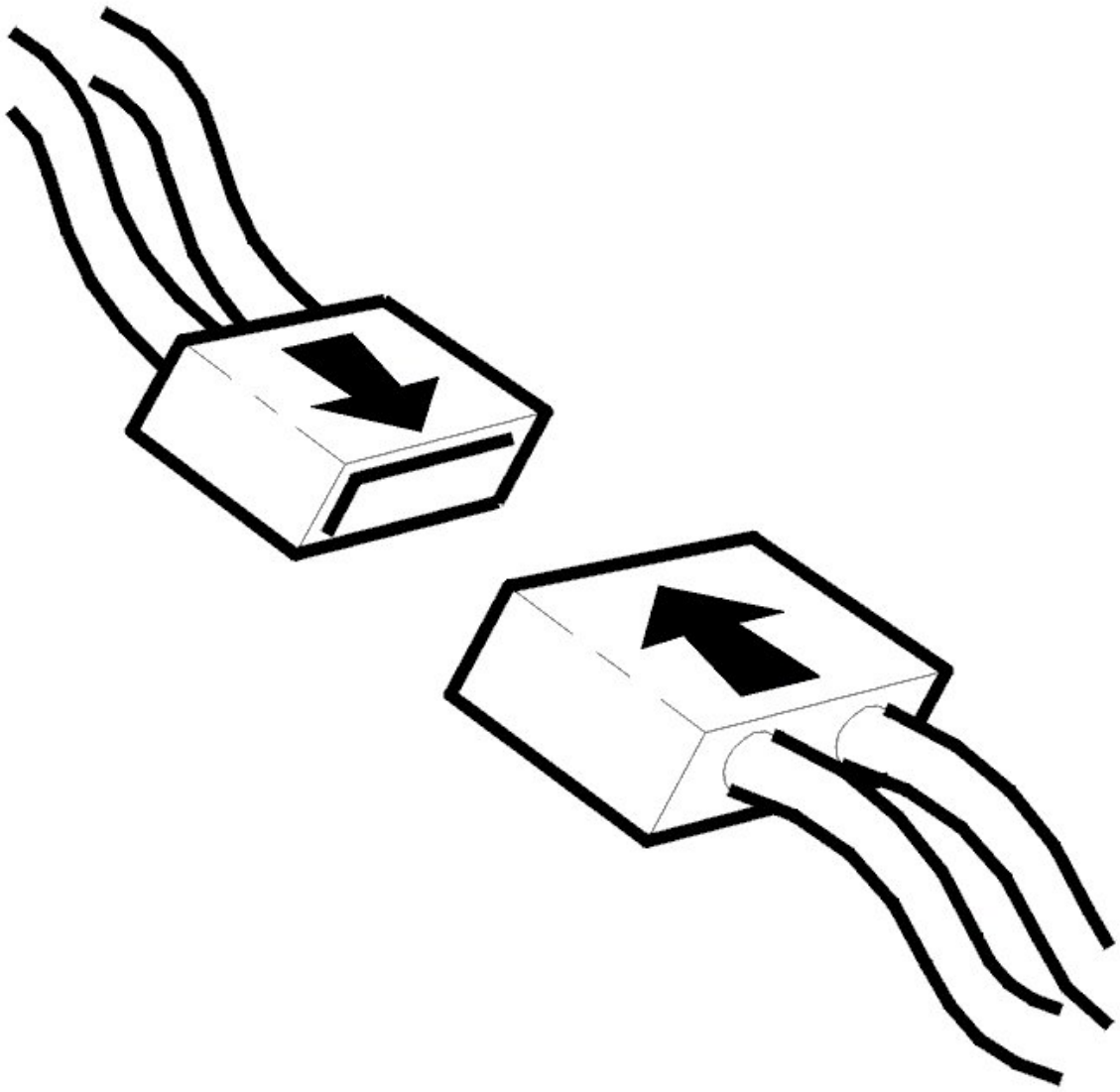
Continue - **DONE**

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Blower fan on.

Check the function of the temperature control. Turn the control between the minimum and maximum positions.
A the same time, check the desired and actual position of the damper motors during control. Ensure that the desired and actual positions are approximately the same.
The values listed below should be seen as guidelines for the positions which the damper motors should reach.

Note! The blower fan must be running for the damper motors to be activated.

- Temperature damper motor left/right 0-100%
- Recirculation damper motor, 40-100%
- Air distribution damper motor, defroster approximately 0%, floor/defroster approximately 19%, floor approximately 39%, vent approximately 83%.

Is the damper motor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Information

VERIFIED - Fault Found

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

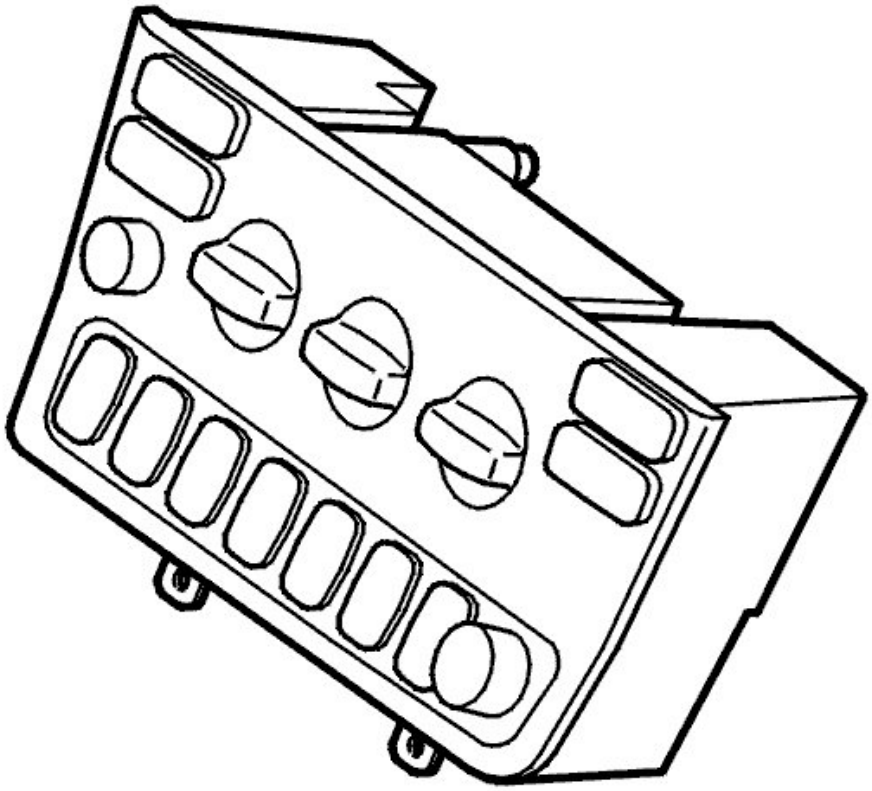
Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0052

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the signal from the temperature control for the right-hand side exceeds 99% or is less than 1% of supply voltage (approximately 5 V).

Substitute value

- The climate control module (CCM) adopts a value corresponding to half of the maximum output of the temperature control.

Possible source
- Defective potentiometer
- Short-circuit to supply voltage or ground in the potentiometer.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set value.

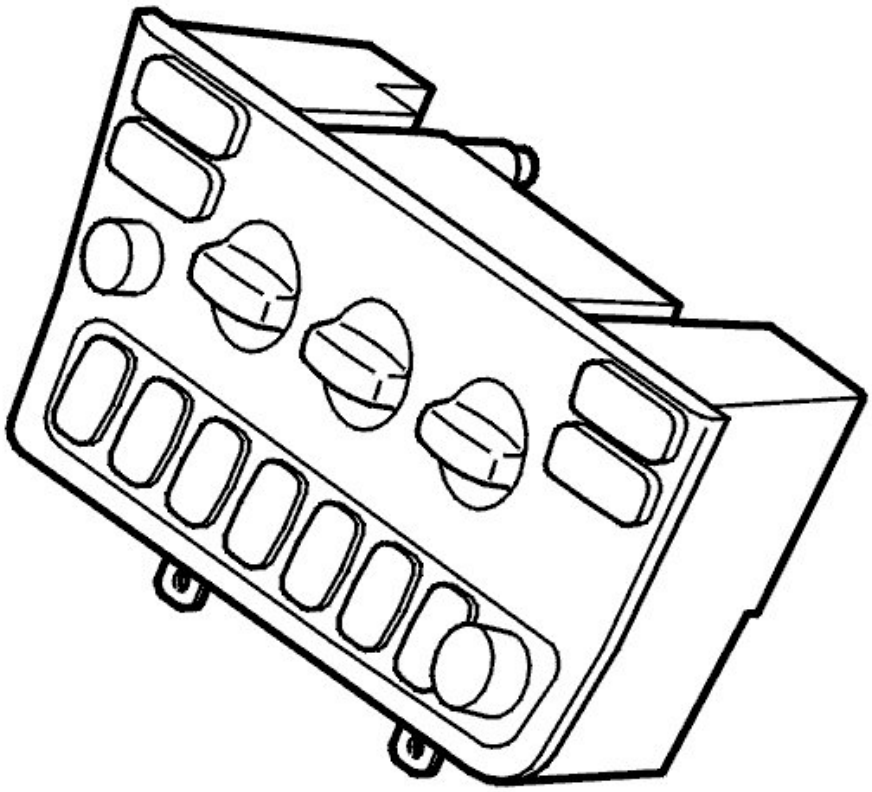
Faulty Signal

Faulty signal

Replacing the component

The fault has probably occurred as a result of a defective potentiometer or a short-circuit in the potentiometer. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.
If the fault persists, replace the climate control module (CCM). The potentiometer cannot be replaced as a separate part.

Other information:
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair.



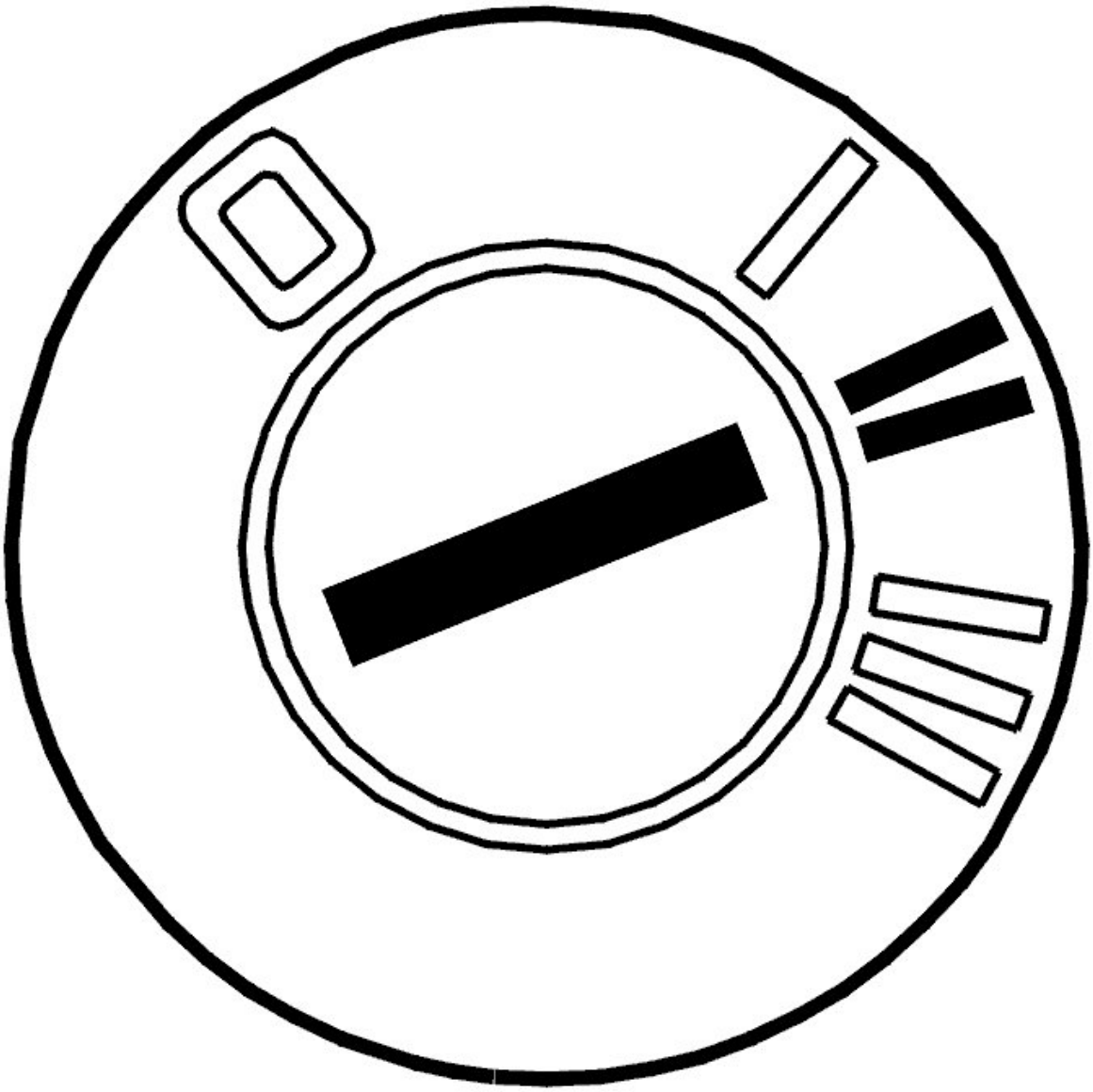
Select "Continue" when the fault has been remedied.

Continue - Checking LIN bus

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

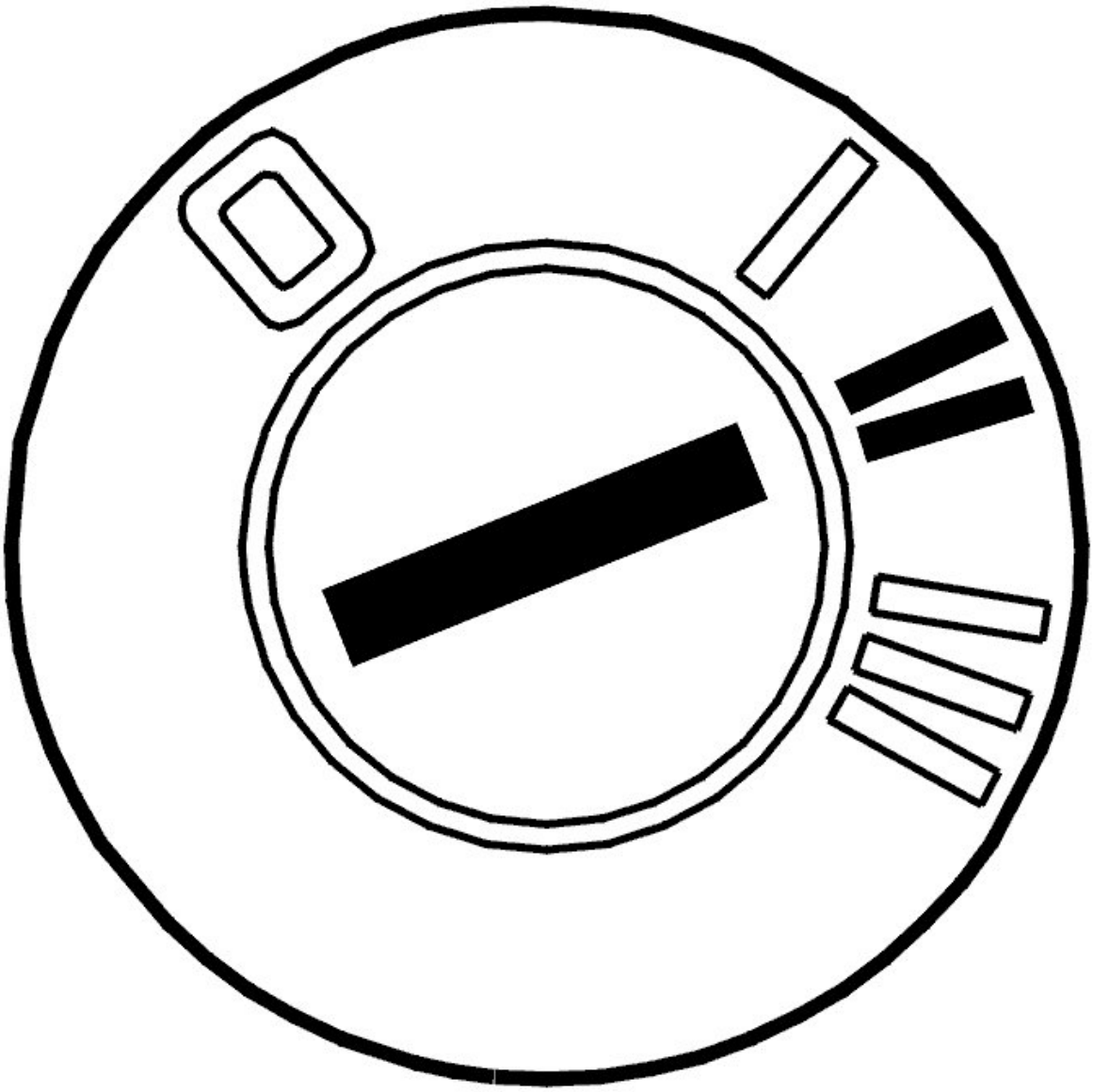
Click the VCT2000 symbol to activate the check.

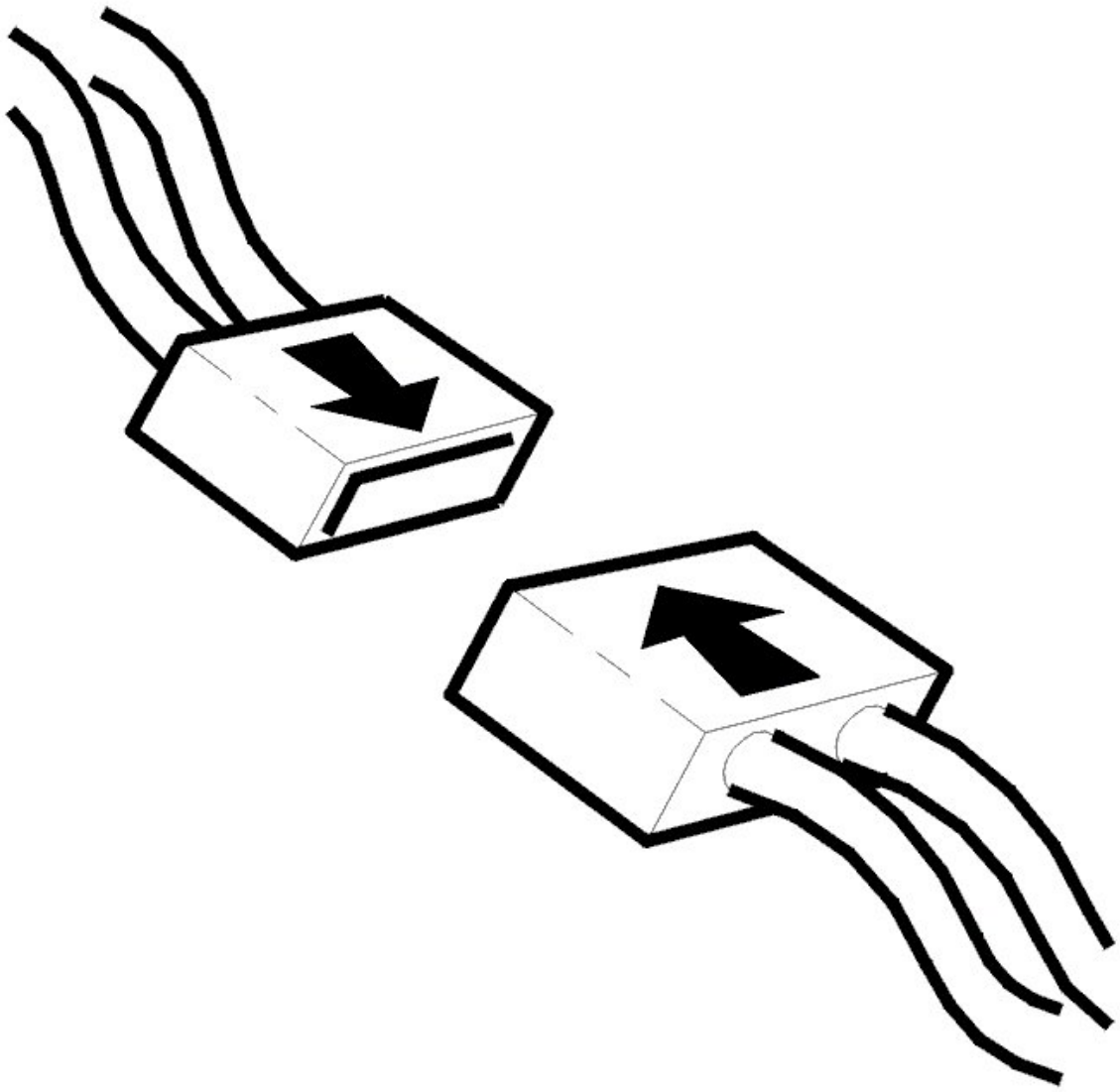
Continue - **DONE**

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Blower fan on.

Check the function of the temperature control. Turn the control between the minimum and maximum positions.
A the same time, check the desired and actual position of the damper motors during control. Ensure that the desired and actual positions are approximately the same.
The values listed below should be seen as guidelines for the positions which the damper motors should reach.

Note! The blower fan must be running for the damper motors to be activated.

- Temperature damper motor left/right 0-100%
- Recirculation damper motor, 40-100%
- Air distribution damper motor, defroster approximately 0%, floor/defroster approximately 19%, floor approximately 39%, vent approximately 83%.

Is the damper motor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Information

VERIFIED - Fault Found

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

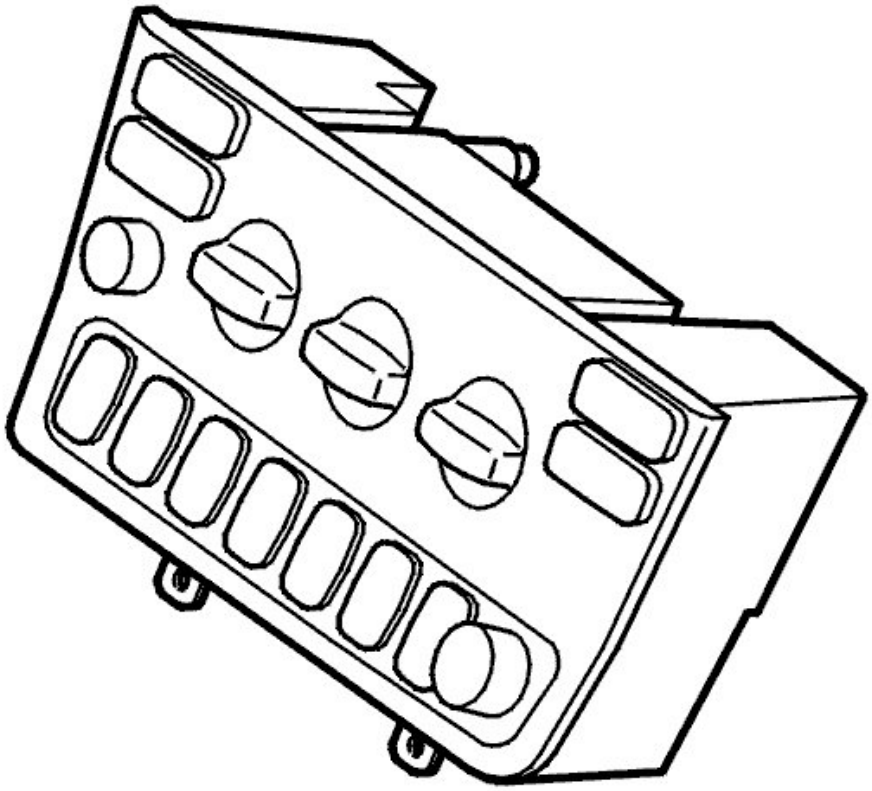
Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0053

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the signal from the air distribution control exceeds 99% or is less than 1% of supply voltage (approximately 5 V).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value

- None.

Possible source
- Defective potentiometer
- Short-circuit to supply voltage or ground in the potentiometer.

Fault symptom[s]
- No air distribution function.

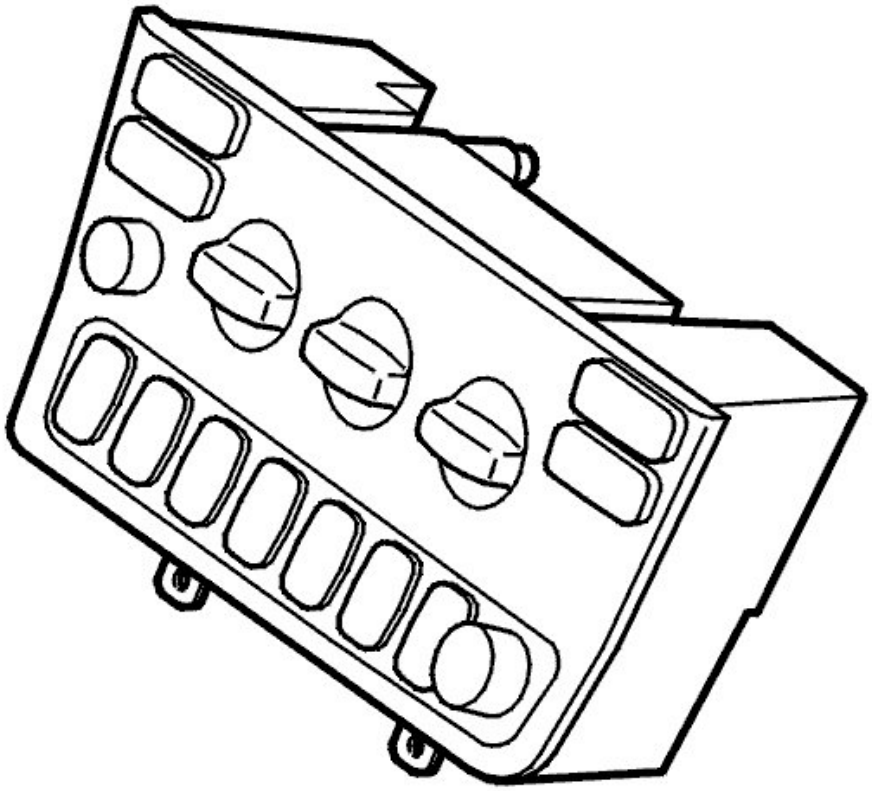
Faulty Signal

Faulty signal

Replacing the component

The fault has probably occurred as a result of a defective potentiometer or a short-circuit in the potentiometer. If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the control module.
If the fault persists, replace the climate control module (CCM). The potentiometer cannot be replaced as a separate part.

Other information:
- To access and replace the control module, see Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair.



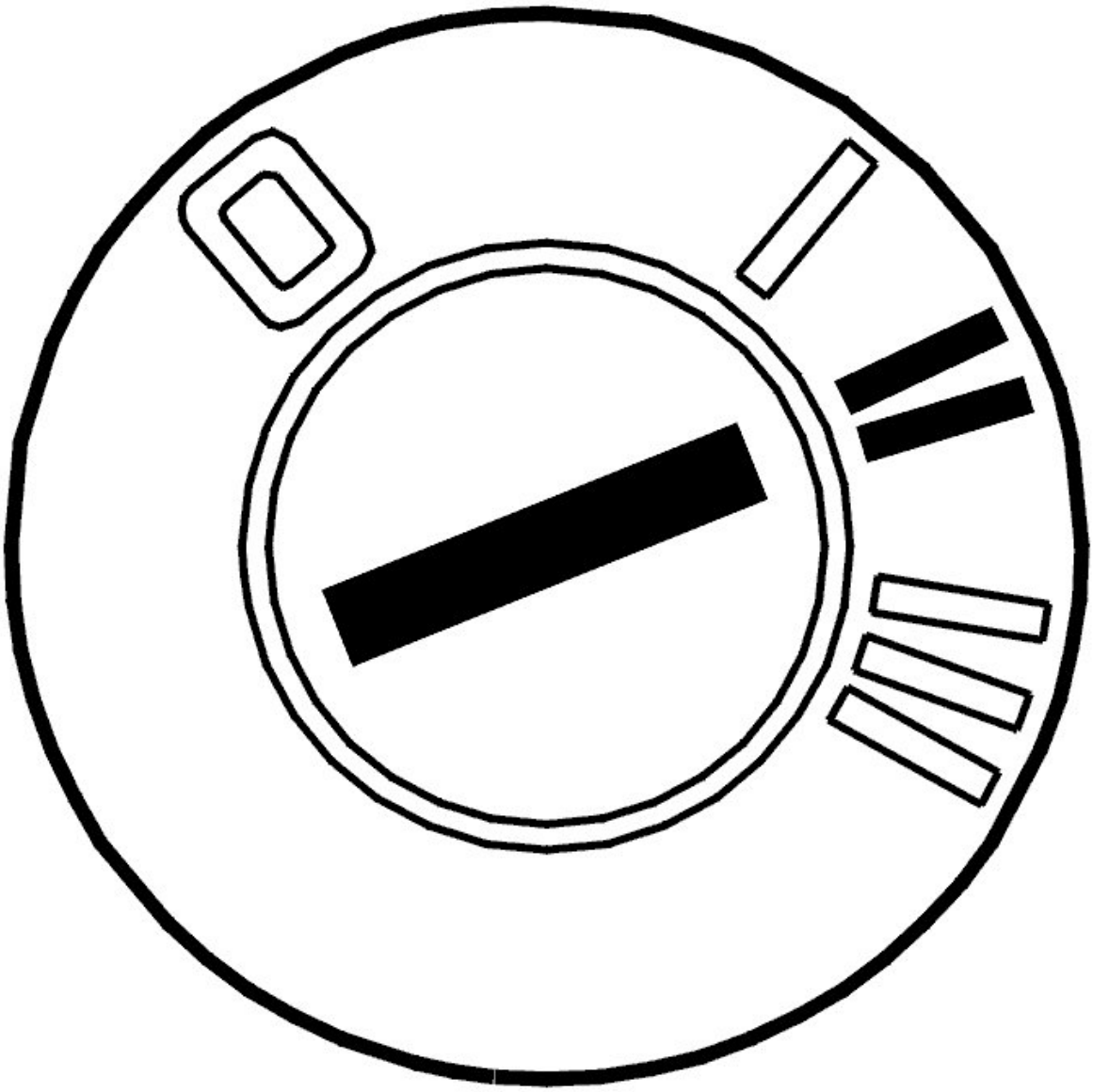
Select "Continue" when the fault has been remedied.

Continue - Checking LIN bus

Checking LIN bus

Identification

Hint: After replacing the climate control module (CCM), the LIN bus must be checked to identify which damper motors are installed and to identify their function and positions.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

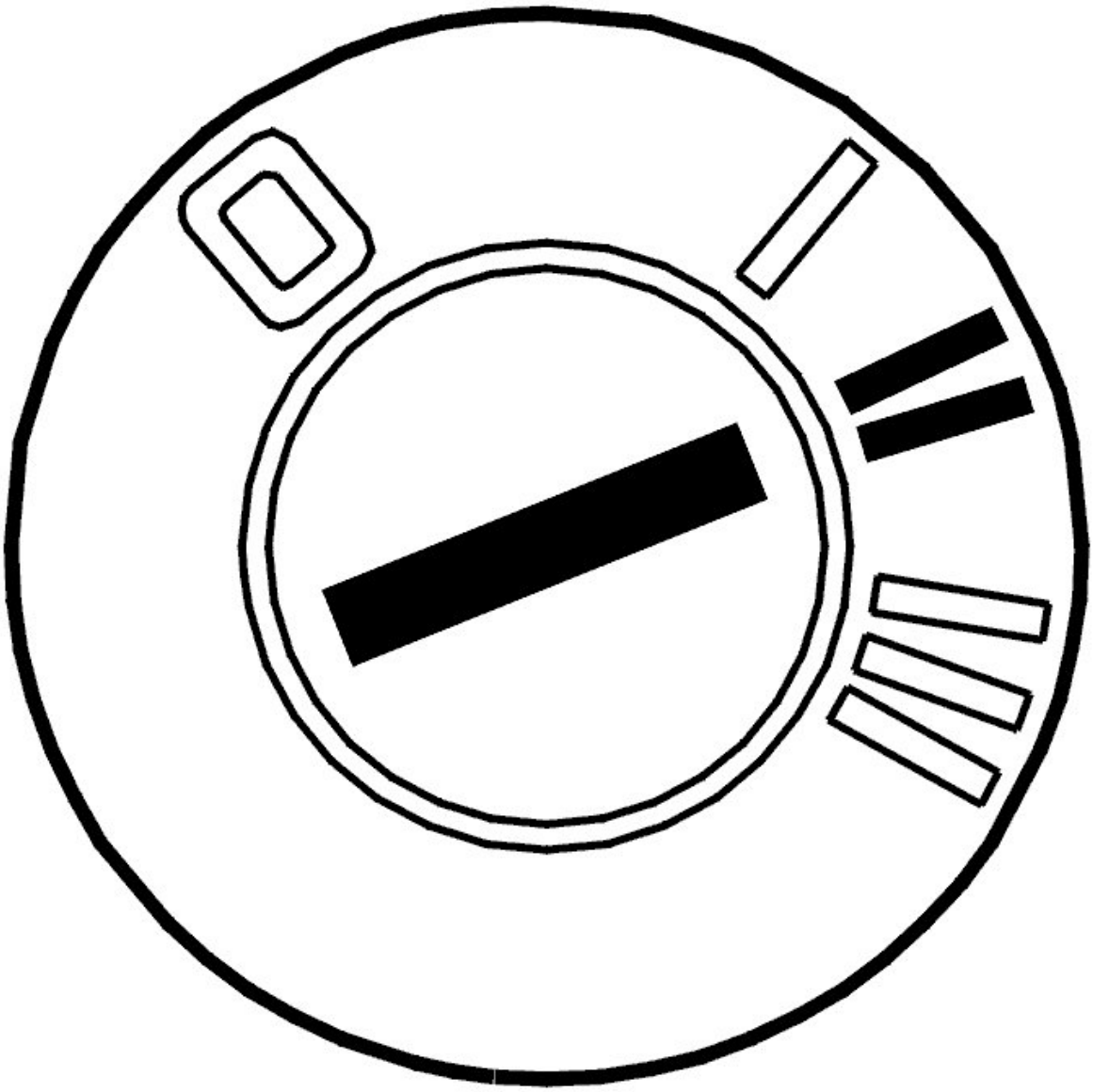
Click the VCT2000 symbol to activate the check.

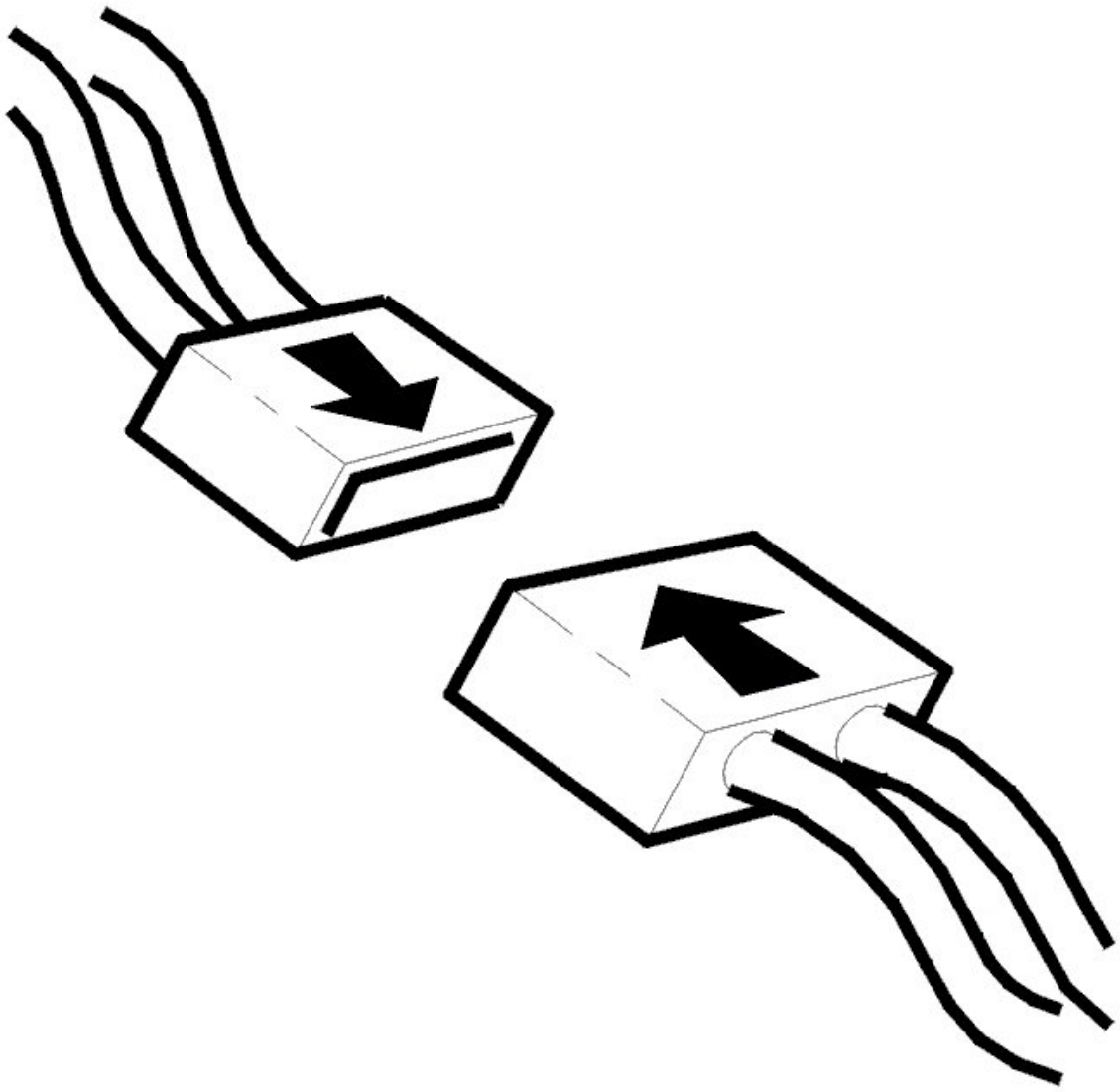
Continue - **DONE**

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Blower fan on.

Check the function of the temperature control. Turn the control between the minimum and maximum positions.
A the same time, check the desired and actual position of the damper motors during control. Ensure that the desired and actual positions are approximately the same.
The values listed below should be seen as guidelines for the positions which the damper motors should reach.

Note! The blower fan must be running for the damper motors to be activated.

- Temperature damper motor left/right 0-100%
- Recirculation damper motor, 40-100%
- Air distribution damper motor, defroster approximately 0%, floor/defroster approximately 19%, floor approximately 39%, vent approximately 83%.

Is the damper motor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Information

VERIFIED - Fault Found

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

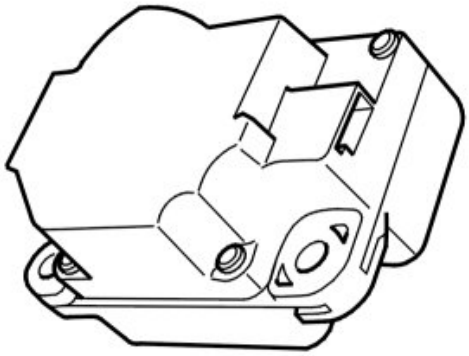
Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0060

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the damper motor module (DMM) defroster.
The climate control module (CCM) communicates with the damper motor module (DMM) defroster via the LIN bus 2.
The damper motor module (DMM) transmits information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal fault in the damper motor module (DMM) defroster
- Incorrect calibration due to loss of power.

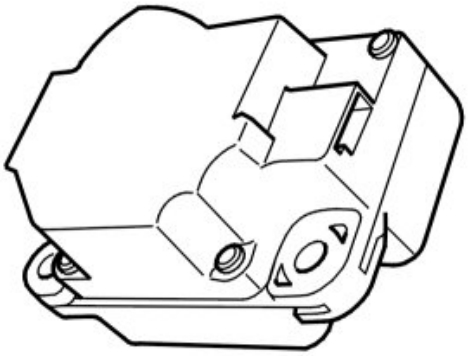
Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.
- Air flow problem.

Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the damper motor module (DMM) for the defroster.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the damper motor module (DMM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the damper motor module (DMM) if the fault recurs.
Replace the damper motor module (DMM) for the defroster if the fault is permanent:
Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
Remedy as necessary.



Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information
- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

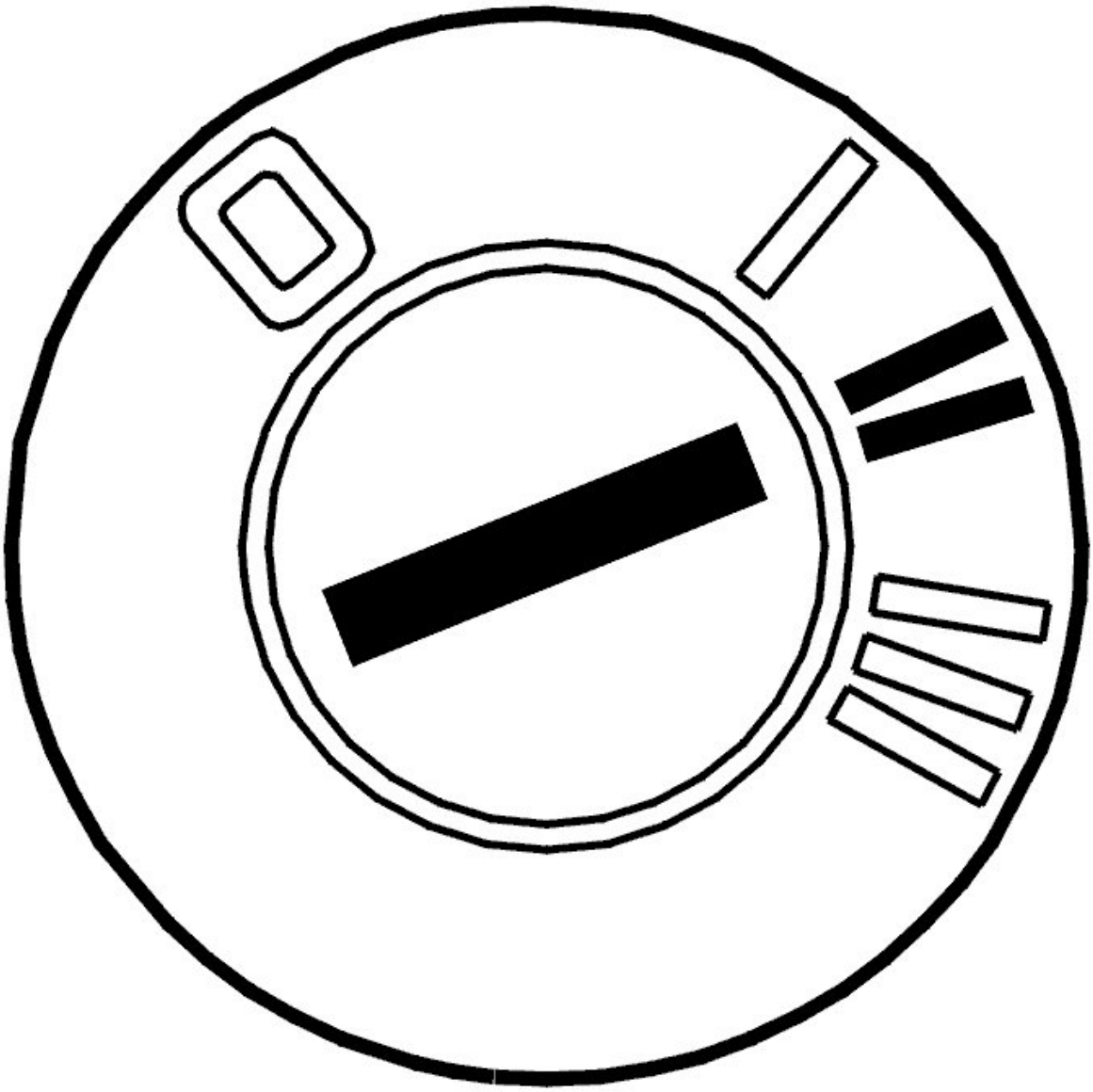
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

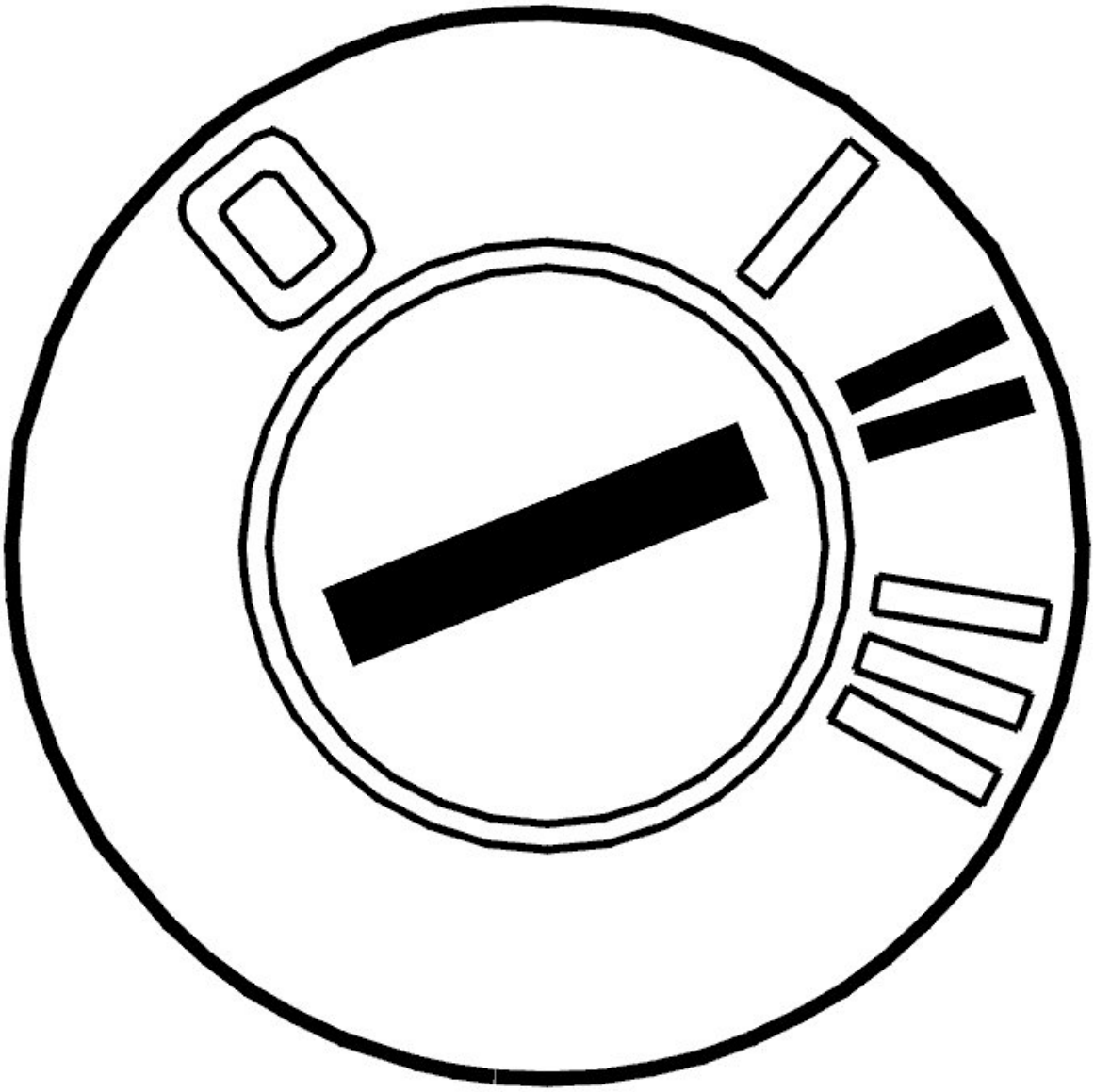
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

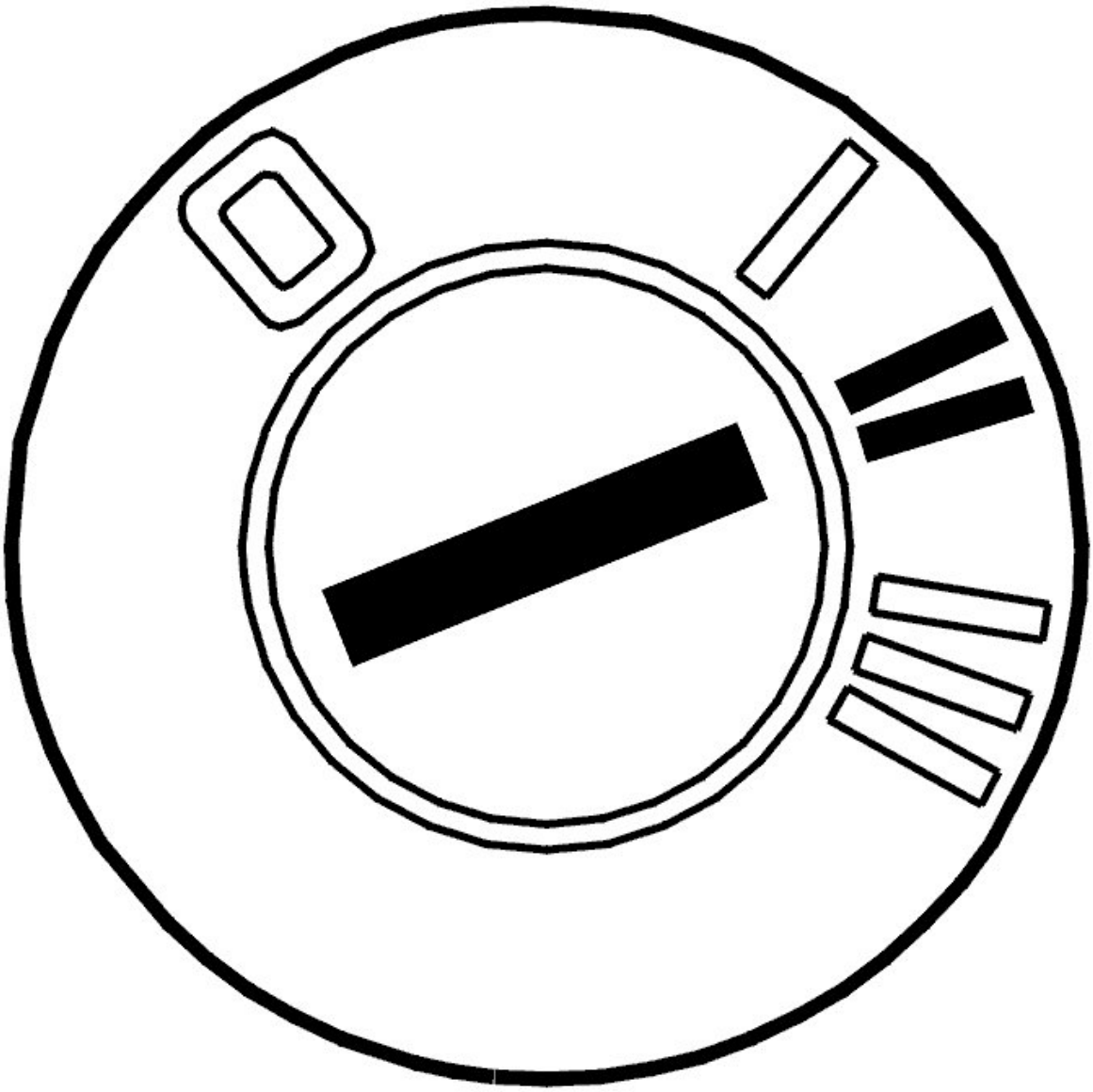
This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

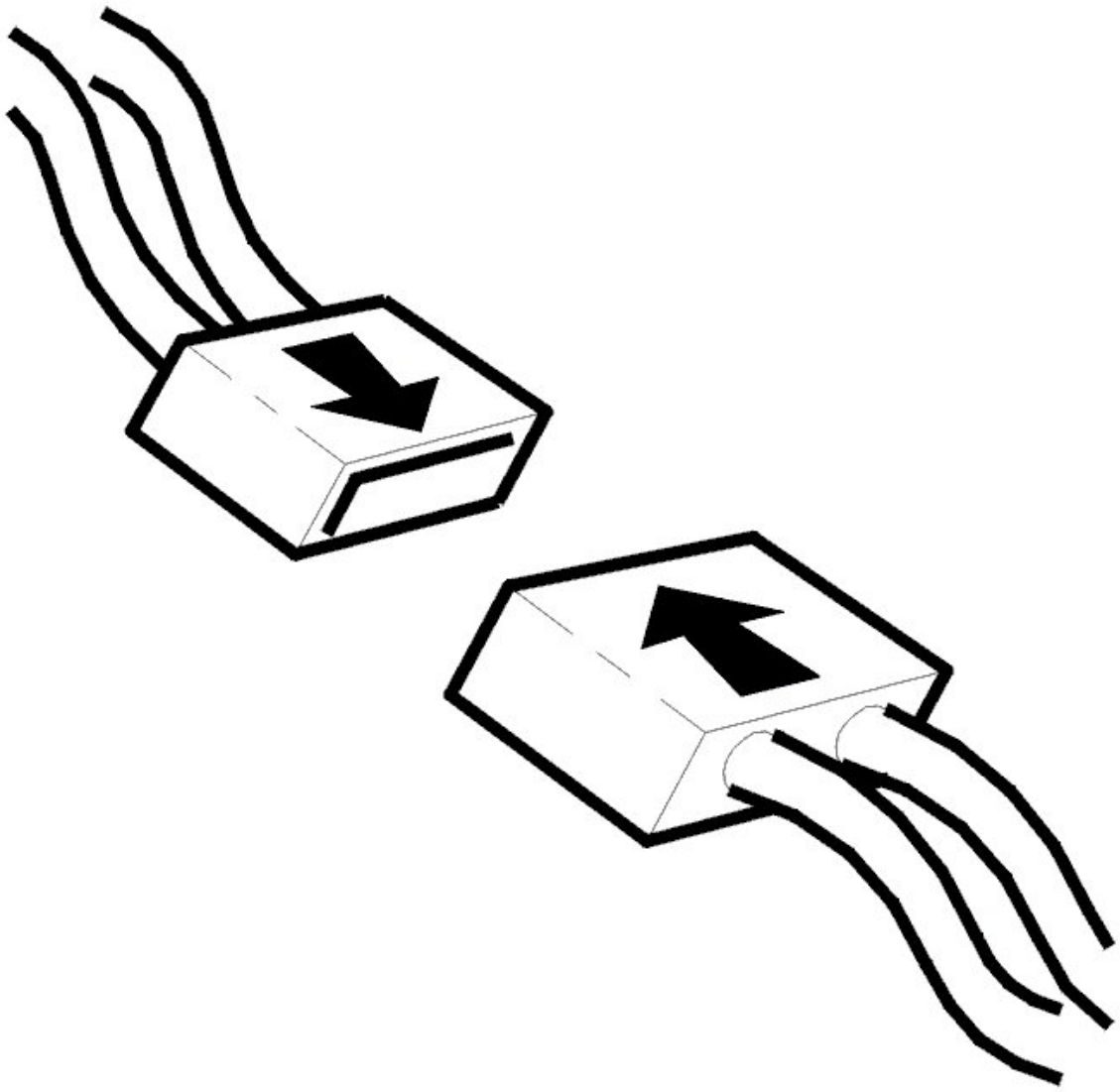
Continue - DONE

DONE - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

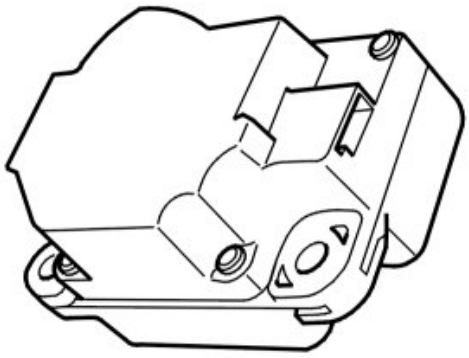
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0061

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the damper motor module (DMM) recirculation.
The climate control module (CCM) communicates with the damper motor module (DMM) recirculation via LIN bus 1 in right-hand drive cars and via LIN bus 2 in left-hand drive cars.
The damper motor module (DMM) transmits information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal fault in the damper motor module (DMM) recirculation
- Incorrect calibration due to loss of power.

Fault symptom[s]
- No recirculation.
- Air flow problem.

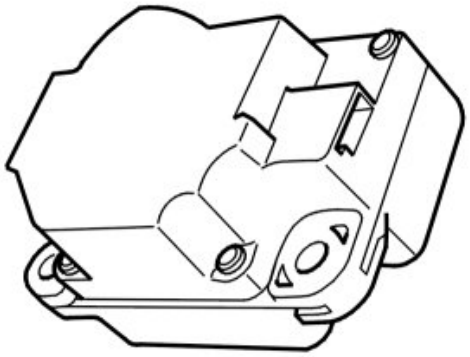
Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the damper motor module (DMM) for recirculation.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the damper motor module (DMM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the damper motor module (DMM) if the fault recurs.
Replace the damper motor module (DMM) recirculation if the fault is permanent:
Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
Remedy as necessary.



Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information
- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

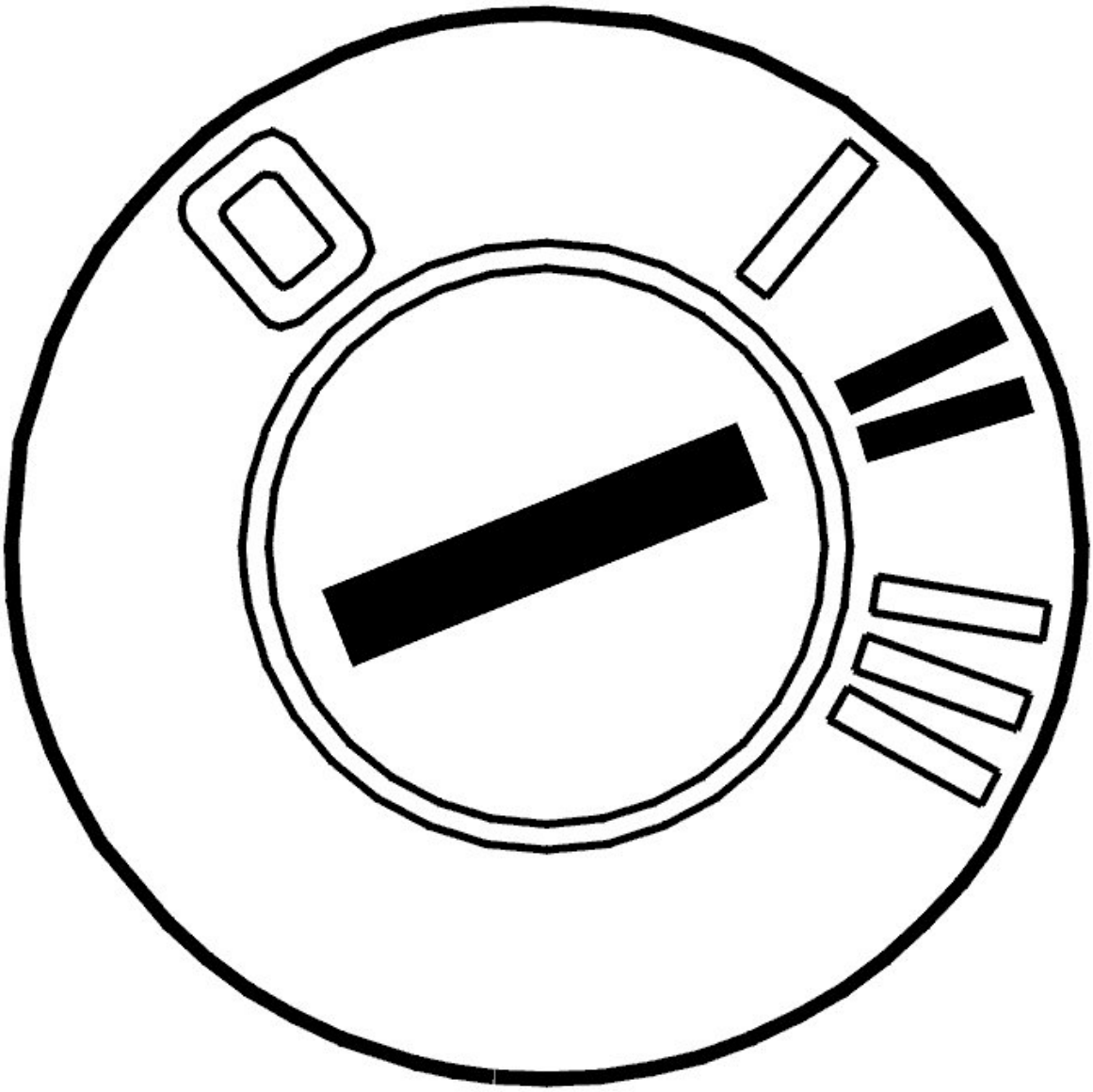
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

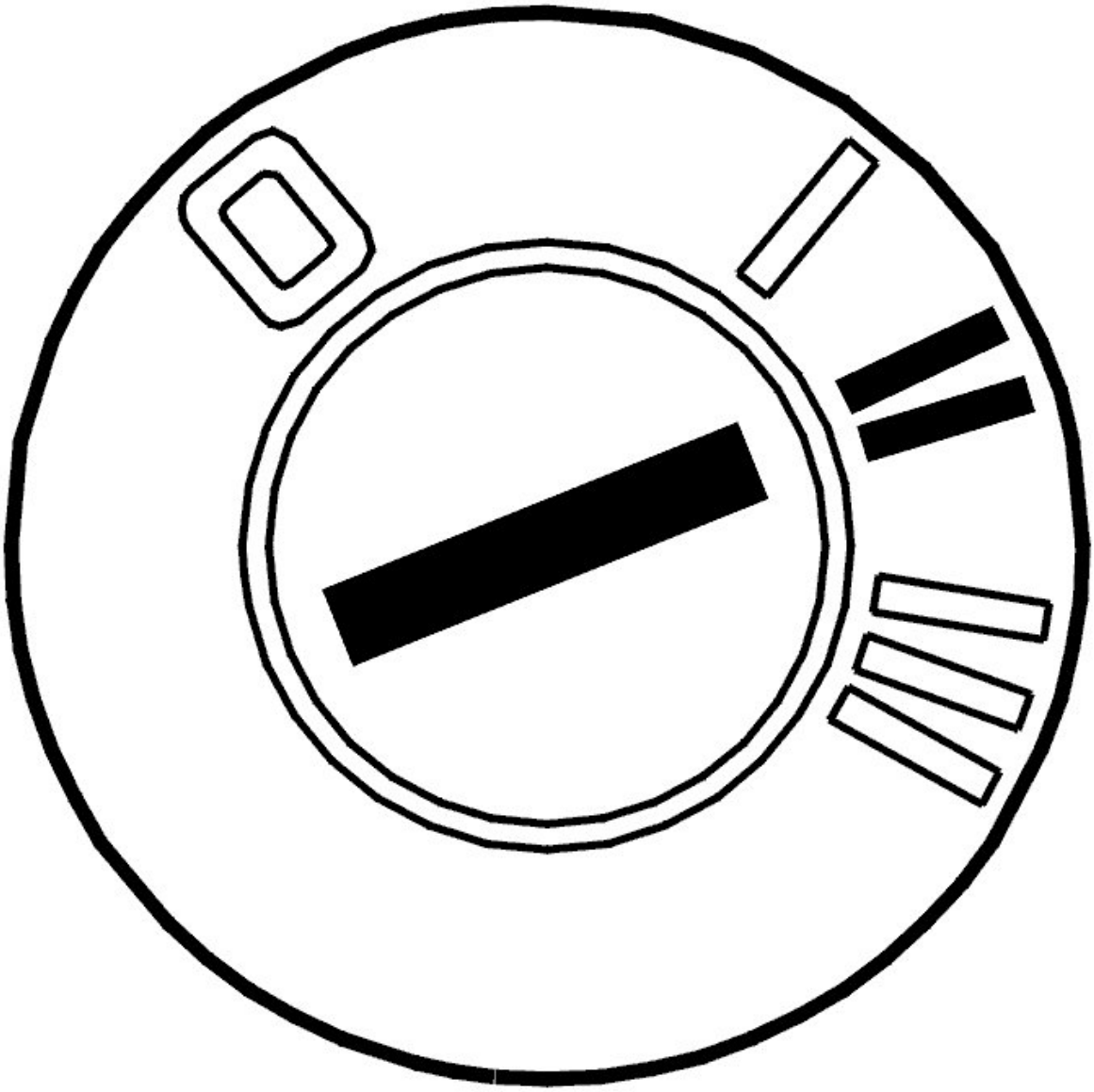
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

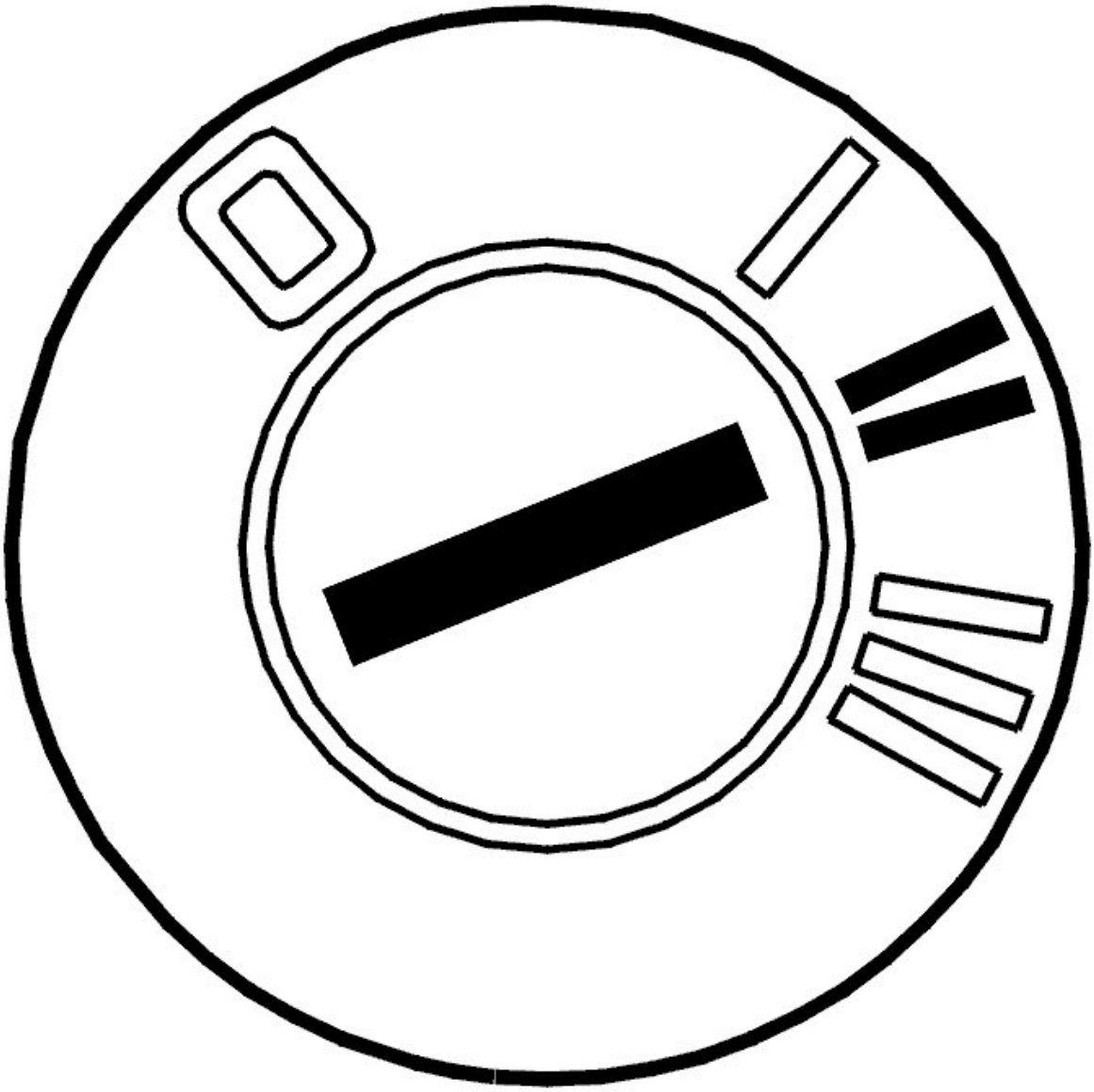
DONE - Verification

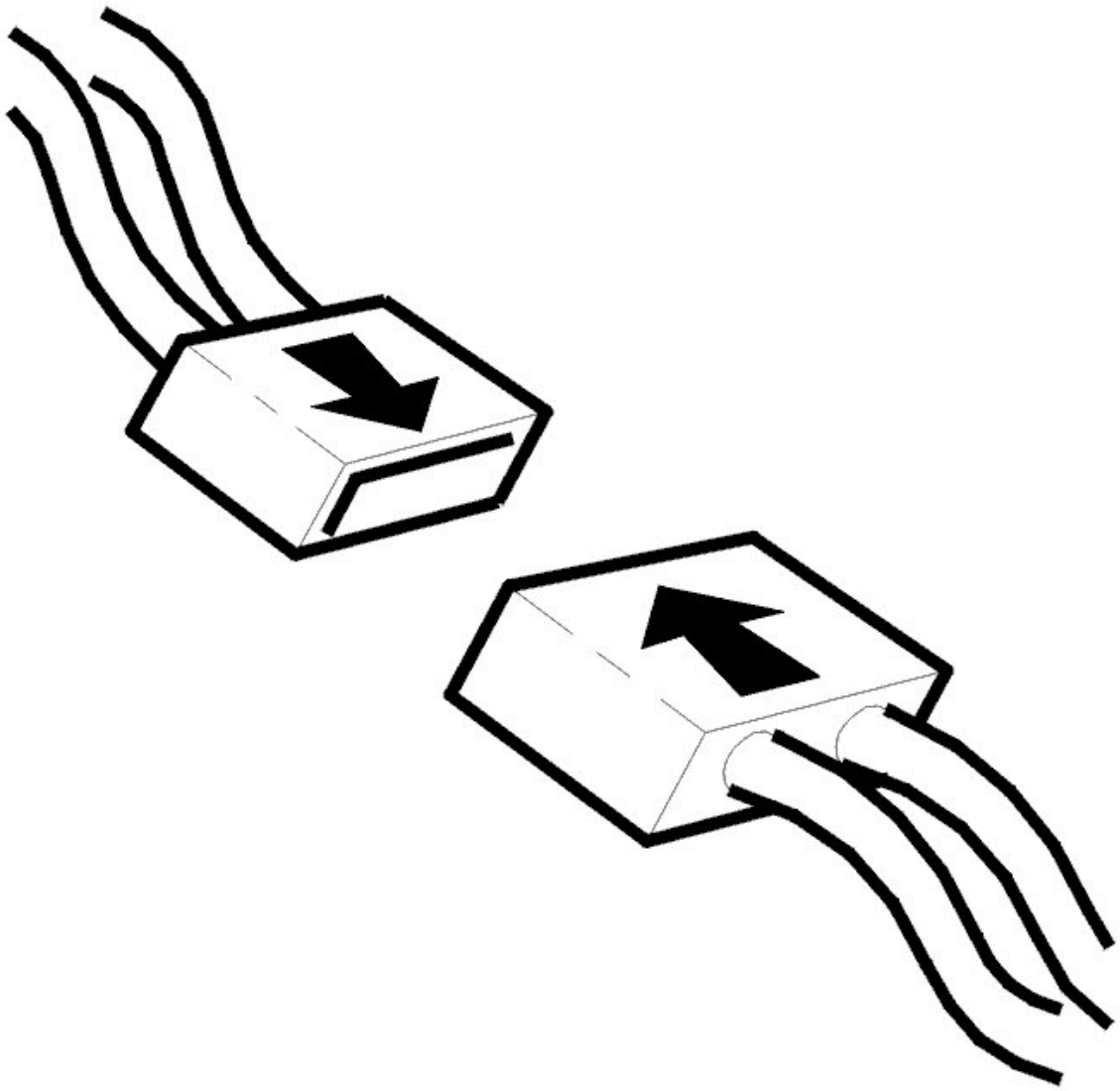
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

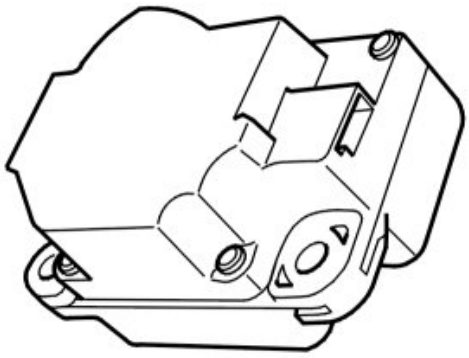
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0062

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the damper motor module (DMM) temperature left.
The climate control module (CCM) communicates with the damper motor module (DMM) temperature left via LIN bus 1.
The damper motor module (DMM) transmits information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal fault in the damper motor module (DMM) temperature left
- Incorrect calibration due to loss of power.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.
- Air flow problem.

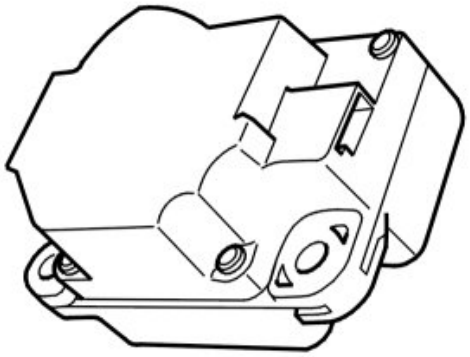
Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the damper motor module (DMM) for temperature left.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the damper motor module (DMM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the damper motor module (DMM) if the fault recurs.
Replace the damper motor module (DMM) for temperature left If the fault is permanent:
Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
Remedy as necessary.



Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information
- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

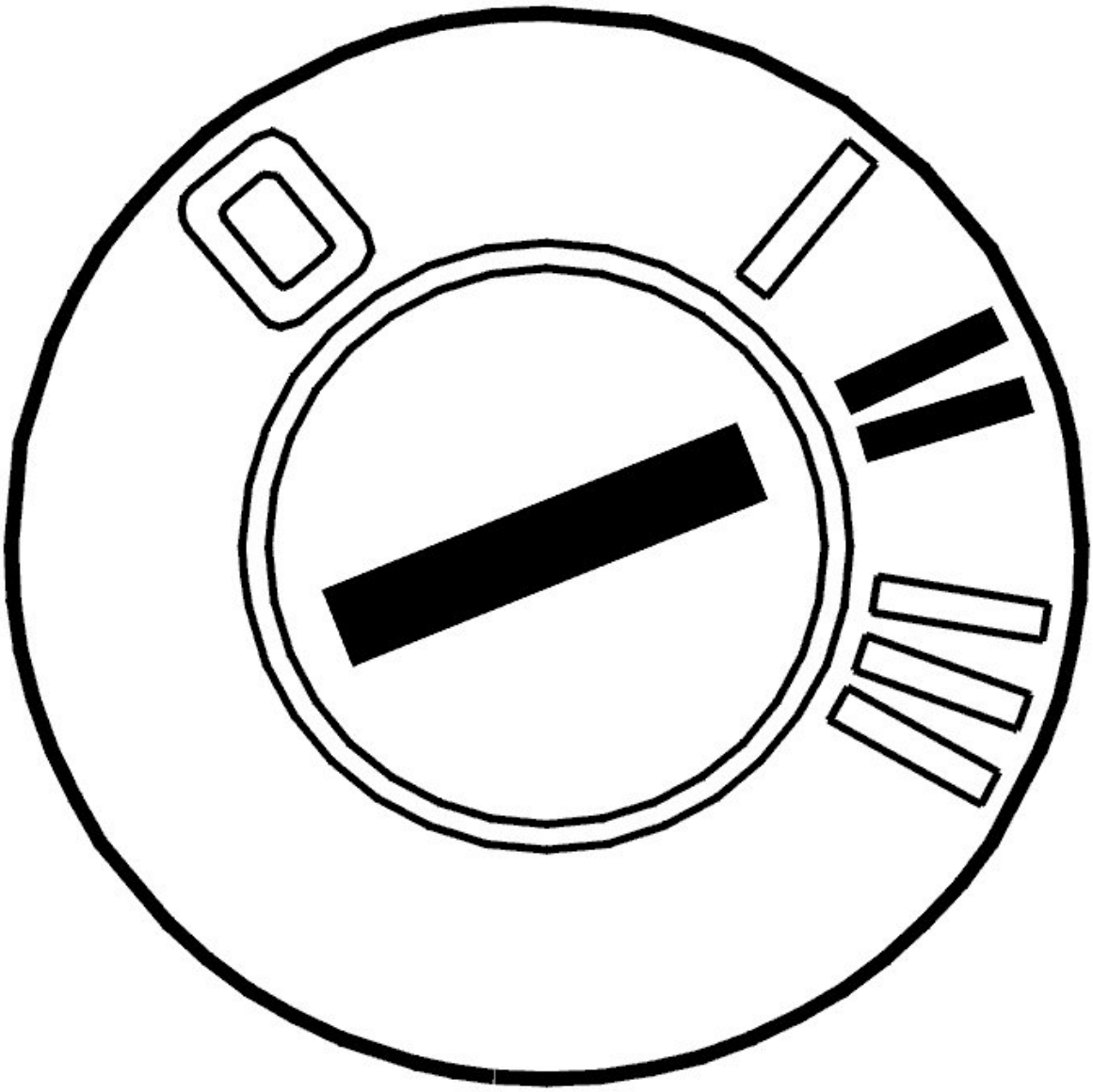
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

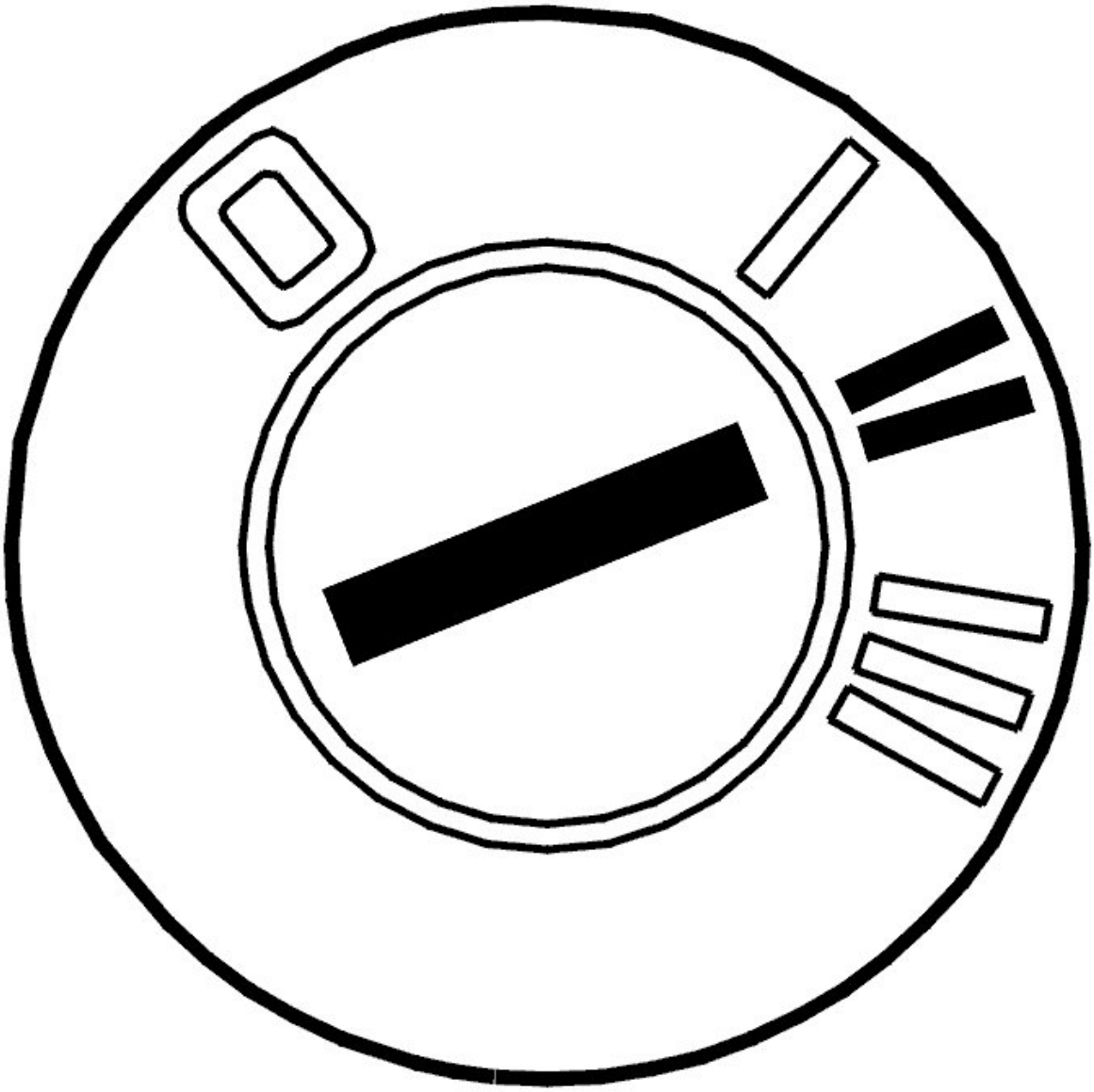
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

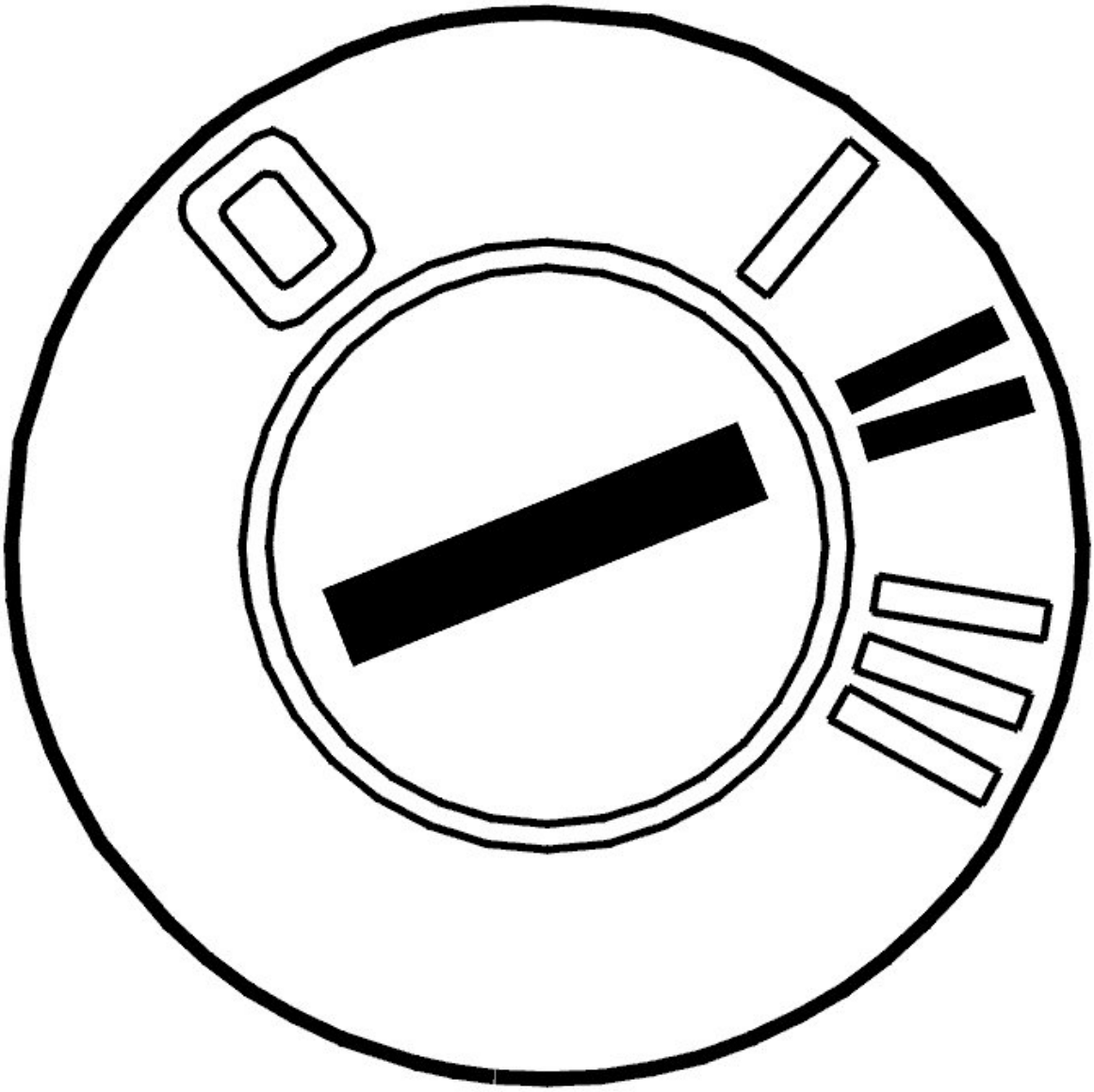
DONE - Verification

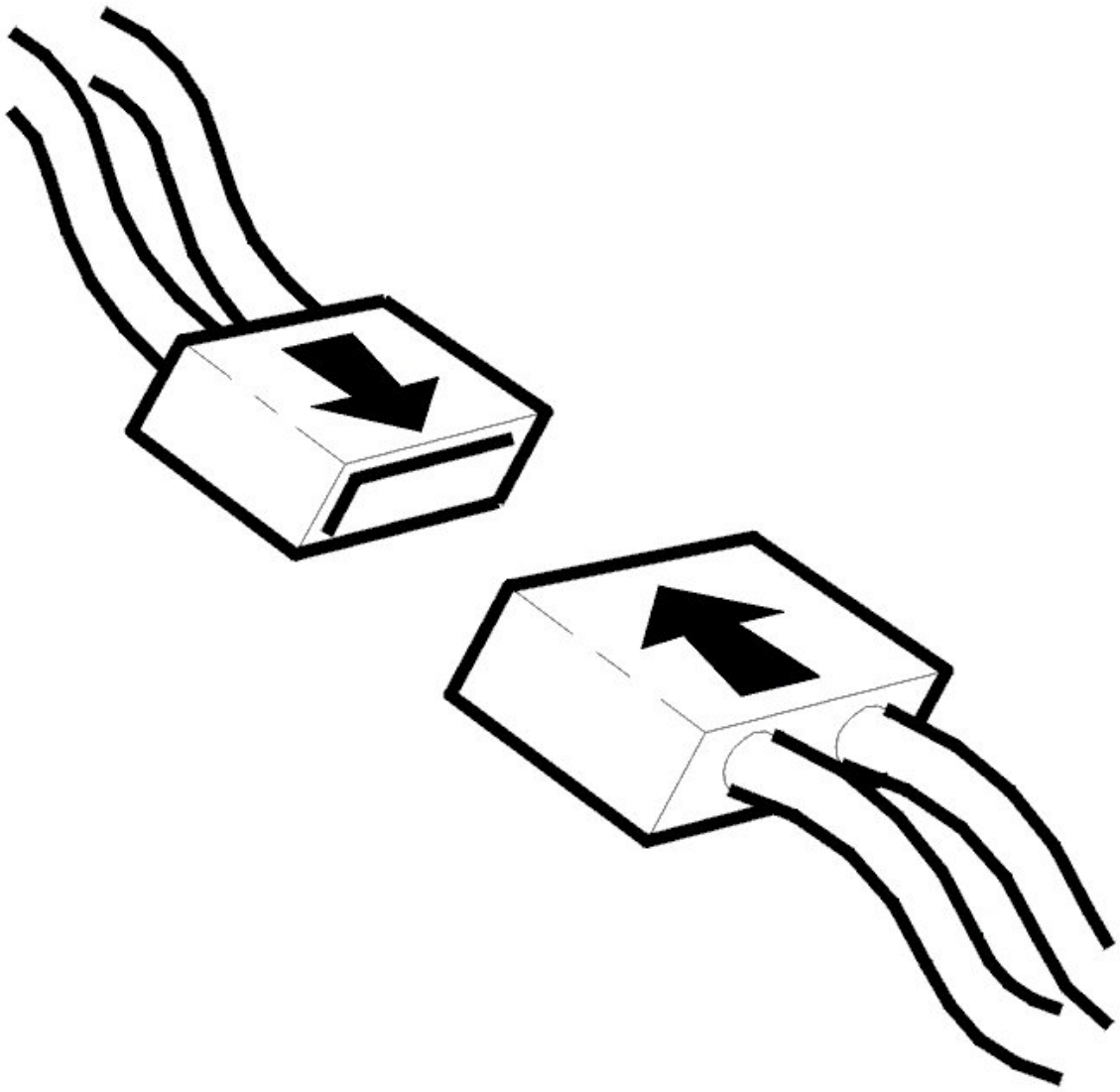
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

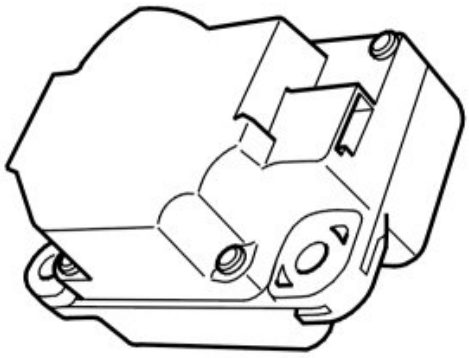
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0063

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the damper motor module (DMM) temperature right.
The climate control module (CCM) communicates with the damper motor module (DMM) temperature right via LIN bus 2.
The damper motor module (DMM) transmits information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed for the electronic climate control module (CCM) (ECC).

Substitute value
- None.

Possible source
- Internal fault in the damper motor module (DMM) for temperature right
- Incorrect calibration due to loss of power.

Fault symptom[s]
- The passenger compartment temperature does not correspond to the set position.
- Air flow problem.

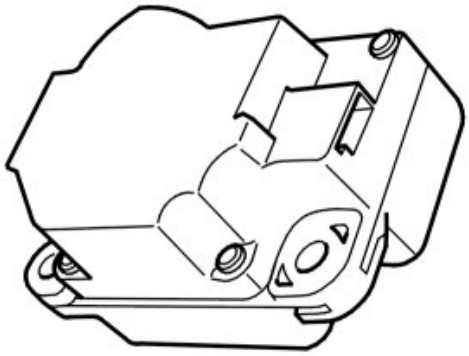
Internal Fault

Internal fault

Replacing the component

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The climate control module (CCM) has registered an internal fault in the damper motor module (DMM) for temperature right.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the damper motor module (DMM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the damper motor module (DMM) if the fault recurs.
Replace the damper motor module (DMM) for temperature right if the fault is permanent:
Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
Remedy as necessary.



Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information
- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

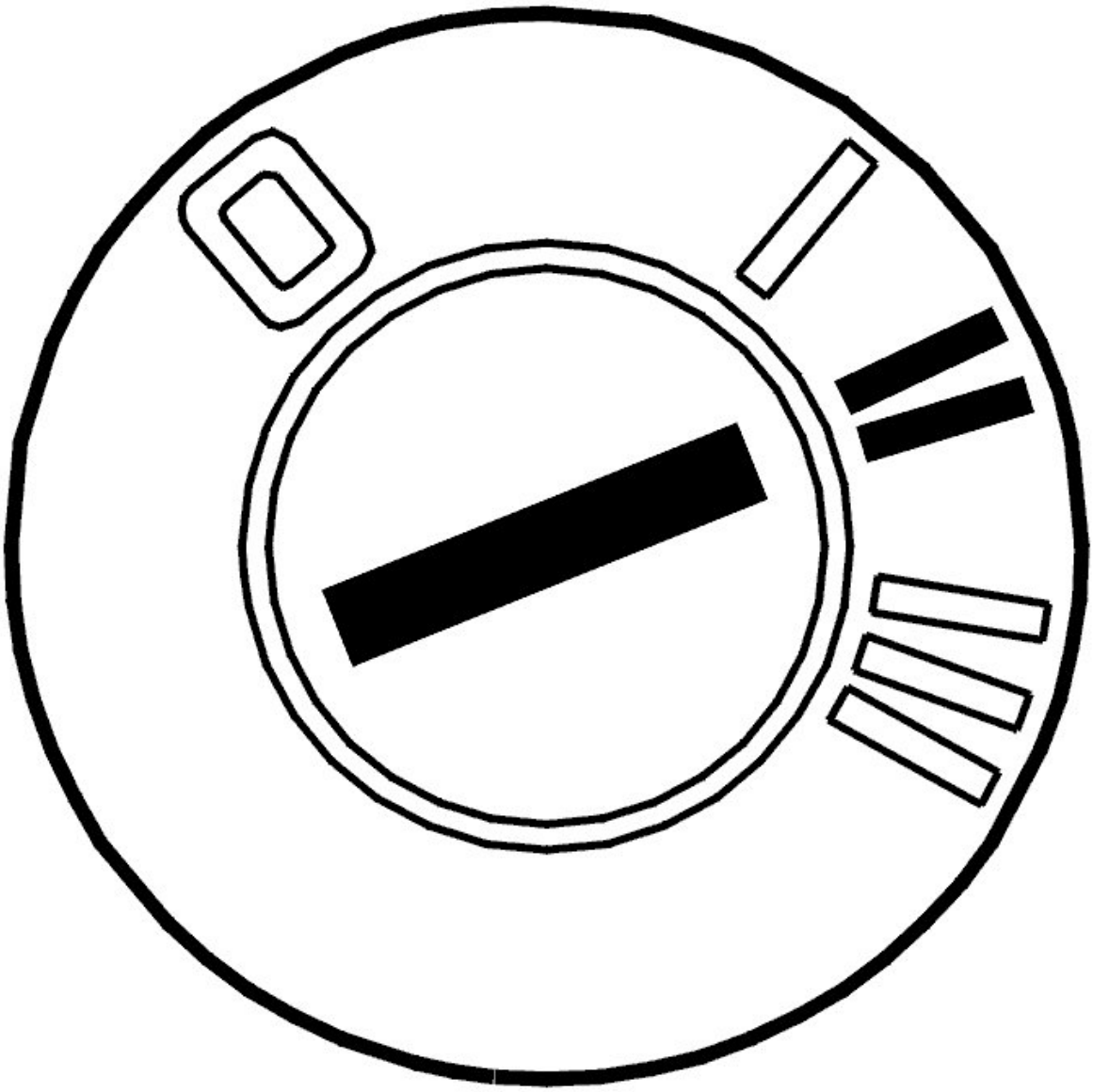
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

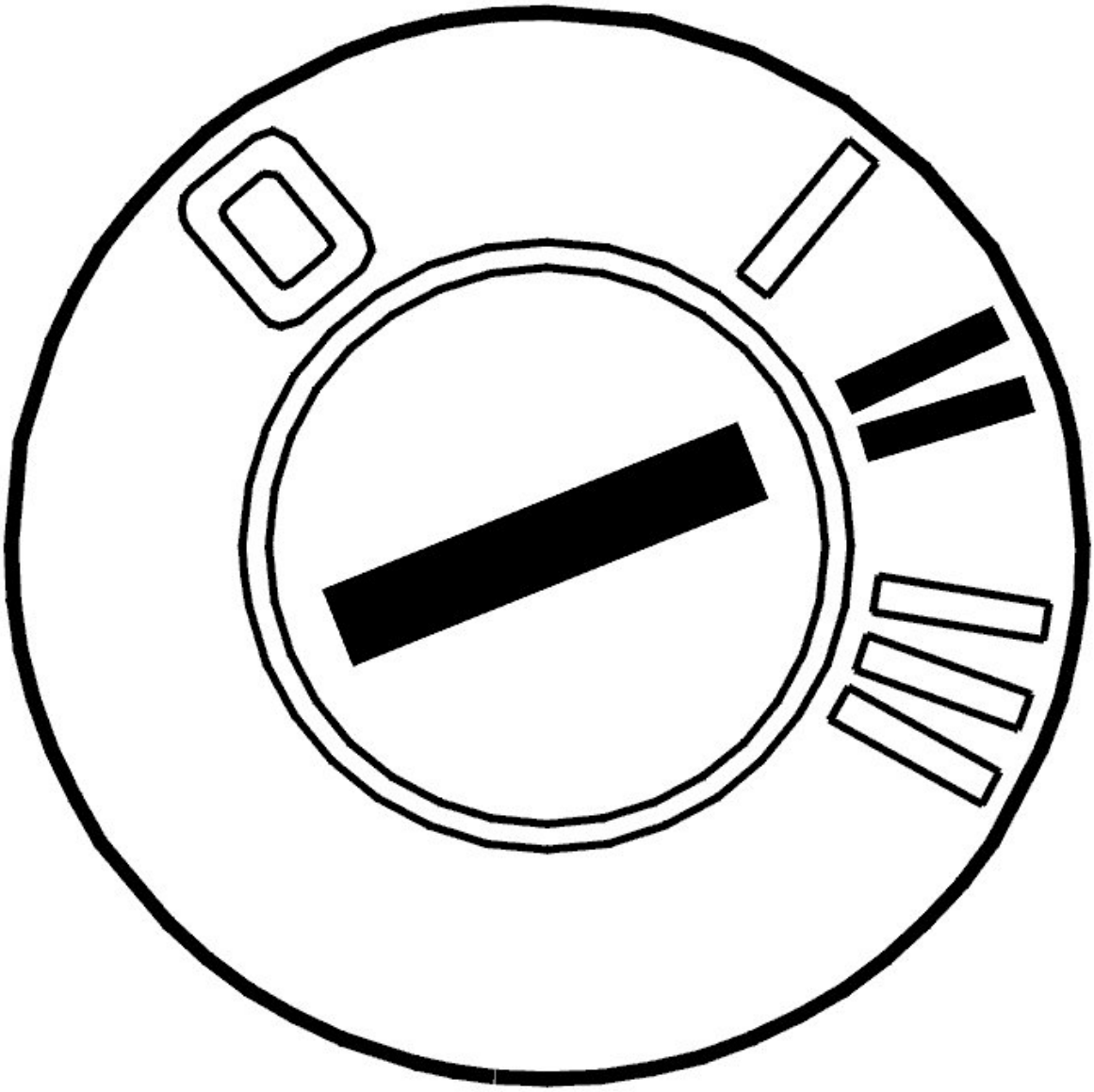
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

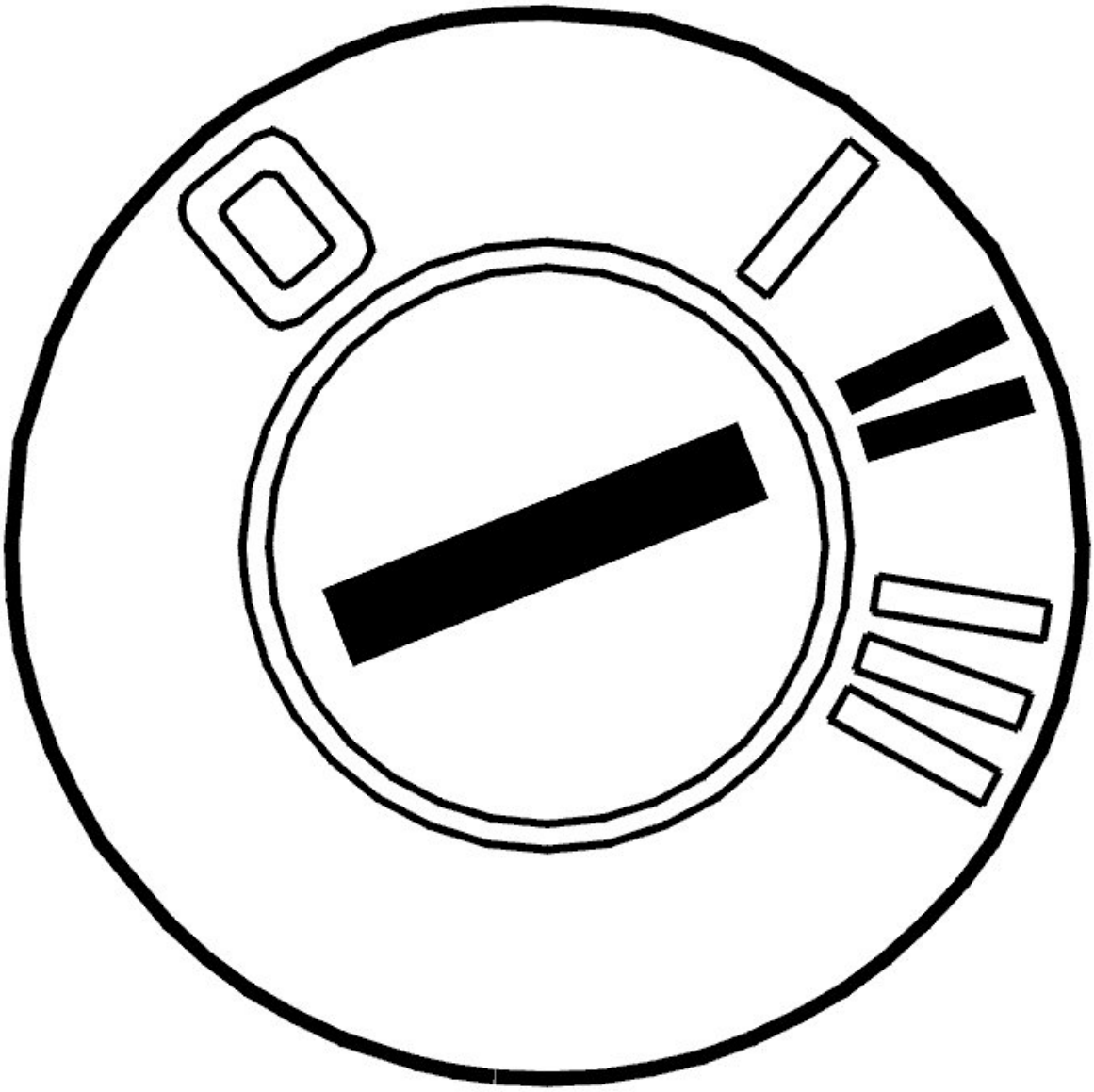
DONE - Verification

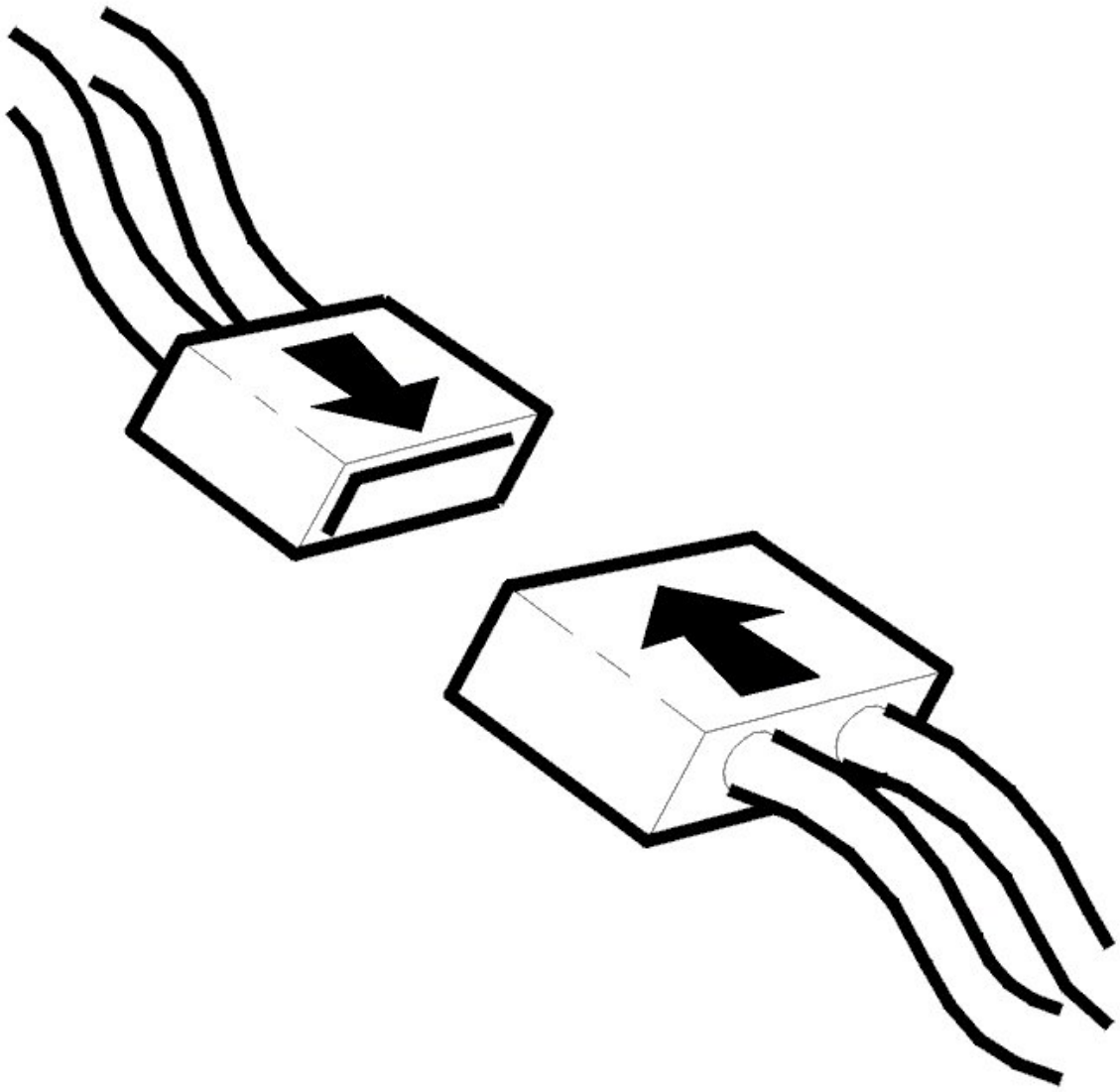
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

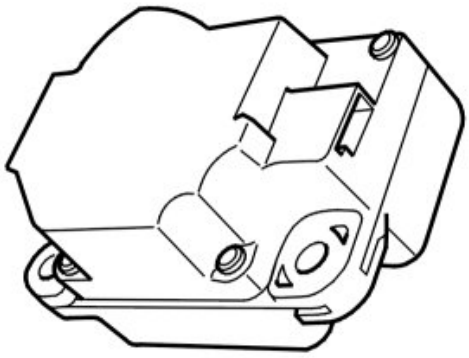
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0064

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects a fault in the damper motor module (DMM) air distribution.
The climate control module (CCM) communicates with the damper motor module (DMM) air distribution via LIN bus 1.
The damper motor module (DMM) transmits information to the climate control module (CCM) about status.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal fault in the damper motor module (DMM) air distribution
- Incorrect calibration due to loss of power.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.

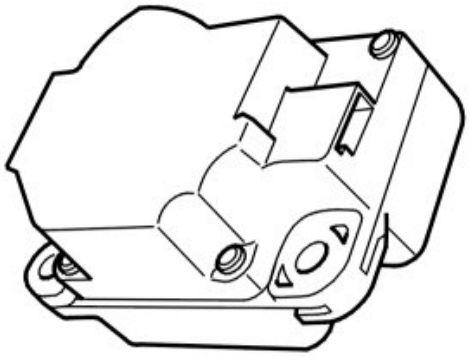
Internal Fault

Internal fault

Replacing the component

The climate control module (CCM) has registered an internal fault in the damper motor module (DMM) for air distribution.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be caused by interference at start up of the damper motor module (DMM). Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. Replace the damper motor module (DMM) if the fault recurs.
Replace the damper motor module (DMM) for air distribution if the fault is permanent:
Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
Remedy as necessary.



Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information
- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

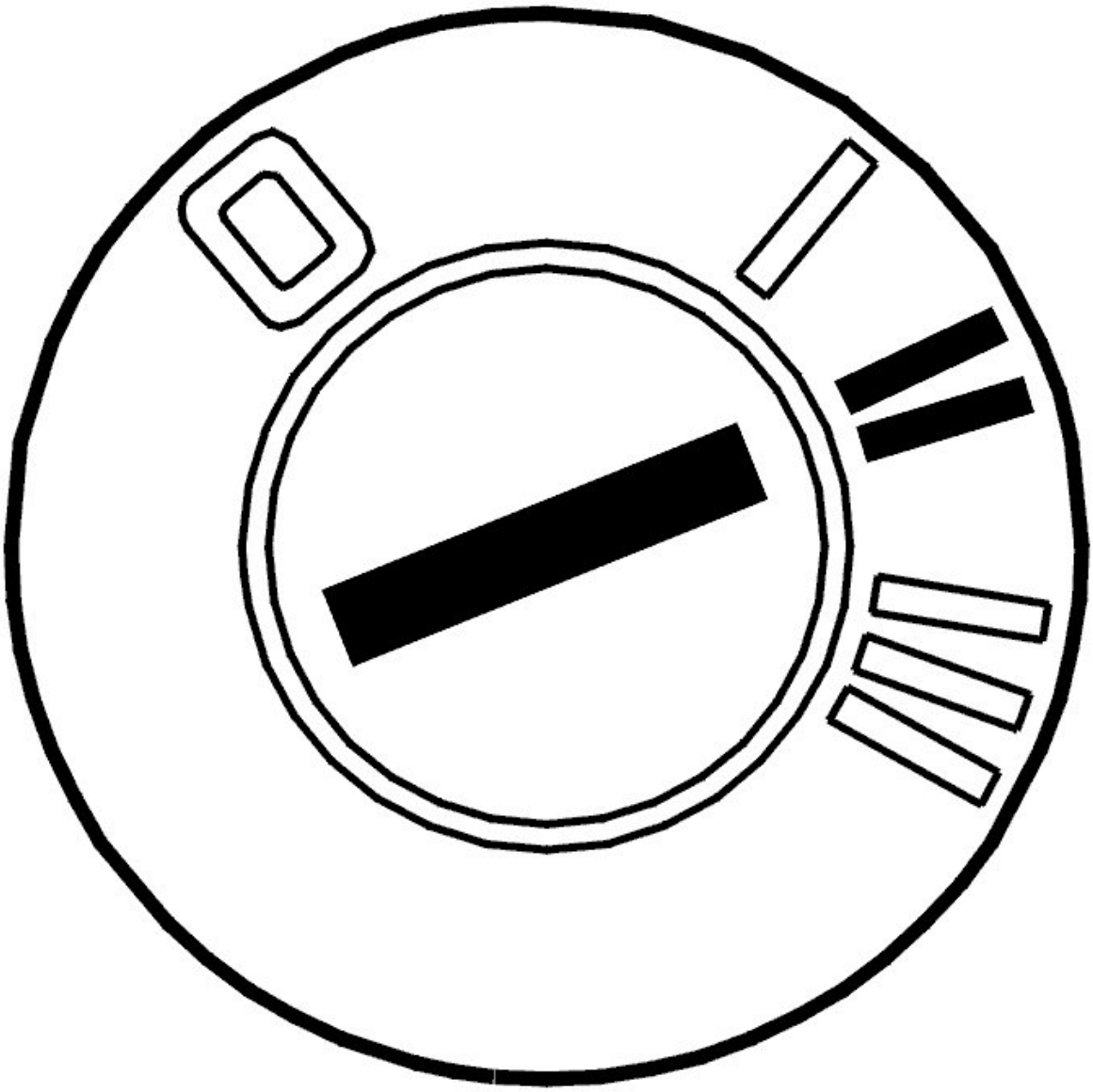
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

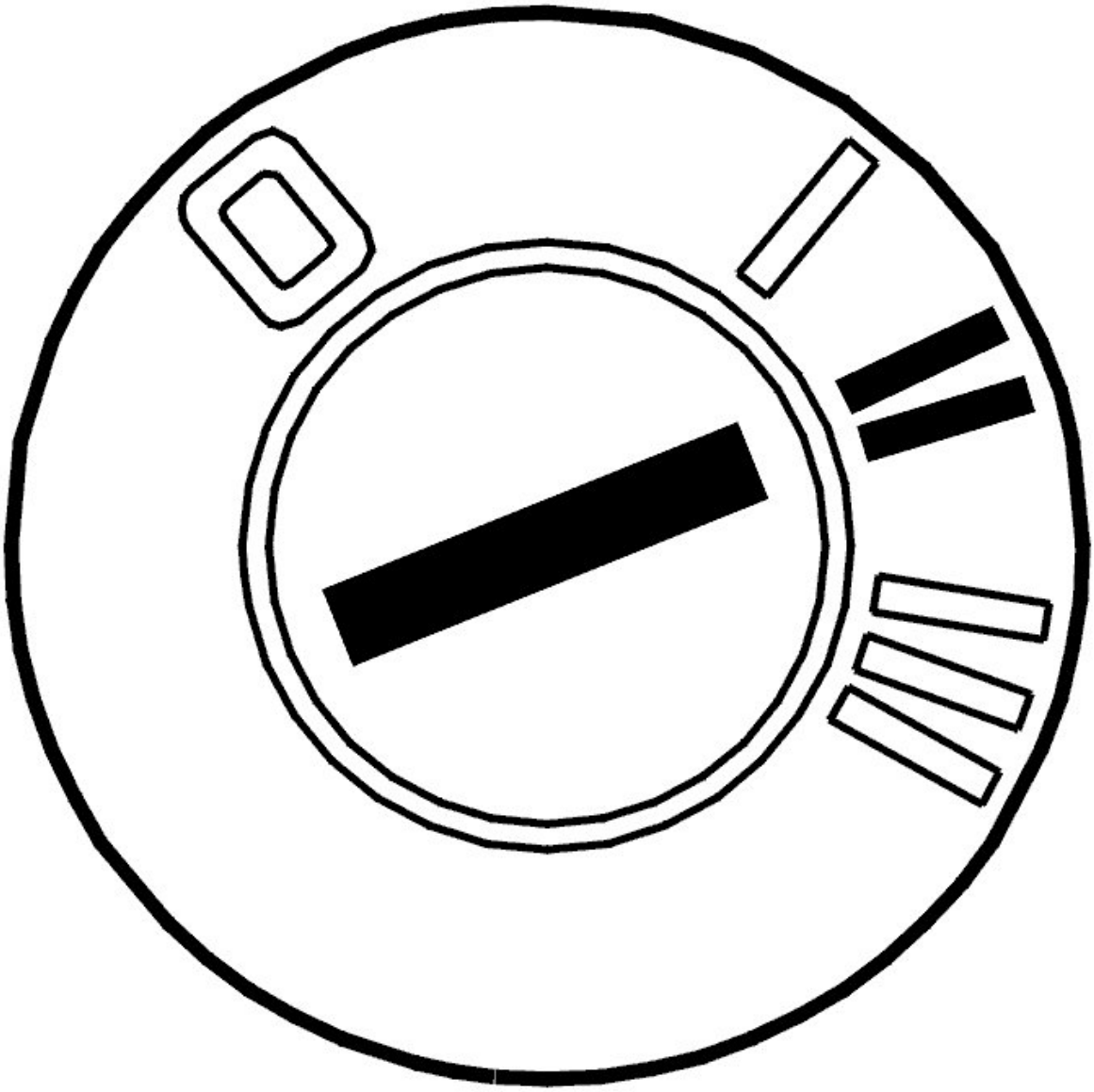
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

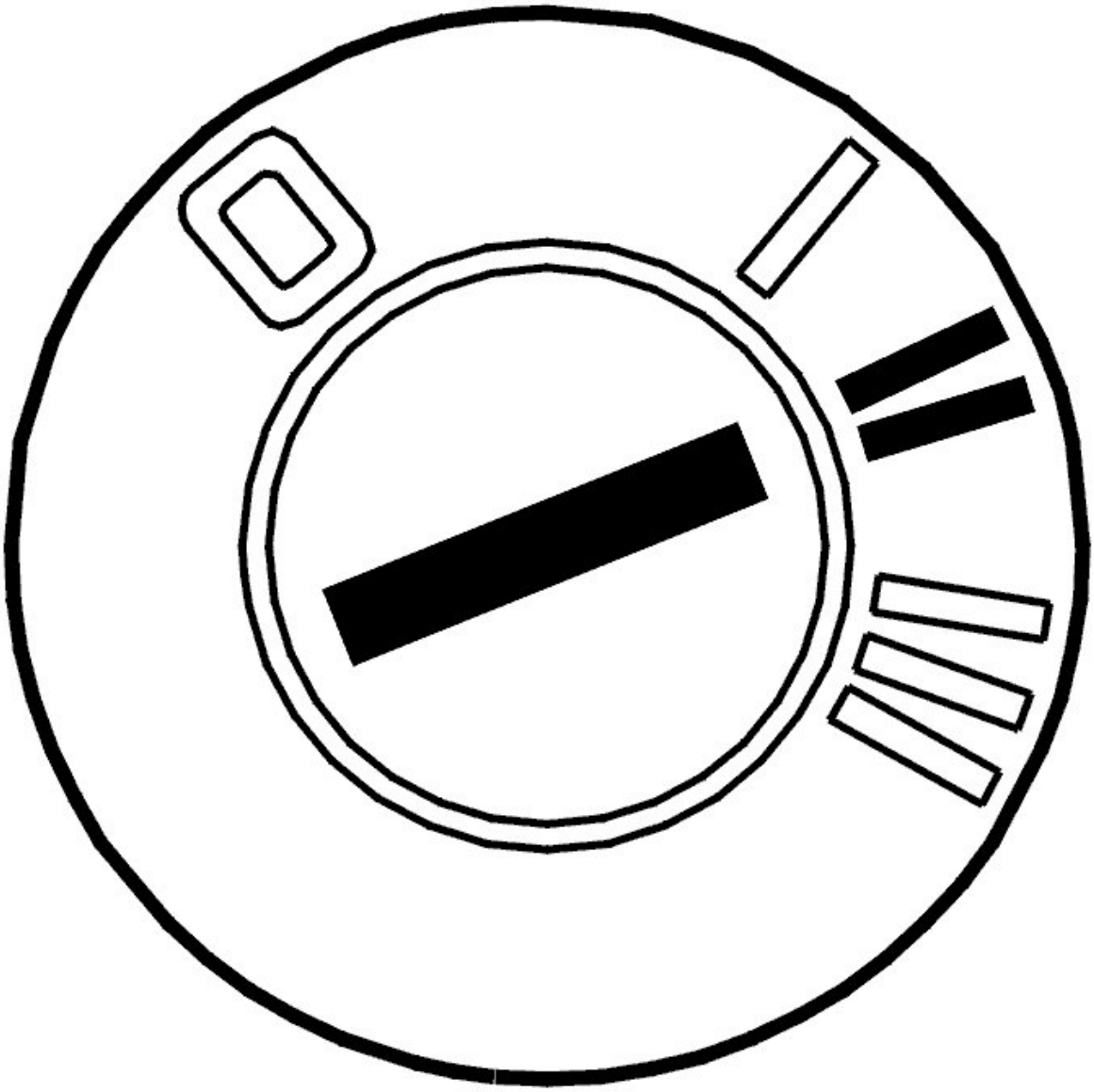
DONE - Verification

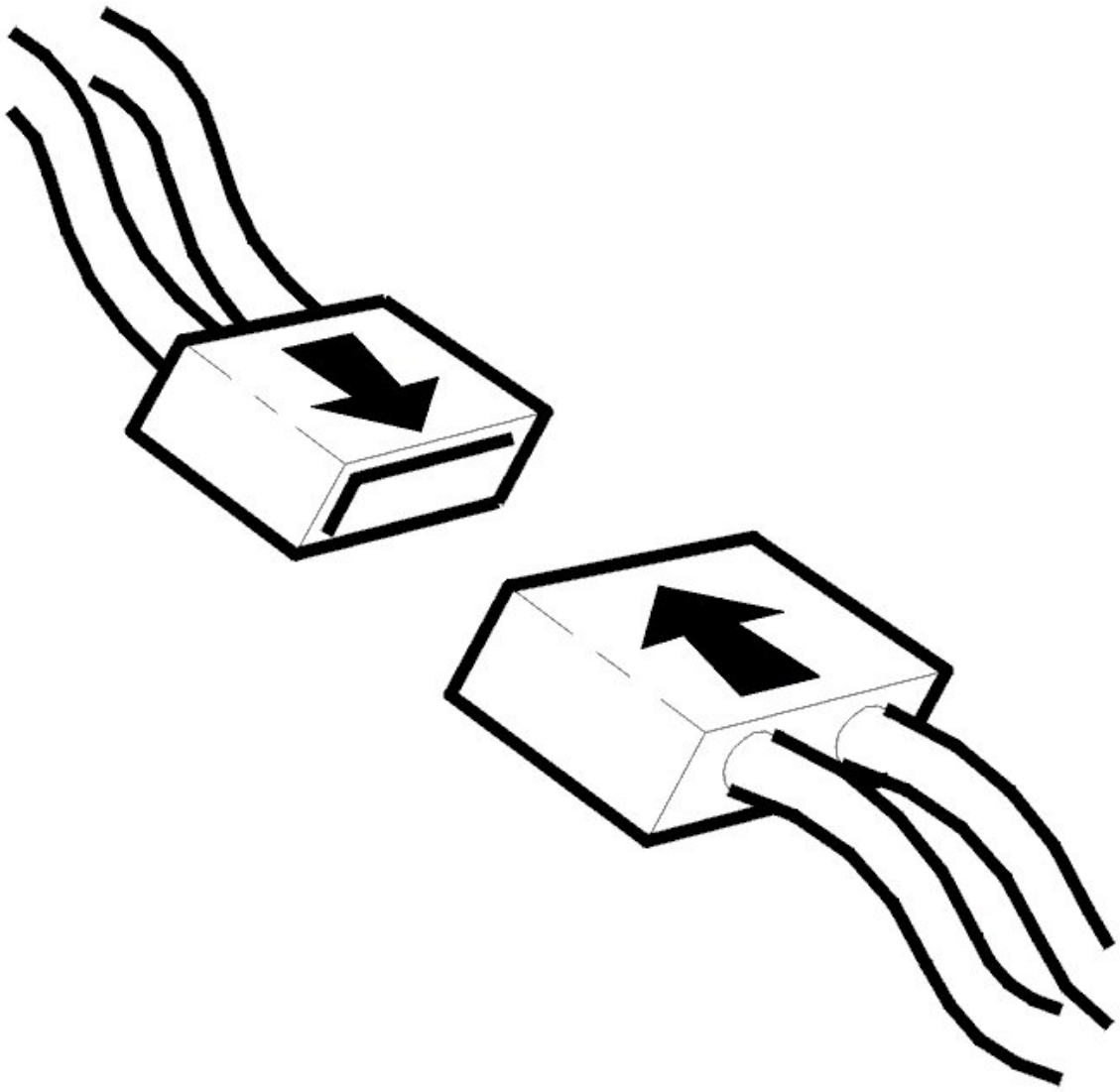
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

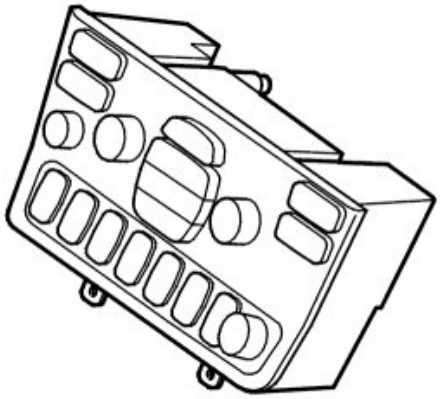
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0070

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that components on LIN bus 1 and LIN bus 2 do not correspond with the components included in the Car Config File.
The climate control module (CCM) receives information about the Car Config File from the central electronic module (CEM) via the CAN network.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed in conjunction with activation of a diagnostic function.

Substitute value
- None.

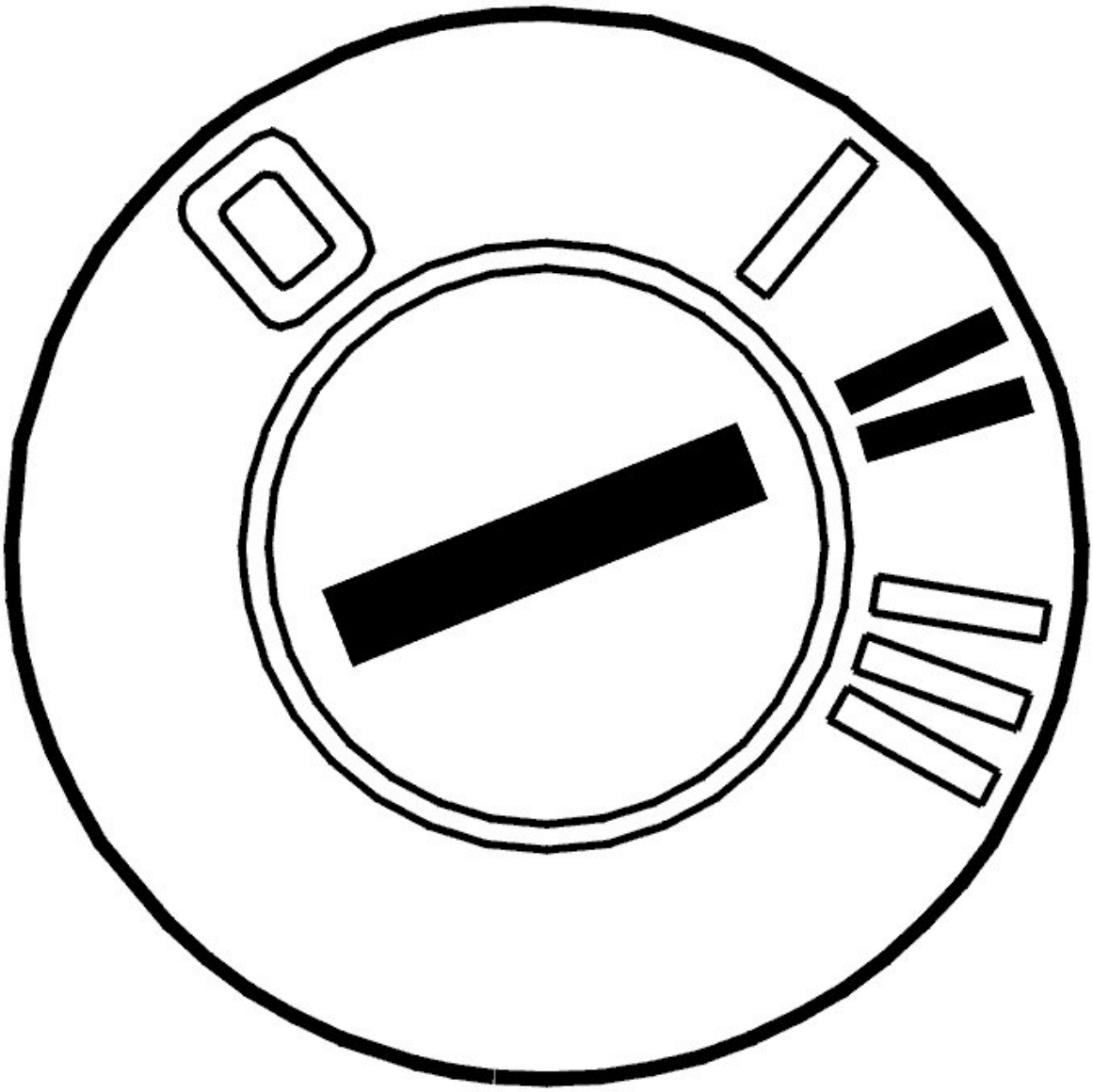
Possible source
- Components on LIN bus 1 or LIN bus 2 are missing
- Components on LIN bus 1 or LIN bus 2 are incorrectly installed.

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.
- Temperature control/Uneven temperature
- The passenger compartment temperature does not correspond to the set position.
- No recirculation.

Faulty Identification

Faulty identification

Checking components on LIN bus



- Ignition on.

The climate control module (CCM) has registered that the number of control modules on LIN bus 1 or 2 does not correspond with the number of control modules occupied in the car configuration.
If a control module is missing according to the car configuration, check that the control module is installed and correctly connected.
Check also whether any control modules are connected that are not occupied in the car configuration.
If the diagnostic trouble code (DTC) is stored together with CCM-0072, the fault can be due to several damper motor modules (DMM) having the same identity. In such cases, remedy by identifying the damper motor.
Read out which control modules/sensors are on LIN bus 1 and 2 and compare this to the car configuration. Which control modules and sensors are to be found and which alternatives can be presented in the car configuration can be read in the tables below.

LIN bus 1

Control module/sensor	On LIN bus 1
Damper Motor Position Sensor recirculation	Always
Damper motor, temperature left	Always
Damper motor recirculation (REC/OSA).	If the vehicle is right-hand drive
Left seat heating	If the vehicle is equipped with seat heating
Air quality sensor (AQS)	If the vehicle is right-hand drive and equipped with an air quality sensor (AQS)

LIN bus 2

Control module/sensor	On LIN bus 2
Damper motor, temperature, right	Always
Defroster damper motor	If the vehicle is equipped with ECC
Damper motor recirculation (REC/OSA).	If the vehicle is left-hand drive
Seat heater, right.	If the vehicle is equipped with seat heating
Air quality sensor (AQS)	If the vehicle is left-hand drive and equipped with an air quality sensor (AQS)

Car configuration

Parameter	Alternative
Steering	Left-hand drive Right-hand drive
Climate control system	ECC ECC/AQS ECC, rear AC MCC
Seat heating calibration	No Low 28C/82F-High 35C/95F Low 30C/86F-High 36C/97F Low 31C/88F-High 37C/99F Low 32C/90F-High 38C/100F Low 33C/91F-High 39C/102F Low 34C/93F-High 40C/104F Low 35C/95F-High 41C/106F Low 36C/97F-High 43C/109F
Cabin filter	Pollen filter Air Quality System, AQS

Click the VCT2000 symbol to check which control module/sensor does not correspond to the car configuration.
Remedy as necessary.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Climate control module (CCM), replacing See: Heating and Air Conditioning/Control Module HVAC/Service and Repair
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Select "Continue" to identify the damper motor.

Continue - Identification of damper motors

Identification of damper motors

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

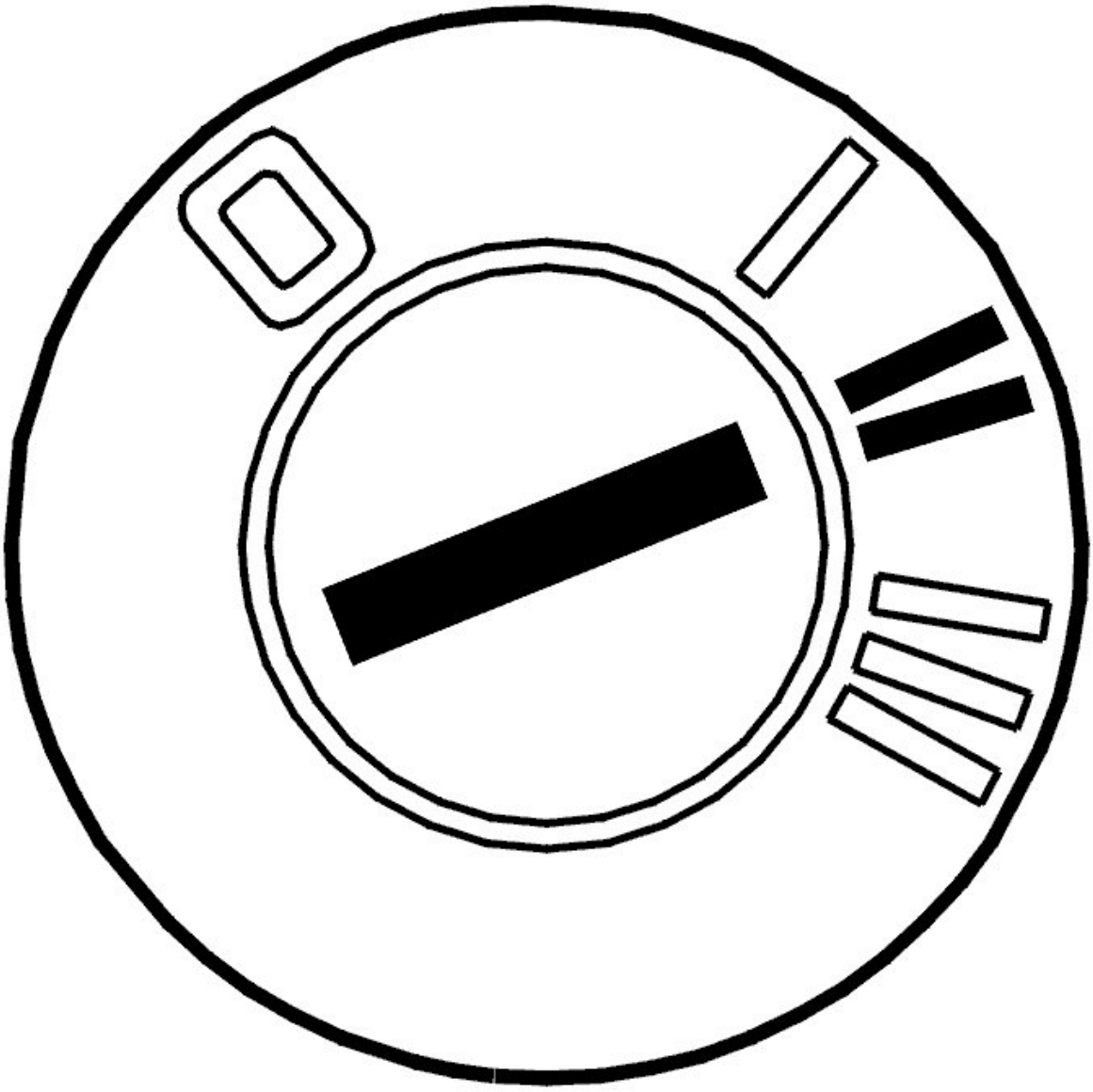
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - DONE

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

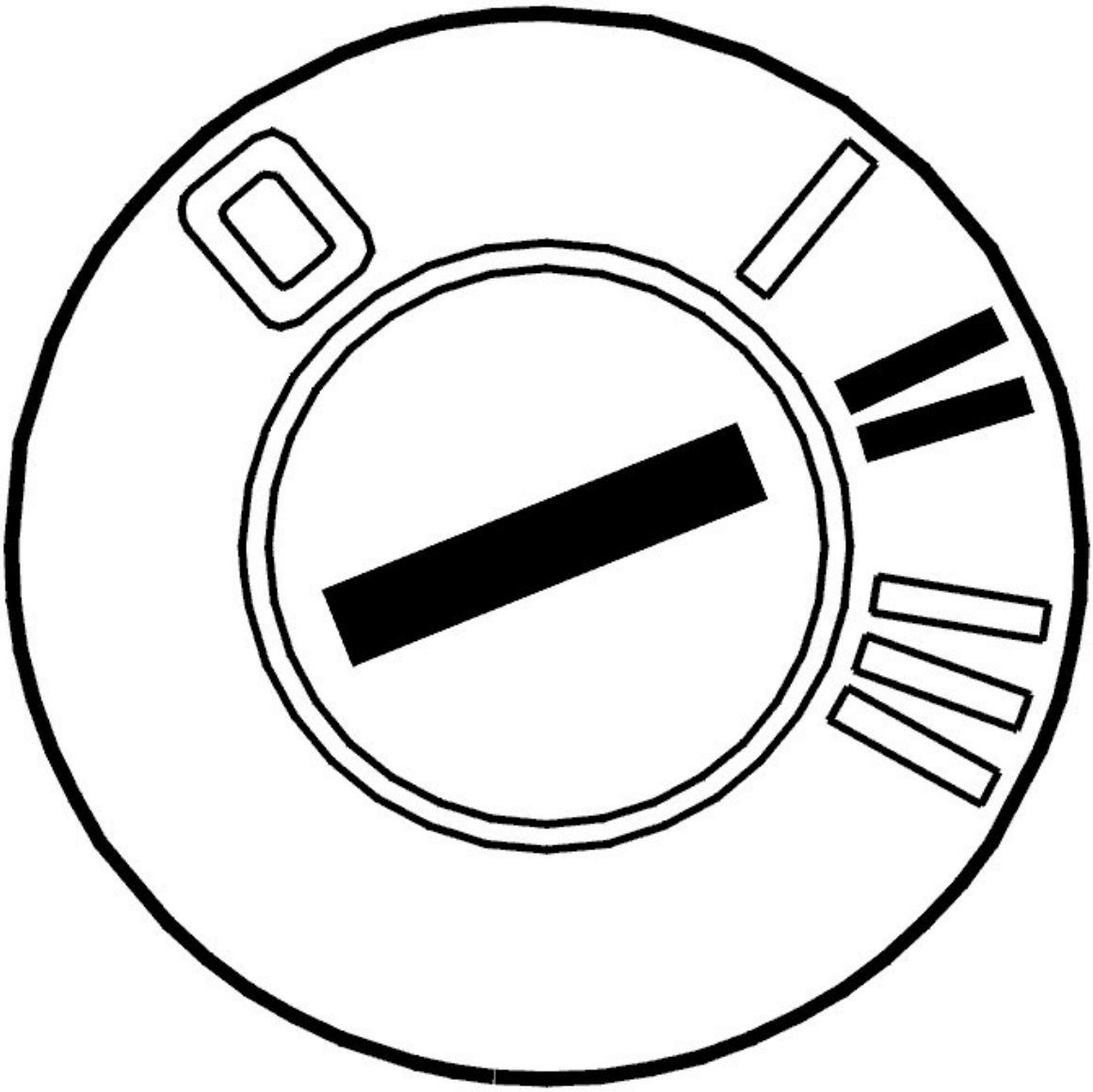
Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

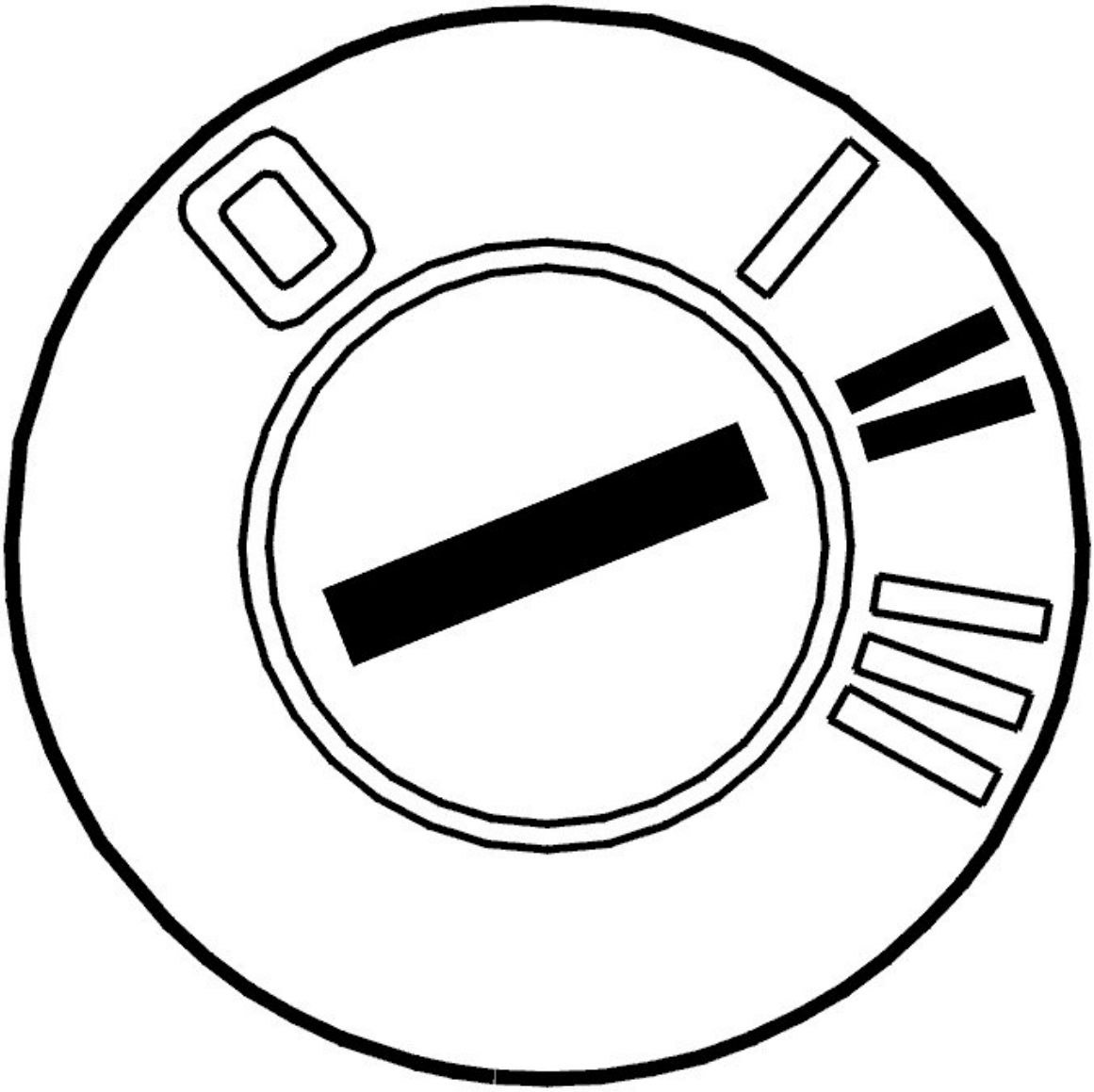
DONE - Verification

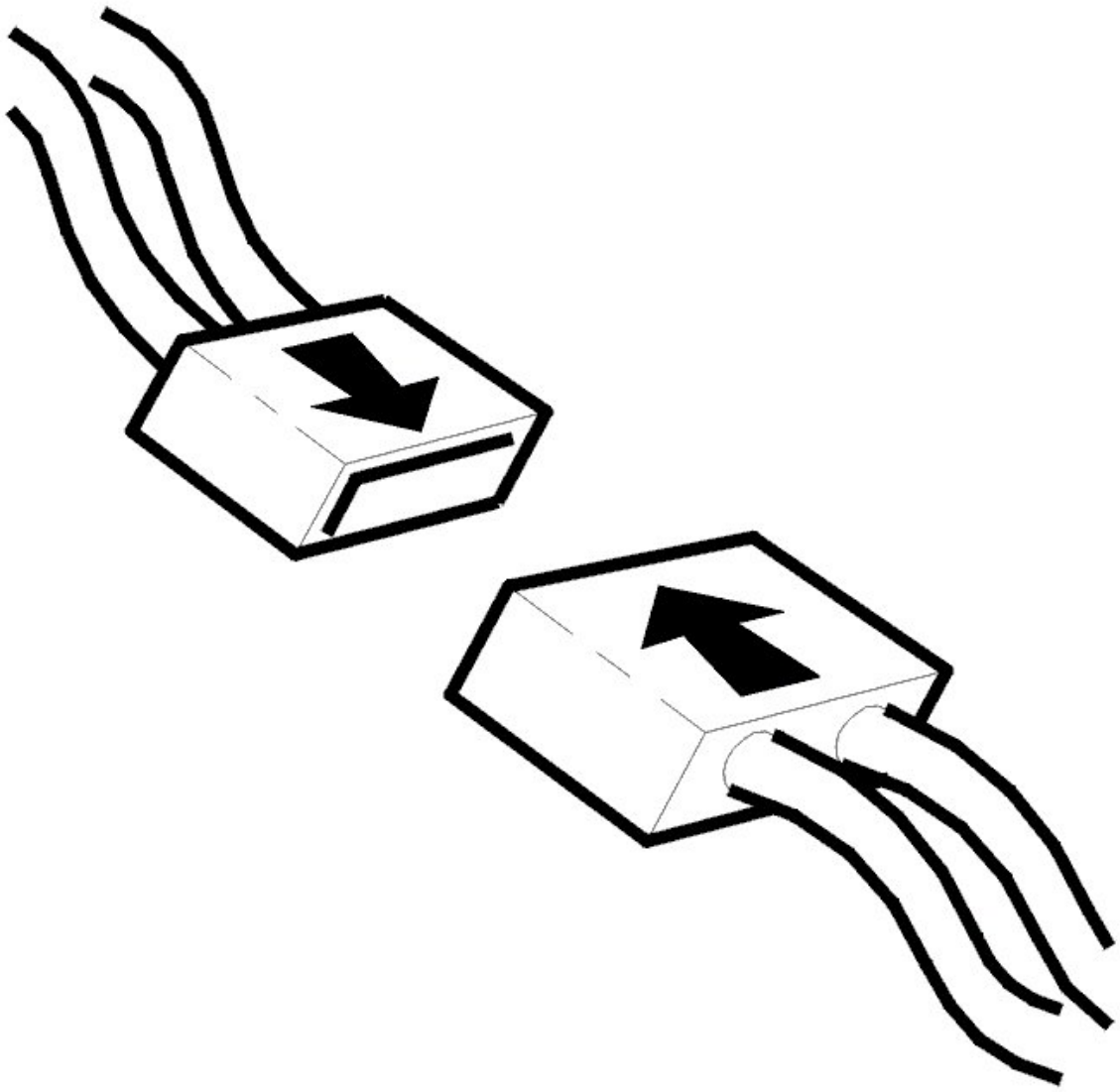
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components on LIN bus

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

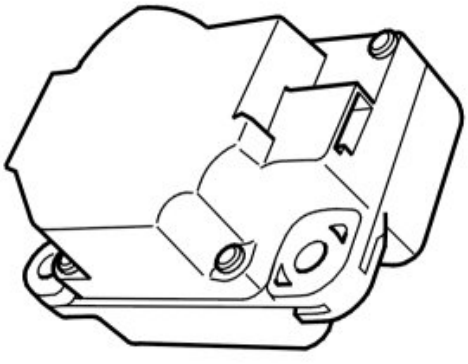
FAULT FOUND - Fault Found

Attempt New Test - Checking components on LIN bus

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0071

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that the limit positions for a damper motor module (DMM) do not correspond to the anticipated limit positions.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

The diagnostic trouble code (DTC) can only be diagnosed in conjunction with activation of a diagnostic function.

Substitute value
- None.

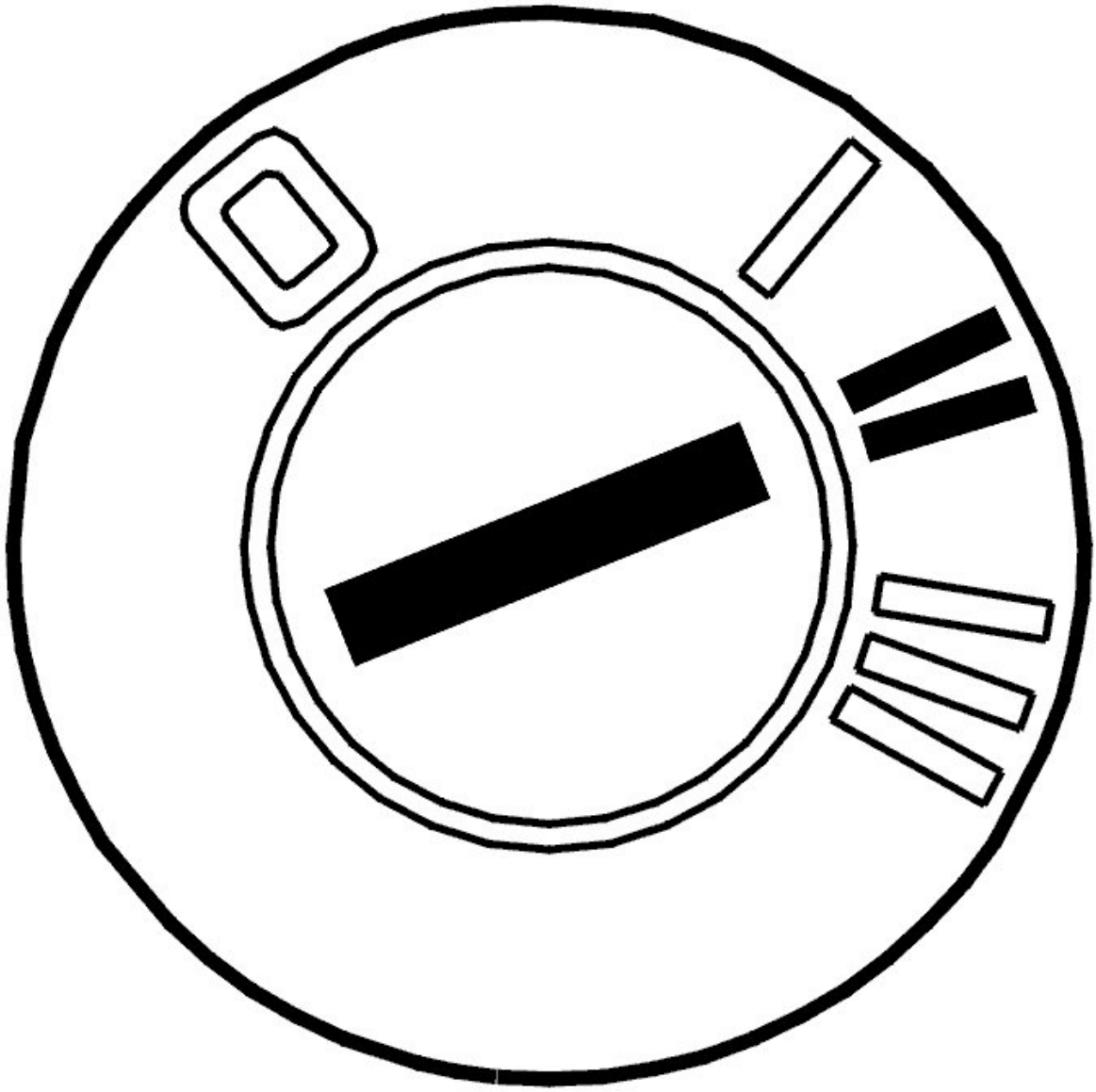
Possible source
- Blocked damper.
- Climate control unit calibrated at incorrect temperature.
- Internal fault in the Damper motor module (DMM).

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.
- The passenger compartment temperature does not correspond to the set position.
- No recirculation.

Incorrect position

Incorrect position

Checking the component



- Ignition on.

The climate control module (CCM) has registered that one or more damper motor modules (DMM) have an incorrect number of steps between the end positions during damper regulation.
Check which damper motor has an incorrect number of steps between the end positions by:
- Read out the actual range to identify the number of stages between the upper and lower end positions measured by the damper motor module (DMM).
- Read out the preset range to identify the number of stages between the upper and lower end positions stored by the damper motor module (DMM).

- Compare these values to check the tolerances.

The defective damper motor has been identified if the actual range of any of the damper motors is outside the preset range by more than the tolerance.
Check that the damper motor is correctly installed.
Check that the damper is not blocked and that is has not become stuck. Look, for example, for a screw, cable or foam rubber gasket.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Continue - Calibration

Calibration

Warning! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.

Continue - Verification

Checking the component

Click on the VCT2000 symbol.
There is an internal fault if the damper motor range shows 0 or 4095. Replace the Damper motor module (DMM).

Does the damper motor range show 0 or 4095?

Yes - Replacing the control module

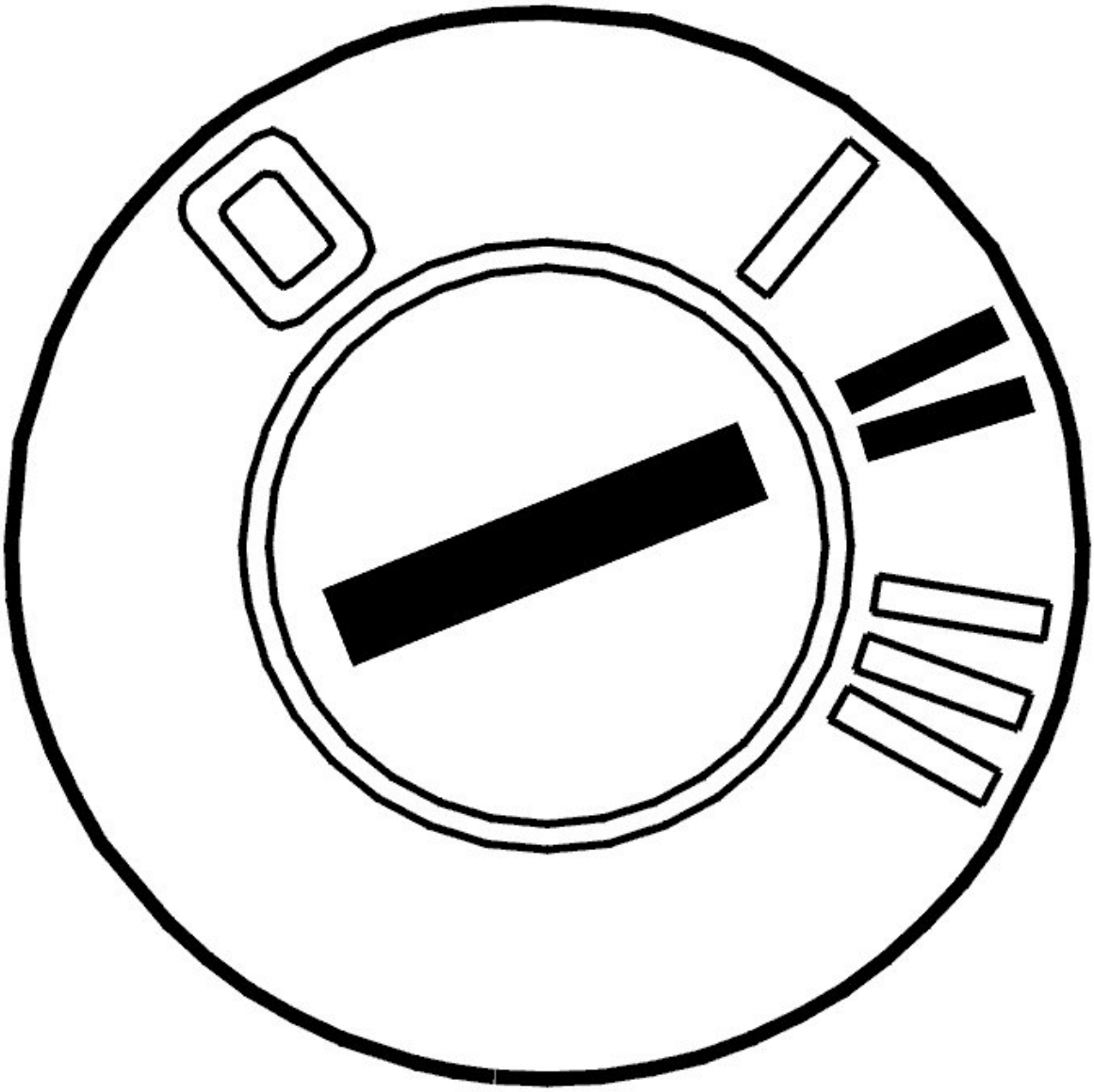
No - Checking the component

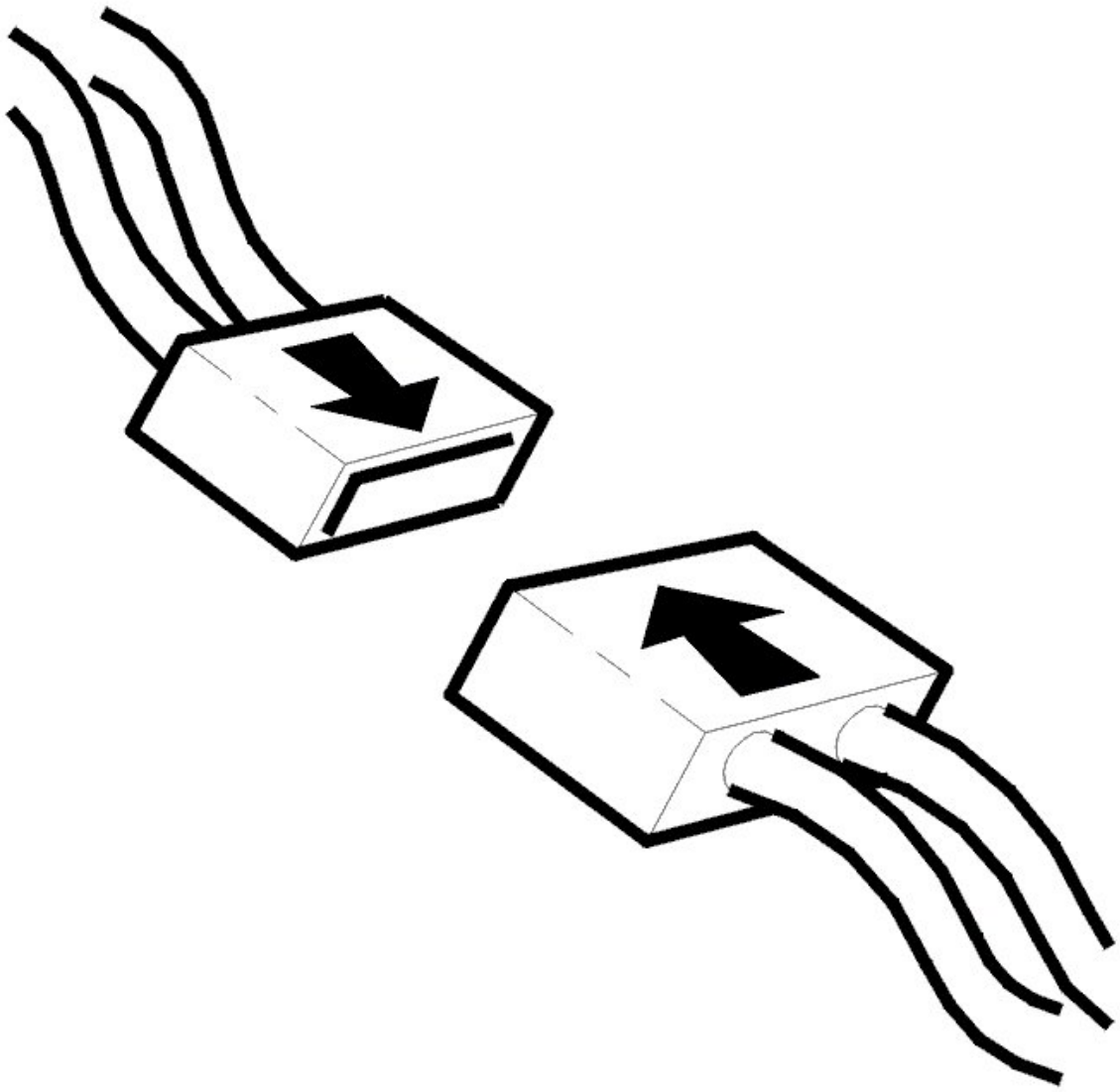
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Checking the component

VERIFIED - Fault Found

Checking the component

Check that the throttle in the throttle module can be closed and opened completely without binding. Check that the damper is not blocked and that is has not become stuck.

Other information:
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Continue - Calibration

Verification

Verification
VERIFICATION FAILED - Information

VERIFIED - **Fault Found**

Information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Faulty position

Replacing the control module

Replace the control module.

Other information:
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Continue - Identification

Identification

Hint: Identification of damper motors requires that the relevant damper motor is run to the limit positions. These runs can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.

- Ignition off.
- Reinstall the connectors, components etc.

Note! Ensure that nothing is physically preventing the damper from moving to its limit positions. If something is blocking the damper, an identification can cause problems which are extremely difficult to correct.Climate Control Module (CCM) and damper motors can be

affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibration

Calibration

Warning! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

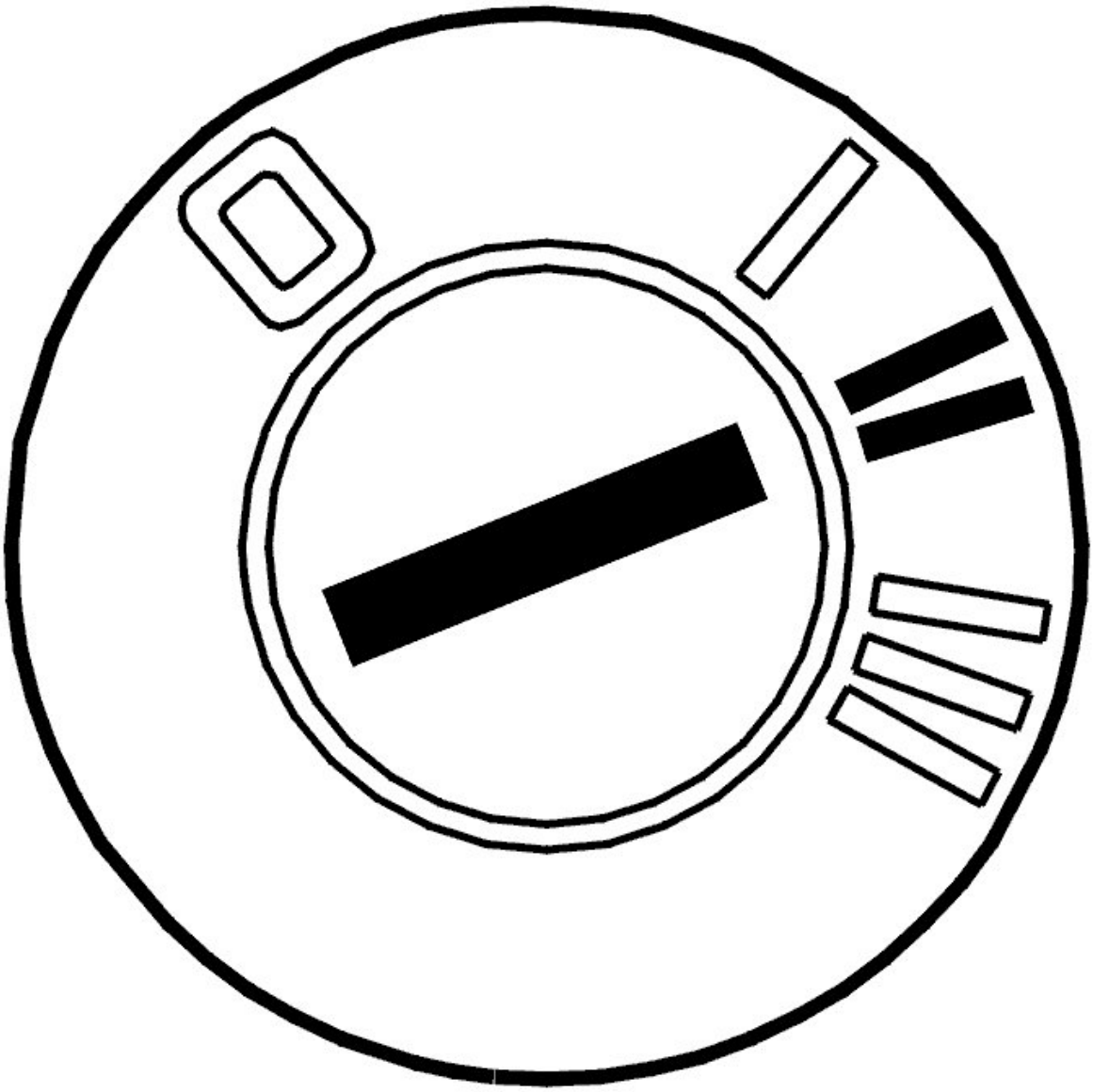
Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out calibration as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.

Continue - Verification

Faulty position



- Ignition on.

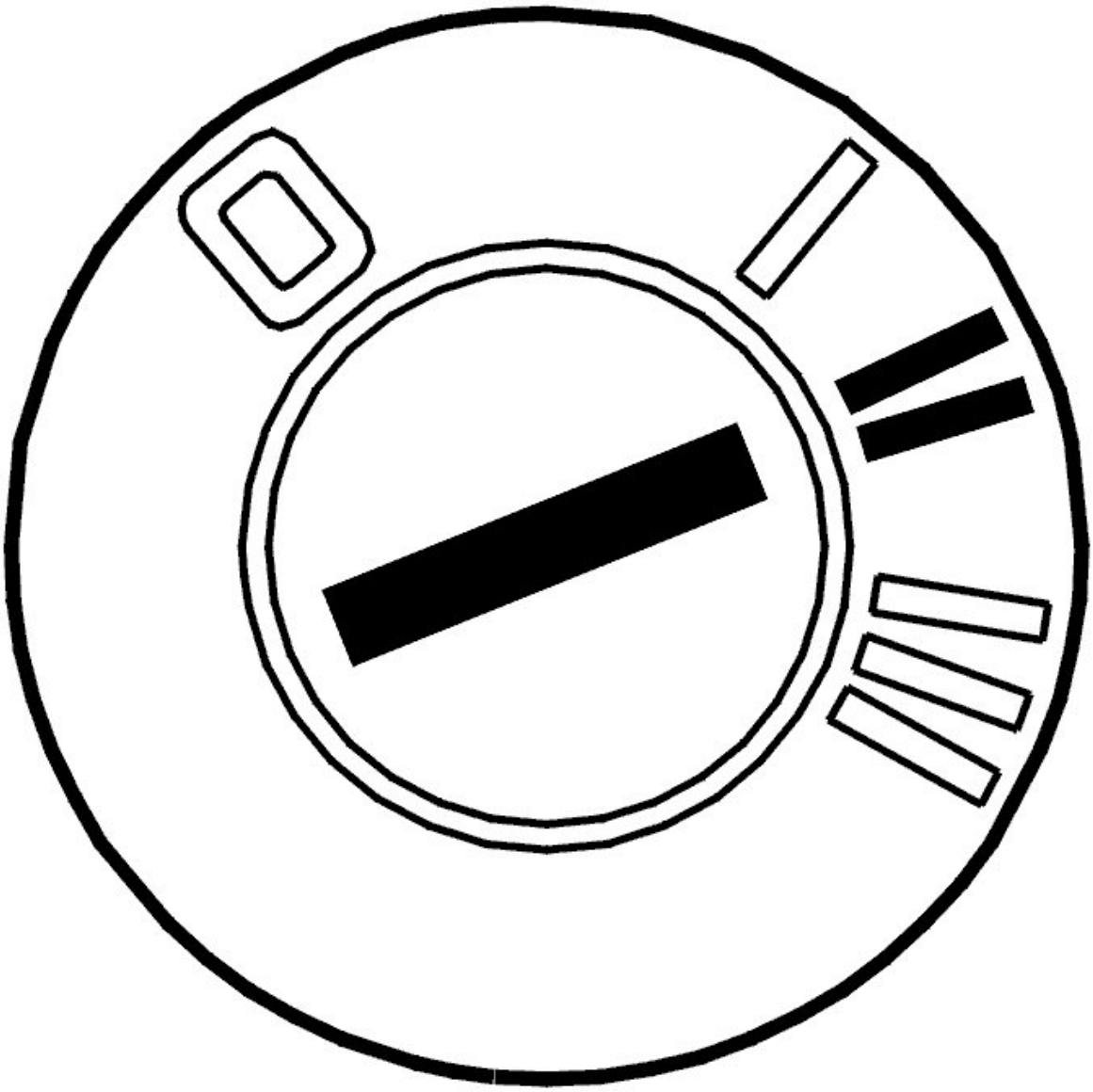
Read off the car structure week by clicking on the VCT2000 symbol.

1. Vehicles with structure week up to and incl. 200445, that is, year 2004 week 45.
2. Vehicles with structure week from and incl. 200446, that is, year 2004 week 46.

1 - Checking the component

2 - Checking the component

Checking the component



- Ignition on.

The climate control module (CCM) has registered that one or more damper motor modules (DMM) have an incorrect number of steps between the end positions during damper regulation.

Check which damper motor has an incorrect number of steps between the end positions by:

- Read out the actual range to identify the number of stages between the upper and lower end positions measured by the damper motor module (DMM).
- Read out the preset range to identify the number of stages between the upper and lower end positions stored by the damper motor module (DMM).
- Compare these values to check the tolerances.

The defective damper motor has been identified if the actual range of any of the damper motors is outside the preset range by more than the tolerance.

Check that the damper motor is correctly installed.

Check that the damper is not blocked and that is has not become stuck. Look, for example, for a screw, cable or foam rubber gasket.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Continue - Calibration

Calibration

Warning! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out calibration as follows:
- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.

Continue - Verification

Verification

Verification
VERIFICATION FAILED - Checking the component

VERIFIED - Fault Found

Checking the component

Click on the VCT2000 symbol.
There is an internal fault if the damper motor range shows 0 or 4095. Replace the Damper motor module (DMM).

Does the damper motor range show 0 or 4095?

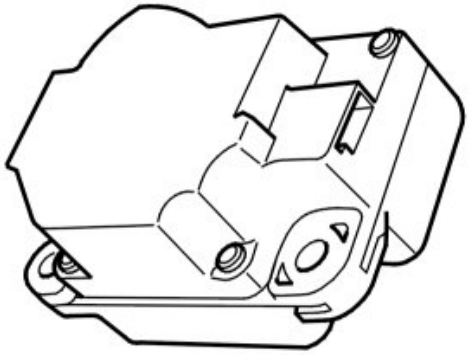
Yes - Replacing the control module

No - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0072

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) detects that the correct address for a damper motor module (DMM) cannot be programmed.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.
The diagnostic trouble code (DTC) can only be diagnosed in conjunction with activation of a diagnostic function.

Substitute value
- None.

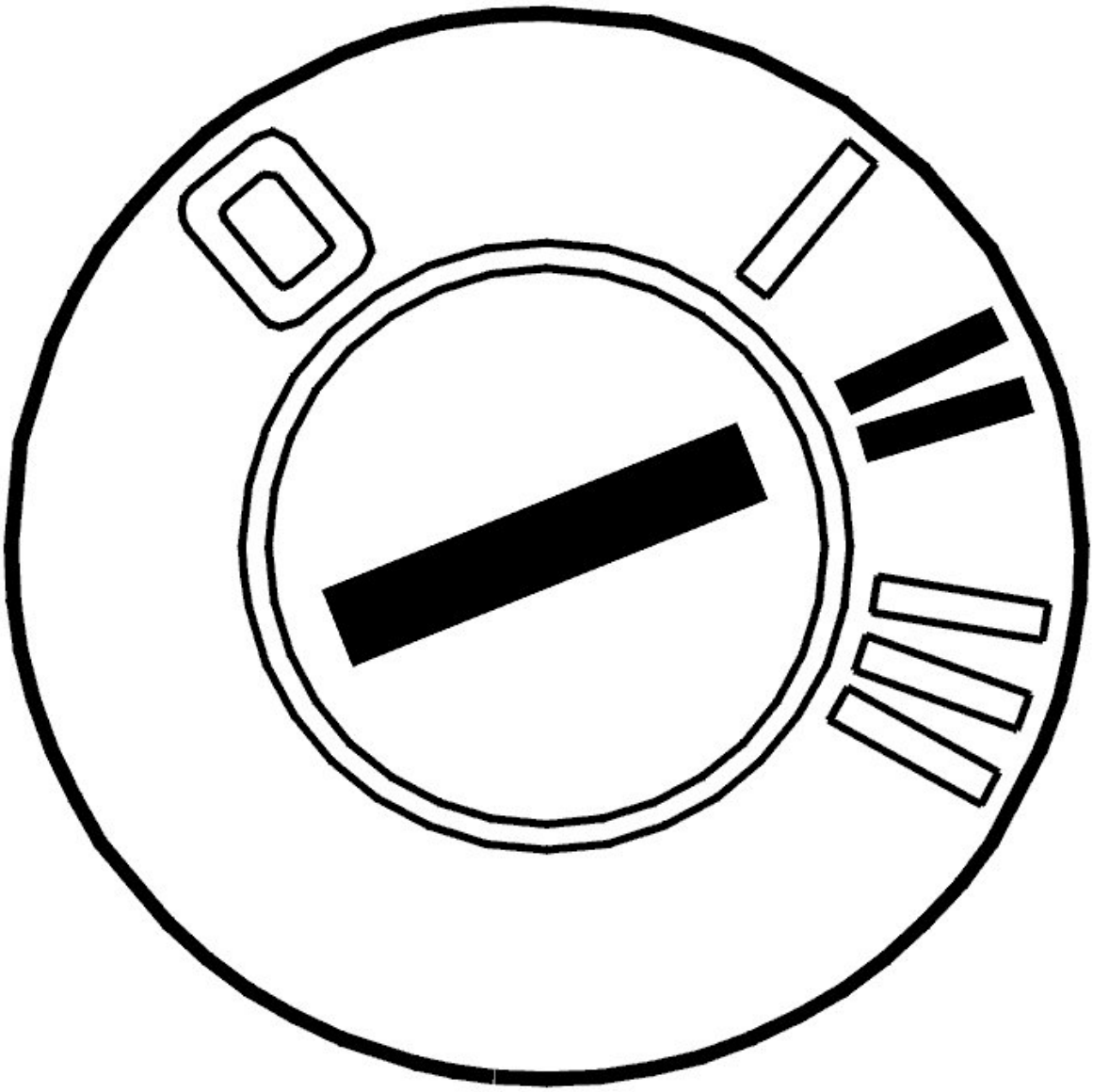
Possible source
- Incorrect damper motor module (DMM).

Fault symptom[s]
- Misting on the windows and/or door mirrors.
- Air flow problem.
- The passenger compartment temperature does not correspond to the set position.
- No recirculation.

Initiation Fault

Initiation fault

Checking the component



- Ignition on.

The climate control module (CCM) has registered that the identification of one or more damper motor modules (DMM) failed.
Remedy by making a new attempt to identify the damper motor.
Try replacing the damper motor module (DMM) if this does not work.
Click on the VCT2000 symbol to check which damper motor module (DMM) was not identified correctly.

Other information:

- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components
- Damper motor temperature, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor defroster, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor recirculation, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor air distribution, replacing See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

Select "Continue" to identify the damper motor.

Continue - Identifying the Damper Motor Module (DMM)

Identifying the Damper Motor Module (DMM)

Information

- The control module must be identified after replacing the Damper Motor Module (DMM).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Note! Identification must only be carried out when replacing the Damper Motor Module (DMM).

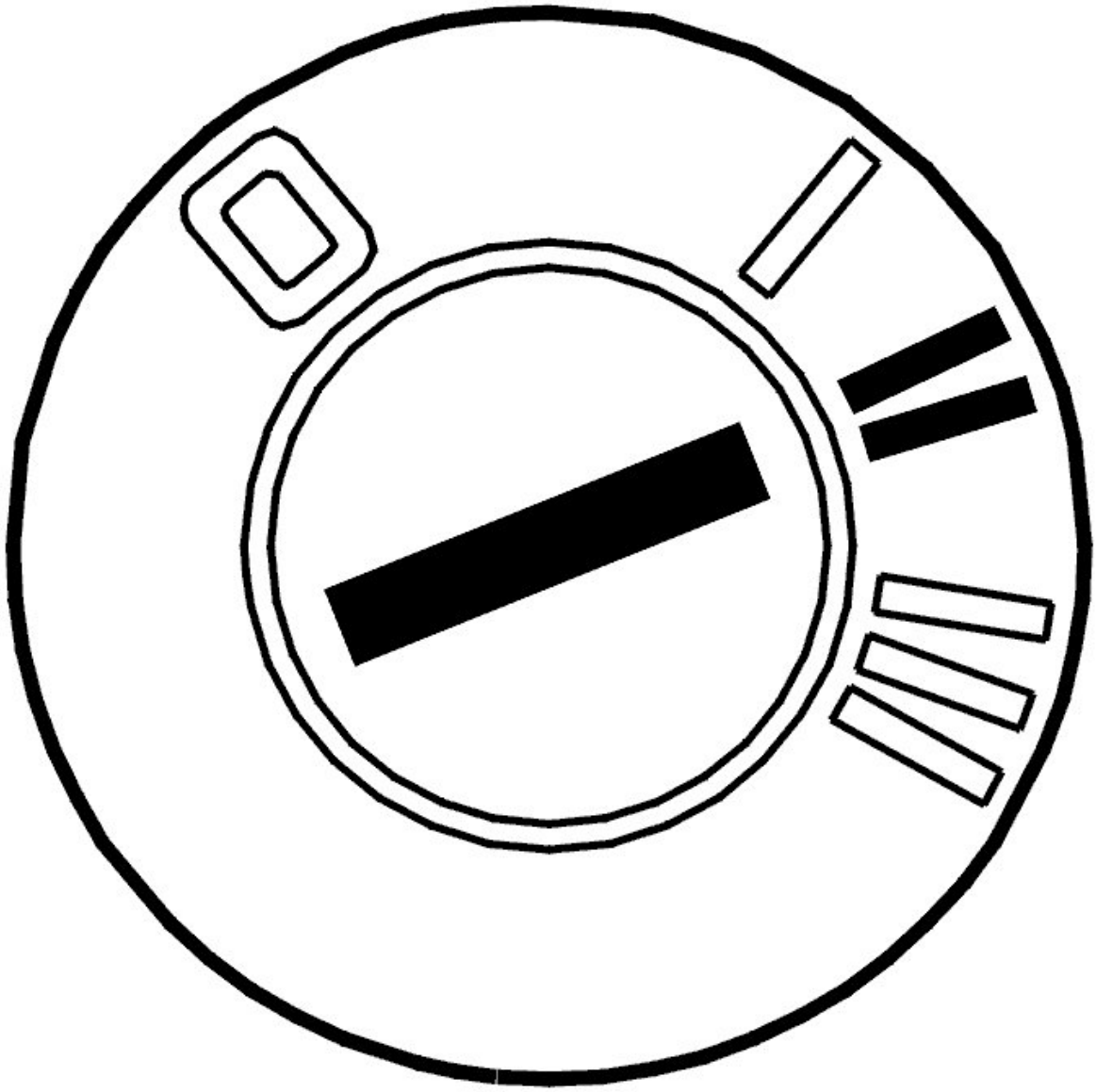
Have any damper motors been replaced?

Yes - Identifying the Damper Motor Module (DMM)

No - **DONE**

Identifying the Damper Motor Module (DMM)

Hint: When identifying damper motors, each damper motor must be run to its limit position. These operations can take up to 30 seconds. When identifying the damper motors it is important that a battery charger is connected.



- Ignition off
- Reinstall the connectors, components etc.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.

Carry out identification as follows:

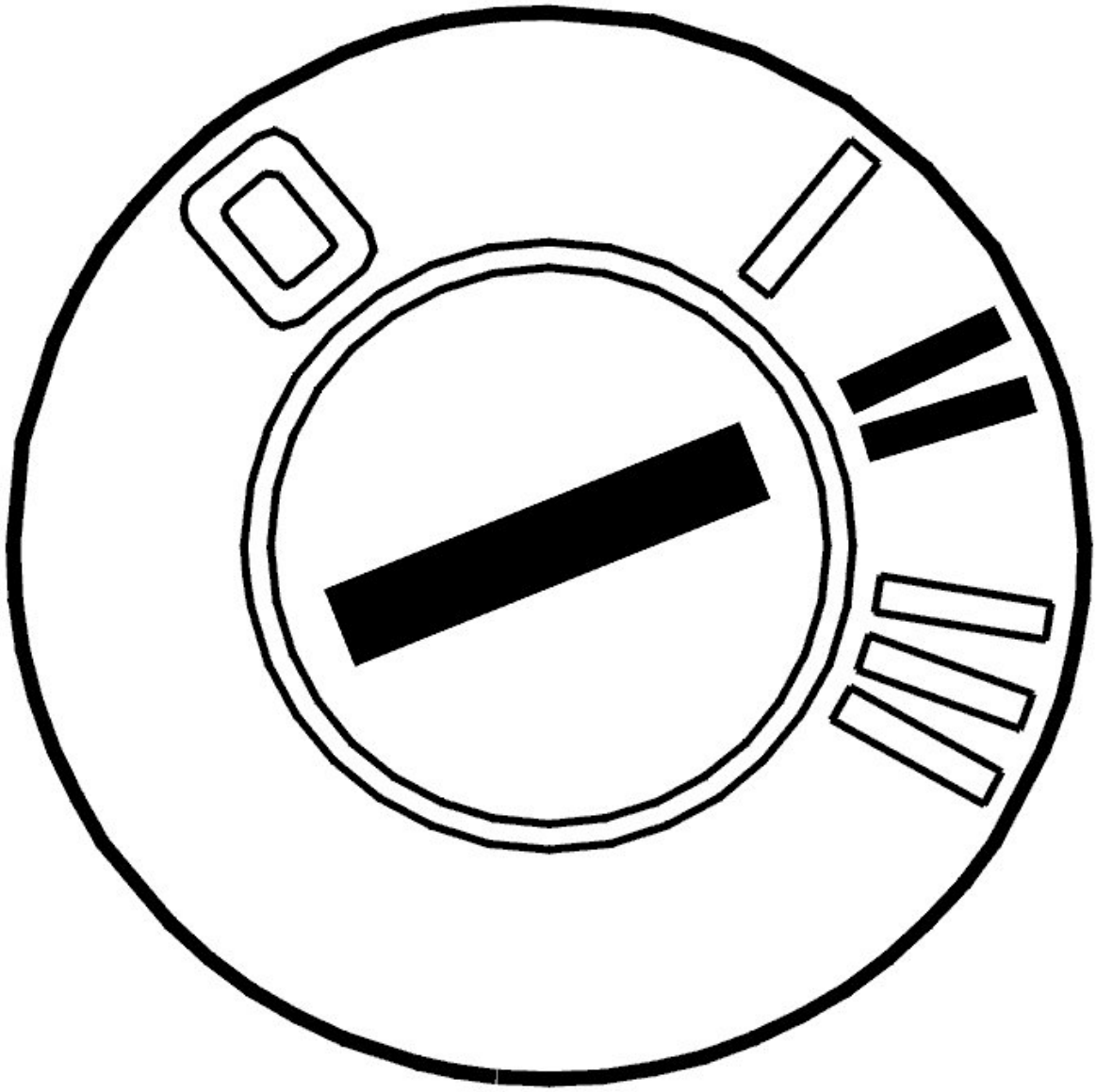
- Ignition on.
- Click on the VCT2000 symbol. Wait until identification has been carried out.
- Ignition off.

Continue - Calibrating the Climate Control Module (CCM)

Calibrating the Climate Control Module (CCM)

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Note! Climate Control Module (CCM) and damper motors can be affected by the temperature. The vehicle should have normal room temperature when performing this service.



Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

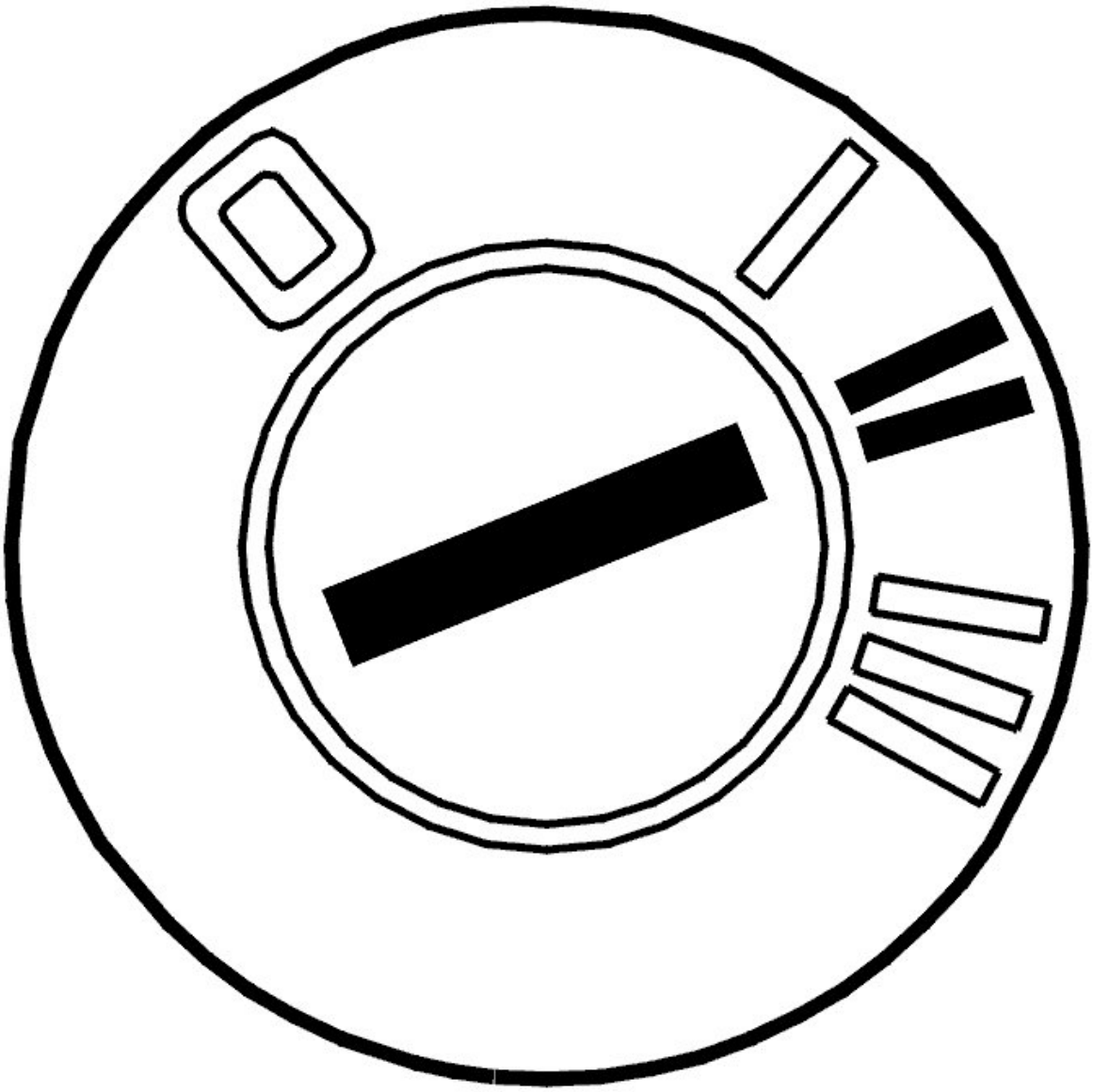
DONE - Verification

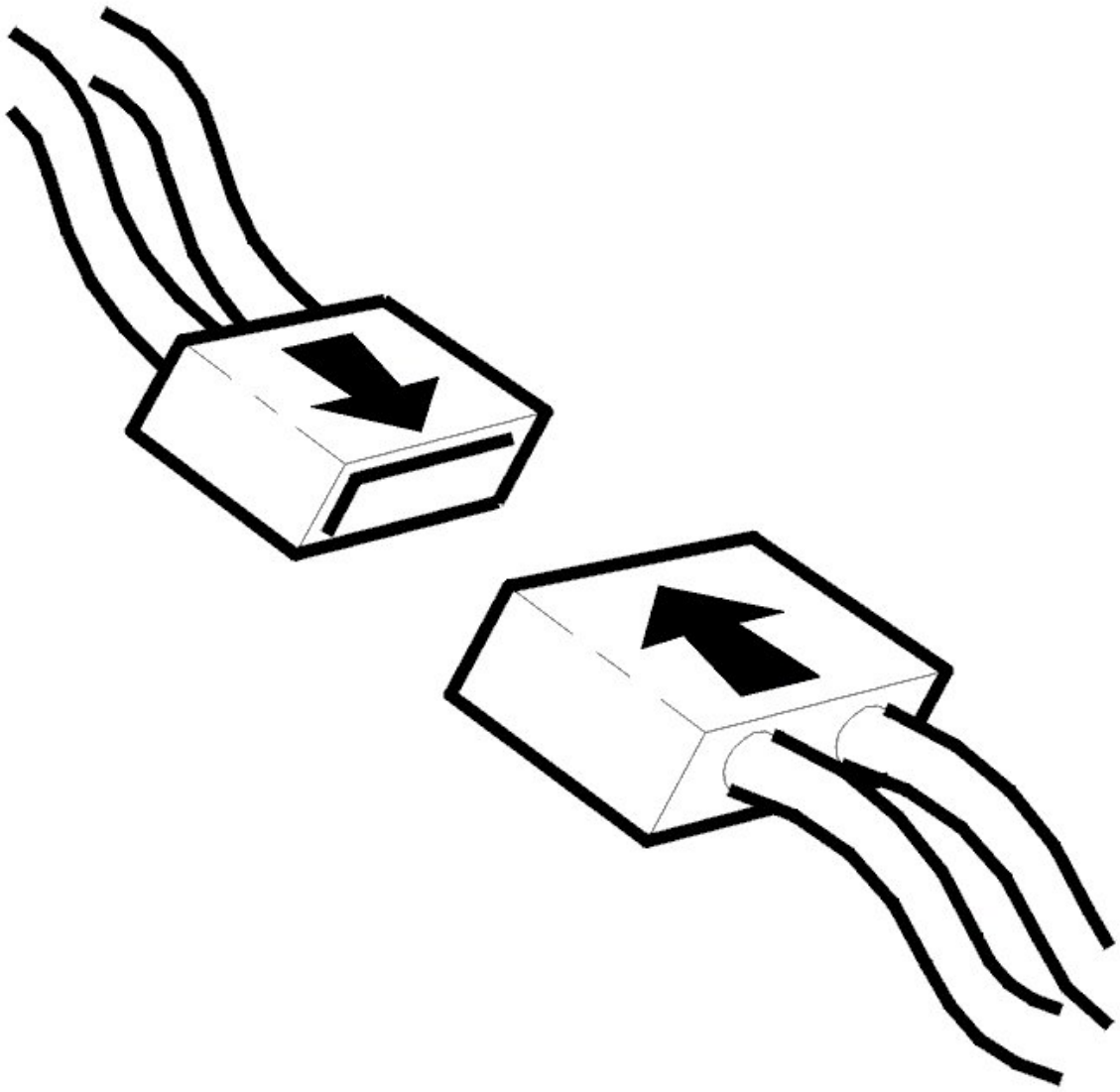
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant diagnostic trouble code (DTC) has switched status from permanent to intermittent fault.
Check also that diagnostic trouble code (DTC) CCM-0070, CCM-0071 CCM-0072 or CCM-0073 has not been stored during identification of the damper motors.
These diagnostic trouble codes (DTCs) can only be stored when identifying damper motors. They mean that the identification has failed for some reason.
Remedy by correctly identifying the damper motor. Fault-trace according to the relevant information.

Has the status of the diagnostic trouble code (DTC) changed?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

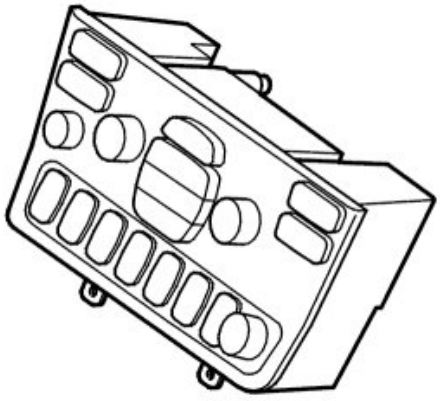
FAULT FOUND - Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0073

Condition



If the climate control module (CCM) detects that the calibration has not been performed correctly then the diagnostic trouble code (DTC) is generated.
The diagnostic trouble code (DTC) can be diagnosed at ignition position I and II.

The diagnostic trouble code (DTC) can only be diagnosed in conjunction with activation of a diagnostic function.

Substitute value
- None.

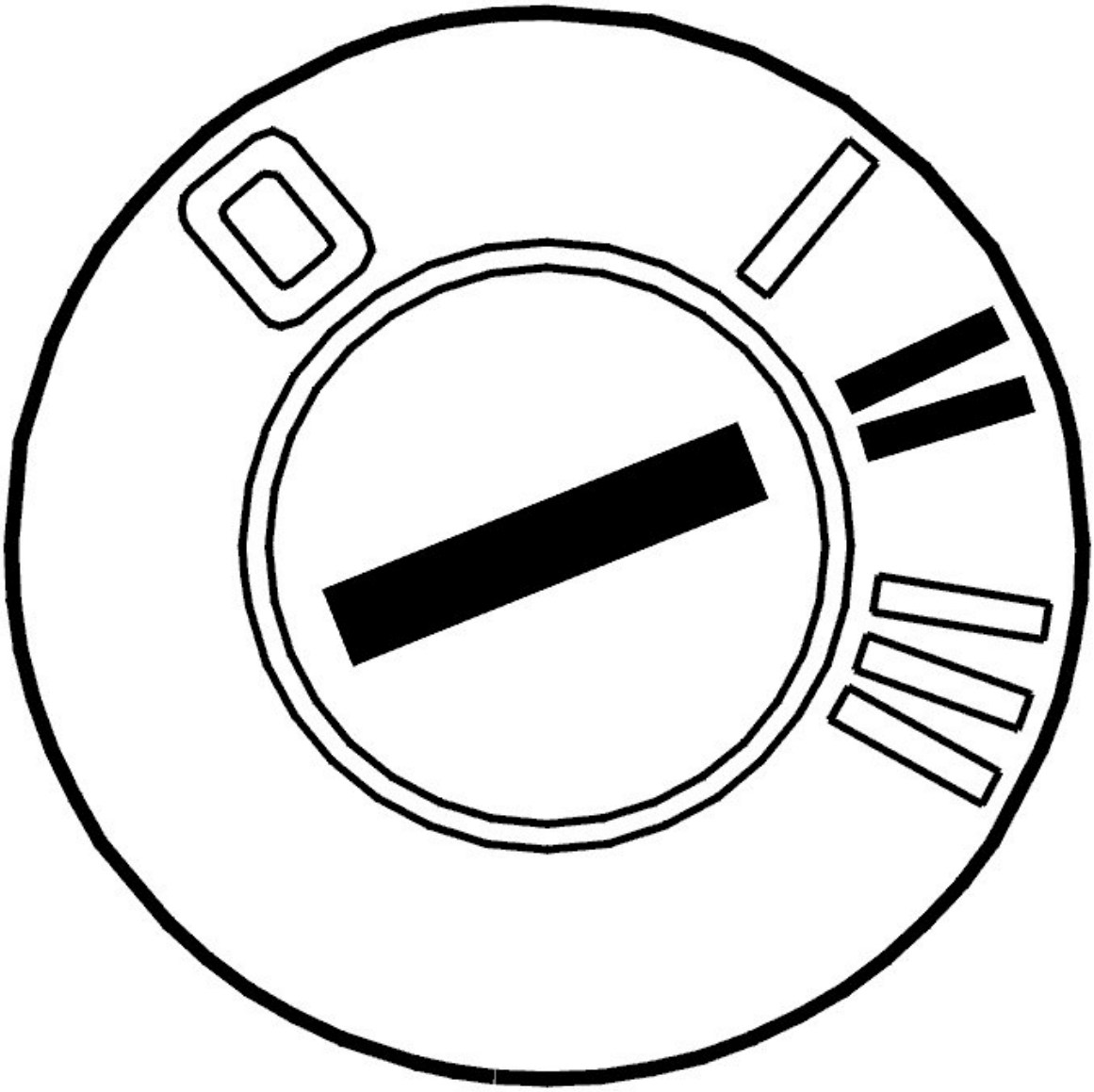
Possible source
- Automatic calibration has failed.
- Auto calibration has not been carried out.

Fault symptom[s]
- Mist on rear window and door mirrors
- Front seat heating does not operate
- No function on air distribution knob
- Air flow problem
- Temperature control/Uneven temperature

Calibration Not Done

Calibration not done

Calibrating the Climate Control Module (CCM)



The climate control module (CCM) has detected that the calibration has not been performed correctly. Remedy by making a new attempt to calibrate the climate control system.

Caution! When activating this function, calibration of the Climate Control Module (CCM) starts. After carrying out calibration read off of the diagnostic trouble codes (DTCs) starts. To ensure that diagnostics for the Climate Control Module (CCM) have been carried out, delay for 30 seconds before reading out diagnostic trouble codes (DTCs) after calibration.

Carry out calibration as follows:

- Ignition on.
- Click on the VCT2000 symbol. Wait until calibration has been carried out and diagnostic trouble codes (DTCs) read out.
- Ignition off.

This function controls the components that communicate with the Climate Control Module (CCM) via LIN bus 1 and LIN bus 2. In the event of a fault in any of the LIN buses, diagnostic trouble codes (DTCs) CCM-0070 to CCM-0071 will be stored depending on the fault. These diagnostic trouble codes (DTCs) can only be stored in conjunction with this diagnostic function.
If any of these diagnostic trouble codes (DTCs) recur, recalibrate to check if the problem was overcome. If the diagnostic trouble code (DTC) recurs, fault-trace the relevant diagnostic trouble code (DTC).

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0074

Condition

The climate control module (CCM) communicates with the damper motor module (DMM) defroster via the LIN bus 2.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- Damper motor module (DMM) defroster does not go to desired position.

Substitute value

- None.

Possible source

- Internal fault in Damper motor module (DMM) defroster.

Fault symptom[s]

- Defog/defrost/Windshield defog/defrost/Slow to clear/uneven clearing
- Defog/defrost/Windshield defog/defrost/Does not work

L.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

Remedy as necessary.

Other information

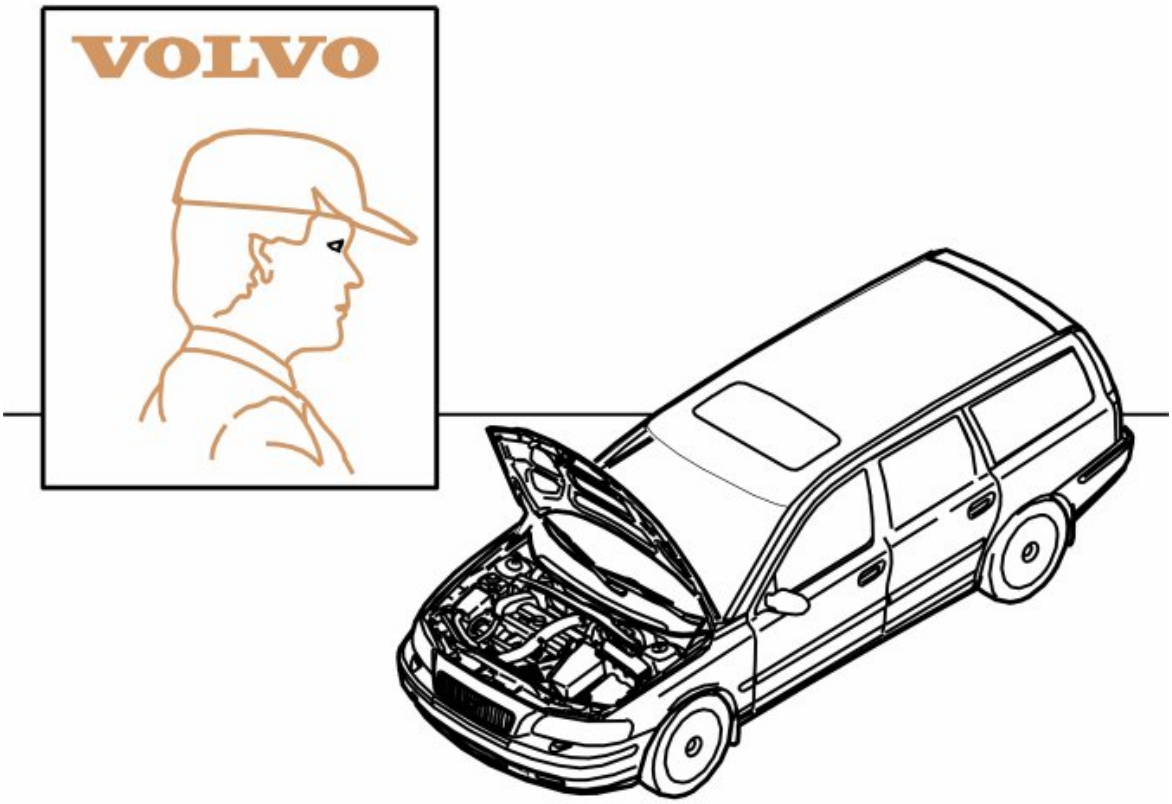
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal

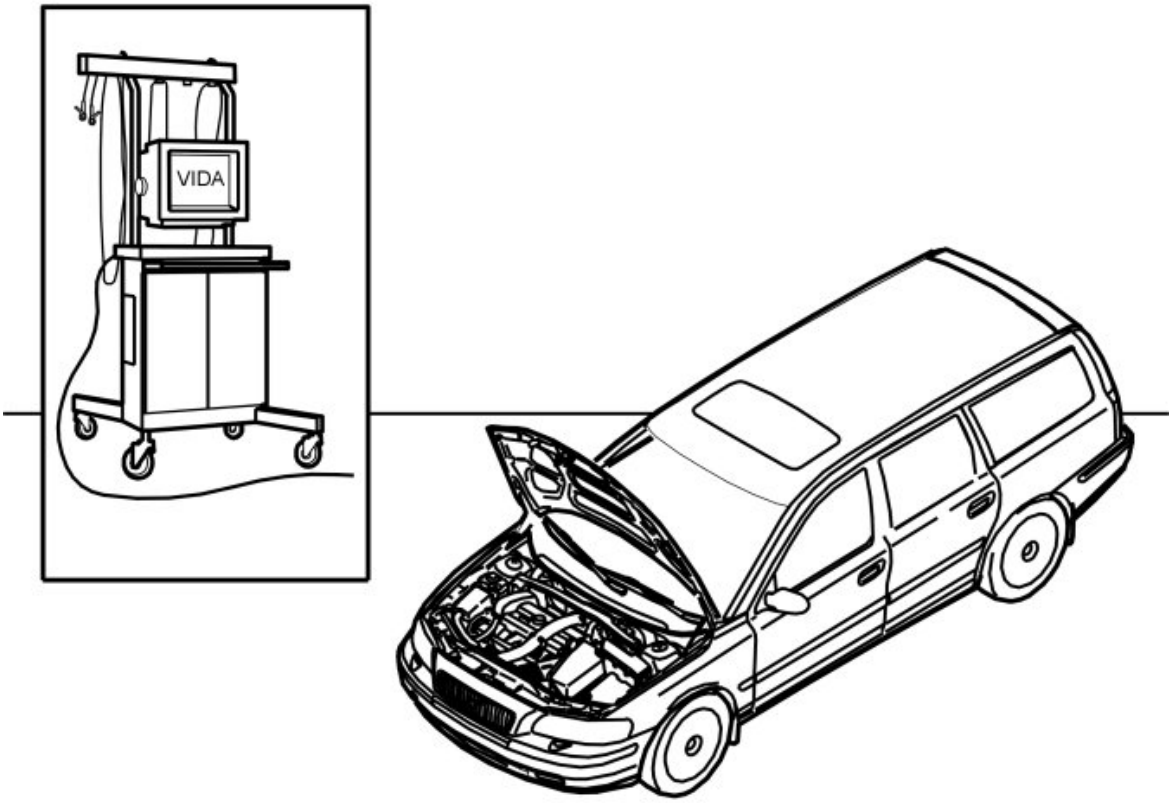
Specification, Climate Control Module (CCM)

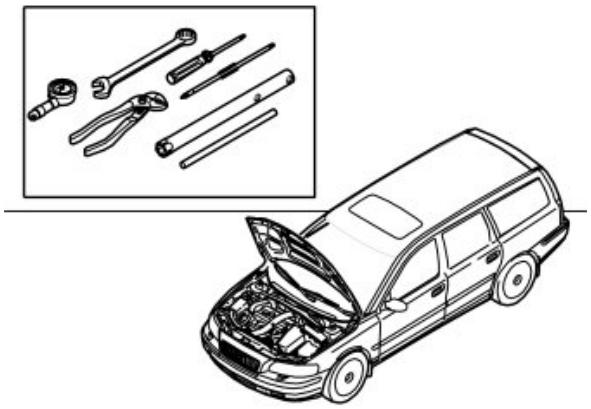
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

R.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

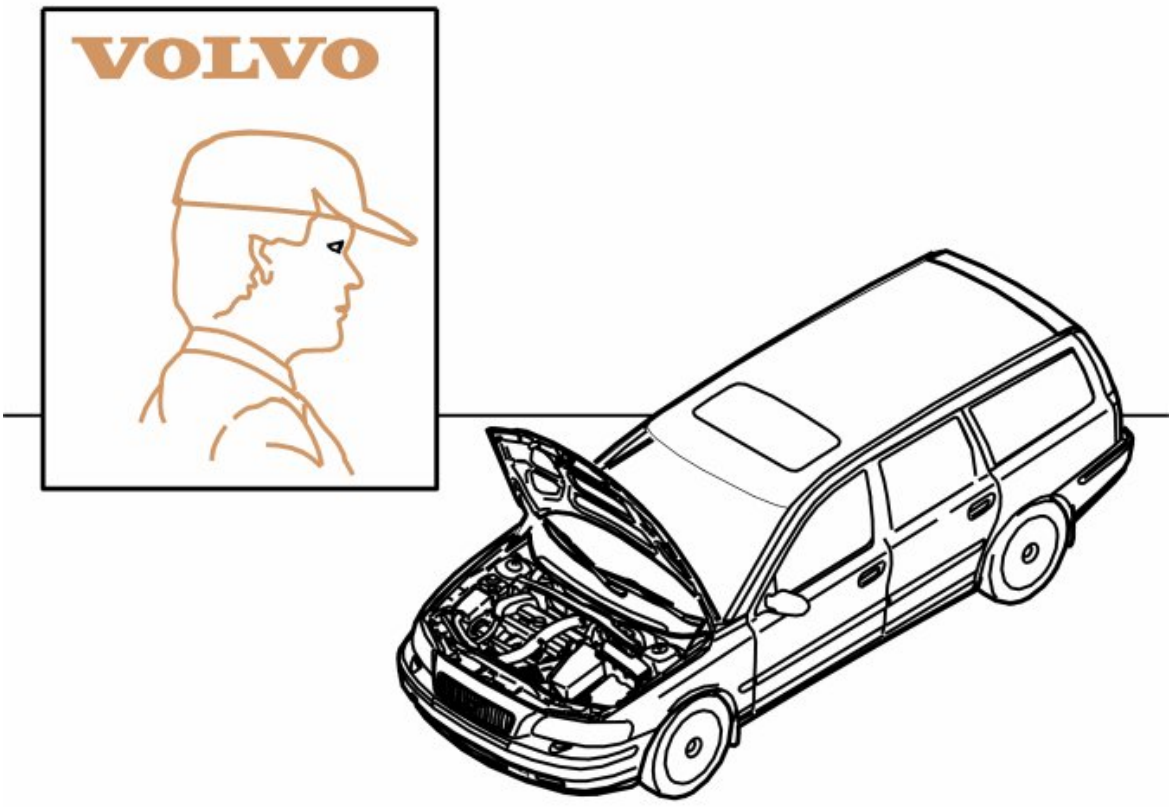
Remedy as necessary.

Other information

- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair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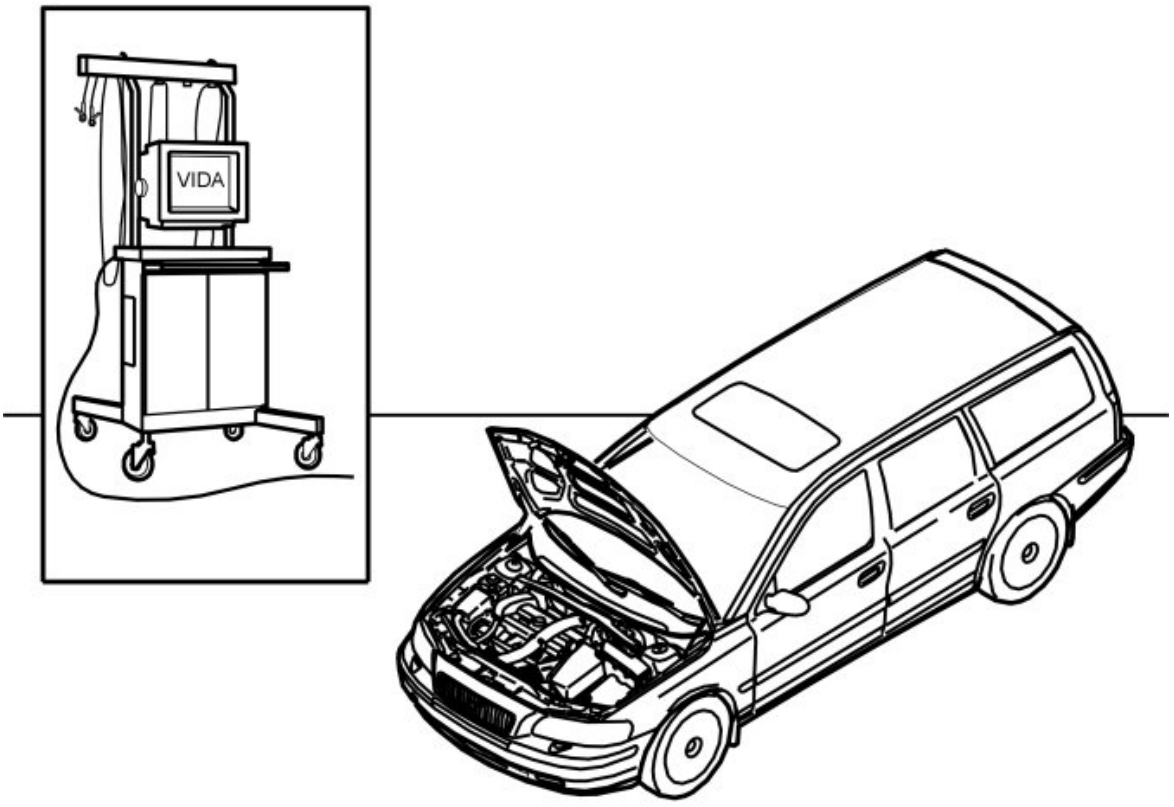
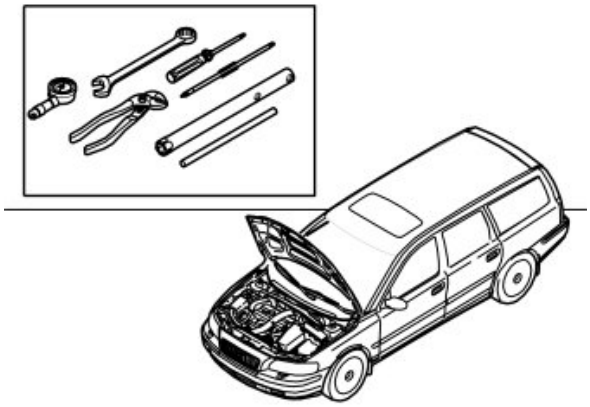

VIDA



Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0075

Condition

Climate control module (CCM) communicates with Damper motor module (DMM) recirculation via LIN-bus 1 if the vehicle is right-hand drive and via LIN-bus 2 if the vehicle is left-hand drive.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- Damper motor module (DMM) recirculation does not go to desired position.

Substitute value

- None.

Possible source

- Internal fault in the Damper motor module (DMM) recirculation.

Fault symptom[s]

- Climate control system/Unusual odor

L.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

Remedy as necessary.

Other information

- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
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- Damper motor module (DMM) air distribution, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
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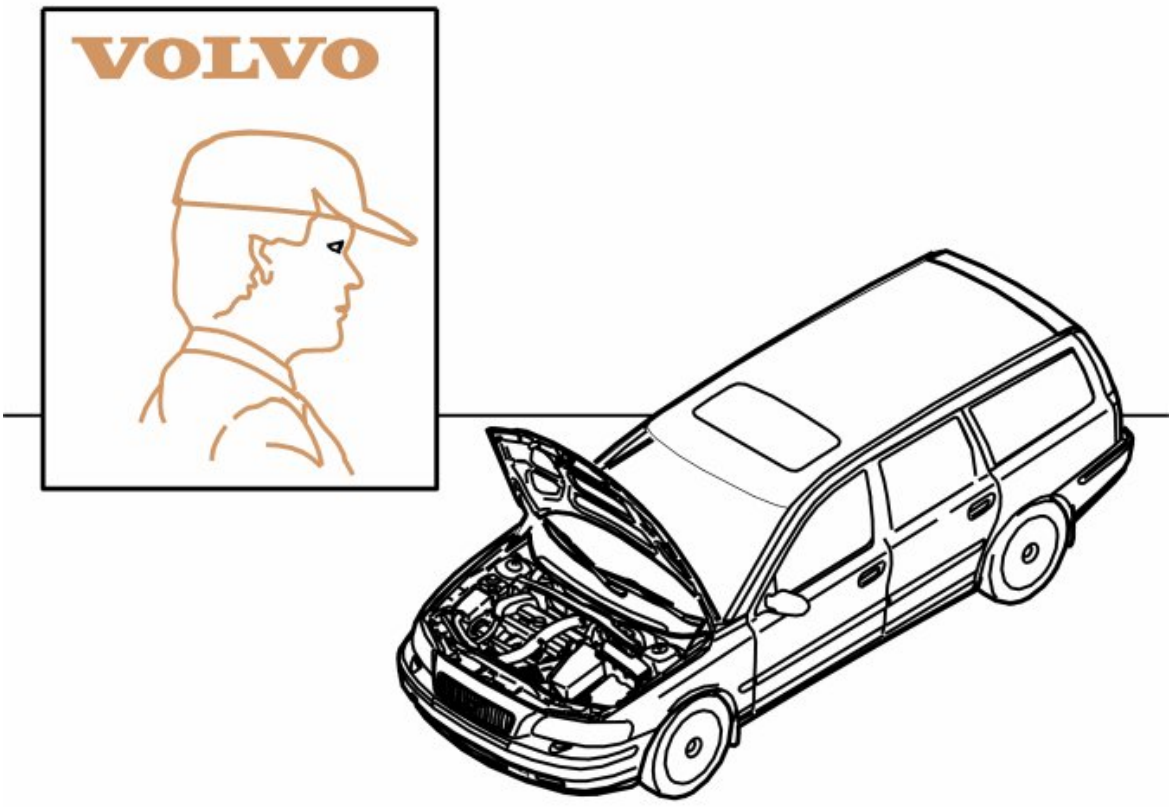
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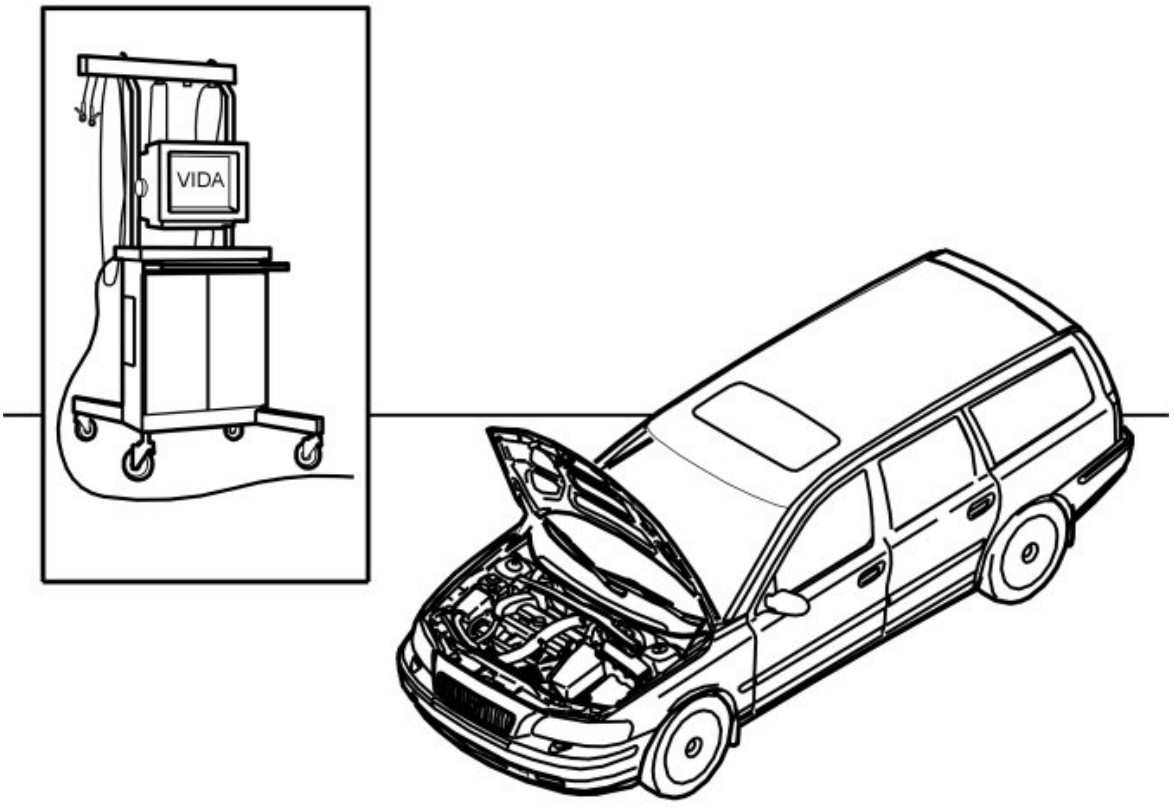
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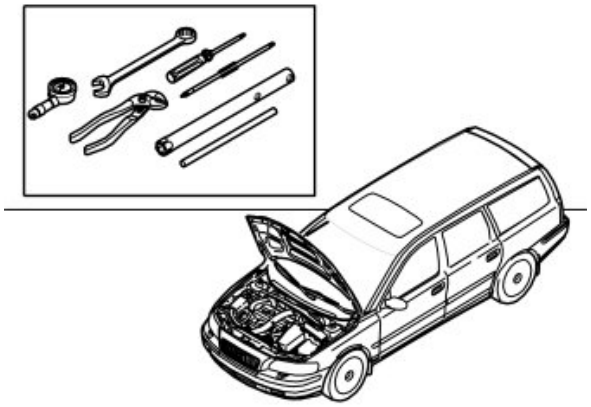


Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

R.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

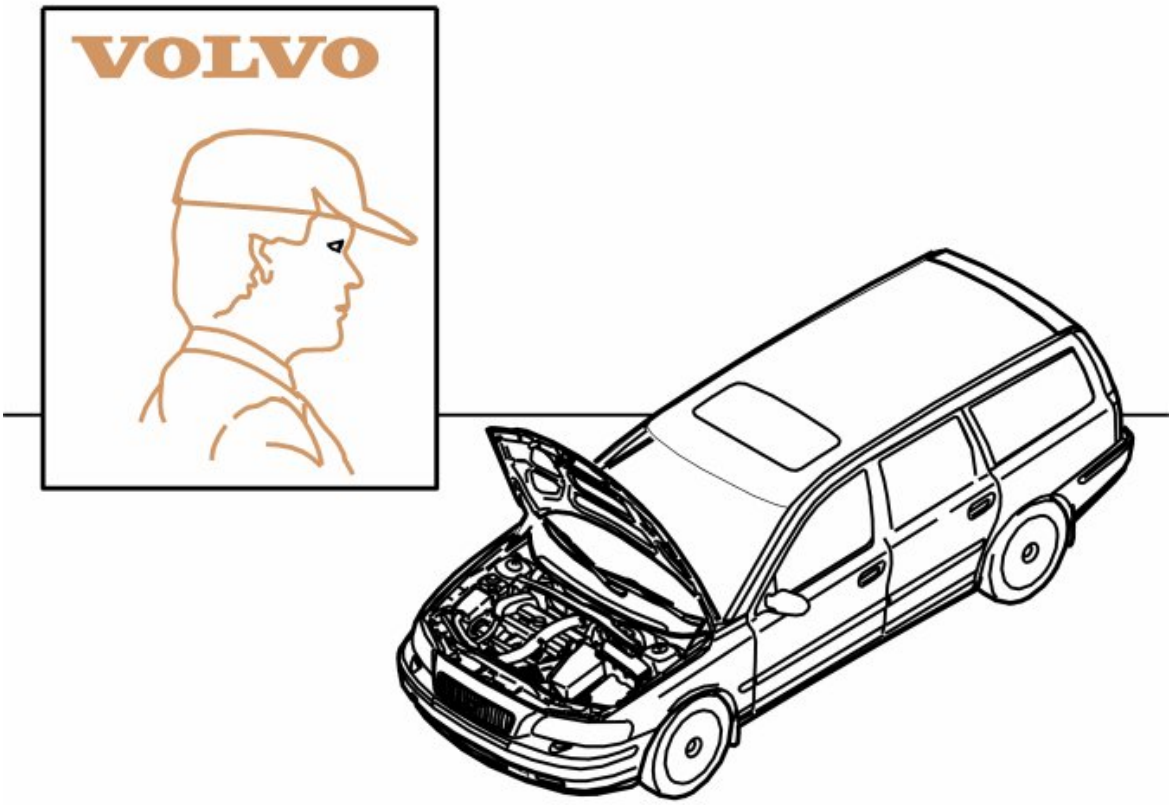
Remedy as necessary.

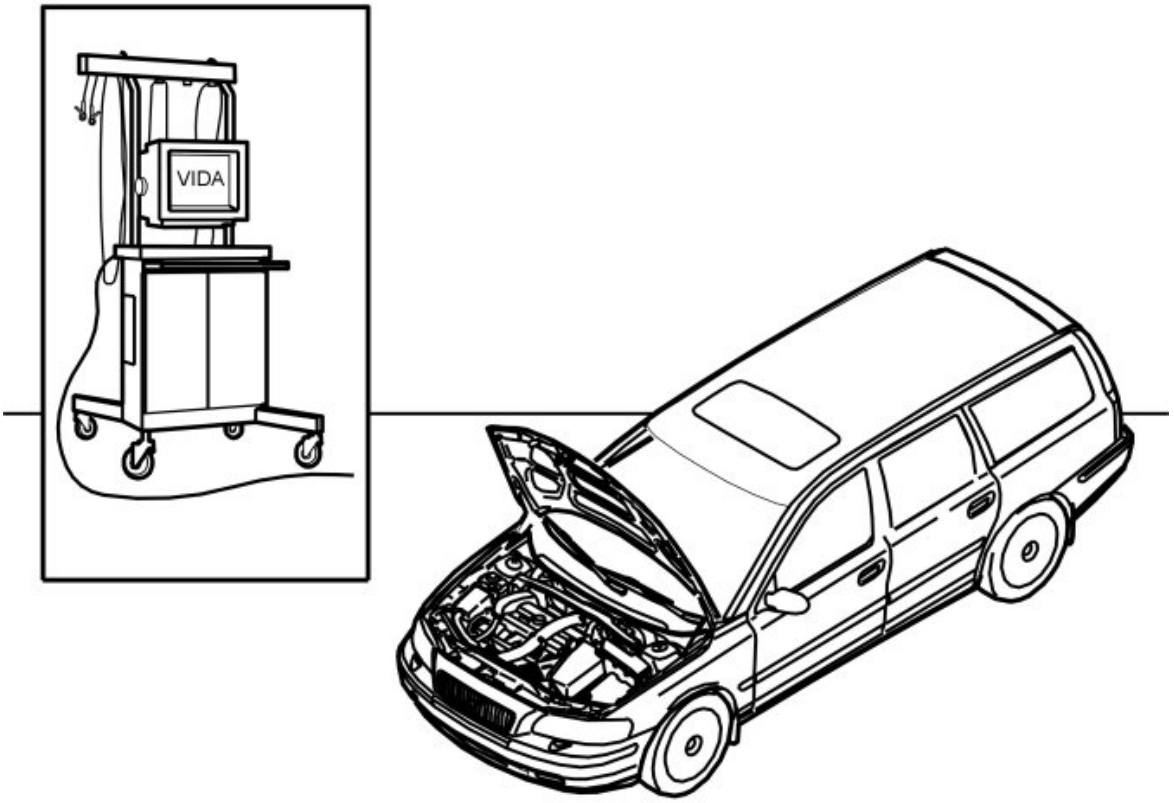
Other information

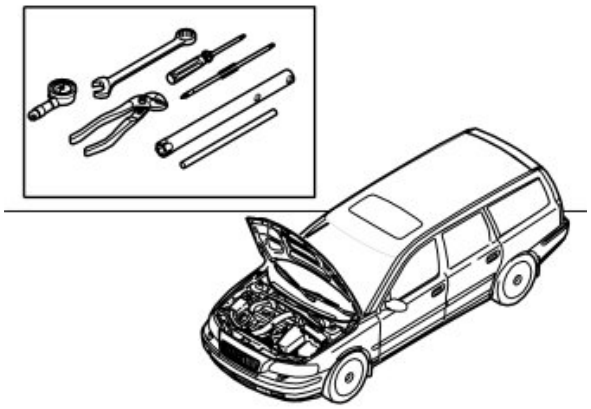
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0076

Condition

Climate control module (CCM) communicates with Damper motor module (DMM) temperature left via LIN-bus 1.
The diagnostic trouble code (DTC) is stored if the control module detects that:
- Damper motor module (DMM) temperature left does not go to desired value.

Substitute value
- None.

Possible source
- Internal fault in Damper motor module (DMM) temperature left.

Fault symptom[s]
- Temperature control/Uneven temperature

L.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

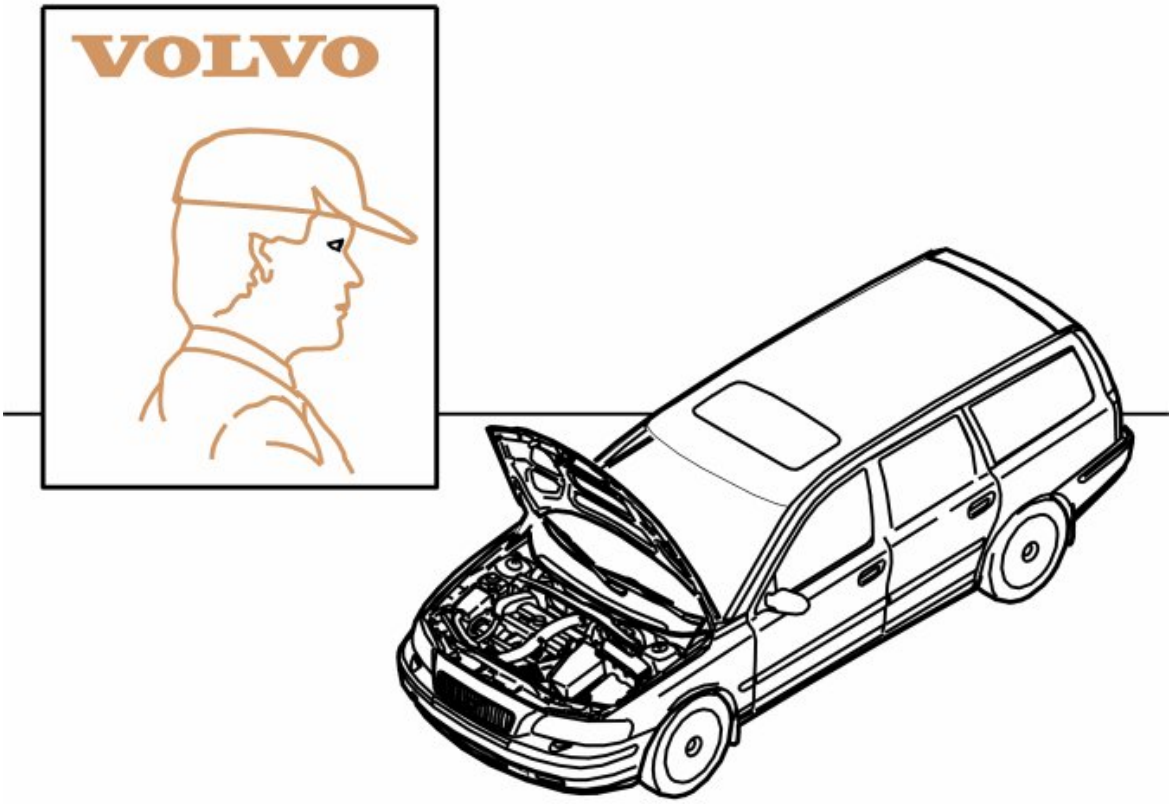
Note! More information is available in Design and function.

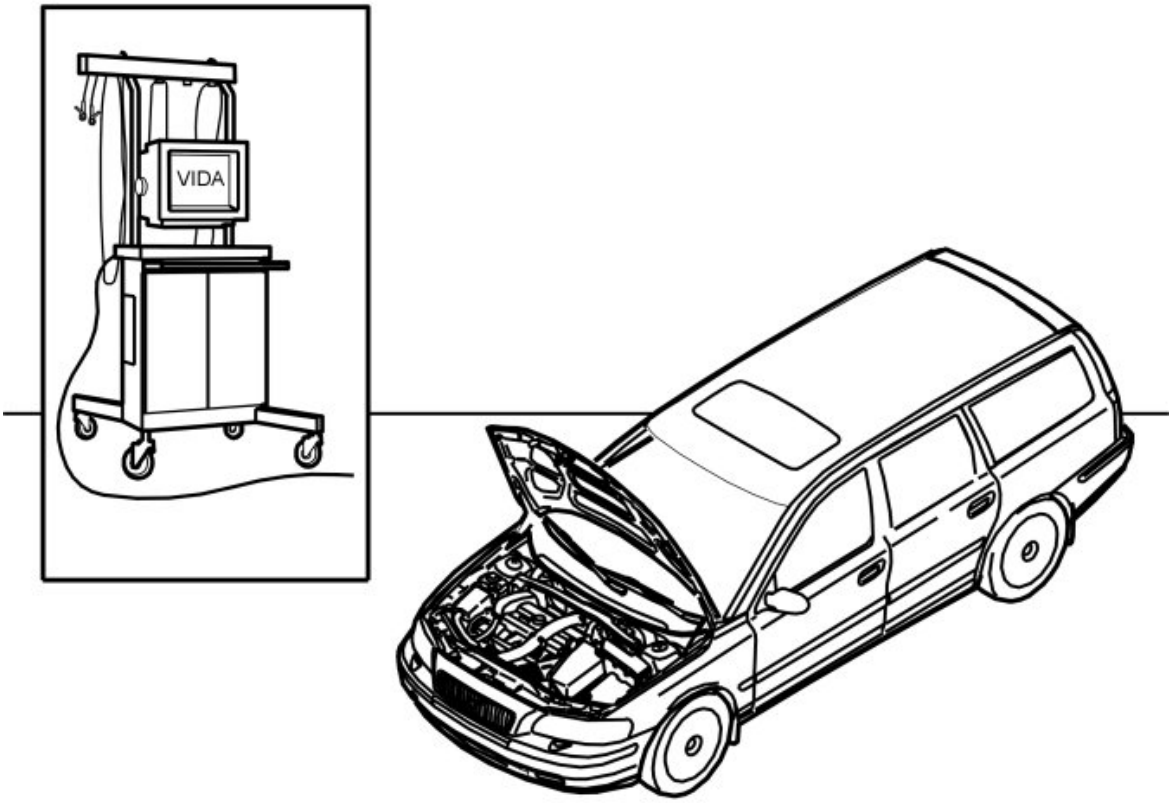
Remedy as necessary.

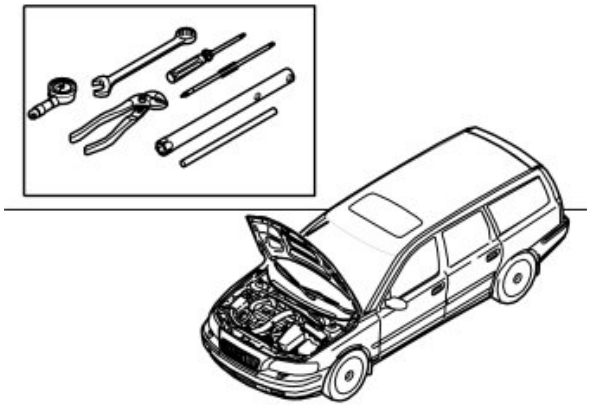
Other information
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair
- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

R.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

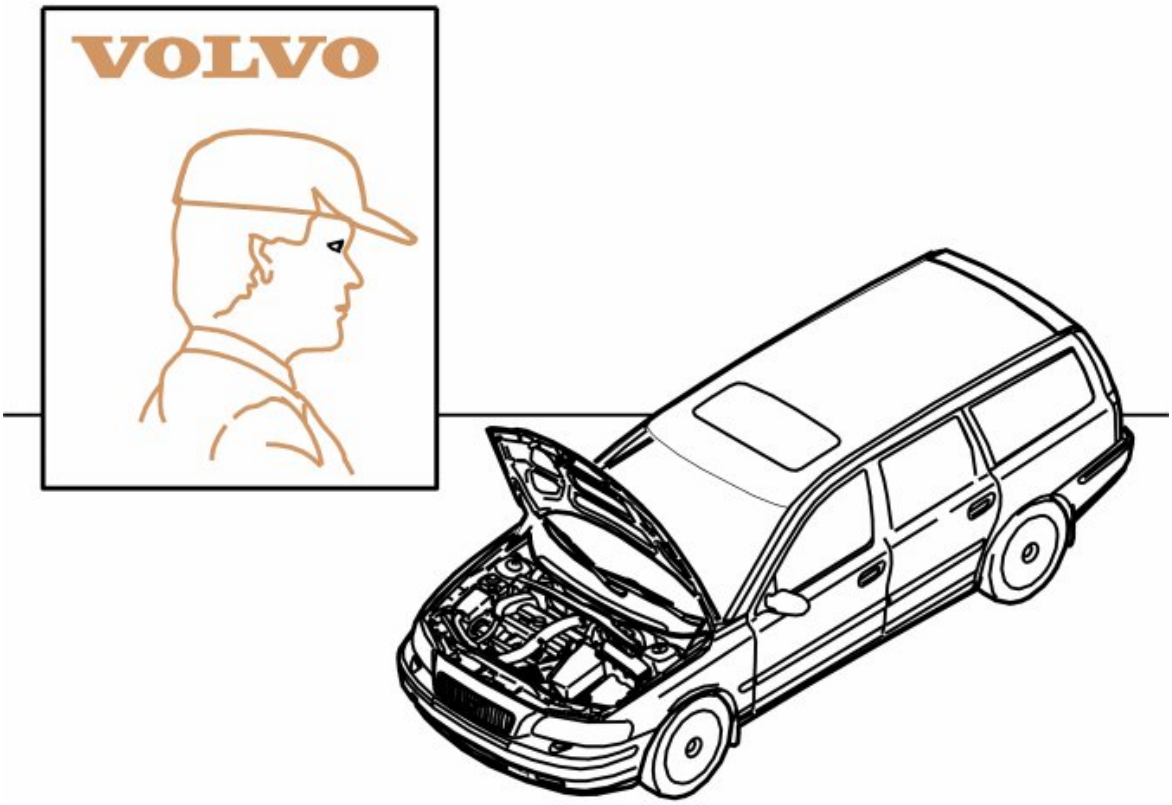
Remedy as necessary.

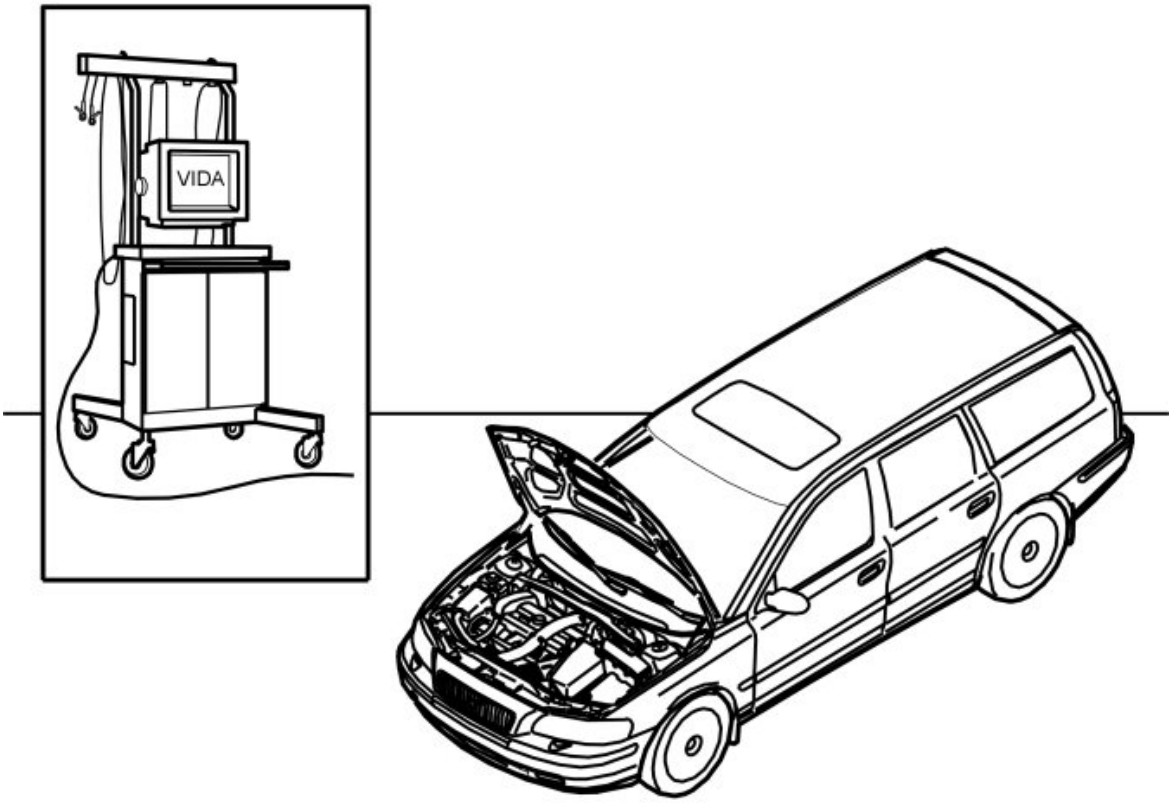
Other information

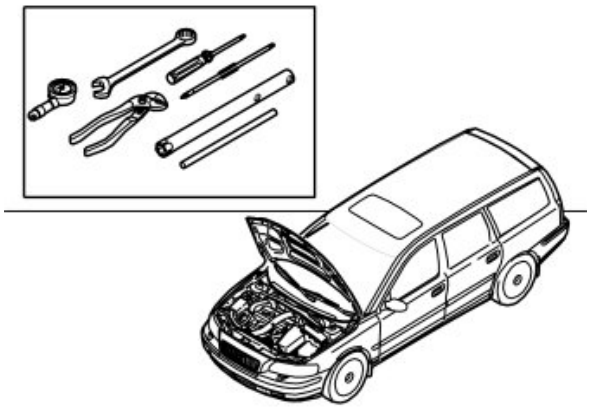
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0077

Condition

Climate control module (CCM) communicates with Damper motor module (DMM) temperature right via LIN-bus 2.
The diagnostic trouble code (DTC) is stored if the control module detects that:
- Damper motor module (DMM) temperature right does not go to desired position.

Substitute value
- None.

Possible source
- Internal fault in Damper motor module (DMM) temperature right.

Fault symptom[s]
- Temperature control/Uneven temperature

L.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

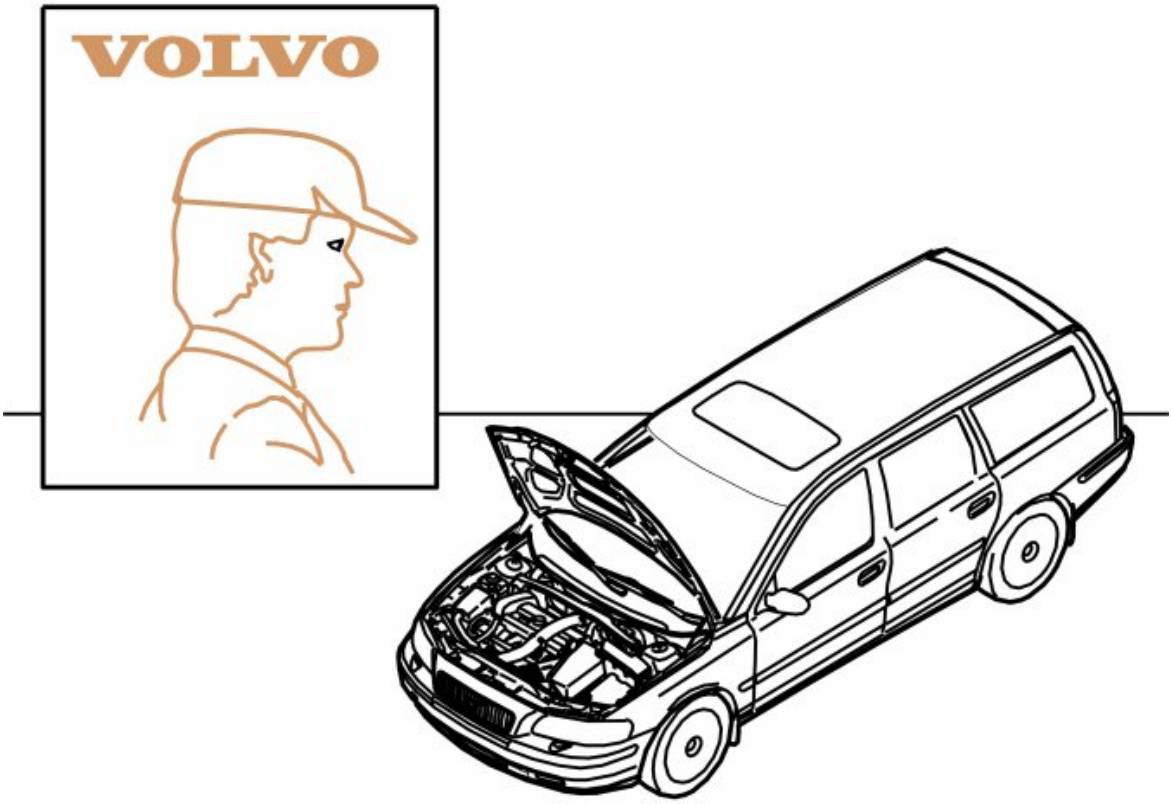
Note! More information is available in Design and function.

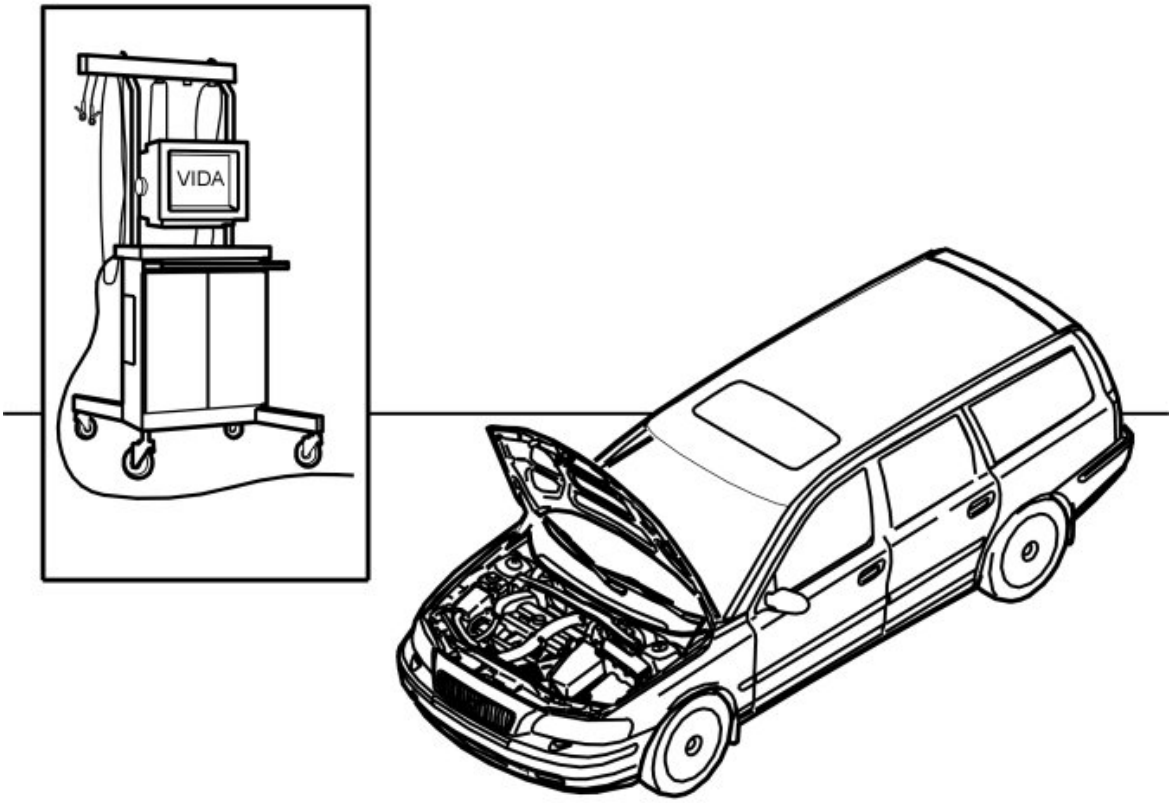
Remedy as necessary.

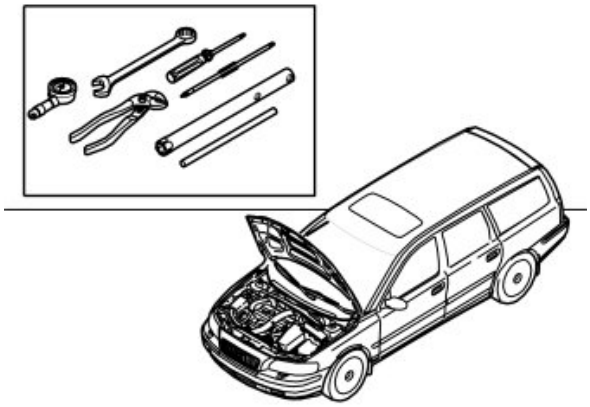
Other information
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair
- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

R.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

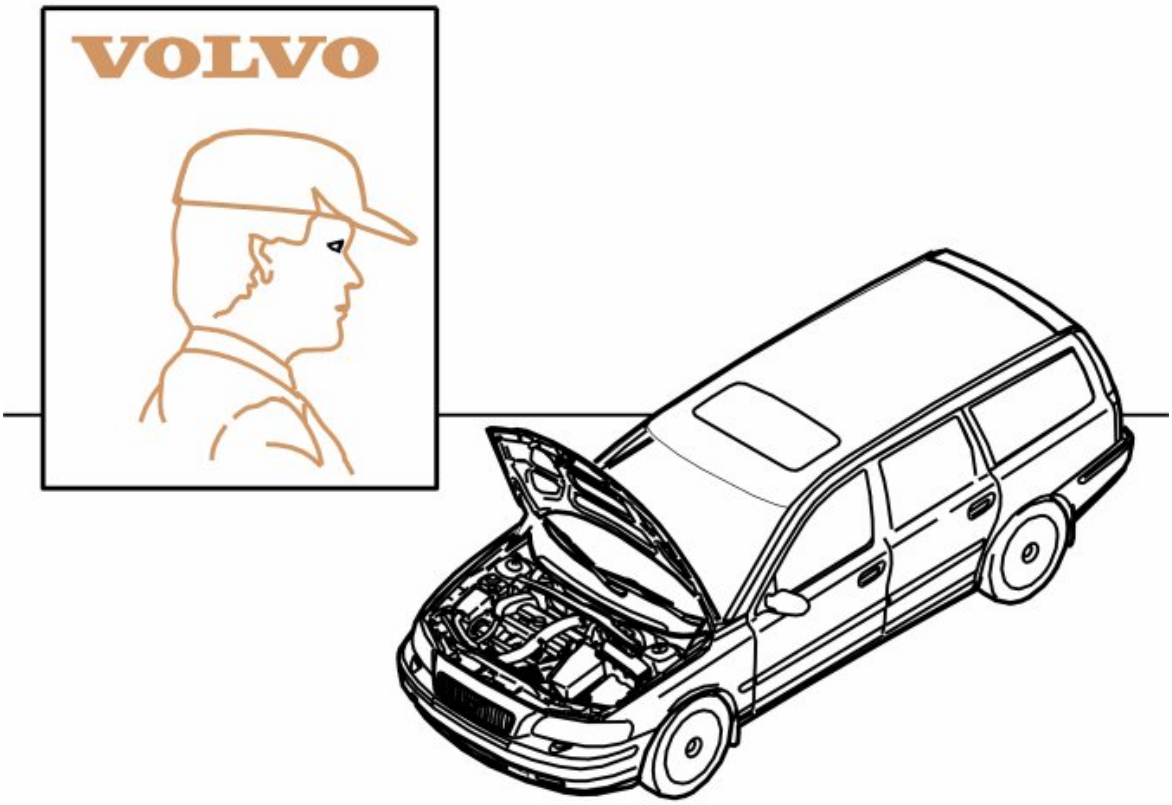
Remedy as necessary.

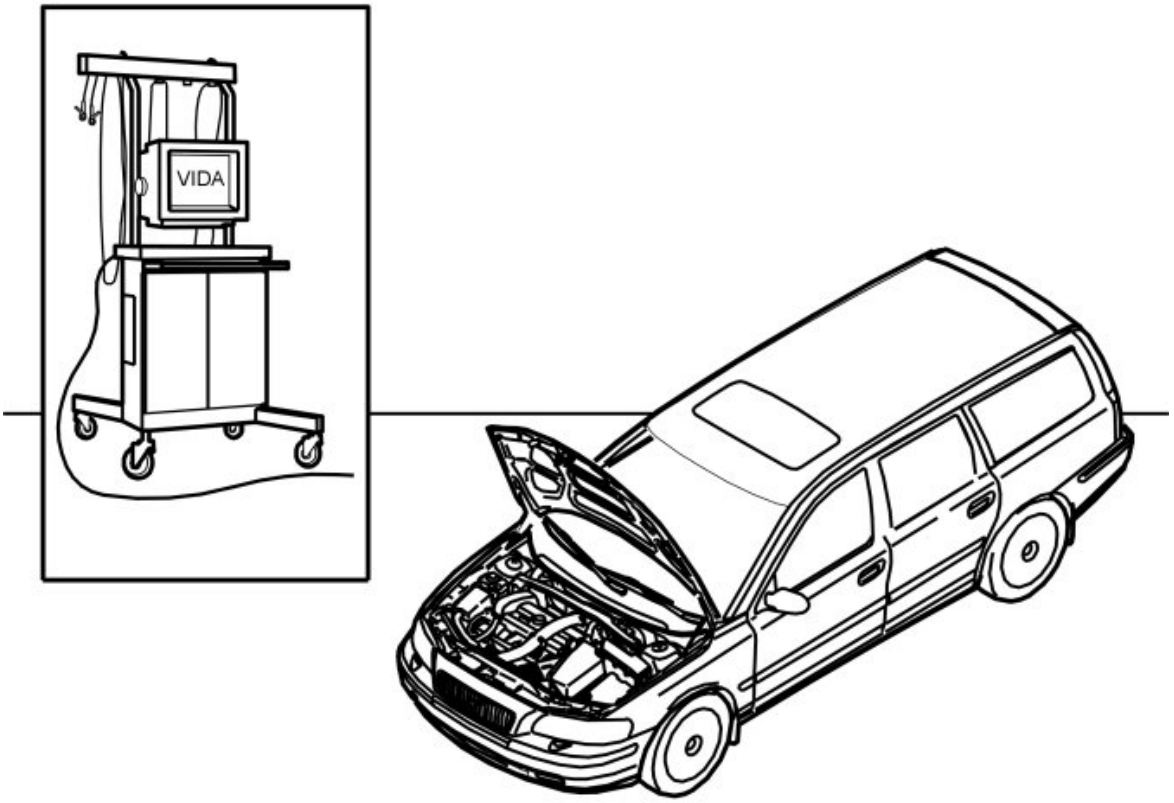
Other information

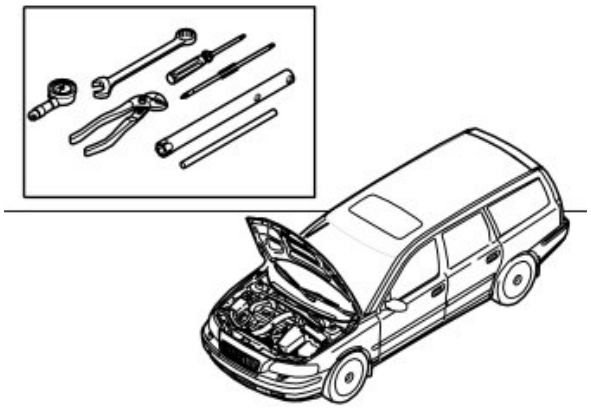
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0078

Condition

The climate control module (CCM) communicates with the damper motor module (DMM) air distribution via LIN-bus 1.
The diagnostic trouble code (DTC) is stored if the control module detects that:
- Damper motor module (DMM) air distribution does not go to desired position.

Substitute value
- None.

Possible source
- Internal fault in the Damper motor module (DMM) air distribution.

Fault symptom[s]
- Blower fan/Does not work

L.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

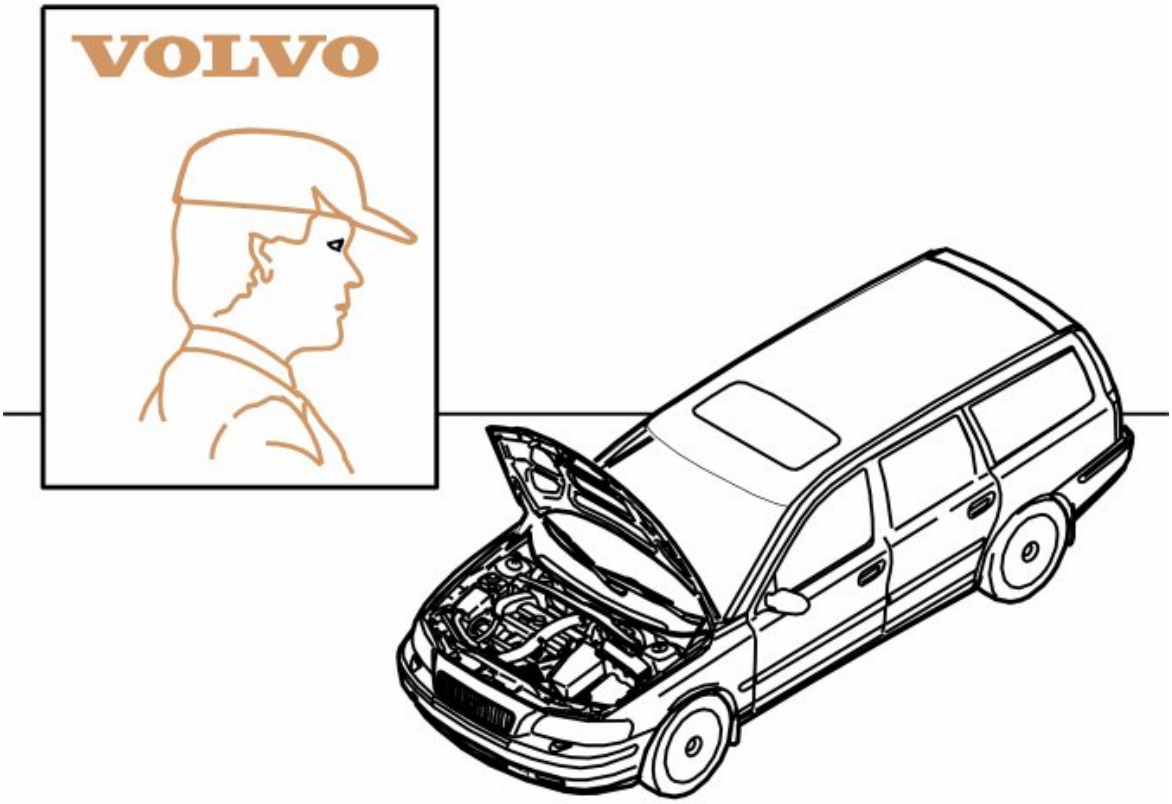
Note! More information is available in Design and function.

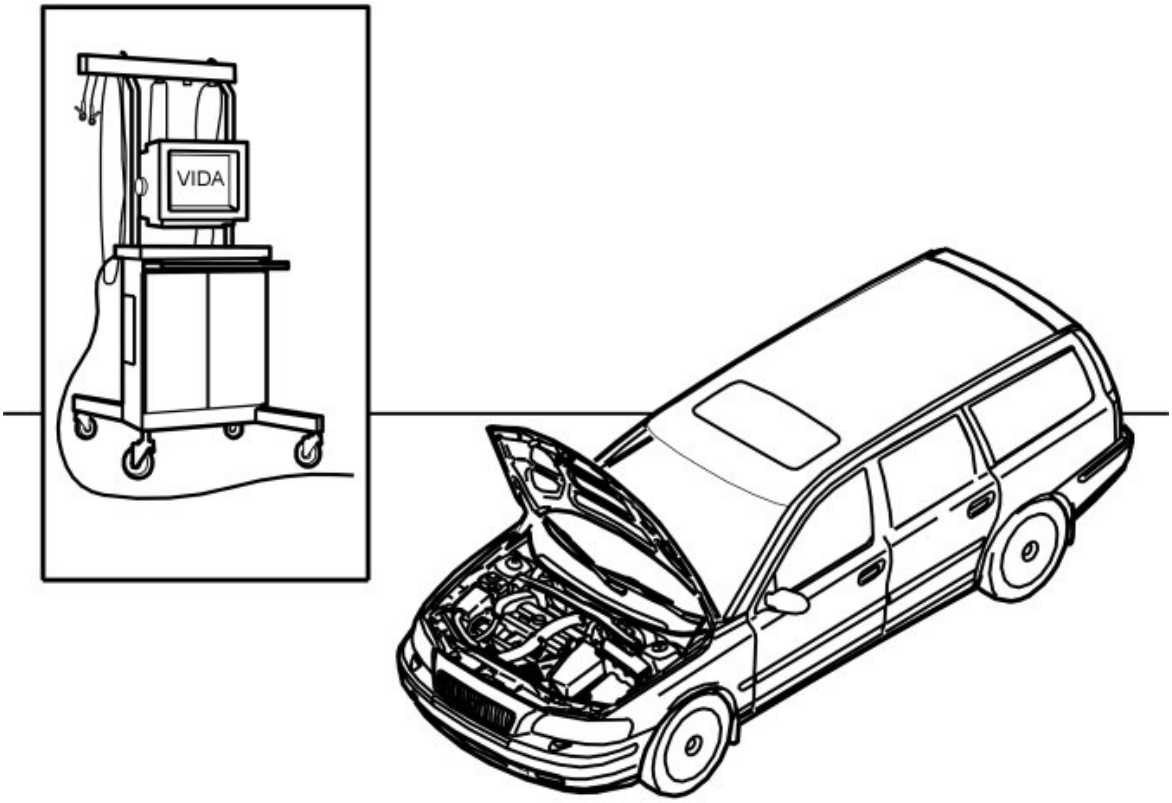
Remedy as necessary.

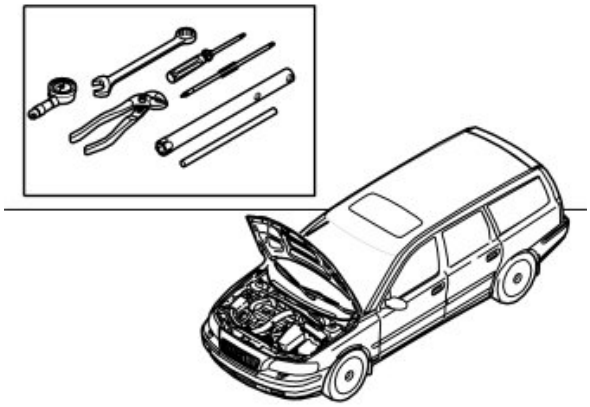
Other information
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair
- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, L.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair

- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

R.H.D.

Fault-tracing

Fault-tracing information

Use the following information and general checks during fault-tracing.

Note! Check that the fuses are intact. For locations, see the instruction manual, cover for fuse box, fuse ratings or similar.

1. Check, if possible, relevant functions in the vehicle using buttons/controls/test drives to determine the status of the fault.

   Note! If the vehicle does not show any of the given symptoms in the diagnostic trouble code information (DTC), this may mean that the fault is intermittent or that the control module is not detecting the fault at this moment.

2. Use the diagnostic trouble code's **frozen values**, **status identifiers** and **counter** to determine the operating conditions when the fault was detected, the fault's current status and any degree of intermittence of the fault.
3. Check and fault-trace according to **the fault causes** that are specified in the **diagnostic trouble code (DTC) information**.
4. Use **VIDA Vehicle communication**. Read off the parameters, activate components and functions, carry out quick tests and checking routines for the diagnostic trouble codes to identify the fault.
5. Check relevant components according to **Component specifications**.
6. Check relevant signals using **wiring diagram**, **signal specification** and **breakout box**.

Note! More information is available in Design and function.

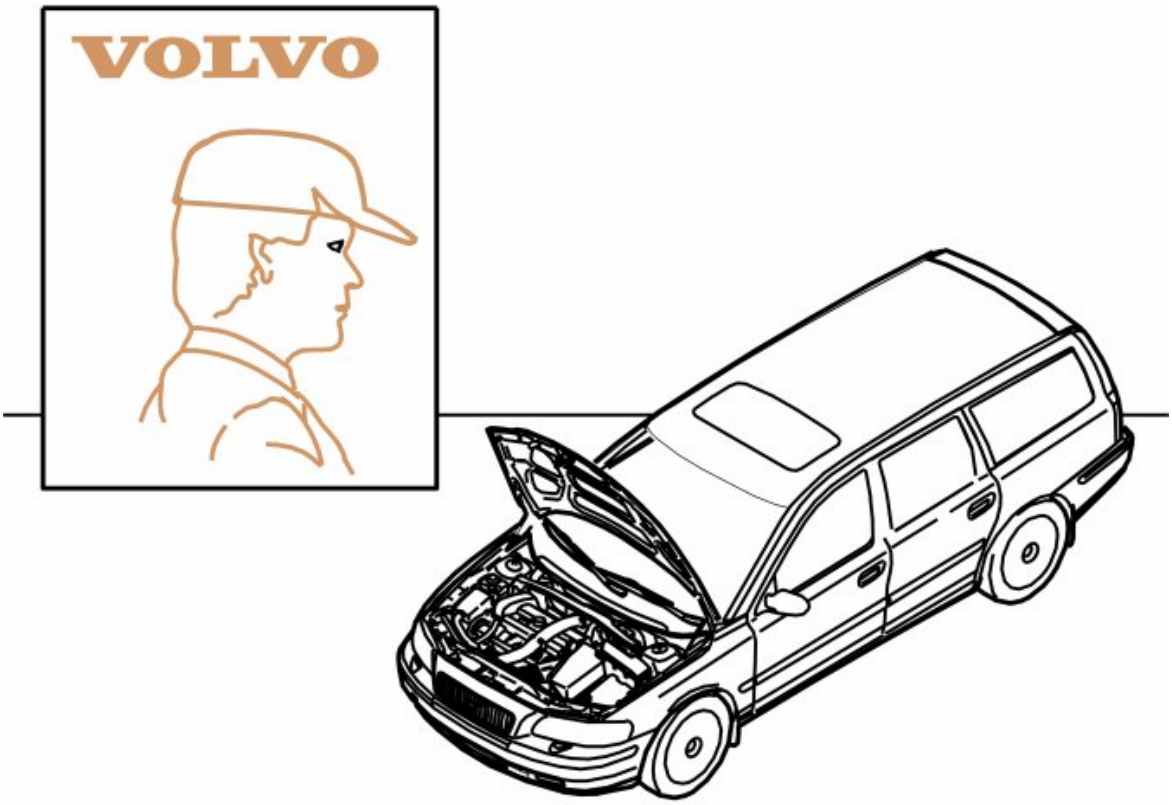
Remedy as necessary.

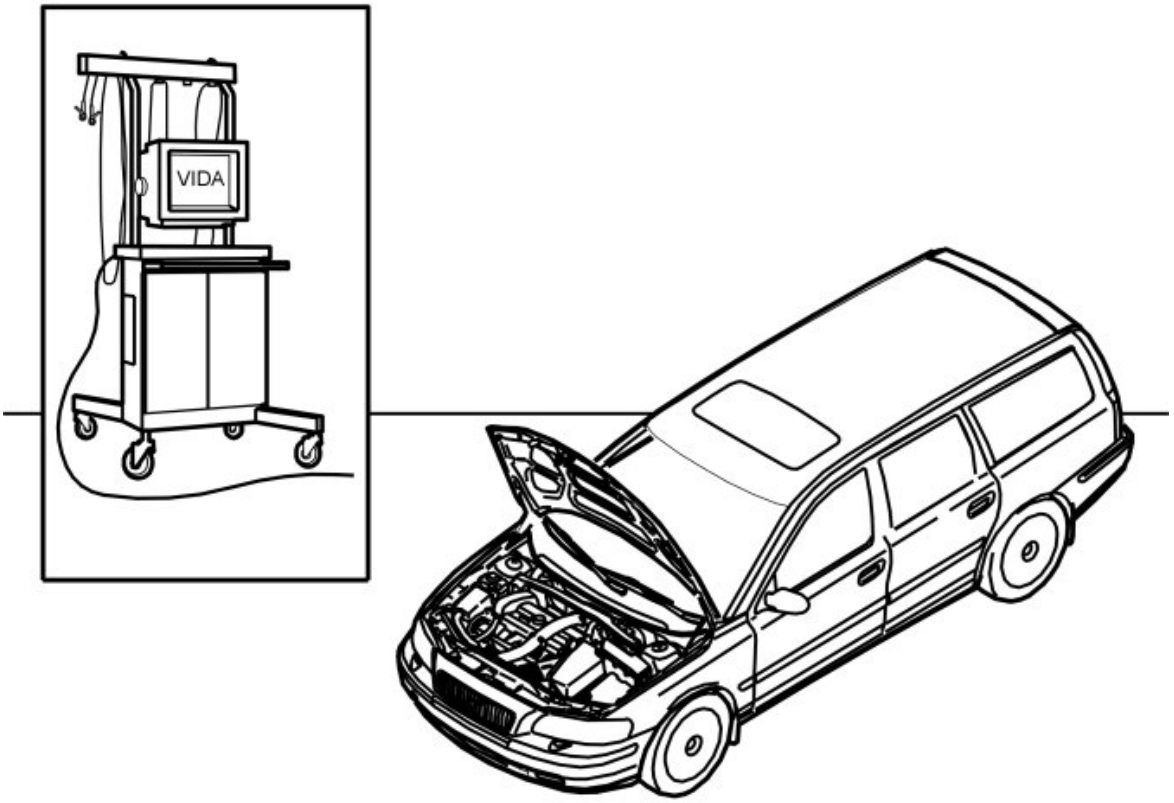
Other information

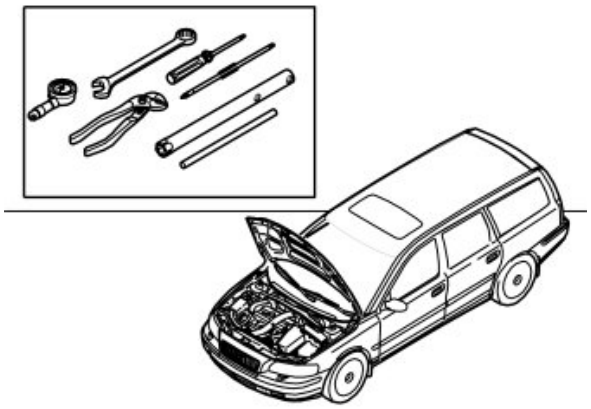
- Signal specification See: Heating and Air Conditioning/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Climate Control Module (CCM)
- Component resistance values See: Heating and Air Conditioning/Specifications/Electrical Specifications
- Description of parameters See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description Of Parameters
- Description of frozen values See: Heating and Air Conditioning/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Climate Control Module (CCM)/Description of Frozen Values, CCM
- Climate control, location of components See: Heating and Air Conditioning/Locations/Climate Control, Location of Components

Repair

- Climate control unit, replacing, L.H.D, R.H.D See: Heating and Air Conditioning/Housing Assembly HVAC/Service and Repair
- Damper motor module (DMM) defroster, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) recirculation, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) temperature, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Damper motor module (DMM) air distribution, replacing, R.H.D See: Heating and Air Conditioning/Air Door/Air Door Actuator / Motor/Service and Repair
- Seat heating module (SHM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Seat Heater Control Module/Service and Repair







Continue - Information

Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

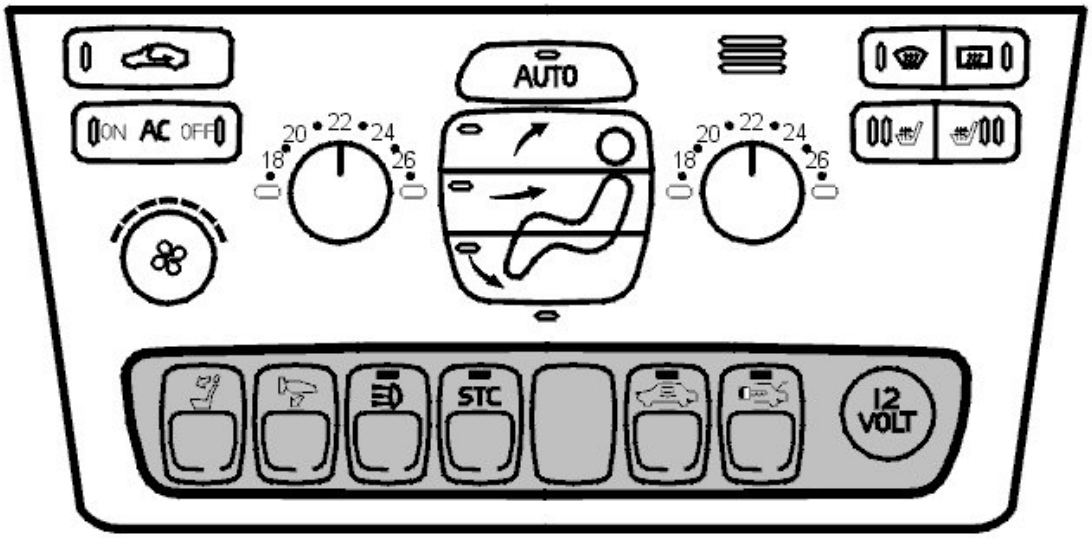
FAULT FOUND - Fault Found

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0090

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers a non-permissible switch identity compared to the permitted switch identities included in the Car Config File.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

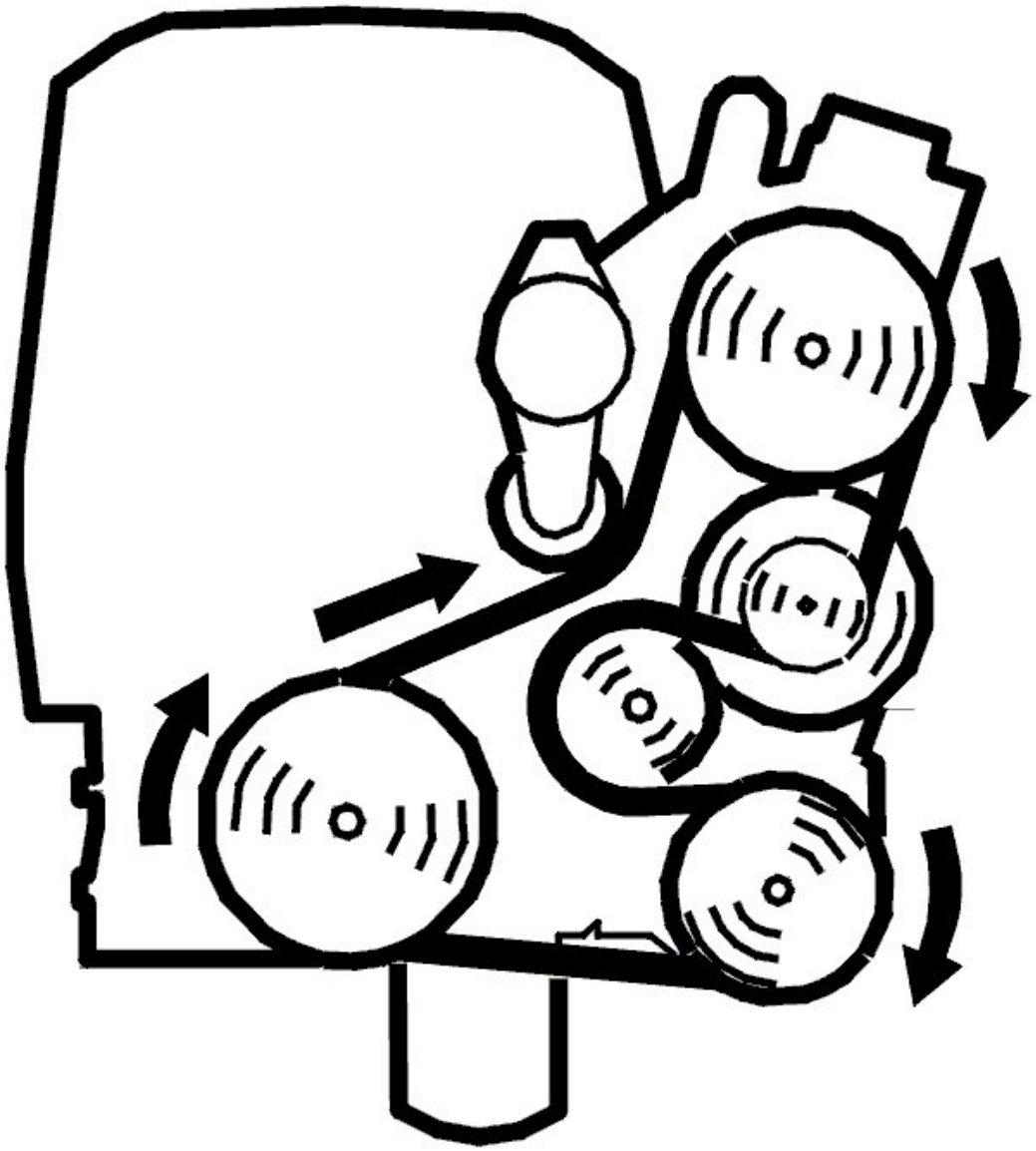
Possible source
- Switch replaced with a switch with incorrect identity
- Defective switch
- Fault in the Car Configuration File
- Two or more switches with the same ID.

Fault symptom[s]
- The function button is not working.

Faulty ID

Faulty ID

Checking the function



- Engine running.

Check that all the functions can be activated via the lower switch.

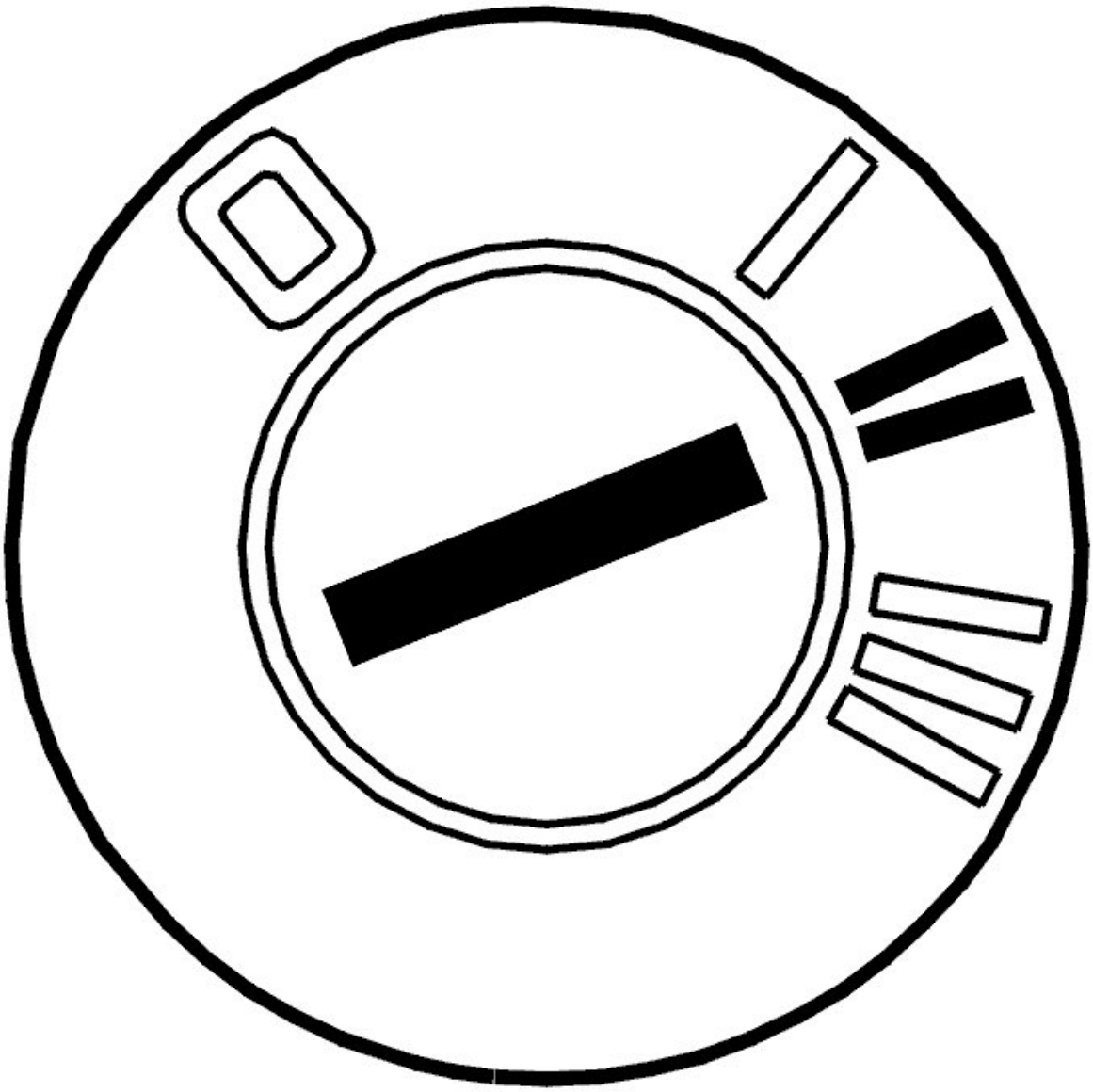
Hint: Where applicable, the LED on the lower switch must be lit when the function is activated.

Are all functions activated?

Yes - Fault-tracing information

No - Checking the switch identity

Checking the switch identity



- Ignition on.

Note! The switches can be placed in any position in the climate control assembly (without internal order). The position of the switches must be taken into account when fault-tracing with VCT2000.The switch furthest to the left in the climate control assembly corresponds to no. 1 in VCT2000. VCT2000 then follows the numbering in order to the switch furthest to the right, which is designated no. 7.

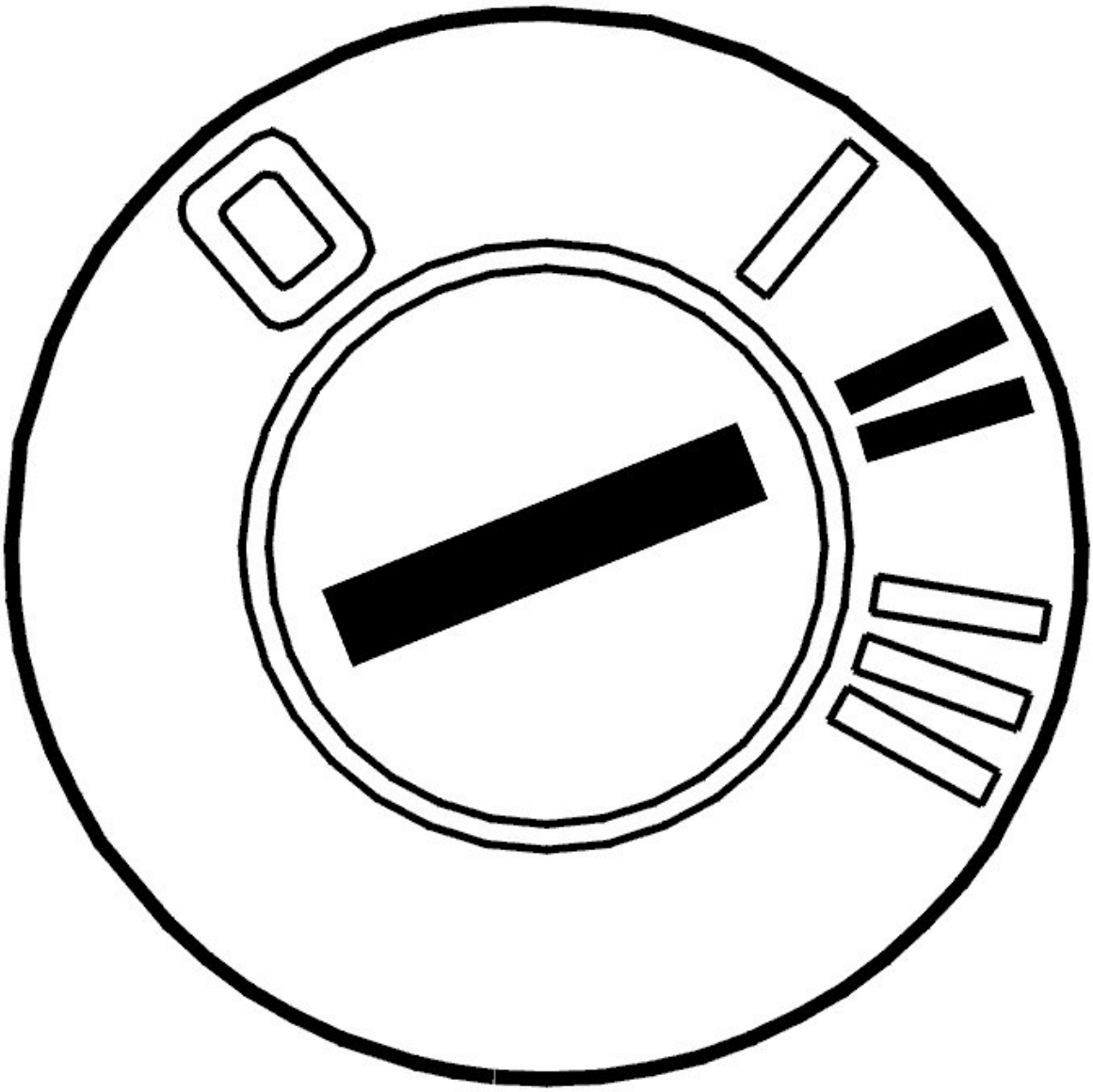
Read off the identities of the switches. Check that the read off identity corresponds to the switch marking for its position in the dashboard environment panel. If the identity does not correspond to the marking, this indicates a defective switch.
Remedy as necessary.

Was a fault detected?

Yes - Verification

No - Checking the switch status

Checking the switch status



- Ignition on.

Note! The switches can be placed in any position in the climate control assembly (without internal order). The position of the switches must be taken into account when fault-tracing with VCT2000.The switch furthest to the left in the climate control assembly corresponds to no. 1 in VCT2000. VCT2000 then follows the numbering in order to the switch furthest to the right, which is designated no. 7.

Read off the status of the switches. Check that the read off status is OK for each switch. If the status is not OK, this indicates that the function of the switch is not in the Car Configuration.

Was a fault detected?

Yes - Information

No - No Fault Found

Information

The fault is probably because the functionality of the button is not in Car Configuration. This is remedied by ordering and downloading the missing functionality.

Continue - Verification

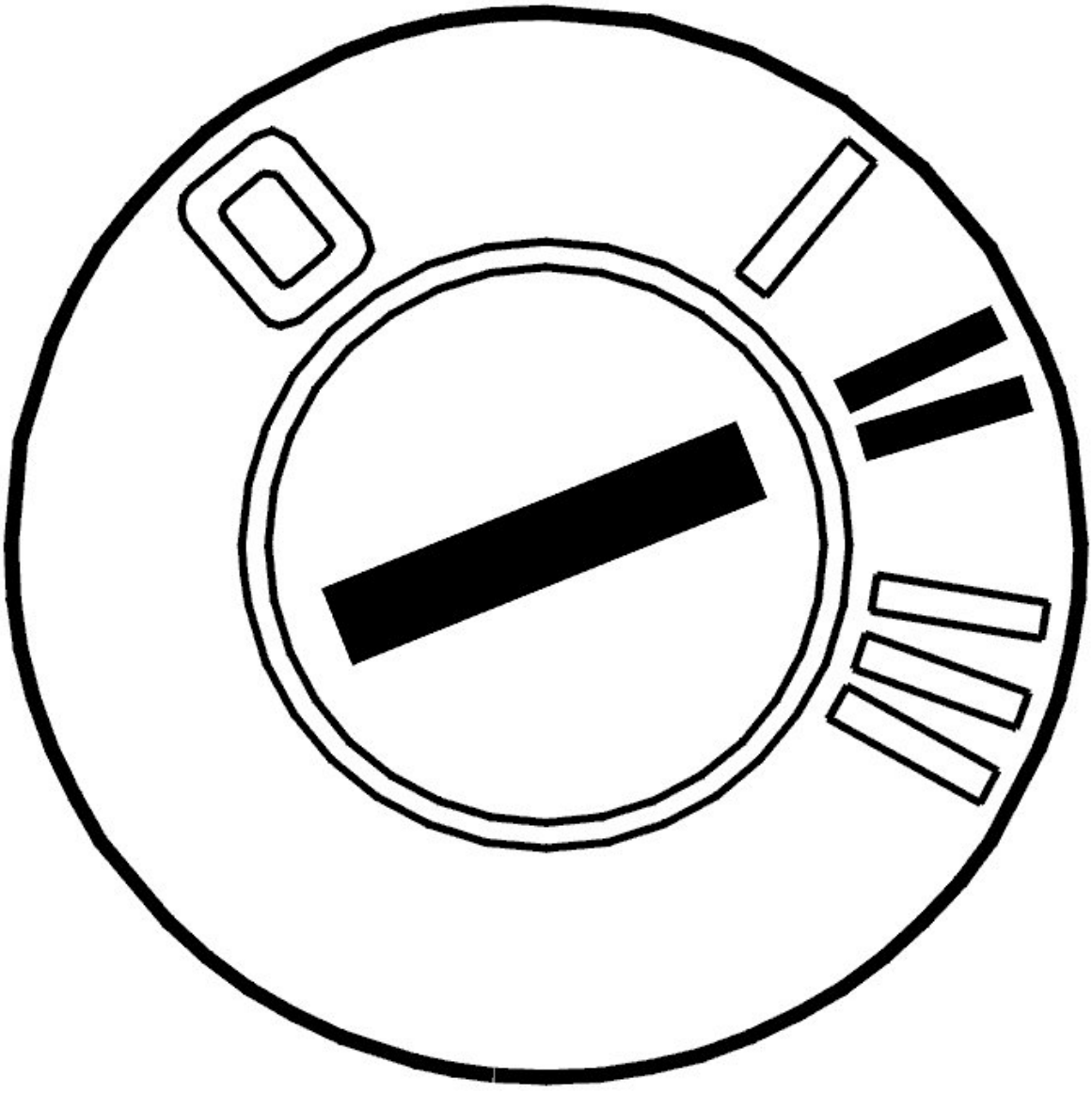
Fault-tracing information

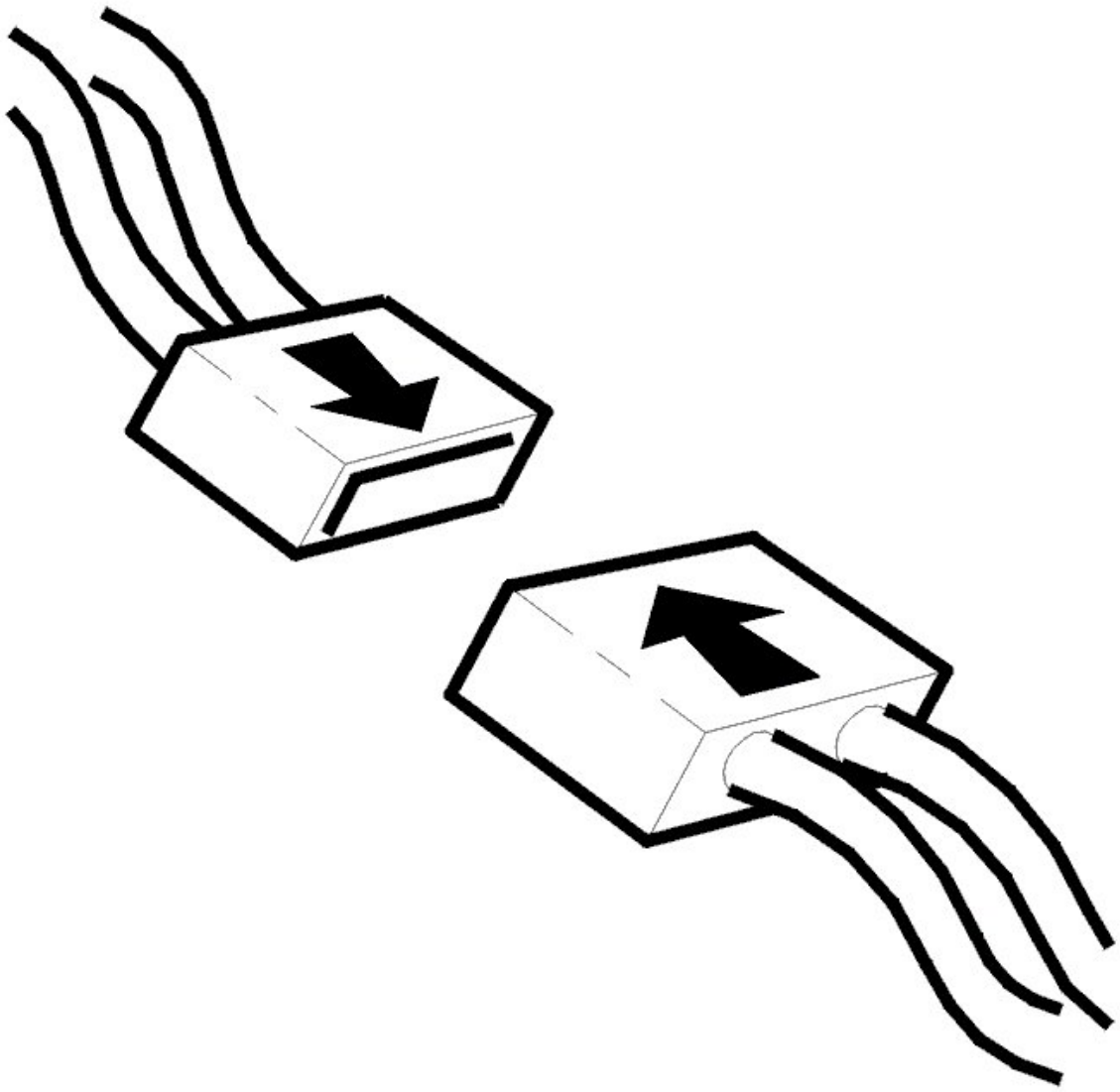
The fault is probably the result of a damaged, intermittently defective or missing switch. If the fault is intermittent, it has been registered previously but is no longer present.
Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs.

Continue - Information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.

Note! Wait at least 1 minute before "Ignition on". This is to allow the climate control module (CCM) to carry out a new diagnostic.

- Reinstall the connectors, components etc.
- Ignition on
- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the status of the diagnostic trouble code (DTC) has changed to intermittent.

Does the status change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

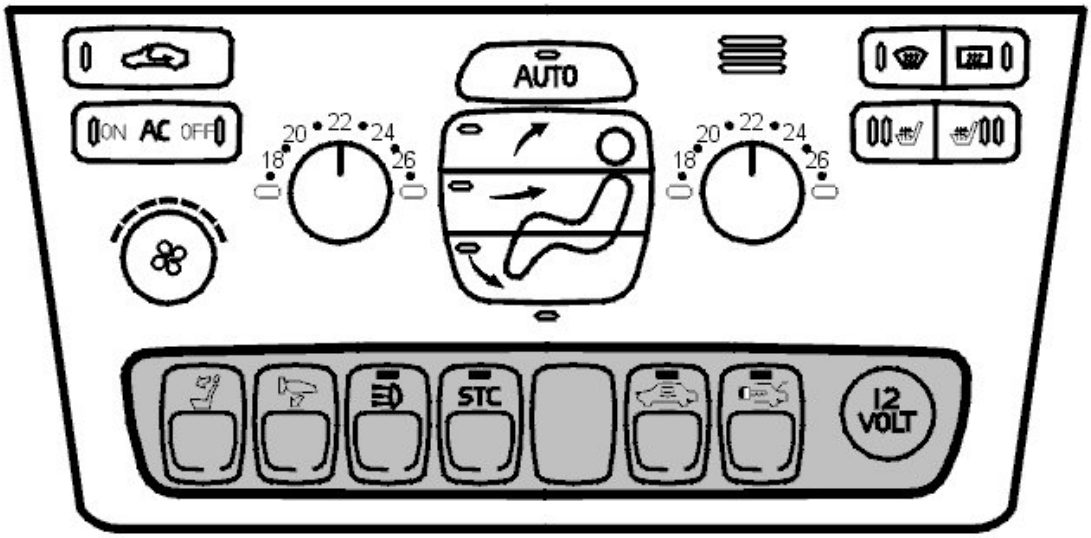
FAULT FOUND - Fault Found

Attempt New Test - Checking the function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CCM-0091

Condition



The diagnostic trouble code (DTC) is stored if the climate control module (CCM) registers that the identity of a lower switch is missing compared to the switch identities included in the Car Config File.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- The climate control module (CCM) assumes different values depending on which switch identity is missing.

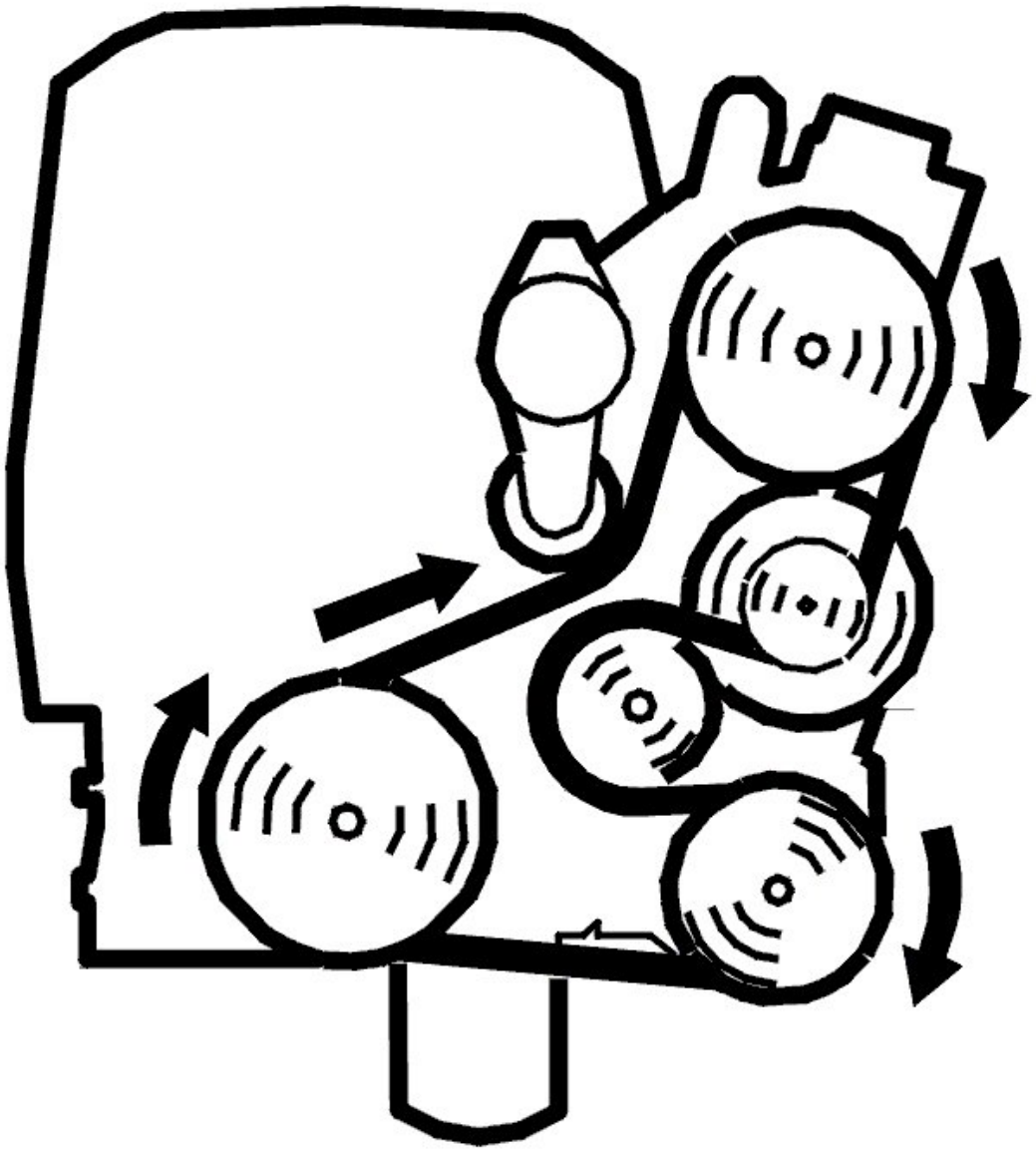
Possible source
- Defective switch
- Switch missing
- Fault in the Car Configuration File.

Fault symptom[s]
- The function button is not working.

ID Missing

ID missing

Checking the function



- Engine running.

Check that all the functions can be activated via the lower switch.

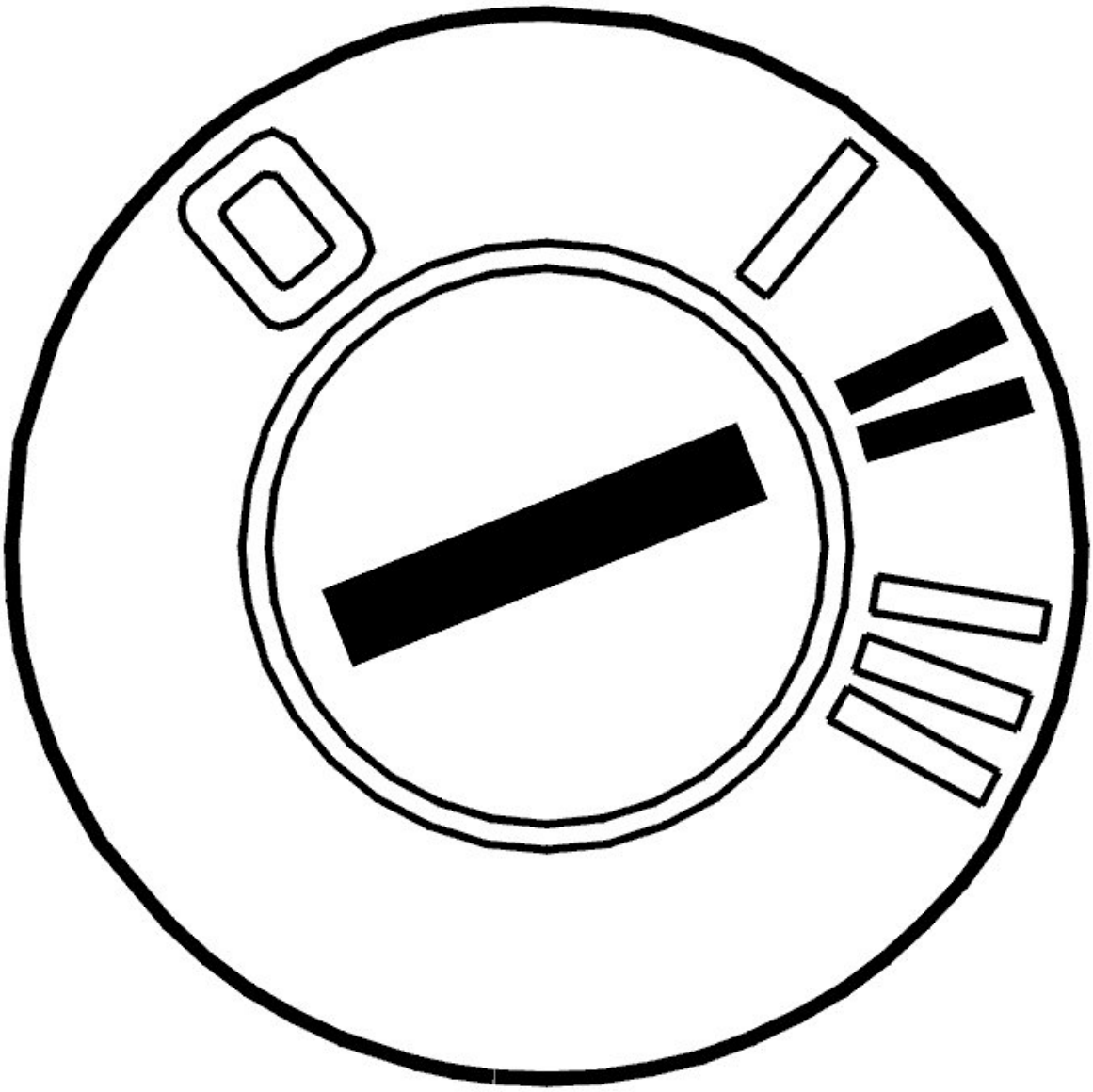
Hint: Where applicable, the LED on the lower switch must be lit when the function is activated.

Are all functions activated?

Yes - Fault-tracing information

No - Checking the component

Checking the component



- Ignition on.

Note! The switches can be placed in any position in the climate control assembly (without internal order). The position of the switches must be taken into account when fault-tracing with VCT2000.The switch furthest to the left in the climate control assembly corresponds to no. 1 in VCT2000. VCT2000 then follows the numbering in order to the switch furthest to the right, which is designated no. 7.

Read off the identities of the switches. Check that the read off identity corresponds to the switch marking for its position in the dashboard environment panel. The switch is defective or missing if the identity does not correspond.

Continue - Verification

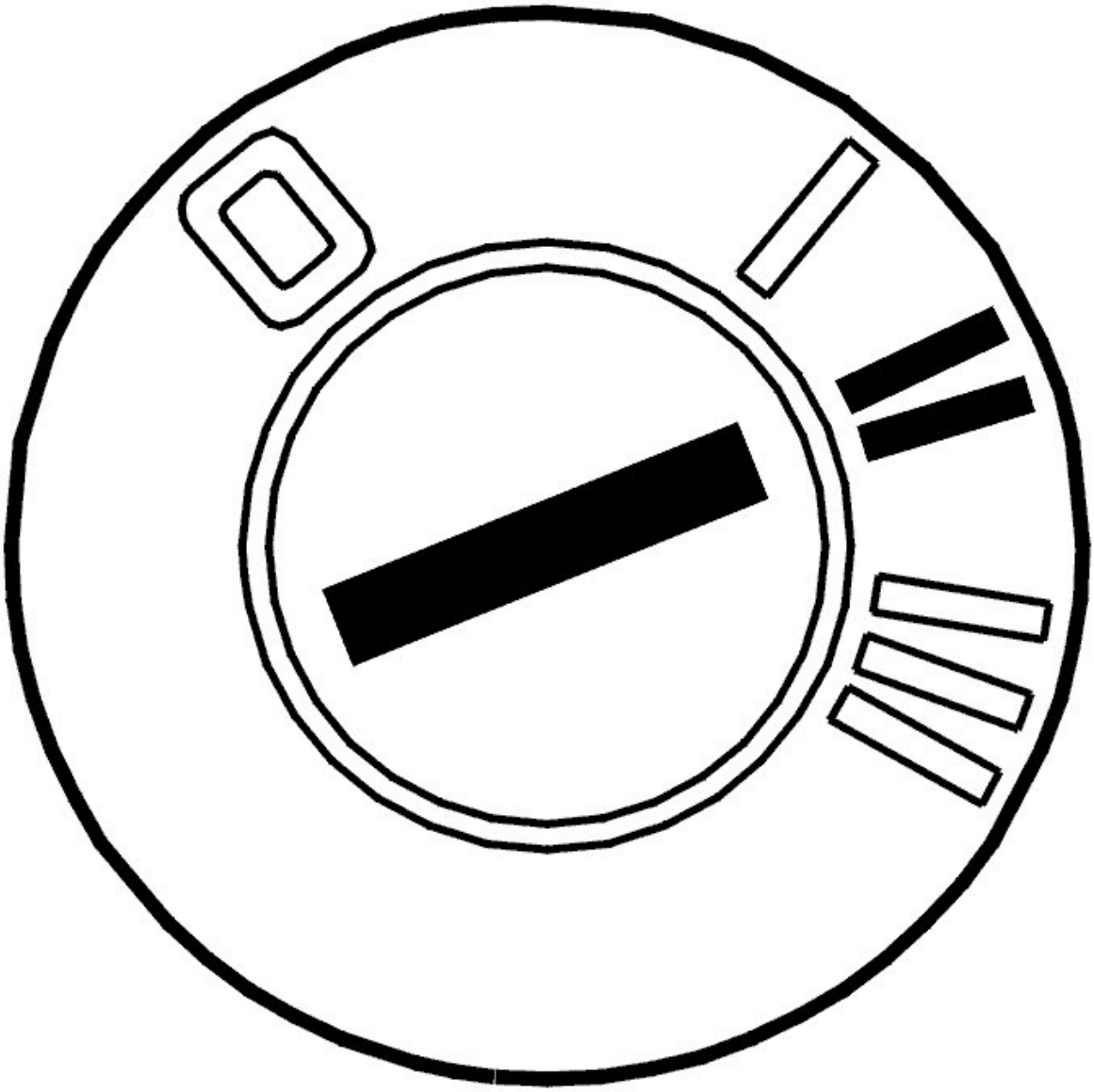
Fault-tracing information

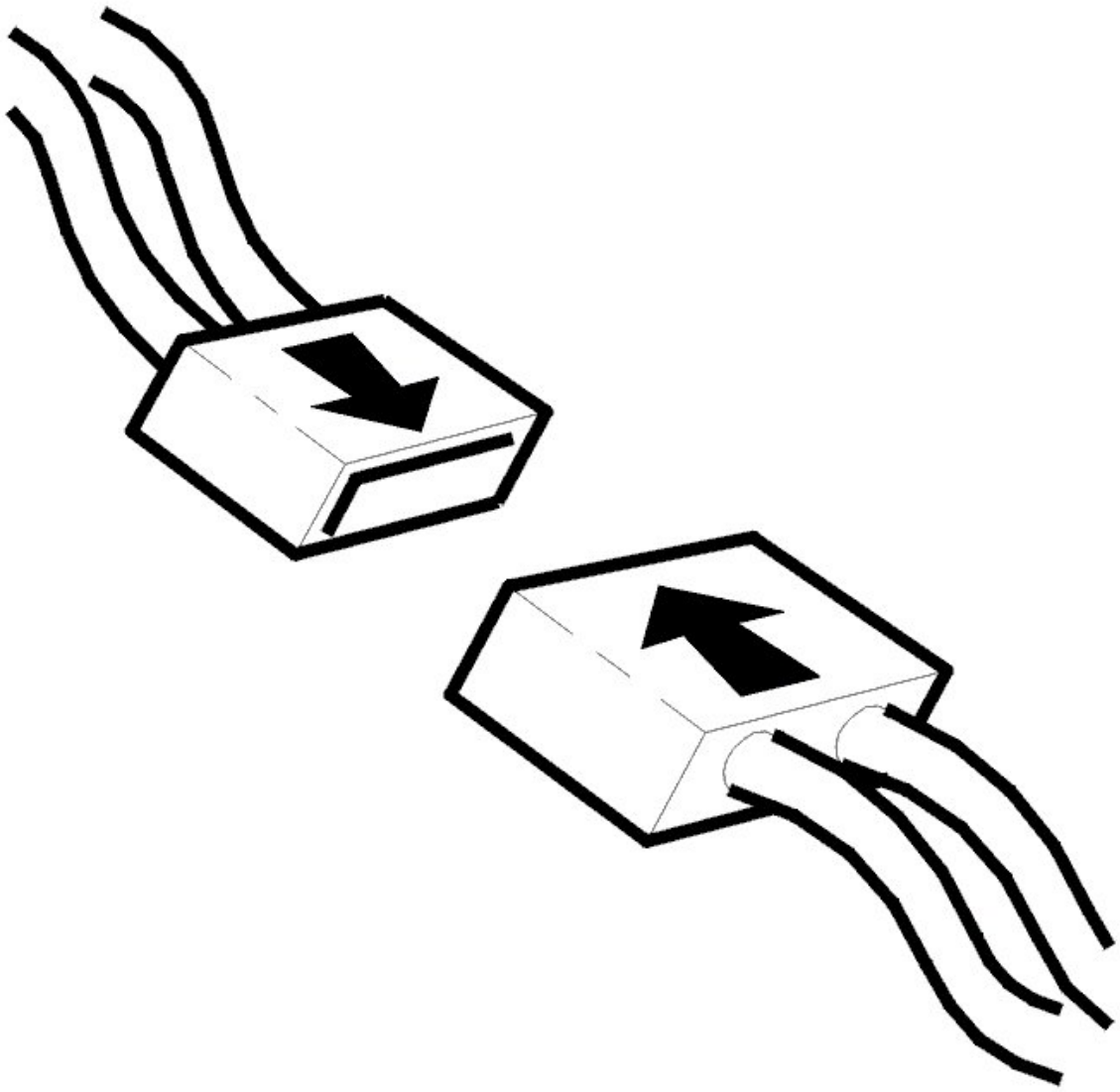
The fault has probably occurred as a result of a defect or intermittent defect or a missing switch. If the fault is intermittent, it has been registered previously but is no longer present.
Intermittent faults may be caused by interference at start up of the control module. Intermittent faults may also be caused by other types of intermittent faults. The fault is evaluated depending on how it occurs. If the fault recurs, replace the switch.

Continue - Information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.

Note! Wait at least 1 minute before "Ignition on". This is to allow the climate control module (CCM) to carry out a new diagnostic.

- Reinstall the connectors, components etc.
- Ignition on
- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the status of the diagnostic trouble code (DTC) has changed to intermittent.

Does the status change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

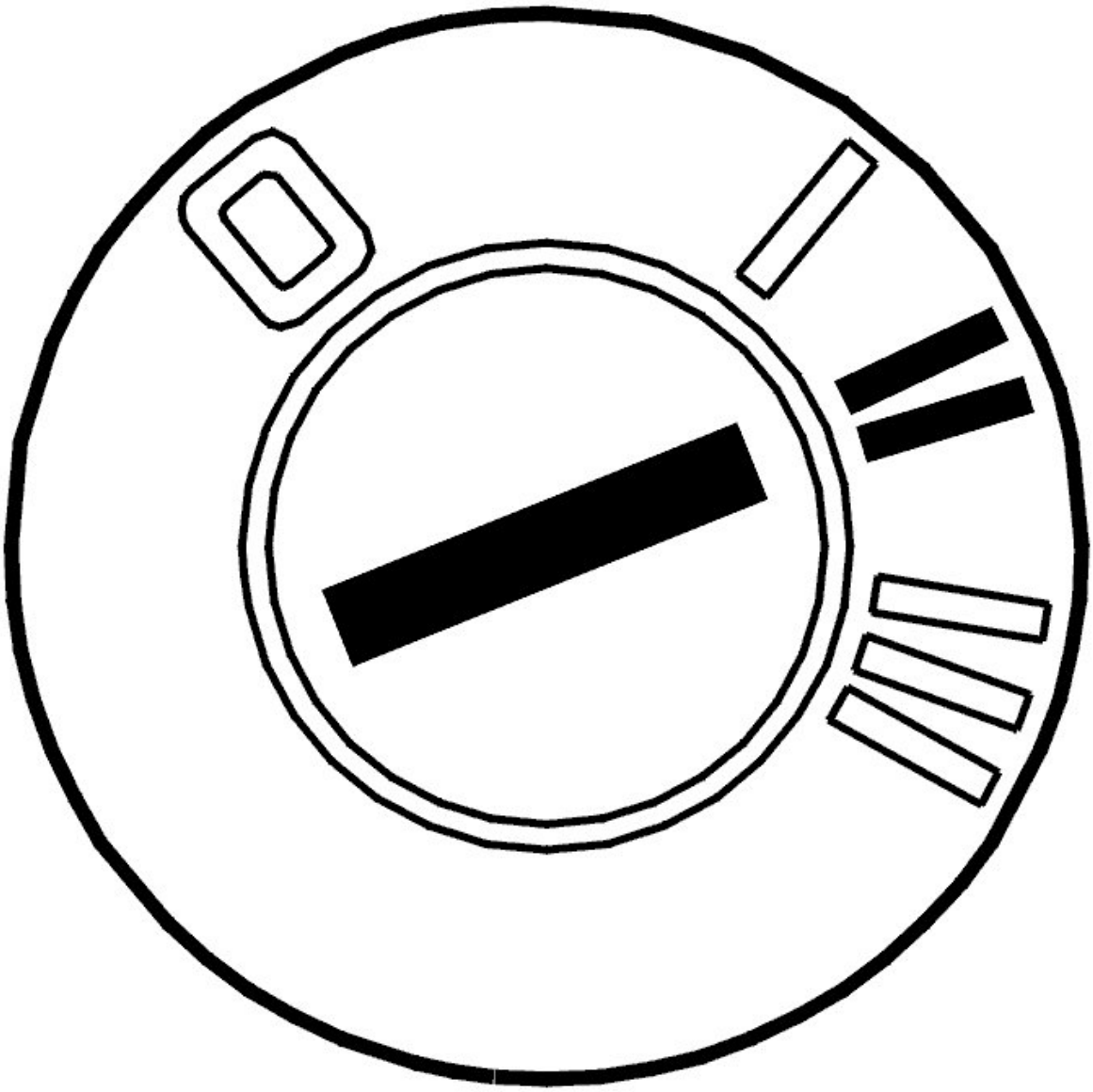
FAULT FOUND - Fault Found

Attempt New Test - Checking the function

CCM-XXXX

Unknown diagnostic trouble code (DTC) for the present control module version

Reading off diagnostic trouble codes (DTC)



- Ignition on.

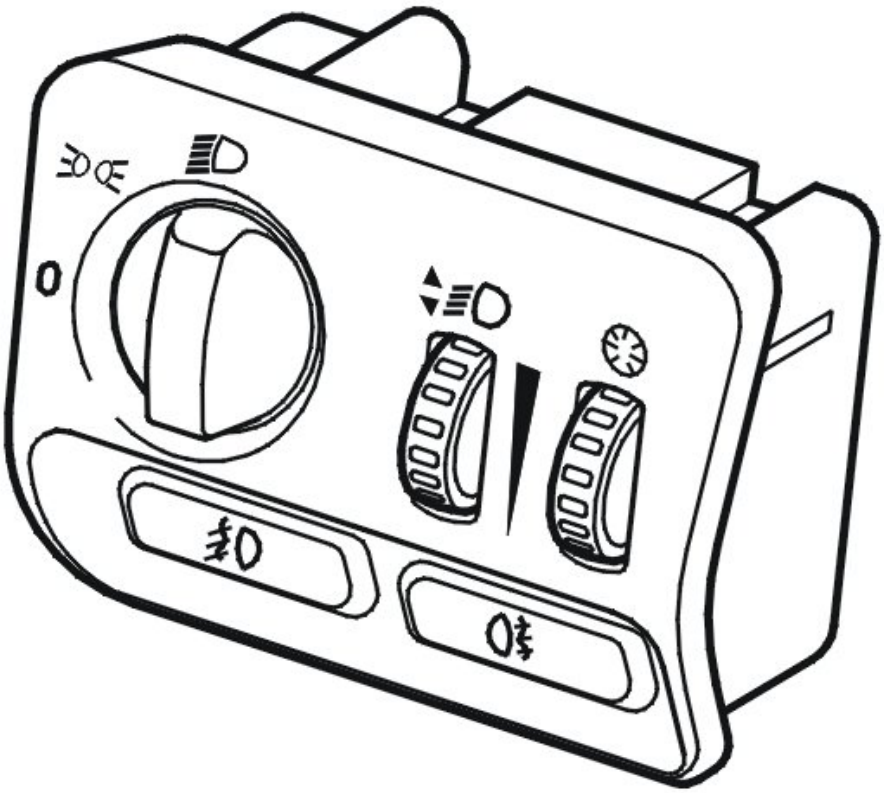
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD00

Condition



The central electronic module (CEM) sends and receives information via a standardized serial communication system. This system is called Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked communication with the light switch module (LSM) or combustion preheater module (CPM). The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position II for at least 10 seconds and with the battery voltage above 10.5 V.

Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors. The central electronic module (CEM) is the only control module that monitors the voltage level in the signal cables. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of this type of fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in the signal cable
- Short-circuit to ground in the signal cable
- Internal fault in another control module in the same part of the network.

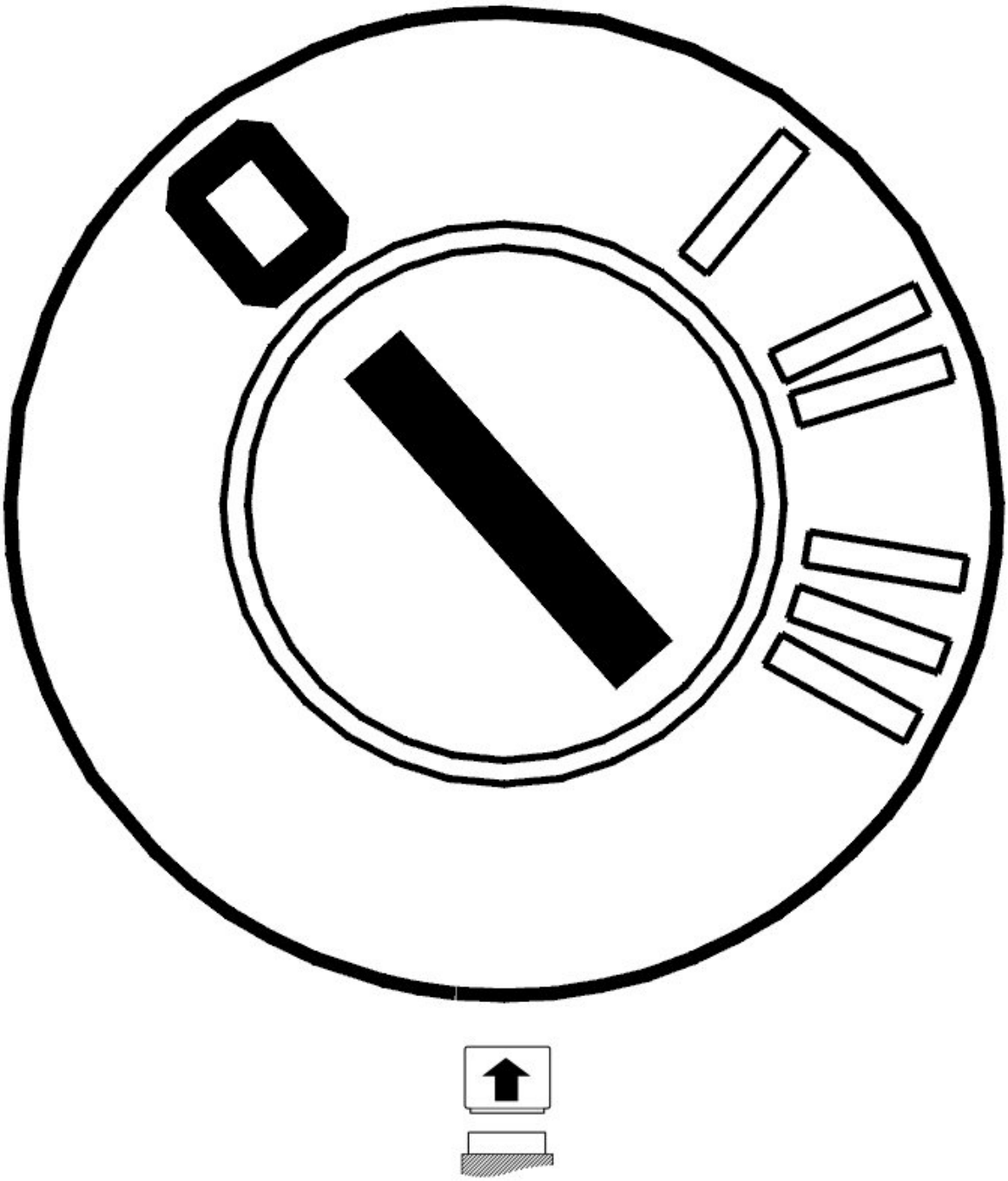
Fault symptom[s]

- The light switch does not operate
- Beam height control does not function
- The parking heater does not operate.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connectors D and C from the central electronic module (CEM).

The diagnostic trouble code (DTC) indicates that the communication between the light switch module (LSM), central electronic module (CEM) and combustion preheater module (CPM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or all of the control modules.
Check the signal cable. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #D41 (#41) and light switch module (LSM) terminal #3
- Central electronic module (CEM) terminal #C32 (#32) and combustion preheater module (CPM) terminal #6.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new light switch module (LSM) and combustion preheater module (CPM).
Only replace one control module at a time. Check the function of each control module between each replacement.
Remedy as necessary.

Other information

- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair

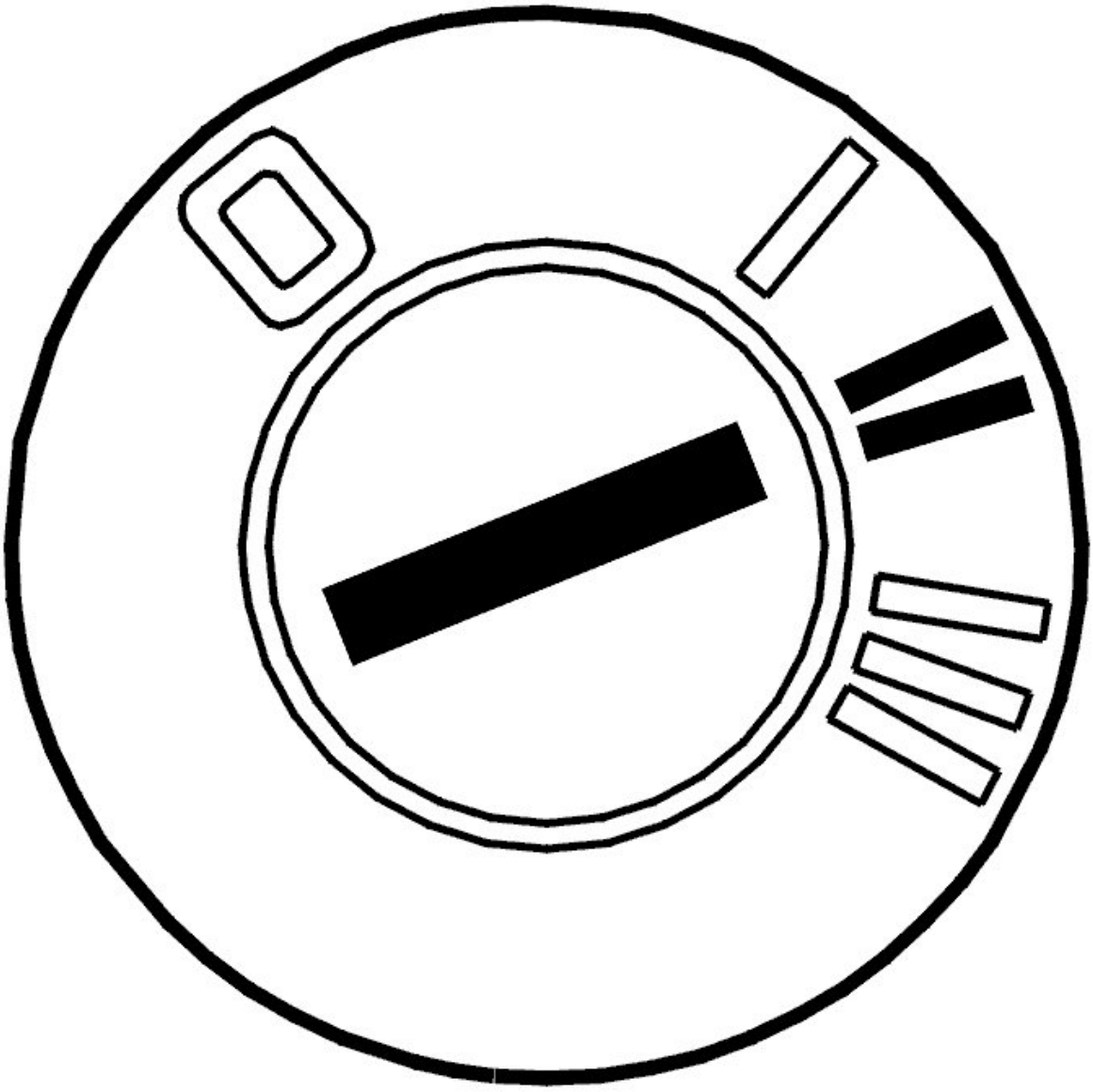
Continue - Verification

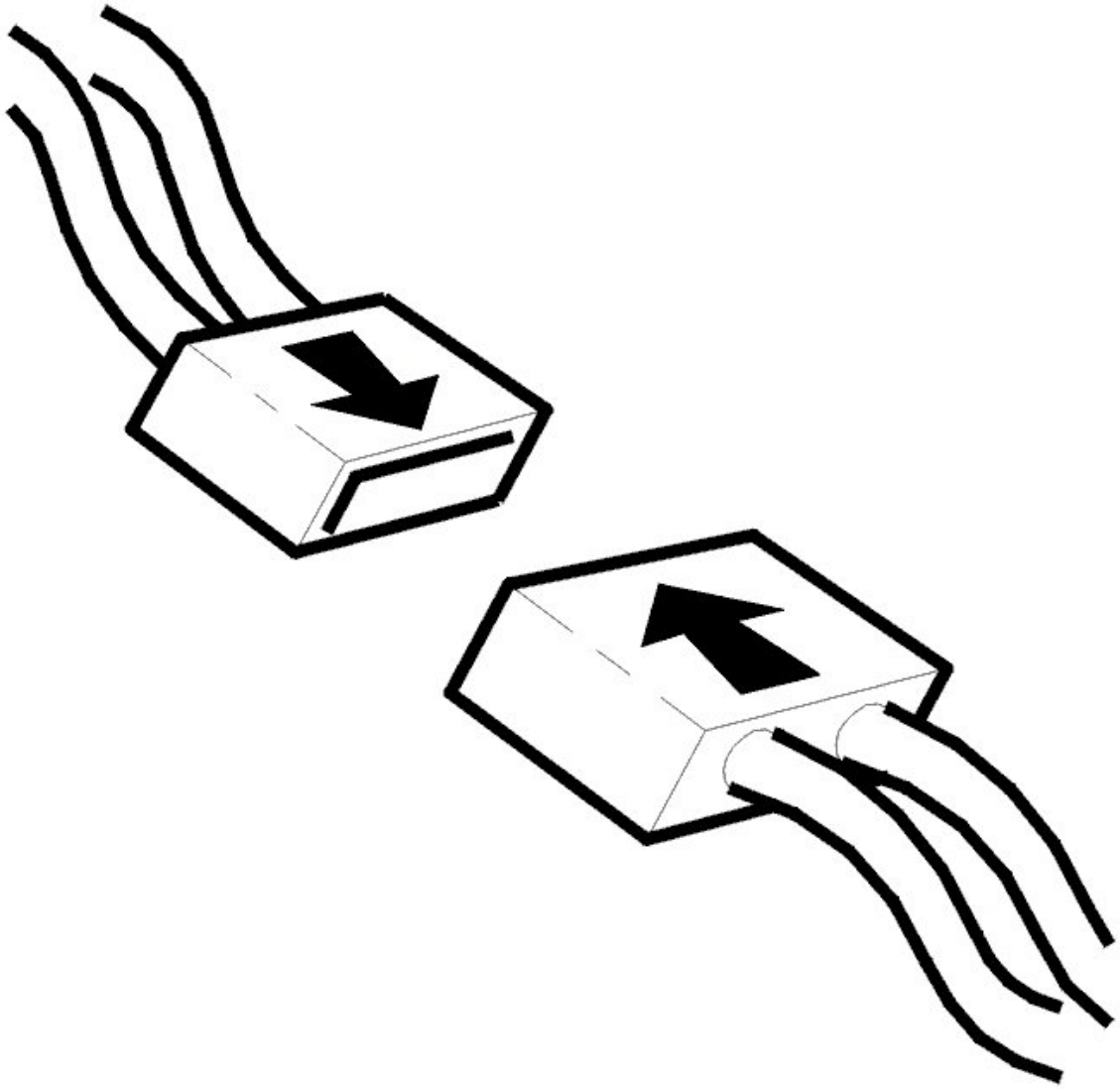
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.
Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Are both the light switch module (LSM) and combustion preheater module (CPM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

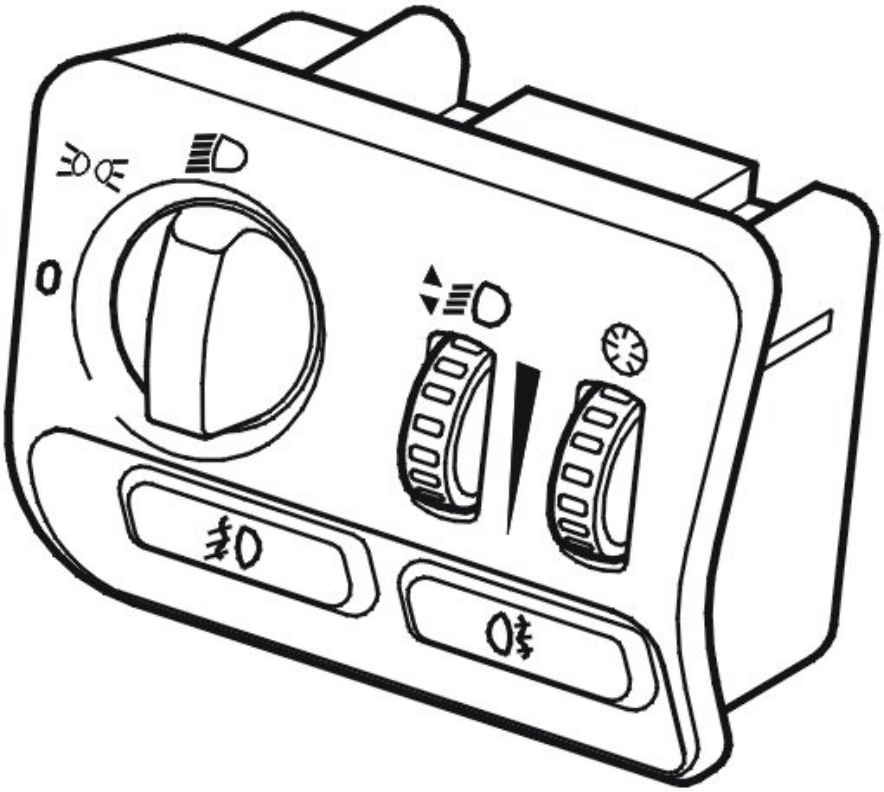
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD01

Condition



The central electronic module (CEM) sends and receives information via a standardized serial communication system. This system is called Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked communication with the light switch module (LSM) or combustion preheater module (CPM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position II for at least 10 seconds and with the battery voltage above 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors. The central electronic module (CEM) is the only control module that monitors the voltage level in the signal cables. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of this type of fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable

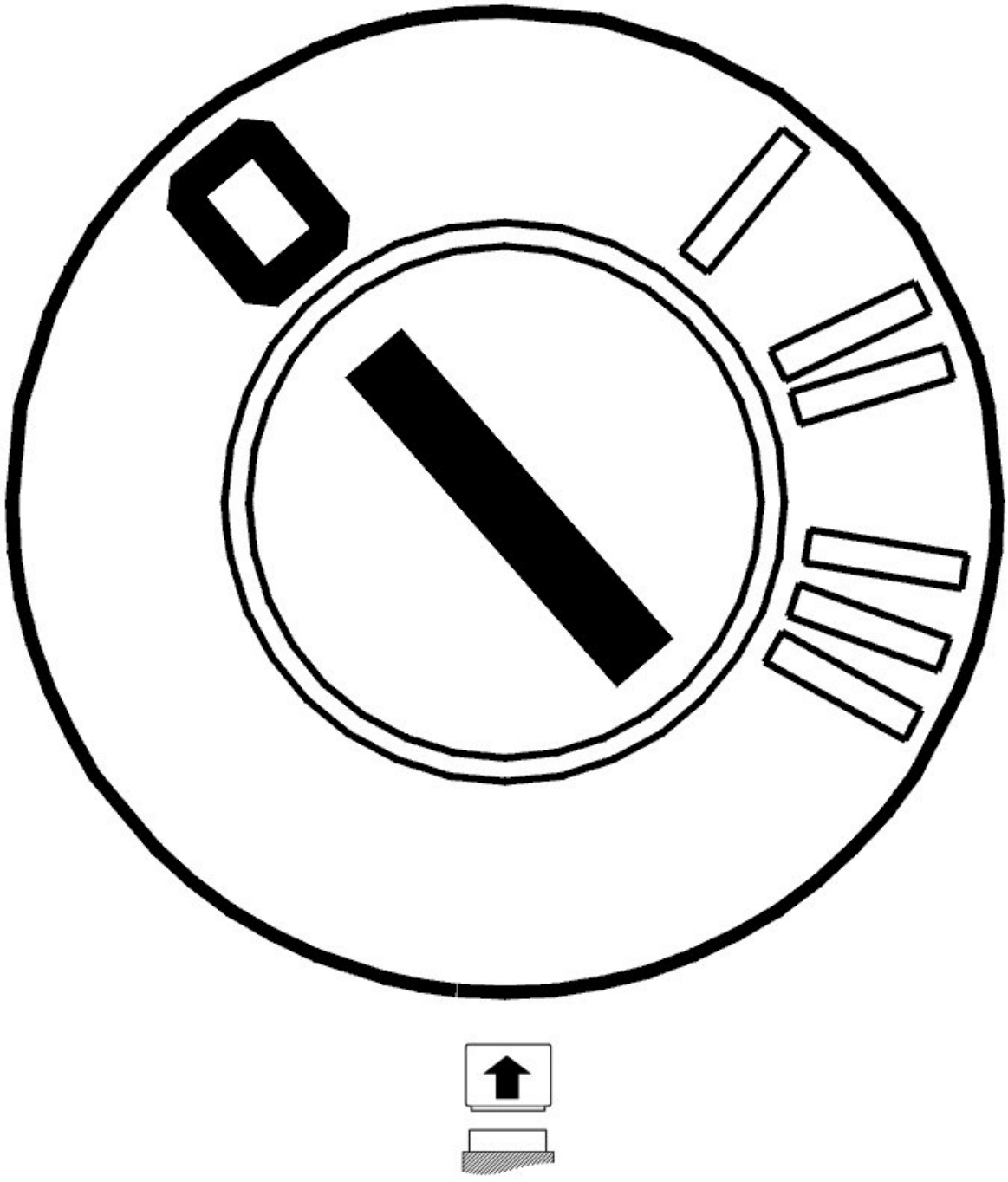
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The light switch does not operate
- Beam height control does not function
- The parking heater does not operate.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect connectors D and C from the central electronic module (CEM).

The diagnostic trouble code (DTC) indicates that the communication between the light switch module (LSM), central electronic module (CEM) and combustion preheater module (CPM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or all of the control modules.
Check the signal cable. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Take readings between:
- Central electronic module (CEM) terminal #D41 (#41) and light switch module (LSM) terminal #3
- Central electronic module (CEM) terminal #C32 (#32) and combustion preheater module (CPM) terminal #6.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
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- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
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- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new light switch module (LSM) and combustion preheater module (CPM).
Only replace one control module at a time. Check the function of each control module between each replacement.
Remedy as necessary.

Other information

- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair

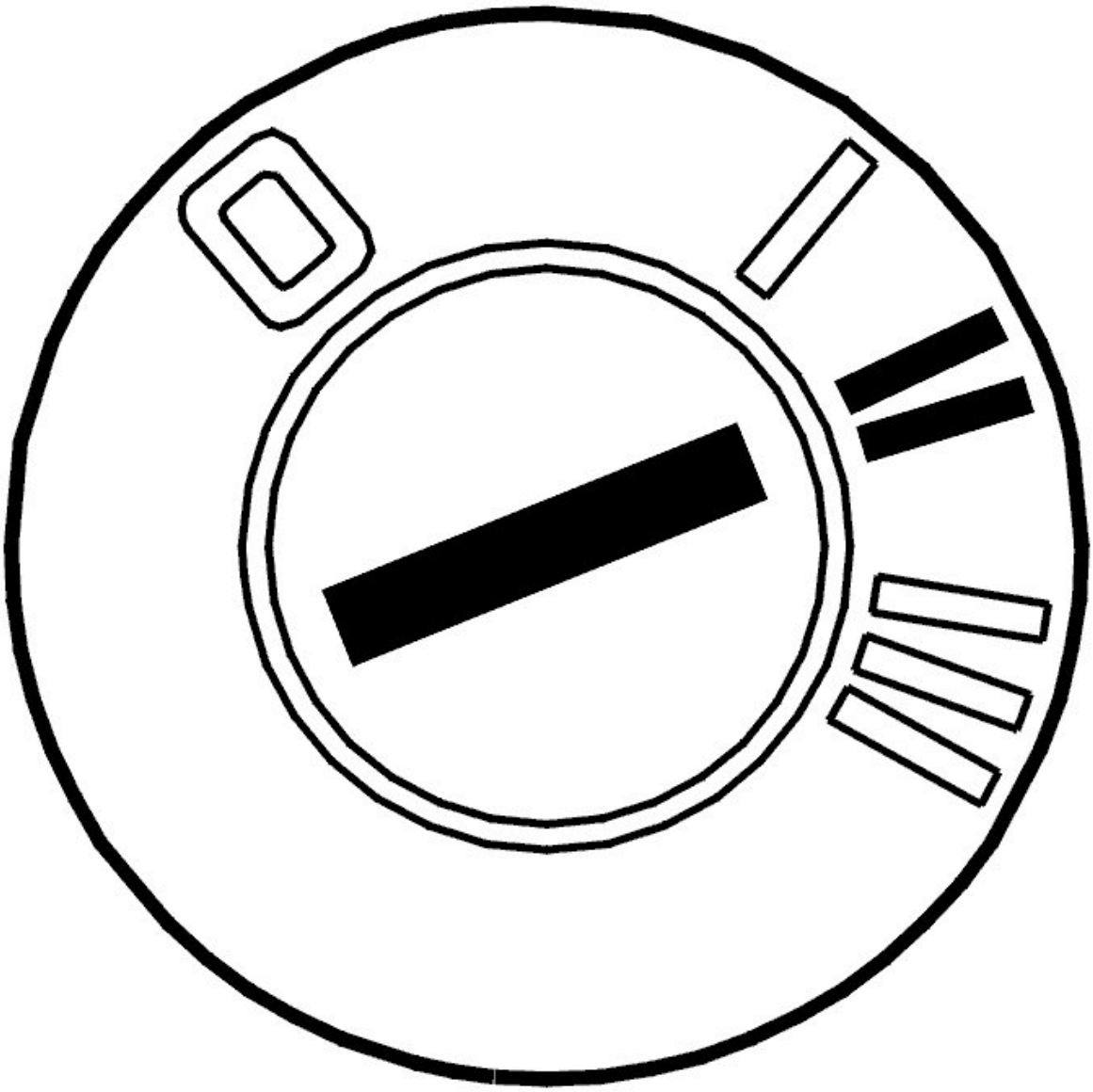
Continue - Verification

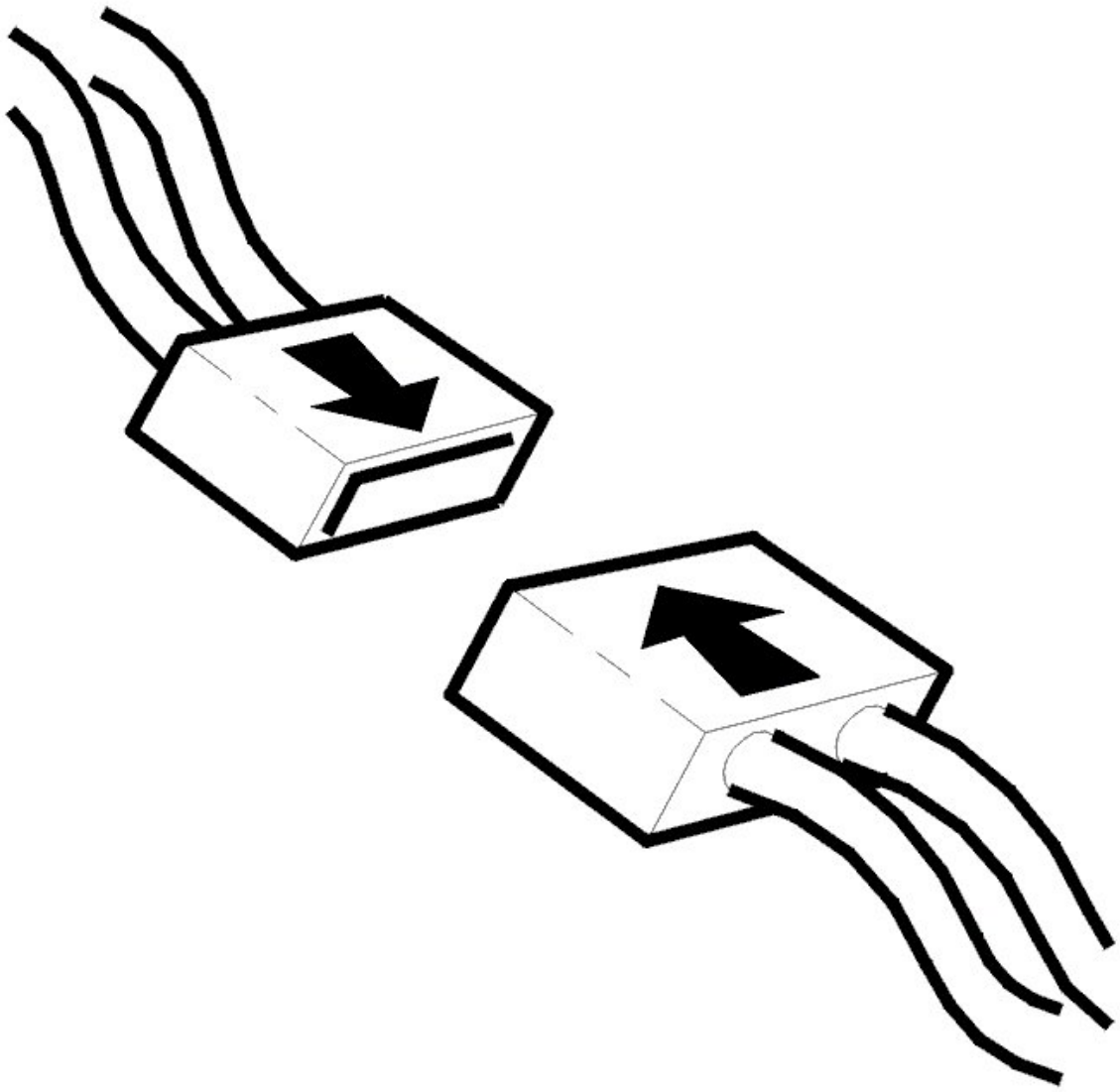
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.
Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Are both the light switch module (LSM) and combustion preheater module (CPM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

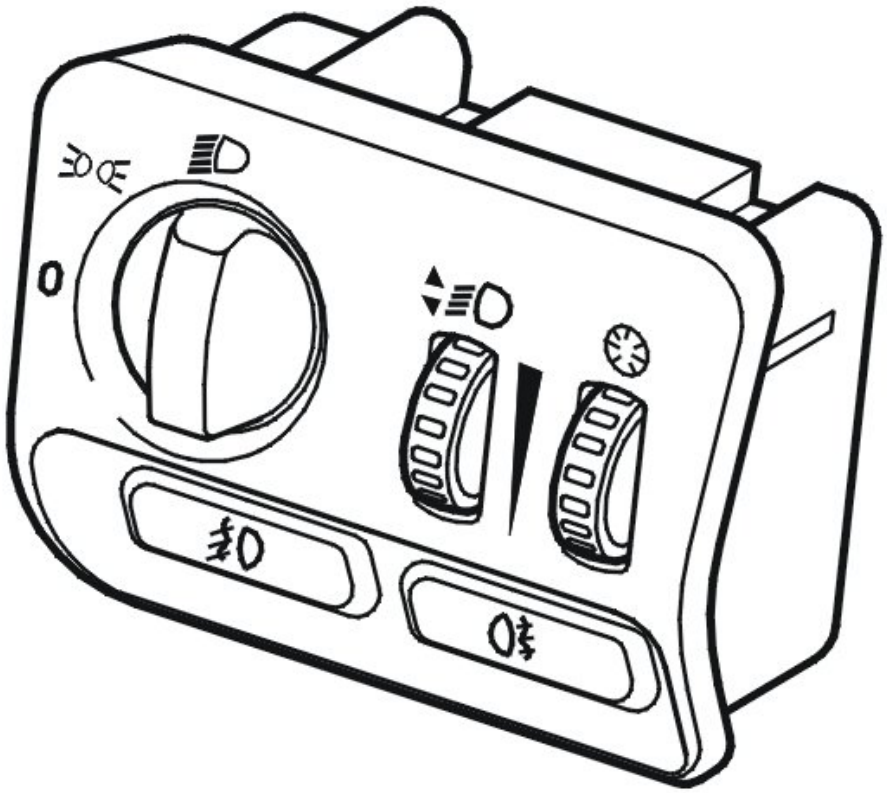
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD02

Condition



The central electronic module (CEM) sends and receives information via a standardized serial communication system. This system is called Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked communication with the light switch module (LSM) or combustion preheater module (CPM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors. The central electronic module (CEM) is the only control module that monitors the voltage level in the signal cables. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of this type of fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Internal fault in another control module in the same part of the network.

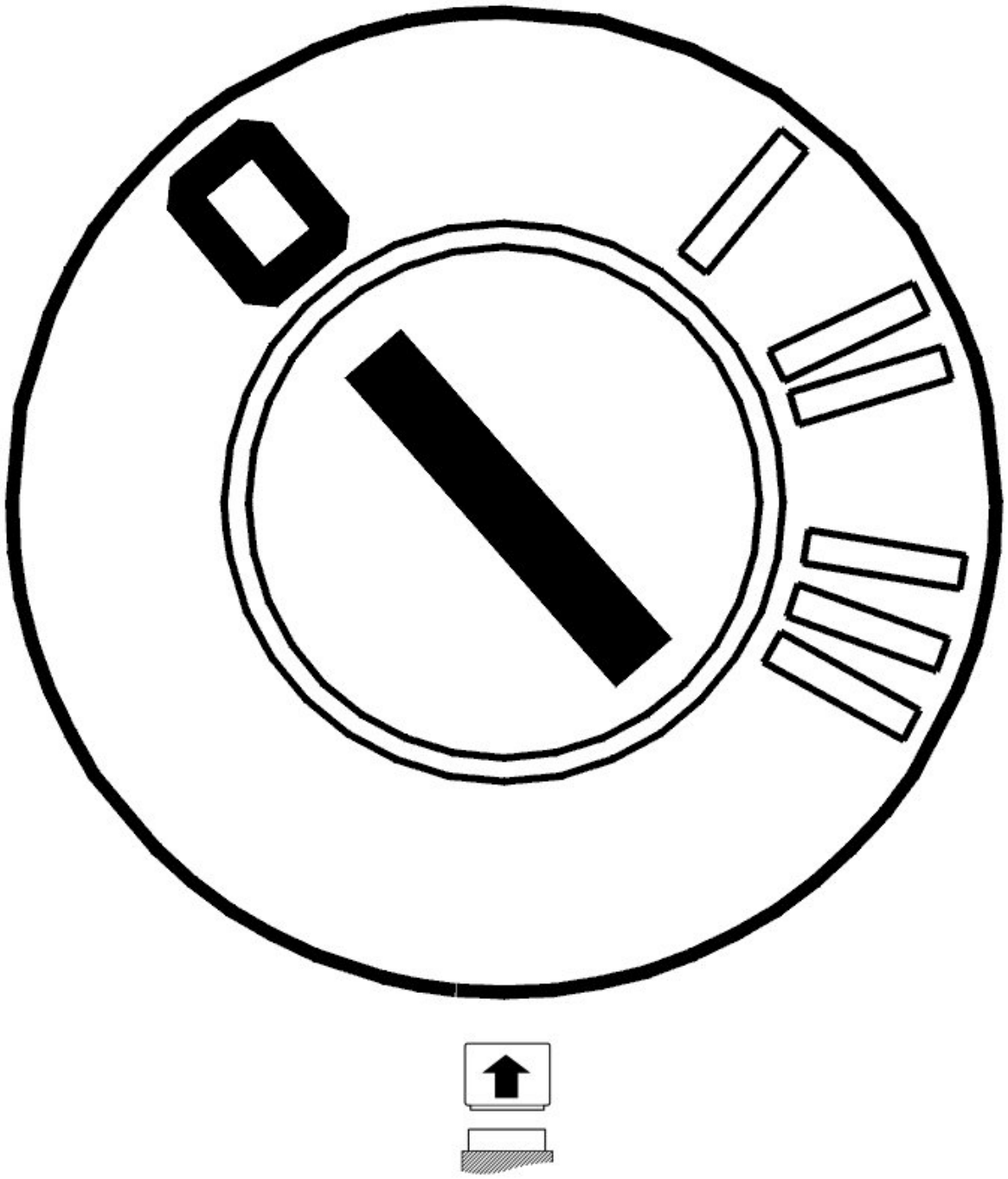
Fault symptom[s]

- The light switch does not operate
- Beam height control does not function
- The parking heater does not operate.

Short-Circuit to Ground

Short-circuit to ground

Checking the wiring



- Ignition off
- Disconnect connectors D and C from the central electronic module (CEM).

The diagnostic trouble code (DTC) indicates that the communication between the light switch module (LSM), central electronic module (CEM) and combustion preheater module (CPM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or all of the control modules.
Check the signal cable. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #D41 (#41) and light switch module (LSM) terminal #3
- Central electronic module (CEM) terminal #C32 (#32) and combustion preheater module (CPM) terminal #6.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new light switch module (LSM) and combustion preheater module (CPM).
Only replace one control module at a time. Check the function of each control module between each replacement.
Remedy as necessary.

Other information

- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair

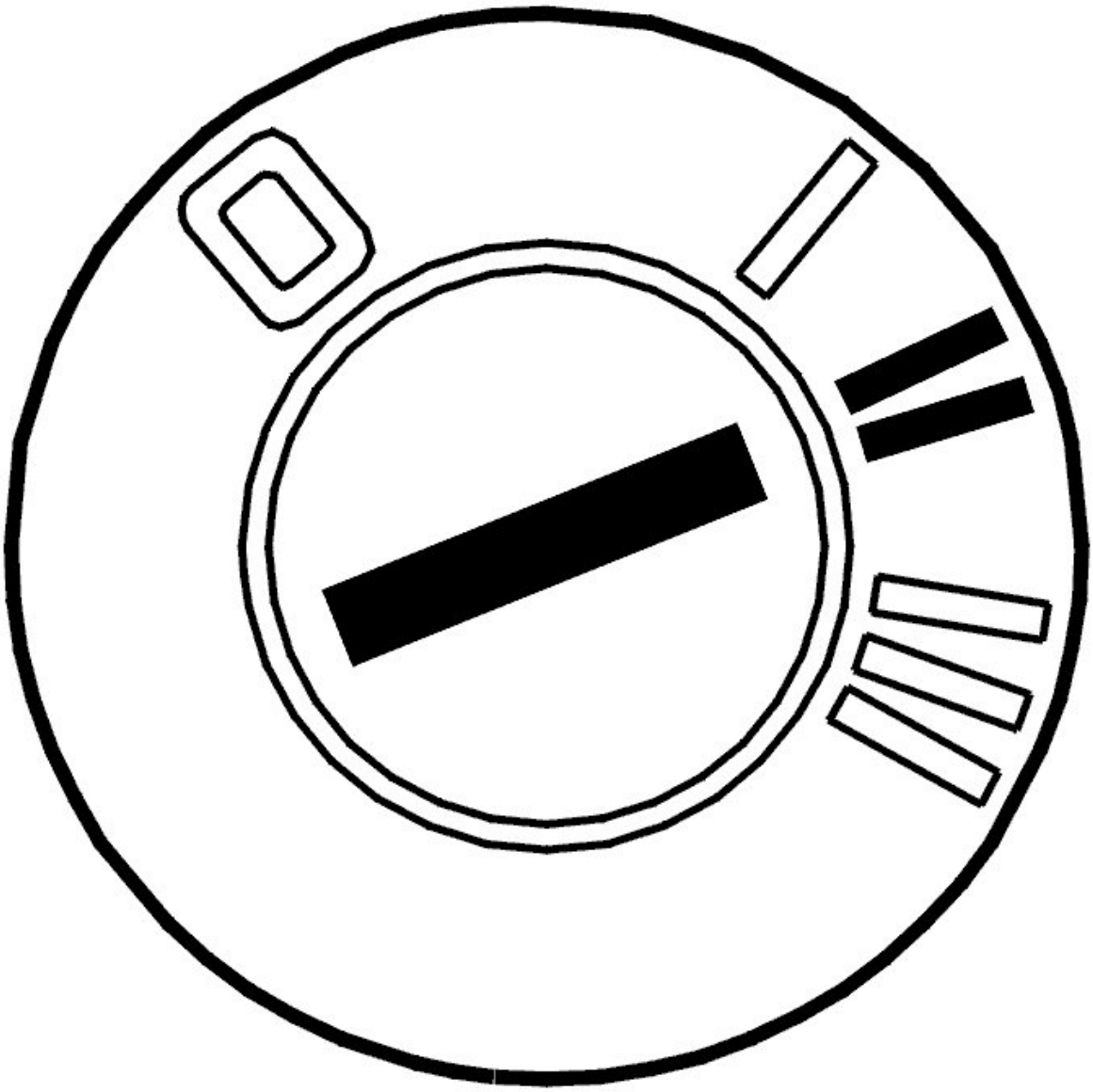
Continue - Verification

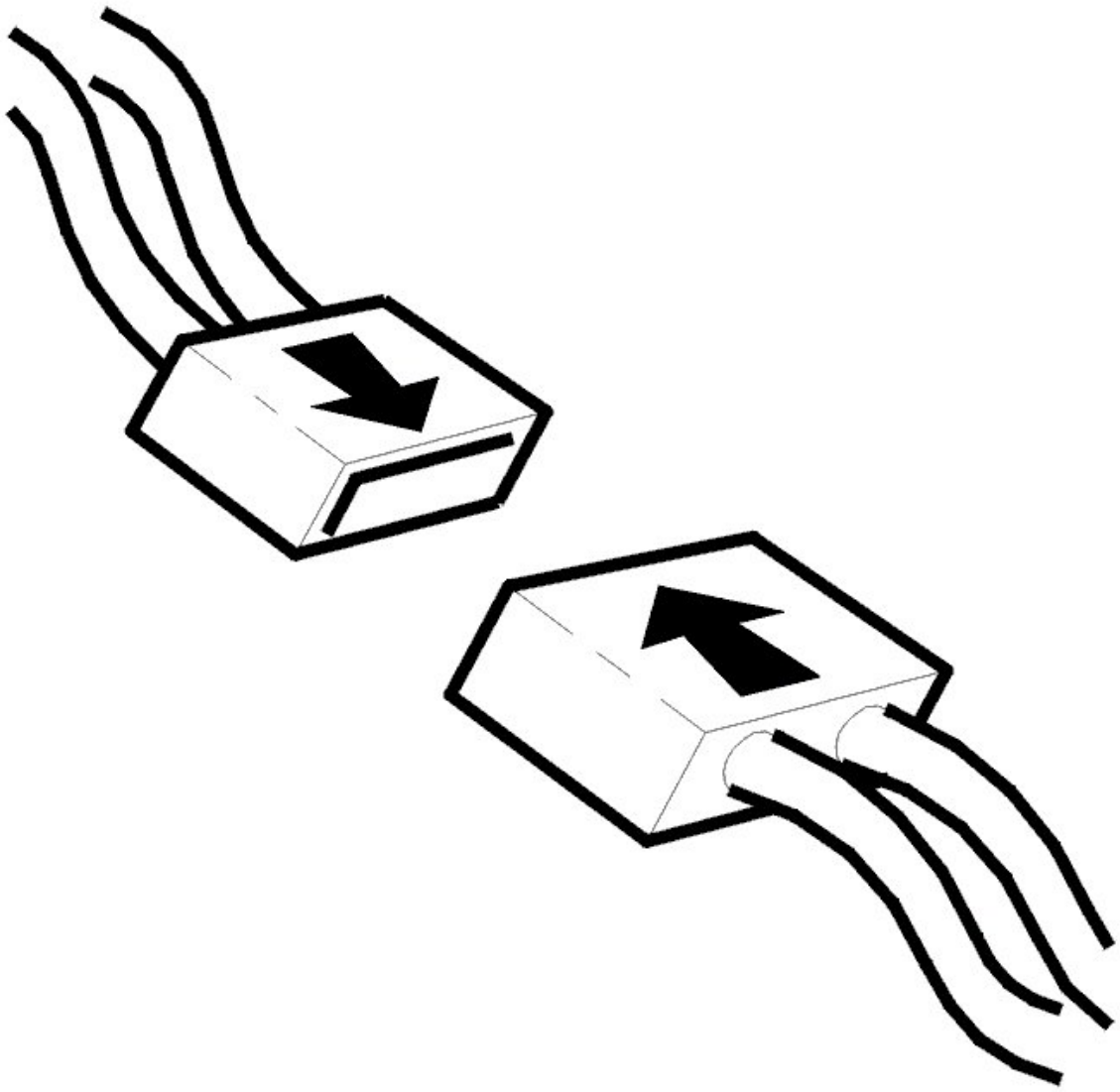
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.
Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Are both the light switch module (LSM) and combustion preheater module (CPM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

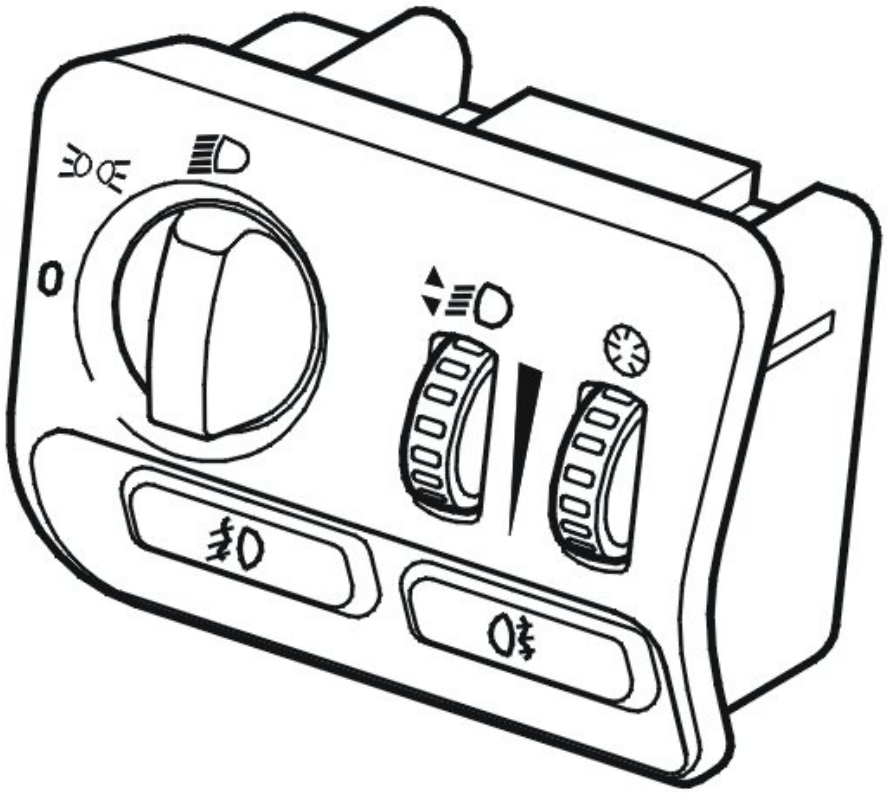
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD10

Condition



The central electronic module (CEM) sends and receives information via a standardized serial communication system. This system is called Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked communication with the light switch module (LSM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors. The central electronic module (CEM) is the only control module that monitors the voltage level in the signal cables. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of this type of fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables

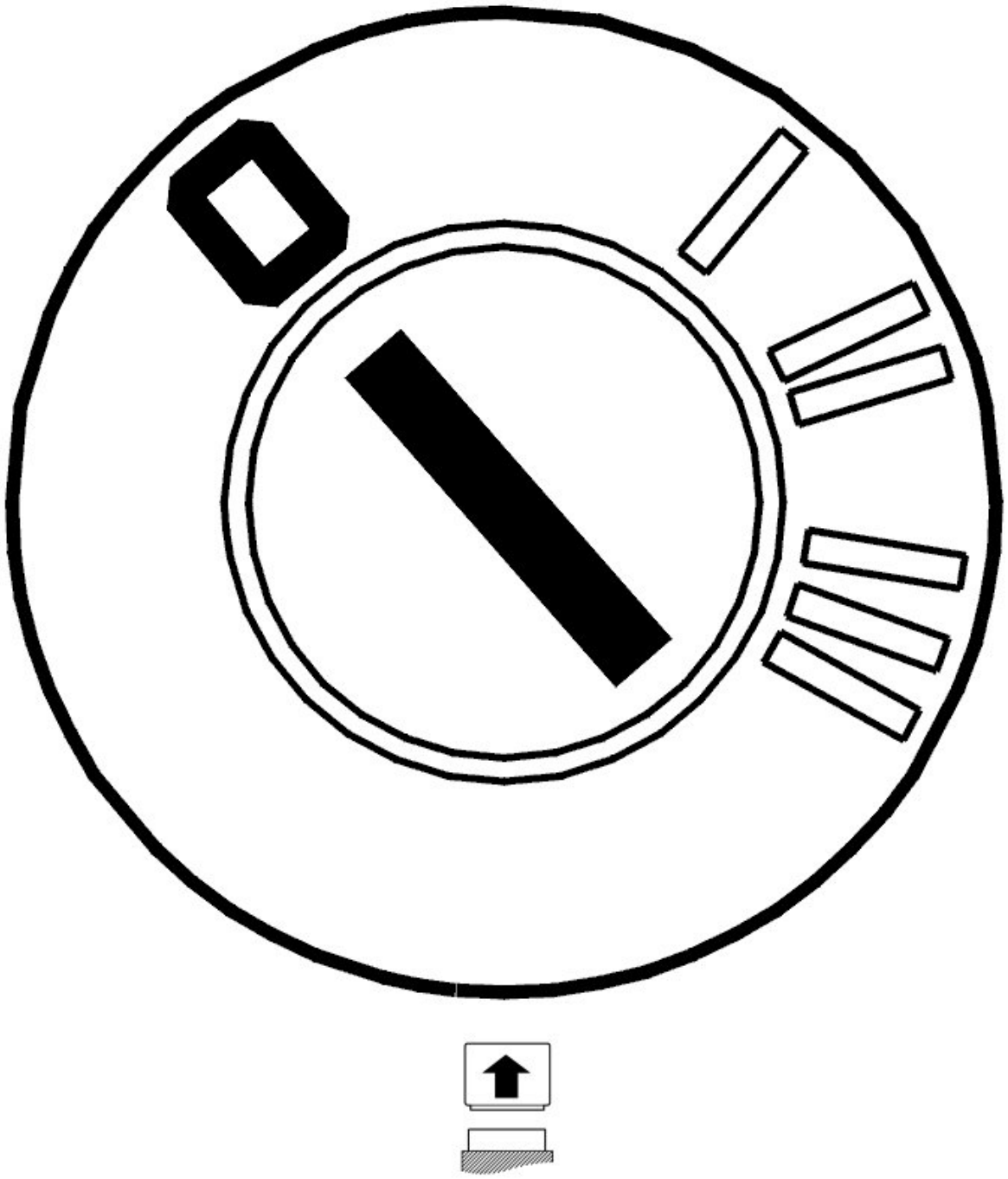
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- The light switch does not operate
- Beam height control does not function.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The diagnostic trouble code (DTC) indicates that the communication between the light switch module (LSM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between central electronic module (CEM) terminal #D41 (#41) and light switch module (LSM) terminal #3.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic

Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try replacing the light switch module (LSM).
Remedy as necessary.

Other information
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

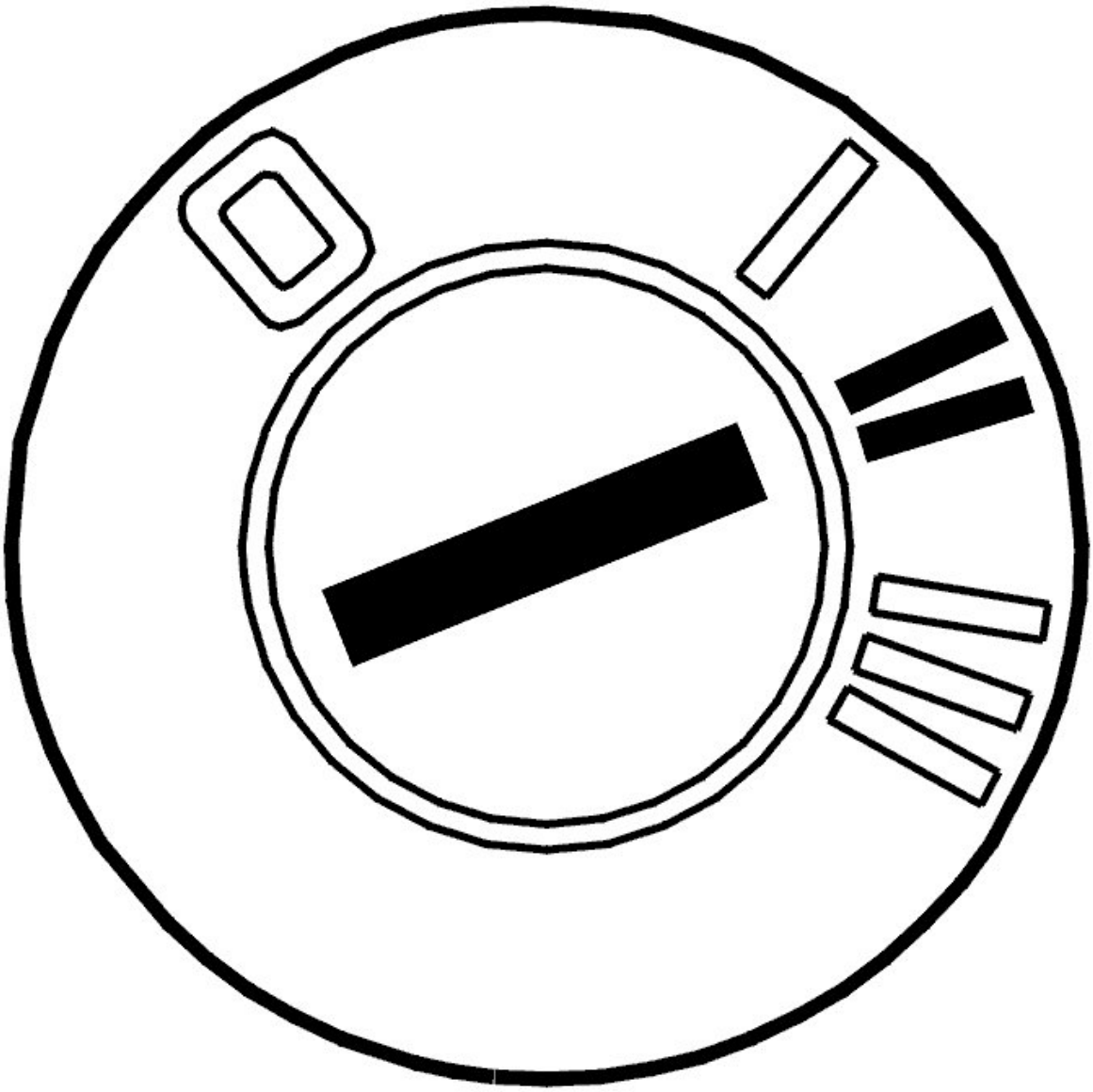
Continue - Verification

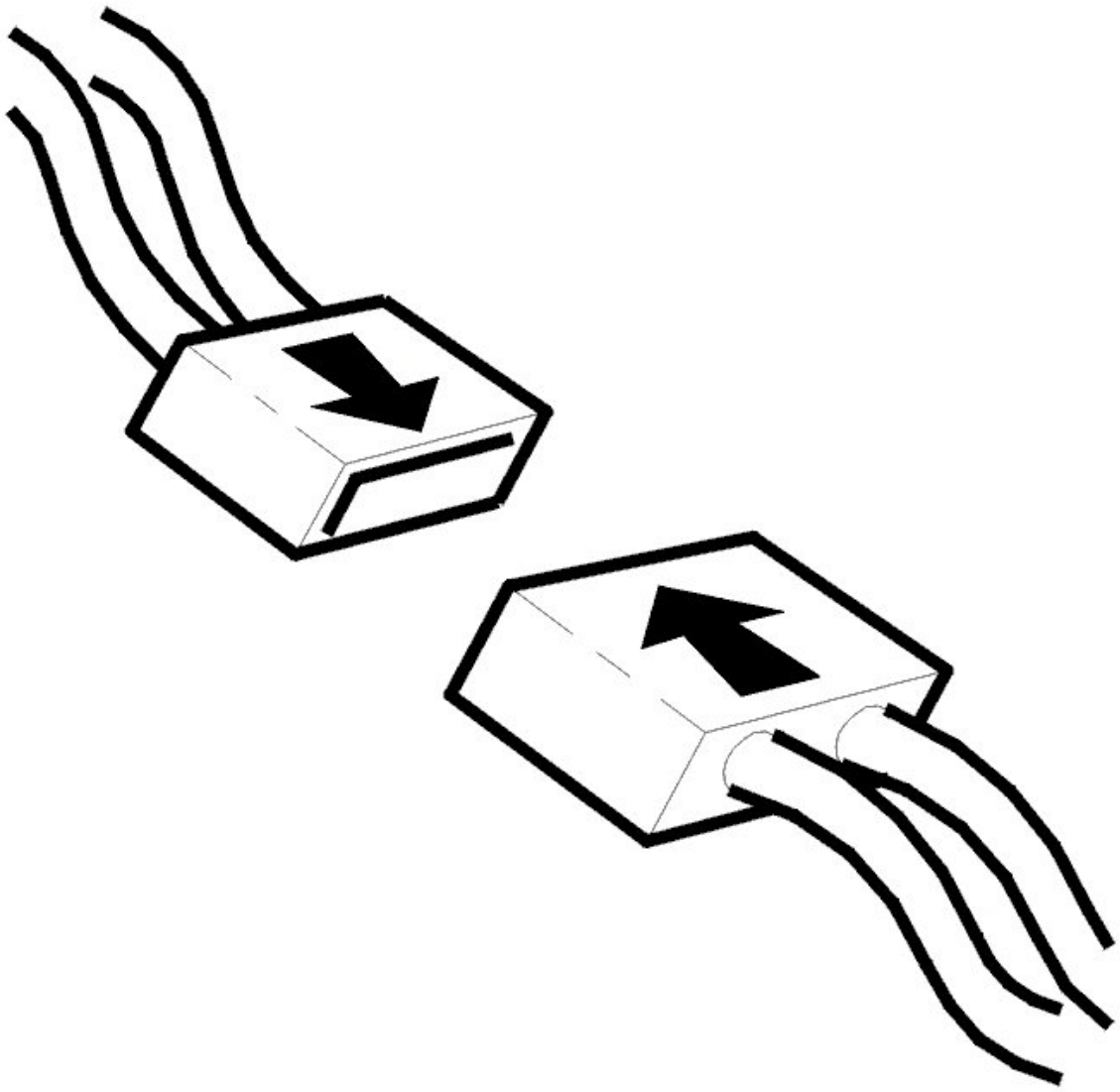
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.

Is the light switch module (LSM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - FAULT-TRACING FAILED

No - Attempt New Test

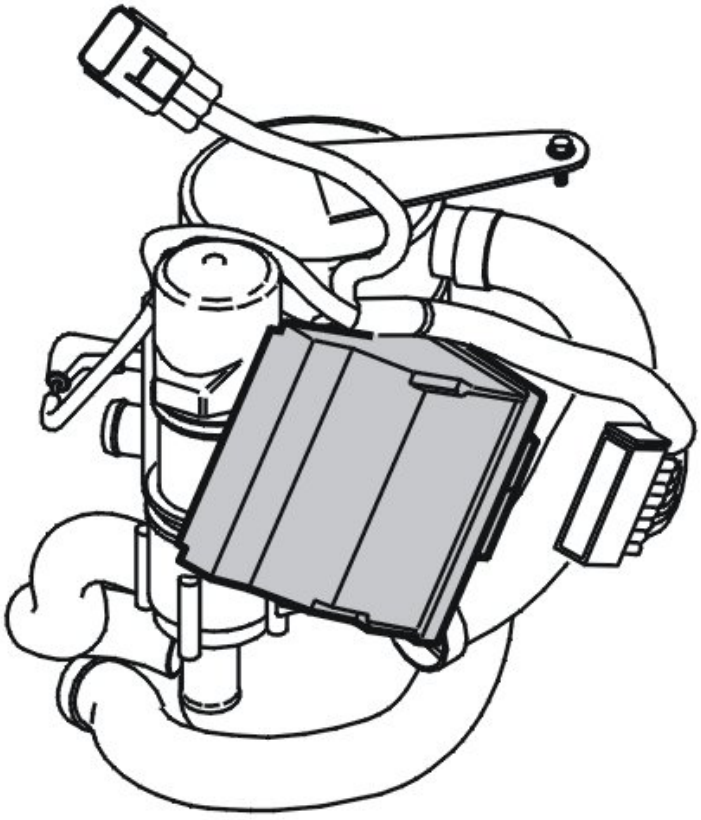
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD11

Condition



The central electronic module (CEM) sends and receives information via a standardized serial communication system. This system is called Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position I and II for at least 10 seconds and with the battery voltage above 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors. The central electronic module (CEM) is the only control module that monitors the voltage level in the signal cables. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of this type of fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Damaged fuse.
- Internal fault in another control module in the same part of the network.

Fault symptom[s]

- The parking heater does not operate.

Signal Missing

Signal missing

Checking fuses

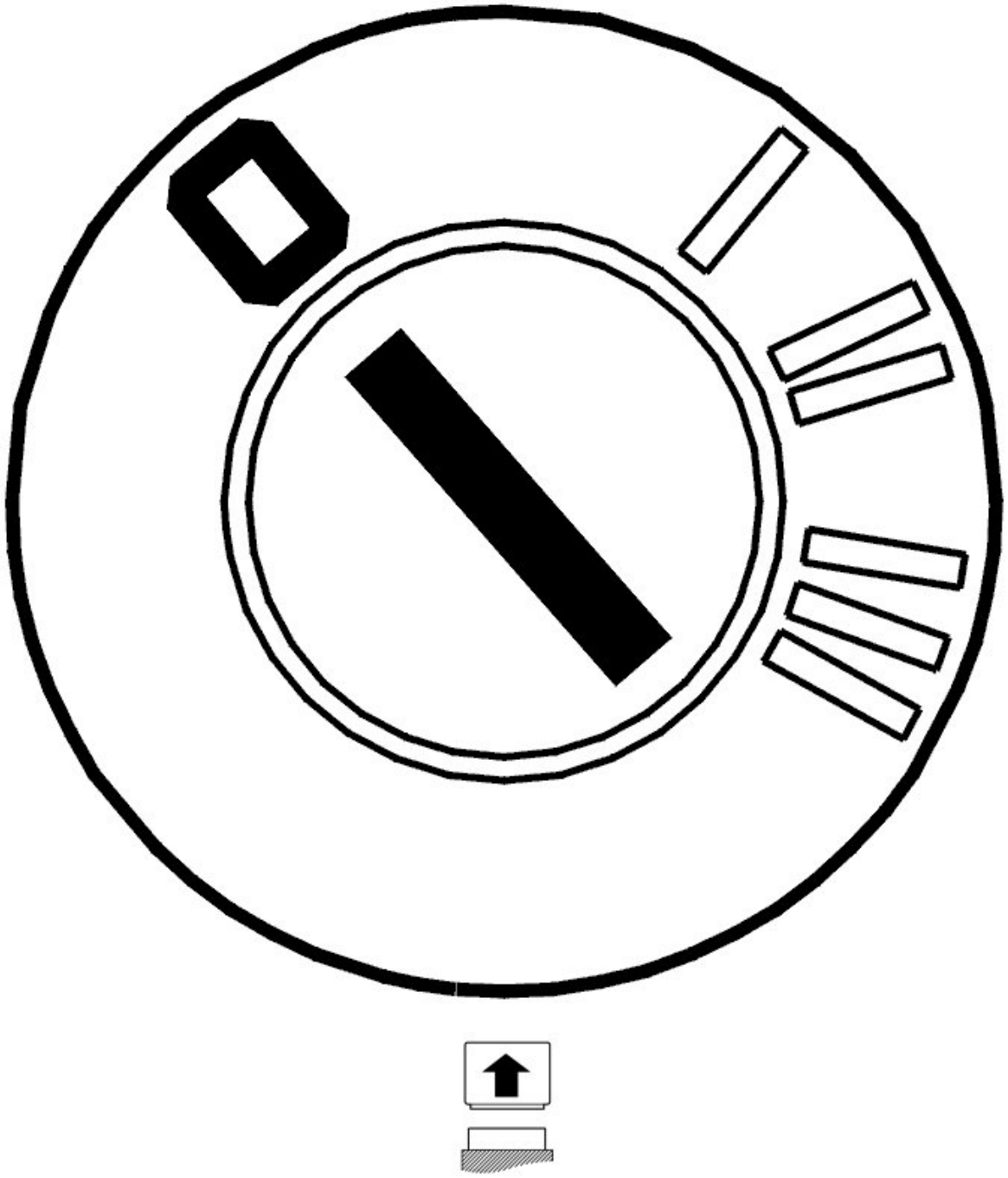
Check that the fuse for the function in question is intact.
For information about fuses, see the wiring diagram.

Was a fault detected?

Yes - Verification

No - Checking the wiring

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

The diagnostic trouble code (DTC) indicates that the communication between the combustion preheater module (CPM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between central electronic module (CEM) terminal #C32 (#32) and combustion preheater module (CPM) terminal #6.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new combustion preheater module (CPM).
Remedy as necessary.

Other information

- Control module engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Control Module/Service and Repair

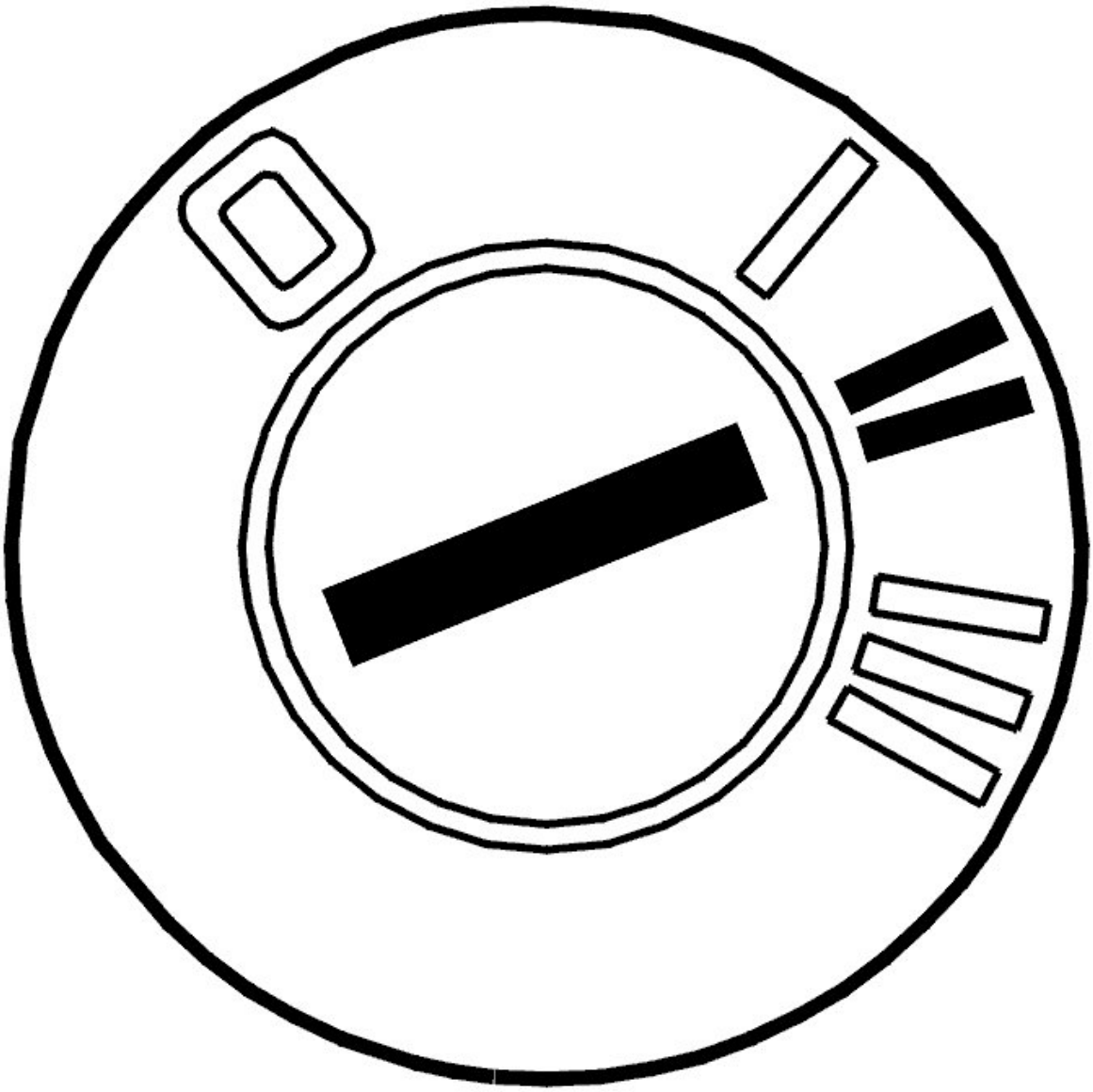
Continue - Verification

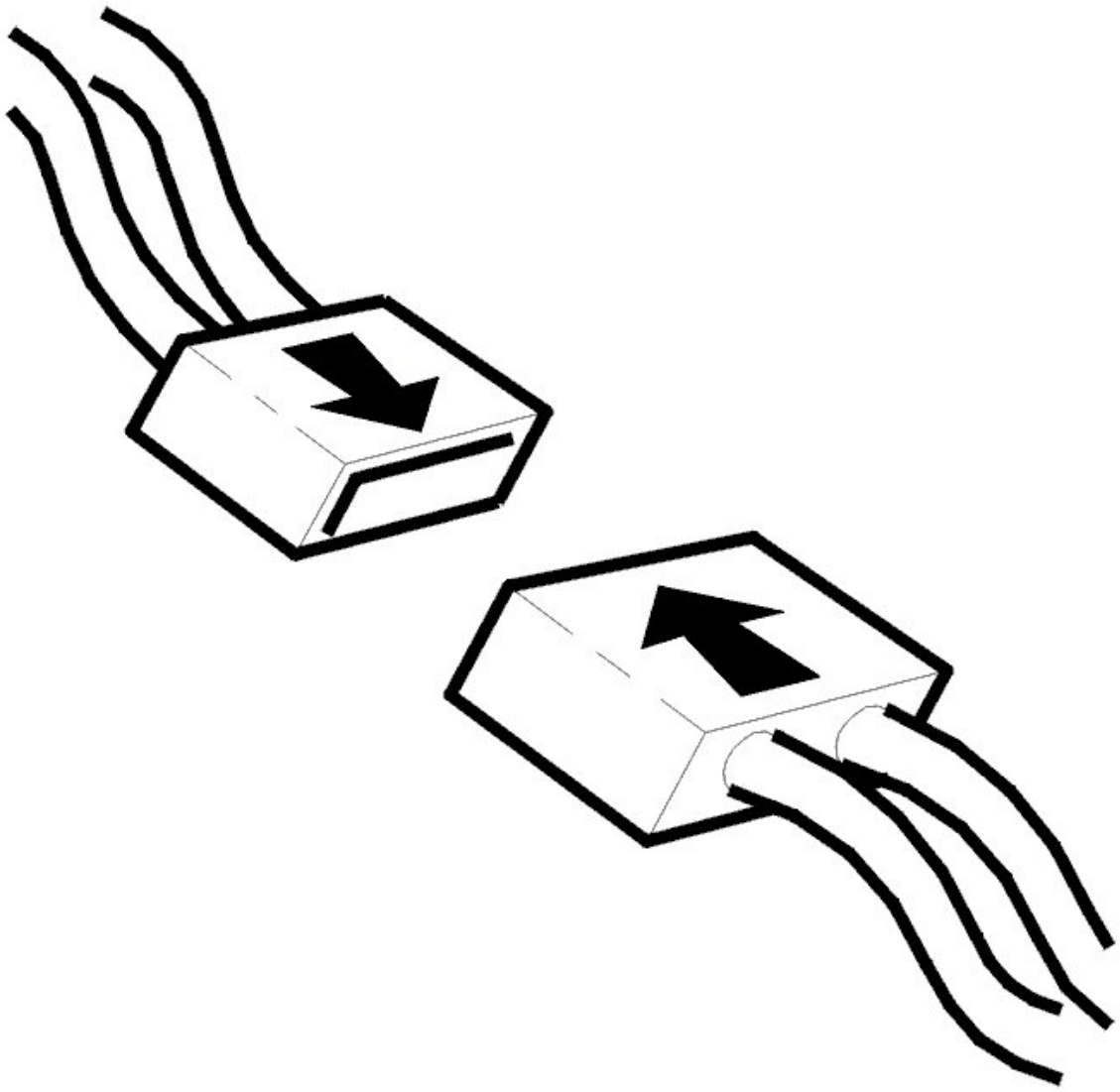
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Is the engine coolant heater working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

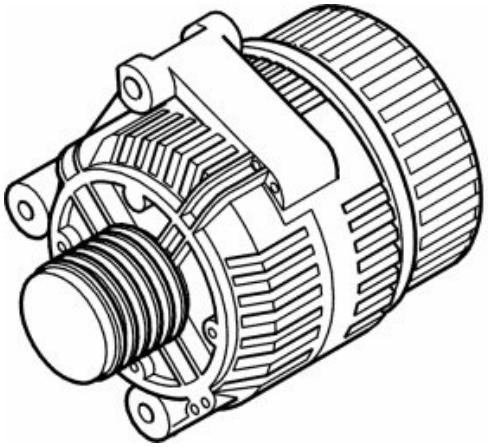
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD20

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is generated if the control module registers serious interference such as blocked LIN communication. The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and with the battery voltage above 10.5 V.
Note: In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can generate diagnostic trouble codes (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

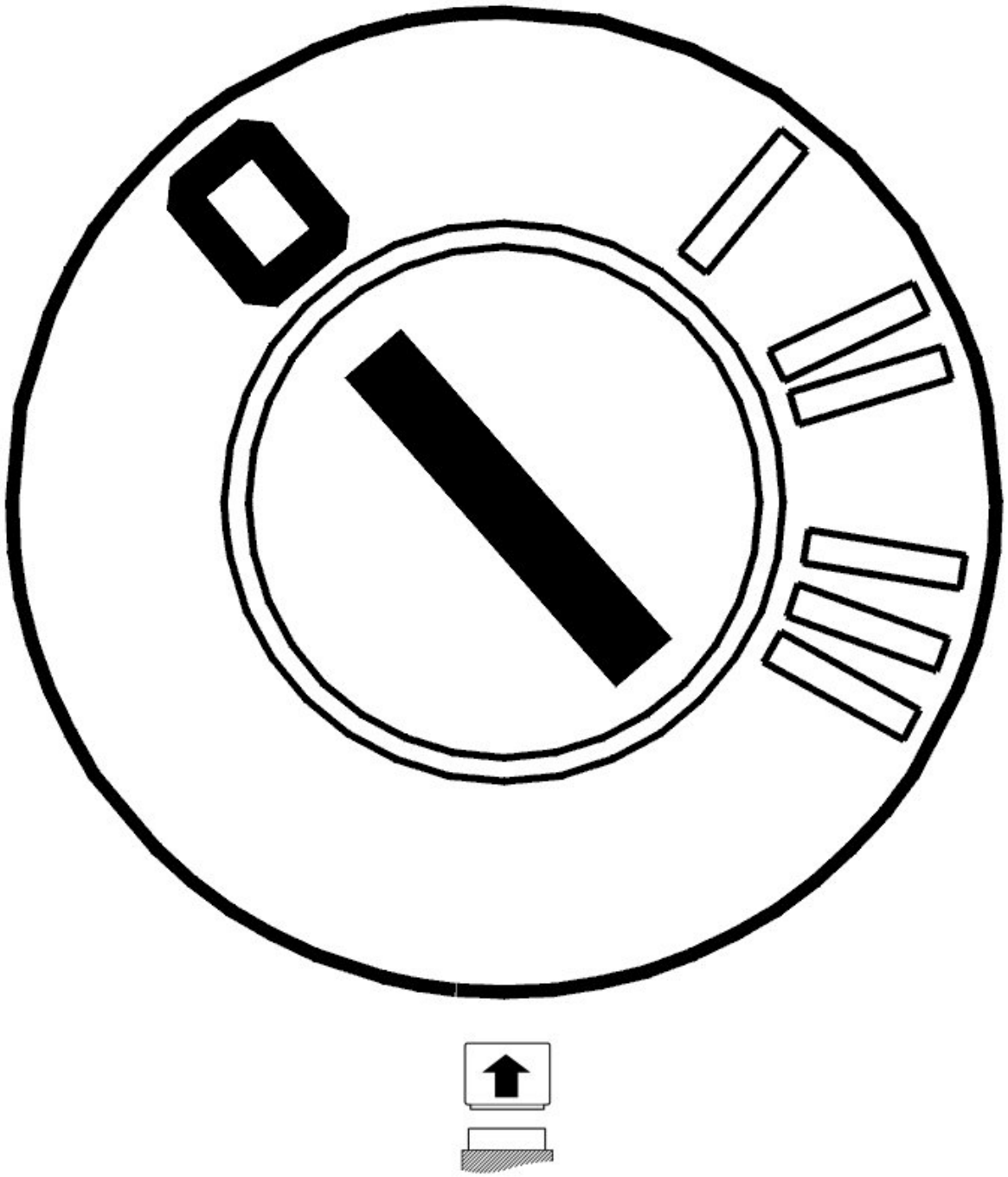
Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

Fault symptom[s]
- The battery electrolyte boils when the engine is running. (Not vehicles with a V8 engine.)
- The battery discharges. (Not vehicles with a V8 engine.)
- The LED does not come on. (Only vehicles with Blind Spot Indication System, BLIS.)

Communication Fault

Communication fault

Checking the wiring



The diagnostic trouble code indicates that communication between the central electronic module (CEM) and the alternator control module (ACM) (not vehicles with a V8 engine), the left camera module (LCM) (optional extra) and the right camera module (RCM) (optional extra) is inoperative. This could be due to a fault in the signal lead between the control modules or a damaged communication unit in one or all of the control modules.

Note! All vehicles from and including model year 2005 are equipped with a signal cable to the Left Camera Module (LCM) / Right Camera Module (RCM) even if the vehicle is not equipped with BLIS system. This means that measurements must always be carried out up to the 12-pin connector in the external doors when the diagnostic trouble code (DTC) has been detected on LIN bus 2.

Check the signal lead between the central electronic module (CEM) and the alternator control module (ACM) for an open circuit or shorting to ground.
Take readings between:

- Central electronic module (CEM) #C16 (#16) and alternator control module (ACM) #B1.

For vehicles without the Blind Spot Indication System (BLIS)

Check the signal cable between the Central Electronic Module (CEM) and the 12-pin connector in the outer doors. Check for an open-circuit.
Check for a short-circuit to ground.
Check the connector in both doors.
Take readings between:

- Central Electronic Module (CEM) D24 (#24) and the 12 pin connector in the external doors terminal #12.

For vehicles equipped with the Blind Spot Indication System (BLIS)

Check the signal lead between the central electronic module (CEM) and the left camera module (LCM) for an open circuit or shorting to ground.
Take readings between:
- Central electronic module (CEM) #D24 (#24) and left camera module (LCM) #5.

Check the signal lead between the central electronic module (CEM) and the right camera module (RCM) for an open circuit or shorting to ground.
Take readings between:
- Central electronic module (CEM) #D24 (#24) and right camera module (RCM) #5.

Also check intermediate connectors.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair
- Change the left camera module (LCM)/right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Fault Found

No - Checking the component

Checking the component

For vehicles equipped with the Blind Spot Indication System (BLIS)

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the right and left sides.
If any LED fails to flash three times on activation, try changing the control module on that side.
If both LEDs flash three times on activation, try changing the alternator control module (ACM)

For vehicles without the Blind Spot Indication System (BLIS)

Try changing the alternator control module (ACM).

Select the desired alternative:
1. Change the alternator control module (ACM).
2. Change the left camera module (LCM) / right camera module (RCM).

Select required alternative.

1 - Replacing the control module

2 - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Replacing the control module

Try a new alternator control module (ACM).
Remedy as necessary.

Other information

- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair

Continue - Verification

Replacing the control module

Try changing the control module on the side where the LED failed to flash.
Remedy as necessary.

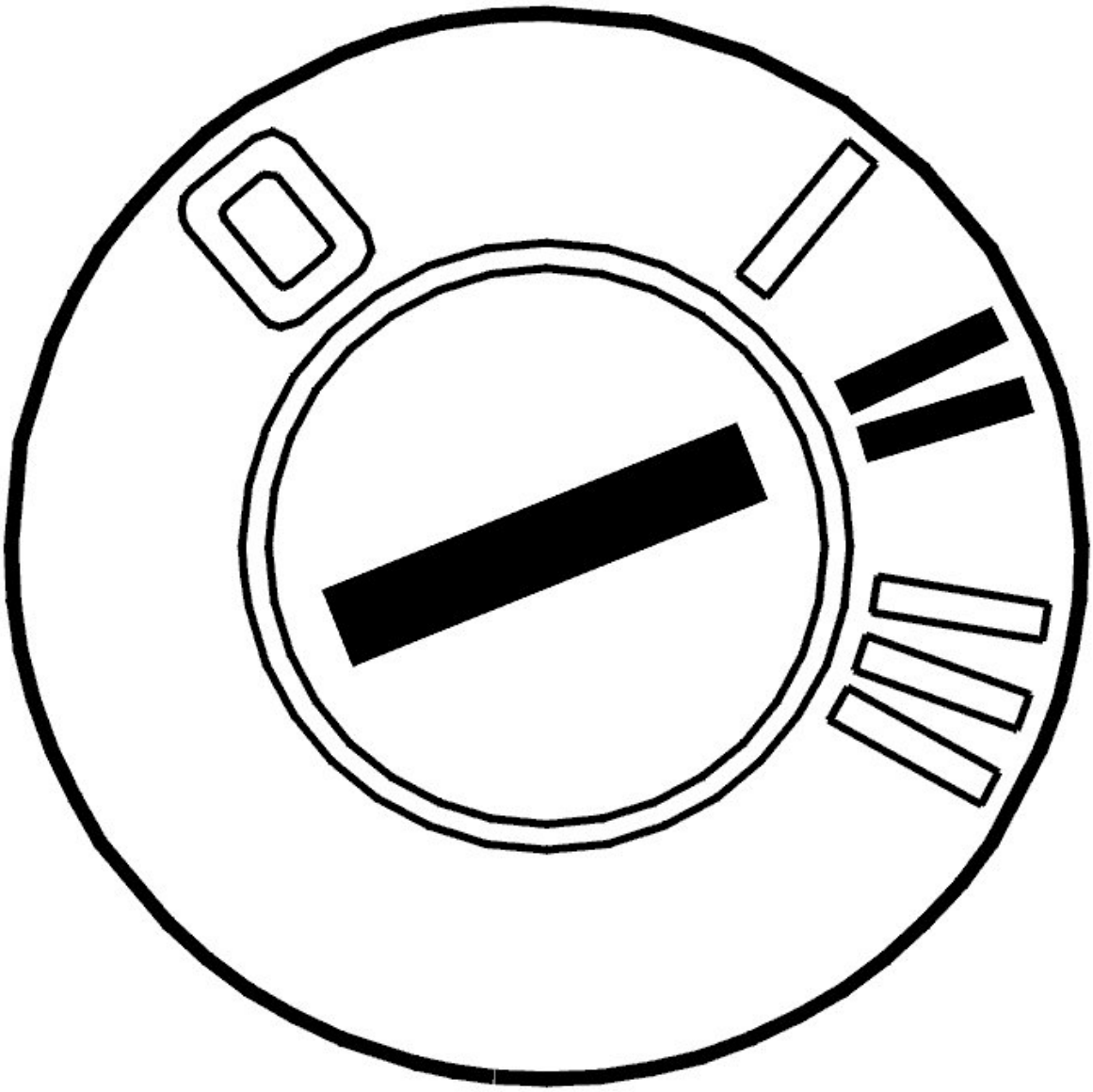
Other information

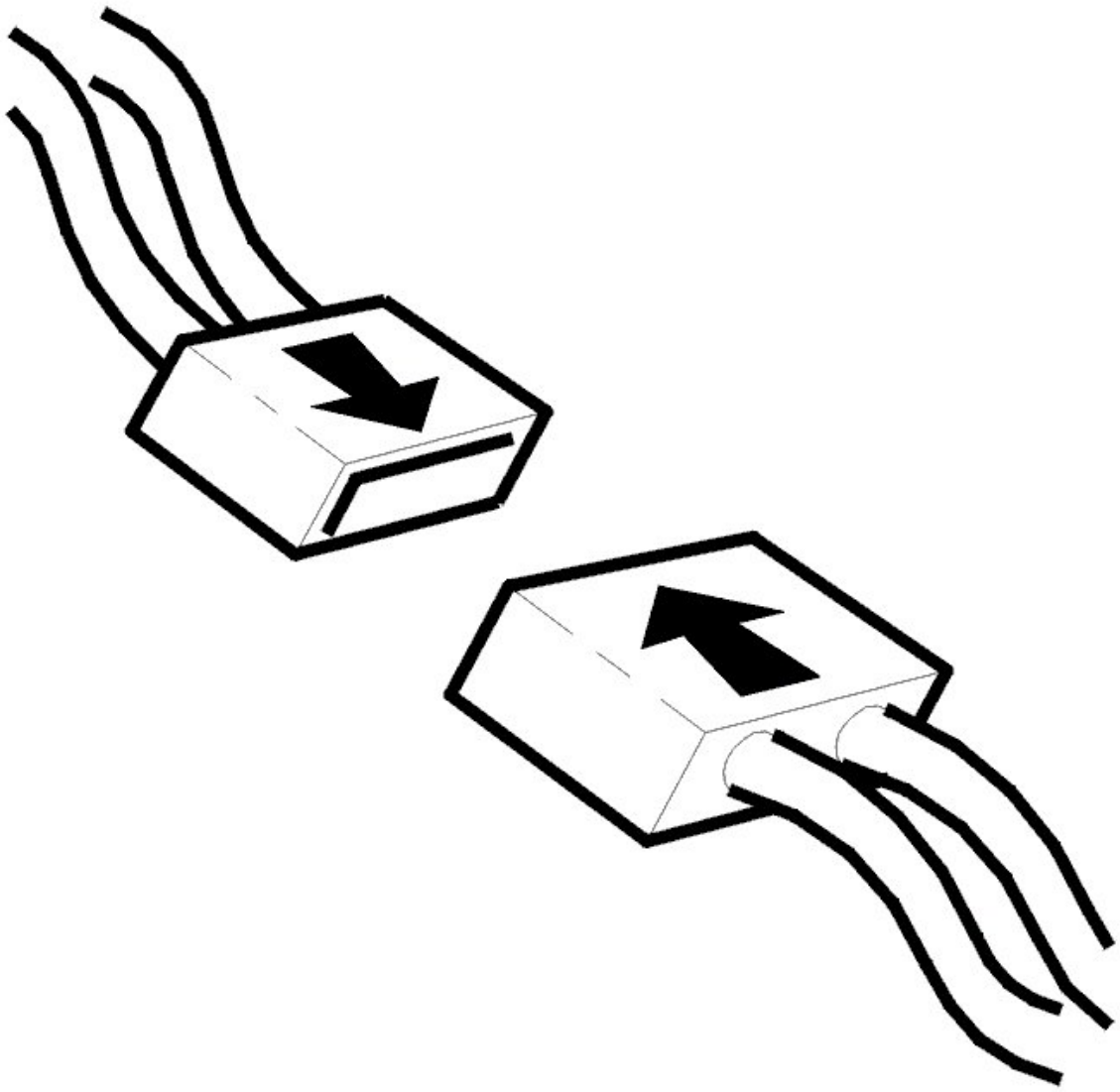
- Change the control module, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and run it to normal operating temperature.

Click on the VCT2000 symbol to read off the status of the generator (GEN).
Check that the read out shows OK.

Is the status given as OK?

Yes - VERIFIED

No - VERIFICATION FAILED

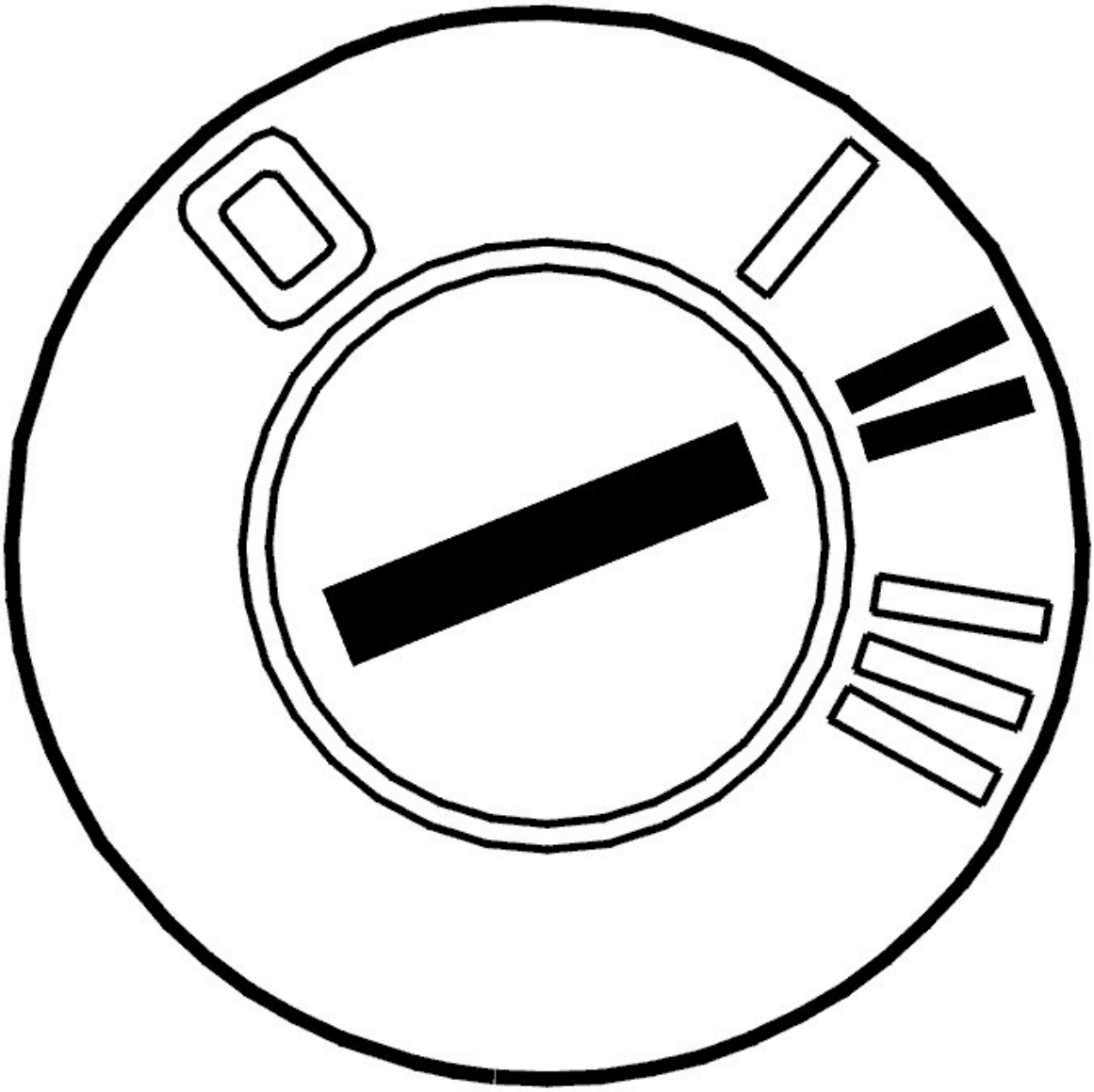
VERIFIED - Fault Found

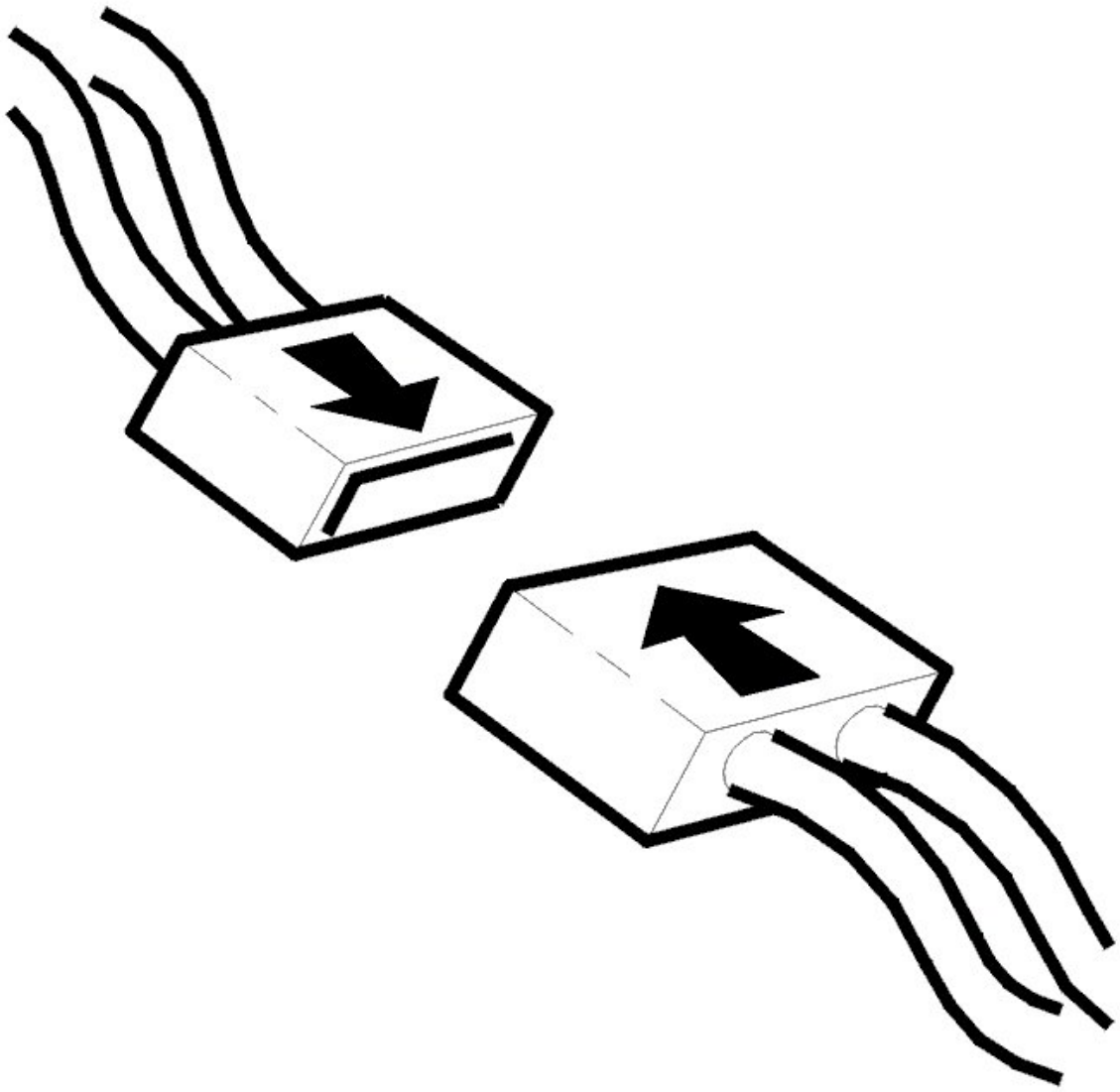
VERIFICATION FAILED - Fault-tracing information

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Check that the light emitting diodes flash three times when the system is activated.

Did the light emitting diodes flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

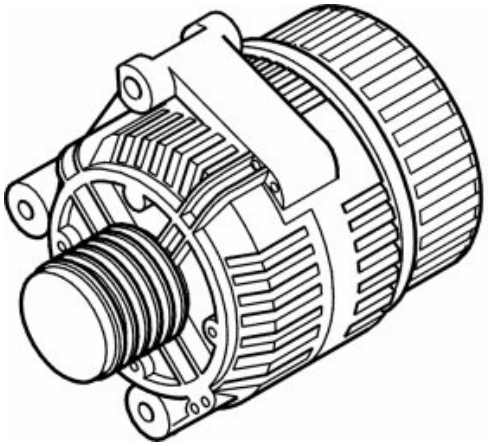
VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD21

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is generated if the control module registers serious interference such as blocked LIN communication. The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.

Note: In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can generate a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value

- None.

Possible source

- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

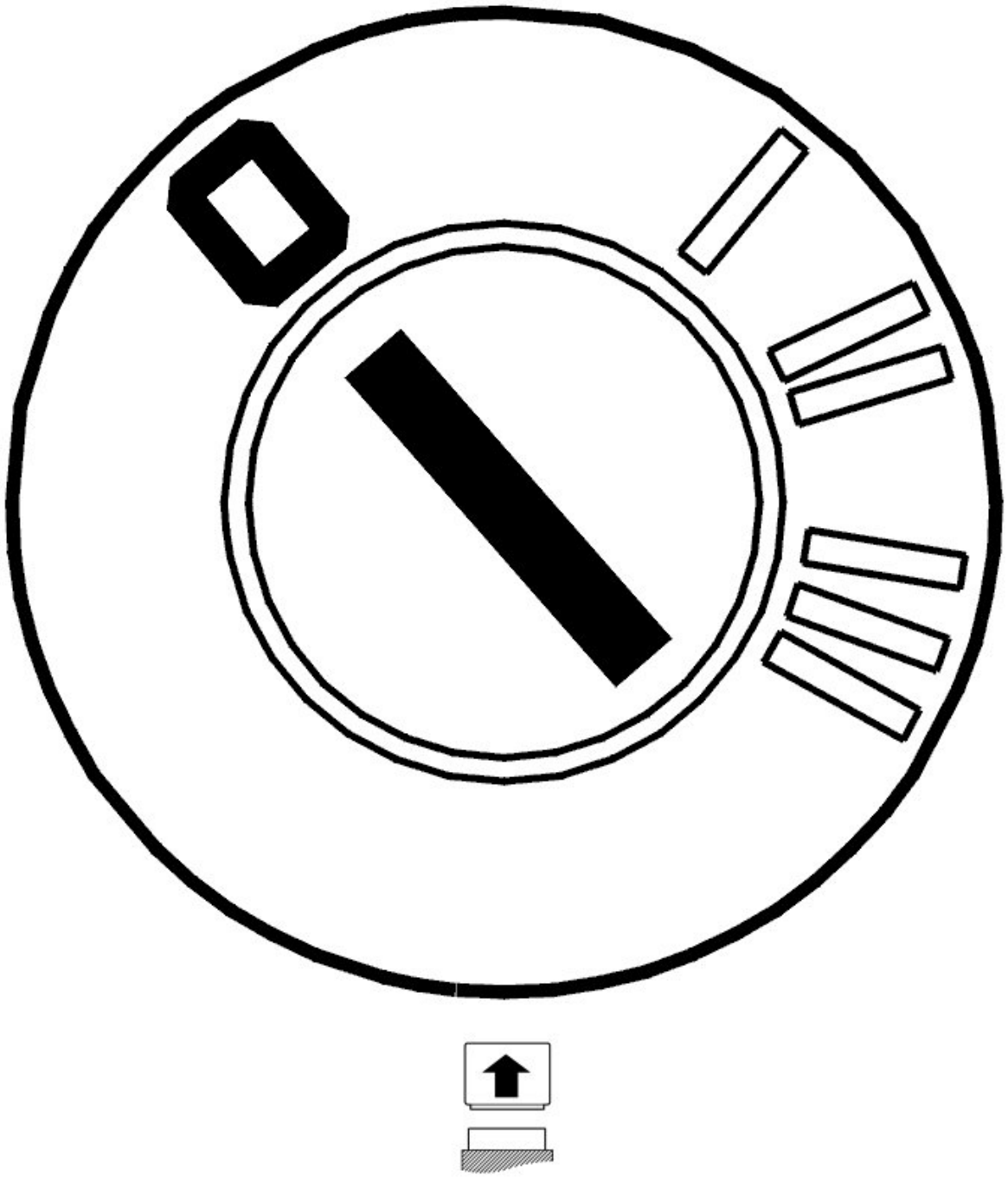
Fault symptom[s]

- The battery electrolyte boils when the engine is running. (Not vehicles with a V8 engine.)
- The battery discharges. (Not vehicles with a V8 engine.)
- The LED does not come on. (Only vehicles with Blind Spot Indication System, BLIS.)

Signal Missing

Signal missing

Checking the wiring



The diagnostic trouble code indicates that communication between the central electronic module (CEM) and the alternator control module (ACM) (not vehicles with a V8 engine), the left camera module (LCM) (optional extra) and the right camera module (RCM) (optional extra) is inoperative. This could be due to a fault in the signal lead between the control modules or a damaged communication unit in one or all of the control modules.

Note! All vehicles from and including model year 2005 are equipped with a signal cable to the Left Camera Module (LCM) / Right Camera Module (RCM) even if the vehicle is not equipped with BLIS system. This means that measurements must always be carried out up to the 12-pin connector in the external doors when the diagnostic trouble code (DTC) has been detected on LIN bus 2.

Check the signal lead between the central electronic module (CEM) and the alternator control module (ACM) for an open circuit or shorting to ground.
Take readings between:

- Central electronic module (CEM) #C16 (#16) and alternator control module (ACM) #B1.

For vehicles without the Blind Spot Indication System (BLIS)

Check the signal cable between the Central Electronic Module (CEM) and the 12-pin connector in the outer doors. Check for an open-circuit.
Check for a short-circuit to ground.
Check the connector in both doors.
Take readings between:

- Central Electronic Module (CEM) D24 (#24) and the 12 pin connector in the external doors terminal #12.

For vehicles equipped with the Blind Spot Indication System (BLIS)

Check the signal lead between the central electronic module (CEM) and the left camera module (LCM) for an open circuit or shorting to ground.
Take readings between:
- Central electronic module (CEM) #D24 (#24) and left camera module (LCM) #5.

Check the signal lead between the central electronic module (CEM) and the right camera module (RCM) for an open circuit or shorting to ground.
Take readings between:
- Central electronic module (CEM) #D24 (#24) and right camera module (RCM) #5.

Also check intermediate connectors.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair
- Change the left camera module (LCM)/right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Fault Found

No - Checking the component

Checking the component

For vehicles equipped with the Blind Spot Indication System (BLIS)

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the right and left sides.
If any LED fails to flash three times on activation, try changing the control module on that side.
If both LEDs flash three times on activation, try changing the alternator control module (ACM).

For vehicles without the Blind Spot Indication System (BLIS)

Try changing the alternator control module (ACM).

Select the desired alternative:
1. Change the alternator control module (ACM).
2. Change the left camera module (LCM) / right camera module (RCM).

Select required alternative.

1 - Replacing the control module

2 - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Replacing the control module

Try a new alternator control module (ACM).
Remedy as necessary.

Other information

- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair

Continue - Verification

Replacing the control module

Try changing the control module on the side where the LED failed to flash.
Remedy as necessary.

Other information

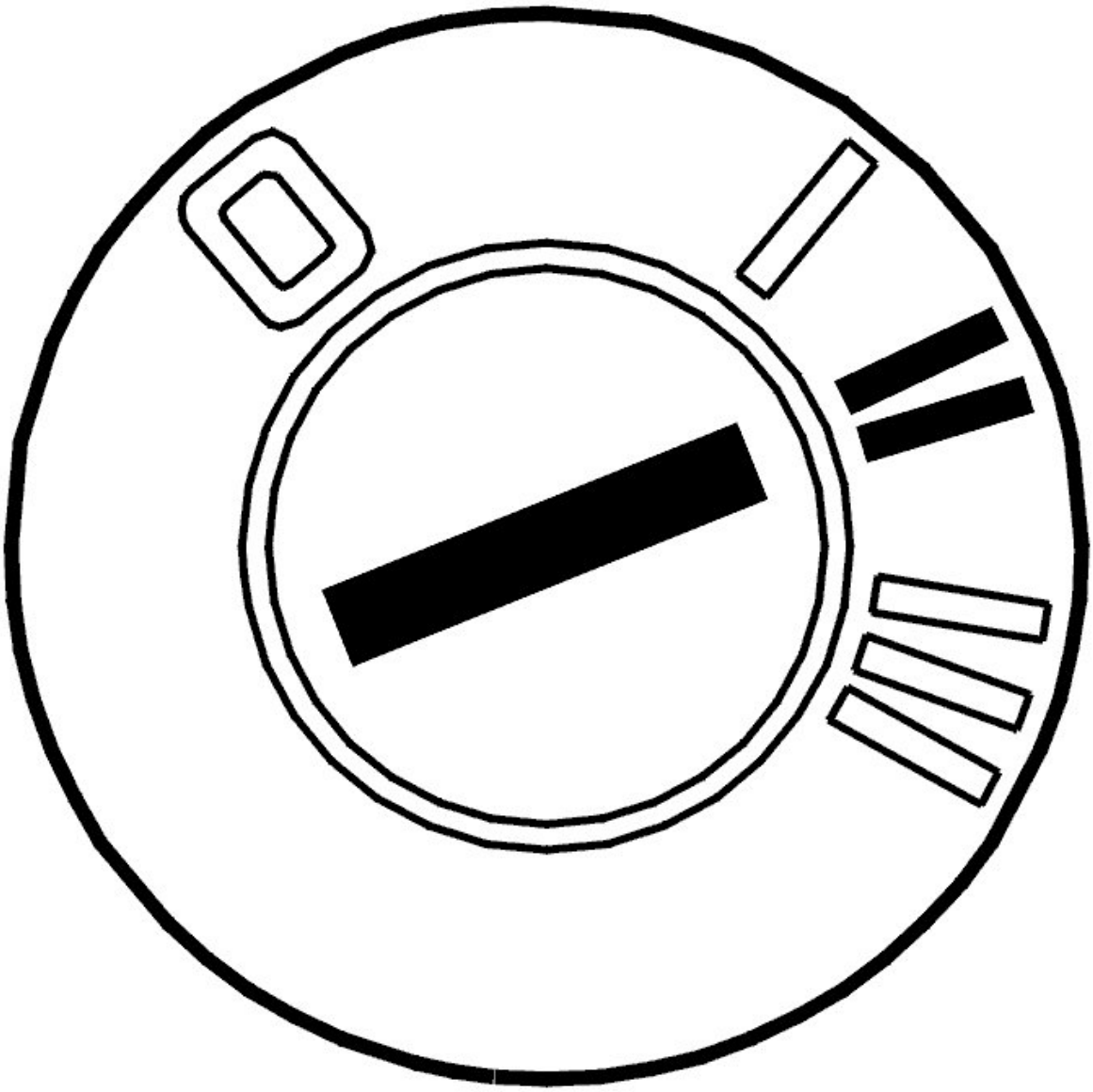
- Change the control module, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair

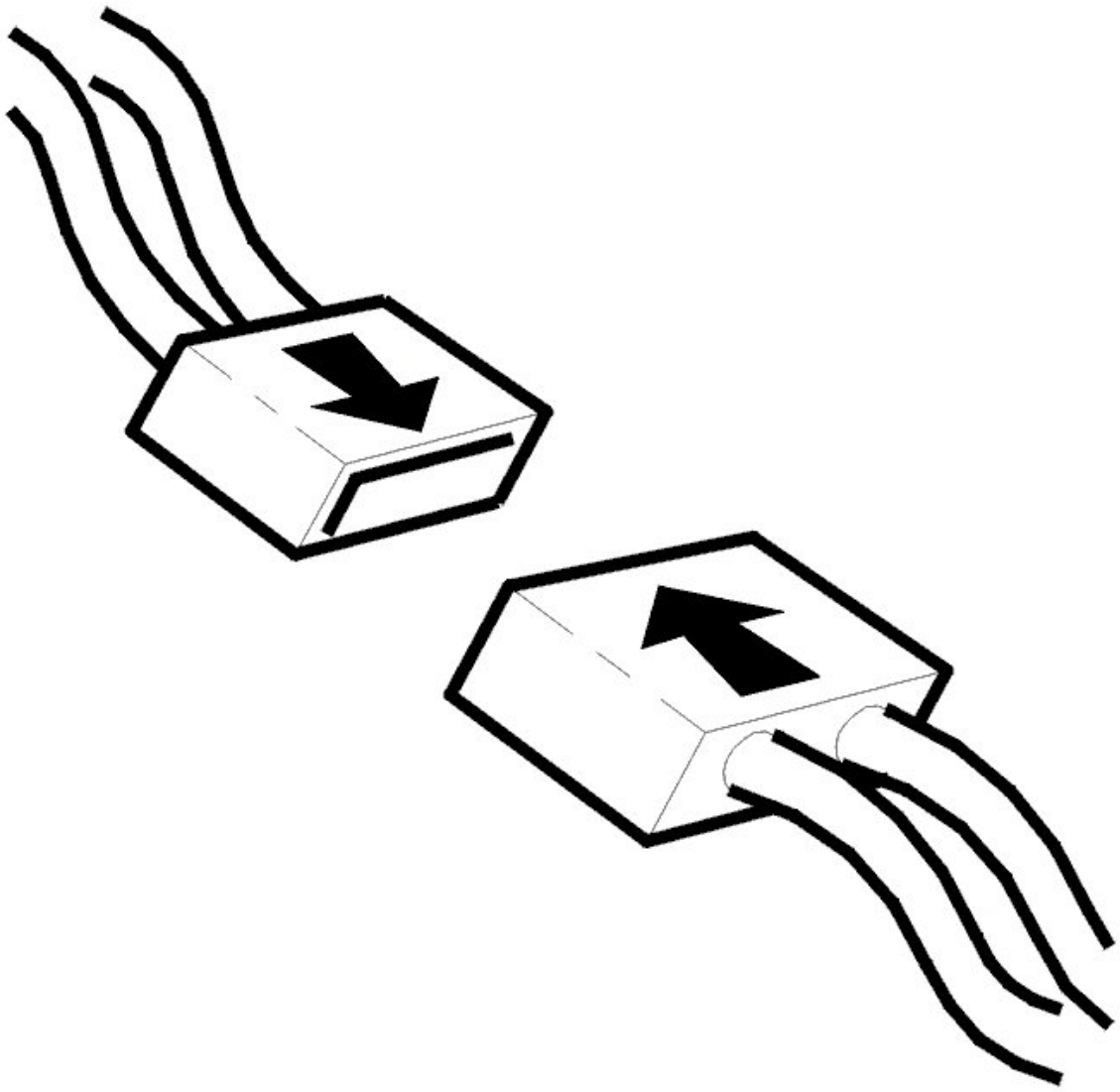
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and run it to normal operating temperature.

Click on the VCT2000 symbol to read off the status of the generator (GEN).
Check that the read out shows OK.

Is the status given as OK?

Yes - VERIFIED

No - VERIFICATION FAILED

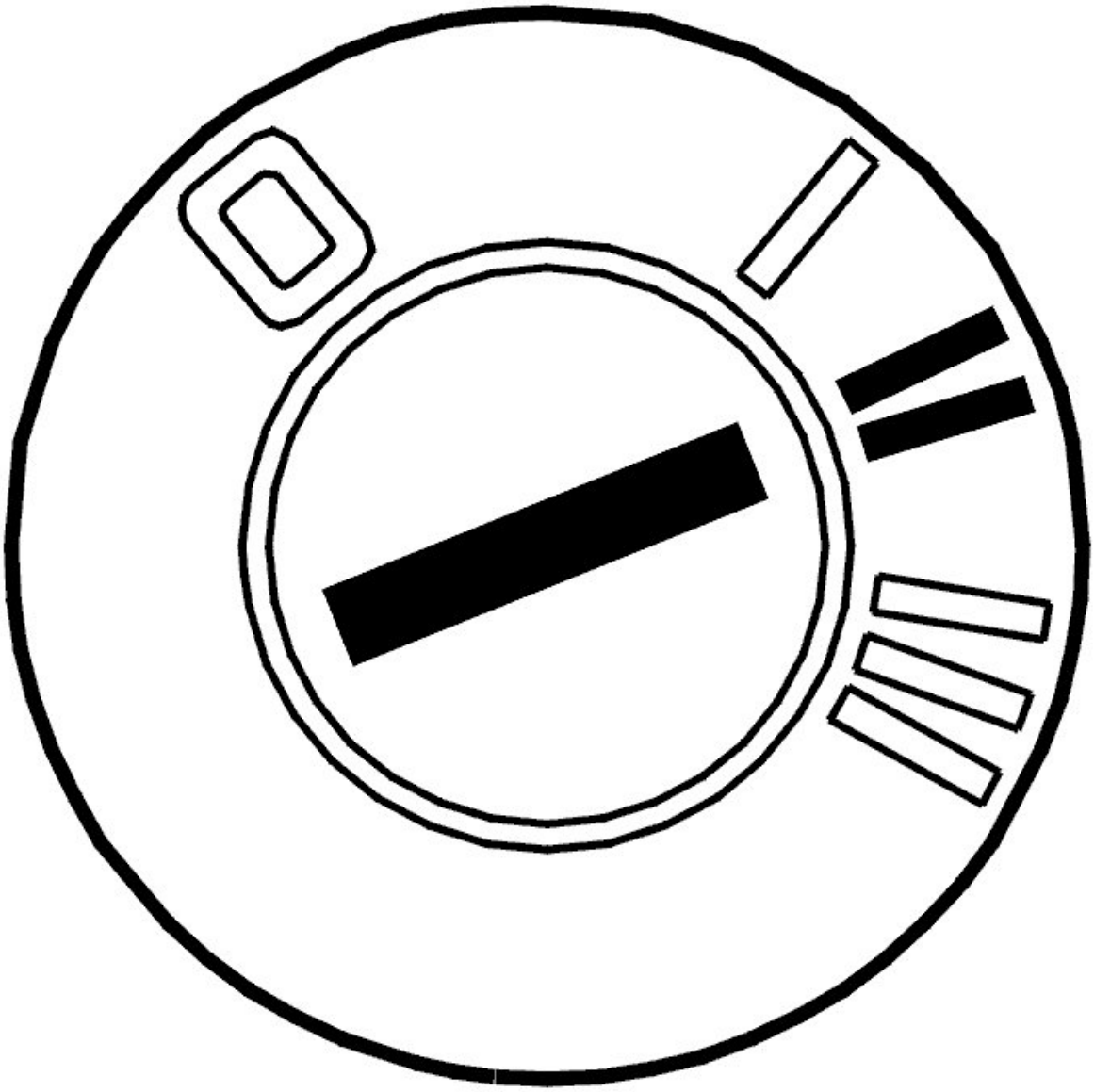
VERIFIED - Fault Found

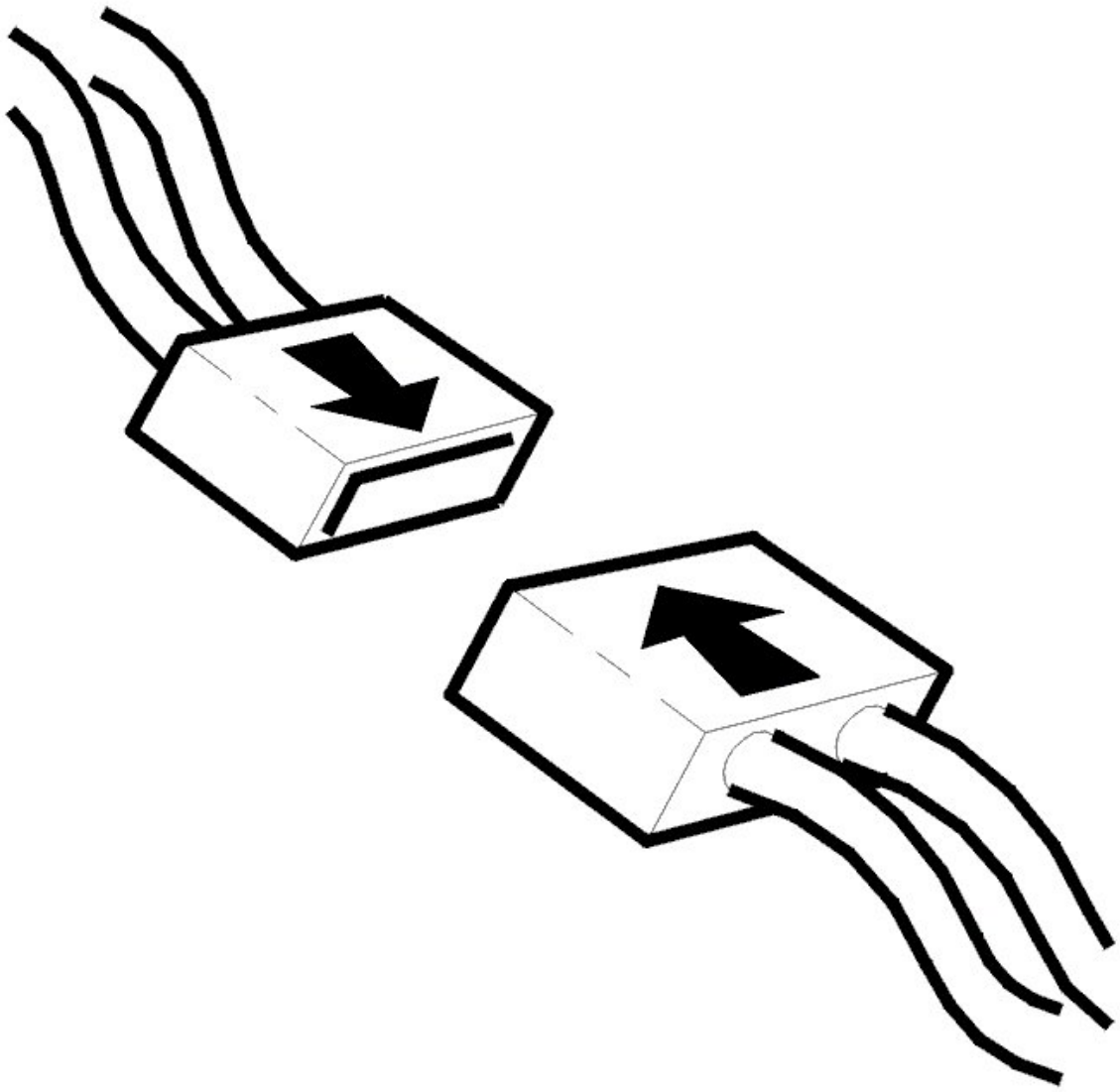
VERIFICATION FAILED - Fault-tracing information

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Check that the light emitting diodes flash three times when the system is activated.

Did the light emitting diodes flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

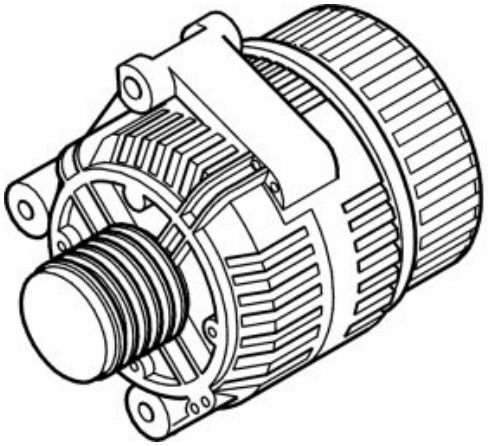
VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD22

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is generated if the control module registers serious interference such as blocked LIN communication. The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.

Note: In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can generate a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value

- None.

Possible source

- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

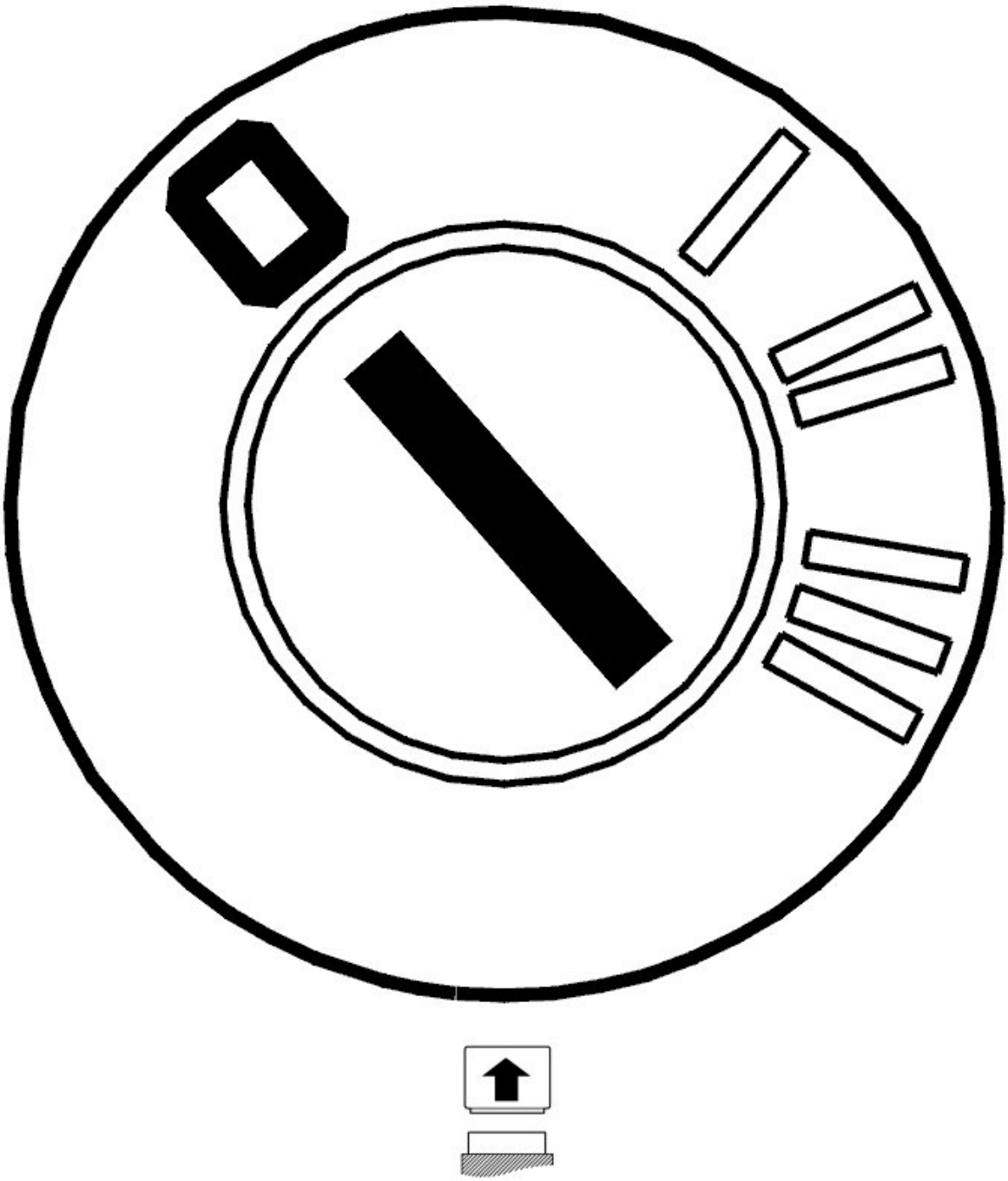
Fault symptom[s]

- The battery electrolyte boils when the engine is running. (Not vehicles with a V8 engine.)
- The battery discharges. (Not vehicles with a V8 engine.)
- The LED does not come on. (Only vehicles with Blind Spot Indication System, BLIS.)

Communication Fault

Communication fault

Checking the wiring



The diagnostic trouble code indicates that communication between the central electronic module (CEM) and the alternator control module (ACM) (not vehicles with a V8 engine), the left camera module (LCM) (optional extra) and the right camera module (RCM) (optional extra) is inoperative. This could be due to a fault in the signal lead between the control modules or a damaged communication unit in one or all of the control modules.

Note! All vehicles from and including model year 2005 are equipped with a signal cable to the Left Camera Module (LCM) / Right Camera Module (RCM) even if the vehicle is not equipped with BLIS system. This means that measurements must always be carried out up to the 12-pin connector in the external doors when the diagnostic trouble code (DTC) has been detected on LIN bus 2.

Check the signal lead between the central electronic module (CEM) and the alternator control module (ACM) for an open circuit or shorting to ground.
Measure between:

- Central electronic module (CEM) #C16 (#16) and alternator control module (ACM) #B1.

For vehicles without the Blind Spot Indication System (BLIS)

Check the signal cable between the Central Electronic Module (CEM) and the 12-pin connector in the outer doors. Check for an open-circuit.
Check for a short-circuit to ground.
Check the connector in both doors.
Take readings between:

- Central Electronic Module (CEM) D24 (#24) and the 12 pin connector in the external doors terminal #12.

For vehicles equipped with the Blind Spot Indication System (BLIS)

Check the signal lead between the central electronic module (CEM) and the left camera module (LCM) for an open circuit or shorting to ground.
Measure between:
- Central electronic module (CEM) #D24 (#24) and left camera module (LCM) #5.

Check the signal lead between the central electronic module (CEM) and the right camera module (RCM) for an open circuit or shorting to ground.
Measure between:
- Central electronic module (CEM) #D24 (#24) and right camera module (RCM) #5.

Also check intermediate connectors.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair
- Change the left camera module (LCM)/right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Fault Found

No - Checking the component

Checking the component

For vehicles equipped with the Blind Spot Indication System (BLIS)

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the right and left sides.
If any LED fails to flash three times on activation, try changing the control module on that side.
If both LEDs flash three times on activation, try changing the alternator control module (ACM).

For vehicles without the Blind Spot Indication System (BLIS)

Try changing the alternator control module (ACM).

Select the desired alternative:
1. Change the alternator control module (ACM).
2. Change the left camera module (LCM) / right camera module (RCM).

Select required alternative.

1 - Replacing the control module

2 - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Replacing the control module

Try a new alternator control module (ACM).
Remedy as necessary.

Other information

- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair

Continue - Verification

Replacing the control module

Try changing the control module on the side where the LED failed to flash.
Remedy as necessary.

Other information

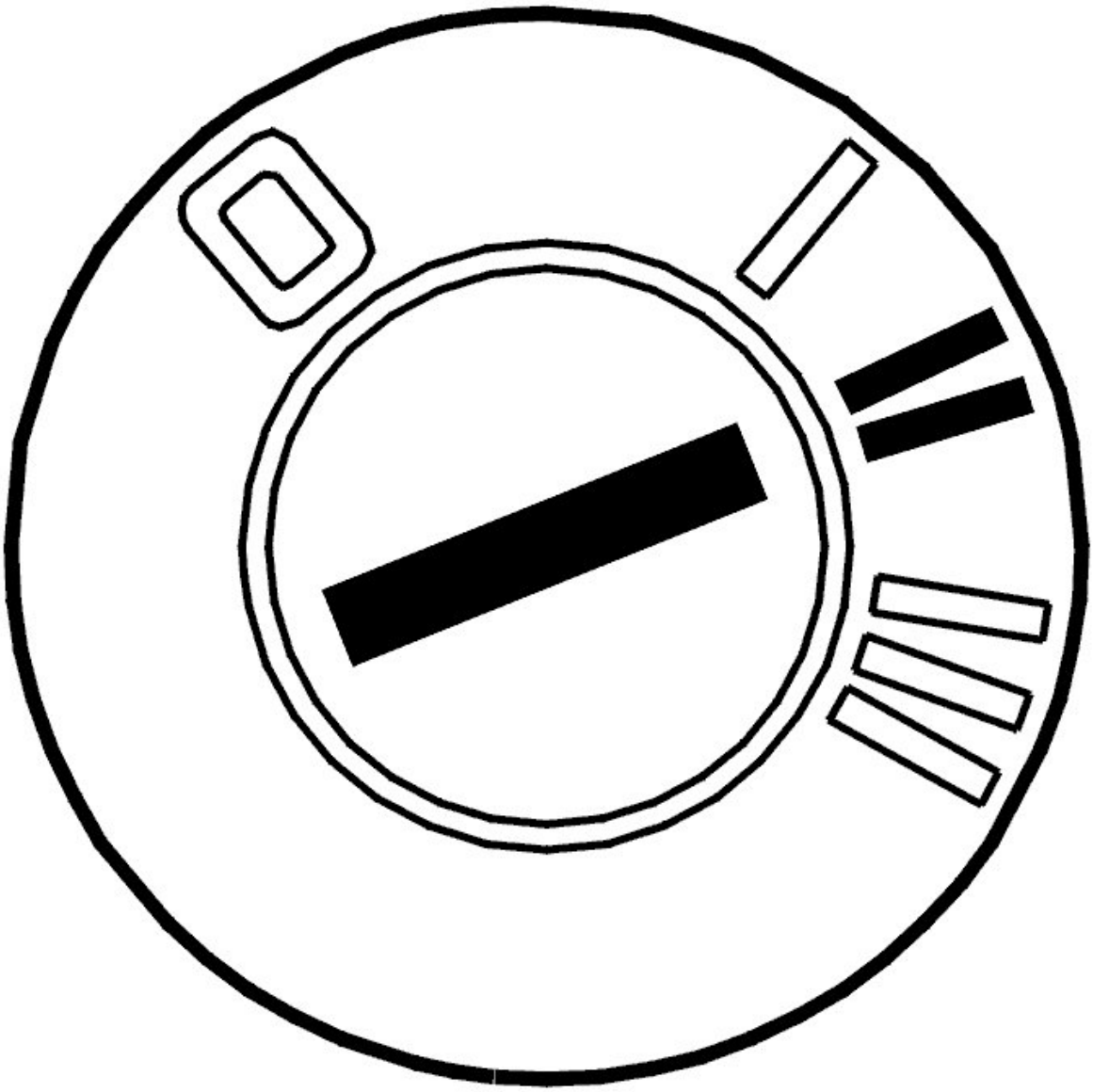
- Change the control module, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair

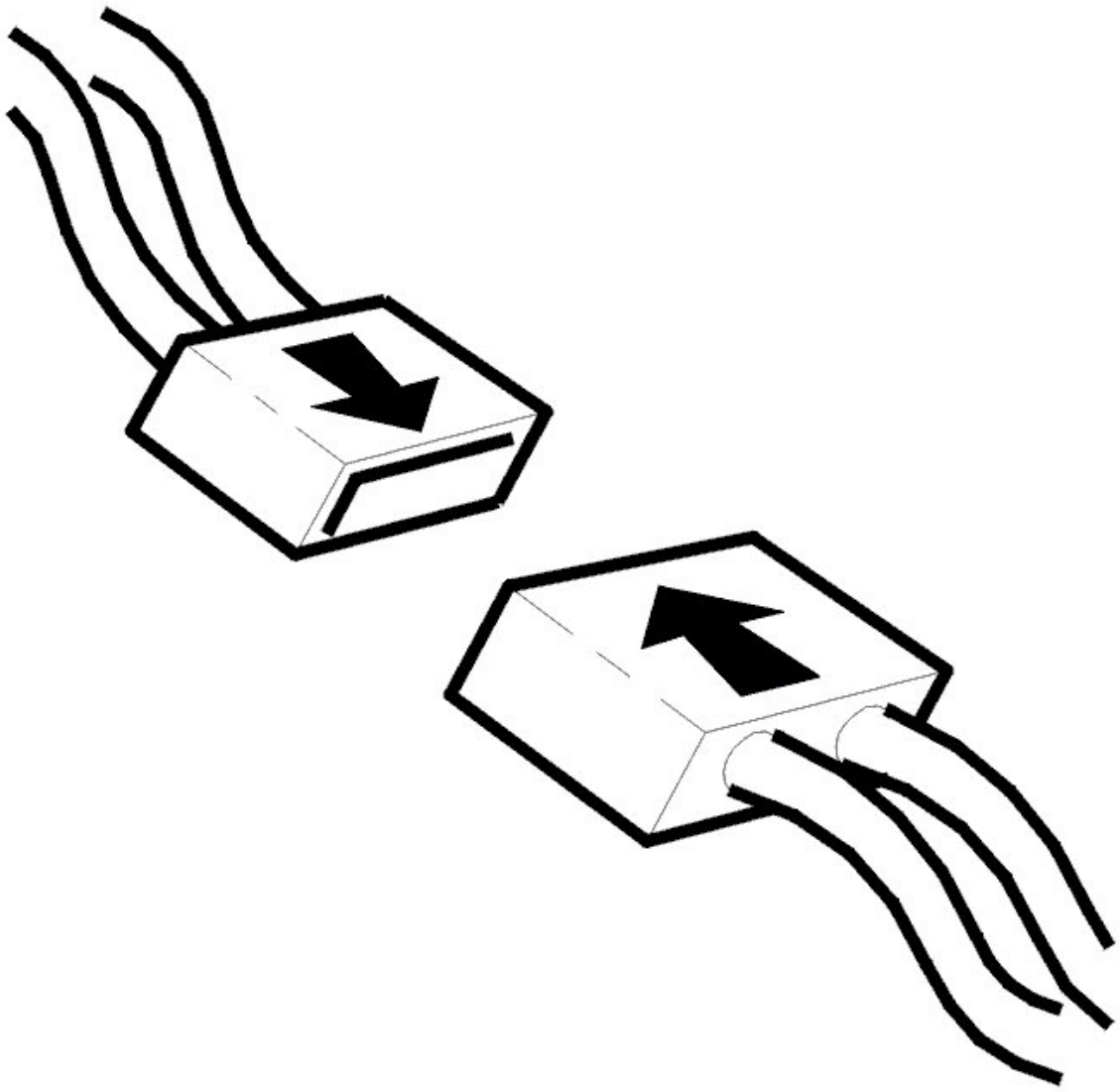
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and run it to normal operating temperature.

Click on the VCT2000 symbol to read off the status of the generator (GEN).
Check that the read out shows OK.

Is the status given as OK?

Yes - VERIFIED

No - VERIFICATION FAILED

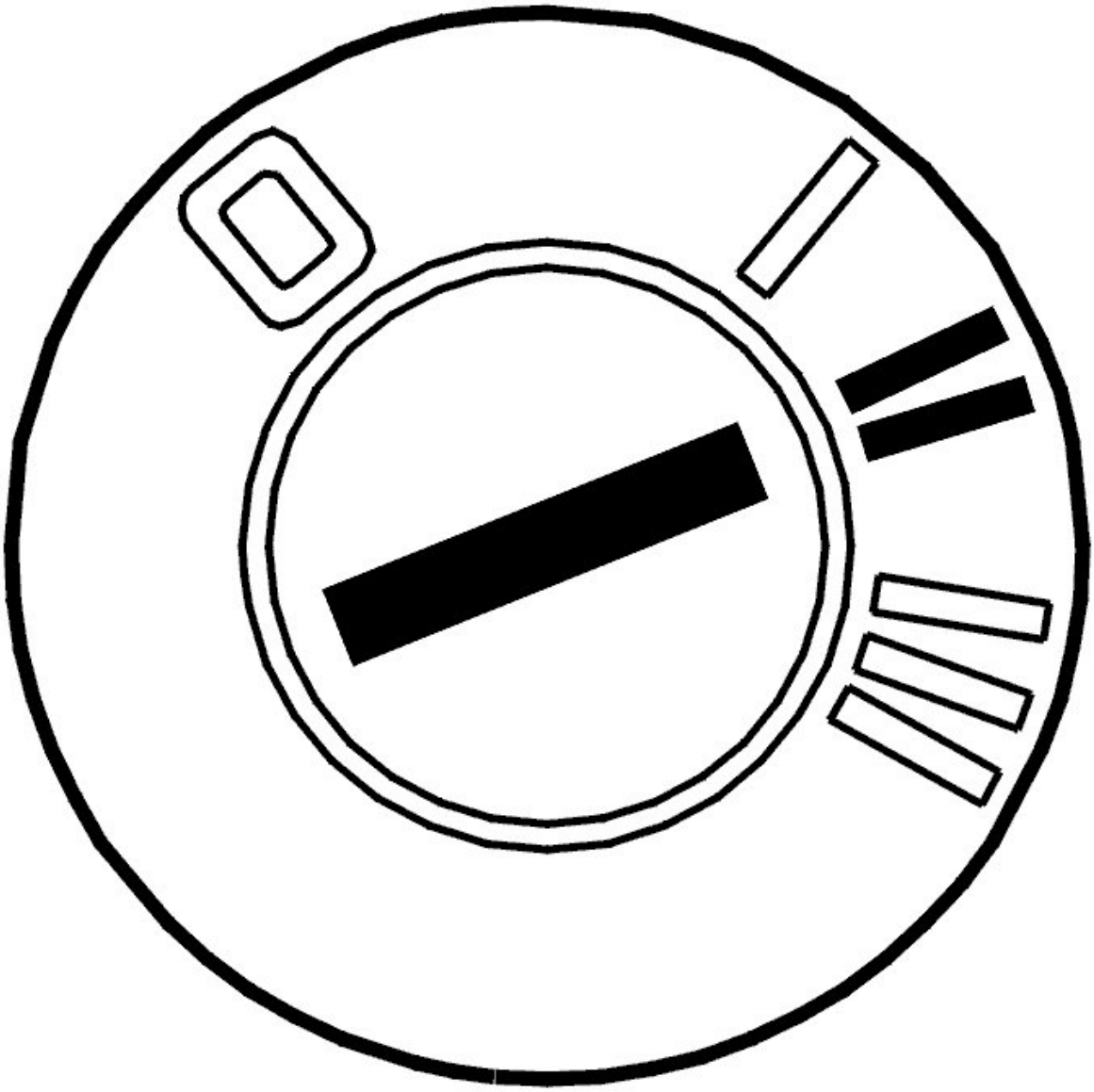
VERIFIED - Fault Found

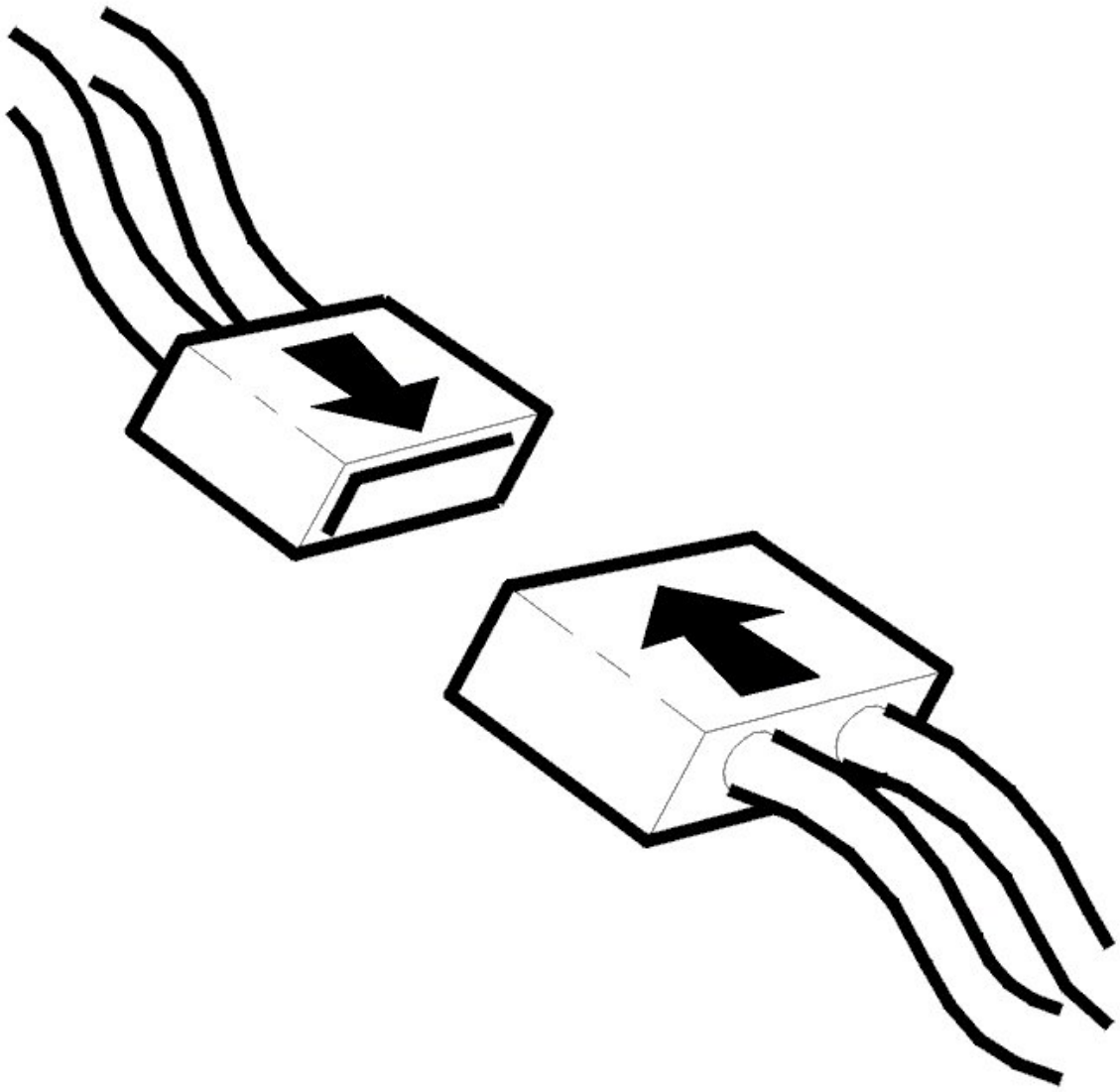
VERIFICATION FAILED - Fault-tracing information

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Check that the light emitting diodes flash three times when the system is activated.

Did the light emitting diodes flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

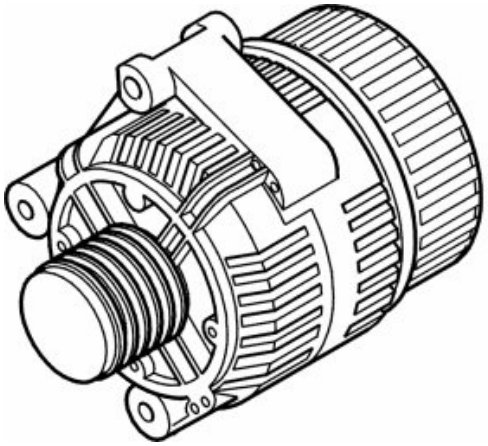
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD30

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked LIN communication with the alternator control module (ACM).
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

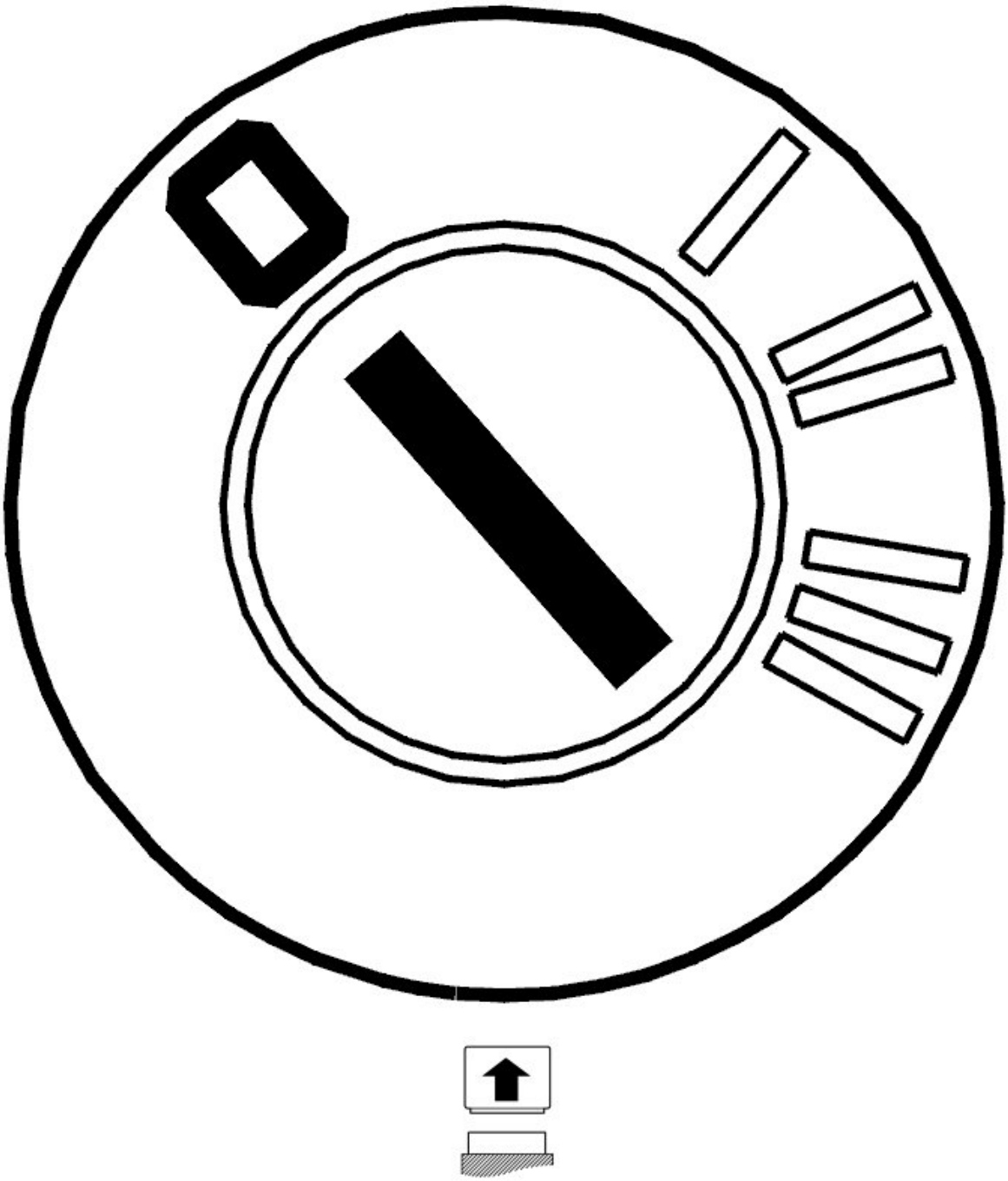
Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

Fault symptom[s]
- The battery discharges.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

The diagnostic trouble code (DTC) indicates that the communication between the alternator control module (ACM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between central electronic module (CEM) terminal #C16 (#16) and alternator control module (ACM) terminal #B1.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
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- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new alternator control module (ACM).
Remedy as necessary.

Other information

- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair

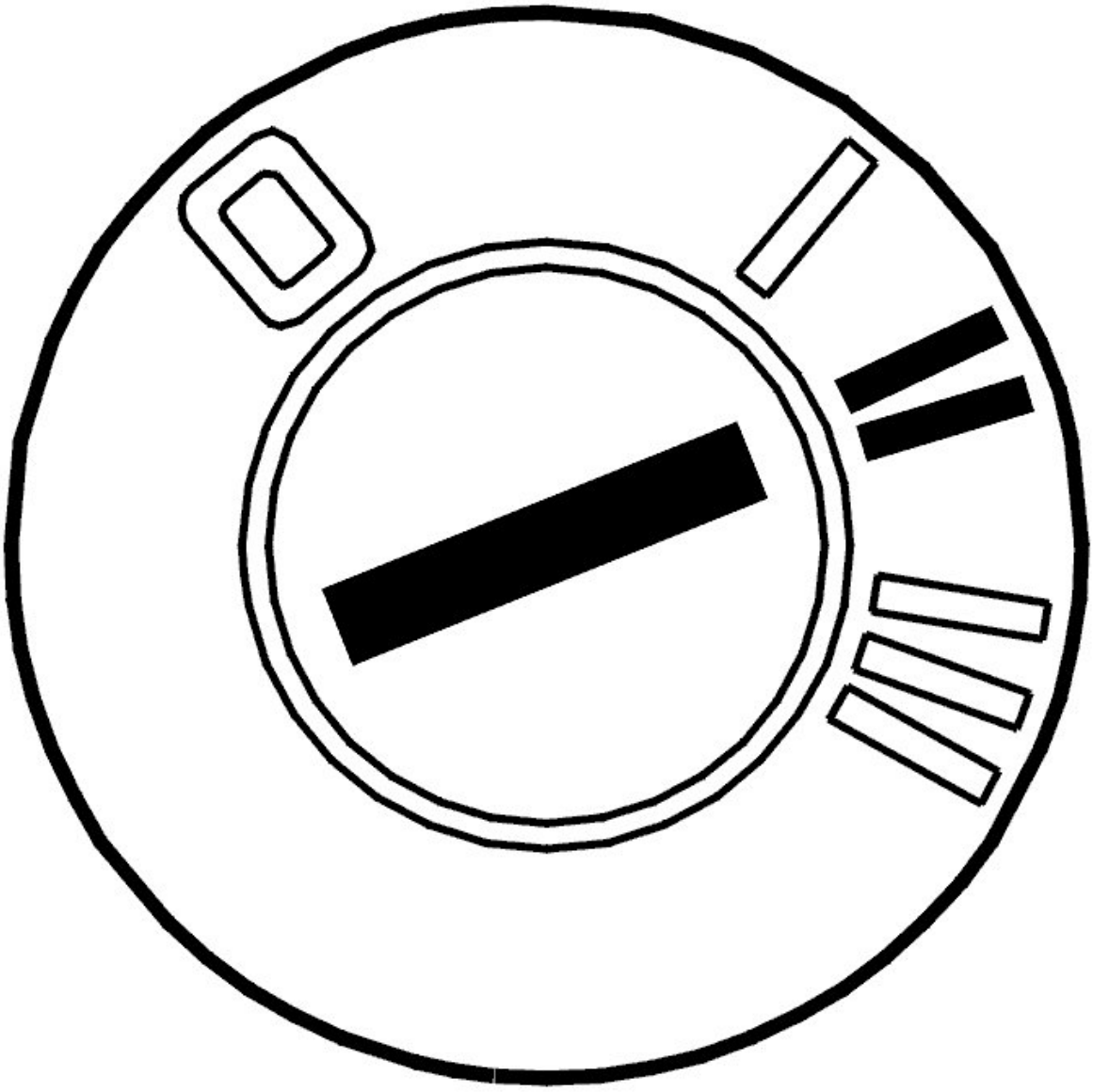
Continue - Verification

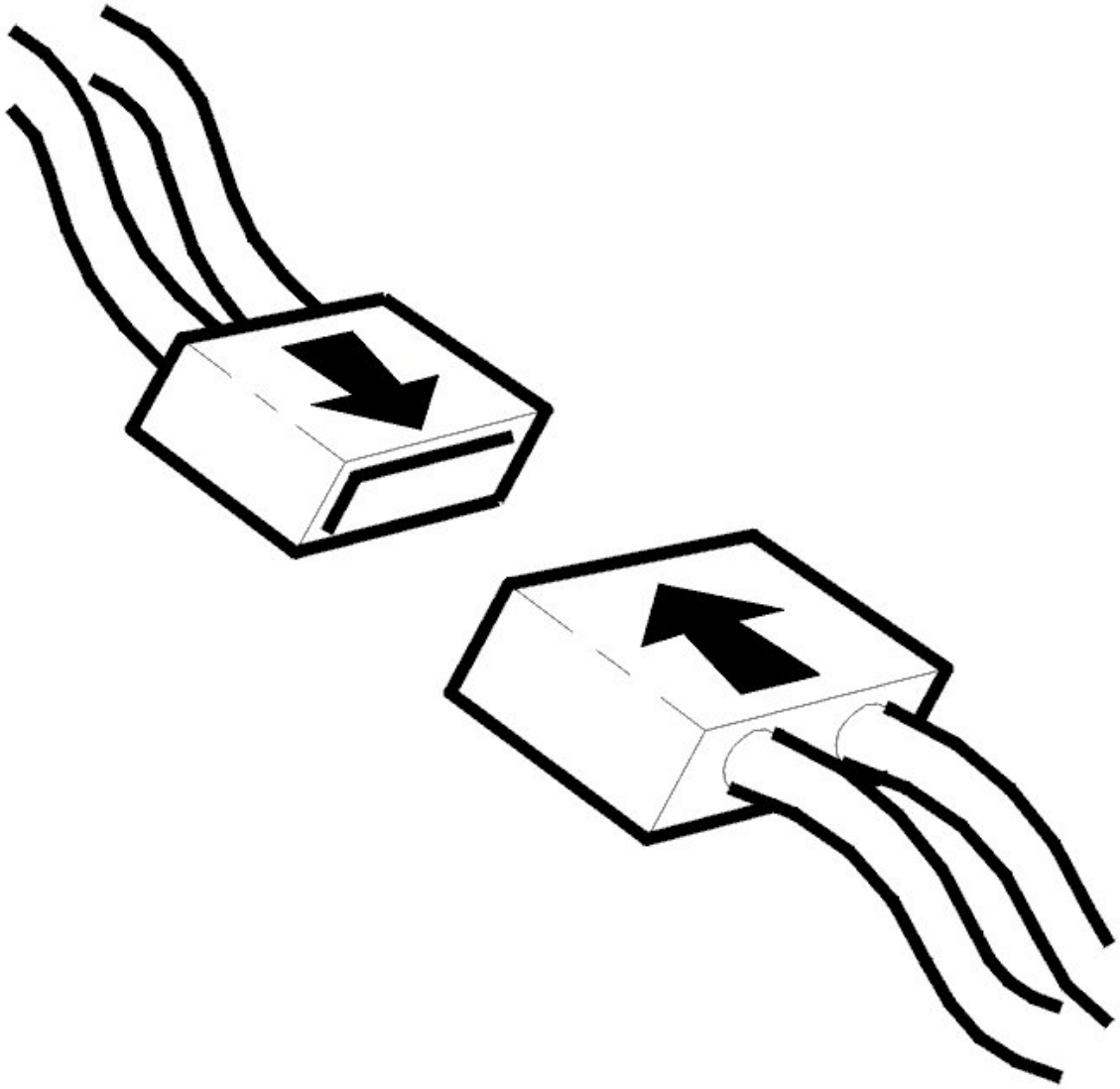
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Start the engine and run it to normal operating temperature.

Click on the VCT2000 symbol to read off the status of the generator (GEN).
Check that the read out shows OK.

Is the status given as OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

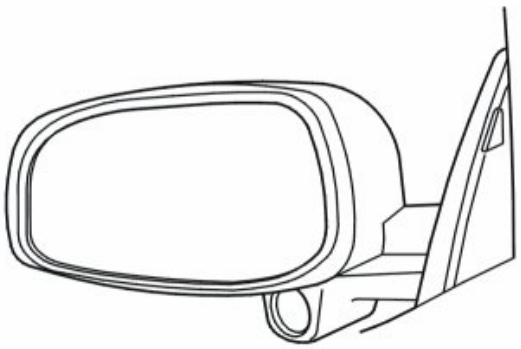
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD31

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is generated if the control module registers serious interference (LIN communication blocked) with the left camera module (LCM).
The diagnostic trouble code (DTC) can be detected when the ignition switch in position II for at least 10 seconds if battery voltage is above 10.5 V.
Note: In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can generate a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- Nothing.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

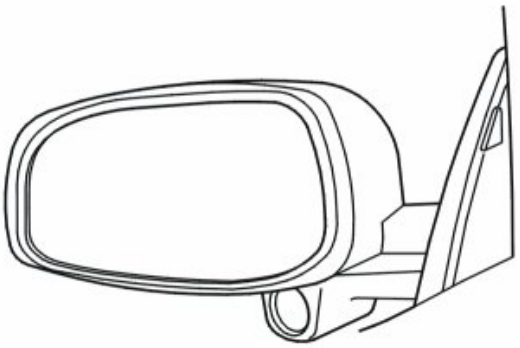
Fault symptom[s]
- The LED does not come on.

Signal Missing

Signal missing

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the left camera module (LCM).

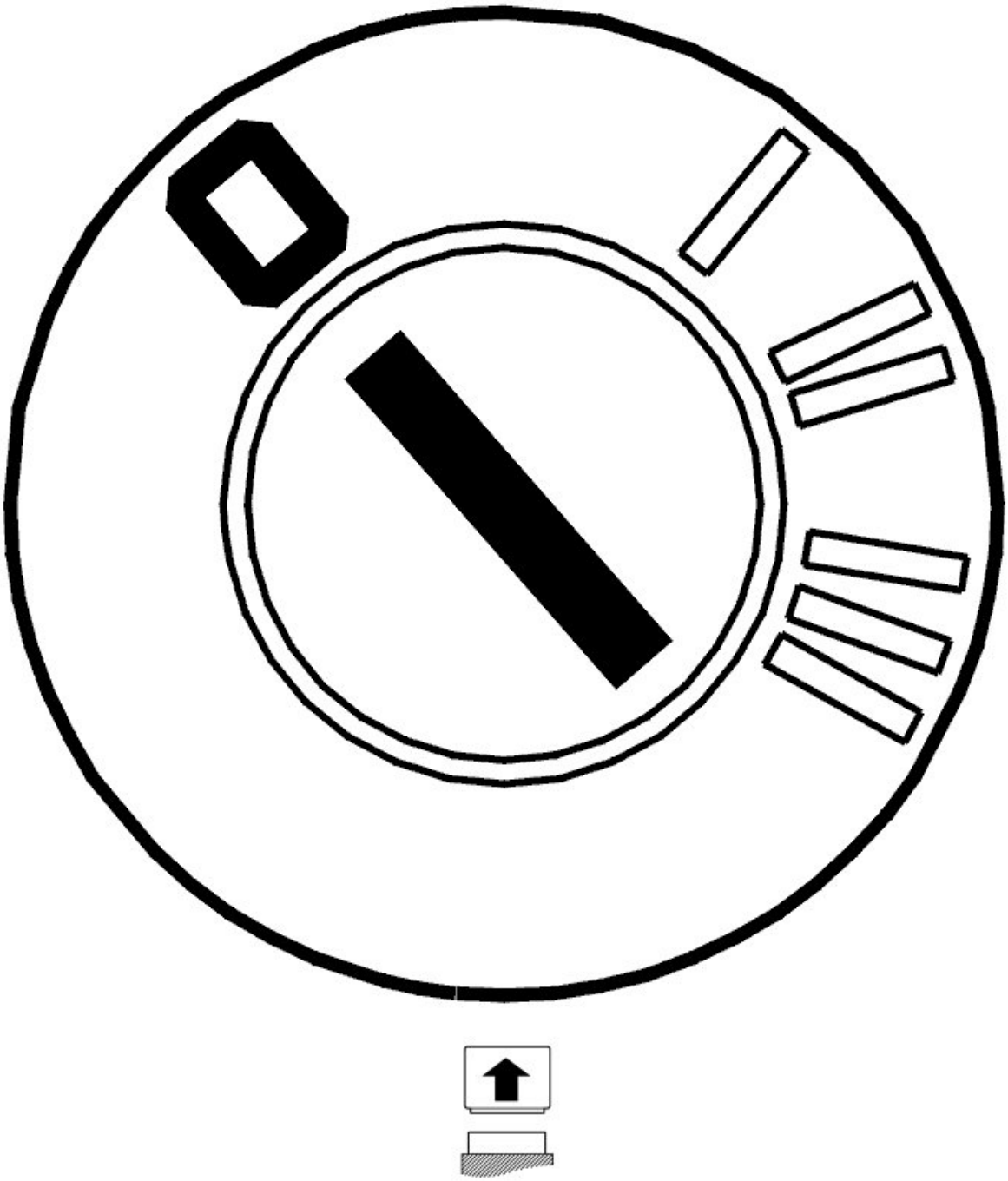


Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



- Ignition off
- Unplug the central electronic module (CEM) D connector.

The diagnostic trouble code indicates that communication between the central electronic module (CEM) and the left camera module (LCM) is inoperative. This could be due to a fault in the signal lead between the control modules or a damaged communication unit in one or all of the control modules.

Check the signal lead between the central electronic module (CEM) and the left camera module (LCM) for an open circuit or short circuit. Also check intermediate connectors.

Measure between:

- Central electronic module (CEM) #D41 (41) and left camera module (LCM) #5.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the left camera module (LCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try changing the left camera module (LCM).
Remedy as necessary.

Other information

- Change the left camera module (LCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair

Continue - Verification

Fault-tracing information

The left camera module (LCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

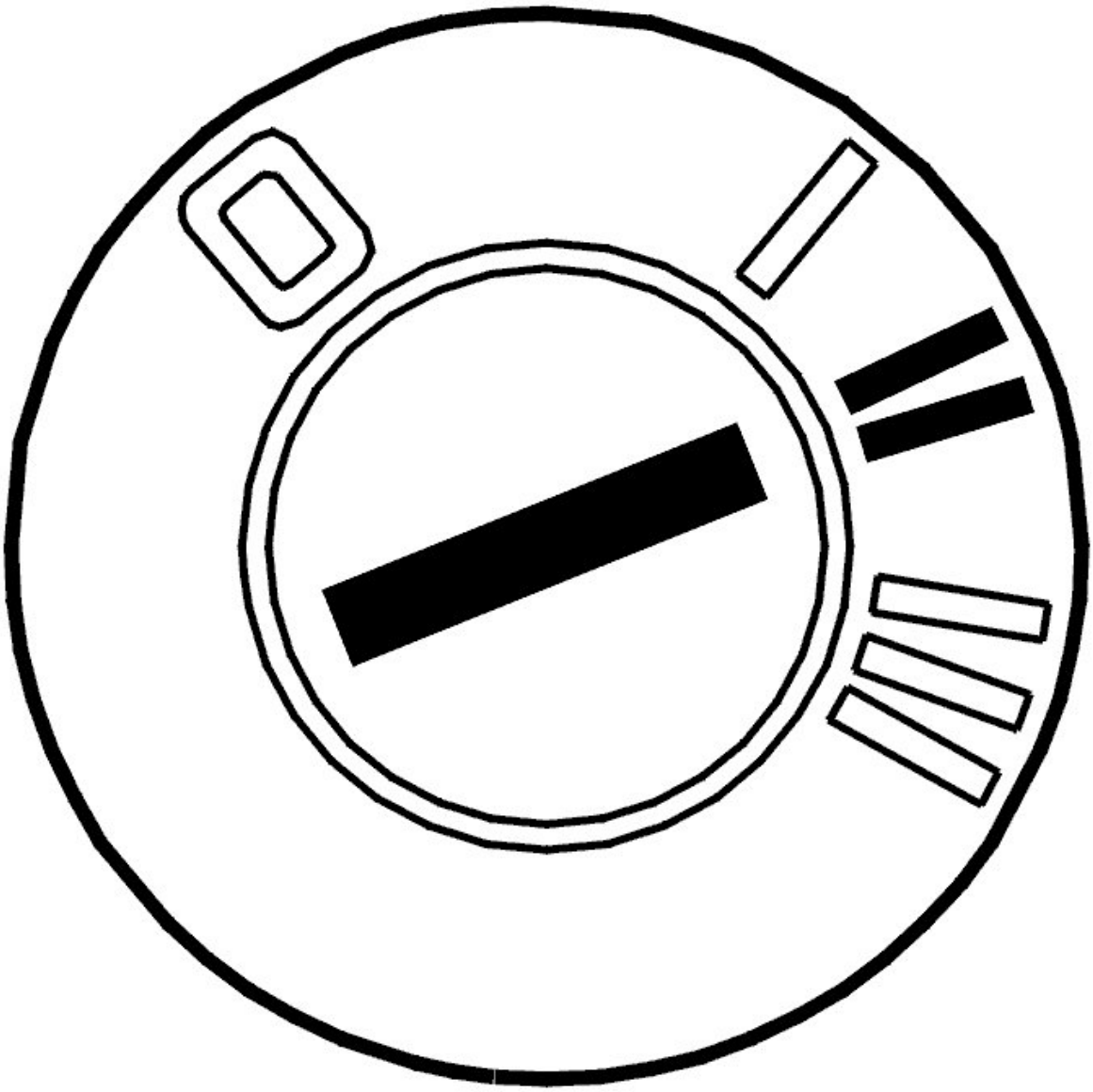
No - **No Fault Found**

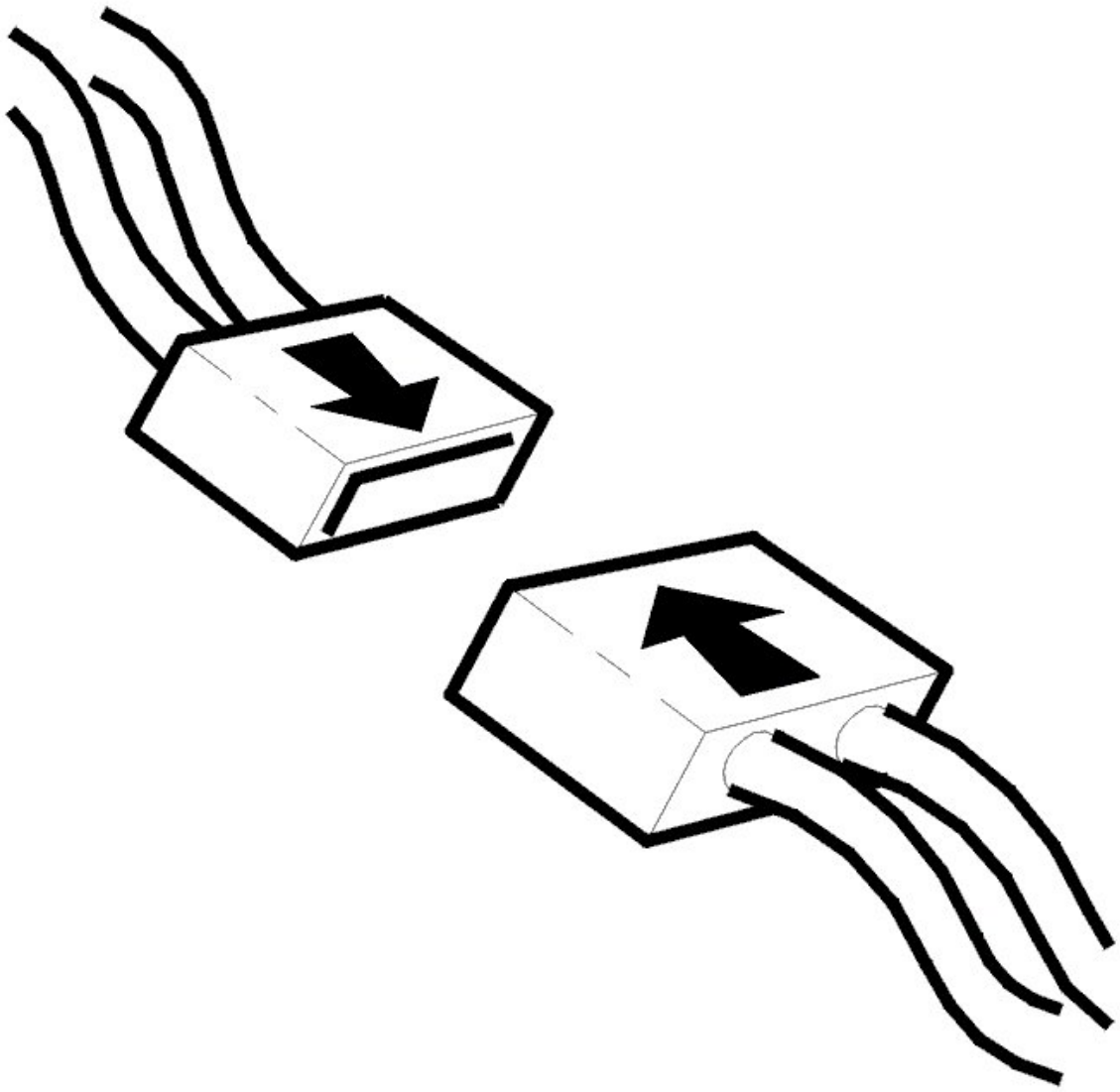
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the left LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

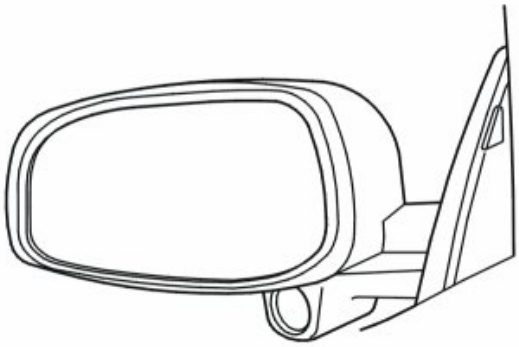
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD32

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is generated if the control module registers serious interference (LIN communication blocked) with the right camera module (LCM).
The diagnostic trouble code (DTC) can be detected when the ignition switch in position II for at least 10 seconds if battery voltage is above 10.5 V.
Note: In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can generate a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- Nothing.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

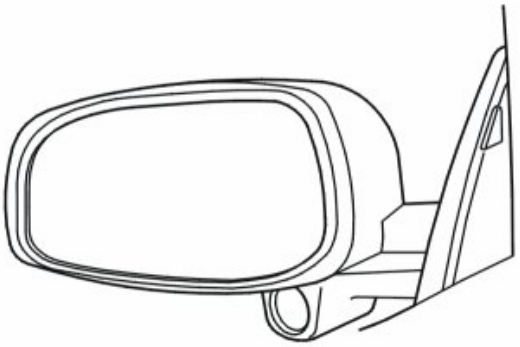
Fault symptom[s]
- The LED does not come on.

Signal Missing

Signal missing

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the right camera module (RCM).

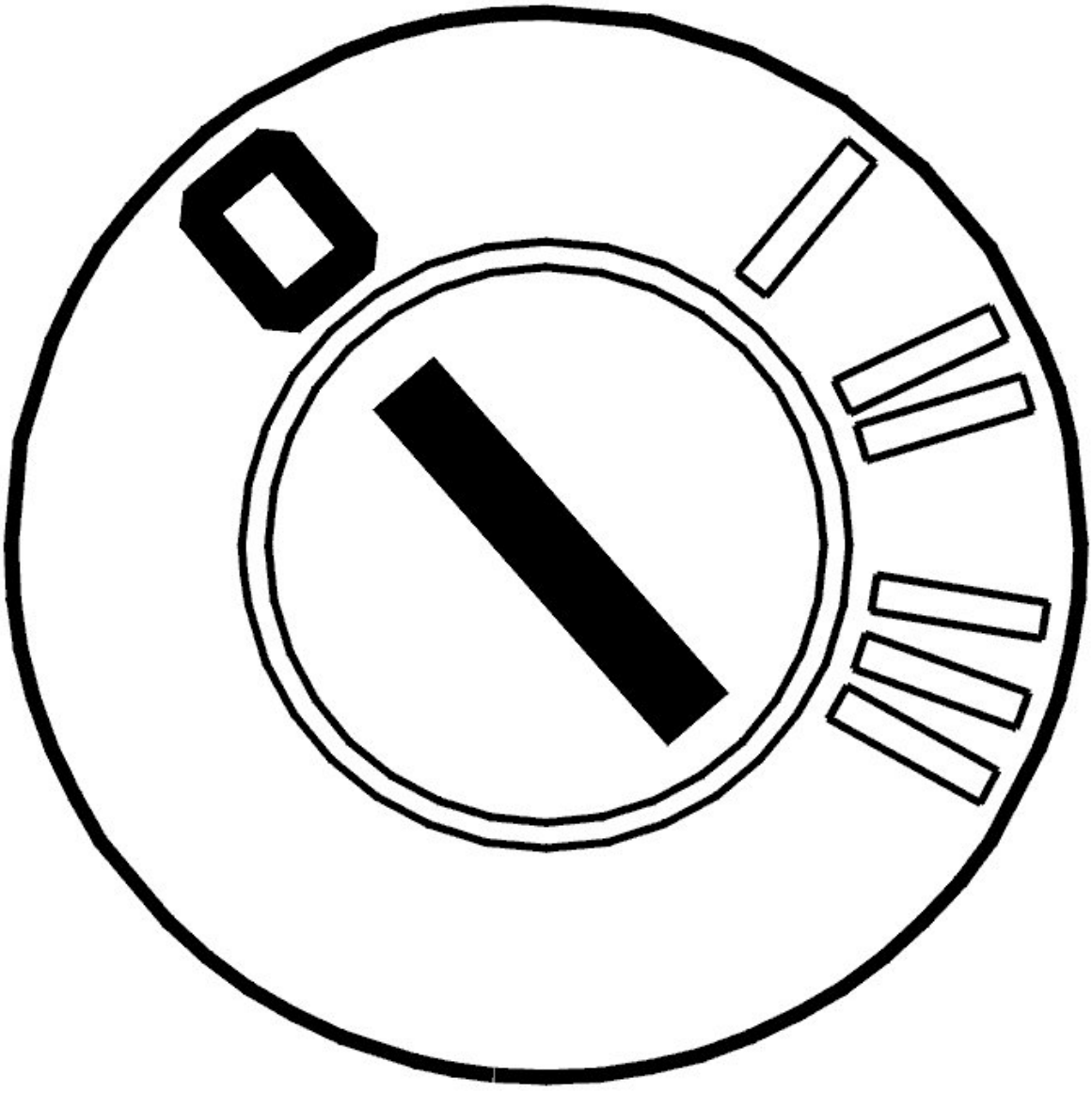


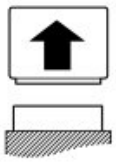
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring





- Ignition off
- Unplug the central electronic module (CEM) D connector.

The diagnostic trouble code indicates that communication between the central electronic module (CEM) and the right camera module (RCM) is inoperative. This could be due to a fault in the signal lead between the control modules or a damaged communication unit in one or all of the control modules.
Check the signal lead between the central electronic module (CEM) and the right camera module (RCM) for an open circuit or short circuit. Also check intermediate connectors.
Measure between:

- Central electronic module (CEM) #D41 (#41) and right camera module (RCM) #5.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try changing the right camera module (RCM).
Remedy as necessary.

Other information

- Change the right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair

Continue - Verification

Fault-tracing information

The right camera module (RCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

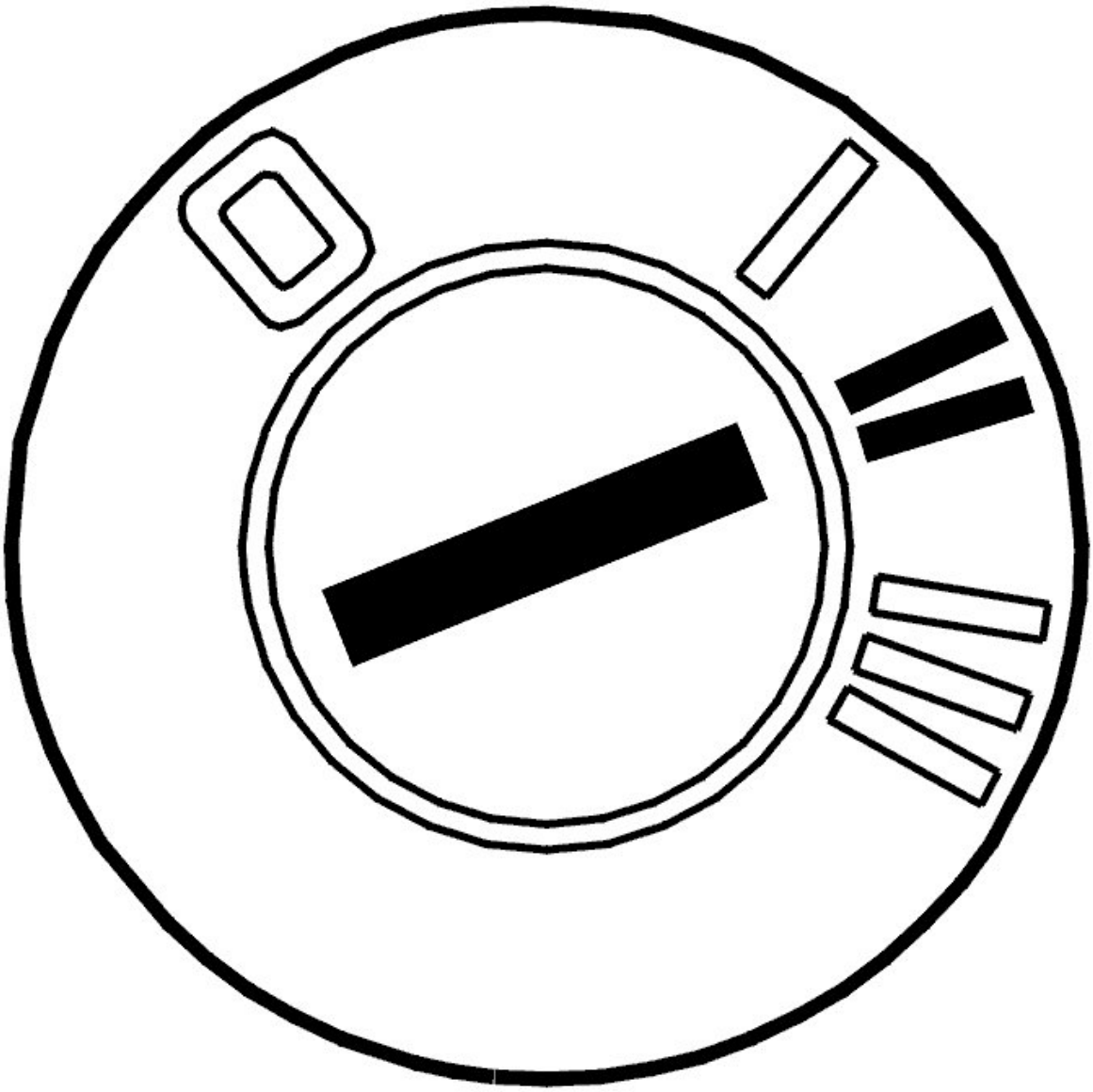
No - No Fault Found

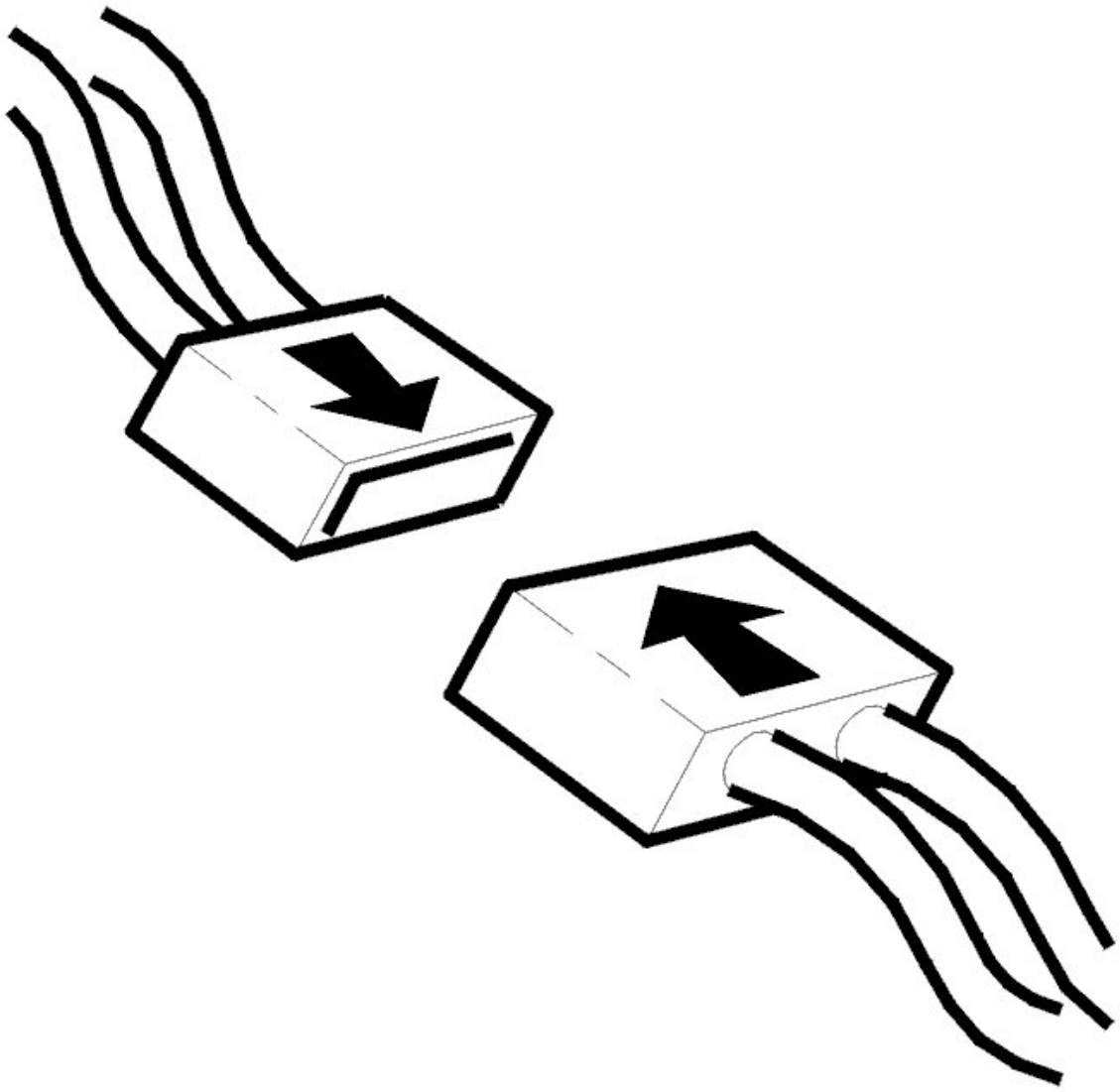
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the right LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

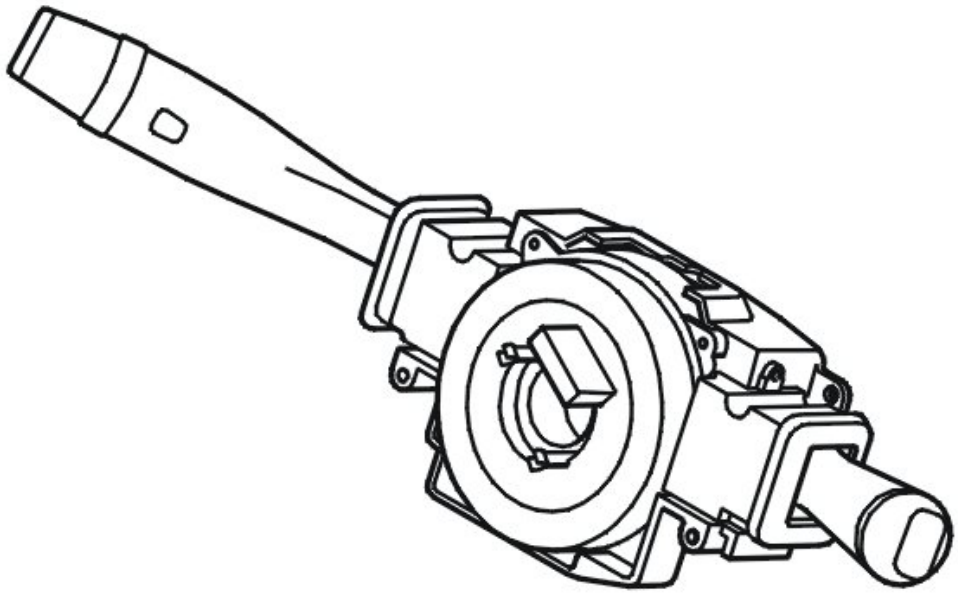
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD40

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked LIN communication with the steering wheel module (SWM).
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

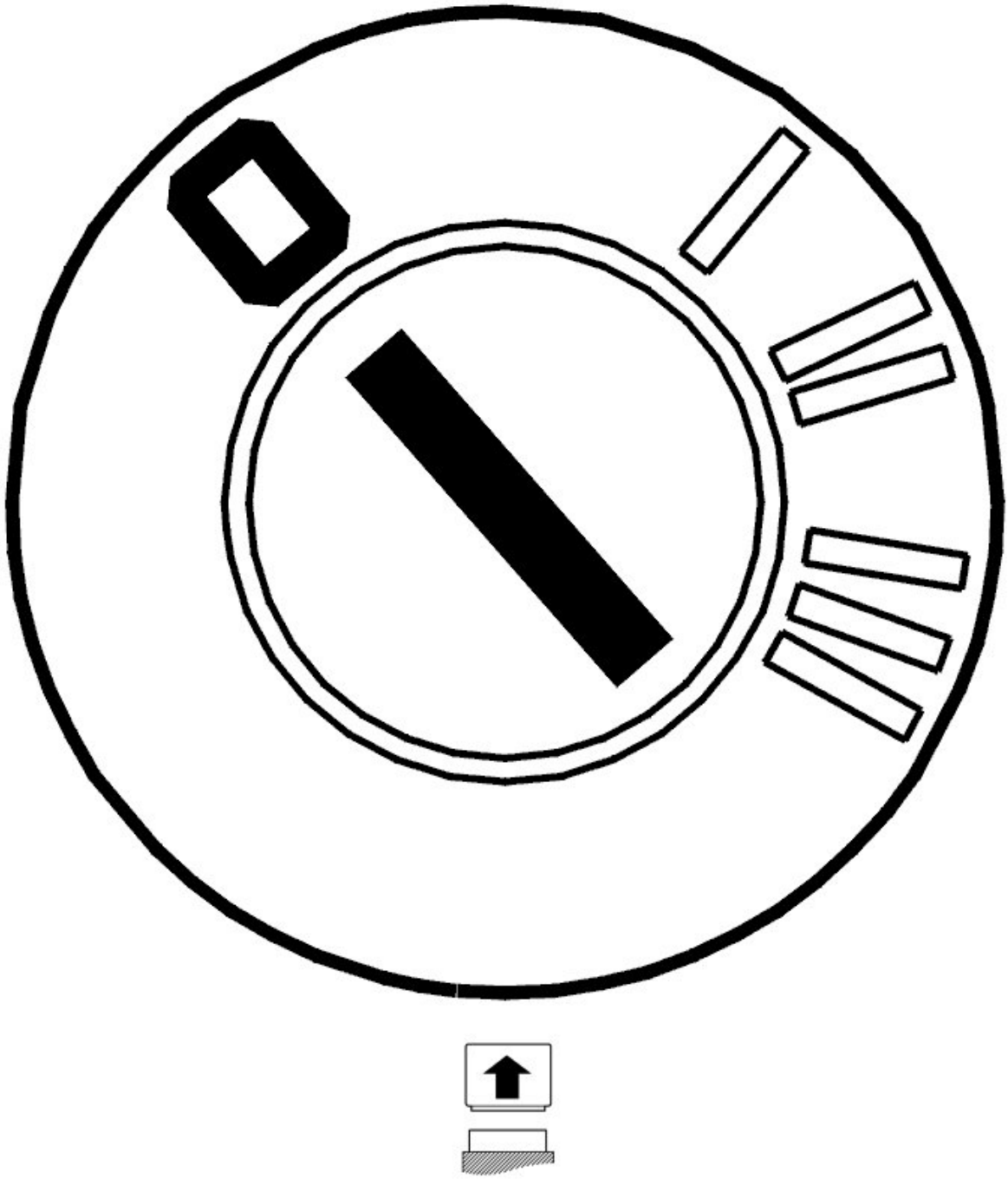
Fault symptom[s]
- The windshield wipers only operate at lowest speed

- Front windshield washing does not work
- Rear windshield washing does not work
- The turn signal lamp switch does not work
- Cruise control does not work at all
- The turn signal lamps are not operating
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The diagnostic trouble code (DTC) indicates that the communication between the steering wheel module (SWM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.

Take readings between:

- Central electronic module (CEM) #D58 (#58) and steering wheel module (SWM) #7.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try replacing the steering wheel module (SWM).
Remedy as necessary.

Other information

- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

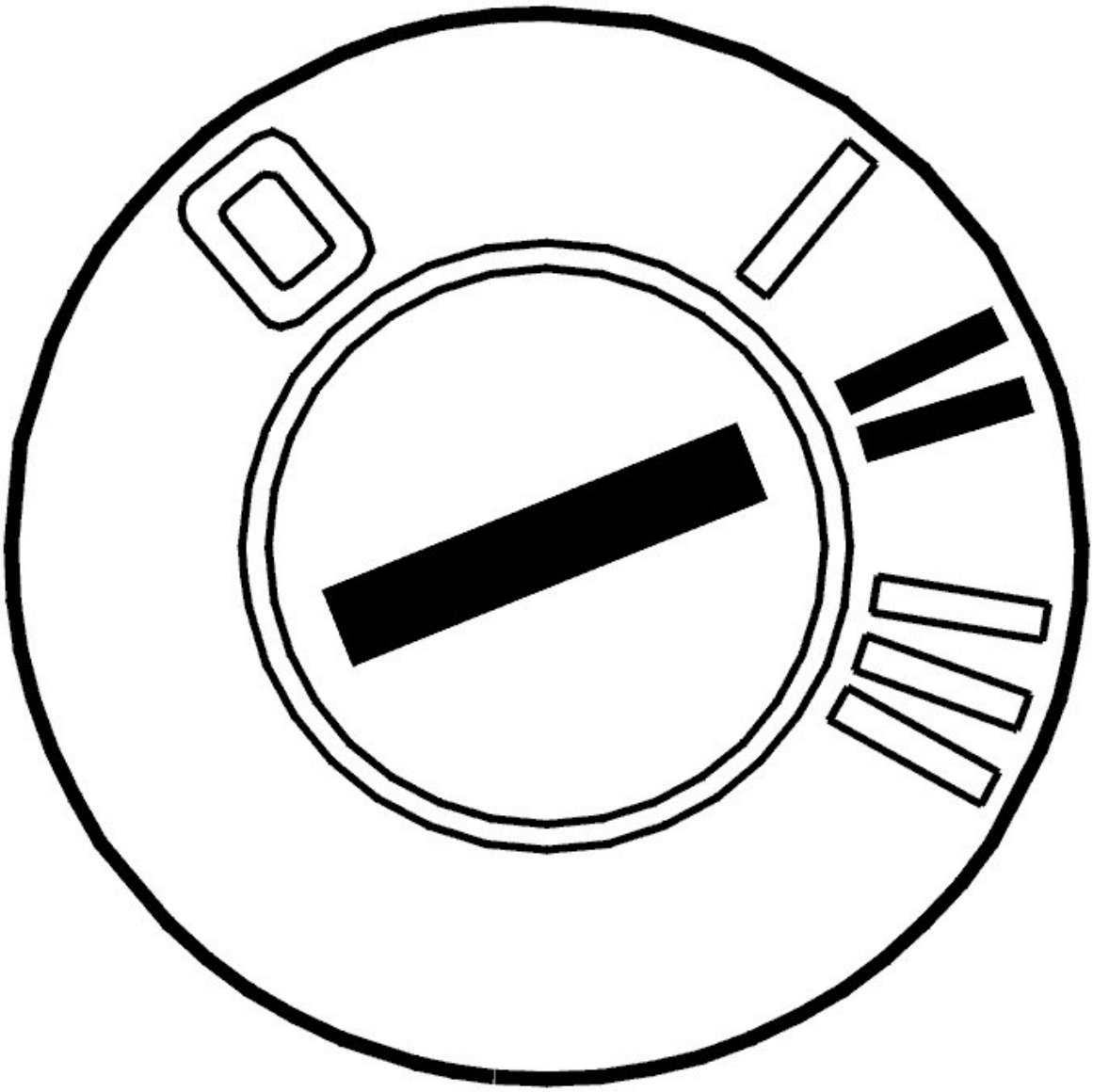
Continue - Verification

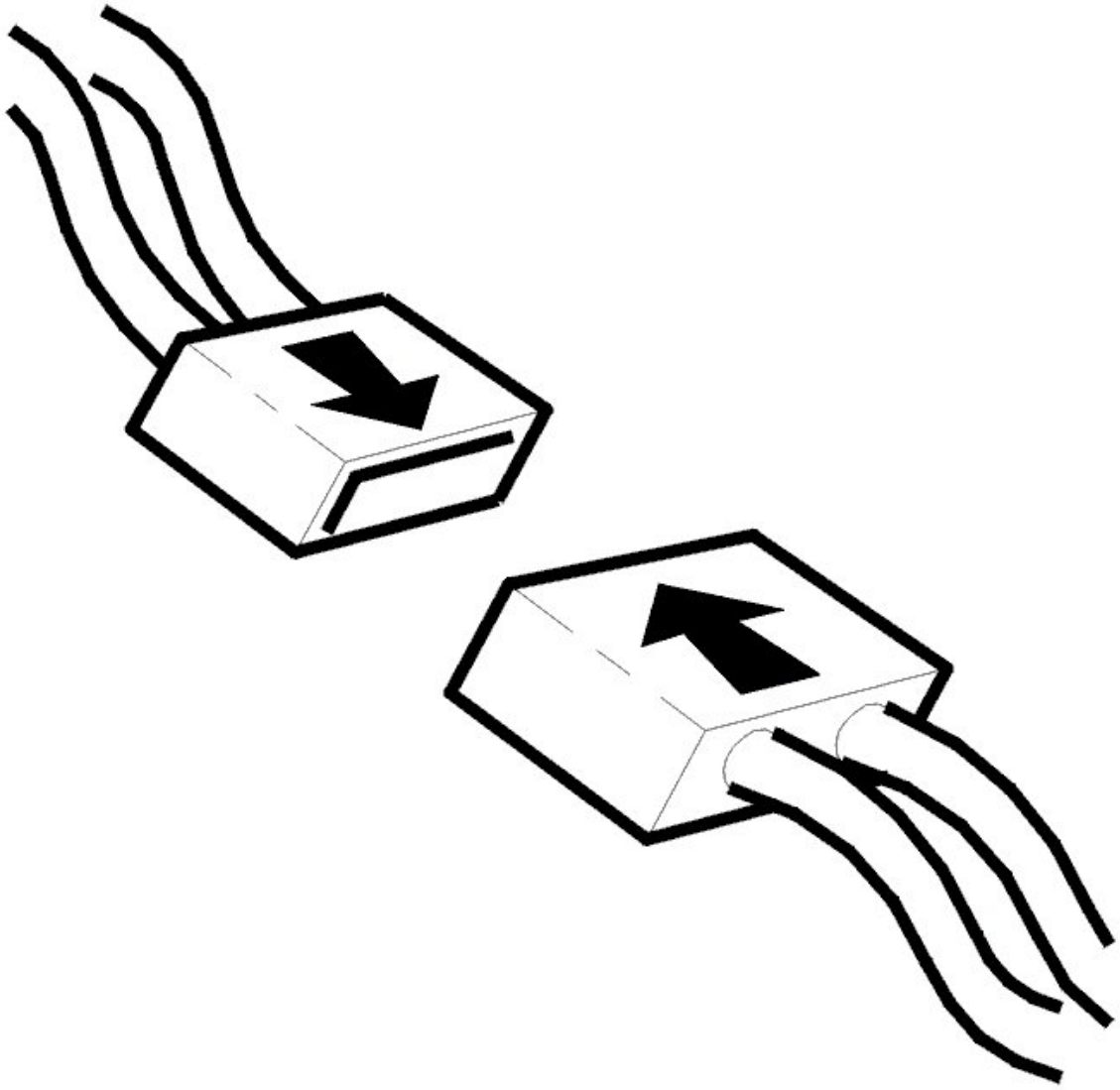
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

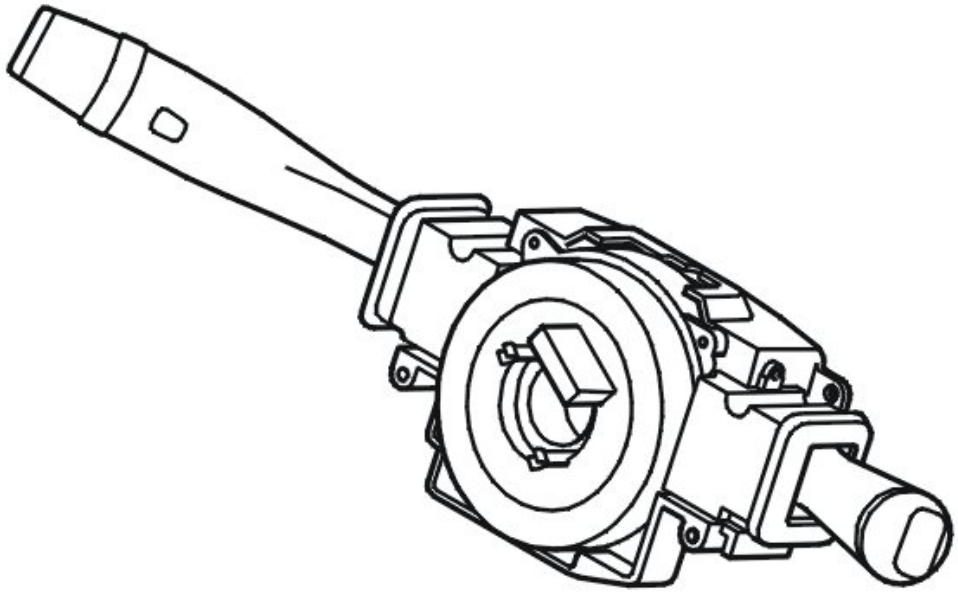
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD41

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked LIN communication with the steering wheel module (SWM).
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit to ground in the LIN cable
- Short-circuit to supply voltage in the LIN cable.

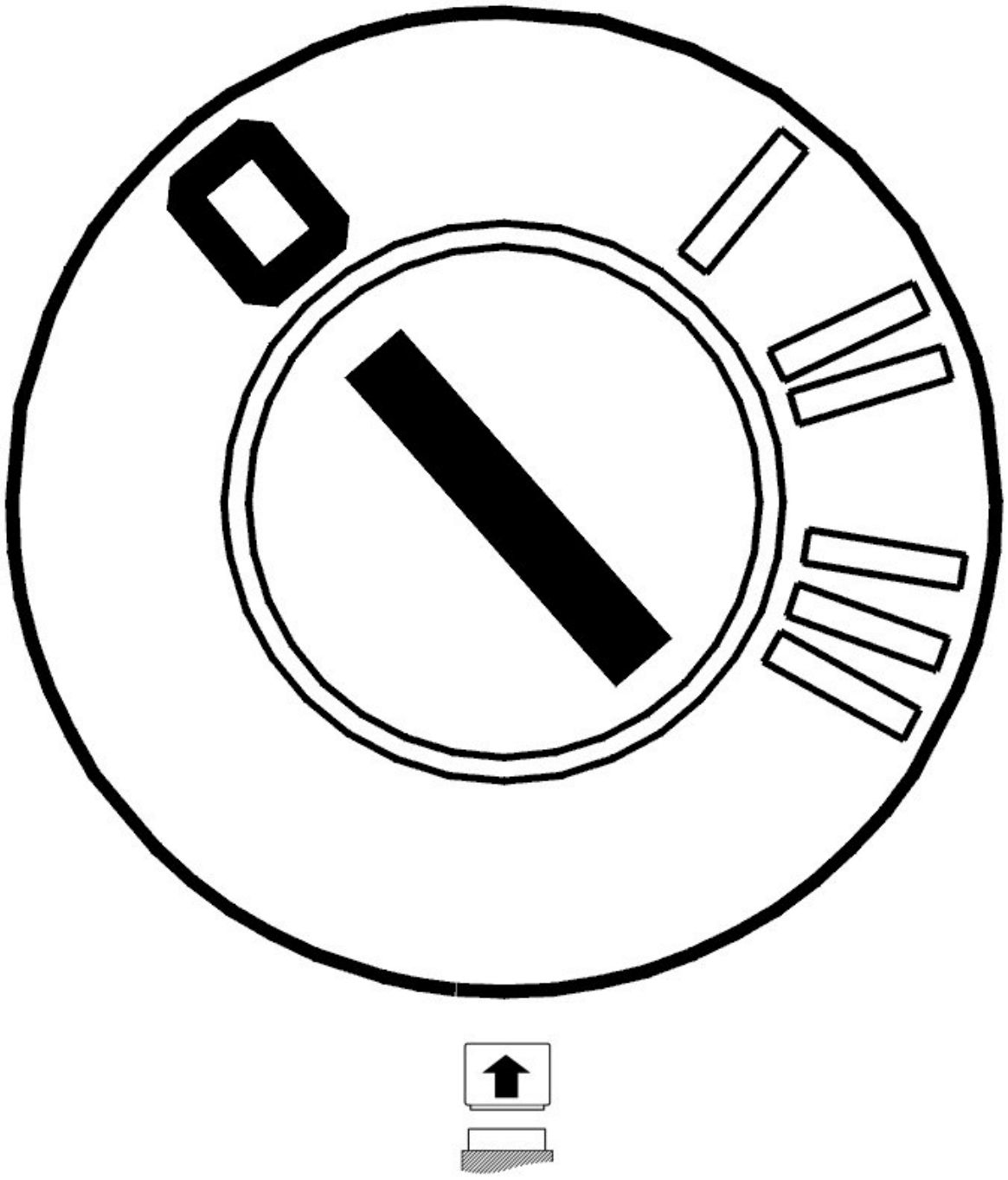
Fault symptom[s]

- The windshield wipers only operate at lowest speed
- Front windshield washing does not work
- Rear windshield washing does not work
- The turn signal lamp switch does not work
- Cruise control does not work at all
- The turn signal lamps are not operating
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The diagnostic trouble code (DTC) indicates that the communication between the steering wheel module (SWM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.

Check the signal cable. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

Take readings between:

- Central electronic module (CEM) #D58 (#58) and steering wheel module (SWM) #7.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try replacing the steering wheel module (SWM).
Remedy as necessary.

Other information

- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

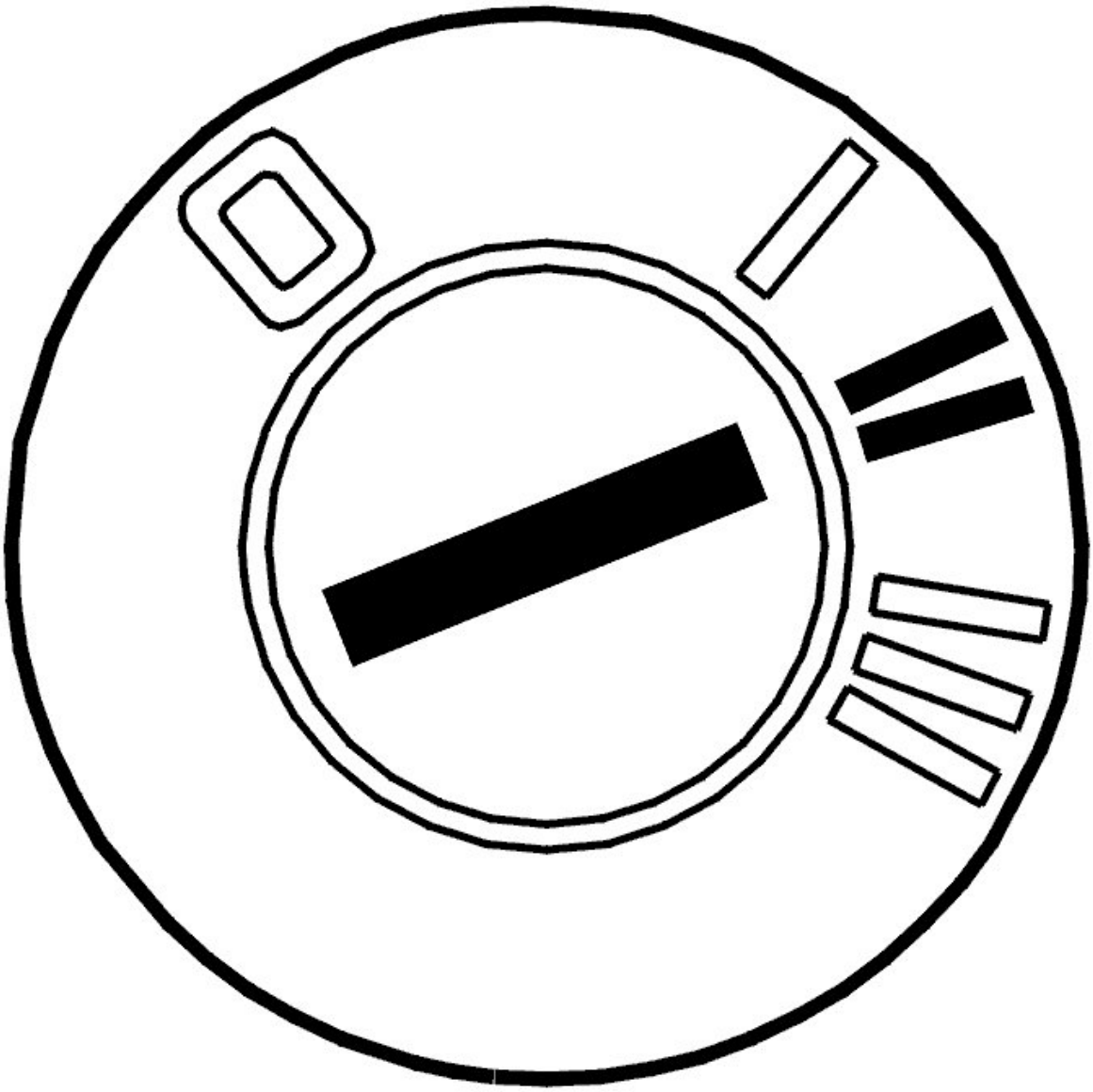
Continue - Verification

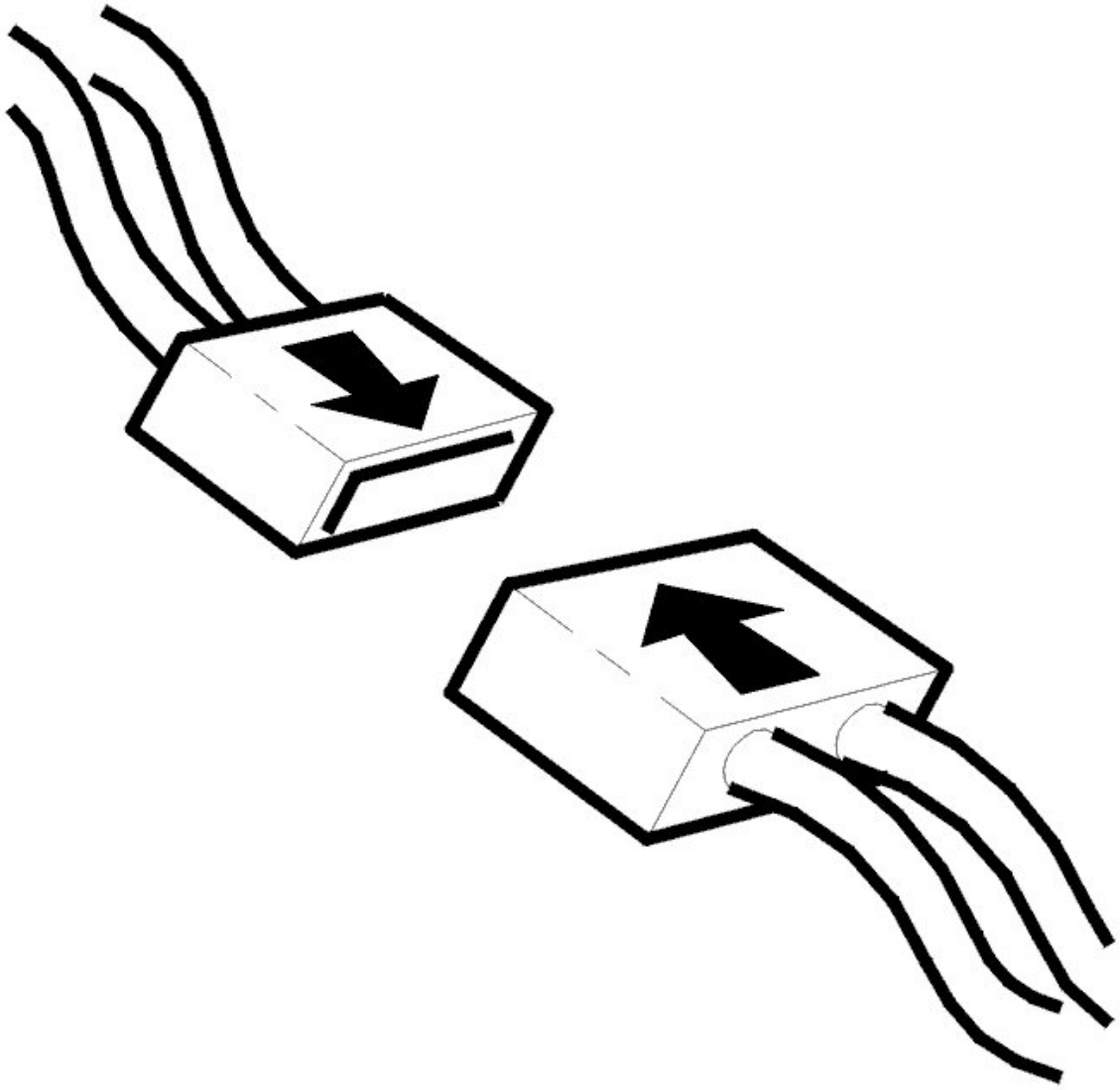
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

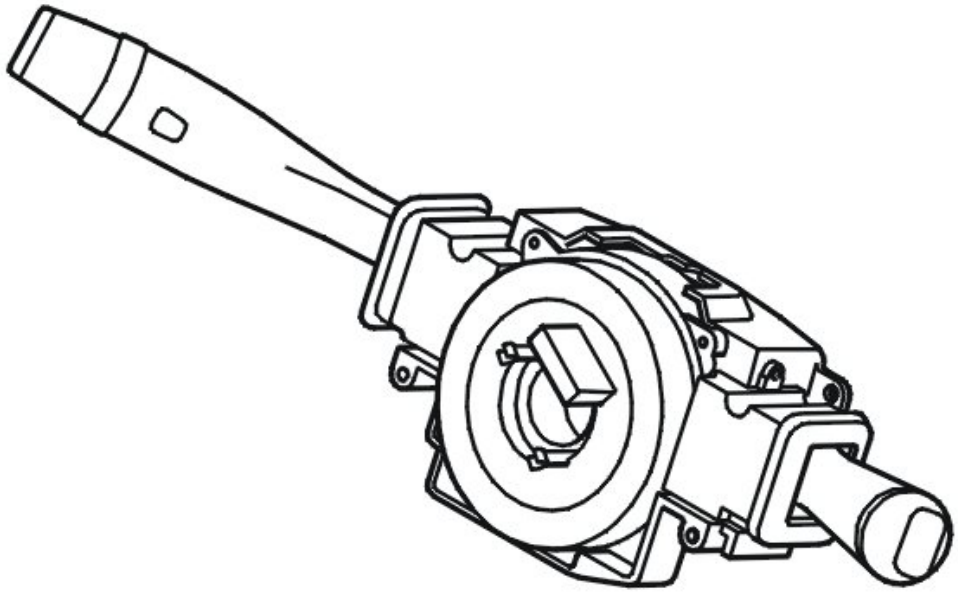
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD42

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked LIN communication with the steering wheel module (SWM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

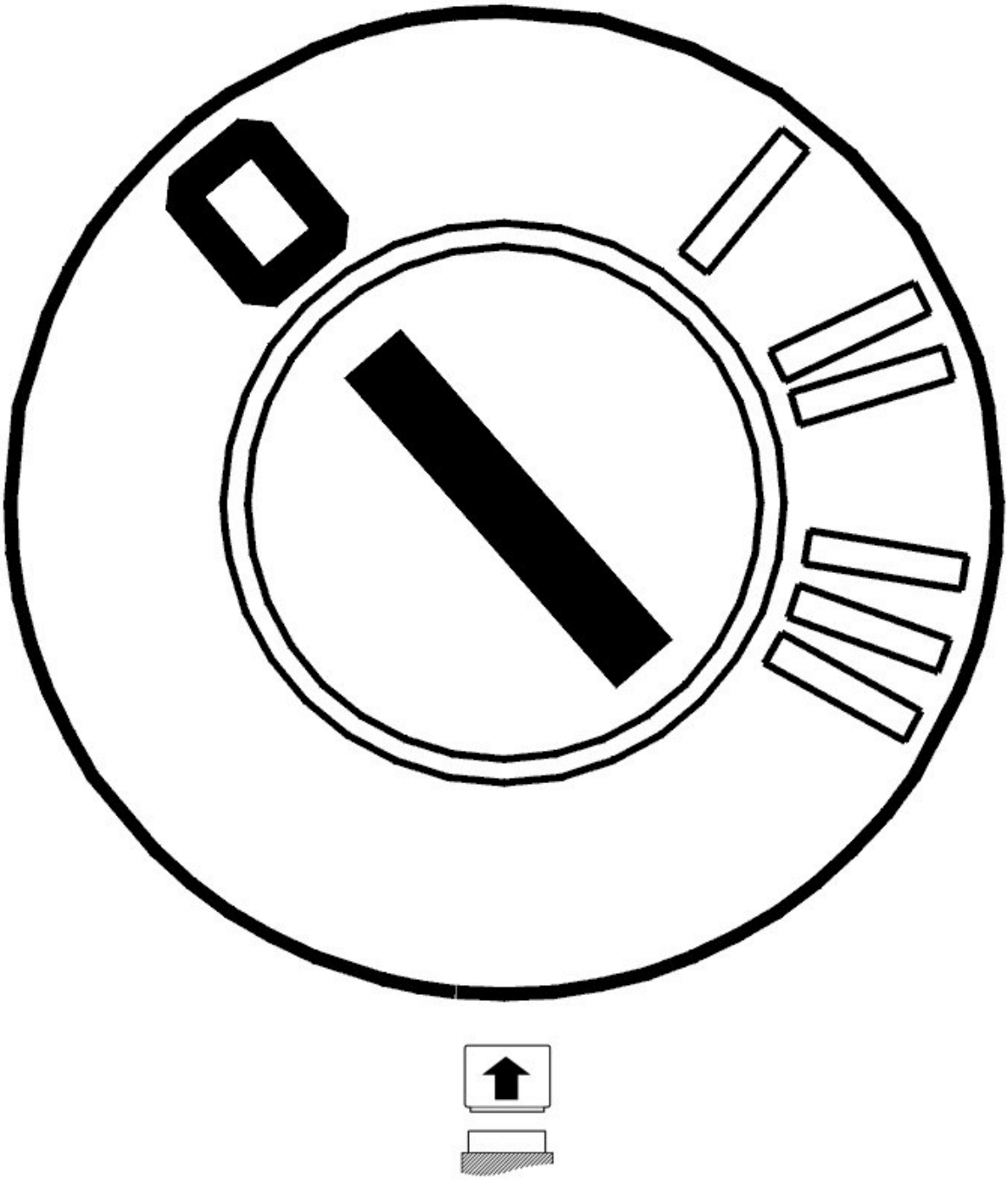
Fault symptom[s]

- The windshield wipers only operate at lowest speed
- Front windshield washing does not work
- Rear windshield washing does not work
- The RTI buttons on the steering wheel do not function
- The turn signal lamp switch does not work
- Cruise control does not work at all
- The turn signal lamps are not operating
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The diagnostic trouble code (DTC) indicates that the communication between the steering wheel module (SWM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) #D58 (#58) and steering wheel module (SWM) #7.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try replacing the steering wheel module (SWM).
Remedy as necessary.

Other information

- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

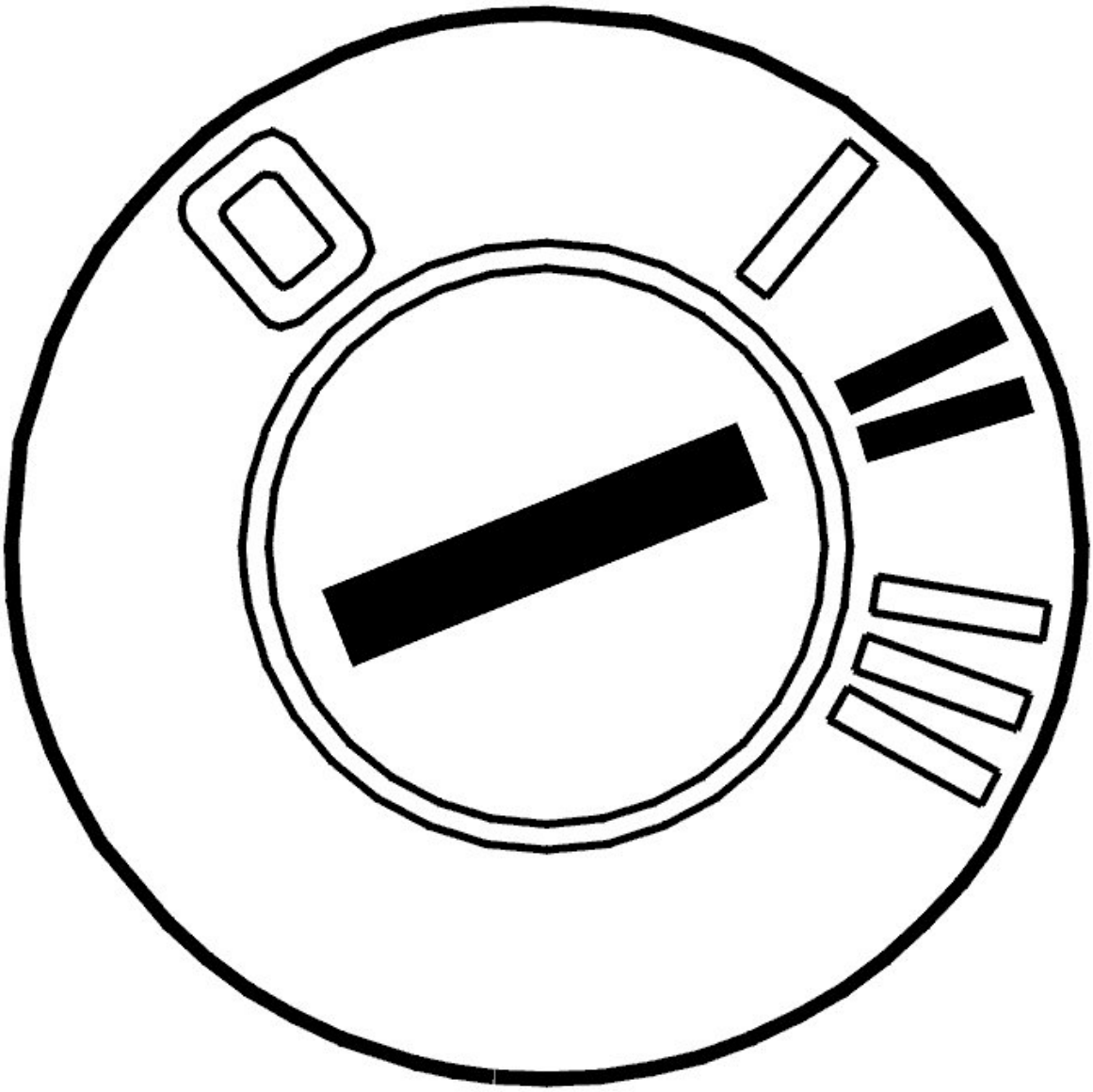
Continue - Verification

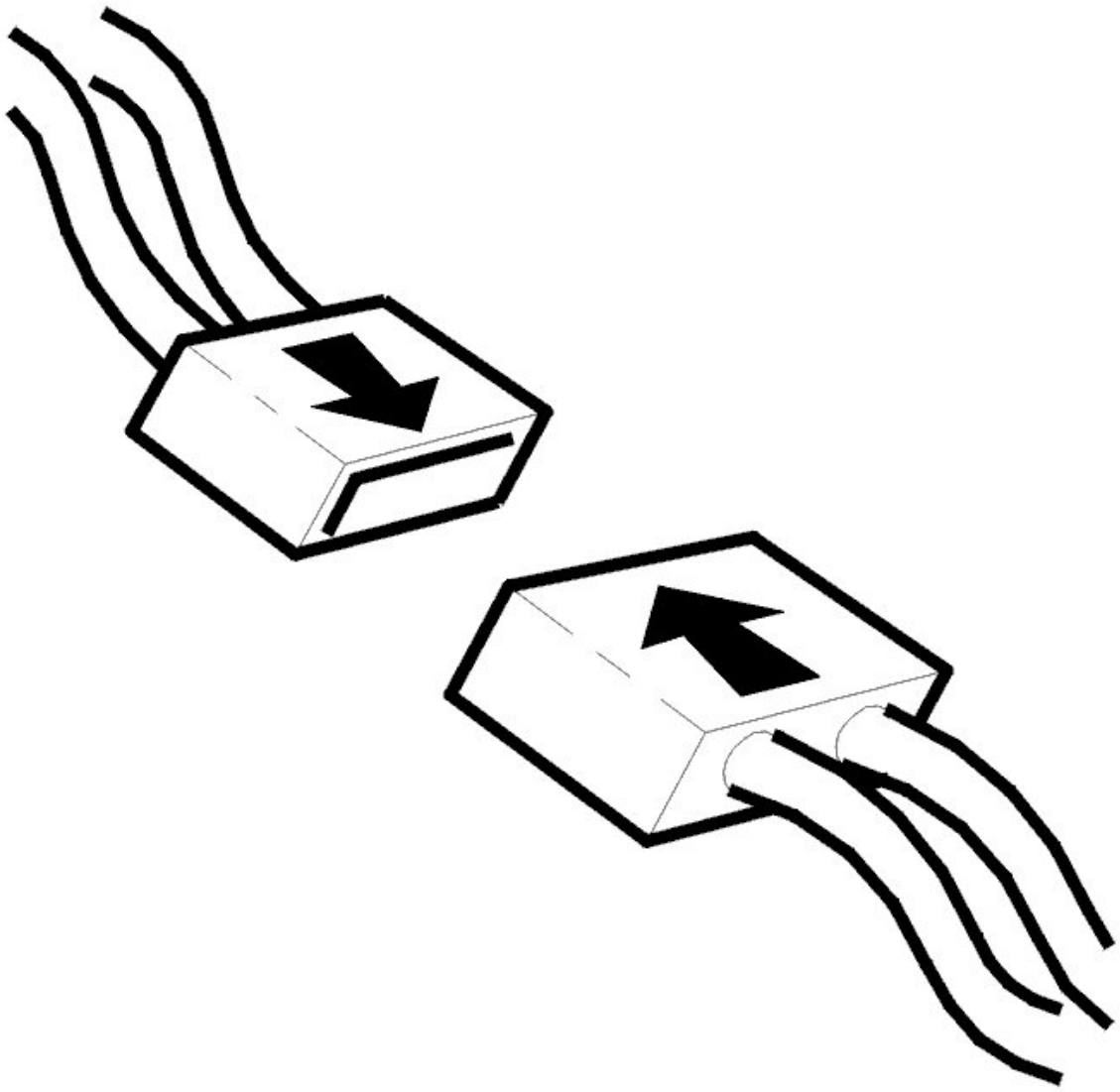
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

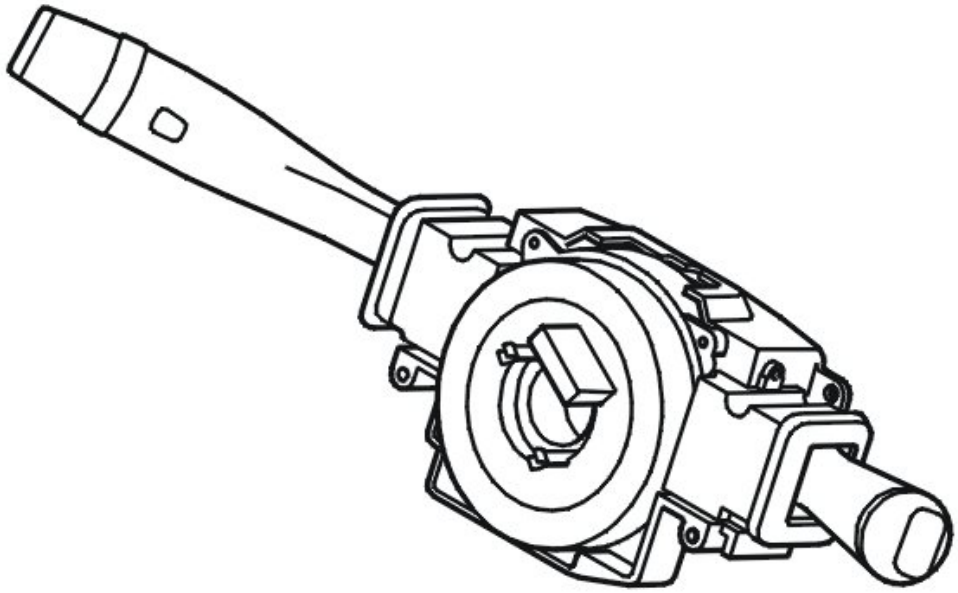
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD50

Condition



The central electronic module (CEM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference such as blocked LIN communication with the steering wheel module (SWM).
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

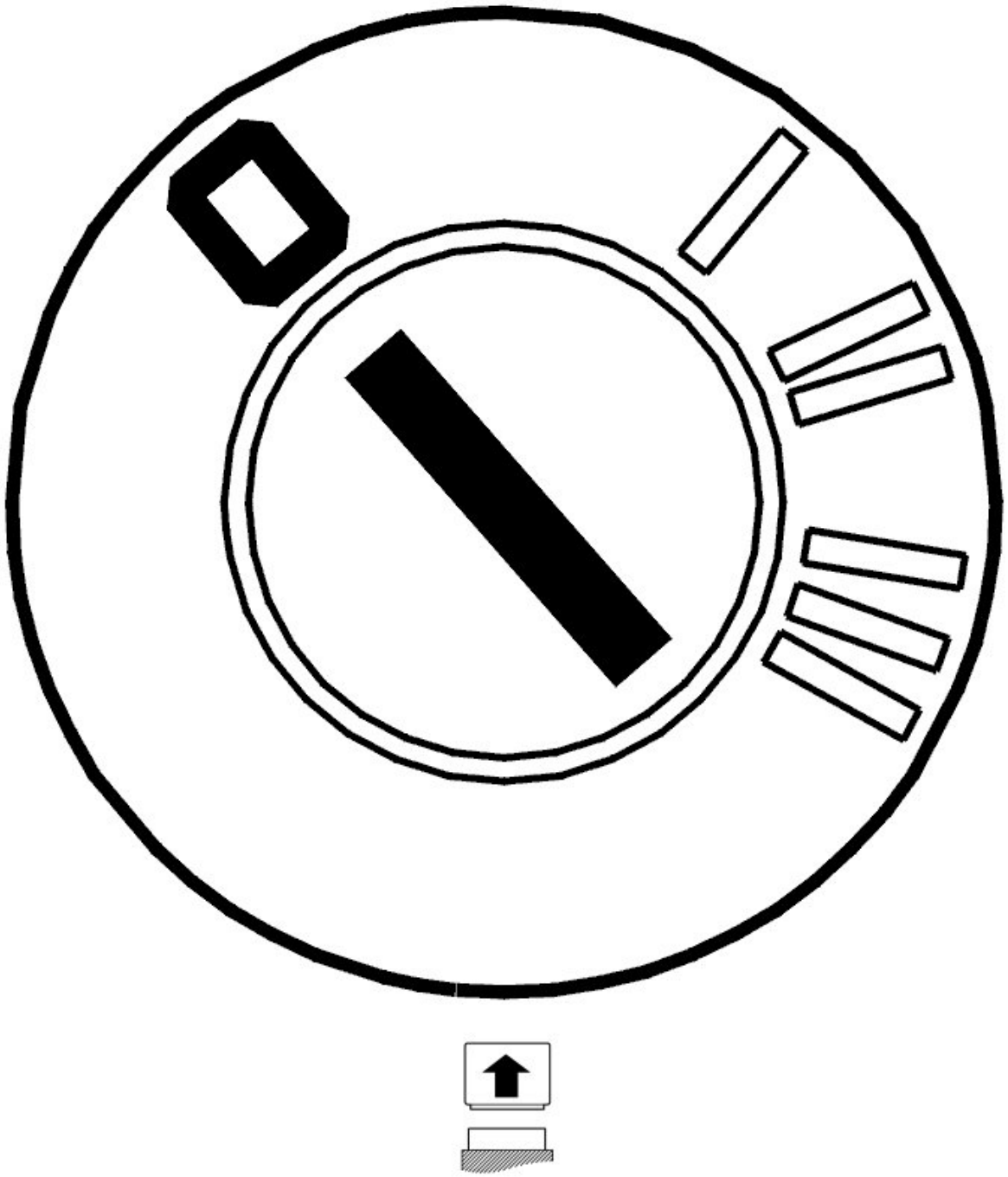
Fault symptom[s]

- The windshield wipers are not working
- Front windshield washing does not work
- Rear windshield washing does not work
- The turn signal lamp switch does not work
- Cruise control does not work at all
- The turn signal lamps are not operating
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The diagnostic trouble code (DTC) indicates that the communication between the steering wheel module (SWM) and central electronic module (CEM) is not working. This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or both of the control modules.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Take readings between:
- Central electronic module (CEM) #D58 (#58) and steering wheel module (SWM) #7.

Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try replacing the steering wheel module (SWM).
Remedy as necessary.

Other information
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

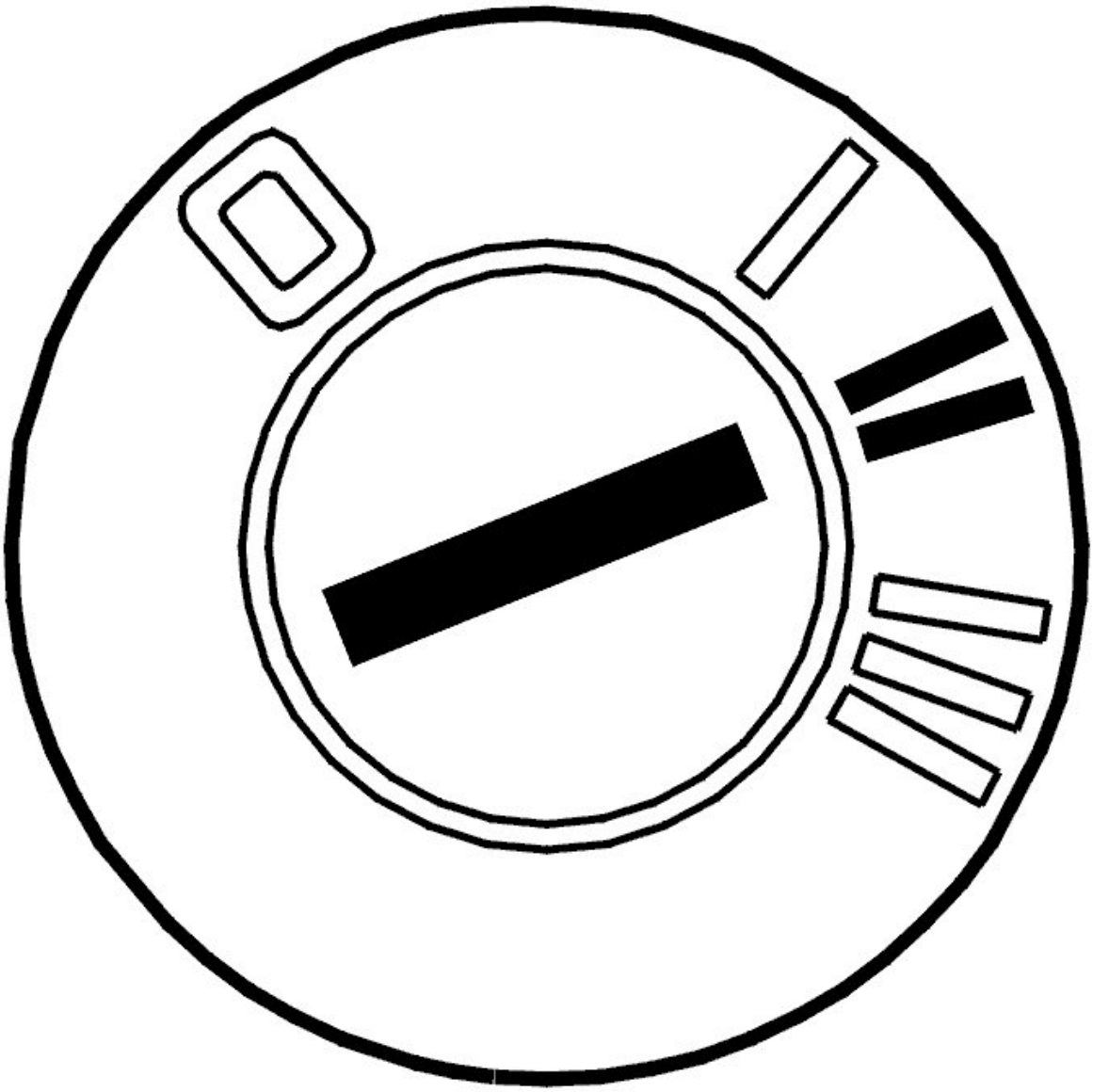
Continue - Verification

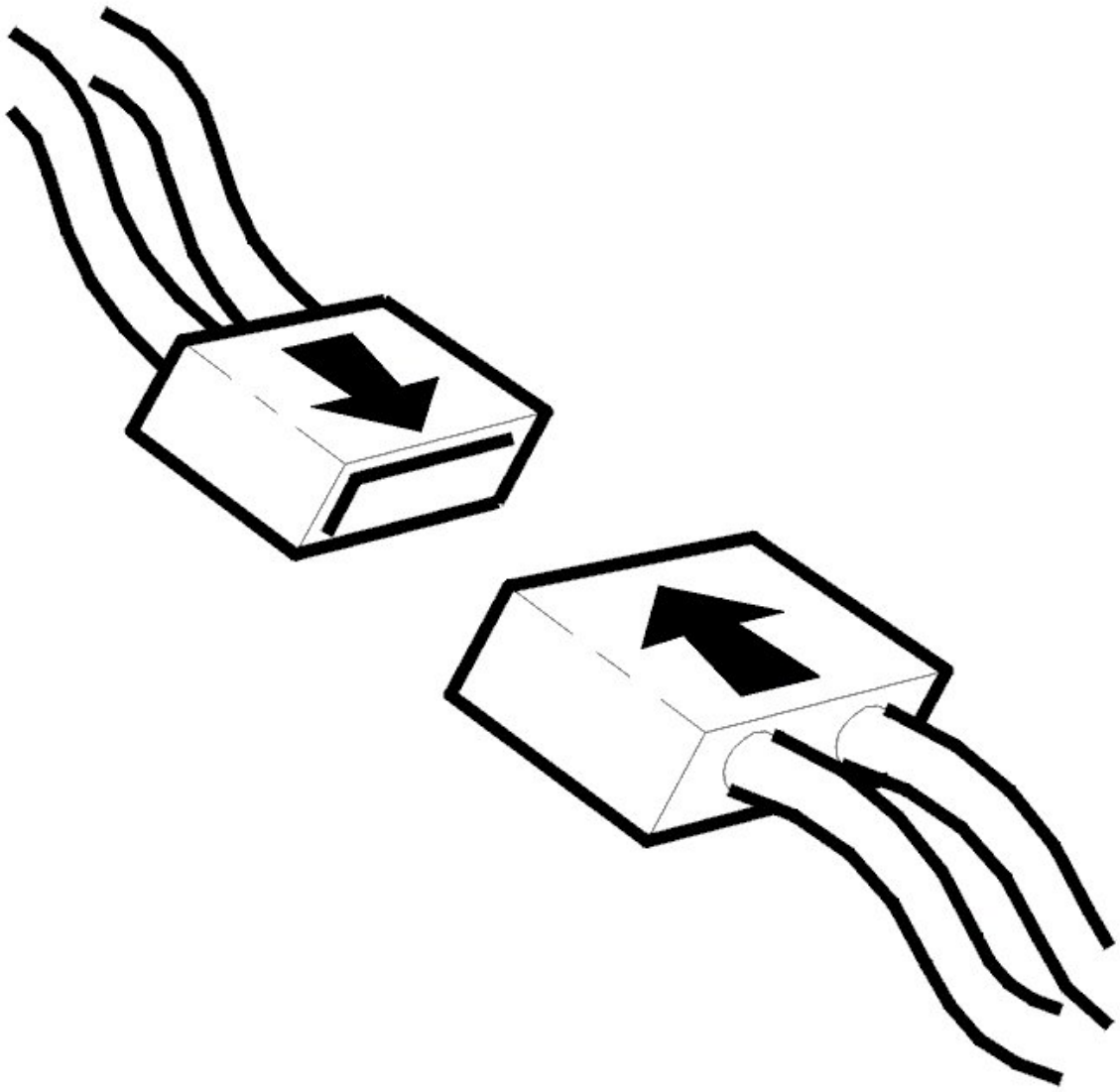
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

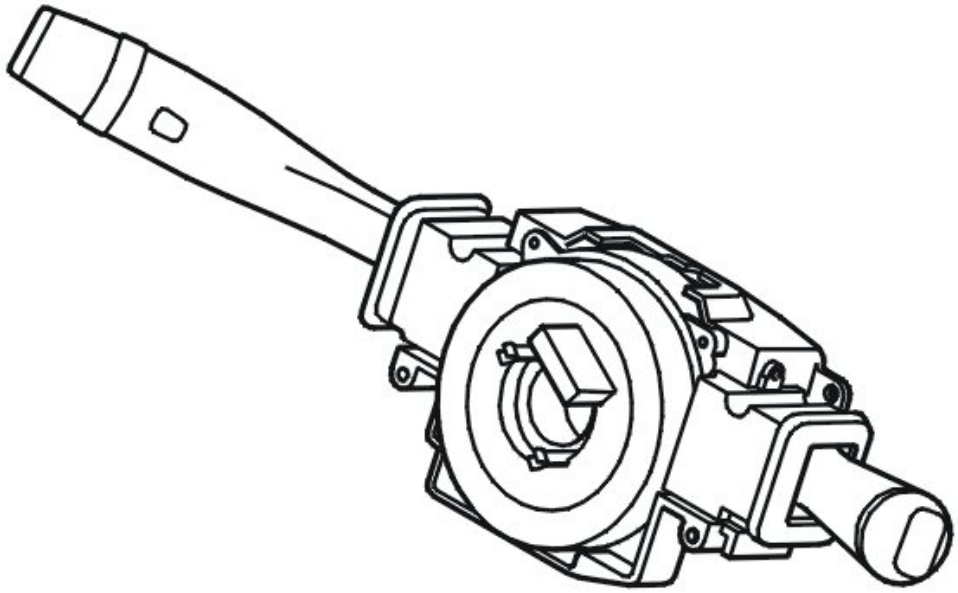
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD51

Condition



The Central Electronic Module (CEM) both transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). If the control module registers serious interference, for example that the LIN communication to the cruise control switch is blocked, then the Diagnostic Trouble Code (DTC) is generated.
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VADIS fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

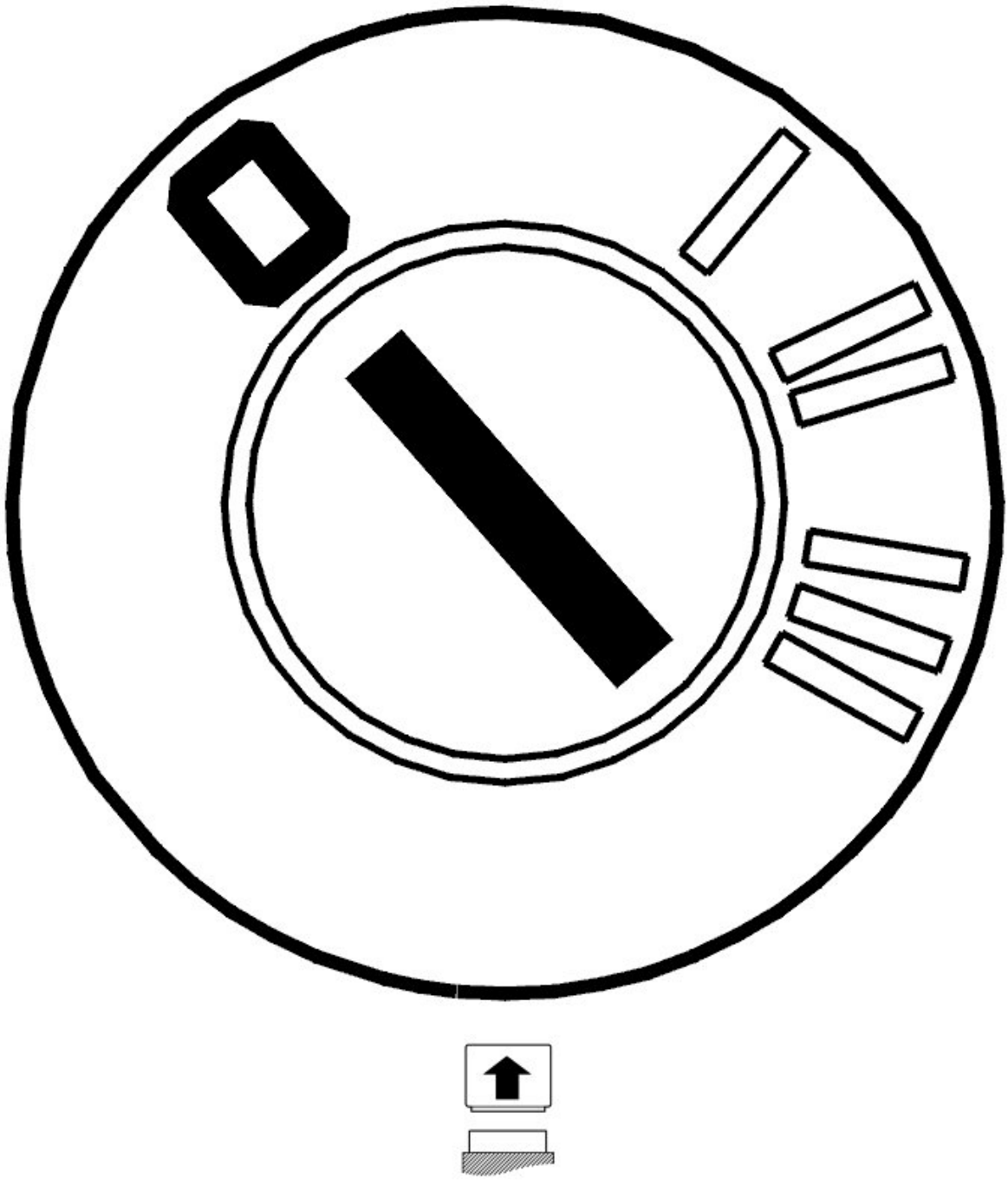
Fault symptom[s]

- Cruise control does not function at all.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The Diagnostic Trouble Code (DTC) indicates that the communication between the Central Electronic Module (CEM) and cruise control switch is not working.
This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or all of the control modules.
Check the connectors for loose connections, damaged or bent terminal pins and oxidation.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- The Central Electronic Module (CEM) #D58 (#58) and cruise control switch #2.

Also check the intermediate connectors.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Keypad unit, steering wheel, replacing See: Accessories and Optional Equipment/Sensors and Switches - Accessories and Optional Equipment/Steering Mounted Controls Assembly/Service and Repair/Keypad Unit, Steering Wheel, Replacing
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new cruise control switch.
Remedy as necessary.

Other information

- Keypad unit, steering wheel, replacing See: Accessories and Optional Equipment/Sensors and Switches - Accessories and Optional Equipment/Steering Mounted Controls Assembly/Service and Repair/Keypad Unit, Steering Wheel, Replacing

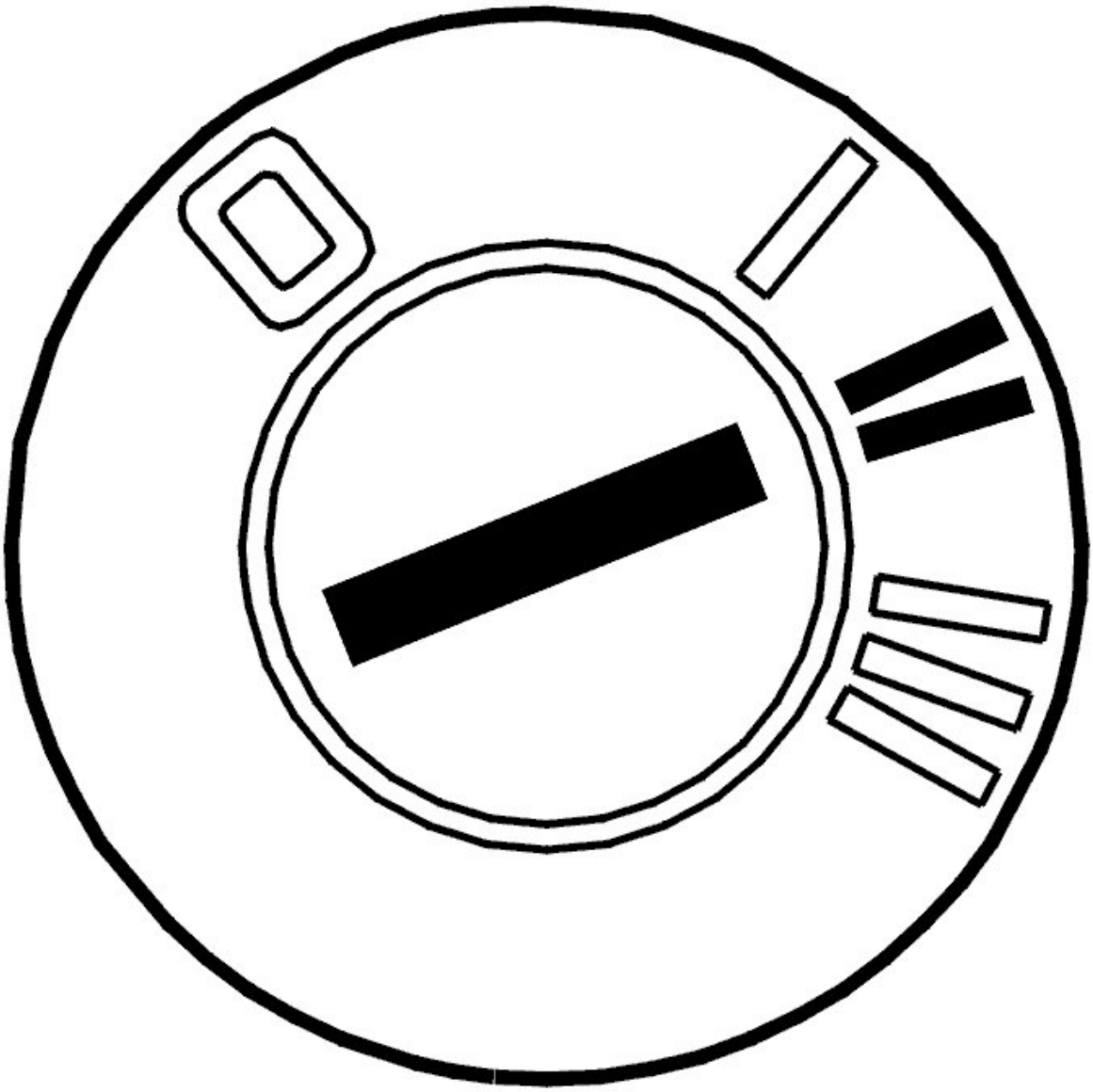
Continue - Verification

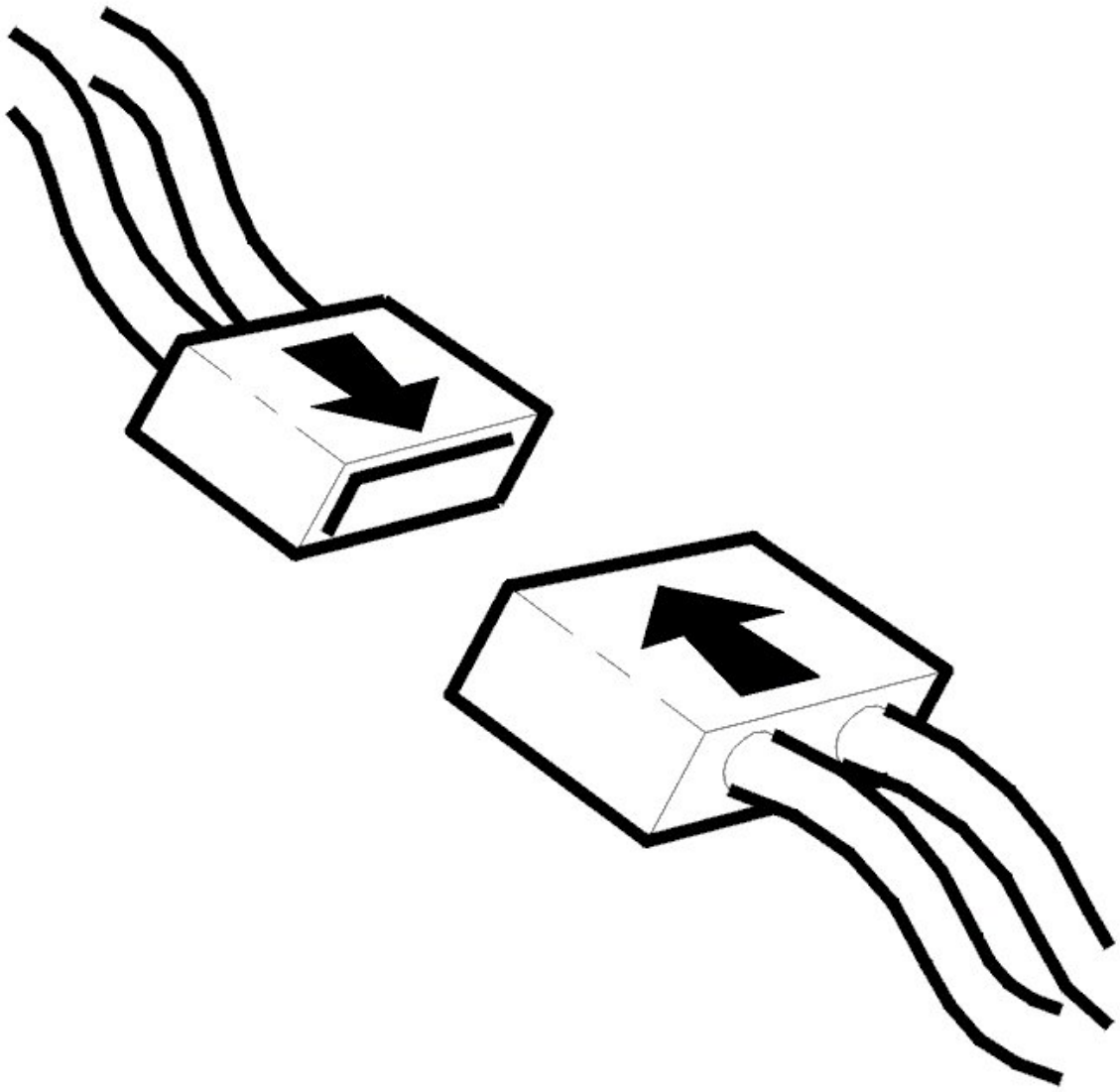
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

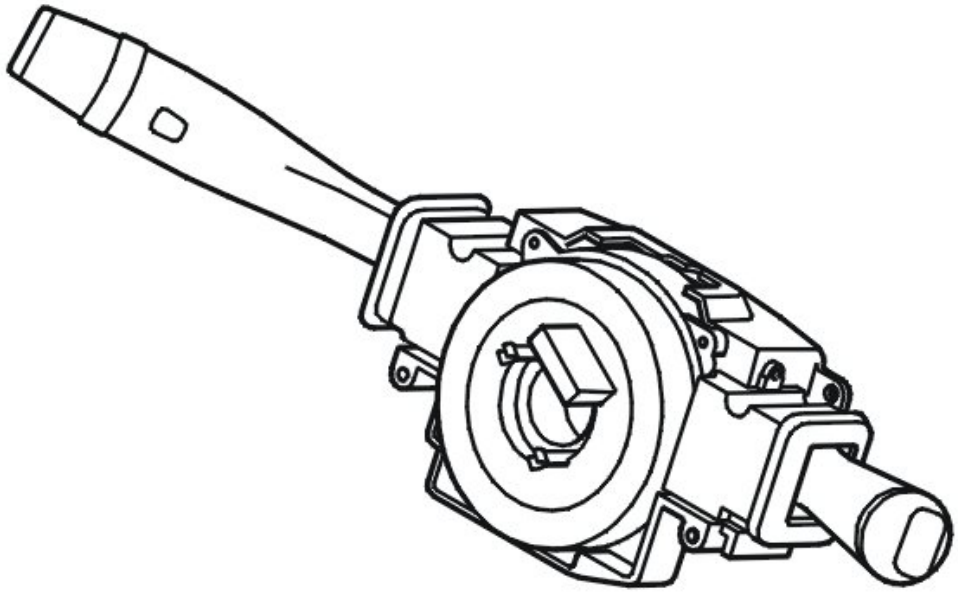
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DD52

Condition



The Central Electronic Module (CEM) both transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). If the control module registers serious interference, for example that the LIN communication to the audio/telephone switch is blocked, then the Diagnostic Trouble Code (DTC) is generated.
The diagnostic trouble code (DTC) can be detected when the ignition key is in position II for at least 10 seconds and the battery voltage exceeds 10.5 V.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network. The central electronic module (CEM) is the only control module that monitors the voltage level in the LIN wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a LIN fault unless VADIS fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between the LIN wiring
- Open-circuit in the LIN wiring
- Internal fault in another control module in the same part of the LIN network.

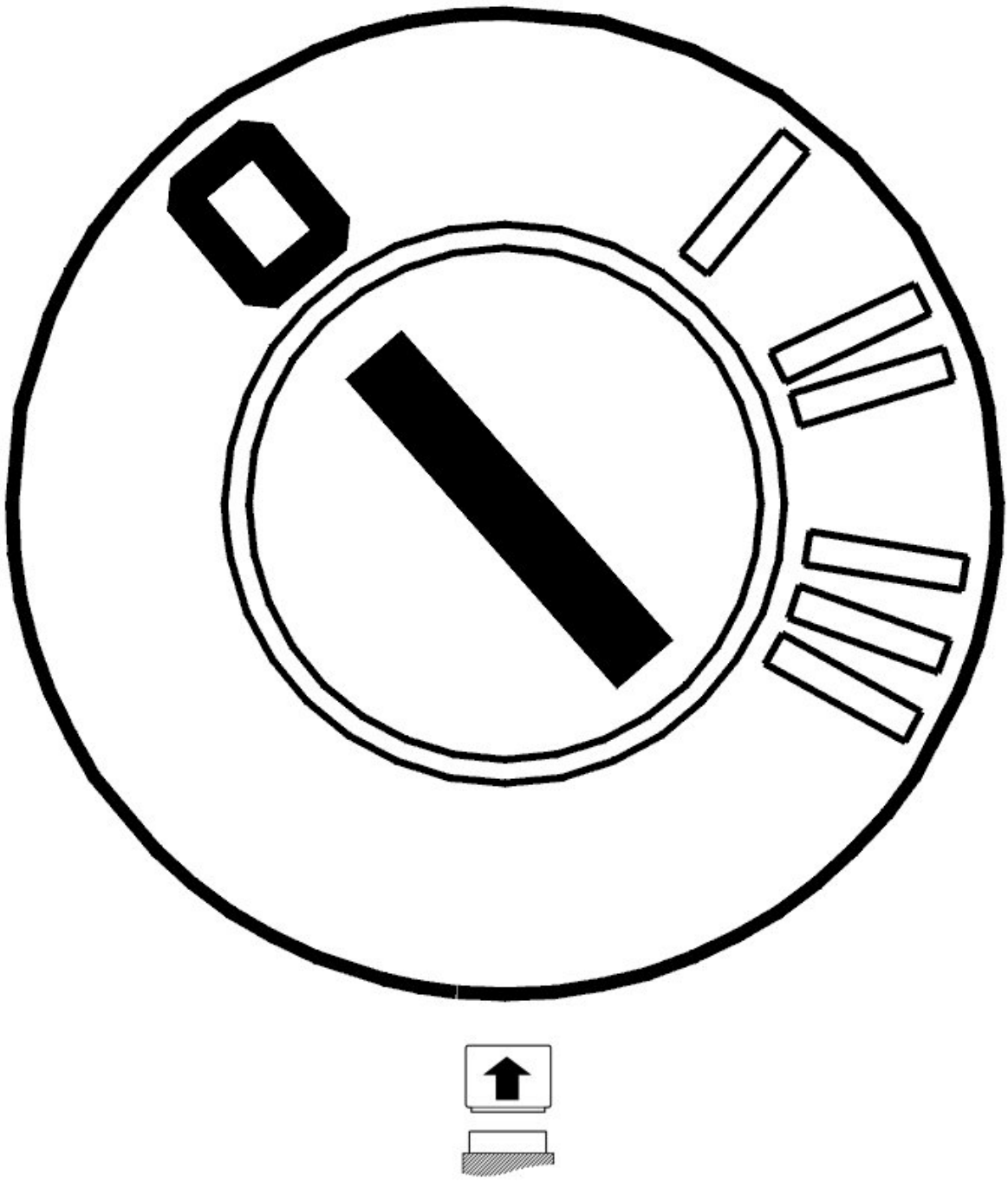
Fault symptom[s]

- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Signal Missing

Signal missing

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

The Diagnostic Trouble Code (DTC) indicates that the communication between the Central Electronic Module (CEM) and audio/telephone switch is not working.
This may be due to a fault in the signal cable between the control modules or a damaged communication device in one or all of the control modules.
Check the connectors for loose connections, damaged or bent terminal pins and oxidation.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- The Central Electronic Module (CEM) #D58 (#58) and audio/telephone switch #2.

Also check the intermediate connectors.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair
- Keypad unit, steering wheel, replacing See: Accessories and Optional Equipment/Sensors and Switches - Accessories and Optional Equipment/Steering Mounted Controls Assembly/Service and Repair/Keypad Unit, Steering Wheel, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new audio/phone switch.
Remedy as necessary.

Other information

- Keypad unit, steering wheel, replacing See: Accessories and Optional Equipment/Sensors and Switches - Accessories and Optional Equipment/Steering Mounted Controls Assembly/Service and Repair/Keypad Unit, Steering Wheel, Replacing

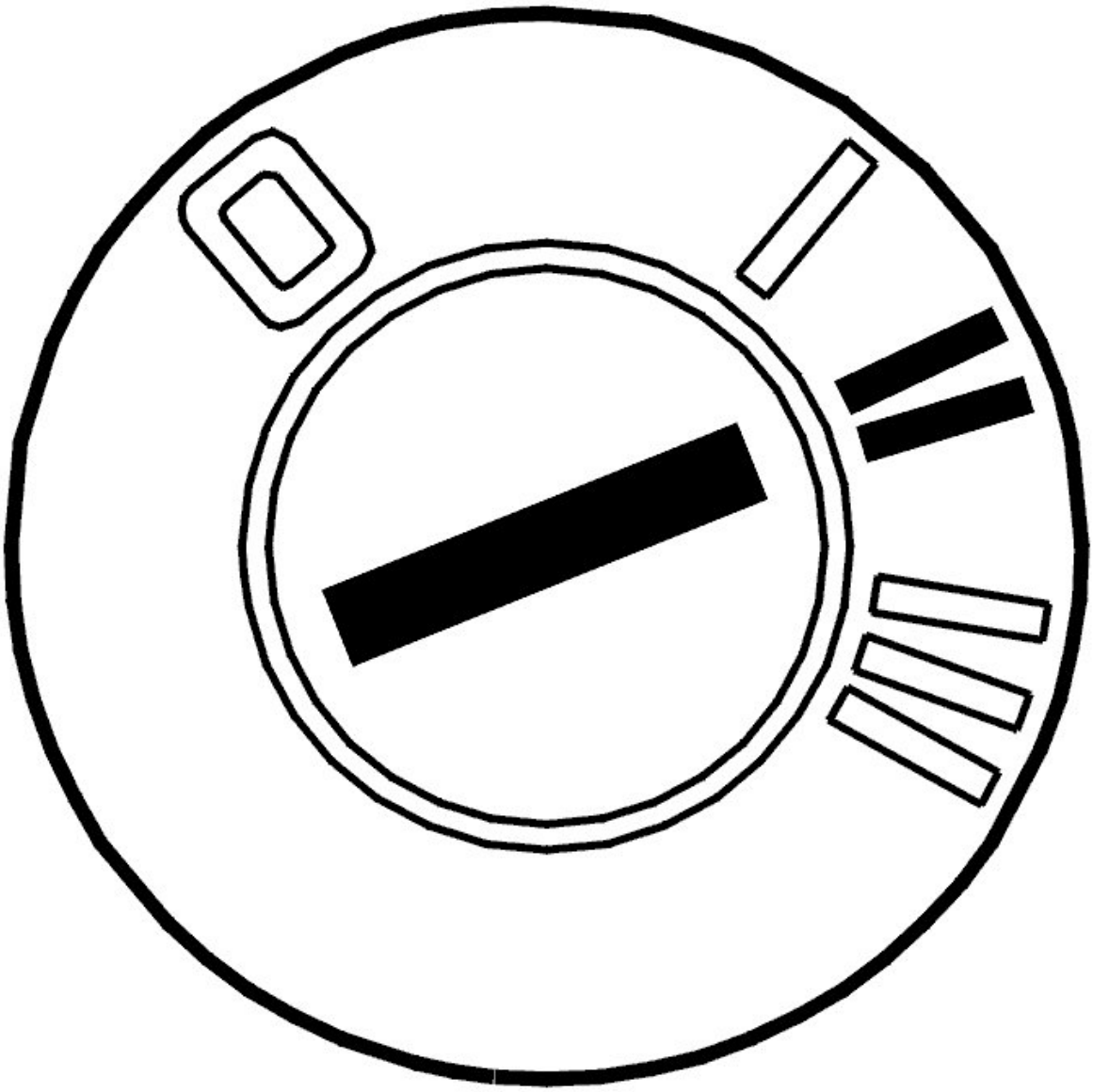
Continue - Verification

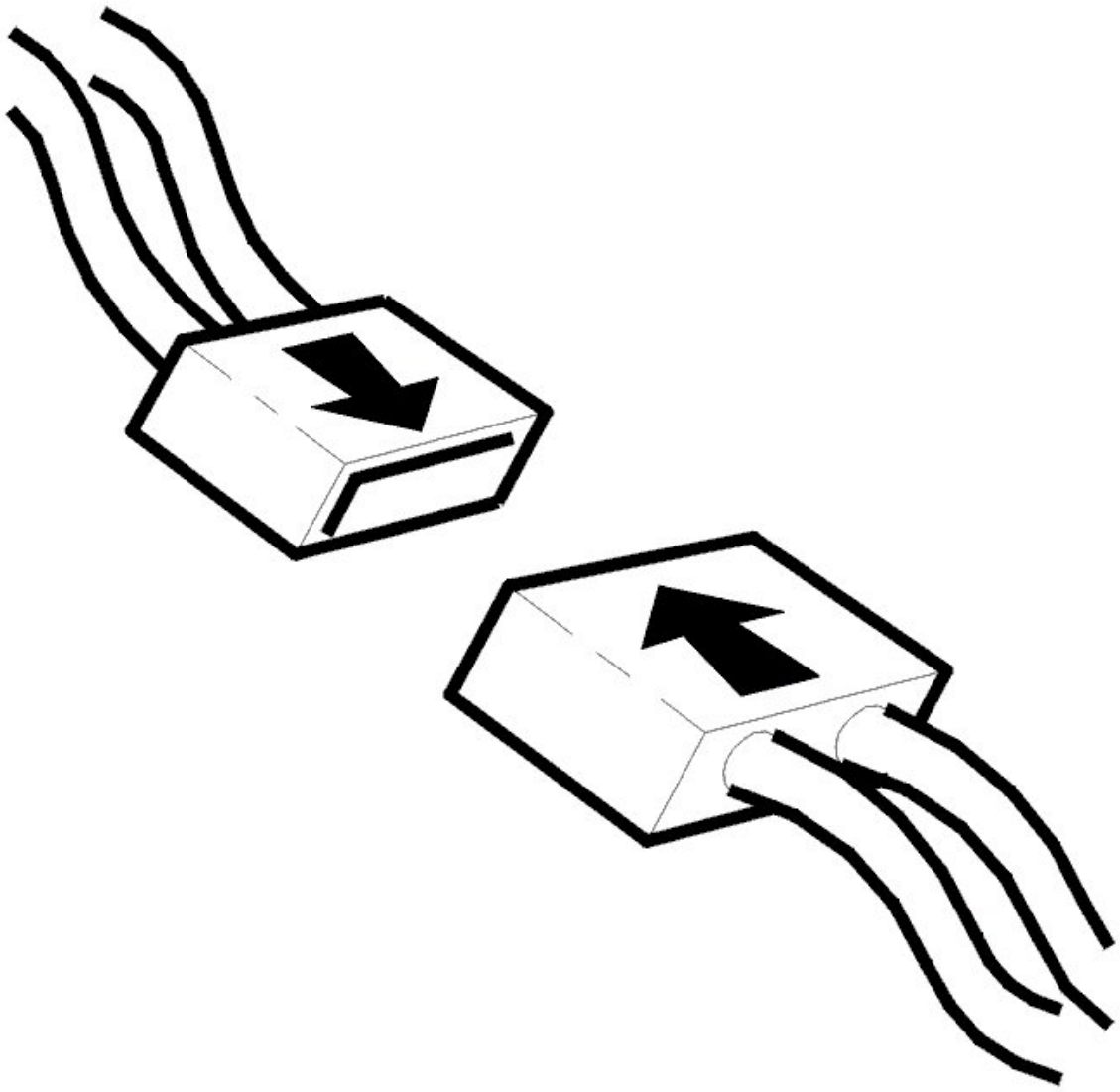
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

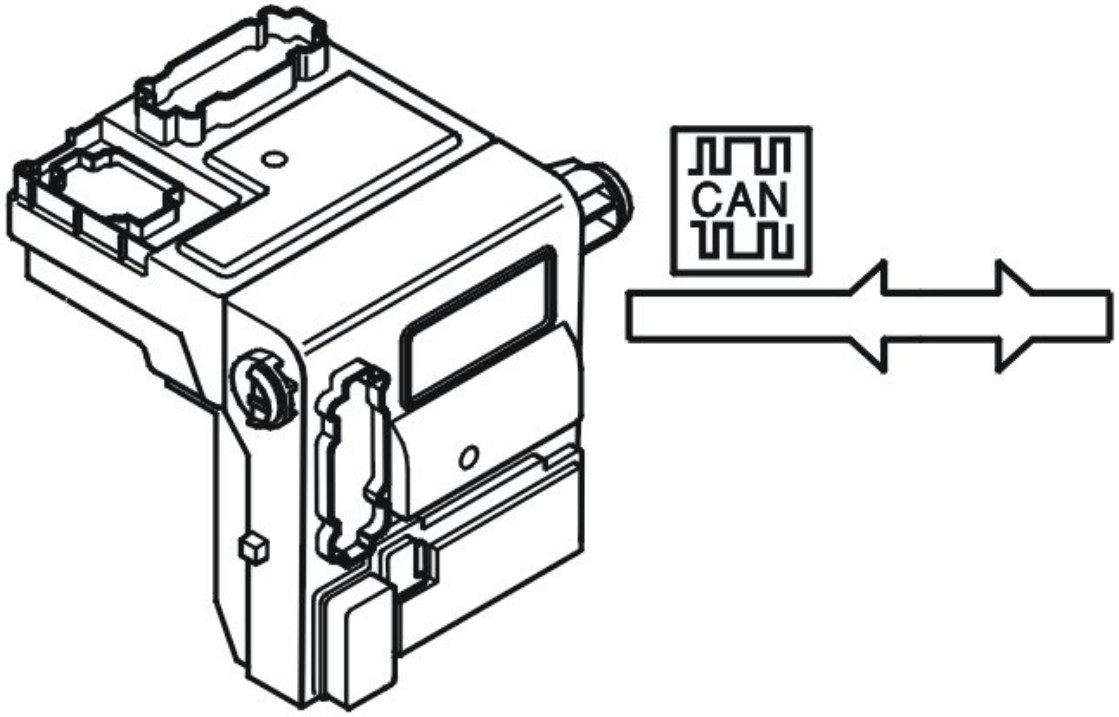
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

CEM-DF01

Diagnostic trouble code (DTC) information CEM-DF01

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in CAN H or CAN L in the low speed network.

Note! The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is the only control module that can directly store diagnostic trouble codes (DTCs) for an open-circuit in these conductors. However other control modules can store diagnostic trouble codes (DTCs) as a result of the open-circuit. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Open-circuit in one of the control area network (CAN) cables on the low speed network
- Contact resistance in the terminals.

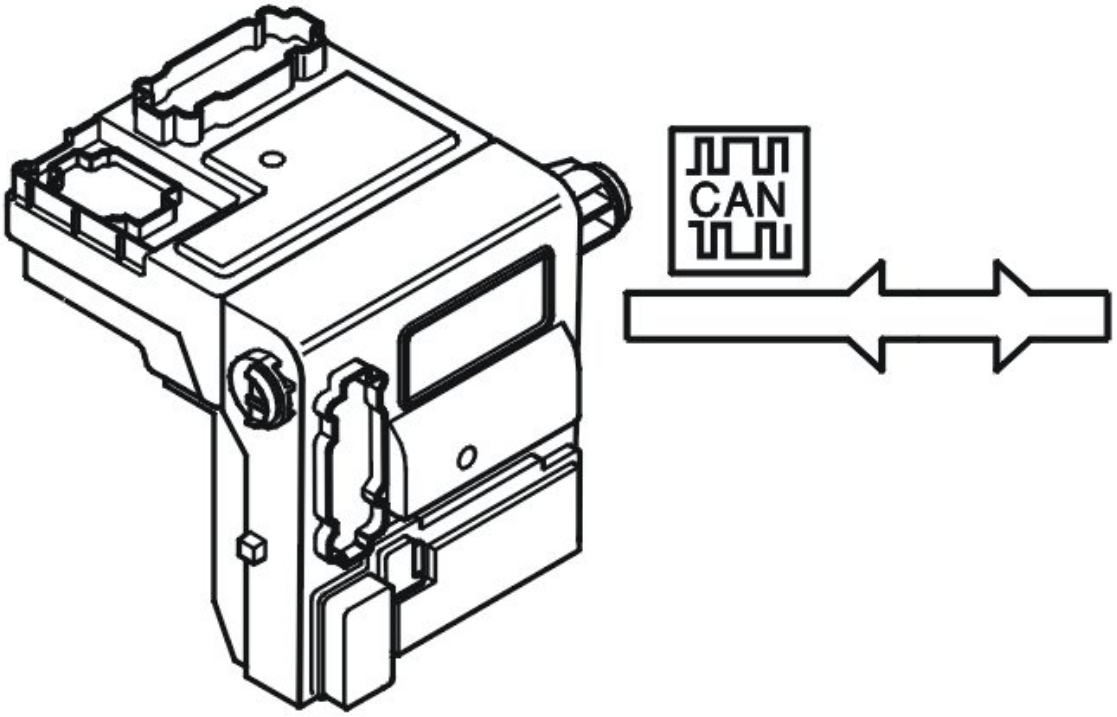
Fault symptom[s]
- No gauges working.

- The lighting in the instrument panel does not function.
- The central locking system does not function at all.

CEM-DF03

Diagnostic trouble code (DTC) information CEM-DF03

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the CAN H in the low speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

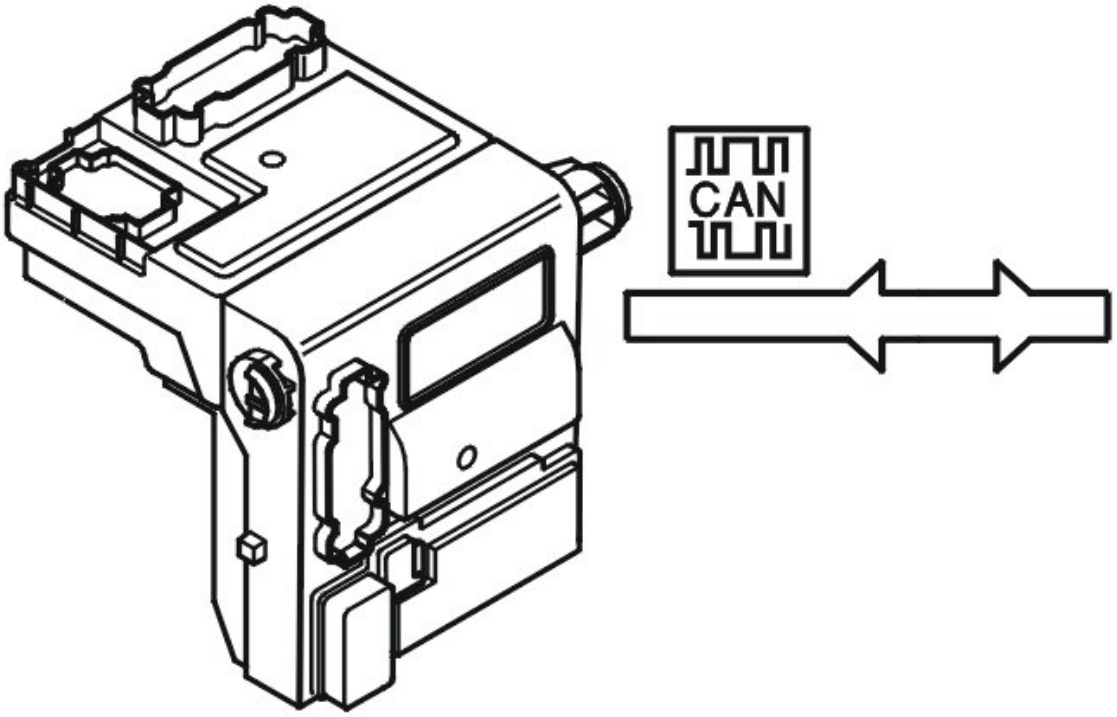
Possible source
- Short-circuit to supply voltage in the low speed network.

Fault symptom[s]
- No gauges working.
- The lighting in the instrument panel does not function.
- The central locking system does not function at all.

CEM-DF04

Diagnostic trouble code (DTC) information CEM-DF04

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the CAN L in the low speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

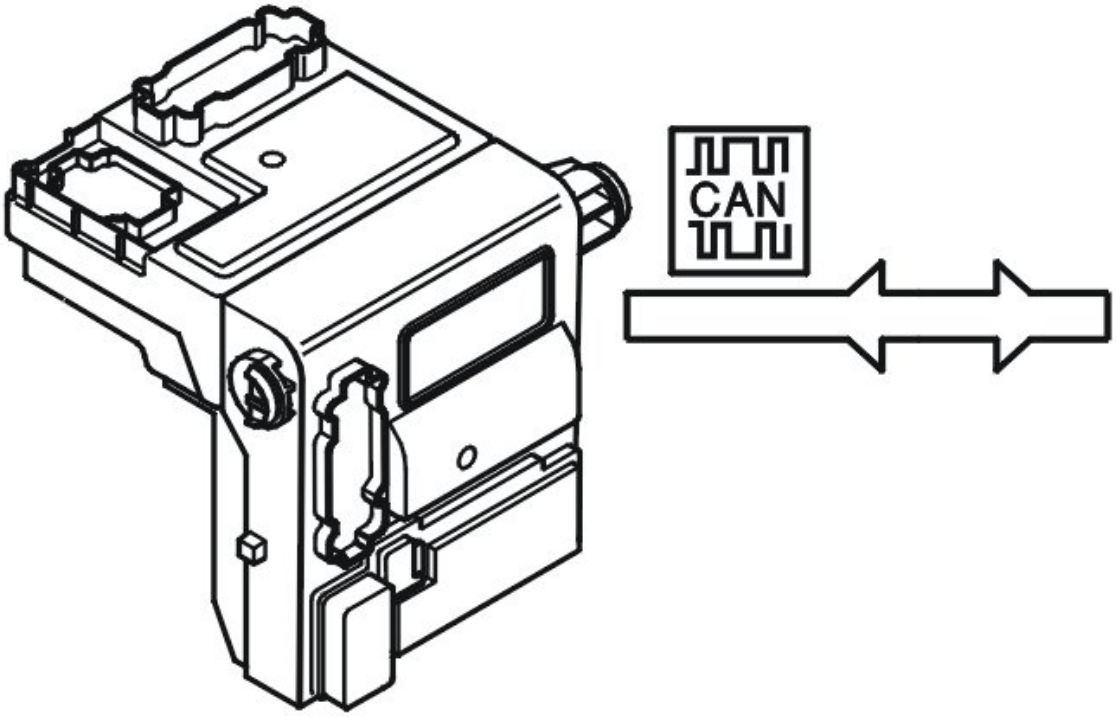
Possible source
- Short-circuit to ground in the low speed network.

Fault symptom[s]
- Radio interference.

CEM-DF05

Diagnostic trouble code (DTC) information CEM-DF05

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that there is a short-circuit to ground in the CAN H in the low speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

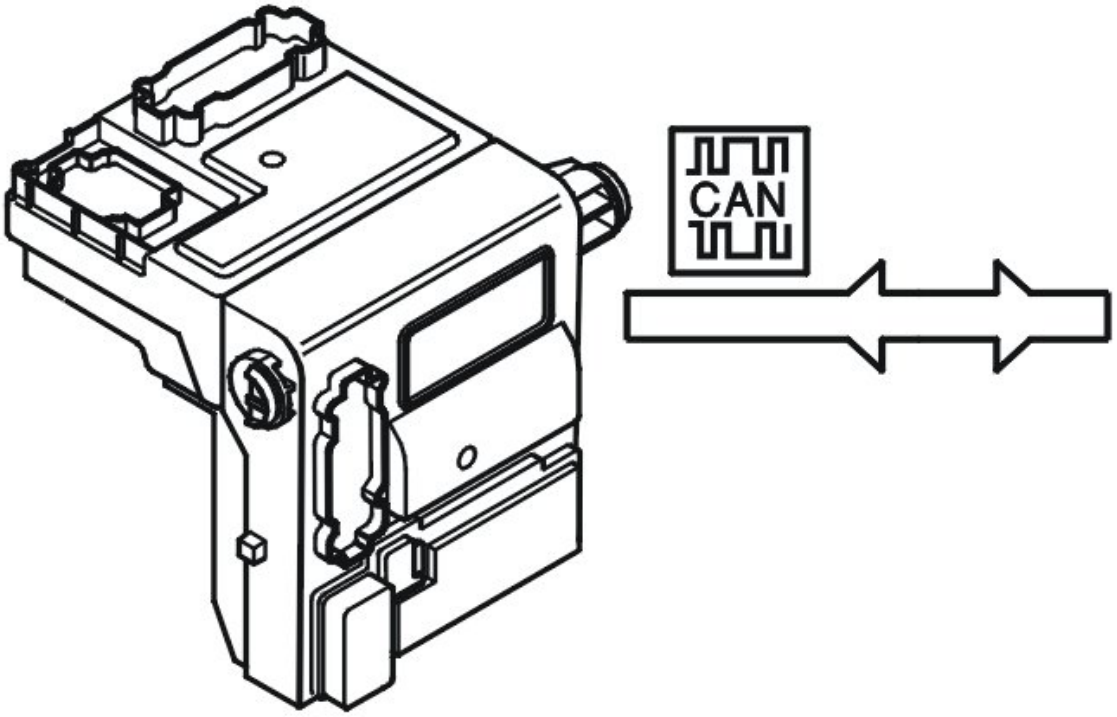
Possible source
- Short-circuit to ground in the low speed network.

Fault symptom[s]
- No gauges working.
- The instrument lighting does not operate
- The central locking system does not function at all.

CEM-DF06

Diagnostic trouble code (DTC) information CEM-DF06

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the CAN L in the low speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

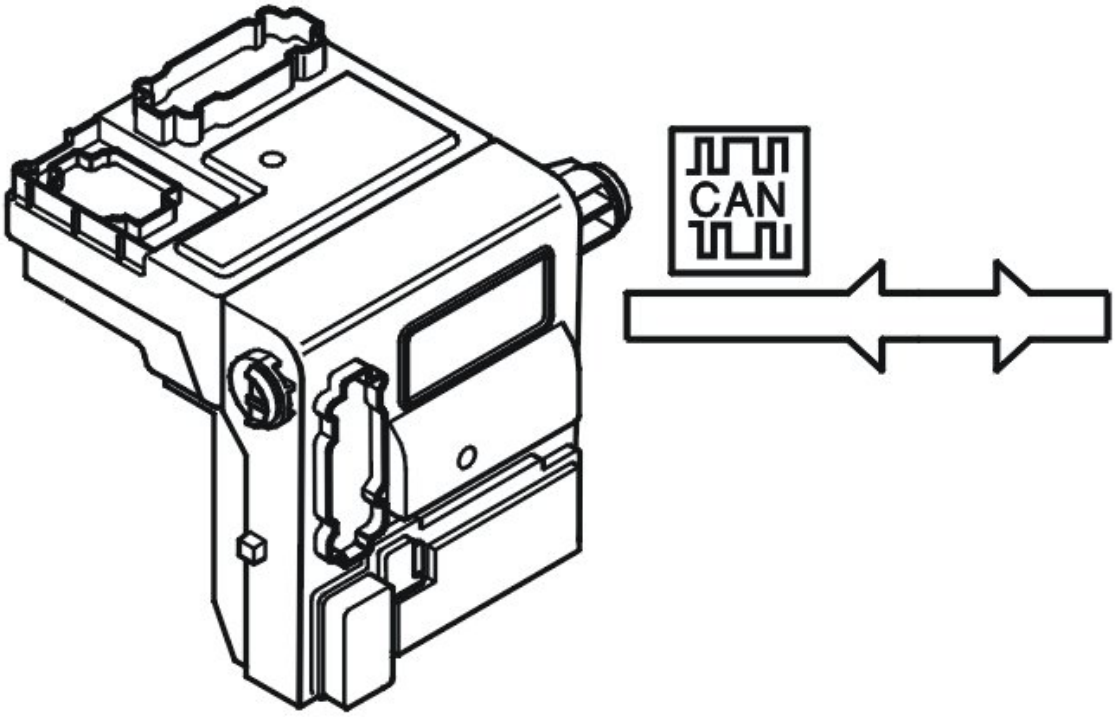
Possible source
- Short-circuit to supply voltage in the low speed network.

Fault symptom[s]
- No gauges working.
- The lighting in the instrument panel does not function.
- The central locking system does not function at all.

CEM-DF07

Diagnostic trouble code (DTC) information CEM-DF07

Condition



The central electronic module (CEM) checks the voltage in CAN L and CAN H on the low speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit between CAN L and CAN H in the low speed network.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for at least 10 seconds.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

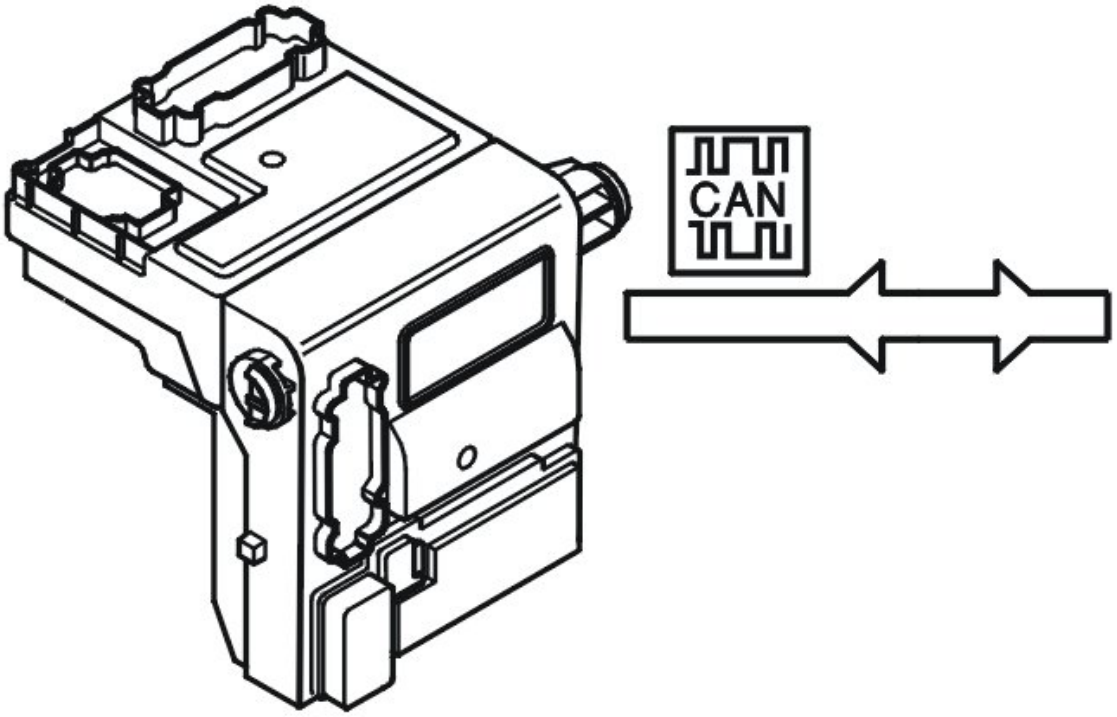
Possible source
- Short-circuit between CAN L and CAN H in the low speed network.

Fault symptom[s]
- No gauges working.
- The instrument lighting does not operate
- The central locking system does not function at all.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF11

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in CAN H or CAN L in the high speed network.

Note! The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is the only control module that can directly store diagnostic trouble codes (DTCs) for an open-circuit in these conductors. However other control modules can store diagnostic trouble codes (DTCs) as a result of the open-circuit. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Open-circuit in one of the control area network (CAN) cables on the high speed network
- Contact resistance in the terminals.

Fault symptom[s]
- The engine does not start.
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These

diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

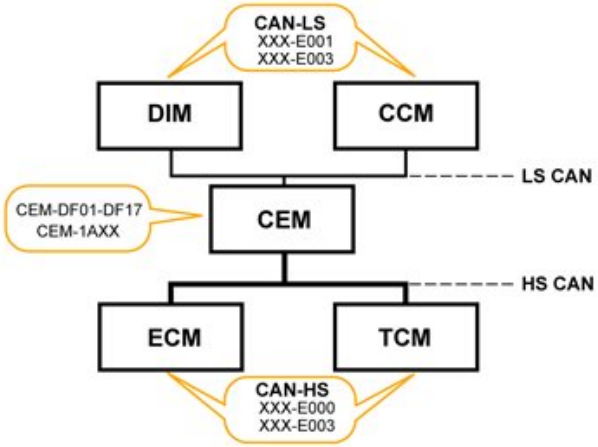
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

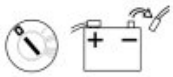
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

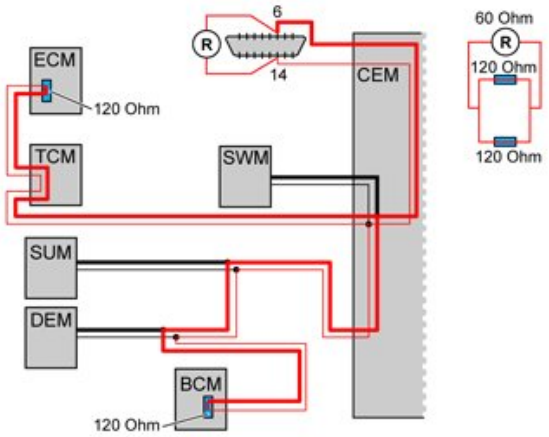
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

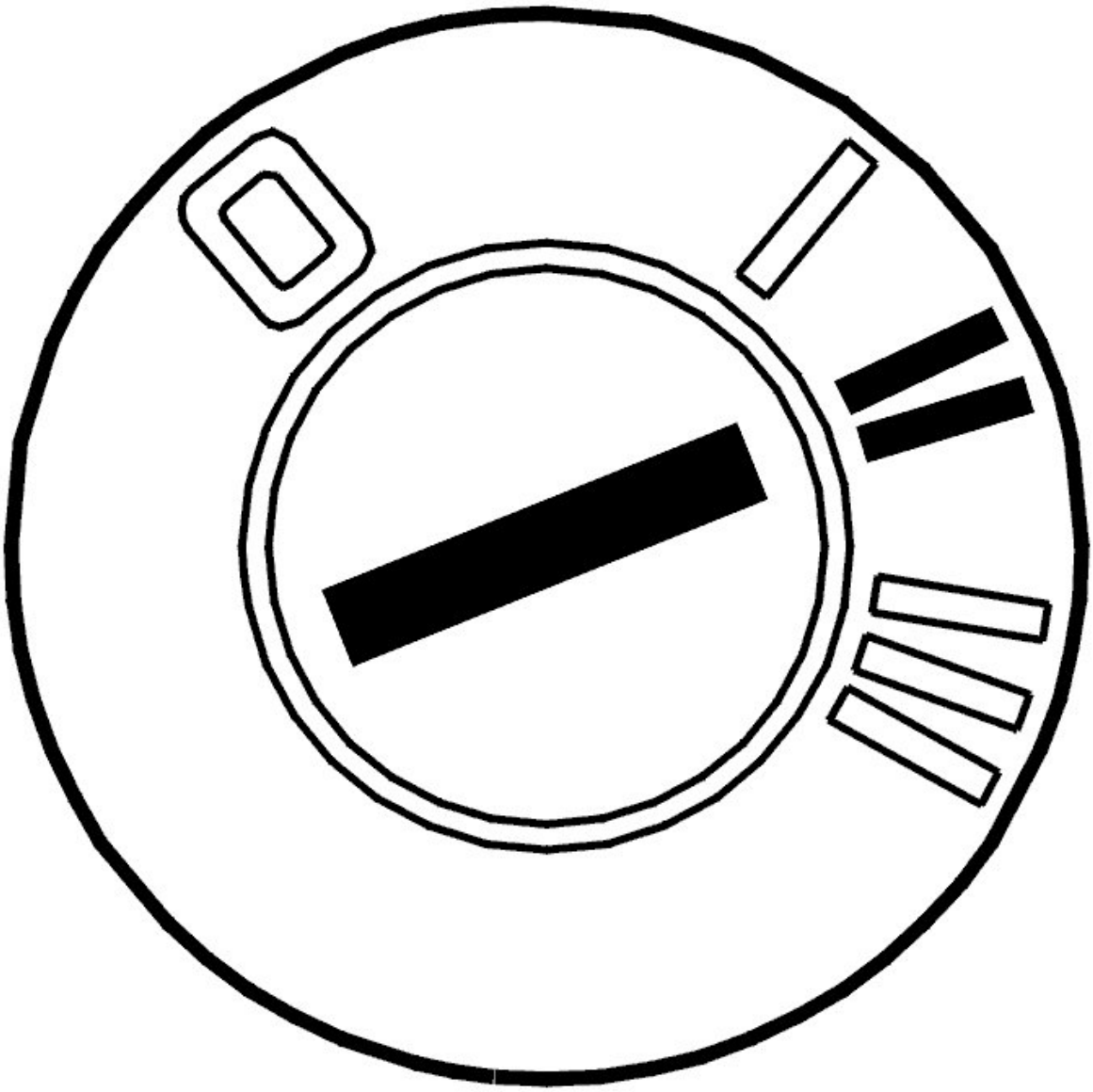


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

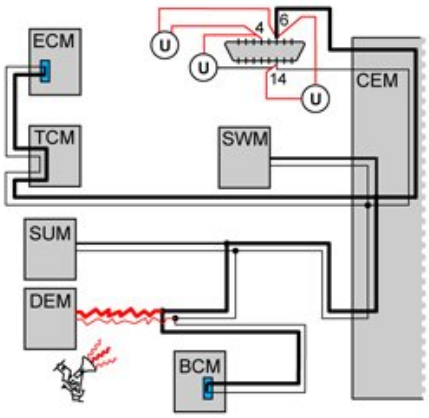
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

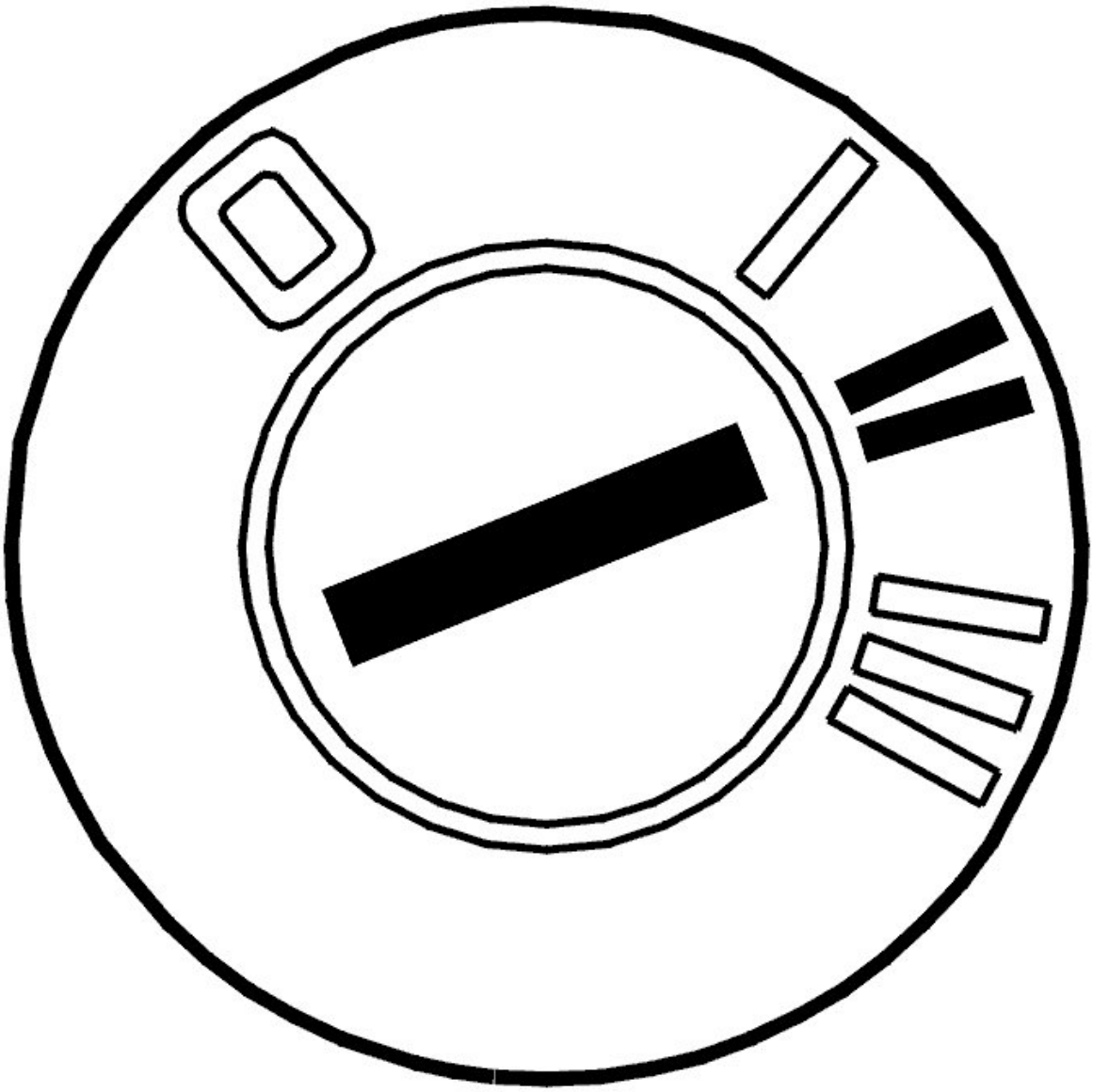


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

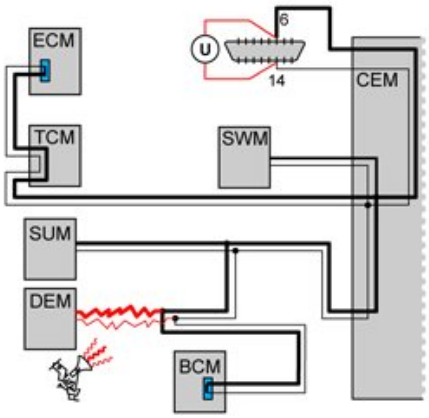
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

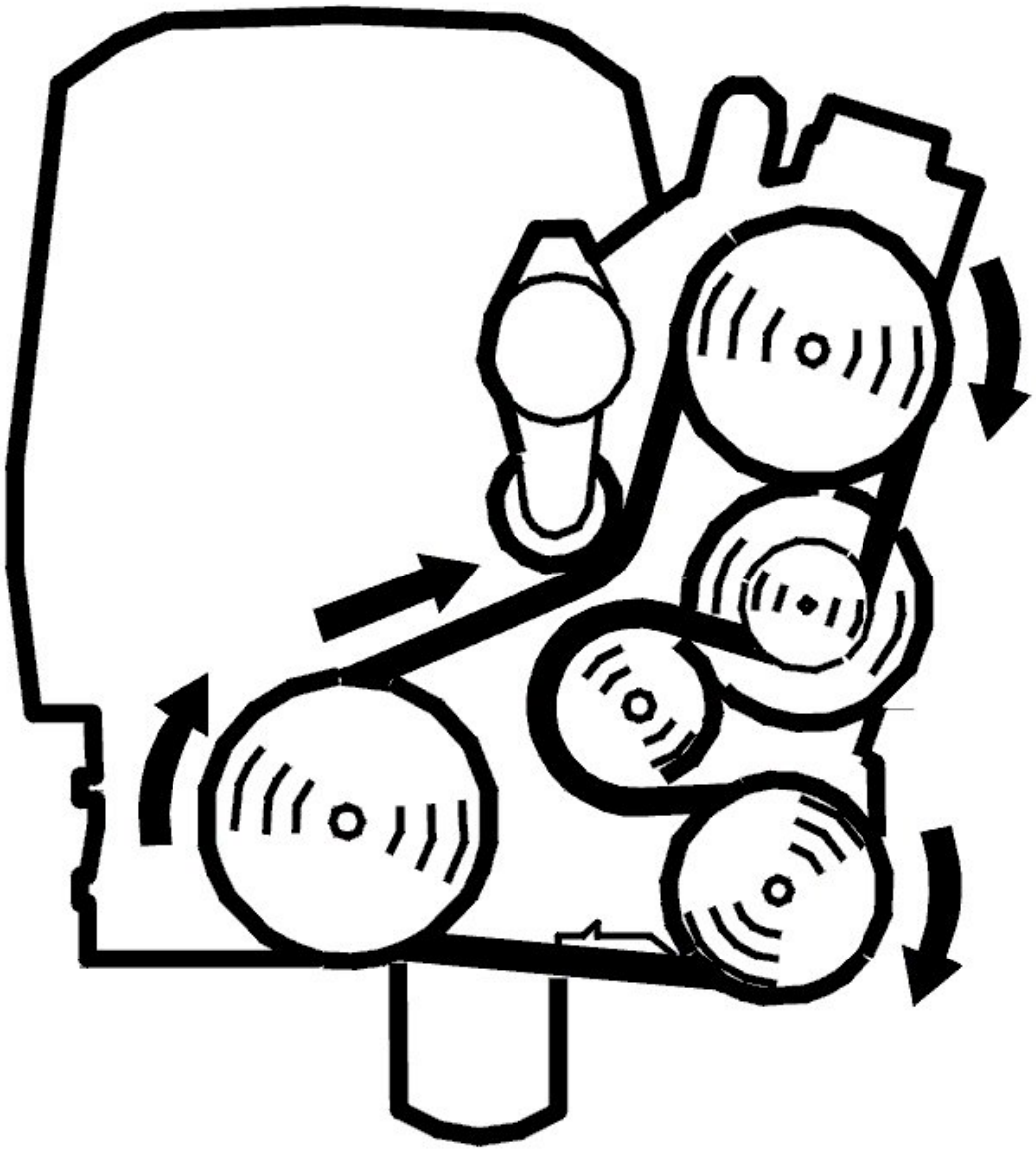
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

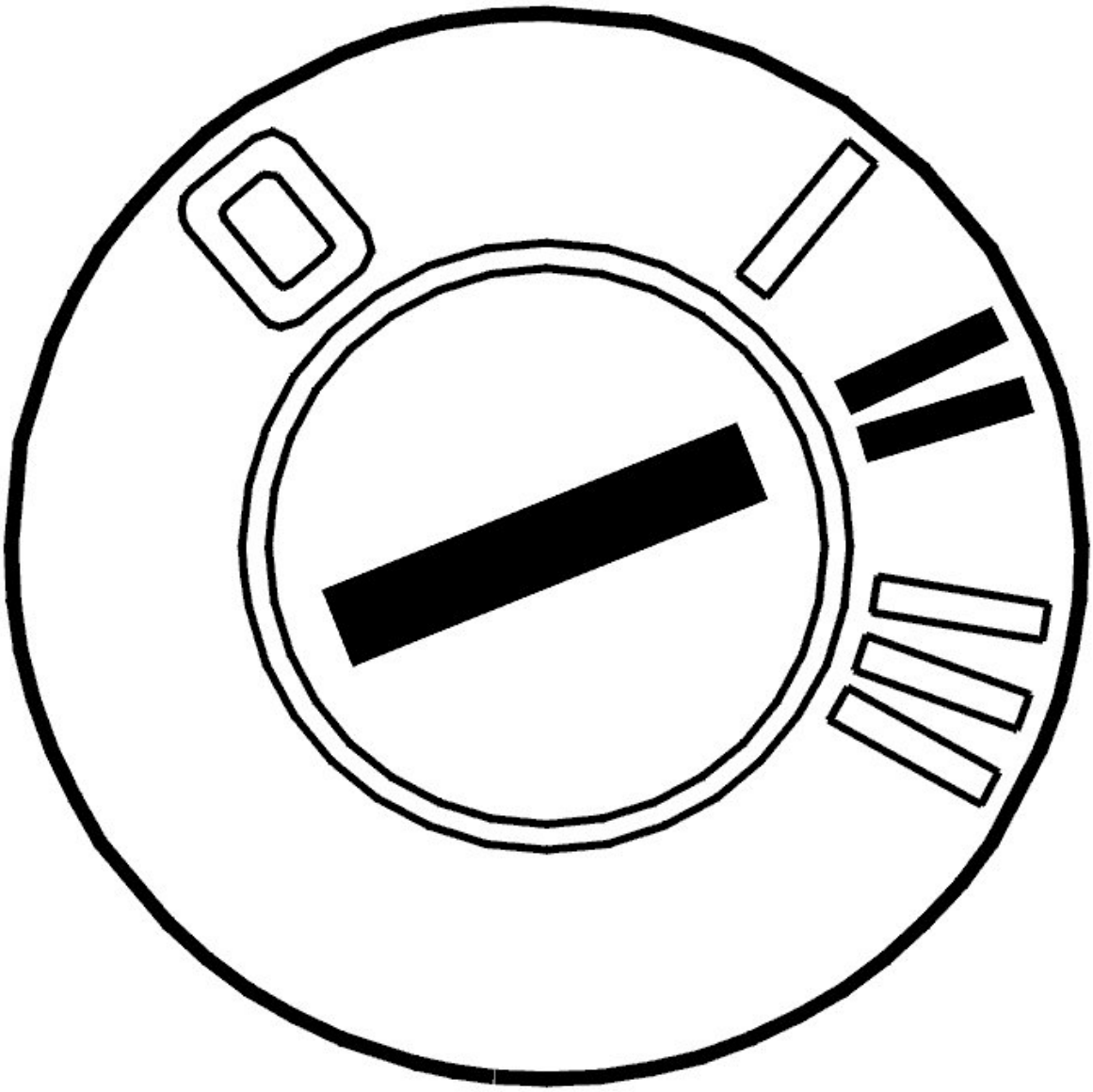


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

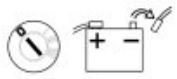
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

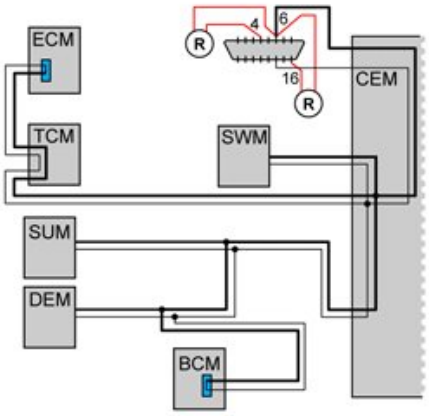
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

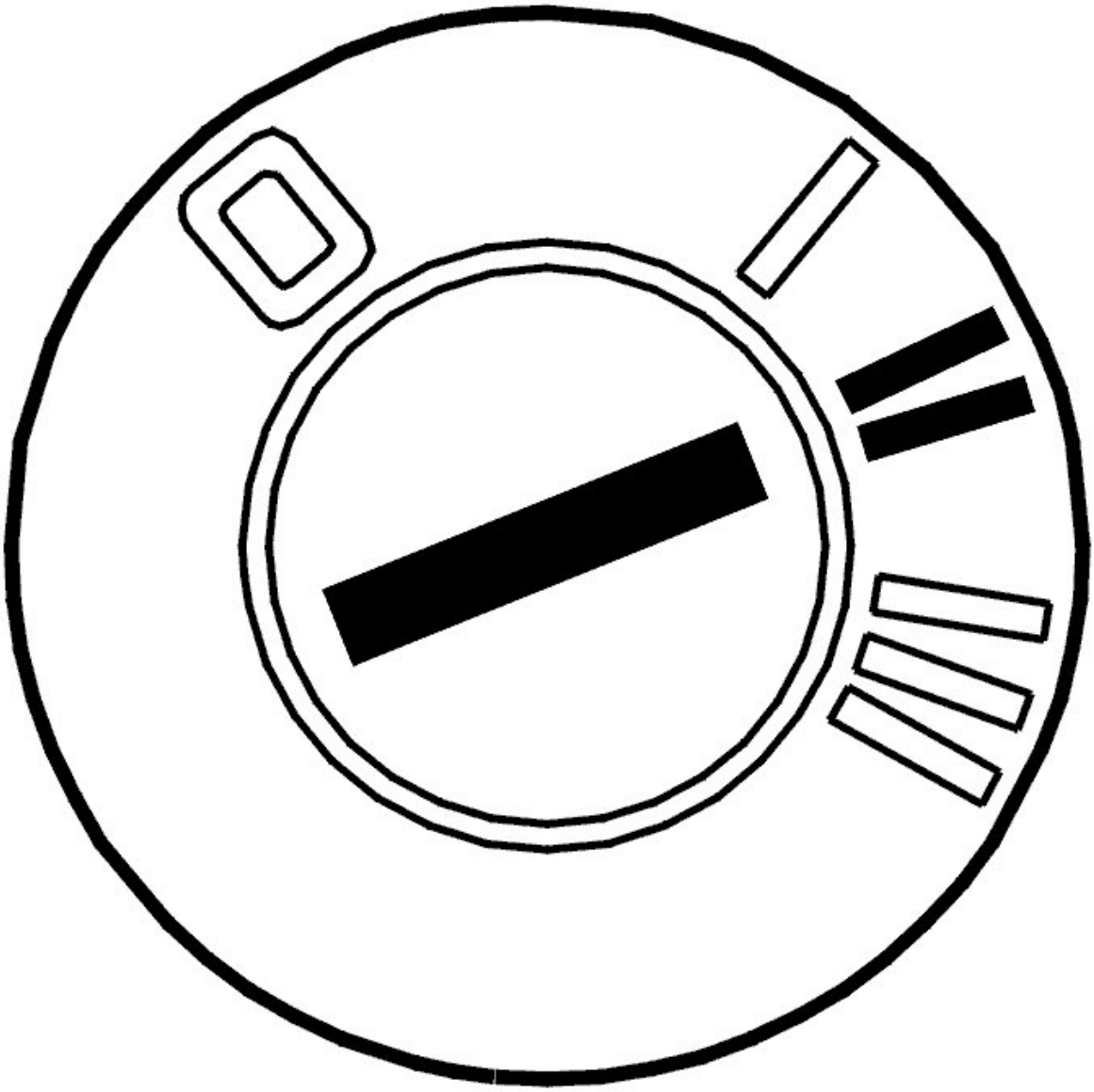


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

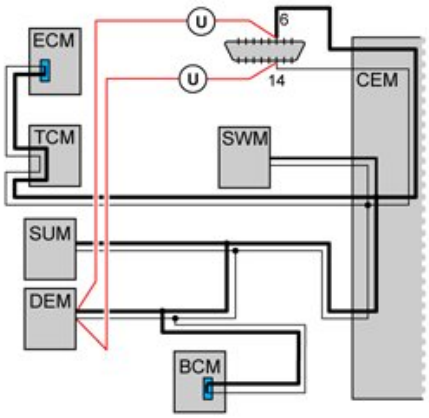
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

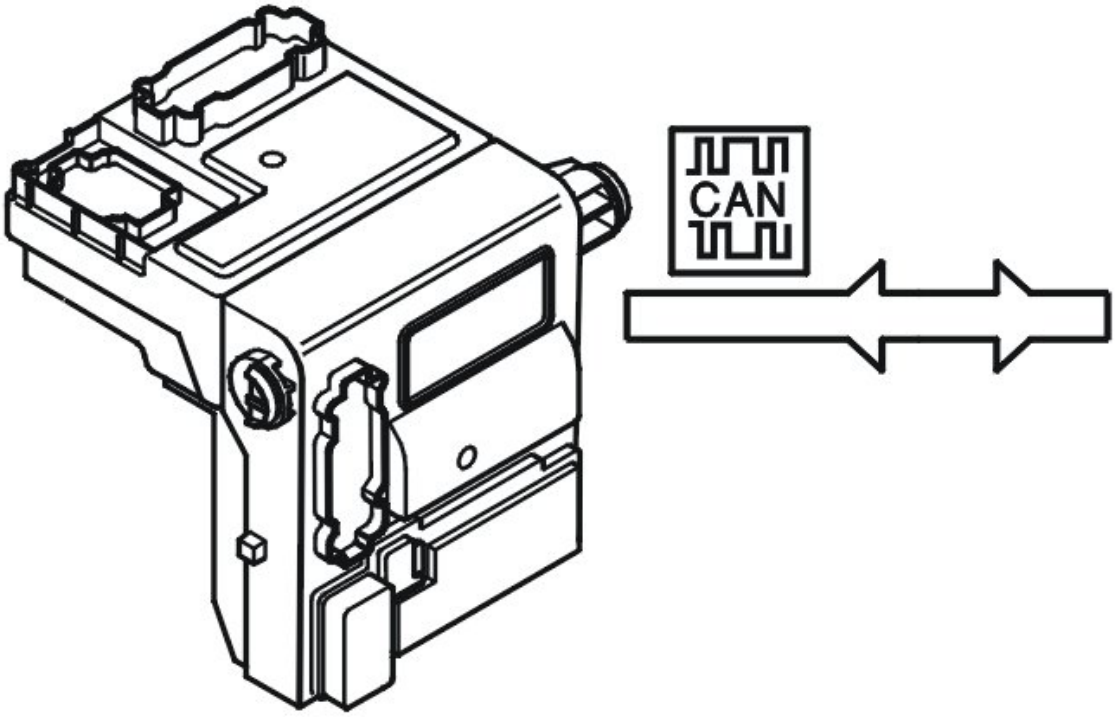


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF13

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the CAN H in the high speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the high speed network.

Fault symptom[s]
- Poor performance.
- Poor accelerator pedal (AP) response.
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.

CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

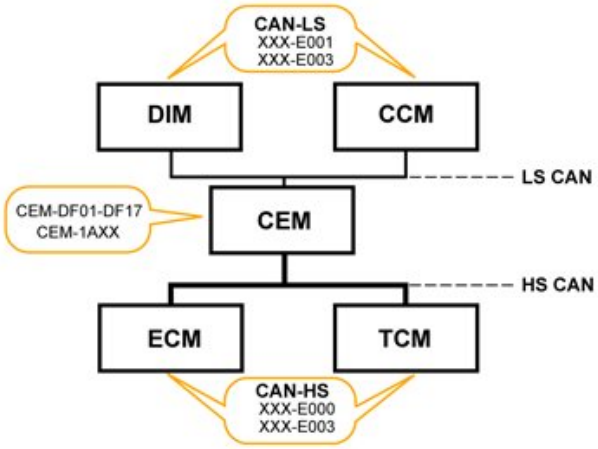
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

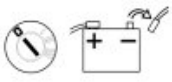
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been

measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

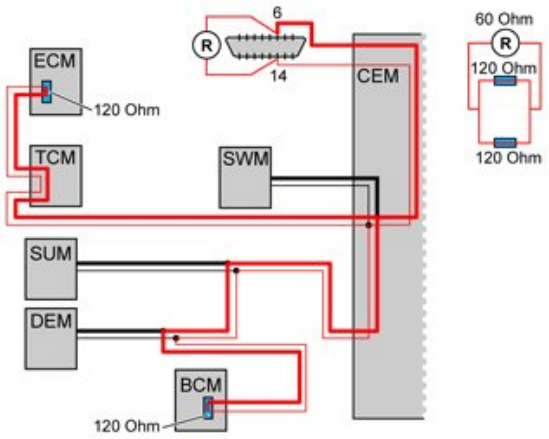
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

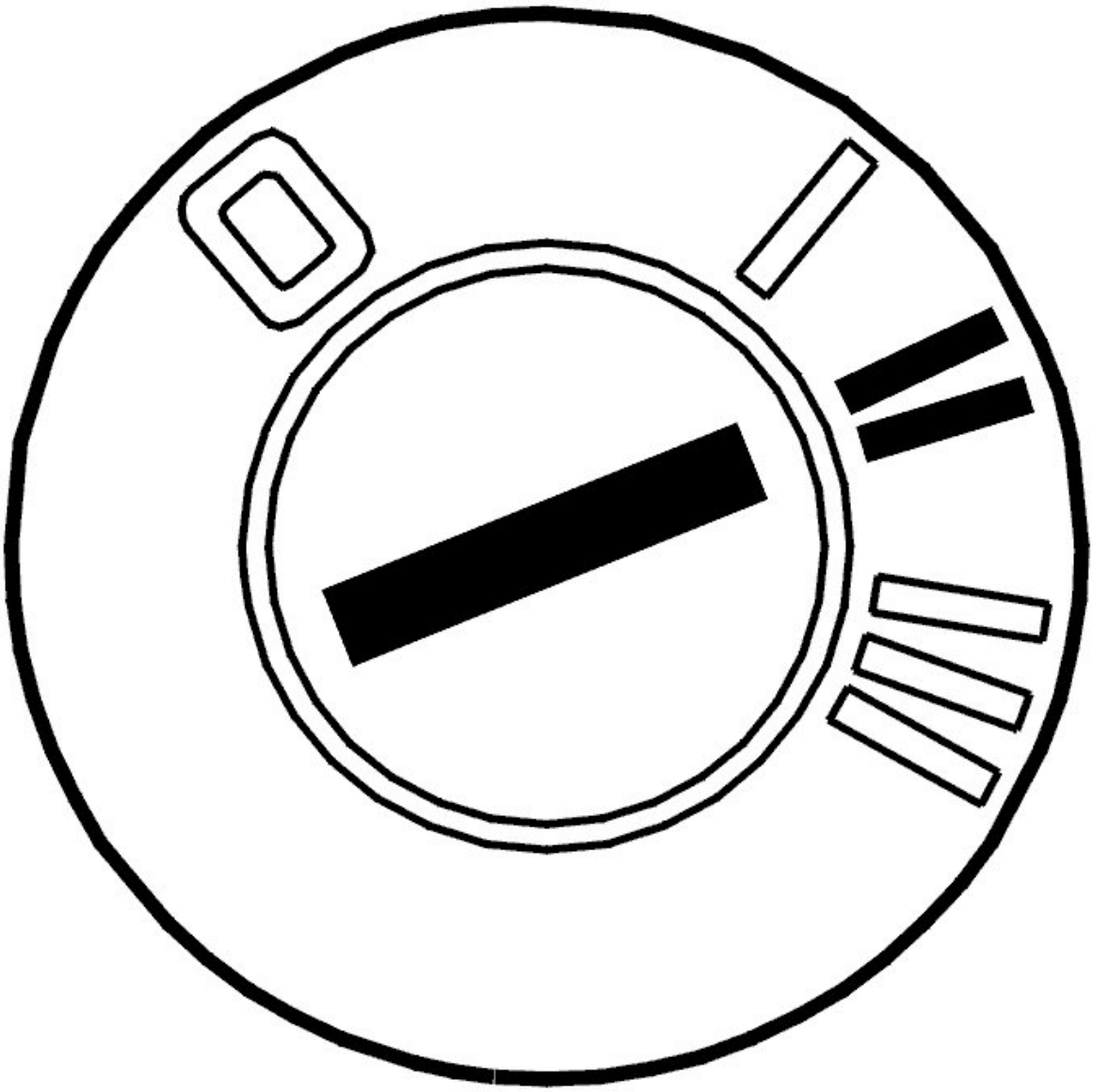


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

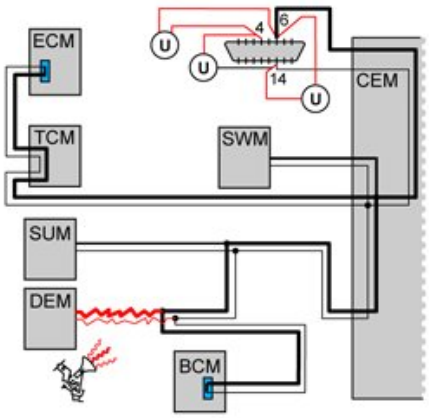
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

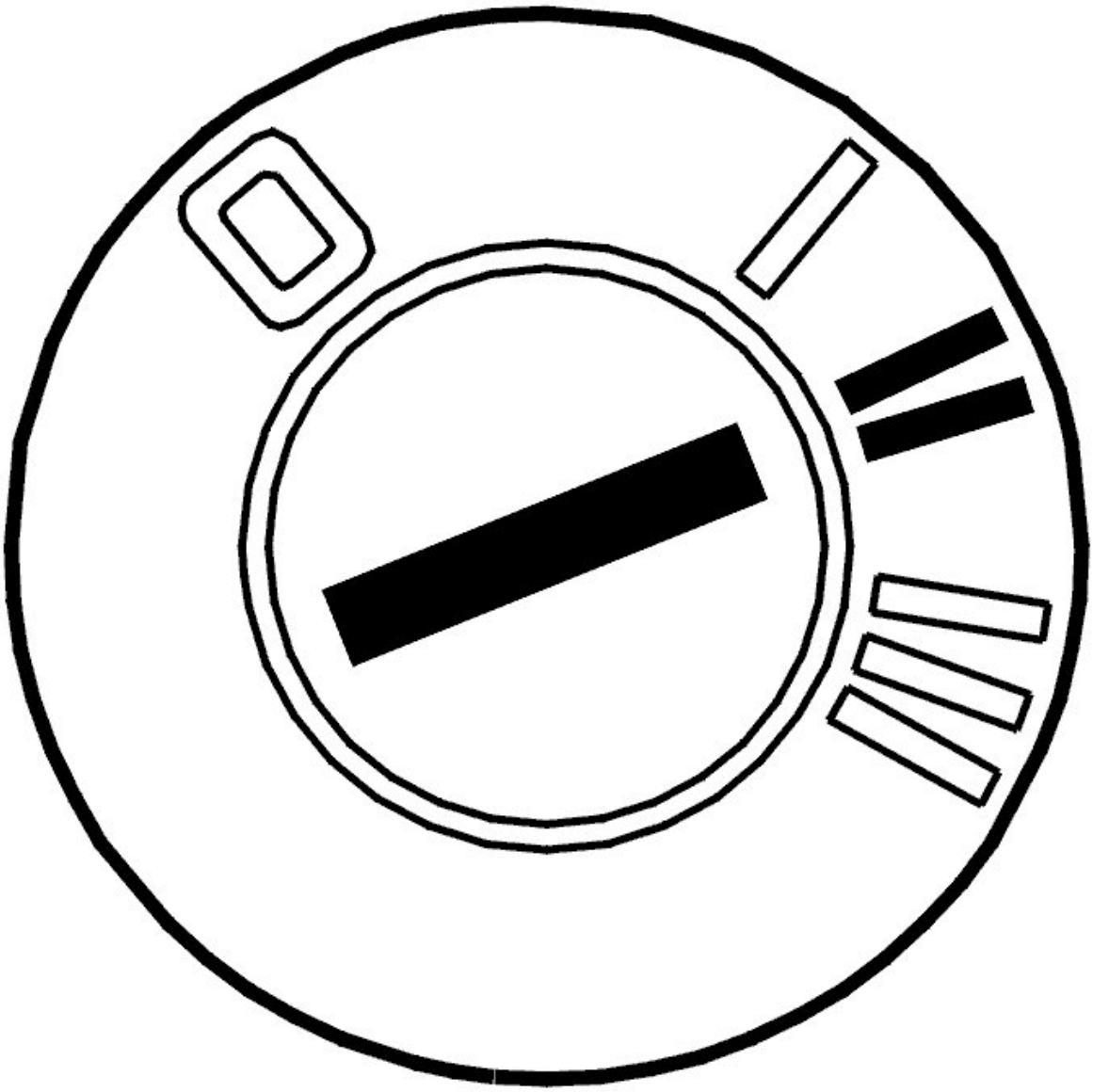


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

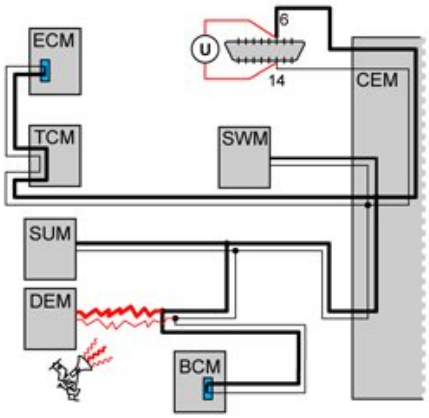
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

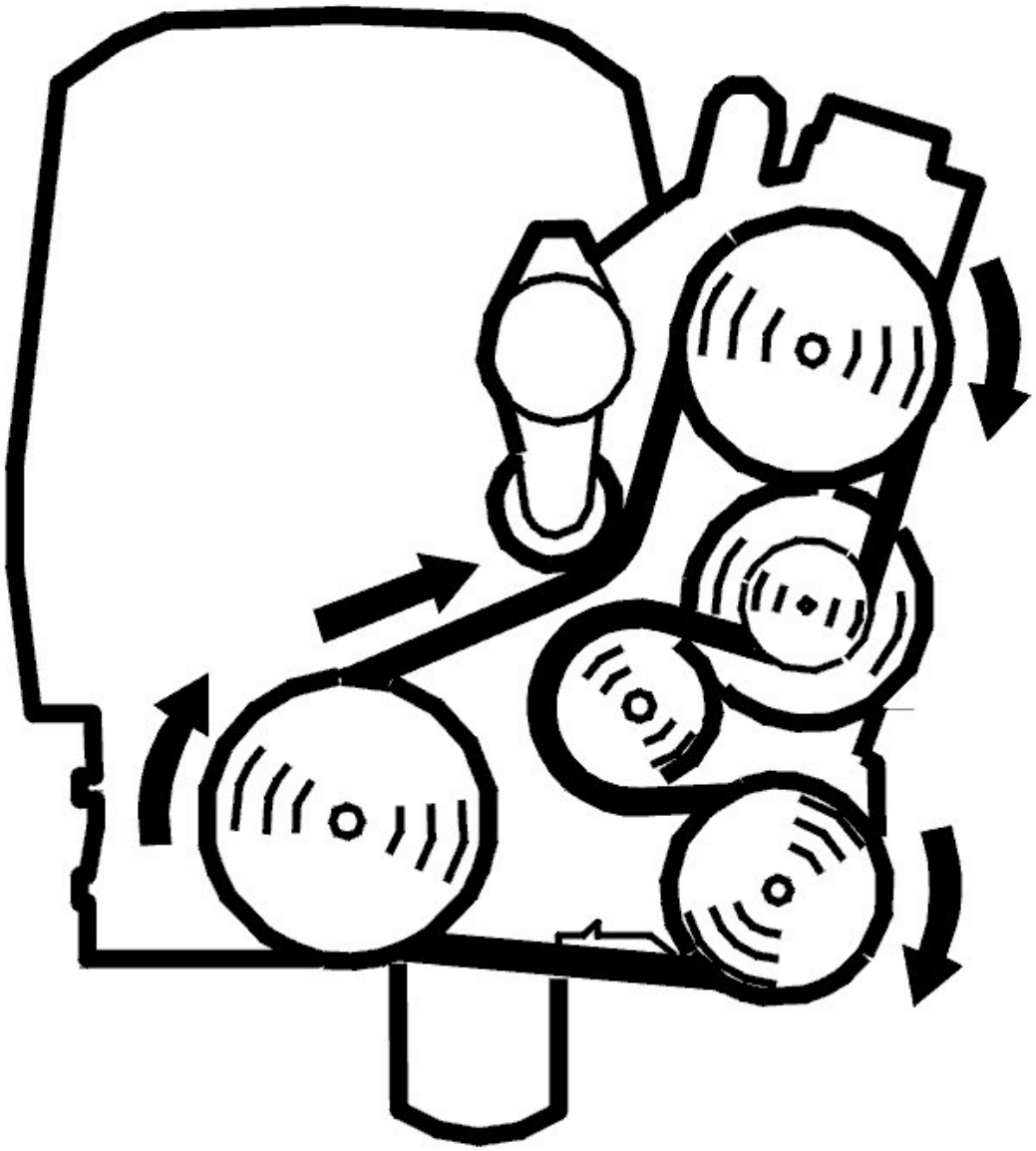
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

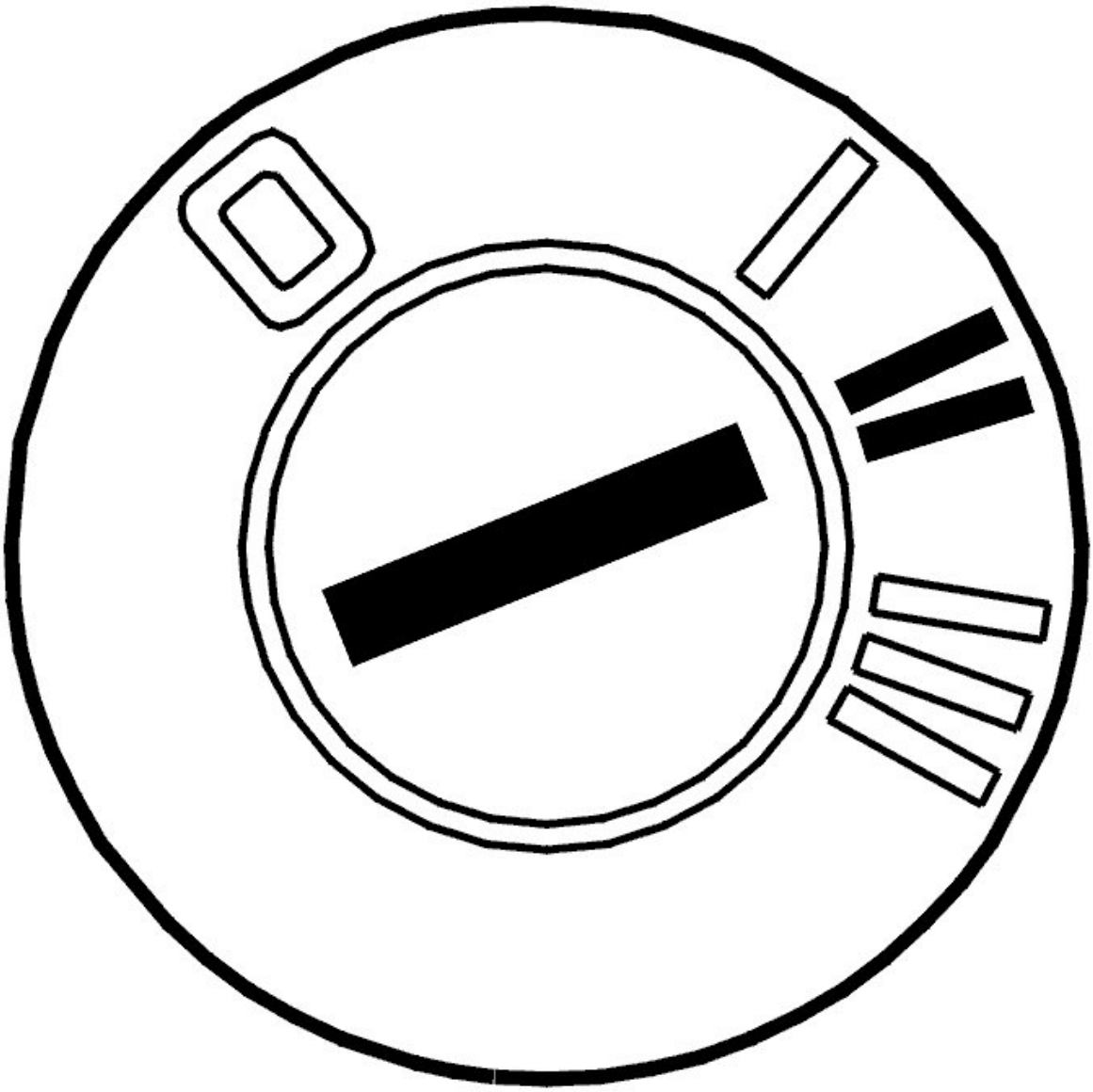


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

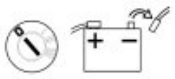
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

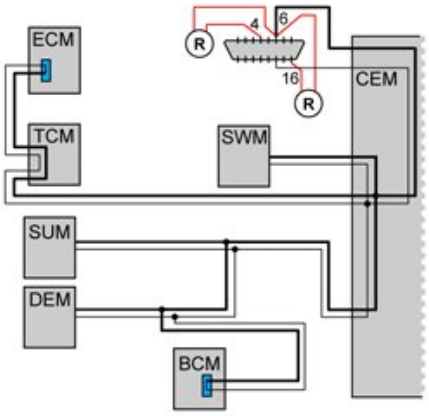
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

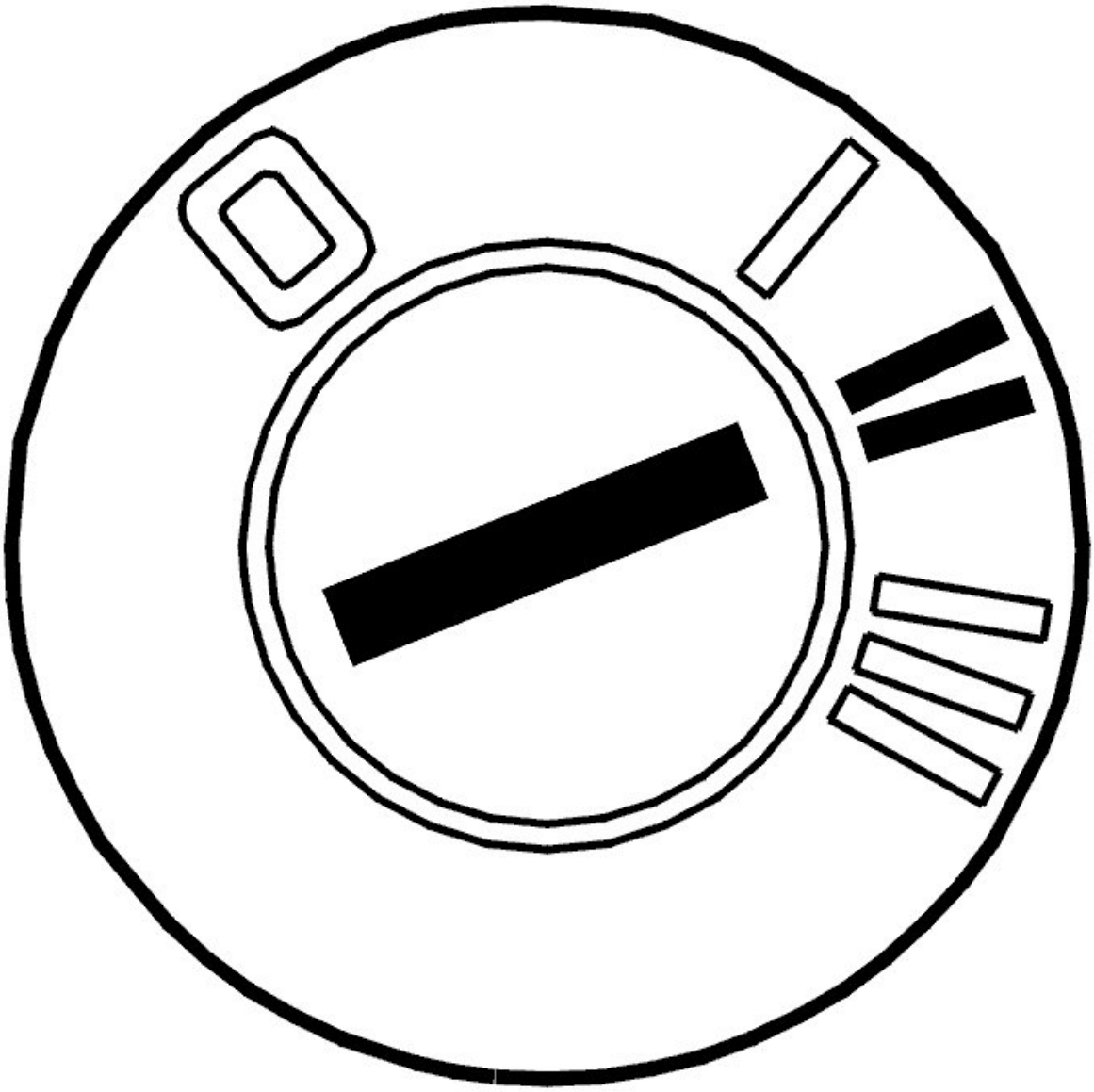


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

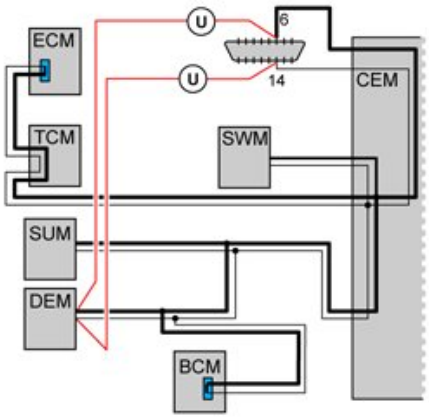
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

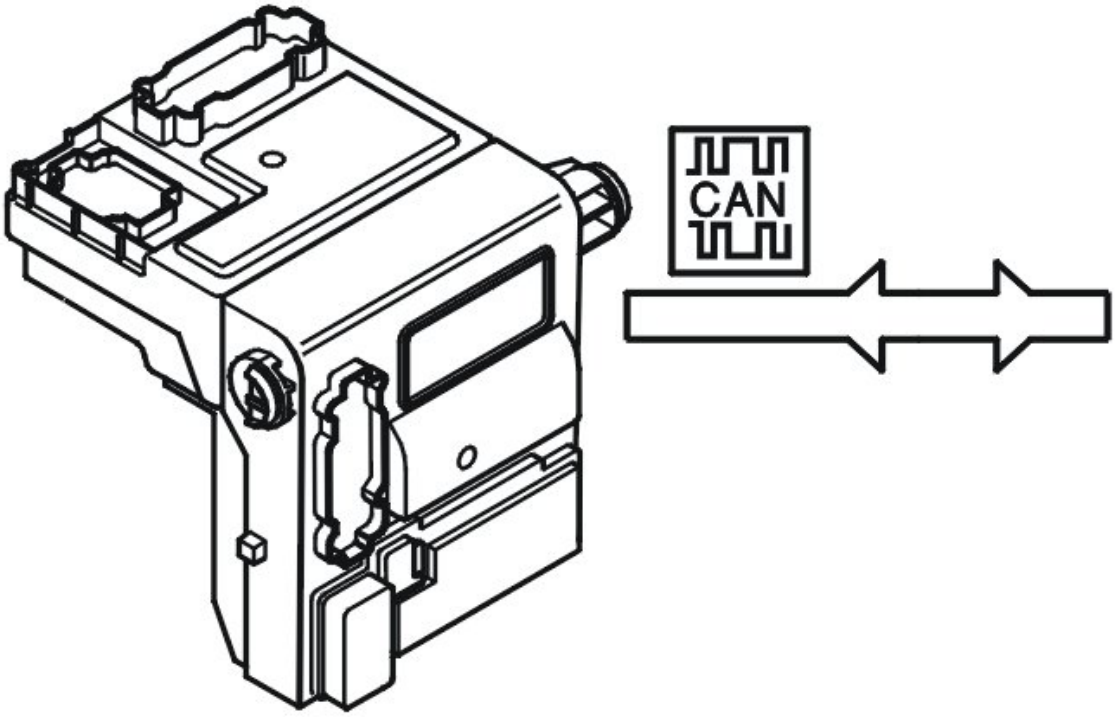


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF14

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the CAN L in the high speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to ground in the high speed network.

Fault symptom[s]
- Radio interference.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the

control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

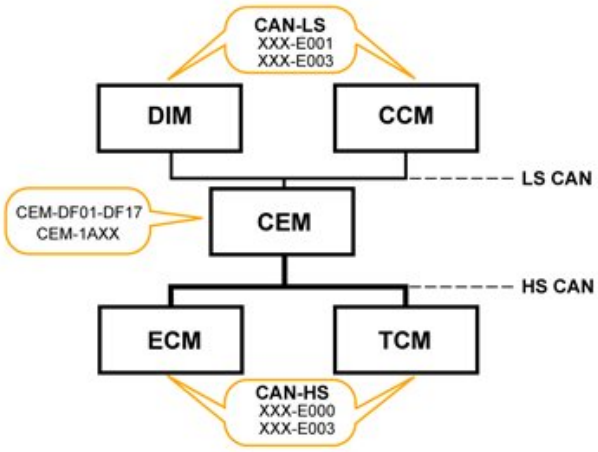
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

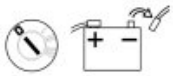
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

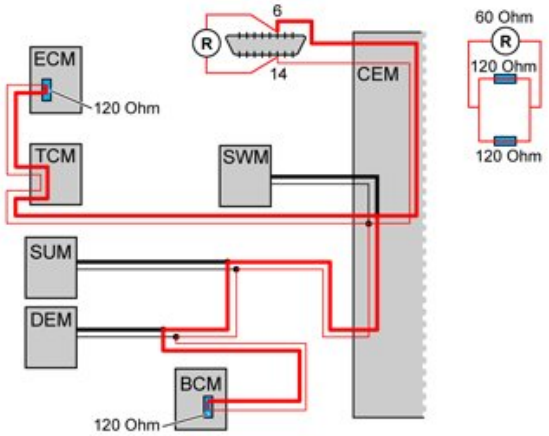
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

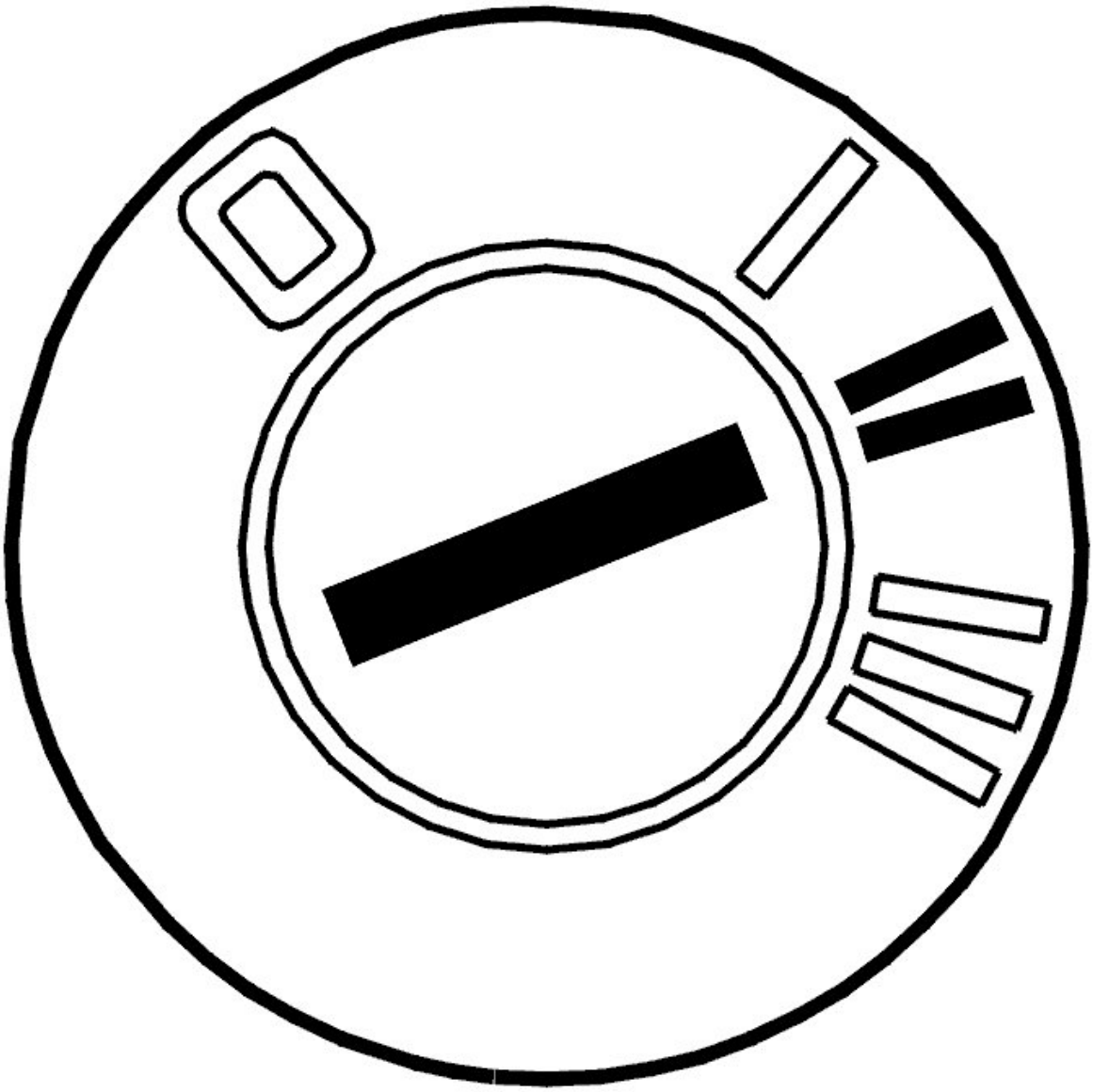


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

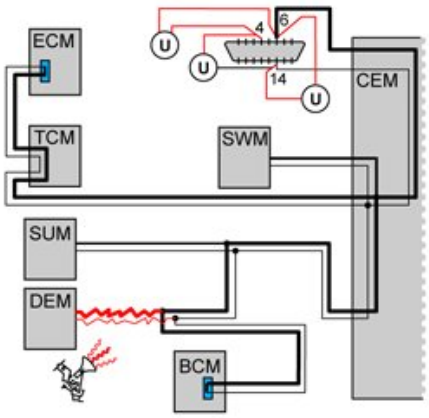
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

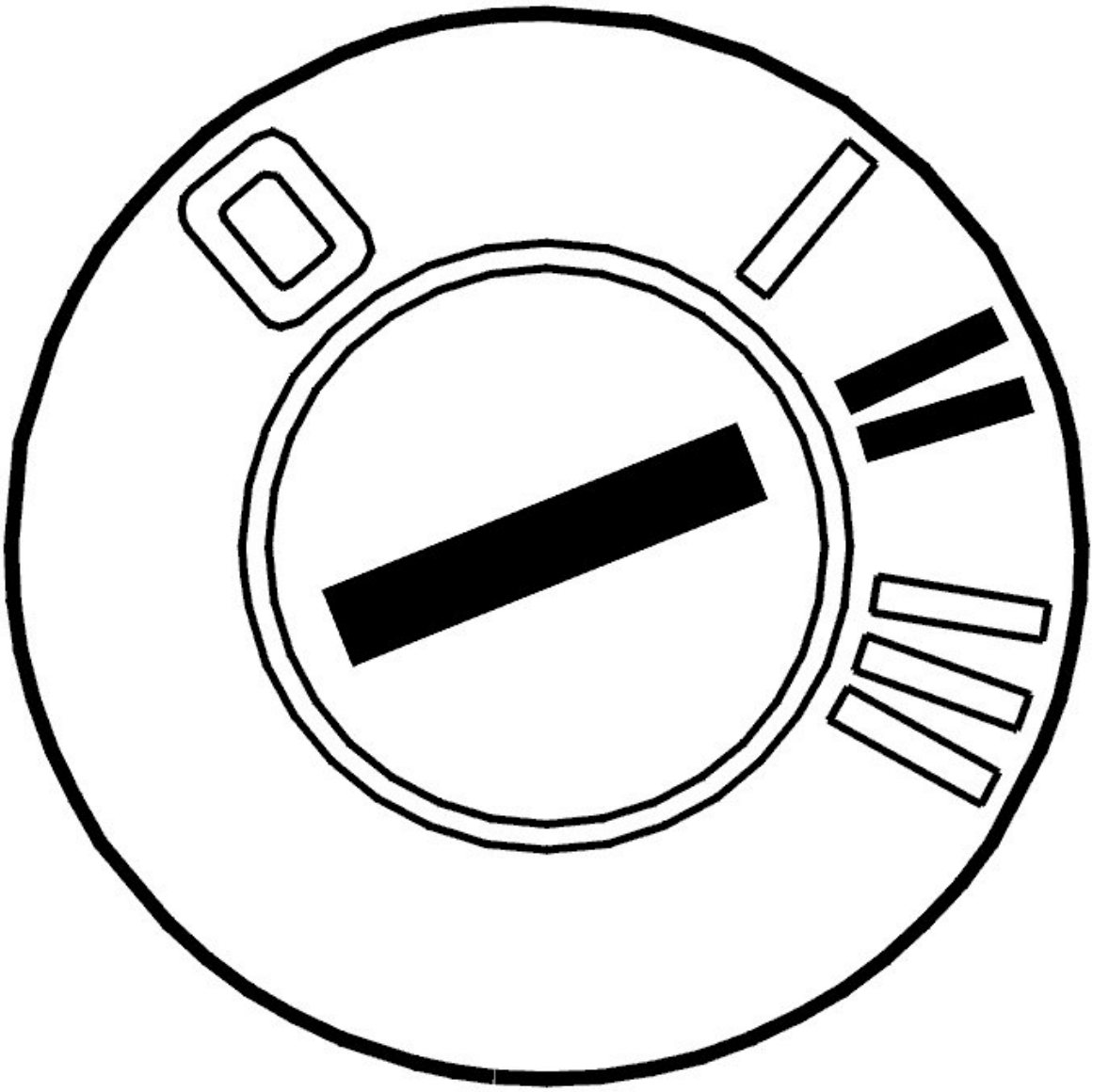


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

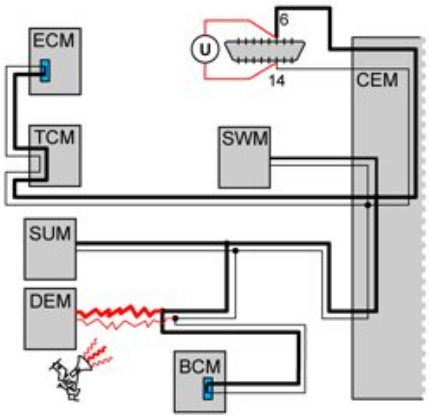
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

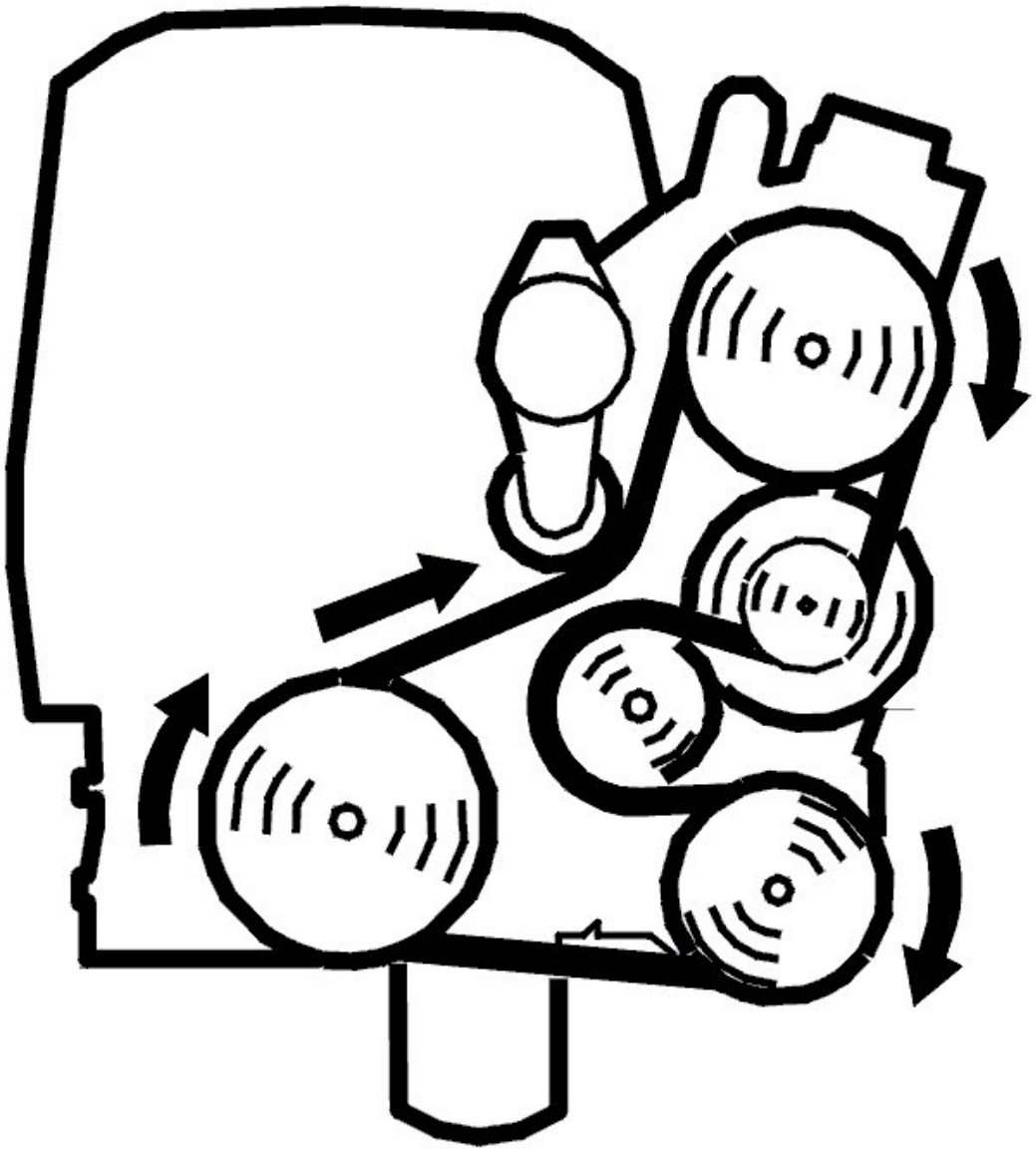
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

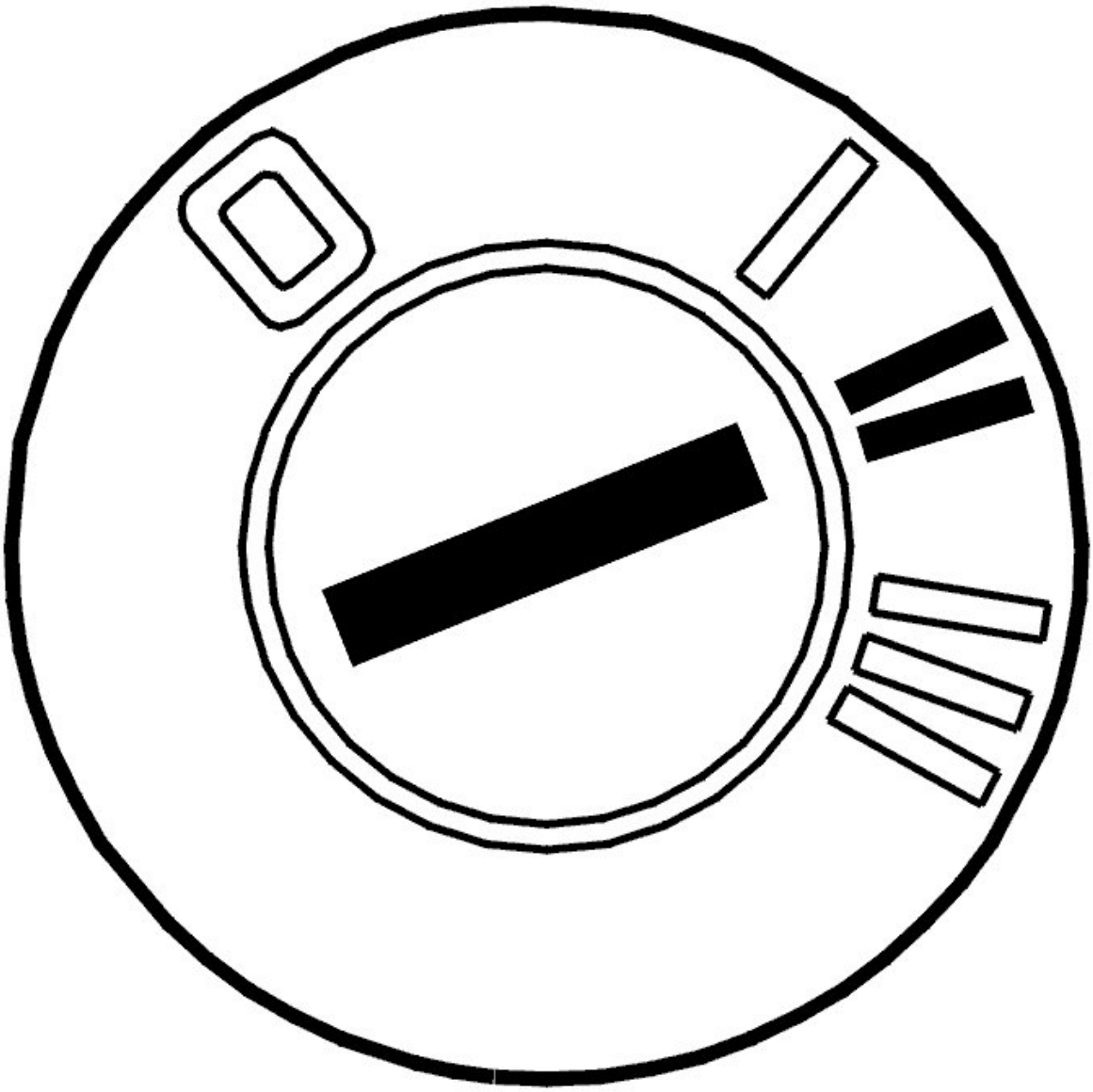


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

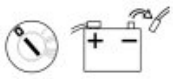
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

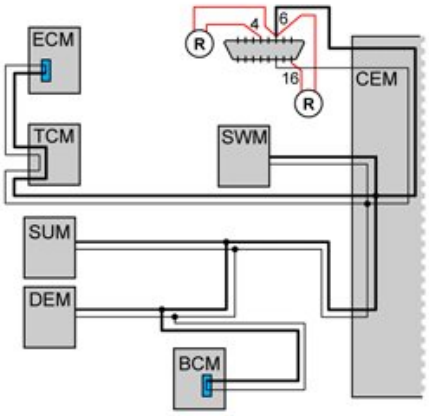
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

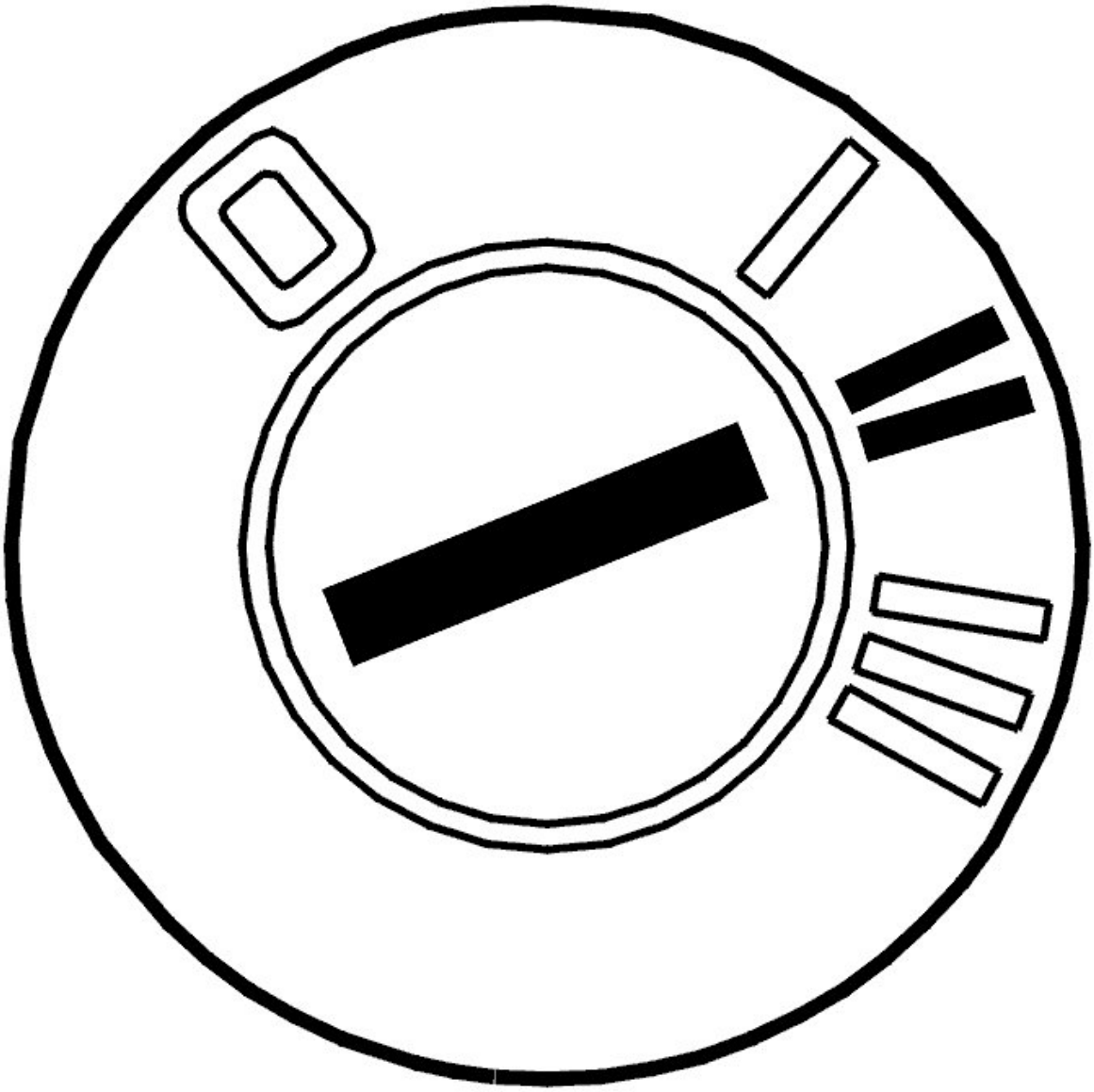


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

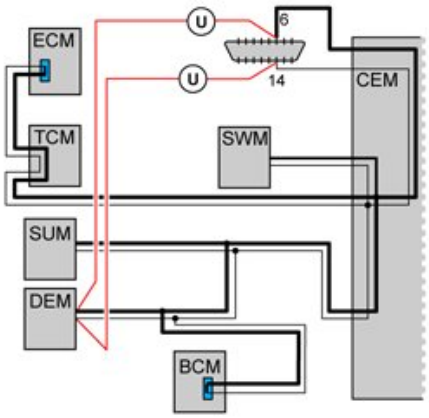
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

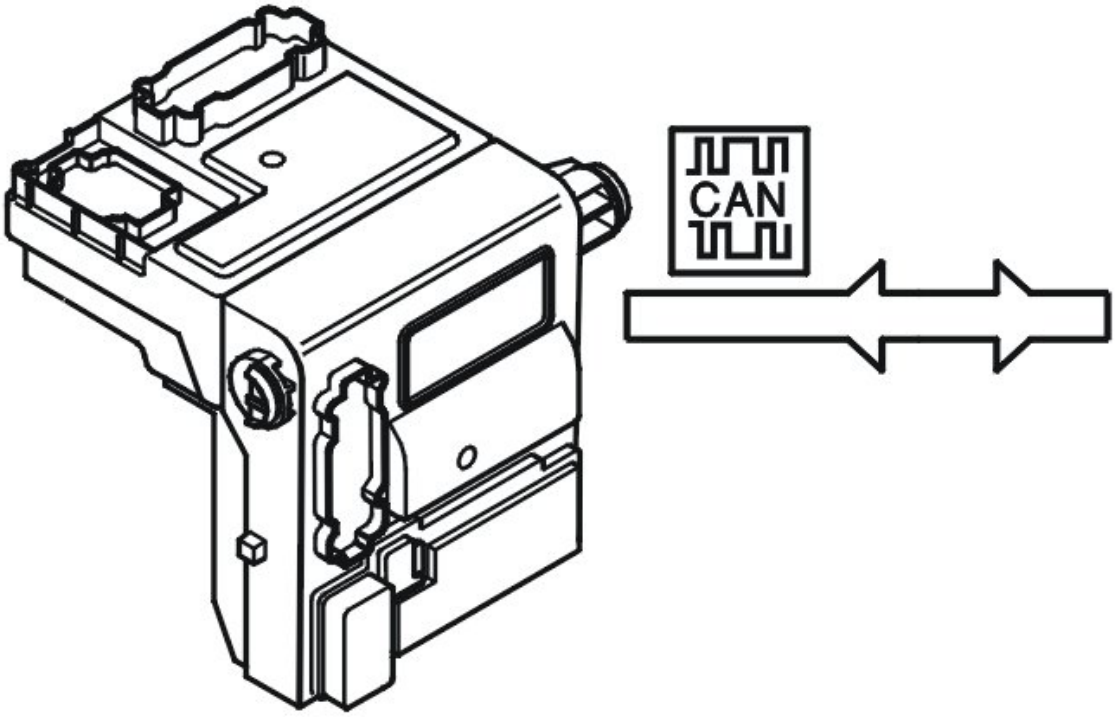


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF15

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the CAN H in the high speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to ground in the high speed network.

Fault symptom[s]
- The engine does not start.
- Engine cuts out when running
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.

CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

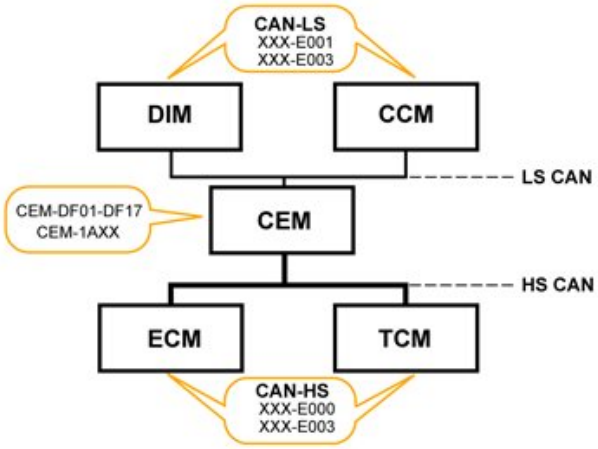
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

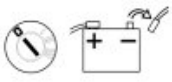
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been

measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

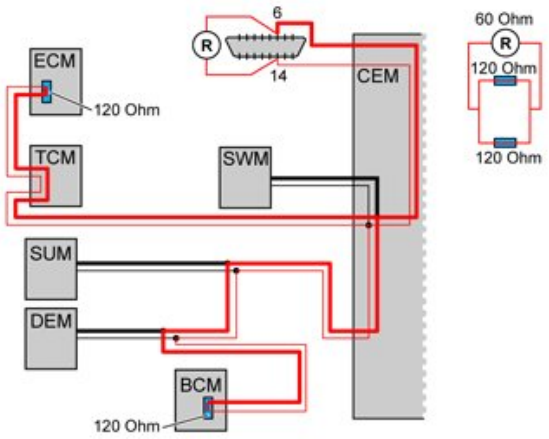
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

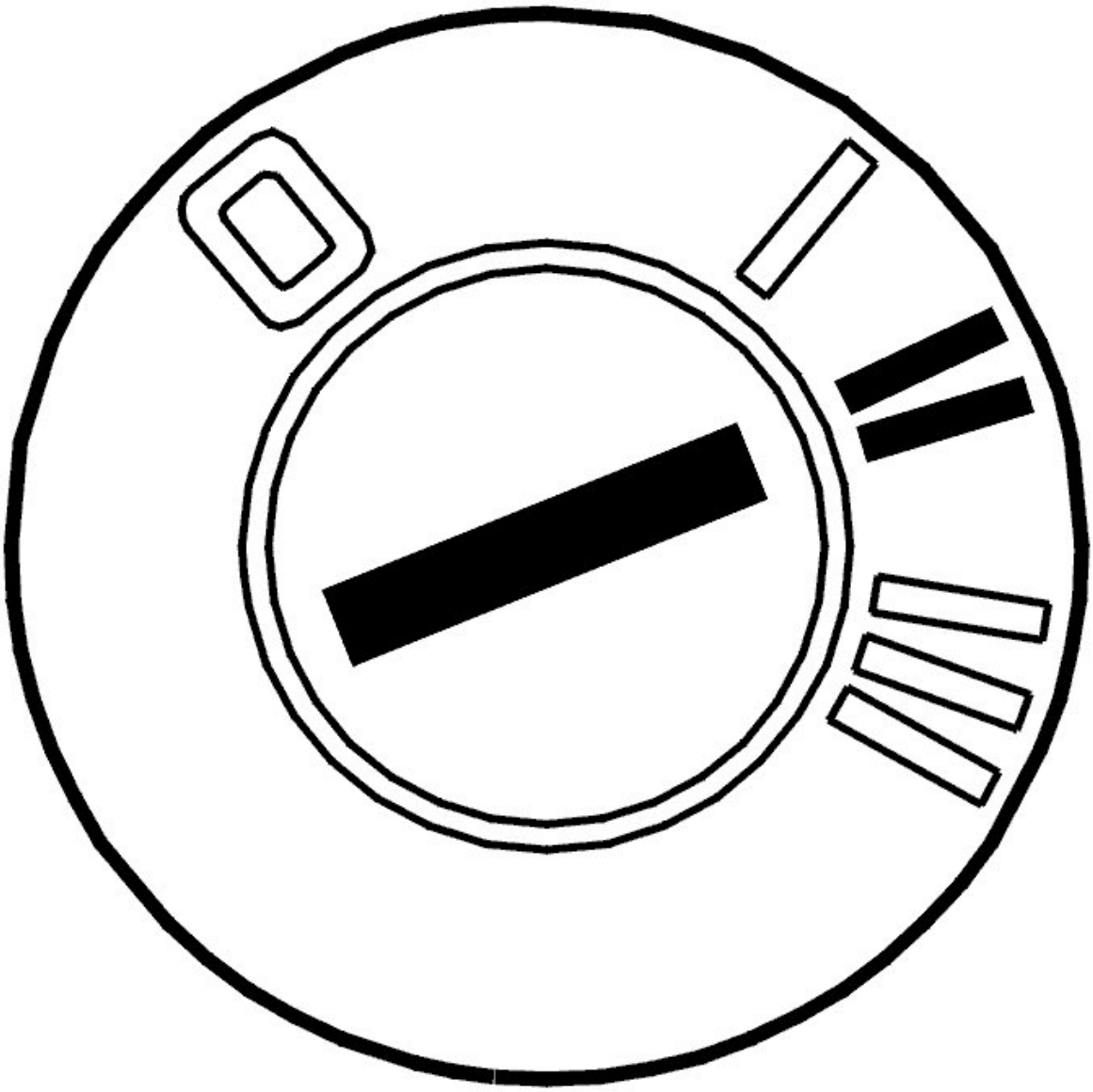


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

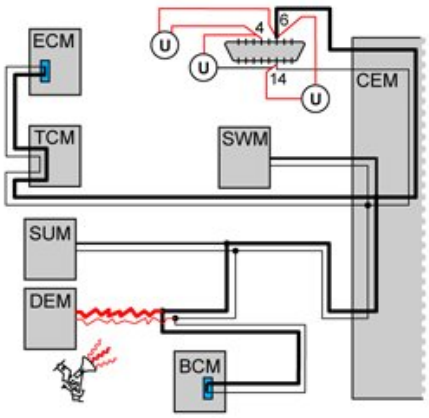
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

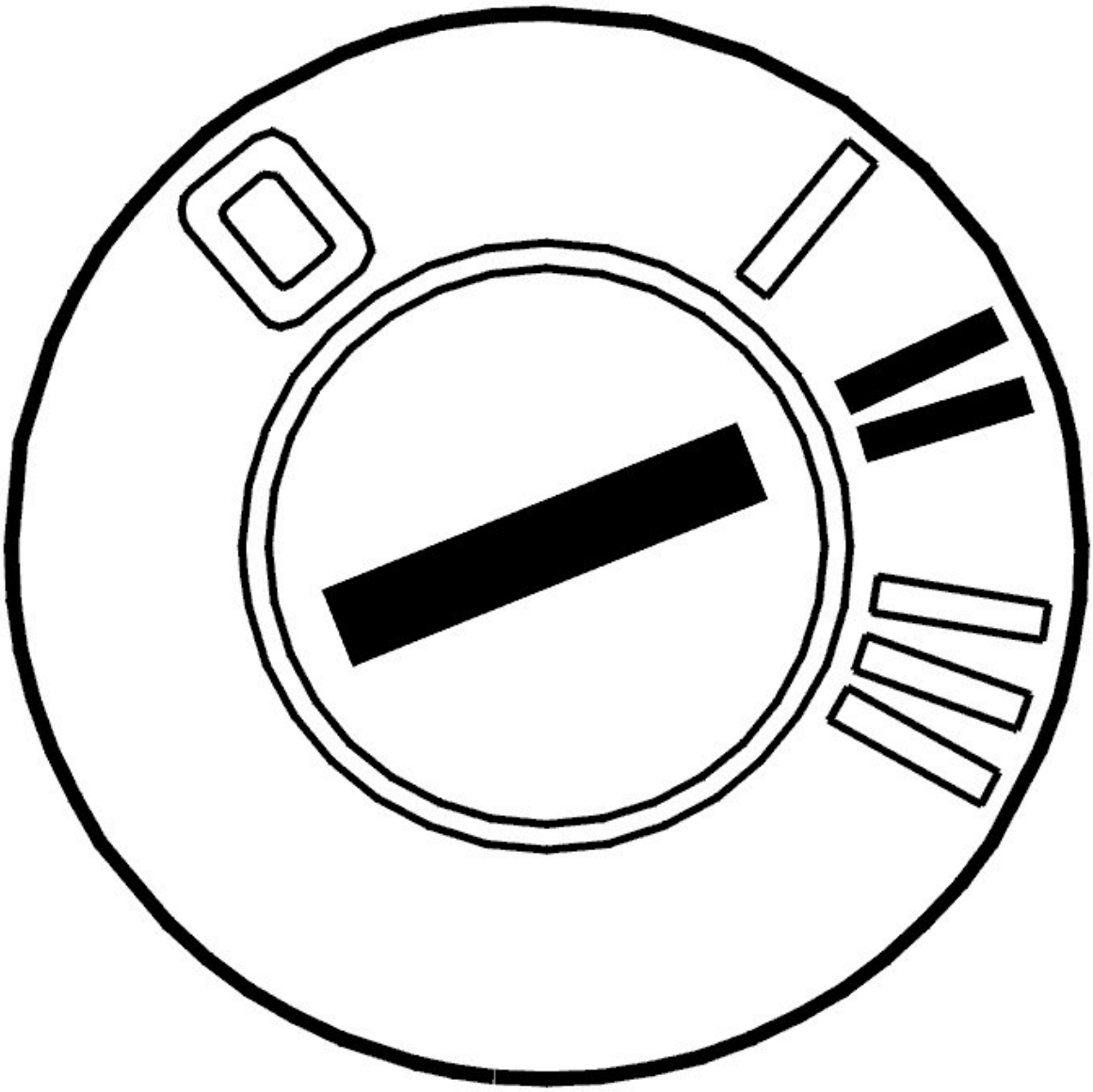


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

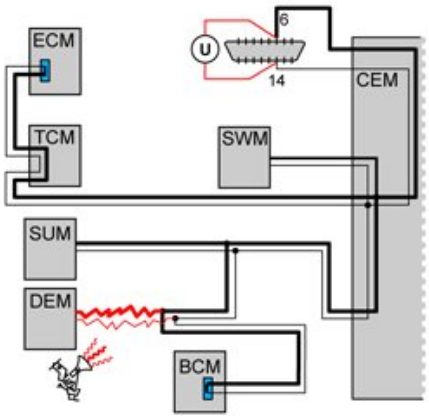
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

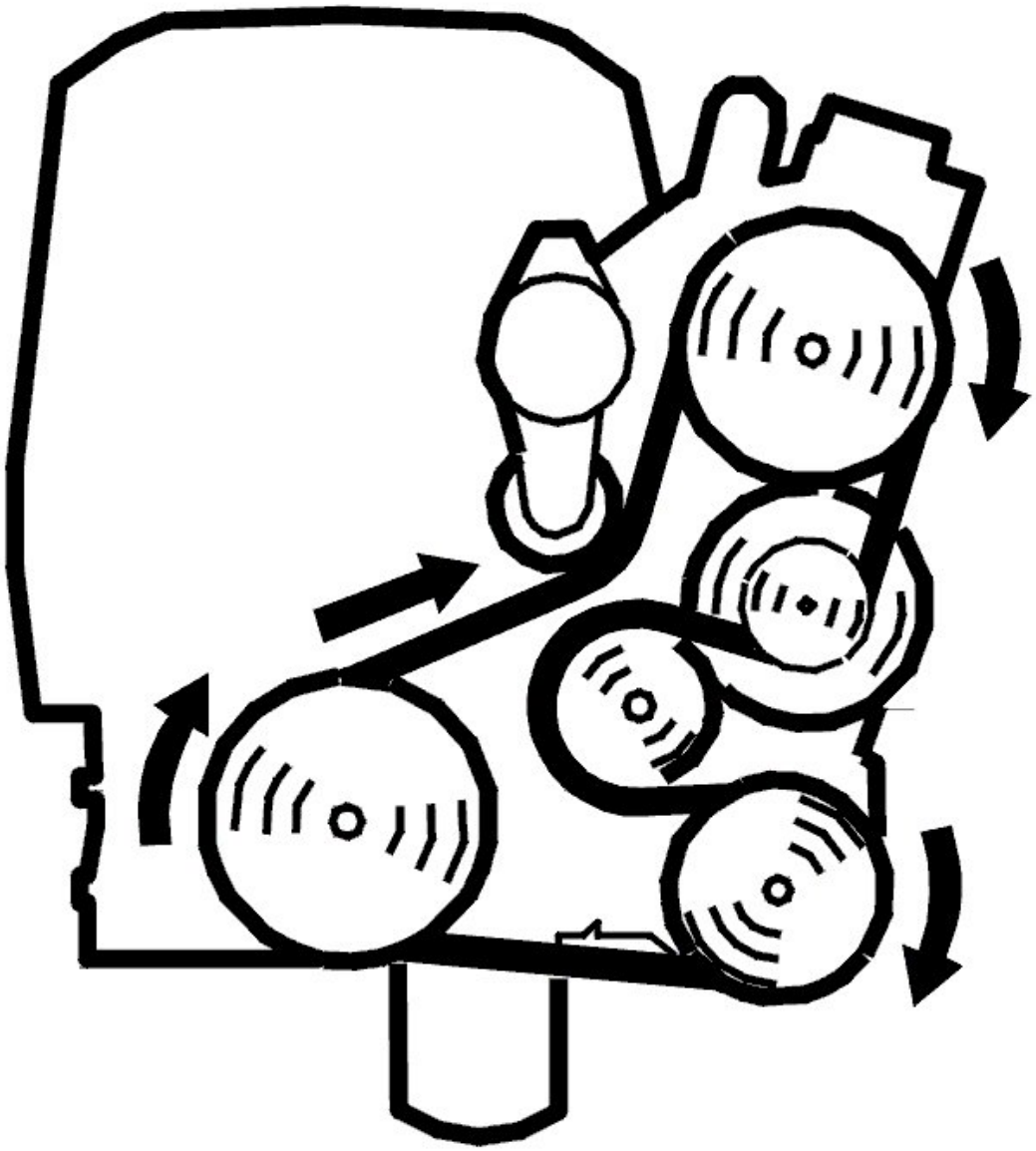
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

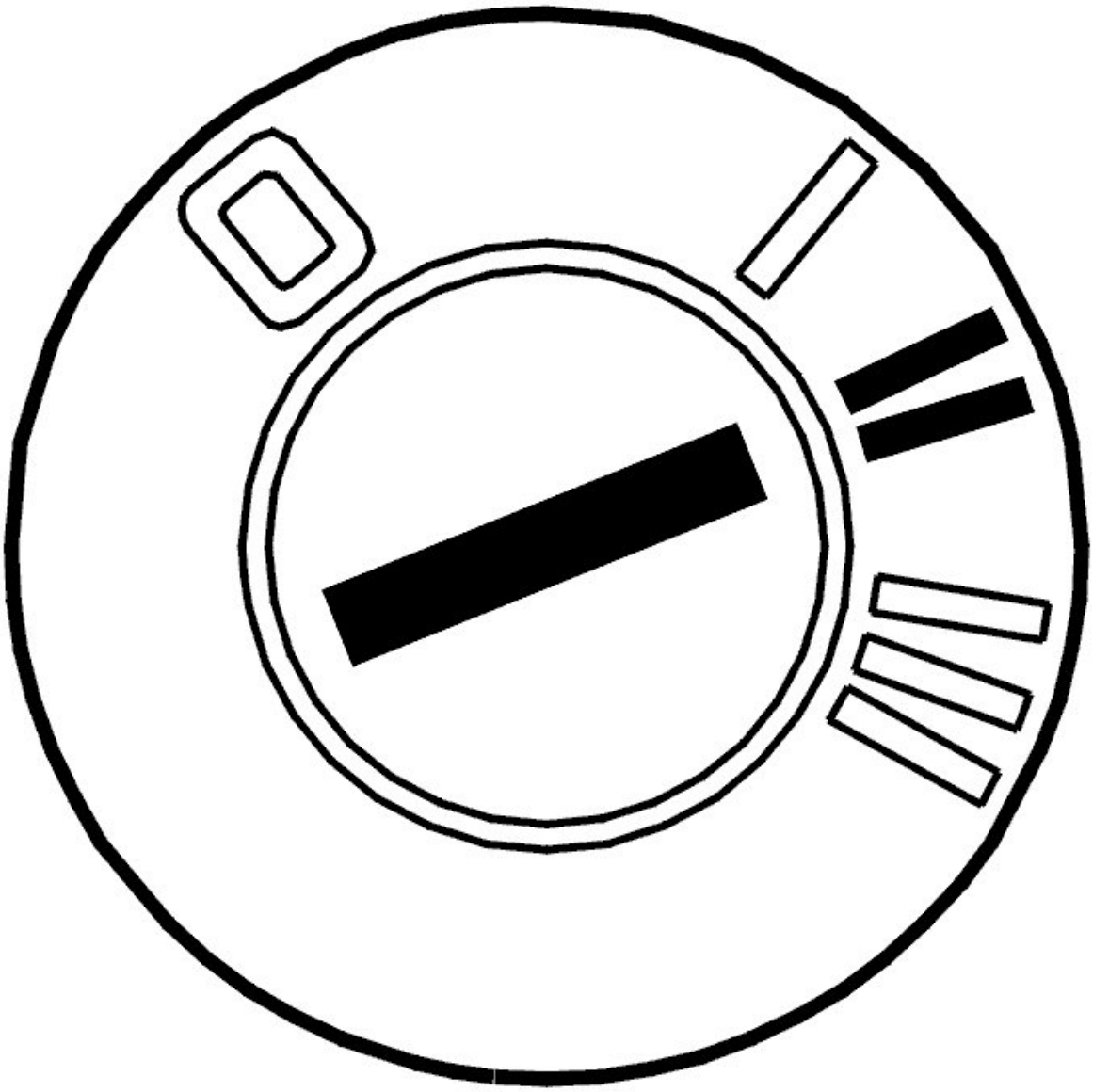


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

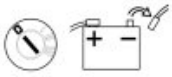
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

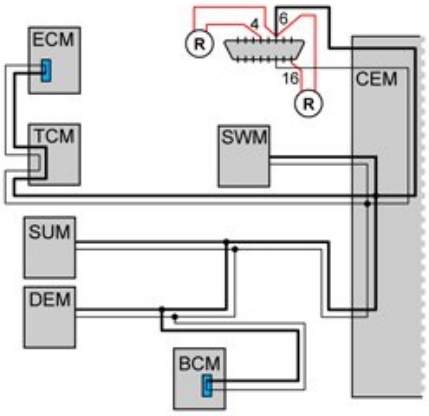
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

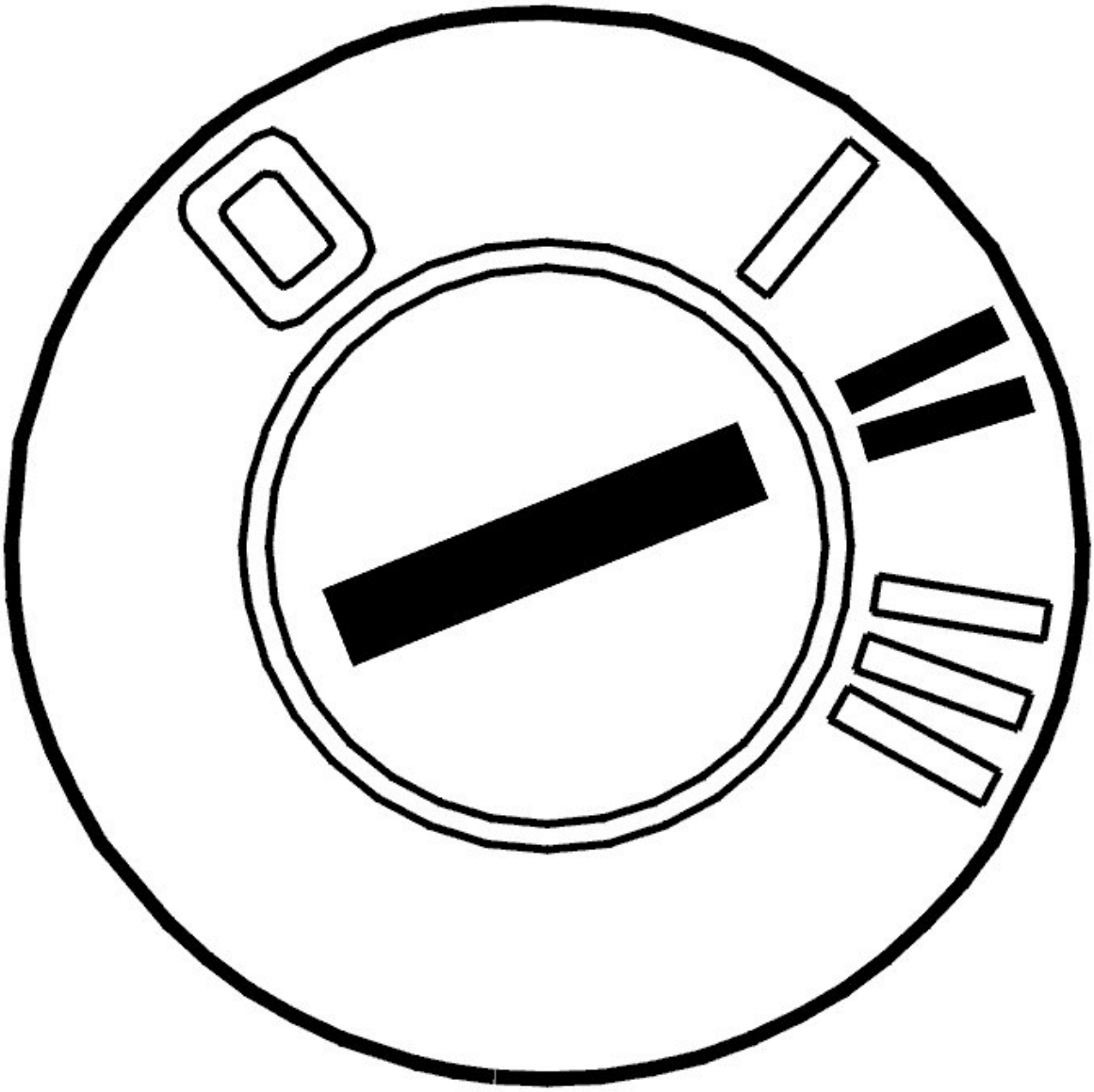


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

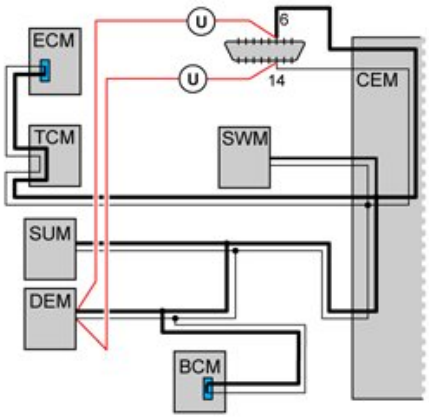
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

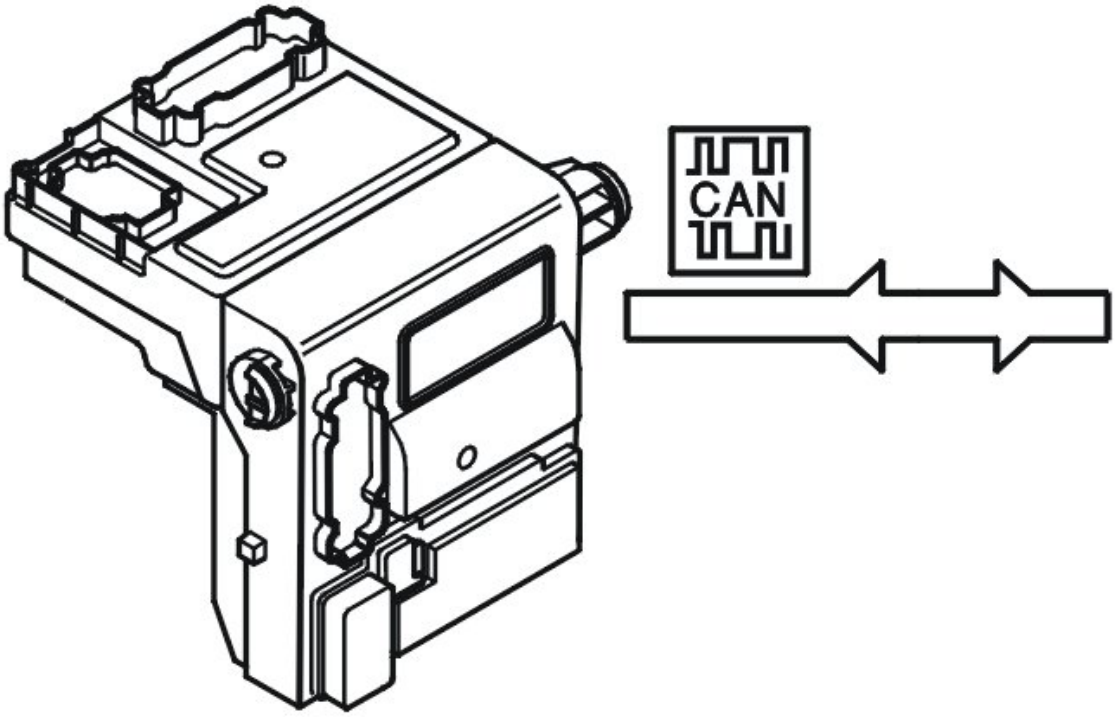


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF16

Condition



The central electronic module (CEM) checks the voltage in the CAN wiring in the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the CAN L in the high speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the high speed network.

Fault symptom[s]
- The engine does not start.
- Engine cuts out when running
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.

CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

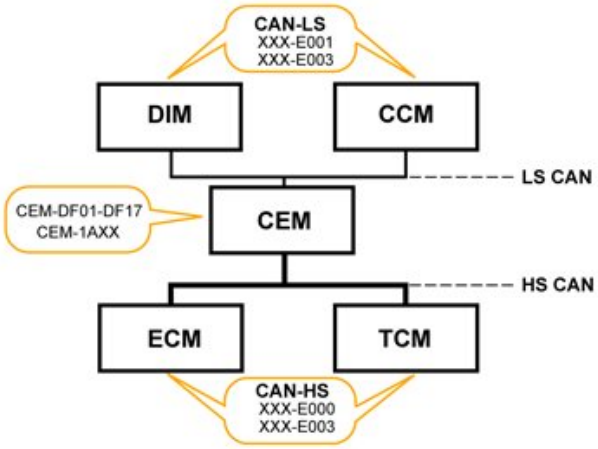
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

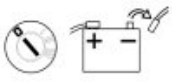
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been

measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

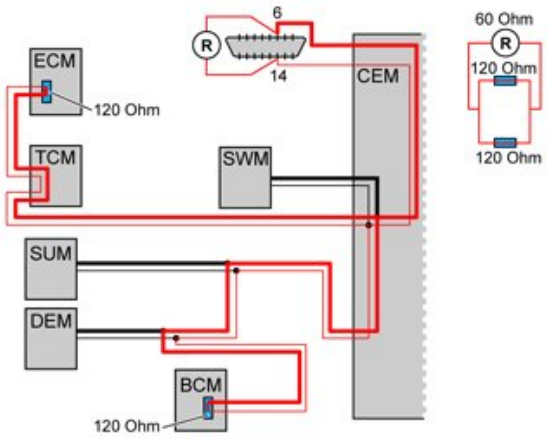
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

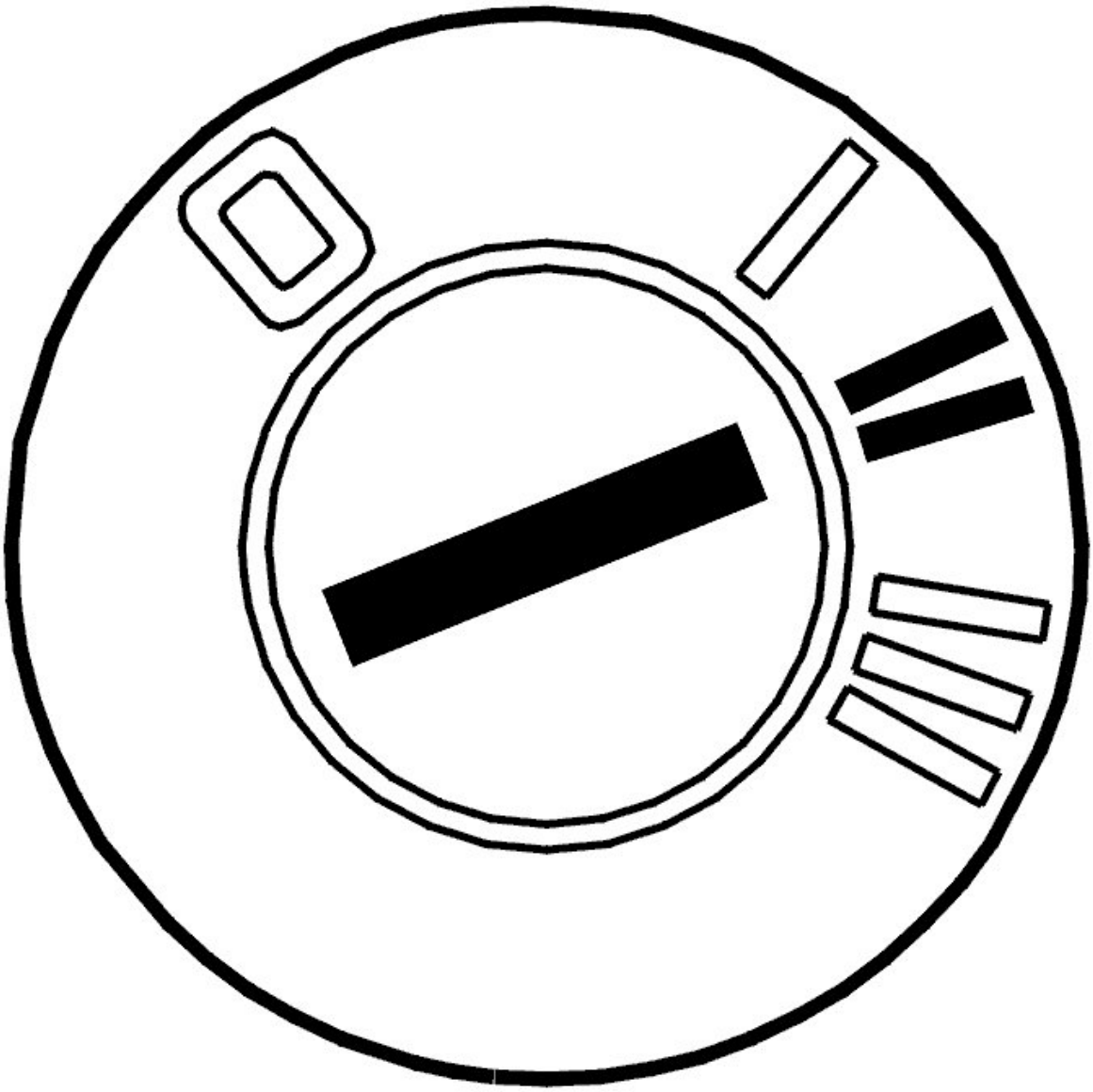


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

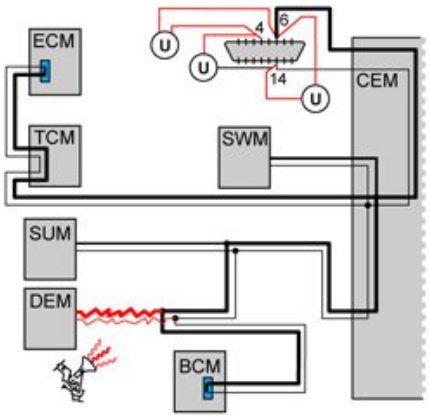
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

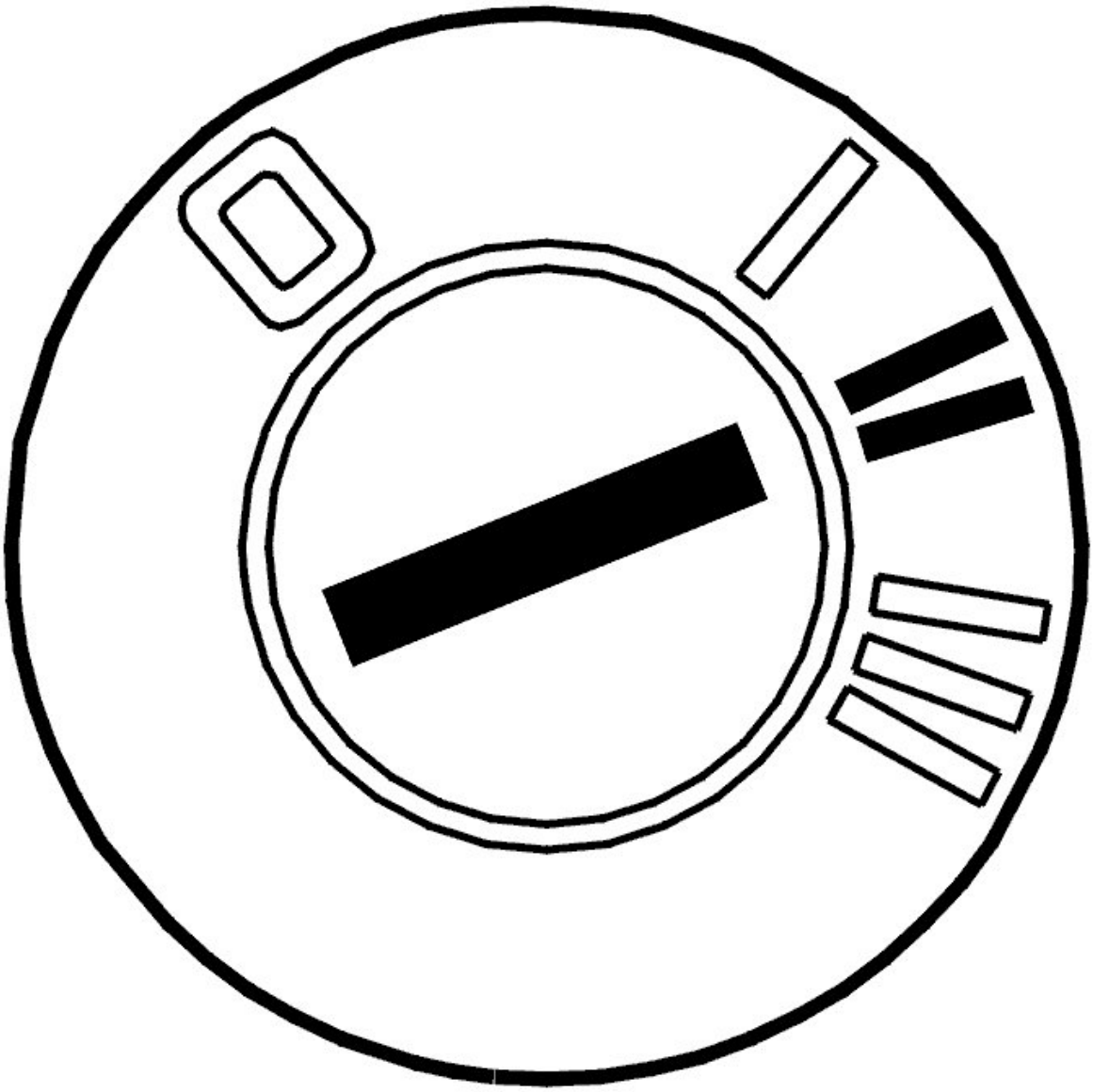


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

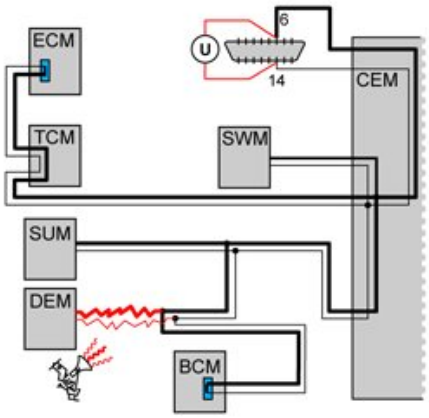
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

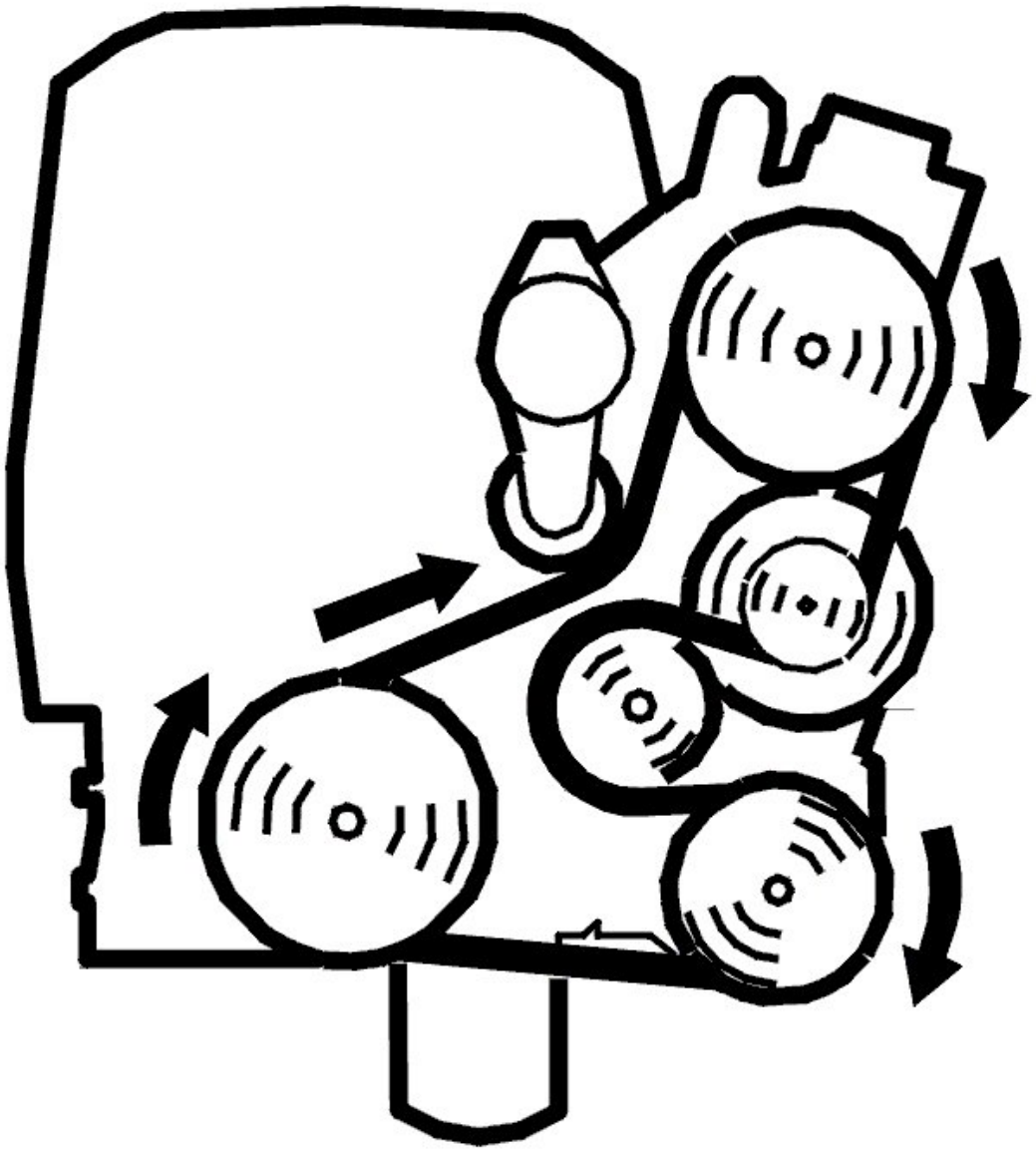
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

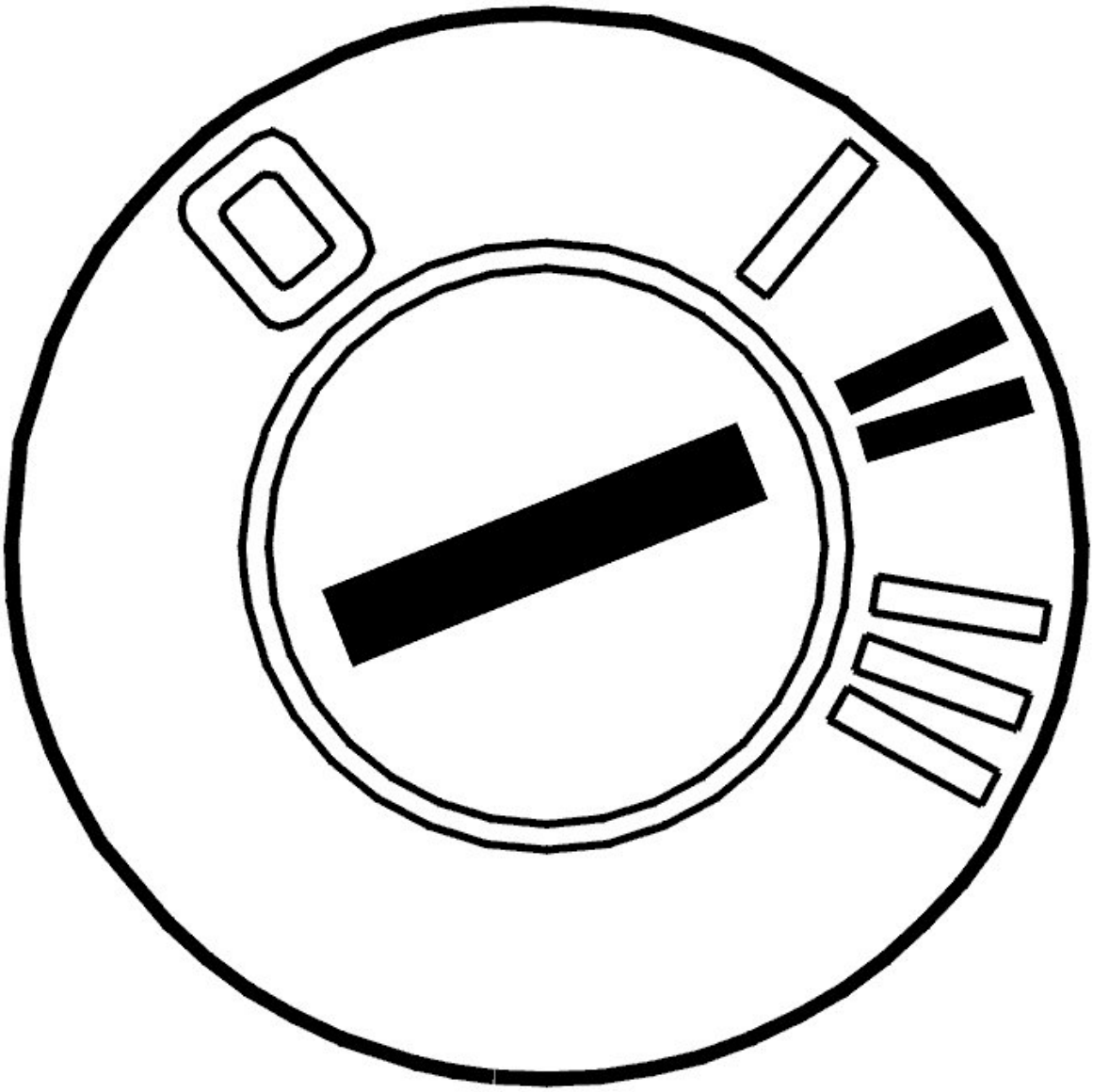


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

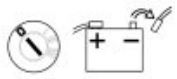
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

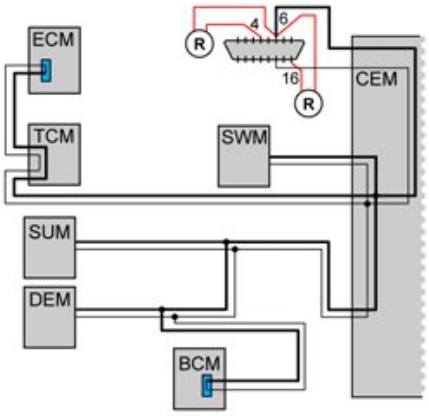
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

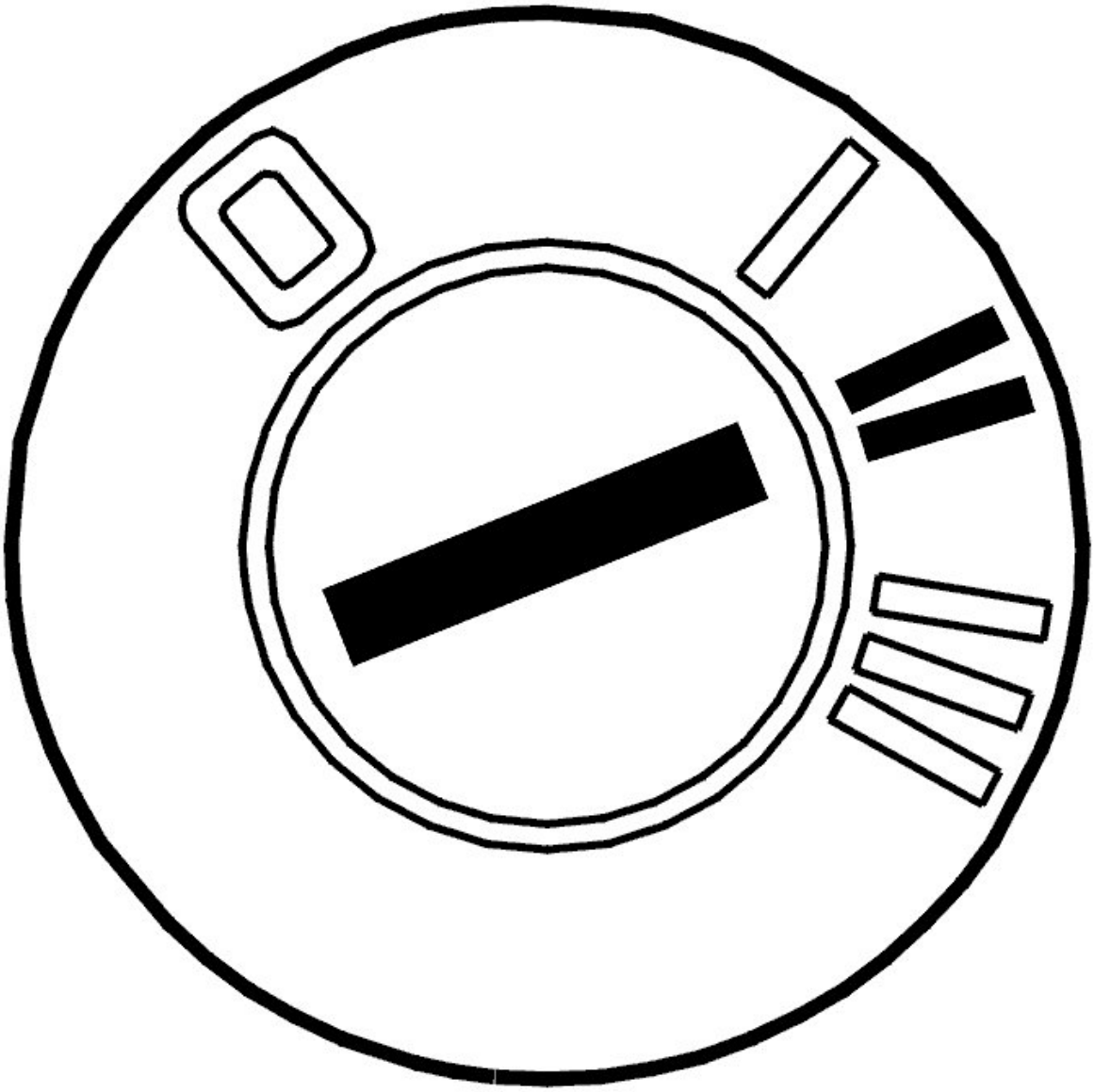


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

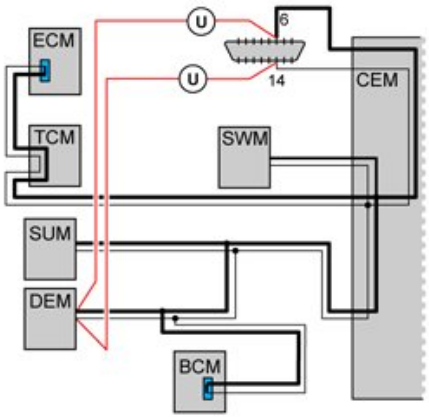
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

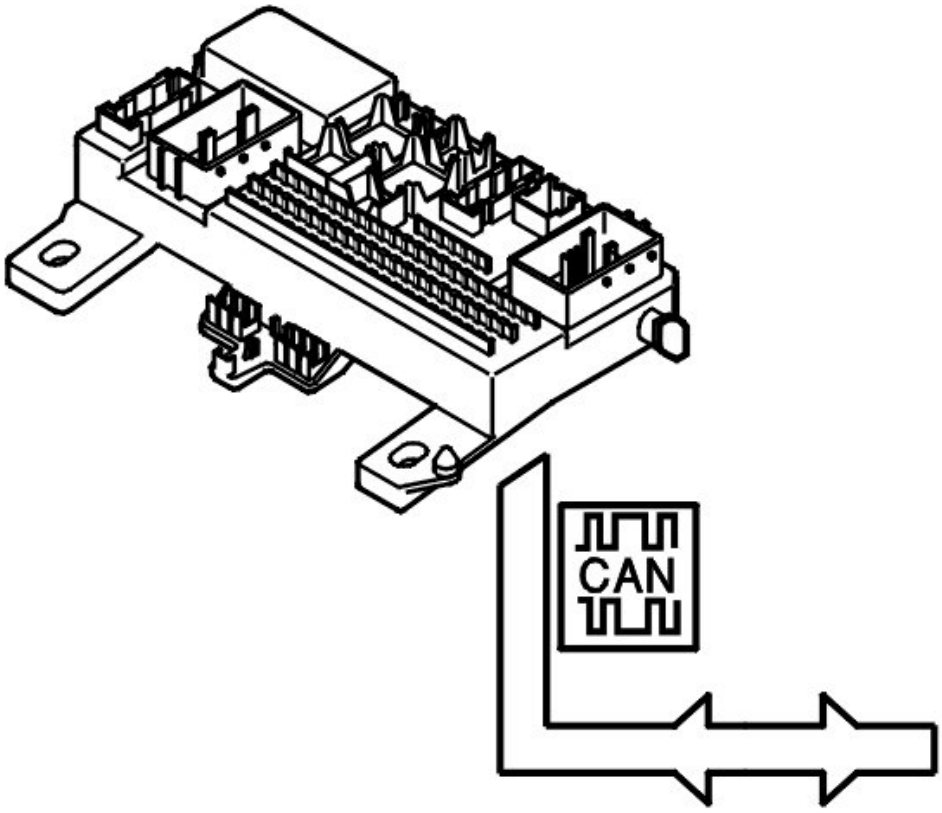


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-DF17

Condition



The central electronic module (CEM) checks the voltage in CAN L and CAN H on the high speed network. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit between CAN L and CAN H in the high speed network.

Note! If DFxx diagnostic trouble codes (DTCs) are stored the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the Control area network. The central electronic module (CEM) is the only control module that monitors the voltage level in the Control area network wiring. The central electronic module (CEM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit in one of the cables to ground or supply voltage. Do not replace the central electronic module (CEM) in the event of a CAN fault unless VIDA fault-tracing has indicated that the central electronic module (CEM) has an internal fault.

The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit between CAN L and CAN H in the high speed network.

Fault symptom[s]
- The engine does not start.
- The engine cuts out when driving.
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.

CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

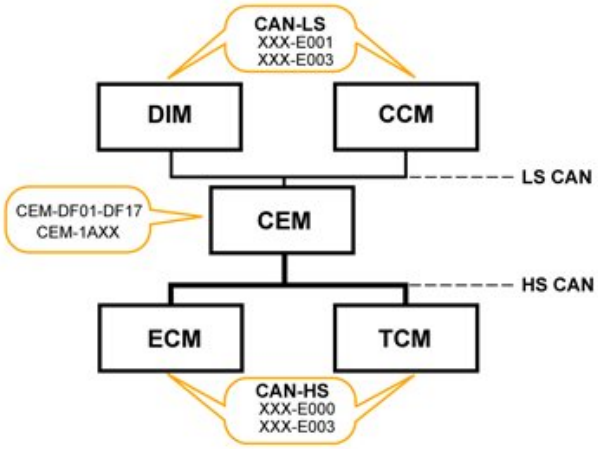
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

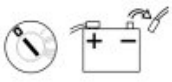
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been

measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

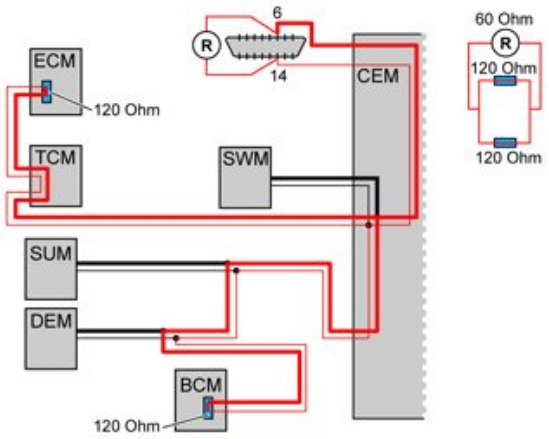
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

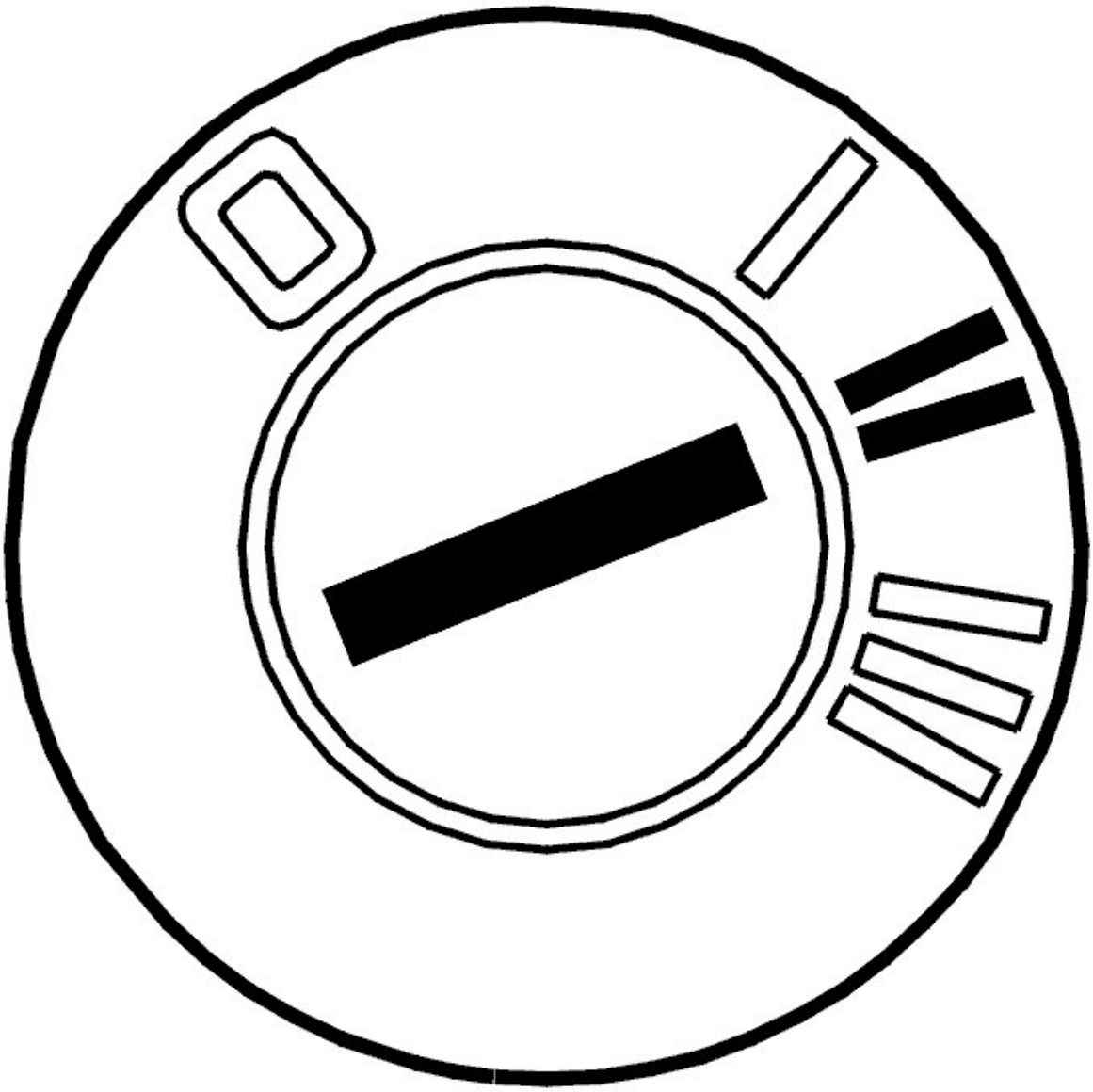


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

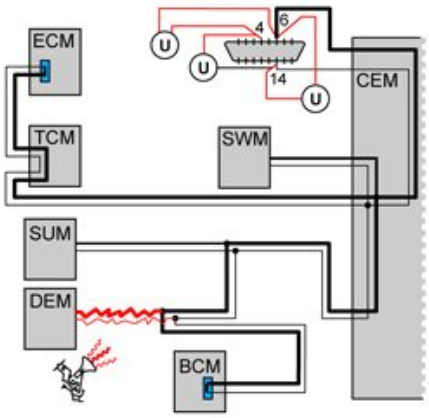
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

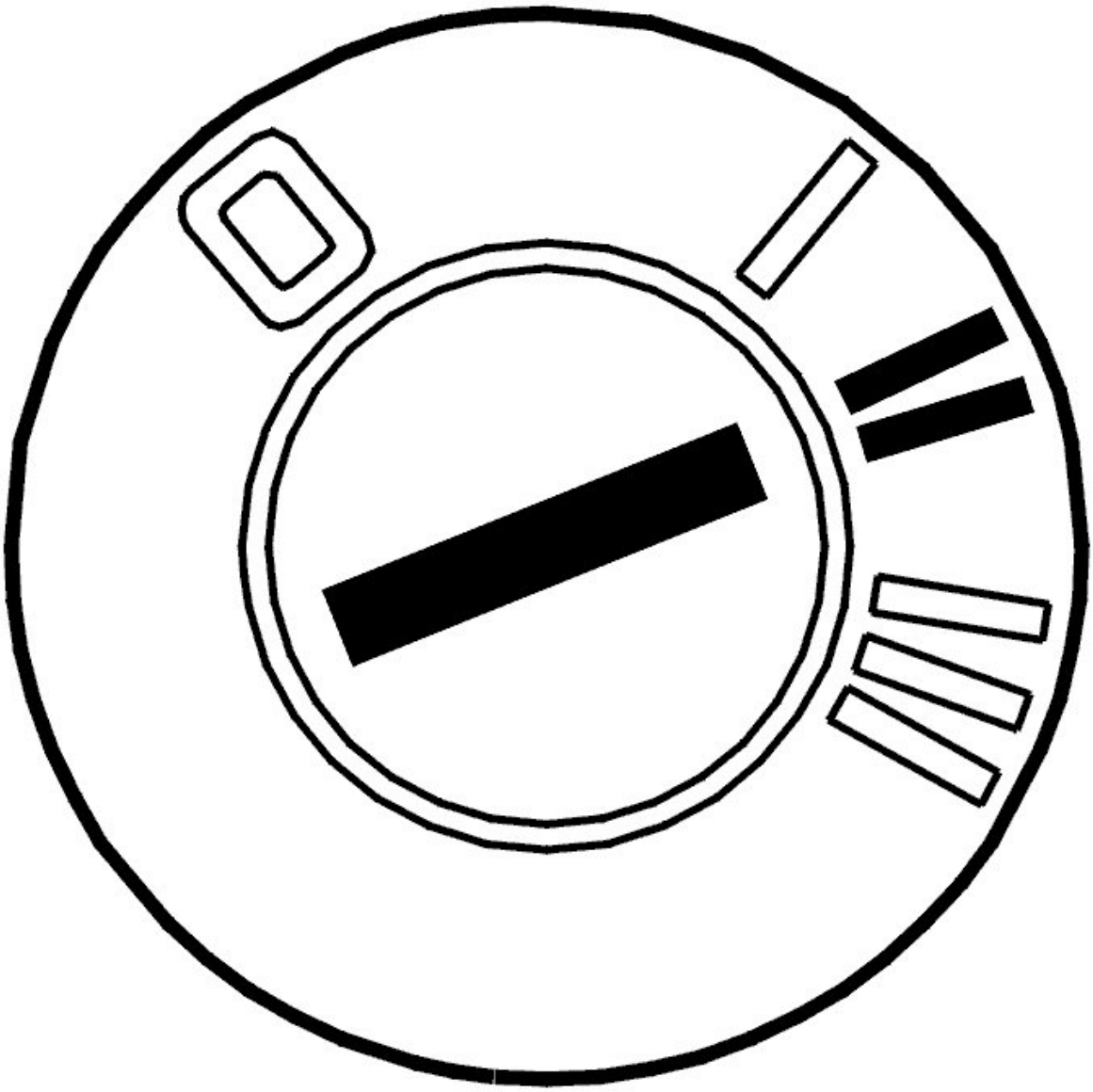


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

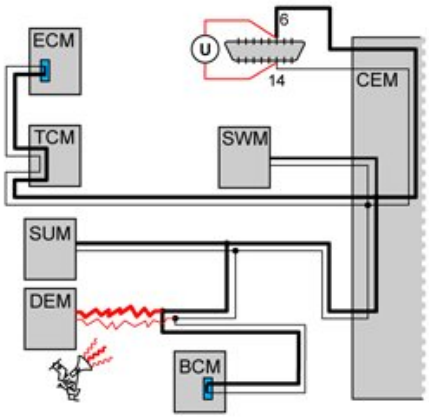
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

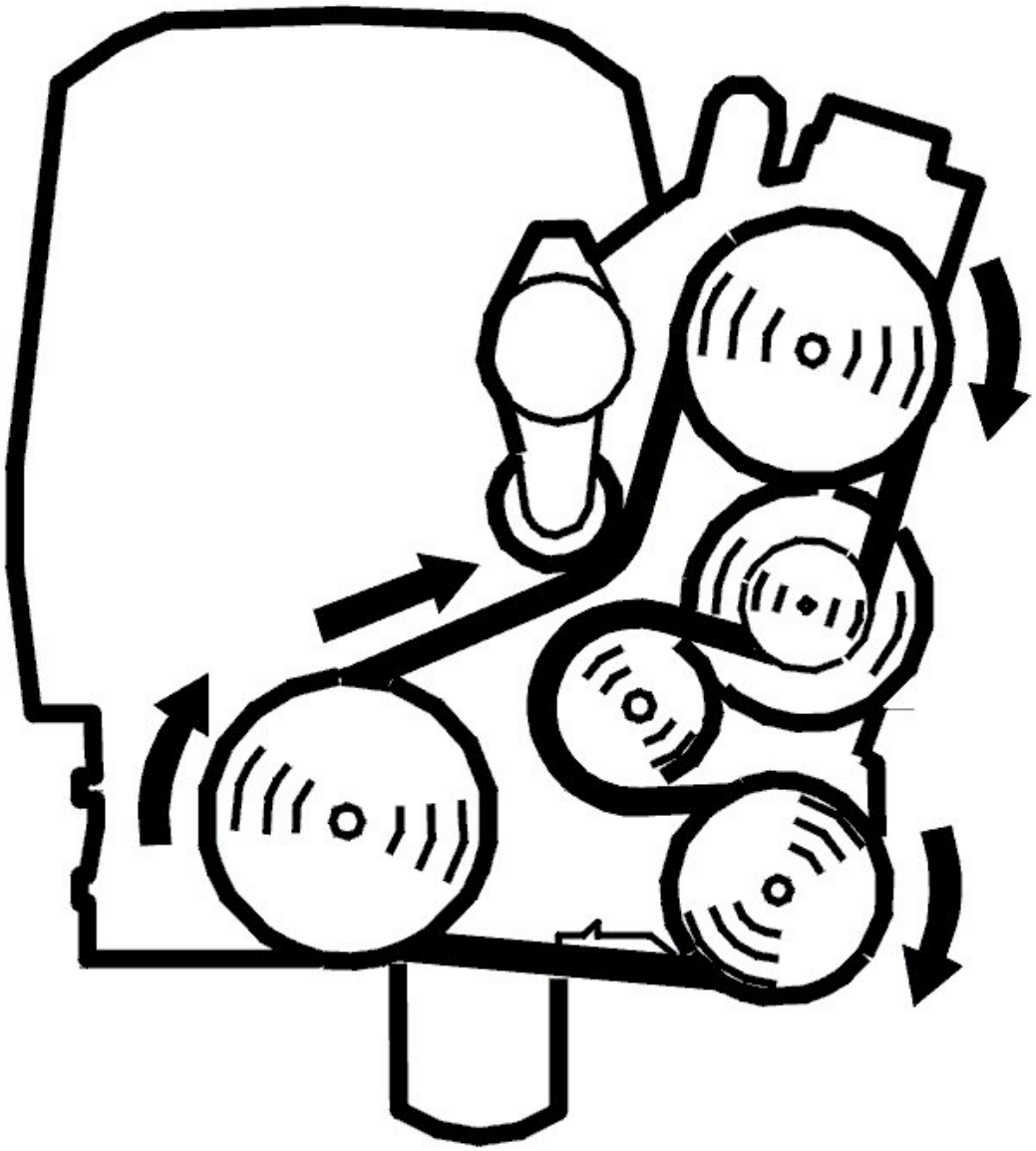
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

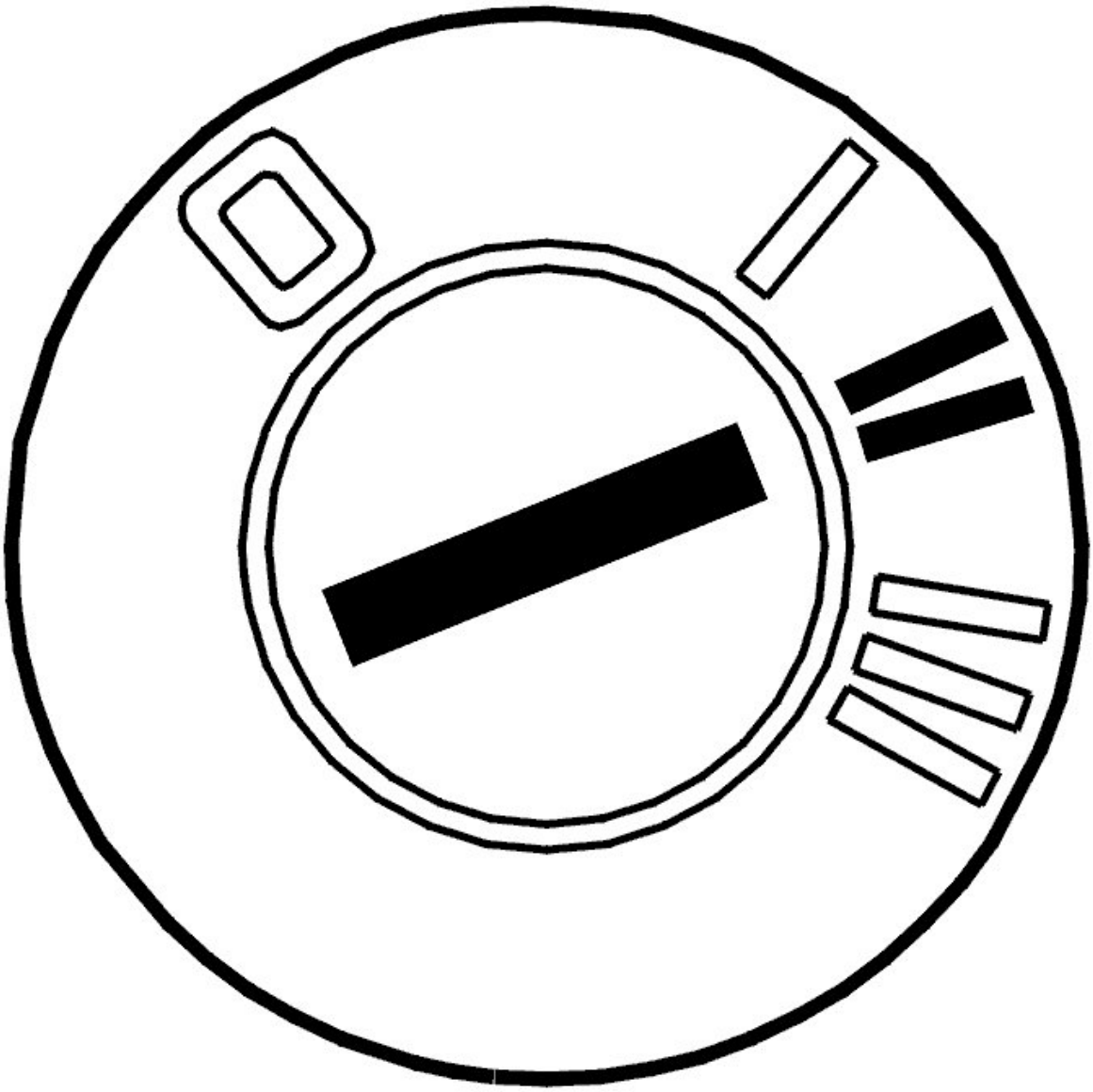


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

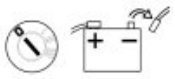
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

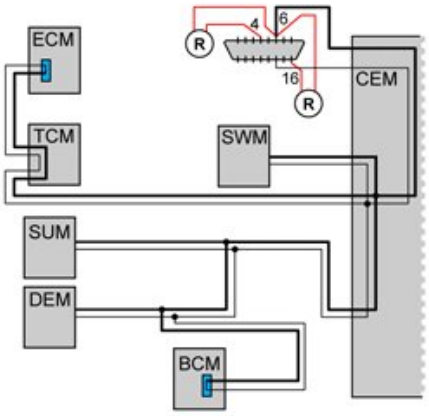
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

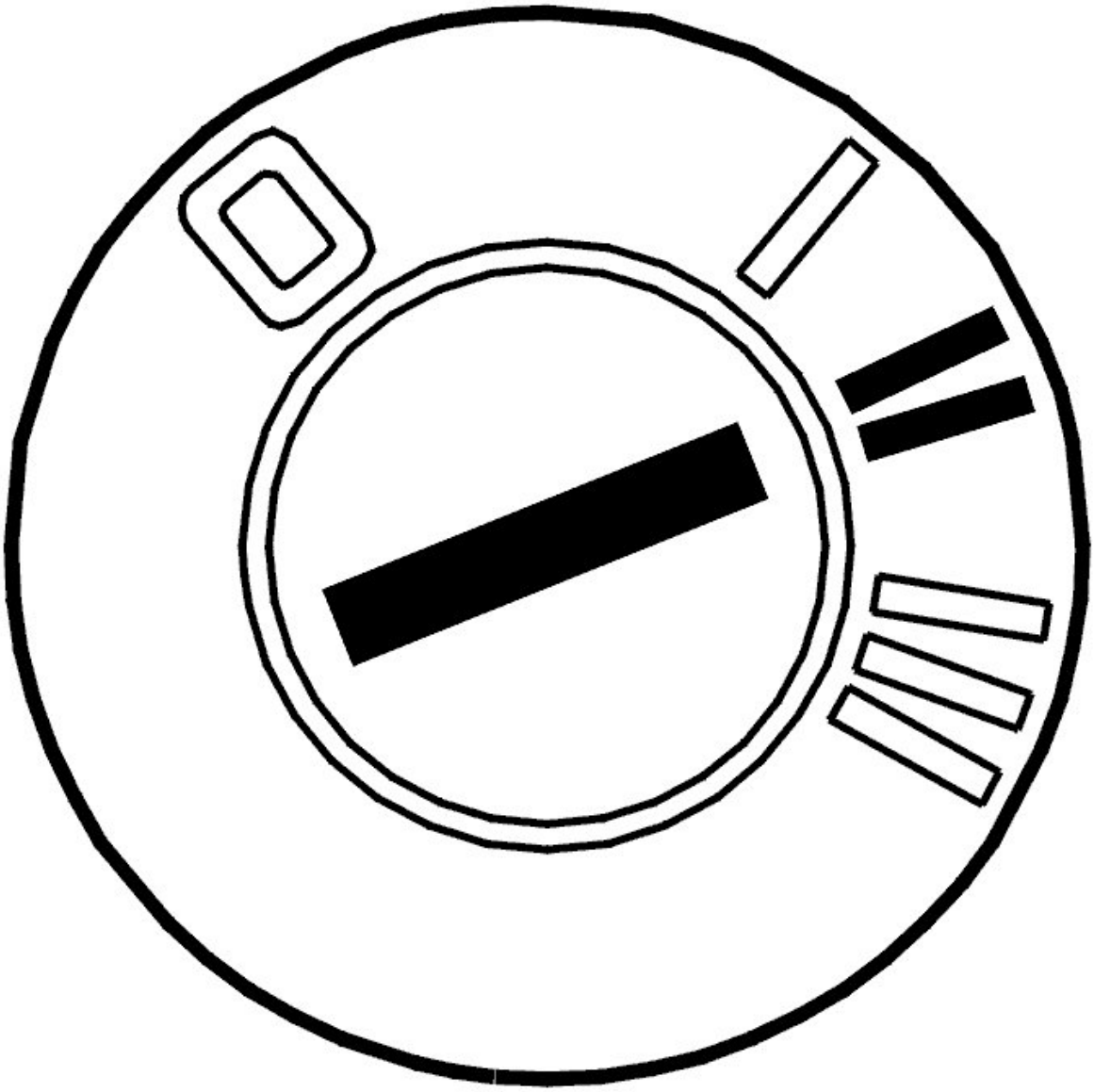


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

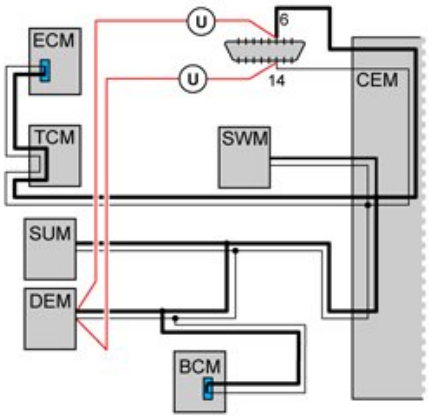
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

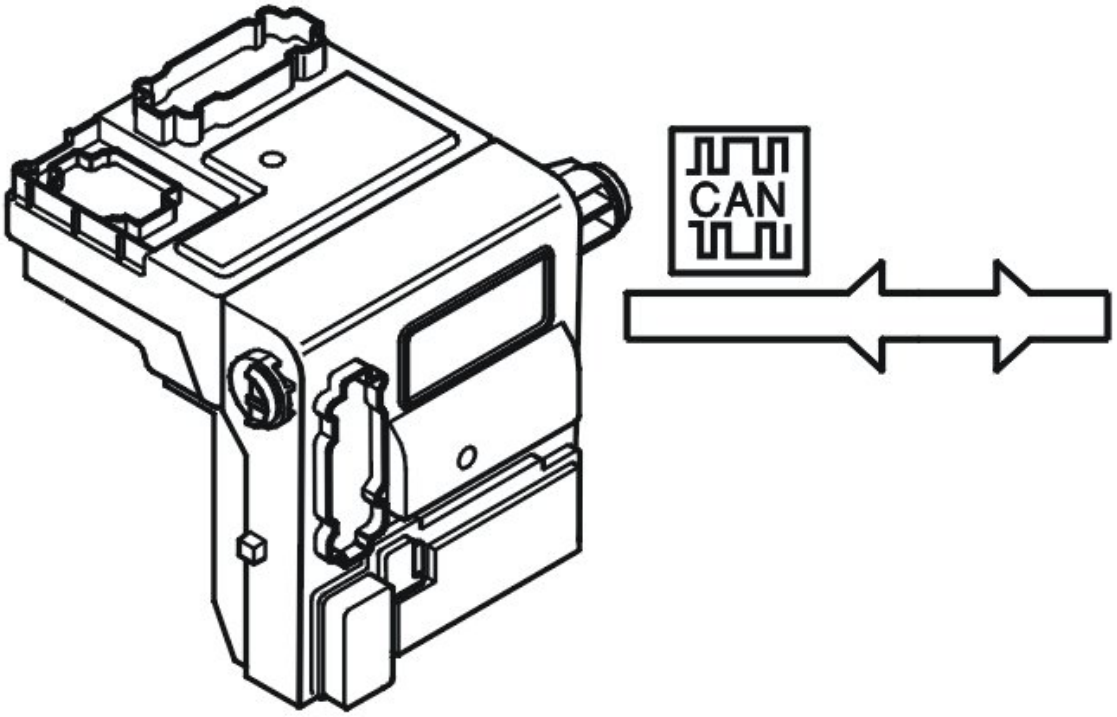


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-E000

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference on the high speed network (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent.

The diagnostic trouble code (DTC) can be diagnosed when the HS CAN is active.

Substitute value
- The control module shuts itself off ("bus-off").

Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in one of the control area network (CAN) cables
- Internal fault in another control module in the same part of the control area network (CAN)
- Internal fault in the control module.

Fault symptom[s]
- The starter motor turns but the engine does not start.
- The speedometer does not operate.
- Tachometer not working.
- Engine coolant temperature (ECT) gauge does not function.
- Cruise control does not function at all.
- Jerky operation.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

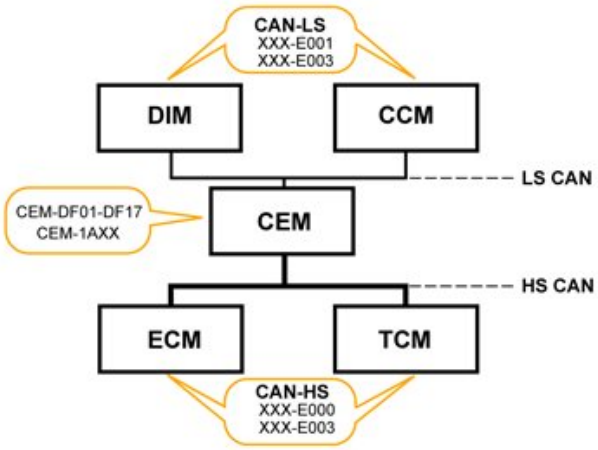
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

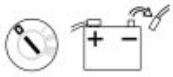
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

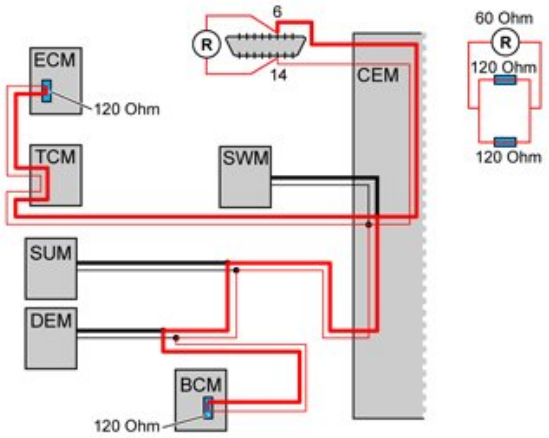
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

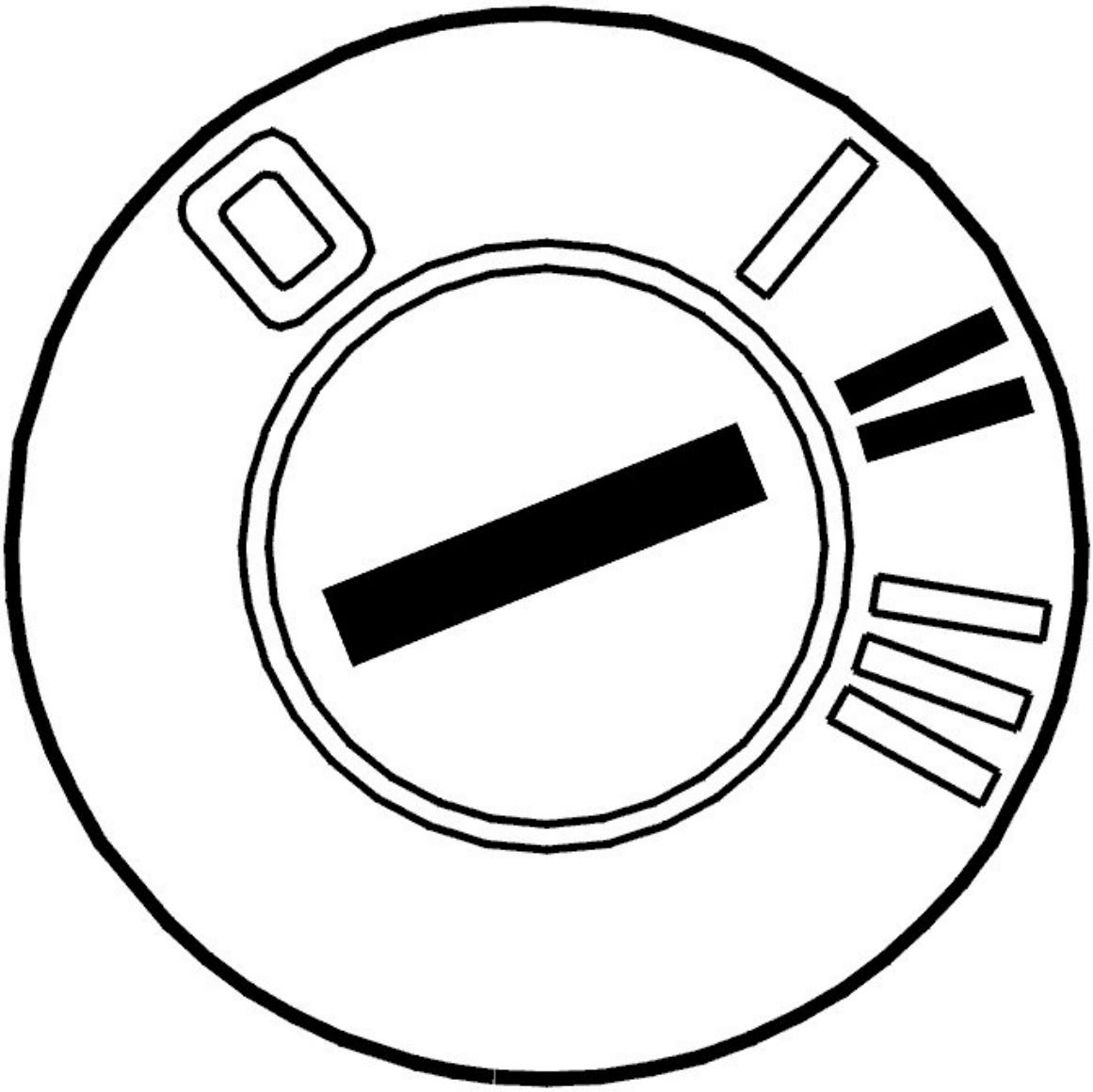


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

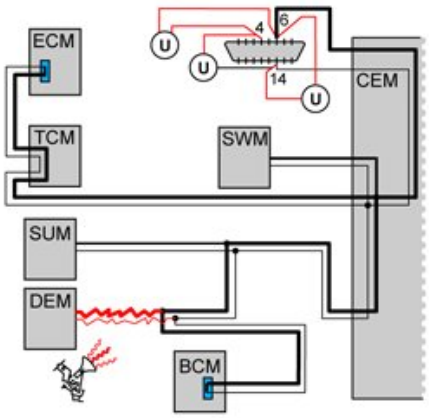
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

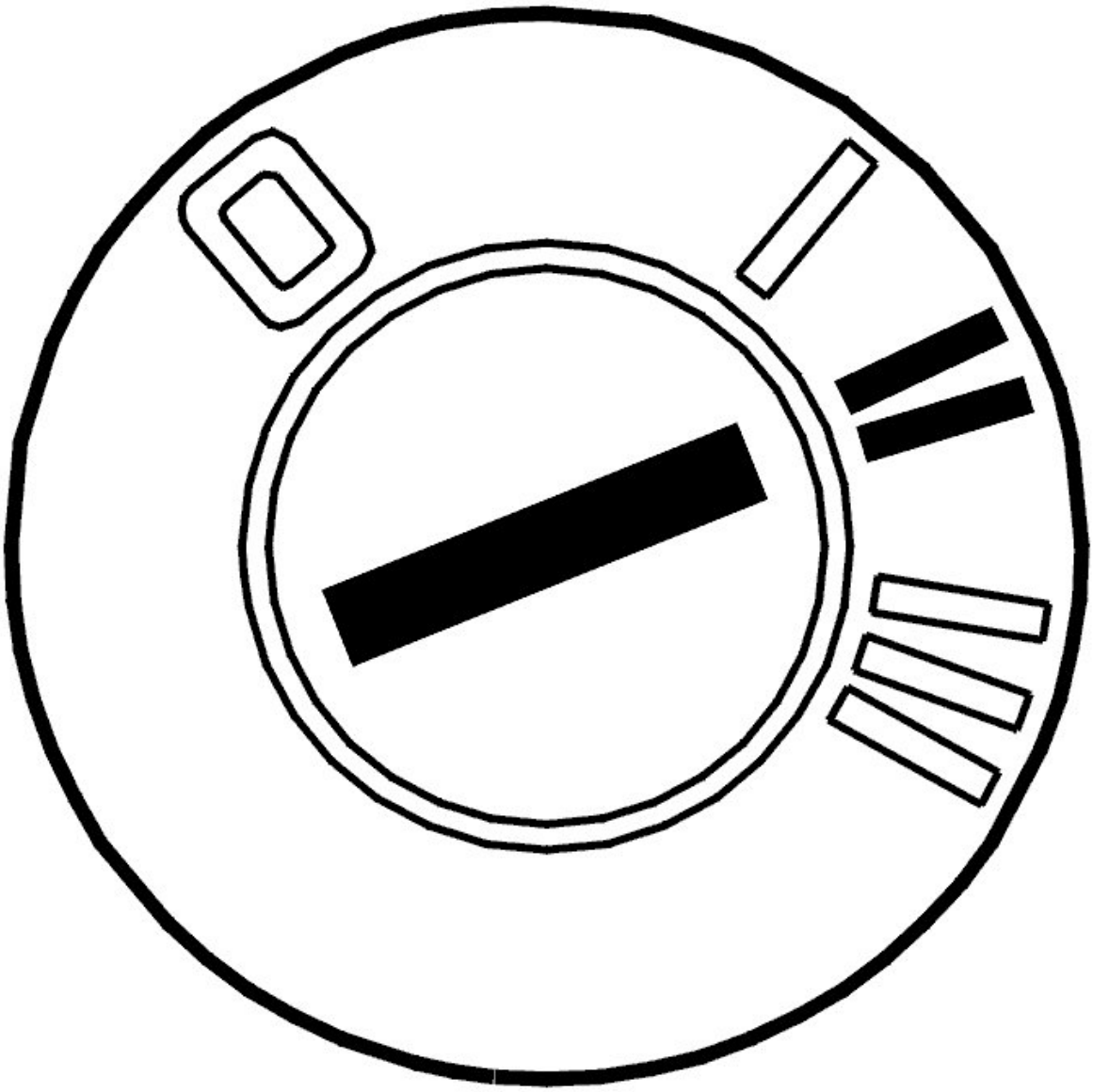


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

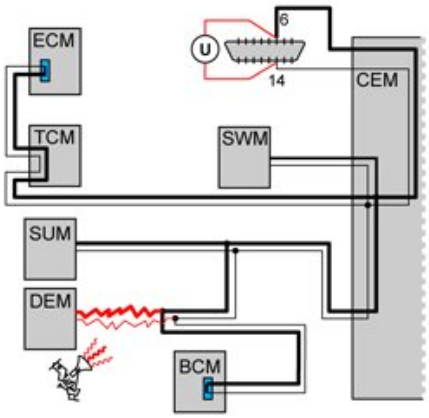
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

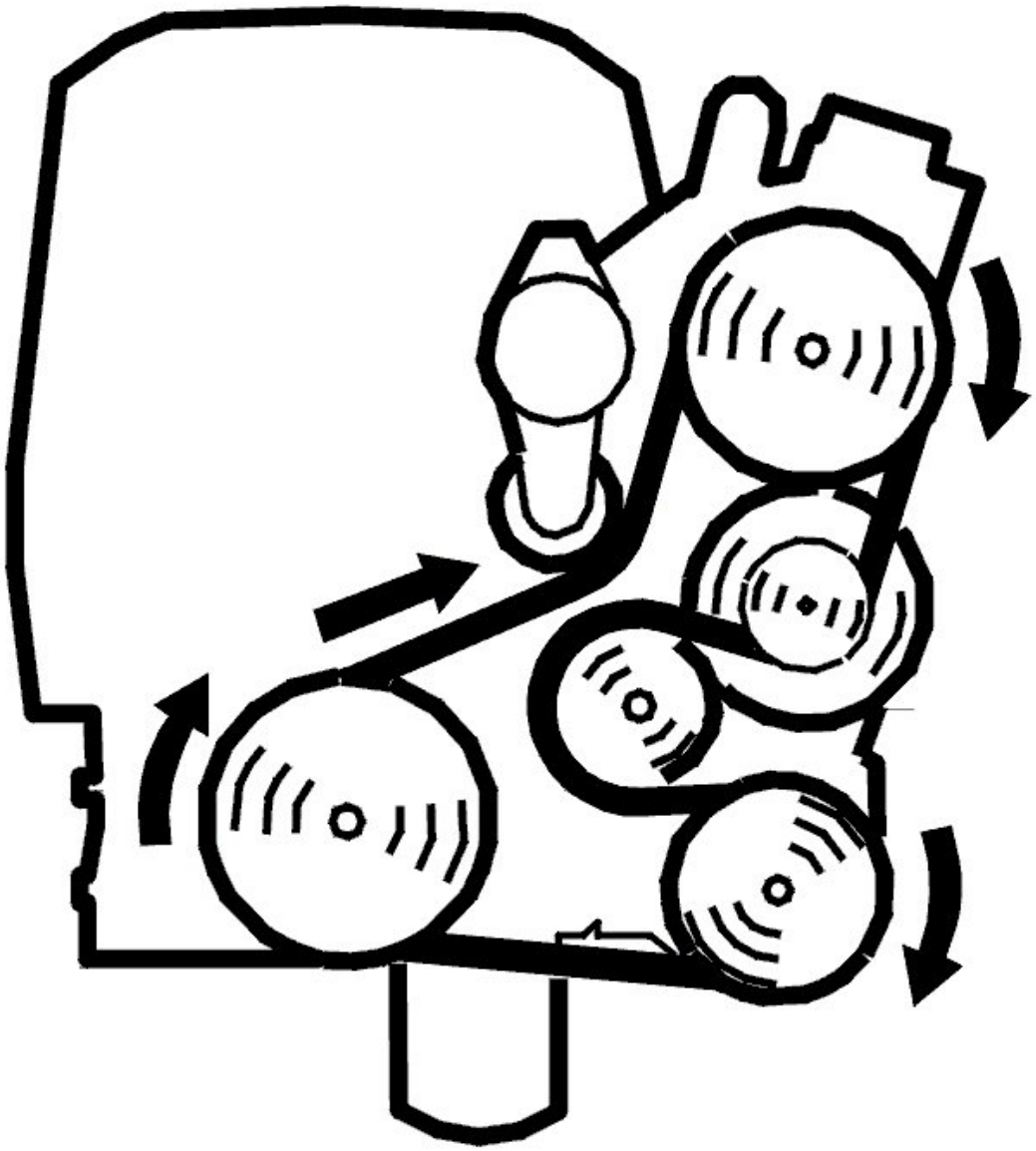
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

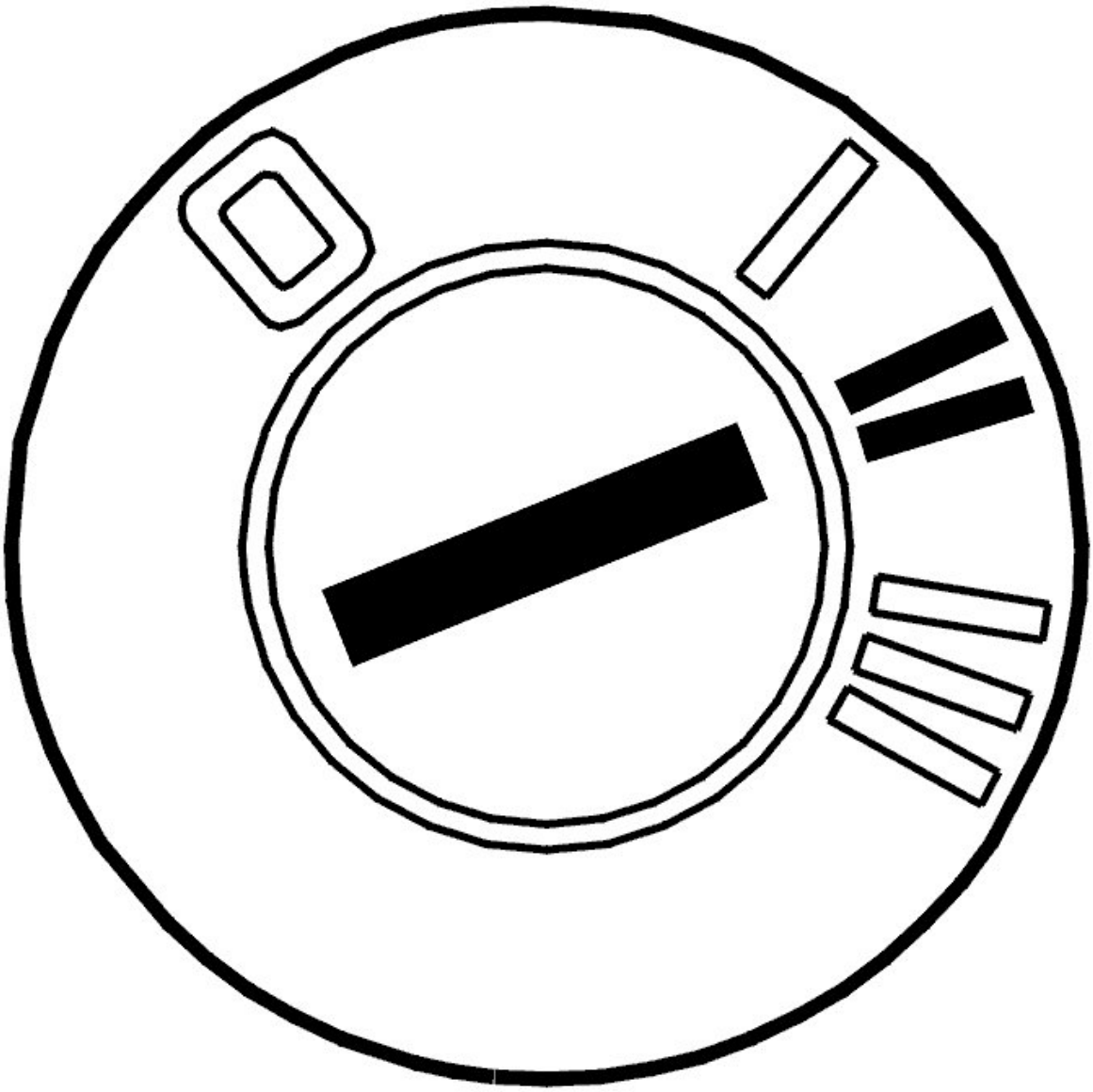


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

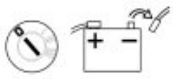
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

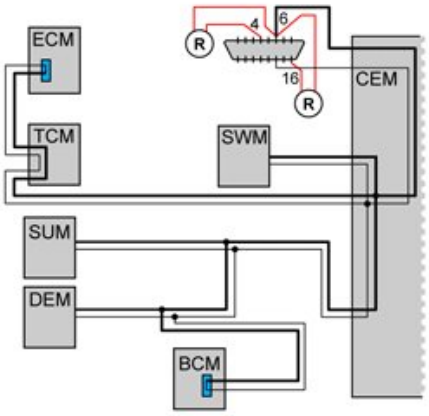
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

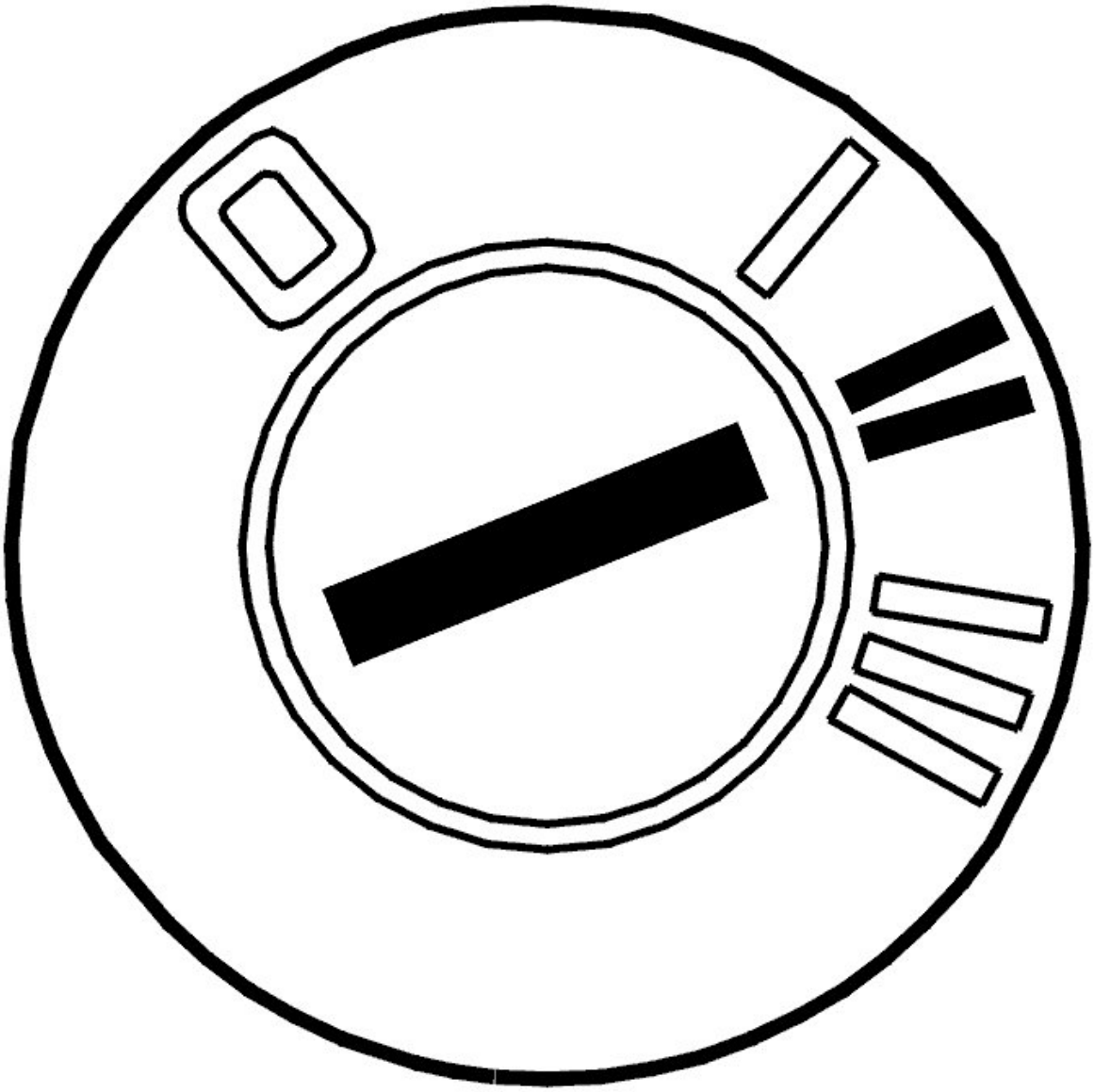


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

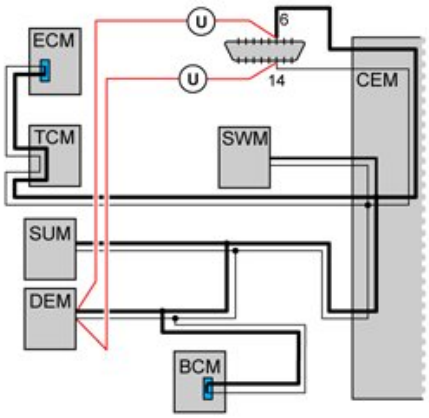
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

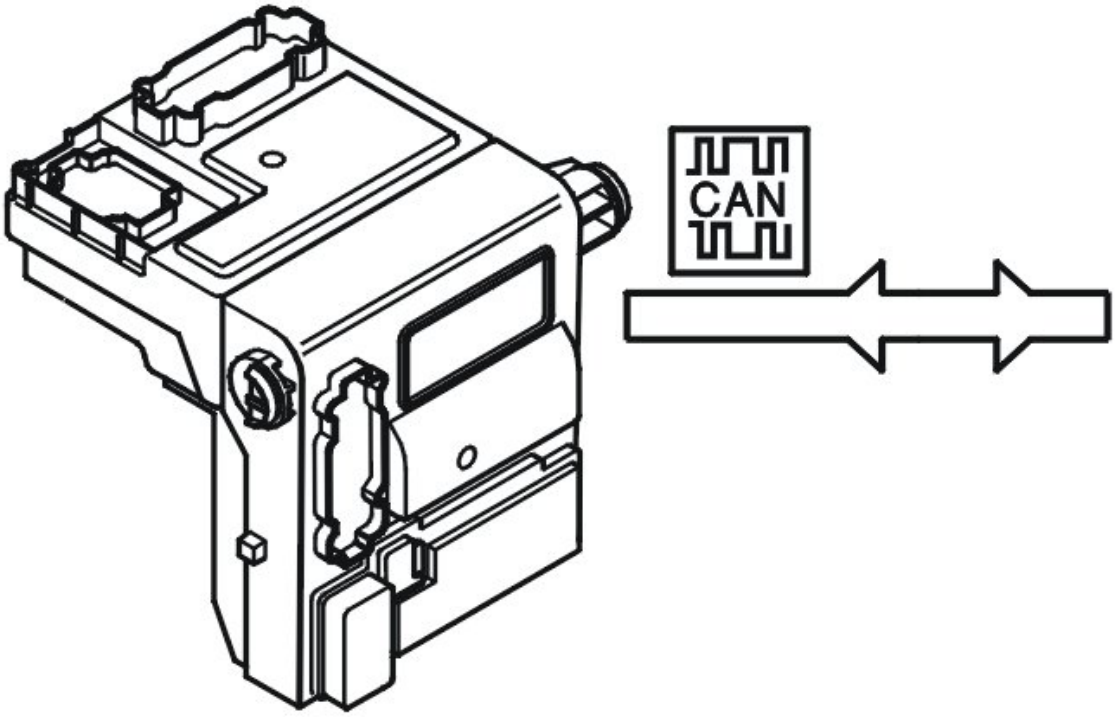


Continue - Verification

CEM-E001

Diagnostic trouble code (DTC) information CEM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference on the low speed network (CAN communication blocked).

Substitute value

- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source

- Short-circuit between the control area network (CAN) wiring
- Open-circuit in one of the control area network (CAN) cables
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

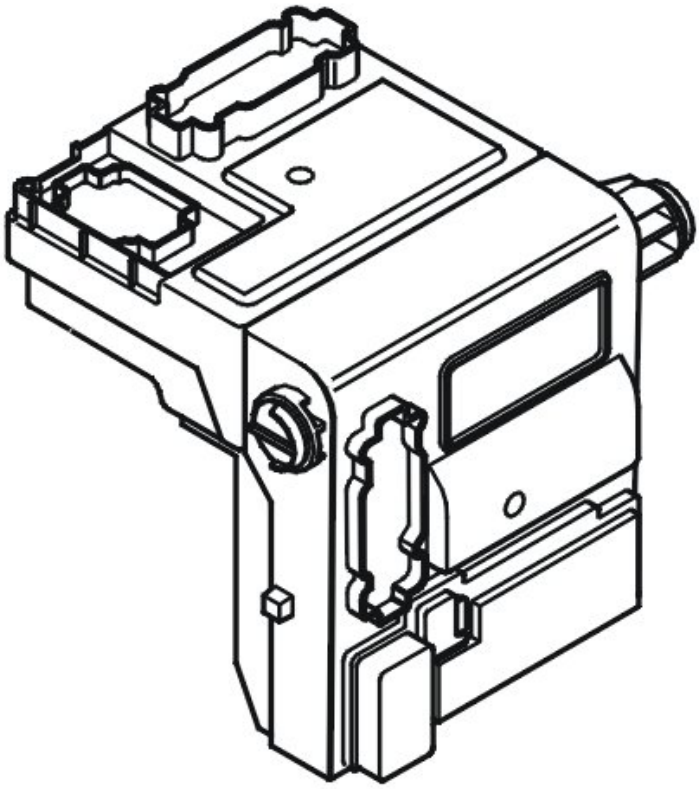
Fault symptom[s]

- No gauges are working
- The instrument lighting does not operate
- Cannot be controlled with the remote control.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A03

Condition



The central electronic module (CEM) monitors the cable for S-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit or a short-circuit to ground in the S-supply.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

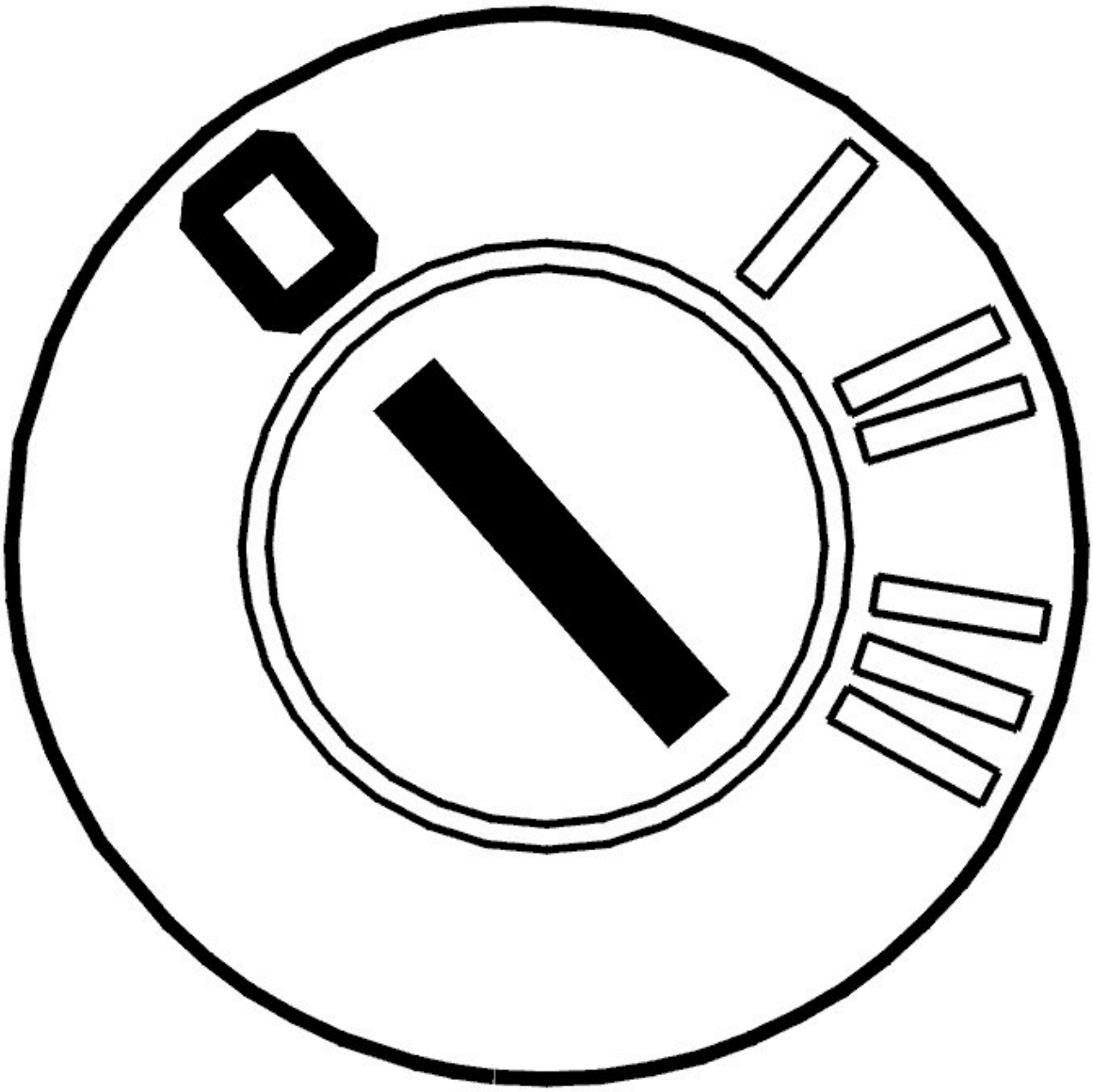
Possible source
- Contact resistance in the terminals
- Open-circuit or short-circuit to ground in the S-supply
- No communication with the key
- Damaged ignition switch.

Fault symptom[s]
- The starter motor does not turn.

Signal Too Low

Signal too low

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Check for loose connections. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

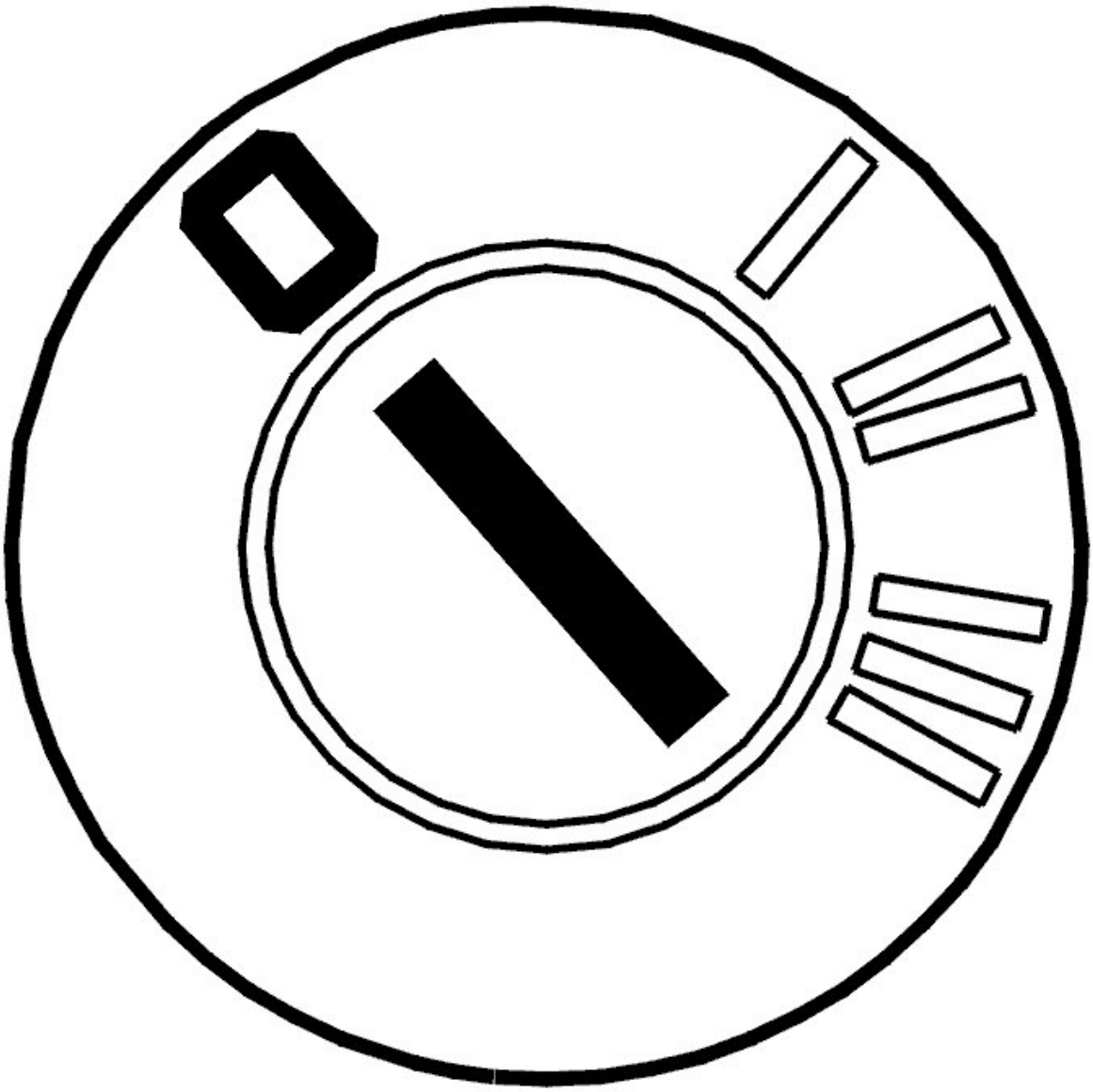
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable

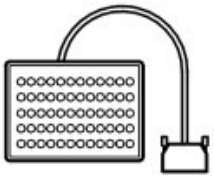


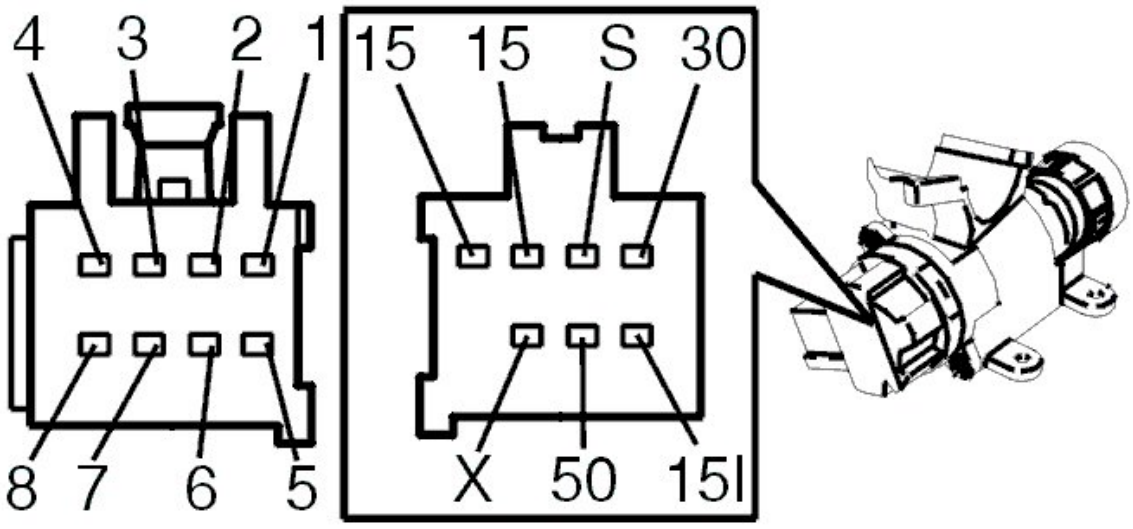
- Ignition off
- Remove the ignition key.

Check the cable between central electronic module (CEM) terminal #D15 and ignition switch terminal #S (#3). Check for an open-circuit. Check for a short-circuit to ground.
The voltage must be battery voltage when the key is in the ignition switch.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

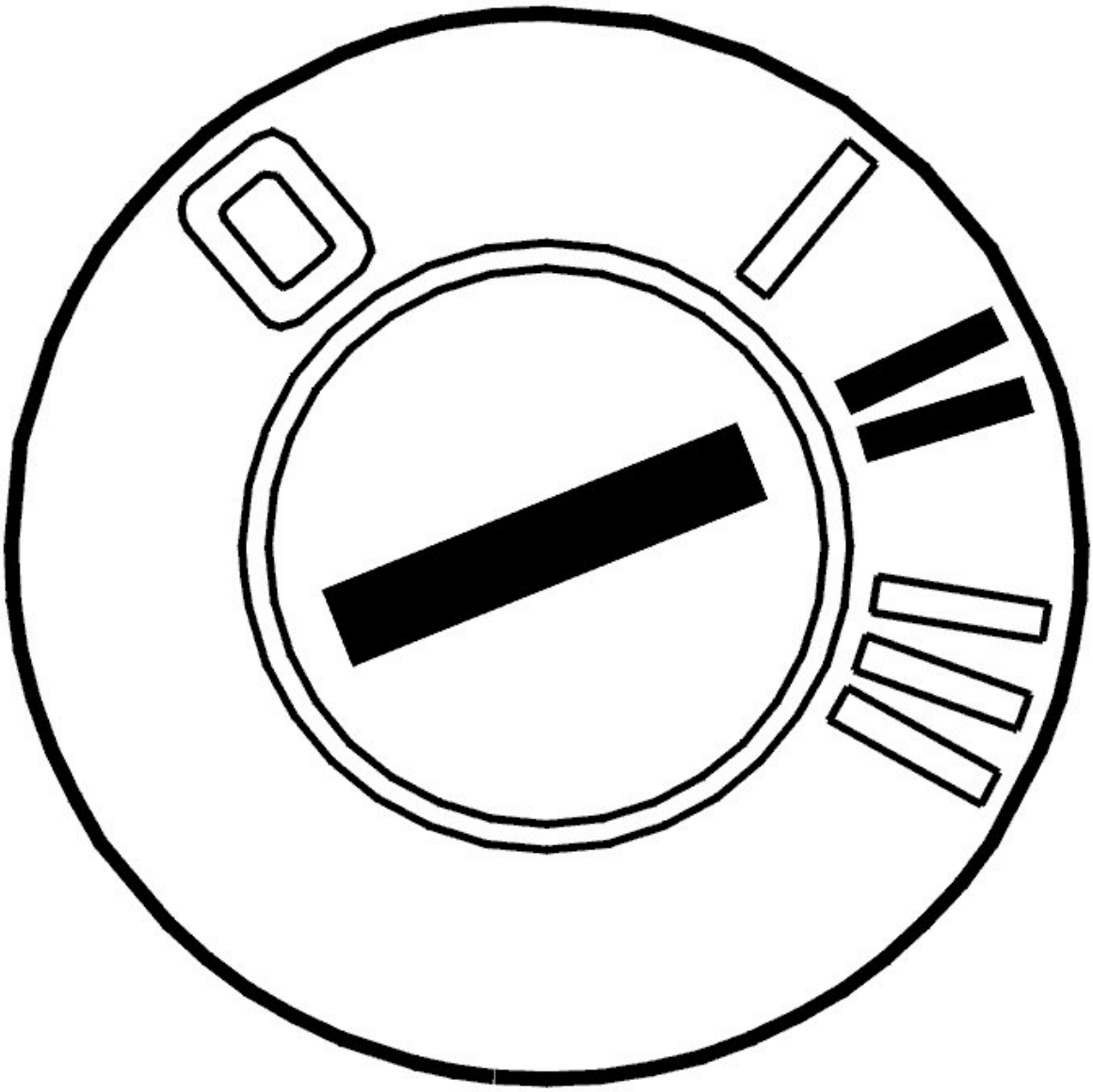
Continue - Verification

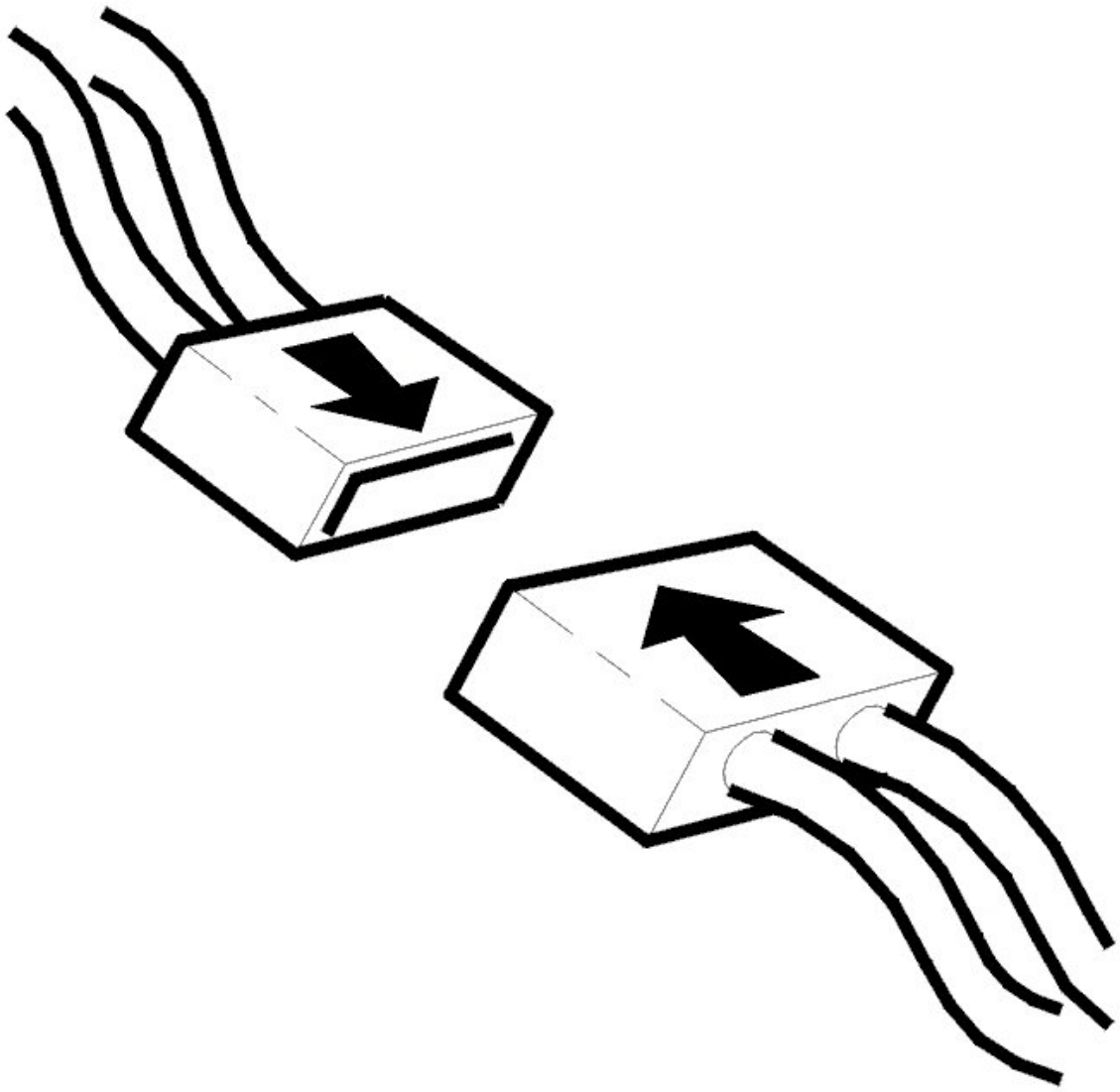
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check whether the S-supply is activated.

Is the S-supply activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

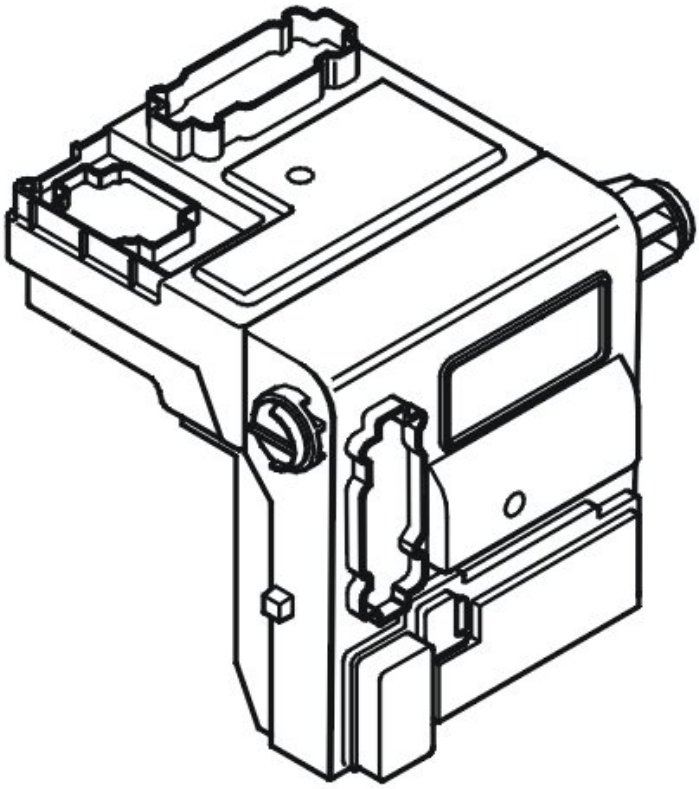
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A04

Condition



The central electronic module (CEM) monitors the cable for X-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit or a short-circuit to ground in the X-supply.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

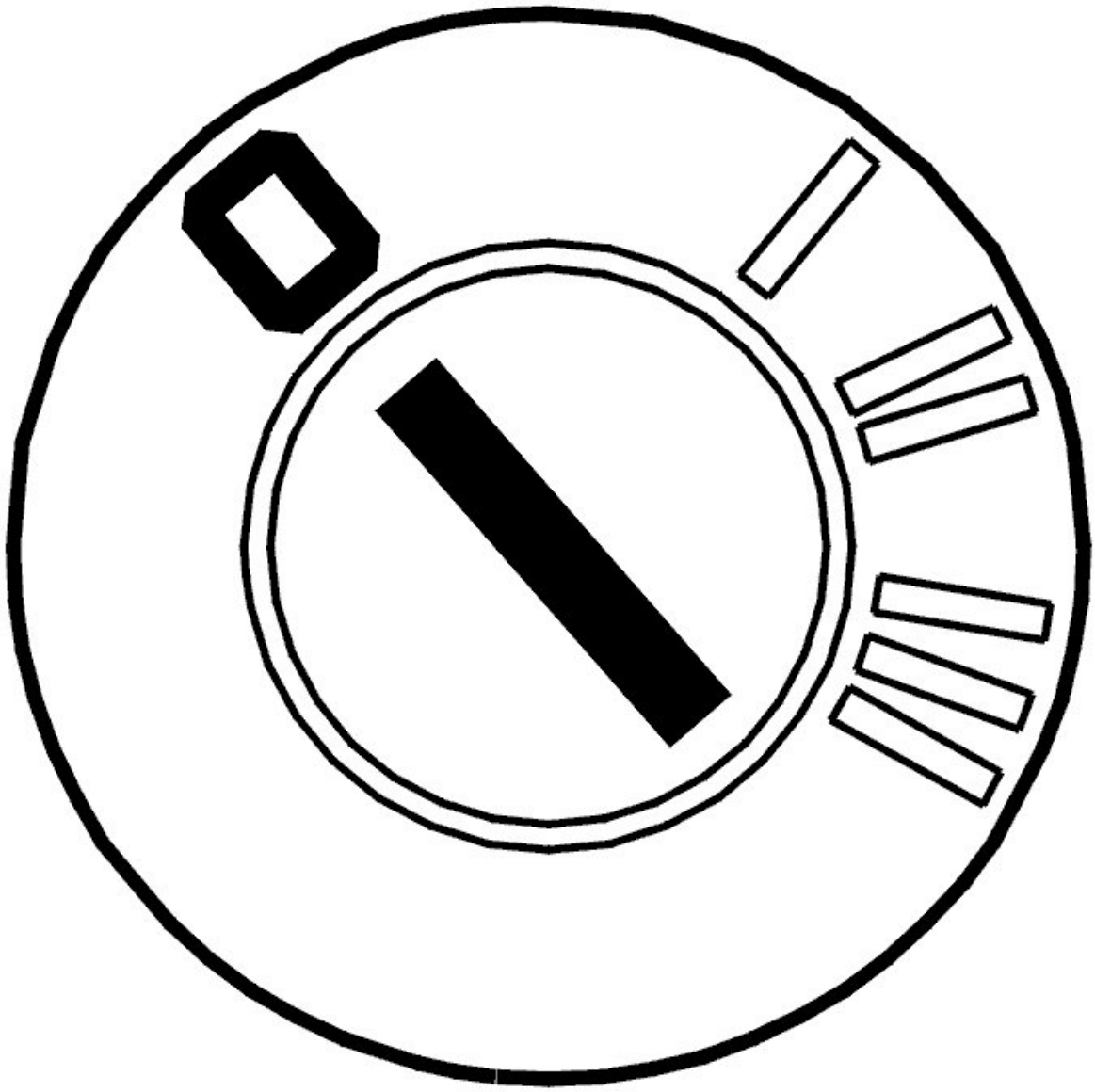
Possible source
- Contact resistance in the terminals
- Open-circuit or short-circuit to ground in the X-supply
- Damaged ignition switch.

Fault symptom[s]
- The blower fan does not operate
- The radio is not working
- The starter motor does not turn.

Signal Too Low

Signal too low

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

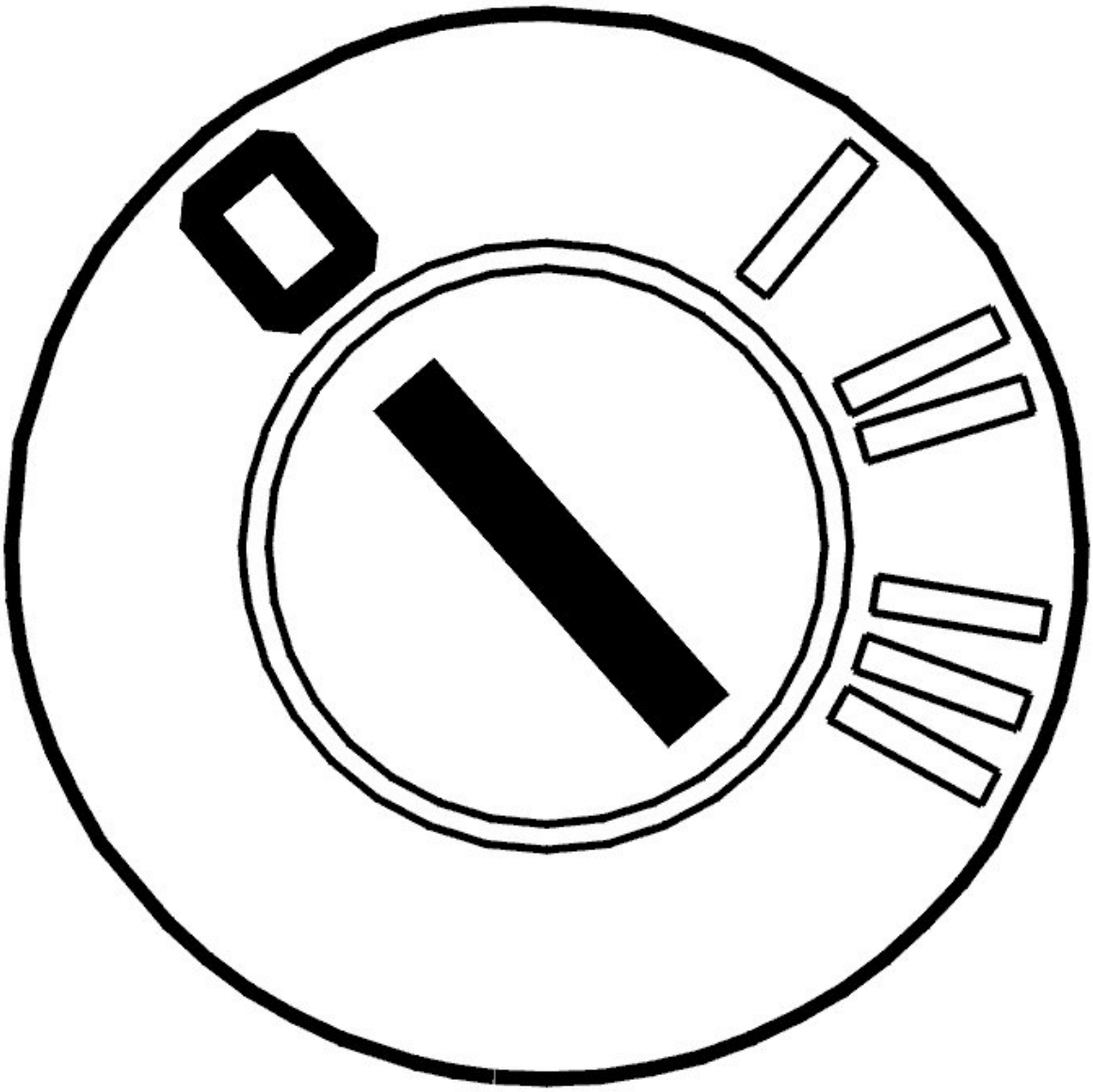
Other information:
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable



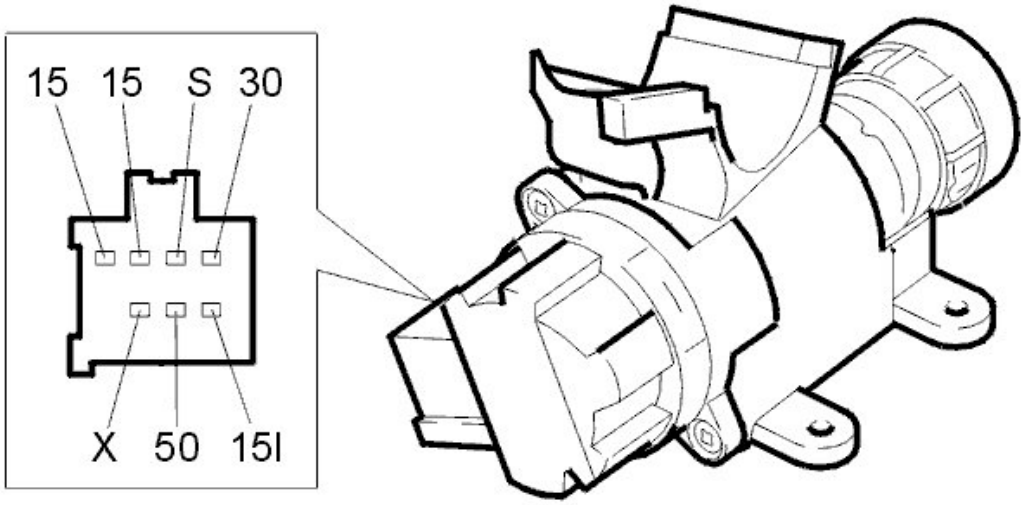
- Ignition off.

Check the cable between central electronic module (CEM) connector terminal #D8 and the ignition switch X-supply (terminal #6). Check for an open-circuit. Check for a short-circuit to ground.
Switch on the ignition. The voltage must be the same as battery voltage if the key is in position I or II.

Hint: For the intermediate junction point and fuse, see the relevant Wiring diagram.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Is the voltage OK?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

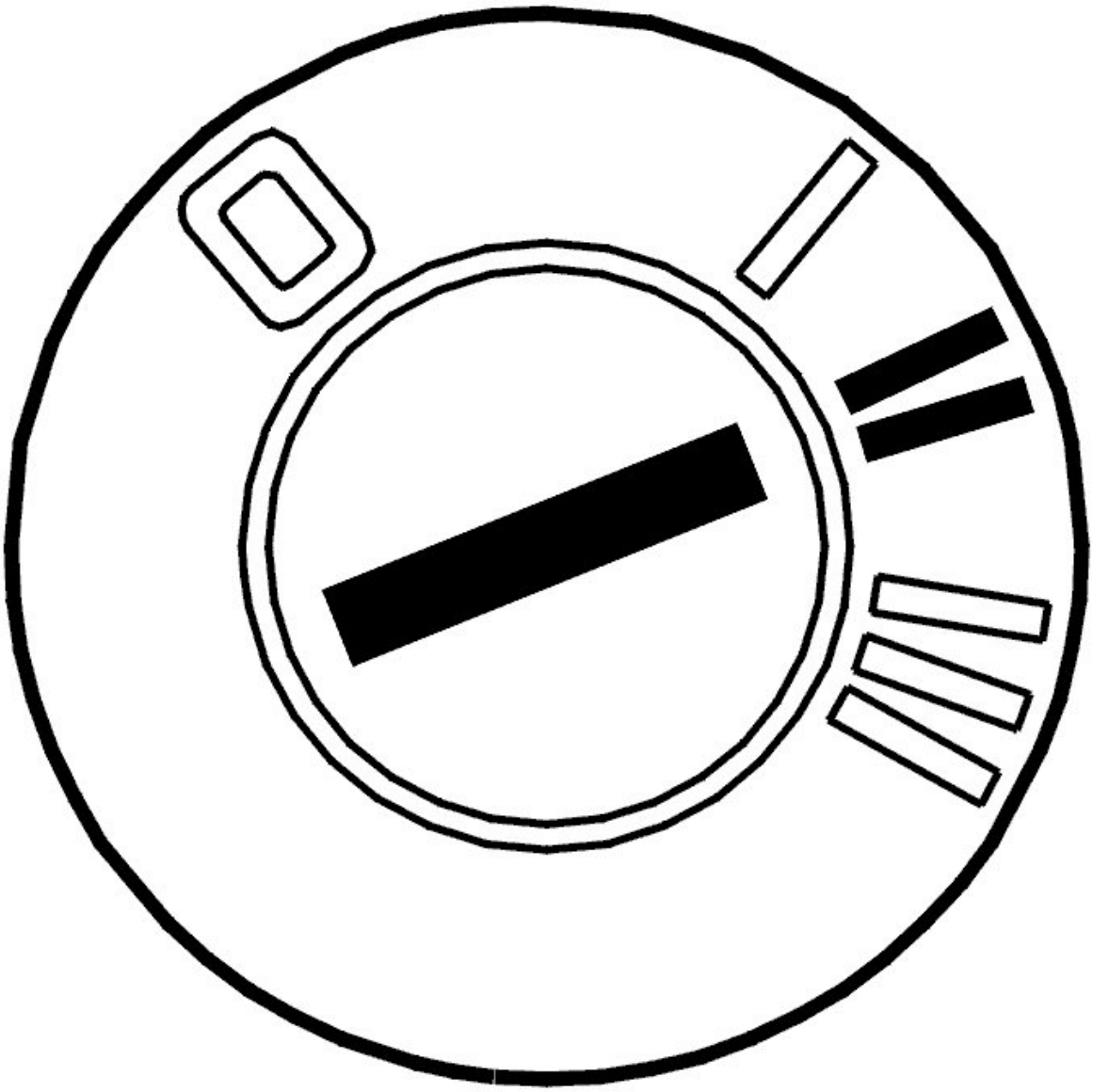
Continue - Verification

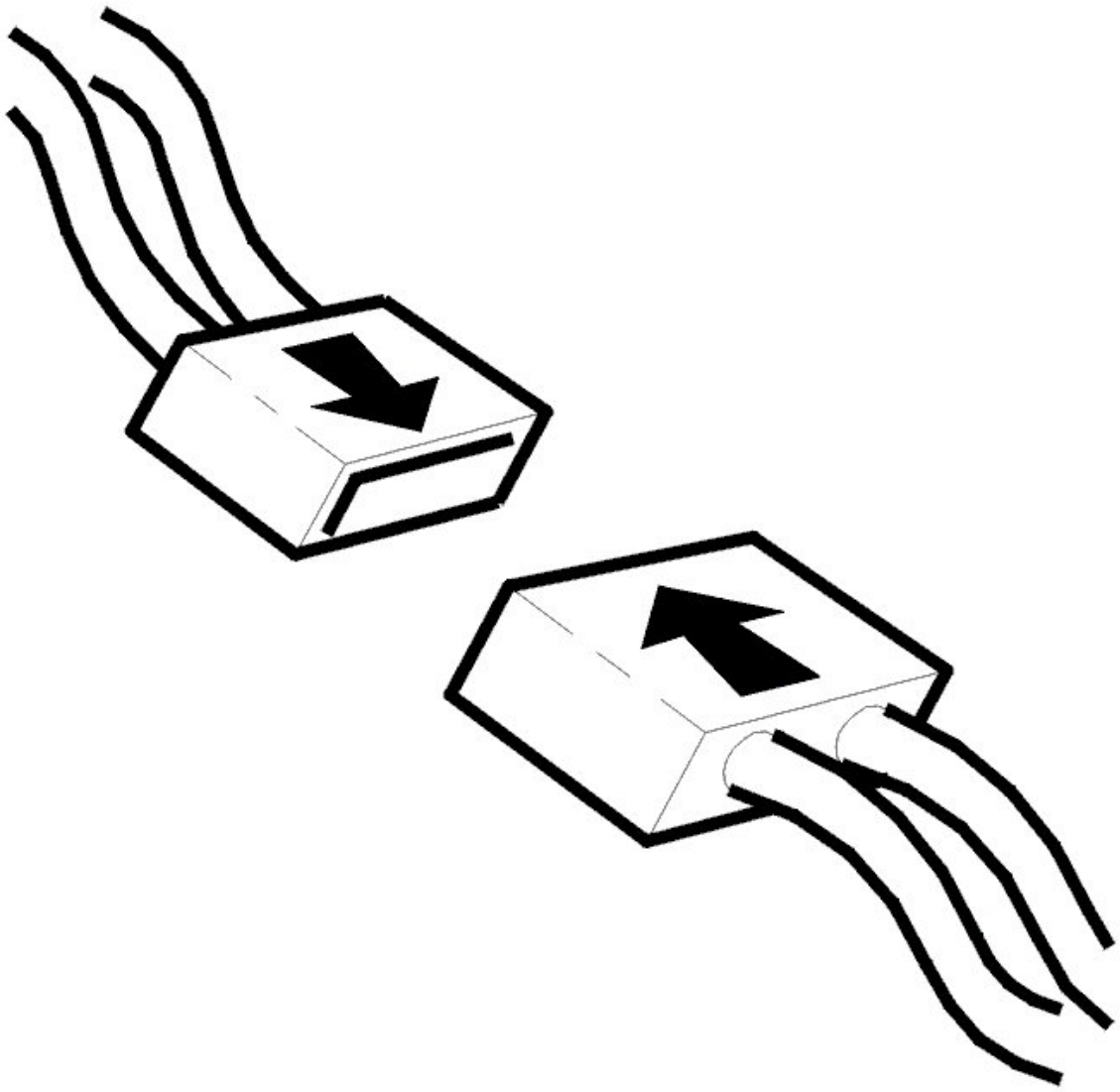
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the X-supply is OK.

Is the voltage high on the cable?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

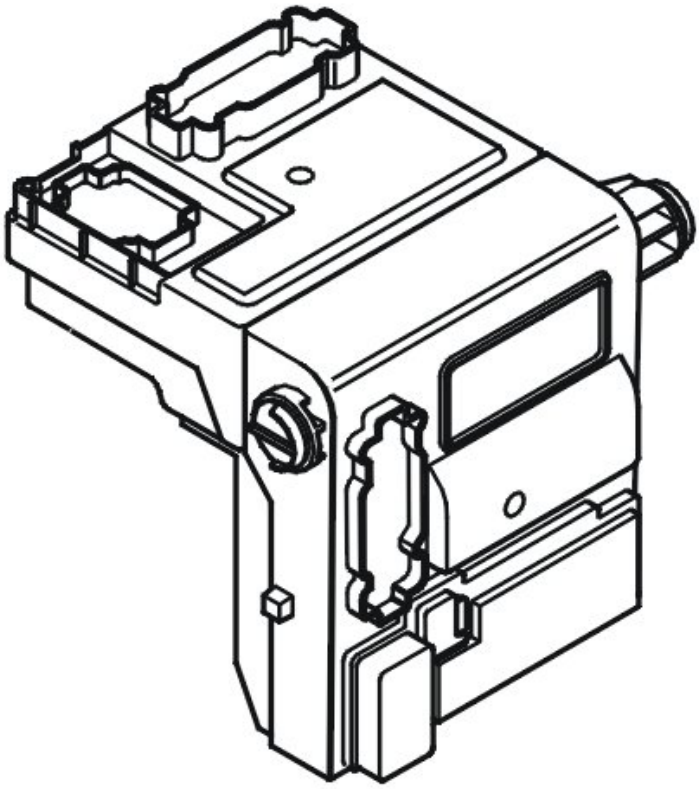
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A05

Condition



The central electronic module (CEM) monitors the cable for X-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the cable for the X-supply.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position III (start attempt).

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the cable for the X-supply
- Damaged ignition switch.

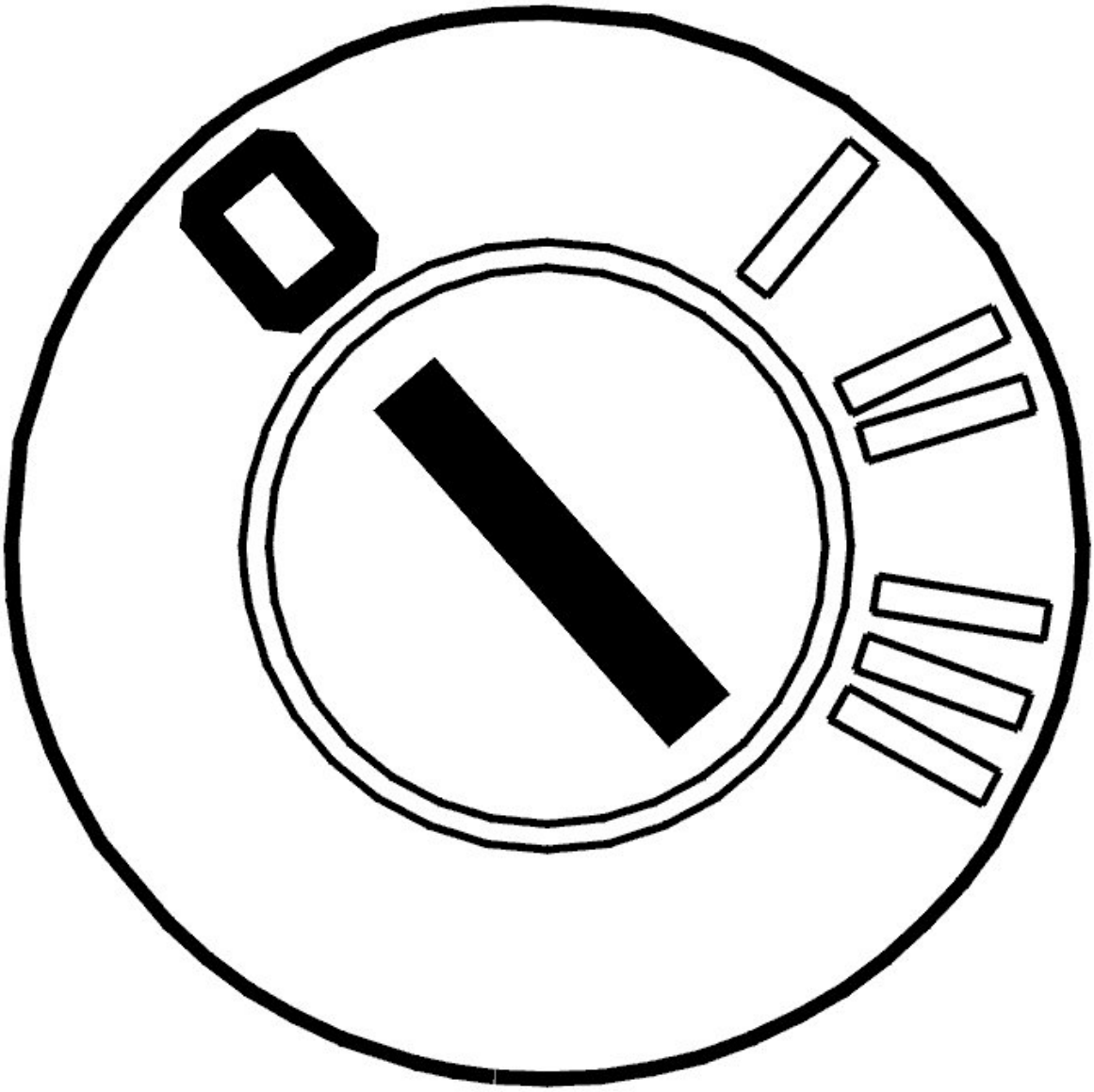
Fault symptom[s]

- The battery discharges.

Signal Too High

Signal too high

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for damage. Remedy as necessary.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

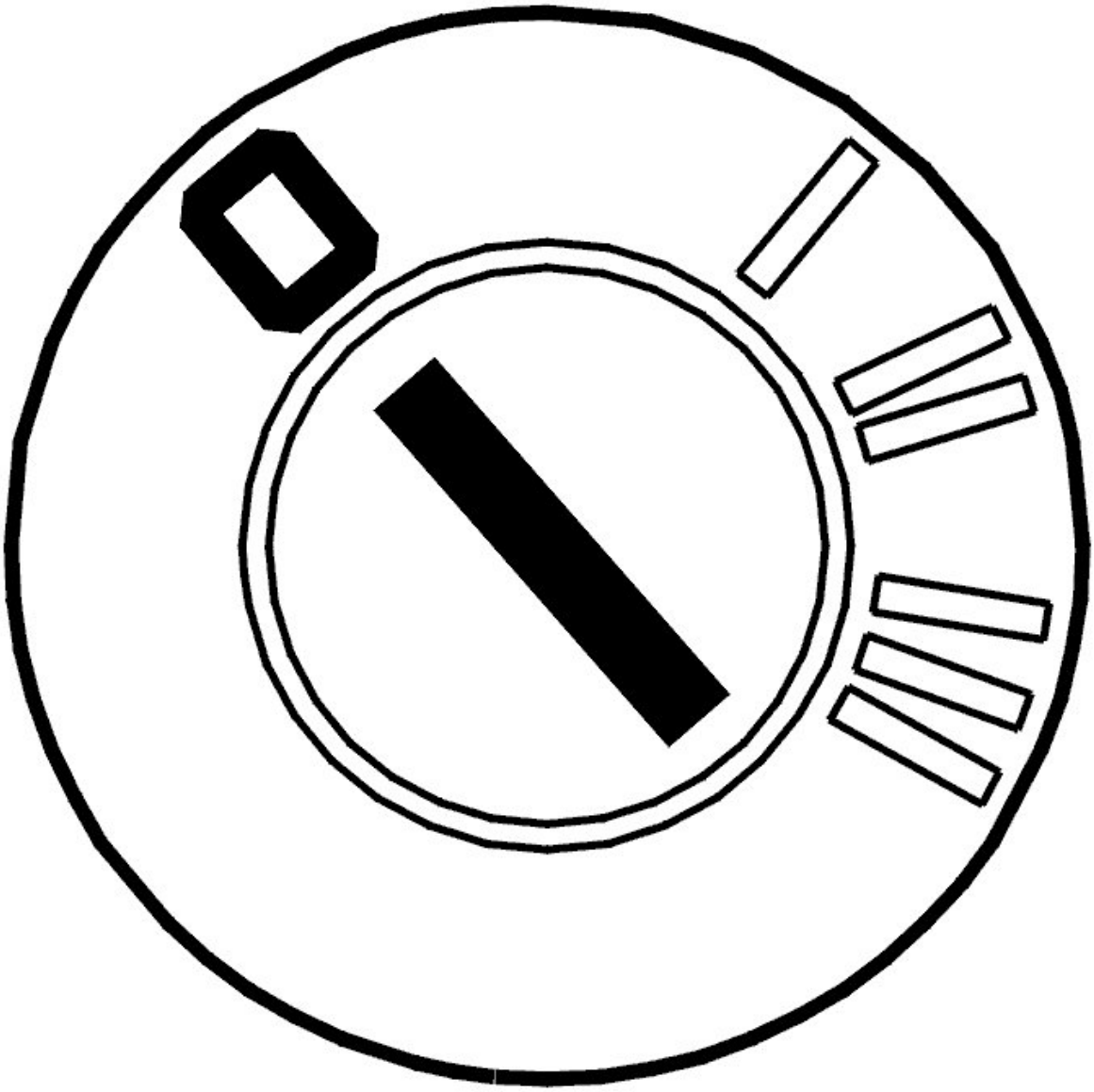
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable



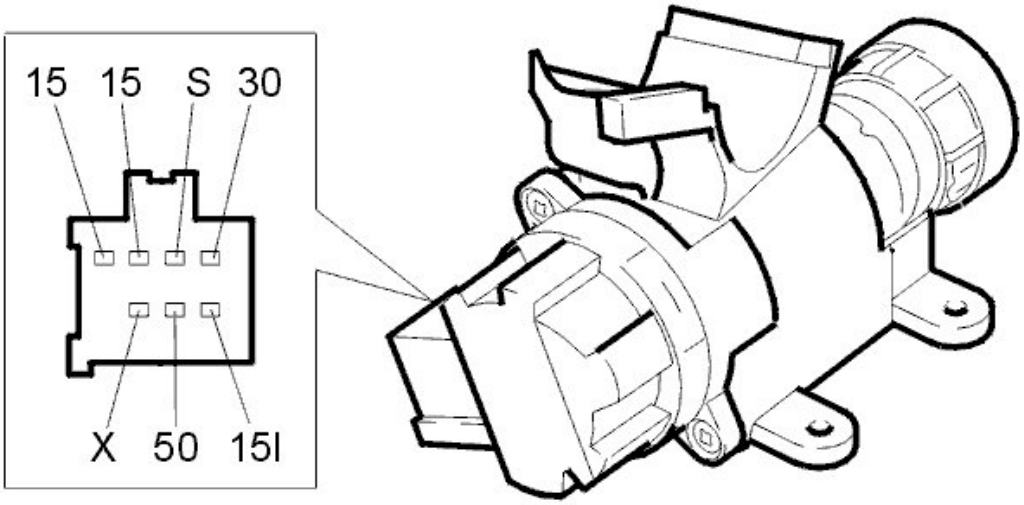
- Ignition off.

Check the cable between central electronic module (CEM) connector terminal #D8 and the ignition switch X-supply (terminal #6). Check for a short-circuit to supply voltage.
The voltage must be 0 V if the key is in position 0 or III.

Hint: For the intermediate junction point and fuses, see the relevant Wiring diagram.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Were any faults found in the cable?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

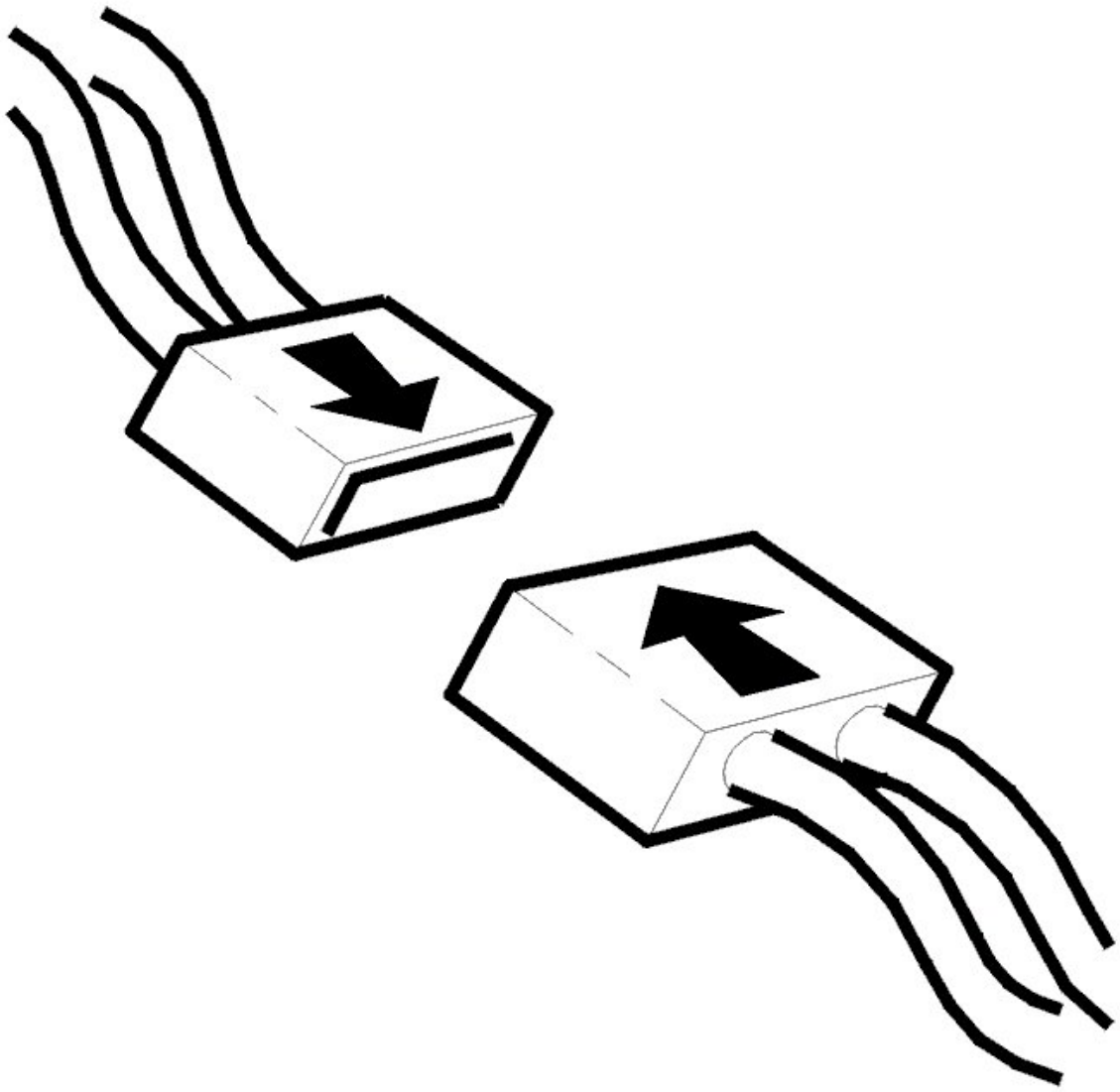
Continue - Verification

Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.



- Ignition off.
- Connect connectors, install components, etc.
- Key in position III.

Check that X-voltage is OK.

Is voltage on the wire low?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

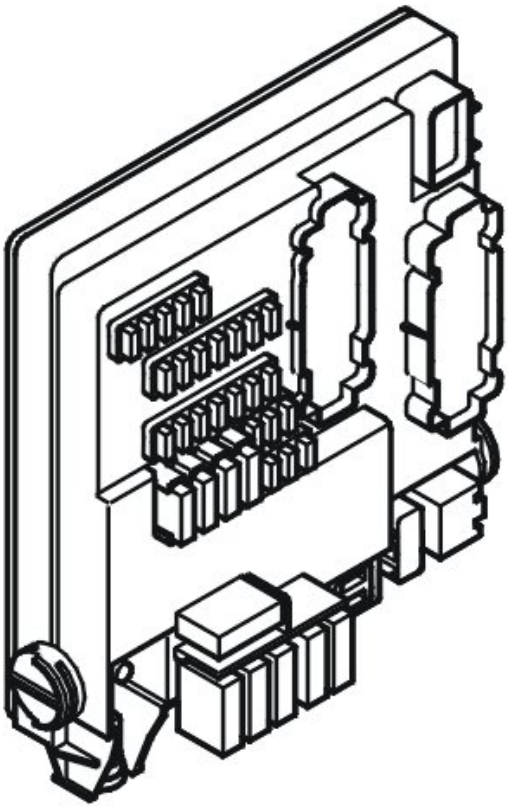
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A5A

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the rear electronic module (REM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to rear electronic module (REM)
- Open-circuit in the ground lead for the rear electronic module (REM)

- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the rear electronic module (REM)
- The rear electronic module (REM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- The fuel gauge indicates zero even though there is fuel in the tank.
- Rear demist does not operate.
- Retractable headrest not operating.
- The central locking system does not function at all.
- No unlocking of the trunk lid.

Signal Missing

Signal missing

Checking the power supply and ground for the rear electronic module (REM)

Check that the fuse for the Rear electronic module (REM) is intact.
Check the power supply and ground for the rear electronic module (REM) as follows.

Other information:
- Checking the supply voltage/ground terminal See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Supply Voltage/Ground Terminal, Rear Electronic Module (REM)
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the rear electronic module (REM)

No - Checking communication with the rear electronic module (REM)

Checking communication with the rear electronic module (REM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the rear electronic module (REM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.

CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

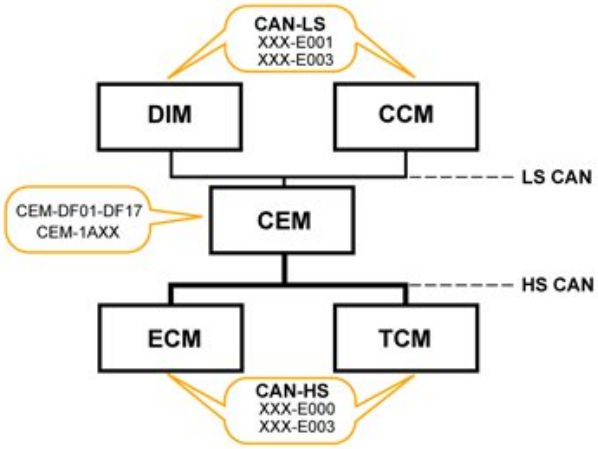
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

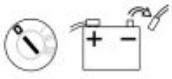
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.

- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

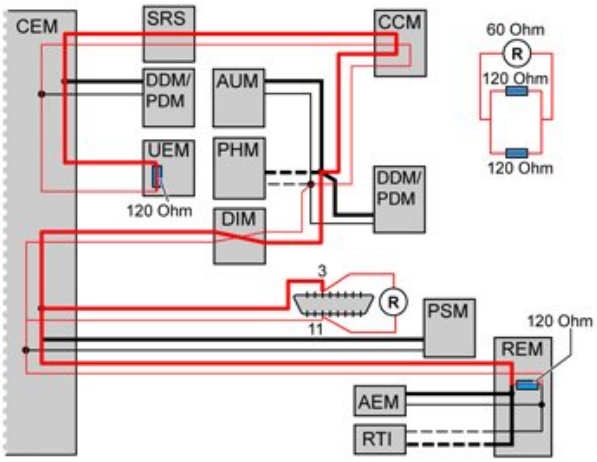
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

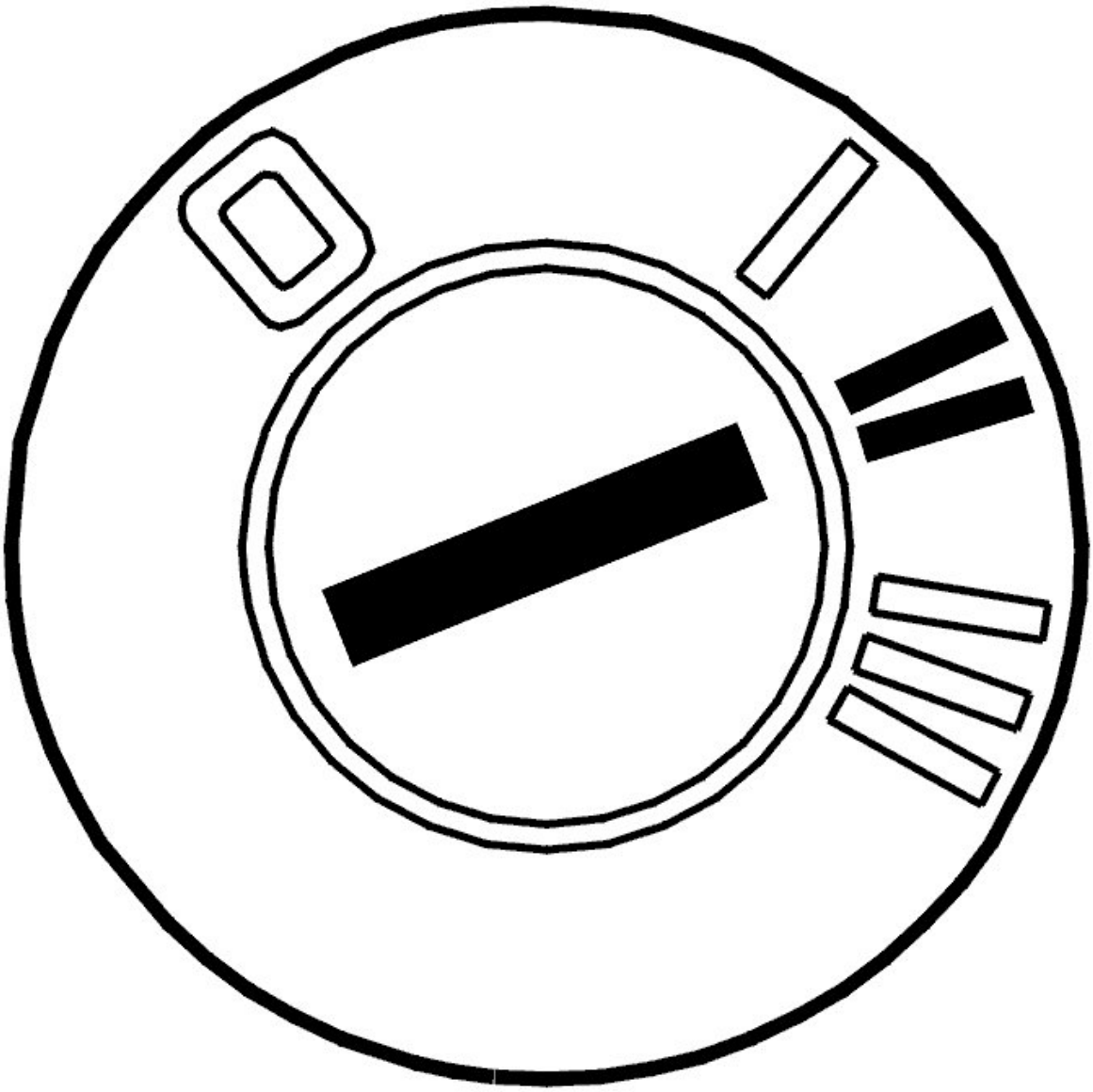


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

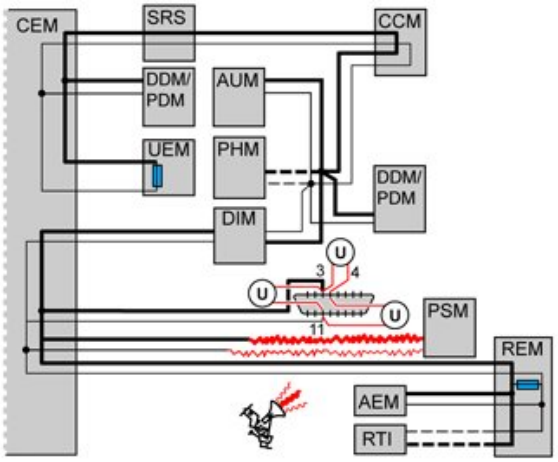
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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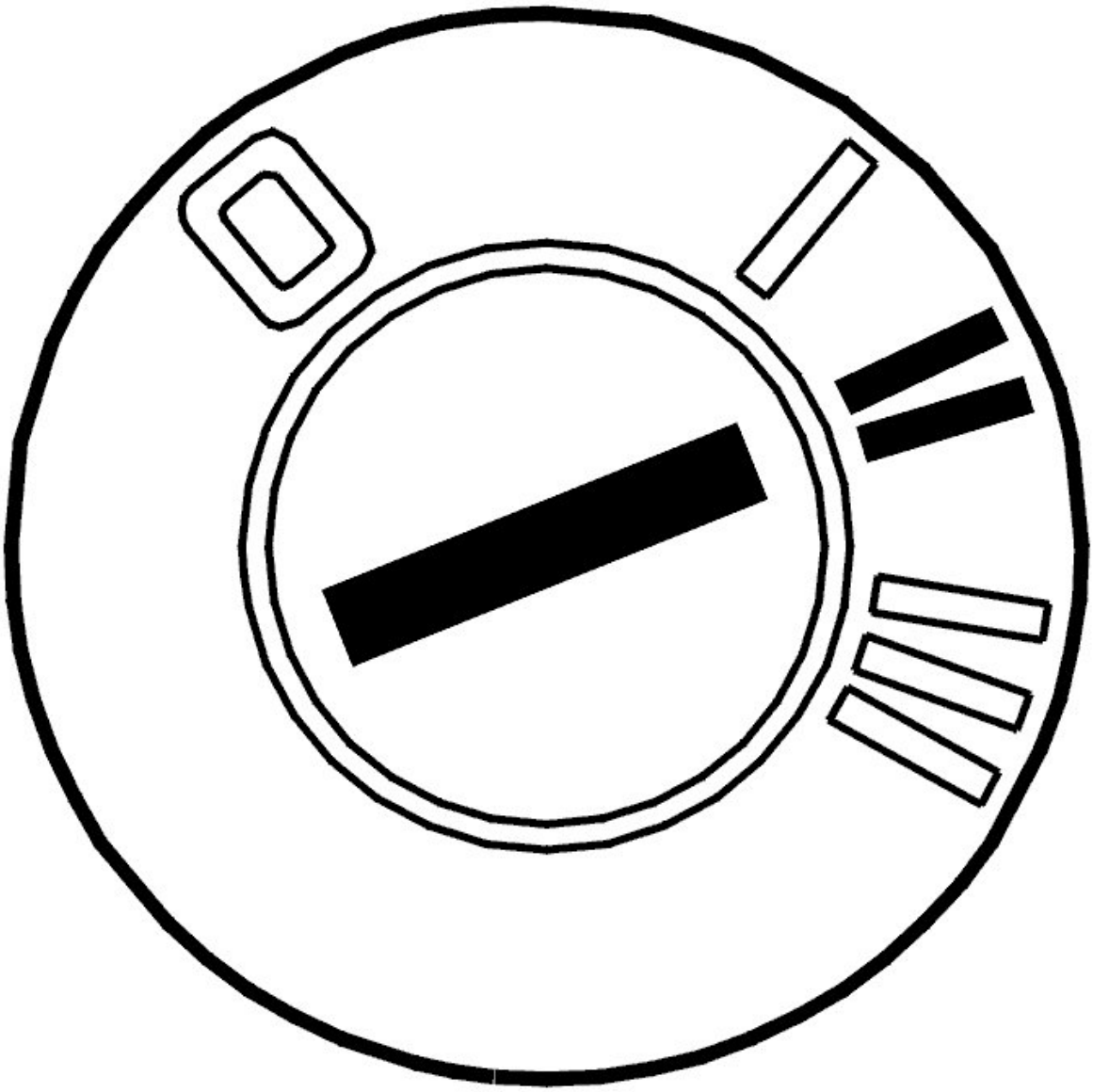
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

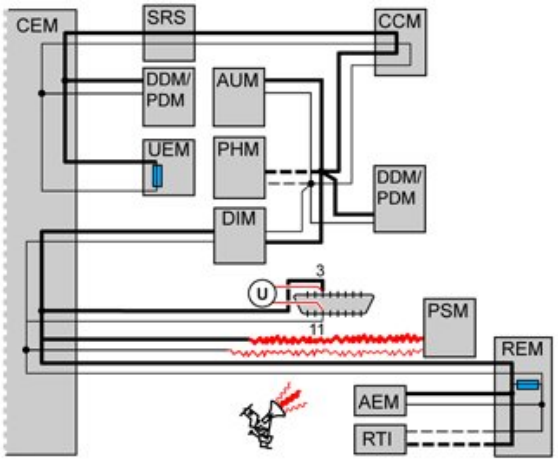
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

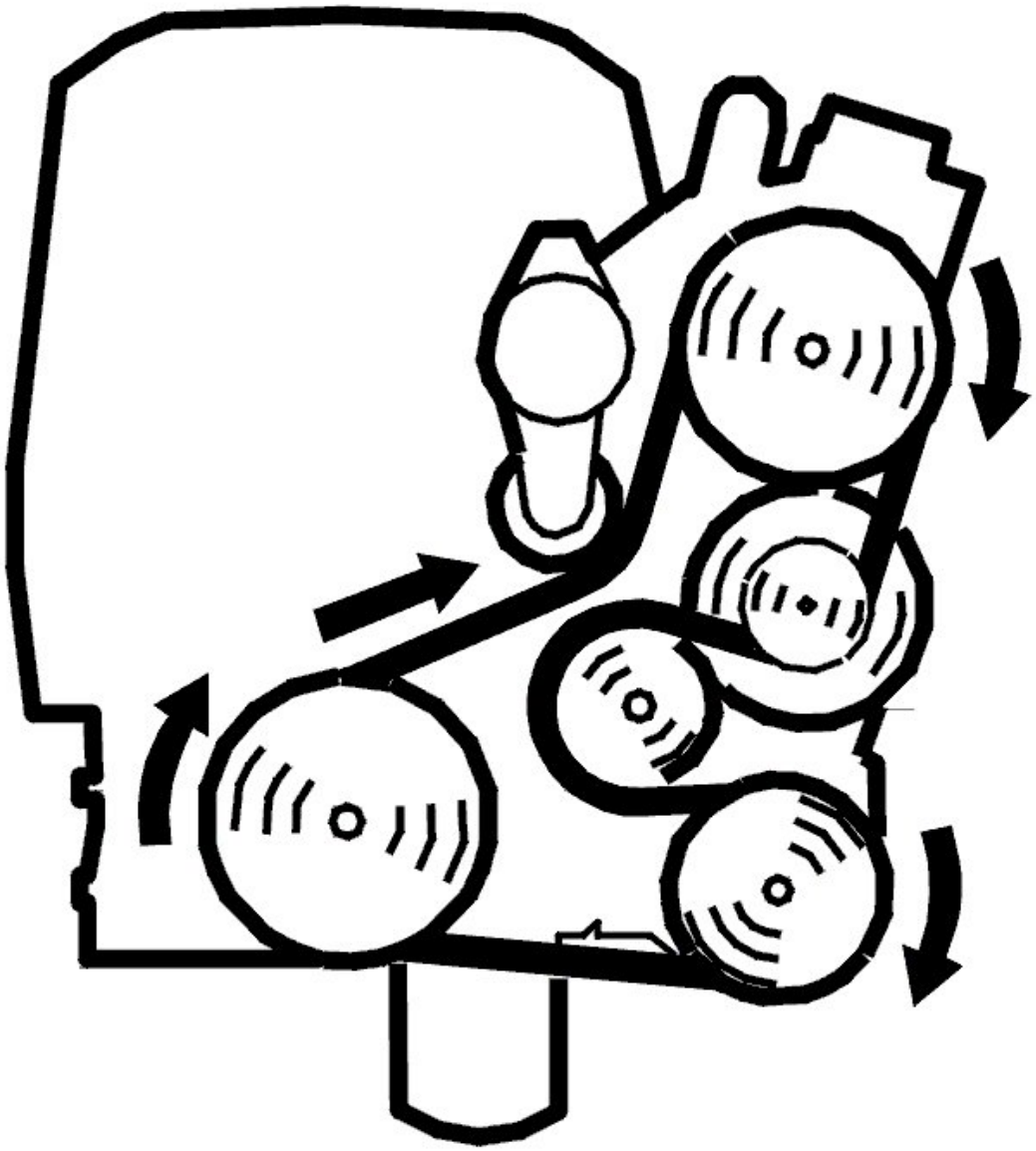
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

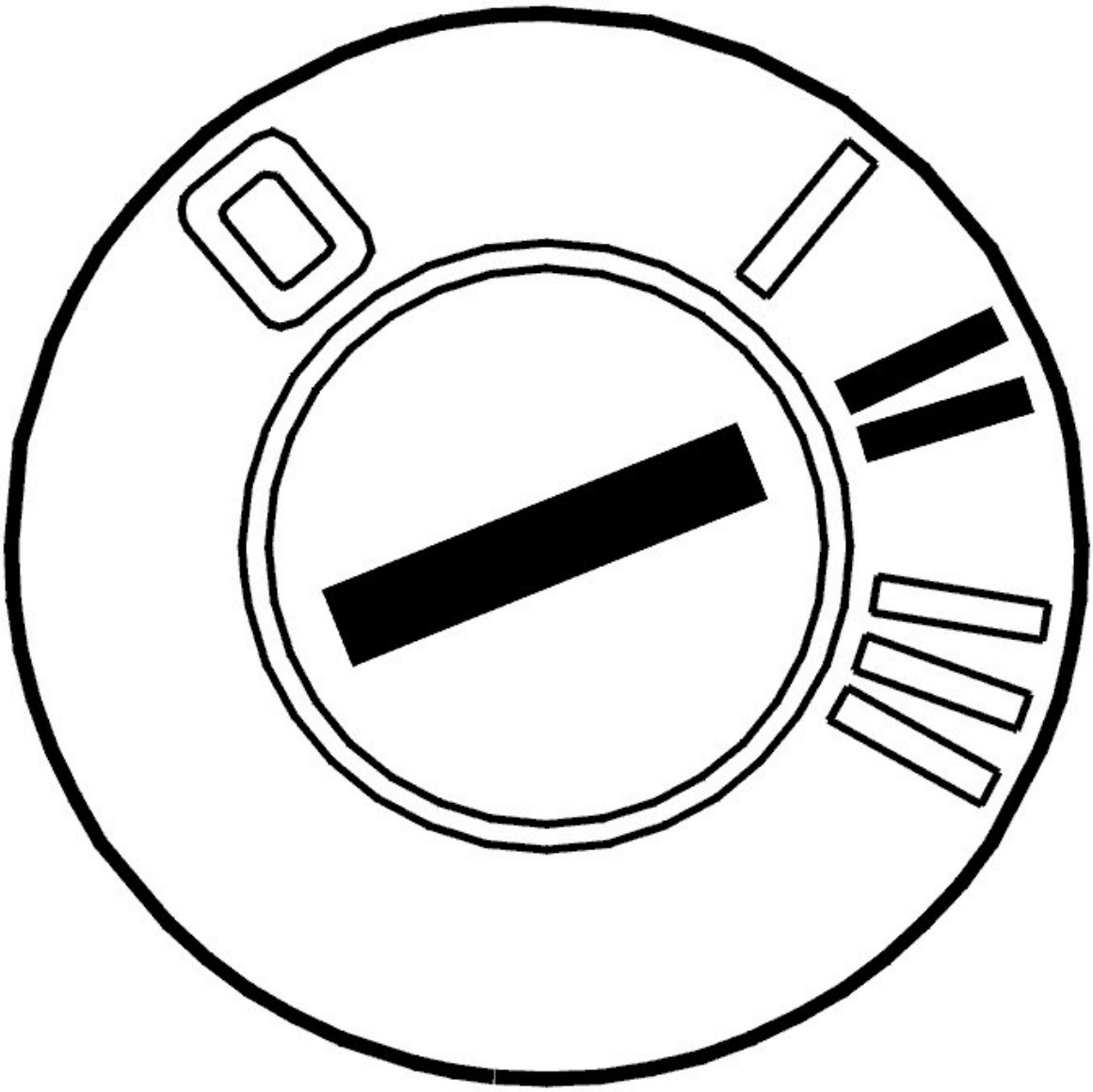


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

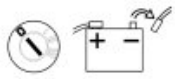
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

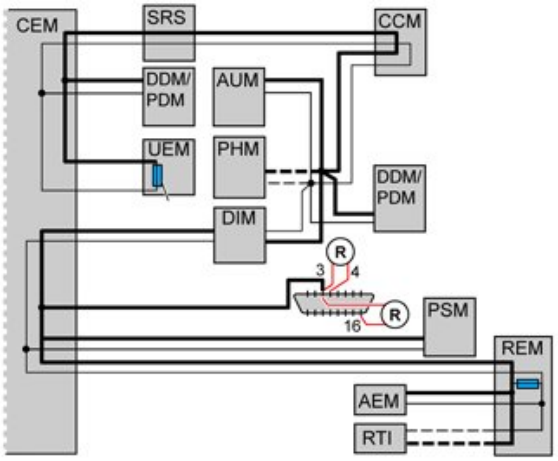
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

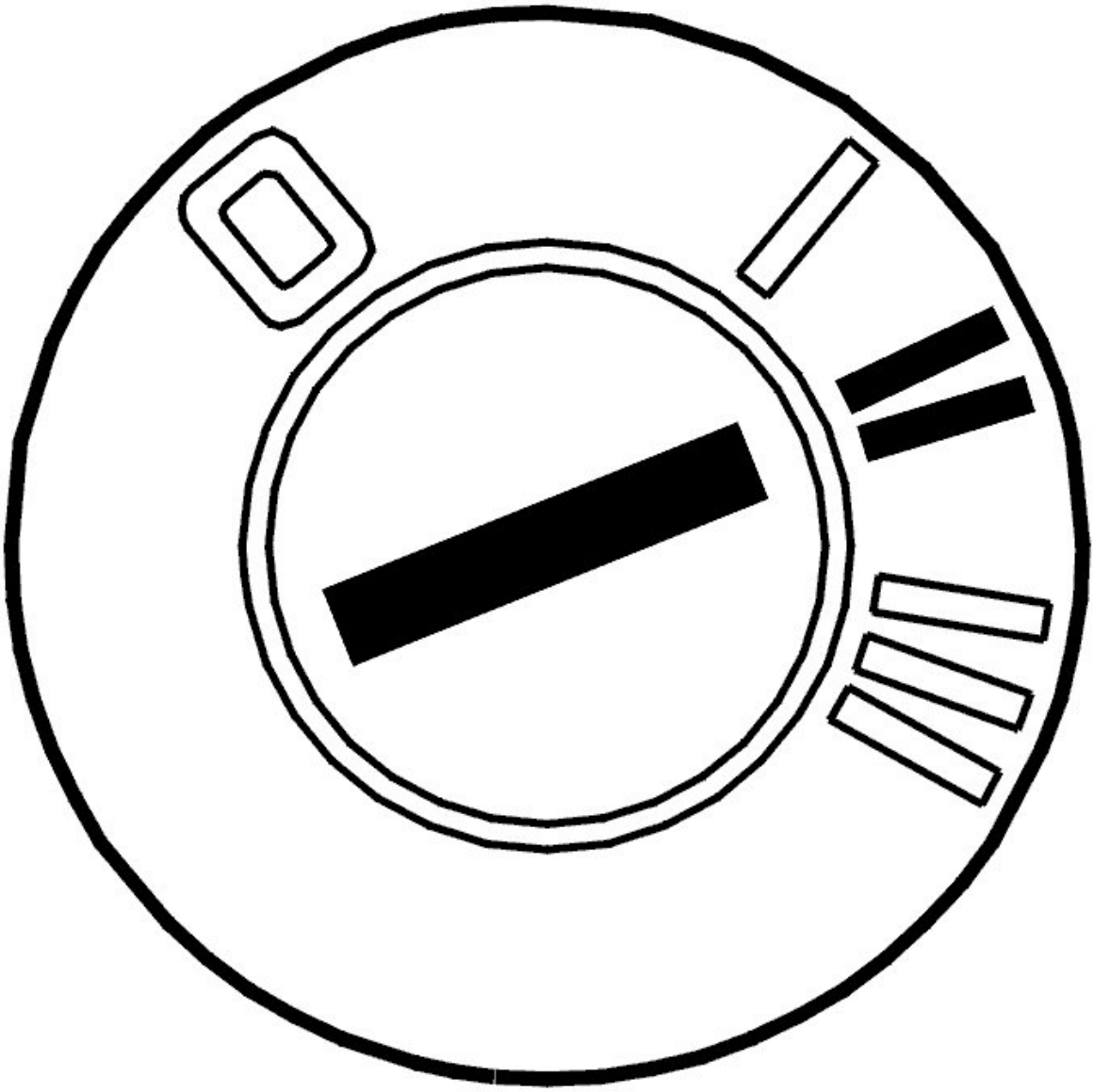


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

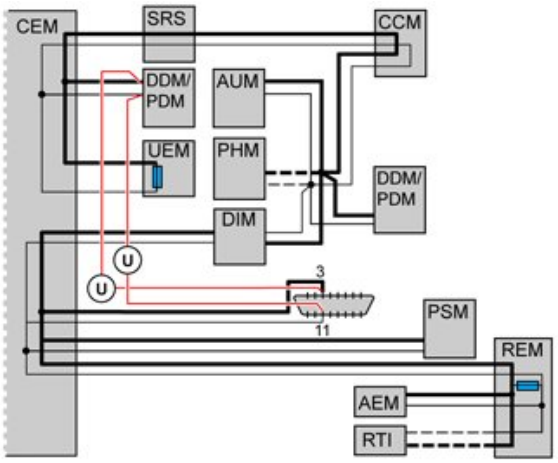
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

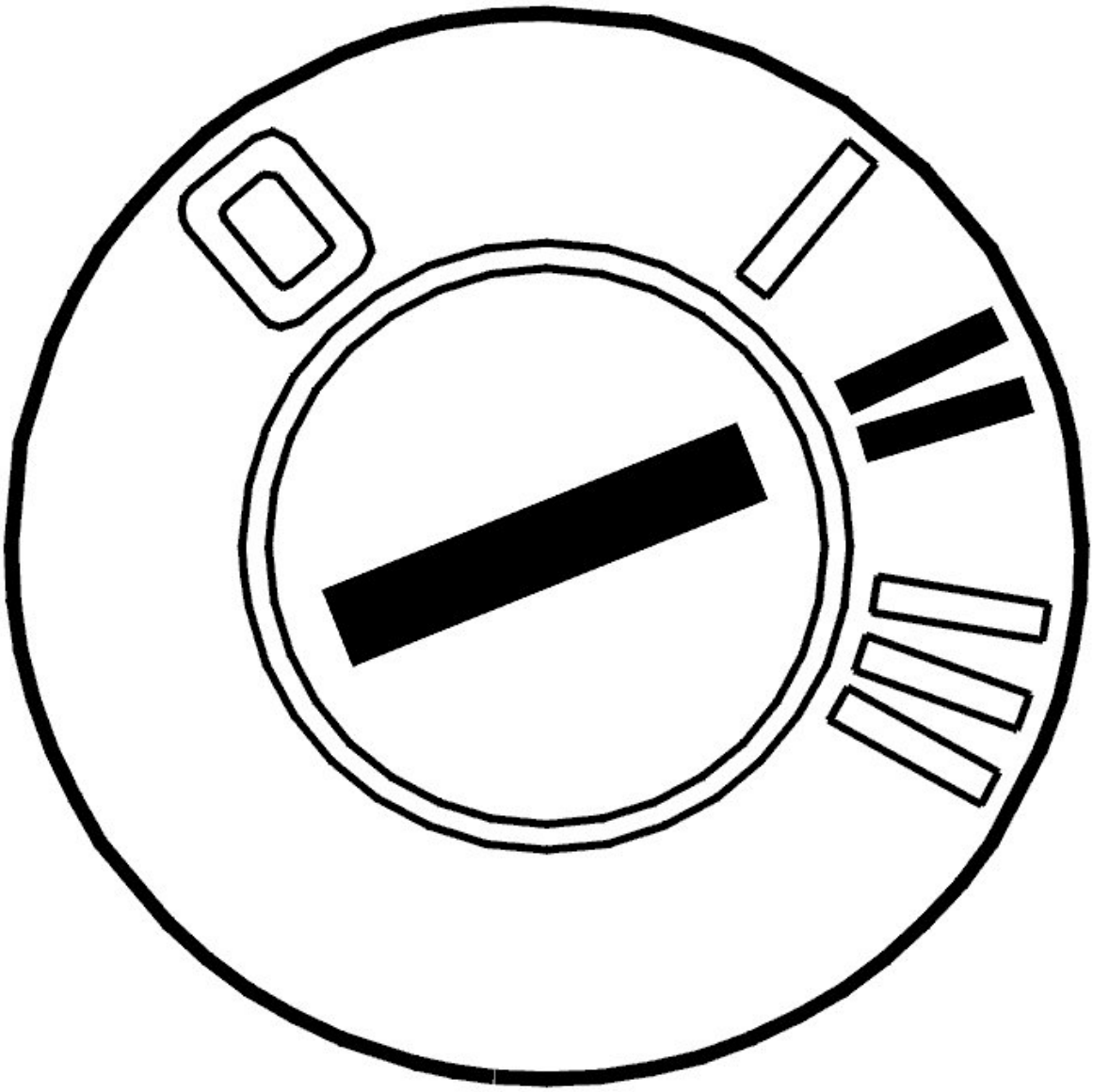
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

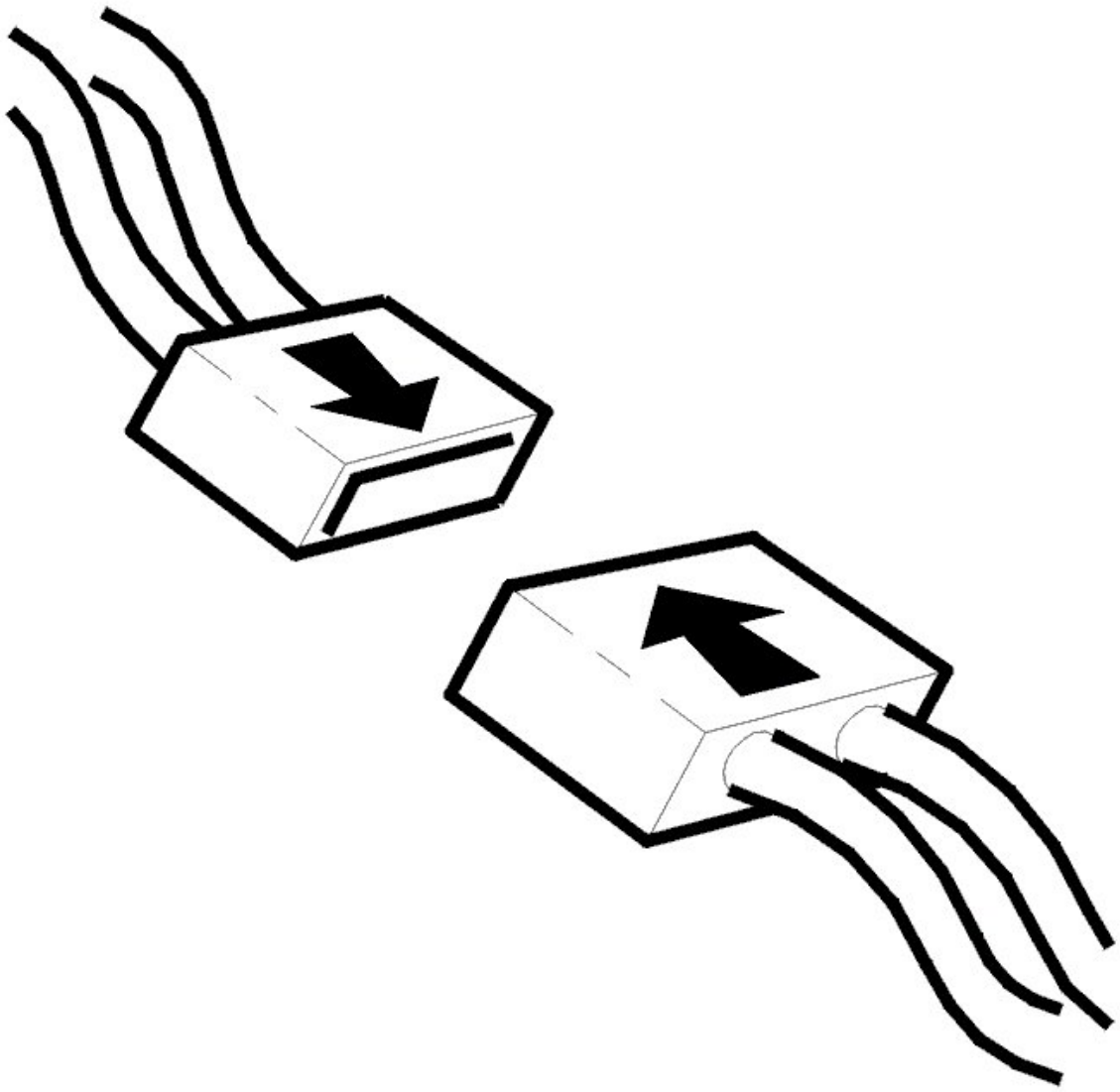


Continue - Verification

Checking the function of the rear electronic module (REM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply and the ground for the rear electronic module (REM) by switching on the rear fog lamp using the button on the dashboard. If the central electronic module (CEM) is definitely powered, the power supply for the rear electronic module (REM) can also be checked by pressing the brake pedal. The stop lamp must then light.

- Try to communicate with the rear electronic module (REM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Can the control module ID be read out?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

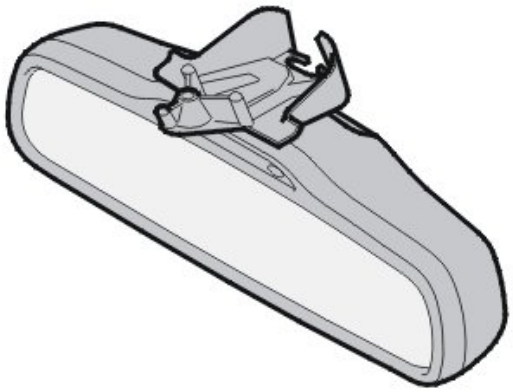
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the rear electronic module (REM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A5C

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the upper electronic module (UEM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to the upper electronic module (UEM)
- Open-circuit in the ground lead for the upper electronic module (UEM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the upper electronic module (UEM)
- The upper electronic module (UEM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the wiring diagram.

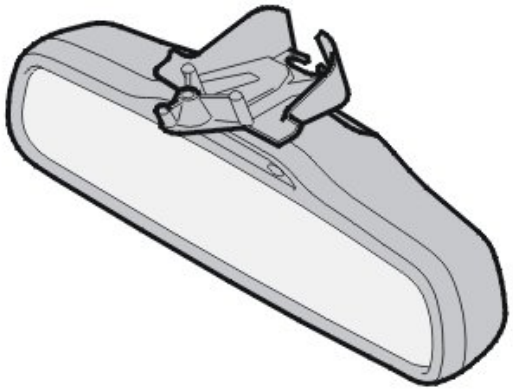
Fault symptom[s]
- SRS warning light on
- Cannot be controlled with the remote control.
- The power sun roof does not operate.
- The interior lighting does not work.

Signal Missing

Signal missing

Checking the function of the upper electronic module (UEM)

Check that the upper electronic module (UEM) is powered by switching on one of the rear reading lamps.



Does one of the rear reading lamps light?

Yes - Checking communication with the upper electronic module (UEM)

No - Checking the power supply and ground for the upper electronic module (UEM)

Checking the power supply and ground for the upper electronic module (UEM)

Check that the fuse for the control module is intact.
For further information about the fuse and terminal pin numbers, see the applicable wiring diagram.
Check the power supply and ground for the upper electronic module (UEM) as follows.
Remedy as necessary.

Other information:

- Checking the ground terminal See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Ground Terminal for the Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the upper electronic module (UEM)

No - Signal missing

Checking communication with the upper electronic module (UEM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the upper electronic module (UEM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

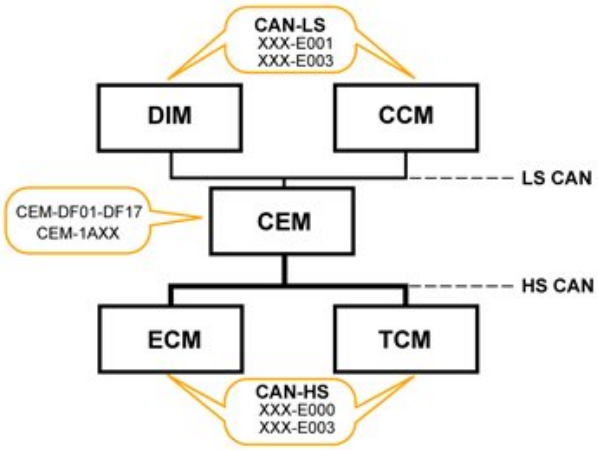
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

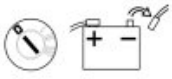
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

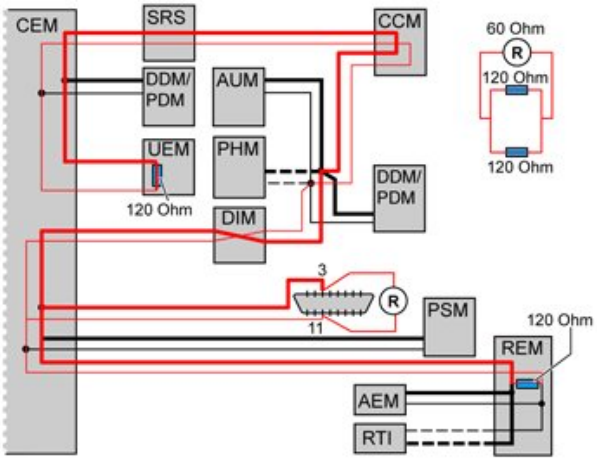
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

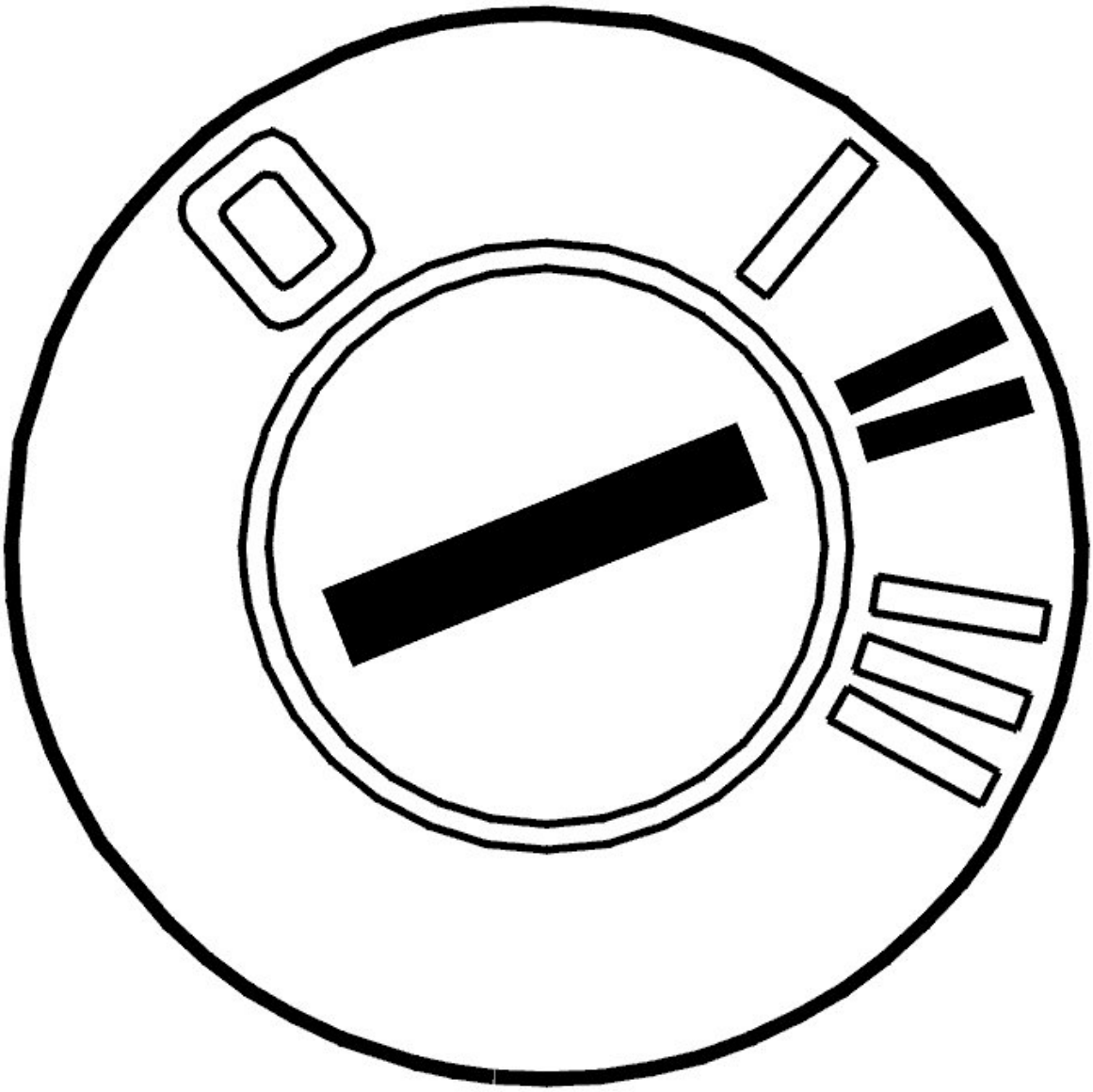


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

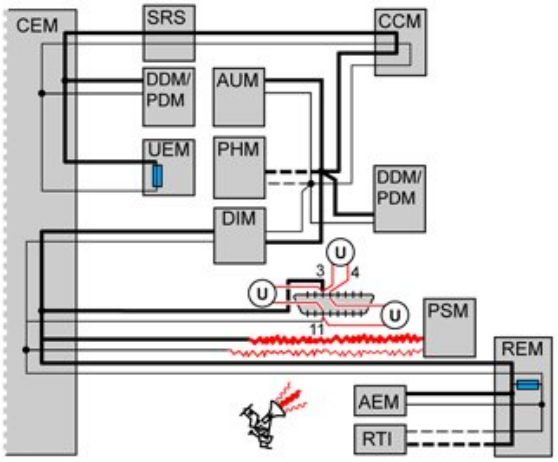
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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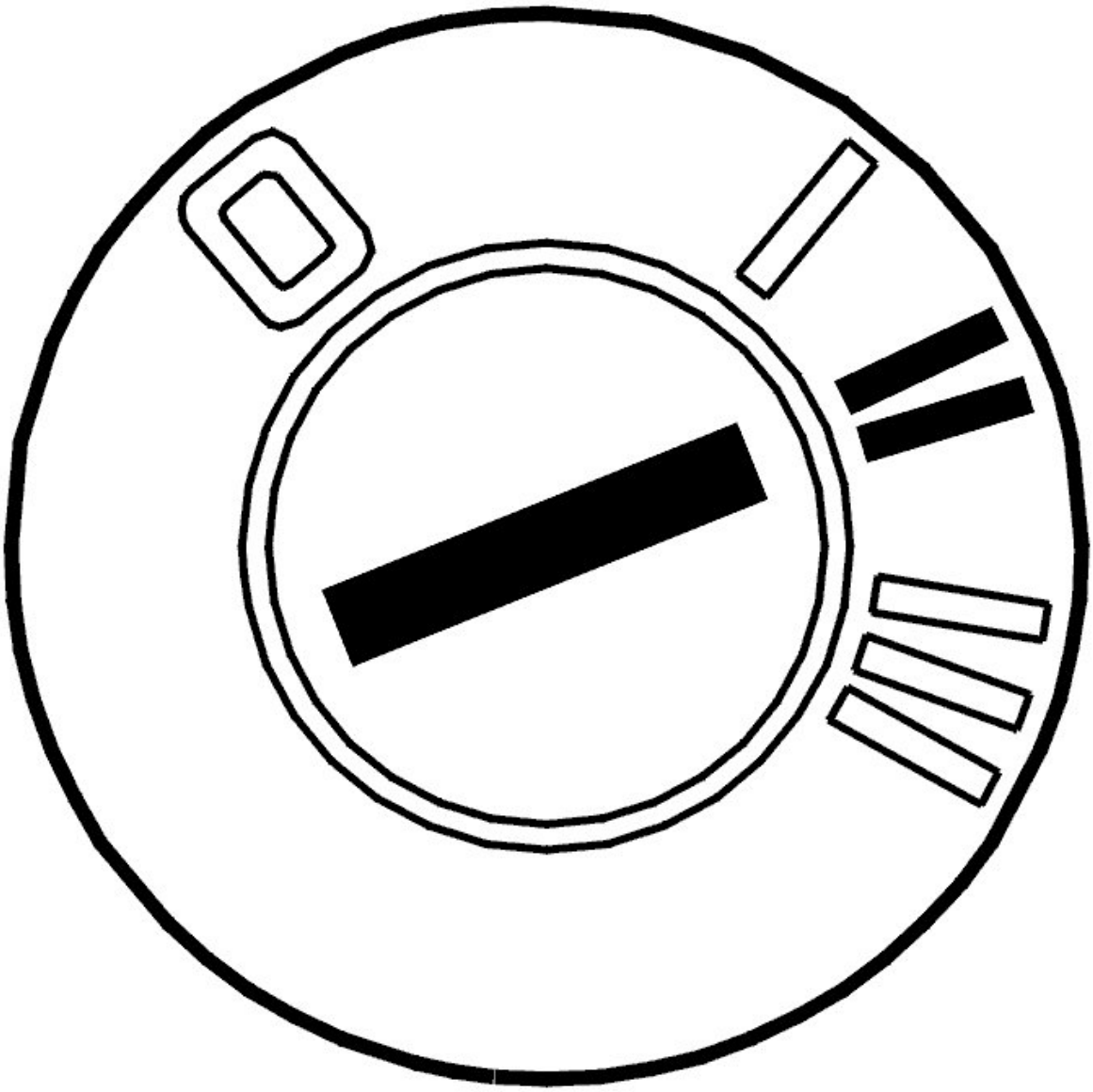
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

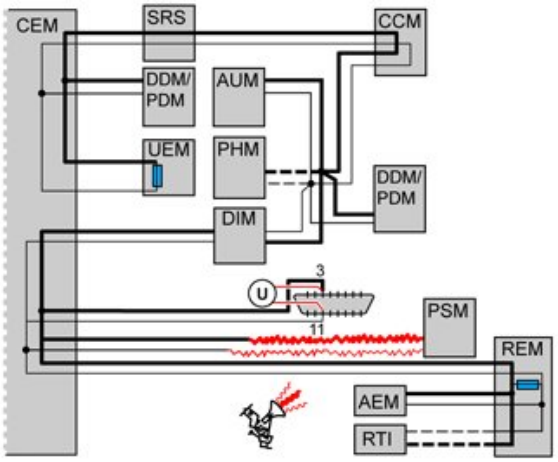
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

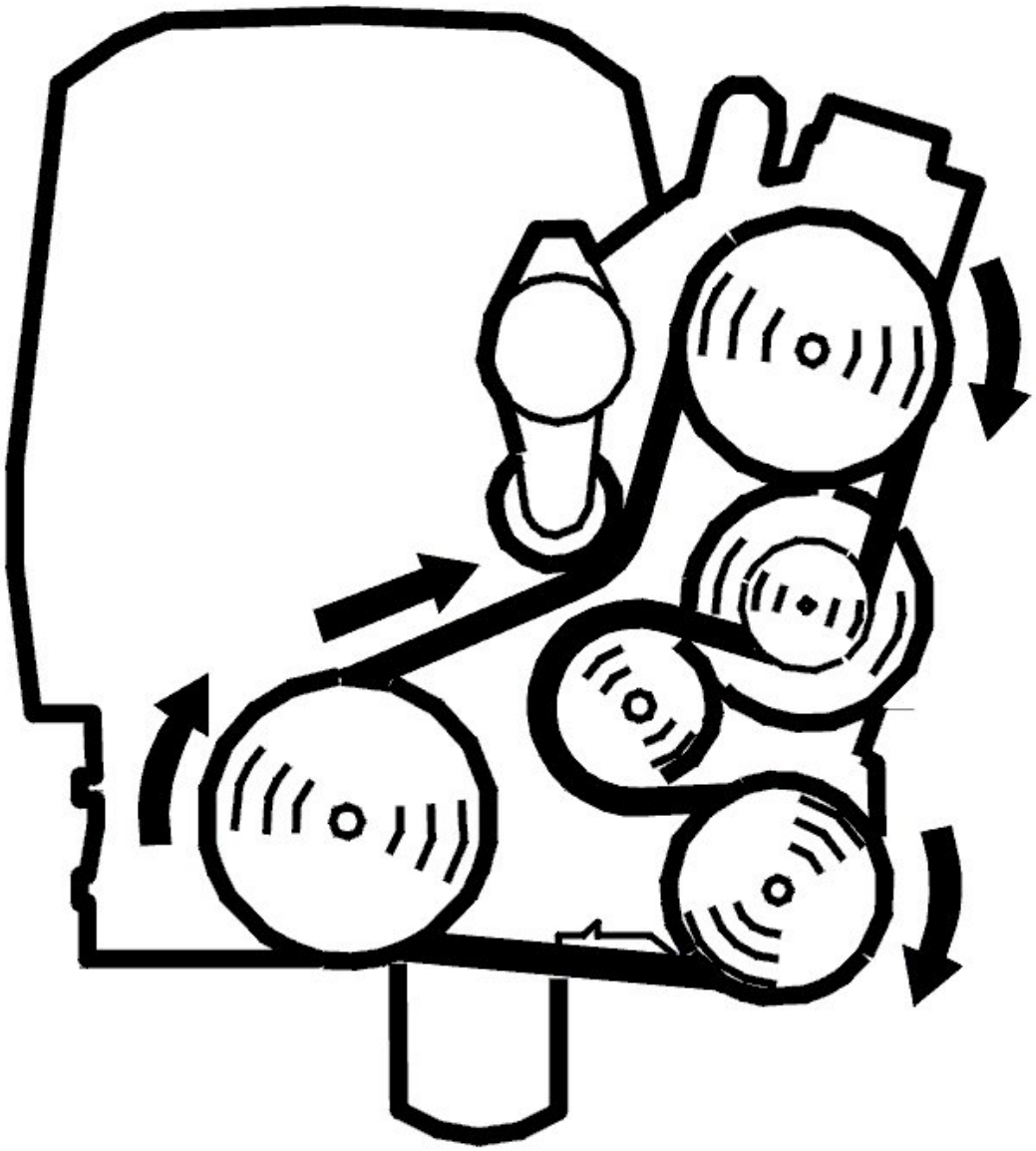
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

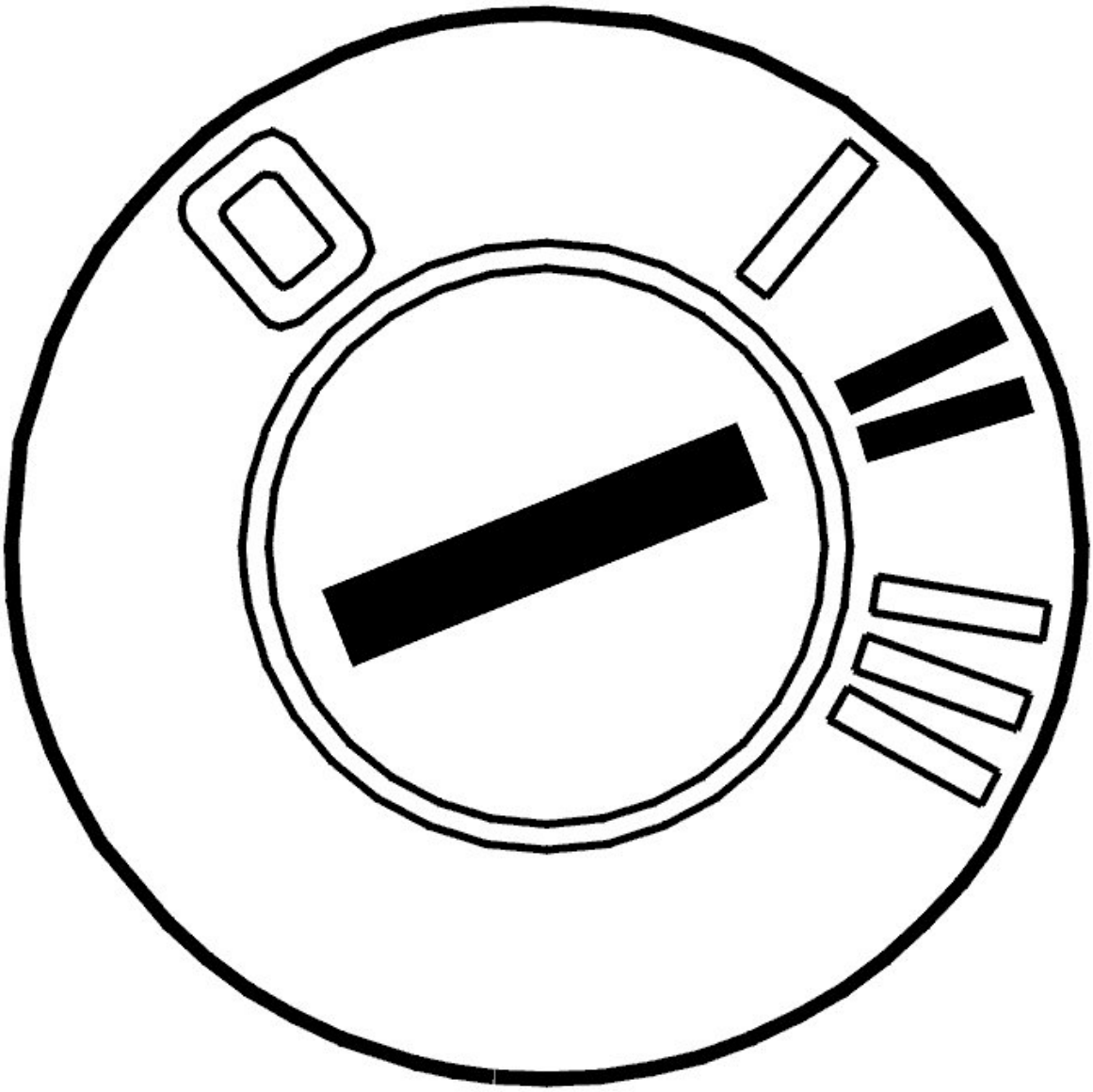


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

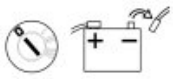
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

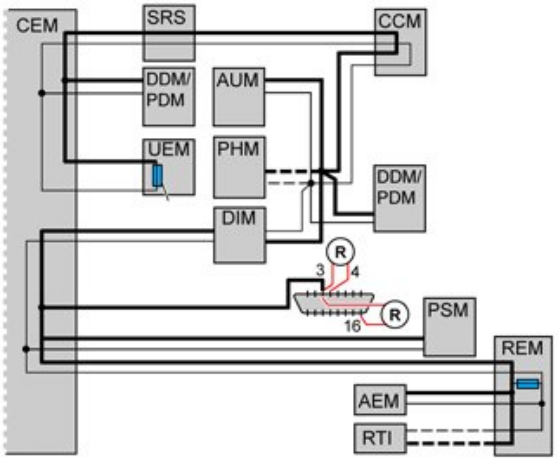
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

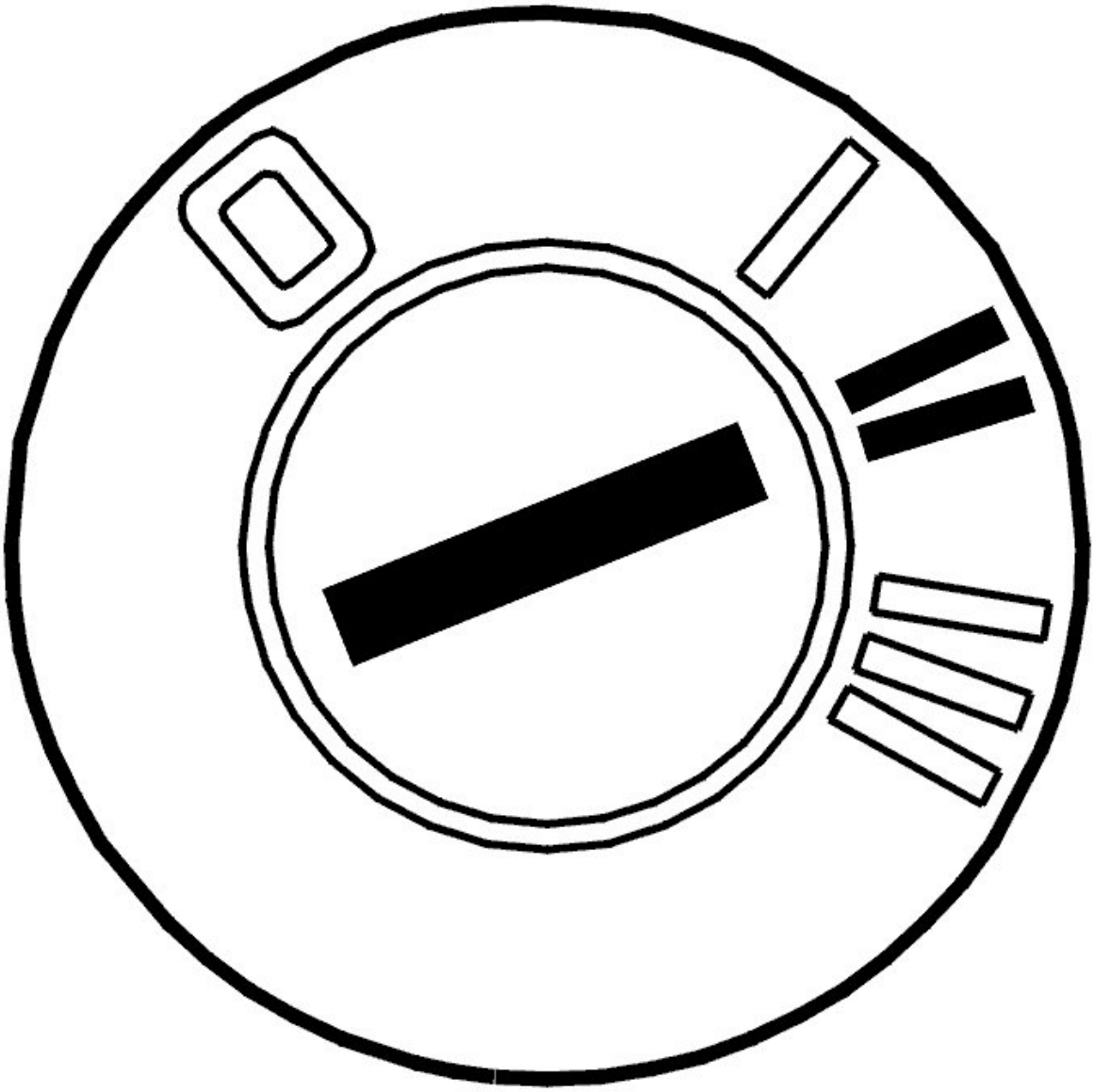


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

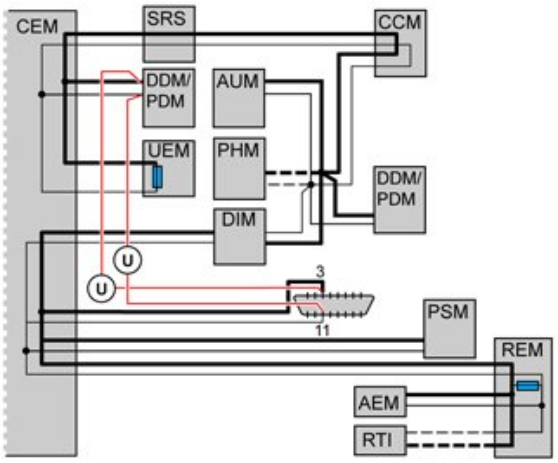
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

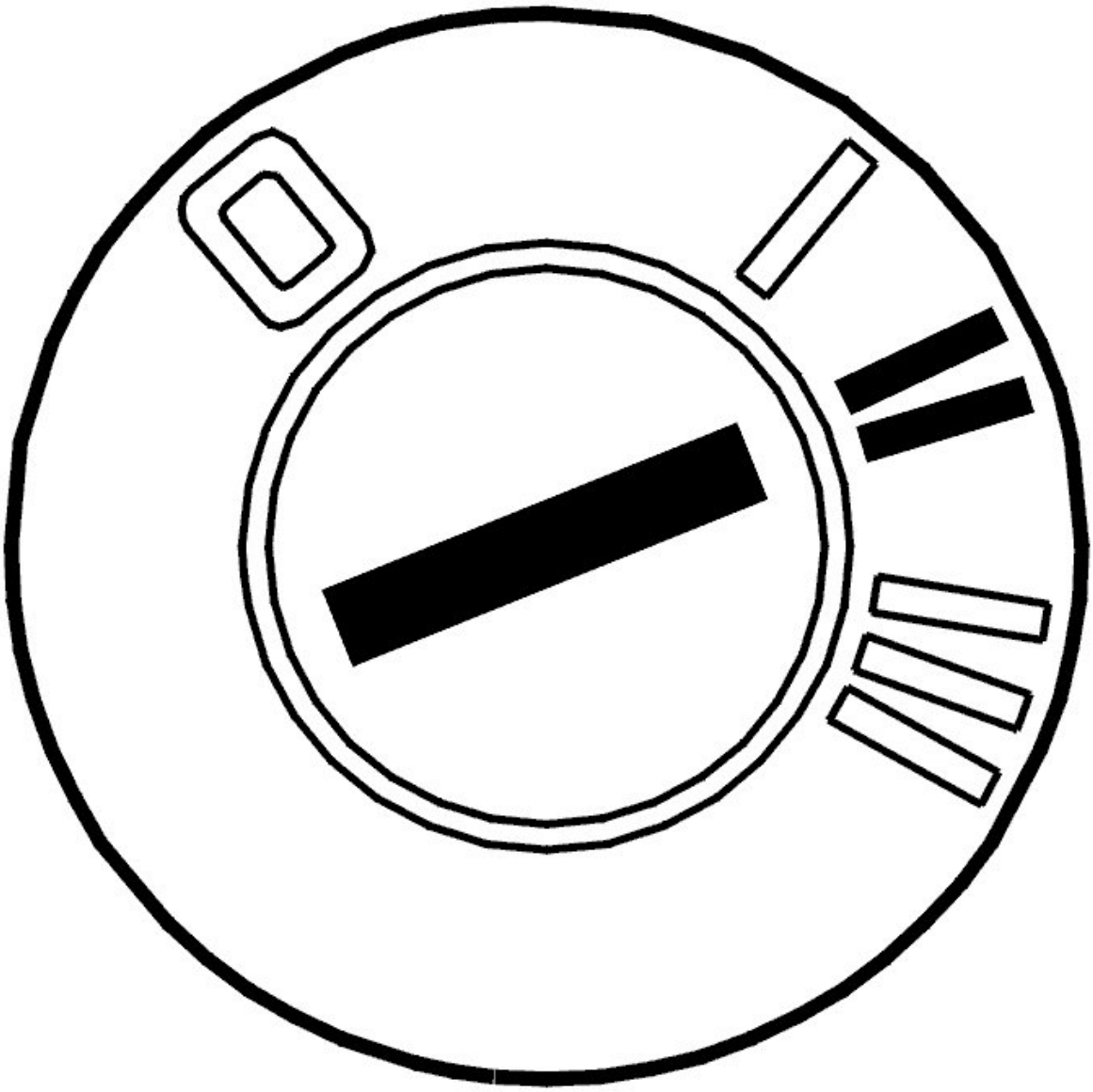
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

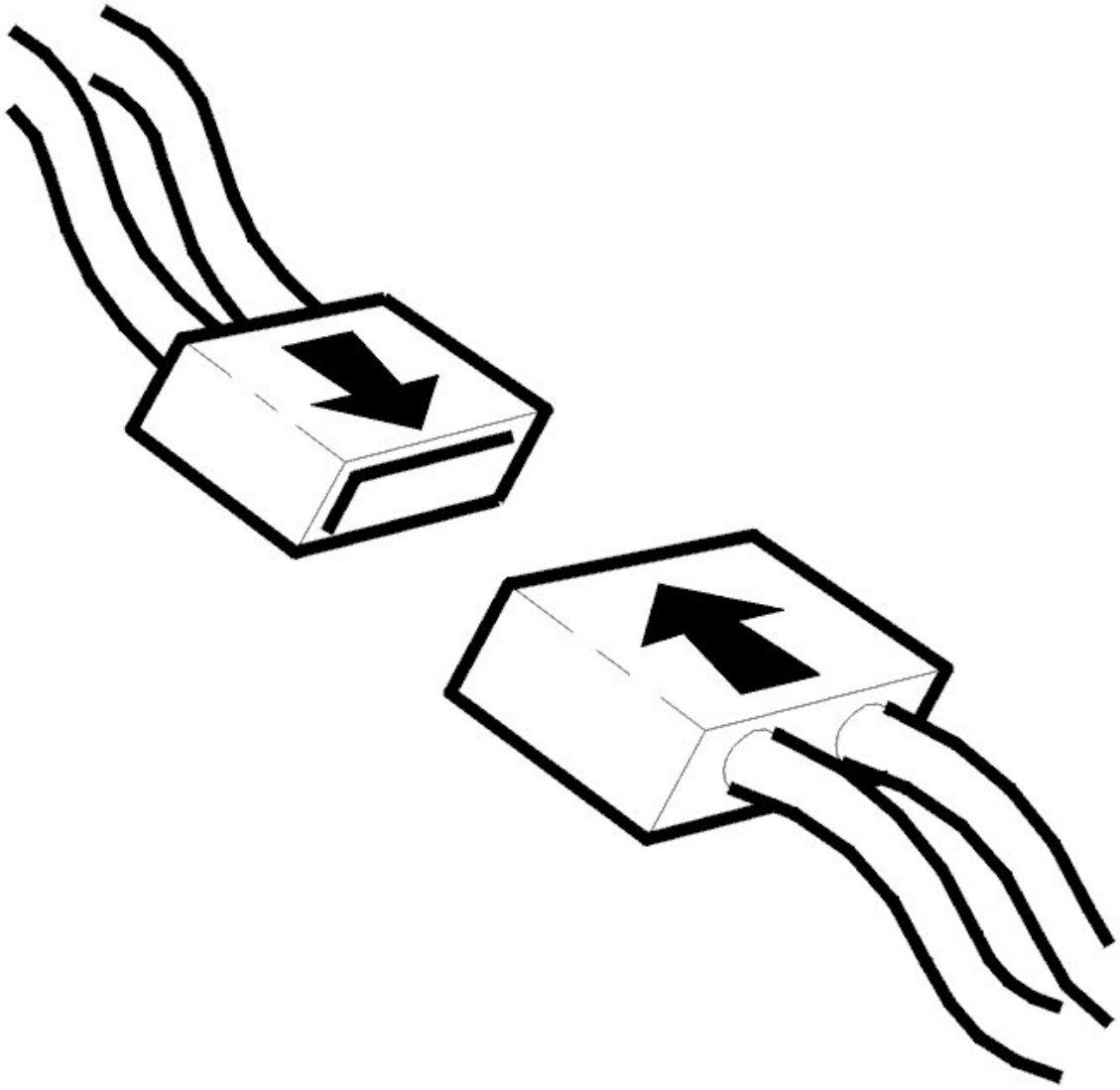


Continue - Verification

Checking the function of the upper electronic module (UEM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check that the upper electronic module (UEM) is powered by switching on one of the rear reading lamps.

Does one of the rear reading lamps light?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT-TRACING FAILED - FAULT-TRACING FAILED

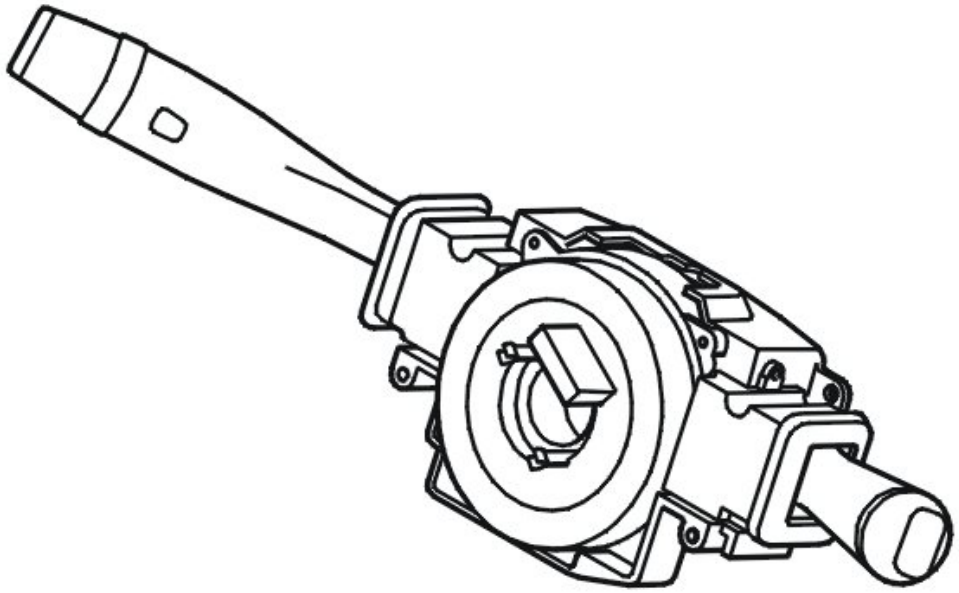
- Checking the power supply and ground for the upper electronic module (UEM)

Attempt New Test - Checking the function of the upper electronic module (UEM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A5E

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the steering wheel angle sensor module (SAS) is not operating.
The steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN)!

Substitute value
- None.

Possible source
- No power supply to the steering wheel module (SWM)
- Open-circuit in the ground lead for the steering wheel module (SWM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the steering wheel angle sensor module (SAS)
- The steering wheel module (SWM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the controller area network (CAN). See the wiring diagram.

Fault symptom[s]
- No stability function.

- Message in the display.

Signal Missing

Signal missing

Checking the power supply and ground for the steering wheel module (SWM)

Note! Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN). The brake control module (BCM) will store a diagnostic trouble code (DTC) if the communication between the brake control module (BCM) and the steering wheel angle sensor module (SAS) has been interrupted. DSTC will not be activated after a fault in the system has been repaired until the vehicle reaches a speed of approximately 50 km/h.

Check that the fuse for the control module is intact.
Check the power supply and ground for the steering wheel module (SWM) as follows.
Remedy as necessary.

Other information

- Checking the voltage / ground terminal See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground, Steering Wheel Angle Sensor Module (SAS)
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the steering wheel angle sensor module (SAS)

No - Checking communication with the steering wheel angle sensor module (SAS)

Checking communication with the steering wheel angle sensor module (SAS)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the steering wheel angle sensor module (SAS) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net

listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

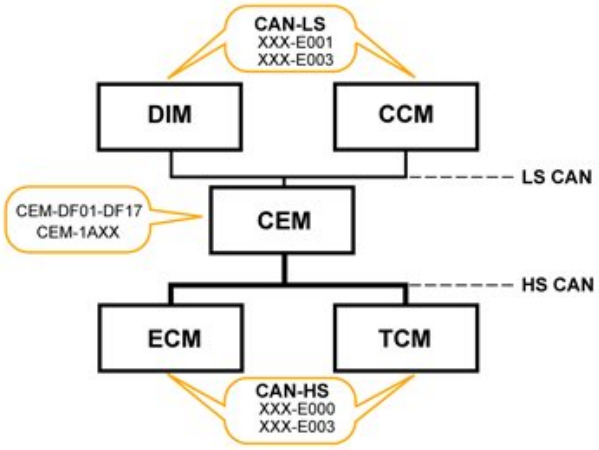
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent. Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

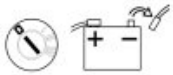
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the

resistance changes to detect intermittent short-circuits or open circuit.

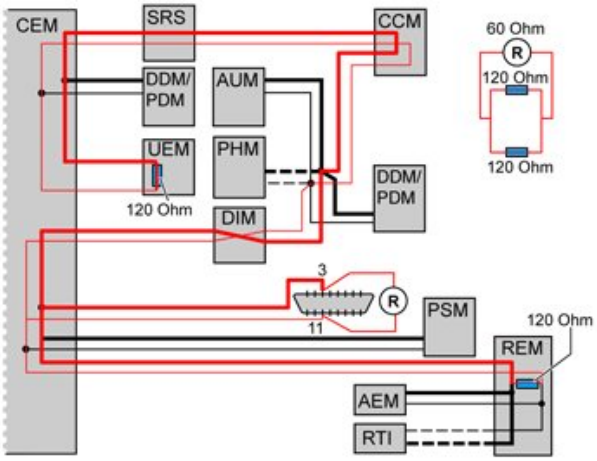
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

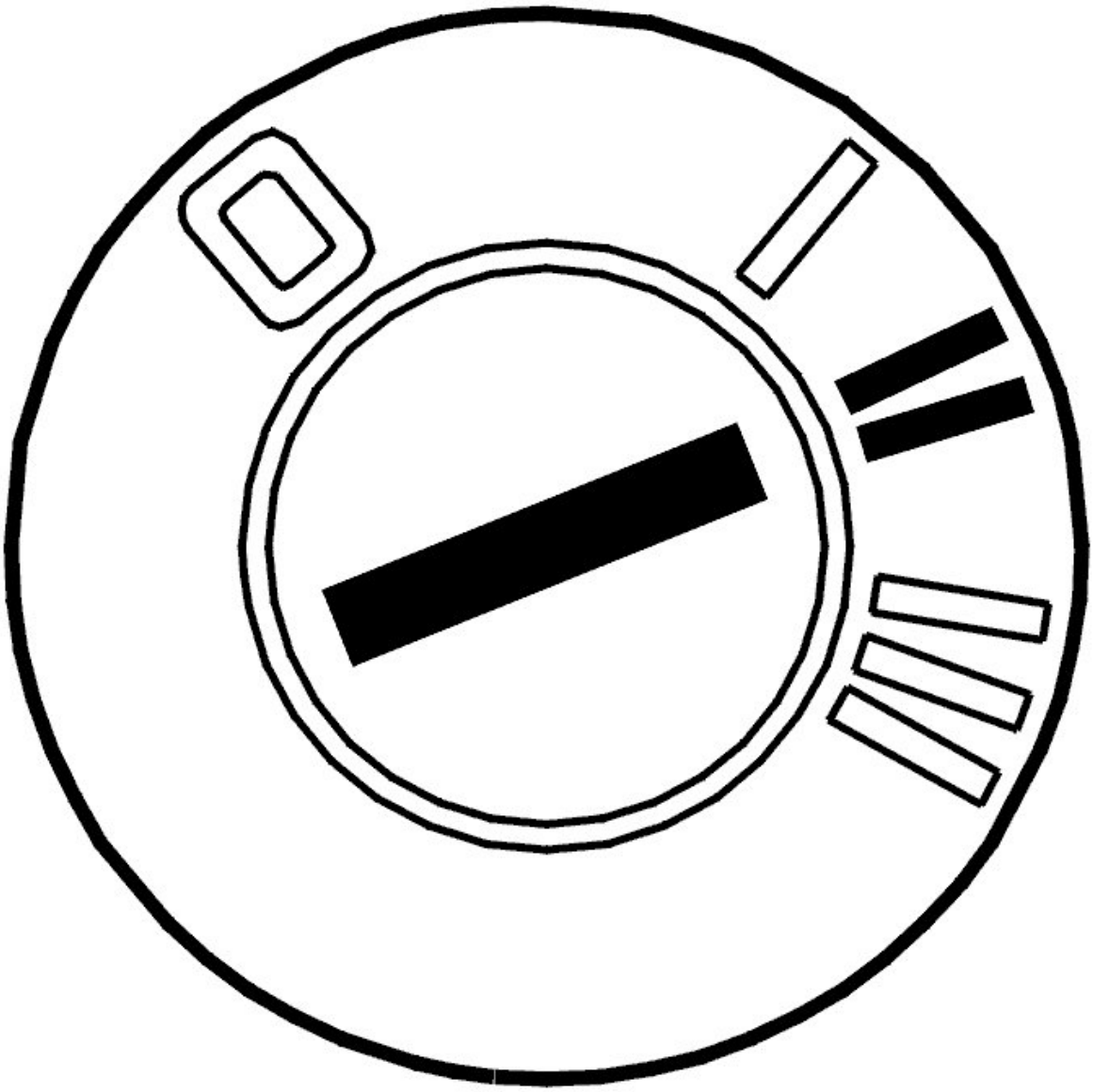


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

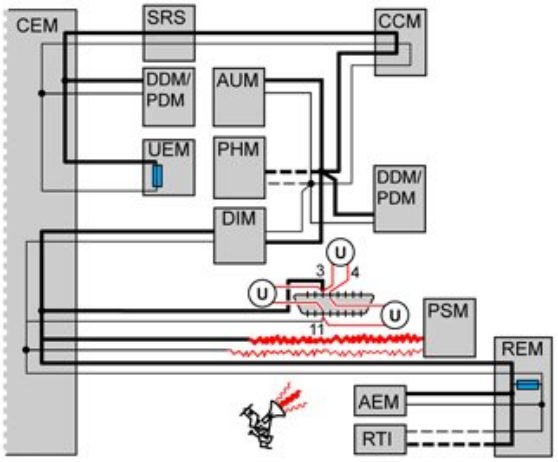
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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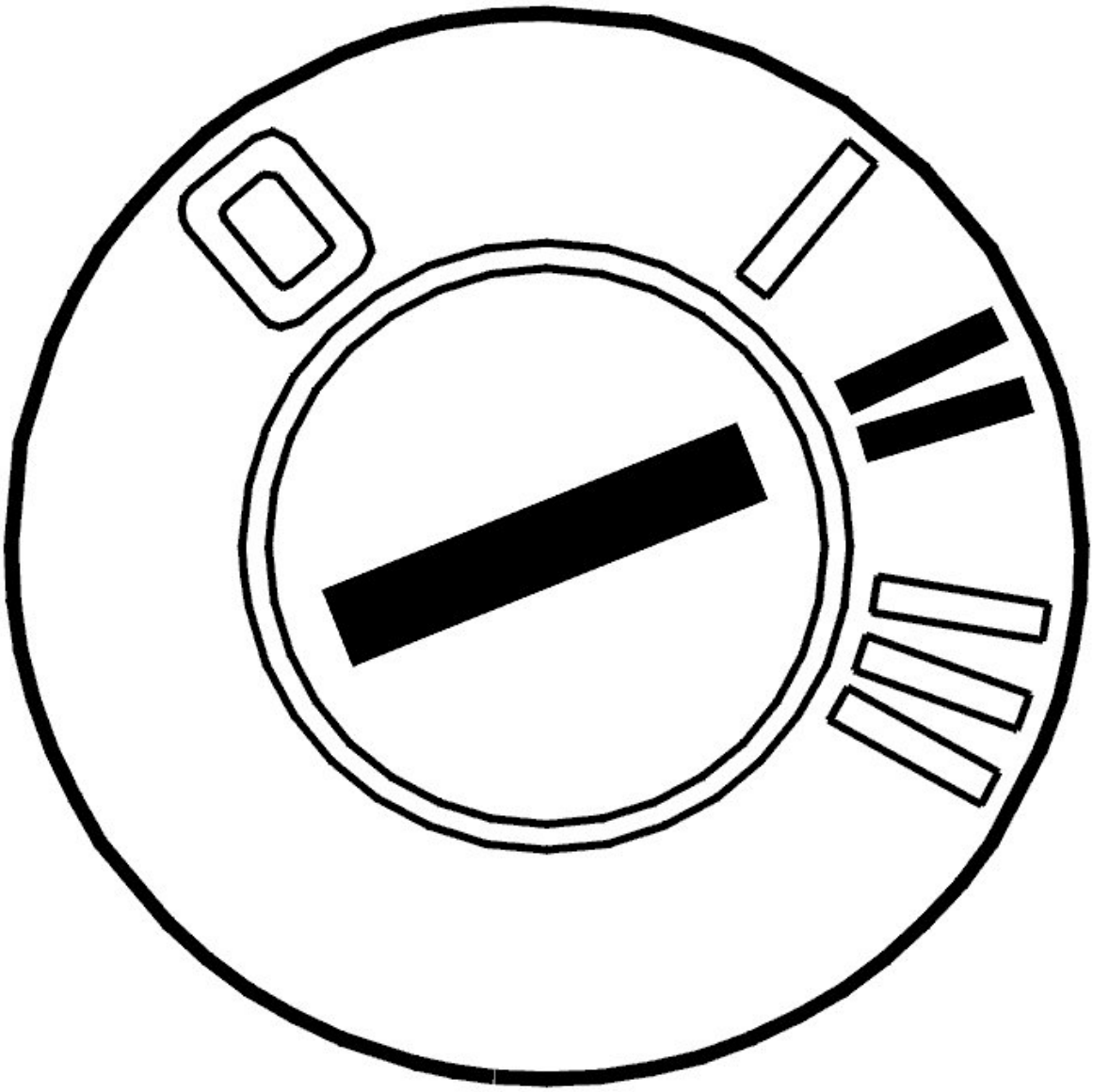
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

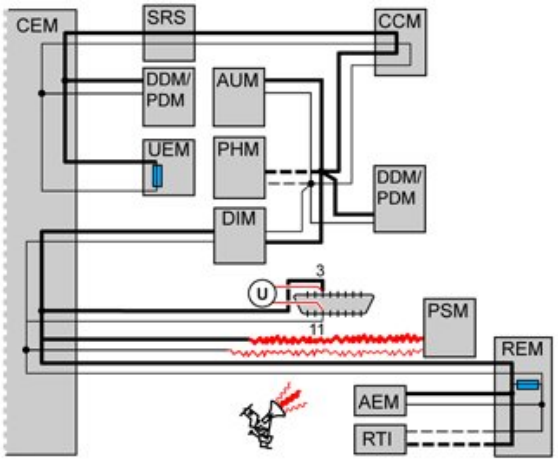
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

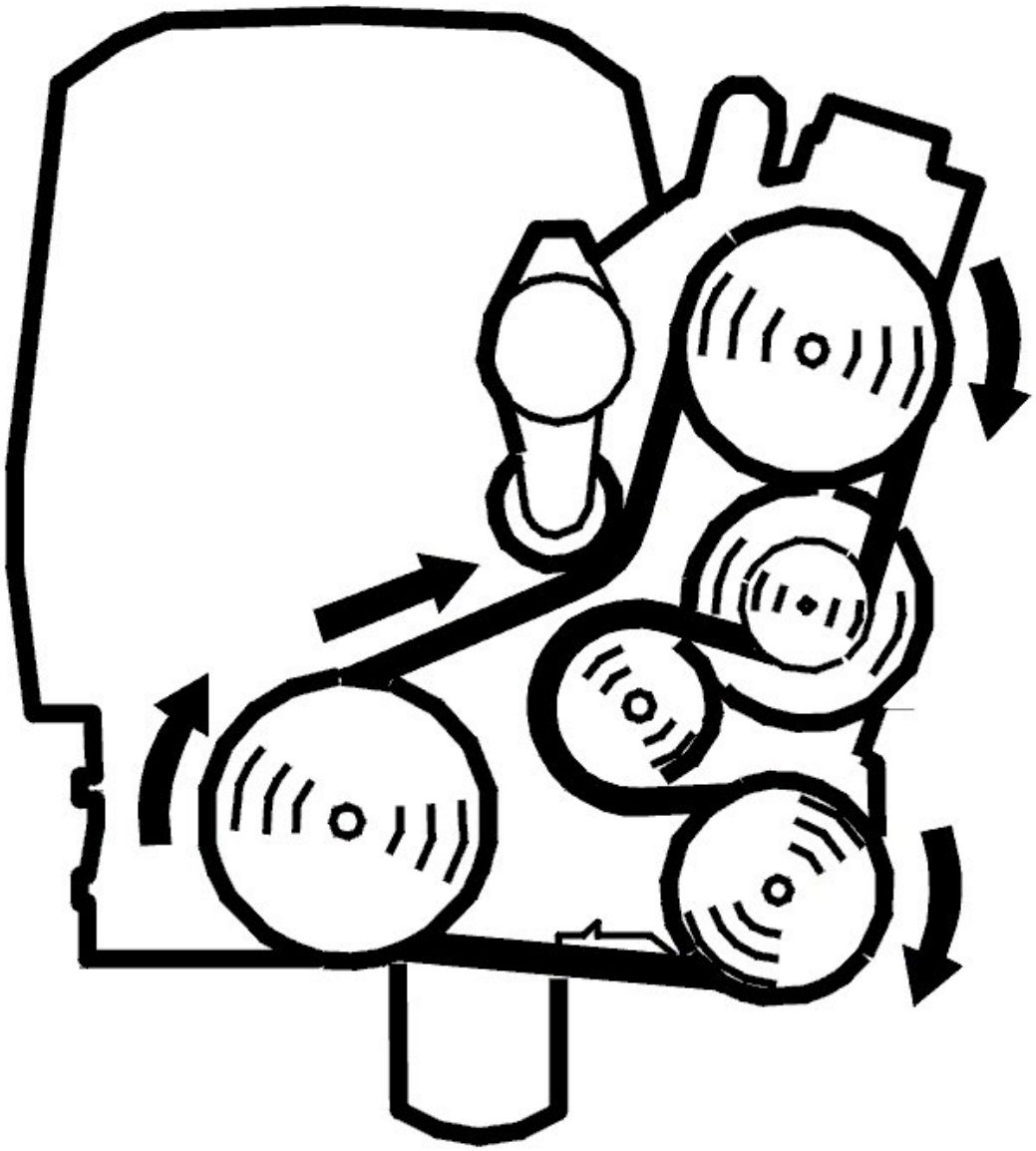
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

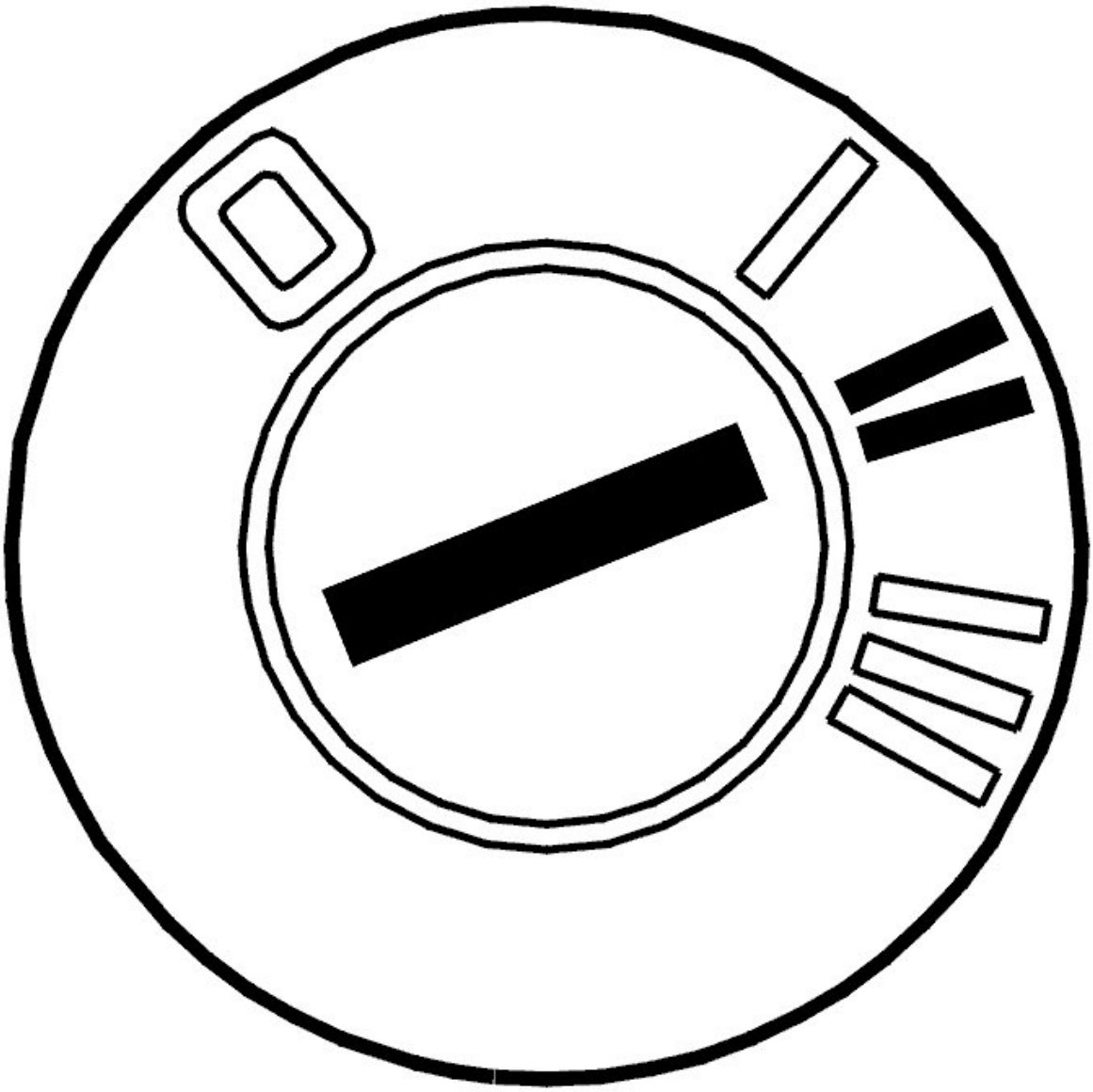


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

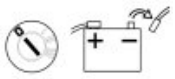
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

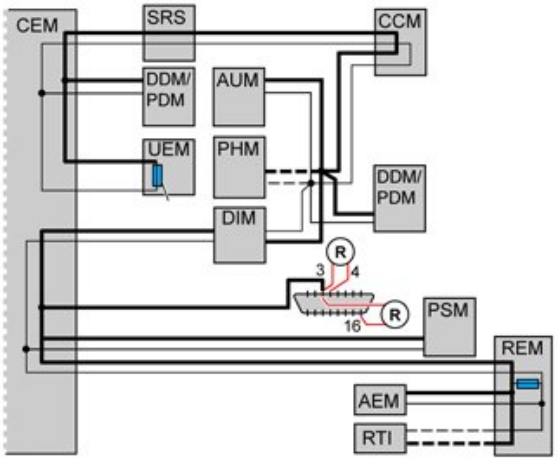
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

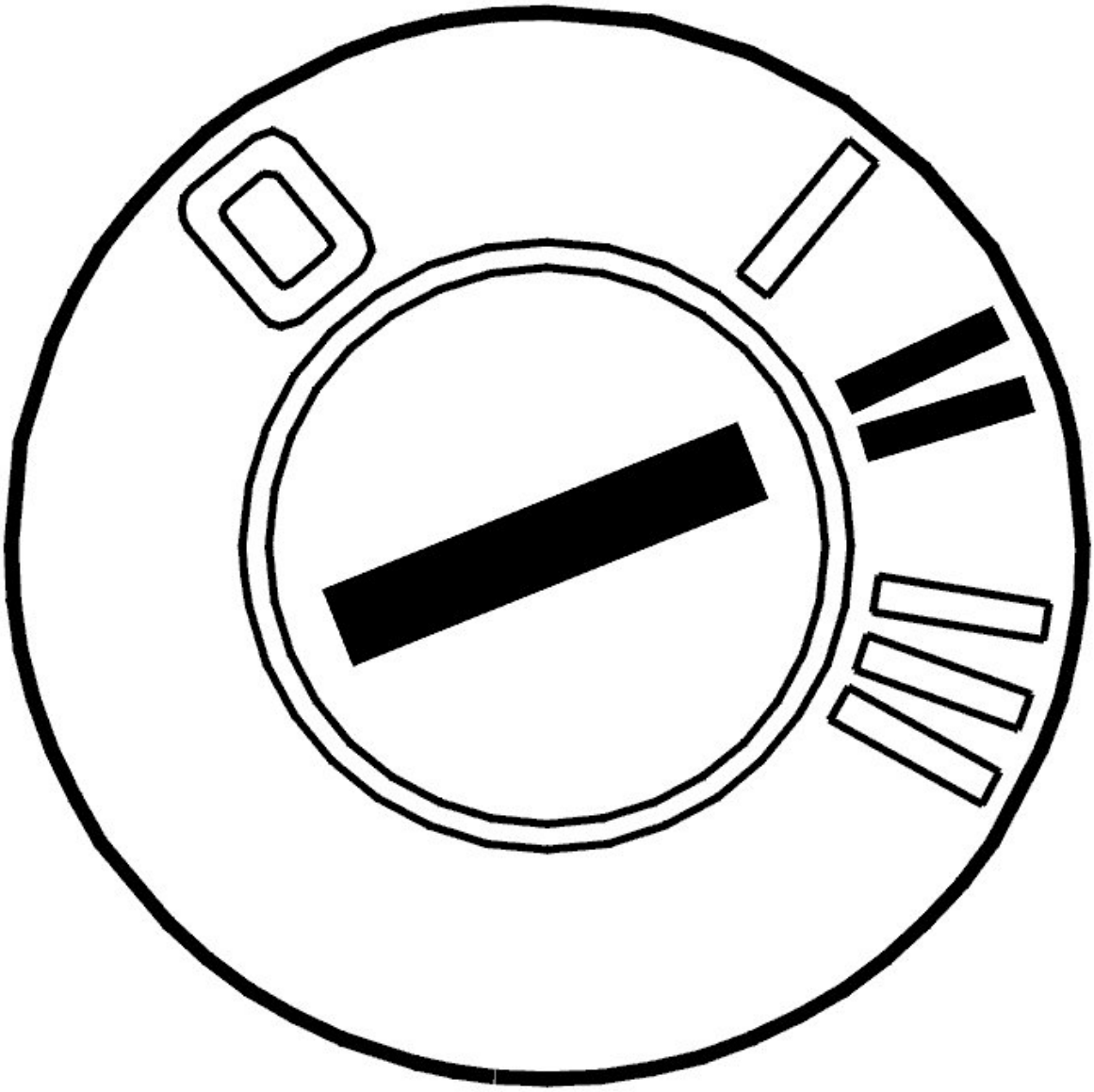


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

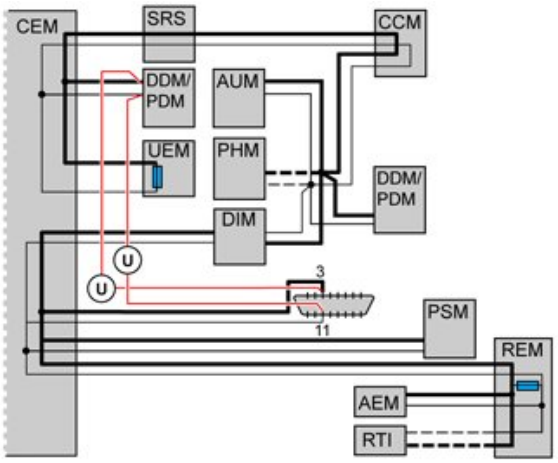
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

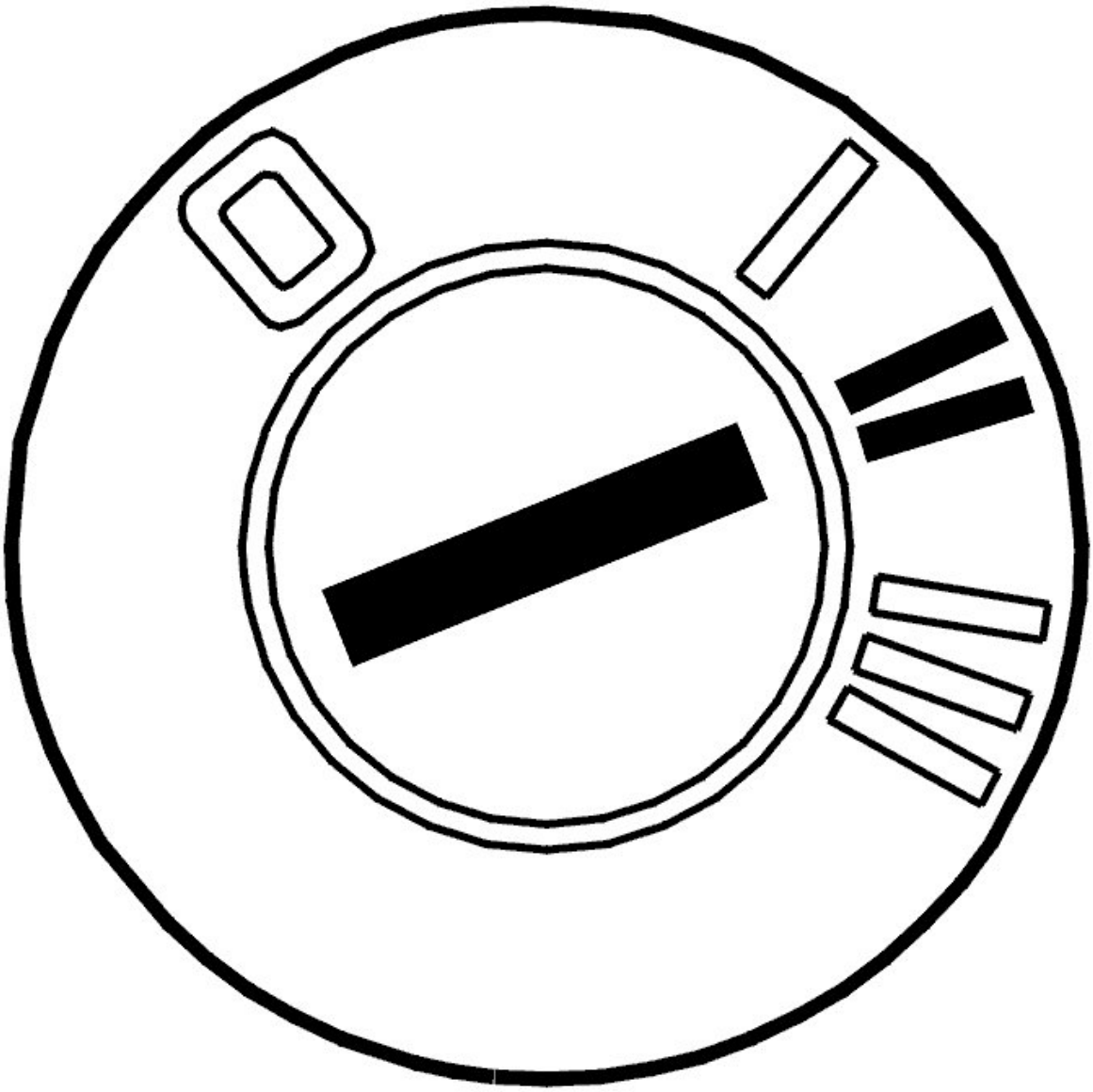
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

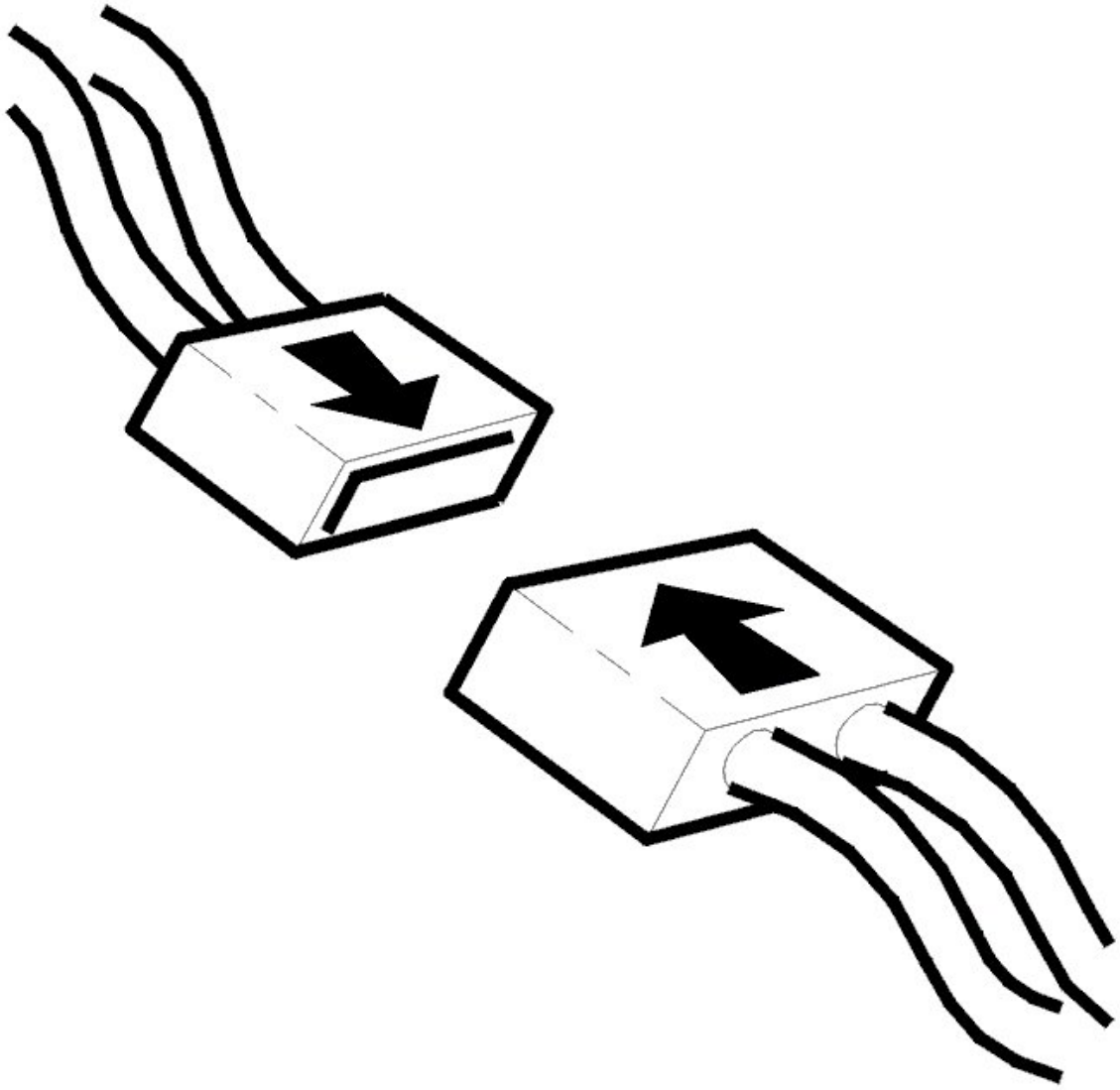


Continue - Verification

Checking the steering wheel angle sensor module (SAS)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Read off the parameters under vehicle communication to check the function of the steering wheel angle sensor module (SAS).

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

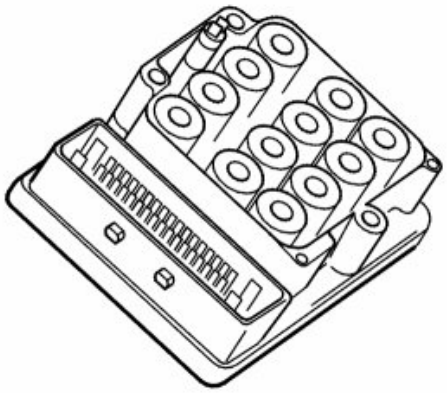
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the steering wheel module (SWM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A5F

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the brake control module (BCM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN)!

Substitute value
- None.

Possible source
- No power supply to the brake control module (BCM)
- Open-circuit in the ground lead to the brake control module (BCM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the brake control module (BCM)
- The brake control module (BCM) is not intended for this vehicle, for example a used control module with different software/hardware.

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- ABS warning lamp lit.
- No ABS function
- Message in the display.

Signal Missing

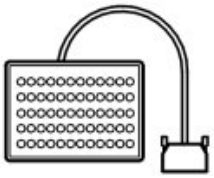
Signal missing

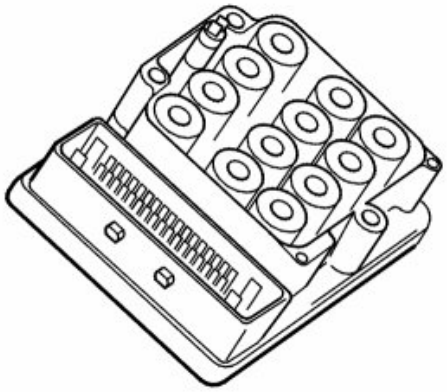
Checking the power supply and ground for the brake control module (BCM)

Check that the fuse for the control module is intact.
Check the power supply and ground for the brake control module (BCM) as follows.
Remedy as necessary.

Other information:
- Checking the power supply, brake control module See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Power Supply, Brake Control Module
- Checking the ground terminals, brake control module See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Ground Terminals, Brake Control Module
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Checking the brake control module (BCM)

No - Checking communication with the brake control module (BCM)

Checking communication with the brake control module (BCM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the brake control module (BCM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net

listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

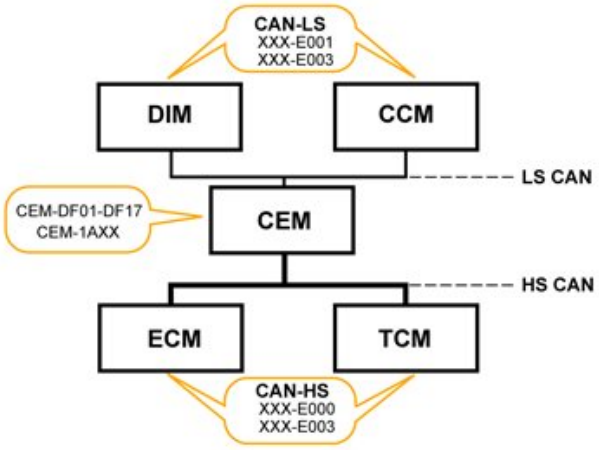
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent. Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

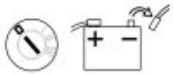
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the

resistance changes to detect intermittent short-circuits or open circuit.

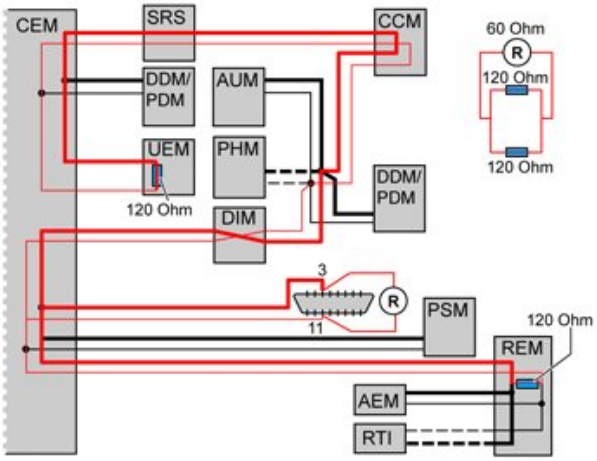
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

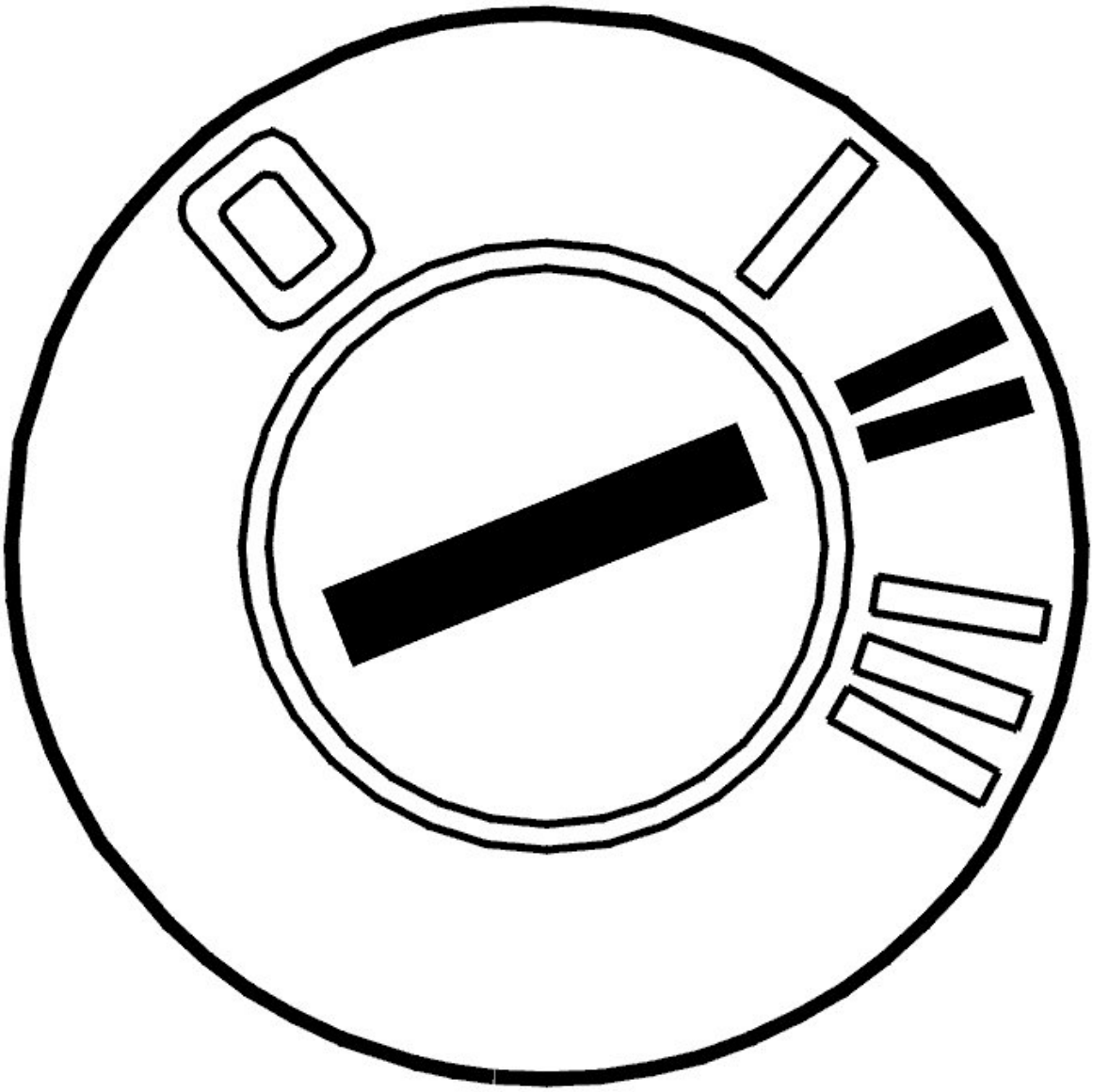


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

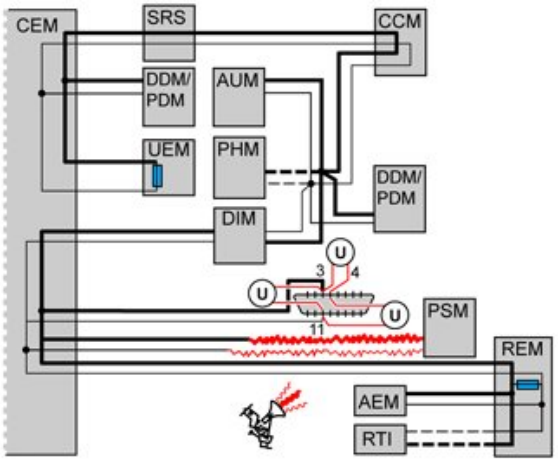
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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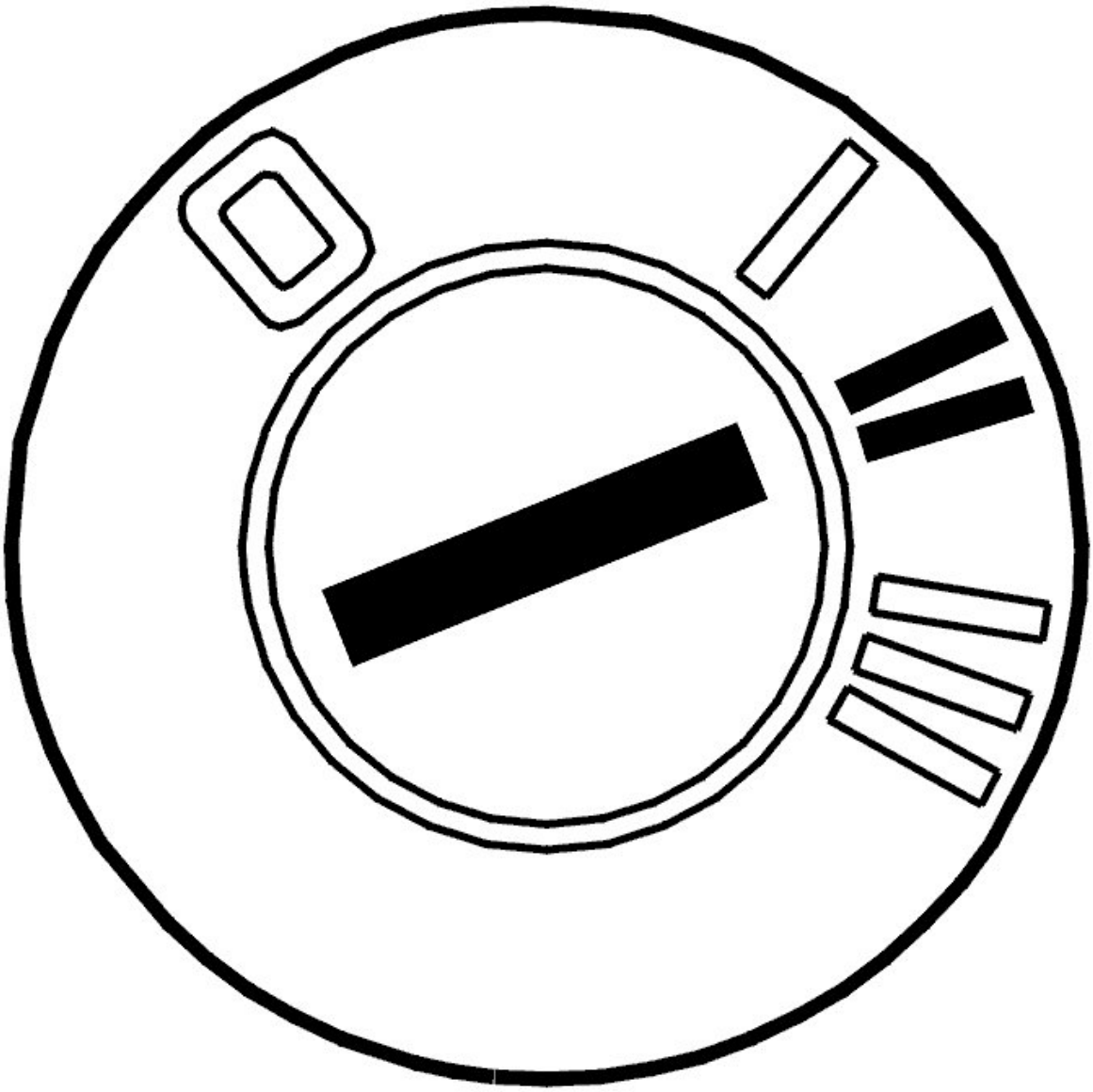
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

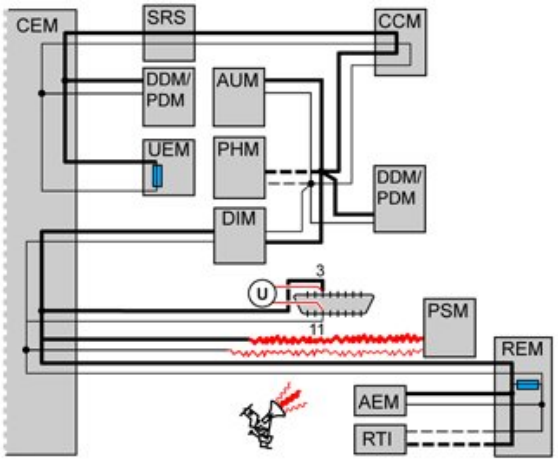
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

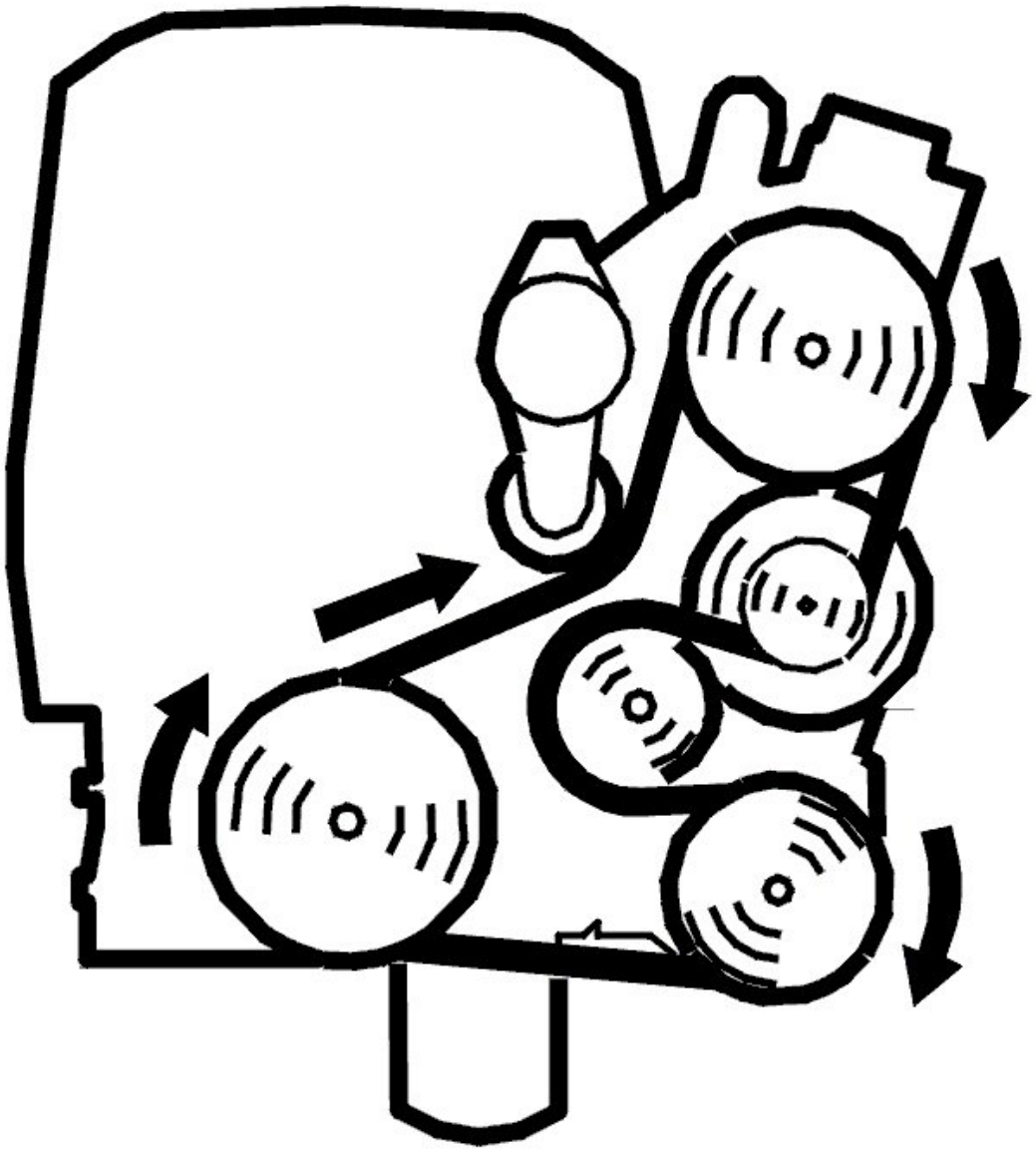
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

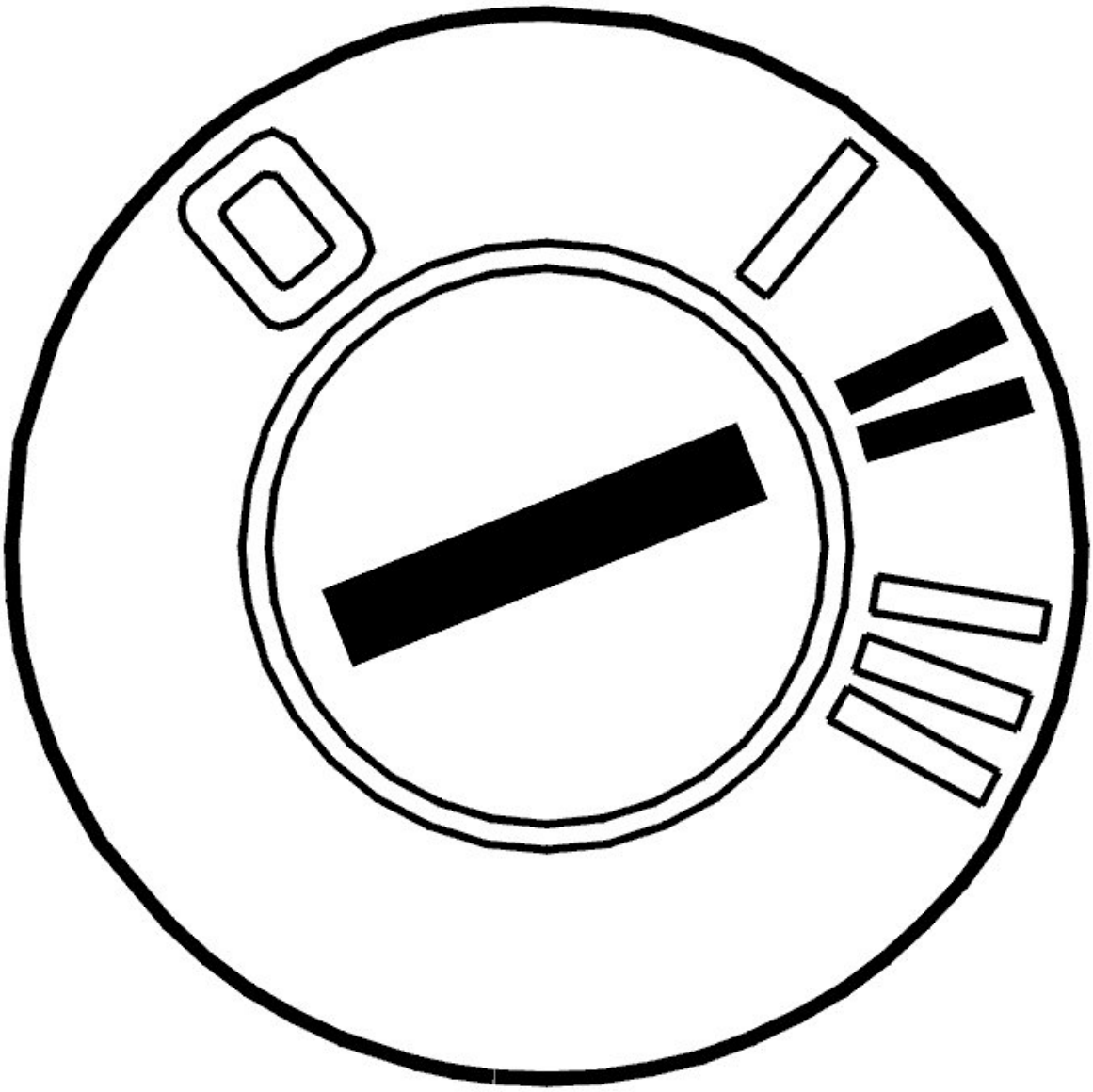


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

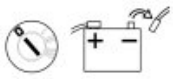
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

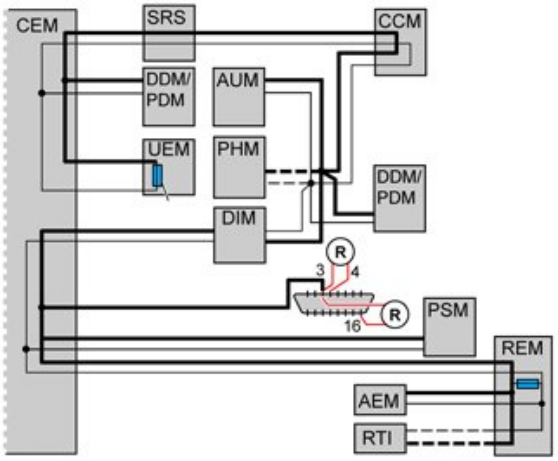
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

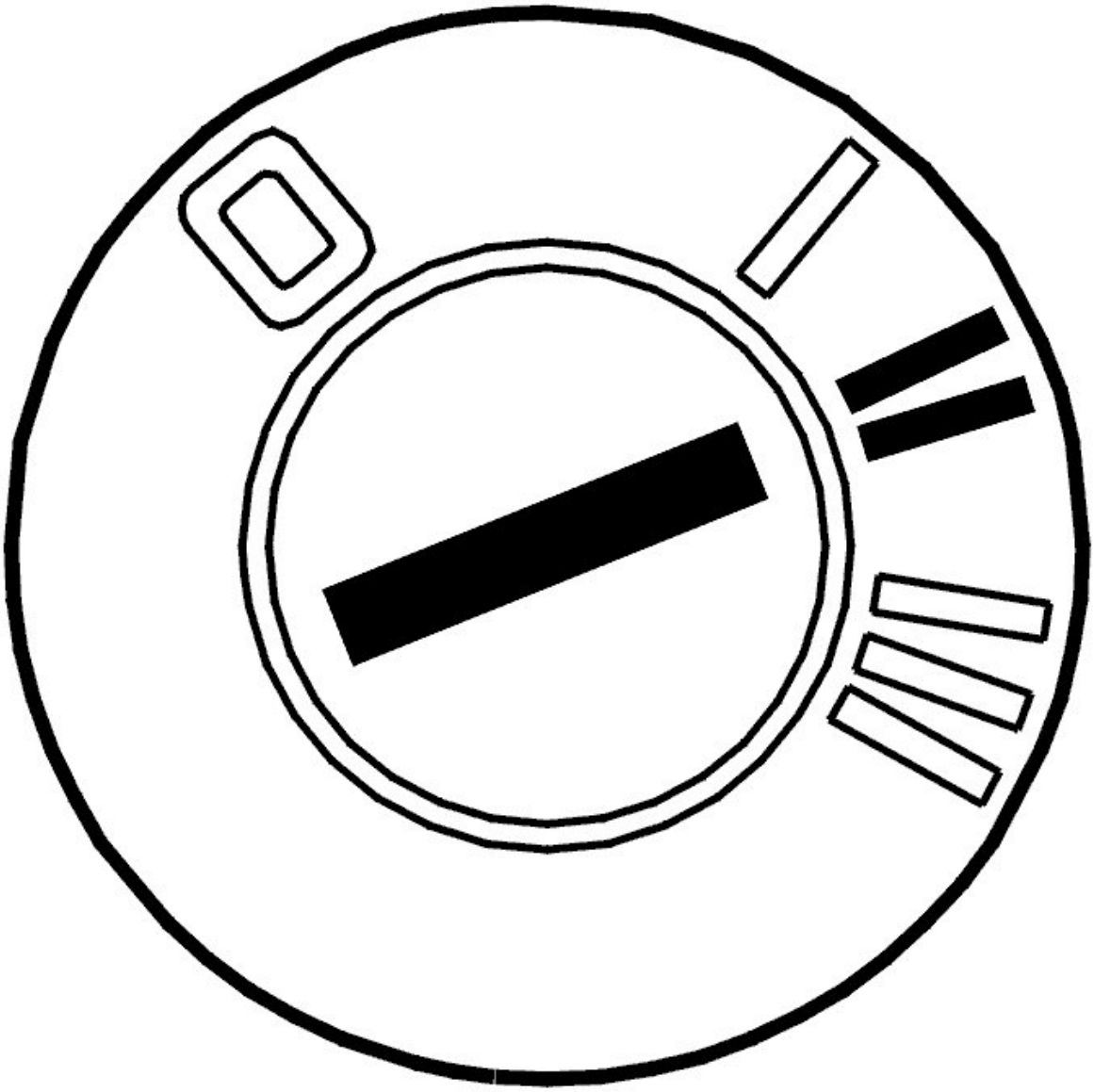


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

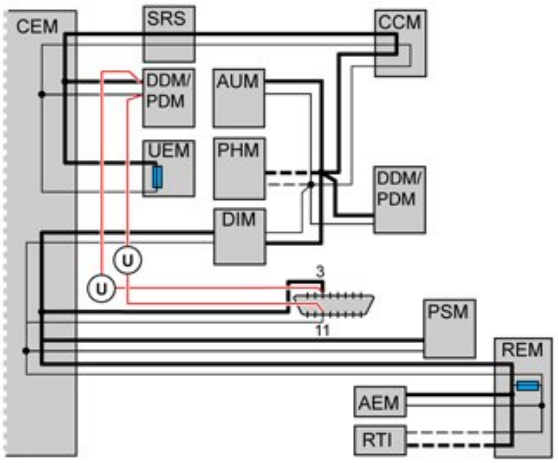
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

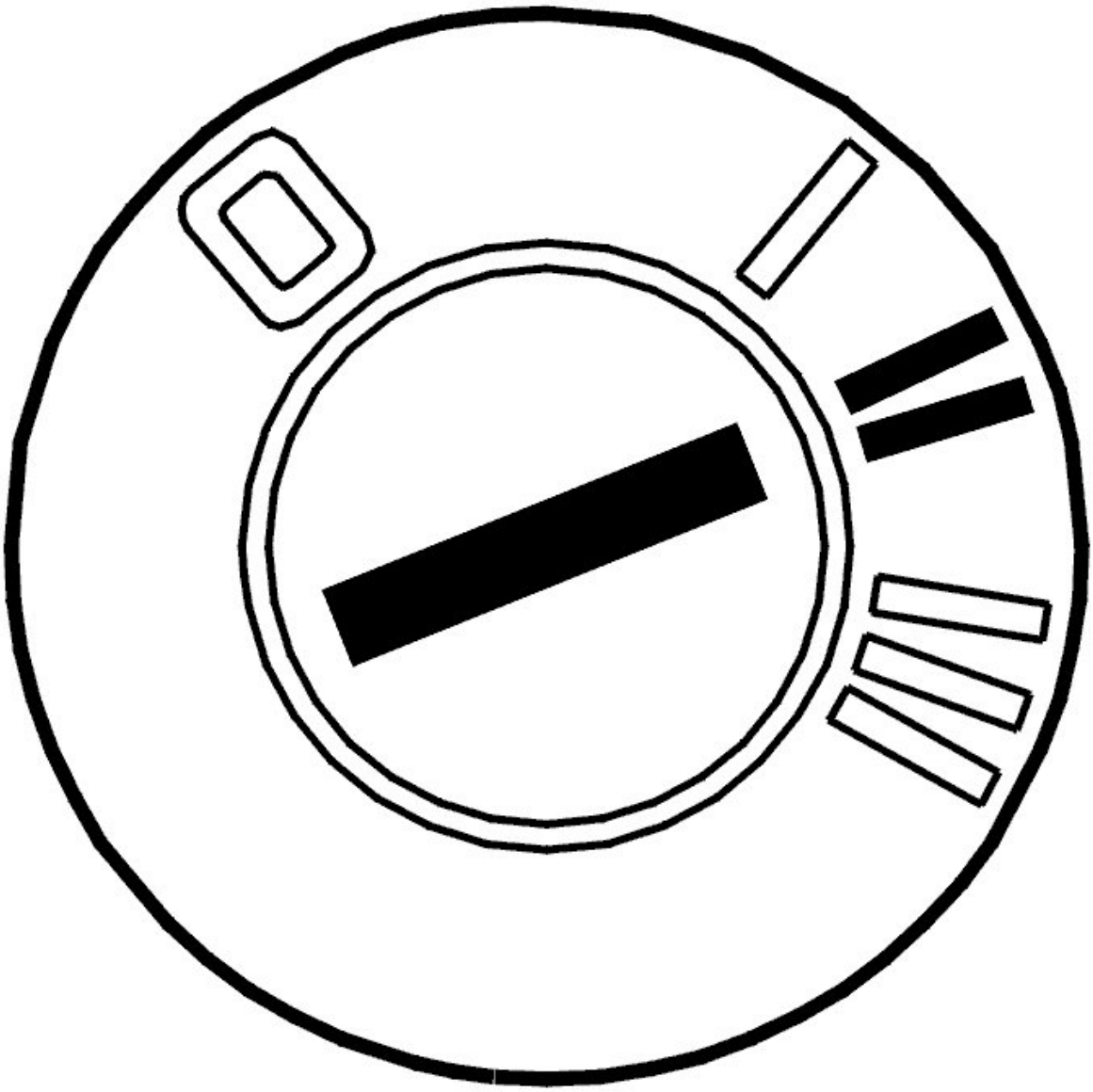
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

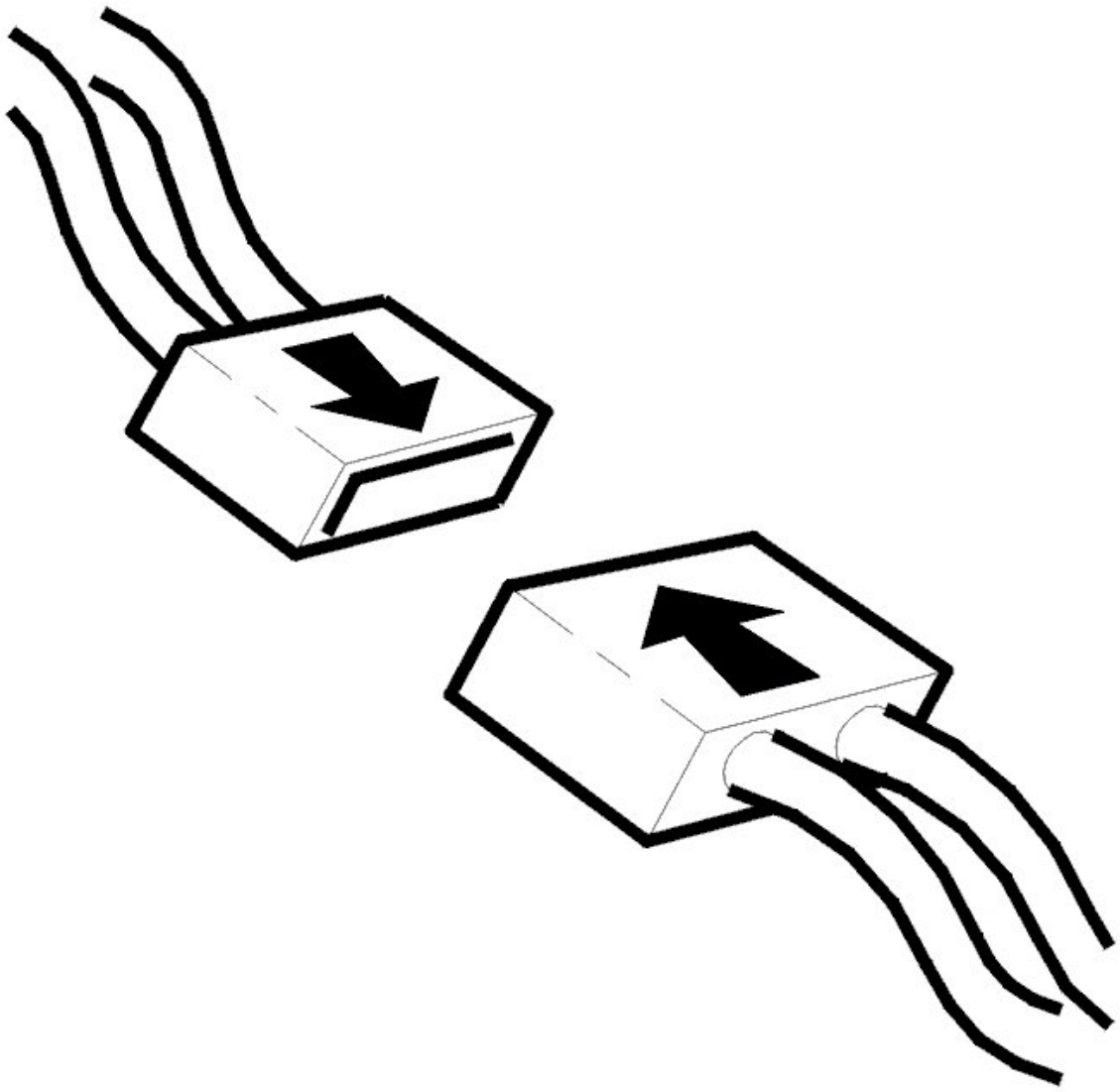


Continue - Verification

Checking the brake control module (BCM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on for at least 10 seconds.

Read off the control module ID from the brake control module (BCM) by clicking on the VCT2000 symbol.

Could the control module ID be read off?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

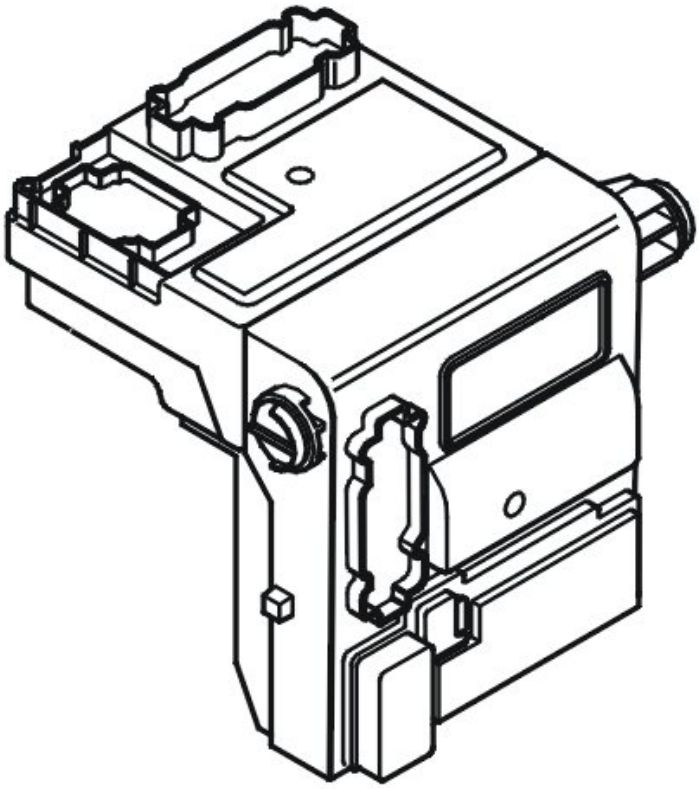
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the brake control module (BCM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A06

Condition



The central electronic module (CEM) monitors the cable for 15-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the cable for 15-supply or a short-circuit to ground in the cable.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position III (start attempt).

Substitute value
- None.

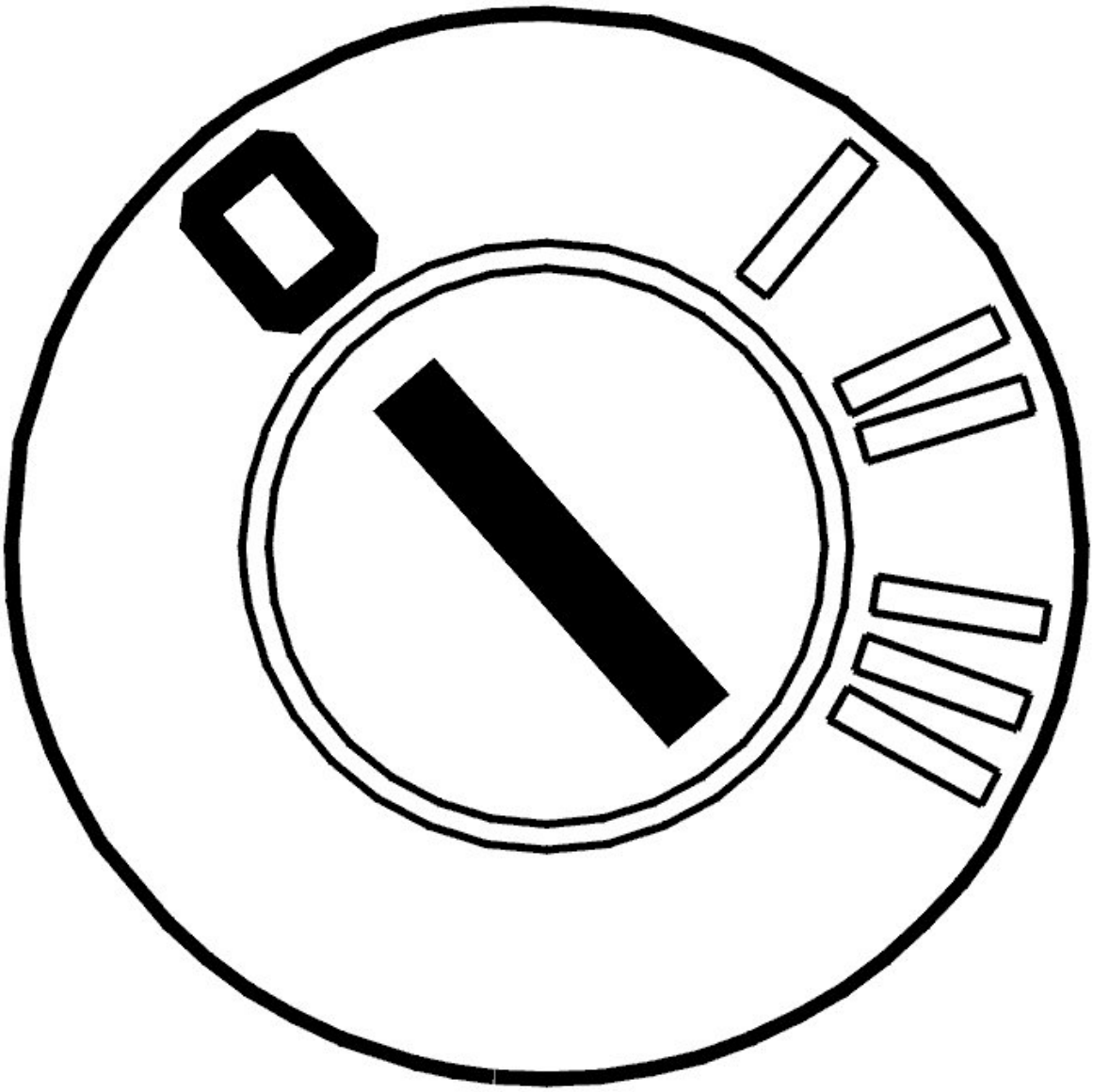
Possible source
- Open-circuit in the 15-supply cable
- Short-circuit to ground in the 15-supply cable
- Damaged ignition switch.

Fault symptom[s]
- The windshield wipers are not working.
- The starter motor does not turn.

Signal Too Low

Signal too low

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

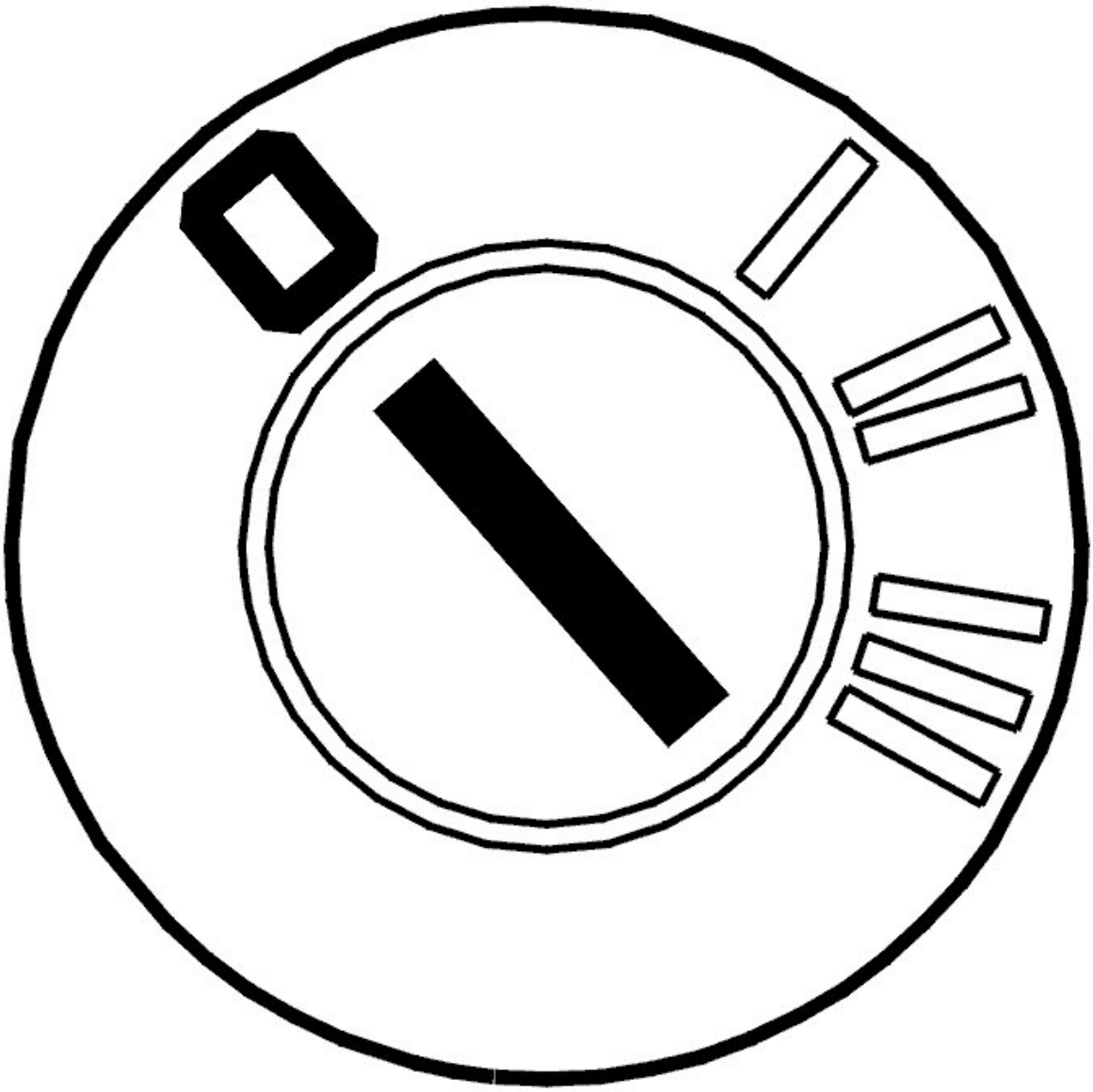
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable



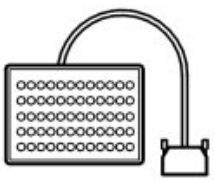
- Ignition off.

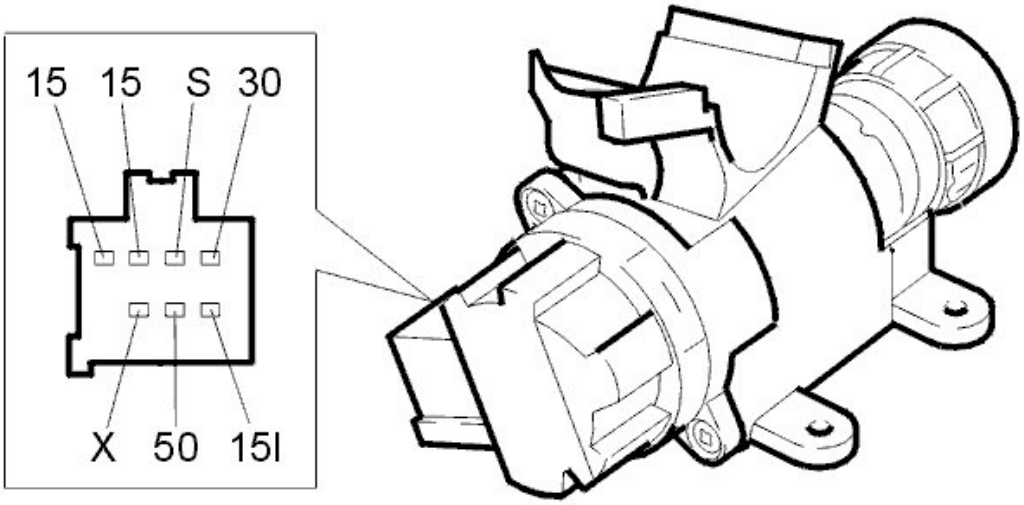
Check the cable between central electronic module (CEM) connector terminal #D16 and ignition switch connector terminal #15A (#1). Check for an open-circuit. Check for a short-circuit to ground.
The voltage must be the same as battery voltage if the key is in position I or III.
Remedy as necessary.

Hint: For intermediate junction points, see the relevant wiring diagram.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Is the voltage the same as battery voltage?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

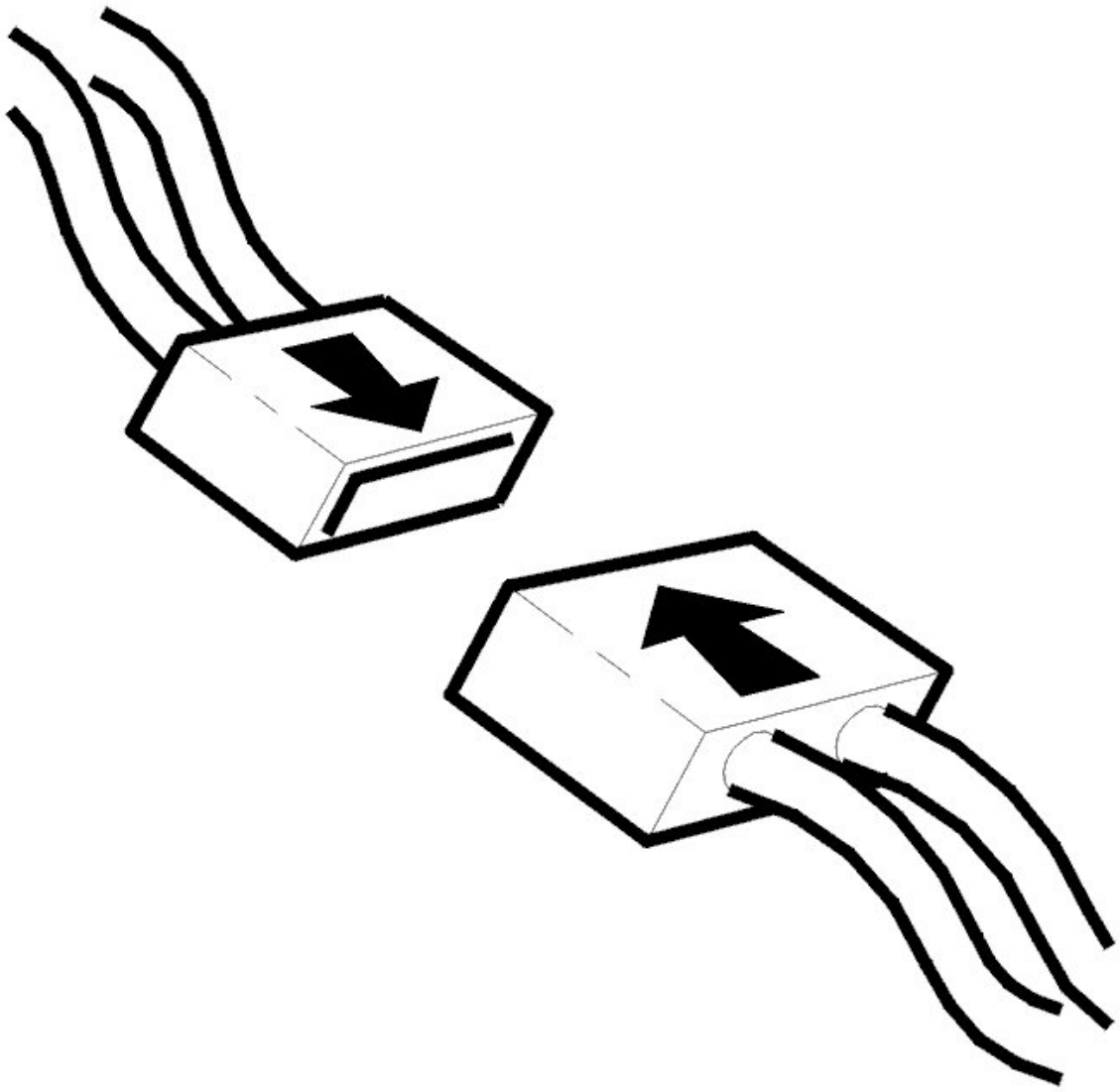
Continue - Verification

Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.



- Ignition off.
- Connect connectors, install components, etc.
- Key in position III.

Check that 15 voltage is OK.

Is voltage on the wire high?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

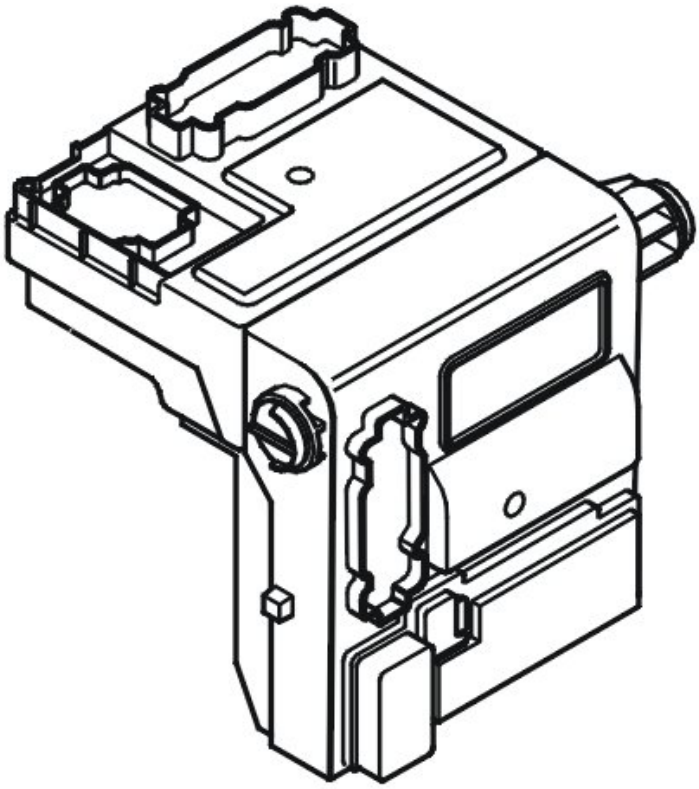
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A07

Condition



The central electronic module (CEM) monitors the cable for 15-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the cable for the 15-supply.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position 0.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the 15-supply cable from the ignition switch
- Damaged ignition switch.

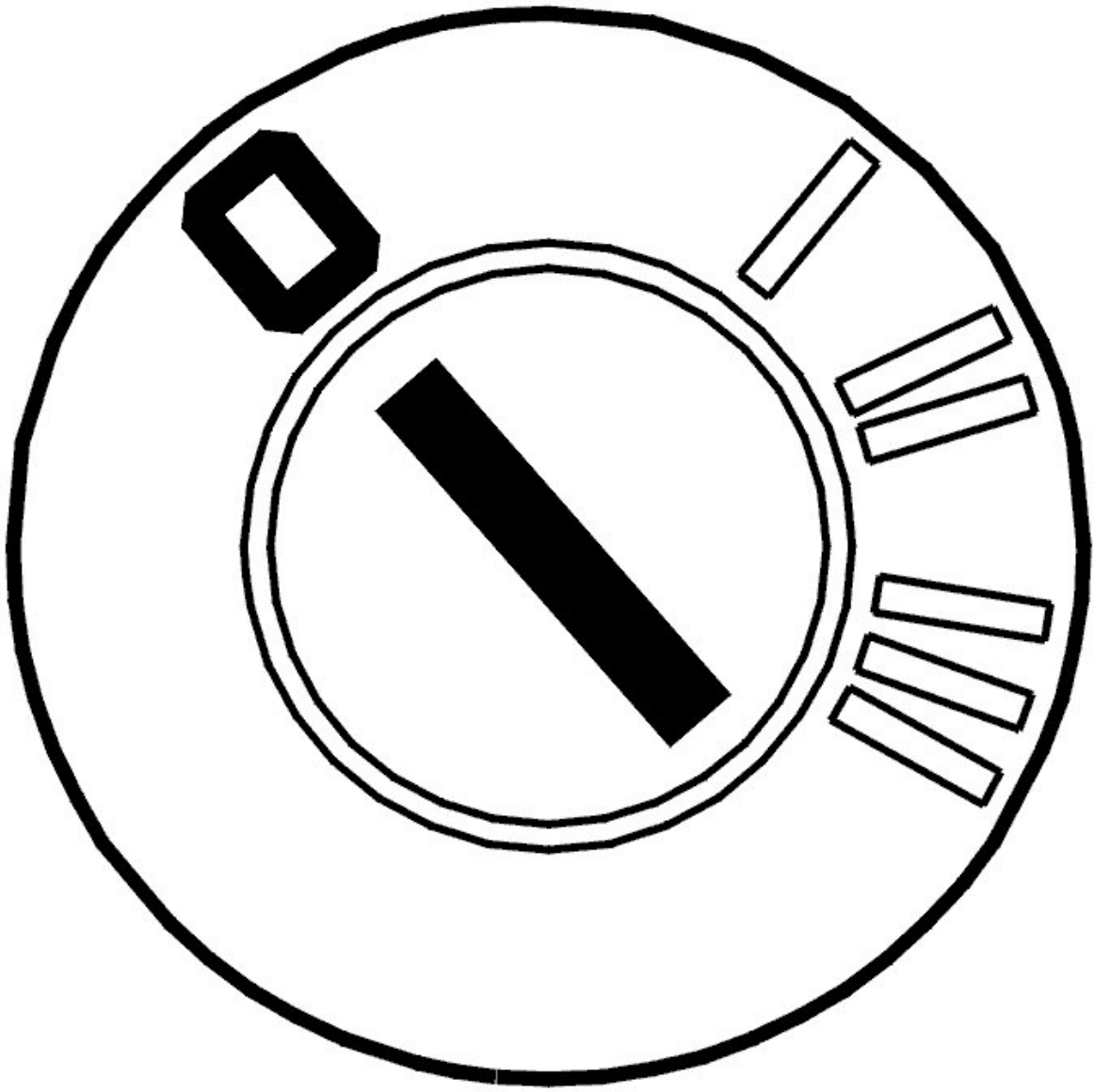
Fault symptom[s]

- The starter motor does not turn.
- The battery discharges.

Signal Too High

Signal too high

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

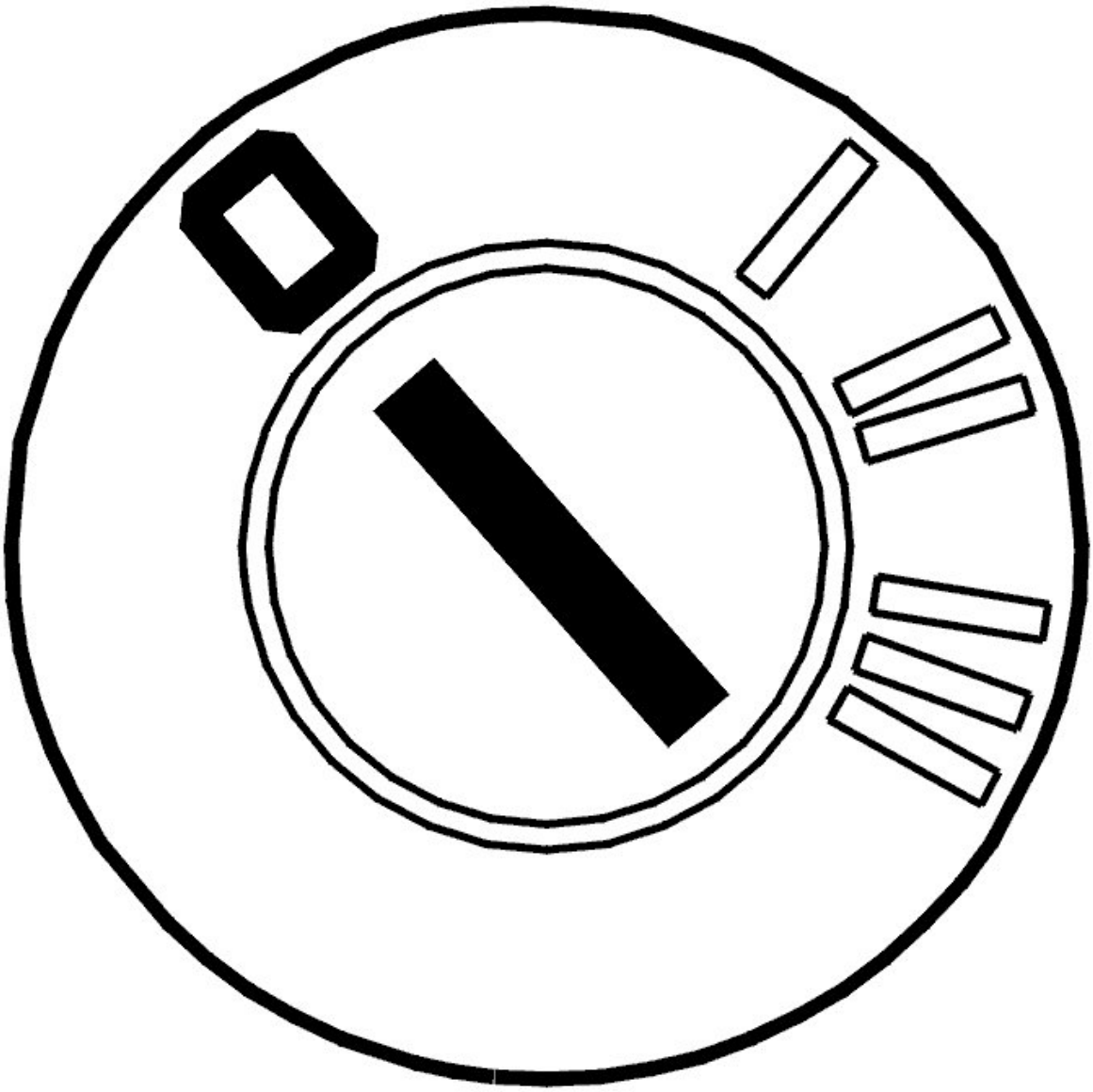
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable



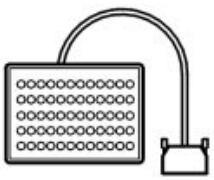
- Ignition off.

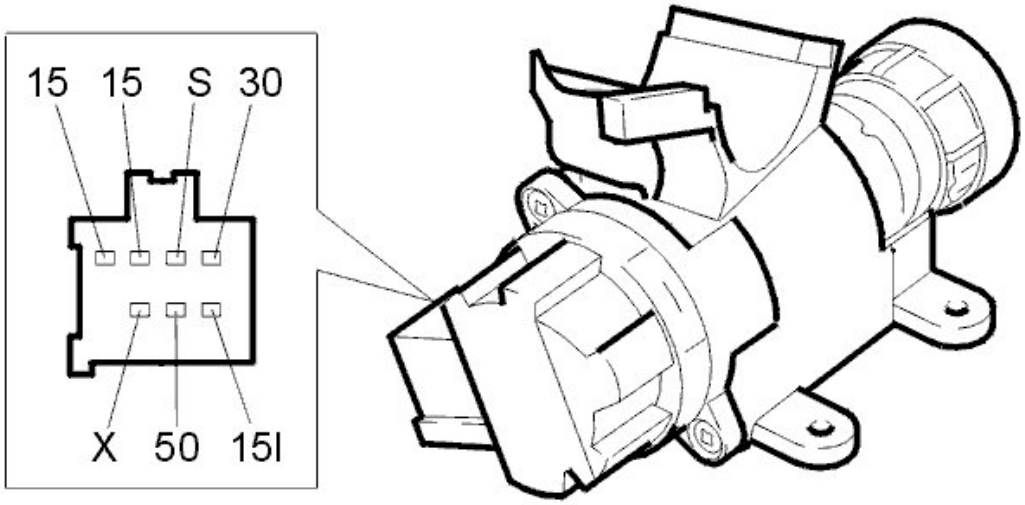
Check the cable between central electronic module (CEM) connector terminal #D16 and ignition switch connector terminal #1. Check for a short-circuit to supply voltage.
The voltage must be 0 V if the key is in position 0 or I.

Hint: For intermediate junction points, see the relevant wiring diagram.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Were any faults found in the cable?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

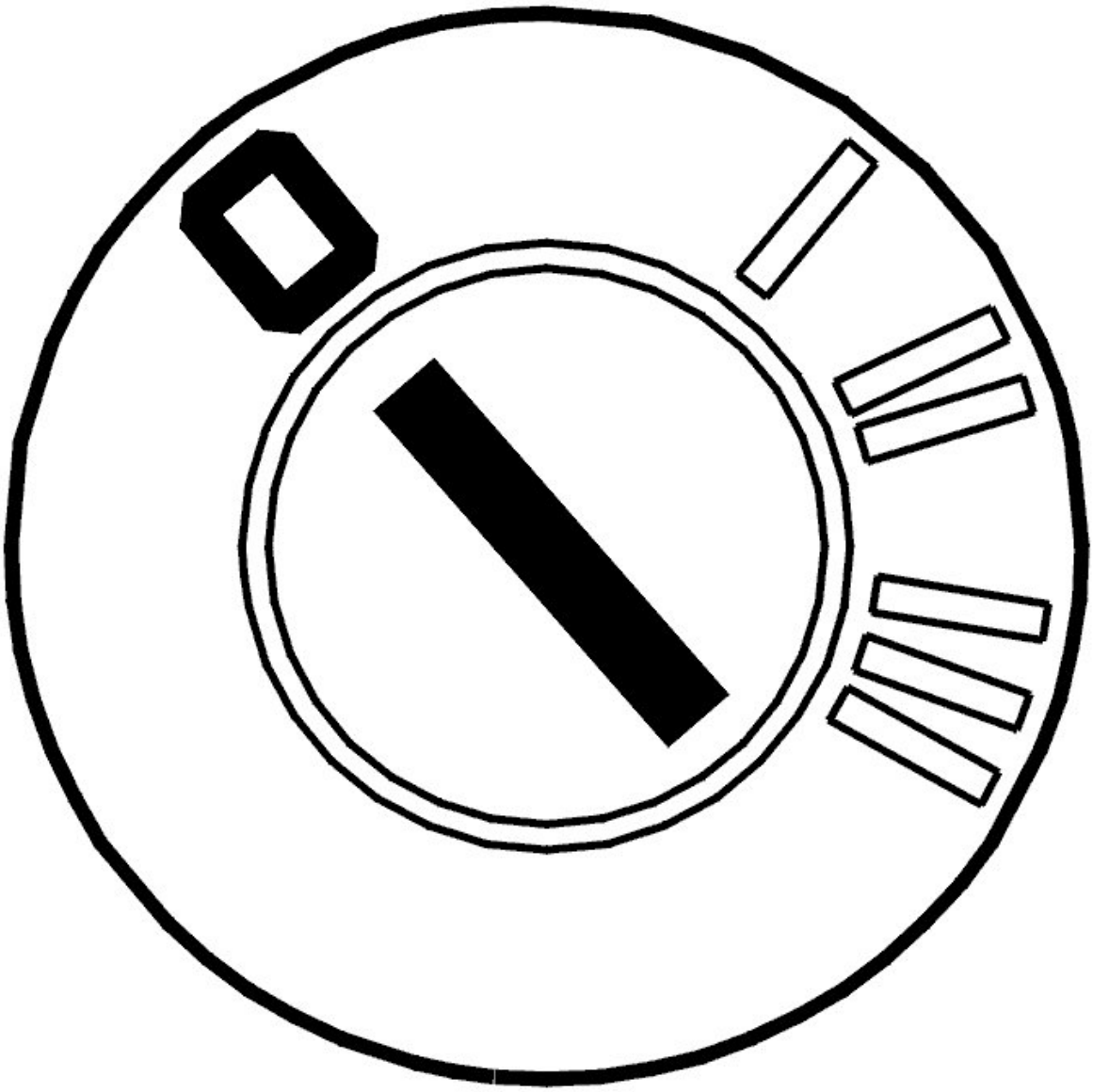
Continue - Verification

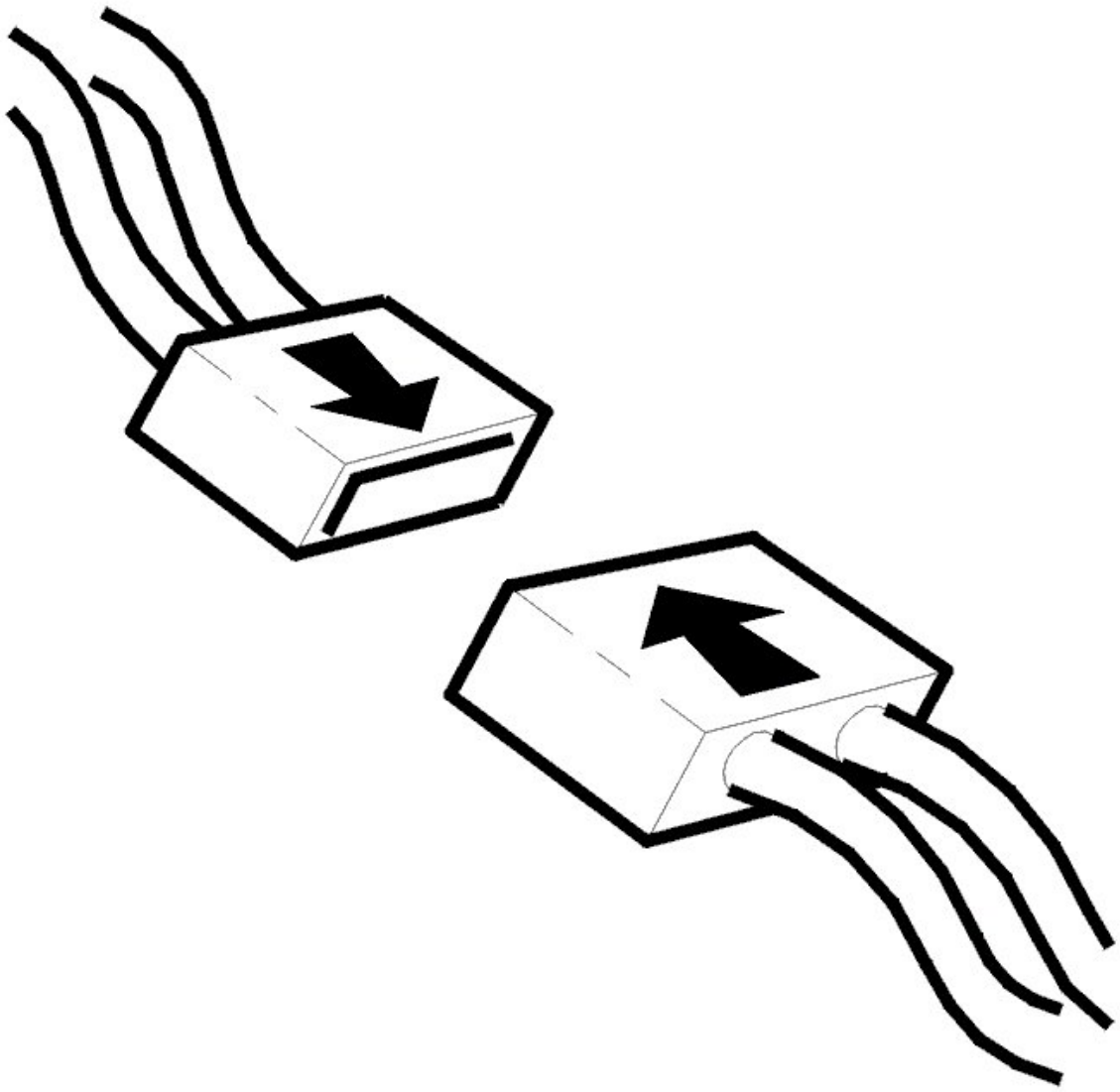
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition off.

Check that 15 voltage is OK.

Is voltage on the wire low?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

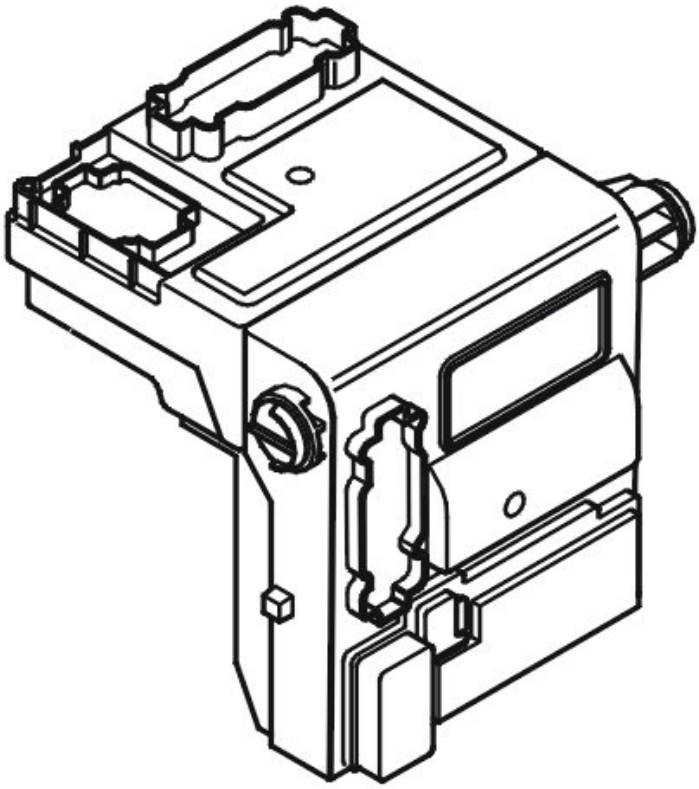
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A08

Condition



The central electronic module (CEM) monitors the cable for 50-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the cable for the 50-supply.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position III (start attempt).

Substitute value
- None.

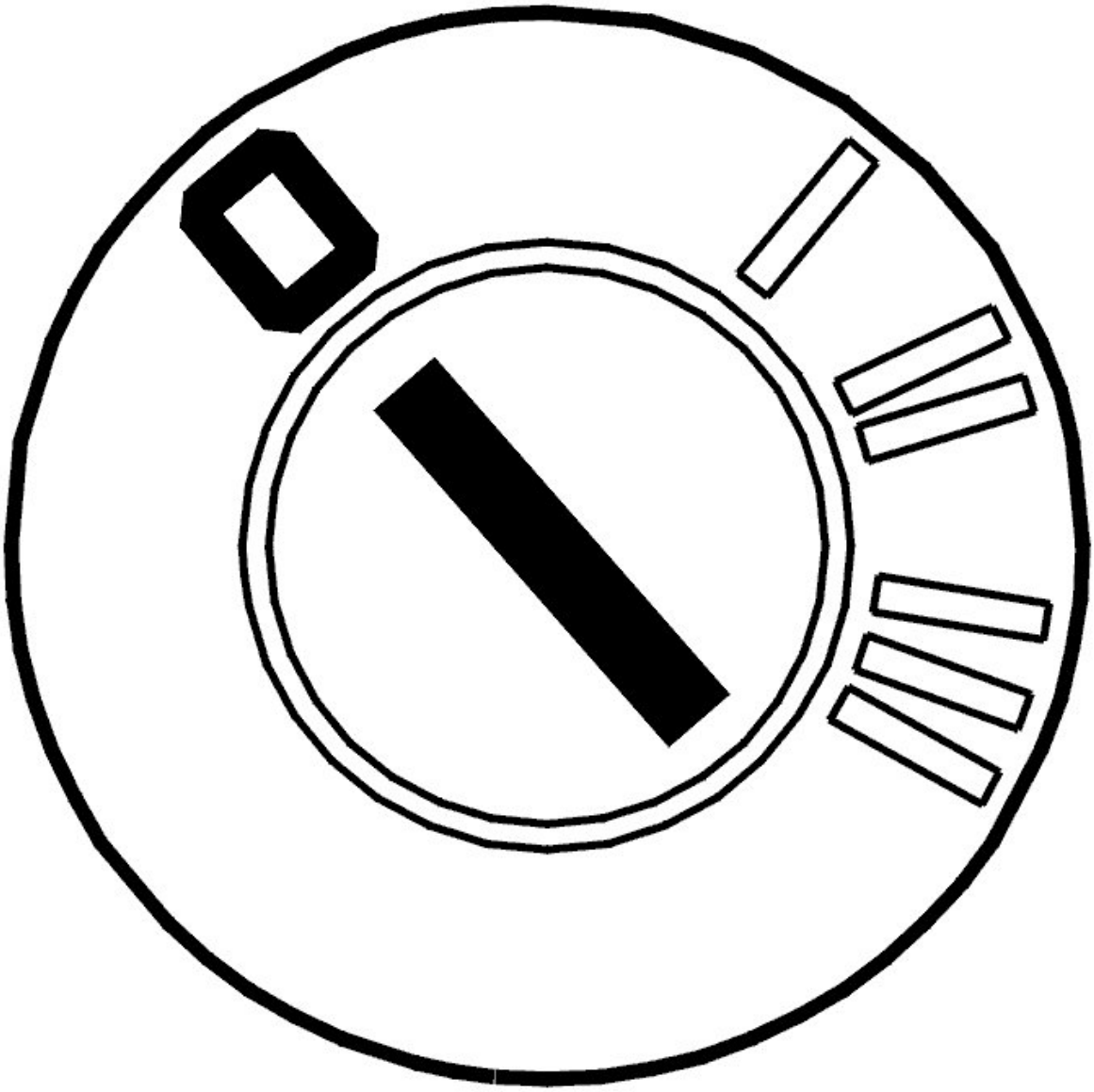
Possible source
- Open-circuit in the 50-supply cable
- Damaged ignition switch.

Fault symptom[s]
- The starter motor does not turn.

Signal Missing

Signal missing

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

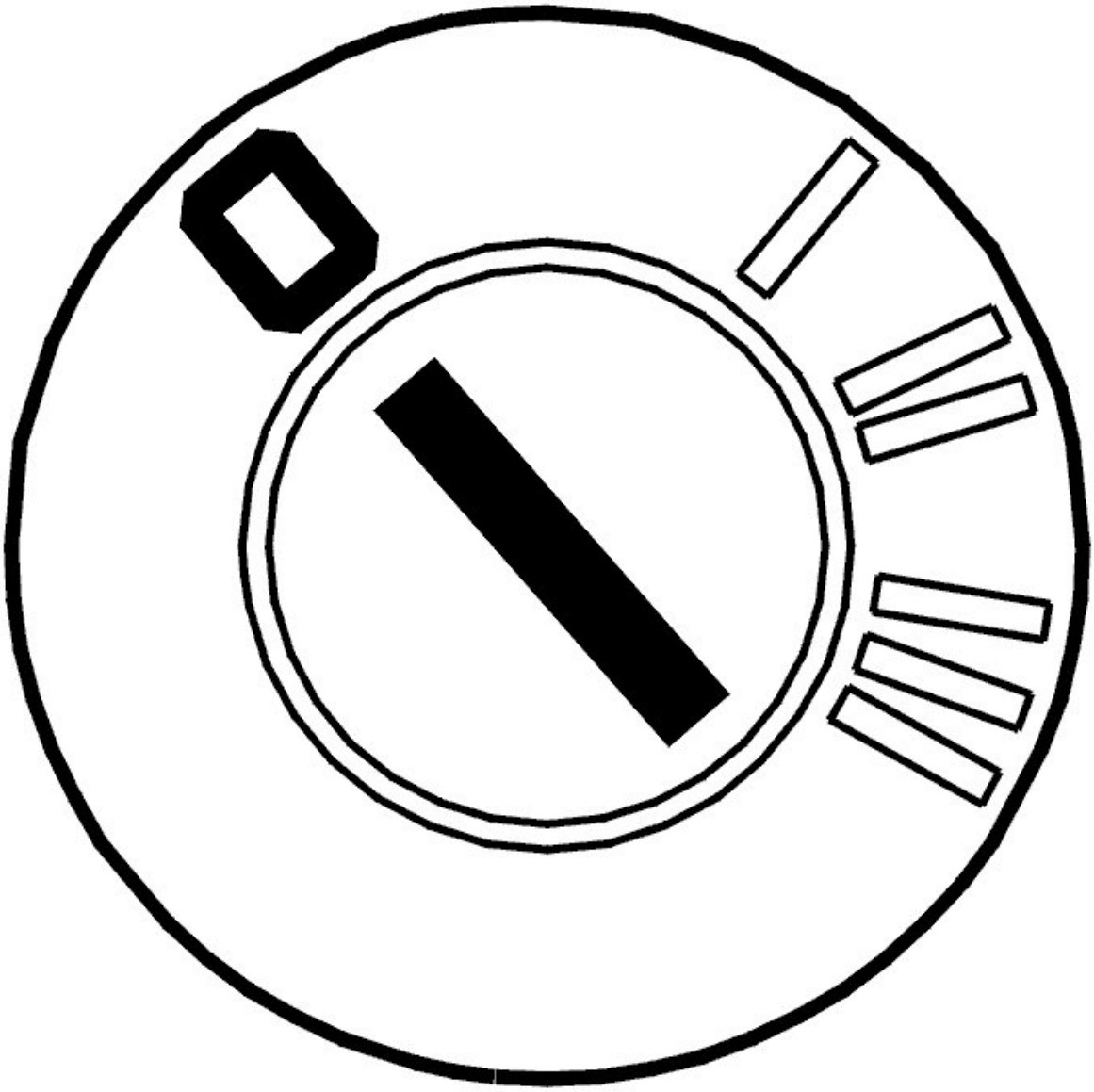
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable

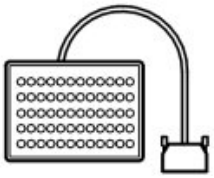


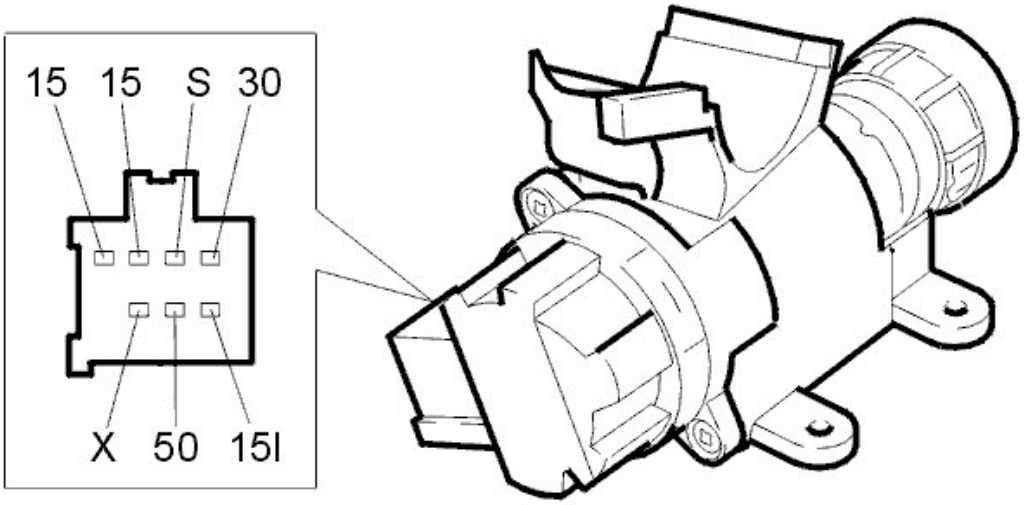
- Ignition off.

Check the cable between central electronic module (CEM) connector terminal #D60 and the 50-supply to ignition switch connector terminal #7.
Check for an open-circuit. Check for a short-circuit to ground.
The voltage must be battery voltage when the key is in the ignition position III.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Is the voltage the same as battery voltage?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

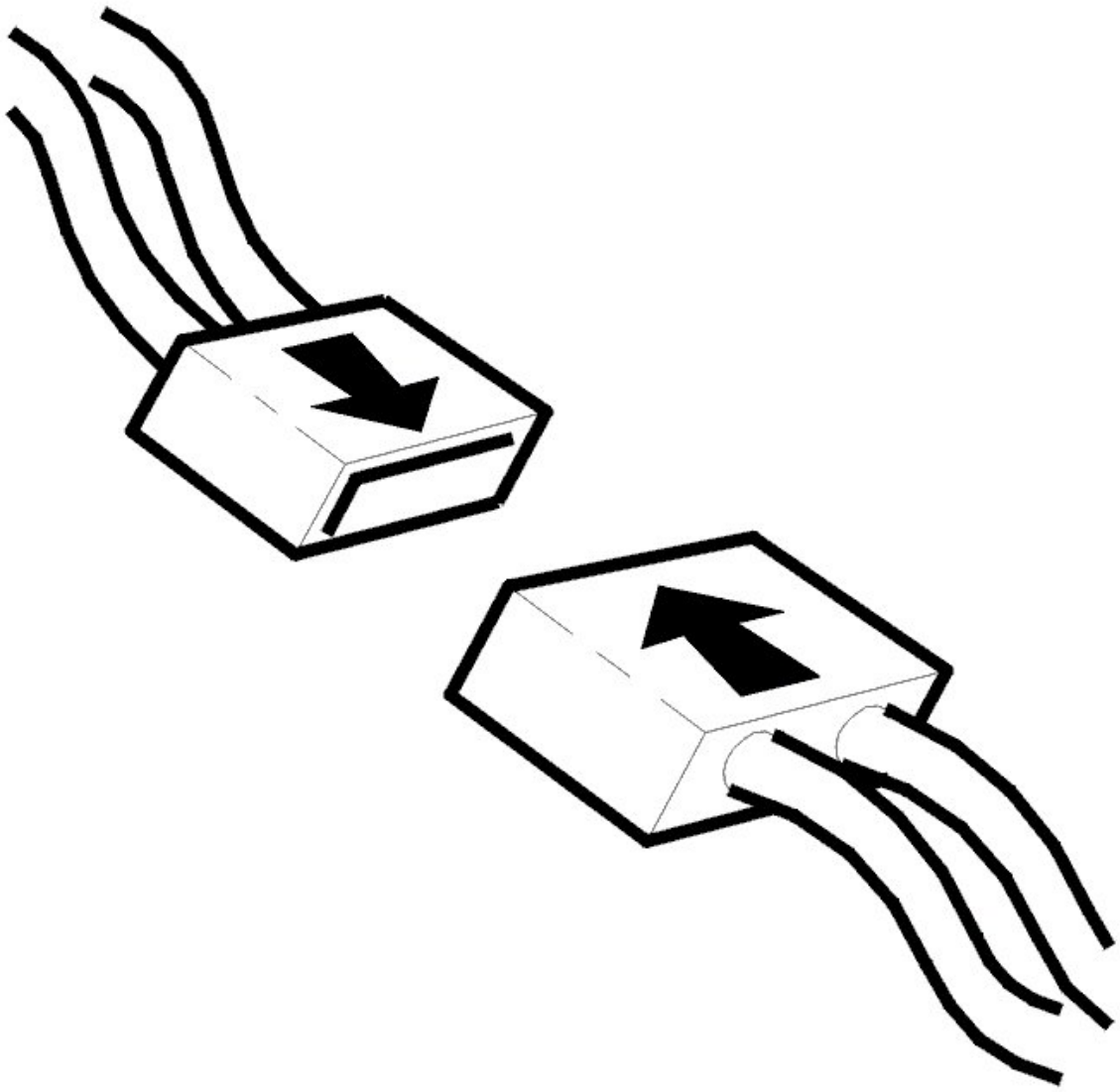
Continue - Verification

Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.



- Ignition off.
- Connect connectors, install components, etc.
- Ignition in starting position.

Check that 50 voltage is OK.

Is voltage on the wire high?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

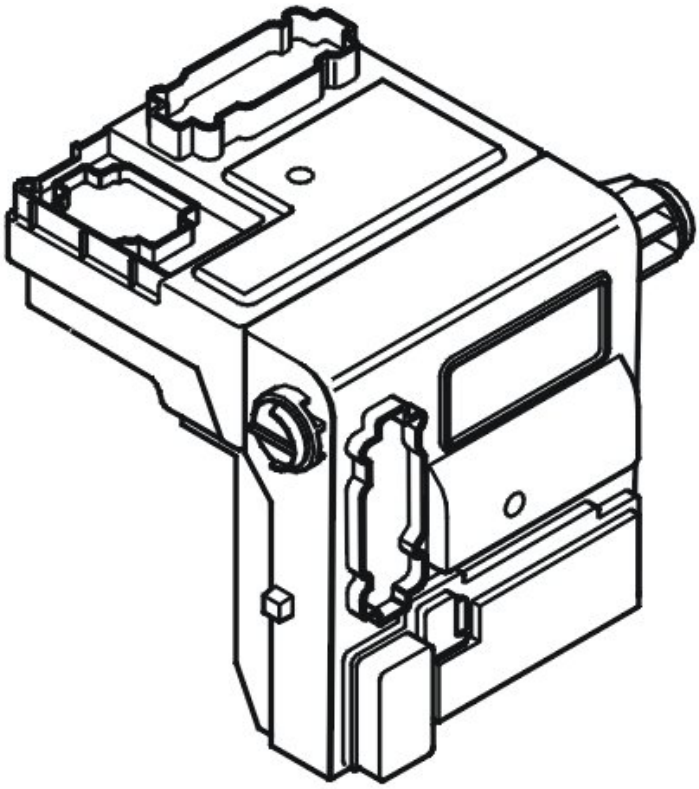
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A09

Condition



The central electronic module (CEM) monitors the cable for 50-supply from the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the cable for the 50-supply.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position III (start attempt).

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the 50-supply cable
- Damaged ignition switch.

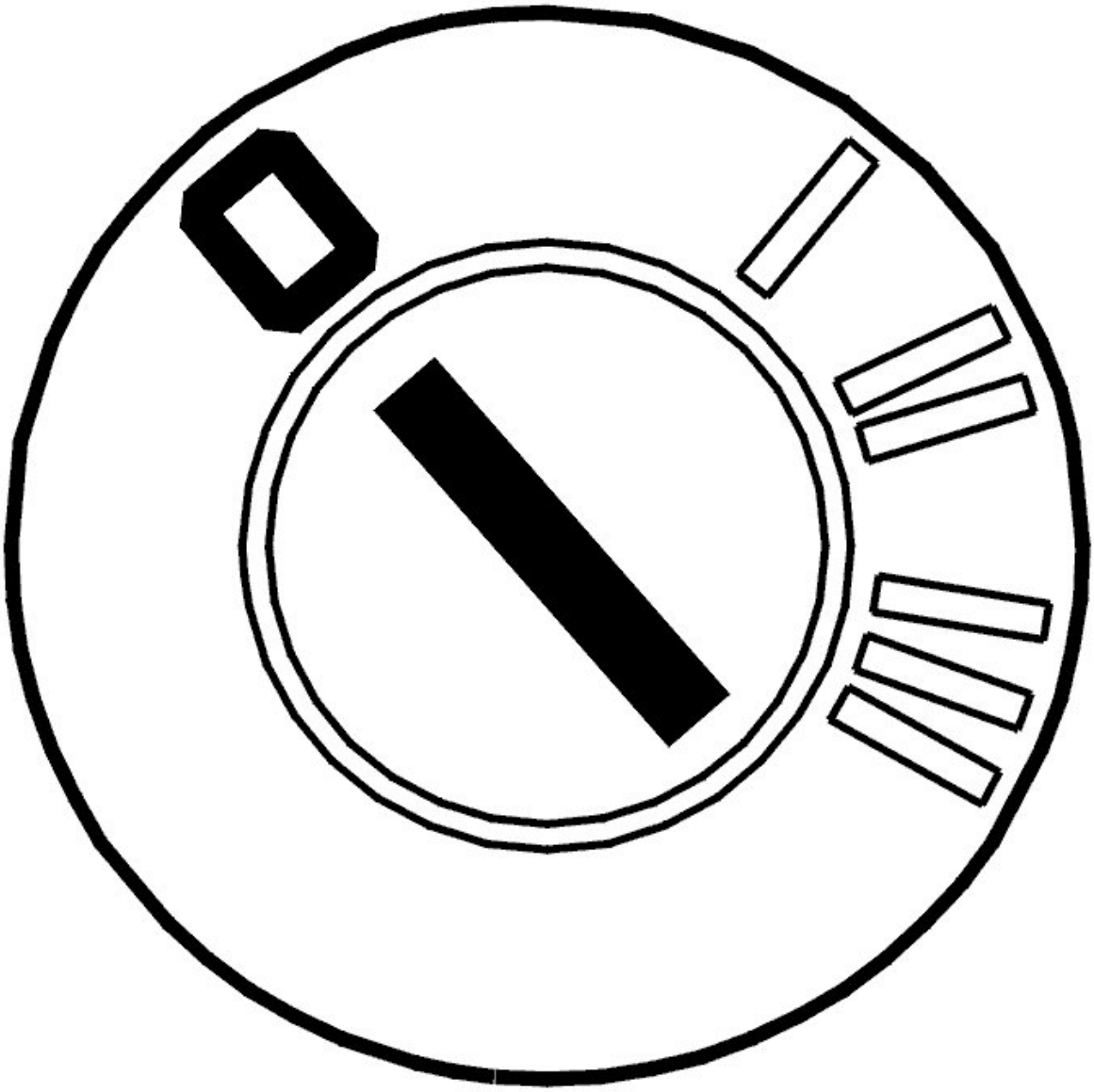
Fault symptom[s]

- The starter motor turns but the engine does not start.

Signal Too High

Signal too high

Checking the connectors



- Ignition off.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Remedy as necessary.
Check for any damage.

Hint: If the fault cause is found, reinstall the components, connectors etc.
If the fault cause was not found, do not reconnect the connector before carrying out further fault-tracing.

Other information:

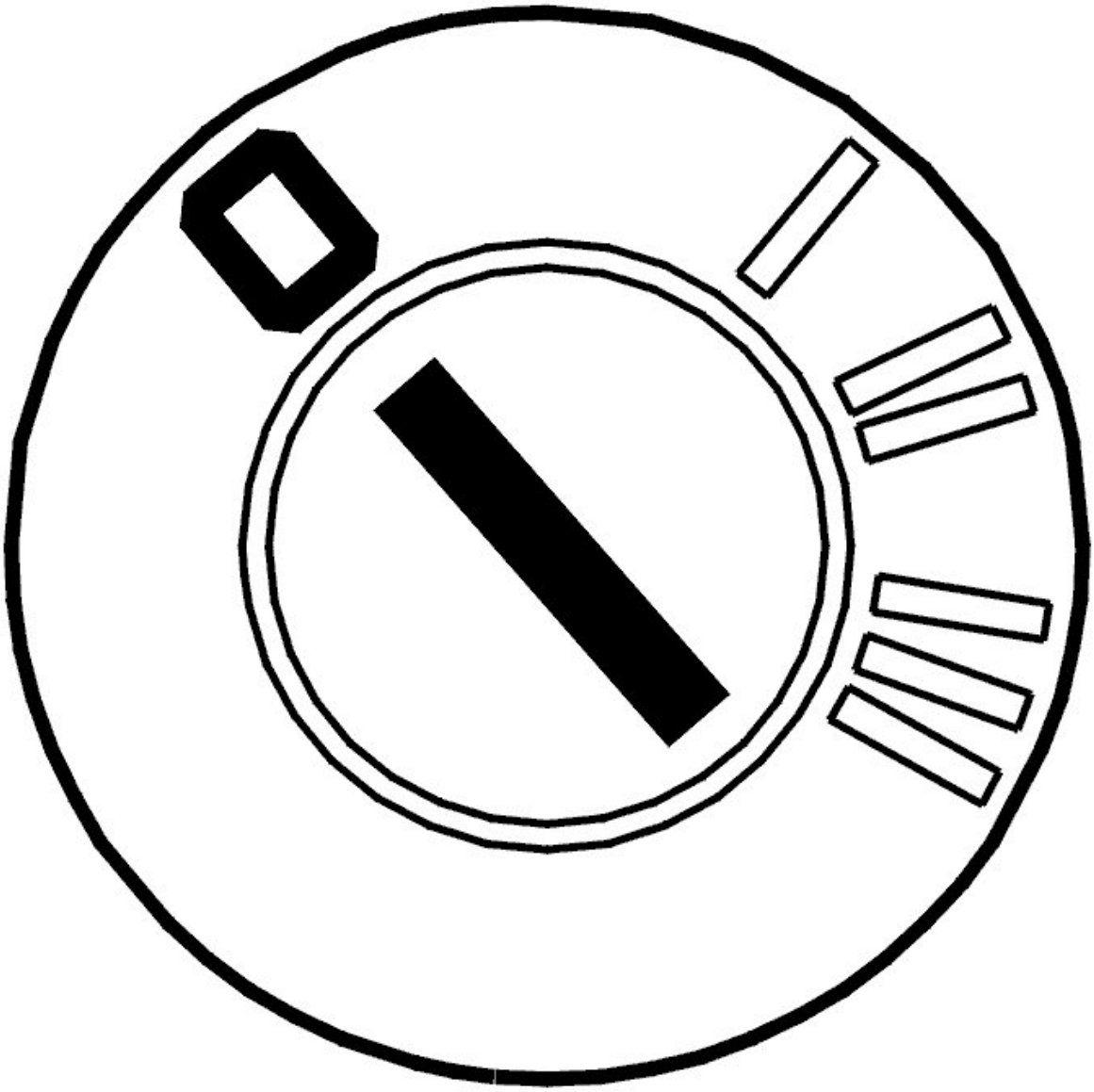
- To replace the connectors for the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the component and cable

Checking the component and cable

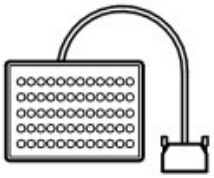


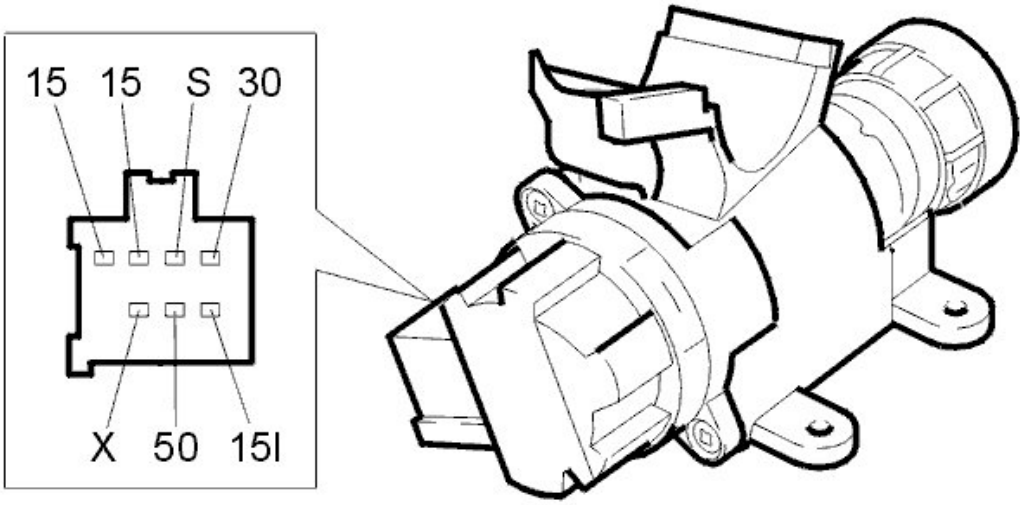
- Ignition off.

Check the cable between central electronic module (CEM) connector terminal #D60 and ignition switch connector terminal #7. Check for a short-circuit to supply voltage.
The voltage must be 0 V if the key is in position 0, I or II.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Were any faults found in the cable?

Yes - Verification

No - Replacing the component

Replacing the component

To replace the connector for the ignition switch, see: Steering wheel lock, replacing See: Steering and Suspension/Steering/Steering Column/Steering Column Lock/Service and Repair

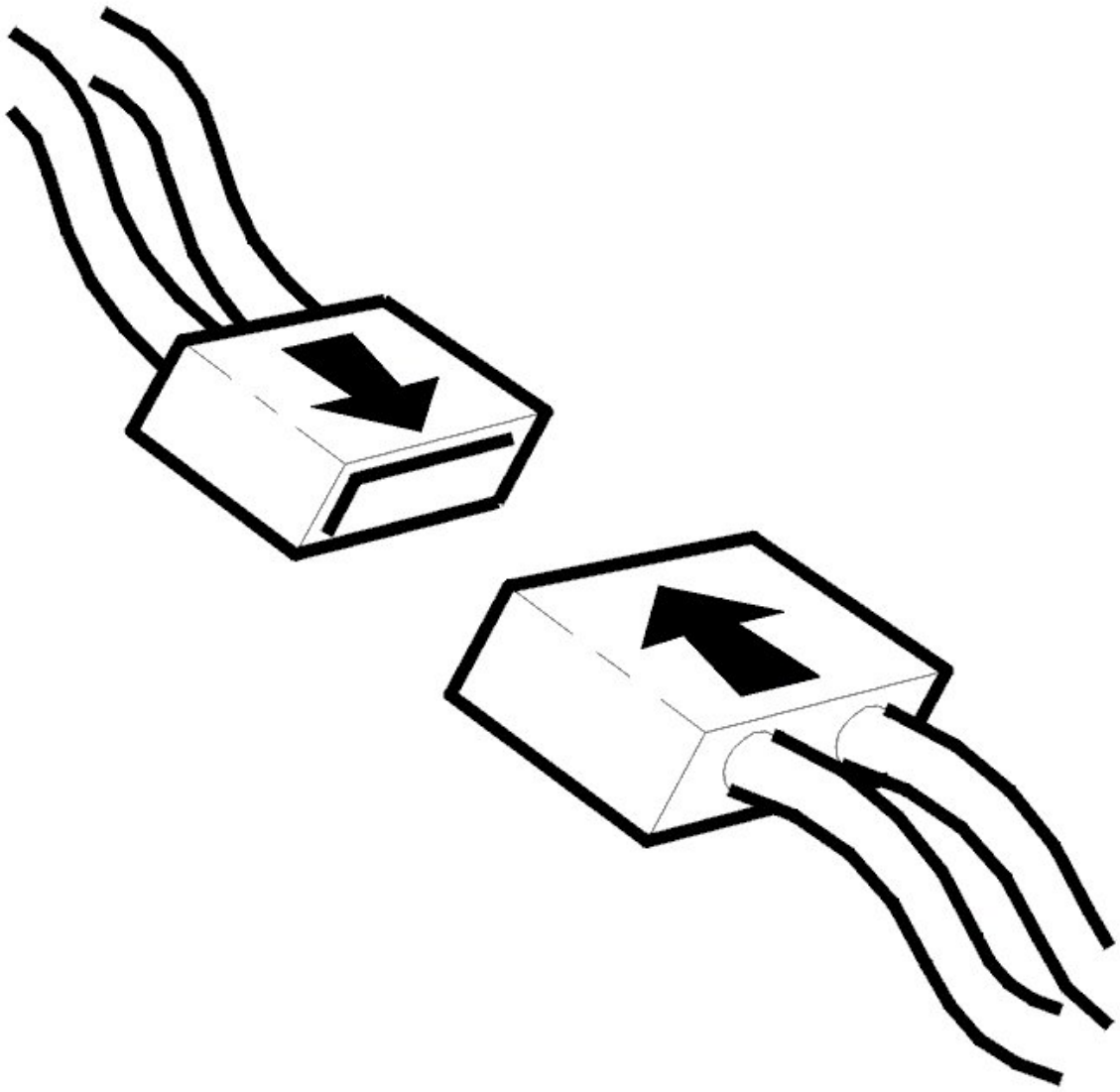
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off.
- Reinstall the connectors, components etc.
- Turn the ignition key to position I.

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

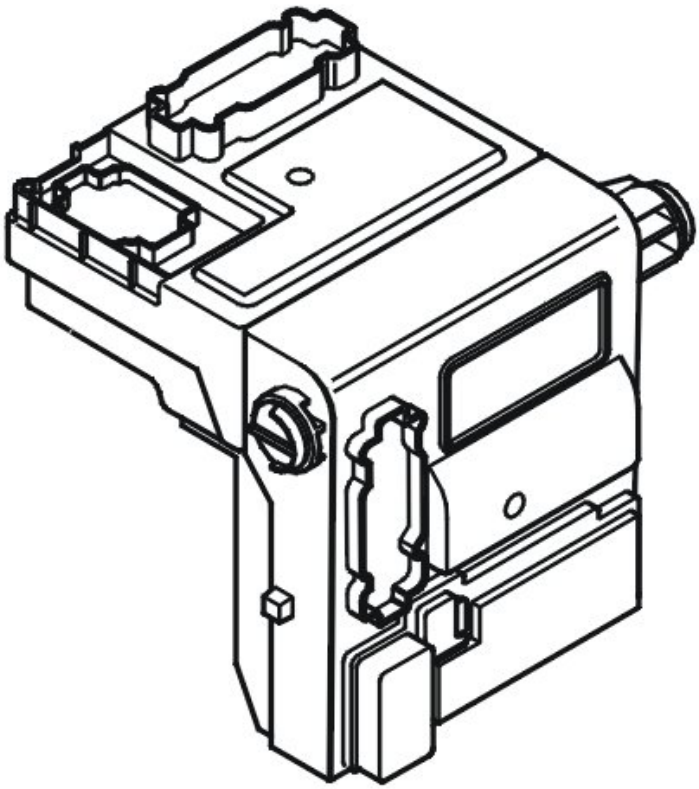
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A41

Condition



The central electronic module (CEM) has an internal clock which starts when the control module is powered for the first time in the factory. The time is kept from the time the internal timer circuit started.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the real time clock has stopped.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and when the test is run at least once a minute.

Substitute value
- None.

Possible source
- Internal fault in the central electronic module (CEM).

Fault symptom[s]
- The parking heater does not operate.
- The clock in the information module is not working

Faulty Signal

Faulty signal

Replacing the control module

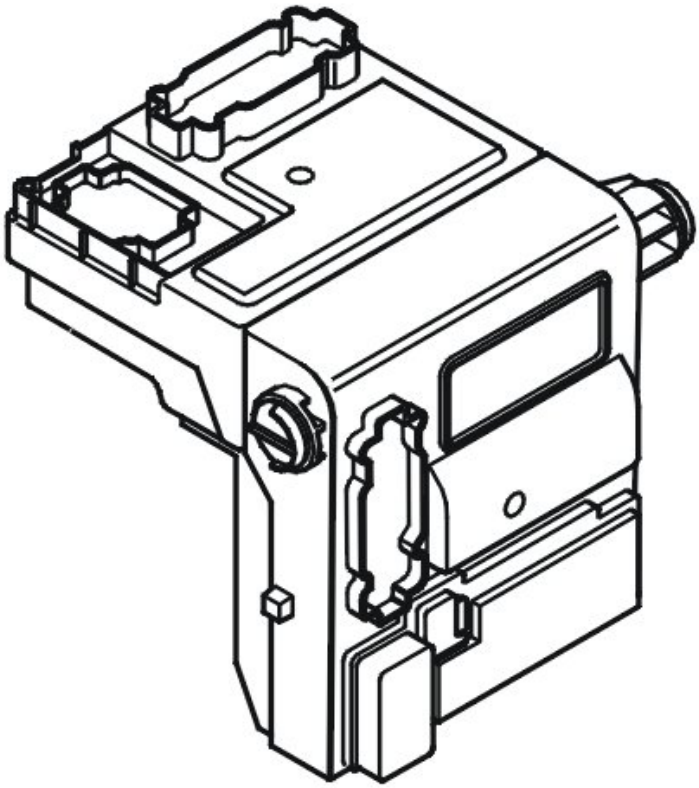
The diagnostic trouble code (DTC) indicates an internal fault in the central electronic module (CEM) which means that the control module needs to be replaced.
Read off the customer parameters from the control module before it is replaced. Click on the VCT2000 symbol. Make a note of the values.
Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A42

Condition



The central electronic module (CEM) has an internal clock which starts when the control module is powered for the first time in the factory. The time is kept from the time the internal timer circuit started.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the real time clock is giving an incorrect value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and when the test is run at least once a minute.

Substitute value
- None.

Possible source
- Internal fault in the central electronic module (CEM).

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Fault symptom[s]

- The parking heater does not operate.
- The clock in the information module is not working

Faulty Signal

Faulty signal

Replacing the control module

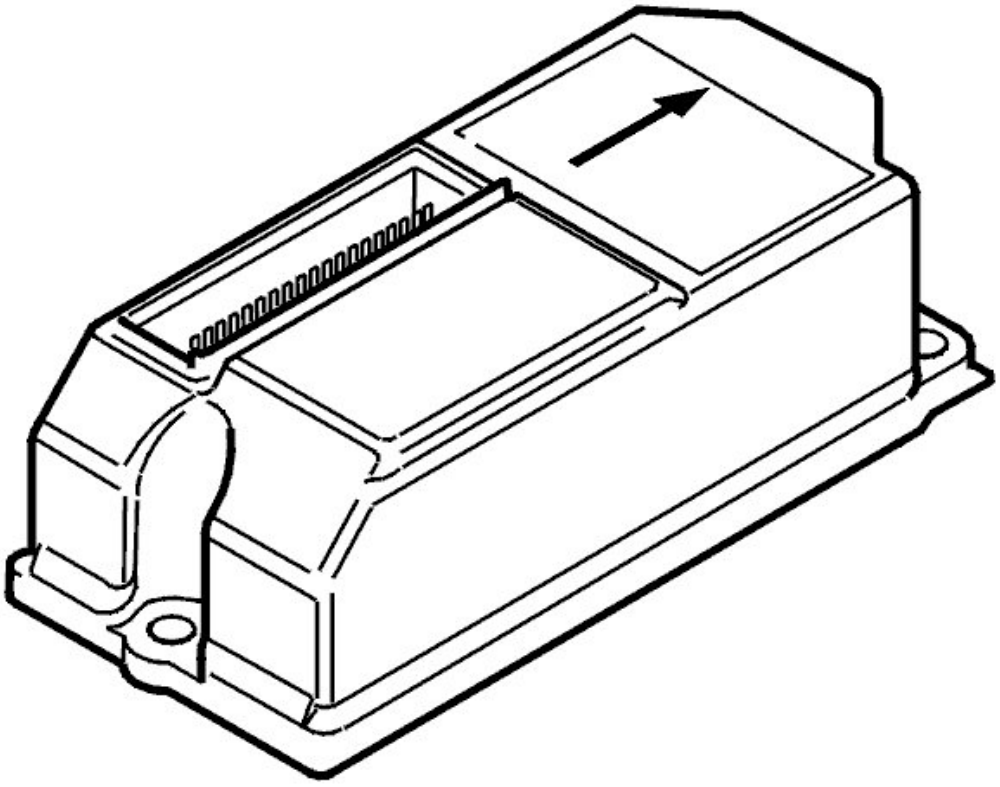
The diagnostic trouble code (DTC) indicates an internal fault in the central electronic module (CEM) which means that the control module needs to be replaced.
Read off the customer parameters from the control module before it is replaced. Click on the VCT2000 symbol. Make a note of the values.
Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A51

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the supplementary restraint system (SRS) control module is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN)!

Substitute value
- None.

Possible source
- No power supply to SRS control module
- Open-circuit in the ground lead for the supplemental restraint system module (SRS)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the SRS control module
- The supplemental restraint system module (SRS) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

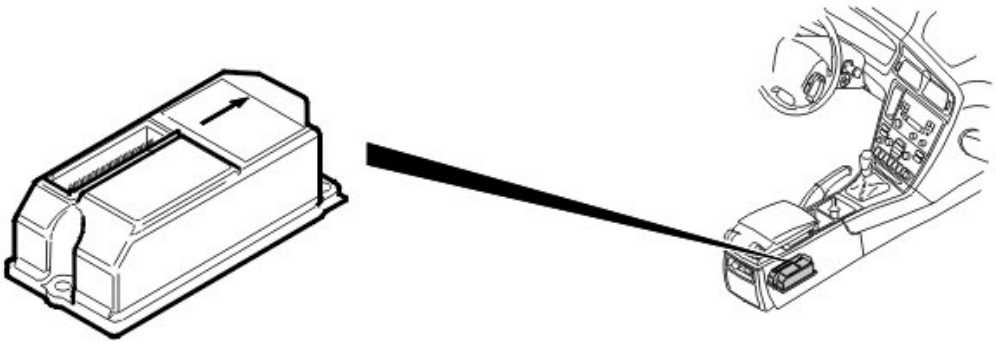
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Checking the power supply for the supplemental restraint system module (SRS)

Check the power supply to the control module by turning the ignition key to ignition position II.
The SRS (supplemental restraint system) indicator lamp in the driver information module (DIM) must light. The lamp must go out after a few seconds.



Does the warning lamp go out?

Yes - Checking communication with the supplemental restraint system module (SRS)

No - Checking the power supply and ground for the supplemental restraint system module (SRS)

Checking the power supply and ground for the supplemental restraint system module (SRS)

Check that the fuse for the control module is intact.
Check the power supply and ground terminal for the supplemental restraint system module (SRS).

Note! The supplemental restraint system module (SRS) is powered via two power inputs. Check that the control module is powered in all ignition positions according to the instructions below.

Remedy as necessary

Other information
- Checking the supply voltage/ground terminal See: Restraint Systems/Air Bag Systems/Testing and Inspection/Component Tests and General Diagnostics
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the supplemental restraint system module (SRS)

No - Signal missing

Checking communication with the supplemental restraint system module (SRS)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the supplemental restraint system module (SRS) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Select Continue

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

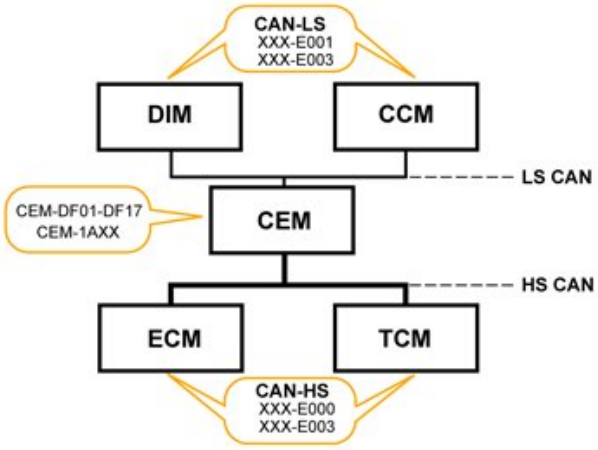
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

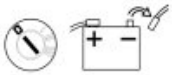
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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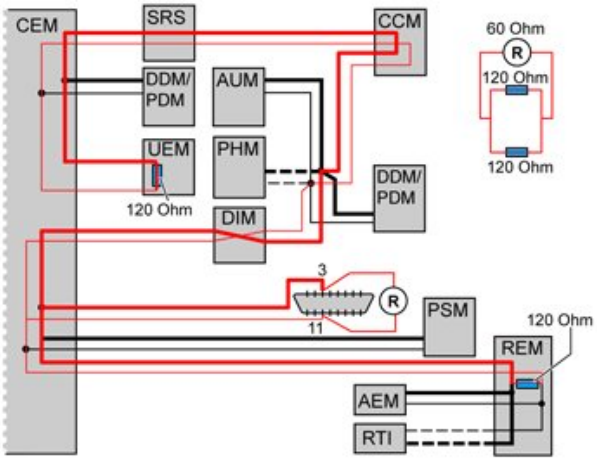
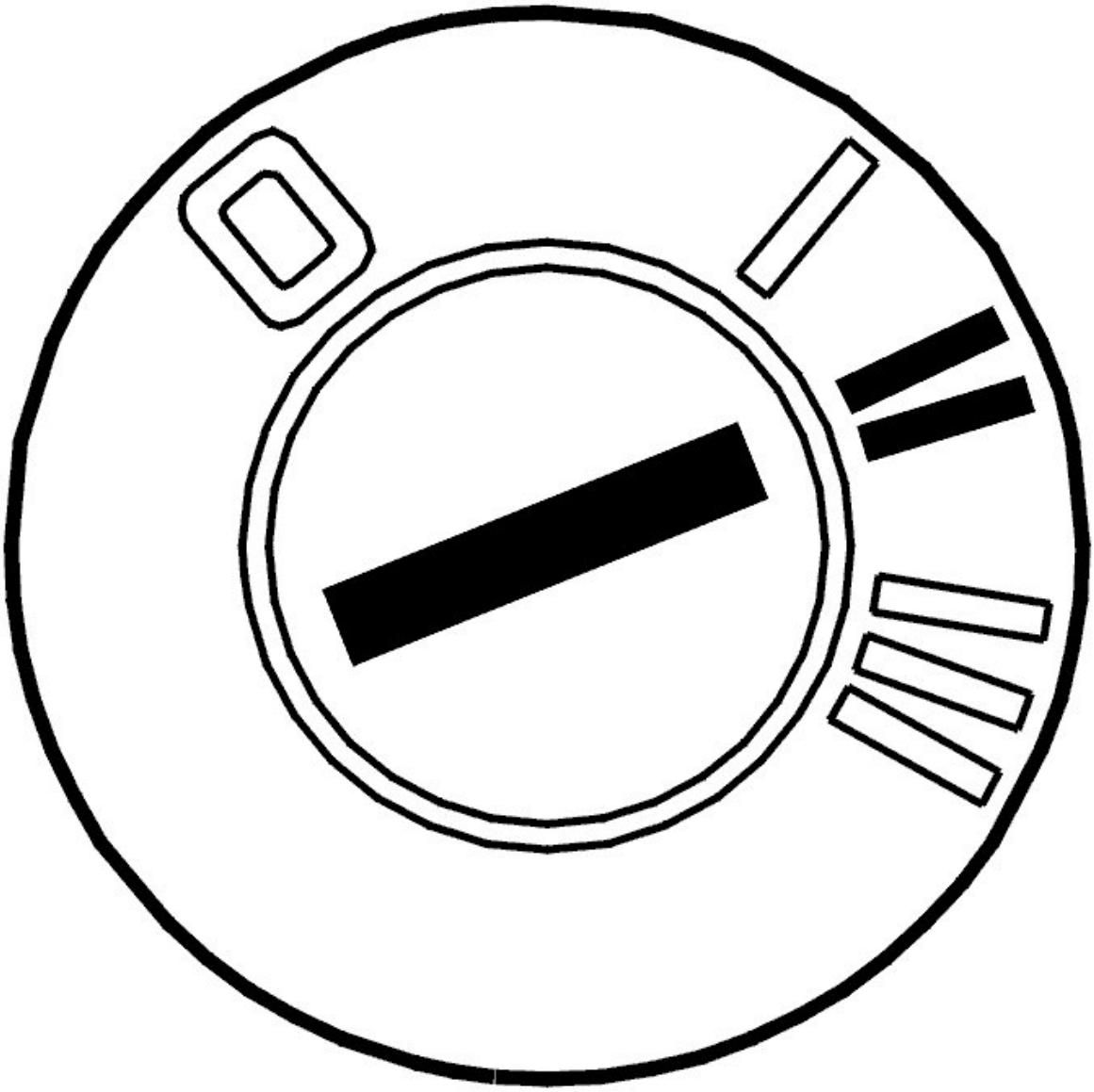


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

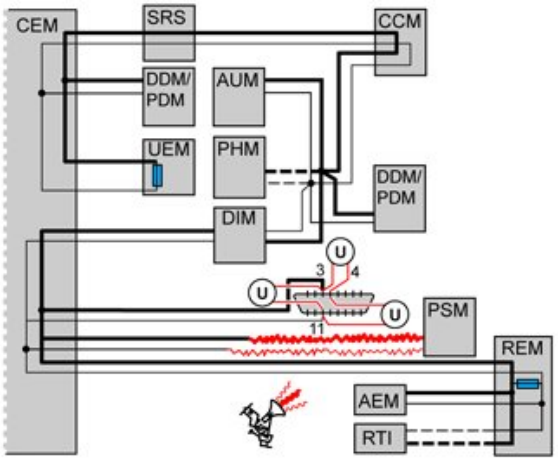
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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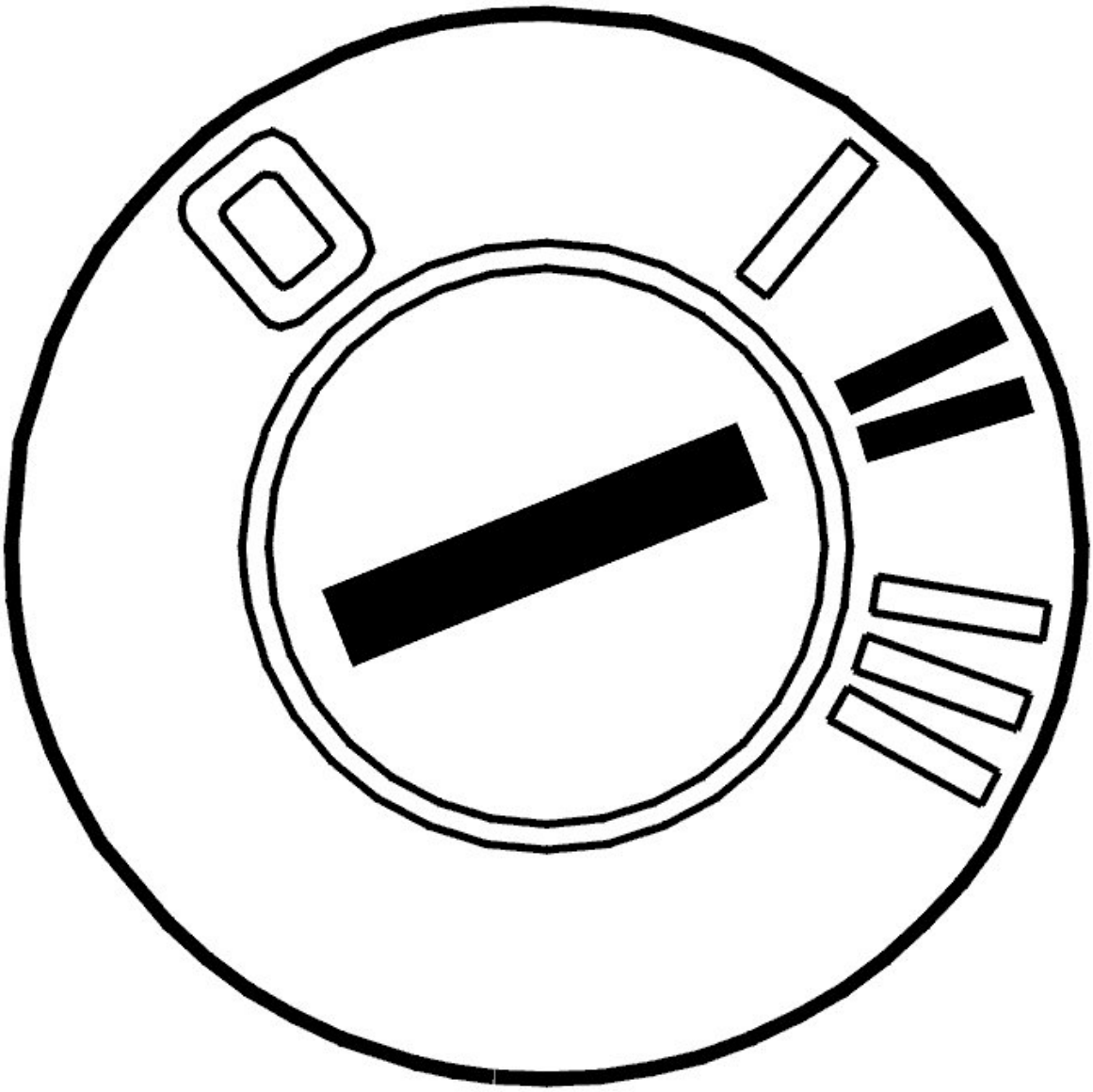
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

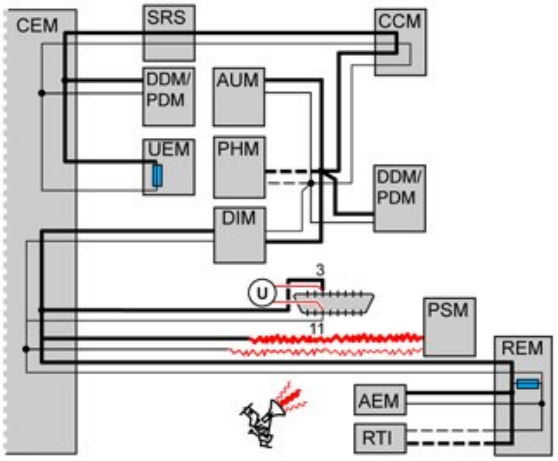
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

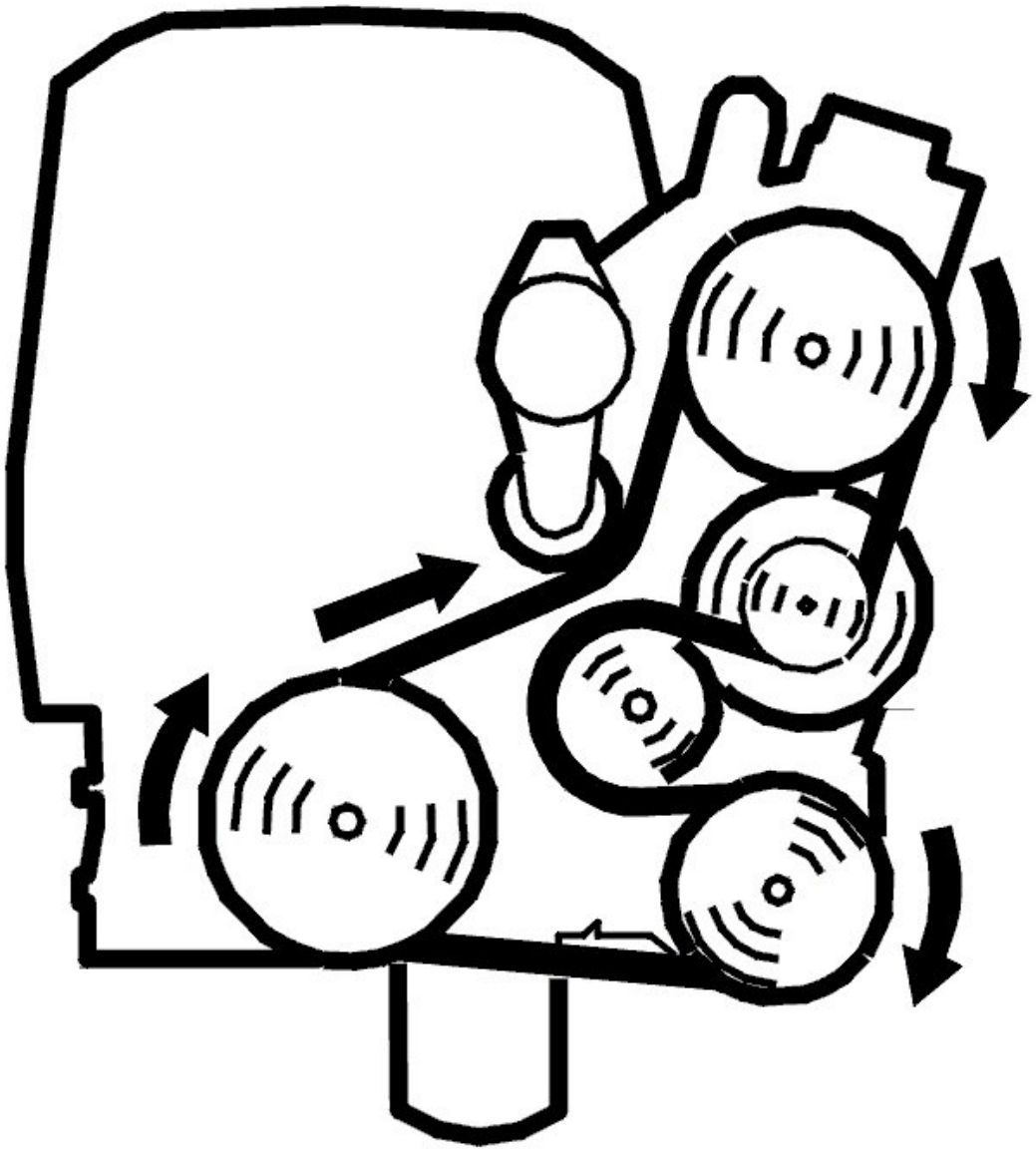
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

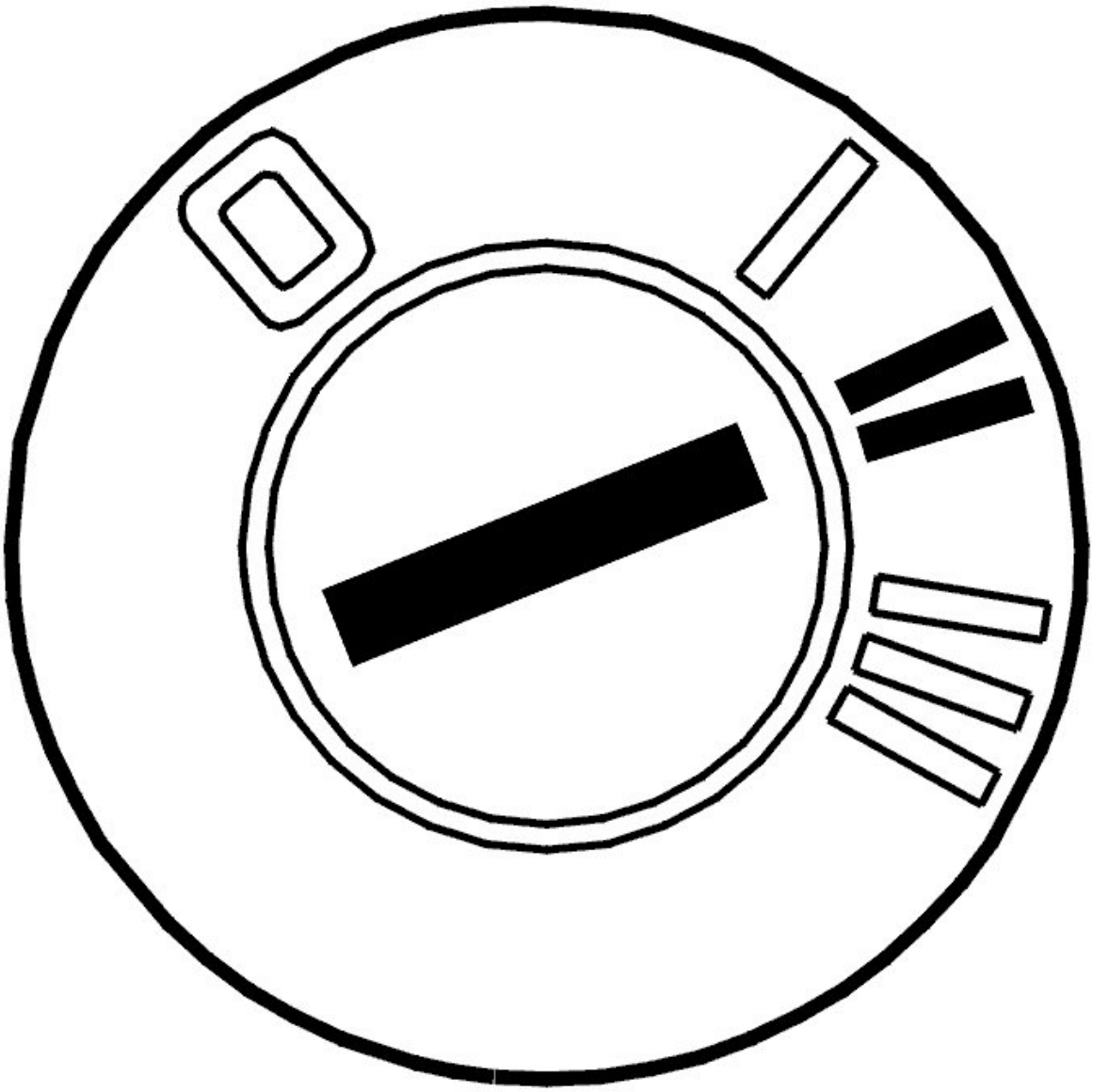


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

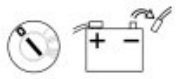
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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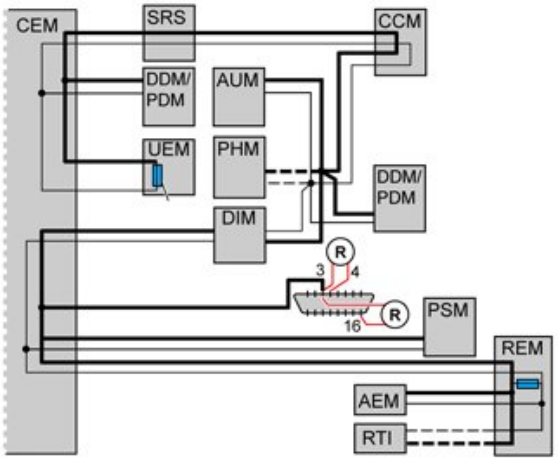
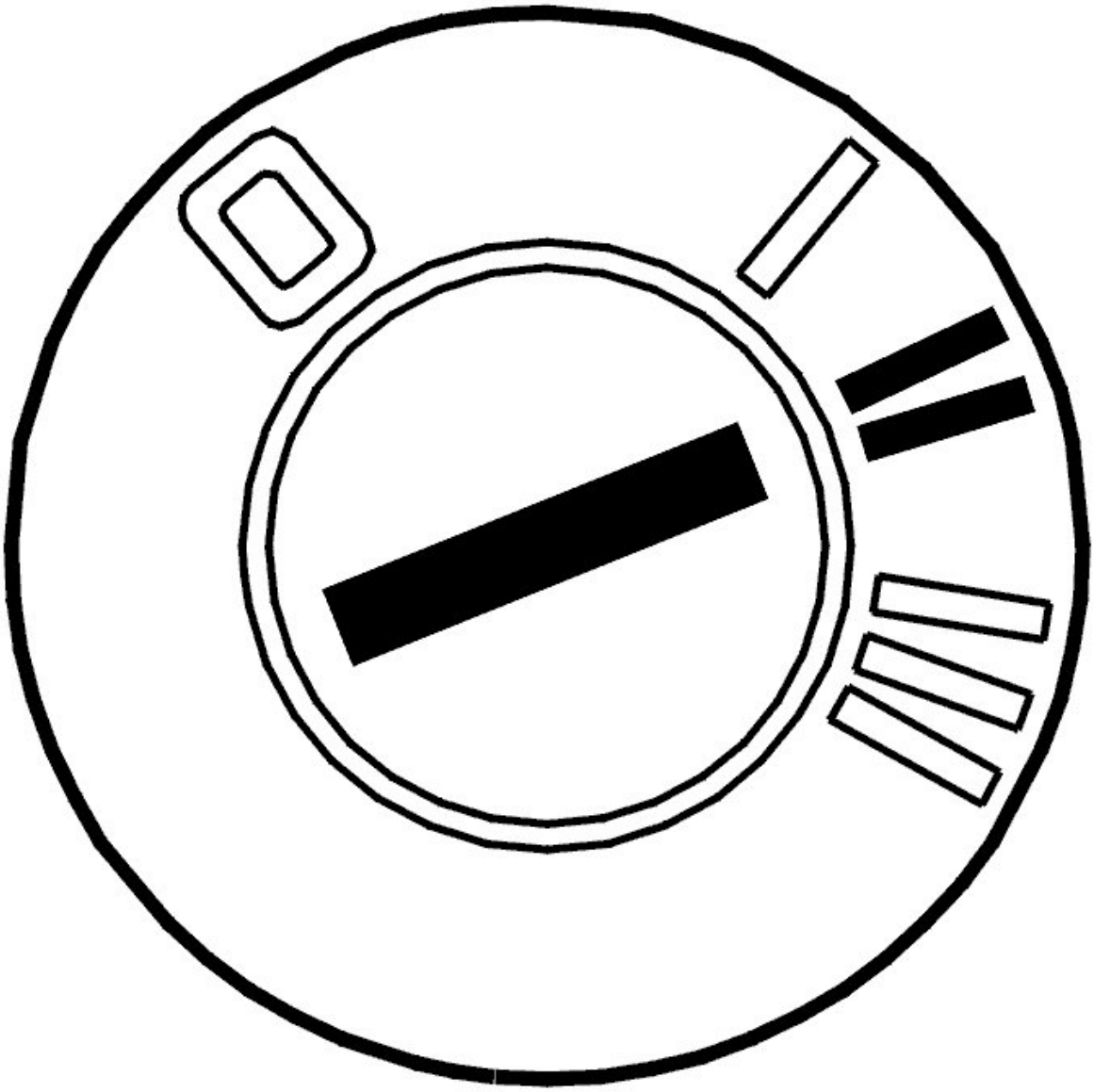


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

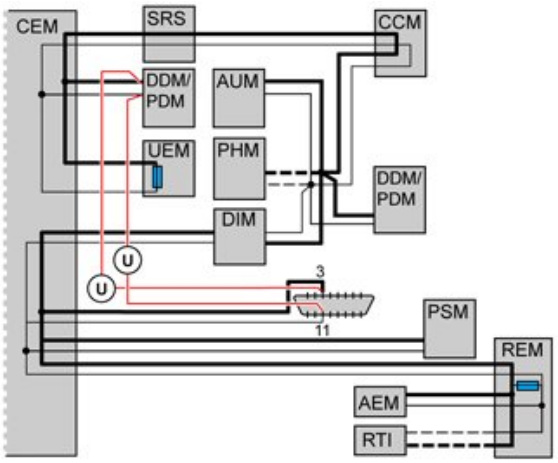
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

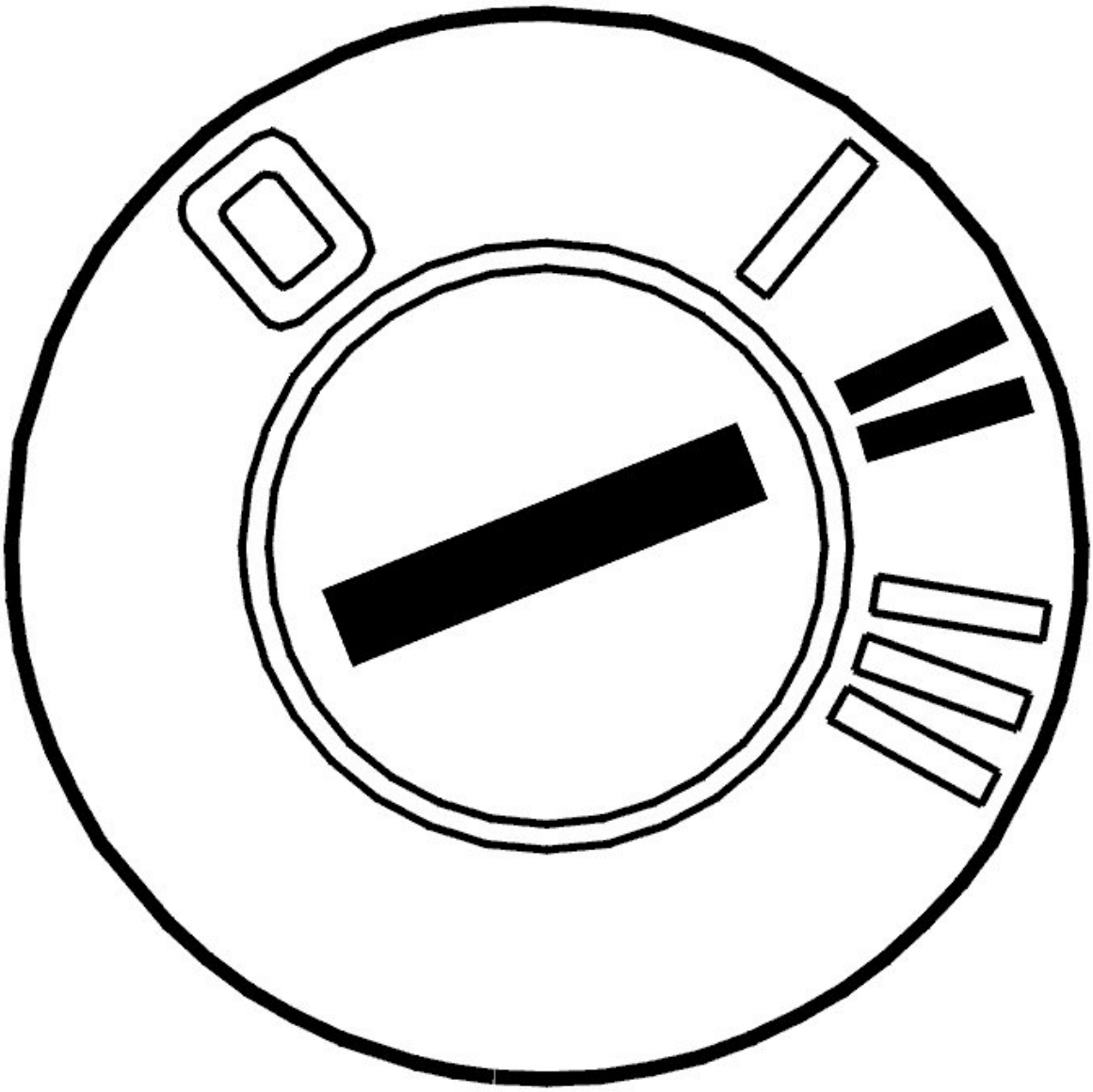
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

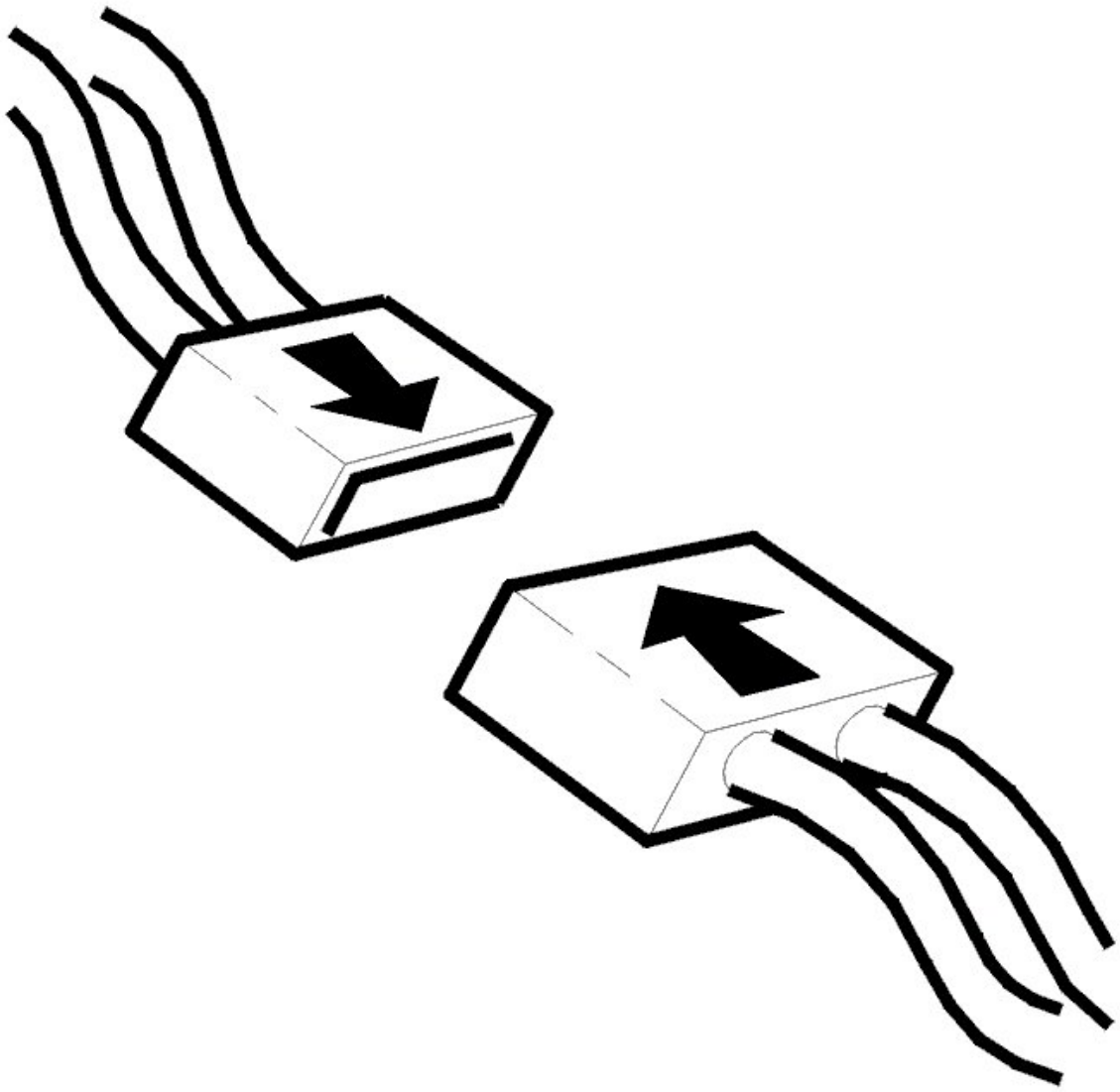


Continue - Verification

Checking the function of the supplemental restraint system module (SRS)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply to the control module by turning the ignition key to ignition position II.
The indicator lamp in the driver information module (DIM) must light up. The lamp must go out after a few seconds.

Does the indicator lamp go out?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

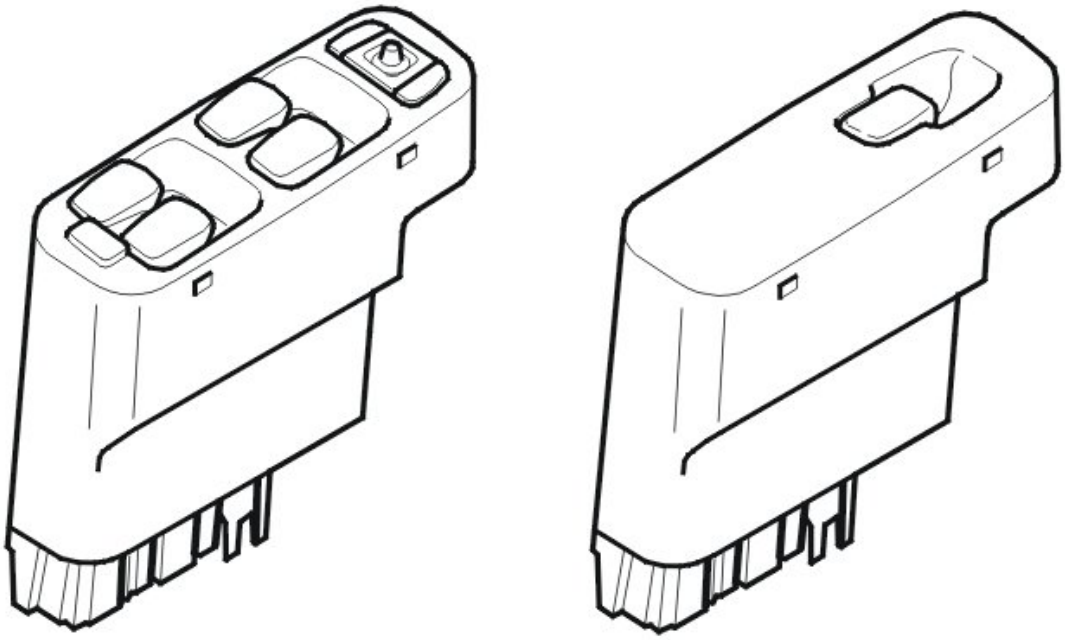
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply for the supplemental restraint system module (SRS)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A52

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the driver's door module (DDM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN)!

Substitute value
- None.

Possible source
- No power supply to the driver's door module (DDM)
- Open-circuit in the ground lead for the driver's door module (DDM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the driver's door module (DDM)
- The driver door module (DDM) is not intended for this vehicle (for example a used control module with different software/hardware).

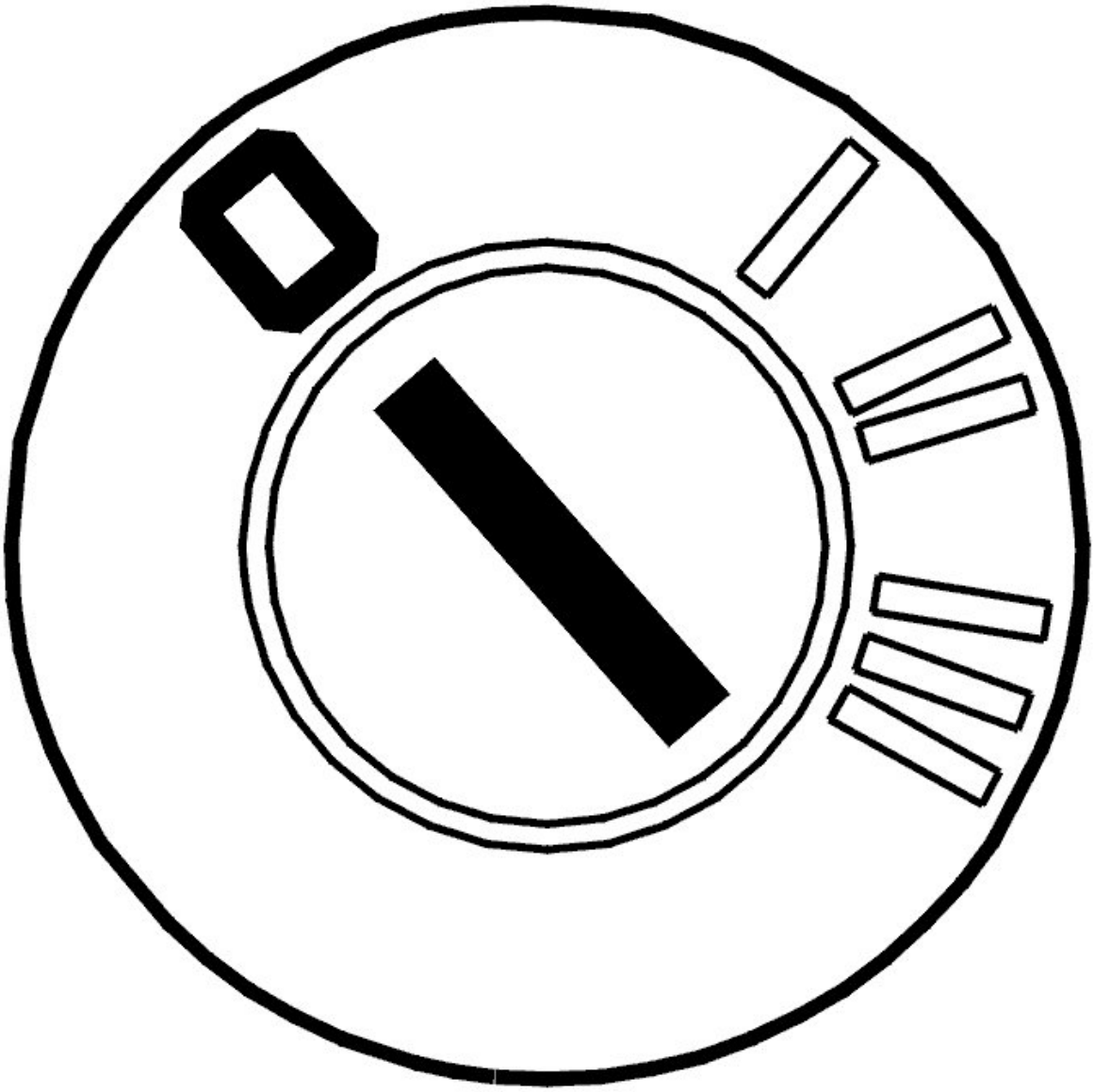
Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- Does not lock / unlock a door.
- The driver's door switch panel does not work.

Signal Missing

Signal missing

Checking the power supply and ground for the driver door module (DDM)



- Ignition off.

Check that the fuse for the control module is intact.
Check the power supply and ground terminal as instructed.

Other information:

- Checking the power supply and ground terminals See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground Terminal, Driver Door Module (DDM)/ Passenger Door Module (PDM)
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the driver door module (DDM)

No - Signal missing

Checking the communication with the driver door module (DDM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Ignition on
- Try to communicate with the driver door module (DDM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Select Continue

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

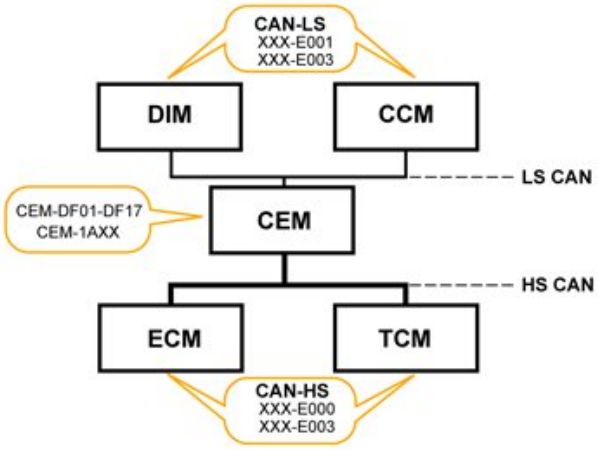
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

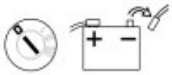
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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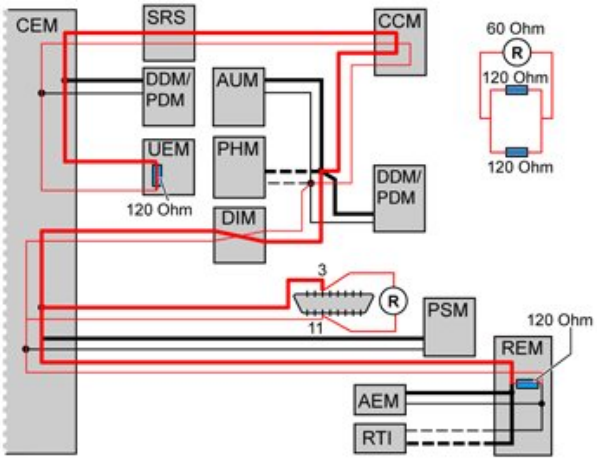
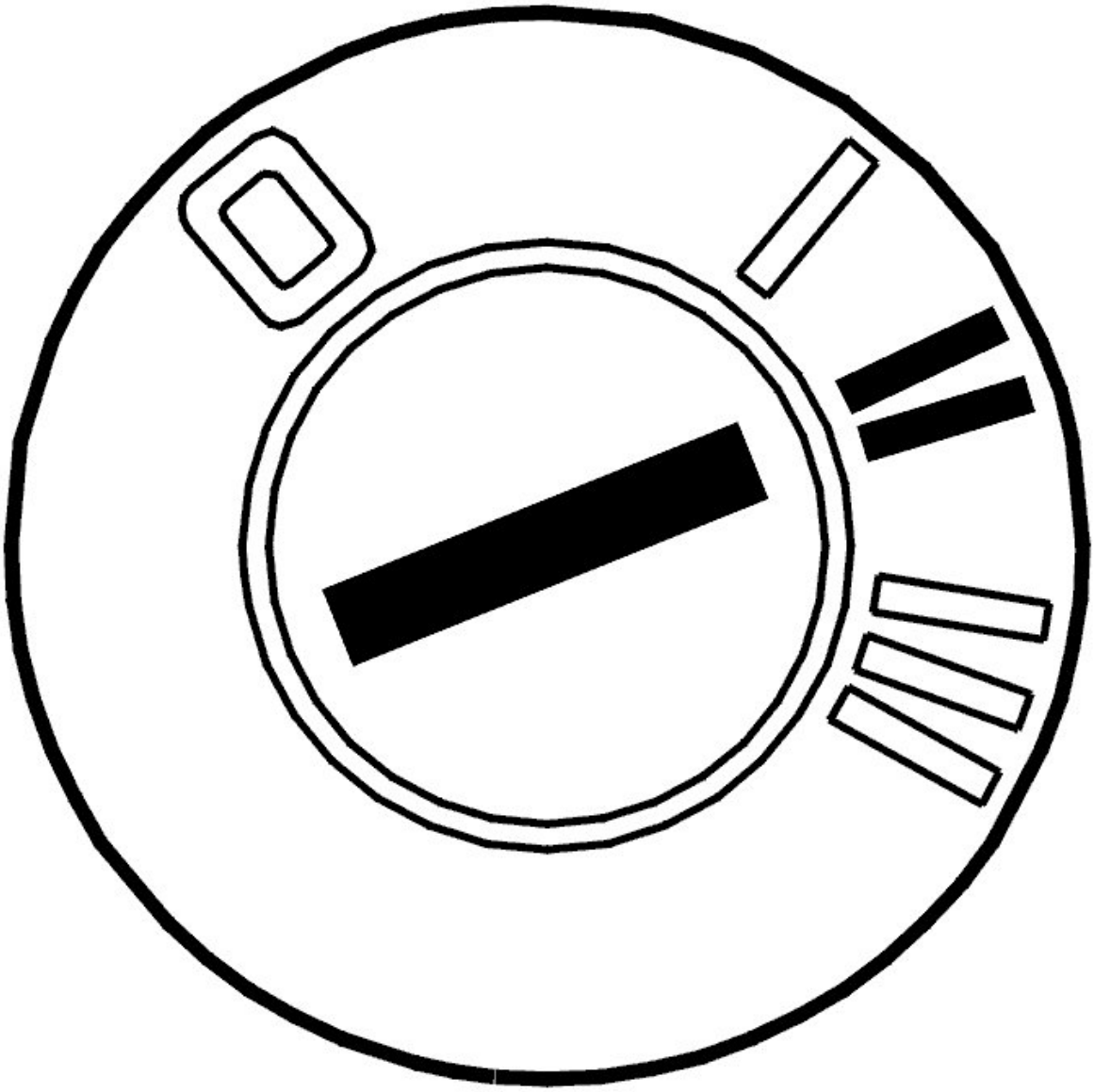


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

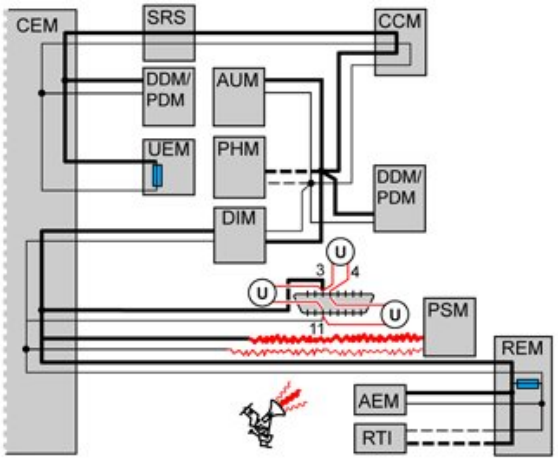
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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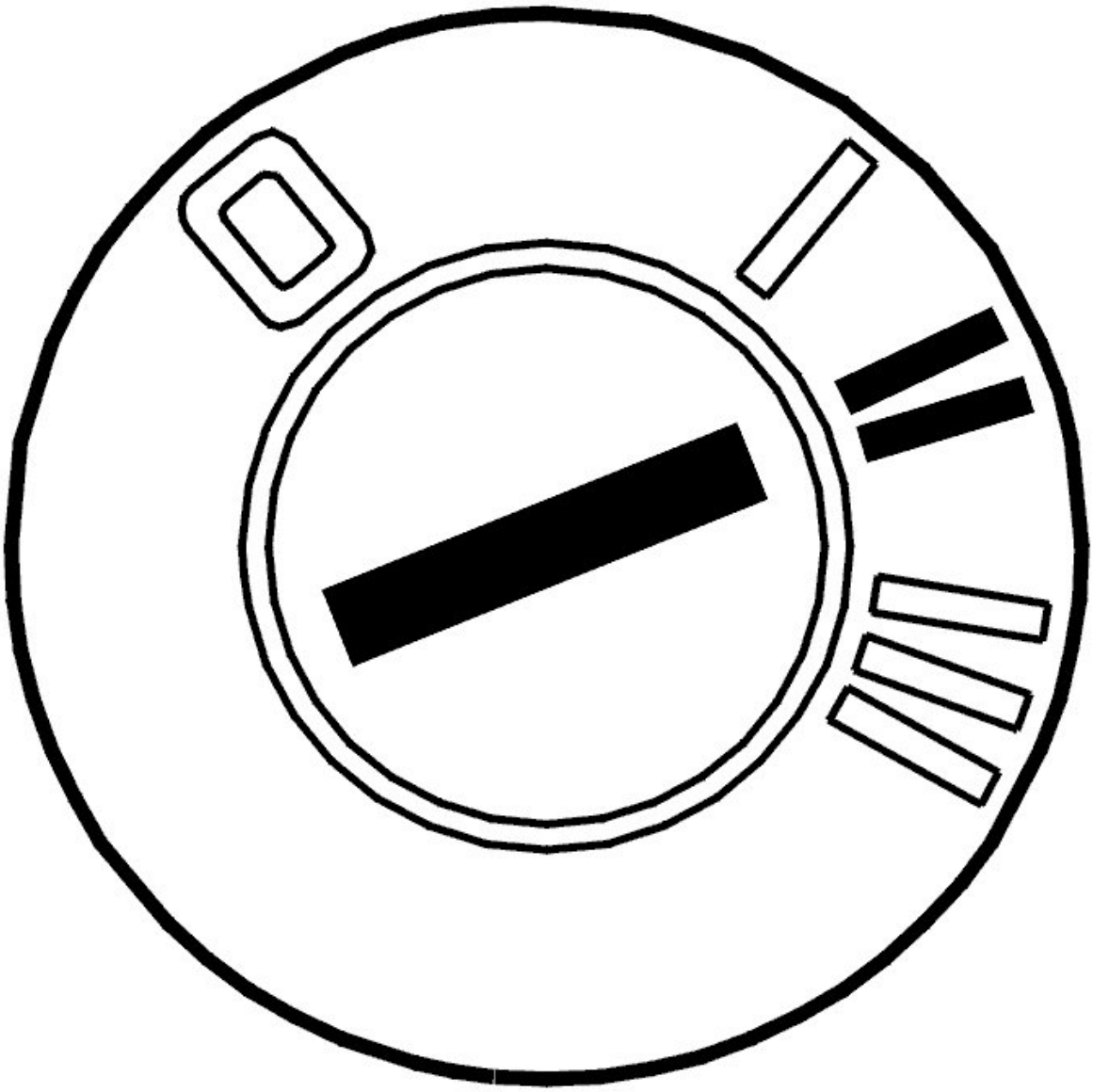
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

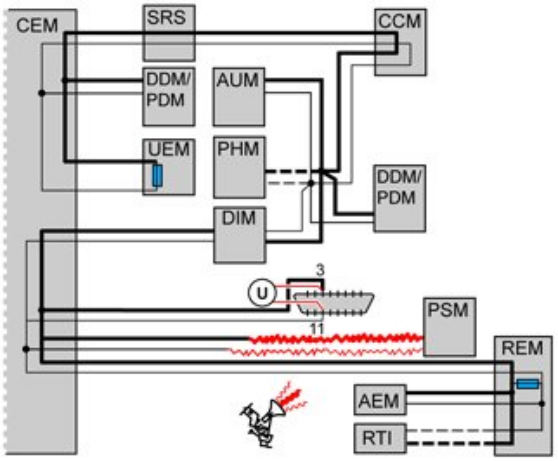
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

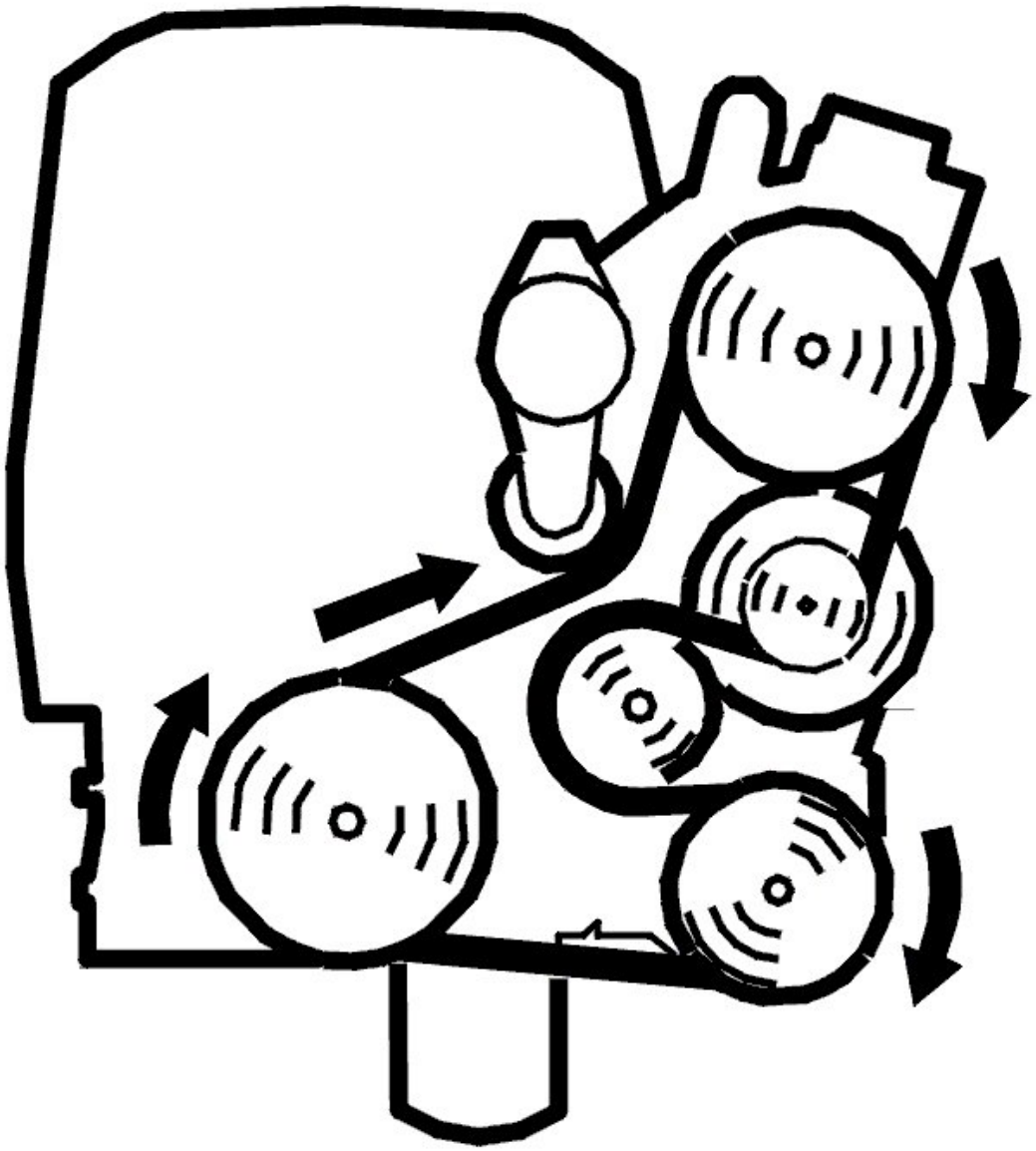
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

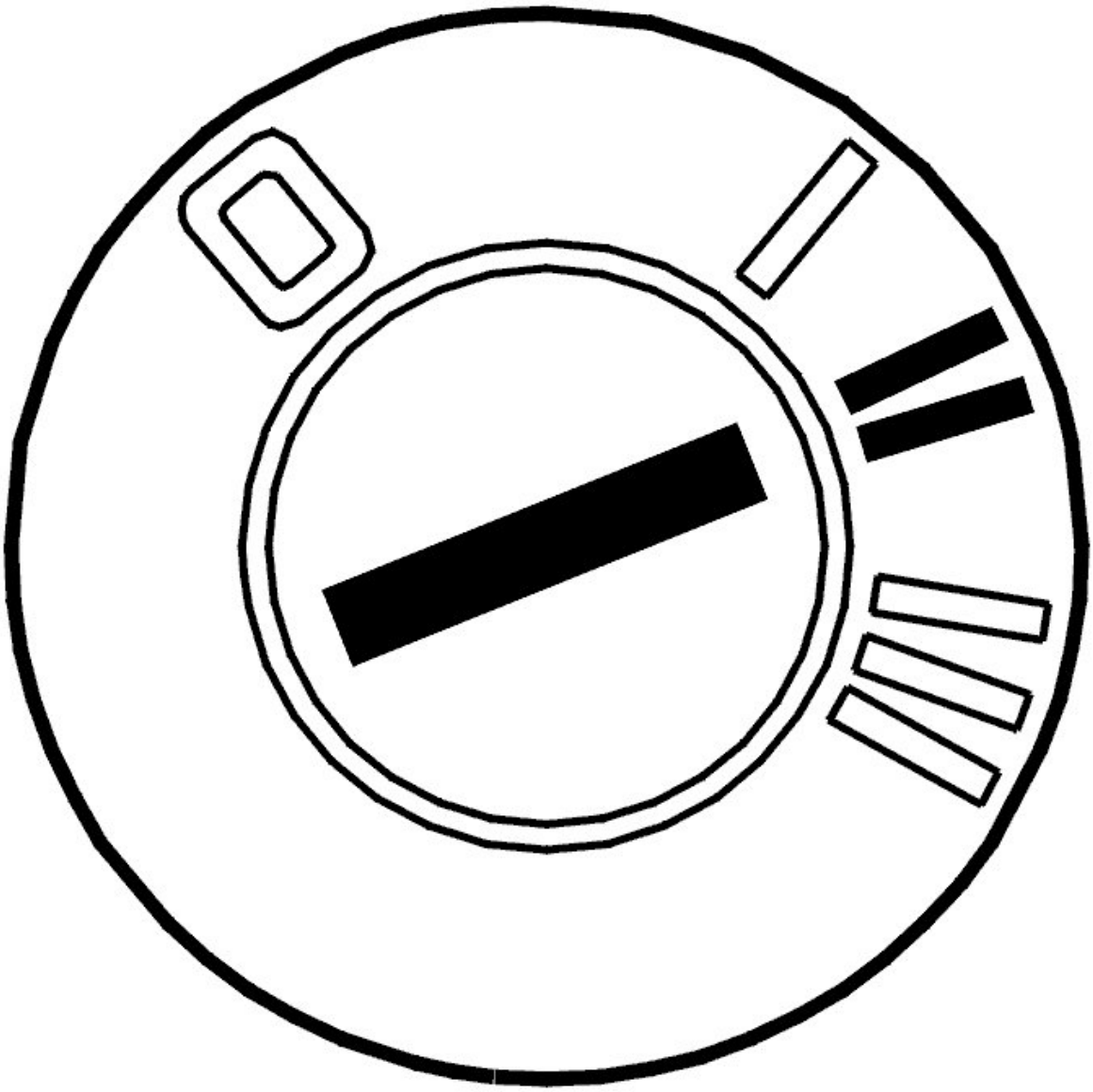


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

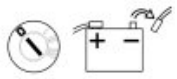
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

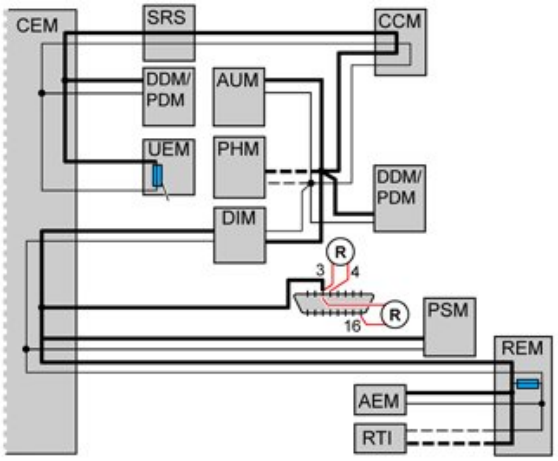
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

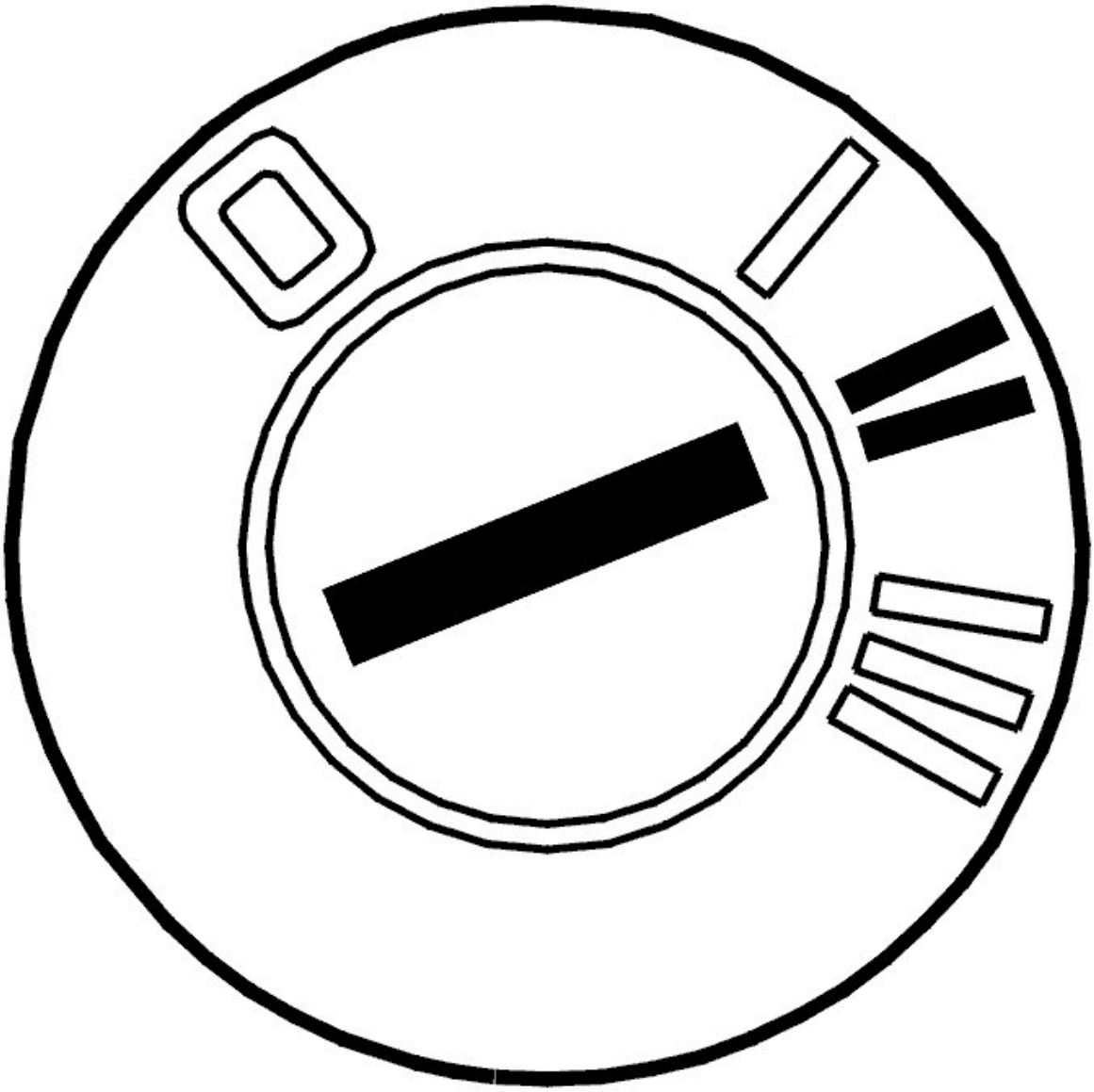


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

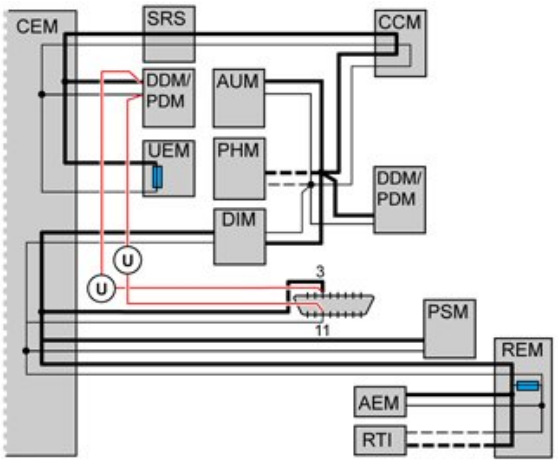
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

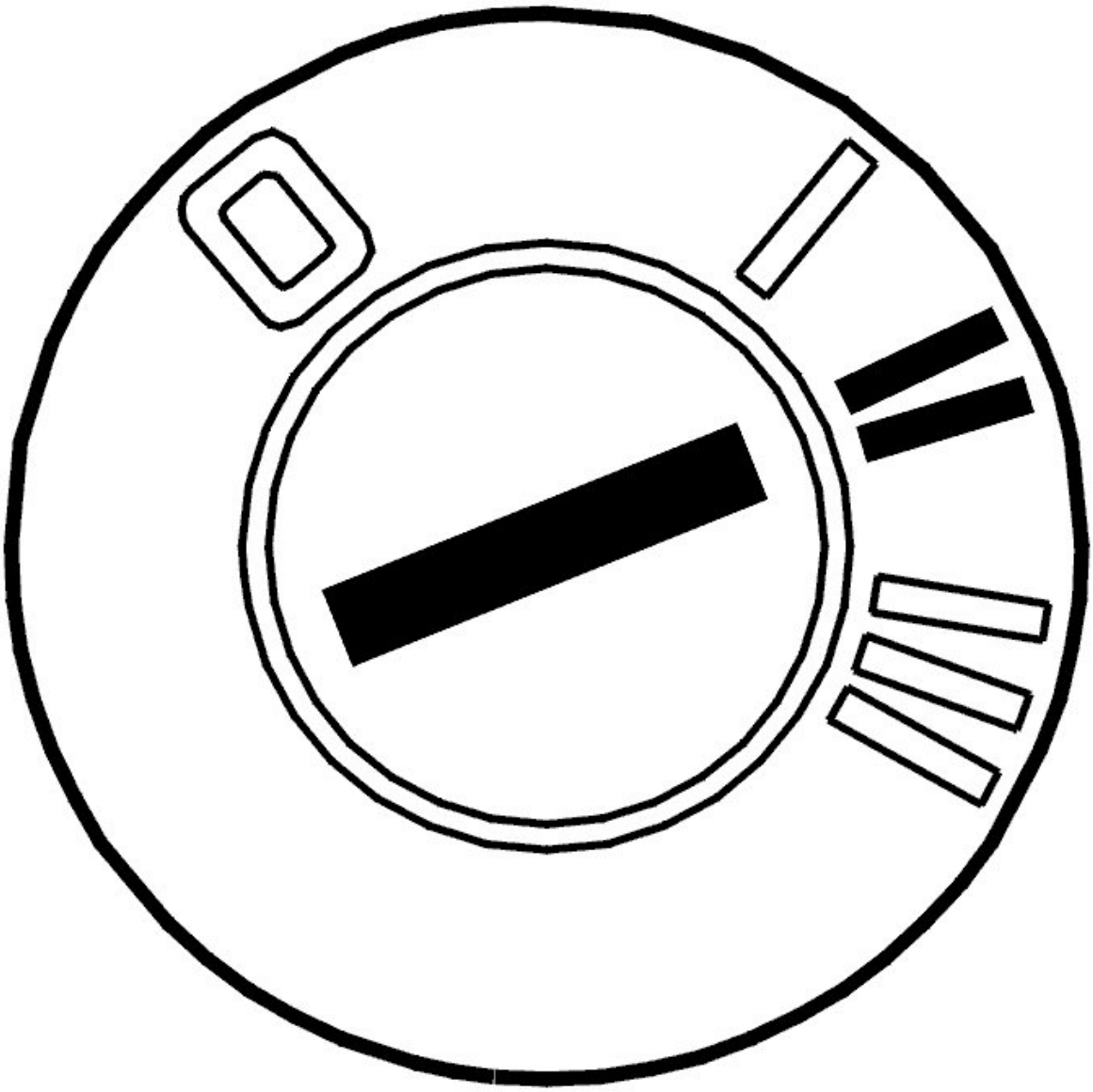
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

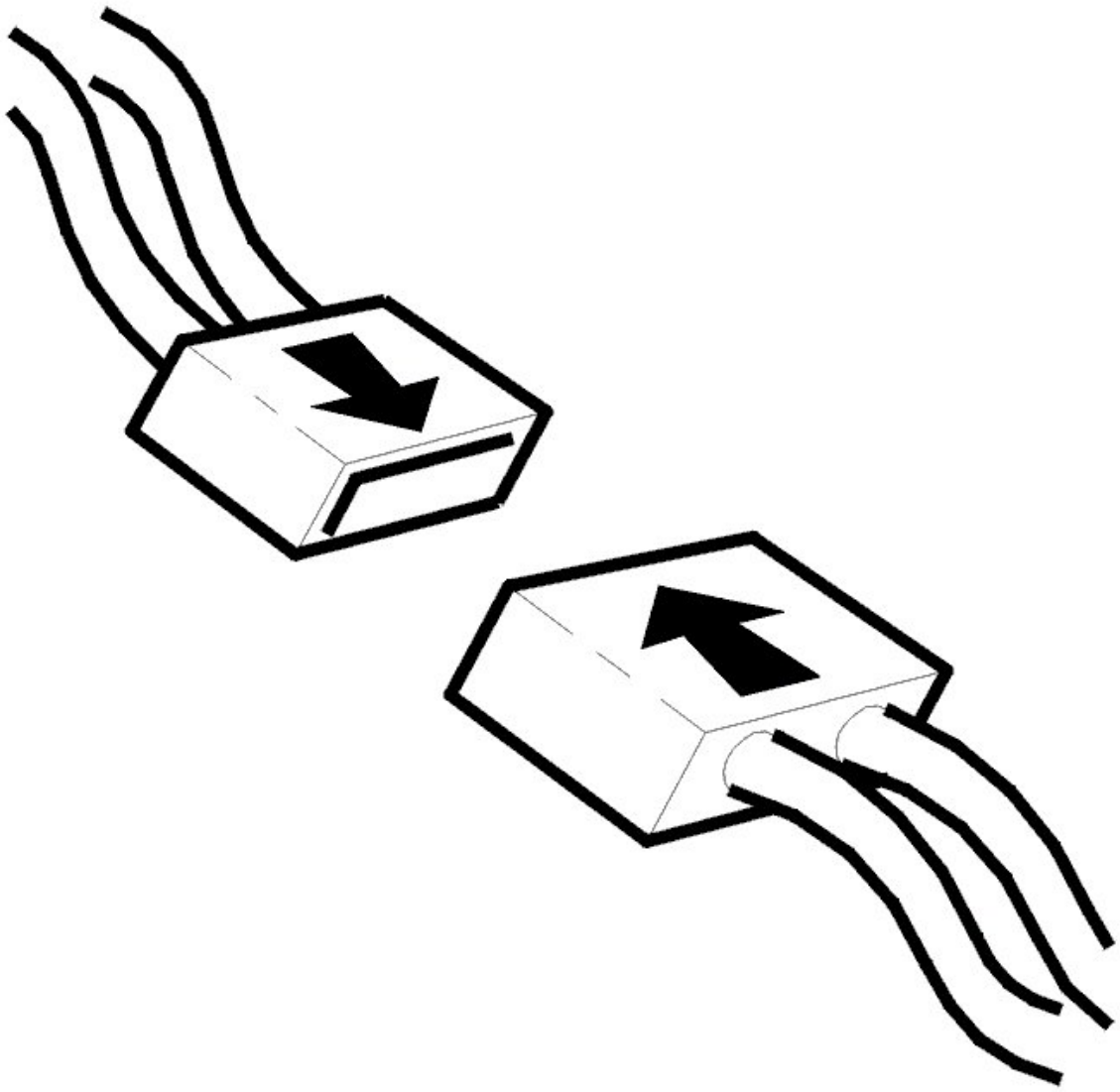


Continue - Verification

Checking the function of the driver door module (DDM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

For further information about the fuse and terminal pin numbers, see the relevant Wiring Diagram.
Check the function of the control module by pressing the up and down buttons for the power window mechanism. The window must open or close.
Also activate the central locking buttons. The doors must lock and unlock.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

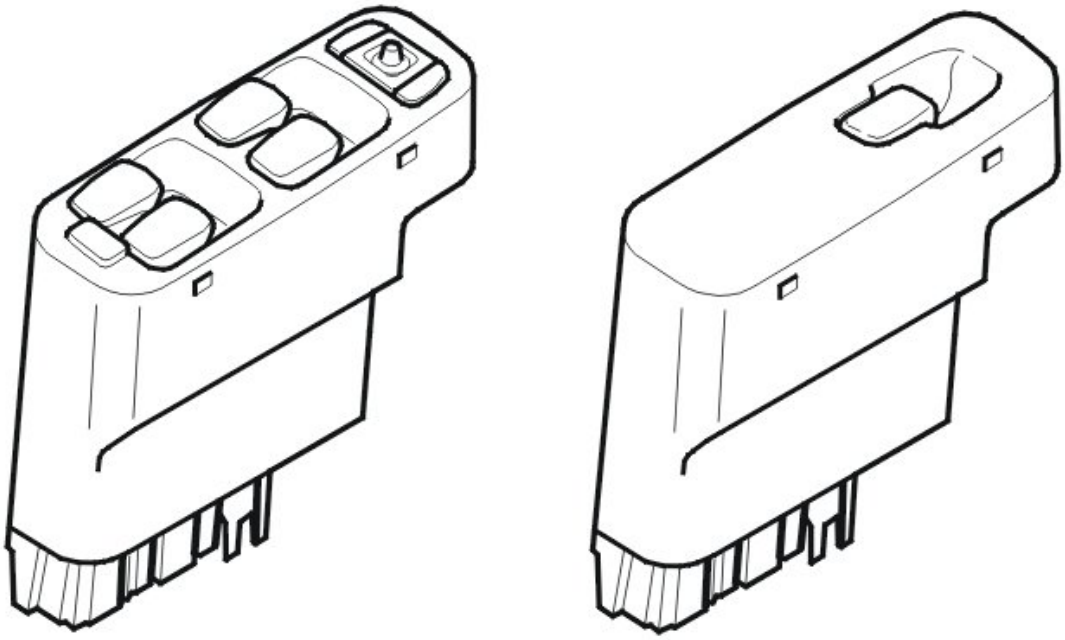
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the driver door module (DDM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A53

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the passenger door module (PDM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN)!

Substitute value
- None.

Possible source
- No power supply to passenger door module (PDM)
- Open-circuit in the ground lead for the passenger door module (PDM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the passenger door module (PDM)
- The passenger door module (PDM) is not intended for this vehicle (for example a used control module with different software/hardware).

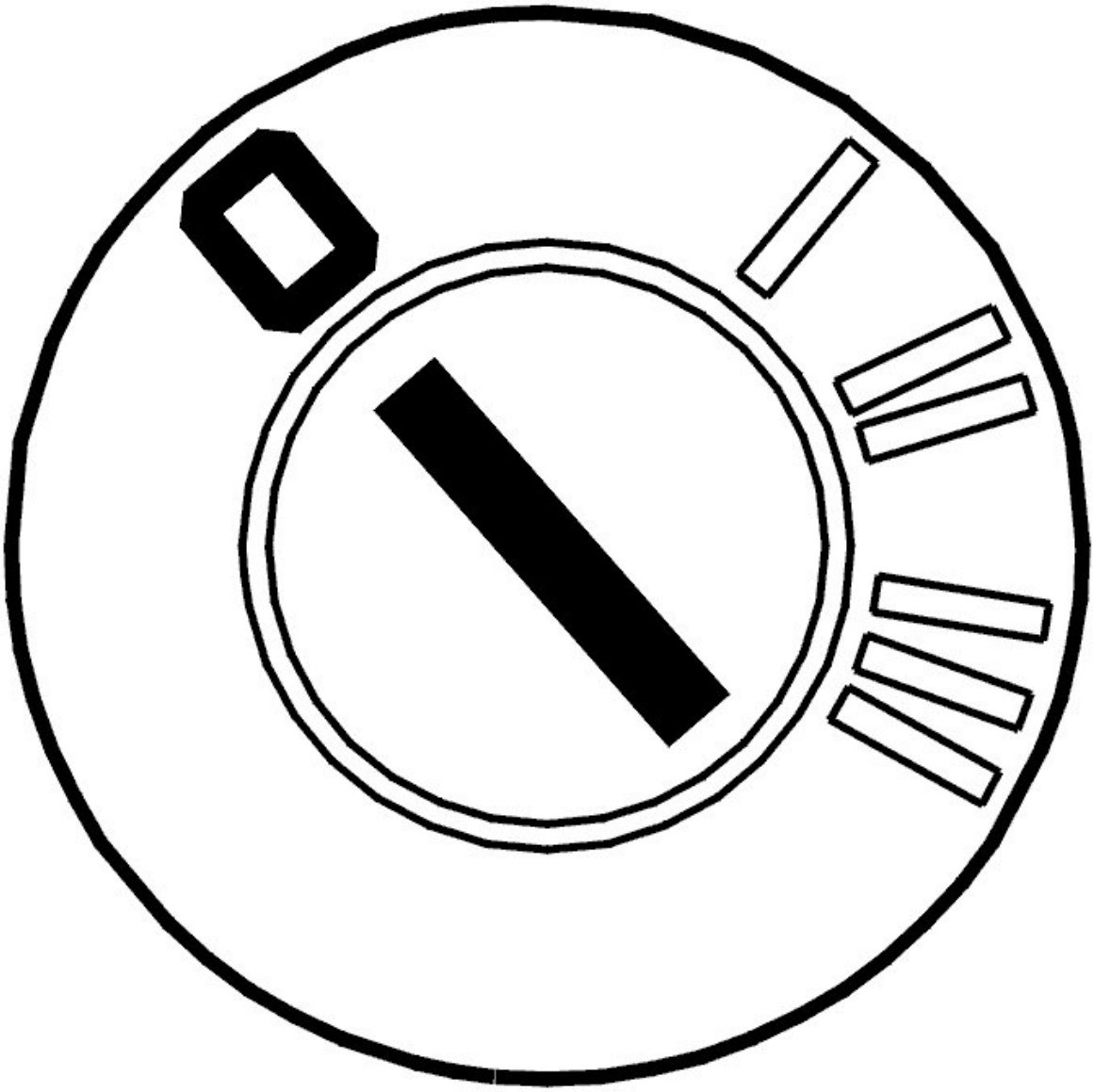
Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- Does not lock / unlock a door.
- The passenger door switch panel does not work.

Signal Missing

Signal missing

Checking the power supply and ground for the passenger door module (PDM)



- Ignition off.

Check that the fuse for the control module is intact.
Check the power supply and ground terminal as instructed.

Other information:

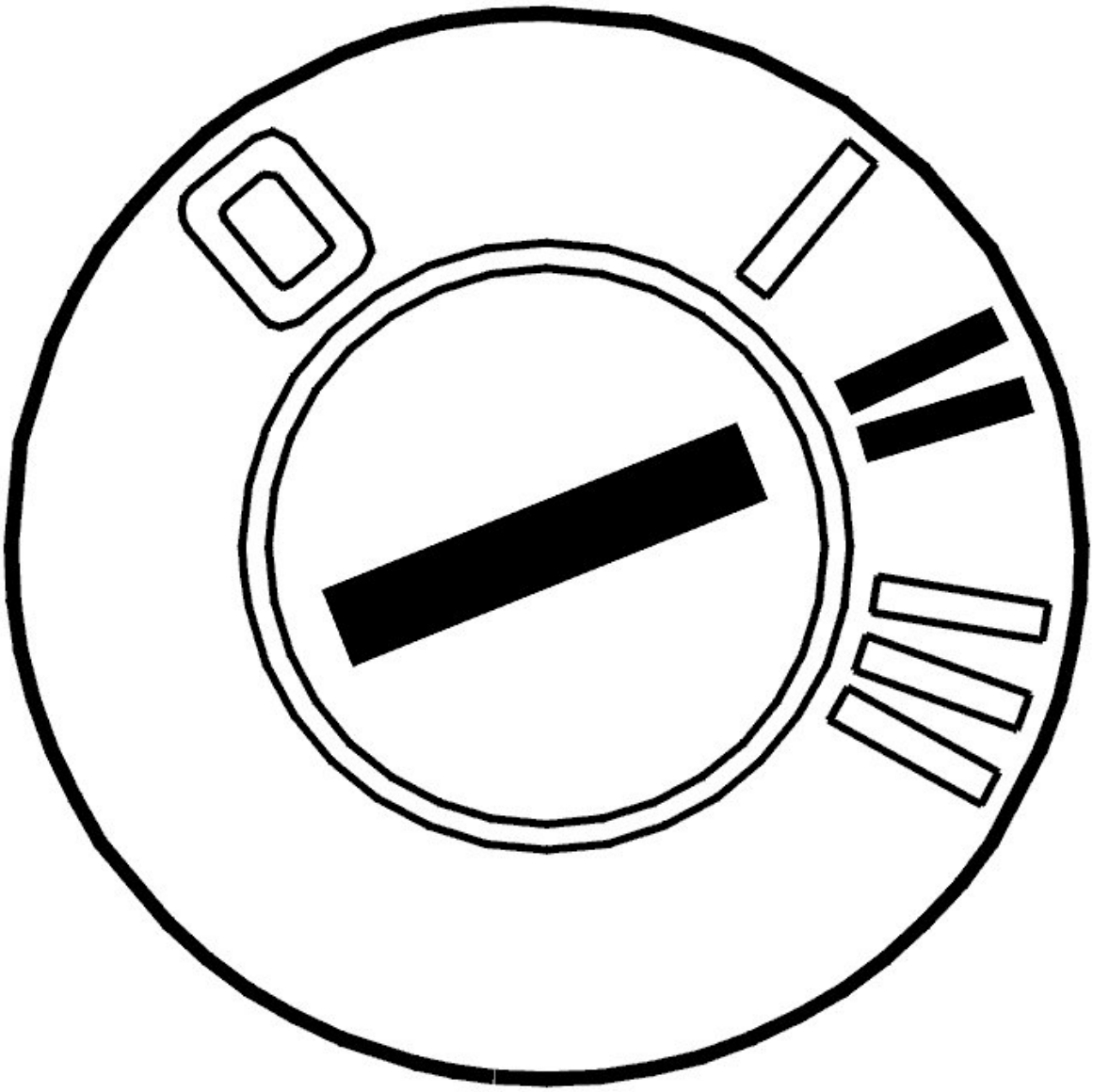
- Checking the power supply and ground terminals See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground Terminal, Driver Door Module (DDM)/ Passenger Door Module (PDM)
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the passenger door module (PDM)

No - Checking communication with the passenger door module (PDM)

Checking communication with the passenger door module (PDM)



- Ignition on.

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the passenger door module (PDM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.

CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

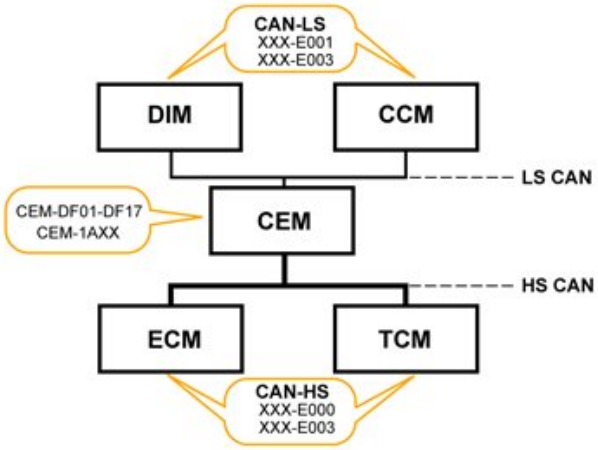
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

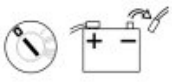
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been

measured.

- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

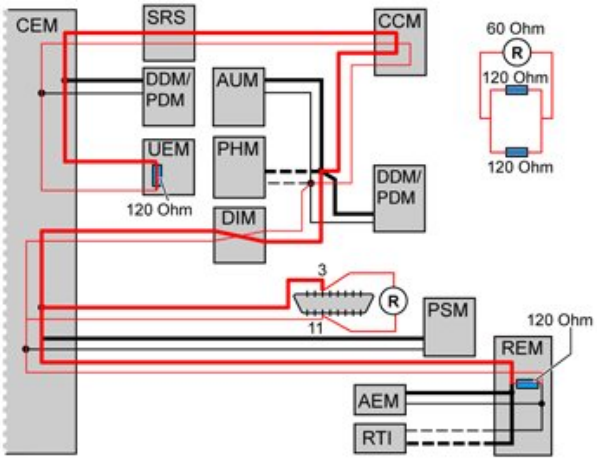
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

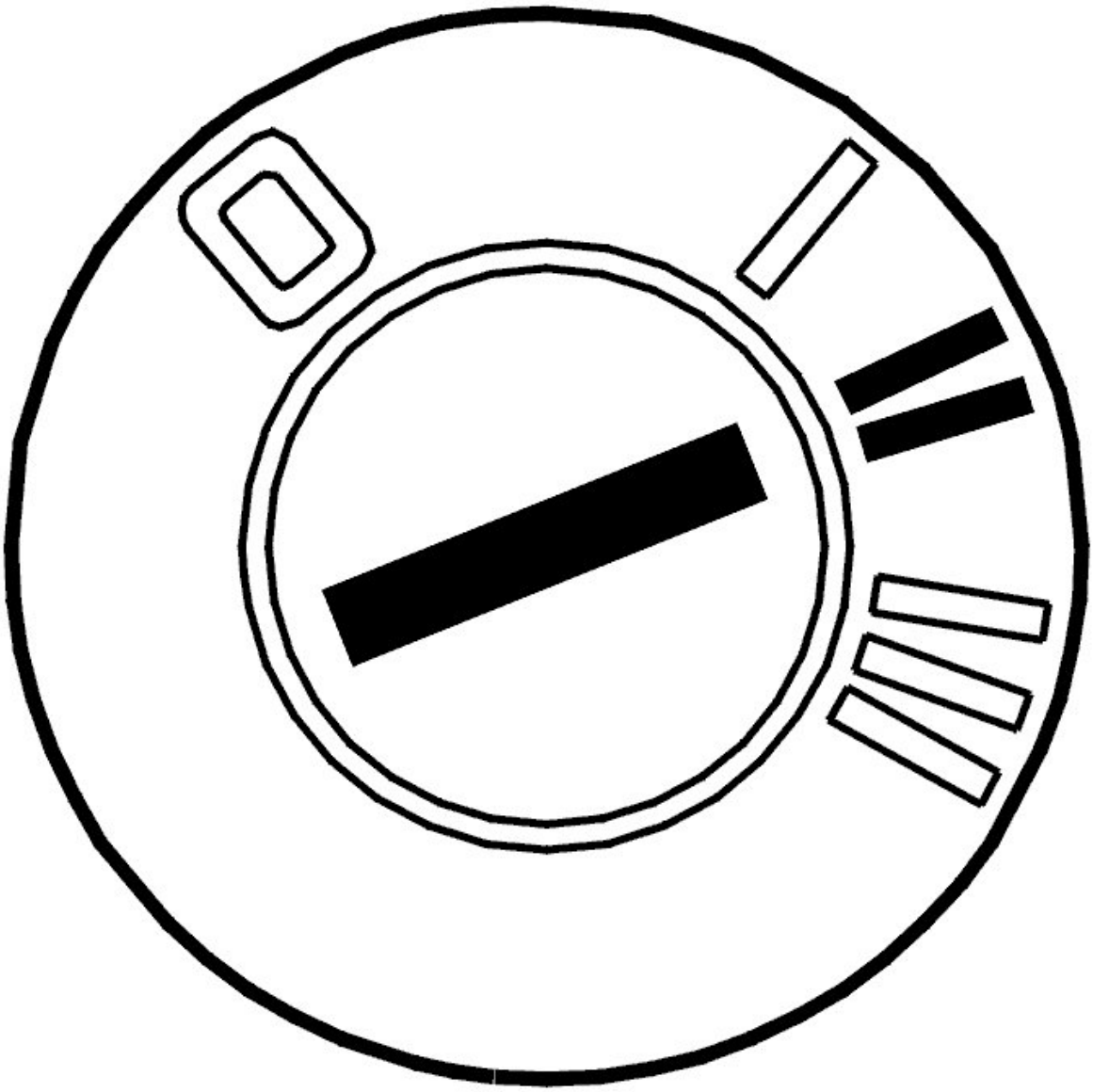


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

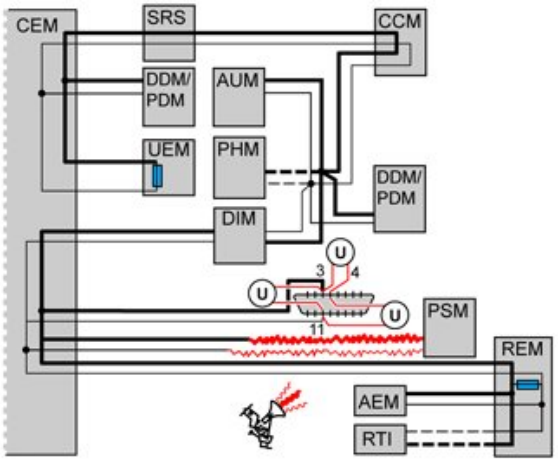
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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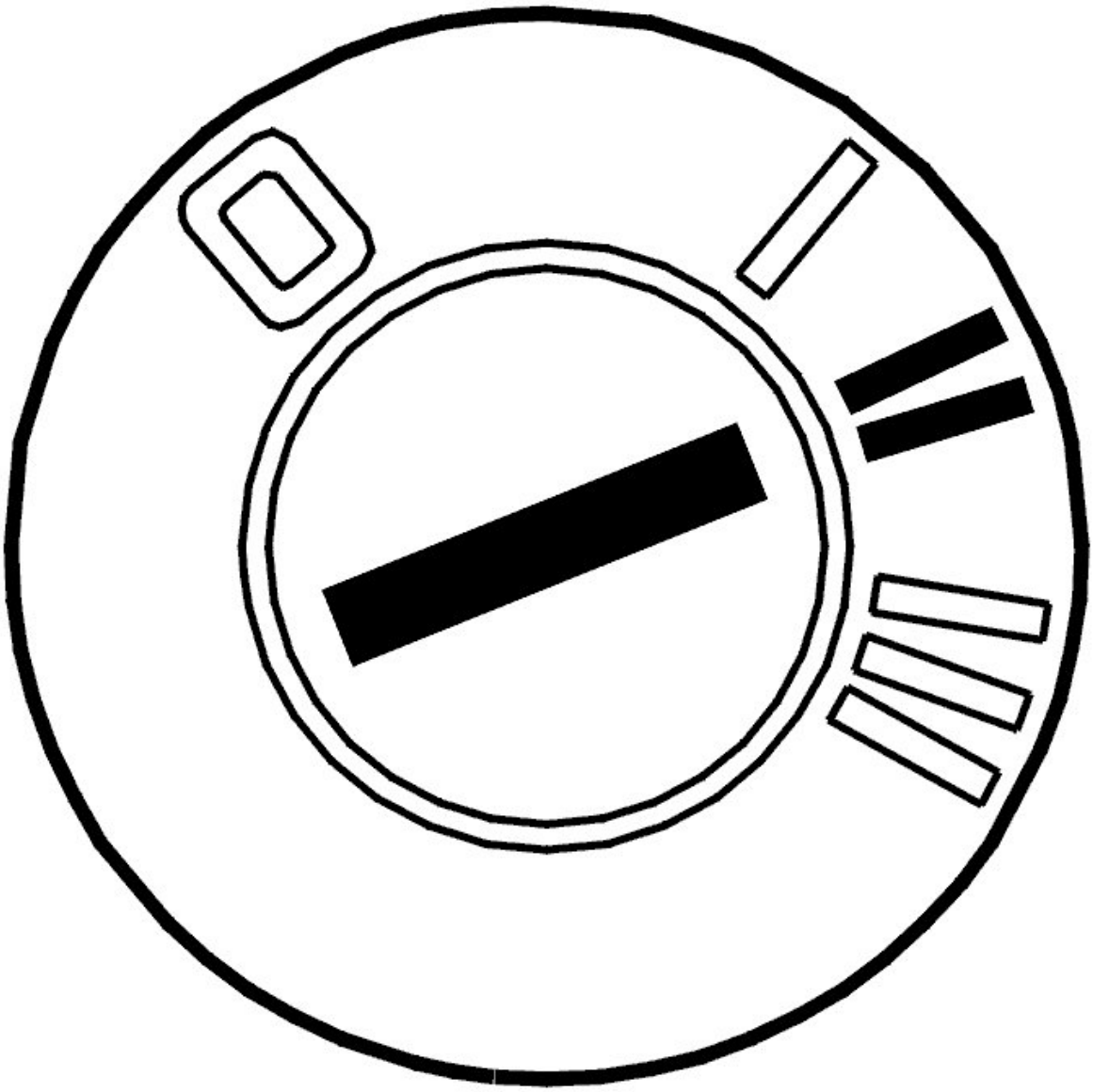
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

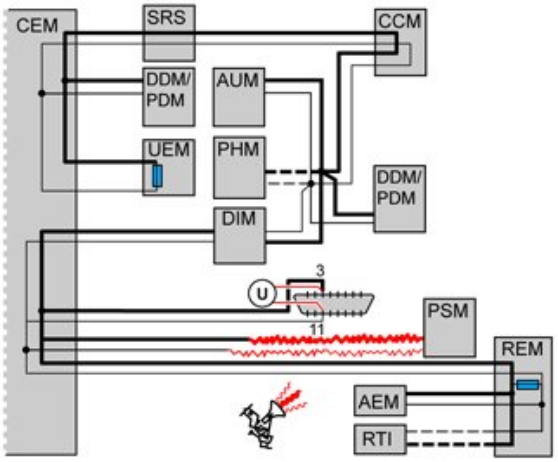
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

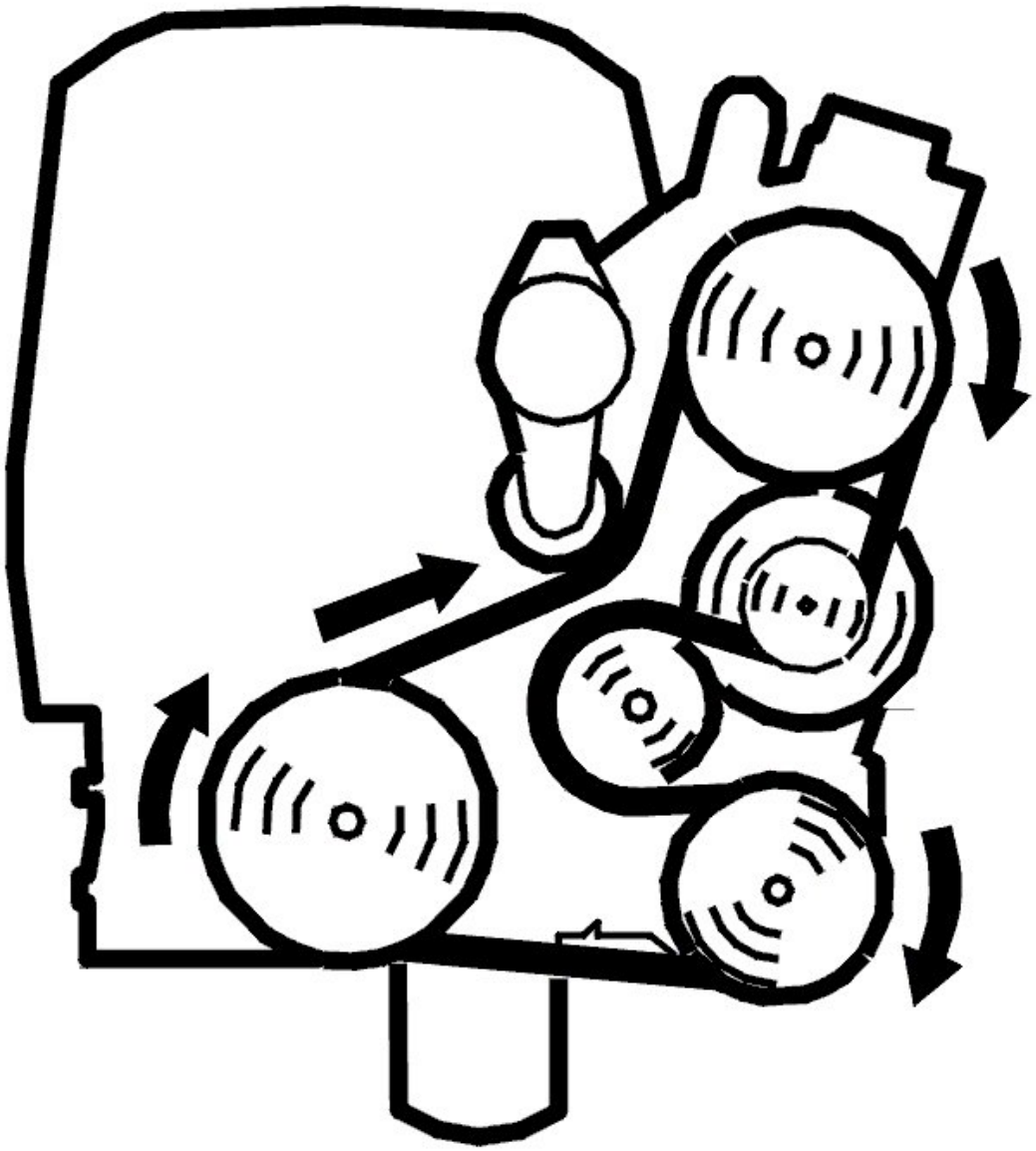
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

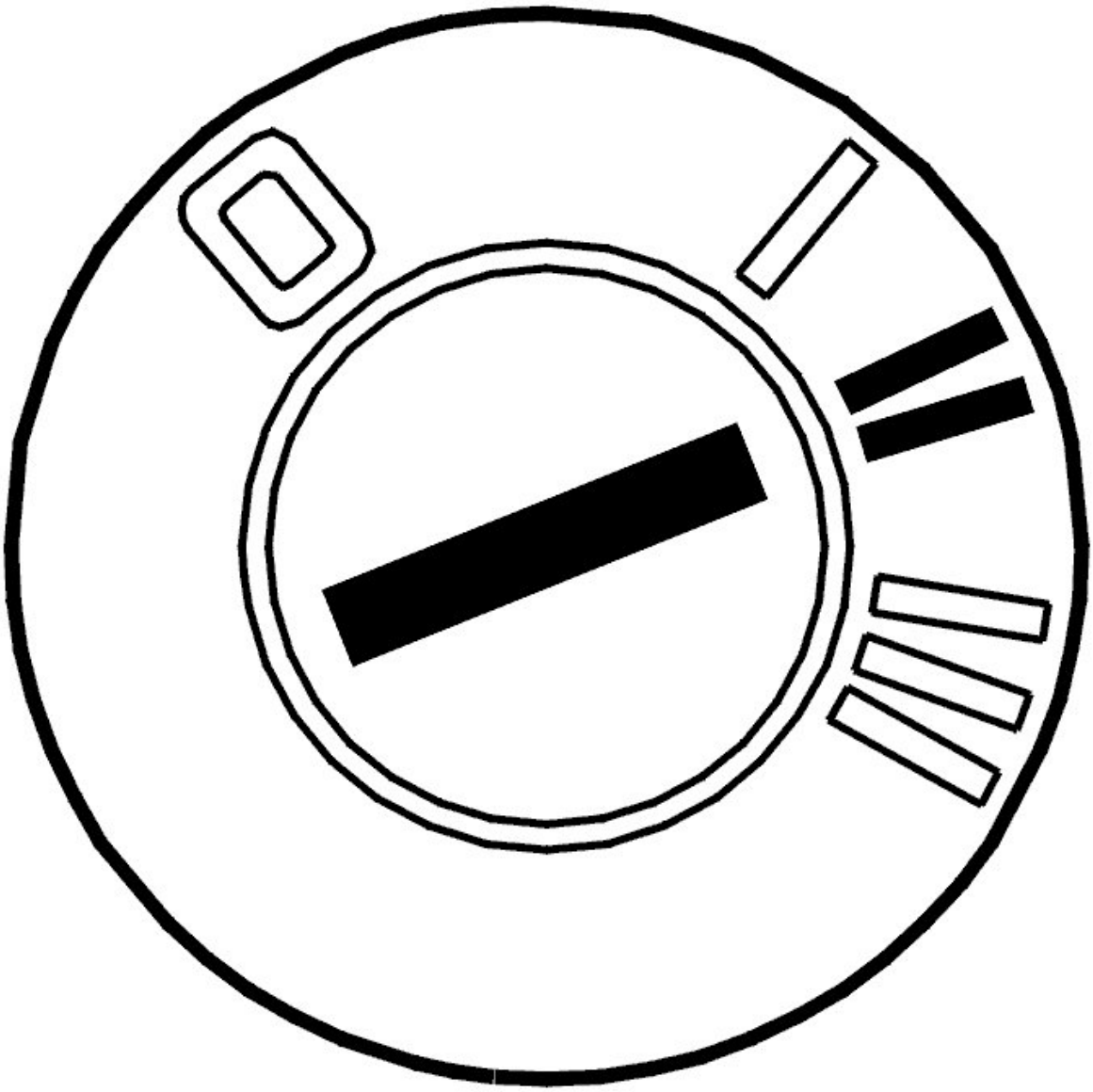


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

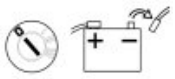
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal Missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

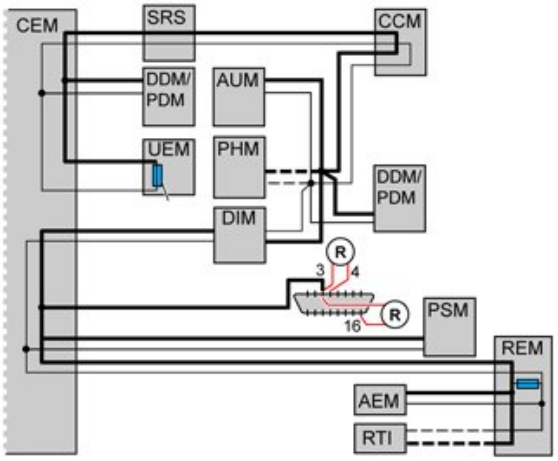
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

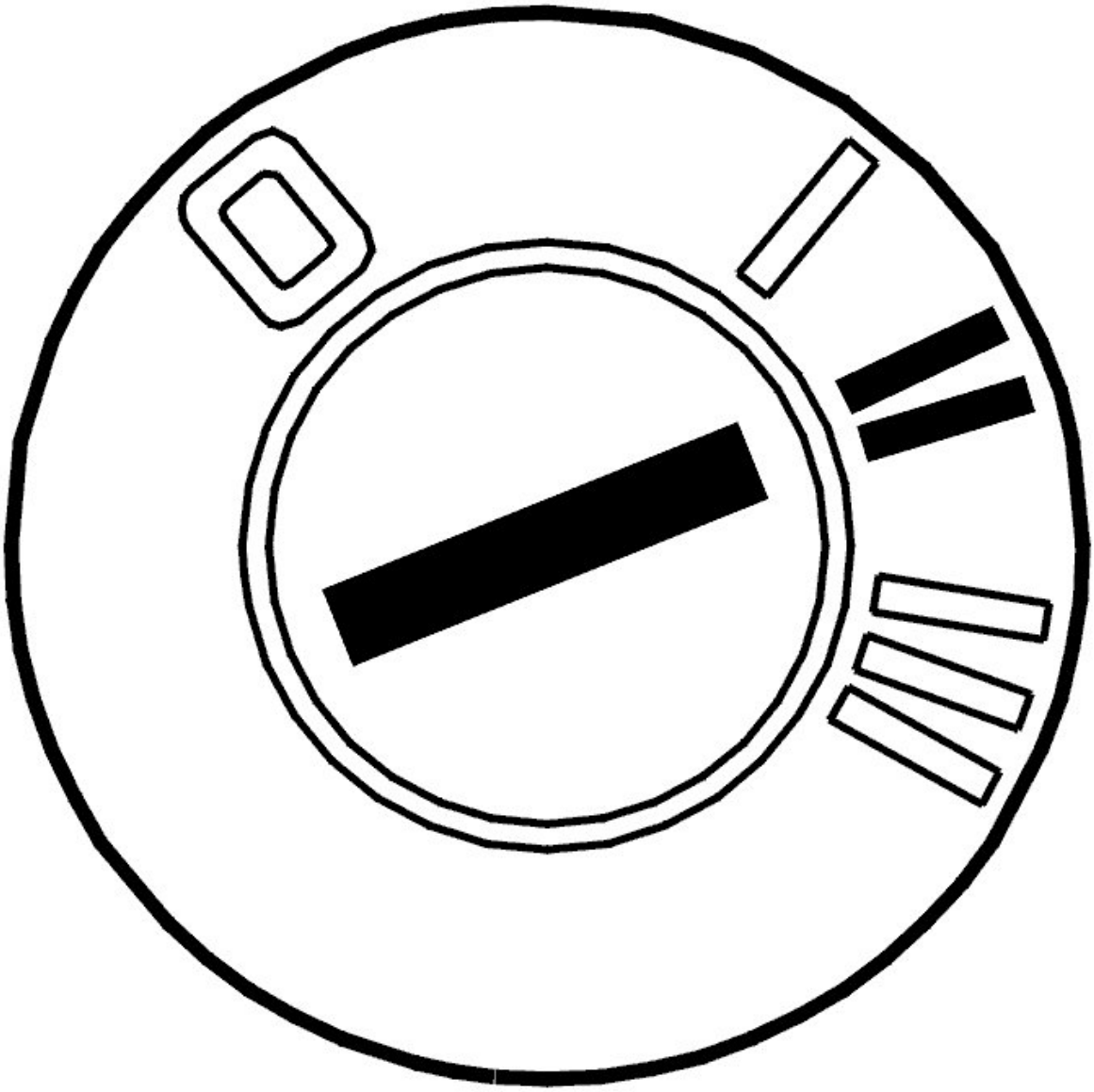


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

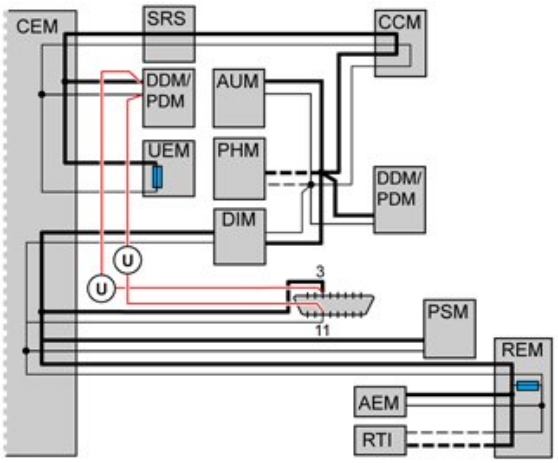
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

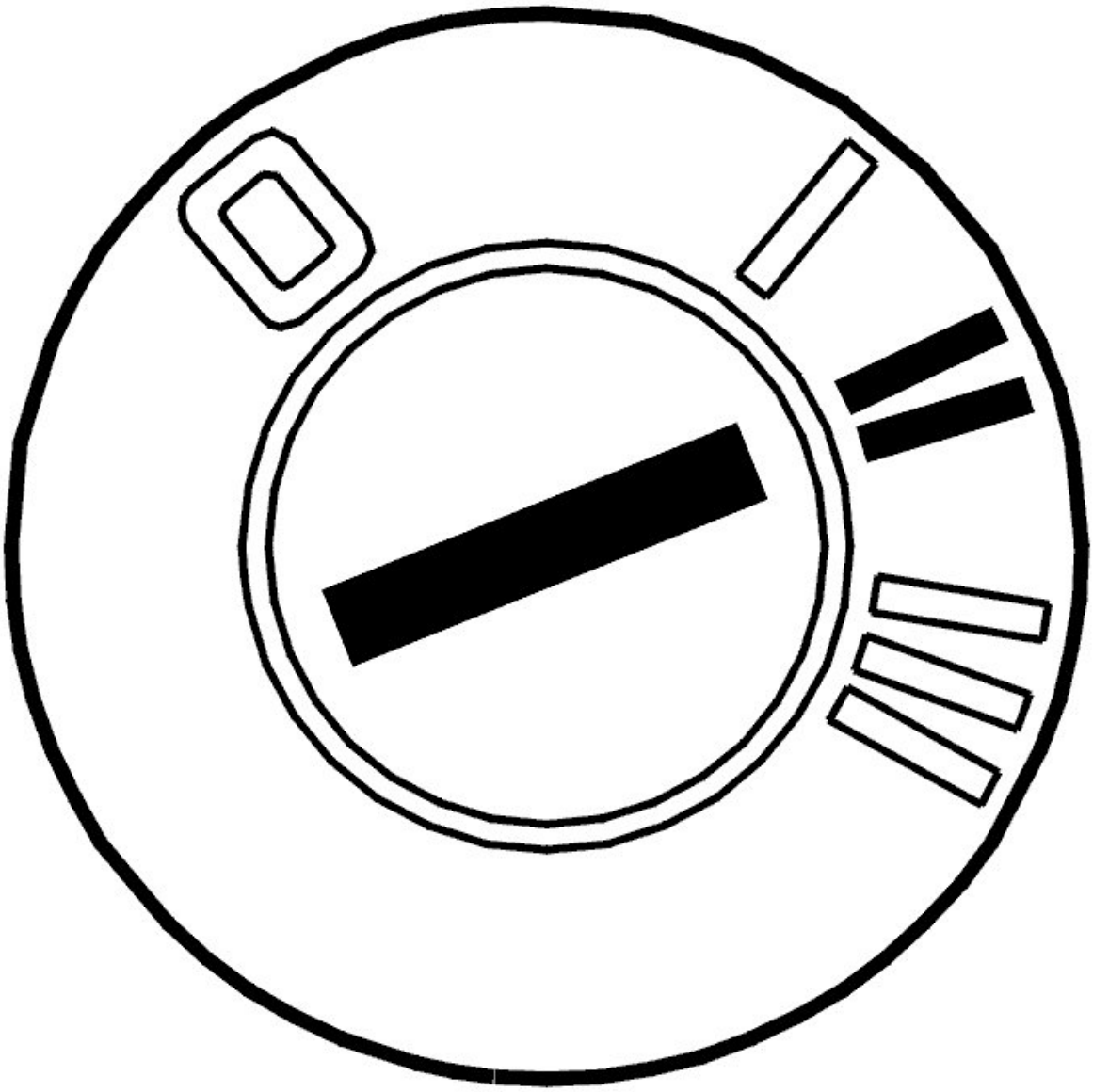
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

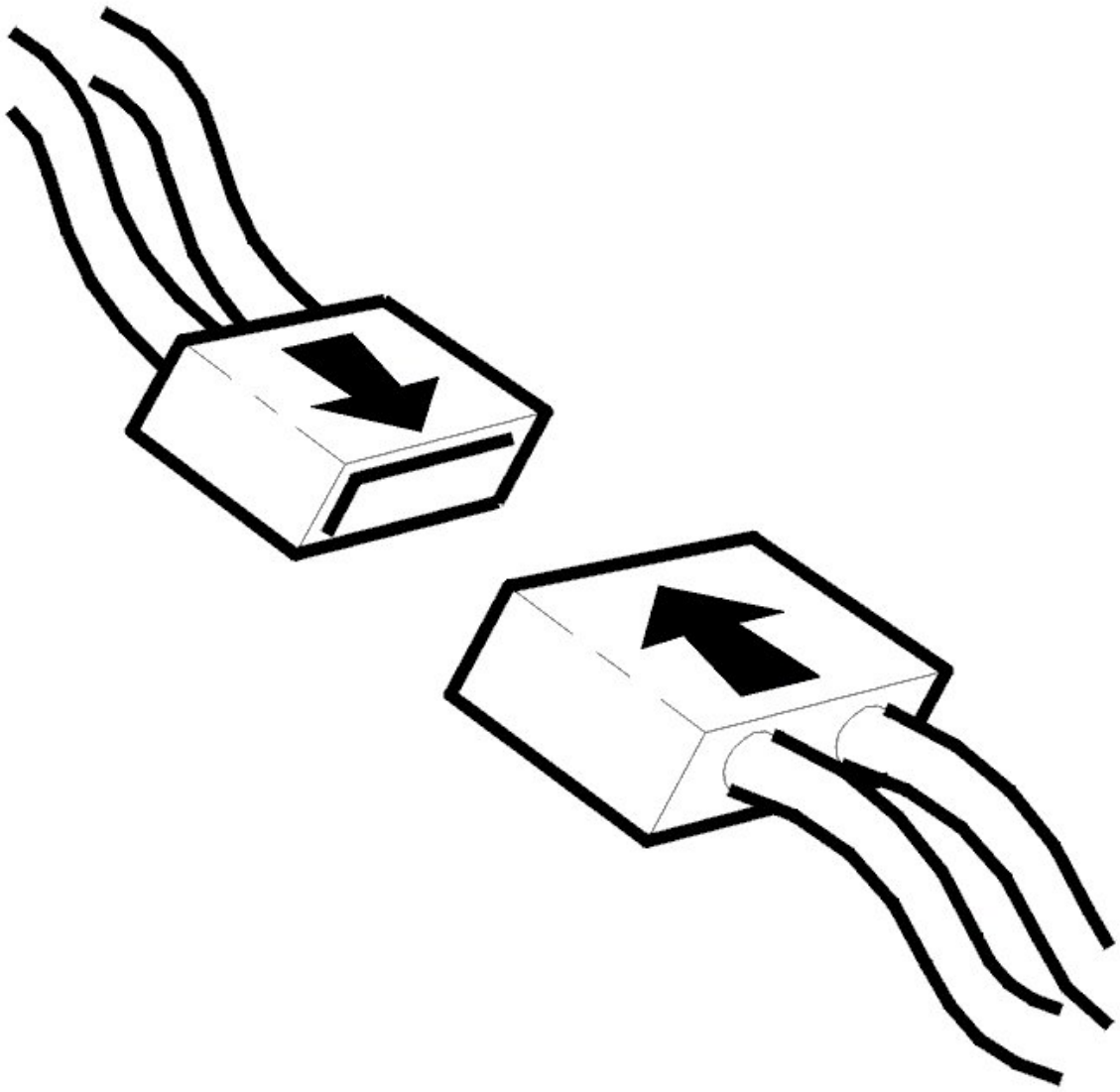


Continue - Verification

Checking the function of the passenger door module (PDM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components and connectors etc.
- Ignition on.

Check the function of the control module by pressing the up and down buttons for the power window mechanism. The window must open or close.
Also activate the central locking buttons. The doors must lock and unlock.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

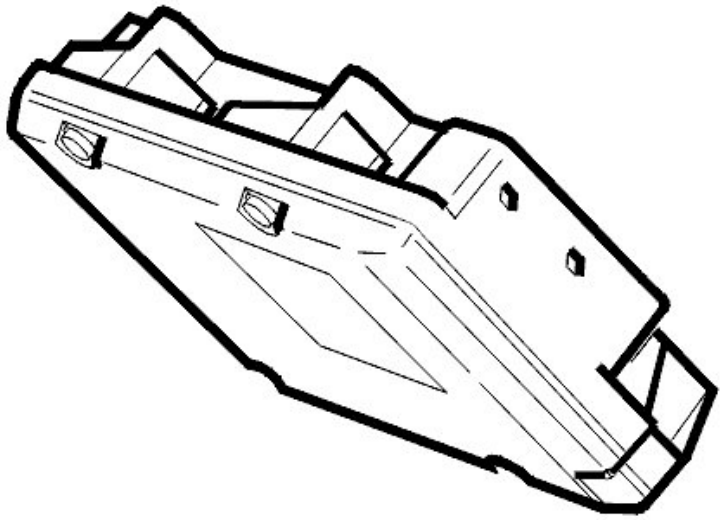
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the passenger door module (PDM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A54

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the power seat module (PSM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to the power seat module (PSM)
- Open-circuit in the ground lead for the power seat module (PSM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the power seat module (PSM)
- The power seat module (PSM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

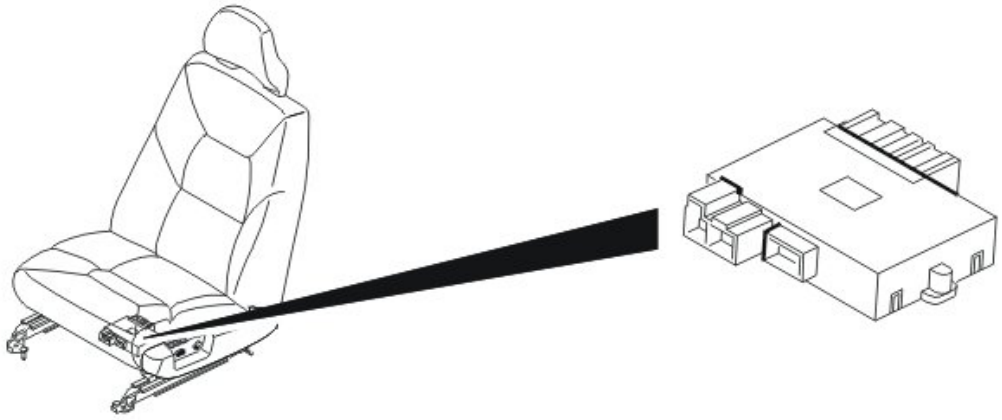
Fault symptom[s]
- Power seat does not operate at all.
- Automatic seat/door mirror operation does not function.

Signal Missing

Signal missing

Checking the function of the power seat module (PSM)

Check the function of the power seat module (PSM) by operating the seat using the controls.



Can the seat be operated?

Yes - Checking communication with the power seat module (PSM)

No - Checking the power supply and ground terminals

Checking the power supply and ground terminals

Check that the fuse for the control module is intact.
Check the power supply and ground terminal for the power seat module (PSM) as follows.
Remedy as necessary.

Other information:

- Power seat module (PSM): Checking ground points See: Body and Frame/Seats/Testing and Inspection/Component Tests and General Diagnostics/Checking Ground Terminals, Power Seats
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the power seat module (PSM)

No - Signal missing

Checking communication with the power seat module (PSM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the passenger seat module (PSM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

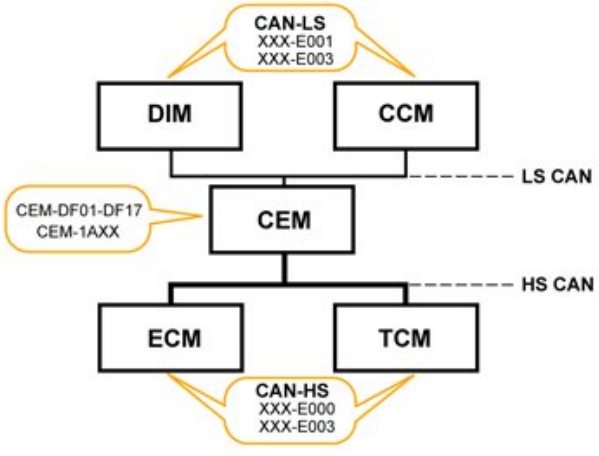
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

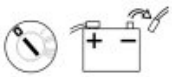
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

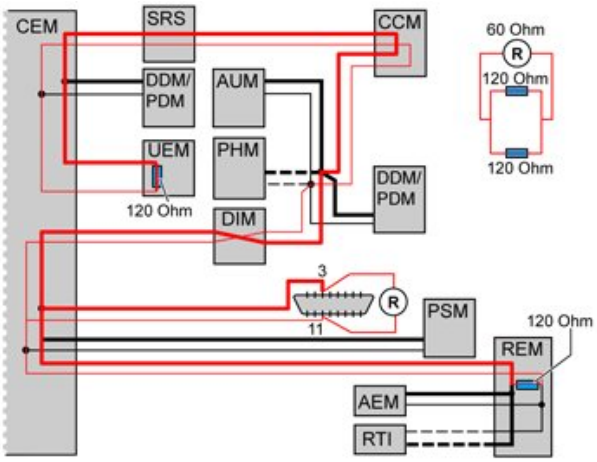
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

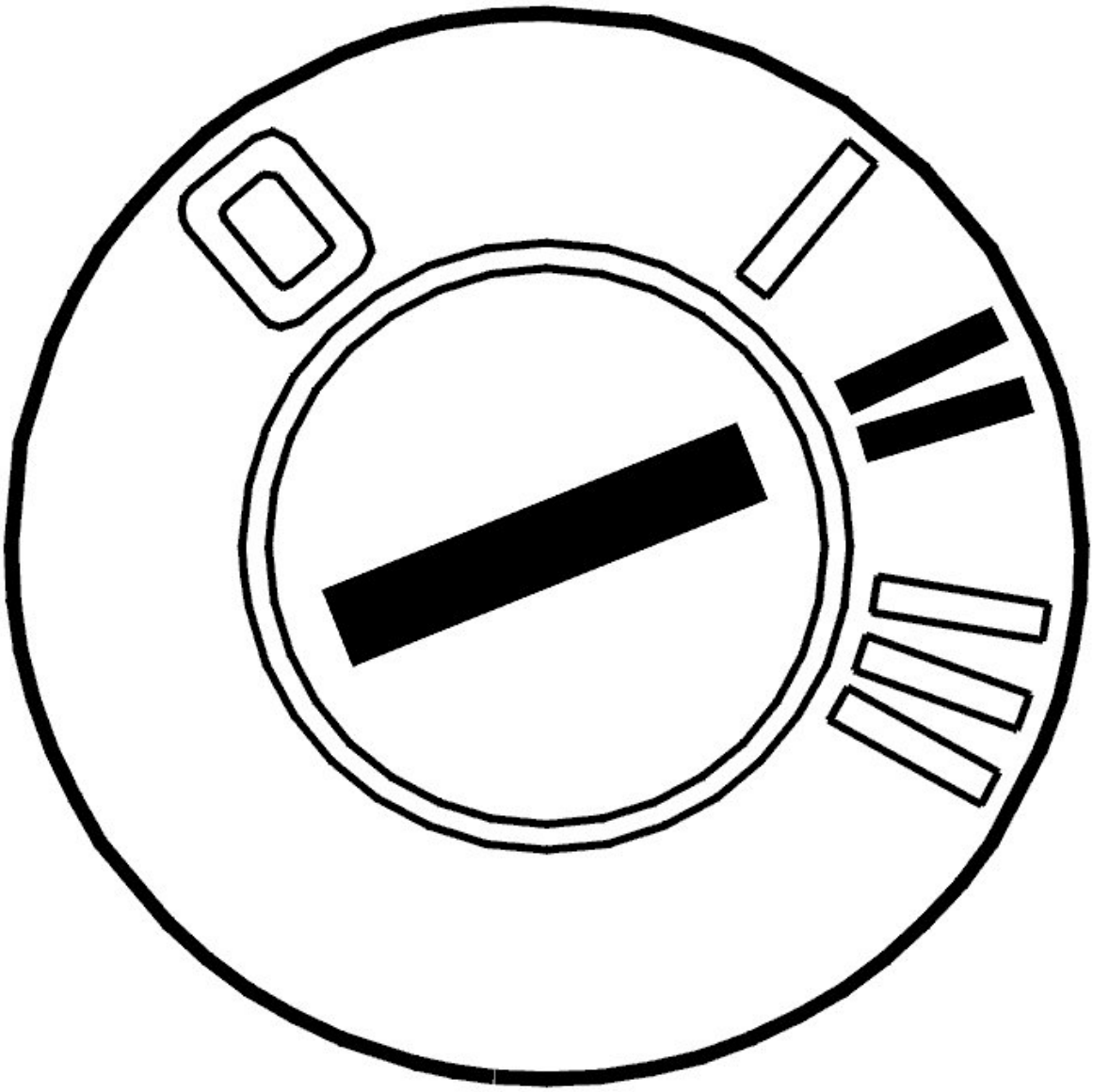


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

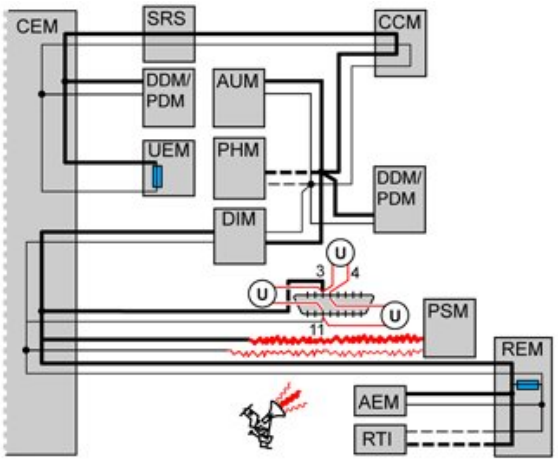
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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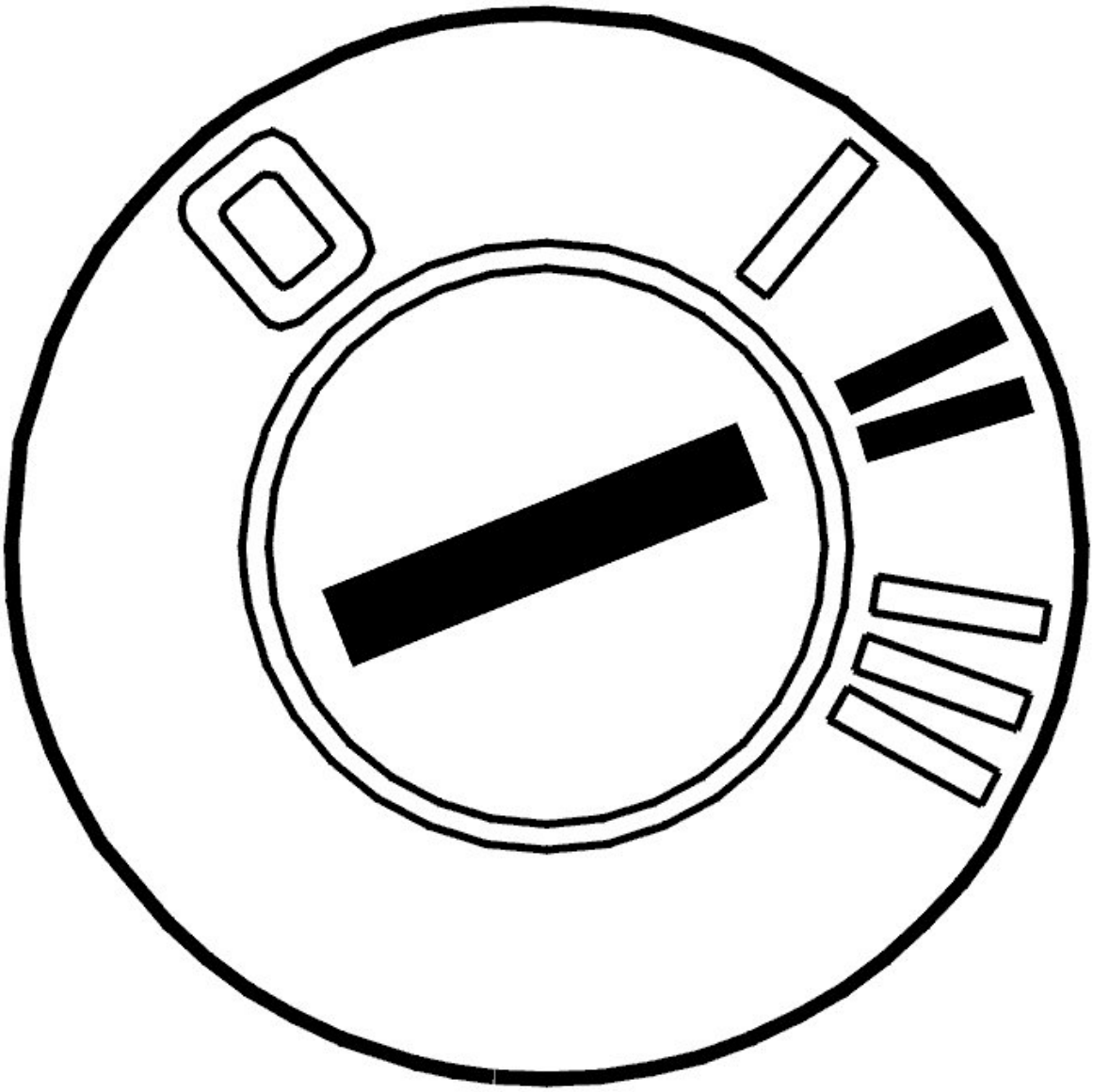
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

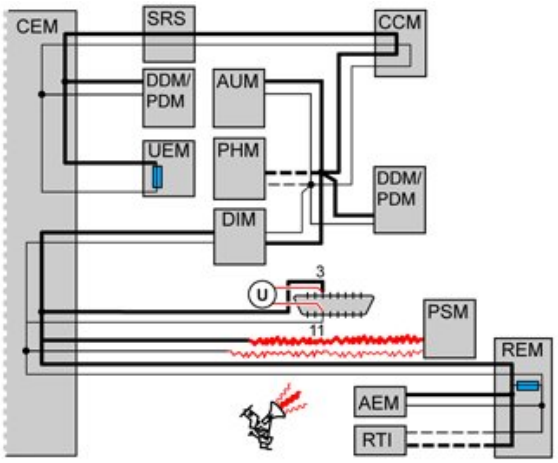
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

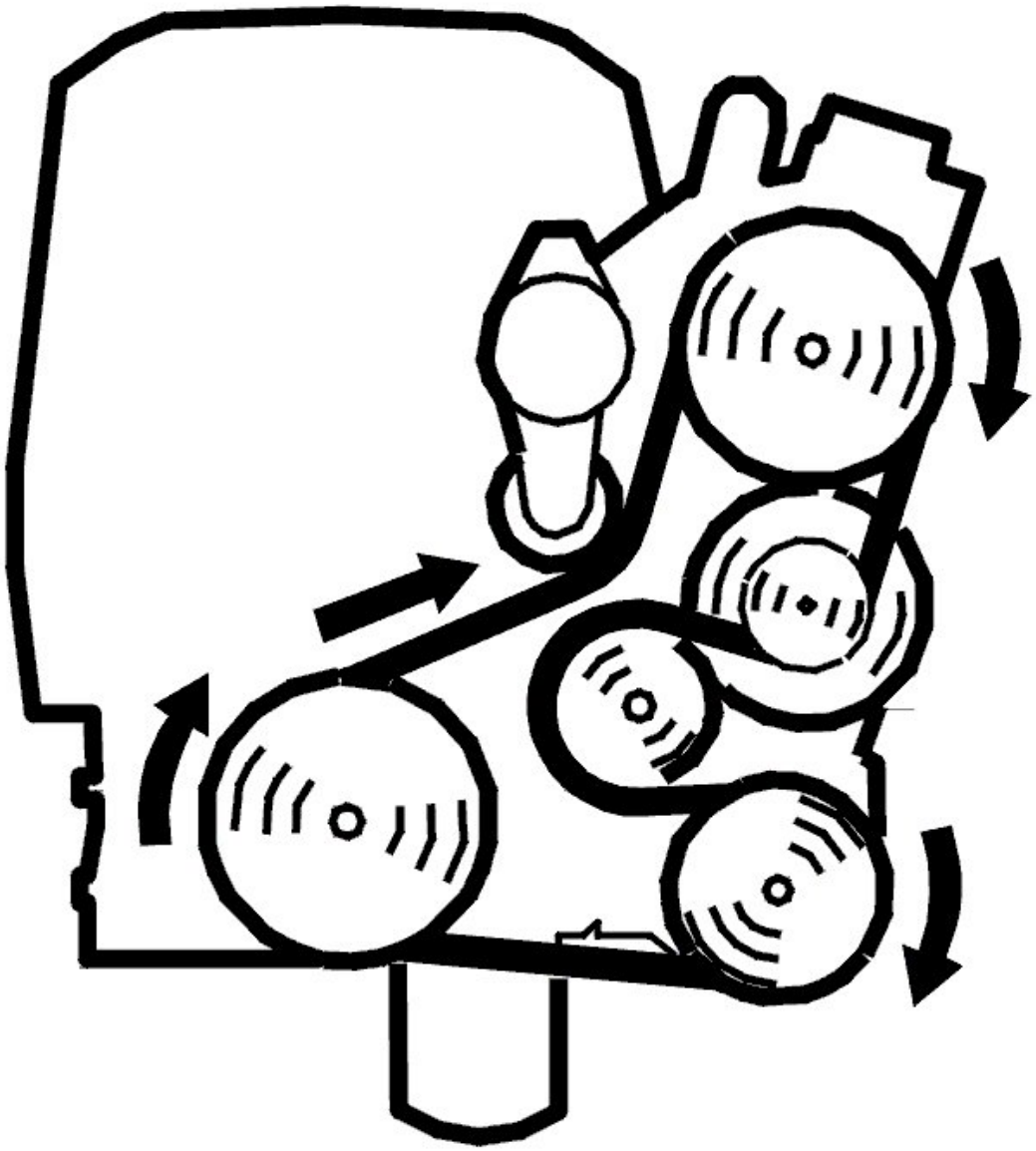
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

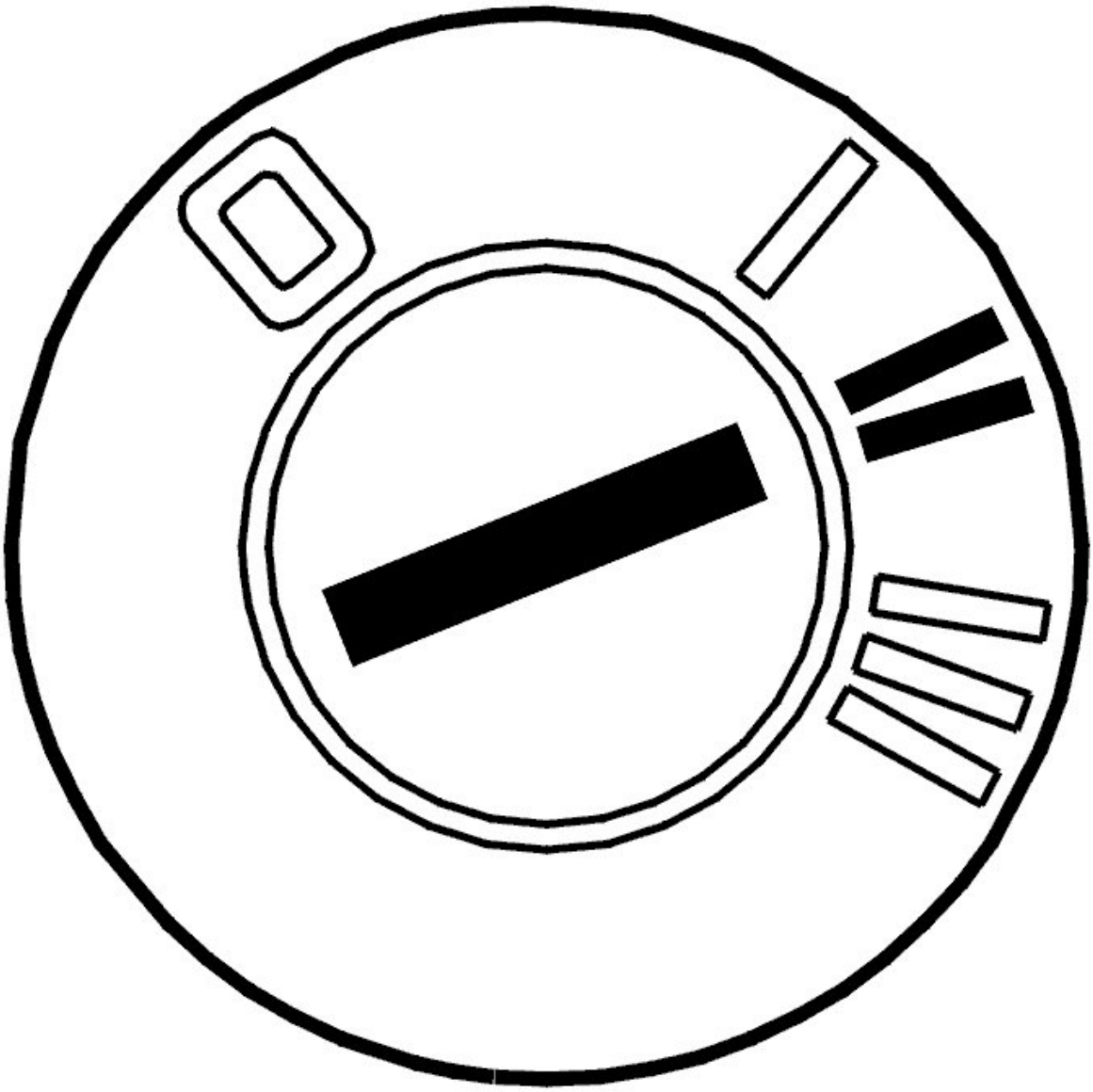


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

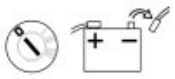
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

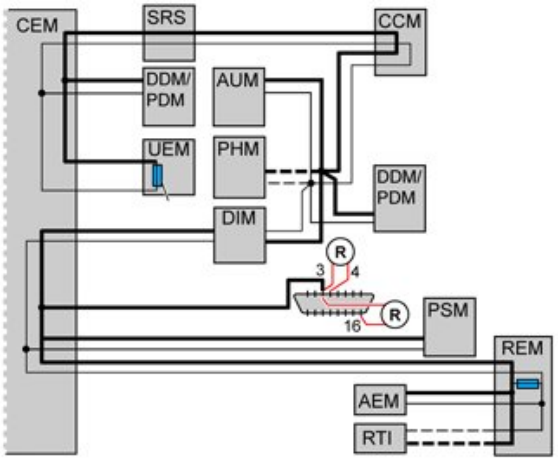
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

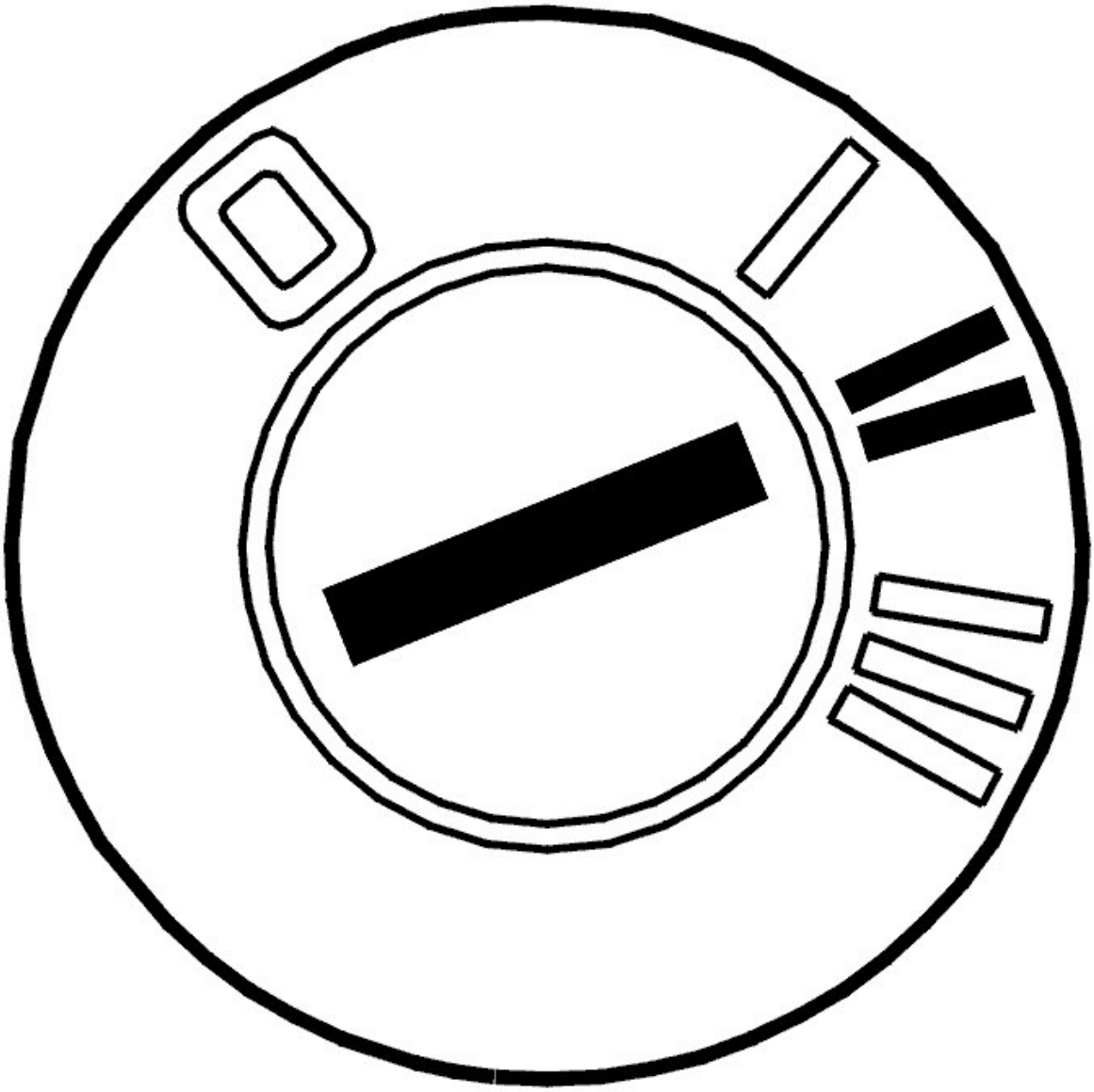


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

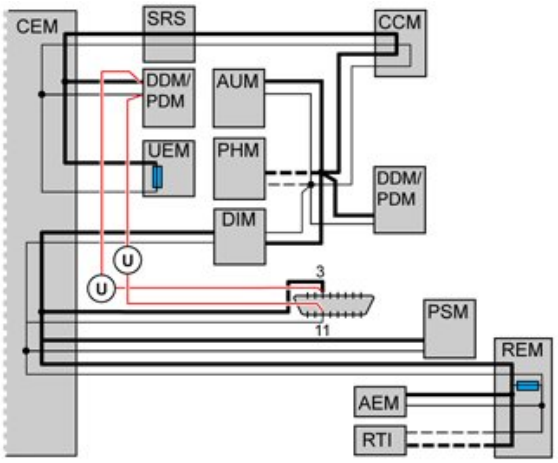
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

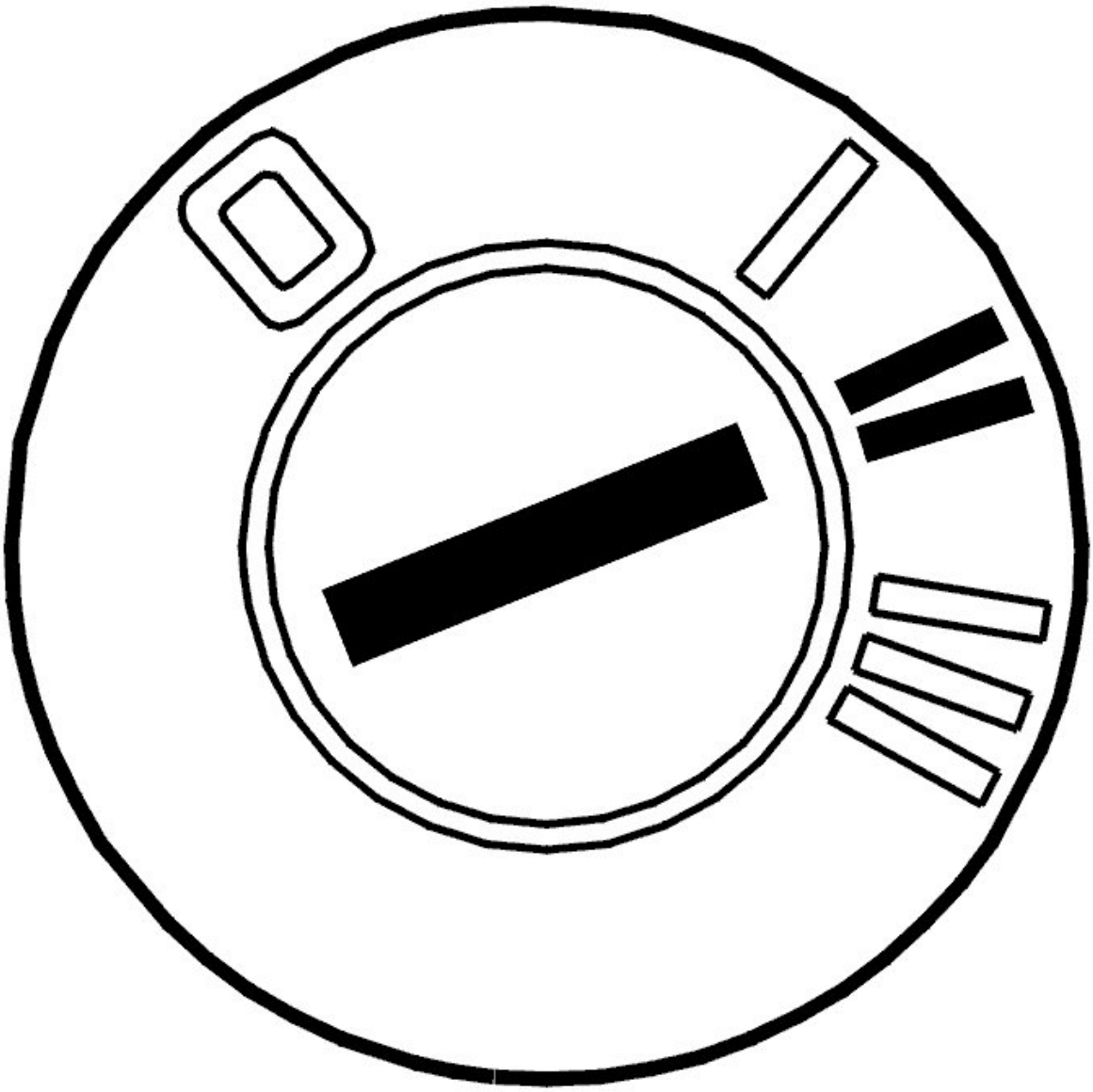
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

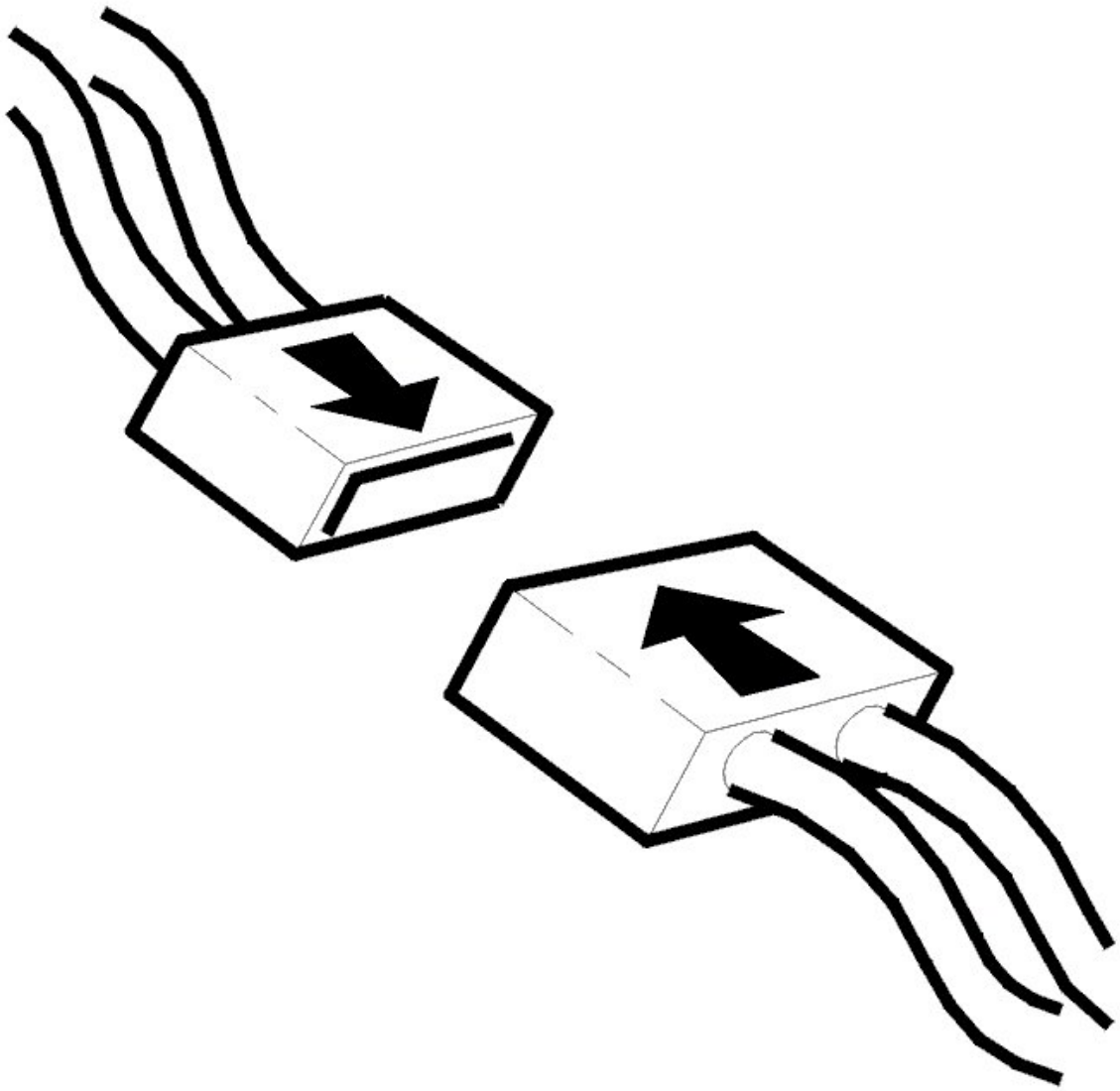


Continue - Verification

Checking the function of the power seat module (PSM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the function of the control module by operating the seat using the controls.
Also check the memory function of the seat, that the seat position can be programmed, recalled and that automatic setting of the seat and door mirrors occurs when the car is unlocked using the remote control.

Can the seat be operated?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

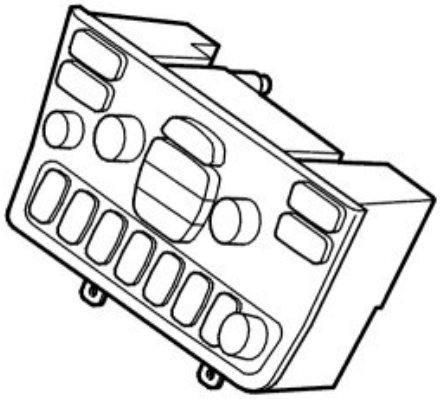
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the power seat module (PSM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A55

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the climate control module (CCM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to climate control module (CCM)
- Open-circuit in the ground lead for the climate control module (CCM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the climate control module (CCM)
- The climate control module (CCM) is not intended for this vehicle (for example a used control module with different software/hardware).

Note! In the event of missing CAN communication, but with the power supply still on, the climate control module (CCM) will function for a few minutes after the key has been removed (Limp-home function).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- The climate control system does not function at all.
- The lower row of buttons on the climate control system does not function.
- The climate control system functions after the key has been removed.

Signal Missing

Signal missing

Checking the function of the climate control module (CCM)
- Ignition on.

Check the power supply to the control module by switching on the climate control module (CCM).
The blower fan must blow and it must be possible to regulate the fan speed.

Does the blower fan start?

Yes - Checking communication with the climate control module (CCM)

No - Checking the power supply and ground for the climate control module (CCM)

Checking the power supply and ground for the climate control module (CCM)

Check that the fuse for the control module is intact.
Check the power supply and ground terminal for the climate control module (CCM) as follows.
Remedy as necessary.

Other information:

- Climate control module (CCM): Checking the supply voltage/ground terminal See: Heating and Air Conditioning/Testing and Inspection/Component Tests and General Diagnostics/Checking the Supply Voltage/Ground Terminal
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the climate control module (CCM)

No - Signal missing

Checking communication with the climate control module (CCM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the climate control module (CCM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

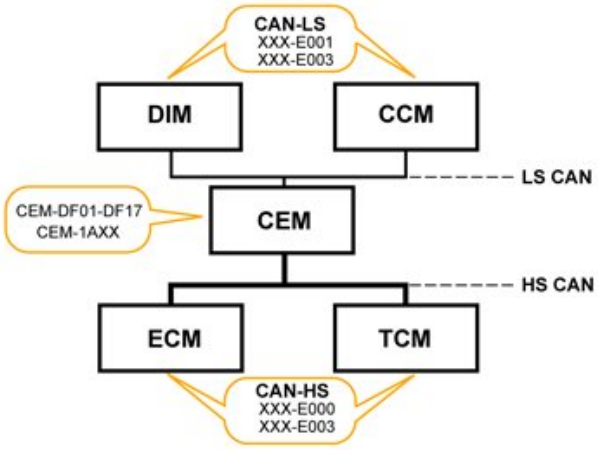
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent. Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

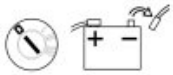
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not

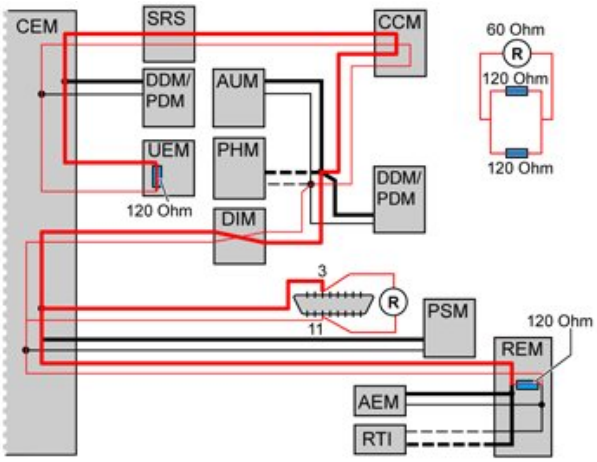
branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

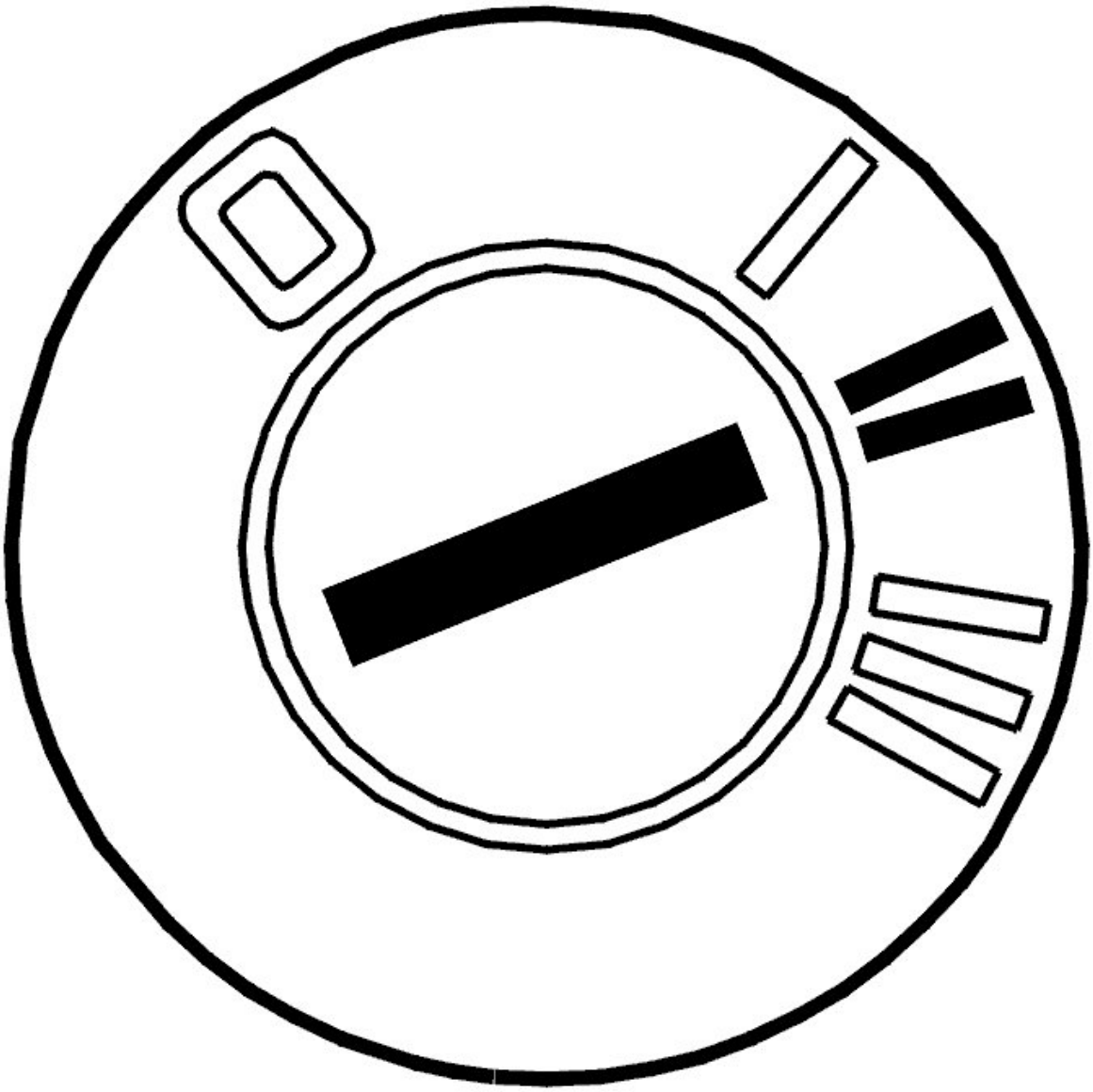


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

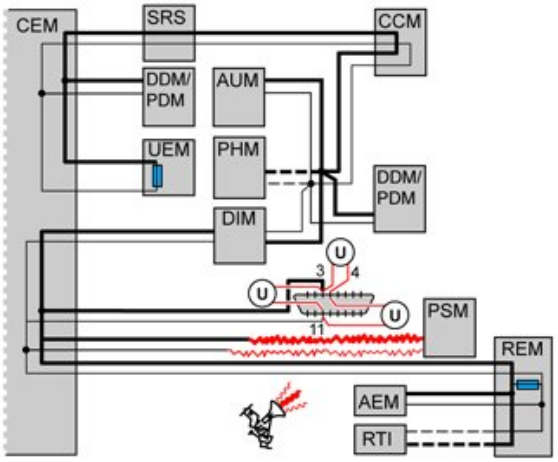
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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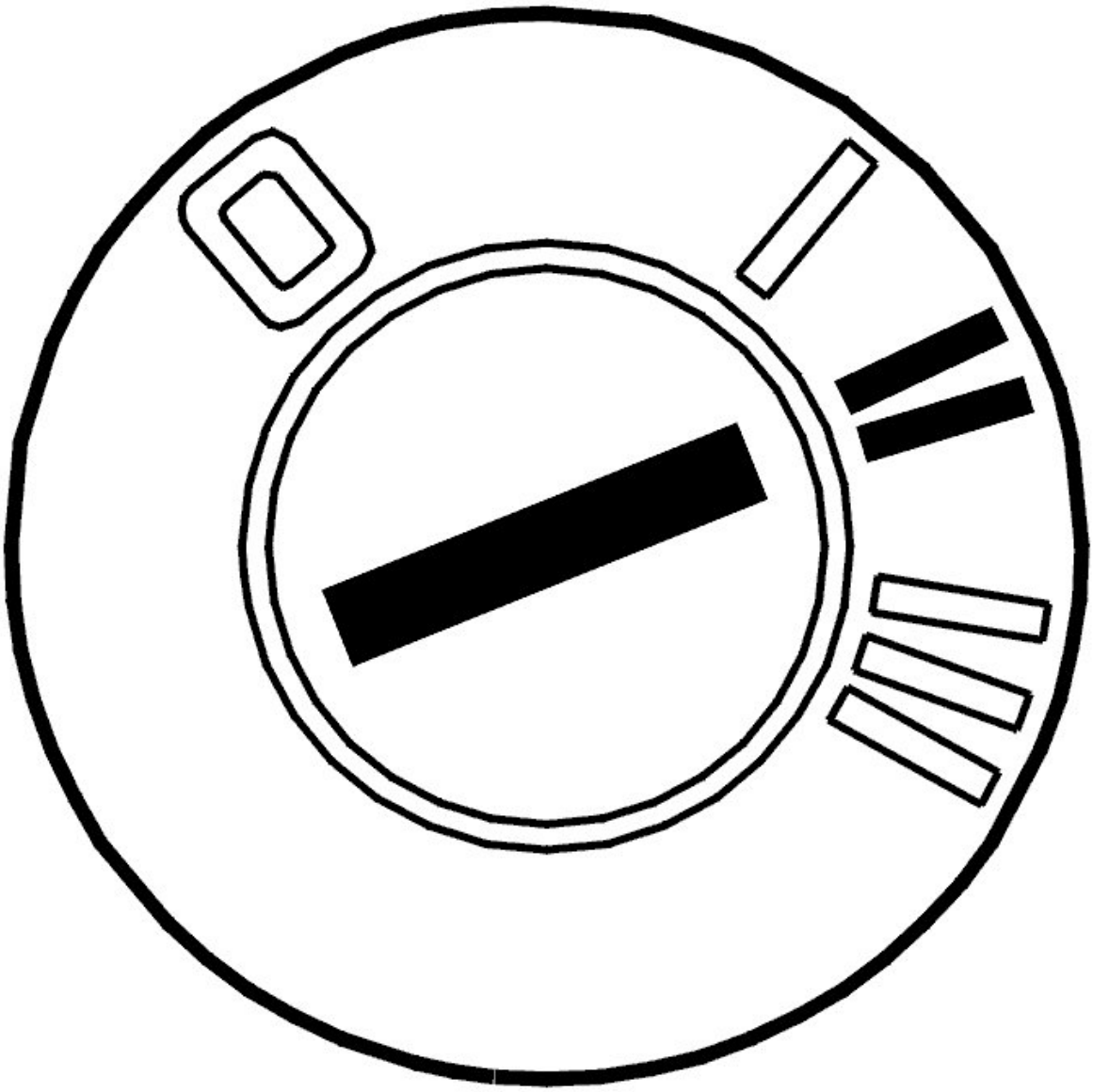
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

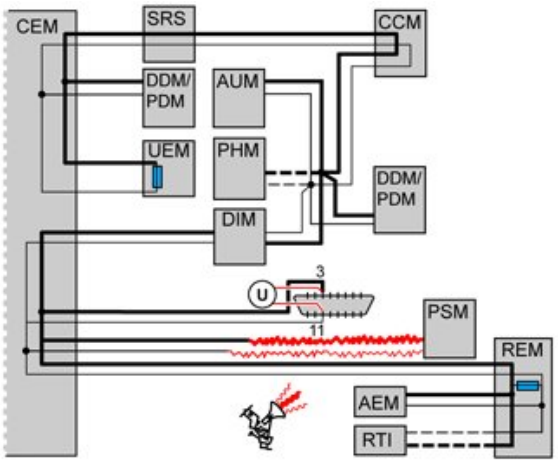
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

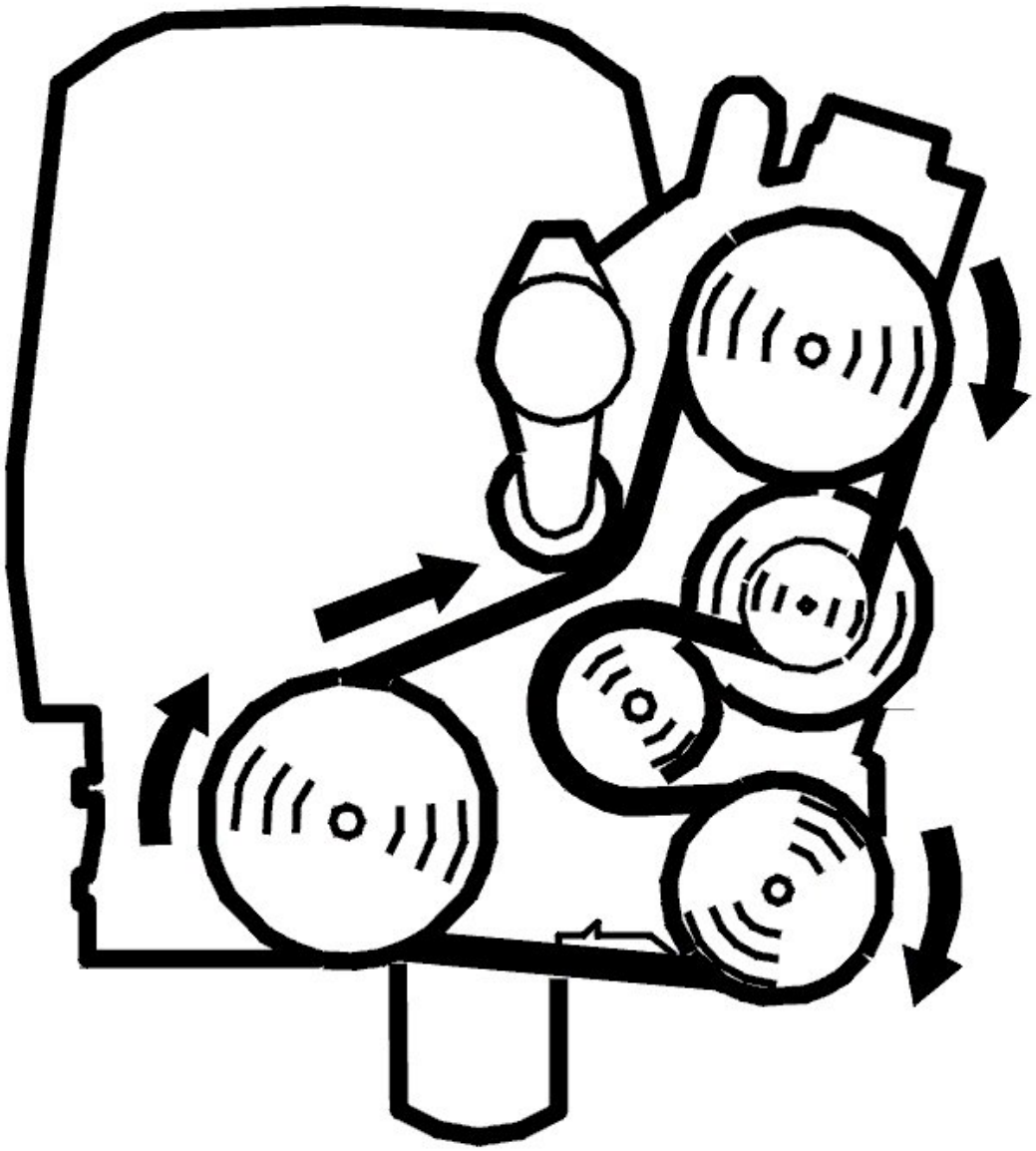
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

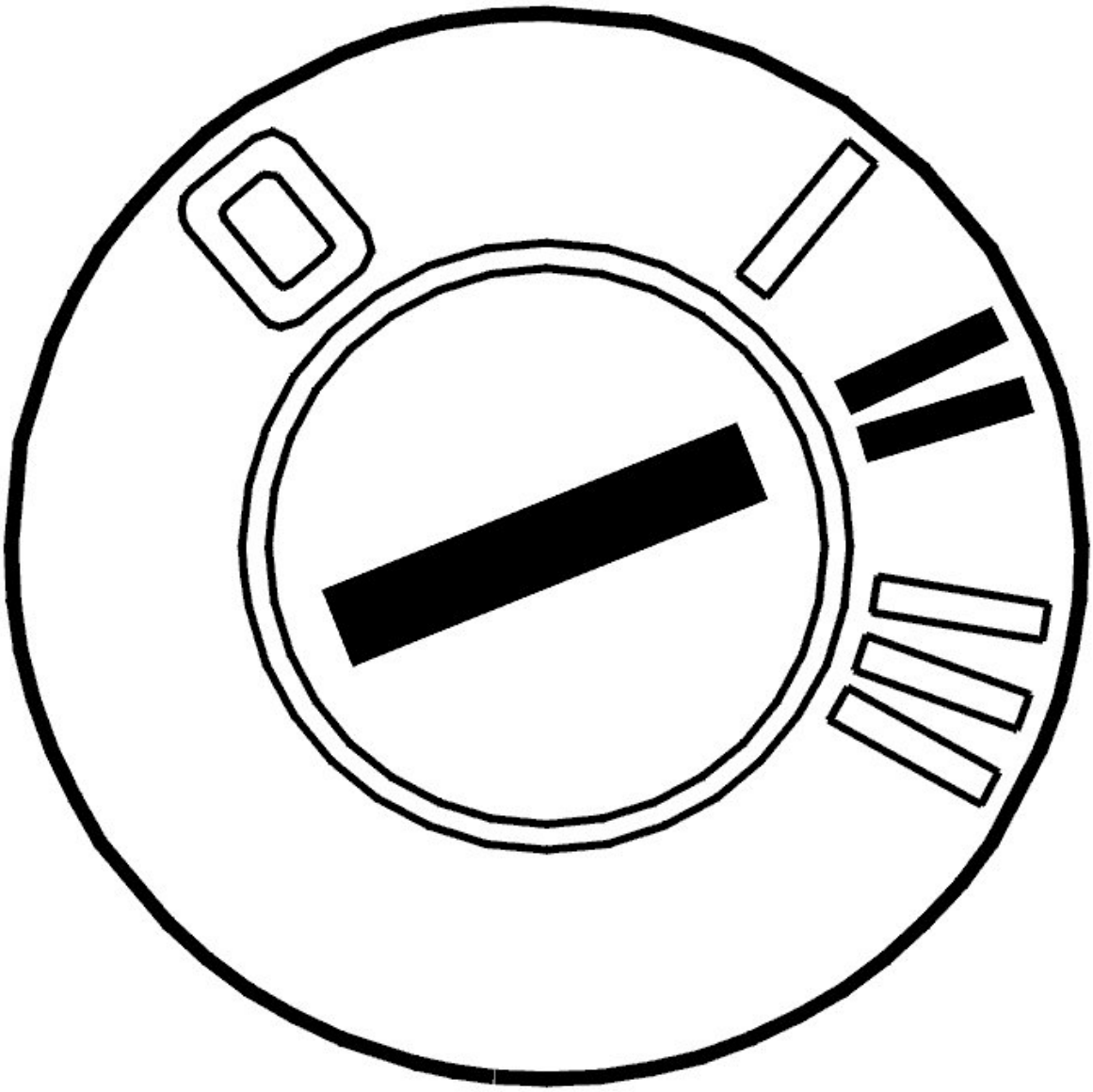


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

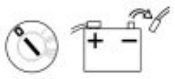
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

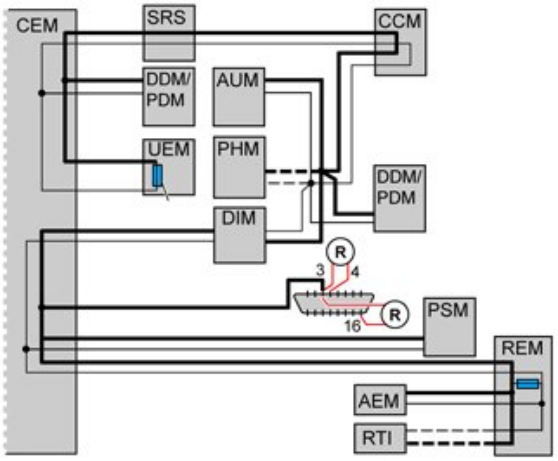
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

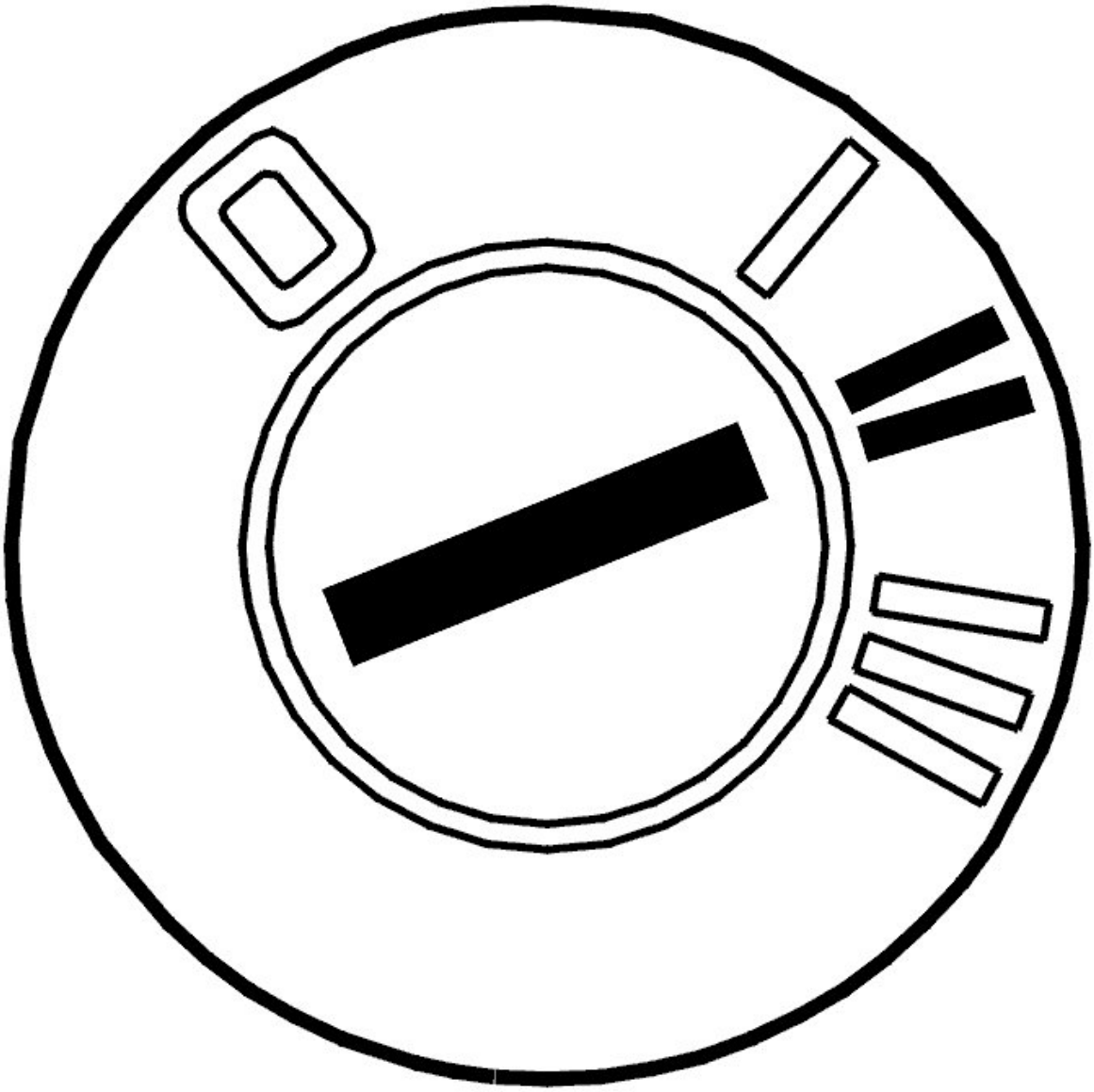


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

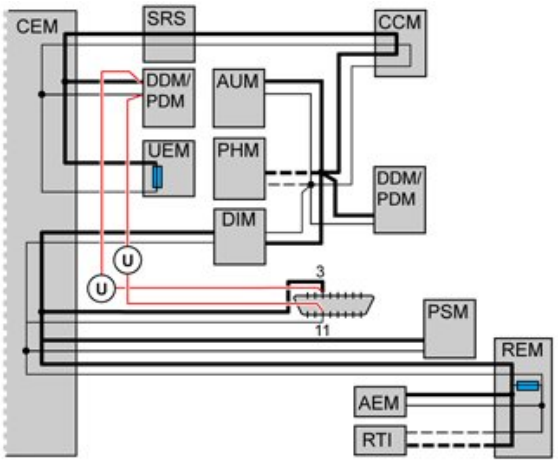
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

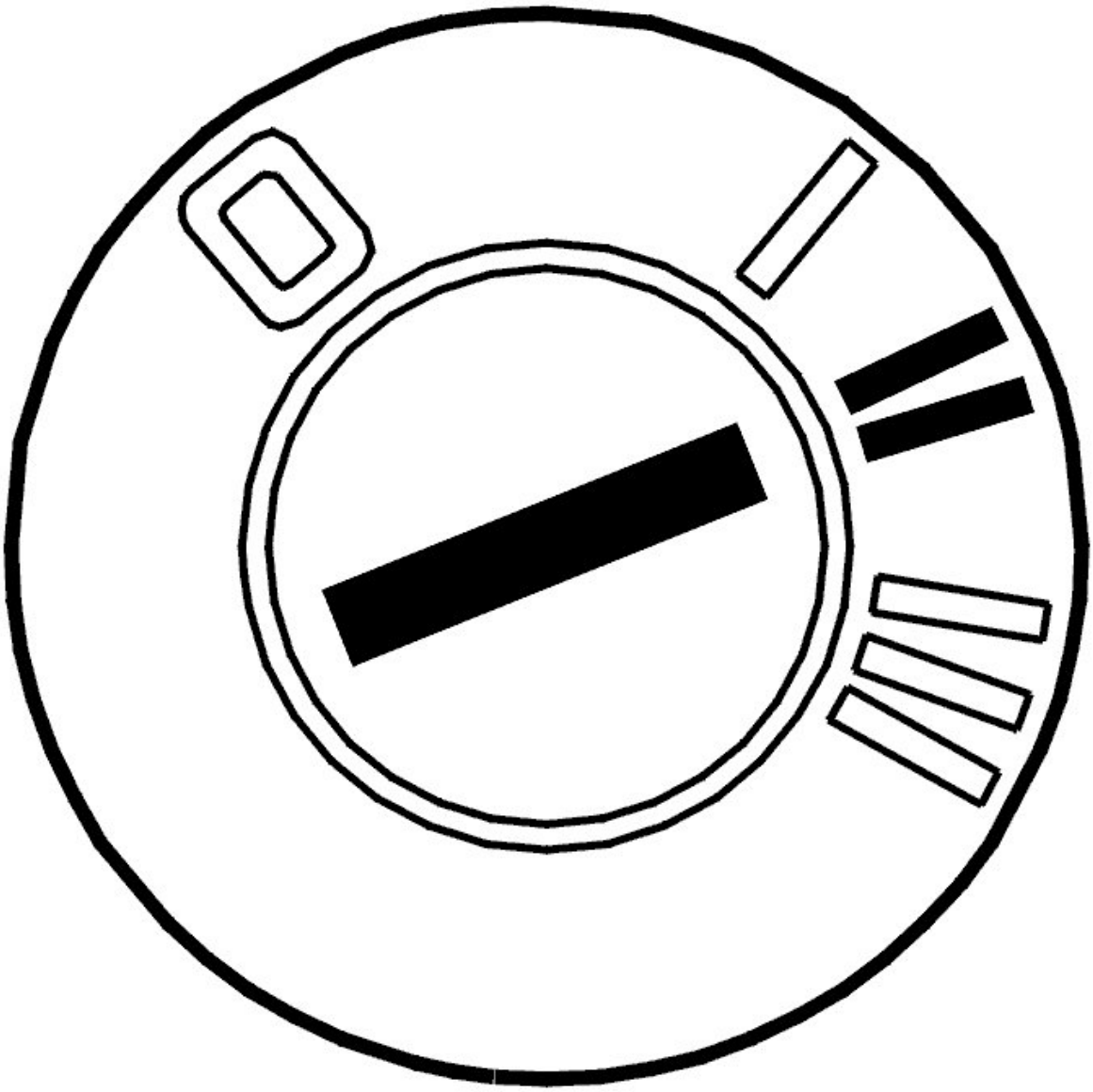
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

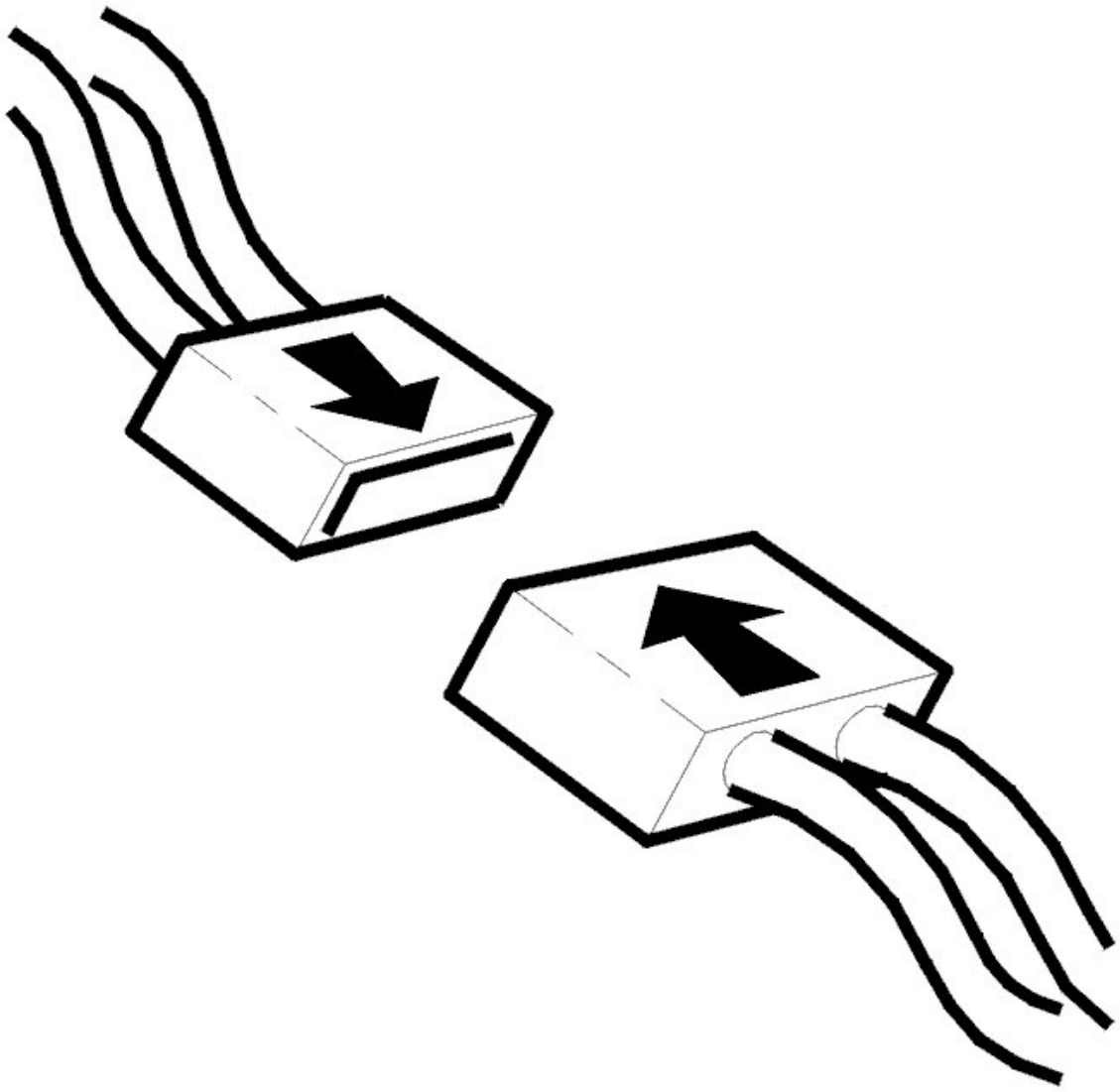


Continue - Verification

Checking the function of the climate control module (CCM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply to the control module by switching on the climate control module (CCM).
The blower fan must blow and it must be possible to regulate the fan speed.

Does the blower fan start?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

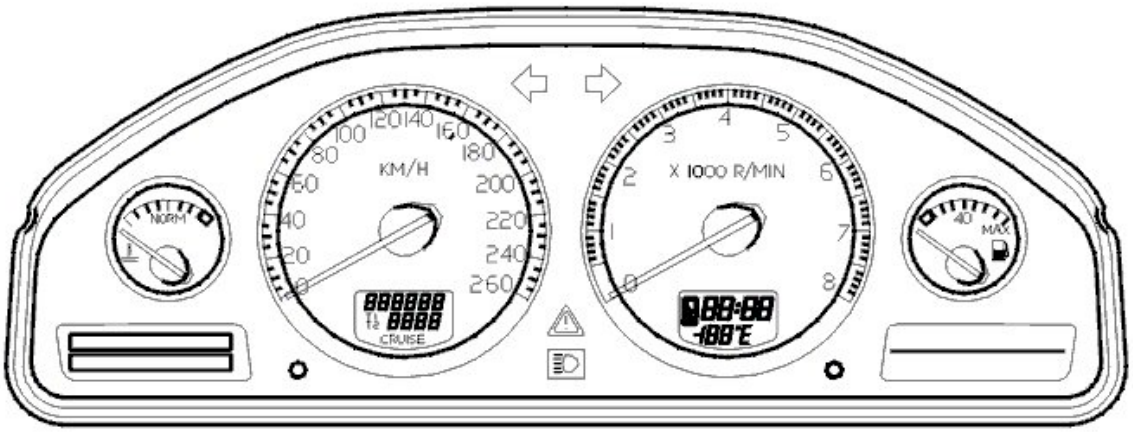
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the climate control module (CCM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A56

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the driver information module (DIM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to the driver information module (DIM)
- Open-circuit in the ground lead for the driver information module (DIM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the drive information module (DIM)
- The driver information module (DIM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- No gauges working.
- The instrument lighting does not operate.

Signal Missing

Signal missing

Checking the function of the driver information module (DIM)

Check the power supply for the driver information module (DIM) by switching on the ignition.

The lighting in the instrument panel must light up.

Does the lighting in the driver information module (DIM) light up?

Yes - Checking communication with the driver information module (DIM)

No - Checking the power supply and ground for the driver information module (DIM)

Checking the power supply and ground for the driver information module (DIM)

Check that the fuse for the control module is intact.
Check the power supply and ground terminal for the driver information module (DIM) as follows.
Remedy as necessary.

Other information:

- Driver information module (DIM): Checking the voltage / ground terminal See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Component Tests and General Diagnostics/Checking the Supply Voltage/Ground Terminal, Driver Information Module (DIM)
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the driver information module (DIM)

No - Signal missing

Checking communication with the driver information module (DIM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the driver information module (DIM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.

XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

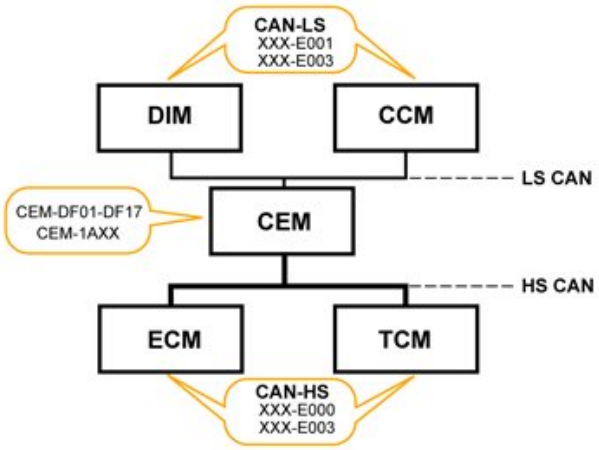
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

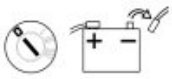
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

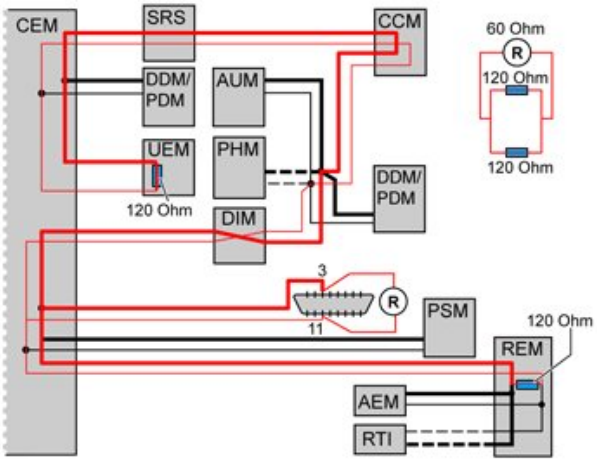
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

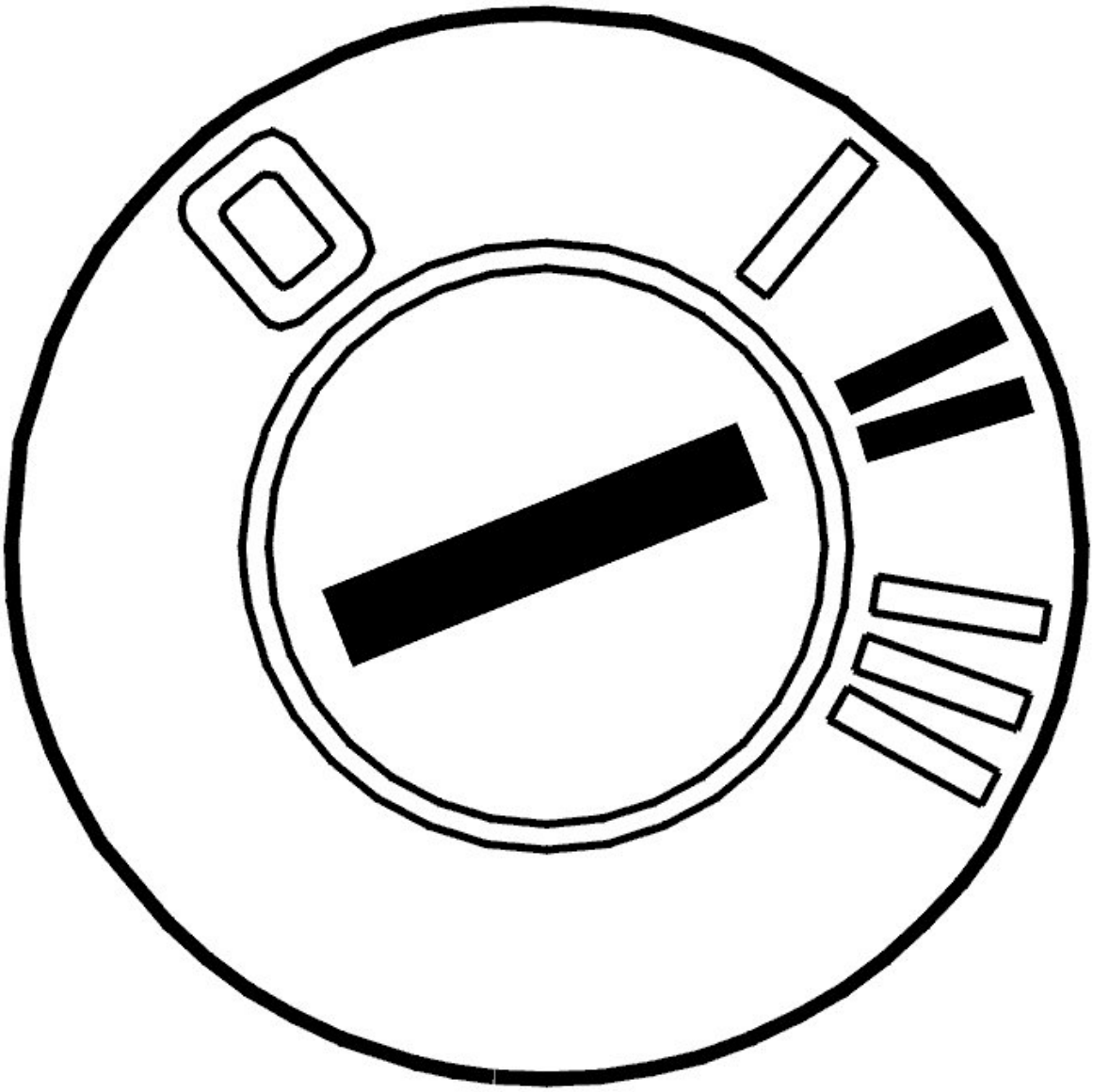


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

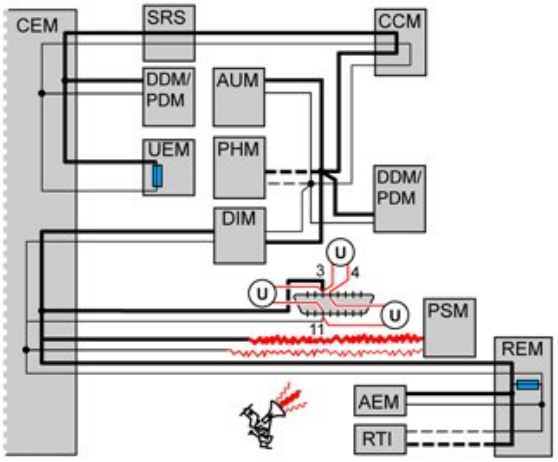
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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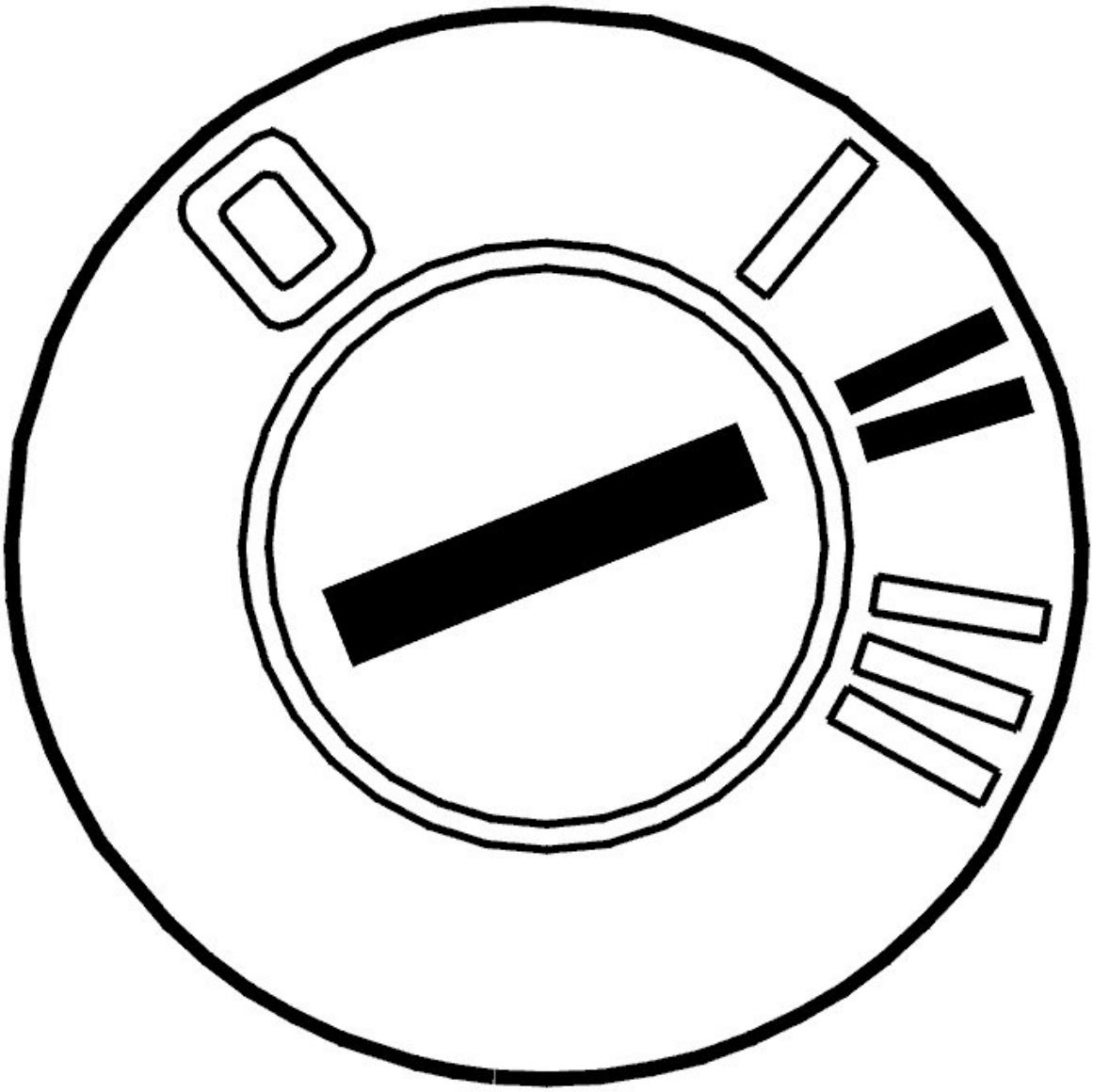
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

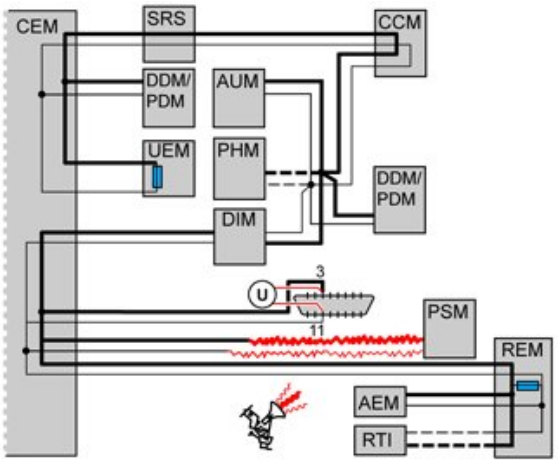
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

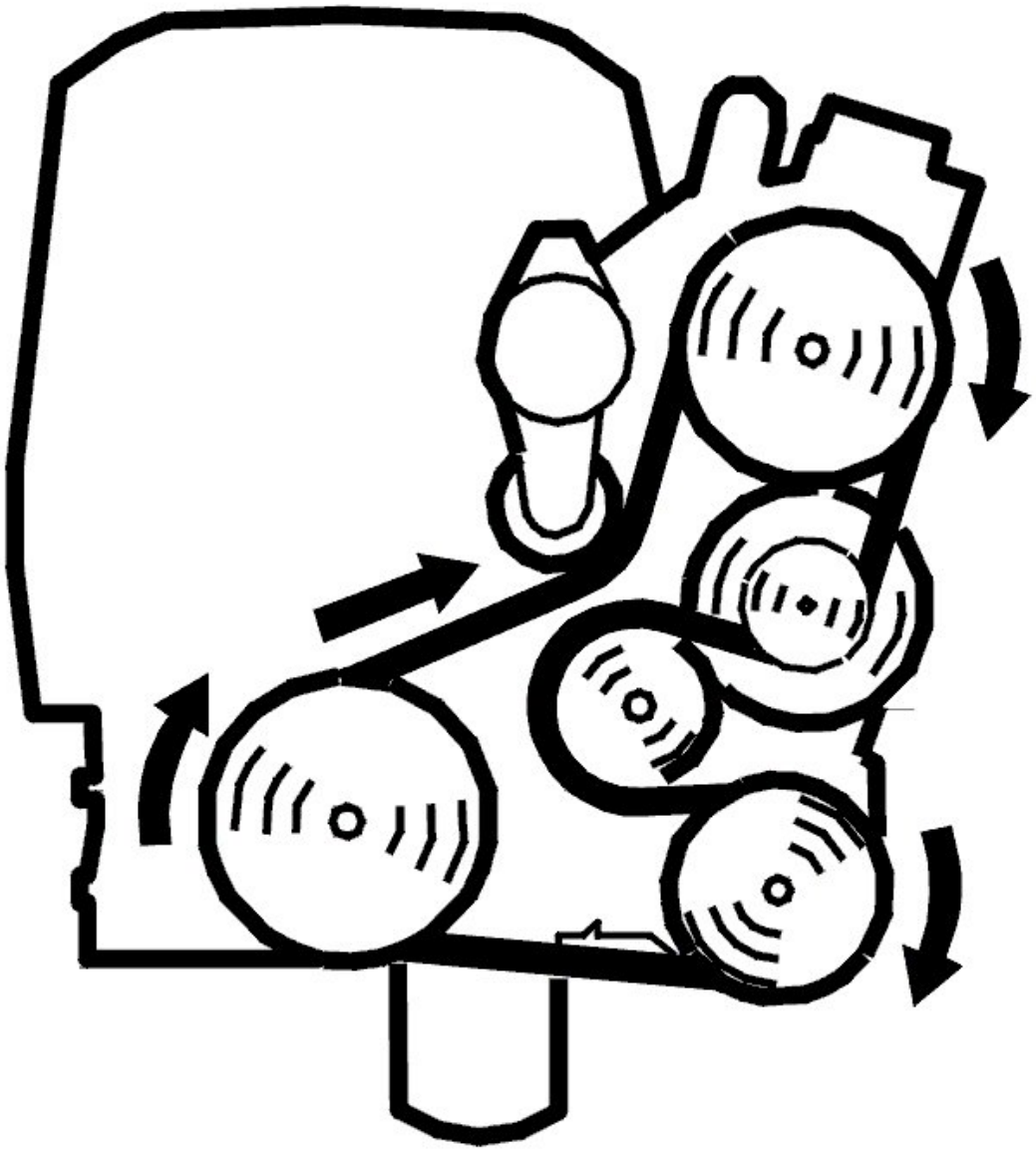
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

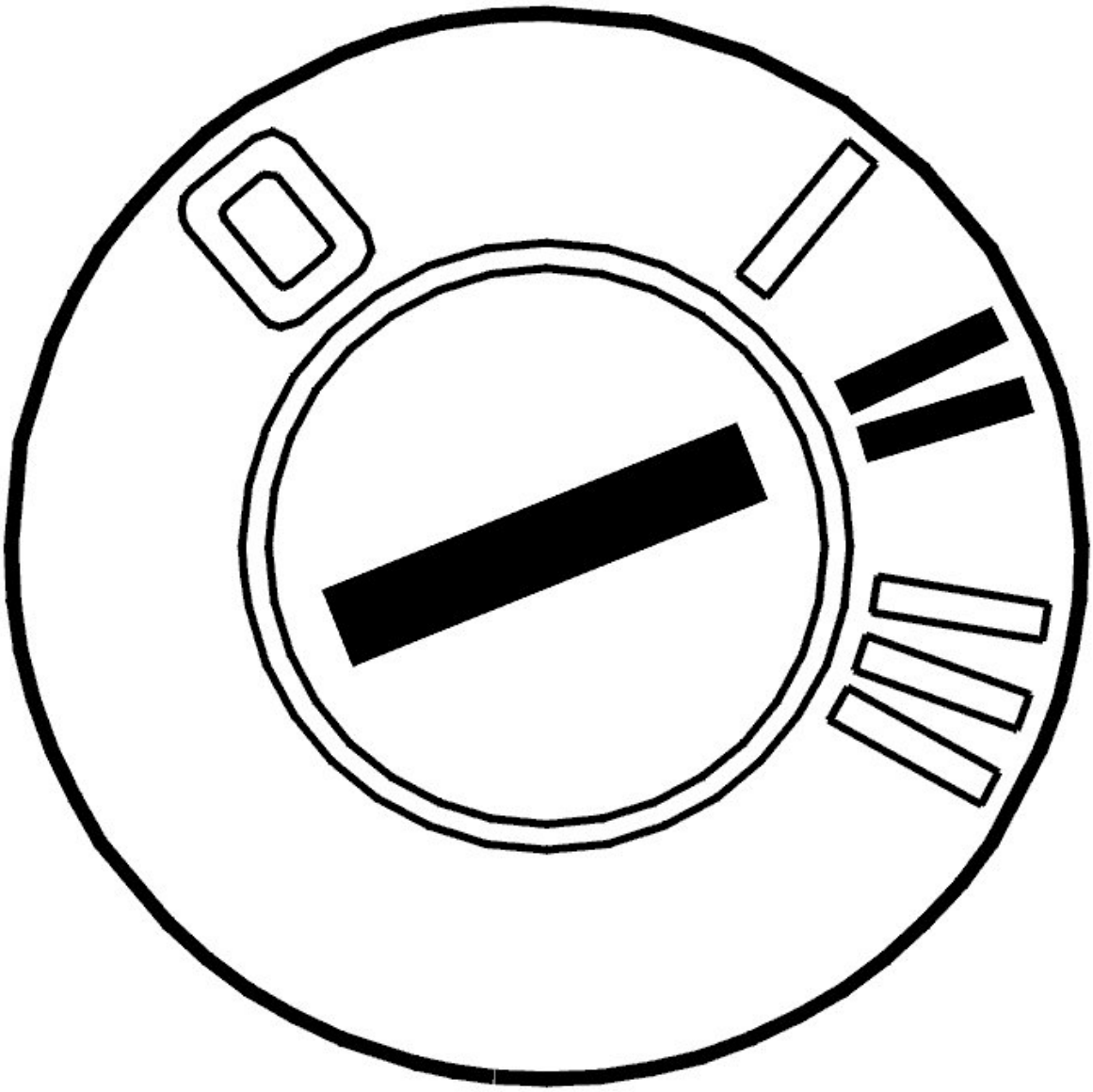


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

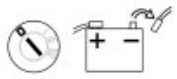
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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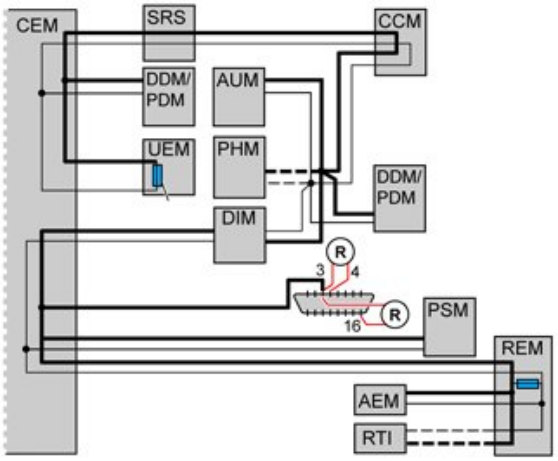
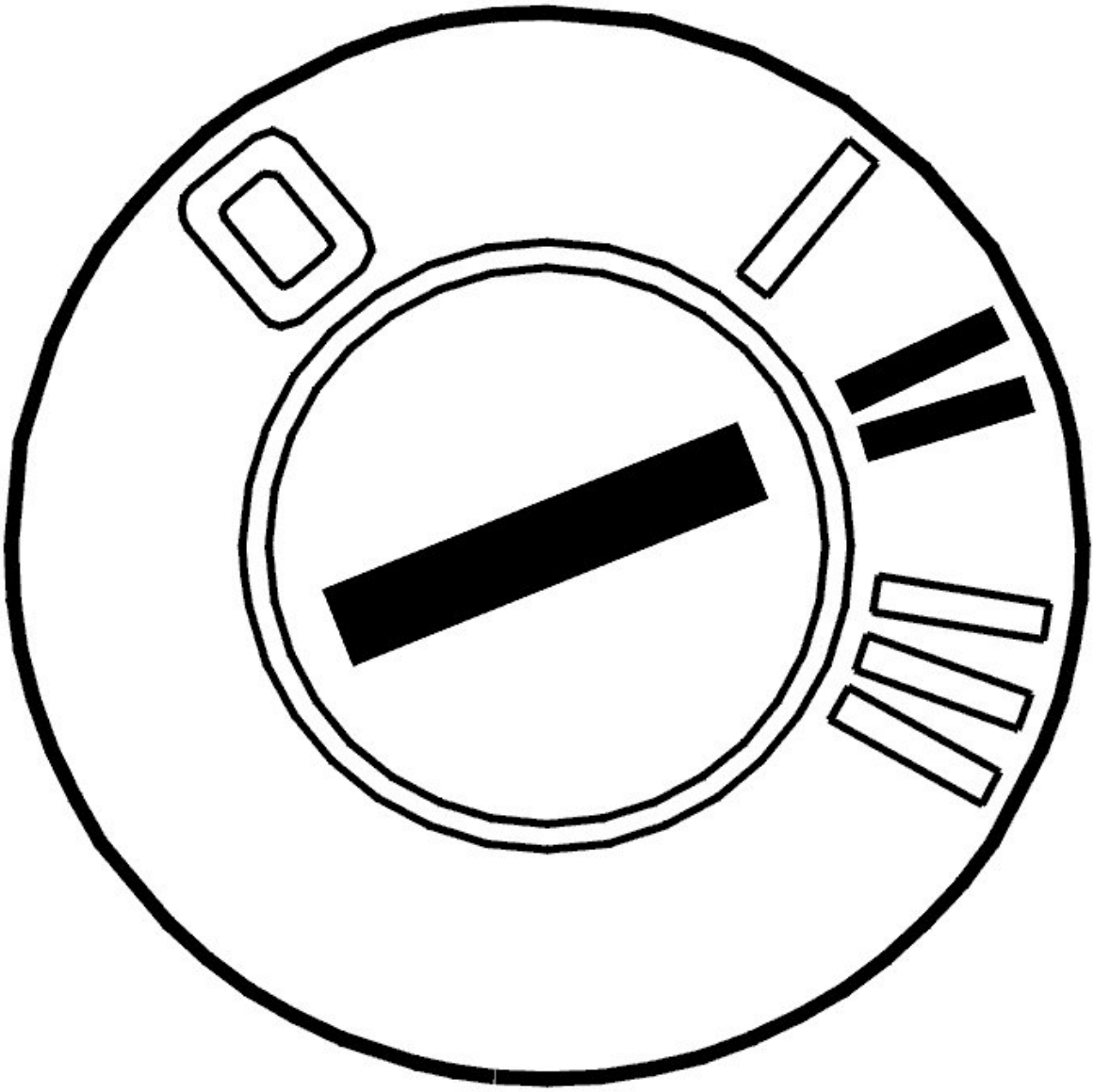


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

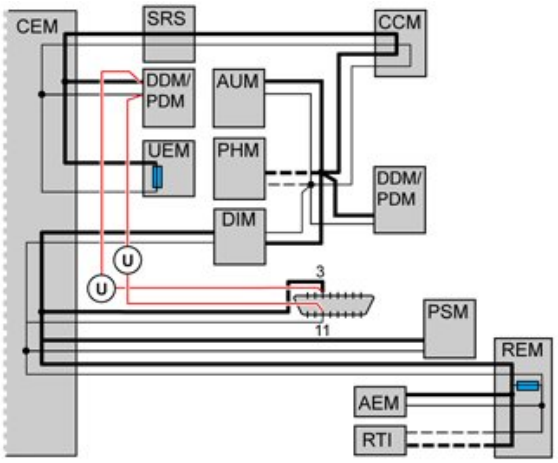
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

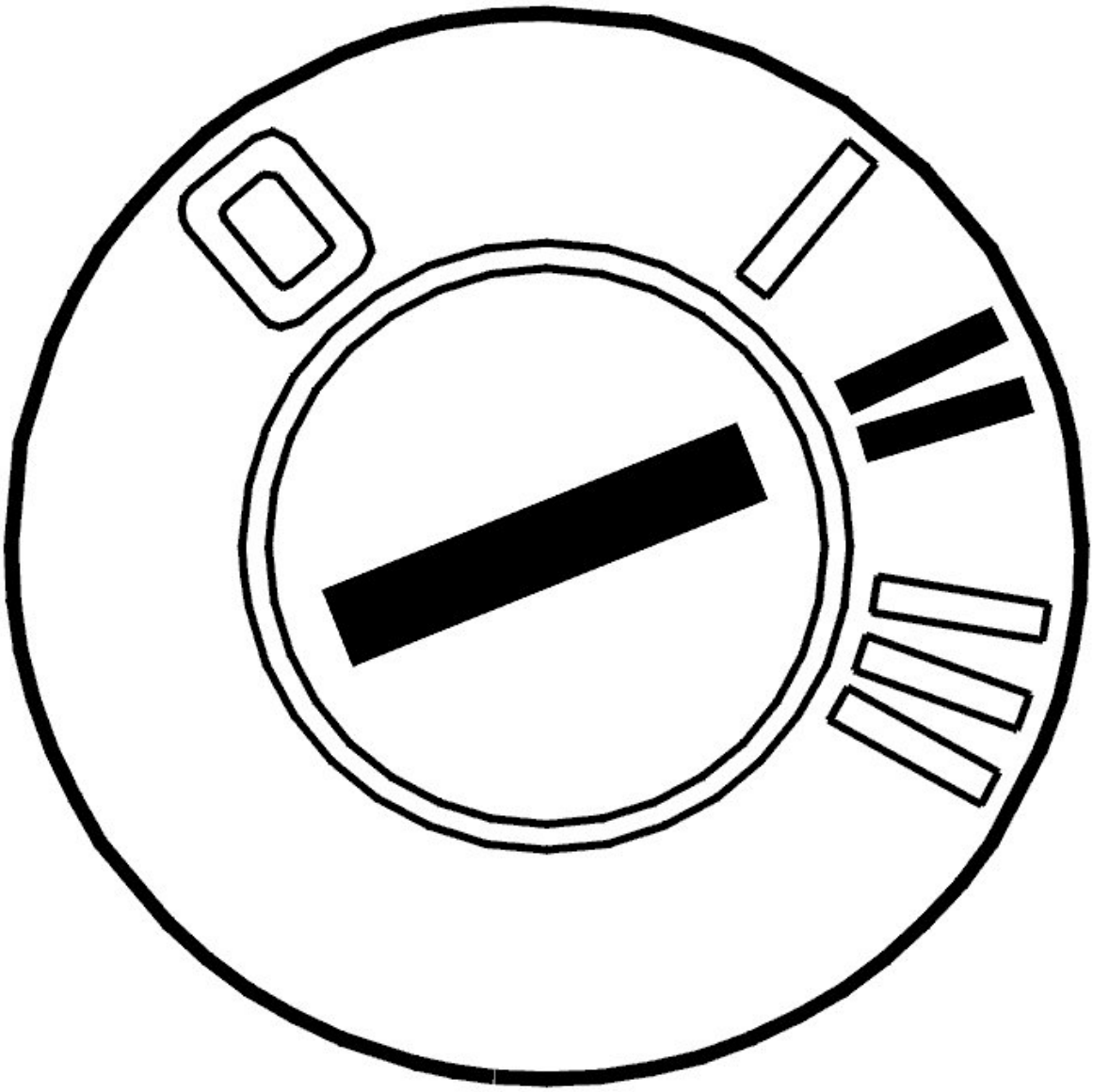
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

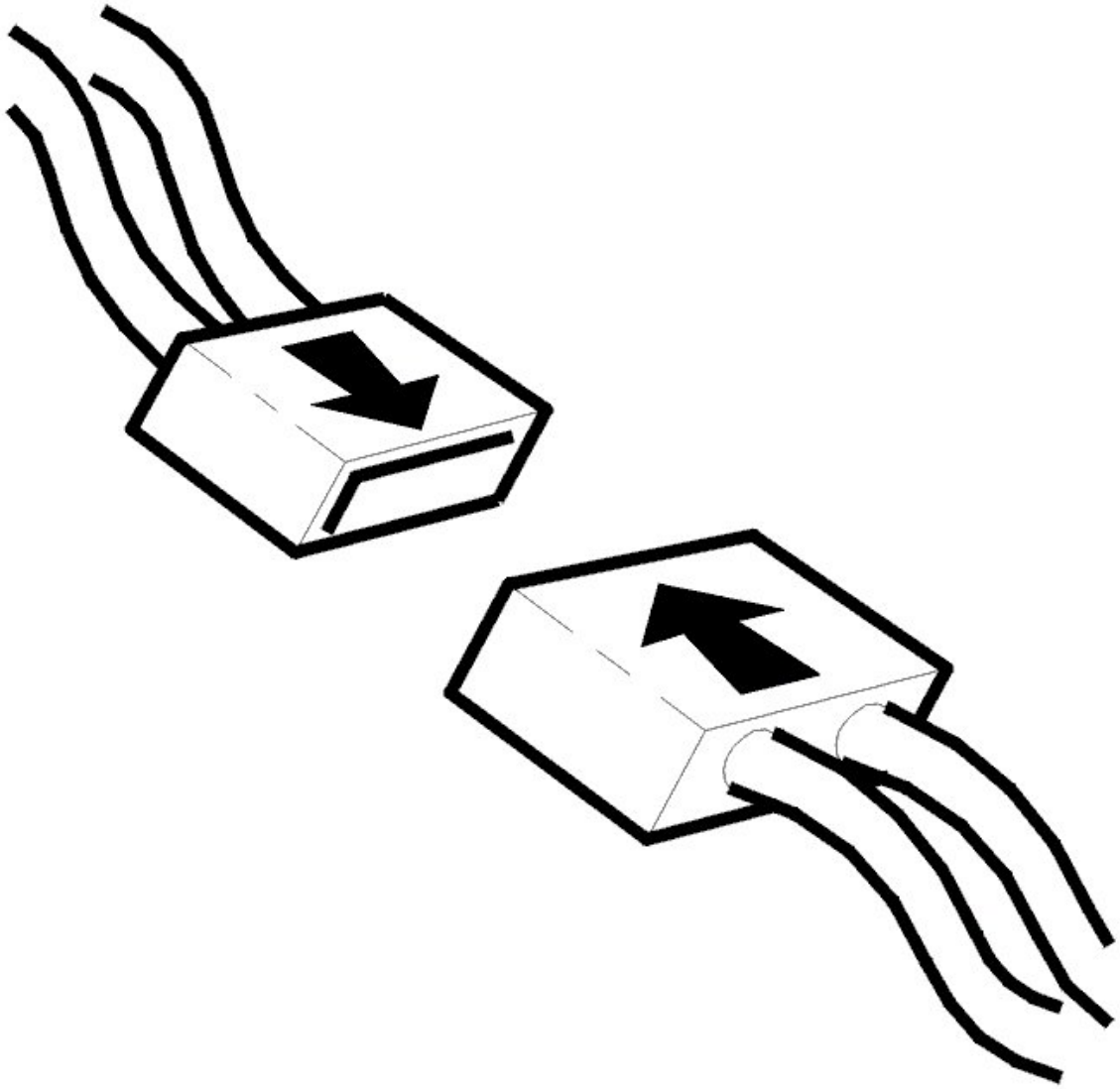


Continue - Verification

Checking the function of the driver information module (DIM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply for the driver information module (DIM) by switching on the ignition.
The lighting in the instrument panel must light up.
If the above works, start the engine and check that the indicator lamps go out correctly and that the tachometer reacts to changes in engine speed.

Is the driver information module (DIM) working?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

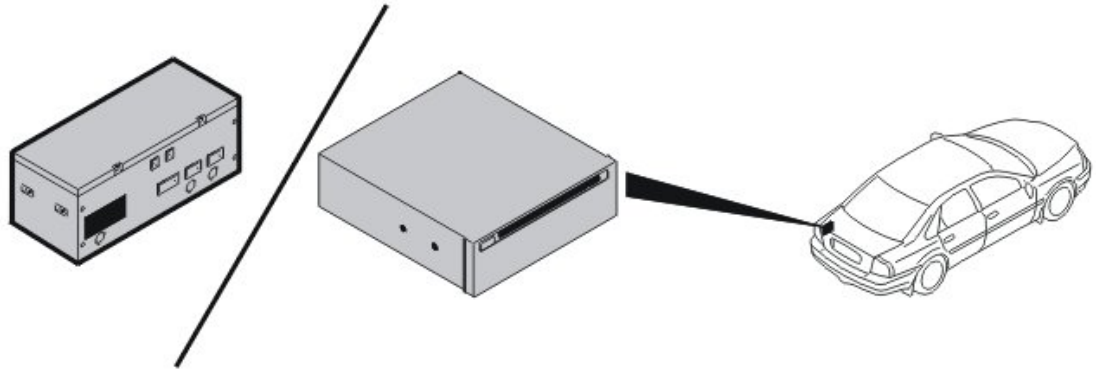
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the driver information module (DIM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A57

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the road traffic information module (RTI) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- New software has been downloaded to the road traffic information module (RTI)
- No power supply to road traffic information module (RTI)
- Open-circuit in the ground lead for the road traffic information module (RTI)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the road traffic information module (RTI)
- The road traffic information module (RTI) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- Traffic information is not displayed or updated.
- The display for the road traffic information module (RTI) does not function.

Signal Missing

Signal missing

Checking the function of the road traffic information module (RTI)

Check the power supply to the road traffic information module (RTI) by inserting and ejecting a DVD or CD.

Hint: This check can be made using either a CD or a DVD. The physical size of the discs is the same. The difference is that a CD will not be recognized by the system. However the insertion and ejection function can be checked.

Is the function OK?

Yes - Checking communication with the road traffic information module (RTI)

No - Checking the power supply and ground for the road traffic information module (RTI)

Checking the power supply and ground for the road traffic information module (RTI)

Check that the fuse for the control module is intact.
Check the power supply and ground terminal for the road traffic information module (RTI).
Also check fuse and power supply for the Audio module (AUM).
For information about fuse and terminal numbers, see the relevant Wiring Diagram.
Remedy as necessary.

Other information:

- Checking the ground terminals See: Accessories and Optional Equipment/Navigation System/Testing and Inspection/Component Tests and General Diagnostics
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the road traffic information module (RTI)

No - Signal missing

Checking communication with the road traffic information module (RTI)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the road traffic information module (RTI) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can

also store this diagnostic trouble code.

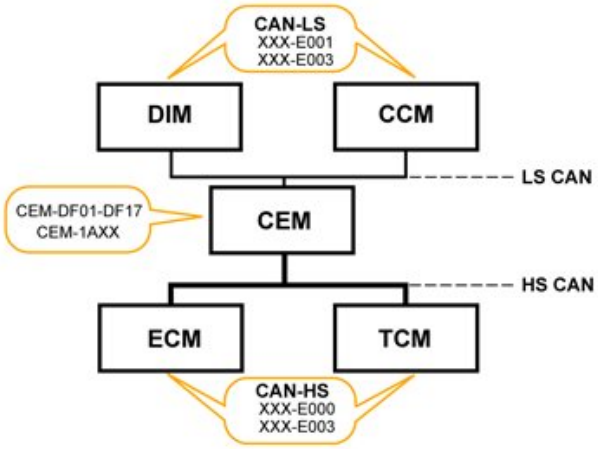
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

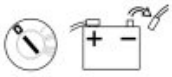
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

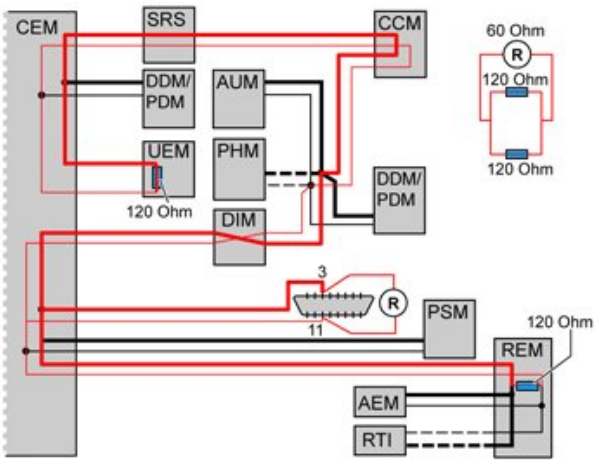
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

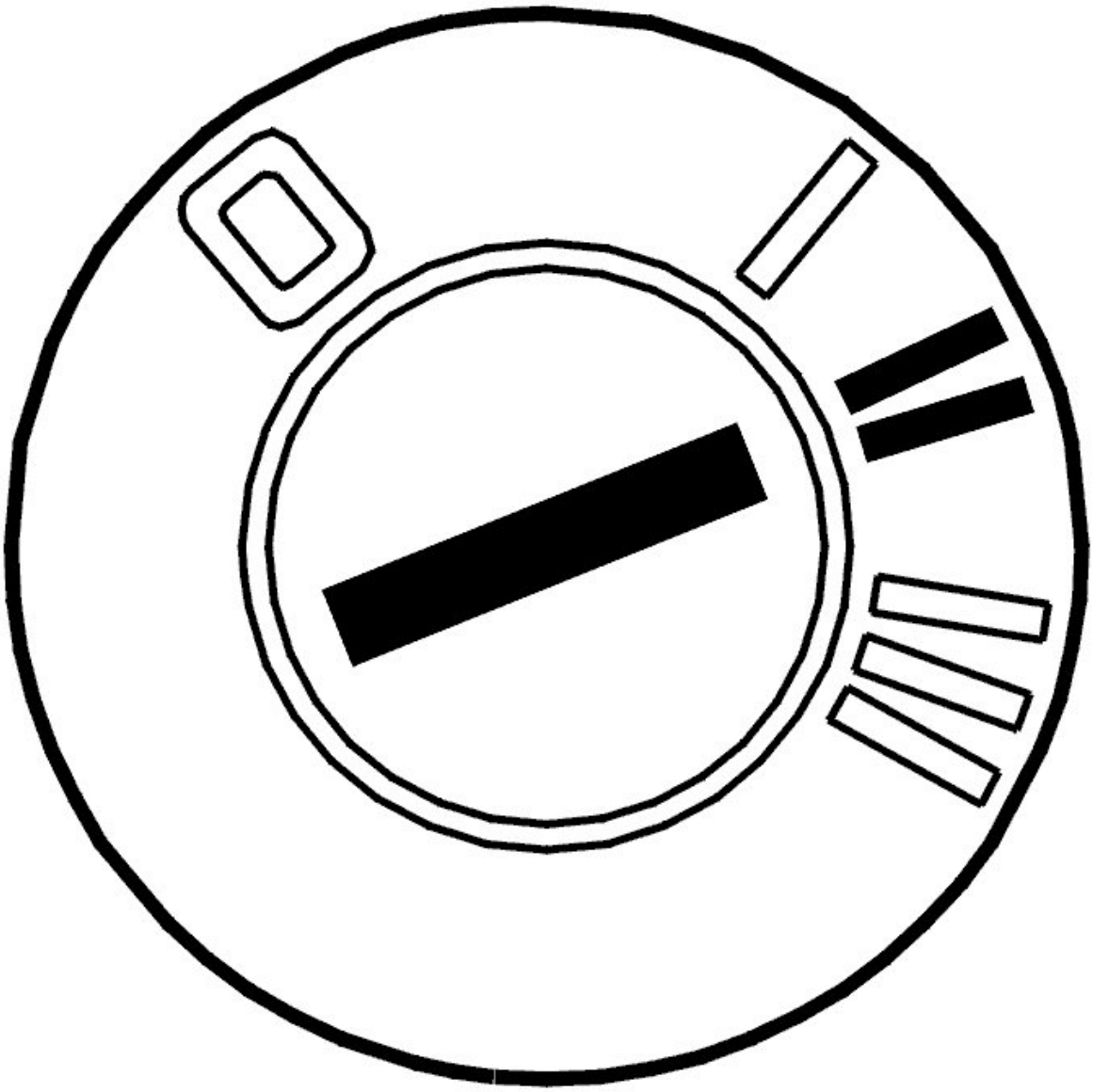


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

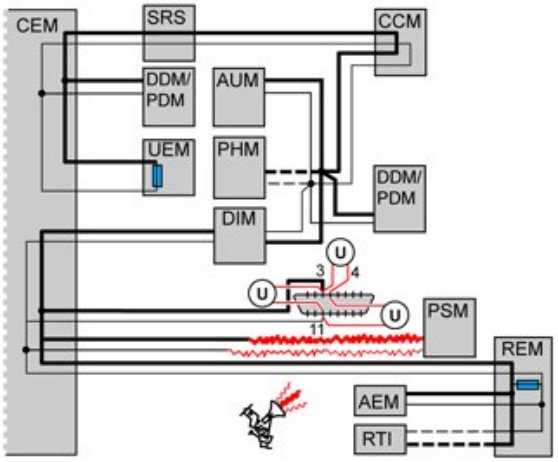
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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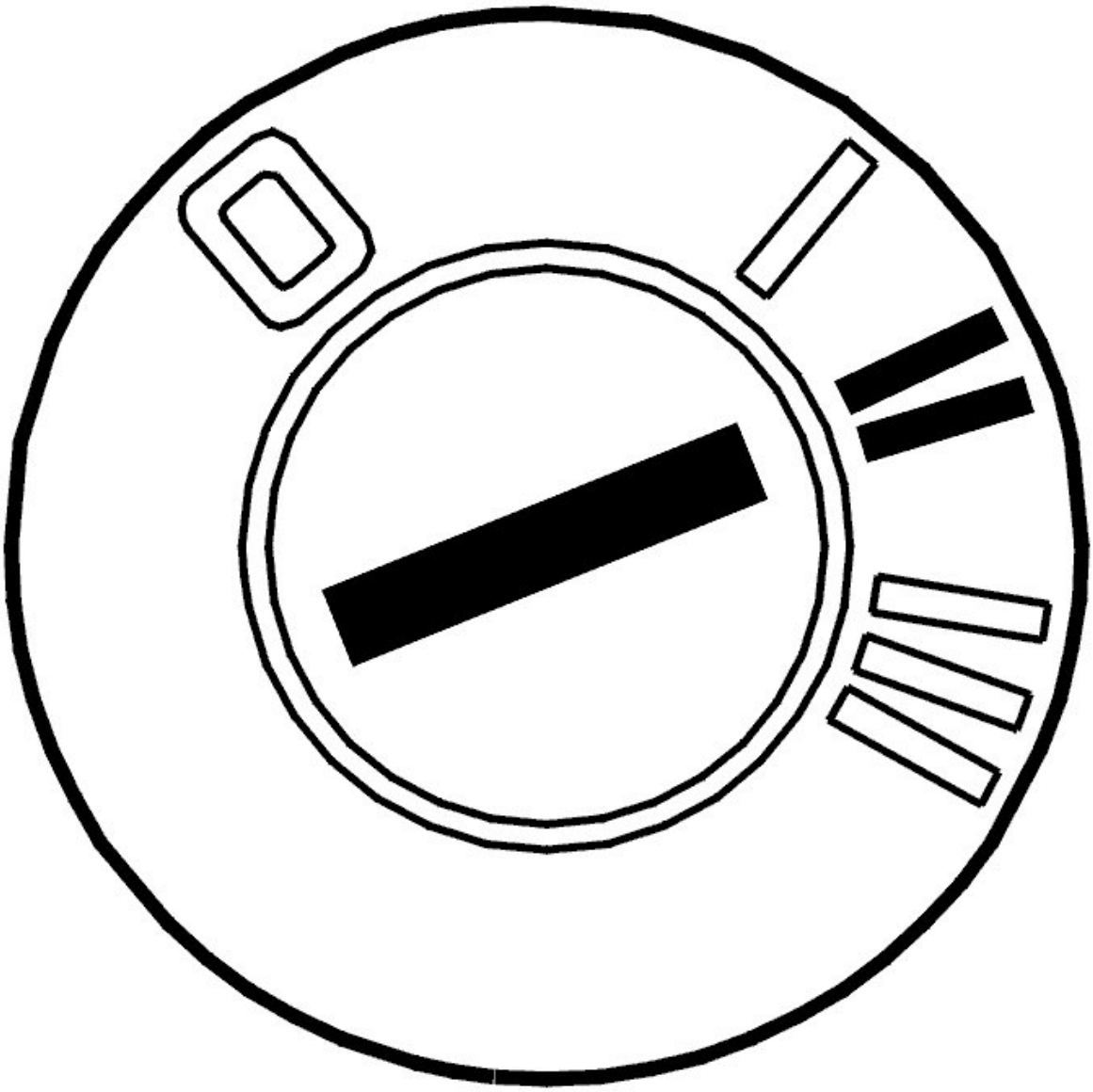
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

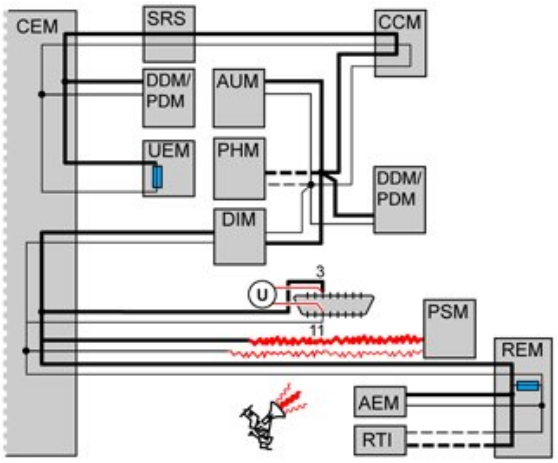
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

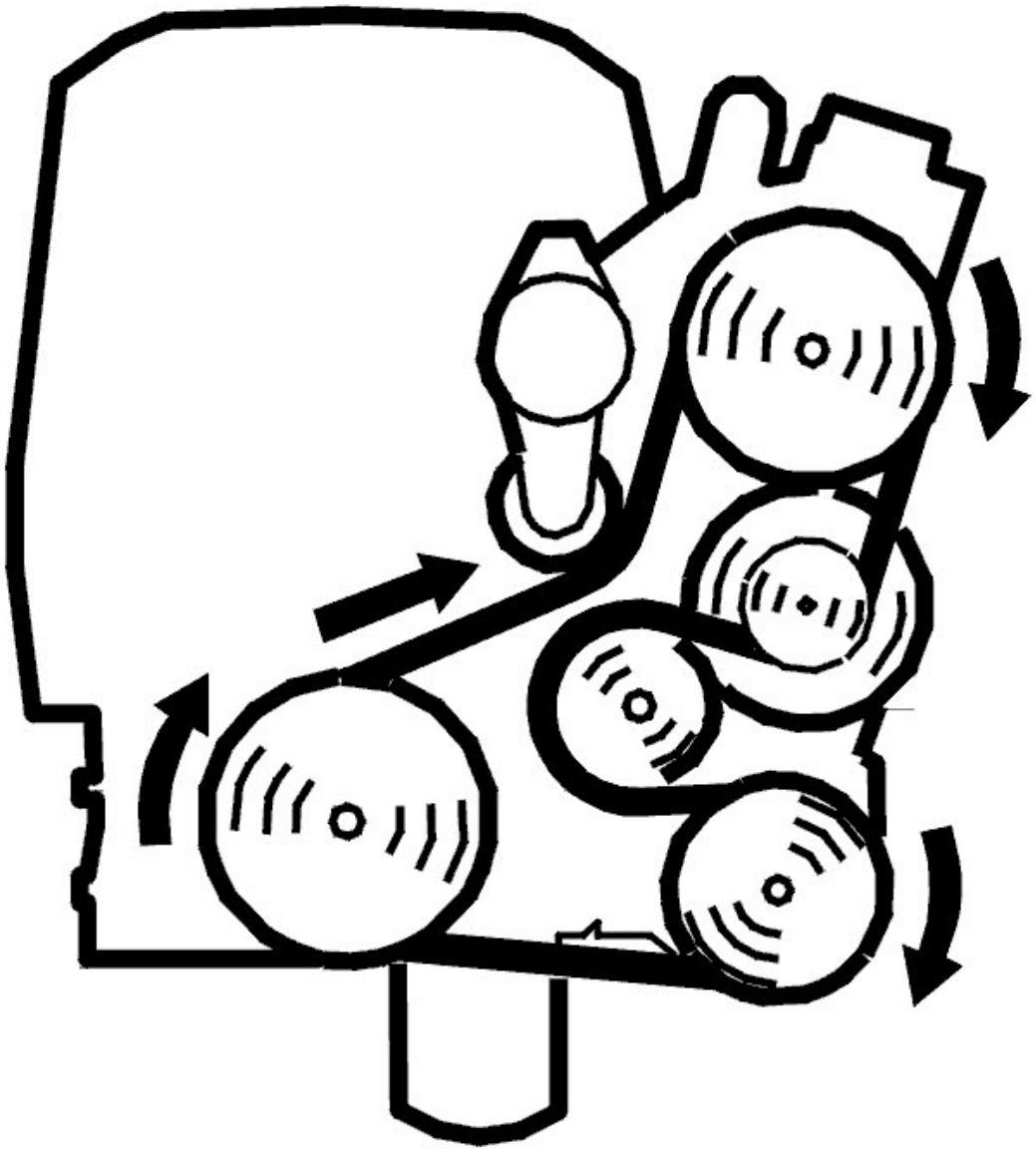
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

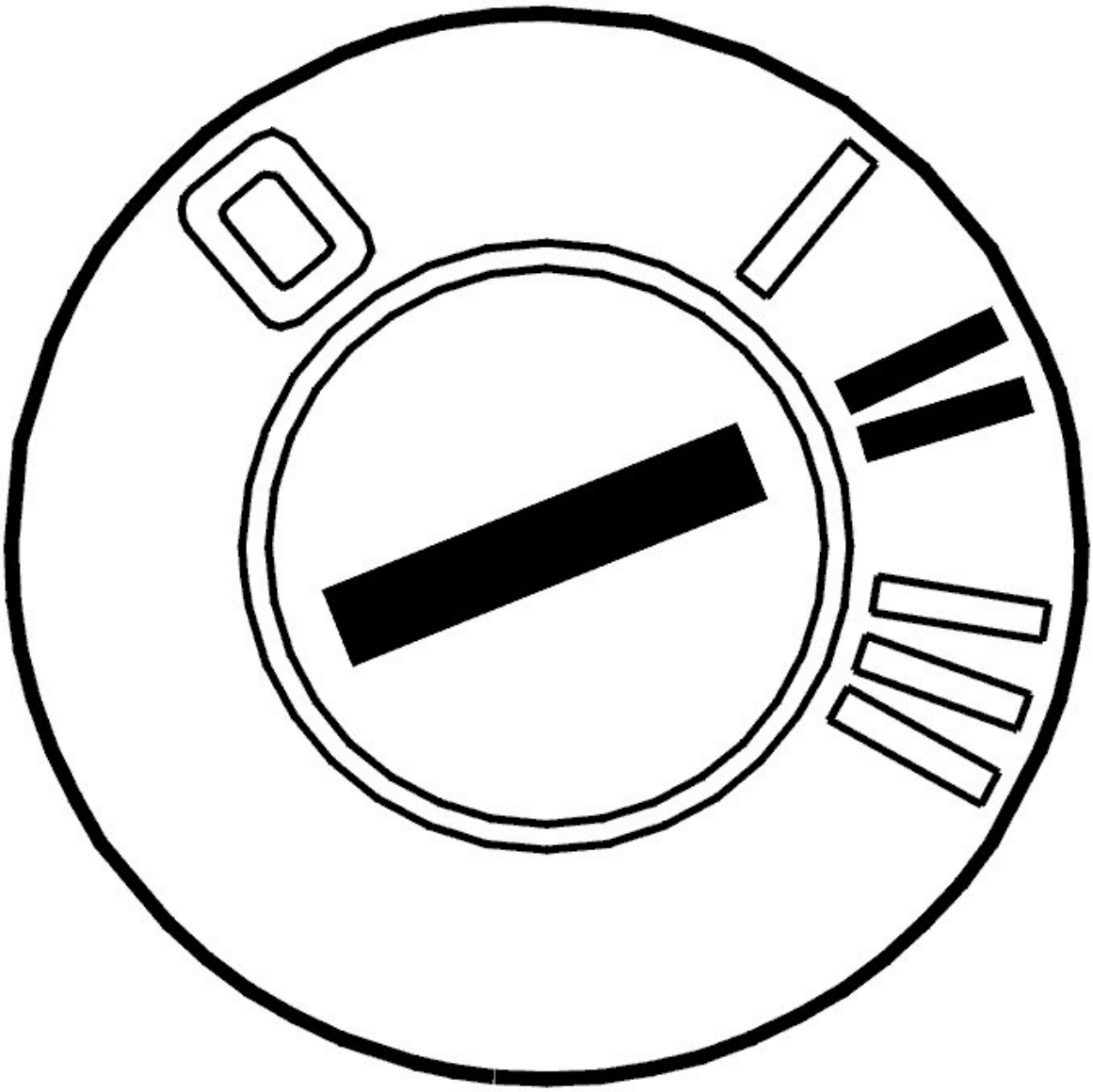


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

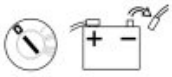
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

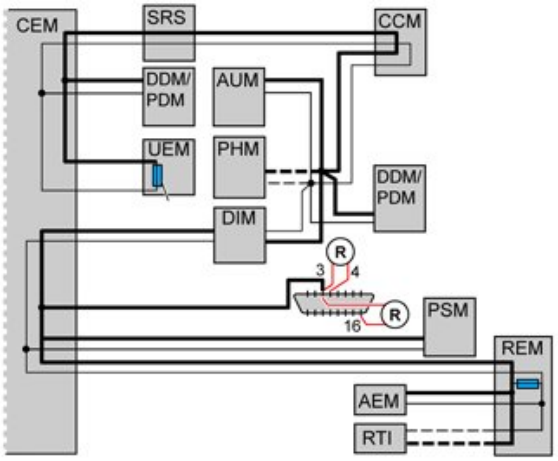
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

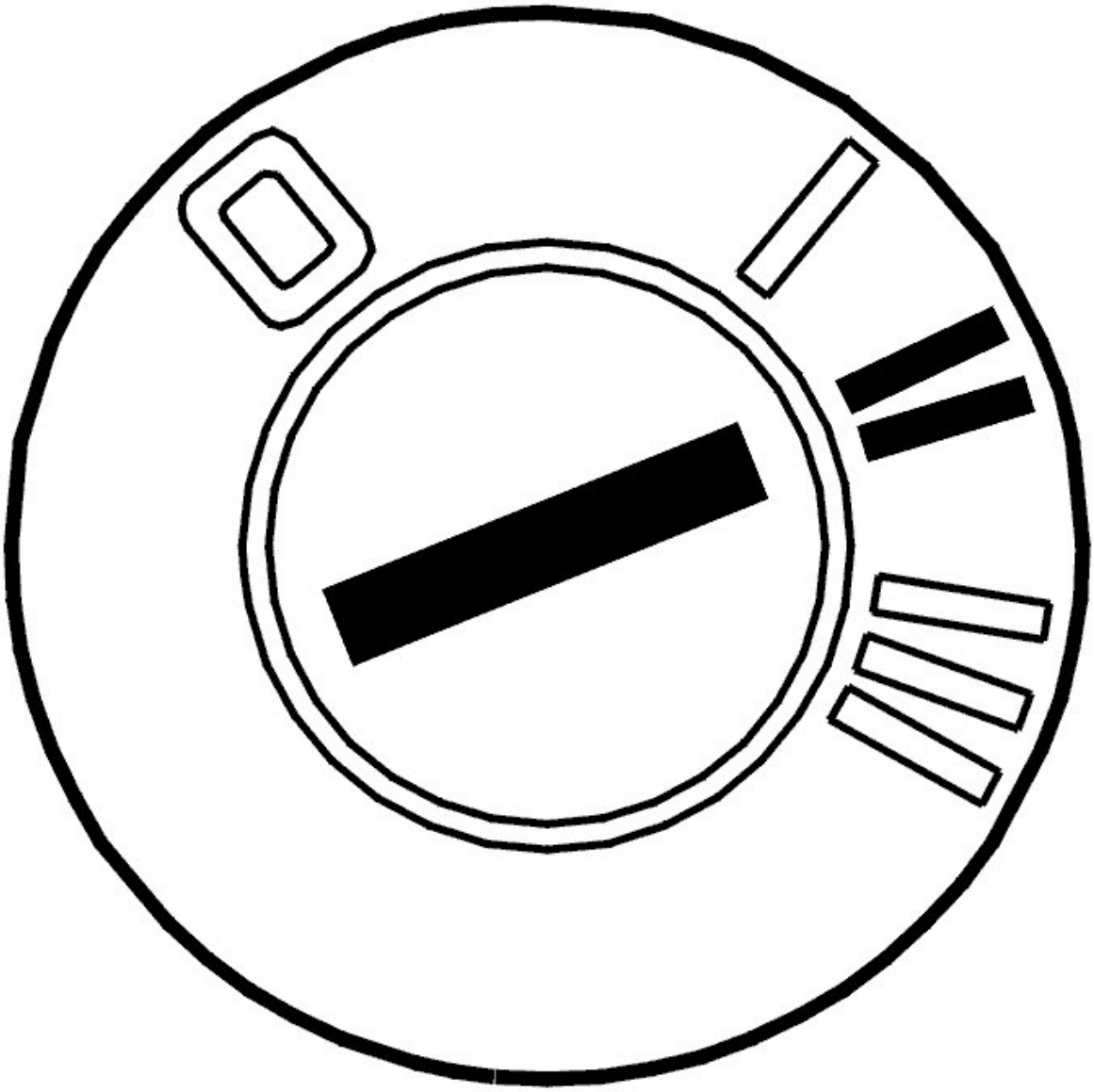


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

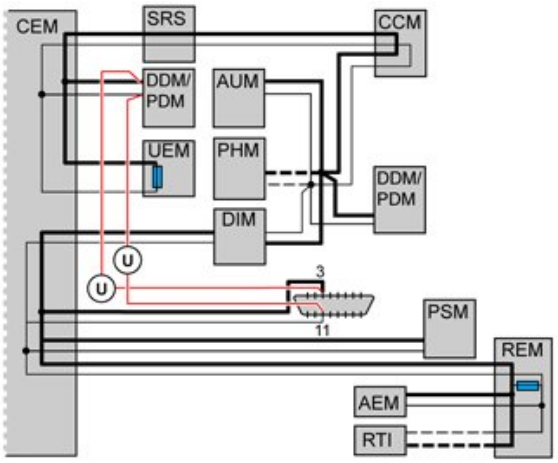
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

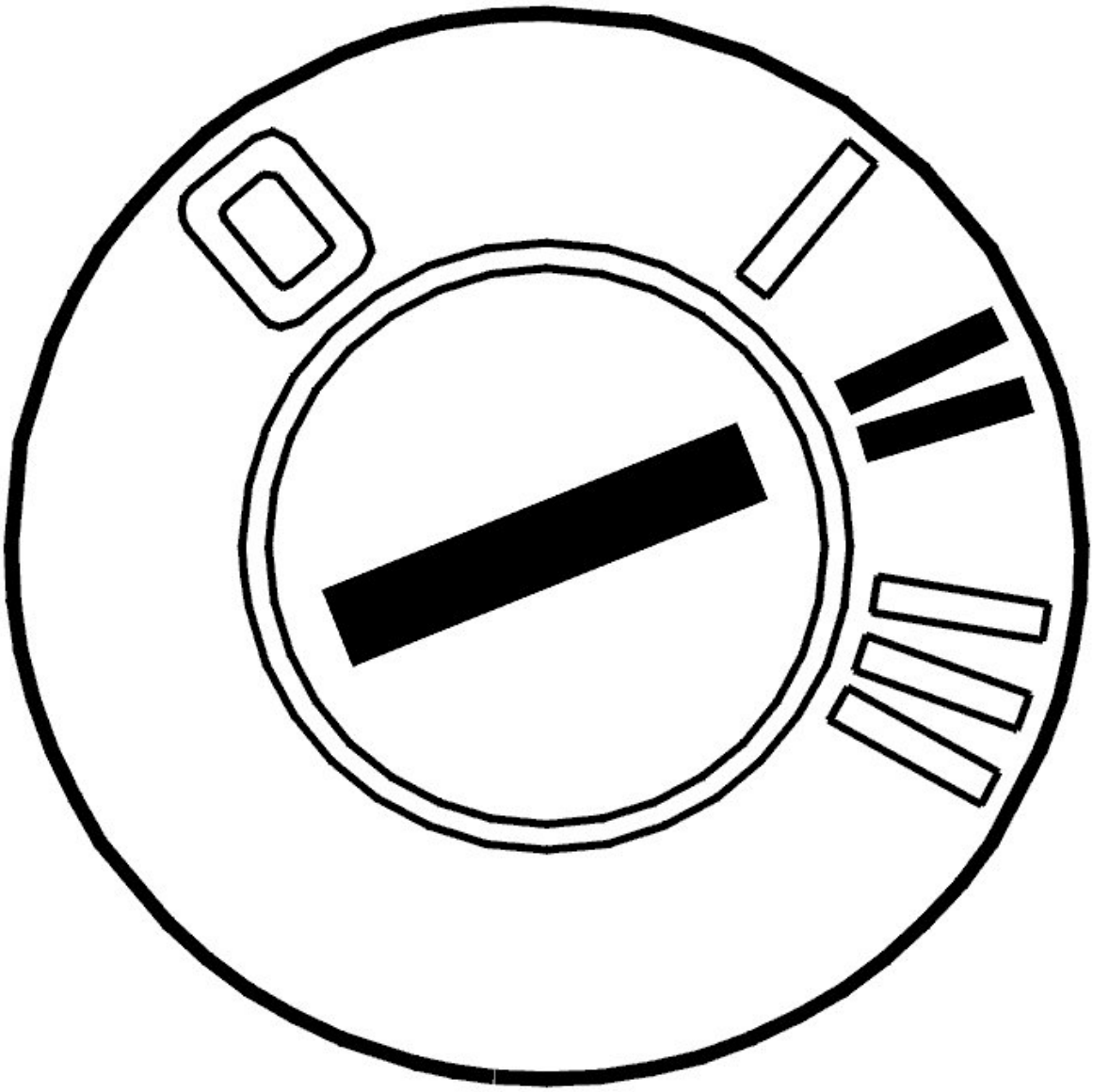
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

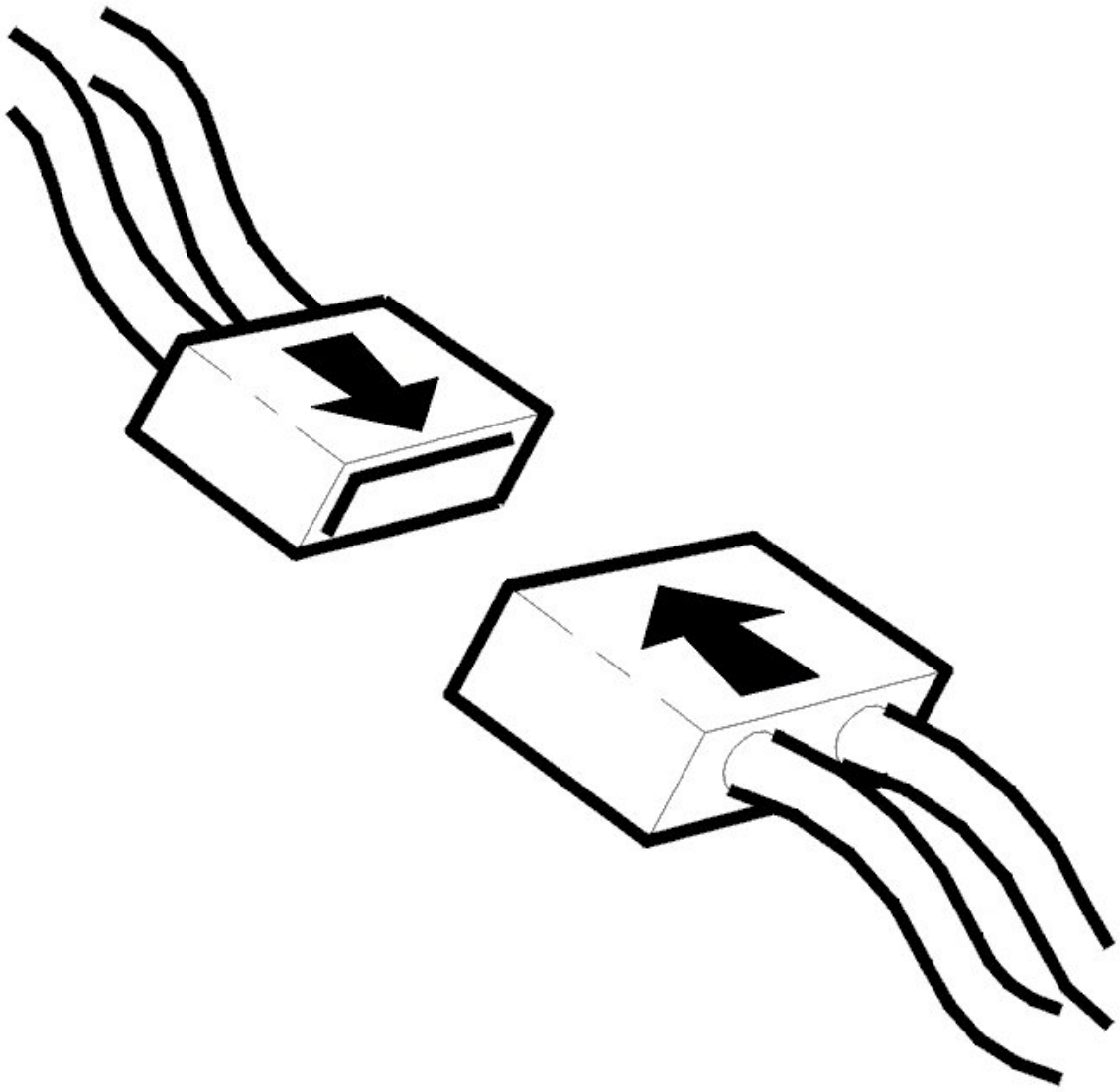


Continue - Verification

Checking the function of the road traffic information module (RTI)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply to the road traffic information module (RTI) by inserting and ejecting a DVD or CD.

Hint: This check can be made using either a CD or a DVD. The physical size of the discs is the same. The difference is that a CD will not be recognized by the system. However the insertion and ejection function can be checked.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

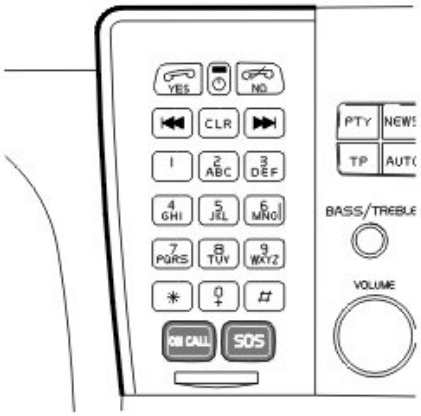
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the road traffic information module (RTI)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A58

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the phone module (PHM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to the phone module (PHM)
- Open-circuit in the ground lead for the phone module (PHM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the phone module (PHM)
- The phone module (PHM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- The phone is not working.
- The menu system does not operate.

Signal Missing

Signal missing

Checking the function of the phone module (PHM)

For further information about the fuse and terminal pin numbers, see the relevant Wiring Diagram.
Check that the phone module (PHM) is powered and grounded by pressing the ON/OFF button and then pressing the YES button.
The LED in the ON/OFF button must light.

Does the LED in the ON/OFF button light?

Yes - Checking communication with the phone module (PHM)

No - Checking the power supply and ground for the phone module (PHM)

Checking the power supply and ground for the phone module (PHM)

Check that the fuse for the control module is intact.
Check the power supply and the ground terminal for the phone module (PHM).
Remedy as necessary.

Other information:

- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the phone module (PHM)

No - Signal missing

Checking communication with the phone module (PHM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the phone module (PHM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

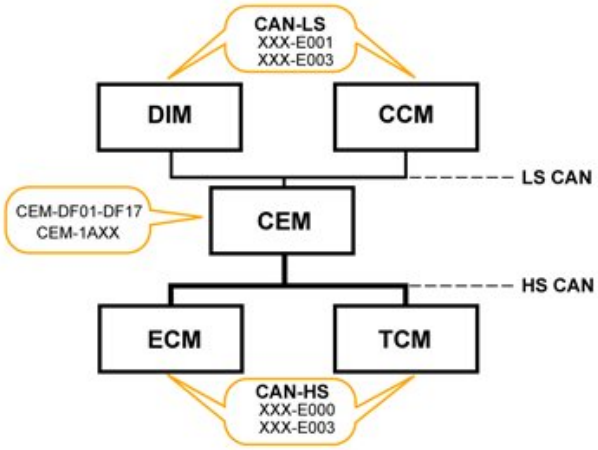
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent. Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

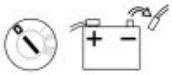
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

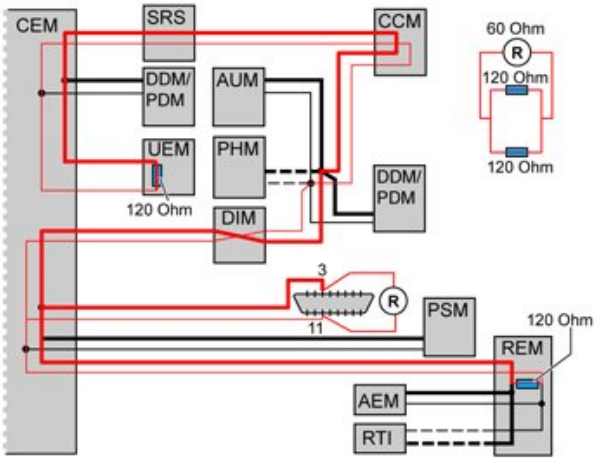
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they

work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

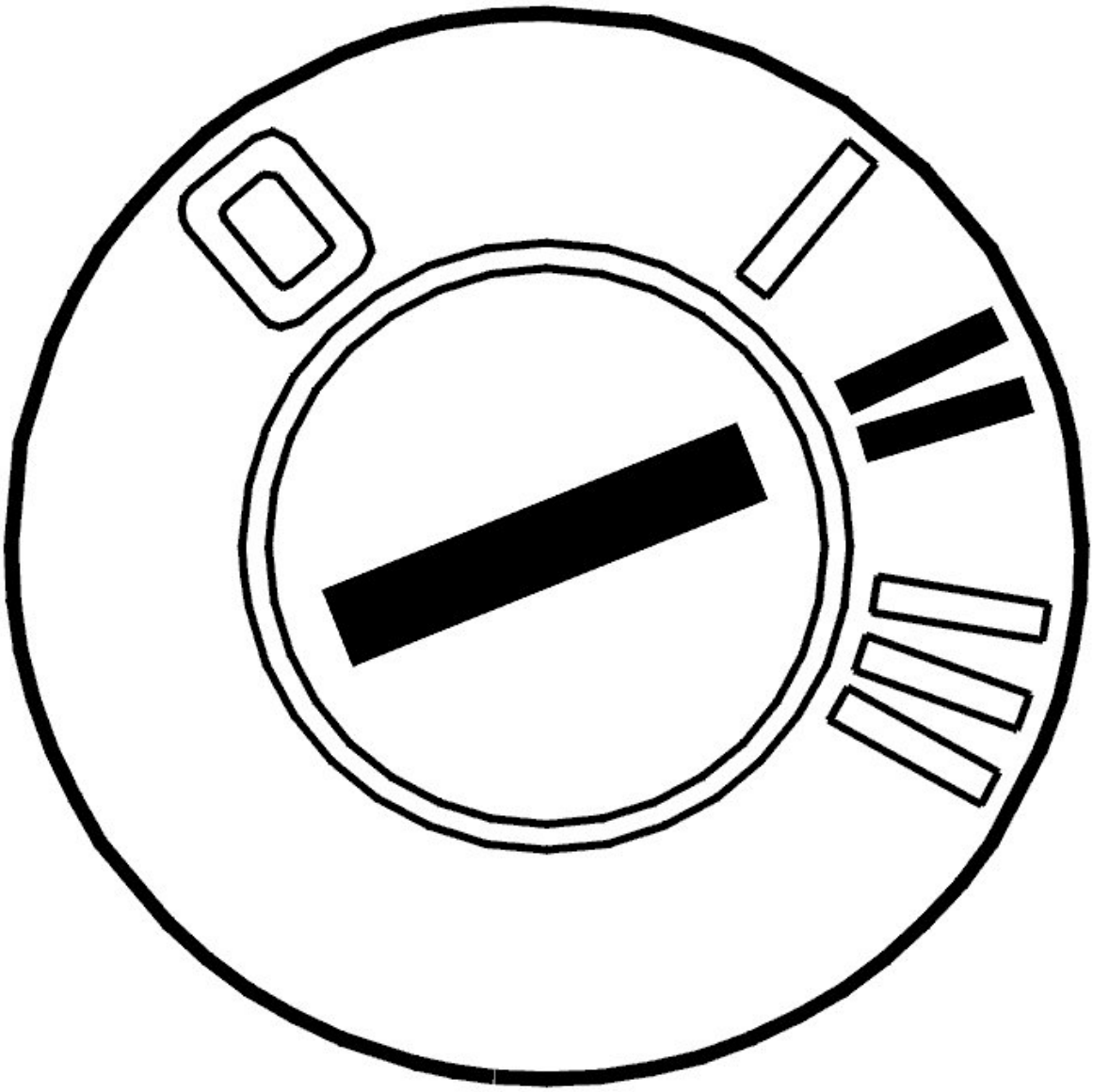


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

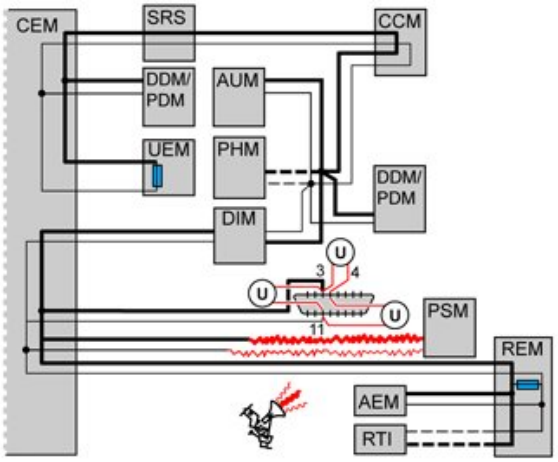
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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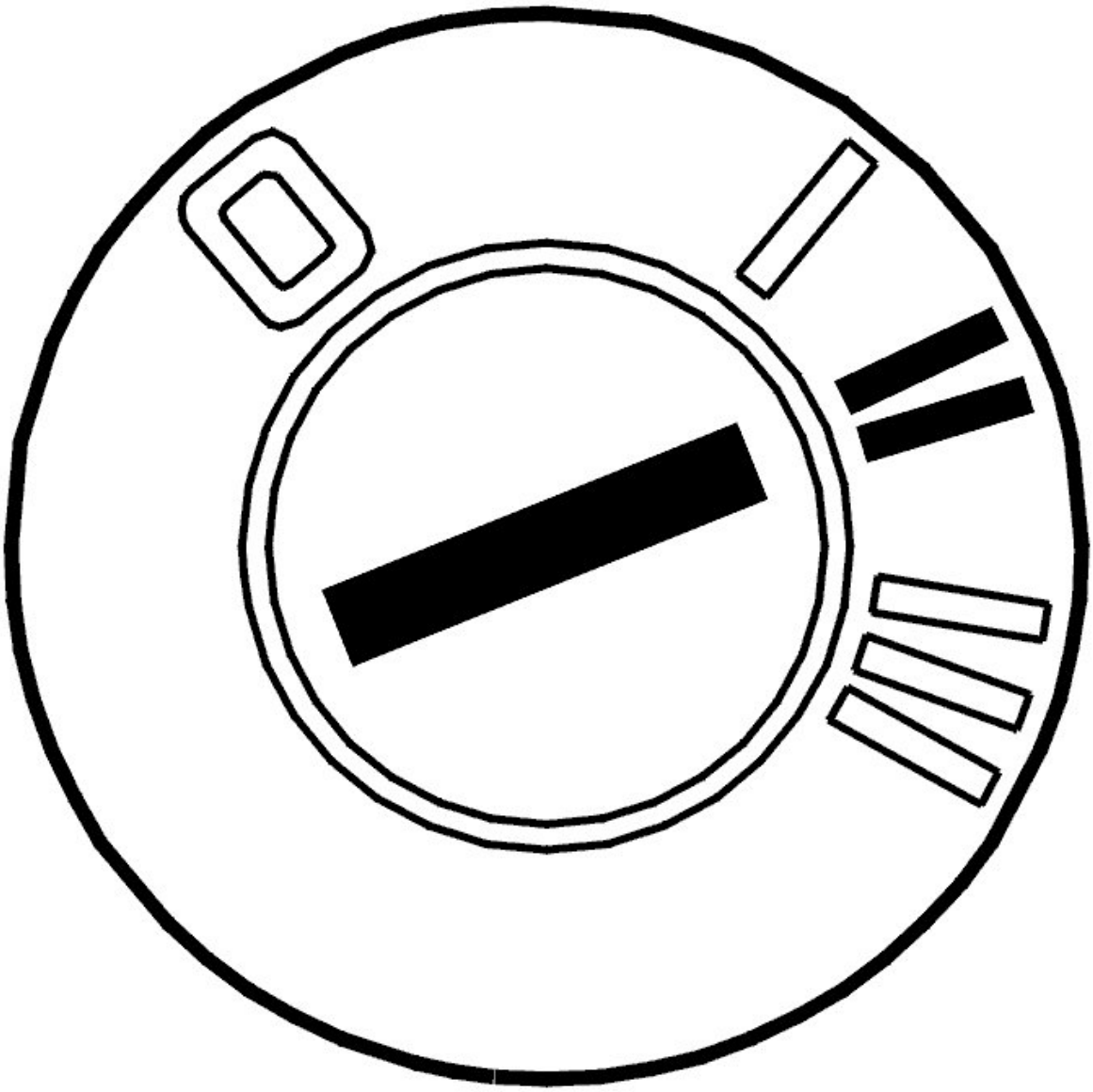
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

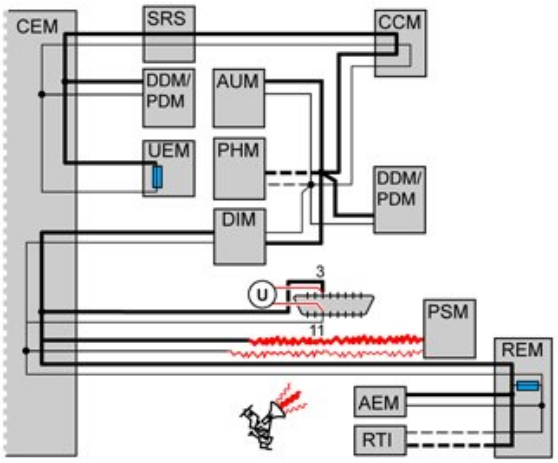
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

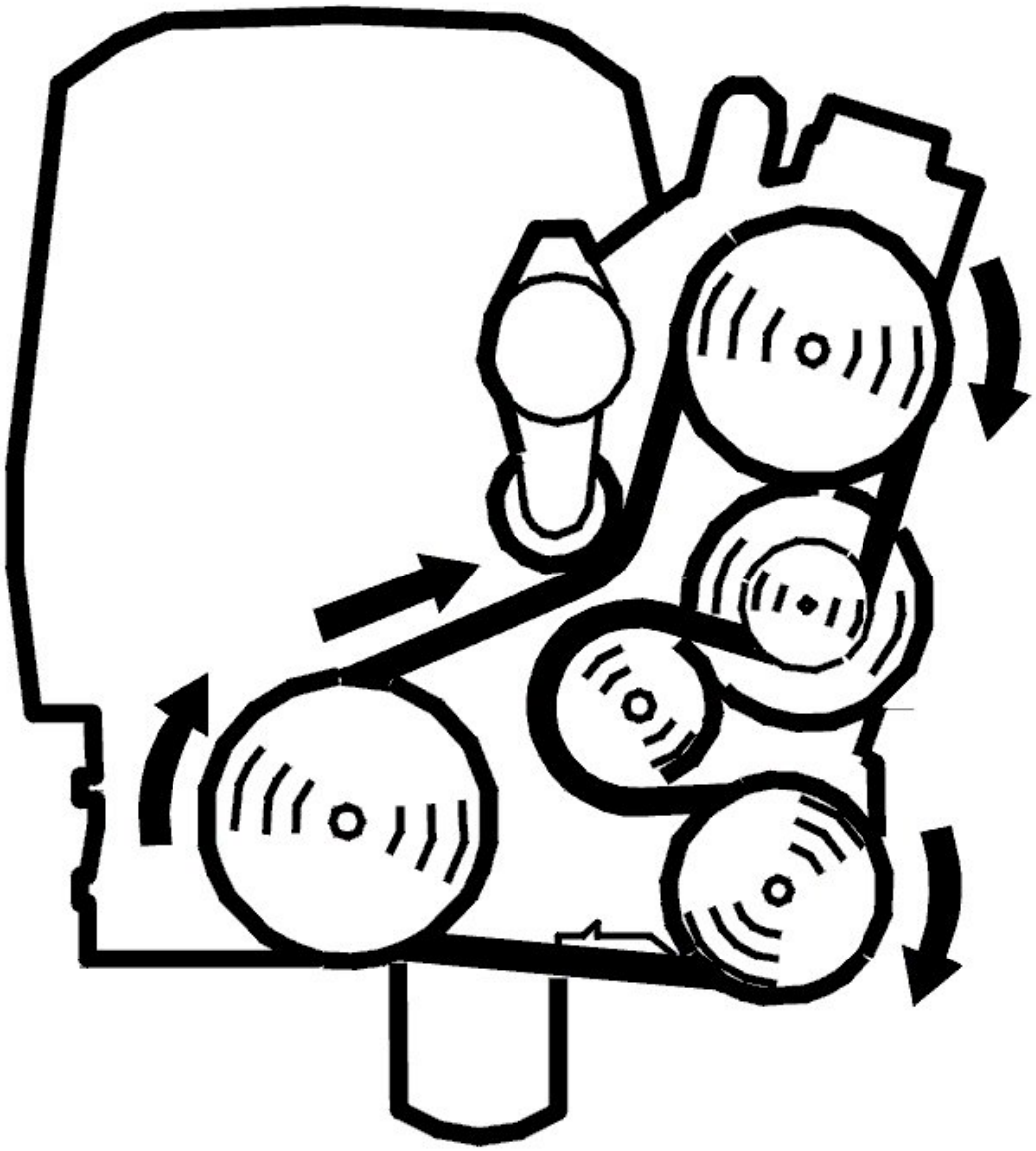
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

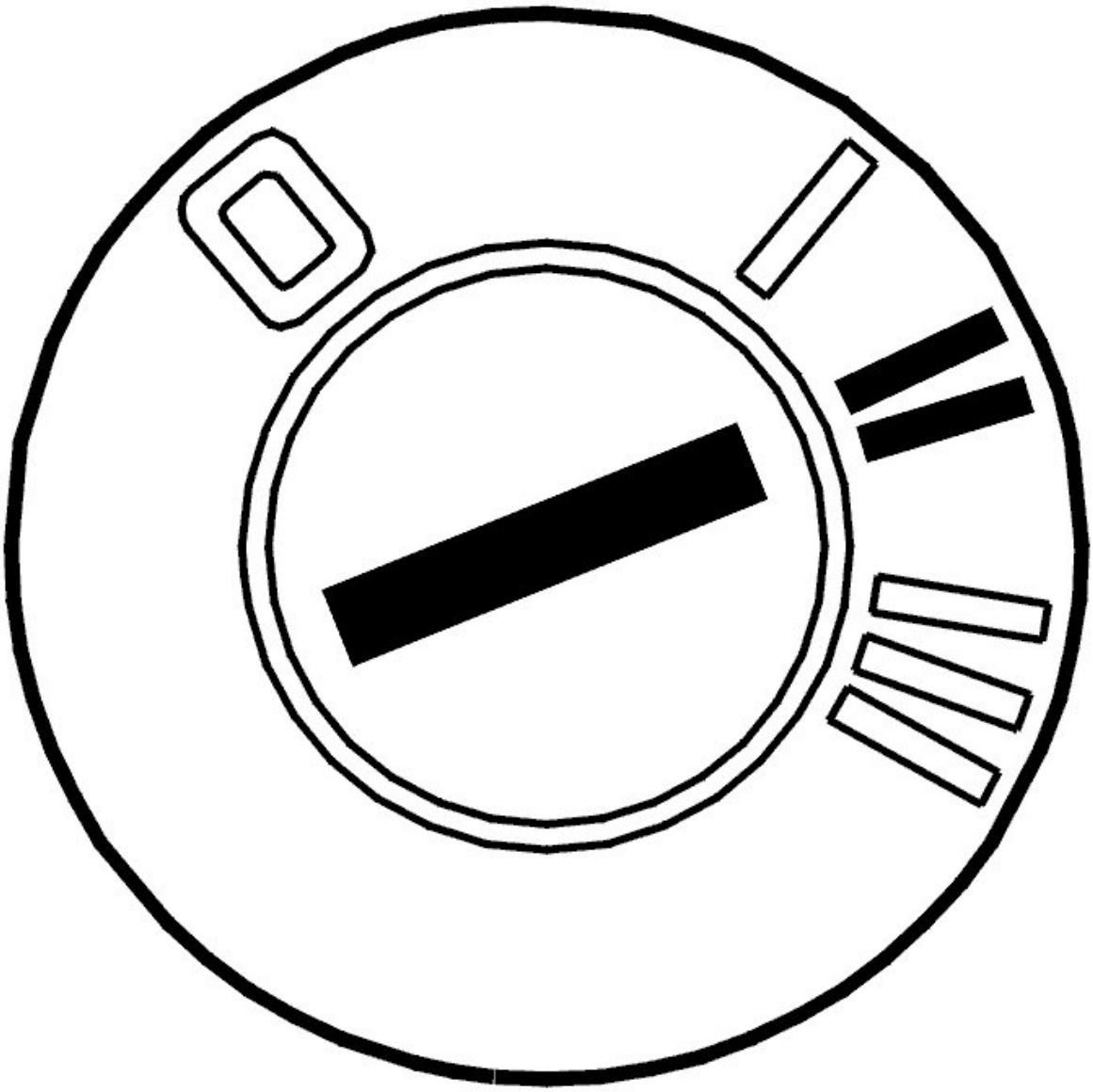


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

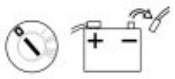
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

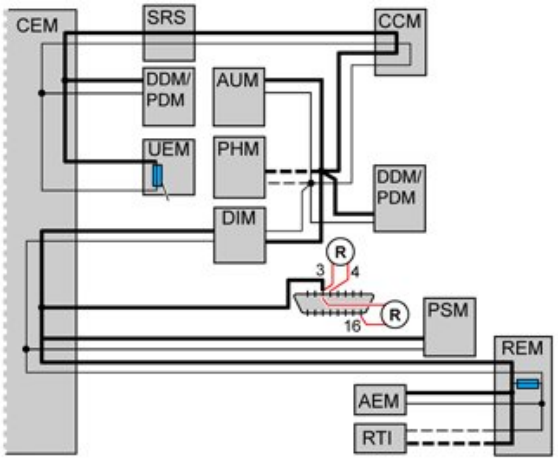
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

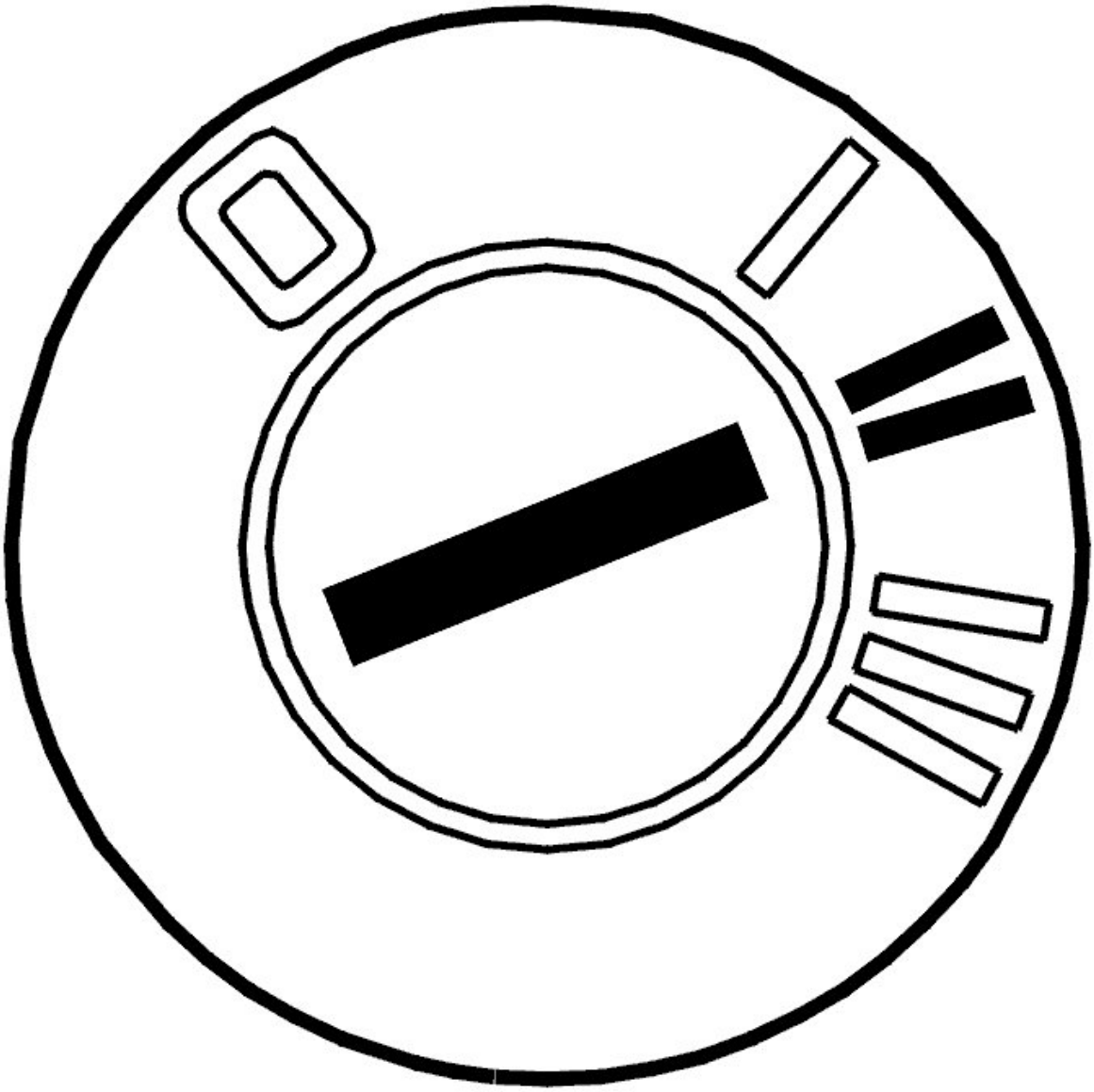


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

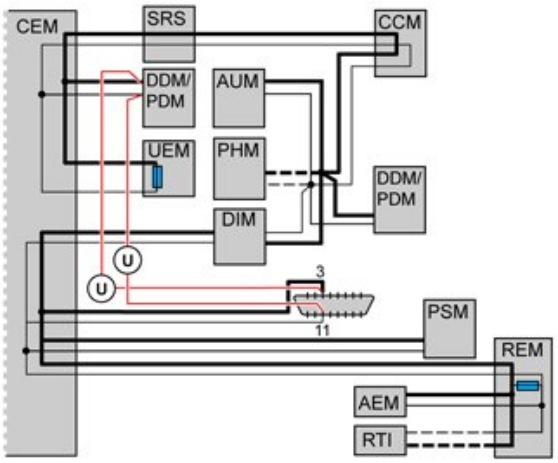
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

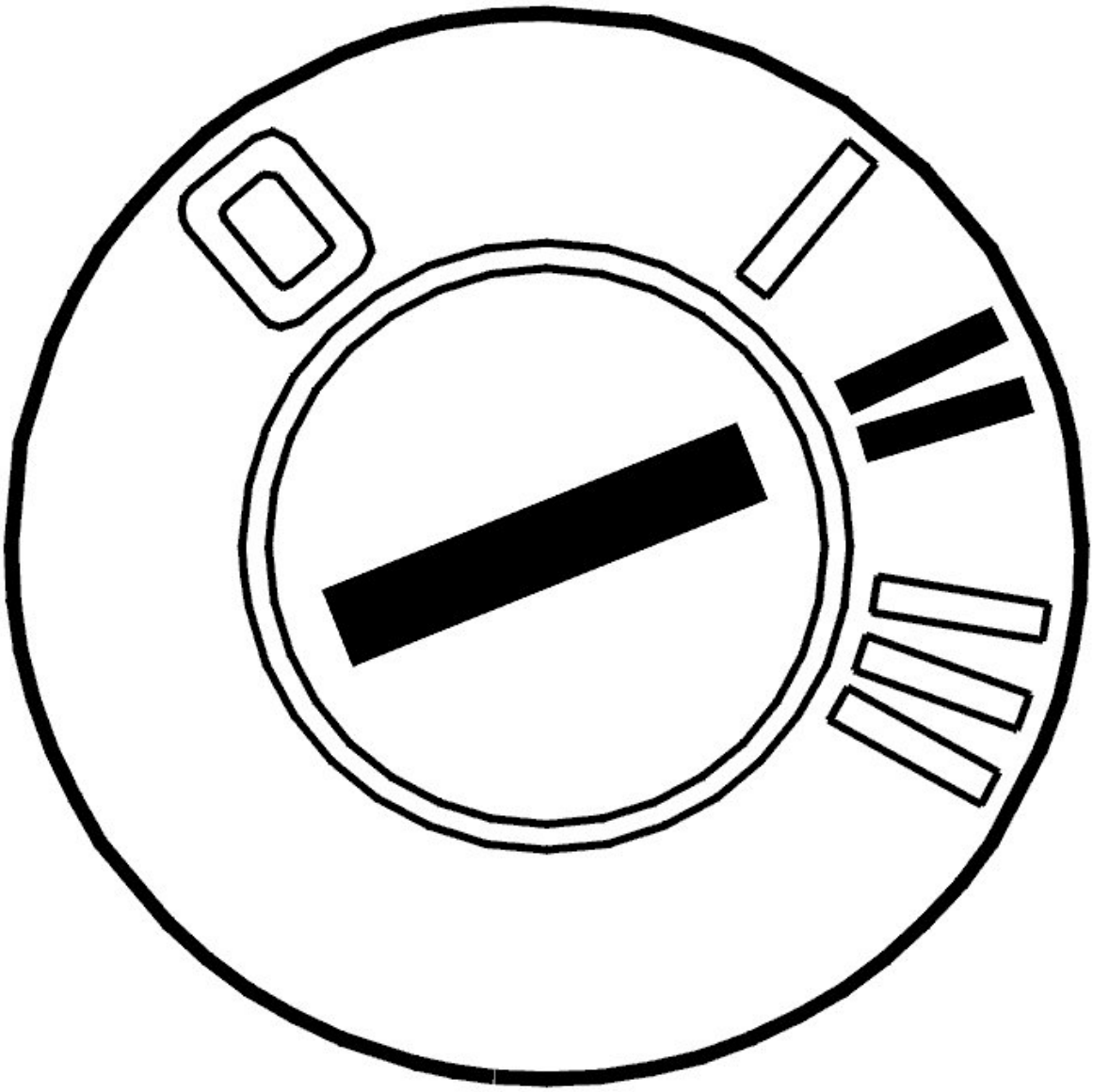
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

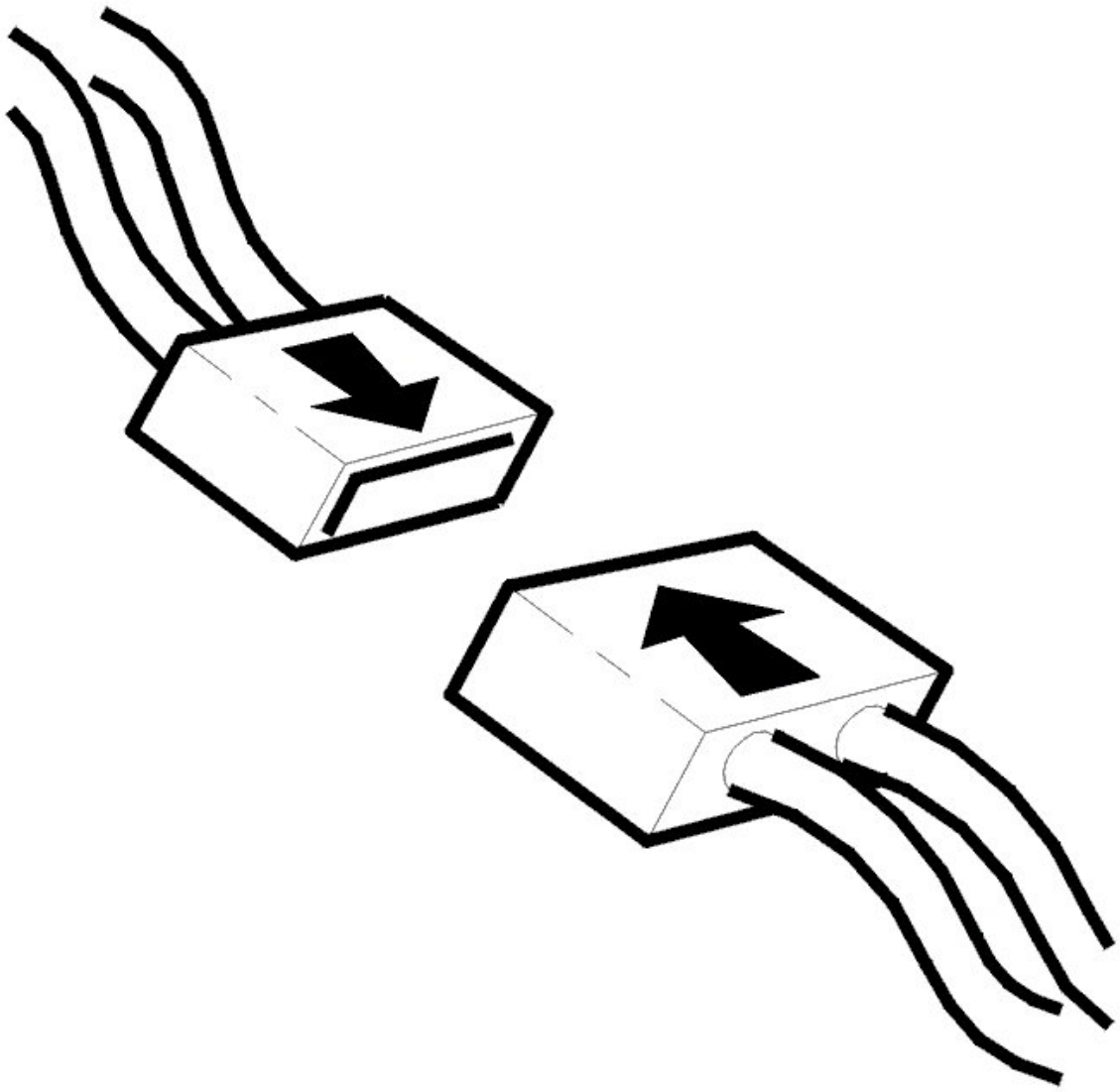


Continue - Verification

Checking the function of the phone module (PHM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check that the phone module (PHM) is powered and grounded by pressing the ON/OFF button and then pressing the YES button. The LED in the ON/OFF button must light. A text message must appear in the display on the driver information module (DIM).

Does the LED in the ON/OFF button light?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

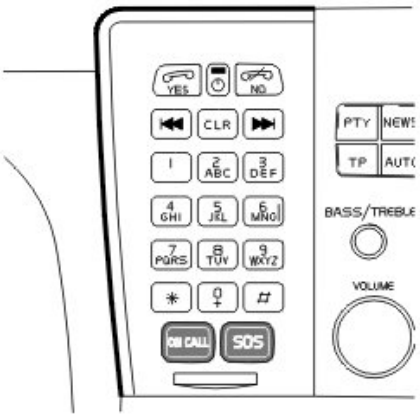
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the phone module (PHM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A59

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the audio module (AUM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! In the event of CEM-1A5X diagnostic trouble codes (DTCs), the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the controller area network (CAN).

Substitute value
- None.

Possible source
- No power supply to the audio module (AUM)
- Open-circuit in the ground lead for the audio module (AUM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the audio module (AUM)
- The audio module (AUM) is not intended for this vehicle (for example a used control module with different software/hardware).

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the controller area network (CAN). See the relevant wiring diagram.

Fault symptom[s]
- The rheostat function on the audio system is not working.
- Cannot be controlled with the remote control.
- The radio buttons on the steering wheel do not function

Signal Missing

Signal missing

Checking the function of the audio module (AUM)

Check the power supply for the control module by switching on the radio or playing a CD. There must be sound from the radio or CD.

Note! Radio reception may be poor indoors. On certain cars, the radio reception may deteriorate if the trunk lid is open.

Is there sound from the radio?

Yes - Checking communication with the audio module (AUM)

No - Checking the power supply and ground for the audio module (AUM)

Checking the power supply and ground for the audio module (AUM)

Check the fuses for the main unit/audio module (AUM).

Note! If a fuse is blown, check the circuit after the fuse before replacing the fuse. Check for a short-circuit to ground. Then replace the fuse. For further information about the circuit after the fuse, see the relevant wiring diagram.

Check the connector for the main unit/audio module (AUM). Check for contact resistance and oxidation.
Check the power supply cable for the main unit/audio module (AUM). Check for an open-circuit.
Check the ground cable between the main unit/audio module (AUM) and the ground terminal. Check for an open-circuit. Also check the ground terminal. Check for contact resistance and oxidation.
Remedy as necessary.

Other information:

- Radio cassette player, replacing See: Accessories and Optional Equipment/Radio, Stereo, and Compact Disc/Radio/Stereo/Service and Repair/Radio/Cassette Player, Replacing
- Connecting the breakout box, Audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, audio control module See: Accessories and Optional Equipment/Cellular Phone/Communications Control Module/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the function of the audio module (AUM)

No - Signal missing

Checking communication with the audio module (AUM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. The fault is probably intermittent and may therefore be difficult to locate.

- Try to communicate with the audio module (AUM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.

XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

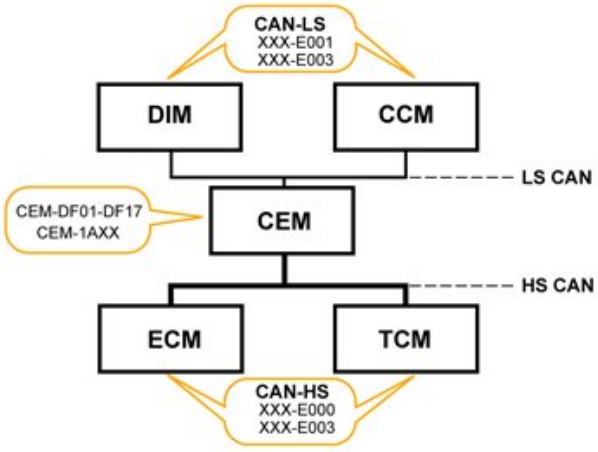
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

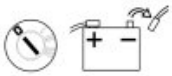
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

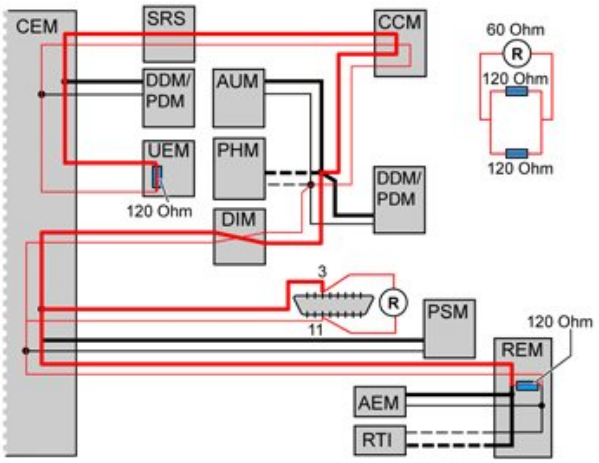
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

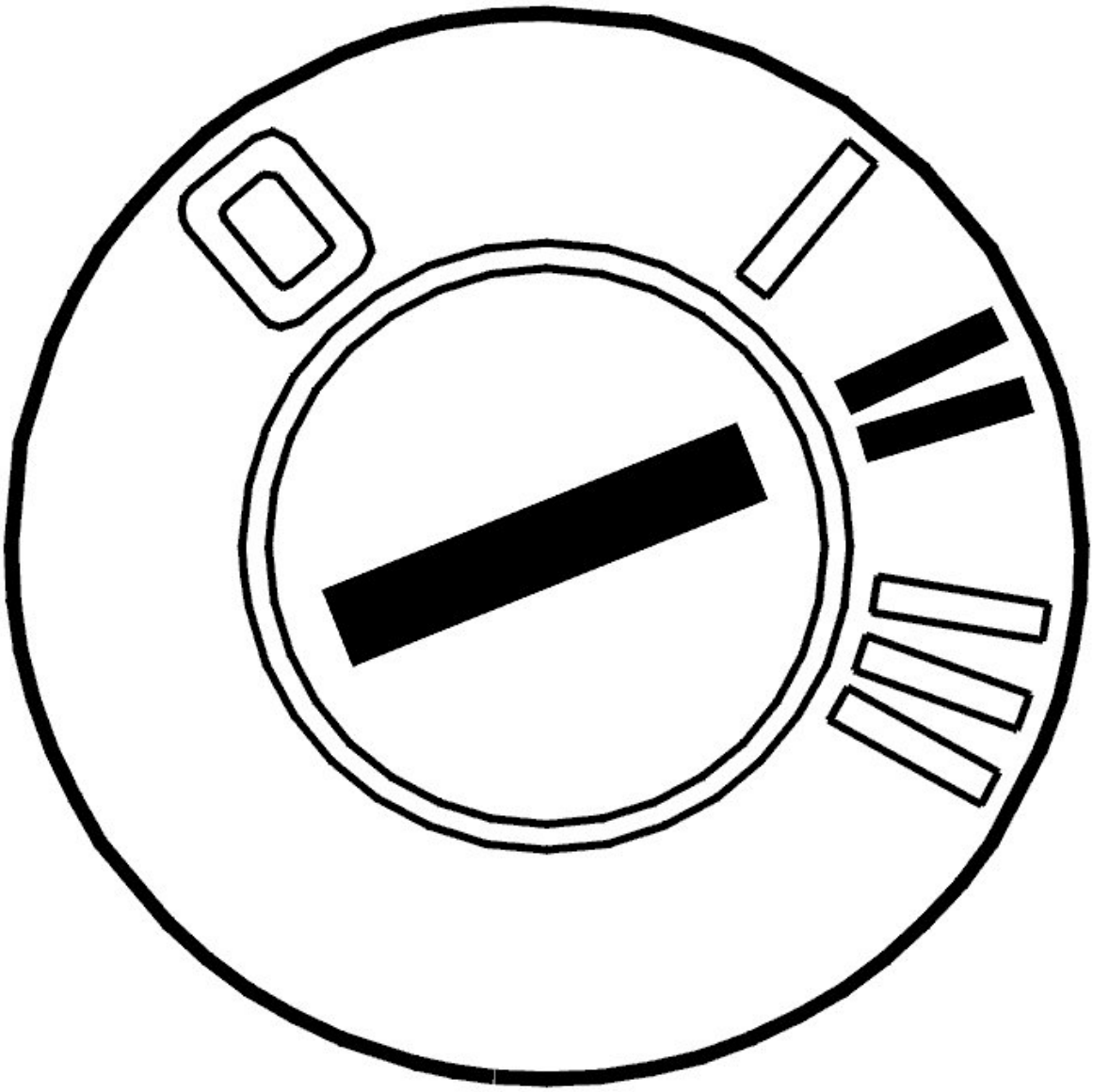


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

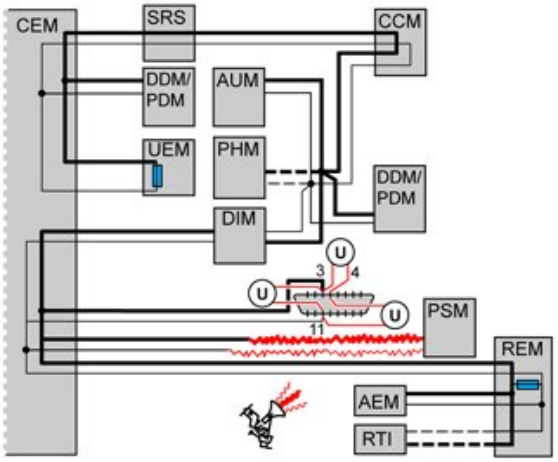
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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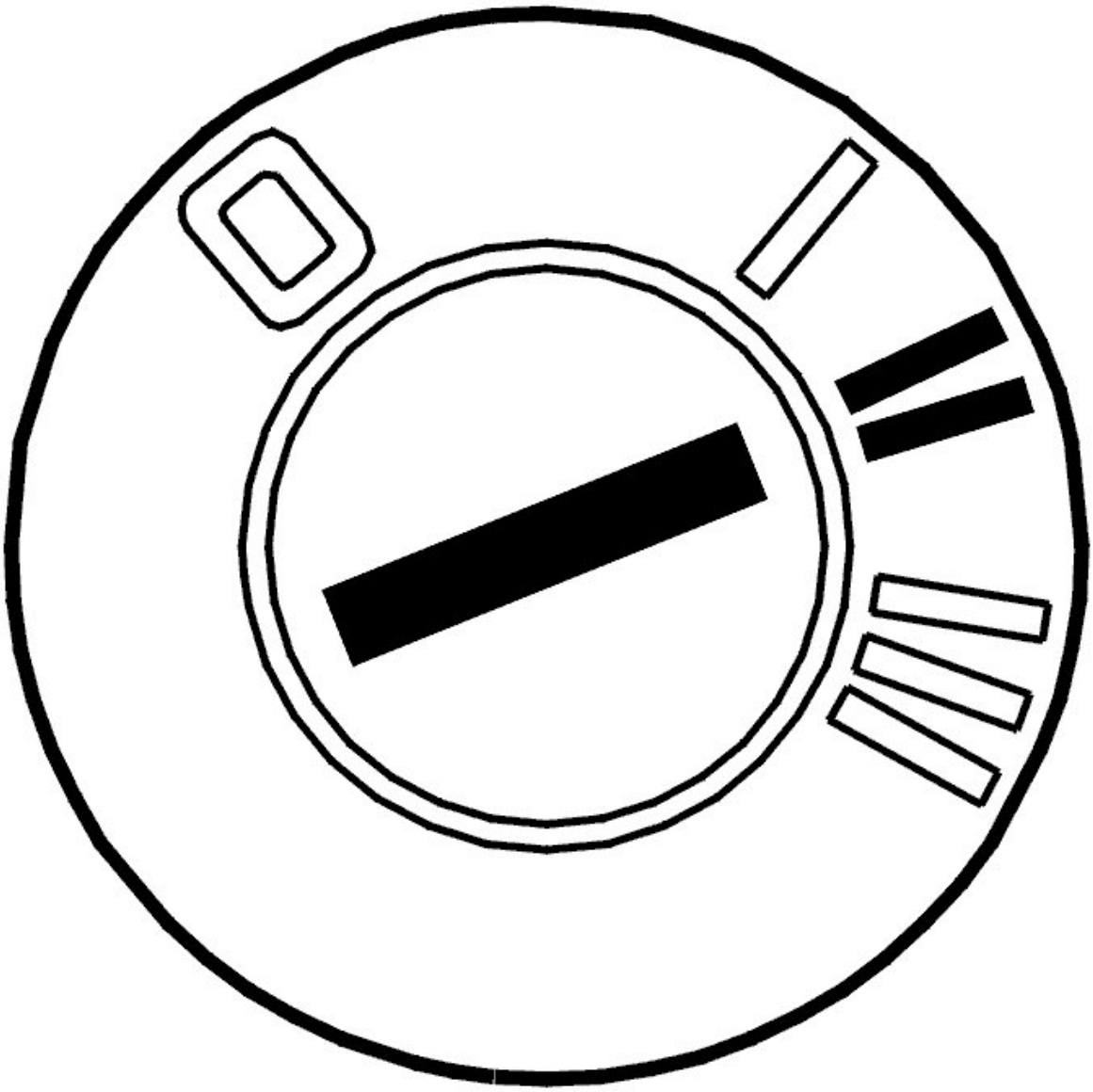
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

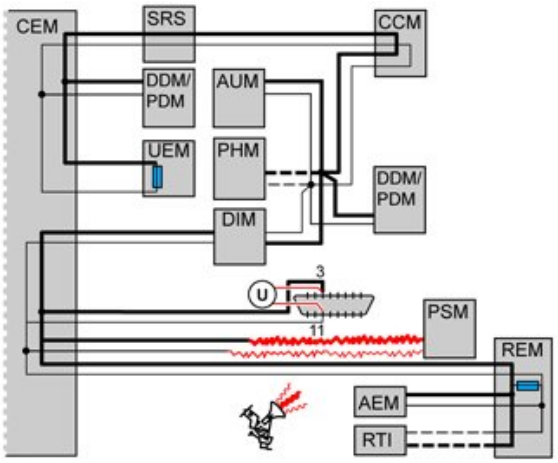
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

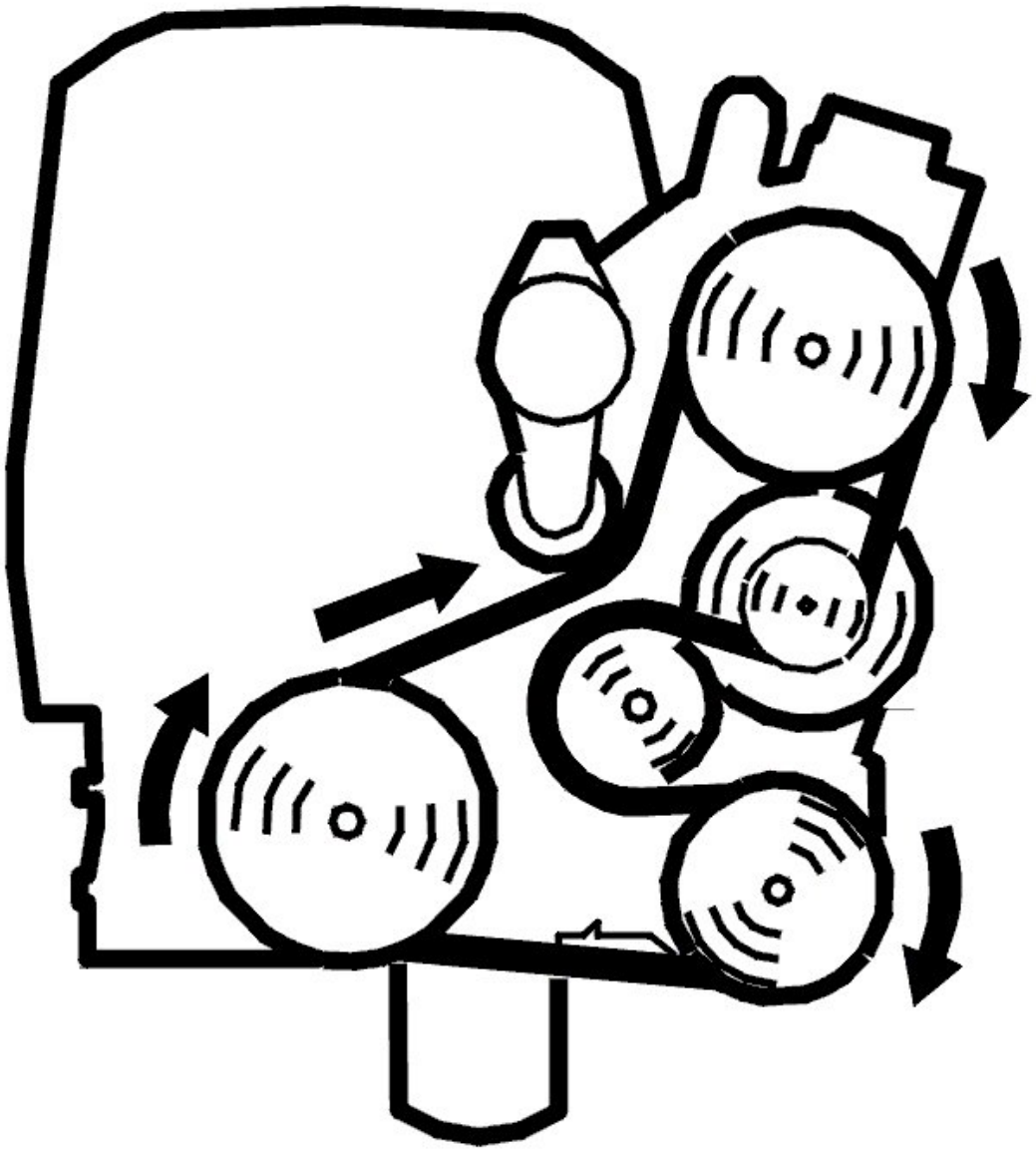
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

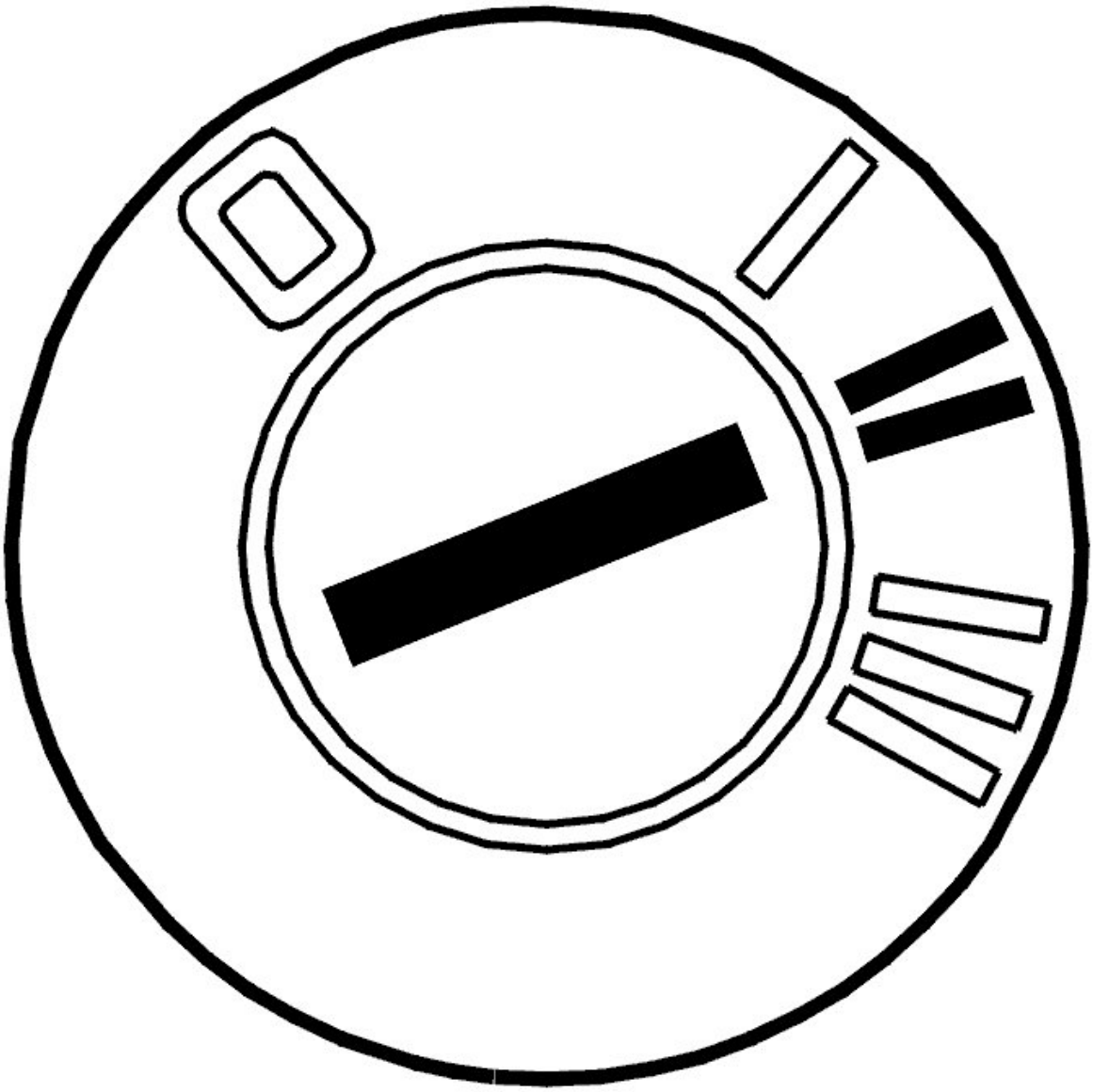


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

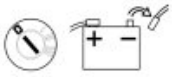
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

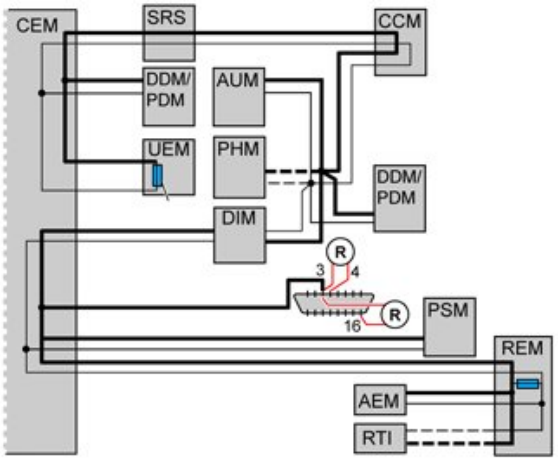
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

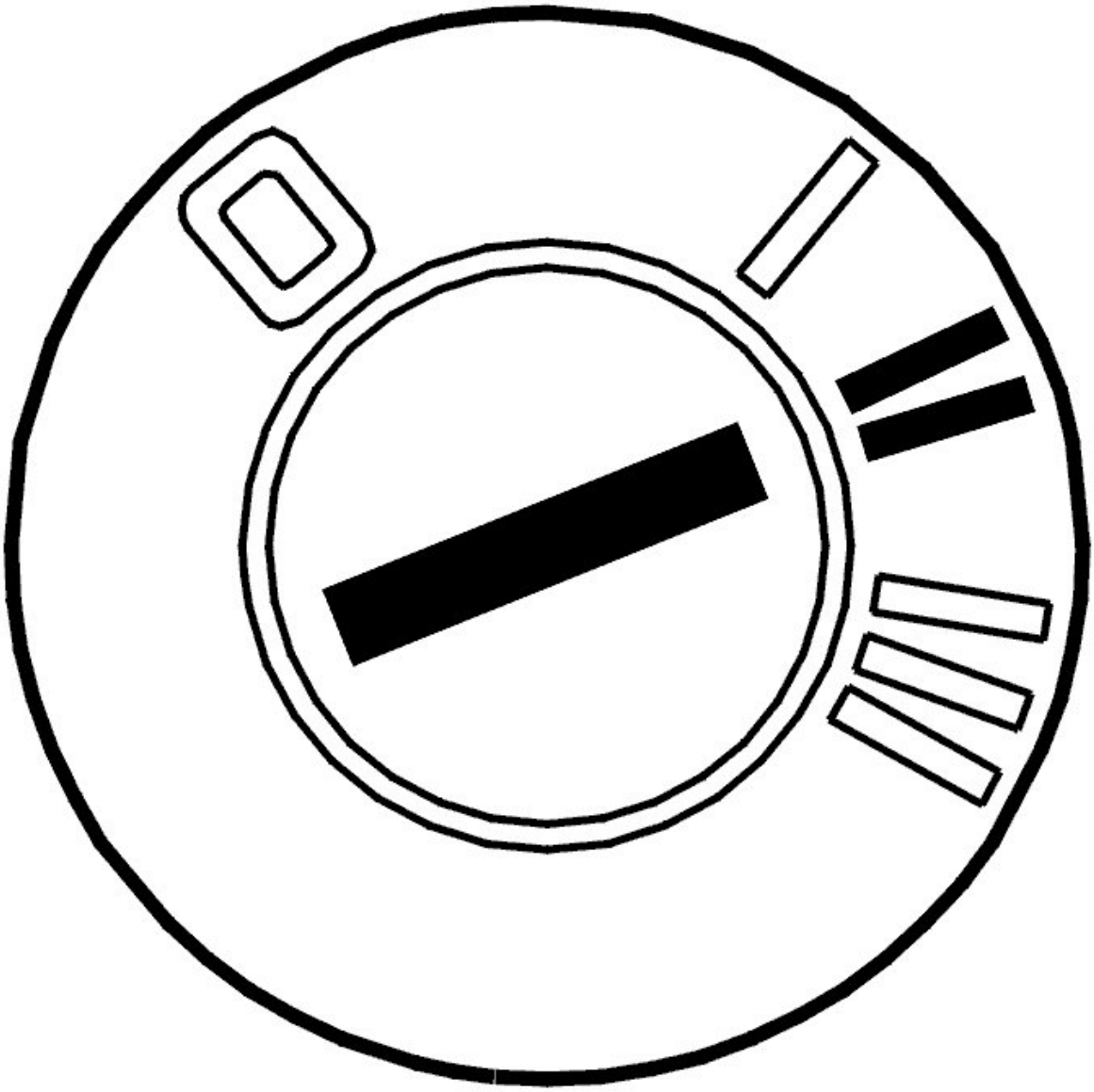


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

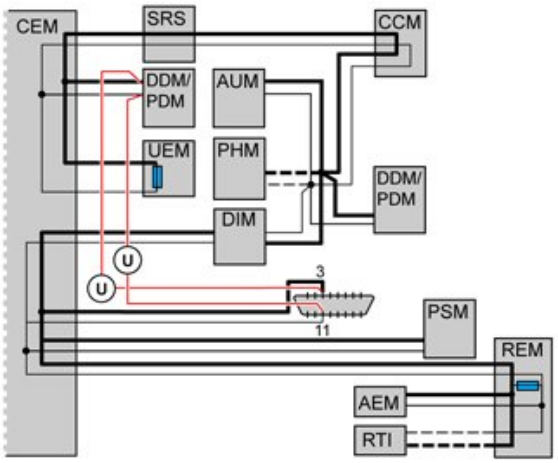
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

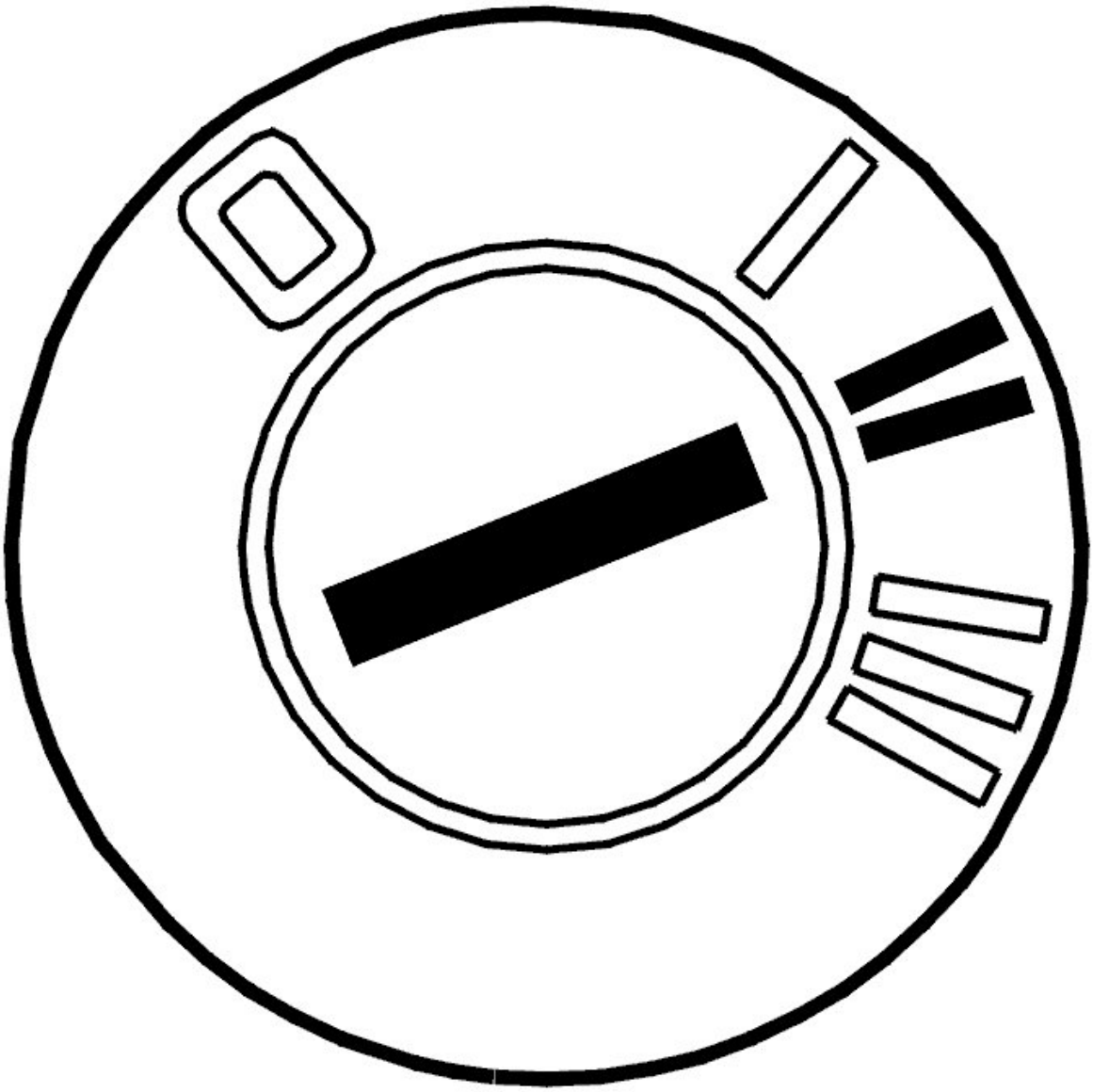
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

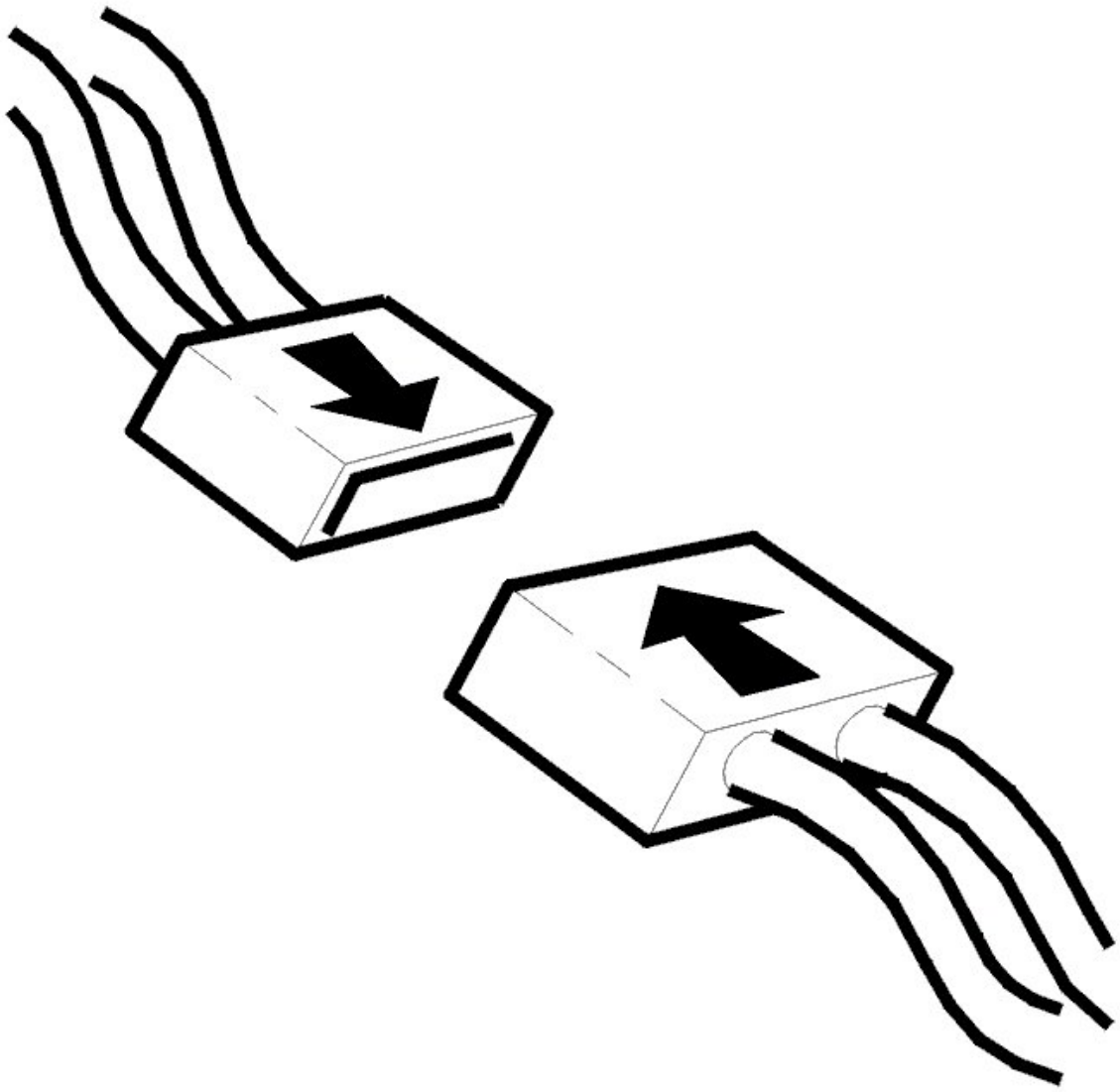


Continue - Verification

Checking the function of the audio module (AUM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on.

Check the power supply for the control module by switching on the radio or playing a CD.
There must be sound from the radio or CD.

Note! Radio reception may be poor indoors. On certain cars, the radio reception may deteriorate if the trunk lid is open.

Is there sound from the radio?

Yes - **Fault Found**

No - Fault-tracing information

Fault-tracing information

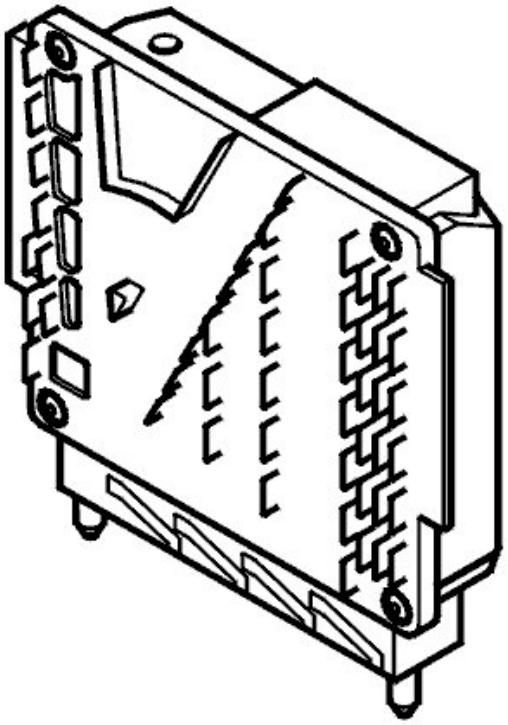
Information
FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking the function of the audio module (AUM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A61

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the transmission control module (TCM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! If CEM-1A6X diagnostic trouble codes (DTCs) are stored, the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the Control area network!

Substitute value
- None.

Possible source
- No power supply to the transmission control module (TCM)
- Open-circuit in the ground lead to the transmission control module (TCM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the transmission control module (TCM)
- The transmission control module (TCM) is not intended for this vehicle, for example a used control module with different software/hardware.

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- No shifting.
- Malfunction indicator lamp (MIL) lit
- Message in the display.

Signal Missing

Signal missing

Checking the power supply and ground for the transmission control module (TCM)

Check that the fuse for the control module is intact.
Check the power supply and ground for the transmission control module (TCM) as follows.
Remedy as necessary.

Other information:
- Checking the power supply and ground terminals, AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Power Supply and Ground Terminals for the Control Module

- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Checking the transmission control module (TCM)

No - Checking the communication with the transmission control module (TCM)

Checking the communication with the transmission control module (TCM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the transmission control module (TCM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

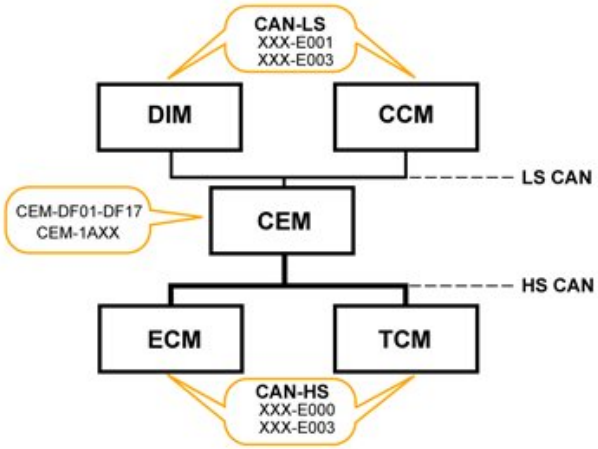
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

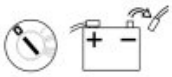
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

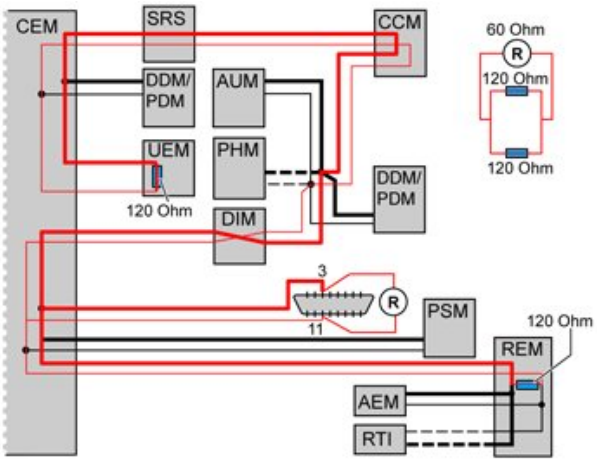
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

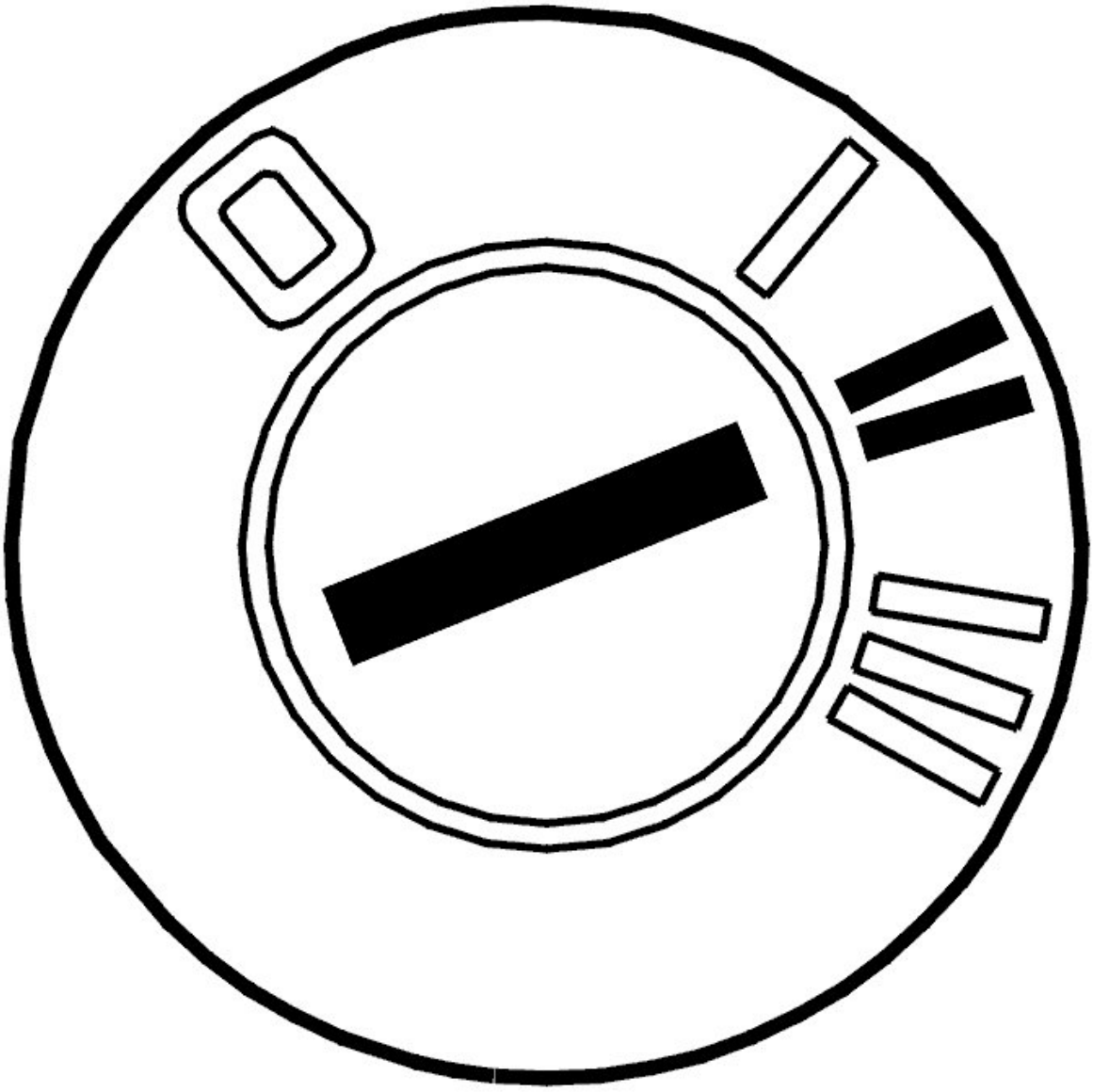


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

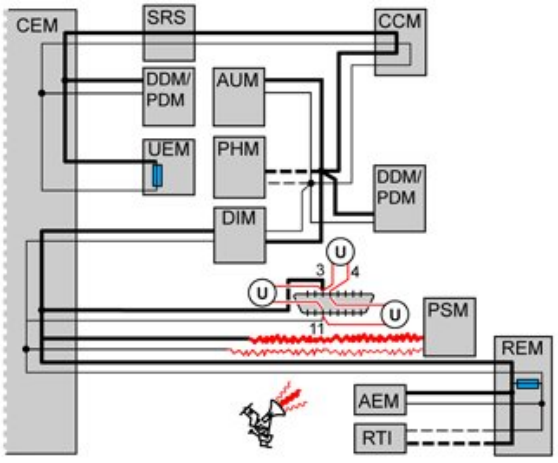
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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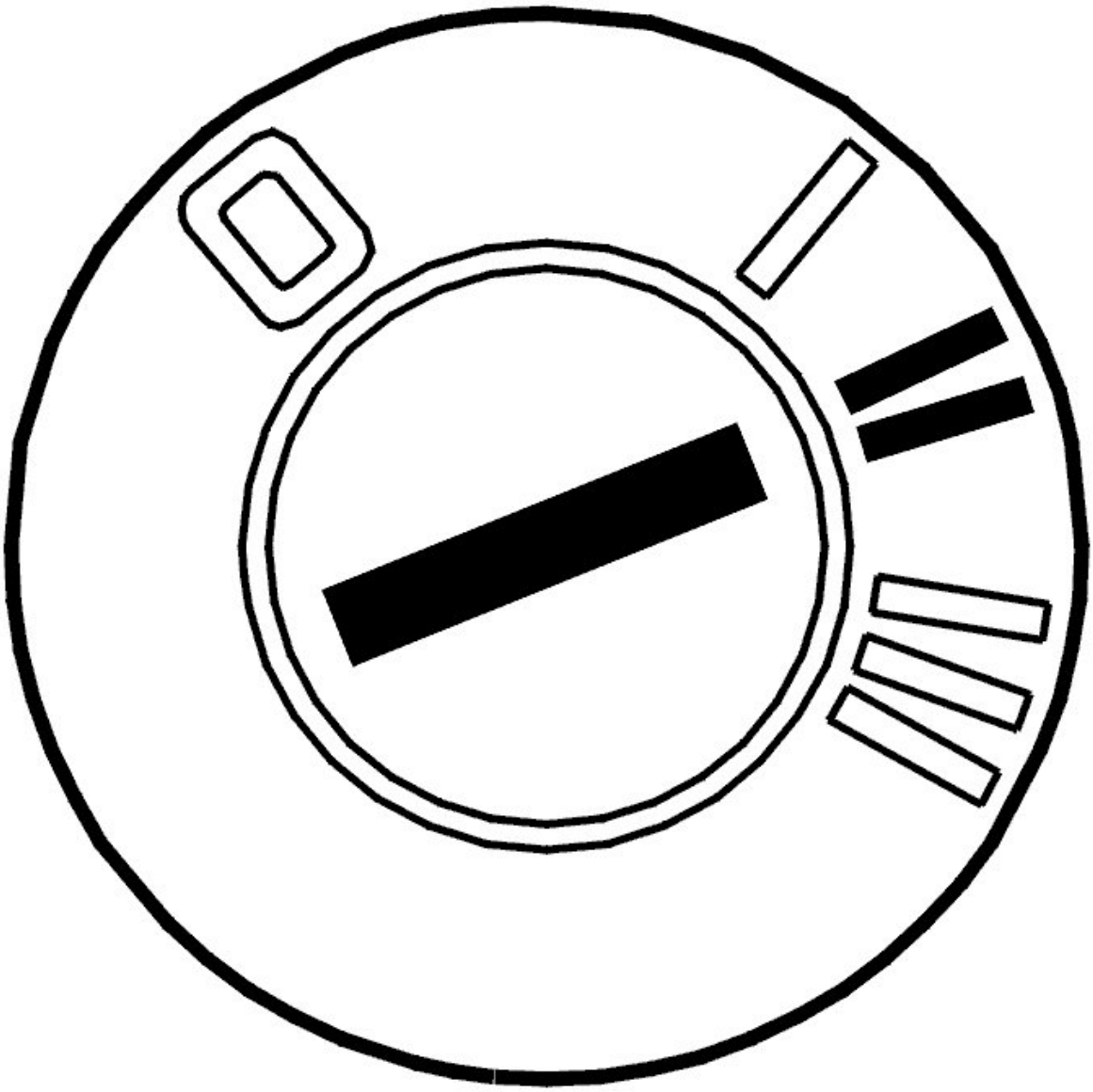
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage

is considerably higher than the above stated values.
In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

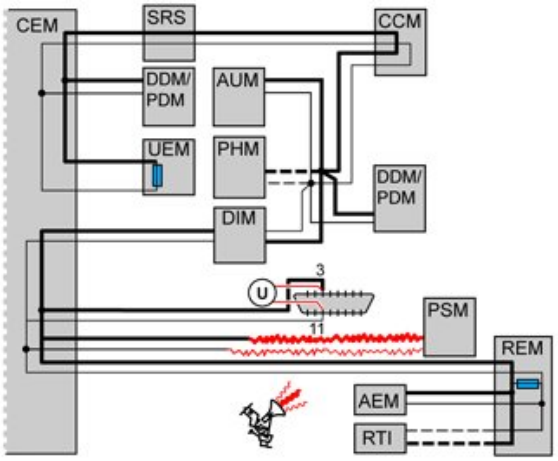
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

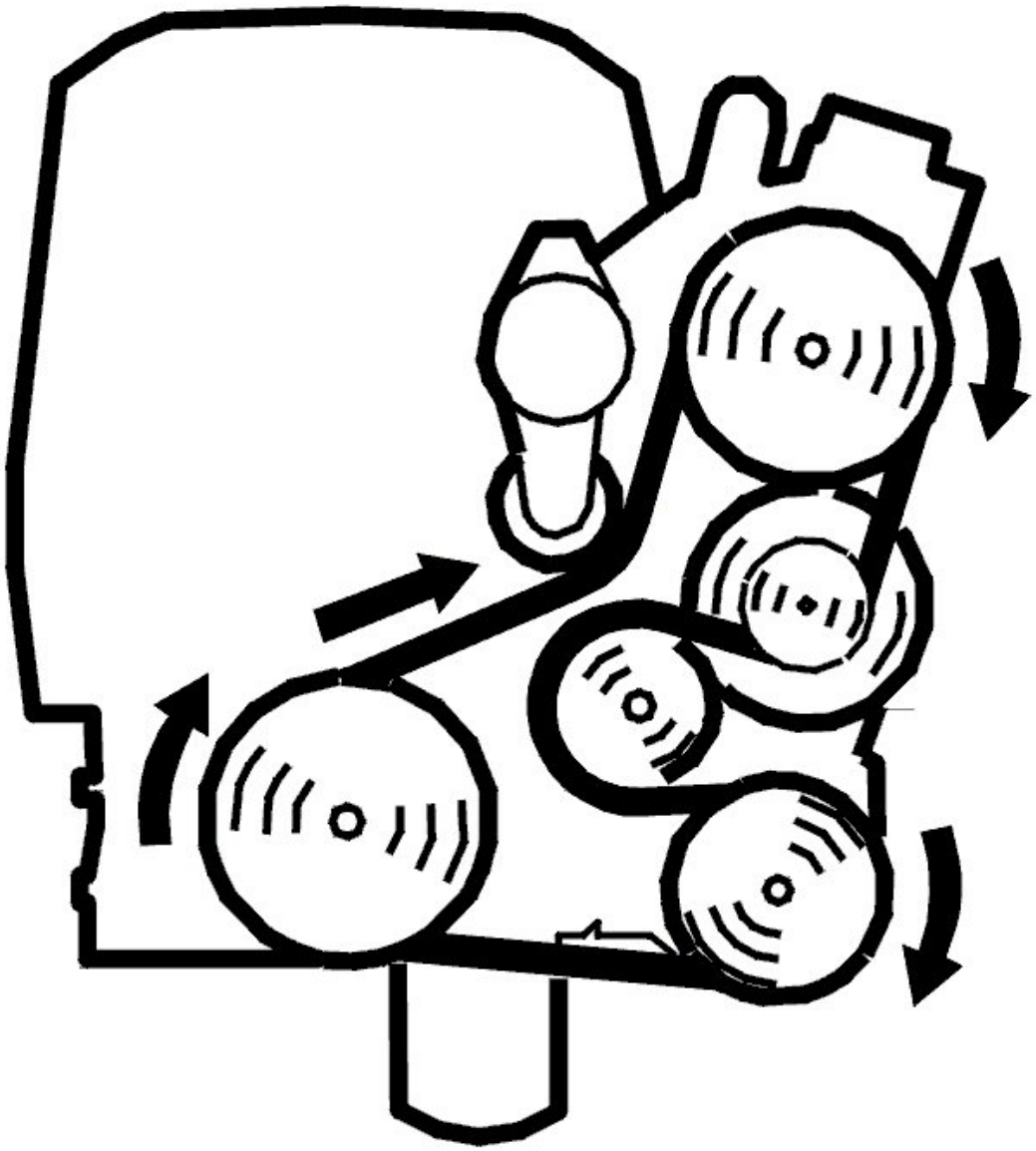
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

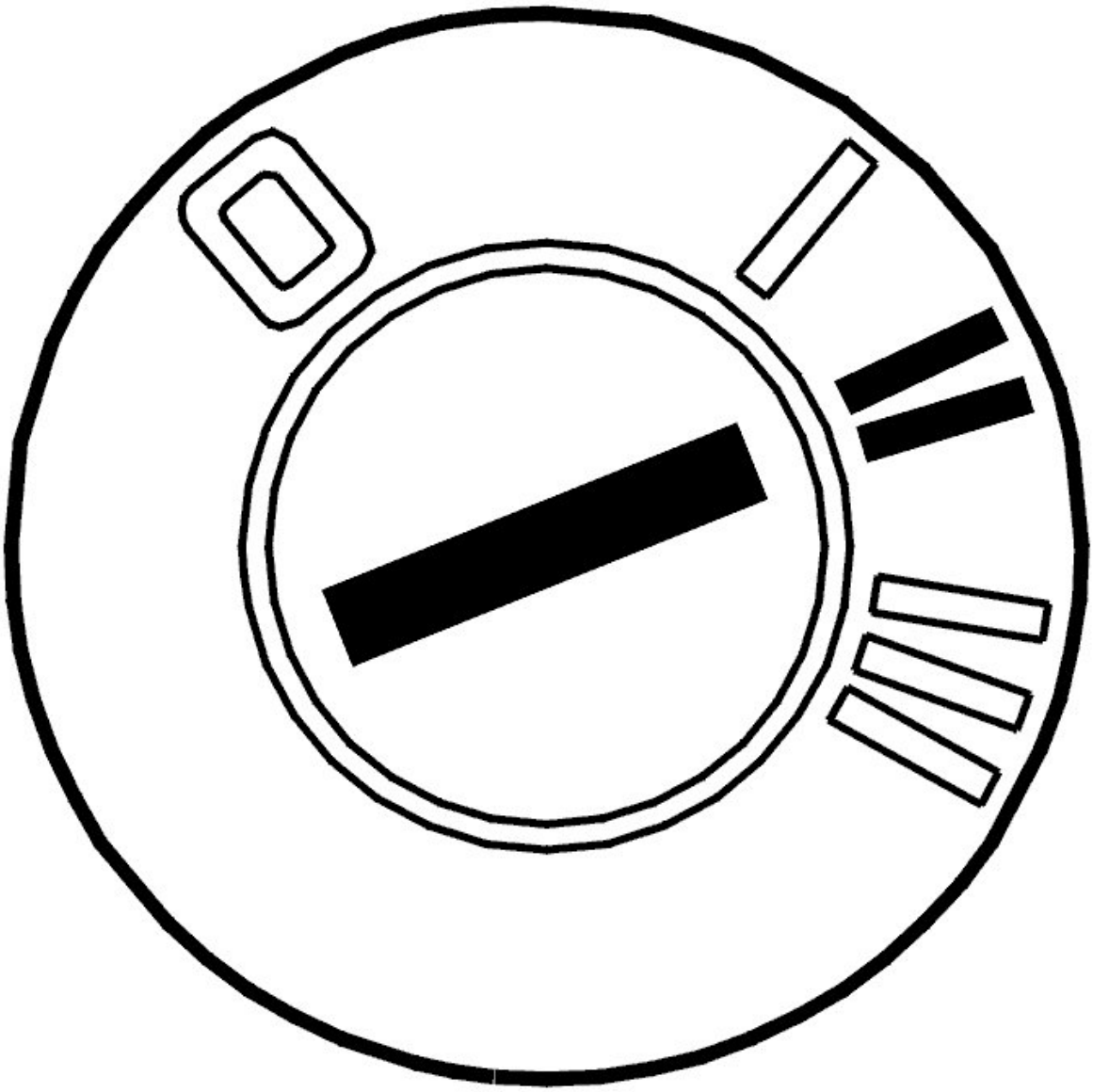


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

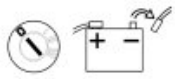
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

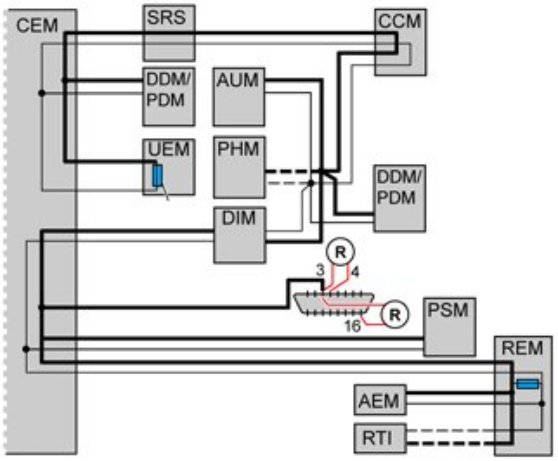
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

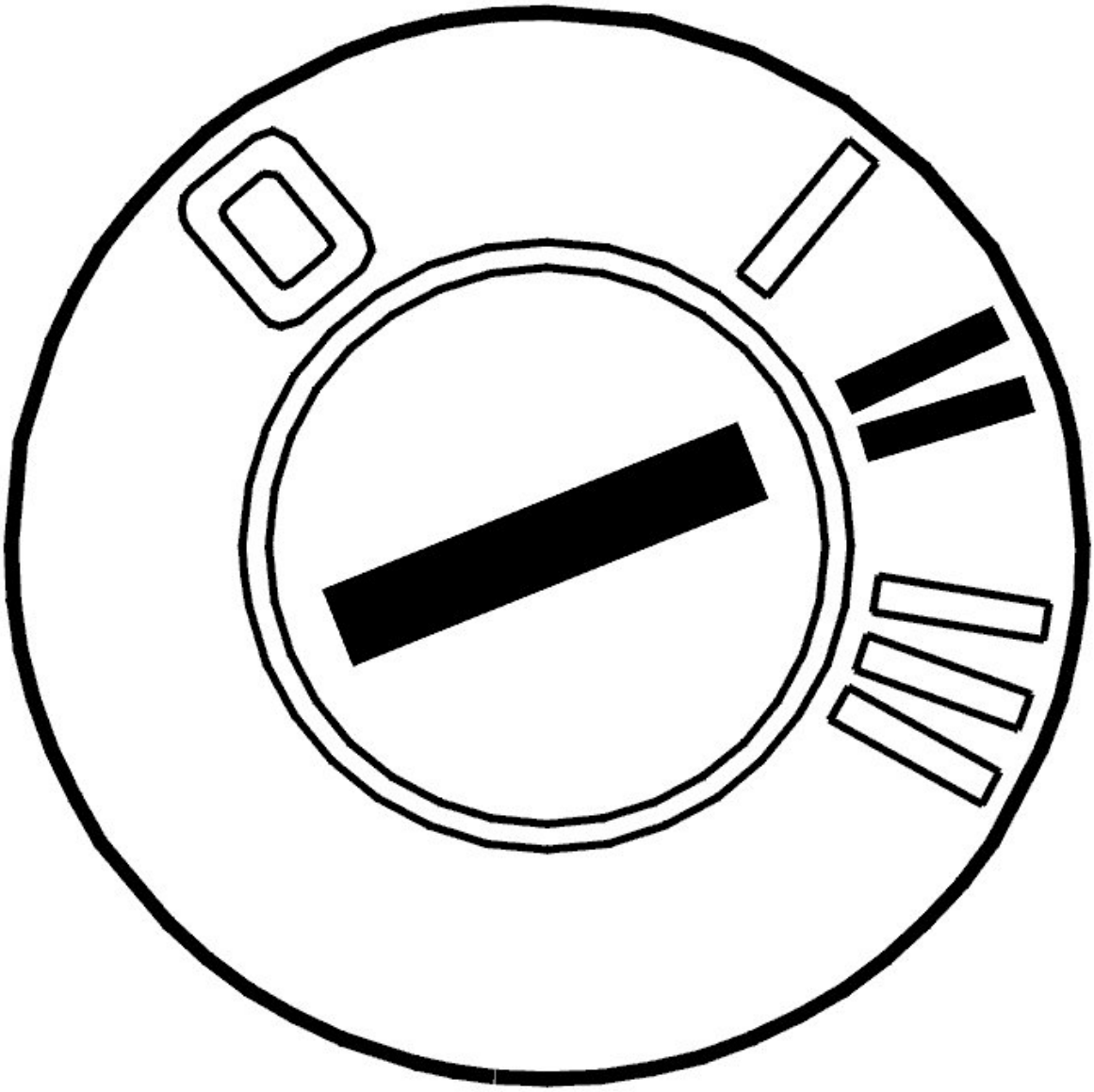


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

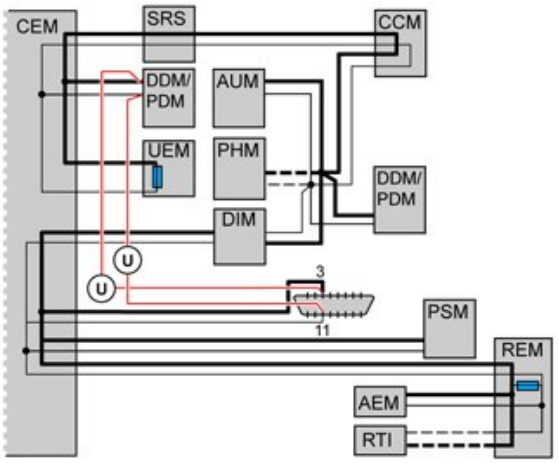
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

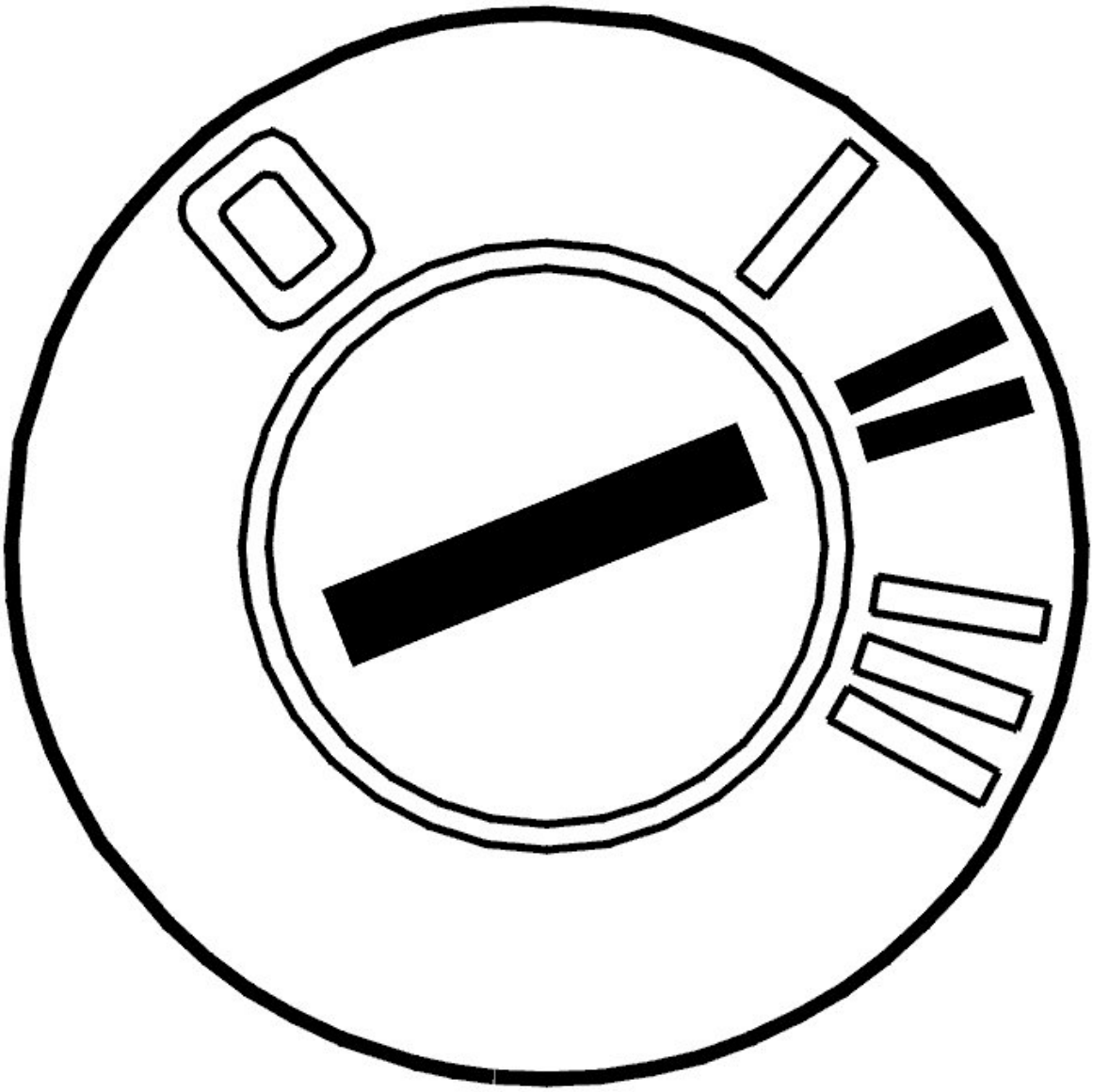
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

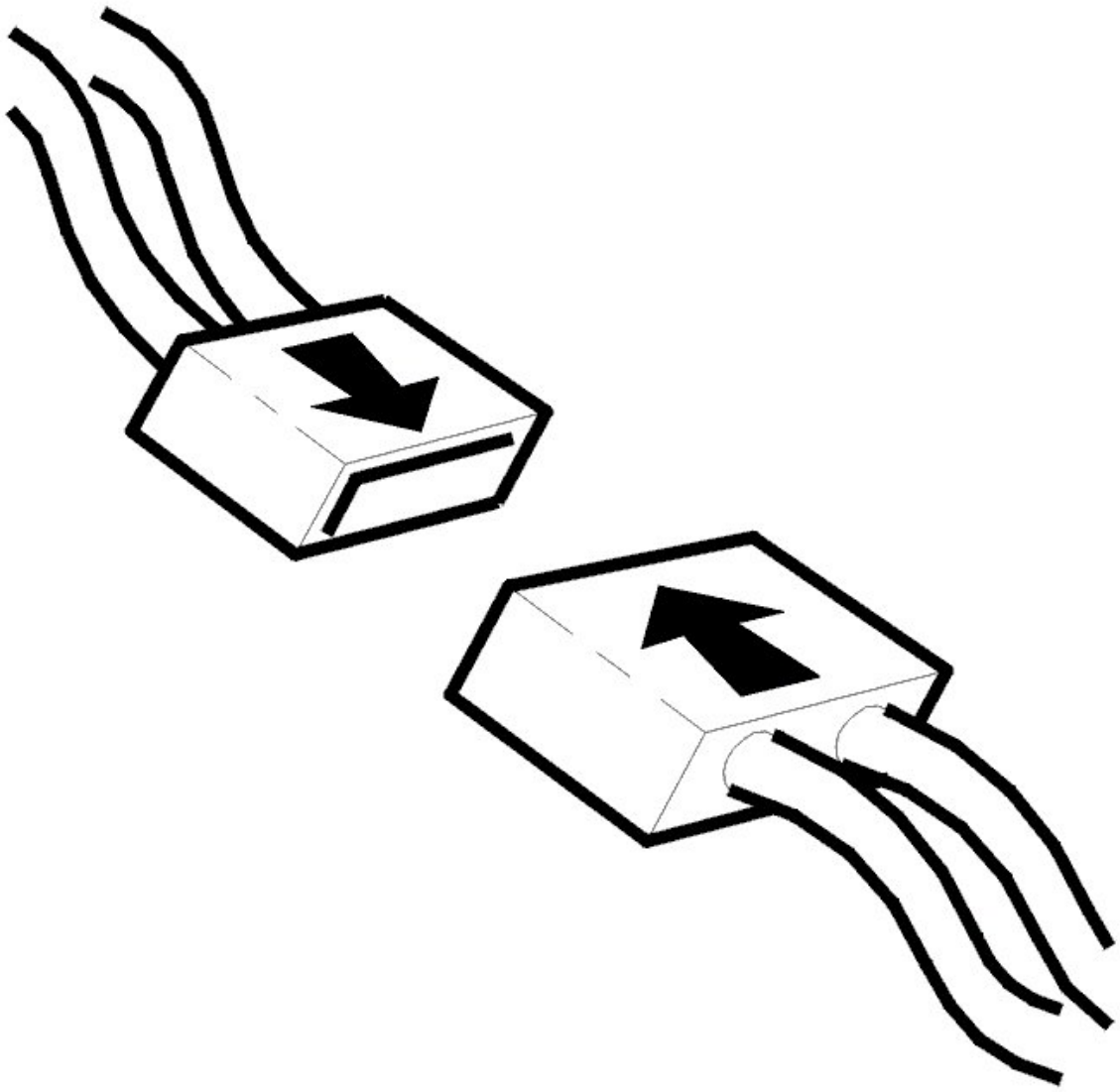


Continue - Verification

Checking the transmission control module (TCM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on for at least 10 seconds.

Read off the control module ID from the transmission control module (TCM) by clicking on the VCT2000 symbol.

Could the control module ID be read off?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

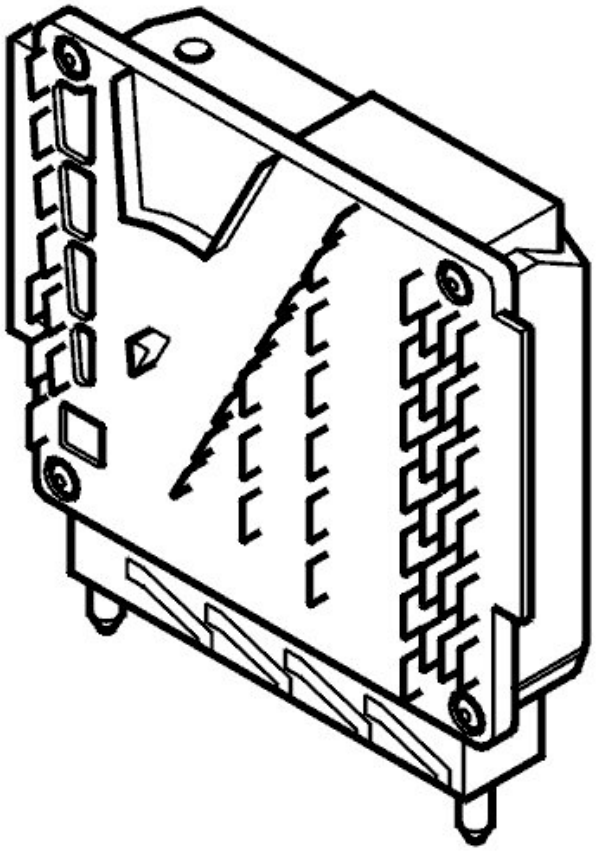
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the transmission control module (TCM)

CEM-1A62

Diagnostic trouble code (DTC) information CEM-1A62

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the engine control module (ECM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! If CEM-1A6X diagnostic trouble codes (DTCs) are stored, the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the Control area network!

Substitute value
- None.

Possible source
- No power supply to the engine control module (ECM)
- Open-circuit in the ground lead for the engine control module (ECM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the engine control module (ECM)
- The engine control module (ECM) is not intended for this vehicle, for example a used control module with different software/hardware.

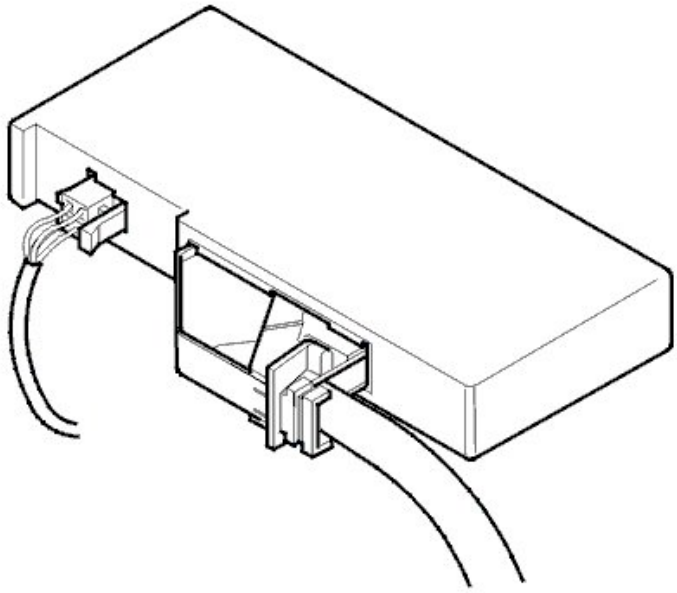
Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- The engine does not start.
- Engine cuts out when running
- Engine feels sluggish.
- Malfunction indicator lamp (MIL) lit.
- Message in the display.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A63

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the accessory electronic module (AEM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! If CEM-1A6X diagnostic trouble codes (DTCs) are stored, the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the Control area network!

Substitute value
- None.

Possible source
- No power supply to the accessory electronic module (AEM)
- Open-circuit in the ground lead for the accessory electronic module (AEM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN low speed network to the accessory electronic module (AEM)
- The accessory electronic module (AEM) is not intended for this vehicle, for example a used control module with different software/hardware.

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the low speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- Accessories connected to the control module do not function.

Signal Missing

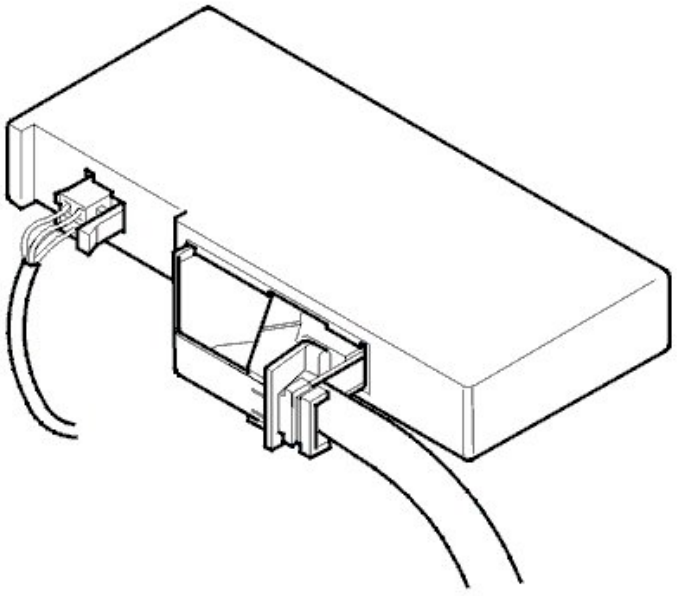
Signal missing

Checking the power supply and ground for the accessory electronic module (AEM)

Check that the fuse for the control module is intact.
Check the power supply and ground for the accessory electronic module (AEM) as follows.

Other information:

- Checking the ground terminal See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Ground Terminal. Accessory Electronic Module
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

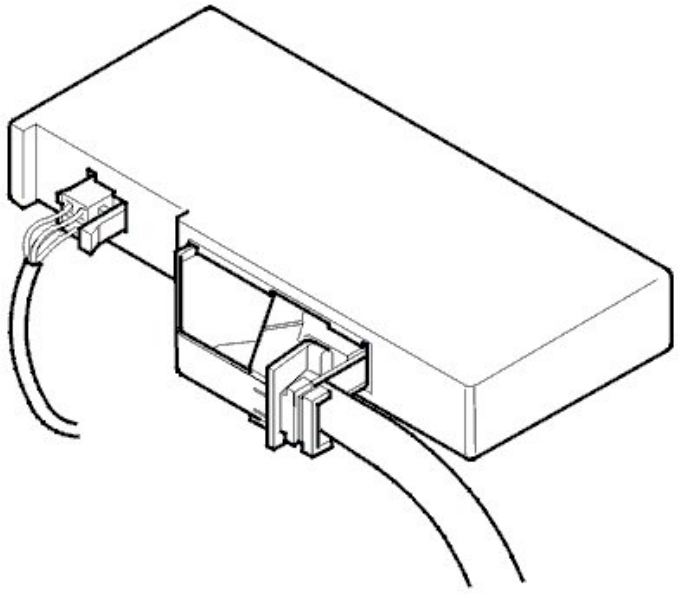
Yes - Checking the accessory electronic module (AEM)

No - Checking communication with the accessory electronic module (AEM)

Checking communication with the accessory electronic module (AEM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the accessory electronic module (AEM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off



Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

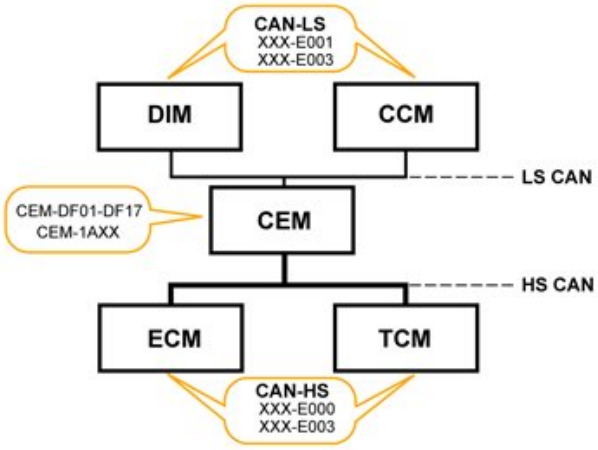
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

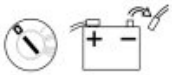
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

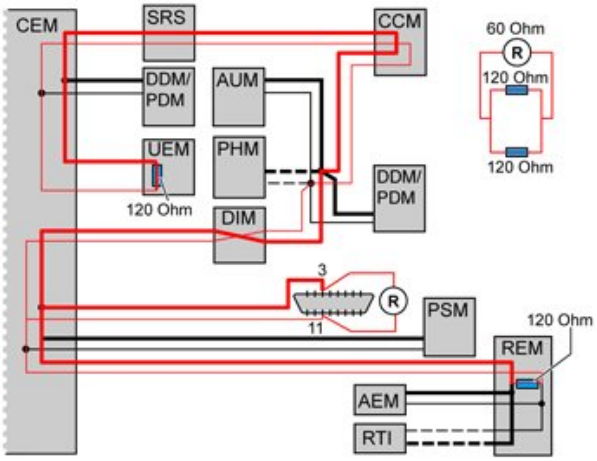
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

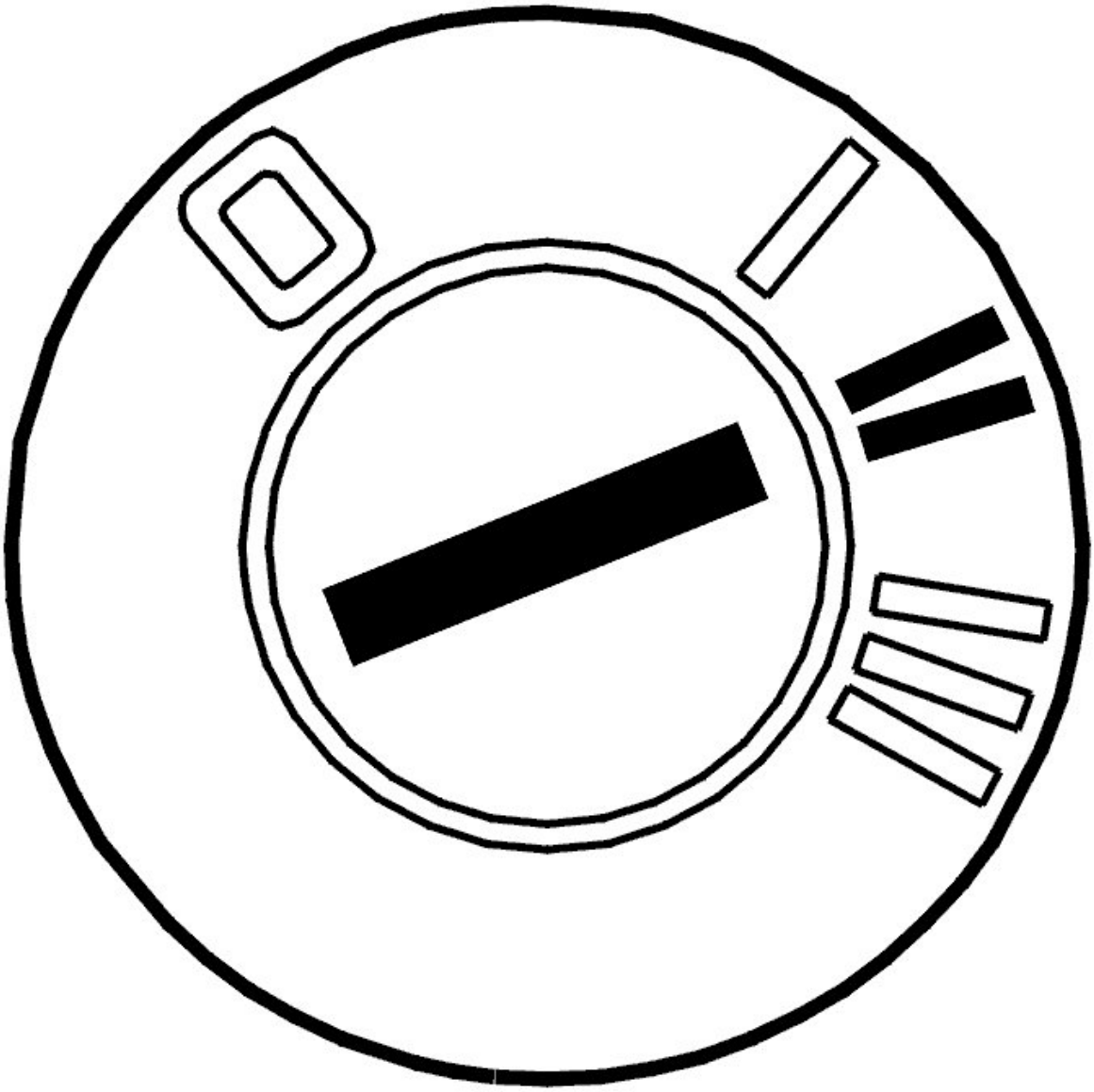


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

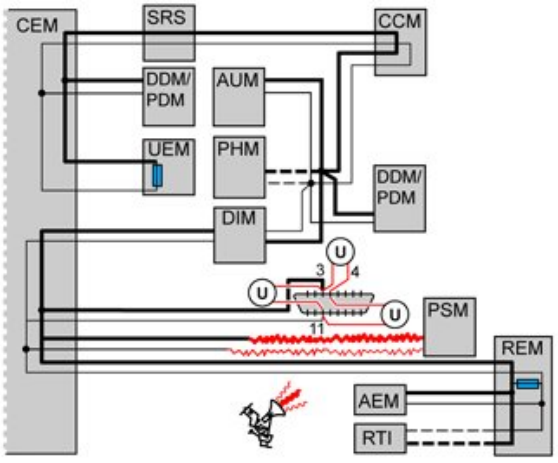
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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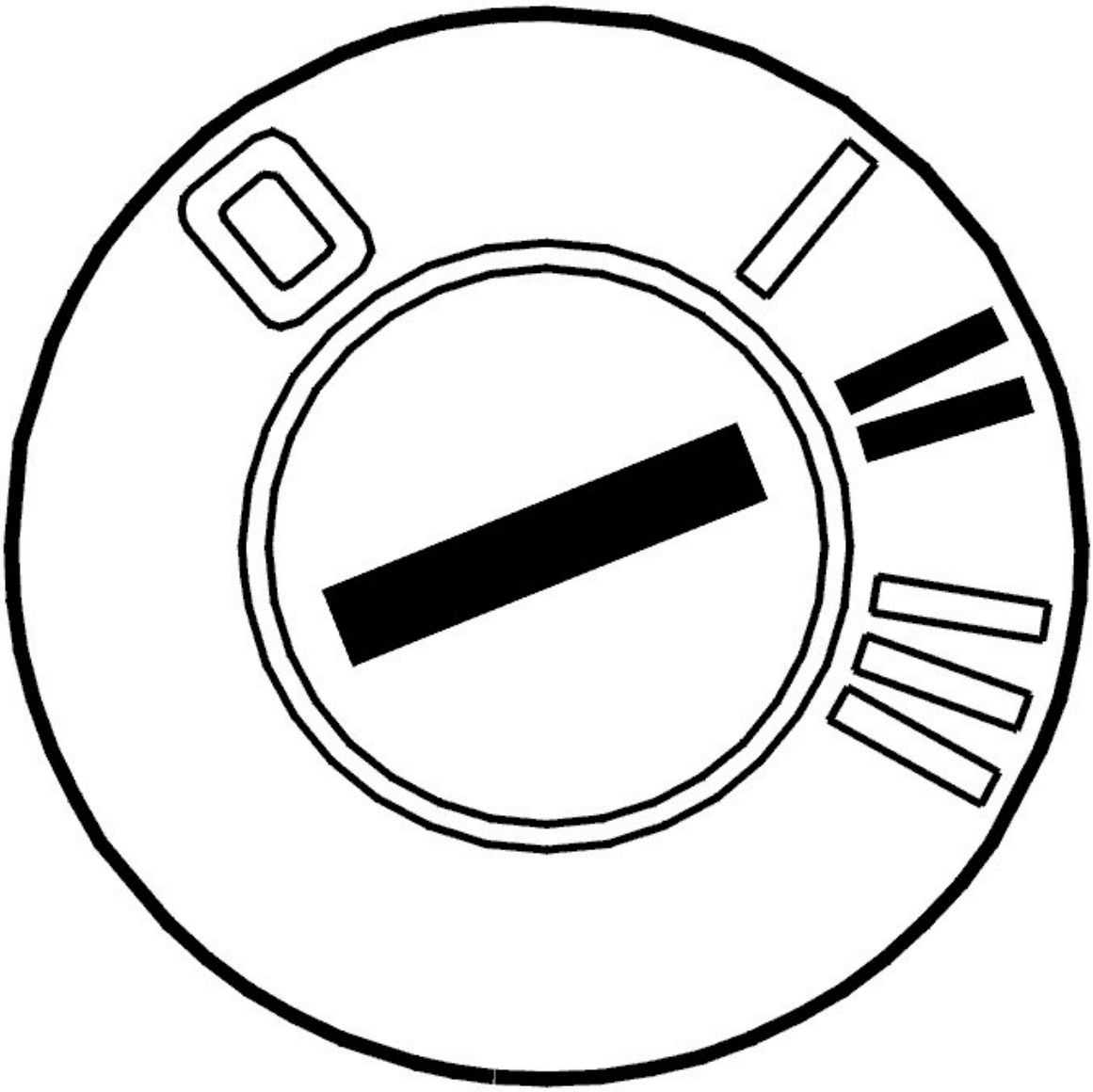
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage

is considerably higher than the above stated values.
In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

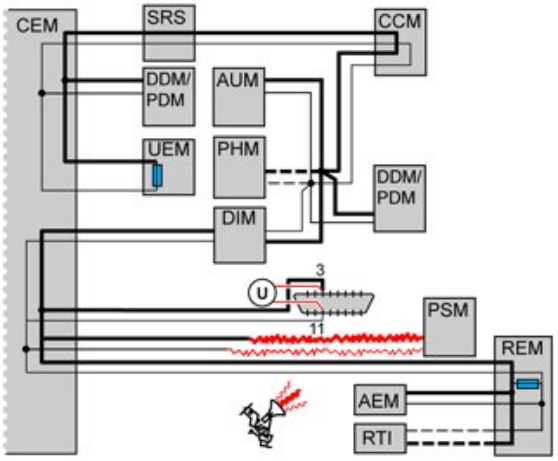
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

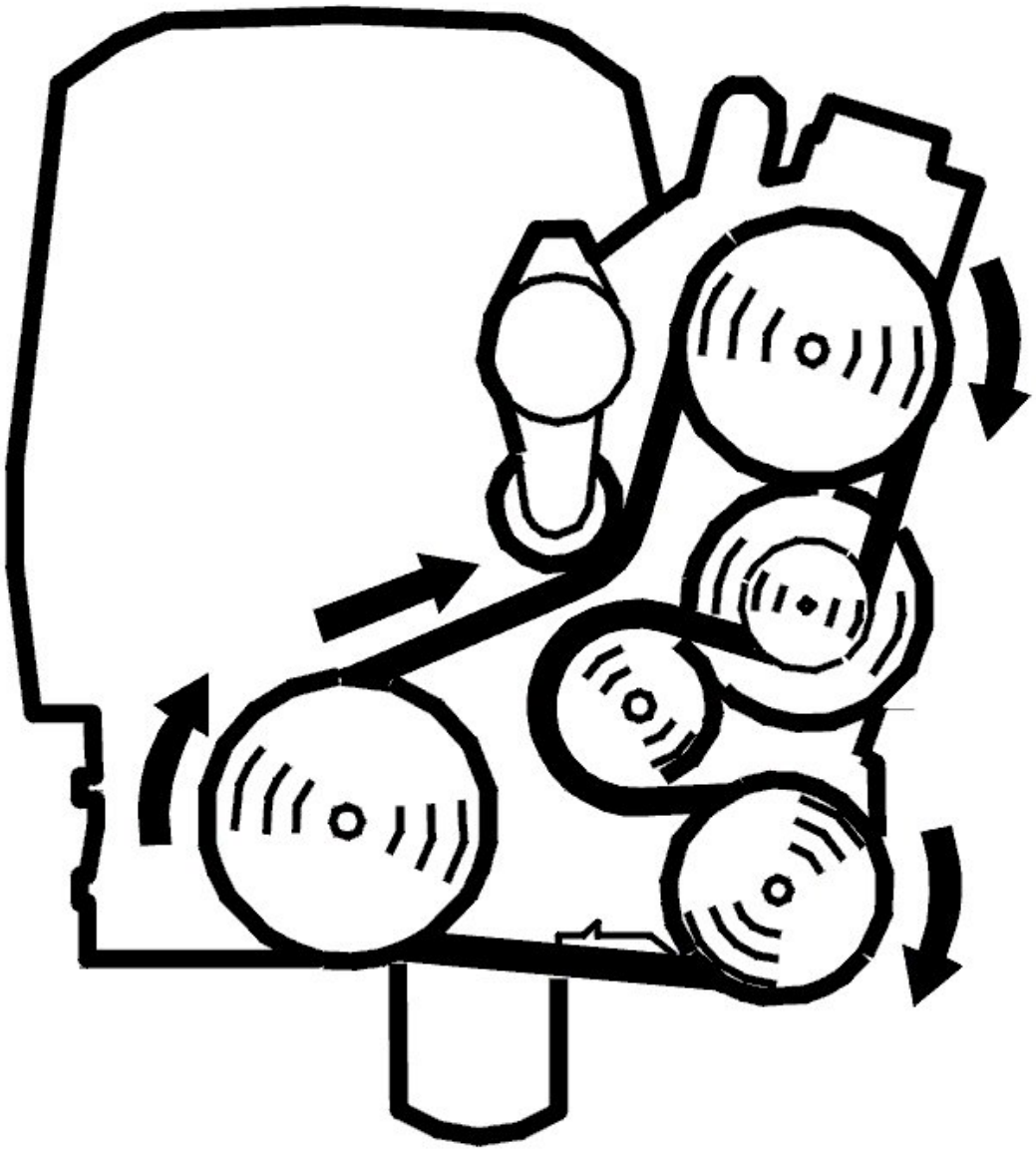
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

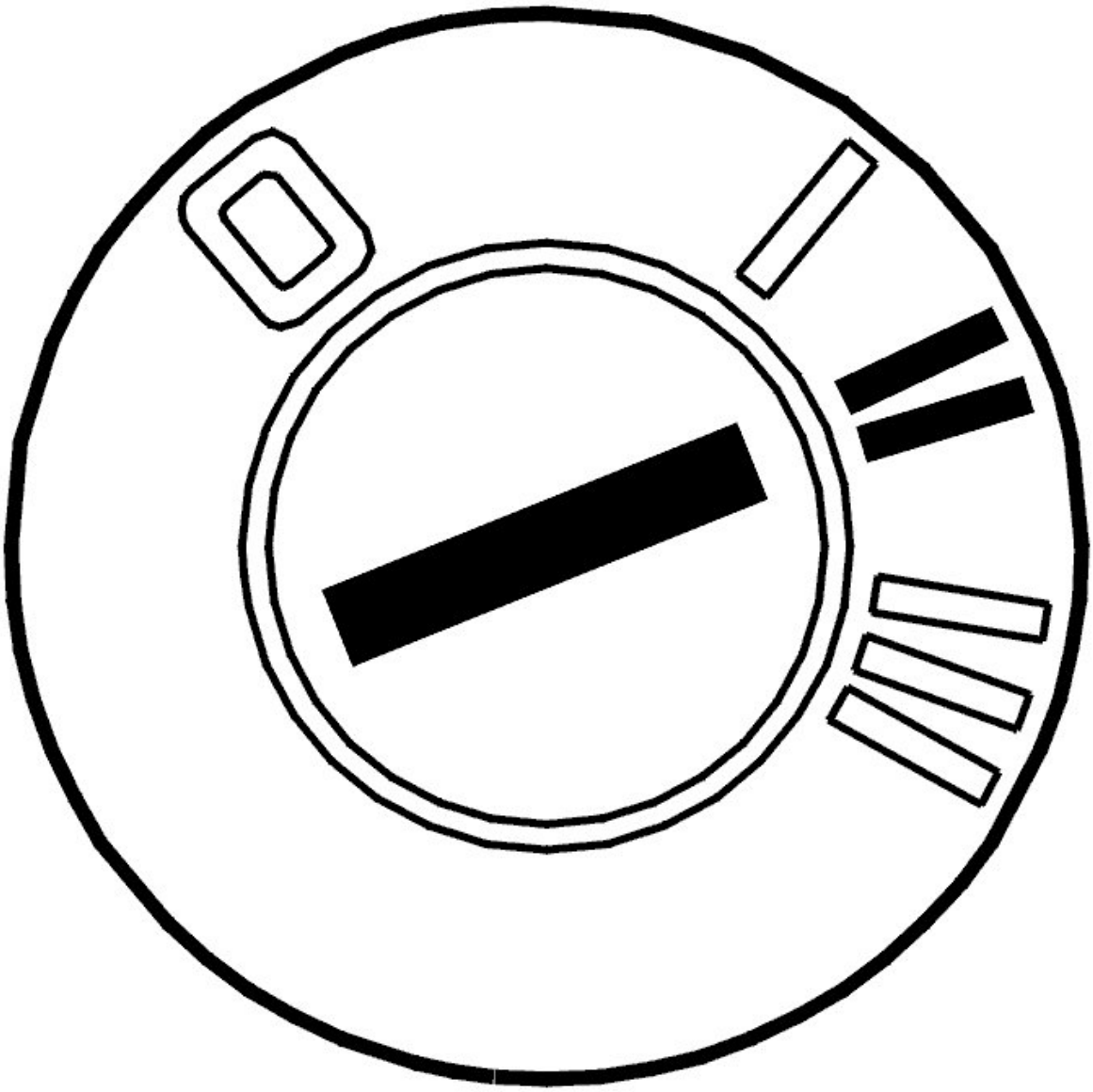


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

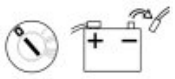
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

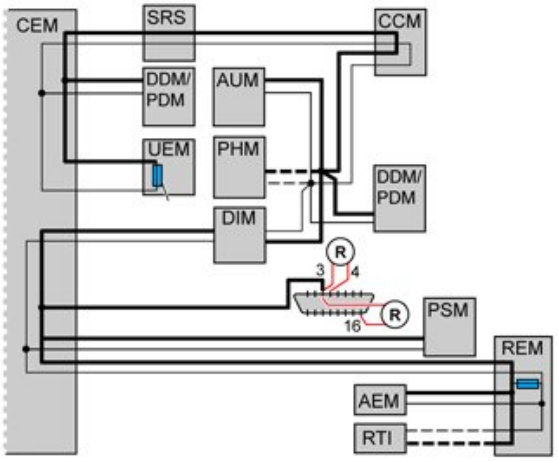
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

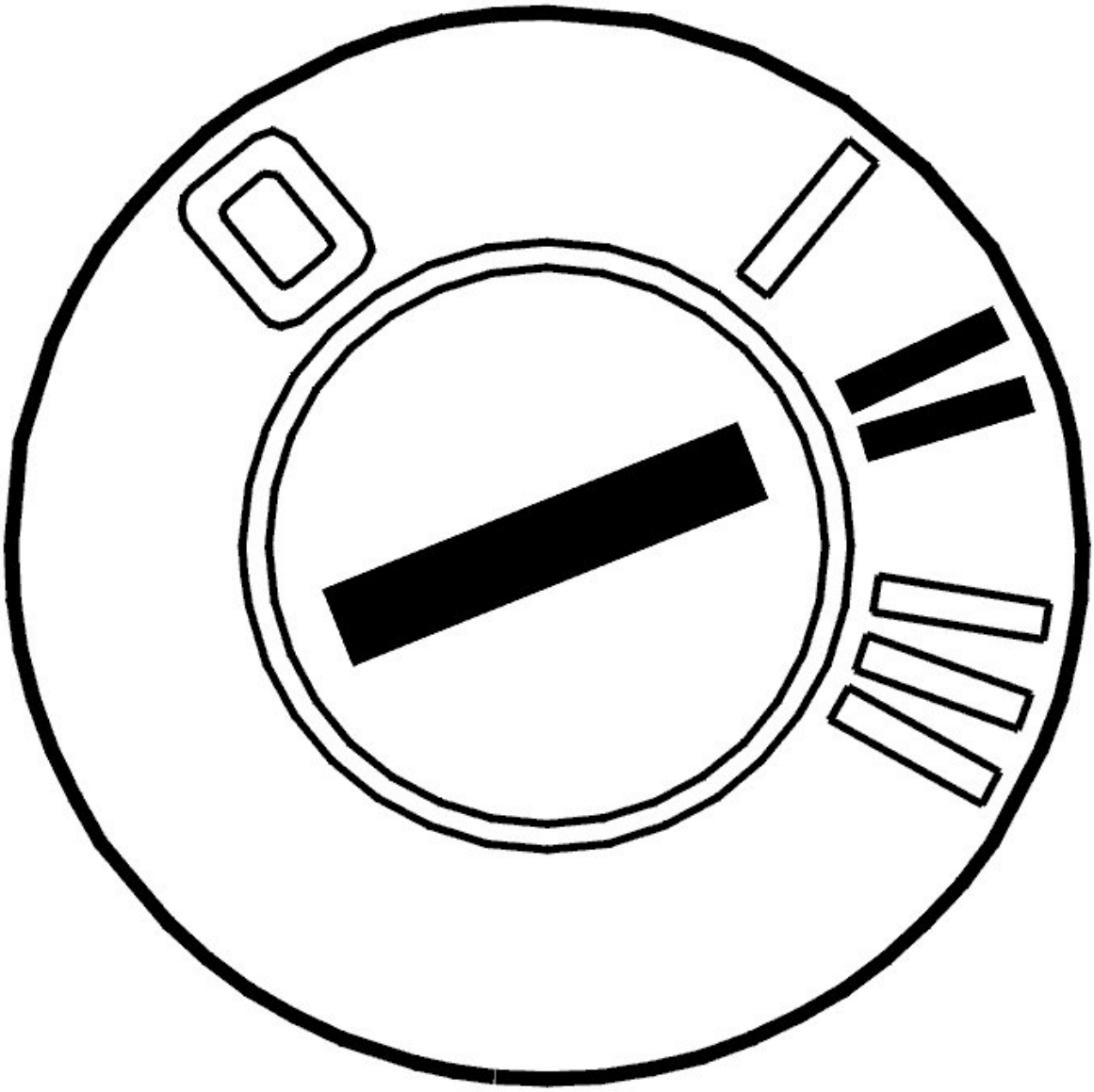


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

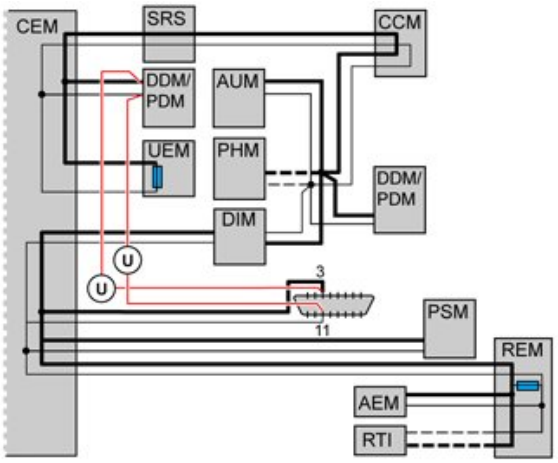
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

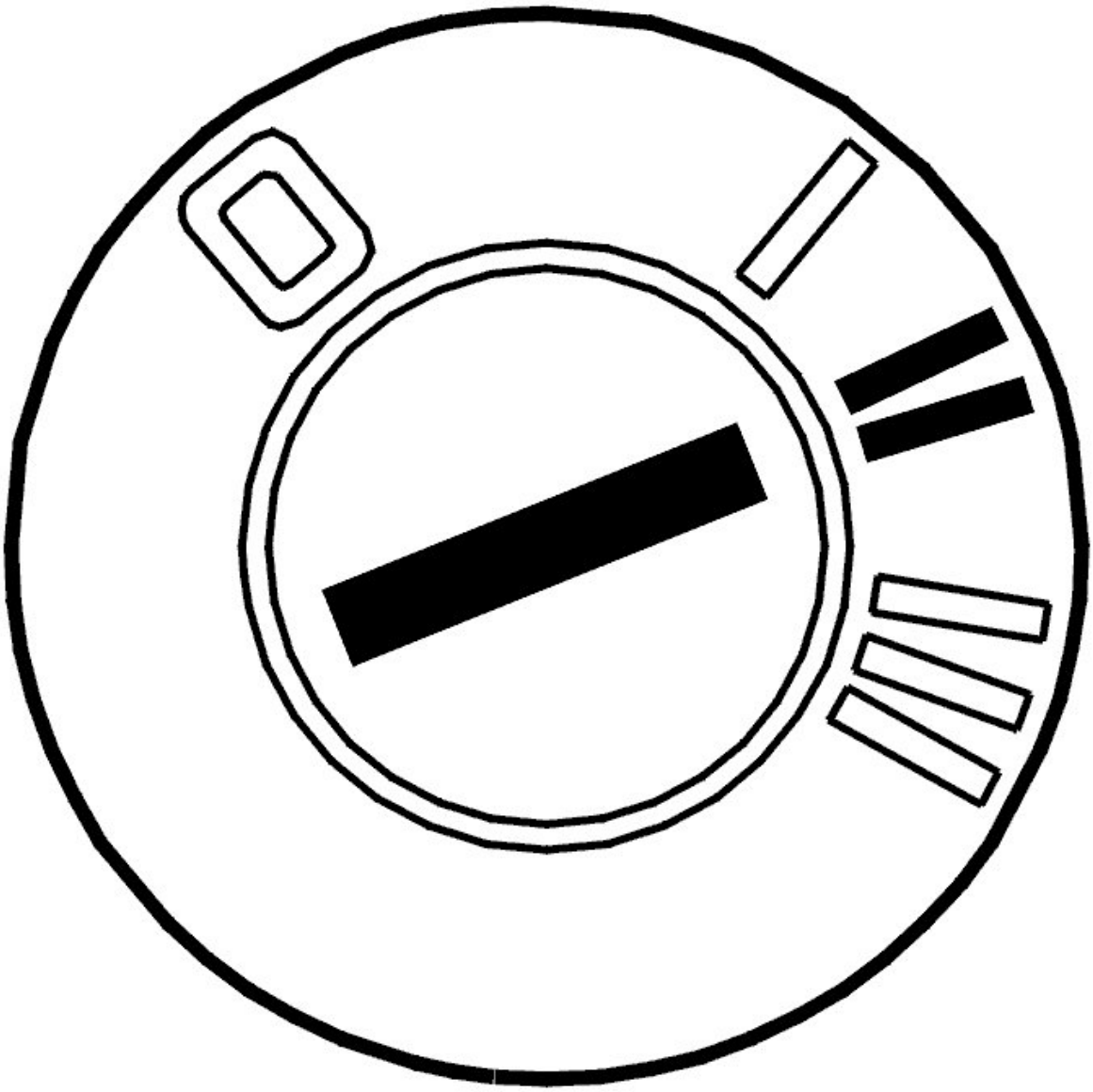
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

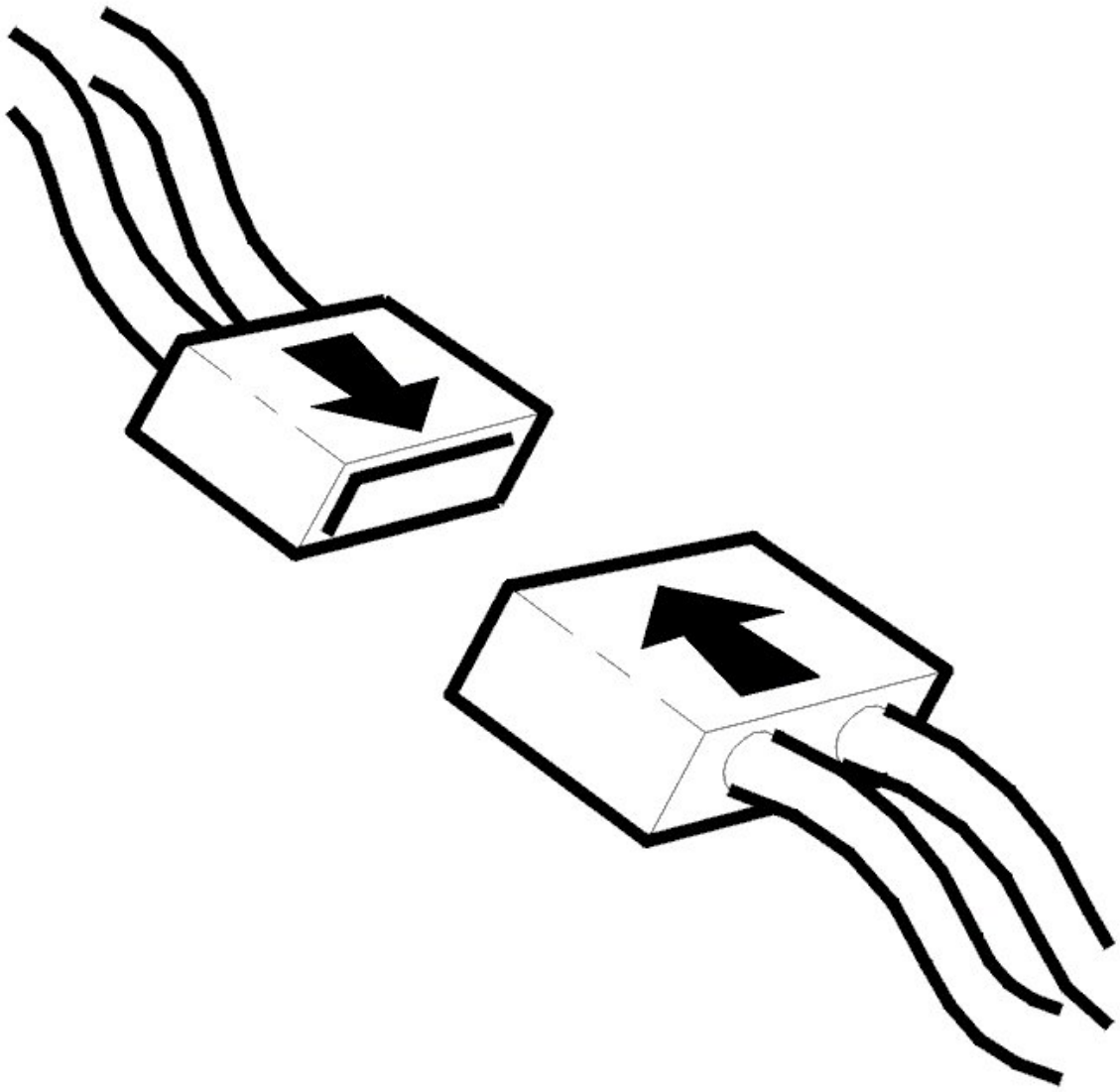


Continue - Verification

Checking the accessory electronic module (AEM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on for at least 10 seconds.

Read off the control module ID from the accessory electronic module (AEM) by clicking on the VCT2000 symbol.

Could the control module ID be read off?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

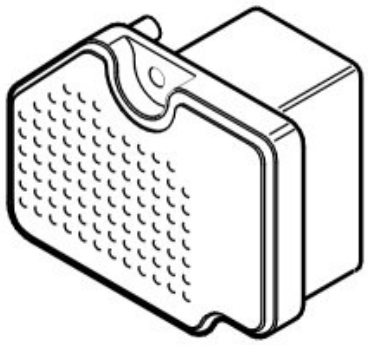
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the accessory electronic module (AEM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A64

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the differential electronic module (DEM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! If CEM-1A6X diagnostic trouble codes (DTCs) are stored, the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the Control area network!

Substitute value
- None.

Possible source
- No power supply to the differential electronic module (DEM)
- Open-circuit in the ground lead for the differential electronic module (DEM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the differential electronic module (DEM)
- The differential electronic module (DEM) is not intended for this vehicle, for example a used control module with different software/hardware.

Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- Four wheel drive is not functioning.
- Message in the display
- General warning lamp lit

Signal Missing

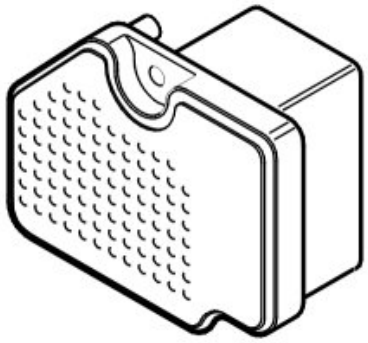
Signal missing

Checking the power supply and ground for the differential electronic module (DEM)

Check that the fuse for the control module is intact.
Checking the power supply and ground terminal for the differential electronic module (DEM).

Other information:

- Checking the supply voltage/ground terminal See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Symptom Related Diagnostic Procedures/Checking the Supply Voltage/Ground Terminal
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Checking the differential electronic module (DEM)

No - Checking communication with the differential electronic module (DEM)

Checking communication with the differential electronic module (DEM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the differential electronic module (DEM) by reading off the control module ID
- Click on the symbol for VCT2000 to begin reading off

Continue - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net

listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

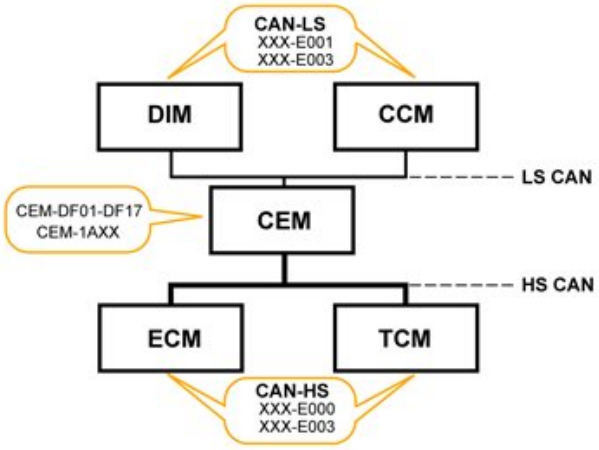
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent. Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

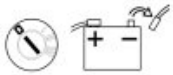
Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #11. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For LS-CAN (Low Speed), terminating resistors are located in Upper electronic module (UEM) and Rear electronic module (REM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the

resistance changes to detect intermittent short-circuits or open circuit.

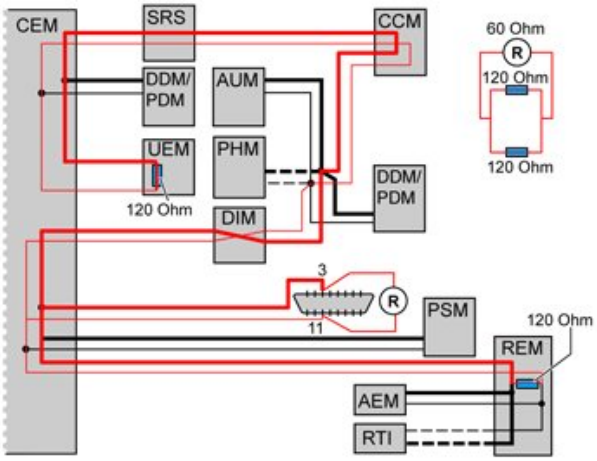
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question. Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

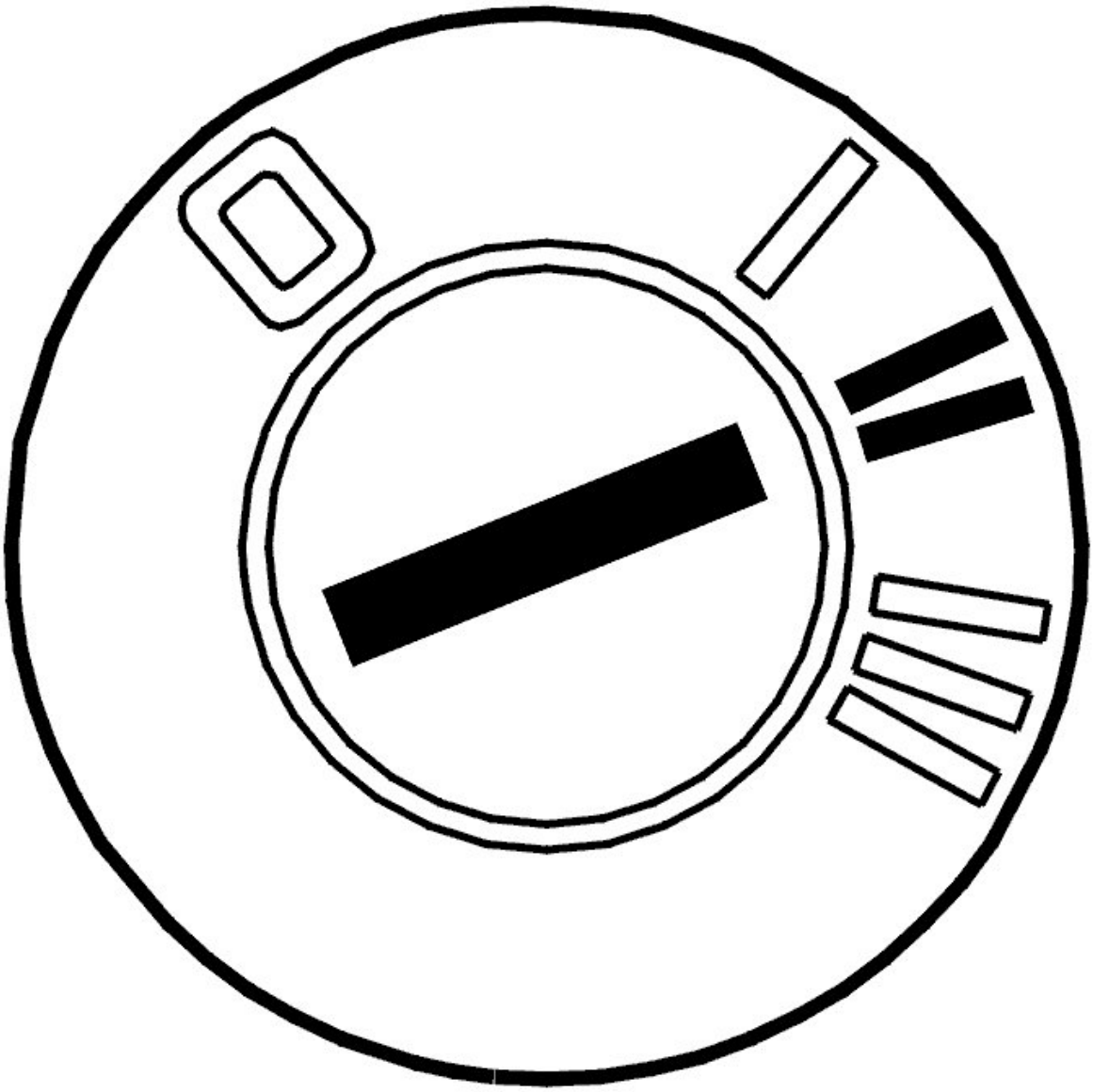


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the amount of traffic on the LS-CAN



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. The load can be checked by reading the average value of the voltage on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #11 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #3 and #11. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

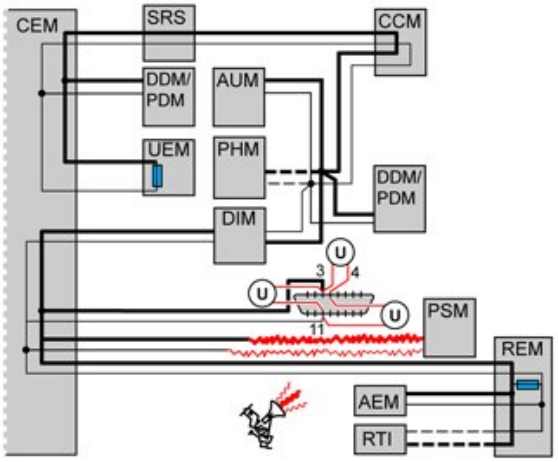
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Identifying a control module in the CAN network

No - Checking voltage-drop in cable for CAN-H and CAN-L, respectively

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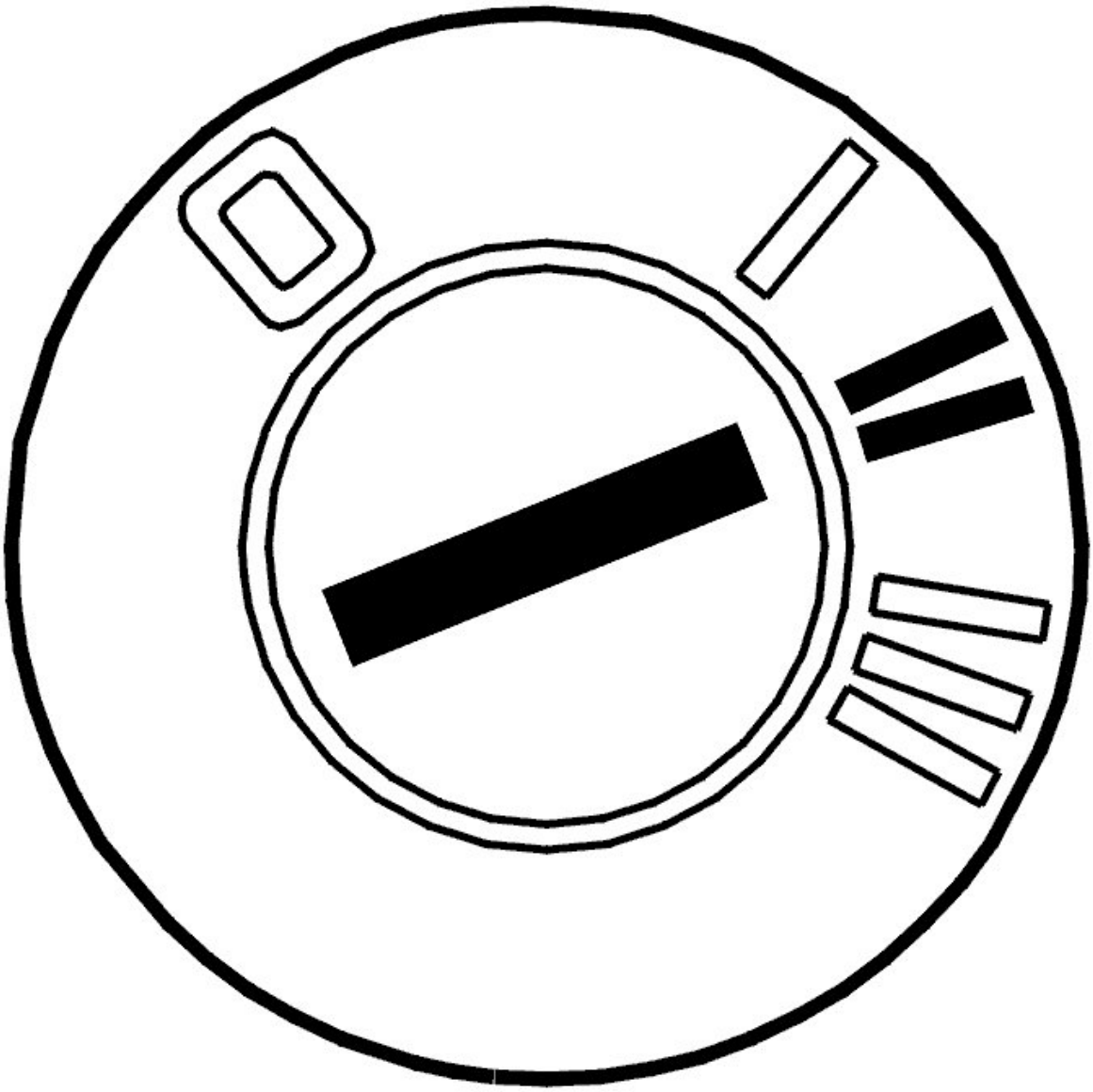
Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402. If the load on the CAN network is too high, this may be due to a control module transmitting faulty messages on the CAN network. This is called a disruptive control module. The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The fault may occur without any of the control modules storing a diagnostic trouble code (DTC). The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module that has set the diagnostic trouble code that communicates incorrectly. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #3 and #11. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage

between the CAN wiring drops to the normal level.

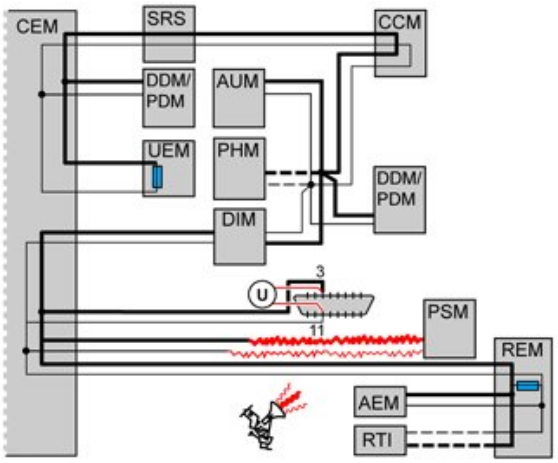
Note! When connecting and disconnecting certain control modules, diagnostic trouble codes (DTCs) may be stored in other control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

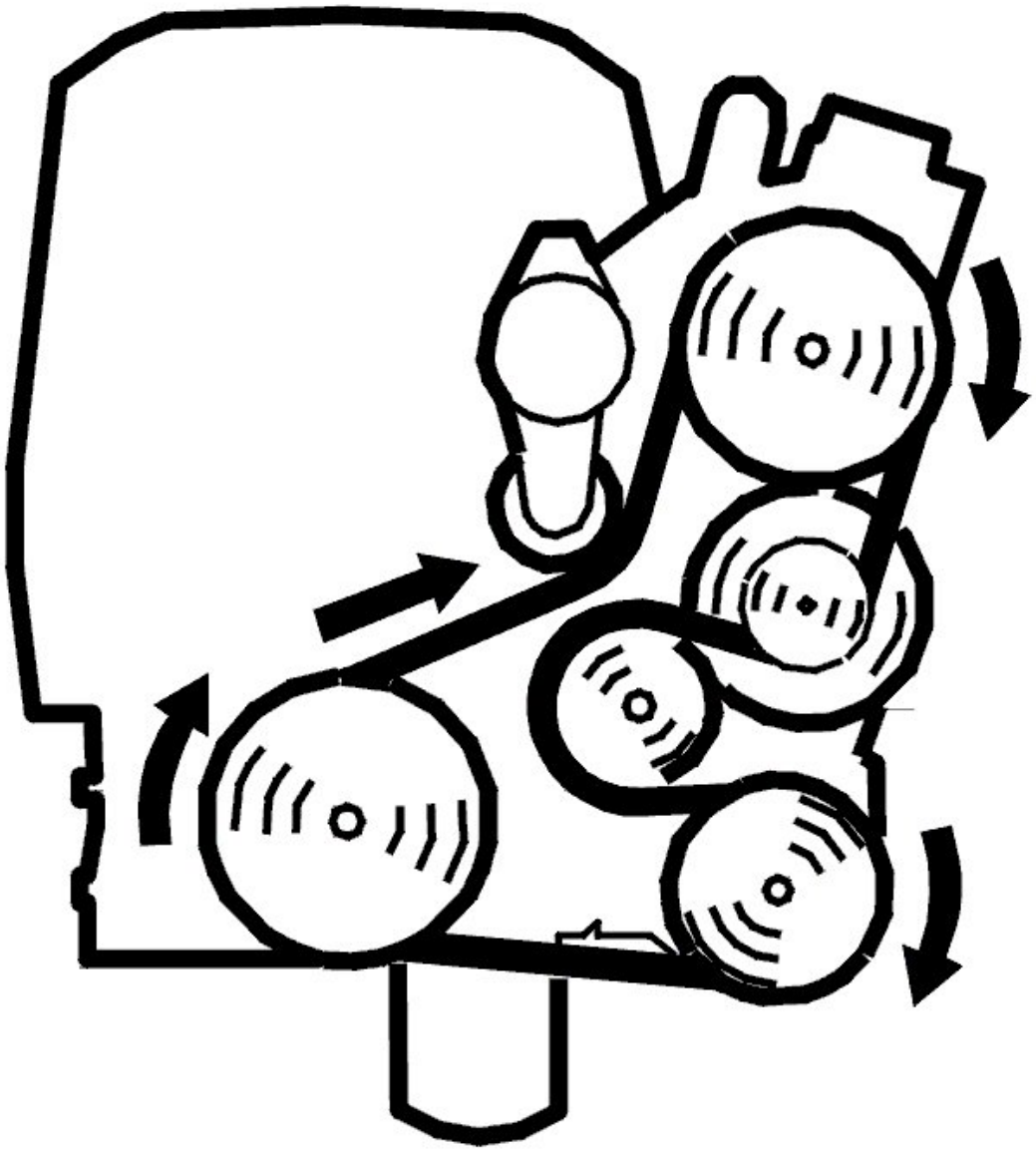
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

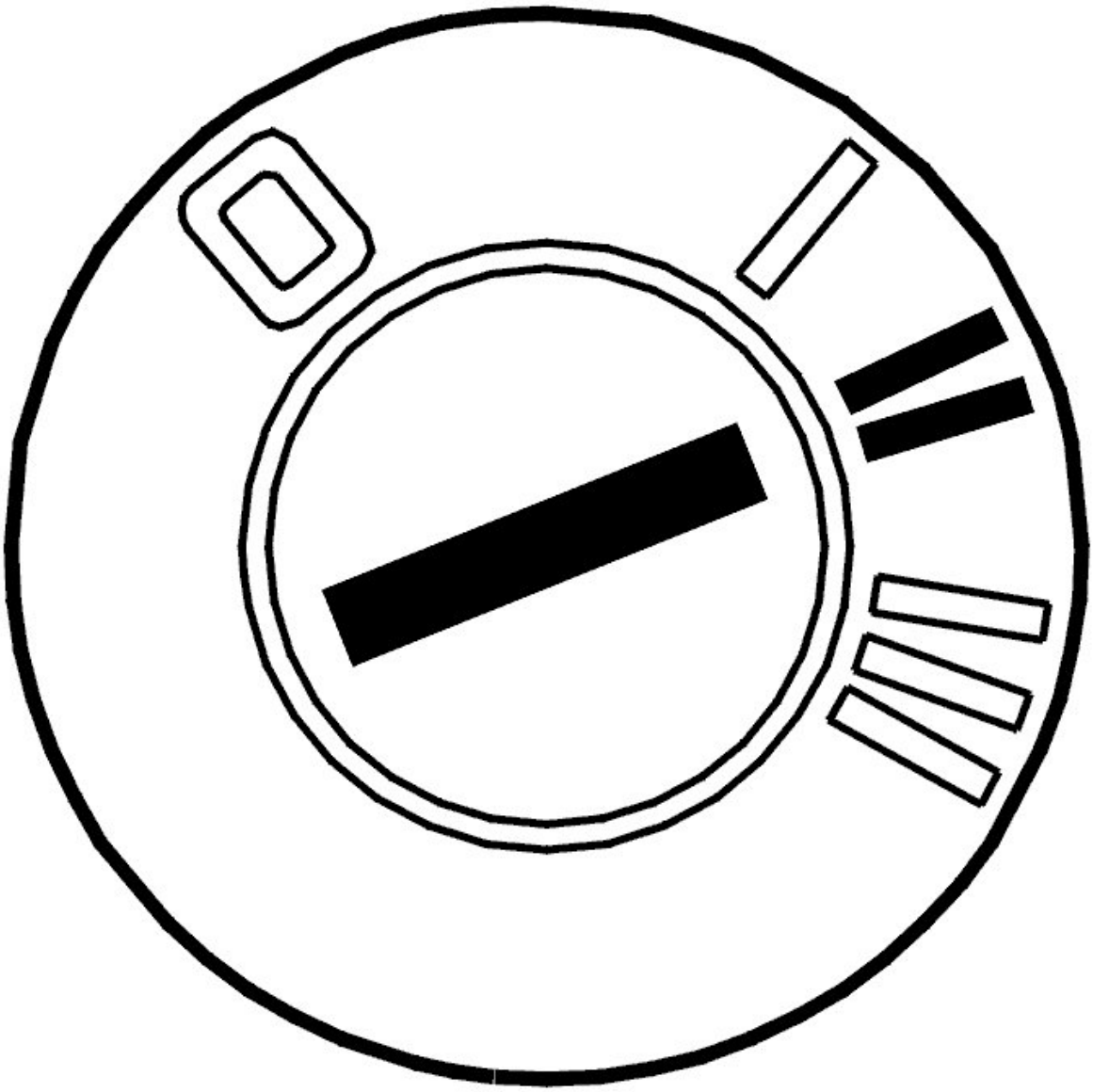


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes. Start the engine. Allow the engine to run at idle speed for 10 minutes
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

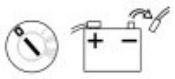
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Signal missing

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #3 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #11 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

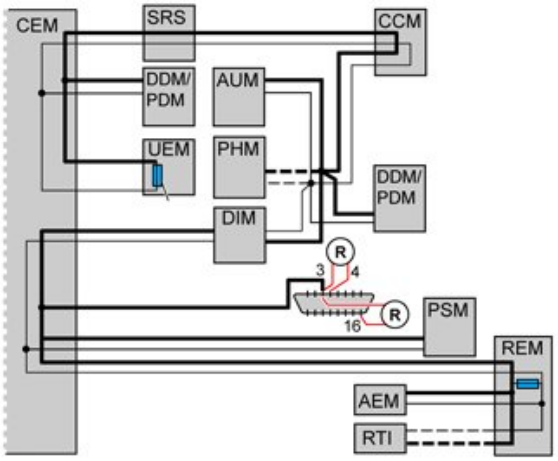
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

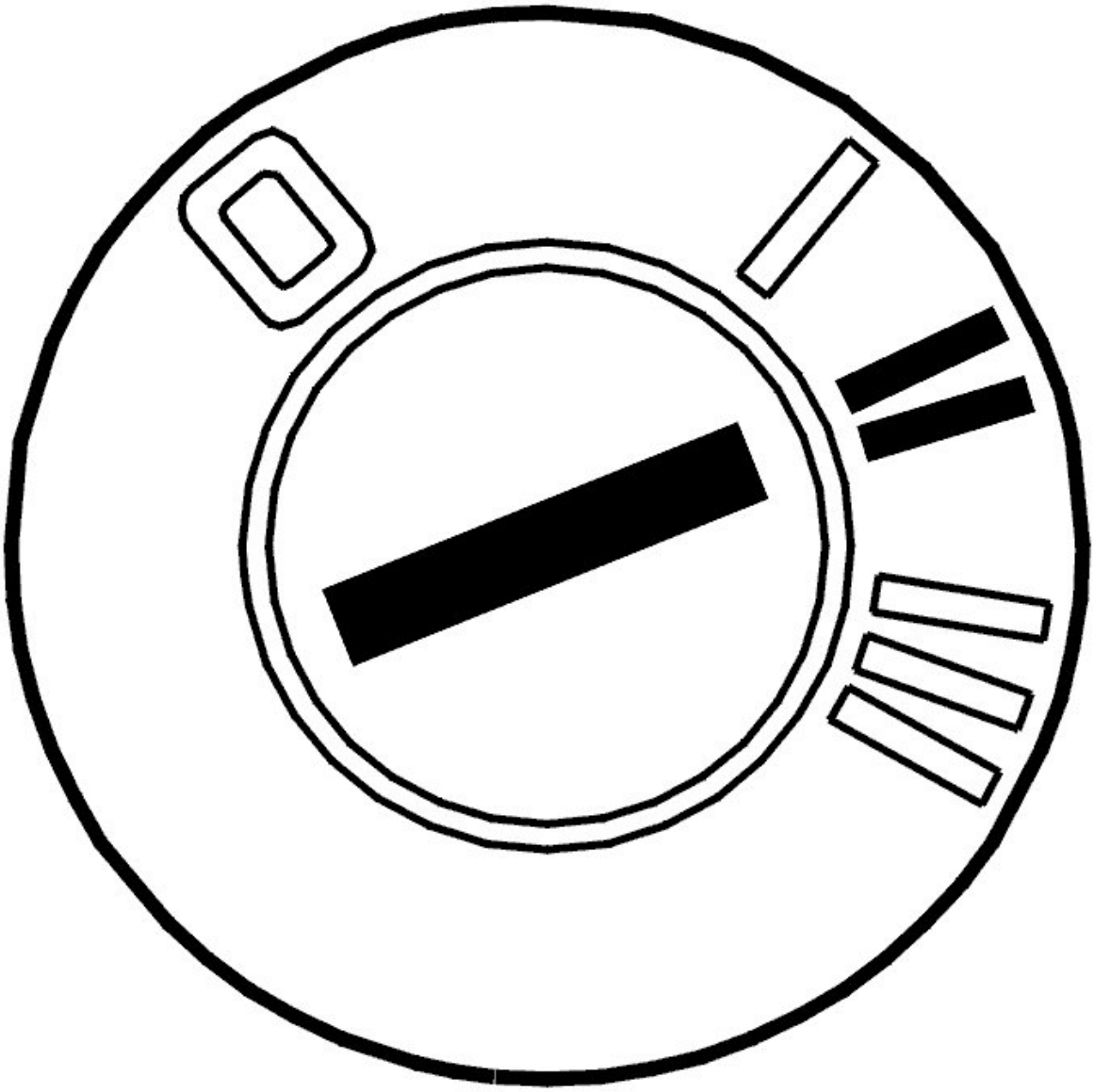


Was a fault detected?

Yes - Verification

No - Checking the amount of traffic on the LS-CAN

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

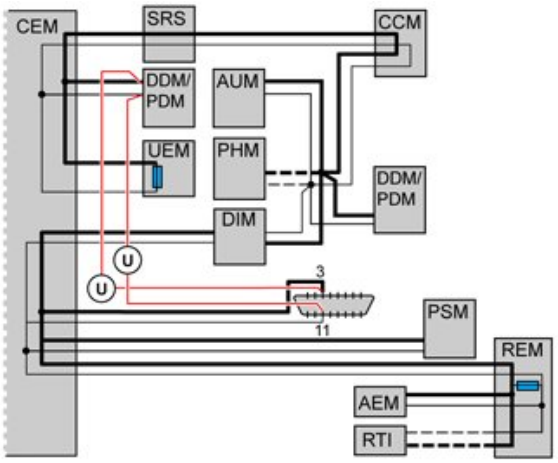
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with. Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #3 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #11 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

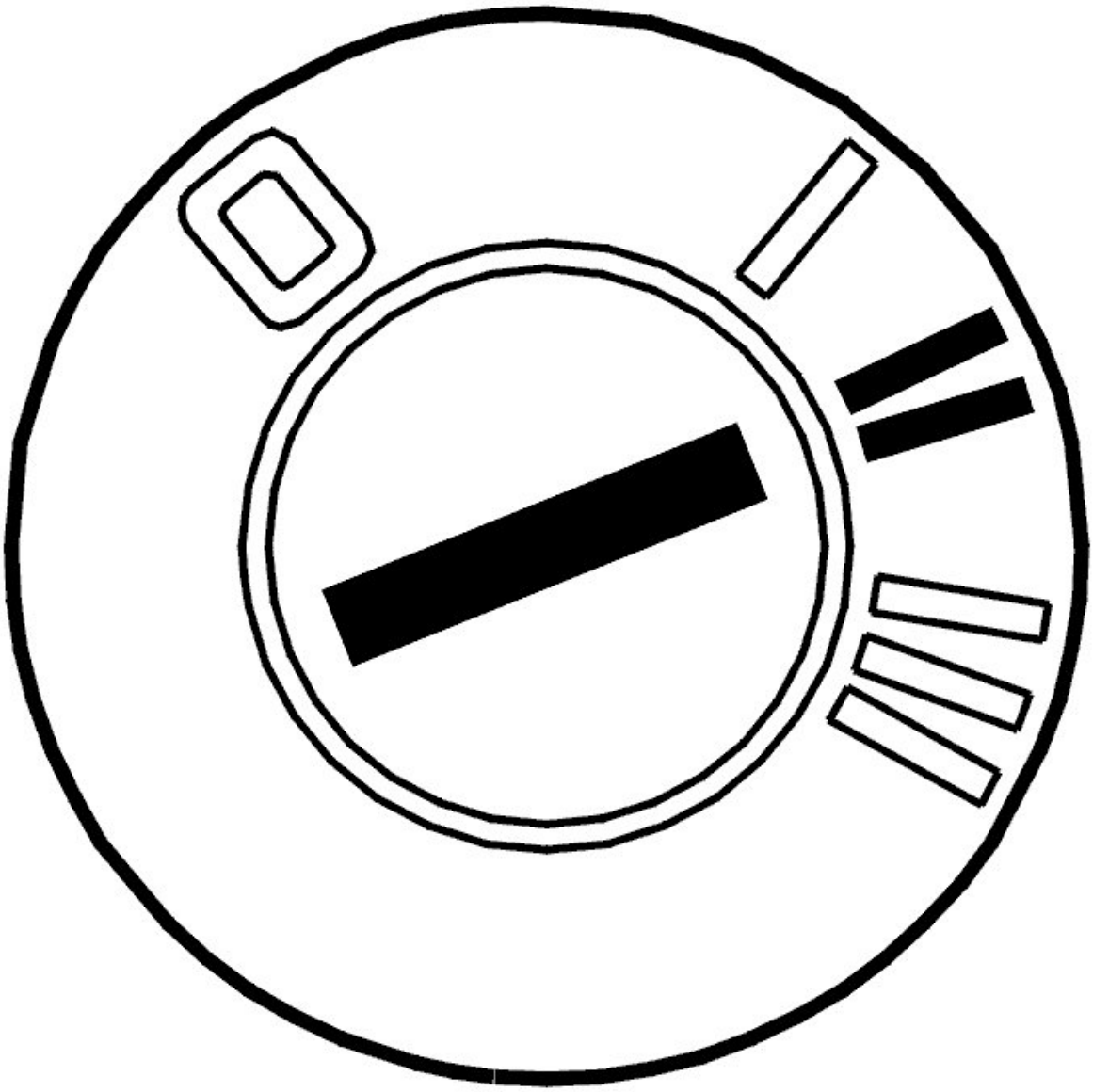
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

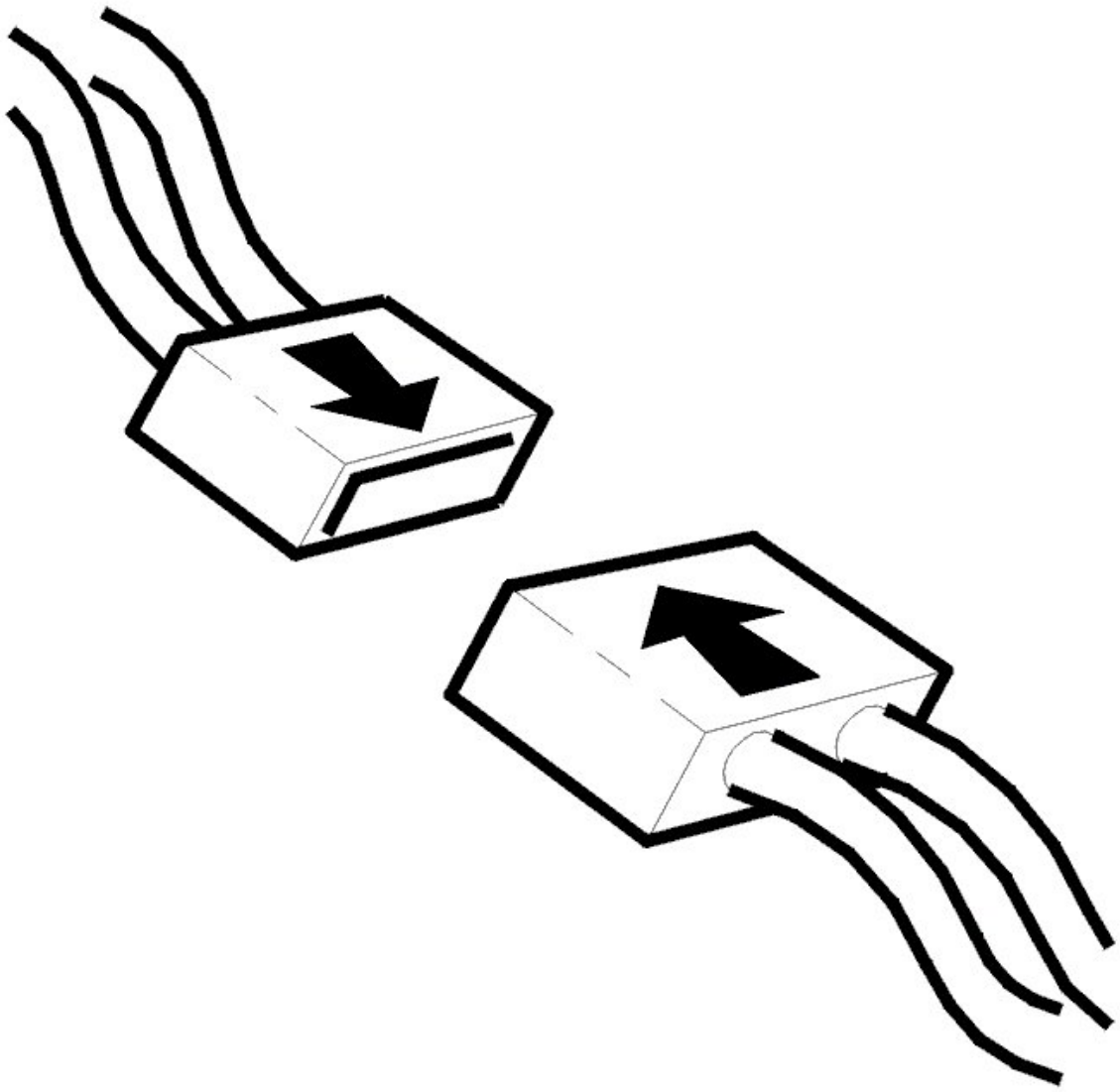


Continue - Verification

Checking the differential electronic module (DEM)

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors. Reinstall the components
- Ignition on for at least 10 seconds.

Read off the control module ID from the differential electronic module (DEM) by clicking on the VCT2000 symbol.

Could the control module ID be read off?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

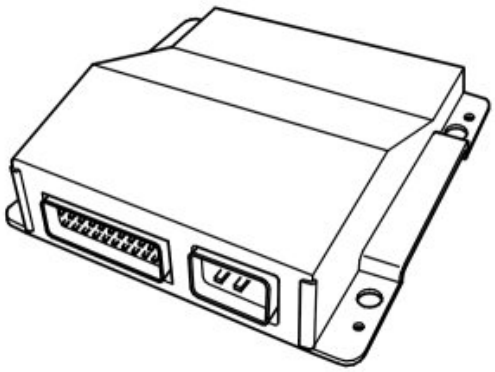
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the differential electronic module (DEM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1A65

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that communication with the suspension module (SUM) is not operating.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 10 seconds.

Note! If CEM-1A6X diagnostic trouble codes (DTCs) are stored, the central electronic module (CEM) must not be replaced as the diagnostic trouble code (DTC) indicates a communication fault in the Control area network!

Substitute value
- None.

Possible source
- No power supply to the suspension module (SUM)
- Open-circuit in the ground lead for the suspension module (SUM)
- Contact resistance in the terminals
- Open-circuit in the wiring for the CAN high speed network to the suspension module (SUM)
- The suspension module (SUM) is not intended for this vehicle, for example a used control module with different software/hardware.

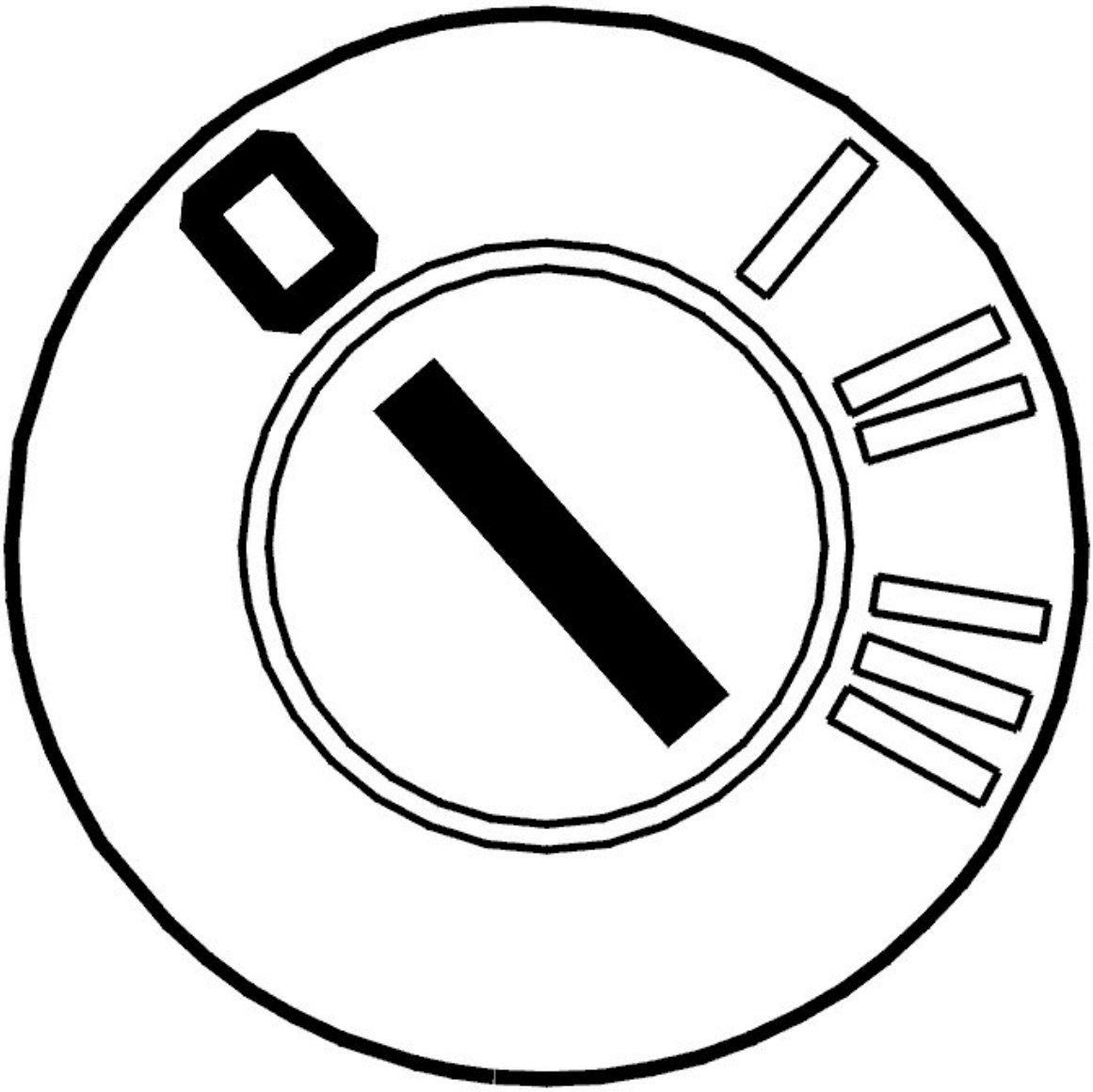
Hint: If several diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM) for communication faults with other control modules in the high speed network, this indicates a common fault in the Control area network, see the wiring diagram.

Fault symptom[s]
- General warning lamp lit.
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Missing

Signal missing

Checking the connectors



- Ignition off.

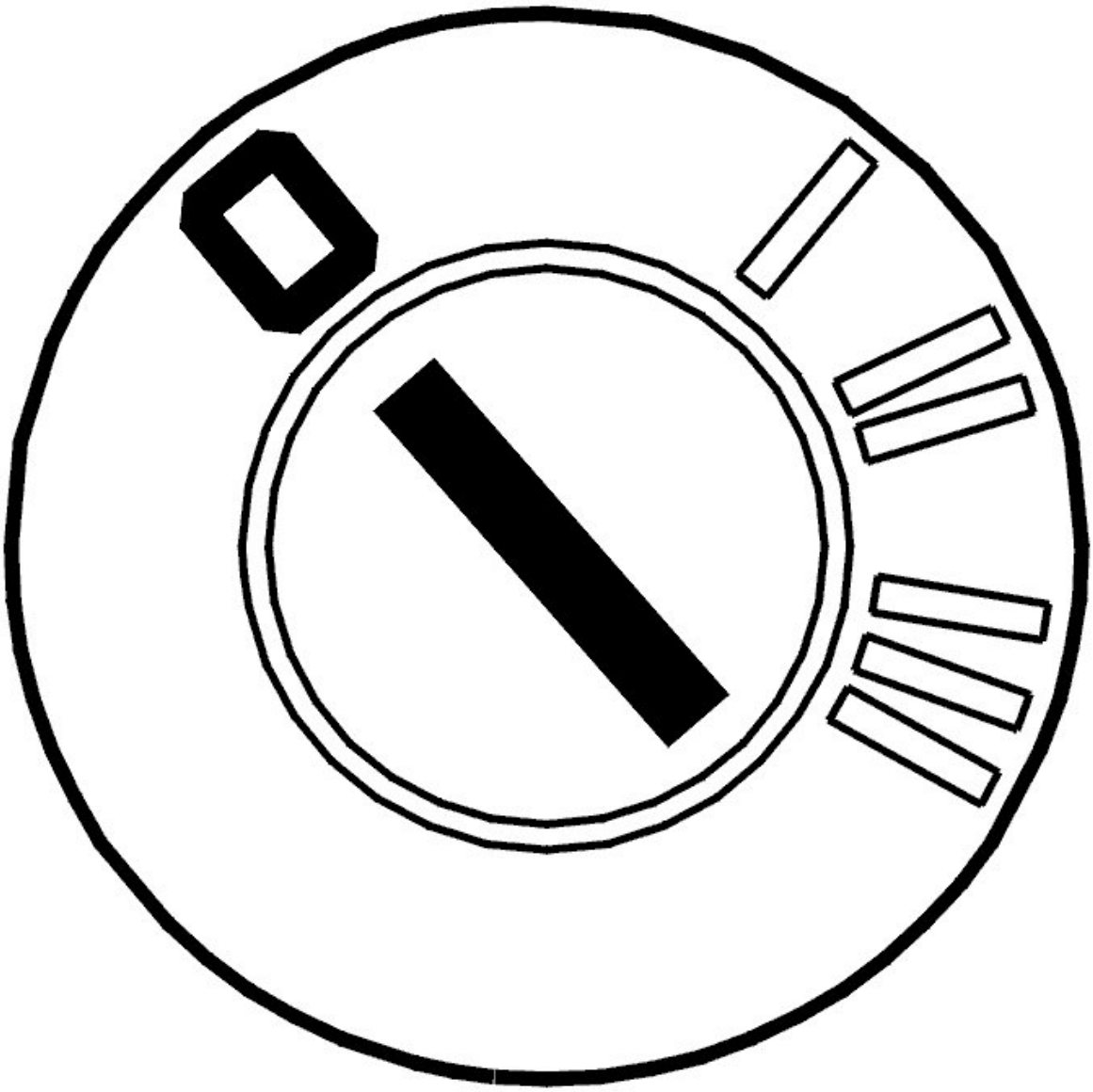
Check the connectors and wiring for the suspension module (SUM) and the cable harness. Check for contact resistance and oxidation. Check for loose connections.
Check for damage carefully.

Other information

- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Checking the components and wiring

Checking the components and wiring



- Ignition off.

Check that the fuses for the suspension module (SUM) are intact.
Check the relay for 15i power supply.

Hint: In the event of a fault in the 15i power supply relay, diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM). If diagnostic trouble codes (DTCs) are stored for the relay, fault trace accordingly.

Check the cable between the fuse and 15i power supply relay terminal #3. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between 15i power supply relay terminal #1 and suspension module (SUM) terminal #C1 (#31). Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between suspension module (SUM) terminal #C2 (#32) and ground. Check for an open-circuit. Check for a short-circuit to supply voltage.

Other information

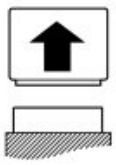
- For further information about fuses and relays, see the Wiring Diagram
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the bus cable

Checking the bus cable



- Disconnect the suspension module (SUM) from the bus cable. Pull the connector out of the control module.
- To obtain the correct value, the battery must be disconnected during resistance readings.

Measure the resistance of the connectors across terminals #A15 and #A16.

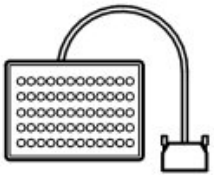
Note! Take care that you measure directly at the connector so that it is not damaged.

Hint: Only connect a breakout box to the connector, not to the control module. In this way, the direction of any faults in the bus cable can be established.

The resistance must be approximately 120 ohms. If another reading is given, there may be an open-circuit in the bus cable.

Other information

- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting



Does the measuring instrument display a resistance of approximately 120 ohms?

Yes - Fault-tracing Information

No - Signal missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

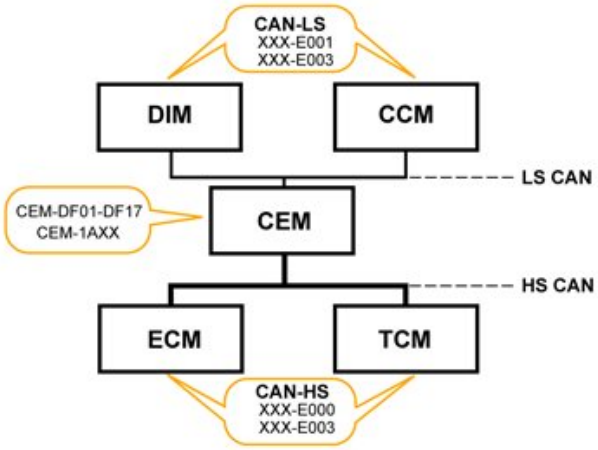
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

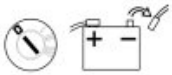
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

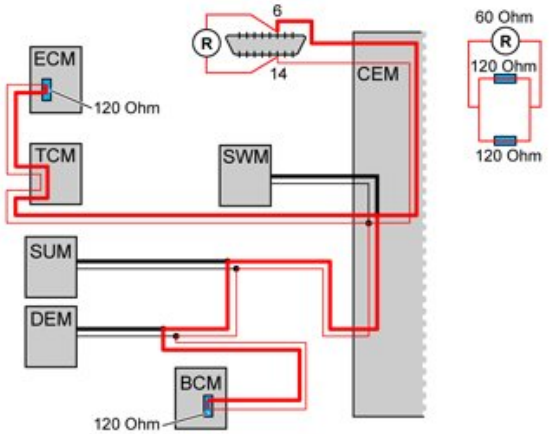
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

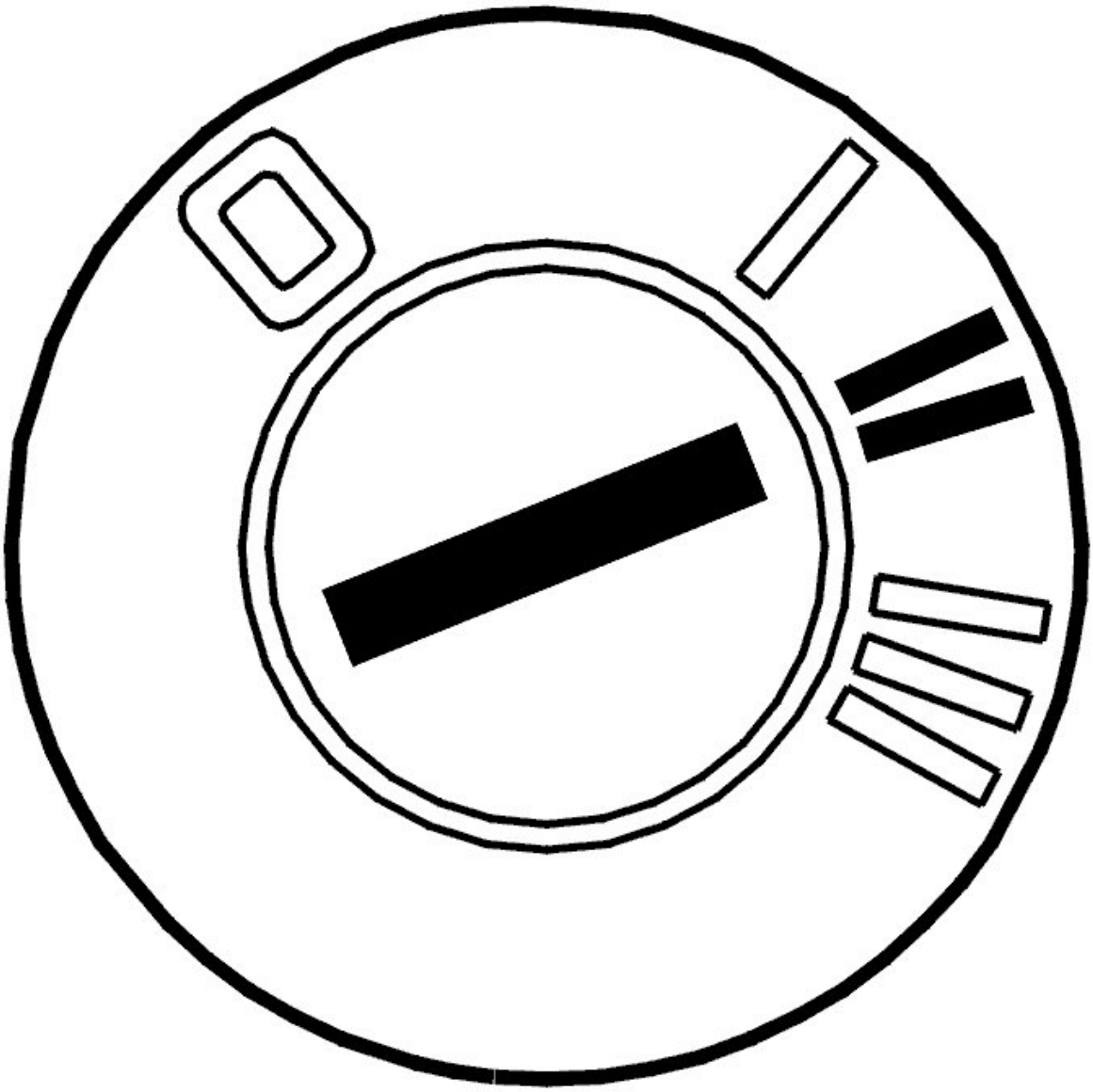


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

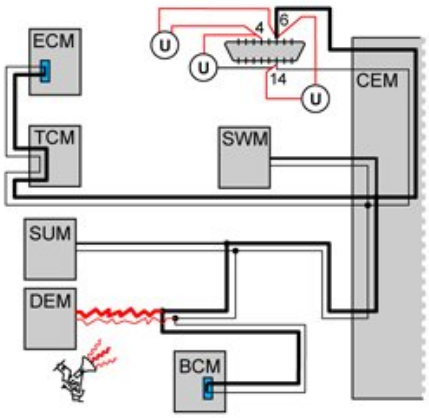
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

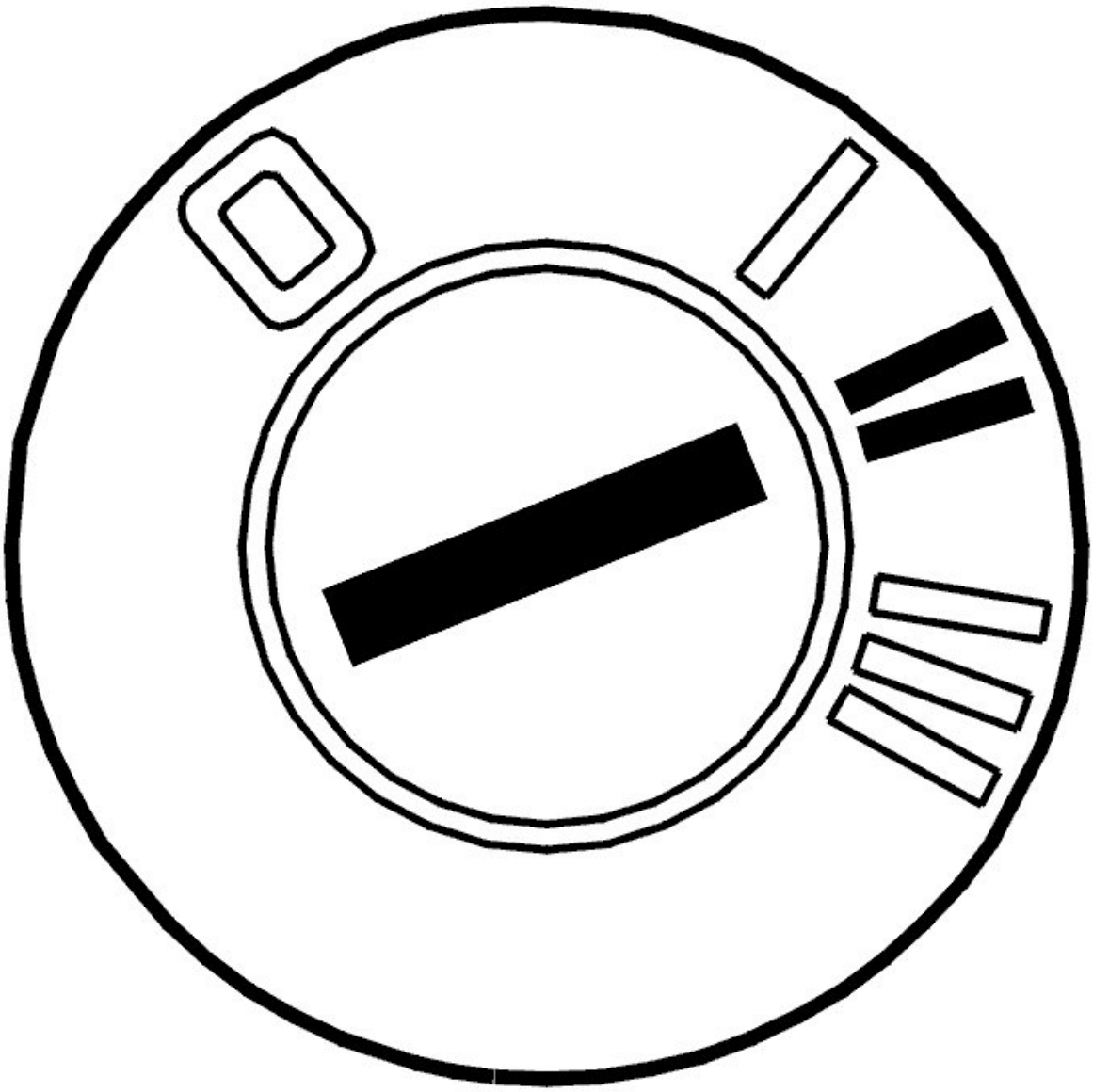


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

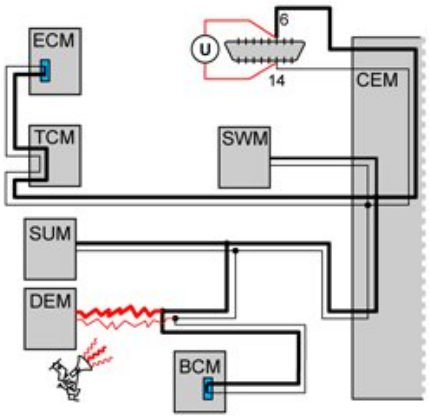
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

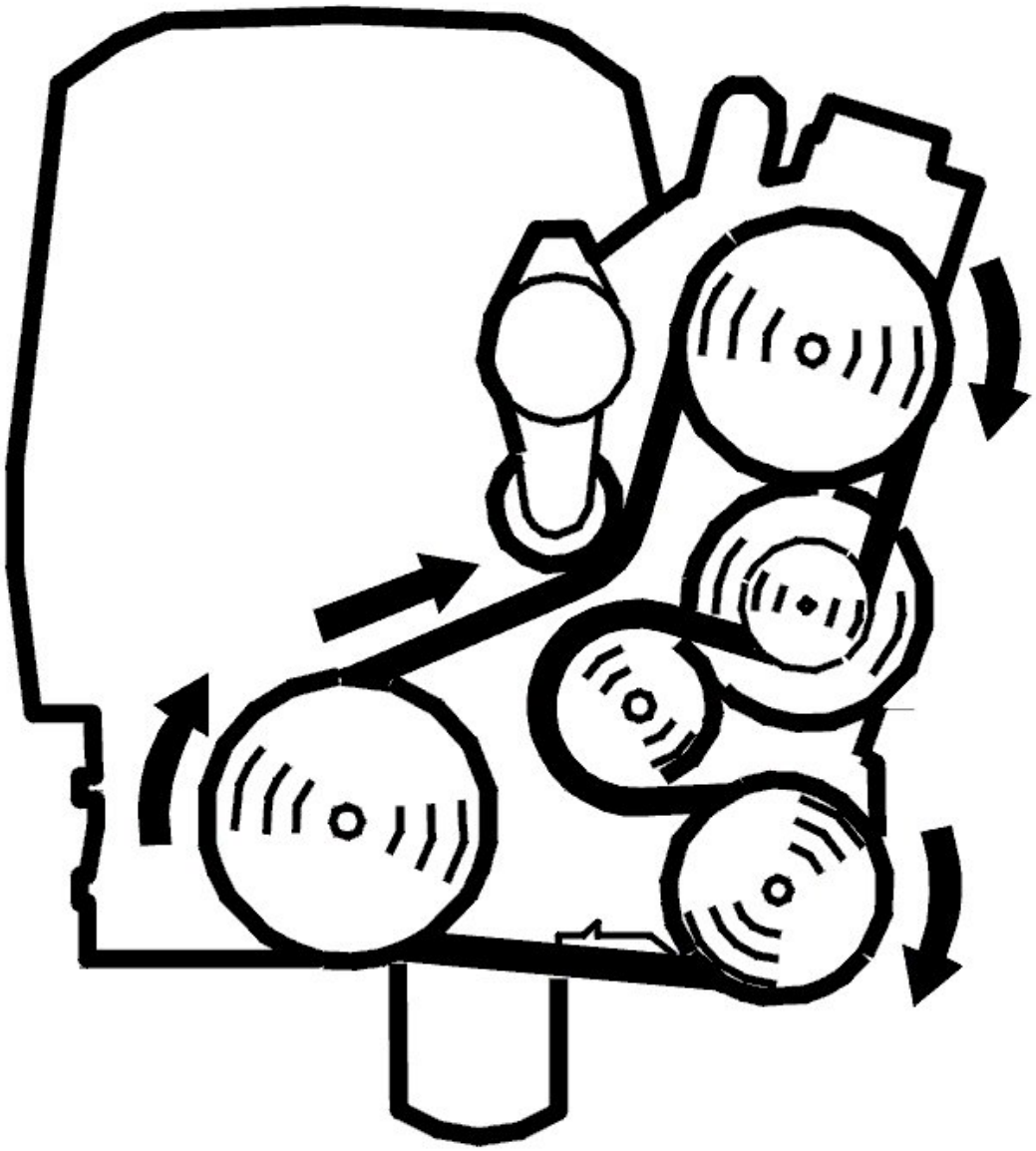
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

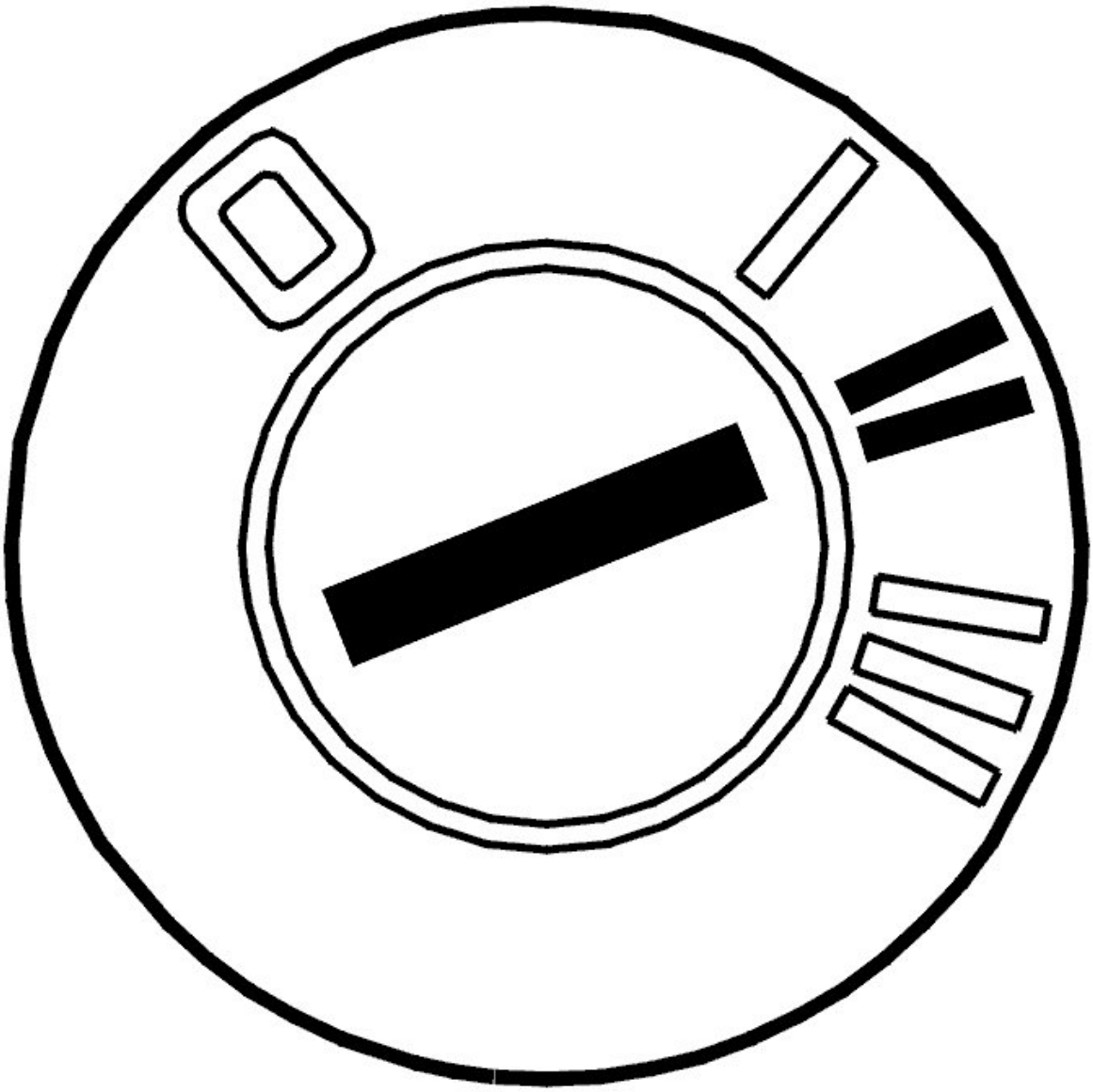


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

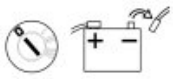
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

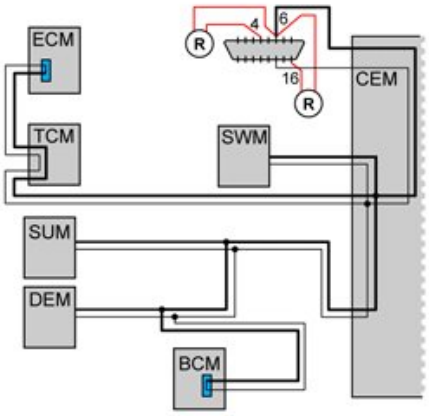
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

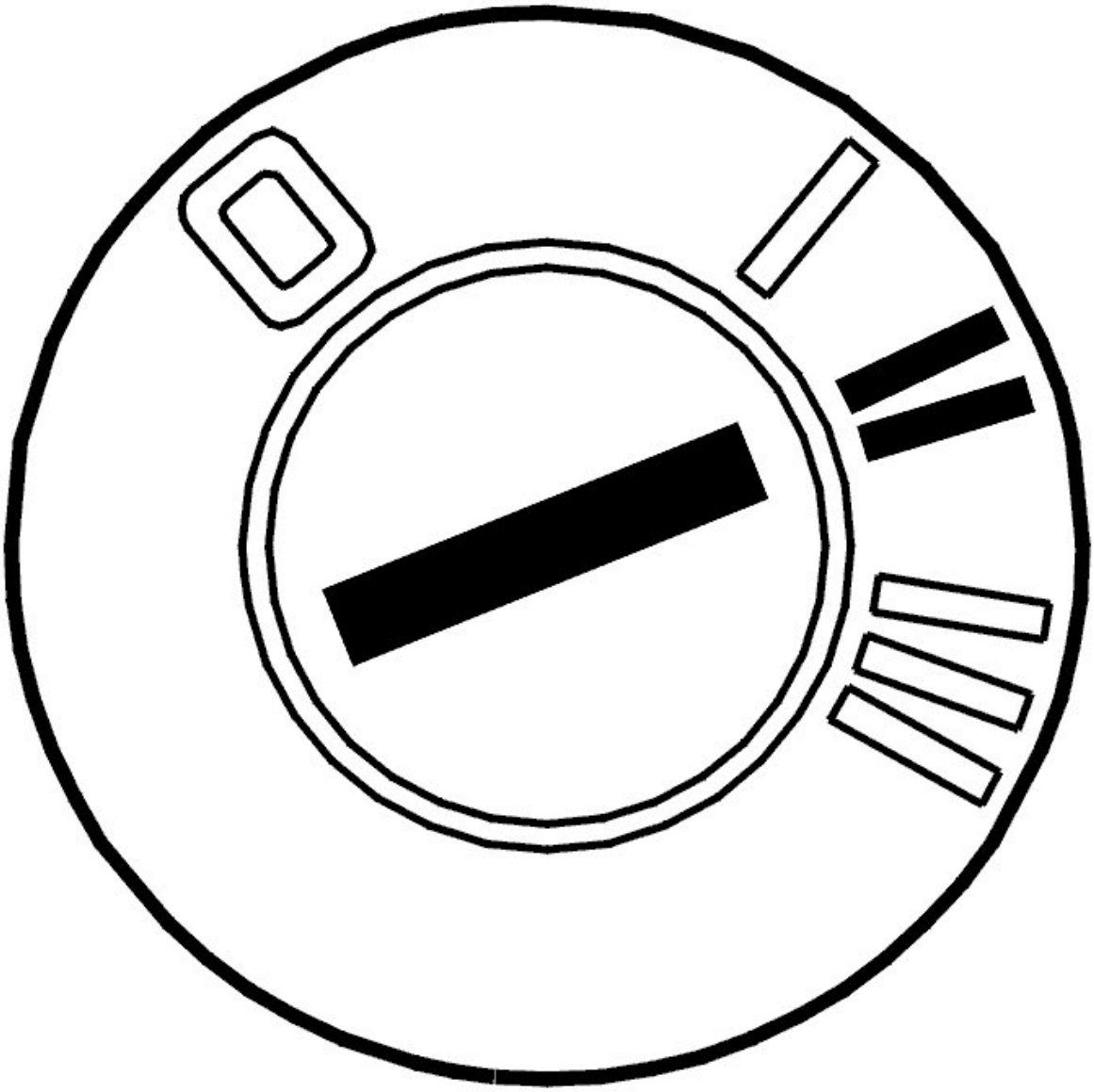


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

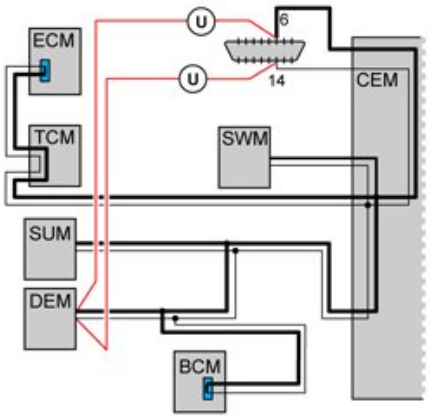
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

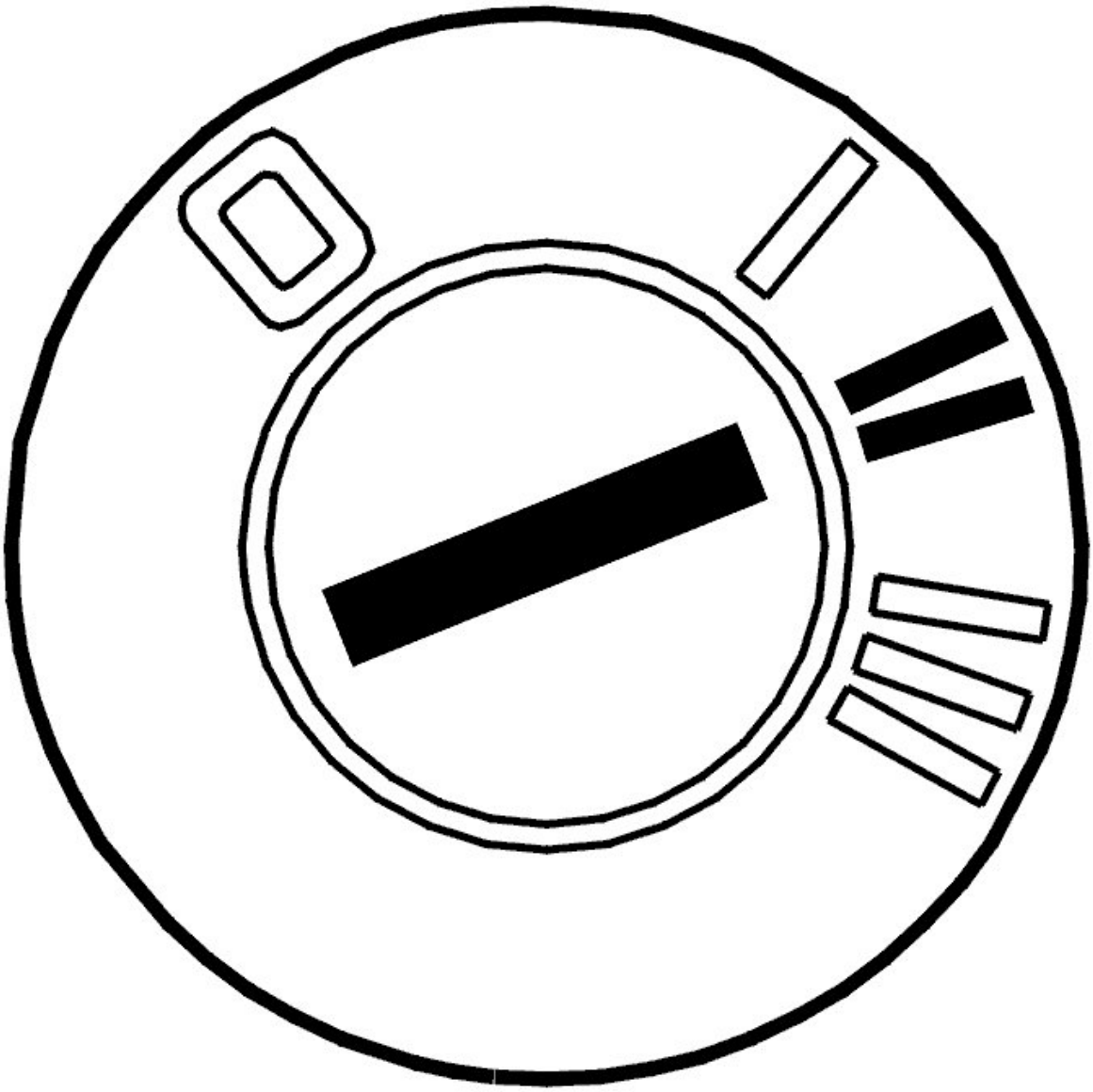
Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

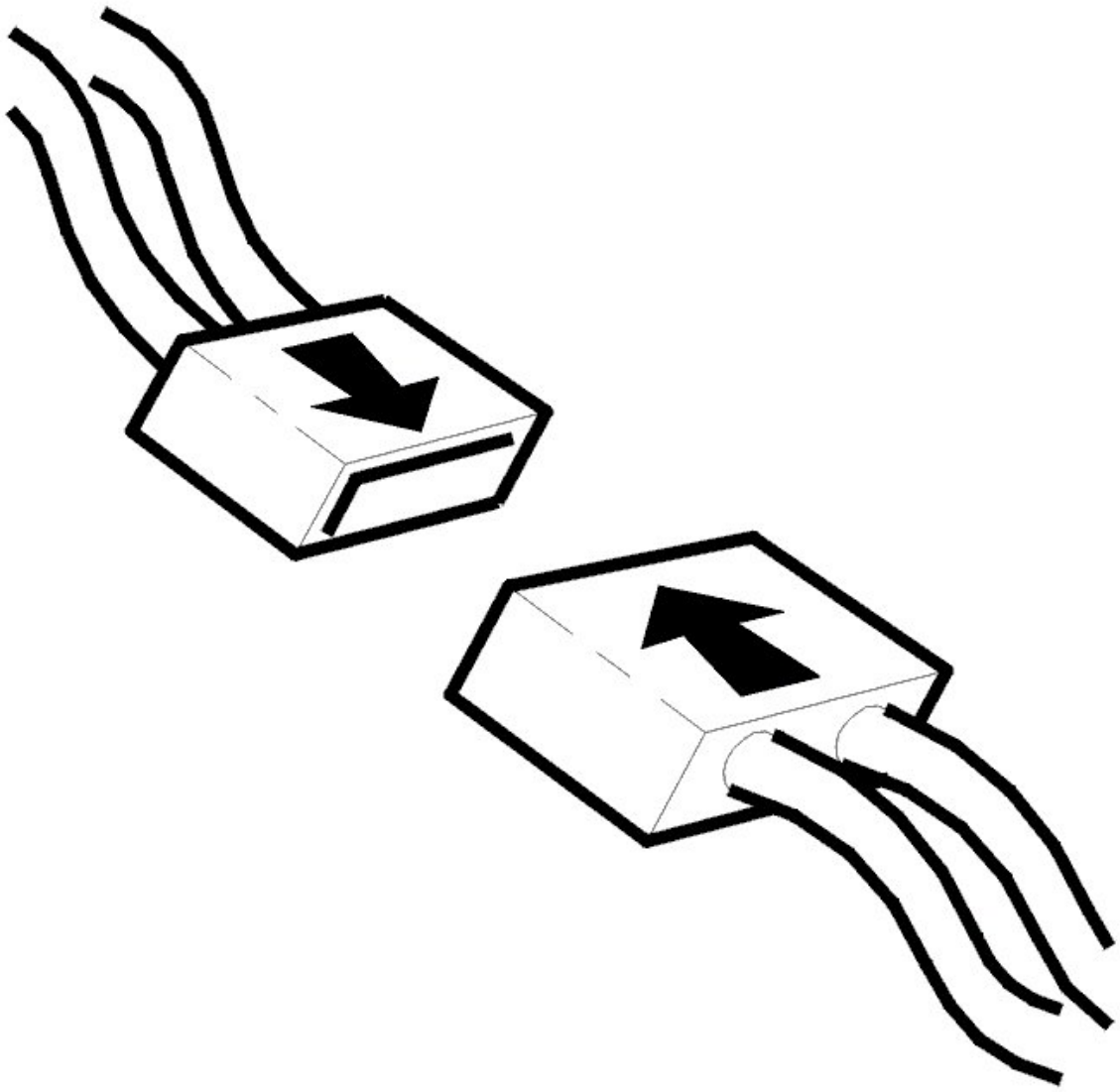


Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Switch on the ignition for at least 10 seconds.

Read off the control module ID from the suspension module (SUM) by clicking on the VCT2000 symbol.

Could the control module ID be read off?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors

Information

Fault-tracing information

Verification shows that the fault is no longer present. The diagnostic trouble code (DTC) was probably caused by an intermittent fault.
Fault-tracing for this diagnostic trouble code (DTC) is not followed by a verification.
You can view the information again or exit fault-tracing for this diagnostic trouble code (DTC).

Do you want to view information again?

Yes - Attempt New Test

No - No Fault Found

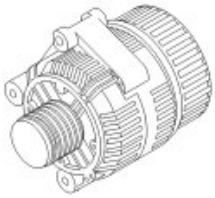
Attempt New Test - Checking the connectors

No Fault Found - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1C0A

Condition



The central electronic module (CEM) continuously checks the charge status of the battery.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects excessive voltage (above 16 V).
The diagnostic trouble code (DTC) can be diagnosed at engine speeds (RPM) above 600 rpm.

Note! The voltage of the battery is measured by Rear electronic module (REM) and the voltage value is transmitted to Central electronic module (CEM) via CAN-net. This means that the diagnostic trouble code can be generated if the rear electronic module (REM) sends

incorrect data.

Substitute value
- None.

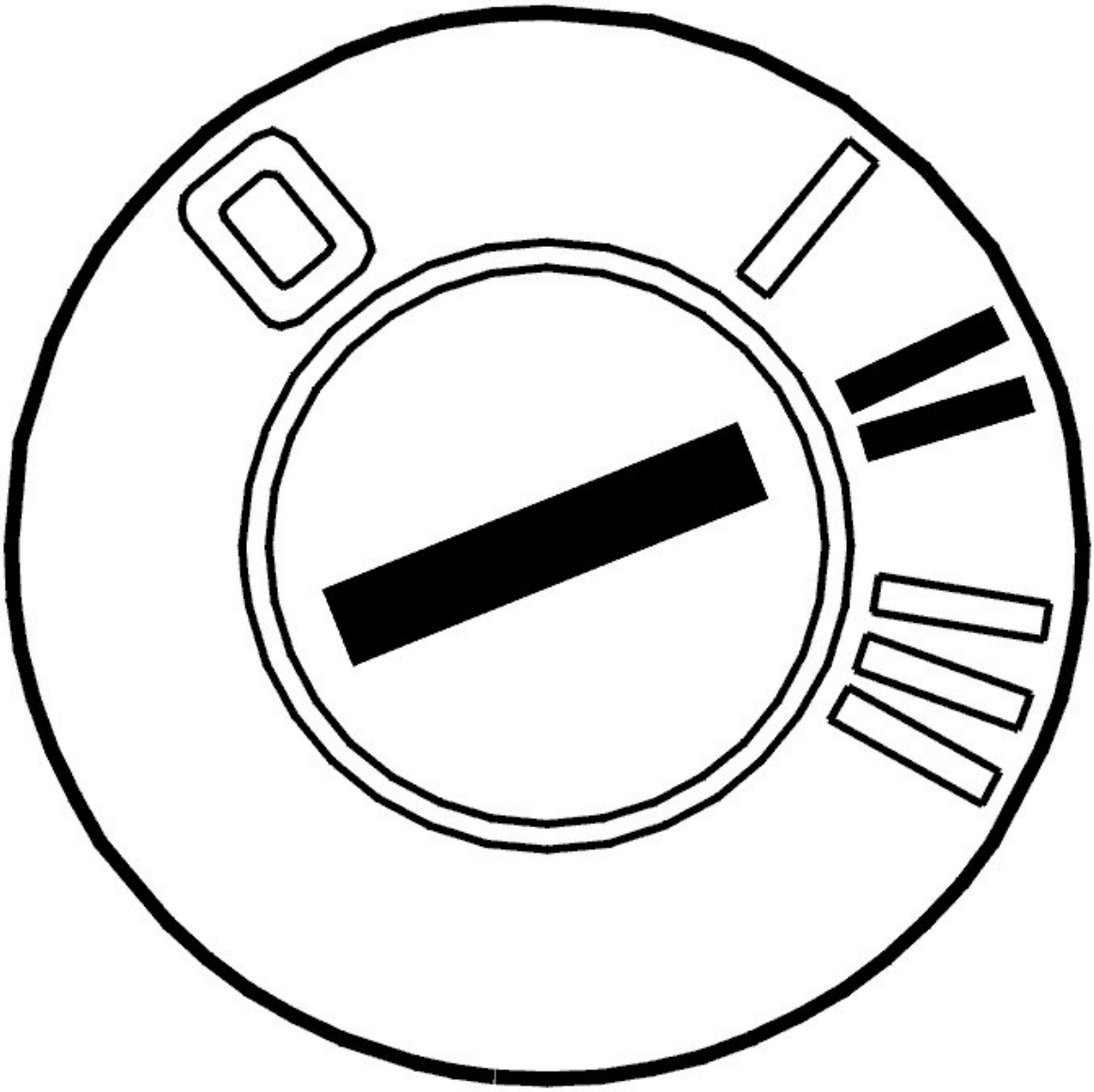
Possible source
- A battery charger with too high charge voltage has been connected previously
- Damaged alternator control module (ACM).

Fault symptom[s]
- The electrolyte in battery boils with the engine running
- The headlamp bulb blows.

Voltage Too High

Voltage too high

Checking the power supply



- Start the engine.
- Read off and compare the voltage feed to central electronic module (CEM) and Rear electronic module (REM) by clicking on the symbol for VCT2000.

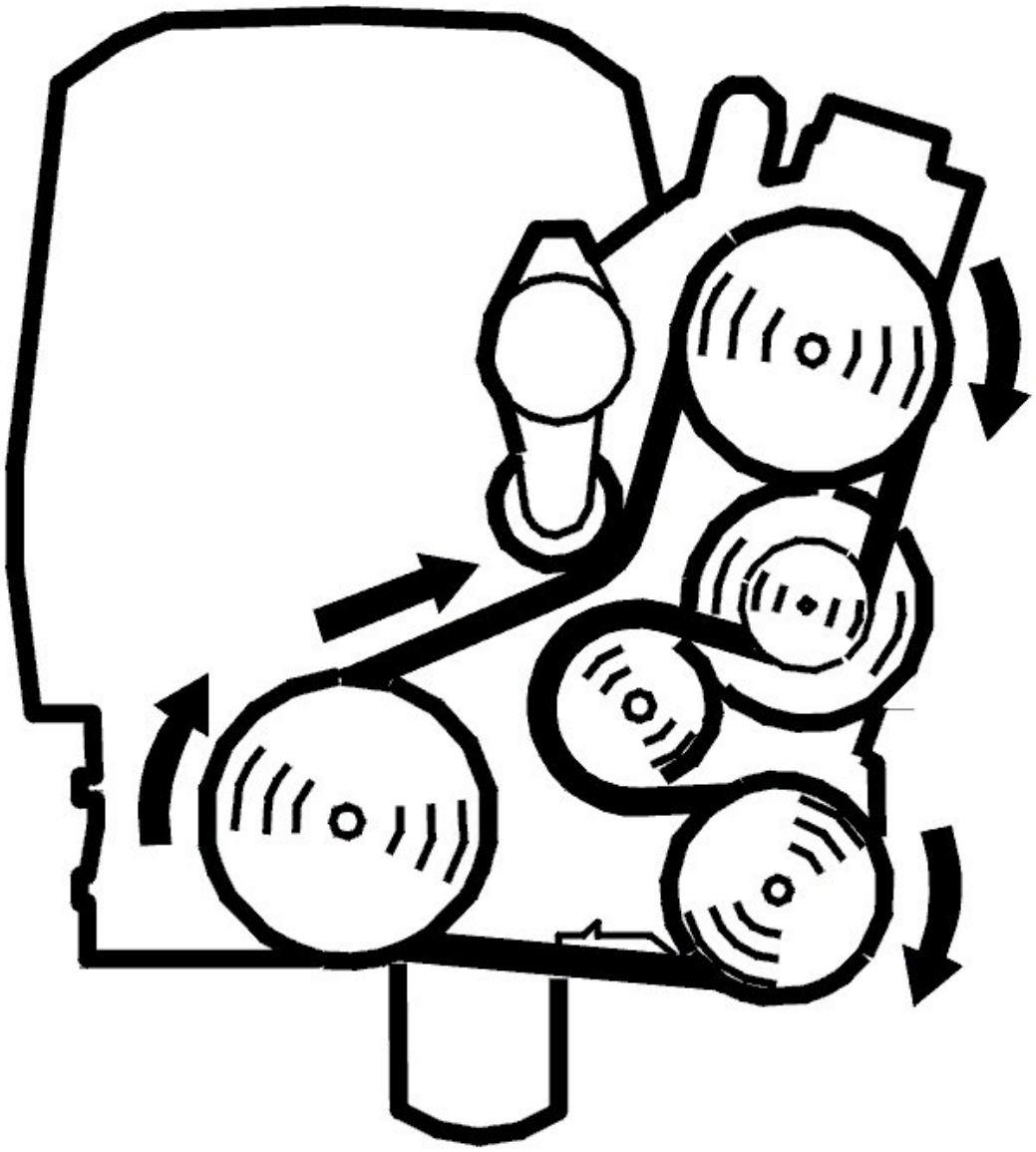
The voltage for Rear electronic module (REM) and the Central electronic module (CEM) should be approximately the same.
The tool also shows the value of the voltage the rear electronic module (REM) transmits on the CAN network.
The value should match other measurement values.

Is the power supply OK?

Yes - Checking battery voltage

No - Checking the power supply and ground at rear electronic module (REM)

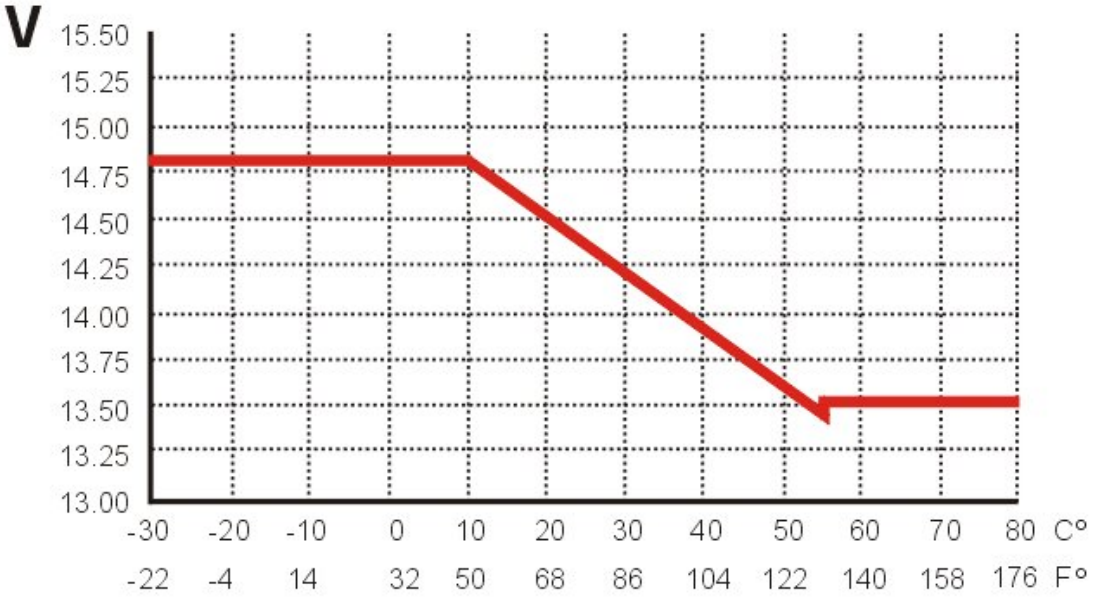
Checking battery voltage



- Start the engine
- Read off the battery voltage. The central electronic module (CEM) uses the prevailing outside temperature to calculate the voltage at which the battery should be charged
- Switch on a few major power consuming components, such as the blower fan.

Check that the voltage is within the limits of 13.5-14.9 V. Try at different engine speeds (RPM).
The fault is permanent if the voltage is outside the permitted range.
If the voltage is within the permitted range, the fault was present previously but is not active at the moment, i.e. an intermittent fault.

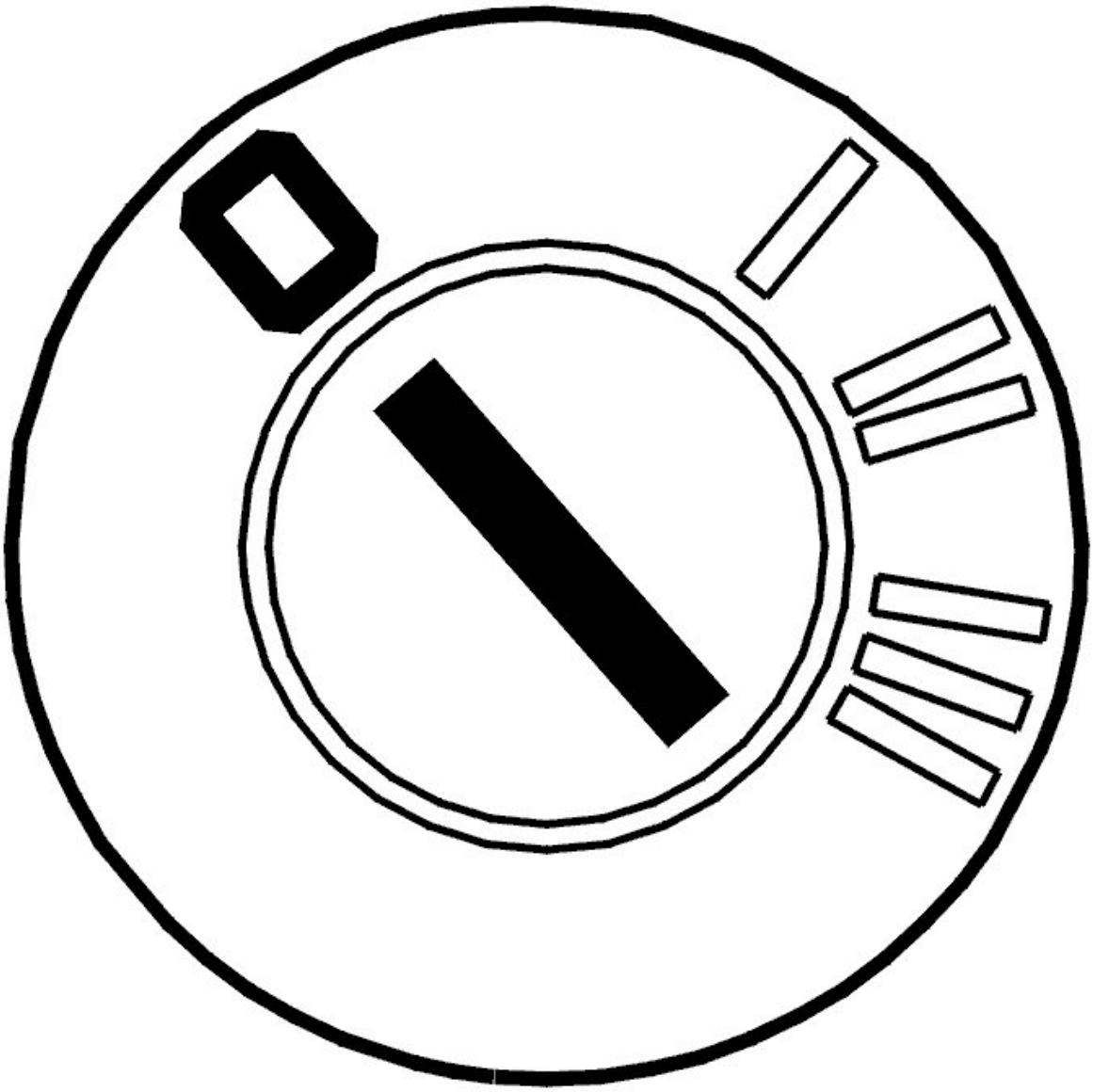
Note! This diagnostic trouble code can be stored if a battery charger with too high charge voltage has been connected.



Select Continue

Continue - Checking the component

Checking the component

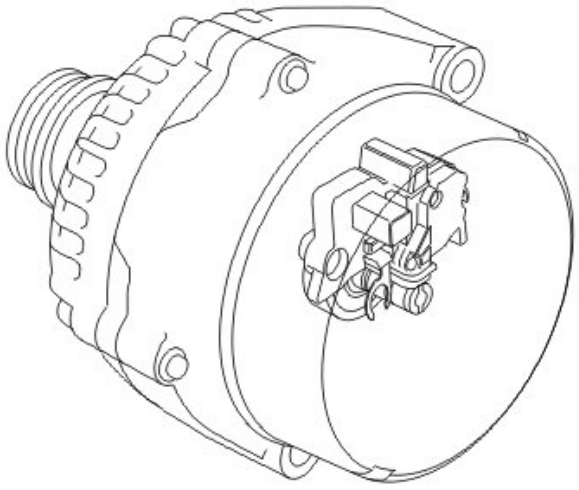


- Ignition off.

Try a new alternator control module (ACM) (charge regulator).
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



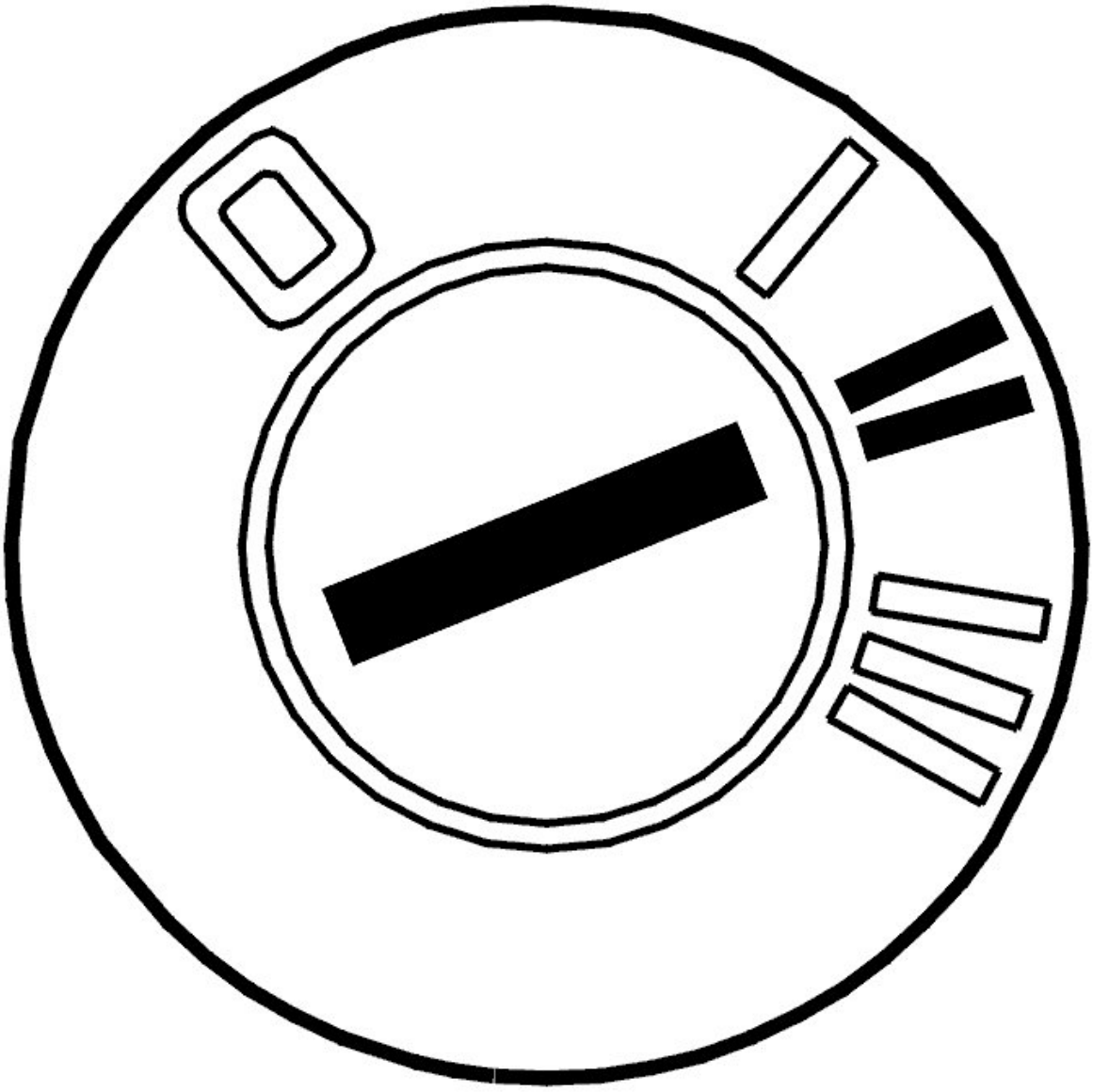
Continue - Verification

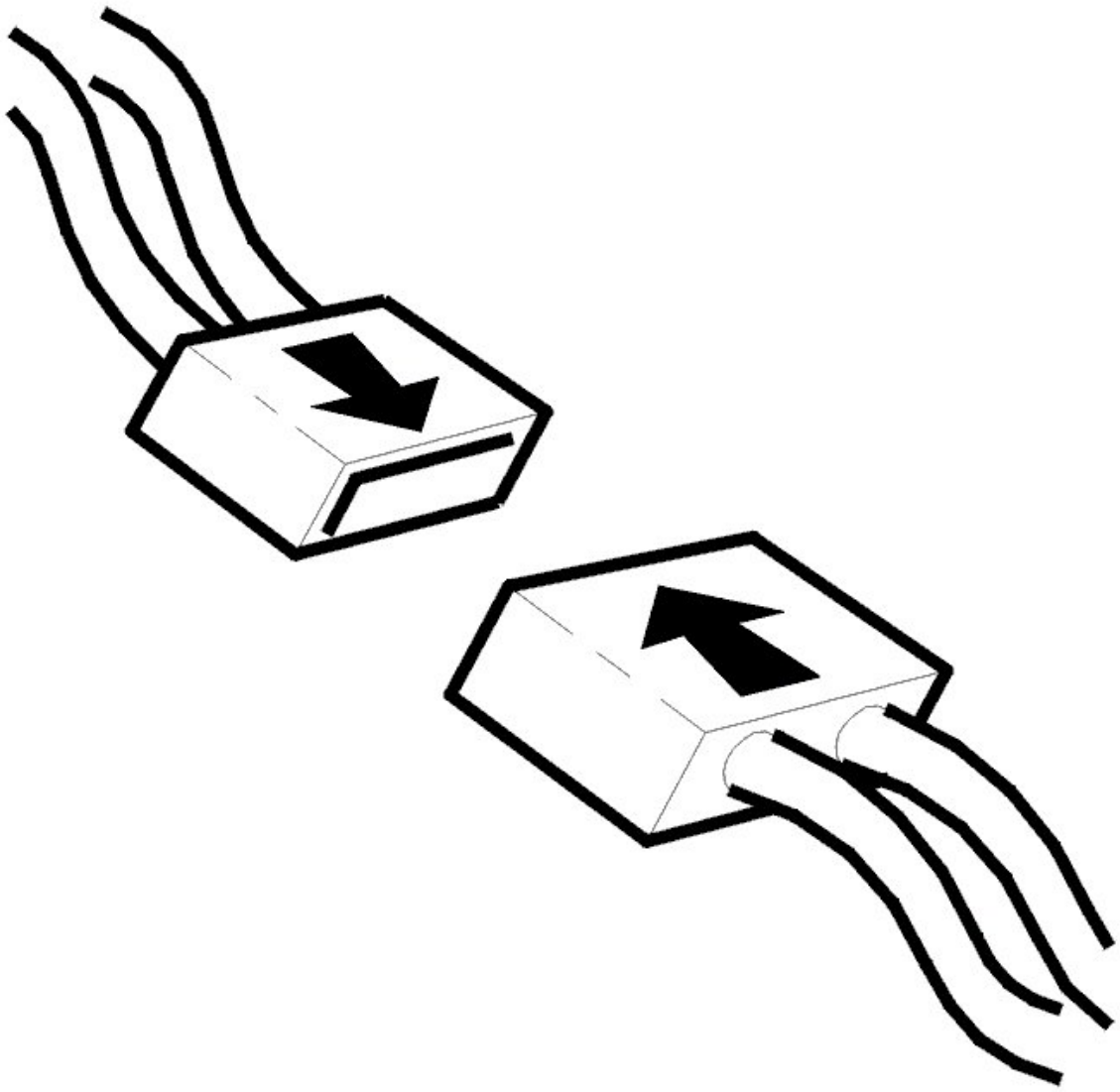
Verification

Verification

Verification

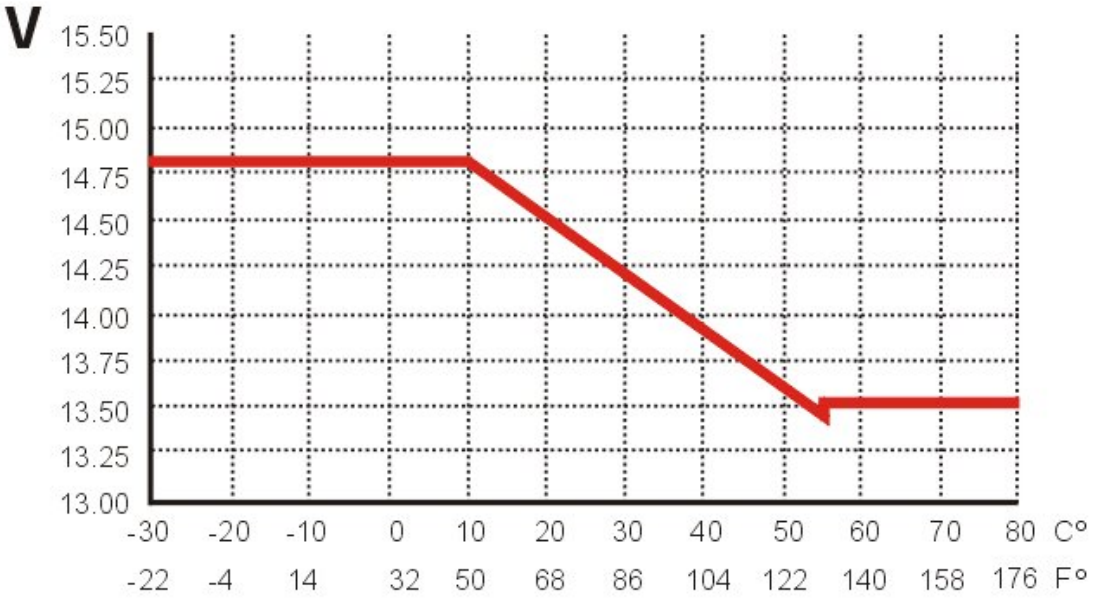
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the battery voltage. The central electronic module (CEM) uses the prevailing outside temperature to calculate the voltage at which the battery should be charged
- Switch on a few major power consuming components, such as the blower fan.

Check that the voltage is within the limits of 13.5-14.9 V. Try at different engine speeds (RPM).



Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking battery voltage

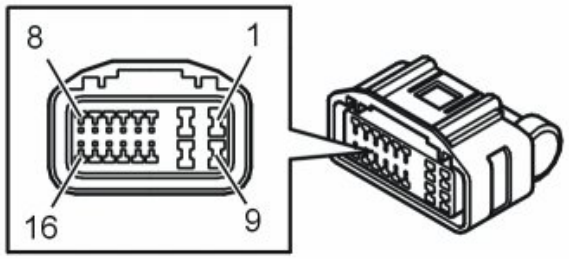
Checking the power supply and ground at rear electronic module (REM)

Check the connectors for the Rear electronic module (REM) for contact resistance and oxidation.

Check the connection for voltage feed (30-feed) from the battery to Rear electronic module (REM) (screw connection) for contact resistance and oxidation. Also check the connections for the fuse to Rear electronic module (REM). For information about fuses, see the wiring diagram.
Check ground connection from Rear electronic module (REM) #12 (#D12) and ground connection for contact resistance and oxidation.
If no problem is found, replace the Rear electronic module (REM).
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off and compare the voltage feed to central electronic module (CEM) and Rear electronic module (REM) by clicking on the symbol for VCT2000.

The voltage for Rear electronic module (REM) and the Central electronic module (CEM) should be approximately the same.

Is the power supply OK?

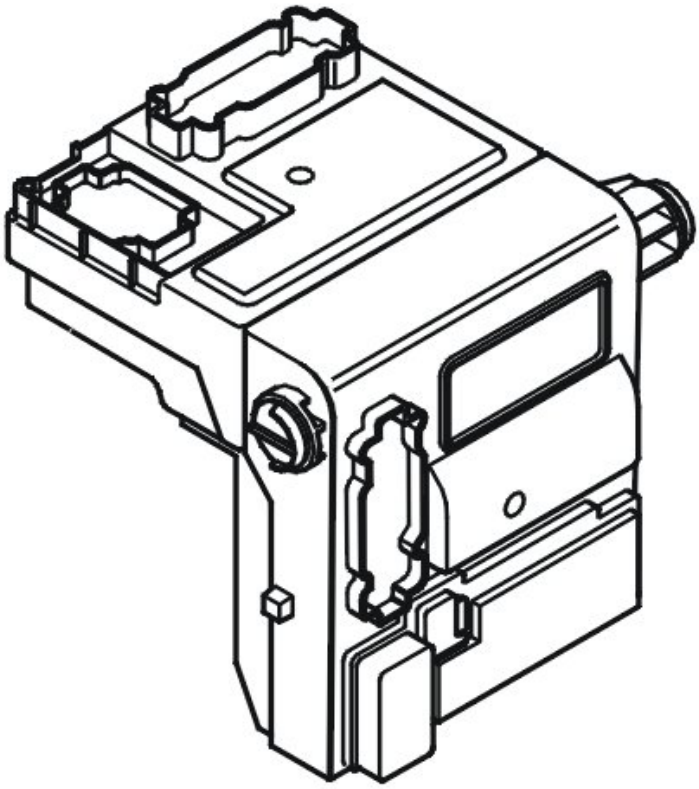
Yes - Fault Found

No - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1C05

Condition



The central electronic module (CEM) continuously monitors its own power supply.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power supply from the battery (30-supply) is too low.
The diagnostic trouble code (DTC) can be diagnosed with the ignition key in position II and with the engine running.

Substitute value
- None.

Possible source
- Poor battery charging
- The battery is fully discharged.

Fault symptom[s]
- Non definable symptom.

Signal Too Low

Signal too low

Checking the cable between the battery and generator (GEN)
- Check that the battery is charged
- Charge the battery if necessary.

Check the cable between generator (GEN) terminal #A1 and starter motor terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between the battery positive terminal and starter motor terminal #1. Check for an open-circuit. Check for a short-circuit to ground. Remedy as necessary.

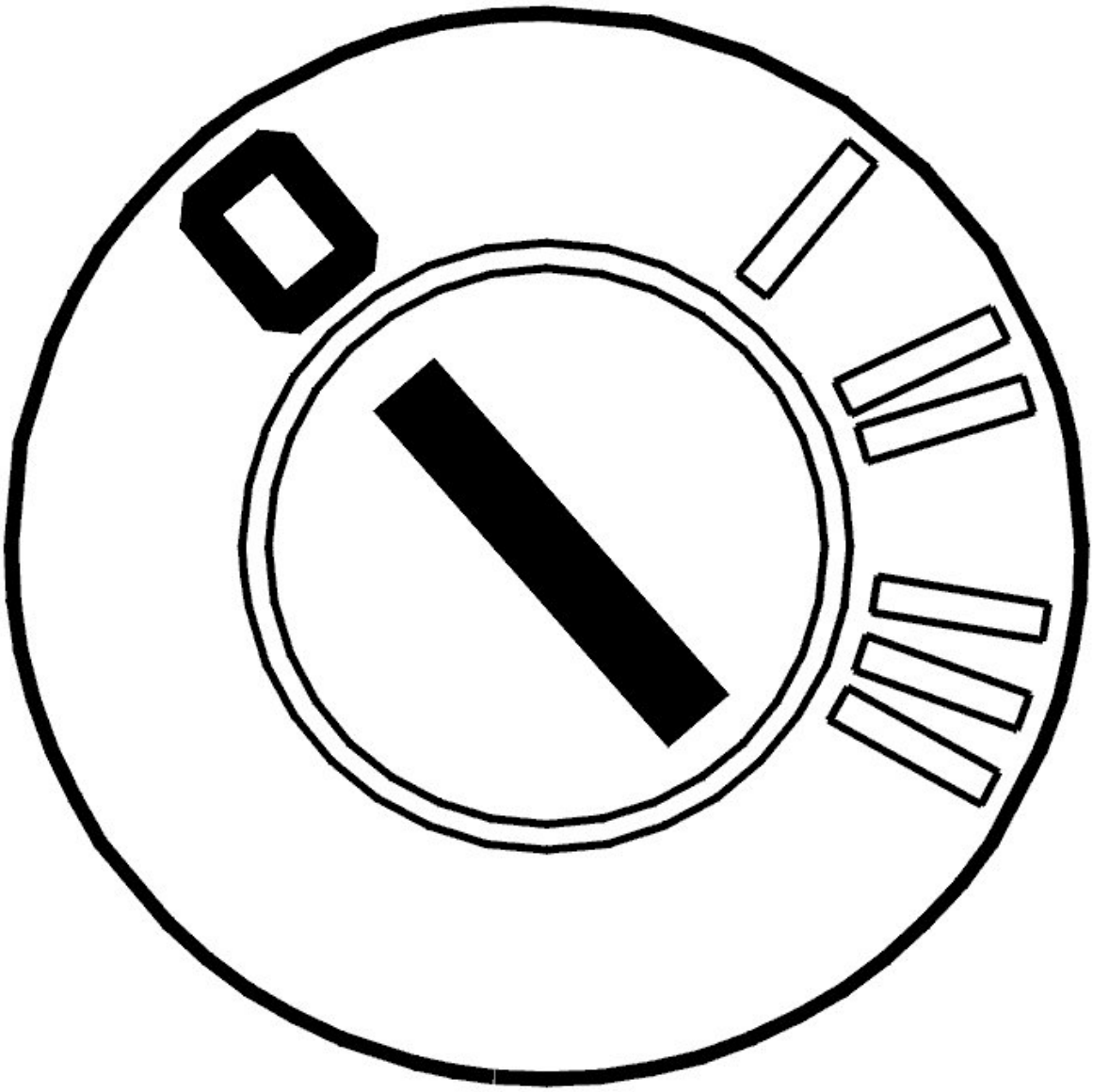
Other information
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

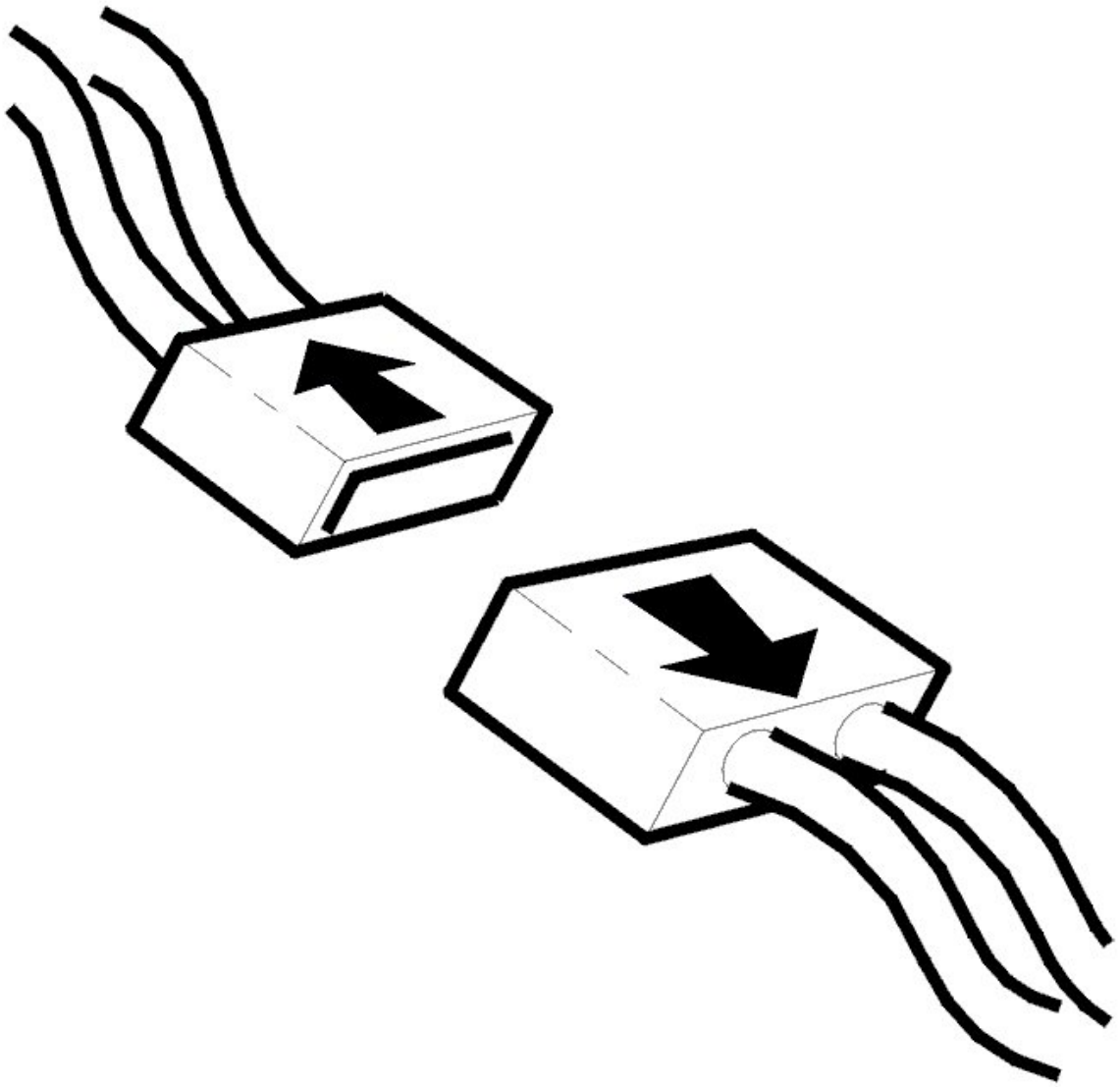
Was a fault detected?

Yes - Verification

No - Checking the power supply

Checking the power supply





- Ignition off
- Disconnect central electronic module (CEM) connector E.

Check central electronic module (CEM) connector E. Check for contact resistance and oxidation. Check for damage carefully.
Check the power supply to central electronic module (CEM) terminals #EA and #EB from the rear electronic module (REM). Also check the intermediate fuses. The voltage must be at least battery voltage minus 3 V.

Note! Also check the power supply from the battery to rear electronic module (REM) terminal #K1. Check for an open-circuit. Check for loose connections. Check for contact resistance and oxidation. Check the fuse.

Remedy as necessary.

Other information

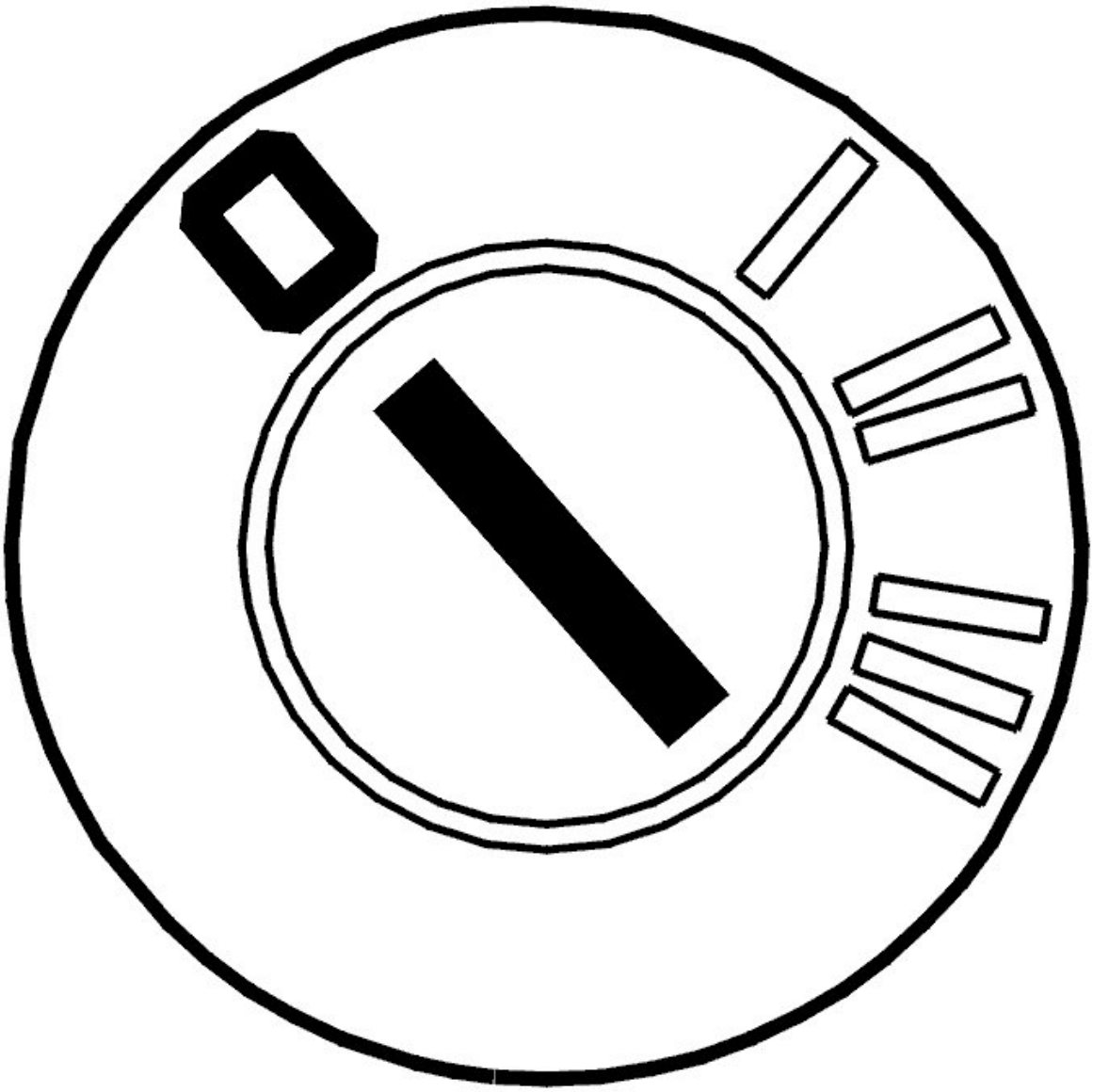
- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

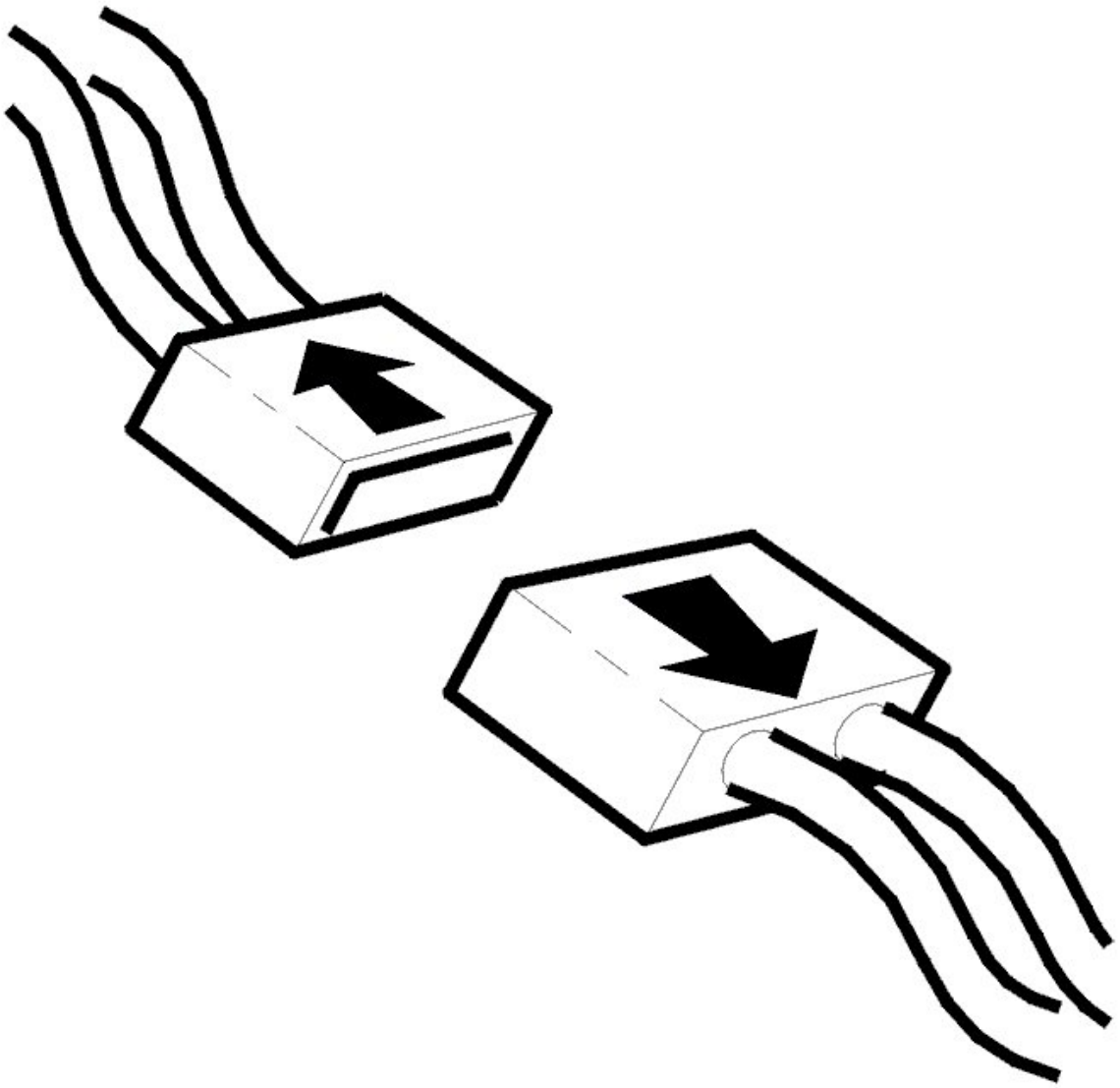
Was a fault detected?

Yes - Verification

No - Checking the ground terminal

Checking the ground terminal





- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check central electronic module (CEM) connector D. Check for contact resistance and oxidation. Check for damage carefully.
Check the ground lead between central electronic module (CEM) terminal #D6 (#6) and the ground terminal. Check for an open-circuit. Check for loose connections. Check for contact resistance and oxidation. With the ignition on, the drop in voltage between the ground connection for the central electronic module (CEM) and the ground terminal must not be greater than 0.5 V.
Remedy as necessary.

Other information

- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Checking the battery

Checking the battery

Check the condition of the battery.

Is the battery OK?

Yes - Checking the generator (GEN)

No - Replacing battery

Replacing battery

Replace the battery.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

Continue - Verification

Checking the generator (GEN)

Check that the generator (GEN) is working correctly.
Remedy as necessary.

Other information

- Replace the generator (GEN) for gasoline engines, see: Generator, replacement See: Starting and Charging/Charging System/Alternator/Service and Repair
- Replace the generator (GEN) for diesel engines, see: Generator (GEN), replacing See: Starting and Charging/Charging System/Alternator/Service and Repair

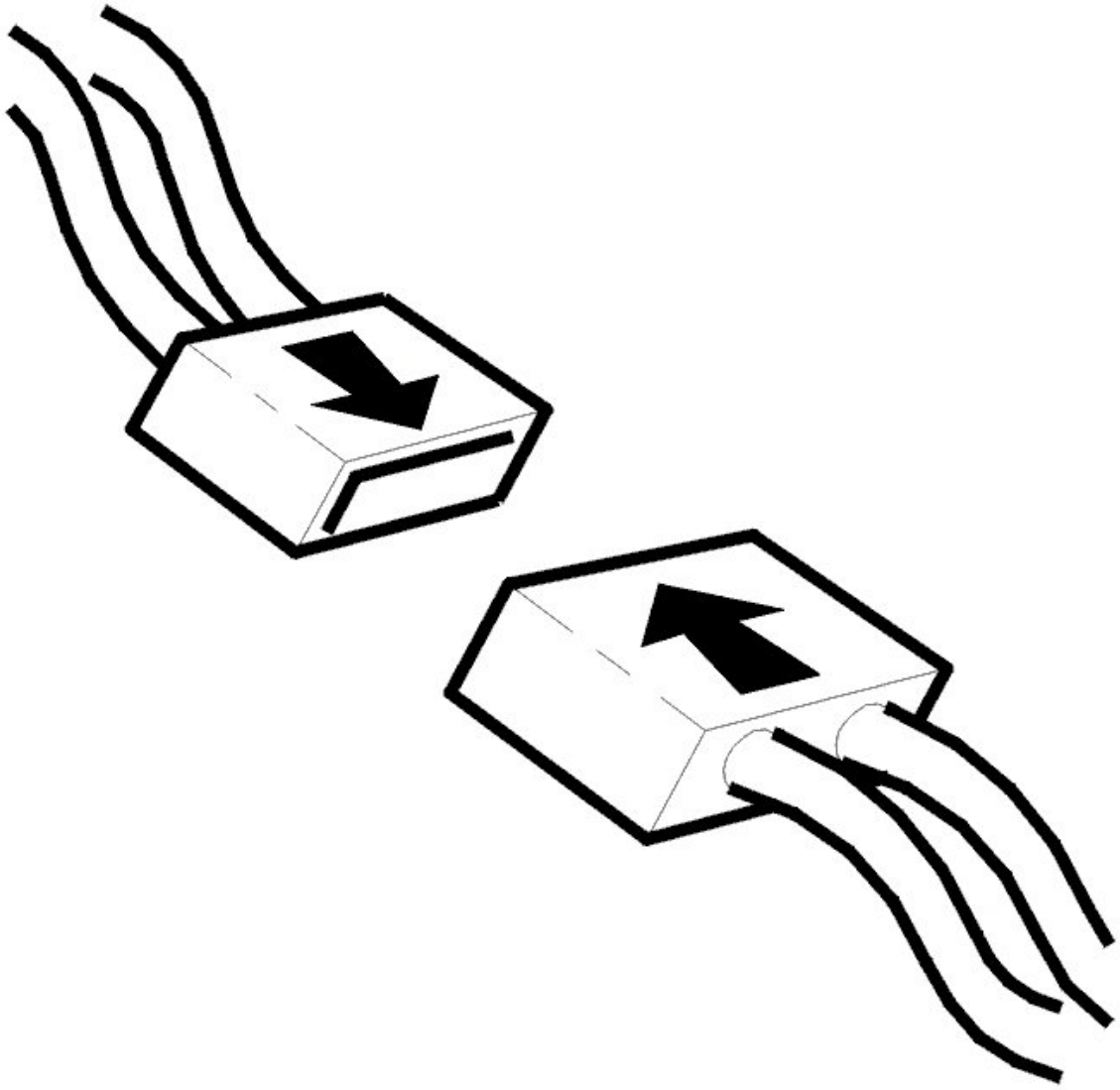
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Start the engine. Allow the engine to idle for at least 5 minutes.

Check the power supply to the central electronic module (CEM). The voltage must be at least battery voltage minus 3 V.

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

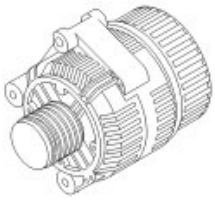
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable between the battery and generator (GEN)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1C06

Condition



The central electronic module (CEM) communicates with the alternator control module (ACM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the alternator control module (ACM) indicating an electrical fault in the generator (GEN).
The diagnostic trouble code (DTC) can be diagnosed at engine speeds (RPM) above 600 rpm.

Substitute value
- None.

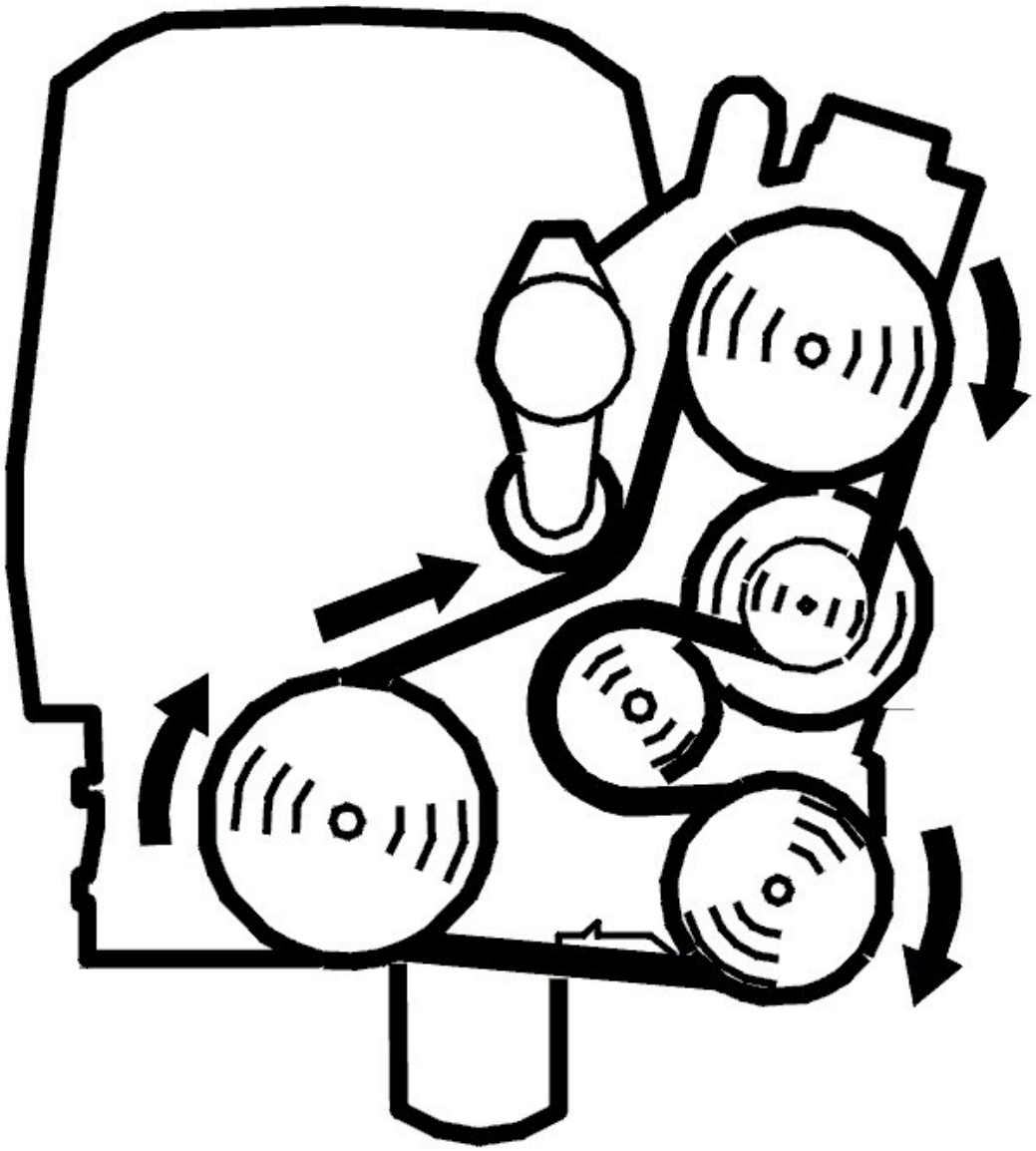
Possible source
- A battery charger with too high charge voltage has been connected previously
- Worn brushes (carbon)
- Damaged alternator control module (ACM)
- Damaged generator (GEN).

Fault symptom[s]
- The "Generator not charging" warning lamp is lit when the engine is running
- The battery discharges
- Low rotation speed in the starter motor
- The electrolyte in battery boils with the engine running
- The headlamp bulb blows.

Electrical Fault

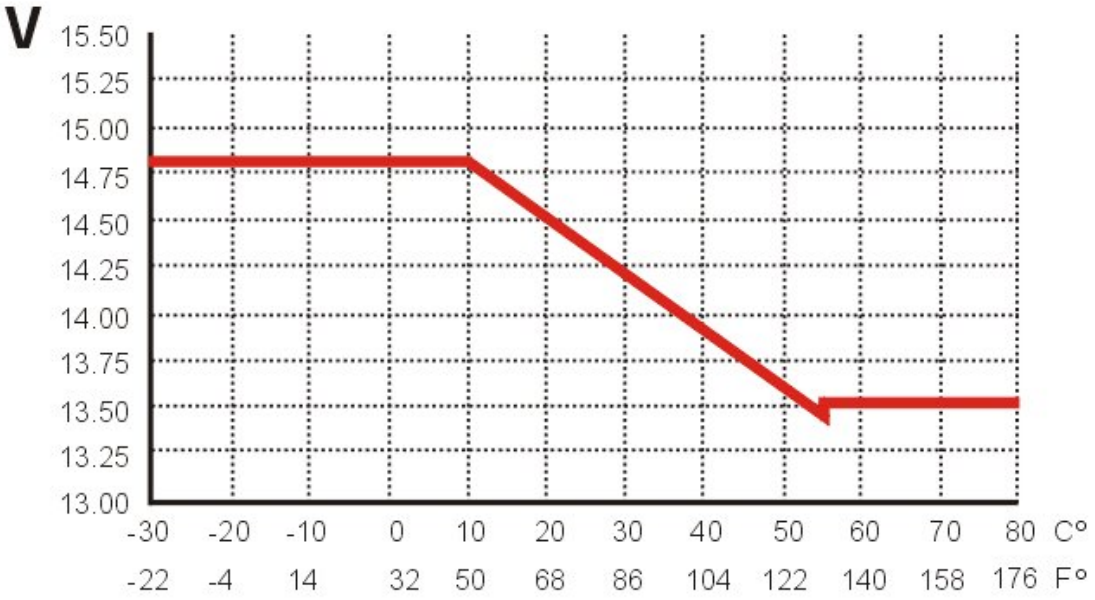
Electrical fault

Checking battery voltage



- Start the engine
- Read off the battery voltage. The central electronic module (CEM) uses the prevailing outside temperature to calculate the voltage at which the battery should be charged
- Switch on a few major power consuming components, such as the blower fan.

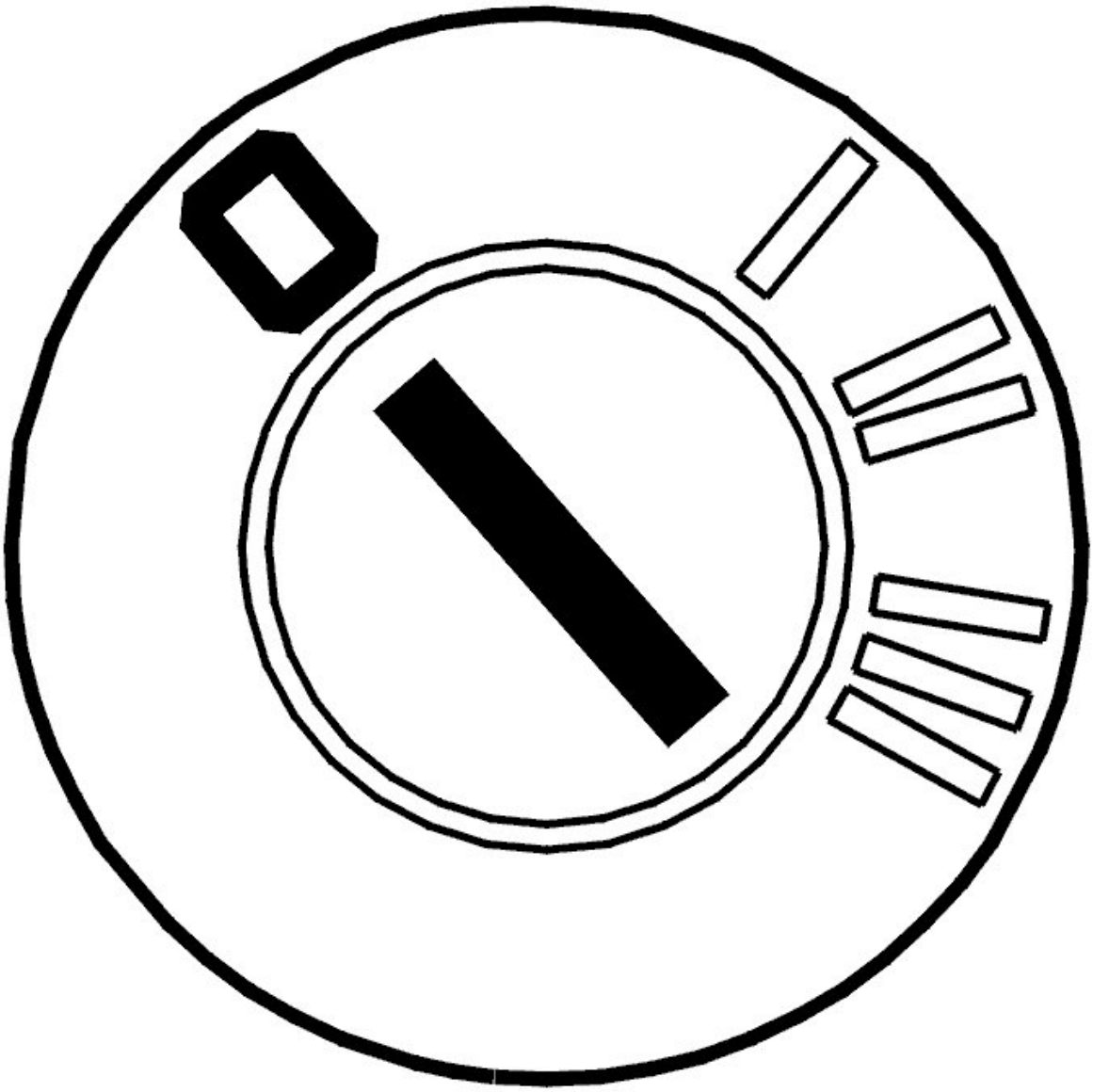
Check that the voltage is within the limits of 13.5-14.9 V. Try at different engine speeds (RPM).
The fault is permanent if the voltage is outside the permitted range.
If the voltage is within the permitted range, the fault was present previously but is not active at the moment, i.e. an intermittent fault.



Select Continue

Continue - Checking the component

Checking the component

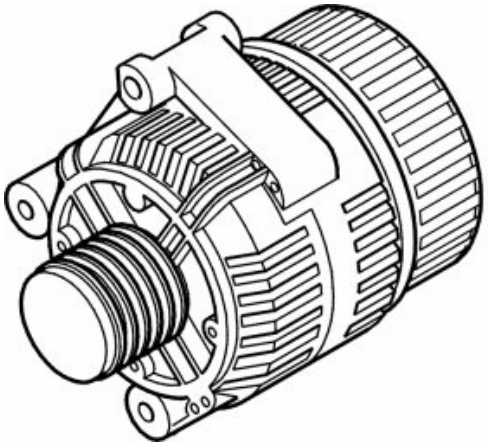


- Ignition off.

Check the carbon brushes. If the brushes are worn, replace the alternator control module (ACM). Check that the brushes can move in the regulator housing. The brushes are lightly sprung. At the same time, check the slip rings. Replace the generator (GEN) if they are worn out.
If the brushes and slip rings appear to be OK, try a new alternator control module (ACM) (charge regulator). If this does not help, try a new generator (GEN).
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



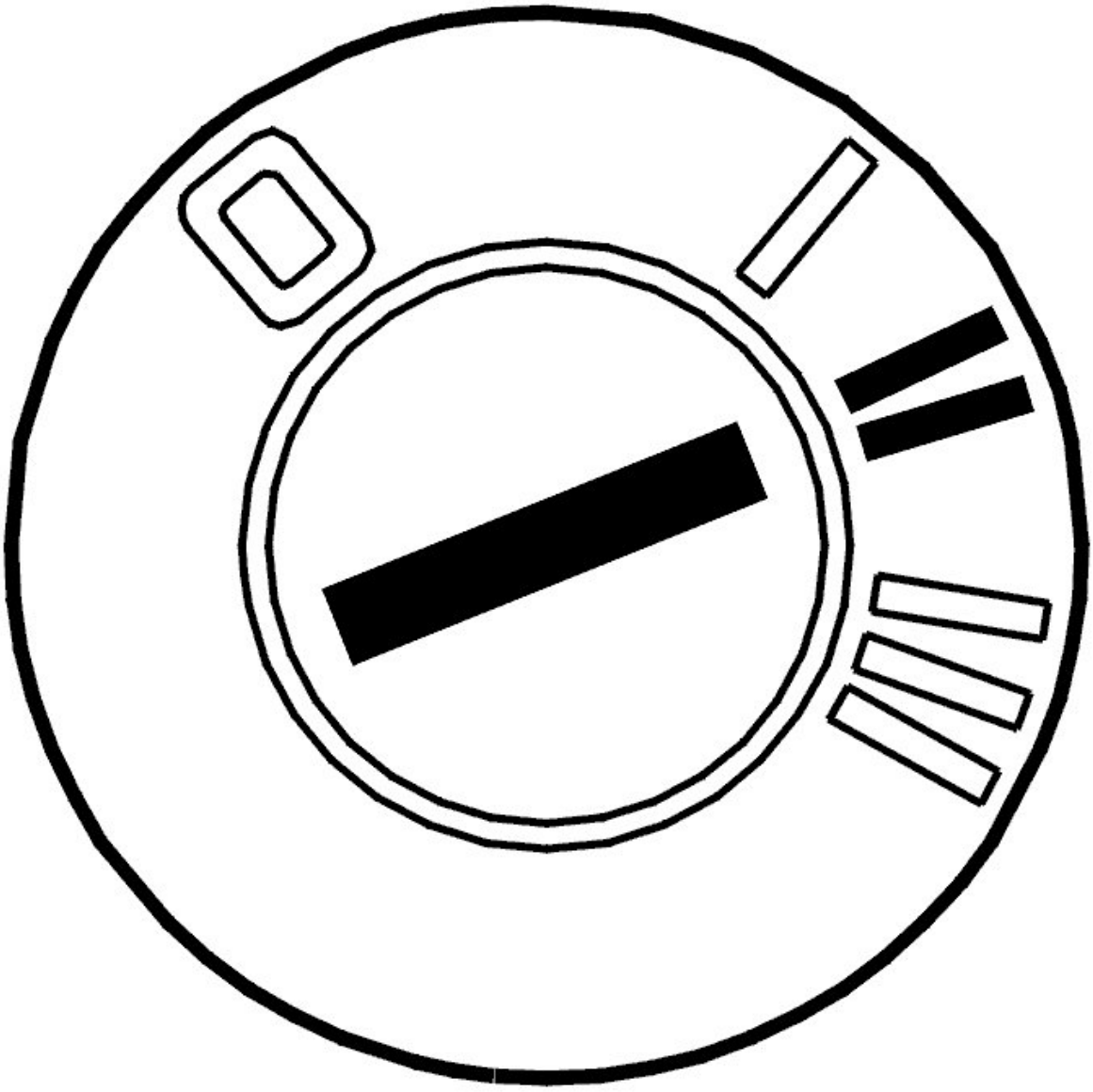
Continue - Verification

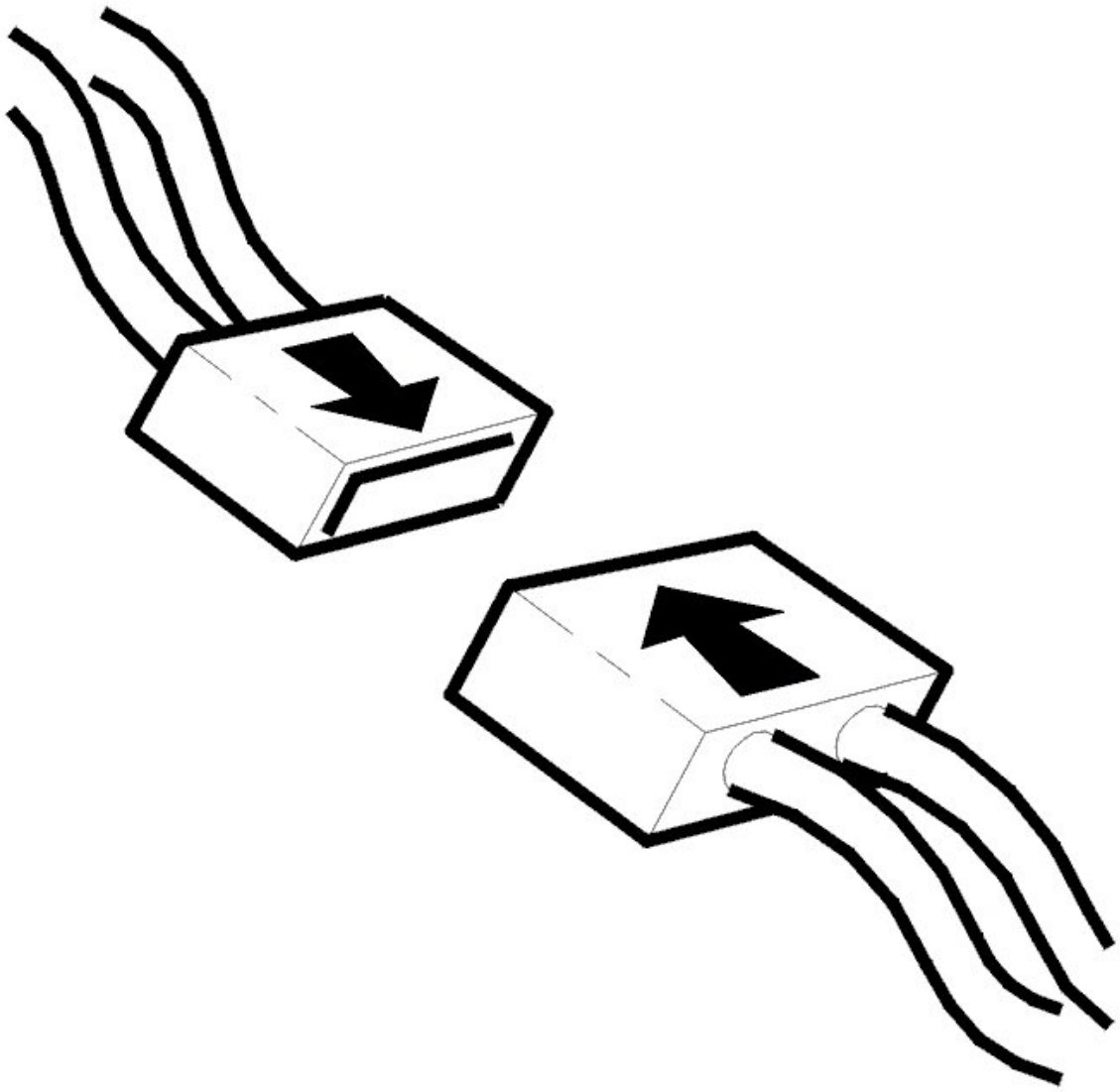
Verification

Verification

Verification

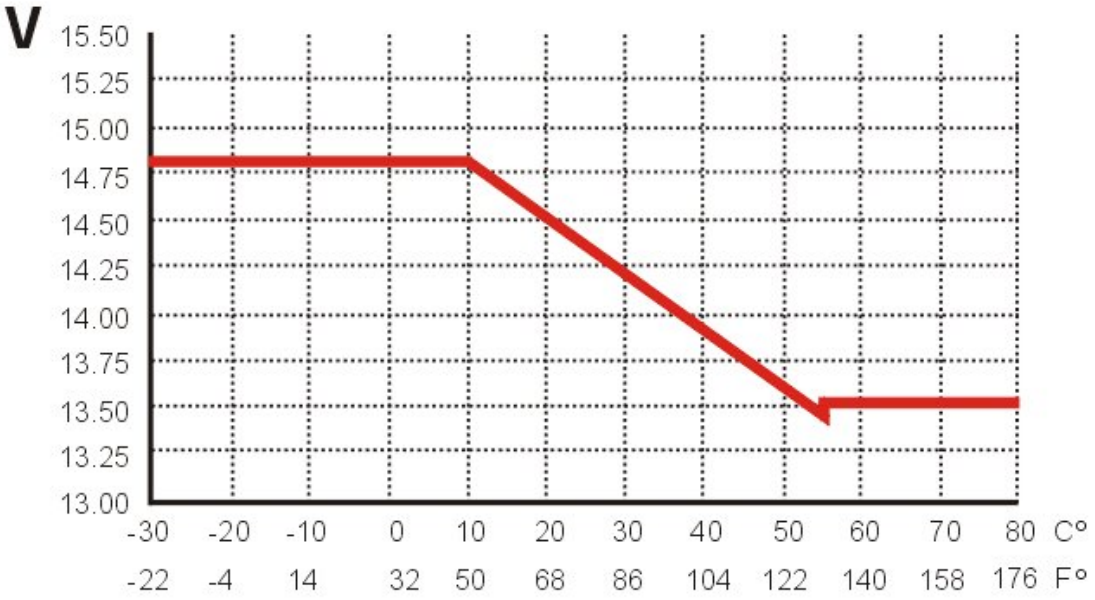
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the battery voltage. The central electronic module (CEM) uses the prevailing outside temperature to calculate the voltage at which the battery should be charged
- Switch on a few major power consuming components, such as the blower fan.

Check that the voltage is within the limits of 13.5-14.9 V. Try at different engine speeds (RPM).



Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

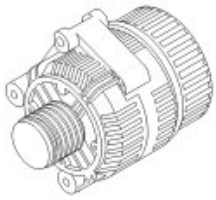
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking battery voltage

CEM-1C07

Diagnostic trouble code (DTC) information CEM-1C07

Condition



The central electronic module (CEM) communicates with the alternator control module (ACM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the alternator control module (ACM) indicating overheating in the generator (GEN).
The diagnostic trouble code (DTC) can be diagnosed at engine speeds (RPM) above 600 rpm.

Substitute value
- None.

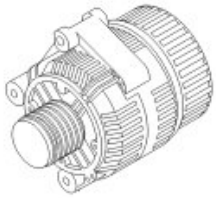
Possible source
- The air ducts for the generator (GEN) are blocked.

Fault symptom[s]
- The "Generator not charging" warning lamp is lit when the engine is running
- The battery discharges
- Low rotation speed in the starter motor.

CEM-1C08

Diagnostic trouble code (DTC) information CEM-1C08

Condition



The central electronic module (CEM) communicates with the alternator control module (ACM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the alternator control module (ACM) indicating an internal mechanical fault in the generator (GEN).
The diagnostic trouble code (DTC) can be diagnosed at engine speeds (RPM) above 600 rpm.

Substitute value
- None.

Possible source
- Defective auxiliaries belt and belt tensioner
- Damaged freewheel

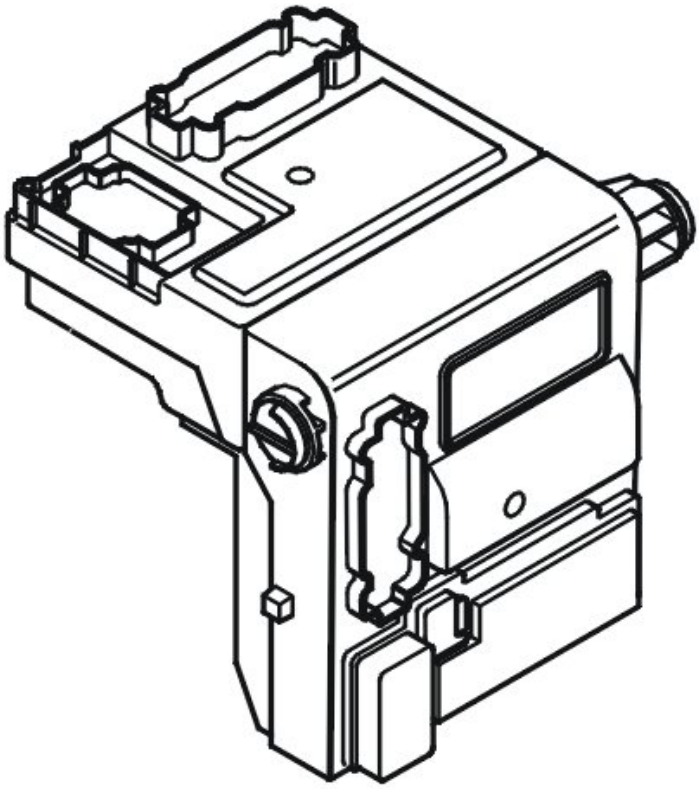
- Damaged generator (GEN).

Fault symptom[s]
- The "Generator not charging" warning lamp is lit when the engine is running
- The battery discharges
- Low rotation speed in the starter motor
- Noise from the generator (GEN)
- Noise from the belt transmission
- The engine judders under acceleration.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D0A

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

Internal Fault

Internal fault

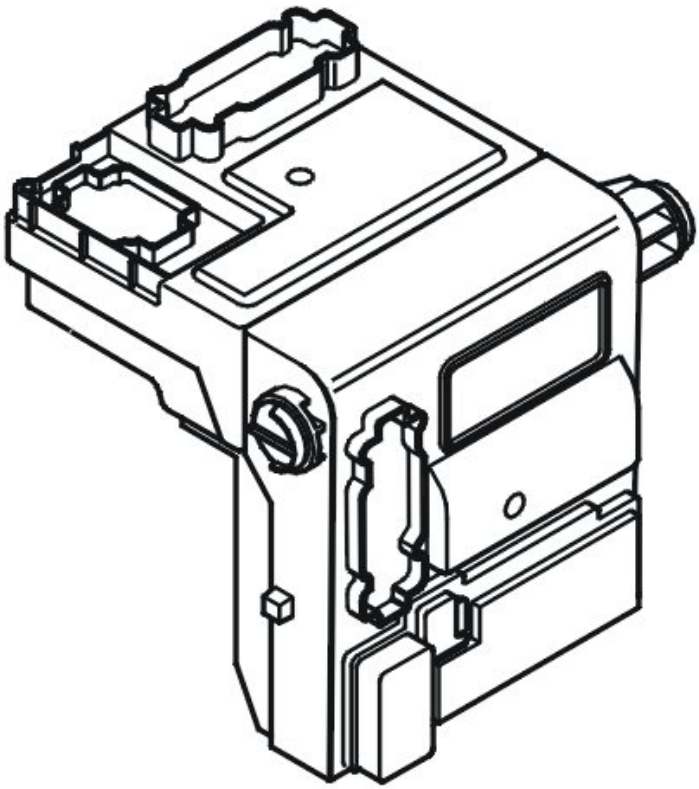
Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of

the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information

- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

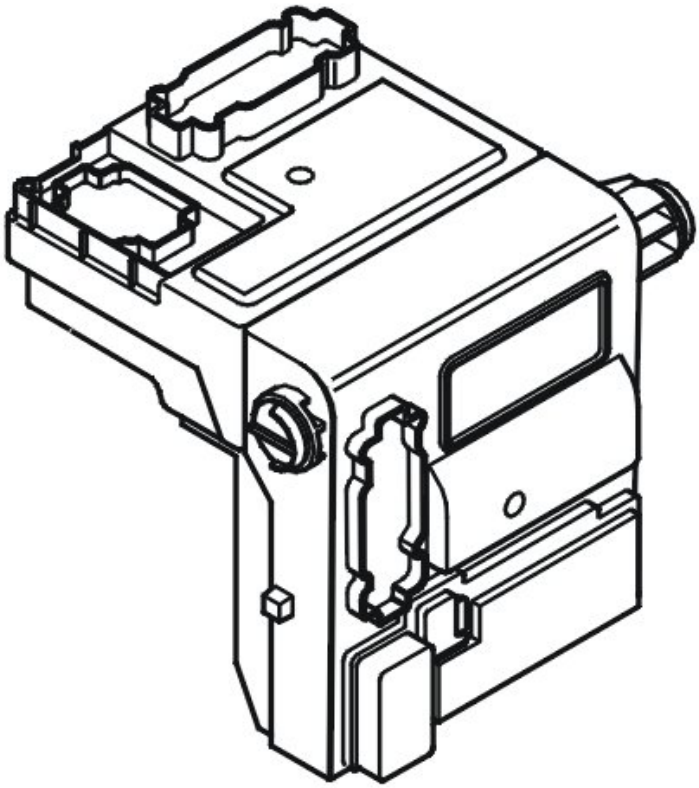
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D0B

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed for 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The clock in the information module is not working
- The parking heater does not operate.

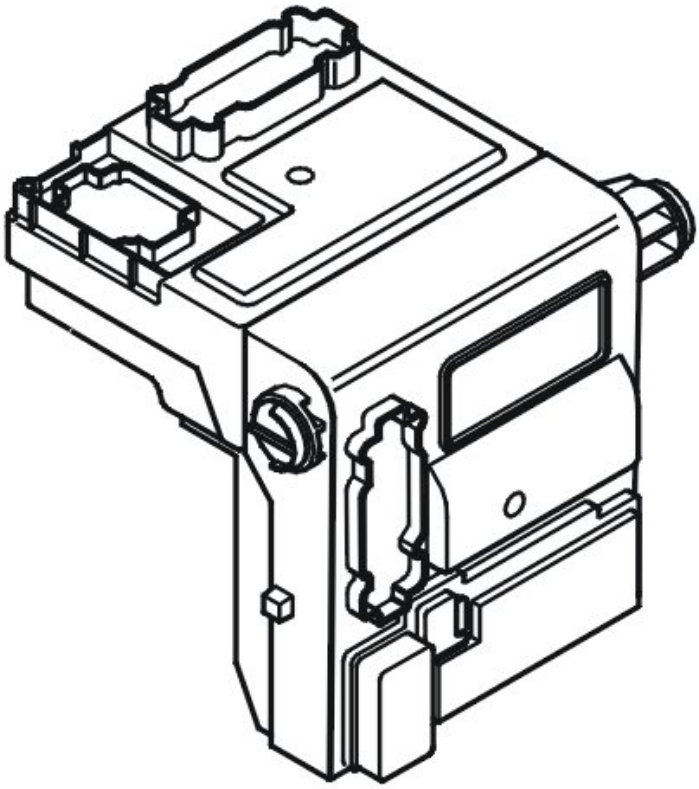
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

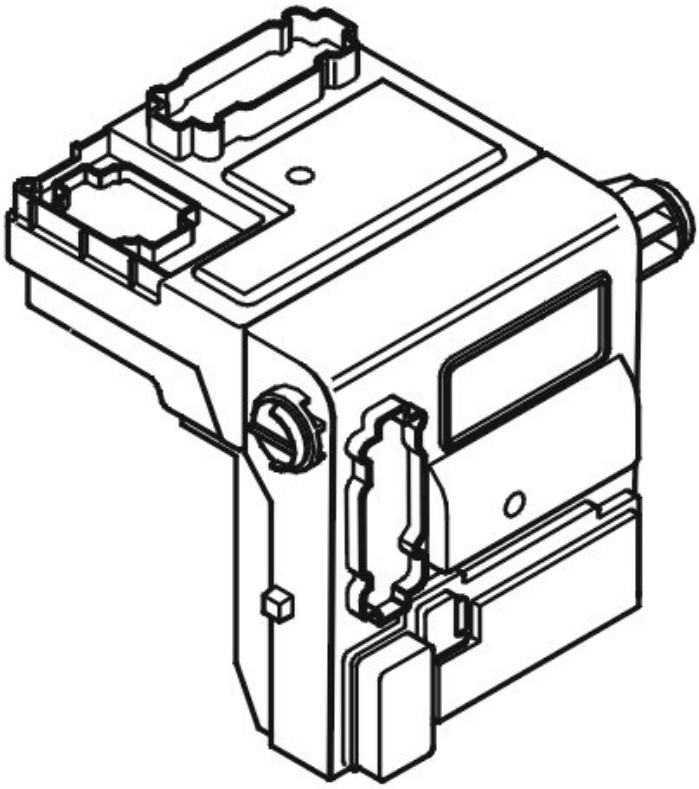
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D01

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

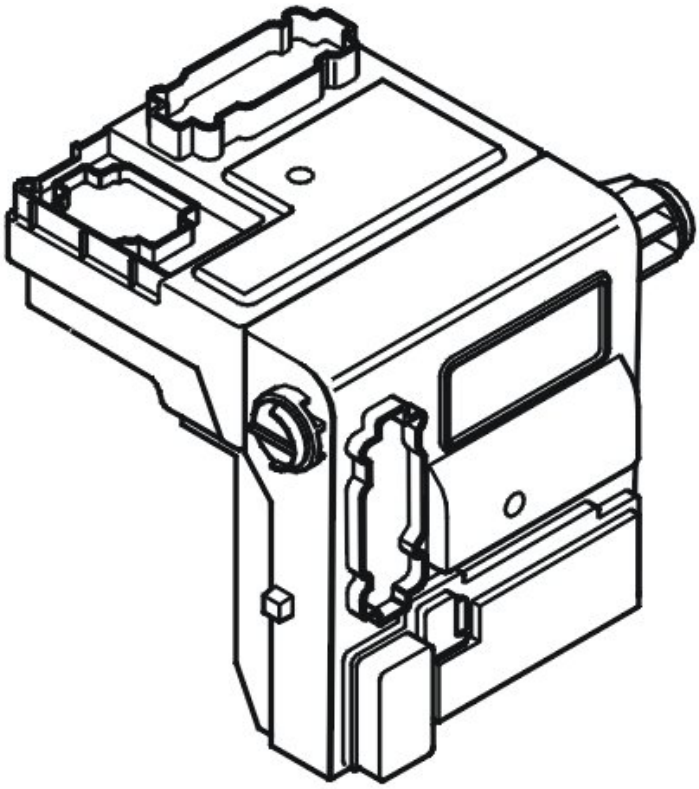
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

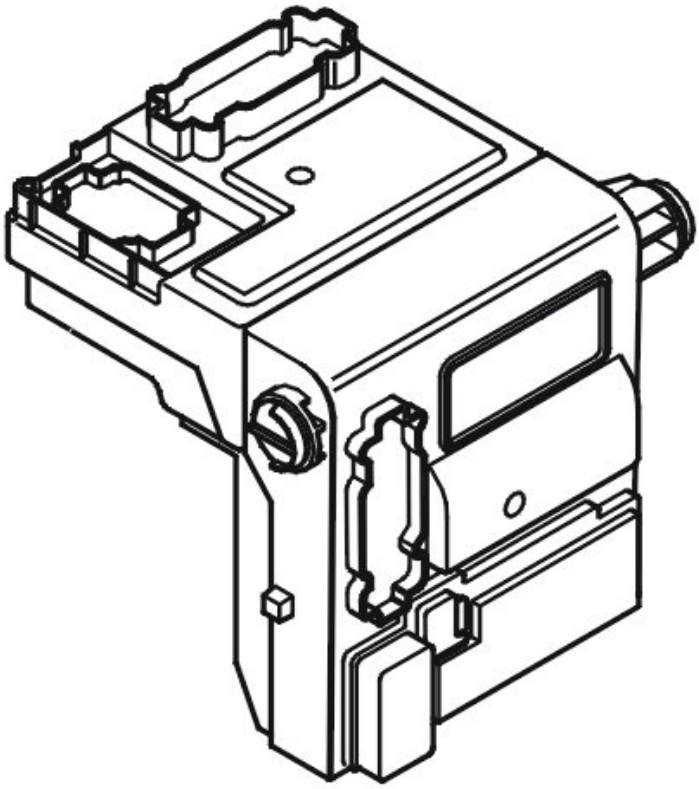
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D02

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal software fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

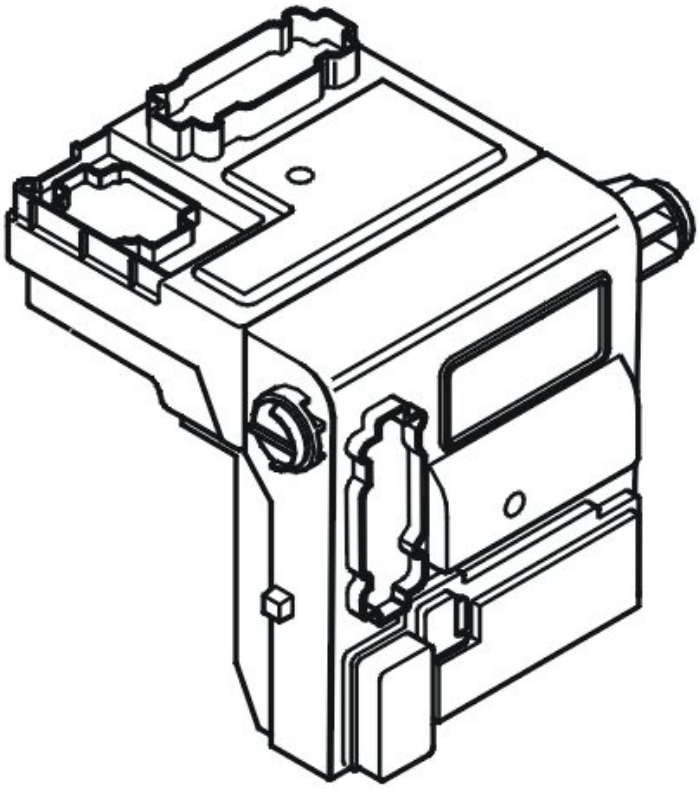
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

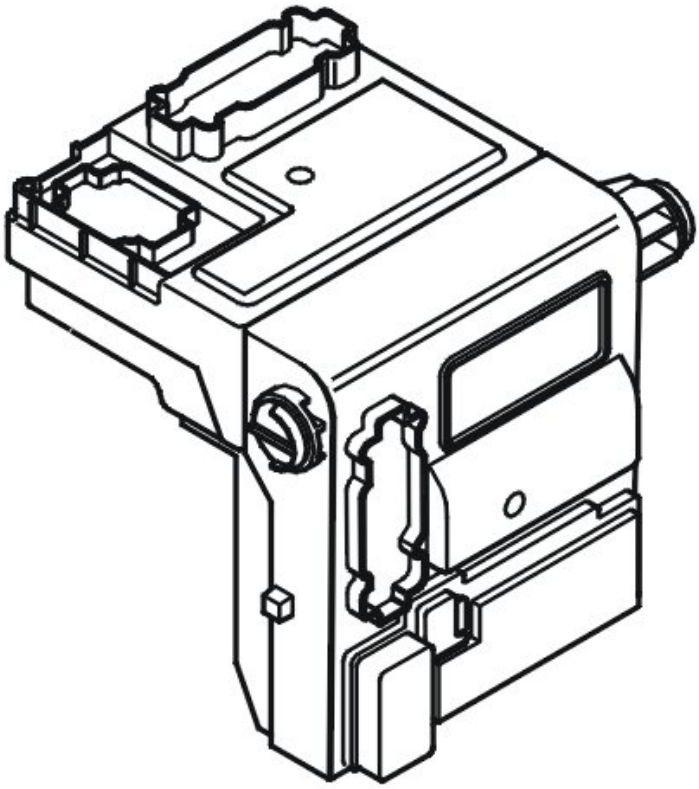
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D03

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the software download is not complete.
Other nodes in the CAN network store diagnostic trouble code (DTC) XXX-E003.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

Possible source
- The software download is not complete.

Fault symptom[s]
- No gauges working.

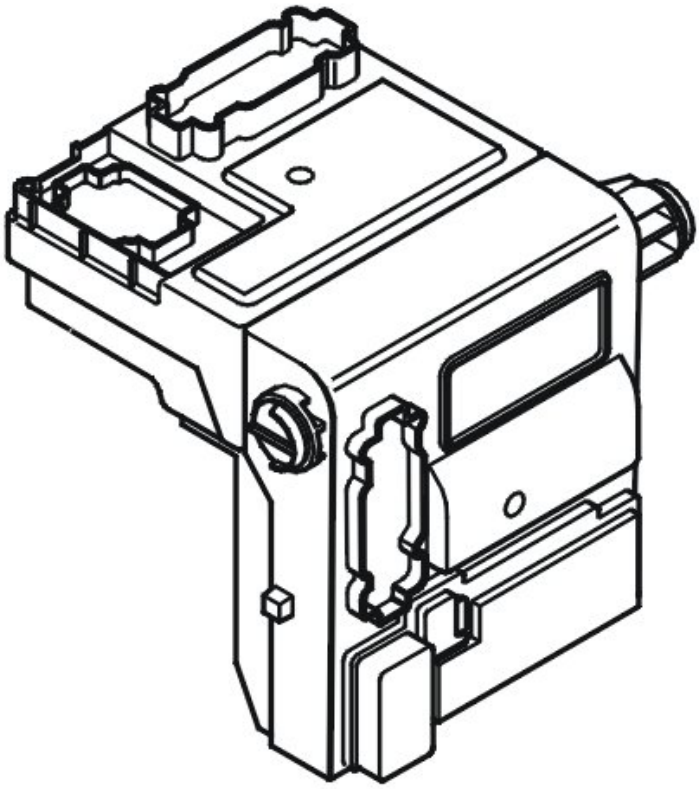
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Reprogram the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

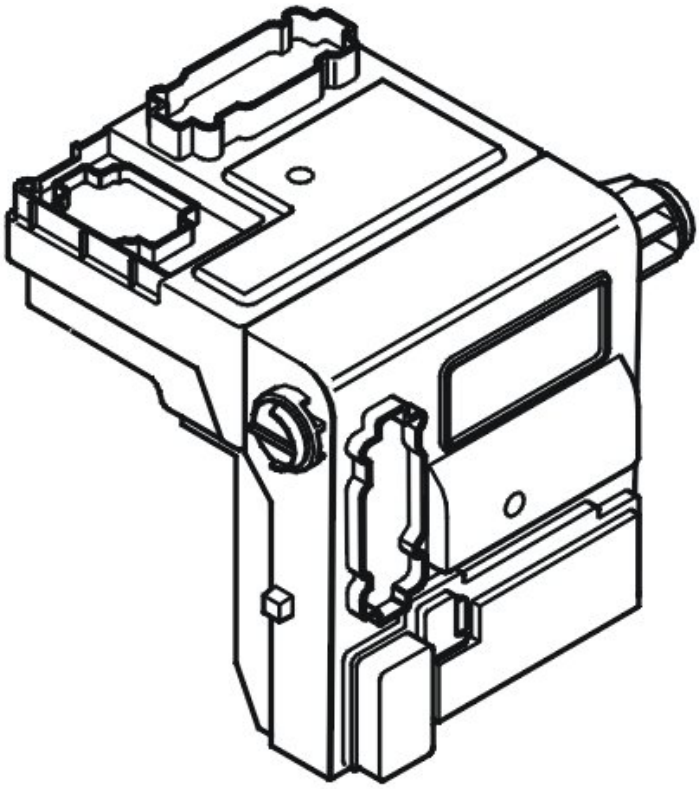
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D06

Condition



The central electronic module (CEM) checks the number of parameters in the vehicle configuration file is correct.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an incorrect number of parameters in the vehicle configuration file.
The diagnostic trouble code (DTC) can be detected when the central electronic module (CEM) is initialized after a reset.

Substitute value
- None.

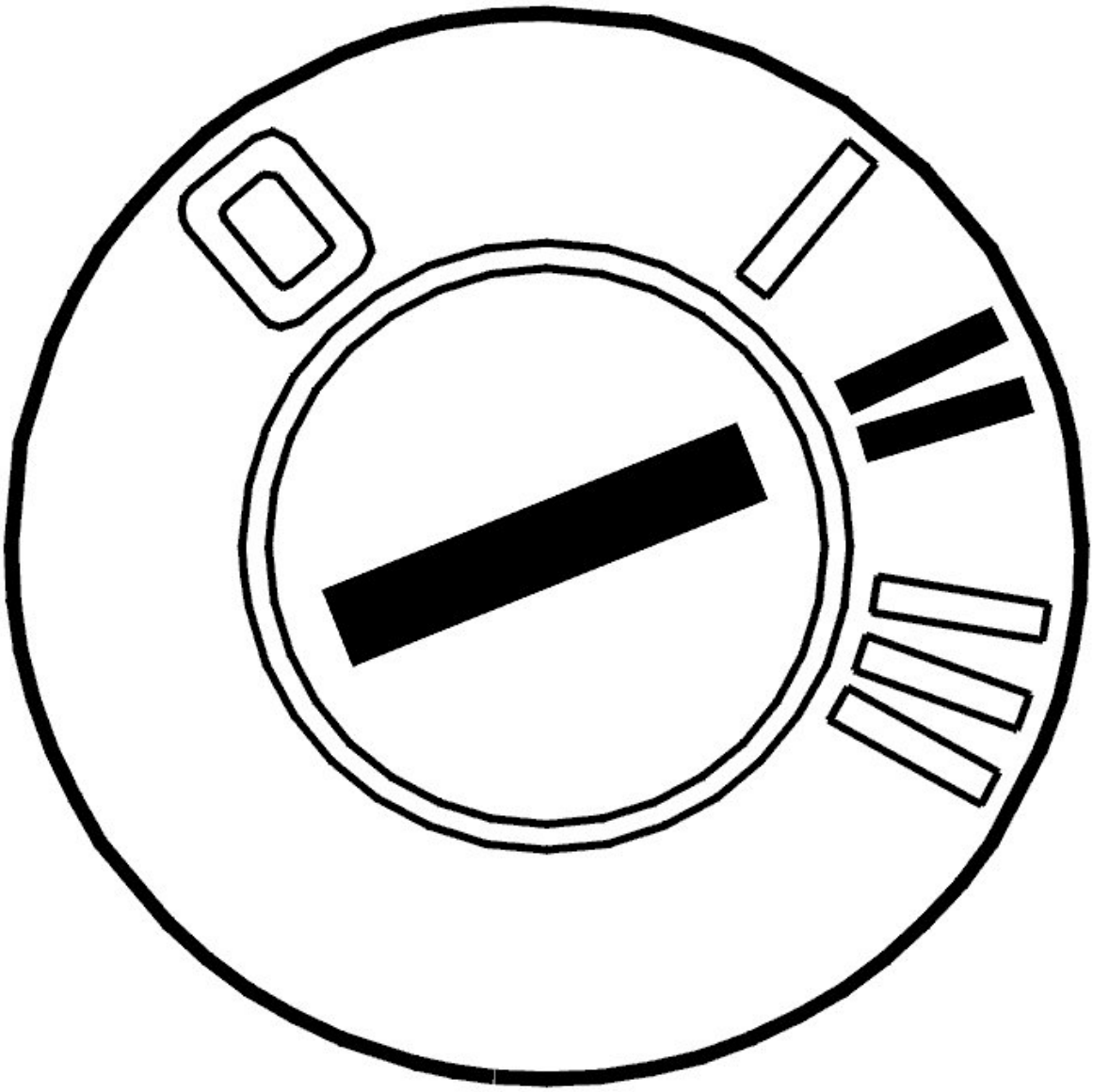
Possible source
- Incorrect number of parameters in the vehicle configuration file.

Fault symptom[s]
- None.

Configuration Fault

Configuration fault

Checking the programmed values



- Ignition on.

The control module has registered an incorrect number of parameters in the vehicle configuration file.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
The control module must be reprogrammed to remedy the fault.
The customer parameters must be read off, if not already been done, before the software is downloaded.
Read off and note the values.
These parameters must be re-entered using VIDA vehicle communication after programming.

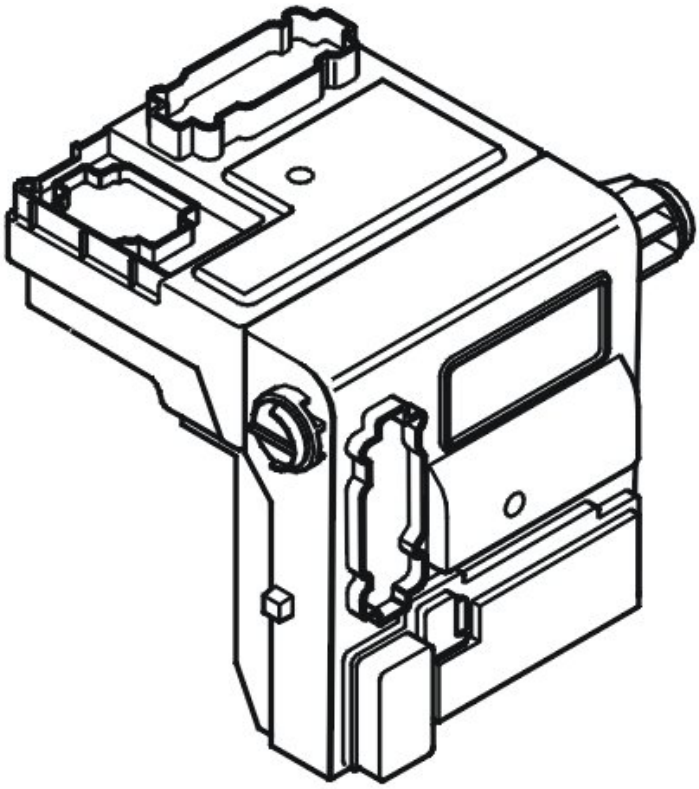
Select Continue

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D07

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

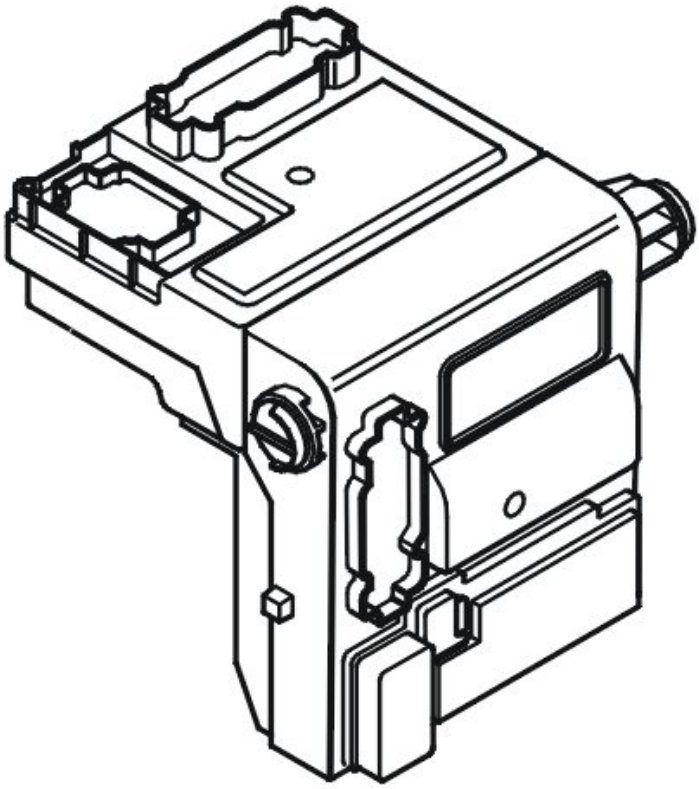
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

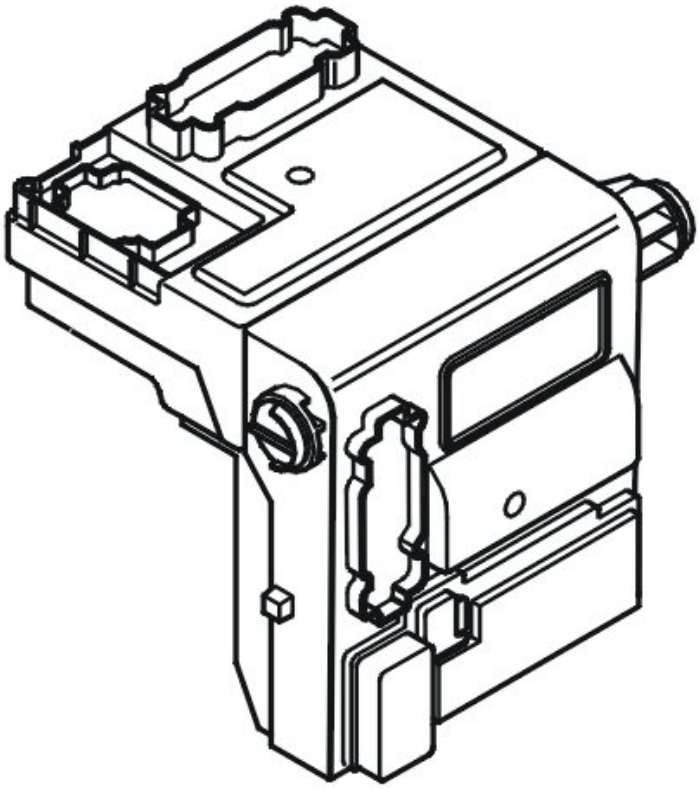
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D08

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

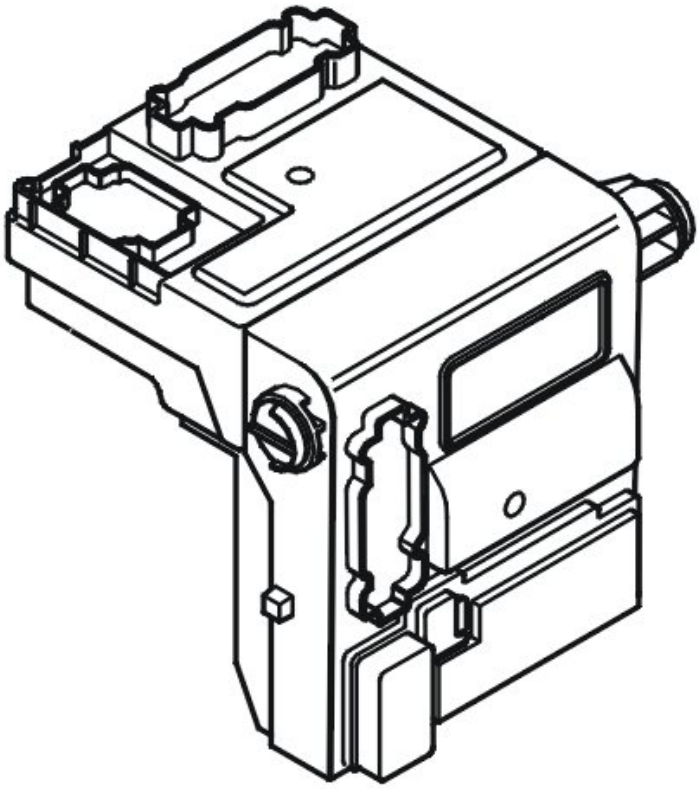
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

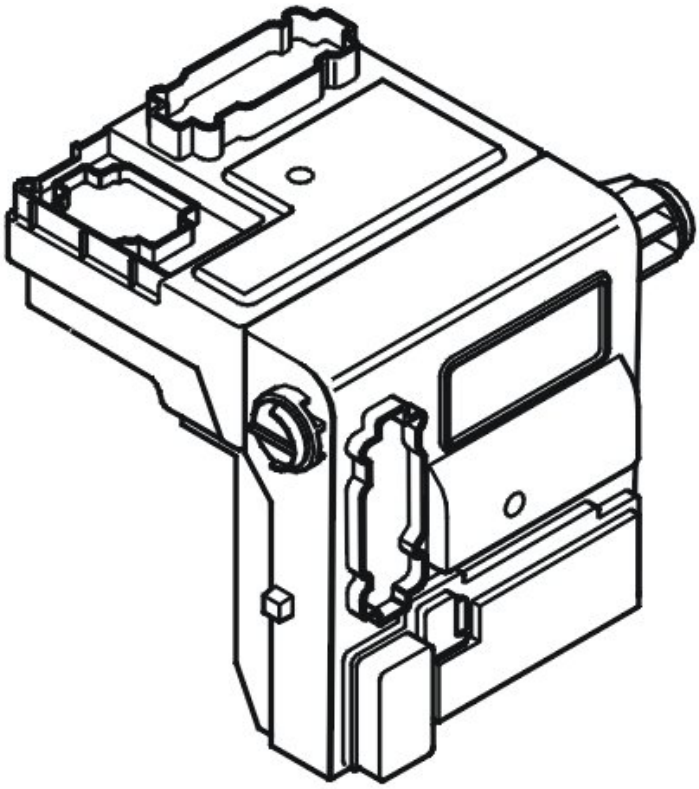
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1D09

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed for 5 minutes after the ignition has been switched off.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- No gauges are working
- The instrument lighting does not operate
- The turn signal lamps are not operating
- Poor performance.

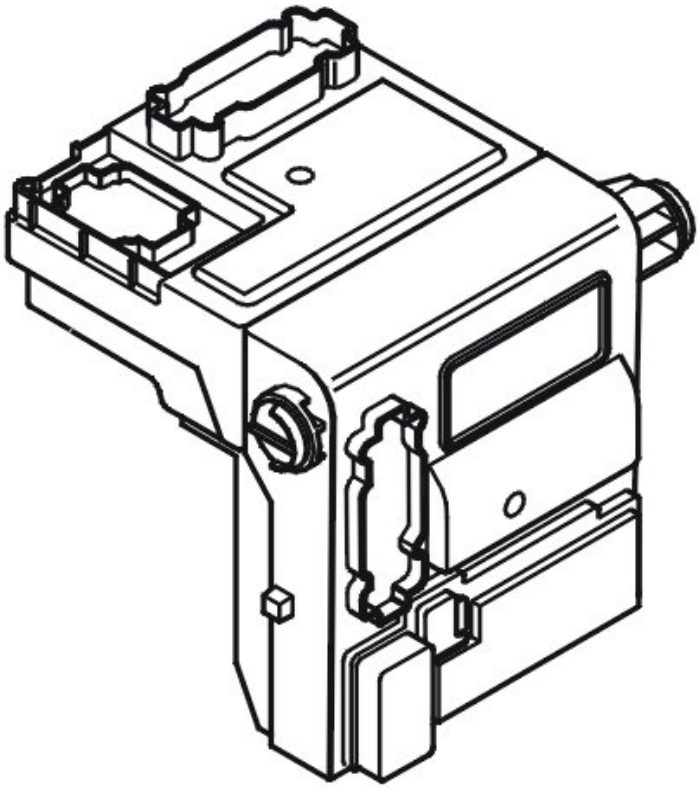
Internal Fault

Internal fault

Replacing the component

The central electronic module (CEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

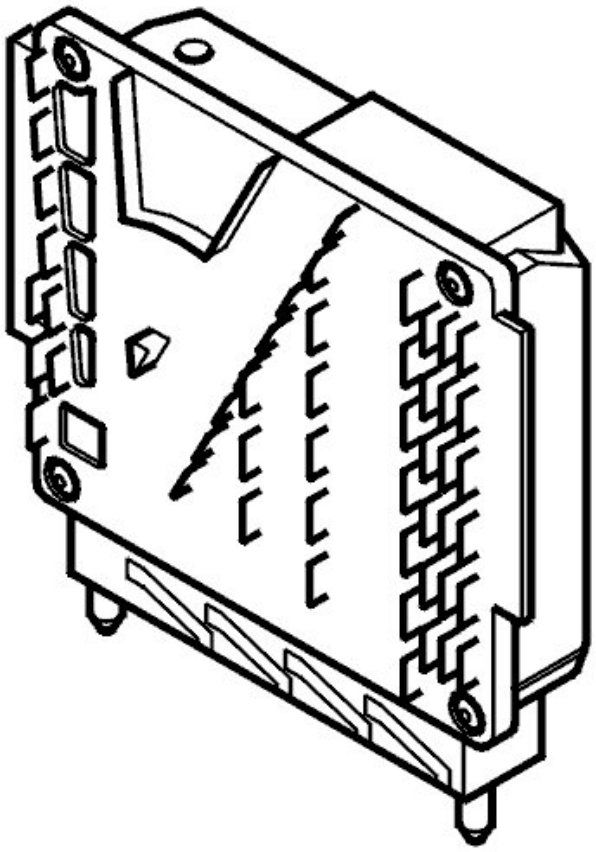
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1F00

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers faulty or modified software in the engine control module (ECM).

Substitute value
- None.

Possible source
- Faulty or modified software in the engine control module (ECM).

Fault symptom[s]
- None.

Faulty Signal

Faulty signal

Checking programming

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.

Note! The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the software in the engine control module (ECM) is faulty or modified. It is therefore important that no steps are taken to remedy modified software in the engine control module (ECM) without first consulting the customer. Neither may software be remedied if the software has been modified by the customer, but this is not the reason for the repair work.

Continue - Replacing software

Replacing software

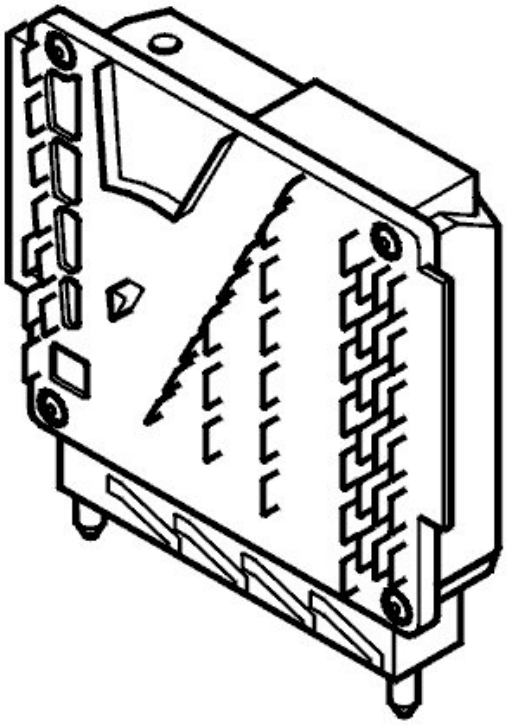
New software must be downloaded to remedy faulty or modified software in the engine control module (ECM).
Remedy as necessary.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-1F01

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers faulty or modified software in the transmission control module (TCM).

Substitute value
- None.

Possible source
- Faulty or modified software in the transmission control module (TCM).

Fault symptom[s]
- None.

Faulty Signal

Faulty signal

Checking programming

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.

Note! The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the software in the transmission control module (TCM) is faulty or modified. It is therefore important that no steps are taken to remedy modified software in the transmission control module (TCM) without first consulting the customer. Neither may software be remedied if the software has been modified by the customer, but this is not the reason for the repair work.

Continue - Replacing software

Replacing software

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

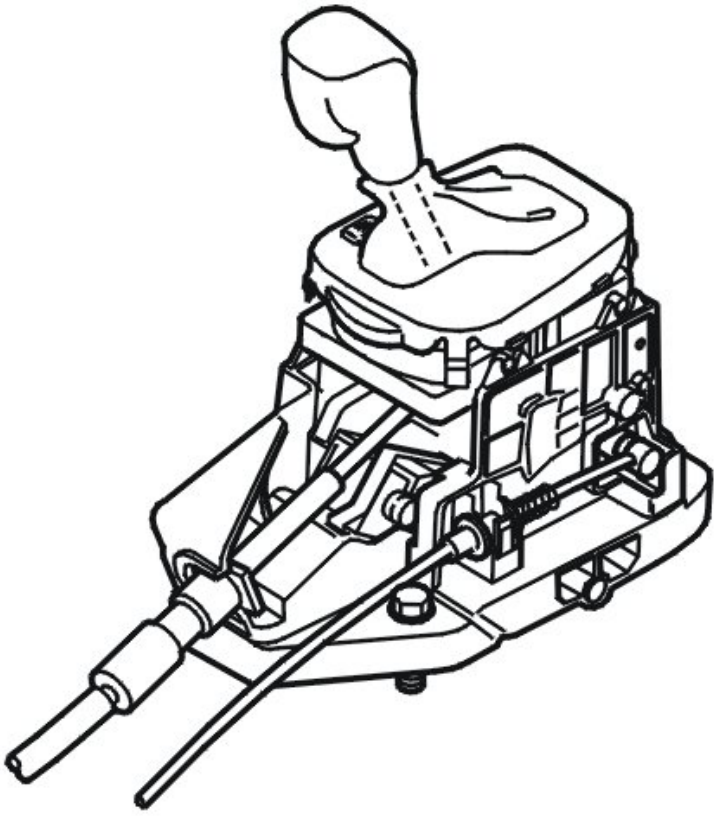
New software must be downloaded to remedy faulty or modified software in the transmission control module (TCM).
Remedy as necessary.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F02

Condition



The central electronic module (CEM) checks the function of the shift lock.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to battery voltage in the output signal for shift lock.
The relay for shift lock must be activated for the diagnostic trouble code (DTC) to be stored. The diagnostic trouble code (DTC) can be diagnosed in ignition positions I and II.

Substitute value
- None.

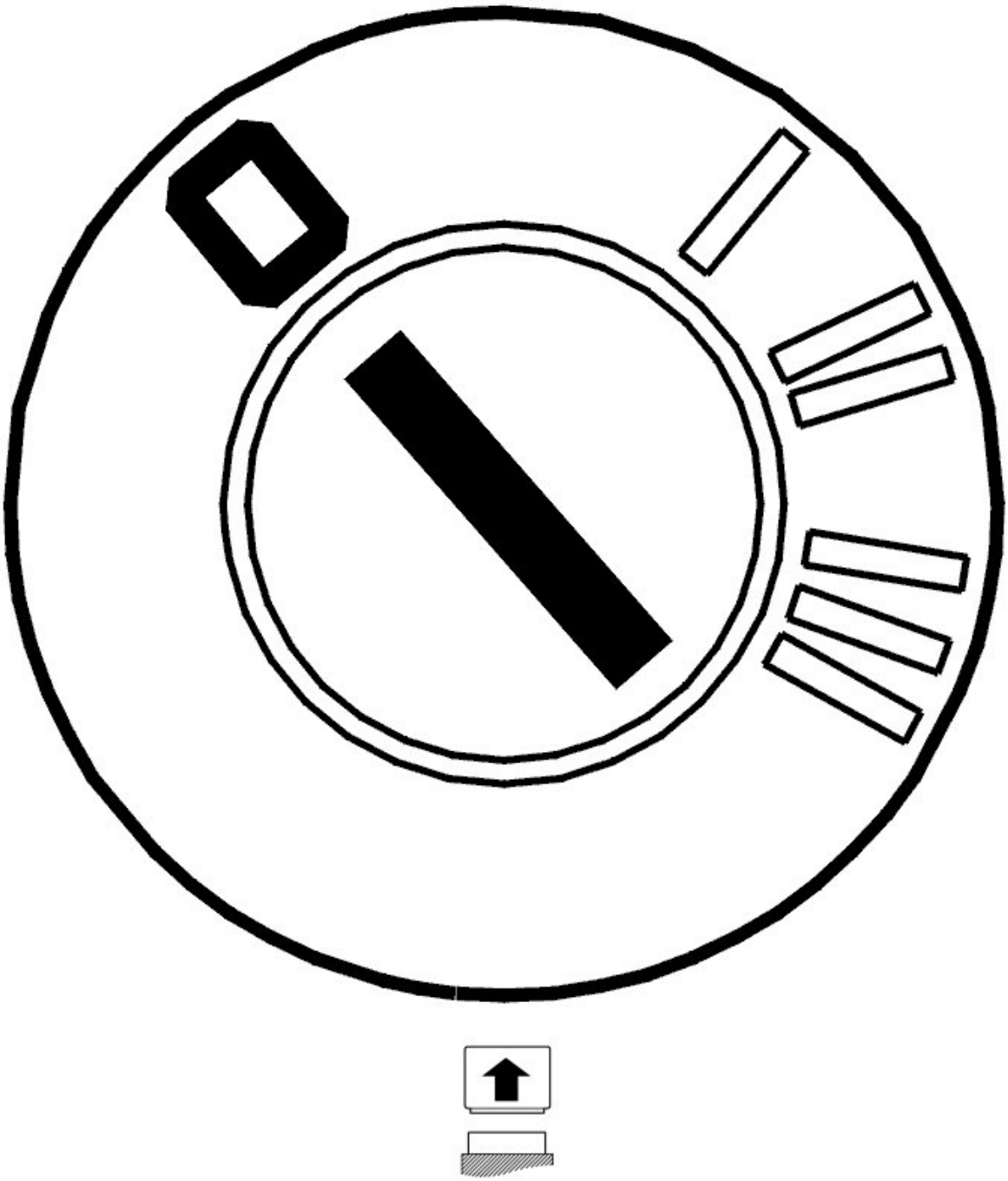
Possible source
- Short-circuit to the positive supply in the "inhibited shifting" output signal. The relay is not activated.

Fault symptom[s]
- The starter motor does not turn
- The engine does not start.

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between central electronic module (CEM) terminal #D23 (#23) and gear selector module (GSM) terminal #3.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Gear selector lever assembly, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Gear Selector Lever Assembly, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

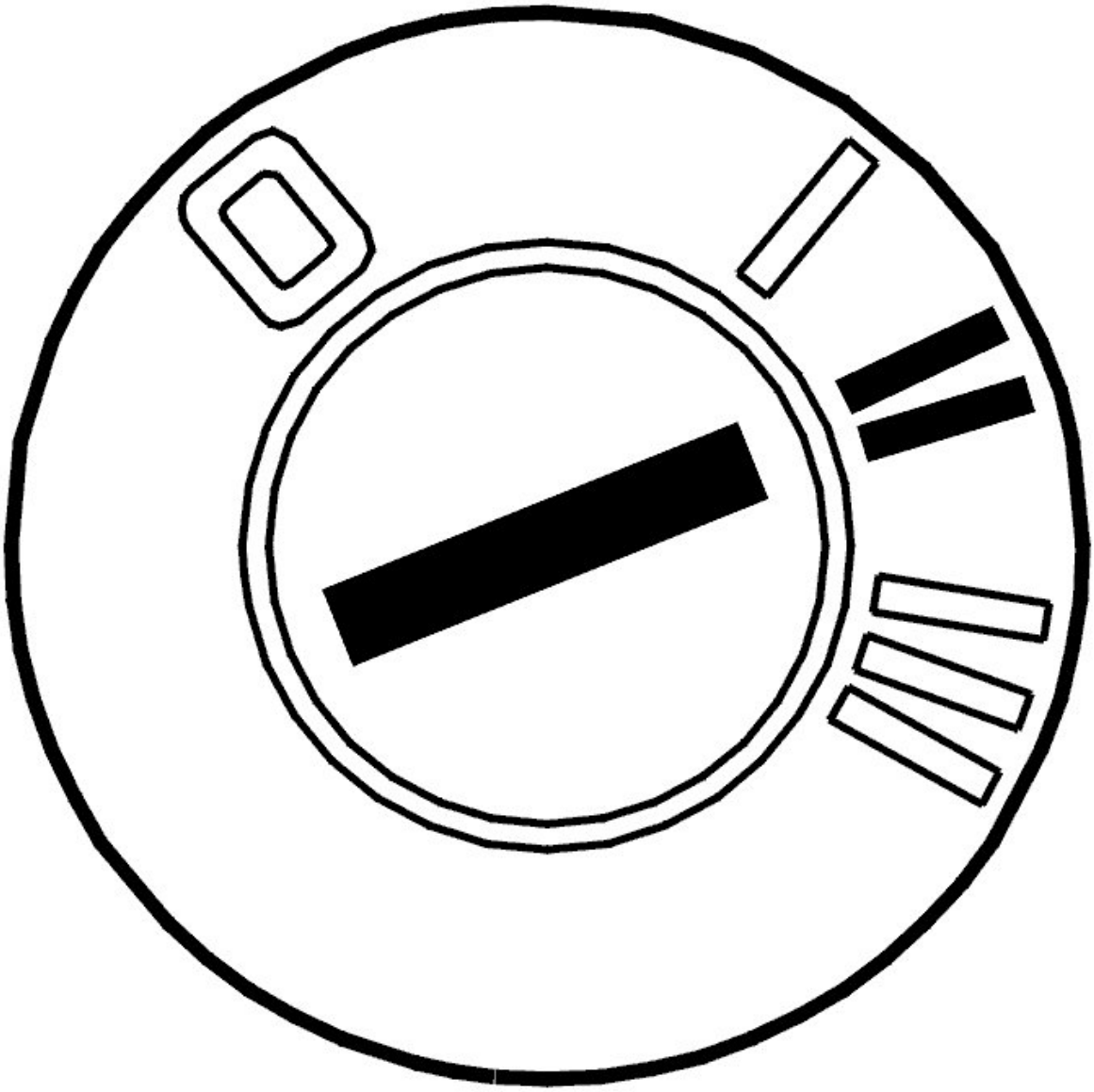
Continue - Verification

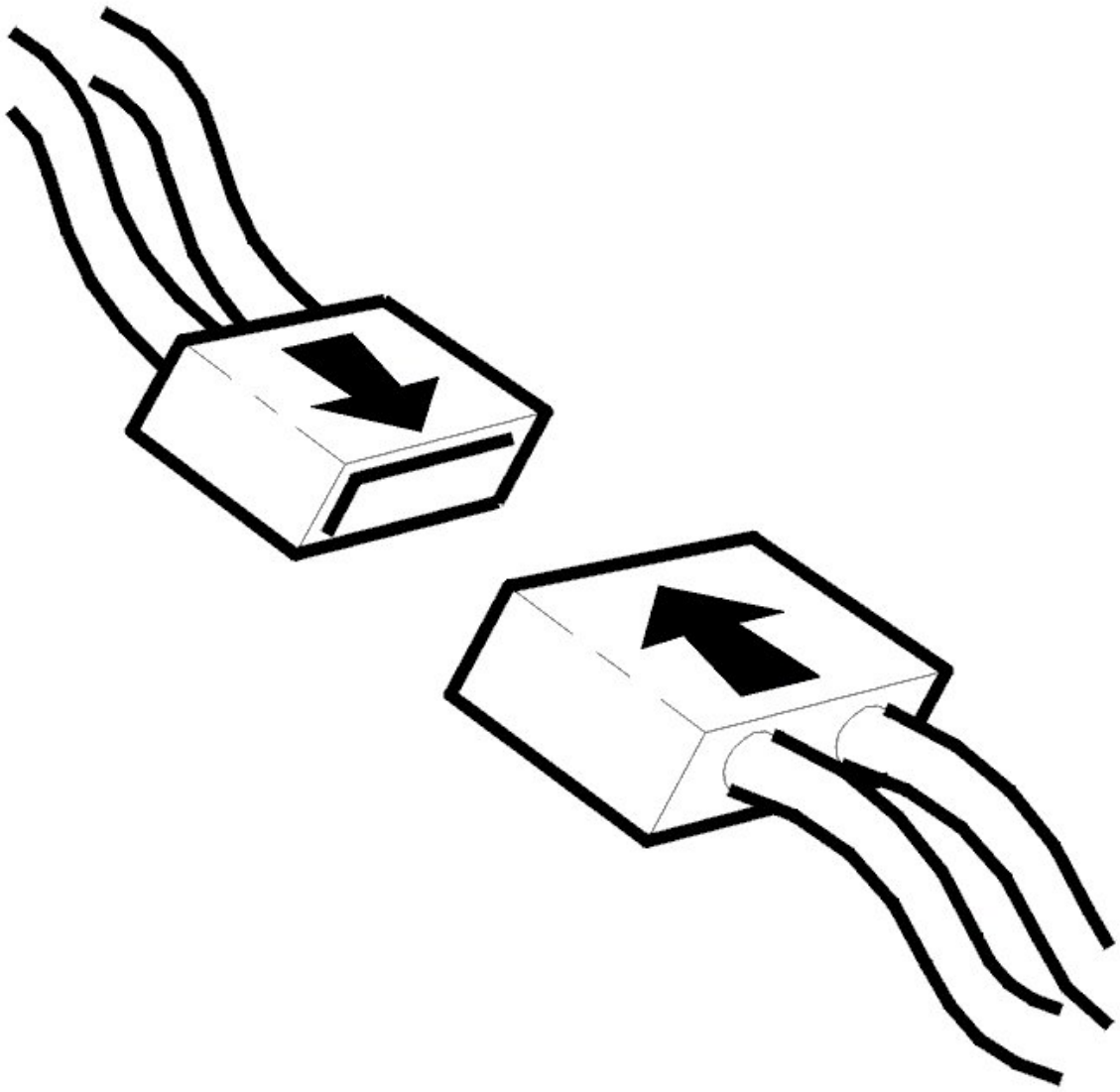
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the gear selector can only be moved from position P when the brake is applied.

Is shift lock working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

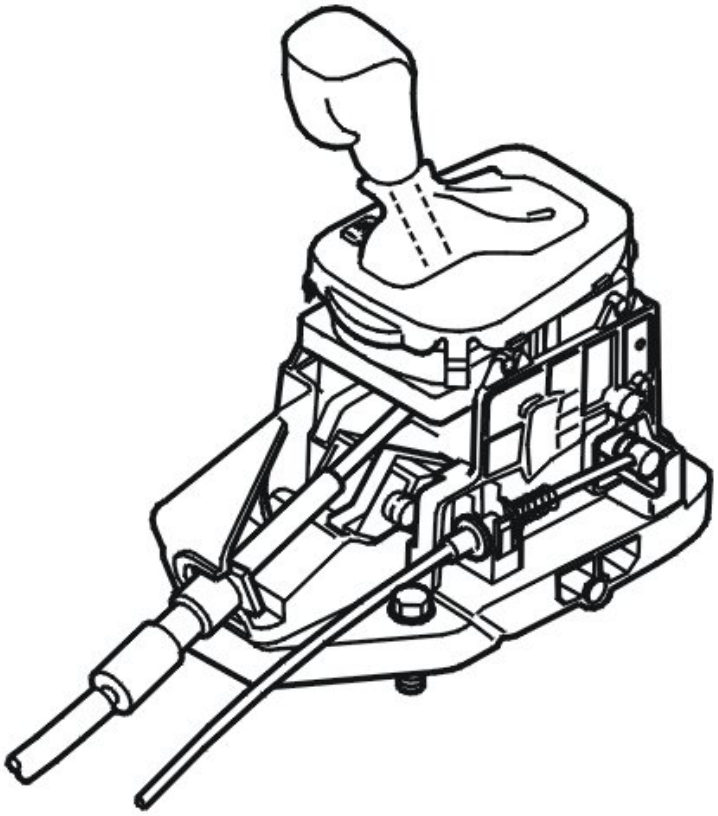
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F03

Condition



The central electronic module (CEM) checks the function of the shift lock.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects a short-circuit to ground or an open-circuit in the output signal circuit to the shift lock.
The relay for shift lock must not be activated for the diagnostic trouble code (DTC) to be stored. The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

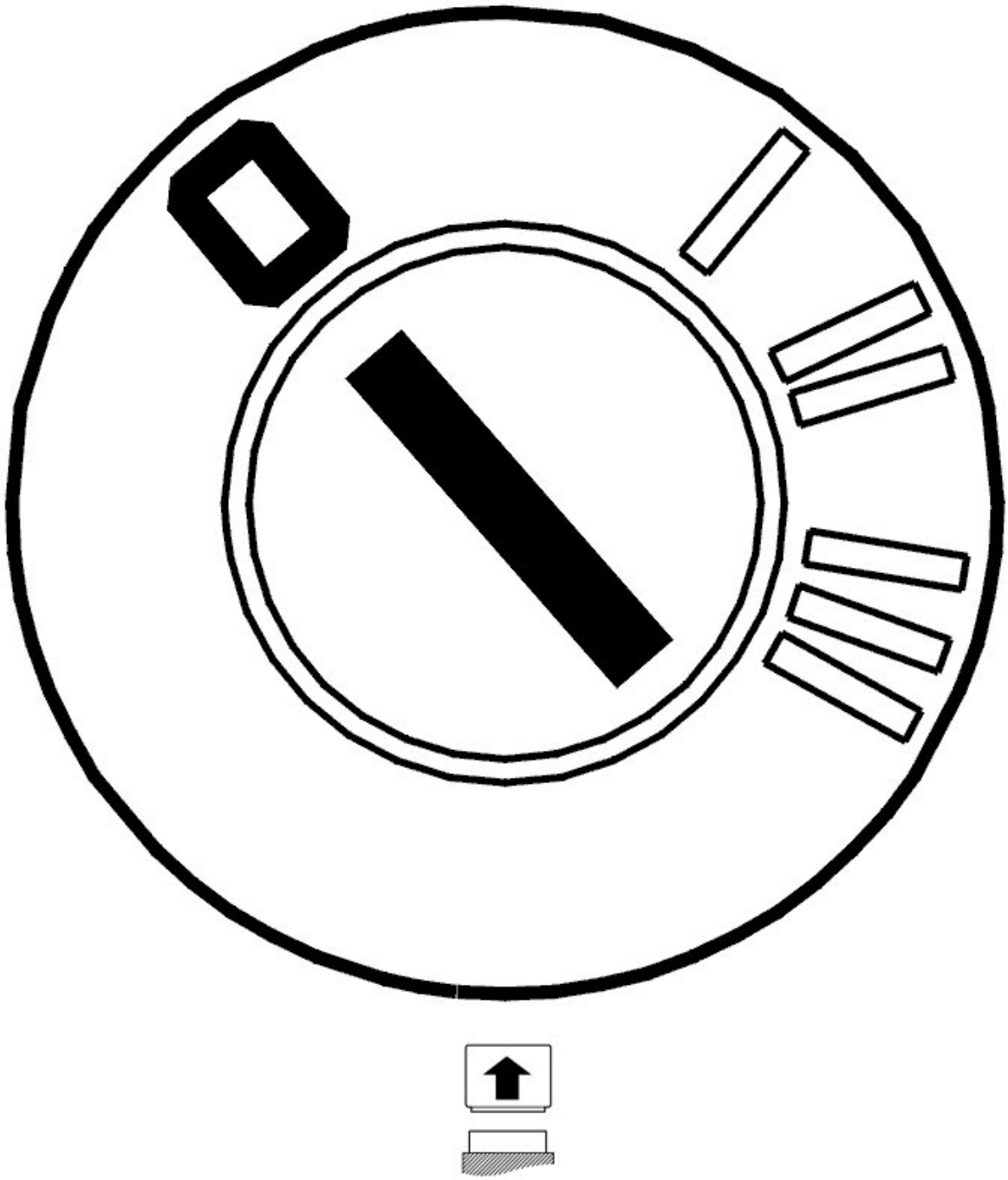
Possible source
- Open-circuit in the "Inhibited shifting" output signal. The relay is not activated.

Fault symptom[s]
- The starter motor does not turn
- The engine does not start.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between central electronic module (CEM) terminal #D23 (#23) and gear selector module (GSM) terminal #3.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Gear selector lever assembly, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Gear Selector Lever Assembly, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

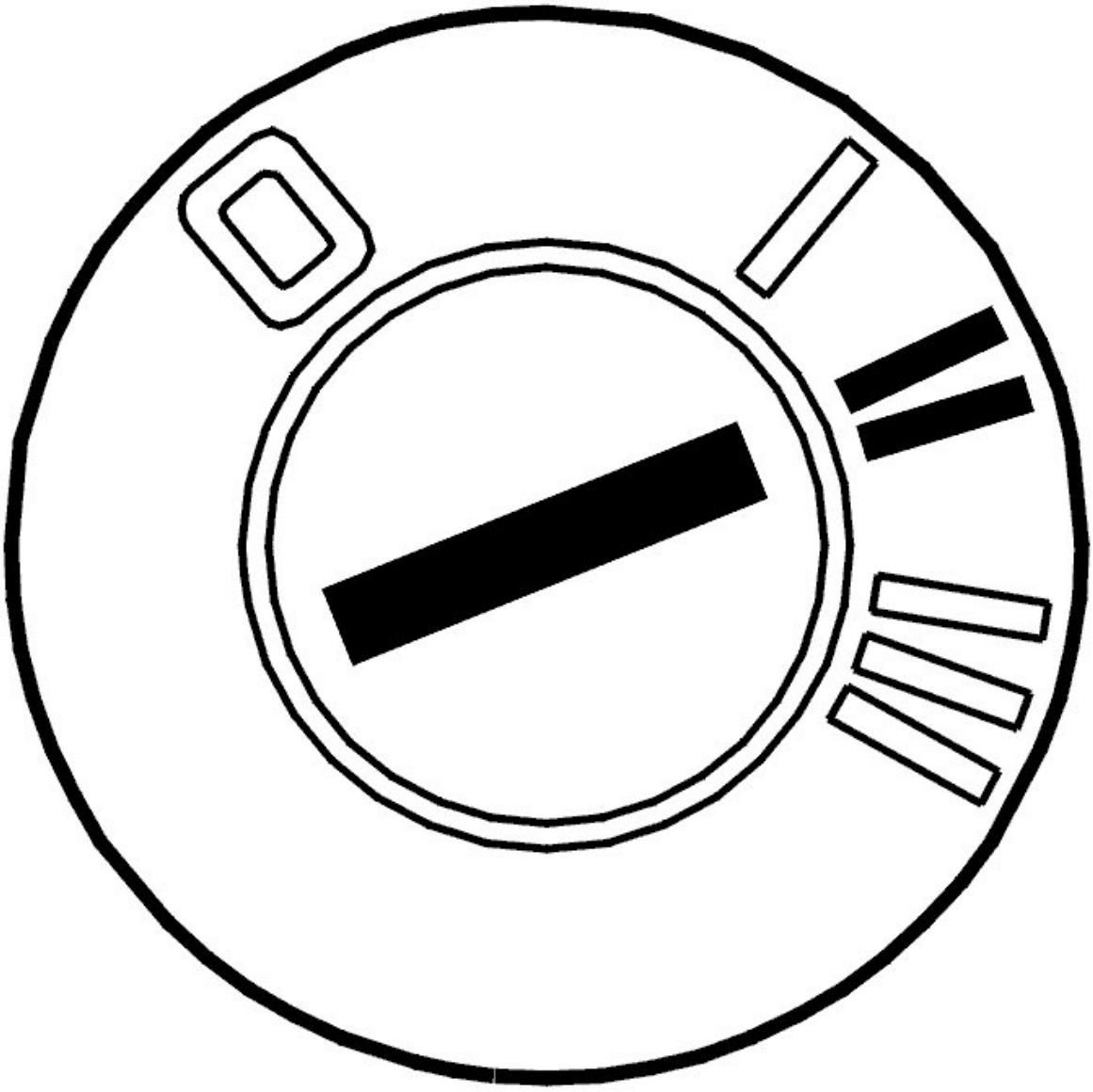
Continue - Verification

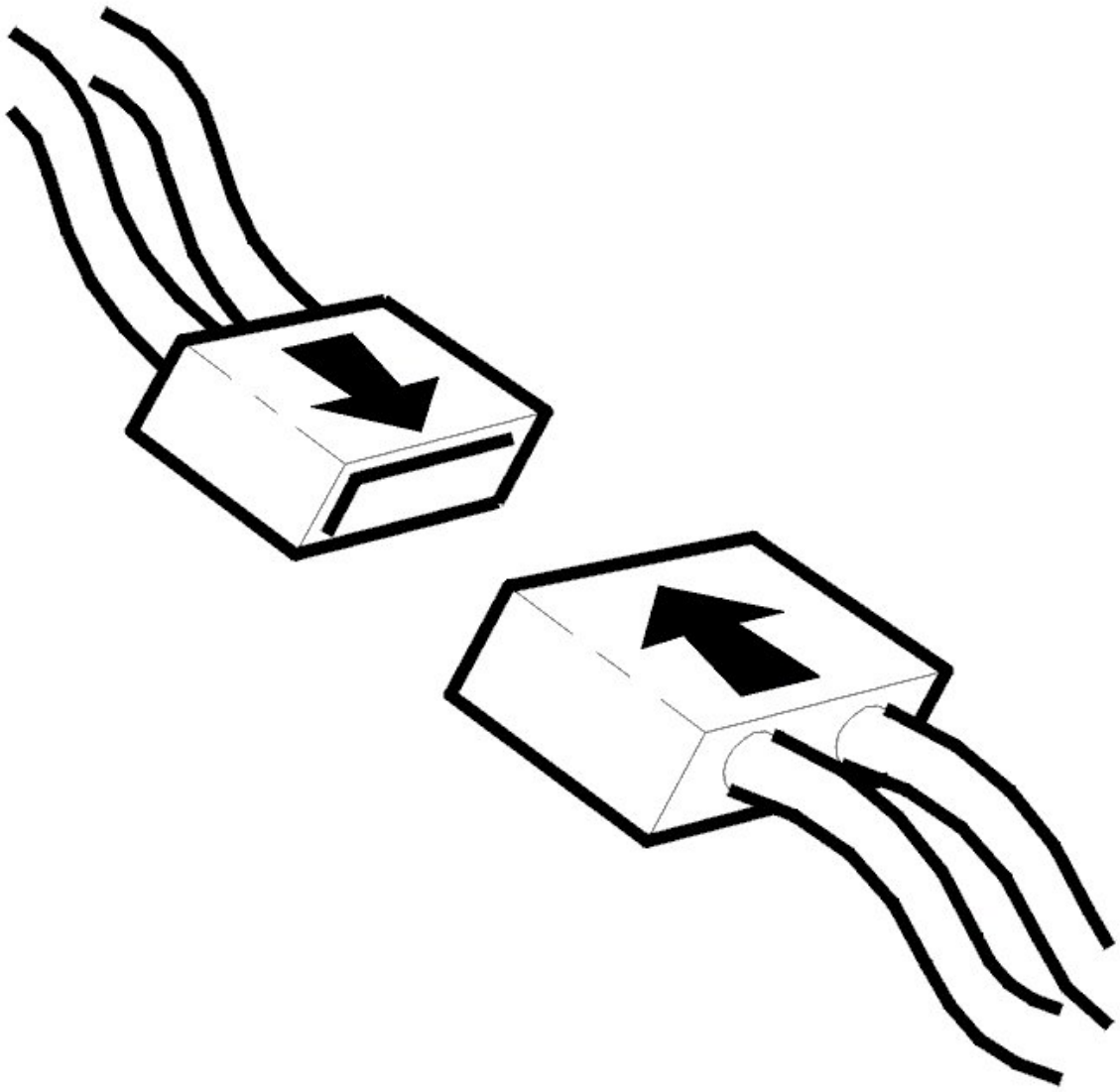
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the gear selector can only be moved from position P when the brake is applied.

Is shift lock working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

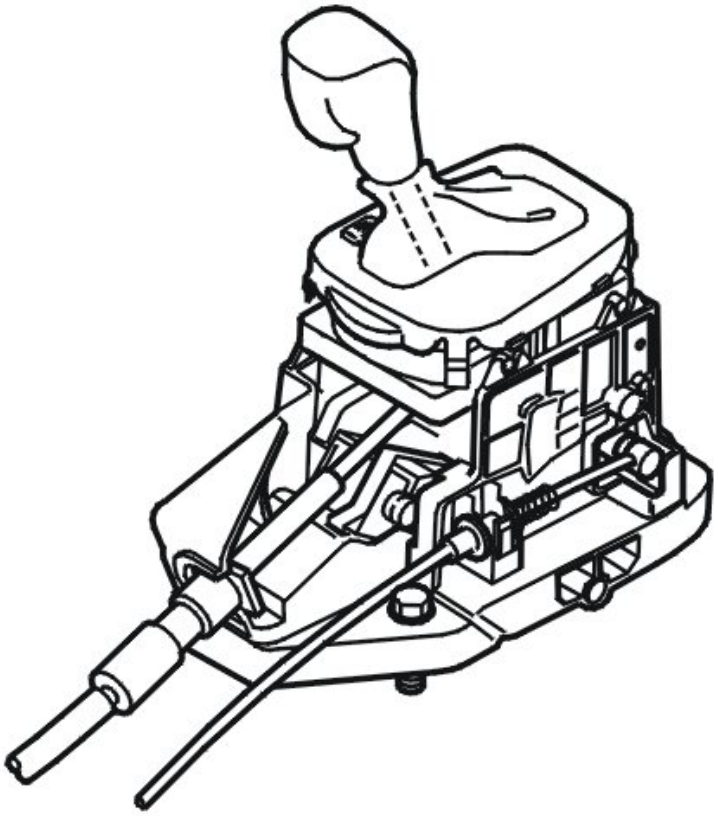
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F83

Condition



The central electronic module (CEM) receives information from the transmission on a hardwired cable indicating when park or neutral are engaged.
The central electronic module (CEM) also receives a signal indicating the position of the gear-shift position sensor from the transmission control module (TCM) via the controller area network (CAN).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the gear-shift selector lever is in position P or N but the position received from the transmission control module (TCM) on the controller area network (CAN) indicates a different position.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions II and III.

Substitute value
- None.

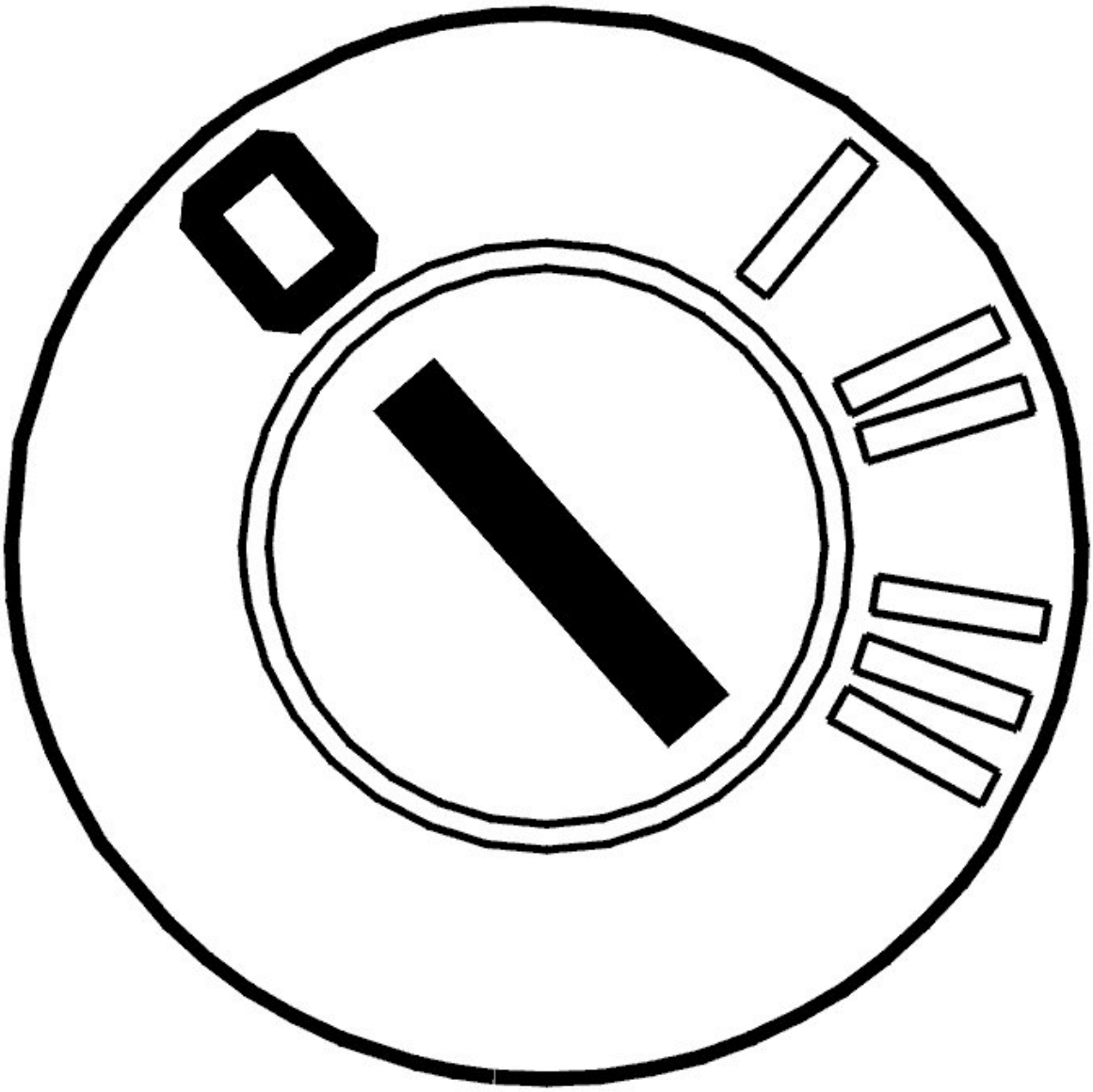
Possible source
- Short-circuit to ground in the cable from the gear-shift position sensor.

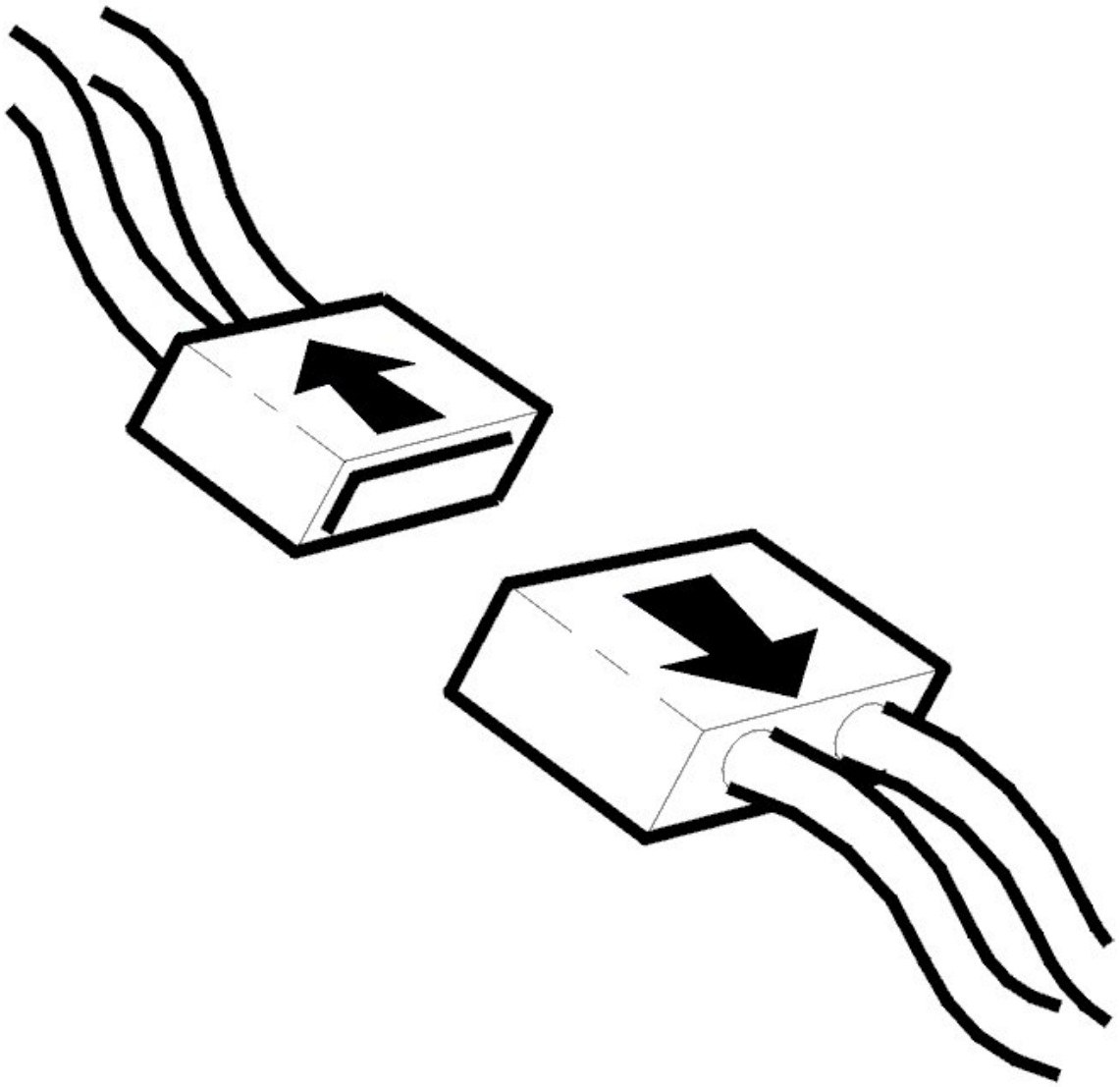
Fault symptom[s]
- The park neutral position (PNP) switch does not function.

Signal Too Low

Signal too low

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector C.

Check the cable for a short-circuit to ground.

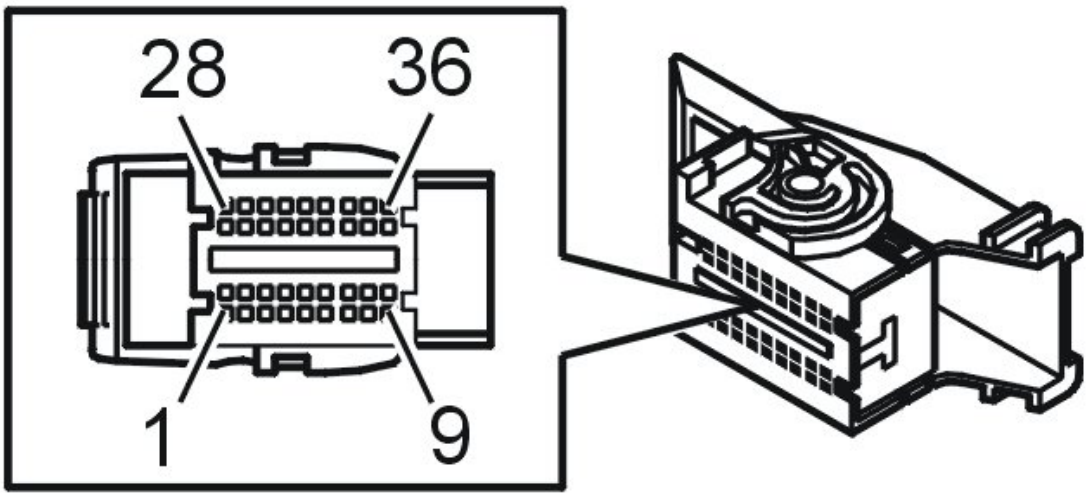
Take readings between:

- Central electronic module (CEM) terminal #C28 (28) and transmission control module (TCM) terminal #A44.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



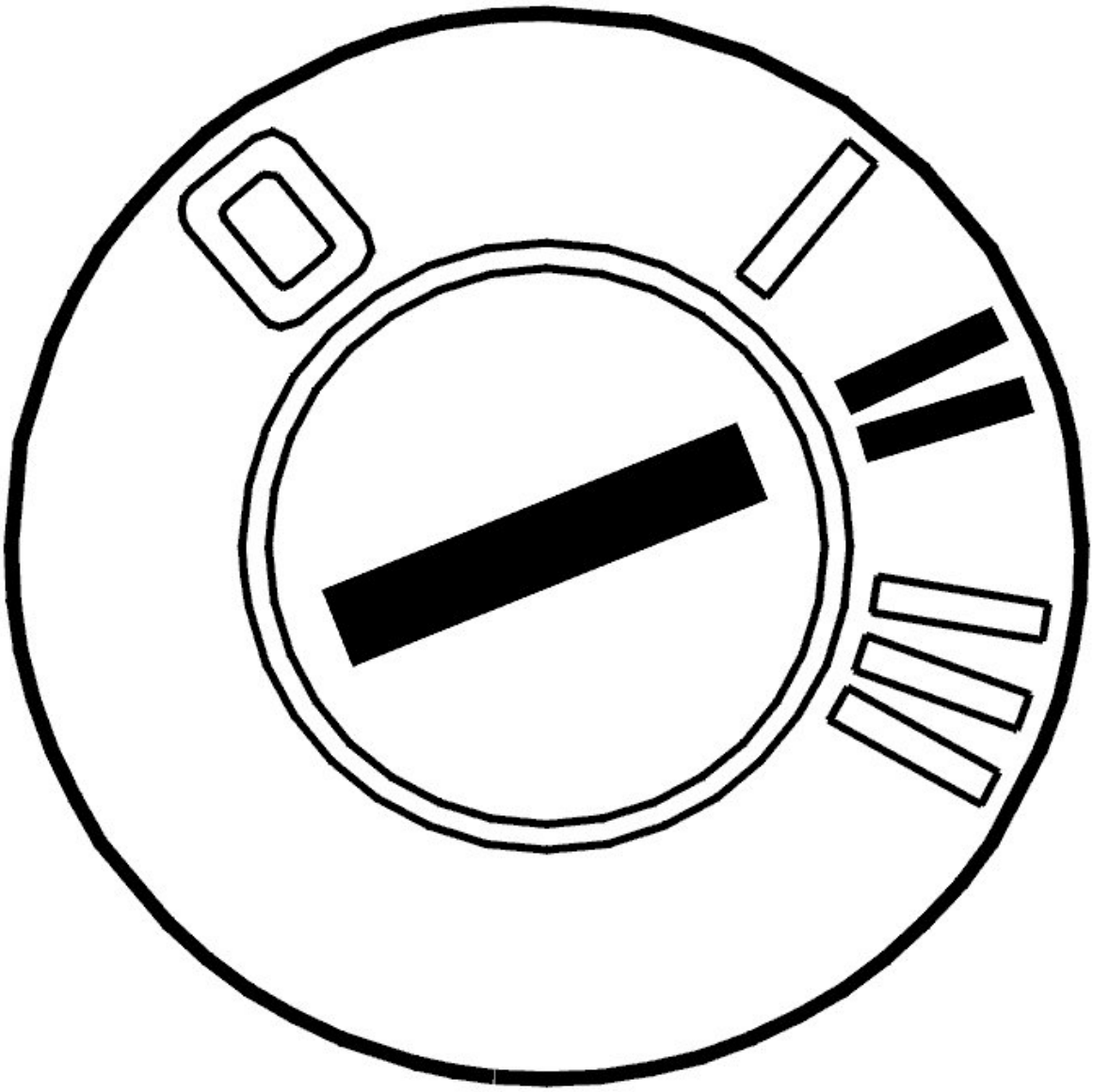
Continue - Verification

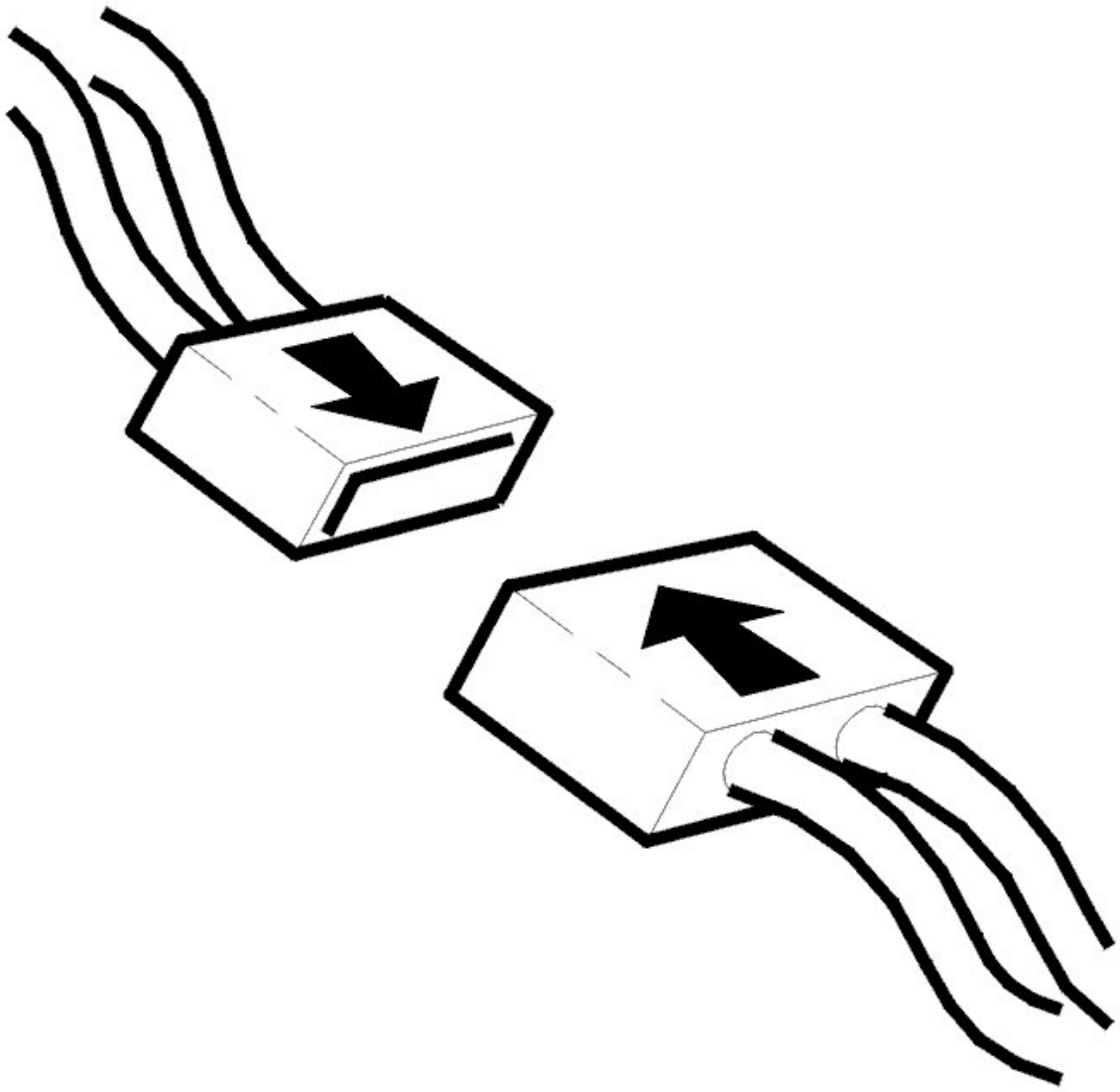
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Is the shift-lock working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

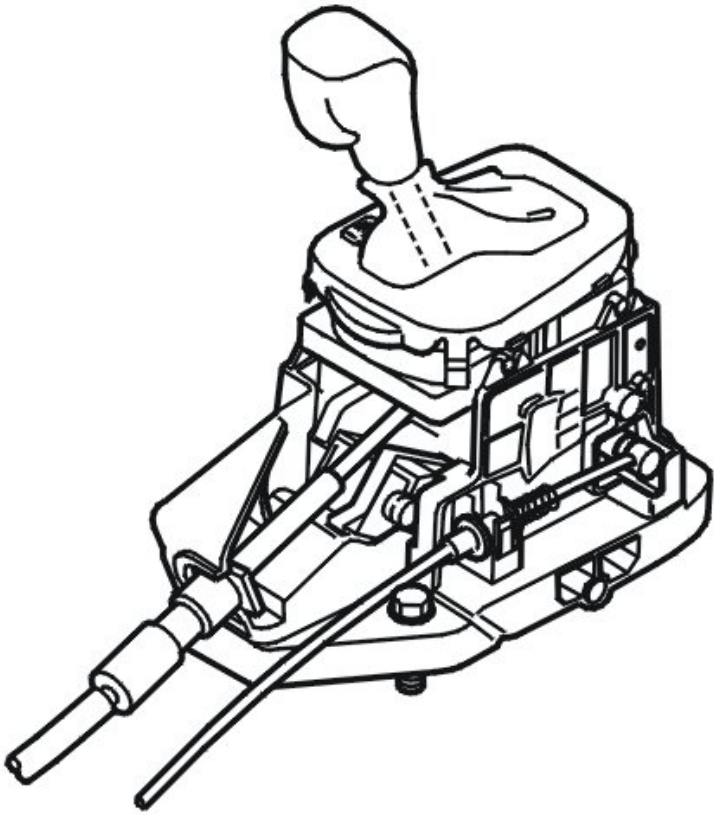
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F84

Condition



The central electronic module (CEM) receives information from the transmission on a hardwired cable indicating when park or neutral are engaged. This is achieved by grounding an input on the central electronic module (CEM). The central electronic module (CEM) also receives a signal indicating the position of the gear-shift position sensor from the transmission control module (TCM) via the controller area network (CAN).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the gear-shift selector lever is not in position P or N but the position received from the transmission control module (TCM) on the controller area network (CAN) indicates that it is.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

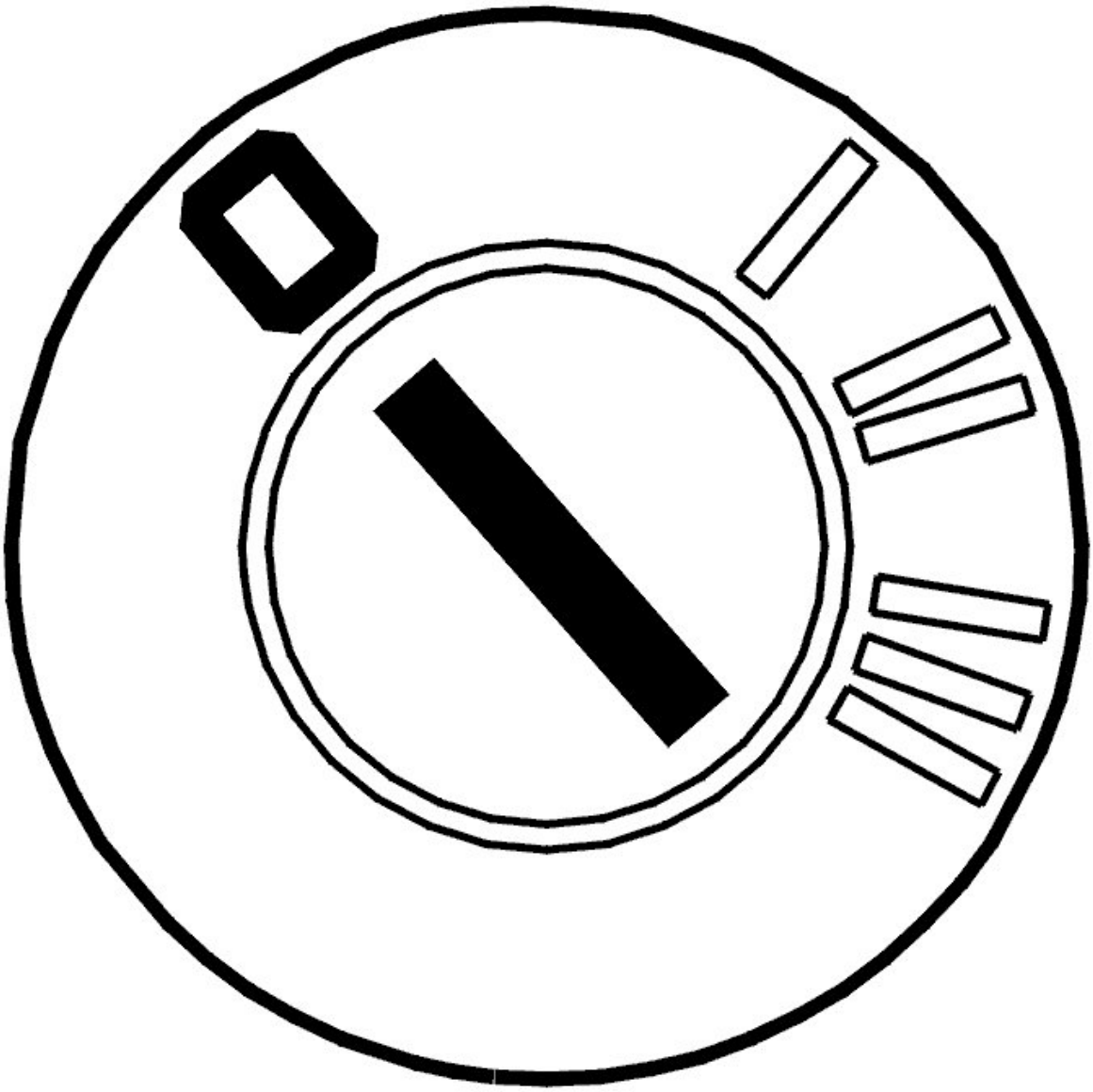
Possible source
- Open-circuit or short-circuit to supply voltage in the cable from the gear-shift position sensor.

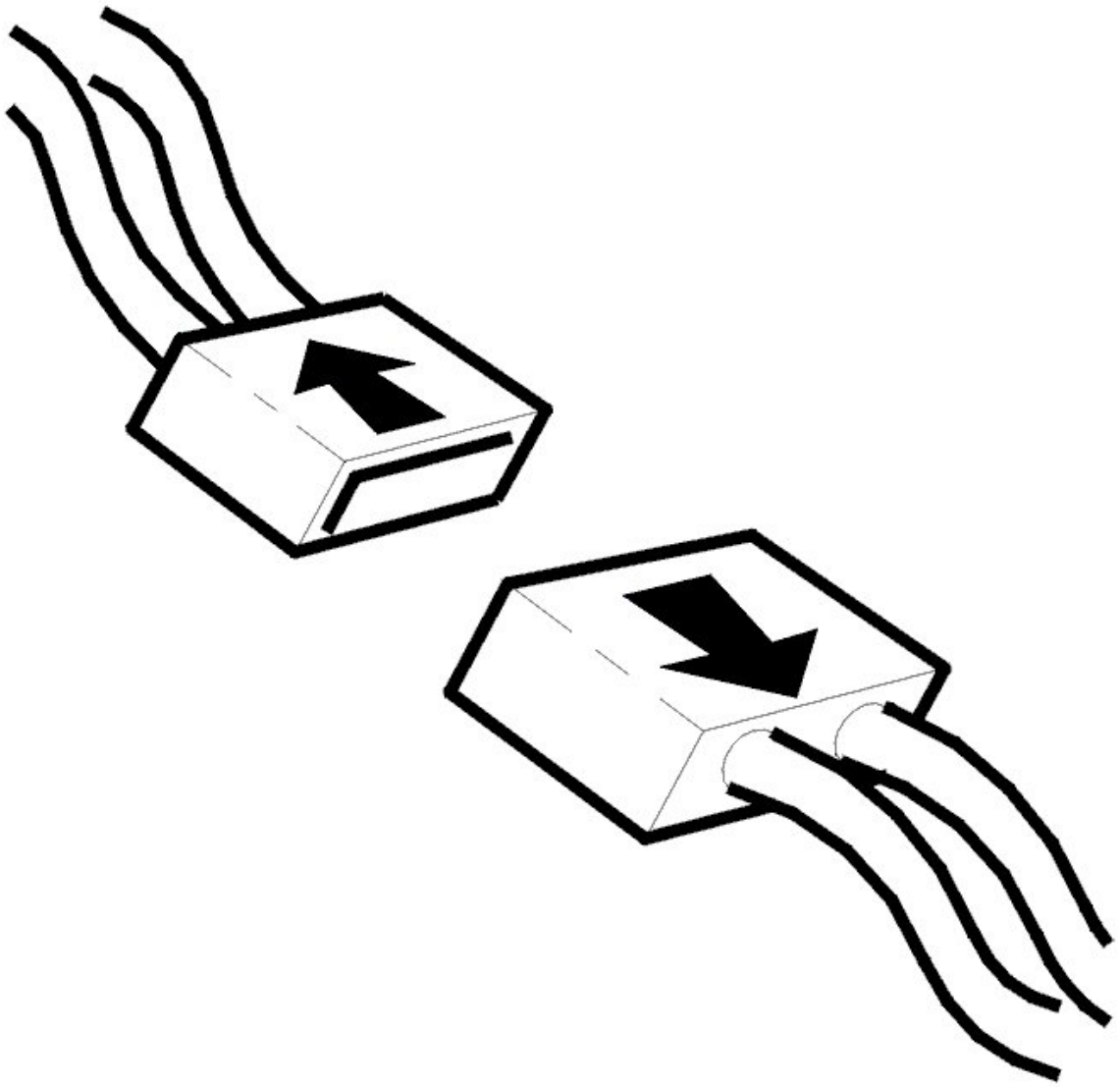
Fault symptom[s]
- The gear selector is jammed in position P.

Faulty Signal

Faulty signal

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector C.

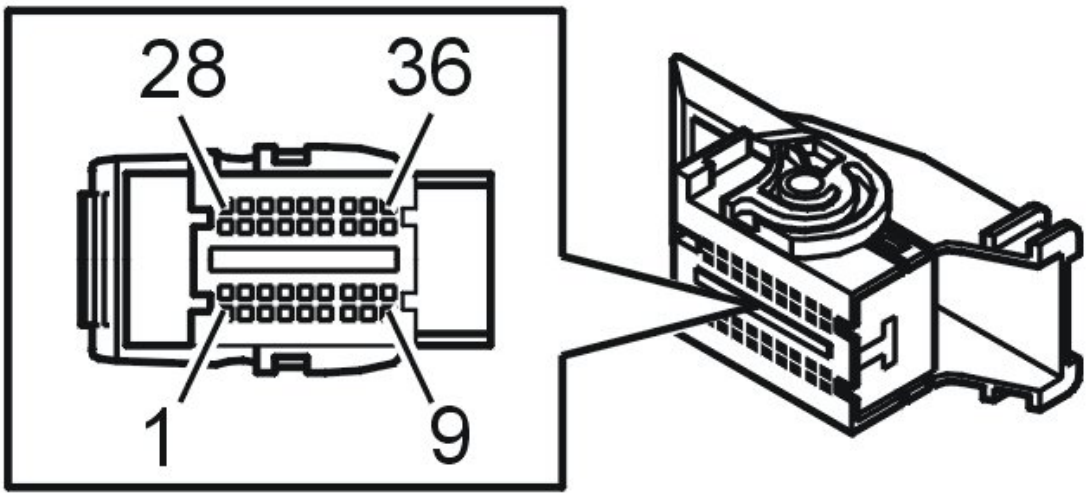
Check central electronic module (CEM) connector terminal C. Check for contact resistance. Check for oxidation. Check for damaged and loose connections.
Check the cable. Check for an open-circuit. Check for a short-circuit to the battery.
Take readings between:

- Central electronic module (CEM) terminal #C28 (28) and transmission control module (TCM) terminal #A44.

Remedy as necessary.

Other information

- Signal too high See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/CEM Codes (Central Electronic Module)/CEM-6C43/Signal Too High
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



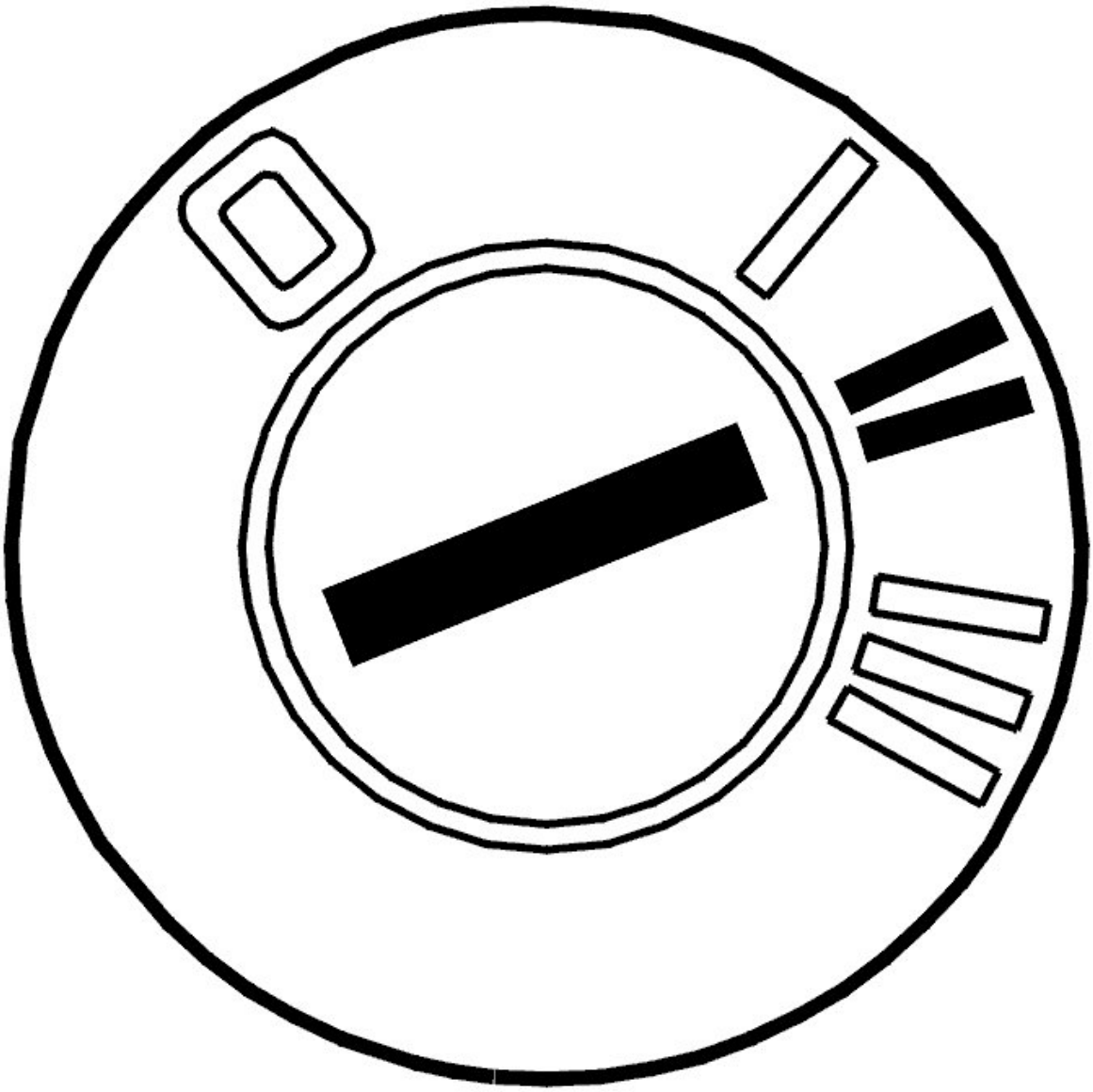
Continue - Verification

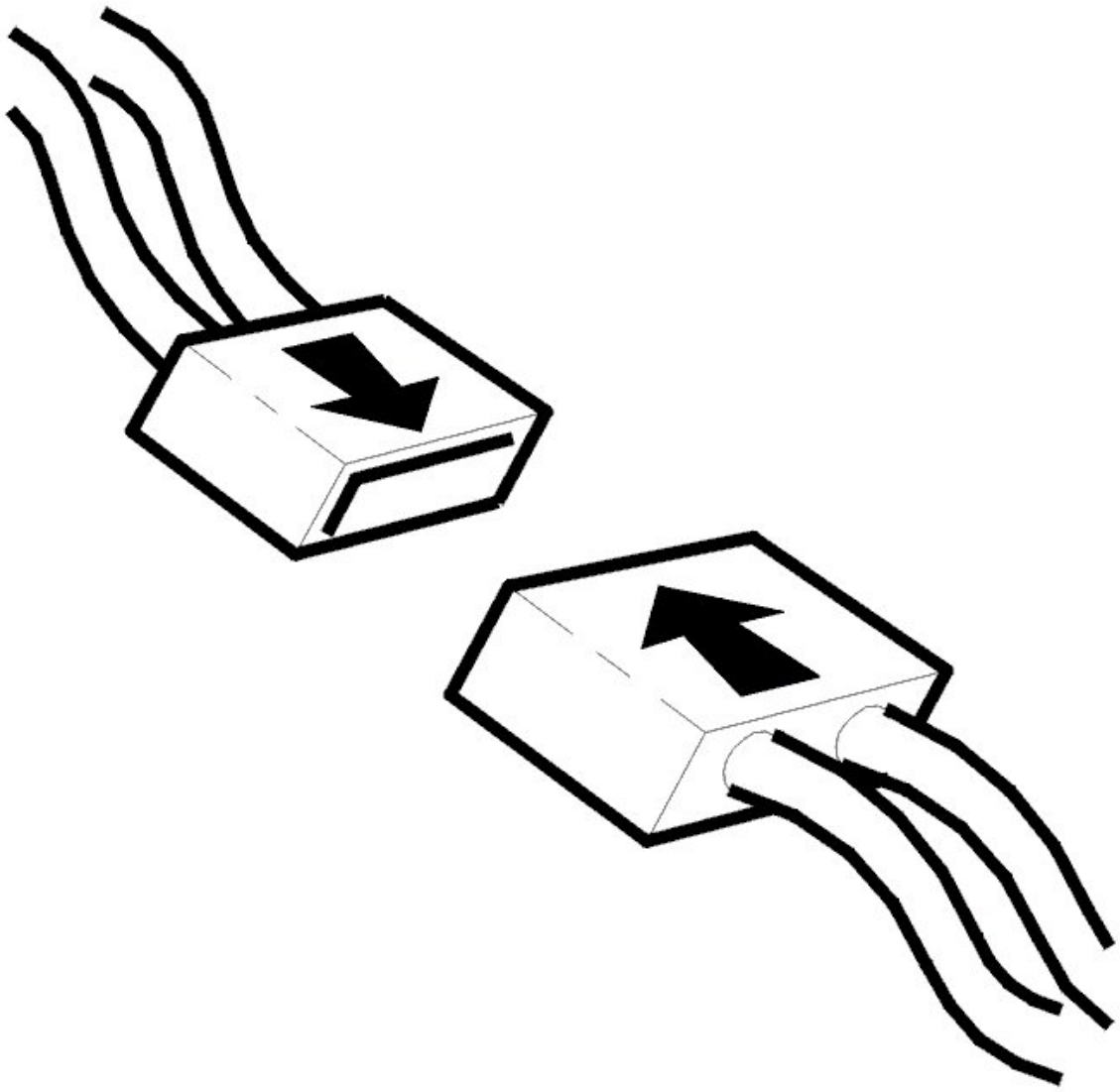
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Is the shift-lock working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

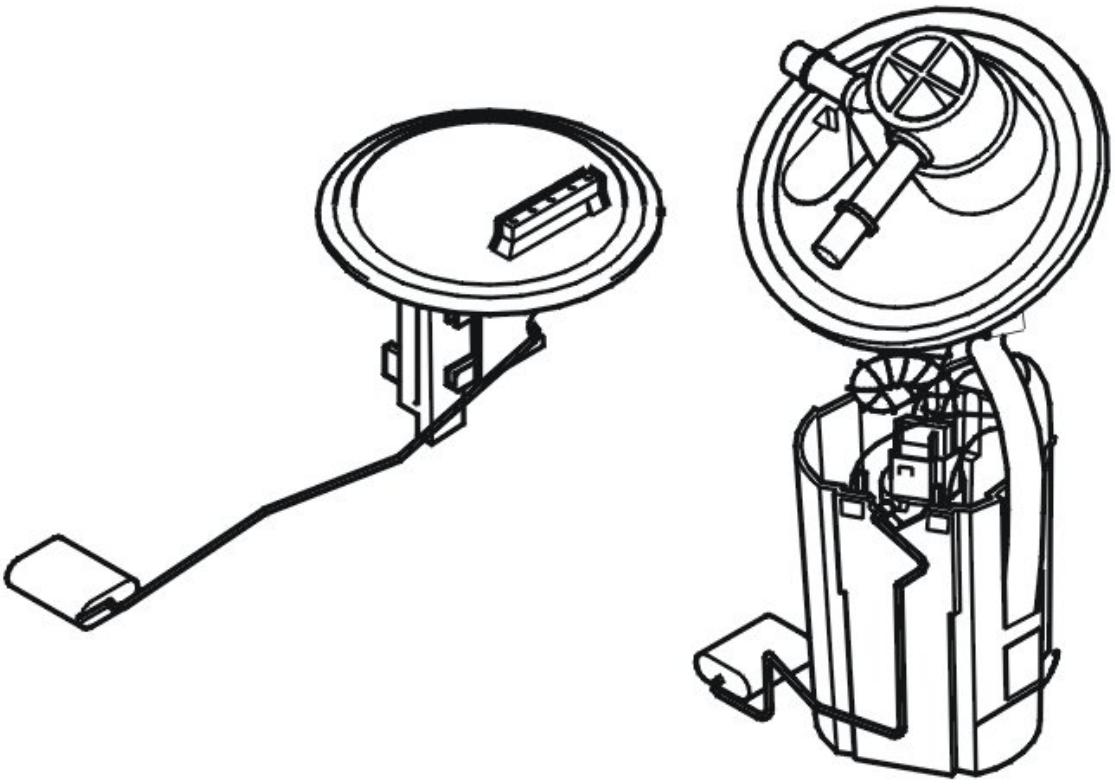
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F90

Condition



Central electronic module (CEM) checks the fuel pump relay, and activates it, when an approved check has been made by the system for Immobilizer. The fuel pump relay is located internally in the Central electronic module (CEM). The fuel pump relay sends voltage feed to the fuel pump when the relay is activated.
If Central electronic module (CEM) detects that the voltage on the output to the fuel pump is too low, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the fuel pump is activated.

Note! When troubleshooting, the fuel pump may not be supplied with voltage by an external power source without first disconnecting the connector to the Central electronic module (CEM). If the connector is not loosened and the fuel pump is supplied with voltage, this can lead to failure of an internal ground conductor in the Central electronic module (CEM). In turn, this can lead to a number of other malfunctions in the vehicle and that Central electronic module (CEM) must be replaced.

The following applies to vehicles with fuel pump module (PEM):

Central electronic module (CEM) checks the voltage feed to the fuel pump module. The Central electronic module (CEM) activates the voltage supply to the fuel pump control module after the checks carried out by the function for the immobilizer have been approved.
If Central electronic module (CEM) detects that the voltage on the output to the fuel pump module (PEM) is too low, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the fuel pump is activated.

Substitute value

- None.

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Possible source

- Damaged power supply fuse.
- Open circuit on cables for voltage feed between fuse box engine compartment and Central electronic module (CEM).
- The cable for voltage feed between Central electronic module (CEM) and fuel pump module (PEM)/fuel pump is short-circuited to ground.

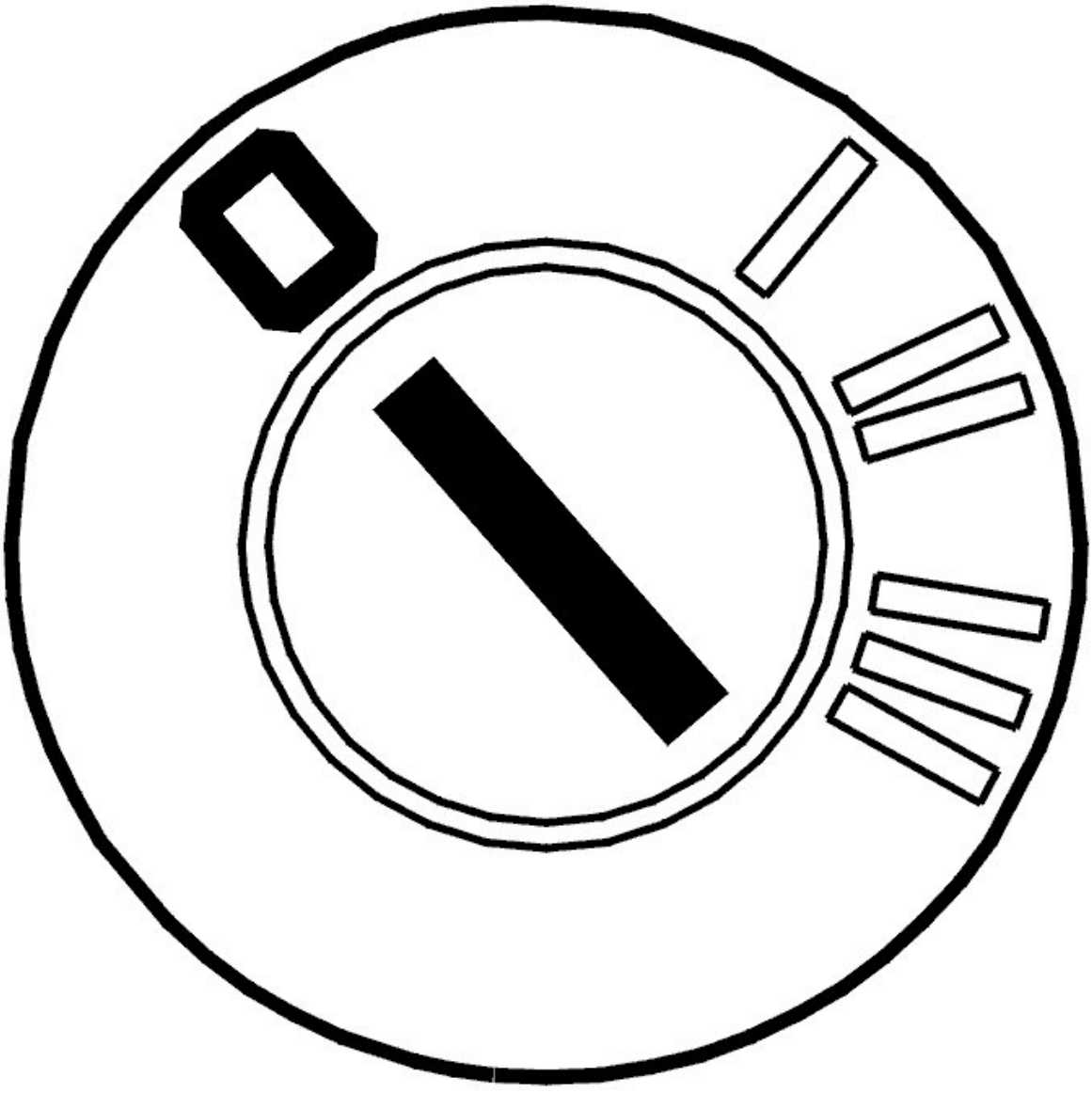
Fault symptom[s]

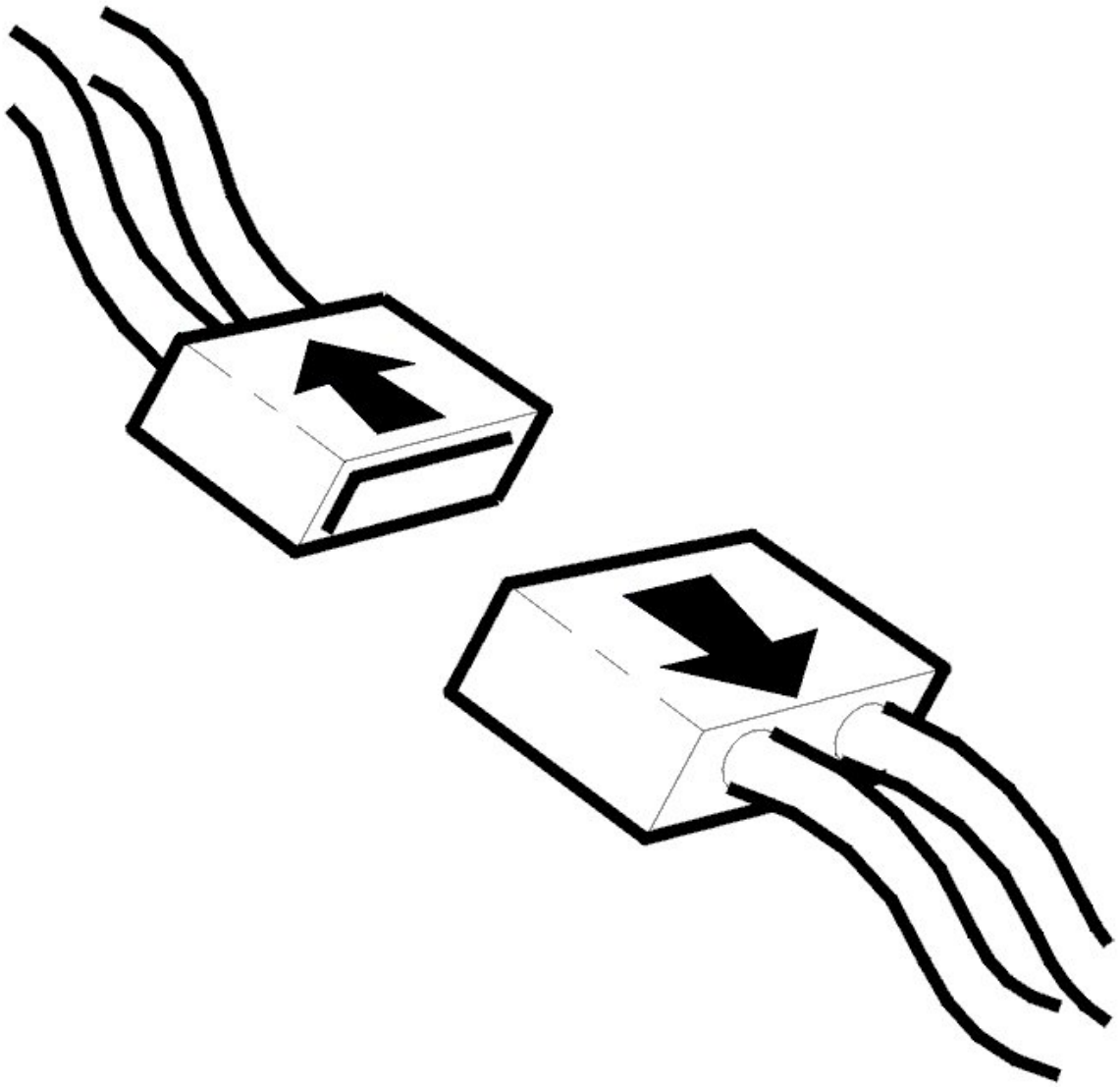
- The engine does not start.

Open-circuit or short-circuit to Ground

Open-circuit or short-circuit to ground

Checking the wiring





- Ignition off
- Check the fuse for voltage feed to fuel pump/fuel pump module.
- Disconnect central electronic module (CEM) connector A.

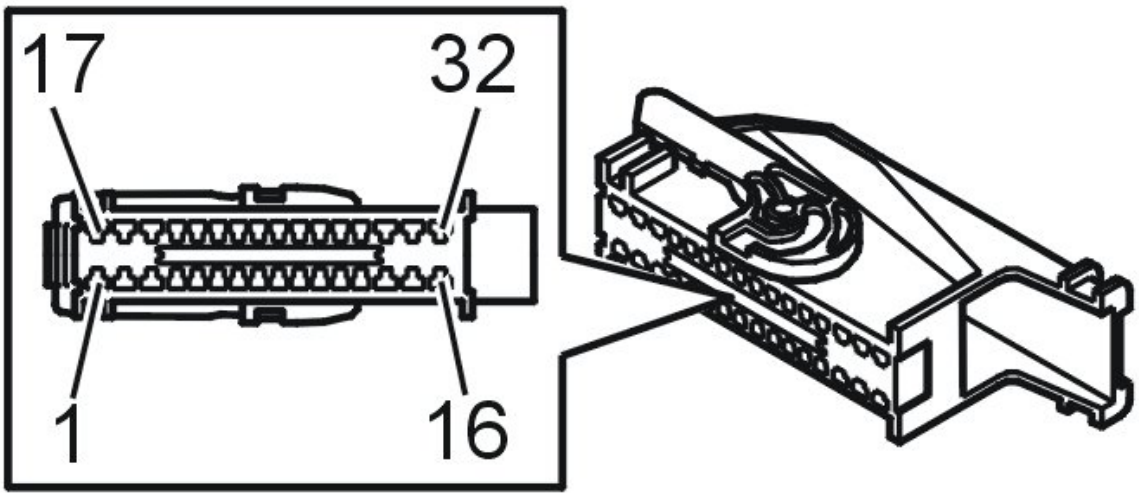
Check central electronic module (CEM) connector A and the connectors for the fuel pump (FP). Check for contact resistance. Check for oxidation. Check for damaged or loose connections.
Check the cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #A16 (16) and fuel pump/fuel pump control module.

Remedy as necessary.

Other information

- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



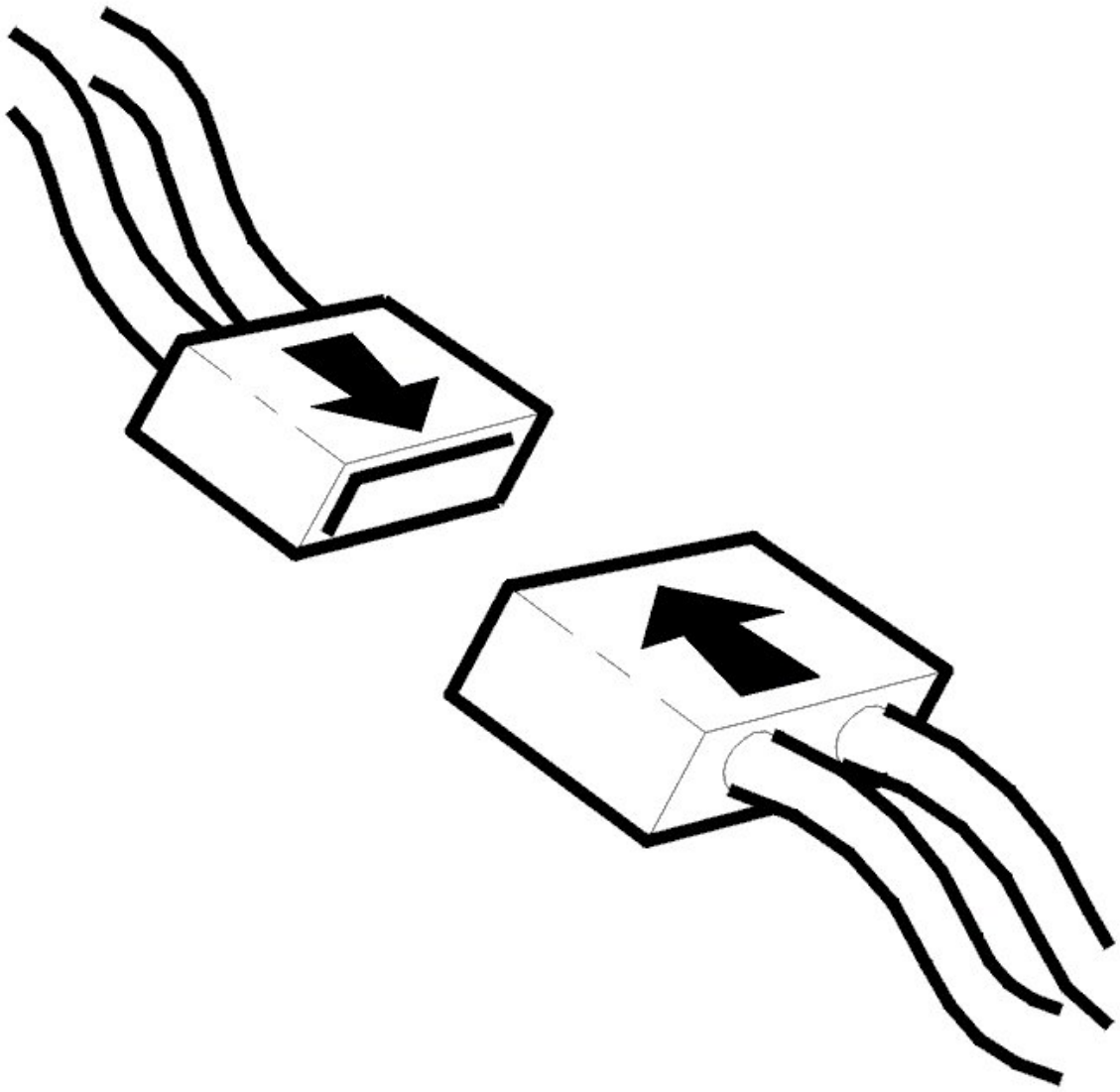
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Try to start the engine.

Does the engine start?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

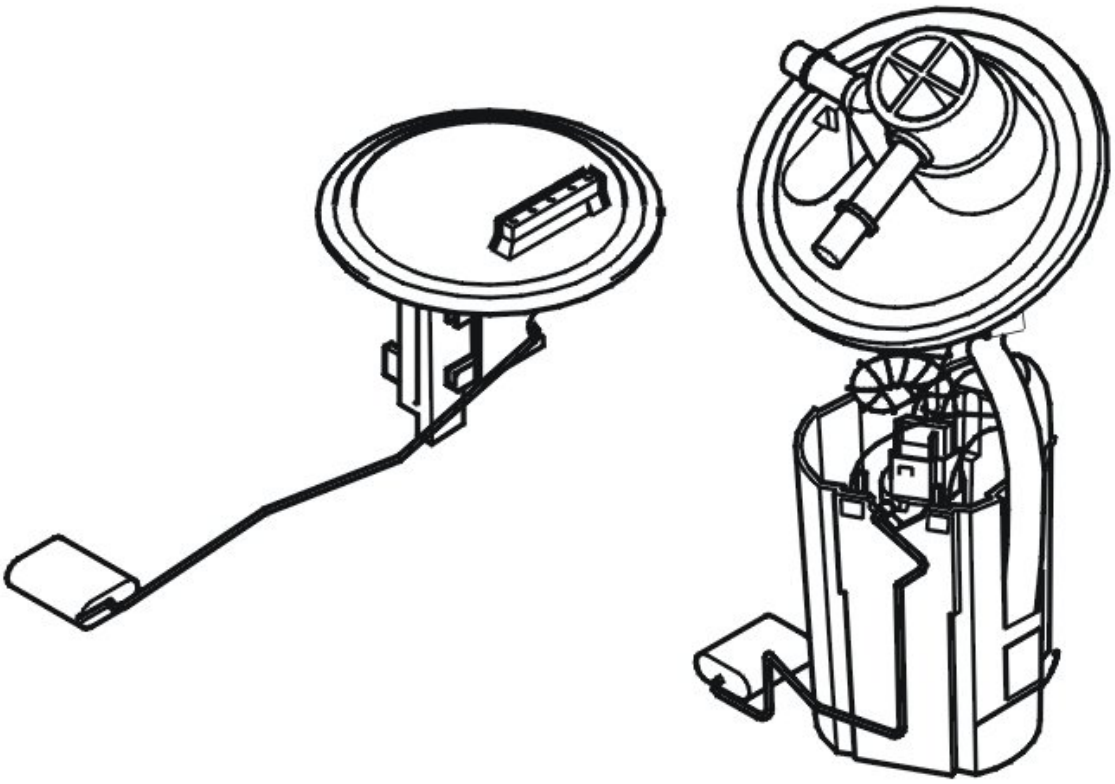
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-3F91

Condition



Central electronic module (CEM) checks the fuel pump relay, and activates it, when an approved check has been made by the system for Immobilizer. The fuel pump relay is located internally in the Central electronic module (CEM). The fuel pump relay sends voltage feed to the fuel pump when the relay is activated.
If Central electronic module (CEM) detects that the output to the fuel pump is short-circuited to voltage, the diagnostic trouble code is generated. The diagnostic trouble code (DTC) can be diagnosed in ignition position II and if the fuel pump relay is activated at the same time.

Note!

Applies to vehicles to and incl. model year 2006

- When troubleshooting, the fuel pump may not be supplied with voltage by an external power source without first disconnecting the connector to the Central electronic module (CEM). If the connector is not loosened and the fuel pump is supplied with voltage, this can lead to failure of an internal ground conductor in the Central electronic module (CEM).

Applies to vehicles from and incl. model year 2007

- The case with the ground cable described above does not apply to Central electronic module (CEM) from and incl. model year 2006. This diagnostic trouble code can be generated if the cable for voltage feed to the fuel pump has an open circuit or if the fuel pump is not connected.

The following applies to vehicles with fuel pump module (PEM):

Central electronic module (CEM) checks the voltage feed to the fuel pump module. The Central electronic module (CEM) activates the voltage supply to the fuel pump control module after the checks carried out by the function for the immobilizer have been approved. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the voltage in the signal cable is too high.

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The diagnostic trouble code (DTC) can be diagnosed in ignition position II and if the relay for power supply to the fuel pump control module is not activated.

Substitute value
- None.

Possible source
- The cable for voltage feed to the fuel pump module is short-circuited to voltage.

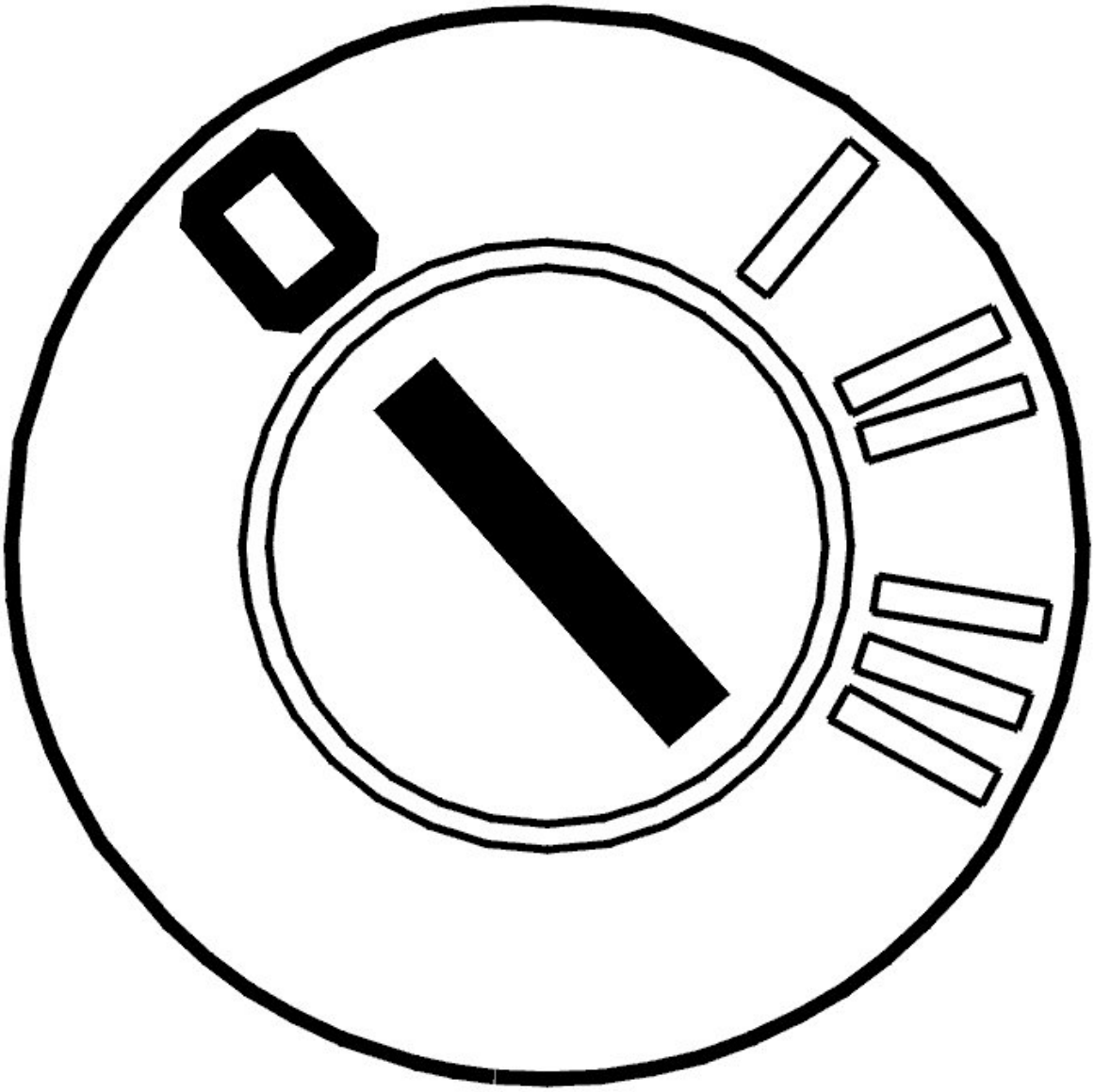
  Note! Applies to vehicles to and incl. model year 2006If the signal cable has been short-circuited to voltage, there is a risk of failure of an internal ground conductor on one of the circuit boards in the Central electronic module (CEM). This may lead to the relay for 15-feed, on Central electronic module (CEM), not working as intended. A result of incorrect function of 15-feed may be, e.g., that diagnostic trouble codes are generated for the seat heater in front seats and also that the communication with Brake control module (BCM) doe not work when the engine is on (BCM is not supplied with voltage when the 15-relay is not grounded). The malfunction may have different effects in different vehicles, depending on the vehicle's configuration (which units that are supplied via 15-feed), but also depends on where the ground conductor has failed.

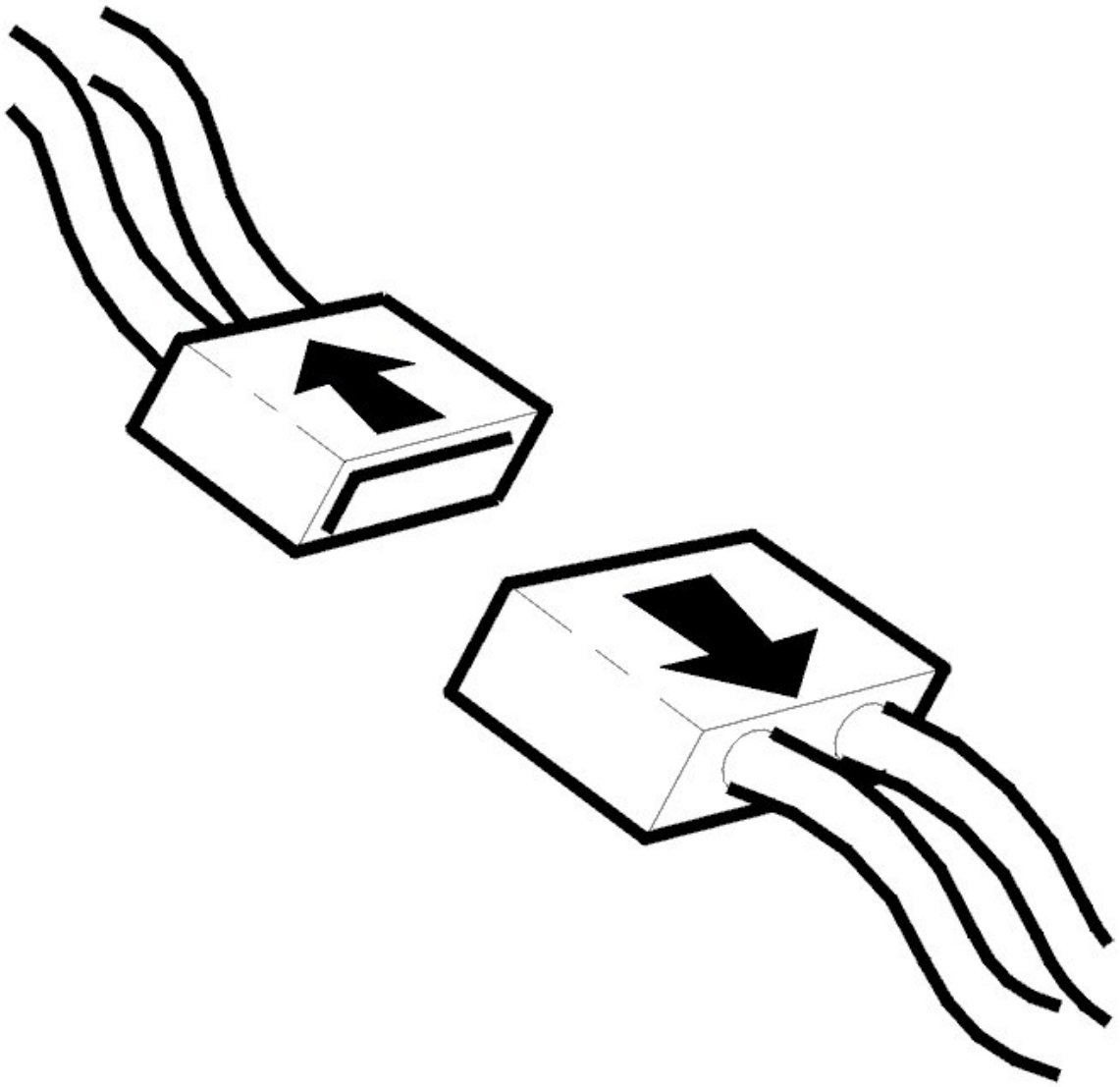
Fault symptom[s]
- Battery discharges

Short-circuit to Supply Voltage

Short-circuit to supply voltage

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector A.

Check the cable for a short-circuit to supply voltage.
Take readings between:

- Central electronic module (CEM) terminal #A16 (16) and fuel pump/fuel pump control module.

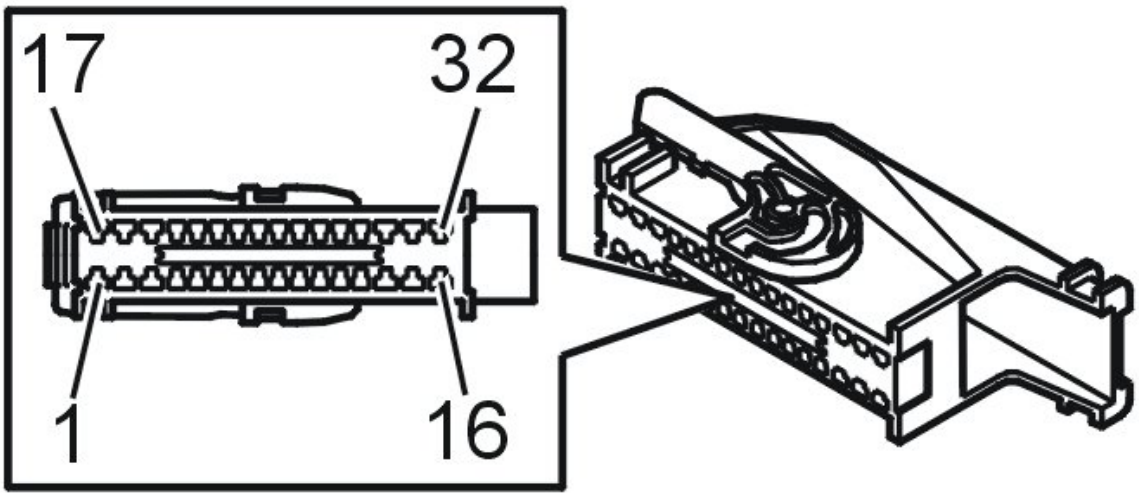
Remedy as necessary.

Applies to vehicles to and incl. model year 2006

If the signal cable has been short-circuited to voltage, there is a risk of failure of an internal ground conductor on one of the circuit boards in the Central electronic module (CEM). This may lead to the relay for 15-feed, on Central electronic module (CEM), not working as intended. A result of incorrect function of 15-feed may be, e.g., that diagnostic trouble codes are generated for the seat heater in front seats and also that the communication with Brake control module (BCM) doe not work when the engine is on (BCM is not supplied with voltage when the 15-relay is not grounded). The malfunction may have different effects in different vehicles, depending on the vehicle's configuration (which units that are supplied via 15-feed), but also depends on where the ground conductor has failed.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

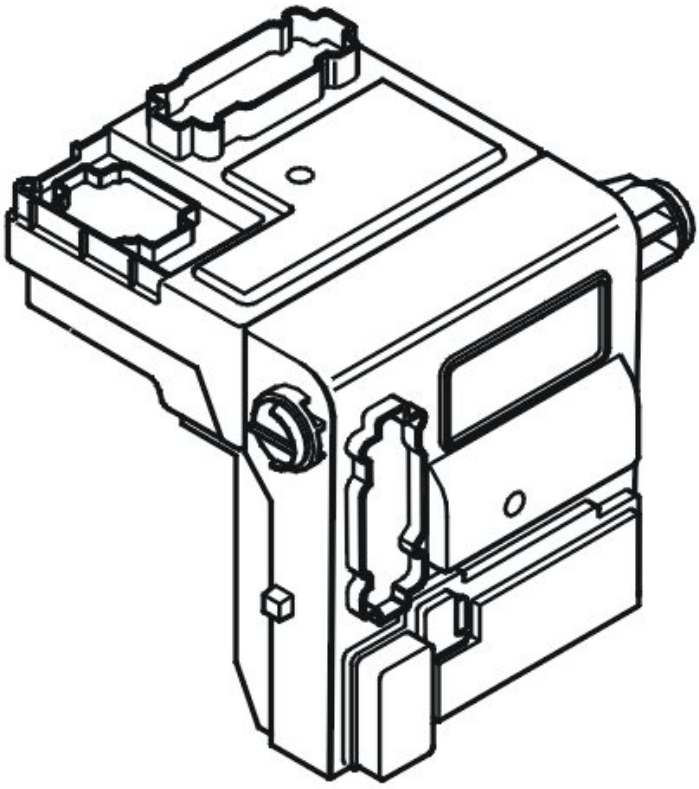
Replacing the component

Caution! A short-circuit to supply voltage may mean that the central electronic module (CEM) is damaged and must be replaced.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the central electronic module (CEM) if the fault recurs.
Replace the central electronic module (CEM) if the fault is permanent.
Remedy as necessary.

Other information

- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing



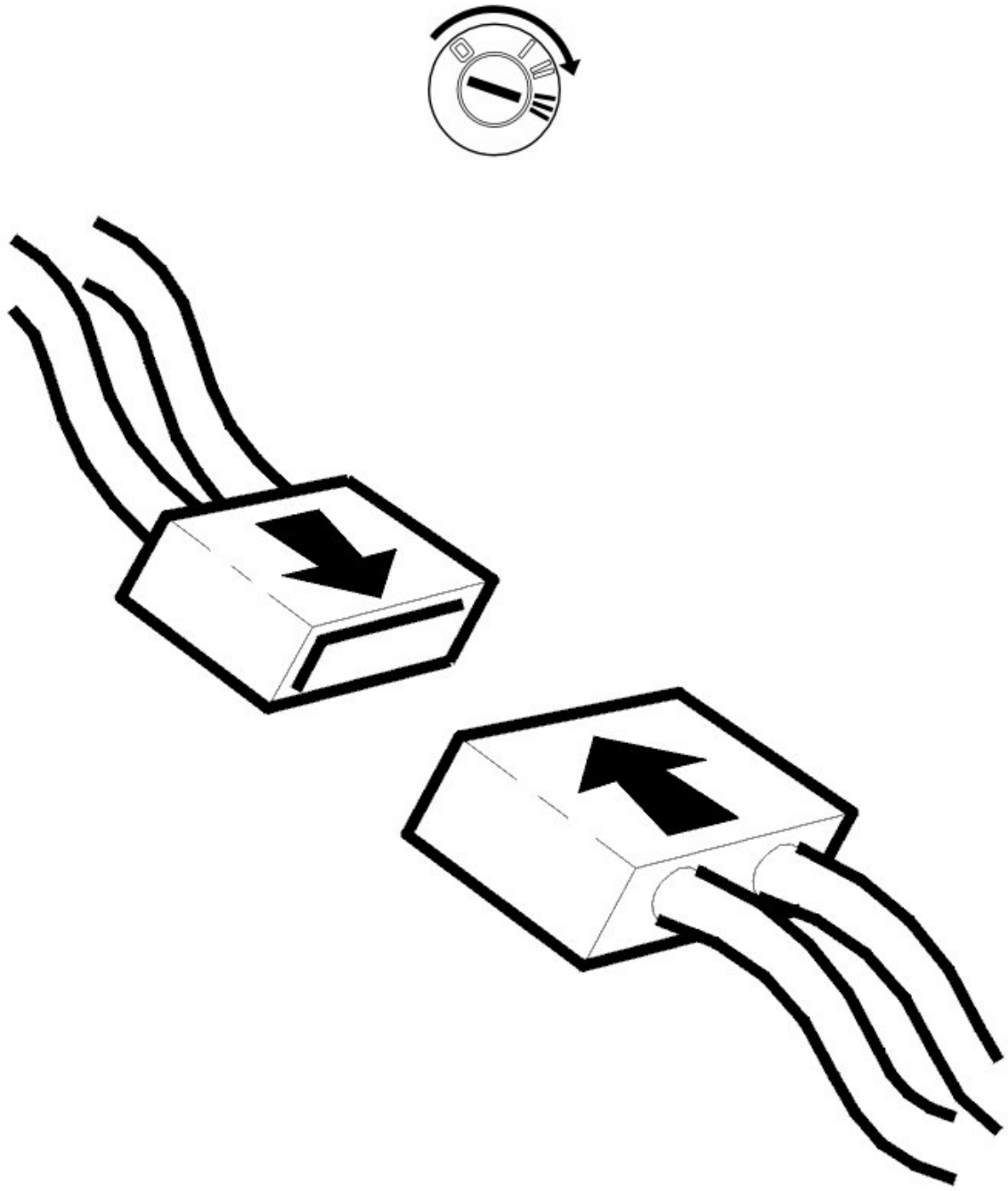
Continue - Fault-tracing information

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.

Turn on the ignition and check that the fuel pump is working normally.

Is the fuel pump (FP) working as it should?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Replacing the component

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

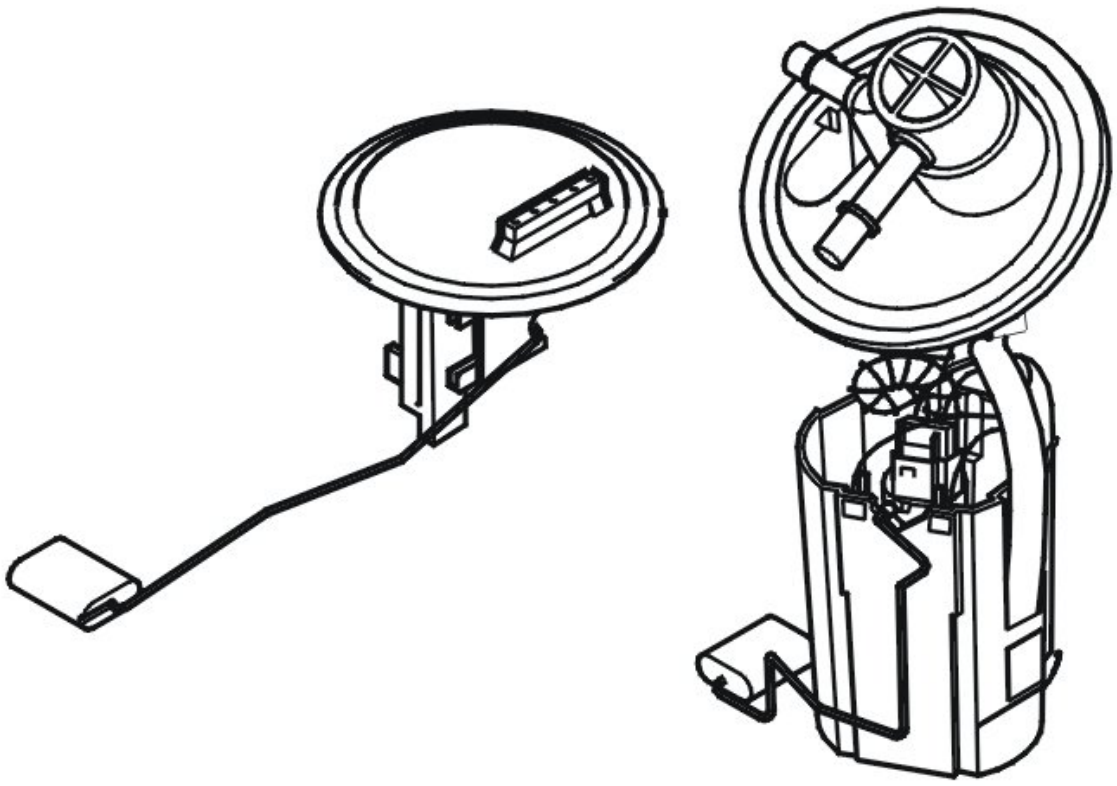
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A31

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the ejector side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the fuel level has not changed during the last 100 km.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and the fuel level above 2 liters.

Substitute value
- None.

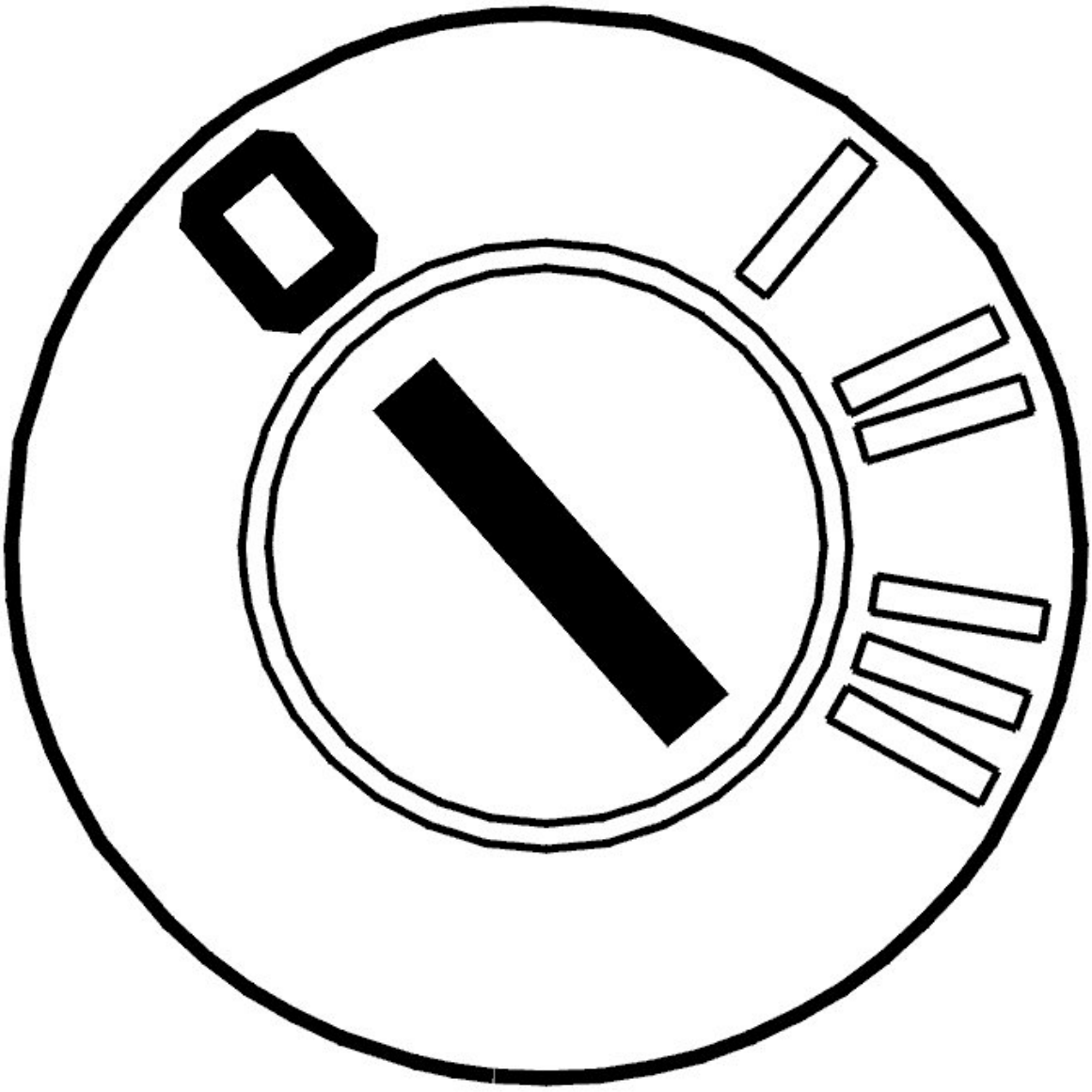
Possible source
- The sensor on the ejector side is faulty.

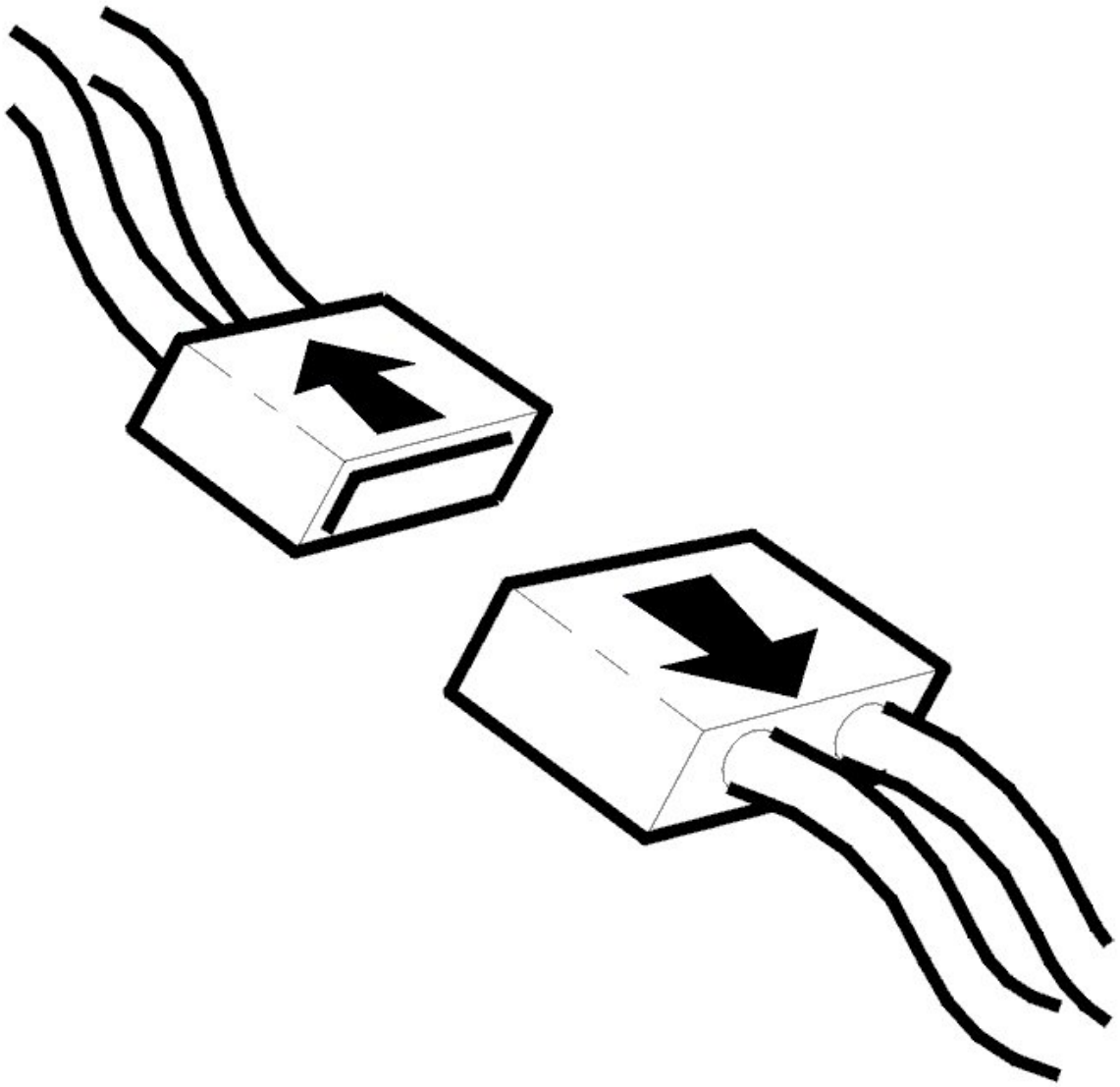
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Faulty Signal

Faulty signal

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

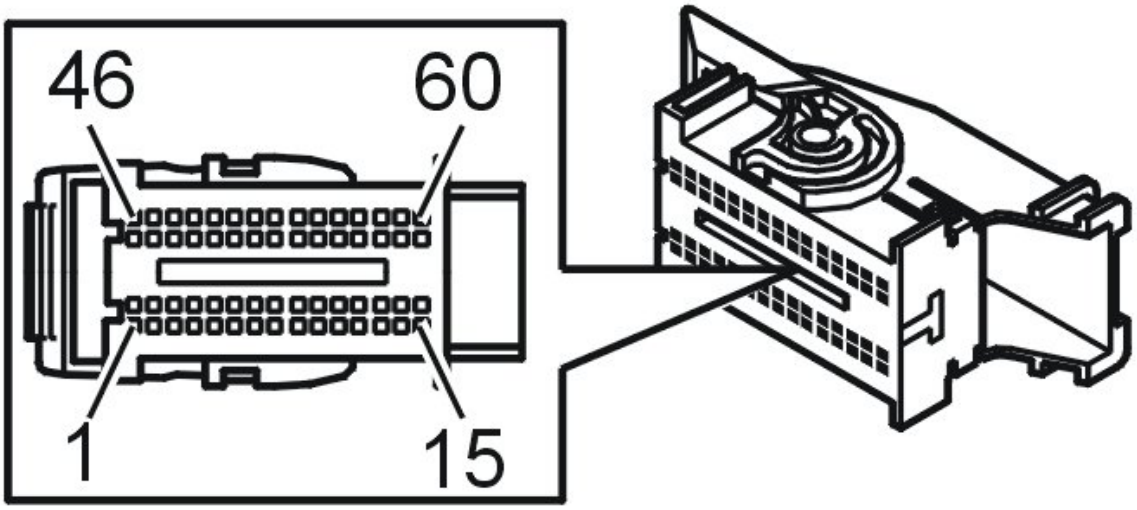
Check the ground lead. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #D45 (45) and the fuel level sensor on the left-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

The central electronic module (CEM) has registered that the fuel level sensor on the left-hand side is faulty.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the fuel level sensor on the left-hand side if the fault recurs.
Replace the fuel level sensor on the left-hand side if there is a permanent fault.
Remedy as necessary.

Other information

- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair

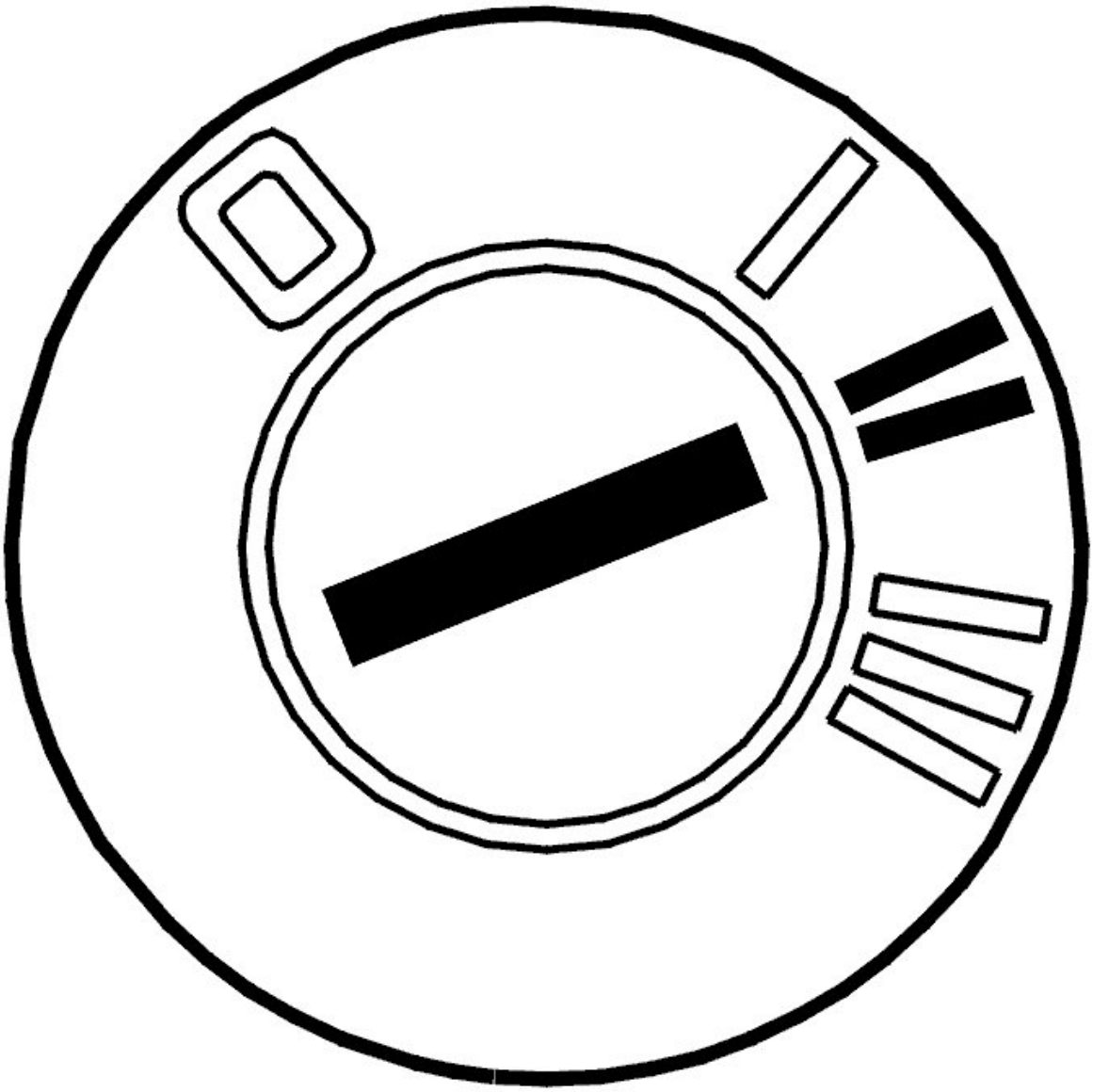
Continue - Verification

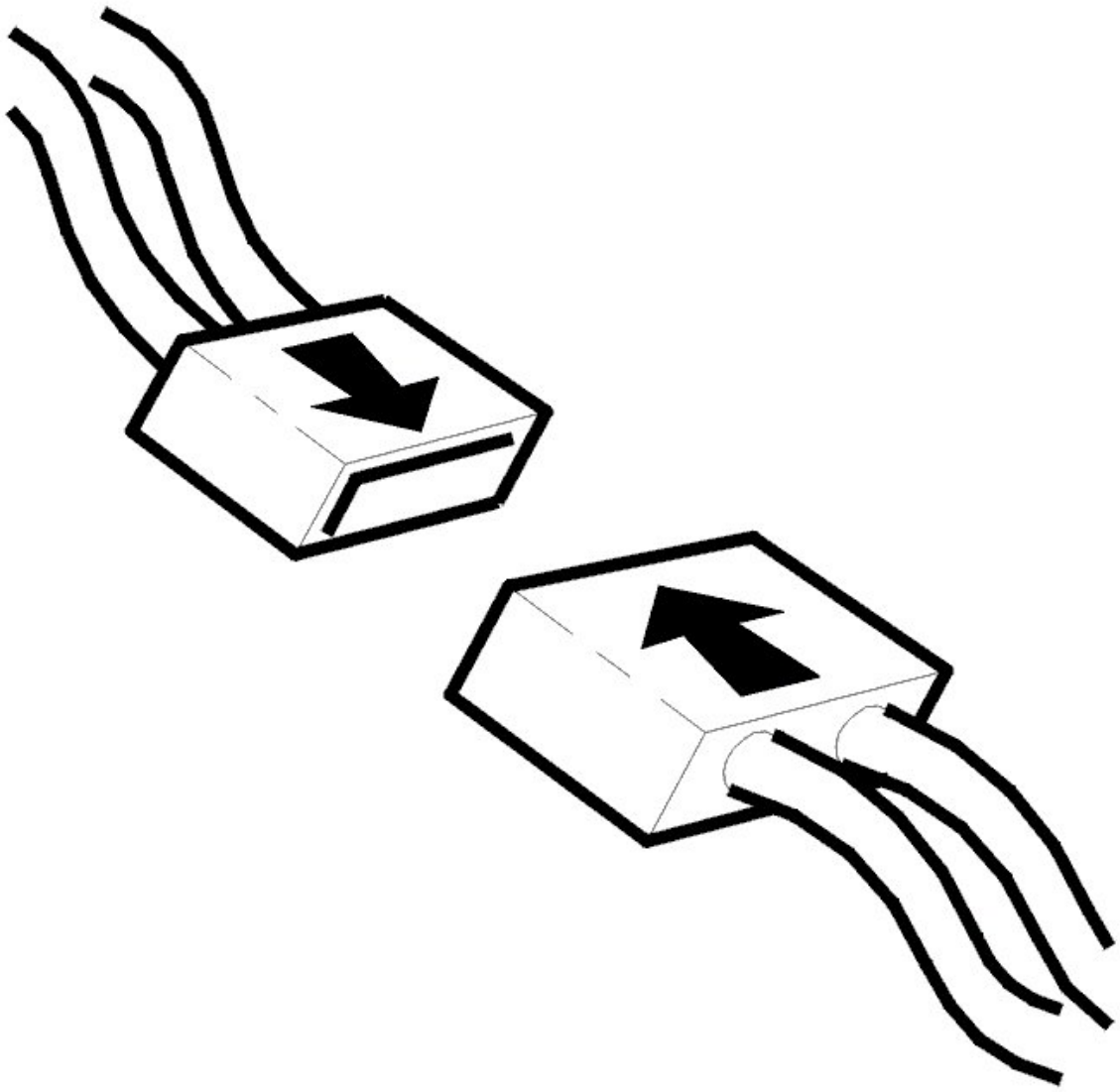
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

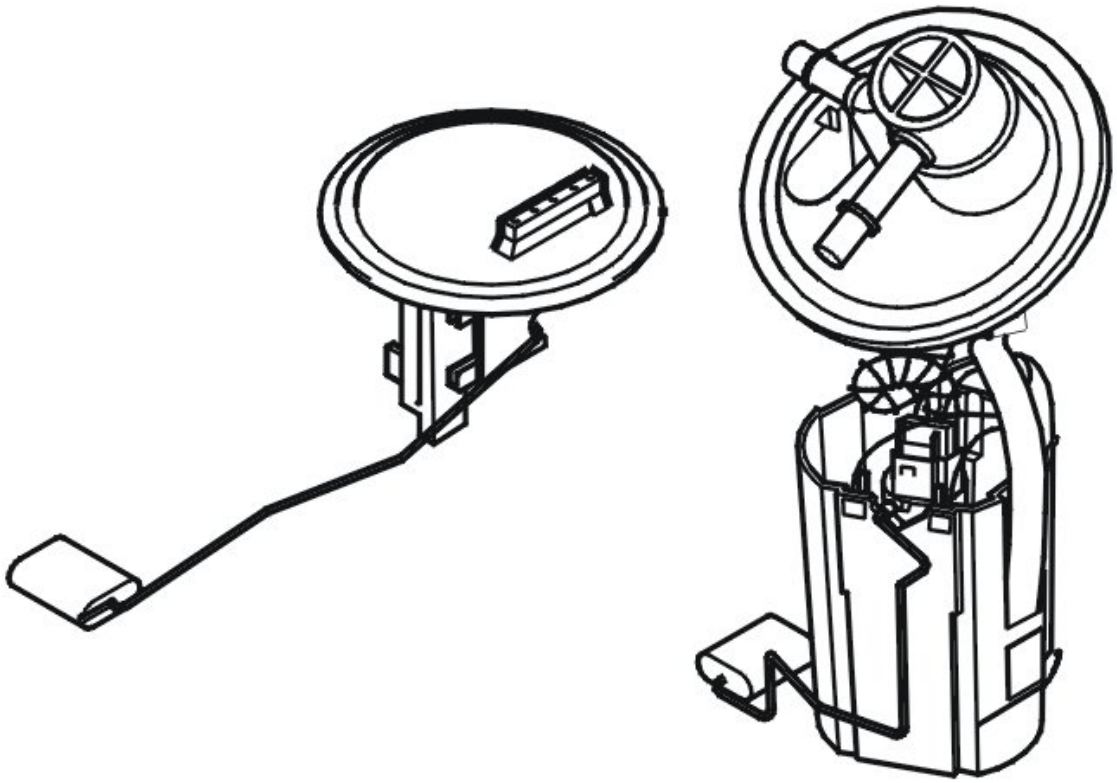
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A33

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the ejector side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the connection to the fuel level sensor on the ejector side or a short-circuit to supply voltage in the sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The fuel level is set to zero.

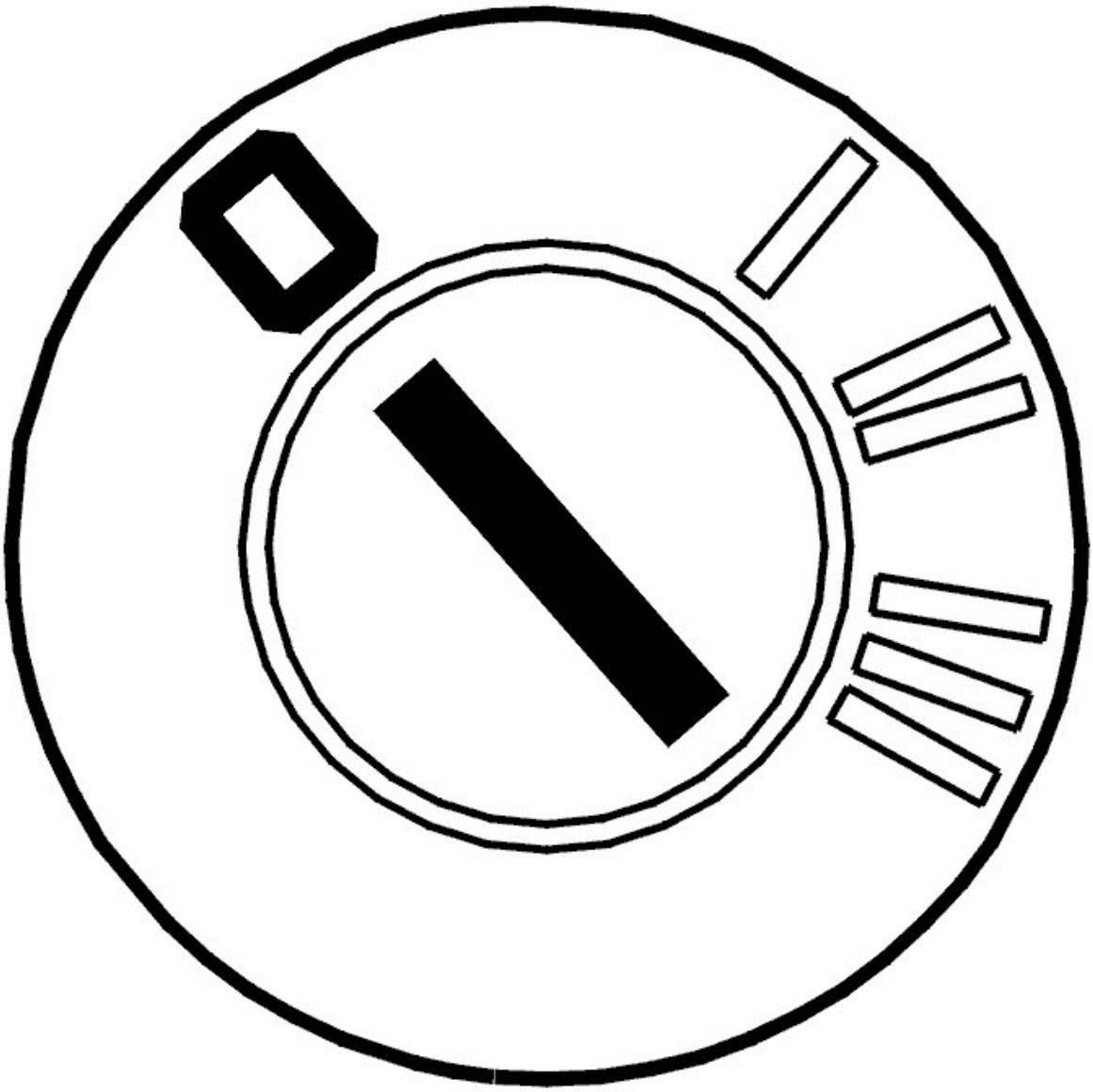
Possible source
- Open-circuit in the connection to the sensor on the ejector side
- Short-circuit to supply voltage in the sensor on the ejector side.

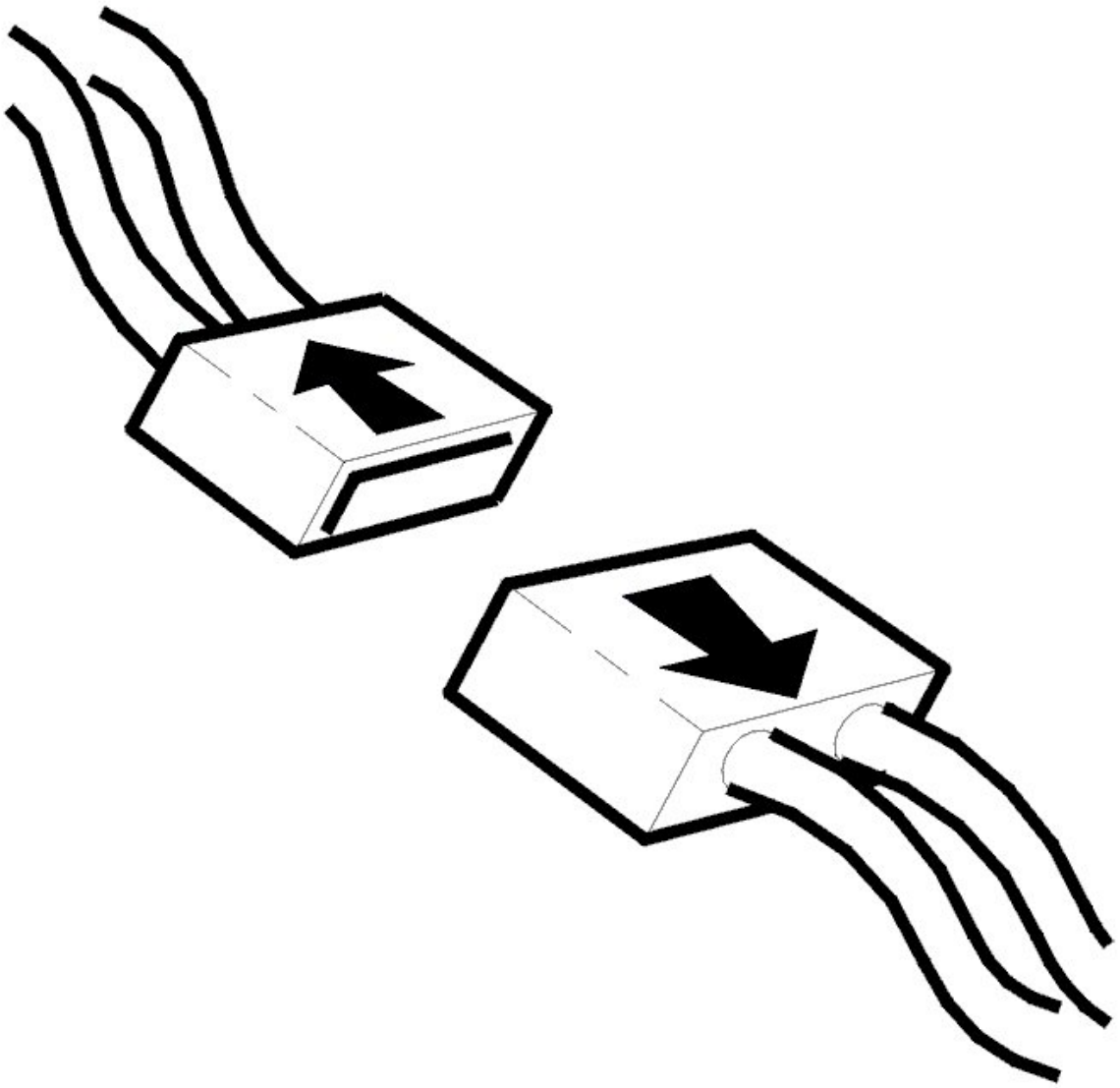
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Short-circuit to Supply Voltage or open-circuit

Short-circuit to supply voltage or open-circuit

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage.
Take readings between:

- Central electronic module (CEM) terminal #D43 (43) and the fuel level sensor on the left-hand side.

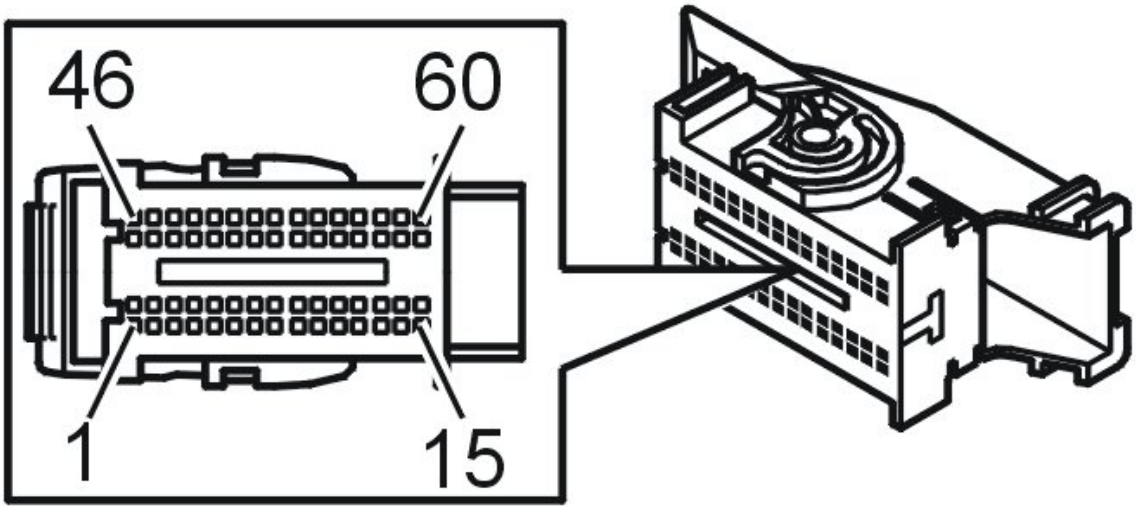
Check the ground lead if diagnostic trouble code (DTC) CEM-4A37 is also stored. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #D45 (45) and the fuel level sensor on the left-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



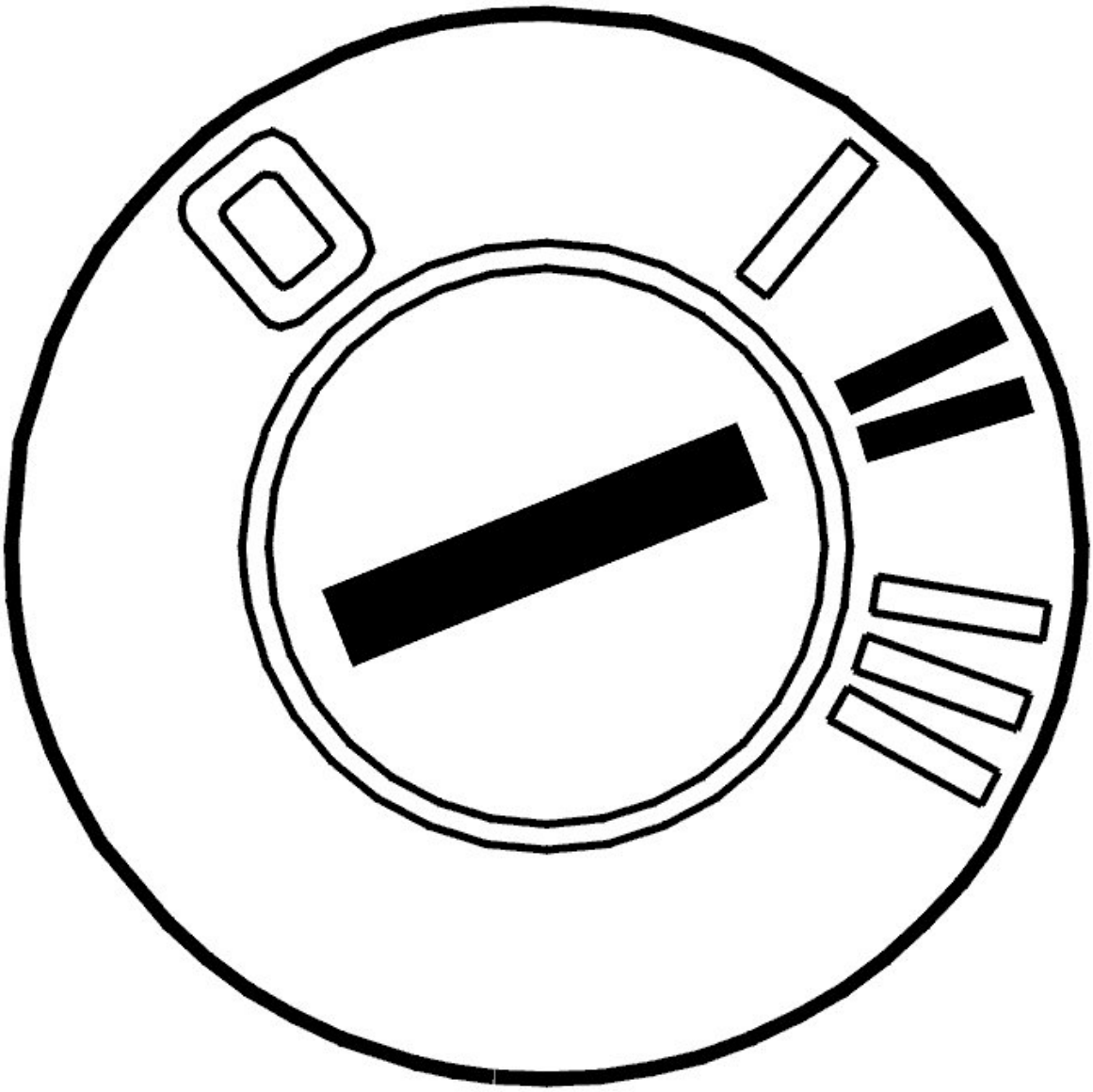
Continue - Verification

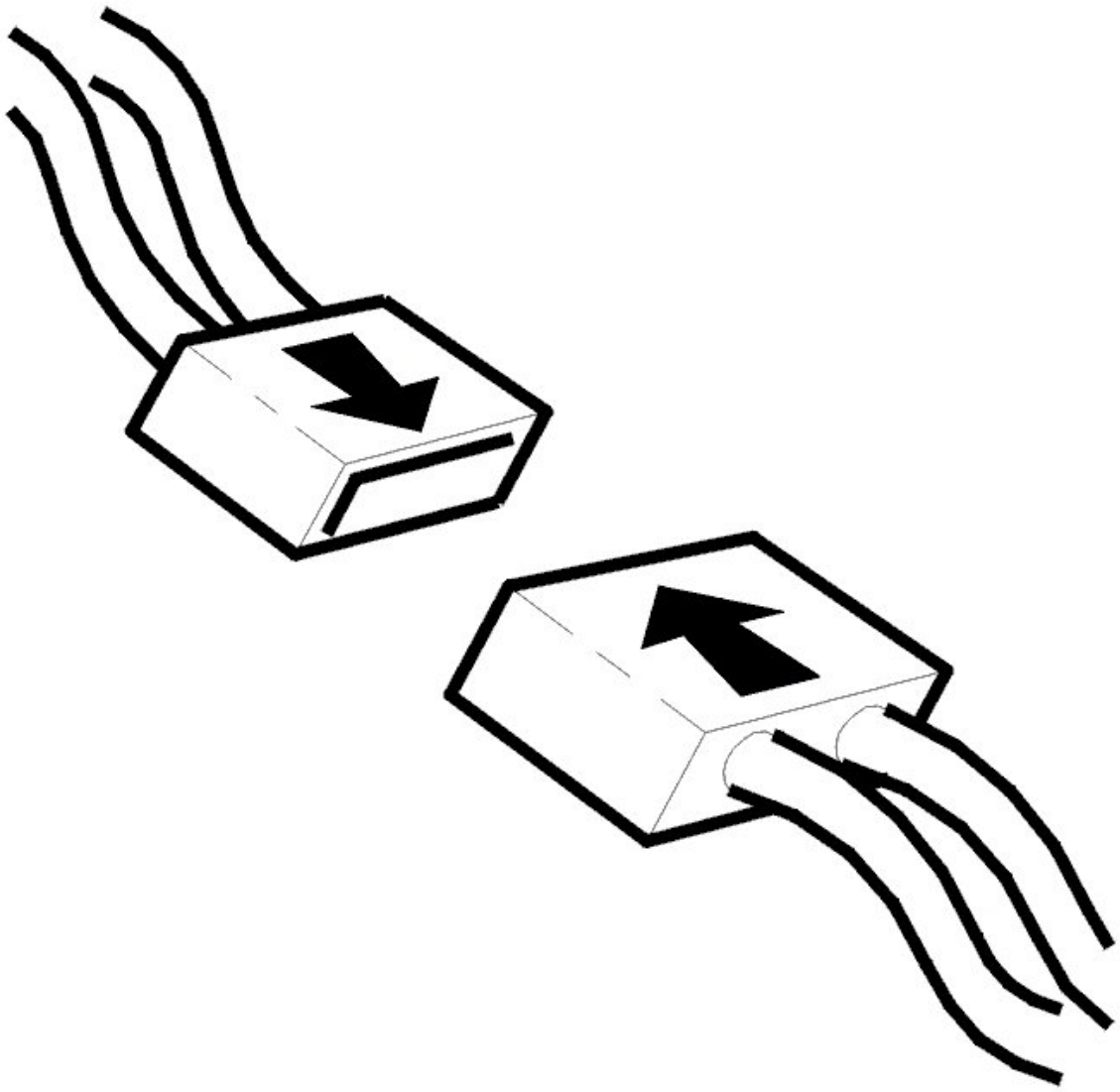
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

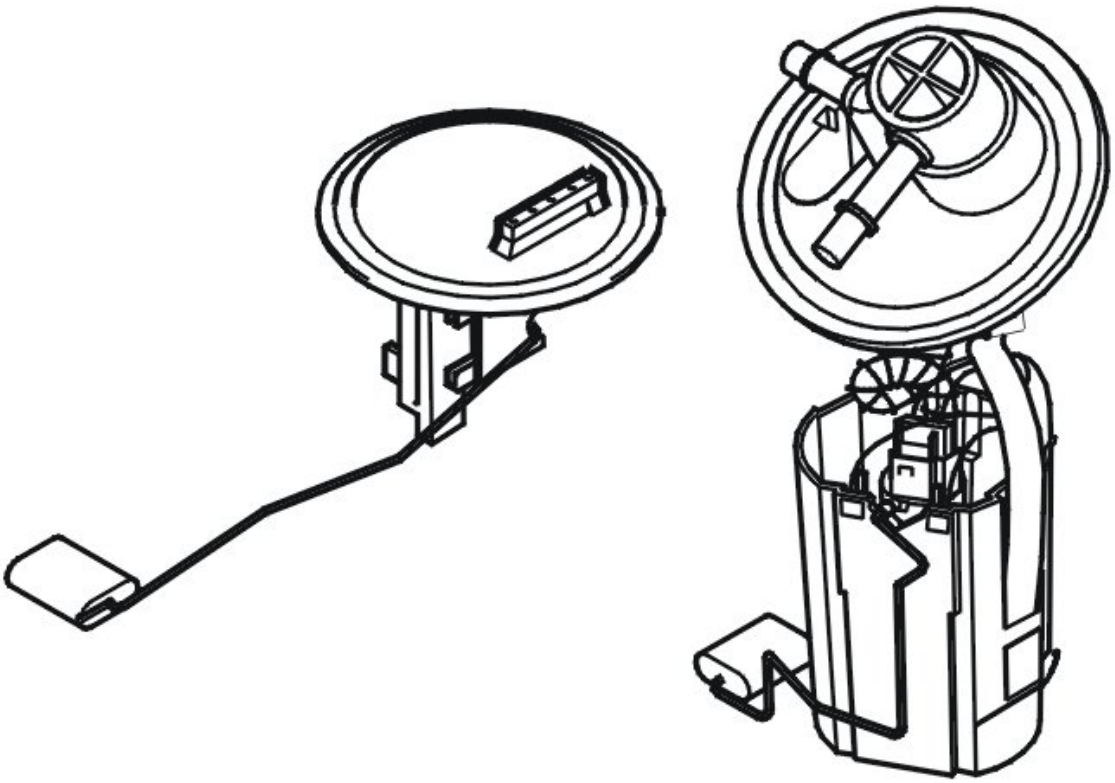
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A34

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the ejector side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The fuel level is set to zero.

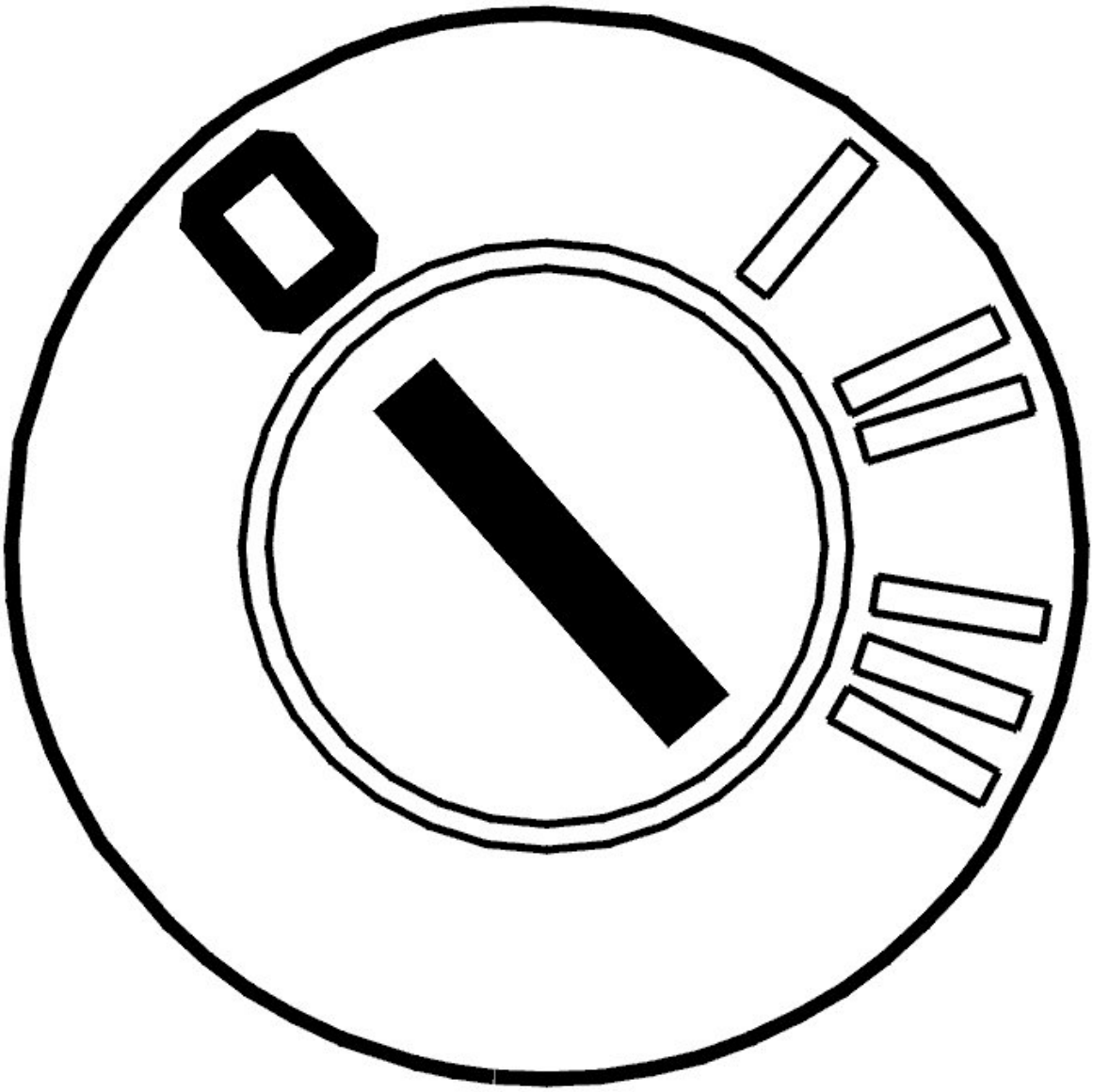
Possible source
- Short-circuit to ground in the sensor on the ejector side.

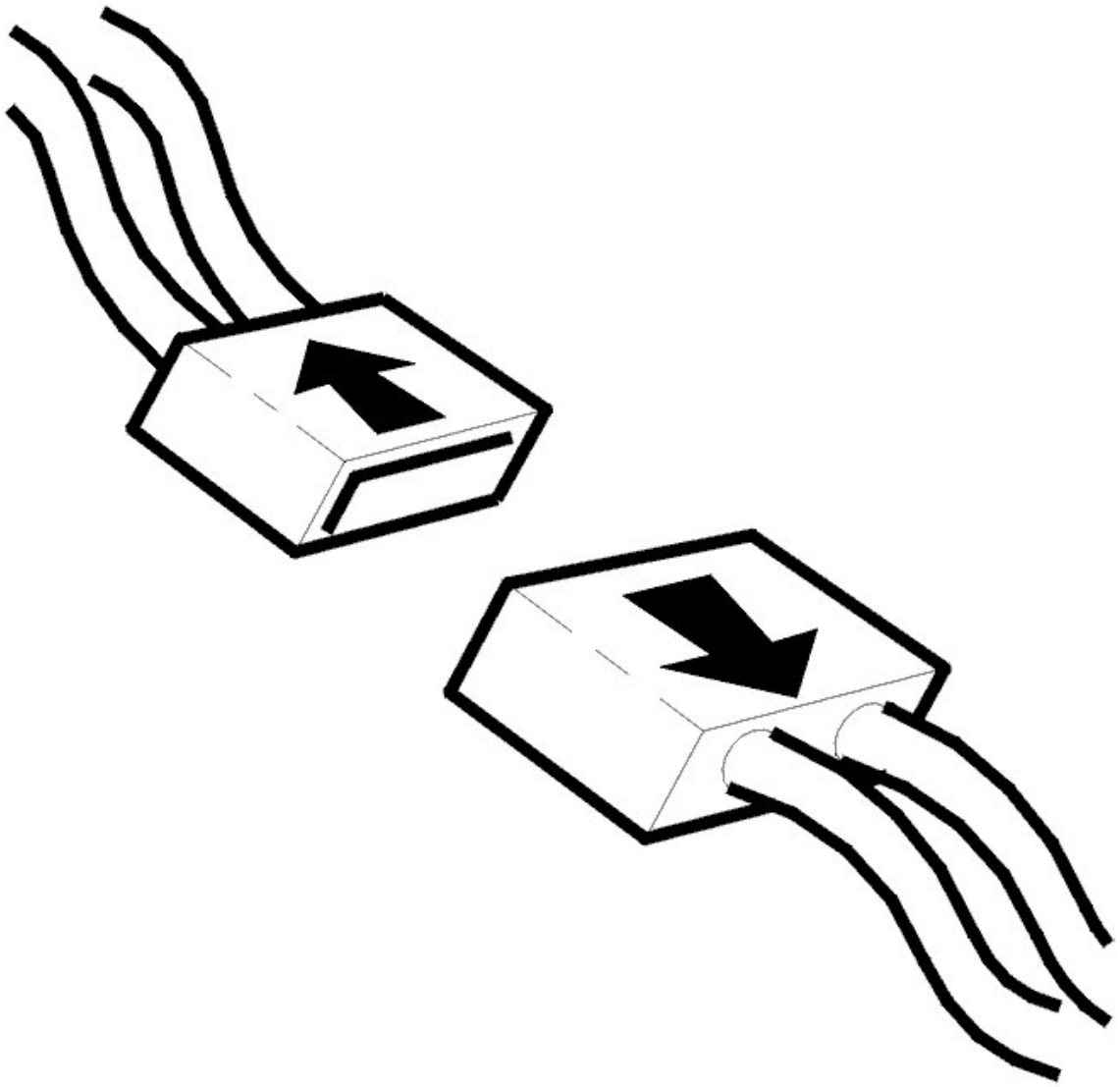
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Short-circuit to Ground

Short-circuit to ground

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for a short-circuit to ground.

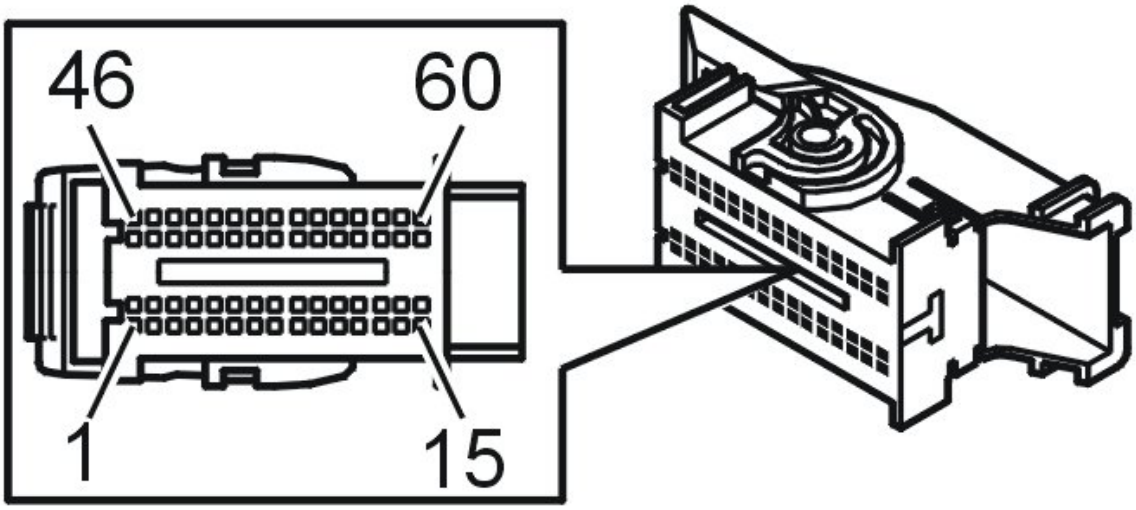
Take readings between:

- Central electronic module (CEM) terminal #D43 (43) and the fuel level sensor on the left-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



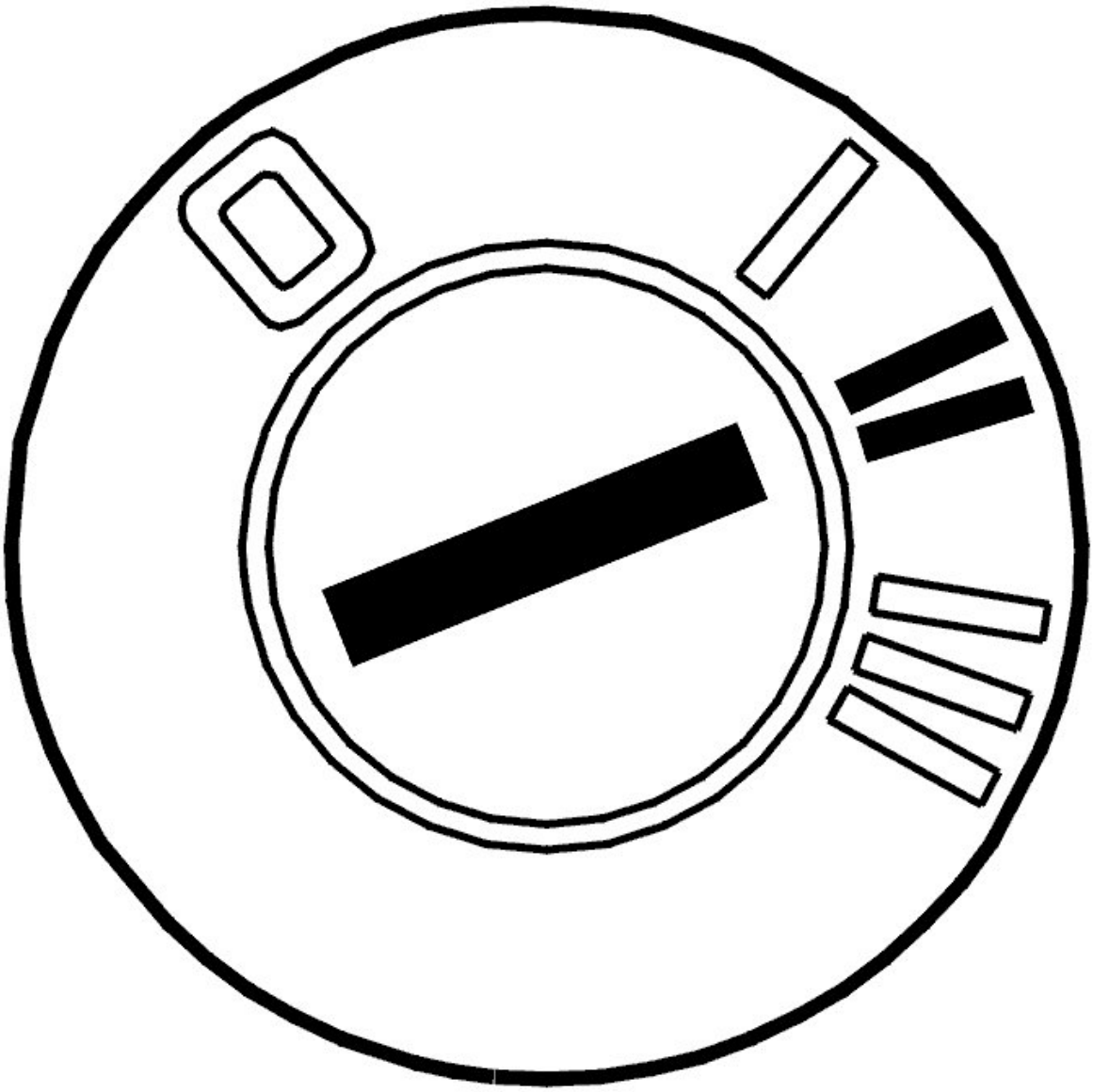
Continue - Verification

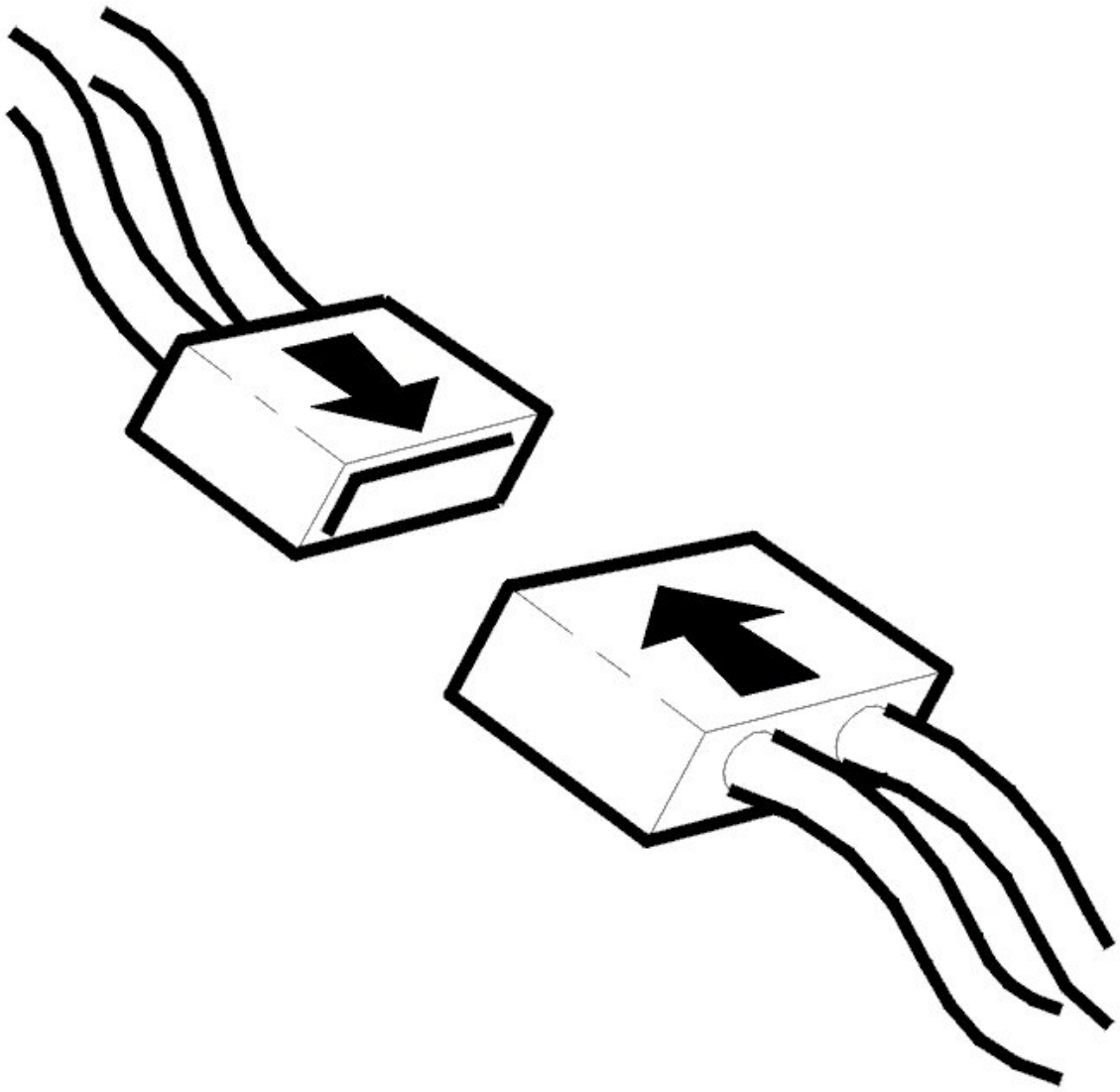
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

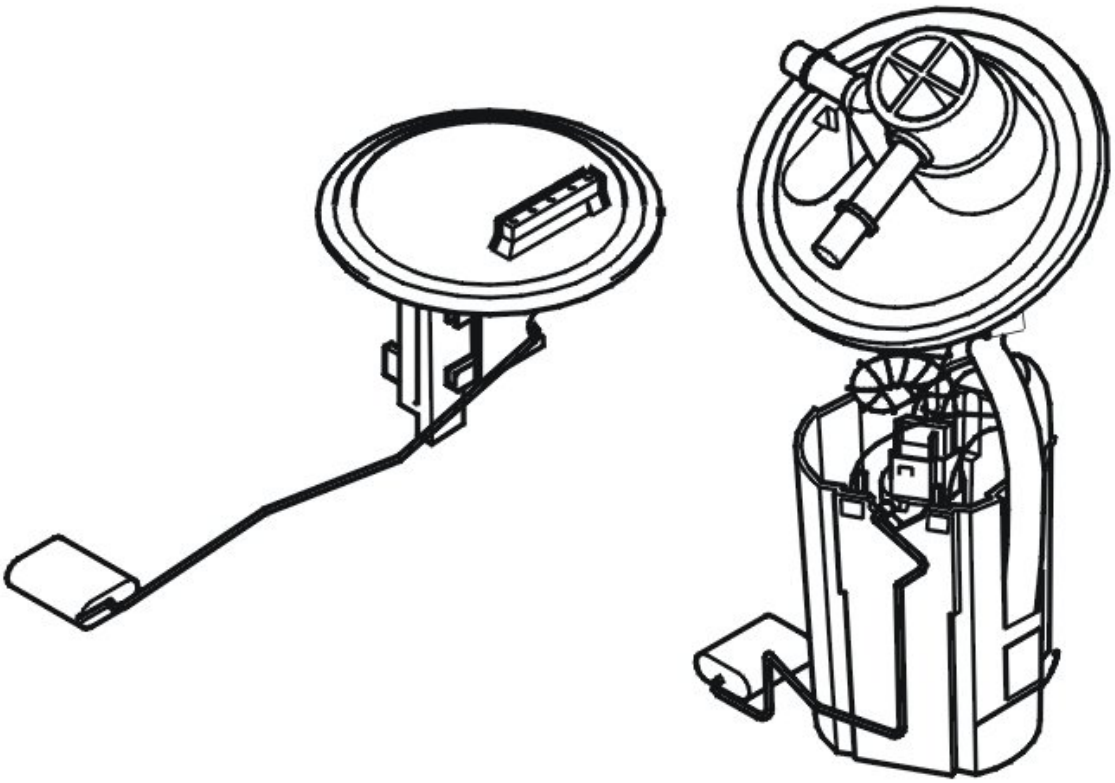
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A35

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the pump side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the fuel level has not changed during the last 100 km.
The diagnostic trouble code (DTC) can be diagnosed with the engine running and the fuel level above 2 liters.

Substitute value
- The fuel level is set to zero.

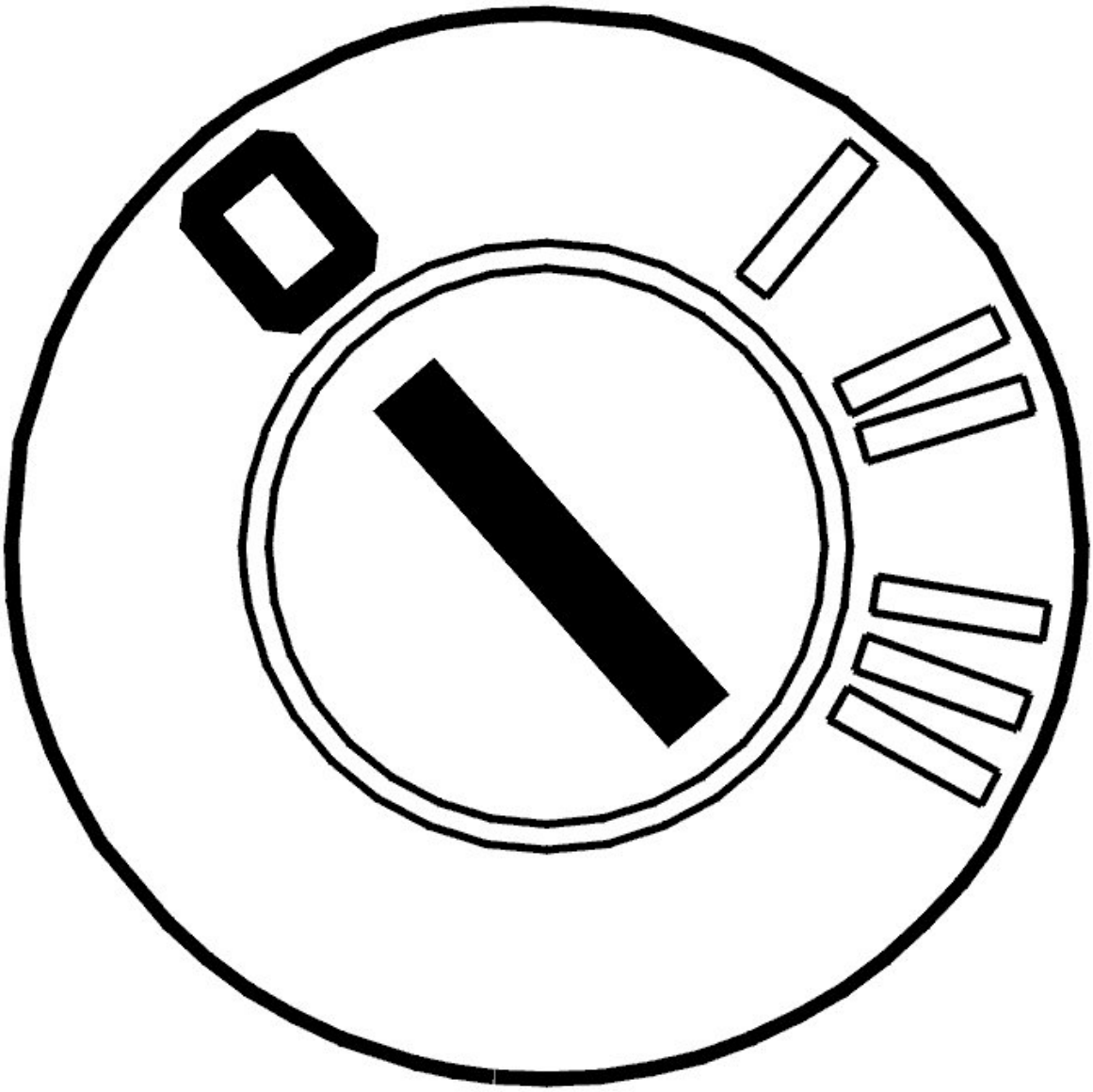
Possible source
- The sensor on the pump side is faulty.

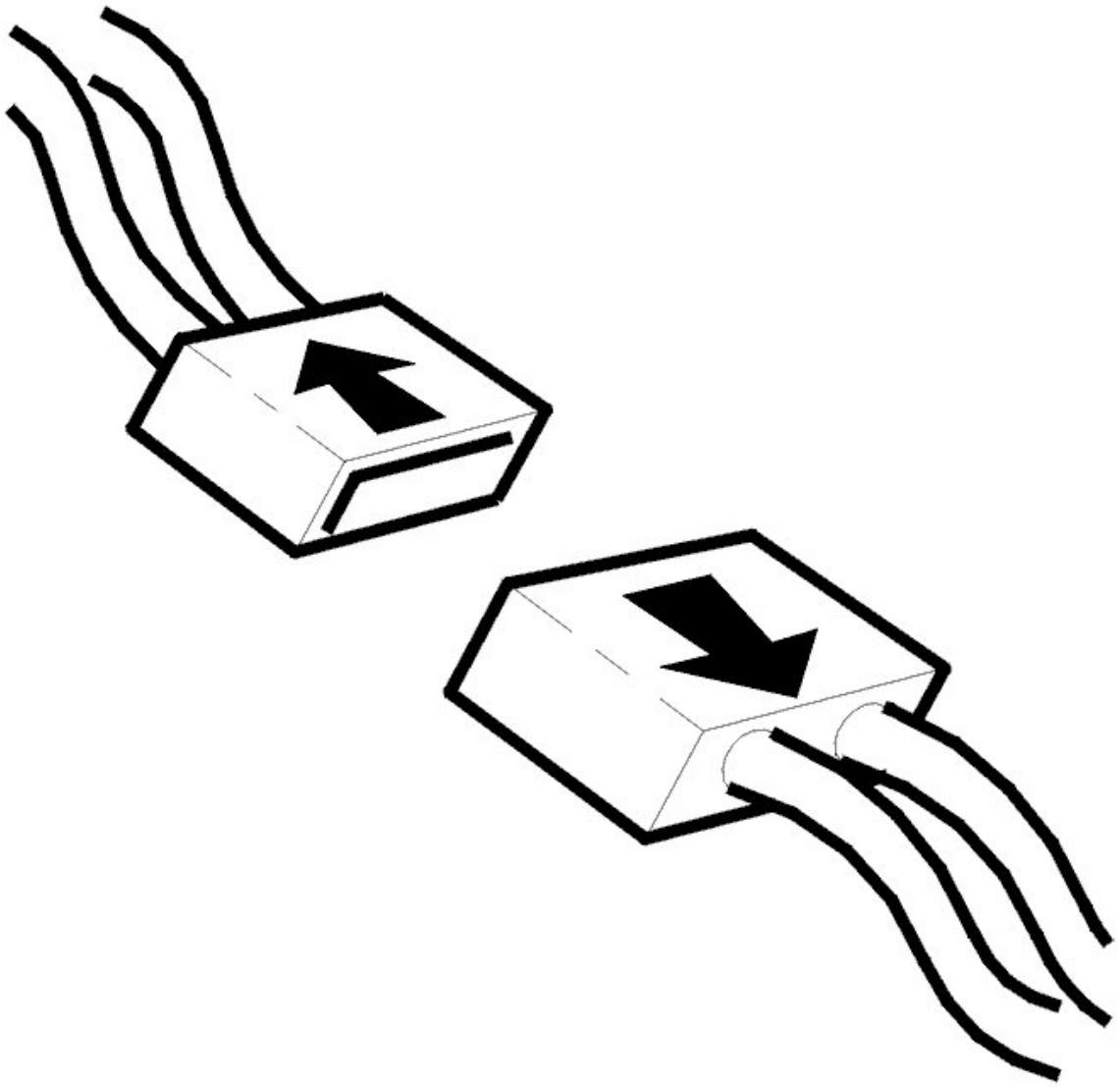
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Faulty Signal

Faulty signal

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the ground lead. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #D45 (45) and the fuel level sensor on the right-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
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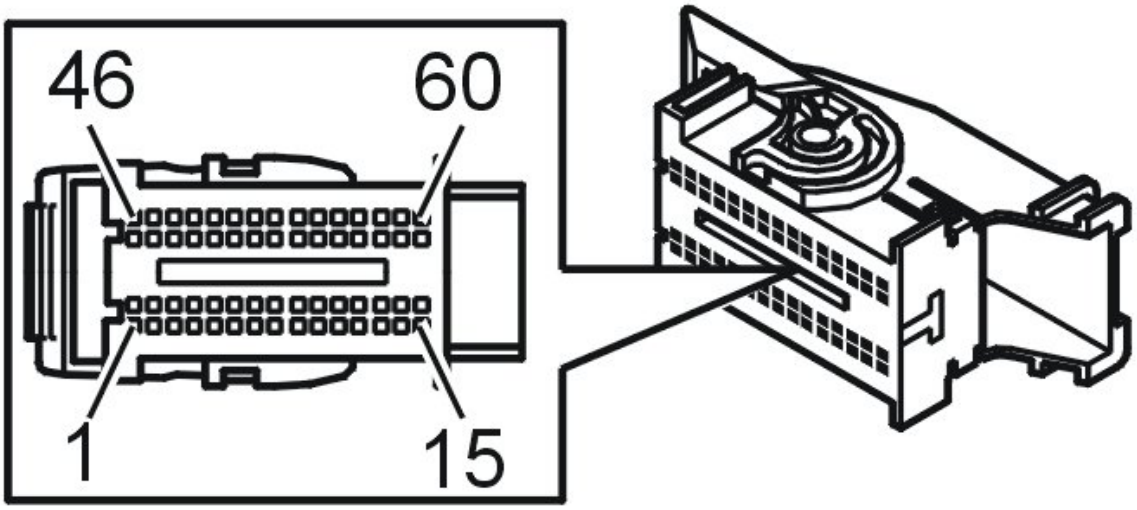
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

The central electronic module (CEM) has registered that the fuel level sensor on the right-hand side is faulty.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the fuel level sensor on the right-hand side if the fault recurs.
Replace the fuel level sensor on the right-hand side if there is a permanent fault.
Remedy as necessary.

Other information

- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair

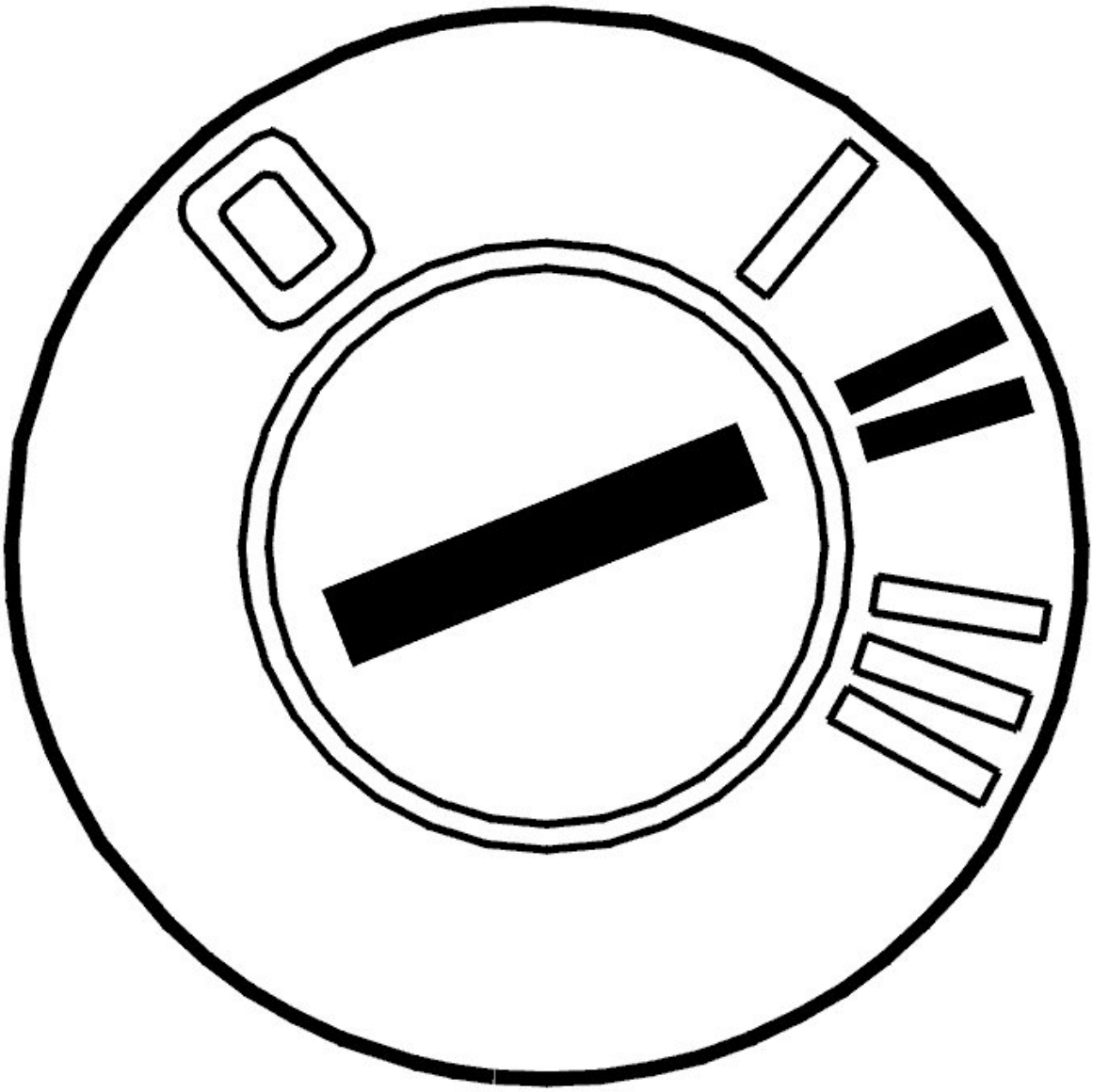
Continue - Verification

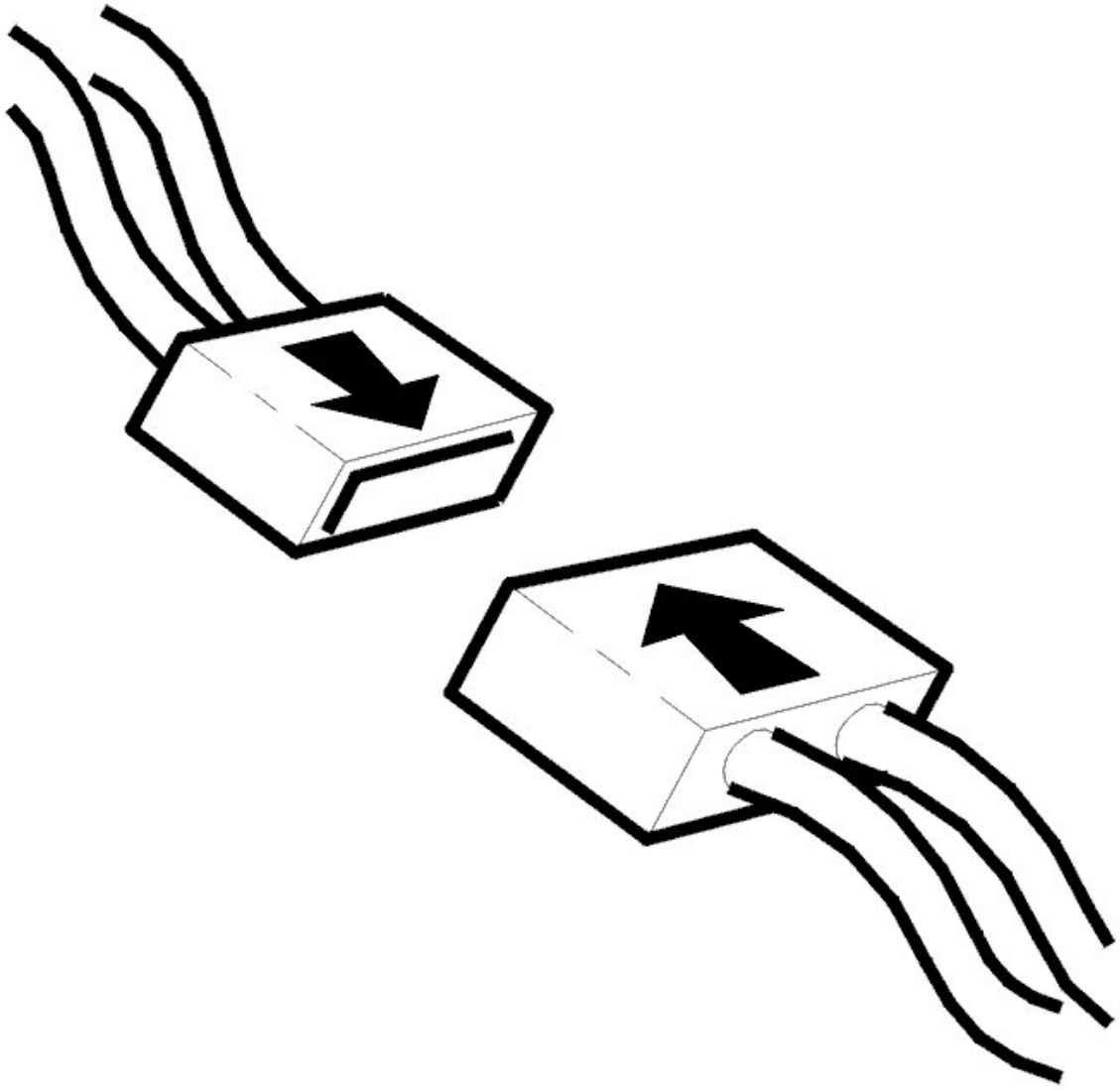
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

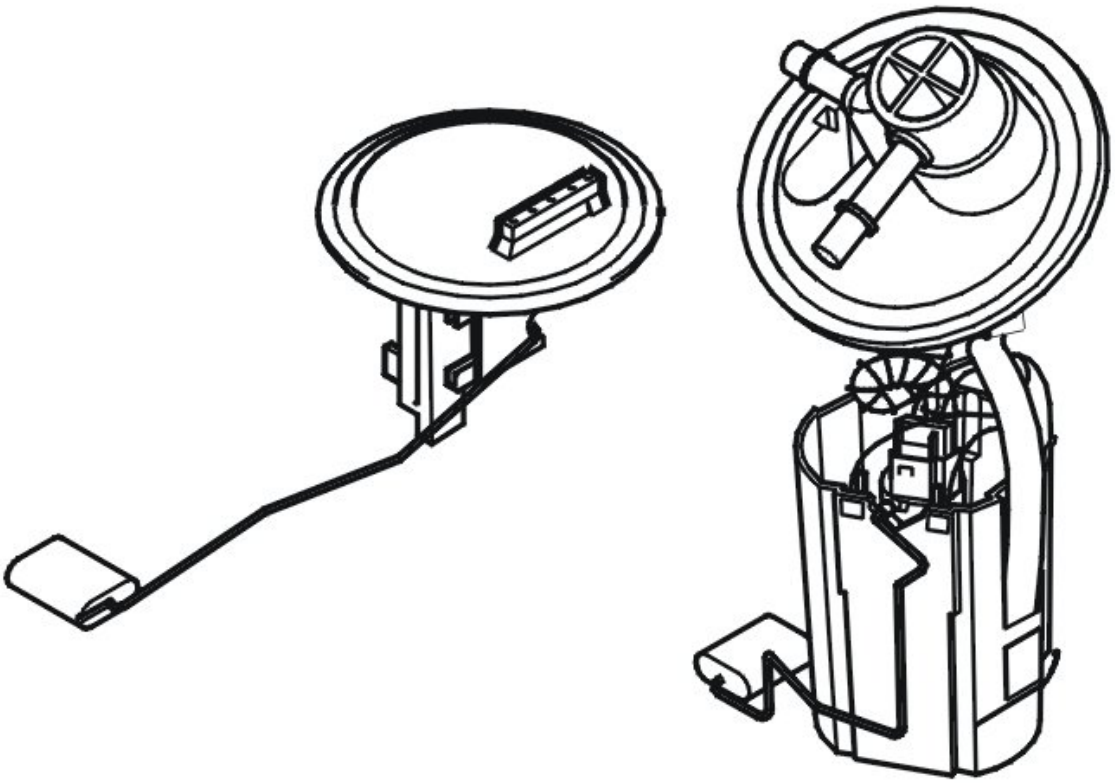
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A37

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the pump side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the connection to the sensor on the pump side in the tank or a short-circuit to supply voltage in the sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The fuel level is set to zero.

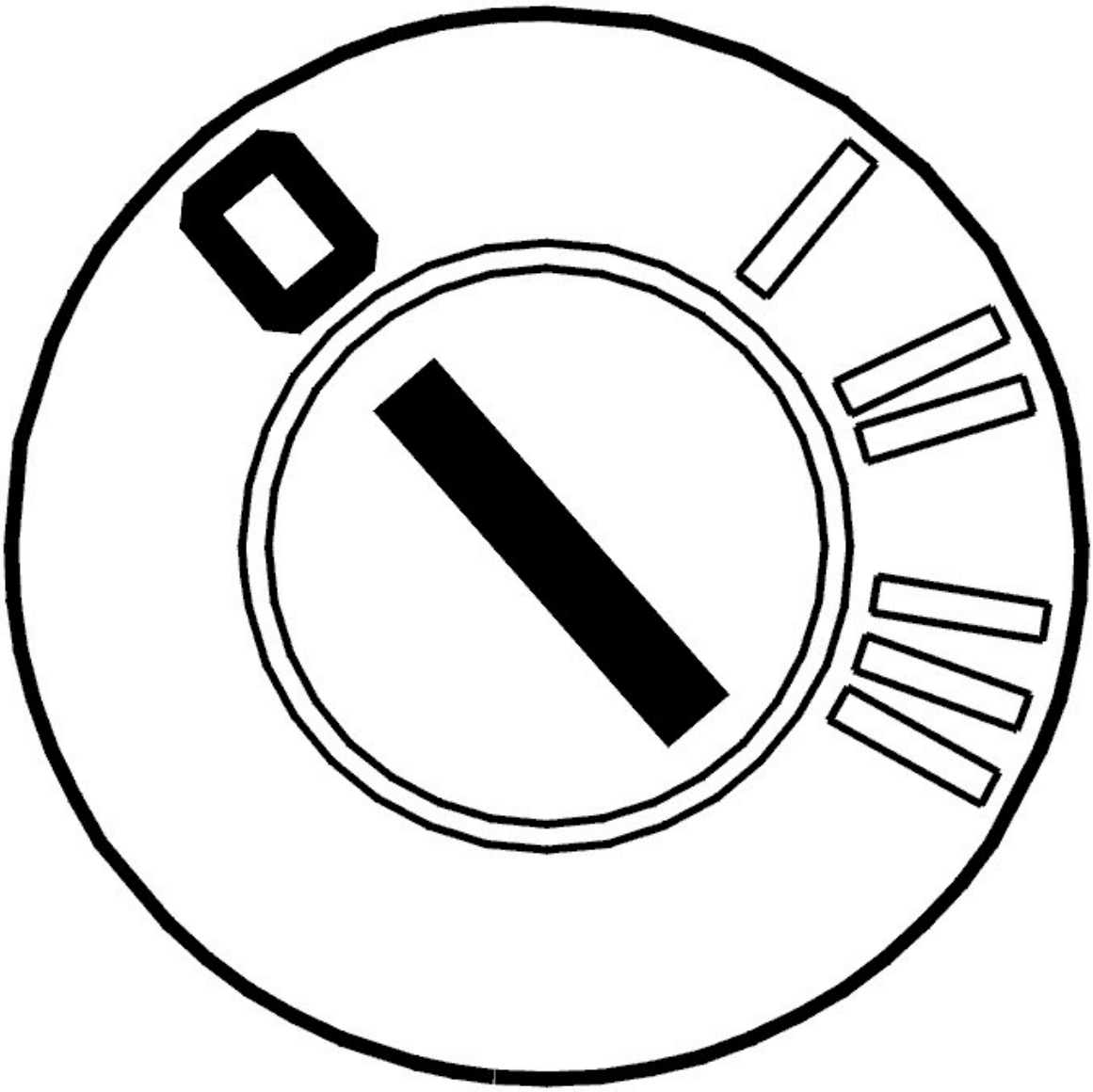
Possible source
- Open-circuit in the connection to the fuel level sensor on the pump side
- Short-circuit to supply voltage in the sensor on the pump side.

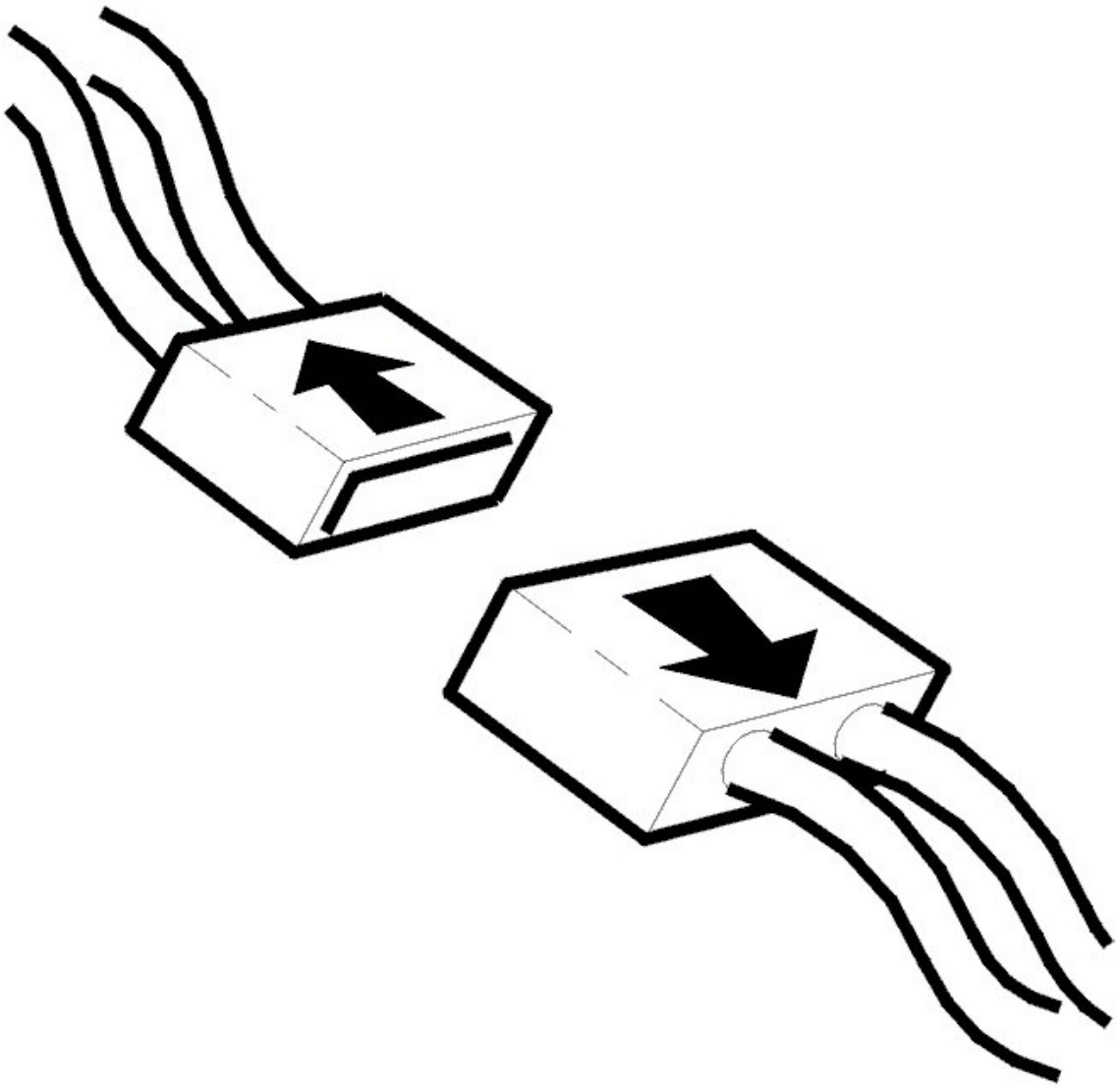
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Short-circuit to Supply Voltage or open-circuit

Short-circuit to supply voltage or open-circuit

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage.
Take readings between:

- Central electronic module (CEM) terminal #D44 (44) and the fuel level sensor on the right-hand side.

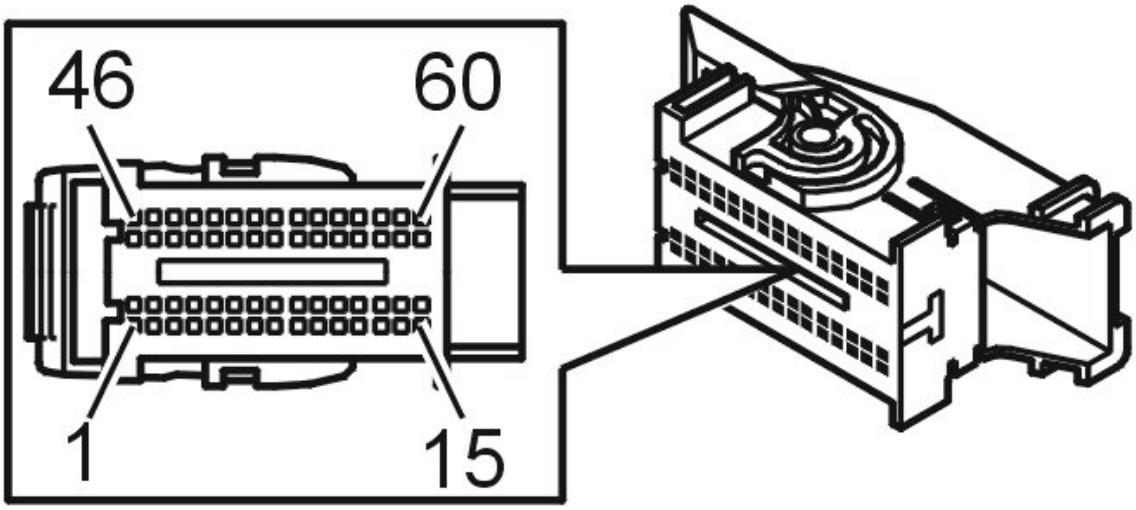
Check the ground lead if diagnostic trouble code (DTC) CEM-4A33 is also stored. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #D45 (45) and the fuel level sensor on the right-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



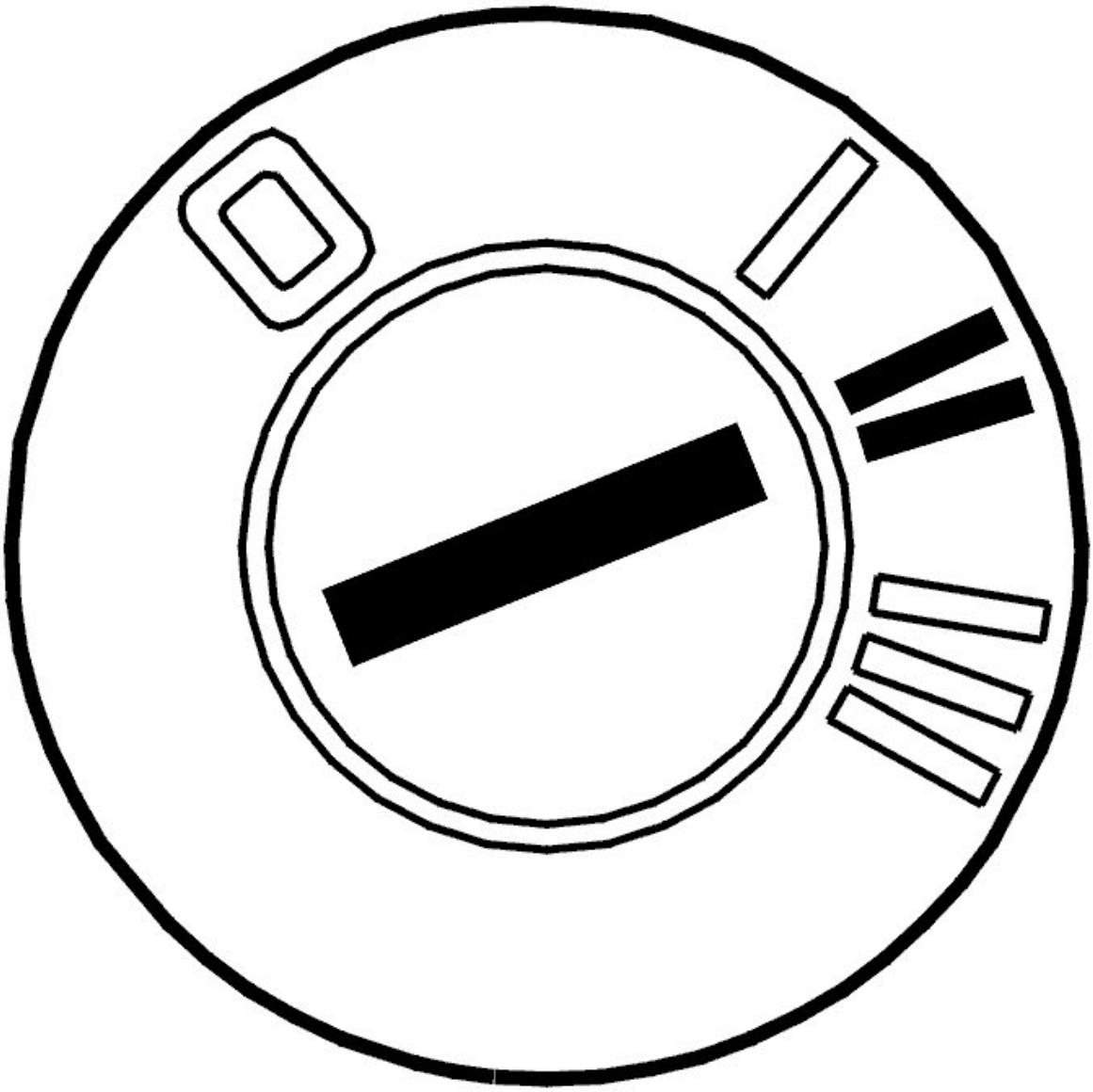
Continue - Verification

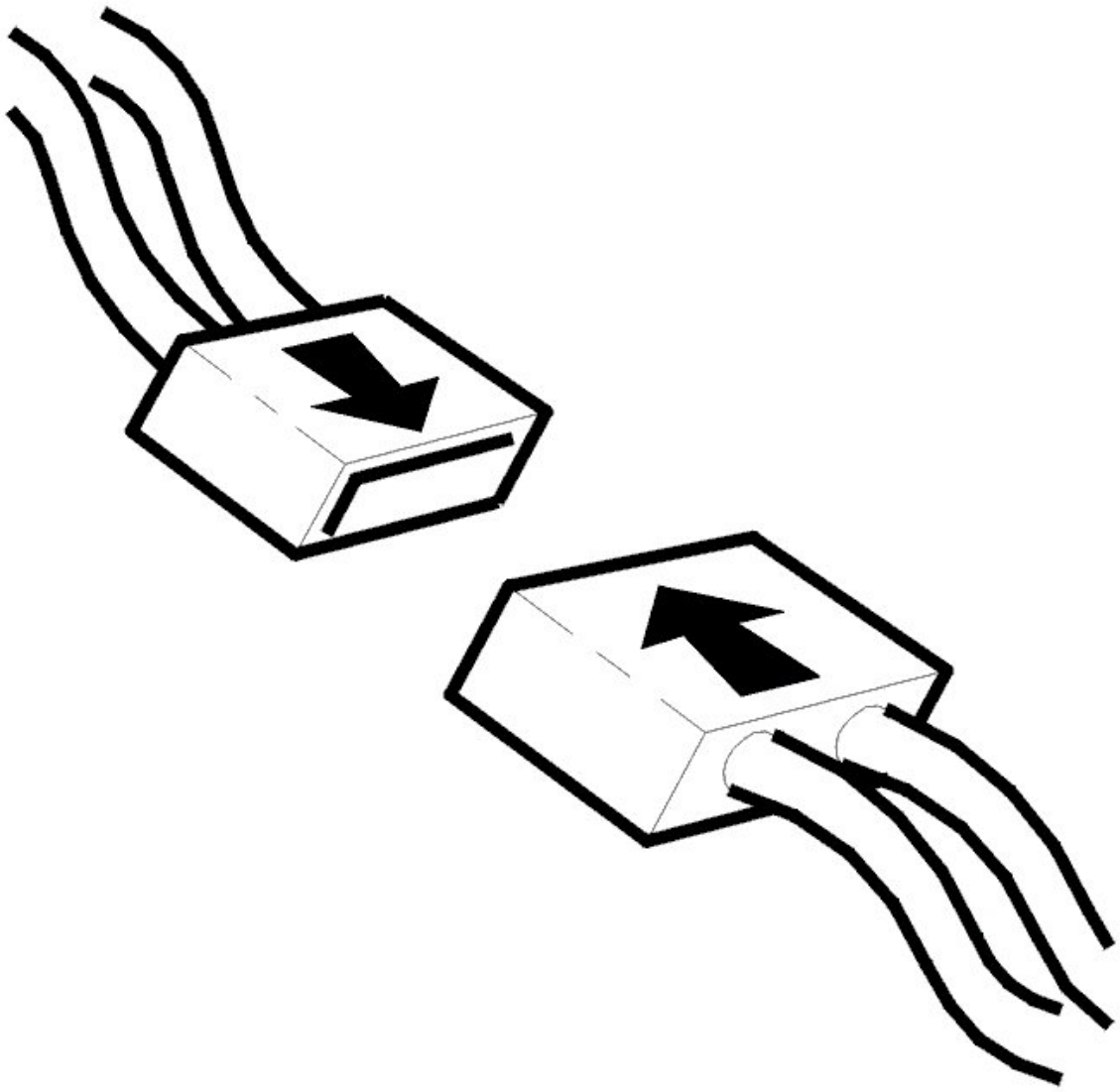
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

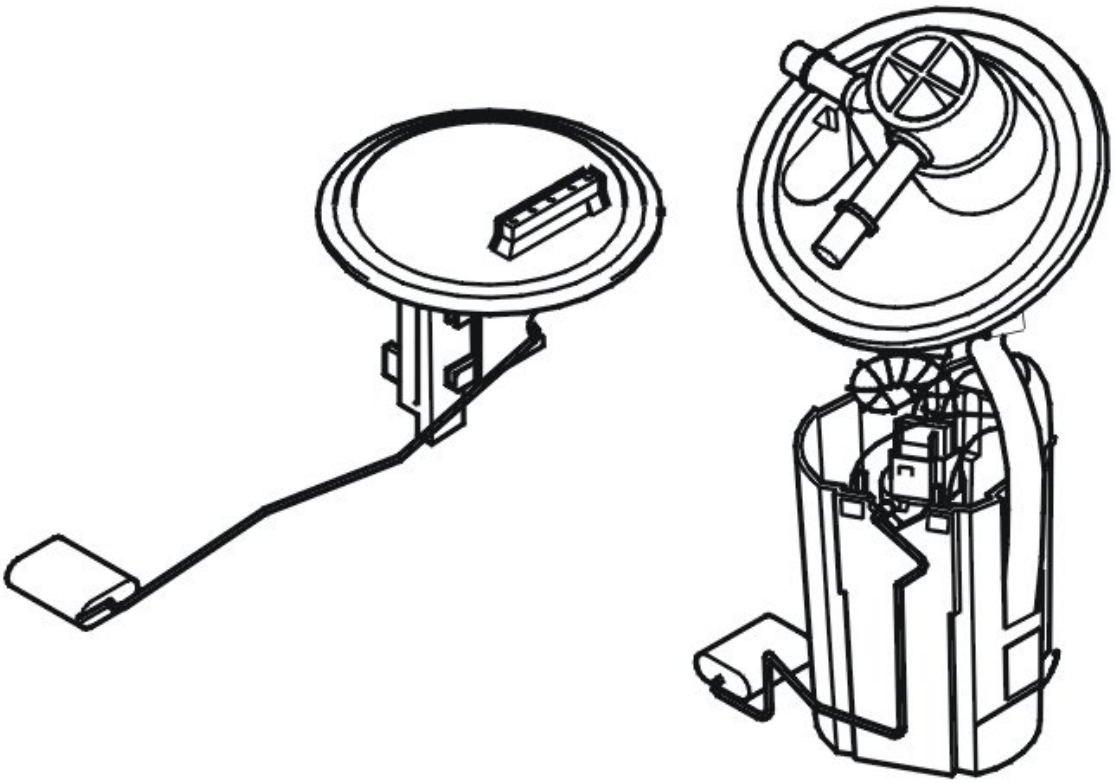
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4A38

Condition



The central electronic module (CEM) continuously checks the signal from the sensor on the pump side which indicates the level in one of the fuel tanks.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The fuel level is set to zero.

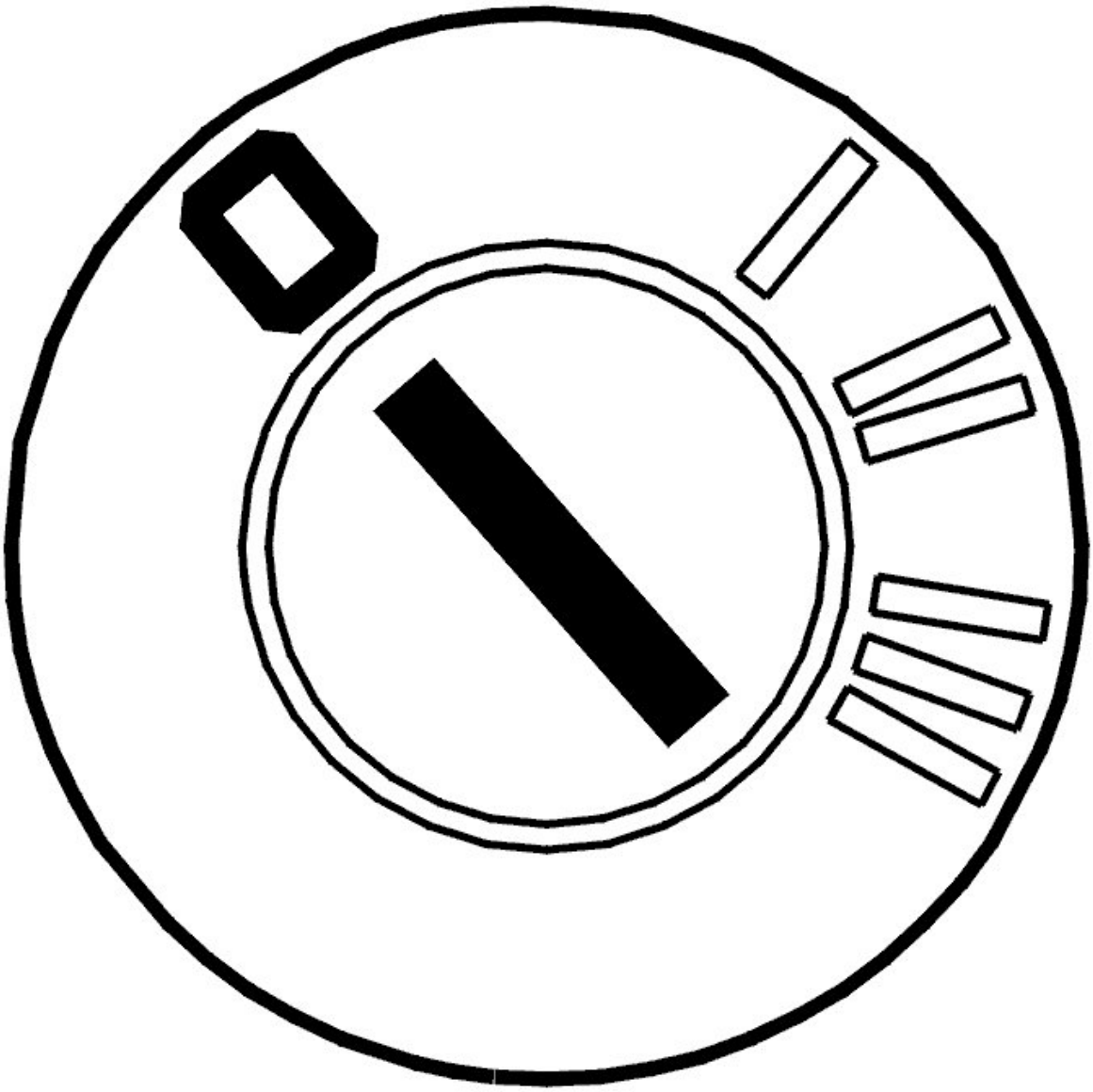
Possible source
- Short-circuit to ground in the sensor on the pump side.

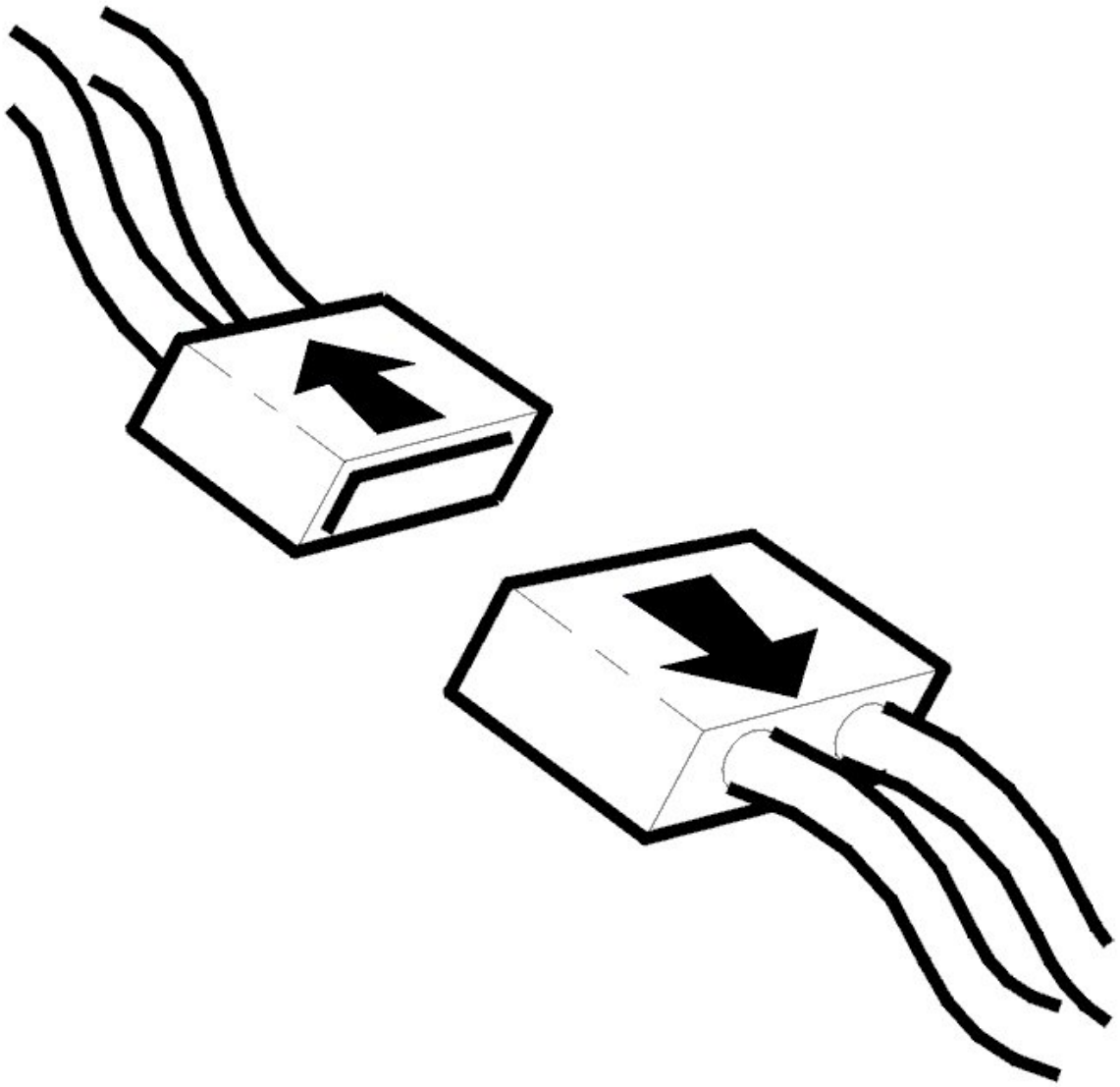
Fault symptom[s]
- The trip computer displays an empty fuel tank too early.
- The fuel gauge indicates zero even though there is fuel in the tank.

Short-circuit to Ground

Short-circuit to ground

Checking the wiring





- Ignition off
- Disconnect central electronic module (CEM) connector D.

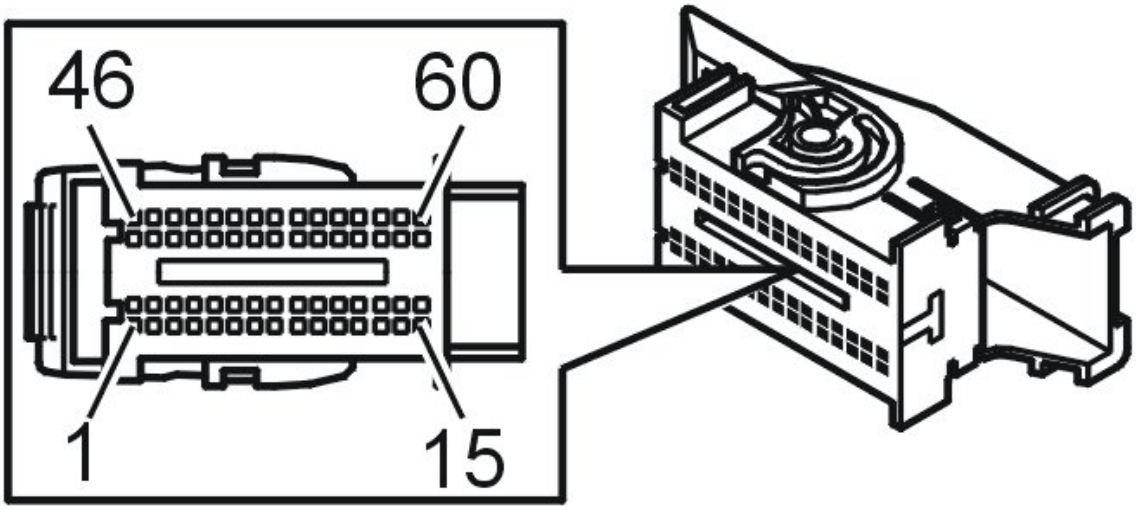
Check the signal cable. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #D44 (44) and the fuel level sensor on the right-hand side.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Level sensor fuel tank, replacing See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



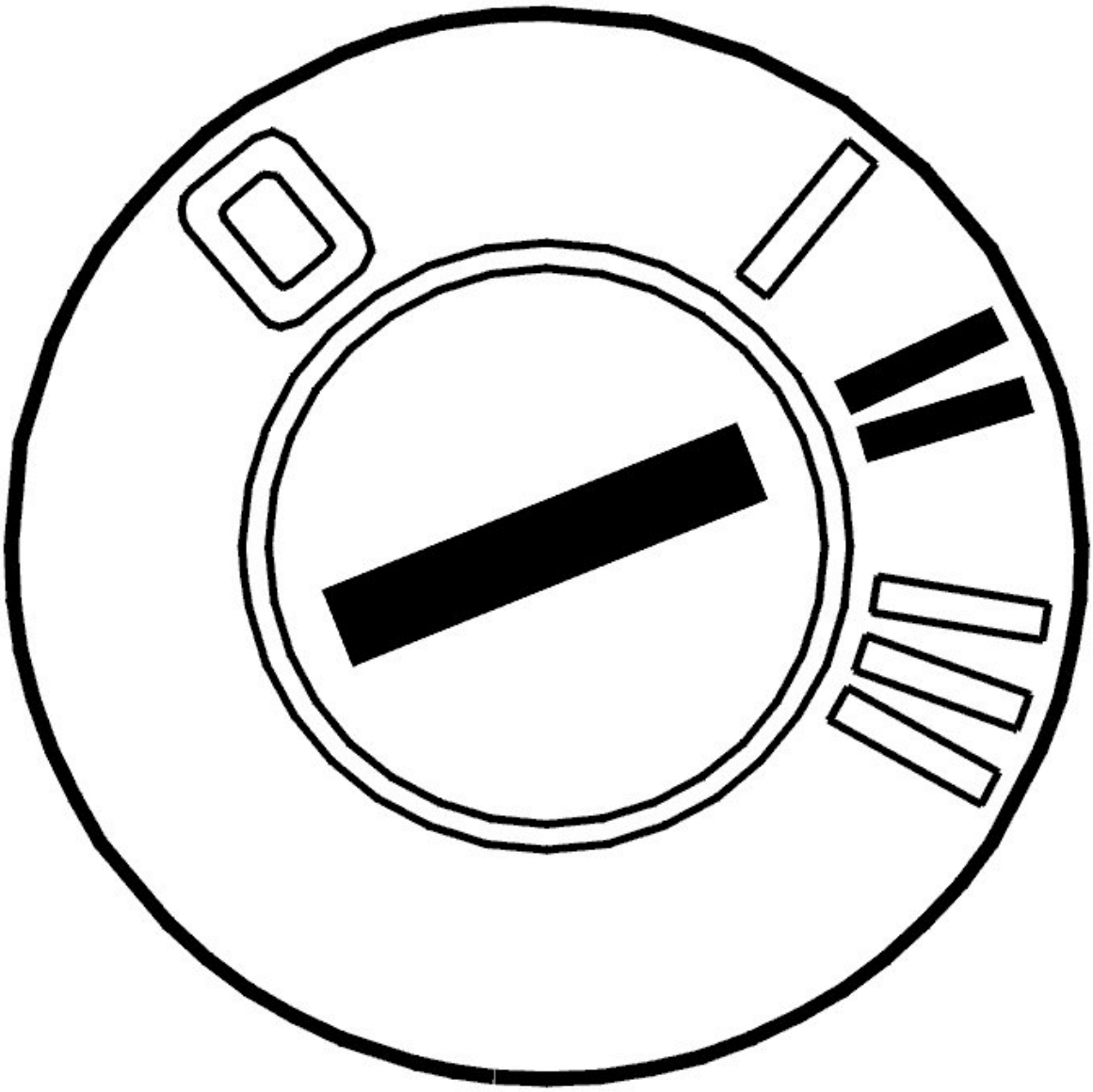
Continue - Verification

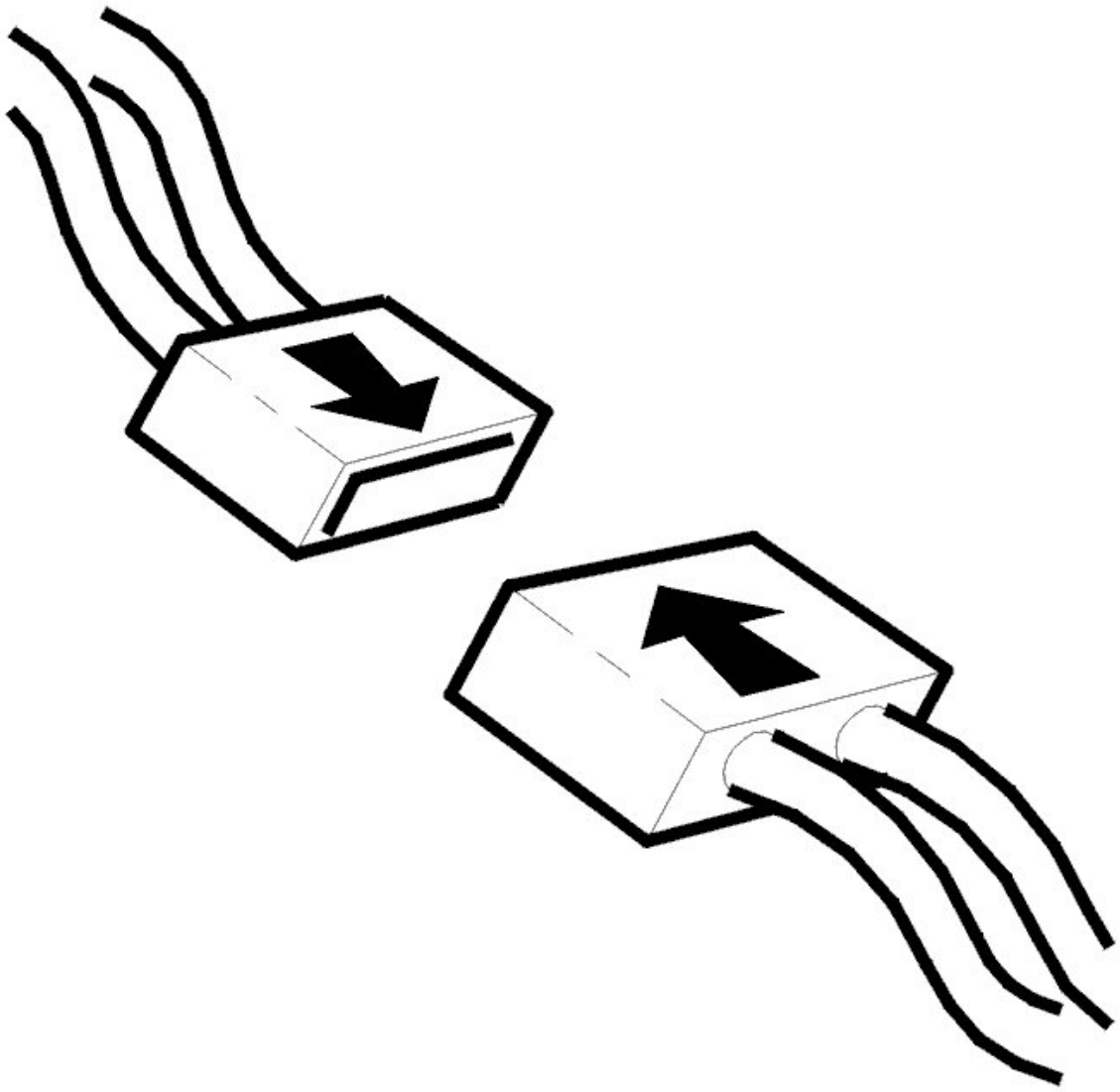
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check if the value at the fuel level gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

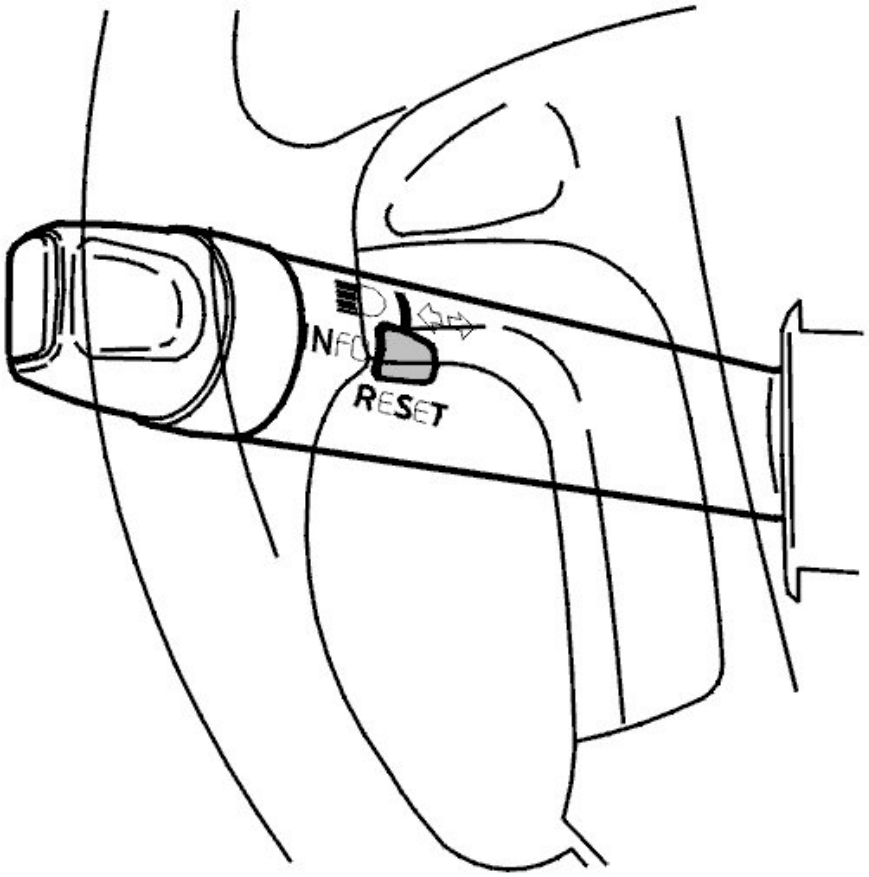
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F00

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the reset button on the control stalk has been active for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The reset button has been pressed in for more than 60 seconds
- The reset button has jammed in the pressed in position.

Fault symptom[s]
- The parking heater does not operate
- The reset button does not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Turn signal switch, replacing See: Lighting and Horns/Sensors and Switches - Lighting and Horns/Turn Signal Switch/Service and Repair/Turn Signal Switch, Replacing

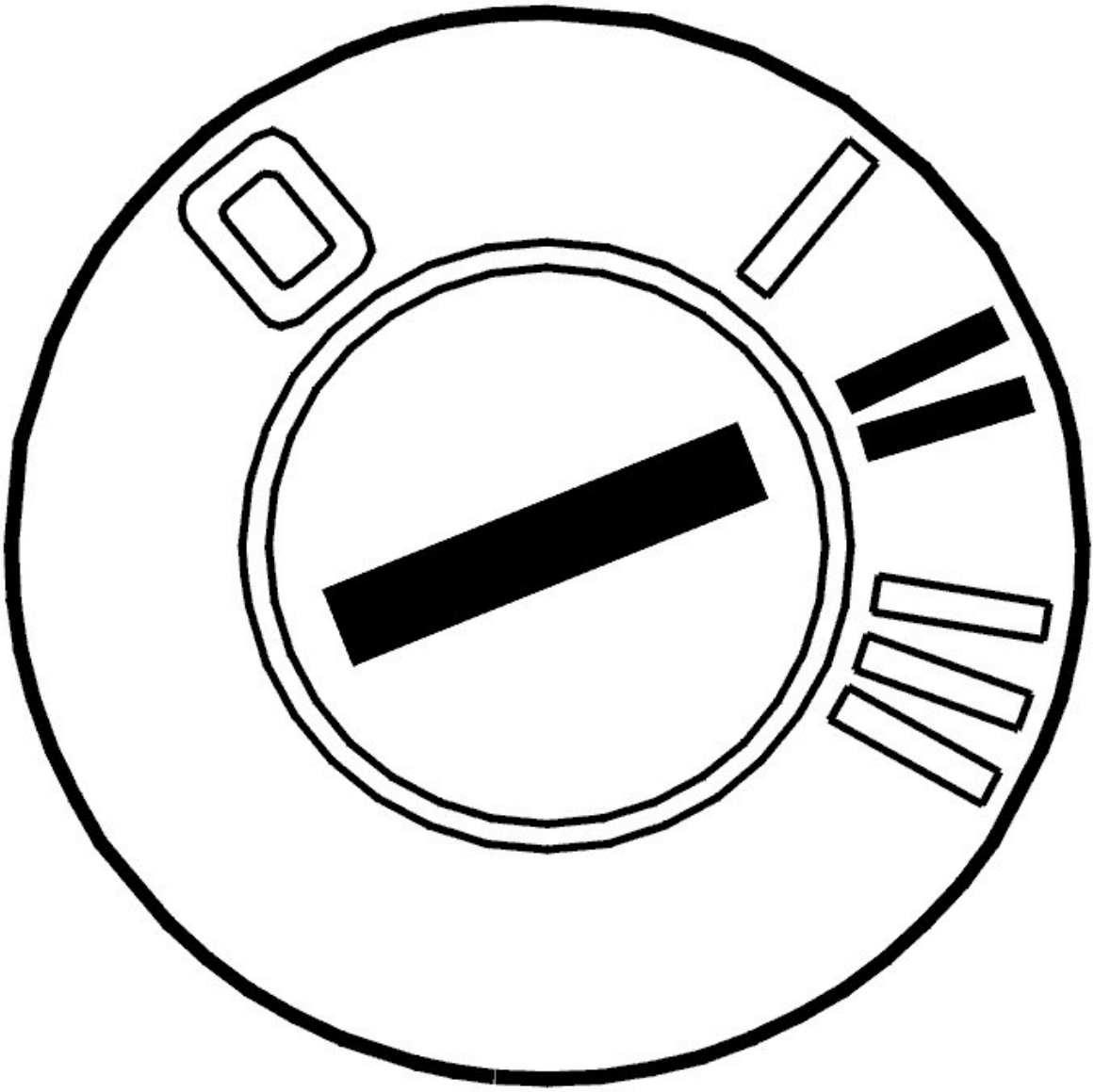
Continue - Verification

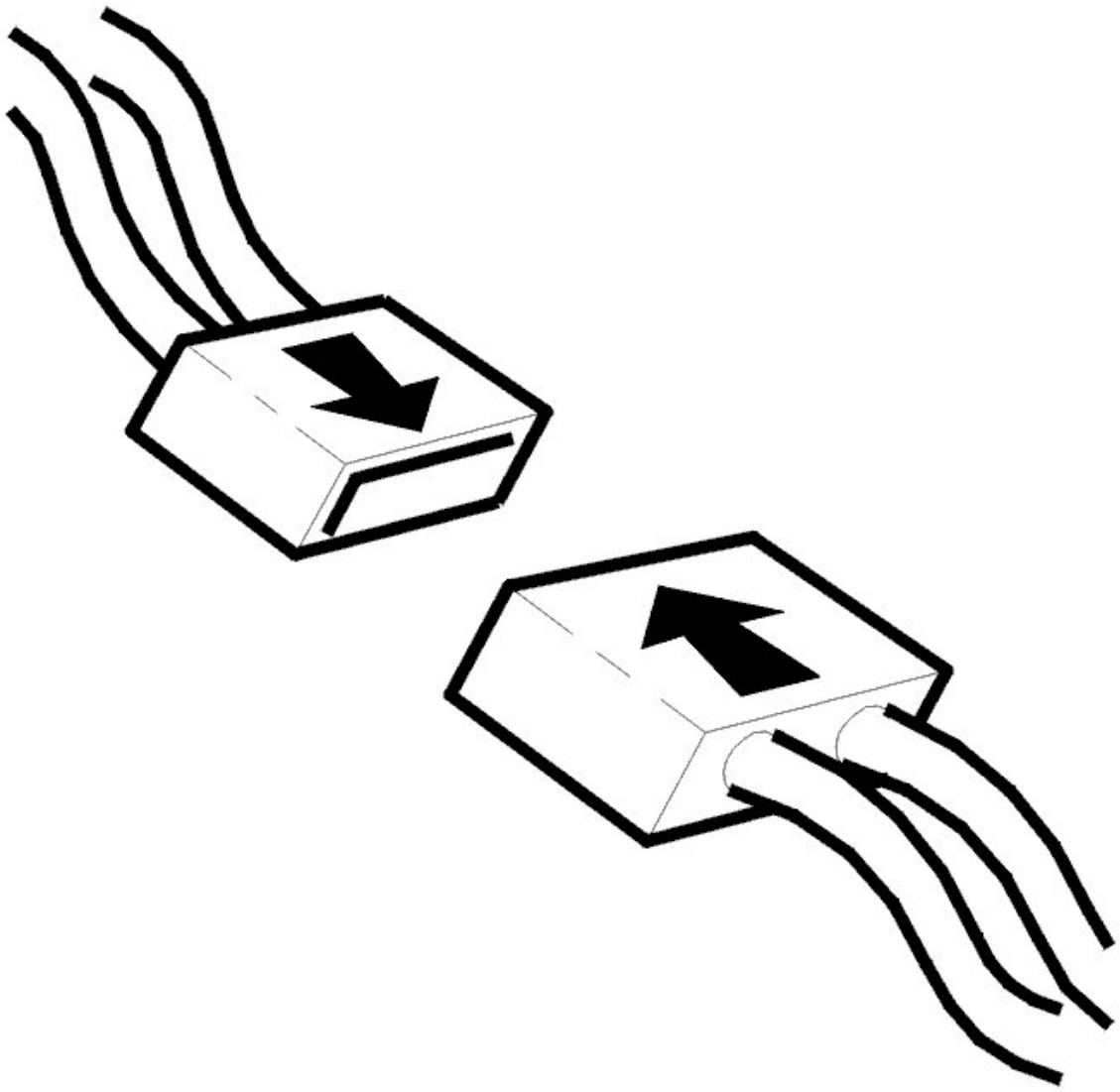
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all functions are working on the turn signal lamp switch.

Does the switch function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

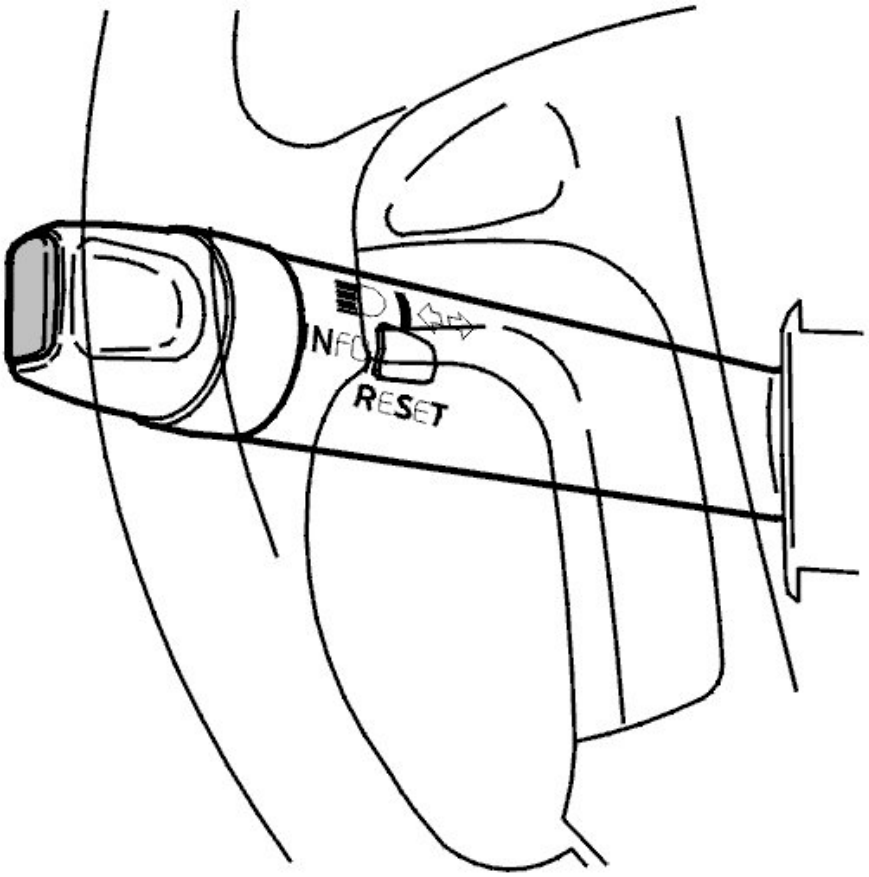
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F01

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the read button on the control stalk has been active for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The read button has been pressed in for more than 60 seconds
- The read button has jammed in the pressed in position.

Fault symptom[s]
- Text messages on the driver information module (DIM) cannot be erased.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Turn signal switch, replacing See: Lighting and Horns/Sensors and Switches - Lighting and Horns/Turn Signal Switch/Service and Repair/Turn Signal Switch, Replacing

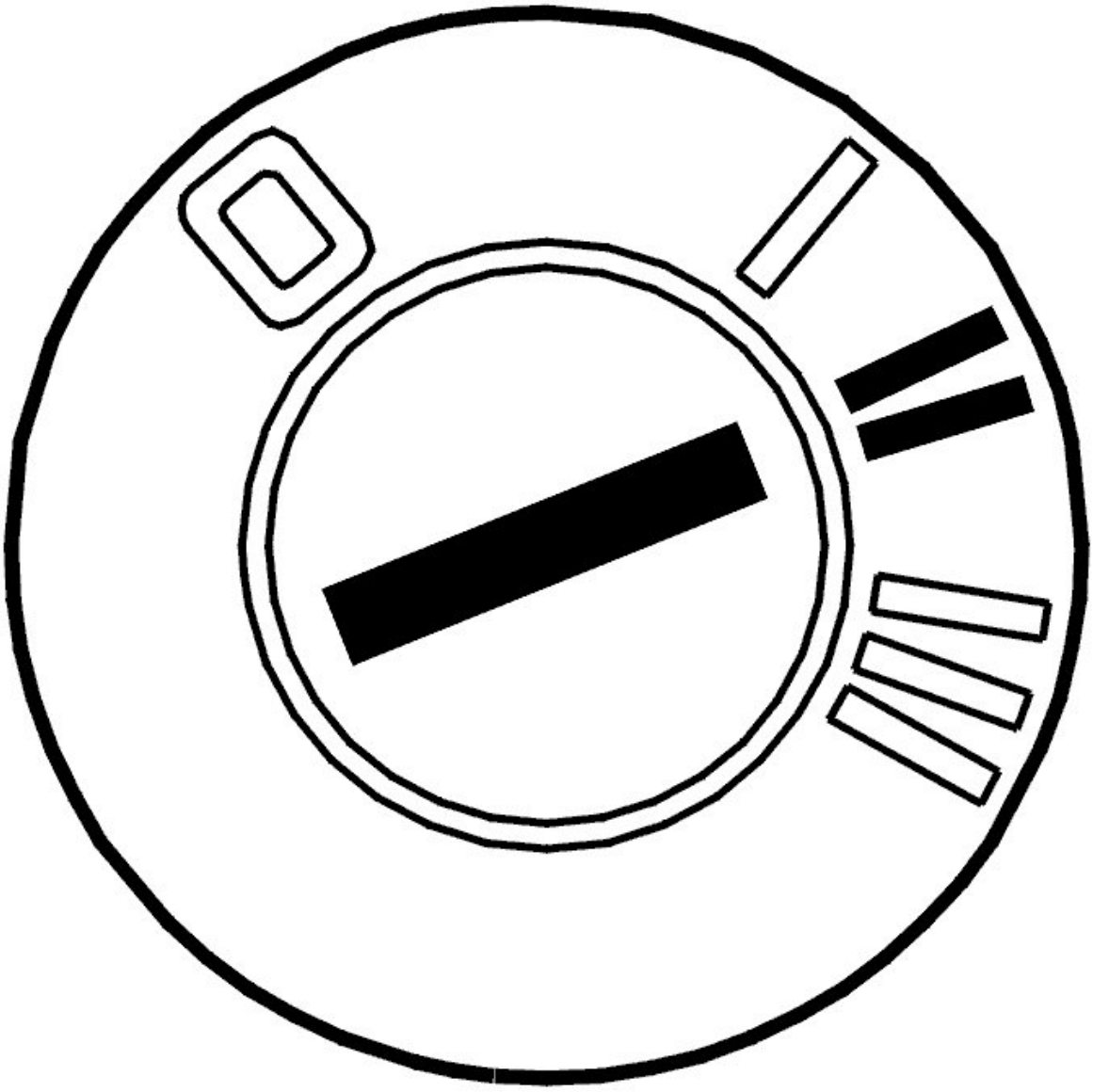
Continue - Verification

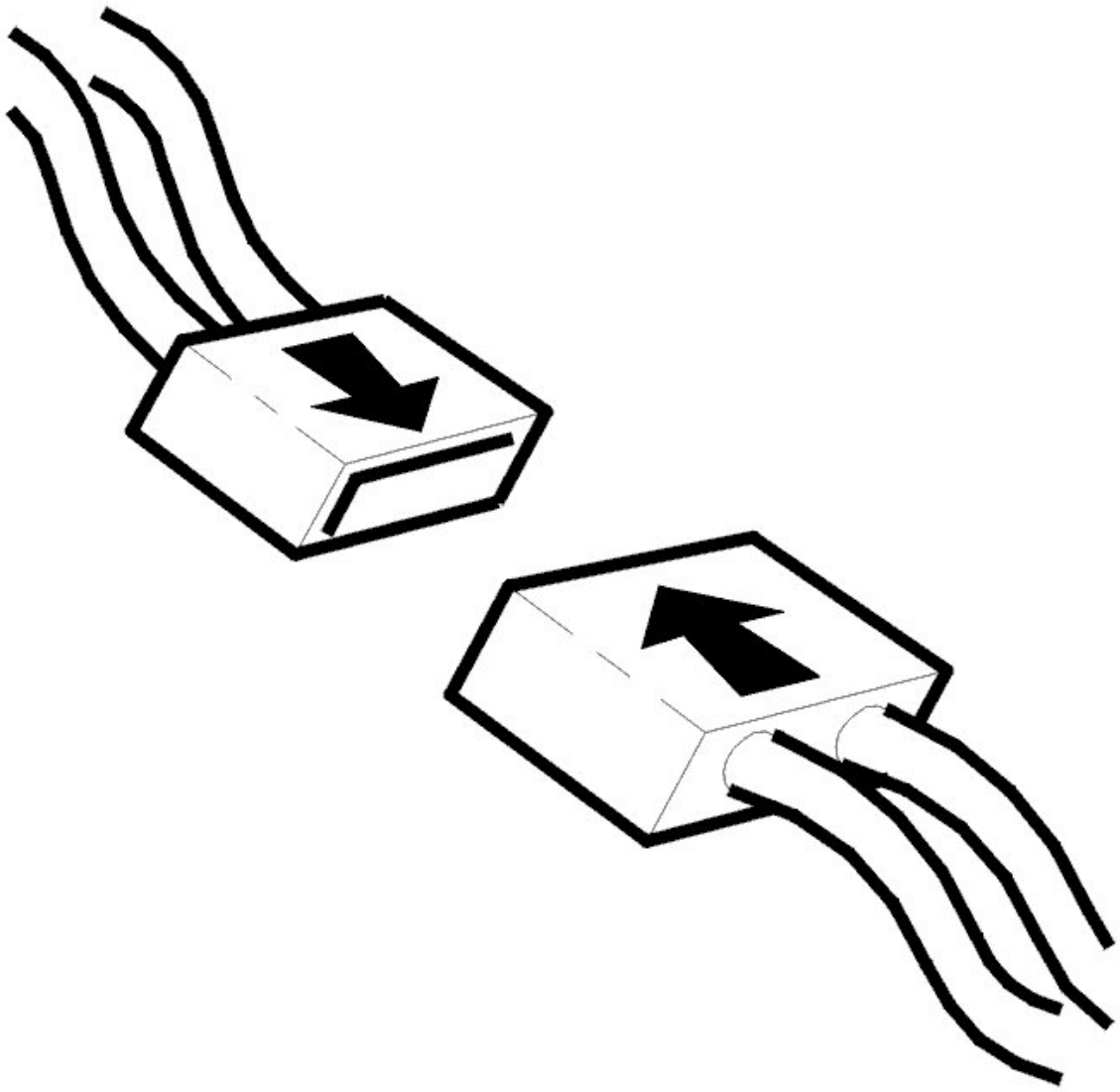
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all functions are working on the turn signal lamp switch.

Does the switch function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

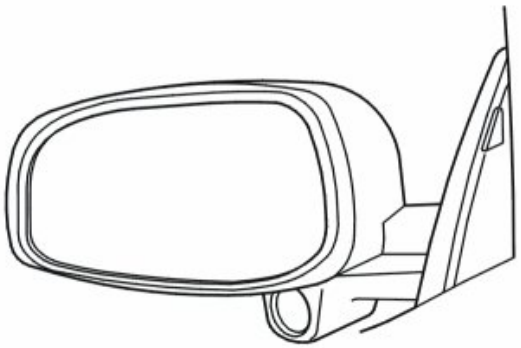
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F41

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the left LED to the left camera module (LCM) is too low, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- The signal lead to the left LED is shorted to ground.

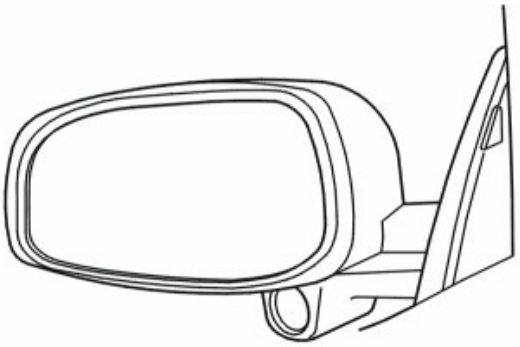
Fault symptom[s]
- The LED does not come on.

Signal Too Low

Signal too low

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the left LED.

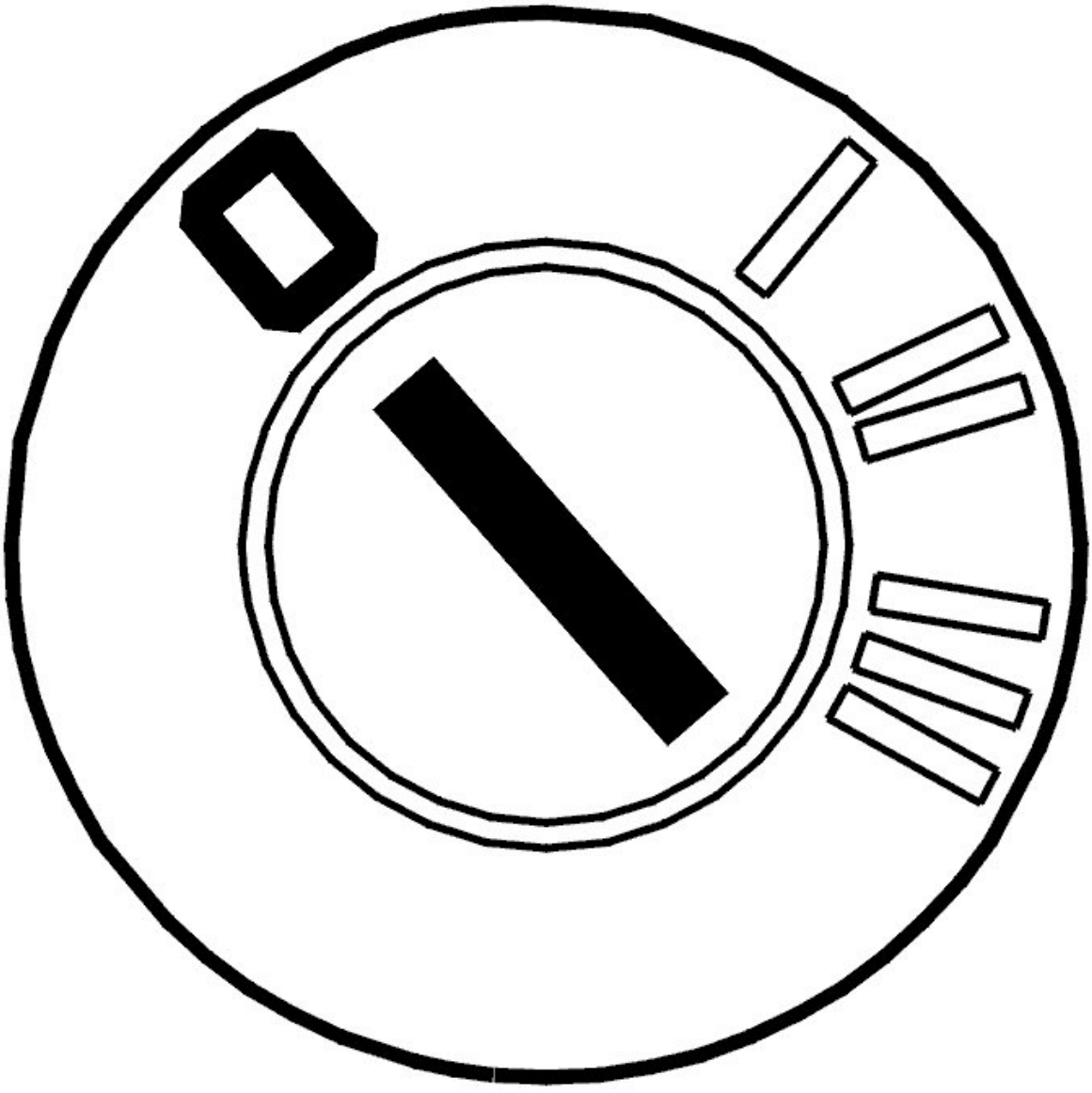


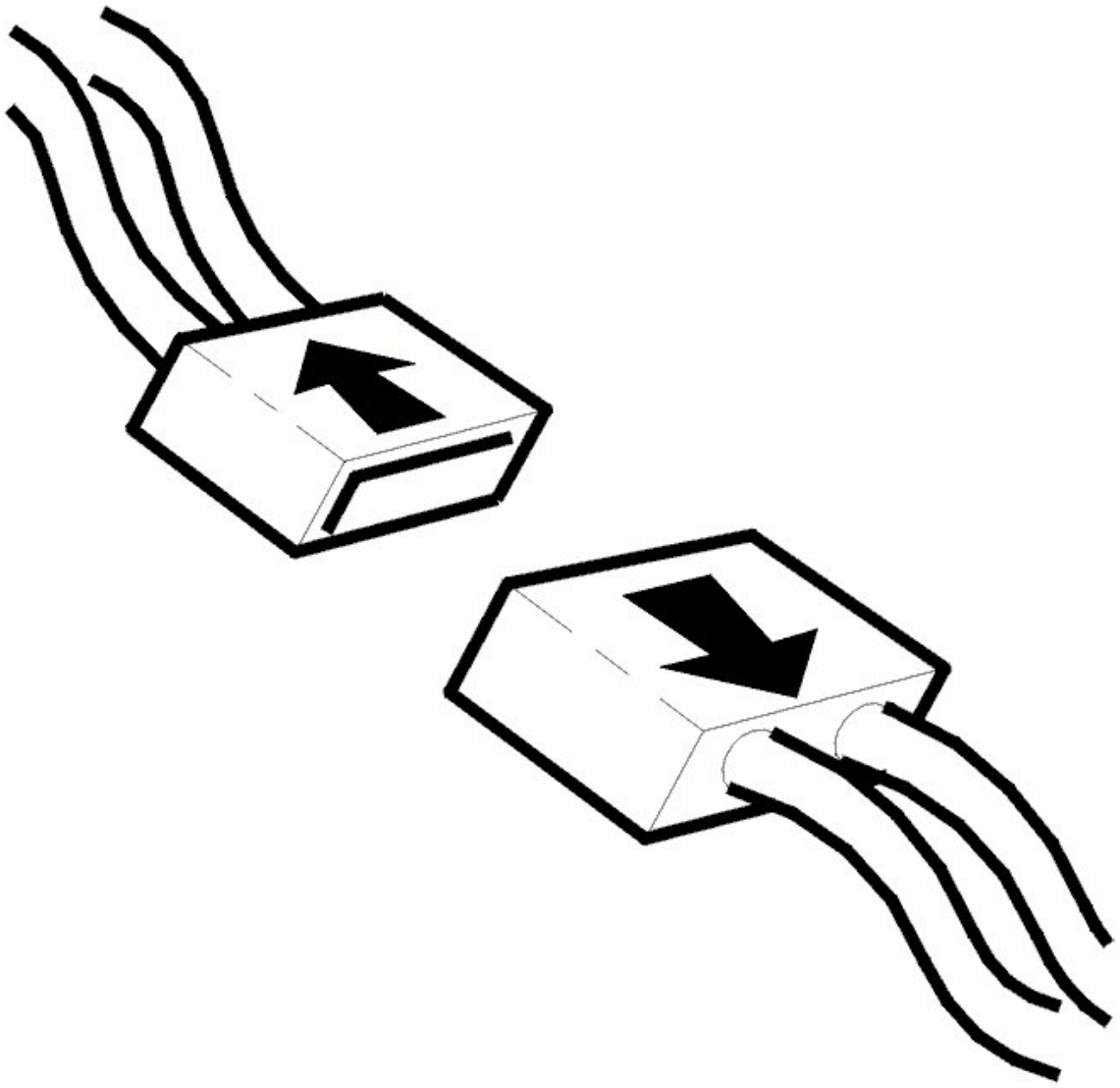
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



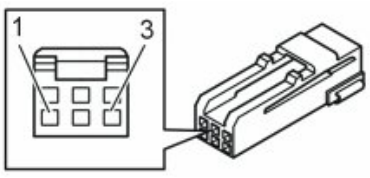


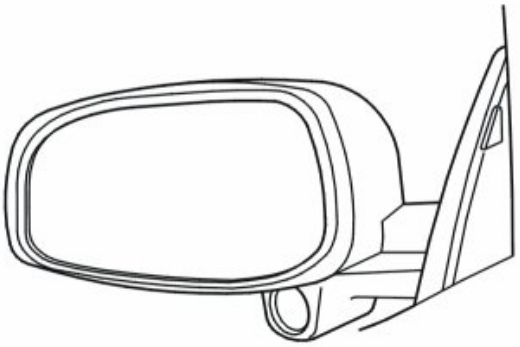
- Ignition off

Unplug the LED connector and check that the LED is intact. Also check the connector for contact resistance and corrosion.
Check the signal lead between the left camera module (LCM) and the #1 LED connector for shorting to ground.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The left camera module (LCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

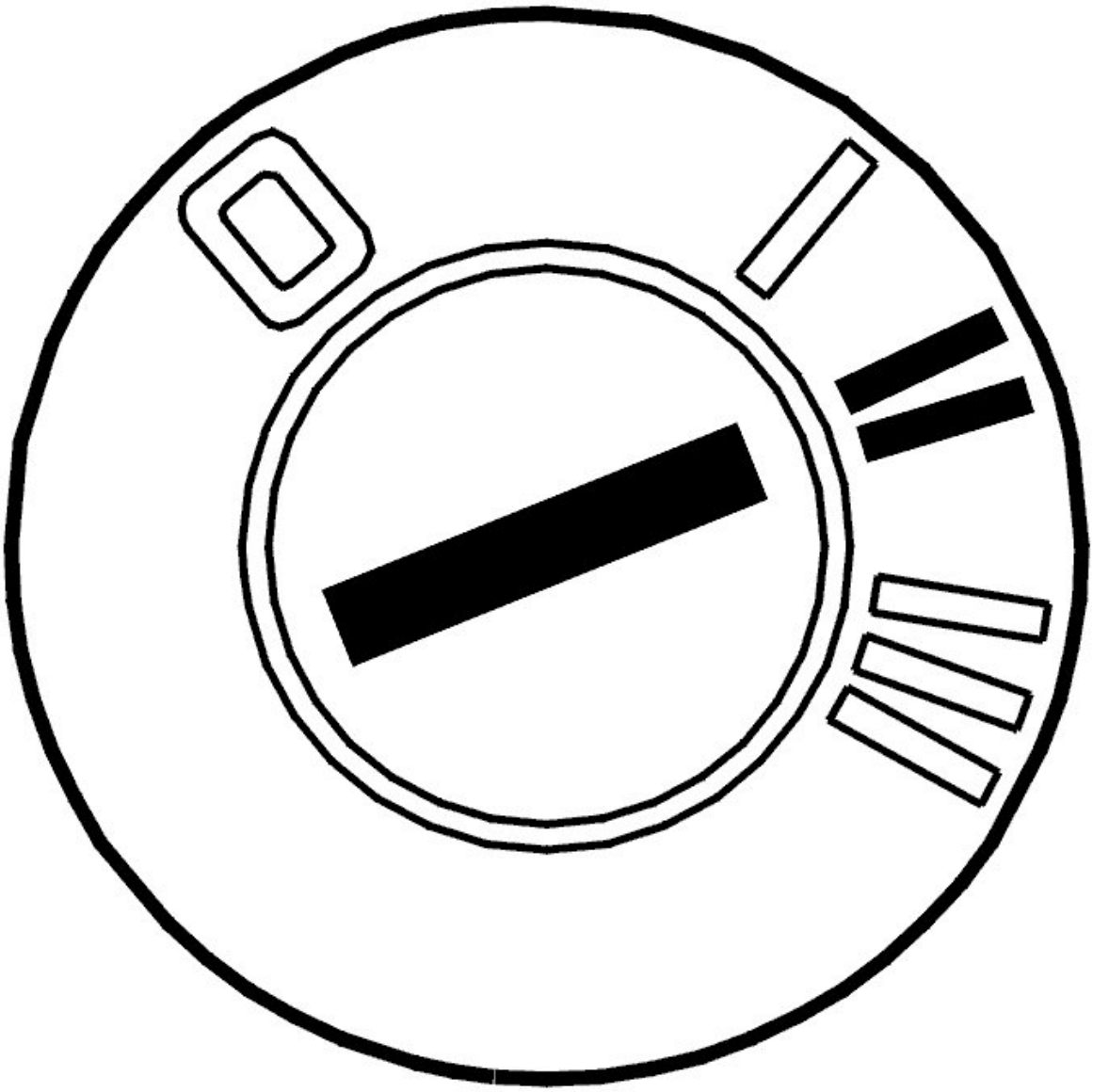
No - No Fault Found

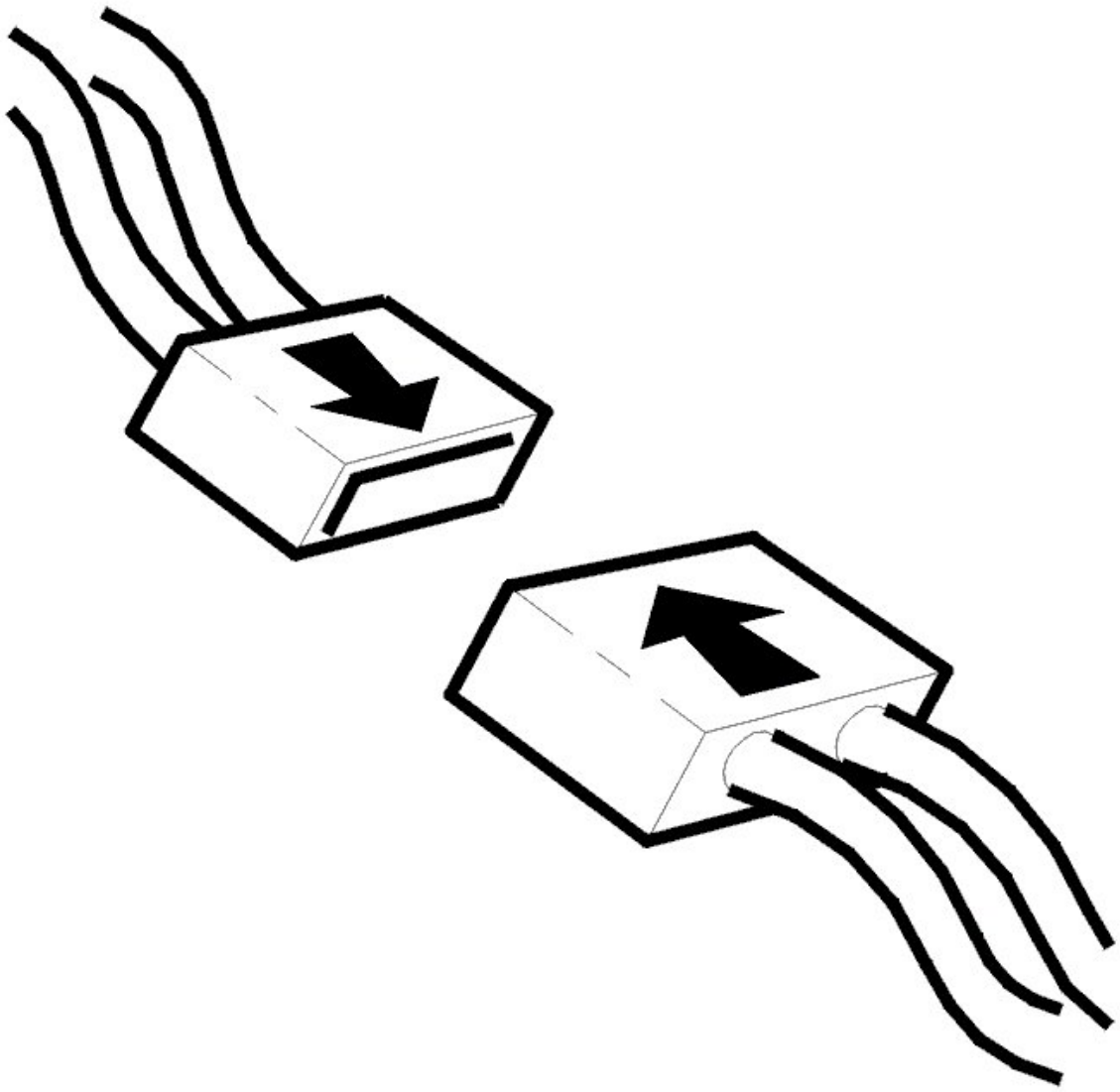
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the left LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

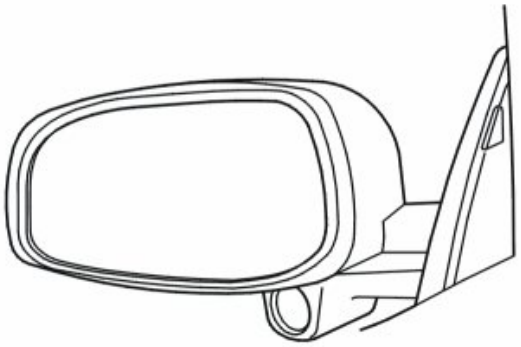
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F42

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the right LED to the right camera module (RCM) is too low, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- The signal lead to the right LED is shorted to ground.

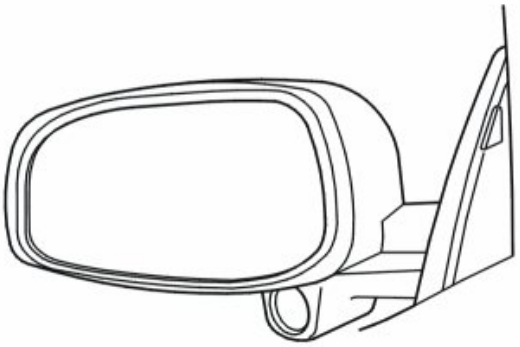
Fault symptom[s]
- The LED does not come on.

Signal Too Low

Signal too low

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the right LED.

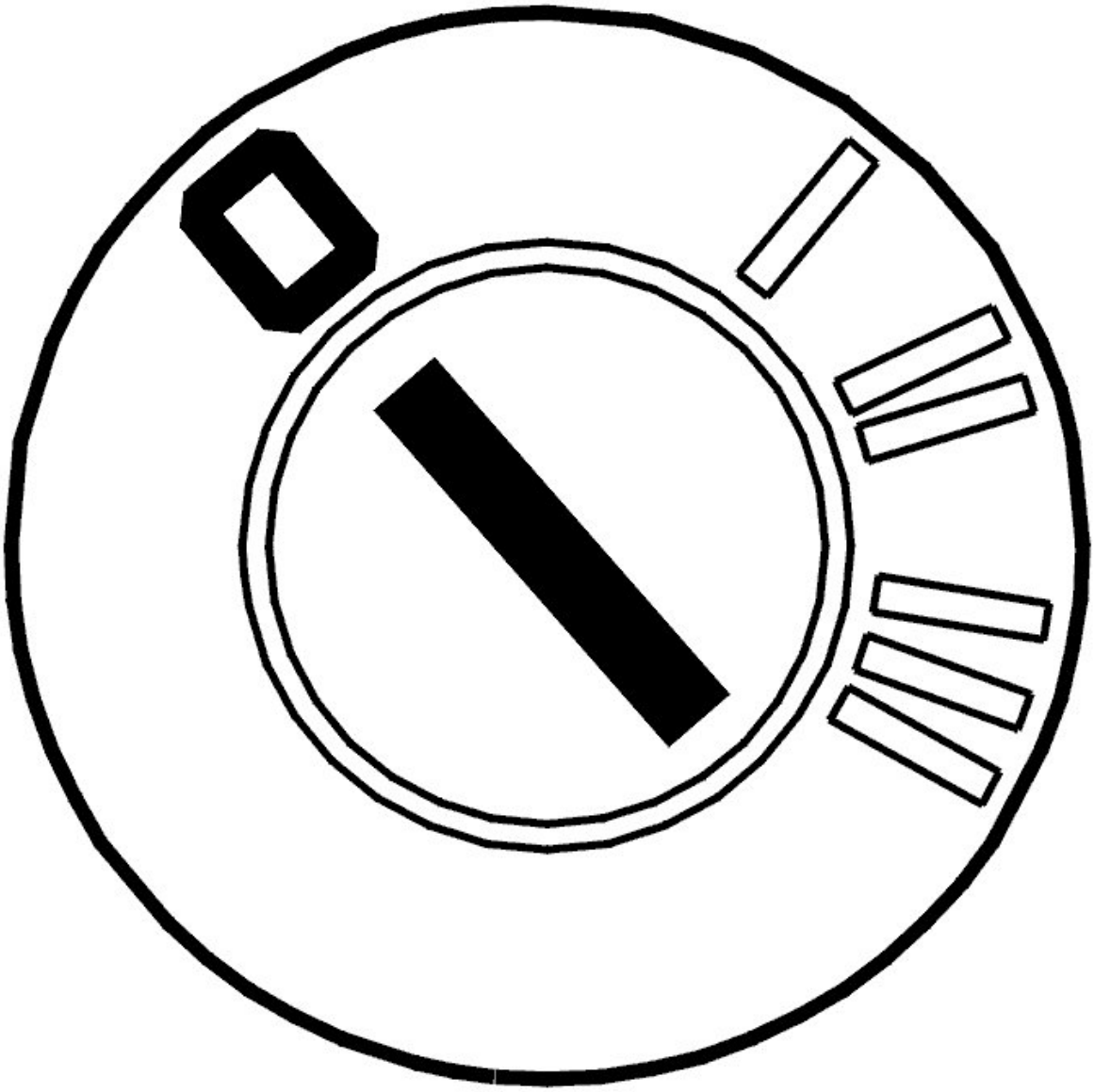


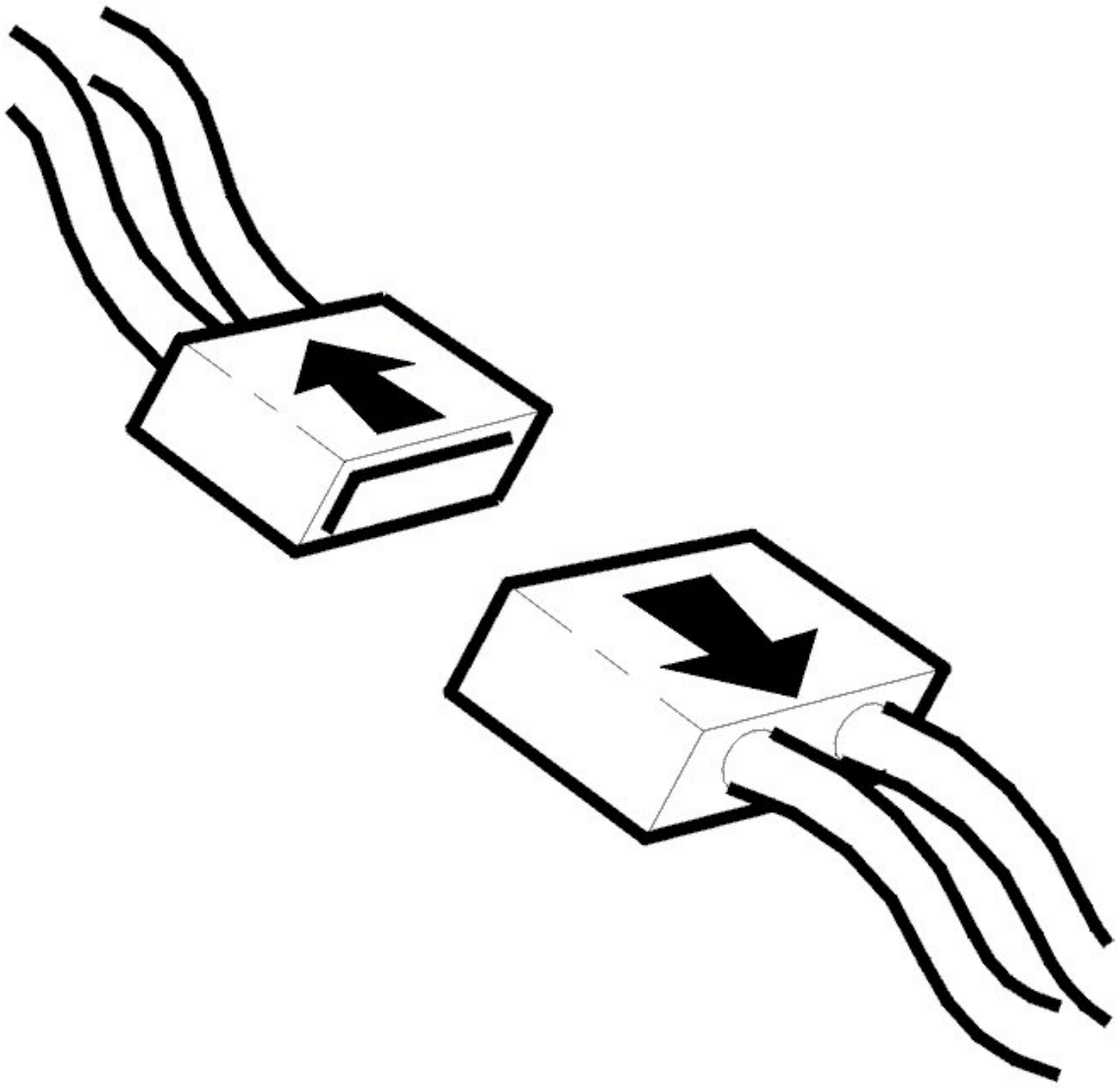
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



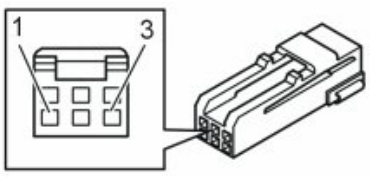


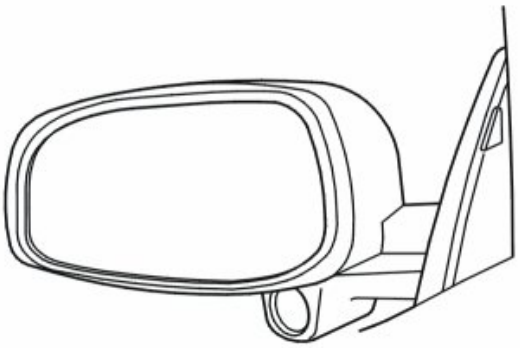
- Ignition off

Unplug the LED connector and check that the LED is intact. Also check the connector for contact resistance and corrosion.
Check the signal lead between the right camera module (RCM) and the #1 LED connector for shorting to ground.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The right camera module (RCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

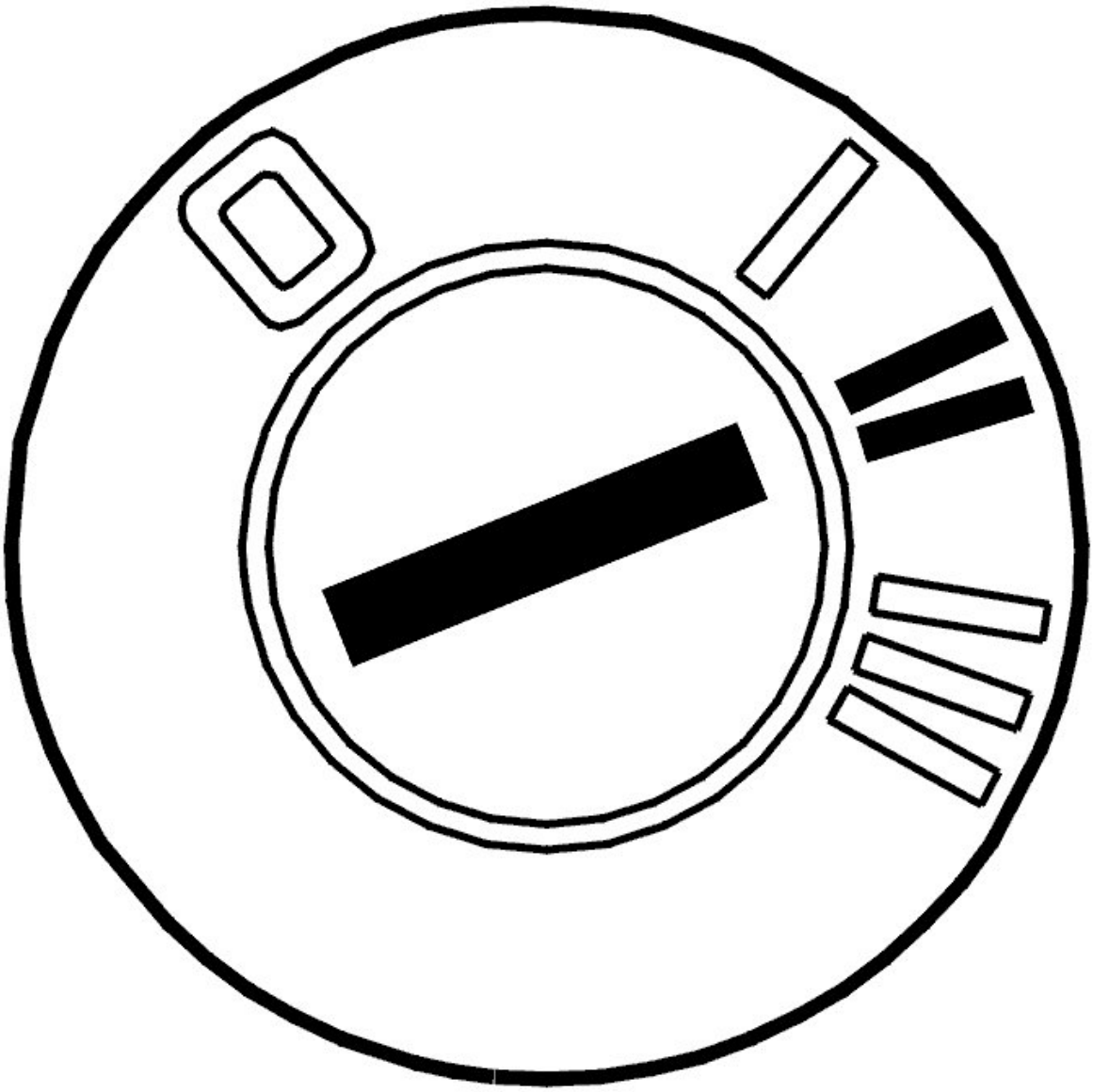
No - No Fault Found

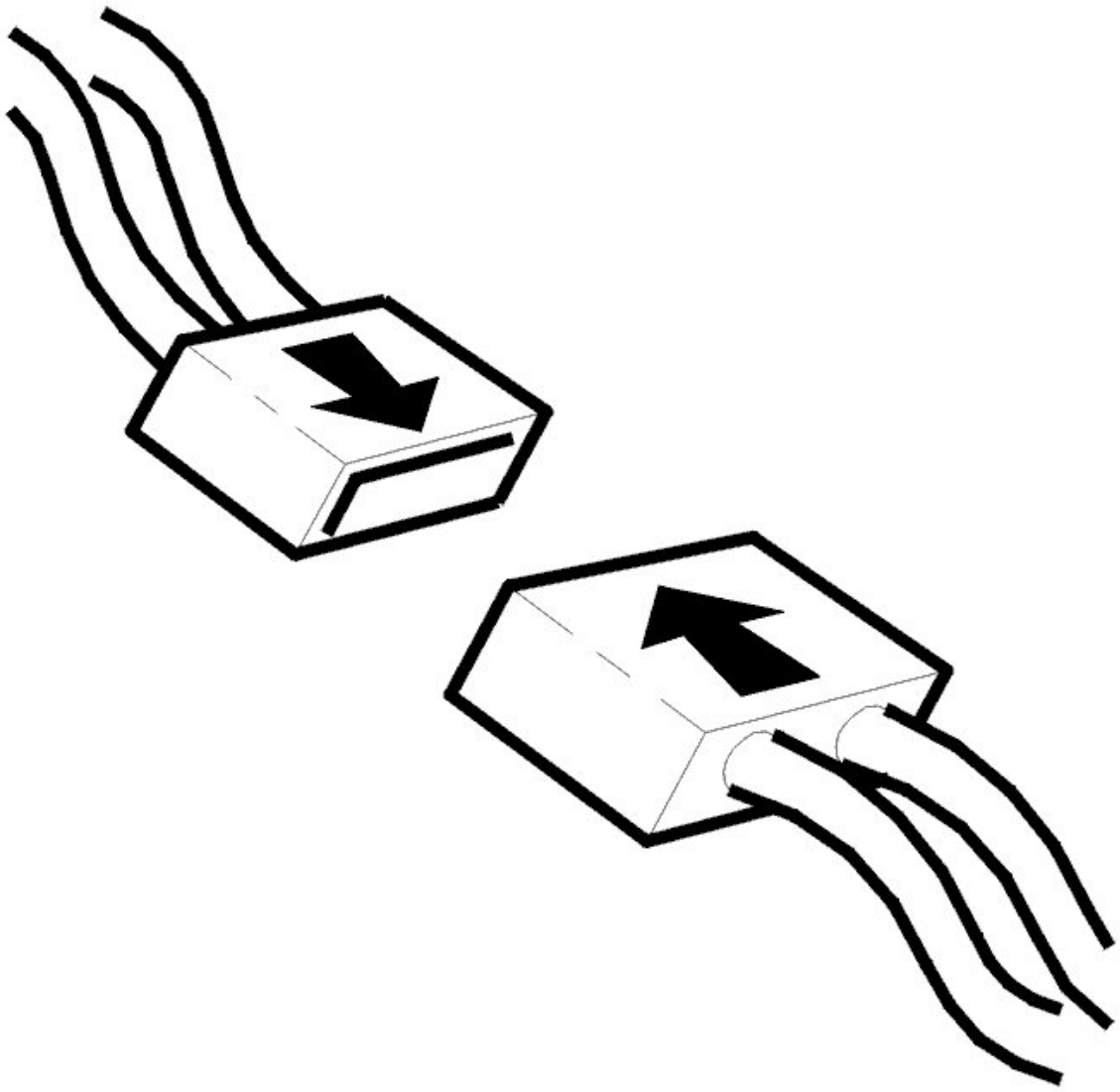
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the right LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

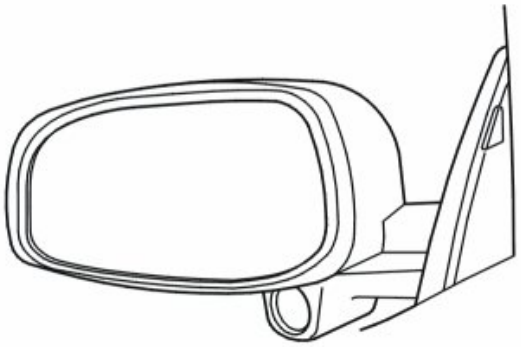
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F43

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the left LED to the left camera module (LCM) is too high, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- The signal lead to the left LED is shorted to supply voltage.

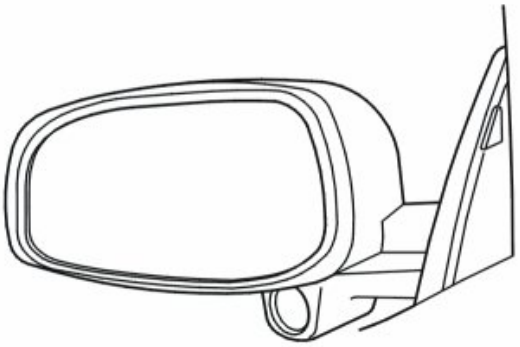
Fault symptom[s]
- The LED does not come on.
- Light emitting diode always on.

Signal Too High

Signal too high

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the left LED.

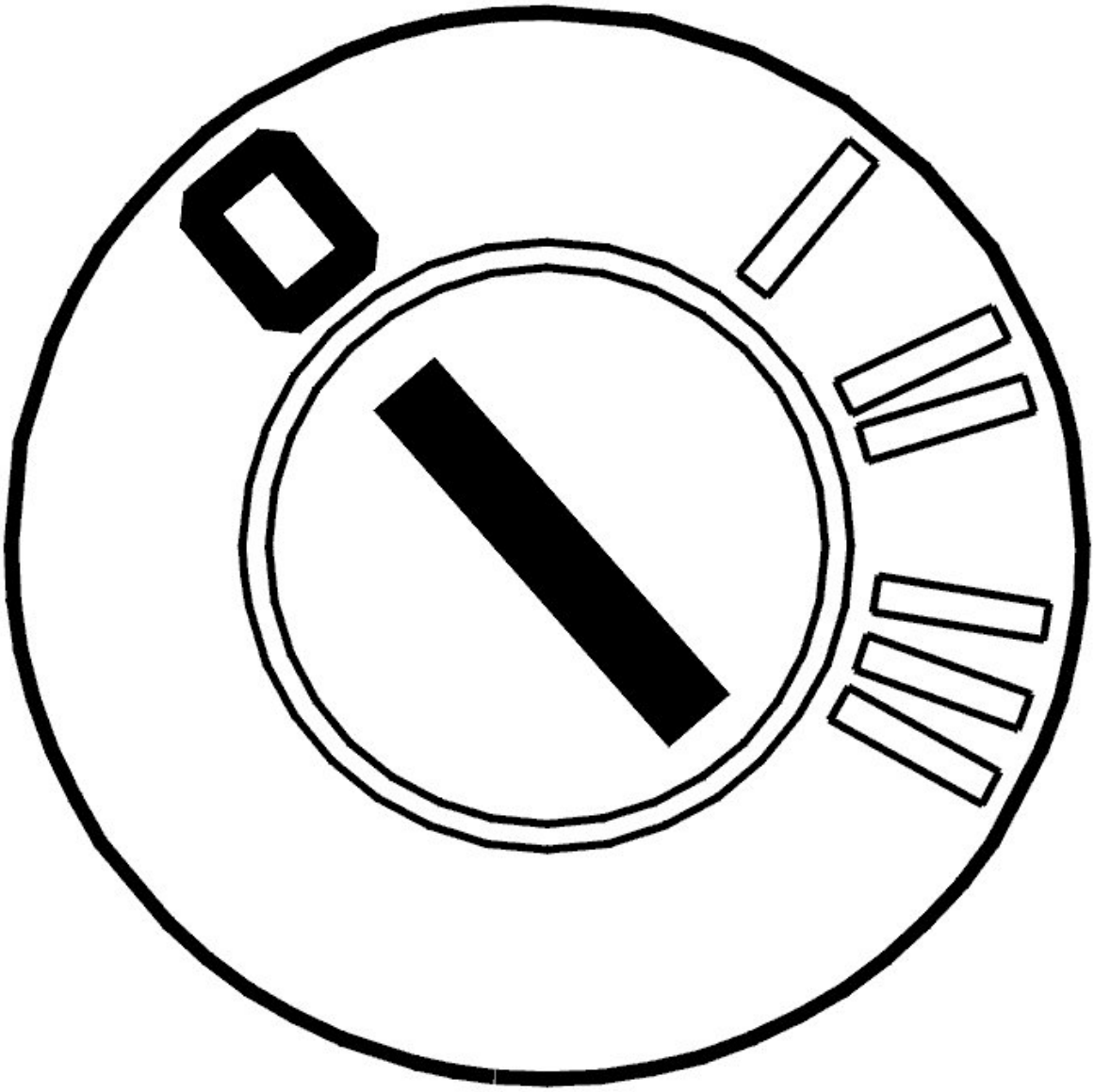


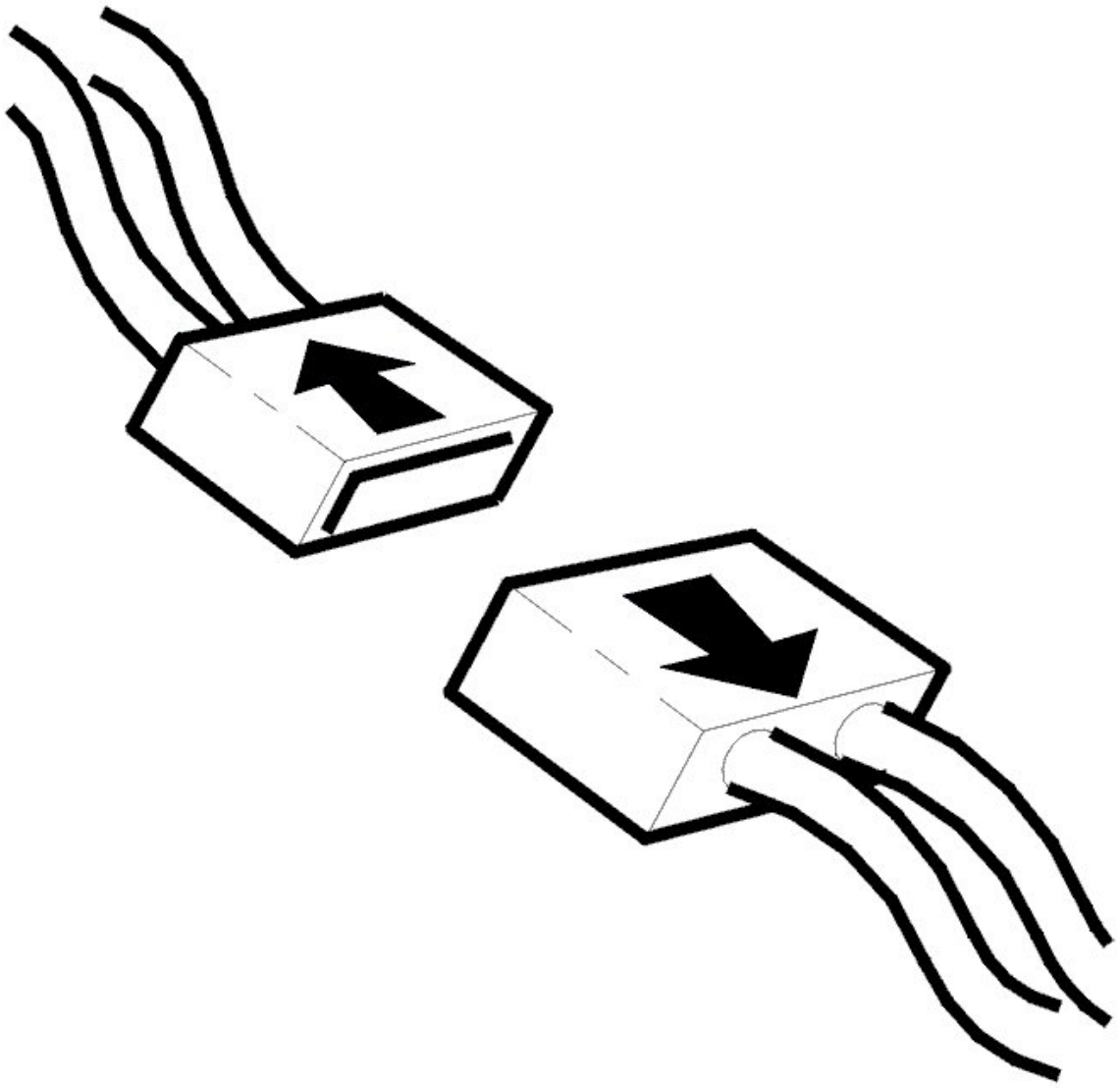
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



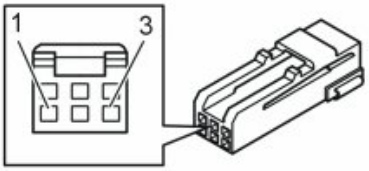


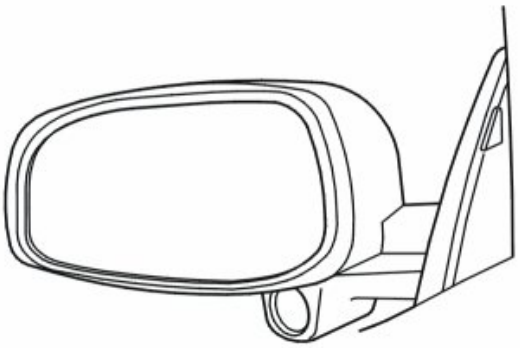
- Ignition off

Unplug the LED connector and check that the LED is intact.
Check the signal lead between the left camera module (LCM) and the #1 LED connector for shorting to a power supply.
Check the ground cable between the left camera module (LCM) and the #3 LED connector for shorting to a power supply.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The left camera module (LCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

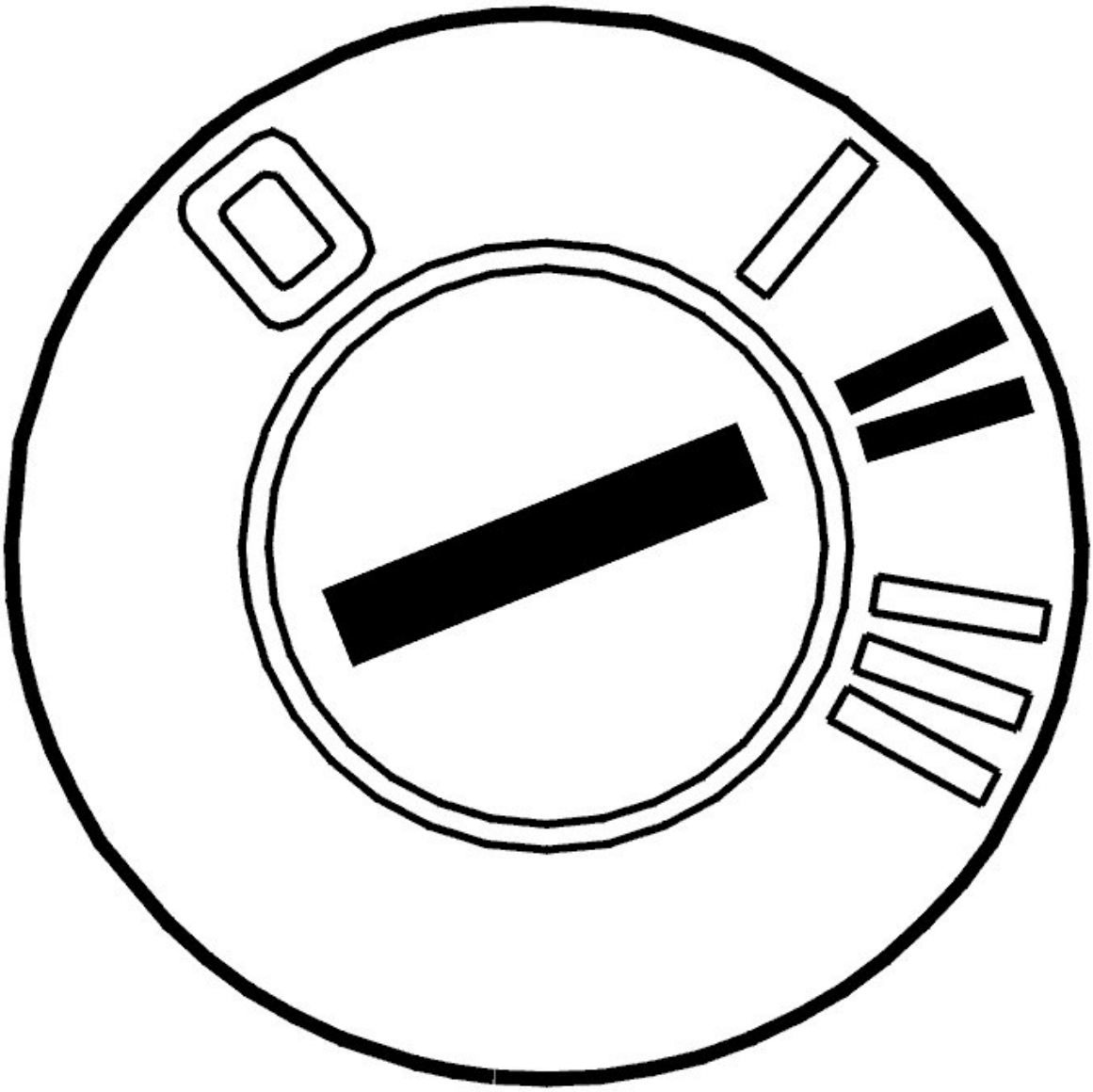
No - No Fault Found

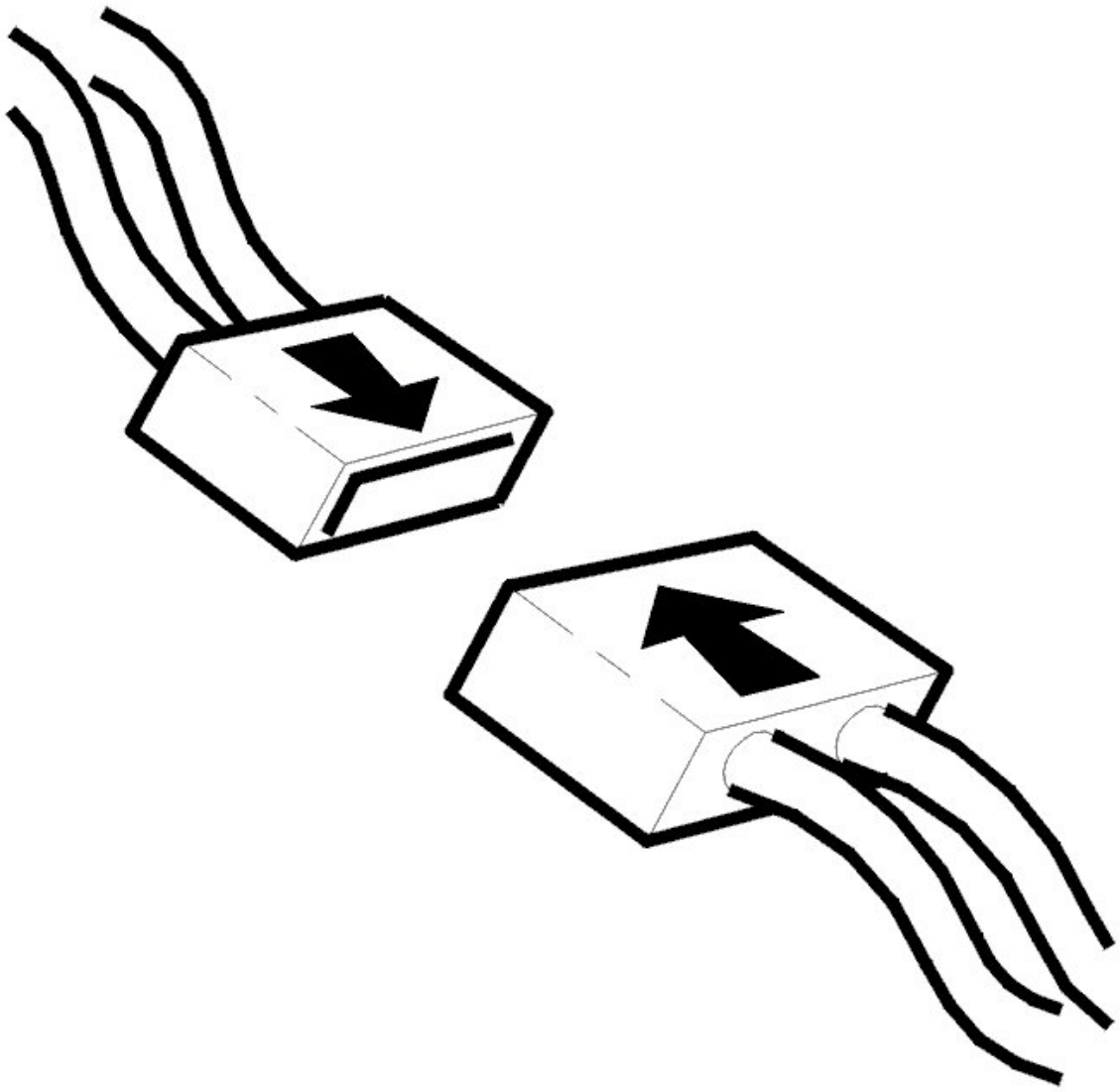
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the left LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

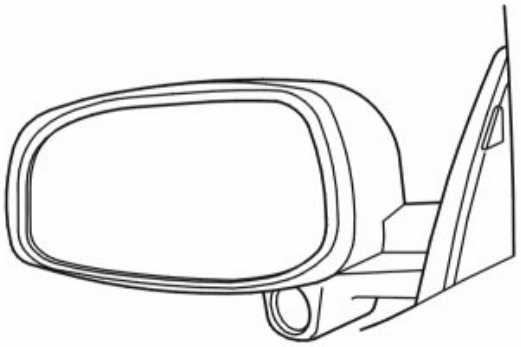
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F44

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the right LED to the right camera module (RCM) is too high, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- The signal lead to the right LED is shorted to supply voltage.

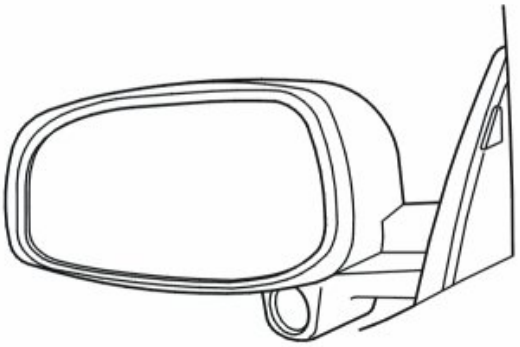
Fault symptom[s]
- The LED does not come on.
- Light emitting diode always on.

Signal Too High

Signal too high

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the right LED.

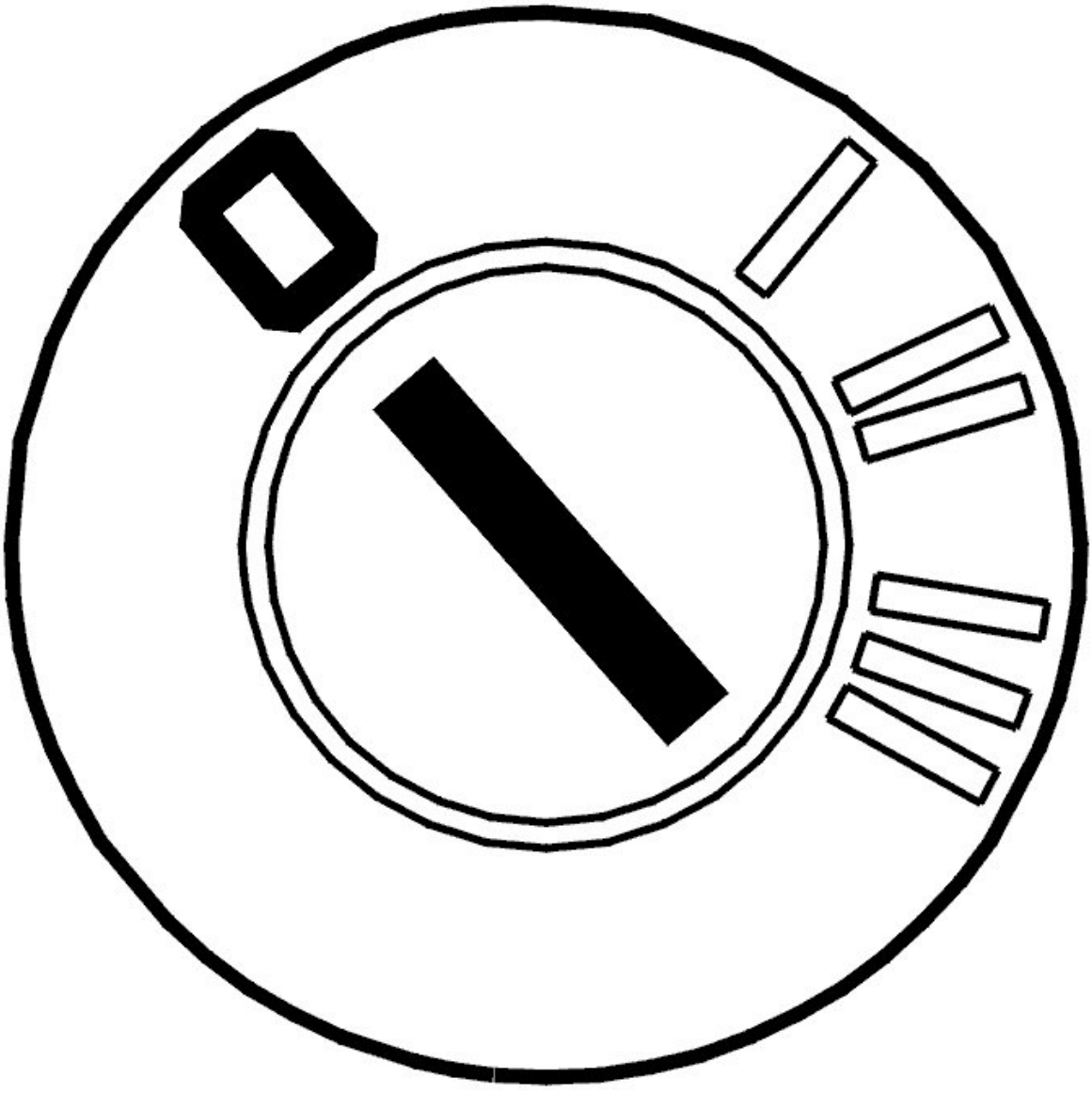


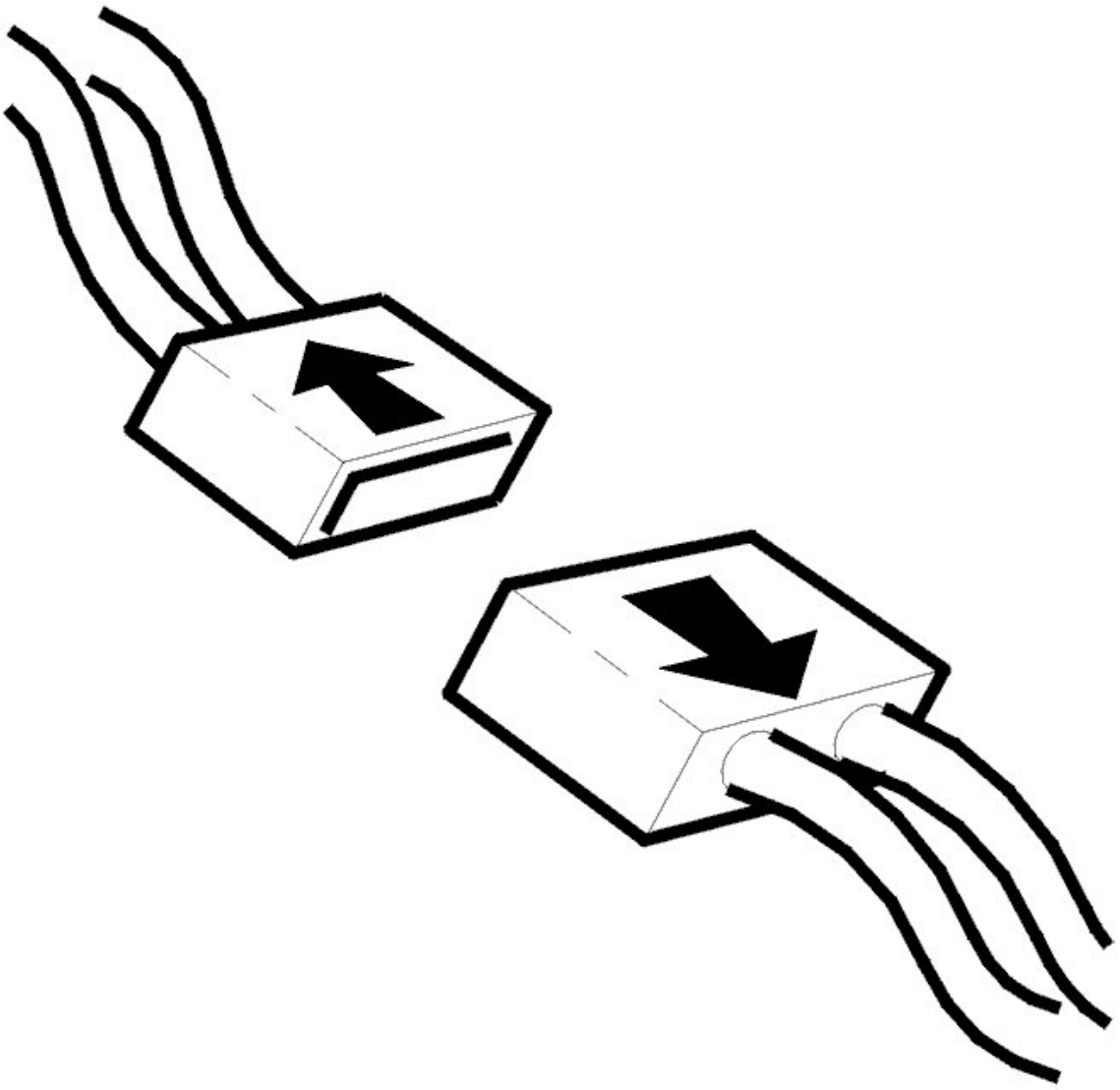
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



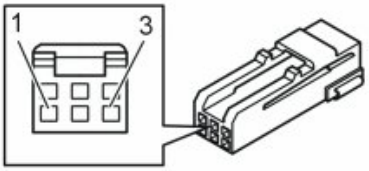


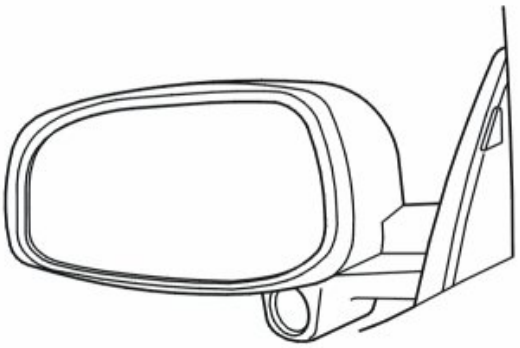
- Ignition off

Unplug the LED connector and check that the LED is intact.
Check the signal lead between the right camera module (RCM) and the #1 LED connector for shorting to a power supply.
Check the ground cable between the right camera module (RCM) and the #3 LED connector for shorting to a power supply.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The right camera module (RCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

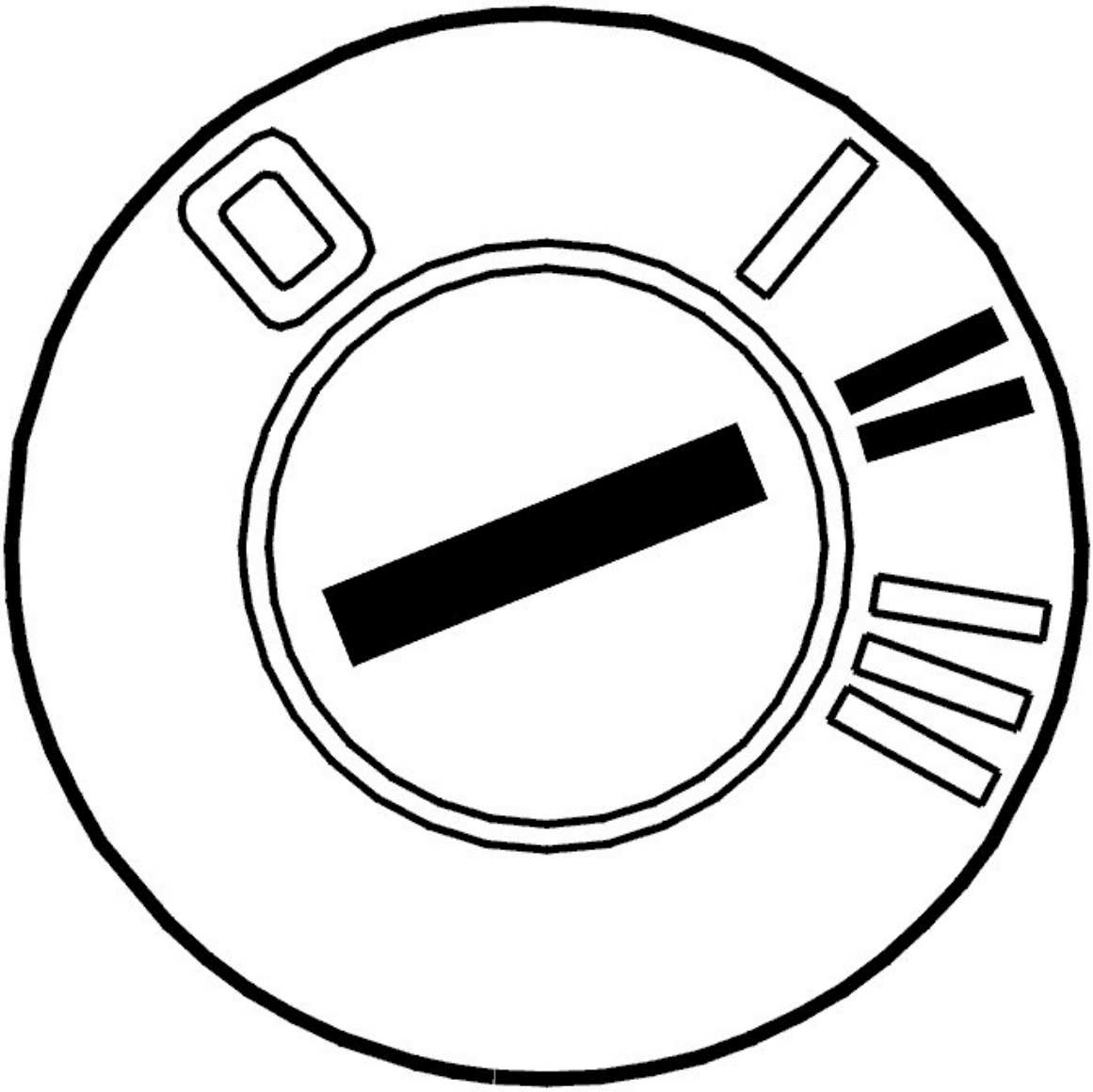
No - No Fault Found

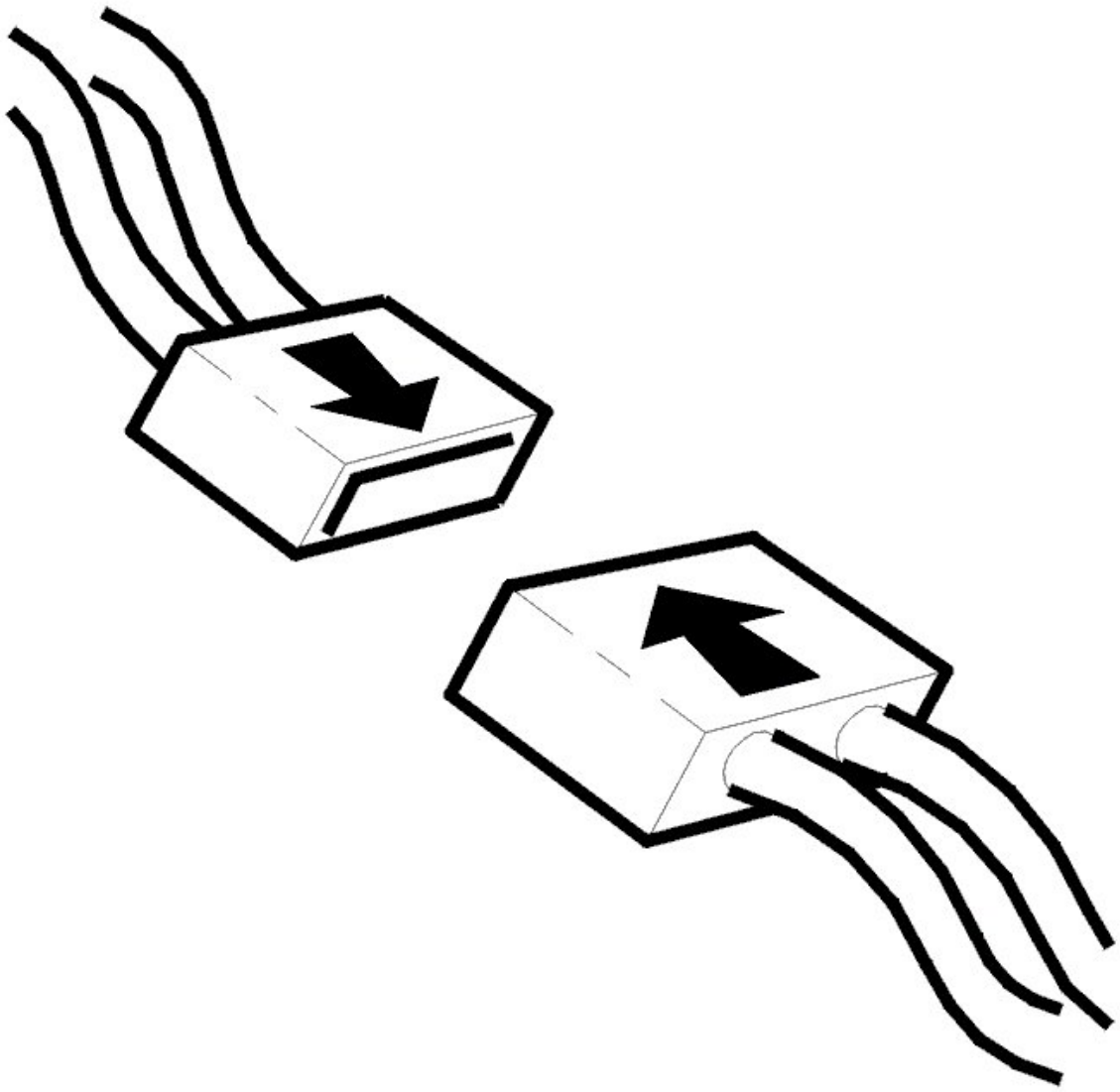
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the right LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

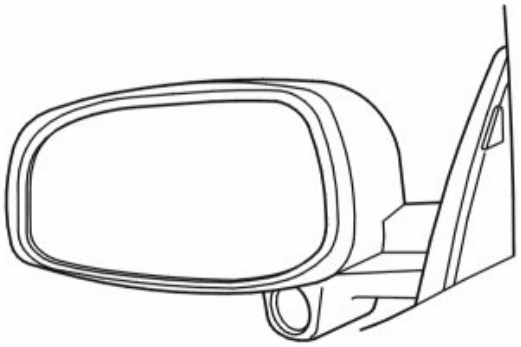
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F45

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the left LED to the left camera module (LCM) is absent, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- Open circuit in signal lead to left light emitting diode.
- Left light emitting diode not connected.

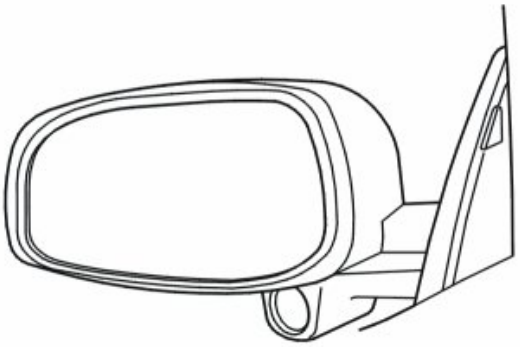
Fault symptom[s]
- The LED does not come on.

Signal Missing

Signal missing

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the left LED.

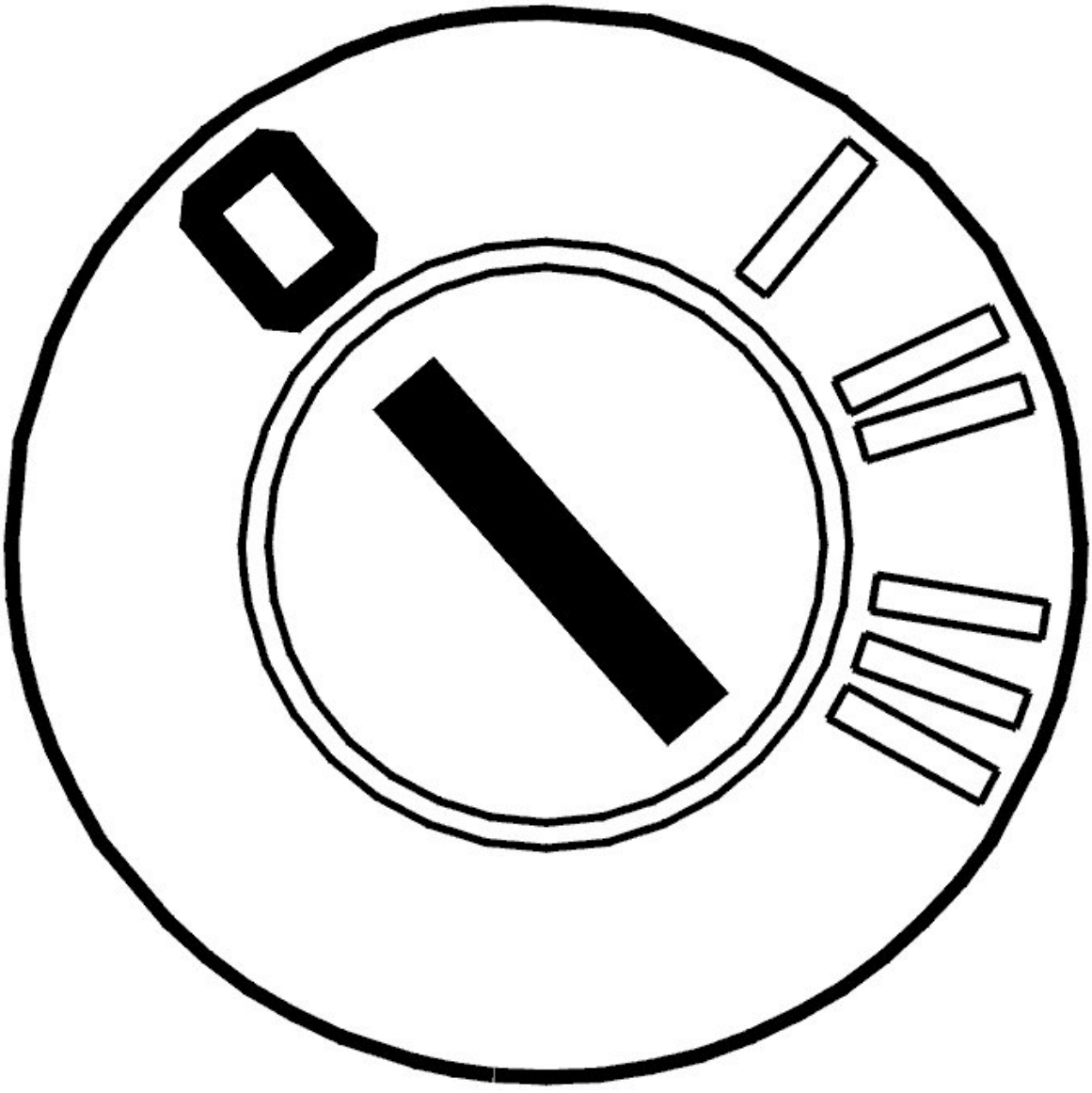


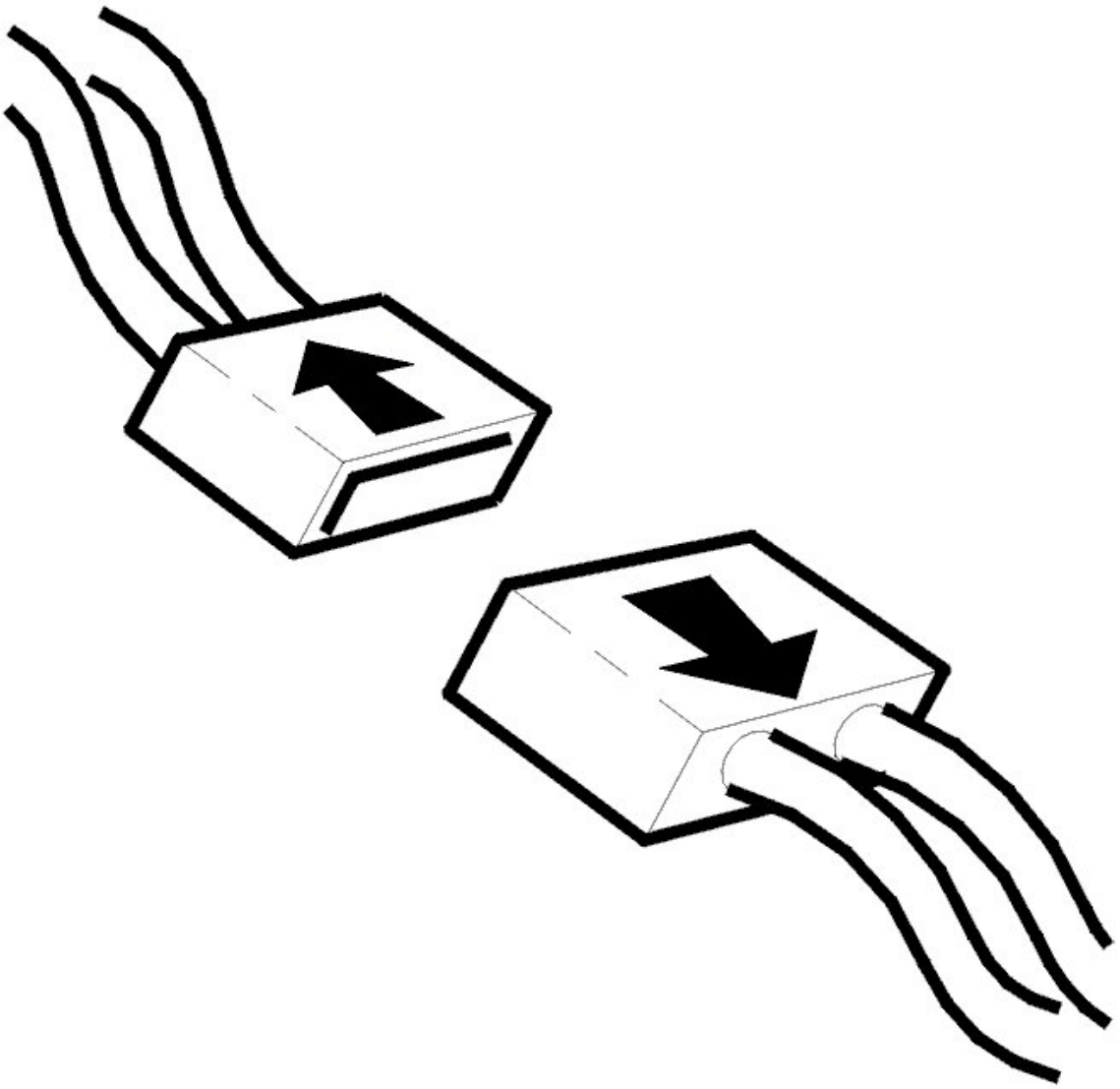
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



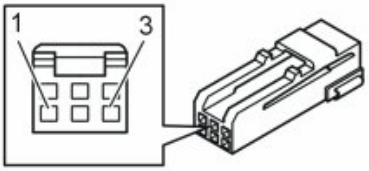


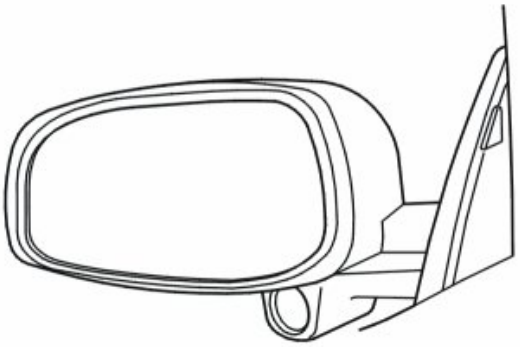
- Ignition off

Unplug the LED connector and check that the LED is intact. Also check the connector for contact resistance and corrosion.
Check the signal lead between the left camera module (LCM) and the #1 LED connector for an open circuit.
Check the ground cable between the left camera module (LCM) and the #3 LED connector for an open circuit.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The left camera module (LCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

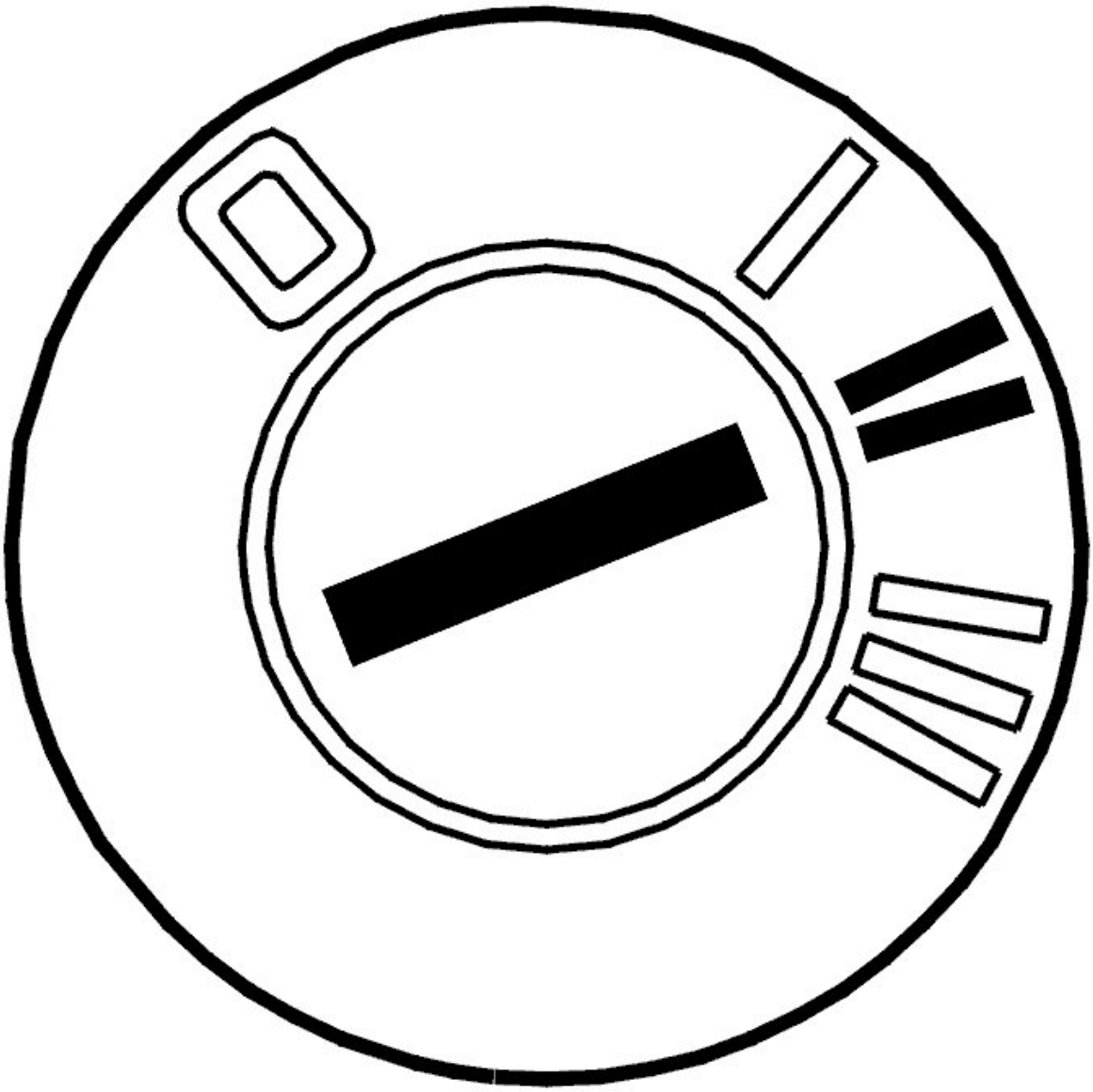
No - No Fault Found

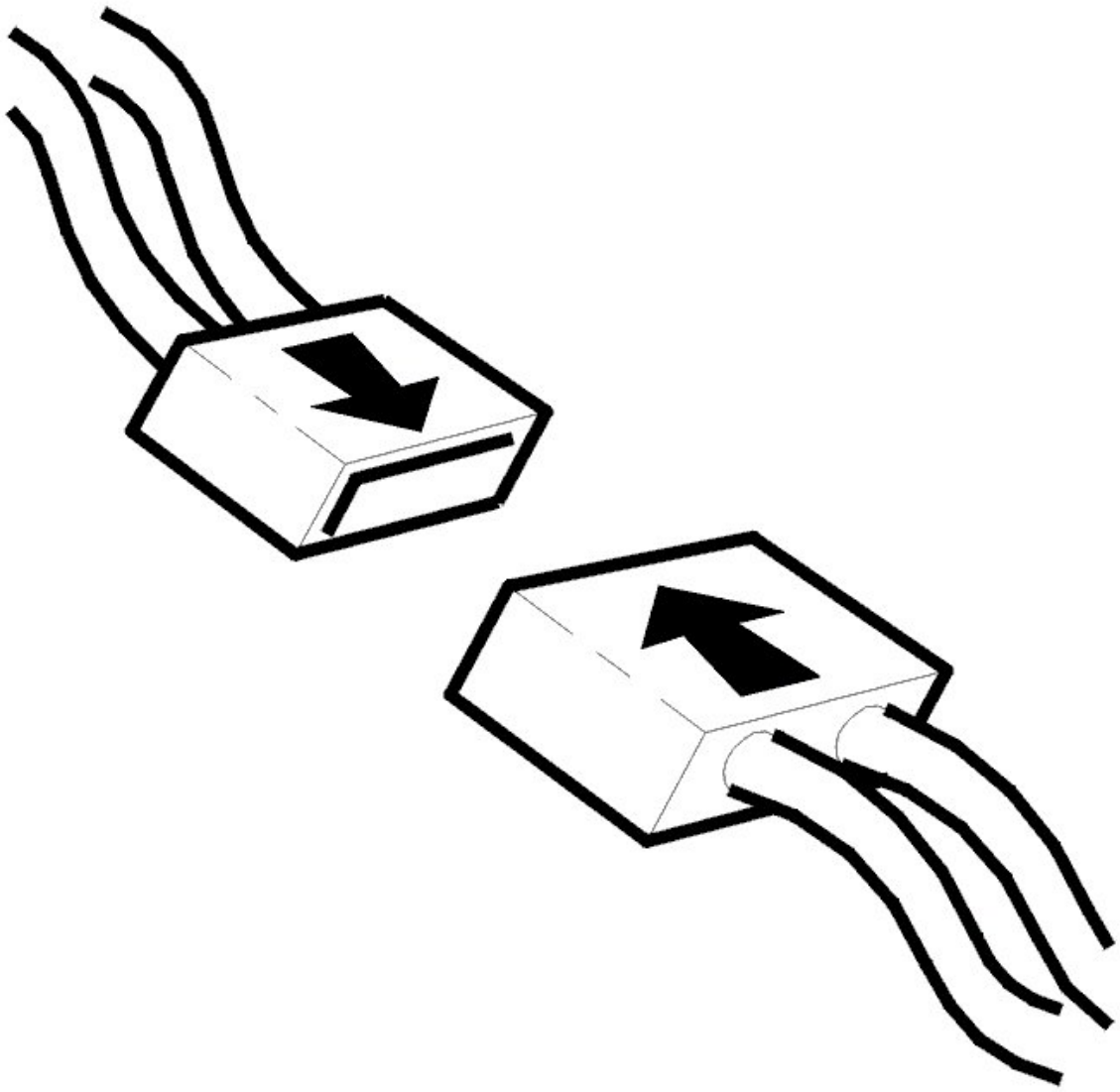
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the left LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

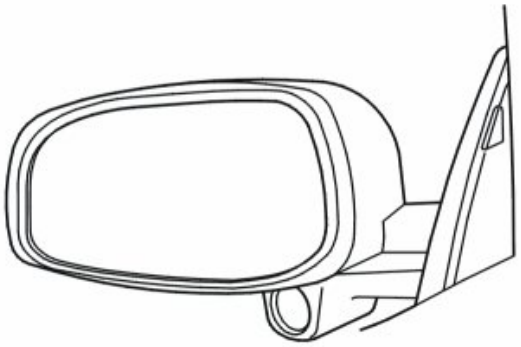
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F46

Condition



The central electronic module (CEM) monitors communication between the blind spot indication system (BLIS) LEDs and camera modules.
If the central electronic module (CEM) detects that the signal from the right LED to the right camera module (RCM) is absent, a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- Open circuit in signal lead to right light emitting diode.
- Right light emitting diode not connected.

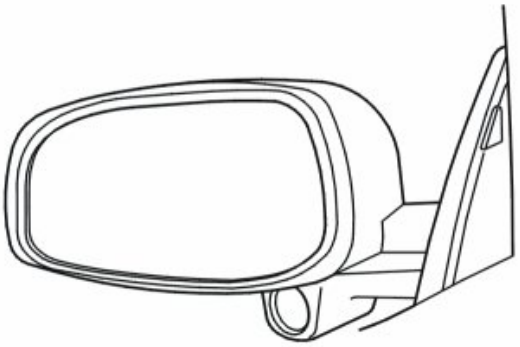
Fault symptom[s]
- The LED does not come on.

Signal Missing

Signal missing

Checking the function

The LEDs should flash three times whenever the Blind Spot Indication System (BLIS) is activated.
Switch on the ignition to check the functionality of the right LED.

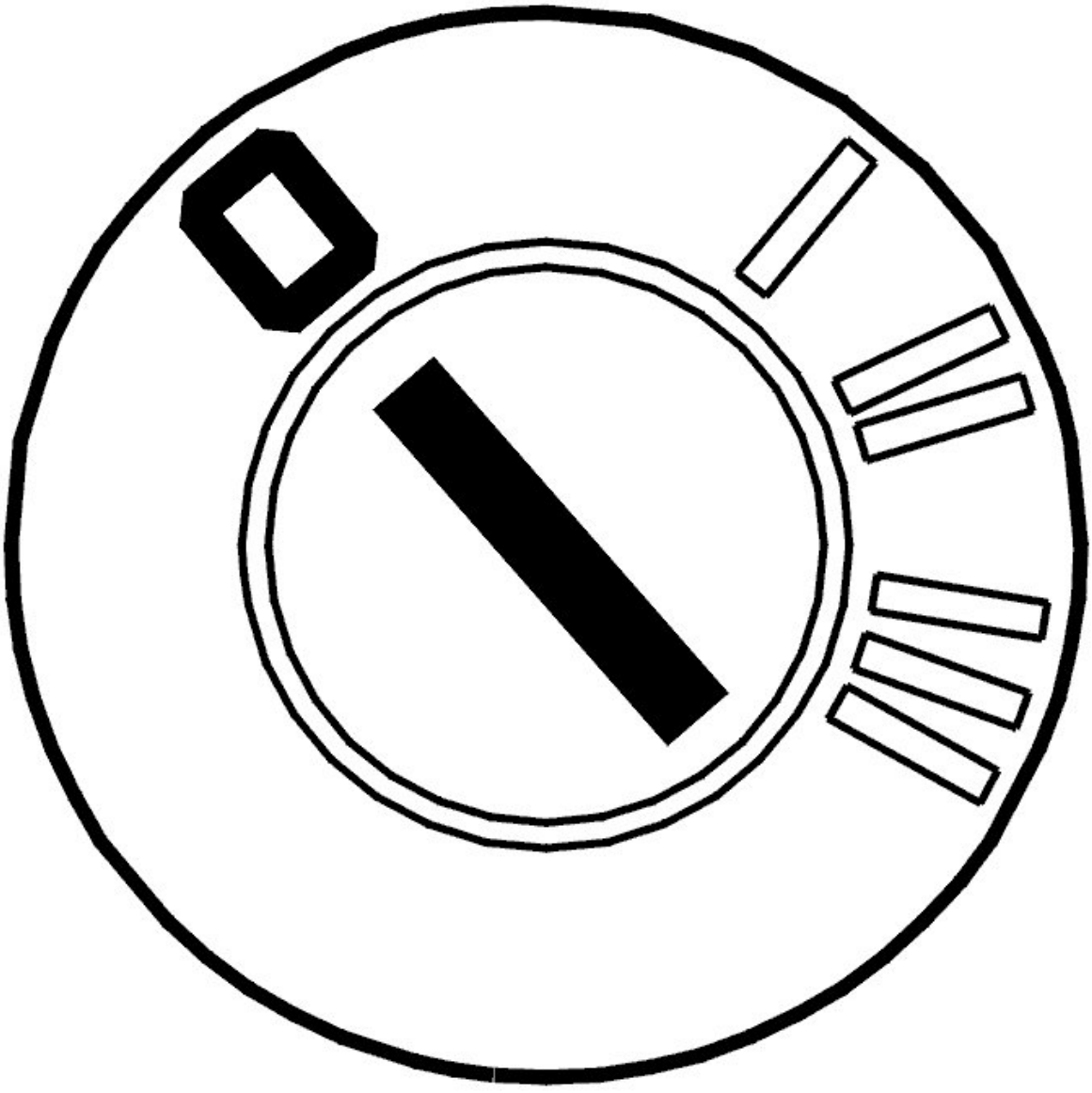


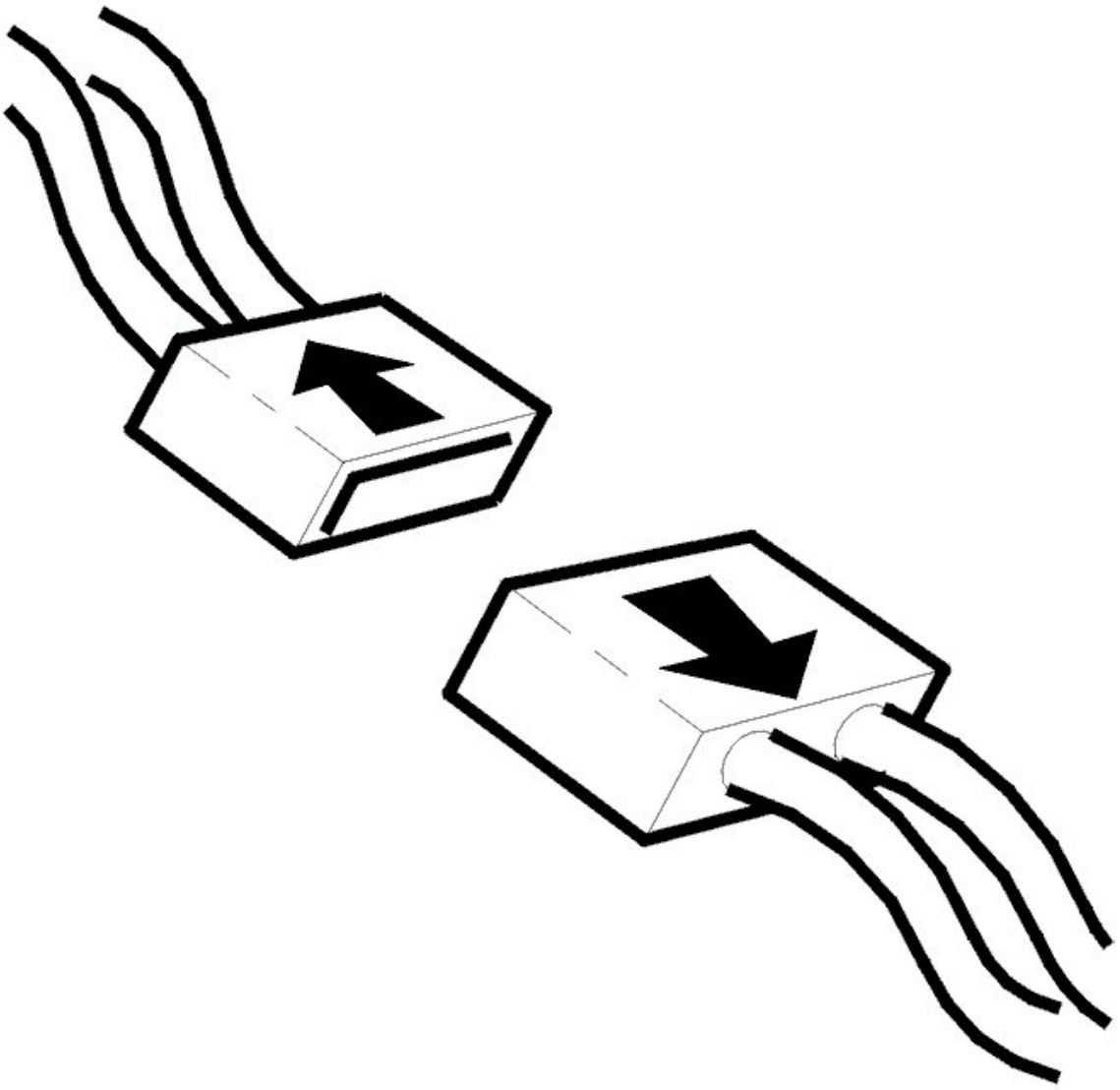
Did the LED flash three times?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



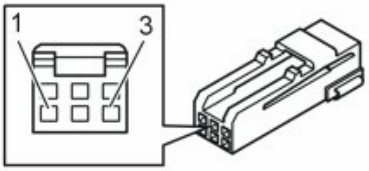


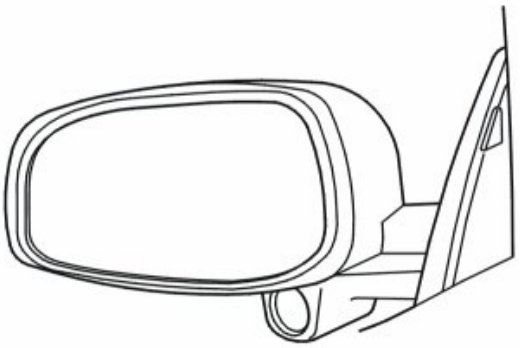
- Ignition off

Unplug the LED connector and check that the LED is intact. Also check the connector for contact resistance and corrosion.
Check the signal lead between the right camera module (RCM) and the #1 LED connector for an open circuit.
Check the ground cable between the right camera module (RCM) and the #3 LED connector for an open circuit.
Remedy as necessary.

Other information

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Change the light emitting diode, see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Fault-tracing information

The right camera module (RCM) has previously registered a fault but the fault no longer exists. The diagnostic trouble code (DTC) was probably generated by an intermittent fault. If the fault persists, fault-tracing according to this diagnostic trouble code (DTC) should be carried out even though no fault symptom can be detected. The seriousness of the fault is determined from case to case.
You can choose between continuing fault-tracing or ending it.

Would you like to continue?

Yes - Checking the wiring

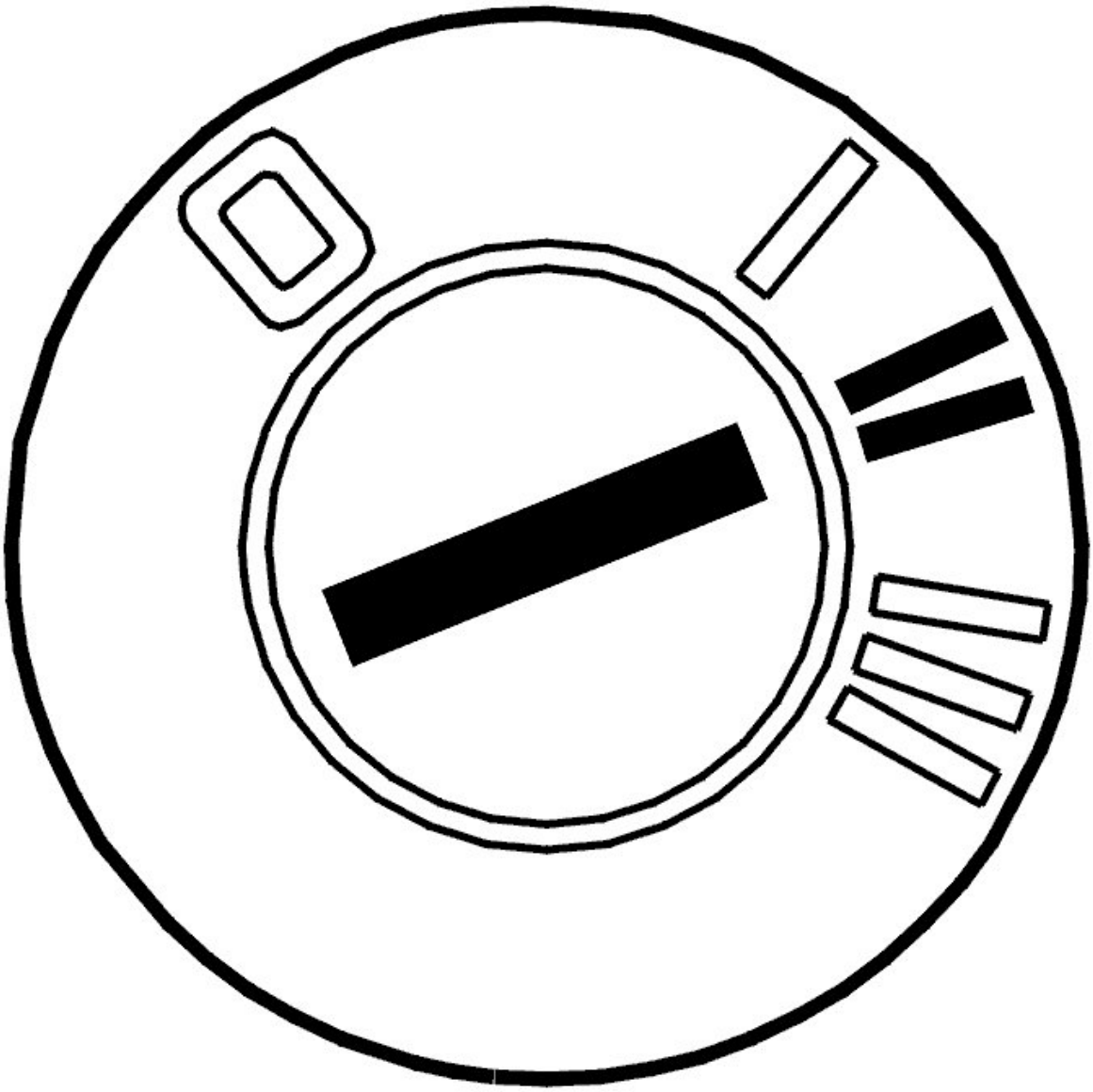
No - No Fault Found

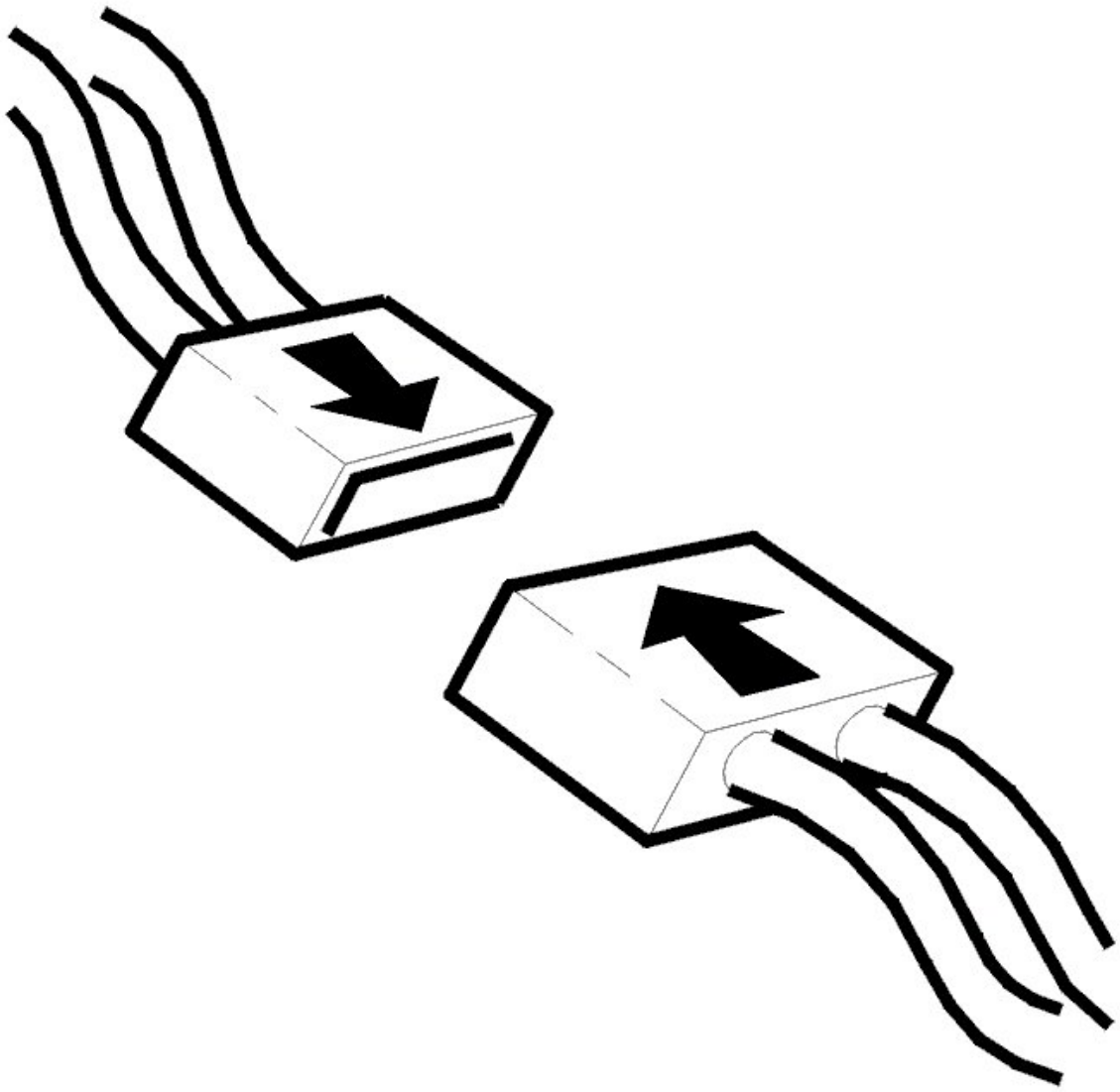
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Did the right LED flash three times?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

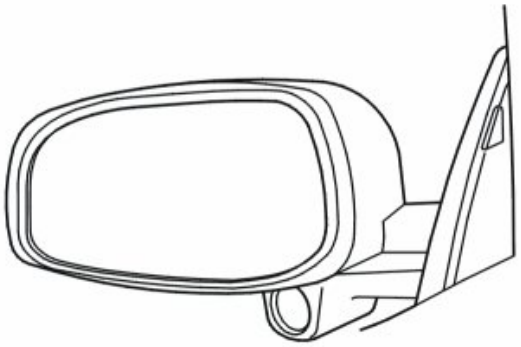
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F47

Condition



The central electronic module (CEM) controls communication with the blind spot indication system (BLIS) camera modules.
If the central electronic module (CEM) detects an internal fault on the left camera module (LCM) a diagnostic trouble code is generated.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- Dirty lens.
- Loose connection or oxidation in signal connections to Left Camera Module (LCM).
- Internal fault in left camera module (LCM).

Fault symptom[s]
- The LED does not come on.
- LED flashing rapidly.

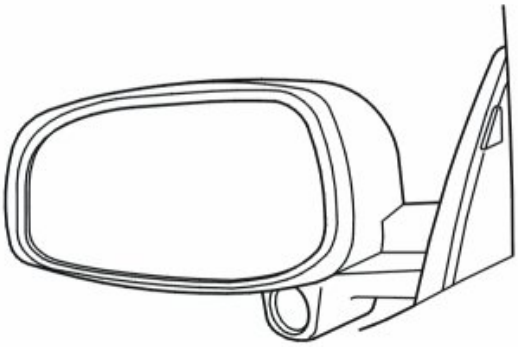
Internal Fault

Internal fault

Replacing the component

A diagnostic trouble code will be generated if the central electronic module (CEM) detects an internal fault in the left camera module (LCM).
If the fault is intermittent it will have been registered earlier but no longer exists. Intermittent faults could be due to interference on starting up or to another type of fault than recurs at different times. The seriousness of the fault is determined from case to case.
Remedy as necessary.

Other information
- Change the left camera module (LCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

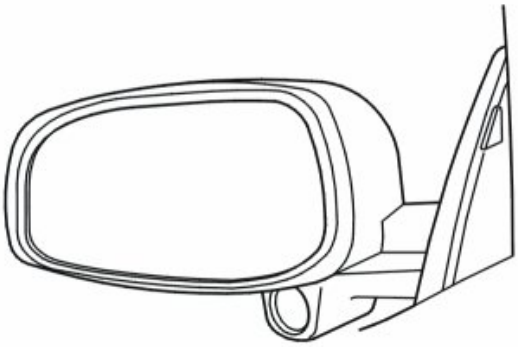
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F48

Condition



The central electronic module (CEM) controls communication with the blind spot indication system (BLIS) camera modules.
A diagnostic trouble code will be generated if the central electronic module (CEM) detects an internal fault in the right camera module (RCM).
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value

- Nothing.

Possible source
- Dirty lens.
- Loose connection or oxidation in signal connections to Right Camera Module (RCM).
- Internal fault in right camera module (RCM).

Fault symptom[s]
- The LED does not come on.
- LED flashing rapidly.

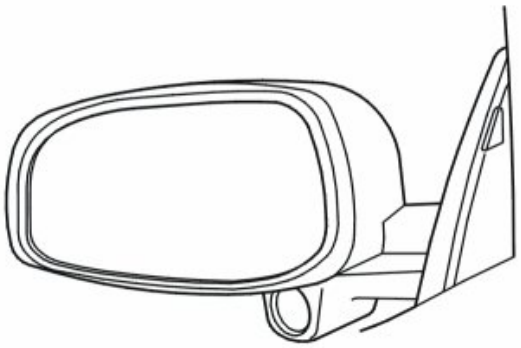
Internal Fault

Internal fault

Replacing the component

A diagnostic trouble code will be generated if the central electronic module (CEM) detects an internal fault in the right camera module (RCM).
If the fault is intermittent it will have been registered earlier but no longer exists. Intermittent faults could be due to interference on starting up or to another type of fault than recurs at different times. The seriousness of the fault is determined from case to case.
Remedy as necessary.

Other information
- Change the right camera module (RCM), see: Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

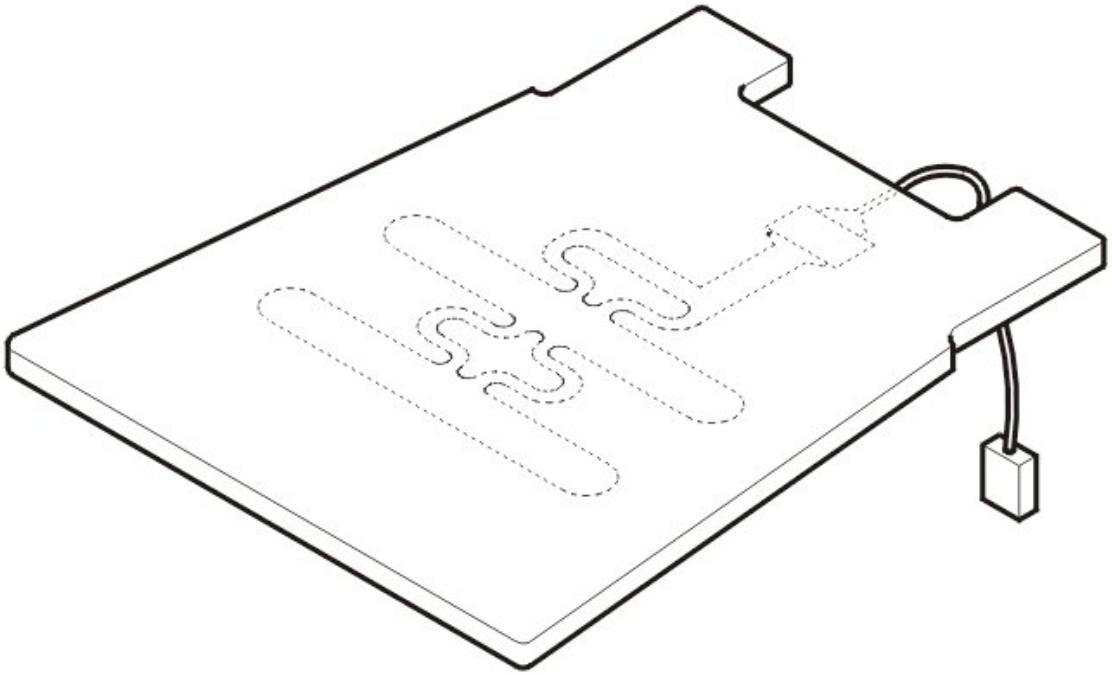
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F90

Condition



The central electronic module (CEM) checks the signal from the sensor for the seat belt reminder in the passenger seat.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is too high.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and the battery voltage above 9 V.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged sensor, seat belt reminder.

Fault symptom[s]
- General warning lamp lit.

Signal Too High

Signal too high

Checking components and wiring

Check the connectors on the central electronic module (CEM) and the sensor for the seat belt reminder. Check for contract resistance and oxidation. Check for damage or loose connections.
Check the connectors between the central electronic module (CEM) and the sensor for the seat belt reminder. Check for a short-circuit to supply voltage.
Take readings between:
- Central electronic module (CEM) terminal D27 (#27) and seat belt reminder sensor terminal #1
- Central electronic module (CEM) terminal D28 (#28) and seat belt reminder sensor terminal #2.

Check the seat belt reminder sensor. Measure the resistance between terminals #1 and #2 in the sensor connector.

Hint: The resistance should be above 50 kohms with no passengers and below 50 kohms with passengers.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To replace the seat belt reminder sensor, see: Heater pad backrest and cushion, replacing See: Body and Frame/Seats/Seat Heater/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

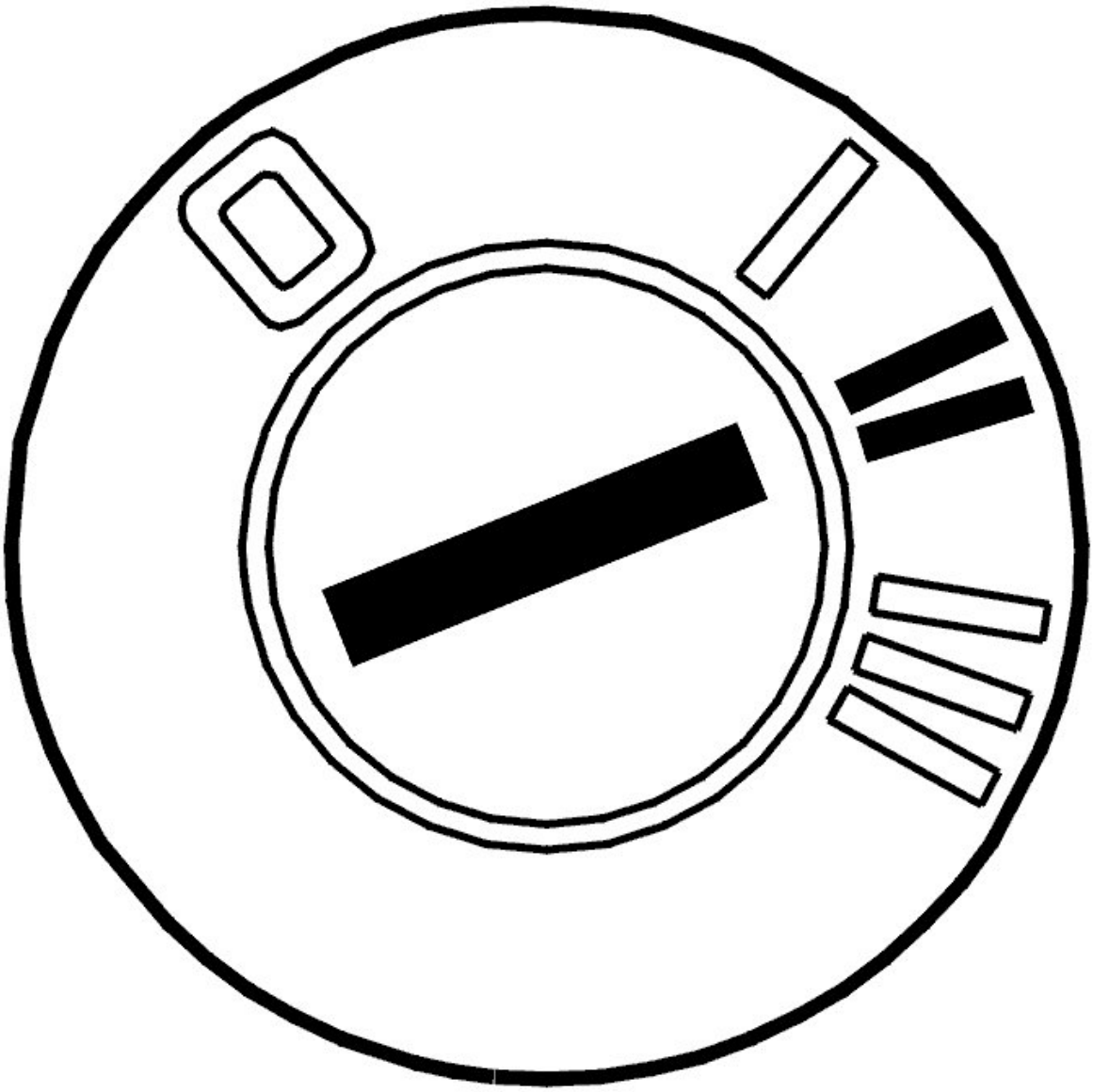
Continue - Verification

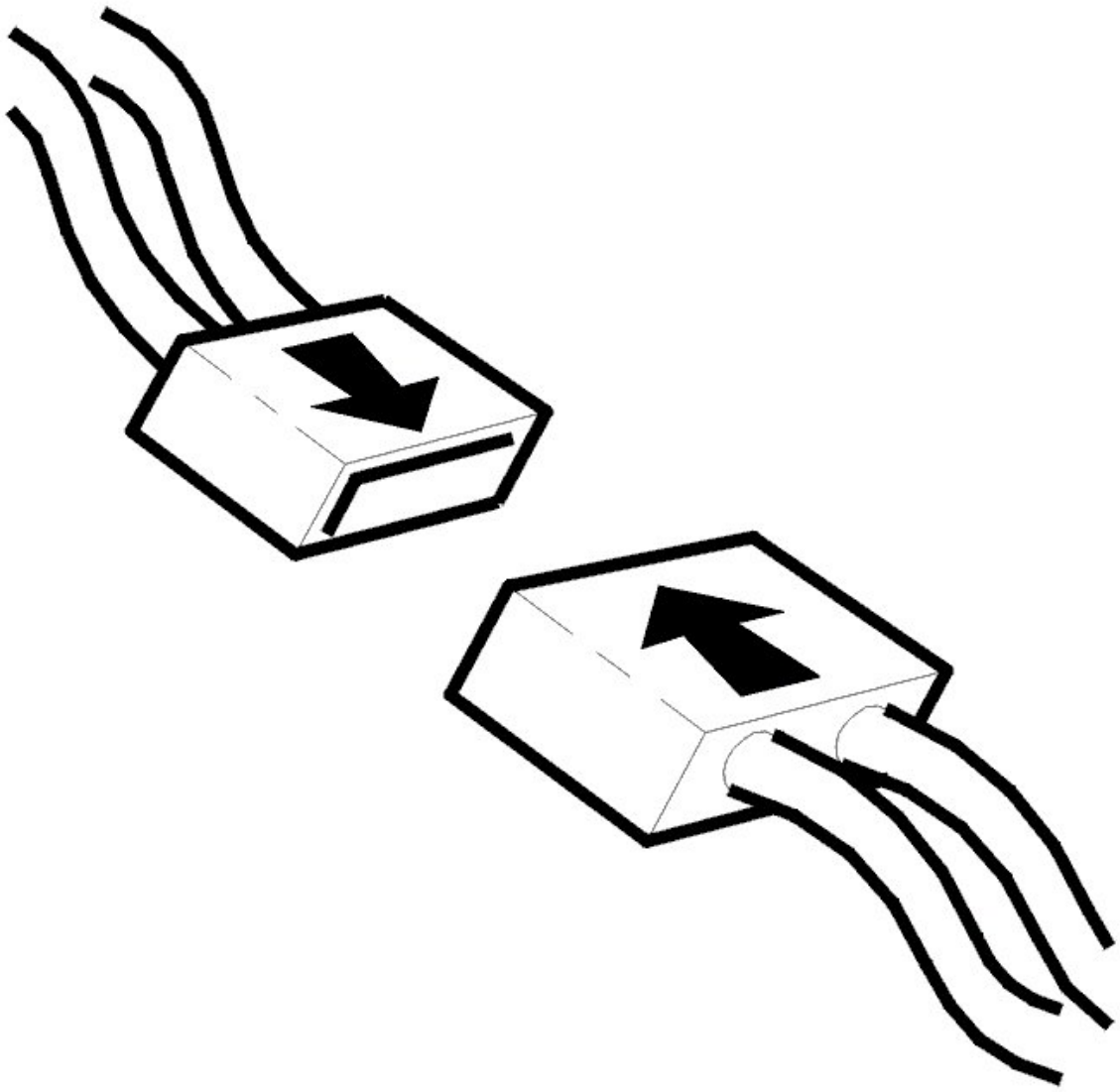
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the status of the seat belt reminder sensor. Check that the sensor changes status with and without a passenger in the passenger seat.

Does the status of the seat belt reminder sensor change with and without a passenger?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

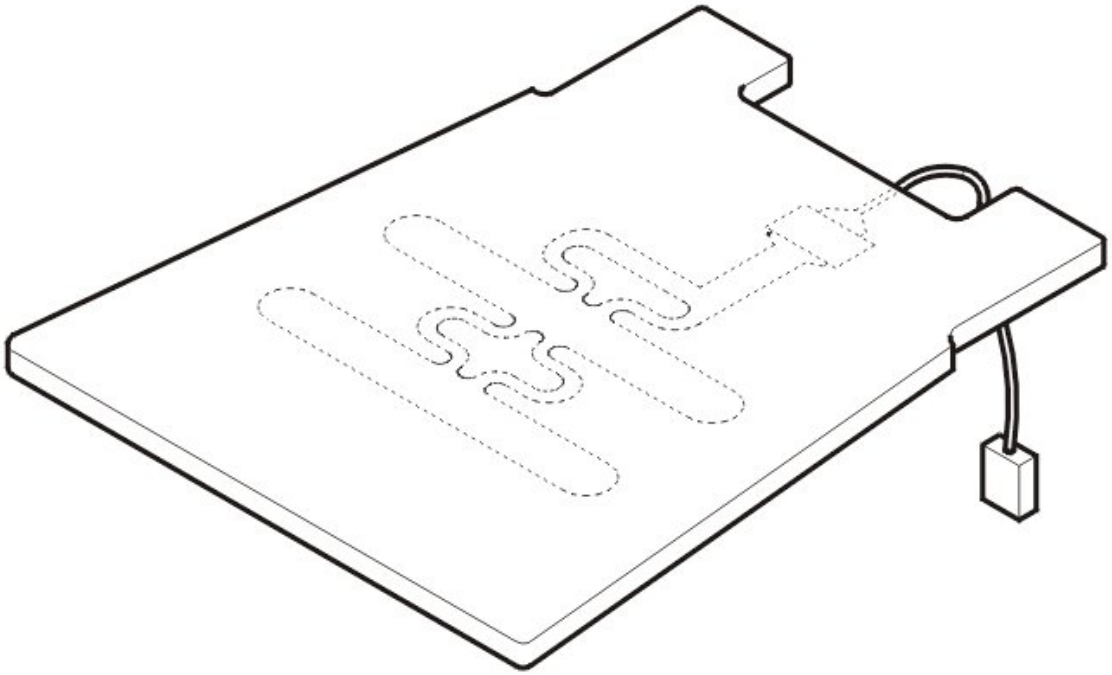
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F91

Condition



The central electronic module (CEM) checks the signal from the sensor for the seat belt reminder in the passenger seat.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and the battery voltage above 9 V.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged sensor, seat belt reminder.

Fault symptom[s]
- General warning lamp lit.

Signal Too Low

Signal too low

Checking components and wiring

Check the connectors on the central electronic module (CEM) and the sensor for the seat belt reminder. Check for contract resistance and oxidation. Check for damage or loose connections.
Check the connectors between the central electronic module (CEM) and the sensor for the seat belt reminder. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal D27 (#27) and seat belt reminder sensor terminal #1
- Central electronic module (CEM) terminal D28 (#28) and seat belt reminder sensor terminal #2.

Check the seat belt reminder sensor. Measure the resistance between terminals #1 and #2 in the sensor connector.

Hint: The resistance should be above 50 kohms with no passengers and below 50 kohms with passengers.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To replace the seat belt reminder sensor, see: Heater pad backrest and cushion, replacing See: Body and Frame/Seats/Seat Heater/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

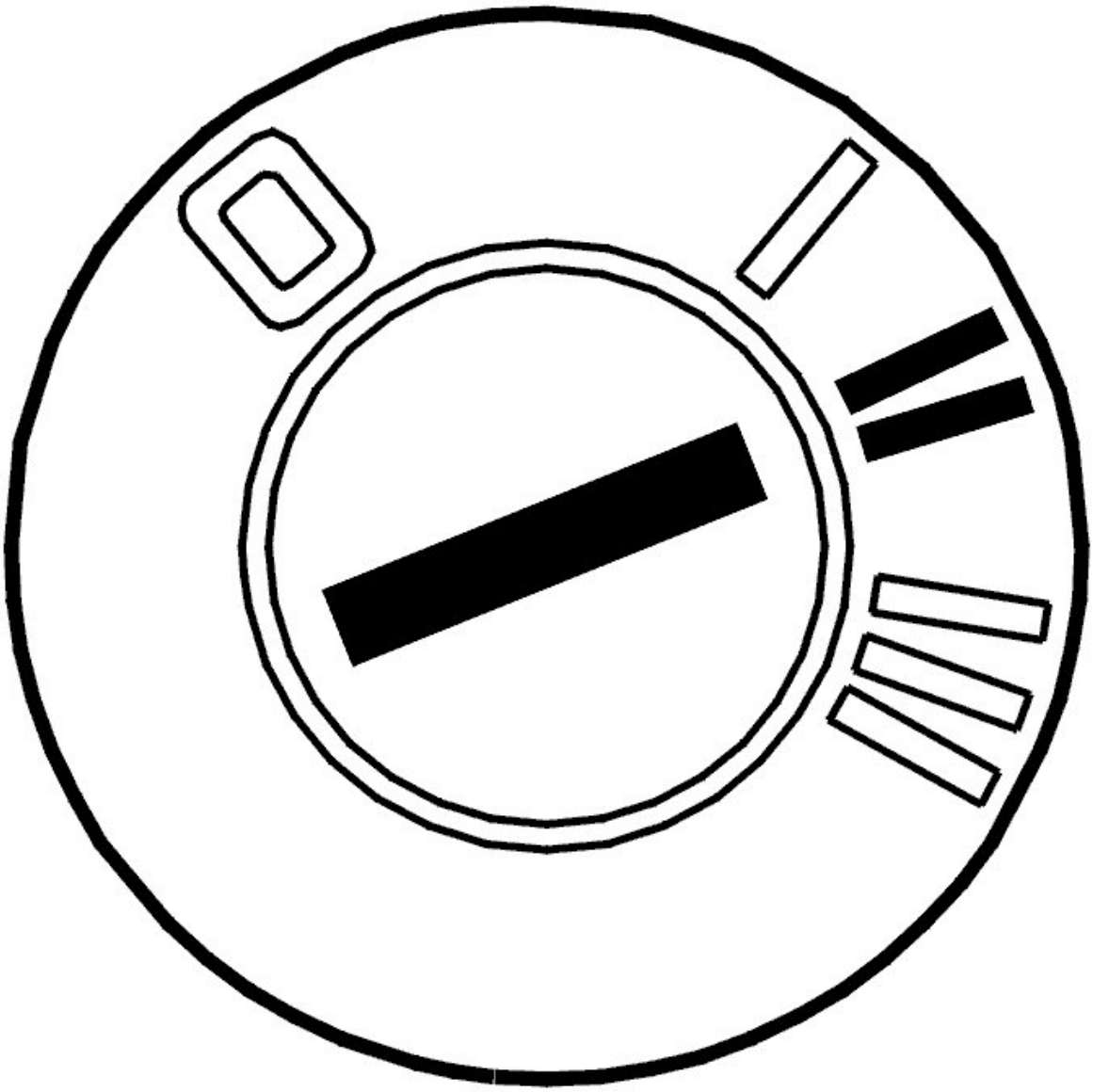
Continue - Verification

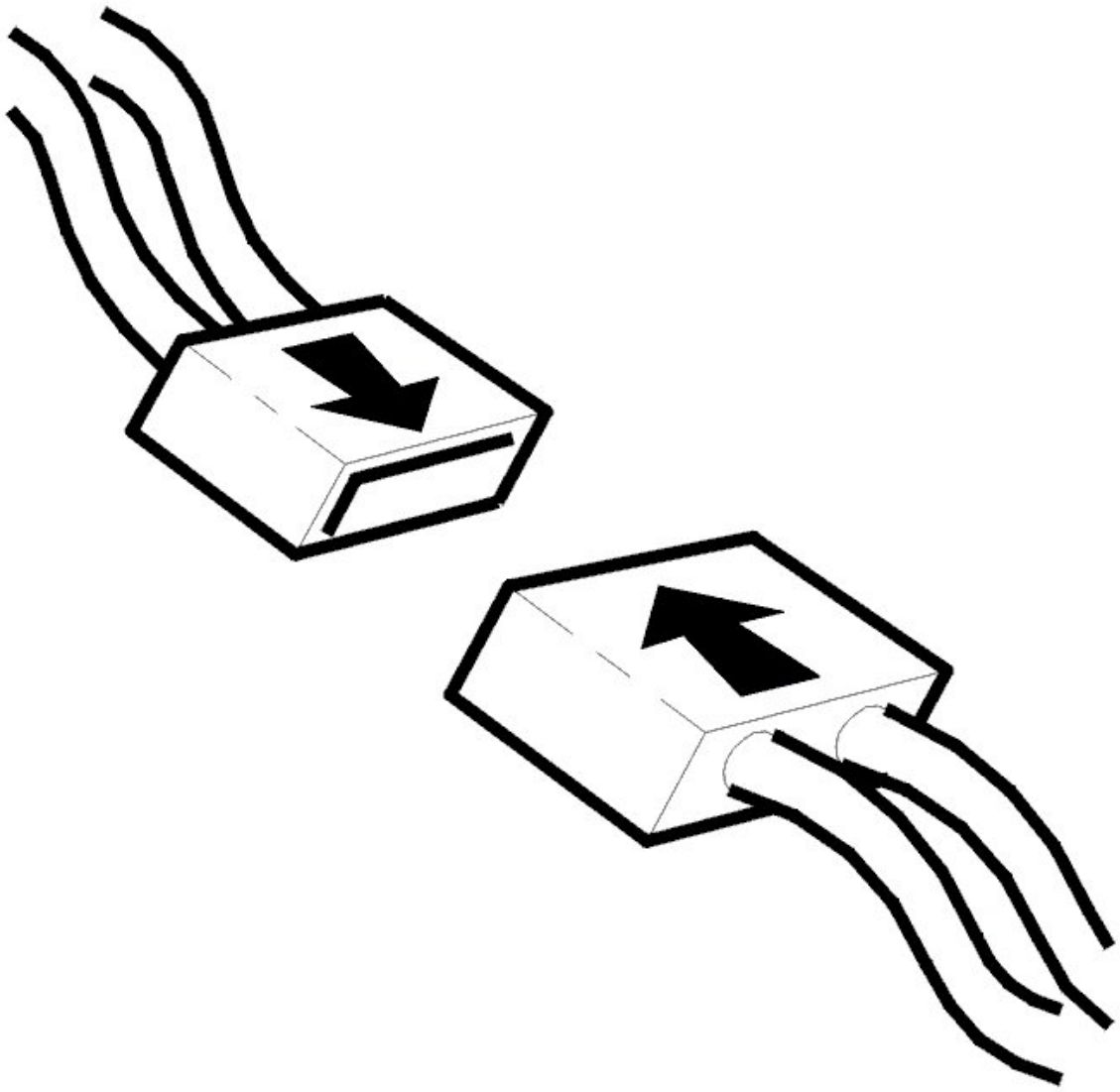
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the status of the seat belt reminder sensor. Check that the sensor changes status with and without a passenger in the passenger seat.

Does the status of the seat belt reminder sensor change with and without a passenger?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

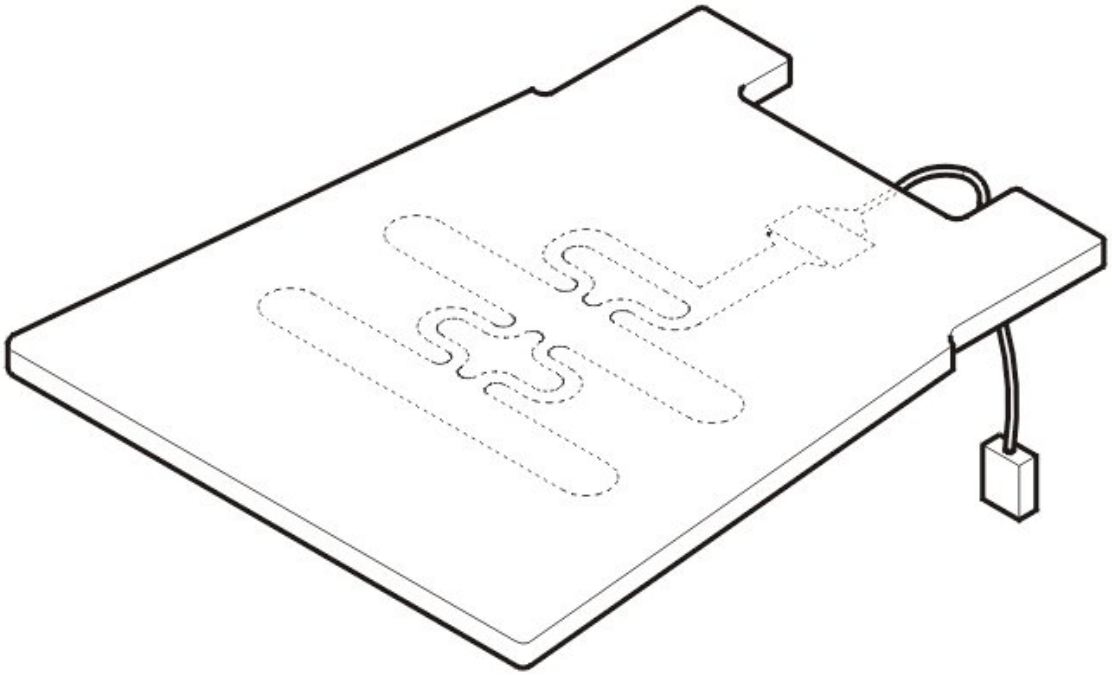
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F92

Condition



The central electronic module (CEM) checks the signal from the sensor for the seat belt reminder in the passenger seat.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is missing.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and the battery voltage above 9 V.

Substitute value
- None.

Possible source
- Open-circuit in the signal cable.

Fault symptom[s]
- General warning lamp lit.

Signal Missing

Signal missing

Checking components and wiring

Check the connectors on the central electronic module (CEM) and the sensor for the seat belt reminder. Check for contract resistance and oxidation. Check for damage or loose connections.
Check the connectors between the central electronic module (CEM) and the sensor for the seat belt reminder. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal D27 (#27) and seat belt reminder sensor terminal #1
- Central electronic module (CEM) terminal D28 (#28) and seat belt reminder sensor terminal #2.

Check the seat belt reminder sensor. Measure the resistance between terminals #1 and #2 in the sensor connector.

Hint: The resistance should be above 50 kohms with no passengers and below 50 kohms with passengers.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To replace the seat belt reminder sensor, see: Heater pad backrest and cushion, replacing See: Body and Frame/Seats/Seat Heater/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

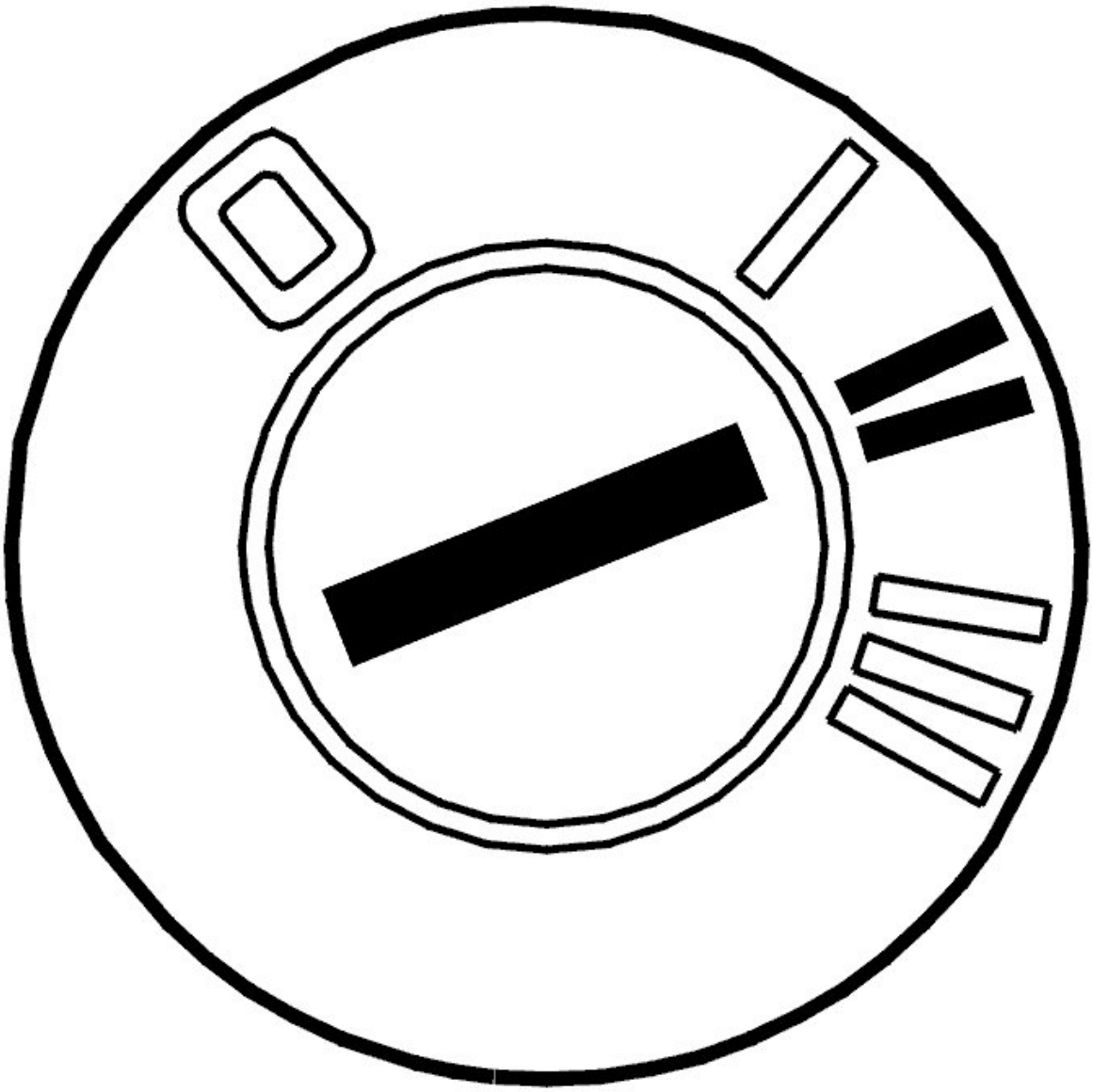
Continue - Verification

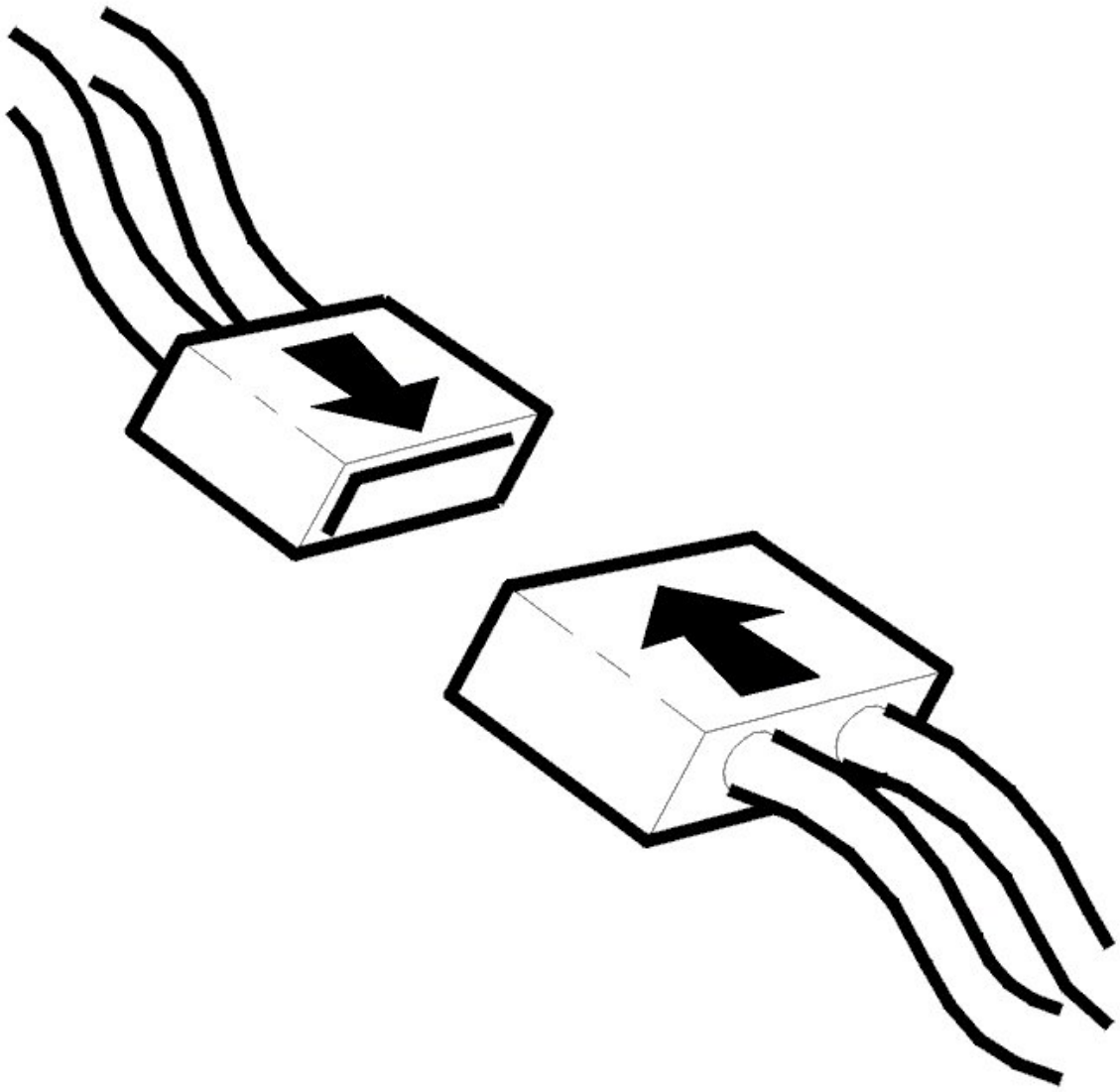
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the status of the seat belt reminder sensor. Check that the sensor changes status with and without a passenger in the passenger seat.

Does the status of the seat belt reminder sensor change with and without a passenger?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

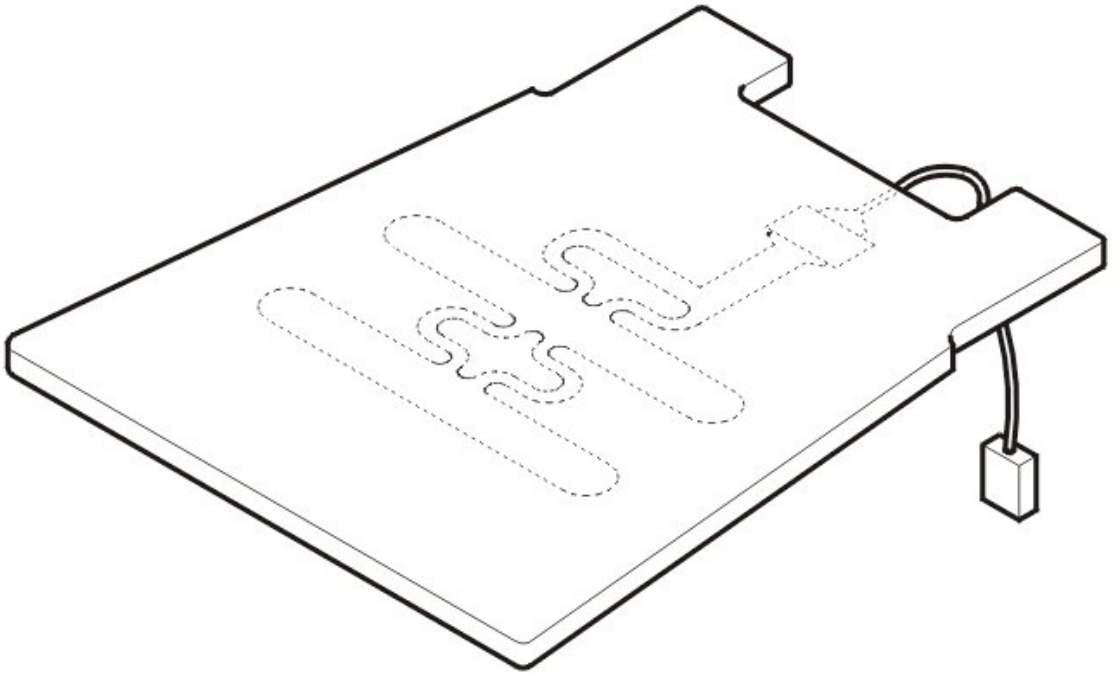
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-4F93

Condition



The central electronic module (CEM) checks the signal from the sensor for the seat belt reminder in the passenger seat.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is faulty.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and the battery voltage above 9 V.

Substitute value
- None.

Possible source
- Short-circuit between the signal cables
- Damaged sensor, seat belt reminder.

Fault symptom[s]
- General warning lamp lit.

Faulty Signal

Faulty signal

Checking components and wiring

Check the connectors on the central electronic module (CEM) and the sensor for the seat belt reminder. Check for contract resistance and oxidation. Check for damage or loose connections.
Check the signal cables between central electronic module (CEM) terminals D27 (#27) and D28 (#28) with the seat belt reminder sensor disconnected by measuring the resistance. Check for a short-circuit to each other. The resistance must be infinite.
Check the seat belt reminder sensor. Measure the resistance between terminals #1 and #2 in the sensor connector.

Hint: The resistance should be above 50 kohms with no passengers and below 50 kohms with passengers.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To replace the seat belt reminder sensor, see: Heater pad backrest and cushion, replacing See: Body and Frame/Seats/Seat Heater/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

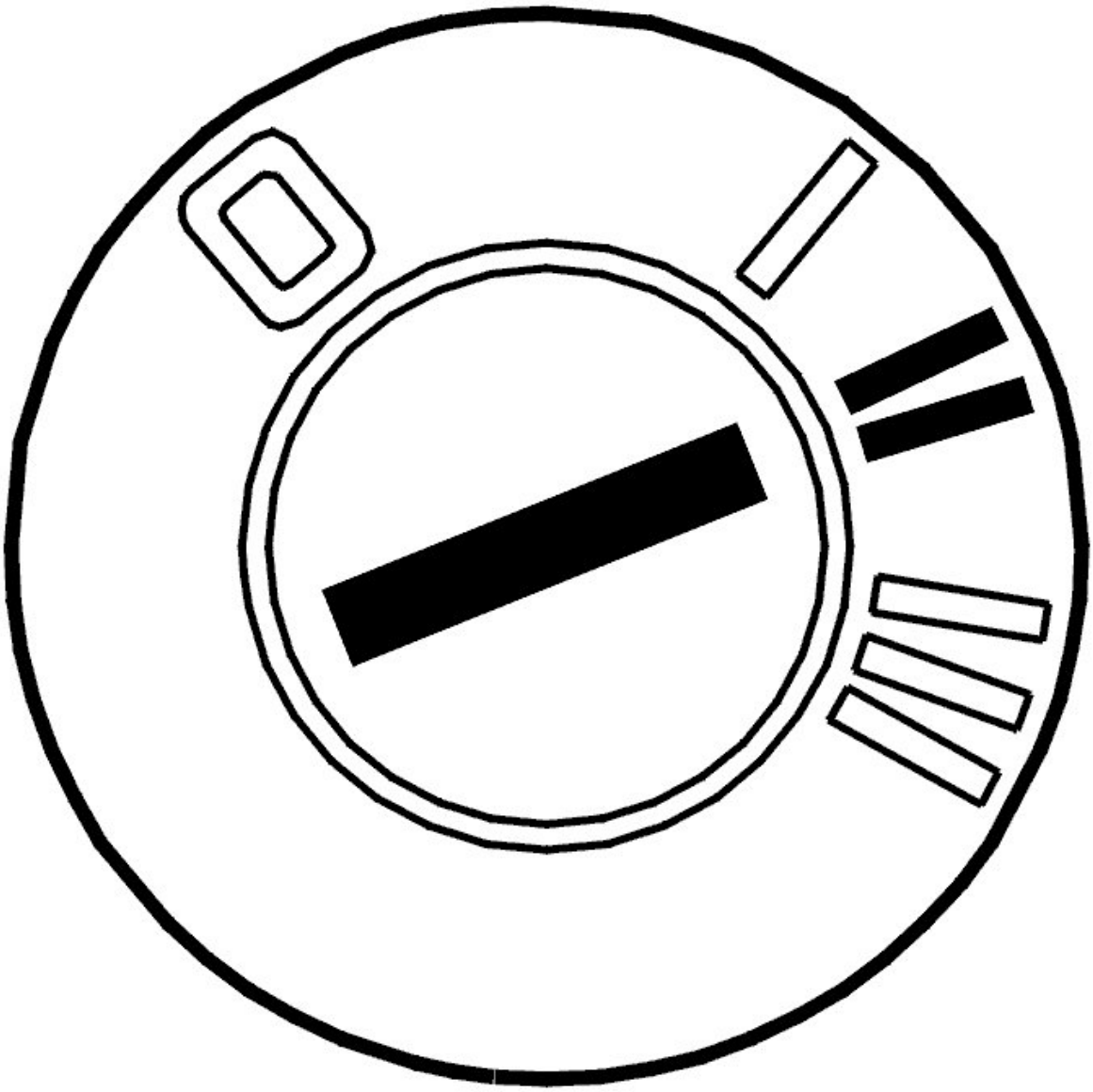
Continue - Verification

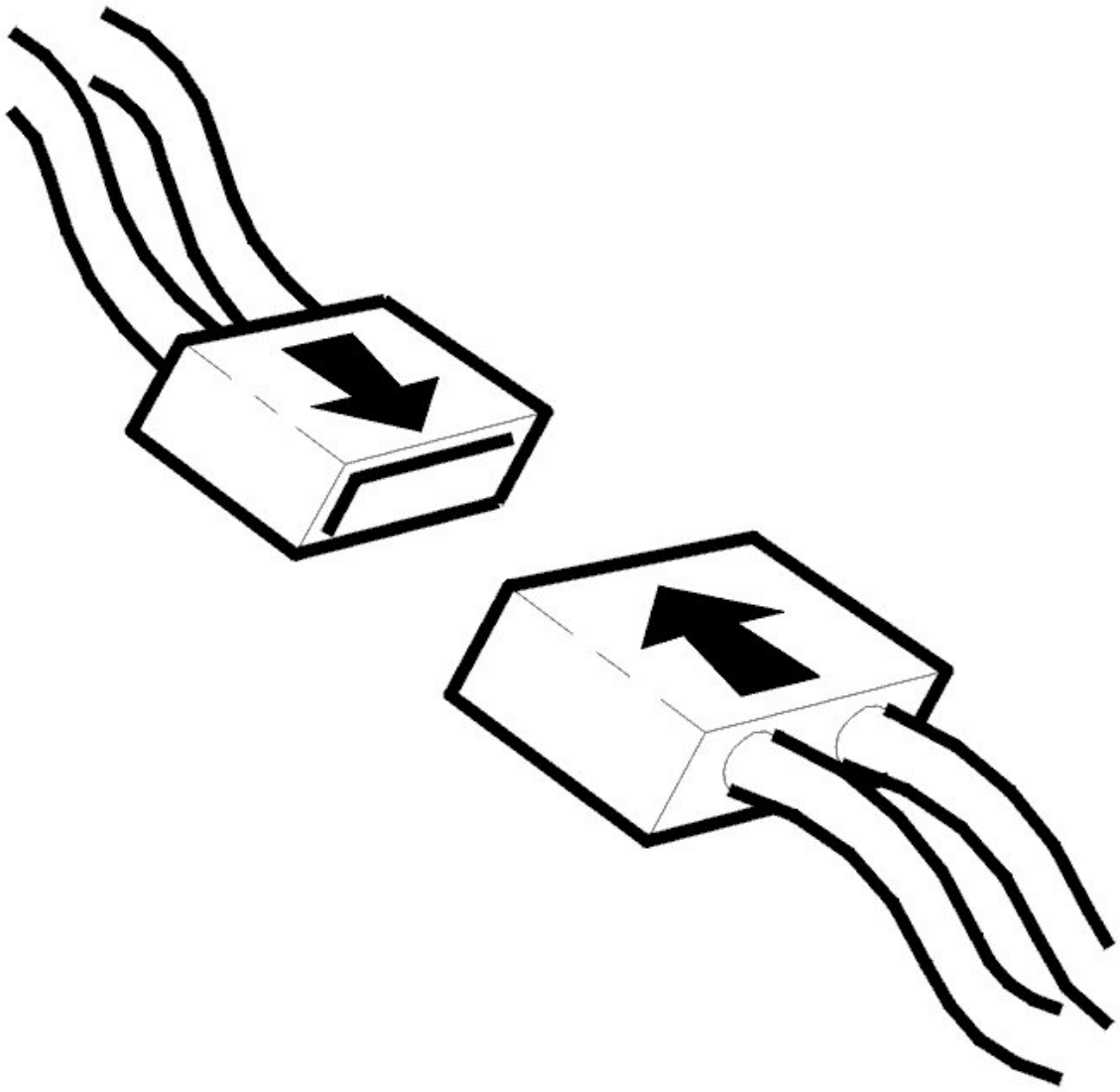
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the status of the seat belt reminder sensor. Check that the sensor changes status with and without a passenger in the passenger seat.

Does the status of the seat belt reminder sensor change with and without a passenger?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

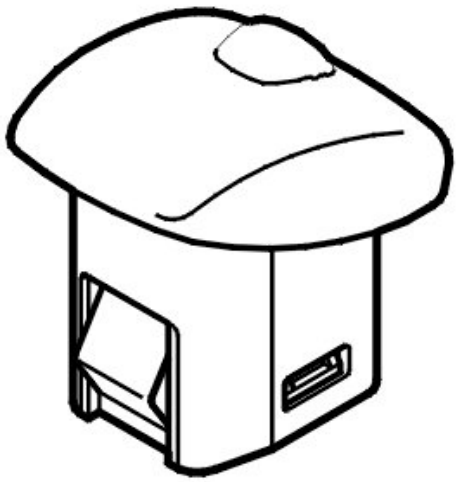
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5A00

Condition



The central electronic module (CEM) checks the signal from the sun sensor.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The control module adopts a substitute value corresponding to approximately 20% (200 W/m2) of maximum solar heat.

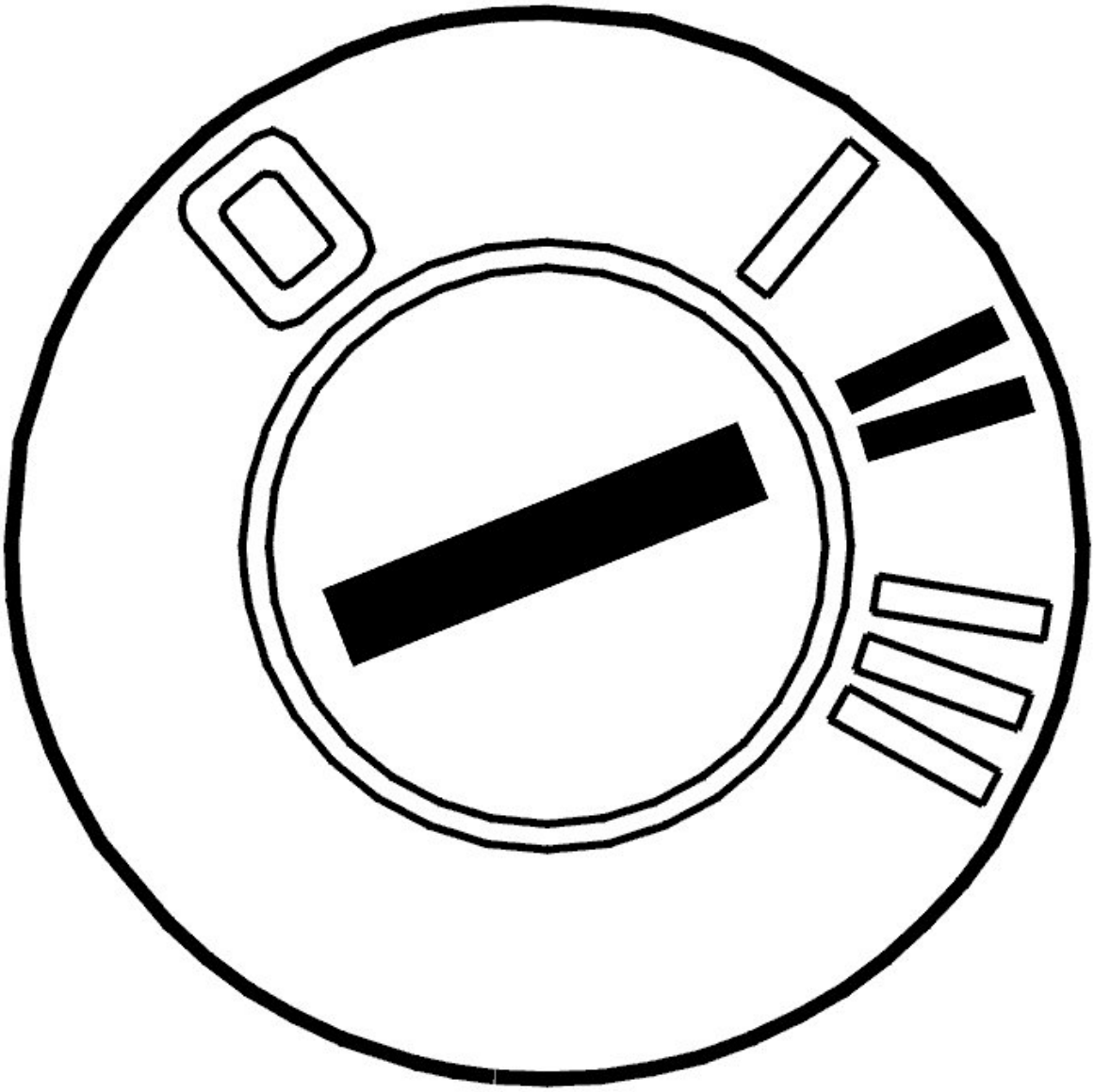
Possible source
- Short-circuit to supply voltage in the signal cable between the control module and the sun sensor
- Damaged sun sensor.

Fault symptom[s]
- The passenger compartment temperature does not drop when the sun intensity is high.

Signal Too High

Signal too high

Checking the component

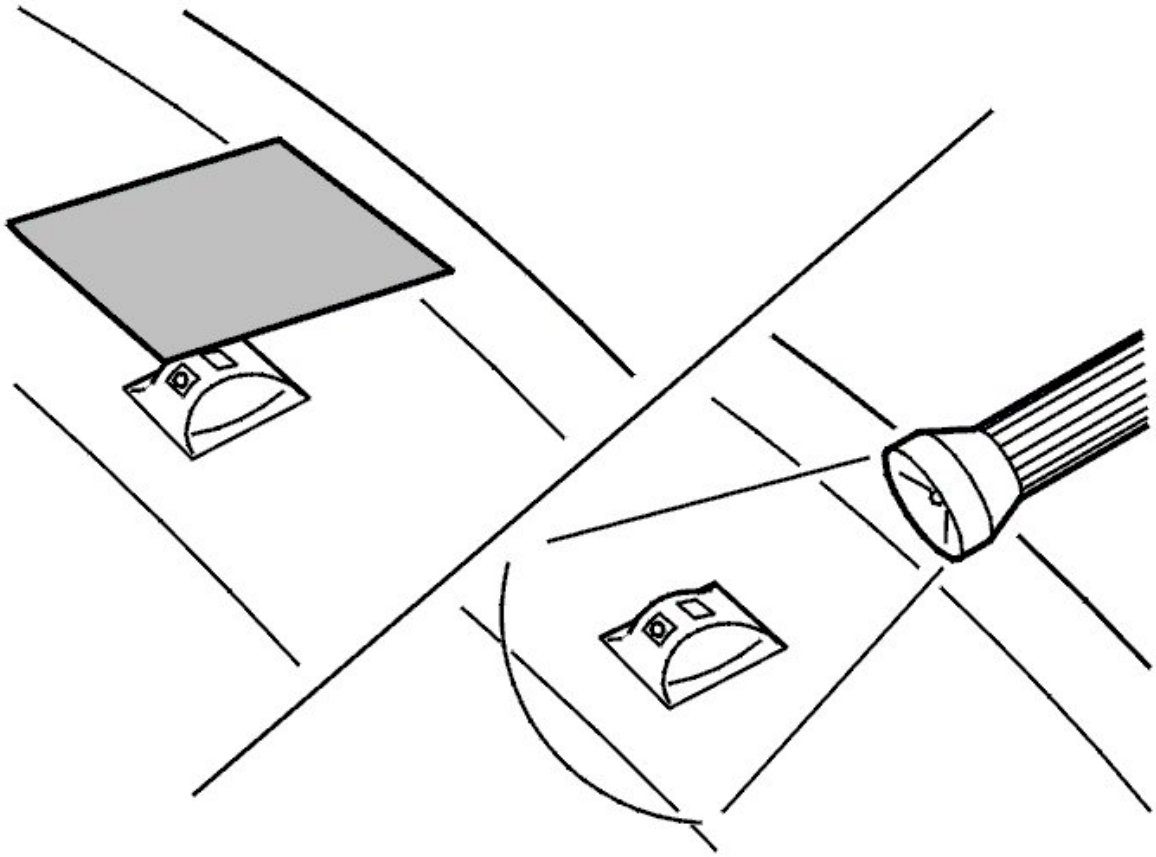


- Ignition on.

Check the sun sensor signal by varying the intensity of the light that it detects.
Cover the sun sensor with your hand to obtain the minimum signal, approximately 0.5 volts.
Then direct a strong light source (for example a flashlight) at the sun sensor from close range to increase the signal.

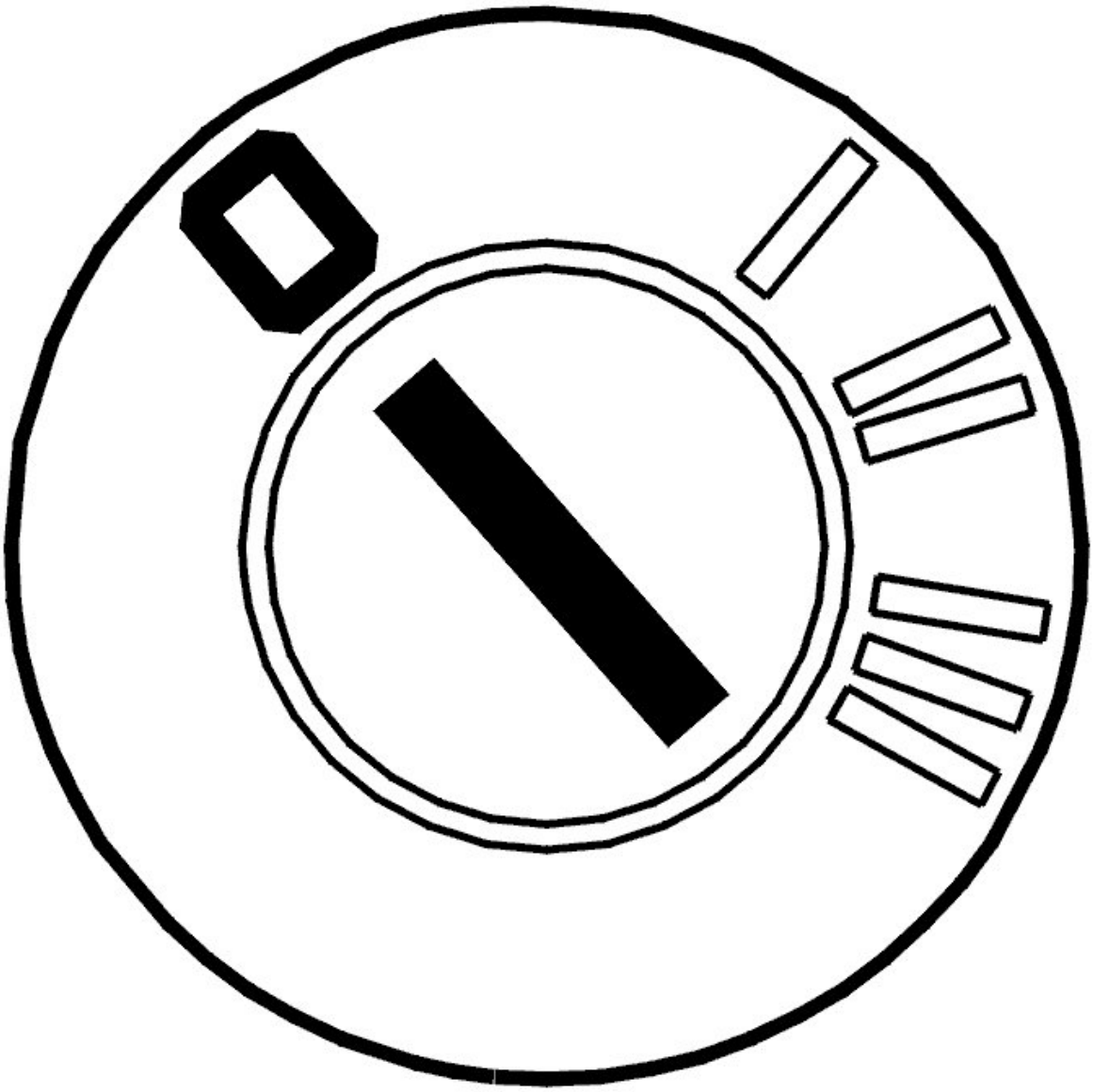
Hint: If the signal from the sun sensor is constantly above 4.85 volts, there is either an open-circuit in the cable or the sun sensor is defective.

Note! The illustration only shows the method. The appearance of the sun sensor can vary between different models.



Continue - Checking the wiring

Checking the wiring



- Ignition off.

Check the signal cable between the central electronic module (CEM) and the sun sensor. Check for an open-circuit. Check for a short-circuit to supply voltage.

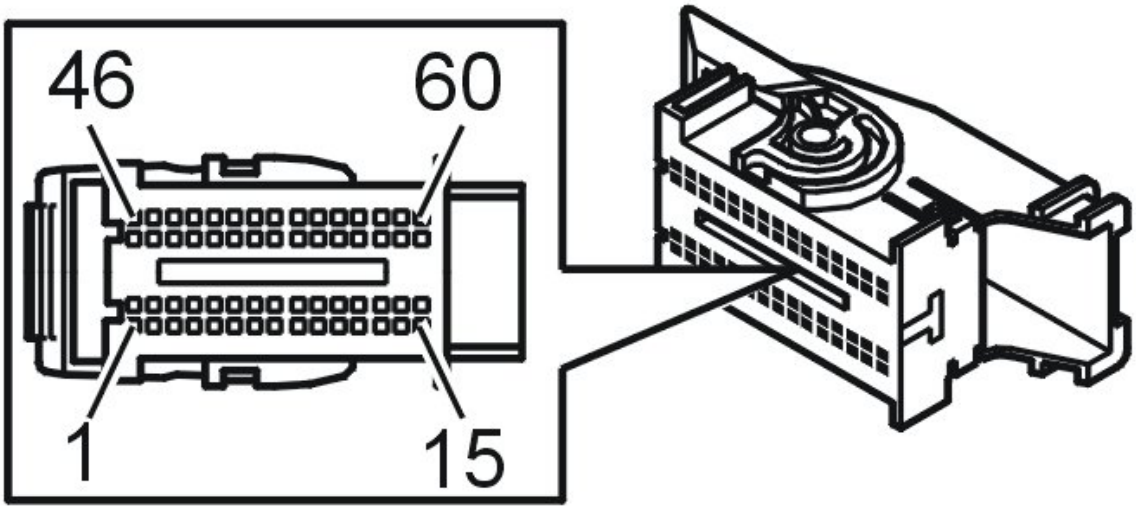
Take readings between:

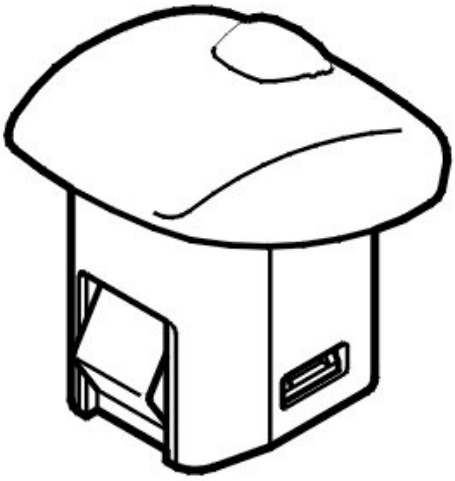
- Central electronic module (CEM) terminal #D30 (#30) and sun sensor terminal #1
- Central electronic module (CEM) terminal #D42 (#42) and sun sensor terminal #5.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Sun sensor / alarm LED, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Security Lamp/Indicator/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





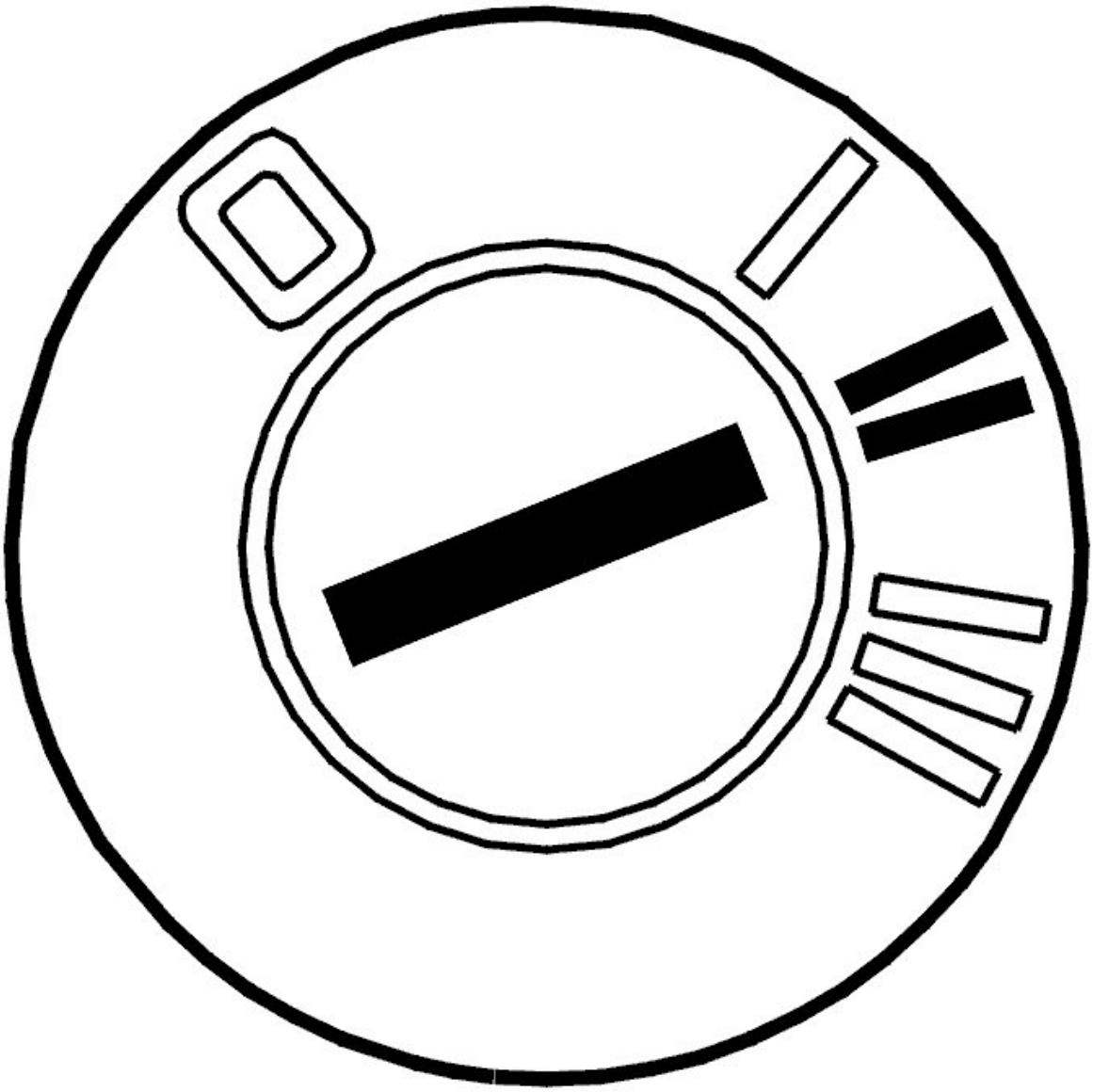
Continue - Verification

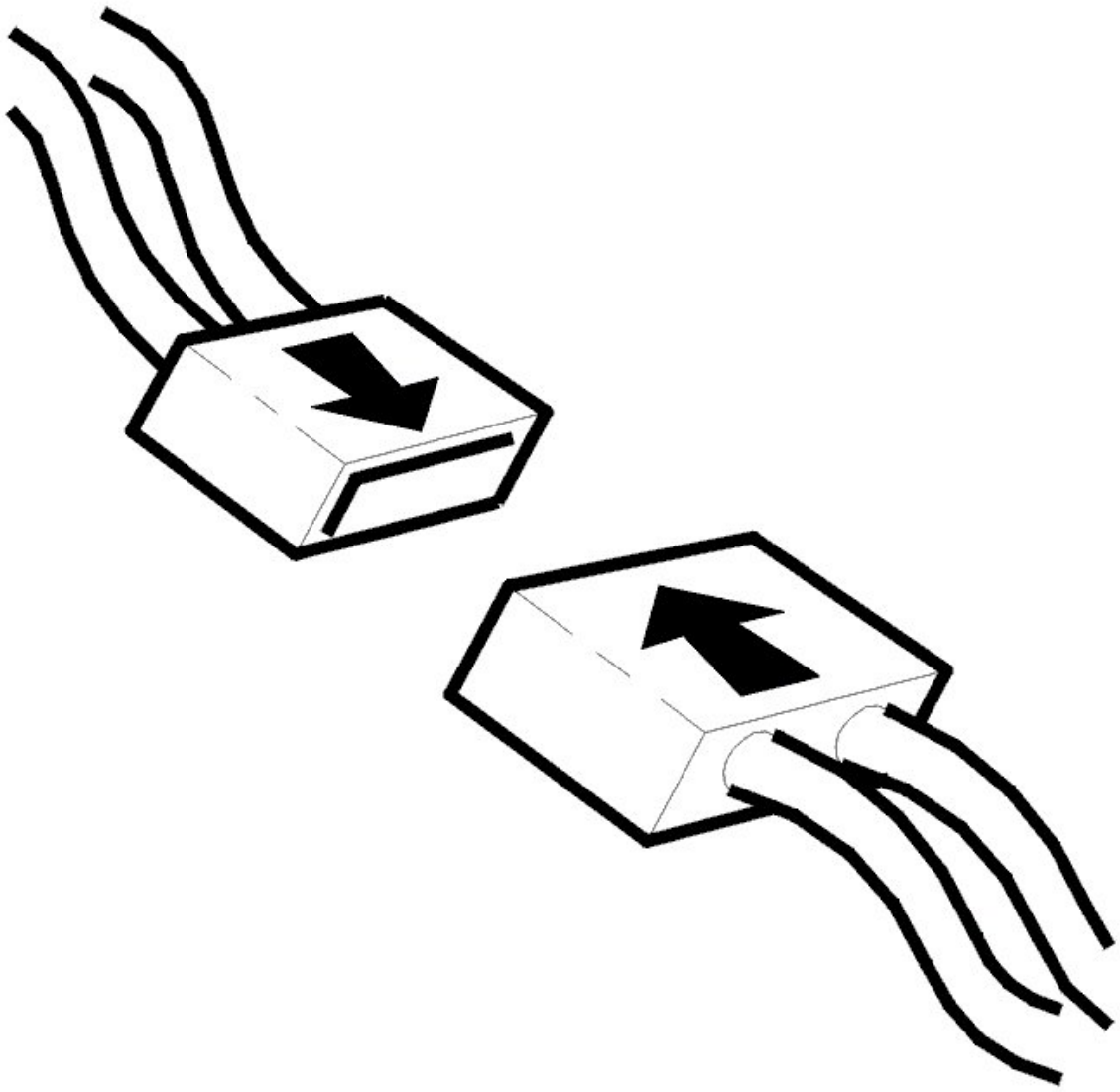
Verification

Verification

Verification

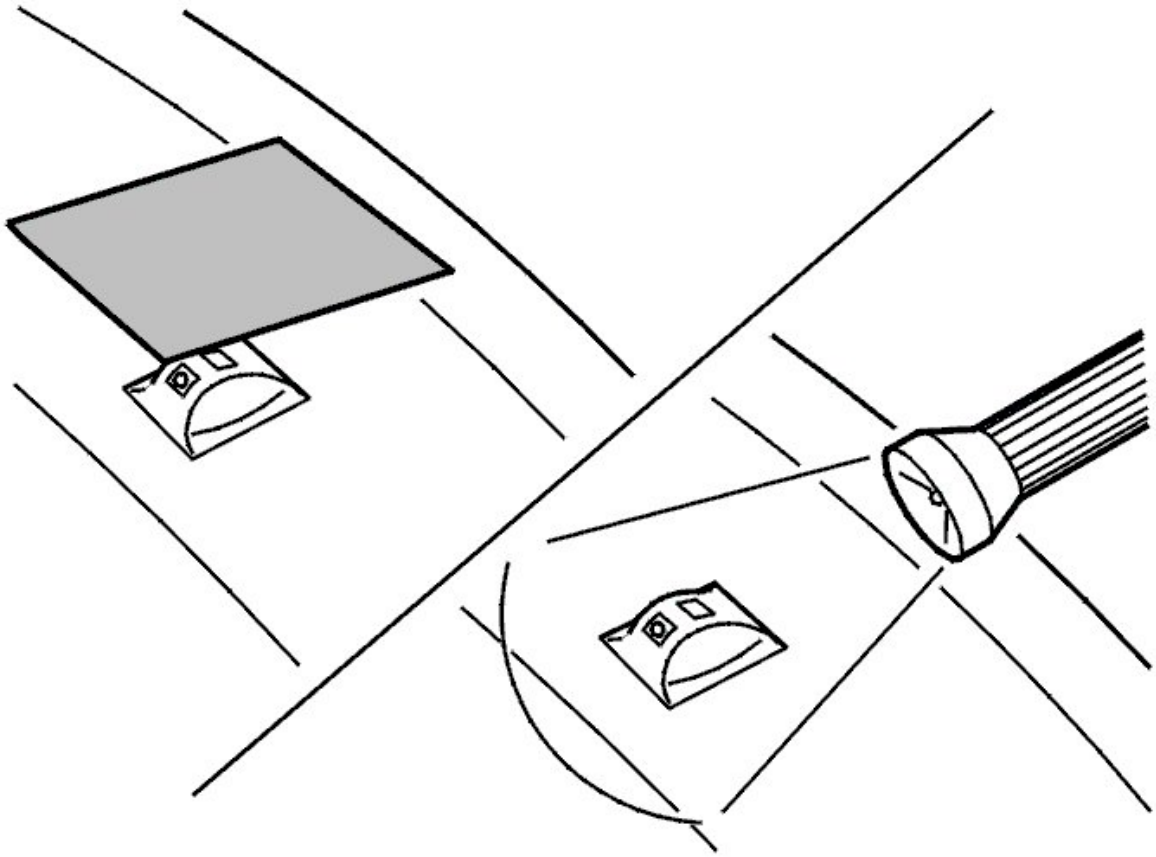
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the sun sensor by varying the light intensity at the sun sensor. Cover the sun sensor with your hand to obtain a minimal signal. Then direct a strong light source (for example a flashlight) at the sun sensor from close range to obtain a maximum signal.
The value must vary between approximately 0.5 and 4.85 V.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

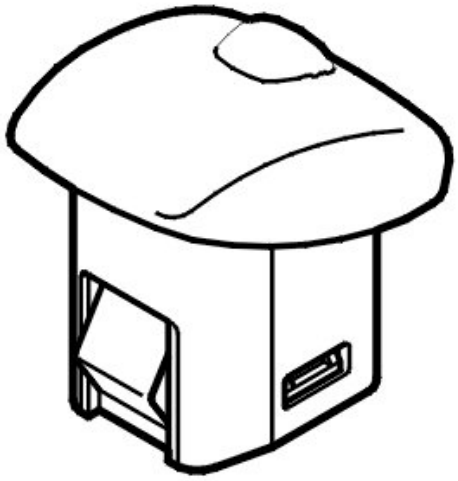
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5A01

Condition



The central electronic module (CEM) checks the signal from the sun sensor.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The control module adopts a substitute value corresponding to approximately 20% (200 W/m2) of maximum solar heat.

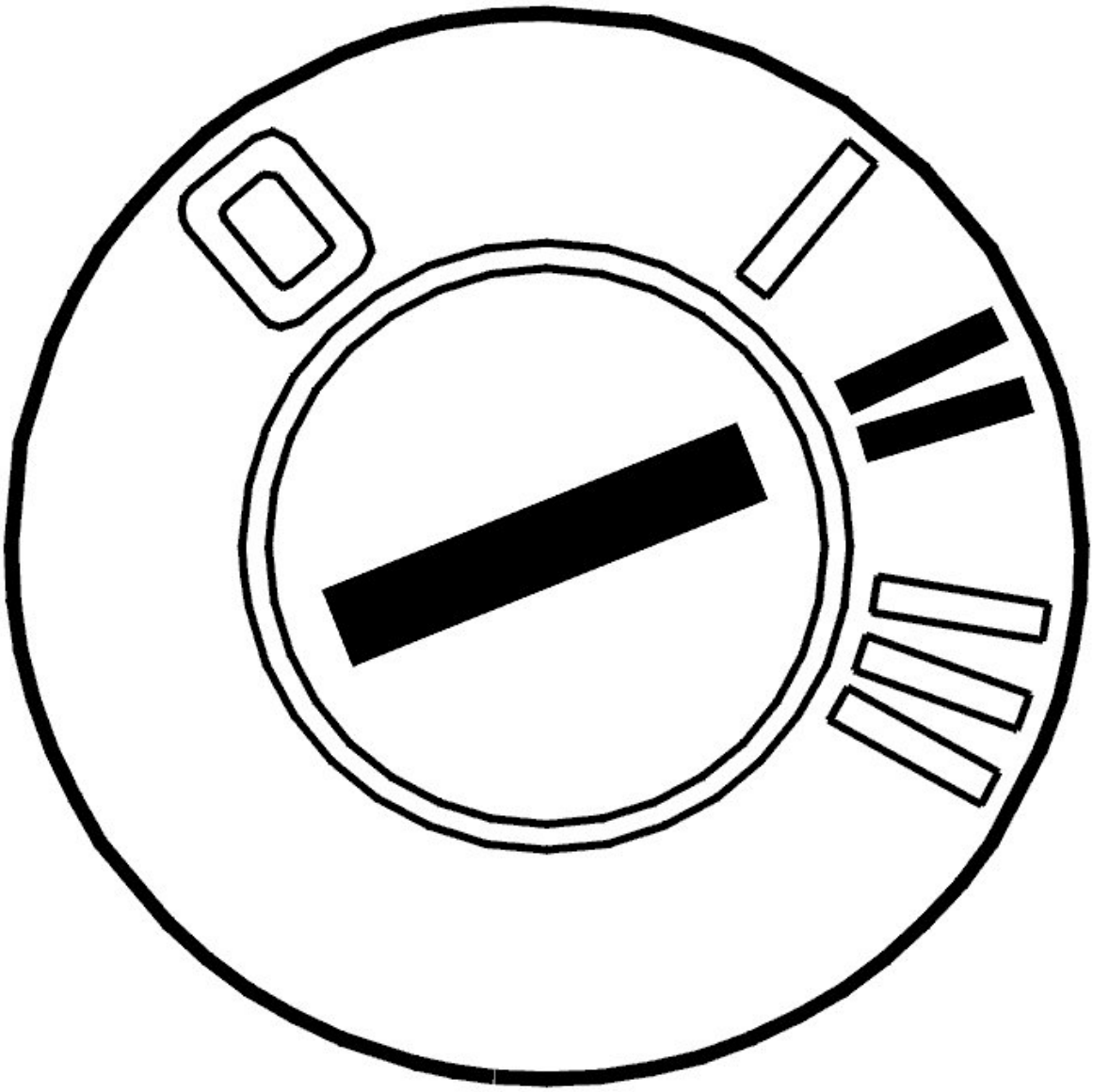
Possible source
- Short-circuit to ground in the signal cable between the control module and the sun sensor
- Damaged sun sensor.

Fault symptom[s]
- The passenger compartment temperature does not drop when the sun intensity is high.

Signal Too Low

Signal too low

Checking the component

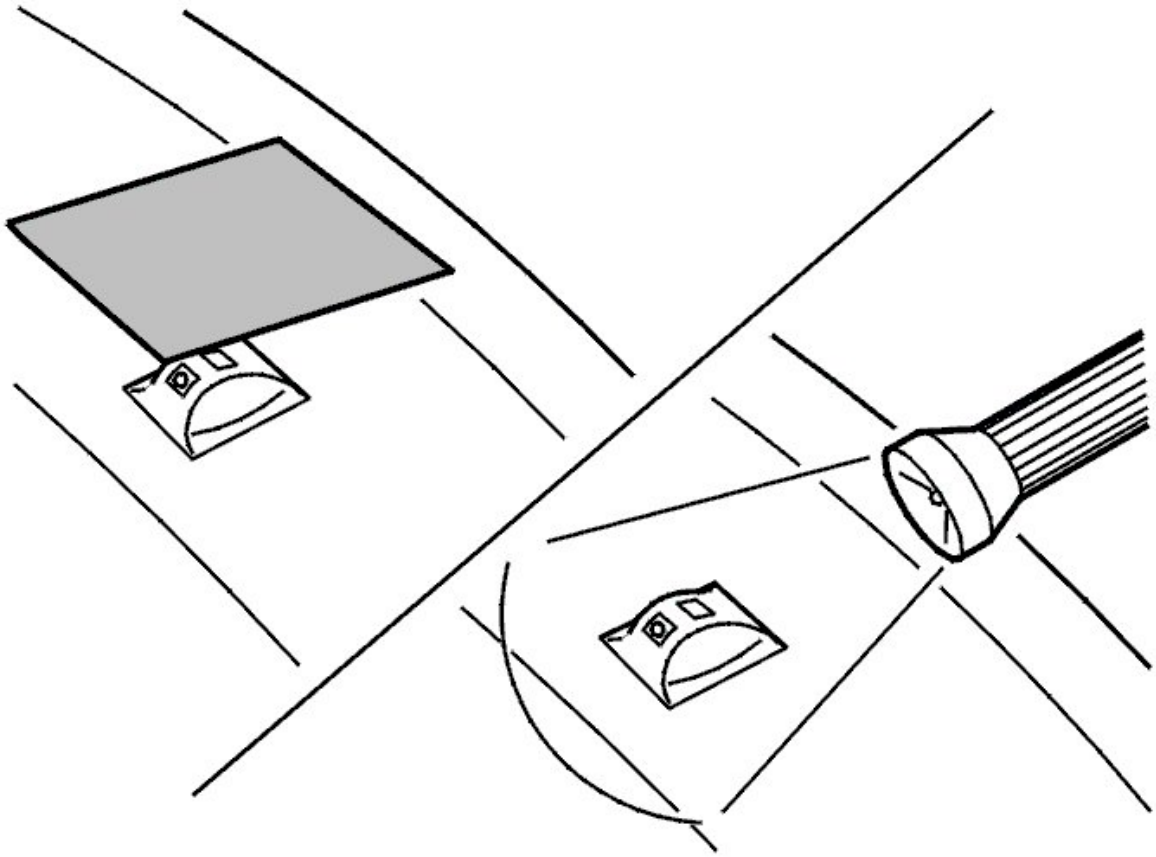


- Ignition on.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Vary the light intensity. Read off the signal from the sun sensor.
Cover the sun sensor with your hand to obtain the minimum signal, approximately 0.5 volts.
Then direct a strong light source (for example a flashlight) at the sun sensor from close range to increase the signal.

Hint: The value must vary between approximately 0.5 and 4.85 V.

Note! The illustration only shows the method. The appearance of the sun sensor can vary between different models.

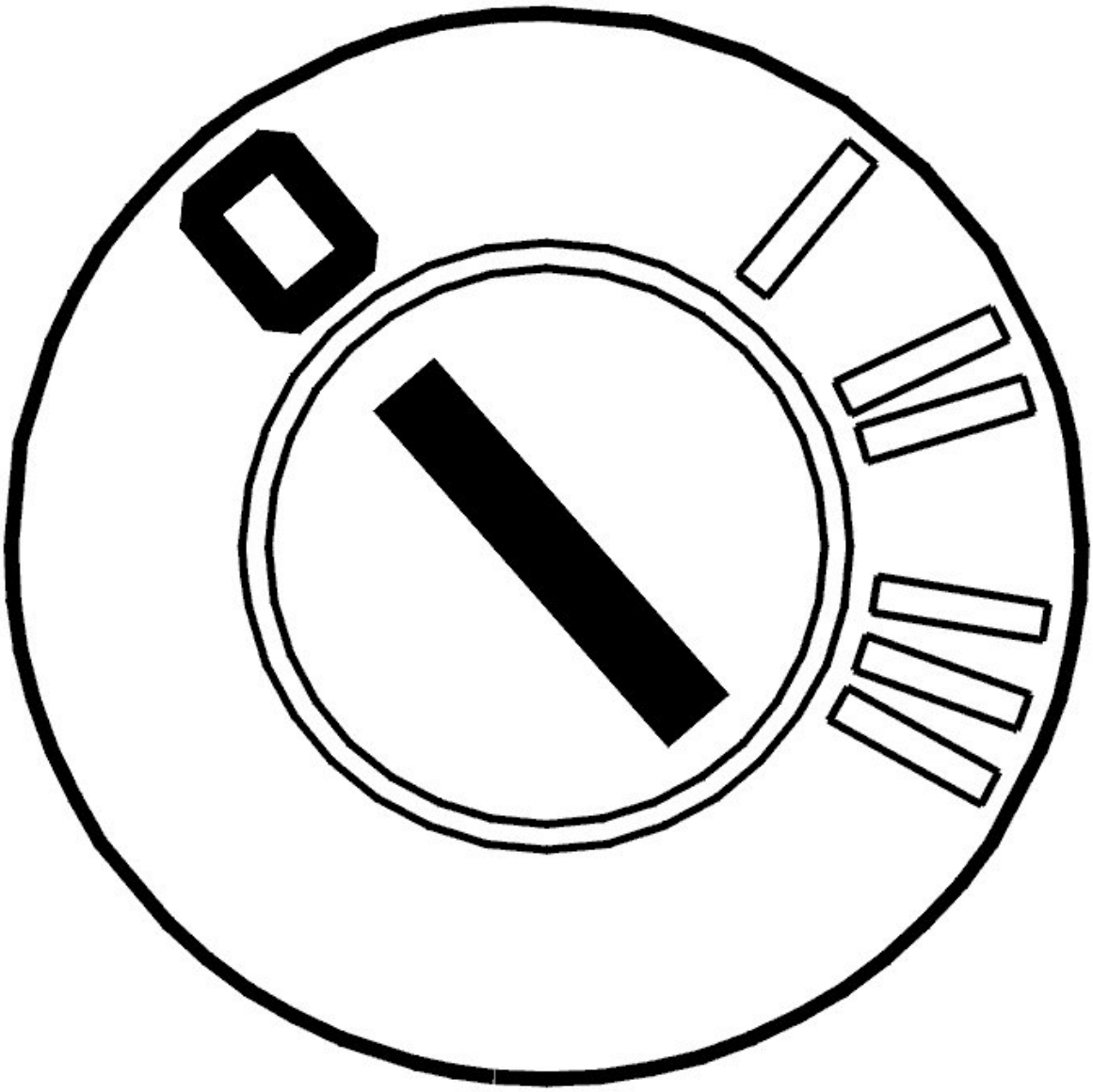


Is the function OK?

Yes - DONE

No - Checking the wiring

Checking the wiring



- Ignition off.

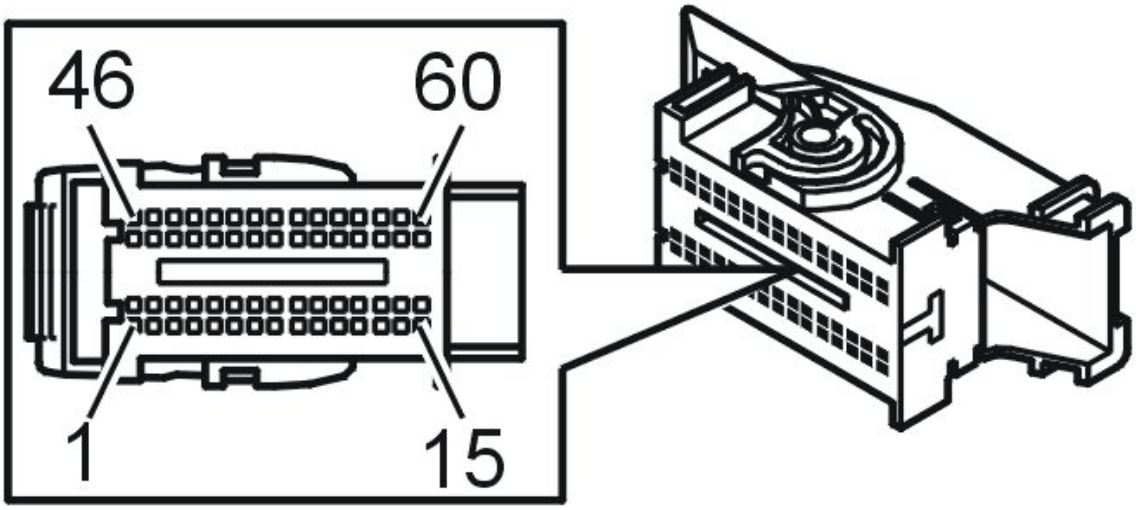
Check the wiring between the central electronic module (CEM) and sun sensor. Check for contract resistance and oxidation. Check for damage.
Check the wiring between the central electronic module (CEM) and the sun sensor. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #D30 (#30) and sun sensor terminal #1
- Central electronic module (CEM) terminal #D42 (#42) and sun sensor terminal #5.

Replace the sun sensor if no fault is found in the wiring.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Sun sensor / alarm LED, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Security Lamp/Indicator/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



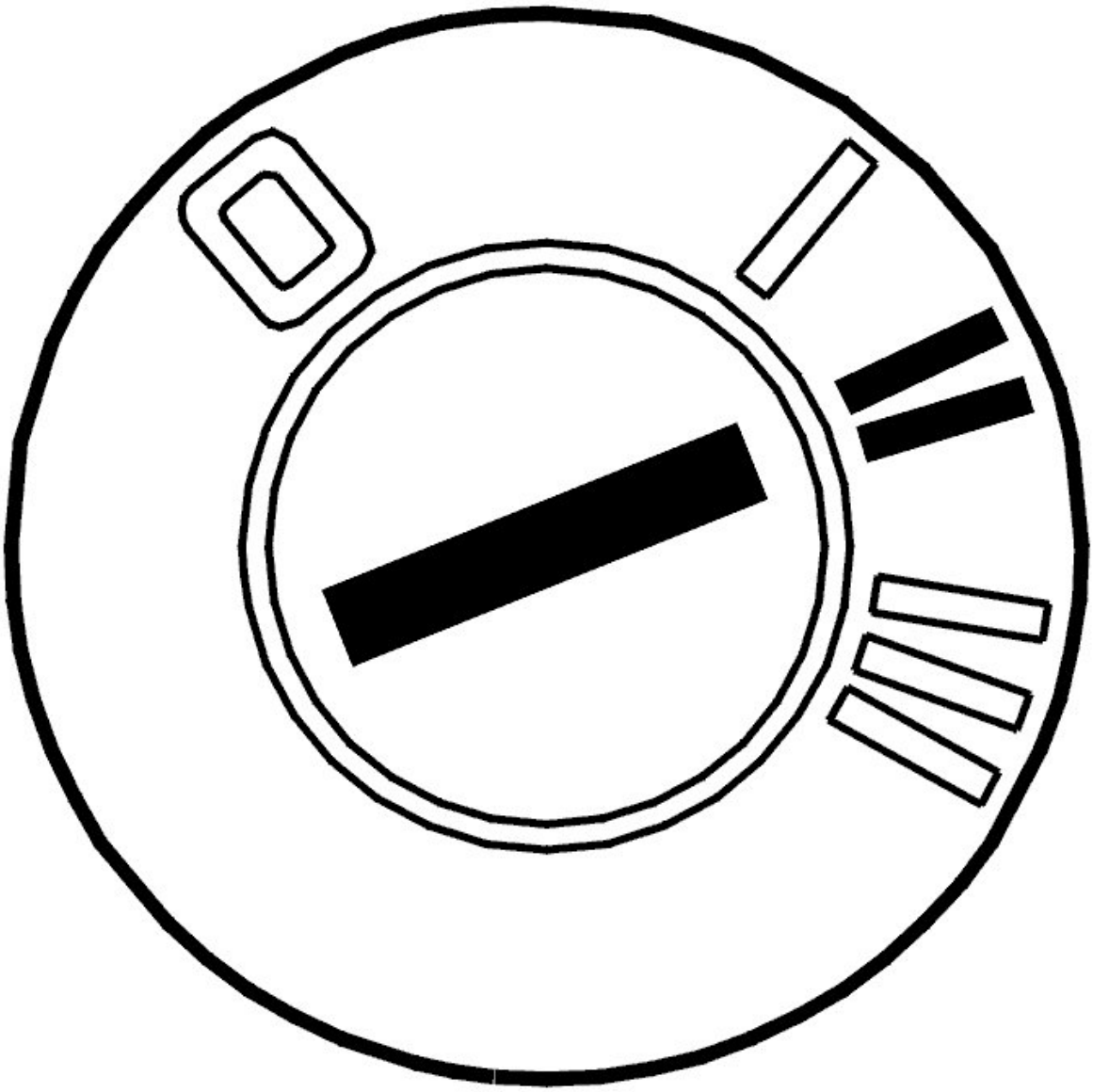
Continue - Verification

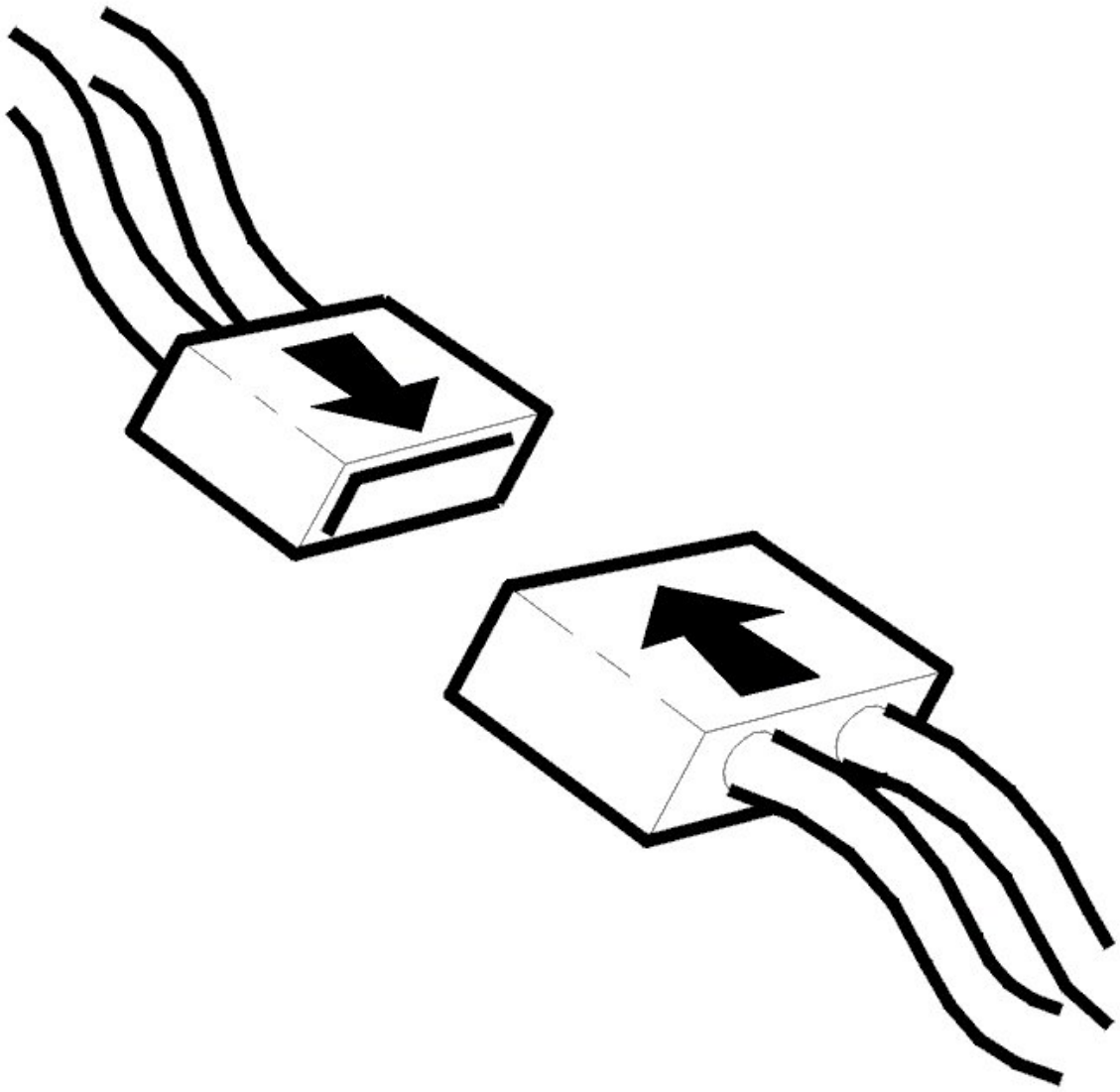
Verification

Verification

Verification

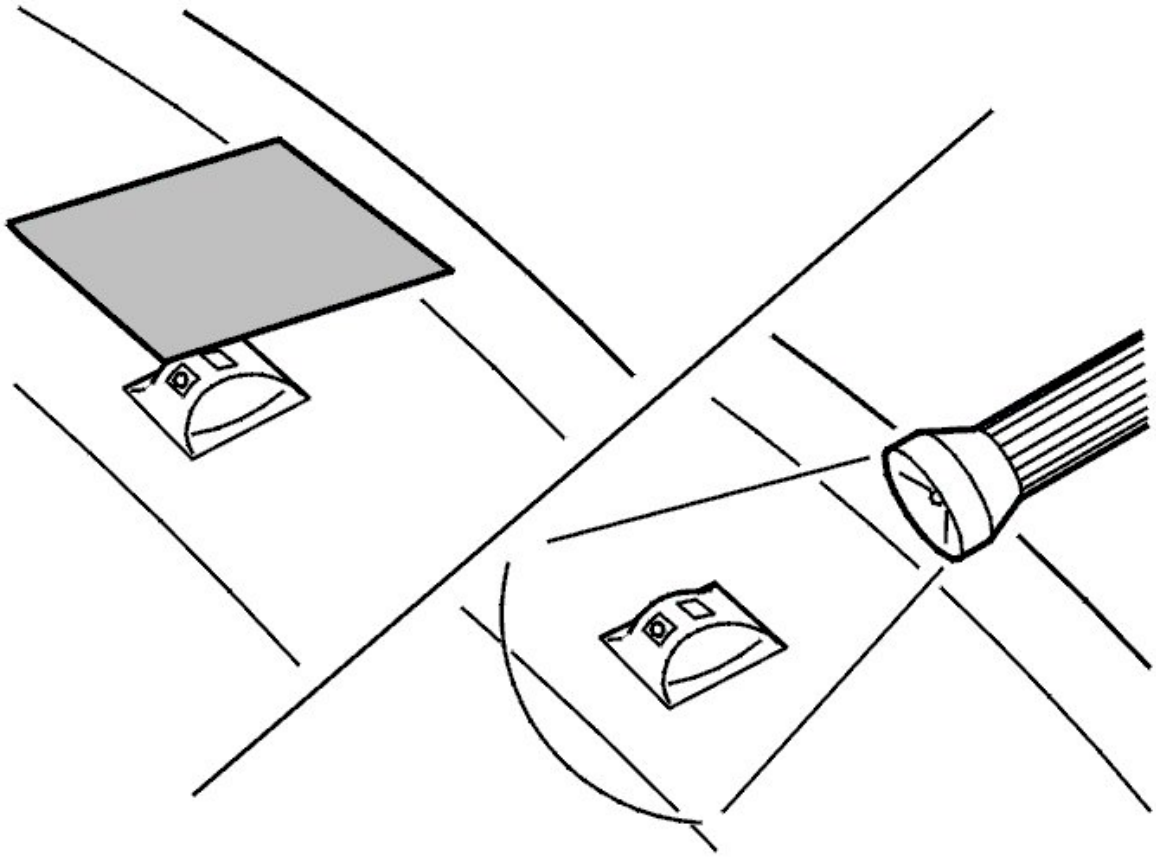
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the sun sensor by varying the light intensity at the sun sensor. Cover the sun sensor with your hand to obtain a minimal signal. Then direct a strong light source (for example a flashlight) at the sun sensor from close range to obtain a maximum signal.
The value must vary between approximately 0.5 and 4.85 V.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

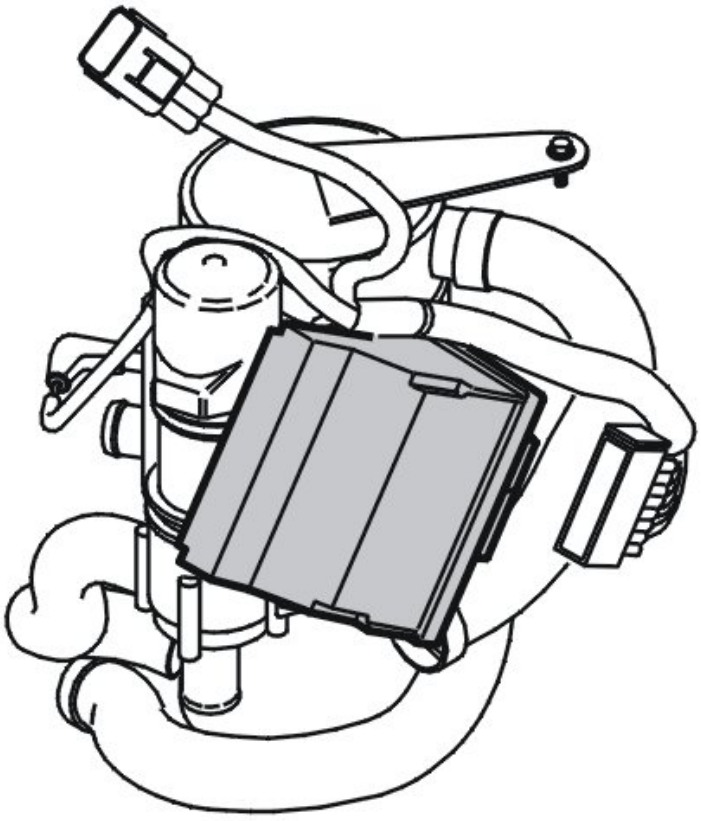
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3A

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the water pump is too high.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

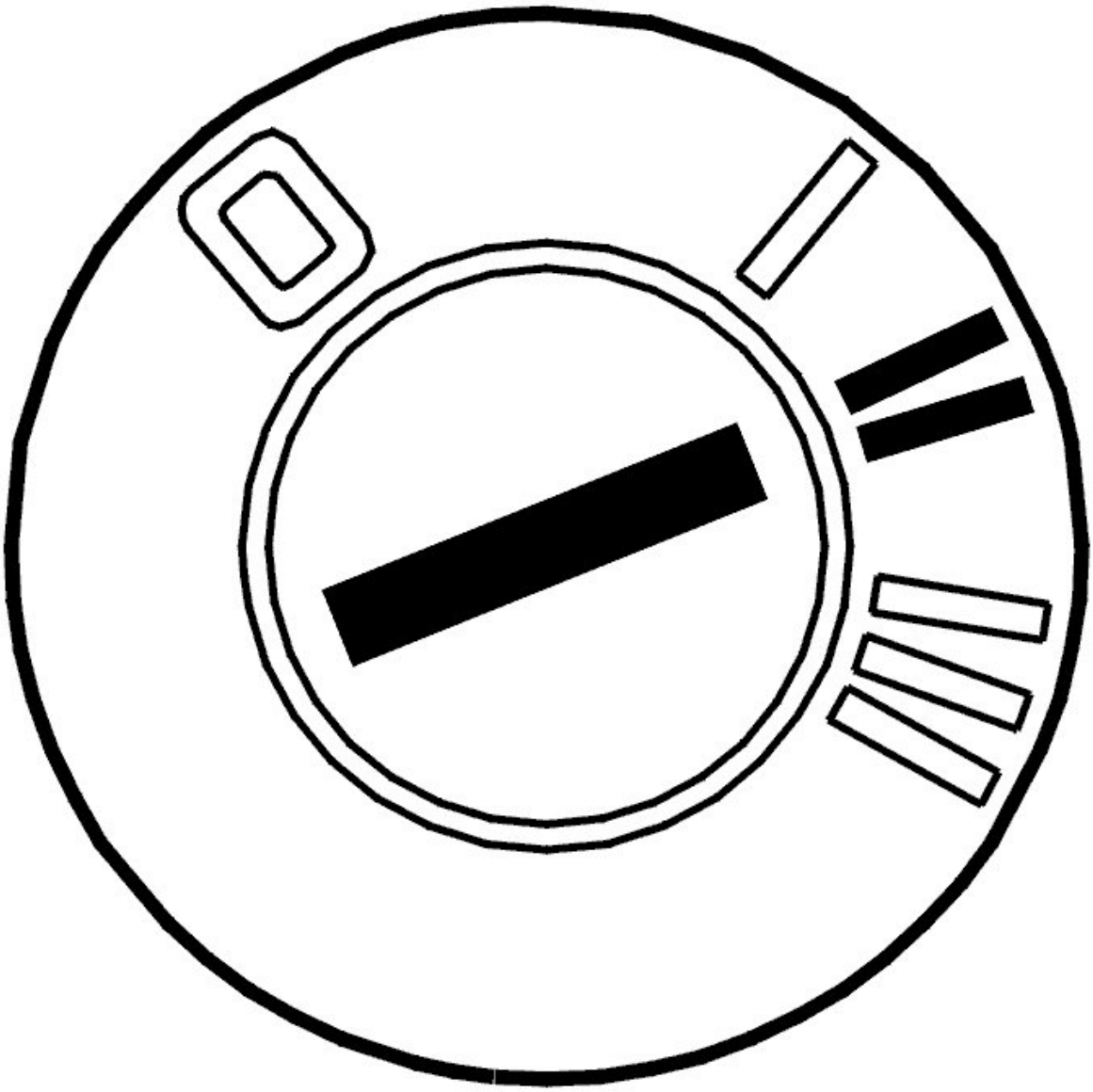
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged water pump.

Fault symptom[s]
- Poor heating in the passenger compartment
- The parking heater does not operate.

Signal Too High

Signal too high

Checking the function of the water pump



- Ignition on.
- Activate the water pump.

Listen for a buzzing sound which indicates that the water pump is running.

Is the water pump working?

Yes - Checking components and wiring

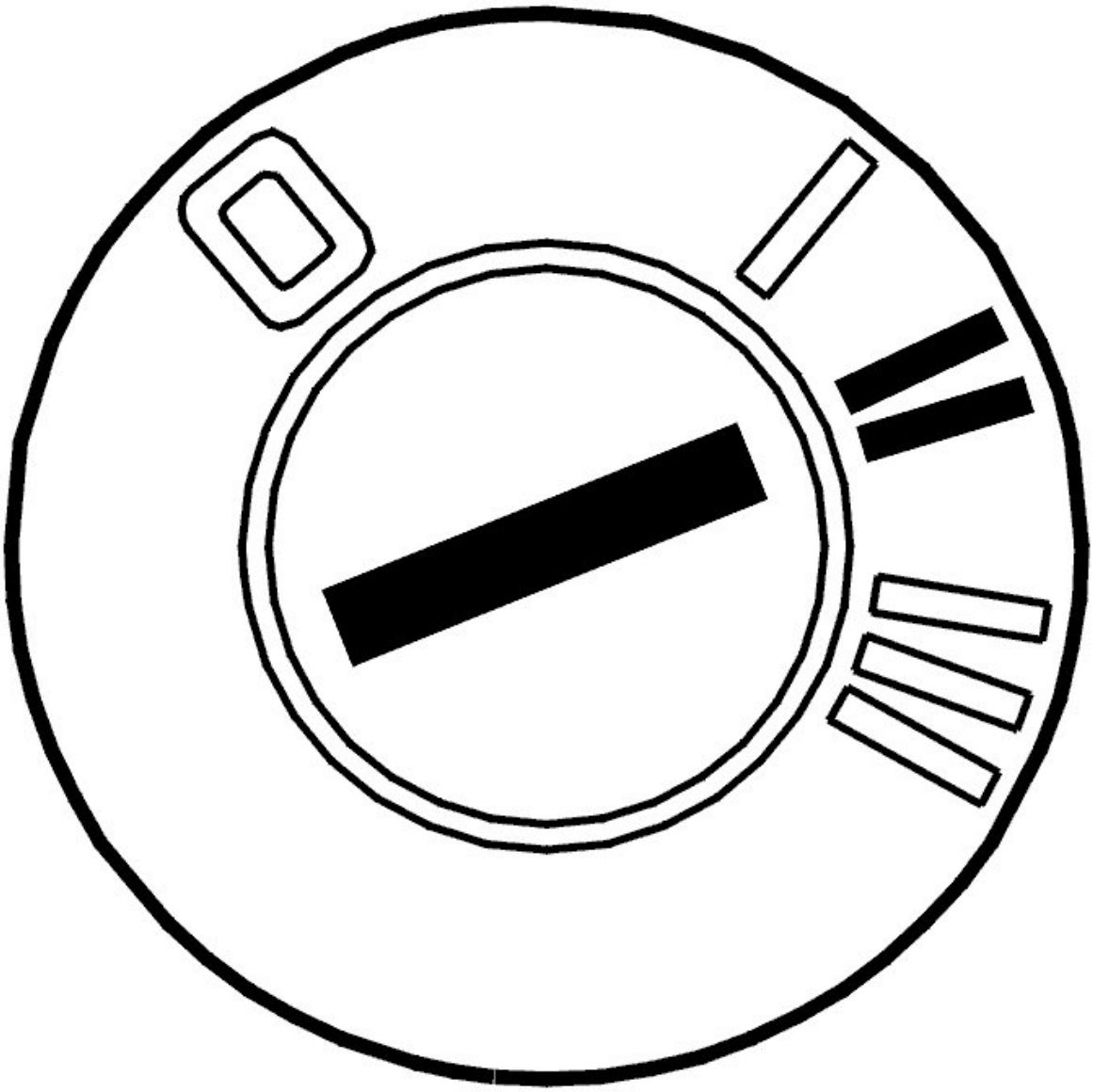
No - Checking components and wiring

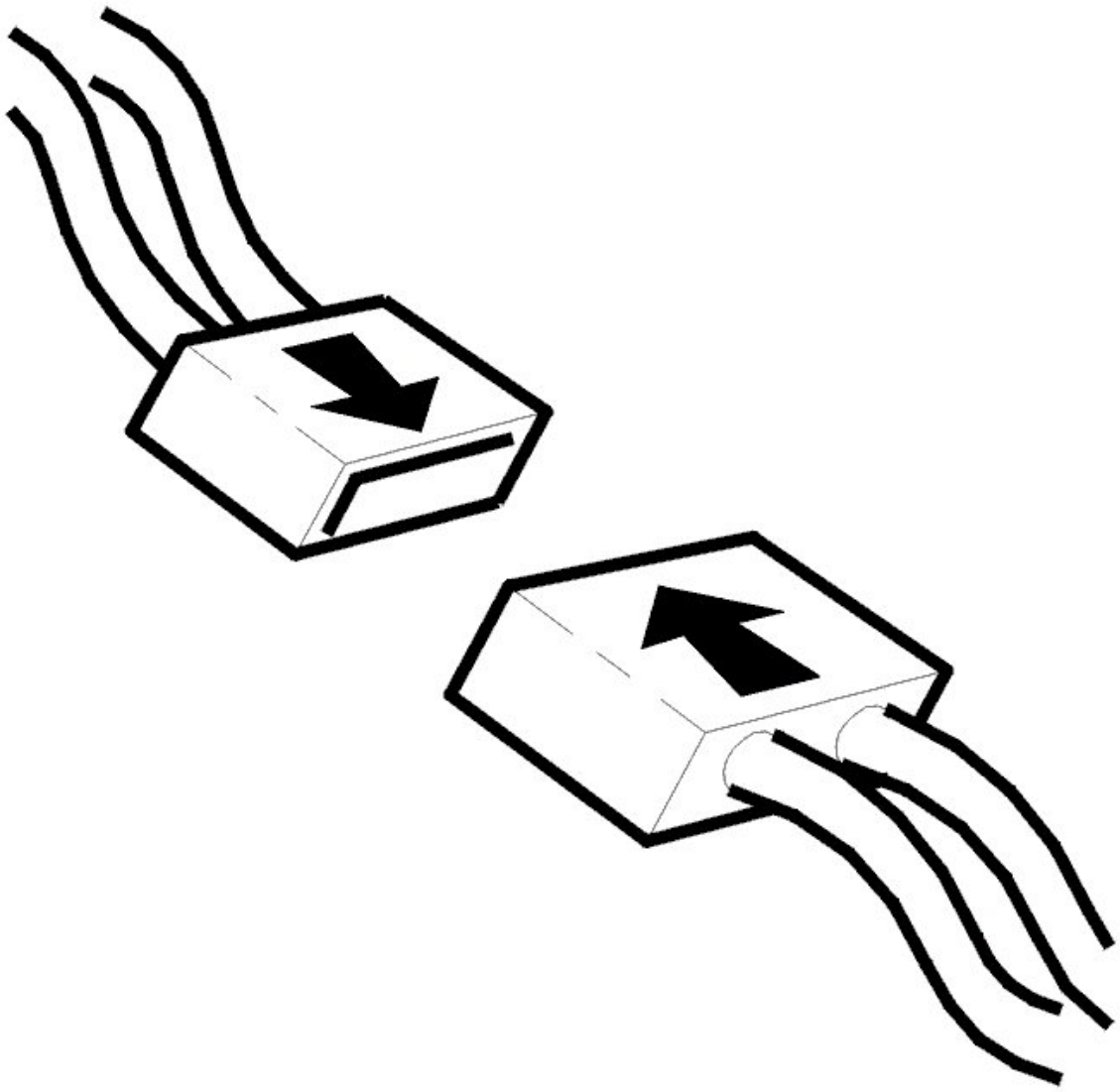
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the water pump.

Listen for a buzzing sound which indicates that the water pump is running.

Is the water pump working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the water pump

Checking components and wiring

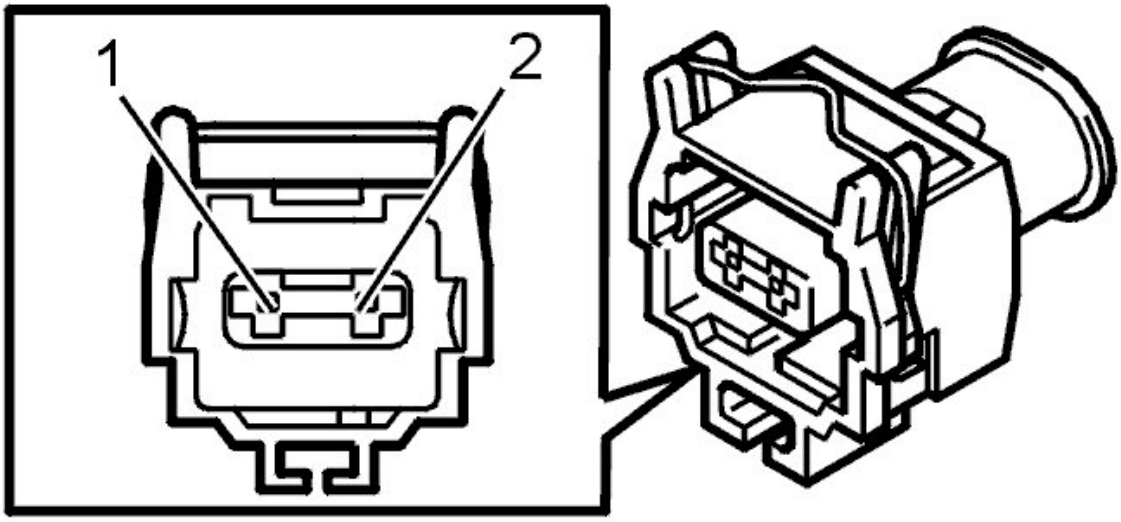
Check the cable between combustion preheater module (CPM) terminal #12 and water pump terminal 1. Check for a short-circuit to supply voltage.

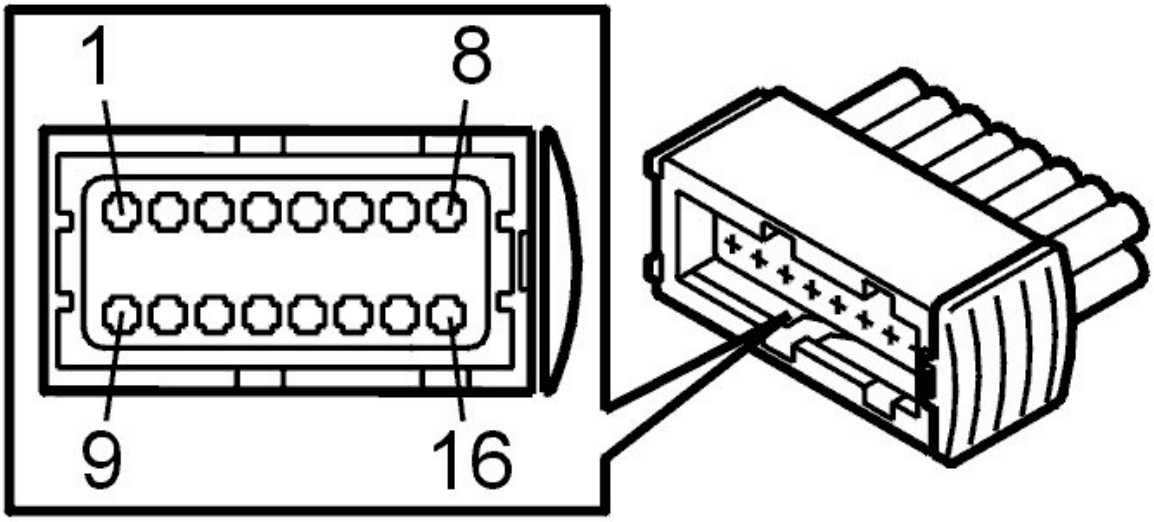
Hint: With the ignition on and the water pump connector disconnected, the voltage between water pump terminal 1 (control module side) and ground should be approximately 0 V.

The water pump must be replaced if no faults are found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





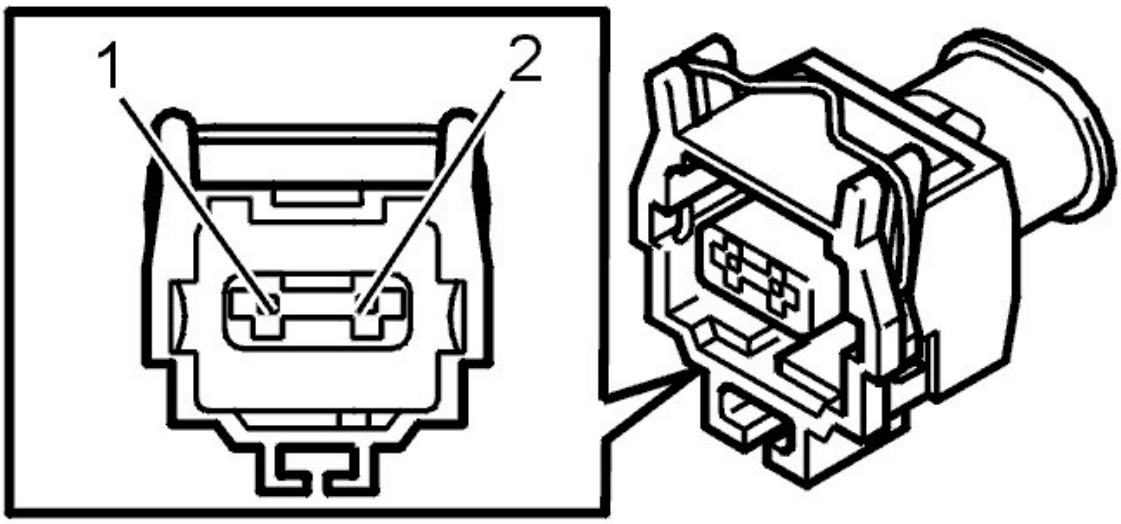
Continue - Verification

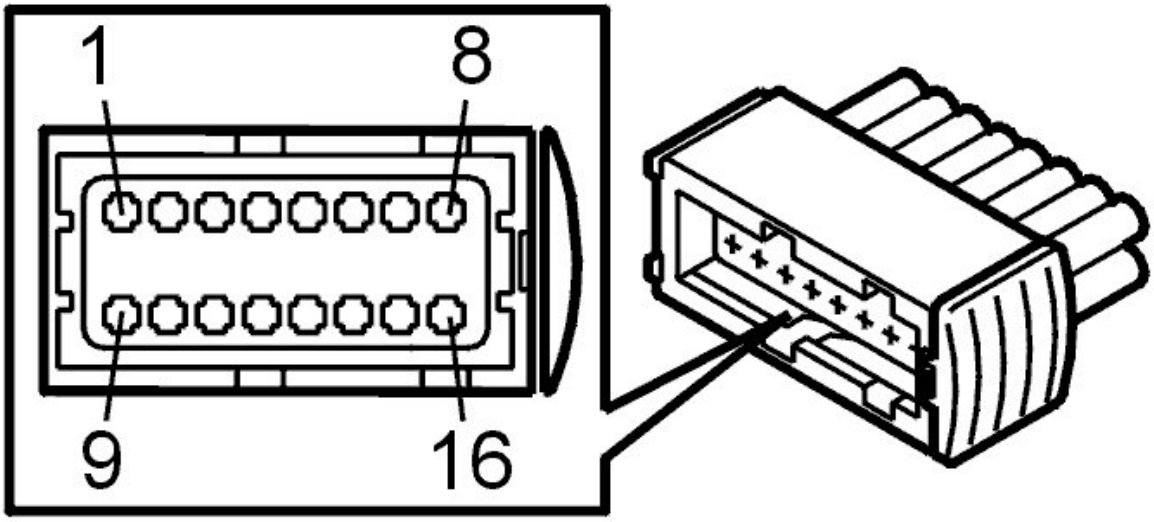
Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #12 and water pump terminal 1. Check for an intermittent short-circuit to supply voltage.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



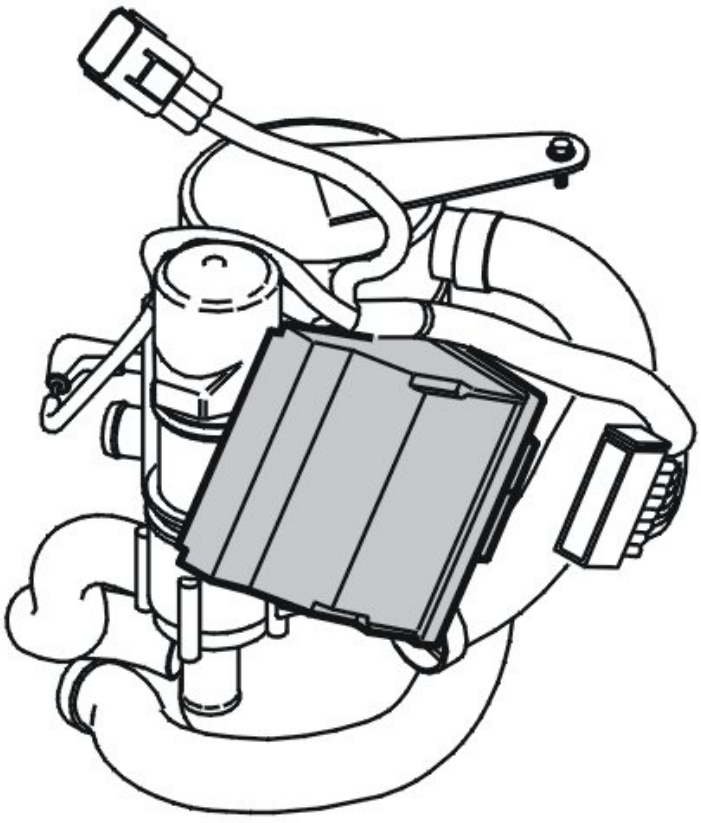


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3B

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the water pump is too low or missing.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Contact resistance in the control module or water pump connectors
- Short-circuit to ground in the signal cable

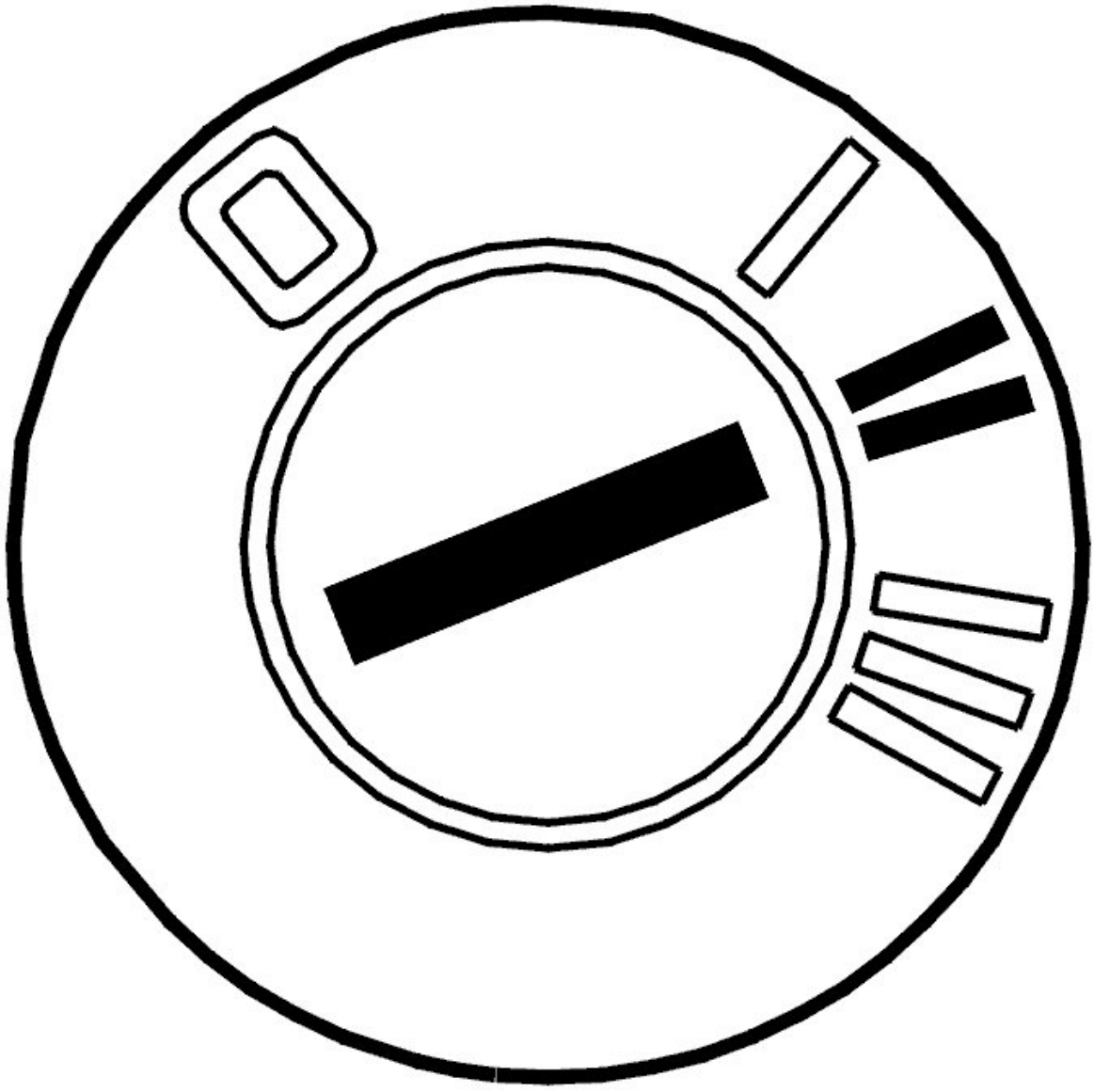
- Open-circuit in the power cable
- Open-circuit in the signal cable
- Damaged water pump.

Fault symptom[s]
- Poor heating in the passenger compartment
- The parking heater does not operate.

Signal Too Low

Signal too low

Checking the function of the water pump



- Ignition on.
- Activate the water pump.

Listen for a buzzing sound which indicates that the water pump is running.

Is the water pump working?

Yes - Checking components and wiring

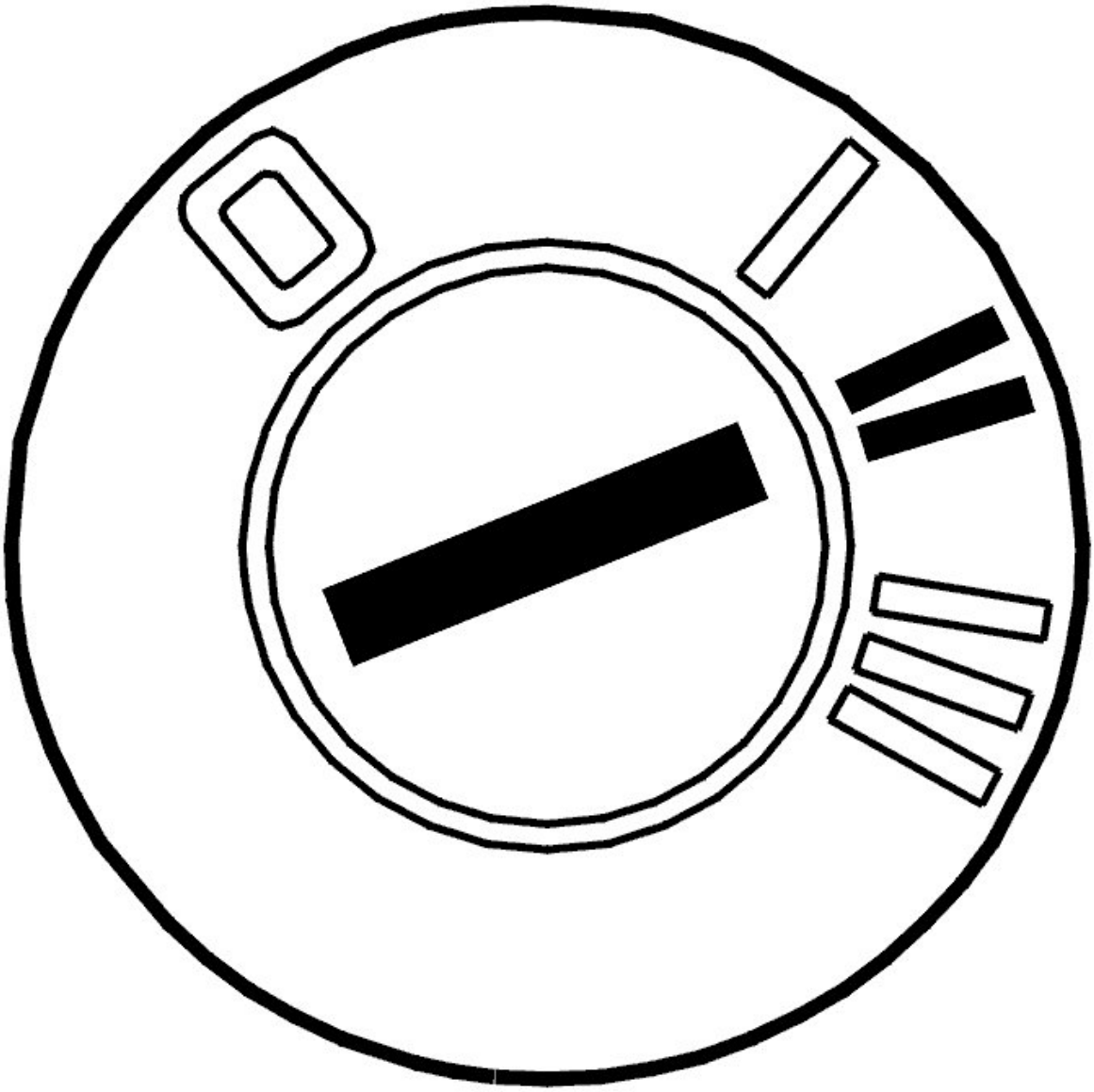
No - Checking components and wiring

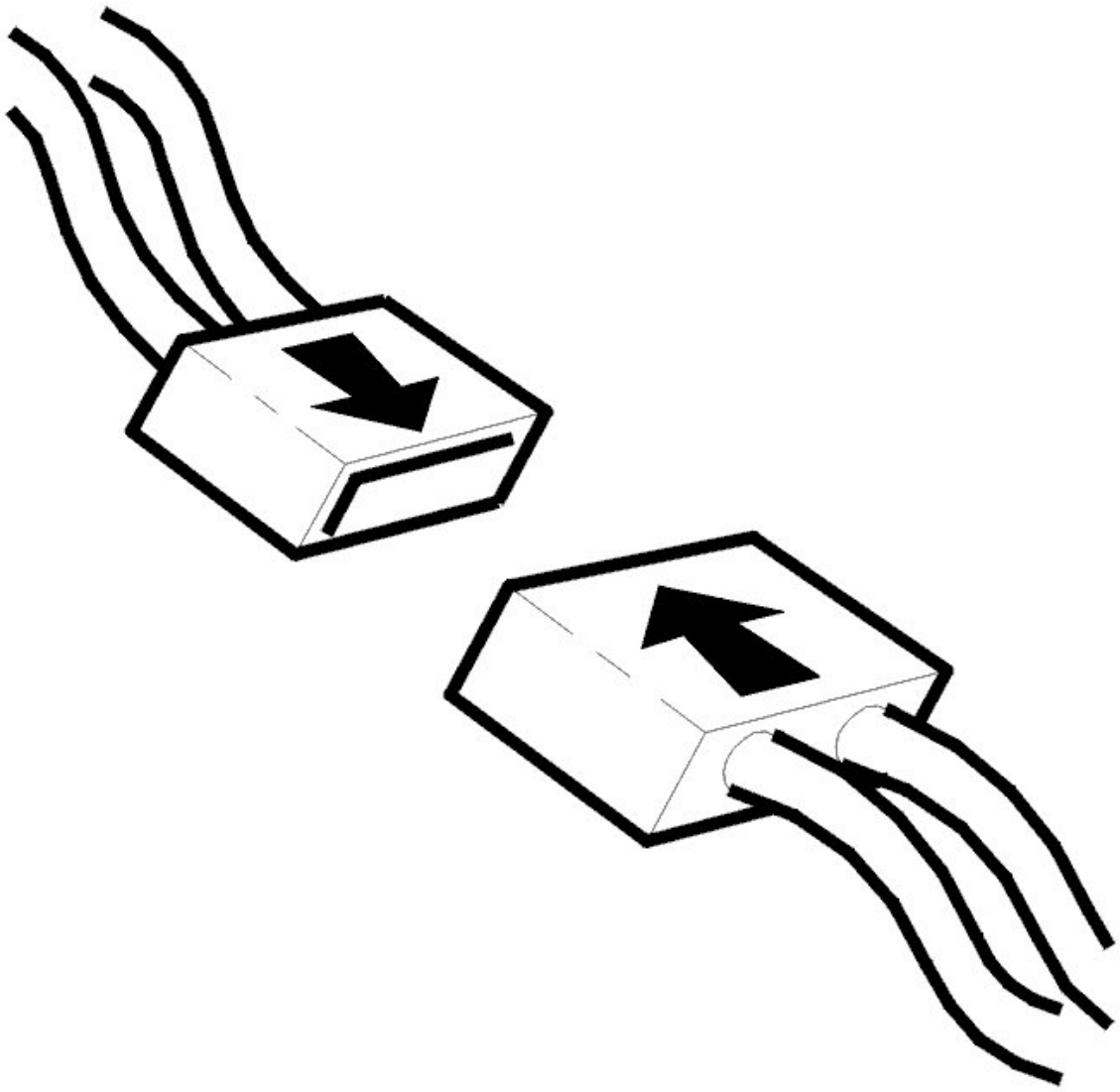
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the water pump.

Listen for a buzzing sound which indicates that the water pump is running.

Is the water pump working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the water pump

Checking components and wiring

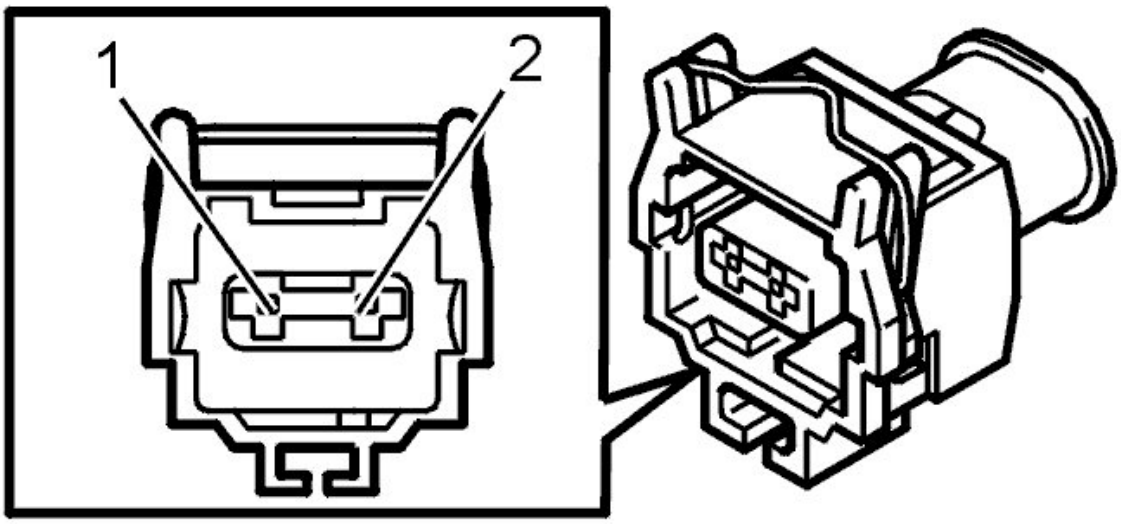
- Check the water pump and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation. Check for damage in particular
- Check the cable between combustion preheater module (CPM) terminal #12 and water pump terminal 1. Check for an open-circuit. Check for a short-circuit to ground
- Check the cable between combustion preheater module (CPM) terminal #11 and water pump terminal 2. Check for an open-circuit.

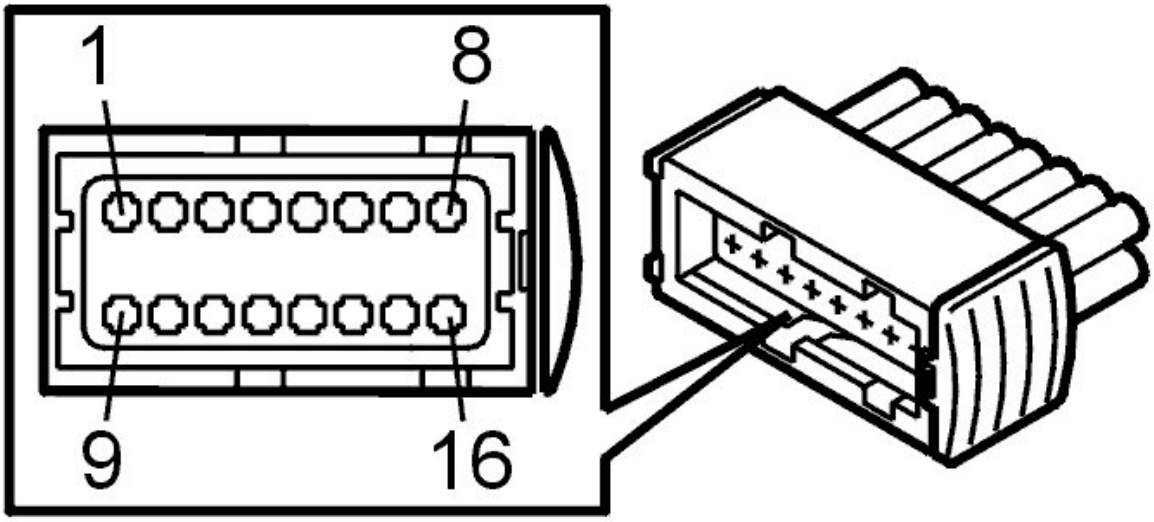
Note! Diagnostic trouble codes (DTC) CEM-5F3D and/or CEM-5F3F may also be stored if there is a fault in the power cable.

The water pump must be replaced if no faults are found in the wiring.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

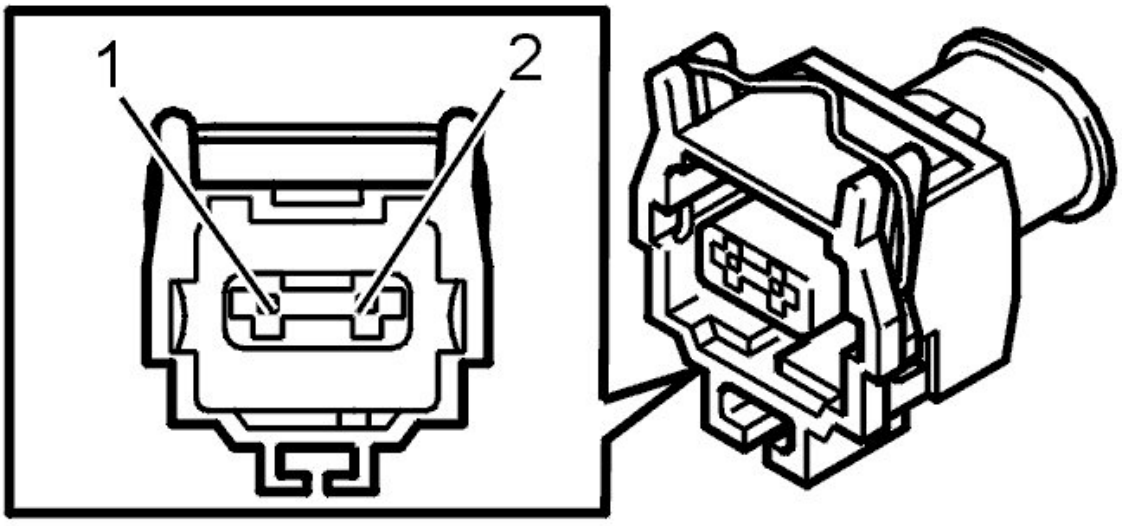
Checking components and wiring

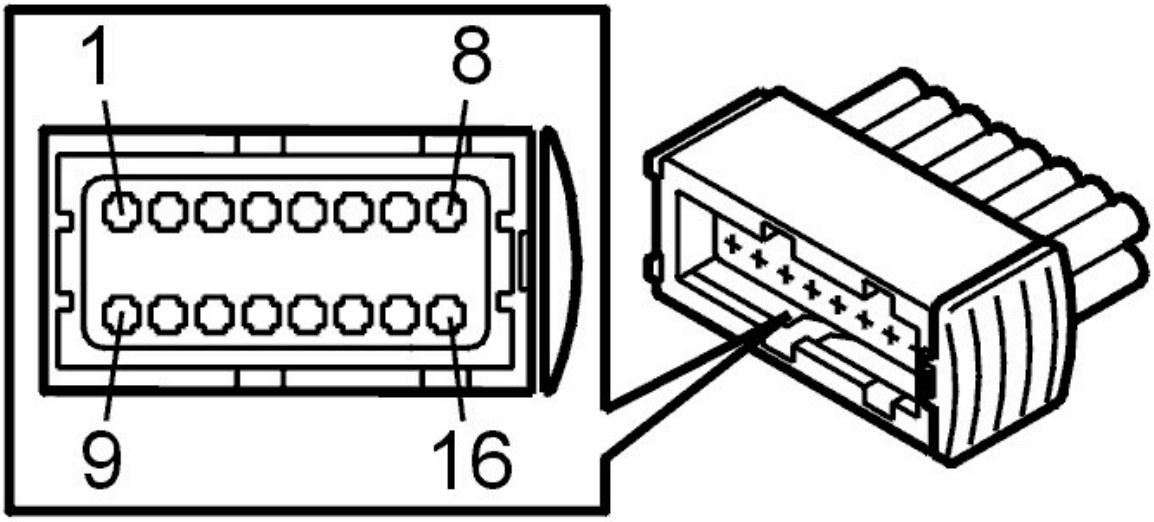
- Check the water pump and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation
- Check the cable between combustion preheater module (CPM) terminal #12 and water pump terminal 1. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground
- Check the cable between combustion preheater module (CPM) terminal #11 and water pump terminal 2. Check for an intermittent open-circuit.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



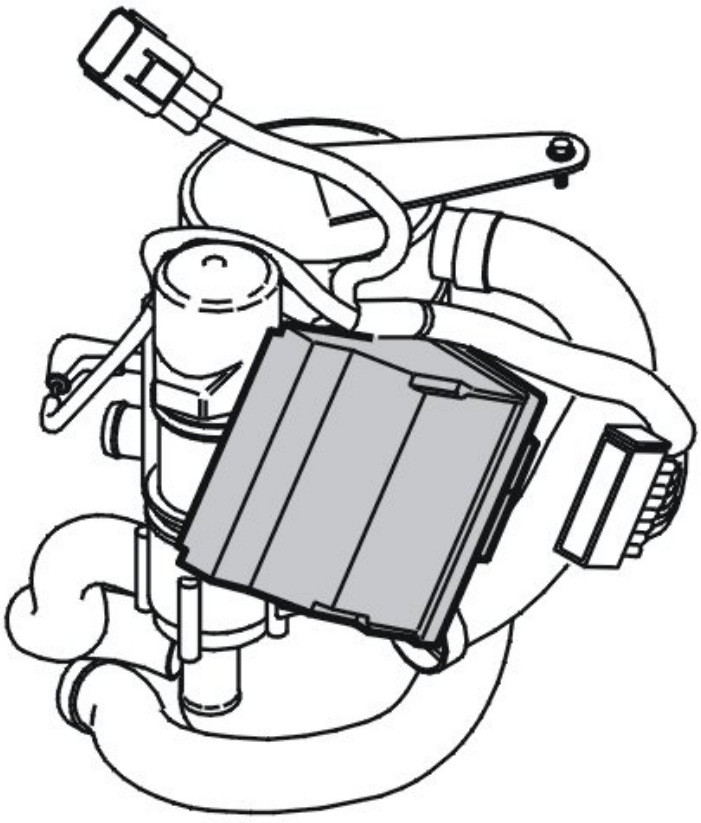


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3C

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the combustion fan is too high.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged combustion fan.

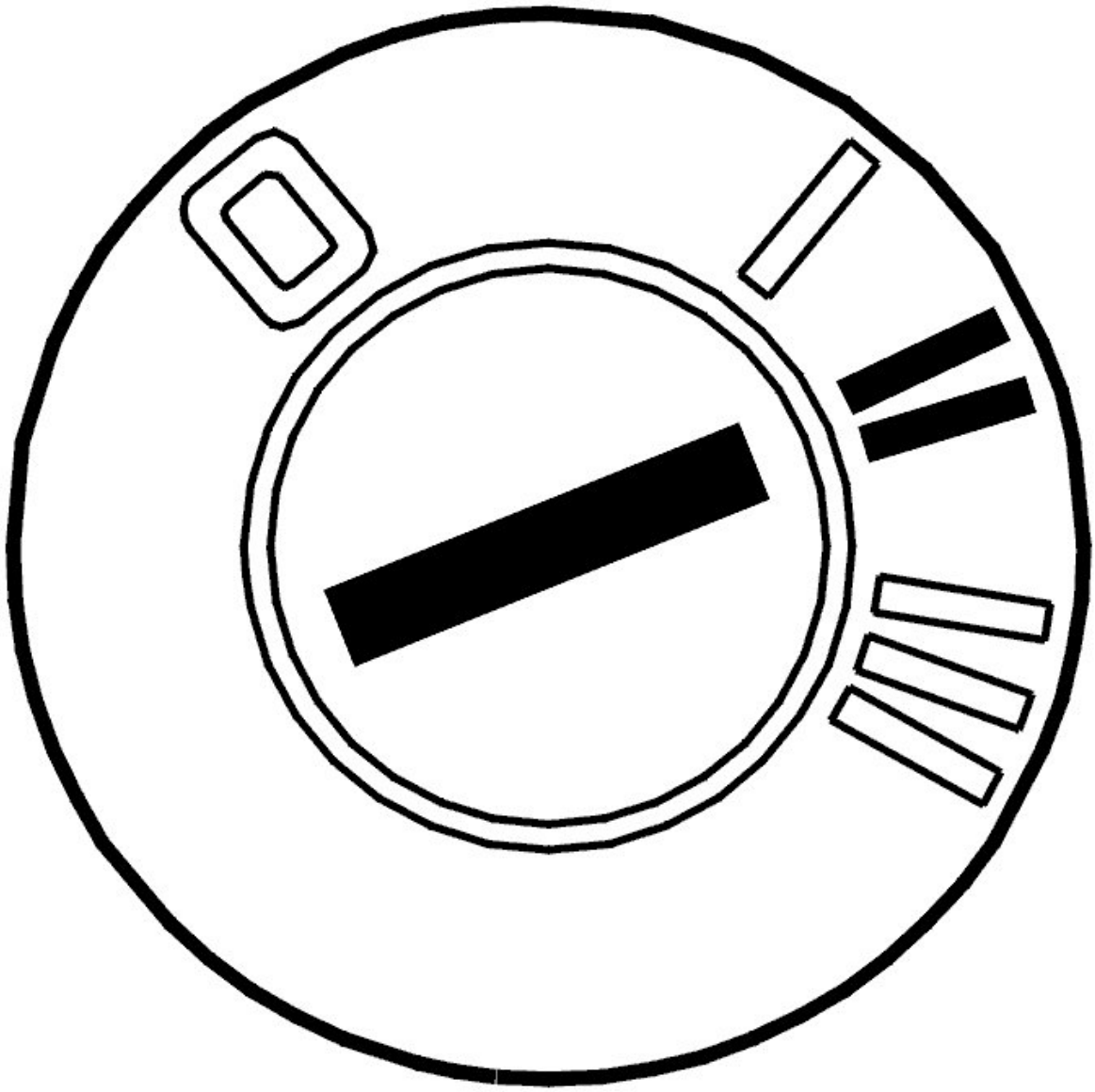
Fault symptom[s]

- Poor heating in the passenger compartment.

Signal Too High

Signal too high

Checking the function of the water pump



- Ignition on.
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - Checking components and wiring

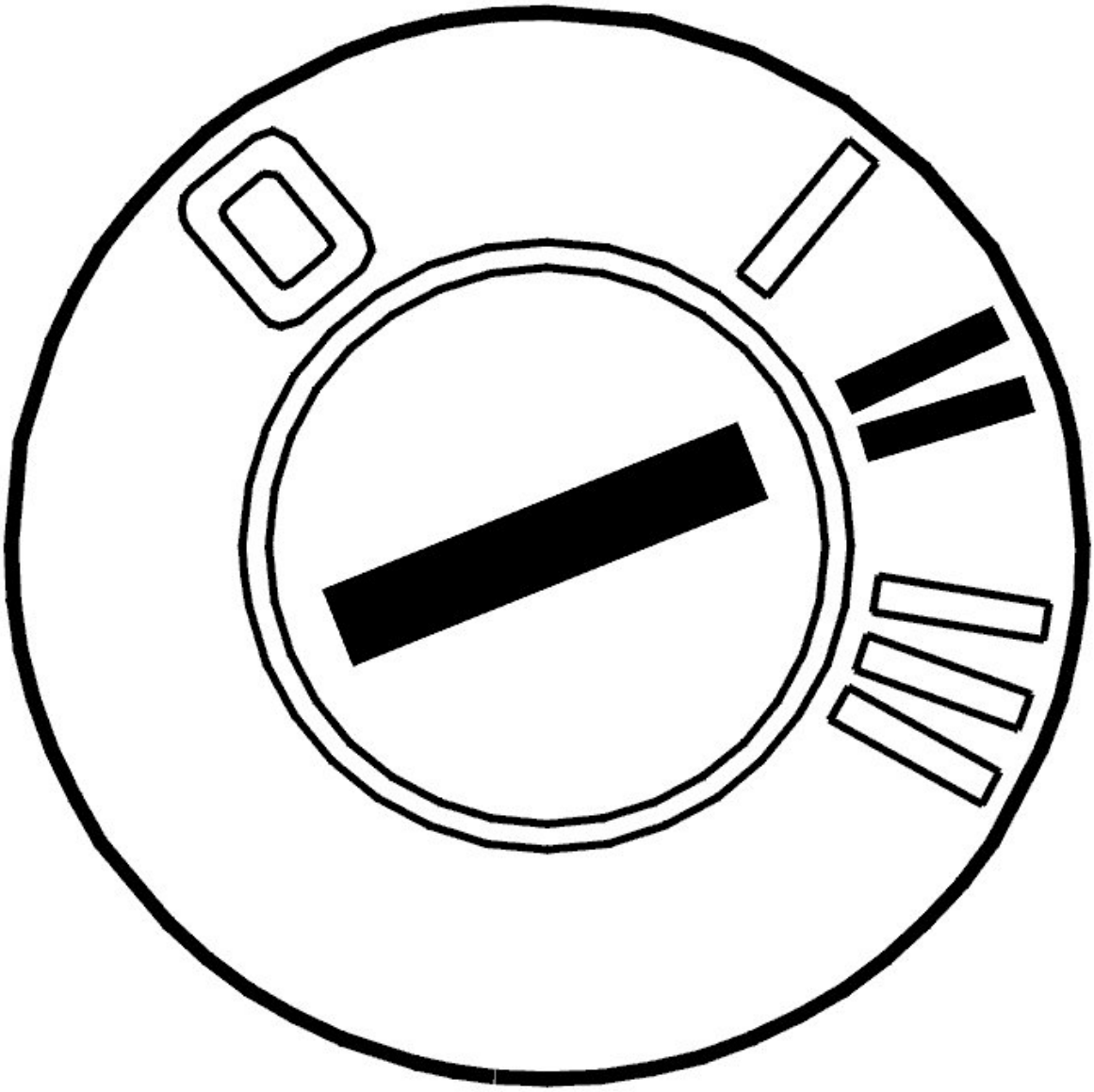
No - Checking components and wiring

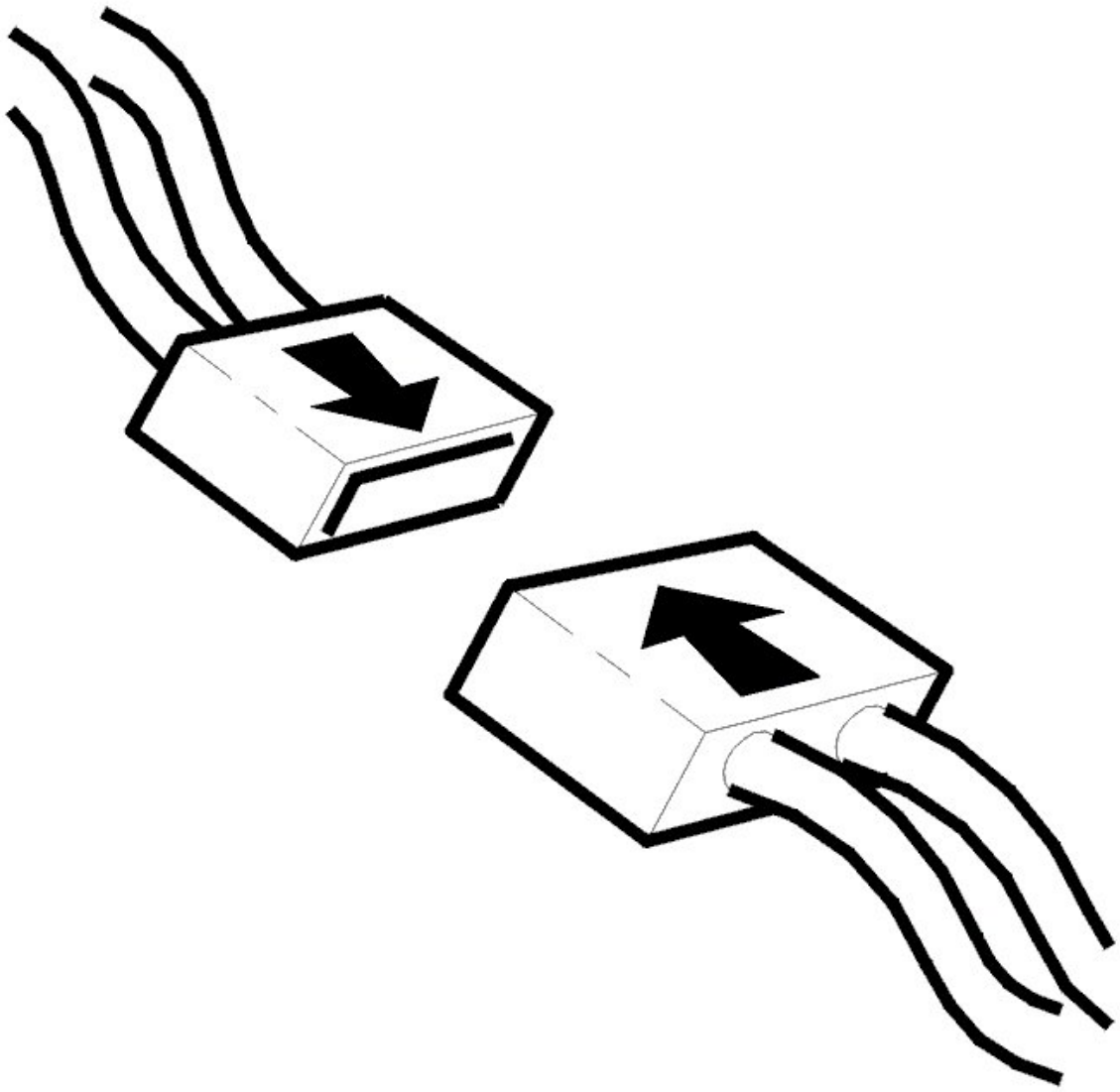
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

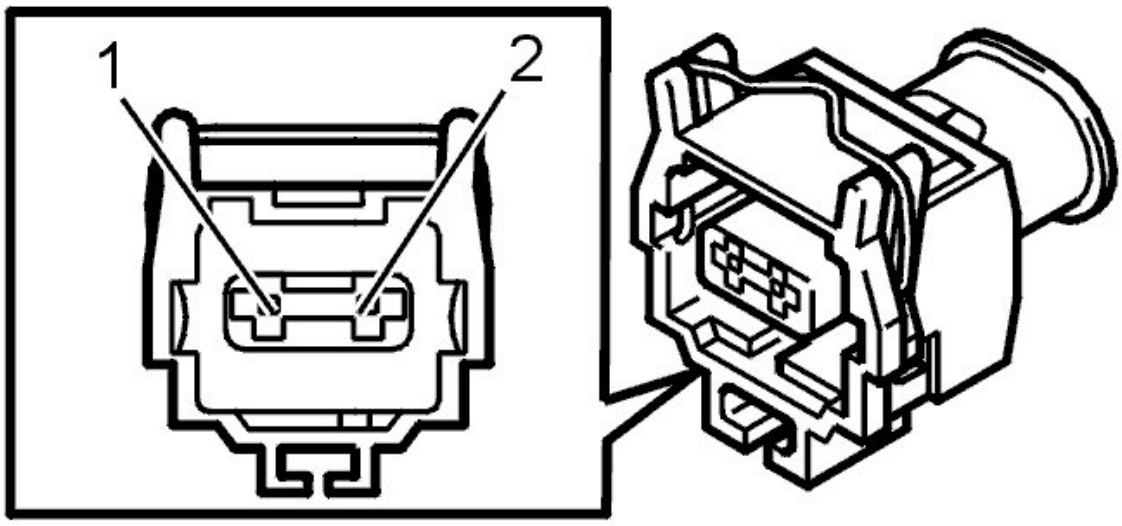
Attempt New Test - Checking the function of the water pump

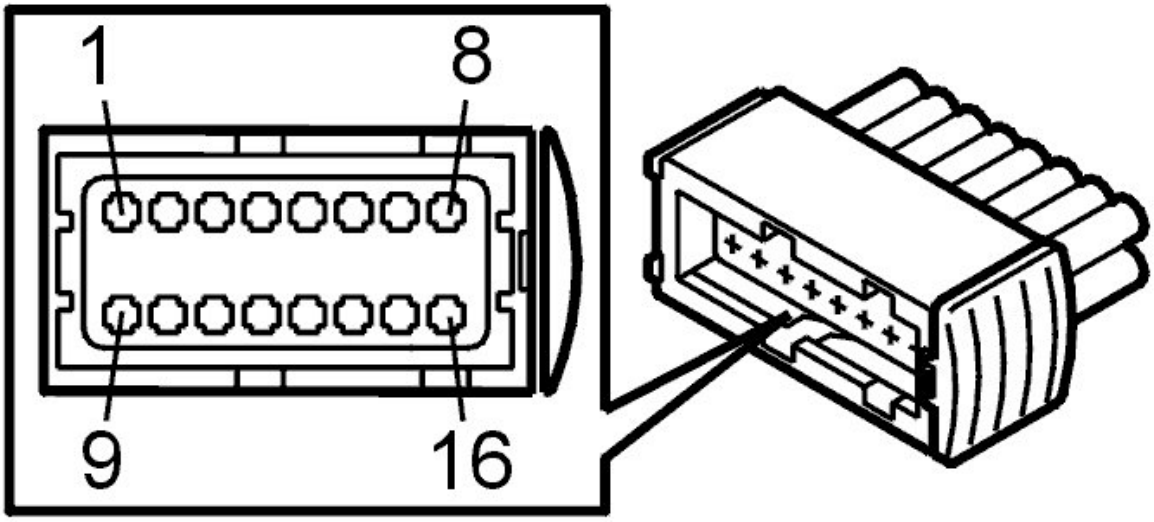
Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #10 and the signal terminal for the combustion fan (the black lead from the fan). Check for a short-circuit to supply voltage.
The combustion fan must be replaced if no faults are found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





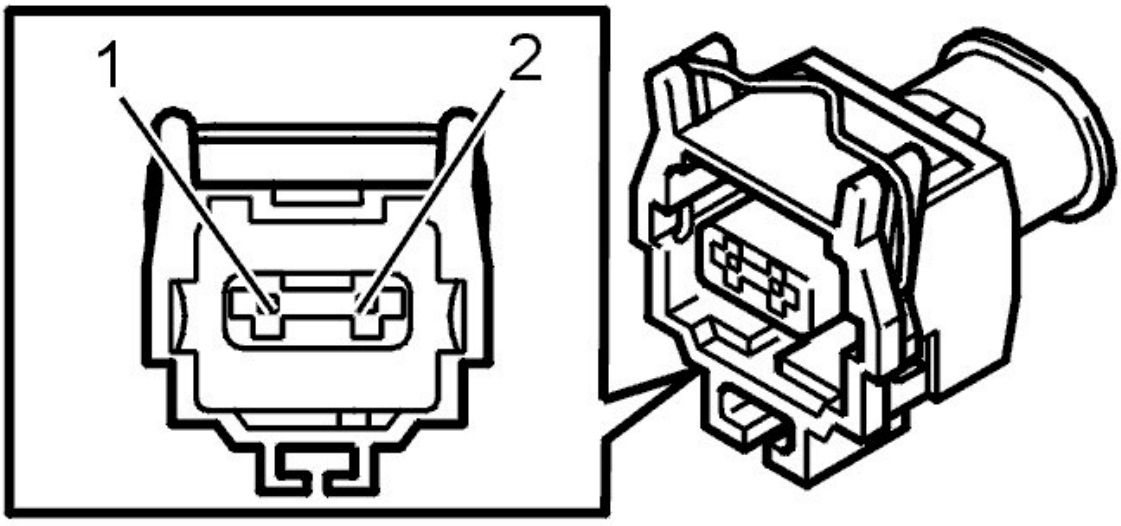
Continue - Verification

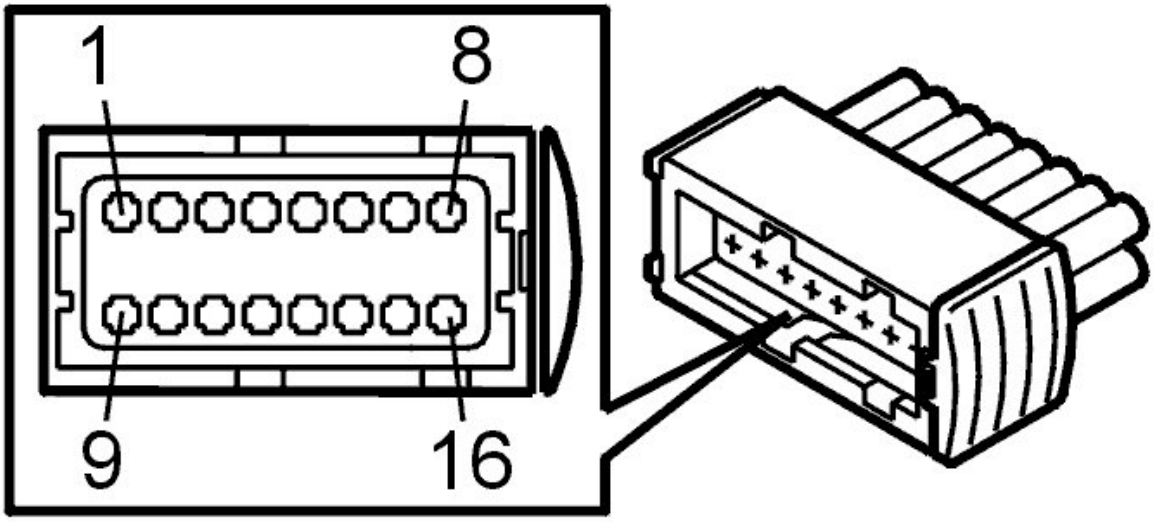
Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #10 and the signal terminal for the combustion fan (the black lead from the fan). Check for an intermittent short-circuit to supply voltage.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the combustion fan, see: Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



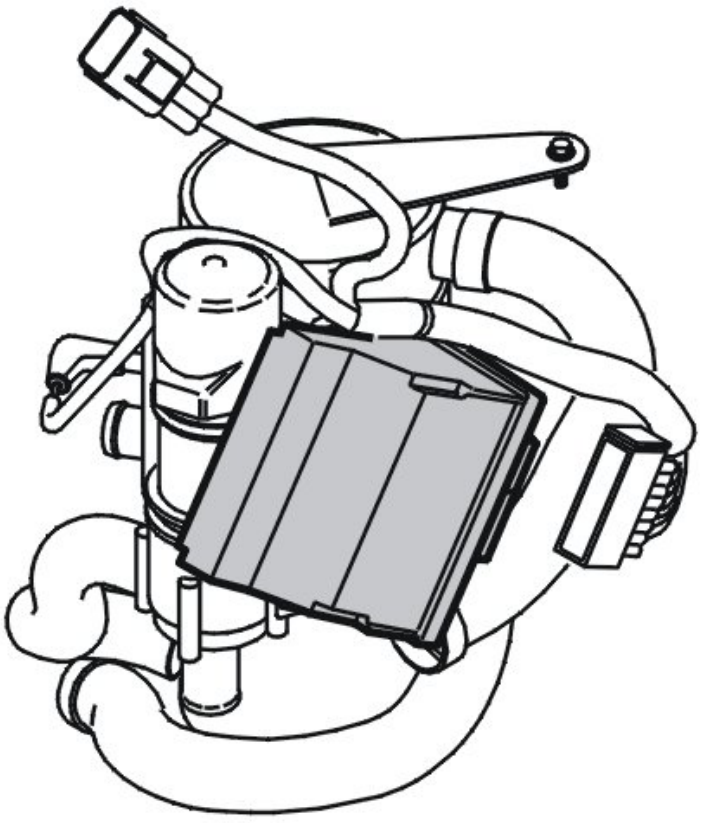


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3D

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the combustion fan is too low or missing.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Contact resistance in the control module or the combustion fan connectors
- Open-circuit in the signal cable

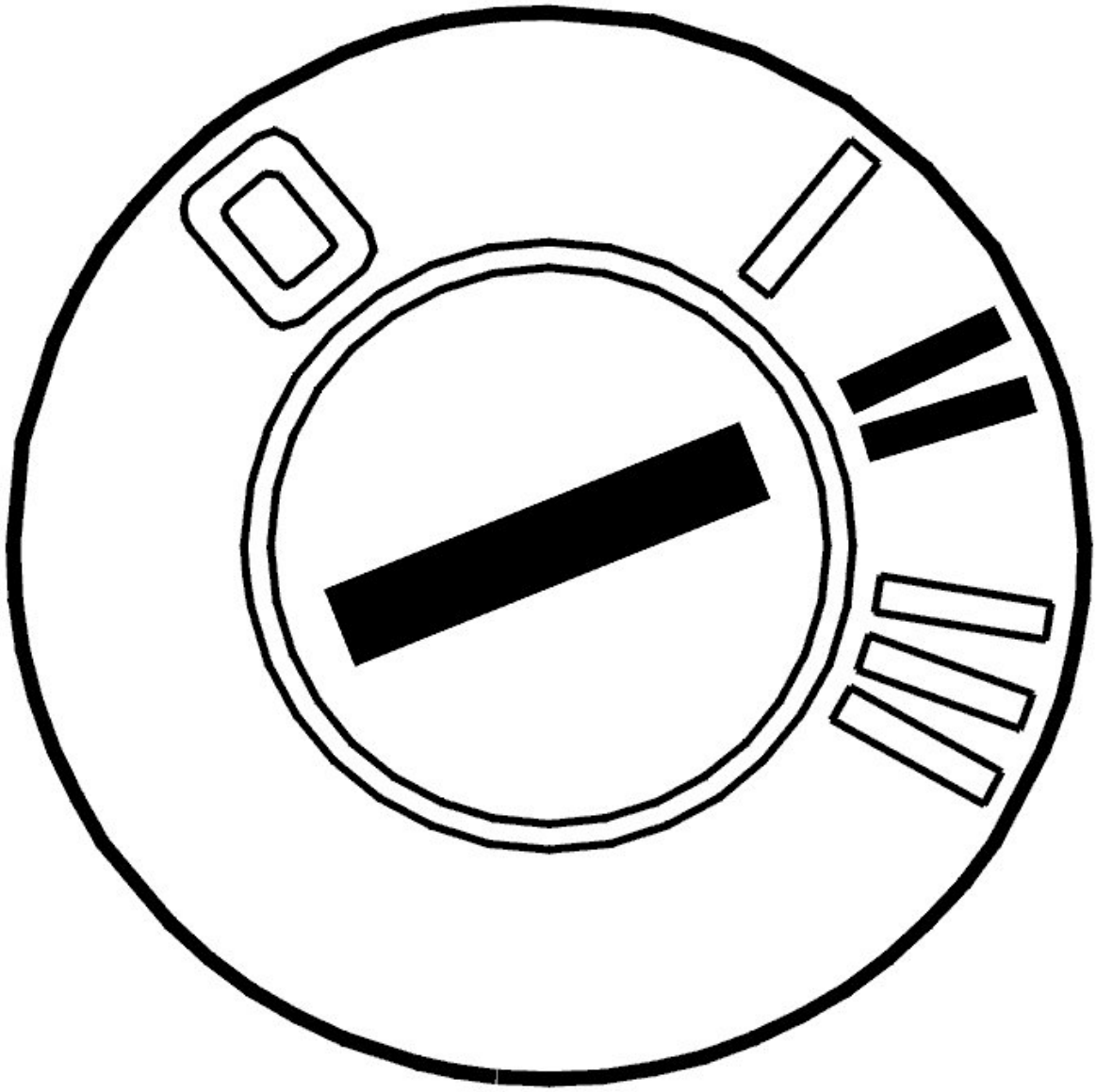
- Open-circuit in the power cable
- Short-circuit to ground in the signal cable
- Damaged combustion fan.

Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too Low

Signal too low

Checking the function of the water pump



- Ignition on.
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - Checking components and wiring

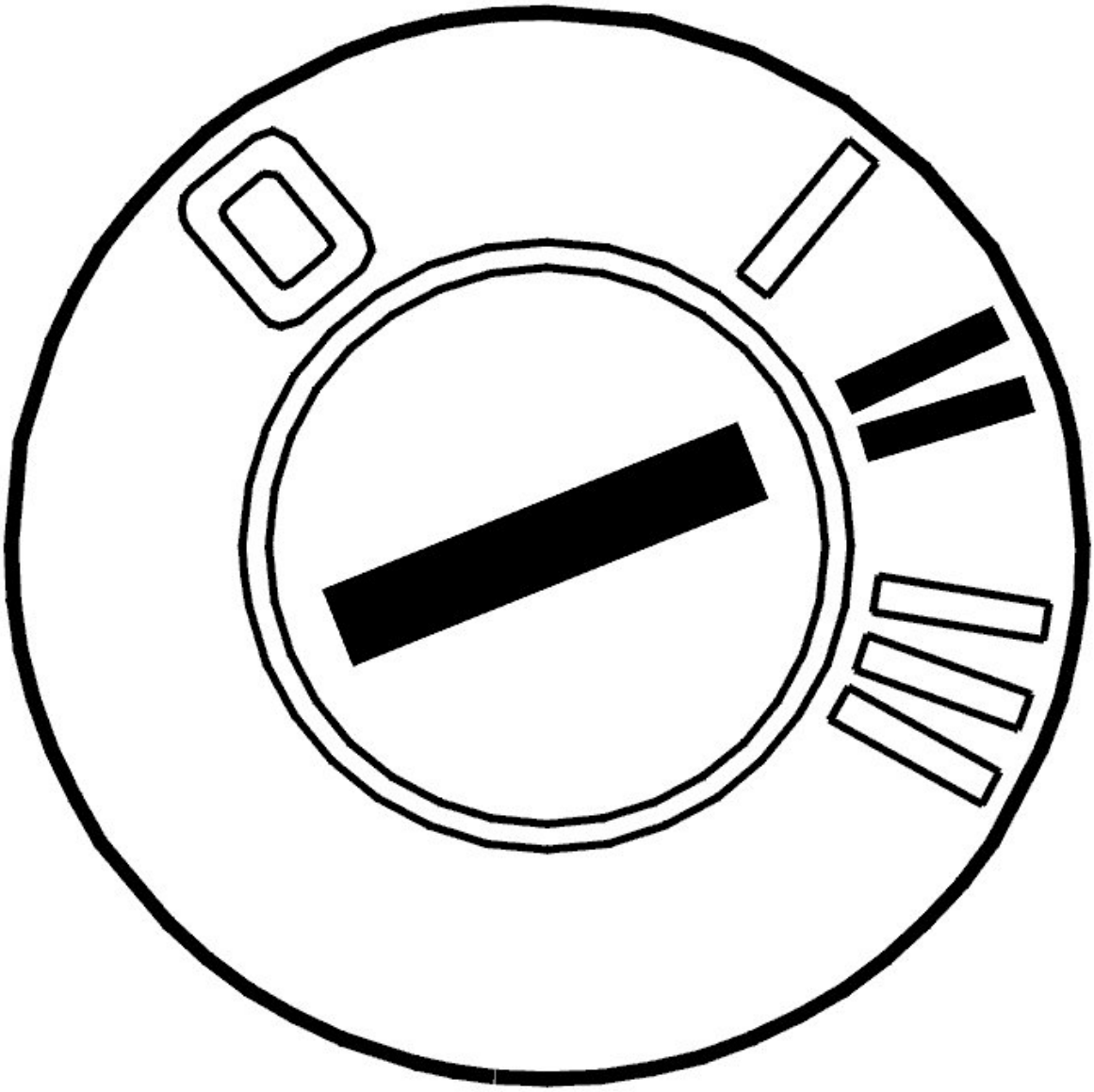
No - Checking components and wiring

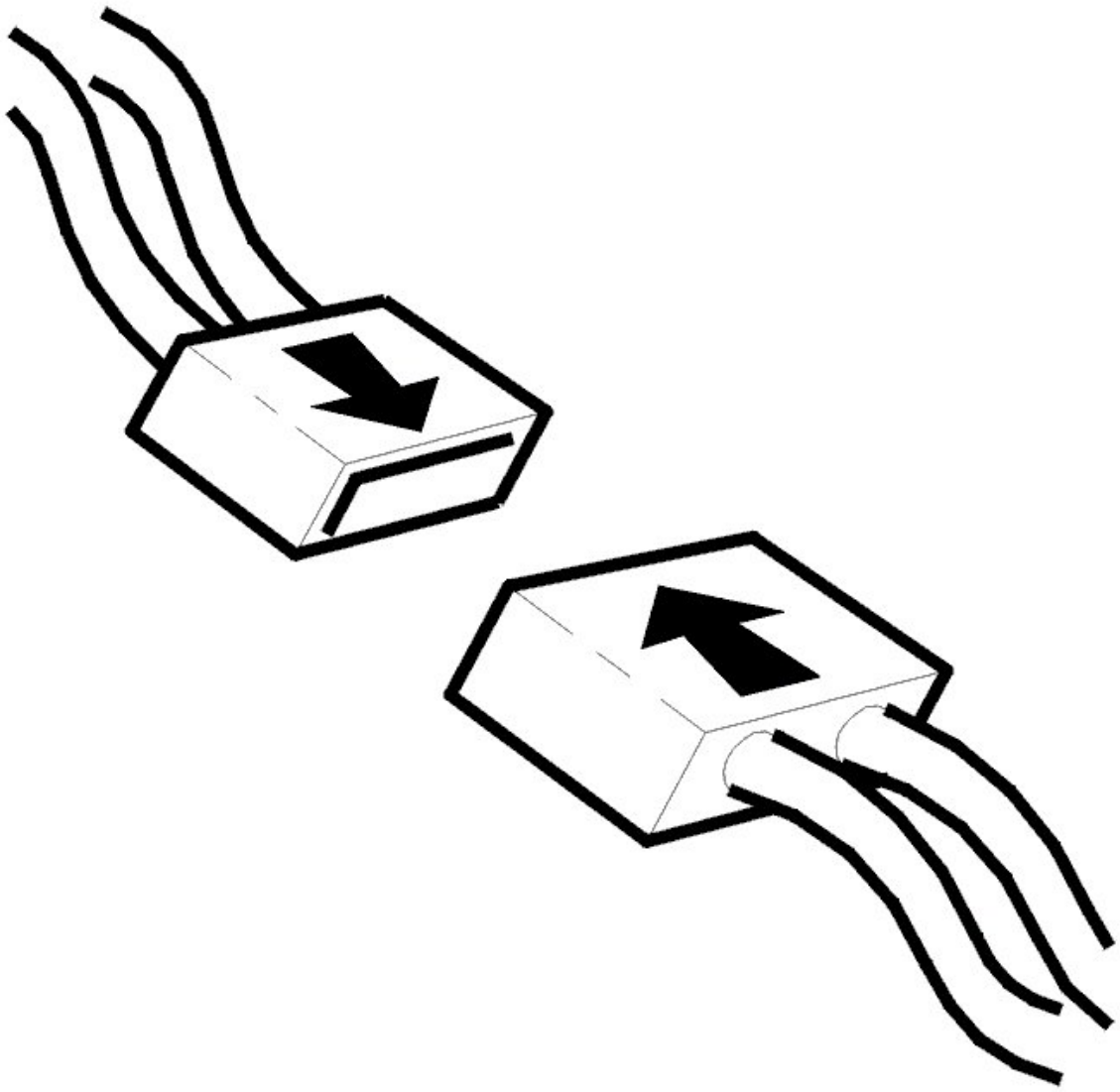
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the water pump

Checking components and wiring

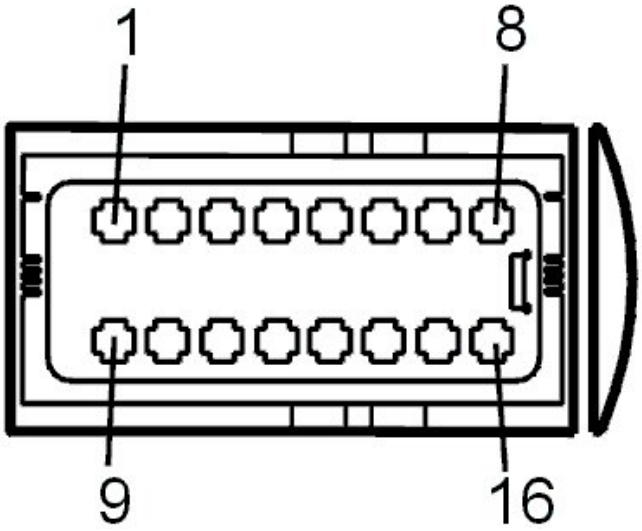
- Check the cable between combustion preheater module (CPM) terminal #10 and the signal terminal for the combustion fan (the black lead from the fan). Check for an open-circuit. Check for a short-circuit to ground
- Check the cable between combustion preheater module (CPM) terminal #11 and the voltage terminal for the combustion fan (the red cable from the fan). Check for an open-circuit.

Note! Diagnostic trouble codes (DTC) CEM-5F3A and/or CEM-5F3F may also be stored if there is a fault in the power cable.

The combustion fan must be replaced if no faults are found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

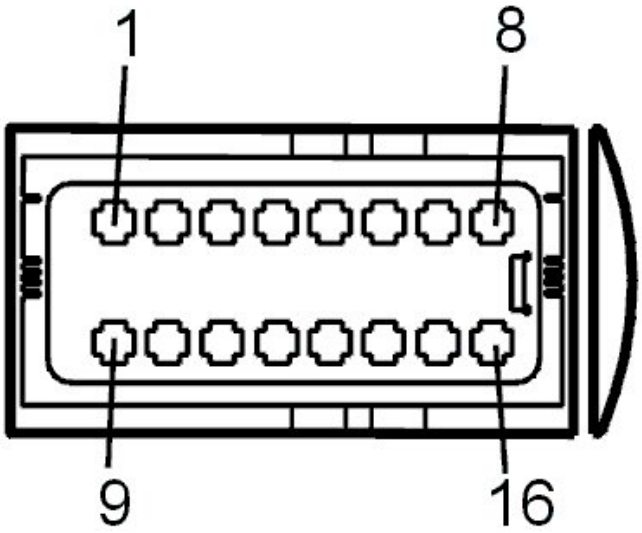
Checking components and wiring

- Check the electrical terminals for the combustion fan and the combustion preheater module (CPM) connector. Check for contact resistance and oxidation
- Check the cable between combustion preheater module (CPM) terminal #10 and the signal terminal for the combustion fan (the black lead from the fan). Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground
- Check the cable between combustion preheater module (CPM) terminal #11 and the voltage terminal for the combustion fan (the red cable

from the fan). Check for an intermittent open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the combustion fan, see: Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

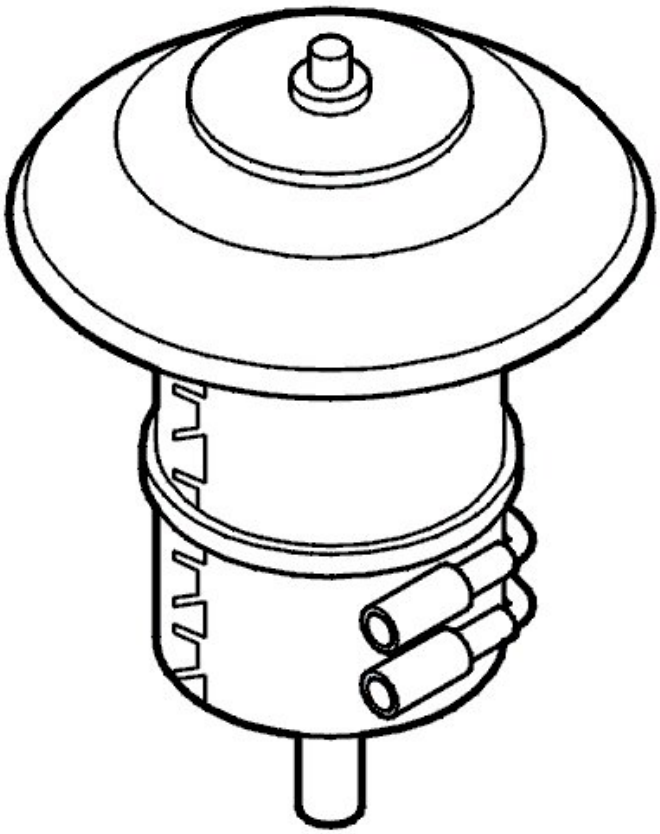


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3E

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the combustion fan is running too slowly.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

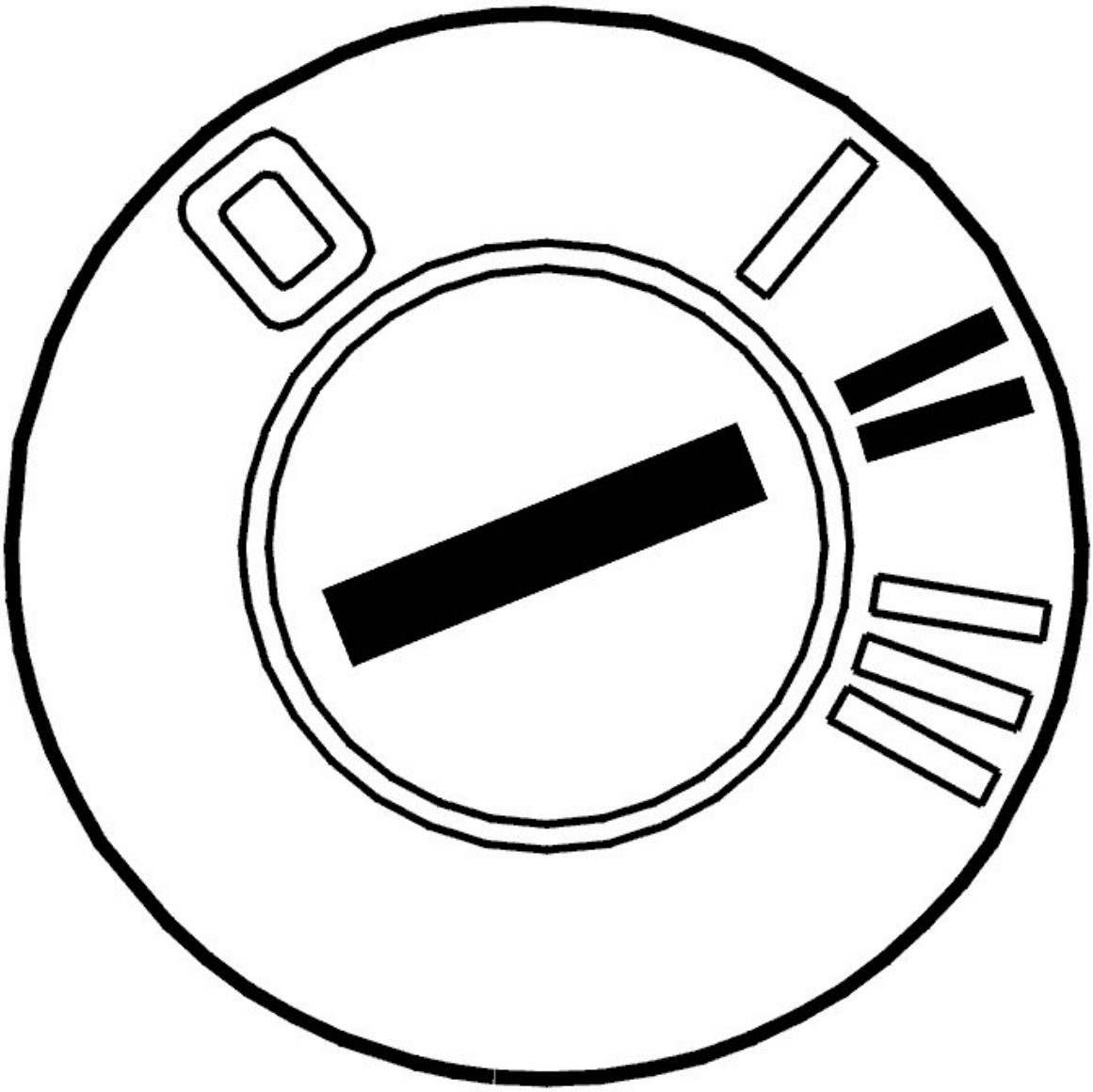
Possible source
- Damaged combustion fan.
- Contact resistance in the control module or the combustion fan connectors

Fault symptom[s]
- Poor heating in the passenger compartment.

Faulty Signal

Faulty signal

Checking the function of the water pump



- Ignition on.
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - Checking components and wiring

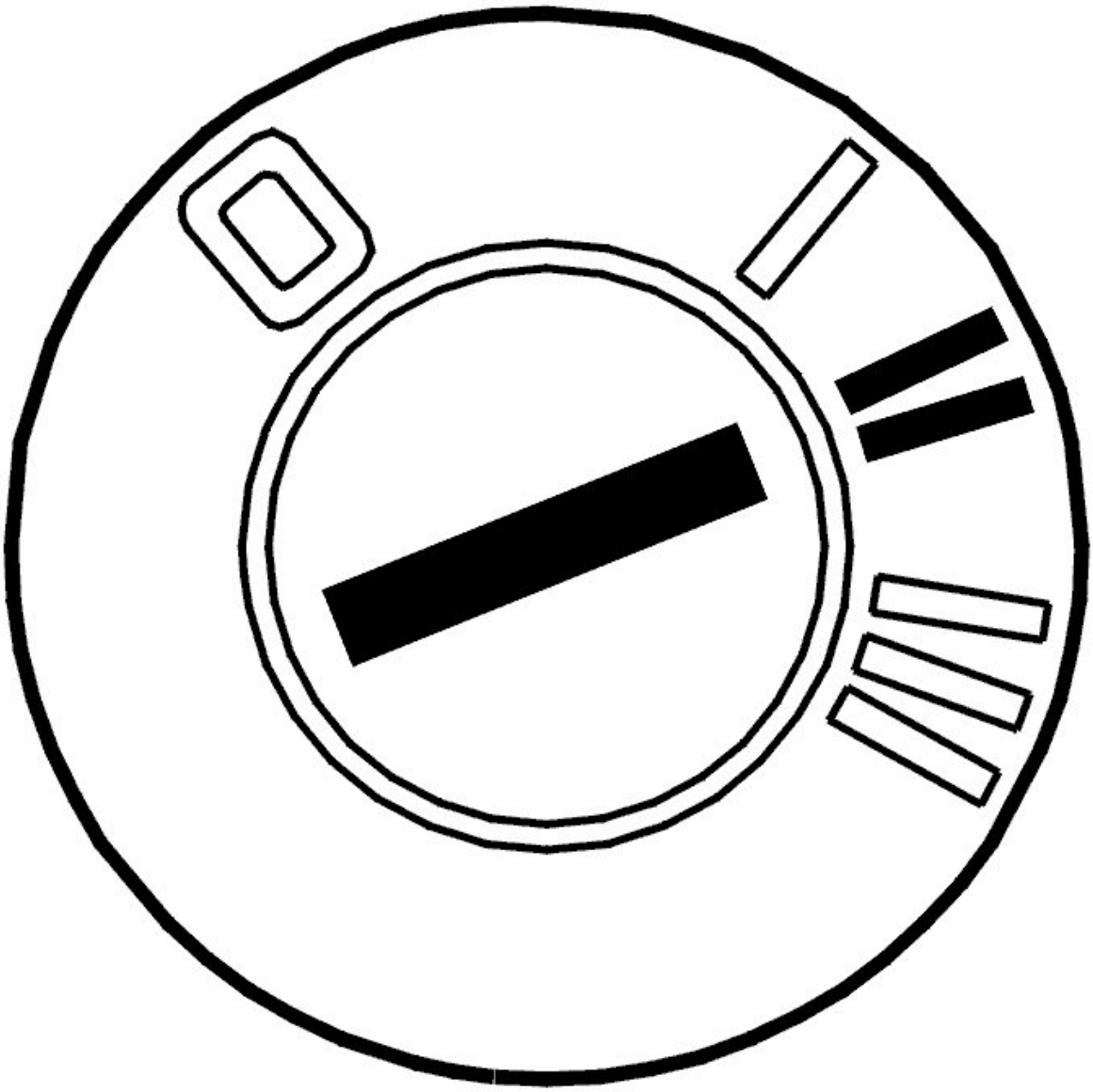
No - Checking components and wiring

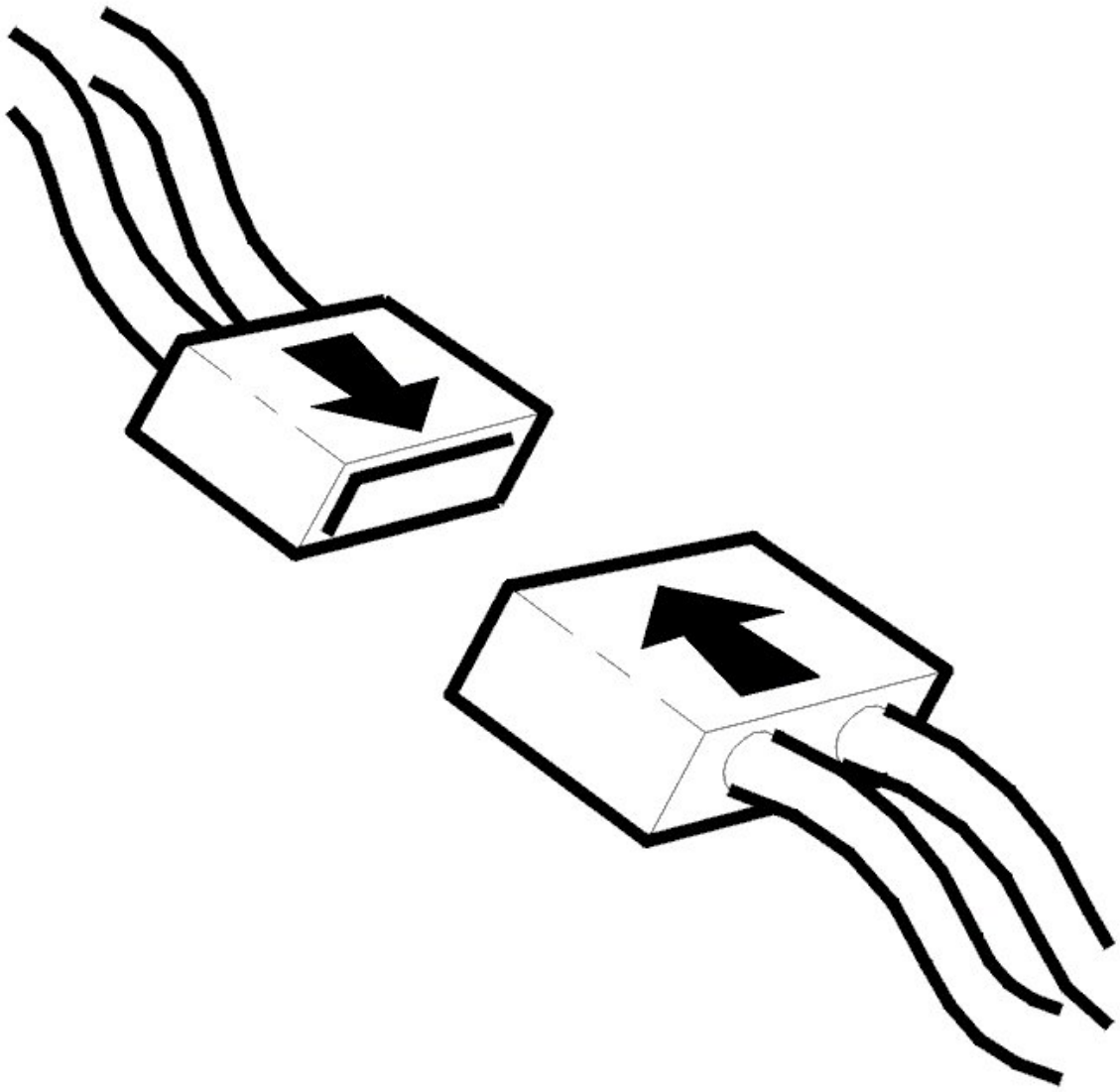
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running.

Is the combustion fan working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the water pump

Checking components and wiring

Check the electrical terminals for the combustion fan and the combustion preheater module (CPM) connector. Check for contact resistance and oxidation.
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate the combustion fan.

Listen for a buzzing sound which indicates that the combustion fan is running. If the combustion fan now operates, the cause of the fault was loose connections in the connectors.
The combustion fan must be replaced if no faults are found.
Remedy as necessary.

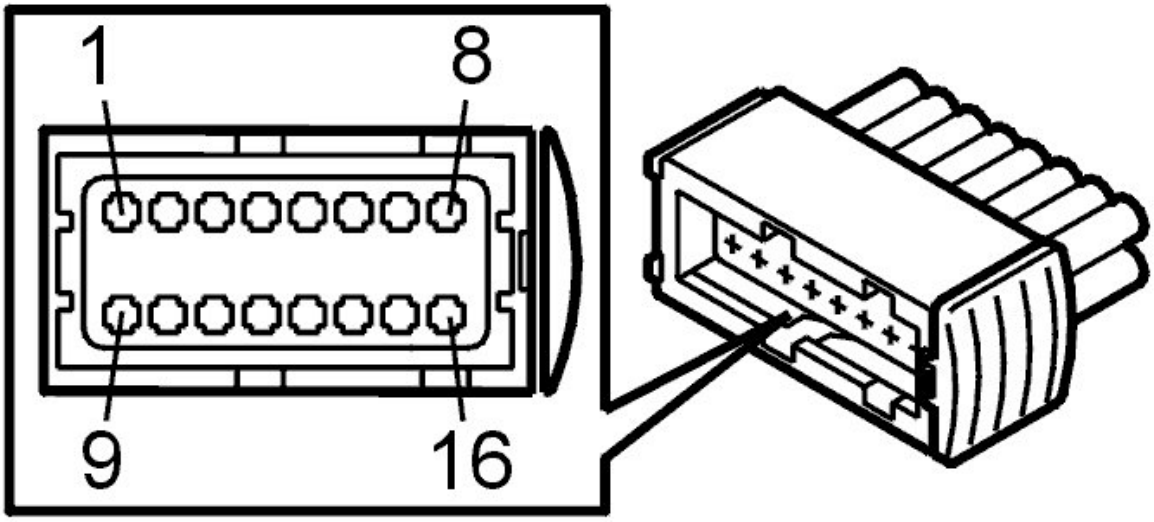
Other information
- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Checking components and wiring

Check the electrical terminals for the combustion fan and the combustion preheater module (CPM) connector. Check for contact resistance and oxidation.
Remedy as necessary.

Other information
- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the combustion fan, see: Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

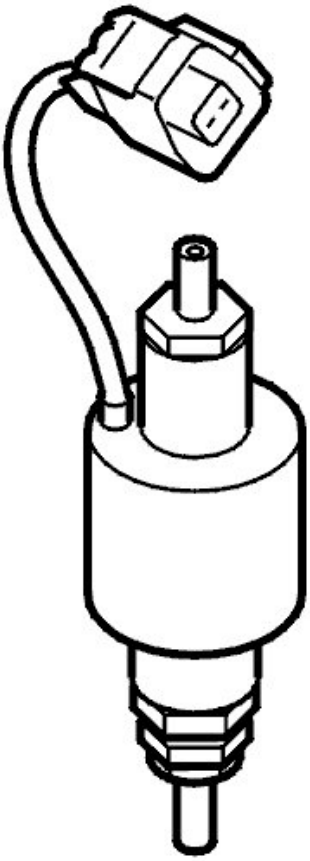


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F3F

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the fuel pump (FP) is too high.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged fuel pump.

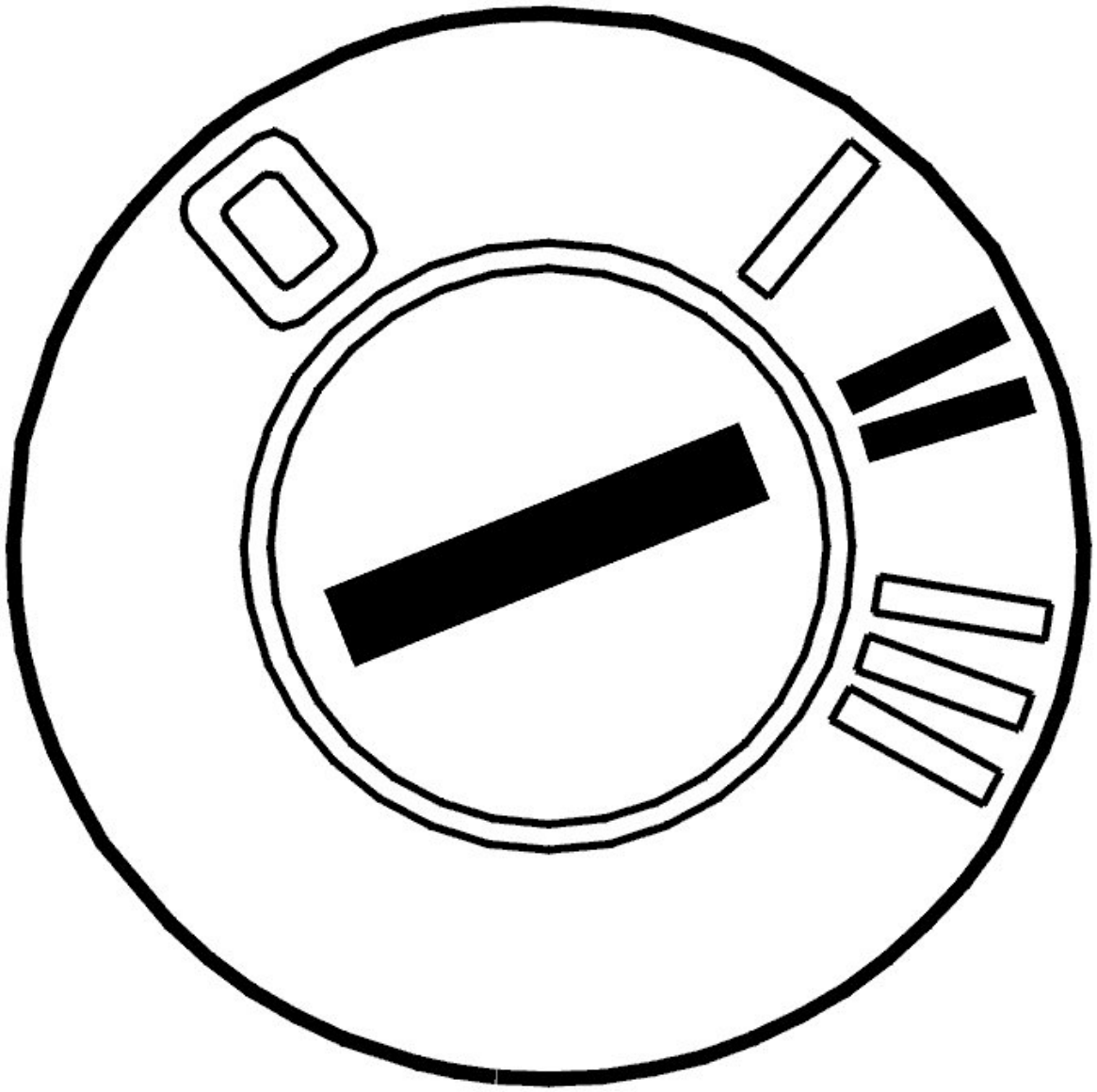
Fault symptom[s]

- Poor heating in the passenger compartment.

Signal Too High

Signal too high

Checking the function of the fuel pump (FP)



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.

Other information

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

Is the heater working?

Yes - Checking components and wiring

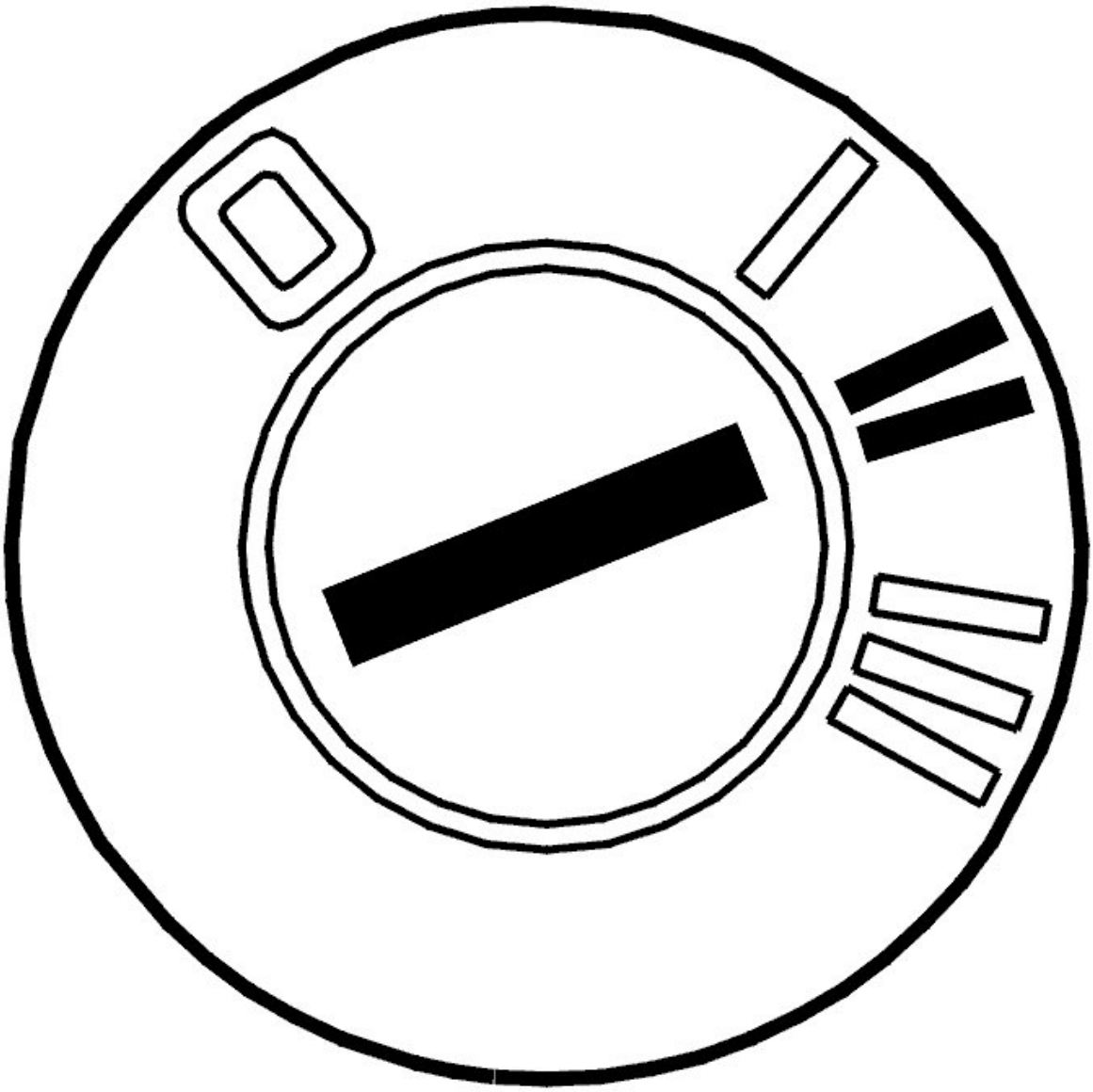
No - Checking components and wiring

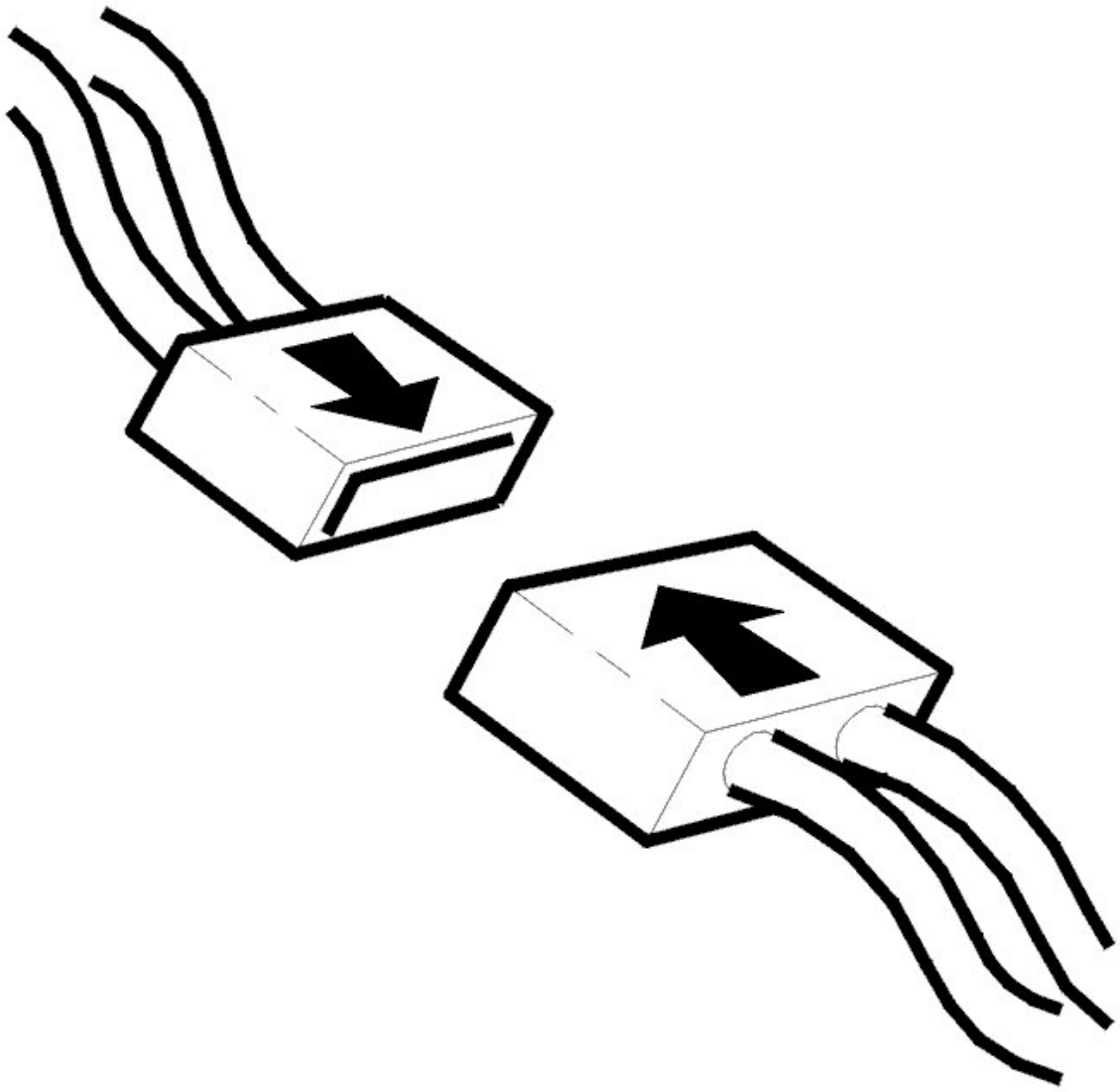
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

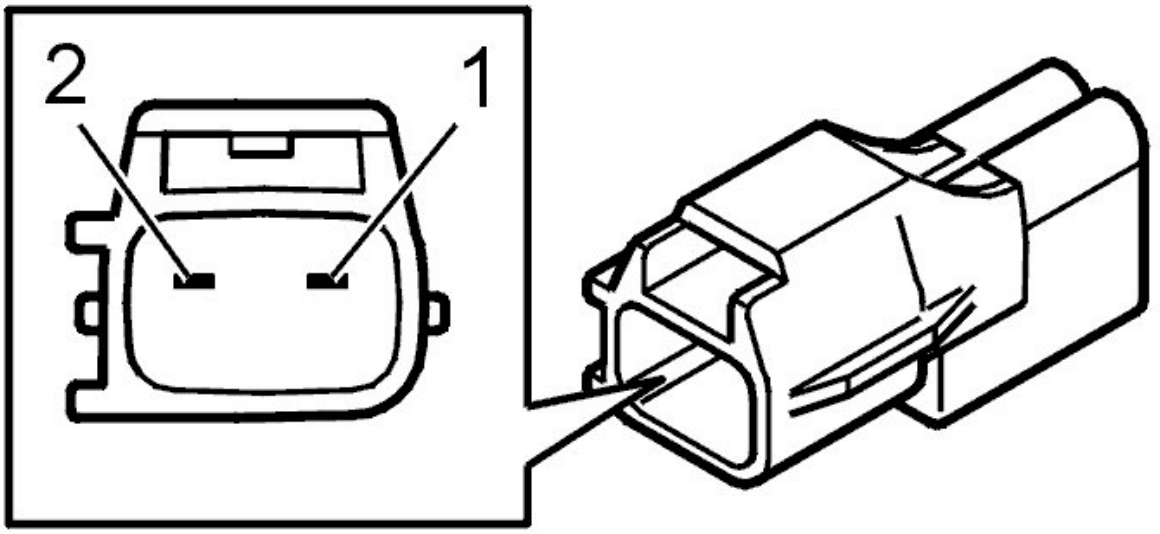
Attempt New Test - Checking the function of the fuel pump (FP)

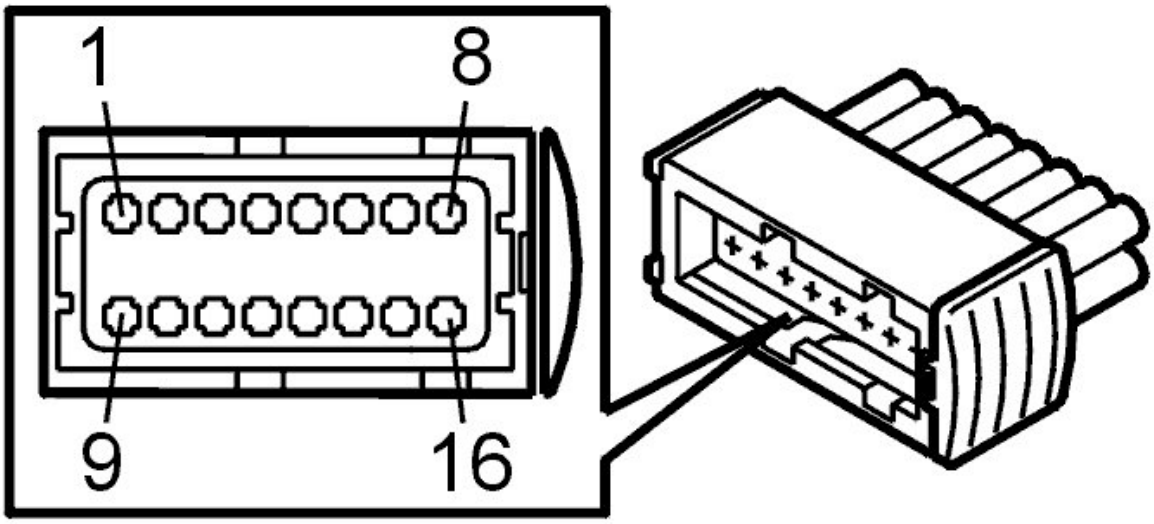
Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump (FP) terminal 2. Check for a short-circuit to supply voltage.
With the ignition on and the fuel pump (FP) connector disconnected, the voltage between fuel pump (FP) terminal 2 (control module side) and ground must be 0 V.
The fuel pump (FP) must be replaced if no faults are found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





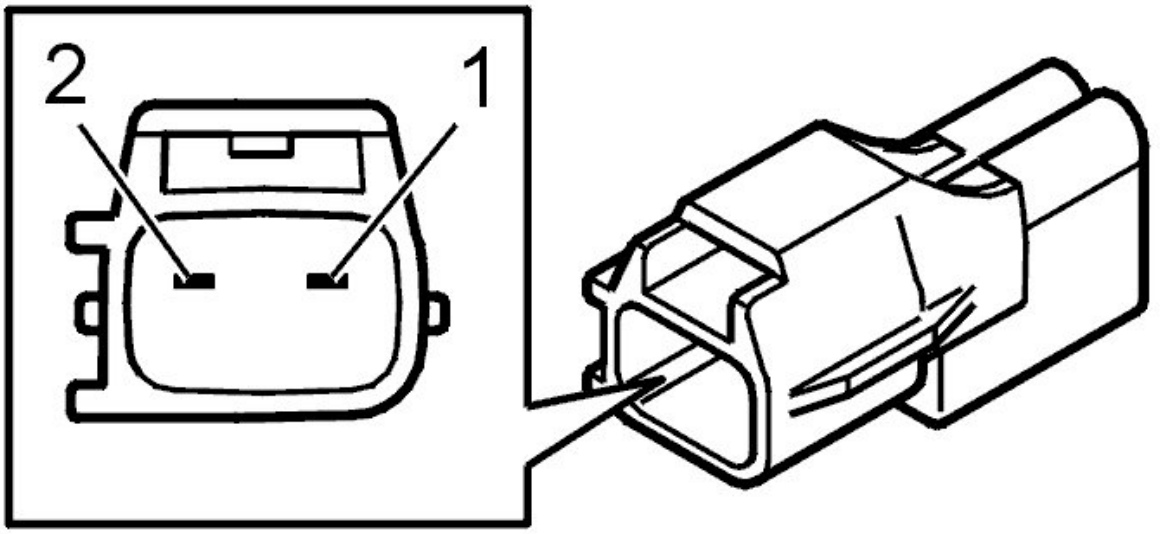
Continue - Verification

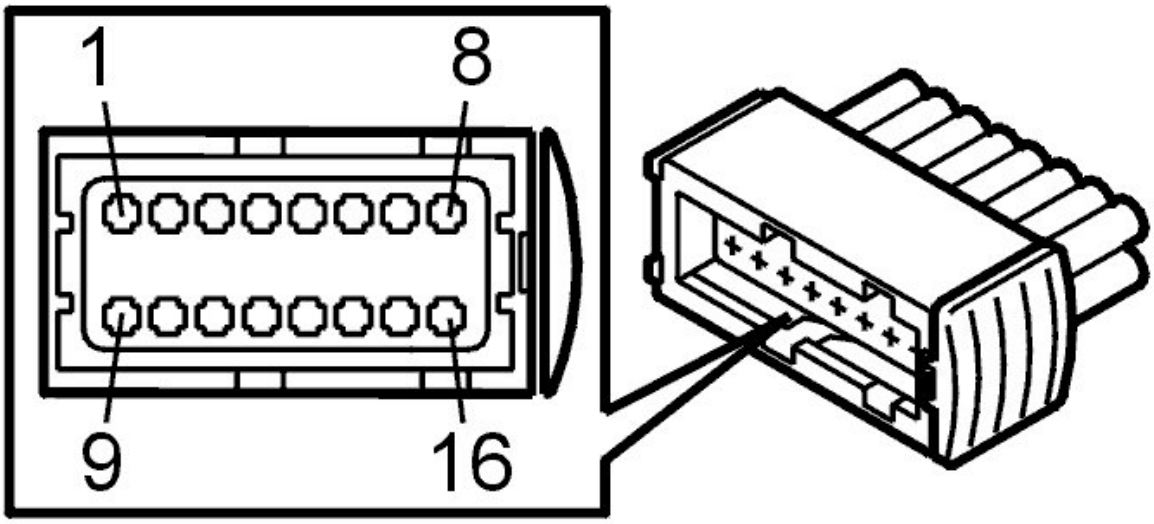
Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump (FP) terminal 2. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



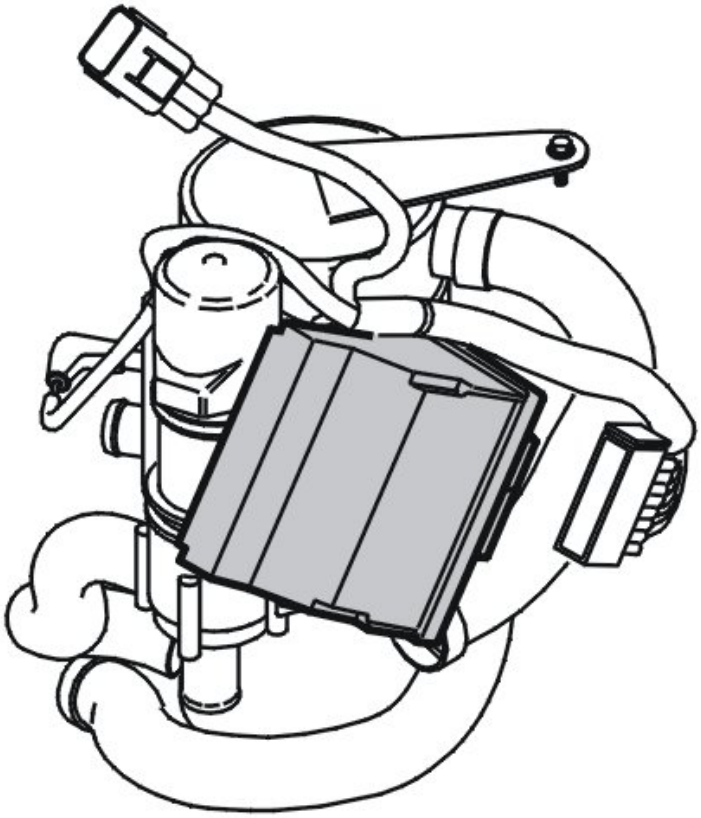


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F4C

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power supply to the combustion preheater module (CPM) is below 10.5 V.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Poor battery
- Contact resistance in the control module terminals
- Damaged generator (GEN).

Fault symptom[s]
- Poor heating in the passenger compartment.

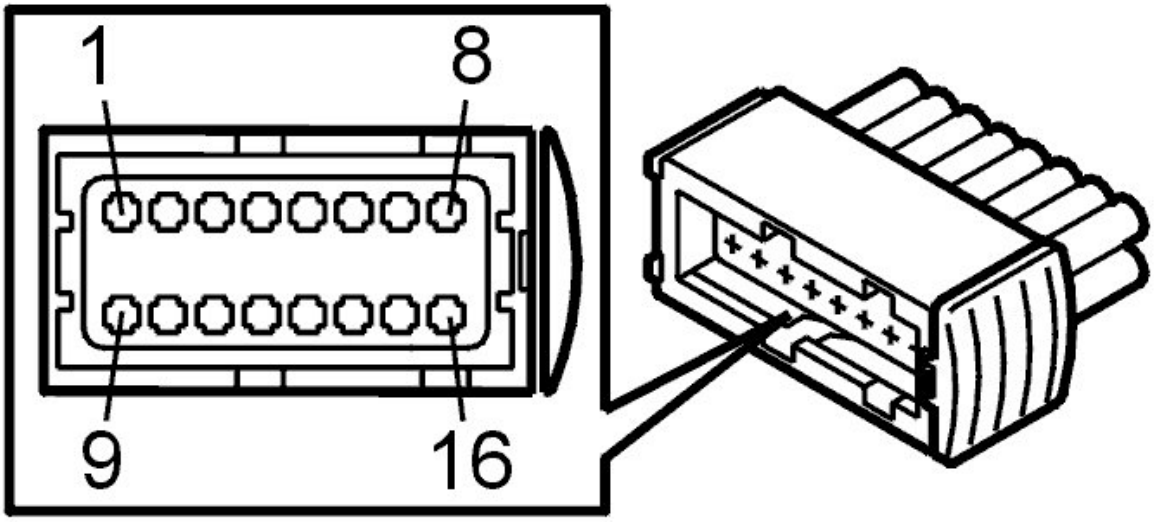
Signal Too Low

Signal too low

Checking the supply

Check the power supply to combustion preheater module (CPM) terminal #9. Check for contact resistance and oxidation. Check for loose connections. Also check the fuse in the engine compartment. Voltage should be 12 V.
Check the cable between terminal #1 on the Ext-X relay (2/29) and terminal #15 on the combustion preheater module (CPM). Check for contact resistance and oxidation. Check for loose connections. Check the relay, the power supply to the relay and the passenger compartment fuse.
If no fault is found, the fault may have been intermittent.
Remedy as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



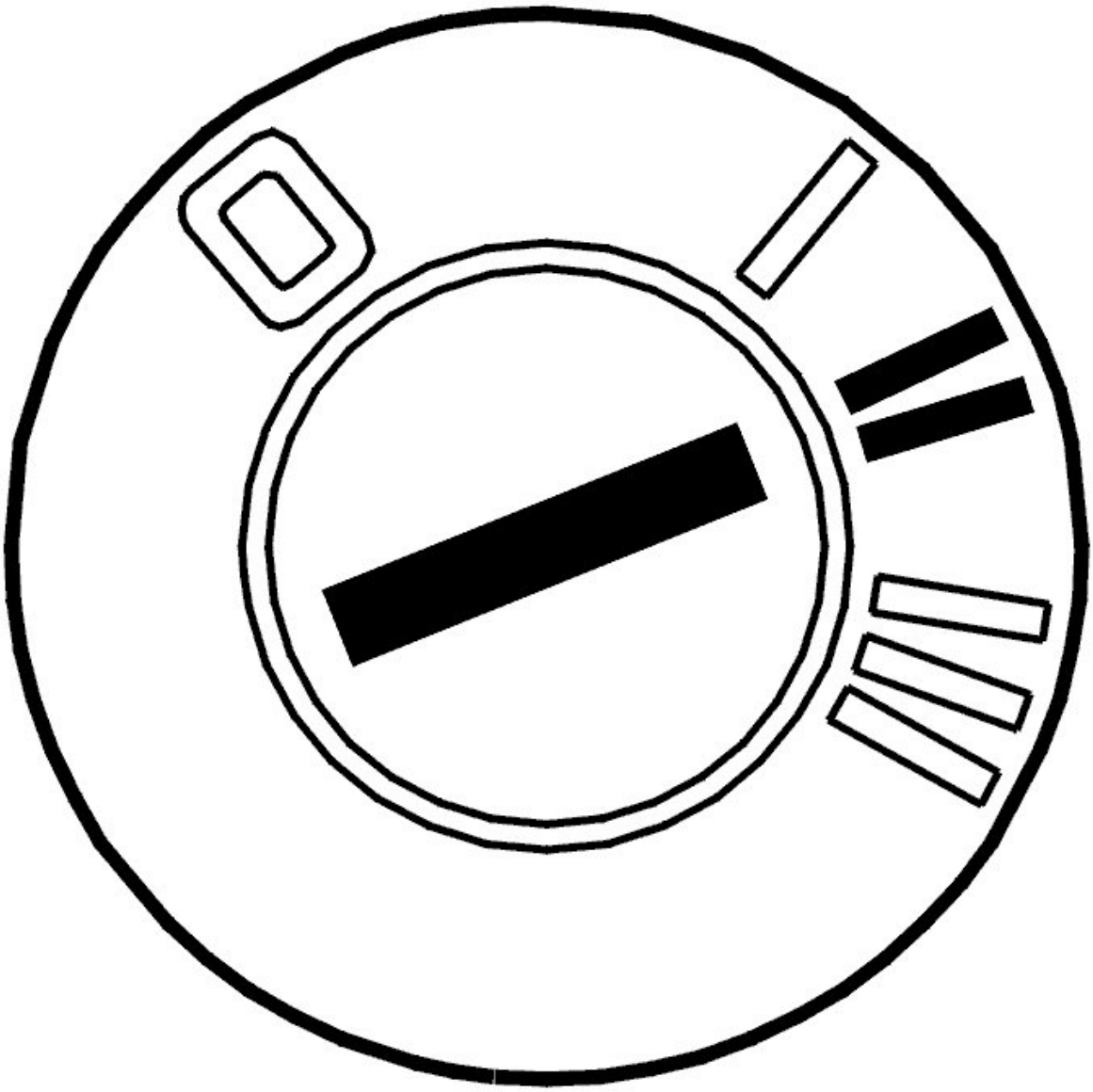
Continue - Verification

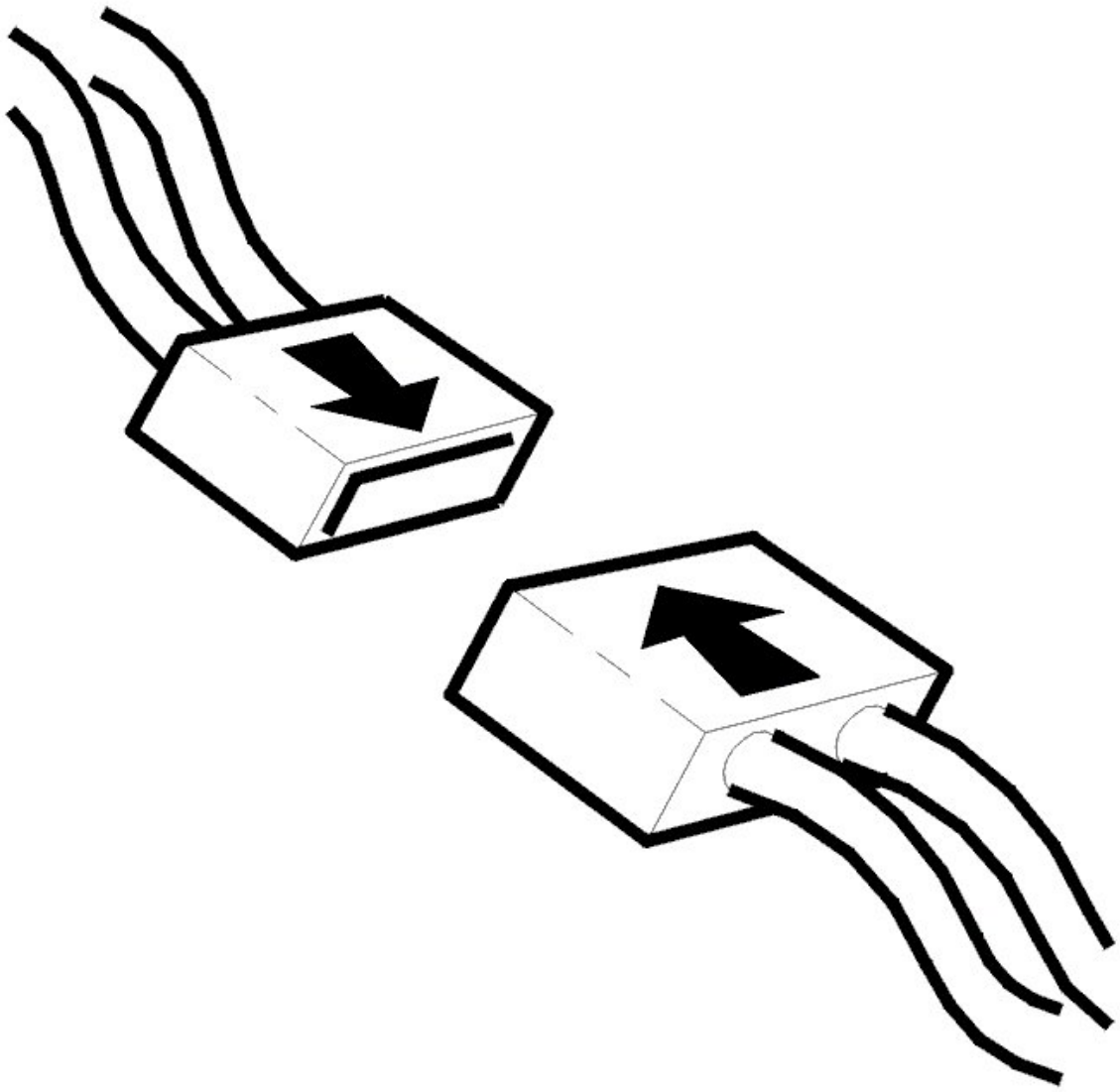
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Is the engine coolant heater working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

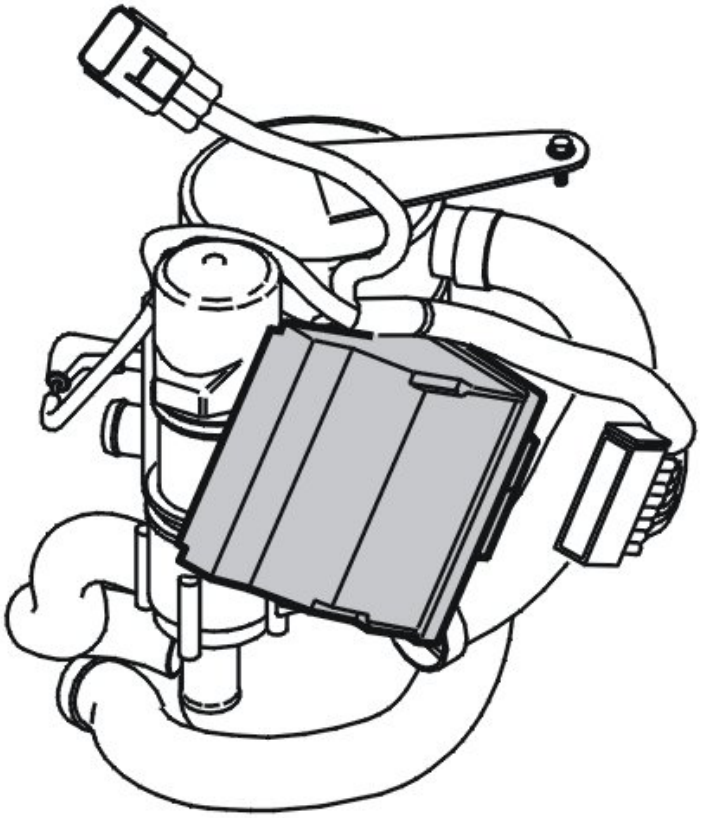
Attempt New Test - Checking the supply

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F4D

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the internal diagnostics in the combustion preheater module (CPM) do not respond within a certain time.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Contact resistance in the terminals.
- Open-circuit in the communication cable.
- Short-circuit to ground in the communication cable.
- Short-circuit to supply voltage in the communication cable.

Fault symptom[s]
- Poor heating in the passenger compartment.

Too long time

Too long time

Checking communication

Check whether the communication is working. Read off the combustion preheater module (CPM) P/N in the VIDA communication input for example.
Test whether the fault is only limited to the combustion preheater module (CPM) or if there are communication faults with other nodes as well. The fault has been localized if the only problem is in establishing contact with the combustion preheater module (CPM).
If the communication works and the P/N can be read off, the fault is intermittent.

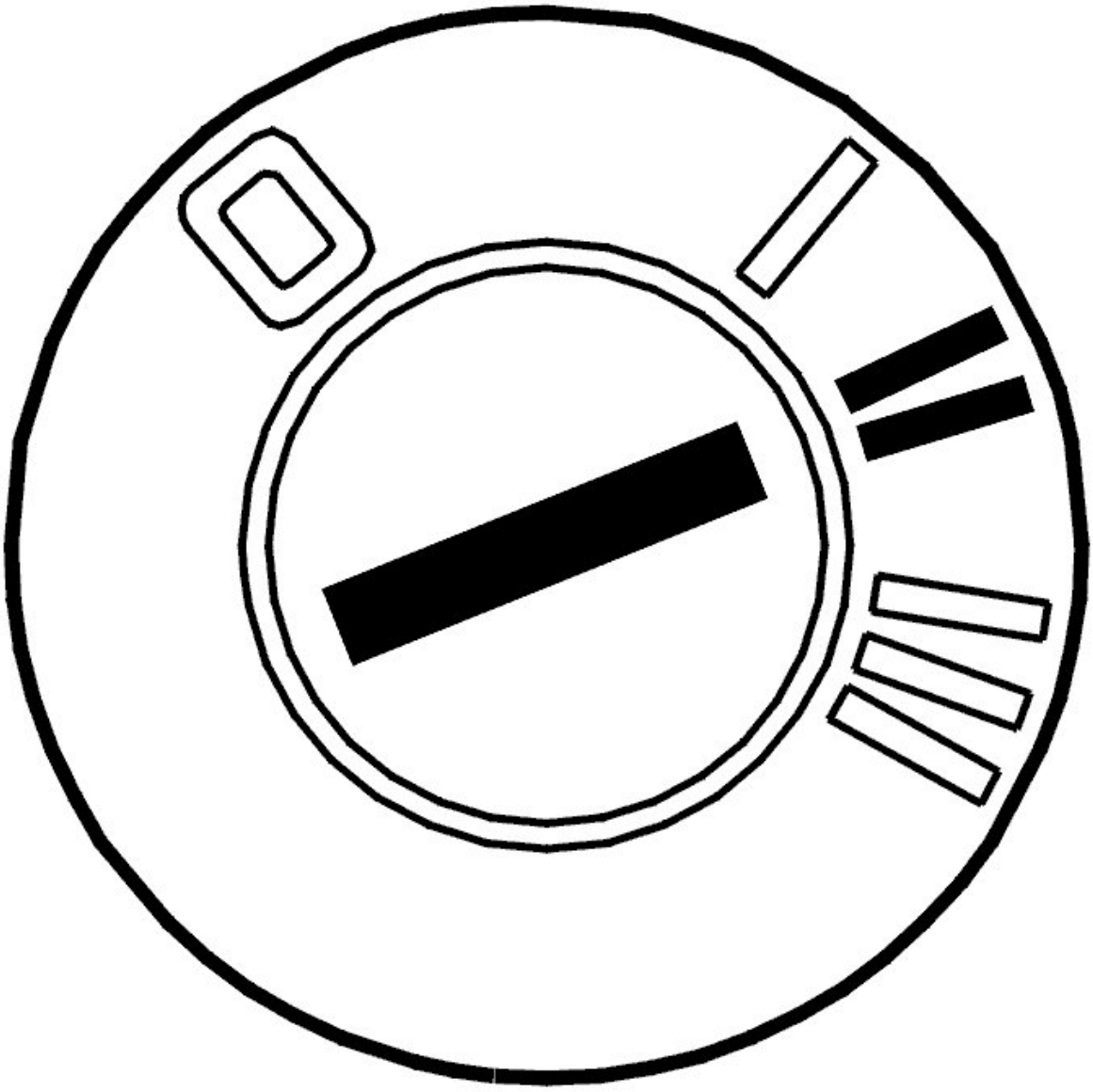
Continue - Checking communication

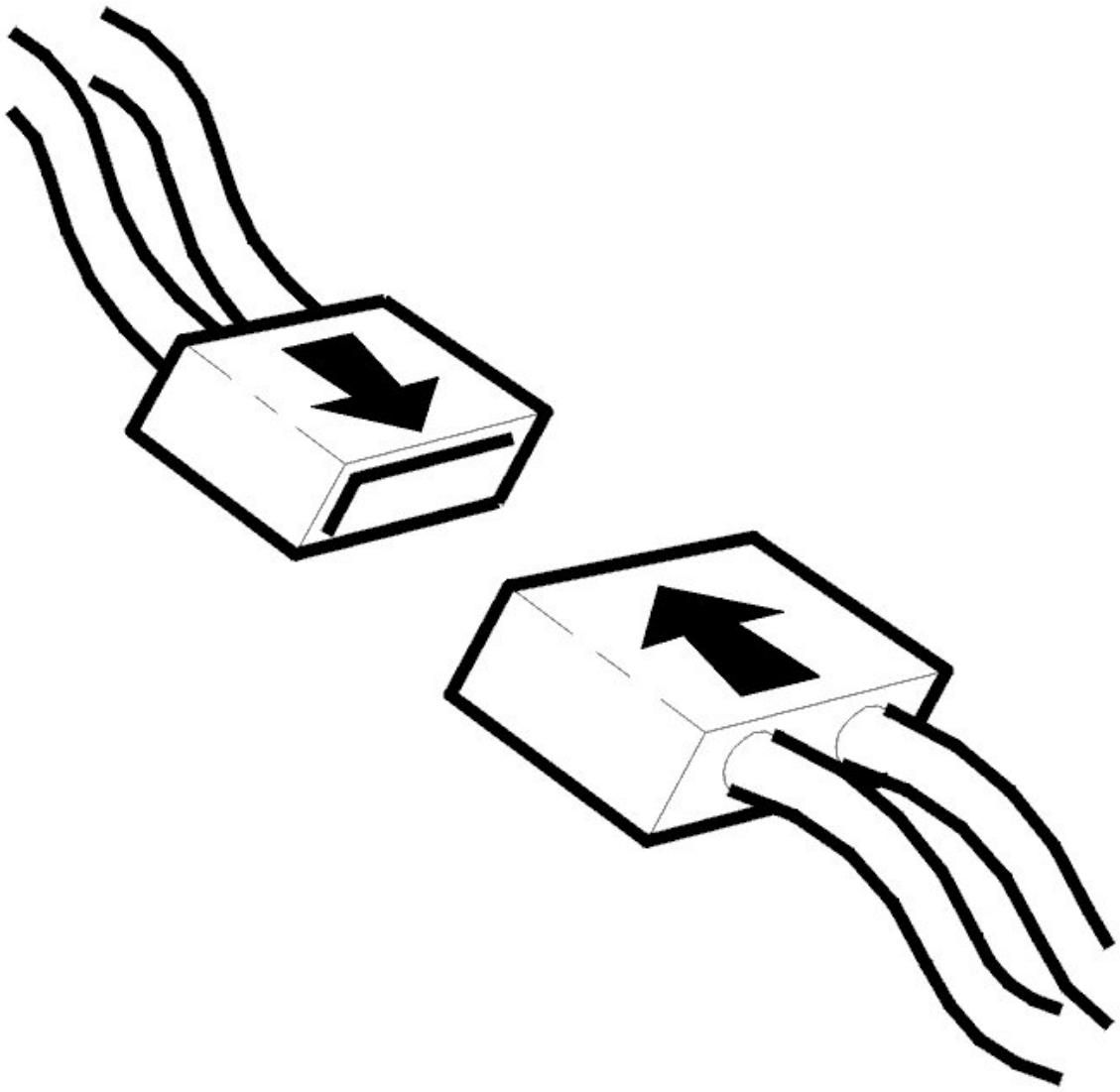
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the combustion preheater module (CPM).
Check that the engine coolant heater is activated.

Is the engine coolant heater working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking communication

Checking communication

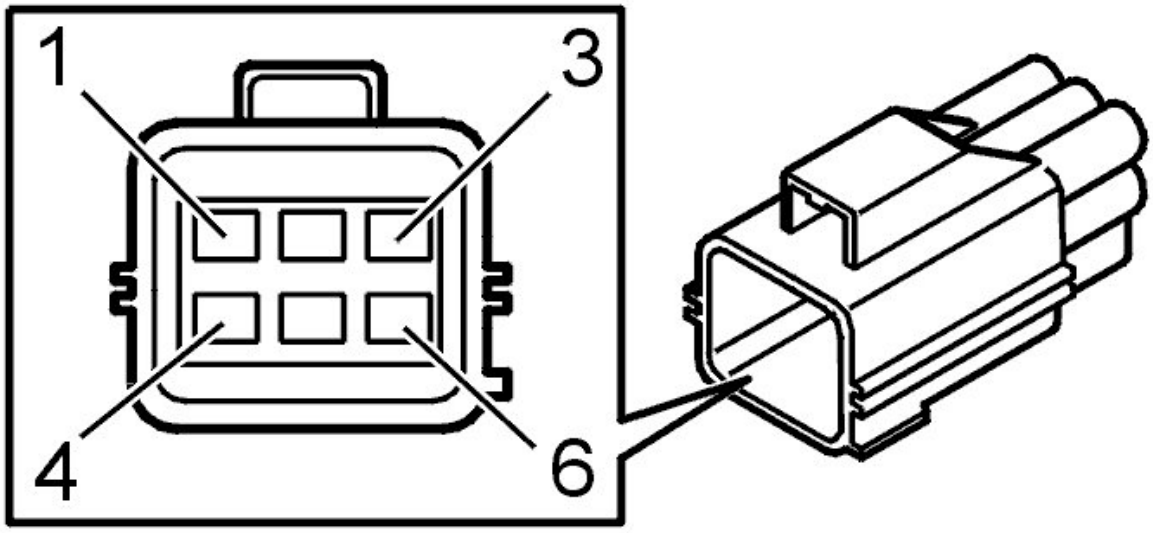
Check the cable between combustion preheater module (CPM) terminal #6 and central electronic module (CEM) terminal #C32. Check for a short-circuit to ground. Check for loose connections.

Hint: All communication between the combustion preheater module (CPM) and the central electronic module (CEM) is via this cable.

Also check the connectors.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Combustion preheater module (CPM): Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Central electronic module (CEM): Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F4F

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The central electronic module (CEM) checks the function and status parking heater.
During activation, the heater tries to start. If the heater does not start, it will try again a few times.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives a signal from the heater indicating that it has tried to start but failed.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- The heater is not activated.

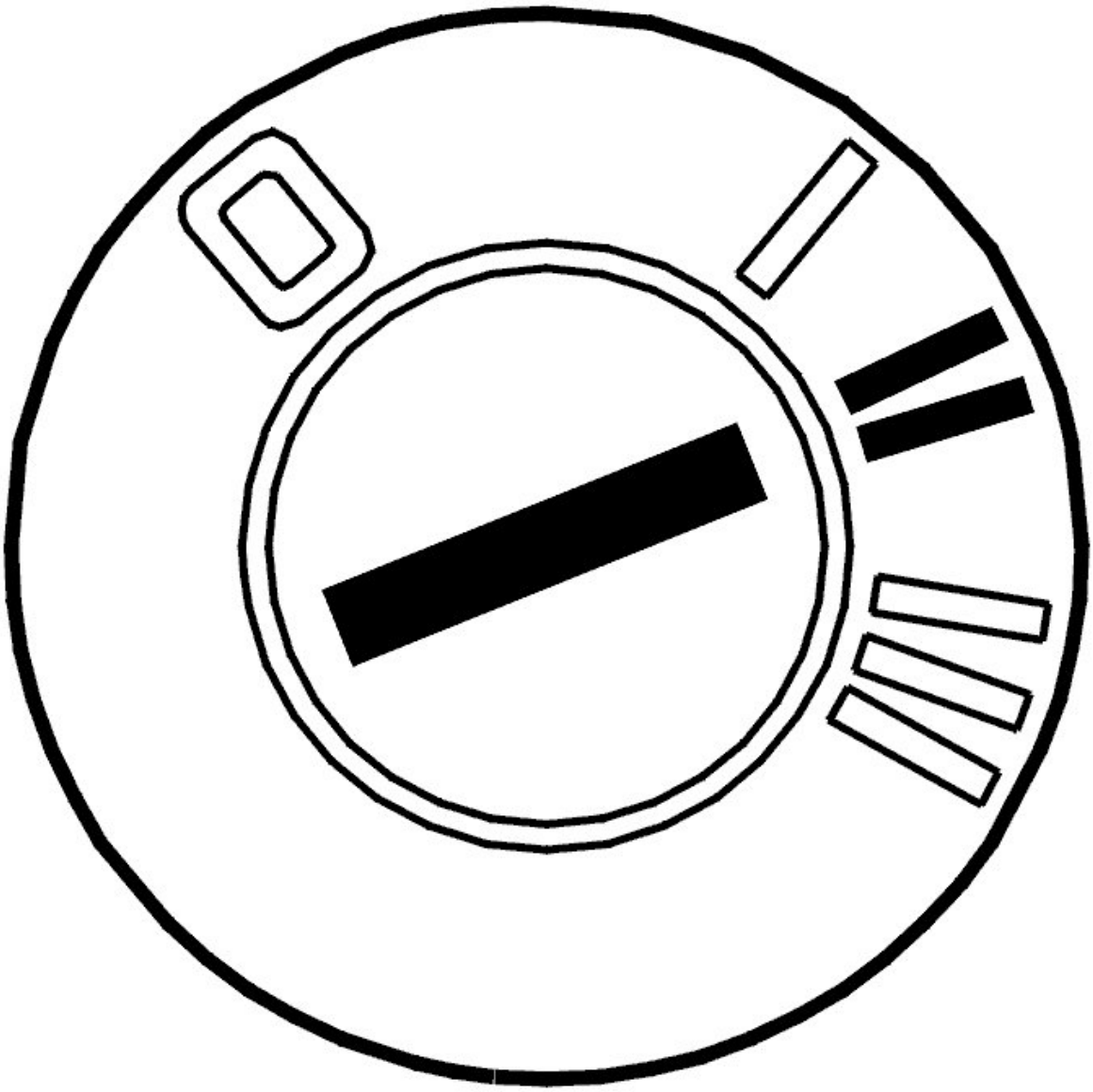
Possible source
- Fault in the fuel supply to the parking heater
- Flame sensor clogged with soot
- Blocked combustion air intake
- Contact resistance in the control module connectors
- Open-circuit or short-circuit to supply voltage in the control signal cable for the flame sensor
- Flame sensor not functioning.
- Fault in the power supply for the parking heater

Fault symptom[s]
- Poor heating in the passenger compartment.

Too Many Unsuccessful Attempts

Too many unsuccessful attempts

Checking the quantity of fuel and voltage



- If the quantity of fuel in the fuel tank is below 6 liters the heater is not permitted to start. If the battery voltage is poor the heater is not permitted to start. The combustion preheater module (CPM) interprets 3 or more failed start attempts as a fault in the heater. The heater cannot then be started until the diagnostic trouble codes (DTCs) have been erased
- Ignition on.

Note! The heater must be switched off when reading off!

Read off the values.
The fuel level status must be OK and the voltage to the heater must be normal.

Other information:

- Combustion preheater module (CPM): Description of parameters See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Scan Tool Testing and Procedures/Description of Parameters

Was a fault detected?

Yes - Verification

No - Checking fuel lines

Checking fuel lines

Warning! Use protective gloves and protective goggles due to the risk of fuel spillage.

- Expose the heater and fuel lines. See: Engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Engine Coolant Heater, Replacing

Check the fuel lines between the connection point to the fuel injection system and heater via the fuel pump (FP). Check for damage and leakage.
Check the fuel lines for blockages.

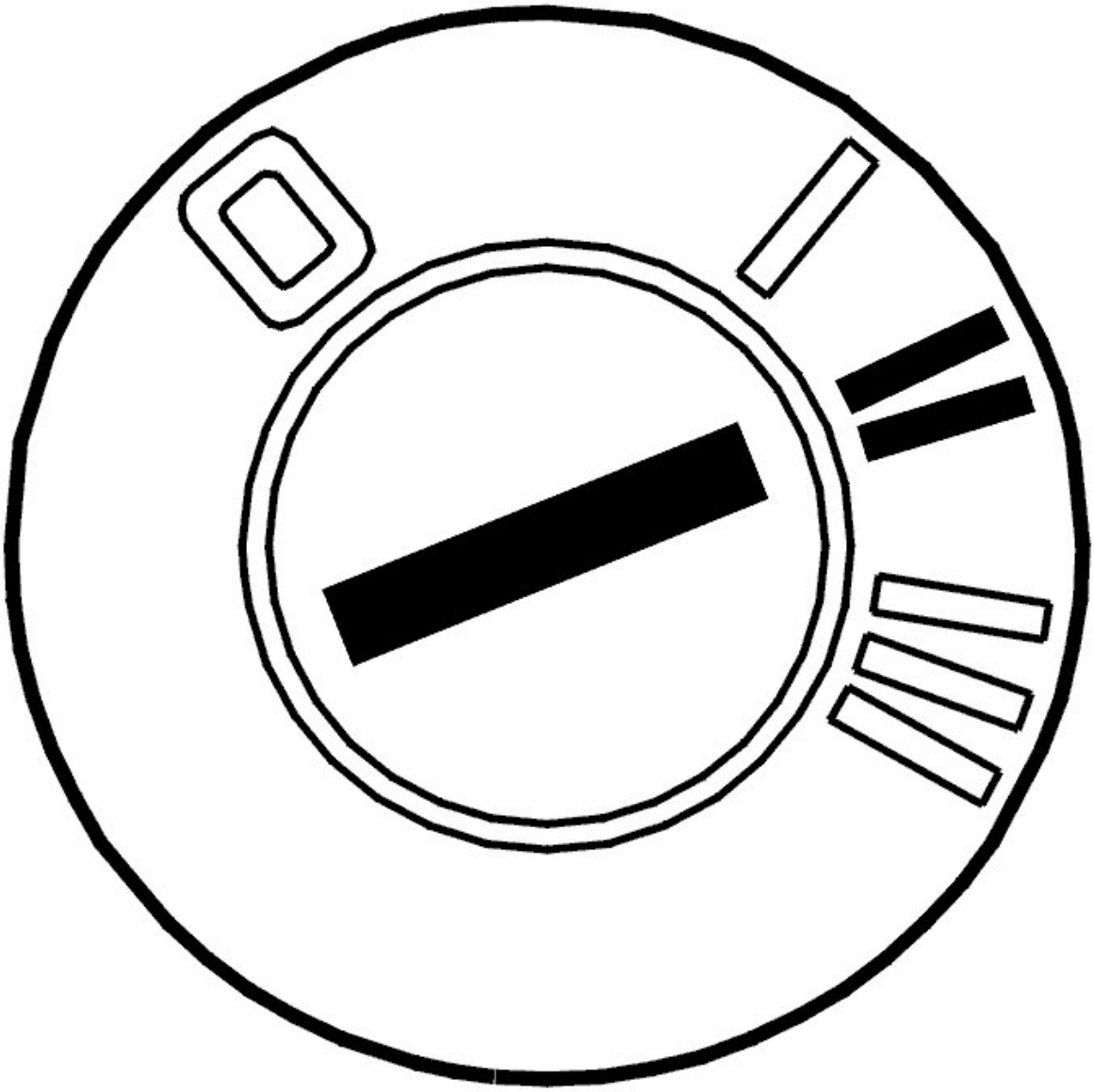
Was a fault detected?

Yes - Verification

No - Checking components

Checking components

Warning! Use protective gloves and protective goggles due to the risk of fuel spillage.



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

A buzzing sound must be heard from the heater
Check whether the fuel pump is operating. The pump should make a ticking sound.
Replace the fuel pump (FP) if it is not working. See: Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair

Other information:

- Description of parameters See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Scan Tool Testing and Procedures/Description of Parameters
- Activating components/functions See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Scan Tool Testing and Procedures/Activating Components/Functions

Did the heater operate?

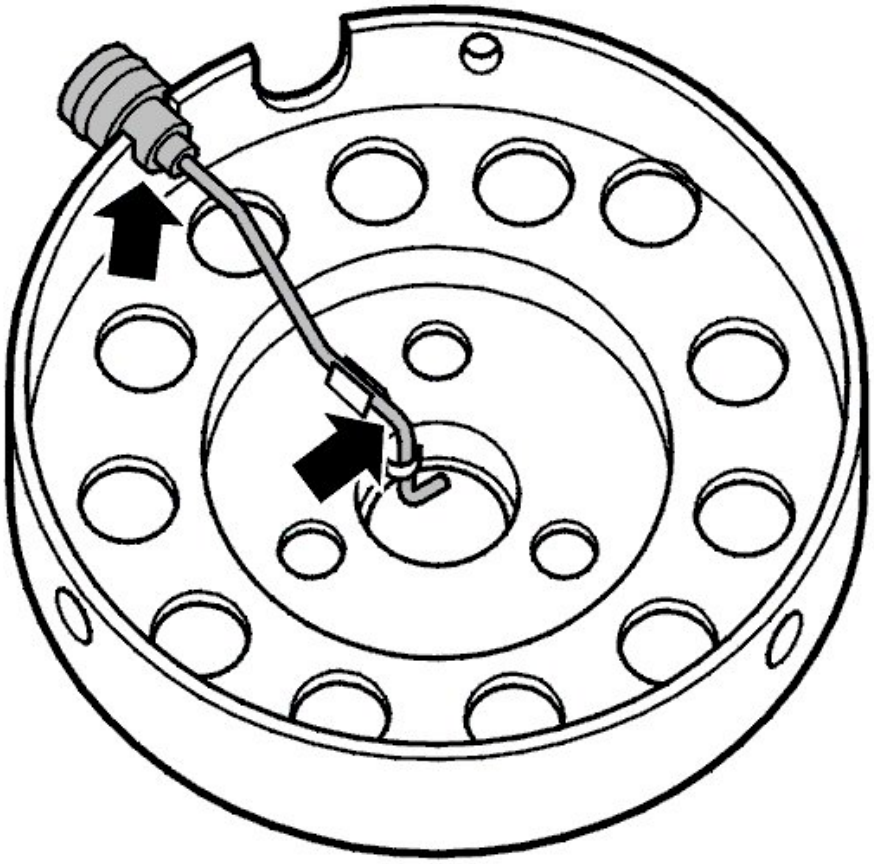
Yes - Checking the nozzle pipe

No - Verification

Checking the nozzle pipe

- Engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Engine Coolant Heater, Replacing
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing

Check that the nozzle pipe is OK and that it is not blocked.
Remedy as necessary.



Was a fault detected?

Yes - Verification

No - Checking the combustion air flow

Checking the combustion air flow

- Engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Engine Coolant Heater,

Replacing

Check for free air flow through the heater (that the air intake and exhaust are not blocked).
Remedy as necessary.

Was a fault detected?

Yes - Verification

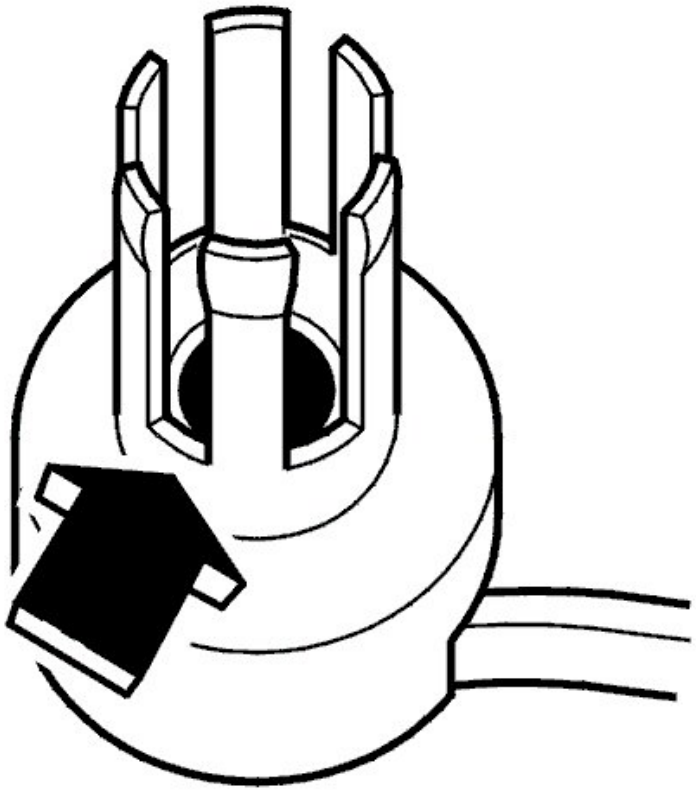
No - Checking the flame sensor

Checking the flame sensor

Check that the flame sensor is not clogged with soot.
Remedy as necessary.

Other information:

- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair



Was a fault detected?

Yes - Verification

No - Checking components and wiring

Checking components and wiring

Check the cable between combustion preheater module (CPM) terminal #4 and the ground terminal for the flame sensor. Check for an open-circuit.

Hint: It is difficult to differentiate between the flame sensor cables so take readings between control module terminal #4 and both flame sensor cables.

Check the cable between combustion preheater module (CPM) terminal #8 and the positive cable for the flame sensor. Check for an open-circuit. Check for a short-circuit to supply voltage.

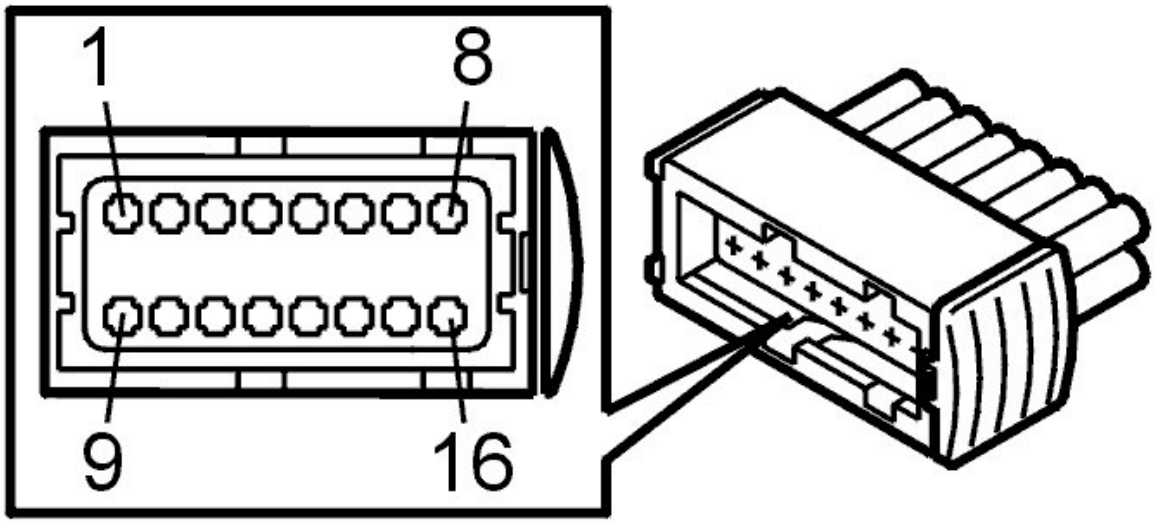
Hint: It is difficult to differentiate between the cables to the flame sensor. Take readings on the cables one at a time and see if a relevant value was

obtained from either of them.

If no fault is found in the connectors or cables, try a new flame sensor.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- For other values: Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



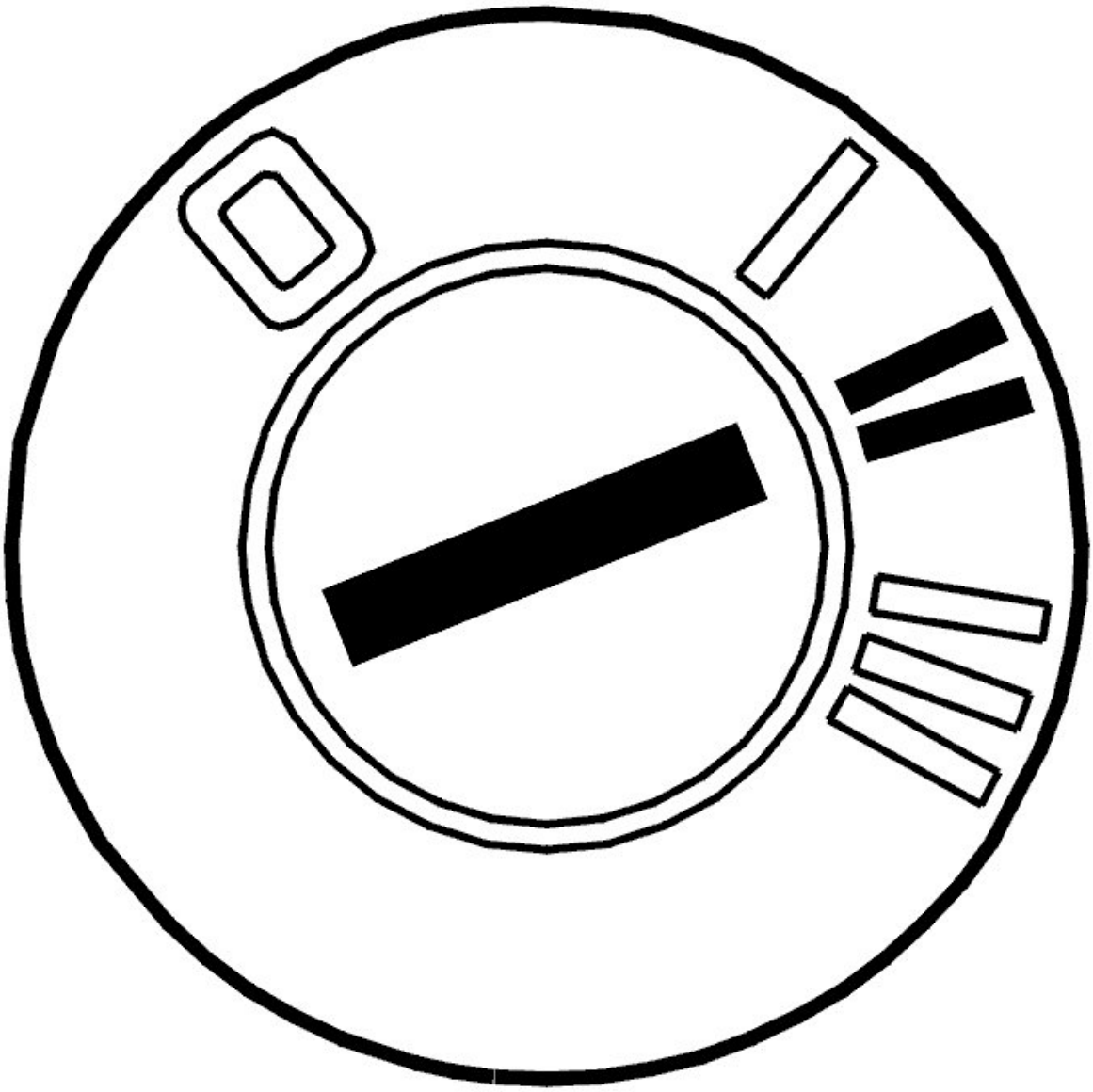
Continue - Verification

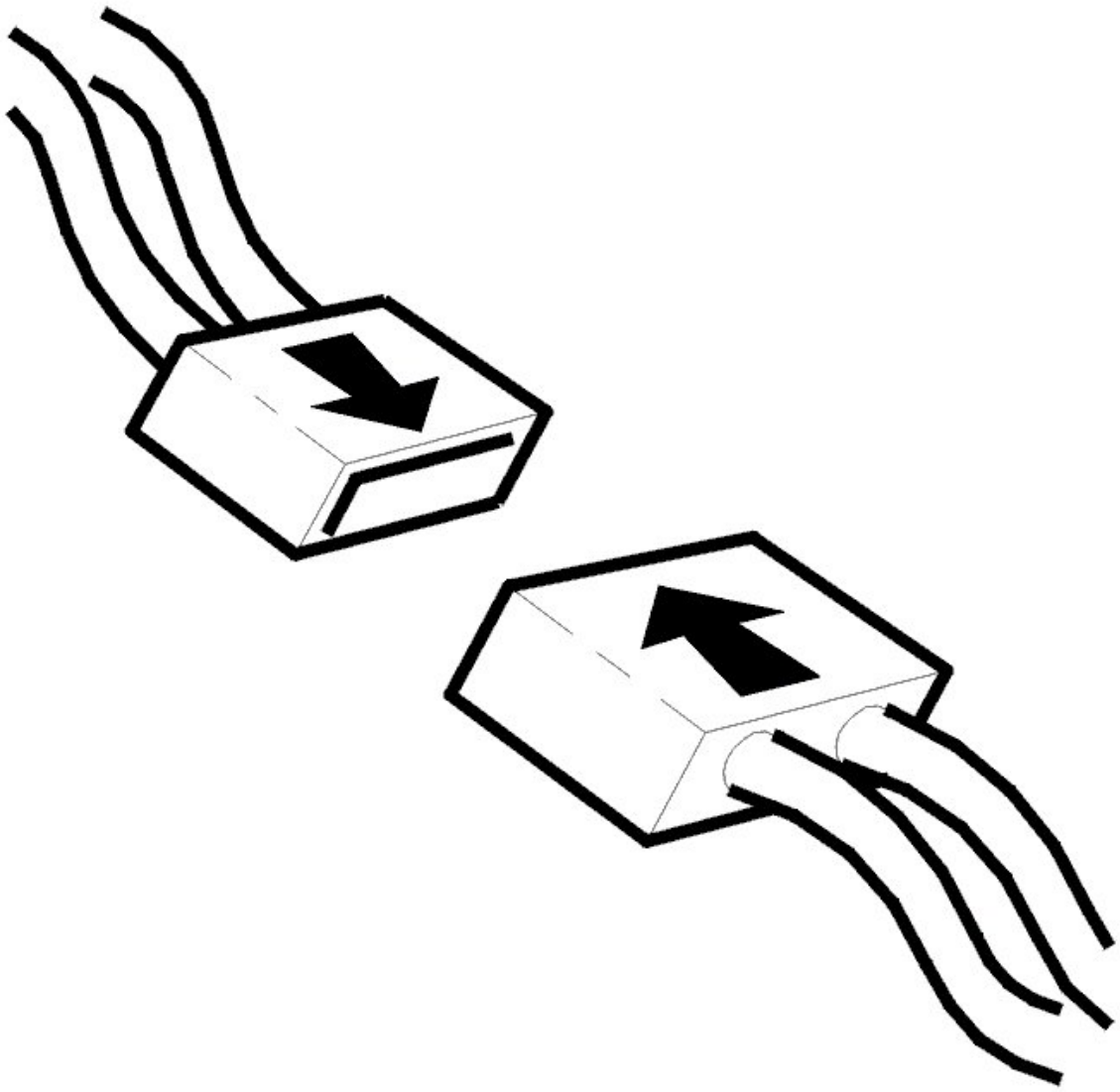
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



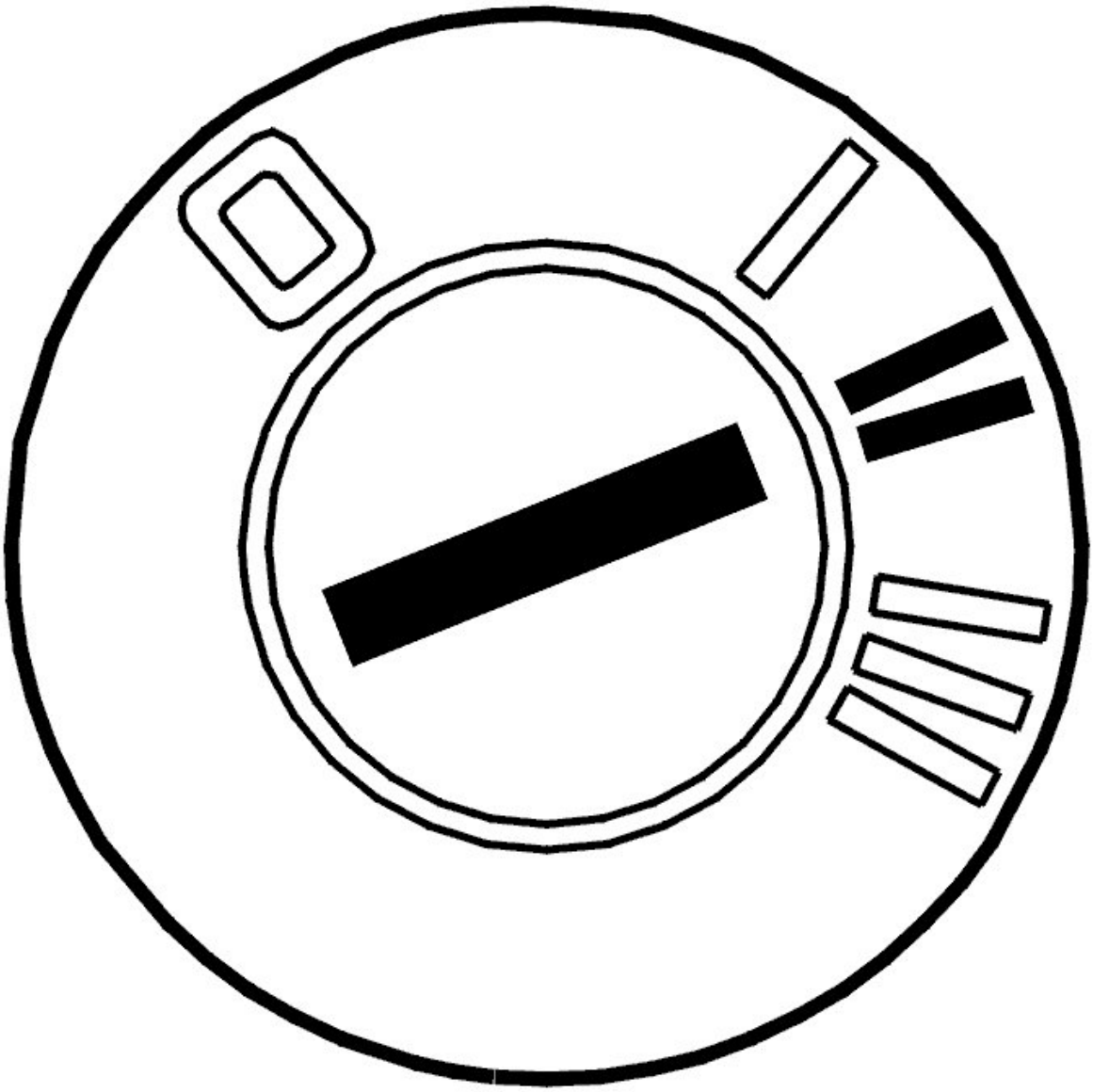


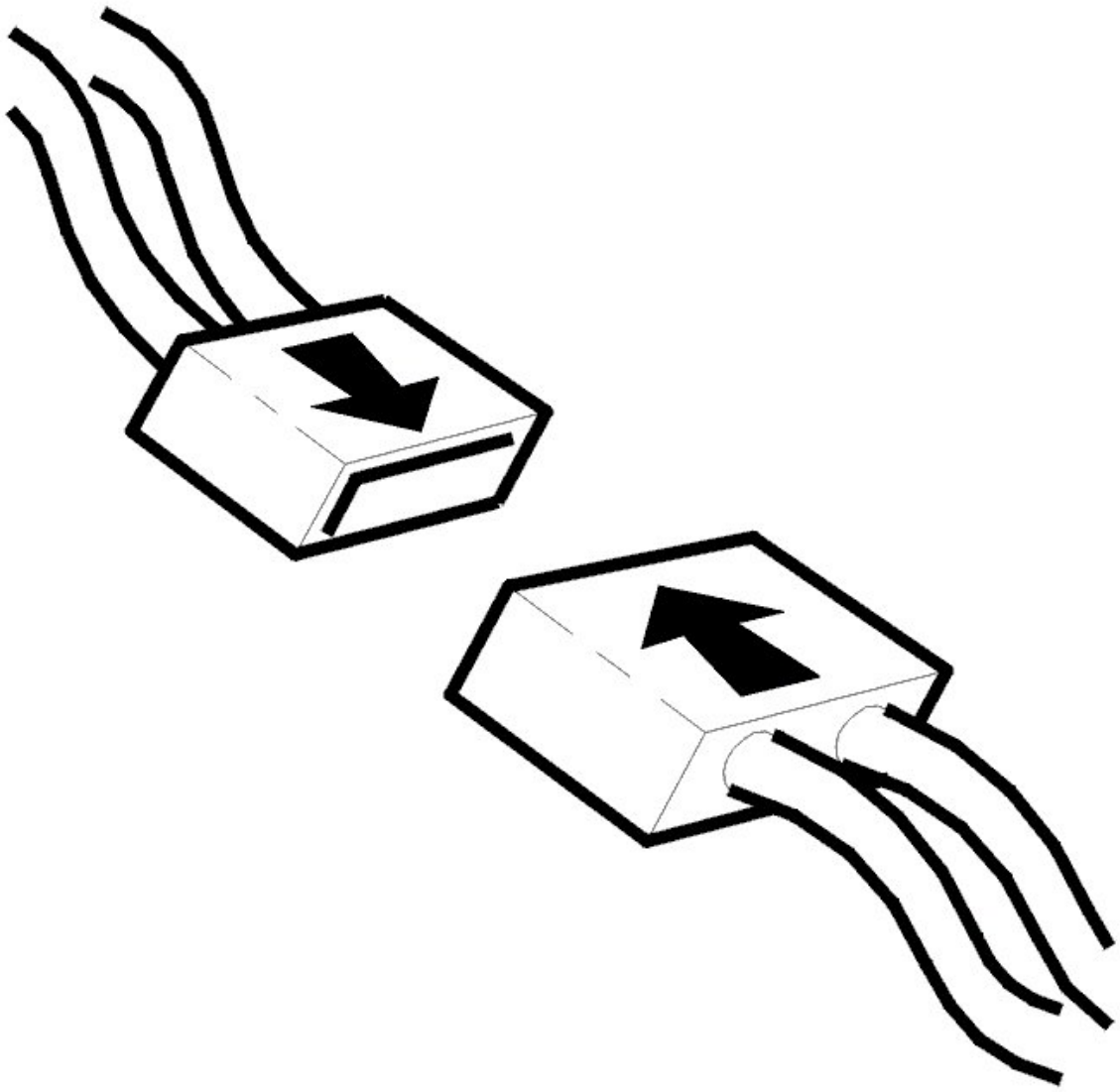
- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Erase diagnostic trouble codes (DTCs).

Note! Diagnostic trouble codes (DTCs) must be erased to start the heater. Before erasing diagnostic trouble codes (DTCs) all indicated faults must be corrected.

Verification, continued





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

A buzzing sound should be heard from the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage should be a maximum of 1.0 V.

Check the function of the heater. See Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Other information:

- For a description of parameters, see Description of parameters See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Scan Tool Testing and Procedures/Description of Parameters
- For a description of activations, see Activating components/functions See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Scan Tool Testing and Procedures/Activating Components/Functions.

Does the heater operate?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

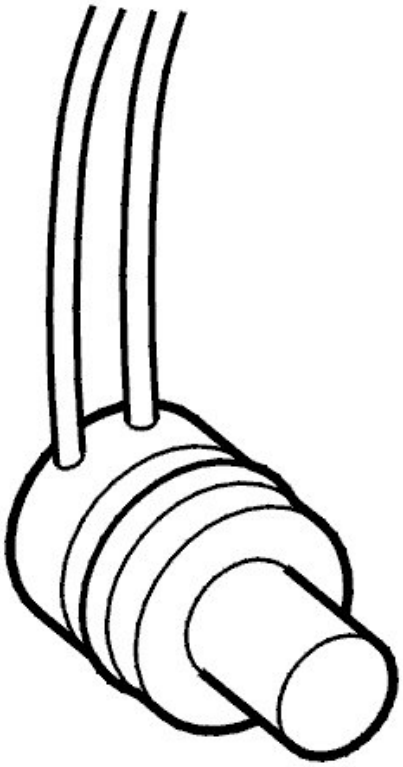
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the quantity of fuel and voltage

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F31

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
If Central electronic module (CEM) registers open circuit or short-circuiting to voltage on the circuit for the water temperature sensor, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

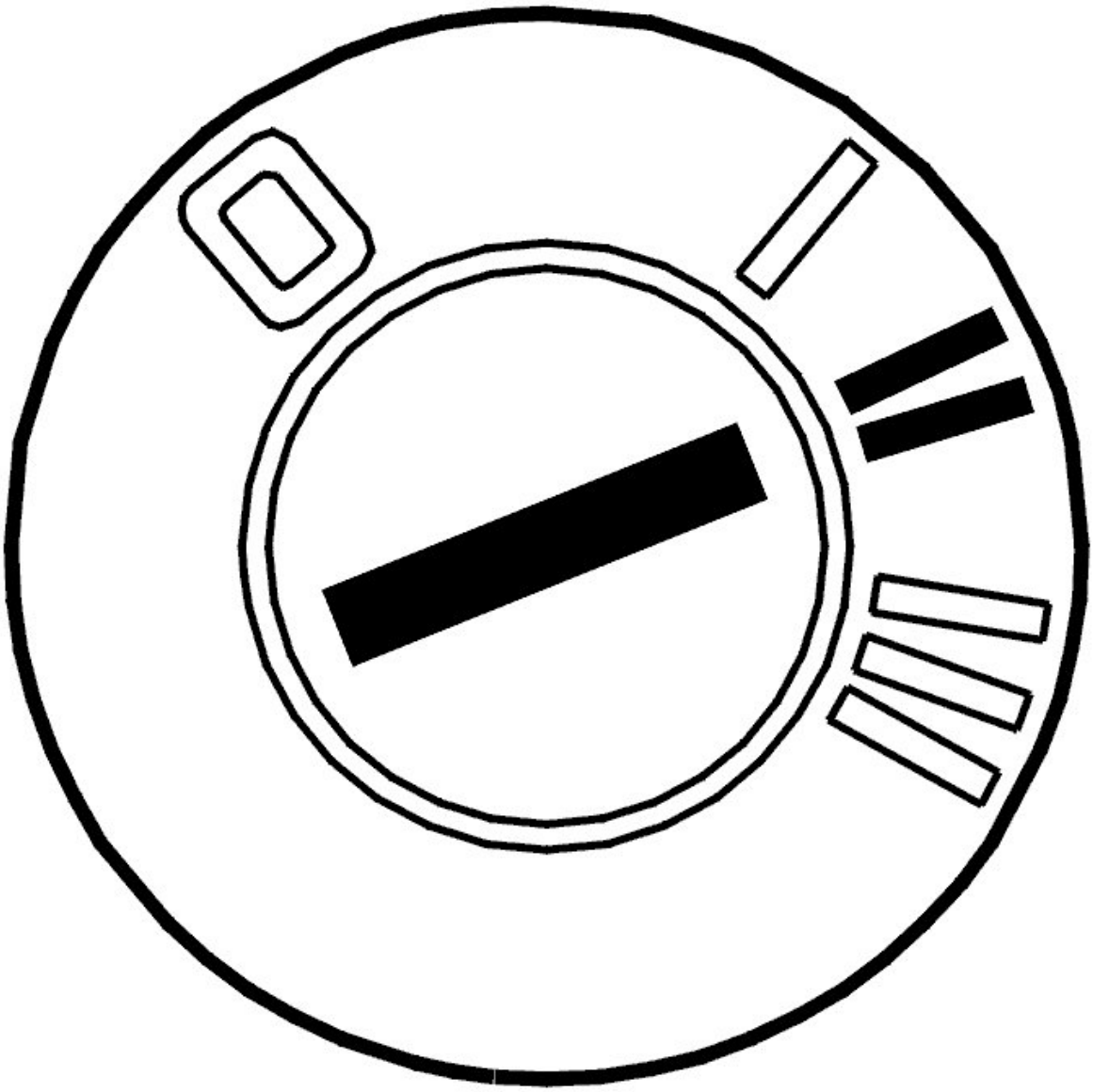
Possible source
- Open-circuit in the signal cable.
- Short-circuit to supply voltage in the signal cable
- Damaged engine coolant temperature (ECT) sensor.

Fault symptom[s]
- Poor heating in the passenger compartment.

Open Circuit or Short-Circuit to Voltage

Open circuit or short-circuit to voltage

Checking the function of the engine coolant temperature sensor



- Ignition on.

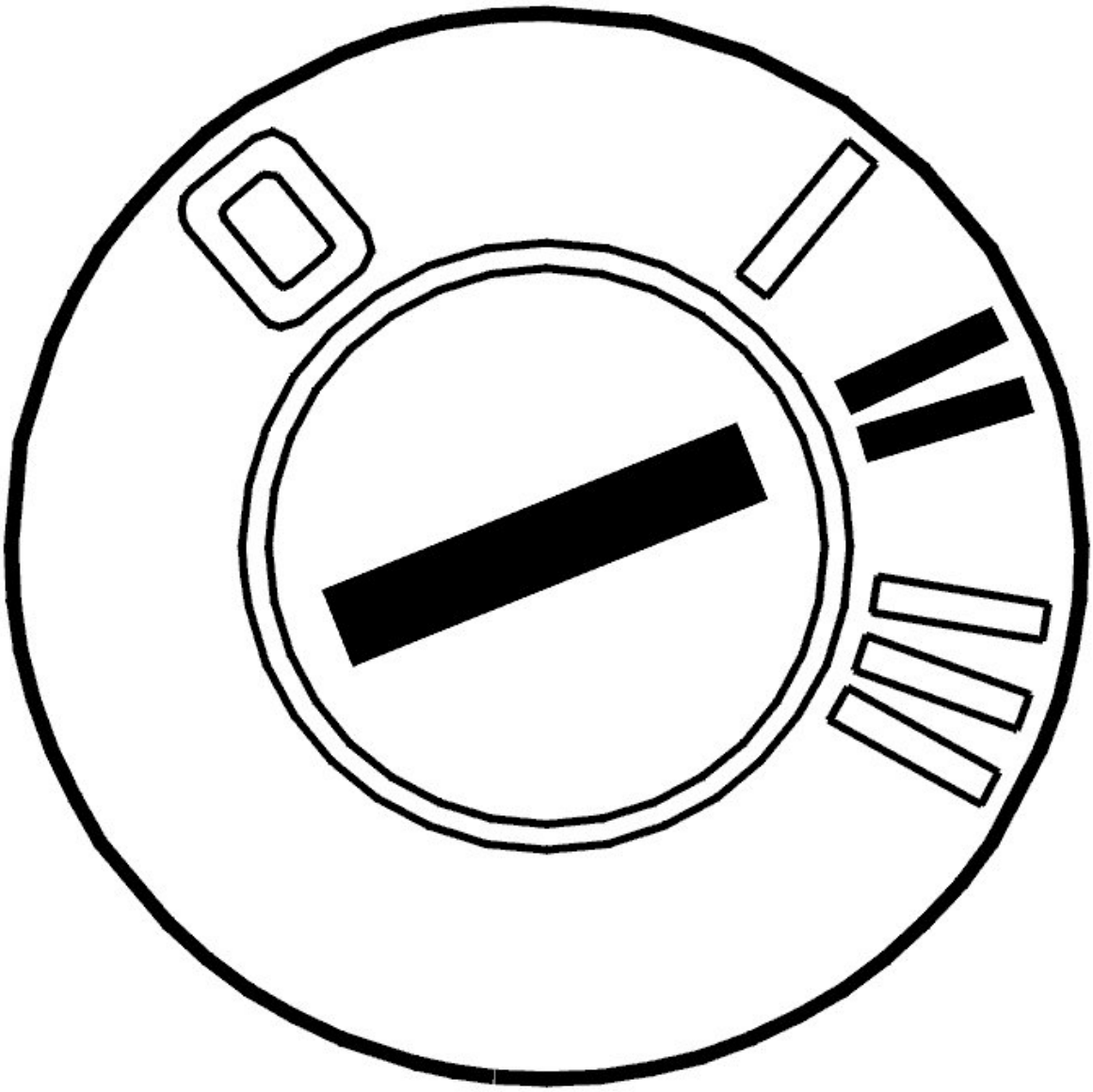
Read off the engine coolant temperature.
Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature reading OK?

Yes - Checking components and wiring

No - Checking the connectors

Checking the connectors



- Ignition off.

Check the combustion preheater module (CPM) connectors. Check for contact resistance and oxidation. Remedy if necessary.

- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the engine coolant temperature.

Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.
If the temperature reading is now OK, the fault was probably caused by poor contact in the connector.

Other information

- To access the control module, see: Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the temperature reading OK?

Yes - Verification

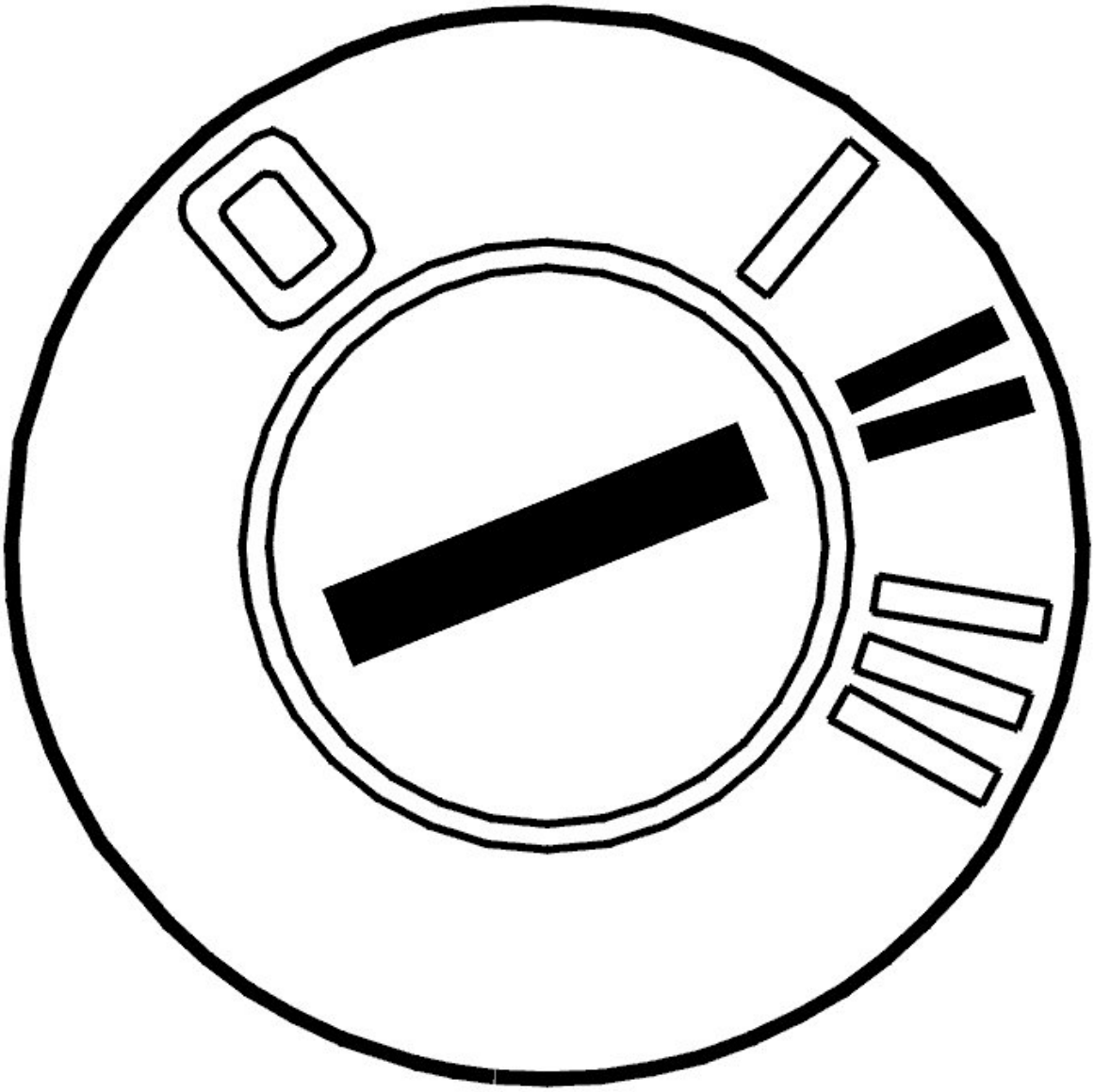
No - Checking components and wiring

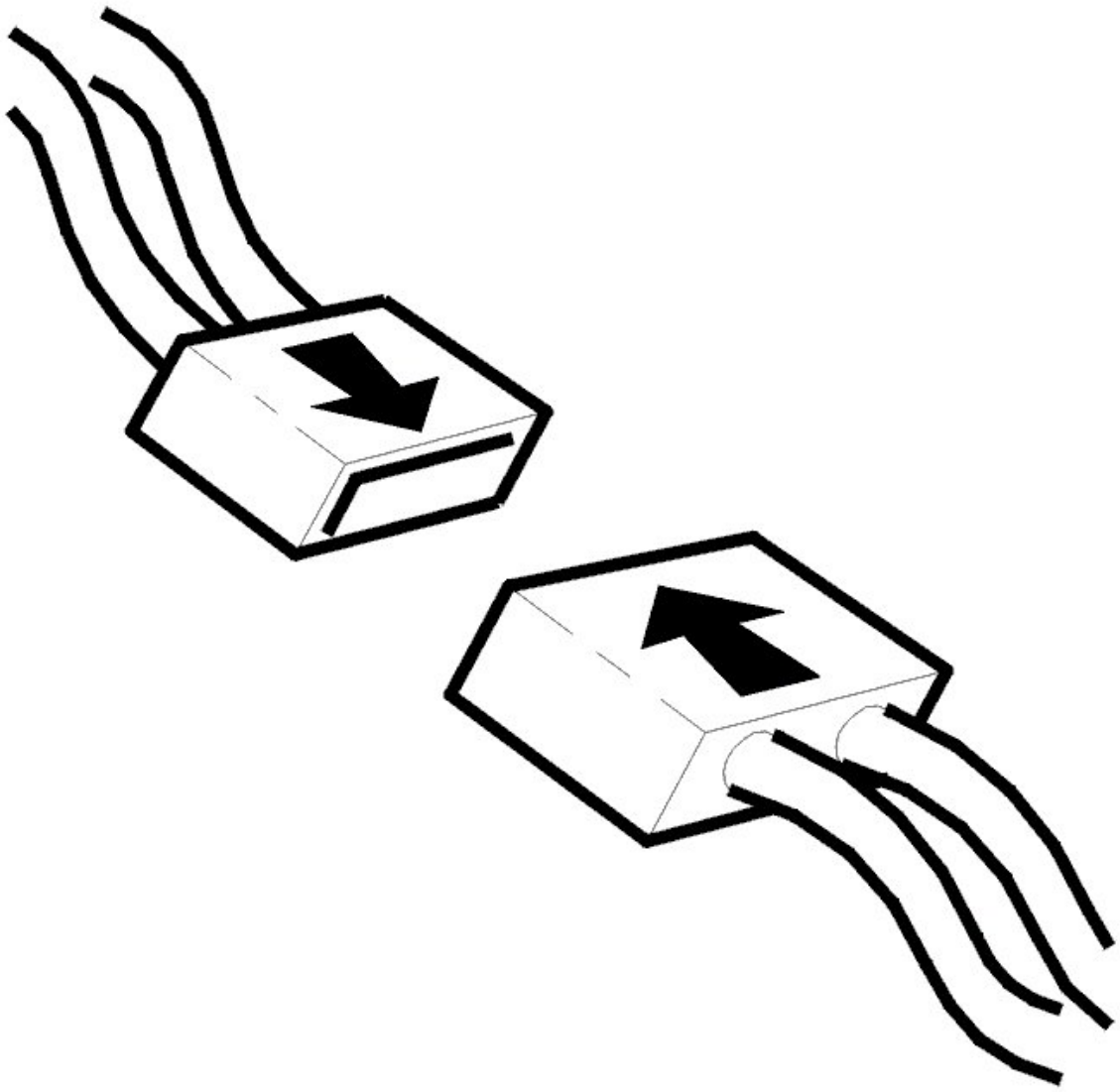
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the engine coolant temperature sensor

---

Checking components and wiring

- Check the resistance of the engine coolant temperature sensor
- Check the cable between combustion preheater module (CPM) terminal #4 and the ground terminal for the engine coolant temperature sensor. Check for an open-circuit.

  Hint: Because it is difficult to separate the cables to the engine coolant temperature sensor, measure between combustion preheater module (CPM) terminal #4 and both cables to the water temperature sensor.

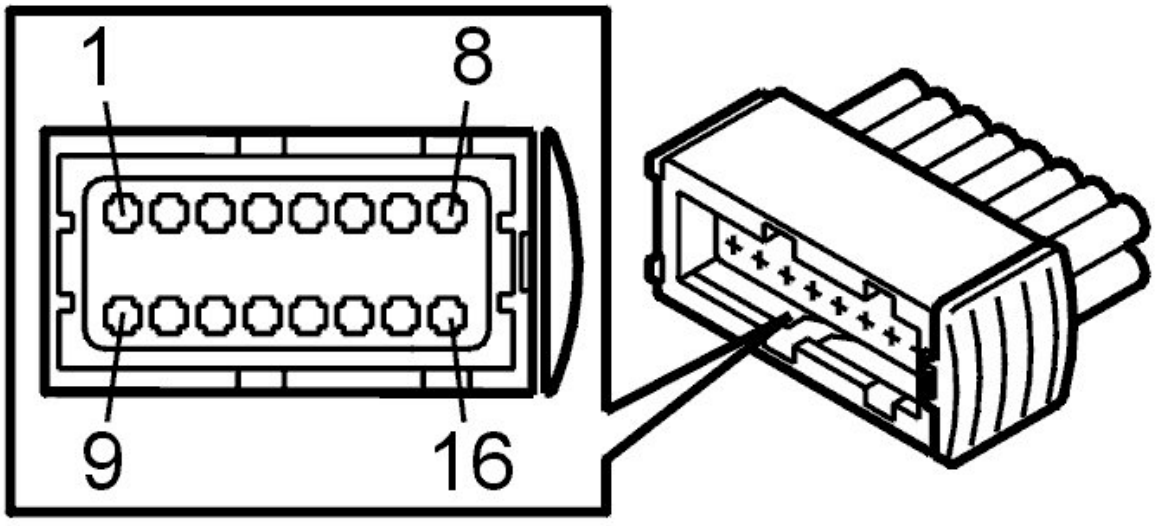
- Check the cable between combustion preheater module (CPM) terminal #16 and the signal terminal for the engine coolant temperature sensor. Check for an open-circuit. Check for a short-circuit to supply voltage.

  Hint: It is difficult to differentiate the cables to the engine coolant temperature sensor. Test the cables one at a time therefore, and see if a relevant value was obtained from either of them.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- For the resistance values, see: Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

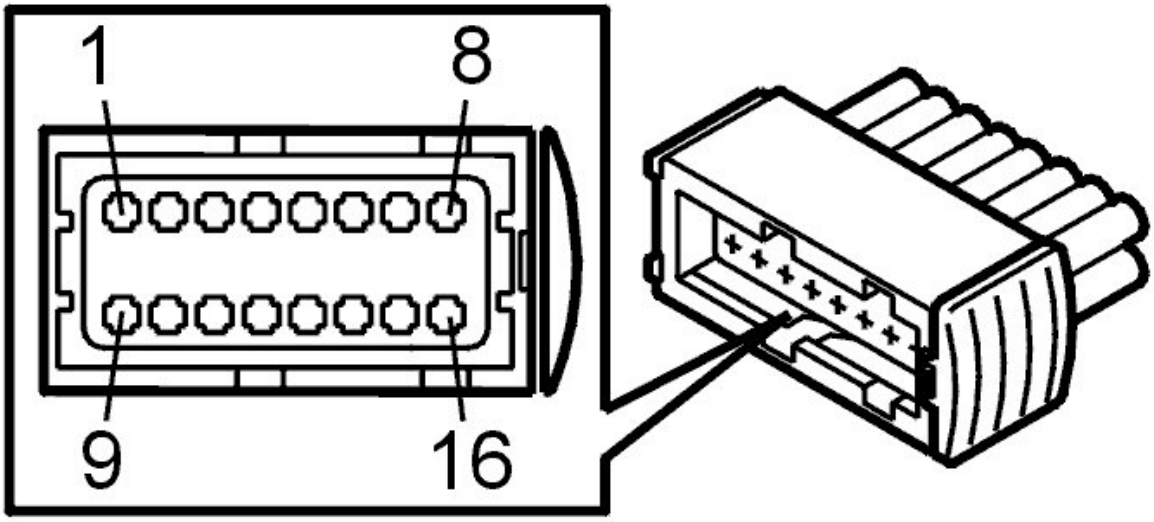
Checking components and wiring

- Check the combustion preheater module (CPM) connectors. Check for contact resistance and oxidation
- Check the circuit for an intermittent open-circuit. Measure the resistance between combustion preheater module (CPM) connector terminals #16 and #4 (sensor side)
- Check the cable between combustion preheater module (CPM) terminal #16 and the engine coolant temperature sensor. Check for an intermittent short-circuit to supply voltage.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- For the resistance values, see: Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

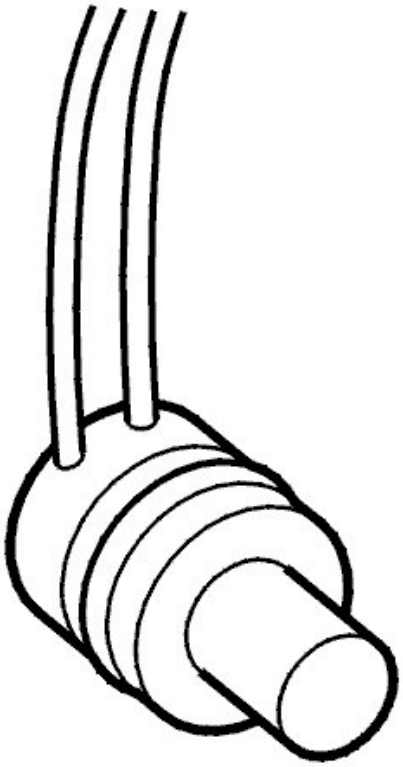


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F32

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
If the Central electronic module (CEM) registers that the circuit for the water temperature sensor is short-circuited to ground, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

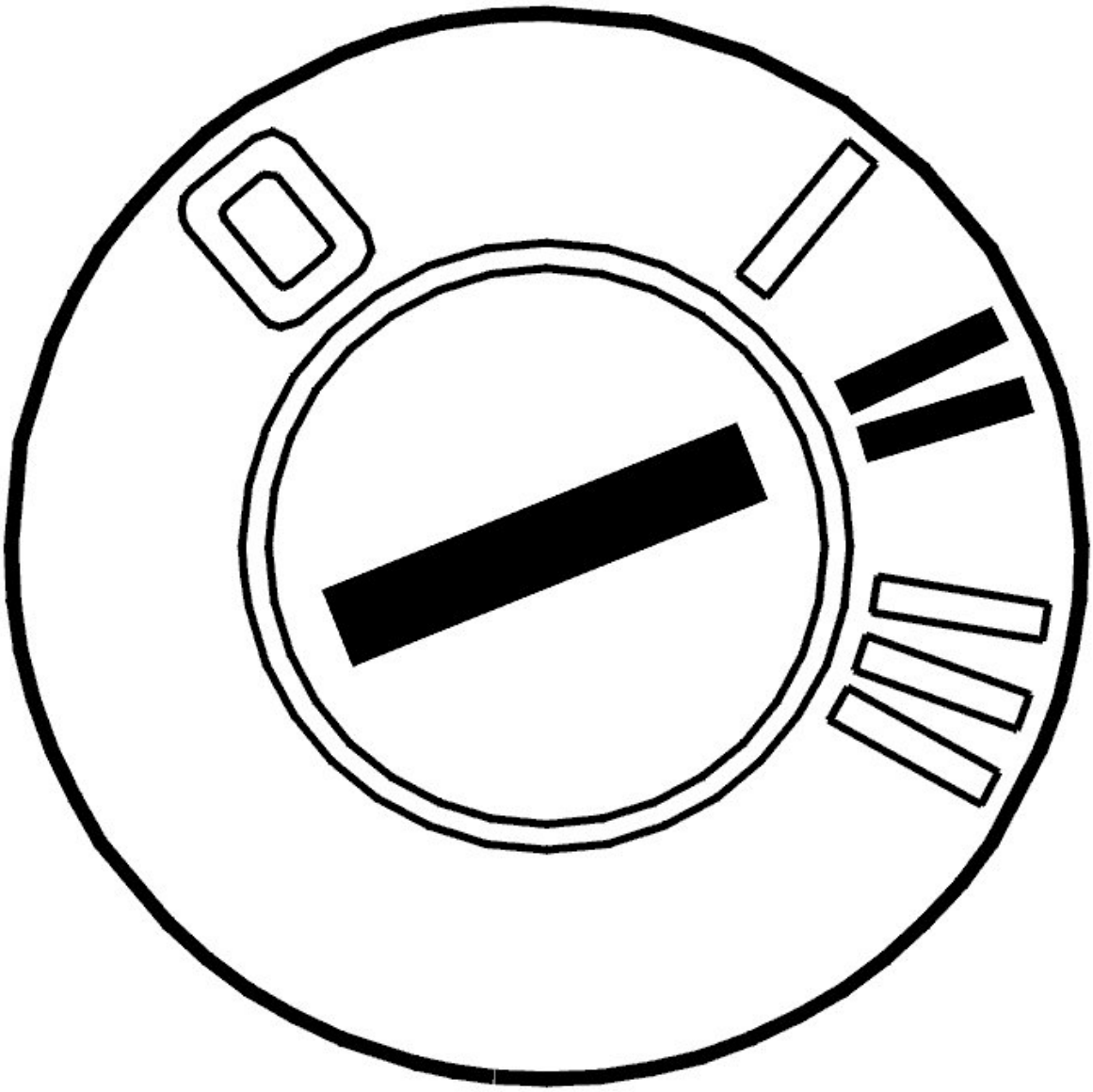
Possible source
- Short-circuit to ground in the signal cable
- Damaged engine coolant temperature (ECT) sensor.

Fault symptom[s]
- Poor heating in the passenger compartment.

Short-circuit to Ground

Short-circuit to ground

Checking the function of the engine coolant temperature sensor



- Ignition on.

Read off the engine coolant temperature.
Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature reading OK?

Yes - Checking components and wiring

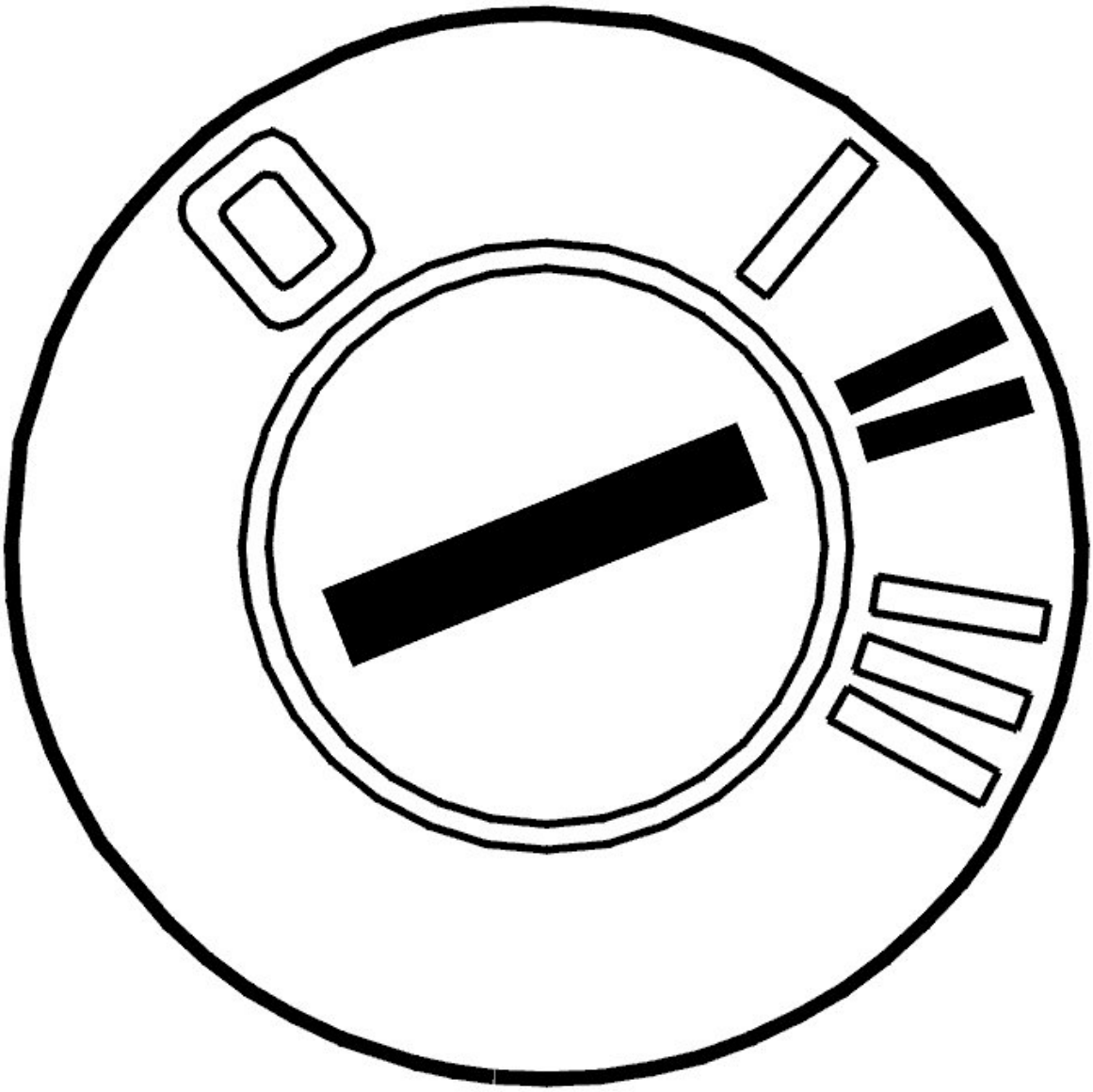
No - Checking components and wiring

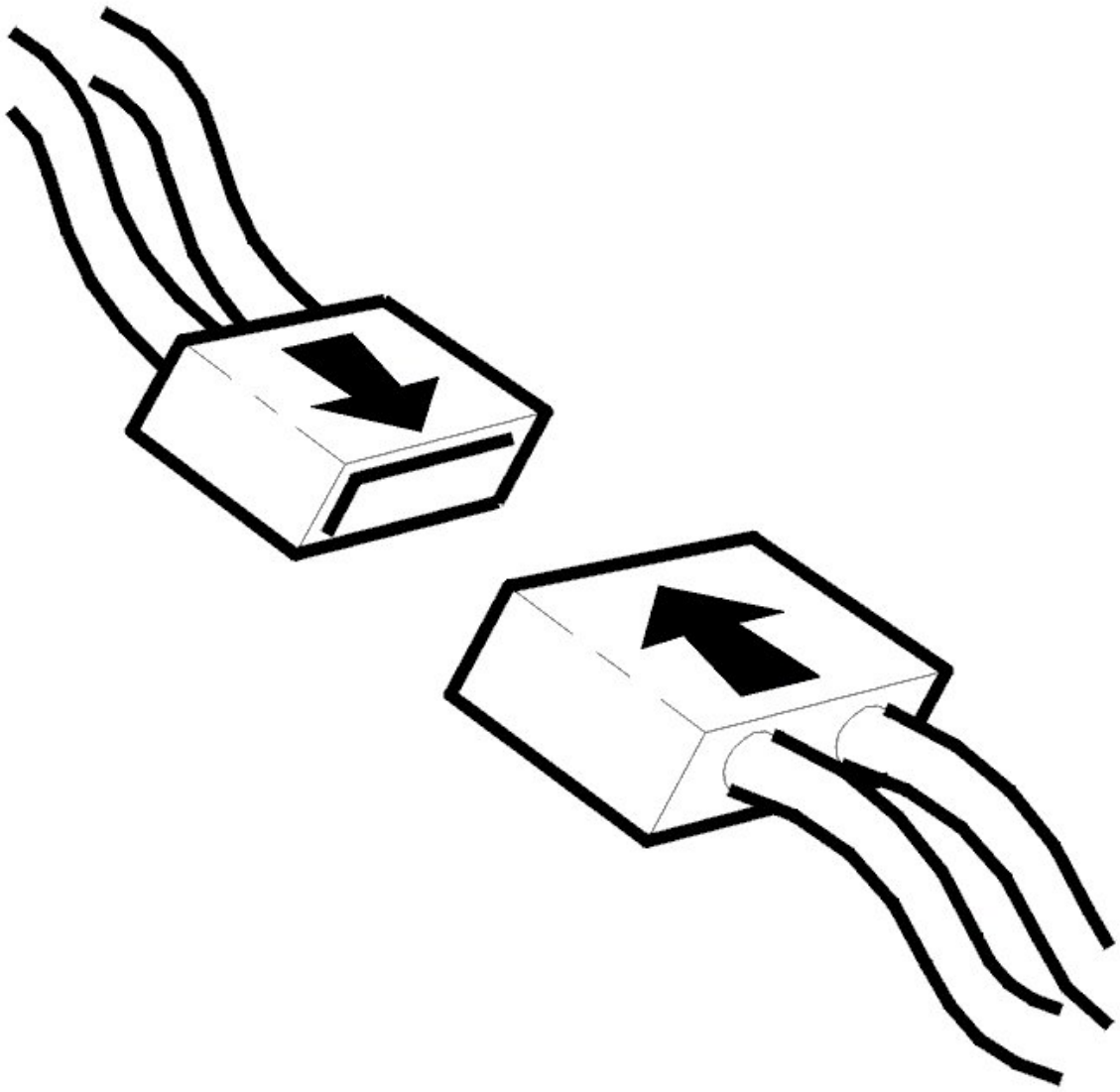
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the engine coolant temperature sensor

---

Checking components and wiring

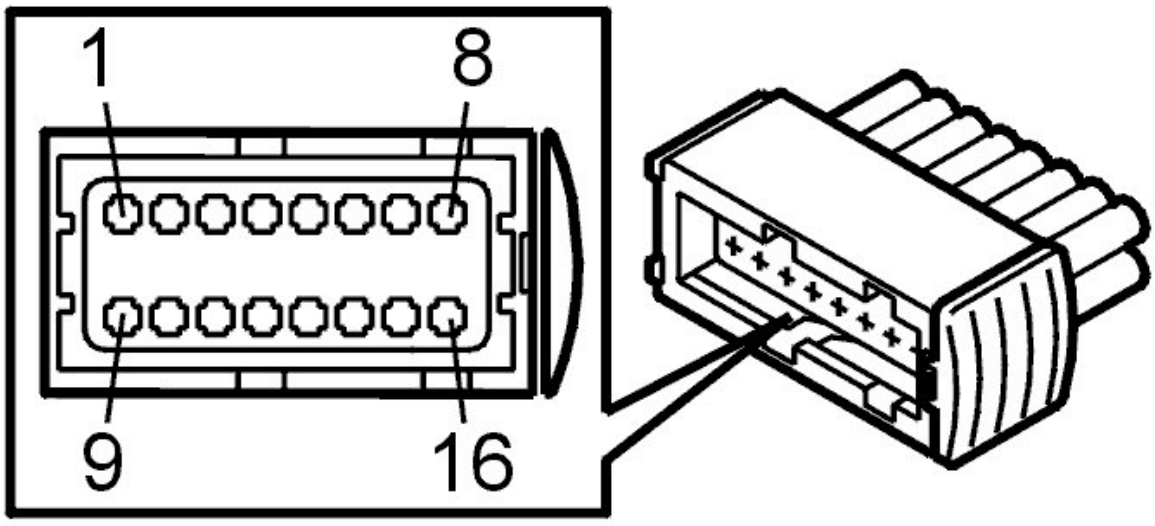
- Check the resistance of the engine coolant temperature sensor
- Check the cable between combustion preheater module (CPM) terminal #4 and the ground terminal for the engine coolant temperature sensor. Check for a short-circuit to ground.

Hint: It is difficult to separate the ground lead for the engine coolant temperature sensor from the signal cable. Therefore, measure one cable at a time and see if plausible values are obtained from either of them.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- For resistance values: Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

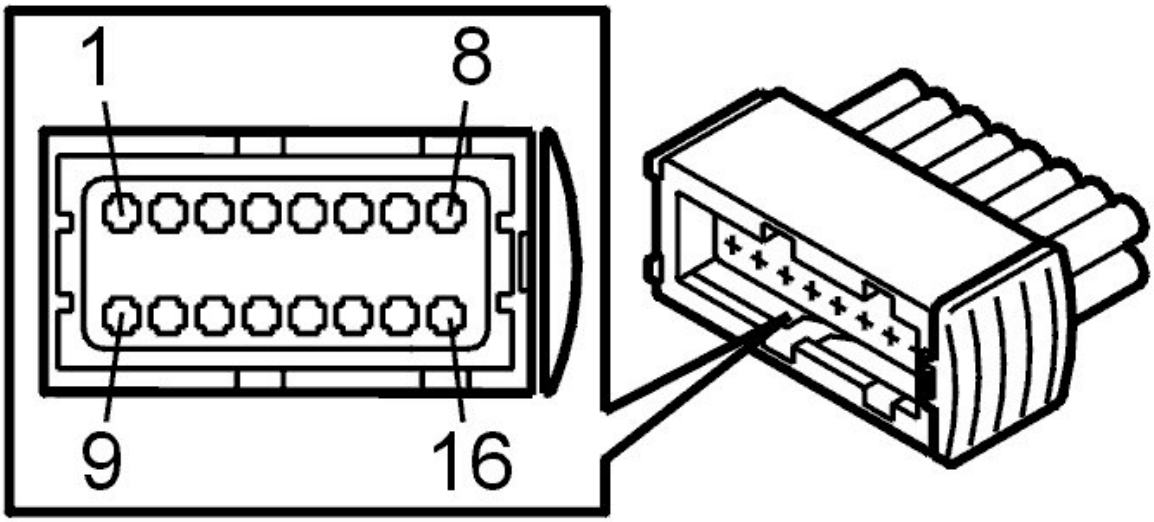
Checking components and wiring

- Check the combustion preheater module (CPM) connectors. Check for contact resistance and oxidation
- Check the cable between combustion preheater module (CPM) terminal #16 and the signal terminal for the engine coolant temperature sensor. Check for an intermittent short-circuit to ground.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- For resistance values: Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

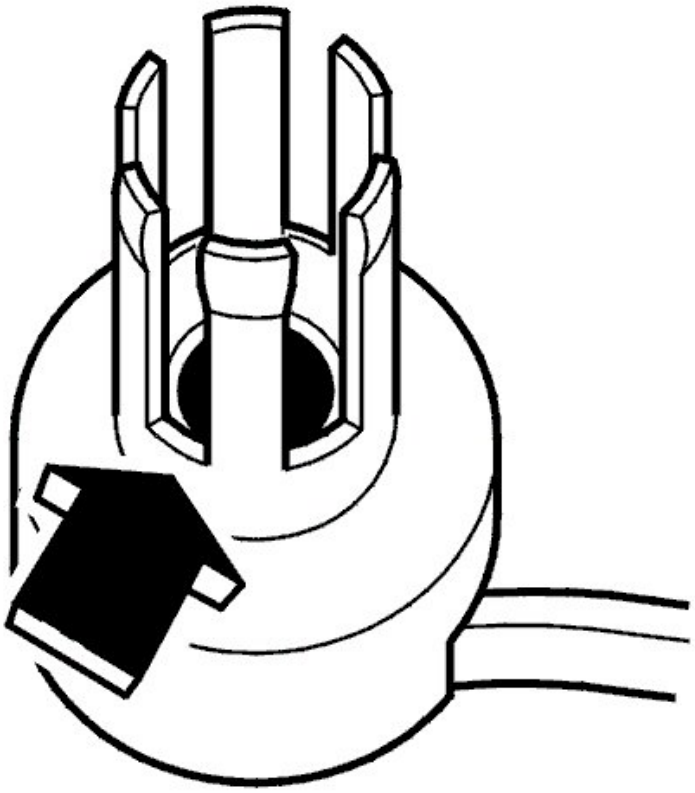


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F36

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code is generated if Central electronic module (CEM) registers that the circuit for flame guard is short-circuited to ground.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

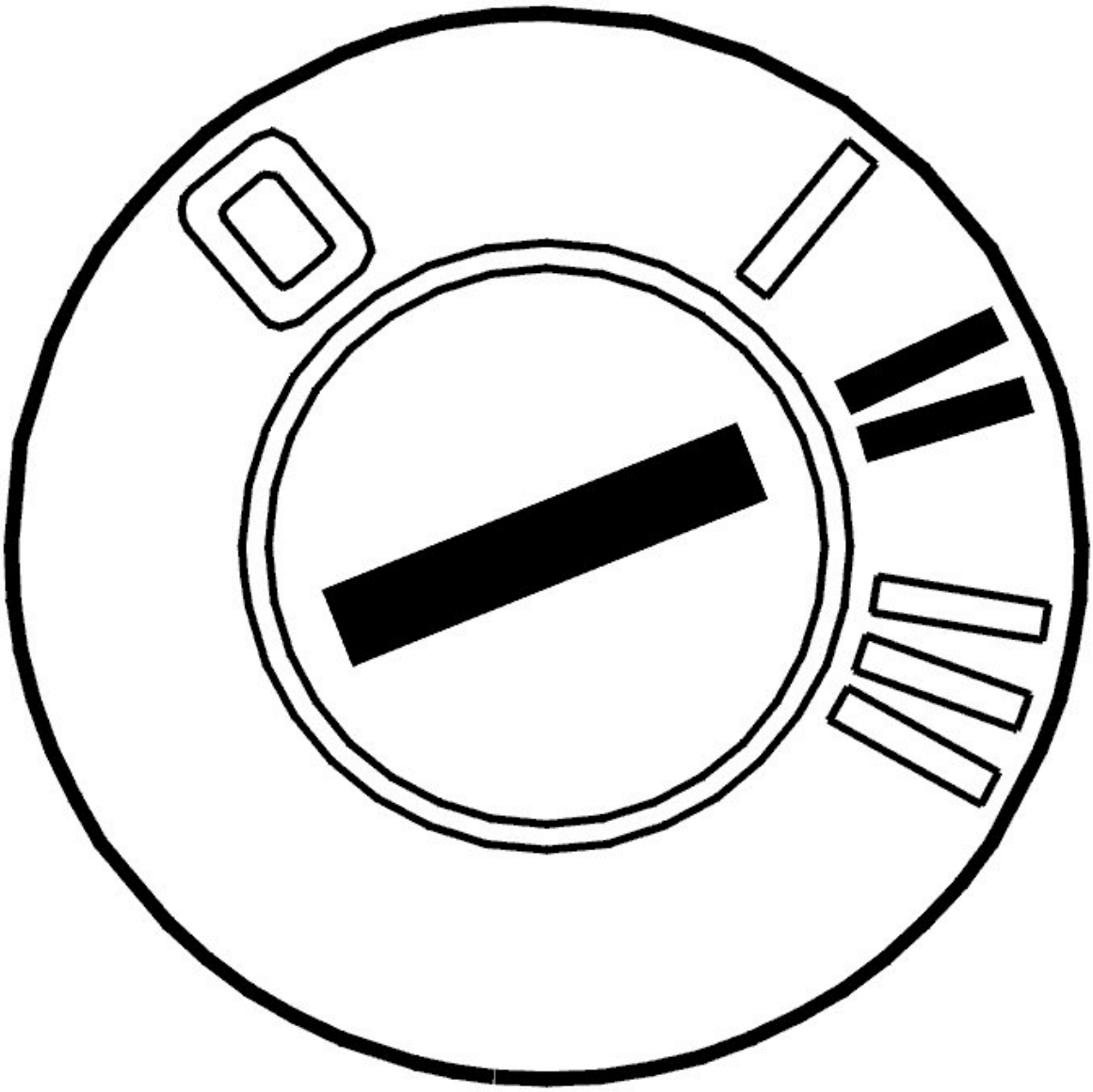
Possible source
- Short-circuit to ground in the signal cable
- Damaged flame sensor.

Fault symptom[s]
- Poor heating in the passenger compartment.

Short-Circuit to Ground

Short-circuit to ground

Checking the function of the flame sensor



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.

Other information

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

Is the heater working?

Yes - Checking components and wiring

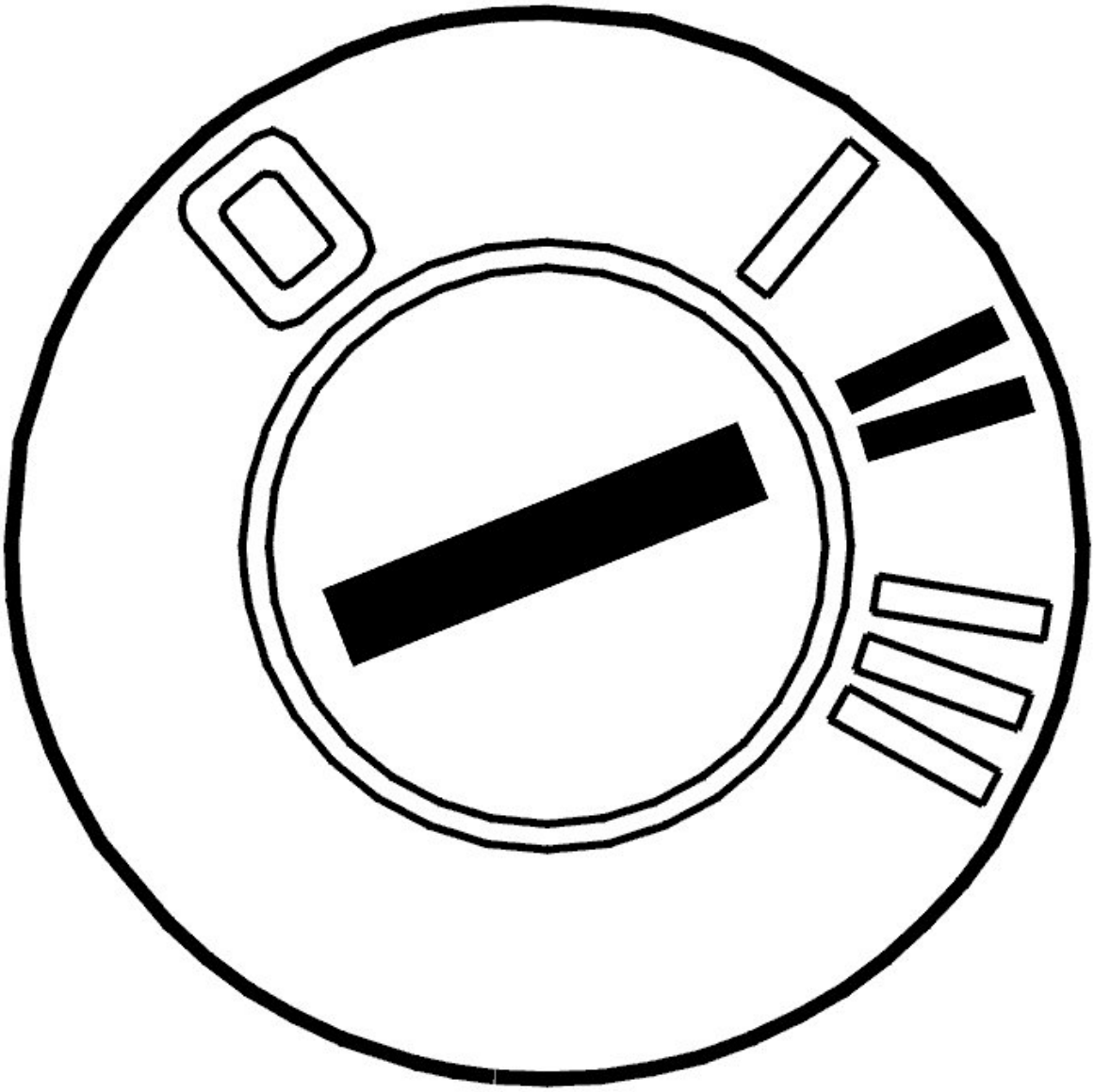
No - Checking components and wiring

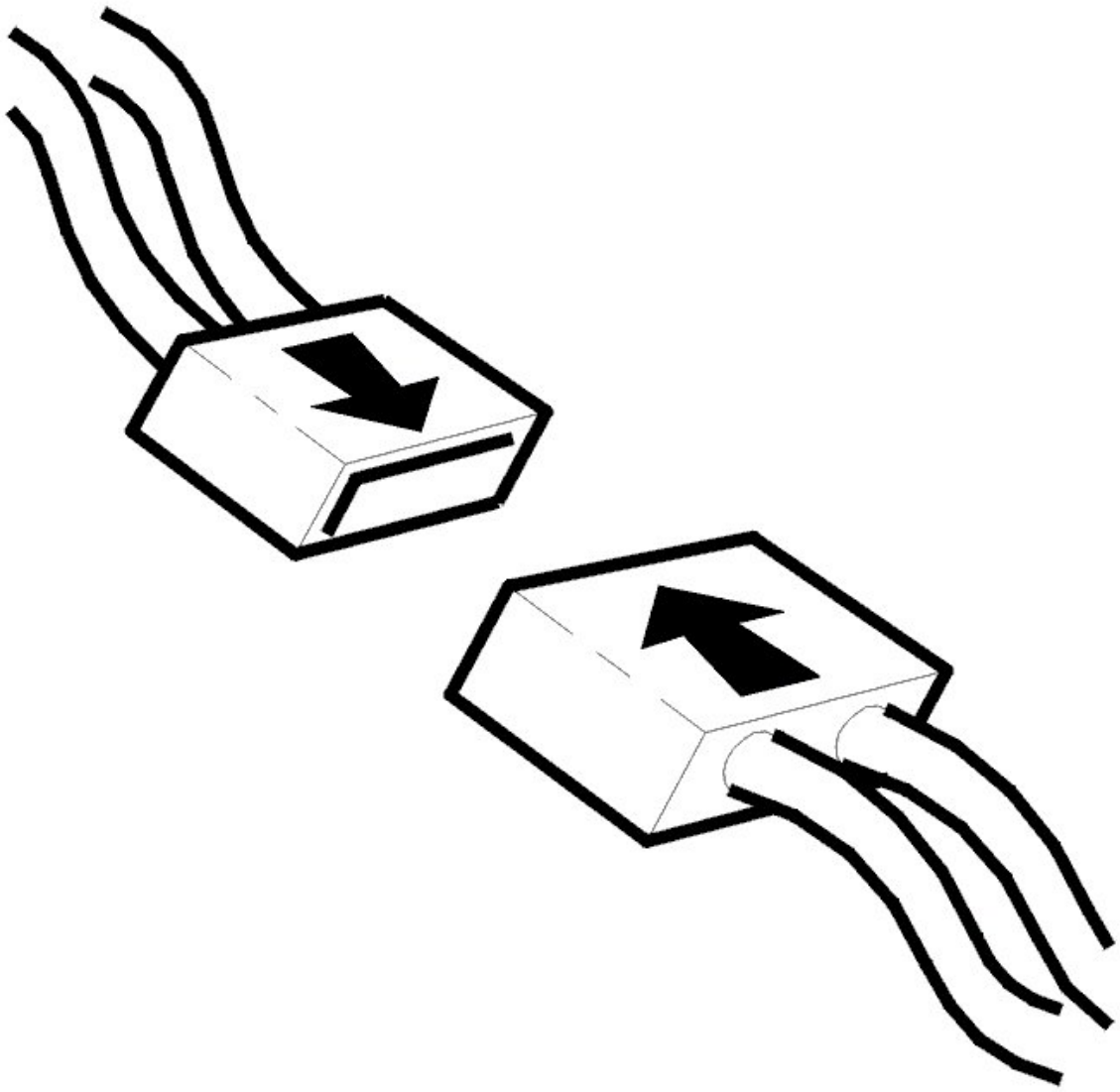
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the flame sensor

Checking components and wiring

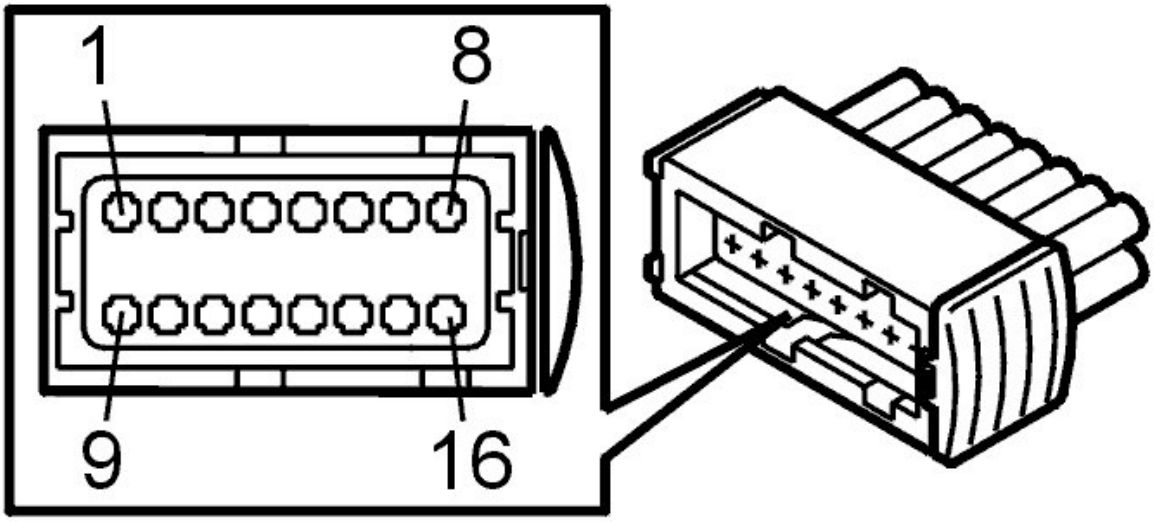
Check the cable between central electronic module (CEM) terminal #8 and the signal cable for the flame sensor. Check for a short-circuit to ground.

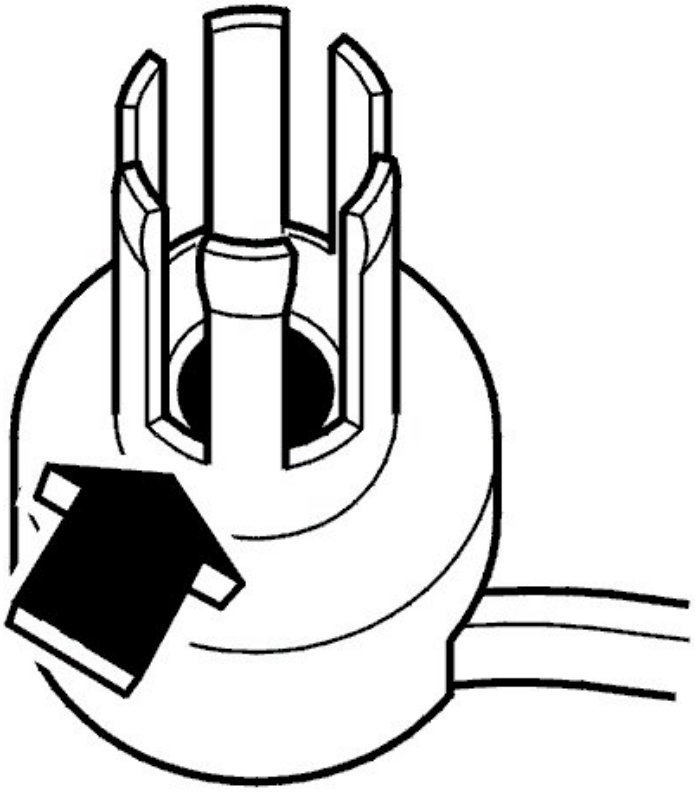
Hint: It is difficult to differentiate between the ground lead for the flame sensor and the signal cable. Take readings on one cable at a time to check for a plausible value on either of them.

Replace the flame sensor if no fault is found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

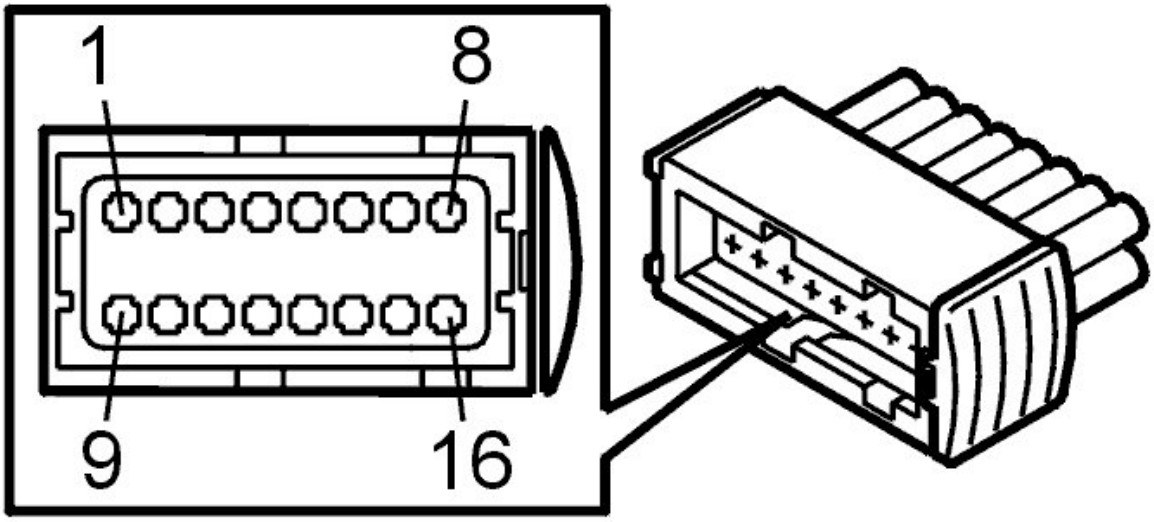
Checking components and wiring

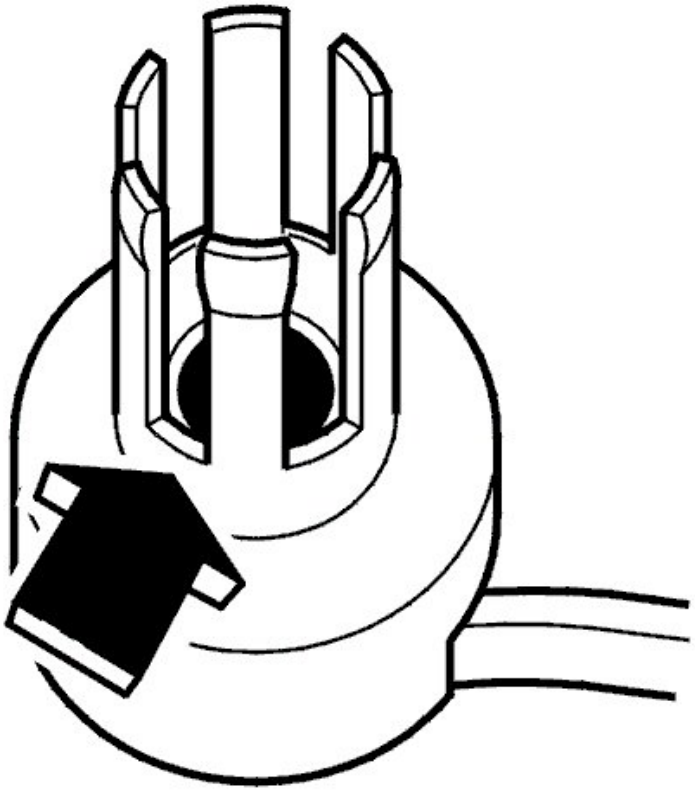
- Check the central electronic module (CEM) connector. Check for contact resistance and oxidation
- Check the cable between central electronic module (CEM) terminal #8 and the signal terminal for the flame sensor. Check for an intermittent short-circuit to ground.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



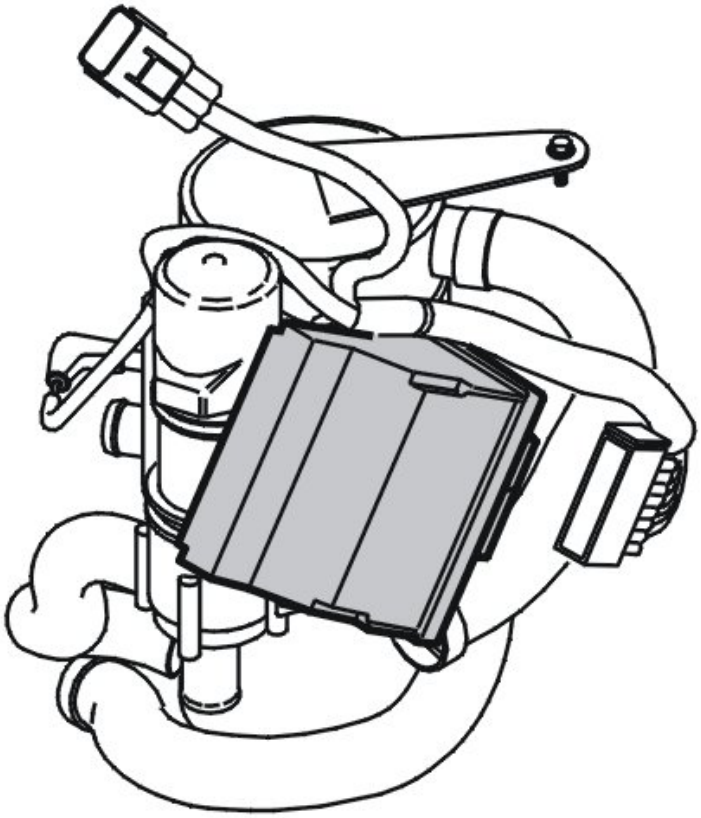


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F37

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) does not register a flame when the VISP test is carried out.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

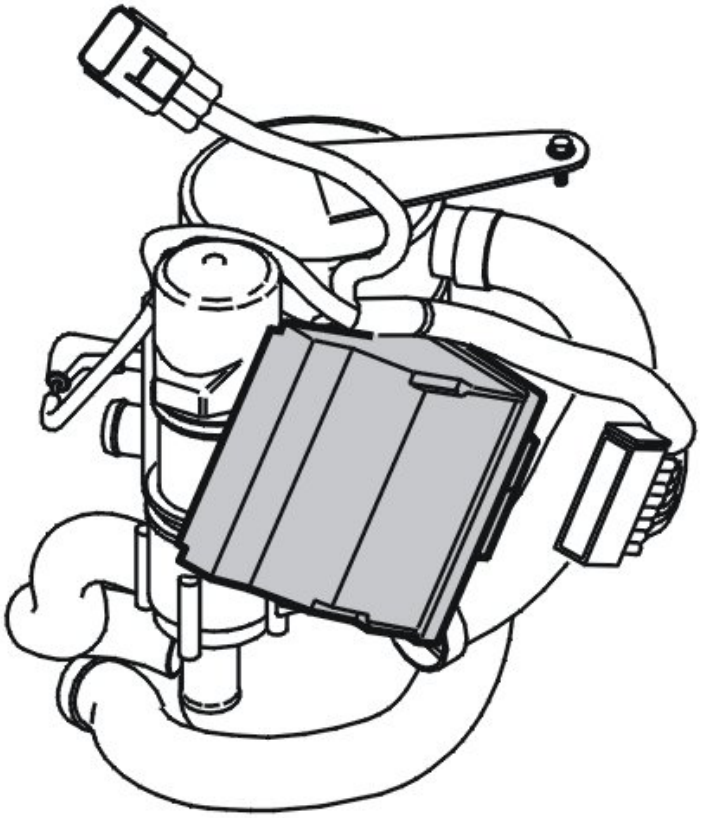
Possible source
- No flame registered during the VISP test.

Fault symptom[s]
- Poor heating in the passenger compartment
- The engine block heater does not operate.

Faulty Code

Faulty code

Fault-tracing information



This diagnostic trouble code (DTC) indicates that the combustion preheater module (CPM) registered a fault in the factory when the heater was started, but that the fault is no longer present.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F39

Condition

The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
If Central electronic module (CEM) registers that the flame goes out in an non-allowed way during operation, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- No fuel supply
- Flame sensor clogged with soot

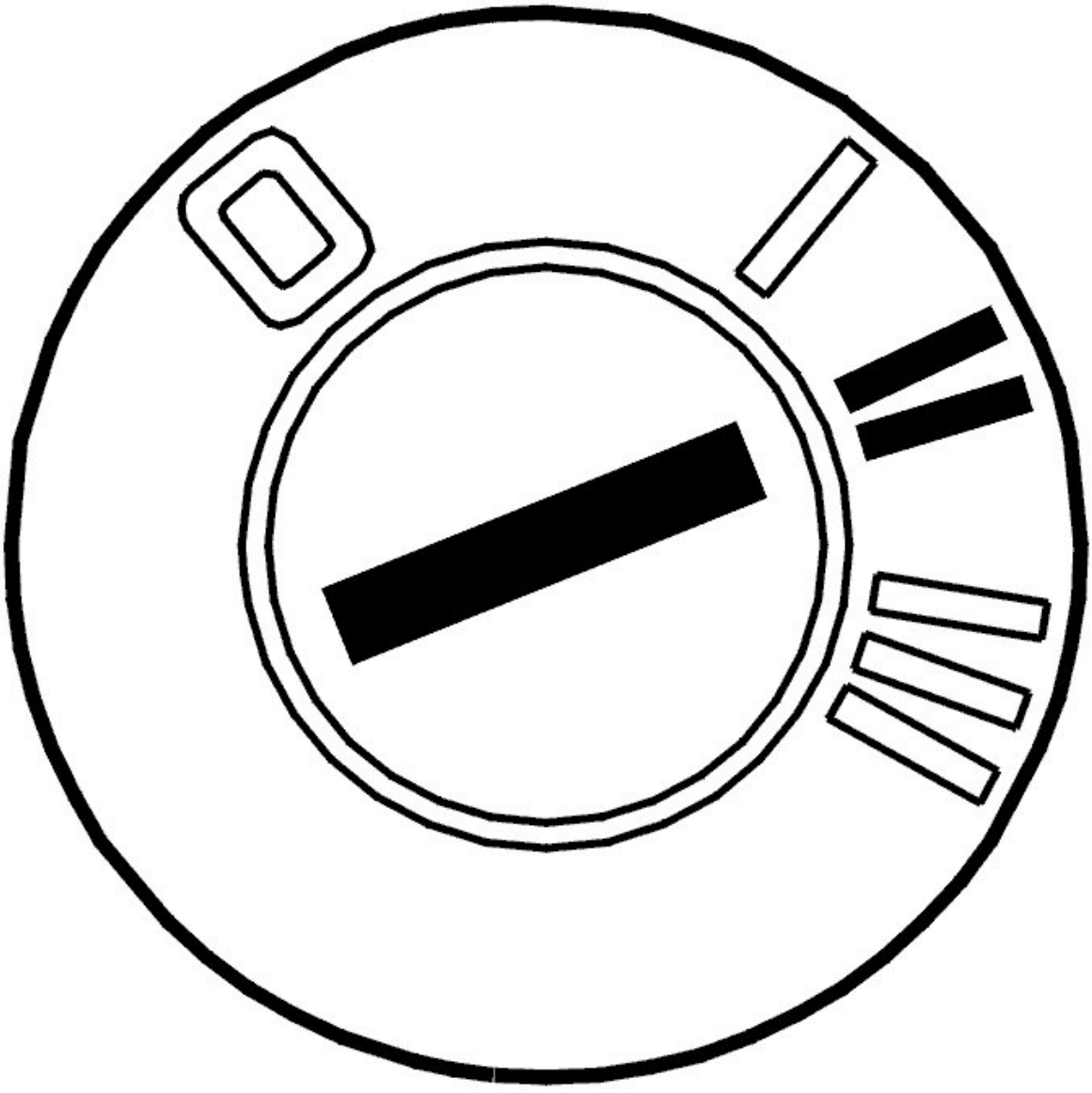
- Damaged flame sensor.
- Contact resistance in the control module connectors
- Open-circuit in the signal cable
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the ground lead

Fault symptom[s]
- Poor heating in the passenger compartment.

Flame Interruption

Flame interruption

Checking the function of the flame sensor



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.

Other information
- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

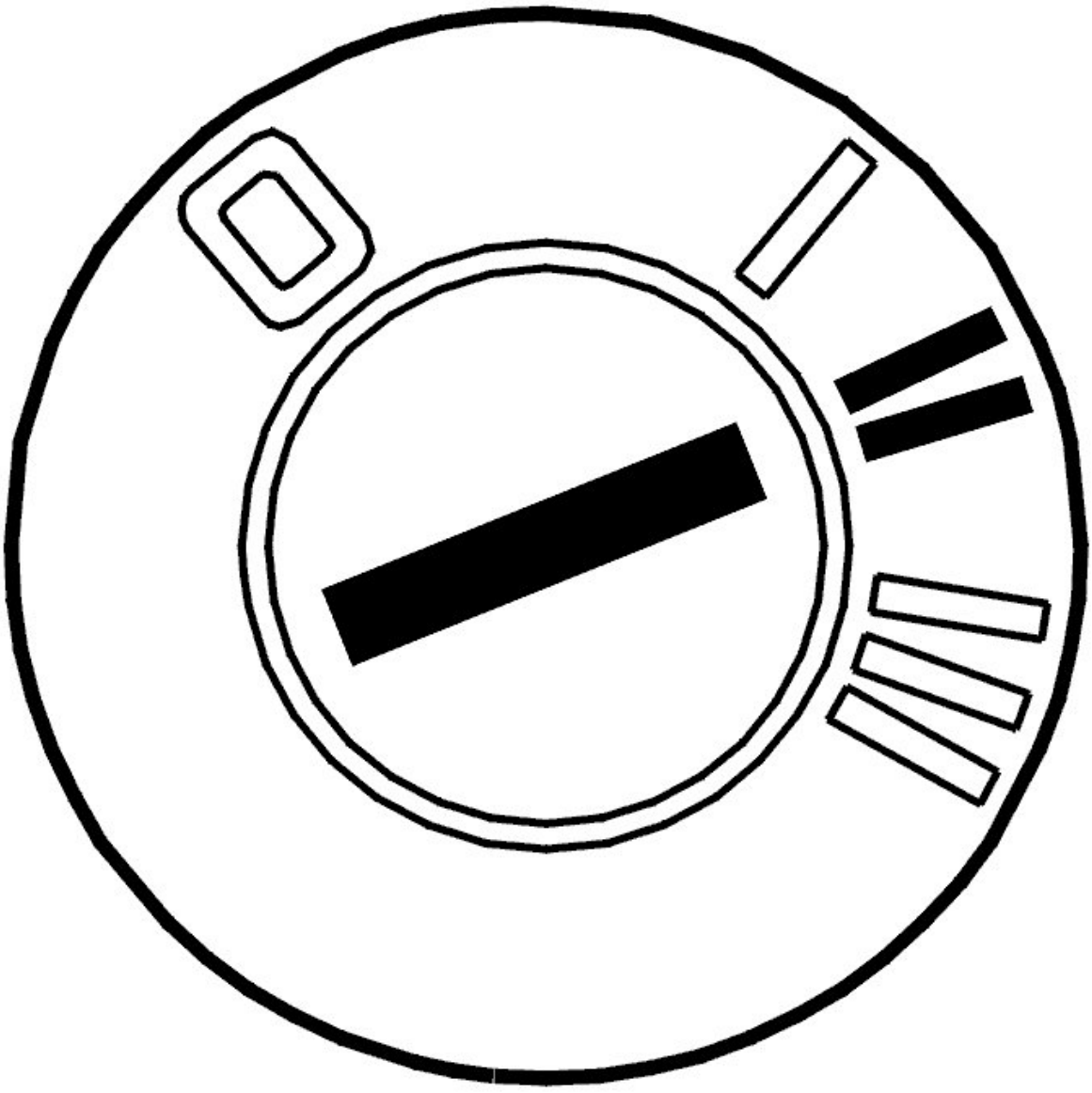
Does the heater start?

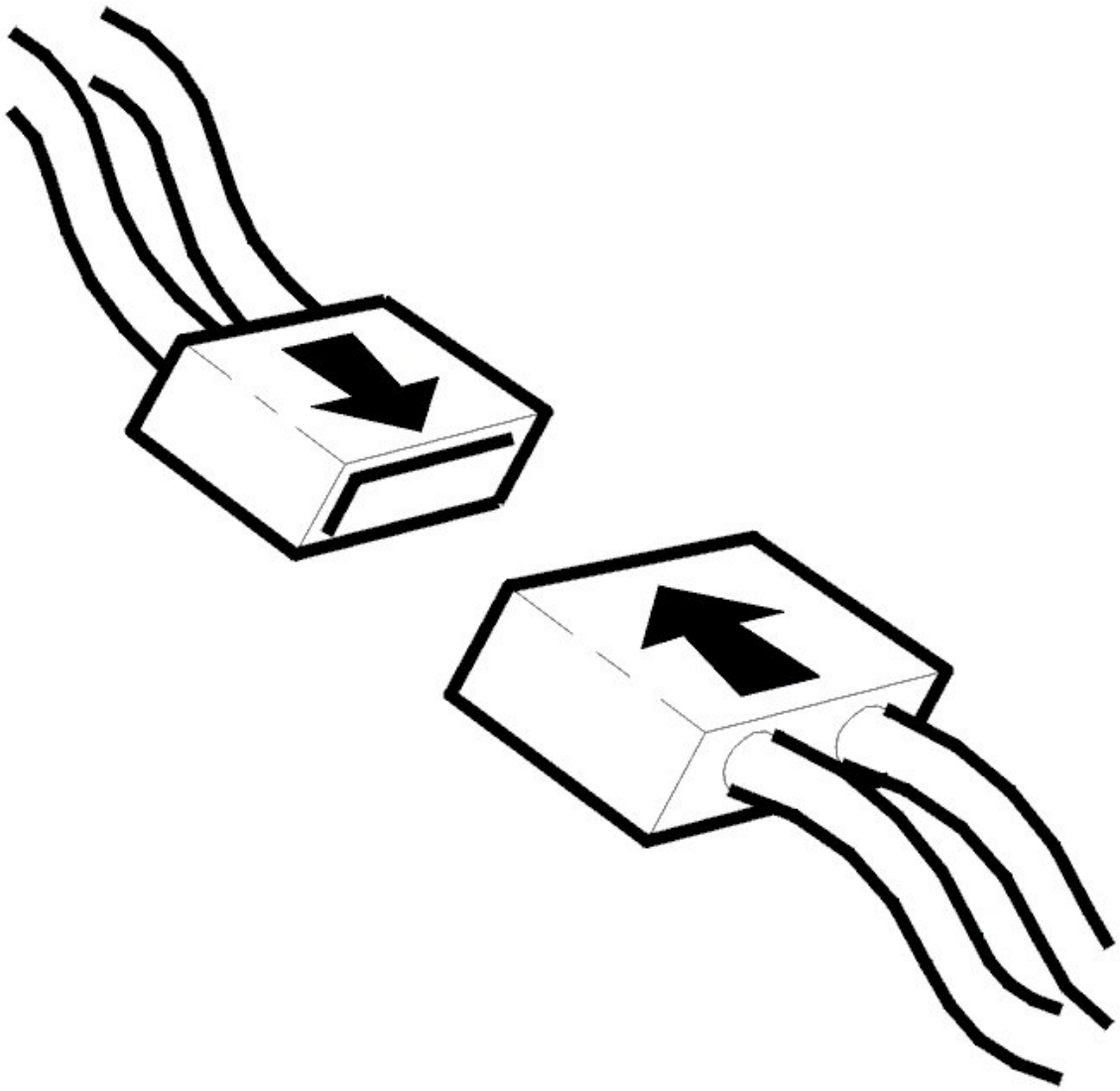
Yes - Checking components and wiring

No - Checking components and wiring

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the flame sensor

Checking components and wiring

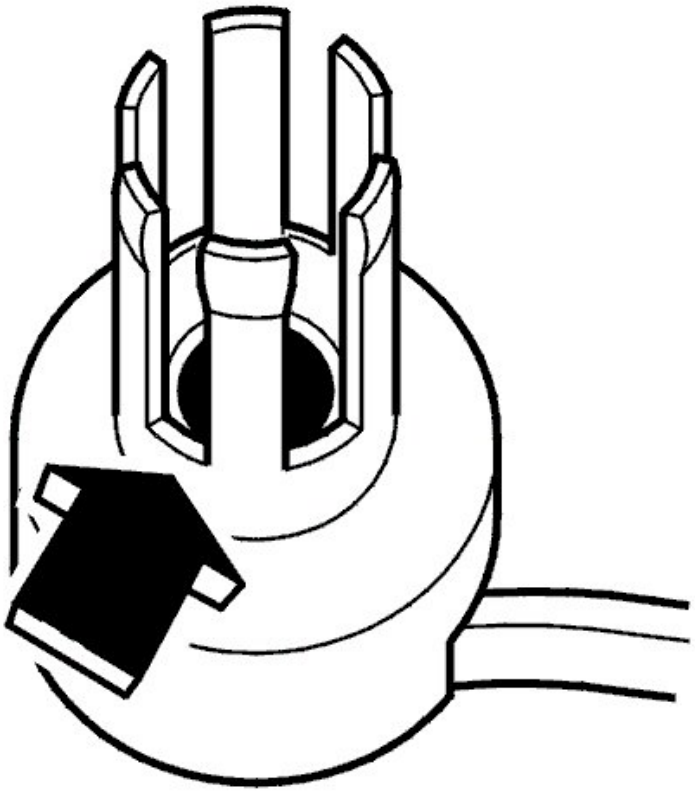
Check the cable between central electronic module (CEM) terminal #8 and the signal cable for the flame sensor. Check for a short-circuit to supply voltage. Check for an open-circuit.

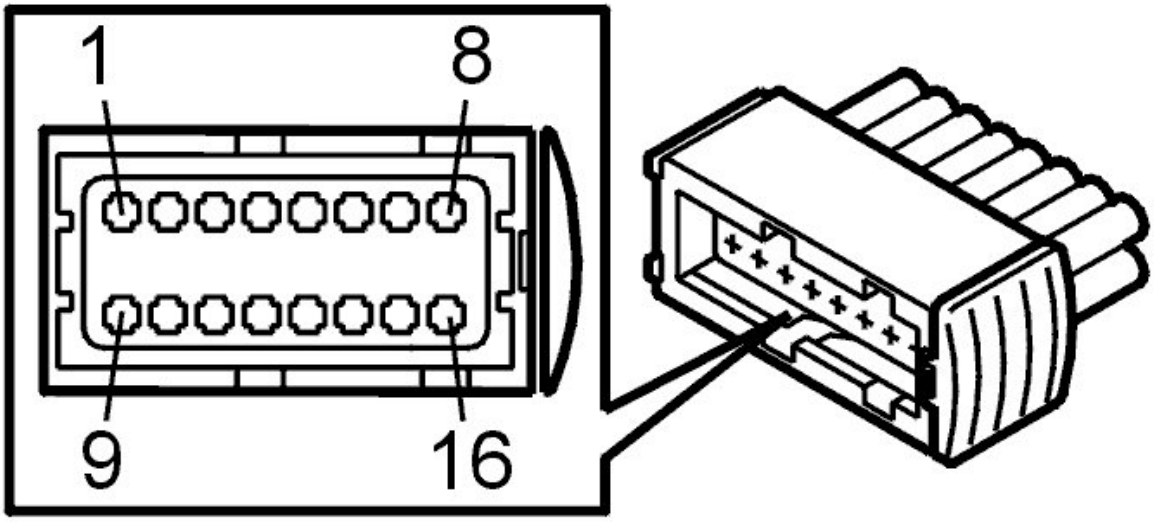
Hint: It is difficult to differentiate between the ground lead for the flame sensor and the signal cable. Take readings on one cable at a time to check for a plausible value on either of them.

Replace the flame sensor if no fault is found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





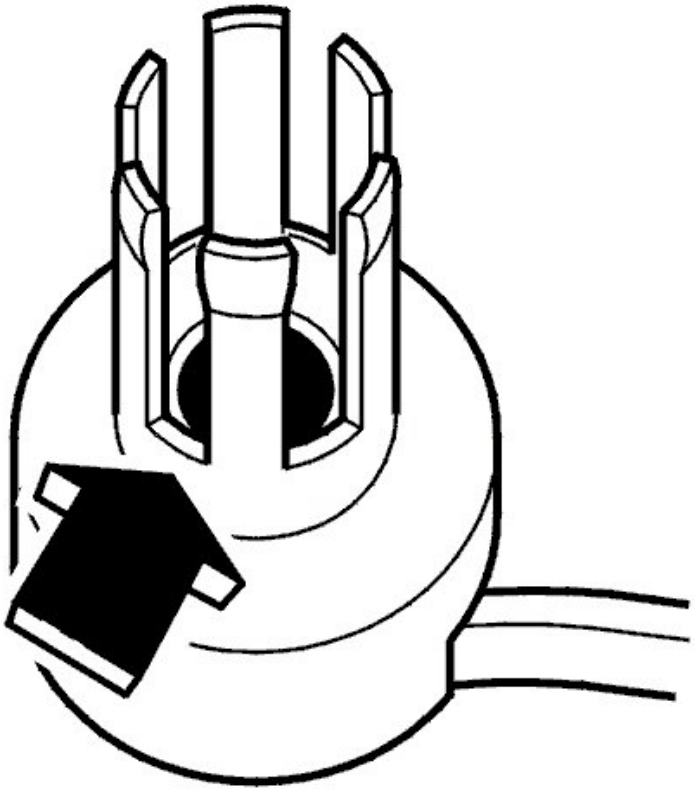
Continue - Verification

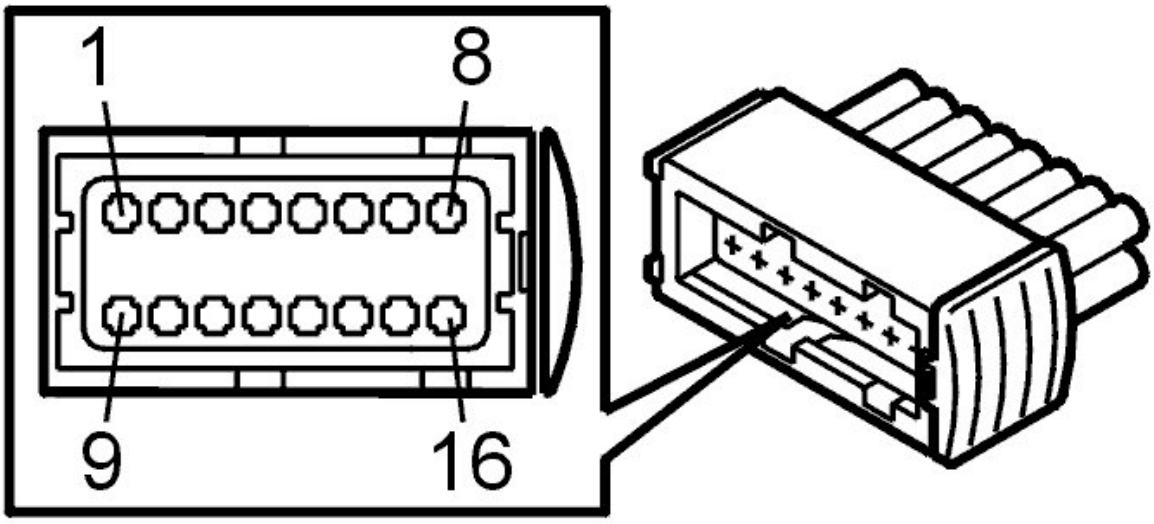
Checking components and wiring

Check the central electronic module (CEM) connector. Check for contact resistance and oxidation.
Check the flame sensor circuit. Check for an intermittent open-circuit.
Check the cable between central electronic module (CEM) terminal #8 and the signal terminal for the flame sensor. Check for an intermittent short-circuit to supply voltage.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



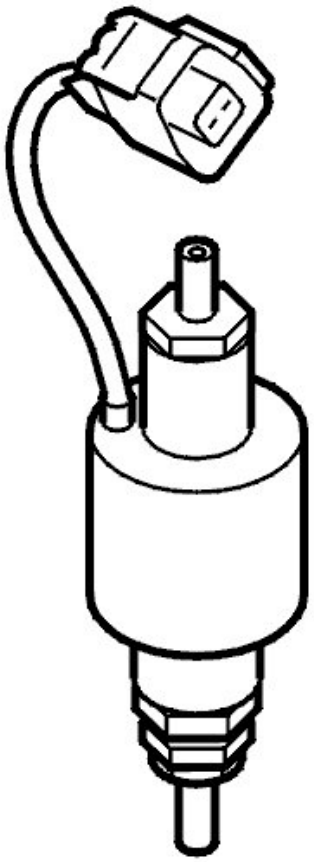


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F40

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the fuel pump (FP) is too low.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

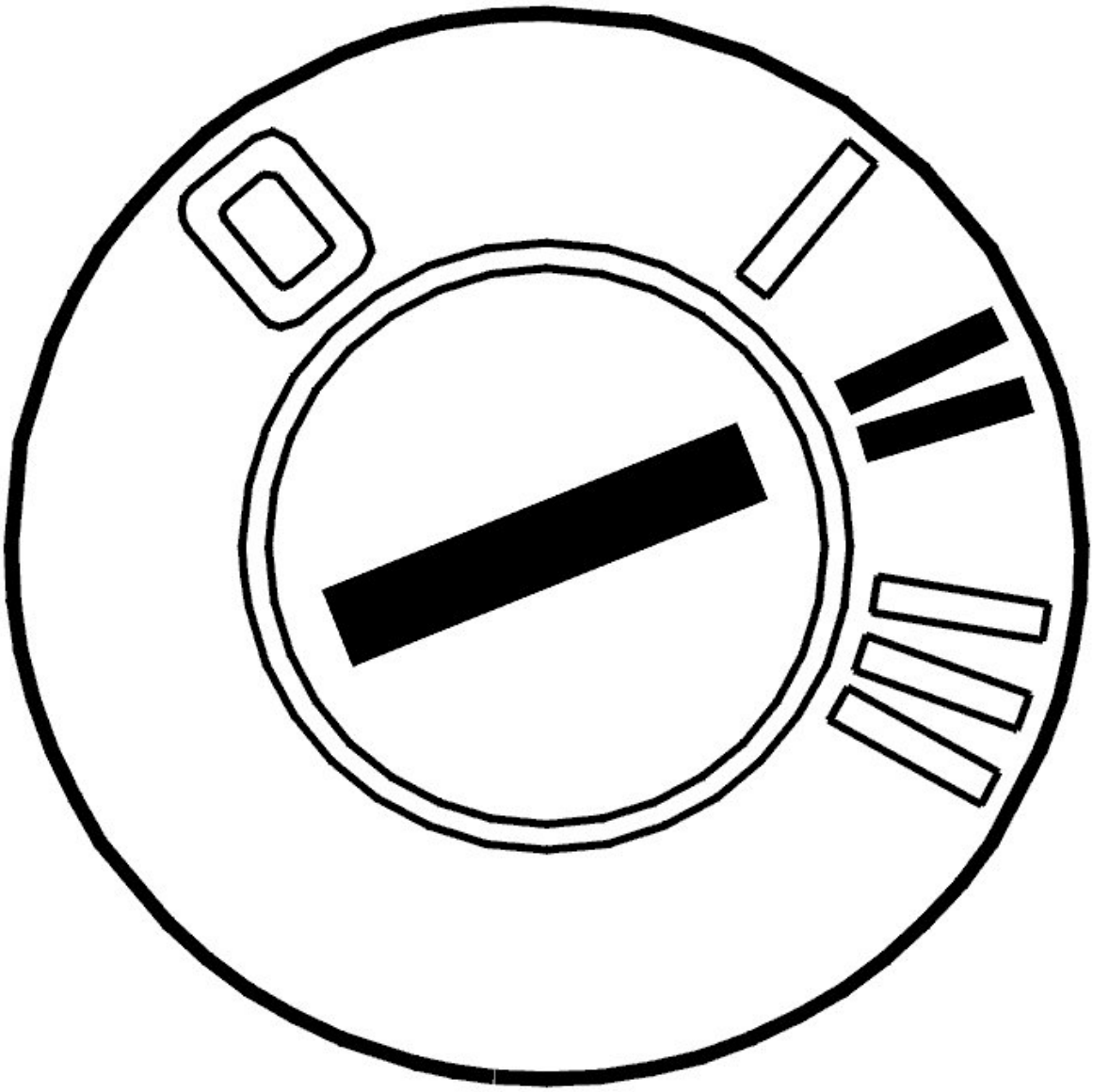
Possible source
- Contact resistance in the control module or fuel pump connectors
- Short-circuit to ground in the signal cable
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged overheat protection thermostat
- Damaged fuel pump.

Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too Low

Signal too low

Checking the function of the fuel pump (FP)



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.

Other information

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

Is the heater working?

Yes - Checking components and wiring

No - Checking components and wiring

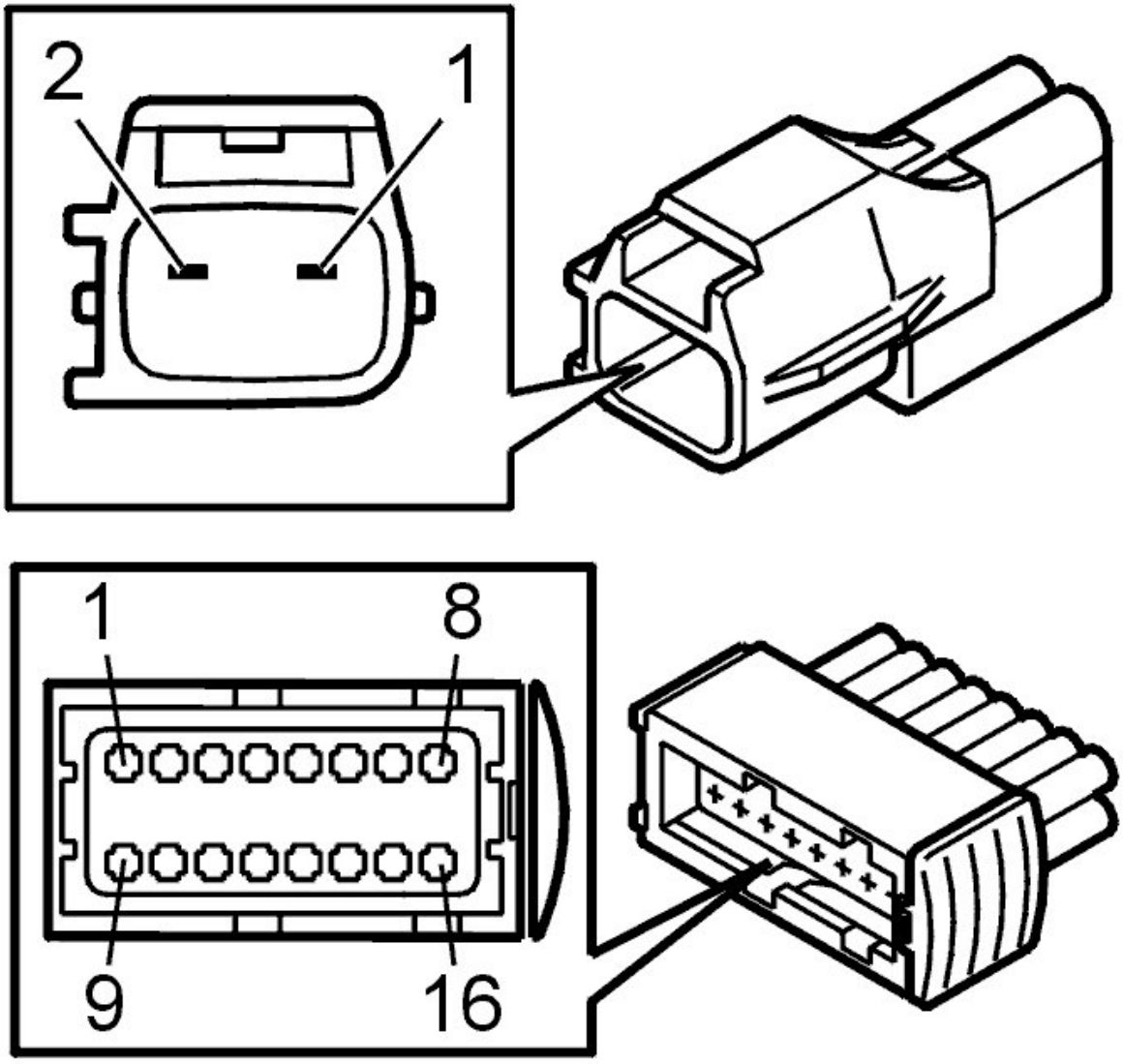
Checking components and wiring

Check the fuel pump (FP) and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation.

Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump (FP) terminal 2. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.
Check the cable between combustion preheater module (CPM) terminal #11 and water pump terminal 1. Check for an intermittent open-circuit. Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Checking components and wiring

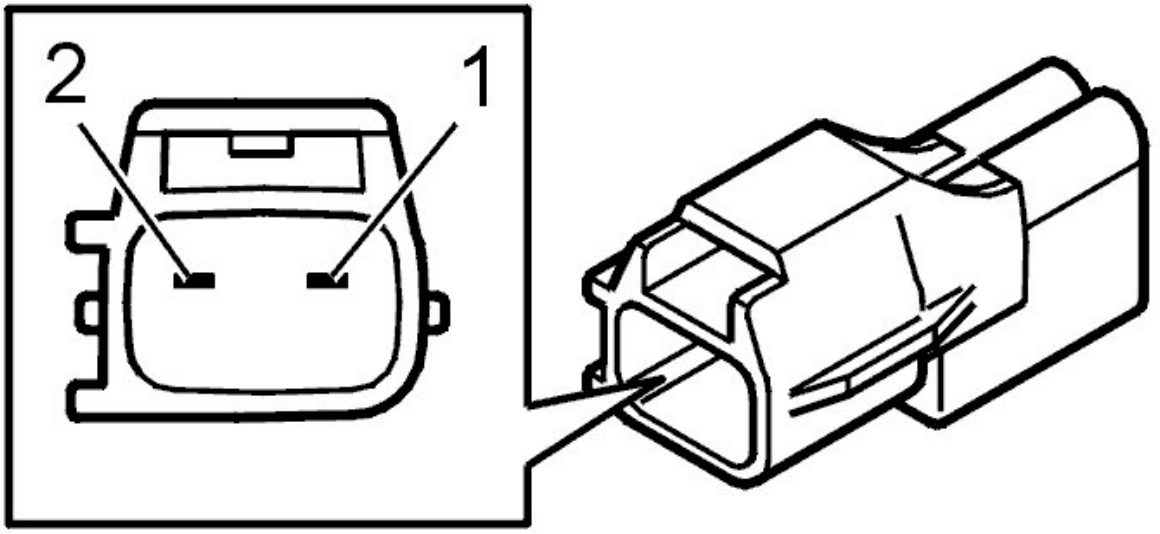
Check the fuel pump (FP) and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation. Remedy as necessary Check for damage in particular.
Measure between the overheat protection thermostat terminals using an ohmmeter. The resistance must be approximately 0 ohms.
The overheat protection thermostat must be replaced if the value is not correct.
Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump (FP) terminal 2. Check for an open-circuit. Check for an short-circuit to ground.
Check the cable between combustion preheater module (CPM) terminal #11 and fuel pump terminal 1. Check for an open-circuit.
The fuel pump (FP) must be replaced if no faults are found in the cable.

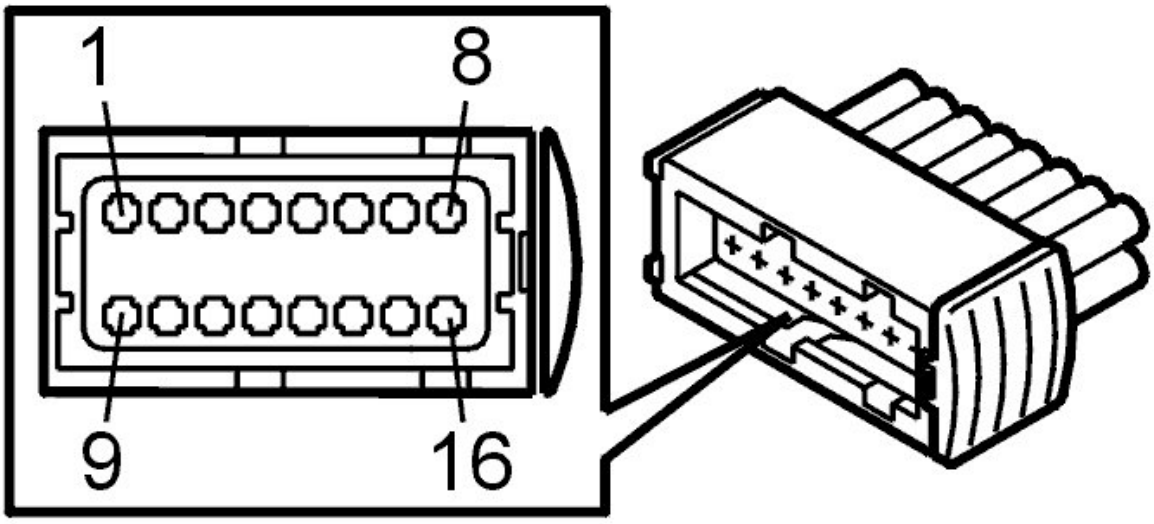
Note! Diagnostic trouble code (DTC) CEM-5F3B and/or diagnostic trouble code (DTC) CEM-5F3D may also be stored if there is a fault in the power cable.

Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





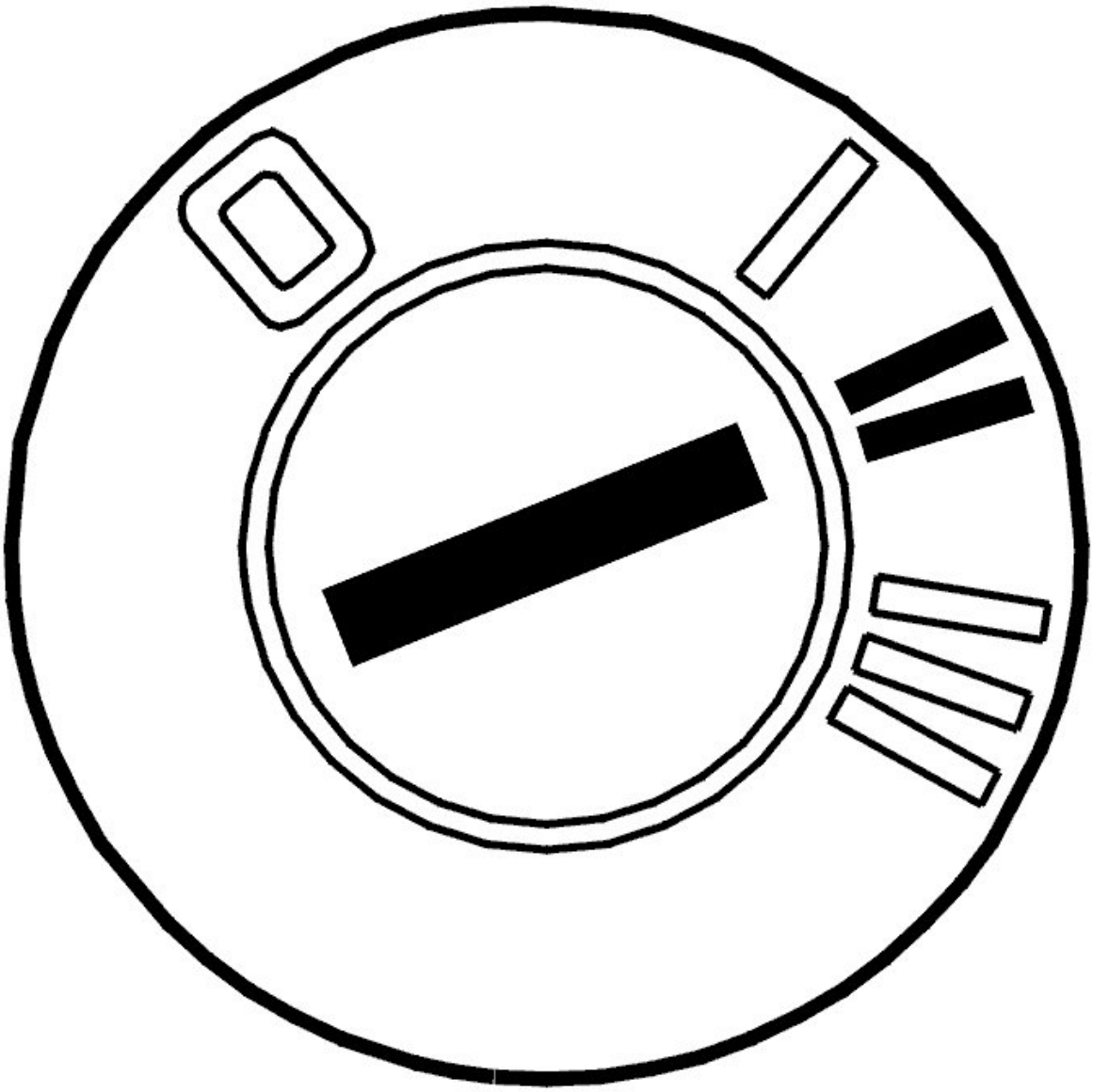
Continue - Verification

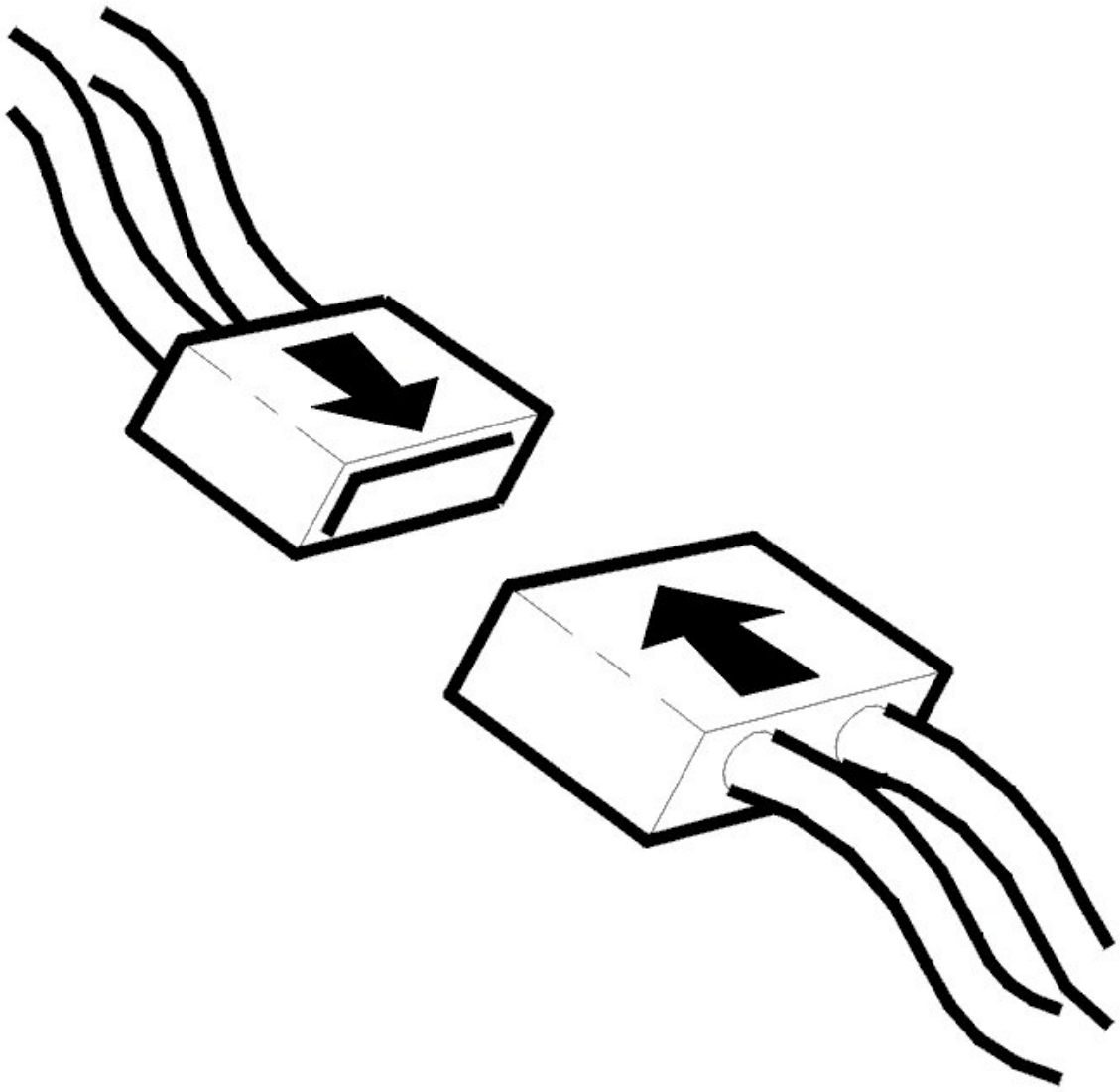
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the fuel pump (FP)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F41

Condition

The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the overheat protection thermostat has deployed.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Air in the cooling system
- The cooling system is blocked

- Damaged overheat protection thermostat
- Damaged engine coolant temperature (ECT) sensor.
- Open circuit on fuel pump circuit.

Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too Low

Signal too low

Checking the water flow

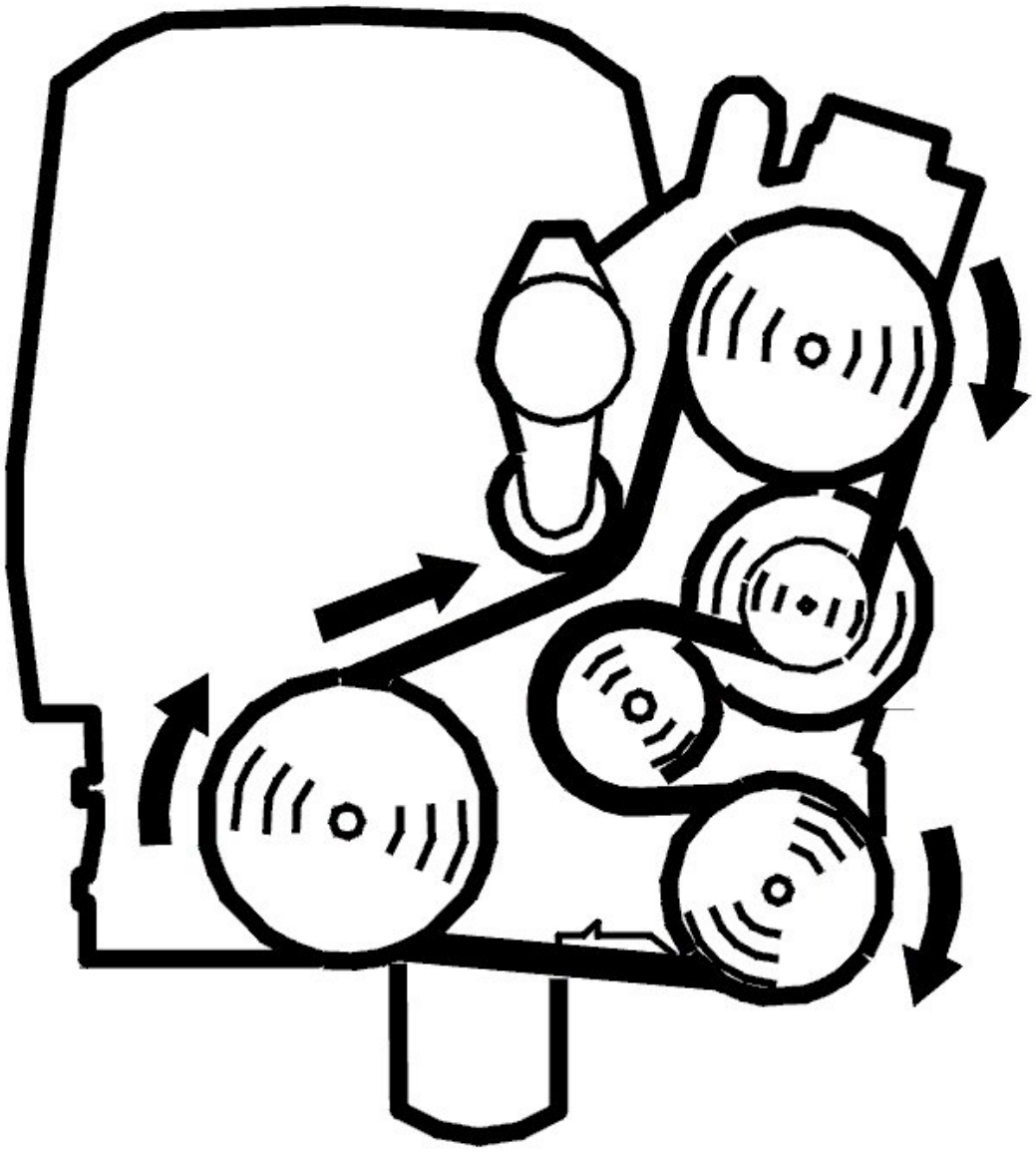
Check if the lines to and from the heater are blocked, or if the heater is damaged causing the through flow to be restricted in some way. Remedy as necessary.

Was a fault detected?

Yes - Verification

No - Checking the engine coolant temperature sensor

Checking the engine coolant temperature sensor



- Start the engine
- Read off the coolant temperature in the heater.

Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature reading OK?

Yes - Checking components and wiring

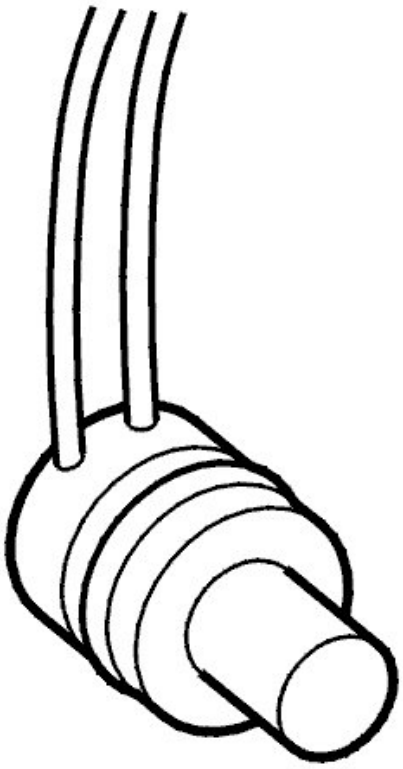
No - Checking components and wiring

Checking components and wiring

Check the resistance of the engine coolant temperature sensor.
Remedy as necessary.

Other information:

- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair



Continue - Verification

Checking components and wiring

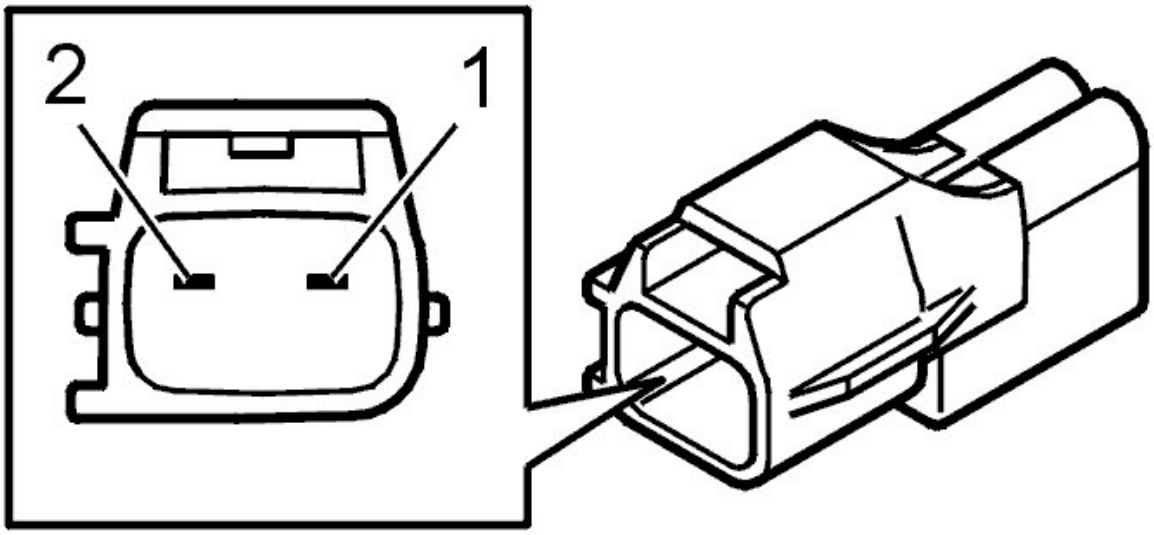
Check the fuel pump (FP) and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation.
Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump terminal 1. Check for an intermittent open-circuit.
Check the cable between combustion preheater module (CPM) terminal #11 and fuel pump terminal 2. Check for an intermittent open-circuit.

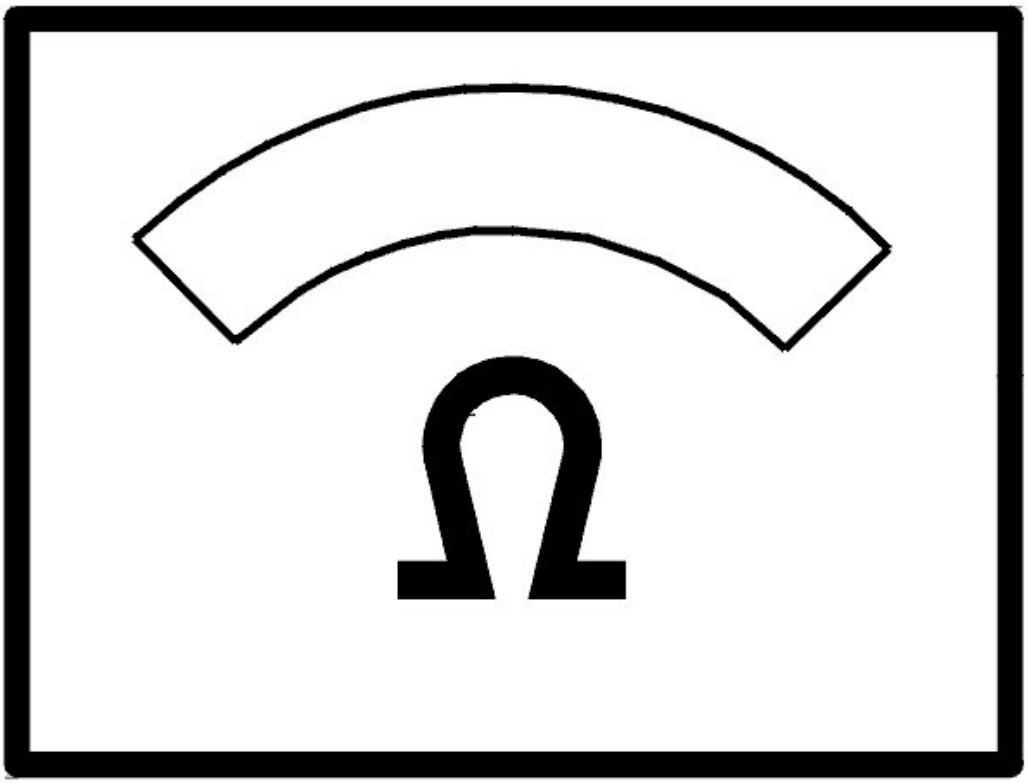
Note! Diagnostic trouble code (DTC) CEM-5F3B and/or diagnostic trouble code (DTC) CEM-5F3D may also be stored if there is a fault in the power cable.

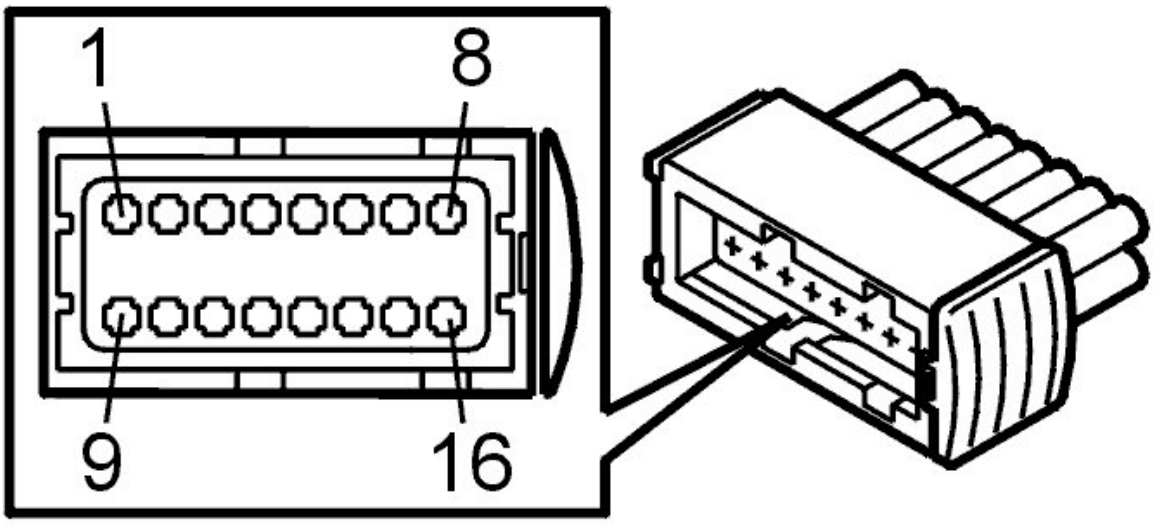
Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals







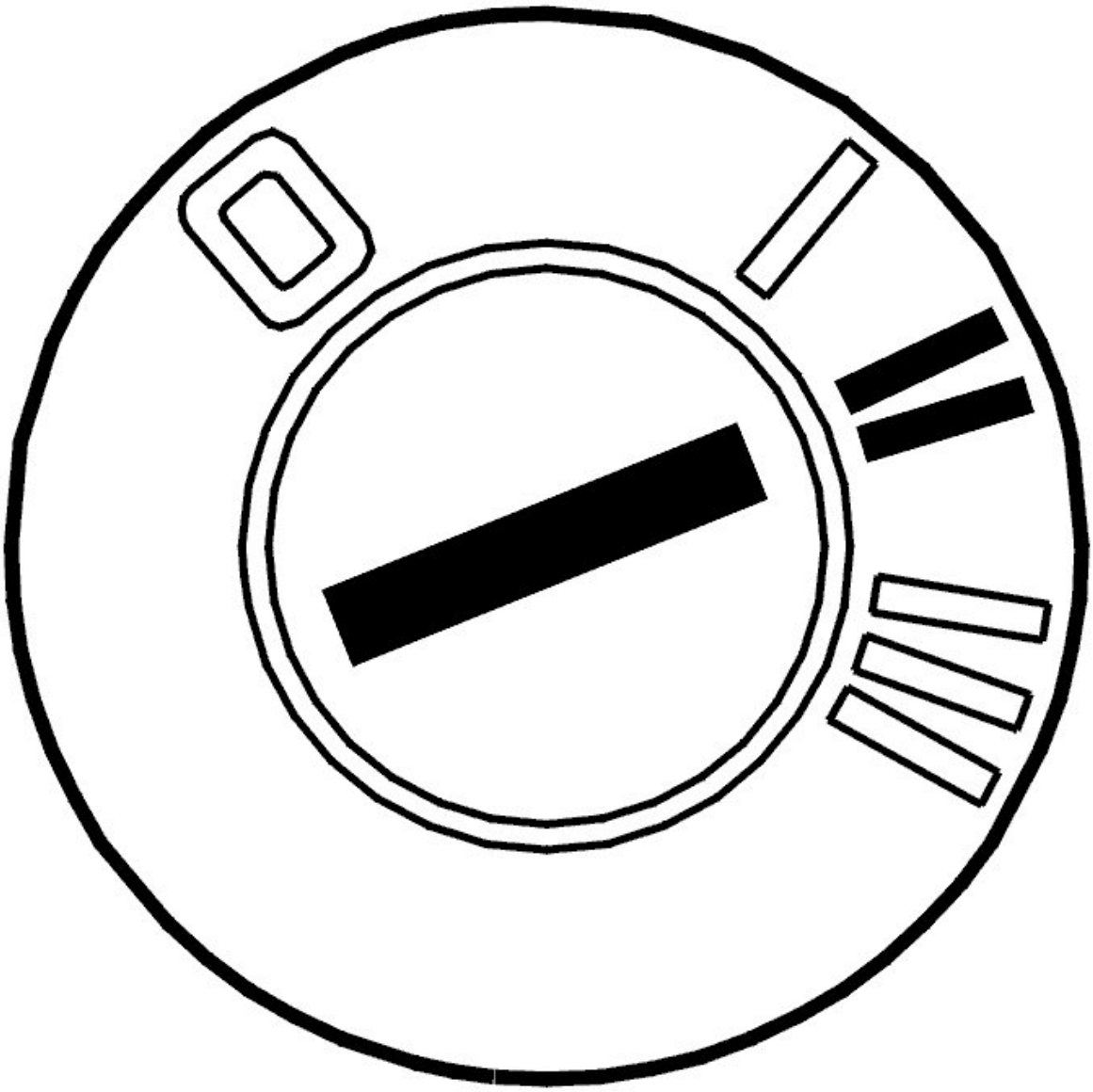
Continue - Verification

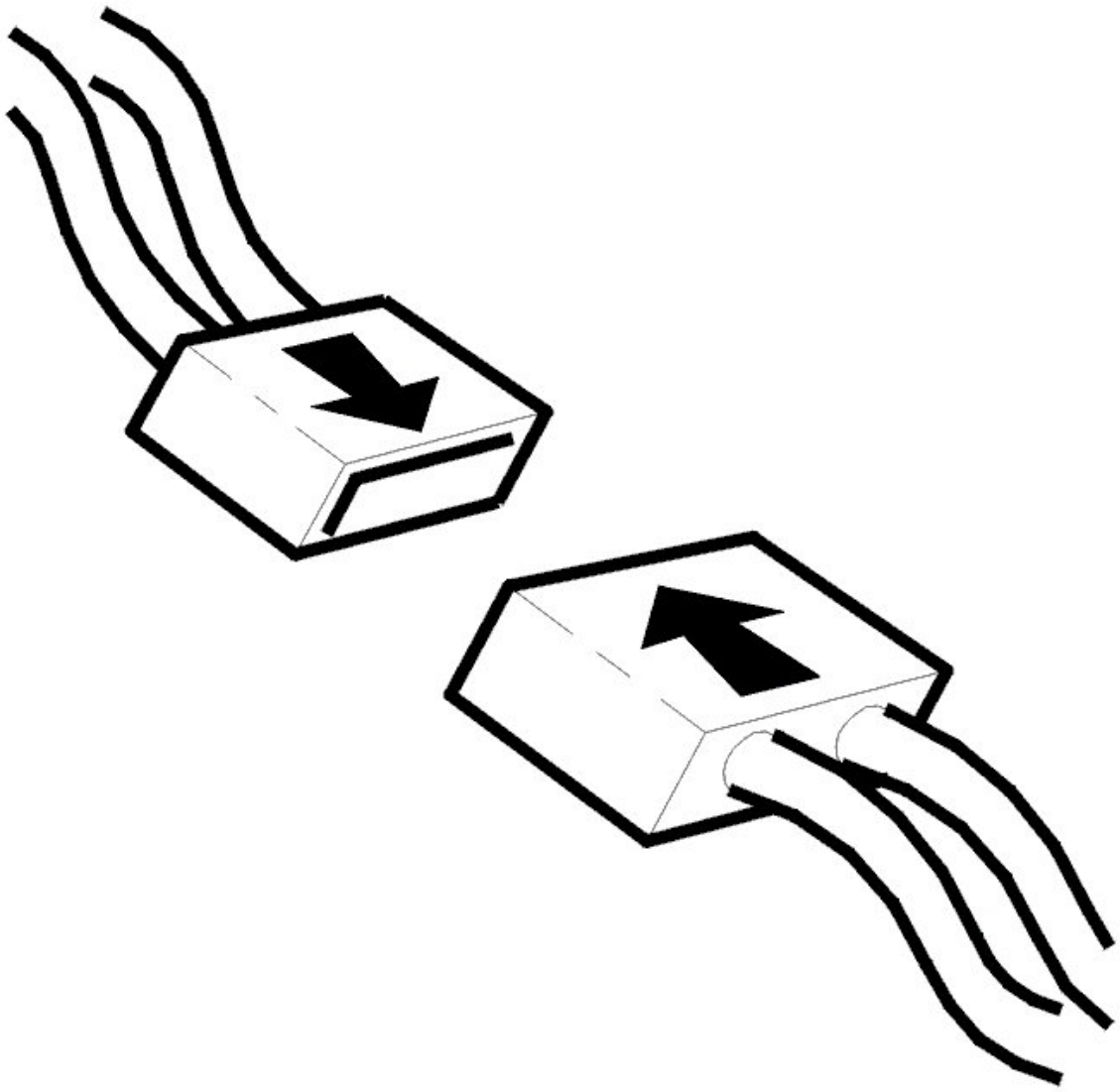
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

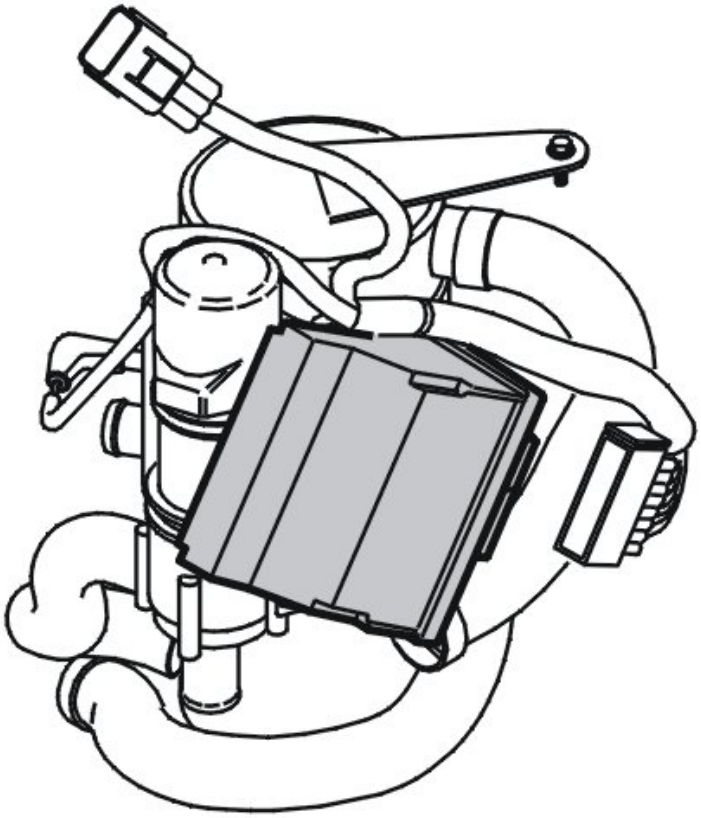
Attempt New Test - Checking the water flow

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F42

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit in the power supply from the combustion preheater module (CPM) to the fuel pump (FP), water pump and combustion fan.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

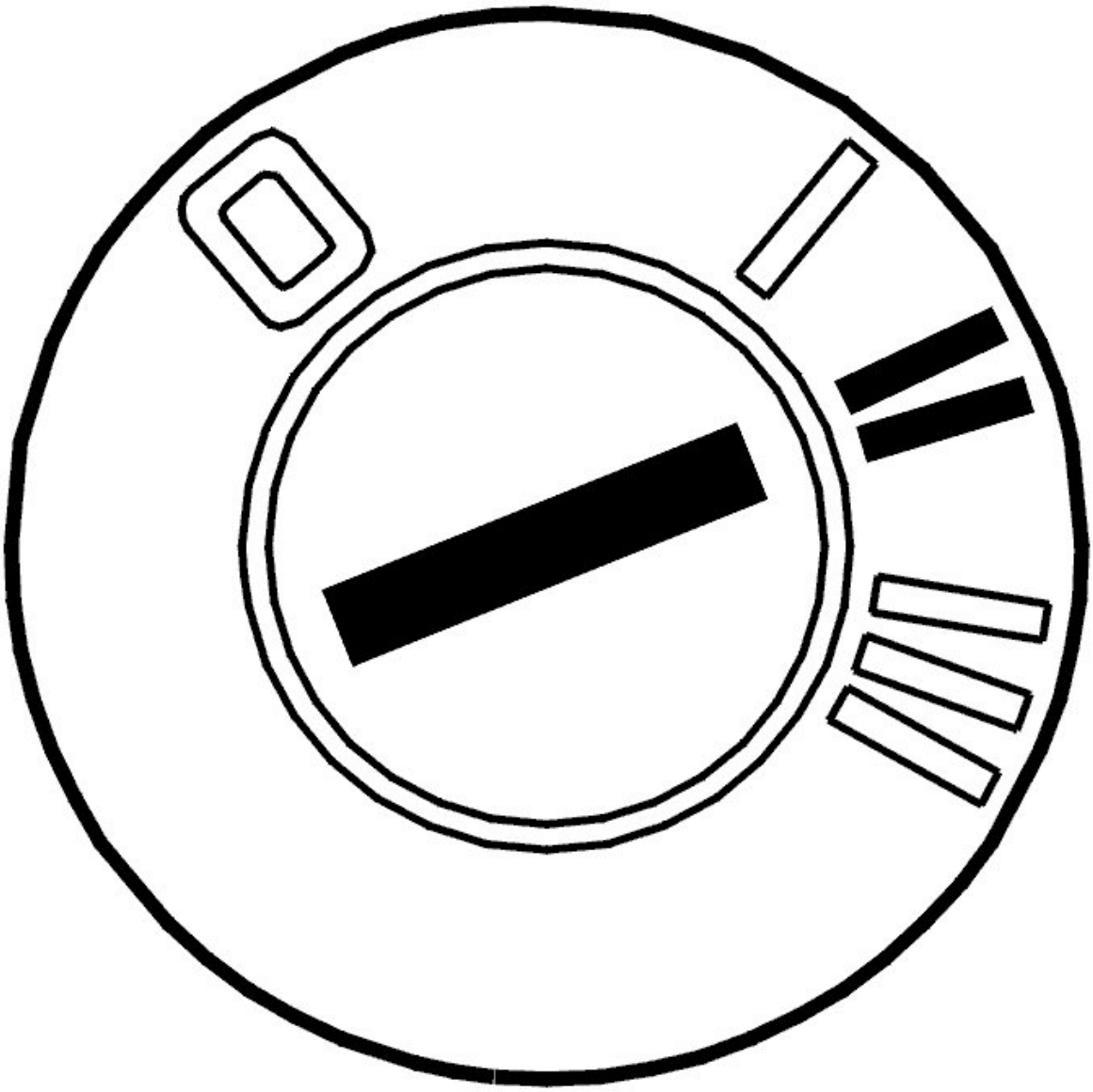
Possible source
- Short-circuit to supply voltage in the power supply cable.

Fault symptom[s]
- Poor heating in the passenger compartment.

Faulty

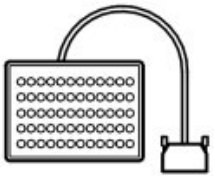
Faulty

Checking the power supply



- Ignition on
- Connect a voltmeter between terminals #11 and #3 on the breakout box.

The voltmeter should read approximately 0 V.

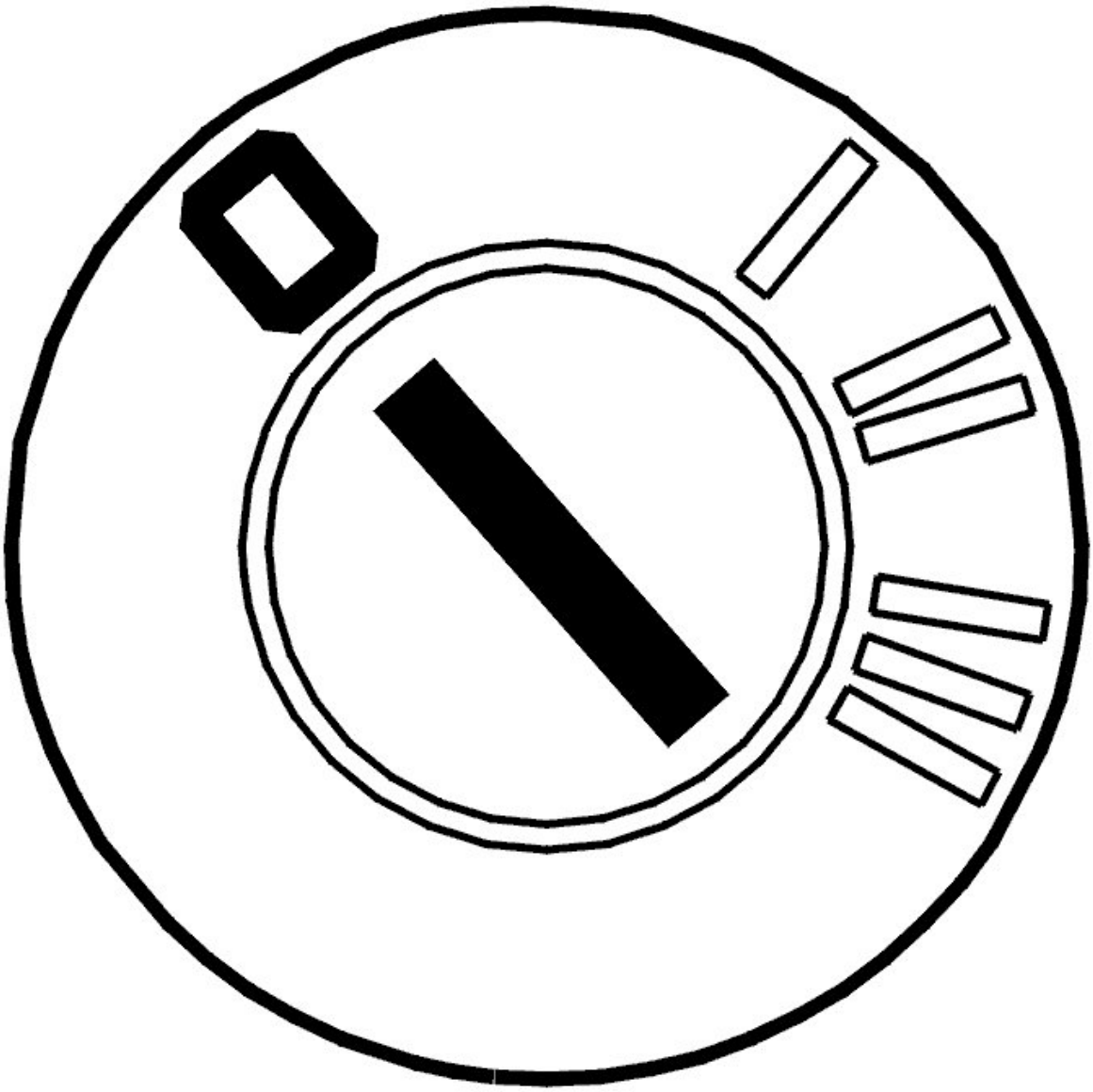


Does the voltmeter read approximately 0V?

Yes - Intermittent fault

No - Checking the supply circuit

Checking the supply circuit

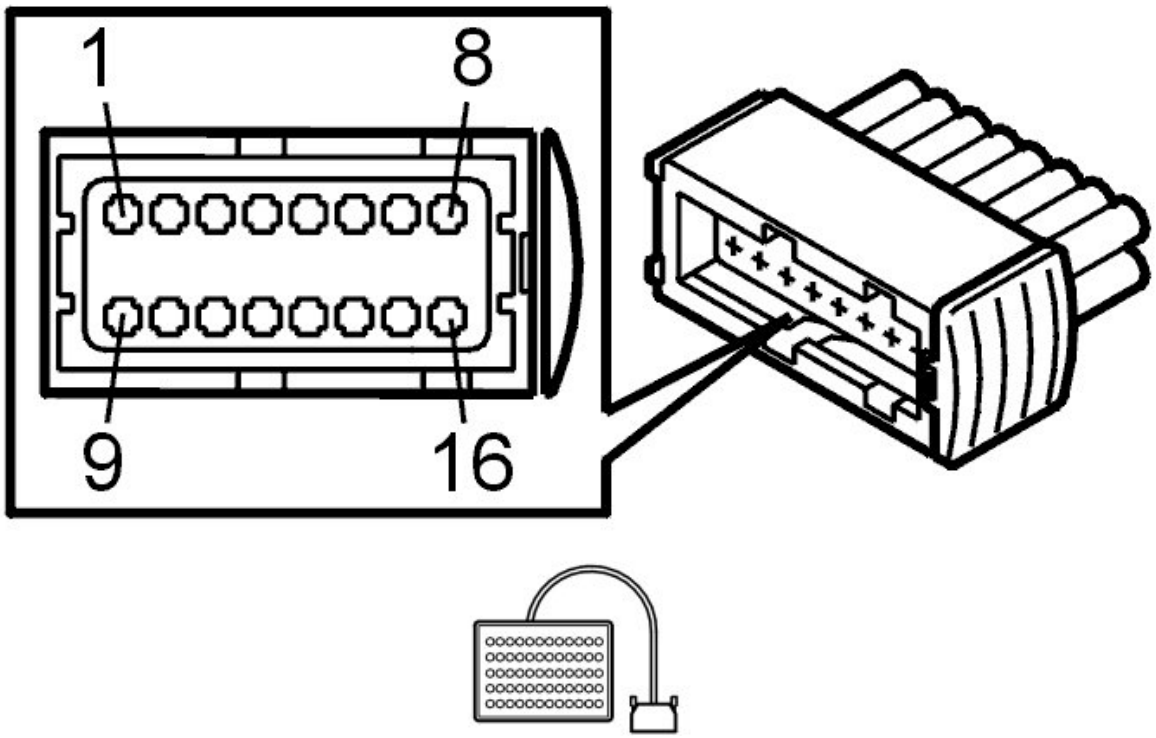


- Ignition off
- Remove the heater.

Check the circuit between combustion preheater module (CPM) terminal #11 and the components which are connected to the supply circuit (water pump terminal 2, fuel pump (FP) terminal 2 and combustion fan supply terminal). Check for a short-circuit to supply voltage.
With the ignition on and the water pump connector disconnected, the voltage between water pump terminal 1 (control module side) and ground should be approximately 0 V.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Engine Coolant Heater, Replacing
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



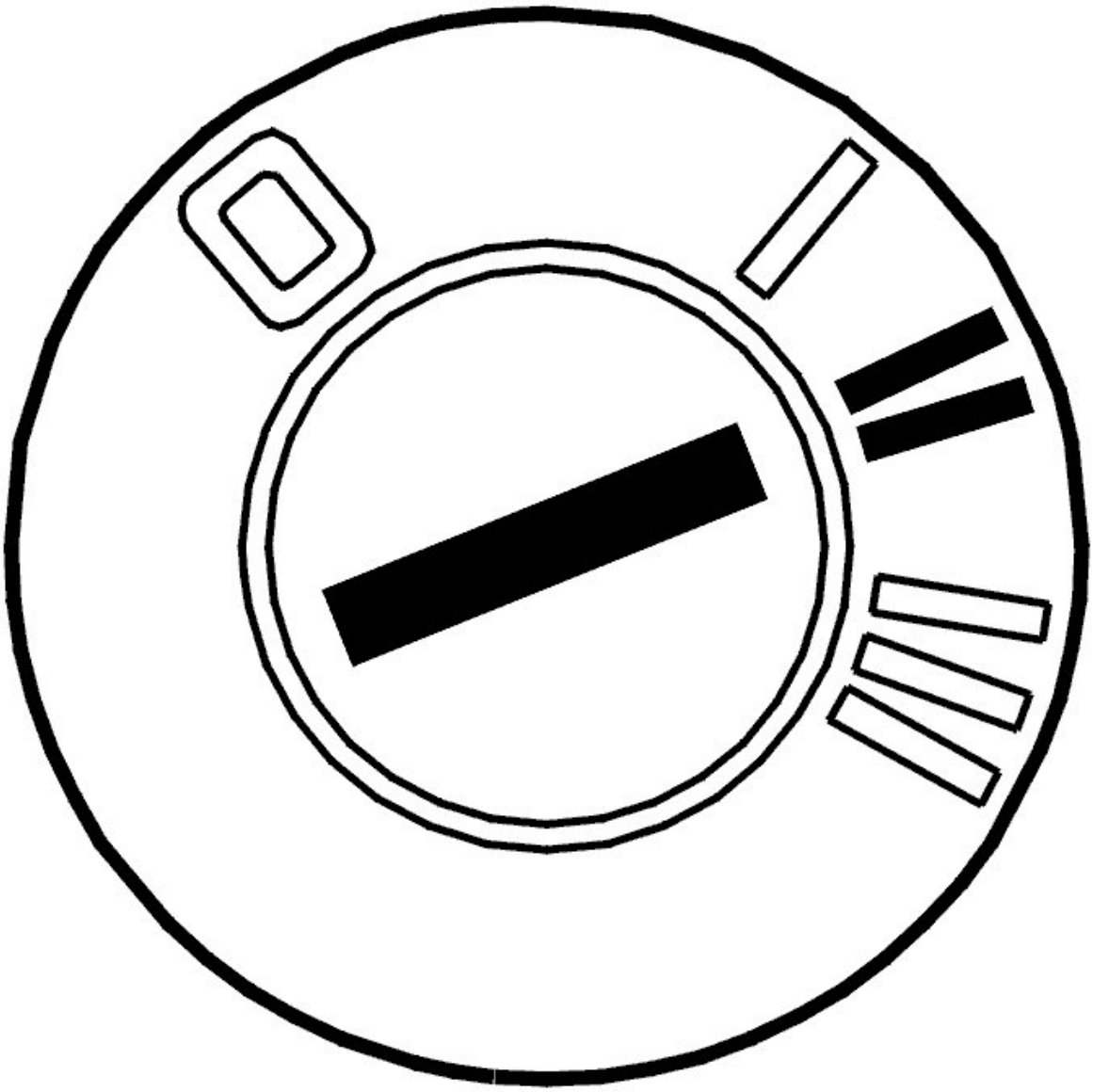
Continue - Verification

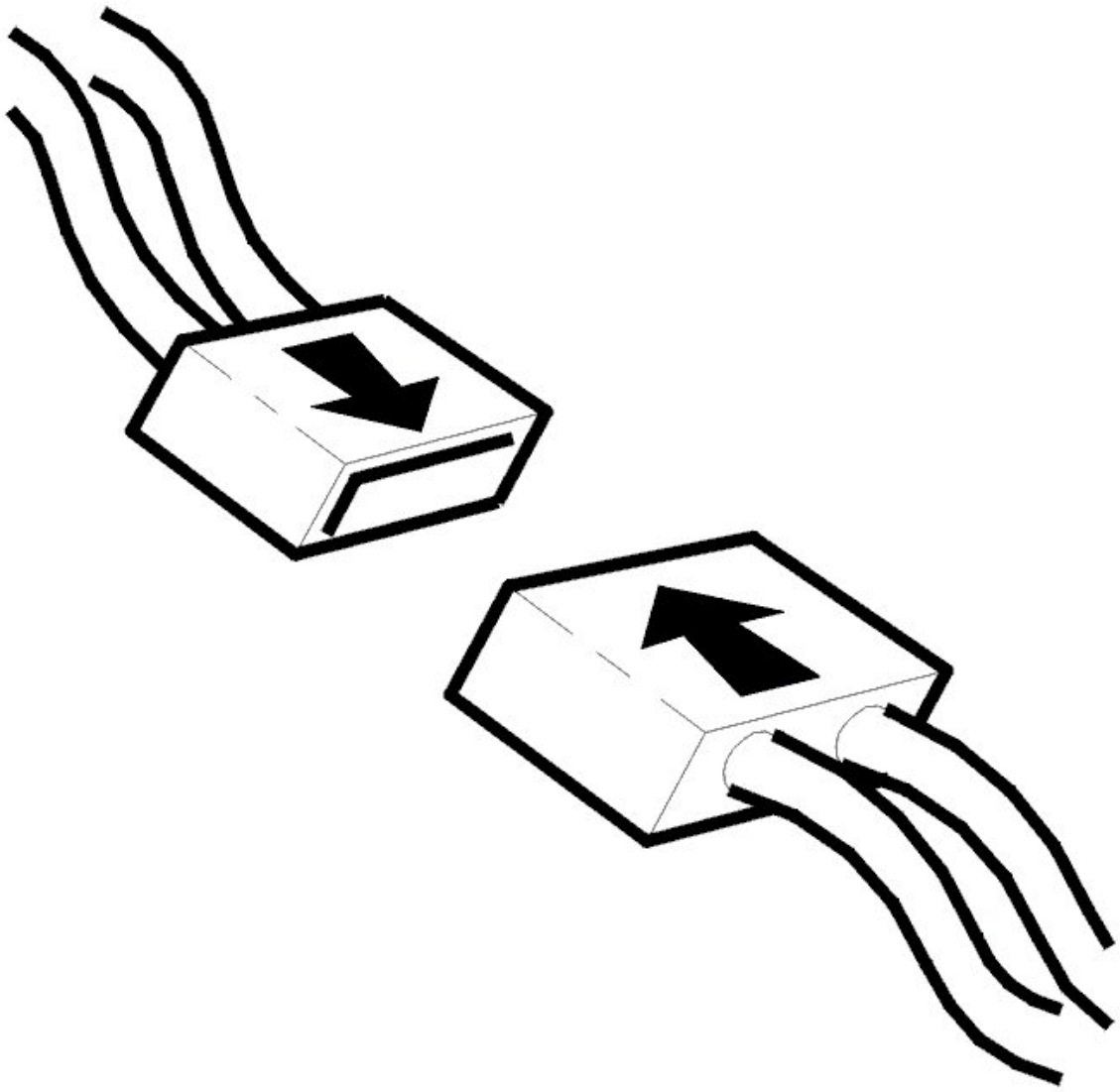
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

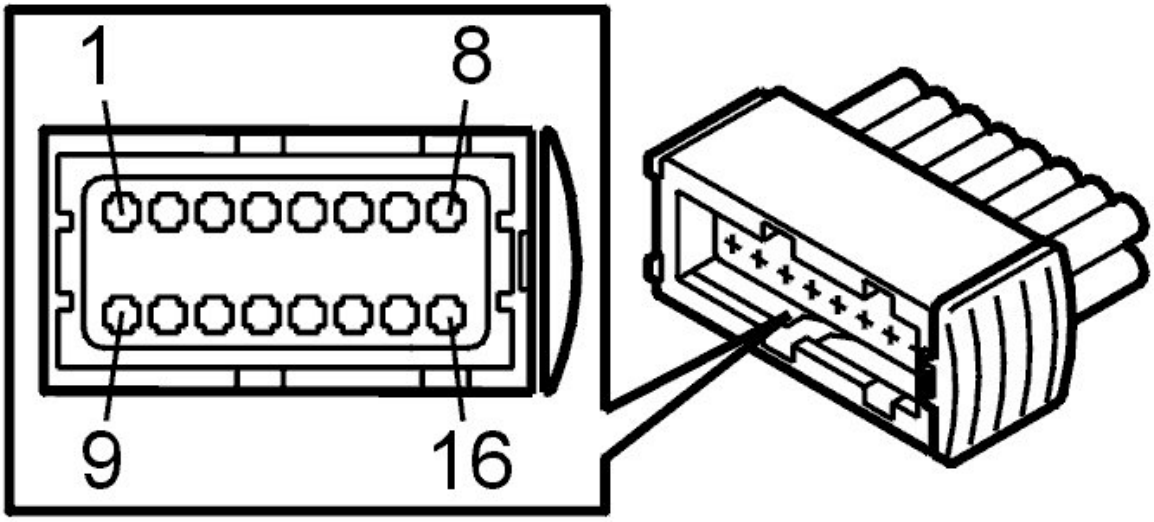
Attempt New Test - Connecting the breakout box

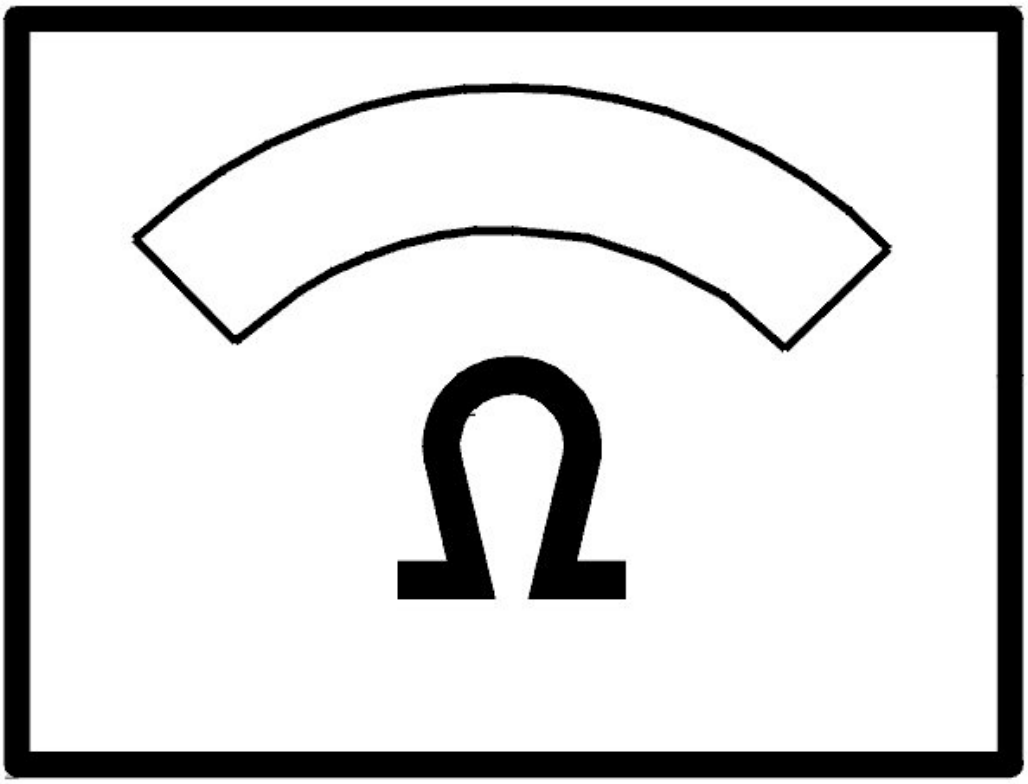
Intermittent fault

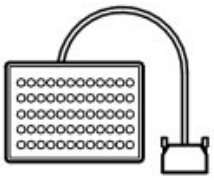
Check the circuit between combustion preheater module (CPM) terminal #11 and the components which are connected to the supply circuit (water pump terminal 2, fuel pump (FP) terminal 1 and combustion fan supply terminal). Check for an intermittent short-circuit to supply voltage.
With the ignition on and the water pump connector disconnected, the voltage between water pump terminal 1 (control module side) and ground should be approximately 0 V.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals







Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT-TRACING FAILED - DONE

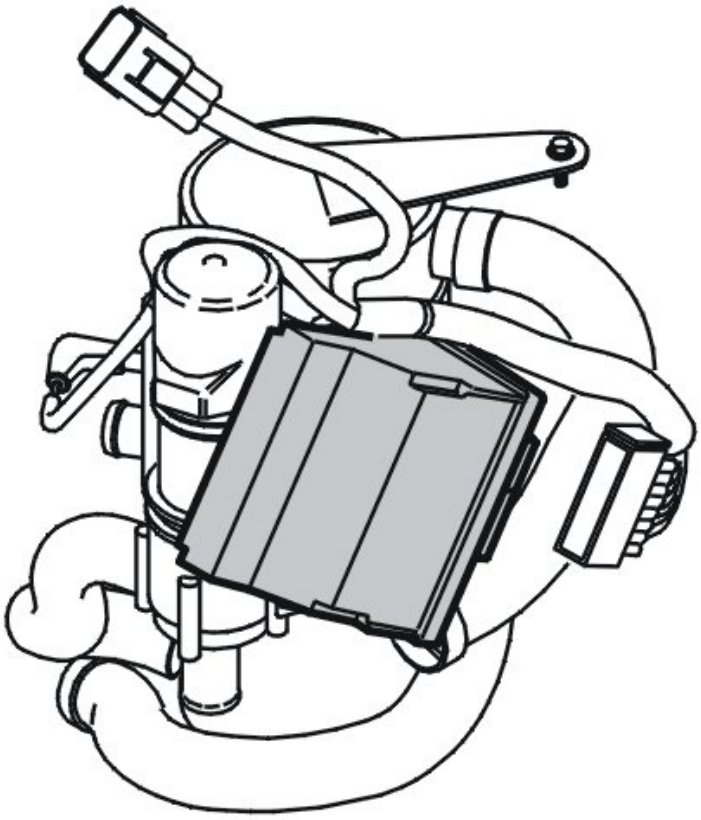
FAULT FOUND - Fault Found

Attempt New Test - Connecting the breakout box

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F43

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the power supply from the combustion preheater module (CPM) to the fuel pump (FP), water pump and combustion fan or that there is no power at all.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value

- None.

Possible source

- Short-circuit to ground in the power supply cable
- Contact resistance in the control module connectors
- Open-circuit in the power supply cable.

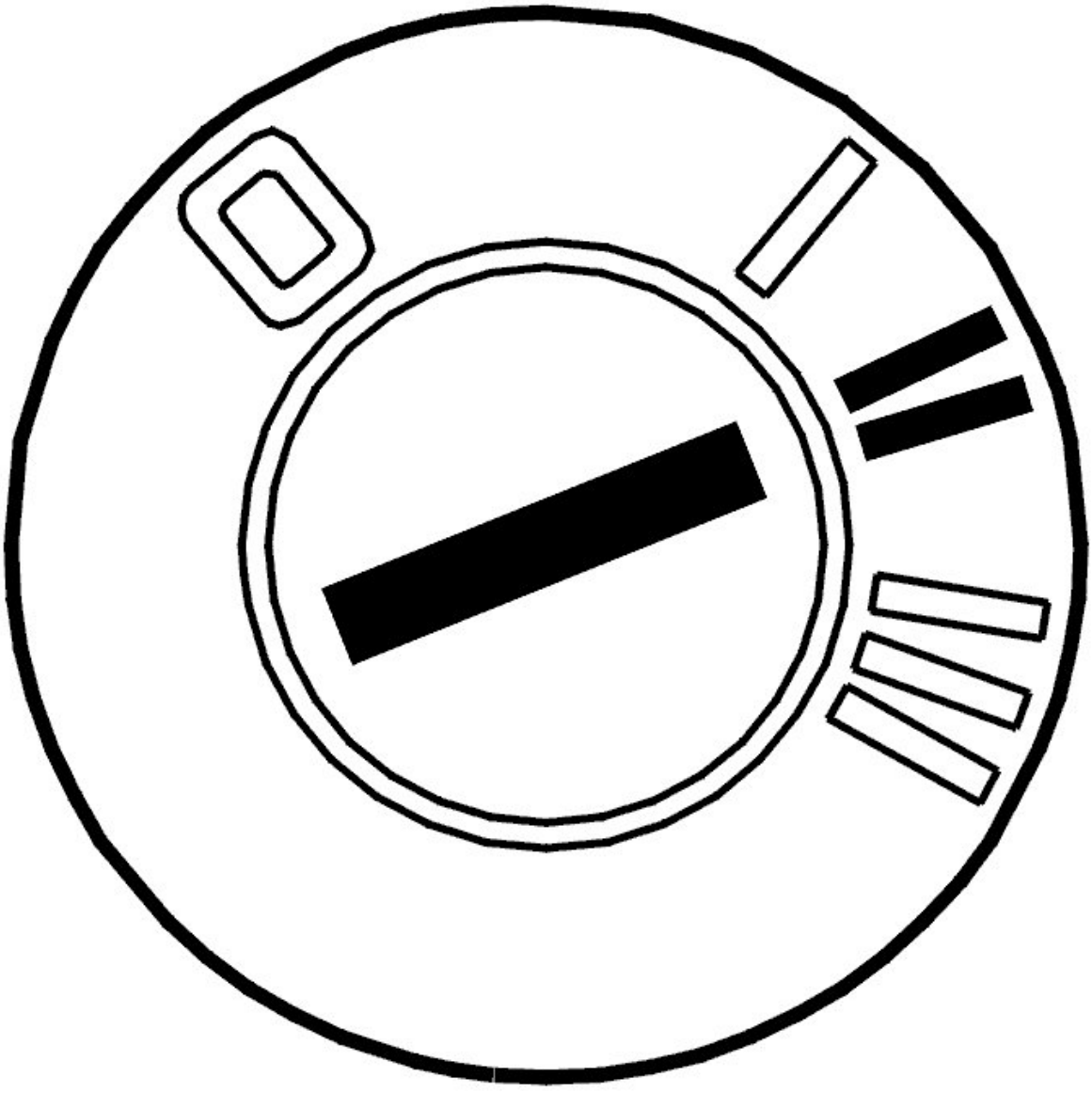
Fault symptom[s]

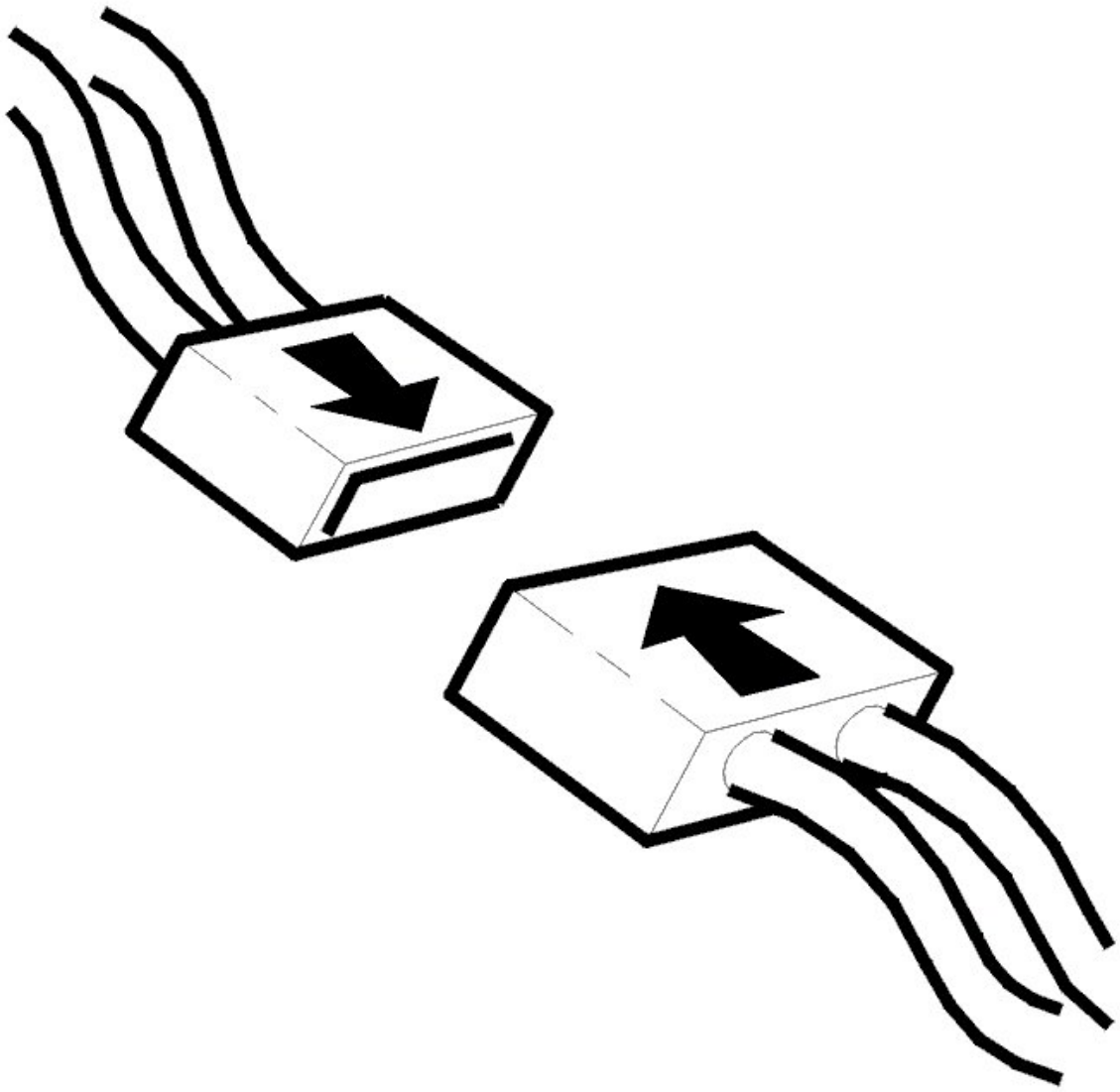
- Poor heating in the passenger compartment.

Missing

Missing

Checking the power supply





- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.

Other information:

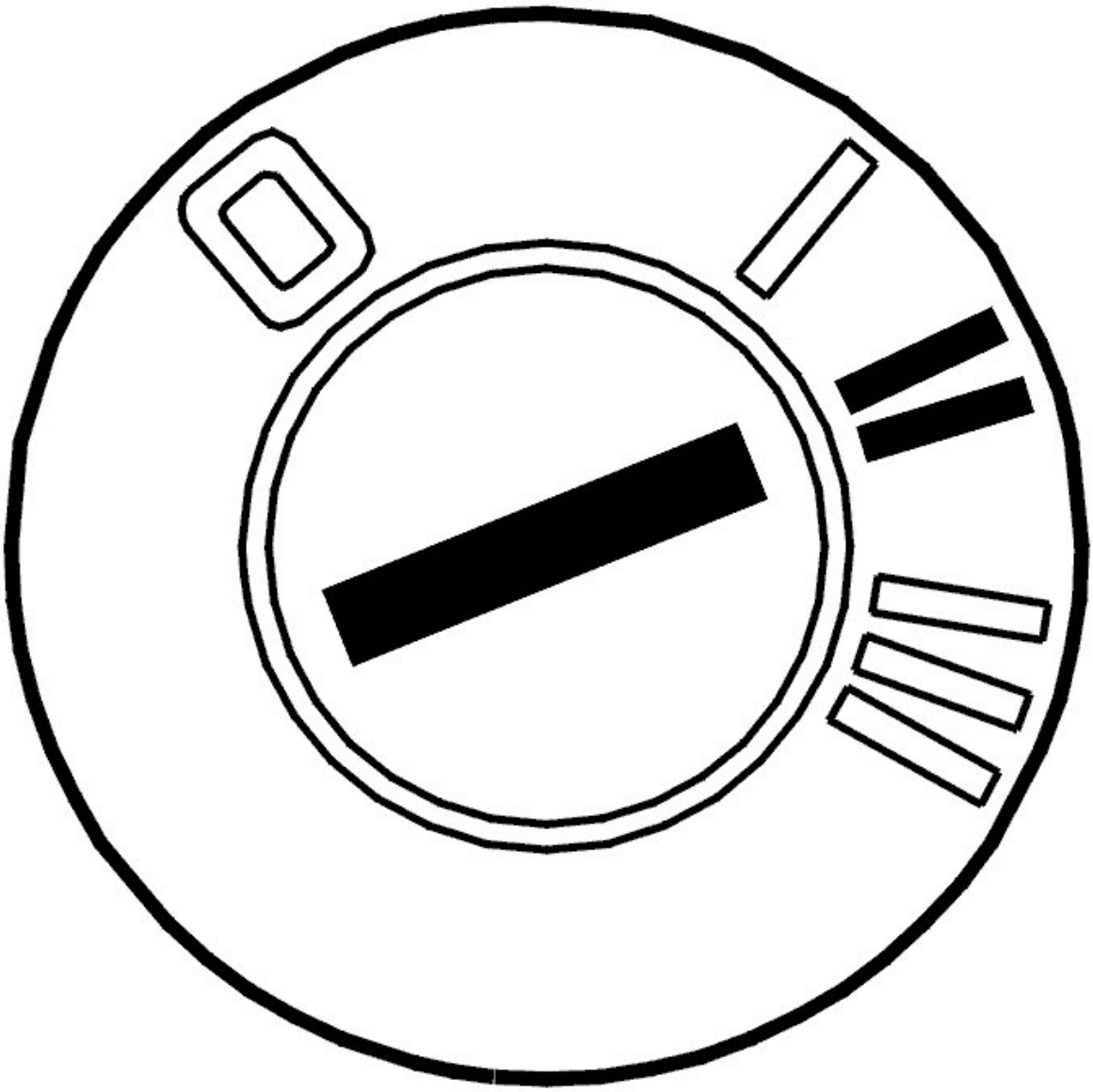
- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

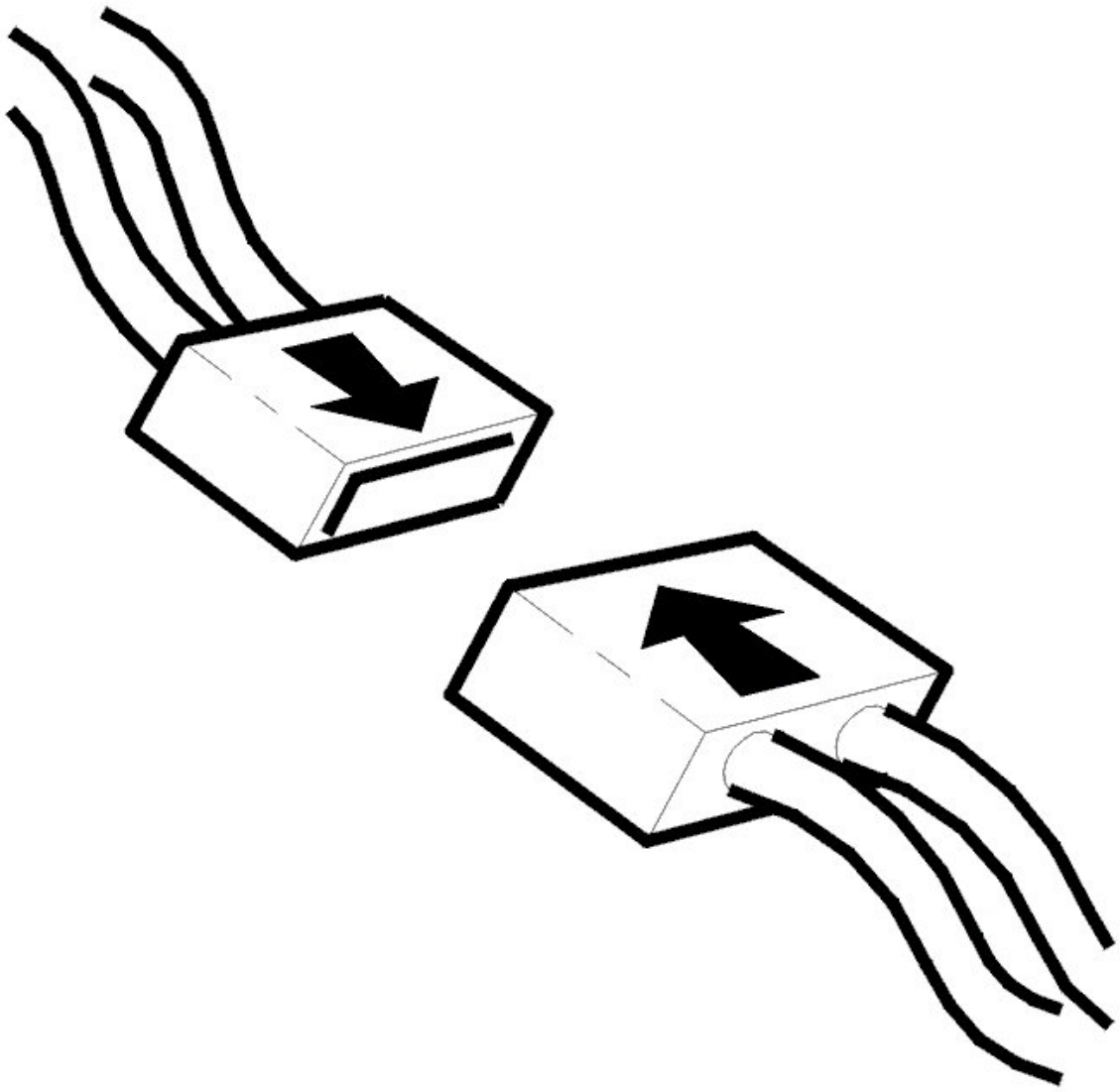
Is the heater working?

Yes - Intermittent fault

No - Checking the connector

Checking the connector





- Ignition off
- Check the control module connector. Check for contact resistance and oxidation. Remedy if necessary.

In particular, check for any damage

- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Listen for a buzzing sound which indicates that the heater is running.
Check the heater function.
If the heater now functions, the cause of the fault was loose connections in the connector.

Other information:

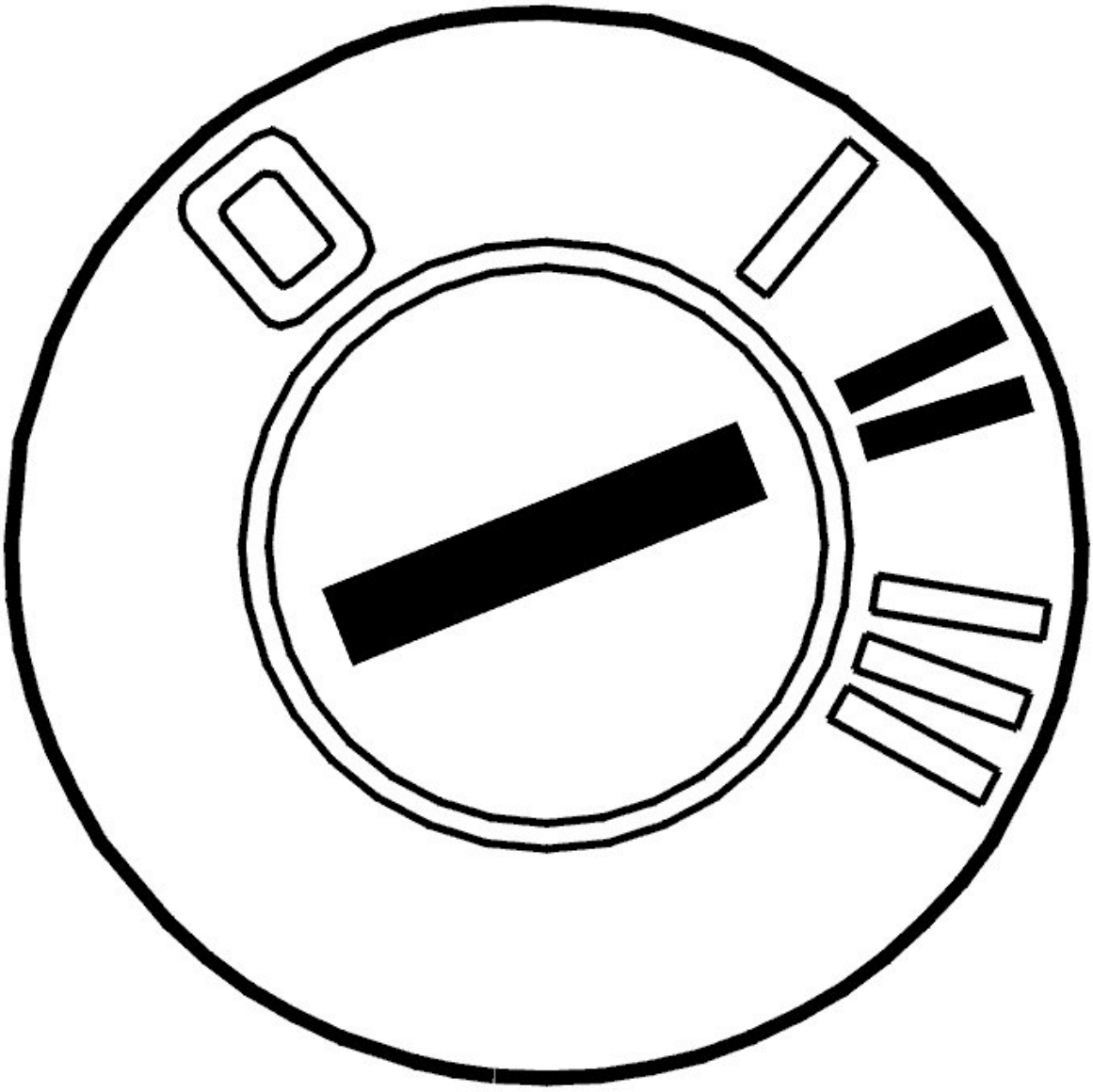
- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the heater working?

Yes - **Fault Found**

No - Checking the supply circuit

Checking the supply circuit



- Ignition on.

There is a common power supply for the water pump, fuel pump (FP) and combustion fan. It is easier to locate the fault if the components are activated one at a time.
Activate the water pump, fuel pump (FP) and combustion fan.

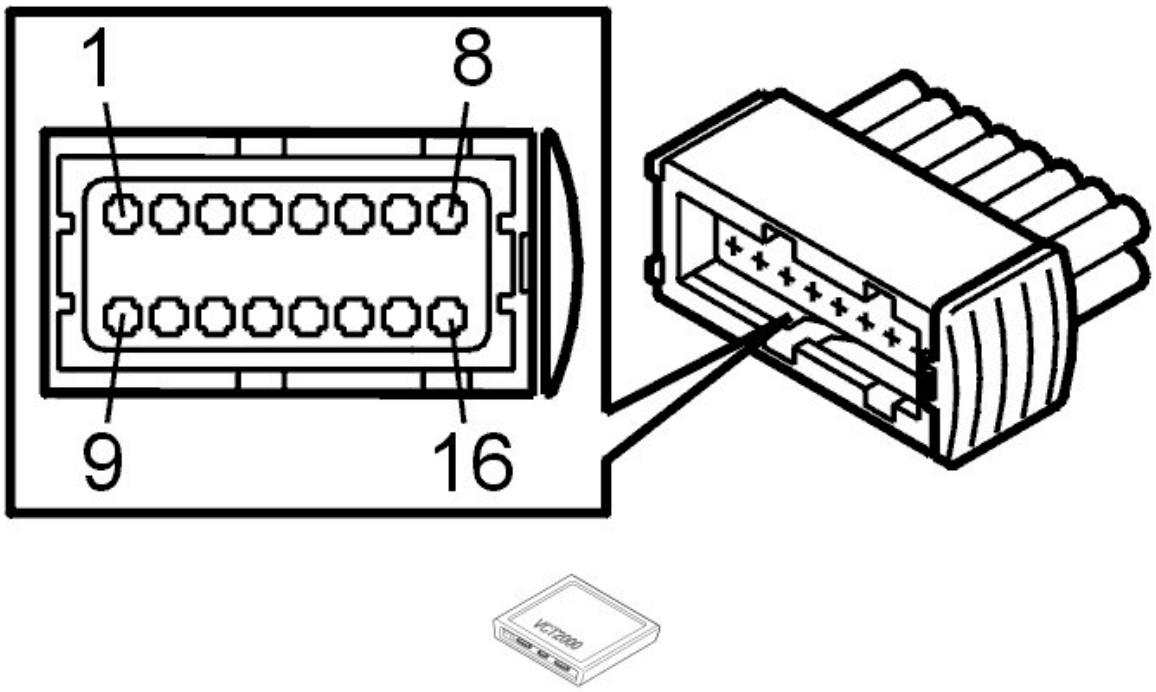
Warning! Do not activate the fuel pump (FP) for longer than a few seconds.

Check the circuit between combustion preheater module (CPM) terminal #11 and the components which are connected to the supply circuit (water pump terminal 2, fuel pump (FP) terminal 2 and combustion fan supply terminal). Check for an open-circuit. Check for a short-circuit to ground. Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



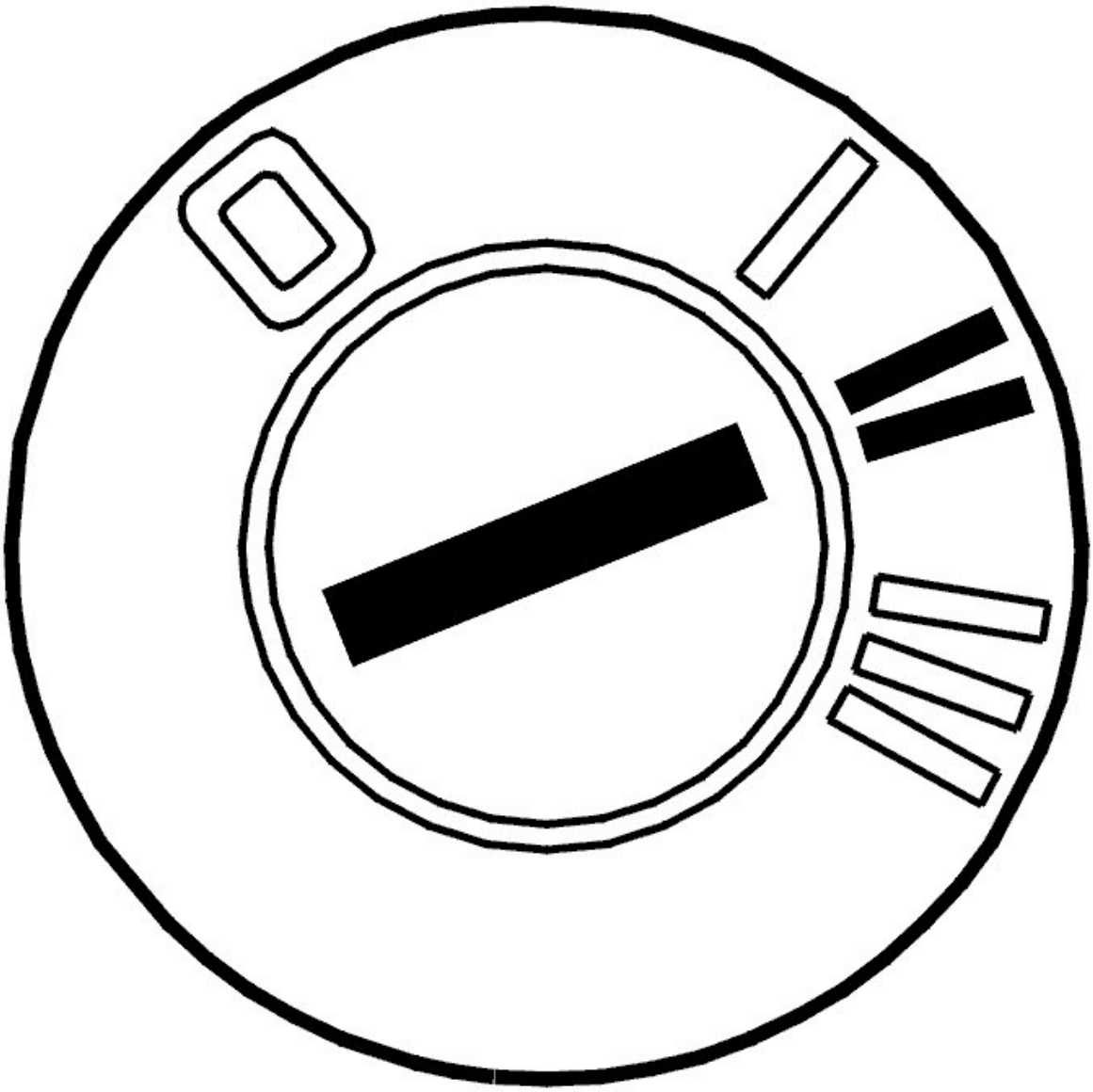
Continue - Verification

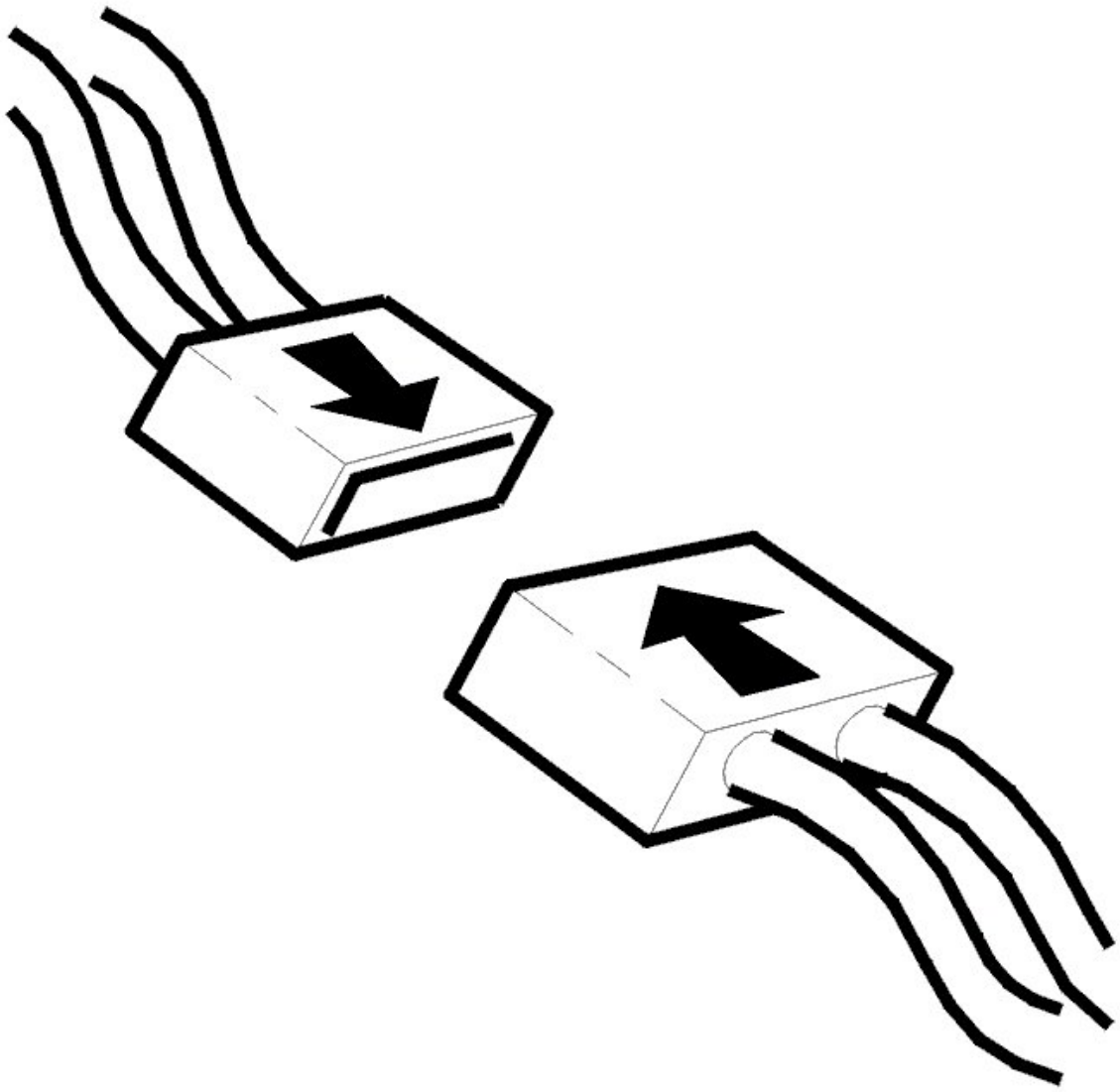
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

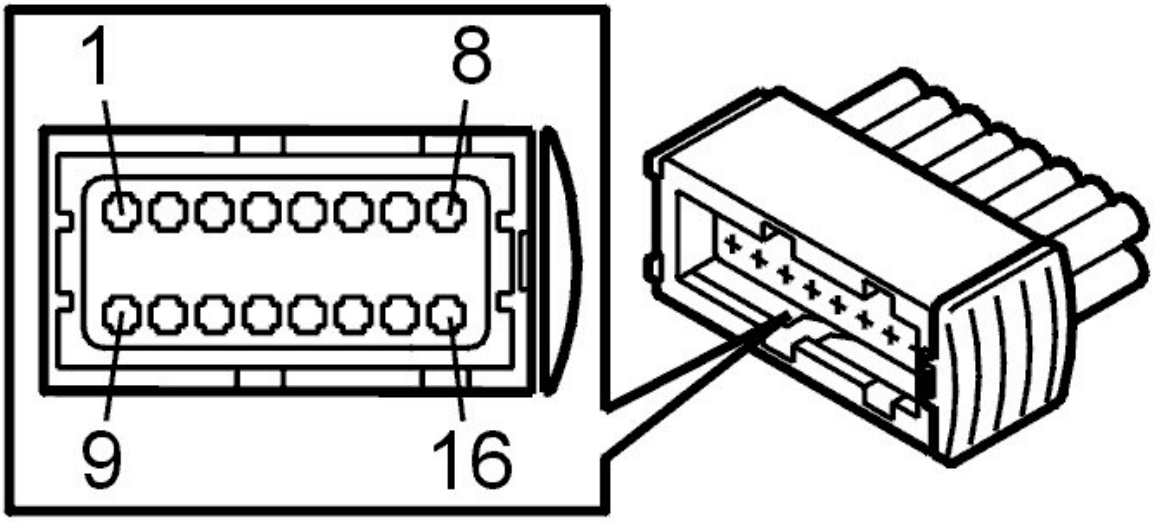
Attempt New Test - Checking the power supply

Intermittent fault

Check the combustion preheater module (CPM) connectors. Check for loose connections. Check for contact resistance and oxidation.
Check the circuit between combustion preheater module (CPM) terminal #11 and the components which are connected to the supply circuit (water pump terminal 2, fuel pump (FP) terminal 1 and combustion fan supply terminal). Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Water pump engine coolant heater, replacing See: Engine, Cooling and Exhaust/Cooling System/Auxiliary Water Pump/Service and Repair
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Fuel injection nozzle / fan motor / pressure equalizer, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Service and Repair/Fuel Injection Nozzle / Fan Motor / Pressure Equalizer, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the power supply

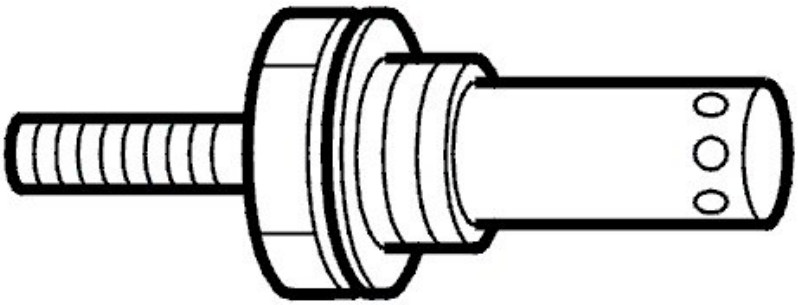
DONE - DONE

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F46

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the power supply from the combustion preheater module (CPM) to the glow plug or that there is no power at all.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

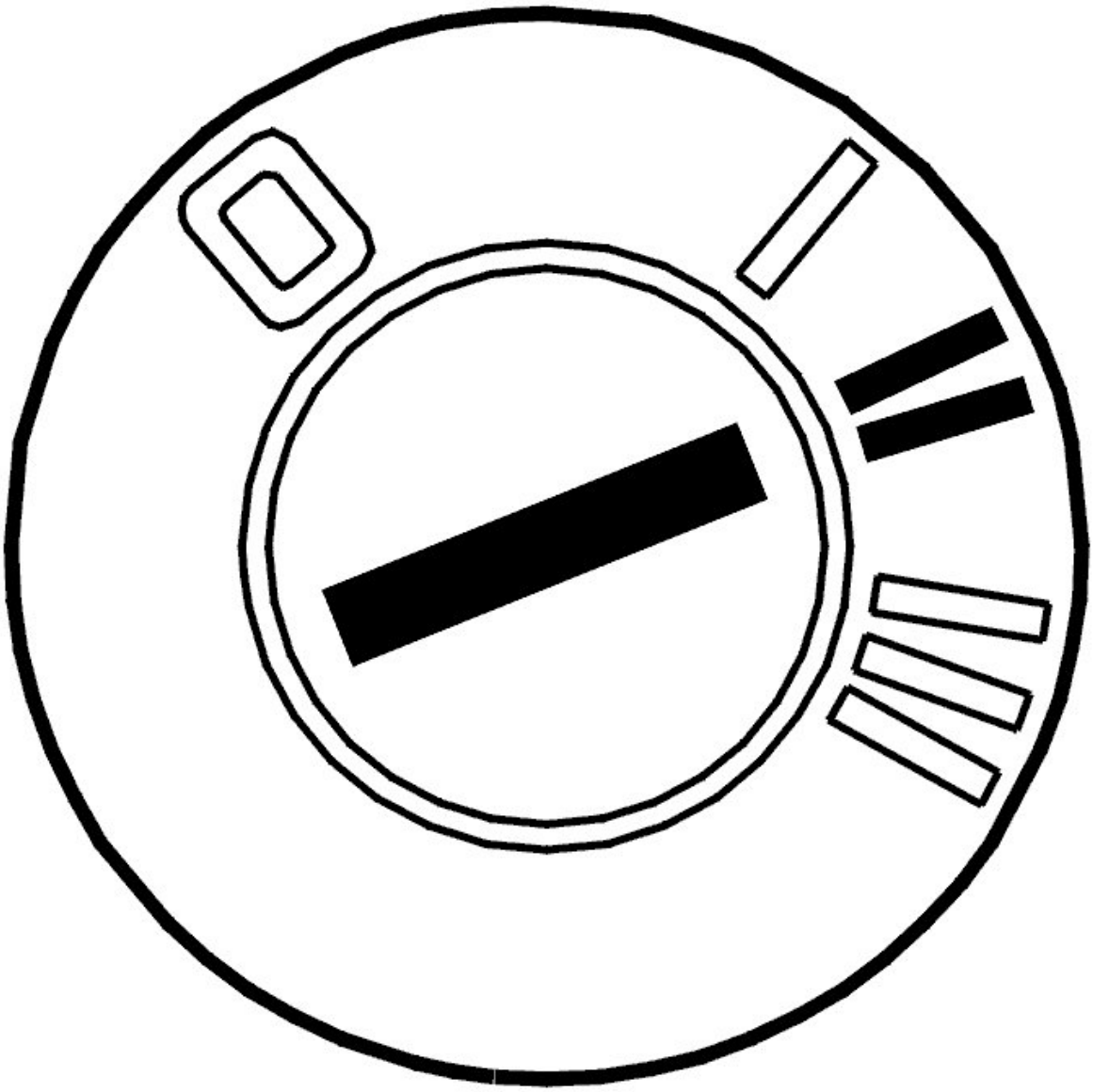
Possible source
- Damaged glow plug.
- Contact resistance in the control module connectors
- Contact resistance in the glow plug connection.
- Short-circuit to ground in the signal cable
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable

Fault symptom[s]
- Poor heating in the passenger compartment.

Faulty Signal

Faulty signal

Checking the function of the glow plug



- Ignition on.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Check the heater function.

Other information

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics

Is the heater working?

Yes - Checking components and wiring

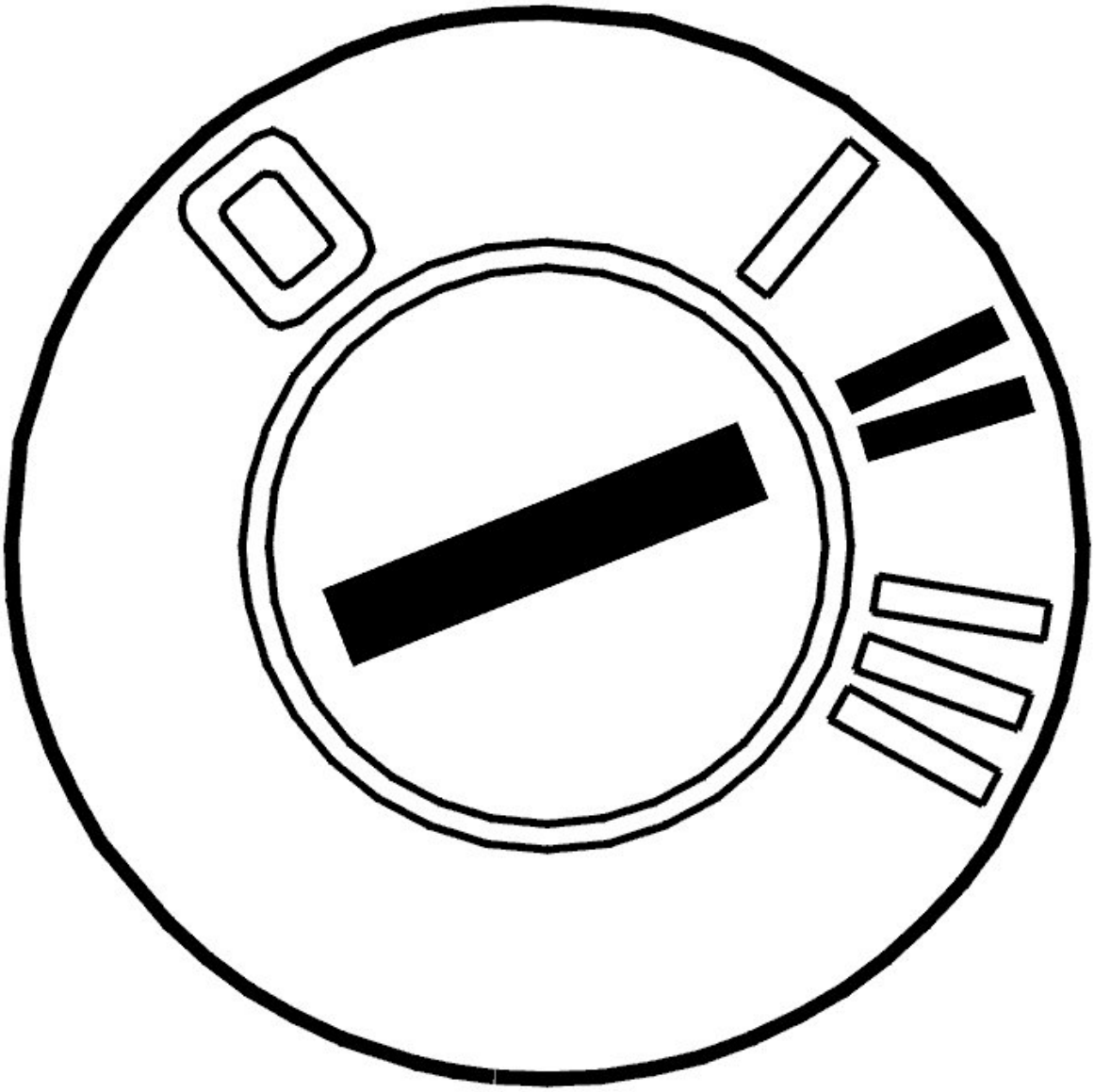
No - Checking components and wiring

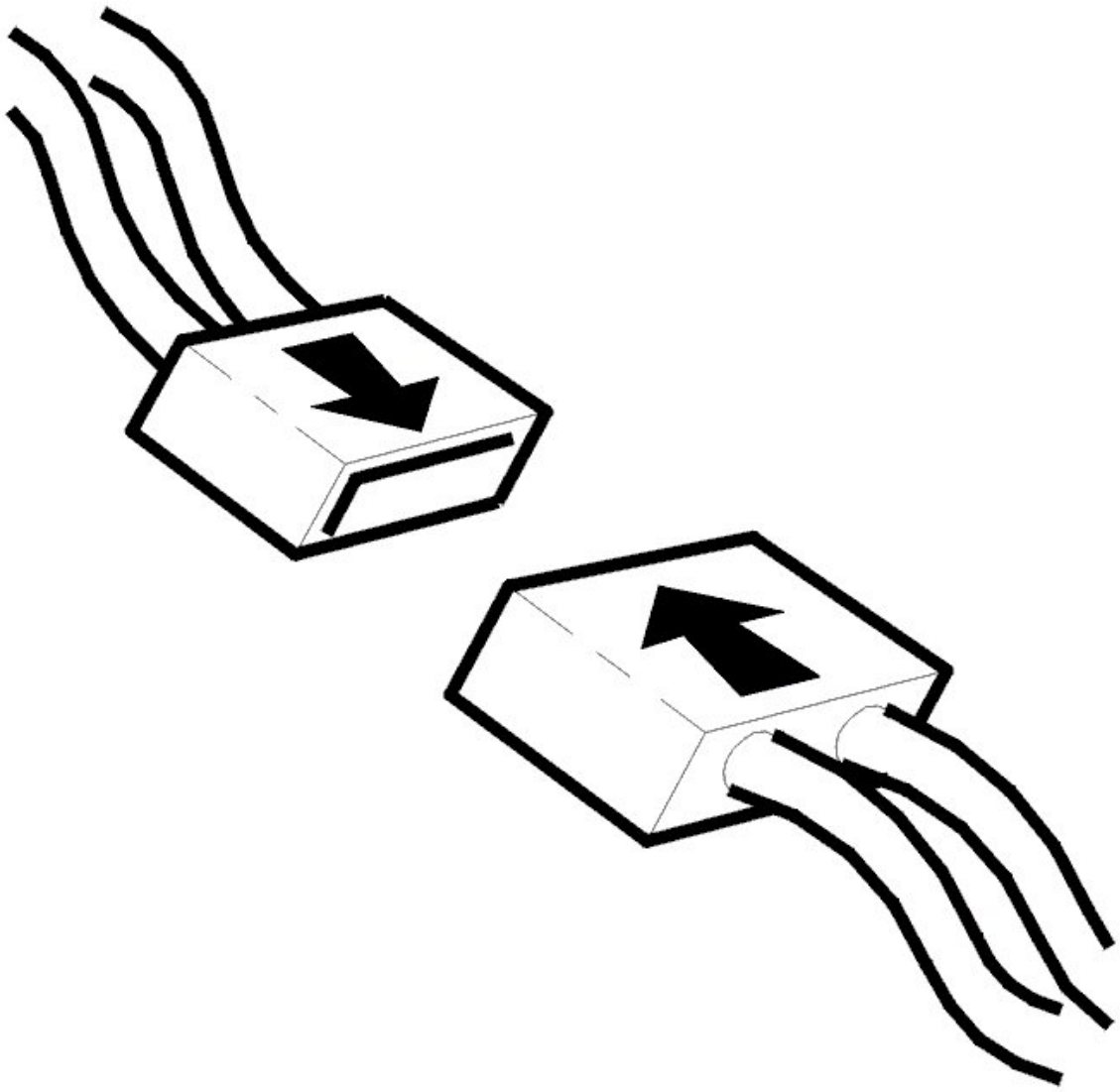
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

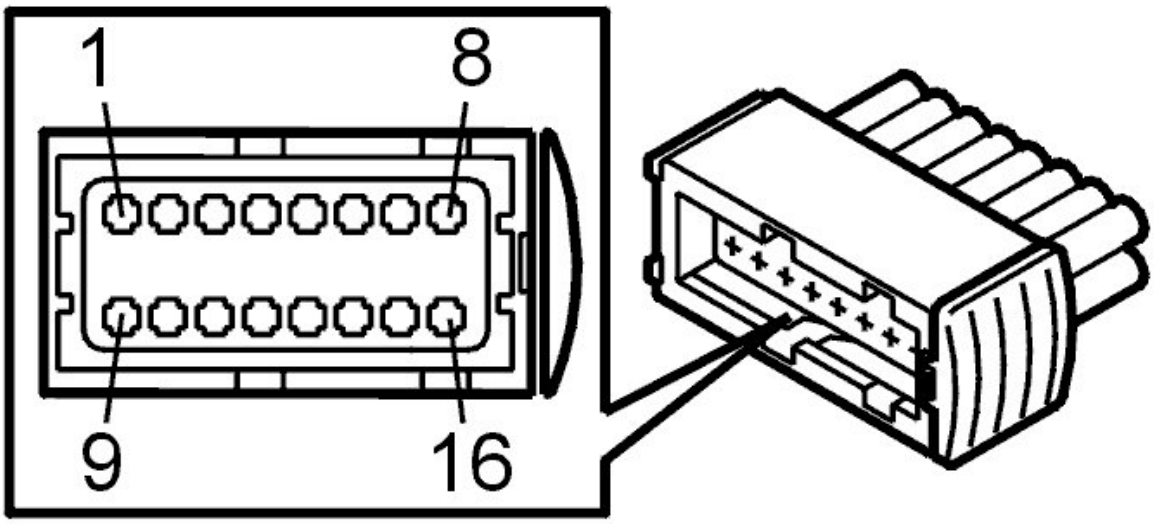
Attempt New Test - Checking the function of the glow plug

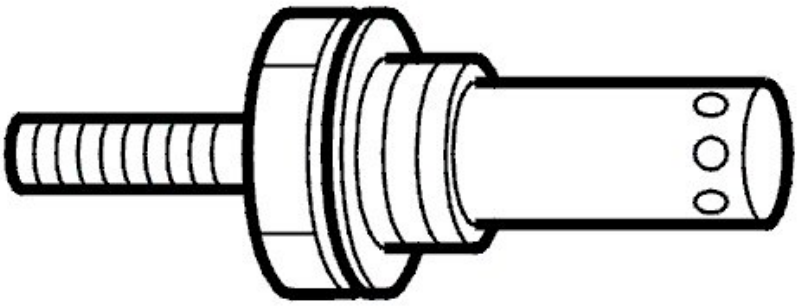
Checking components and wiring

Check the electrical terminal for the glow plug and the combustion preheater module (CPM) connector. Check for contact resistance and oxidation. Check for damage in particular.
Check the cable between combustion preheater module (CPM) terminal #1 and the glow plug terminal. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
With the ignition on and the glow plug electrical terminal disconnected, the voltage between the glow plug electrical terminal (control module side) and ground must be approximately 9 V.
Replace the glow plug if no fault is found in the cable.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Glow plug engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Heater Element/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

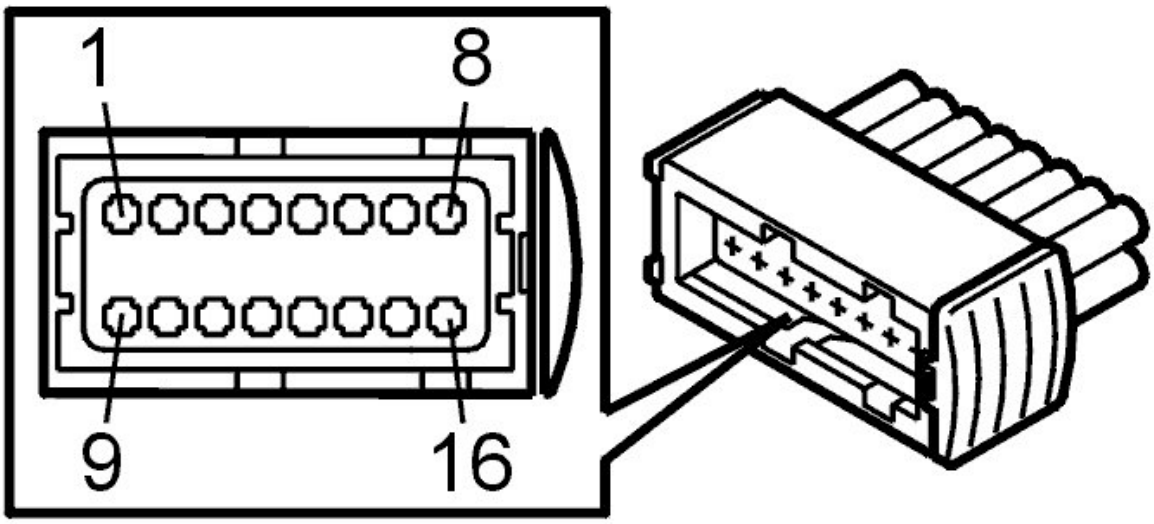
Checking components and wiring

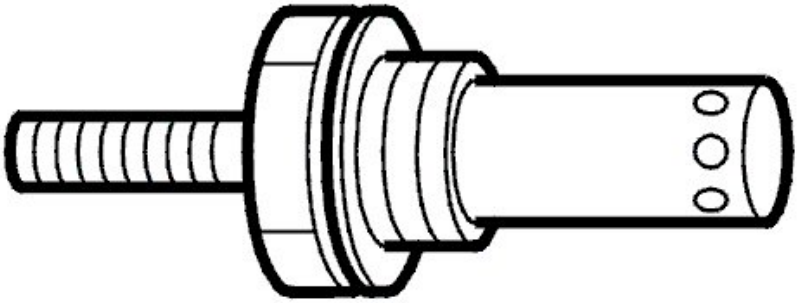
Check the electrical terminal for the glow plug and the combustion preheater module (CPM) connector. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between combustion preheater module (CPM) terminal #1 and the glow plug terminal. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground. Check for an intermittent short-circuit to supply voltage.
With the ignition on and the glow plug electrical terminal disconnected, the voltage between the glow plug electrical terminal (control module side) and ground must be approximately 9 V.
Remedy as necessary.

Other information

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Glow plug engine coolant heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Heater Element/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



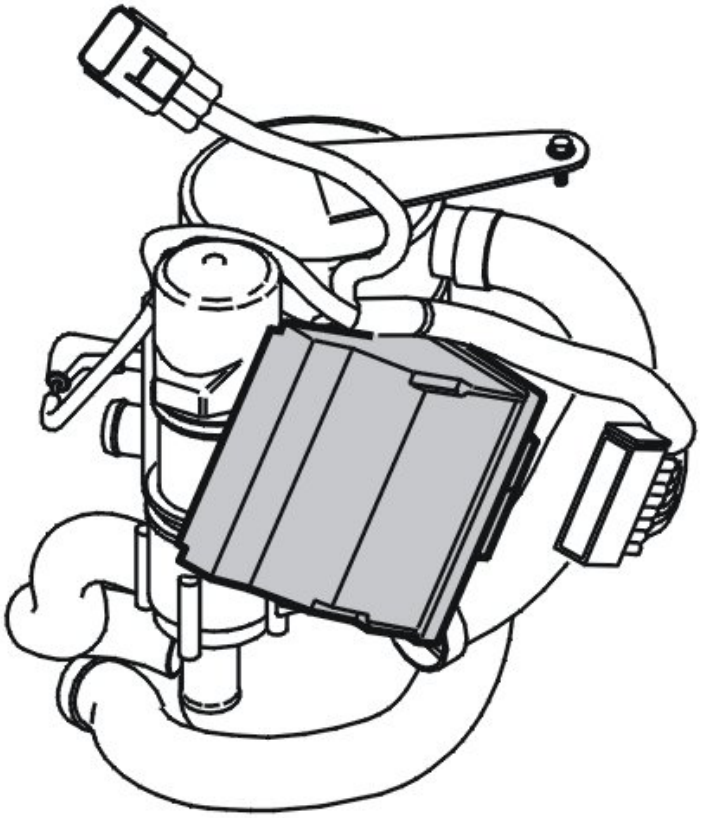


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F47

Condition



The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power supply to the combustion preheater module (CPM) exceeds 16 V.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- A battery charger or starter unit with incorrect charge voltage is connected
- Damaged generator (GEN).

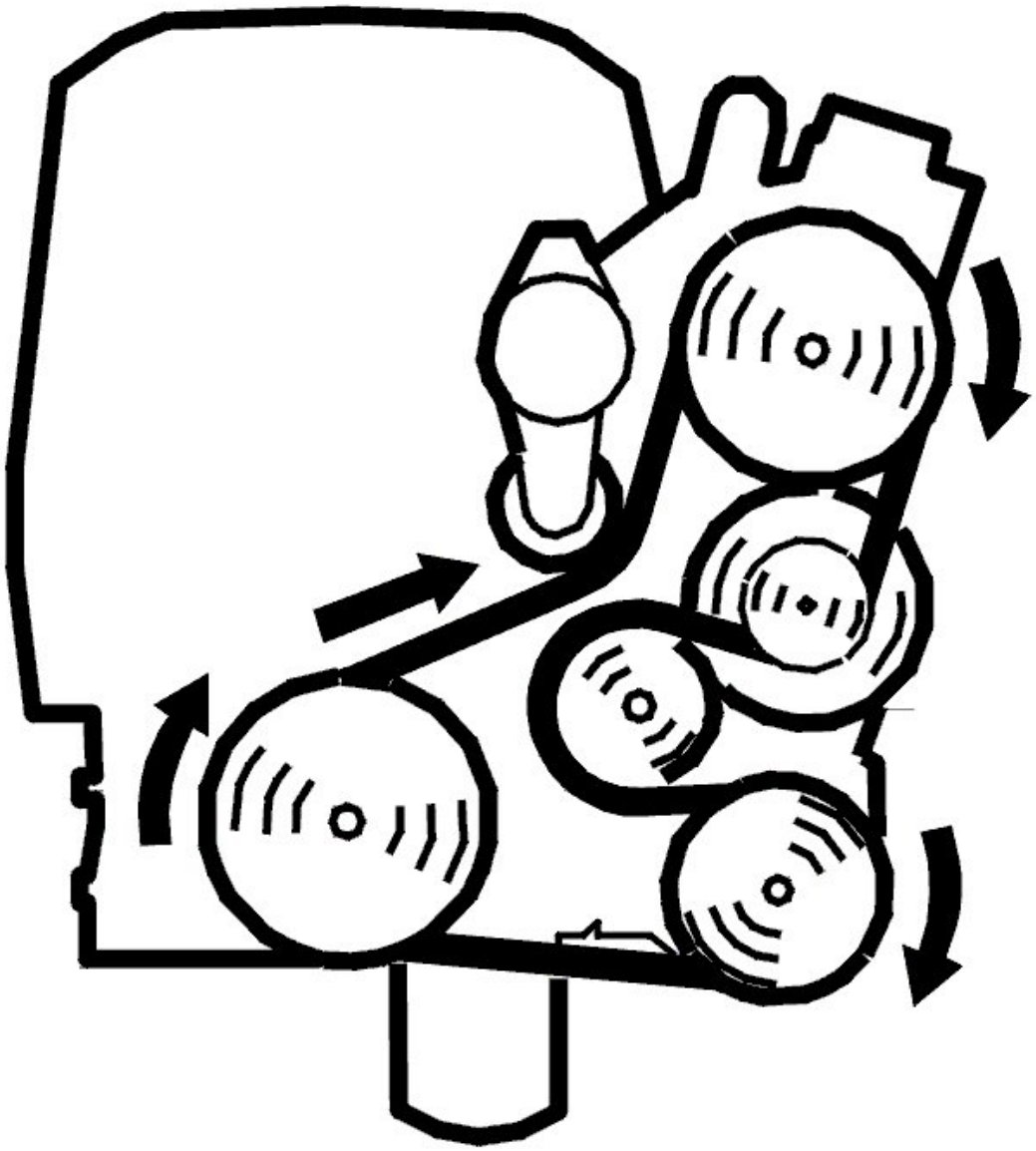
Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too High

Signal too high

Checking charge voltage

Hint: It is important that the correct voltage is set when the battery charger or start unit is connected to the battery.
Charging with too high a voltage can cause a diagnostic trouble code (DTC) to be stored.



- Engine running
- Connect a voltmeter between the battery terminals.

The battery voltage must be less than 16 V.

Is the battery voltage OK?

Yes - Intermittent fault

No - Checking the charging system

Checking the charging system

Check the charging system for excessive charge voltage. See relevant information.

Continue - **DONE**Fault-tracing information

Intermittent fault

The combustion preheater module (CPM) has previously registered too high a voltage. This may have been caused by the connection of a battery charger with incorrect voltage to the battery, or by an intermittent fault in the charging regulator.

Continue - **DONE**Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking charge voltage

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-5F50

Condition

The central electronic module (CEM) checks the communication with the combustion preheater module (CPM).
If Central electronic module (CEM) registers non-allowed high temperature of the coolant, the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when the heater is activated.

Substitute value
- None.

Possible source
- Air in the cooling system
- The cooling system is blocked
- Damaged water pump.
- Damaged overheat protection thermostat
- Damaged engine coolant temperature (ECT) sensor.

Fault symptom[s]
- Poor heating in the passenger compartment.

Signal Too High

Signal too high

Checking the water flow

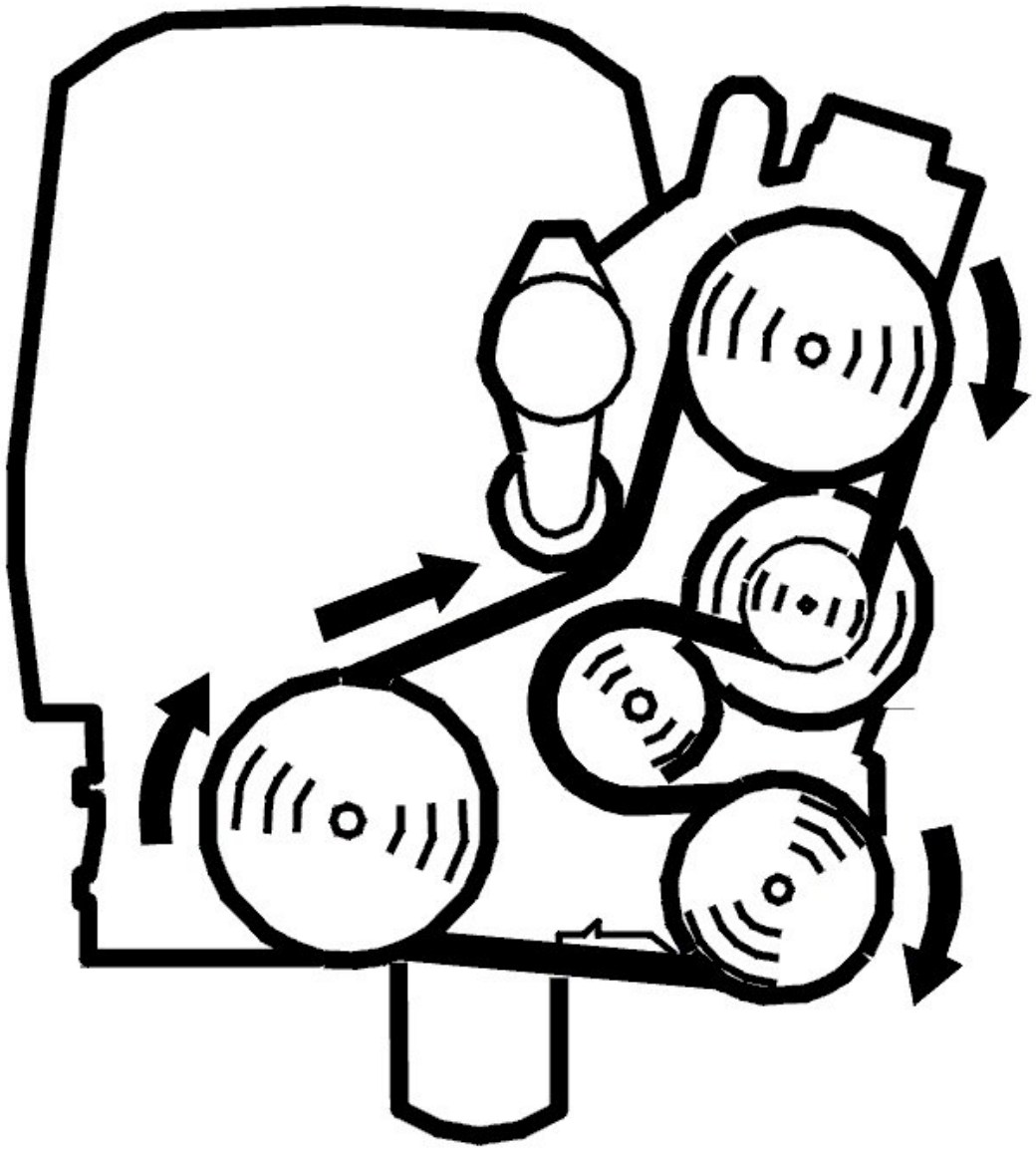
Check if the lines to and from the heater are blocked, or if the heater is damaged causing the through flow to be restricted in some way.
Remedy as necessary.

Was a fault detected?

Yes - Verification

No - Checking the engine coolant temperature sensor

Checking the engine coolant temperature sensor



- Start the engine
- Read off the coolant temperature in the heater.

Check that the engine coolant temperature (ECT) reading is correct. Compare with the actual coolant temperature of the engine.

Is the temperature reading OK?

Yes - Checking components and wiring

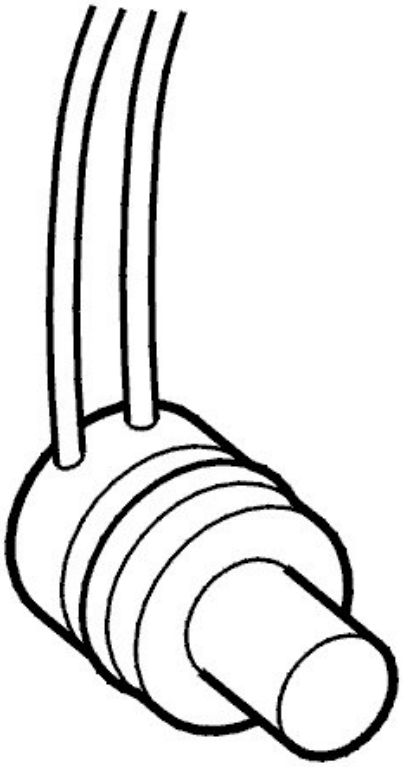
No - Checking components and wiring

Checking components and wiring

Check the resistance of the engine coolant temperature sensor.
Remedy as necessary.

Other information:

- Signal specification See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification
- Components resistance values See: Heating and Air Conditioning/Auxiliary Cabin Heater/Specifications
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair



Continue - Verification

Checking components and wiring

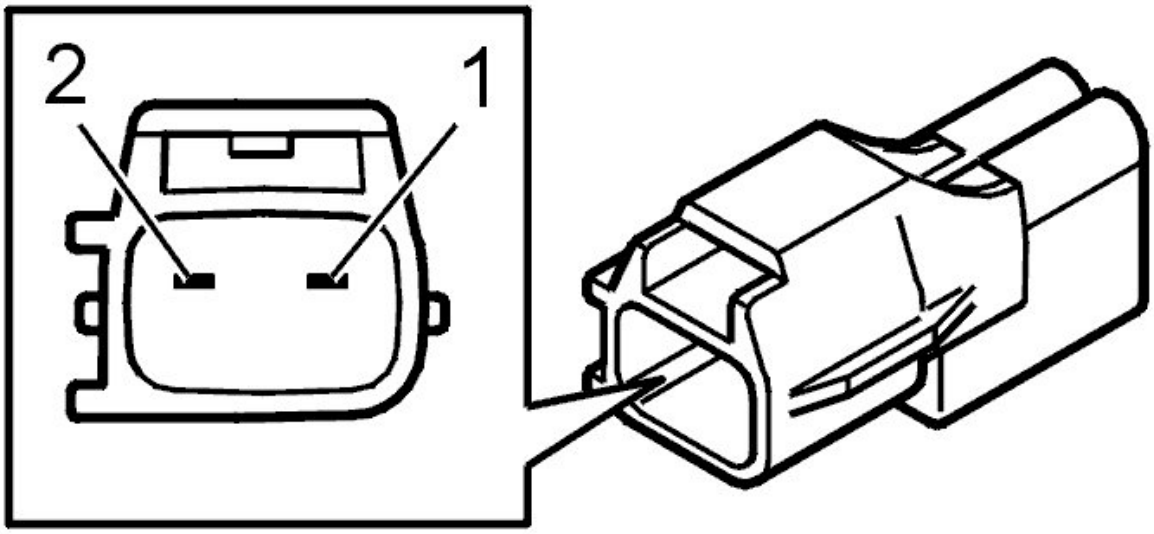
Check the fuel pump (FP) and combustion preheater module (CPM) connectors. Check for contact resistance and oxidation.
Check the cable between combustion preheater module (CPM) terminal #13 and fuel pump terminal 1. Check for an intermittent open-circuit.
Check the cable between combustion preheater module (CPM) terminal #11 and fuel pump terminal 2. Check for an intermittent open-circuit.

Note! Diagnostic trouble code (DTC) CEM-5F3B and/or diagnostic trouble code (DTC) CEM-5F3D may also be stored if there is a fault in the power cable.

Remedy as necessary.

Other information:

- Connecting the breakout box See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Fuel pump auxiliary heater, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Fuel Pump/Service and Repair
- Overheat protection thermostat / flame sensor / engine coolant temperature sensor, replacing See: Heating and Air Conditioning/Auxiliary Cabin Heater/Auxiliary Cabin Heater Overheat Sensor / Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals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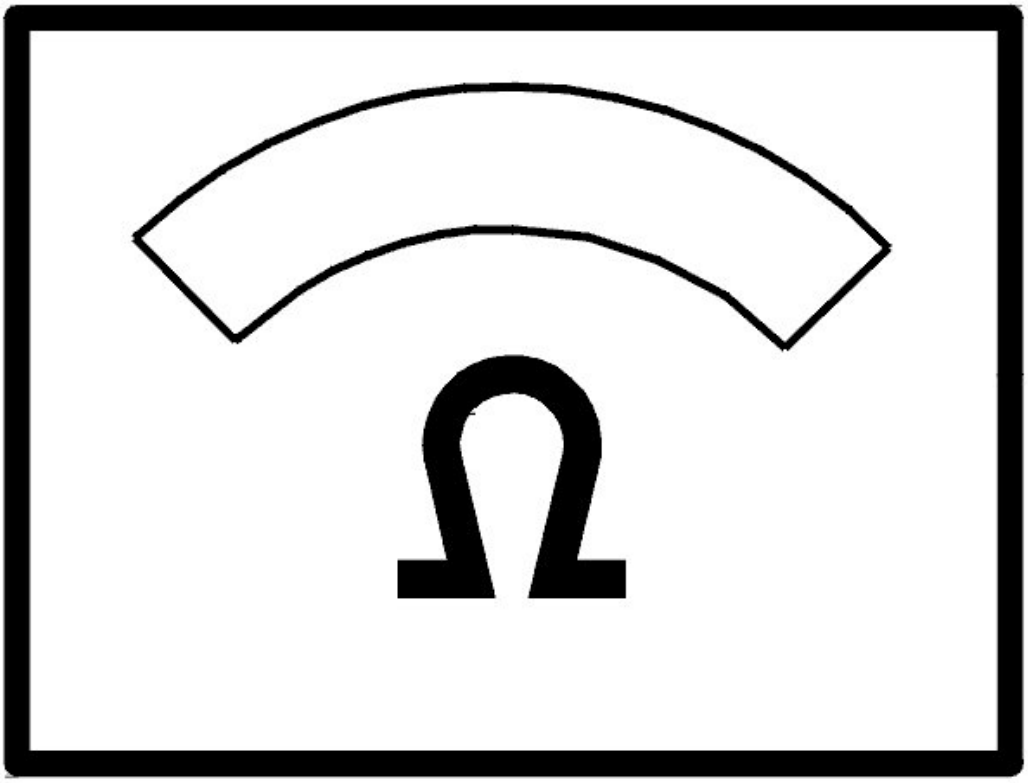
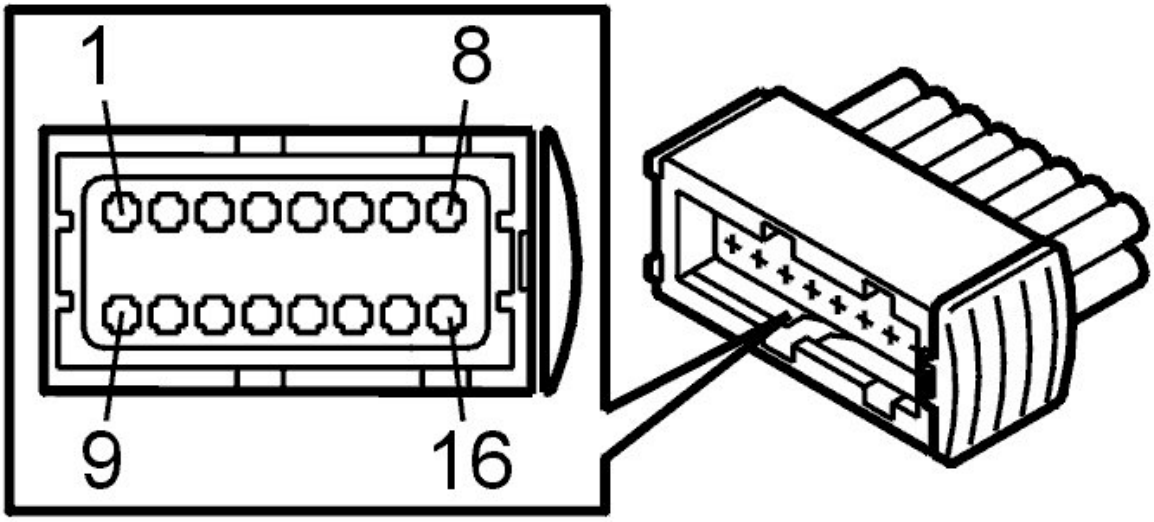




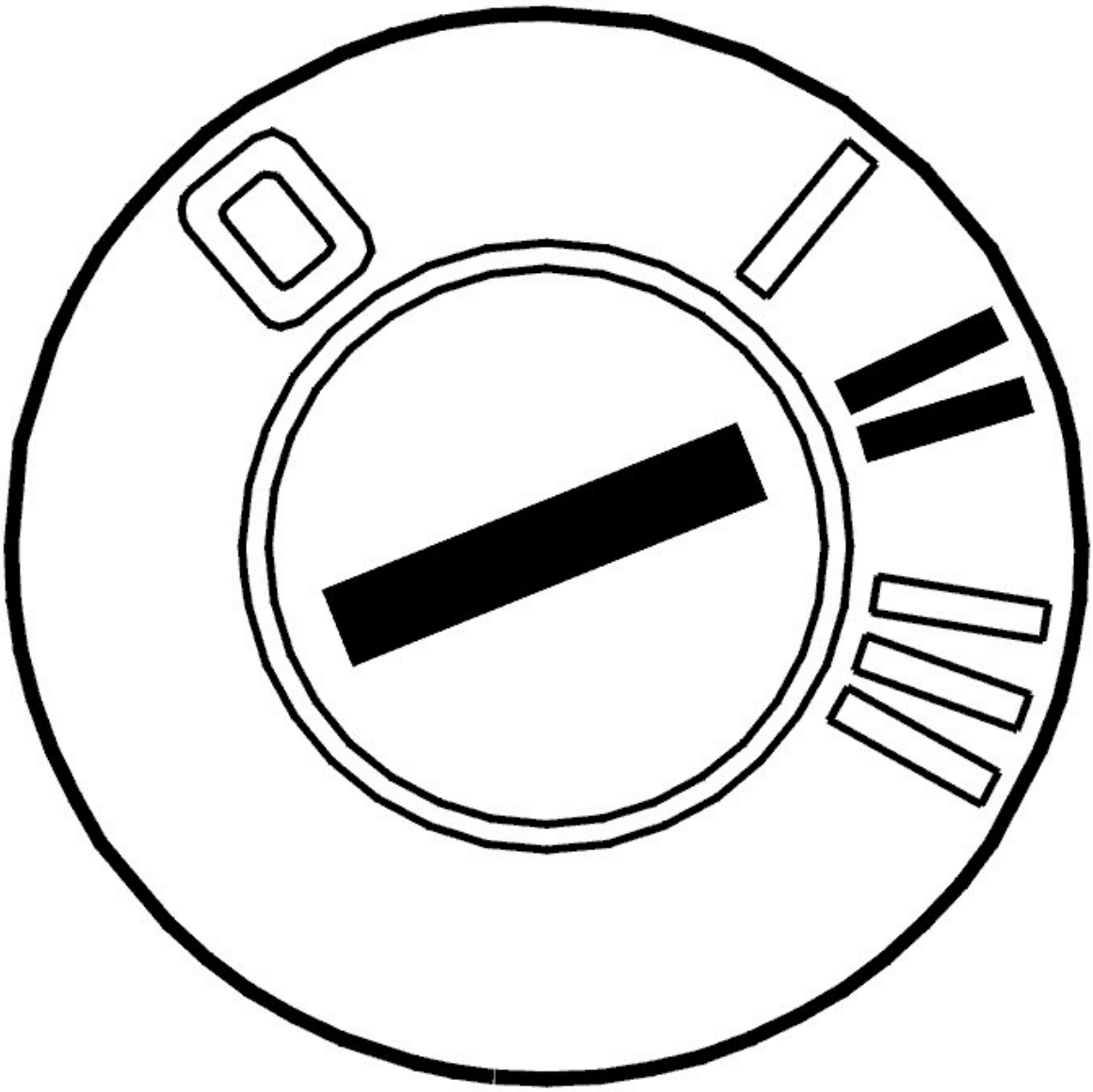
Continue - Verification

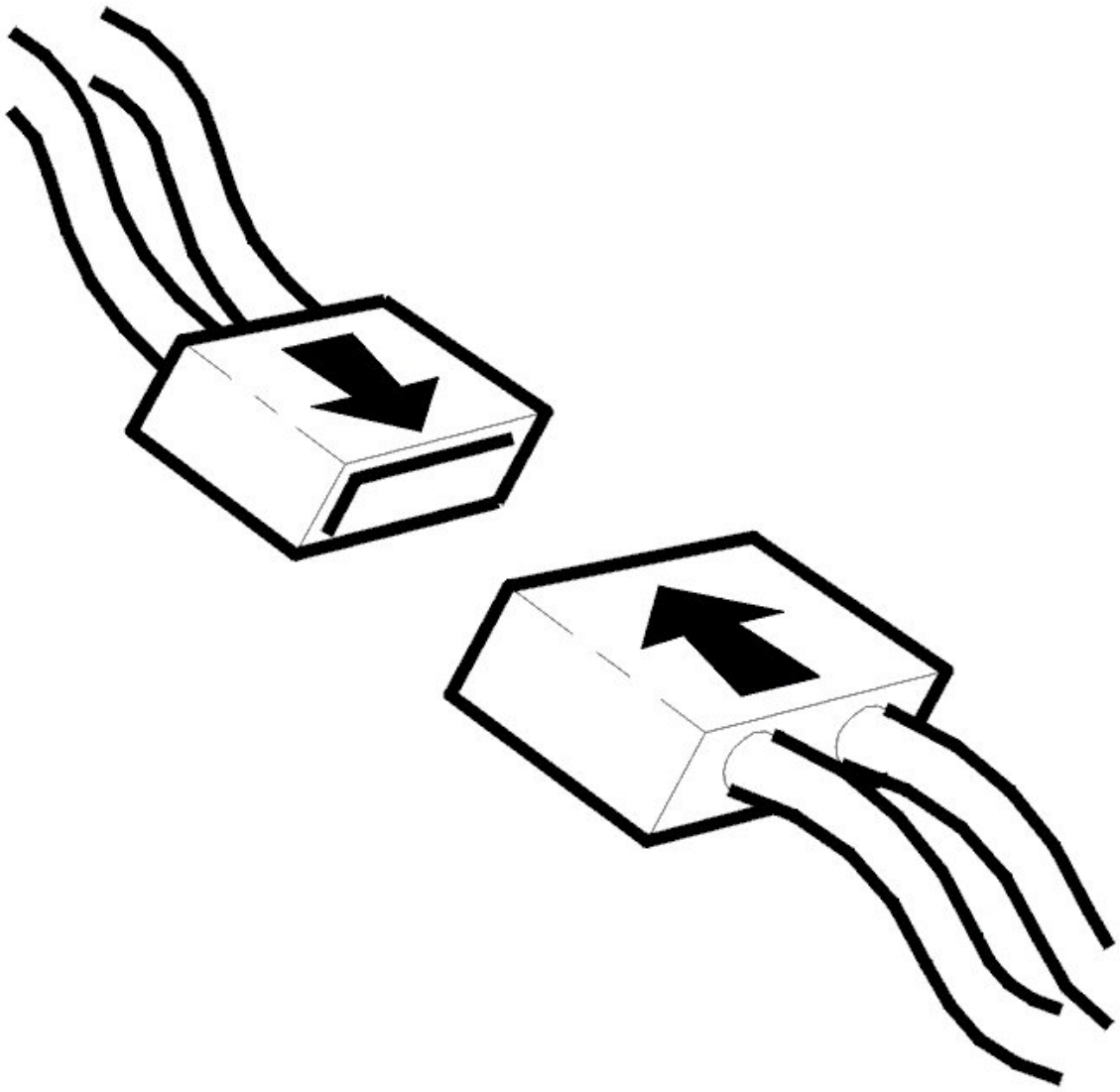
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the engine coolant temperature.

Note! It is important that only the ignition is on in order for the heater to start.

- Activate the heater.

Hint: After repair, the voltage of the flame sensor can be checked. The voltage must be a maximum of 1.0 V.

Check the heater function.

Caution! In order for to enable start of the heater itself, the battery voltage must be normal, coolant temperature must be lower than +96 °C and the heater's after-run/stop sequence must be finished. There must also be enough fuel in the tank.

Caution! If the heater or other components are not activated, try closing down the activation window and then starting the activation again with the symbol for VCT2000.

Other information:

- Engine coolant heater, test running See: Heating and Air Conditioning/Auxiliary Cabin Heater/Testing and Inspection/Component Tests and General Diagnostics.

Is the heater working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

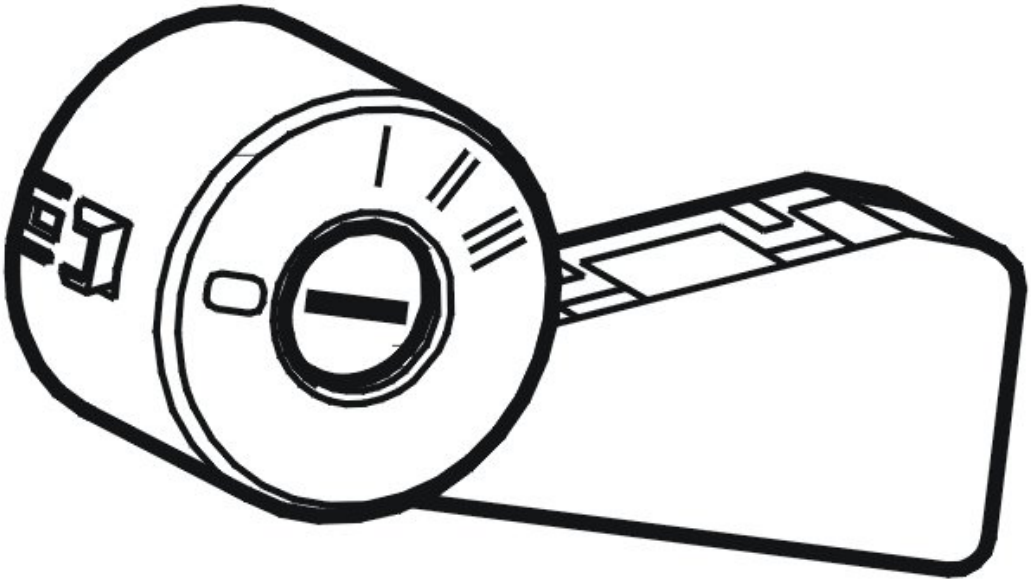
Attempt New Test - Checking the water flow

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C41

Condition



The central electronic module (CEM) communicates with the ignition key when the key is inserted in the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects a short-circuit to supply voltage in the ignition switch.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

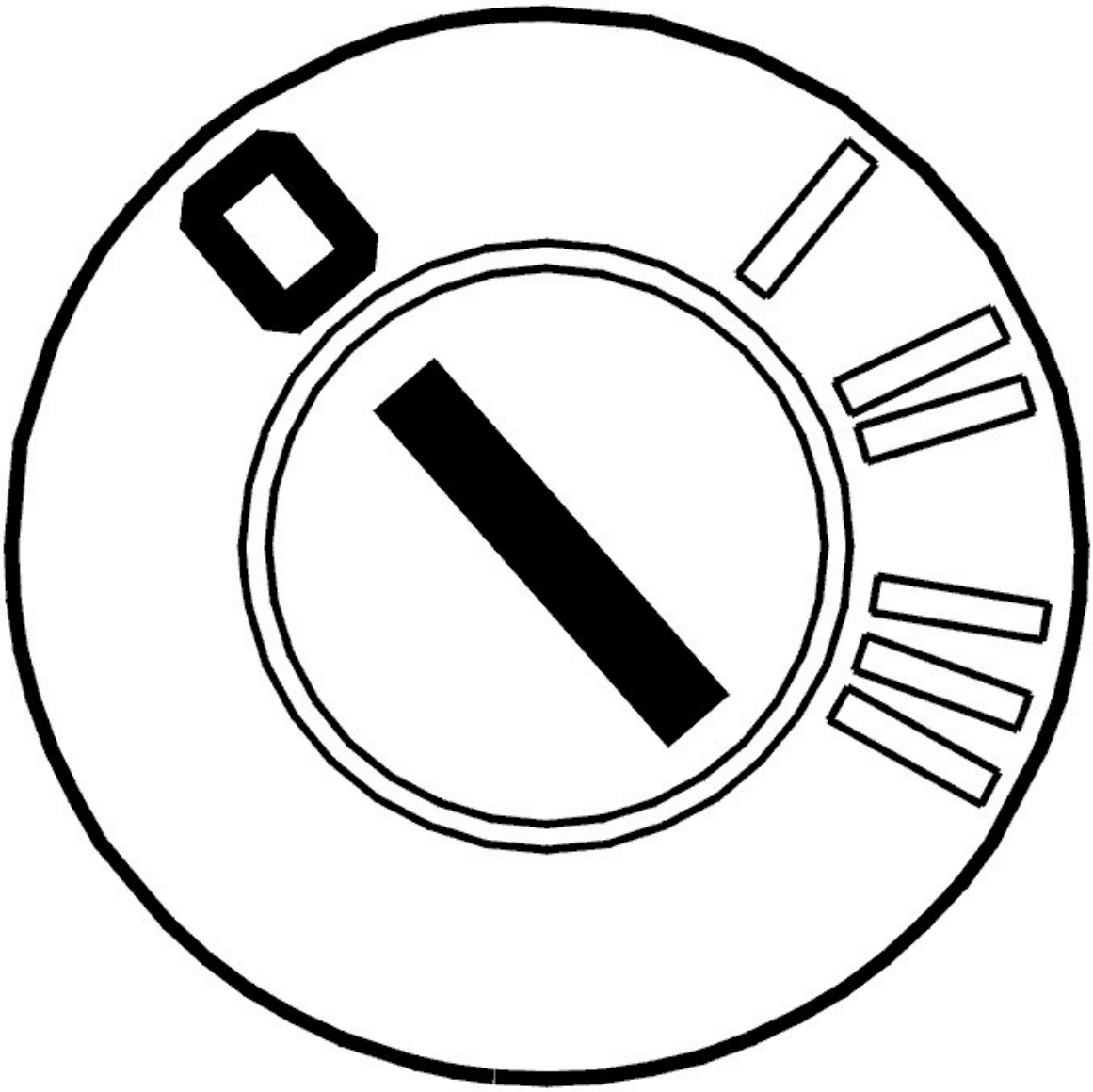
Possible source
- Short-circuit to supply voltage in the clock signal.

Fault symptom[s]
- The starter motor does not turn.

Signal Too High

Signal too high

Checking the wiring



- Ignition off.

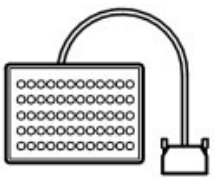
Check central electronic module (CEM) connector D and the connector for the immobilizer antenna unit. Check for contact resistance. Check for oxidation. Check for damaged or loose connections.
Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:

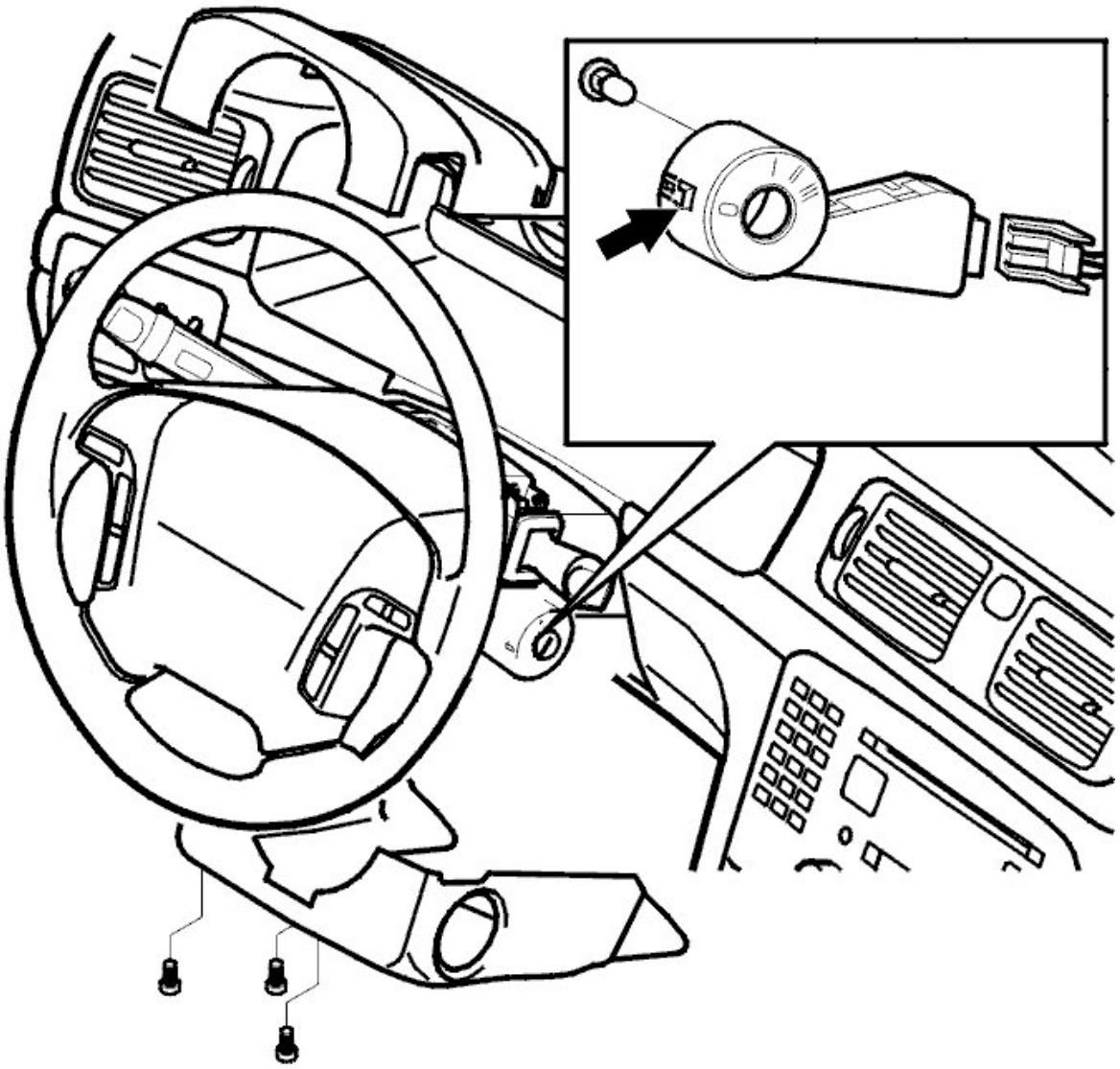
- Central electronic module (CEM) connector terminal #D57 (#57) and immobilizer antenna unit terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





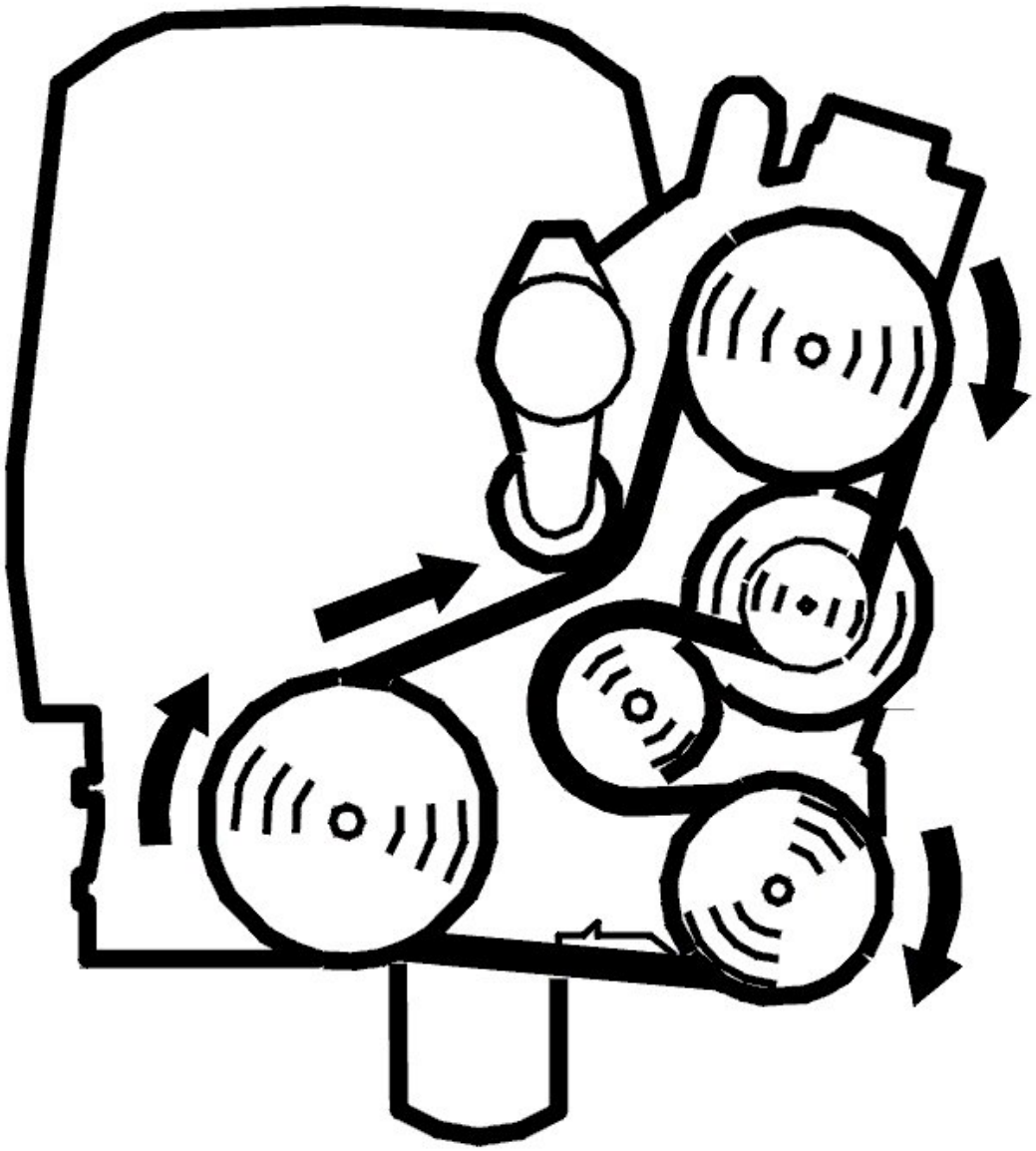
Continue - Verification

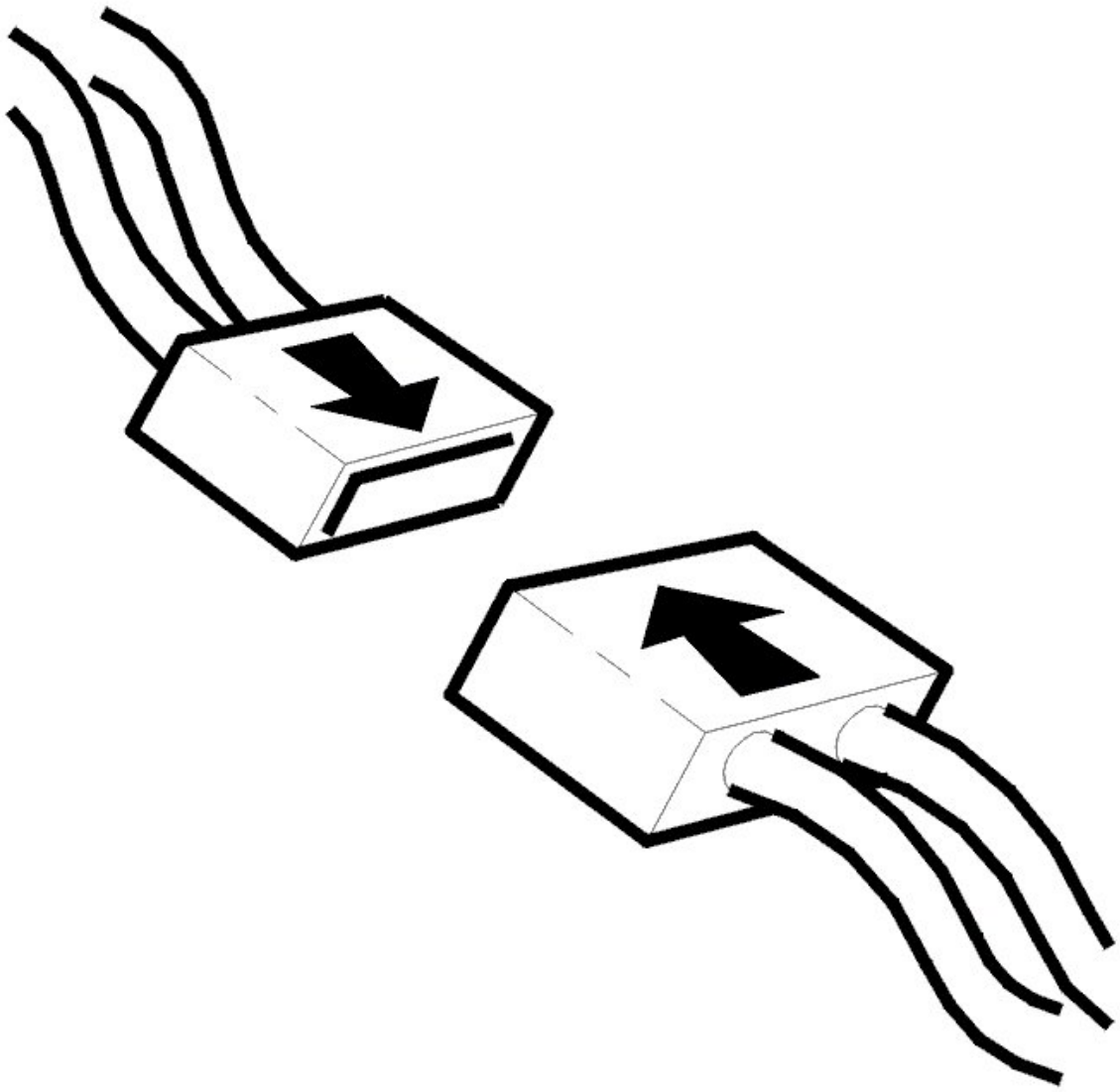
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the vehicle.

Does the vehicle start?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

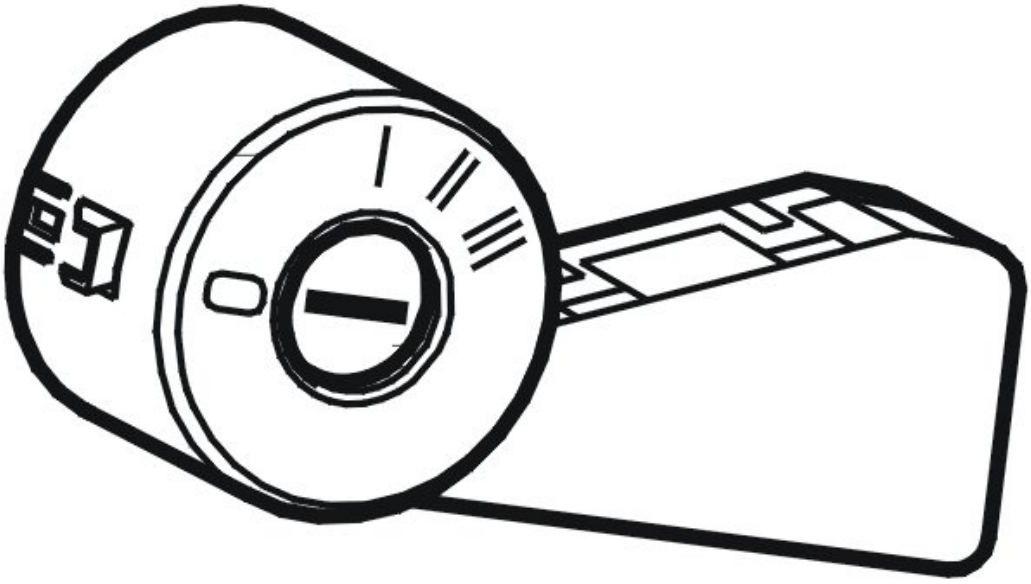
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C42

Condition



The central electronic module (CEM) communicates with the ignition key when the key is inserted in the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the cable for the clock signal to the ignition switch or a short-circuit to ground in the cable.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault in the power supply (15) to the ignition switch
- Open-circuit in the cable for the clock signal
- Short-circuit to ground in the clock signal.

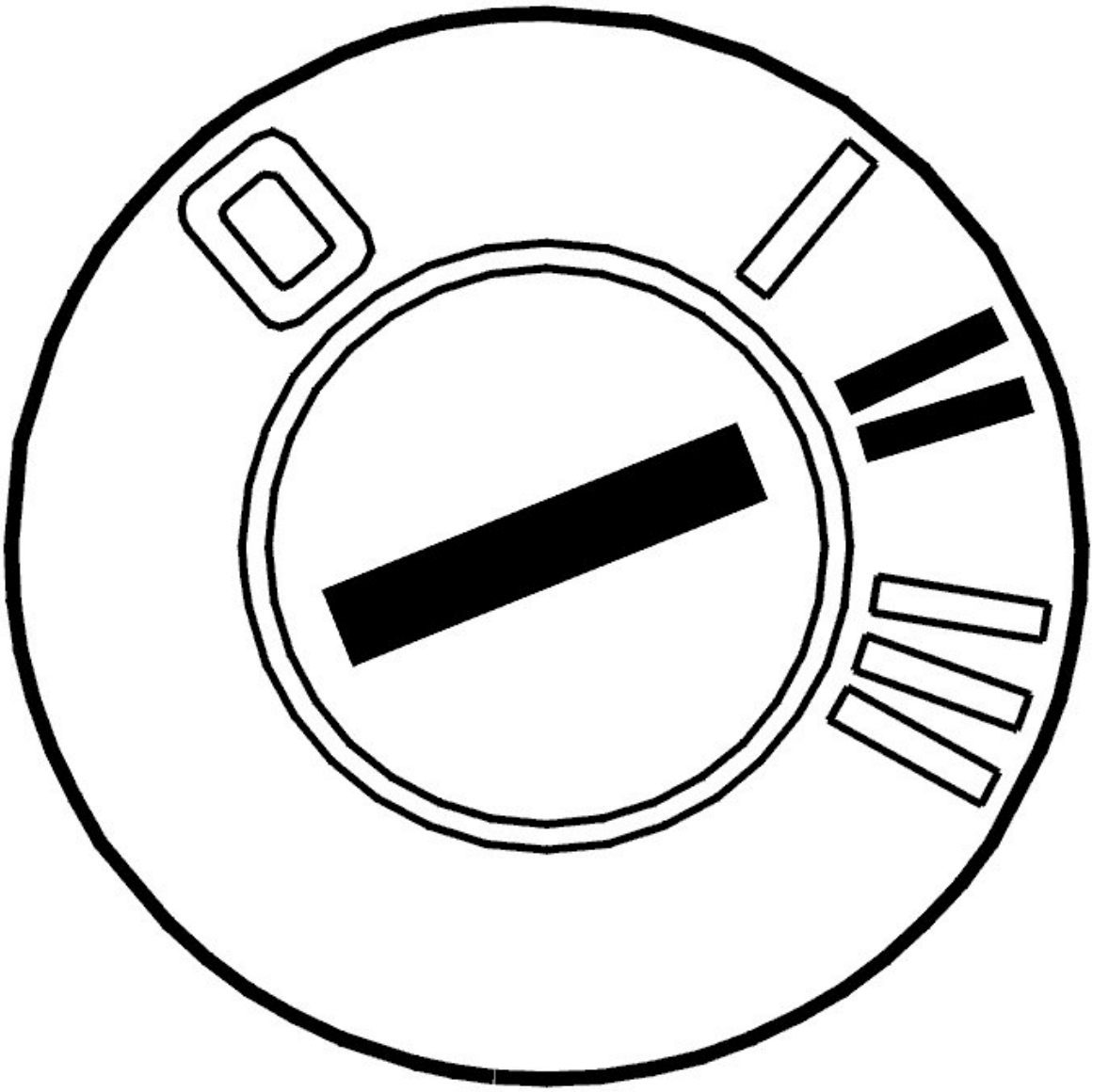
Fault symptom[s]

- The starter motor does not turn.

Signal Too Low

Signal too low

Checking the power supply

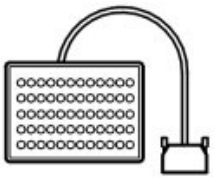


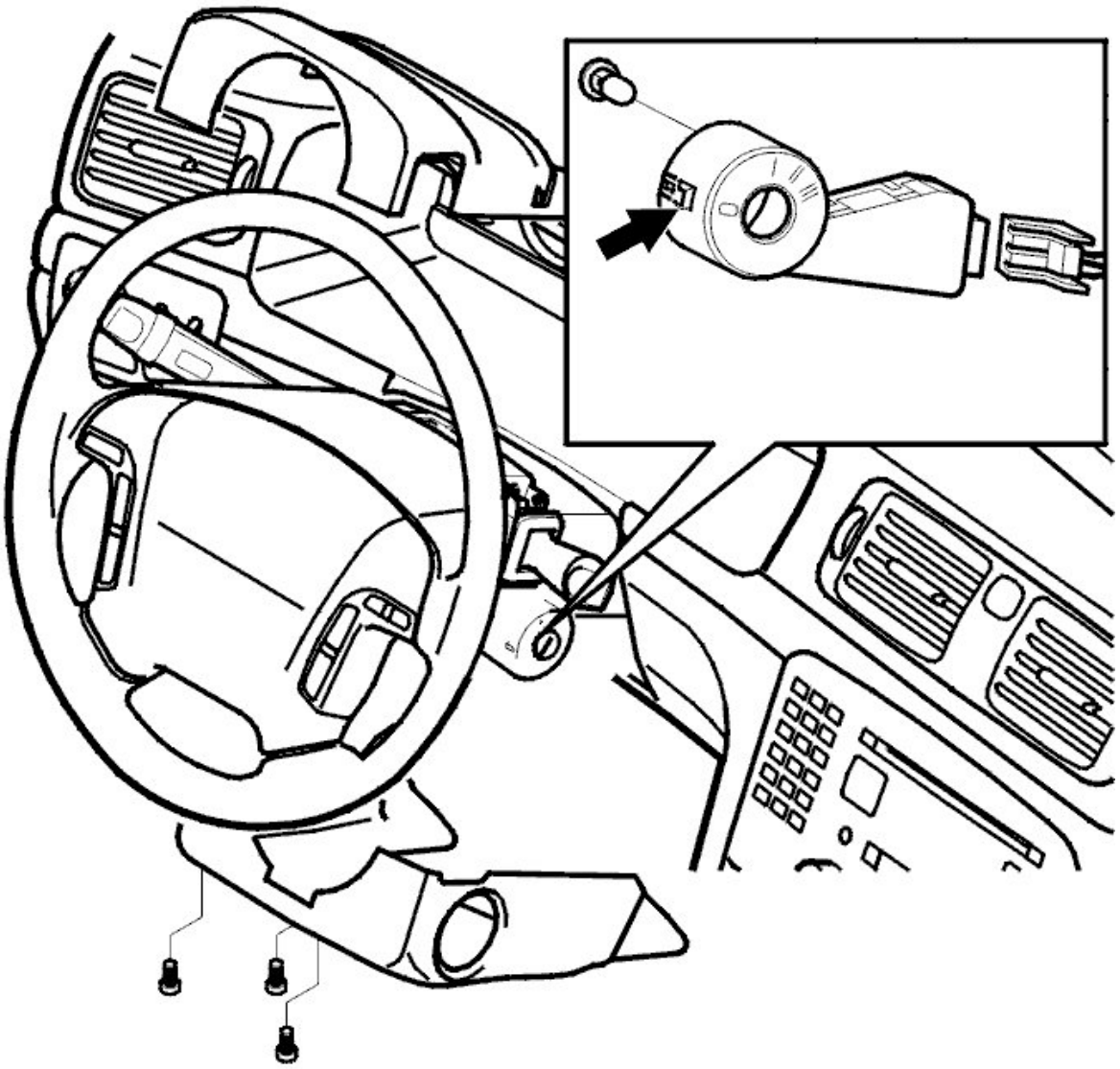
- Ignition on.

Check the power supply cable from the ignition switch to connector terminal #1 on the immobilizer antenna unit. Check for an open-circuit. Check for loose connections. Check for contact resistance and oxidation.
Remedy as necessary.

Other information

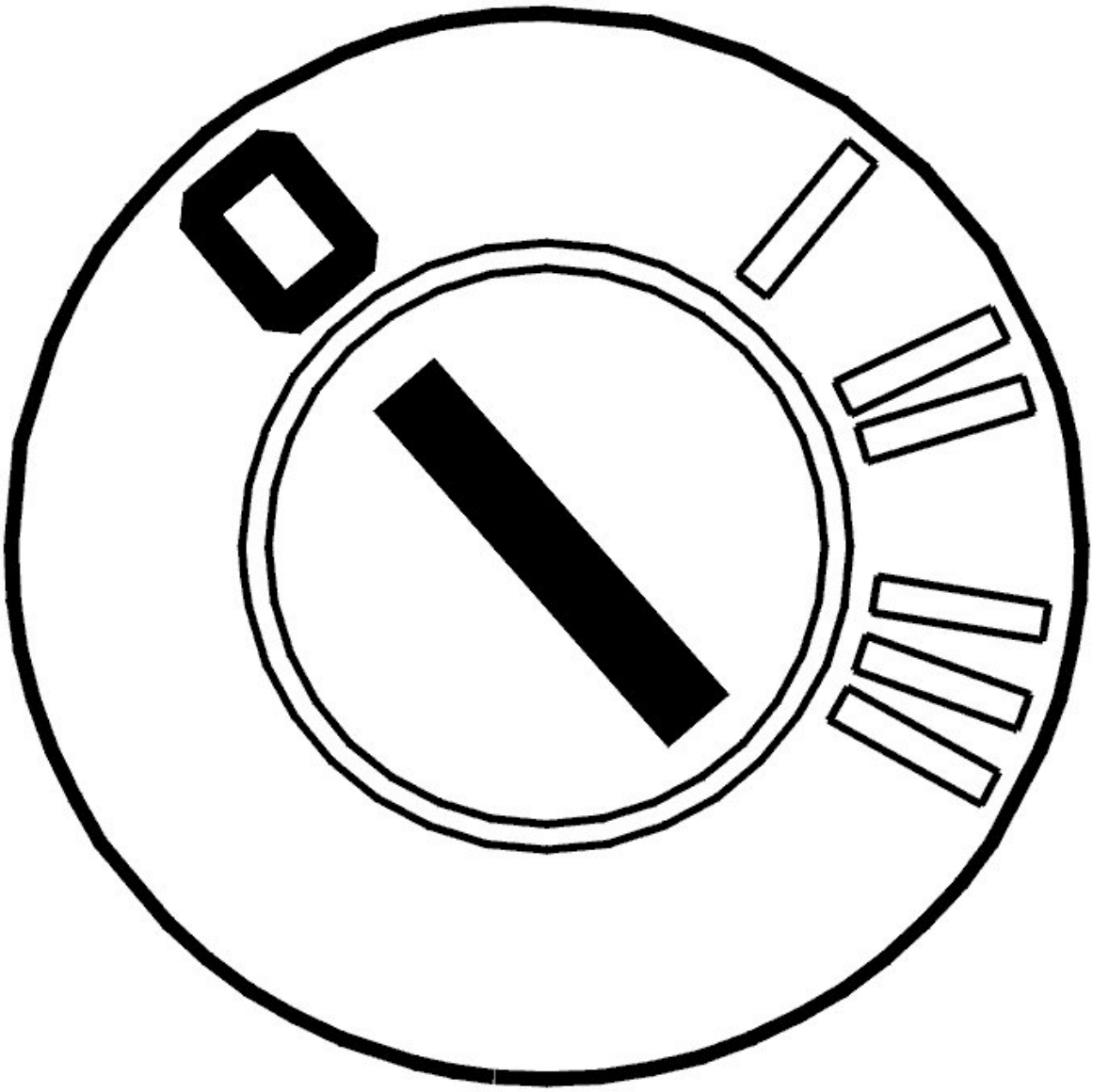
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Checking the signal cable

Checking the signal cable



- Ignition off.

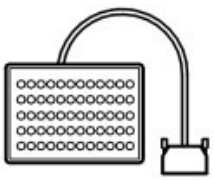
Check central electronic module (CEM) connector D and the connector for the immobilizer antenna unit. Check for contact resistance. Check for oxidation. Check for damaged or loose connections.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

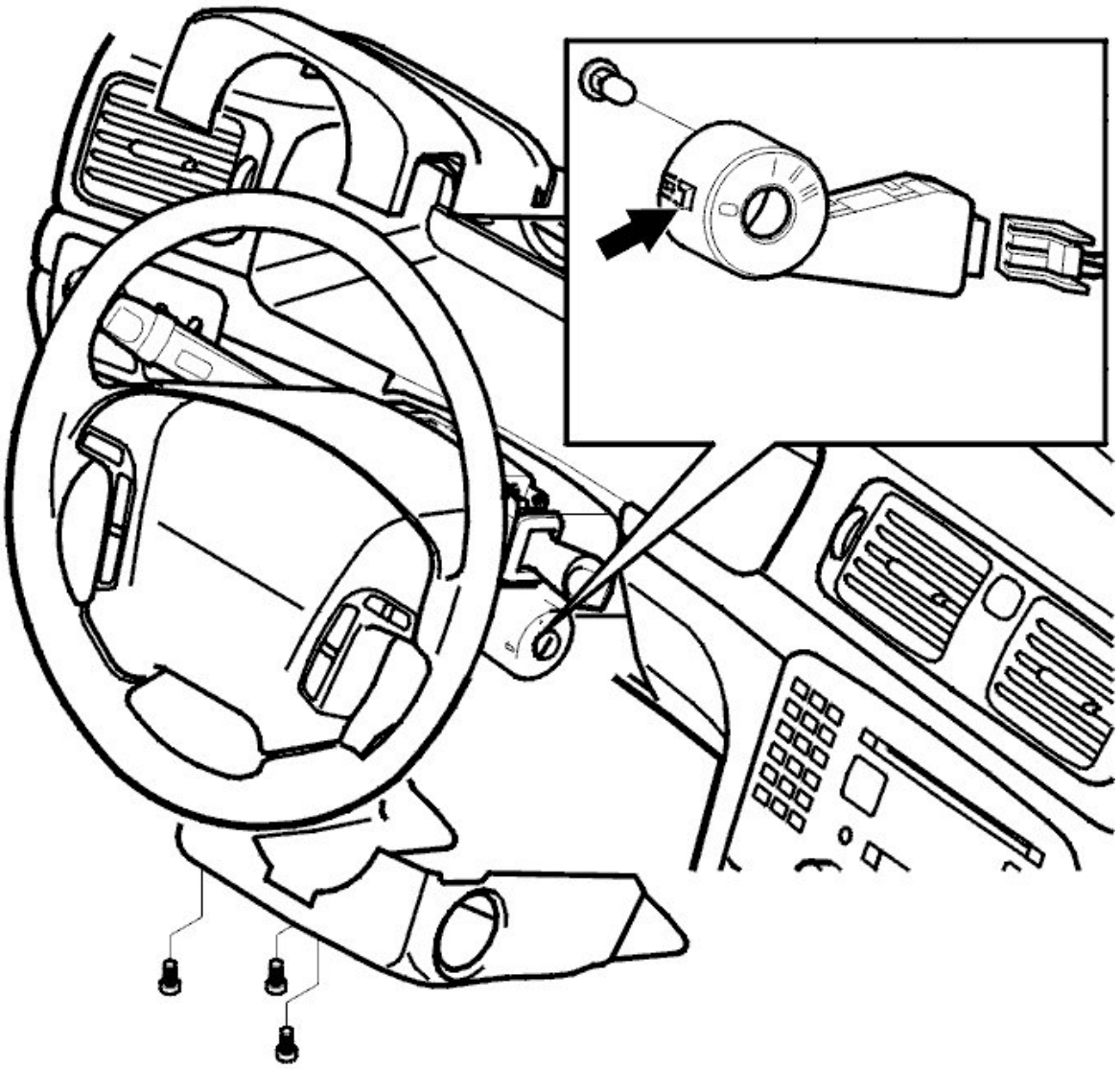
- Central electronic module (CEM) connector terminal #D57 (#57) and immobilizer antenna unit terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





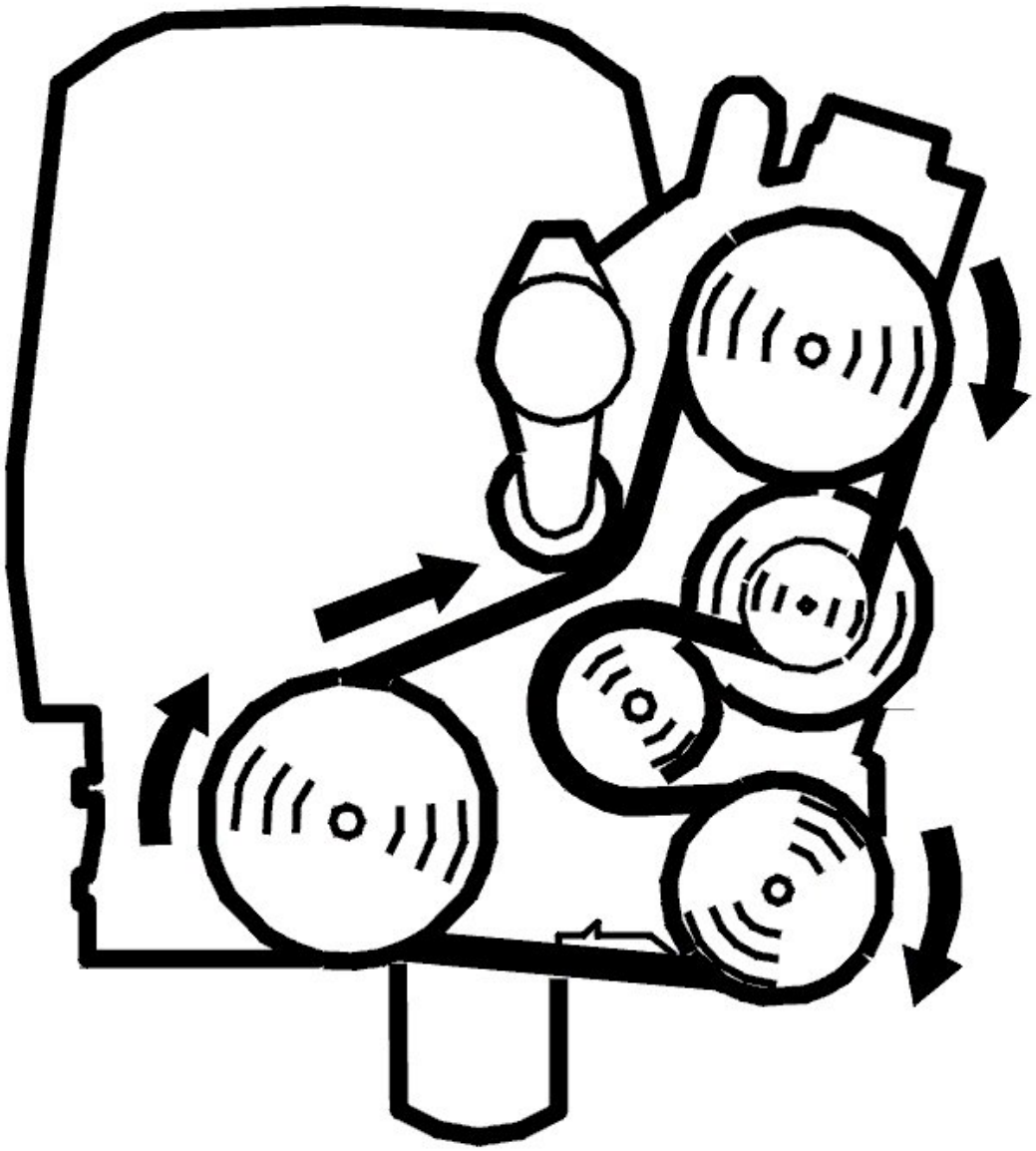
Continue - Verification

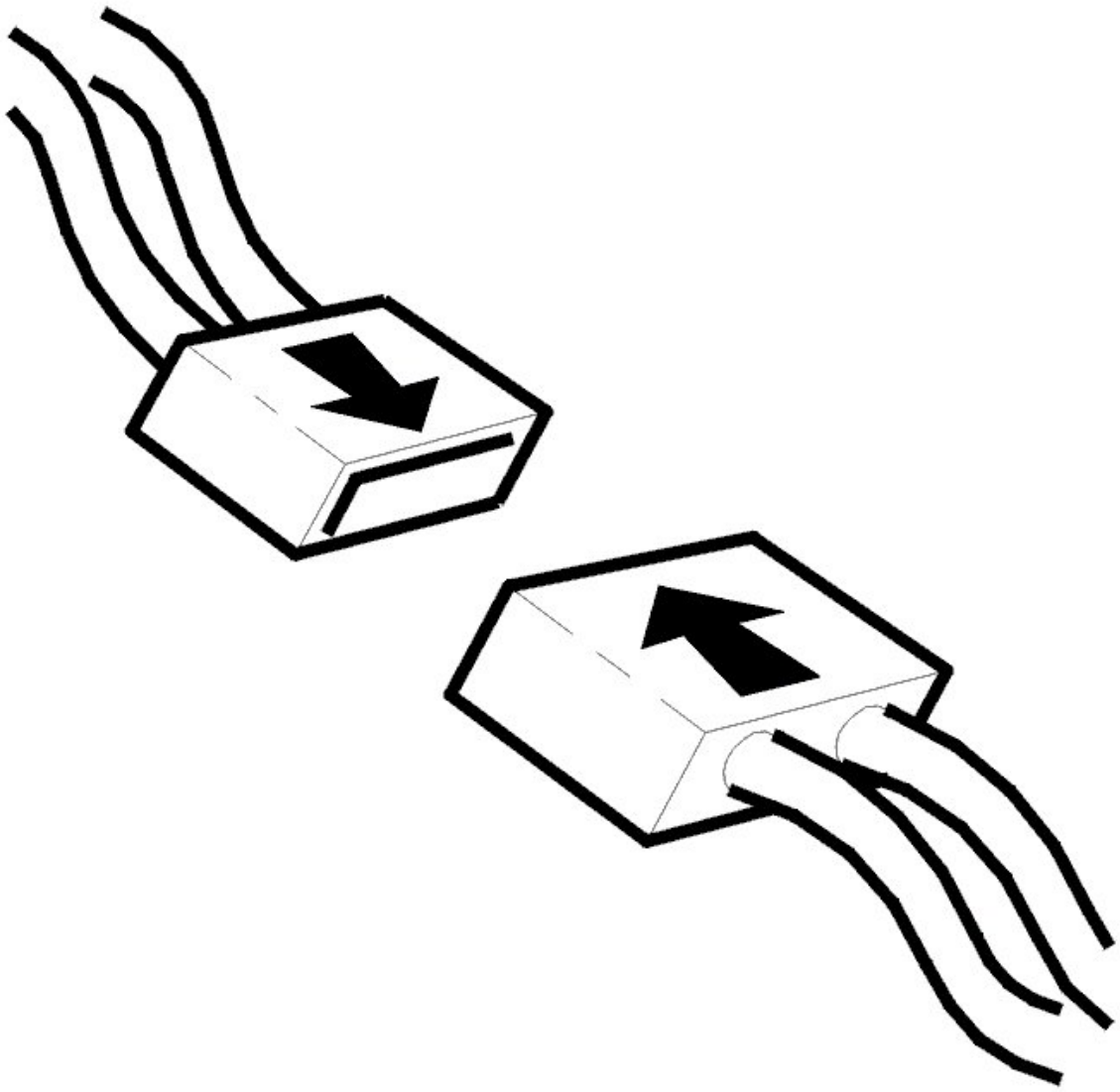
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the vehicle.

Does the vehicle start?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

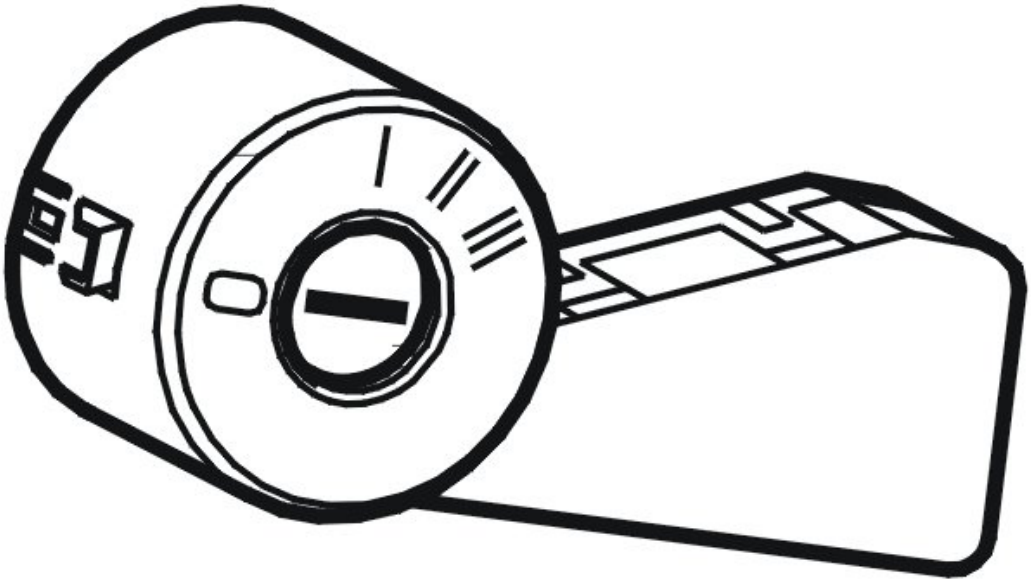
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C43

Condition



The central electronic module (CEM) communicates with the ignition key when the key is inserted in the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to supply voltage in the data cable for the ignition switch.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

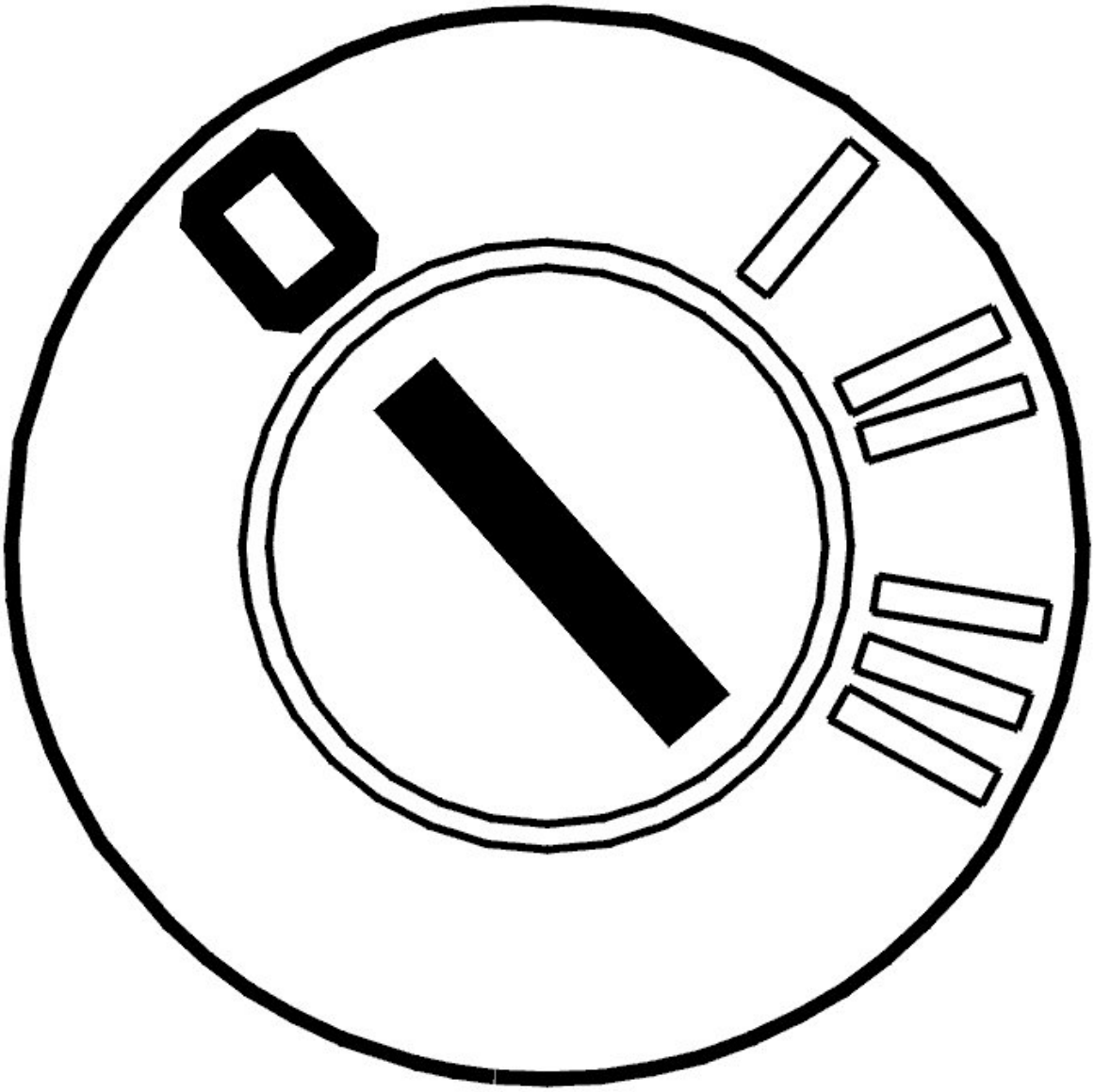
Possible source
- Short-circuit to supply voltage in the data cable.

Fault symptom[s]
- The starter motor does not turn.

Signal Too High

Signal too high

Checking the wiring



- Ignition off.

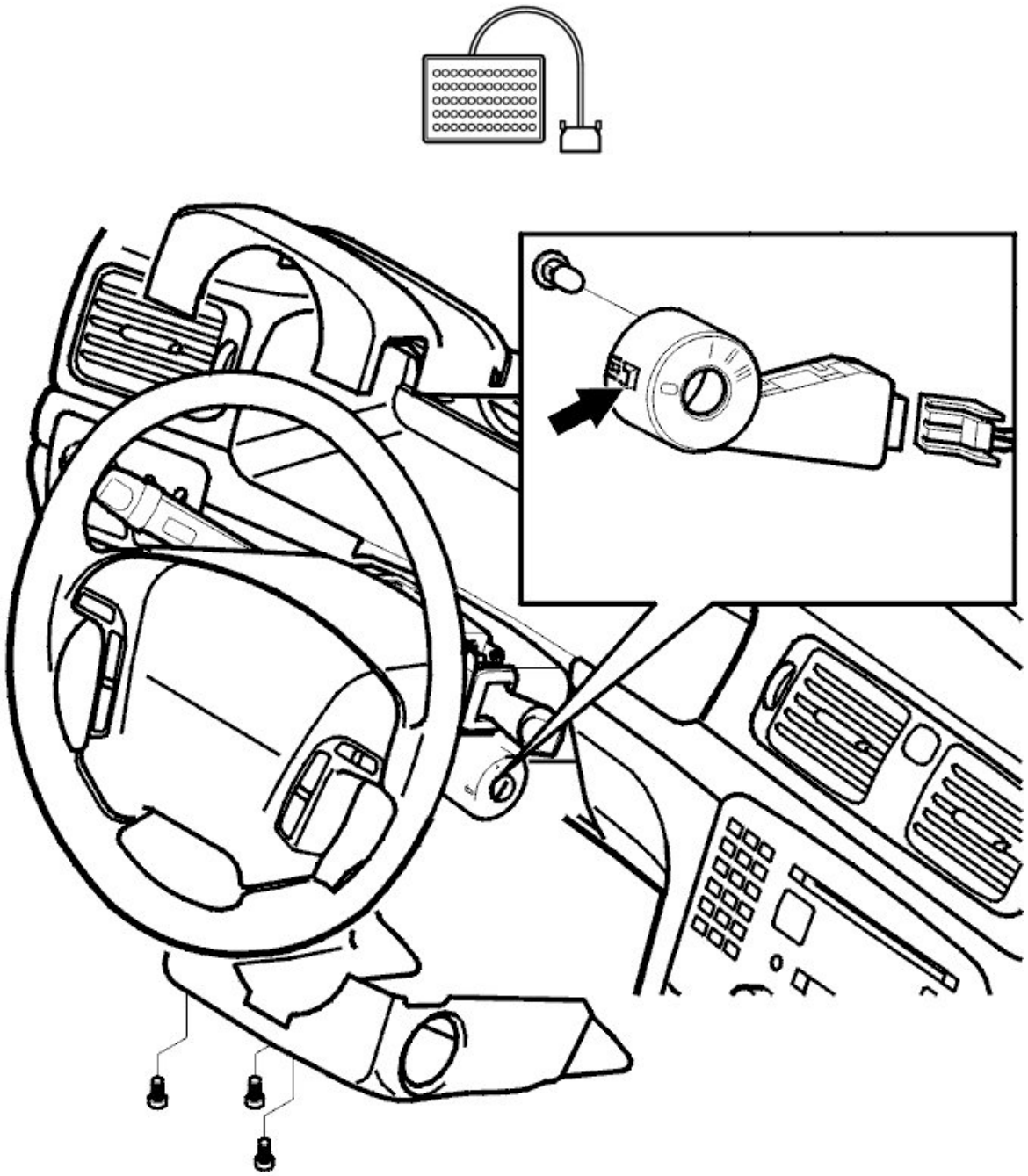
Check central electronic module (CEM) connector D and the connector for the immobilizer antenna unit. Check for contact resistance. Check for oxidation. Check for damaged or loose connections.
Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:

- Central electronic module (CEM) connector terminal #D56 (#56) and immobilizer antenna unit terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



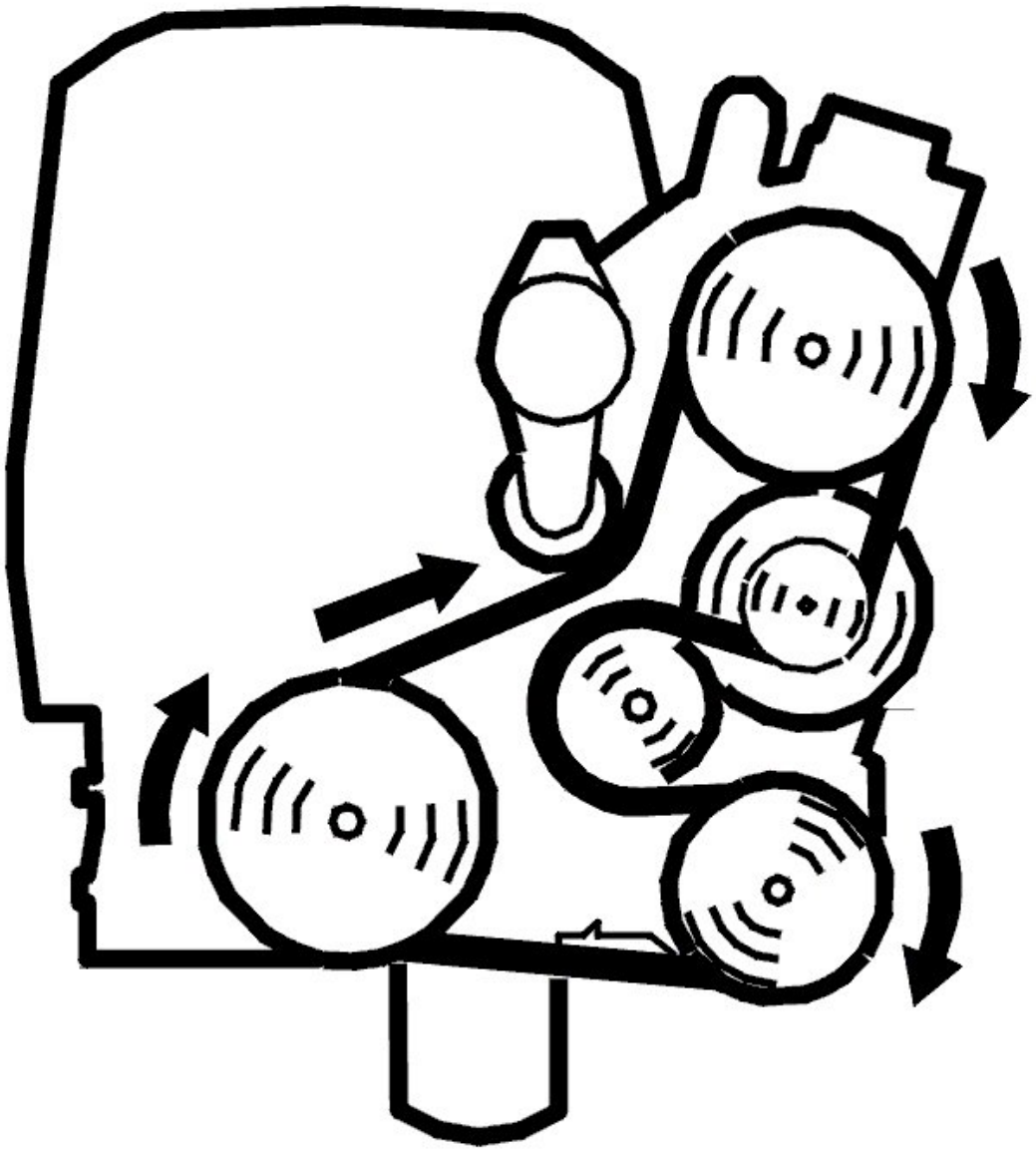
Continue - Verification

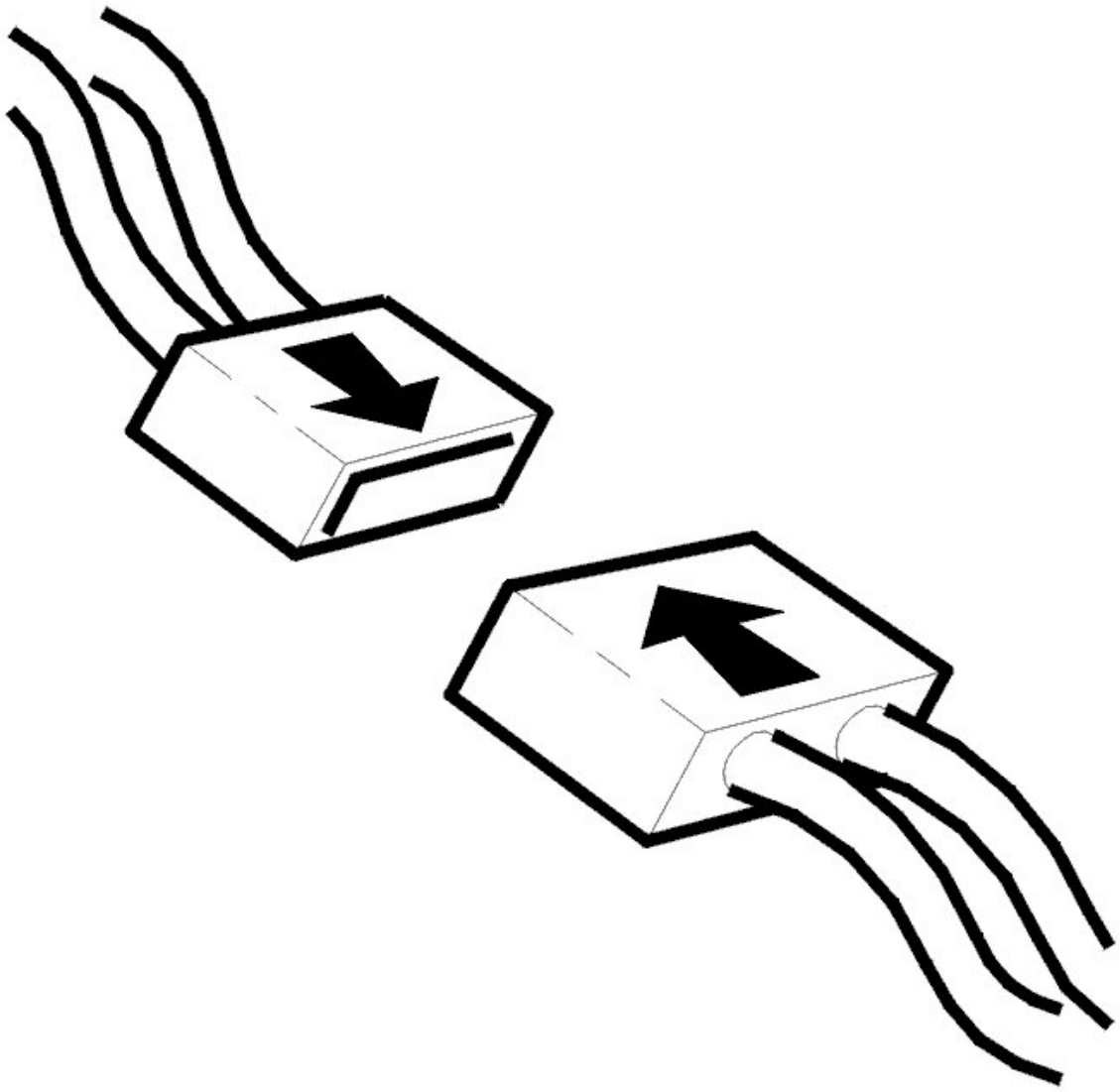
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the vehicle.

Does the vehicle start?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

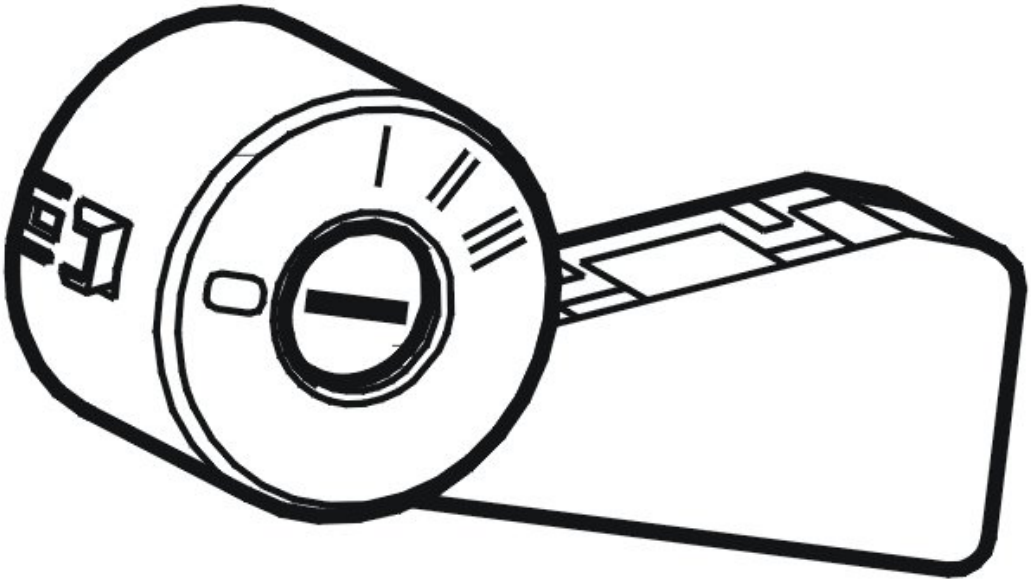
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C44

Condition



The central electronic module (CEM) communicates with the ignition key when the key is inserted in the ignition switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an open-circuit in the data cable for the ignition switch, a short-circuit to ground in the cable or that there is no communication.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault in the power supply to the ignition switch
- Short-circuit to ground in the data cable
- Open-circuit in the data cable.

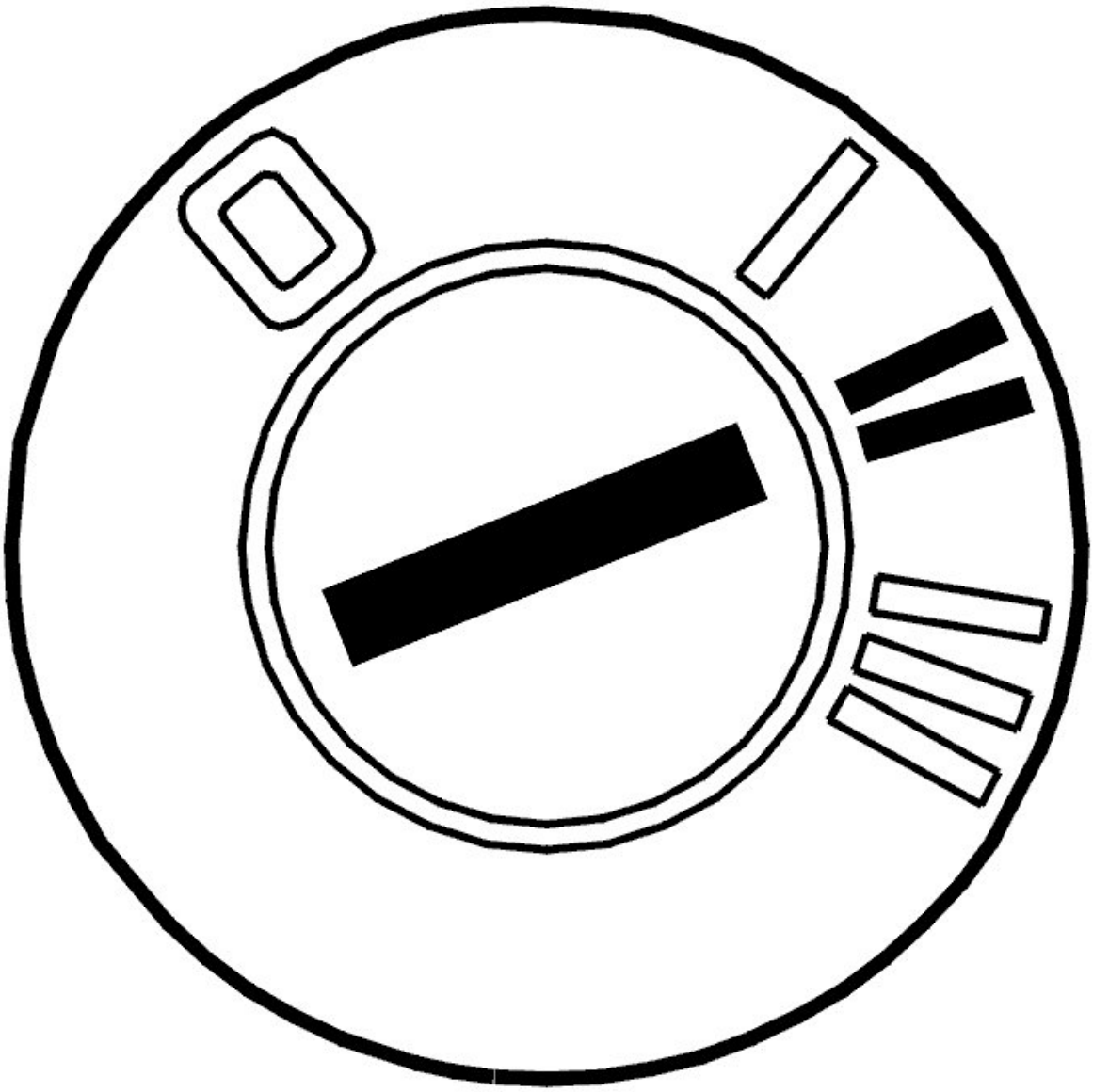
Fault symptom[s]

- The starter motor does not turn.

Signal Too Low

Signal too low

Checking the power supply

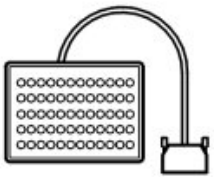


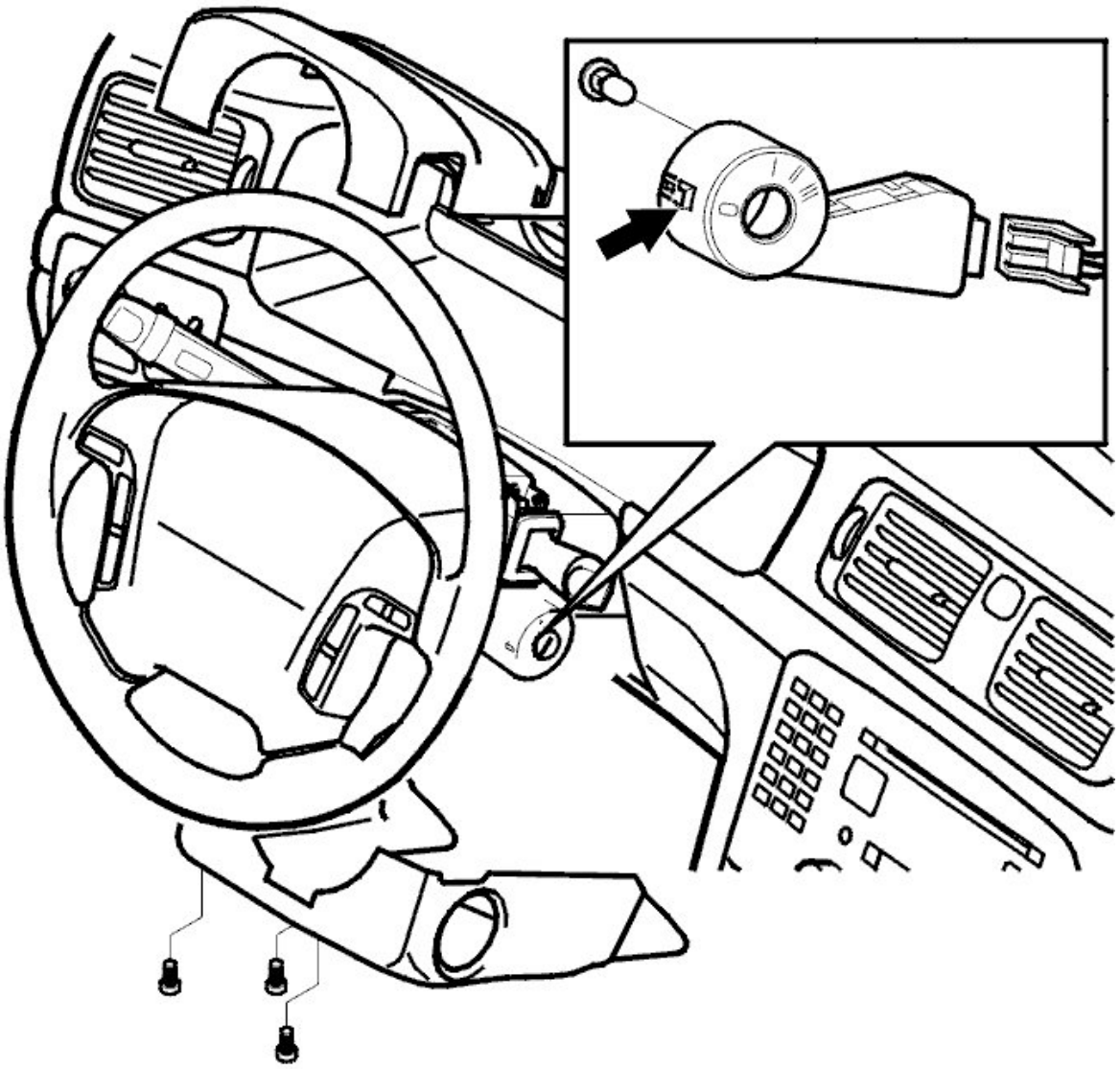
- Ignition on.

Check the power supply cable from the ignition switch to connector terminal #1 on the immobilizer antenna unit. Check for an open-circuit. Check for loose connections. Check for contact resistance and oxidation.
Remedy as necessary.

Other information

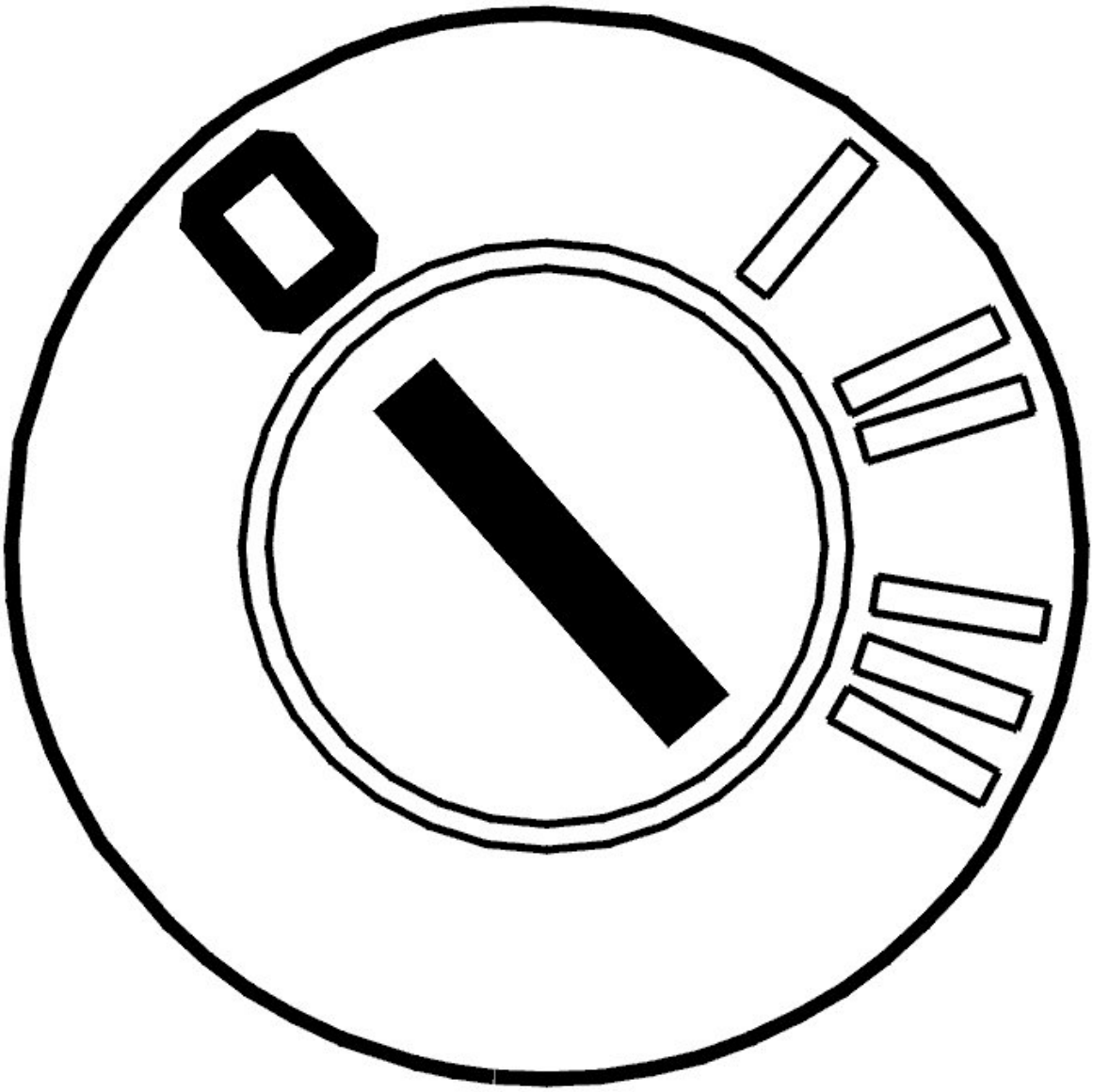
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Checking the signal cable

Checking the signal cable



- Ignition off.

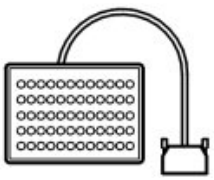
Check central electronic module (CEM) connector D and the connector for the immobilizer antenna unit. Check for contact resistance. Check for oxidation. Check for damaged or loose connections.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

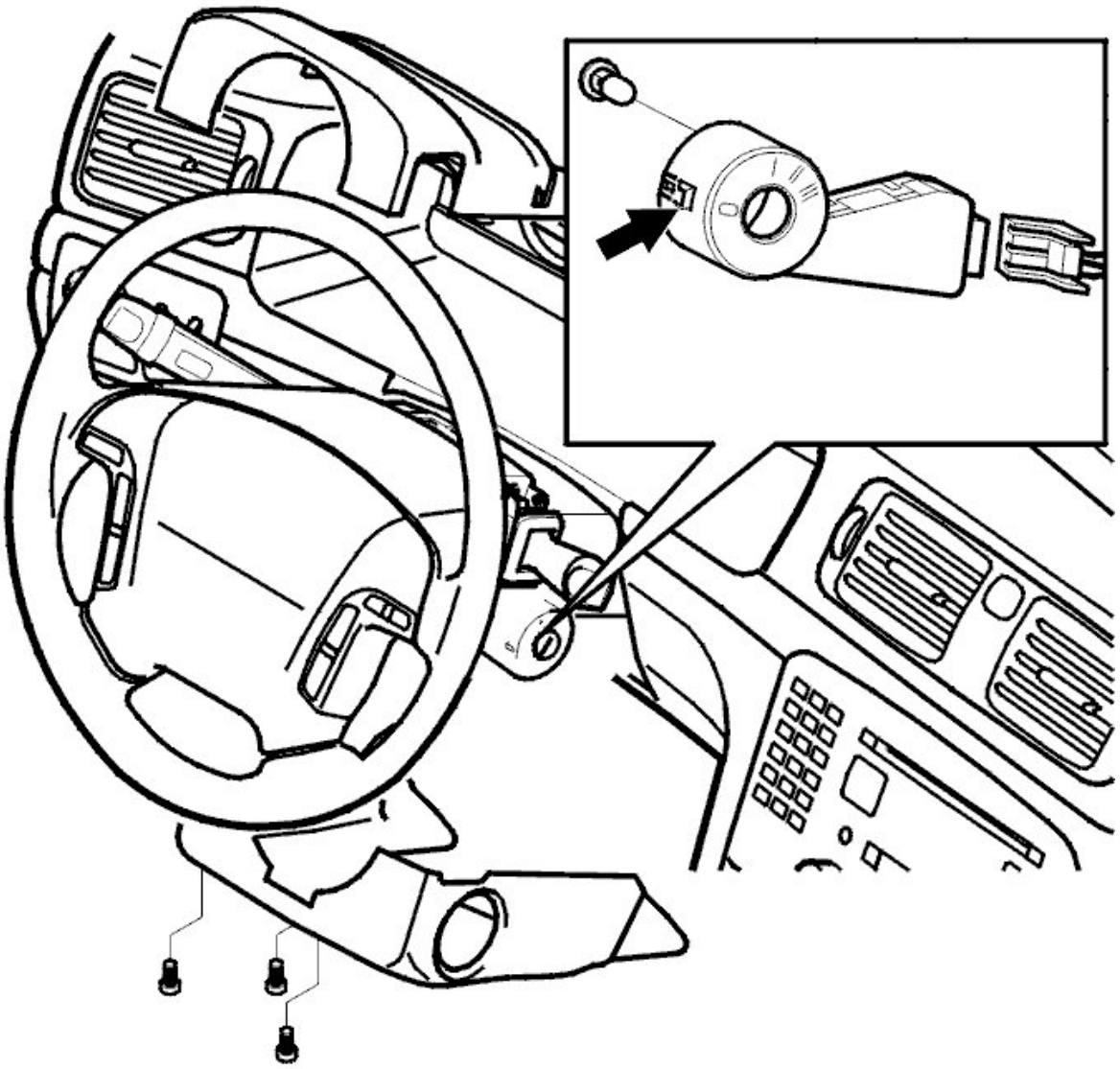
- Central electronic module (CEM) connector terminal #D56 (#56) and immobilizer antenna unit terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





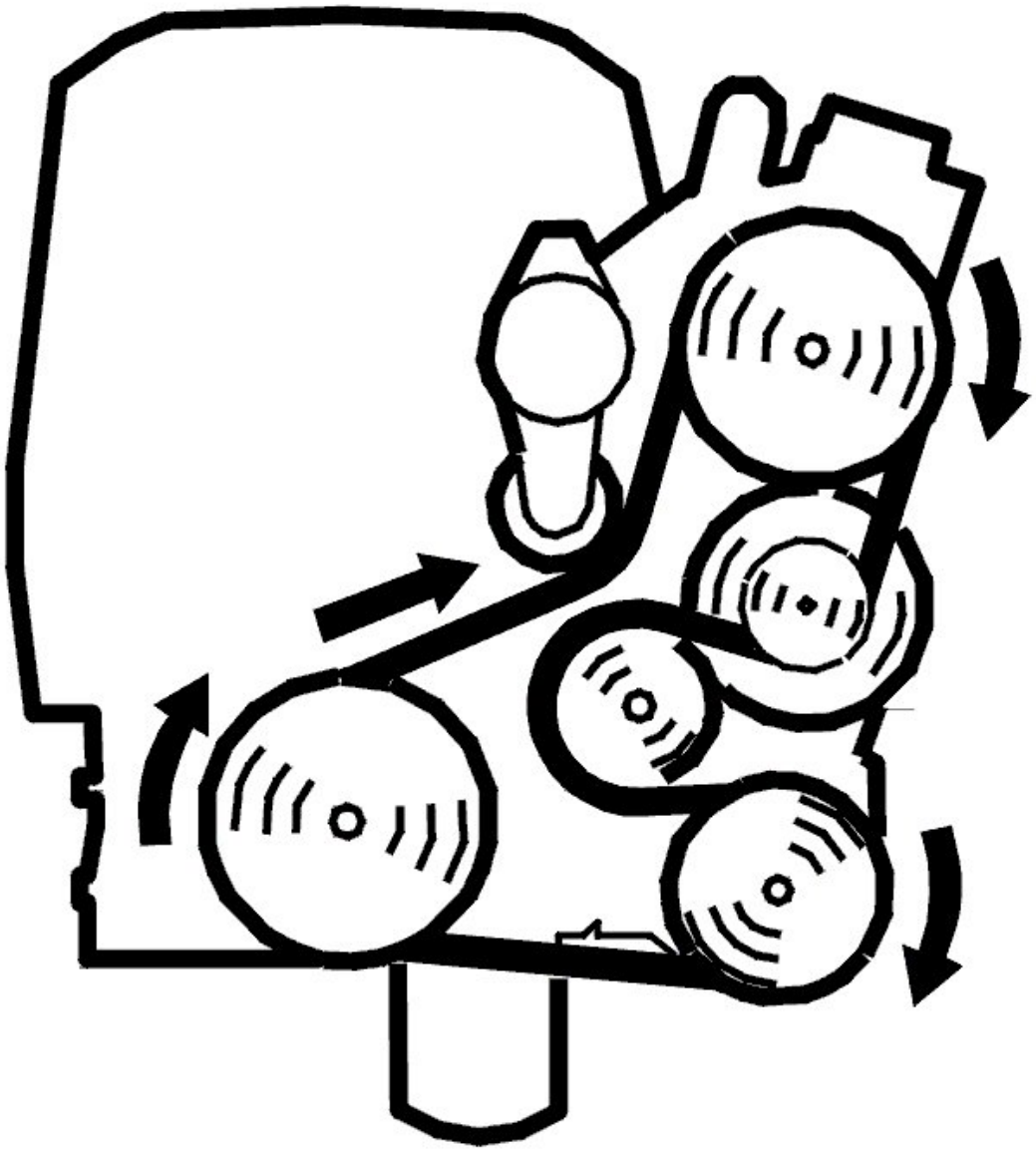
Continue - Verification

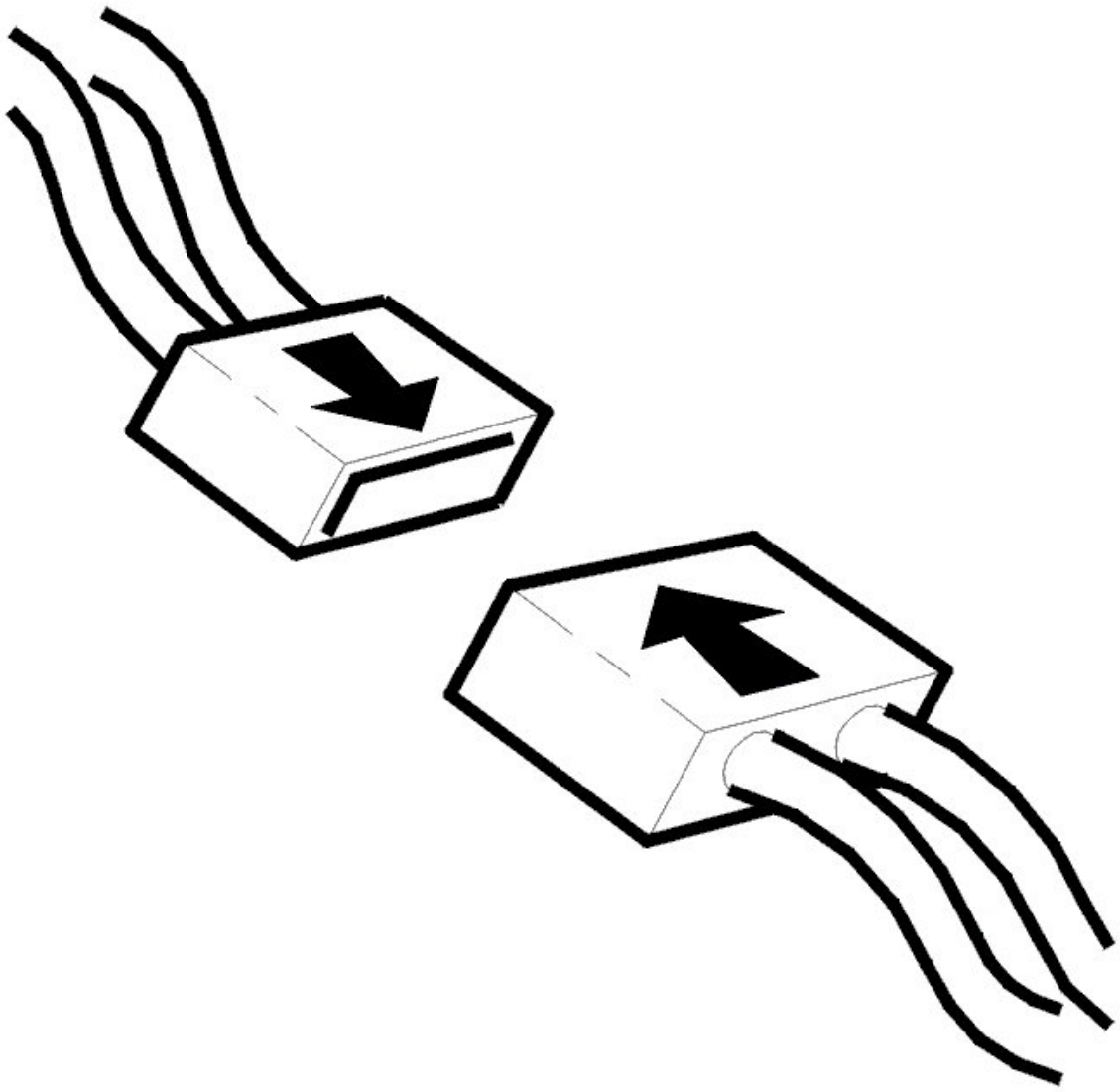
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the vehicle.

Does the vehicle start?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

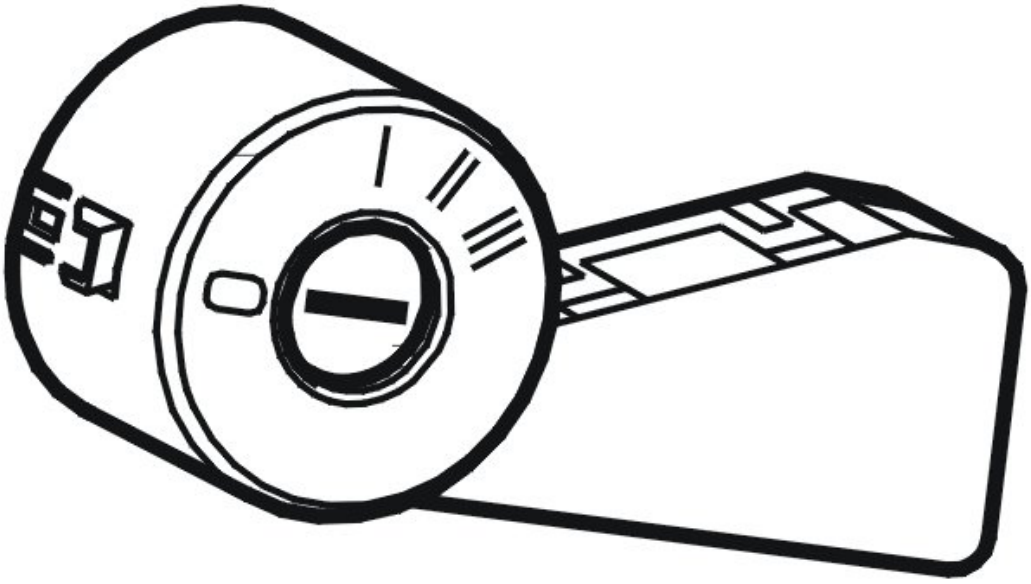
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C45

Condition



The central electronic module (CEM) checks the communication with the immobilizer antenna unit (IAU). The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a fault in the communication with the immobilizer antenna unit (IAU).
The diagnostic trouble code (DTC) can be detected with the ignition on and if diagnostic trouble codes (DTCs) CEM-6C41 - CEM-6C44 are not stored during communication with the immobilizer antenna unit (IAU).

Substitute value
- None.

Possible source
- Temporary interference in the communication with the immobilizer antenna unit (IAU)
- Immobilizer antenna unit (IAU) not working.

Fault symptom[s]

- The starter motor does not turn.

Communication Fault

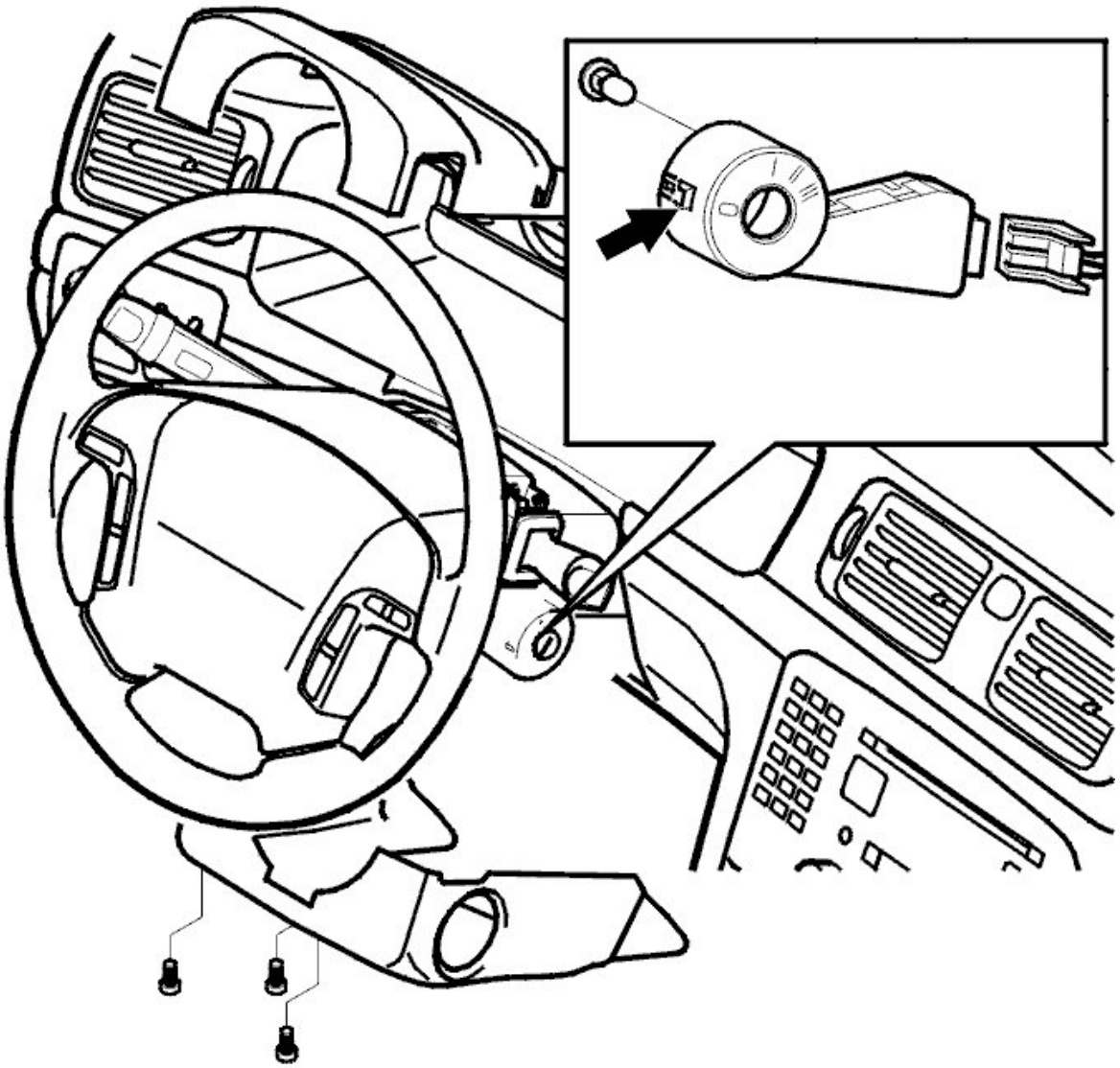
Communication fault

Replacing the antenna unit

The antenna unit has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the antenna module (ATM) or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the antenna unit.

Hint: The diagnostic trouble code (DTC) can also be stored by temporary interference in the communication with the antenna unit. If this is the case the antenna unit need not be replaced and the diagnostic trouble code (DTC) can be erased.

Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

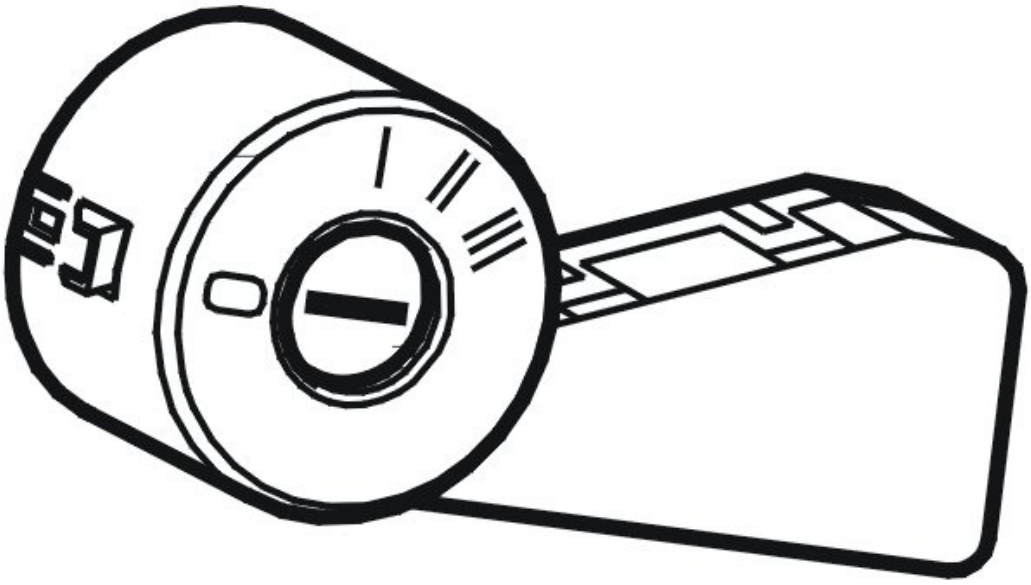
Attempt New Test - Replacing the antenna unit

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C46

Condition



When the ignition is switched on, the central electronic module (CEM) attempts to read the identity number of the transponder in the ignition key. The central electronic module (CEM) tests the antenna unit before this. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers an internal fault in the antenna unit.

Hint: The diagnostic trouble code (DTC) may also be stored in the event of temporary interference in the communication with the antenna unit.

Substitute value

- None.

Possible source
- Temporary interference in the communication with the immobilizer antenna unit (IAU)
- Internal fault in the immobilizer antenna unit (IAU).

Fault symptom[s]
- The starter motor does not turn.

Internal Fault

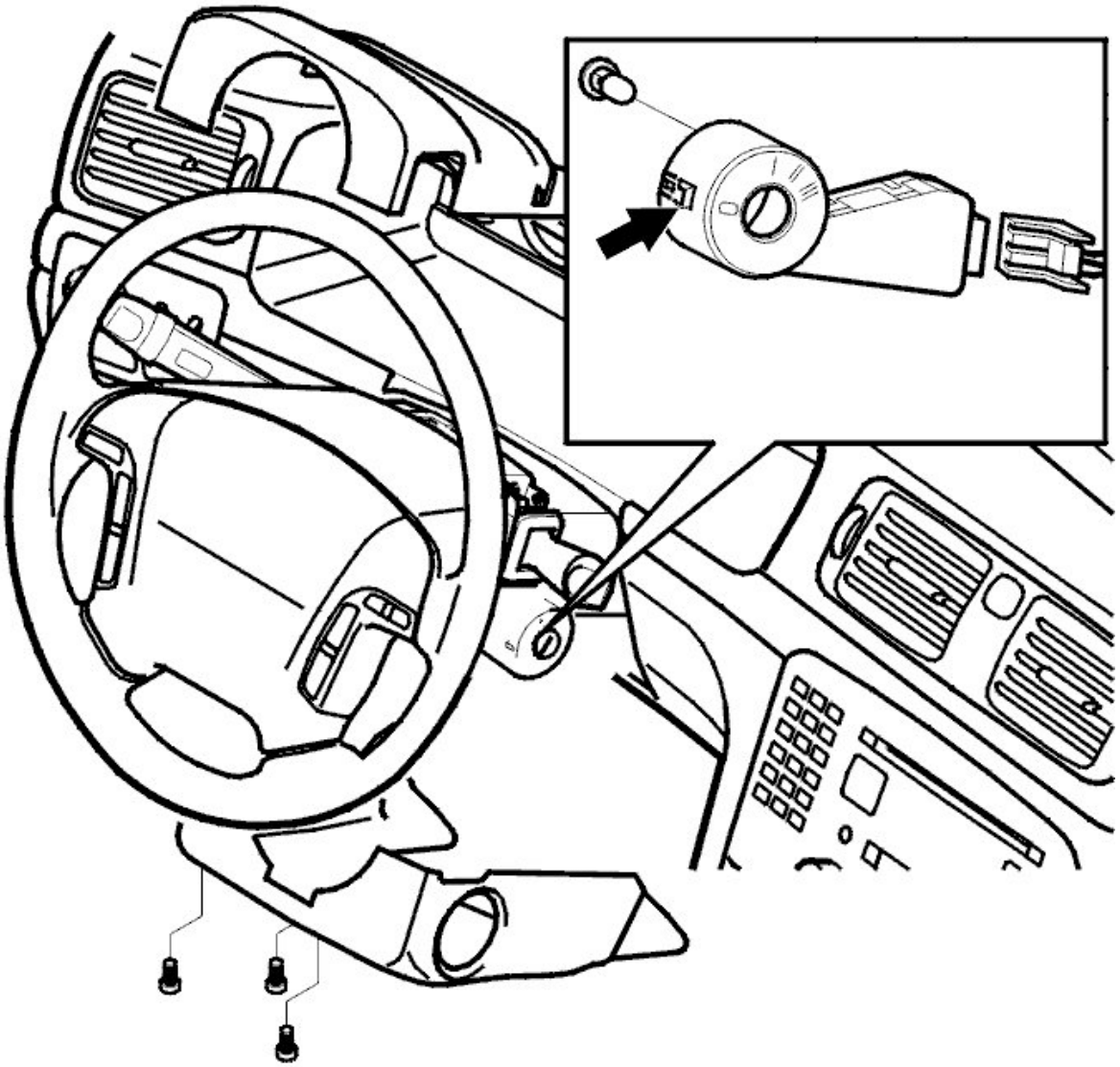
Internal fault

Replacing the antenna unit

The antenna unit has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the antenna module (ATM) or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the antenna unit.

Hint: The diagnostic trouble code (DTC) can also be stored by temporary interference in the communication with the antenna unit. If this is the case the antenna unit need not be replaced and the diagnostic trouble code (DTC) can be erased.

Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

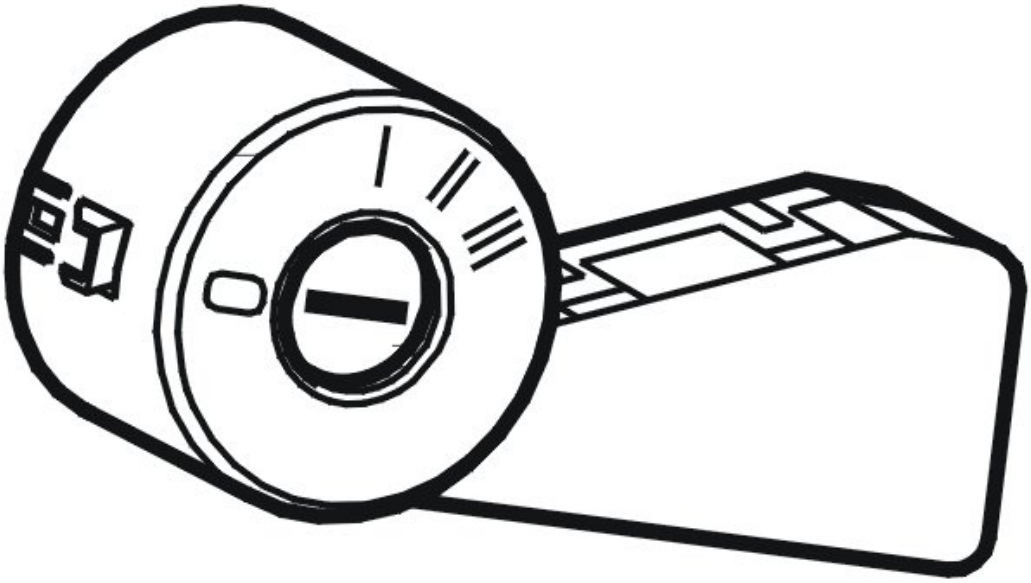
Attempt New Test - Replacing the antenna unit

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C48

Condition



With the ignition on the central electronic module (CEM) reads the transponder signal. The diagnostic trouble code (DTC) is stored if the transponder responds with an unknown transponder, a non-approved code (not stored in the memory), no transponder code at all or an unknown

communication format.

Note! This diagnostic trouble code (DTC) may be stored for example if there are several ignition keys on the same key ring and one of them is inserted in the ignition switch.

Substitute value
- None.

Possible source
- The ignition key has a damaged transponder
- The ignition key is of the wrong type. It has no transponder
- The ignition key has previously belonged to the vehicle but has been erased from the memory for the central electronic module (CEM)
- The ignition key is a new key and has not yet been programmed into the memory for the central electronic module (CEM)
- Several keys are too close to each other during the read off
- An electronic door key was too close to the antenna unit during the read off
- An automatic road toll transponder is installed too close to the antenna unit
- EMC interference (strong electrical field) during the communication phase (when starting the engine)
- The ignition key is a Volvo key but for a different model
- The ignition key belongs to another Volvo of the same type, i.e. it has a different transponder code
- The ignition key is for another make of car and therefore does not have the same type of transponder.

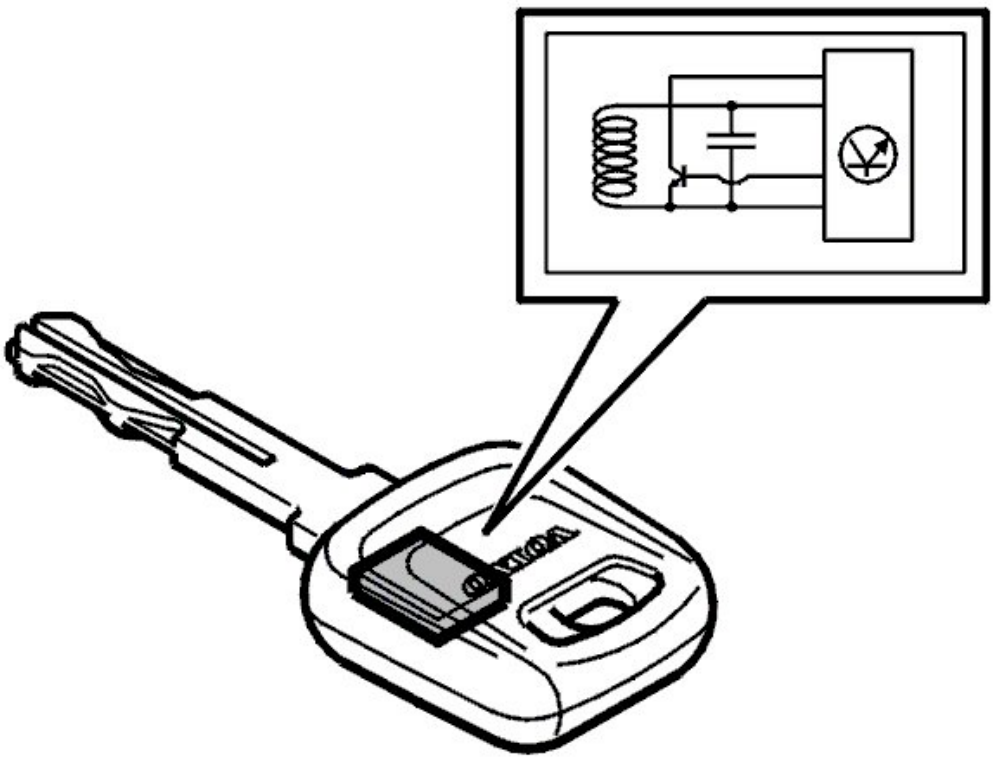
Fault symptom[s]
- The starter motor does not turn.

Faulty Signal

Faulty signal

Checking the key type

Visually check to see if the key in the ignition switch is the correct type. See the illustration.
Check that the color marking (a small semi-circular plastic marking positioned on the head of the key nearest one of the short sides of the metal section) is the correct color: The correct color is gray or red.
The key is for another type of Volvo if the colour marking is black or blue.
If the color is not correct, replace the key with the color marking as above. Insert the key in the ignition switch. If there is no key the correct color, order a new key and program it.
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key

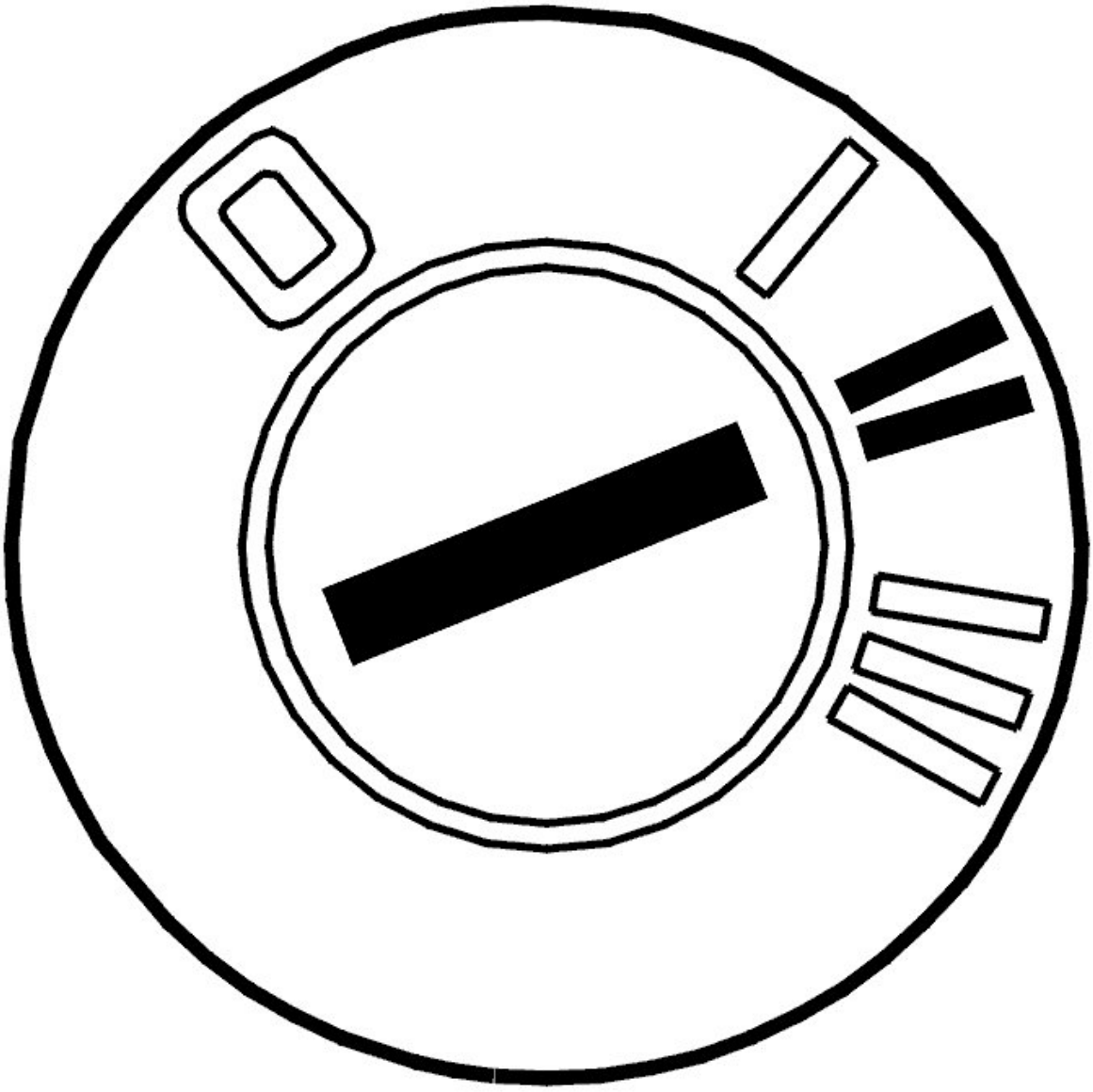


Continue - Checking the key code

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking the key code

Note! Check to see if there are several keys (with transponders) on the same key ring. These keys should be separate so that they do not touch the key being used. Also check that no other transponder, such as an electronic door key or an identity card with an integrated transponder, is near by.If there is an automatic toll road transponder in the car, this should be positioned as far from the antenna unit as possible.



- Ignition on

Read off the CODE RECEIVED parameter to see if the key code has been received by the central electronic module (CEM).
If the code has been received Yes is shown.

Has the code been received?

Yes - Checking the stored code

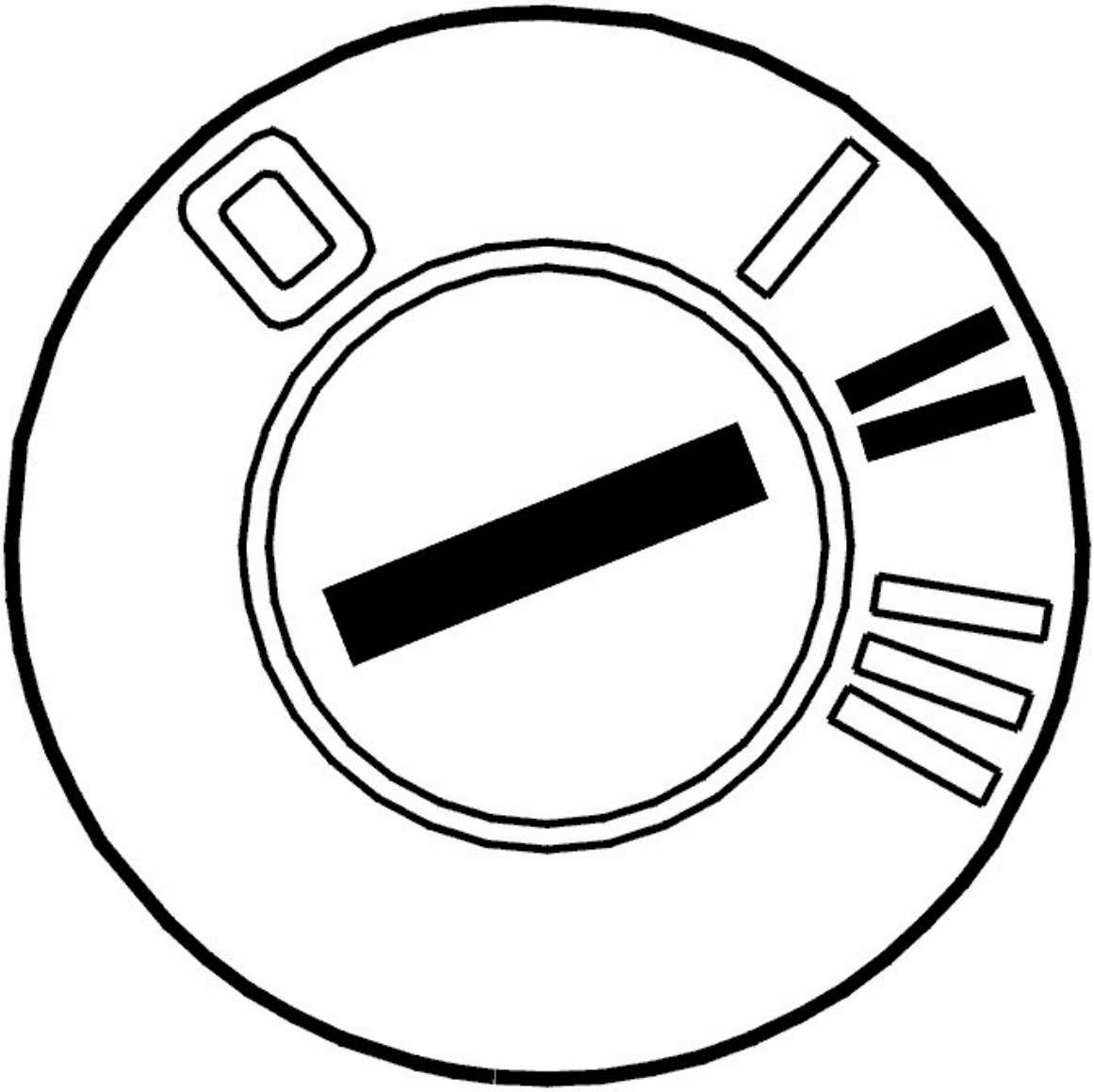
No - Damaged transponder

Damaged transponder

The key has a damaged transponder.
Order new key(s) and software.
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key

Continue - Verification

Checking the stored code



- Ignition on

Read off the CODE STORED parameter to see if the key code has been stored in the central electronic module (CEM).
If the code has been stored Yes is shown.
Check all the keys belonging to the car.
Make a note of the keys that are not stored.

Is the code stored for all keys?

Yes - Verification

No - Programming keys

Programming keys

Program the key(s) which displayed NO, when CODE STORED was read off according to:
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key

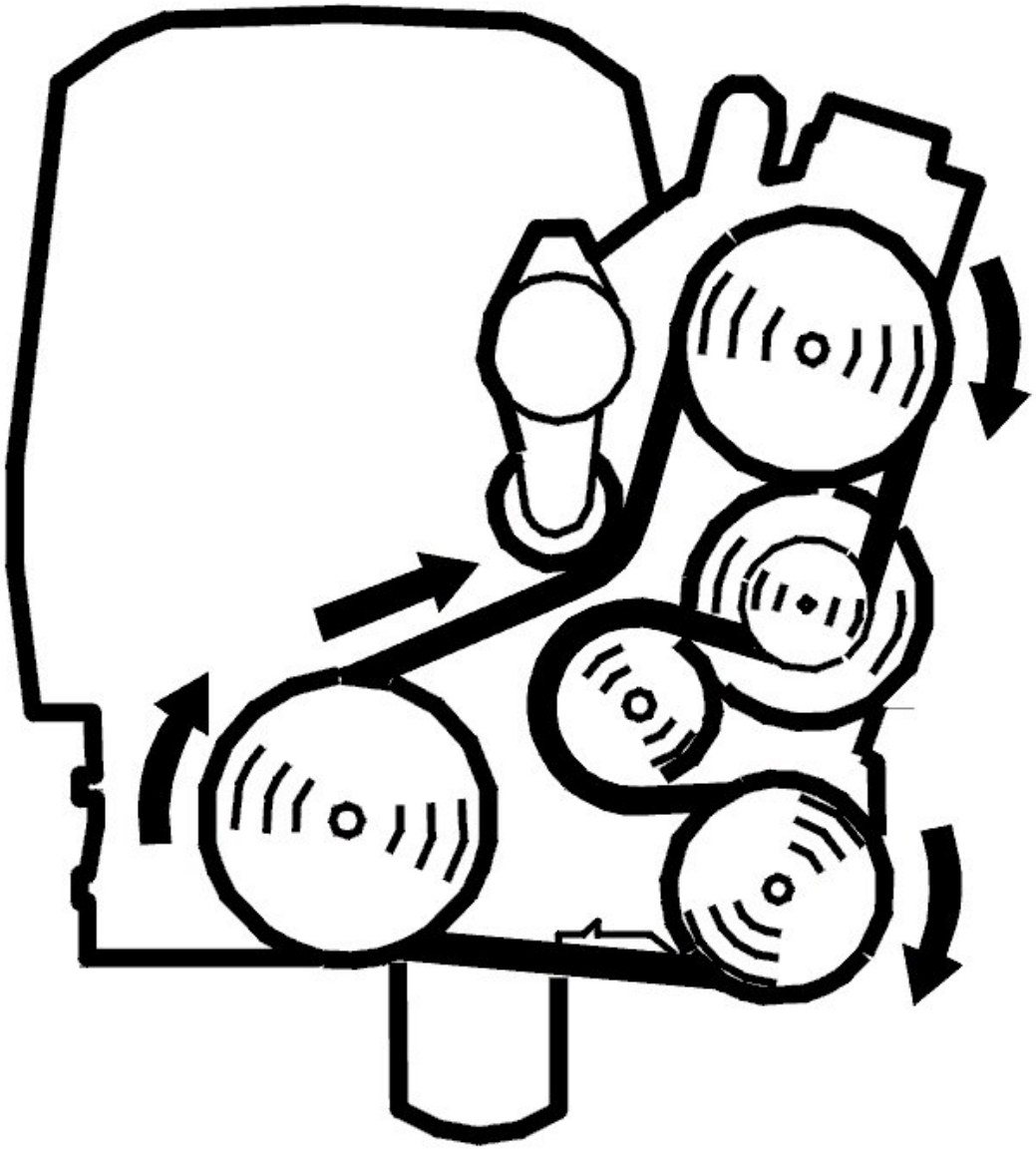
Continue - Verification

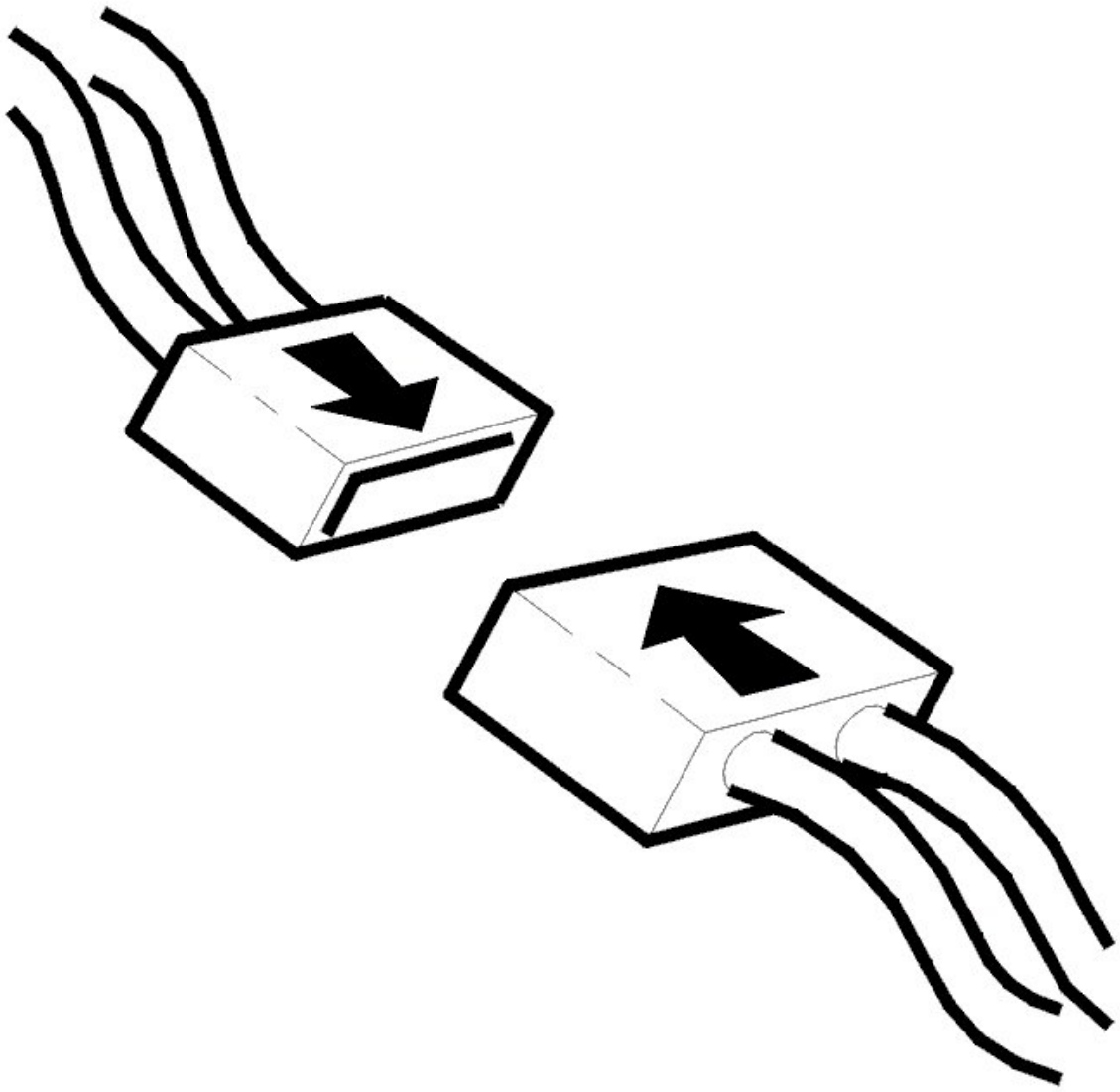
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the car with all the keys (of the correct type).

Does the car start with all the keys?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

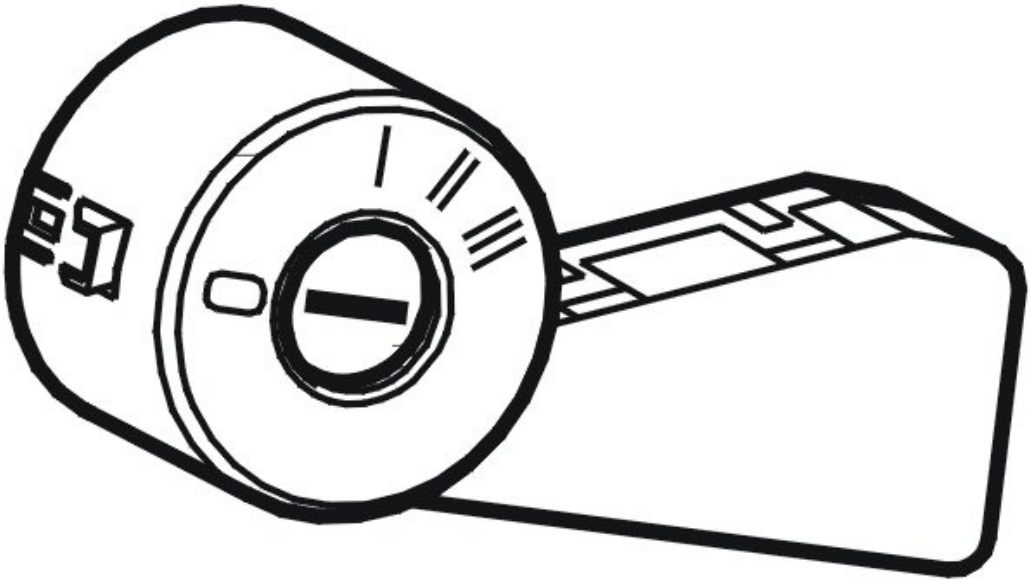
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the key type

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6C49

Condition



With the ignition on the central electronic module (CEM) reads the transponder signal. The diagnostic trouble code (DTC) is stored if the transponder responds with a correct code (the key belongs to the vehicle) but something else failed during communication.

Note! This diagnostic trouble code (DTC) may be stored for example if there are several ignition keys on the same key ring and one of them is inserted in the ignition switch.

Substitute value

- None.

Possible source

- Several keys are too close to each other during the read off
- An electronic door key was too close to the antenna unit during the read off
- An automatic road toll transponder is installed too close to the antenna unit

- EMC interference (strong electrical field) during the communication phase (when starting the engine)
- The ignition key belongs to another Volvo of the same type, i.e. it has a different transponder code.

Fault symptom[s]
- The starter motor does not turn.

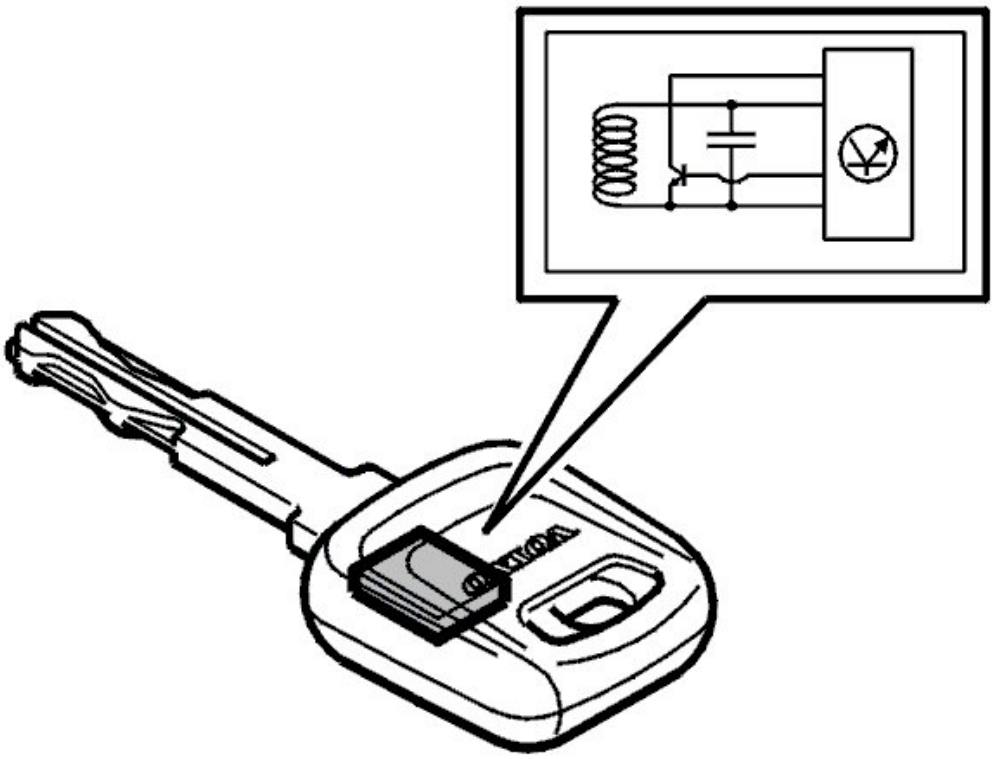
Faulty Signal

Faulty signal

Checking the key type

Note! Check to see if there are several keys (with transponders) on the same key ring. These keys should be separate so that they do not touch the key being used. Also check that no other transponder, such as an electronic door key or an identity card with an integrated transponder, is near by.If there is an automatic toll road transponder in the car, this should be positioned as far from the antenna unit as possible.

Visually check to see if the key in the ignition switch is the correct type. See the illustration.
Check that the color marking (a small semi-circular plastic marking positioned on the head of the key nearest one of the short sides of the metal section) is the correct color: The correct color is gray or red.
The key is for another type of Volvo if the color marking is black or blue.
If the color is not correct, replace the key with the color marking as above. Insert the key in the ignition switch. If there is no key the correct color, order a new key and program it.
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key



Continue - Checking start

Checking start

Use the same key which previously could not start the engine. Carry out three more start attempts.

Hint: If the start attempts are carried out in quick succession, remove the key from the ignition switch for at least two seconds between each start attempt. Otherwise a new transponder check will not be carried out. (If the key is left in the ignition switch between each start attempt, a new transponder check will not occur until the ignition has been switched off for approximately 30 seconds.).

One of the following may occur:
1. The engine starts every time

2. The engine starts at least once
3. The engine does not start.

Select one of the above response options.

1 - Communication

2 - Damaged transponder

3 - Incorrect key

Communication

Hint: The fault was caused by a temporary interruption in the communication between the transponder and the central electronic module (CEM).

Continue - Verification

Damaged transponder

The key has a damaged transponder.
Order new key(s) and software.
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key

Continue - Verification

Incorrect key

The key belongs to another vehicle. The transponder code and the mechanical key code (the key fits in the ignition switch) correspond but the security code for the key does not correspond with the security code of the car.
Order new key(s) and software.
Key, add / remove See: Body and Frame/Locks/Key/Testing and Inspection/Add or Remove Key

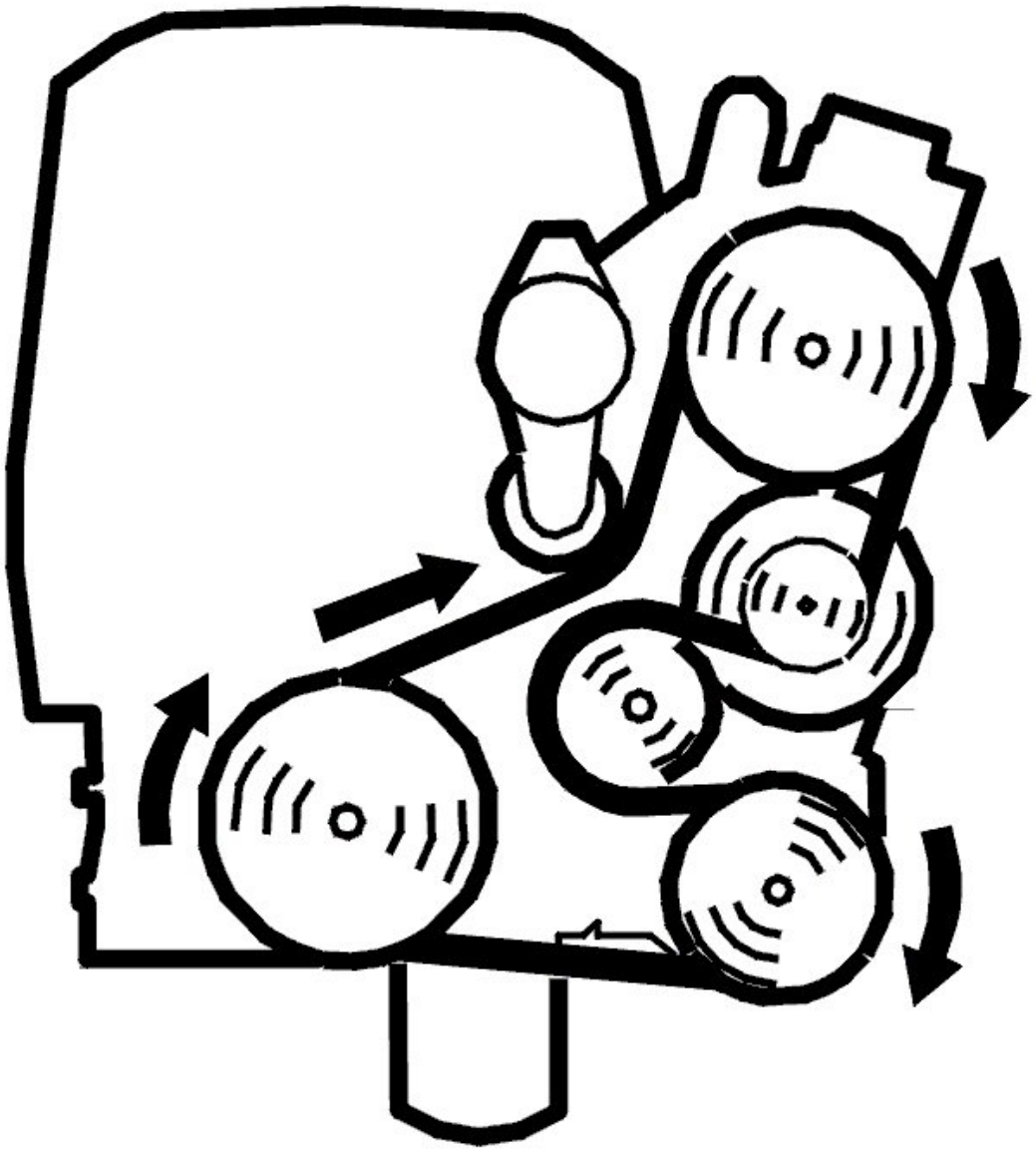
Continue - Verification

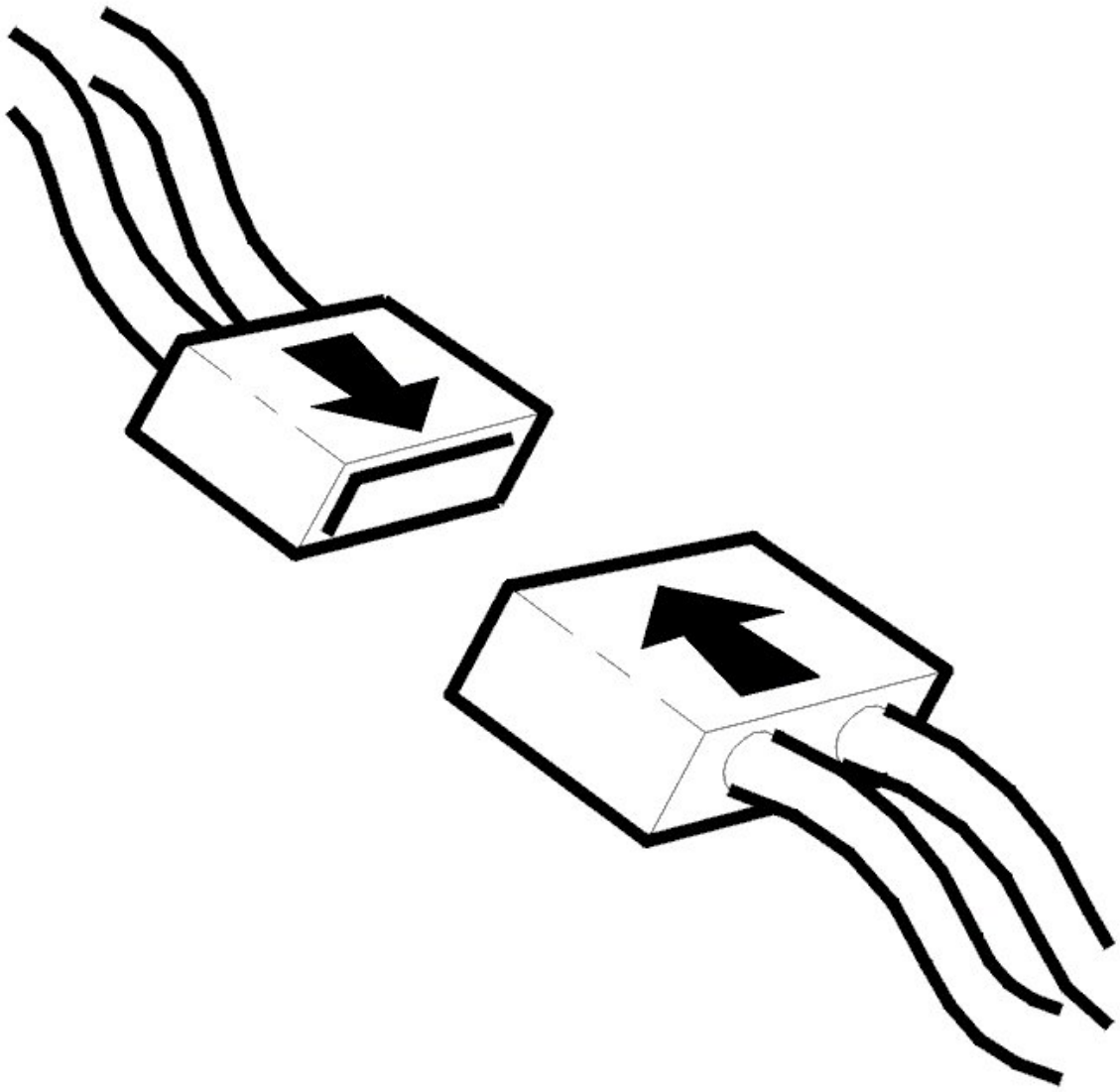
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Try to start the car with all the keys (of the correct type).

Does the car start with all the keys?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

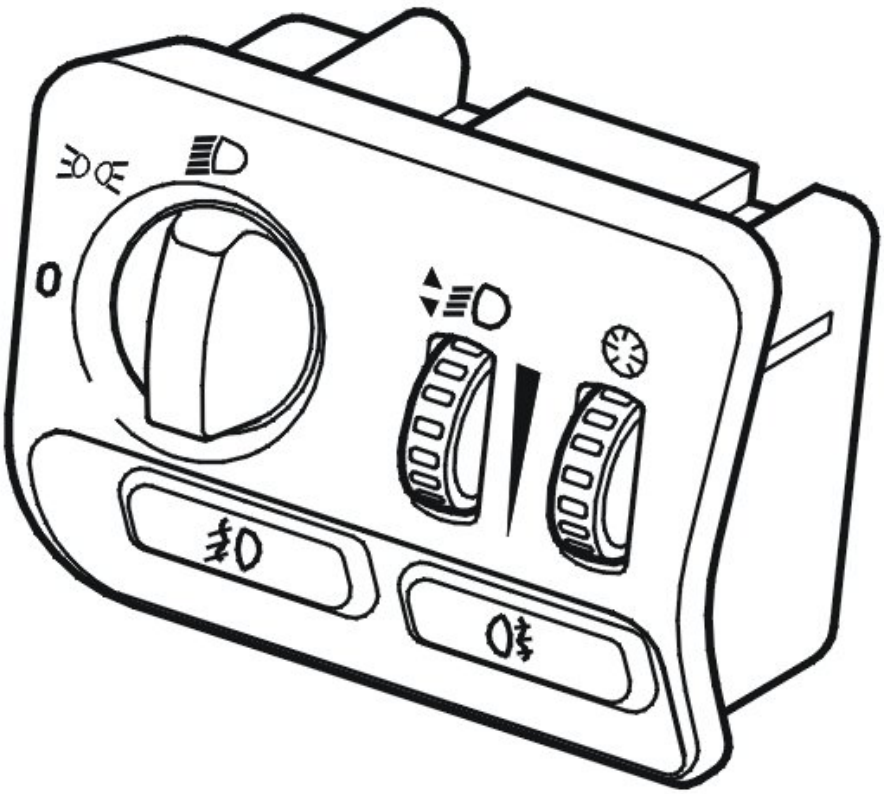
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the key type

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6E01

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that it has detected that the switch for opening the fuel tank filler cover has been activated for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged switch for opening the fuel tank filler cover
- Fault in the communication with the light switch module (LSM).

Fault symptom[s]
- Does not lock / unlock the fuel tank filler cap.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

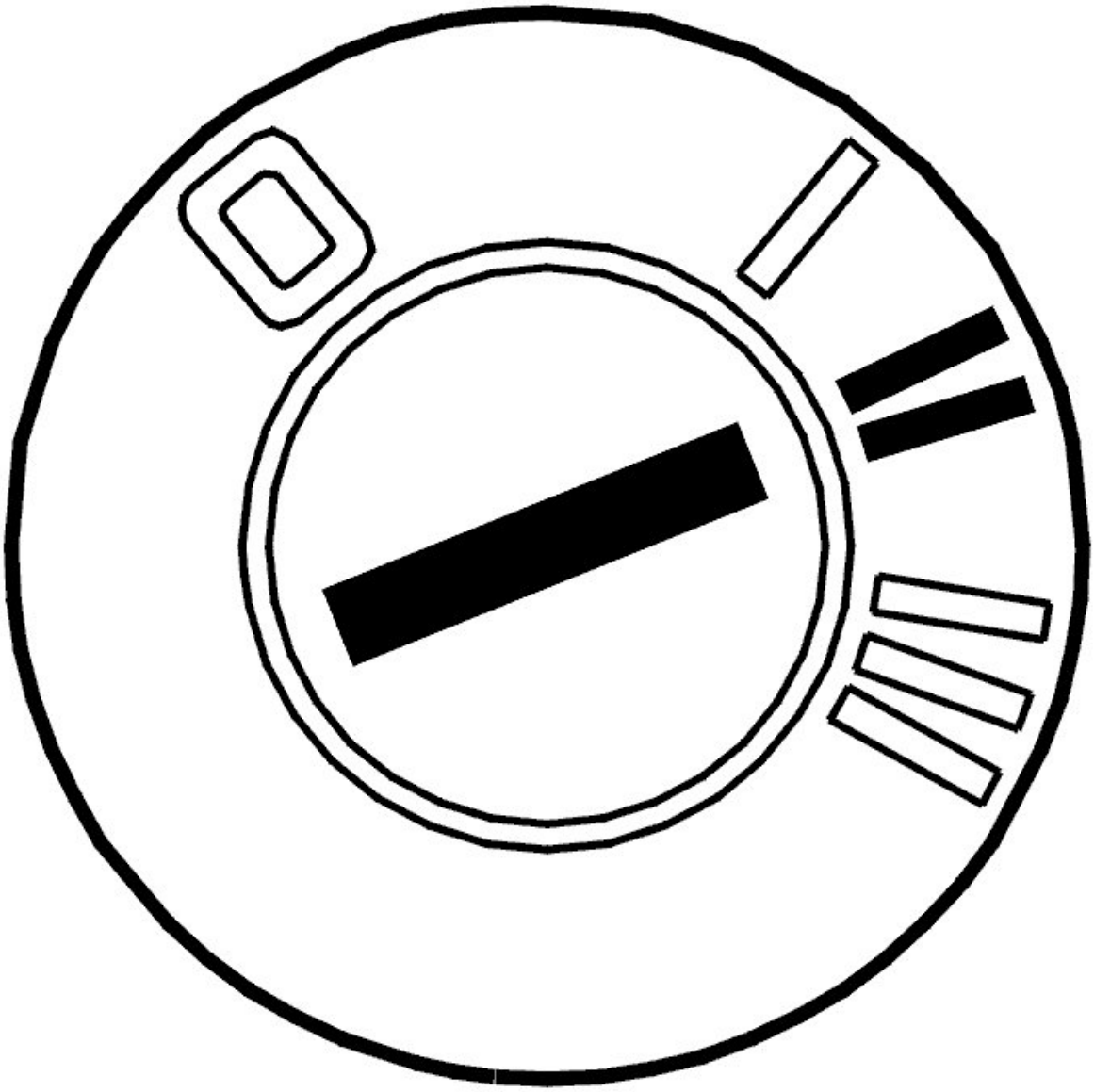
Continue - Verification

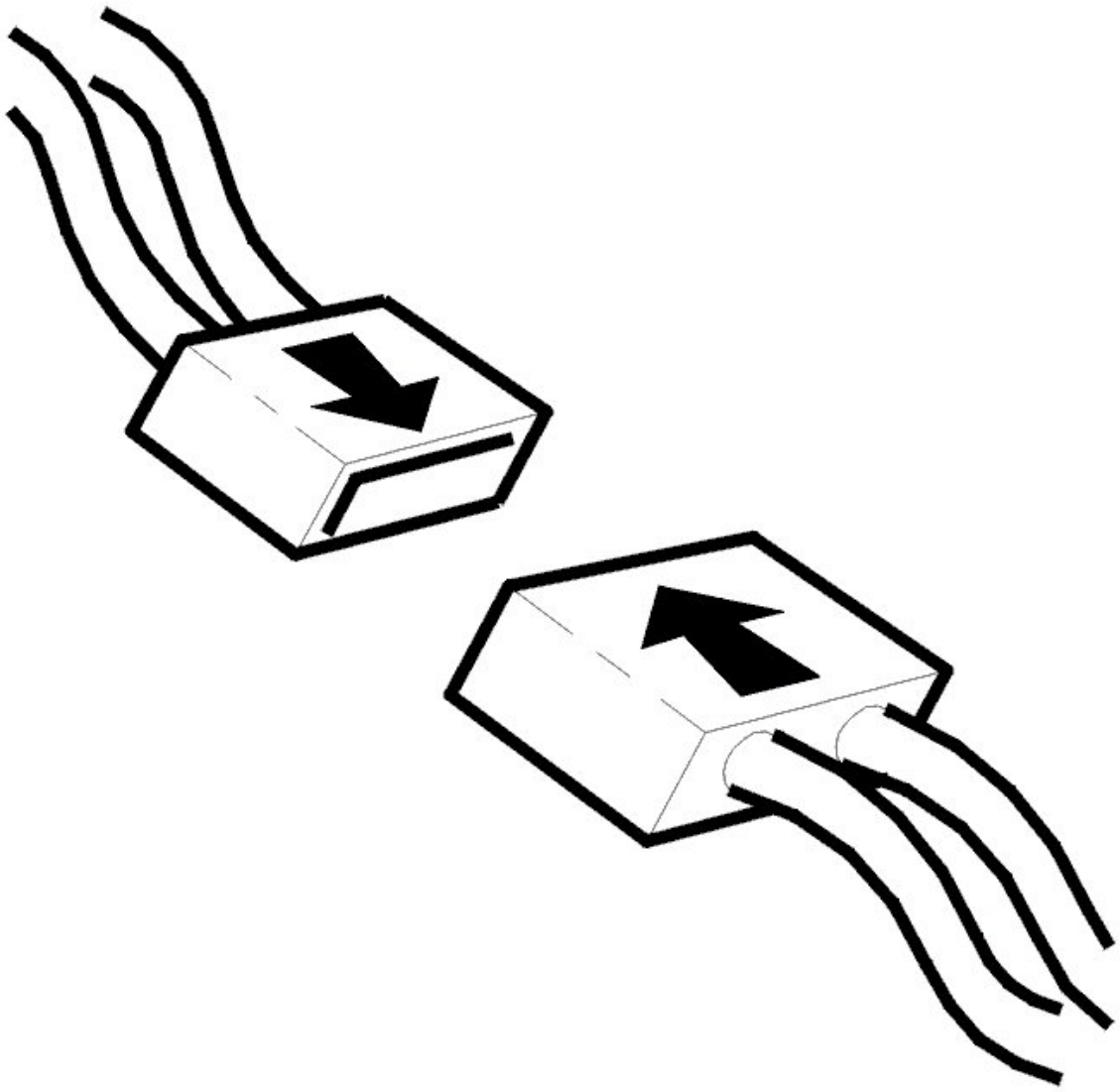
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

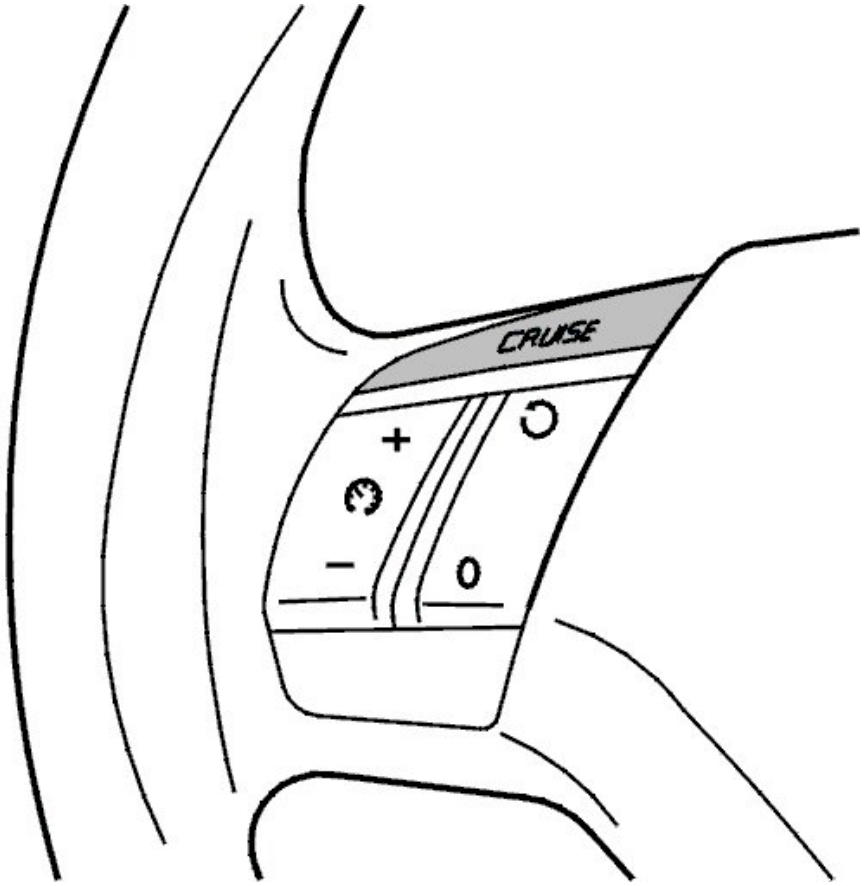
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F01

Condition



The central electronic module (CEM) checks the signal from the ON/OFF button for the cruise control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the ON/OFF button has been active for more than 3 minutes.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The ON/OFF button is jammed in the depressed position
- Damaged ON/OFF button.

Fault symptom[s]
- Cruise control does not function at all.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

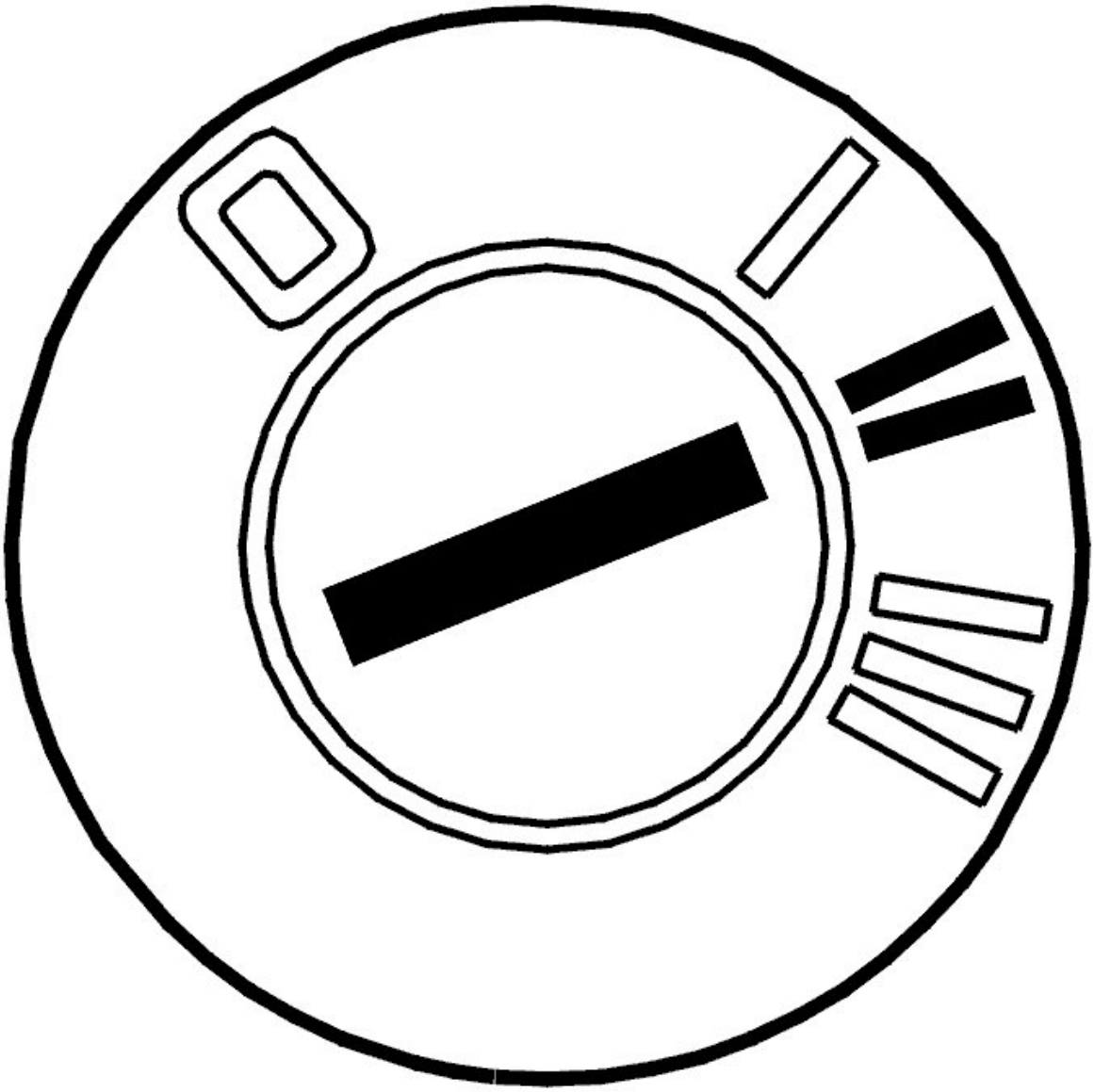
Continue - Verification

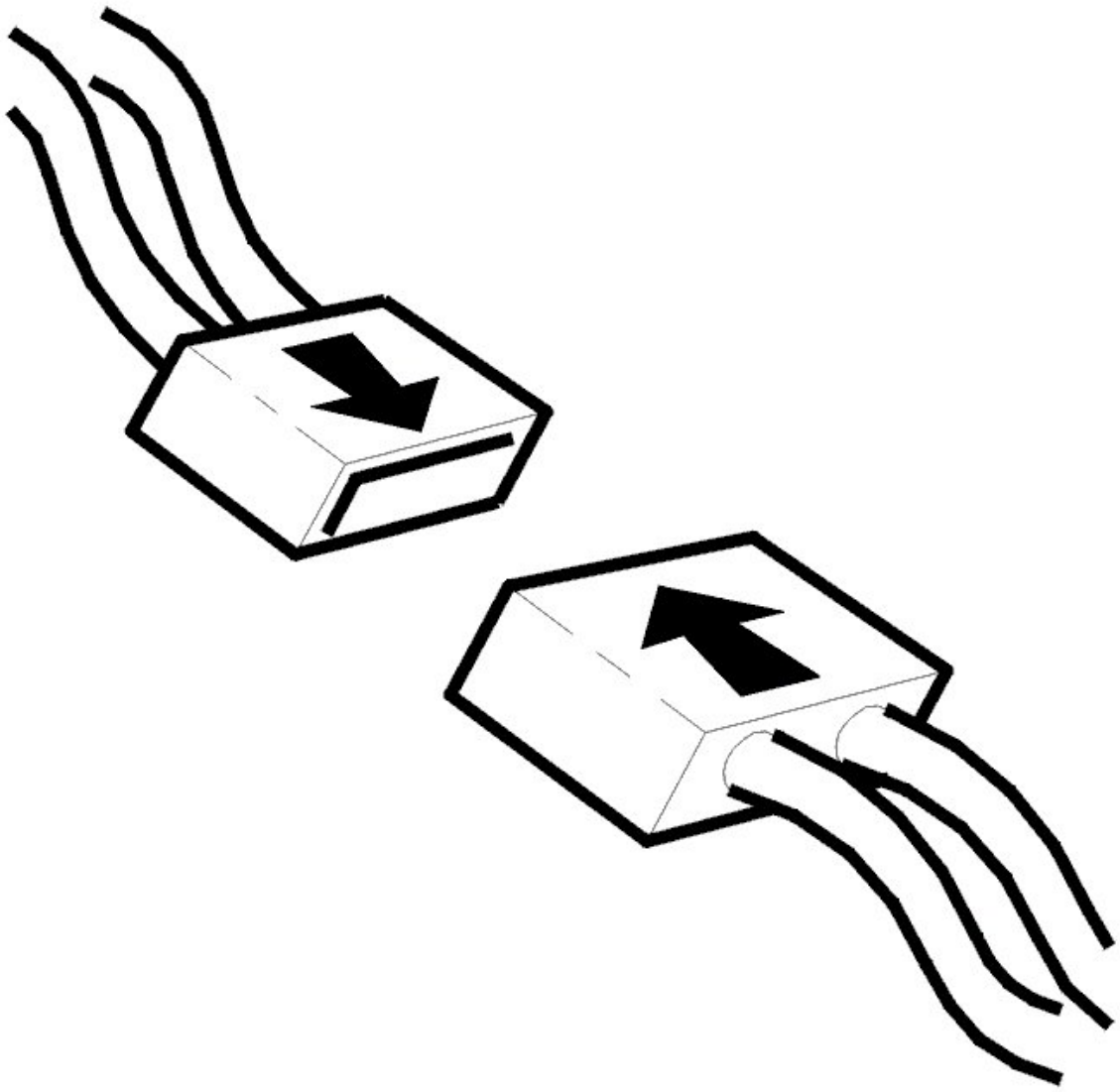
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

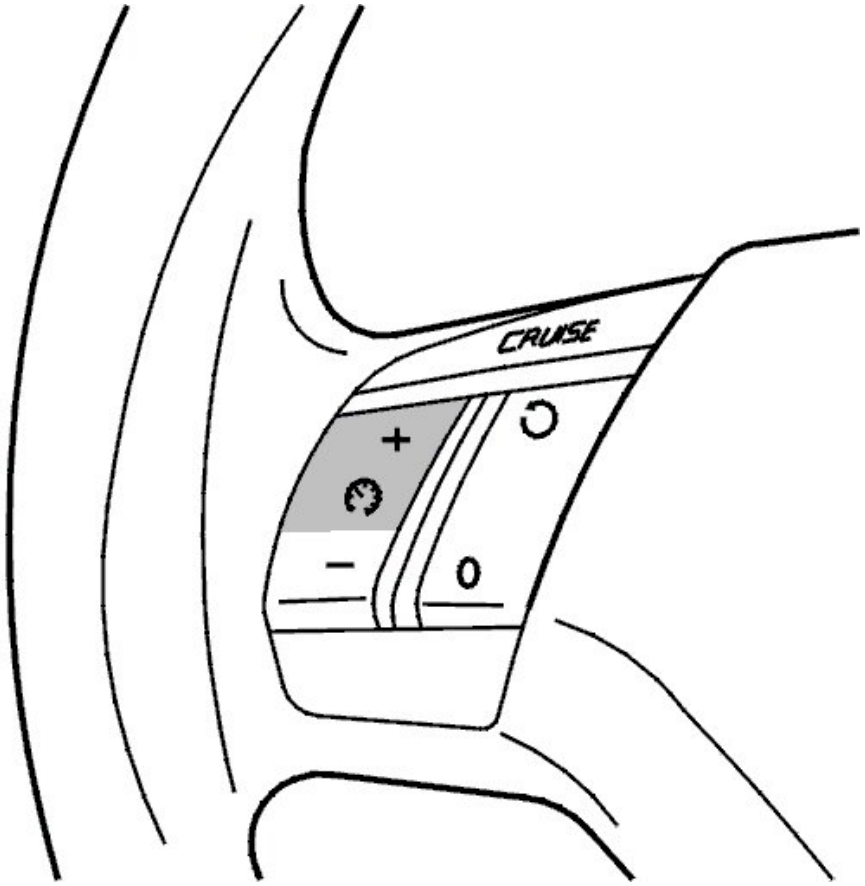
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F02

Condition



The central electronic module (CEM) checks the signal from the Set+ button for the cruise control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Set+ button has been active for more than 3 minutes.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Set+ button is jammed in the pressed in position
- Damaged Set+ button.

Fault symptom[s]
- Cruise control does not function at all.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

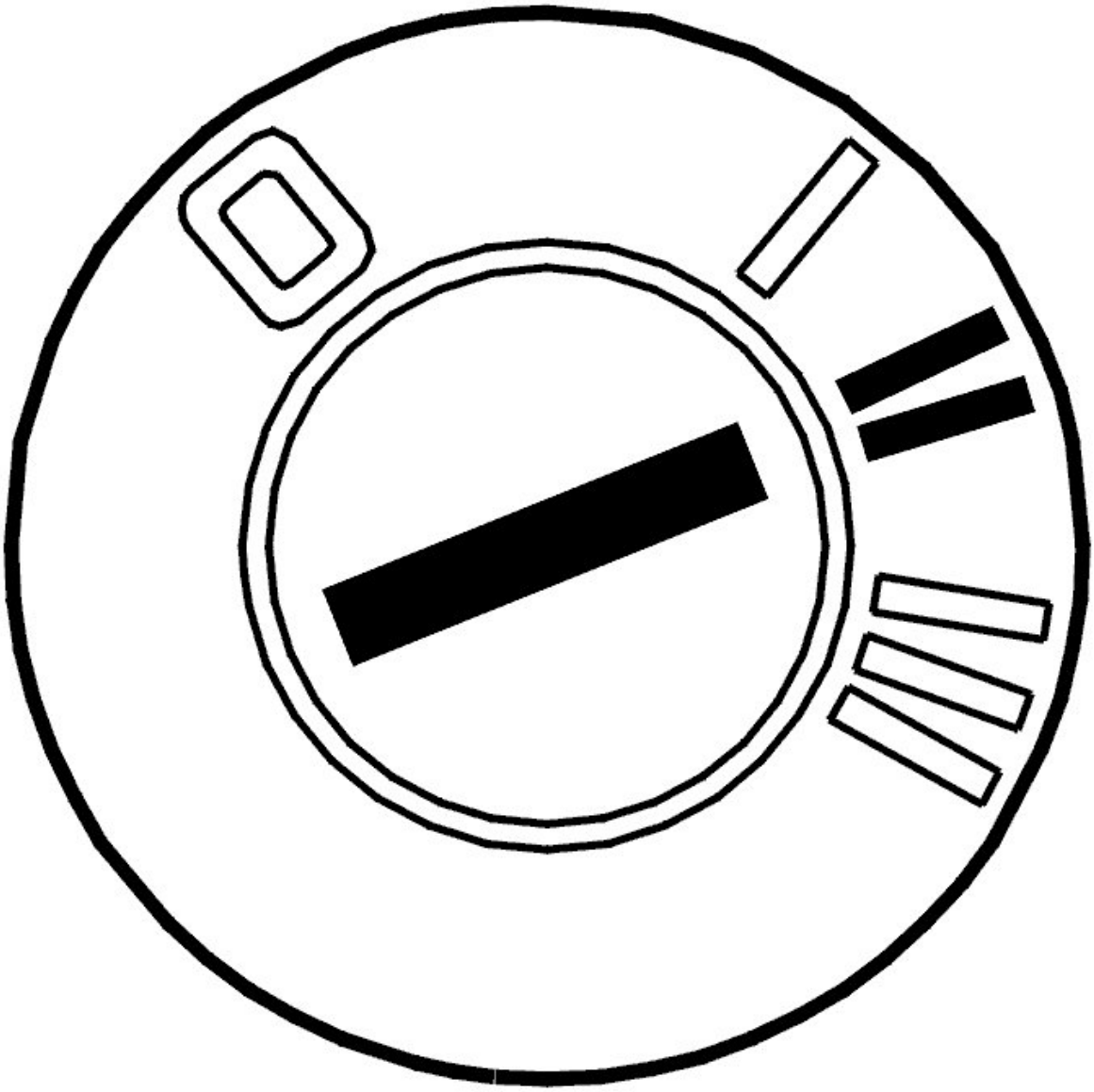
Continue - Verification

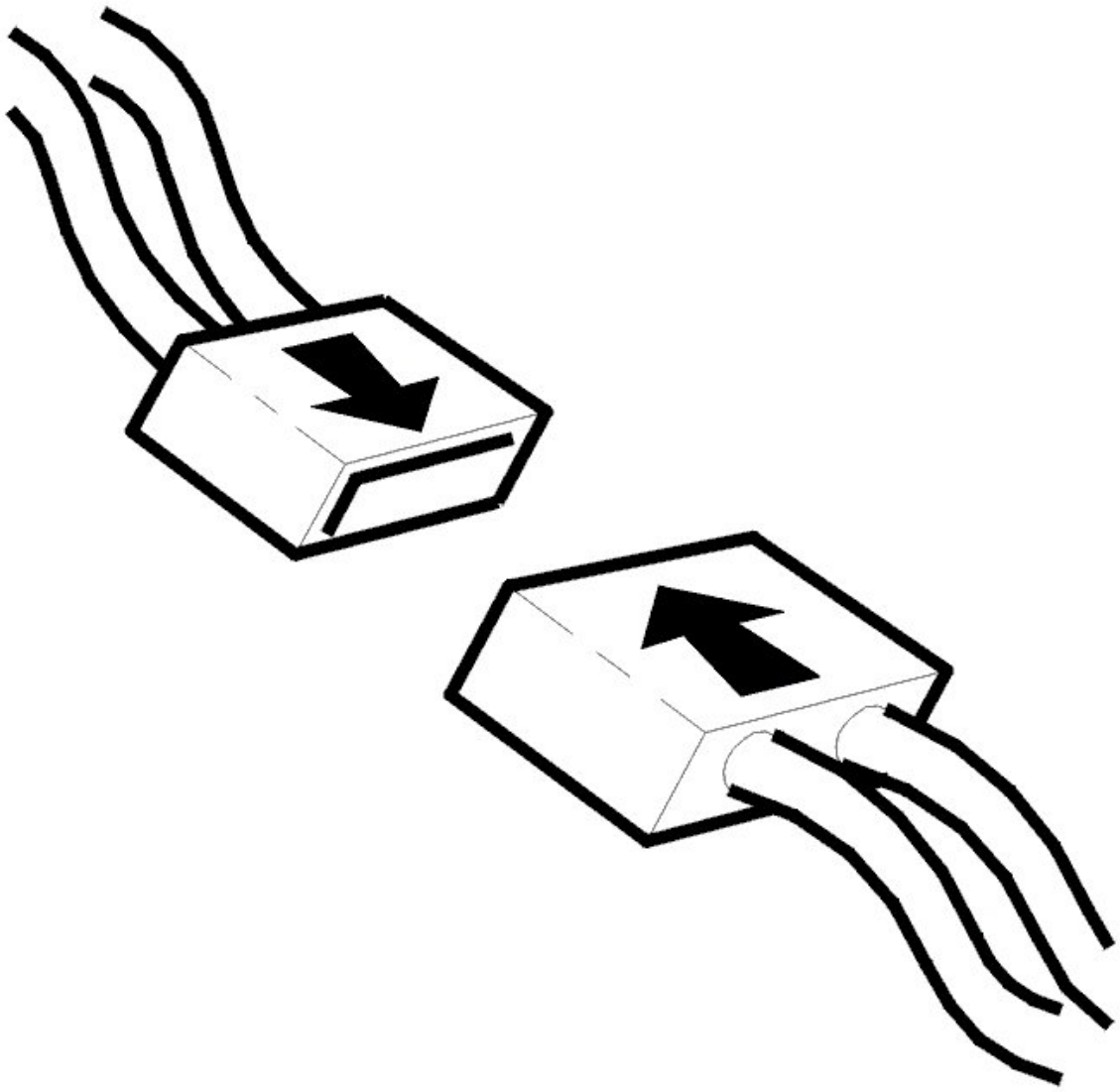
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

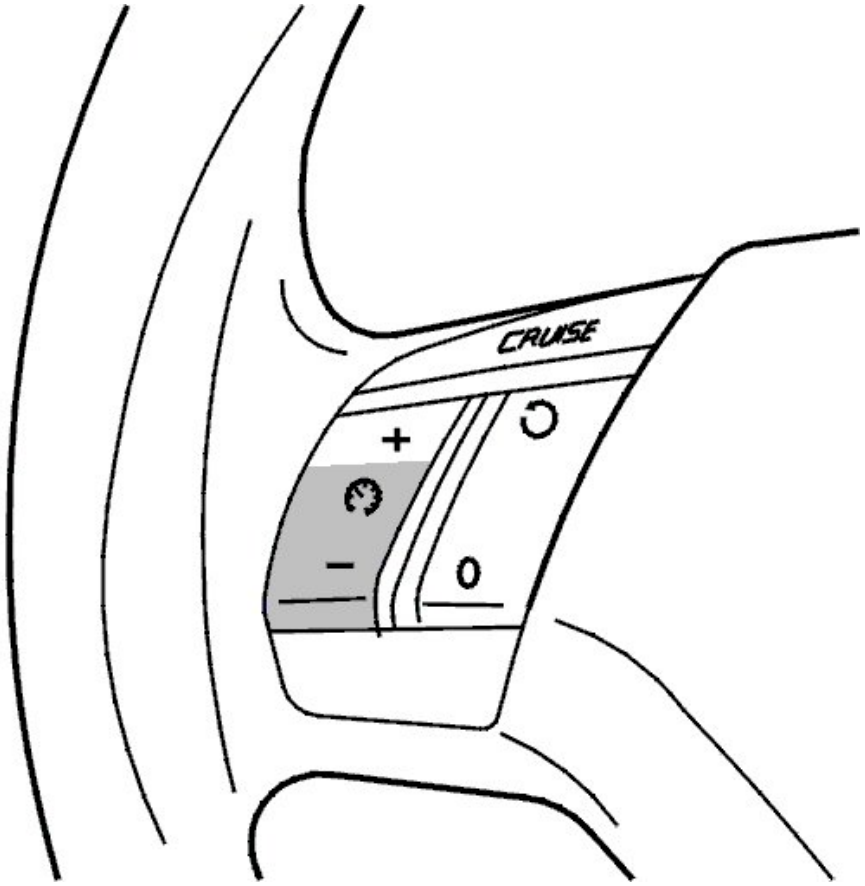
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F03

Condition



The central electronic module (CEM) checks the signal from the Set- button for the cruise control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Set- button has been active for more than 3 minutes.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Set- button is jammed in the pressed in position
- Damaged Set- button.

Fault symptom[s]
- Cruise control does not function at all.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

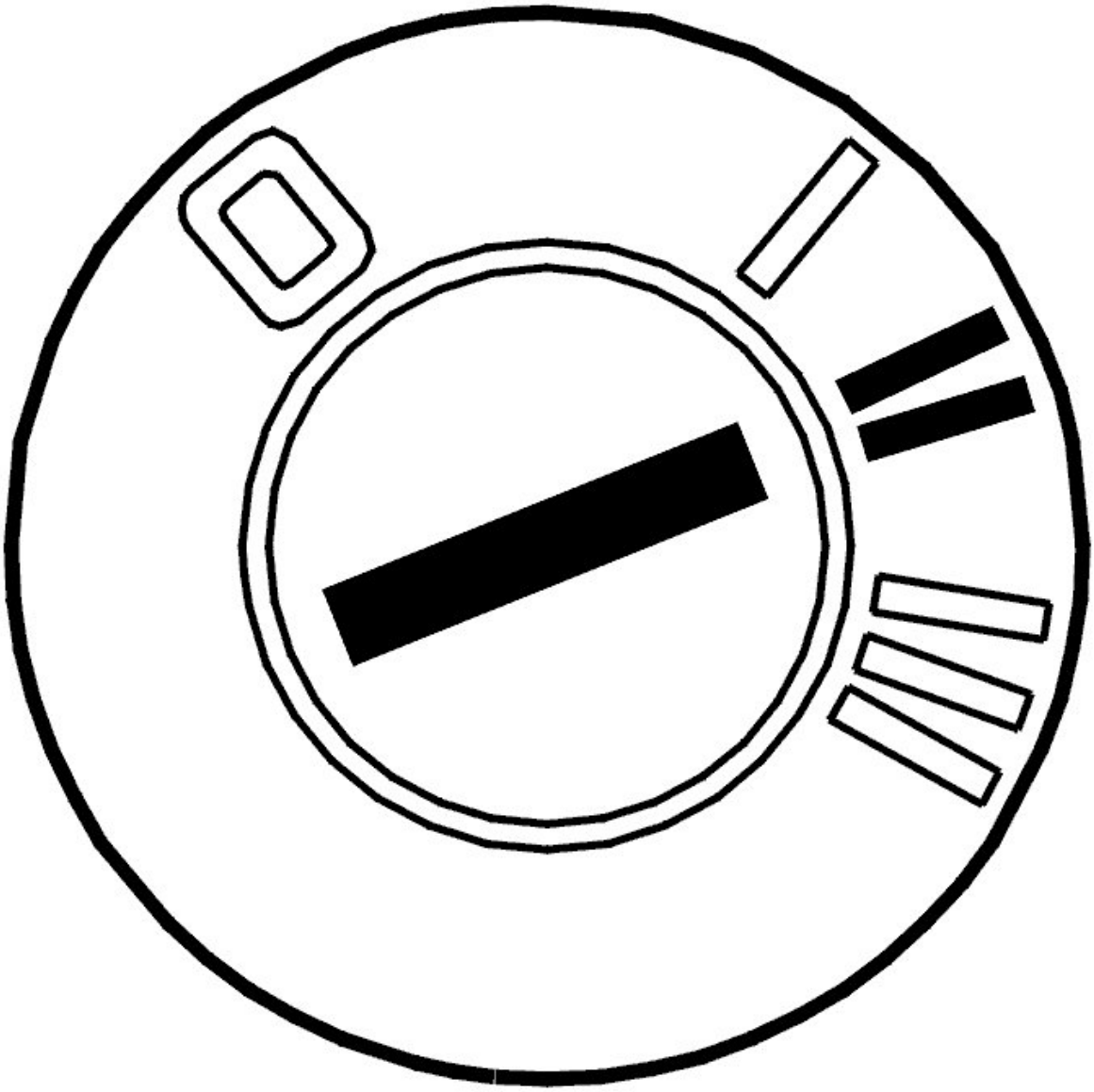
Continue - Verification

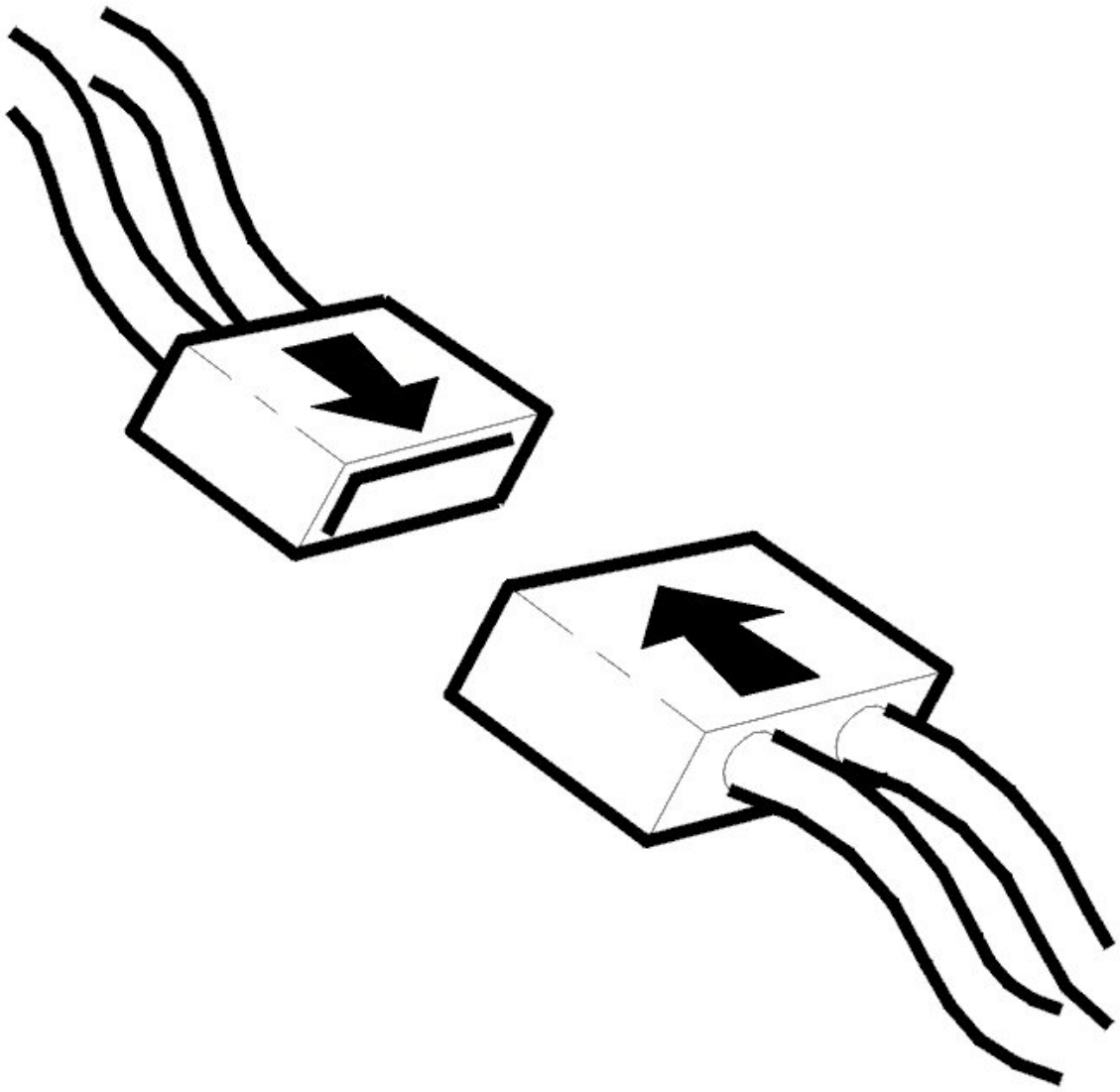
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

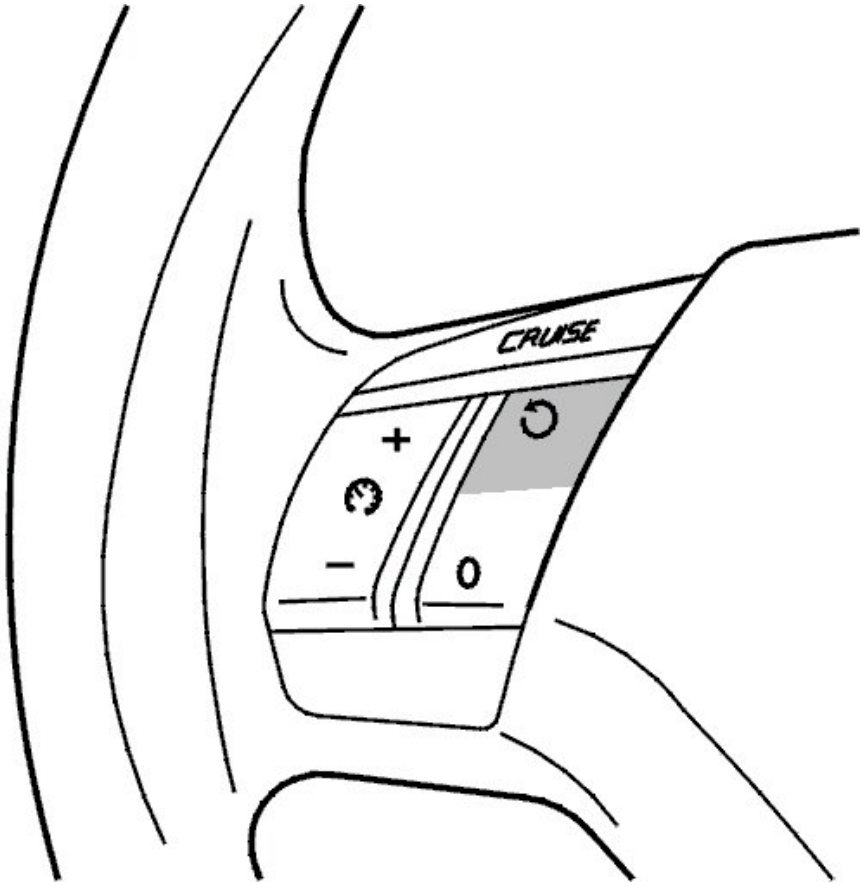
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F04

Condition



The central electronic module (CEM) checks the signal from the Resume button for the cruise control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Resume button has been active for more than 3 minutes.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Resume button is jammed in the pressed in position
- Damaged Resume button.

Fault symptom[s]
- Cruise control does not function at all.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

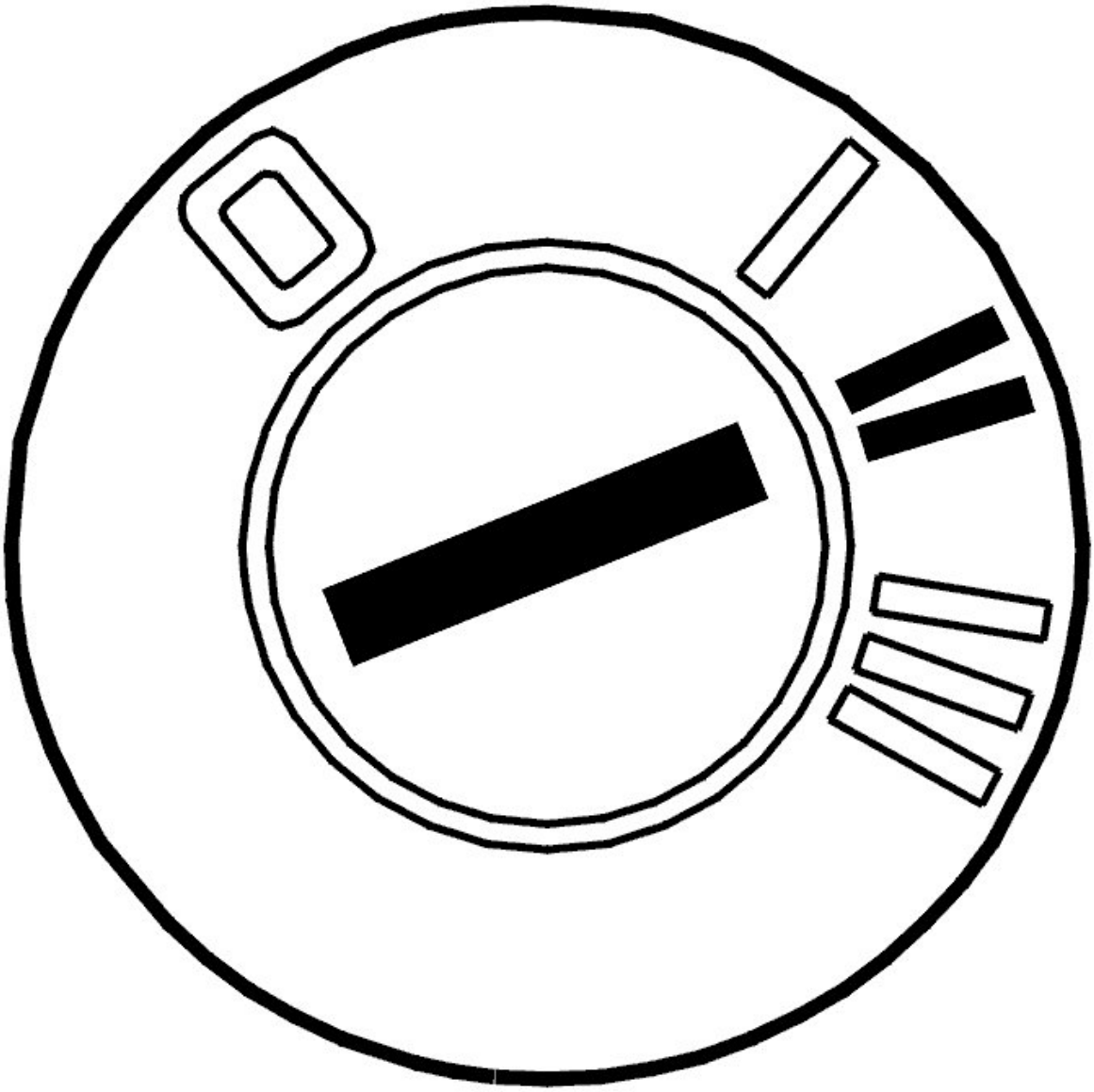
Continue - Verification

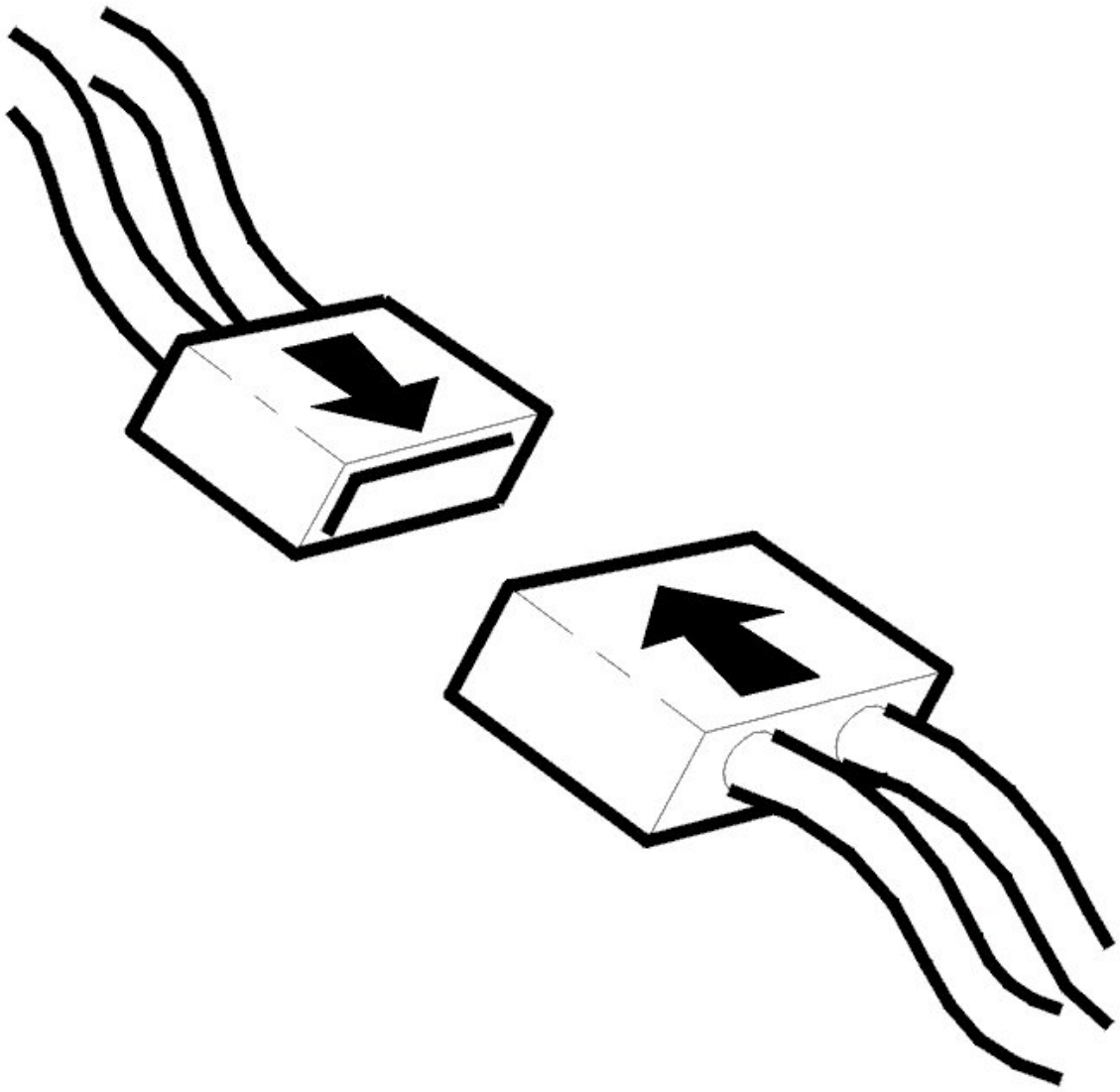
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

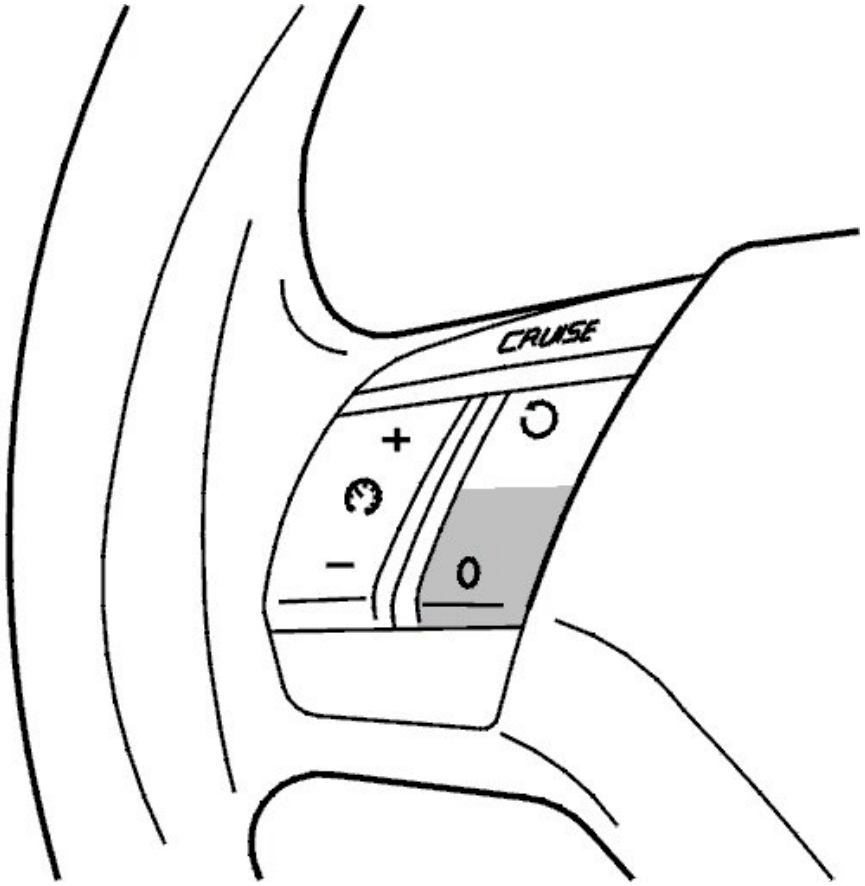
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F05

Condition



The central electronic module (CEM) checks the signal from the Cancel button for the cruise control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Cancel button has been active for more than 3 minutes.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Cancel button is jammed in the pressed in position
- Damaged Cancel button.

Fault symptom[s]
- Cruise control does not function at all.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

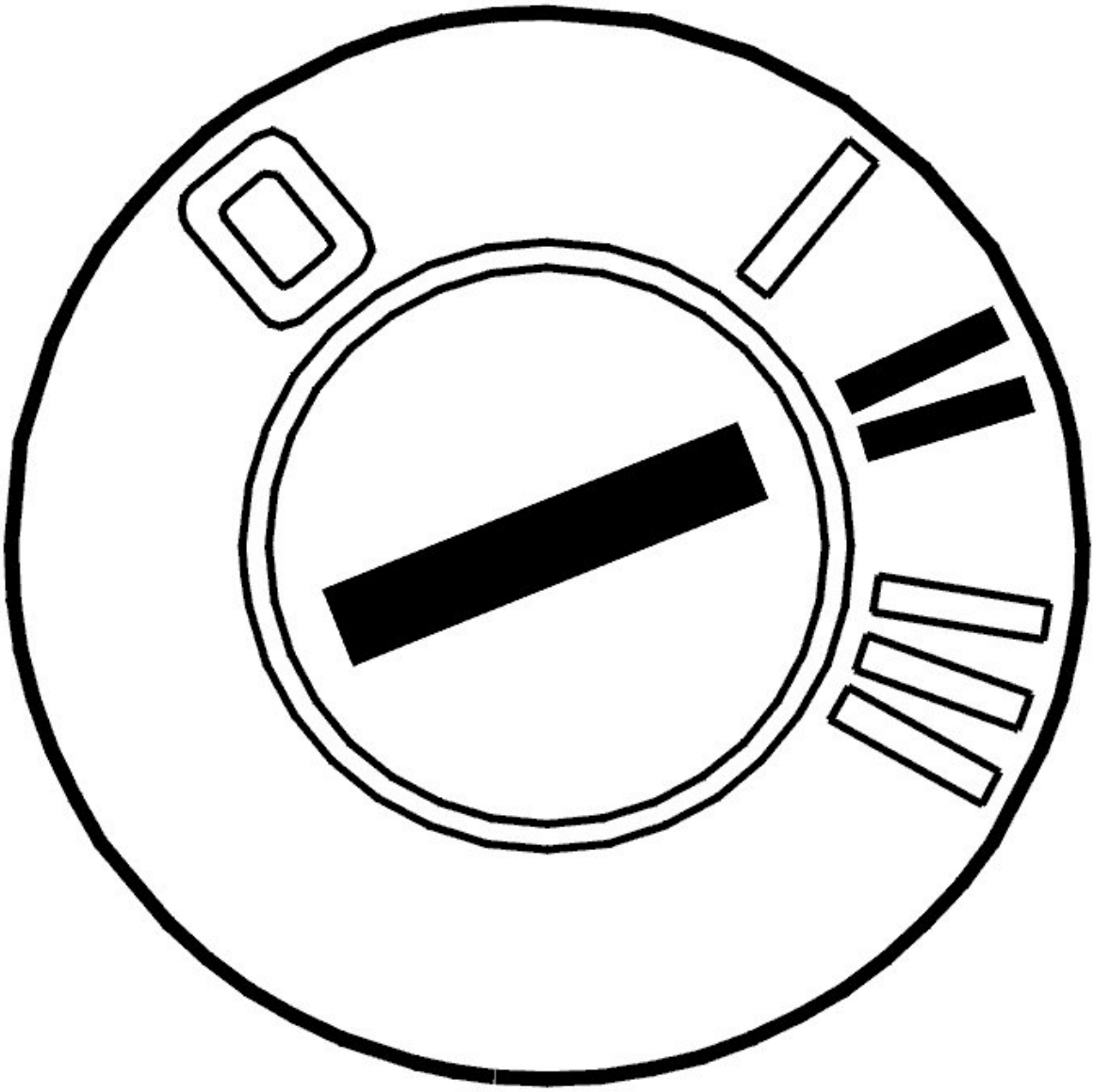
Continue - Verification

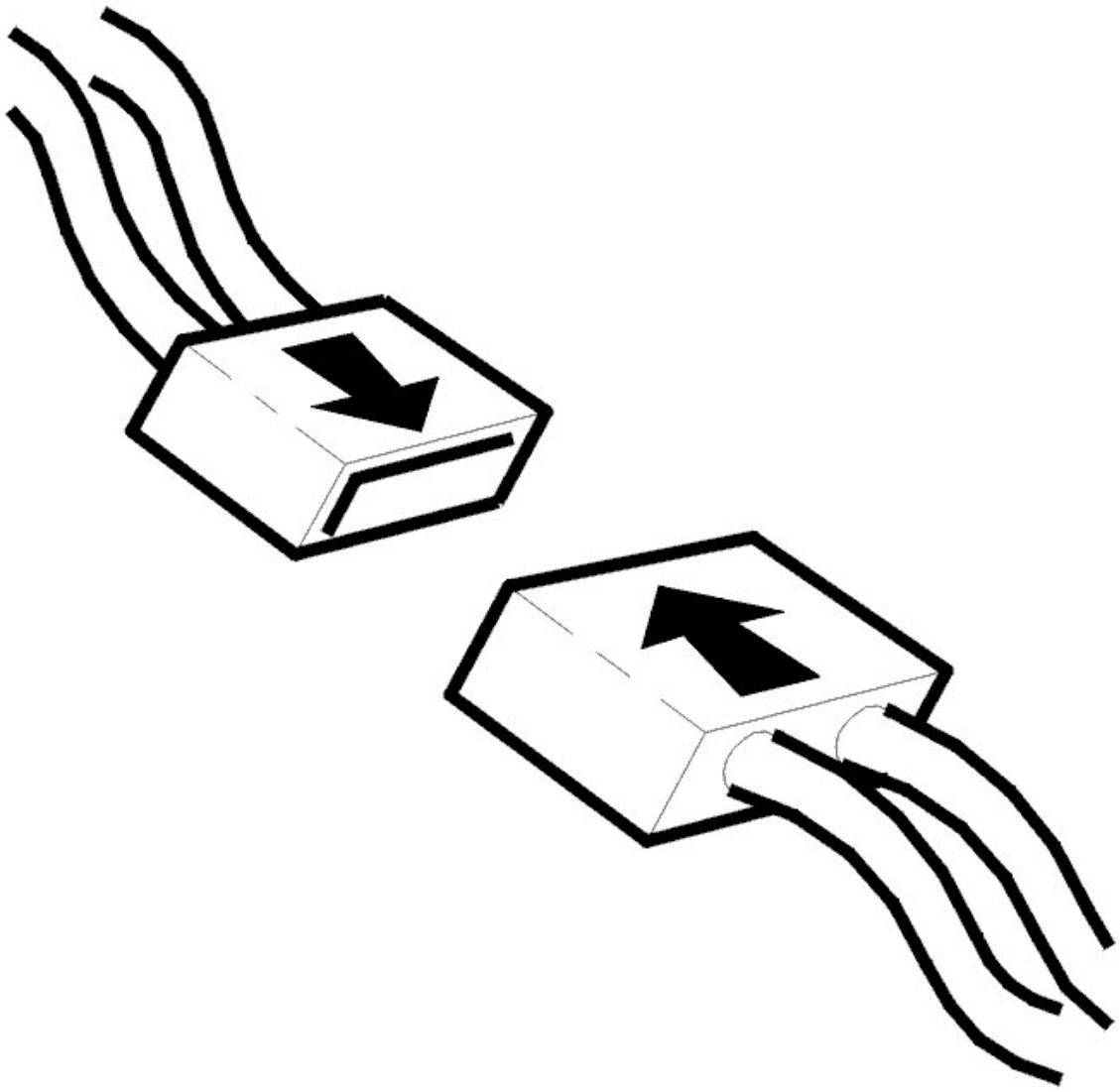
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

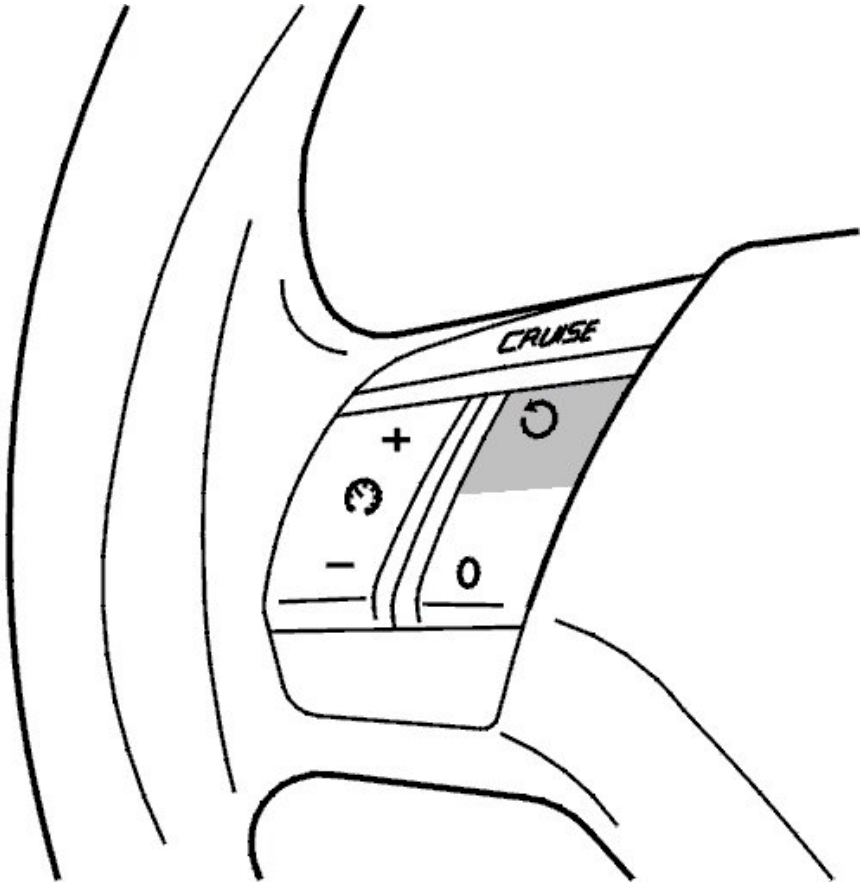
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F06

Condition



The central electronic module (CEM) checks the signal from the buttons on the steering wheel.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Resume and Cancel buttons for the cruise control are active at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged buttons on the steering wheel.

Fault symptom[s]
- Cruise control does not function at all.

Faulty Signal

Faulty signal

Checking the control

The diagnostic trouble code (DTC) is stored when the steering wheel module (SWM) has detected an invalid combination for the button or switch position.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

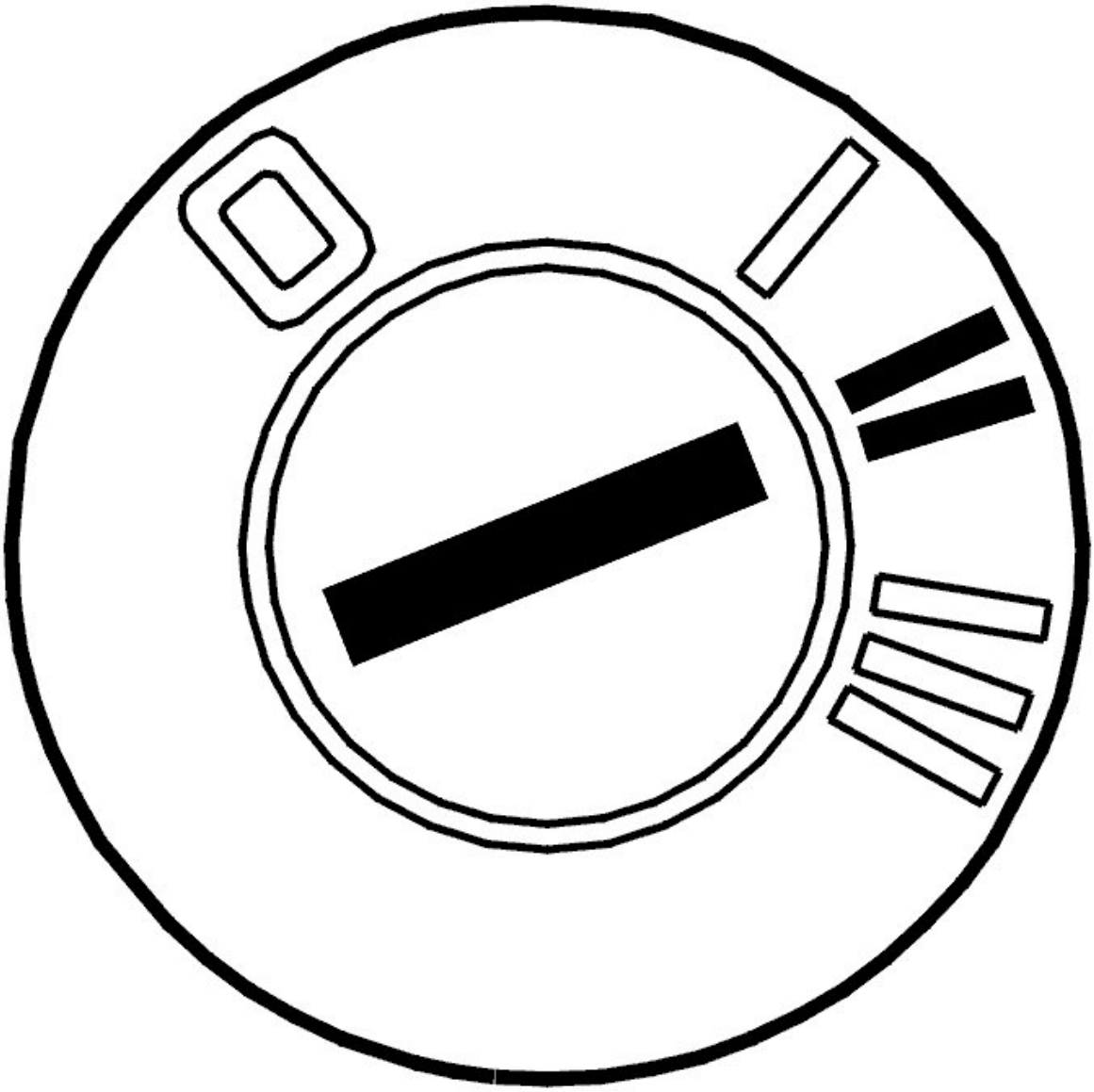
Continue - Verification

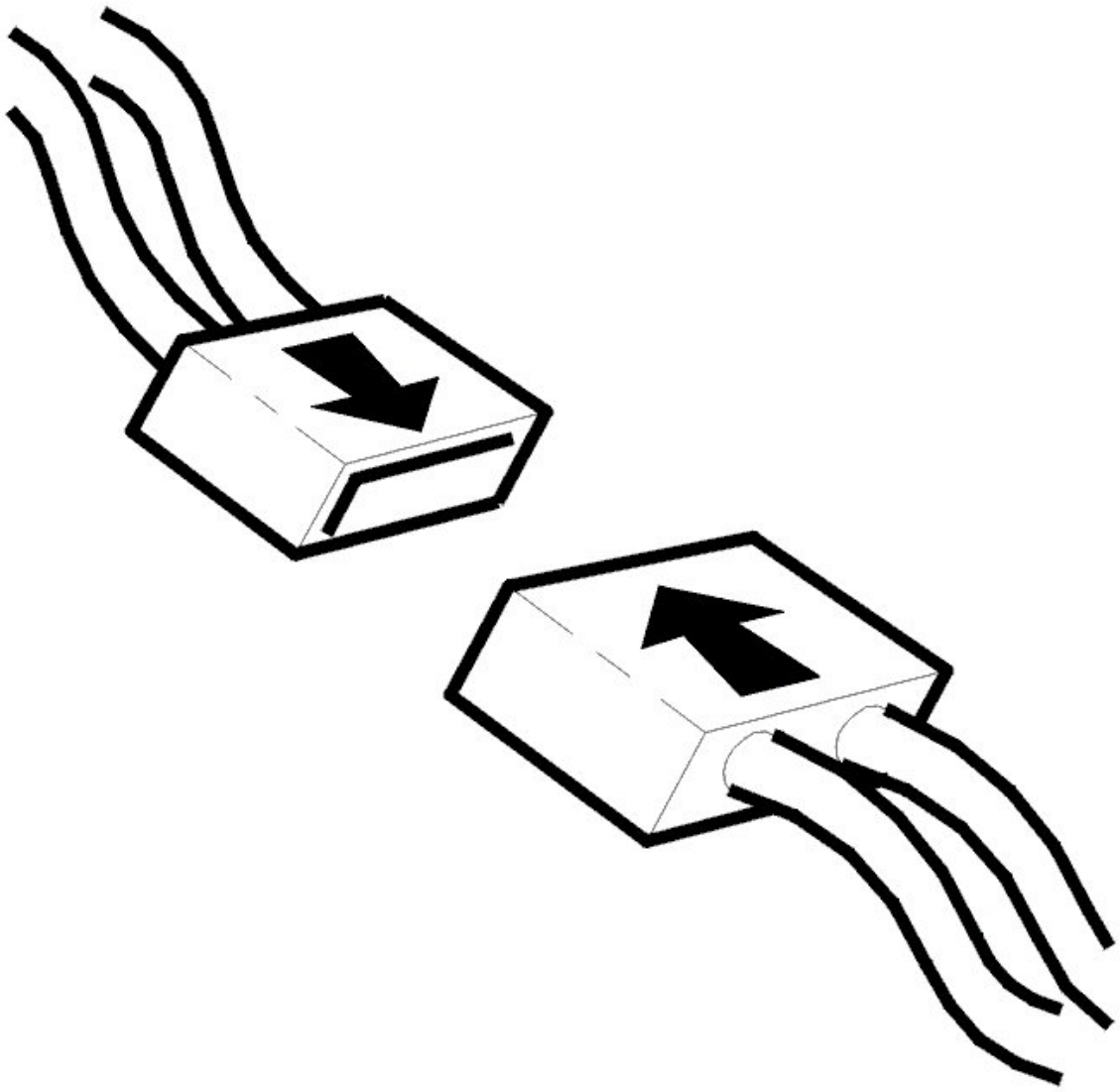
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

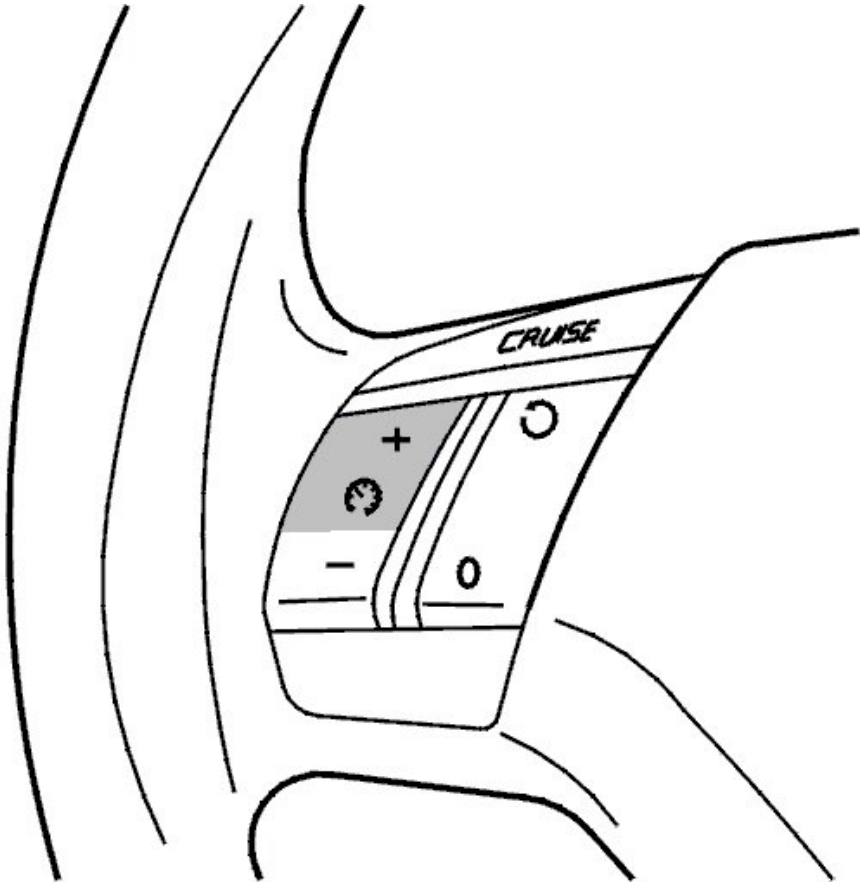
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-6F07

Condition



The central electronic module (CEM) checks the signal from the buttons on the steering wheel.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Set+ and Set- buttons for the cruise control are active at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged buttons on the steering wheel.

Fault symptom[s]
- Cruise control does not function at all.

Faulty Signal

Faulty signal

Checking the control

The diagnostic trouble code (DTC) is stored when the steering wheel module (SWM) has detected an invalid combination for the button or switch position.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

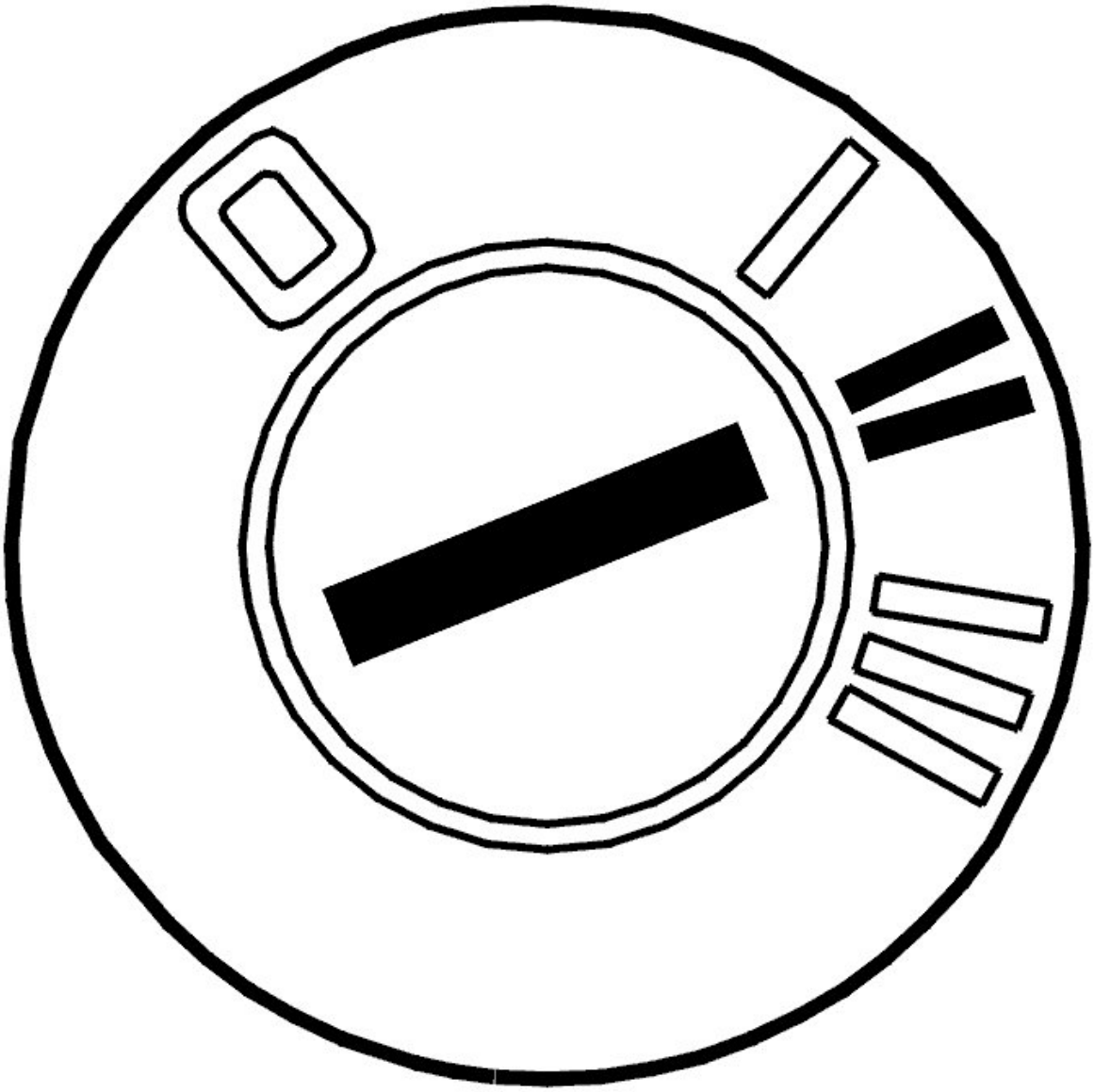
Continue - Verification

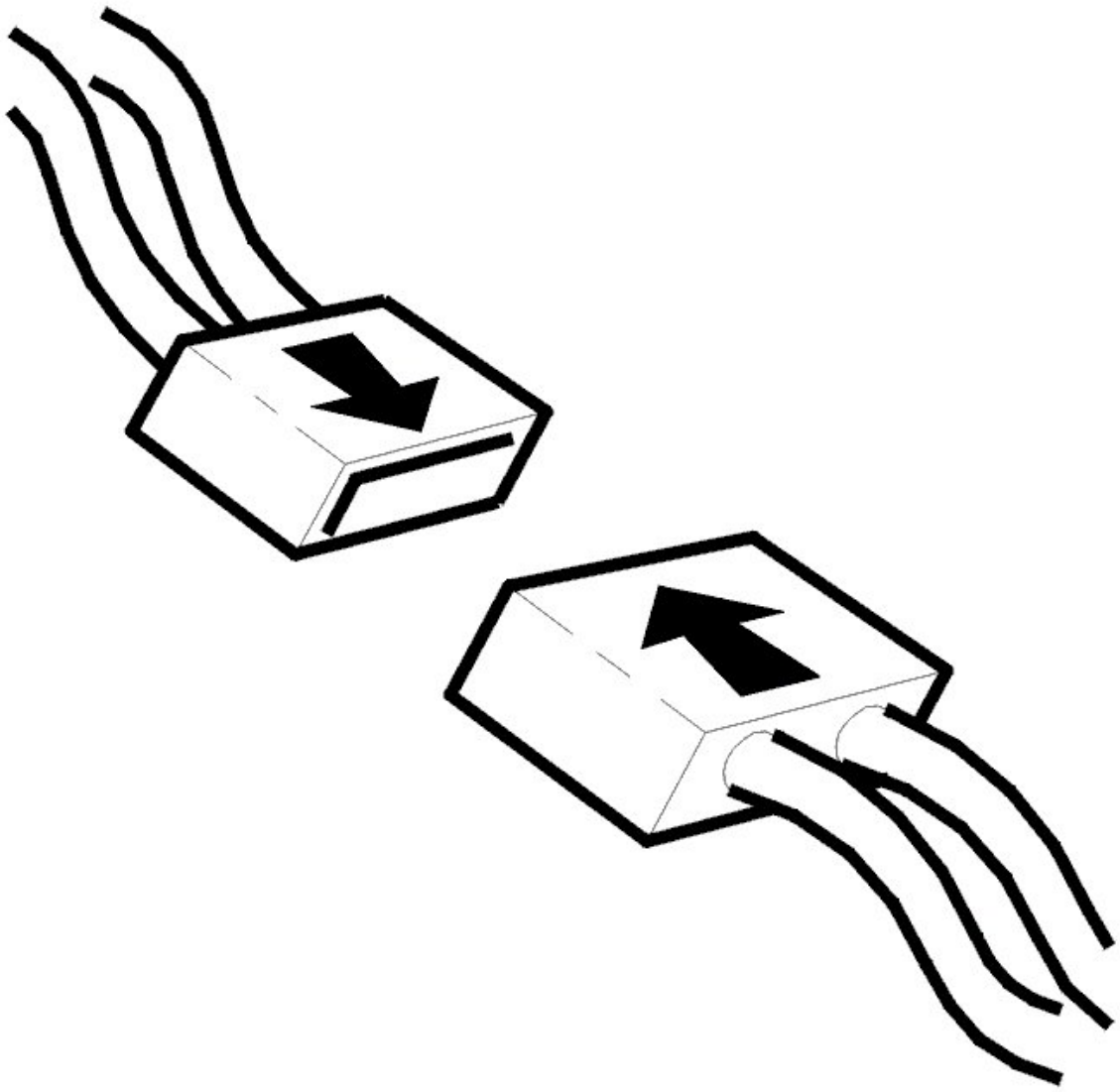
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that all switches are working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

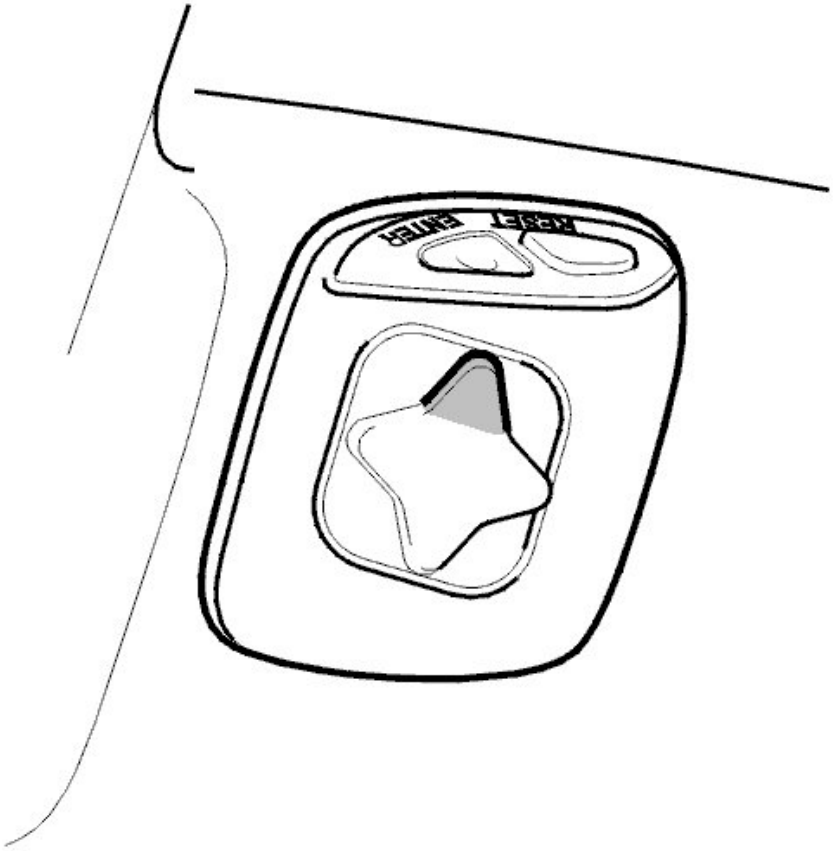
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A0A

Condition



The central electronic module (CEM) checks the signal from the up button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the up button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The up button has jammed in the pressed in position
- Damaged up button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

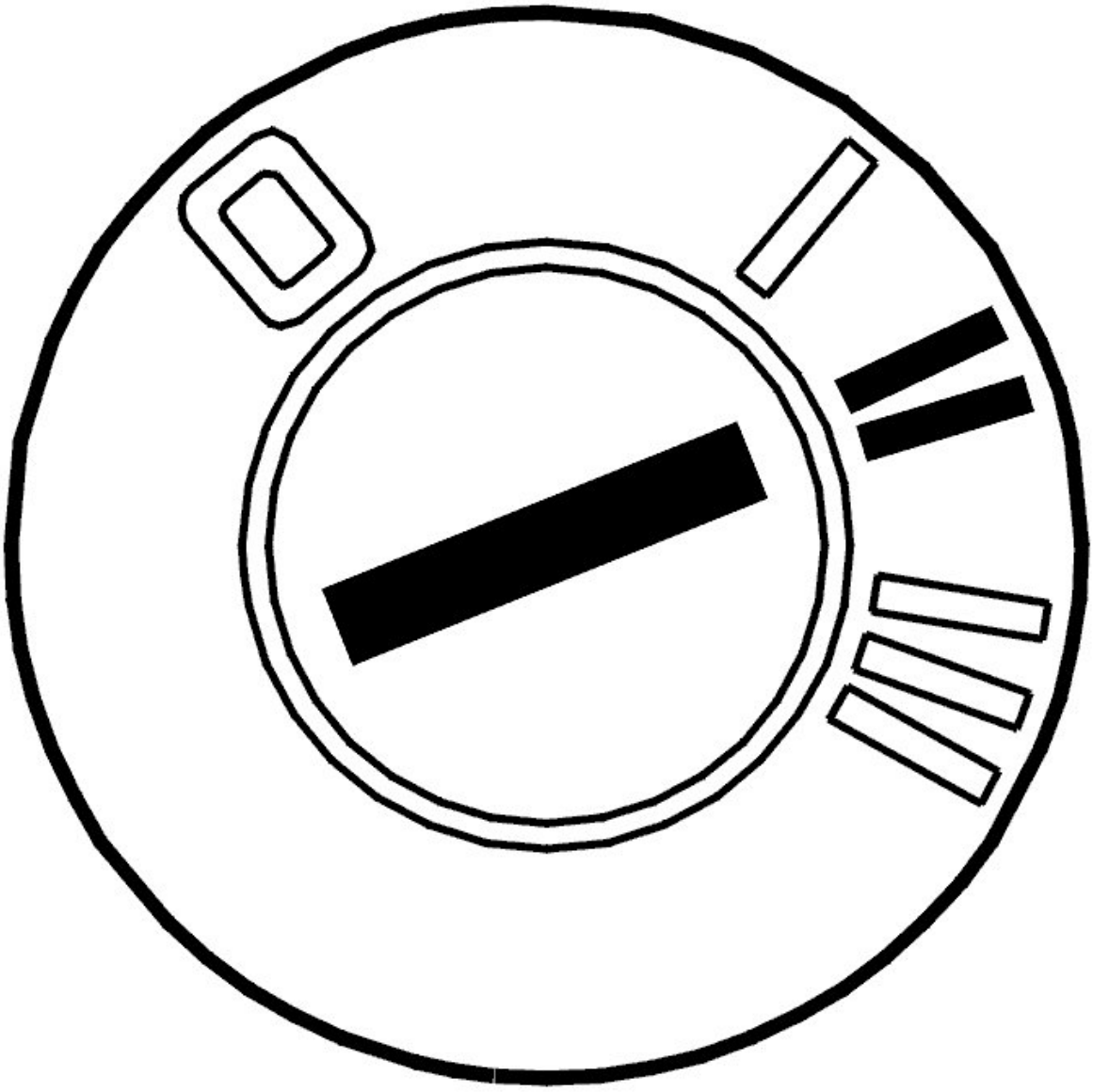
Continue - Verification

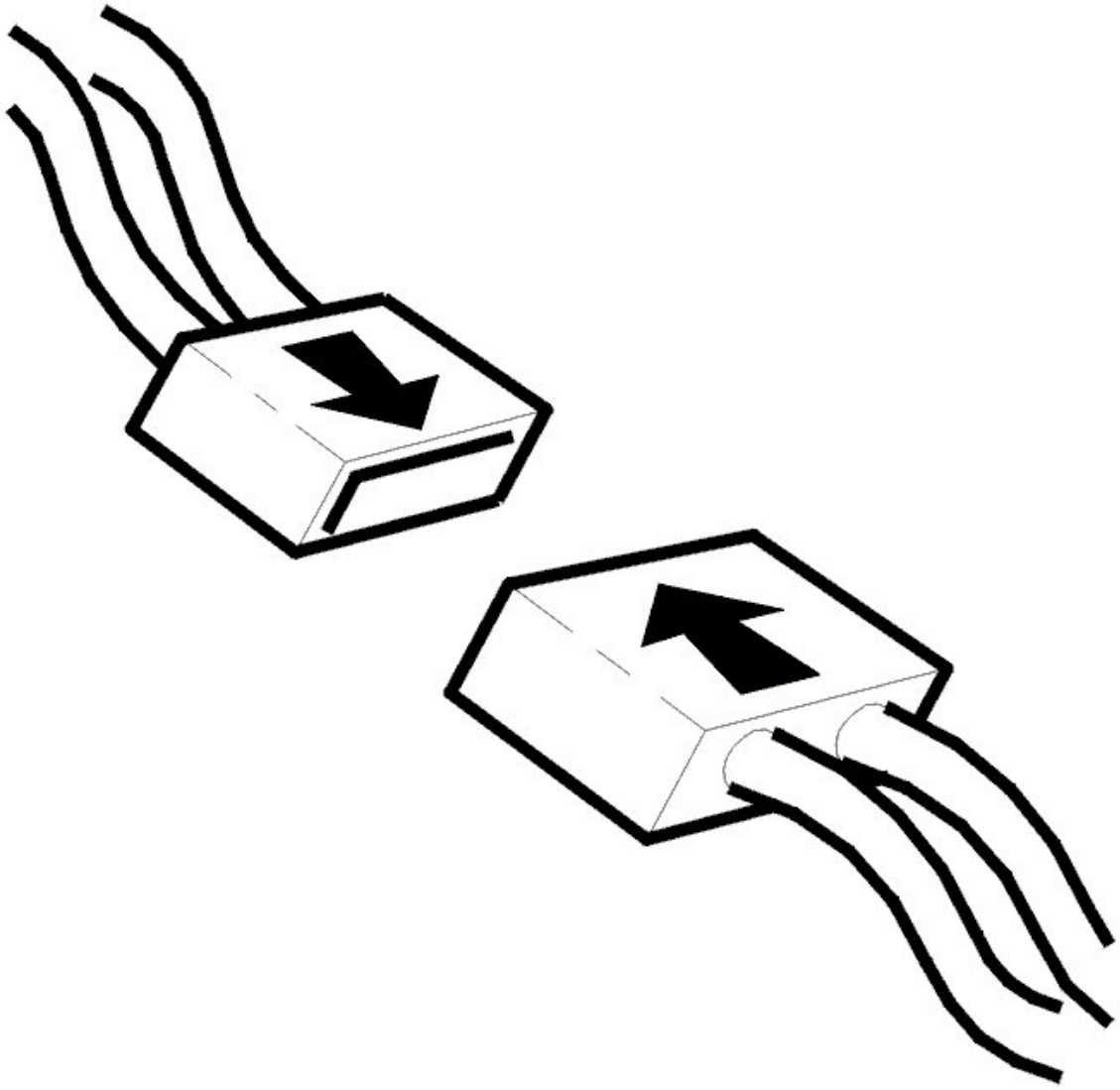
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

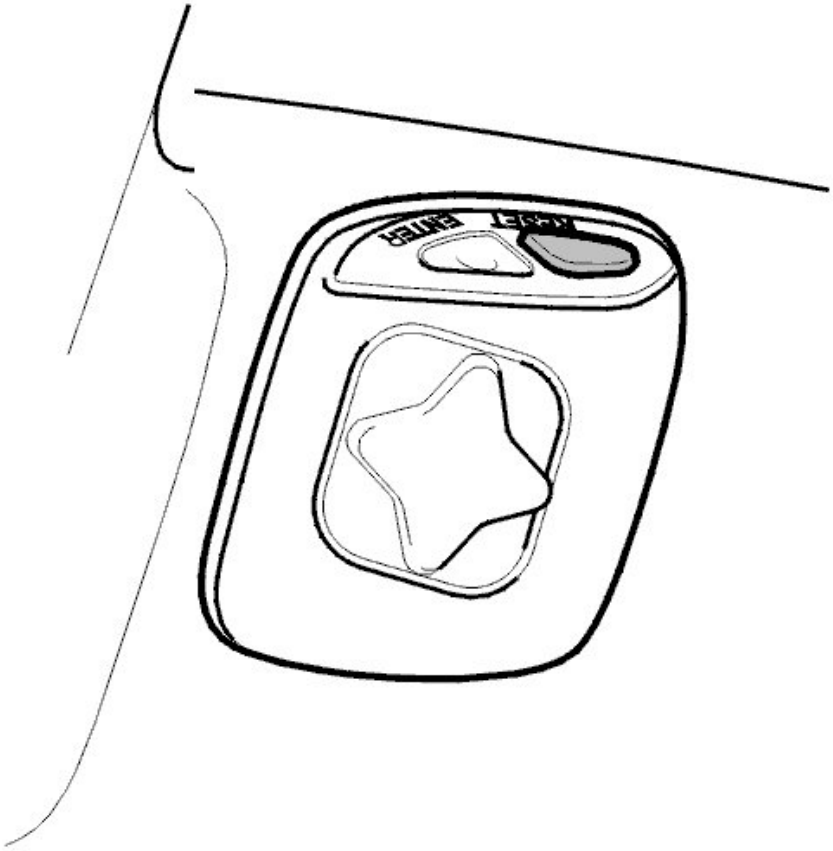
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A0B

Condition



The central electronic module (CEM) checks the signal from the back button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the back button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The back button has jammed in the pressed in position
- Damaged back button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

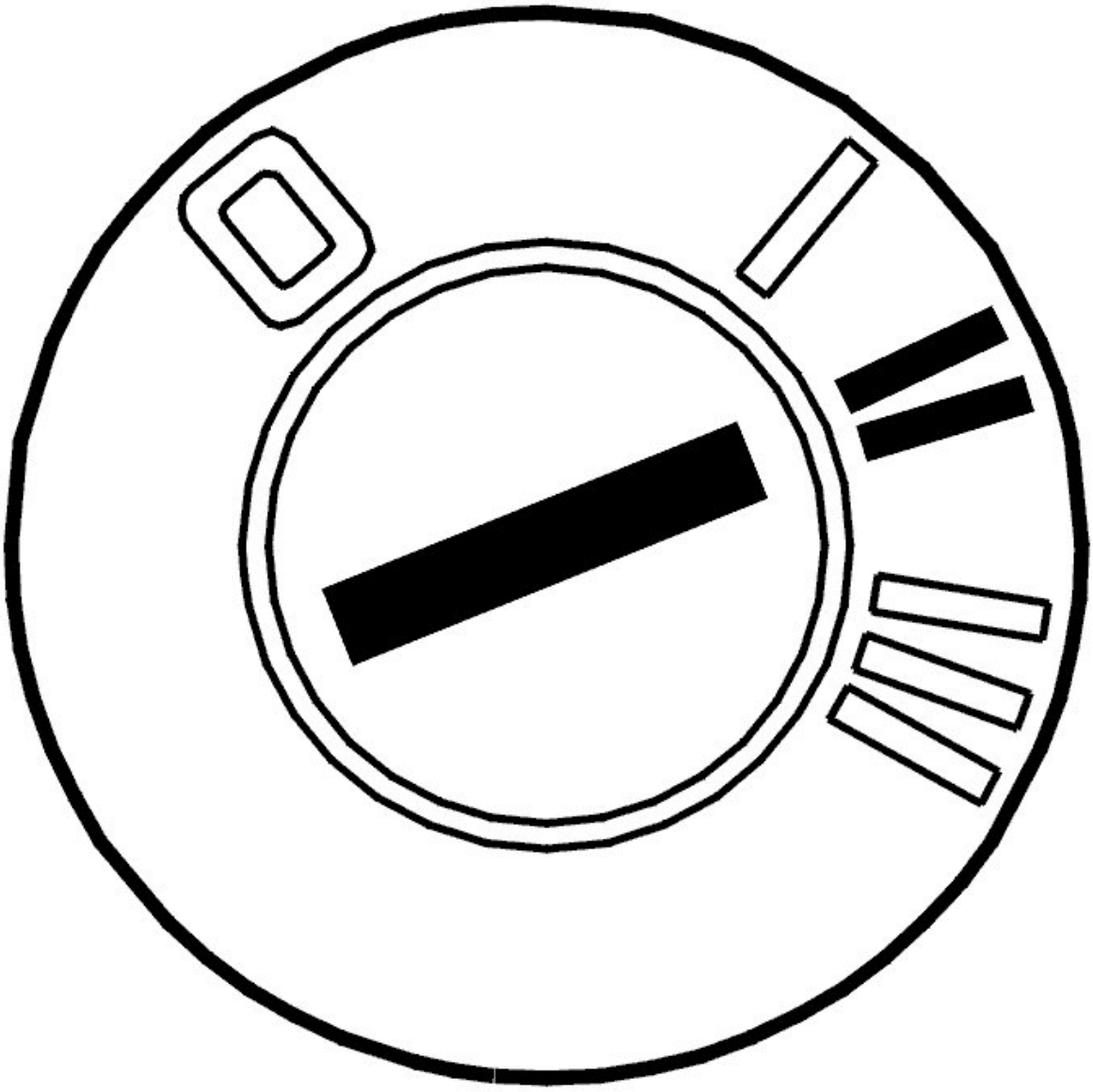
Continue - Verification

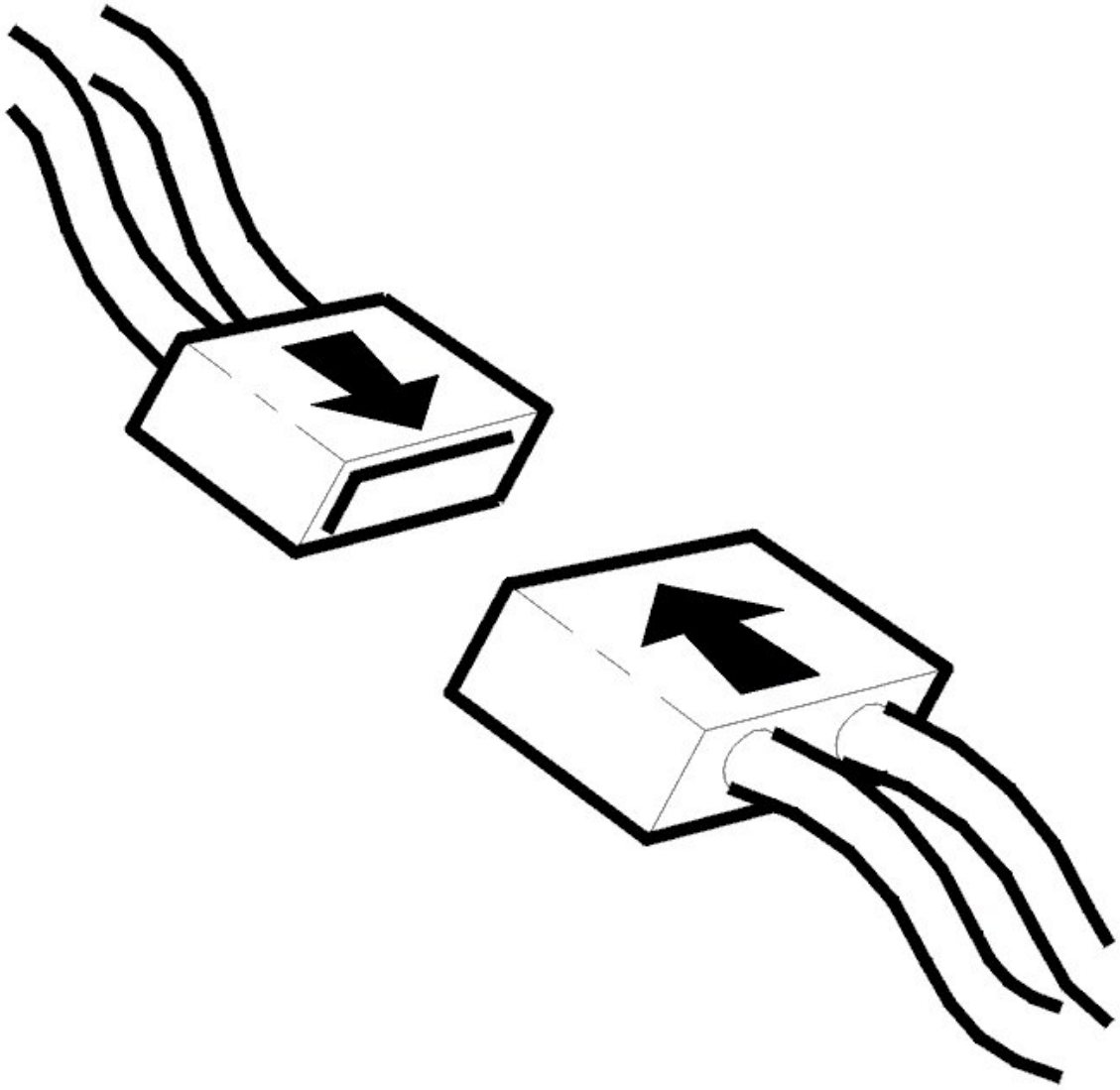
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

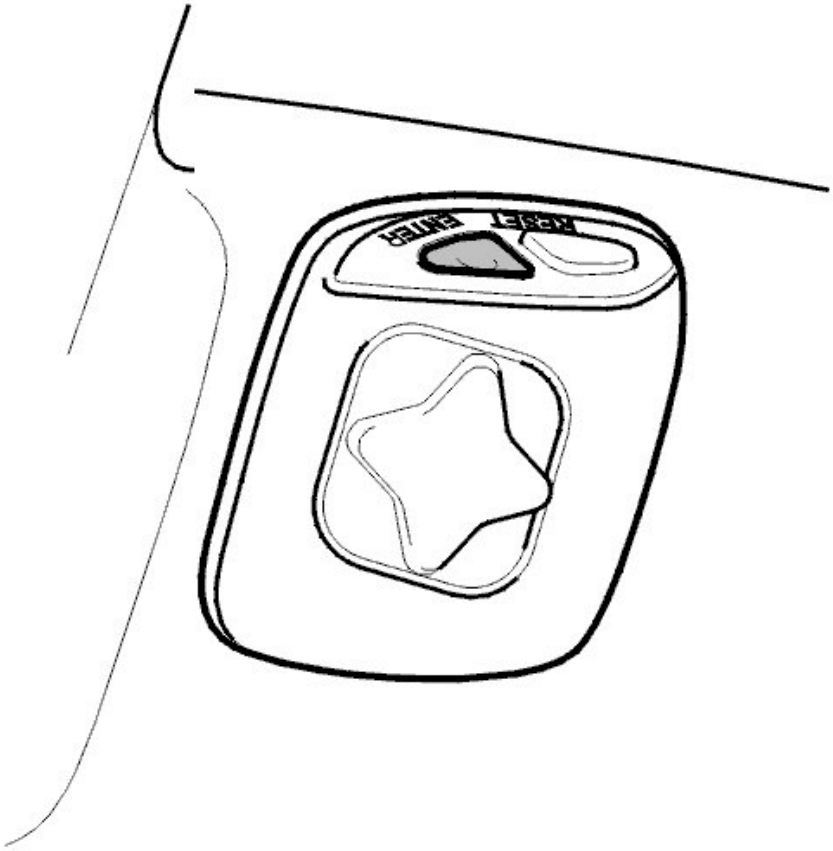
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A0C

Condition



The central electronic module (CEM) checks the signal from the enter button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the enter button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Enter button has jammed in the pressed in position
- Damaged enter button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

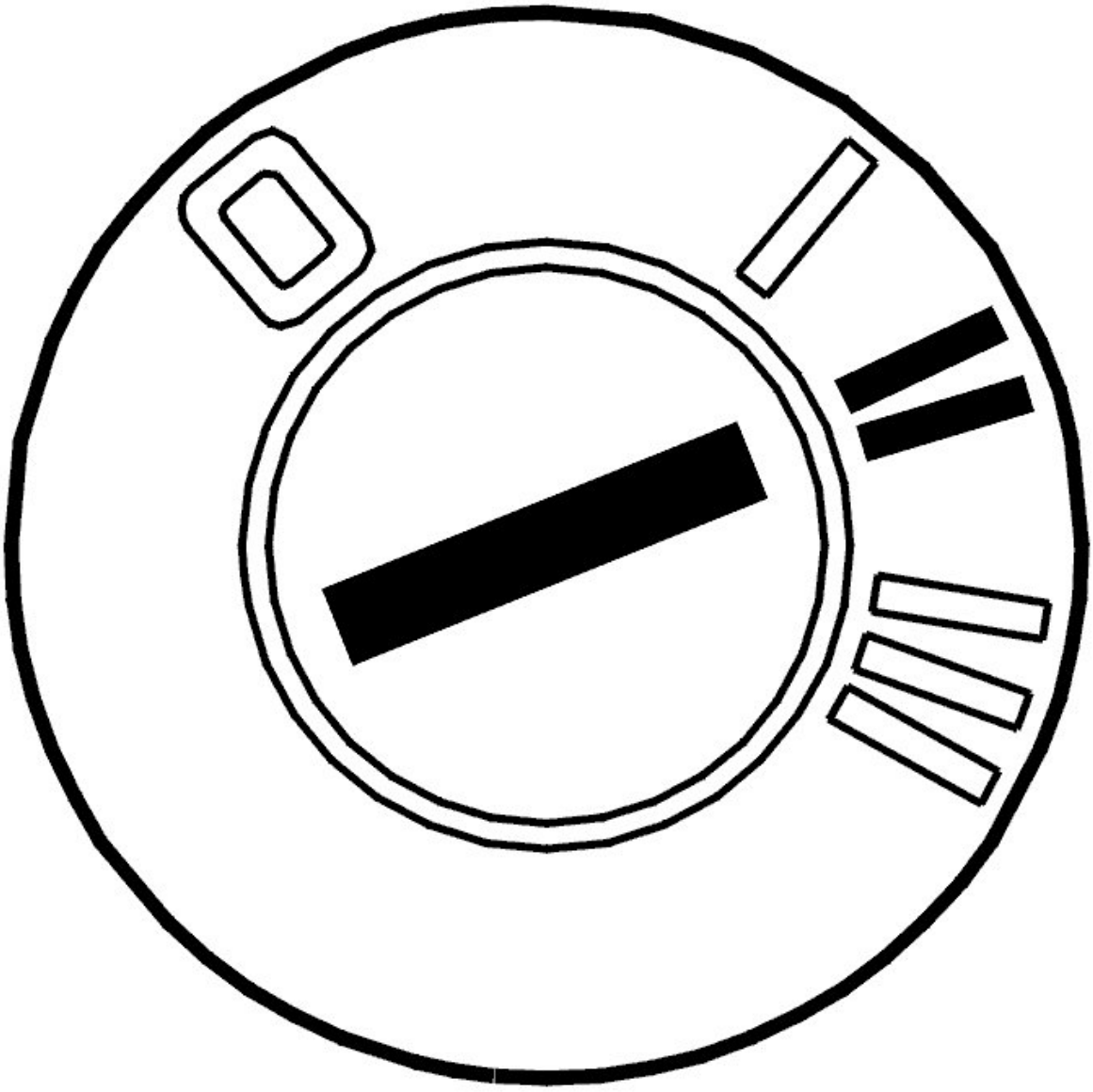
Continue - Verification

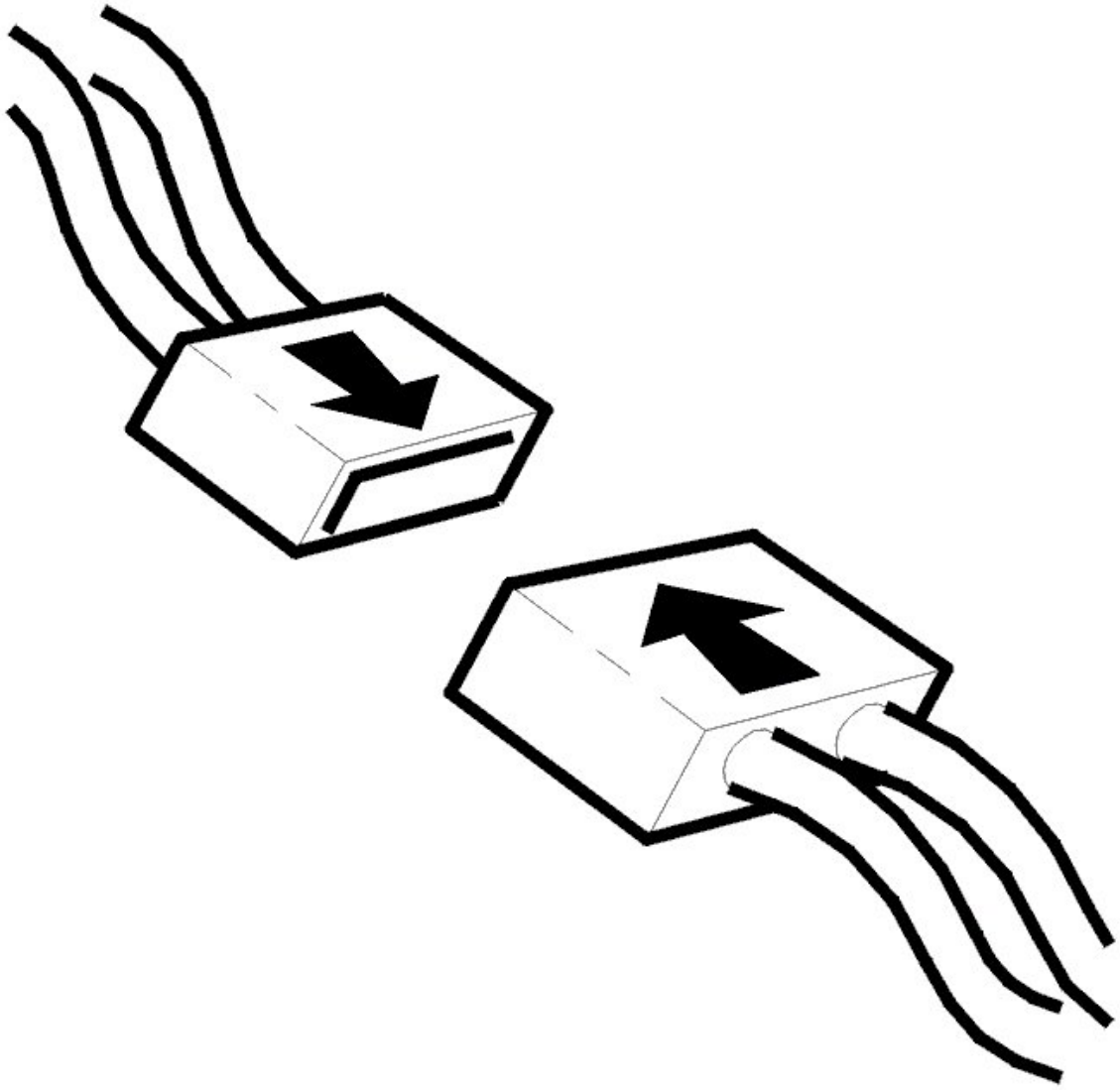
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

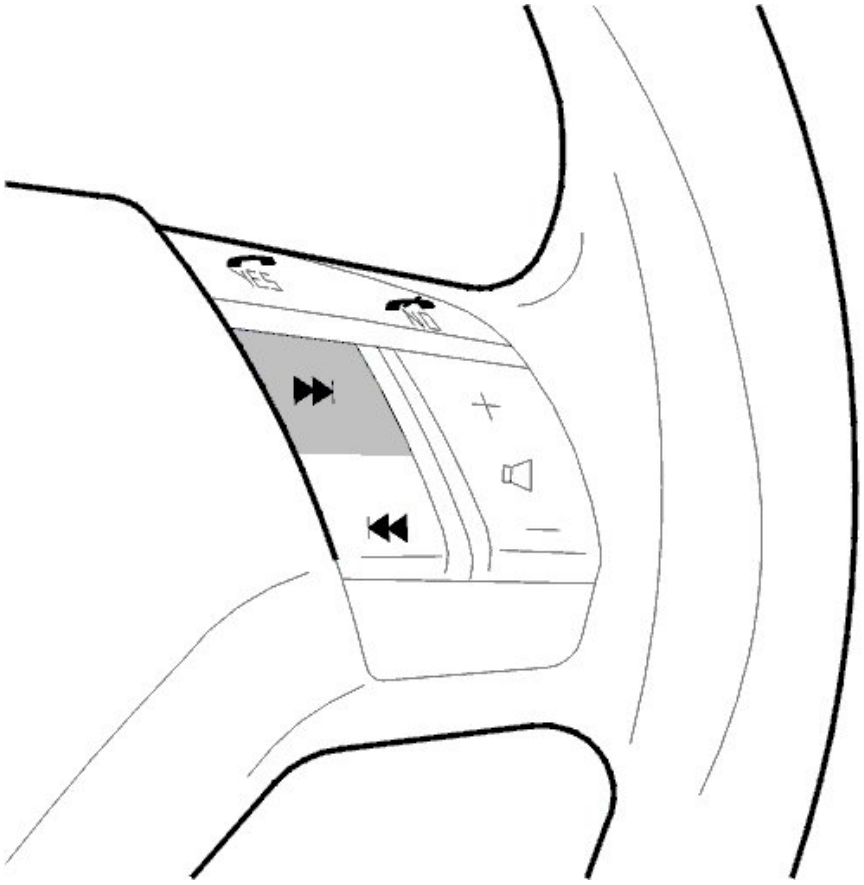
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A01

Condition



The central electronic module (CEM) checks the signal from the Scan- button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Scan- button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Scan- button is jammed in the pressed in position
- Damaged Scan- button.

Fault symptom[s]
- The radio buttons on the steering wheel do not function
- The phone is not working.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

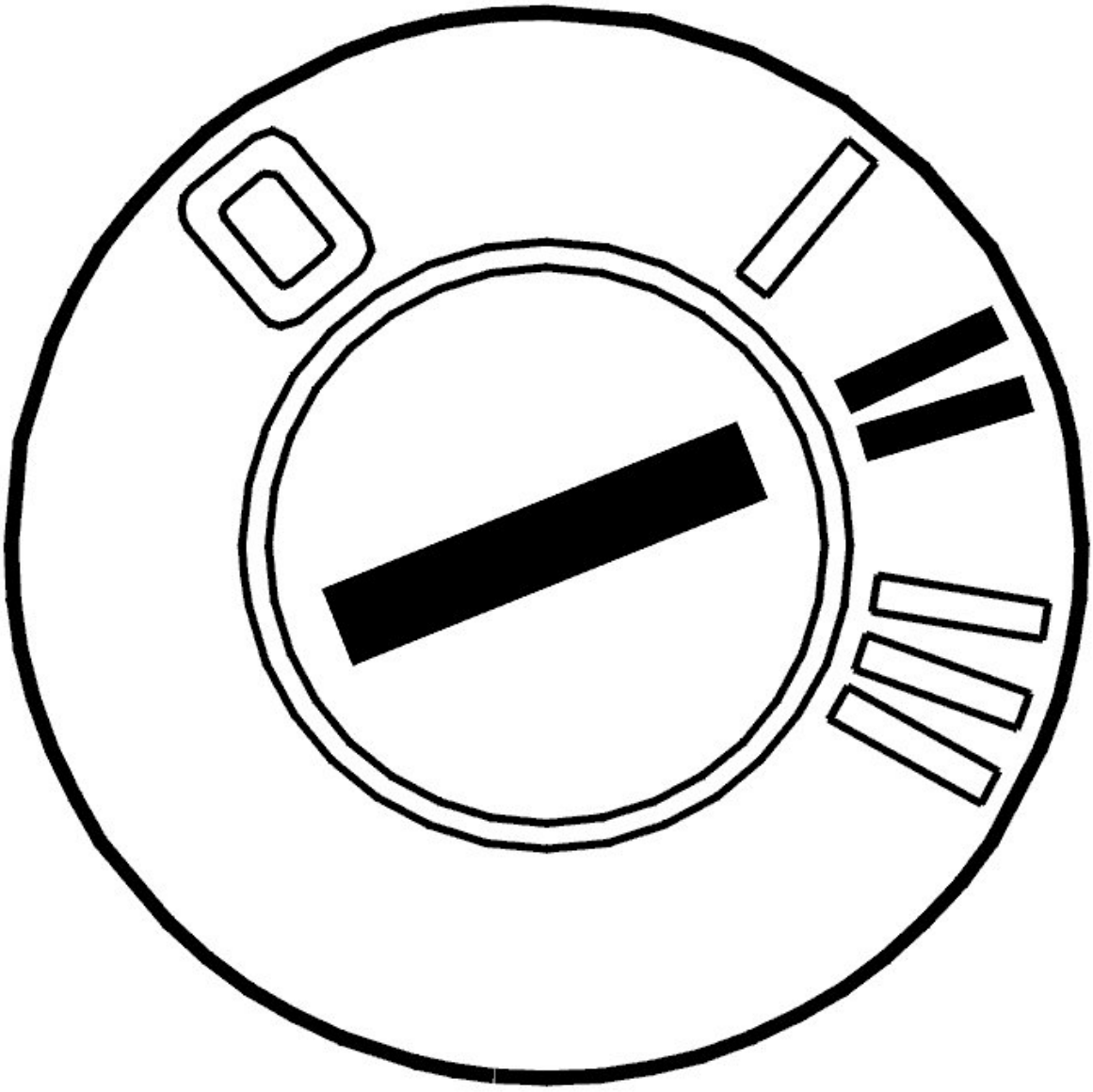
Continue - Verification

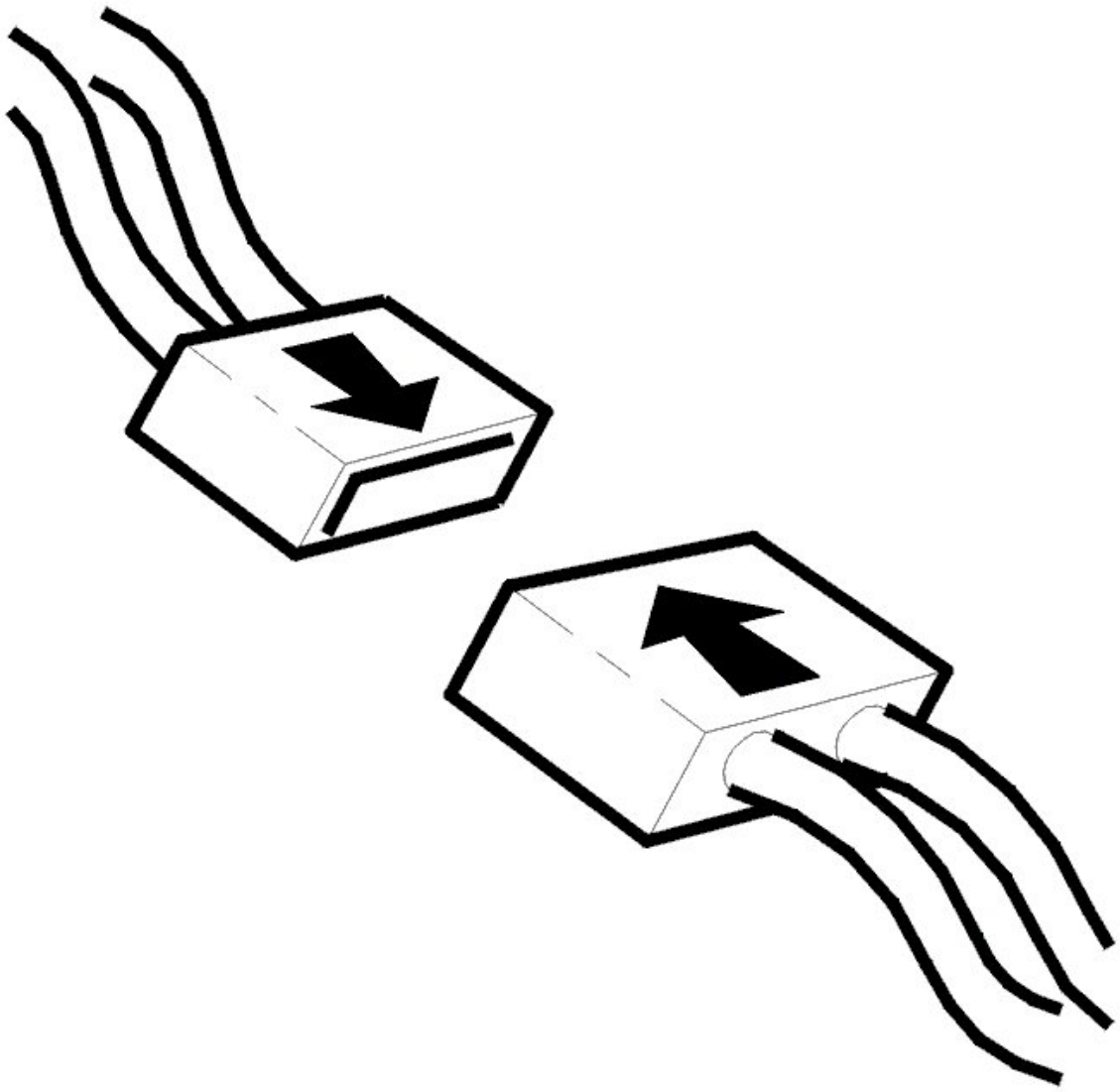
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

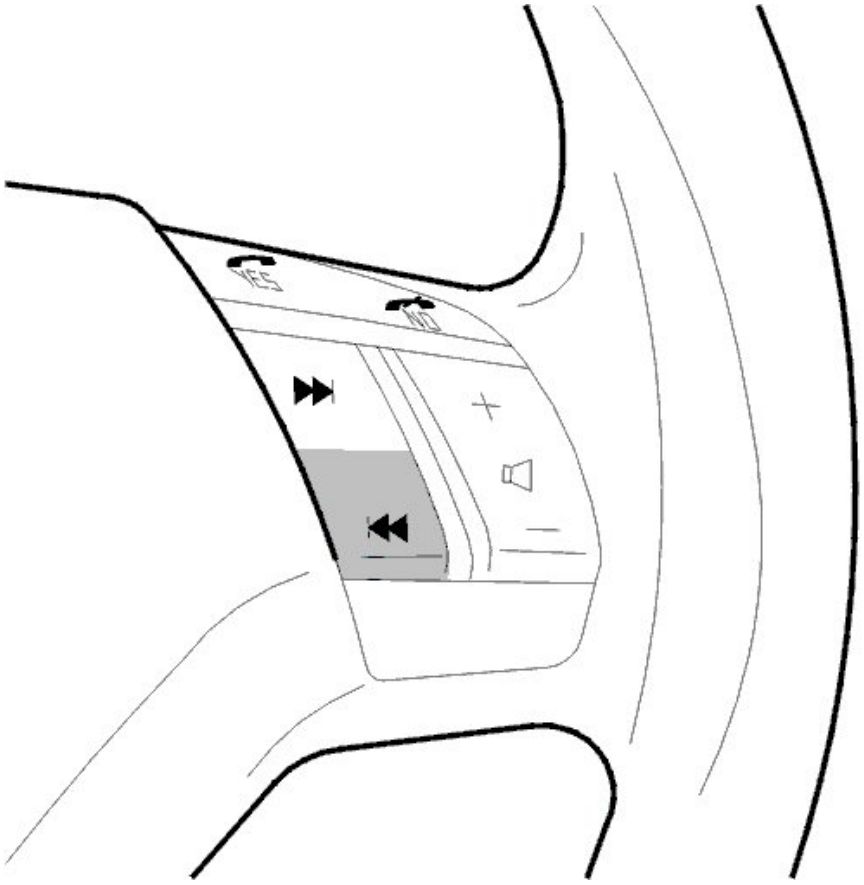
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A02

Condition



The central electronic module (CEM) checks the signal from the Scan+ button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Scan+ button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Scan+ button is jammed in the pressed in position
- Damaged Scan+ button.

Fault symptom[s]
- The radio buttons on the steering wheel do not function
- The phone is not working.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

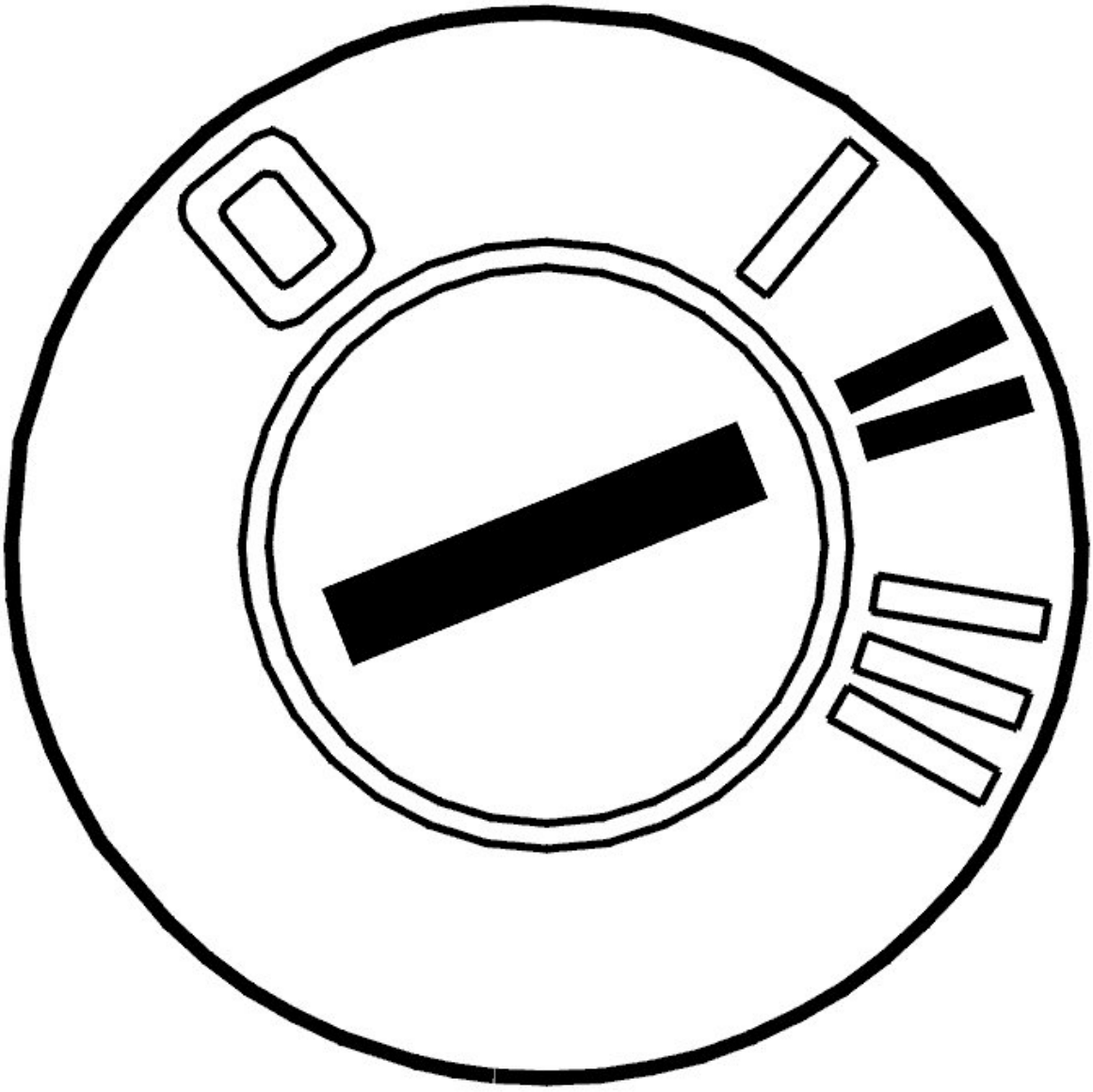
Continue - Verification

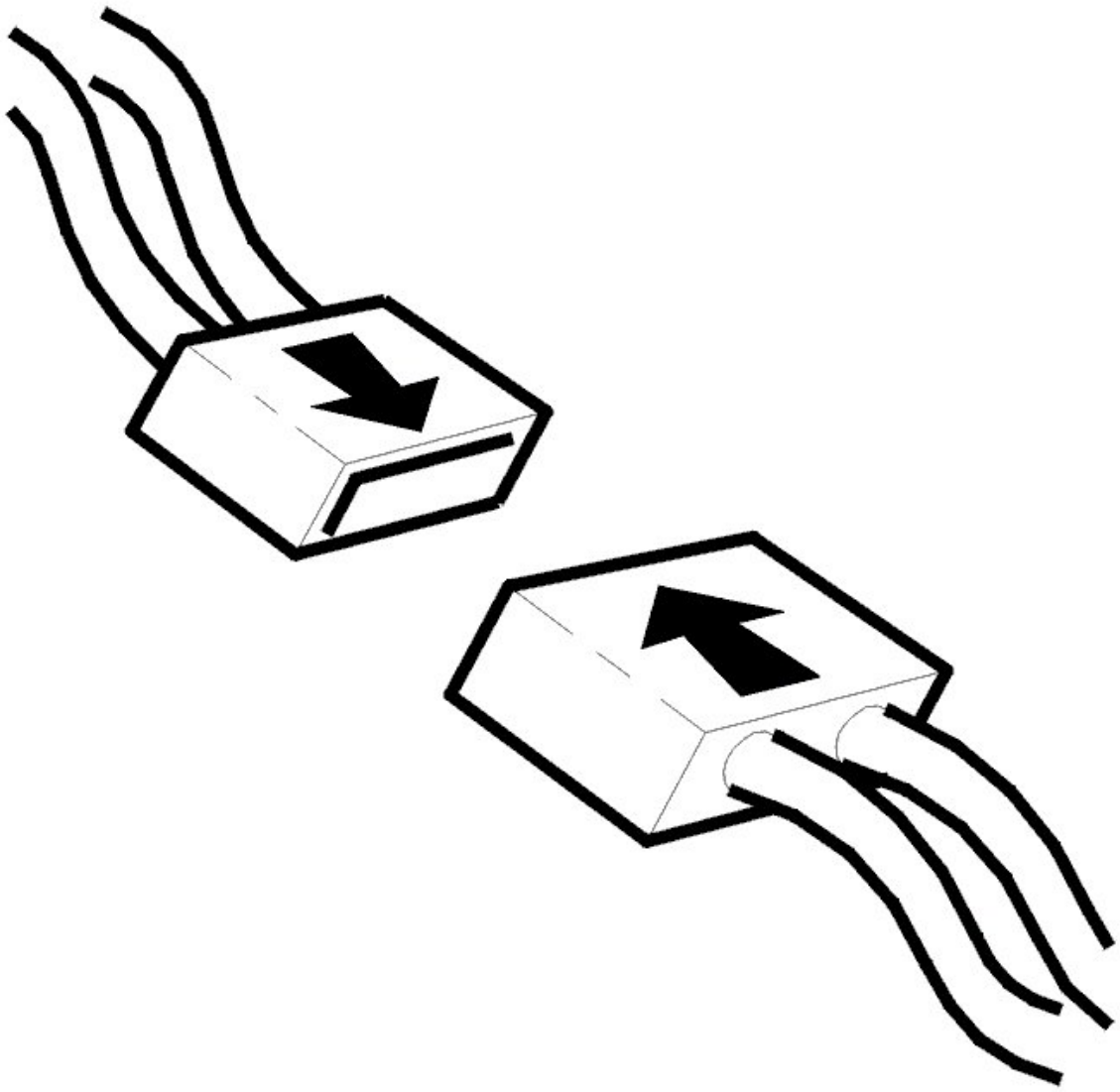
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

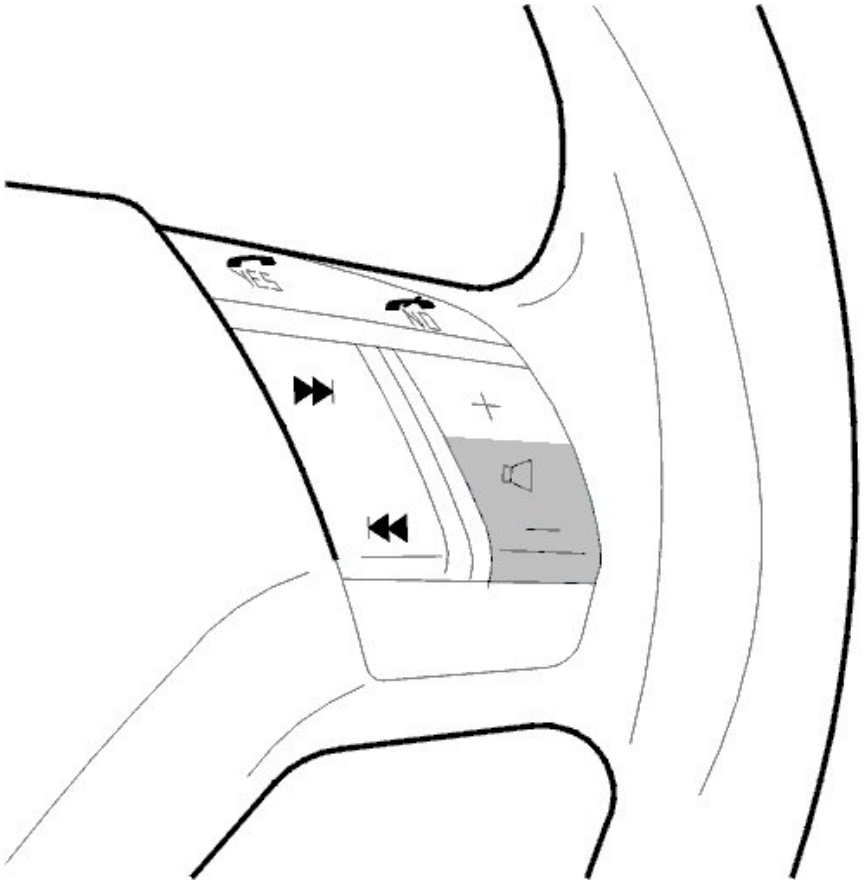
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A03

Condition



The central electronic module (CEM) checks the signal from the Volume- button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Volume- button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Volume- button is jammed in the pressed in position
- Damaged Volume- button.

Fault symptom[s]
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

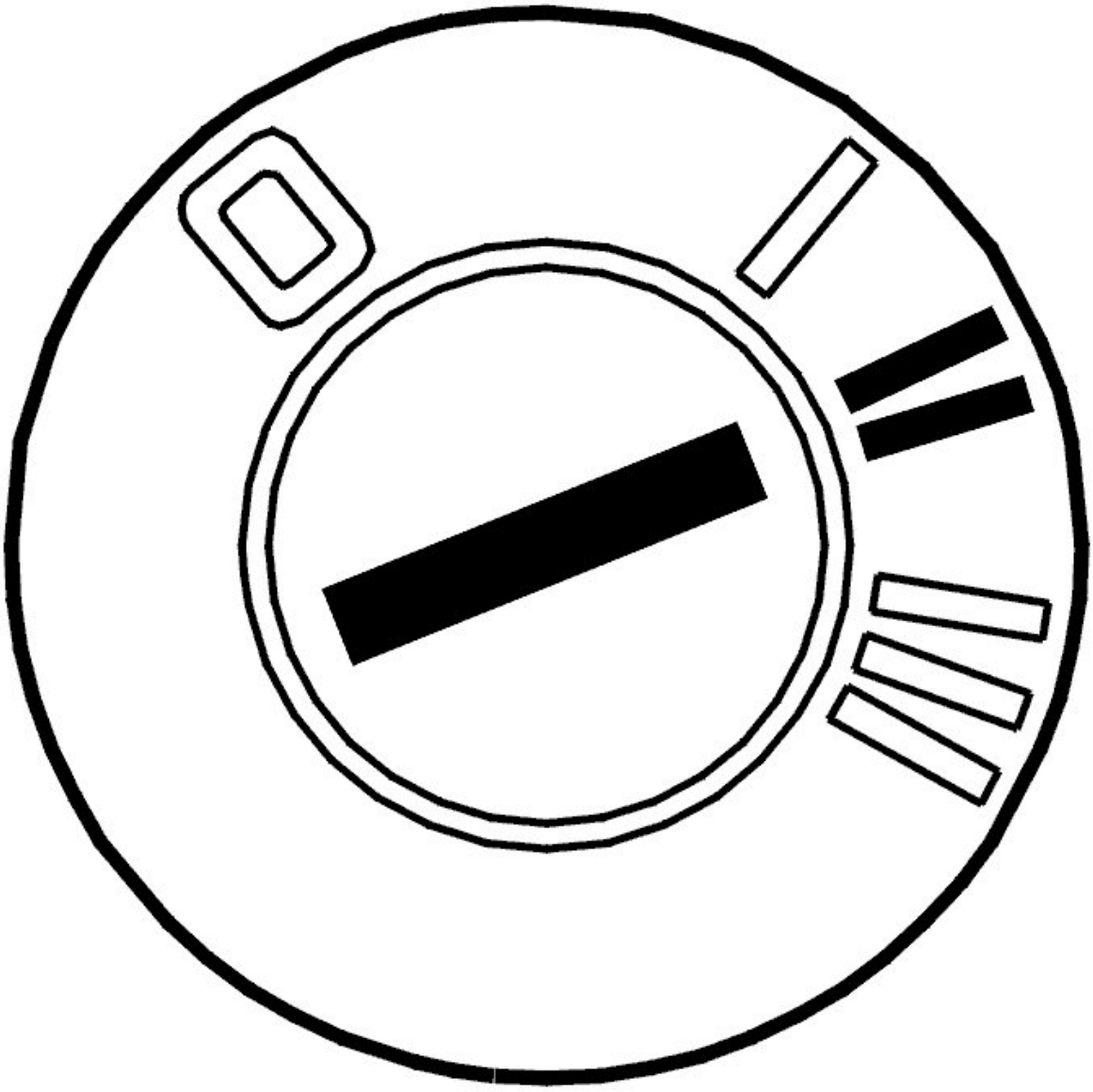
Continue - Verification

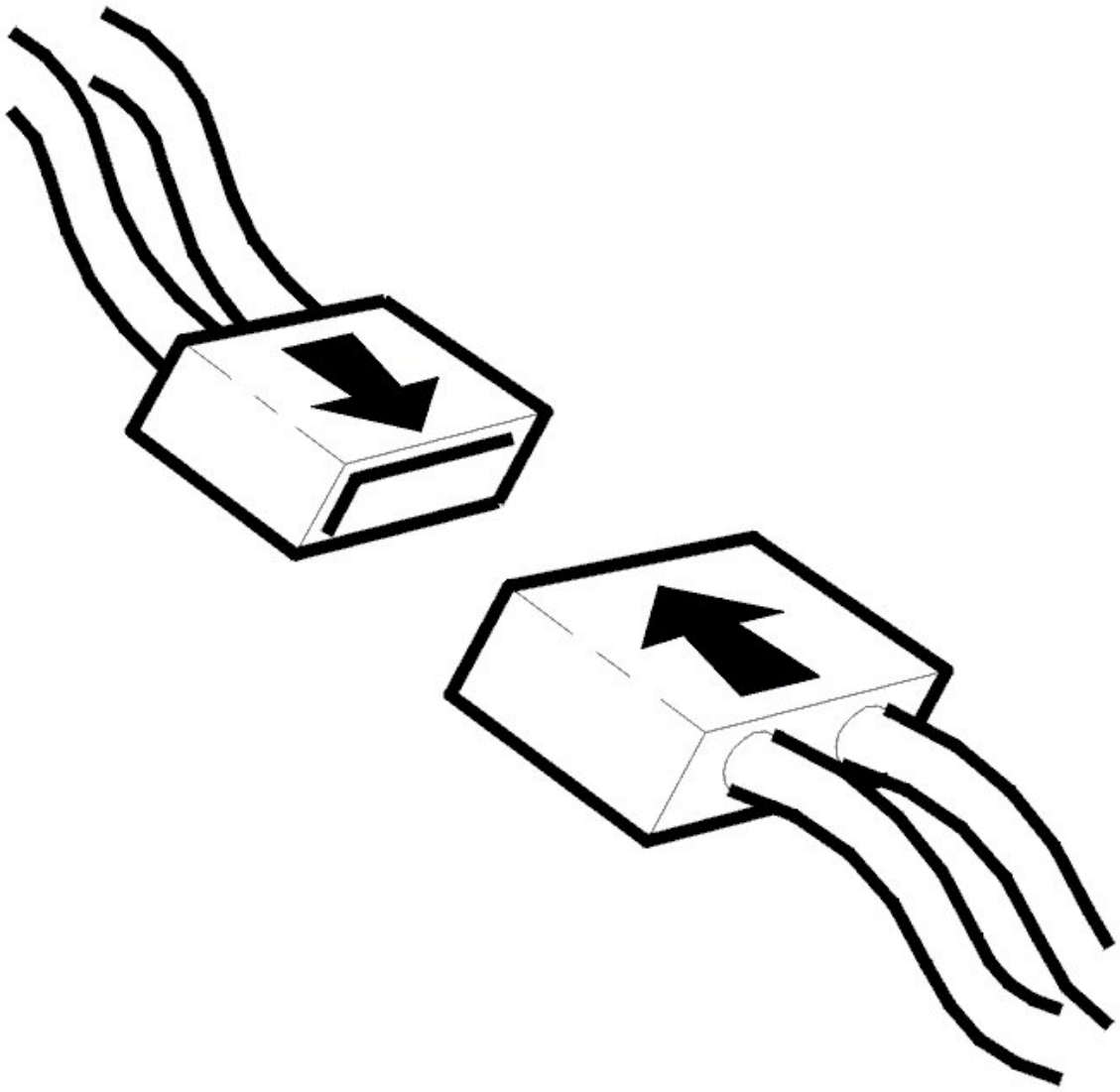
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

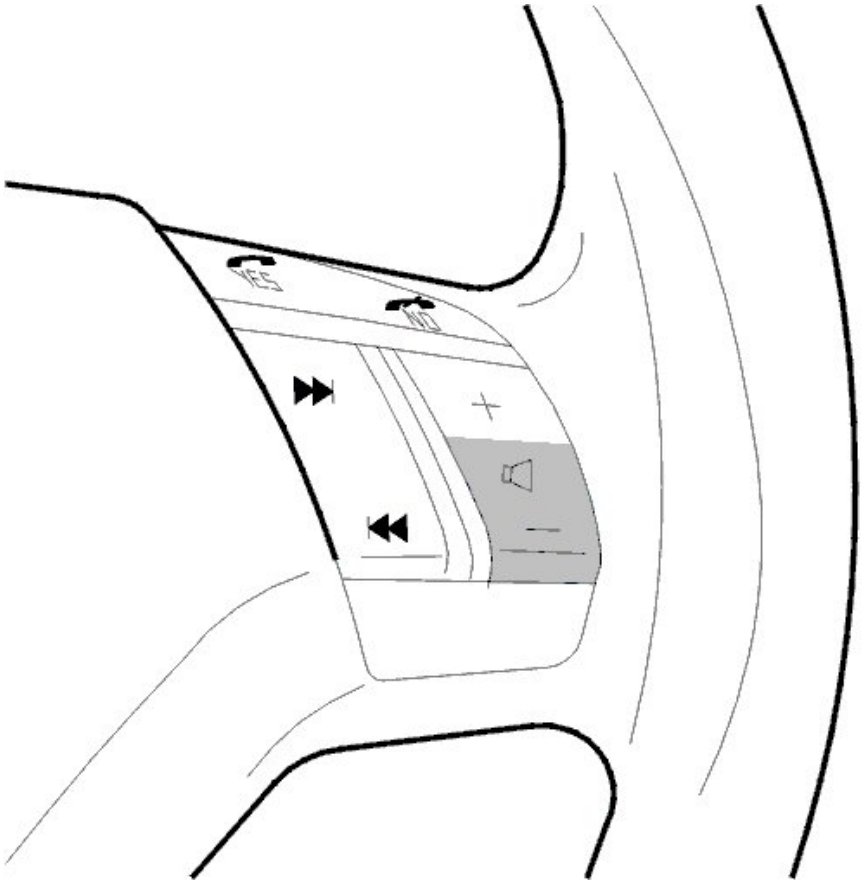
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A04

Condition



The central electronic module (CEM) checks the signal from the Volume+ button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the Volume+ button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The Volume+ button is jammed in the pressed in position
- Damaged Volume+ button.

Fault symptom[s]
- The radio buttons on the steering wheel do not function
- The phone buttons on the steering wheel do not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

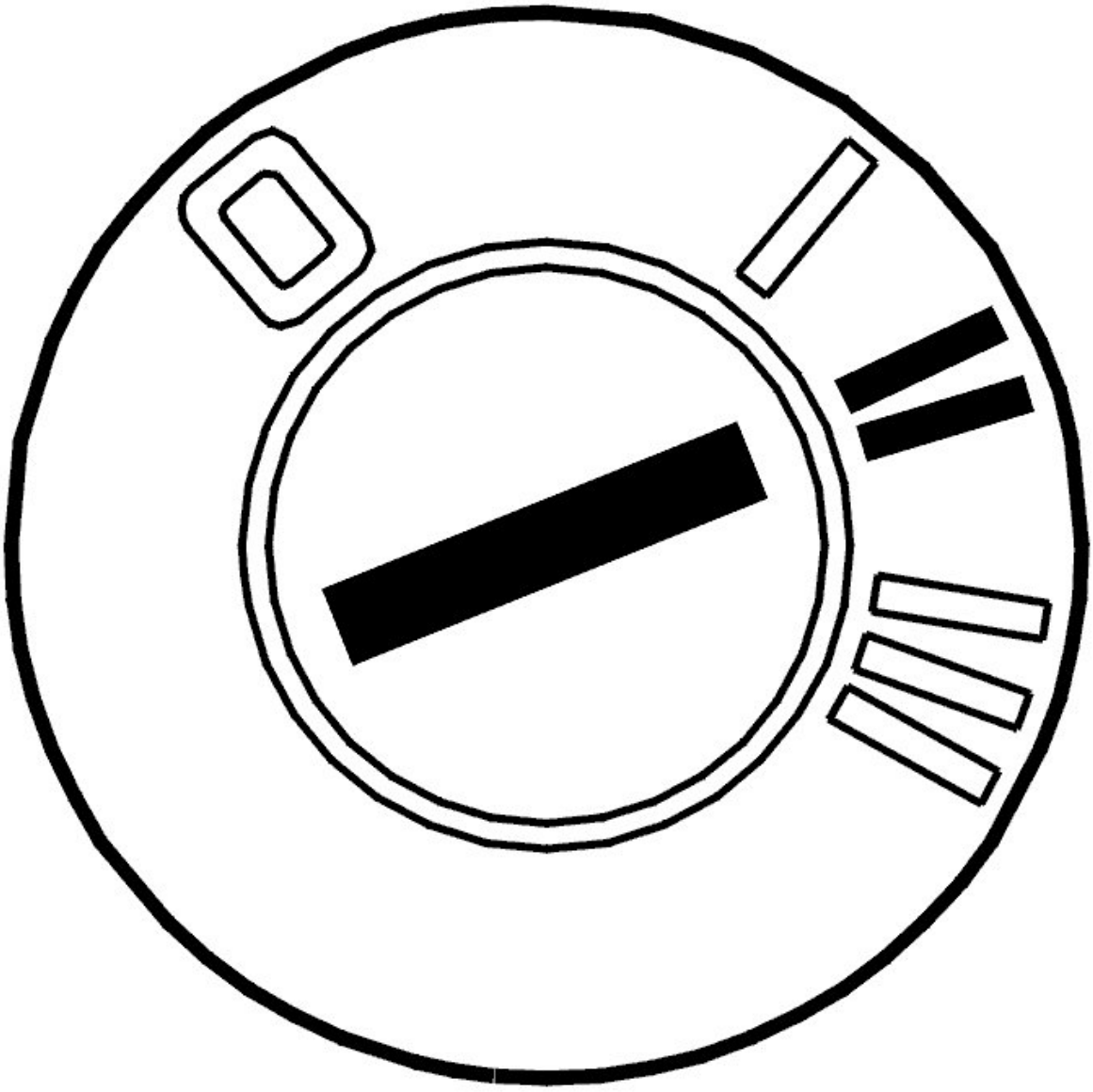
Continue - Verification

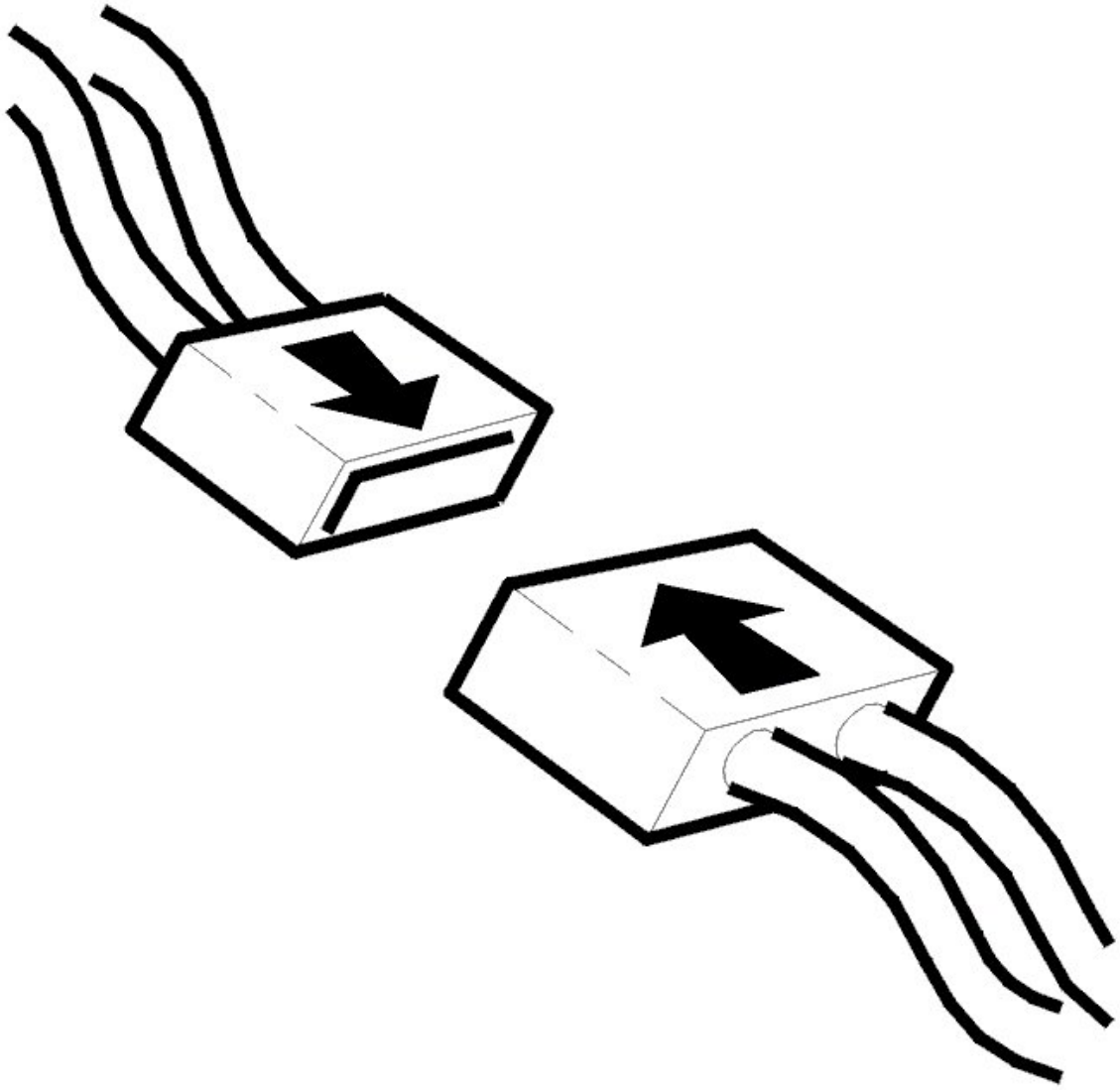
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

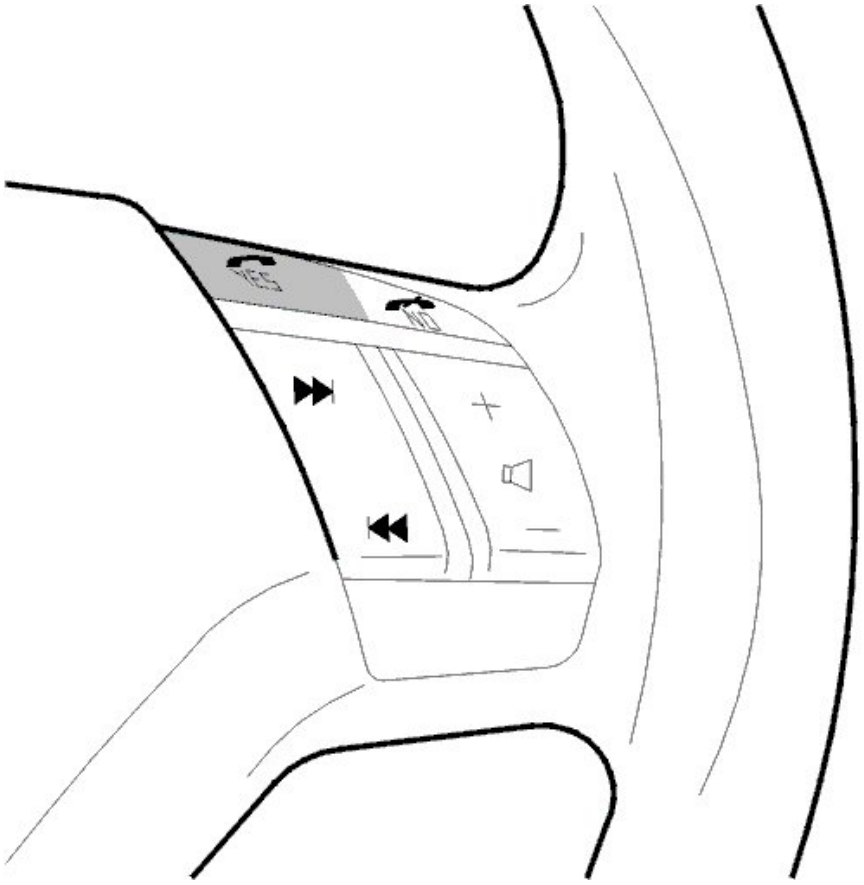
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A05

Condition



The central electronic module (CEM) checks the signal from the YES button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the YES button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The YES button is jammed in the pressed in position
- Damaged YES button.

Fault symptom[s]
- The phone buttons on the steering wheel do not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

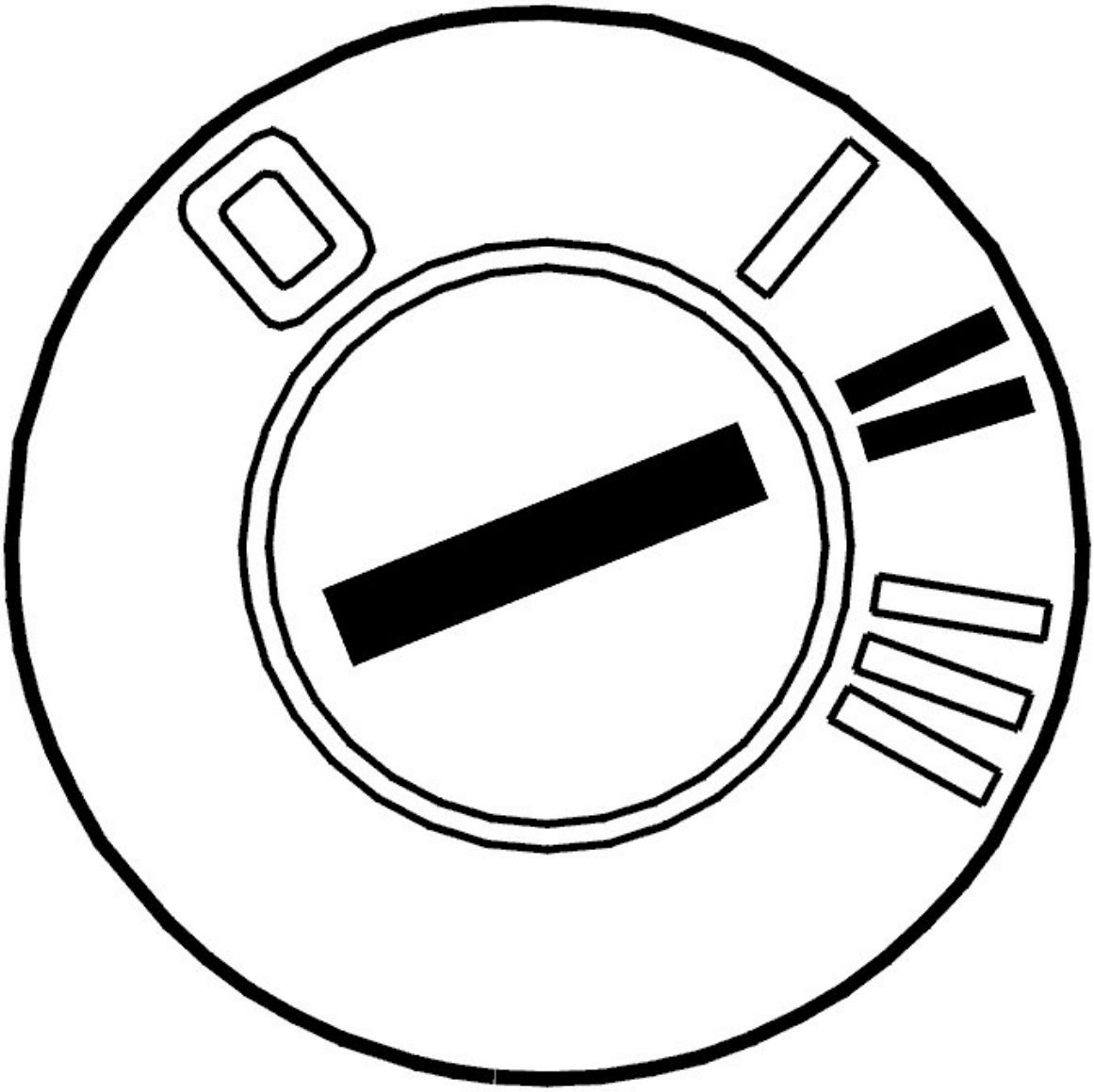
Continue - Verification

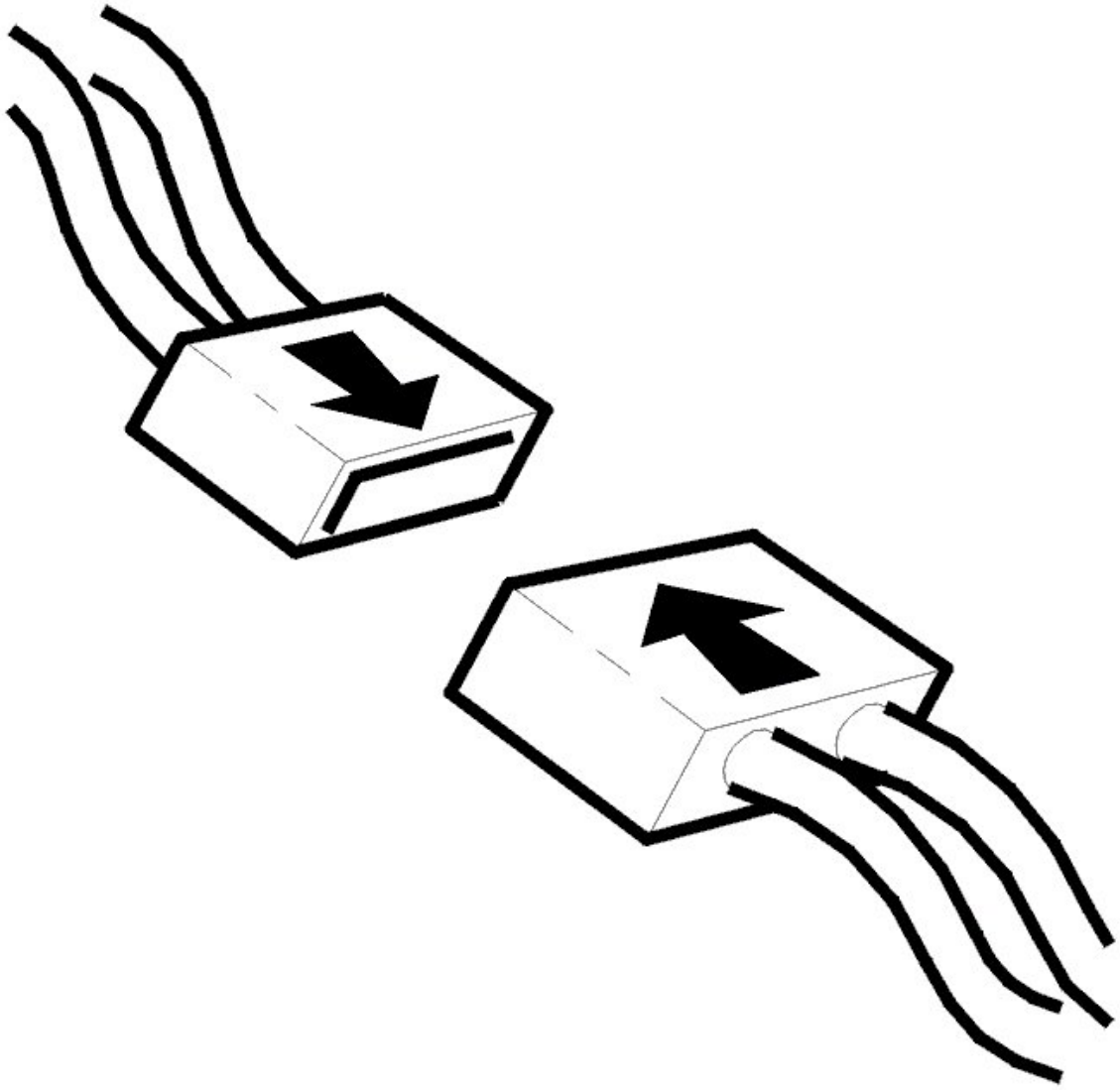
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

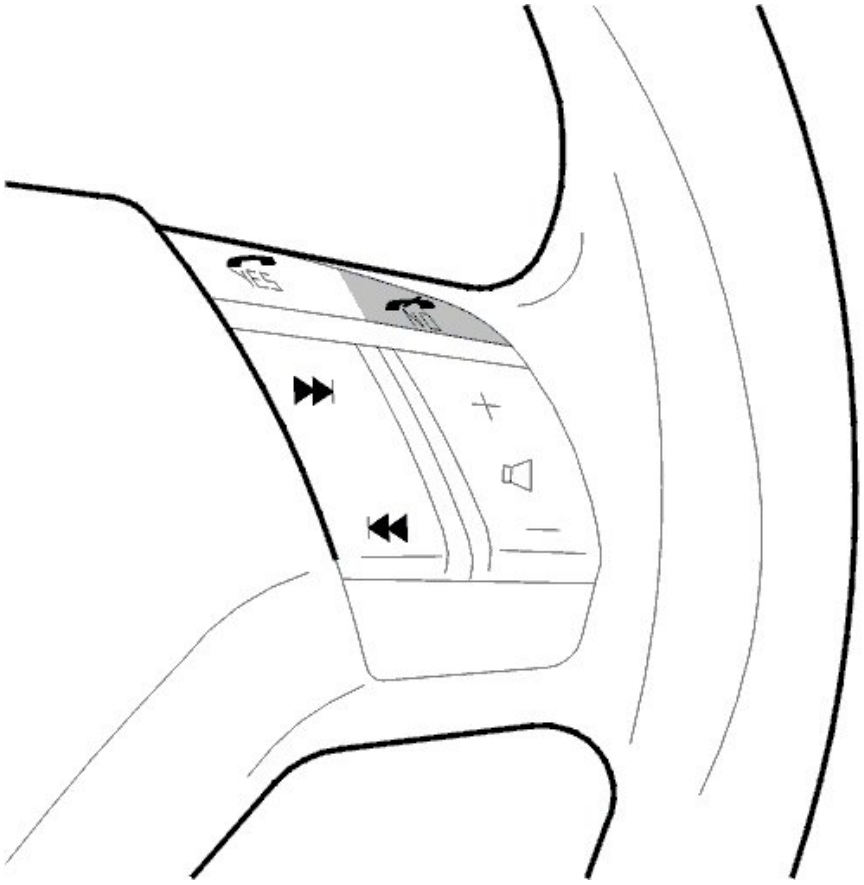
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A06

Condition



The central electronic module (CEM) checks the signal from the NO button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the NO button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The NO button is jammed in the pressed in position
- Damaged NO button.

Fault symptom[s]
- The phone buttons on the steering wheel do not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

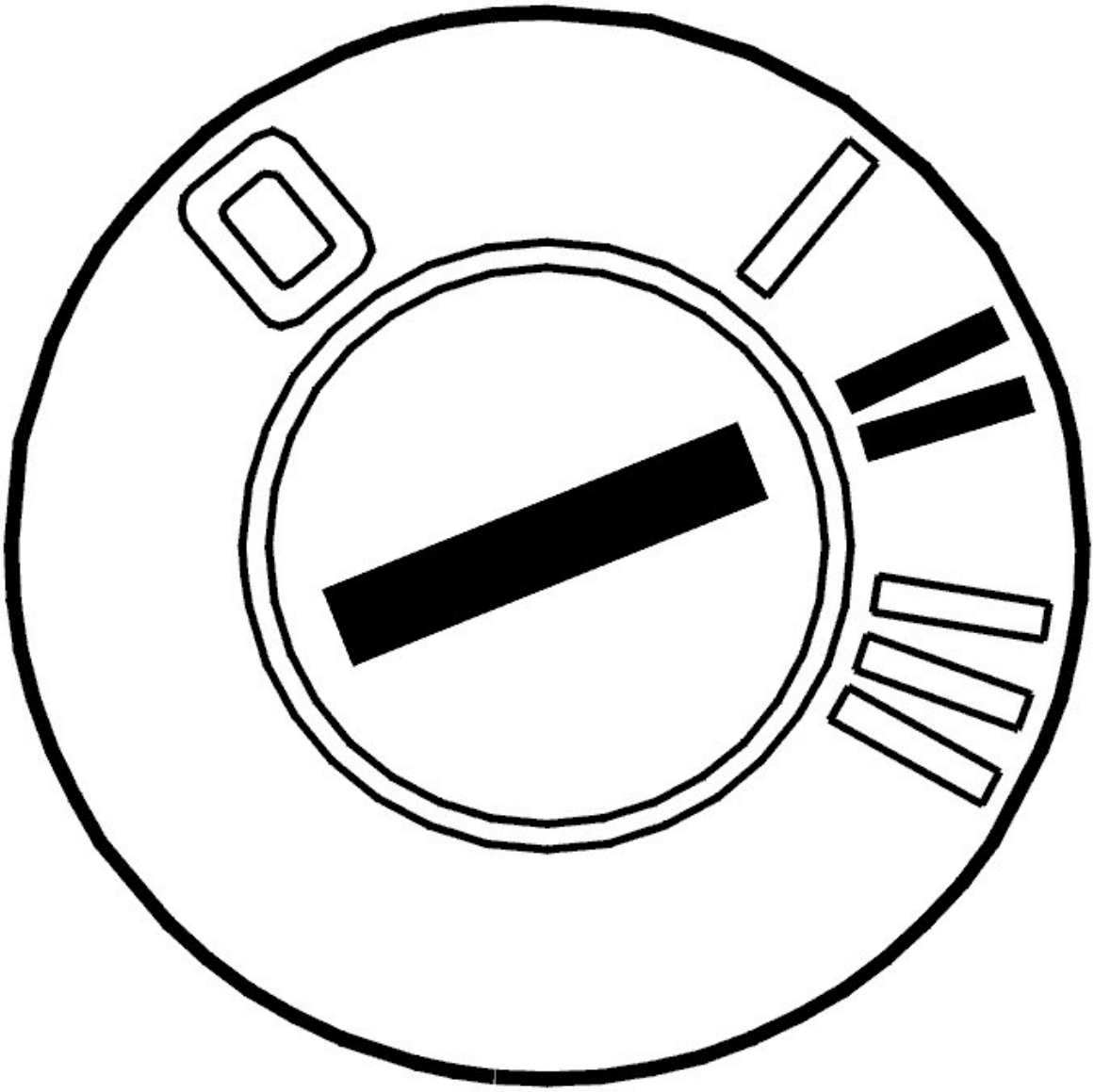
Continue - Verification

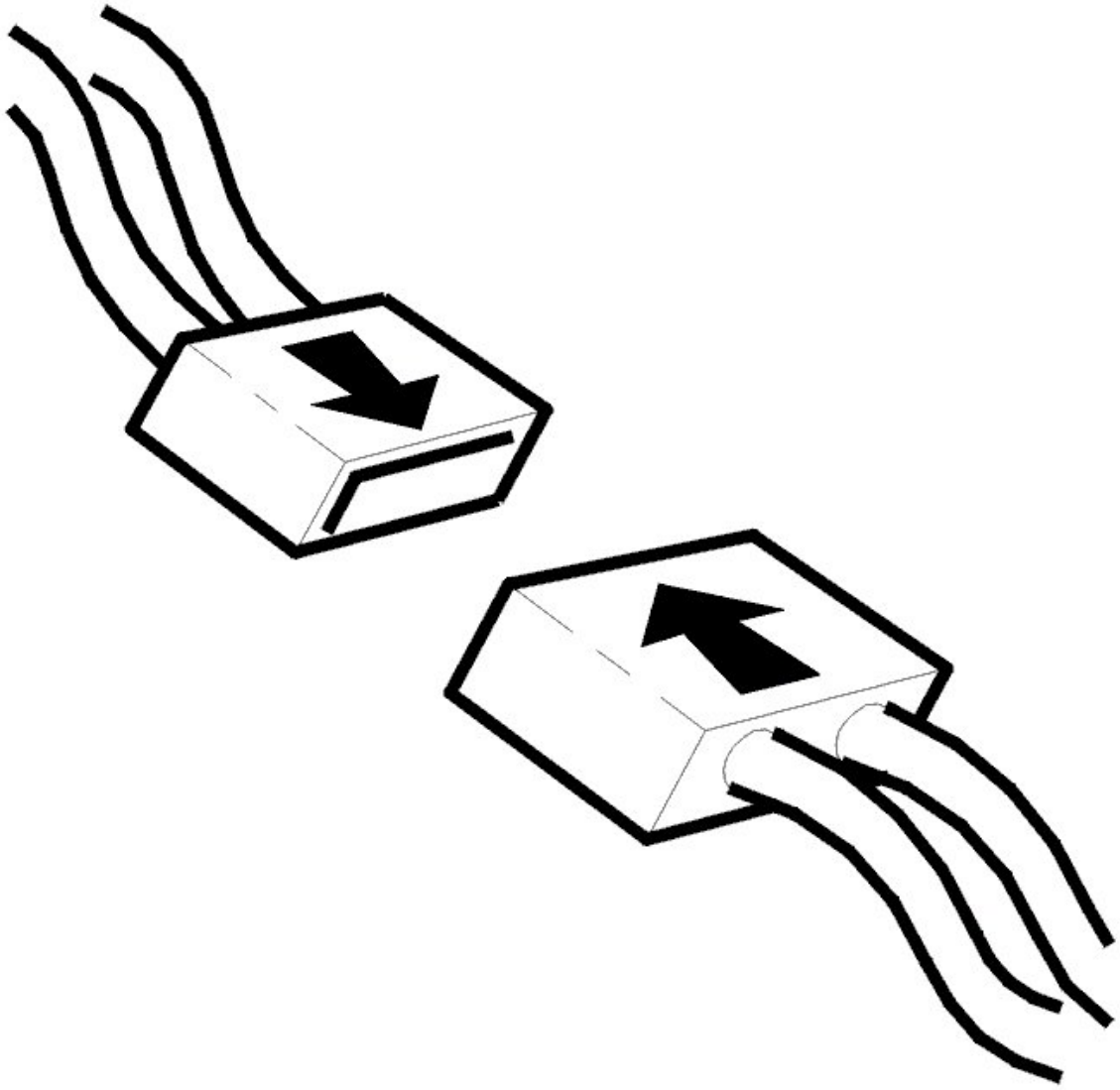
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

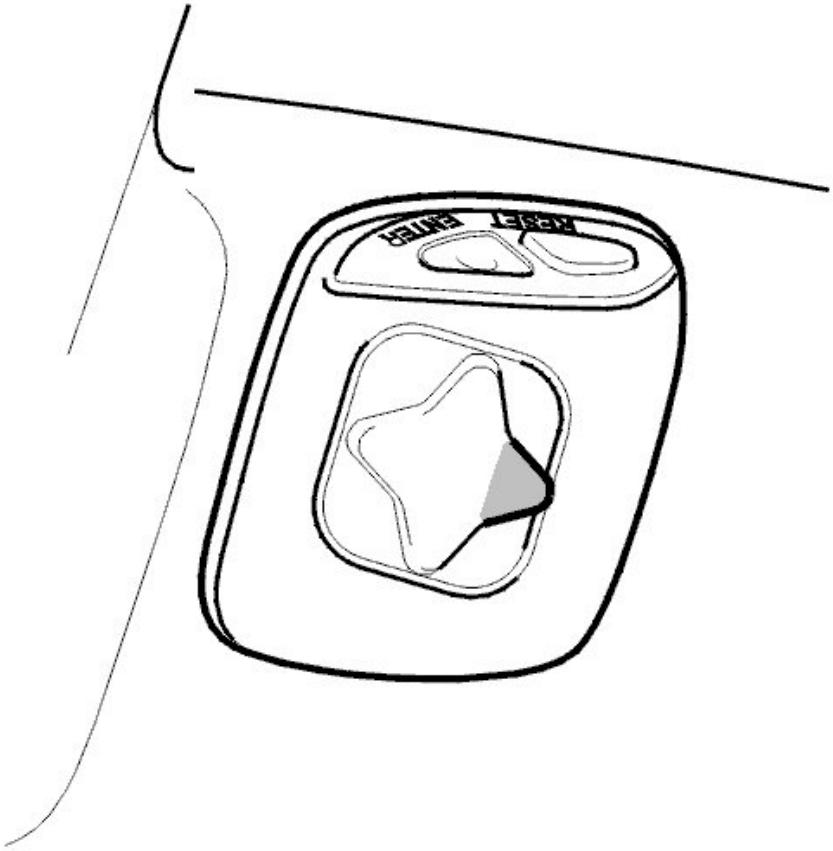
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A07

Condition



The central electronic module (CEM) checks the signal from the right button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the right button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The right button has jammed in the pressed in position
- Damaged right button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

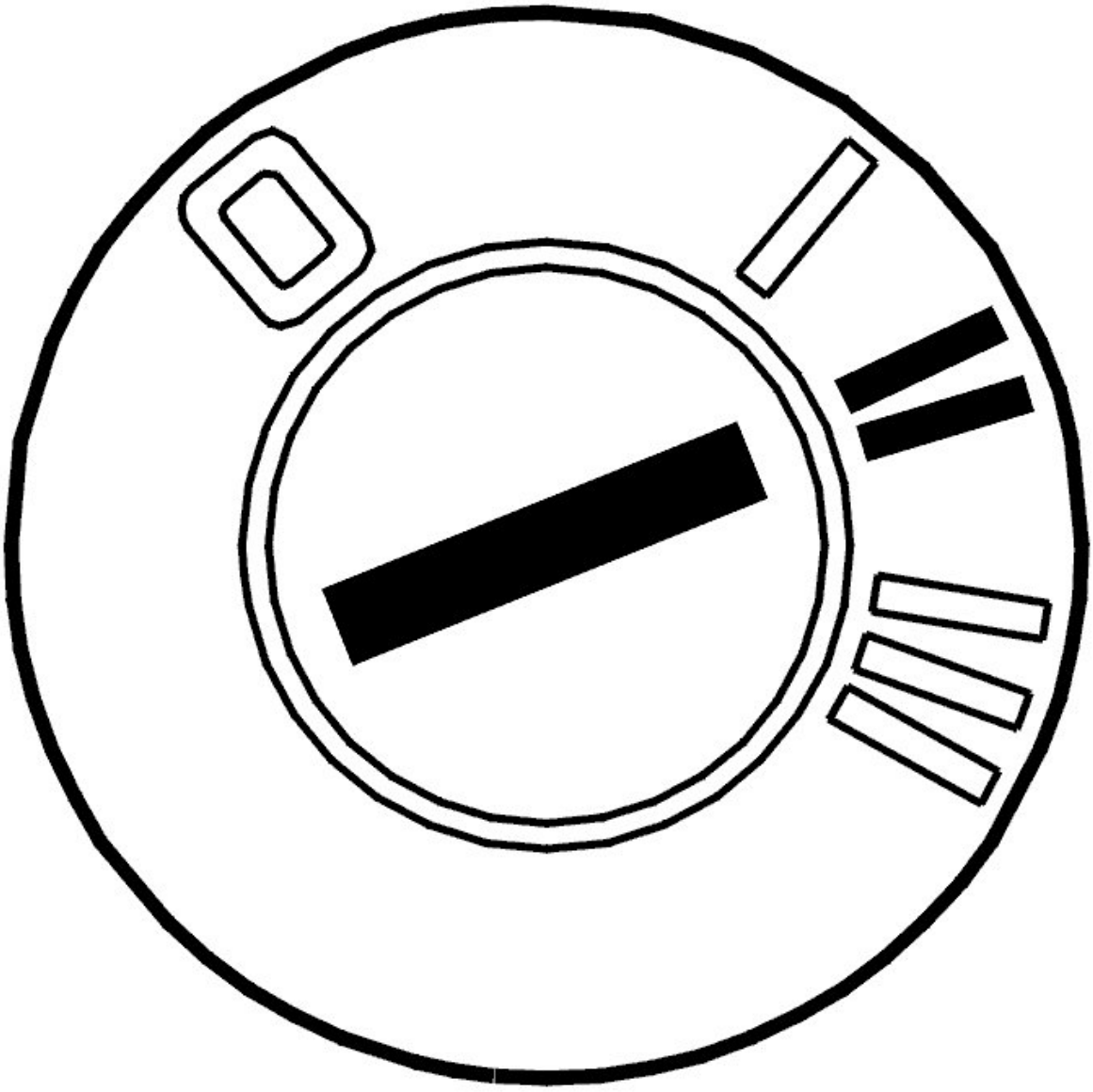
Continue - Verification

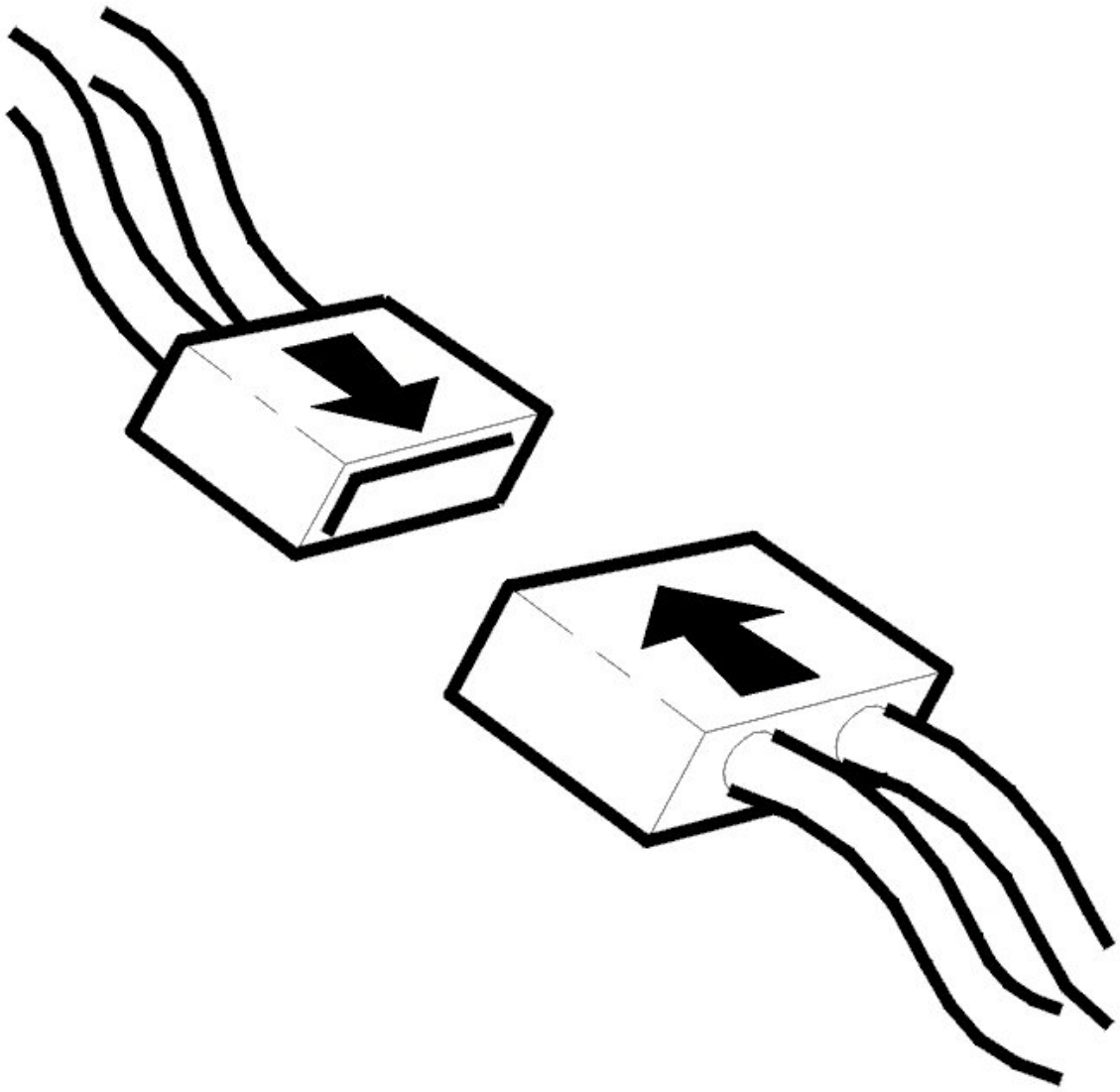
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

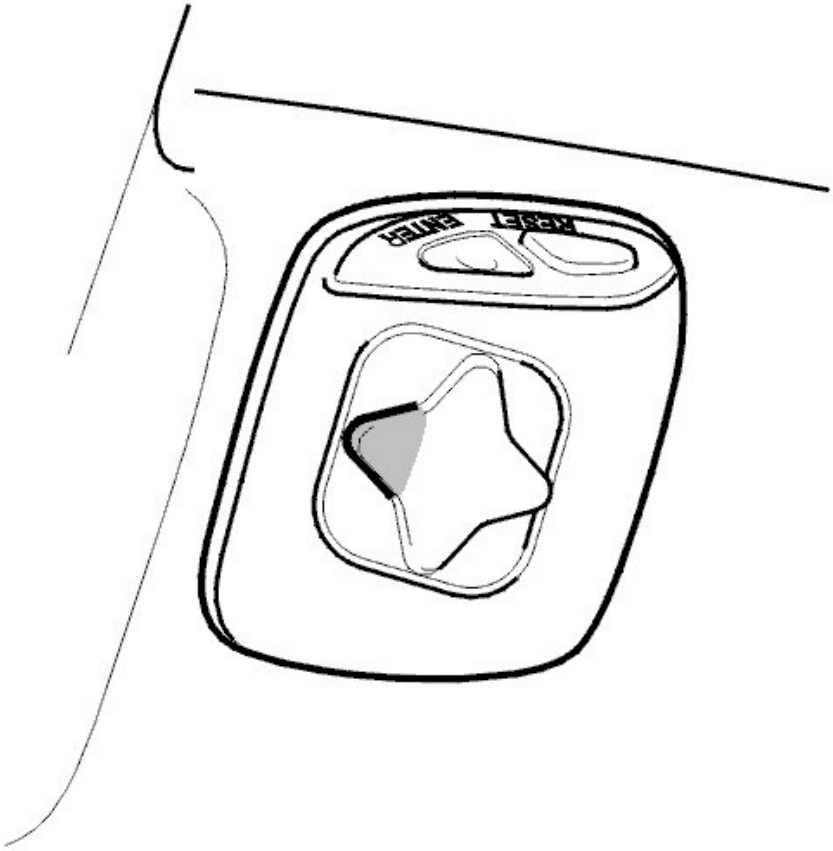
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A08

Condition



The central electronic module (CEM) checks the signal from the left button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the left button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The left button has jammed in the pressed in position
- Damaged left button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

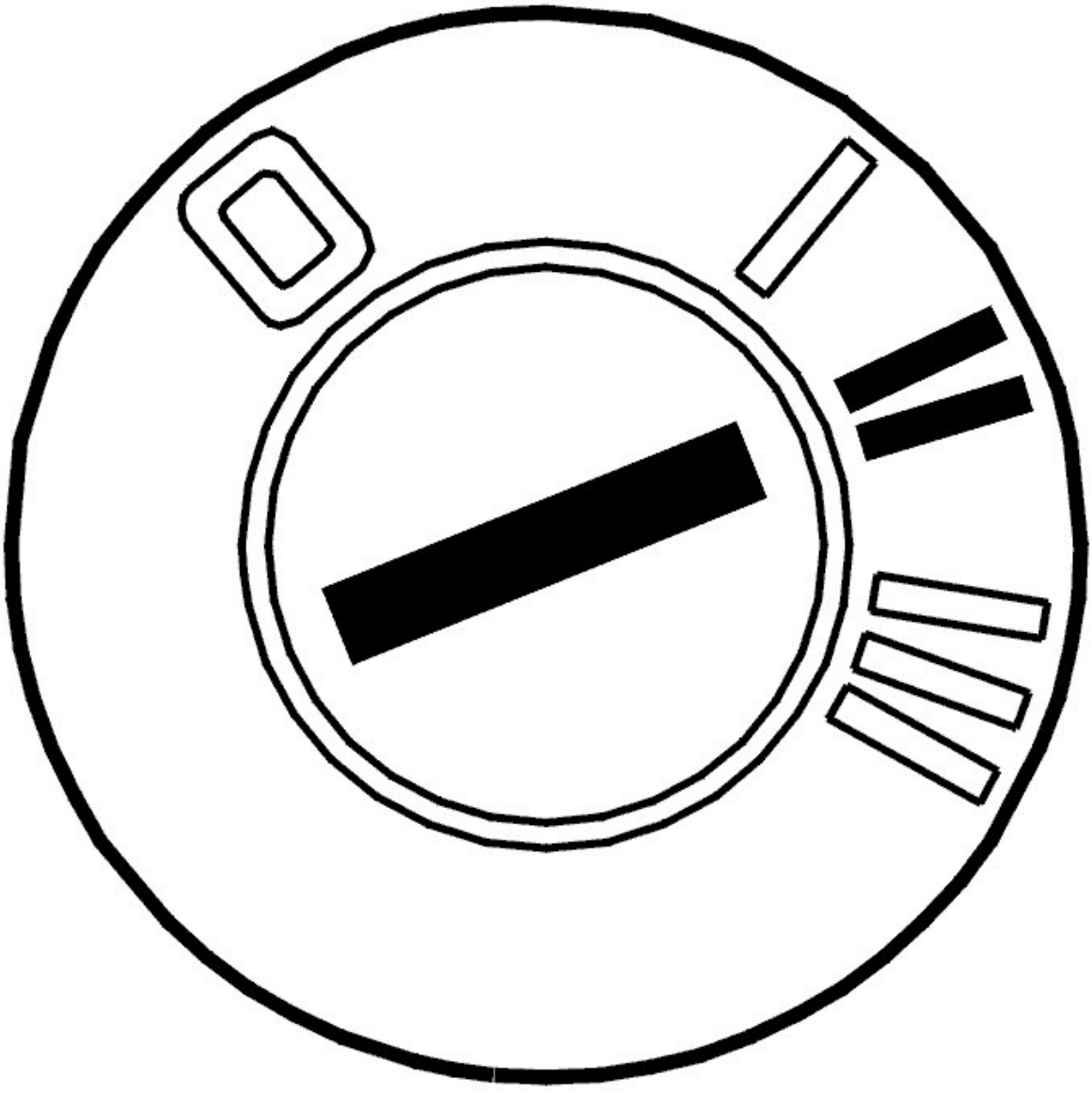
Continue - Verification

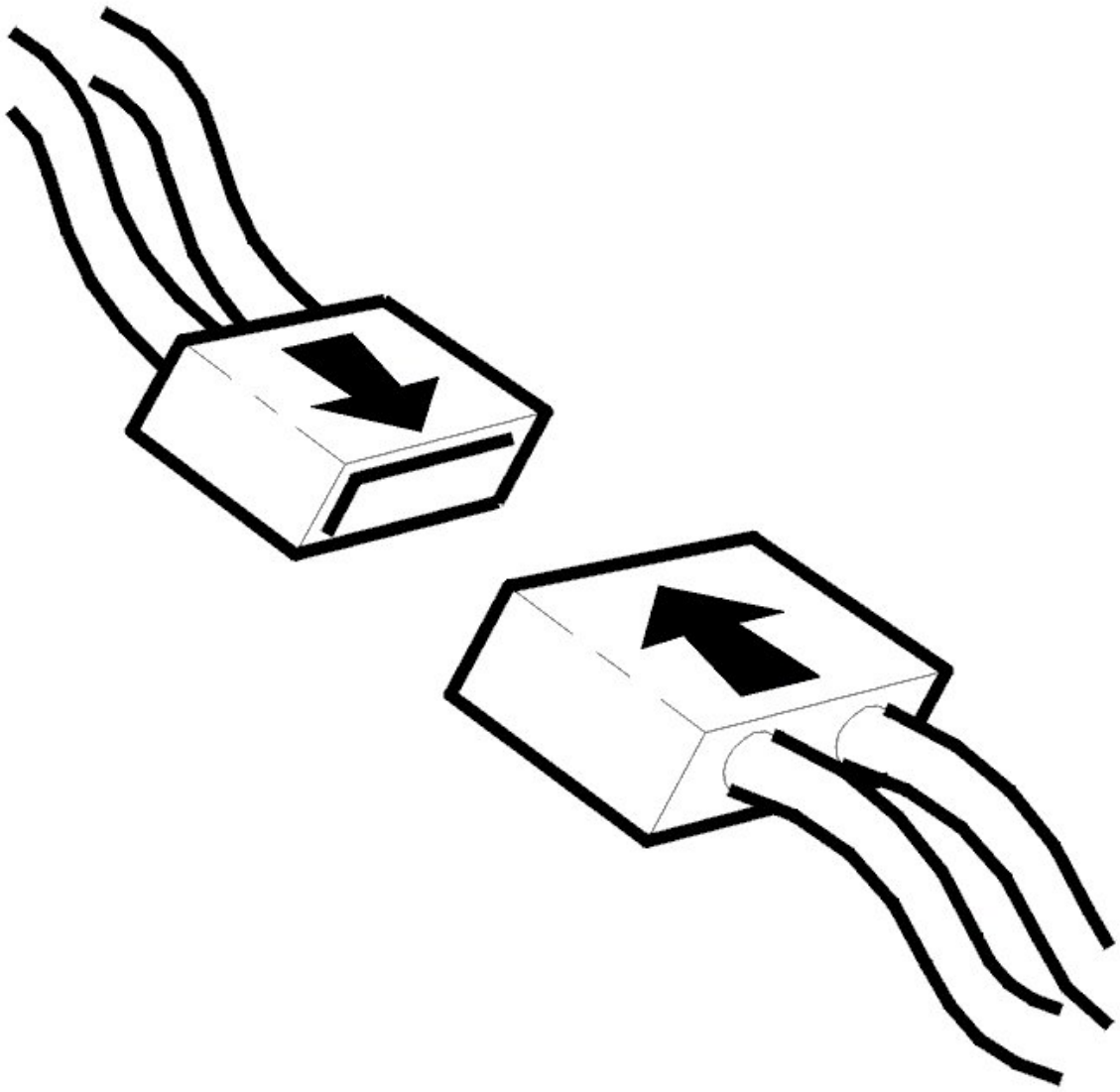
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

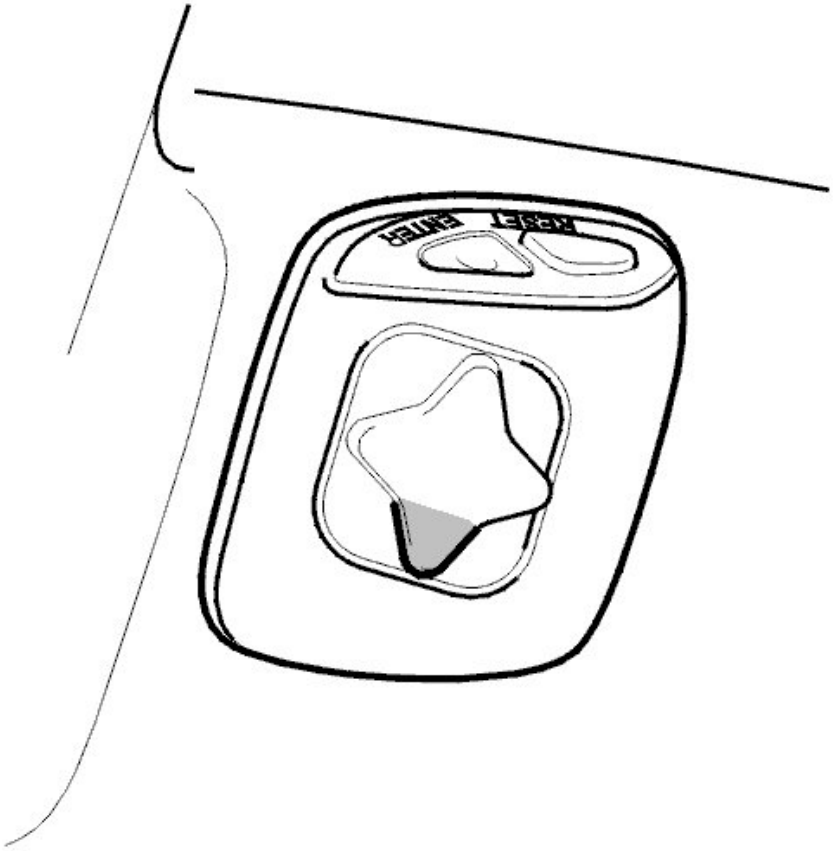
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-7A09

Condition



The central electronic module (CEM) checks the signal from the down button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the down button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The down button has jammed in the pressed in position
- Damaged down button.

Fault symptom[s]
- The RTI buttons on the steering wheel do not function
- The navigation buttons on the steering wheel do not function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Keypad steering wheel, replacing See: Accessories and Optional Equipment/Steering Mounted Controls Transmitter/Service and Repair

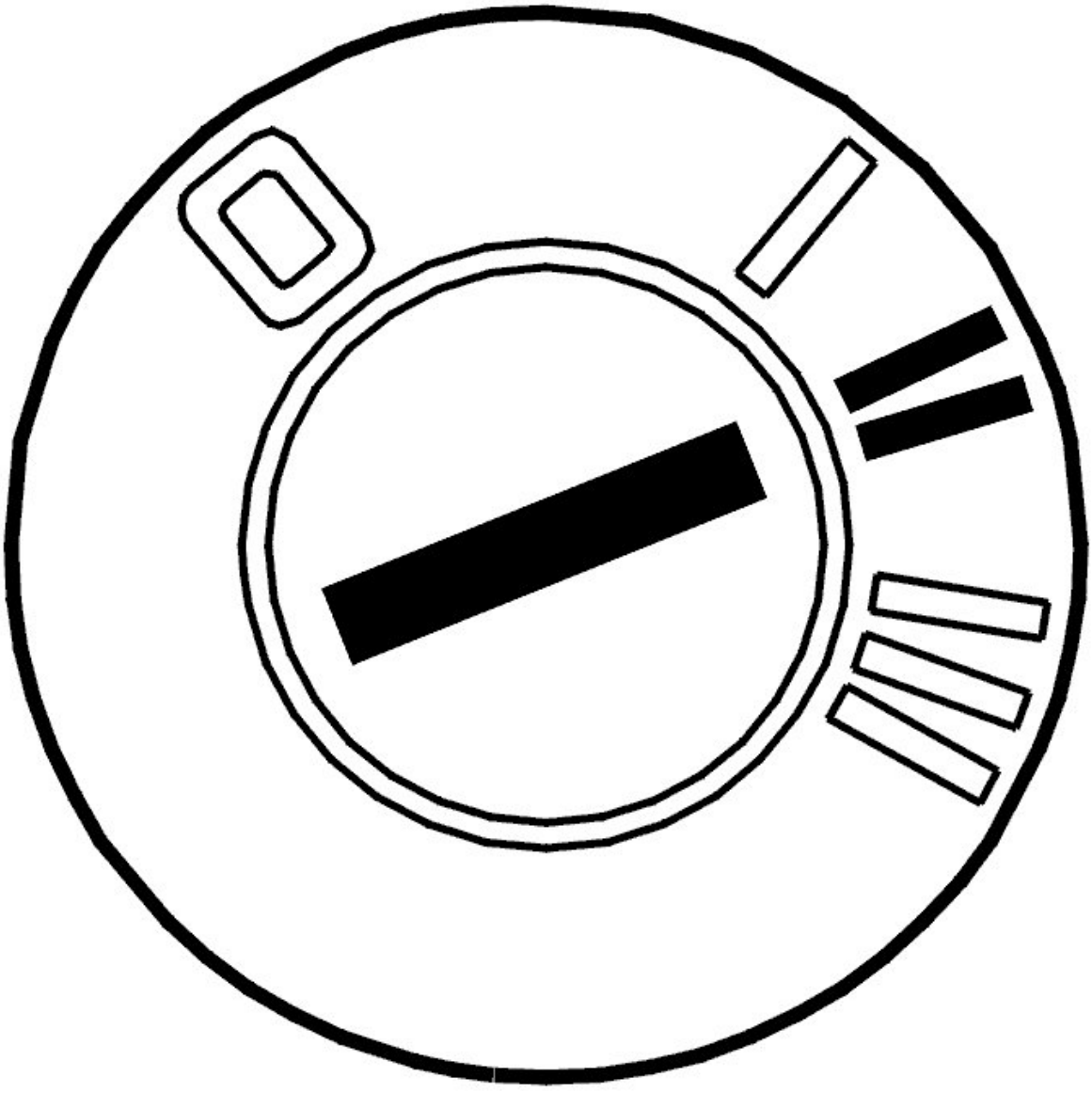
Continue - Verification

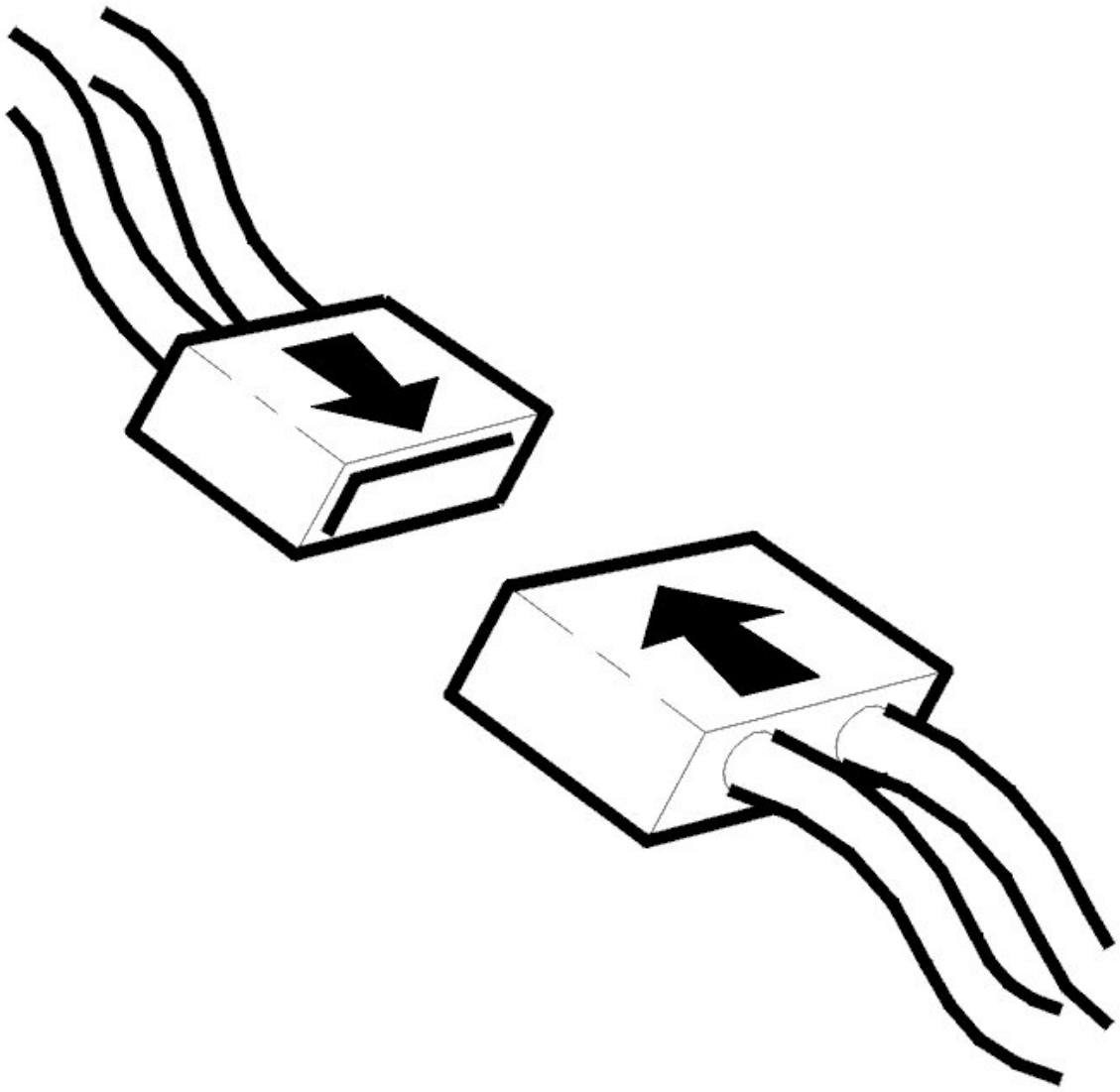
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

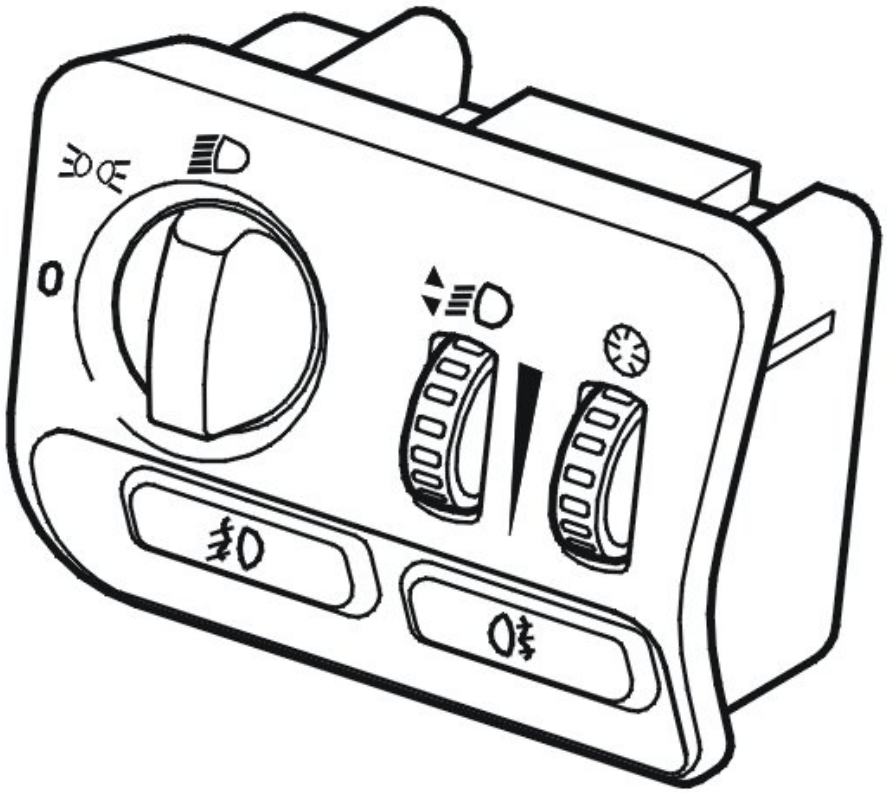
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A01

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) that the light switch is not in an approved position. For example it is in-between the position for parking lamps and low beam.
The voltage in the central electronic module (CEM) must exceed 10 V for at least 1 second in order for the diagnostic trouble code (DTC) to be detected.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Low beam always on.

Possible source
- Fault in the communication with the light switch module (LSM)
- Damaged light switch module (LSM).

Fault symptom[s]
- The low beam is constantly lit.

Faulty position

Faulty position

Checking the control

The diagnostic trouble code (DTC) is stored when the button or switch has been pressed in for too long or is in a non-approved position.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or the switch is not sticking, jammed in the activated position or in a non-approved position.
Remedy as necessary.

Other information

Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

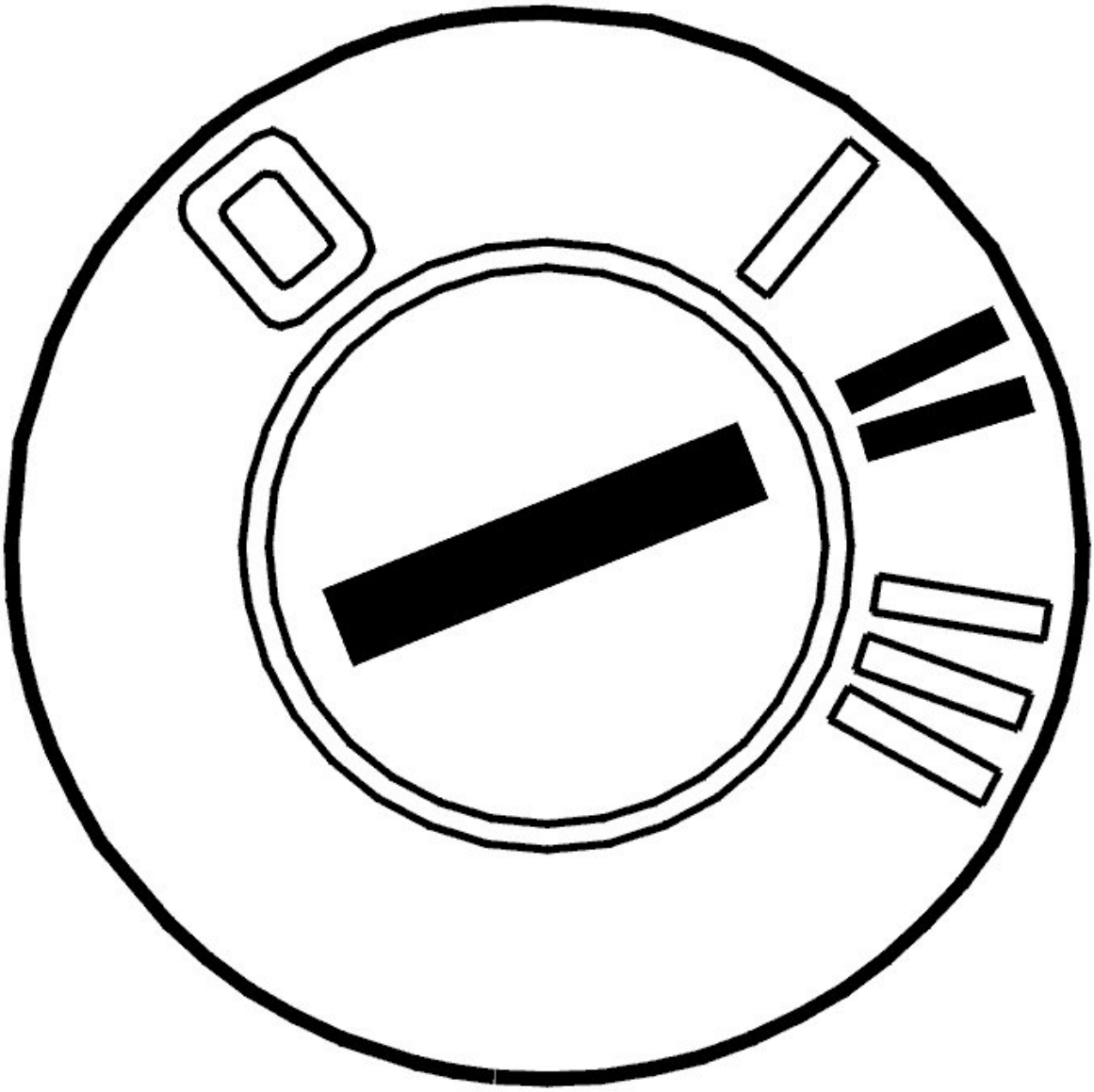
Continue - Verification

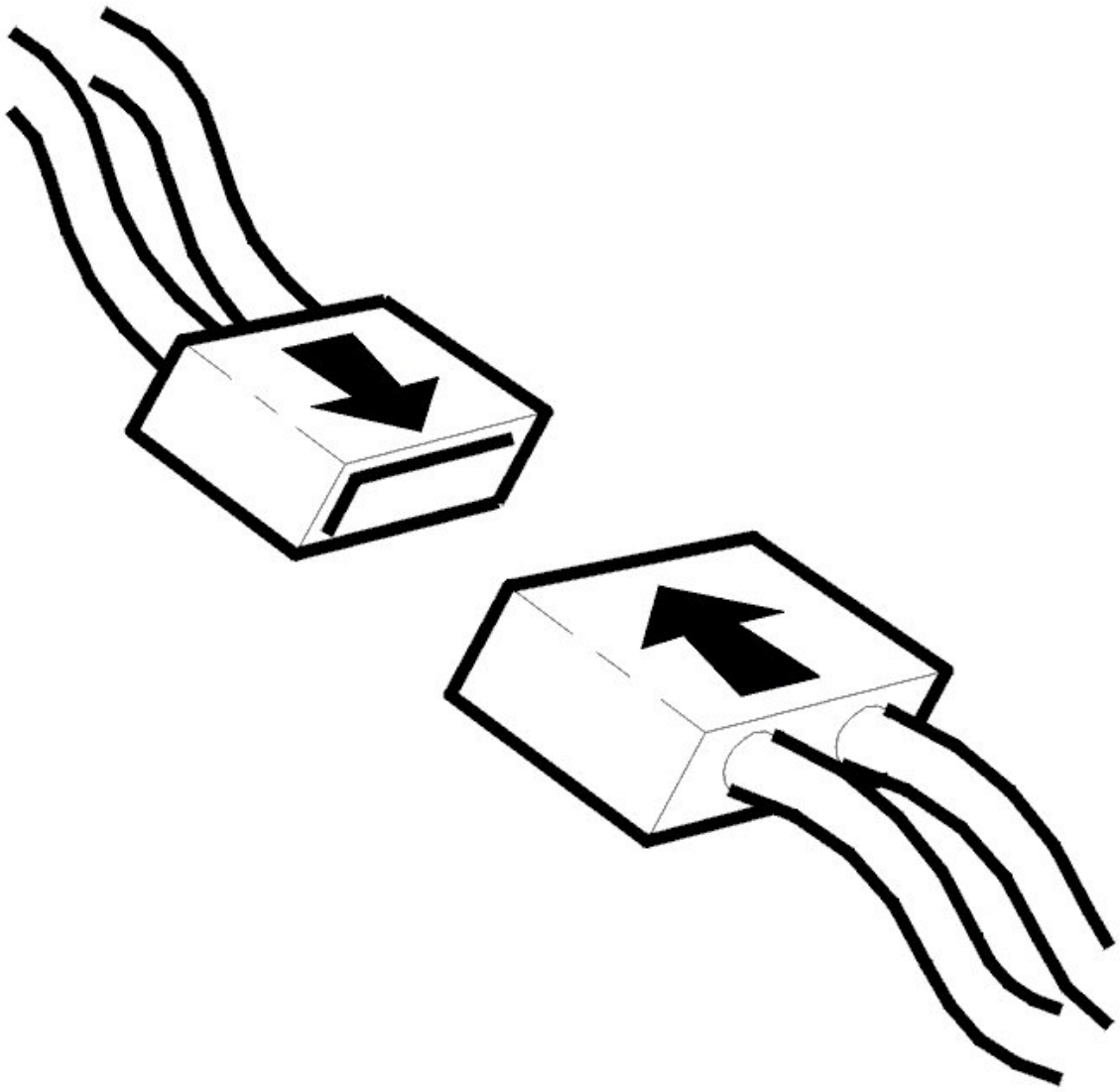
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

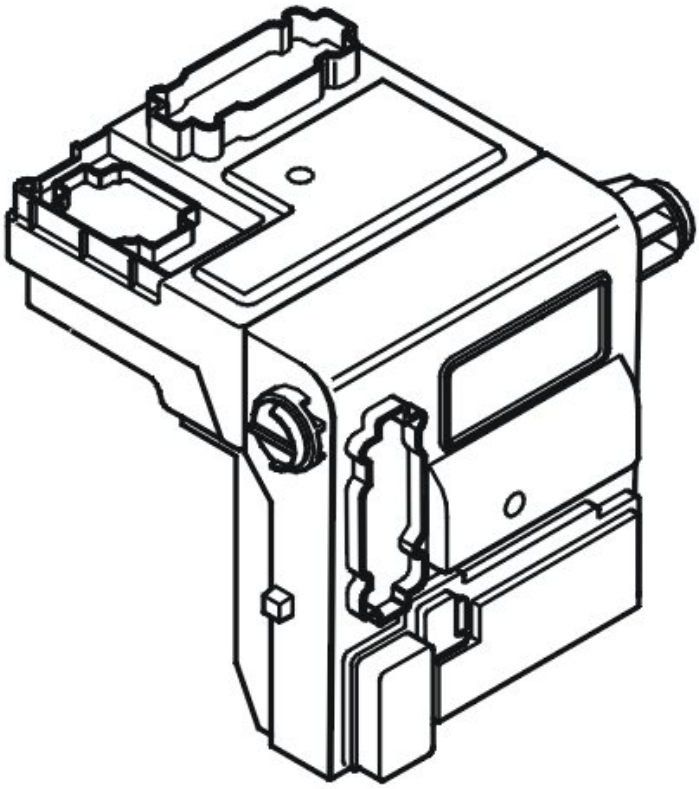
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A20

Condition



The central electronic module (CEM) powers the left-hand low beam directly via an output. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power consumption for the output is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 40 seconds.

Substitute value
- None.

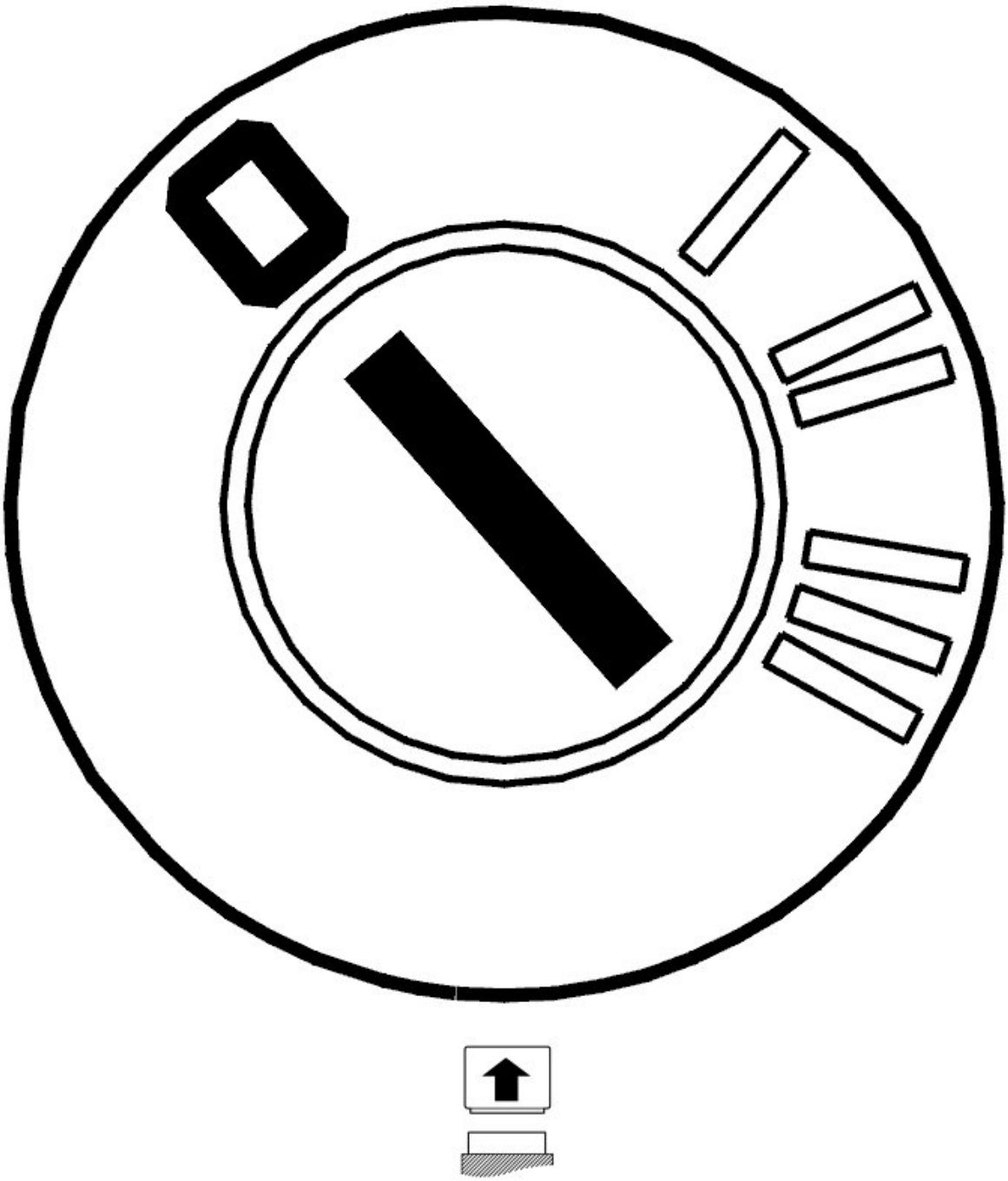
Possible source
- Short-circuit to ground in the low beam signal cable.

Fault symptom[s]
- Low beam does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector B.

Check the power cable for a short-circuit to ground.

For S60, V70, S80 with Bi-Xenon and XC90

Take readings between:

- Central electronic module (CEM) terminal #B7 (#B7) and left-hand lamp housing connector terminal #A2.

For S80 without Bi-Xenon

Take readings between:

- Central electronic module (CEM) terminal #B7 (#B7) and left-hand stop lamp connector terminal #A3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

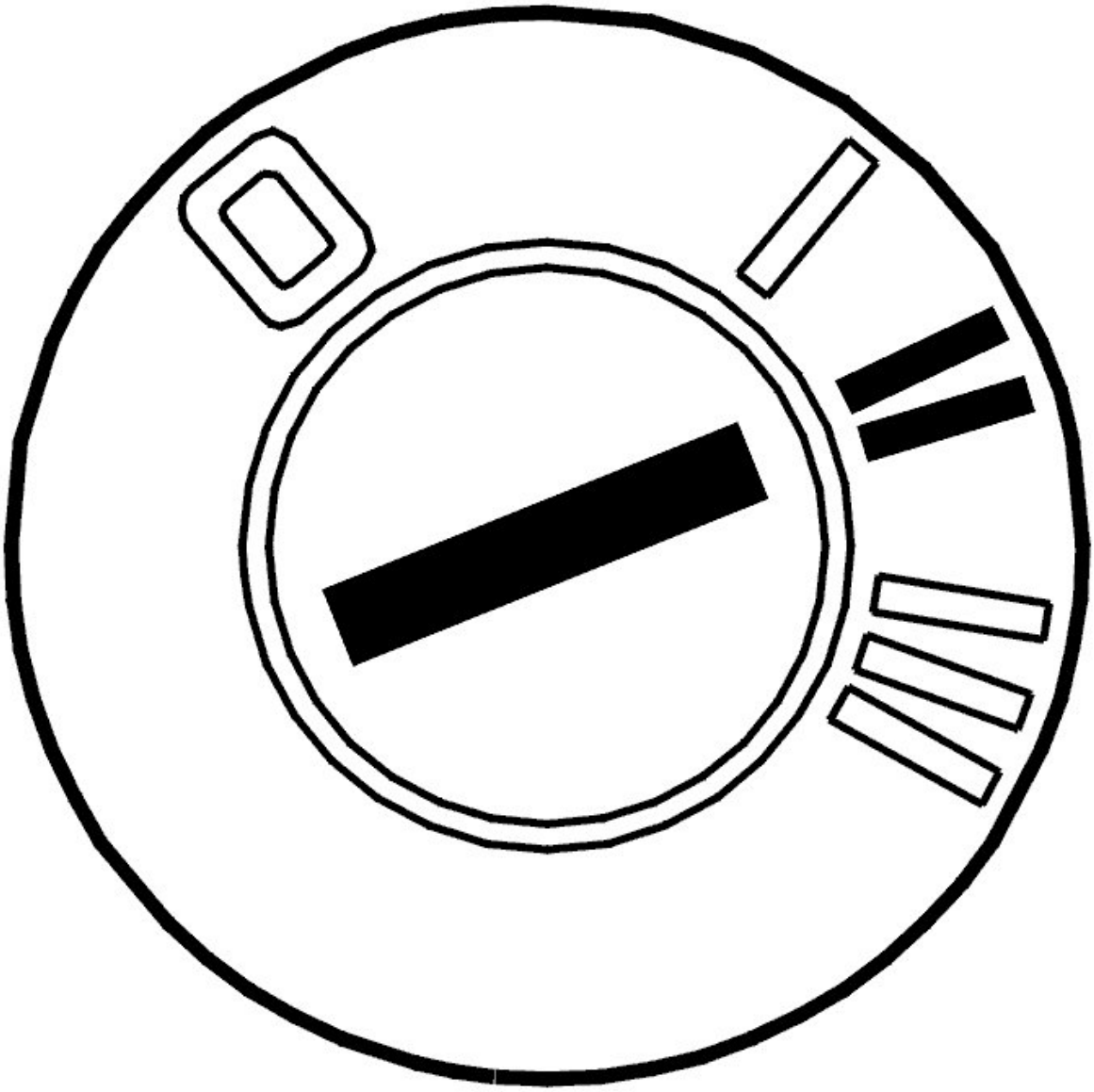
Continue - Verification

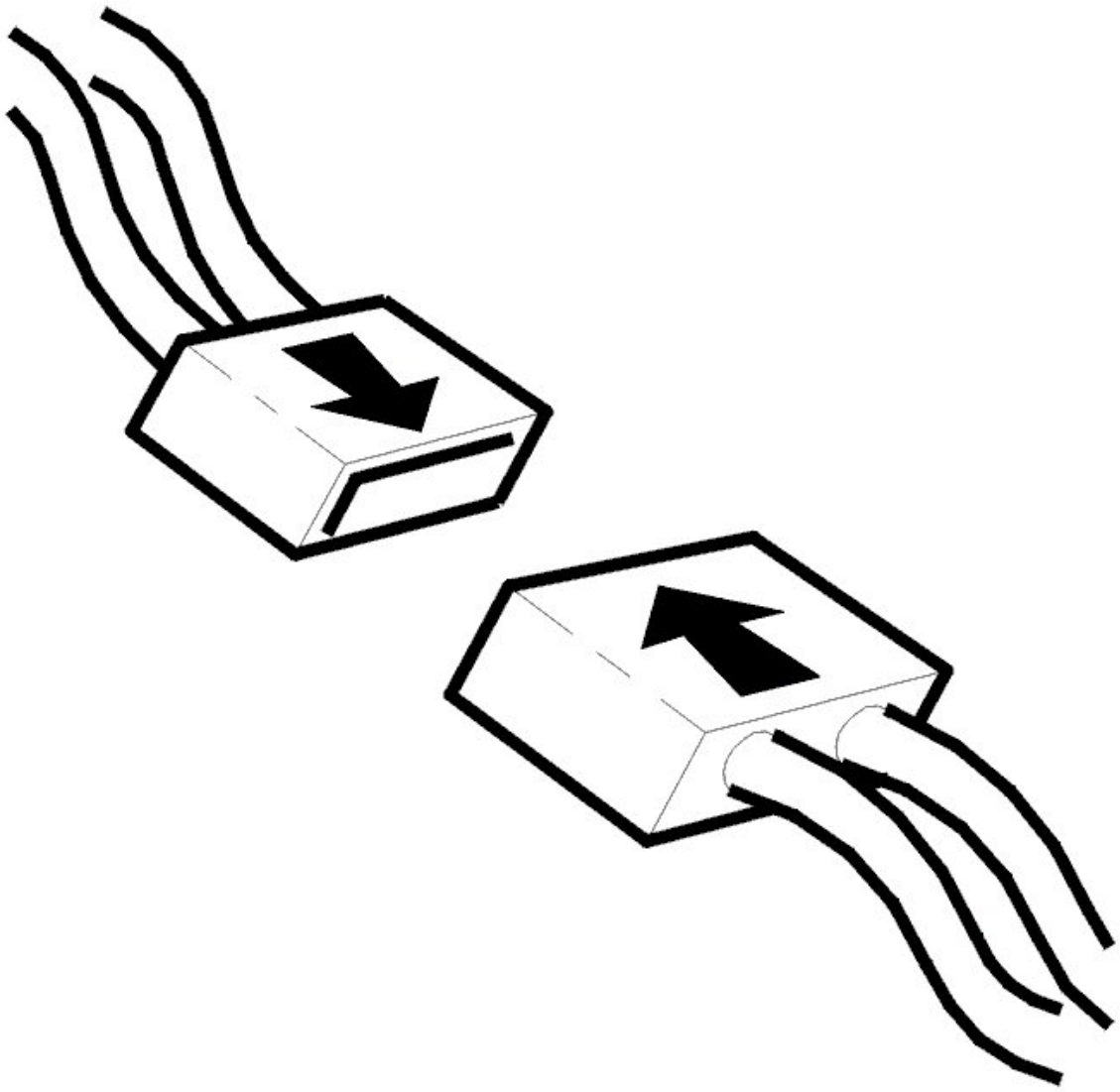
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Set the light switch to low beam.
Check that low beam is activated.

Is low beam activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

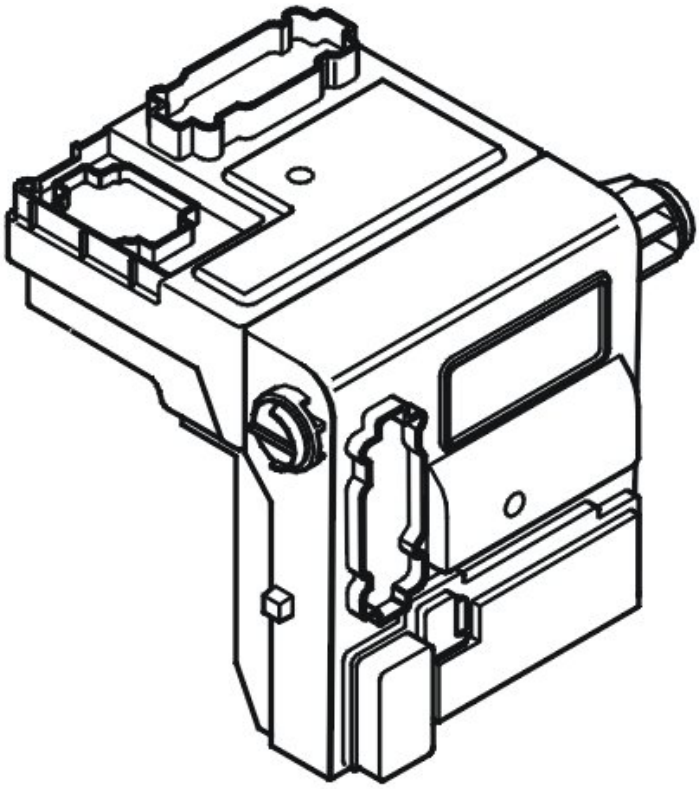
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A21

Condition



The central electronic module (CEM) powers the right-hand low beam directly via an output. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power consumption for the output is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for more than 40 seconds.

Substitute value
- None.

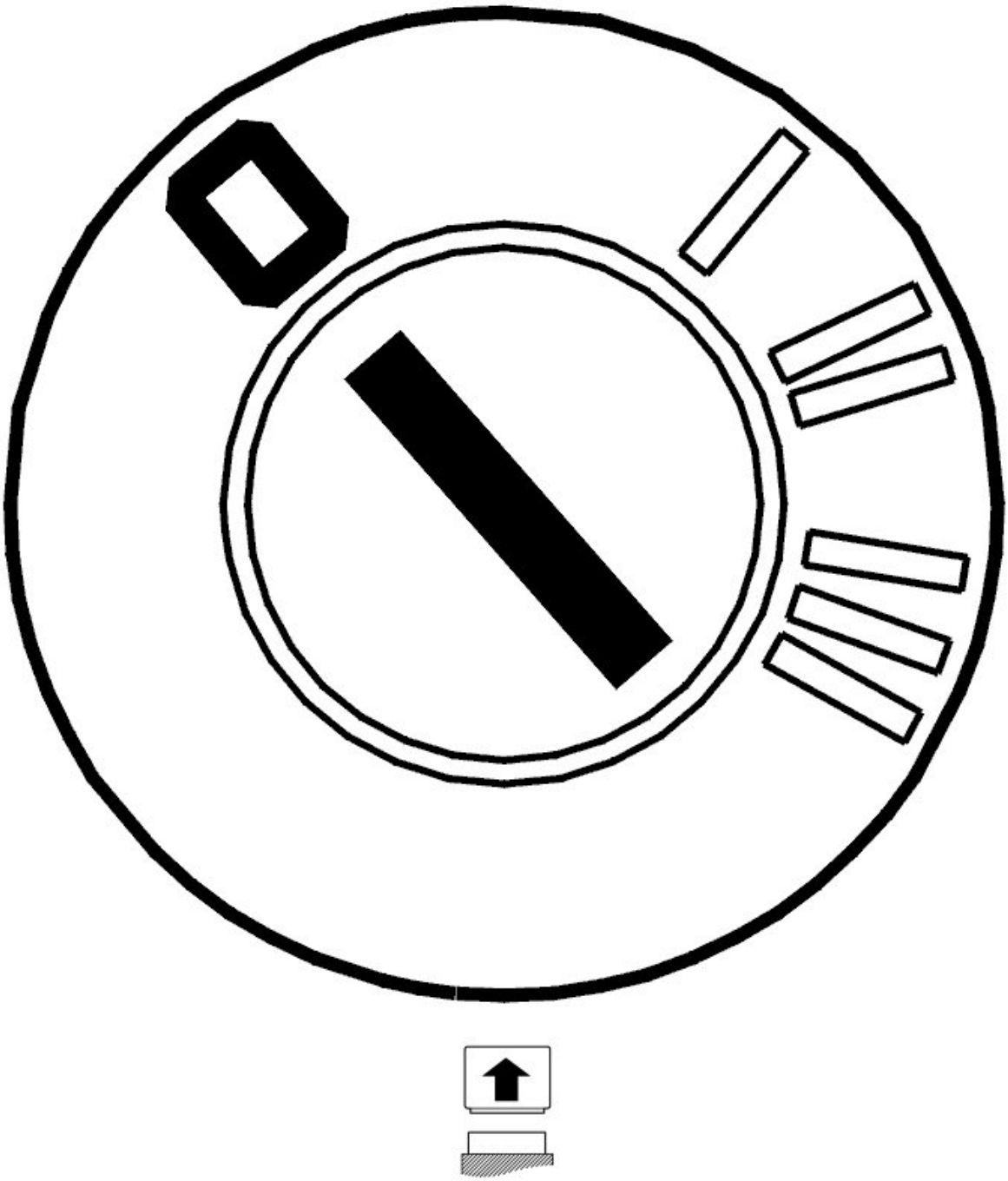
Possible source
- Short-circuit to ground in the low beam signal cable.

Fault symptom[s]
- Low beam does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector B.

Check the power cable for a short-circuit to ground.

For S60, V70, S80 with Bi-Xenon and XC90

Take readings between:

- Central electronic module (CEM) terminal #B4 (#B4) and right-hand stop lamp connector terminal #A2.

For S80 without Bi-Xenon

Take readings between:

- Central electronic module (CEM) terminal #B4 (#B4) and right-hand lamp housing connector terminal #A3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

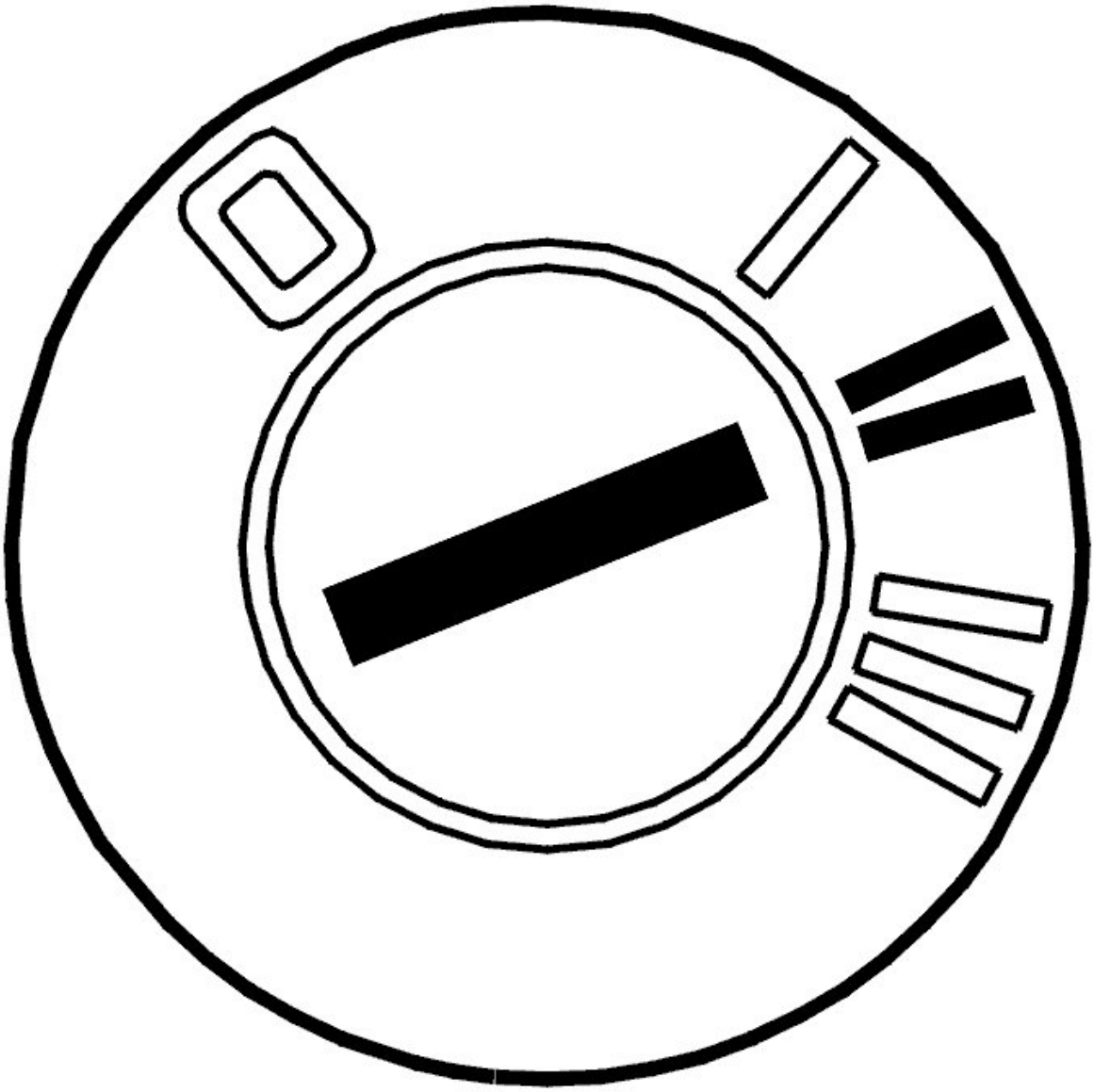
Continue - Verification

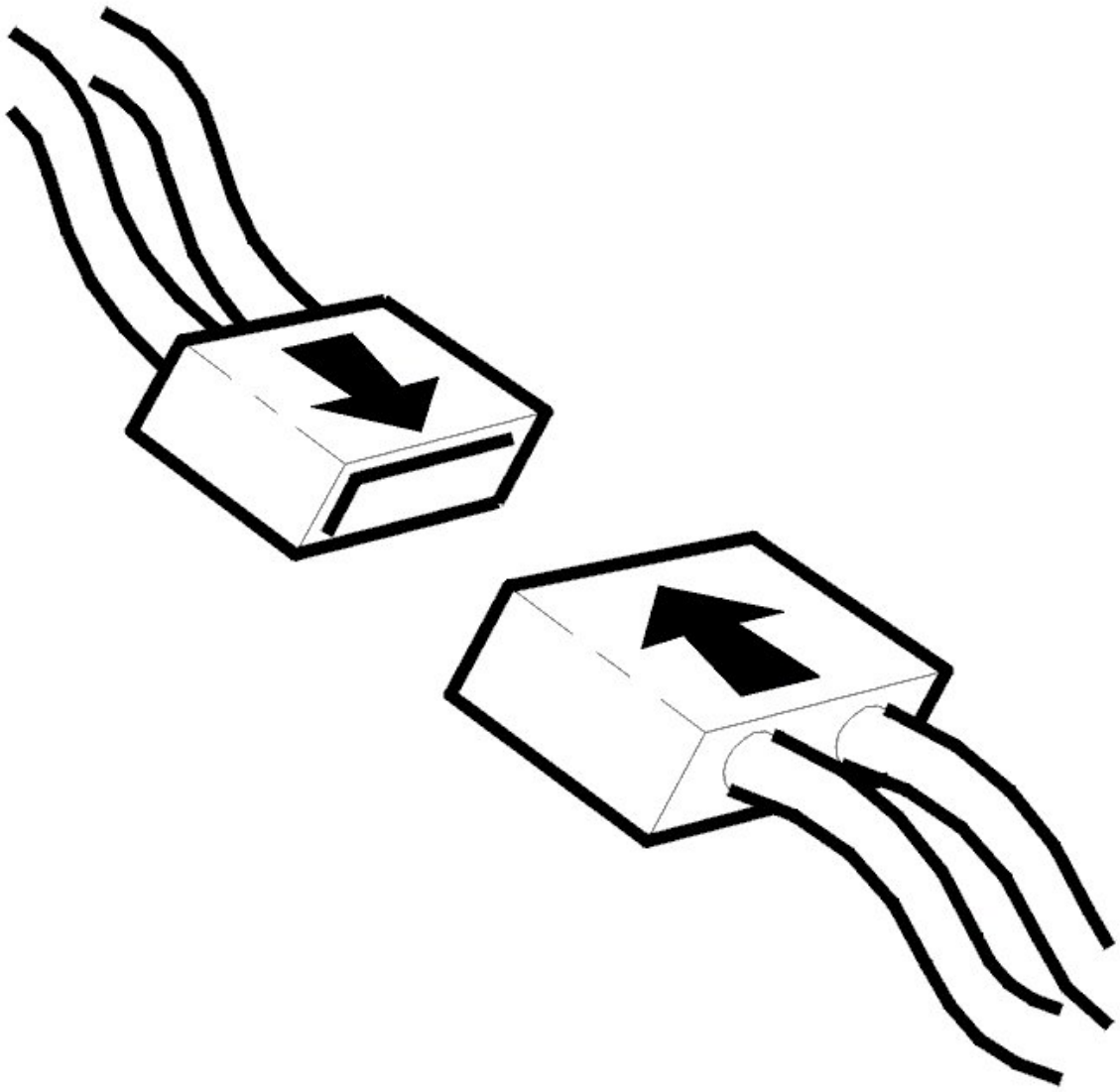
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Set the light switch to low beam.
Check that low beam is activated.

Is low beam activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

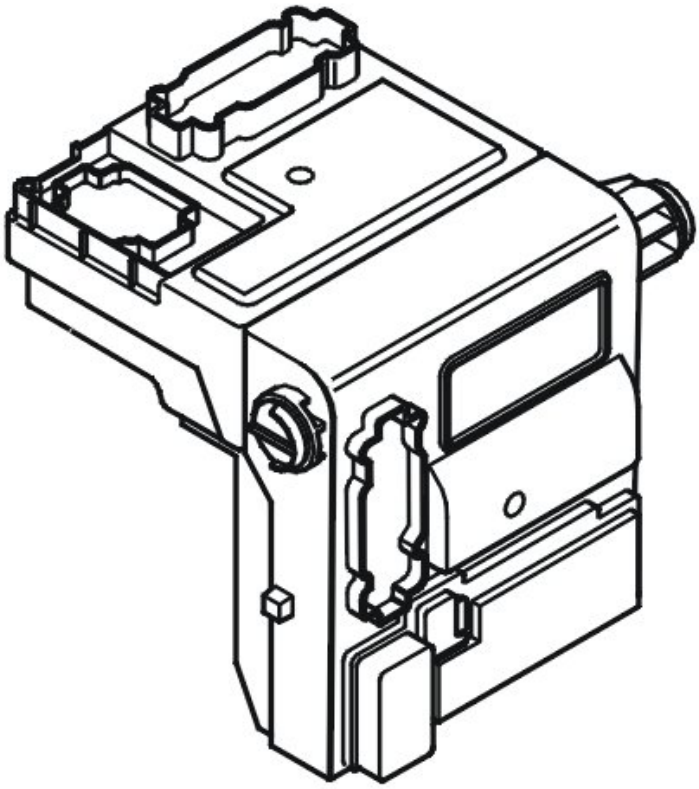
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A30

Condition



The central electronic module (CEM) powers the left-hand daytime running lamps directly via an output. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power consumption for the output is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

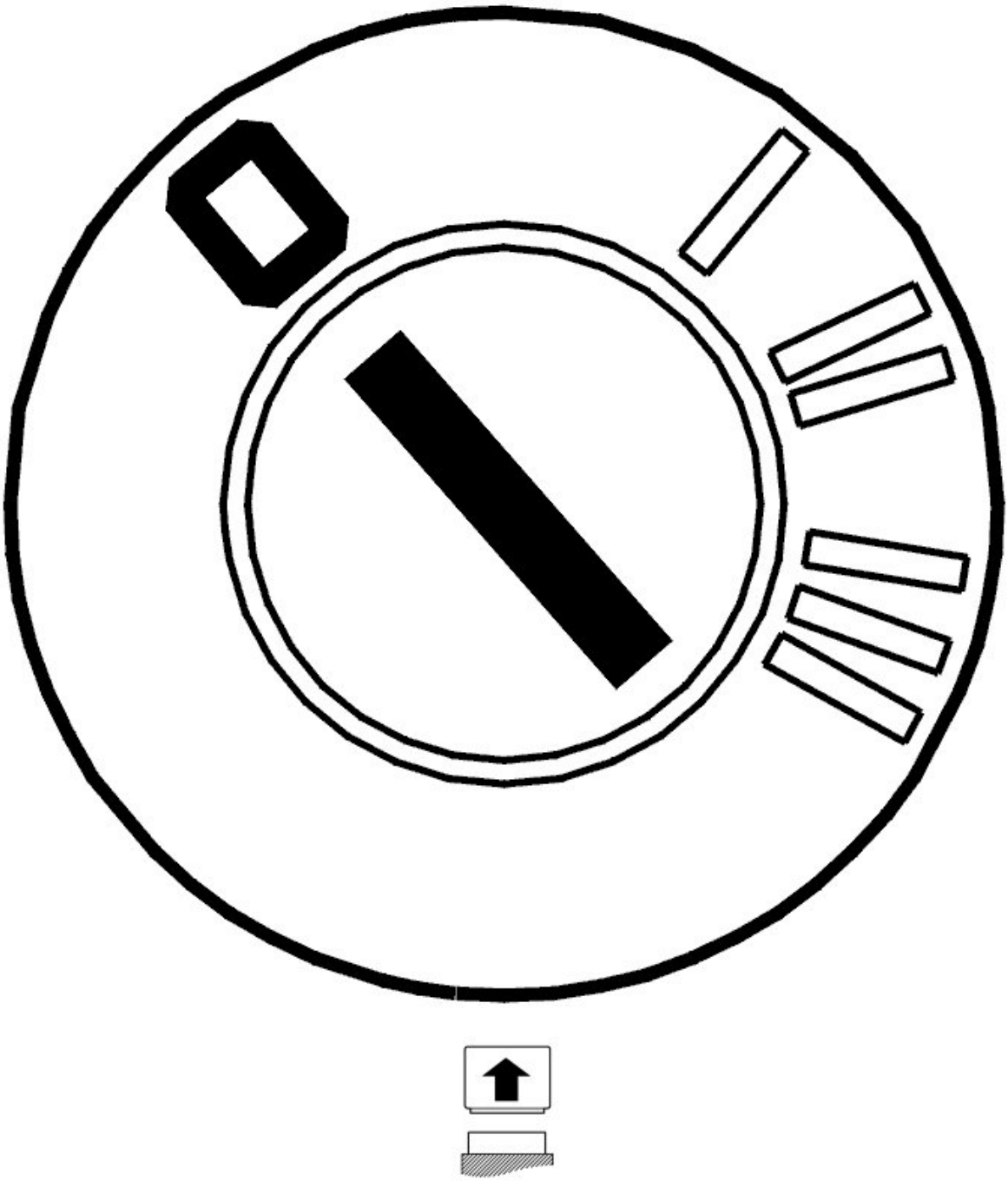
Possible source
- Short-circuit to ground in the signal cable for the daytime running lamps.

Fault symptom[s]
- The daytime running lamps do not operate.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector B.

Check the power cable for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #B8 (#B8) and left-hand lamp housing connector terminal #A6.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

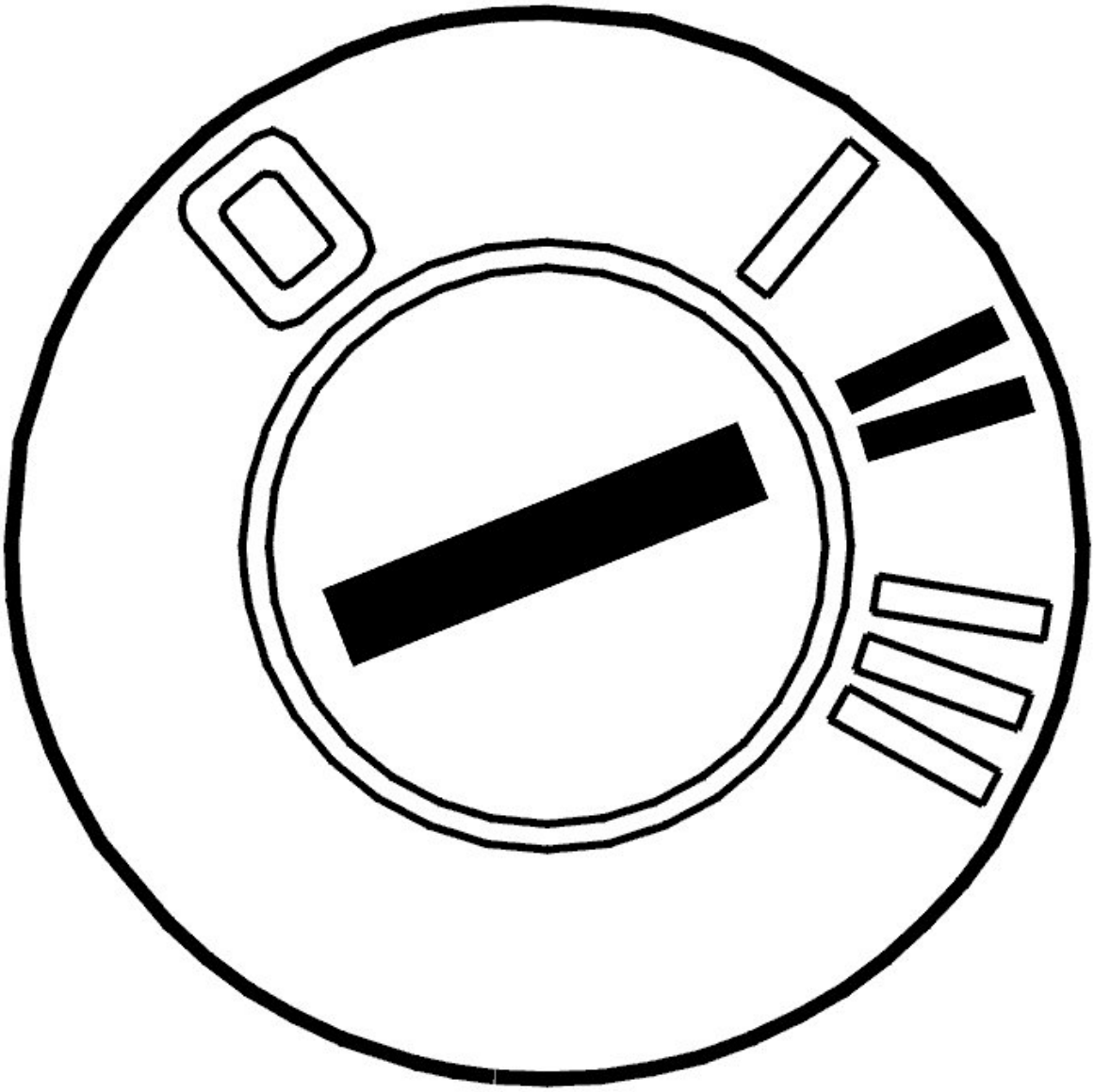
Continue - Verification

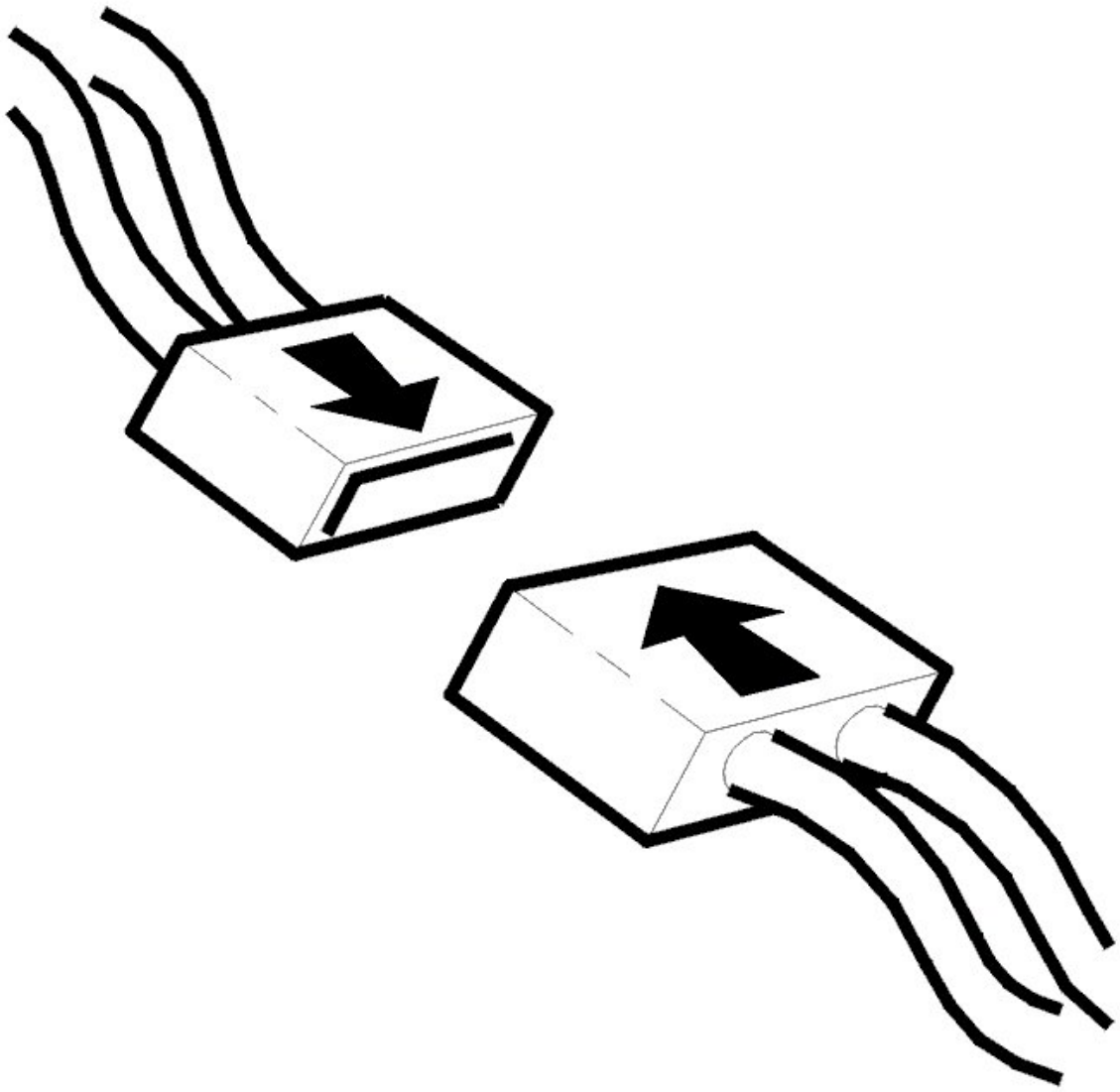
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the daytime running lamps.
Check that the daytime running lamps are activated.

Are the daytime running lamps activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

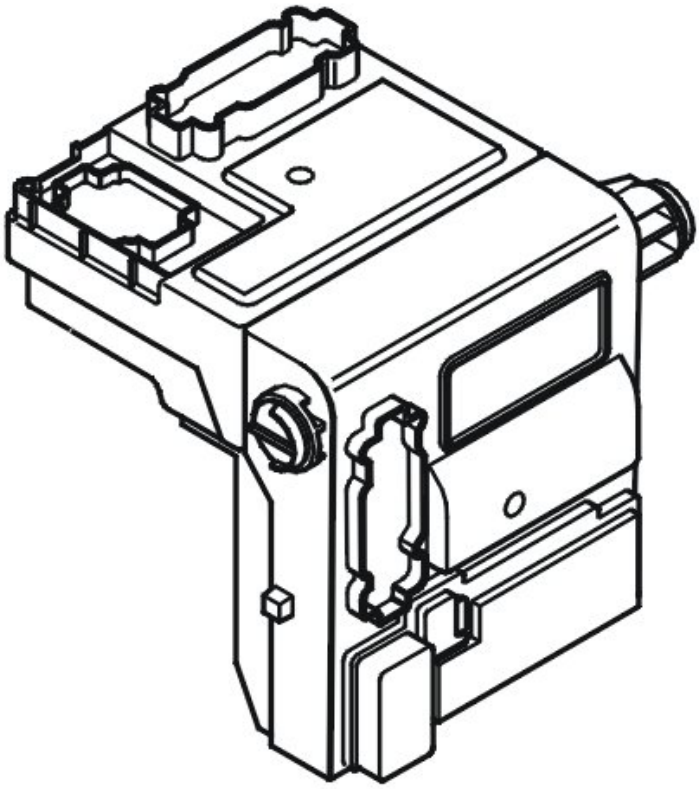
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A31

Condition



The central electronic module (CEM) powers the right-hand daytime running lamps directly via an output. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power consumption for the output is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

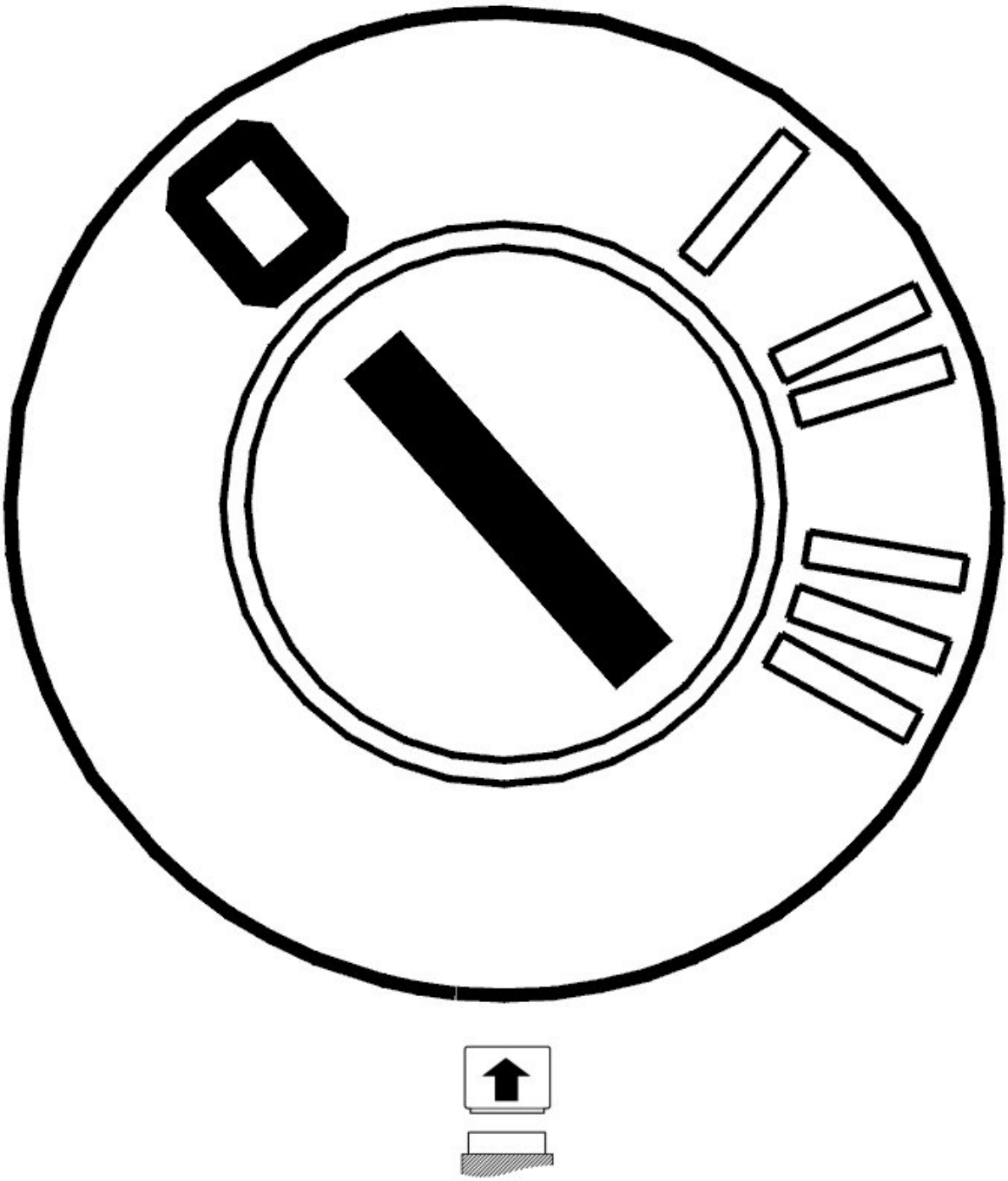
Possible source
- Short-circuit to ground in the signal cable for the daytime running lamps.

Fault symptom[s]
- The daytime running lamps do not operate.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector B.

Check the power cable for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #B9 (#B9) and right-hand stop lamp connector terminal #A6.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

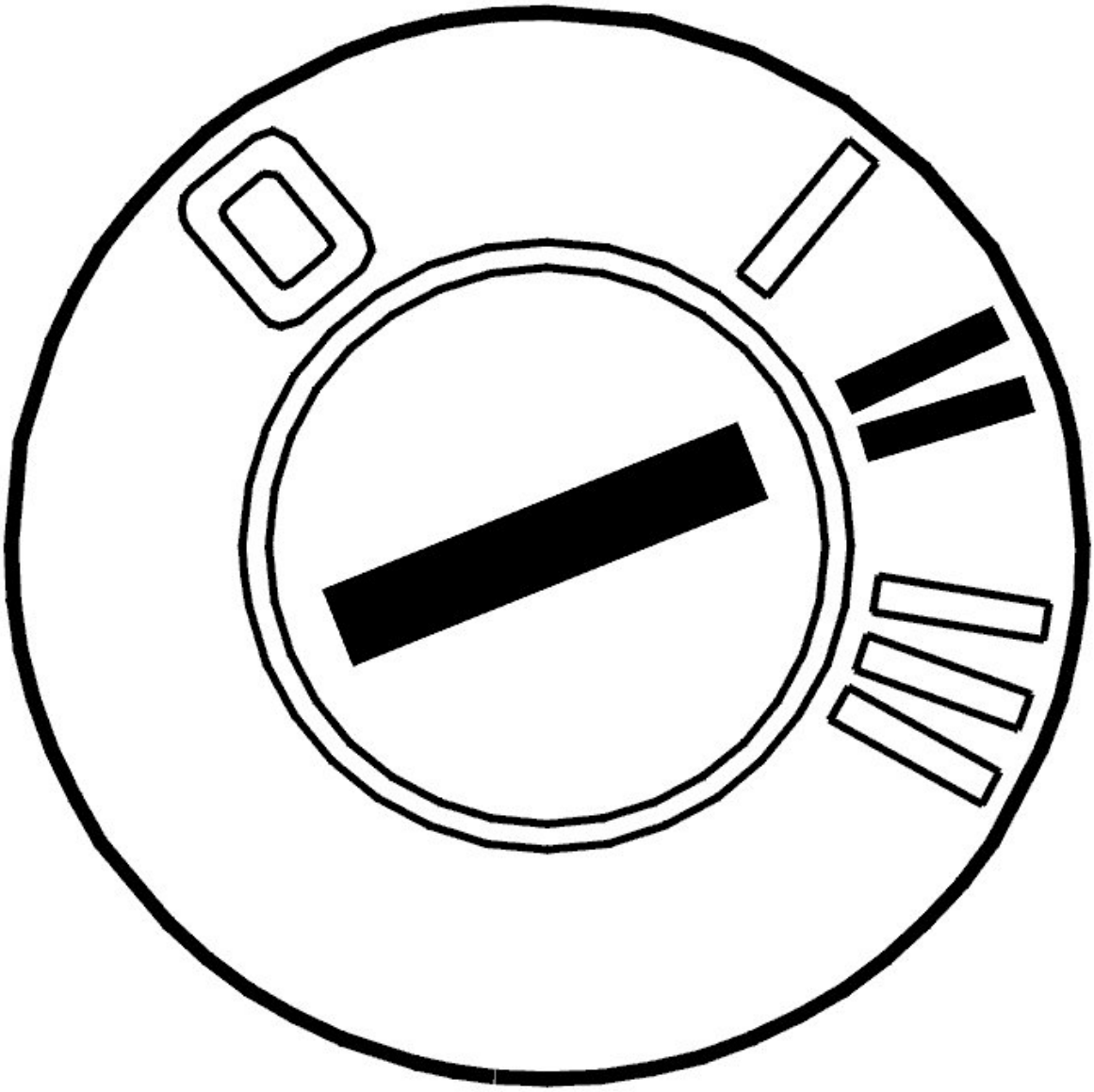
Continue - Verification

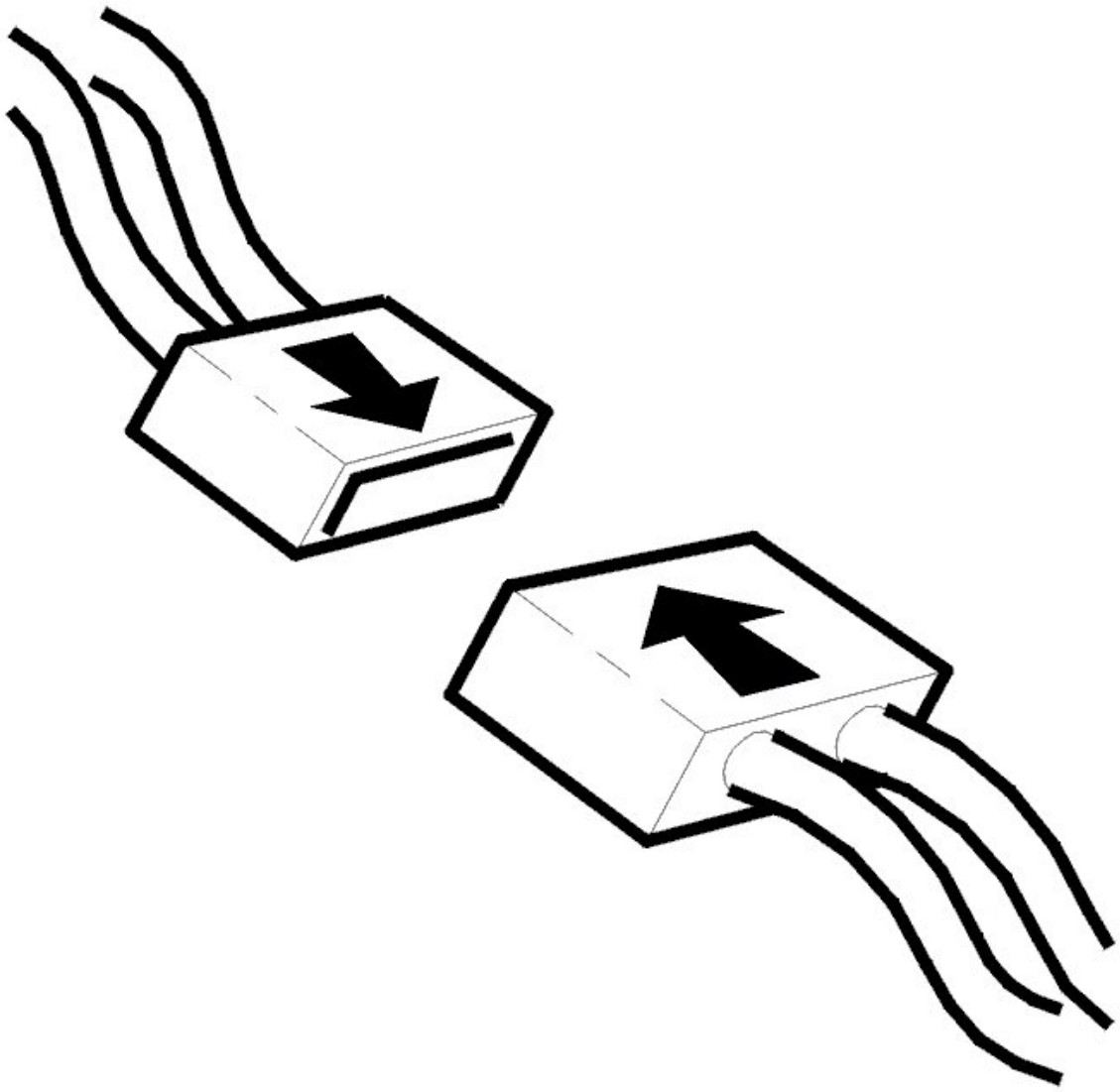
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the daytime running lamps.
Check that the daytime running lamps are activated.

Are the daytime running lamps activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

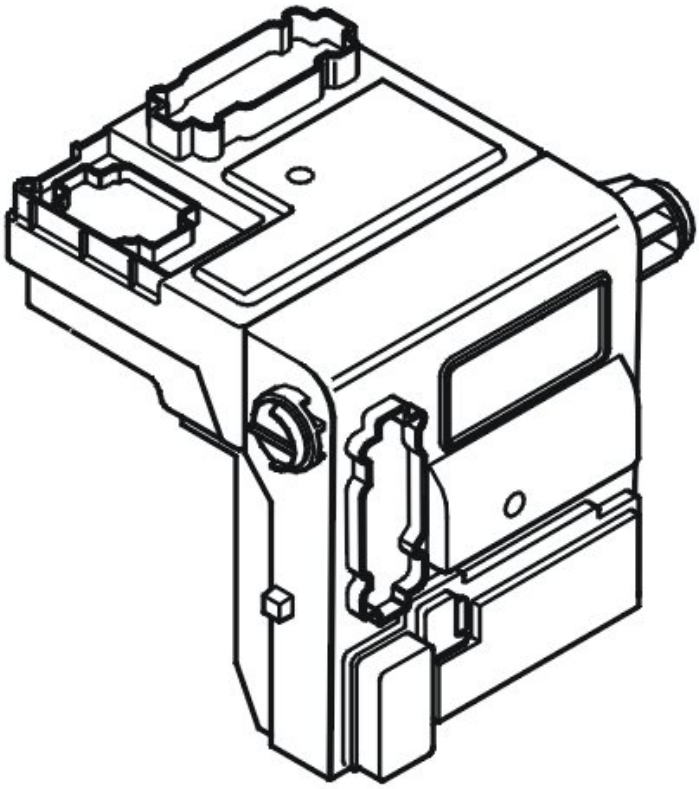
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8A32

Condition



The central electronic module (CEM) activates the relay for full beam. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switch for high beam flash has been active for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged dip switch
- Fault in the communication with the steering wheel module (SWM).

Fault symptom[s]
- The high beam is constantly lit.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when the button or switch has been pressed in for too long or is in a non-approved position.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or the switch is not sticking, jammed in the activated position or in a non-approved position.
Remedy as necessary.

Other information

Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

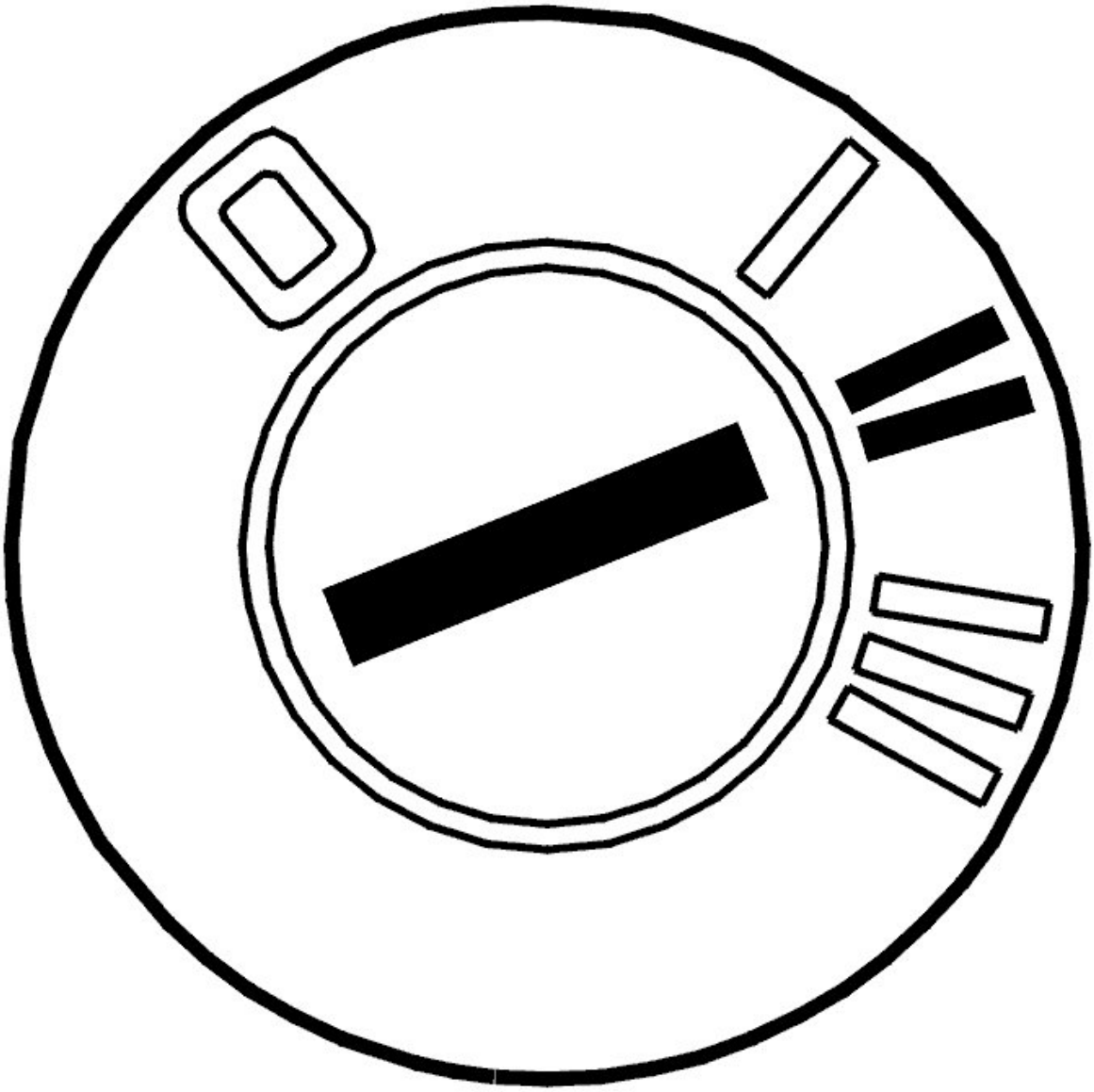
Continue - Verification

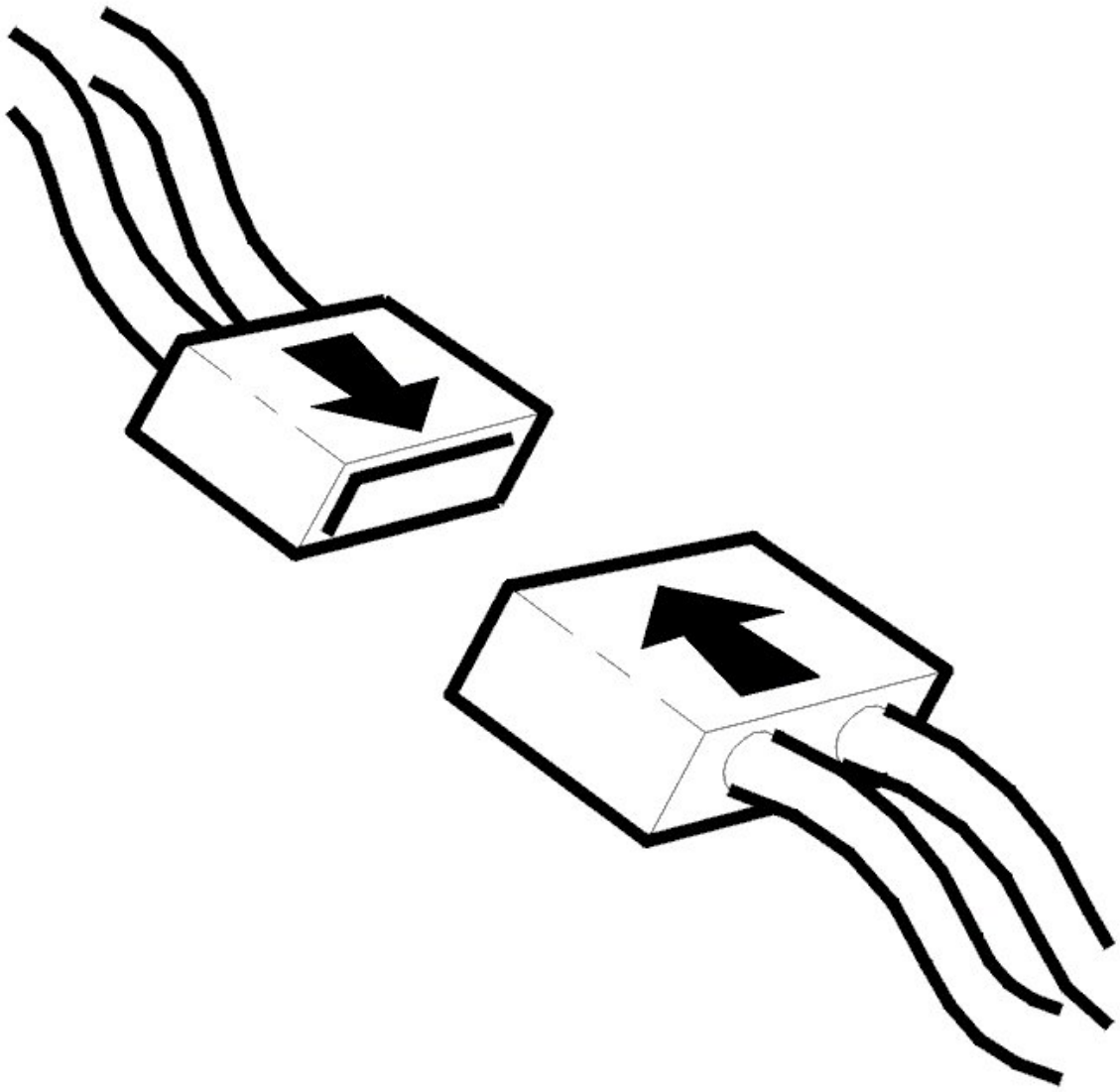
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

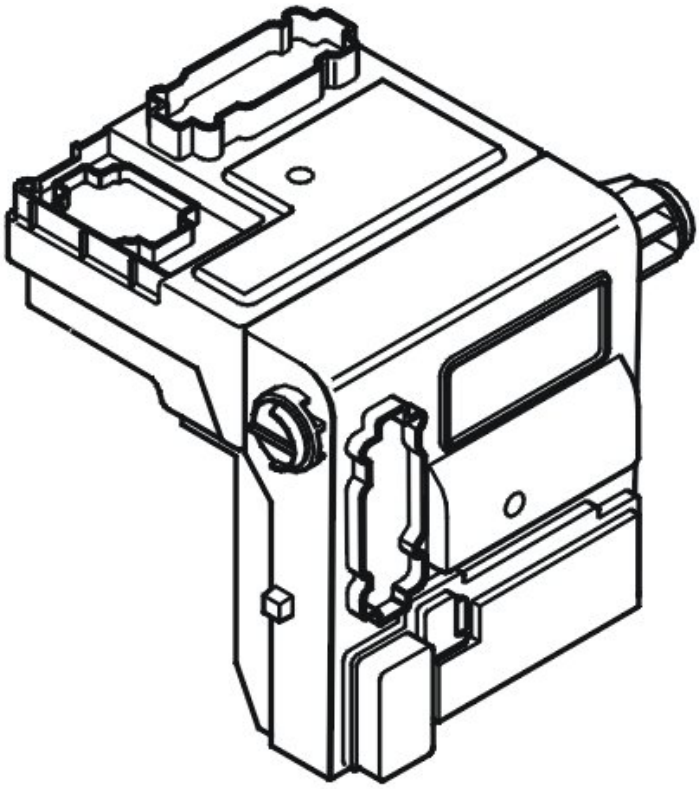
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8B01

Condition



The central electronic module (CEM) powers the left-hand parking lamps directly via an output. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the power consumption for the output is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

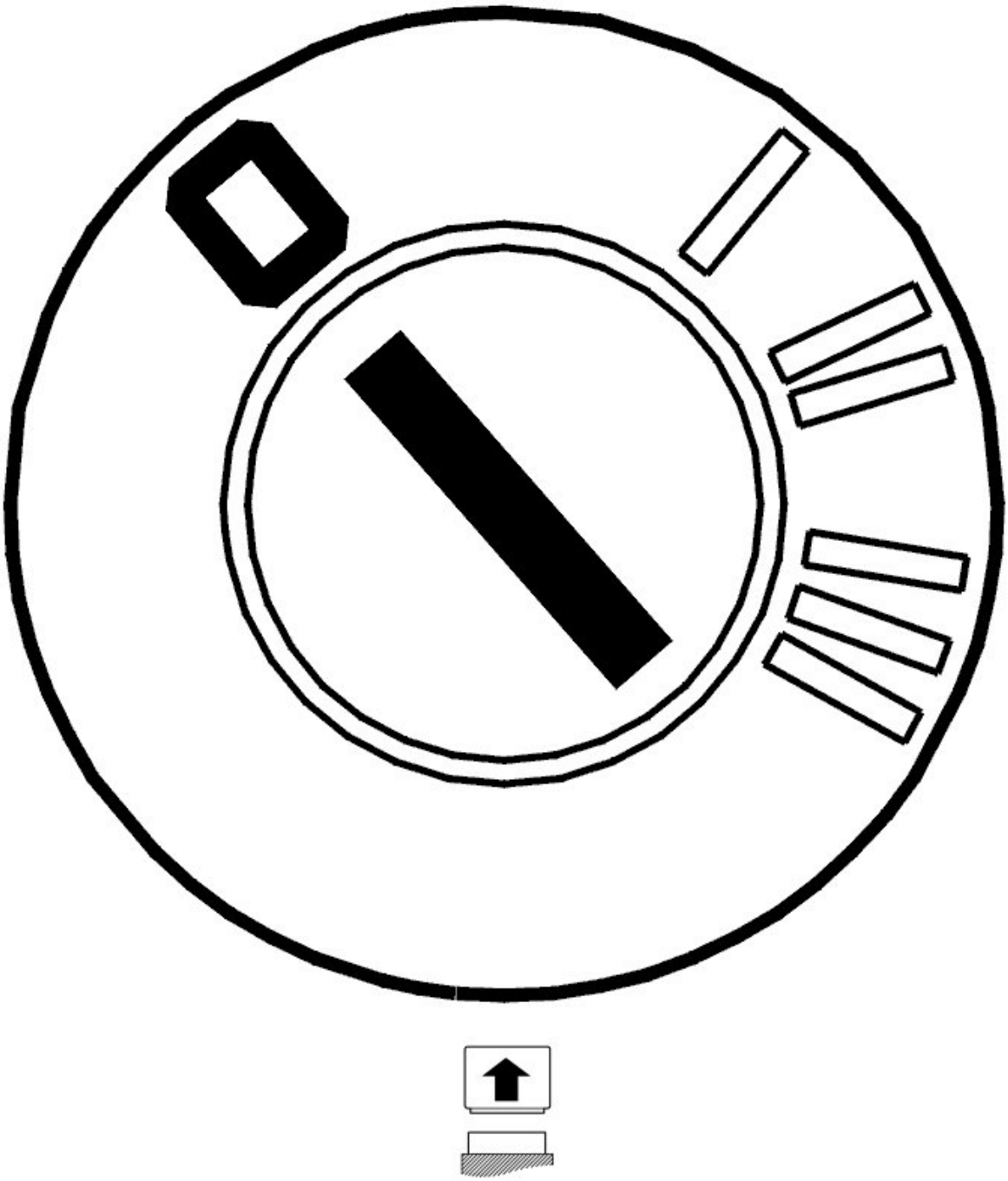
Possible source
- Short-circuit to ground in the signal cable for the parking lamp bulb.

Fault symptom[s]
- The parking lamps do not operate.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

Check the power cable for a short-circuit to ground.

For S60 and V70

Take readings between:

- Central electronic module (CEM) terminal #C19 (#19) and left-hand lamp housing connector terminal #A3
- Central electronic module (CEM) terminal #C19 (#19) and left-hand sidemarker lamp terminal #A1.

For S80 without Bi-Xenon

Take readings between:

- Central electronic module (CEM) terminal #C19 (#19) and left-hand lamp housing connector terminal #A2
- Central electronic module (CEM) terminal #C19 (#19) and left-hand sidemarker lamp terminal #A1
- Central electronic module (CEM) terminal #C19 (#19) and left-hand parking lamp terminal #A1.

For S80 with Bi-Xenon

Take readings between:

- Central electronic module (CEM) terminal #C19 (#19) and left-hand parking lamp terminal #A1
- Central electronic module (CEM) terminal #C19 (#19) and left-hand sidemarker lamp terminal #A1
- Central electronic module (CEM) terminal #C19 (#19) and left-hand parking lamp terminal #A1.

For the XC90

Take readings between:

- Central electronic module (CEM) terminal #C19 (#19) and left-hand parking lamp terminal #A1
- Central electronic module (CEM) terminal #C19 (#19) and left-hand parking lamp terminal #A1.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

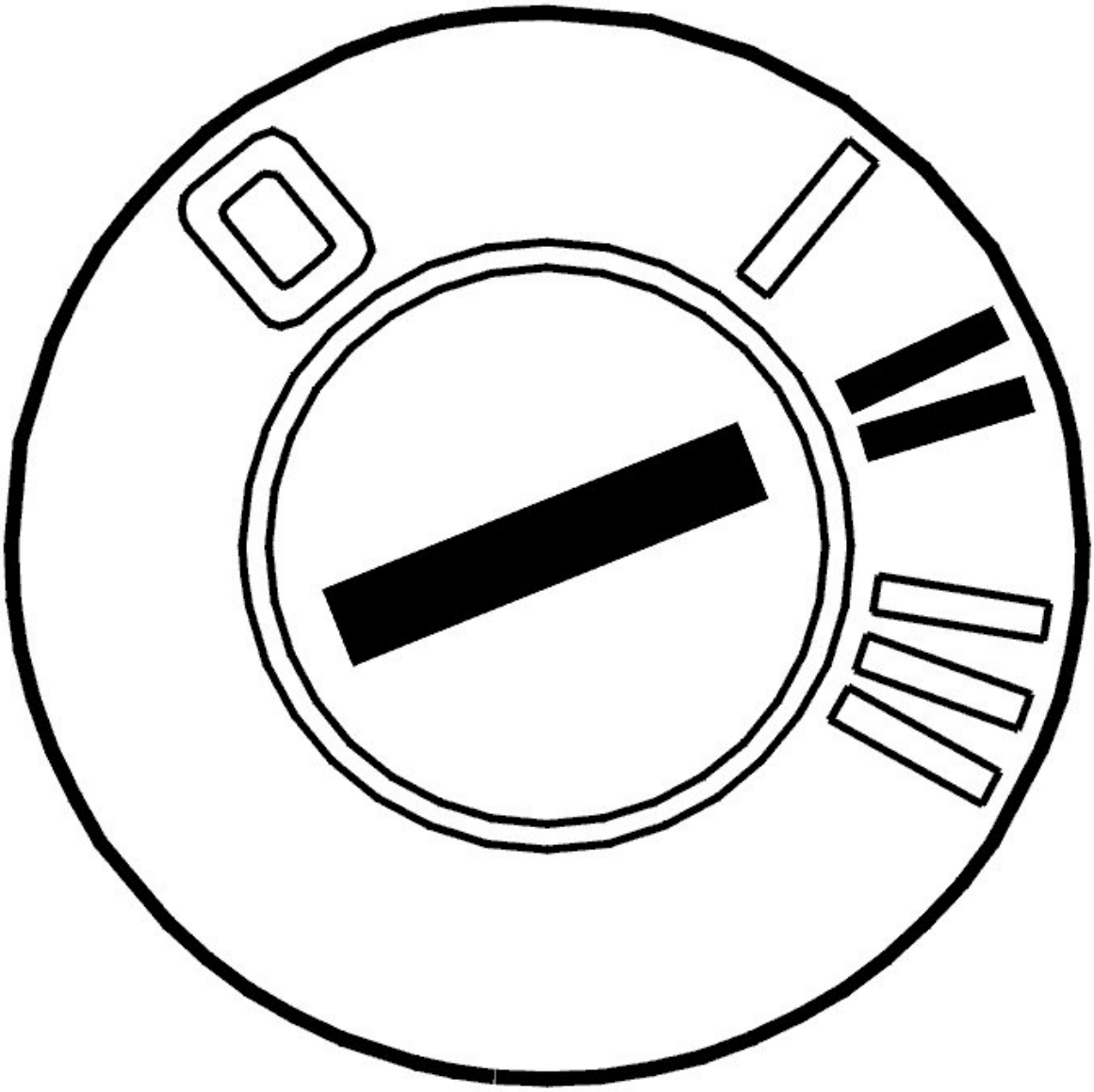
Continue - Verification

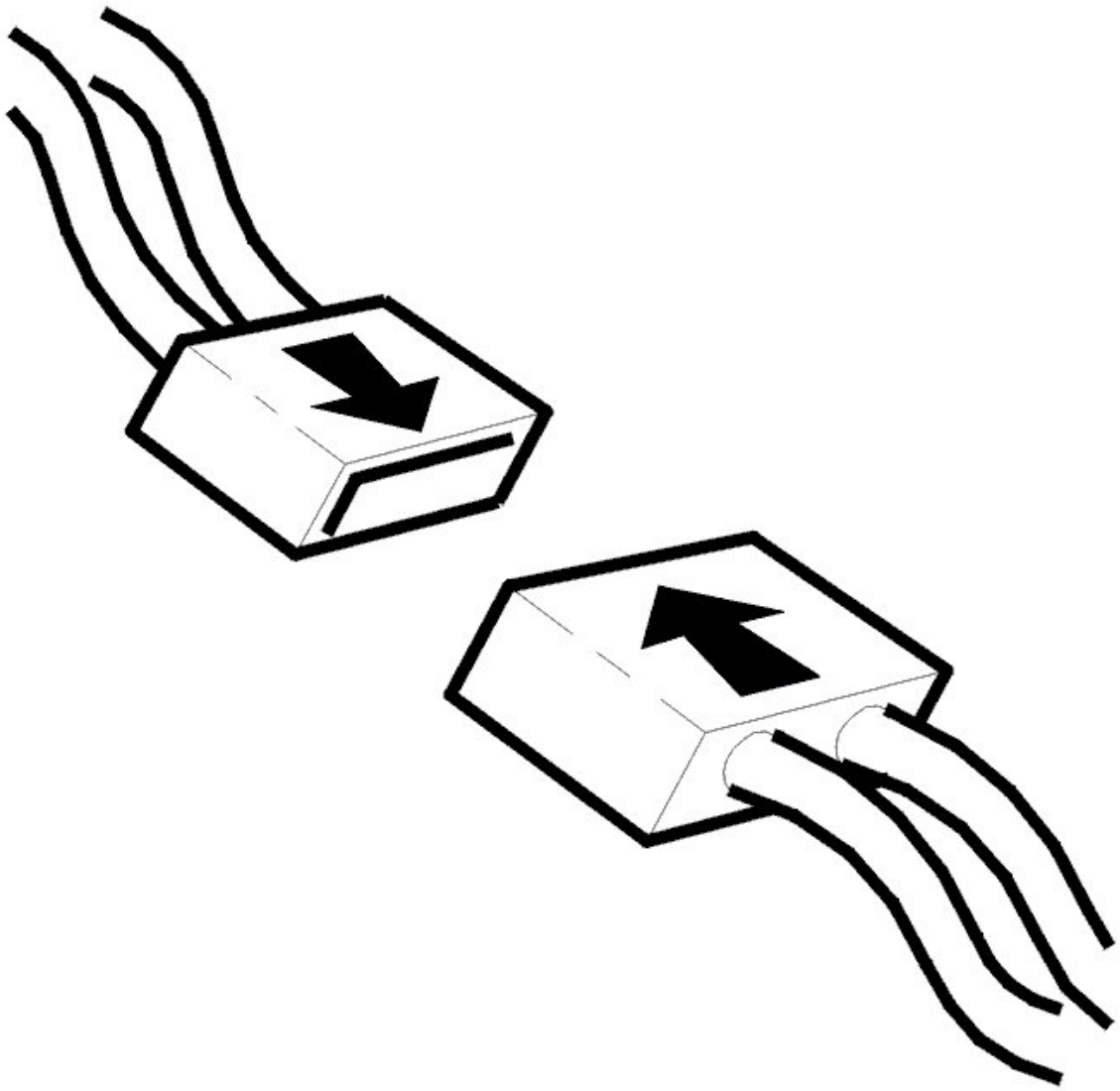
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the parking lamp.
Check that the parking lamp is activated.

Is the parking lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

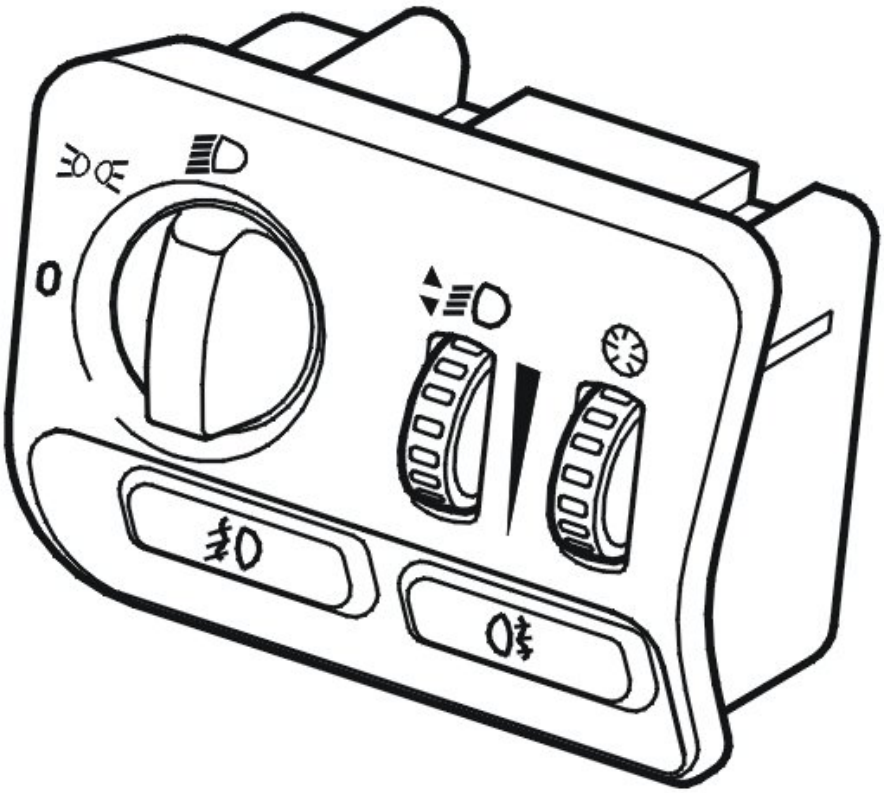
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8C11

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that it has detected that the switch for the front fog lamps has been activated for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged switch for the front fog lamps
- Fault in the communication with the light switch module (LSM).

Fault symptom[s]
- The front fog lamps do not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

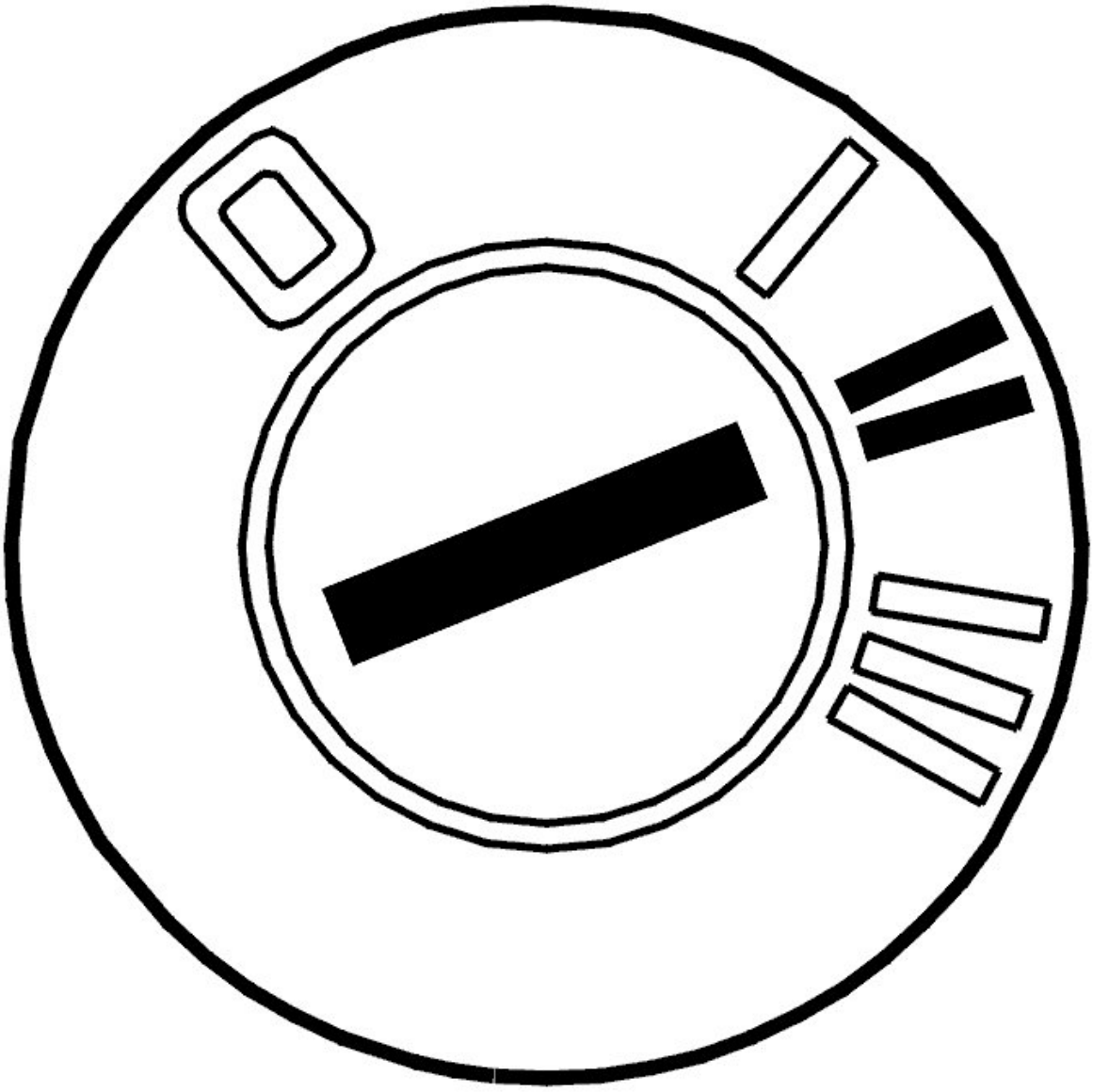
Continue - Verification

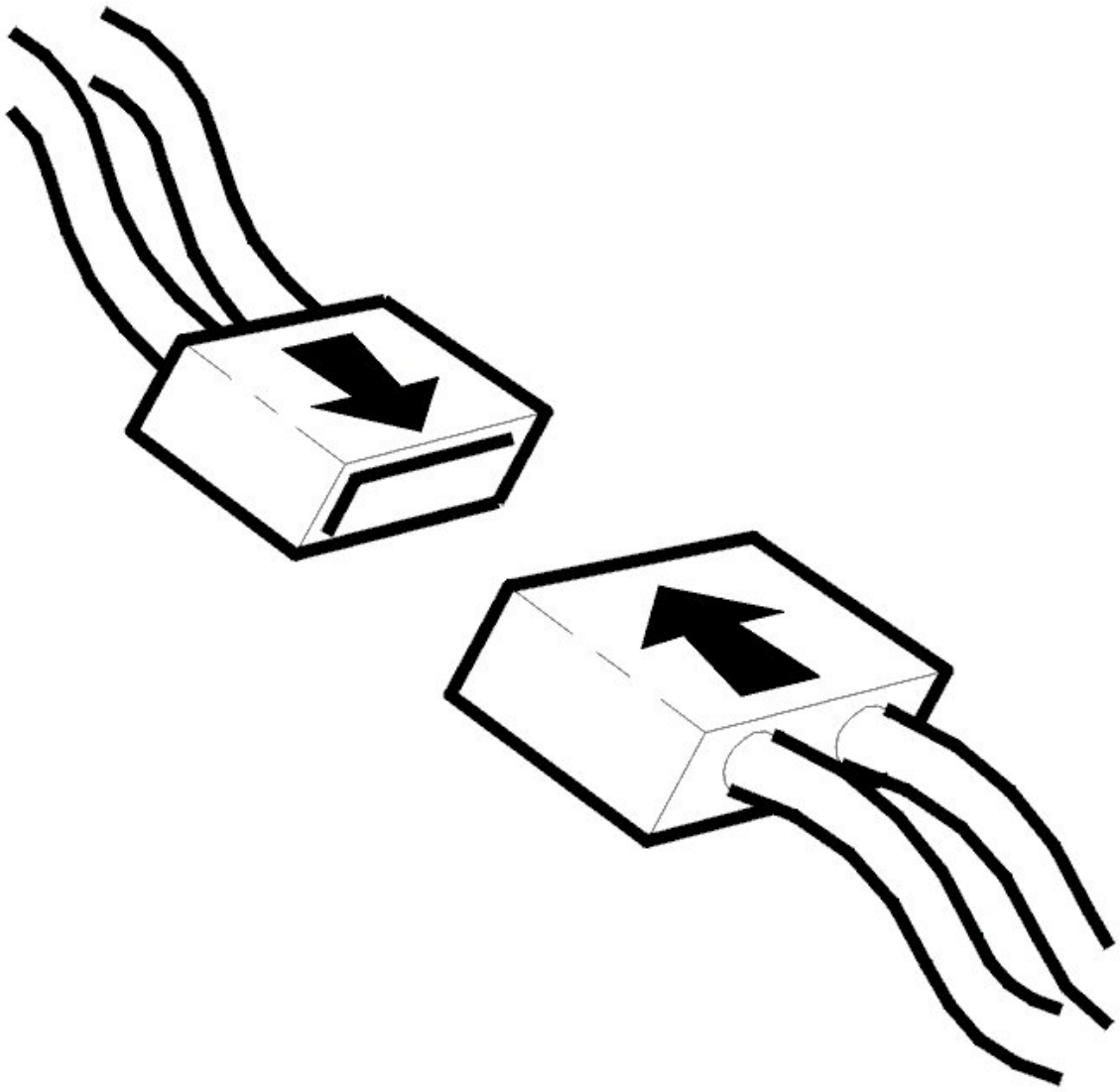
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

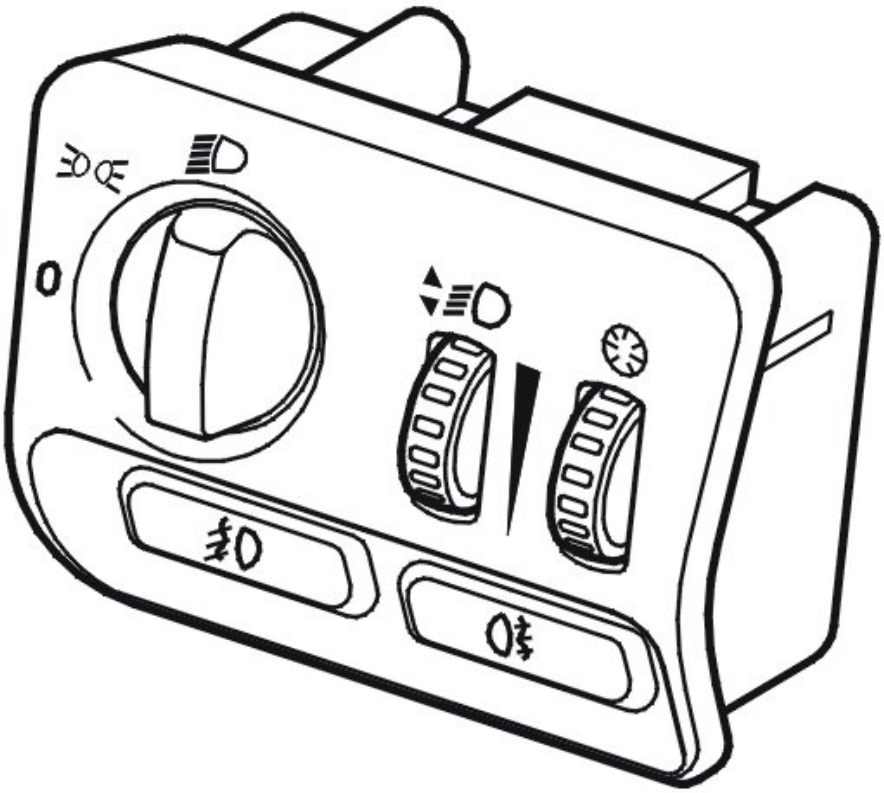
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8C12

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that it has detected that the switch for the rear fog lamps has been activated for more than 60 seconds.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged switch for the rear fog lamps
- Fault in the communication with the light switch module (LSM).

Fault symptom[s]
- The rear fog lamp does not work.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair

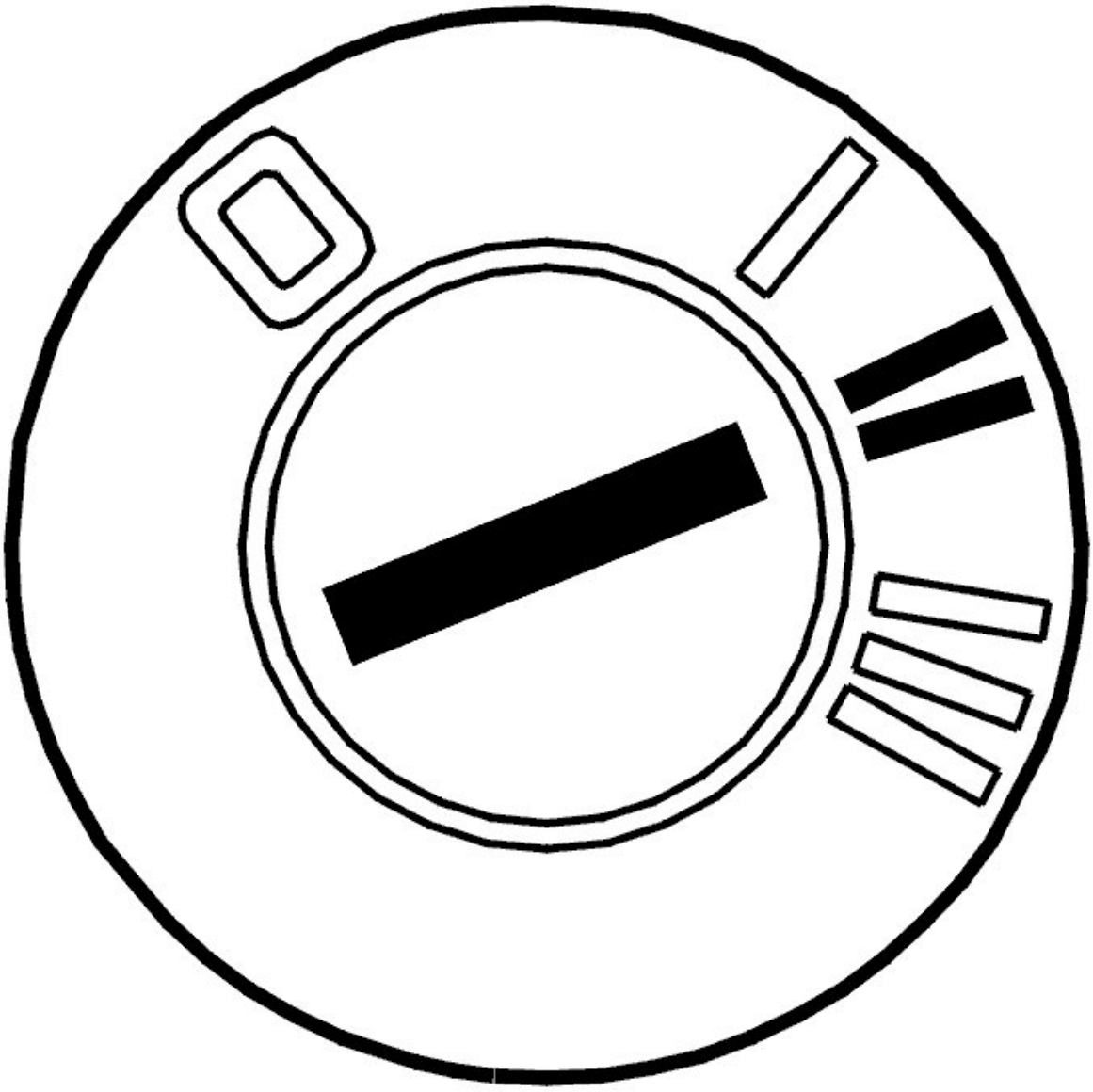
Continue - Verification

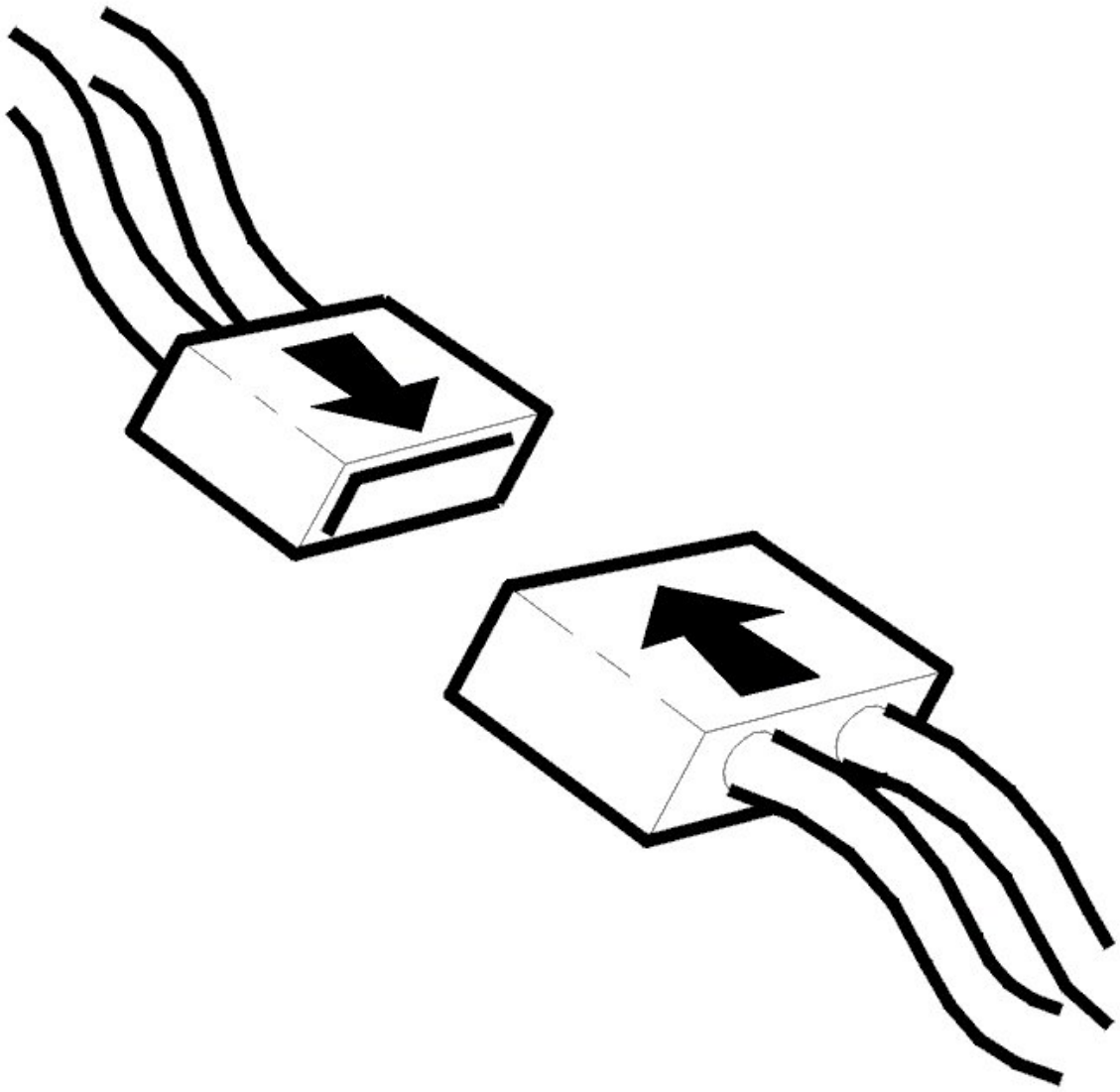
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the function for the relevant button or switch is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

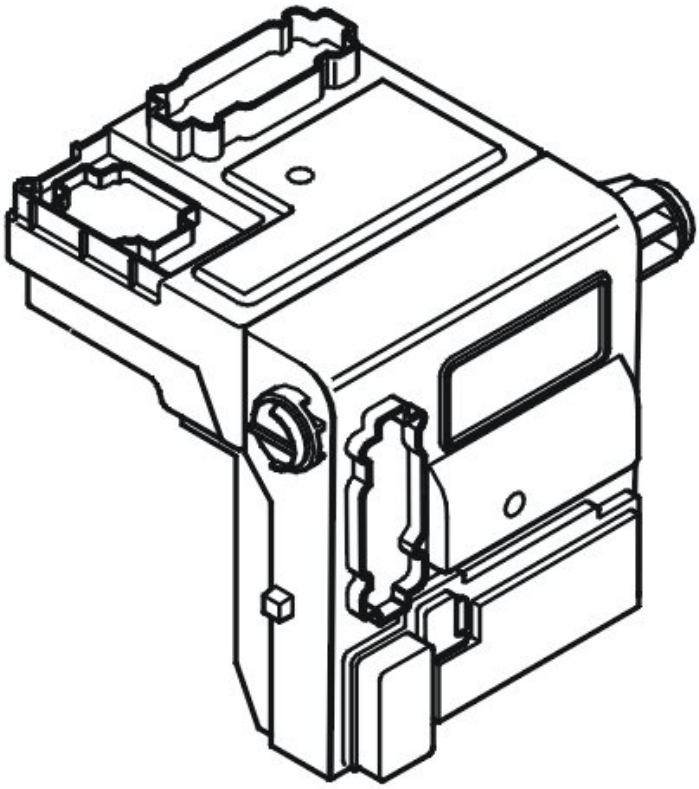
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8D01

Condition



The central electronic module (CEM) checks the stop lamps.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the stop lamps is too low.
The diagnostic trouble code (DTC) can be diagnosed when the stop lamp is active.

Substitute value
- None.

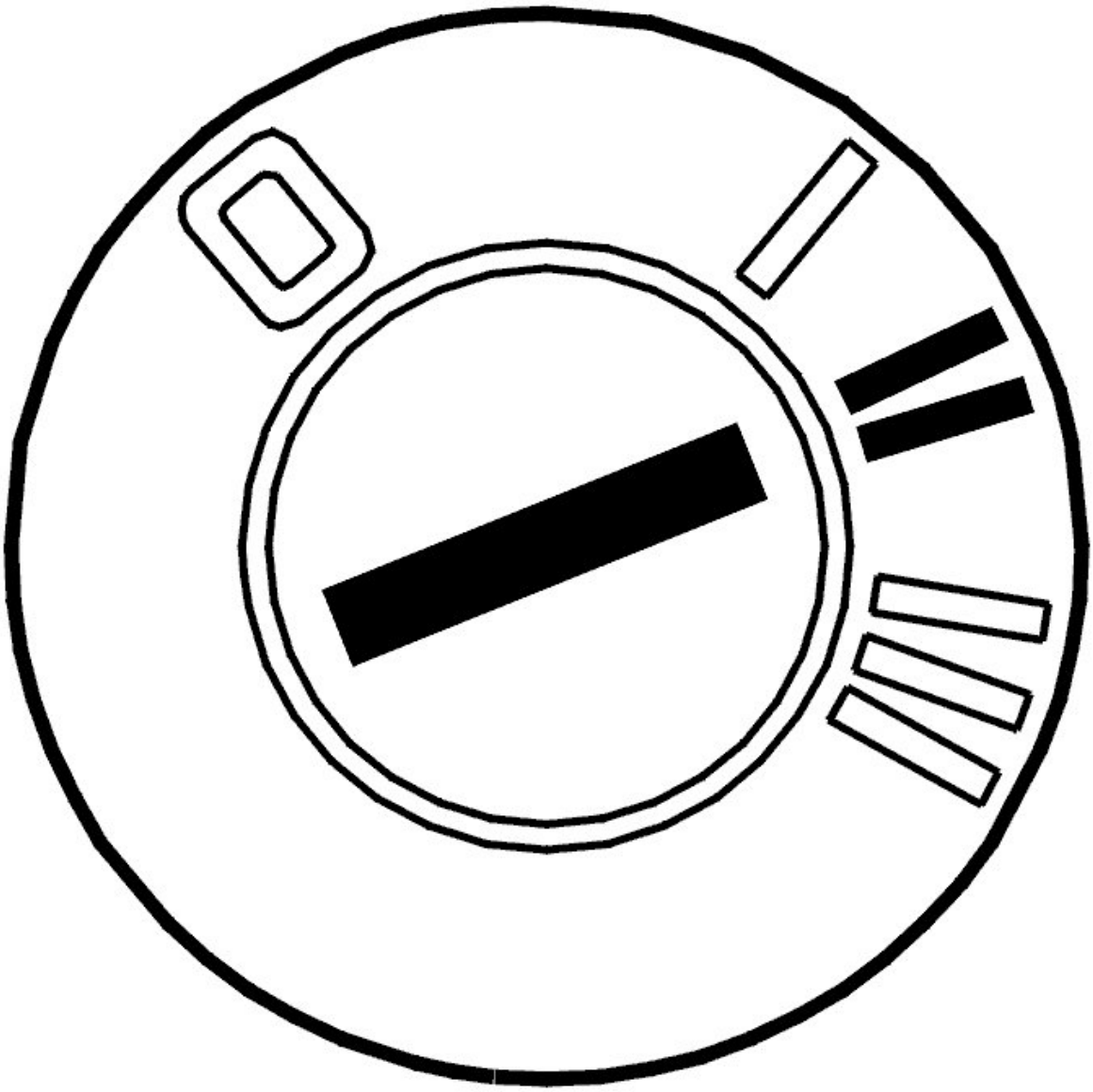
Possible source
- Short-circuit to ground in the circuit for the stop lamps.

Fault symptom[s]
- The stop lamp does not light when the brake pedal is depressed.

Signal Too Low

Signal too low

Checking the status



- Ignition on.

Activate the stop lamp.
Check if the fault is permanent or intermittent.
The stop lamp must light on activation.
The fault is permanent if the stop lamp does not activate.
If the stop lamp is activated, this is an indication that the fault was present previously but that it is not active at the moment, i.e. the fault is intermittent.

Continue - Checking components and wiring

Checking components and wiring

Check the voltage between the left and right-hand stop lamps and the output on the rear electronic module (REM). The voltage must be approximately 12 V when the stop lamp is activated.
Check the control signal cable. Check for a short-circuit to ground.
Take readings between:
S60

- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #B4.

S80

- Rear electronic module (REM) terminal #D18 (#18) and stop lamp terminal #7.

V70/XC70

- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #B2.

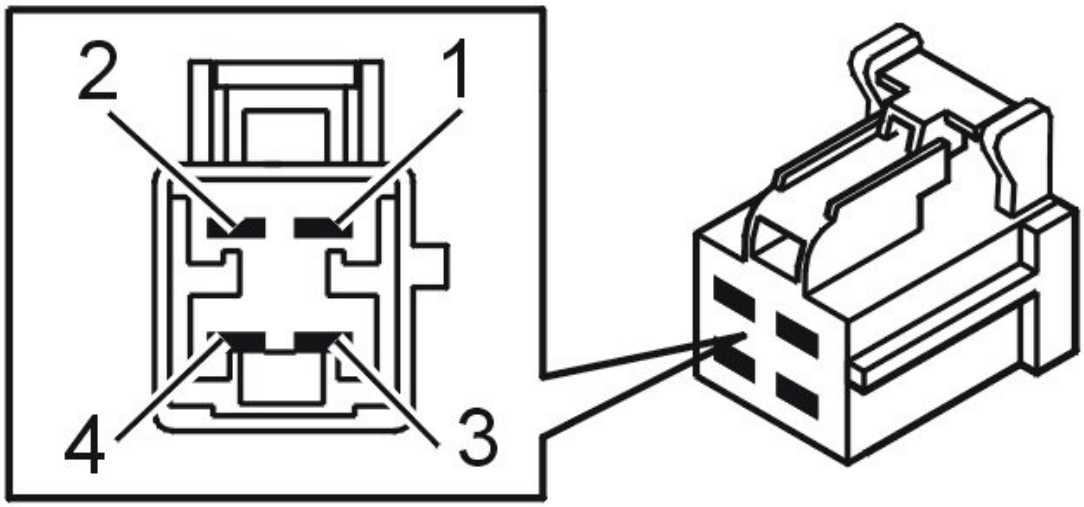
XC90

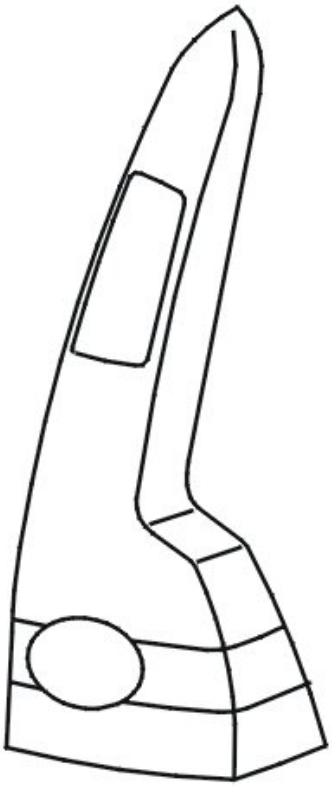
- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #A5.

Check the cable between central electronic module (CEM) terminal #A15 (15) and rear electronic module (REM) terminal #A18 (18). Check for a short-circuit to ground.
Remedy as necessary.

Other information

- Central electronic module (CEM): Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Rear electronic module (REM): Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Central electronic module (CEM): Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Rear electronic module (REM): Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Stop lamp high mounted, replacing See: Lighting and Horns/Center Mounted Brake Lamp/Service and Repair/Stop Lamp, Rear Windshield, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





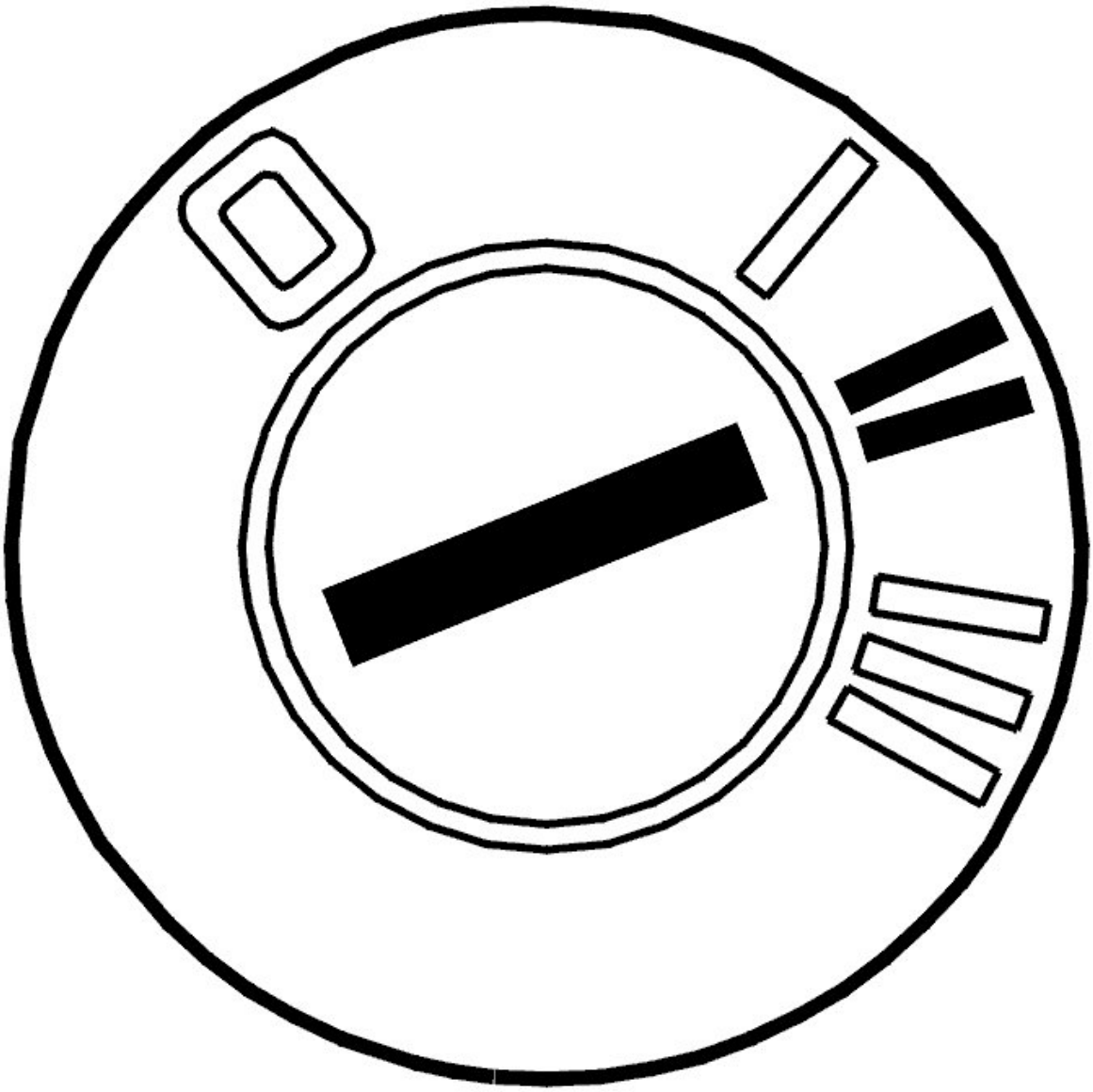
Continue - Verification

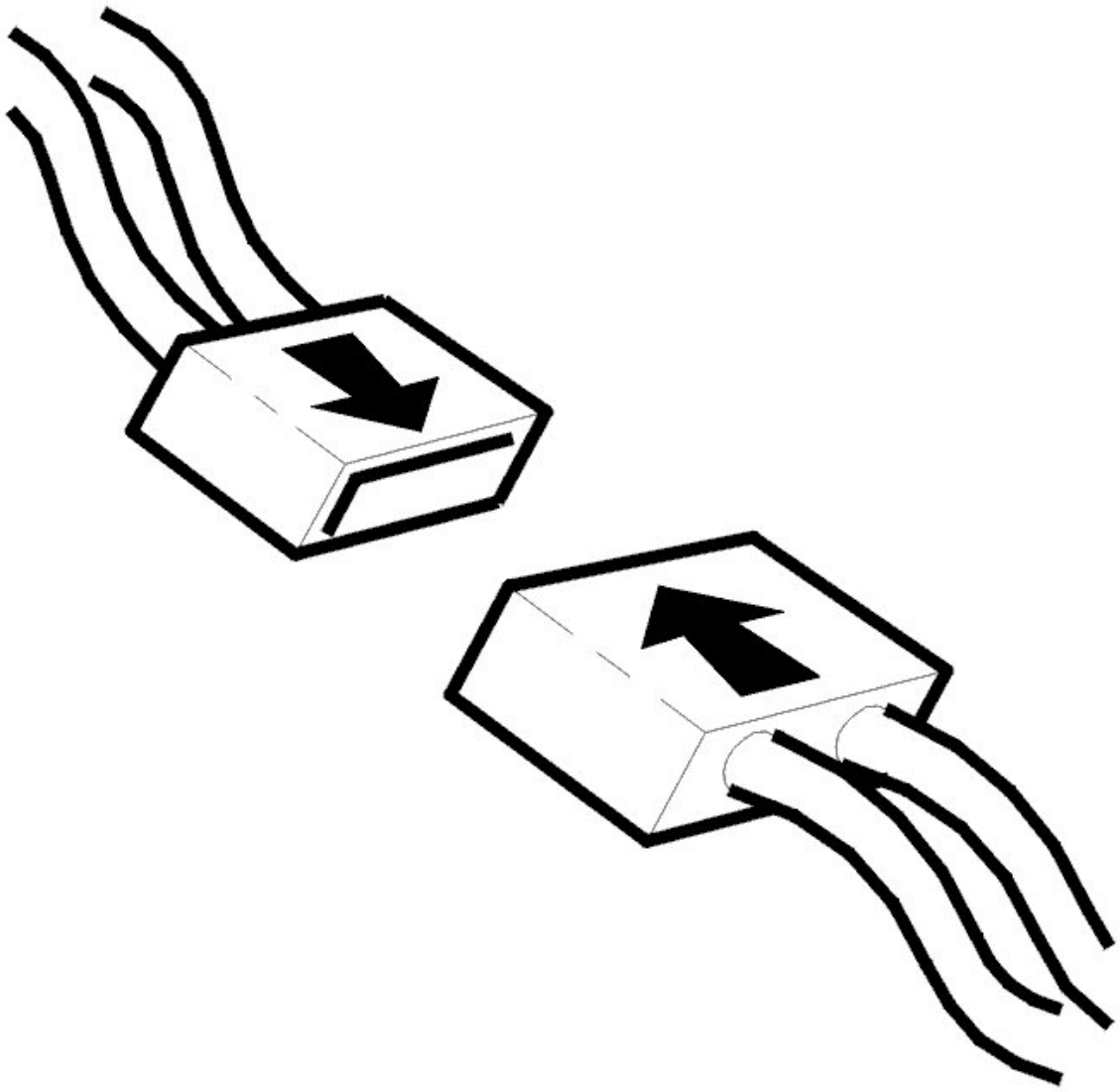
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the stop lamps.

Check that the stop lamps are working.

Are the stop lamps working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

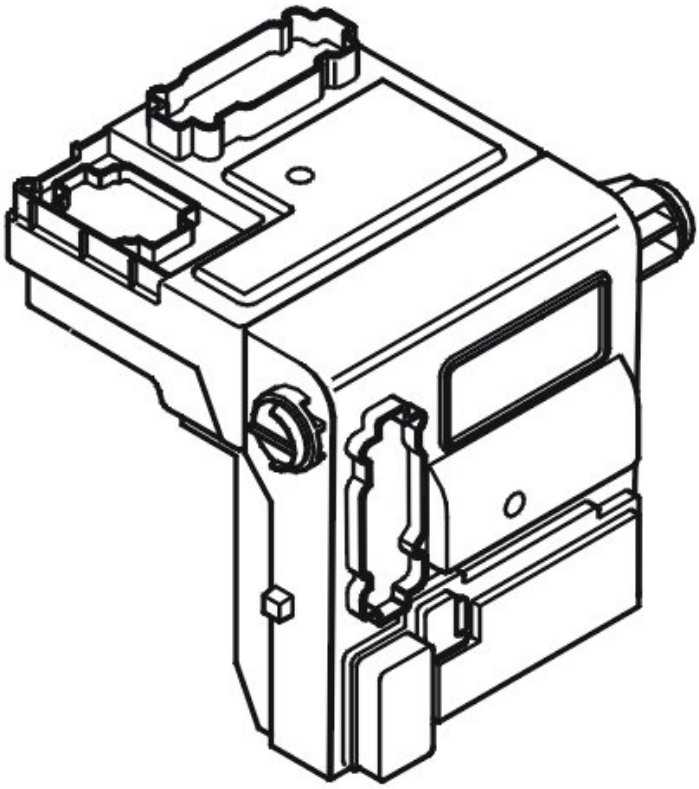
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8D02

Condition



The central electronic module (CEM) checks the stop lamps.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the stop lamps is faulty.
The diagnostic trouble code (DTC) can be diagnosed when the stop lamp is active.

Substitute value
- None.

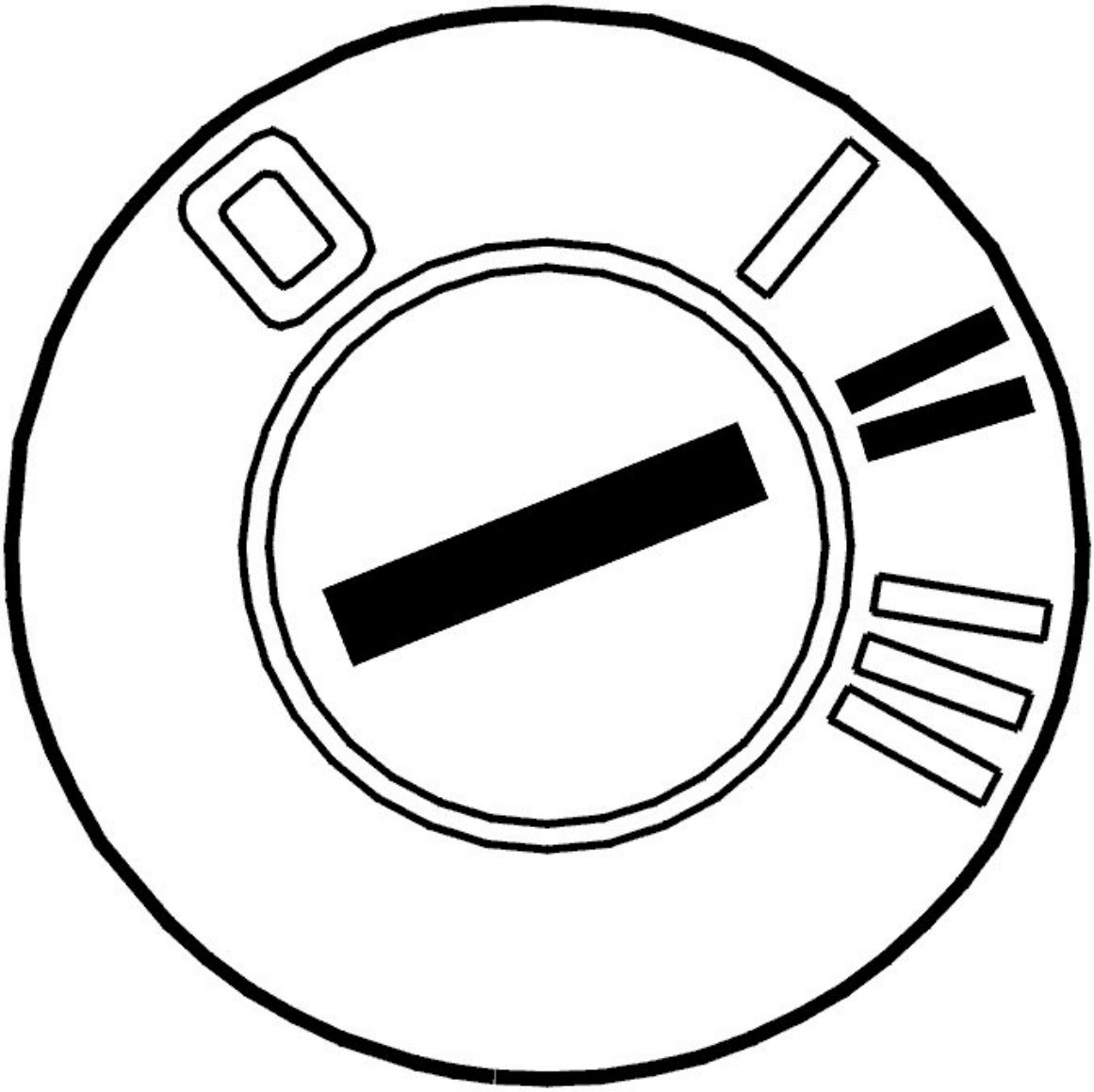
Possible source
- Open-circuit in the circuit for the stop lamps.

Fault symptom[s]
- The stop lamp does not light when the brake pedal is depressed.

Faulty Signal

Faulty signal

Checking the status



- Ignition on.

Activate the stop lamp.
Check if the fault is permanent or intermittent.
The stop lamp must light on activation.
The fault is permanent if the stop lamp does not activate.
If the stop lamp is activated, this is an indication that the fault was present previously but that it is not active at the moment, i.e. the fault is intermittent.

Continue - Checking components and wiring

Checking components and wiring

Check the voltage between the left and right-hand stop lamps and the output on the rear electronic module (REM). The voltage must be approximately 12 V when the stop lamp is activated.

Check the control signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage.
Take readings between:

S60

- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #B4.

S80

- Rear electronic module (REM) terminal #D18 (#18) and stop lamp terminal #7.

V70/XC70

- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #B2.

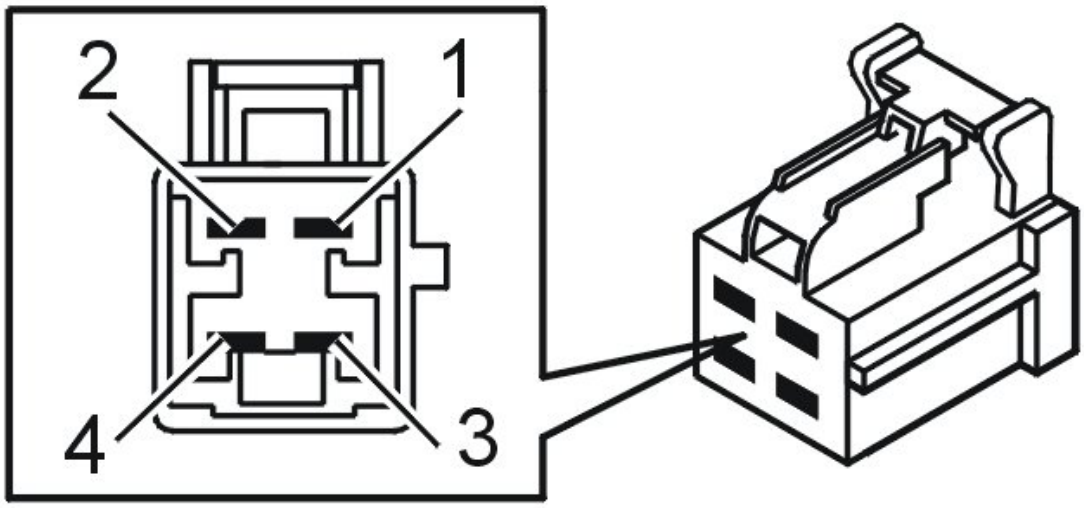
XC90

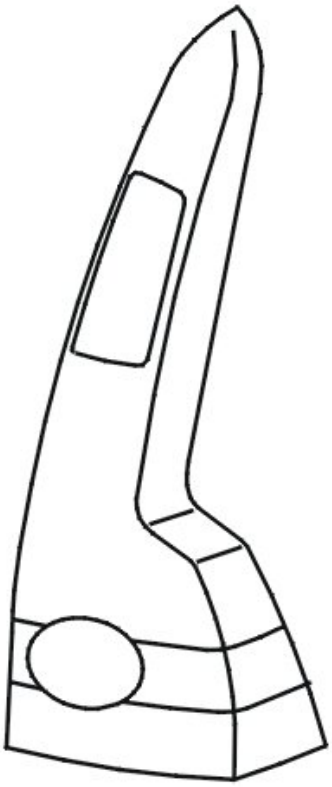
- Rear electronic module (REM) terminal #B3 (#3) and stop lamp terminal #A5.

Check the cable between central electronic module (CEM) terminal #A15 (15) and rear electronic module (REM) terminal #A18 (18). Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Central electronic module (CEM): Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Rear electronic module (REM): Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Central electronic module (CEM): Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Rear electronic module (REM): Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Stop lamp high mounted, replacing See: Lighting and Horns/Center Mounted Brake Lamp/Service and Repair/Stop Lamp, Rear Windshield, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





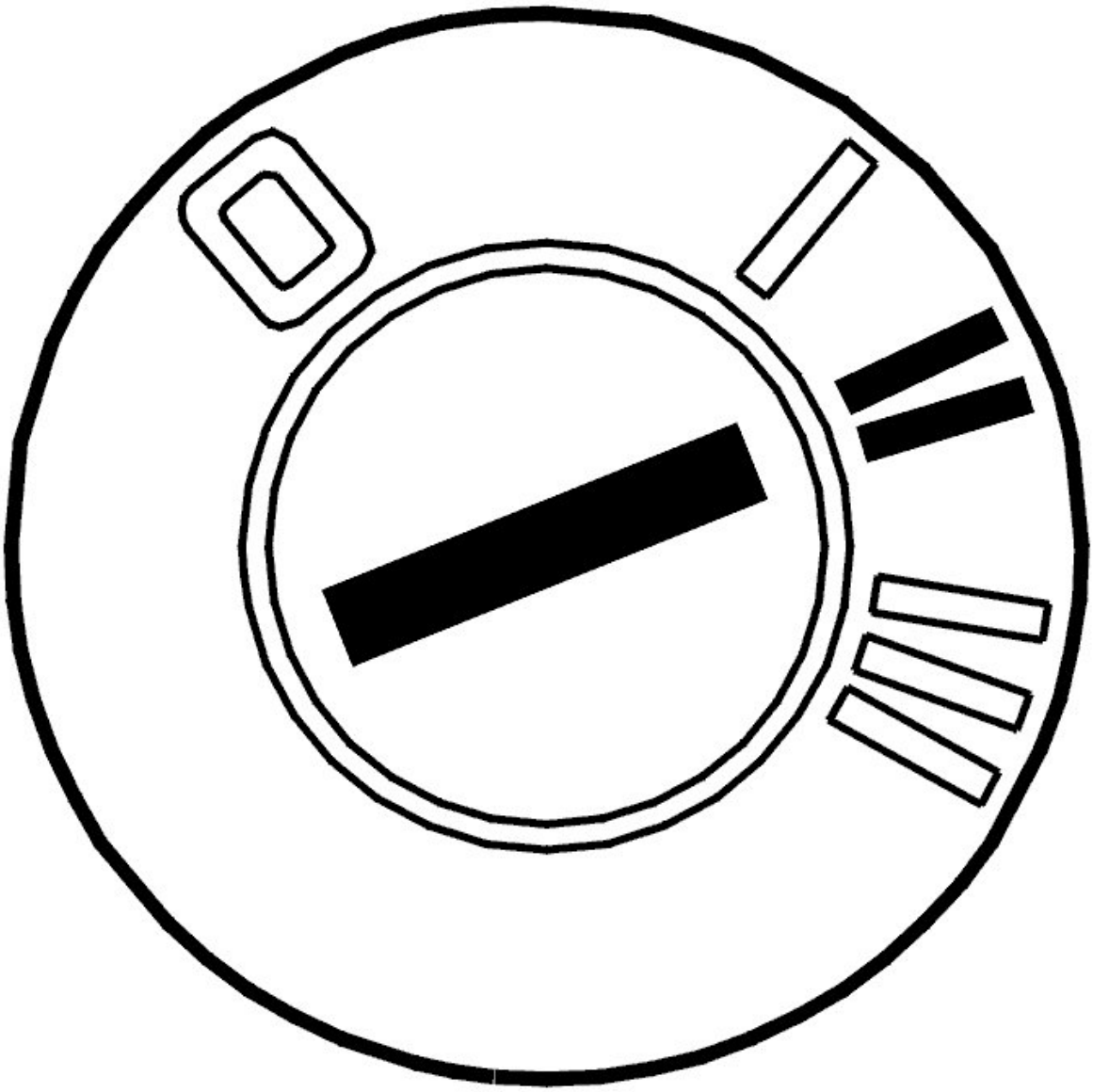
Continue - Verification

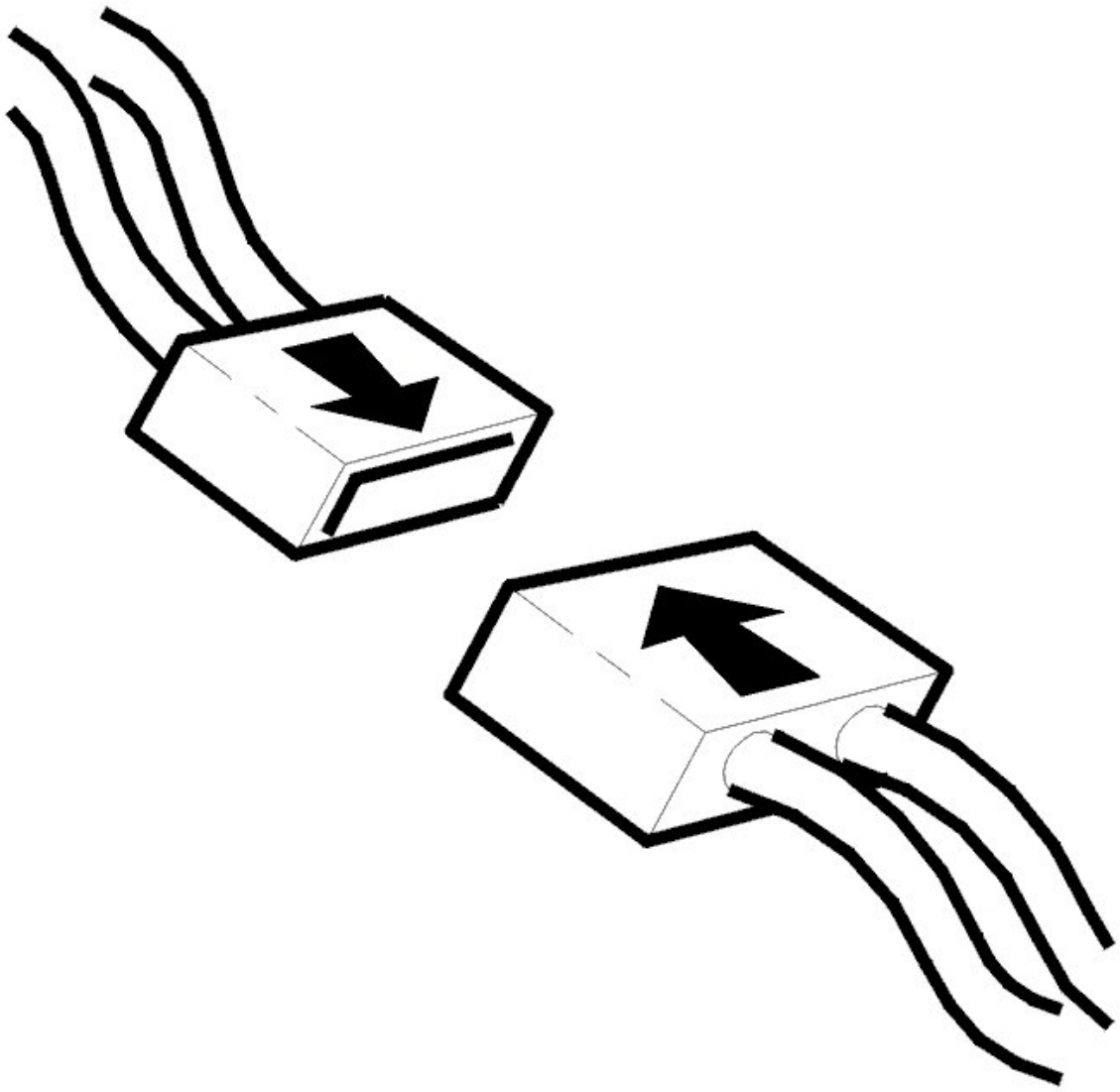
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the stop lamps.

Check that the stop lamps are working.

Are the stop lamps working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8D03

Condition

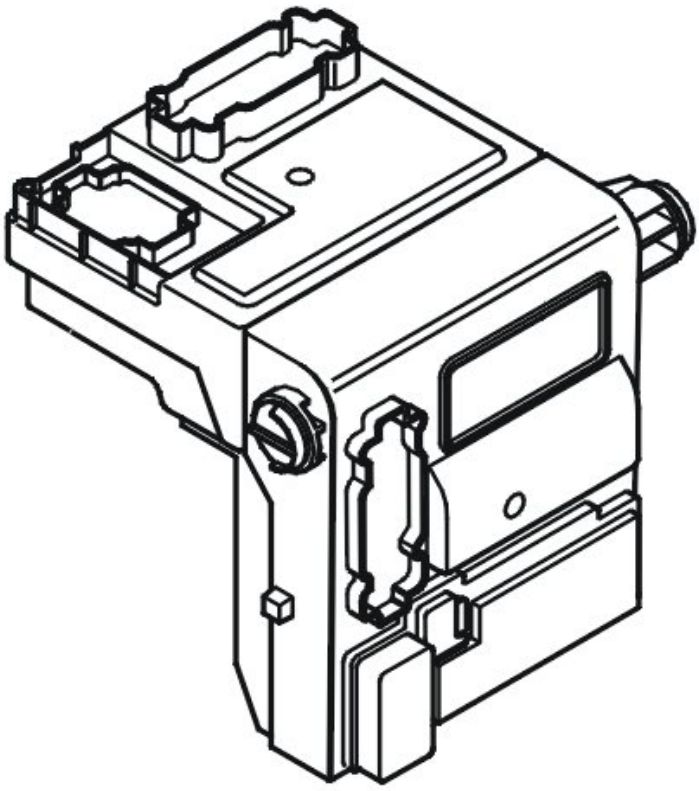
The central electronic module (CEM) checks the signal from the stop lamp switch.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- Brake light is activated when Engine control module (ECM) informs that brake pedal is not depressed, and no internal error has been detected of Central electronic module (CEM).

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I and II, when HS-CAN is activated.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value

- None.

Possible source
- Internal error in brake light switch or leads.

Fault symptom[s]
- Cruise control/Does not engage
- Cruise control/Disengagement does not work
- Cruise control/Does not remain at set speed/disengages
- Tail light/Brake lights constantly lit

Fault-tracing

Fault-tracing

Checking stop lamp switch status

Note! The following troubleshooting shall not be performed if no symptom (acc. to trouble code information) is noticed on the vehicle. Then the diagnostic trouble code shall be erased instead.

This diagnostic trouble code indicates that there is a defect in the brake light switch or the leads to the same.
Brake light switch is a switch that controls when the brake lights shall be activated/not activated.
Troubleshoot according to:
1. Check the brake light switch connector for contact resistance and oxidation.
2. Check that the brake light switch is supplied with voltage.
3. Check leads between Central electronic module (CEM) and brake light switch.
If no defect is detected, replace brake light switch.
Remedy as necessary.

Other information
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - DONE

Attempt New Test - Checking stop lamp switch status

Diagnostic Trouble Code (DTC) Information

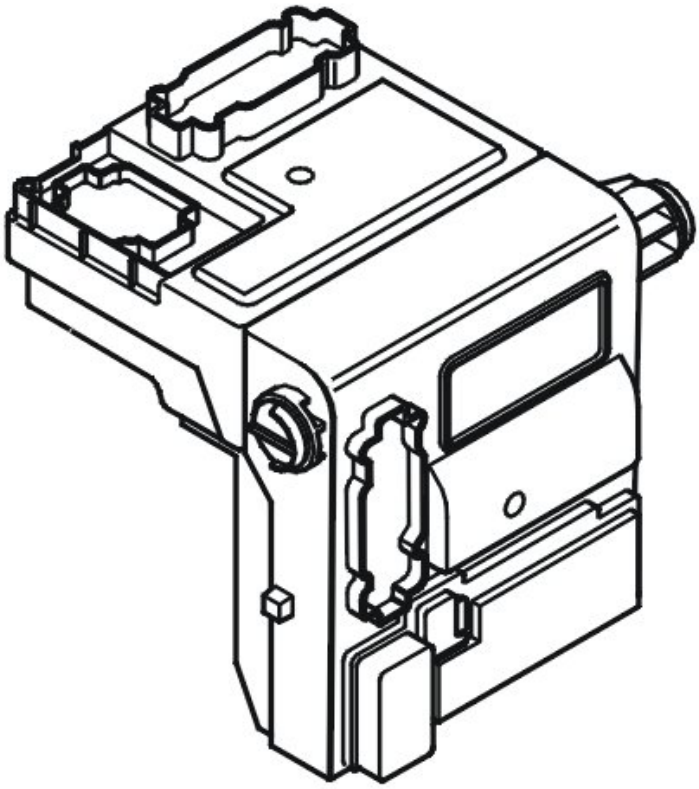
Diagnostic trouble code (DTC) information CEM-8D04

Condition

The central electronic module (CEM) checks the signal from the stop lamp switch.
The diagnostic trouble code (DTC) is stored if the control module detects that:
- Brake light is activated when Engine control module (ECM) informs that brake pedal is not depressed, and Central electronic module (CEM)

detects abnormal current to brake light.
The control module's test for the diagnostic trouble code (DTC) starts in the event of:
- Ignition position I and II, when HS-CAN is activated.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

Possible source
- Internal fault in the central electronic module (CEM).

Fault symptom[s]
- Tail light/Brake lights constantly lit

Fault-tracing

Fault-tracing

Replacing a component

The component has registered an internal fault.
Troubleshoot according to:
1. Check the brake light switch connector for contact resistance and oxidation.
2. Check that the brake light switch is supplied with voltage.
3. Check leads between Central electronic module (CEM) and brake light switch.
If no defect is found and the brake light is on constantly, change Central electronic module (CEM).

Note! Central electronic module (CEM) shall not be replaced if the brake lights work correctly. Then the diagnostic trouble code shall be erased instead.

Remedy as necessary.

Other information
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

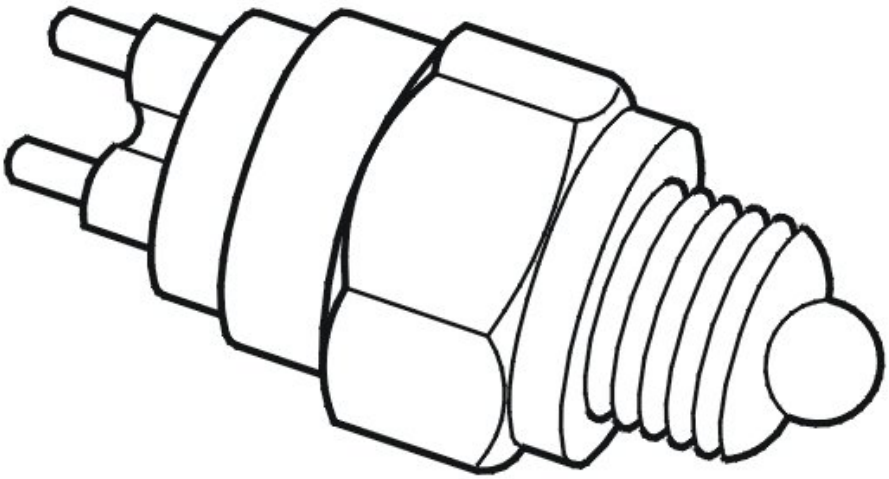
FAULT FOUND - DONE

Attempt New Test - Replacing a component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8E01

Condition



The central electronic module (CEM) checks the back-up (reversing) lamp switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal in the circuit for the back-up (reversing) lamp switch is too low when gears 1 to 5 are selected and vehicle speed is above 80 km/h.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

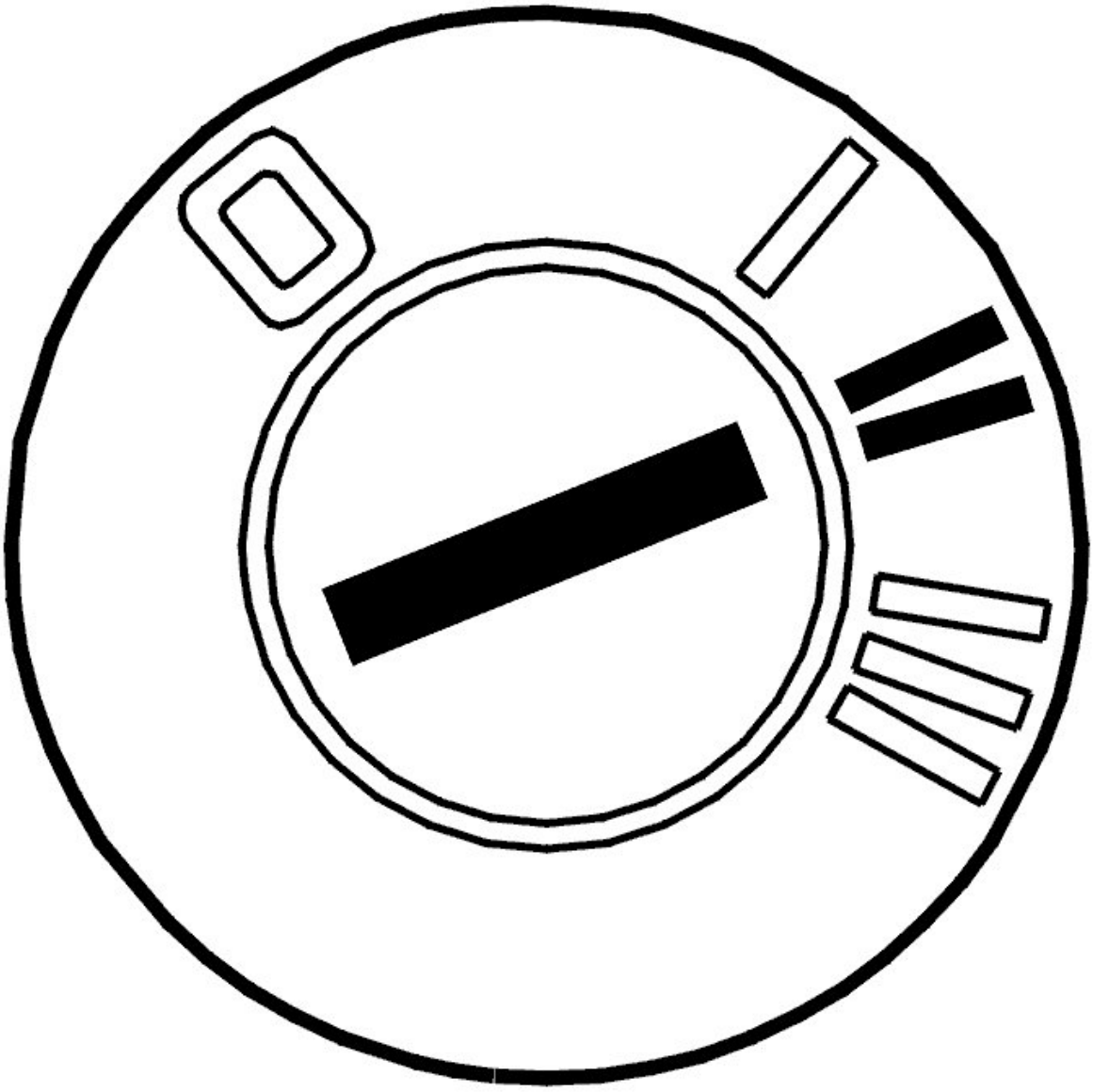
Possible source
- Damaged back-up (reversing) lamp switch
- Short-circuit to ground in the cable from the back-up (reversing) lamp switch.

Fault symptom[s]
- The back-up (reversing) lamp is constantly lit.

Faulty Signal

Faulty signal

Checking the component



- Ignition on.

Check that the back-up (reversing) lamp is only lit when back-up (reverse) gear is engaged.

Was a fault detected?

Yes - Checking components and wiring

No - Checking components and wiring

Checking components and wiring

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Check the cable between the central electronic module (CEM) and the back-up (reversing) lamp switch. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #C34 (34) and back-up (reversing) lamp switch terminal #1 (3/10).

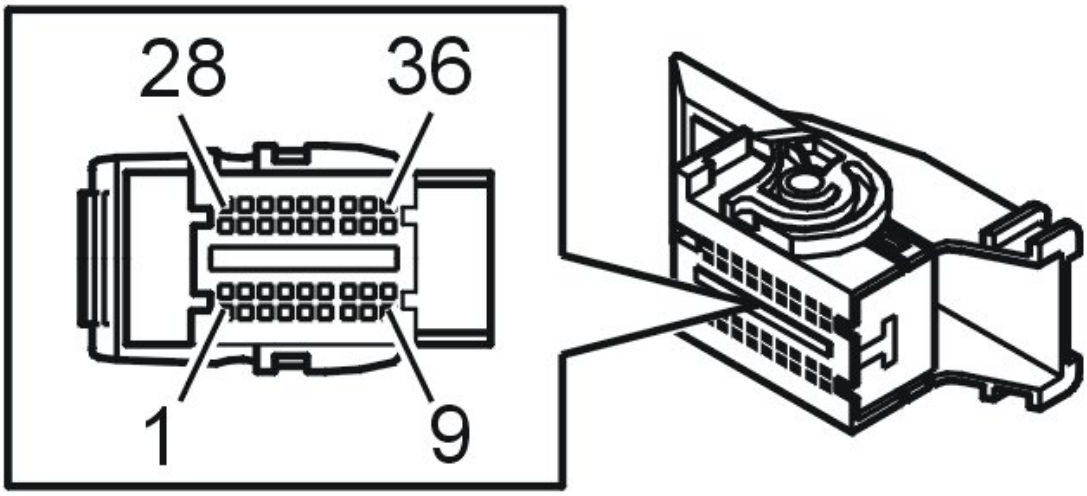
Measure the resistance between back-up (reversing) lamp switch terminals #1 and #2 with gears 1 to 5 engaged. The resistance must be high.

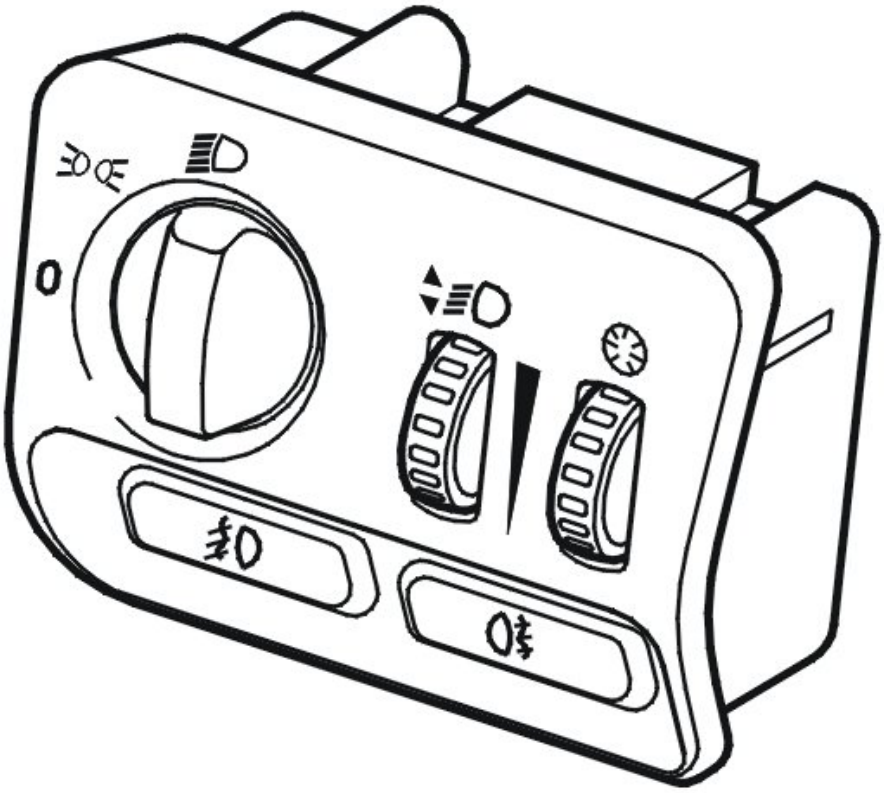
Hint: The back-up (reverse) gear switch should be open in all gear positions except back-up (reverse).

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Back-up lamp switch, replacing See: Lighting and Horns/Backup Lamp/Backup Lamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





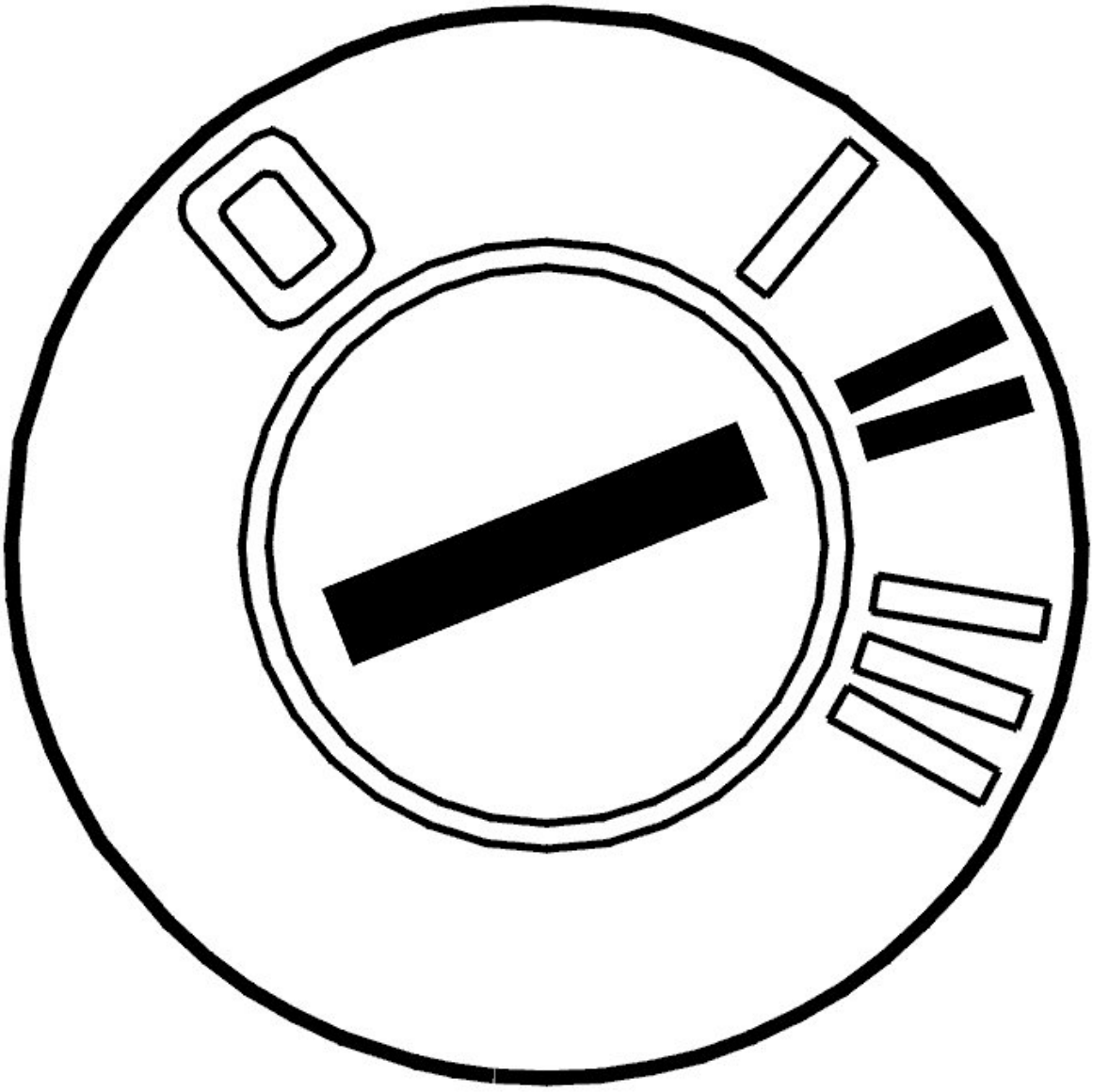
Continue - Verification

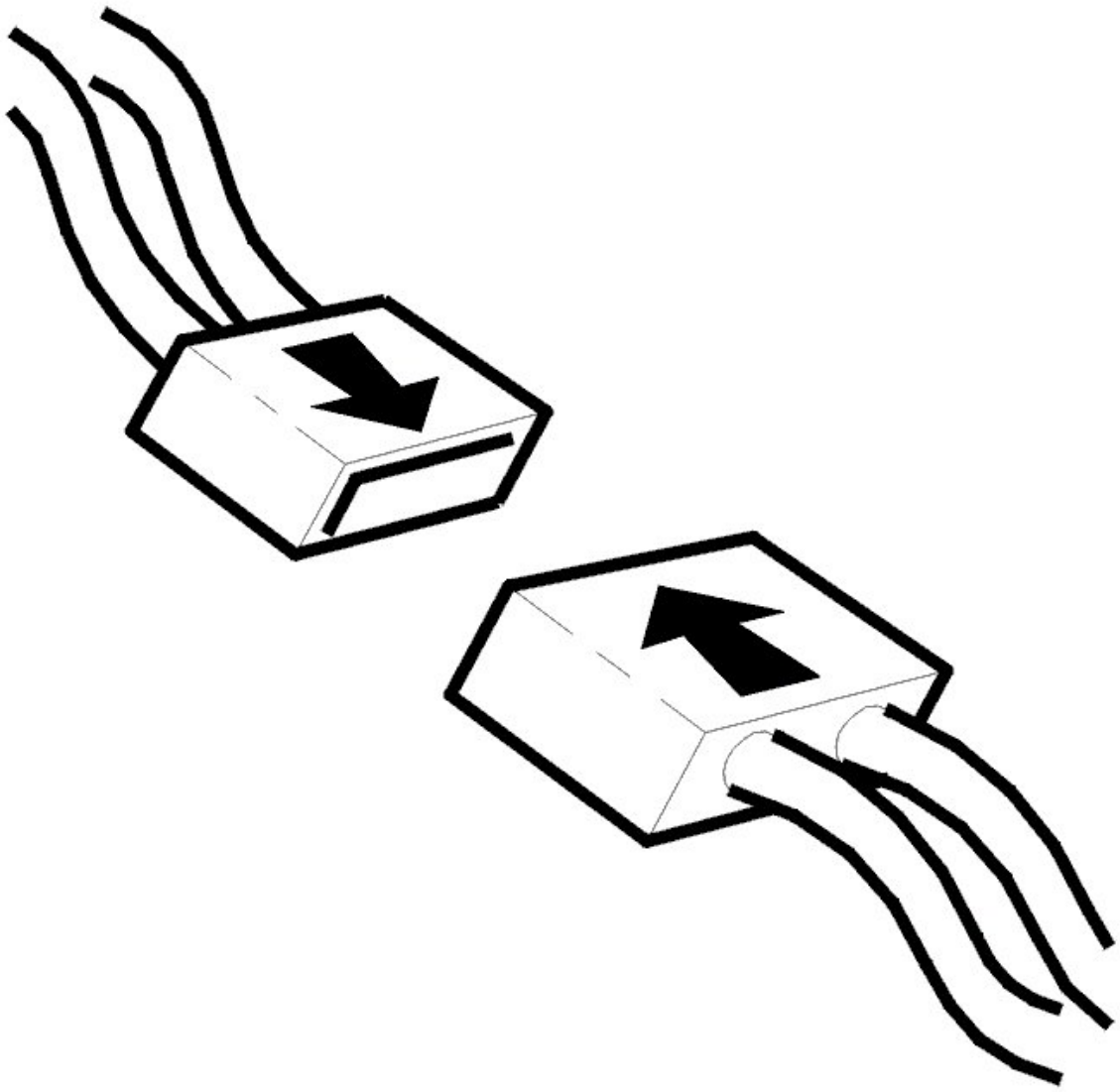
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

The back-up (reversing) lamp should not light with gears 1 to 5 engaged.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking the component

Checking components and wiring

Check central electronic module (CEM) connector C. Check for contact resistance and oxidation. Check for damage in particular.
Check the connector on the back-up (reversing) lamp switch. Check for contact resistance and oxidation. Check for damage in particular.
Check the cable between the central electronic module (CEM) and the back-up (reversing) lamp switch. Check for an open-circuit. Check for an intermittent short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #C34 (34) and back-up (reversing) lamp switch terminal #1 (3/10).

Other information

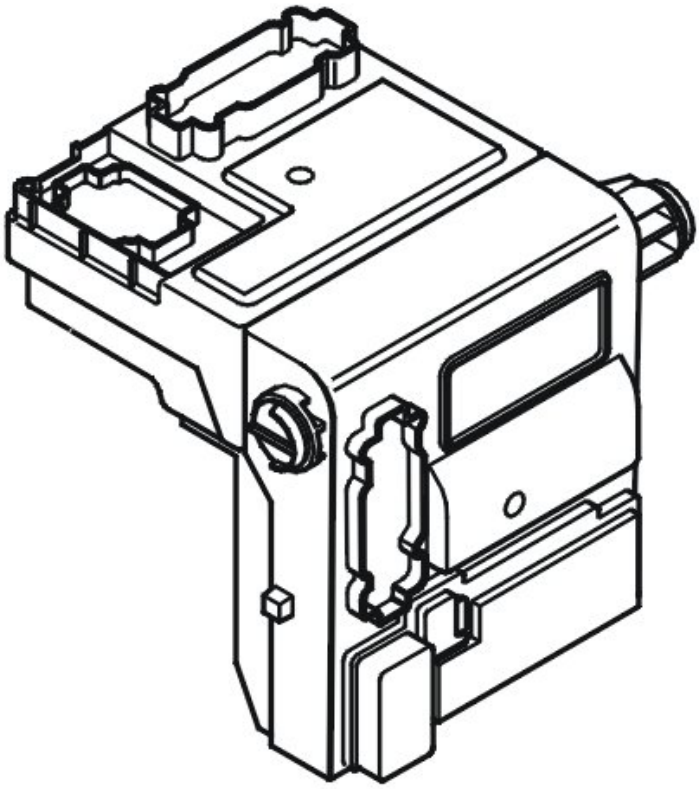
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Back-up lamp switch, replacing See: Lighting and Horns/Backup Lamp/Backup Lamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8FF0

Condition



The central electronic module (CEM) checks the signal from the rain sensor button.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the rain sensor button has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The rain sensor button has jammed in the pressed in position
- Damaged rain sensor button.

Fault symptom[s]
- No rain sensor function.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

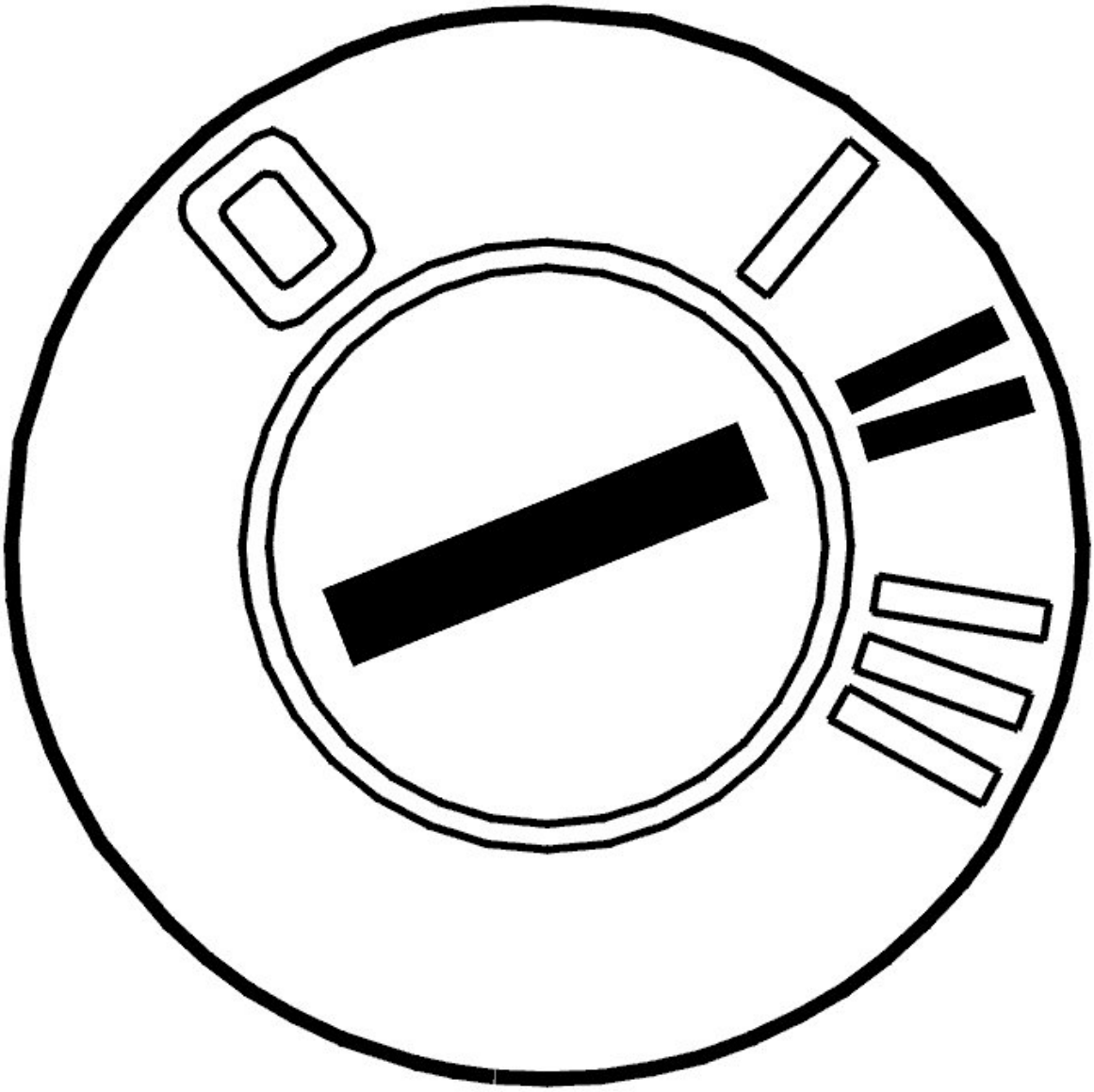
Continue - Verification

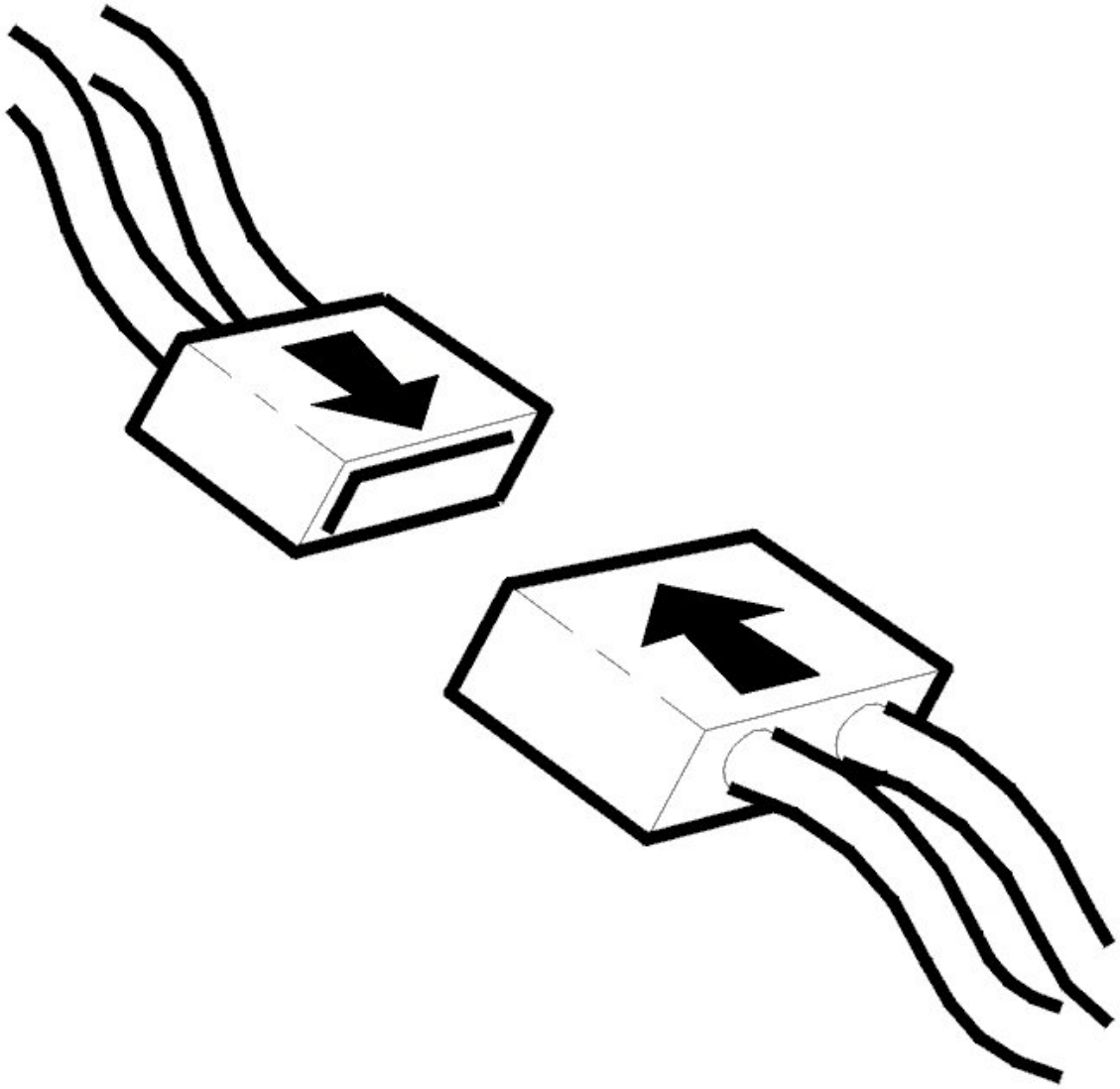
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

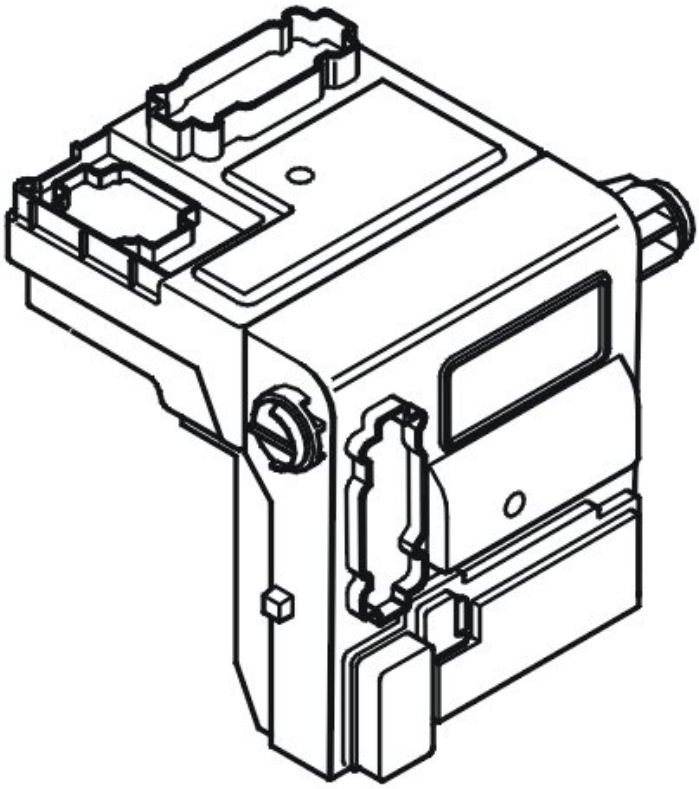
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8FF1

Condition



The central electronic module (CEM) checks the signal from the LED in the rain sensor button.
A diagnostic trouble code will be generated if the central electronic module (CEM) registers a signal from the LED in the rain sensor button that is too low.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Nothing.

Possible source
- LED in rain sensor button short-circuited to ground.

Fault symptom[s]
- The LED does not come on.

Signal Too Low

Signal too low

Replacing the component

A diagnostic trouble code will be generated if the LED in the rain sensor button is shorted to ground.
If the fault is intermittent it will have been registered earlier but no longer exists. Intermittent faults could be due to interference on starting up or to another type of fault than recurs at different times. The seriousness of the fault is determined from case to case.
Remedy as necessary.

Other information

Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

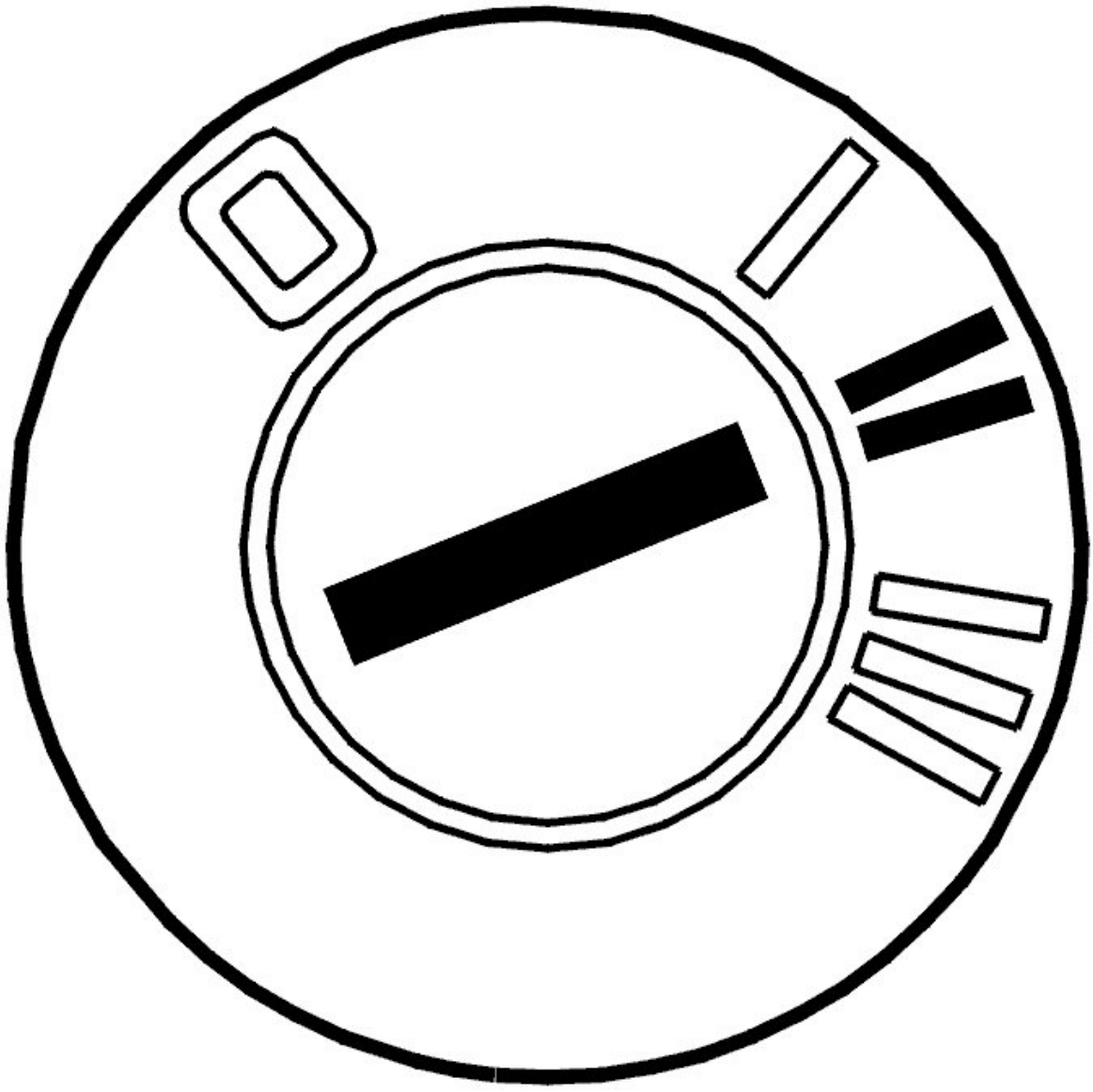
Continue - Verification

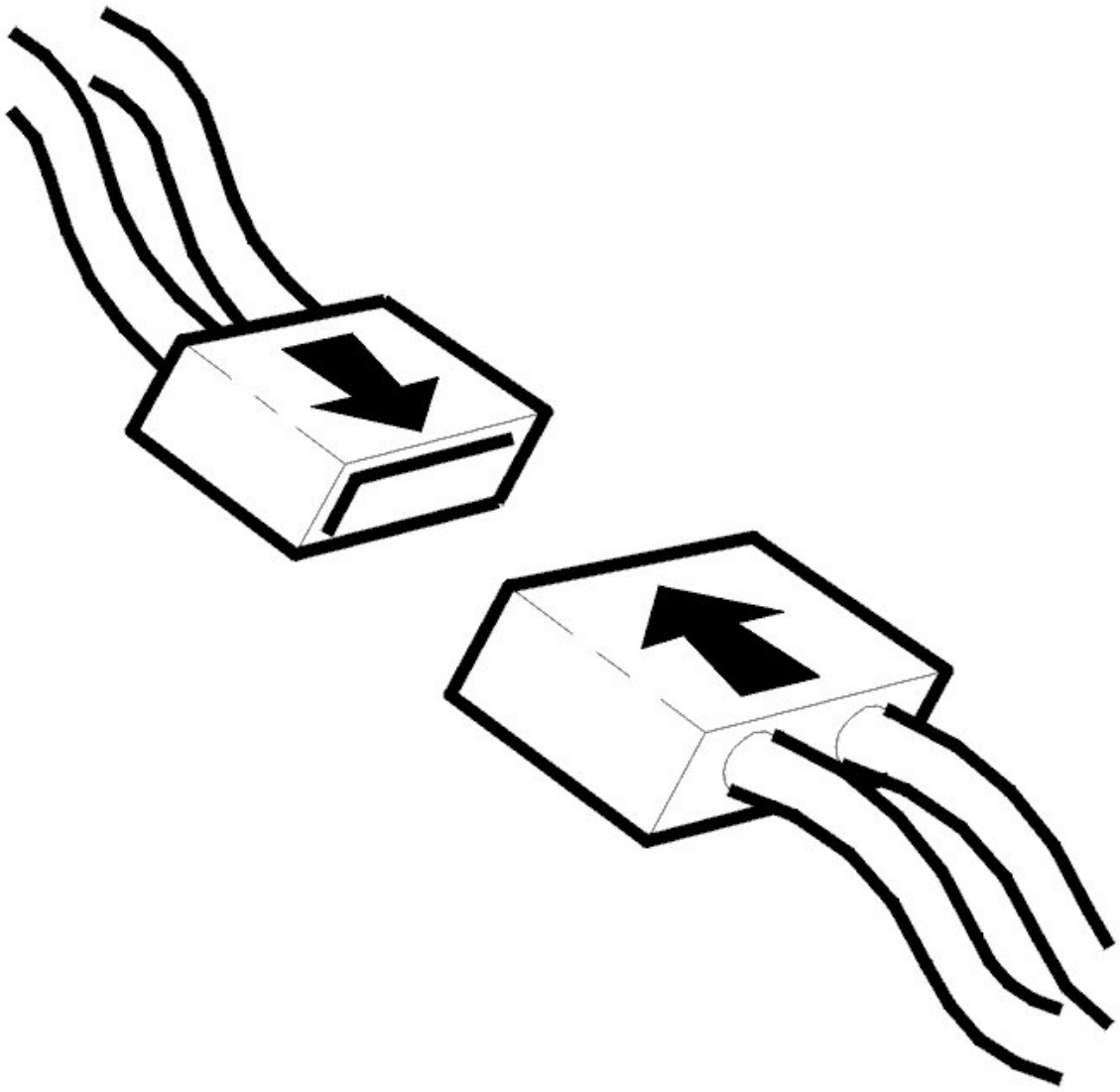
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on

Activate the rain sensor.

Hint: When the rain sensor is activated the wiper blades perform a reference sweep to determine the cleanness/condition of the windscreen. Switching off the ignition deactivates the rain sensor. To activate the rain sensor, switch on the ignition, move the lever to position 0 and then to the intermittent wipe position.

Check that the LED in the rain sensor button comes on.

Does the LED come on?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F1A

Condition

The central electronic module (CEM) checks the signal from the right-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the right-hand Xenon bulb is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

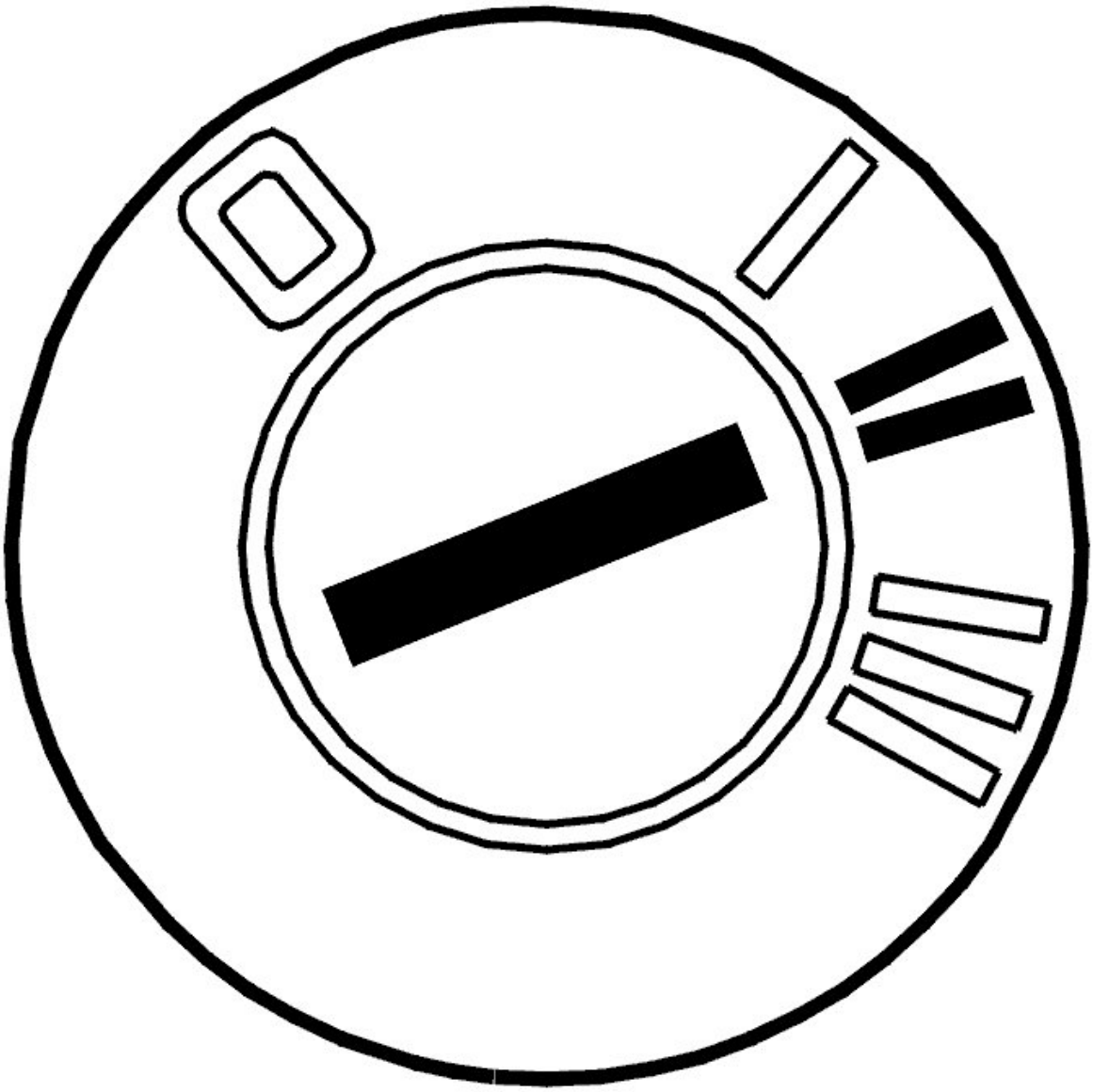
Possible source
- Short-circuit to ground in the signal cable
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Signal Too Low

Signal too low

Checking the status



- Ignition on.
- Switch between high and low beam.

If the right-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the right-hand xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the signal cable between the central electronic module (CEM) and the actuating motor in the right Xenon headlamp for short circuit to ground.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the right headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

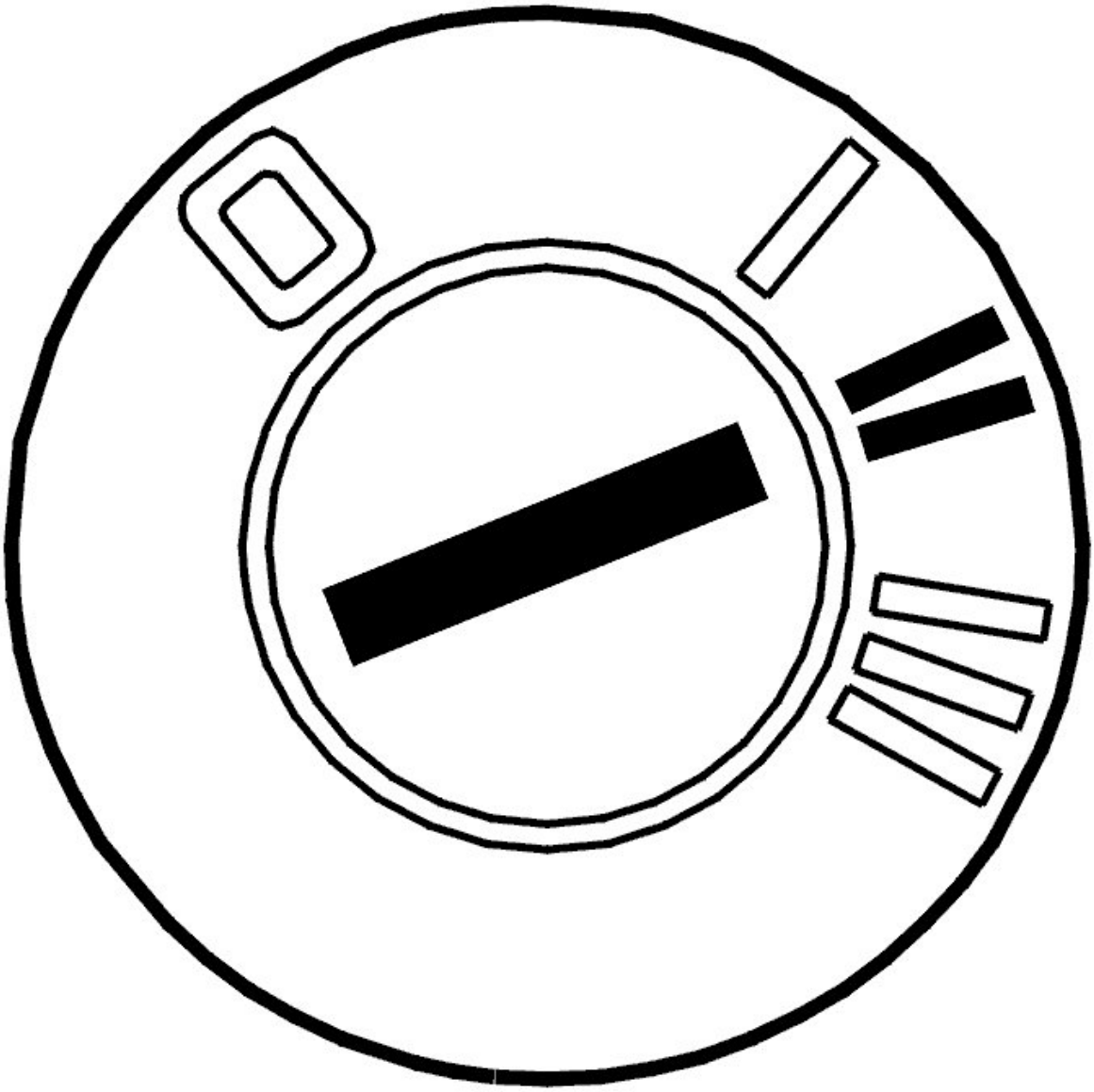
Continue - Verification

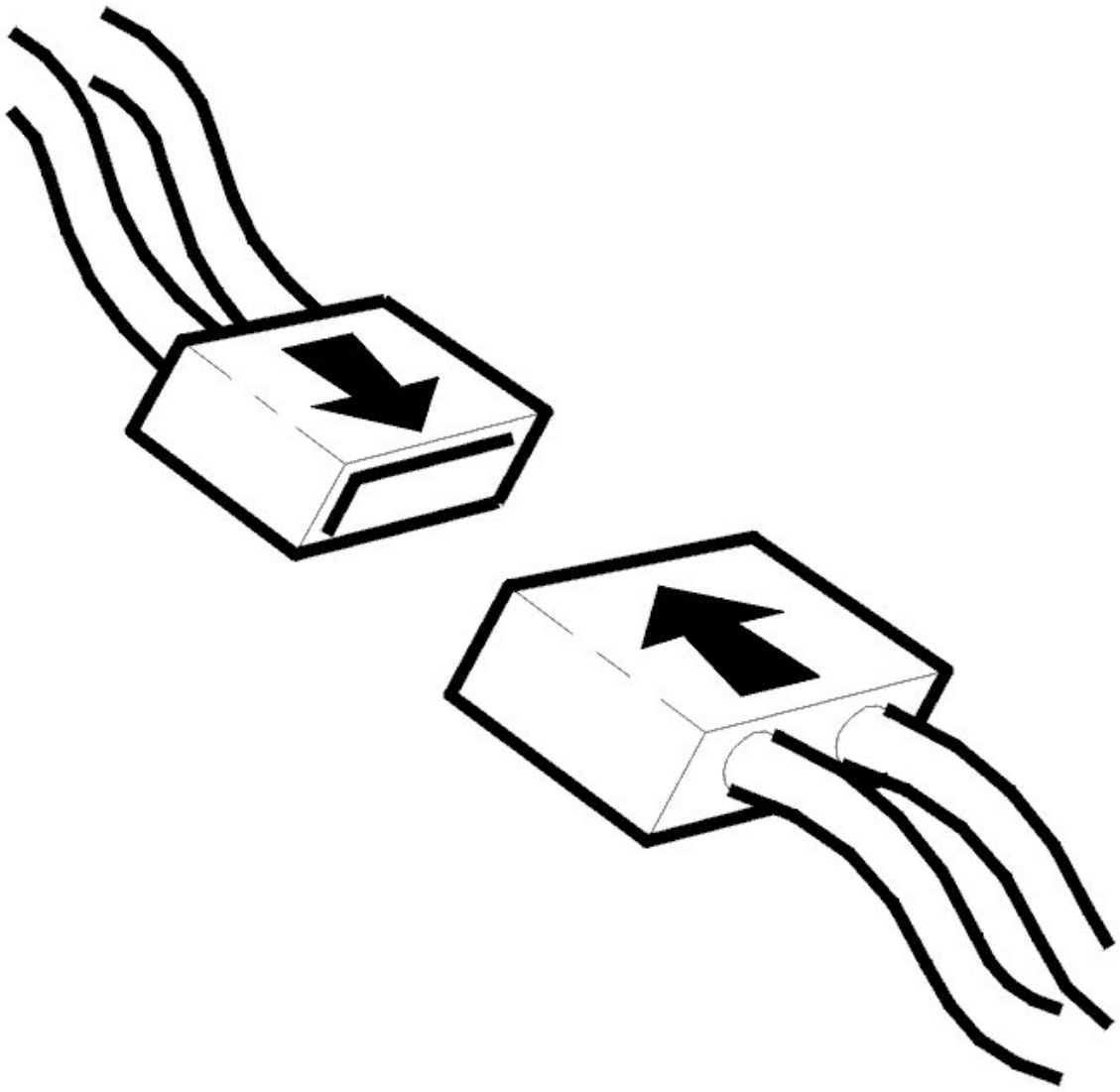
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F1B

Condition

The central electronic module (CEM) checks the signal from the right-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the right-hand Xenon bulb is faulty.
The diagnostic trouble code (DTC) can be detected when the ignition has been on for at least 10 seconds and the battery voltage is above 10.5 V.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

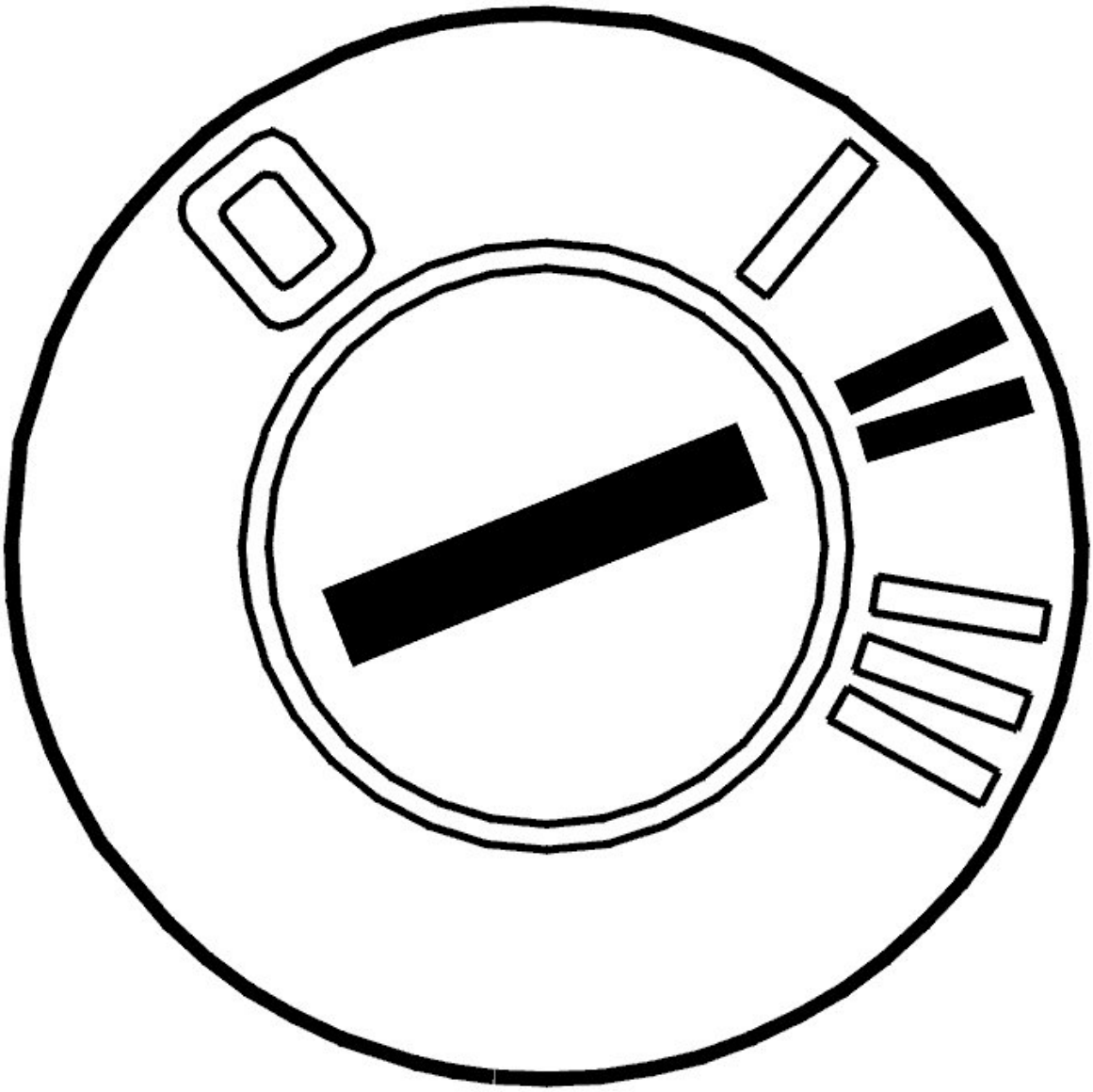
Possible source
- Damaged gas discharge lamp module (GDL).

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Faulty Signal

Faulty signal

Checking the status



- Ignition on.
- Switch between high and low beam.

If the right-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the right-hand xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the power supply and grounding point for the actuating motor in the right headlamp.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the right headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

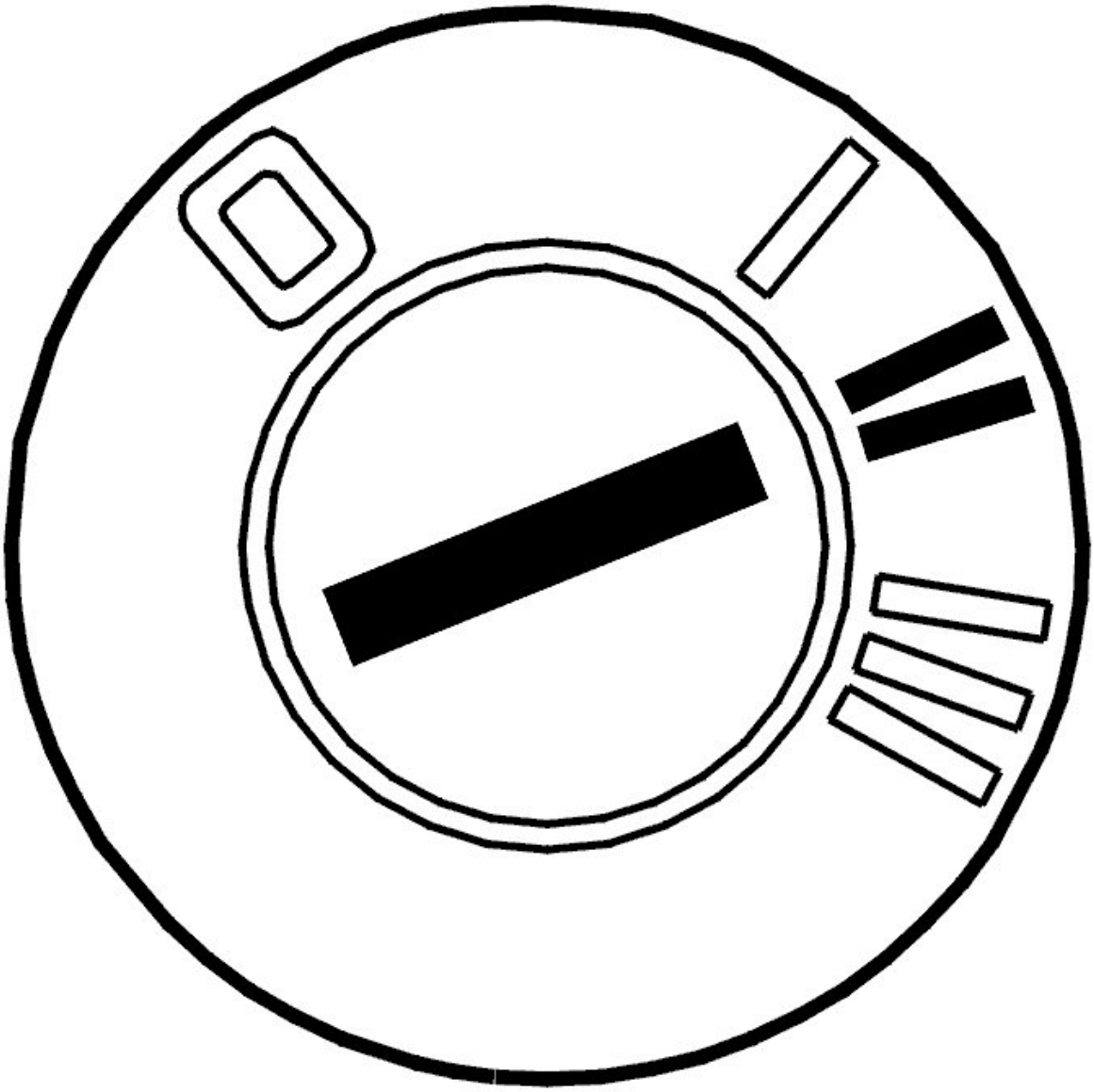
Continue - Verification

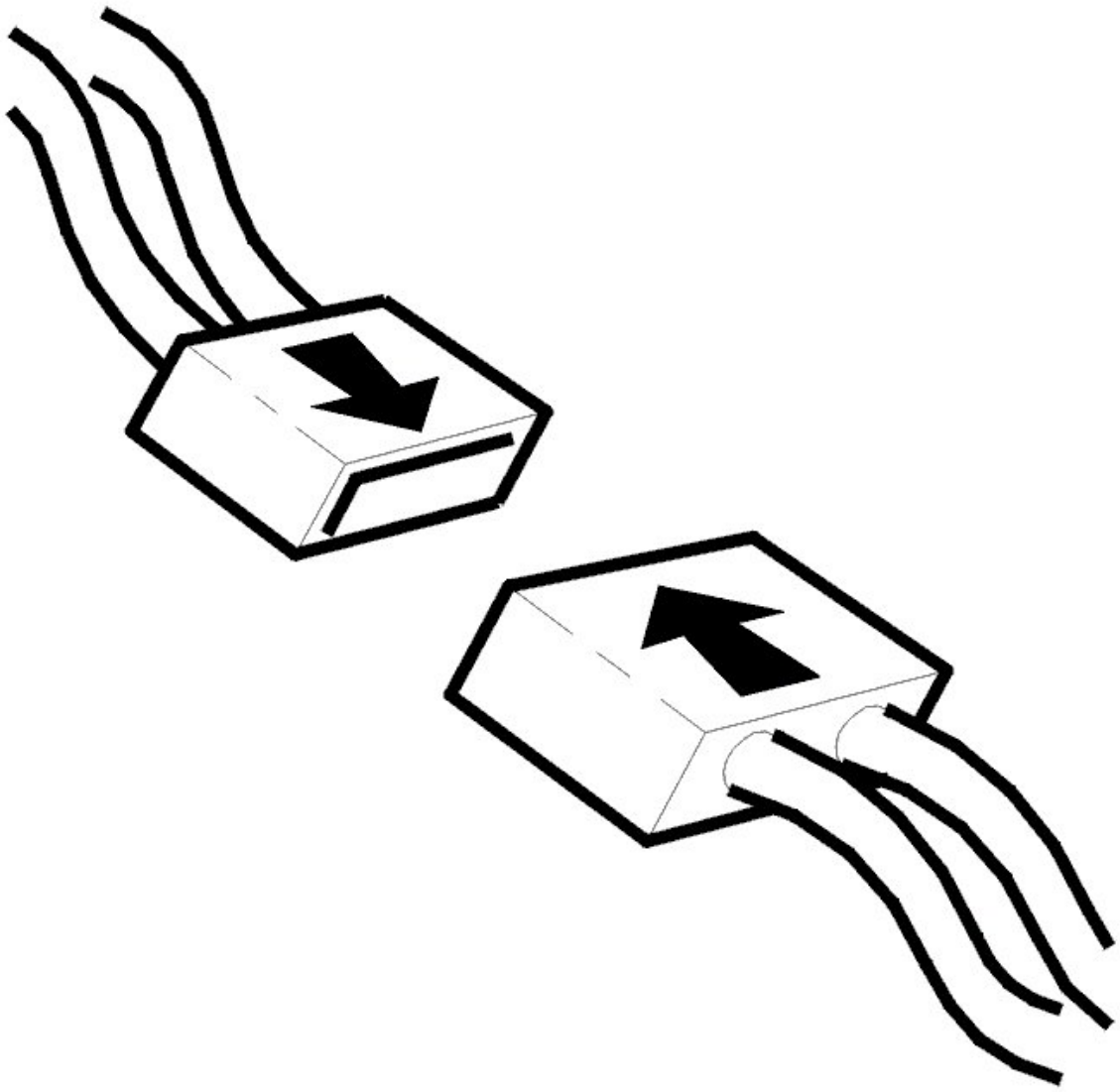
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F1C

Condition

The central electronic module (CEM) checks the signal from the right-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the right-hand Xenon bulb is too high.
The diagnostic trouble code (DTC) can be detected when the ignition has been on for at least 10 seconds and the battery voltage is above 10.5 V.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

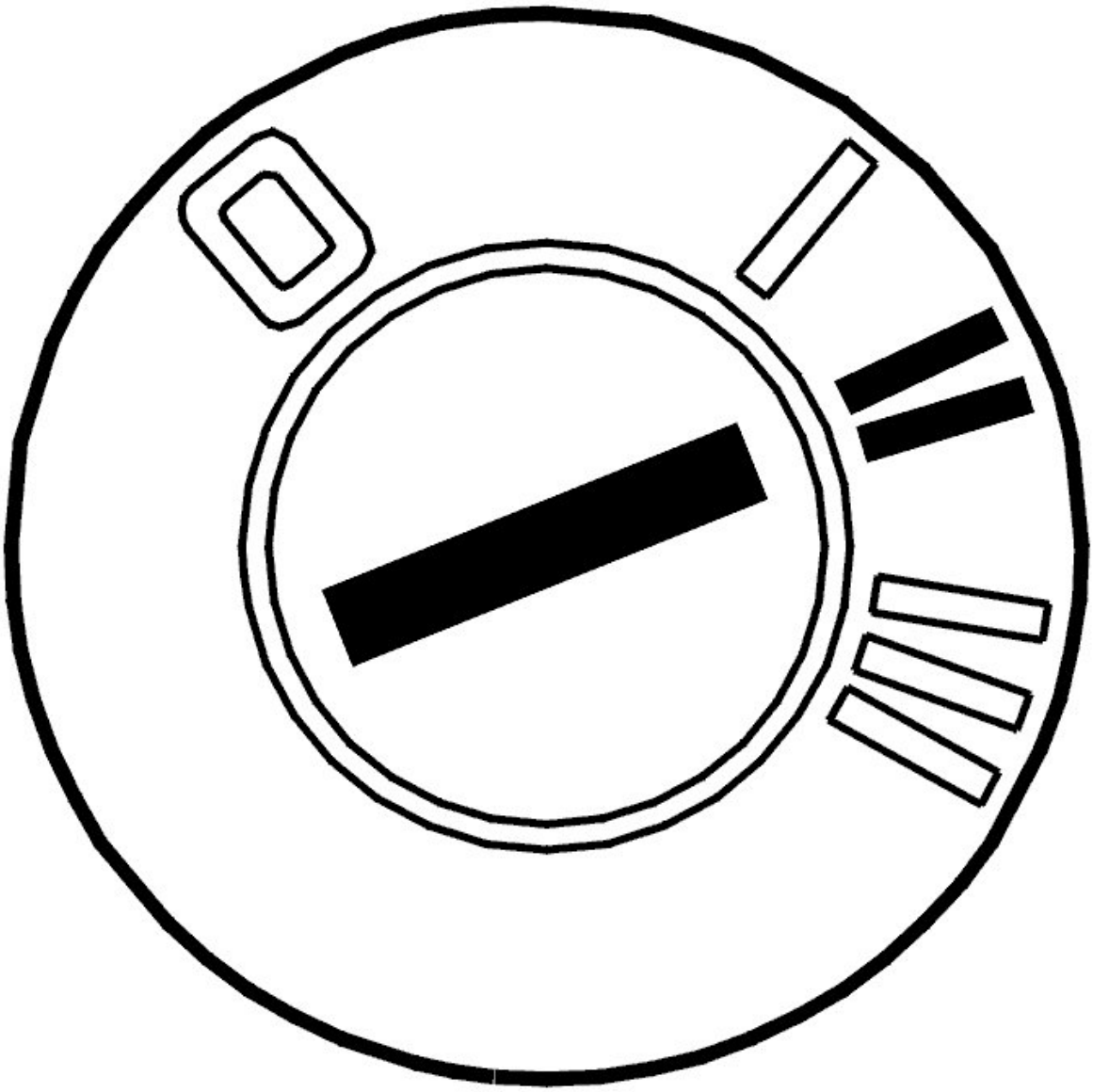
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.
- Headlights/Headlight aim is off

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking the status



- Ignition on.
- Switch between high and low beam.

If the right-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the right-hand xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the signal cable between the central electronic module (CEM) and the actuating motor in the right Xenon lamp for open circuit and short circuit to supply voltage.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the right headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

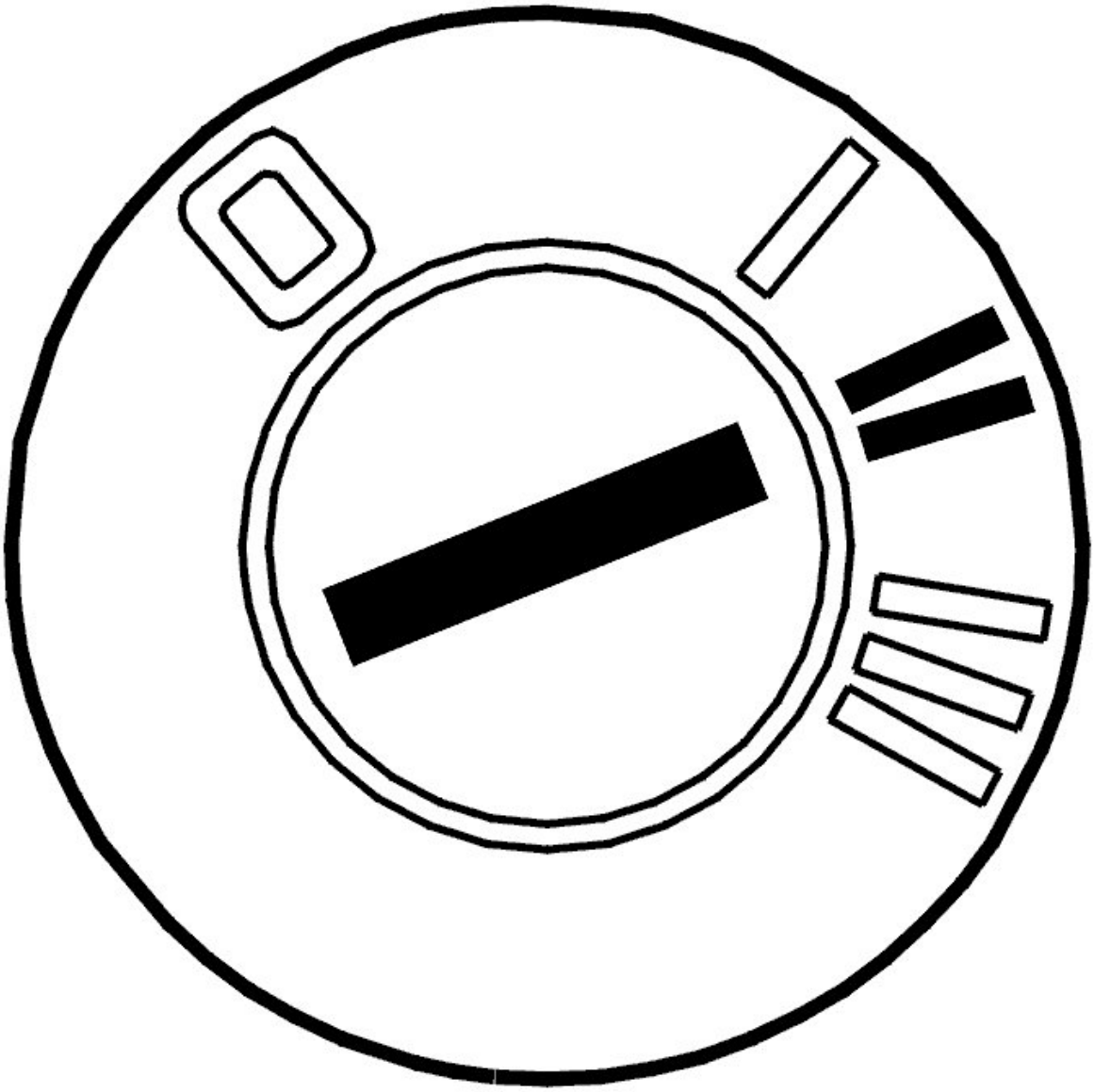
Continue - Verification

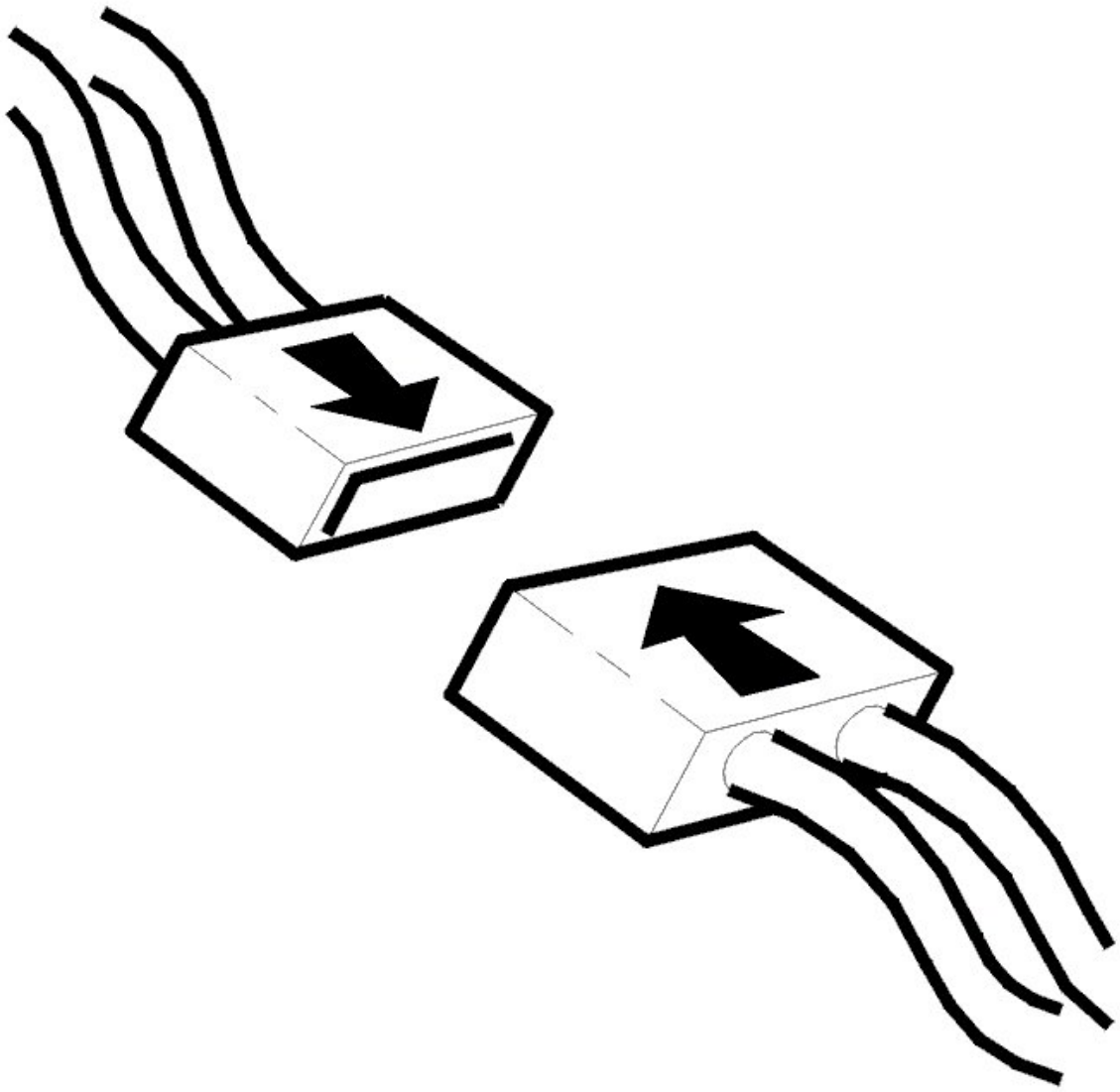
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

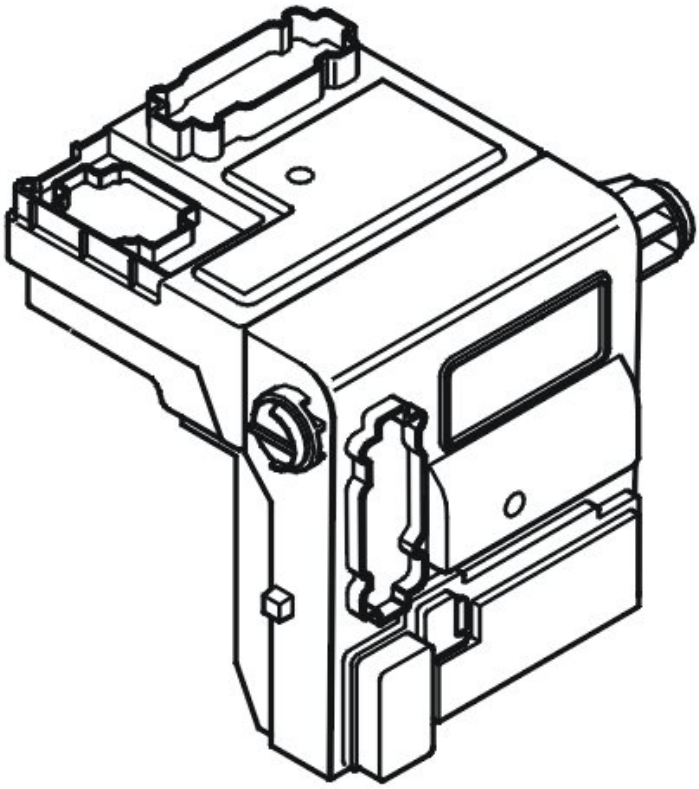
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F1D

Condition



The central electronic module (CEM) checks the voltage on the driver circuits for the 15-supply and headlamp range adjustment. This is achieved by a common re-activation of the drive circuit.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers from the re-engagement signal that there is a short-circuit to supply voltage in the output from one of the drive circuits.
The diagnostic trouble code (DTC) can be detected at ignition position 0 and I.

Substitute value
- None.

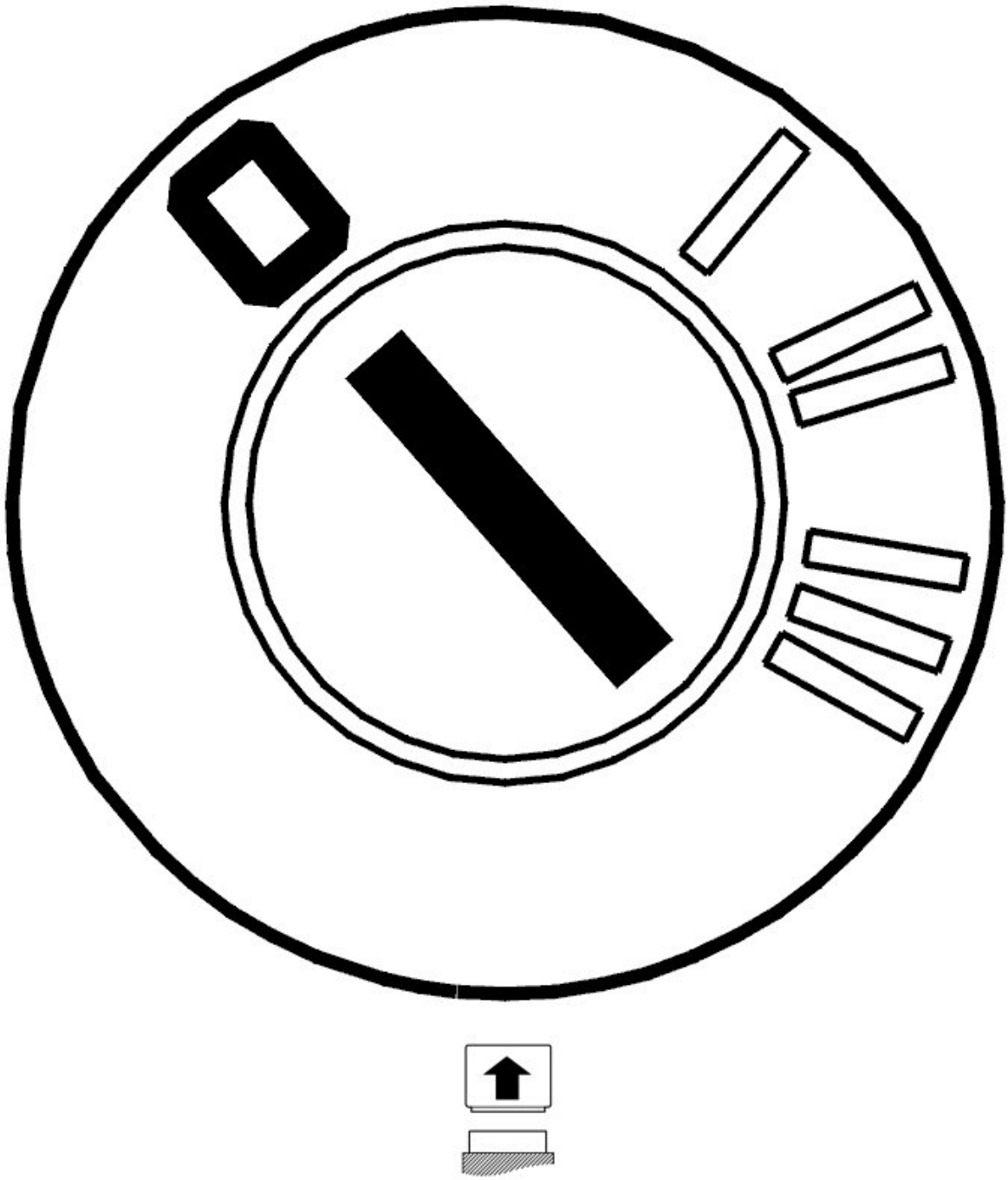
Possible source
- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]
- Beam height control does not function.
- Automatic headlamp range control is not functioning.
- Incorrect setting for low beam.

Short-circuit to Supply Voltage

Short-circuit to supply voltage

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:

- Central electronic module (CEM) terminal #C12 (#12) and left headlamp alignment motor terminal #2
- Central electronic module (CEM) terminal #C11 (#11) and right headlamp alignment motor terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

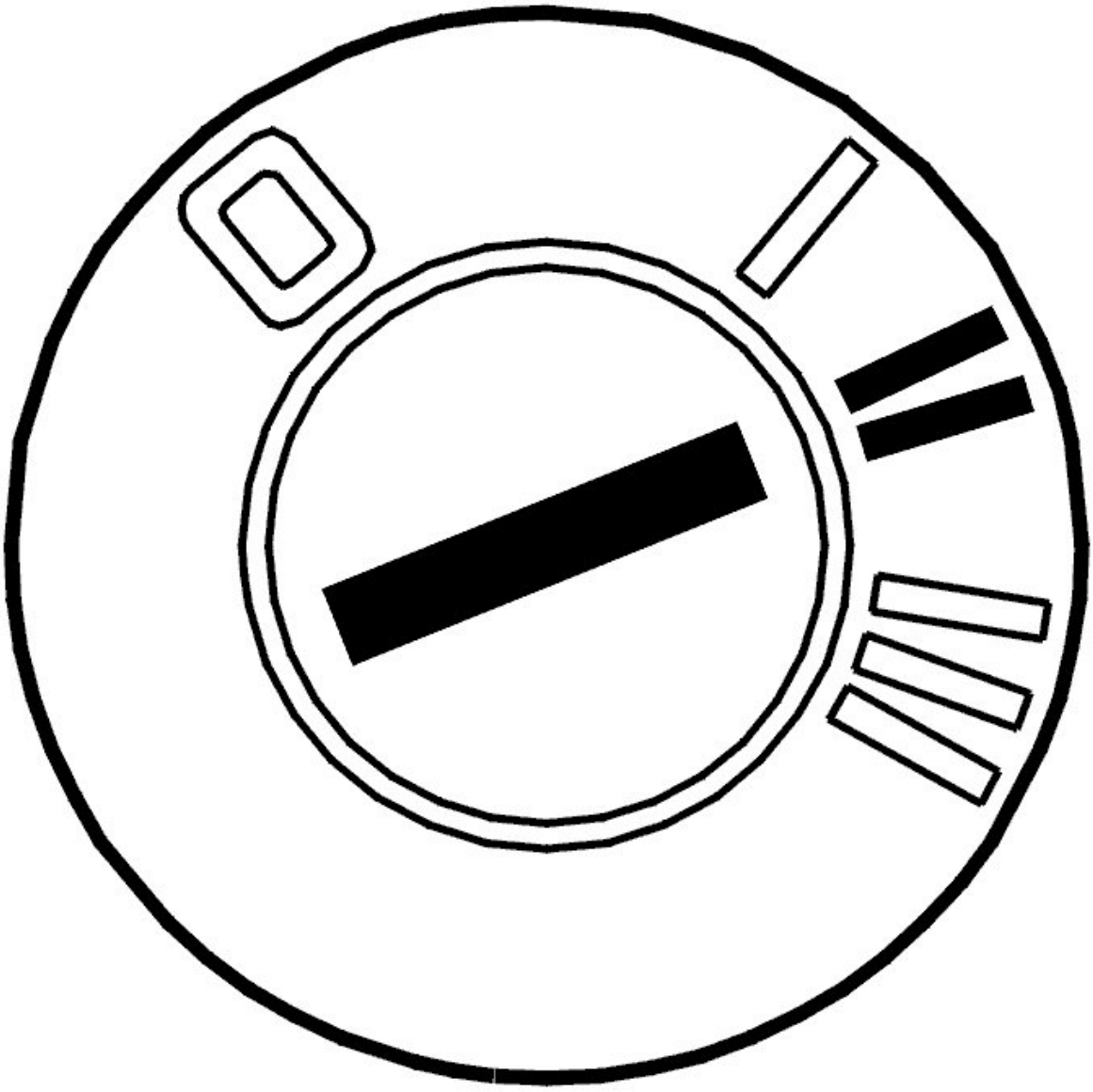
Continue - Verification

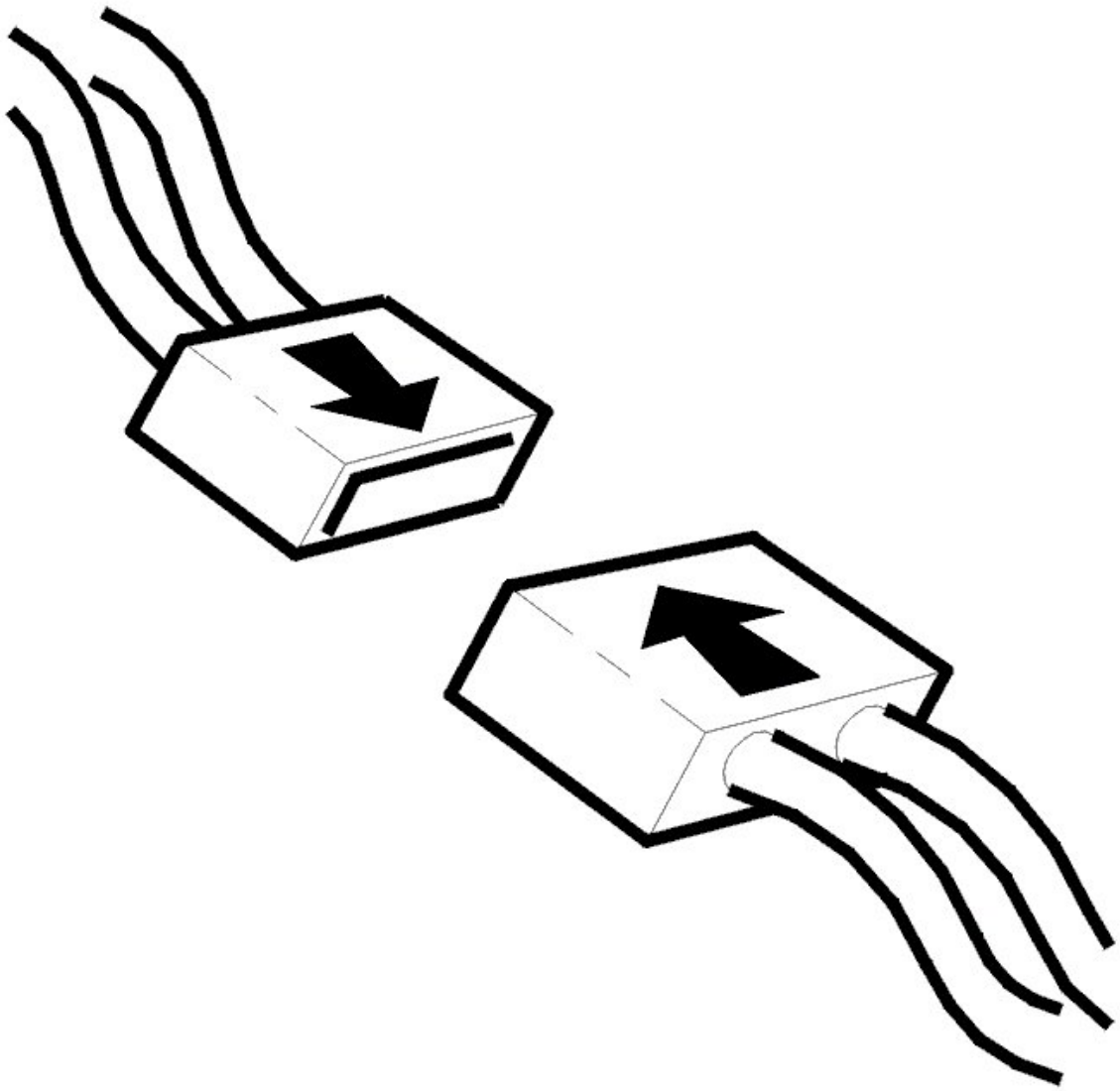
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Adjust the beam length between maximum and minimum.
Check that the beam length changes.

Does the beam length change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

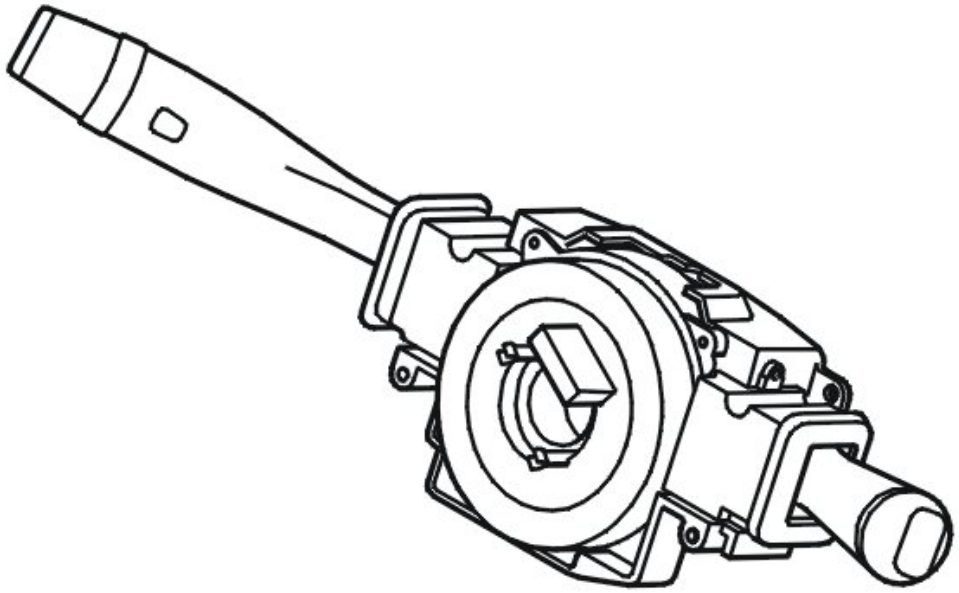
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F02

Condition



The central electronic module (CEM) checks the turn signal lamps.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that there is no signal or a low signal in the circuit for the left-hand turn signal lamp.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

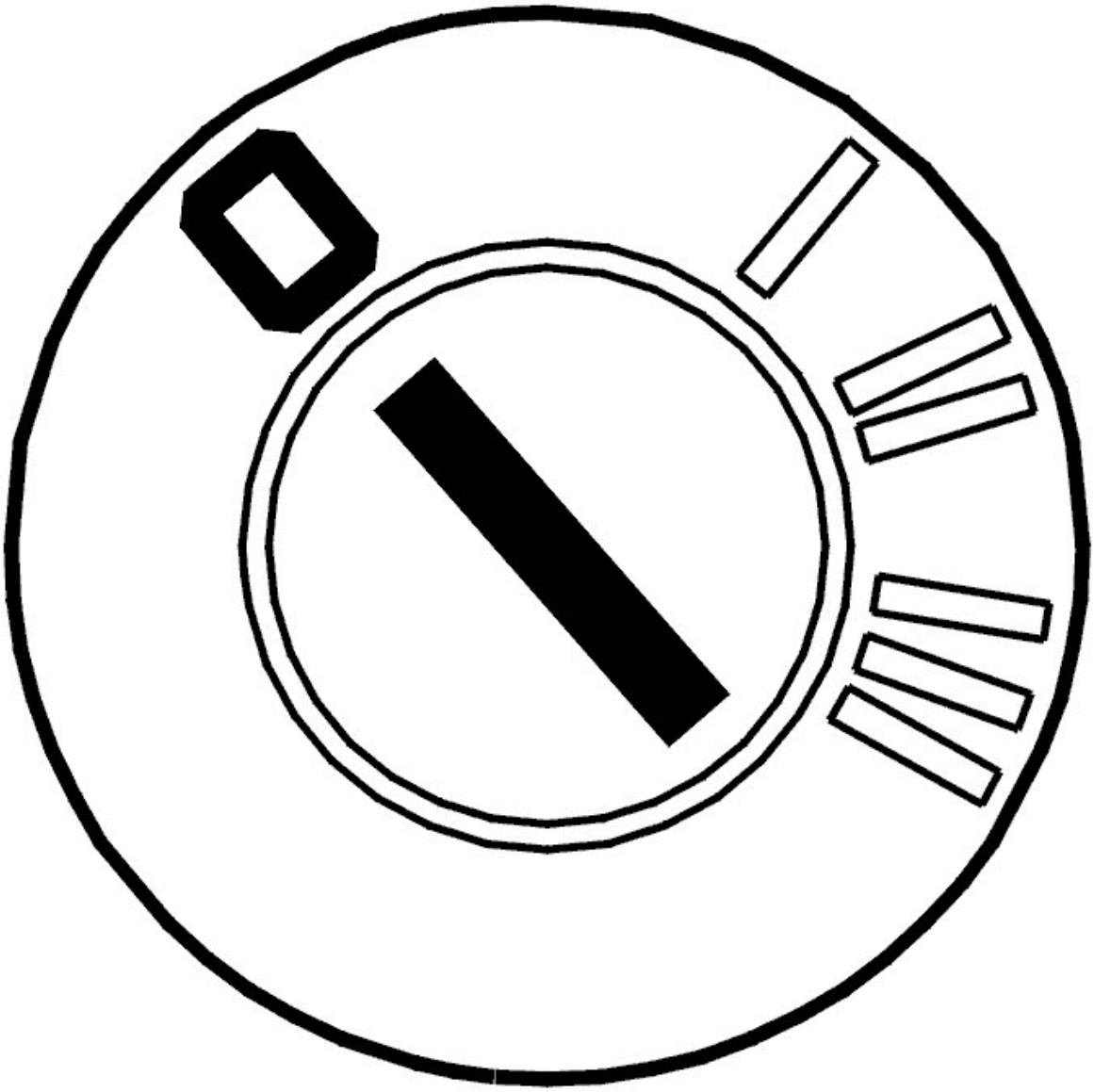
Possible source
- Short-circuit to ground in the circuit for the left-hand turn signal lamp
- Open-circuit in the circuit for the left-hand turn signal lamp.

Fault symptom[s]
- The turn signal lamps do not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off.

Check the cable between the central electronic module (CEM) and the left-hand turn signal lamps. Check for an open-circuit. Check for a short-circuit to ground.
Also check the intermediate connectors.

For S60 and V70

Take readings between:

- Central electronic module (CEM) terminal #B31 (#31) and left front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B31 (#31) and left turn signal lamp terminal #1.

For S80

Take readings between:

- Central electronic module (CEM) terminal #B31 and left front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B31 and left turn signal lamp terminal #2.

For the XC90

Take readings between:

- Central electronic module (CEM) terminal #A12 (#12) and left front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B31 (#31) and left turn signal lamp terminal #1.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

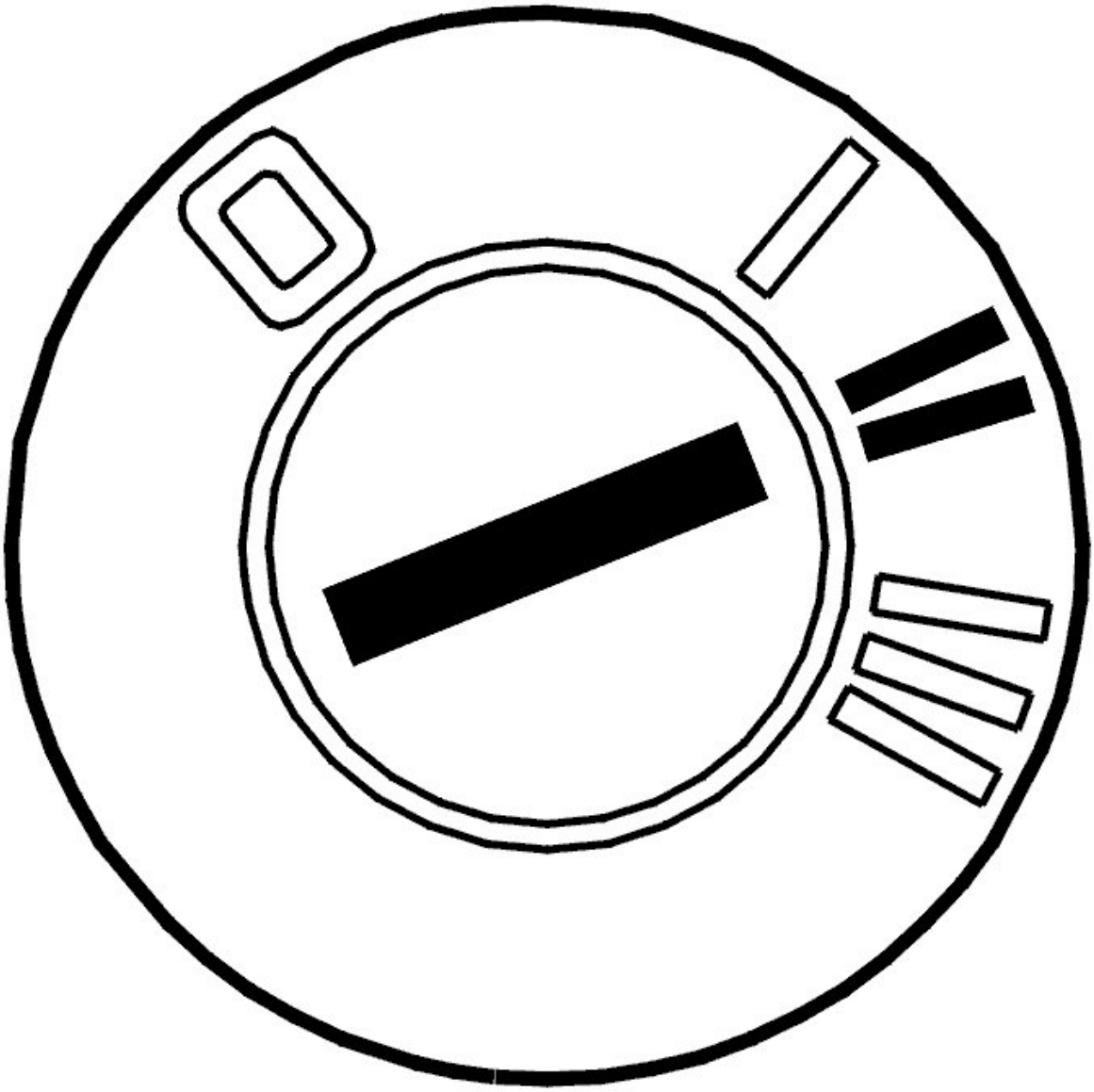
Continue - Verification

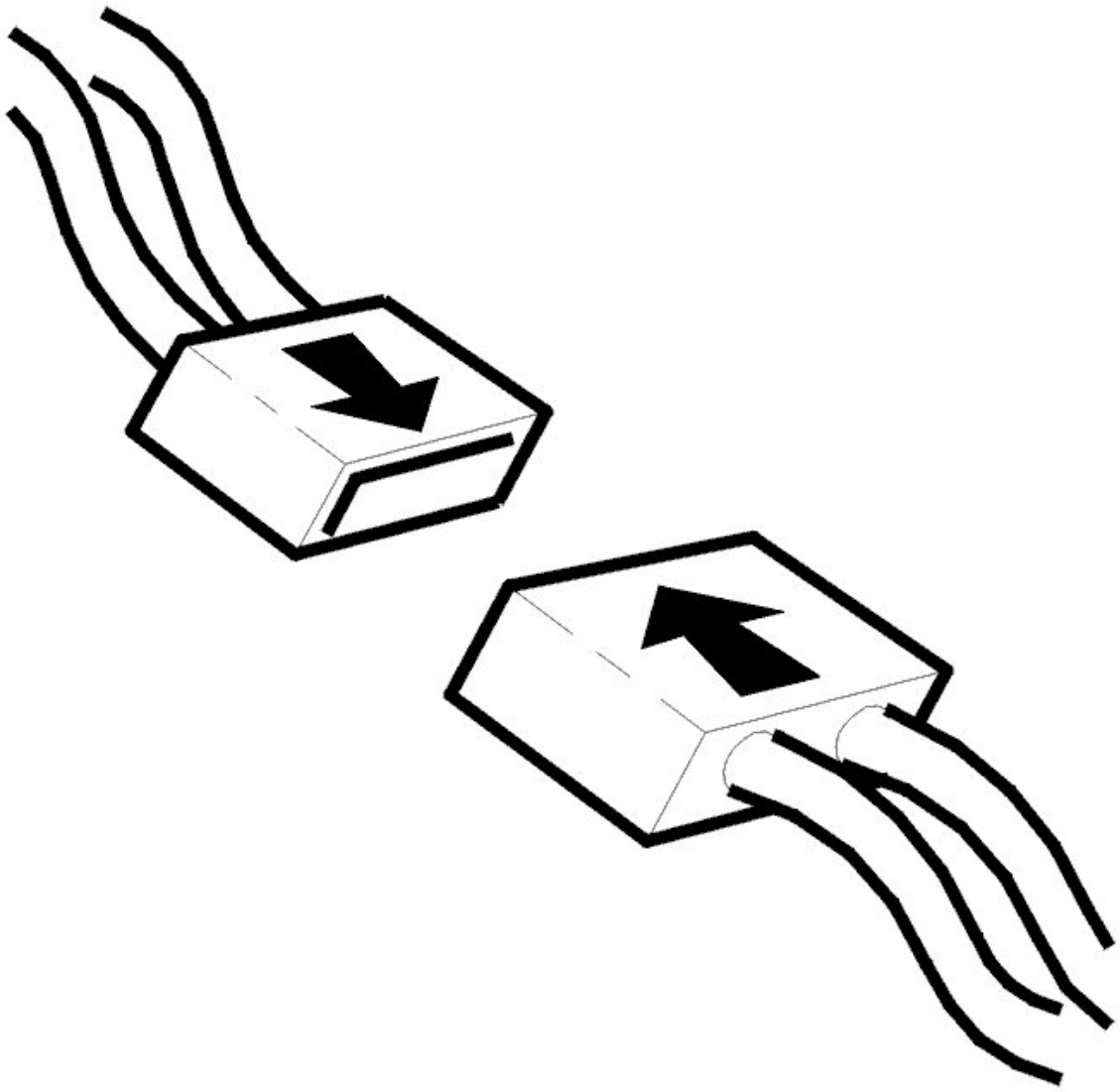
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the turn signal lamps.
Check that the turn signal lamps are activated.

Are the turn signal lamps activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

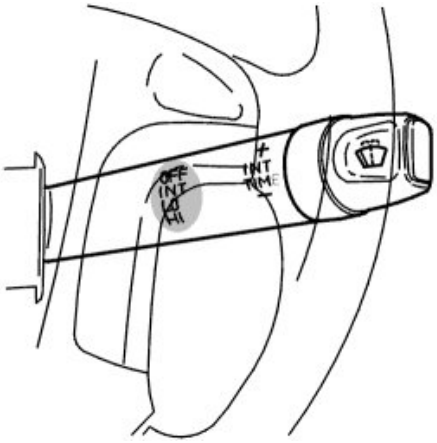
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F2C

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the windshield wiper is in "parking position" for longer than 5 seconds and the steering wheel module (SWM) indicates that the windshield wiper should be activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged windshield wiper motor
- Short-circuit to supply voltage in the power supply cable
- Open-circuit in the power supply cable.

Fault symptom[s]
- The windshield wipers are not working
- No rain sensor function.

Signal Too High

Signal too high

Checking the cable

Hint: The fault could also have been caused by the windshield wipers sticking.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the cable between the central electronic module (CEM) and the windshield wiper motor (6/1). Check for a short-circuit to supply voltage. Check for an open-circuit.
Take readings between Central electronic module (CEM) terminal #C31(#31) and the windshield wiper motor (6/1) #3.
Check the cable between the central electronic module (CEM) and the rain sensor (7/149). Check for a short-circuit to supply voltage. Check for an open-circuit.
Take readings between Central electronic module (CEM) terminal #D11 (#11) and rain sensor (7/149) #4.
Also check the connectors.

If no other faults are found try a new windshield wiper motor (6/1).
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Motor windshield wiper, replacing See: Wiper and Washer Systems/Wiper Motor/Service and Repair/Motor, Windshield Wiper, Replacing

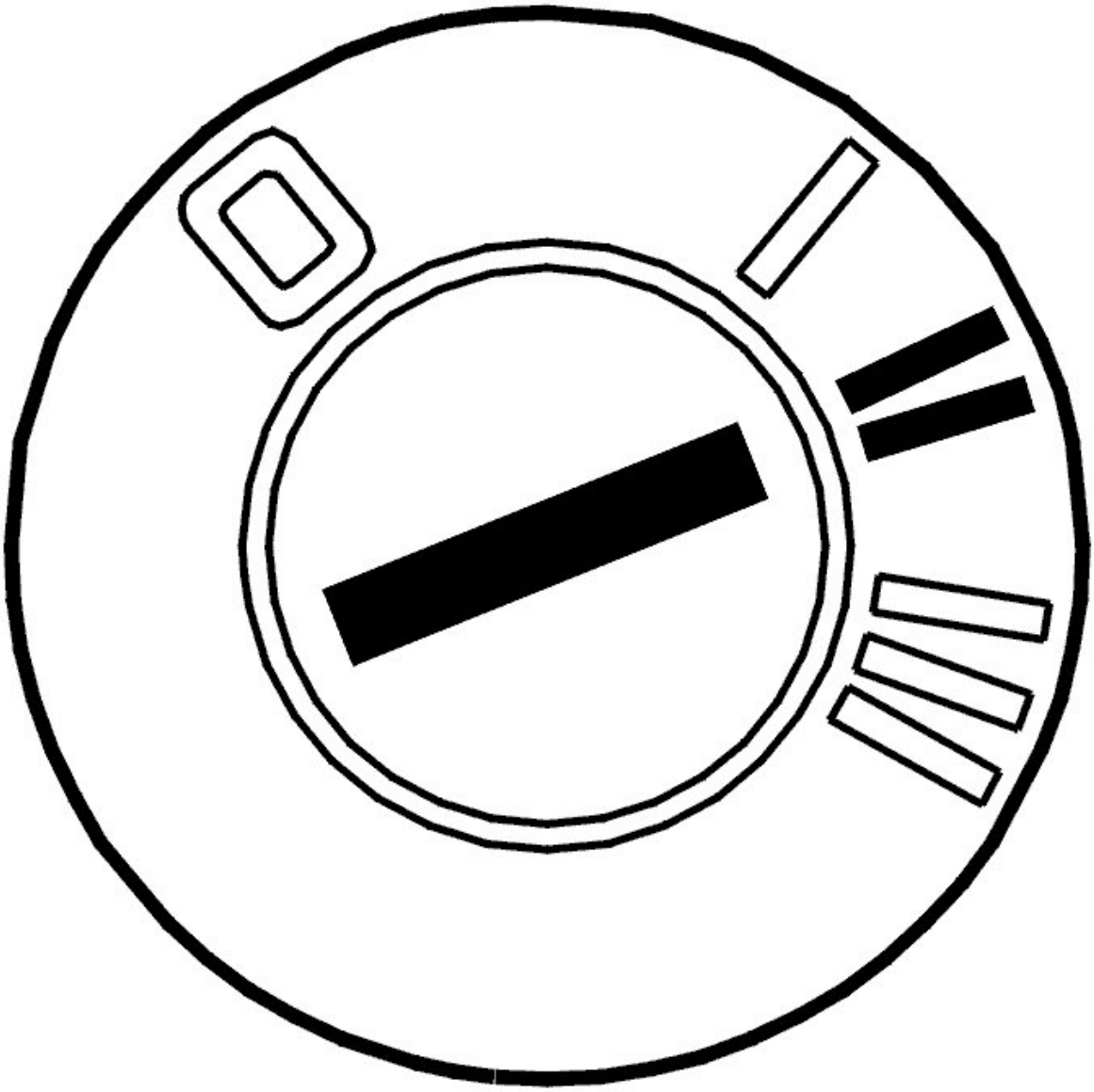
Continue - Verification

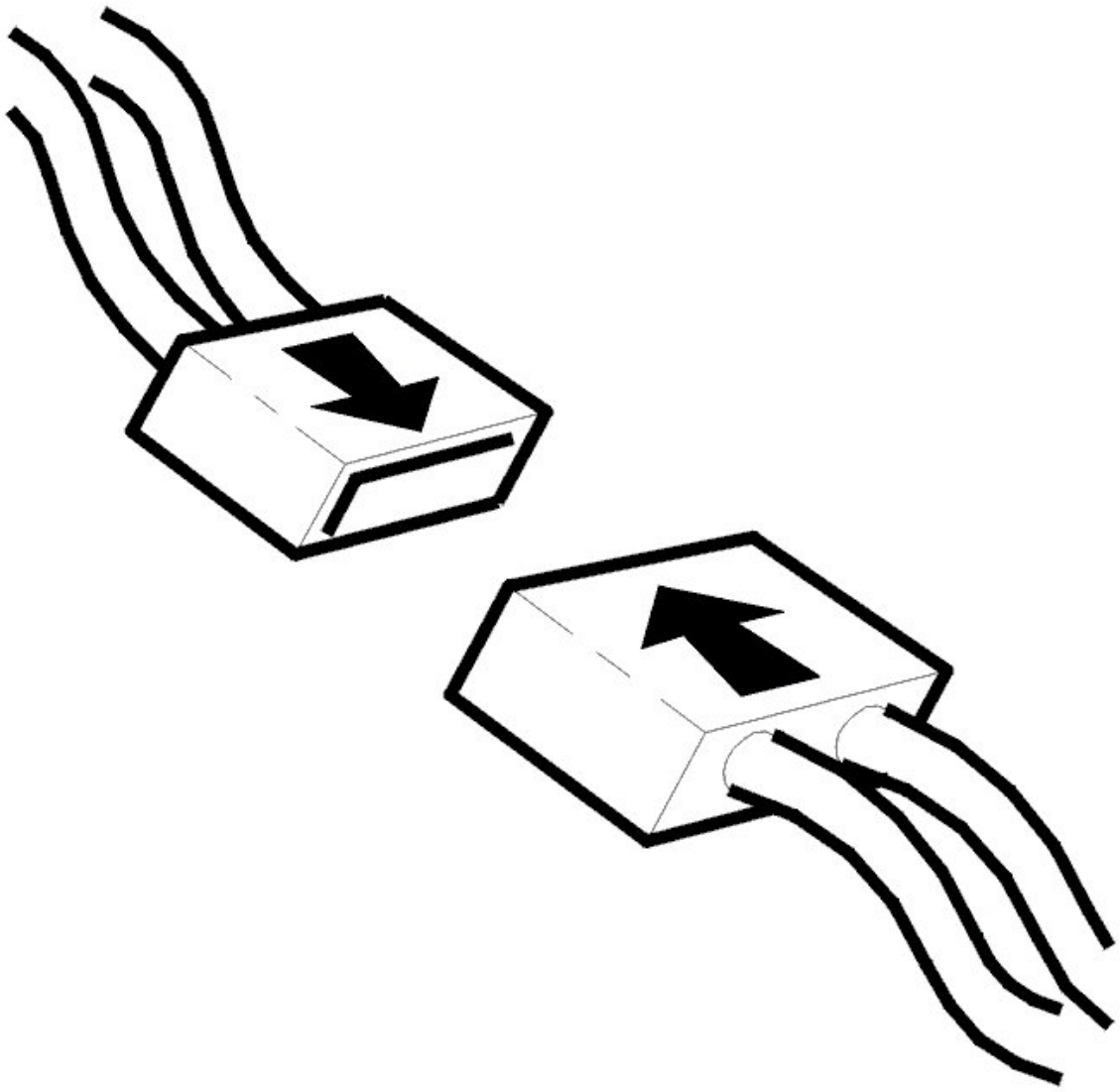
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

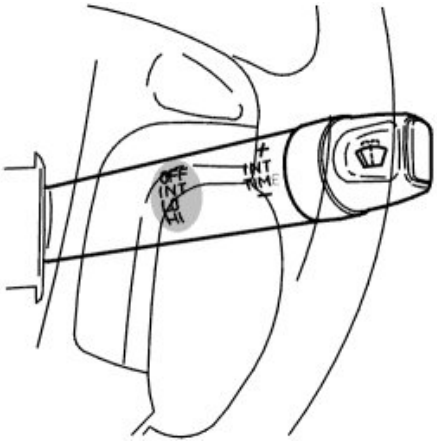
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F2D

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the windshield wipers are deployed somewhere on the windshield for longer than 5 seconds and the steering wheel module (SWM) indicates that the windshield wipers should not be activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged windshield wiper motor
- Short-circuit to ground in the power supply cable.

Fault symptom[s]
- The windshield wipers are not working
- No rain sensor function.

Signal Too Low

Signal too low

Checking the cable

Hint: The fault could also have been caused by the windshield wipers sticking.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the cable between the central electronic module (CEM) and the windshield wiper motor (6/1). Check for a short-circuit to ground.
Take readings between Central electronic module (CEM) terminal #C31(#31) and the windshield wiper motor (6/1) #3.
Check the cable between the central electronic module (CEM) and the rain sensor (7/149). Check for a short-circuit to ground.
Take readings between Central electronic module (CEM) terminal #D11 (#11) and rain sensor (7/149) #4.
Also check the connectors.
If no other faults are found try a new windshield wiper motor (6/1).
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Motor windshield wiper, replacing See: Wiper and Washer Systems/Wiper Motor/Service and Repair/Motor, Windshield Wiper, Replacing

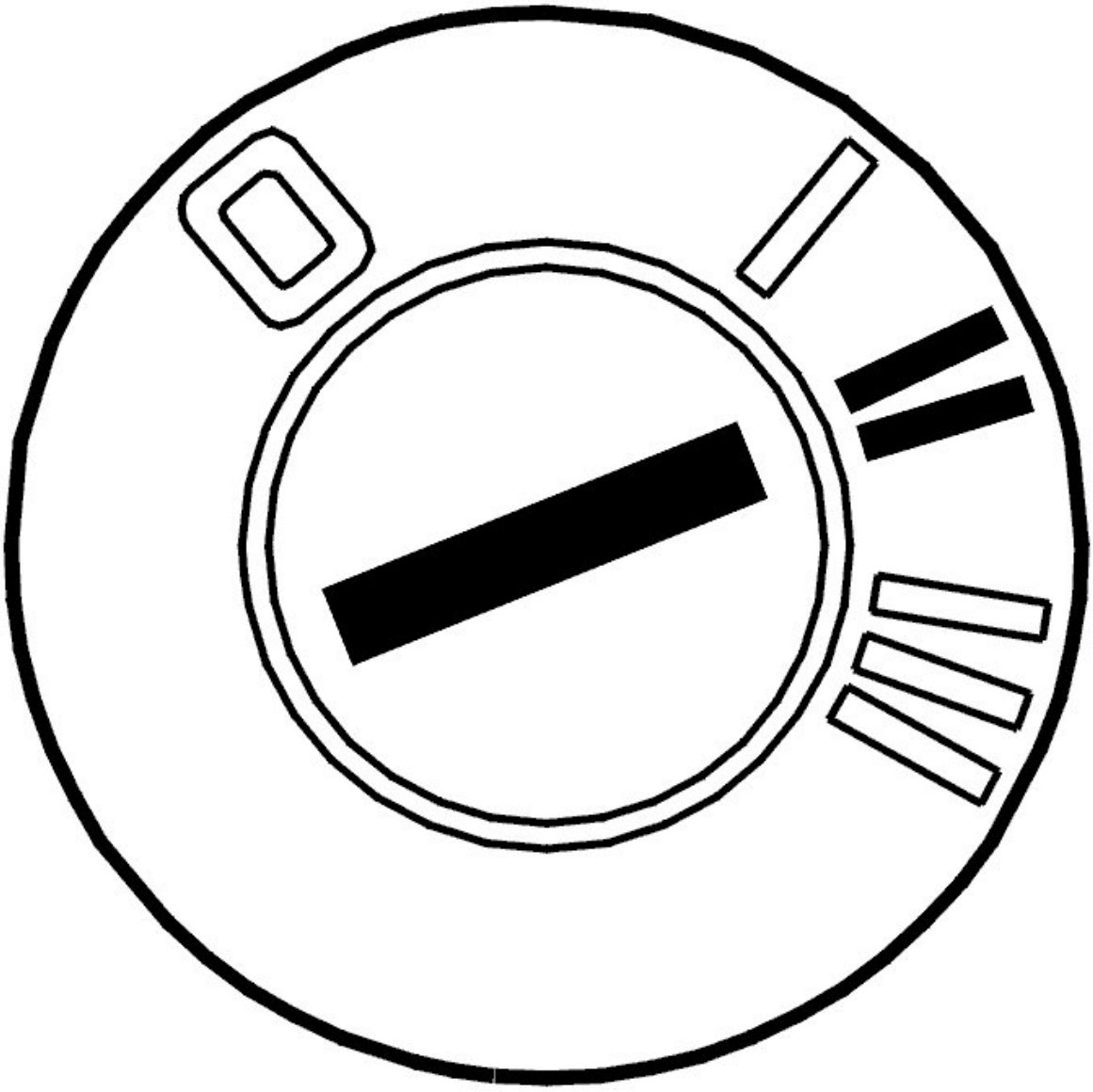
Continue - Verification

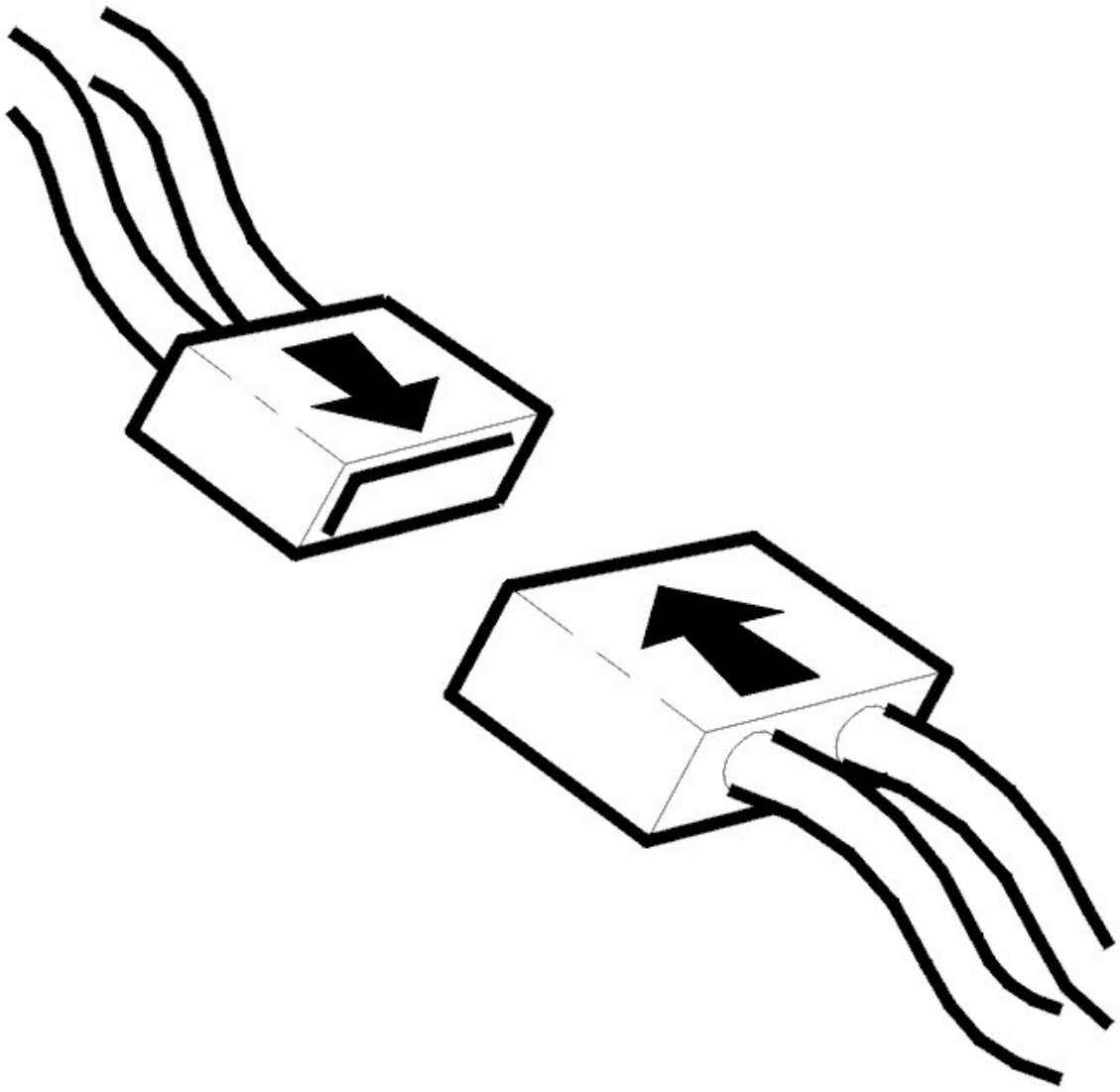
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

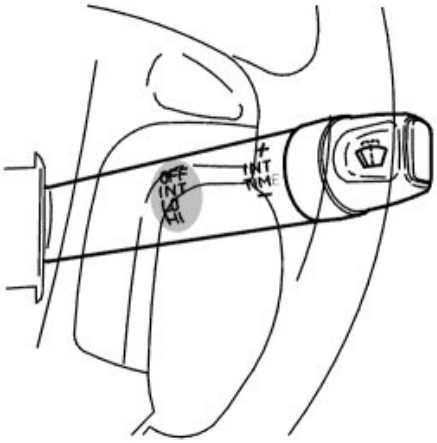
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F2E

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the windshield wipers are deployed somewhere on the windshield for longer than 5 seconds and the steering wheel module (SWM) indicates that the windshield wipers should be activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged windshield wiper motor
- Short-circuit to ground in the power supply cable.

Fault symptom[s]
- The windshield wipers are not working.

Signal Too Low

Signal too low

Checking the cable

Hint: The fault could also have been caused by the windshield wipers sticking.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the cable between the central electronic module (CEM) and the windshield wiper motor (6/1). Check for a short-circuit to ground.
Take readings between Central electronic module (CEM) terminal #C31(#31) and the windshield wiper motor (6/1) #3.
Check the cable between the central electronic module (CEM) and the rain sensor (7/149). Check for a short-circuit to ground.
Take readings between Central electronic module (CEM) terminal #D11 (#11) and rain sensor (7/149) #4.
Also check the connectors.
If no other faults are found try a new windshield wiper motor (6/1).
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Motor windshield wiper, replacing See: Wiper and Washer Systems/Wiper Motor/Service and Repair/Motor, Windshield Wiper, Replacing

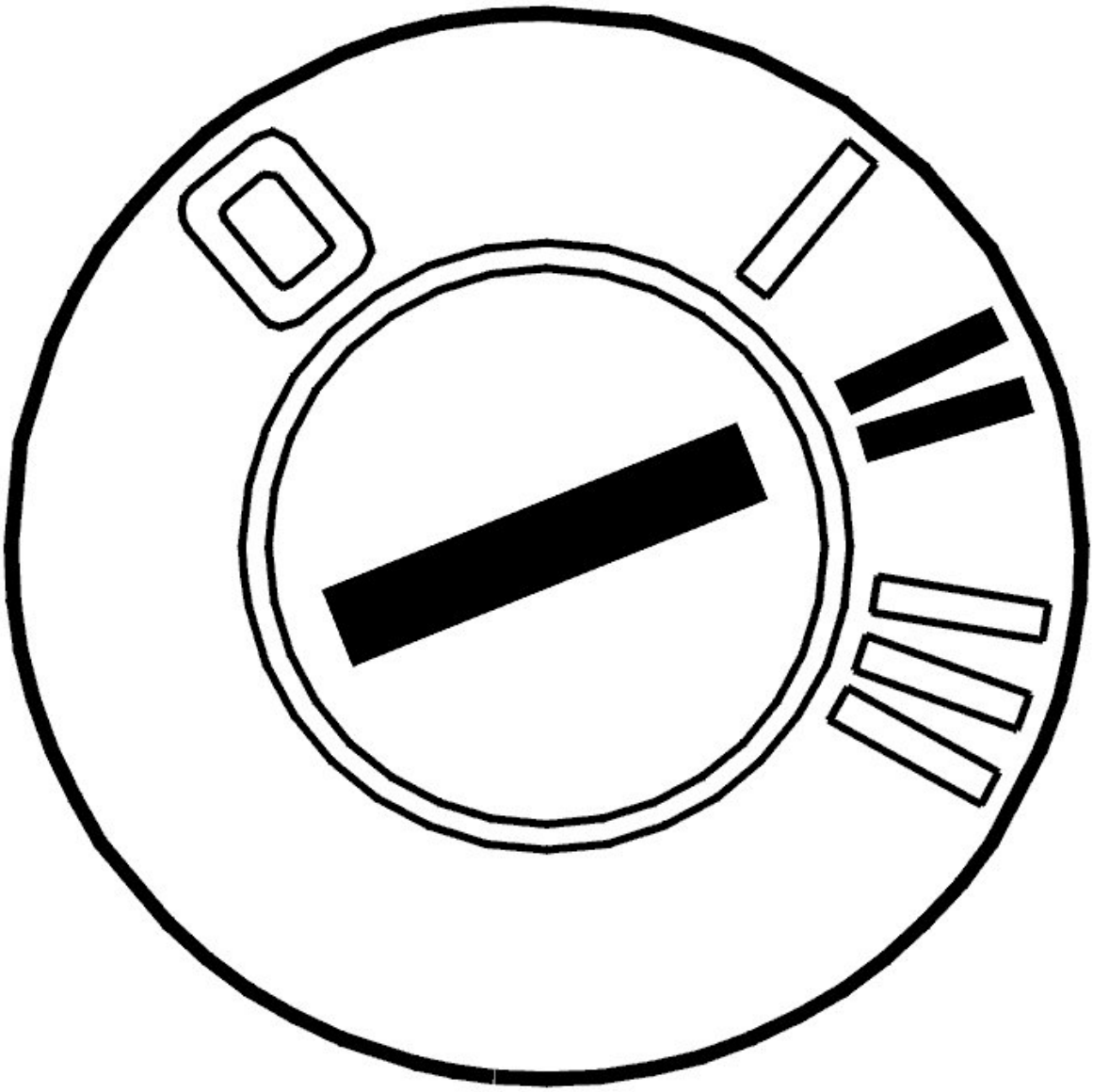
Continue - Verification

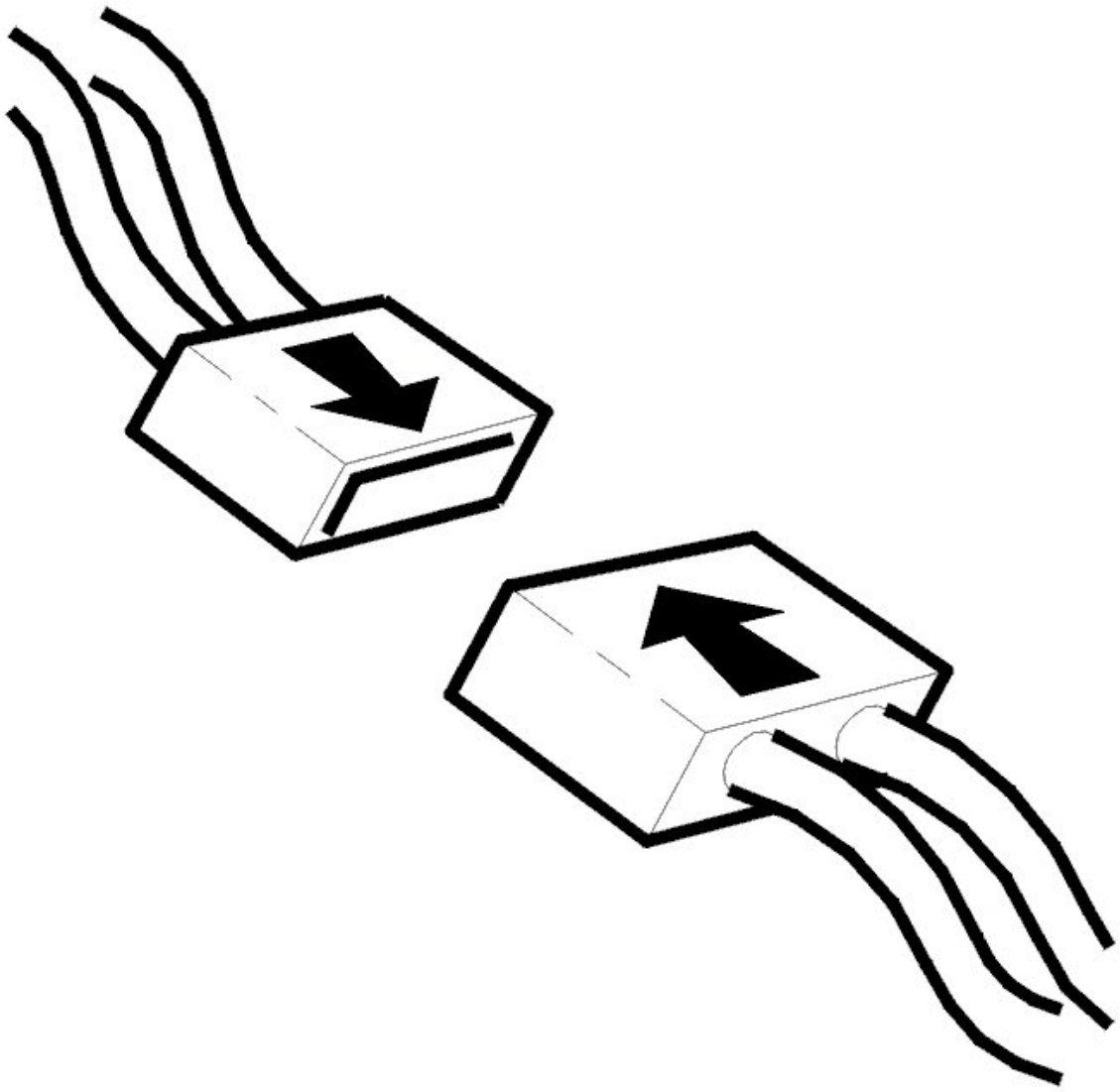
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

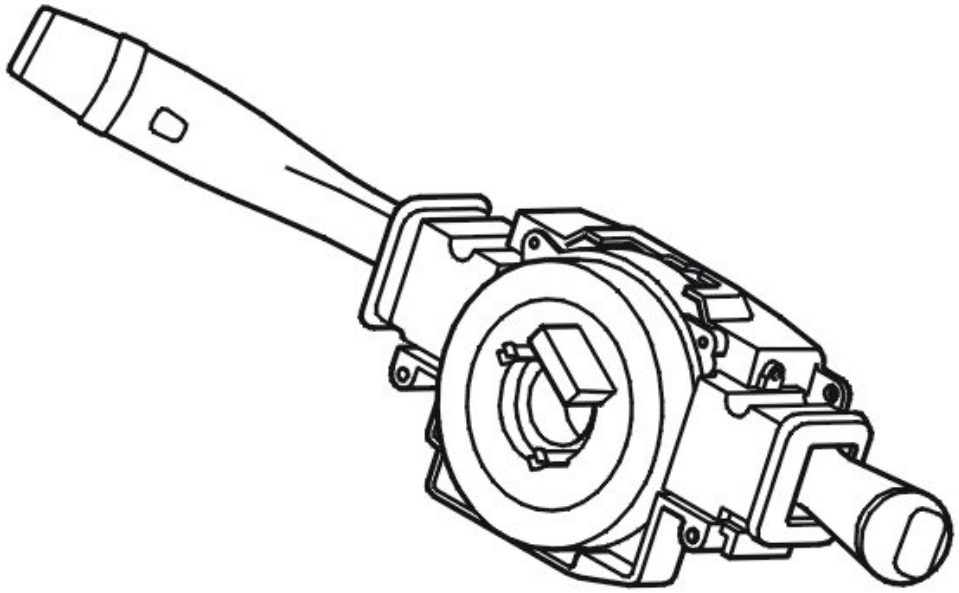
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F03

Condition



The central electronic module (CEM) checks the turn signal lamps.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that there is no signal or a low signal in the circuit for the right-hand turn signal lamp.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

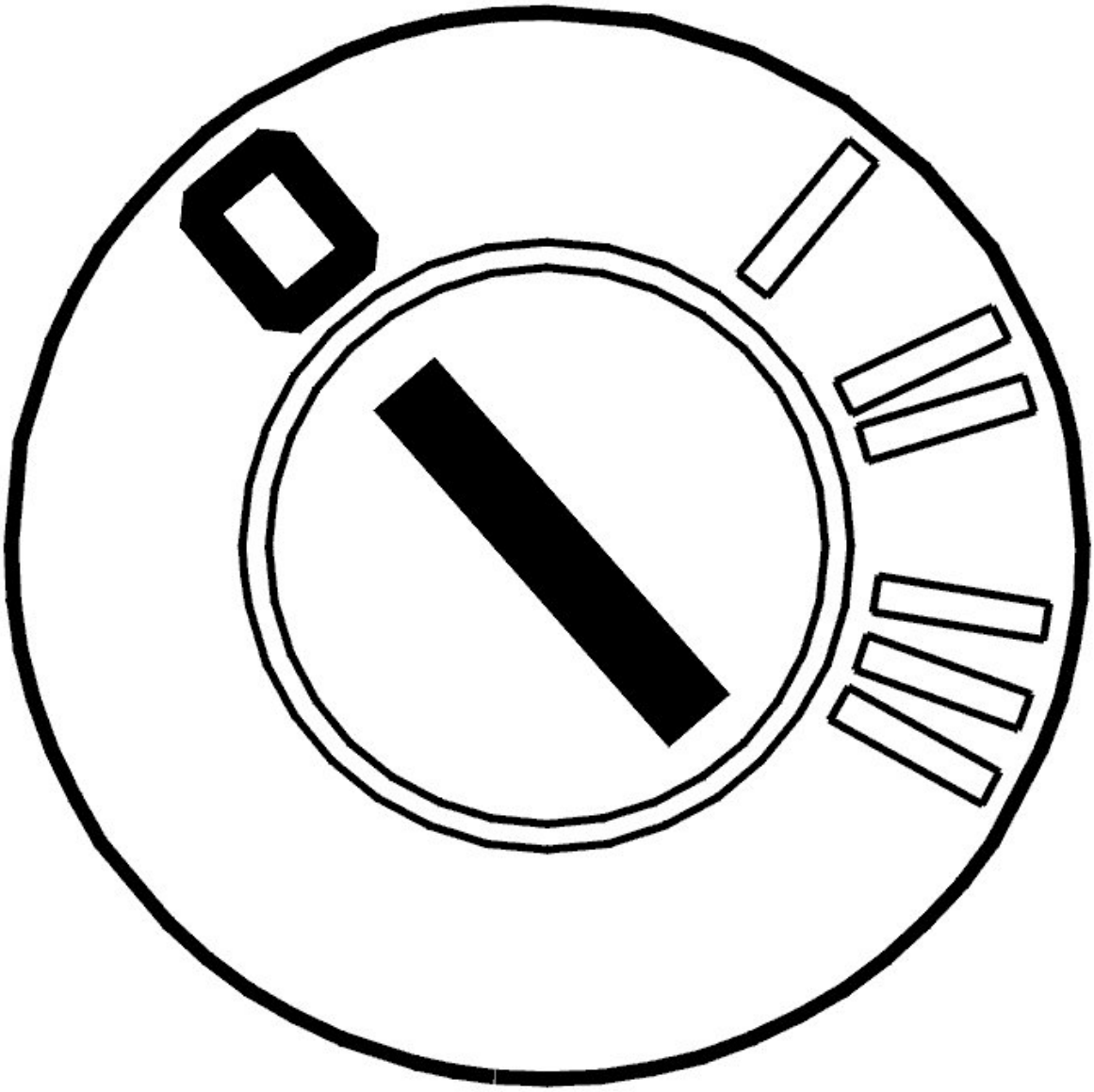
Possible source
- Short-circuit to ground in the circuit for the right-hand turn signal lamp
- Open-circuit in the circuit for the right-hand turn signal lamp.

Fault symptom[s]
- The turn signal lamps do not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off.

Check the cable between the central electronic module (CEM) and the right-hand turn signal lamps. Check for an open-circuit. Check for a short-circuit to ground.
Also check the intermediate connectors.

For S60 and V70

Take readings between:

- Central electronic module (CEM) terminal #B32 (#32) and right front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B32 (#32) and right-hand turn signal lamp terminal #1.

For S80

Take readings between:

- Central electronic module (CEM) terminal #B32 and right-hand front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B32 and right-hand turn signal lamp terminal #2.

For the XC90

Take readings between:

- Central electronic module (CEM) terminal #A29 (#29) and right front door turn signal lamp terminal #2
- Central electronic module (CEM) terminal #B32 (#32) and right-hand turn signal lamp terminal #1.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

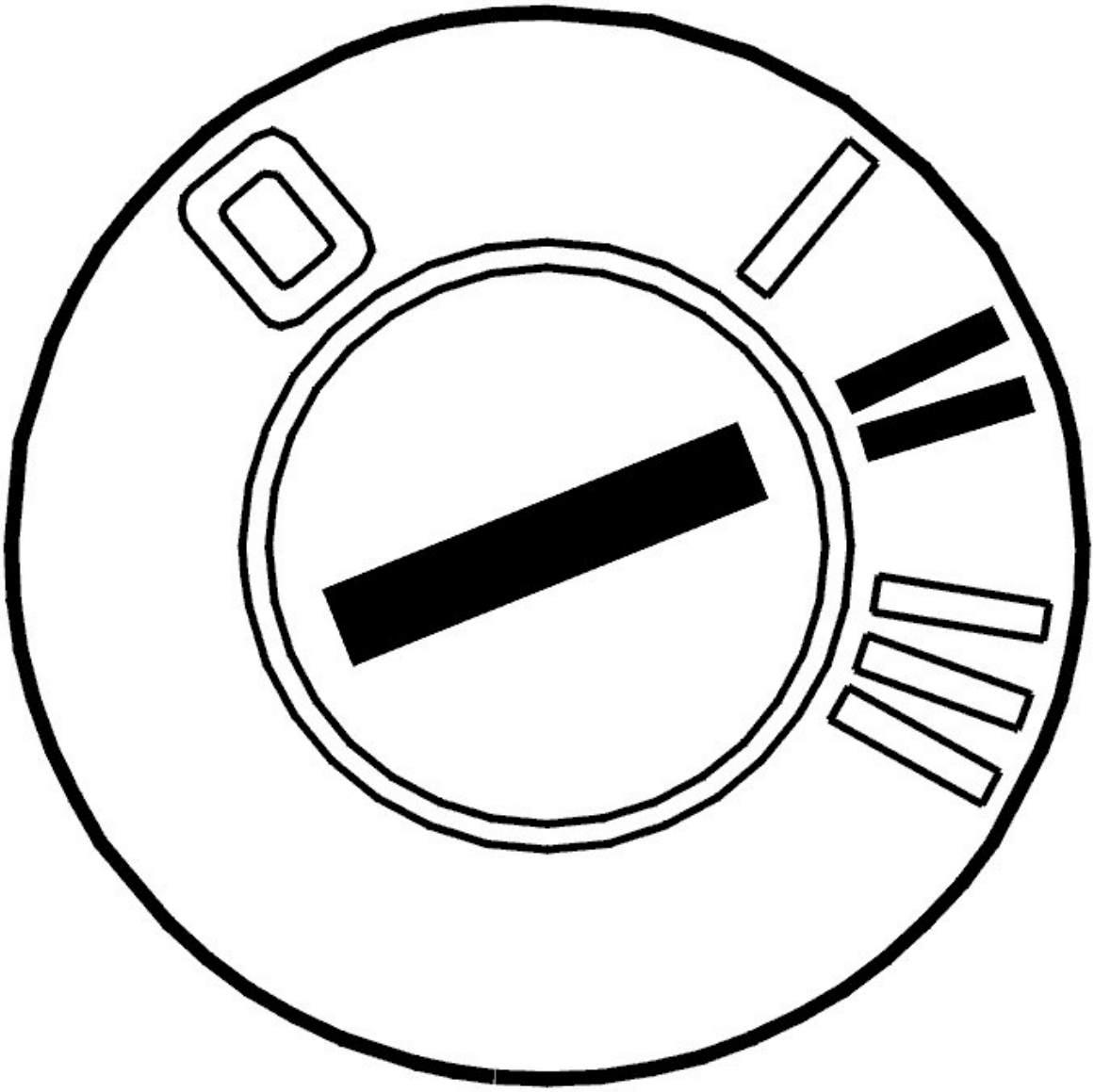
Continue - Verification

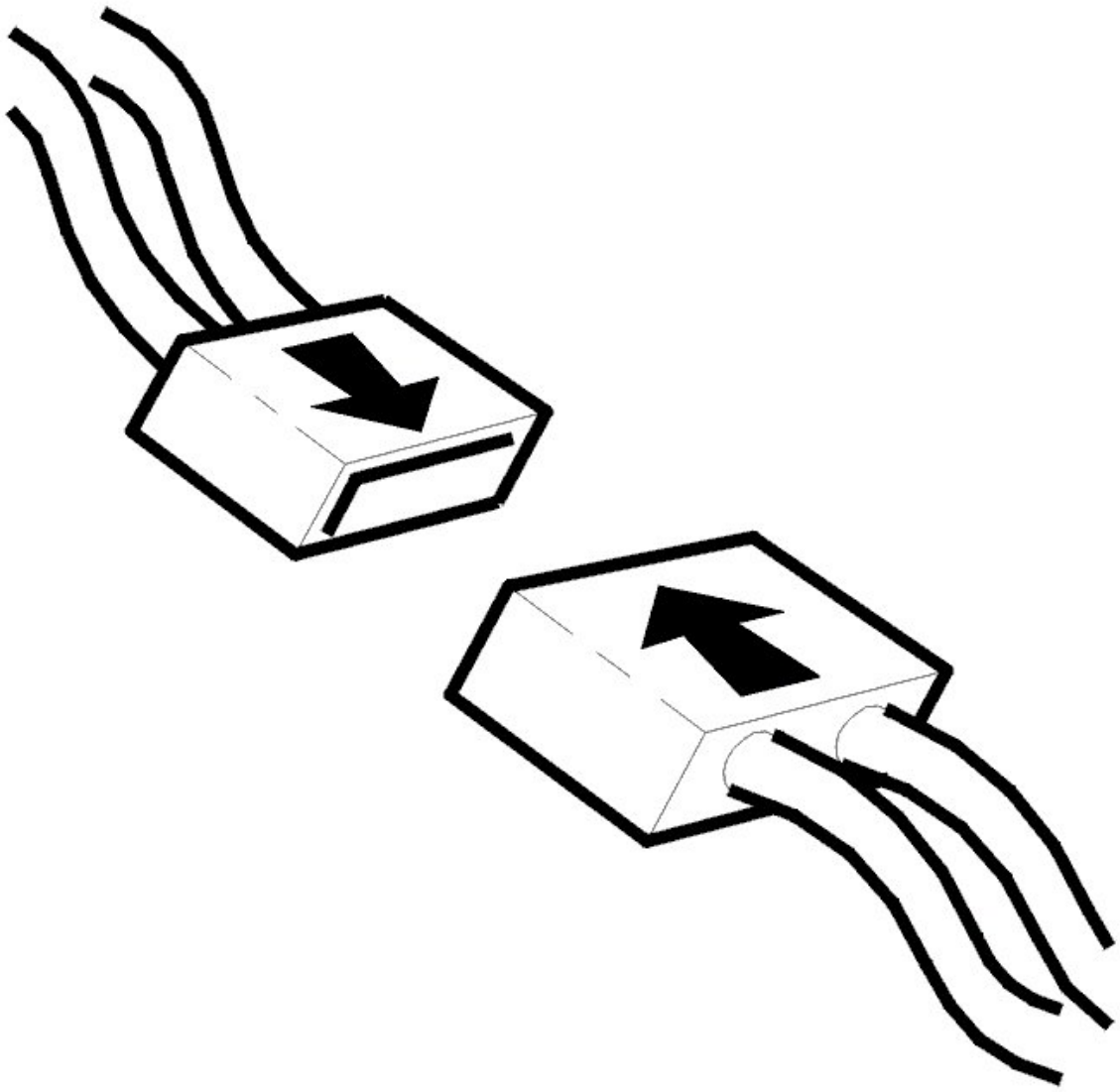
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the turn signal lamps.
Check that the turn signal lamps are activated.

Are the turn signal lamps activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

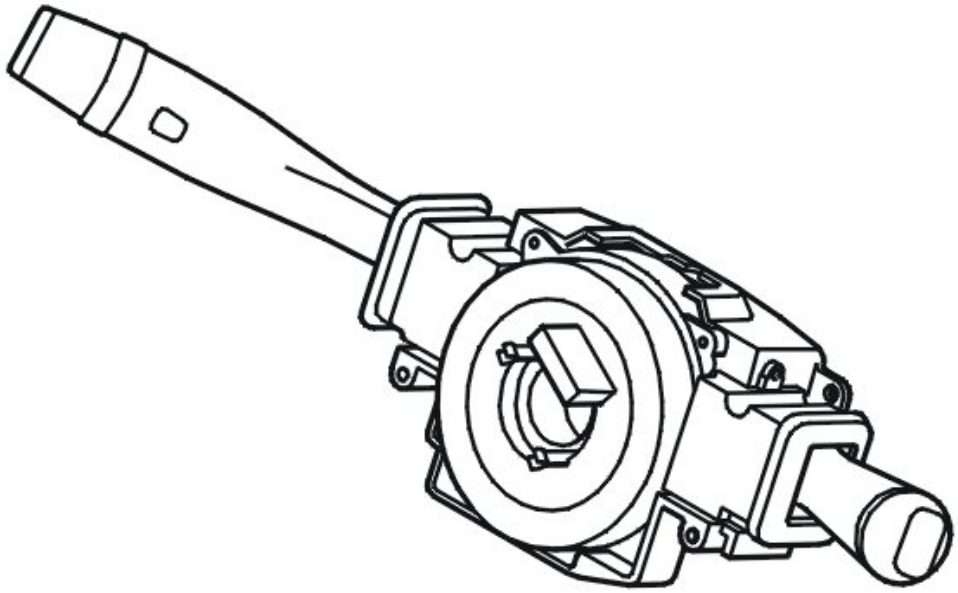
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F04

Condition



The central electronic module (CEM) checks the turn signal lamps.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the switch for the turn signal lamps is faulty.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged switch for the turn signal lamps
- Internal fault in the steering wheel module (SWM).

Fault symptom[s]
- The turn signal lamps do not work.

Faulty Signal

Faulty signal

Checking the status

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the steering wheel module (SWM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the diagnostic trouble code (DTC) recurs, replace the turn signal lamp switch.

Other information

- Turn signal switch, replacing See: Lighting and Horns/Sensors and Switches - Lighting and Horns/Turn Signal Switch/Service and Repair/Turn Signal Switch, Replacing

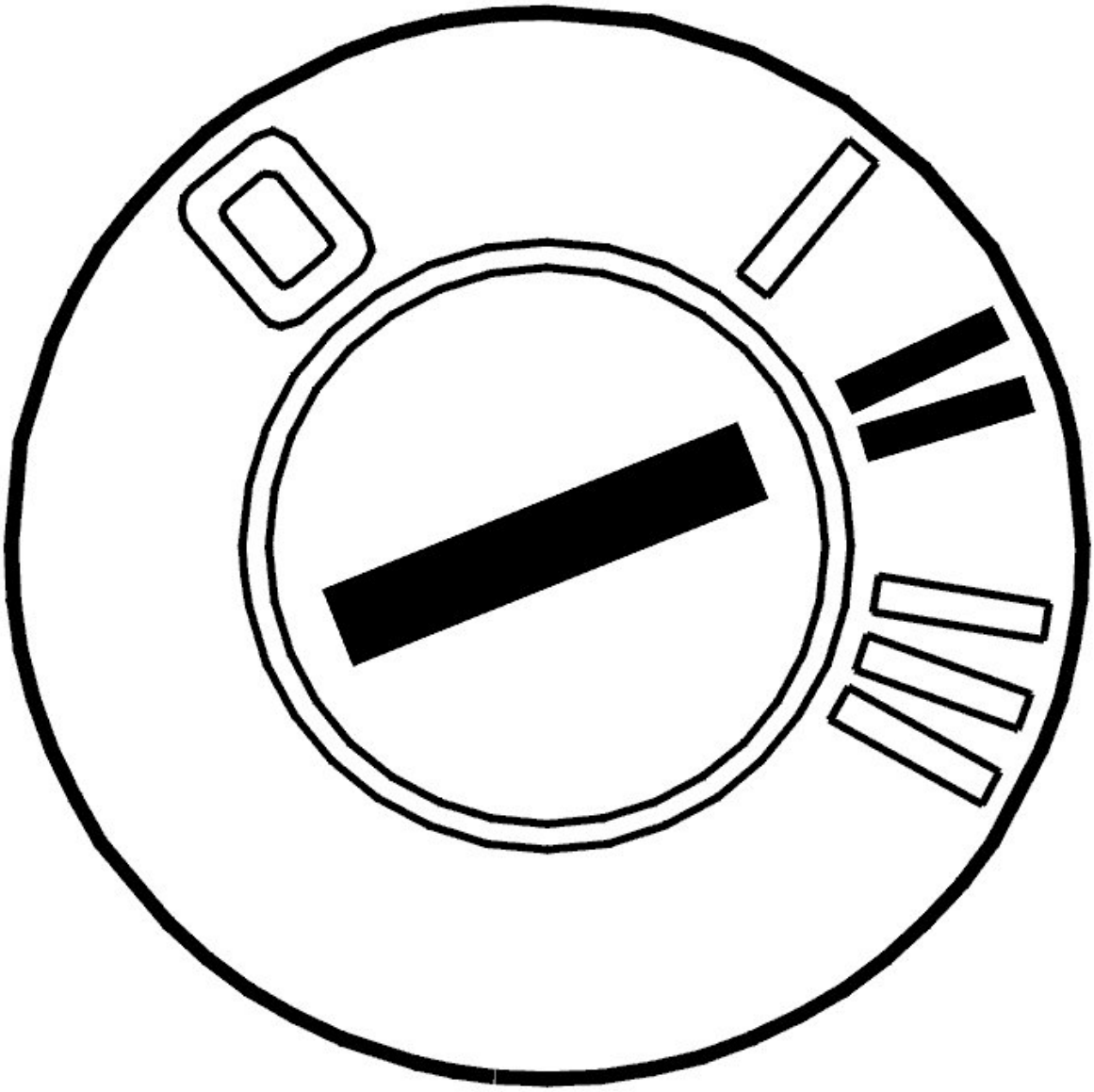
Continue - Verification

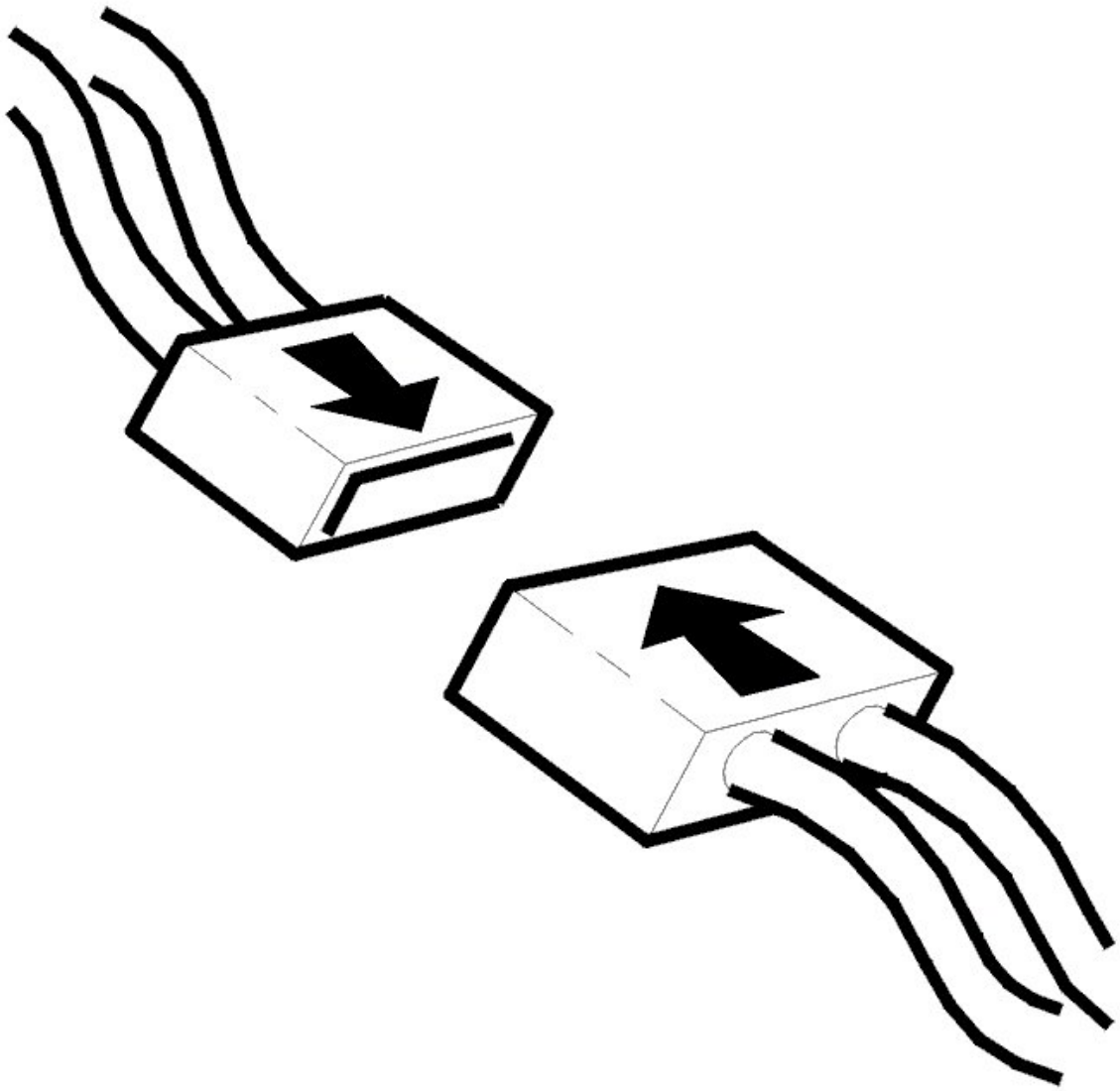
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the turn signal lamps.
Check that the turn signal lamps are activated.

Are the turn signal lamps activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

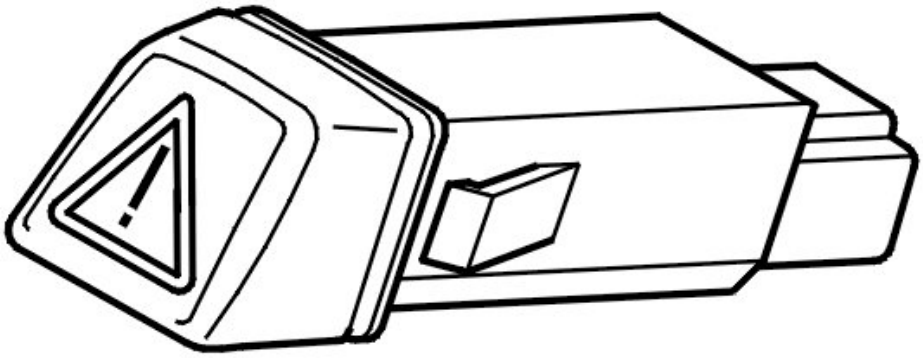
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F05

Condition



The central electronic module (CEM) checks the signal from the hazard warning signal flasher switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switch for the hazard warning signal flashers has been active for more than 1 minute.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The switch for the hazard warning signal flasher has jammed in one position
- Damaged switch for the hazard warning signal flasher.

Fault symptom[s]
- The hazard warning signal flashers are not functioning.

Activated too long

Activated too long

Checking the control

The diagnostic trouble code (DTC) is stored when a button or switch has been depressed for a long time.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check that the button or switch does not stick in the activated position.
Remedy as necessary.

Other information

Switch hazard warning signal flasher, replacing See: Lighting and Horns/Hazard Warning Lamps/Hazard Warning Switch/Service and Repair/Switch, Hazard Warning Signal Flasher, Replacing

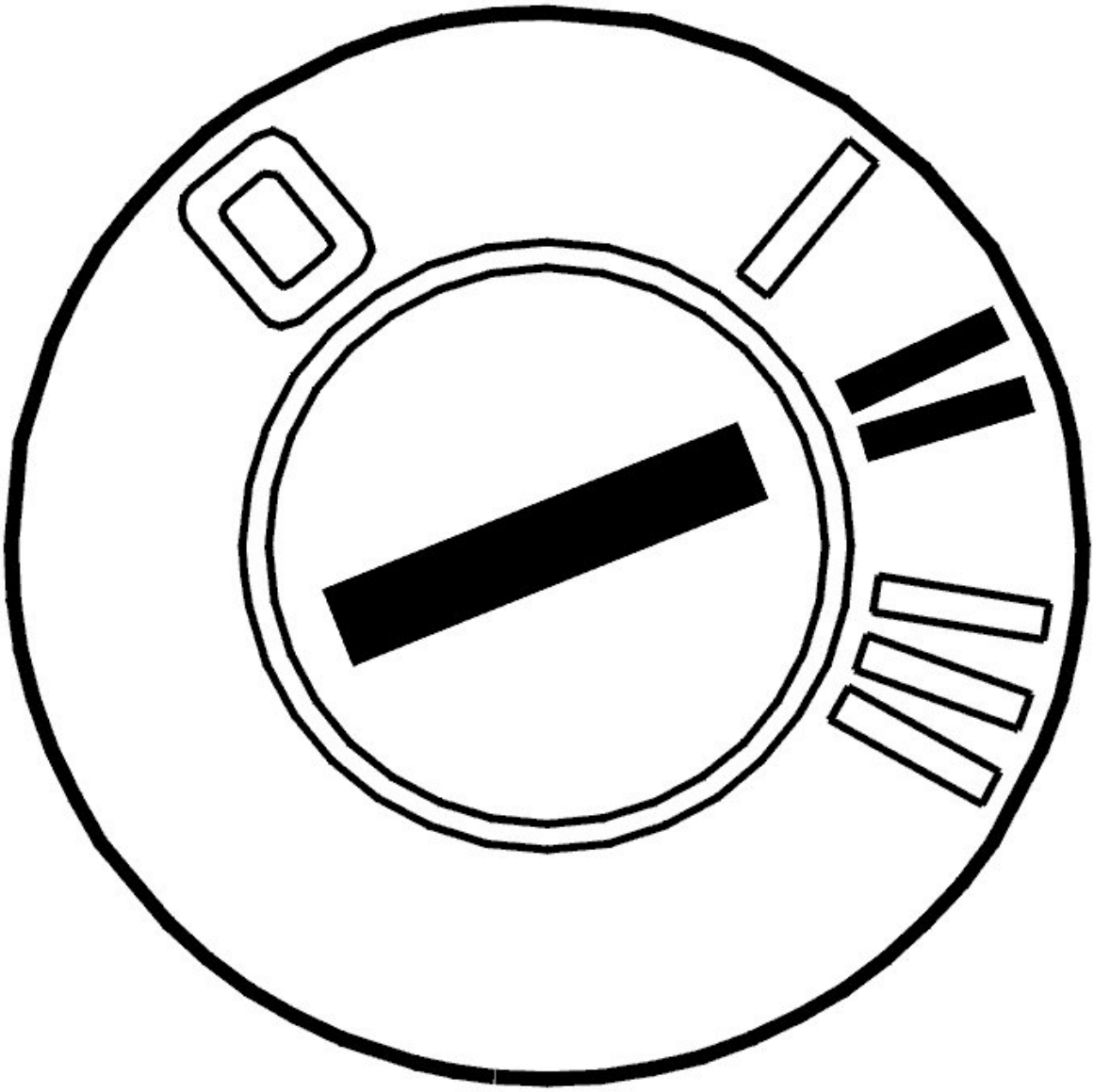
Continue - Verification

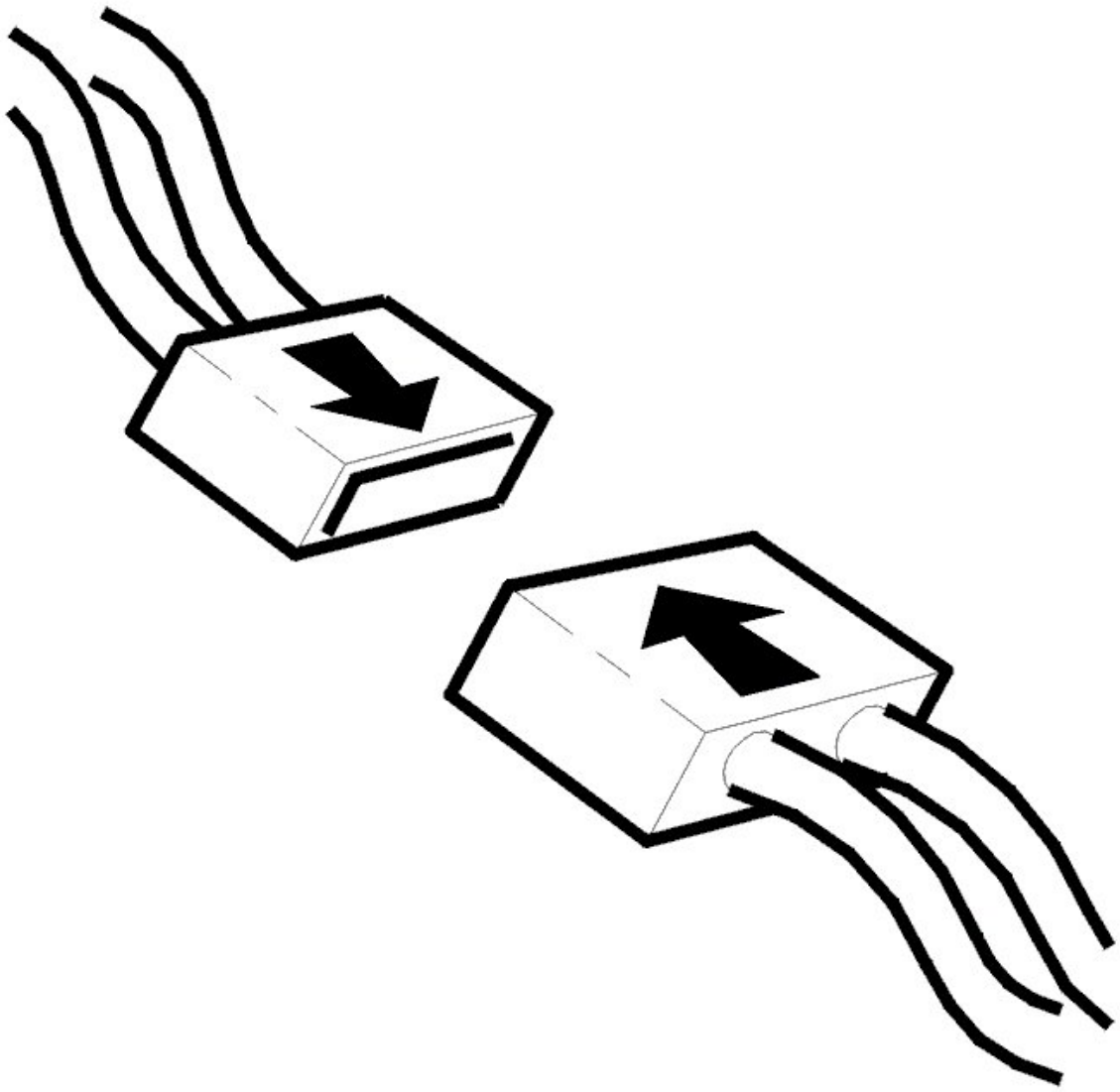
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch on the hazard warning signal flasher. Check that the switch is working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

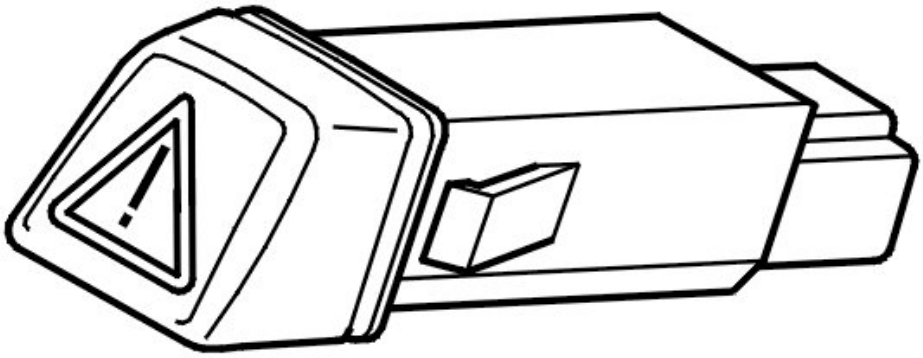
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F06

Condition



The central electronic module (CEM) checks the signal from the hazard warning signal flasher switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that there is no signal from the switch for the hazard warning signal flasher.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

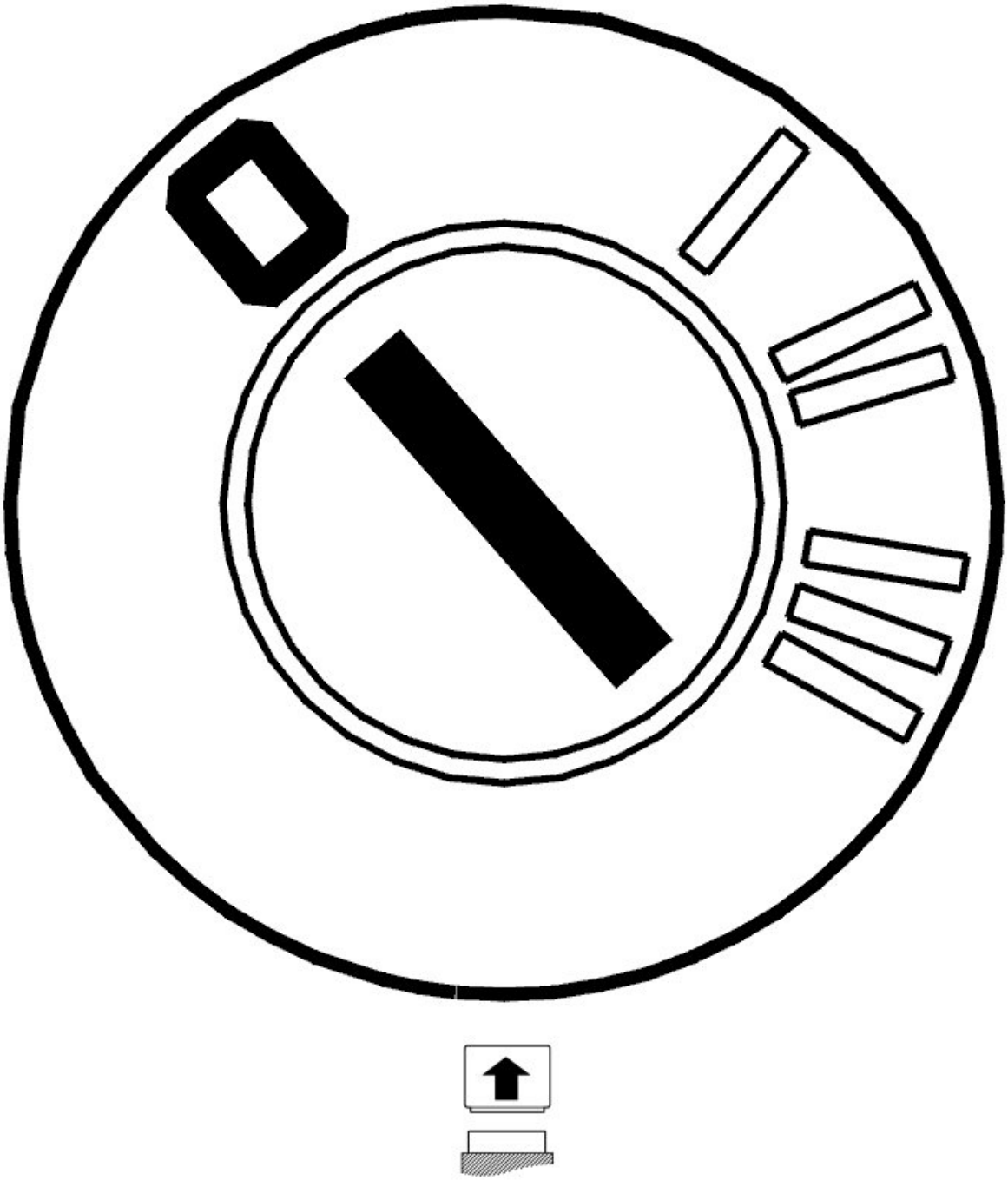
Possible source
- Open-circuit in the circuit for the switch for the hazard warning signal flasher.

Fault symptom[s]
- The hazard warning signal flashers are not functioning.

Signal Missing

Signal missing

Checking the wiring



- Ignition off.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the cable between the central electronic module (CEM) and the switch for the hazard warning signal flasher. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #D14 (14) and terminal #1 on the switch for the hazard warning signal flasher.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switch hazard warning signal flasher, replacing See: Lighting and Horns/Hazard Warning Lamps/Hazard Warning Switch/Service and Repair/Switch, Hazard Warning Signal Flasher, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

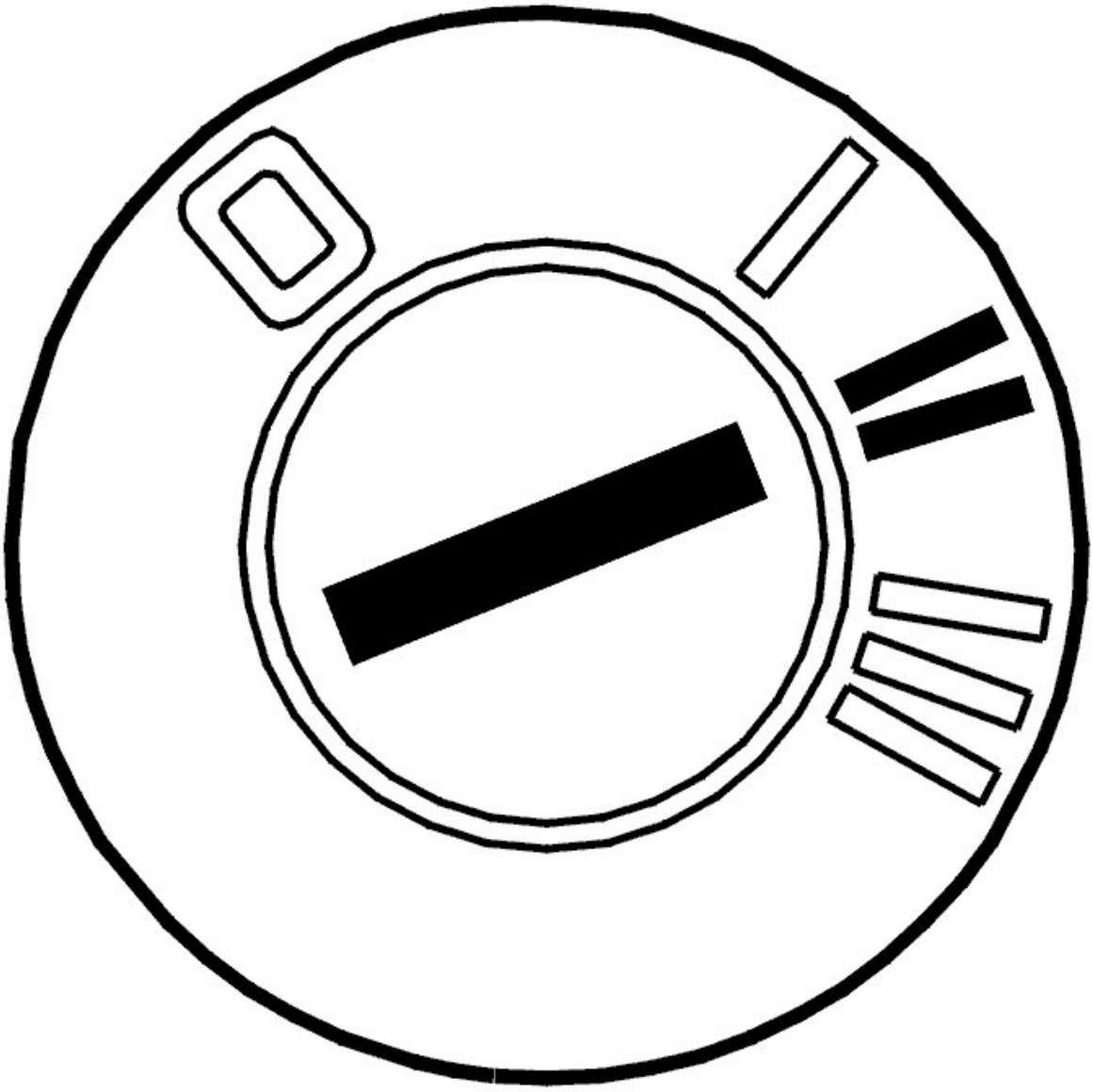
Continue - Verification

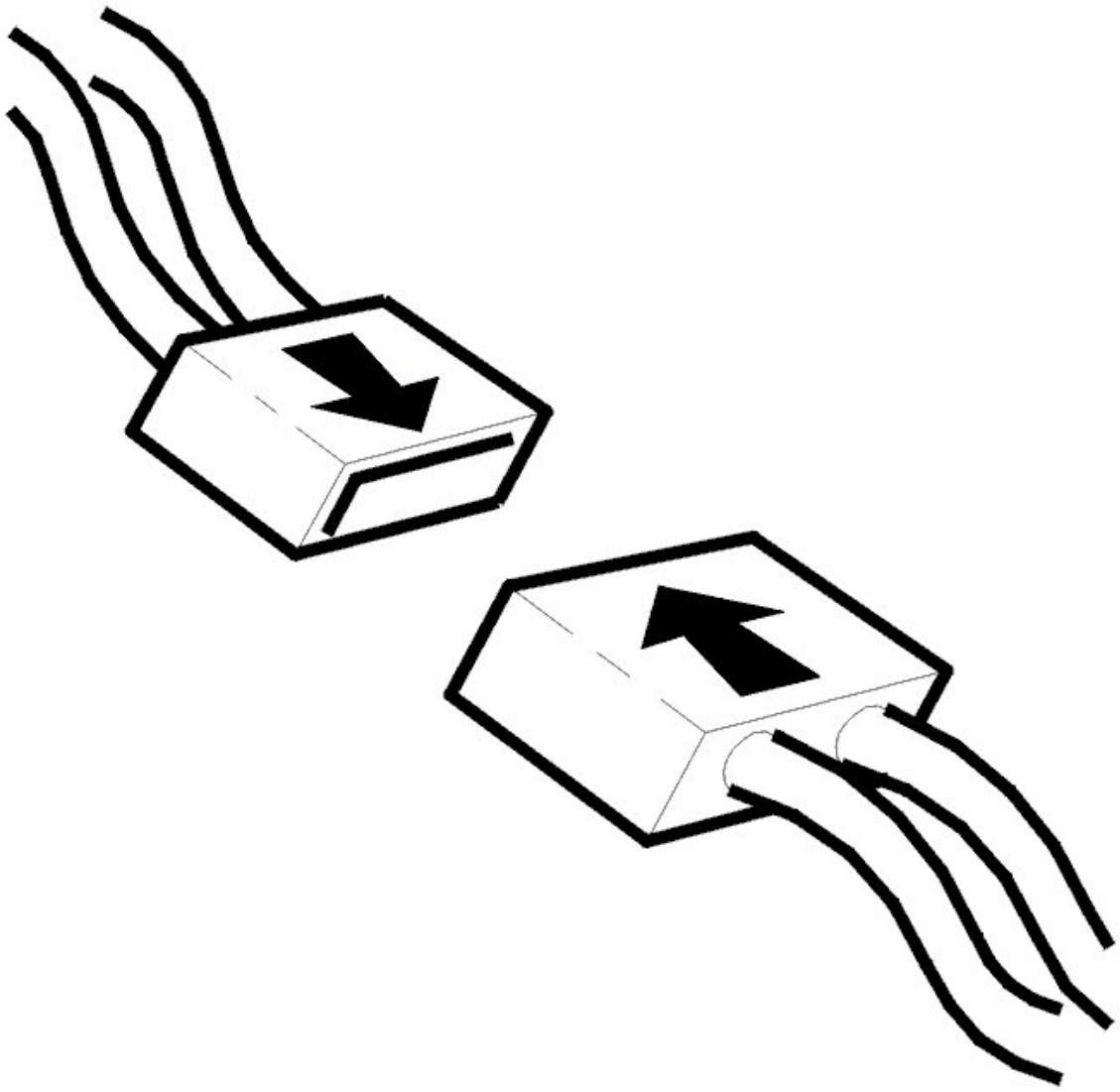
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch on the hazard warning signal flasher. Check that the switch is working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

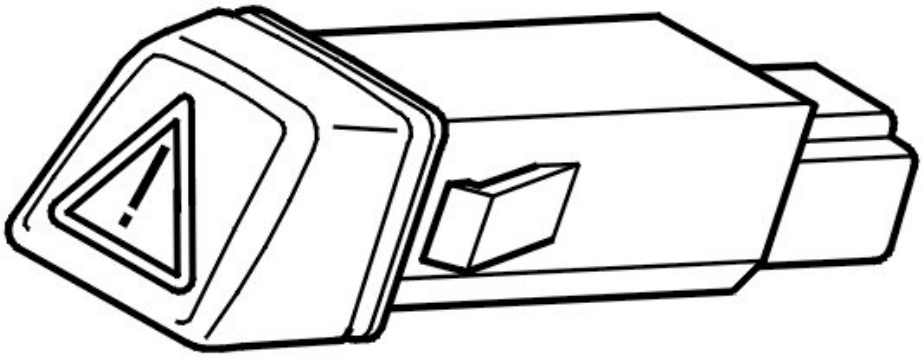
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F07

Condition



The central electronic module (CEM) checks the signal from the hazard warning signal flasher switch.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the switch for the hazard warning signal flasher is too low.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

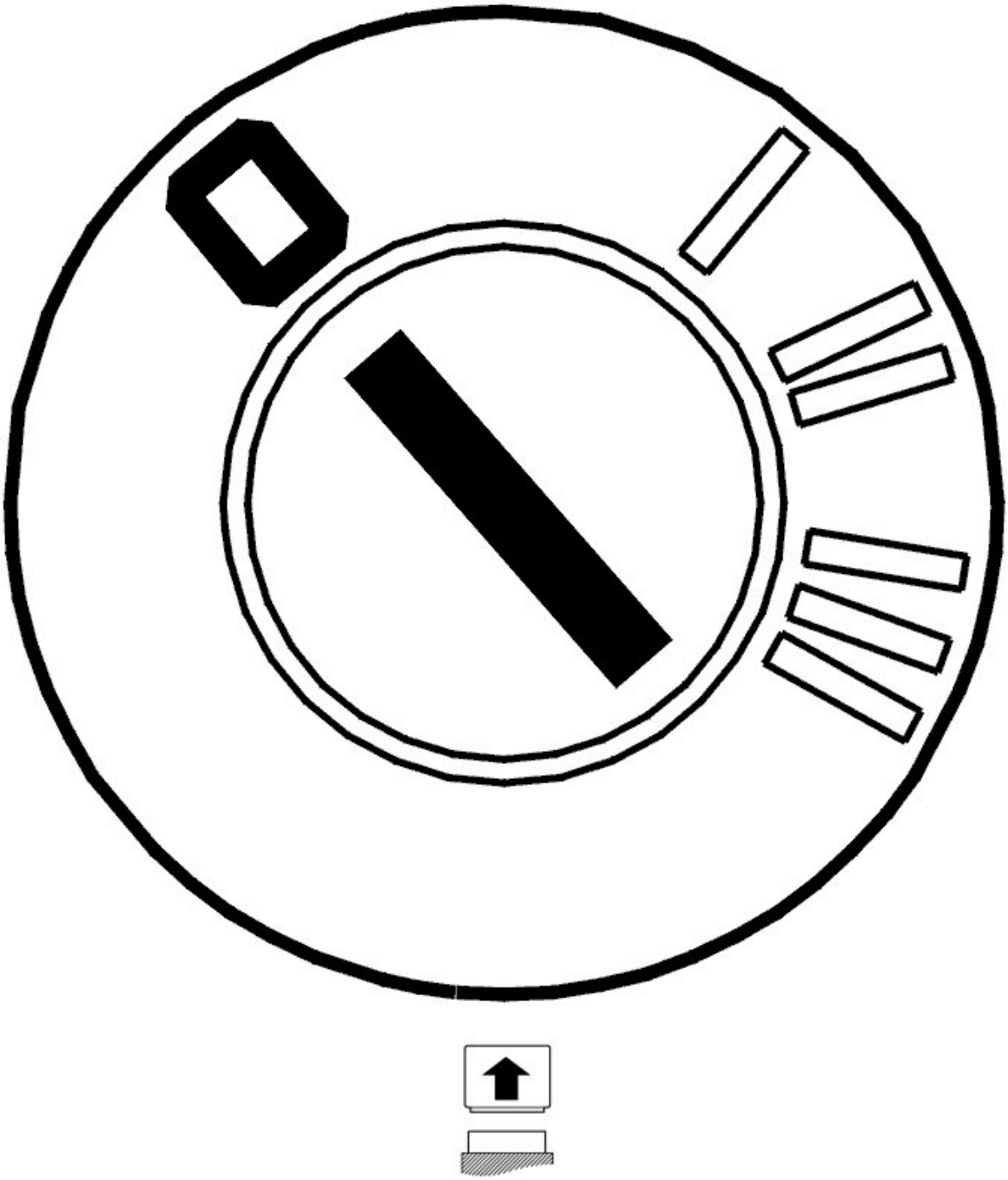
Possible source
- Short-circuit to ground in the circuit for the switch for the hazard warning signal flasher
- Overheated switch for the hazard warning signal flasher.

Fault symptom[s]
- The hazard warning signal flashers are not functioning.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off.

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the cable between the central electronic module (CEM) and the switch for the hazard warning signal flasher. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #D14 (14) and terminal #1 on the switch for the hazard warning signal flasher.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switch hazard warning signal flasher, replacing See: Lighting and Horns/Hazard Warning Lamps/Hazard Warning Switch/Service and Repair/Switch, Hazard Warning Signal Flasher, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

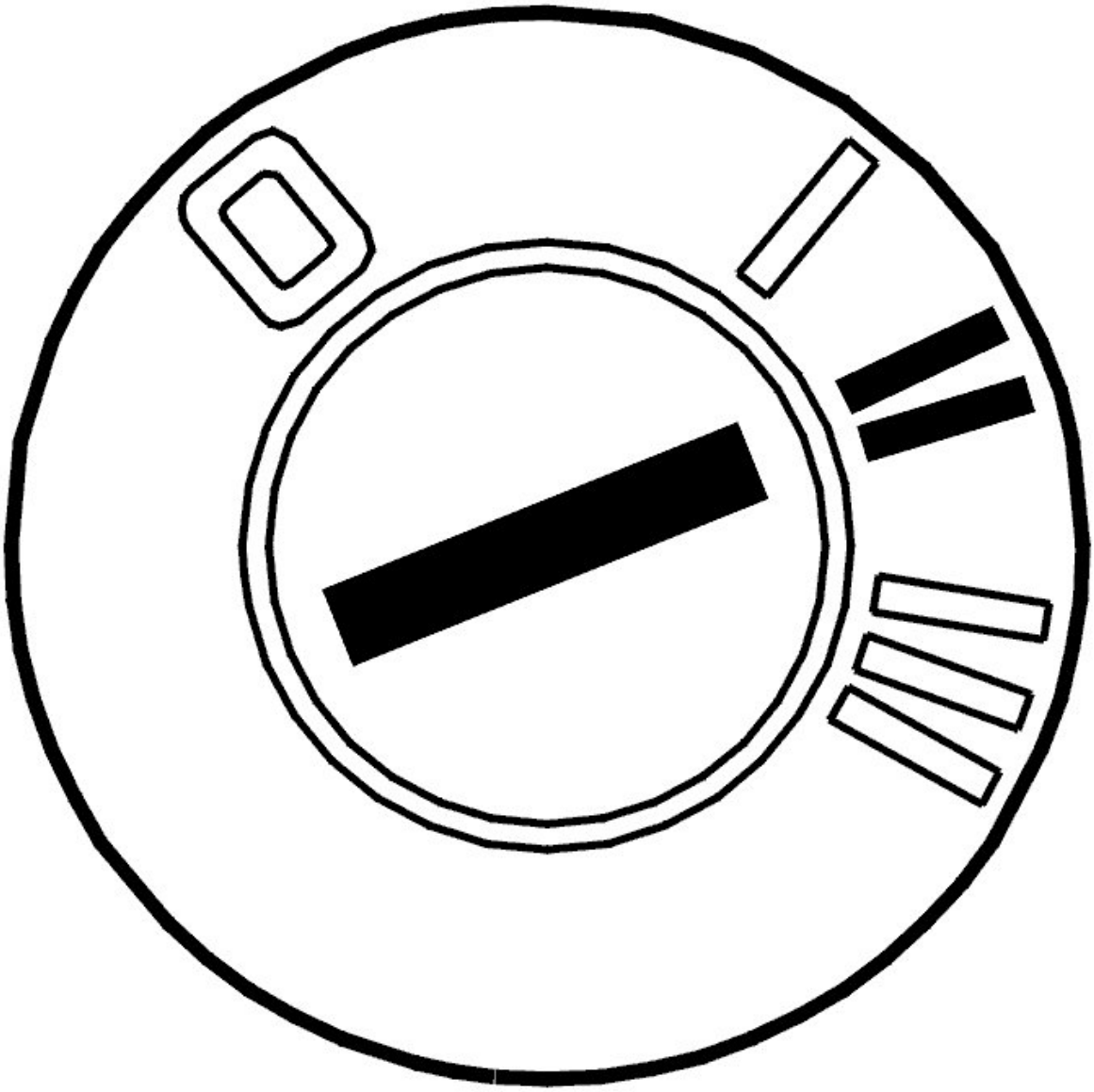
No - Checking over temperature

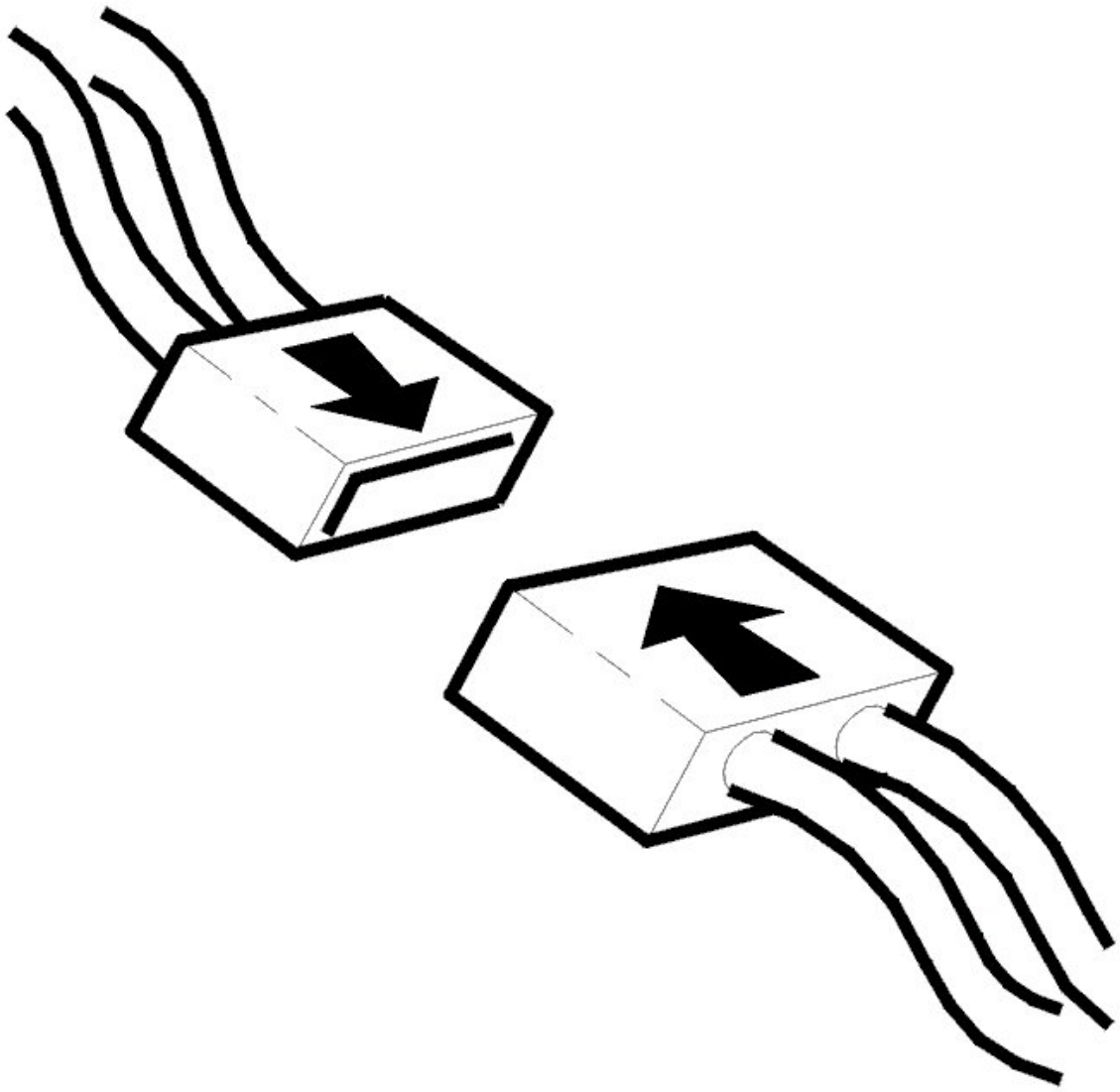
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch on the hazard warning signal flasher. Check that the switch is working.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Checking over temperature

Turn on the hazard warning signal flasher to see if the switch works.
If the switch does not work, the fault may be due to overheating.
Wait approximately 10 minutes. Check whether the fault was due to overheating.
Remedy as necessary.

Other information

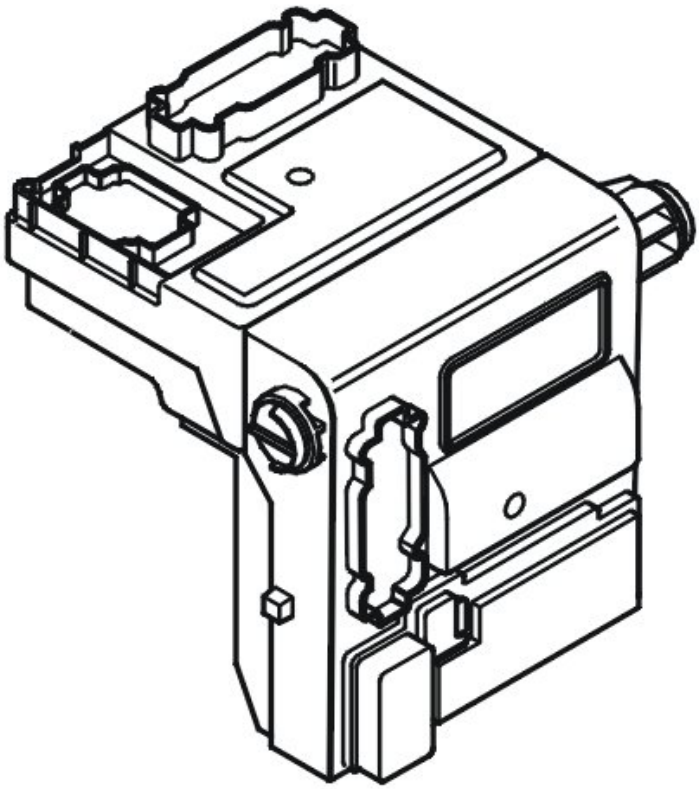
- Switch hazard warning signal flasher, replacing See: Lighting and Horns/Hazard Warning Lamps/Hazard Warning Switch/Service and Repair/Switch, Hazard Warning Signal Flasher, Replacing

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F08

Condition



The central electronic module (CEM) checks the re-engagement signal from the driver circuit to the wake-up signal for the engine control module (ECM) and to the hazard warning signal flasher. Both functions are controlled by the same driver circuit in the central electronic module (CEM) but can only be re-engaged once.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the wake-up signal to the engine control module (ECM) is too low.

The diagnostic trouble code (DTC) can be detected when the ignition is on and when the lamp in the switch for the hazard warning signal flasher is not lit.

Substitute value
- None.

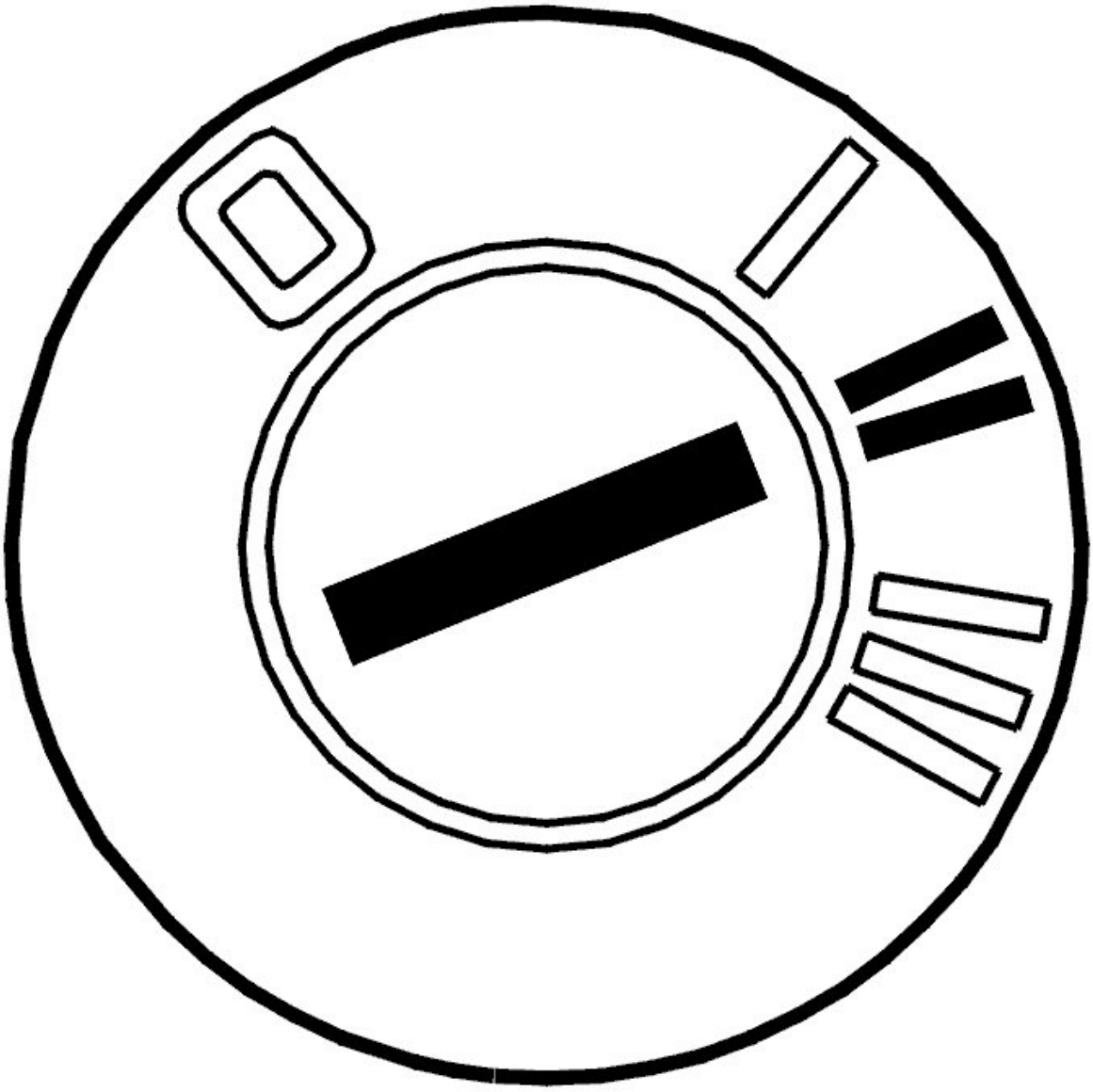
Possible source
- Short-circuit to ground in the signal cable for the wake-up signal to the engine control module (ECM).

Fault symptom[s]
- The starter motor turns but the engine does not start.

Signal Too Low

Signal too low

Checking the status

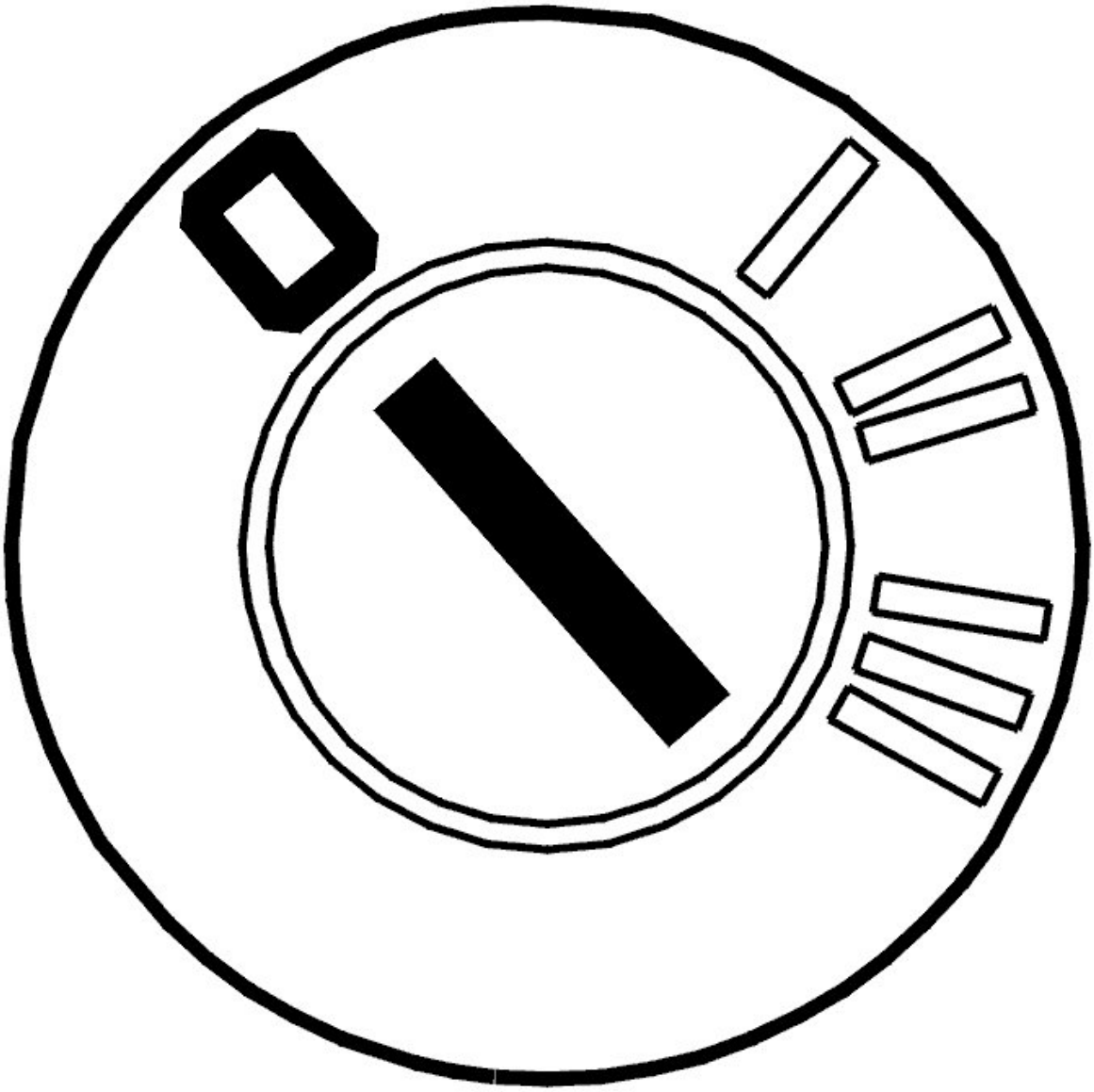


- Ignition on.

Read off the status of the waking signal for the engine control module (ECM).
Change the ignition key position from position I to II.
Check if the fault is permanent or intermittent.
The status of the wake-up signal for the engine control module (ECM) must change when changing the ignition key position.
If the status of the waking signal for the engine control module (ECM) does not change, the fault is permanent.
If the status of the waking signal for the engine control module (ECM) changes, this is an indication that the fault was present previously but that it is not active at the moment, i.e. the fault is intermittent.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

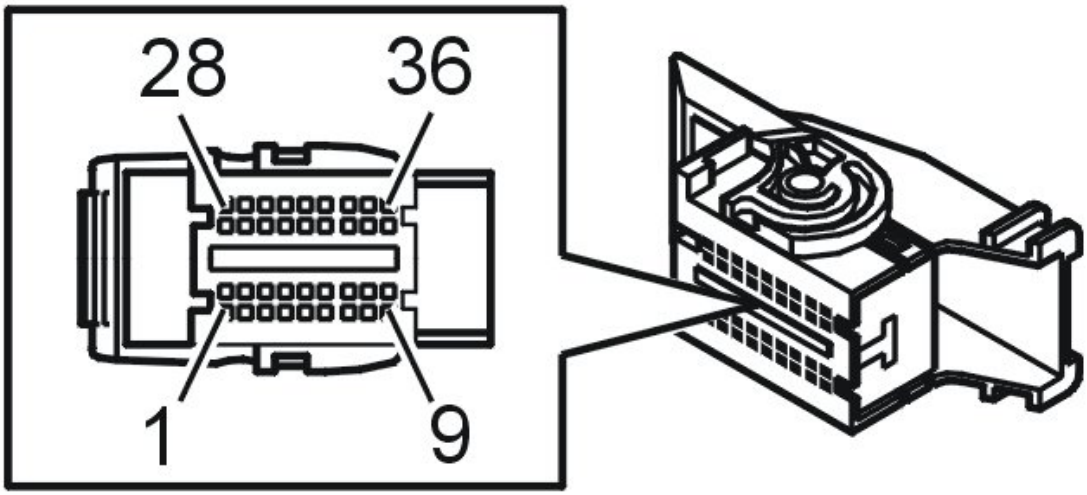
Check central electronic module (CEM) connector terminal C and engine control module (ECM) connector B. Check for contact resistance. Check for oxidation. Check for damage. Check for loose connections. Also check the intermediate connectors.
Check the signal cable. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #C15 (#15) and engine control module (ECM) terminal #B27.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



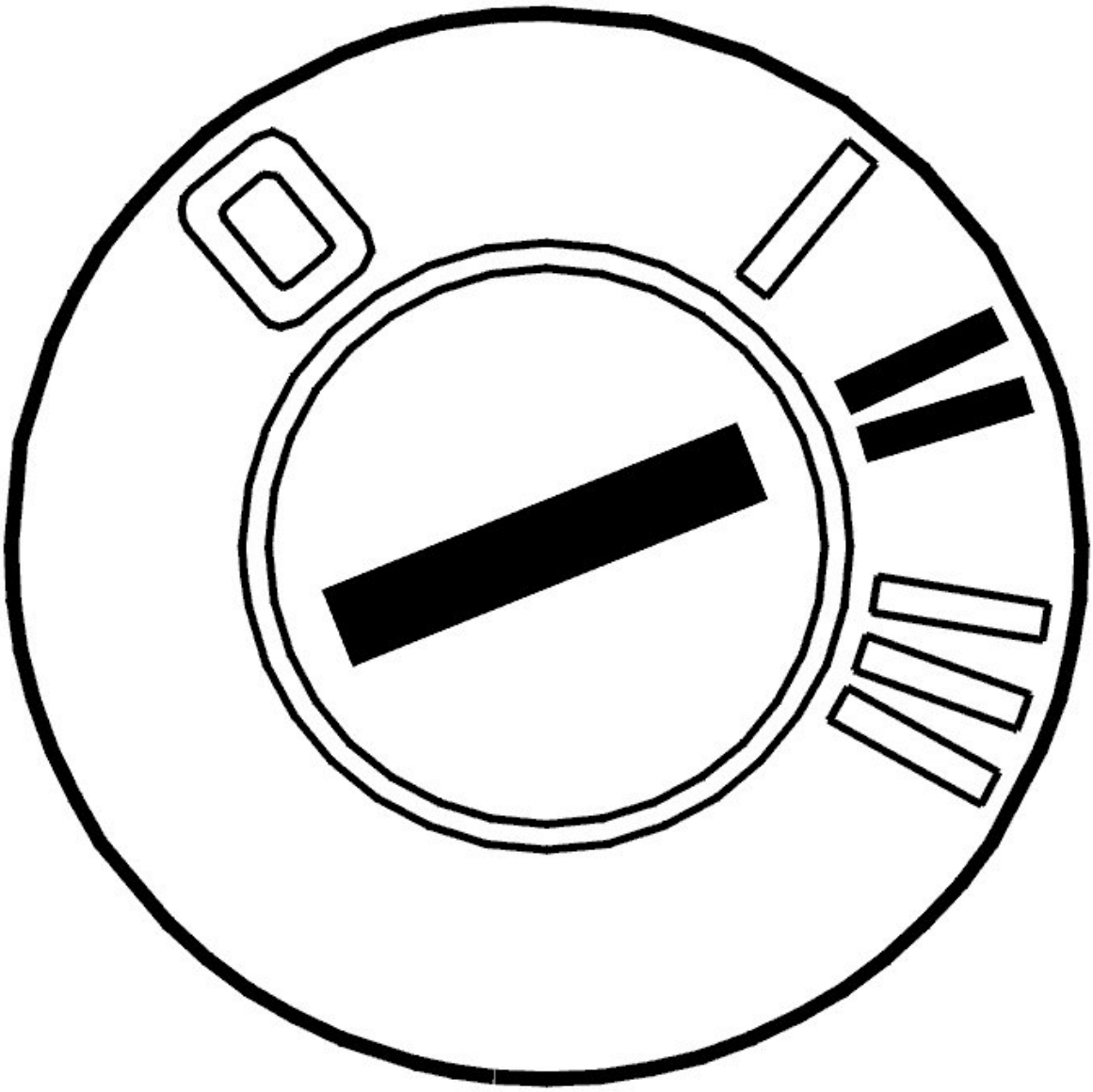
Continue - Verification

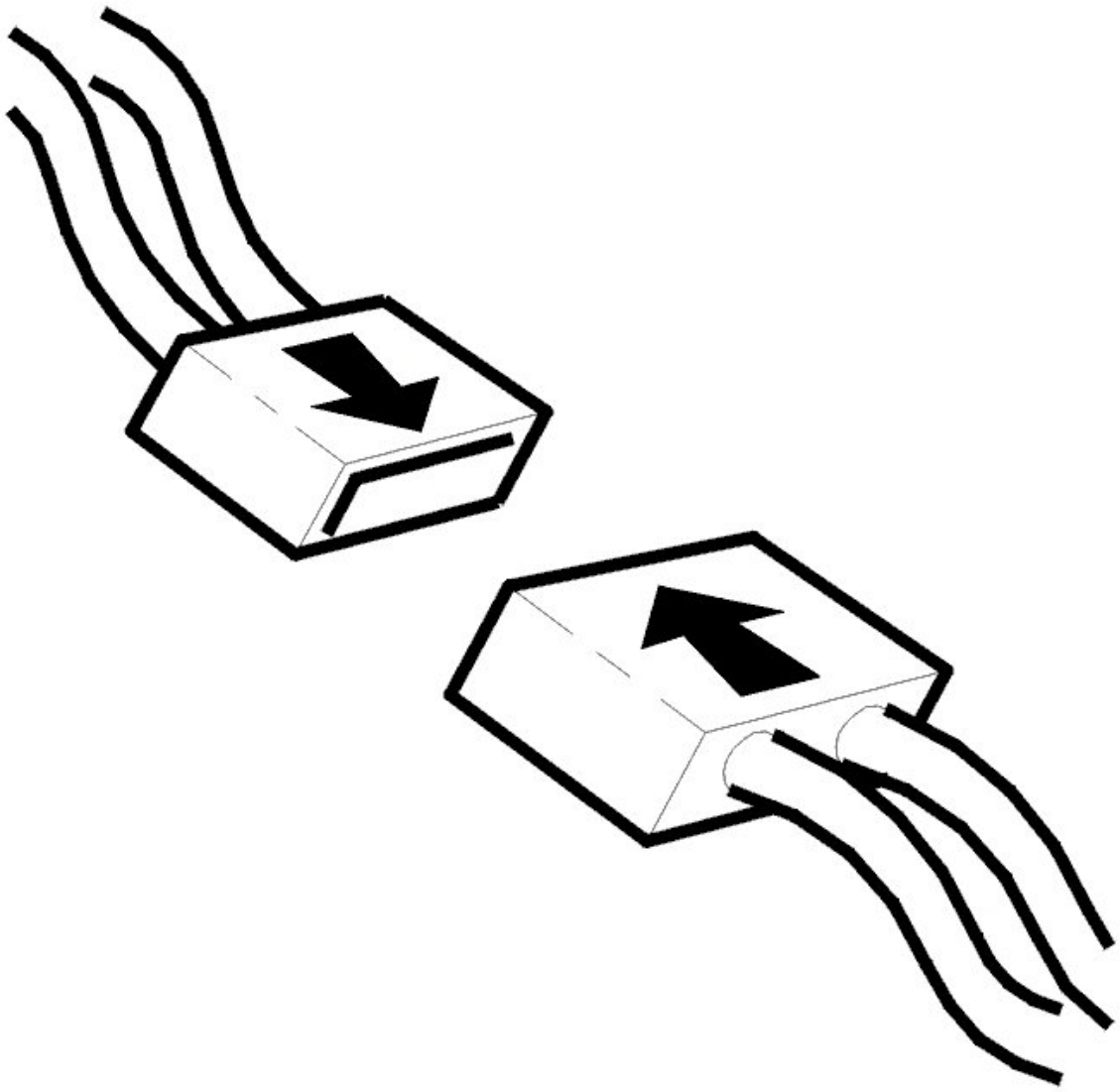
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate reading off the status. Click the VCT2000 symbol.
Activate and deactivate the function.
Check that the function is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

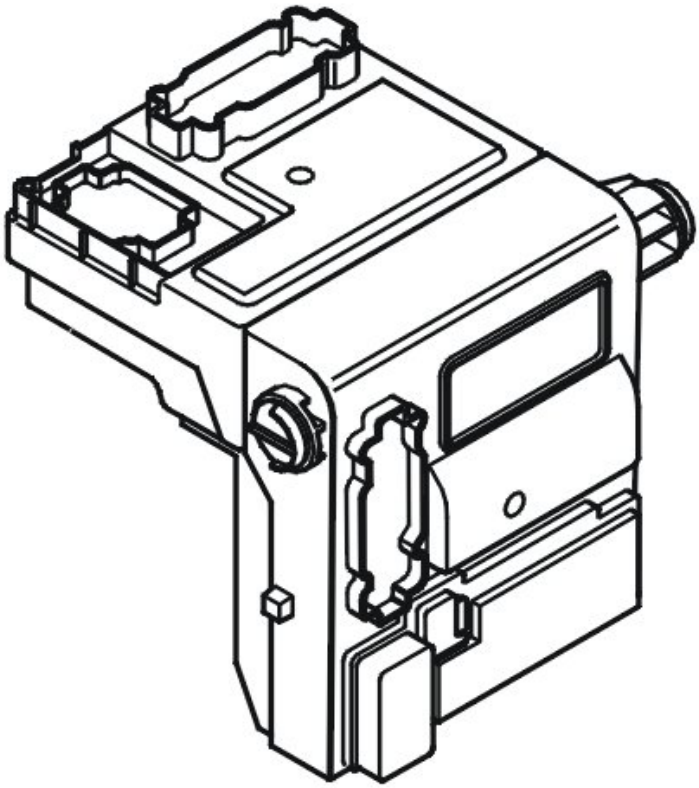
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F09

Condition



The central electronic module (CEM) checks the re-engagement signal from the driver circuit to the wake-up signal for the engine control module (ECM) and to the hazard warning signal flasher. Both functions are controlled by the same driver circuit in the central electronic module (CEM) but can only be re-engaged once.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the wake-up signal to the engine control module (ECM) is too high.
The diagnostic trouble code (DTC) can be detected when the ignition is on and when the lamp in the switch for the hazard warning signal flasher is not lit.

Substitute value

- None.

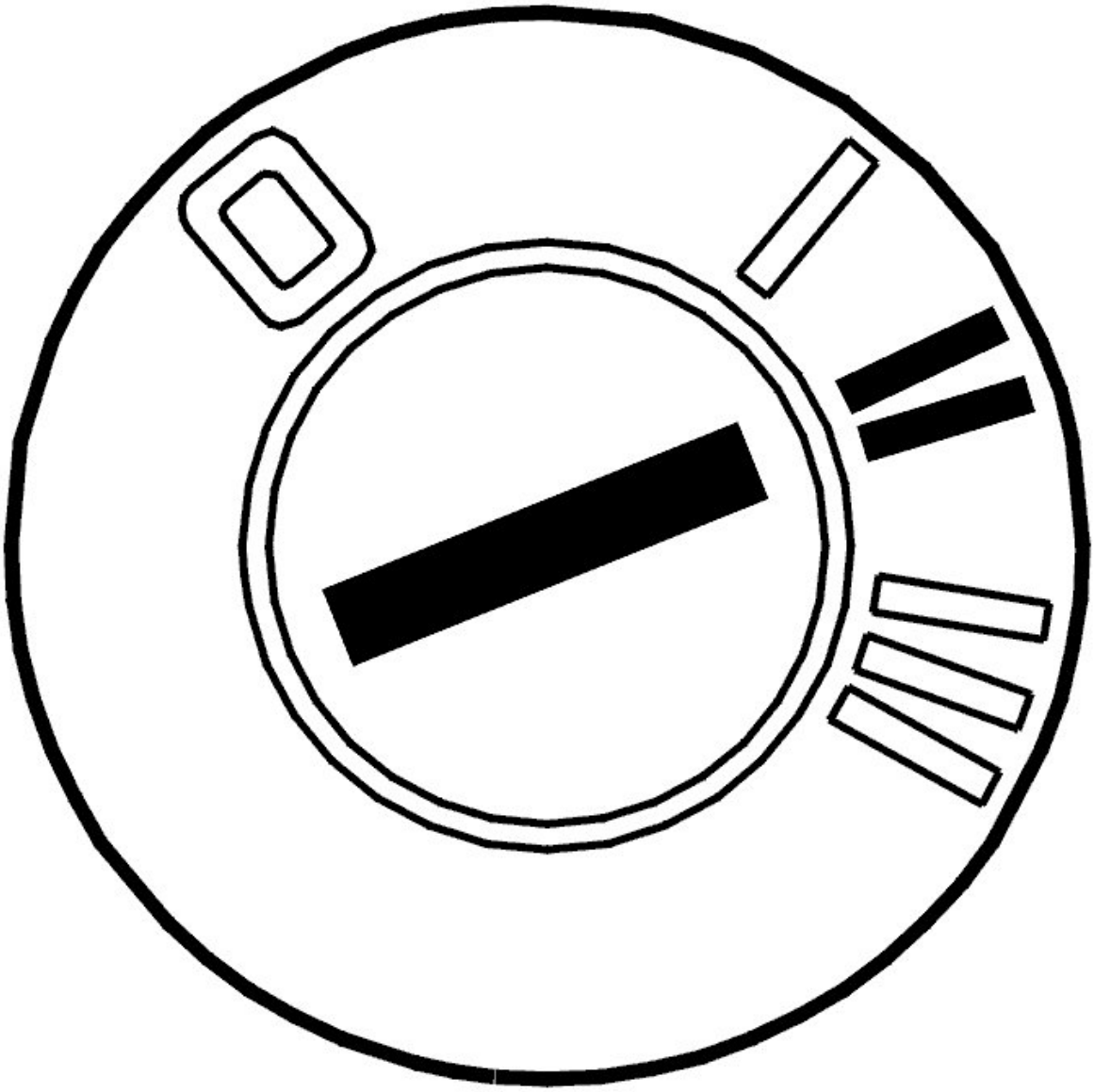
Possible source
- Open-circuit in the signal cable for the engine control module (ECM).

Fault symptom[s]
- The starter motor turns but the engine does not start.

Signal Too High

Signal too high

Checking the status

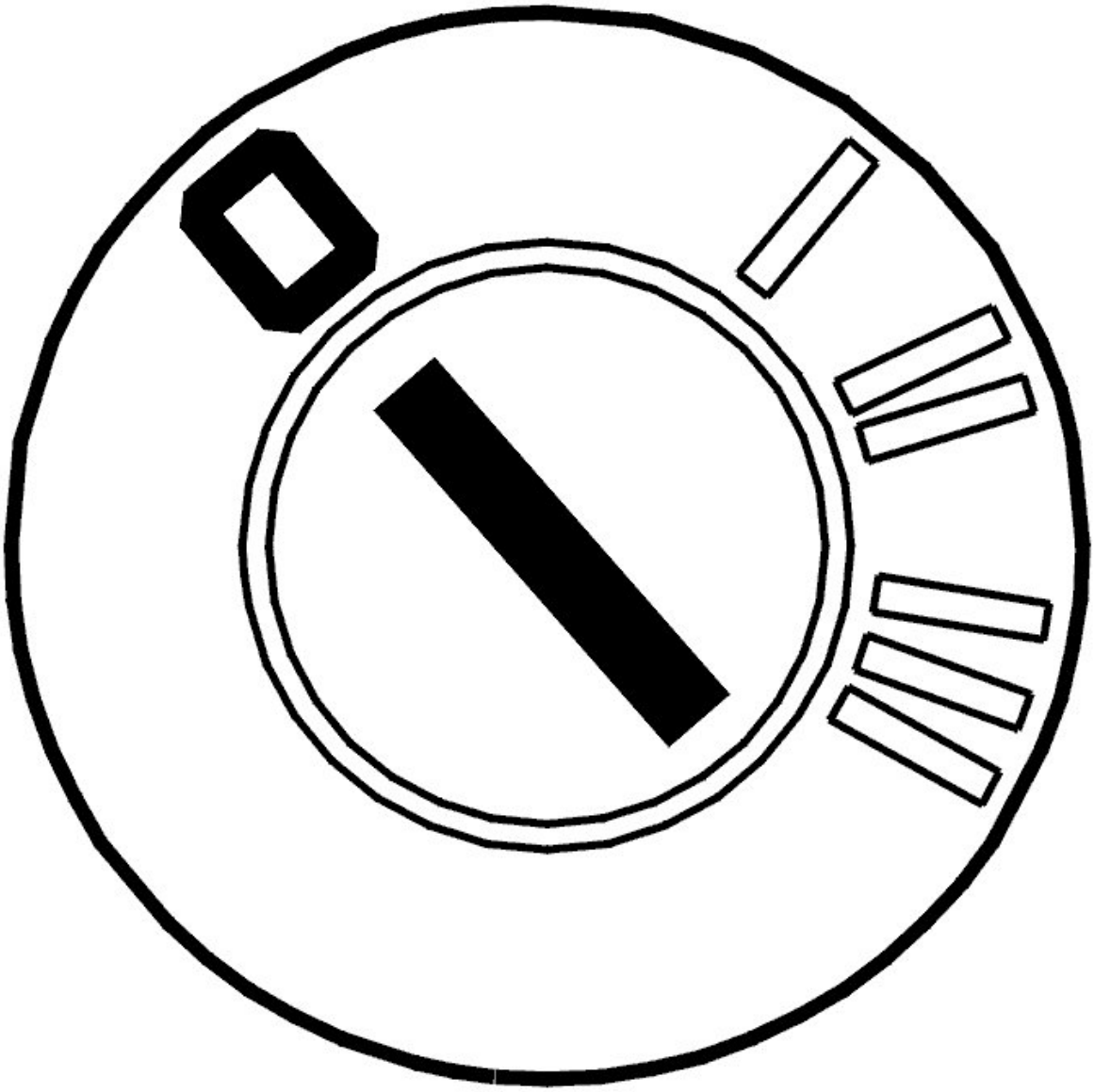


- Ignition on.

Read off the status of the waking signal for the engine control module (ECM).
Change the ignition key position from position I to II.
Check if the fault is permanent or intermittent.
The status of the wake-up signal for the engine control module (ECM) must change when changing the ignition key position.
If the status of the waking signal for the engine control module (ECM) does not change, the fault is permanent.
If the status of the waking signal for the engine control module (ECM) changes, this is an indication that the fault was present previously but that it is not active at the moment, i.e. the fault is intermittent.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

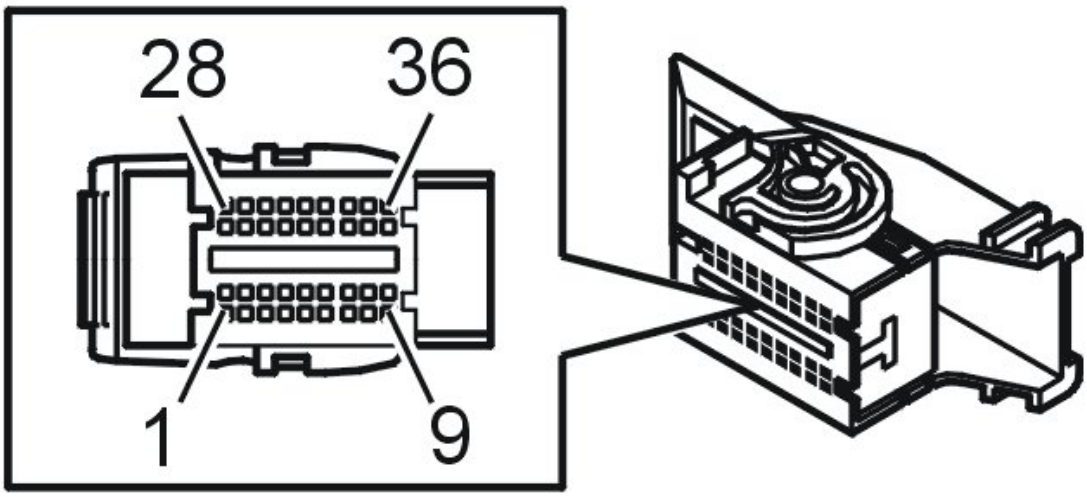
Check central electronic module (CEM) connector terminal C and engine control module (ECM) connector B. Check for contact resistance. Check for oxidation. Check for damage. Check for loose connections. Also check the intermediate connectors.
Check the signal cable. Check for an open-circuit.
Take readings between:

- Central electronic module (CEM) terminal #C15 (#15) and engine control module (ECM) terminal #B27.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



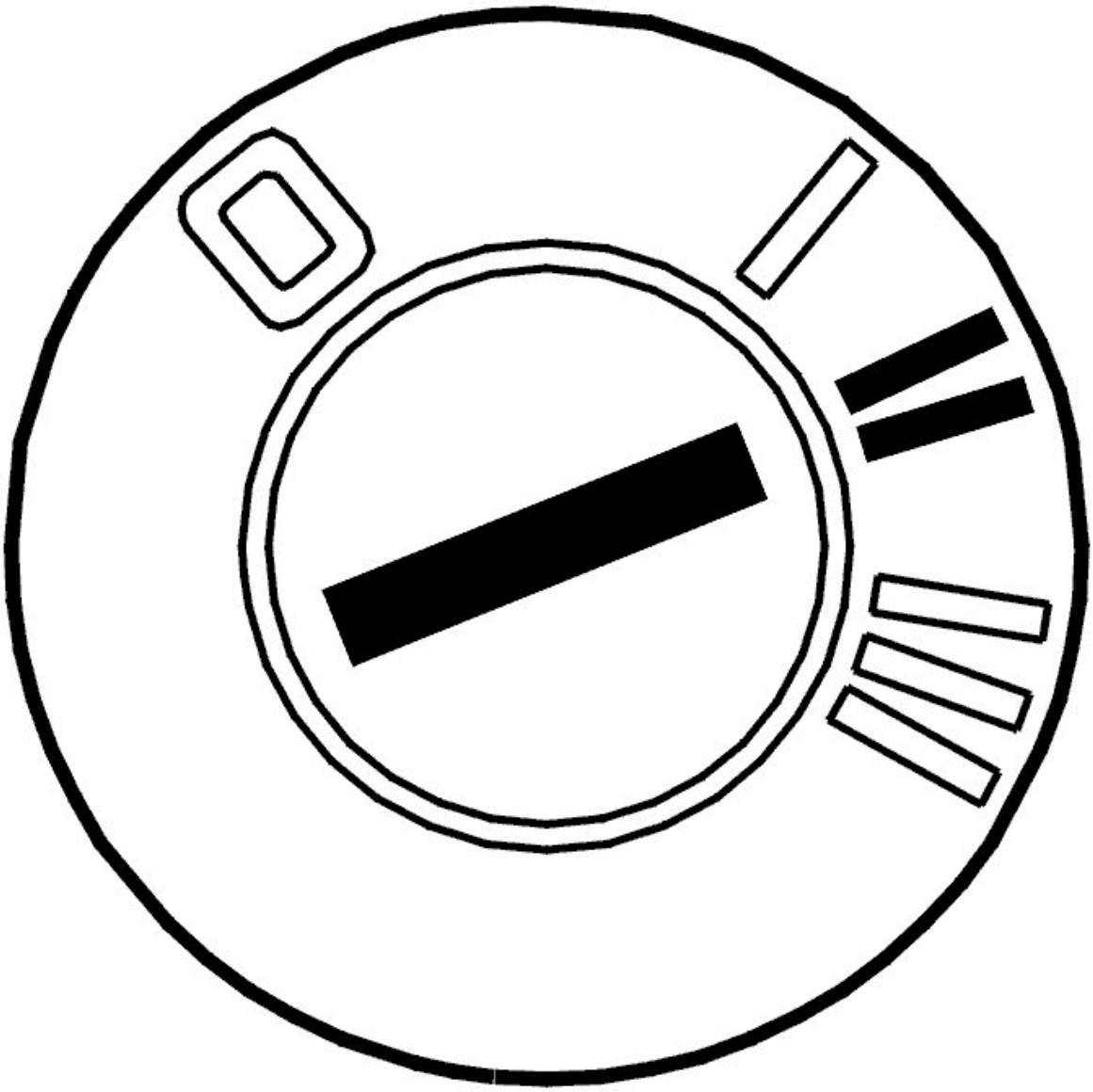
Continue - Verification

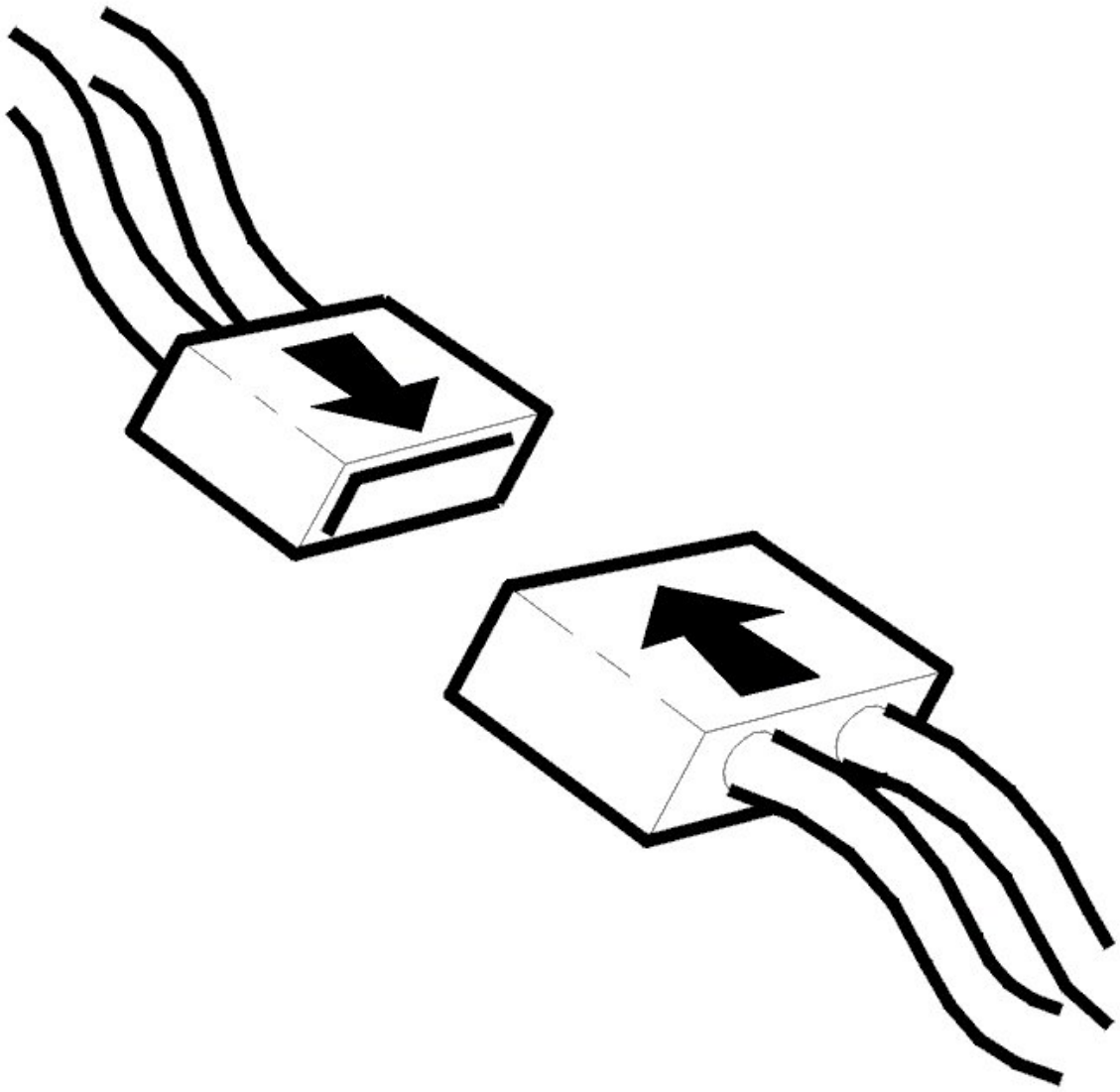
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate reading off the status. Click the VCT2000 symbol.
Activate and deactivate the function.
Check that the function is OK.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

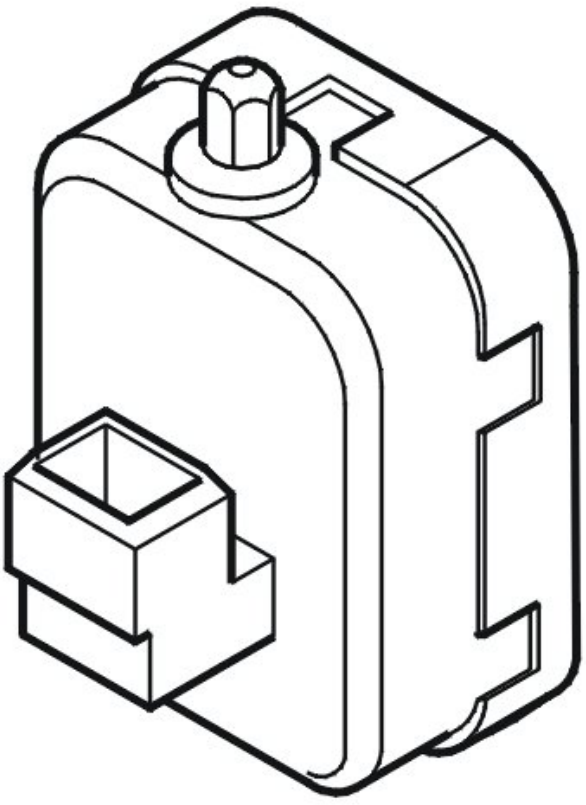
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F11

Condition



The central electronic module (CEM) checks the signal for the headlamp beam height control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the voltage to headlamp beam height control exceeds 90% of the supply voltage.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

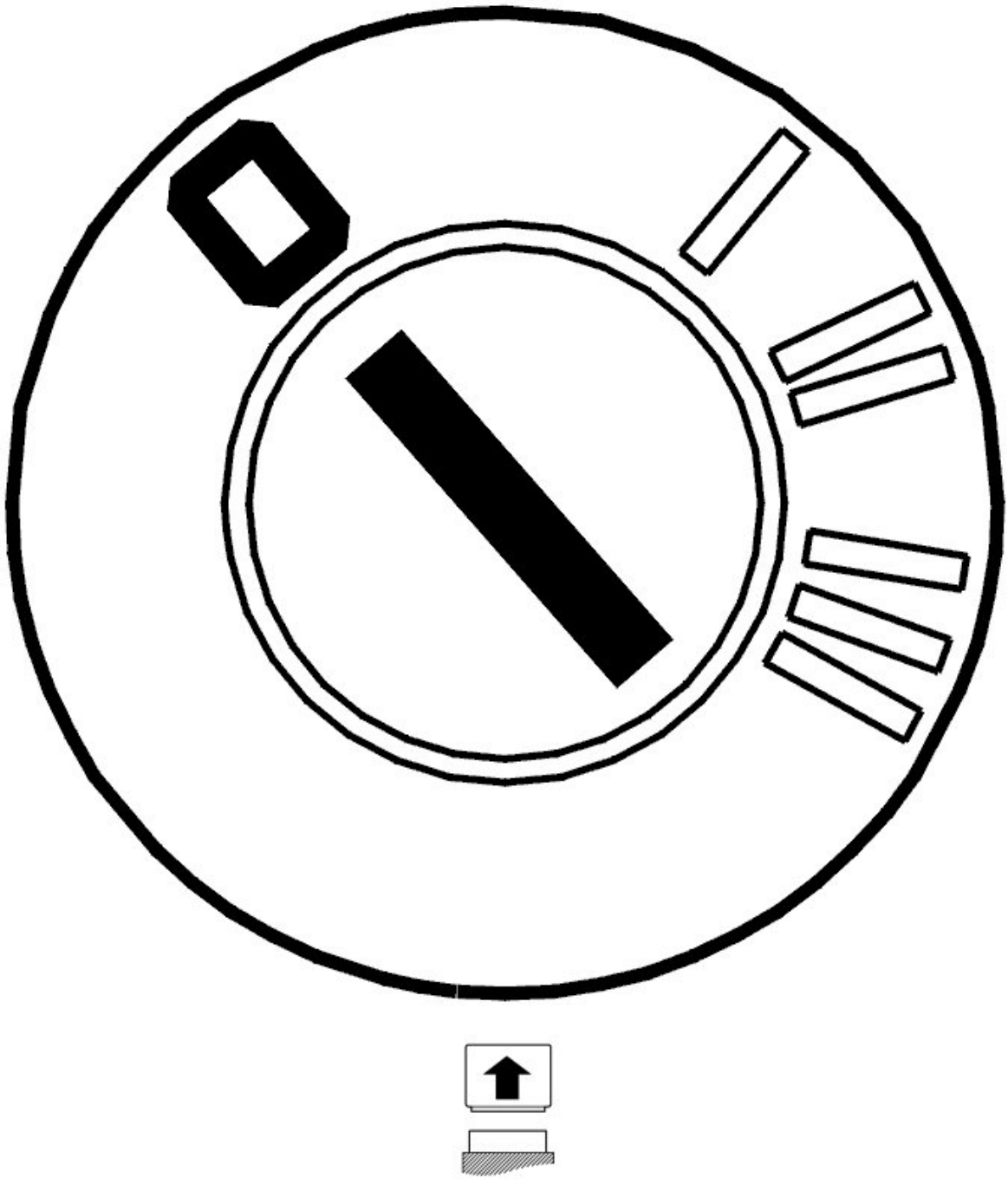
Possible source
- Damaged actuator motor for headlamp beam height control
- Short-circuit to supply voltage in signal cable.

Fault symptom[s]
- Incorrect setting for low beam.

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:
- Central electronic module (CEM) terminal #C12 (#12) and left headlamp alignment motor terminal #2
- Central electronic module (CEM) terminal #C11 (#11) and right headlamp alignment motor terminal #2.

If no fault was found, replace the actuator motor for headlamp beam height control.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters

- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

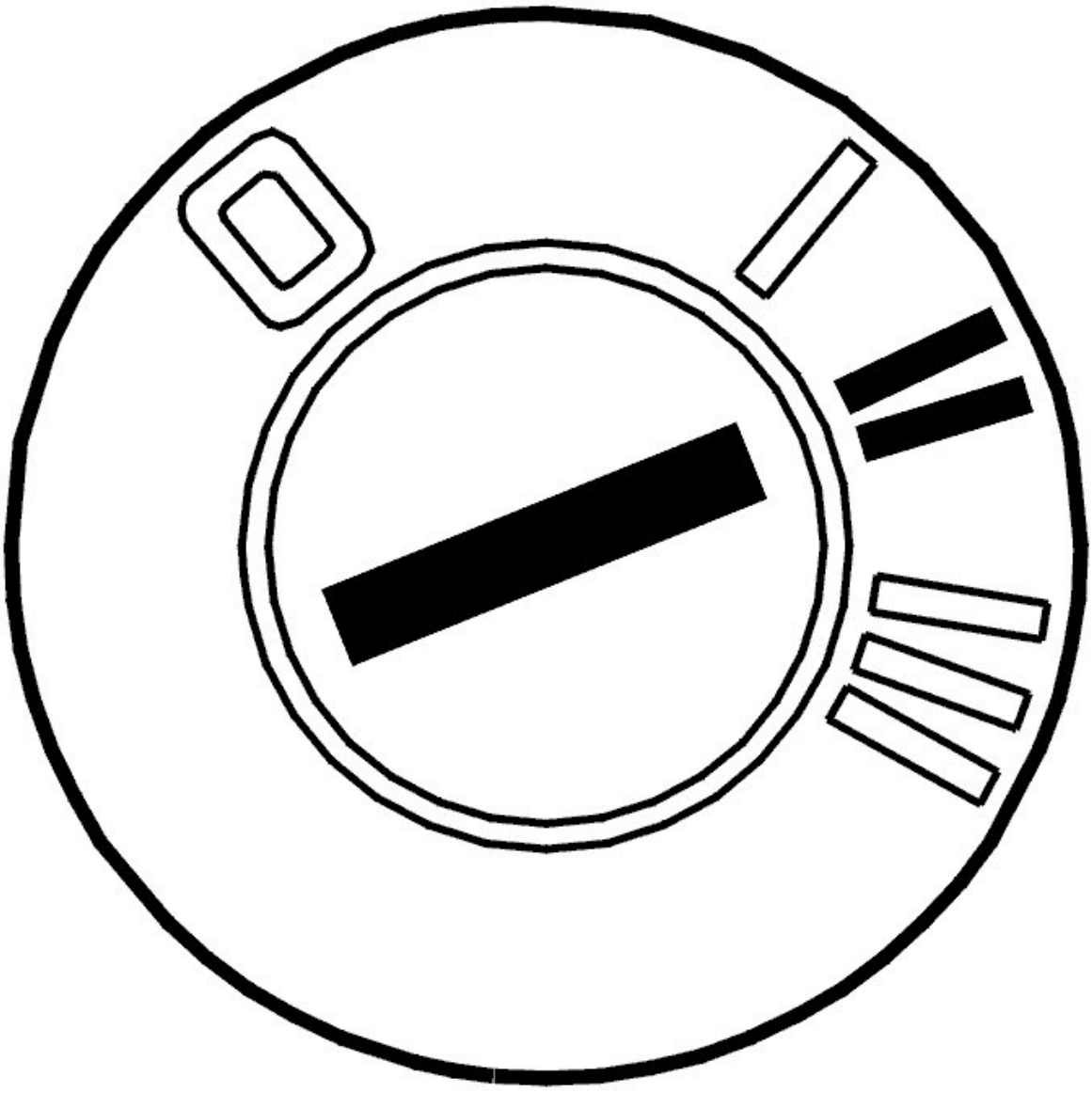
Continue - Verification

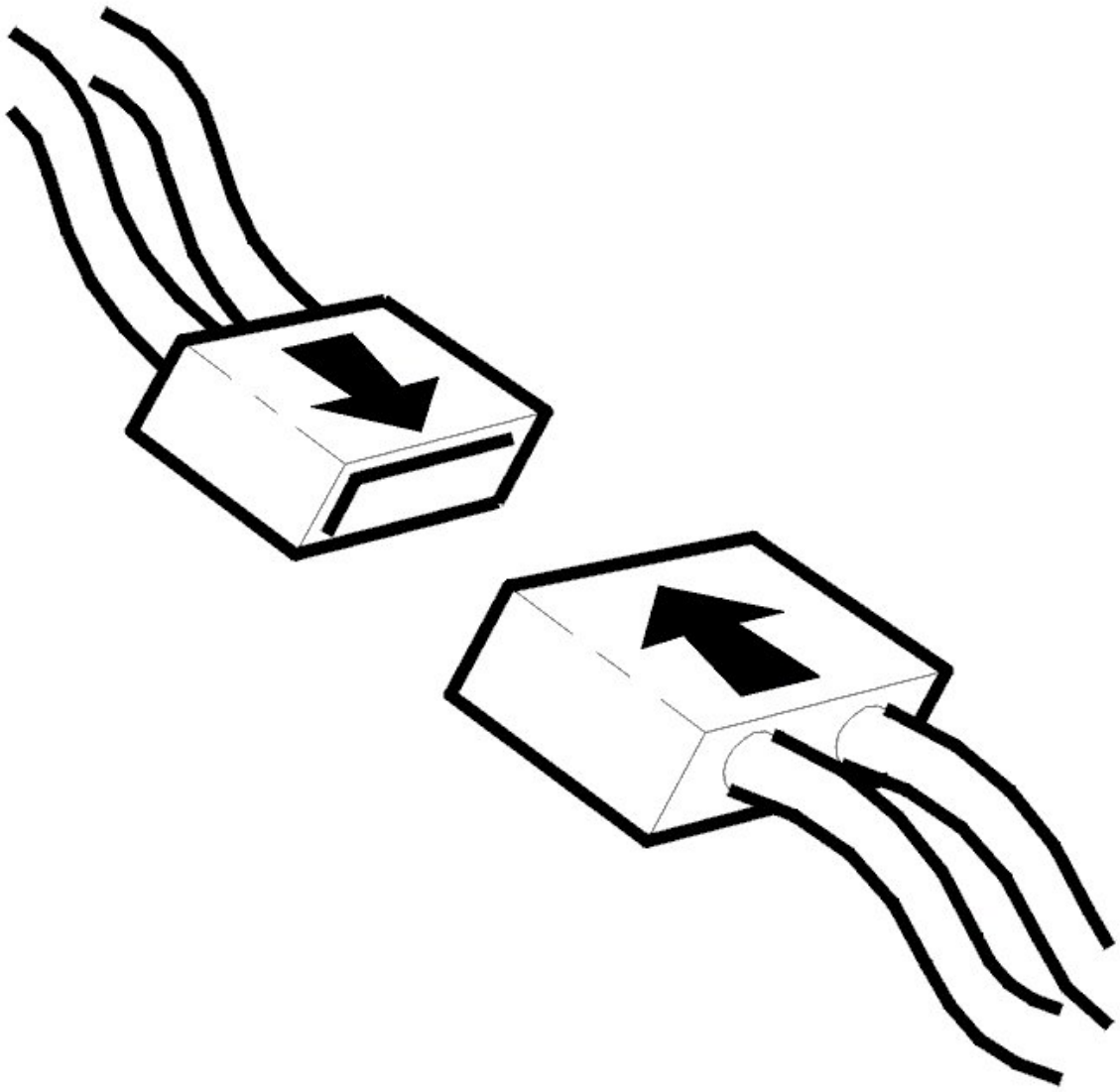
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Adjust the beam length between maximum and minimum.
Check that the beam length changes.

Does the beam length change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

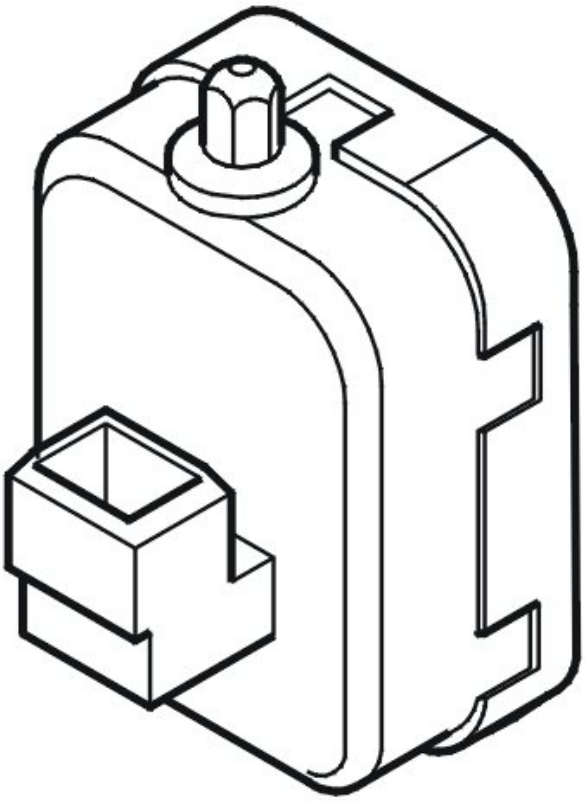
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F12

Condition



The central electronic module (CEM) checks the signal for the headlamp beam height control.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects that the voltage to the headlamp beam height control is below 10% of the supply voltage.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

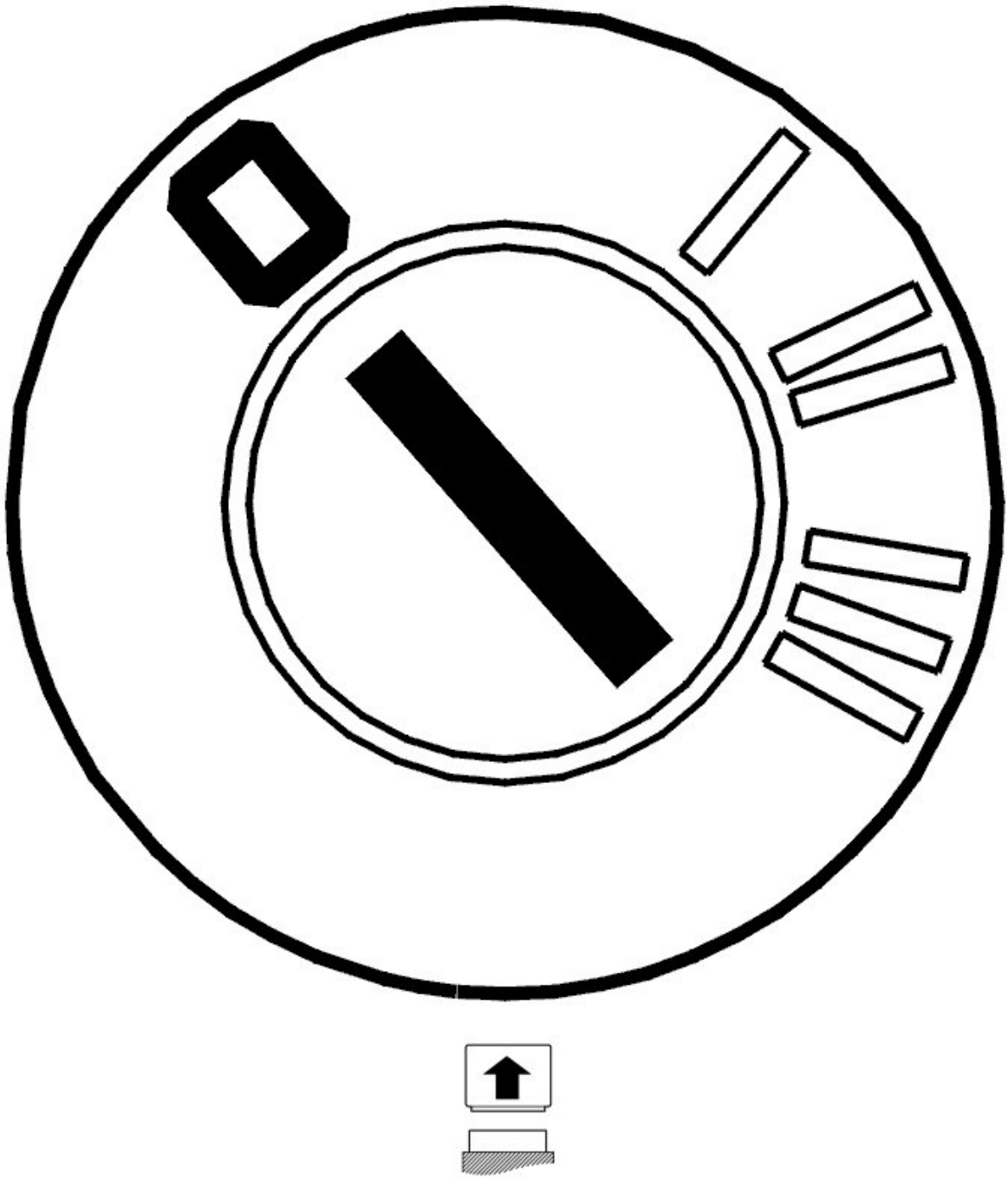
Possible source
- Damaged actuator motor for headlamp beam height control
- Open-circuit in the cable or short-circuit to ground.

Fault symptom[s]
- Incorrect setting for low beam.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector C.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) terminal #C12 (#12) and left headlamp alignment motor terminal #2
- Central electronic module (CEM) terminal #C11 (#11) and right headlamp alignment motor terminal #2.

If no fault was found, replace the actuator motor for headlamp beam height control.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

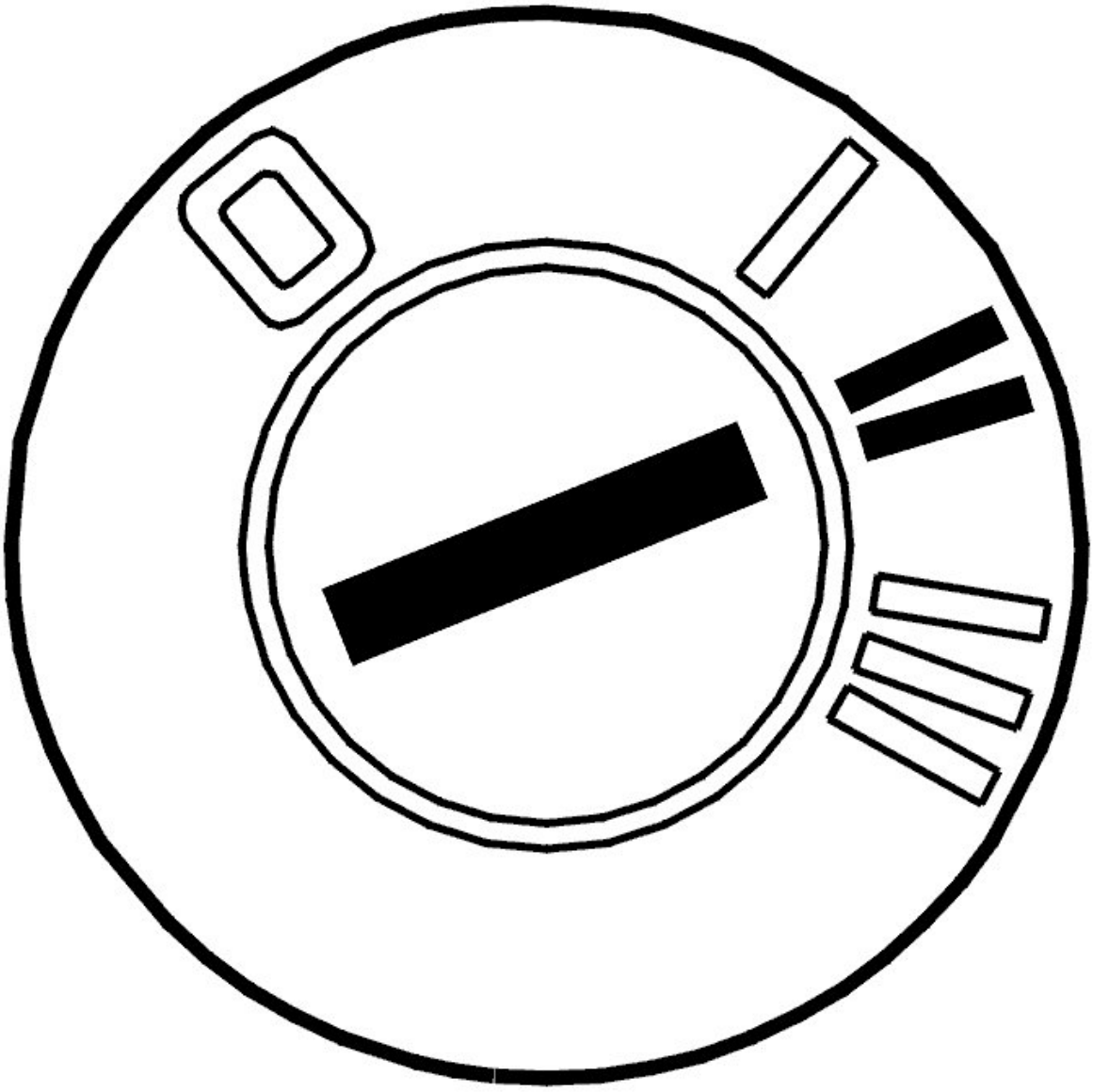
Continue - Verification

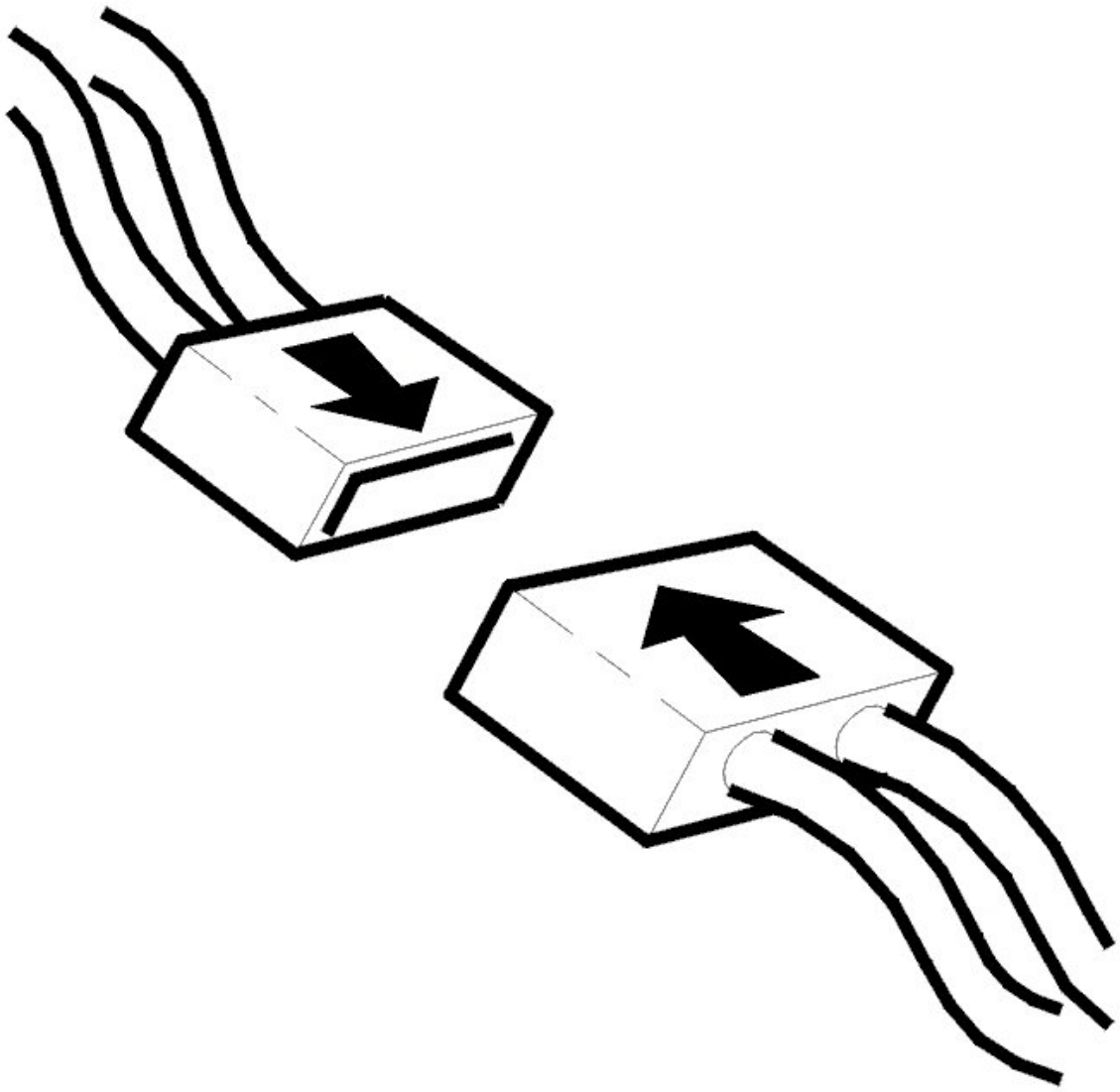
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Adjust the beam length between maximum and minimum.
Check that the beam length changes.

Does the beam length change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

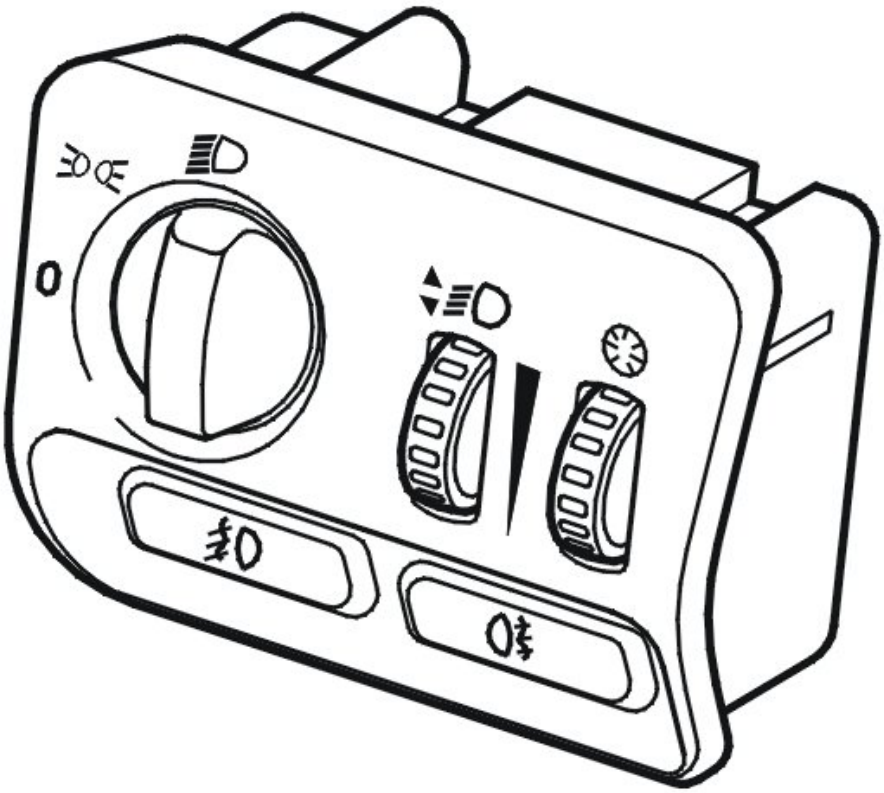
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F13

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that the signal from the headlamp beam height control is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged controller in the light switch module (LSM).

Fault symptom[s]
- Beam height control does not function.

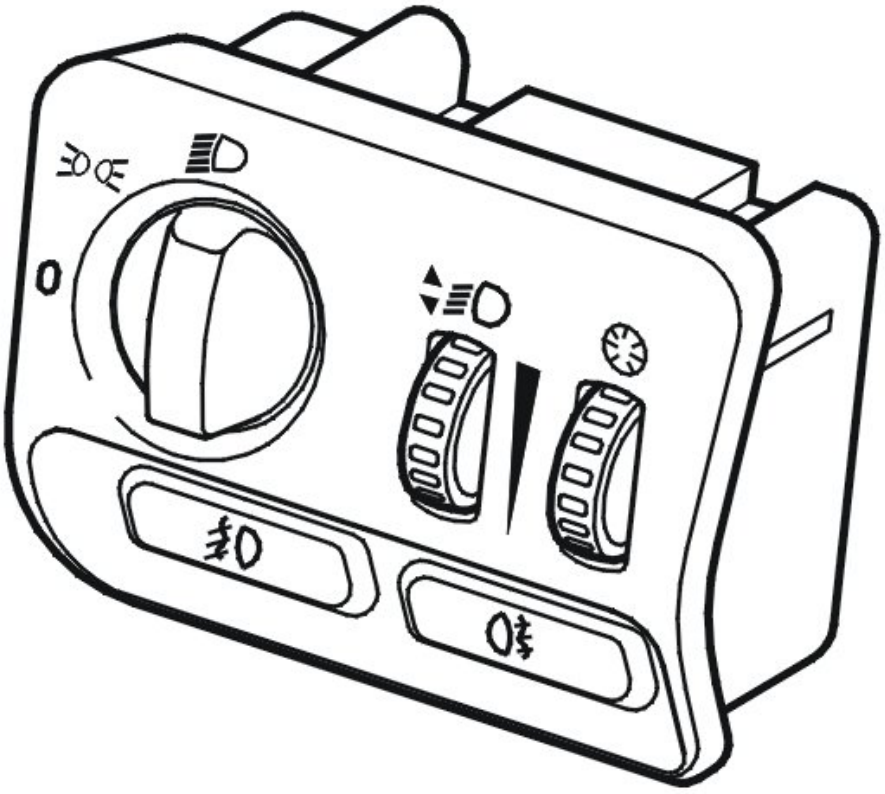
Signal Too High

Signal too high

Replacing the component

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The central electronic module (CEM) has registered an internal fault in the light switch module (LSM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the light switch module (LSM).
Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

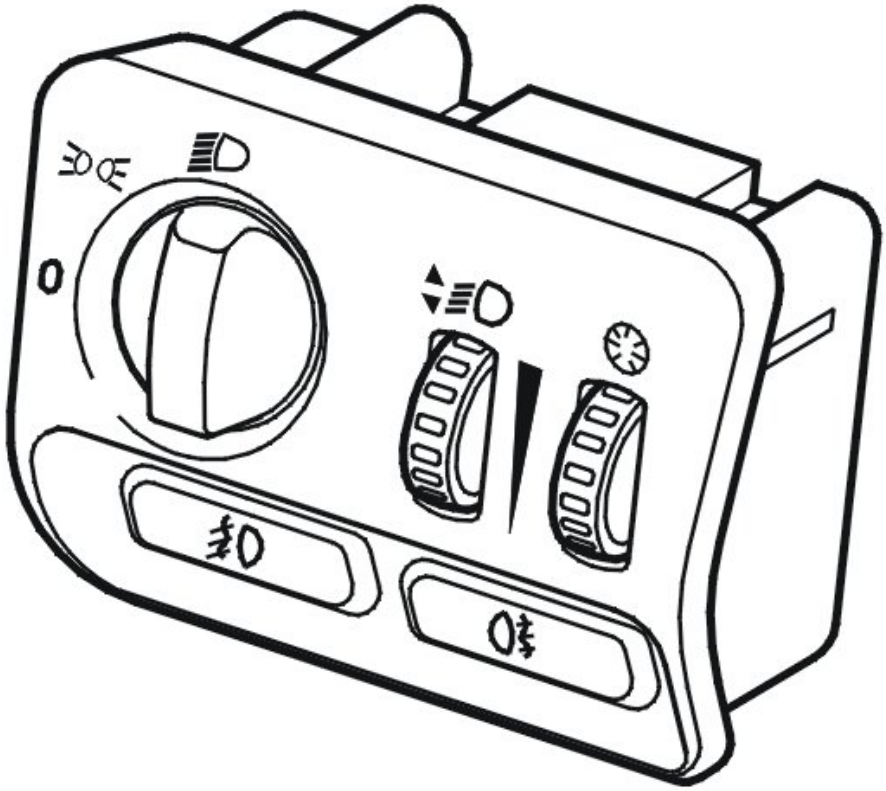
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F14

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that the signal from the headlamp beam height control is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Damaged controller in the light switch module (LSM).

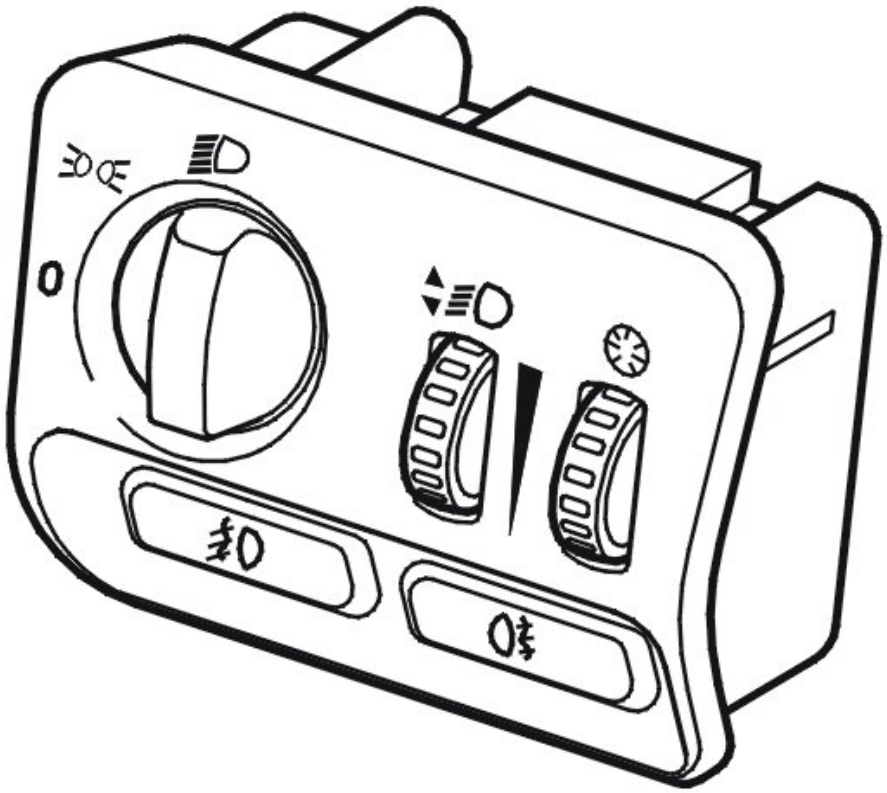
Fault symptom[s]
- Beam height control does not function.

Signal Too Low

Signal too low

Replacing the component

The central electronic module (CEM) has registered an internal fault in the light switch module (LSM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the light switch module (LSM).
Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F15

Condition

The central electronic module (CEM) checks the signal from the left-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a fault in the left-hand Xenon bulb.
The diagnostic trouble code (DTC) can be detected with the ignition on and when switching between low and high beam.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value

- Shortest headlamp range will be used.

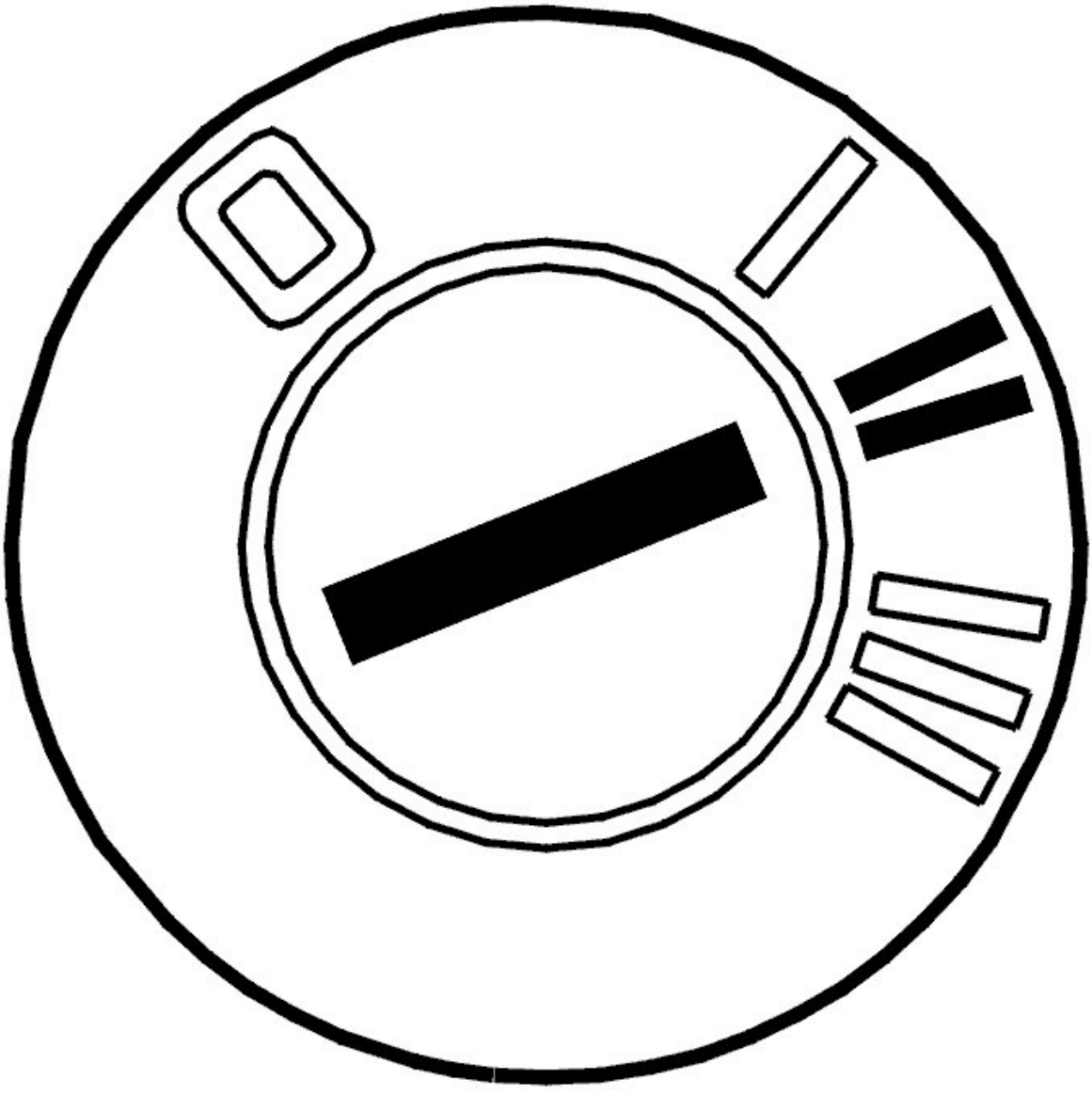
Possible source
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Faulty Signal

Faulty signal

Checking the status



- Ignition on.
- Switch between high and low beam.

If the left-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the left-hand Xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Do the xenon lamps switch between high and low beam?

Yes - Fault Found

No - Replacing a component

Replacing a component

The diagnostic trouble code (DTC) indicates that the actuator motor in the left Xenon lamp is damaged.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

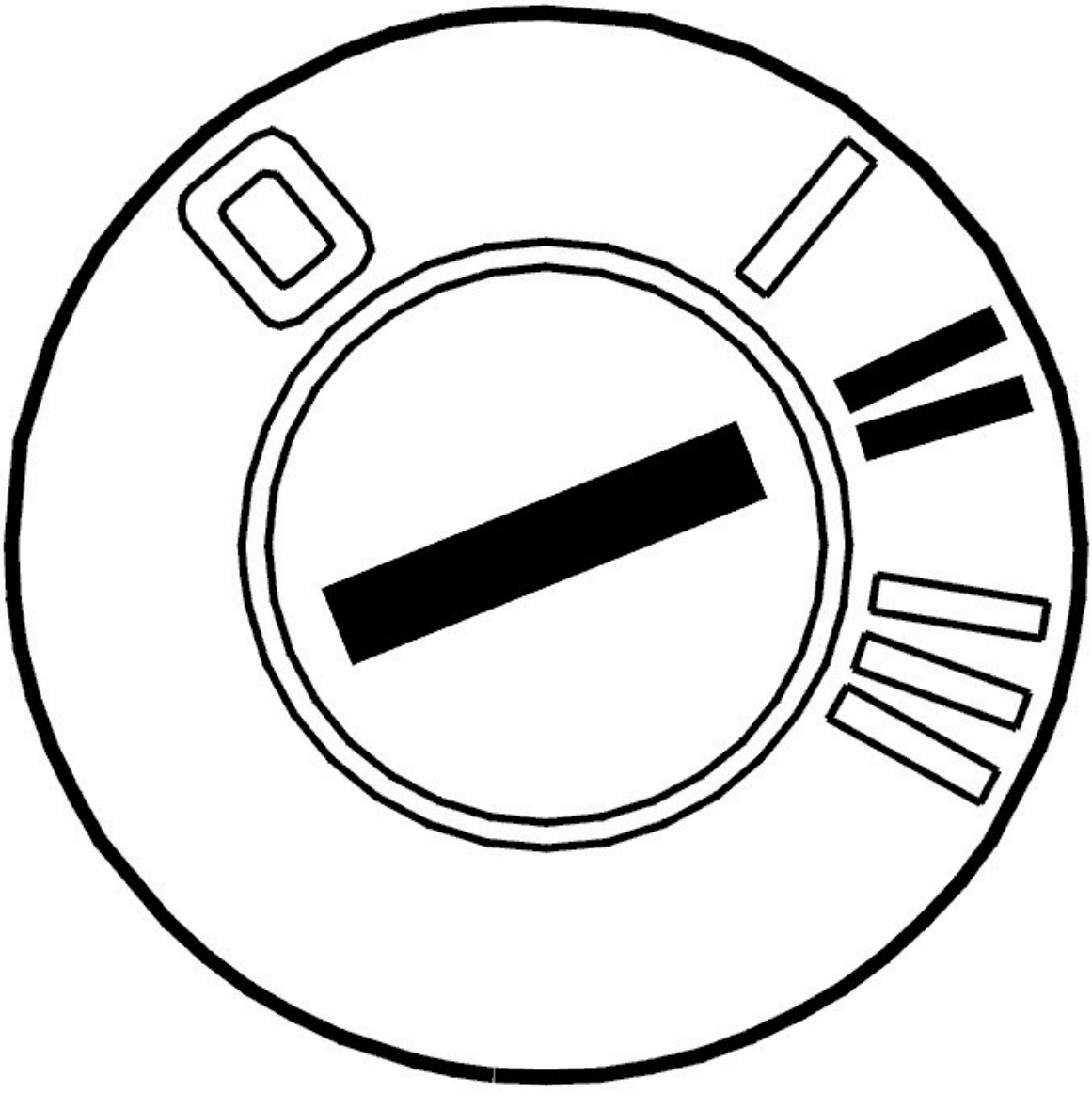
Continue - Verification

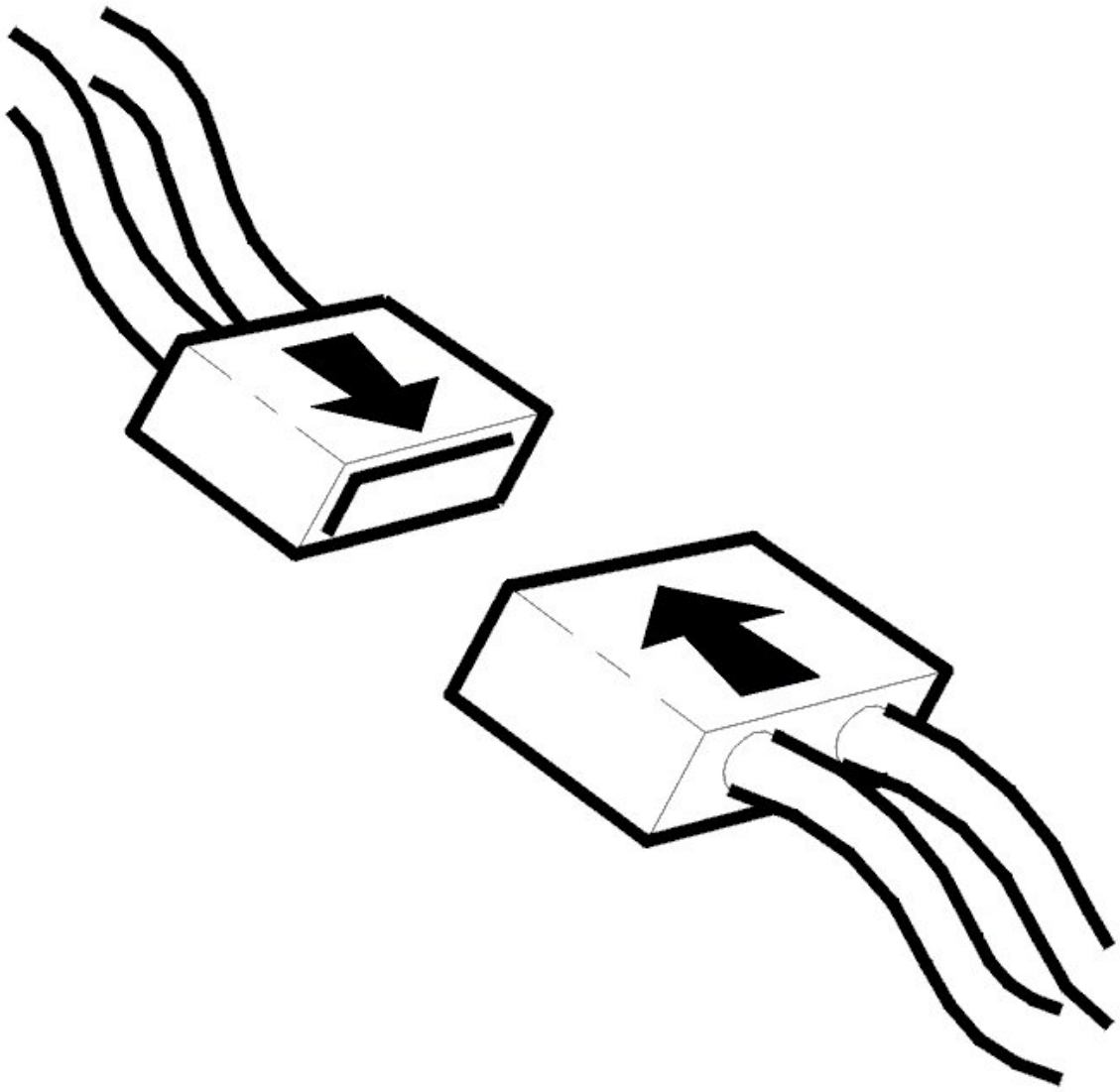
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing a component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F16

Condition

The central electronic module (CEM) checks the signal from the left-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the left-hand Xenon bulb is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

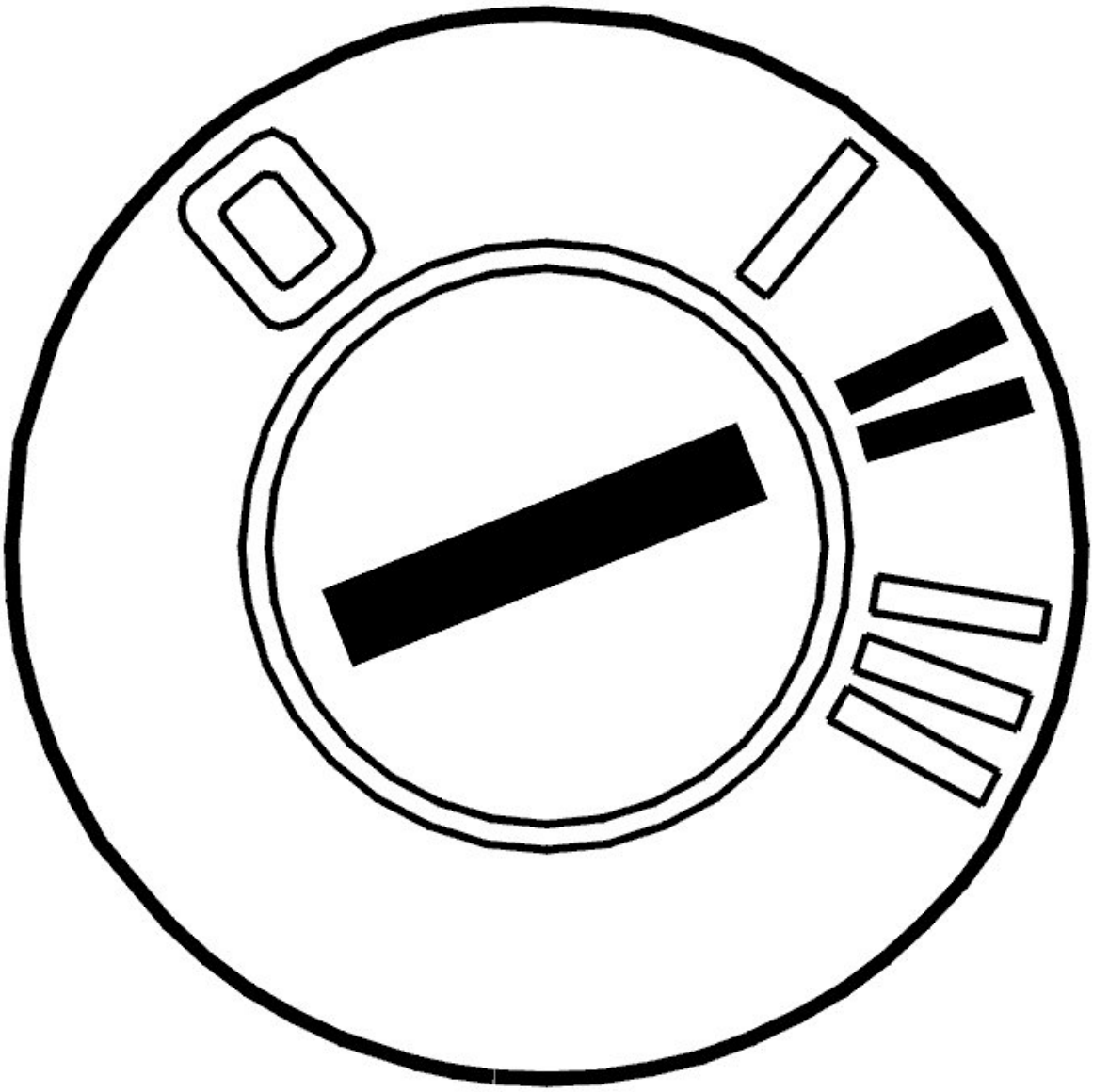
Possible source
- Short-circuit to ground in the signal cable
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Signal Too Low

Signal too low

Checking the status



- Ignition on.
- Switch between high and low beam.

If the left-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the left-hand Xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the signal cable between the central electronic module (CEM) and the actuating motor in the left Xenon headlamp for short circuit to ground.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the left headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

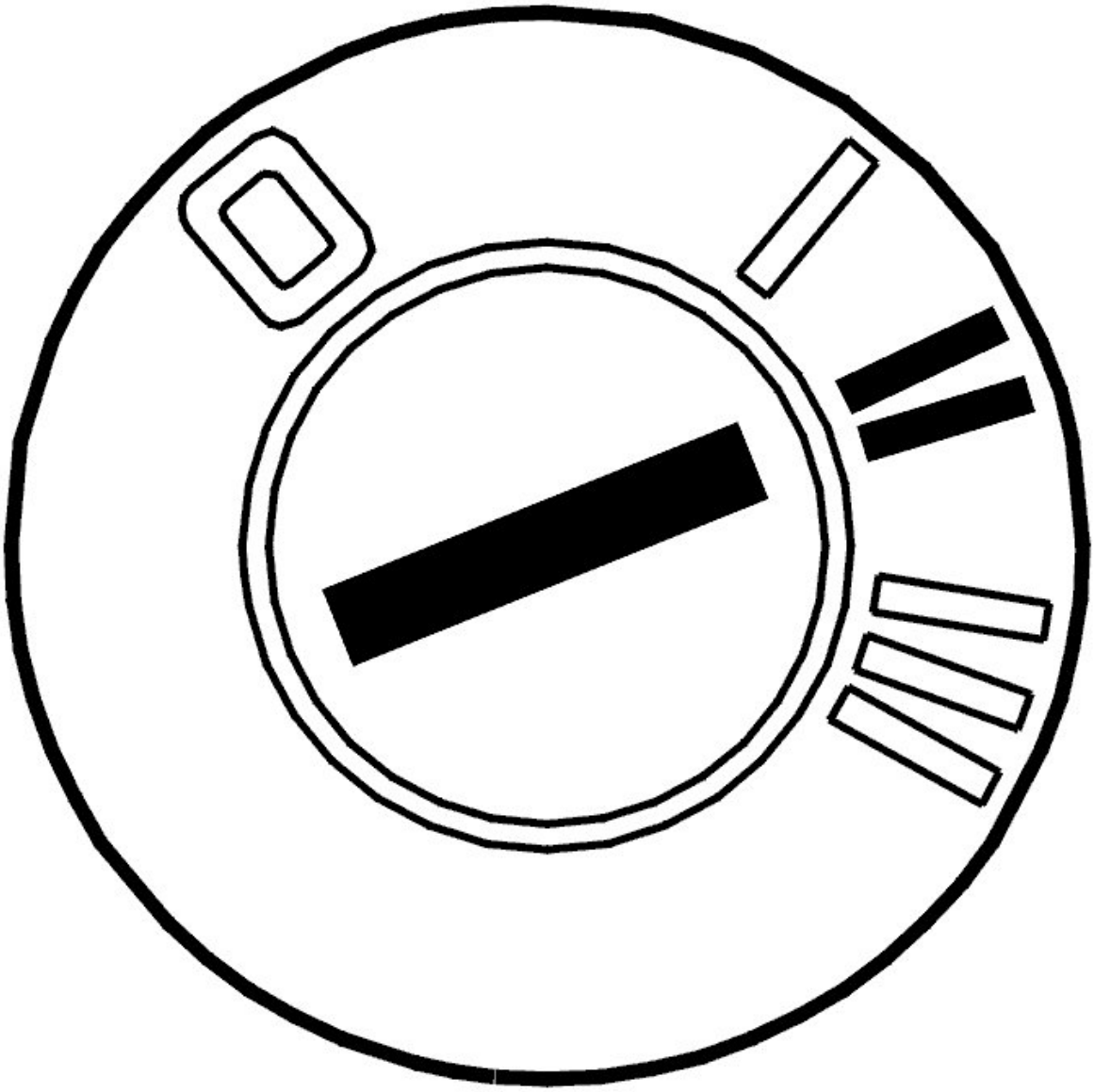
Continue - Verification

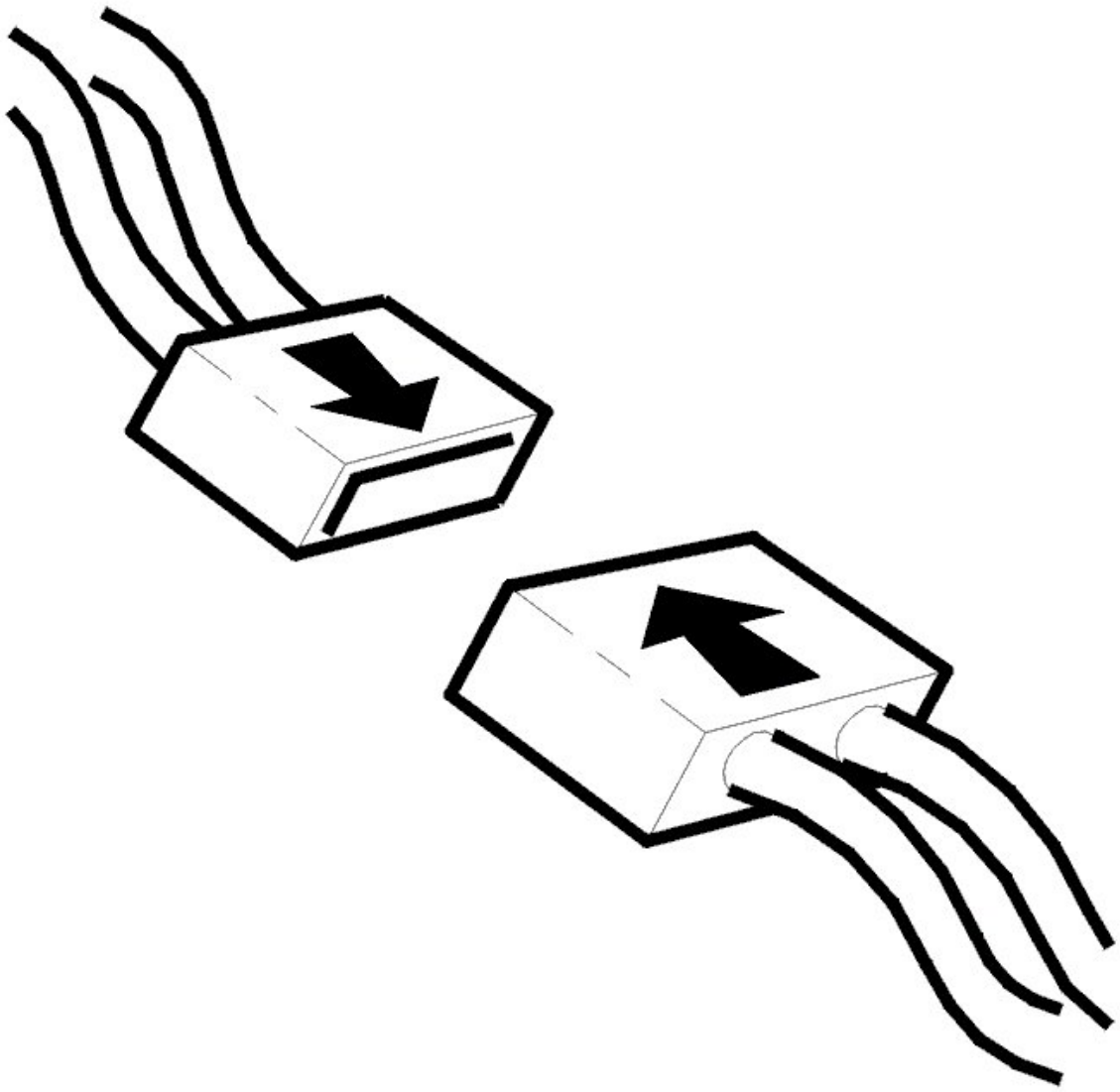
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F17

Condition

The central electronic module (CEM) checks the signal from the left-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the left-hand Xenon bulb is faulty.
The diagnostic trouble code (DTC) can be detected when the ignition has been on for at least 10 seconds and the battery voltage is above 10.5 V.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

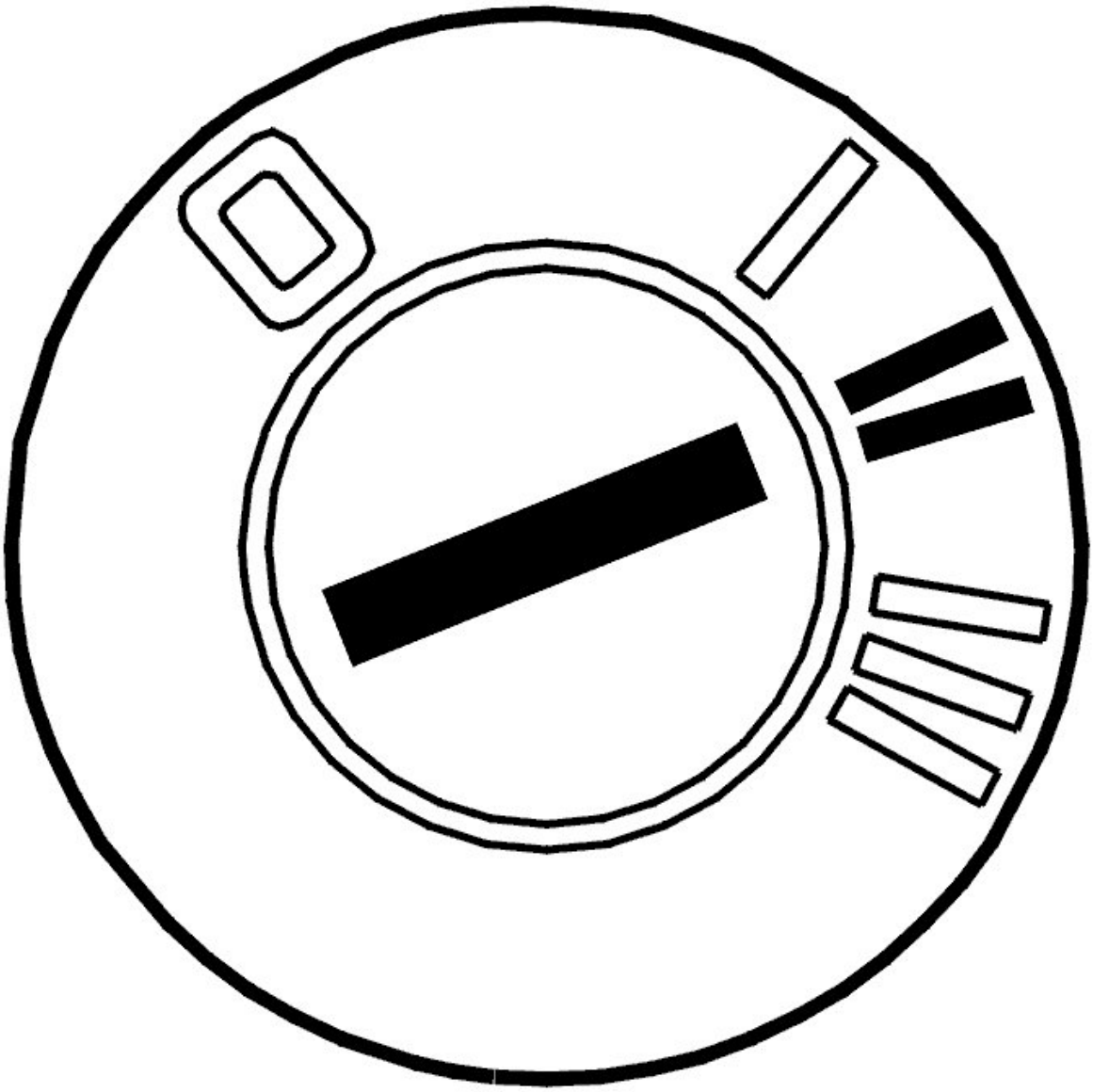
Possible source
- Damaged gas discharge lamp module (GDL).

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Faulty Signal

Faulty signal

Checking the status



- Ignition on.
- Switch between high and low beam.

If the left-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the left-hand Xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the power supply and grounding point for the actuating motor in the left headlamp.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the left headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

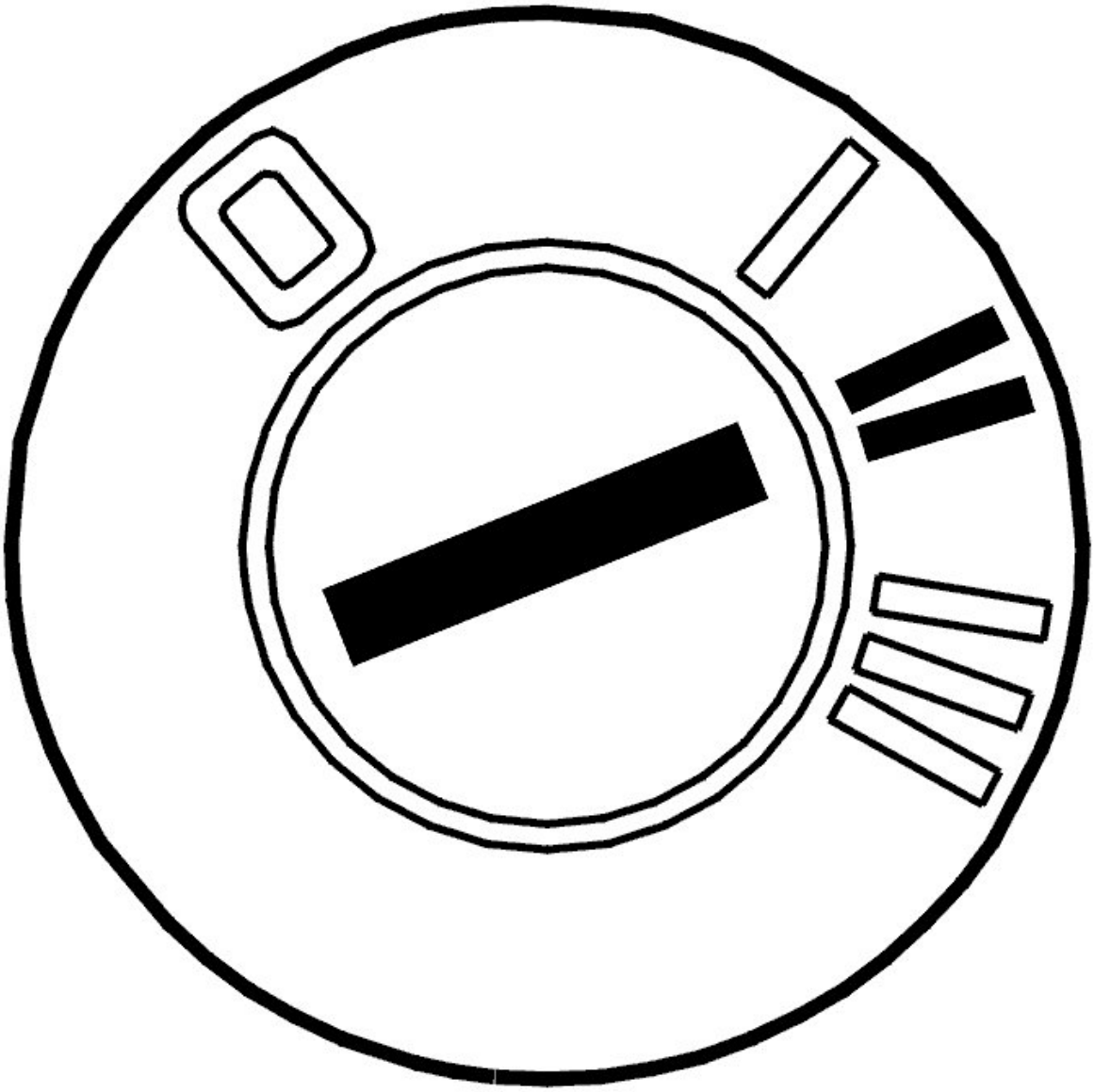
Continue - Verification

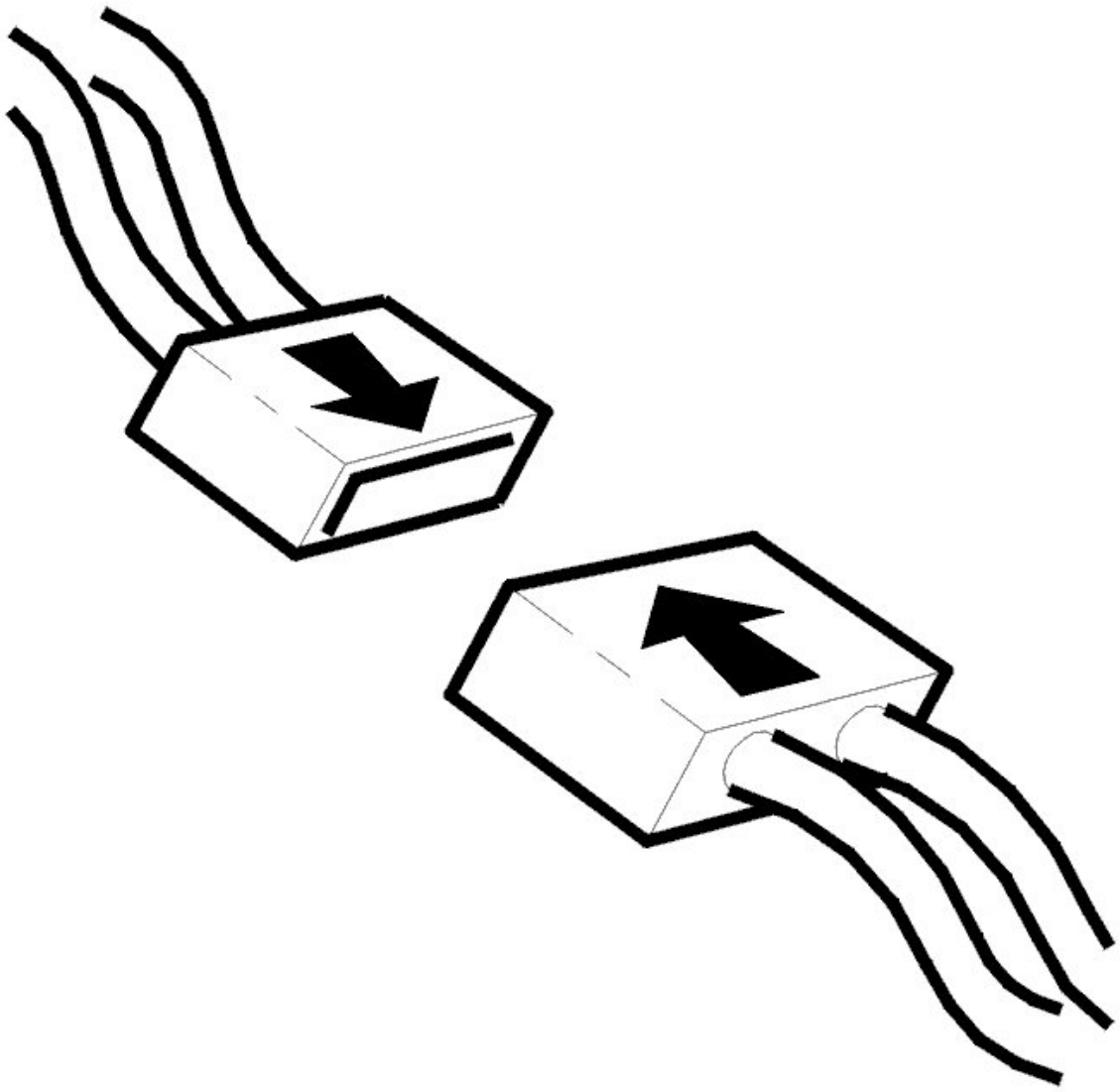
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F18

Condition

The central electronic module (CEM) checks the signal from the left-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the left-hand Xenon bulb is too high.
The diagnostic trouble code (DTC) can be detected when the ignition has been on for at least 10 seconds and the battery voltage is above 10.5 V.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

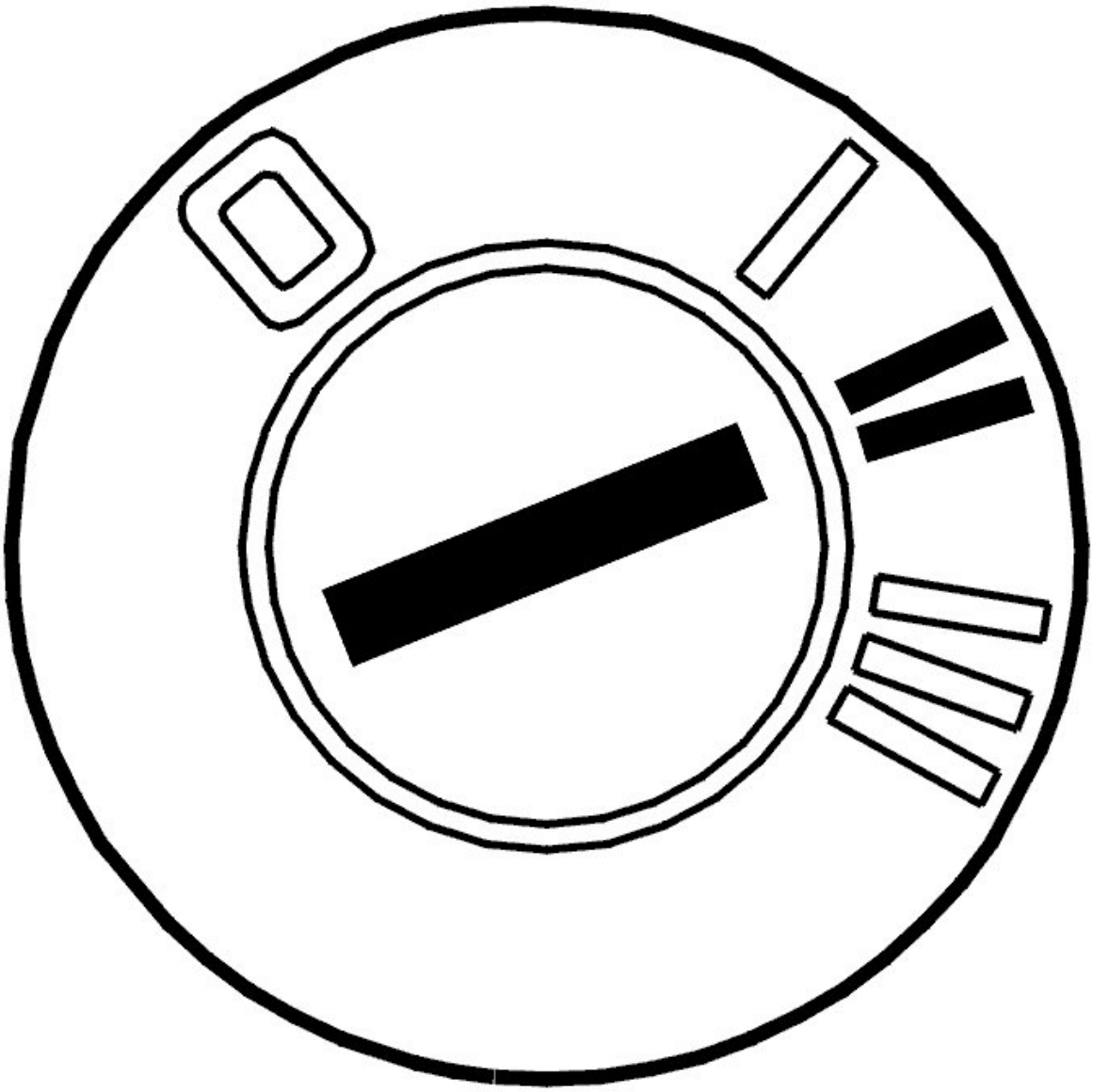
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Signal Too High / Signal Missing

Signal too high / Signal missing

Checking the status



- Ignition on.
- Switch between high and low beam.

If the left-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the left-hand Xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

Check the signal cable between the central electronic module (CEM) and the actuating motor in the left Xenon lamp for open circuit and short circuit to supply voltage.
For information about terminal numbers and cable routing, see signal description and corresponding wiring diagram.
If no fault is found, replace the left headlamp.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

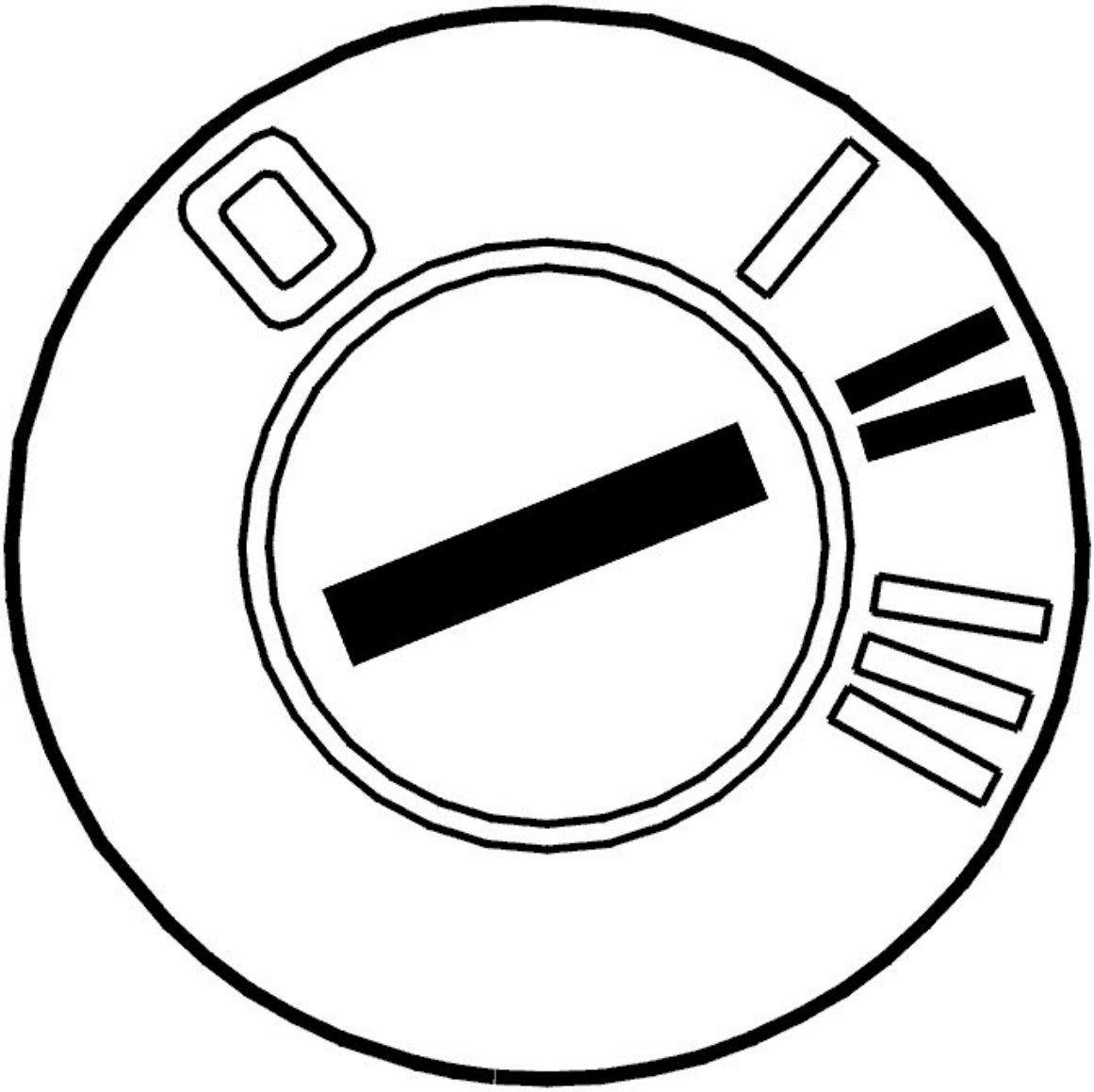
Continue - Verification

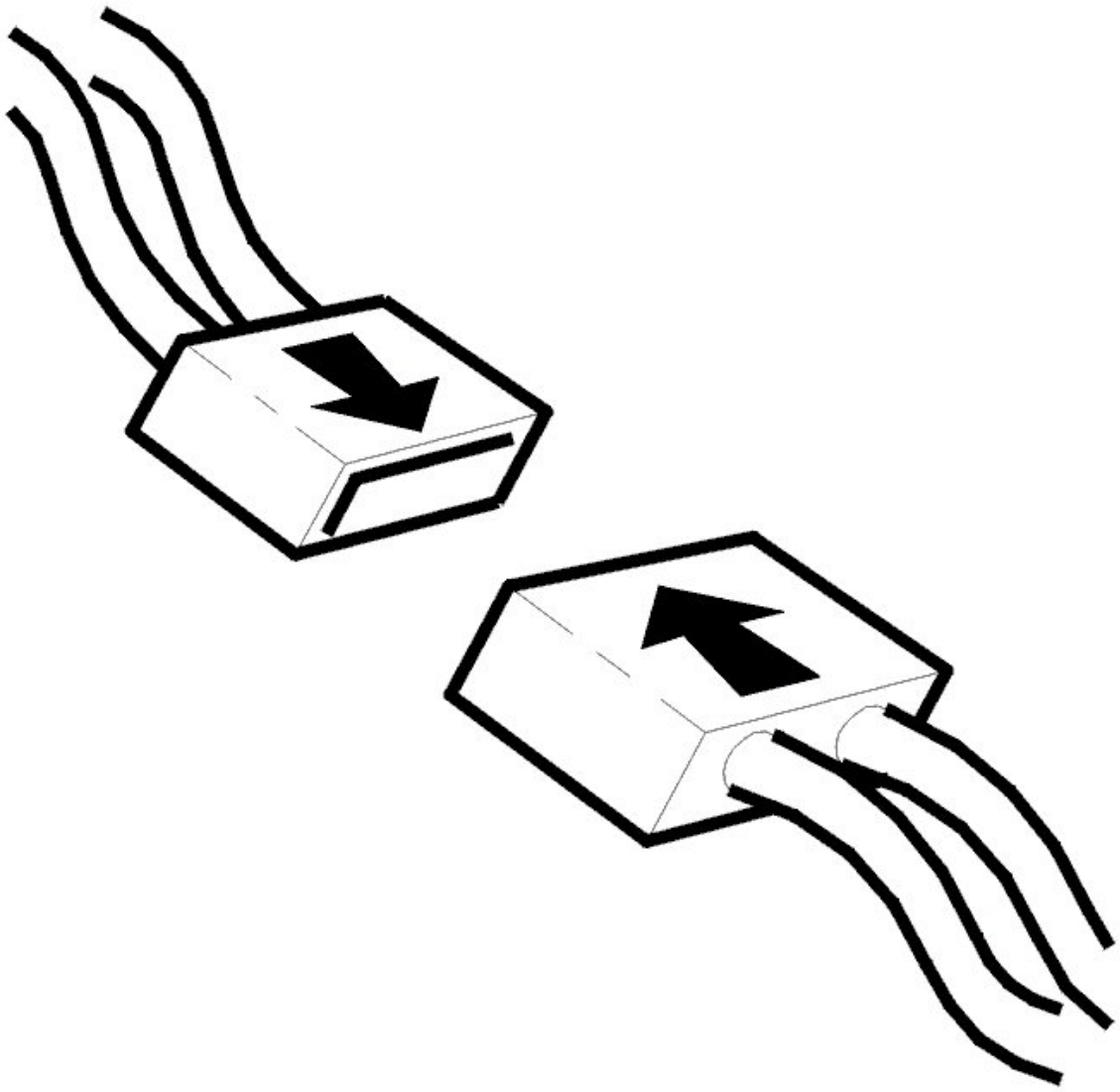
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F19

Condition

The central electronic module (CEM) checks the signal from the right-hand Xenon lamp.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a fault in the right-hand Xenon bulb.
The diagnostic trouble code (DTC) can be detected with the ignition on and when switching between low and high beam.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Shortest headlamp range will be used.

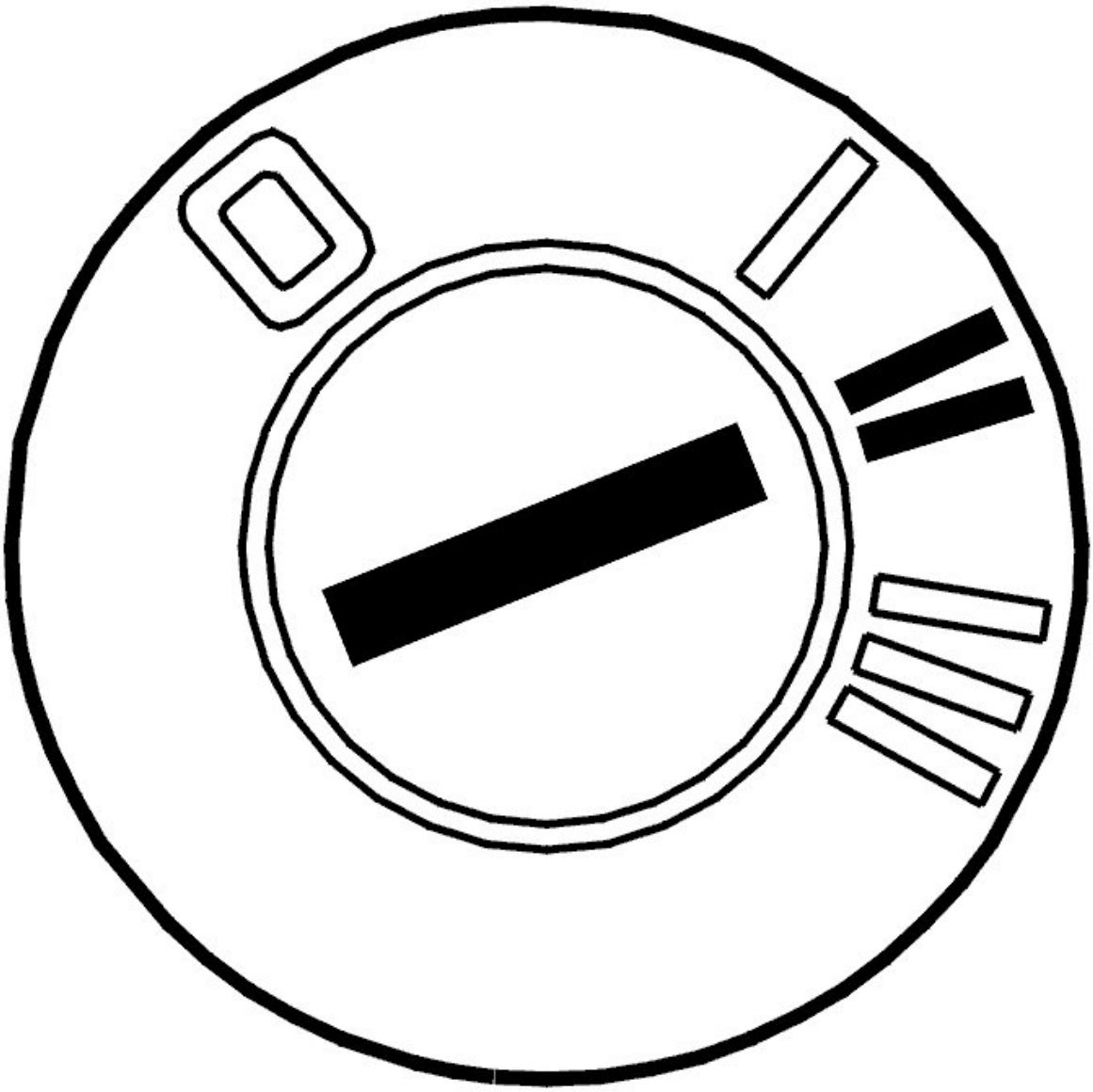
Possible source
- The actuator motor in the xenon lamp housing has jammed
- Damaged actuator motor in the xenon lamp housing.

Fault symptom[s]
- The low beam is constantly lit
- The high beam is constantly lit
- The road surface is not illuminated.
- Headlights/Headlight aim is off

Faulty Signal

Faulty signal

Checking the status



- Ignition on.
- Switch between high and low beam.

If the right-hand Xenon lamp does not switch between high and low beam, the fault is permanent.
If the right-hand xenon lamp switches between high and low beam, the fault was present previously but is no longer active, intermittent fault.

Continue - Checking components and wiring

Checking components and wiring

The diagnostic trouble code (DTC) indicates that the actuator motor in the right Xenon lamp is damaged.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Headlamp/bulb, replacing See: Lighting and Horns/Headlamp/Headlamp Bulb/Service and Repair/Headlamp/Bulb, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

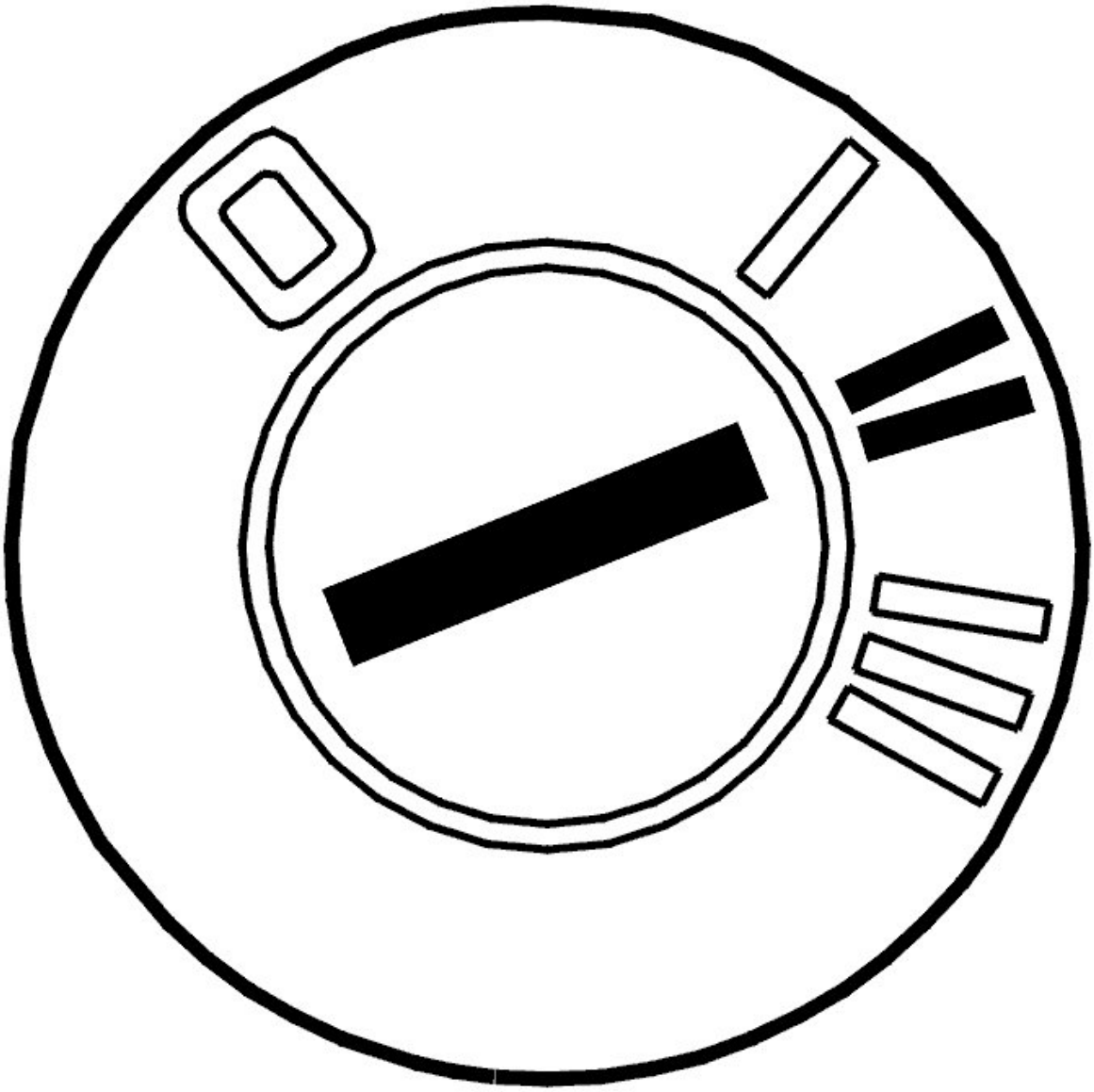
Continue - Verification

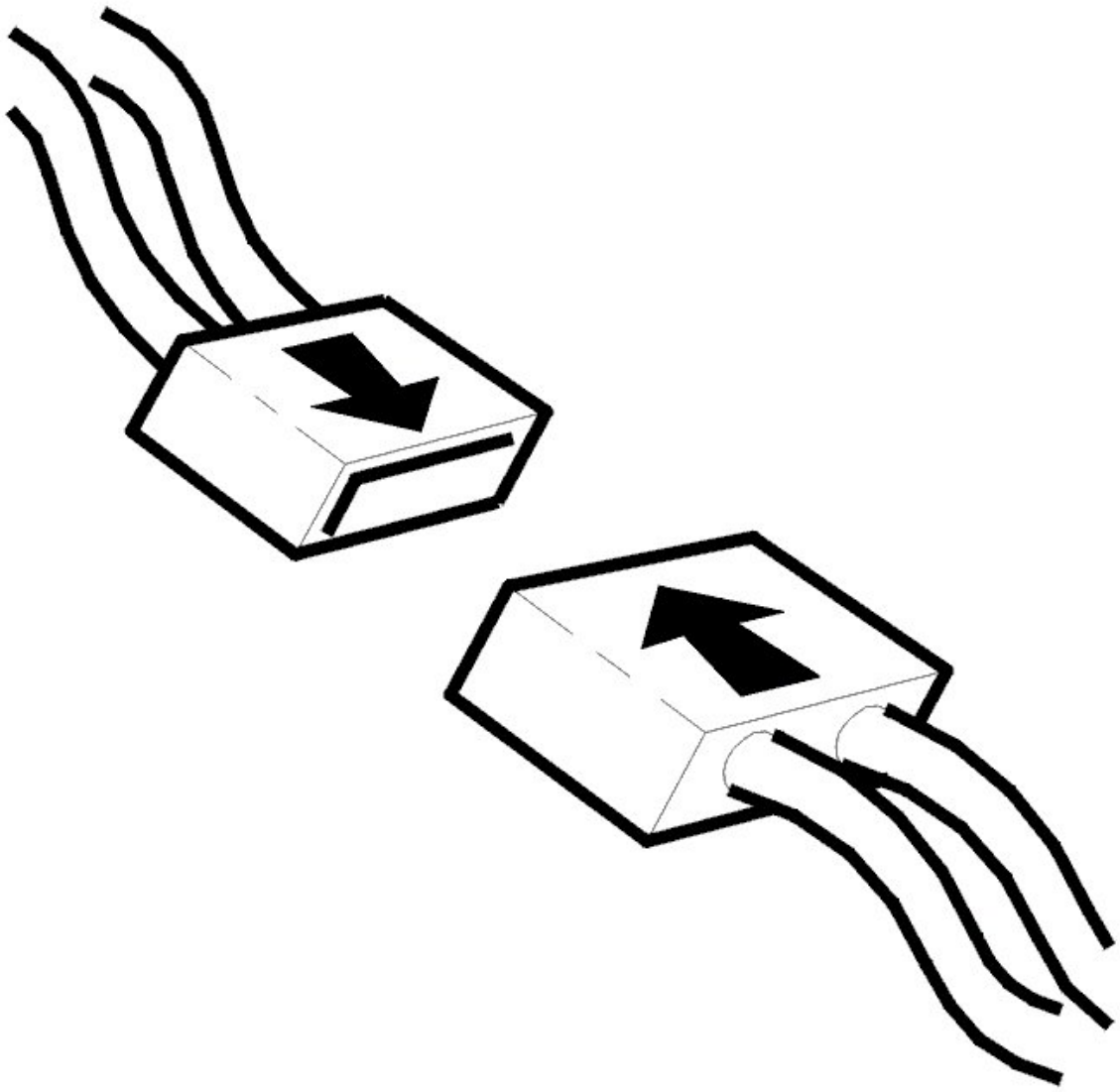
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between high and low beam.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

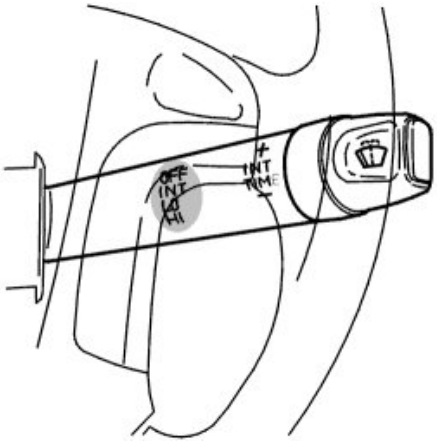
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F21

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module registers that the signal on the signal cable for the windshield wiper lever is too high or missing.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable.

Fault symptom[s]
- The windshield wipers are not working.

Faulty Signal

Faulty signal

Replacing the component

The central electronic module (CEM) has registered a faulty signal in the signal cable from the windshield wiper.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the steering wheel module (SWM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the windshield wiper.
Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair
Remedy as necessary.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

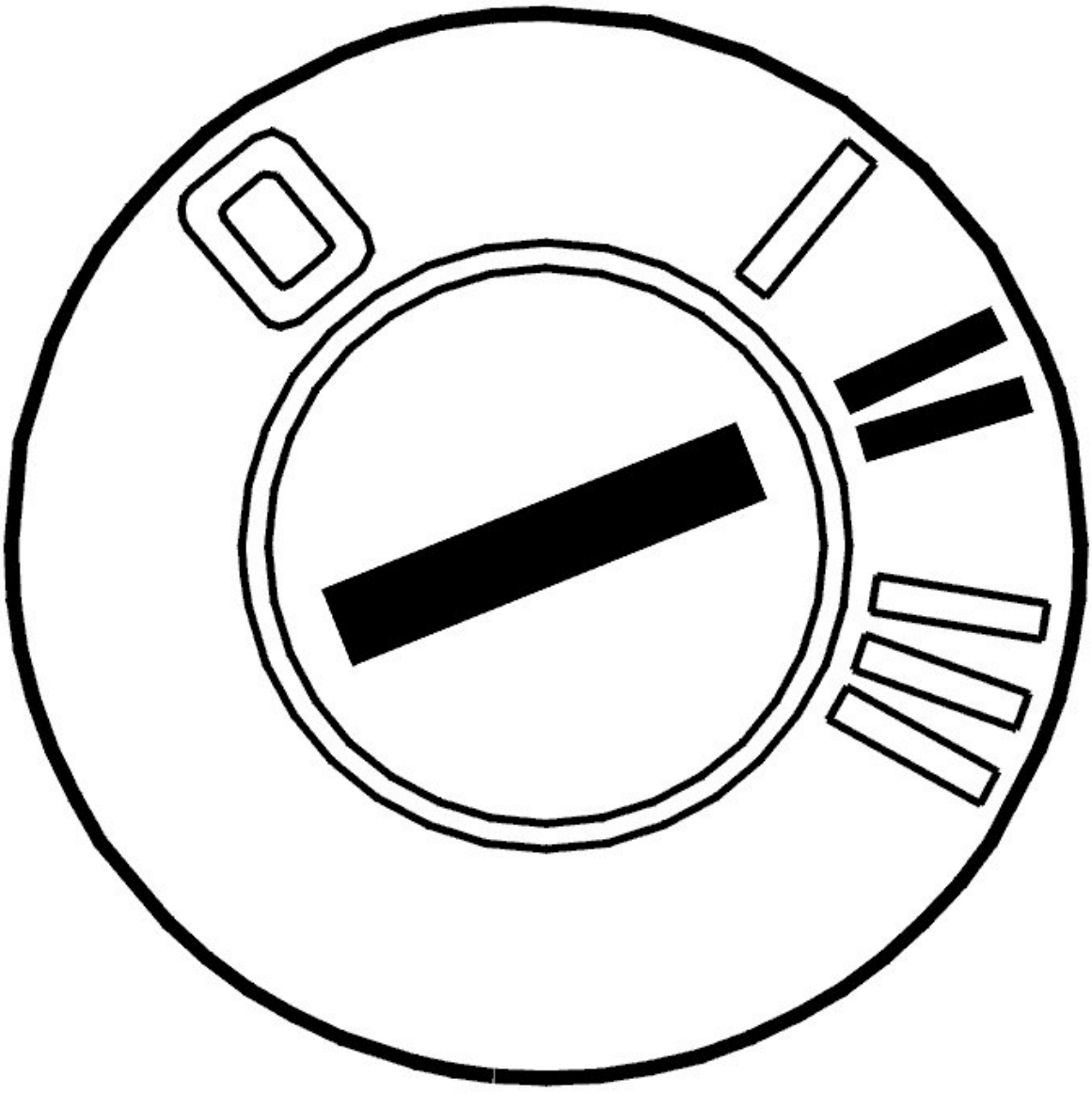
Attempt New Test - Replacing the component

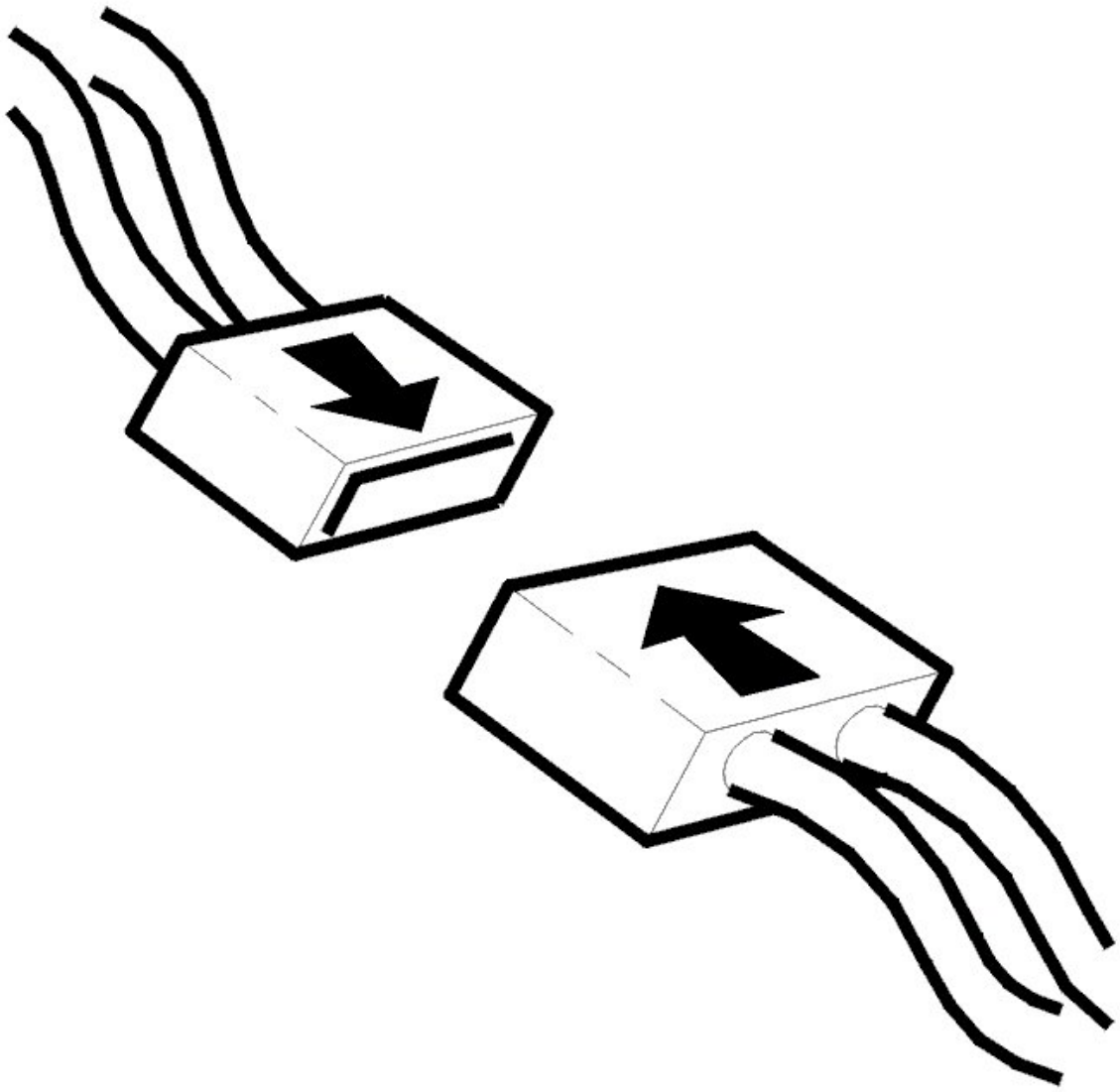
FAULT FOUND - FAULT-TRACING FAILED

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers are activated.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

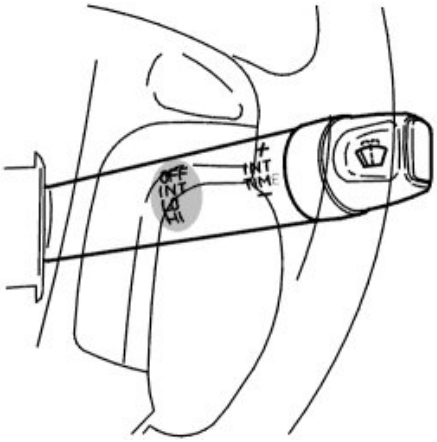
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F22

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal for the windshield wiper lever is too low.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The windshield wipers are not working.

Signal Too Low

Signal too low

Replacing the component

The central electronic module (CEM) has registered that the signal in the signal cable from the windshield wiper lever is too low.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the steering wheel module (SWM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the windshield wiper.
Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair
Remedy as necessary.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

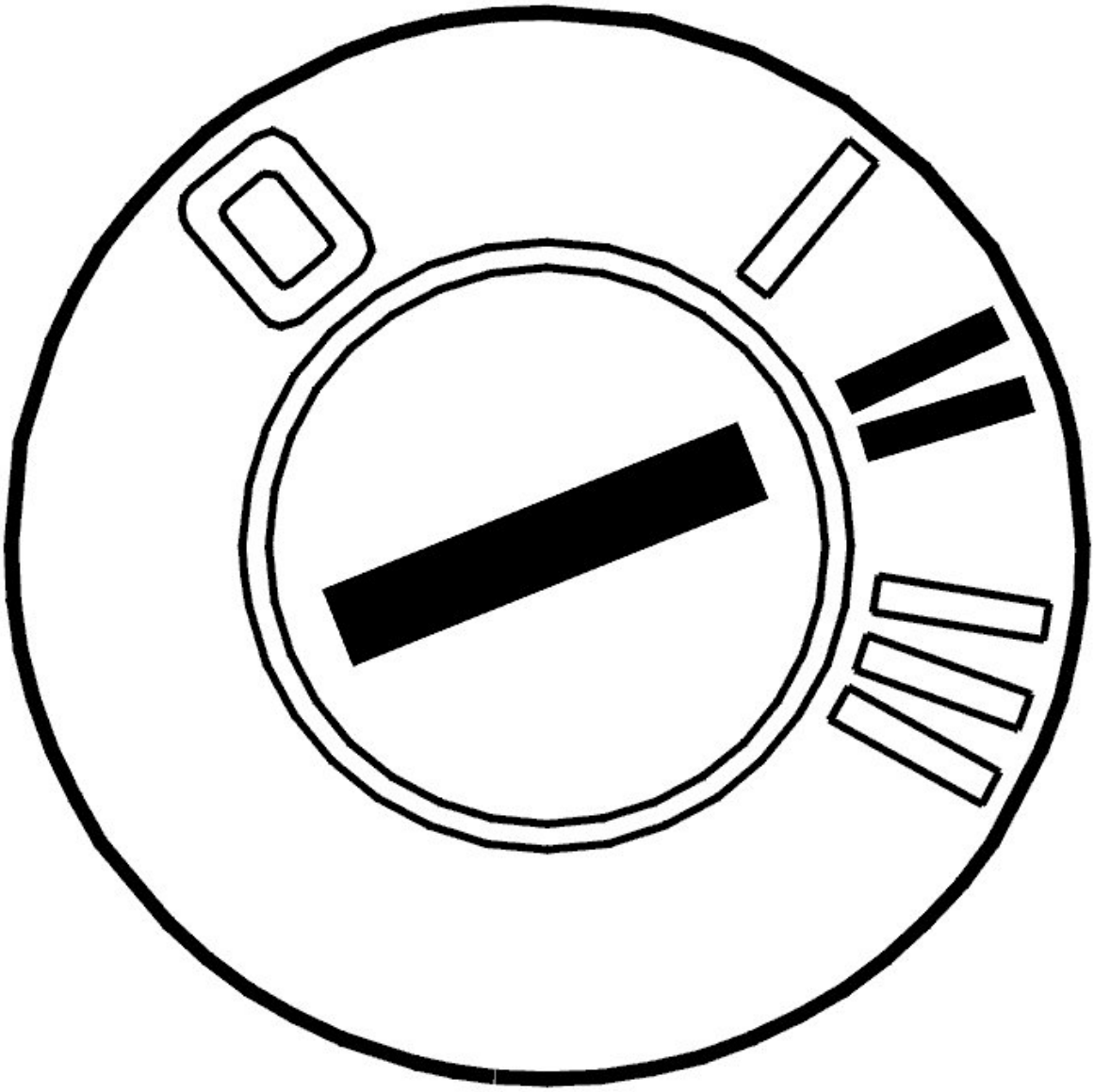
No - Attempt New Test

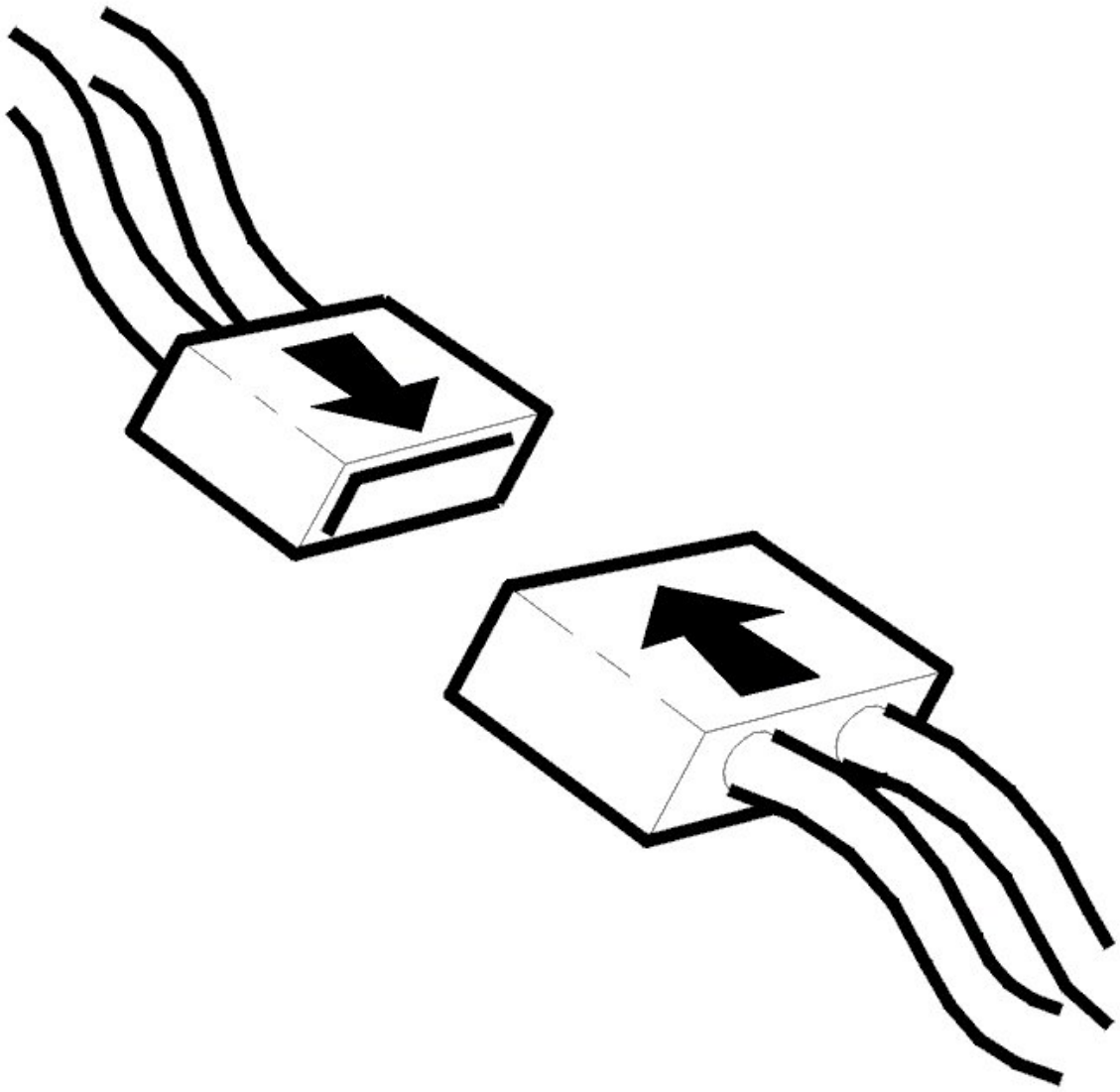
Attempt New Test - Replacing the component

FAULT FOUND - FAULT-TRACING FAILED

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers are activated.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

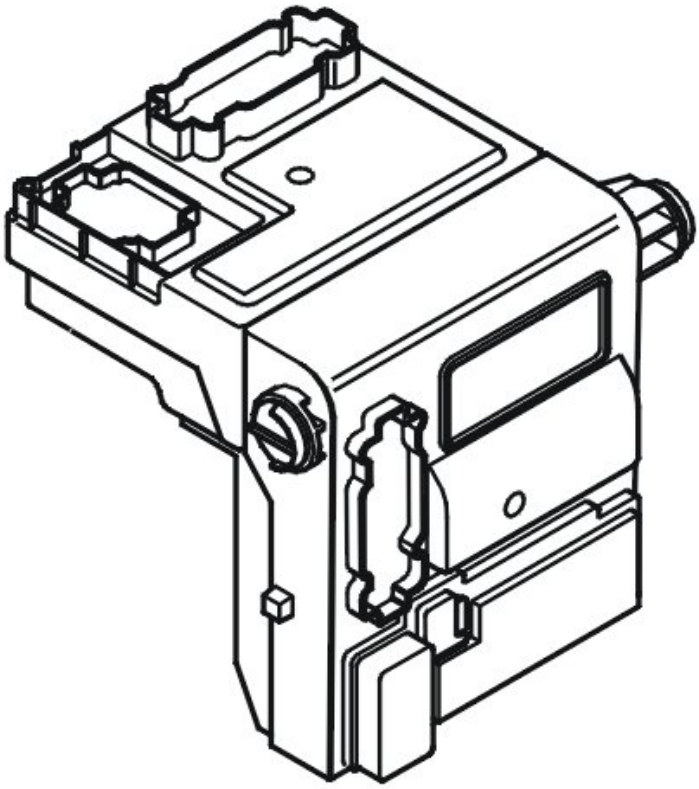
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F23

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal at the relay coil is too high when the windshield wipers are activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the relay coil.

Fault symptom[s]
- The windshield wipers are not working.

Signal Too High

Signal too high

Checking the component

Replace relay 2/91.
Activate the relay for windshield wipers on.
If the function is OK, the cause of the fault was a damaged relay (short-circuit in the relay).

Other information:
- For further information about the fuses and relays, see the Wiring Diagram.

Was a fault detected?

Yes - Verification

No - Checking fusebox

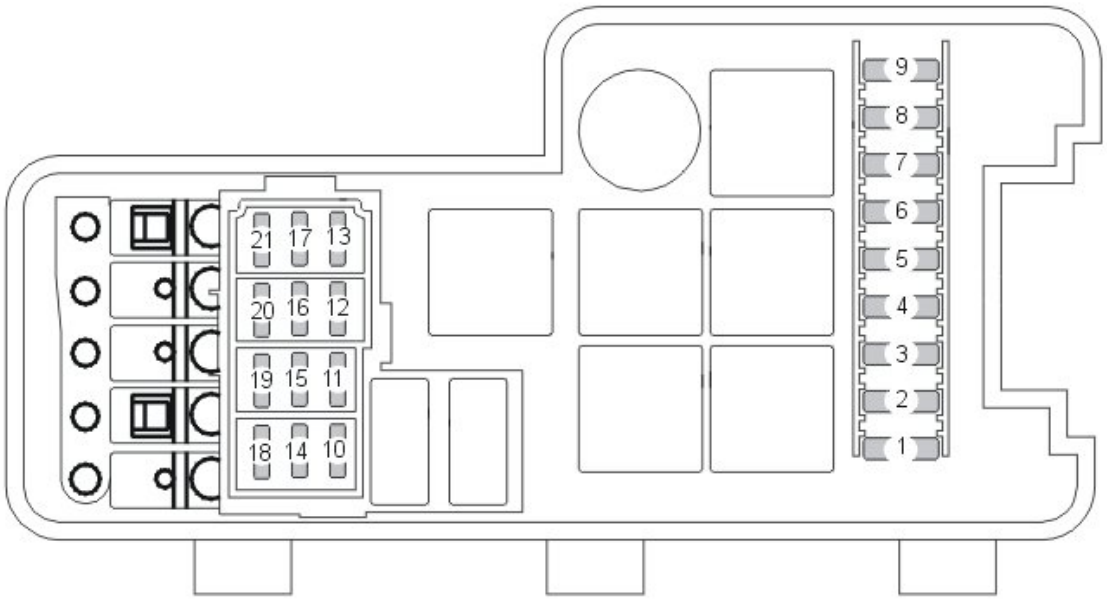
Checking fusebox

Remove windshield wiper relay 2/91 from the fusebox base.
Check the relay coil driver circuit for a short-circuit to supply voltage. Take a voltmeter reading between terminal #2 and ground in the relay base.

The voltage between terminal #2 and ground must be approximately 0 V.
Remedy as necessary.

Other information

- For further information about the fuses and relays, see the Wiring Diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

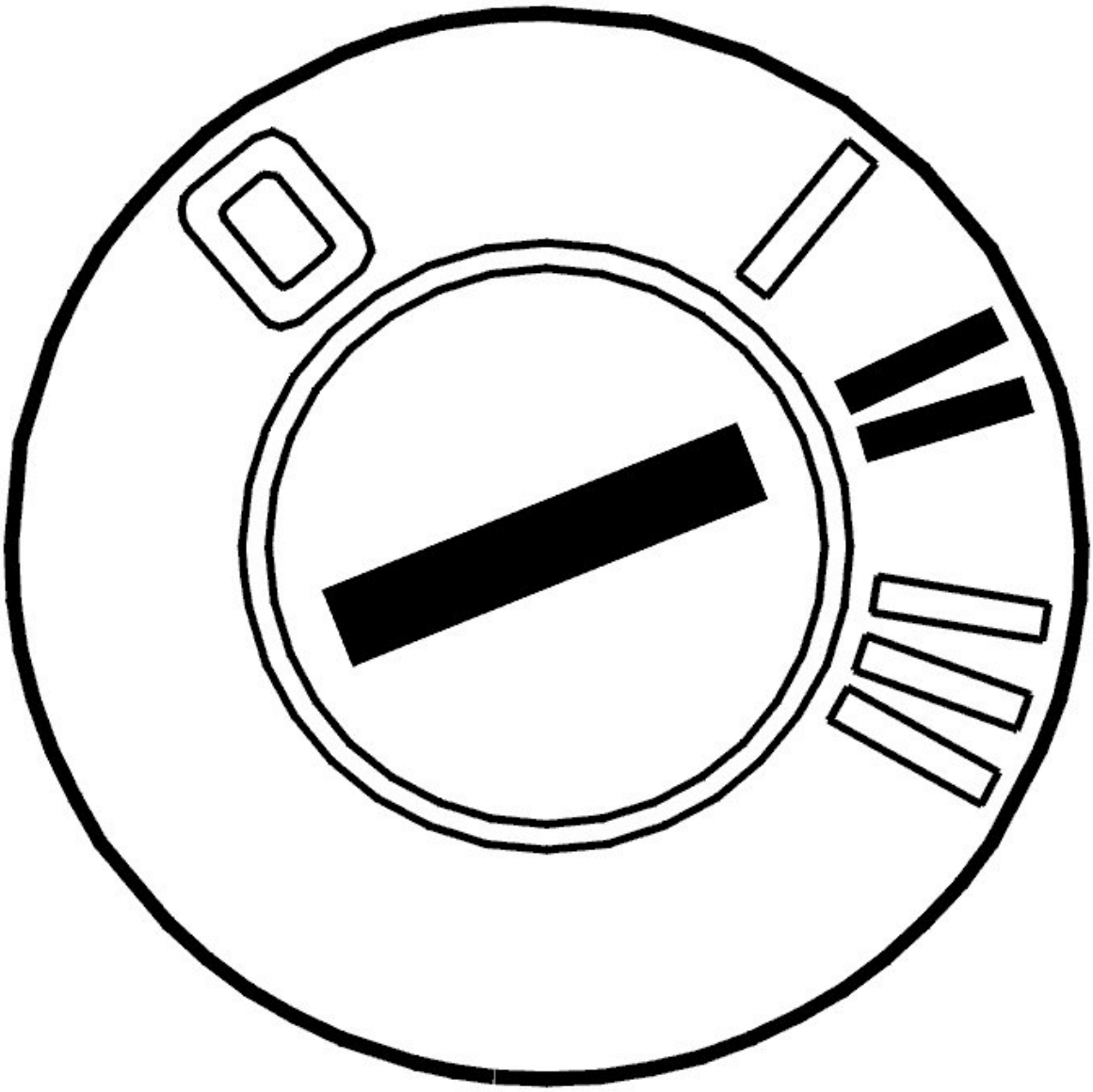
No - Checking the component

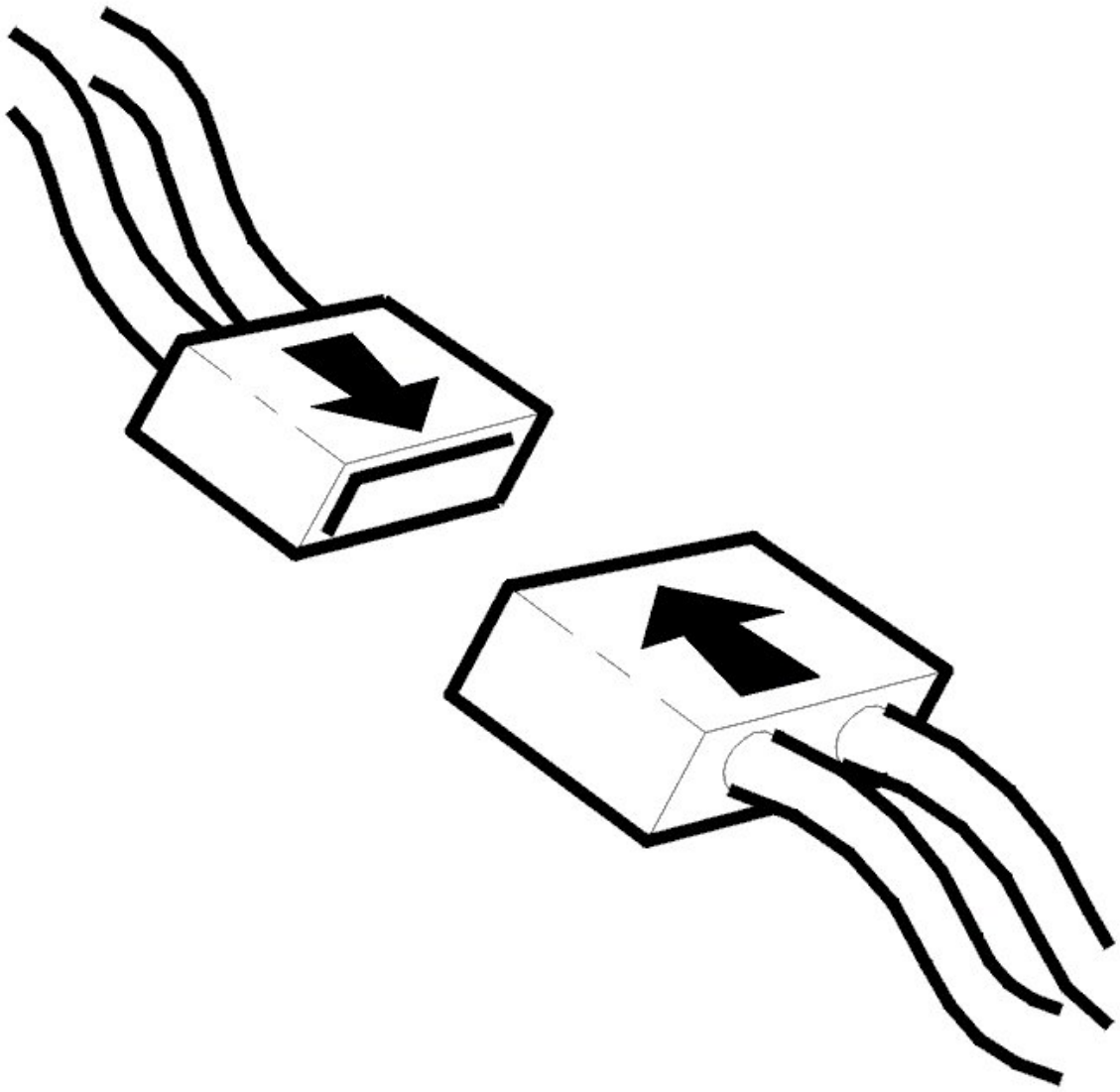
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking fusebox

Checking the wiring

Check the cable between windshield wiper relay base terminal #2 and central electronic module (CEM) terminal #C4. Check for a short-circuit to supply voltage.
Remedy as necessary.
Replace the fusebox if no fault is found.

Other information

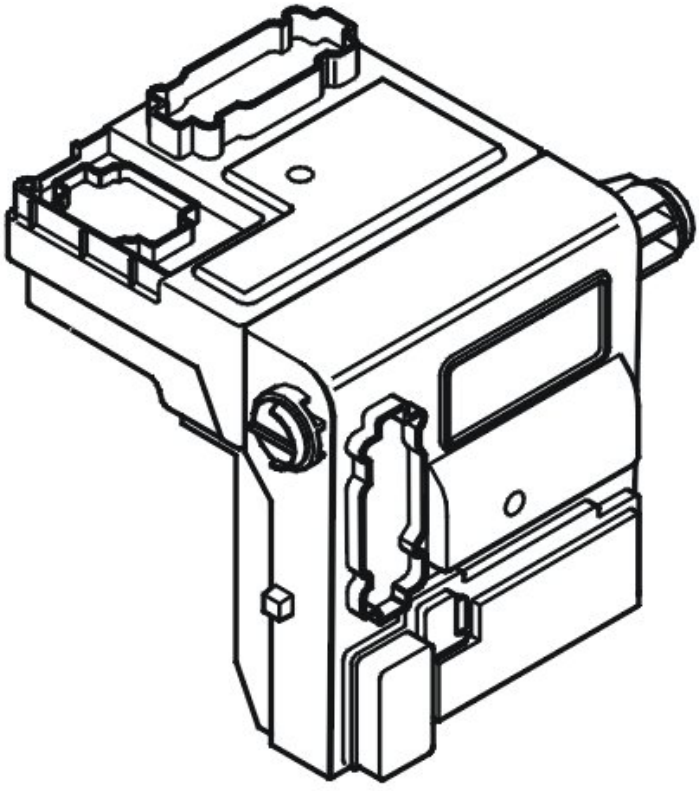
- For further information about the fuses and relays, see the Wiring Diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F25

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal at the relay coil is too low when the windshield wipers are activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to ground in the relay coil.

Fault symptom[s]
- The windshield wipers are not working.

Signal Too Low

Signal too low

Checking the component

Check that the fuse for the intermittent relay, windshield wipers is intact.
Replace relay 2/91.
Activate the relay for windshield wipers on.
If the function is OK the cause of the fault was a damaged relay (open-circuit in the relay).

Other information:
- For further information about fuses and relays, see the relevant wiring diagram.
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Was the function OK?

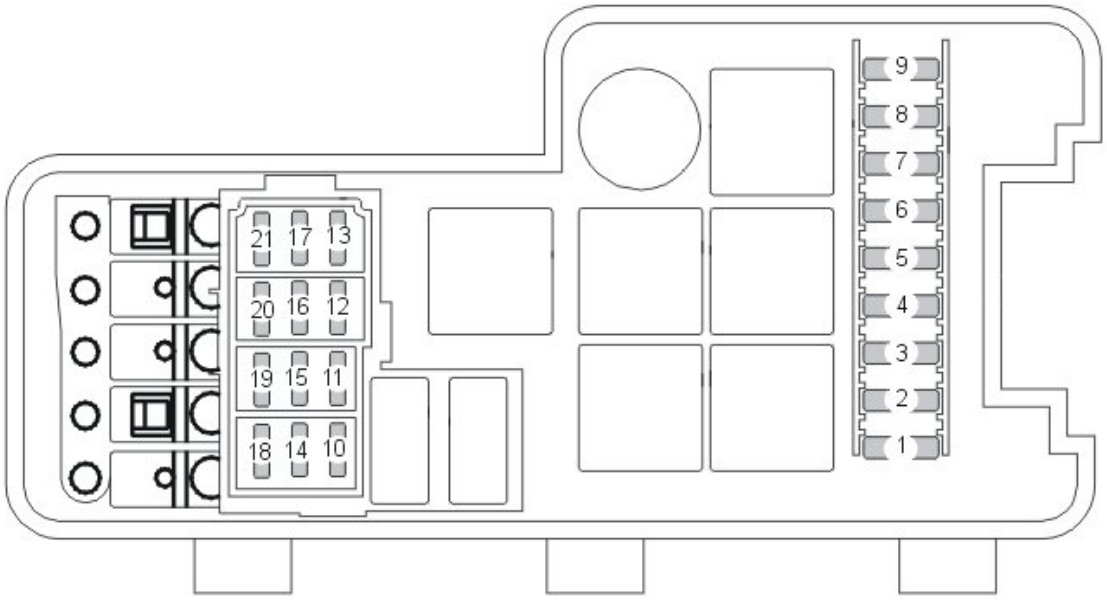
Yes - Verification

No - Checking fusebox

Checking fusebox

Remove windshield wiper relay 2/91 from the fusebox base.
Check the relay base terminals. Check for contact resistance and oxidation.
Check the cable between relay base 2/91 terminal #2 and central electronic module (CEM) terminal #C4 (4). Check for an open-circuit.
Reinstall and activate the relay.
Remedy as necessary.

Other information
- For further information about fuses and relays, see the relevant wiring diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was the function OK?

Yes - Verification

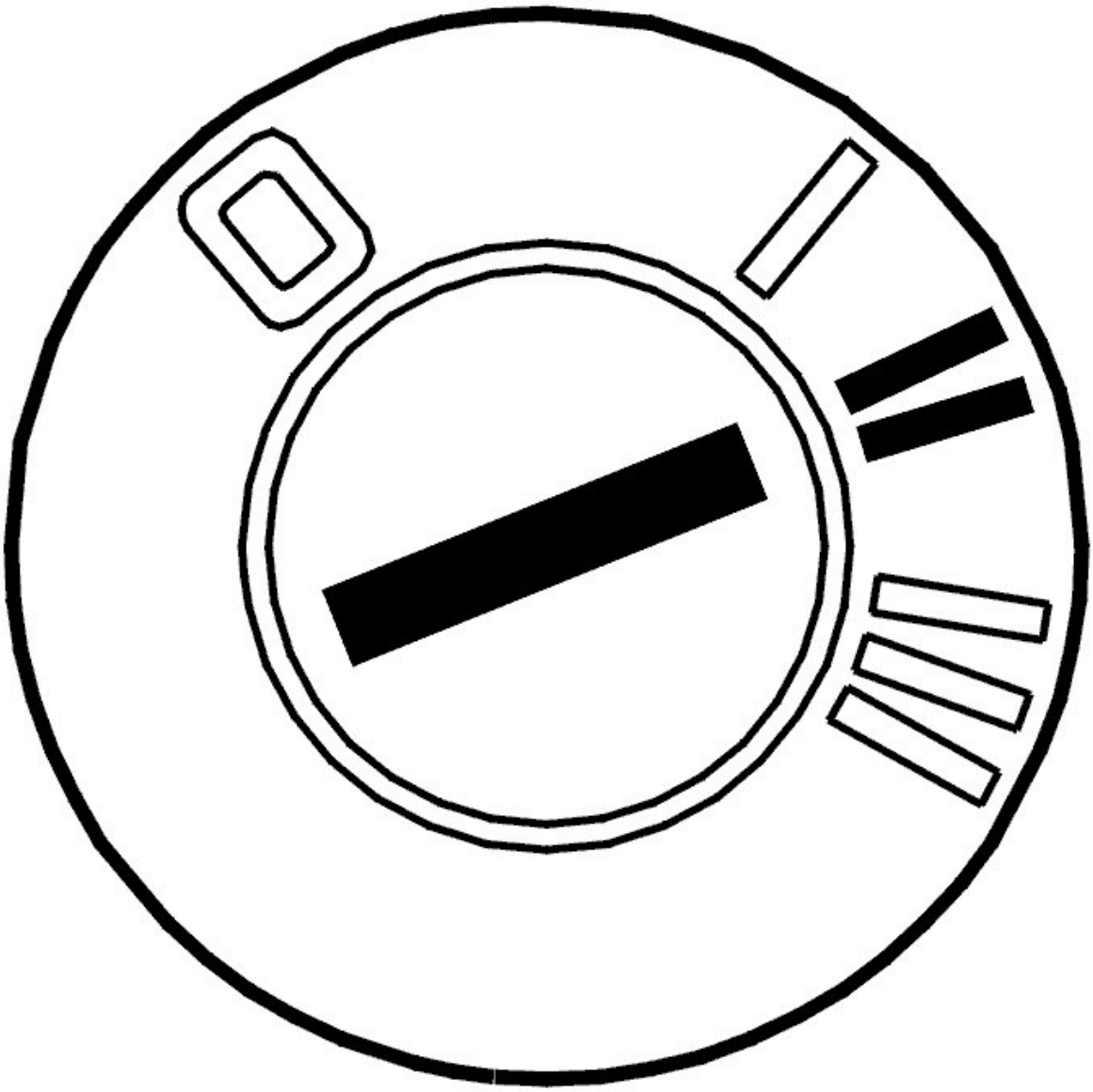
No - Checking the wiring

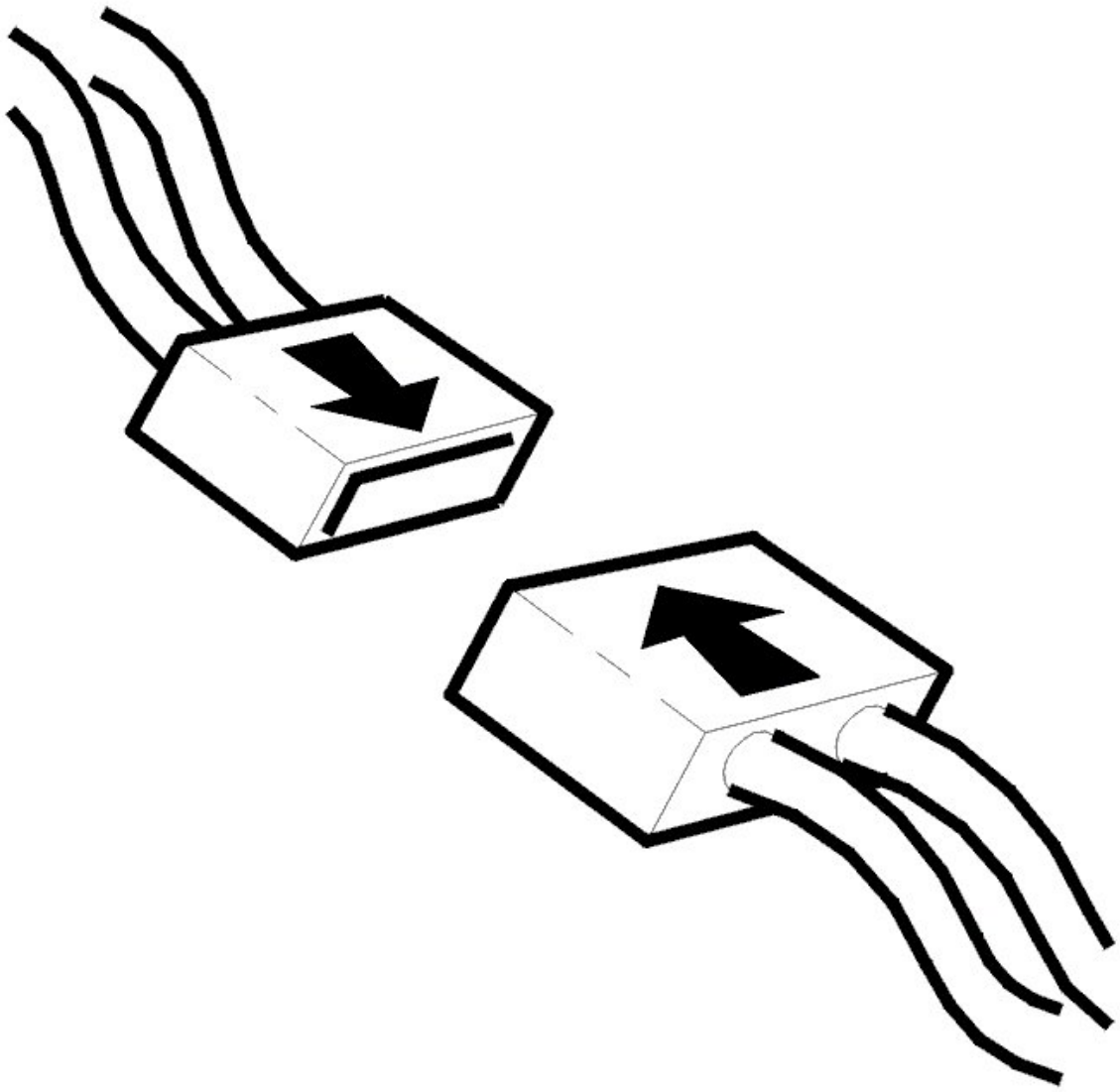
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking fusebox

Checking the wiring

Remove windshield wiper relay 2/91 from the fusebox base.
Check the cable between relay base terminal #2 and ground. Check for a short-circuit to ground.
Remedy as necessary.
Replace the fusebox if no fault is found.

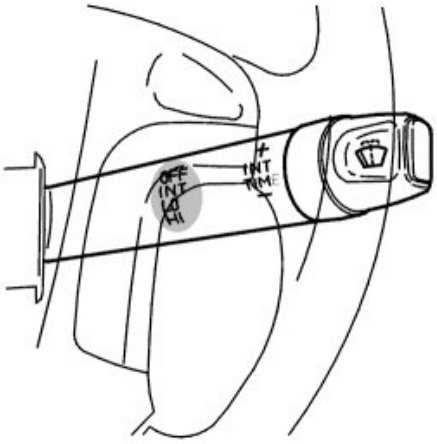
Other information
- For further information about fuses and relays, see the relevant wiring diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F30

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switch for single sweep and intermittent wiping are active at the same time for more than 2.5 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The windshield wipers only operate at lowest speed.

Possible source
- Damaged windshield wiper lever.

Fault symptom[s]
- The windshield wipers only operate at lowest speed.

Faulty Signal

Faulty signal

Replacing the windshield wiper switch

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated on an individual basis
If the fault is permanent, replace the windshield wiper switch because an internal fault has occurred.

Other information:

- Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

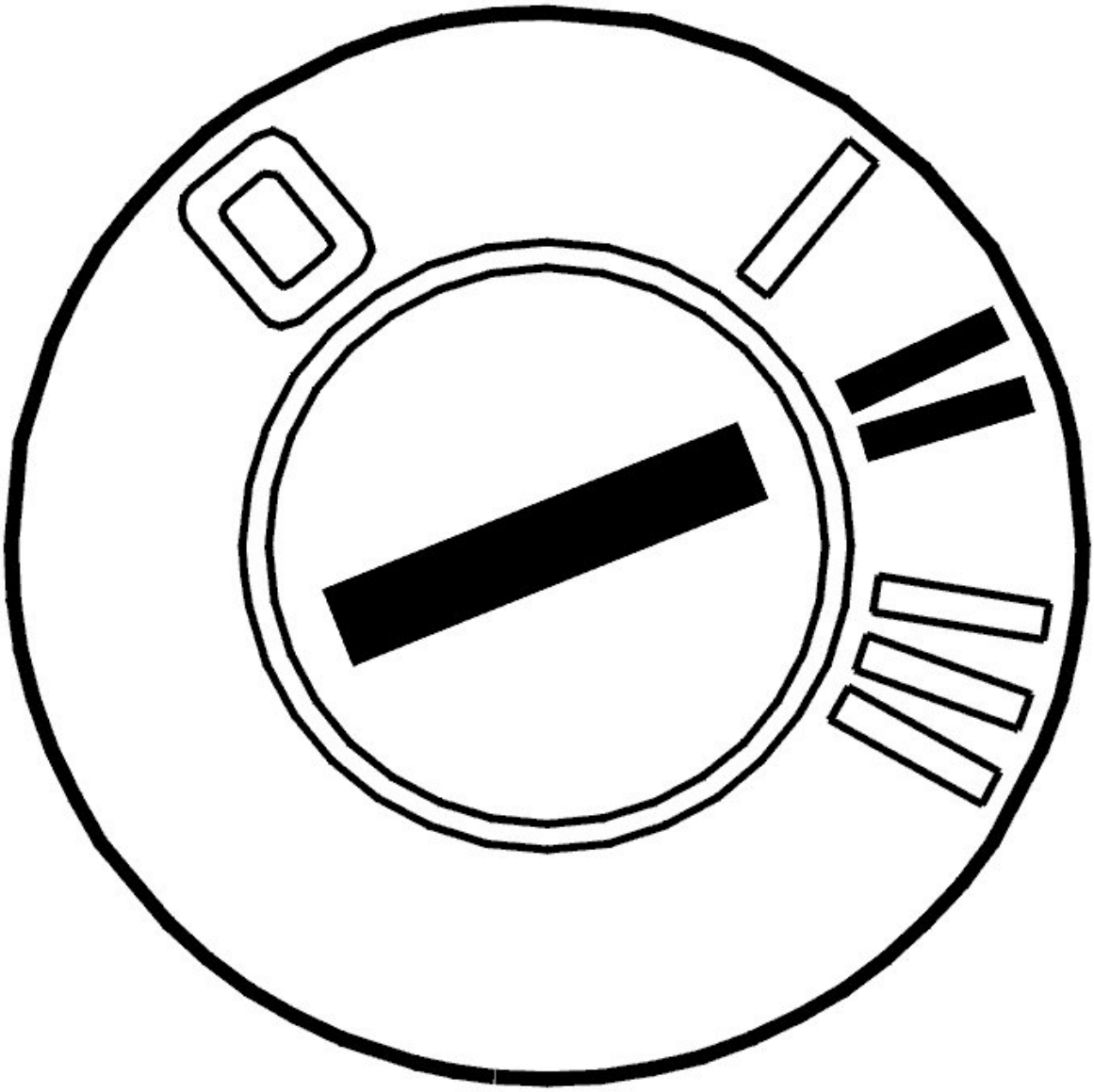
Continue - Verification

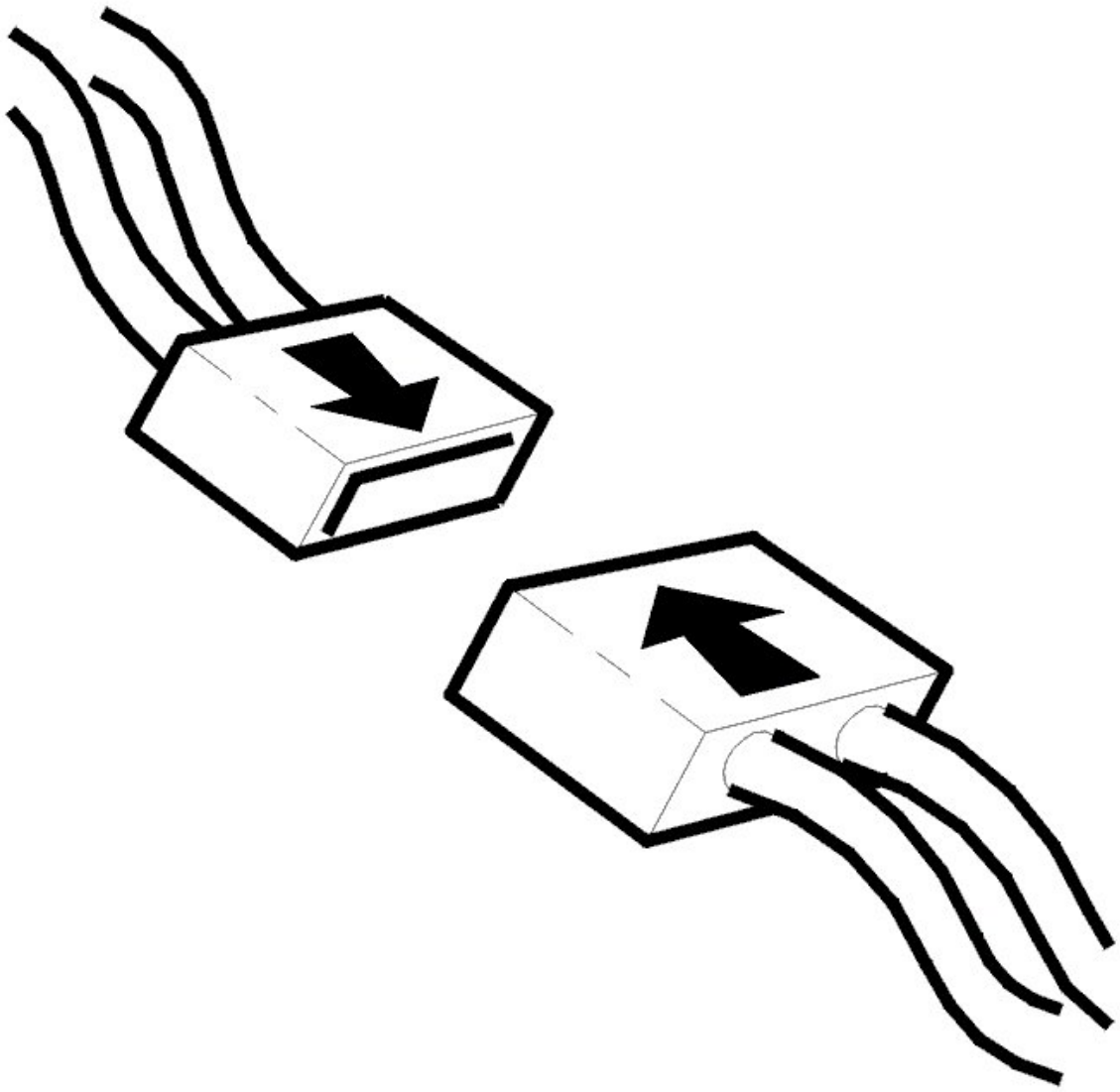
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

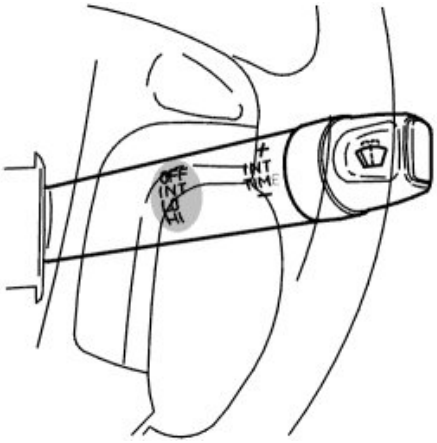
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the windshield wiper switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F31

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switch for single sweep and low speed wiping are active at the same time for more than 2.5 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The windshield wipers only operate at lowest speed.

Possible source
- Damaged windshield wiper lever.

Fault symptom[s]
- The windshield wipers only operate at lowest speed.

Faulty Signal

Faulty signal

Replacing the windshield wiper switch

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
If the fault is permanent, replace the windshield wiper switch because an internal fault has occurred.

Other information:
- Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

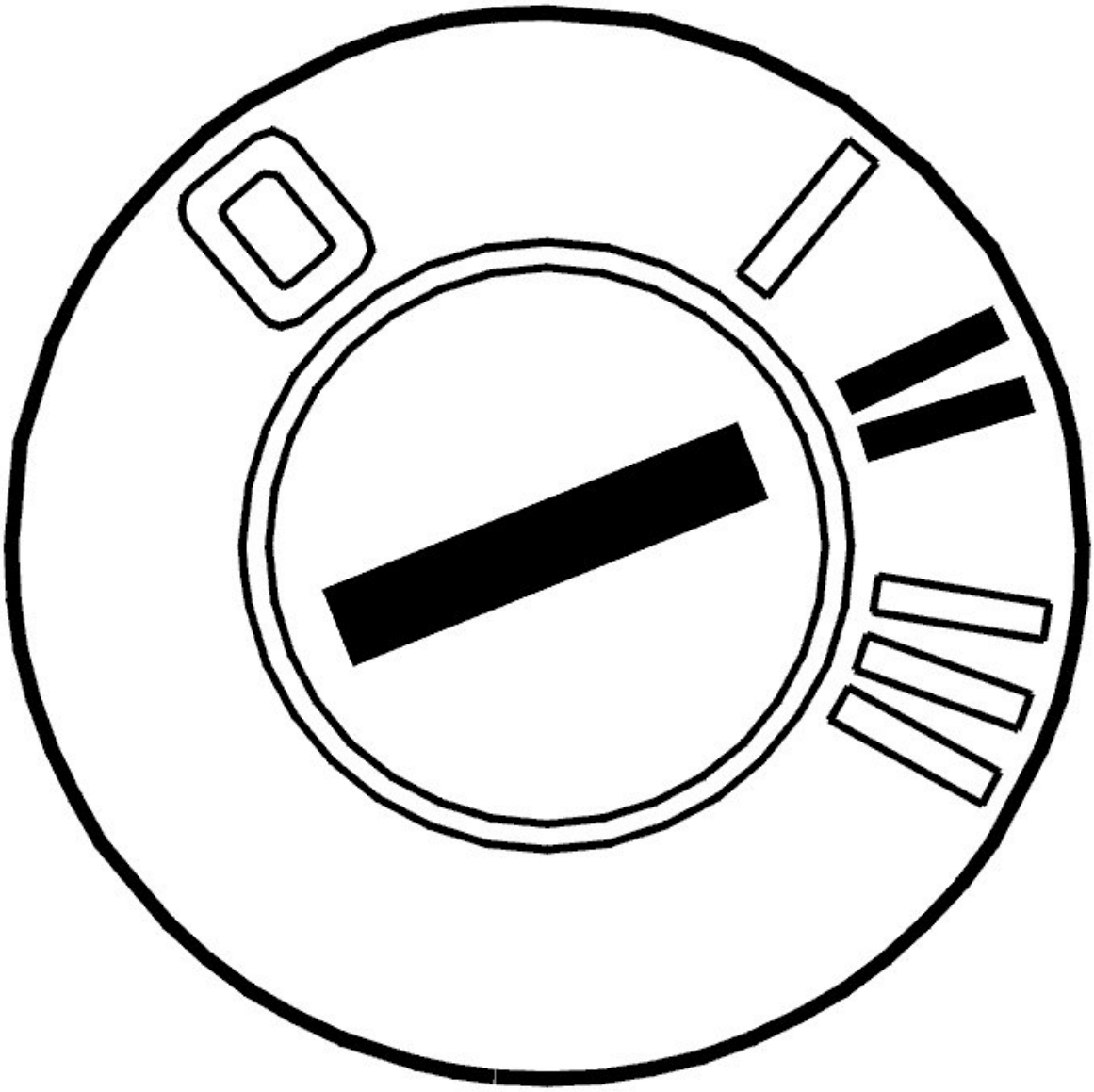
Continue - Verification

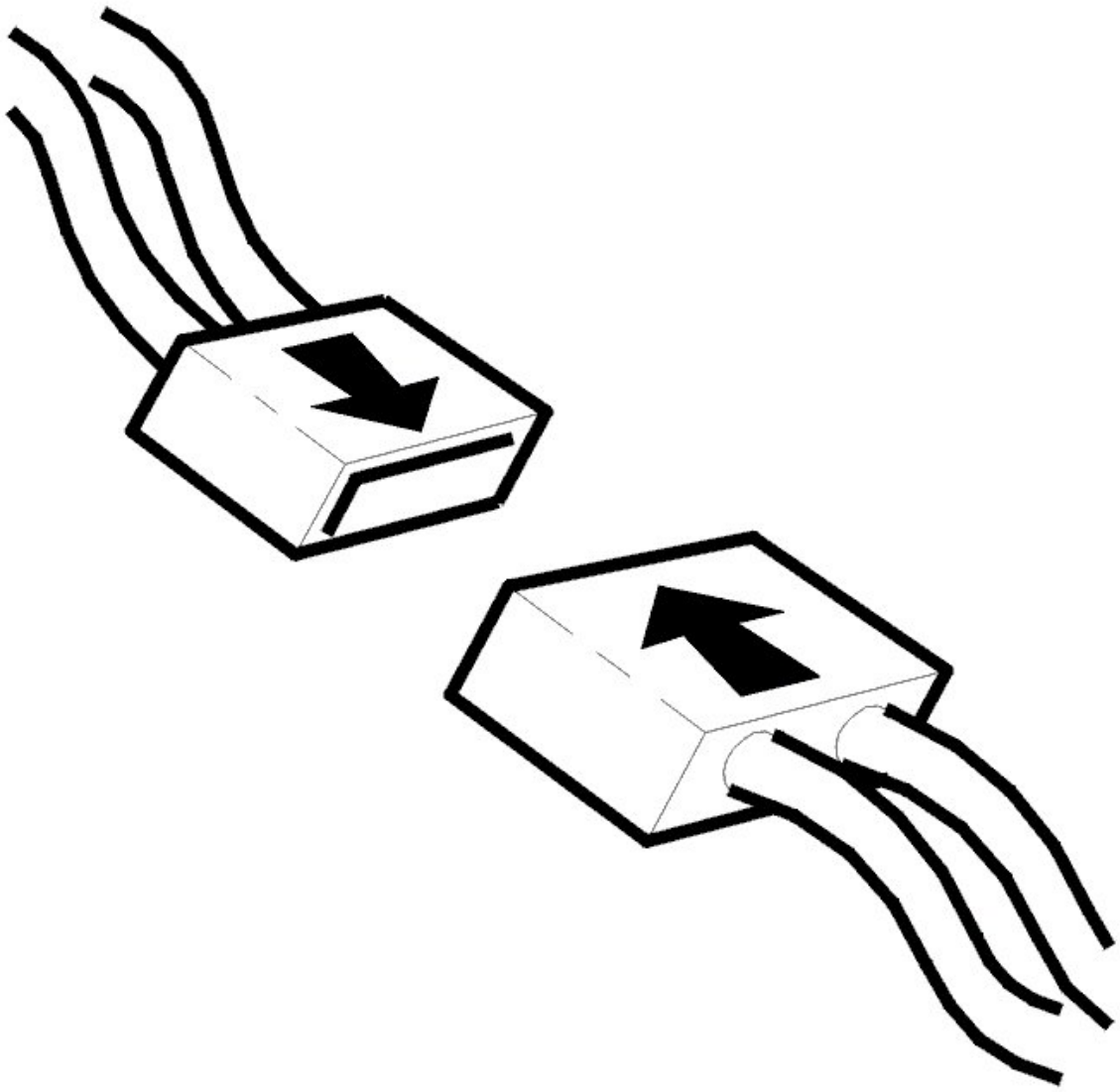
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

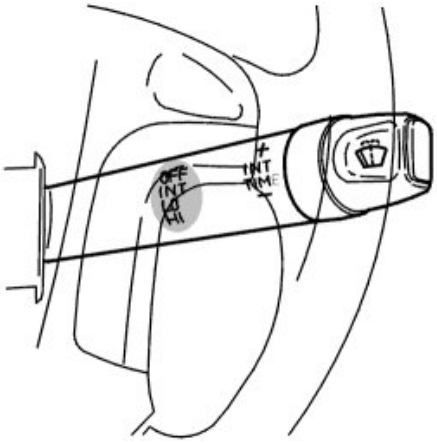
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the windshield wiper switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F32

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switch for single sweep and high speed wiping are active at the same time for more than 2.5 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The windshield wipers only operate at lowest speed.

Possible source
- Damaged windshield wiper lever.

Fault symptom[s]
- The windshield wipers only operate at lowest speed.

Faulty Signal

Faulty signal

Replacing the windshield wiper switch

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
If the fault is permanent, replace the windshield wiper switch because an internal fault has occurred.

Other information:
- Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

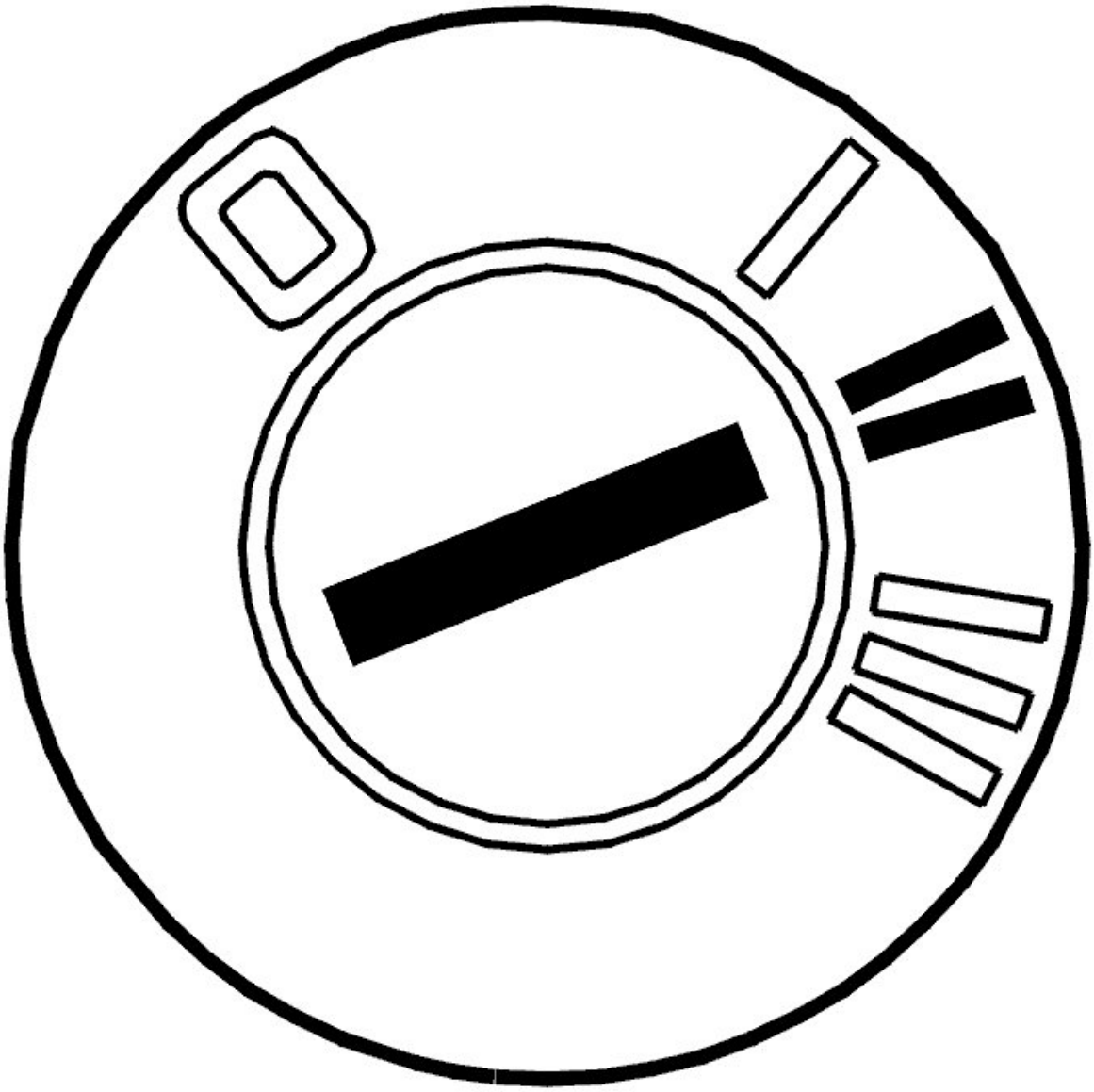
Continue - Verification

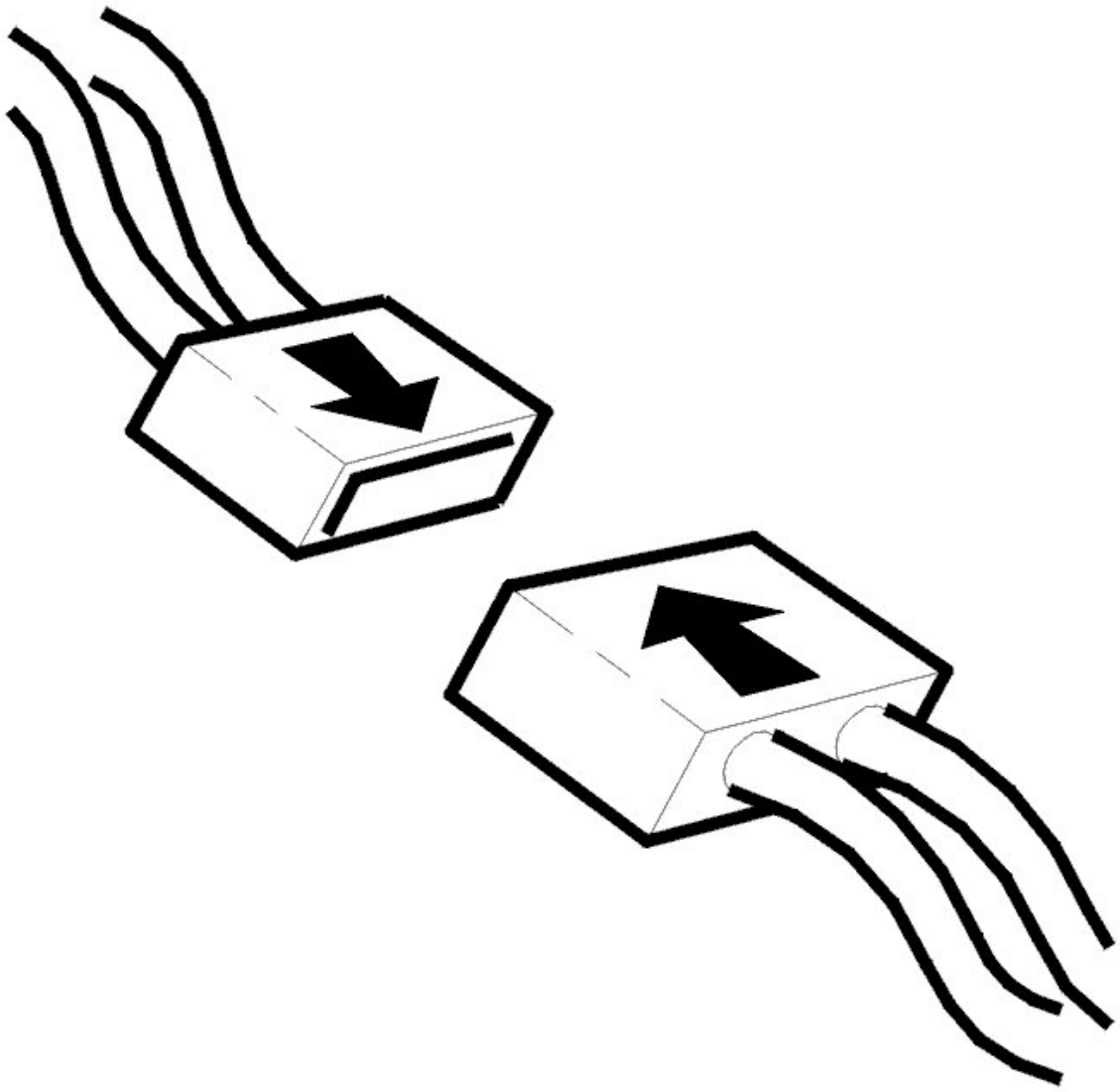
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

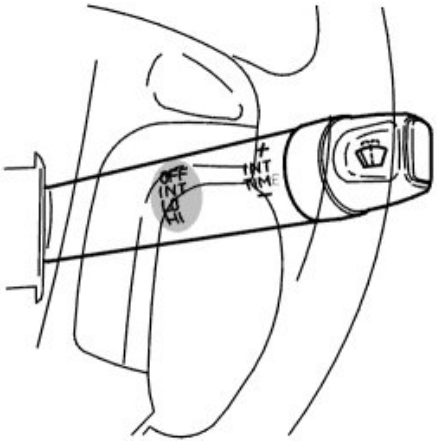
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the windshield wiper switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F41

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the relay circuit for the rear washer motor is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the relay circuit for the rear washer motor.
- Damaged fuse.

Fault symptom[s]
- Rear windshield washing does not work
- The rear windshield washer motor does not operate.

Signal Too High

Signal too high

Checking the wiring

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the fuse for the washer motor, replace if necessary.
For further information about the fuses and relays, see the Wiring Diagram
Check the cable between the central electronic module (CEM) and the washer motor. Check for a short-circuit to supply voltage.
Take readings between:
- Central electronic module (CEM) terminal #B29 (#29) and washer motor terminal #2.

Replace the central electronic module (CEM) if no fault is found.

Other information:
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters

- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

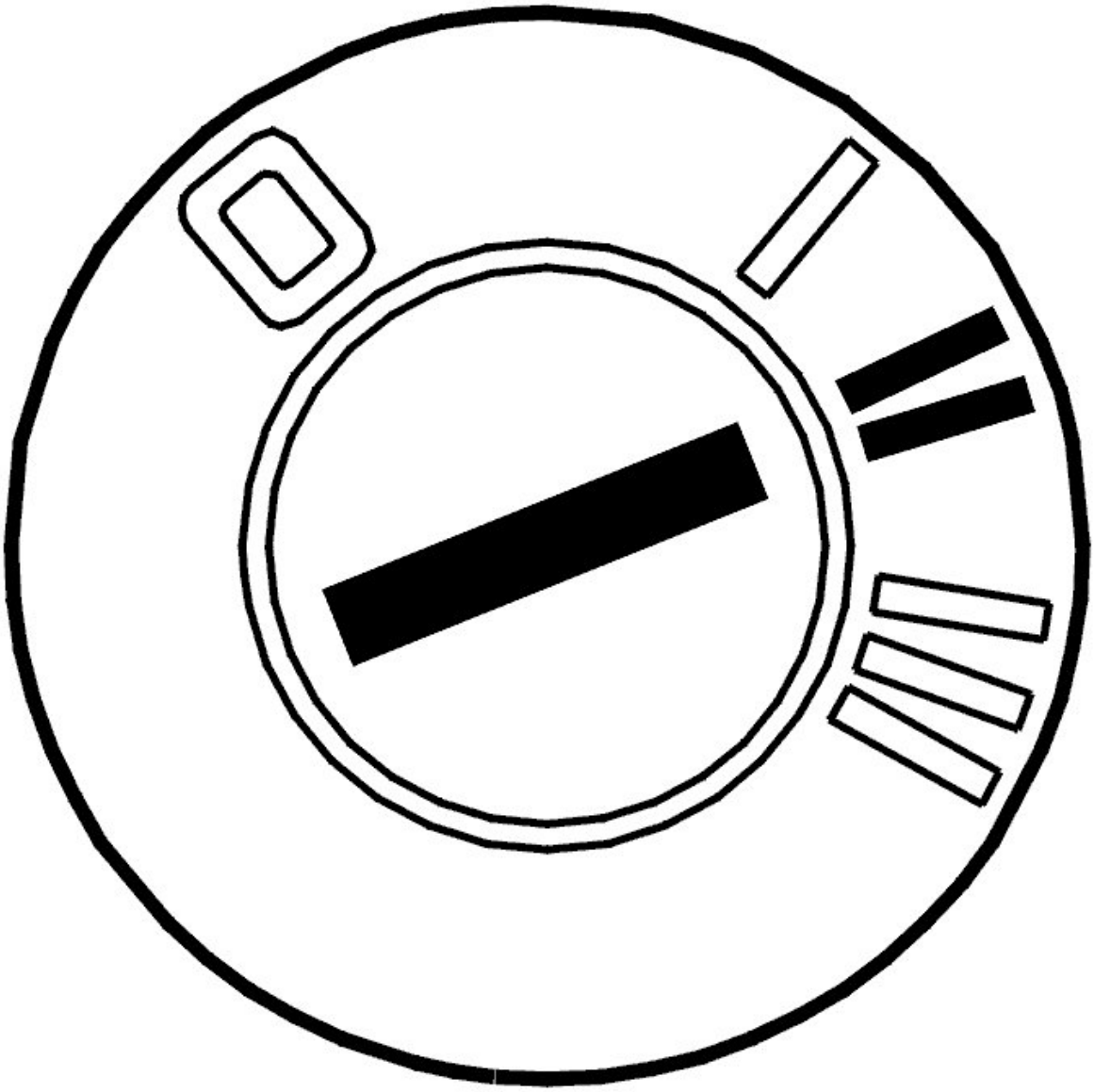
Continue - Verification

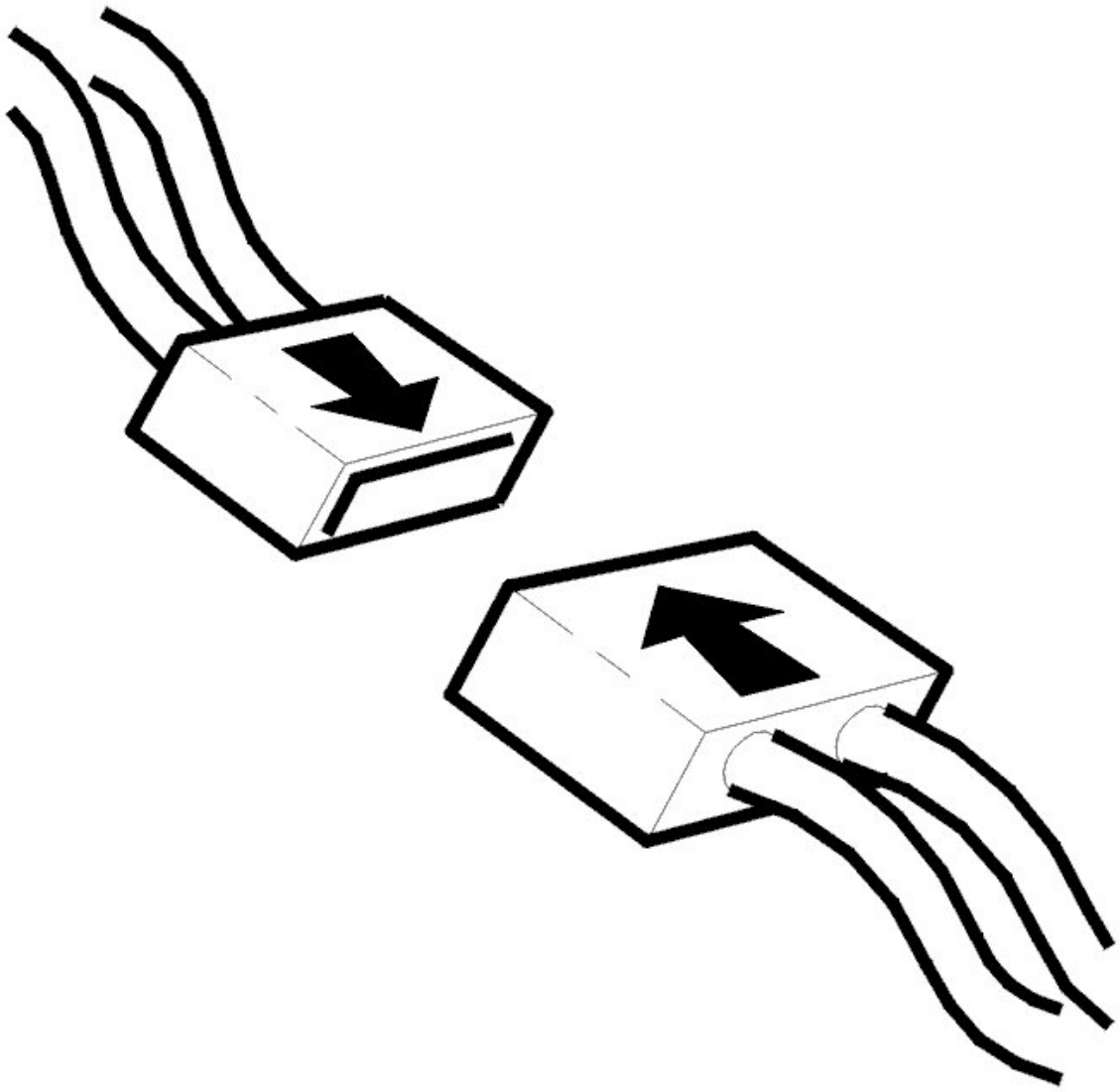
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the washer motor.

Is the washer working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

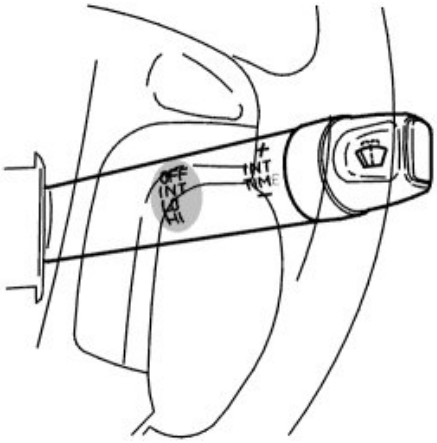
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F43

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal from the relay circuit for the rear washer motor is too low.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to ground in the relay circuit for the rear washer motor
- Open-circuit in the relay circuit for the rear washer motor.
- Damaged fuse.

Fault symptom[s]
- Rear windshield washing does not work
- The rear windshield washer motor does not operate.

Signal Too Low

Signal too low

Checking the wiring

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Check the fuse for the washer motor, replace if necessary.
For further information about the fuses and relays, see the Wiring Diagram
Check the cable between the central electronic module (CEM) and the washer motor. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:
- Central electronic module (CEM) terminal #B29 (#29) and washer motor terminal #2.

Replace the central electronic module (CEM) if no fault is found.

Other information:
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

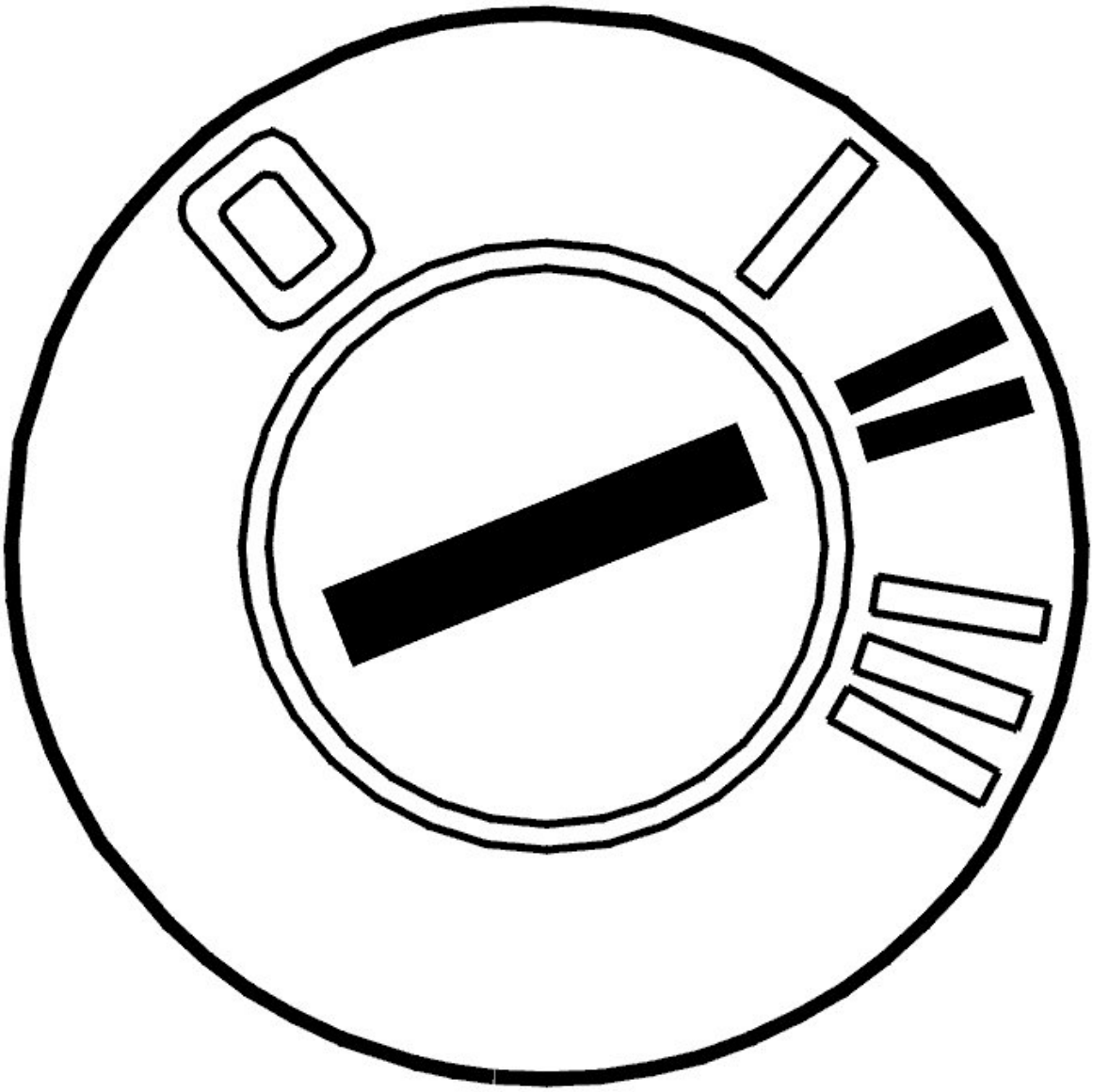
Continue - Verification

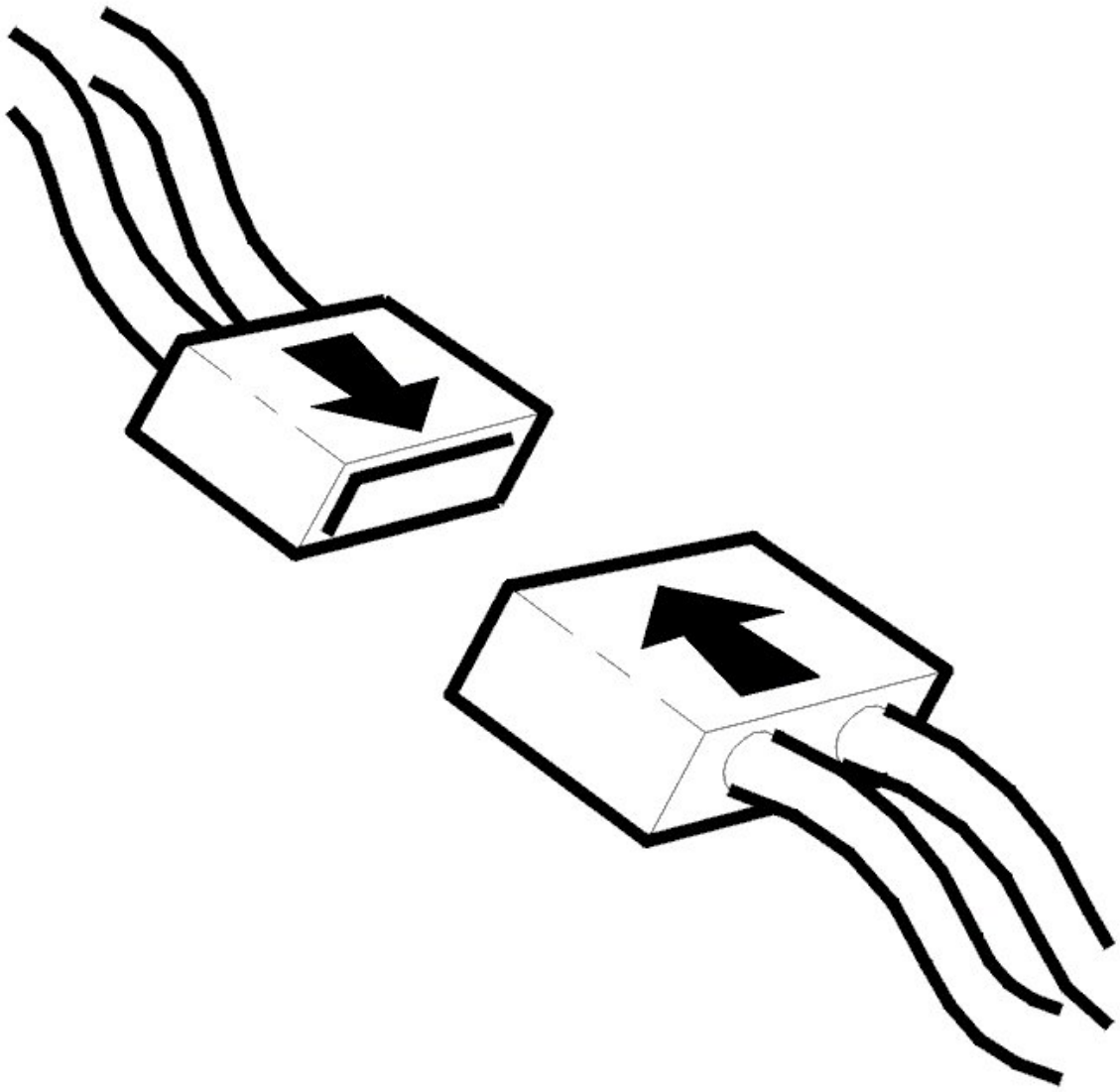
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the washer motor.

Is the washer working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

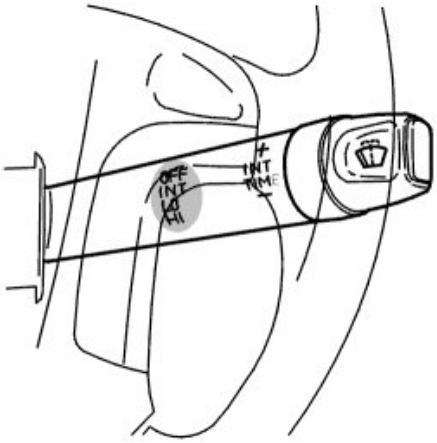
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F44

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switches for the front and rear washer motors are active at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged windshield wiper lever.

Fault symptom[s]
- The rear windshield washer motor does not operate
- The windshield washer motor does not operate.

Faulty Signal

Faulty signal

Replacing the windshield wiper switch

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
If the fault is permanent, replace the windshield wiper switch because an internal fault has occurred.

Other information:
- Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

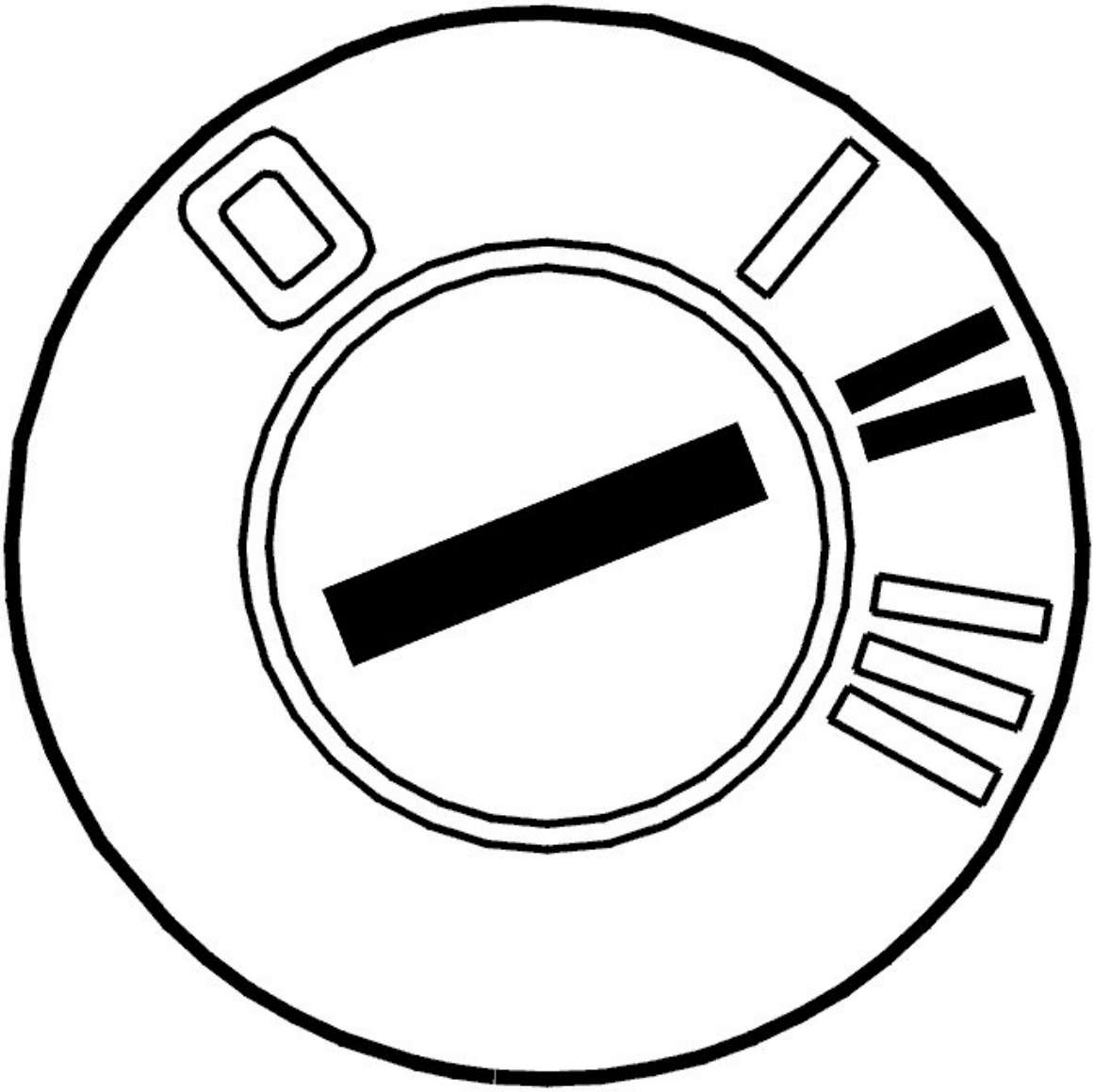
Continue - Verification

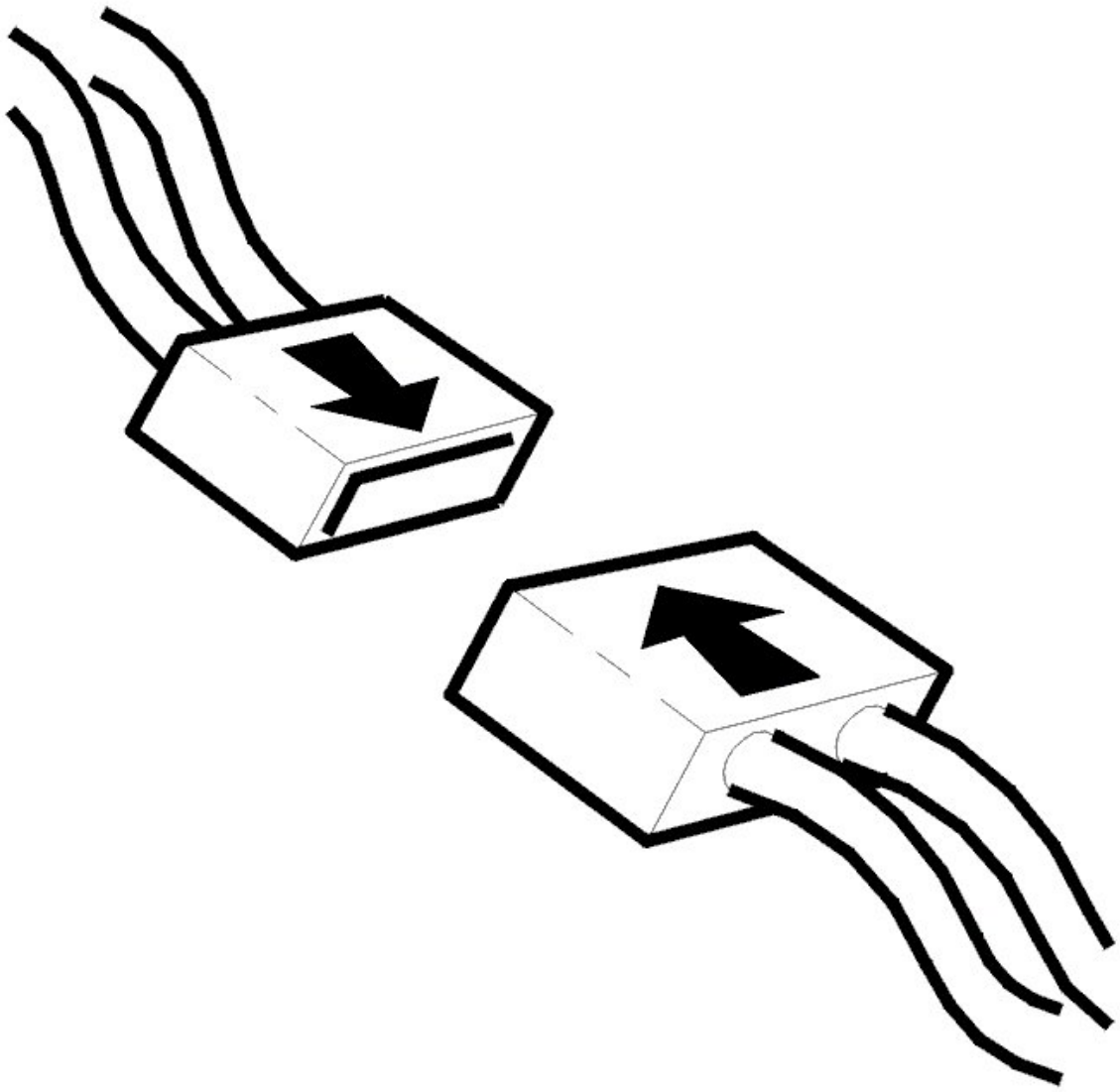
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

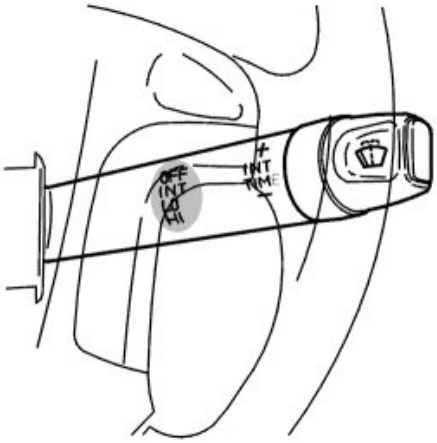
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the windshield wiper switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F45

Condition



The central electronic module (CEM) checks the windshield wipers.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the switches for the rear windshield continuous wiping and intermittent wiping are active at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged windshield wiper lever.

Fault symptom[s]
- The rear windshield wiper motor does not operate.

Faulty Signal

Faulty signal

Replacing the windshield wiper switch

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up or can be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
If the fault is permanent, replace the windshield wiper switch because an internal fault has occurred.

Other information:
- Washer / wiper switch, replacing See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Wiper Switch/Service and Repair

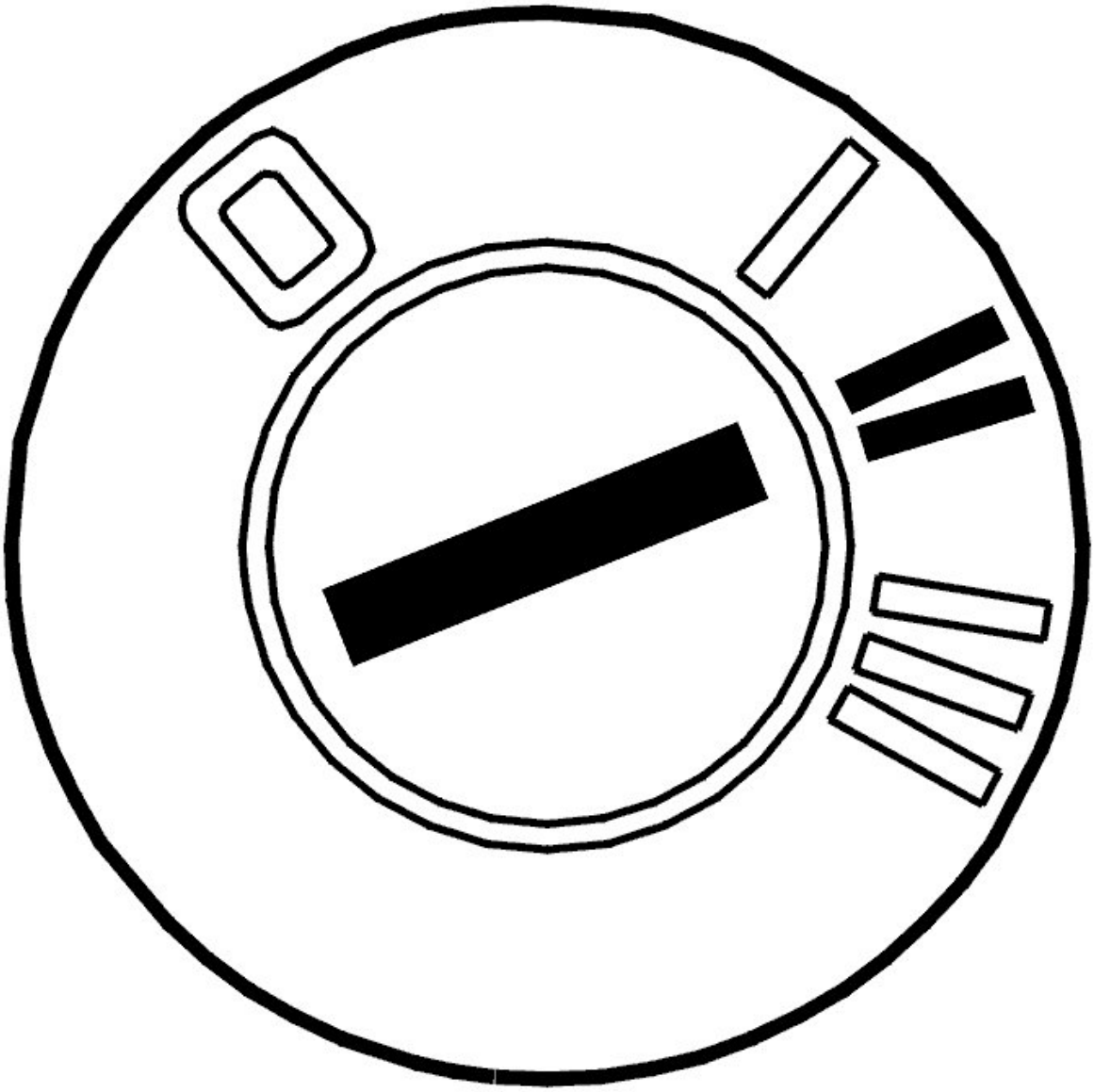
Continue - Verification

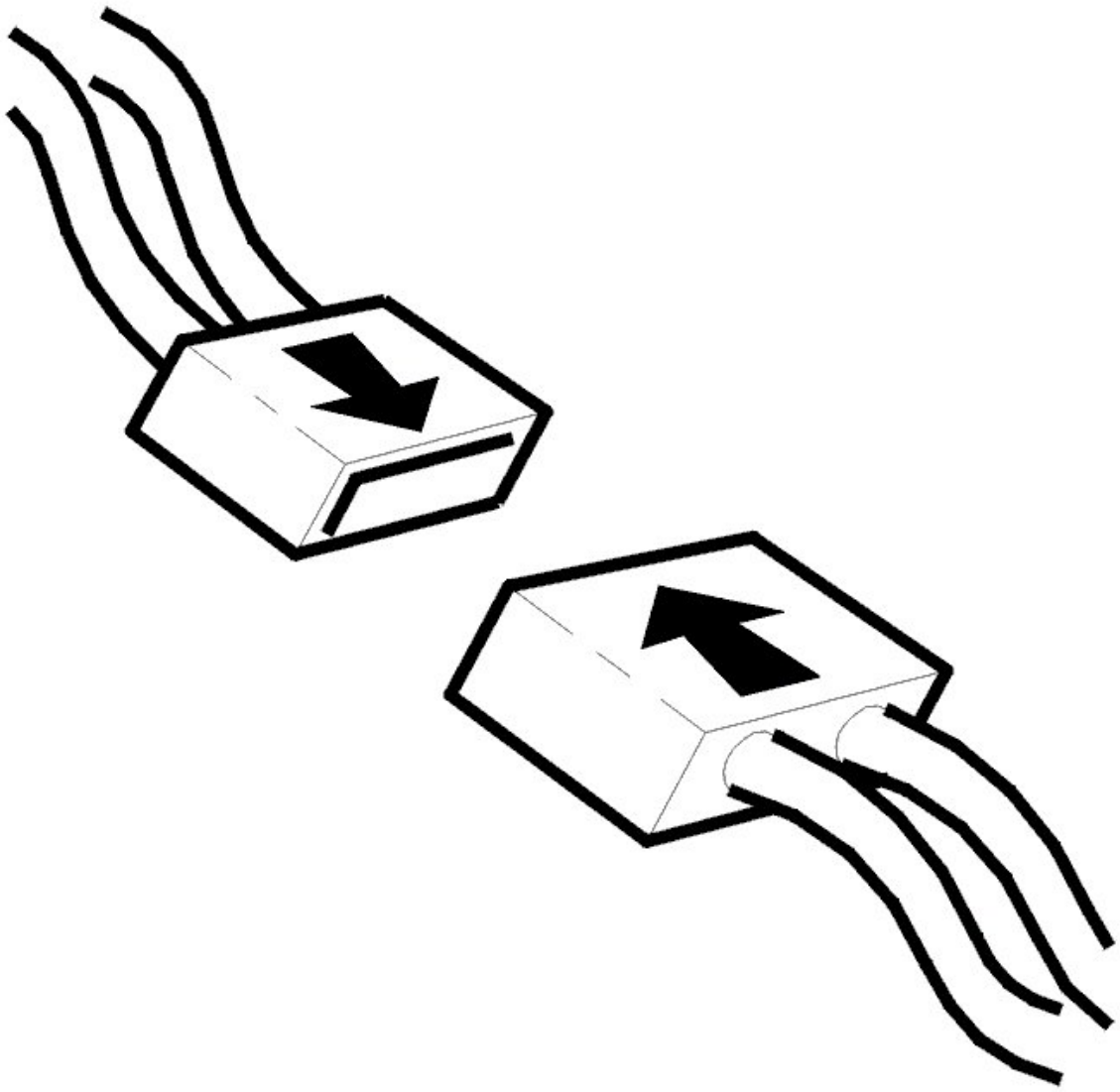
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the windshield wipers.
Check that the windshield wipers work in all positions.

Are the windshield wipers working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

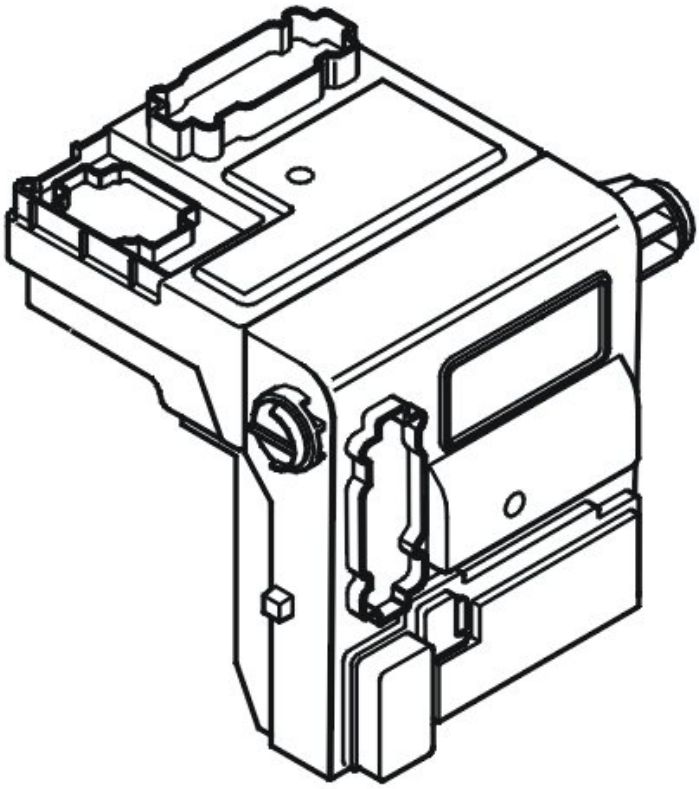
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the windshield wiper switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F51

Condition



The central electronic module (CEM) checks the output signal to the relay coil for the headlamp wash/wipe.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the output signal to the relay coil is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged relay.

Fault symptom[s]
- The headlamp washer motor does not operate.

Signal Too High

Signal too high

Checking the component

Replace relay 2/182.
Activate high-pressure cleaning by activating the windshield washer.

Hint: The washer must be activated for more than 0.3 seconds before high pressure cleaning will be activated. High-pressure cleaning is activated every fifth time the washers are activated if not more than 10 minutes have passed since the last activation.

If the function is OK, the cause of the fault was a damaged relay (short-circuit in the relay).

Other information:
- For further information about fuses and relays, see the relevant wiring diagram.

Was a fault detected?

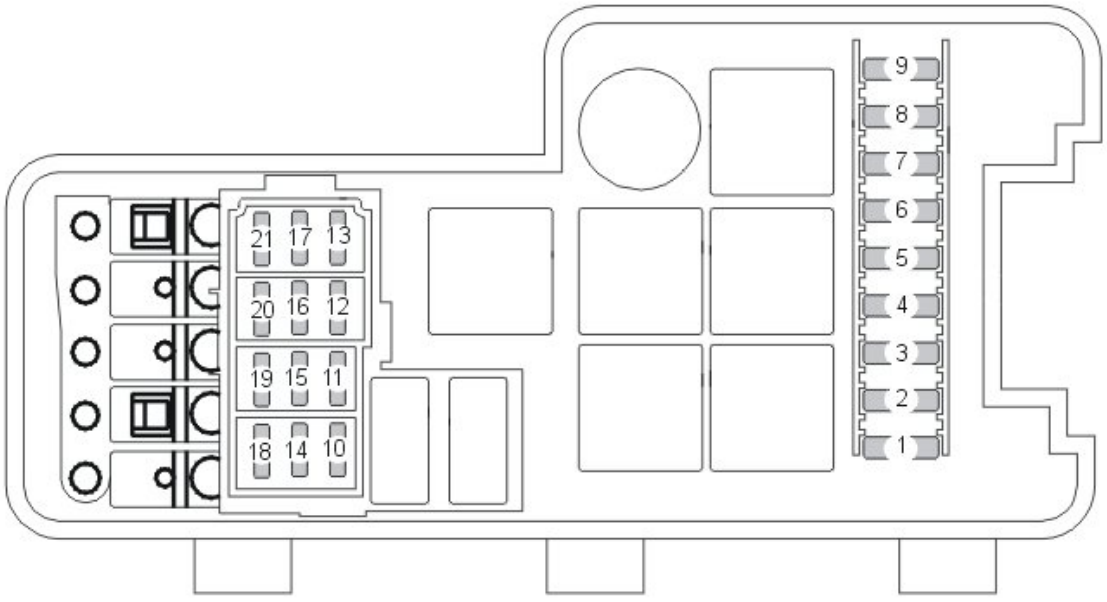
Yes - Verification

No - Checking fusebox

Checking fusebox

Remove windshield wiper relay 2/182 from the fusebox base.
Check the relay coil driver circuit for a short-circuit to supply voltage. Take a voltmeter reading between terminal #2 and ground in the relay base.
The voltage between terminal #2 and ground must be approximately 0 V.
Remedy as necessary.

Other information
- For further information about fuses and relays, see the relevant wiring diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

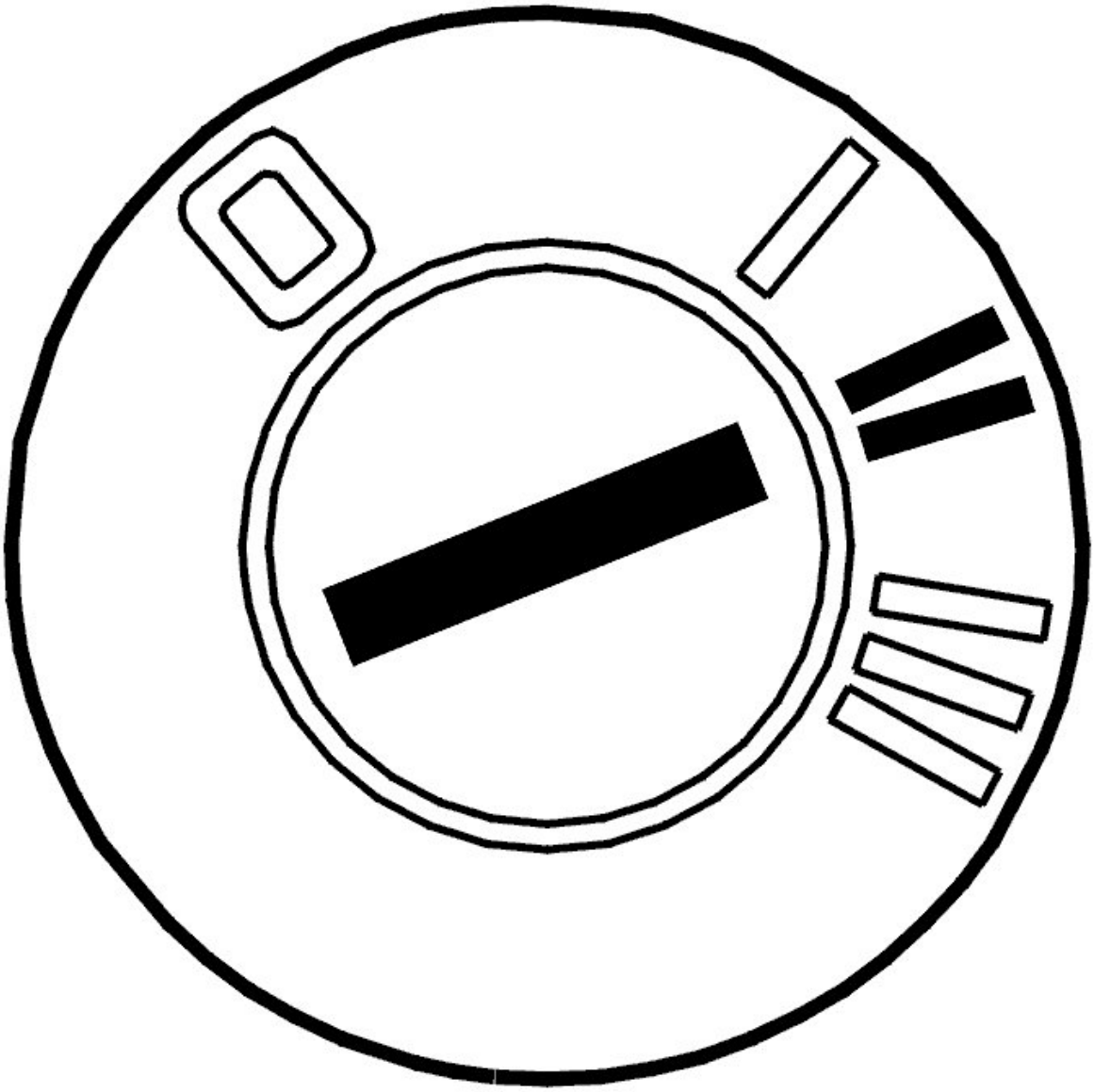
No - Checking the wiring

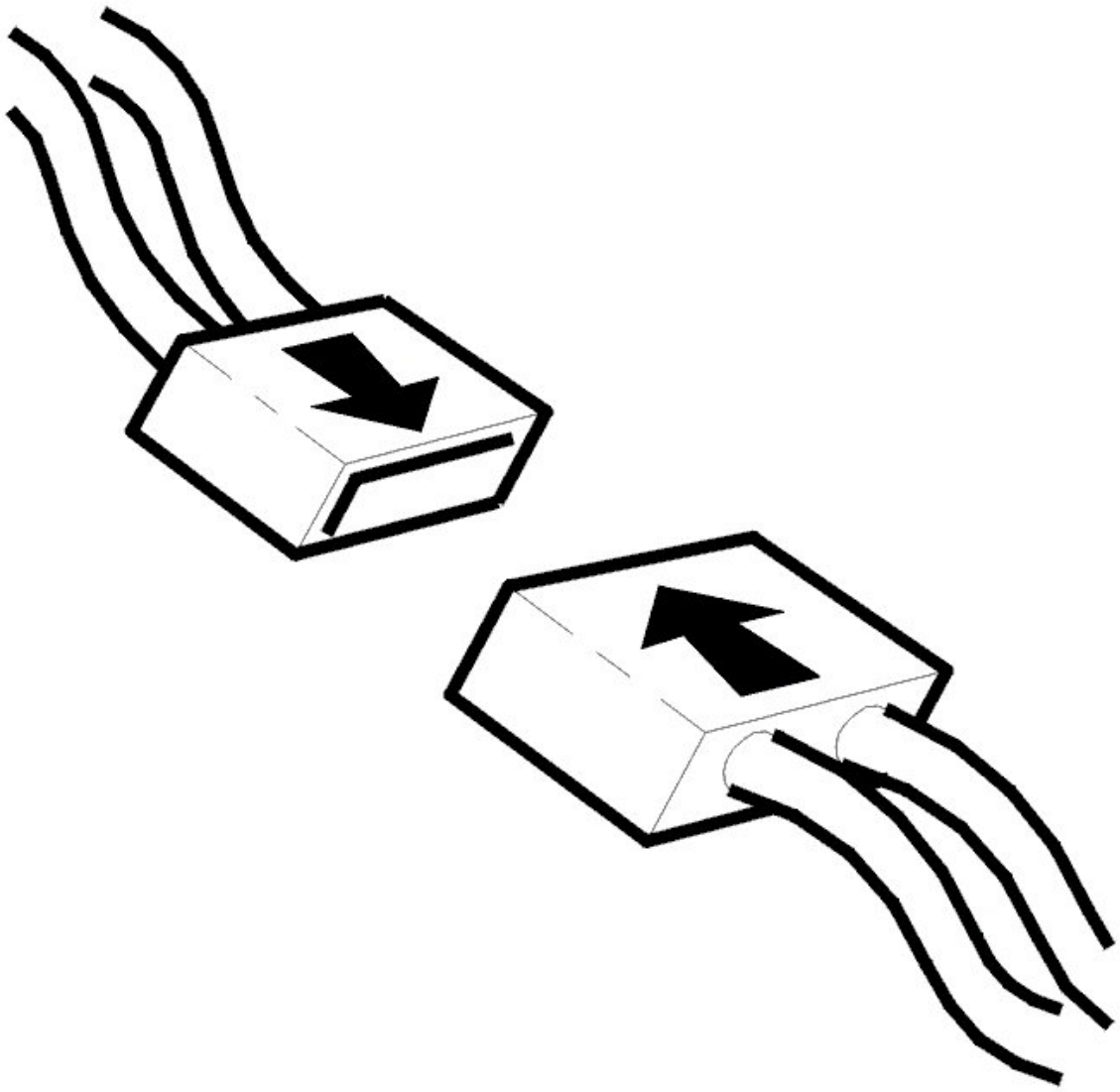
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate high-pressure cleaning by activating the windshield washer.

Hint: The washer must be activated for more than 0.3 seconds before high pressure cleaning will be activated. High-pressure cleaning is activated every fifth time the washers are activated if not more than 10 minutes have passed since the last activation.

Is the washer working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking fusebox

Checking the wiring

Check the cable between windshield wiper relay base terminal #2 and central electronic module (CEM) terminal #C25. Check for a short-circuit to supply voltage.
Remedy as necessary.
Replace the fusebox if no fault is found.

Other information

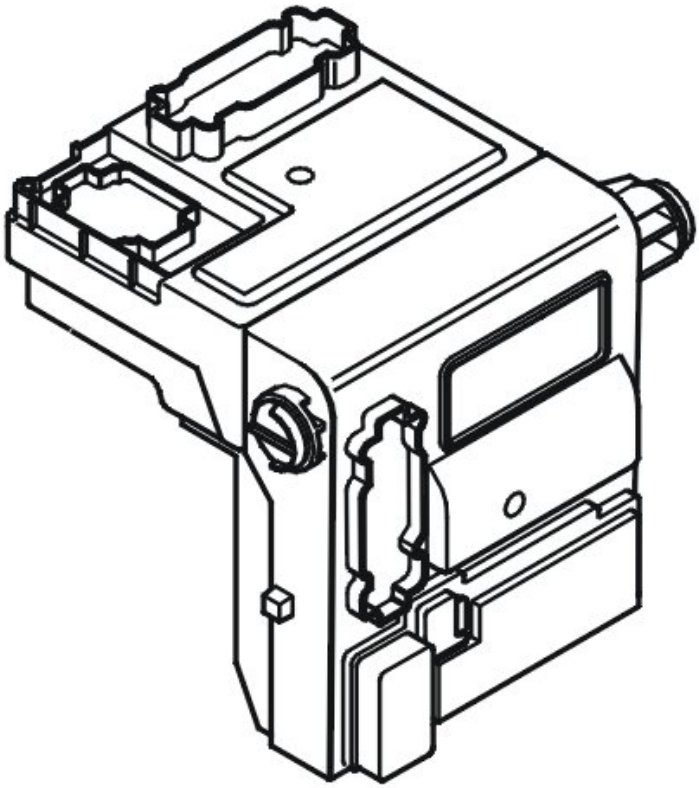
- For further information about fuses and relays, see the relevant wiring diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-8F52

Condition



The Central electronic module (CEM) checks the output signal to the relay winding for headlight cleaning.
If Central electronic module (CEM) registers that the output signal to the relay winding is missing or too low, the diagnostic trouble code is

generated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- The washer pump's fuse has failed.
- Open-circuit or short-circuit to ground in the signal cable.
- Damaged relay.
- Short-circuiting in the pump for high-pressure washing.

Fault symptom[s]
- Headlight washer pump does not work

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking fuses

Check that the fuse for the high-pressure washer is intact. Replace the fuse if necessary.
After changing fuse, erase trouble codes.
Activate ignition position II.
Try to activate the headlight washers with the lever.

Hint: The washer must be activated for more than 0.3 seconds for the high-pressure washer to be activated. The high-pressure washer is activated every fifth time that the washers are activated if not more than 10 minutes have passed since the last activation. Warning light for low washer fluid level may not be on.

If the trouble code does not return and the high-pressure washer works, no further action is needed.
If the fuse fails again, or if the trouble code returns, continue troubleshooting.

Do you wish to continue with fault tracing?

Yes - Checking the component

No - Verification

Checking the component

Replace relay 2/182.
Activate high-pressure washing by activating the washer for the windshield.

Hint: The washer must be activated for more than 0.3 seconds for the high-pressure washer to be activated. The high-pressure washer is activated every fifth time that the washers are activated if not more than 10 minutes have passed since the last activation.

If the function is OK, the cause of the fault was a damaged relay (short-circuit in the relay).

Other information:
- For further information about the fuses and relays, see the Wiring Diagram.

Do you wish to continue with fault tracing?

Yes - Checking high-pressure washer pump

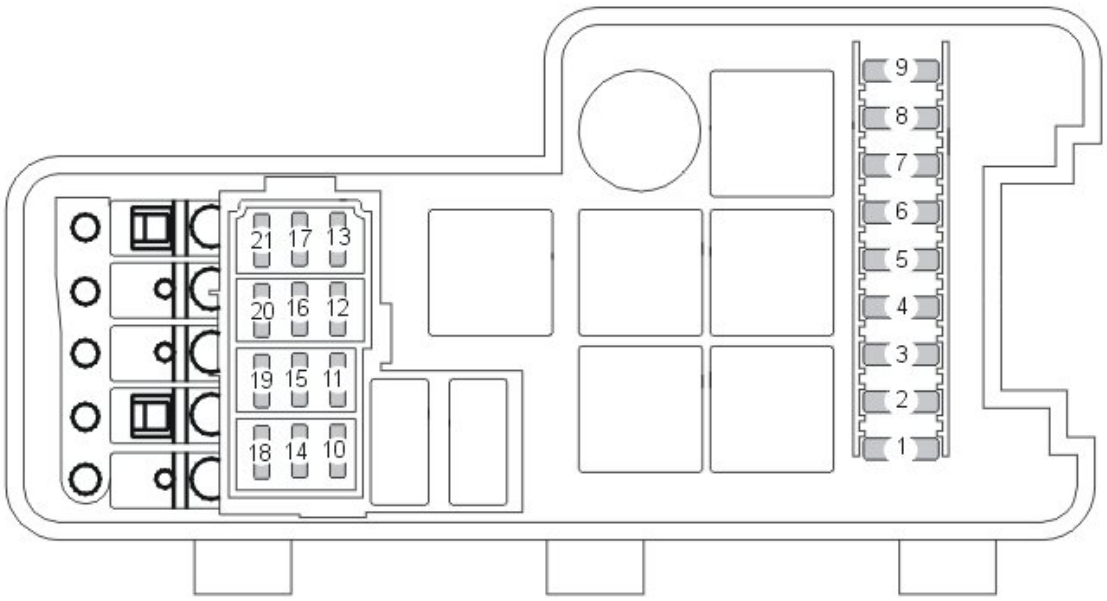
No - Verification

Checking fusebox

Remove headlight washer relay (2/182) from the fuse box socket.
Check the relay winding's drive circuit for short-circuiting to voltage by measuring voltage between #2 and ground in the relay socket.
Voltage between #2 and ground shall be battery voltage.
Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Do you wish to continue with fault tracing?

Yes - Checking the wiring

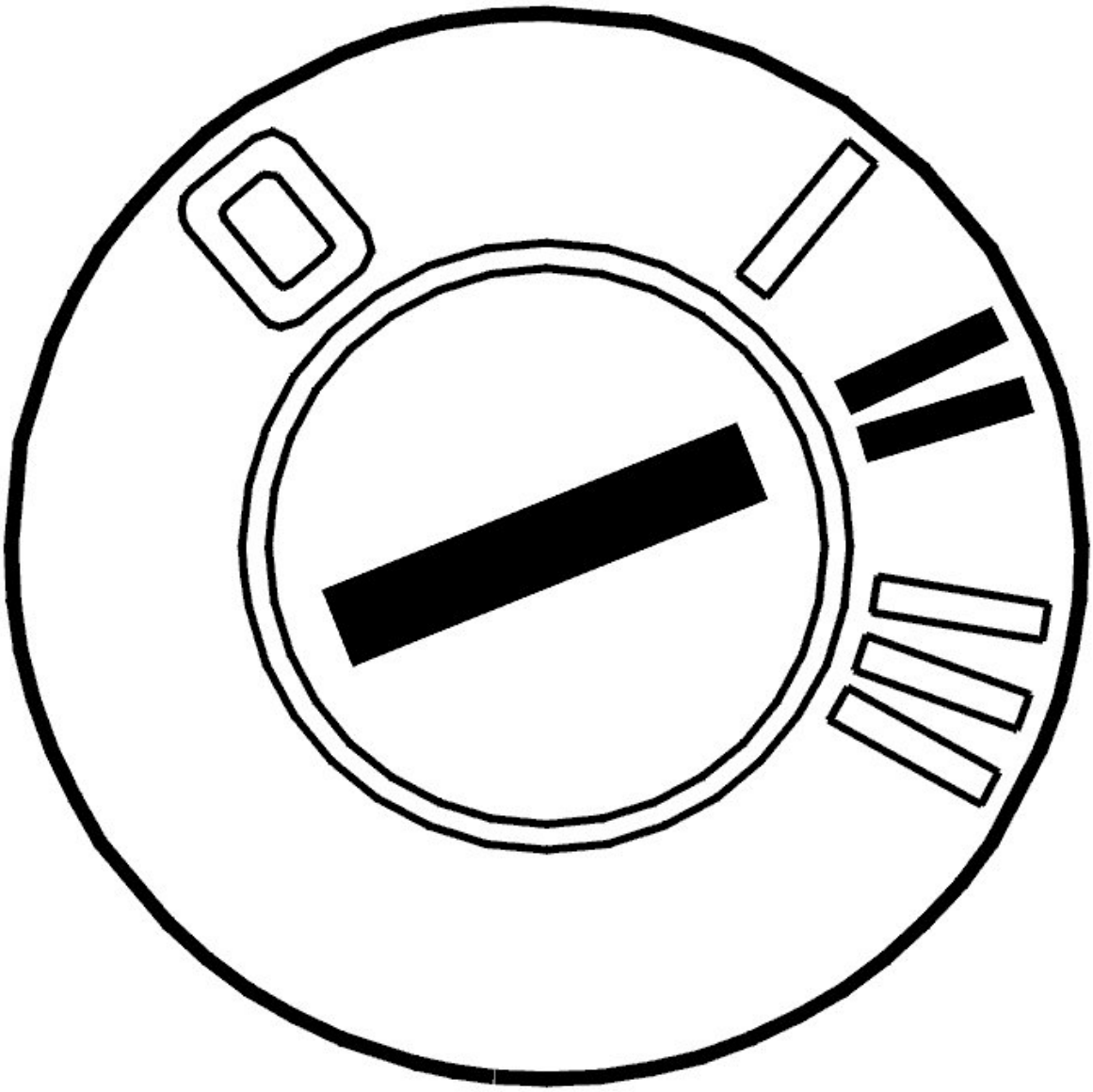
No - Verification

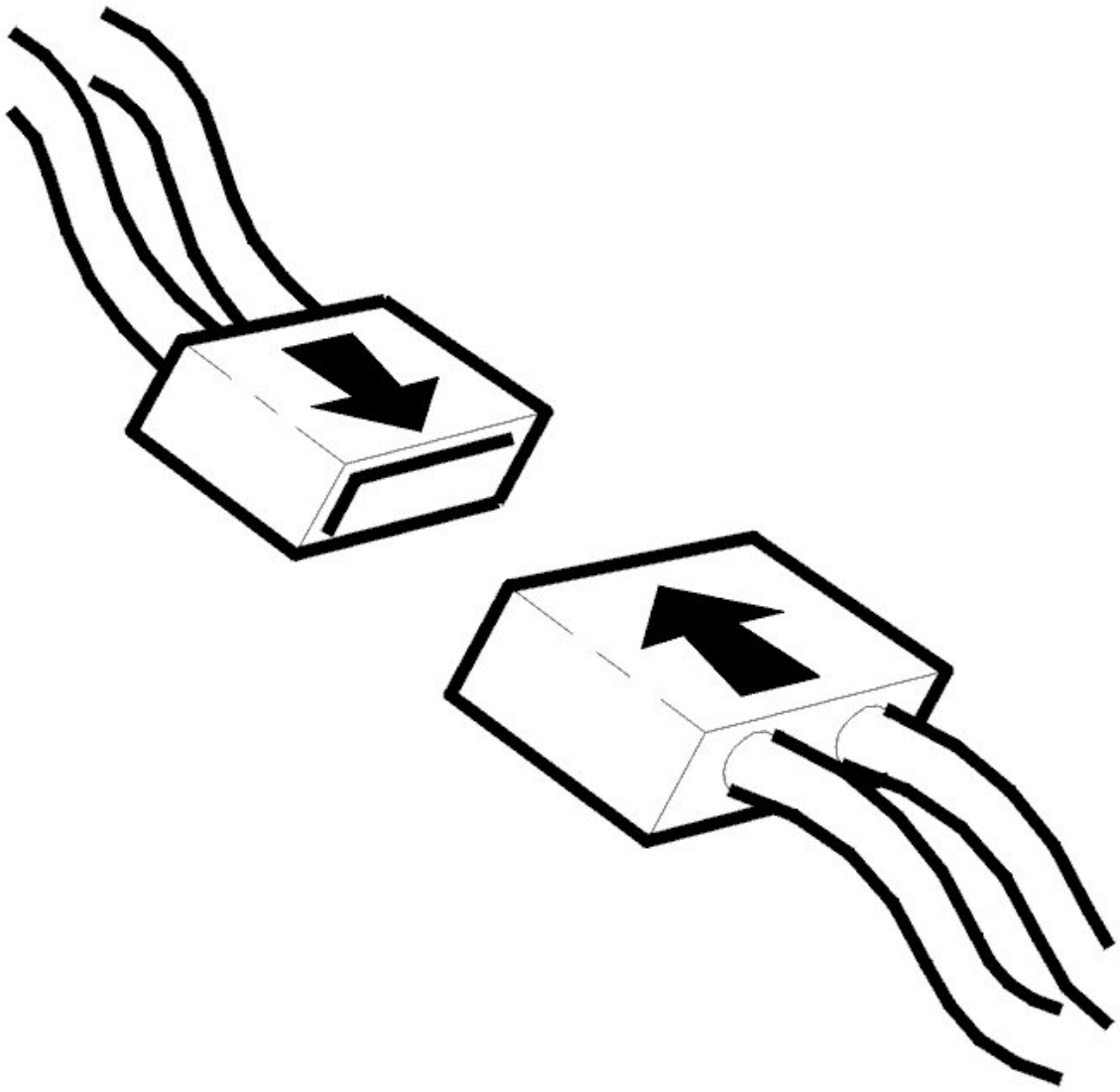
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate high-pressure cleaning by activating the windshield washer.

Hint: The washer must be activated for more than 0.3 seconds before high pressure cleaning will be activated. High-pressure cleaning is activated every fifth time the washers are activated if not more than 10 minutes have passed since the last activation.

Is the washer working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking fuses

Checking the wiring

Check the cable between the headlight washer relay (2/182) #4 and central electronic module (CEM) #C25 for short circuits to ground and open circuits.
Disconnect washer pump and headlight washer relay (2/182). Check cable between connection #1 on the headlight washer relay (2/182) and ground for short-circuiting to ground.
Remedy as necessary.
Replace the fusebox if no fault is found.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Checking high-pressure washer pump

Check that the fuse for the high-pressure washer is intact.
Disconnect the pump for high-pressure washing from its connector.
Try to activate the headlight washers with the lever.
If the fuse does not fail when the washer pump is disconnected, the cause of the trouble code being set is probably an internal short circuit in the washer pump for the headlights. Try with changing high-pressure washer pump.
If the fuse fails, even if the pump is disconnected, the pump is probably okay. Continue troubleshooting.

Do you wish to continue with fault tracing?

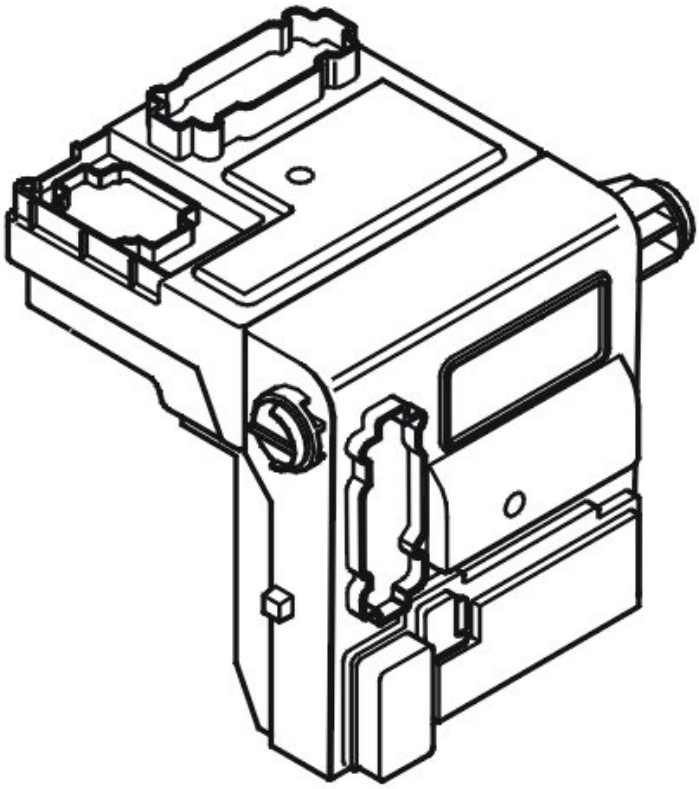
Yes - Checking fusebox

No - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9C01

Condition



The central electronic module (CEM) checks the glove compartment lighting.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects a short-circuit to ground in the power supply cable for the glove compartment lighting.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

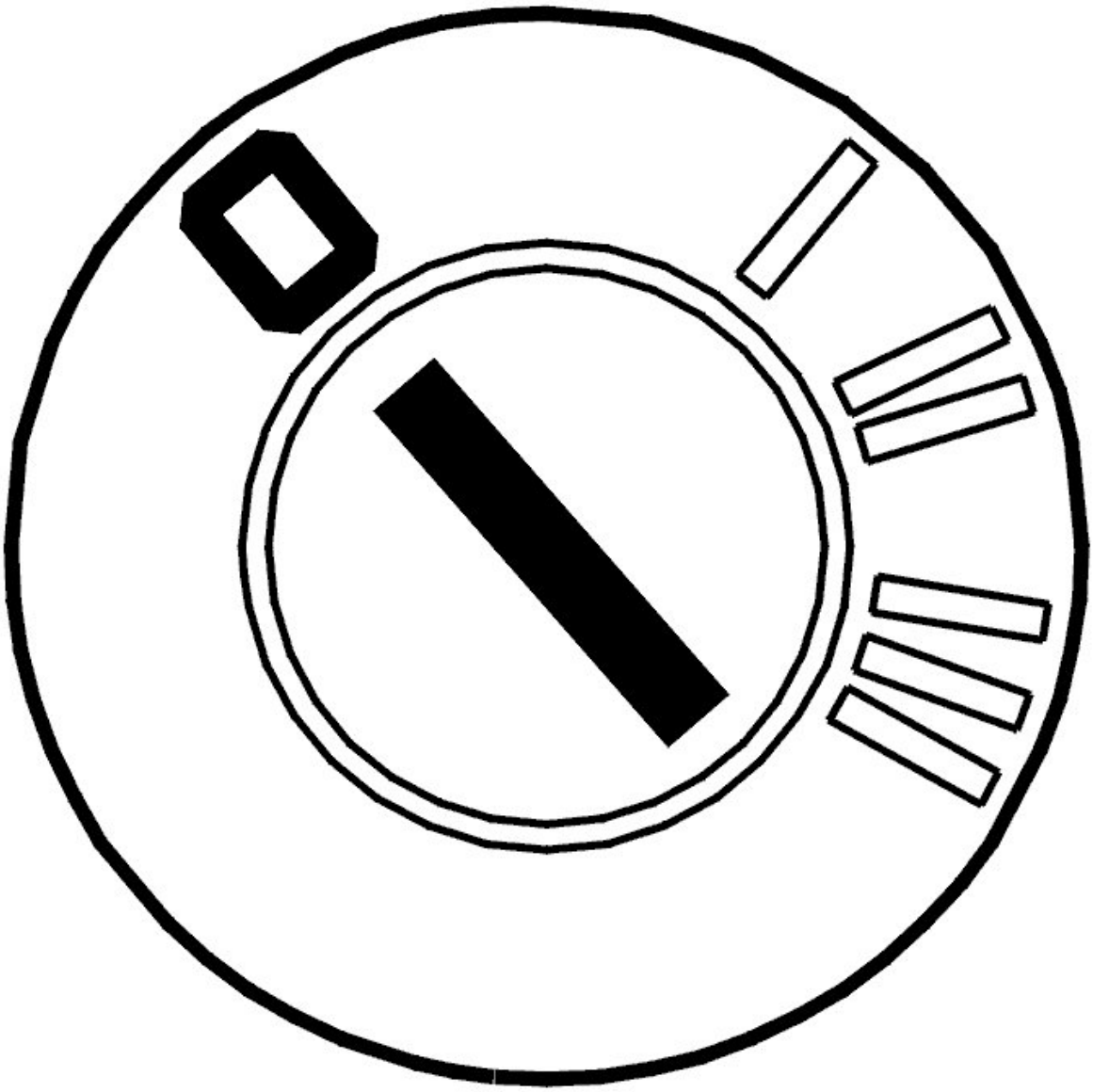
Possible source
- Short-circuit to ground in the cable to the glove compartment lighting.

Fault symptom[s]
- The glove compartment lighting is not working.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off.

Check the power cable for a short-circuit to ground.
Take readings between:

- Central electronic module (CEM) #D9 and glove compartment lighting terminal #1.

Also check that the correct type of bulb is installed in the glove compartment lighting.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

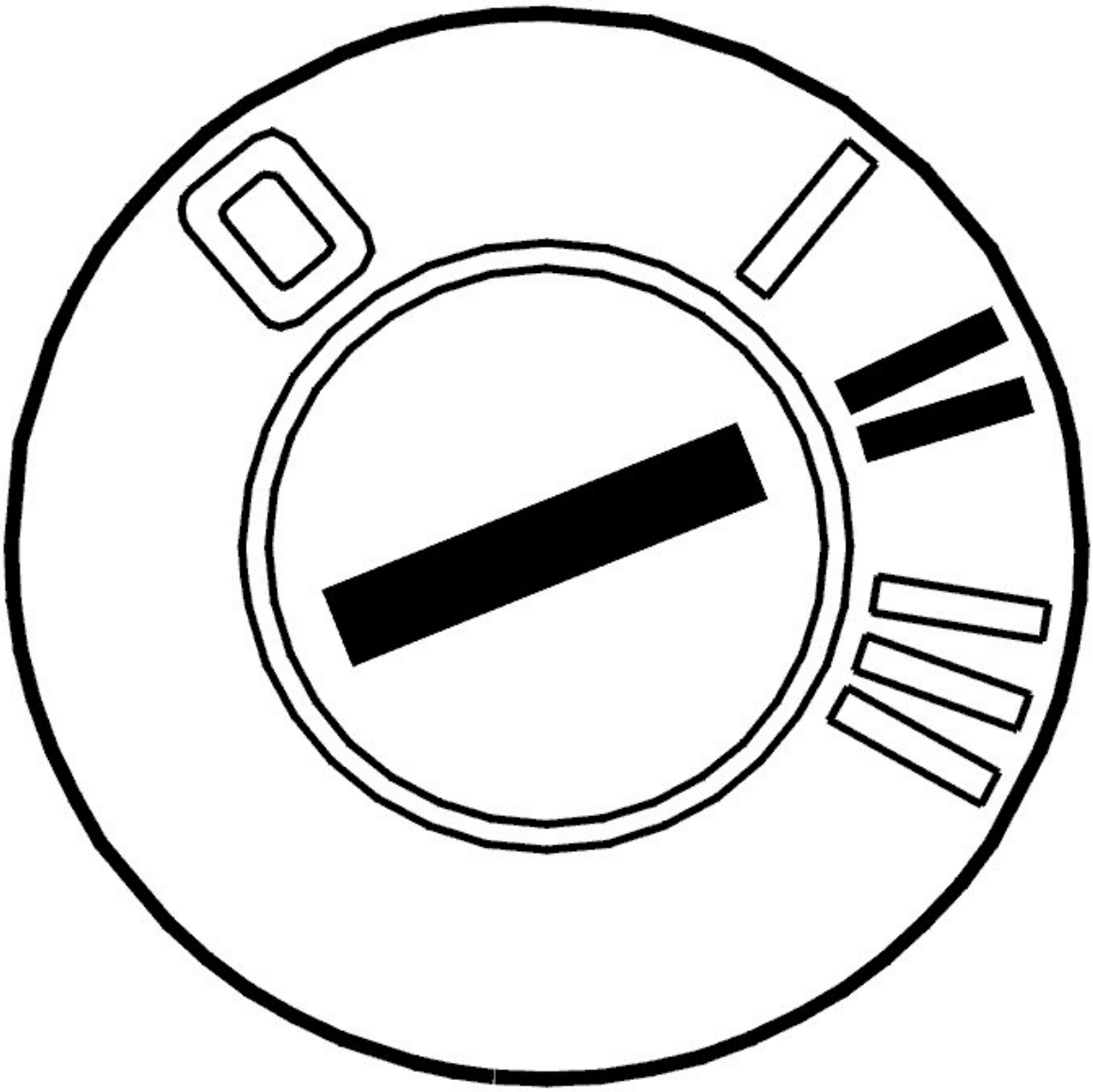
Continue - Verification

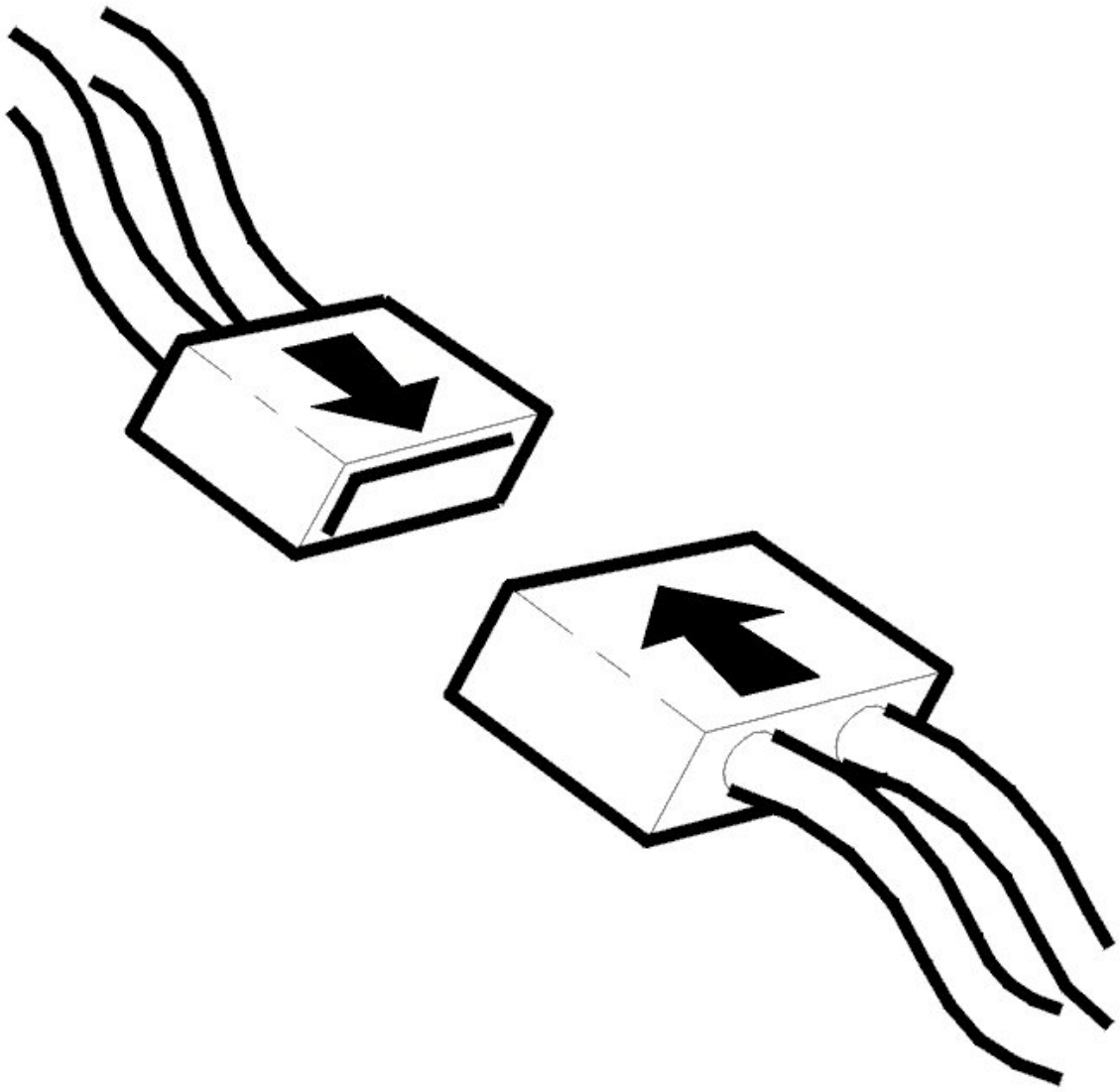
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Open the glove compartment.

Does the lamp light?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

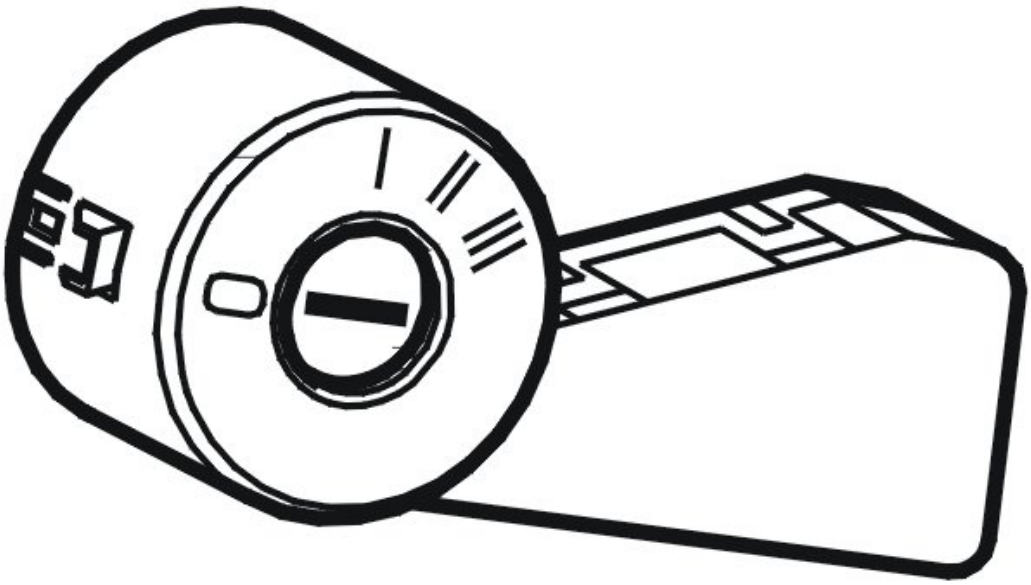
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9C02

Condition



When the vehicle is unlocked, the interior lighting and the lighting around the ignition switch light up.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects a short-circuit to ground in the supply cable for the lighting ring.
The diagnostic trouble code (DTC) can be diagnosed when the interior lighting is active.

Substitute value
- None.

Possible source
- Short-circuit to ground in the light ring around the ignition switch.

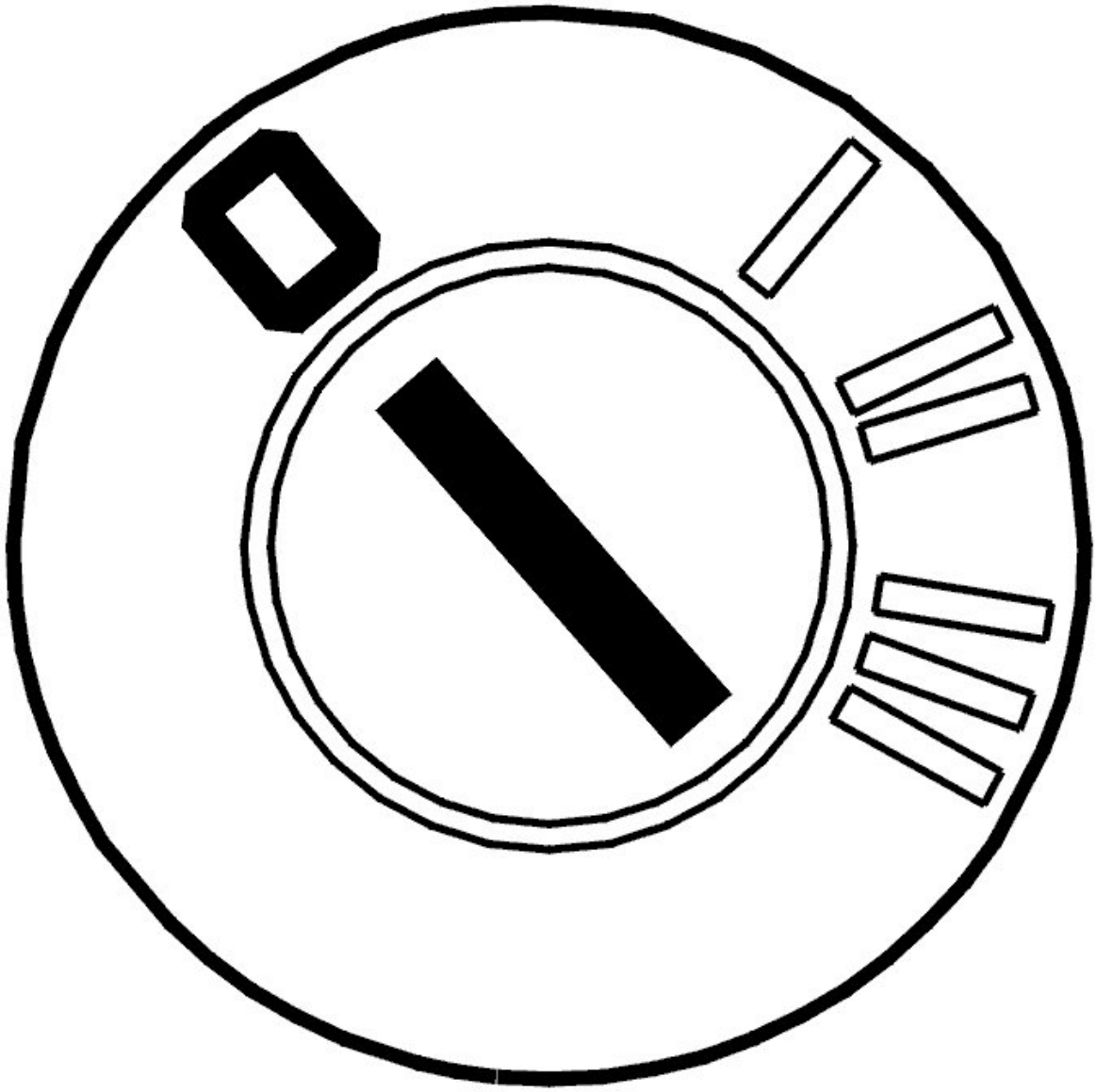
Fault symptom[s]
- None.

Short-circuit to Ground

Short-circuit to ground

Checking the wiring

Hint: The light ring for the ignition switch is deactivated 30 minutes after the vehicle is unlocked.

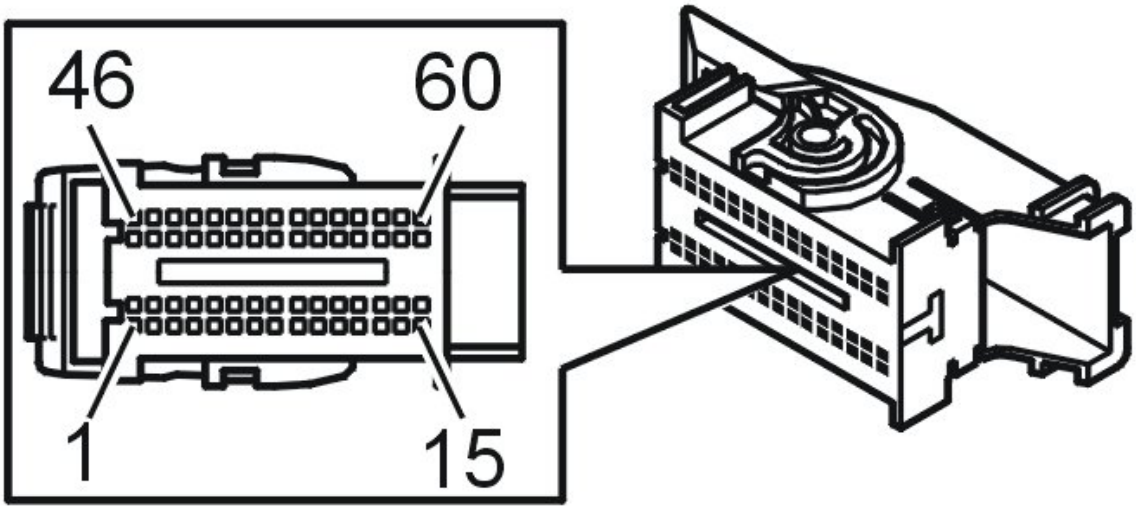


- Ignition off.

Check the power cable for a short-circuit to ground.
Take readings between:
- Central electronic module (CEM) terminal #D13 and terminal #5 on the light ring for the ignition switch.

Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



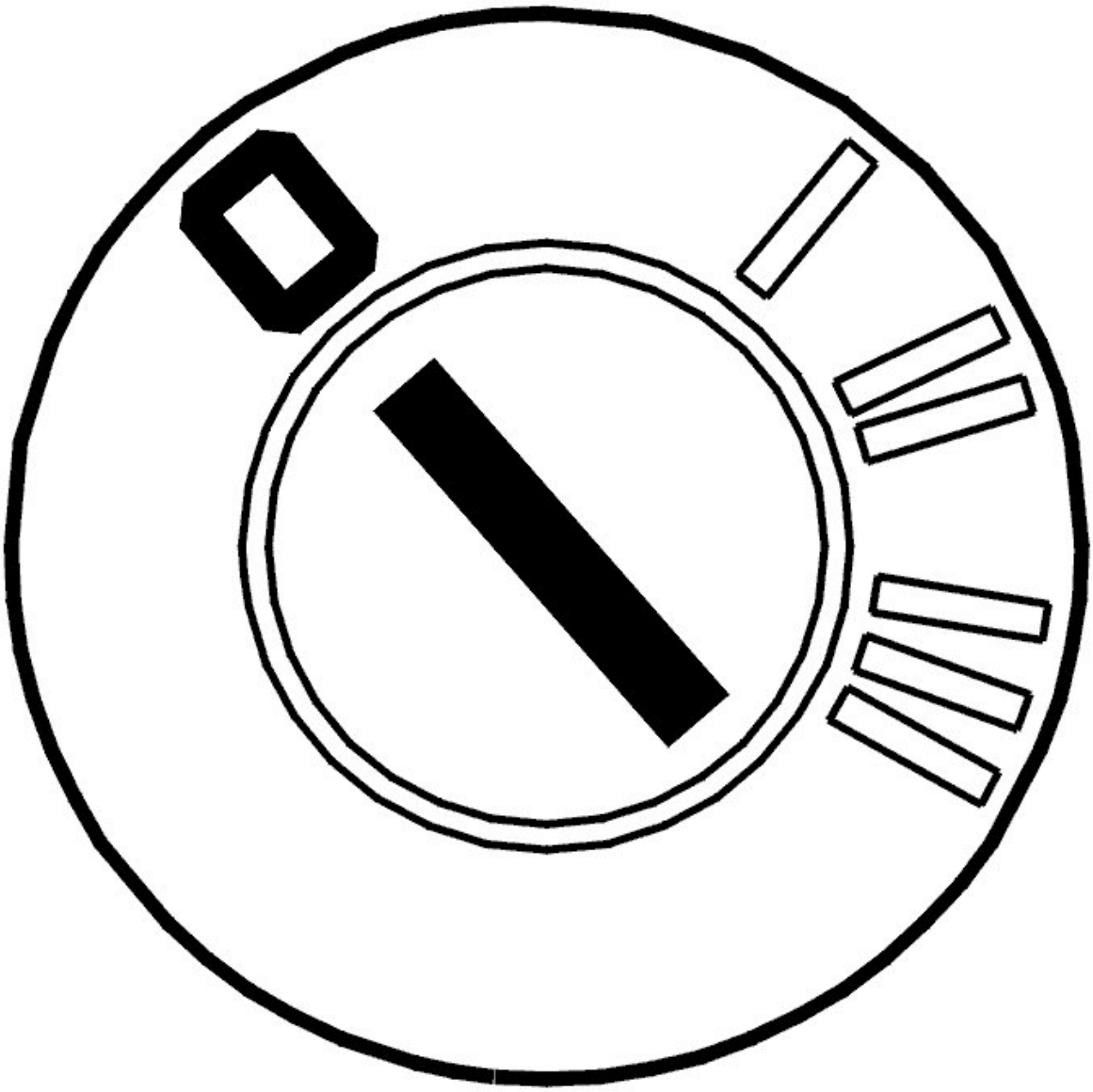
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Activate the interior lighting
- Unlock the car.

Does the light ring come on?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

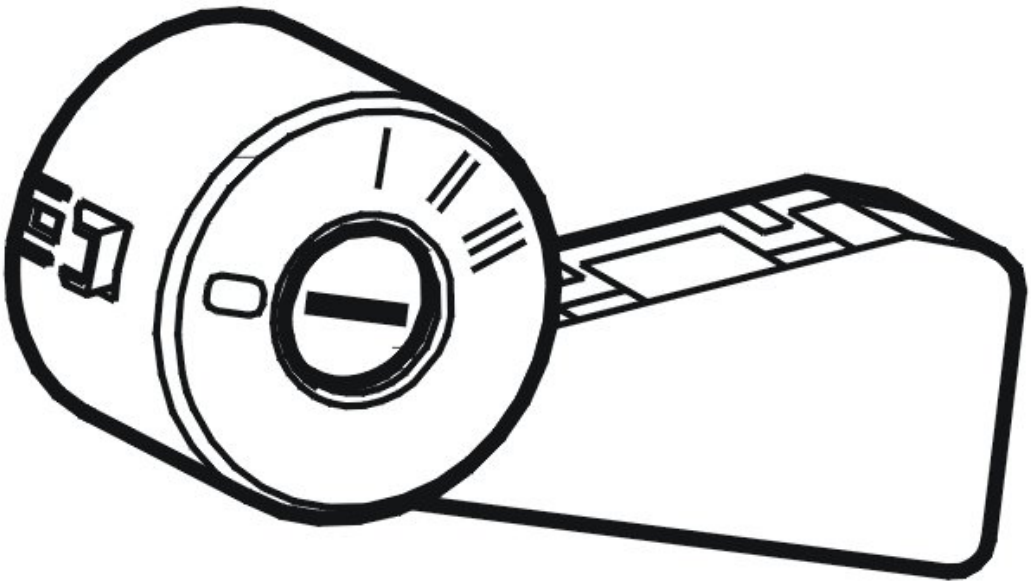
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9C03

Condition



When the vehicle is unlocked, the interior lighting and the lighting around the ignition switch light up.
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers that the signal on the light ring is too high or that there is no signal.
The diagnostic trouble code (DTC) can be diagnosed when the interior lighting is active.

Substitute value
- None.

Possible source
- Open-circuit in the light ring
- Short-circuit to supply voltage in the cable for the light ring

- Damaged light ring.

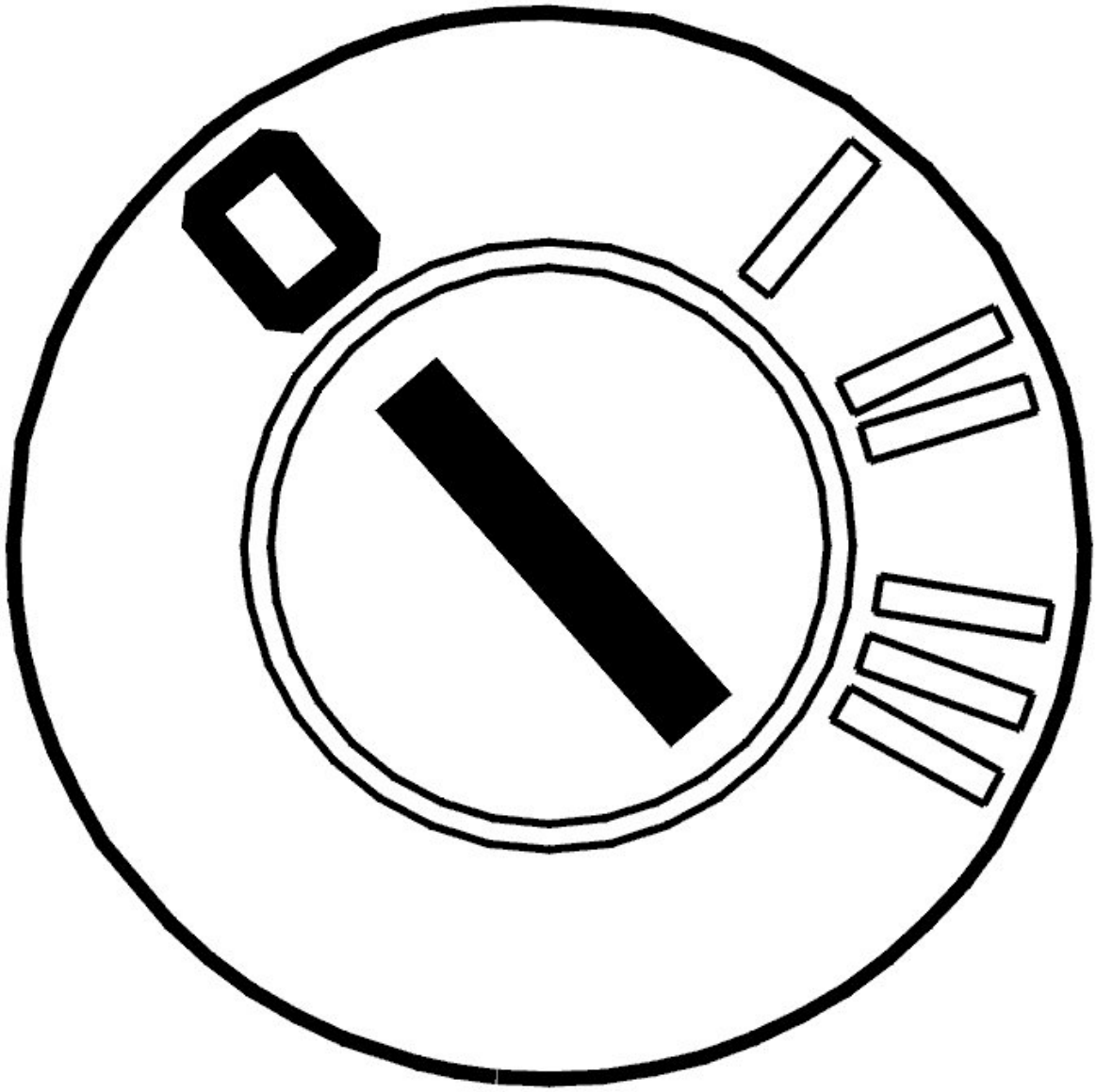
Fault symptom[s]
- None.

Signal Missing

Signal missing

Checking the wiring

Hint: The light ring for the ignition switch is deactivated 30 minutes after the vehicle is unlocked.



- Ignition off.

Check the ground lead. Check for an open-circuit. Check for a short-circuit to supply voltage.
Take readings between light ring terminal #6 and ground.
Replace the antenna/light ring if there is no fault in the signal cable.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Antenna unit immobilizer, replacing See: Accessories and Optional Equipment/Antenna/Antitheft Antenna/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

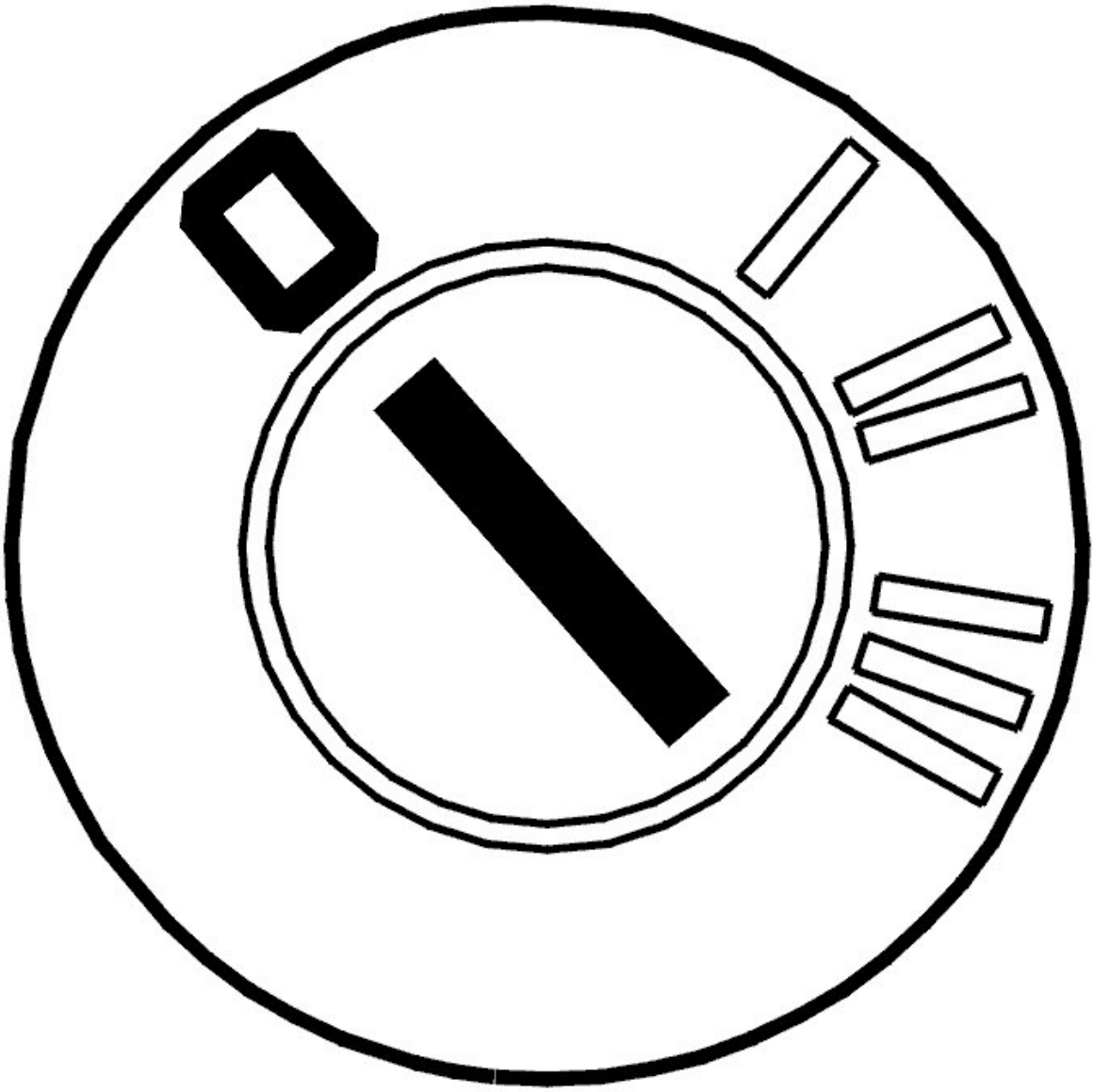
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Activate the interior lighting
- Unlock the car.

Does the light ring come on?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

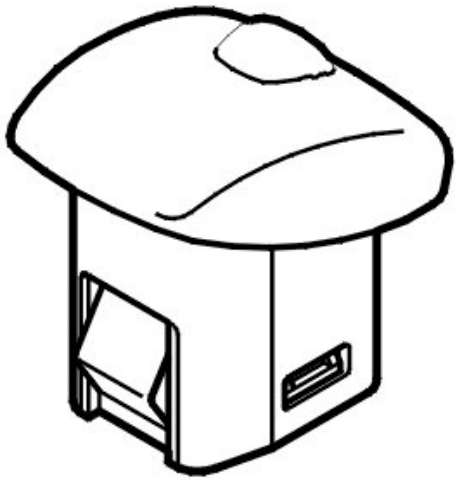
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9F20

Condition



The central electronic module (CEM) receives information about the prevailing light conditions from the twilight sensor. This information is used to determine the light intensity for symbols and the instrument lighting. Two different levels are pre-defined, one for day and one for night. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to battery voltage in the twilight sensor circuit.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Light intensity for night is used.

Possible source

- Short-circuit to supply voltage in the signal cable
- Damaged twilight sensor.

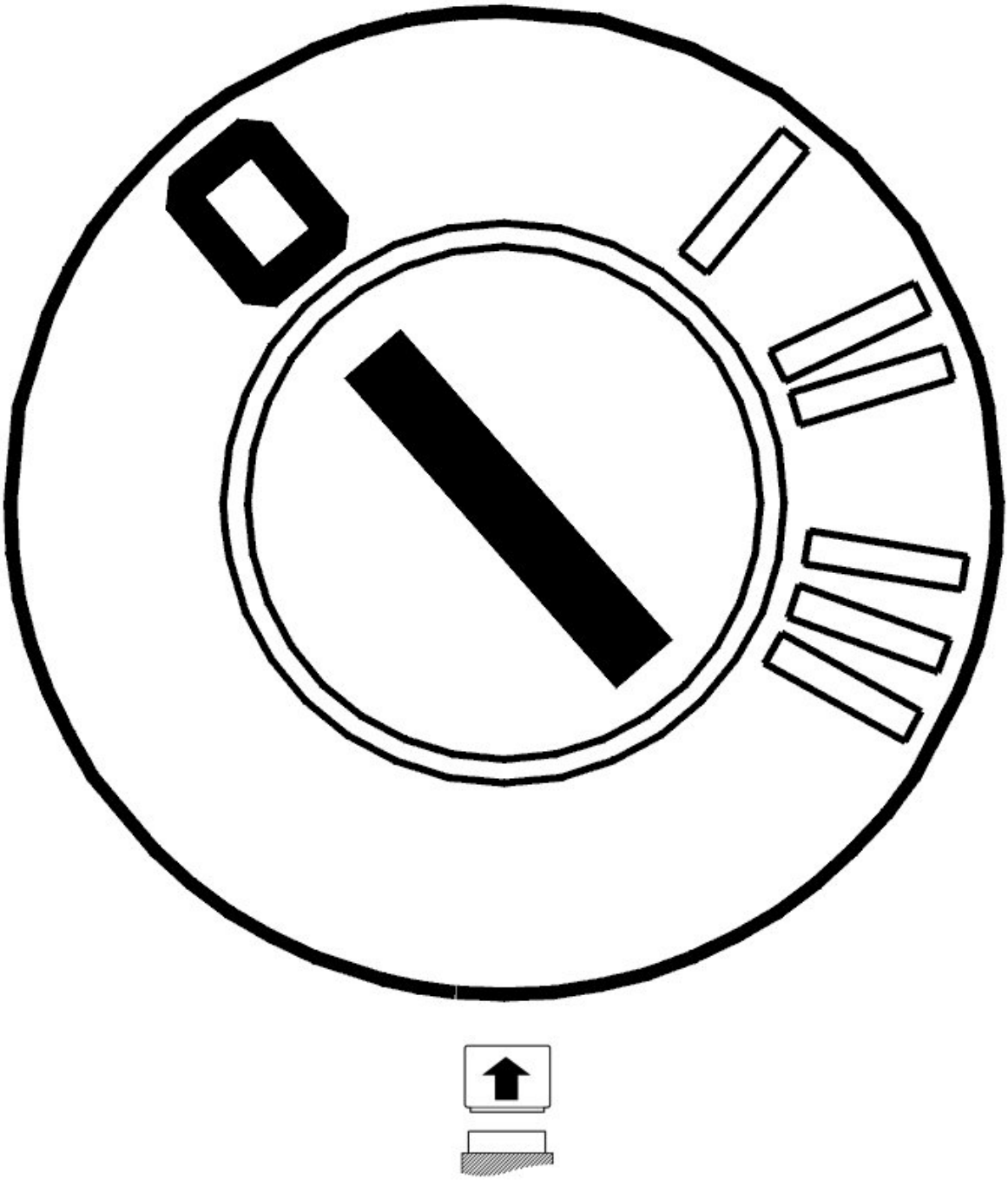
Fault symptom[s]

- The instrument lighting is constantly lit at full strength.

Short-circuit to Supply Voltage

Short-circuit to supply voltage

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage. Take readings between central electronic module (CEM) terminal #D29 (#29) and twilight sensor terminal #4.
For further information, see the wiring diagram.
Try a new twilight sensor if no fault was found.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Sun sensor / alarm LED, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Security Lamp/Indicator/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

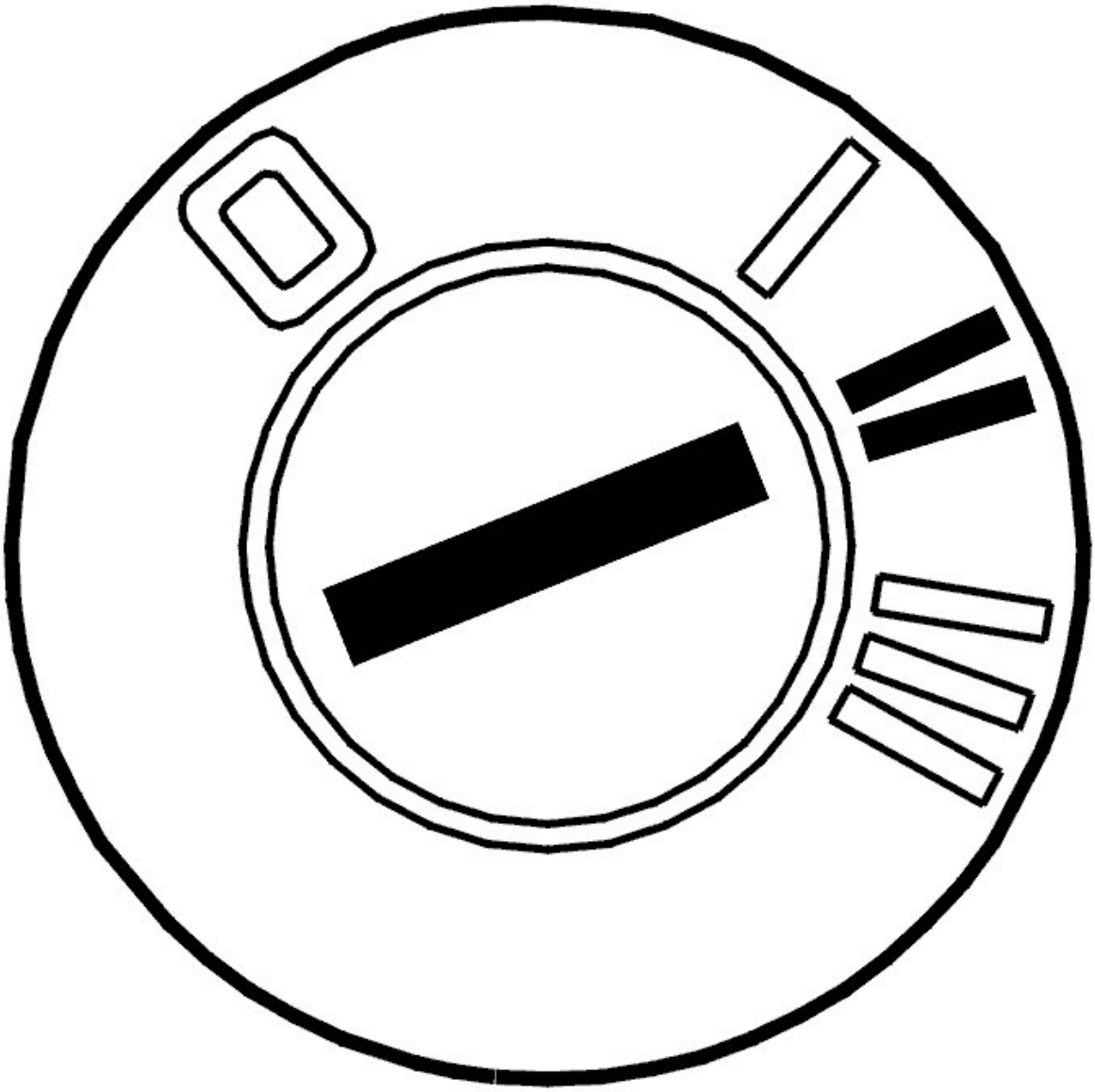
Continue - Verification

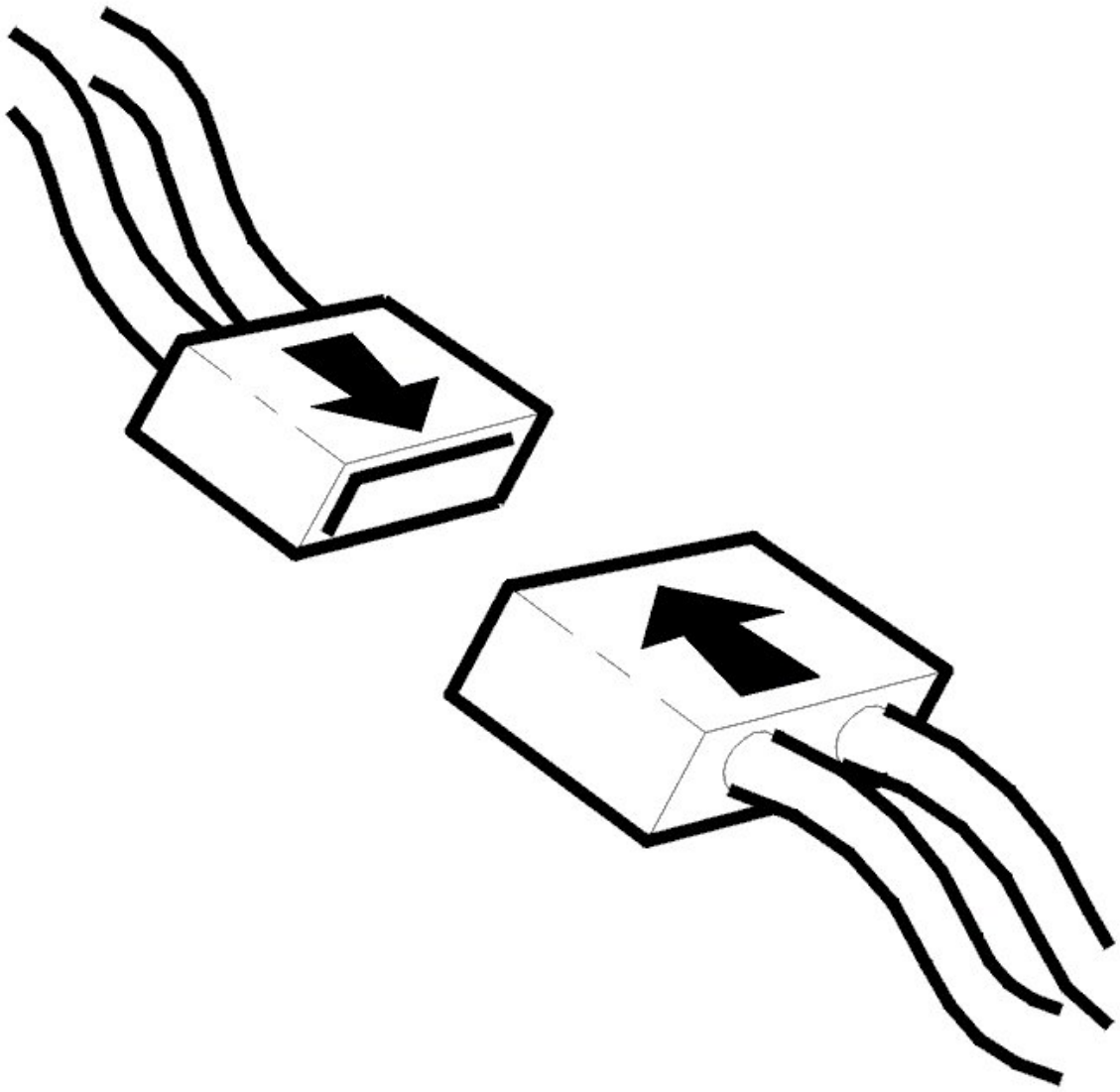
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage level at the twilight sensor by clicking the VCT2000 symbol.
Check that the value is between 2 and 4.8 V.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

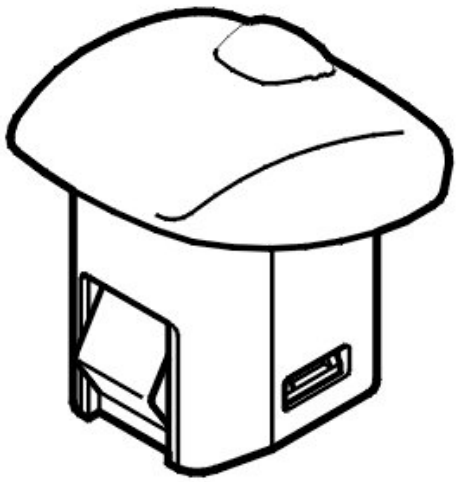
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9F21

Condition



The central electronic module (CEM) receives information about the prevailing light conditions from the twilight sensor. This information is used to determine the light intensity for symbols and the instrument lighting. Two different levels are pre-defined, one for day and one for night. The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) registers a short-circuit to ground in the twilight sensor circuit. The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- Light intensity for night is used.

Possible source
- Short-circuit to ground in the signal cable
- The twilight sensor does not operate.

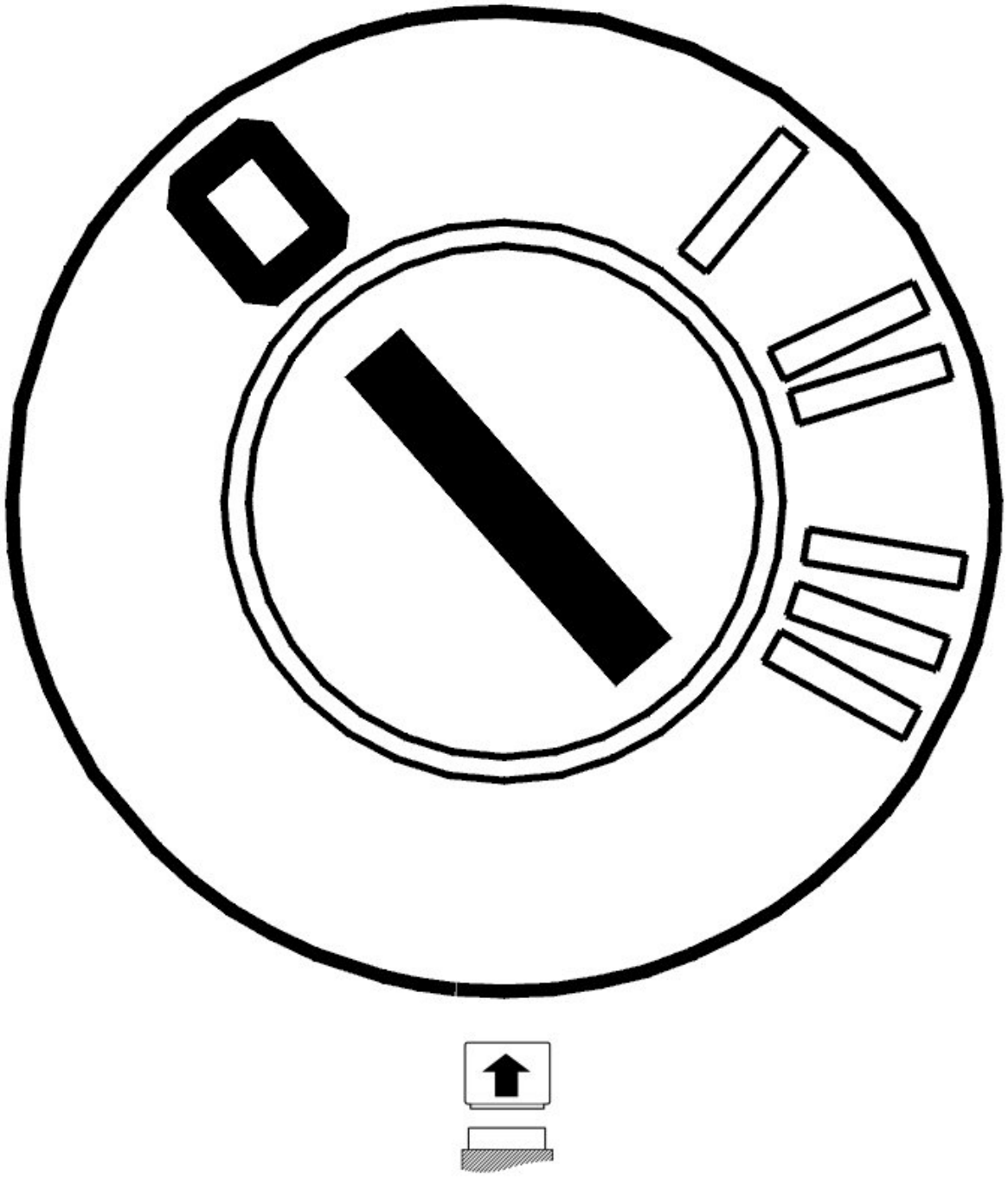
Fault symptom[s]

- The instrument lighting is constantly lit at full strength.

Short-circuit to Ground

Short-circuit to ground

Checking the wiring



- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for a short-circuit to ground. Take readings between central electronic module (CEM) terminal #D29 (#29) and twilight sensor terminal #4.
For further information, see the wiring diagram.
Try a new twilight sensor if no fault was found.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Sun sensor / alarm LED, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Security Lamp/Indicator/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

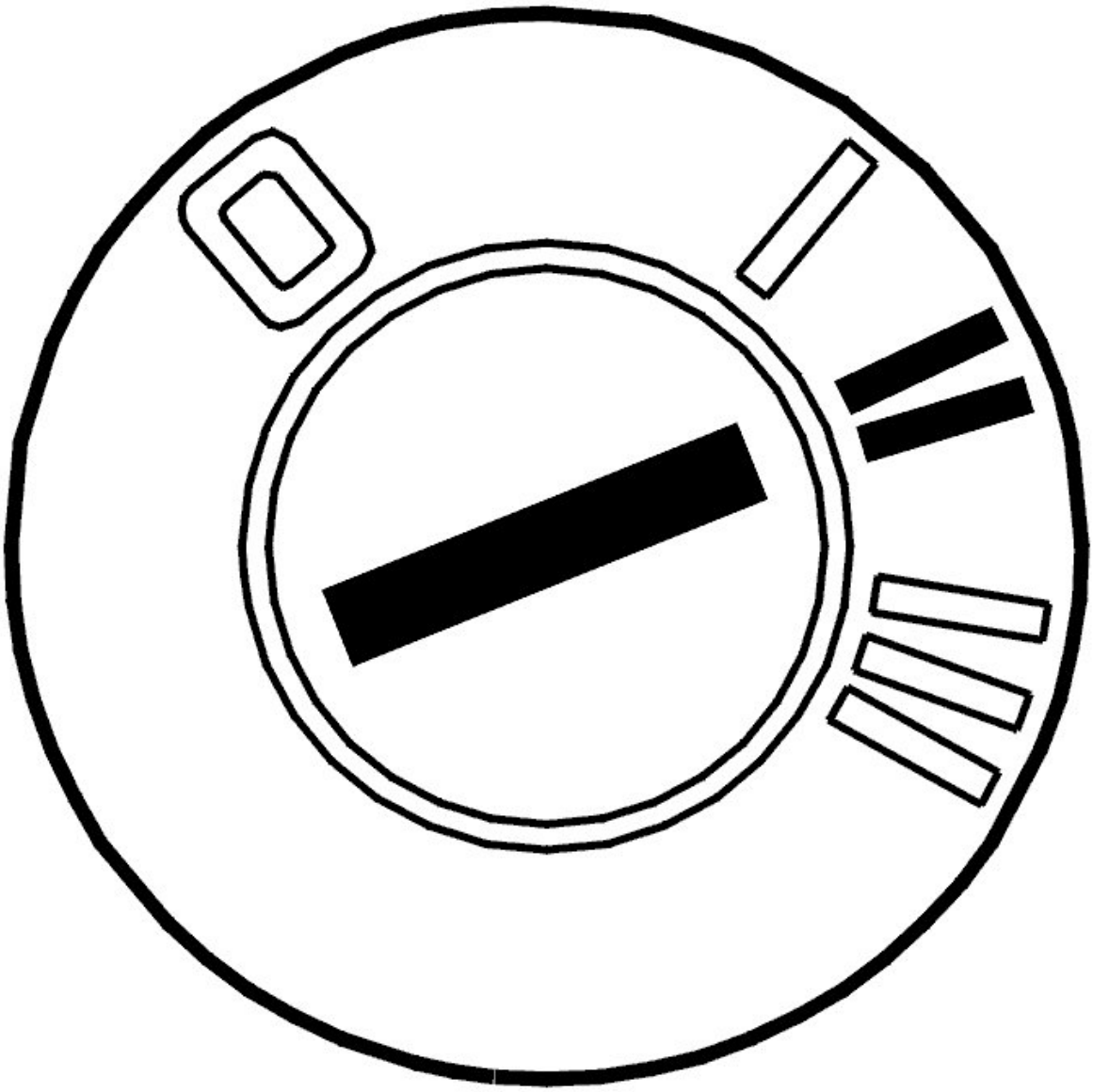
Continue - Verification

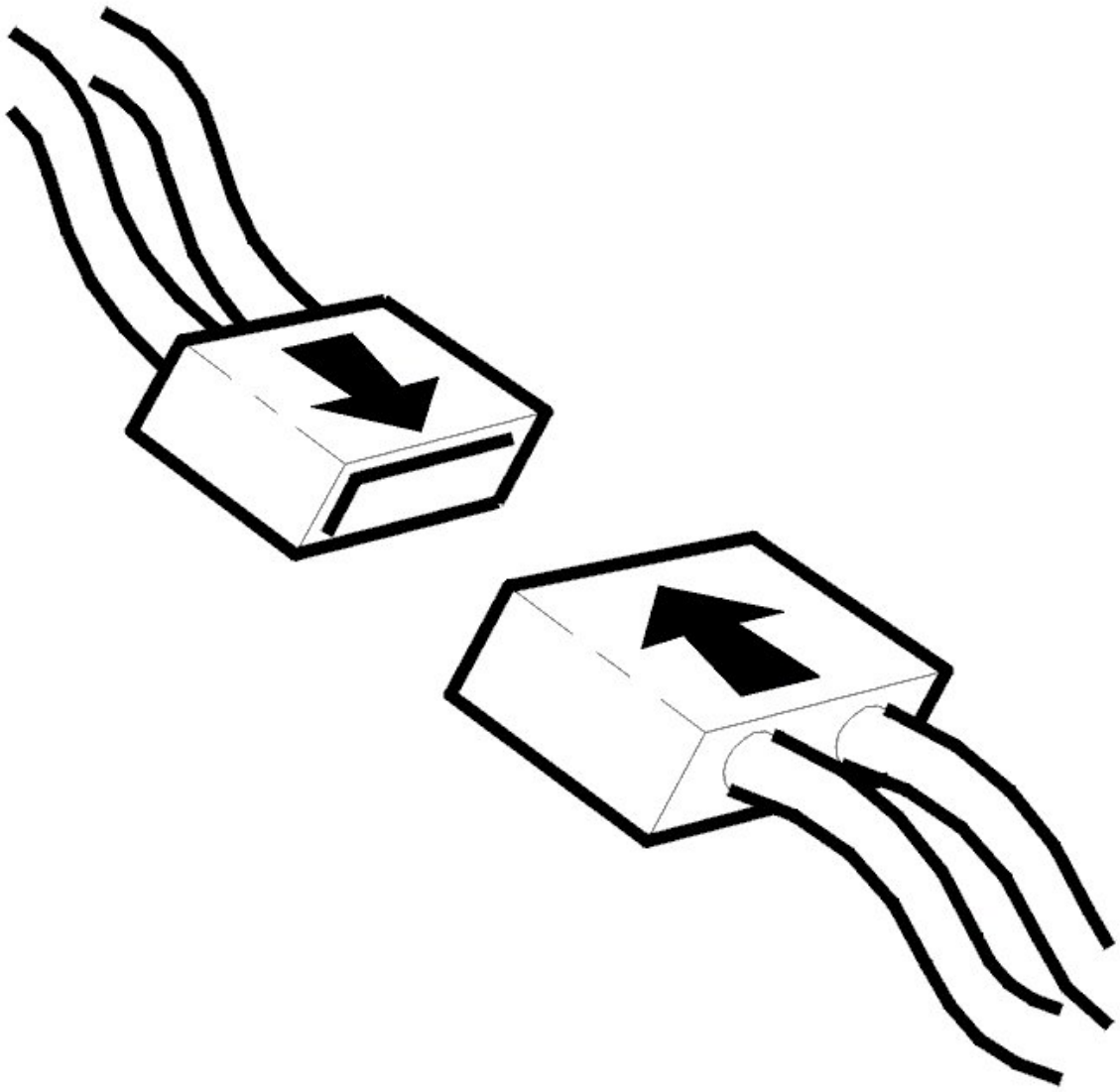
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage level at the twilight sensor by clicking the VCT2000 symbol.
Check that the value is between 2 and 4.8 V.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

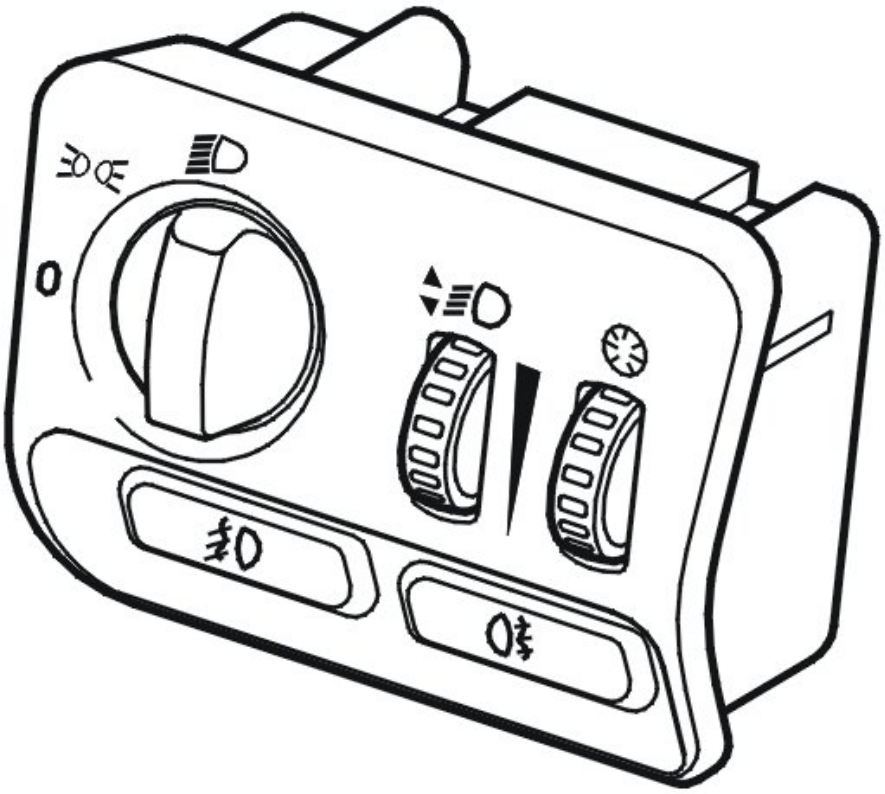
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9F24

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that the signal from the rheostat is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the rheostat
- Damaged light switch.

Fault symptom[s]

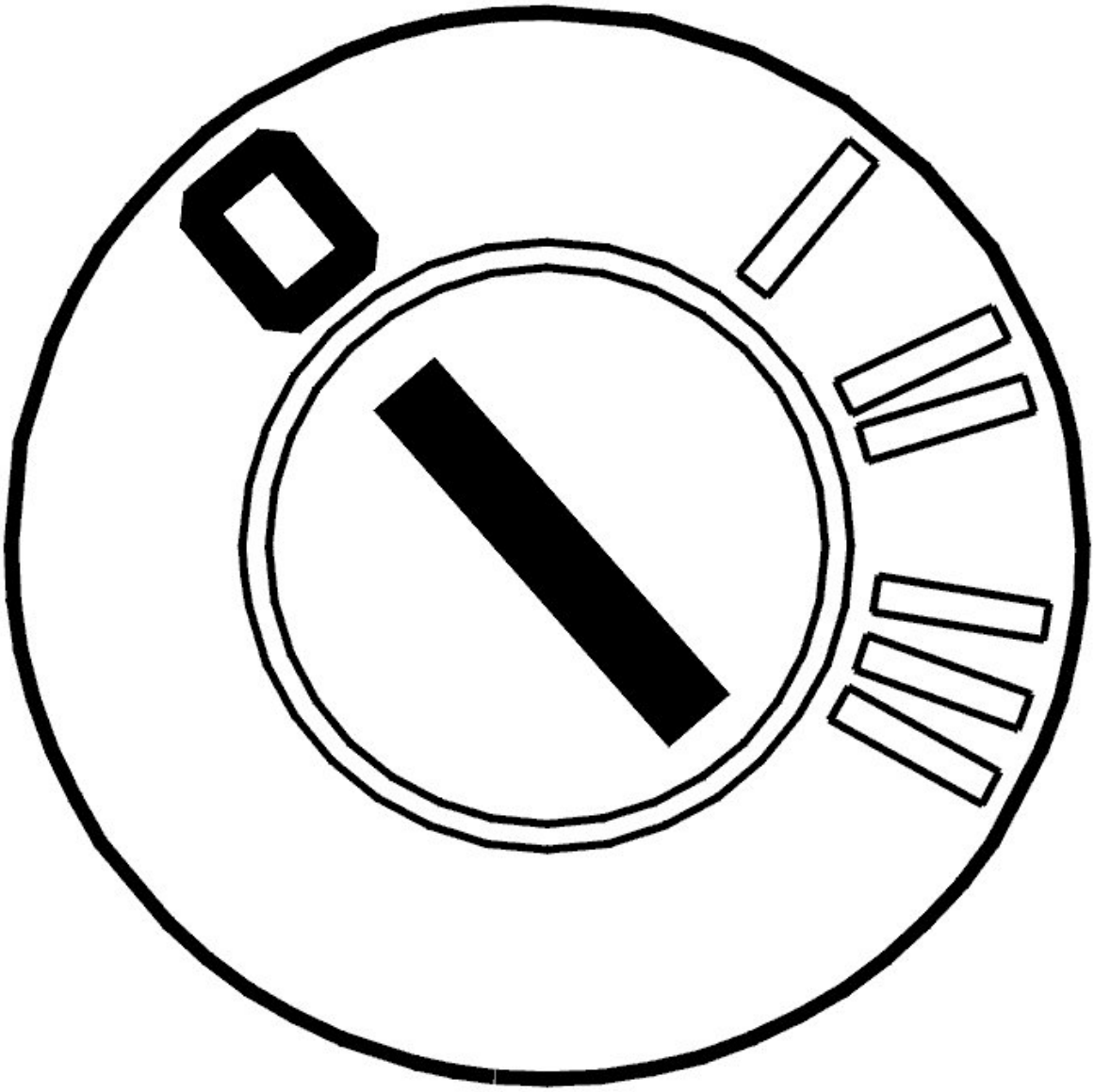
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

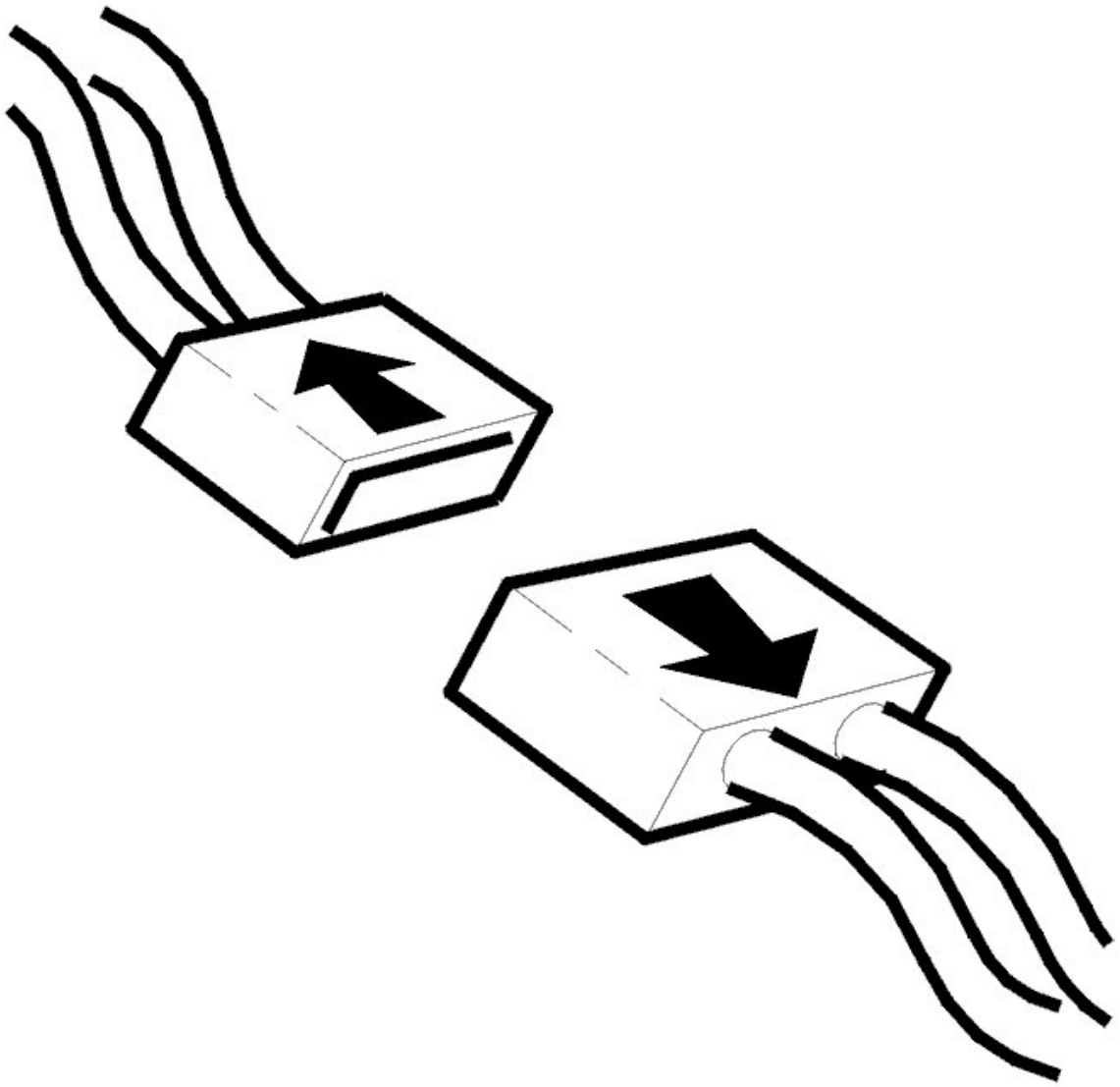
- The instrument lighting does not operate.

Signal Too High

Signal too high

Checking the wiring



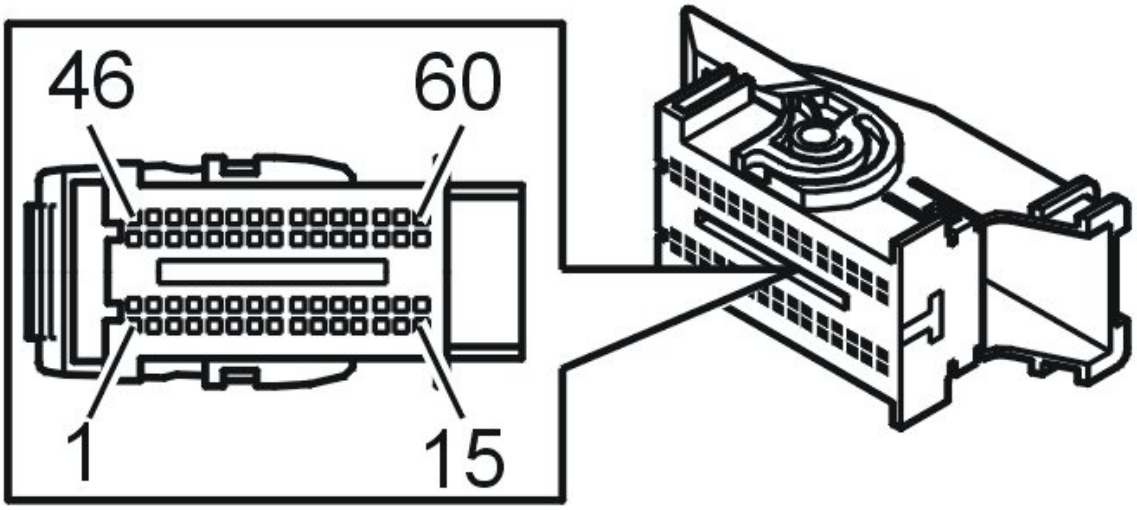


- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for a short-circuit to supply voltage. Take readings between central electronic module (CEM) terminal #D41 (#D41) and light switch module (LSM) terminal #3.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



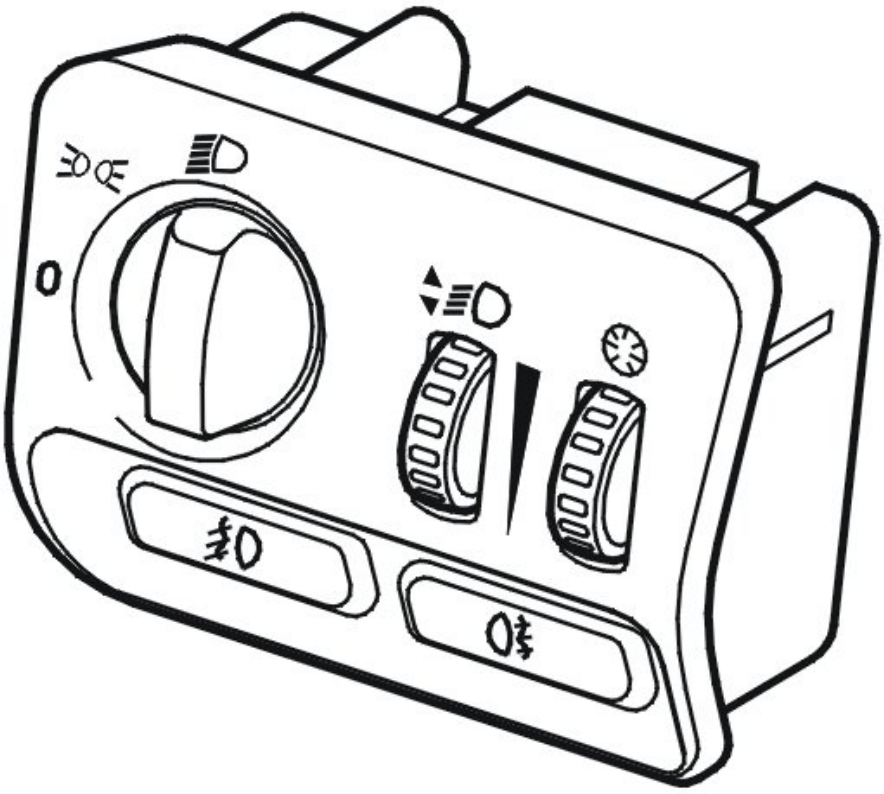
Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

The central electronic module (CEM) has registered an internal fault in the light switch module (LSM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the light switch module (LSM).
Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
Remedy as necessary.



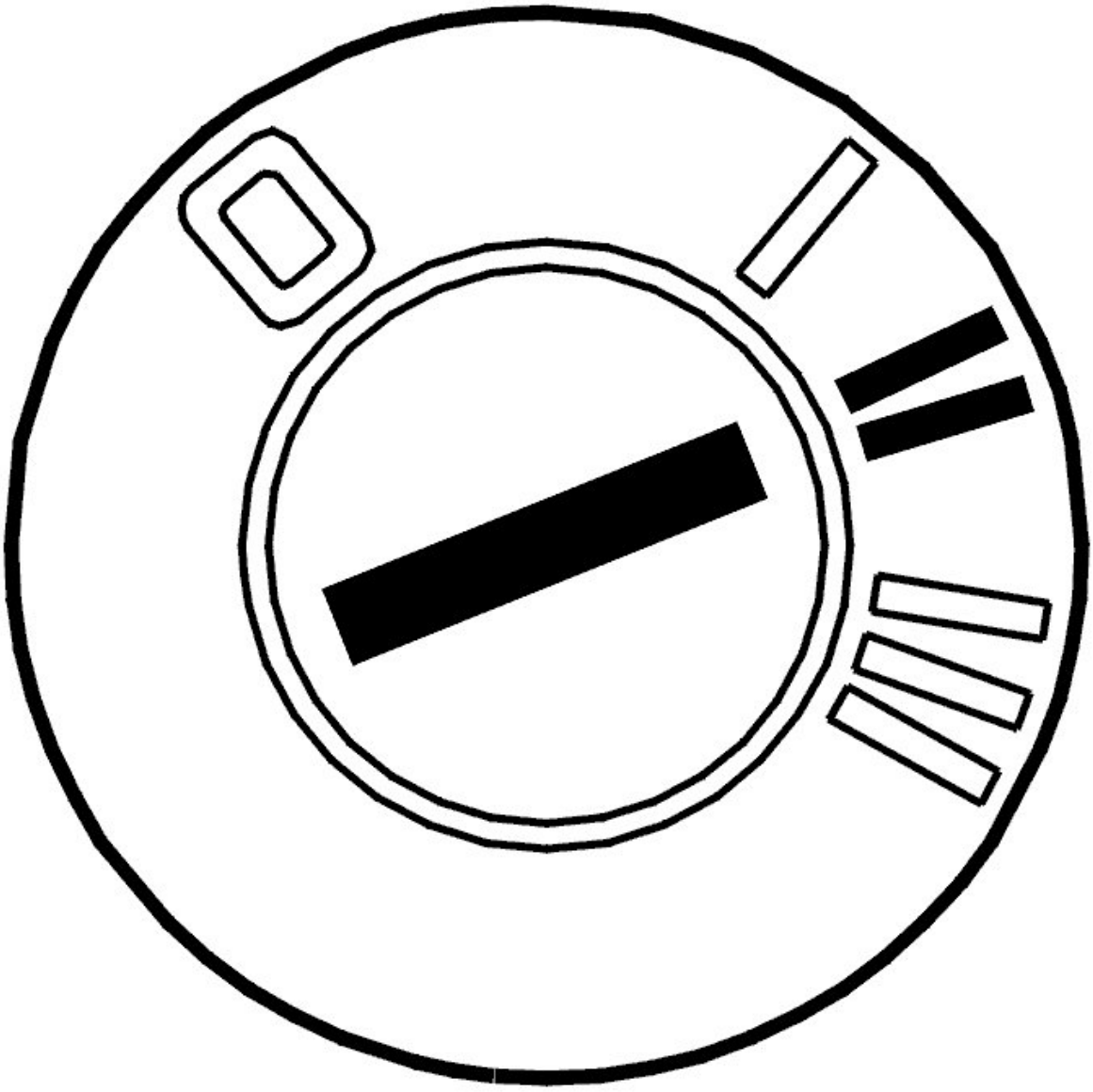
Continue - Verification

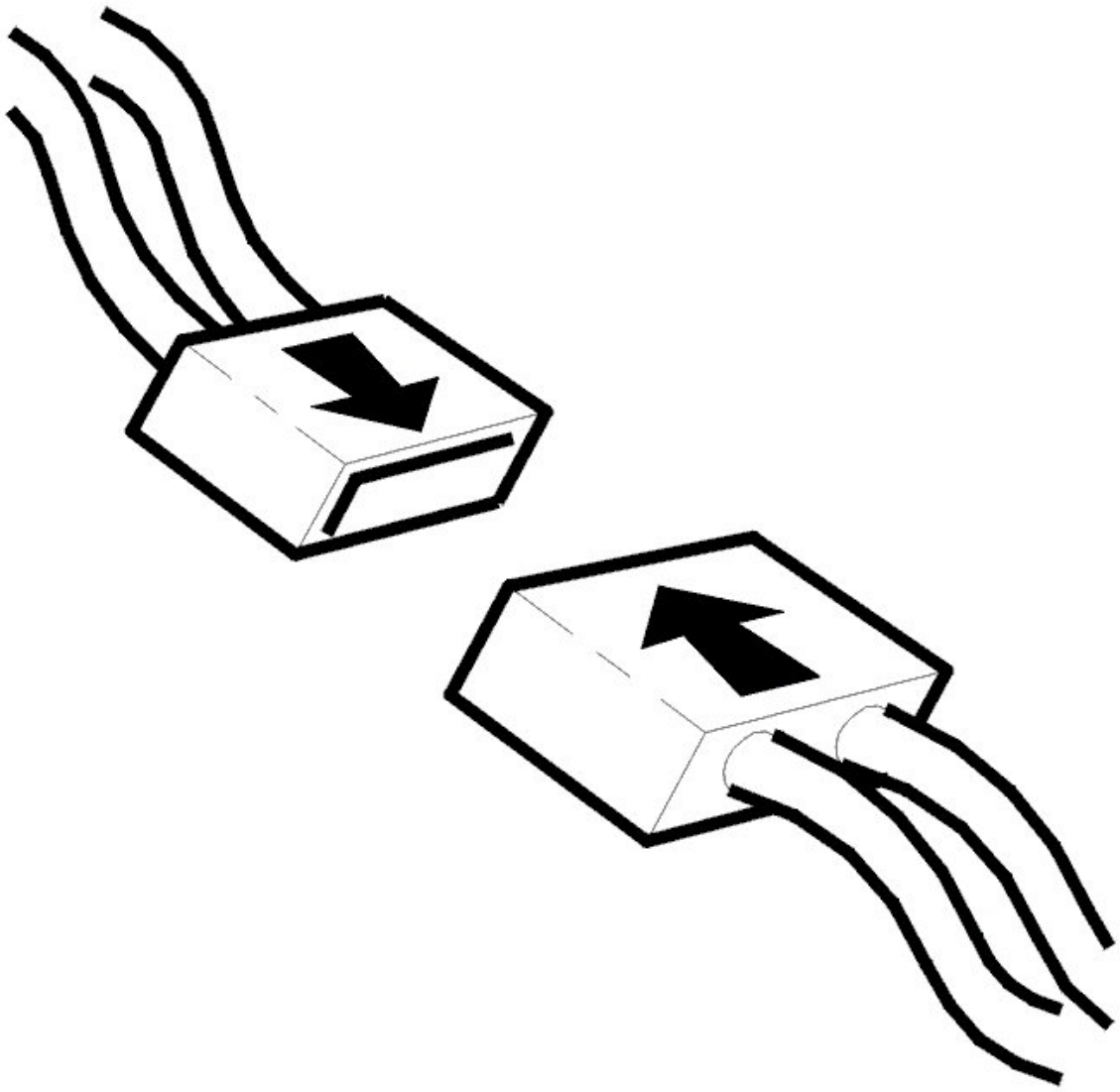
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.

Is the light switch module (LSM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

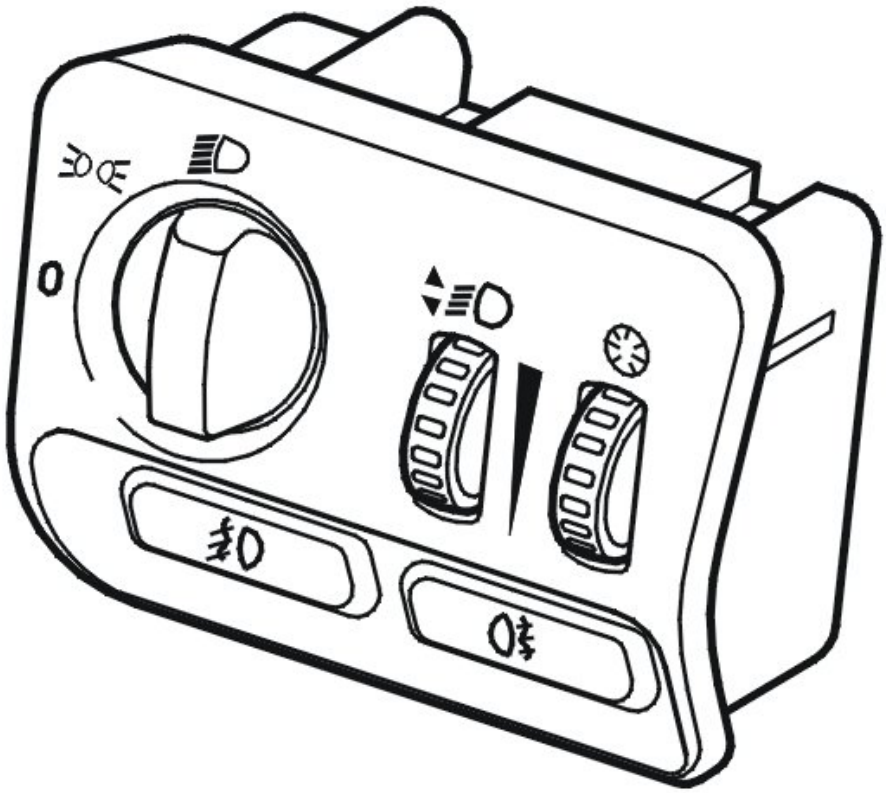
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information CEM-9F25

Condition



The central electronic module (CEM) communicates with the light switch module (LSM).
The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) receives information from the light switch module (LSM) indicating that the signal from the rheostat is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition switch position II.

Substitute value
- None.

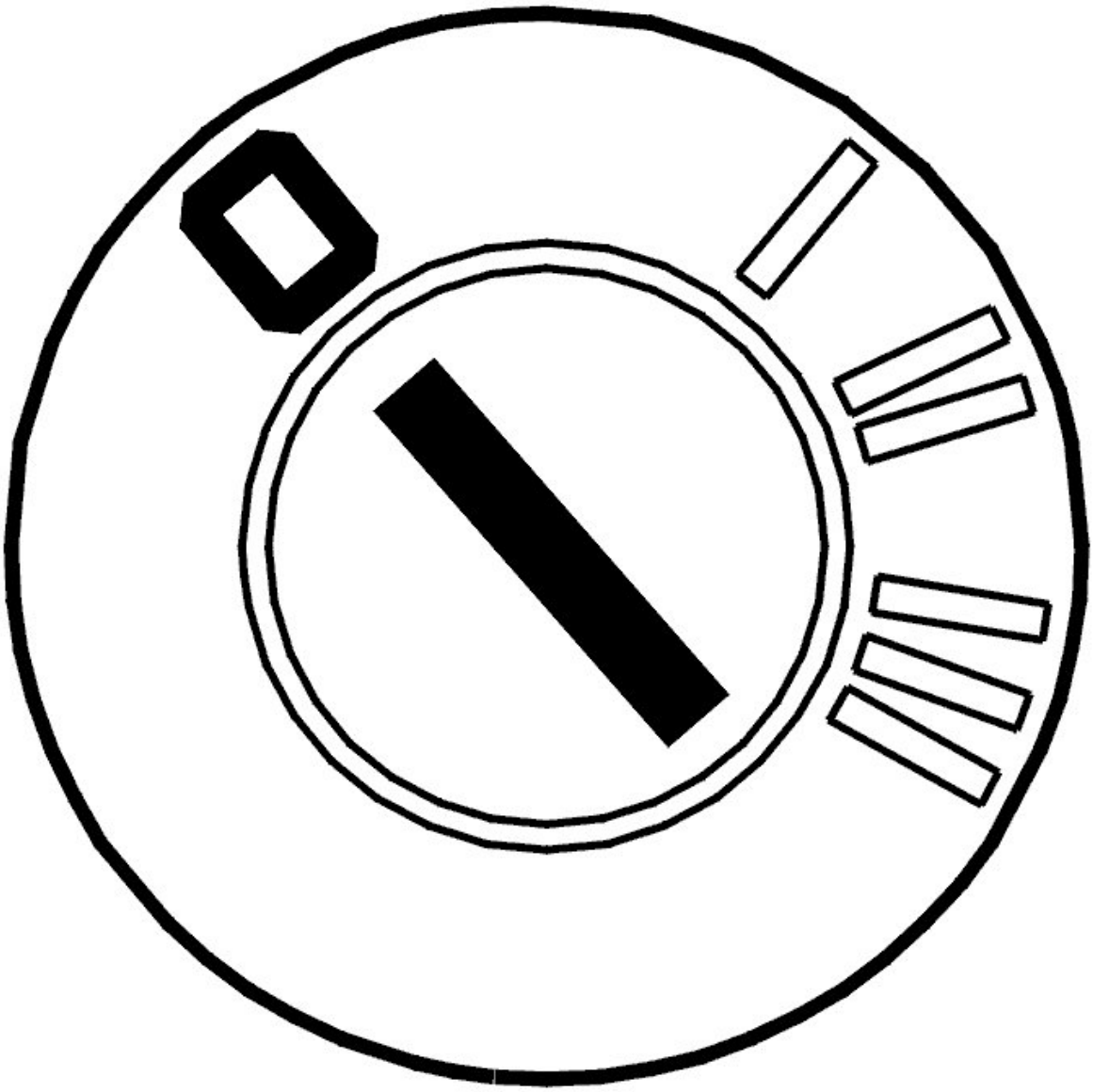
Possible source
- Short-circuit to ground in the rheostat
- Damaged light switch.

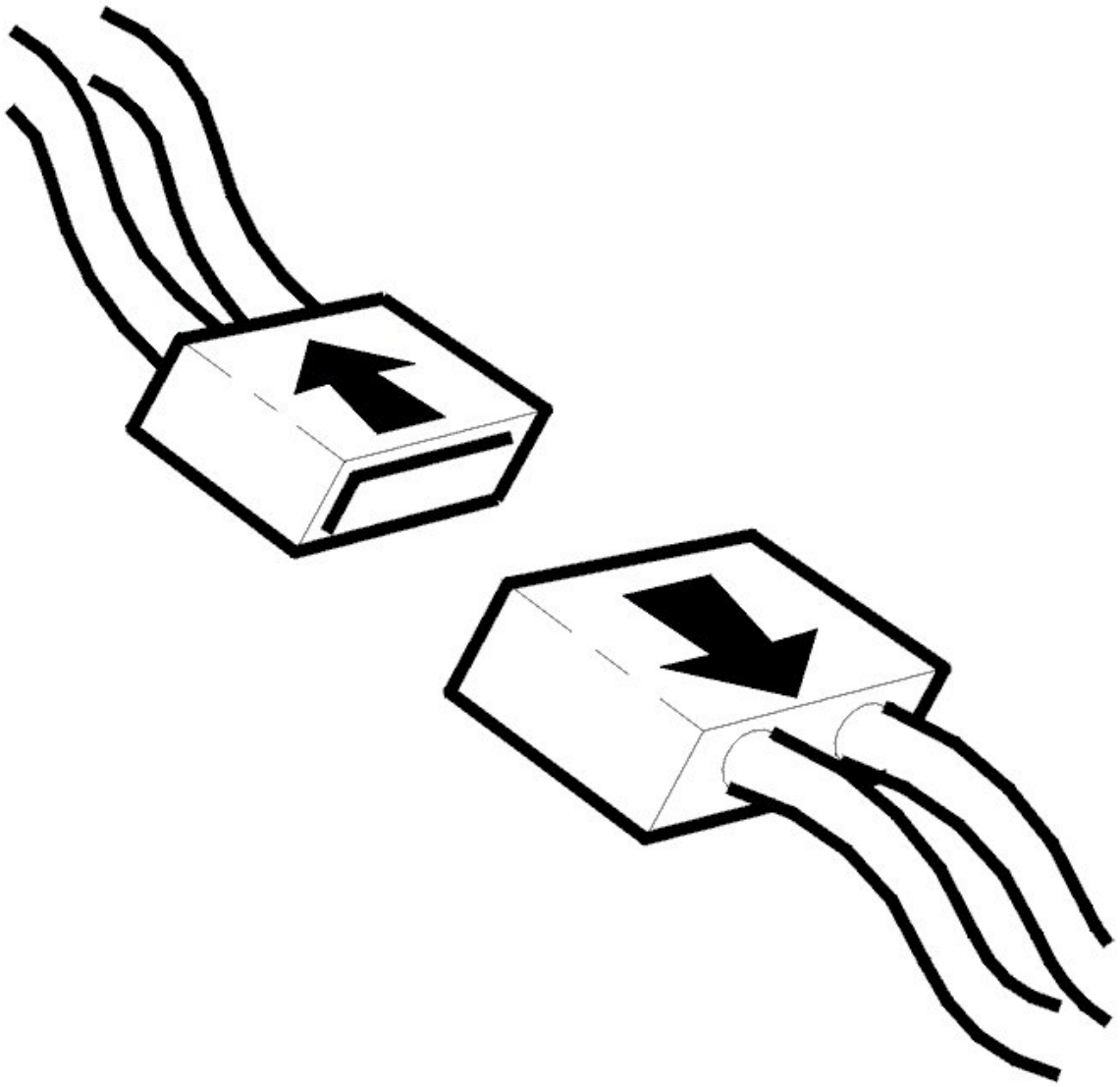
Fault symptom[s]
- The instrument lighting does not operate.

Signal Too Low

Signal too low

Checking the wiring



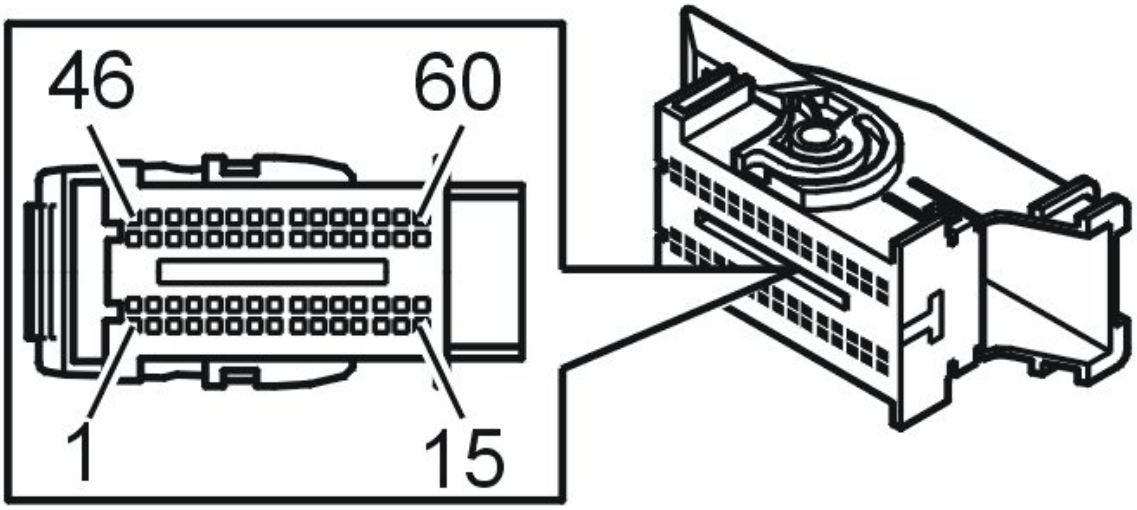


- Ignition off
- Disconnect central electronic module (CEM) connector D.

Check the signal cable. Check for a short-circuit to ground. Take readings between central electronic module (CEM) terminal #D41 (#D41) and light switch module (LSM) terminal #3.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Location of components See: Body and Frame/Body Control Systems/Locations/Component Location, Central Electronic Module (CEM)
- Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



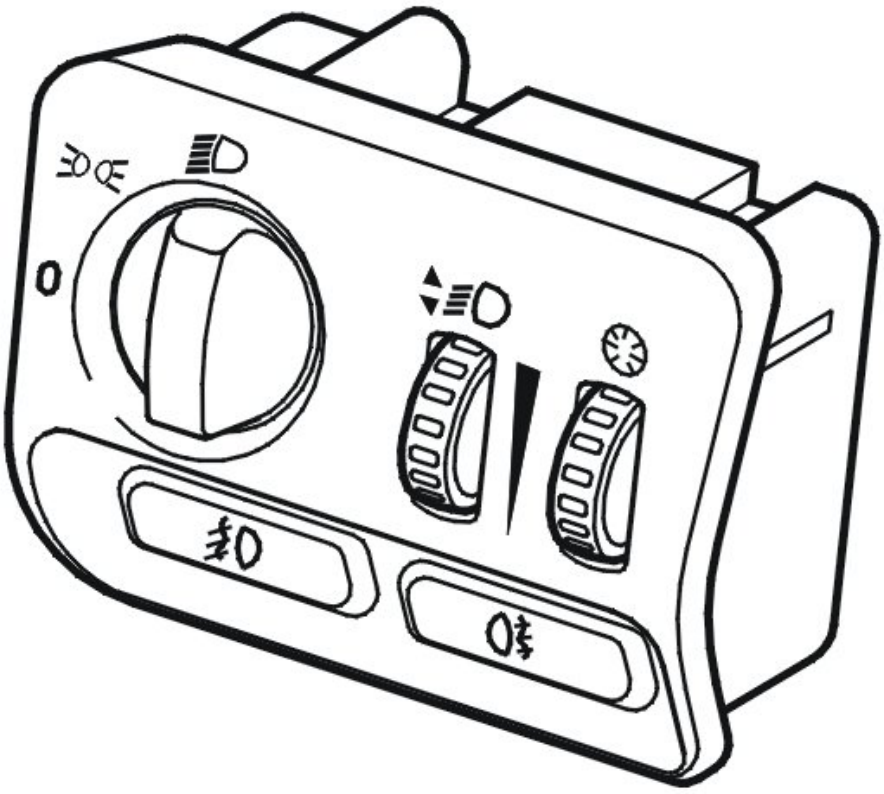
Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

The central electronic module (CEM) has registered an internal fault in the light switch module (LSM).
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the central electronic module (CEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. If the fault recurs, replace the light switch module (LSM).
Switches lights, replacing See: Lighting and Horns/Headlamp/Headlamp Switch/Service and Repair
Remedy as necessary.



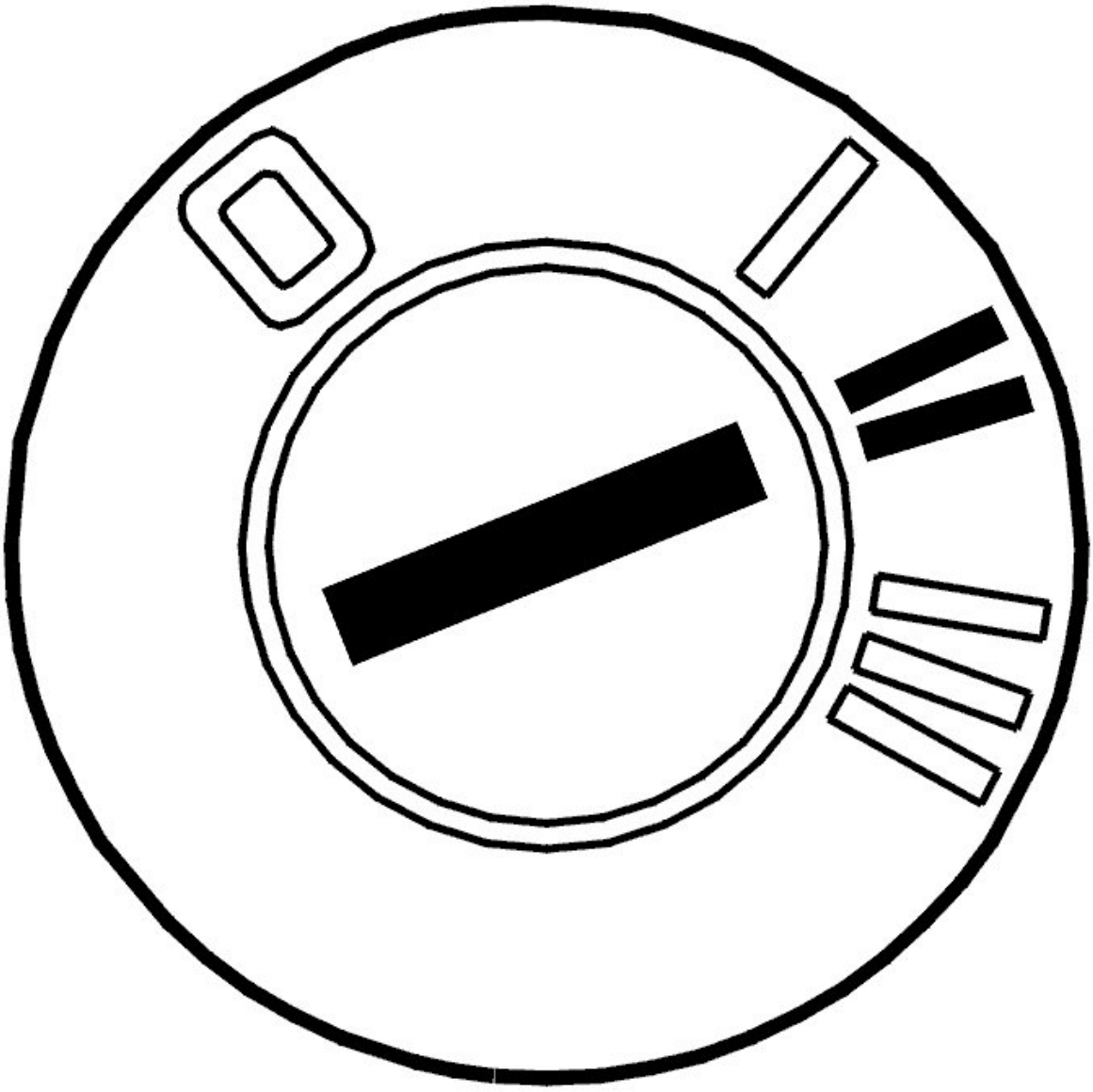
Continue - Verification

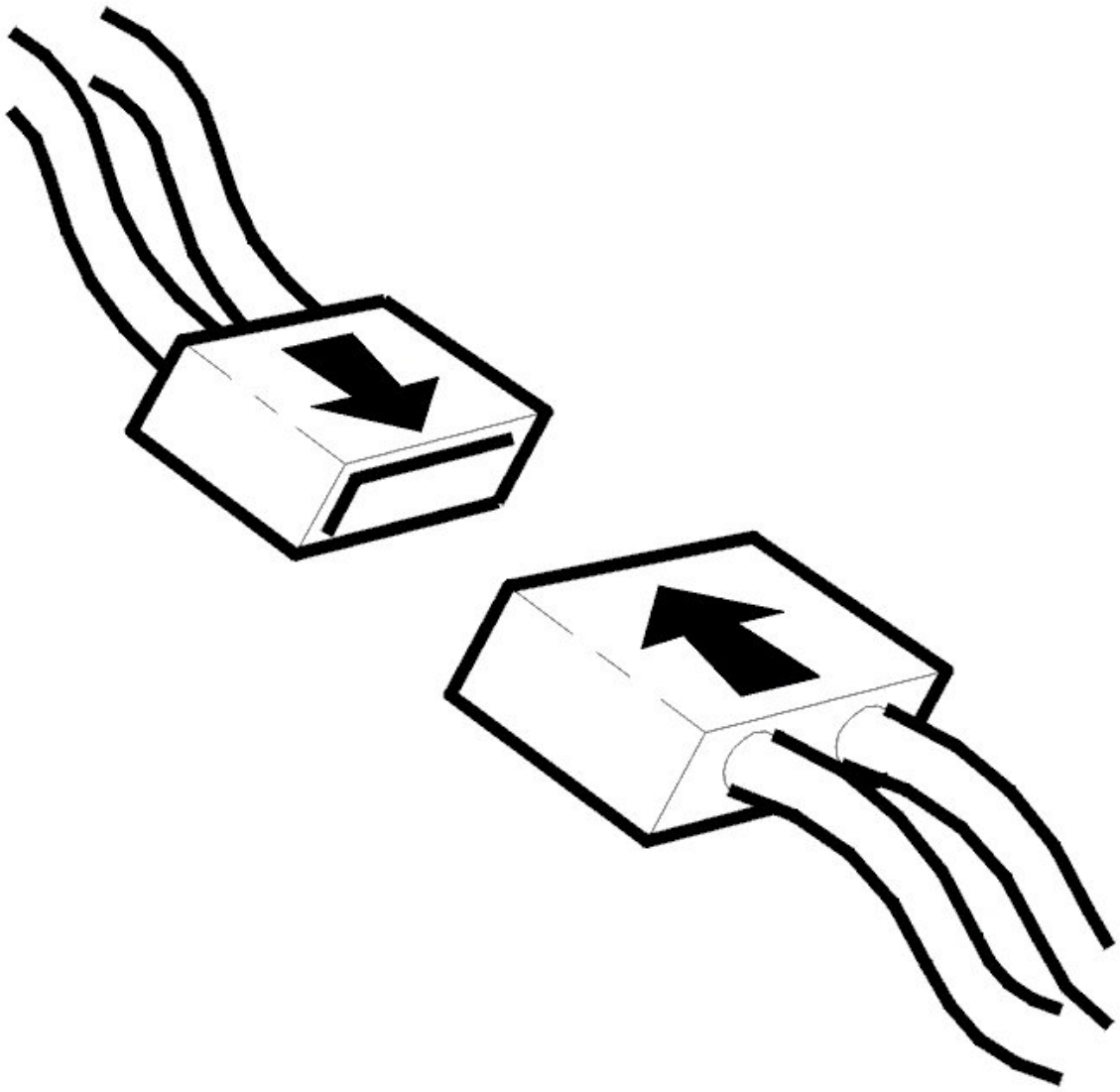
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Switch between parking lamps and low beam on the light switch module (LSM).
Check on the light switch module (LSM) that each lamp activates correctly.

Is the light switch module (LSM) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

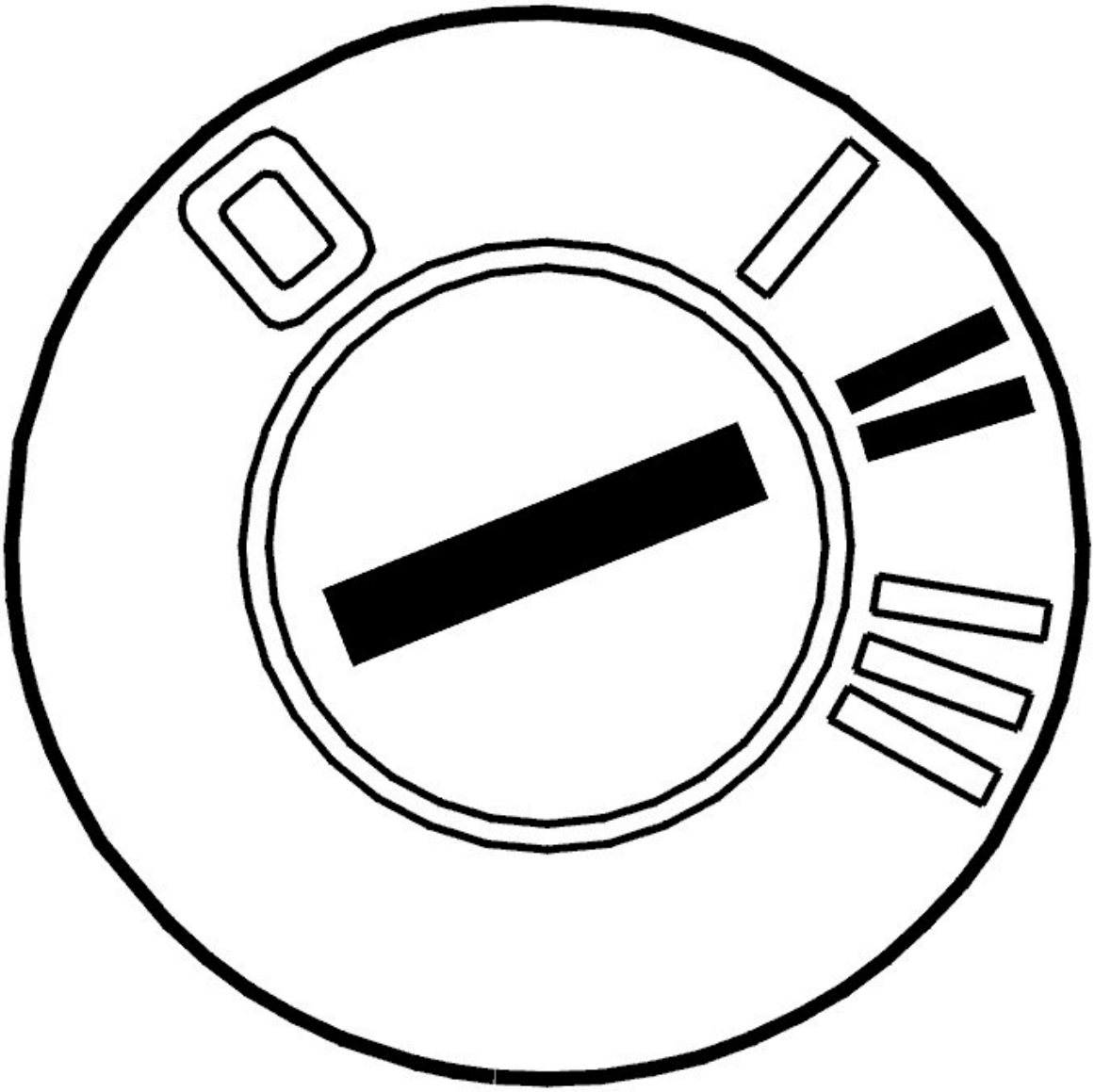
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

CEM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

DDM-E001

Diagnostic trouble code (DTC) information DDM-E001

Condition

The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

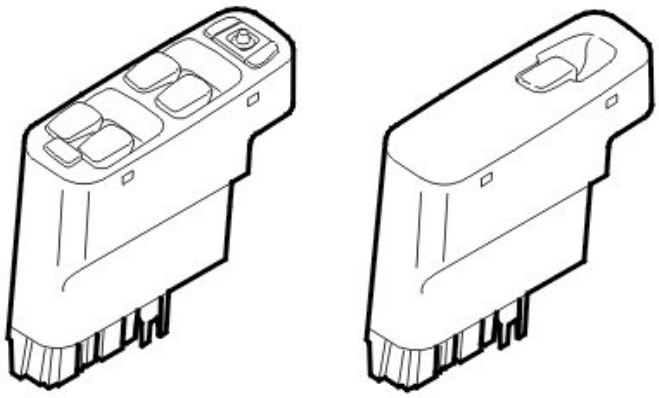
Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- The switch panel for the driver's door does not work
- Automatic window closure does not function
- Cannot be controlled with the remote control.

DDM-E003

Diagnostic trouble code (DTC) information DDM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different

software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The switch panel for the driver's door does not work
- Automatic window closure does not function
- Cannot be controlled with the remote control.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM-001A is stored if the driver's door module registers a low signal in the lock signal cable (locking) for more than 10 seconds.

Substitute value
- None.

Possible source
- The lock has jammed in the locked position.
- Defective locking switch. (Short-circuit in the locking switch.)
- Short-circuit to ground in the lock signal cable (LK).

Fault symptom[s]
- Cannot be operated with a key from the driver's door.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults

Check that the driver's door lock can be operated with the key.

Is the function OK?

Yes - Checking the cable

No - Checking the cable

Checking the cable

Check the cable between the door control module and the lock unit on the driver's door. Check for a short-circuit to ground.

DDM-0019 Central locking input (Unlocking)

Door control module terminal #A12 and driver's door terminal #1.

DDM-001A Central locking input (Locking)

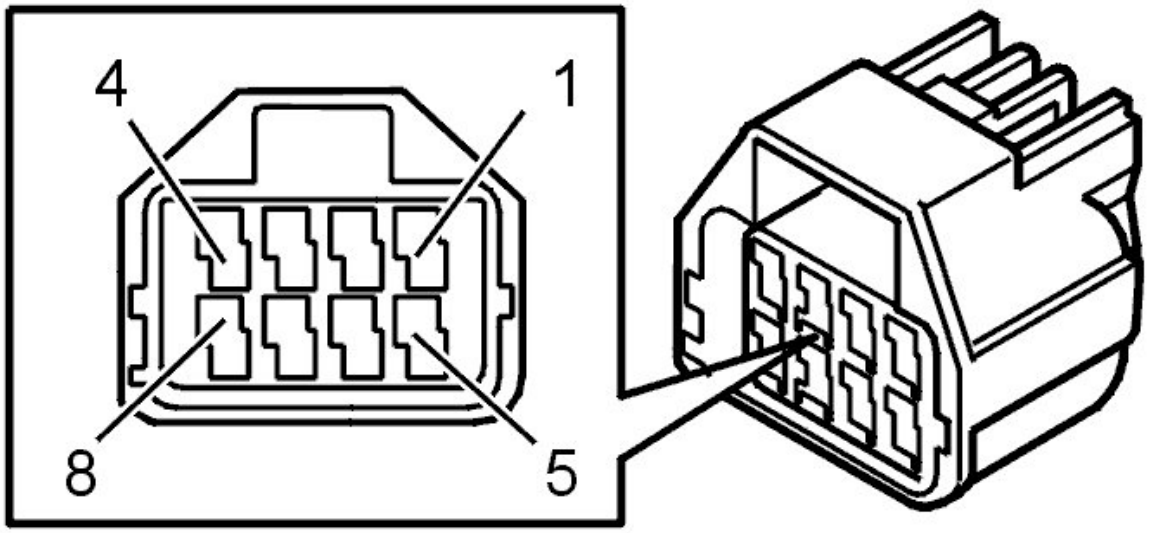
Door control module terminal #A13 and driver's door terminal #5.

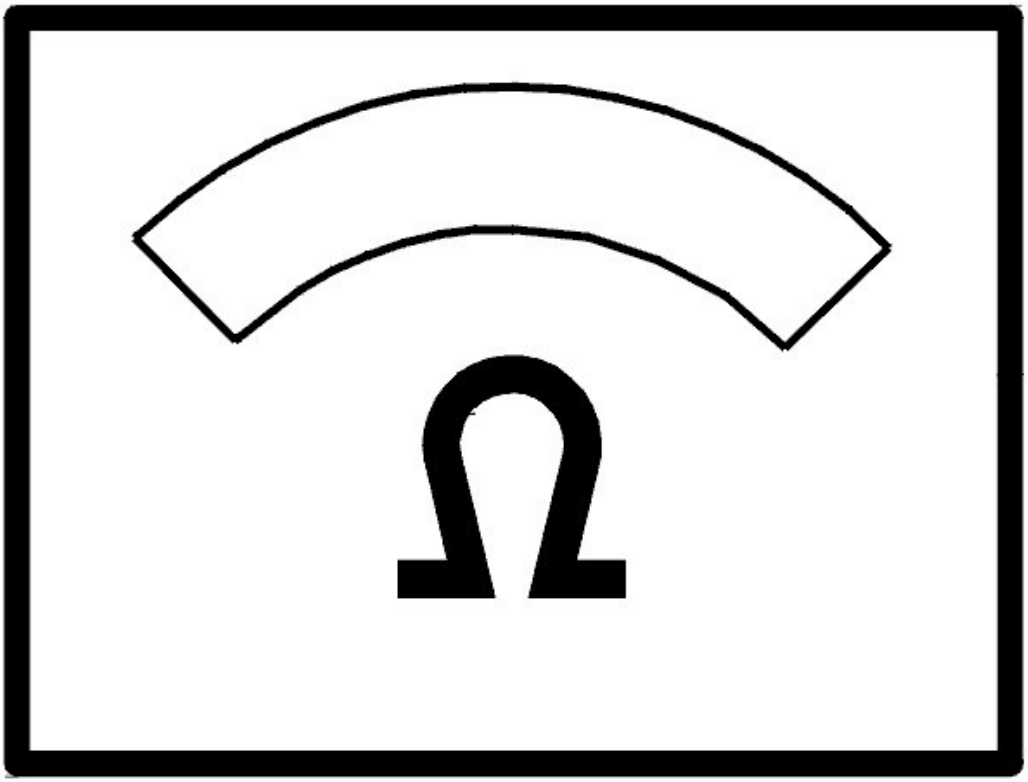
DDM-001B Central locking, lock cylinder

Door control module terminal #A13 and driver's door terminal #5, and door control module terminal #A12 and driver's door terminal #1. Remedy as necessary.

Other information:
- With the ignition off, the voltage between terminal #12B and ground must be battery voltage
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing

- To access the lock unit, see Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking the cable

Check the cable between the door control module and the lock unit on the driver's door. Check for an intermittent short-circuit to ground.

DDM-0019 Central locking input (Unlocking)

Door control module terminal #A12 and driver's door terminal #1.

DDM-001A Central locking input (Locking)

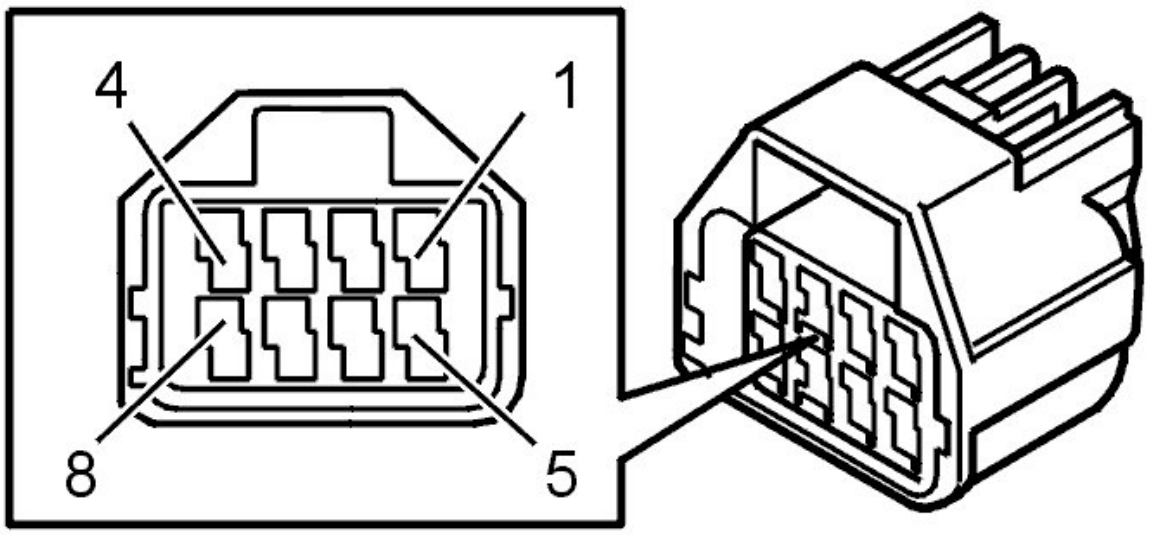
Door control module terminal #A13 and driver's door terminal #5.

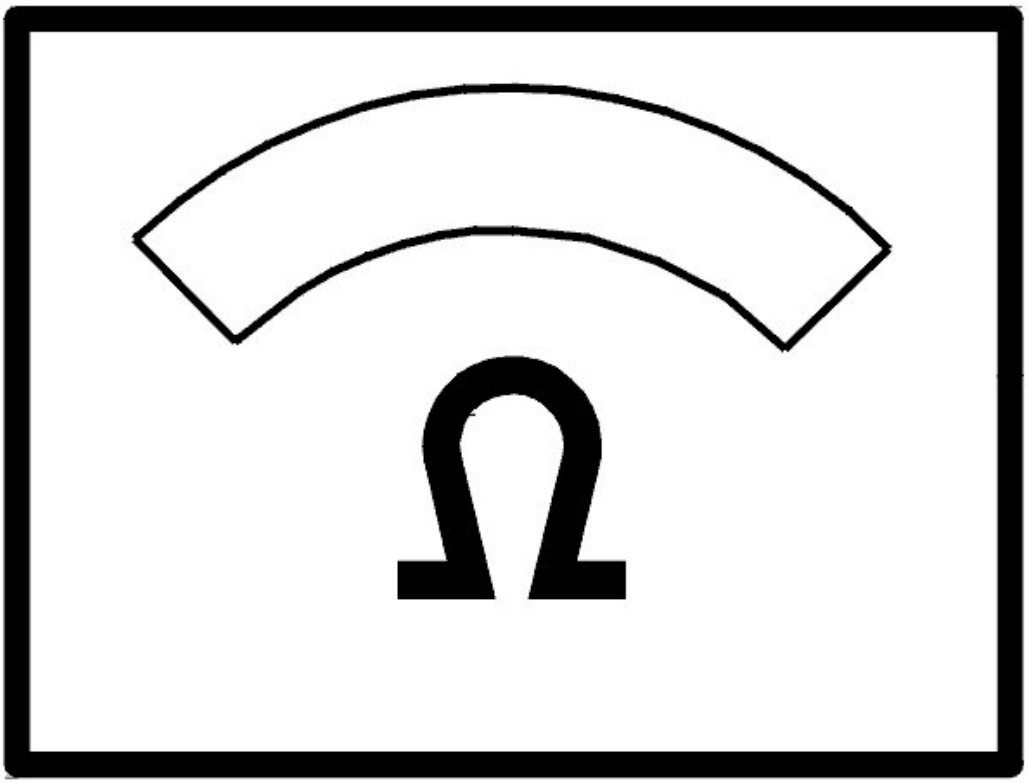
DDM-001B Central locking, lock cylinder

Door control module terminal #A13 and driver's door terminal #5, and door control module terminal #A12 and driver's door terminal #1. Remedy as necessary.

Other information:

- With the ignition off, the voltage between terminal #12B and ground must be battery voltage
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the lock unit, see Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





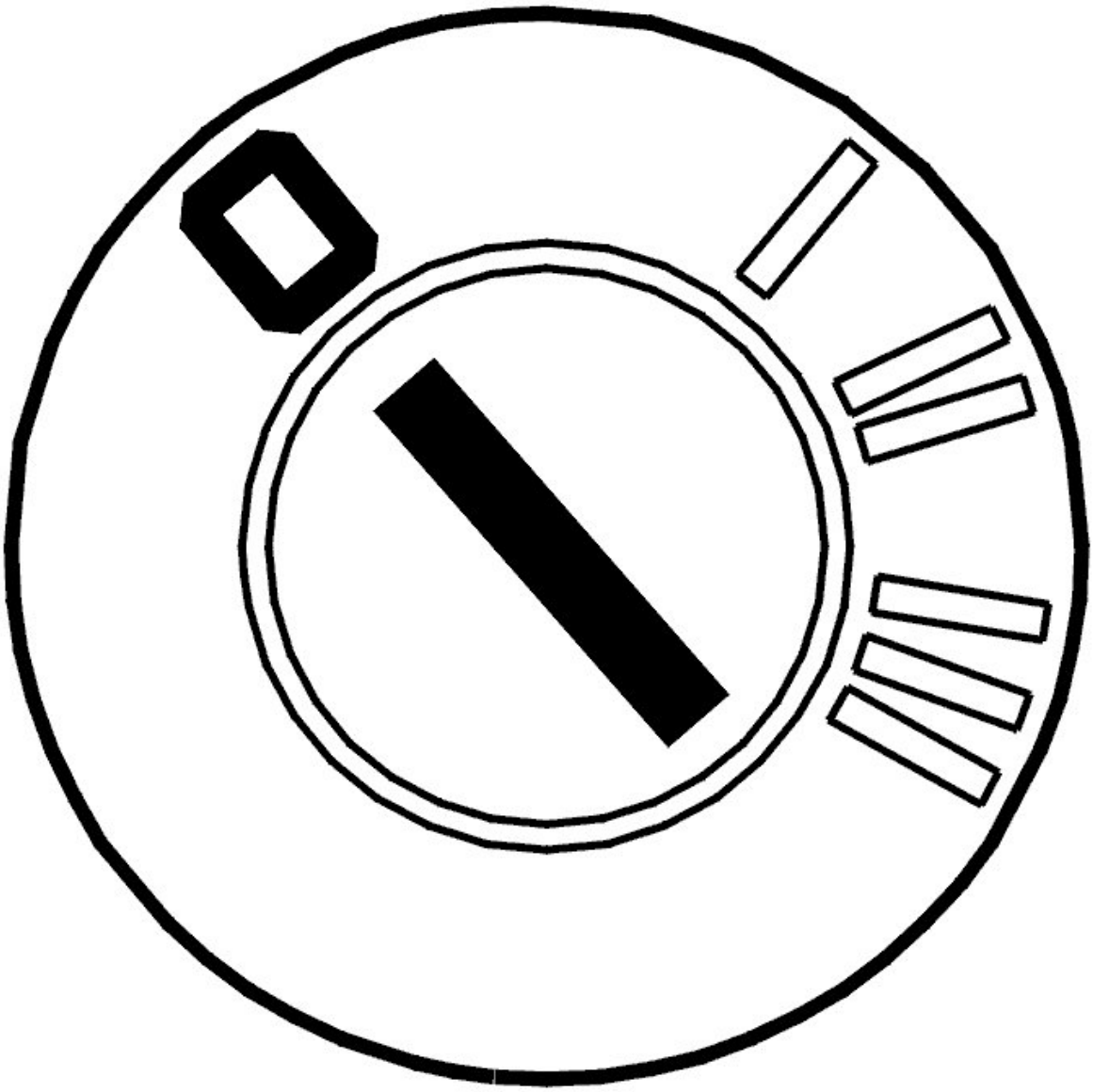
Continue - Fault-tracing information

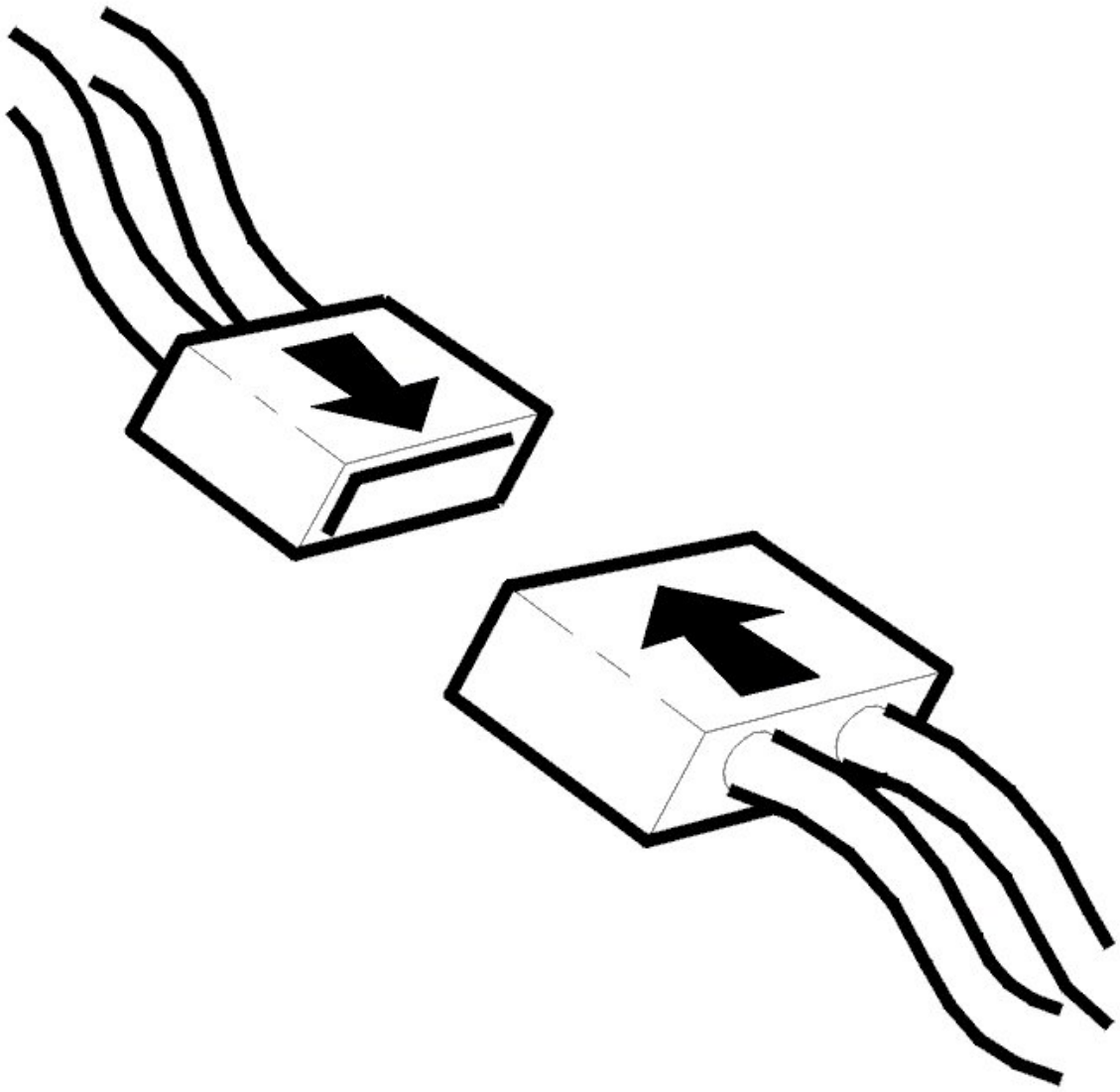
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.

Check that the driver's door lock can be operated with the key.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If driver door module (DDM) registers that the central locking button is depressed for more than 60 seconds, error code DDM-001D is set.

Substitute value
- Nothing.

Possible source
- Button depressed for more than 60 seconds.
- Defective central locking button.

Fault symptom[s]
- Cannot be operated from central-locking switch.

Signal Faulty

Signal faulty

Trouble-shooting information

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that electric window-lift switch on driver door is activated for more than 60 seconds, diagnostic trouble code DDM-003B is

displayed.

Substitute value
- Nothing.

Possible source
- Electric window lift switch on driver door has stuck in an activated position.

Fault symptom[s]
- Electric window lift on driver side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults

Operate the window to its limit positions.
DDM-003B: Driver's window
DDM-003C: Passenger window
DDM-003D: Left rear side window
DDM-003E: Right rear side window

Is the power window control operating correctly?

Yes - Intermittent fault

No - Checking the operation of the window

Checking the operation of the window

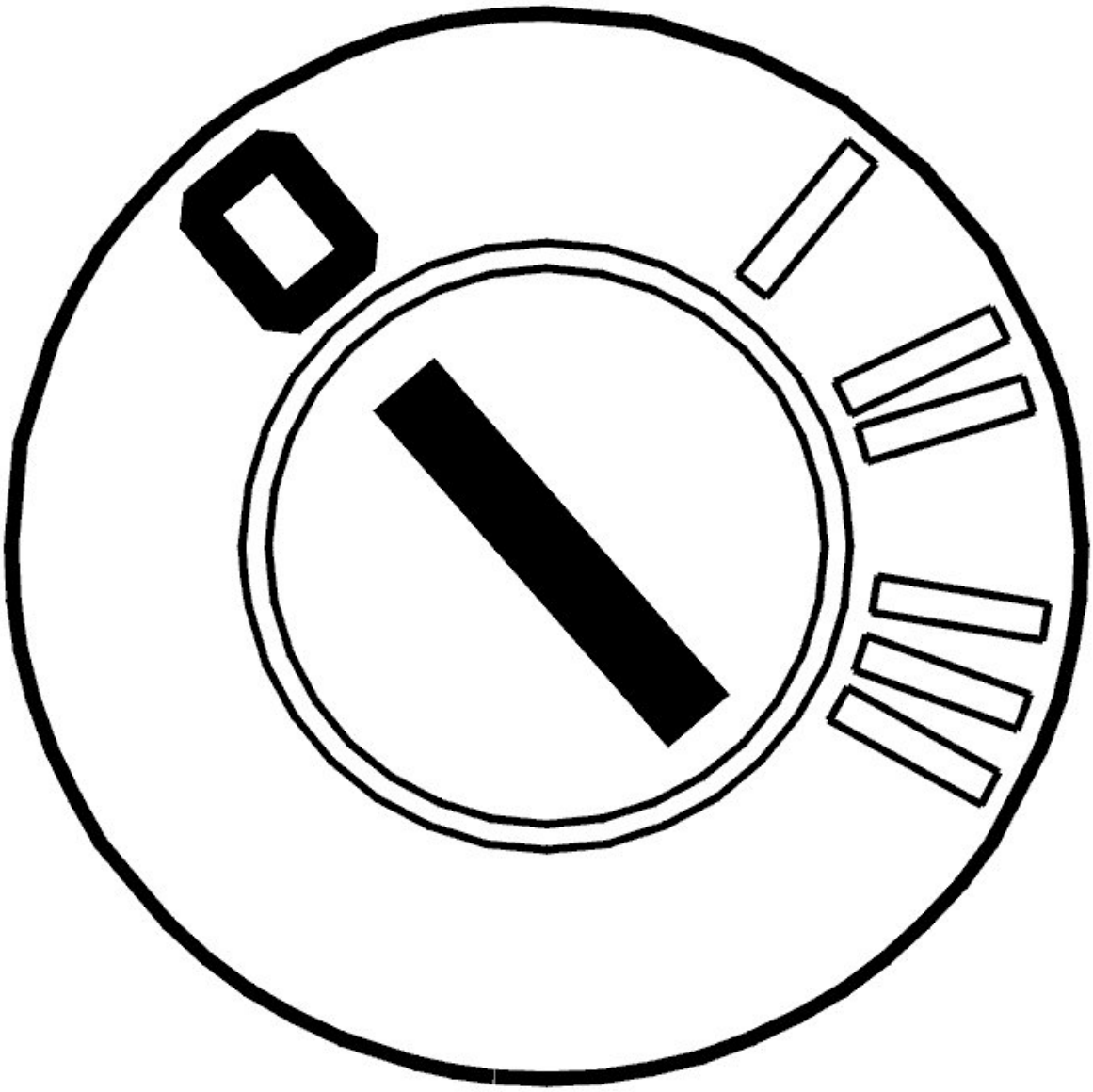
Check that the button for operating the window is in the correct position. Check that the button has not jammed in an incorrect position. Press the button a few times and try to run the window up and down.

Is the power window control operating correctly?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - **DONE**

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - **Attempt New Test**

No - **Fault Found**

FAULT FOUND - **Fault Found**

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that driver-door switch to passenger-door electric window lift is activated for more than 60 seconds, diagnostic trouble code DDM-003C is displayed.

Substitute value
- Nothing.

Possible source
- Driver-door switch for passenger-door electric window lift has stuck in an activated position.

Fault symptom[s]
- Electric window lift on passenger side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults

Operate the window to its limit positions.
DDM-003B: Driver's window
DDM-003C: Passenger window
DDM-003D: Left rear side window
DDM-003E: Right rear side window

Is the power window control operating correctly?

Yes - Intermittent fault

No - Checking the operation of the window

Checking the operation of the window

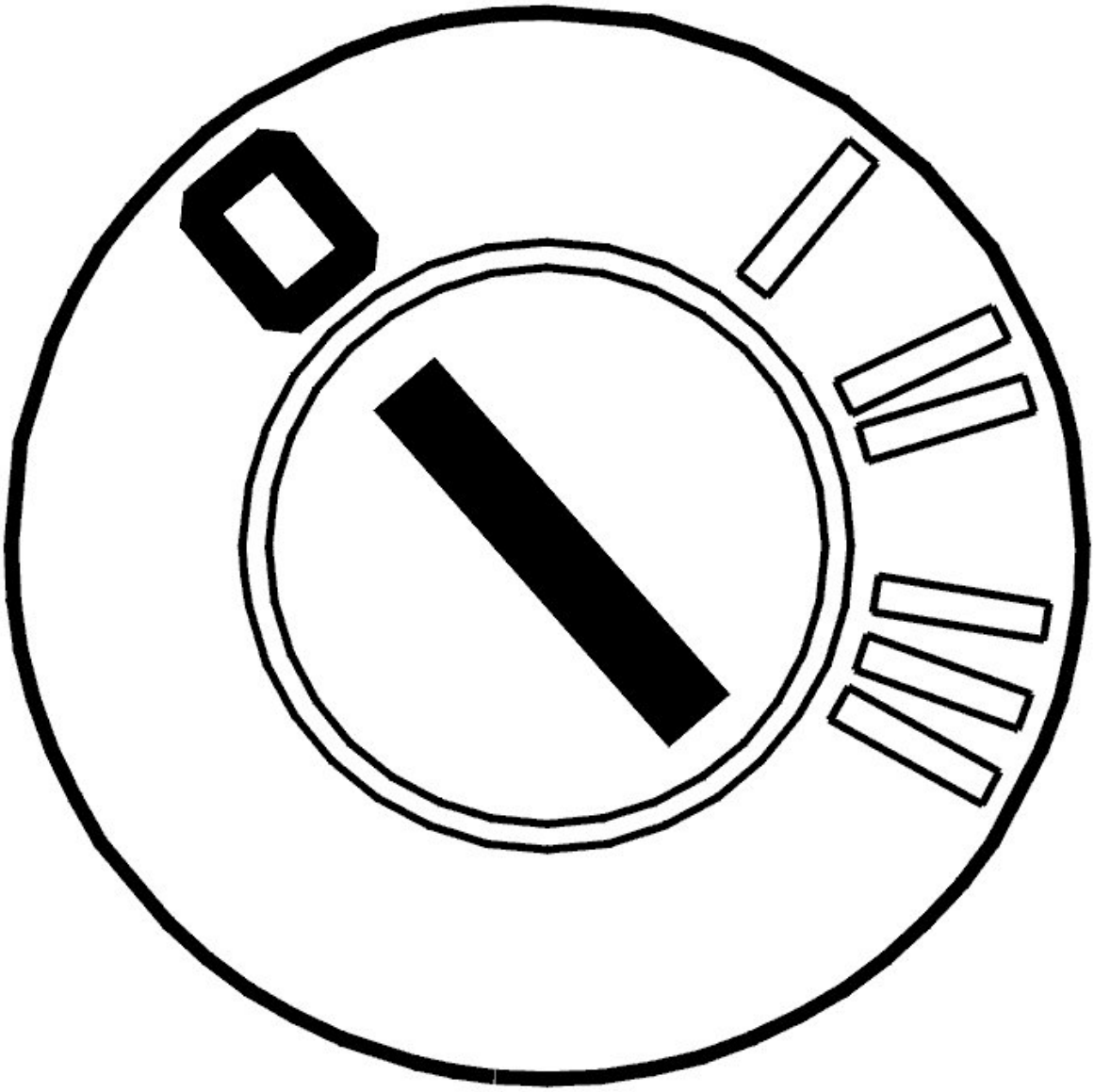
Check that the button for operating the window is in the correct position. Check that the button has not jammed in an incorrect position. Press the button a few times and try to run the window up and down.

Is the power window control operating correctly?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:
- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM-003D is stored if the control module registers that the switch for the power window for the left hand rear door is activated for more than 60 seconds.

Substitute value
- None.

Possible source

- The switch in the driver's door for the power window in the left hand rear door has jammed in the active position.

Fault symptom[s]

- The power window mechanism does not operate.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults

Operate the window to its limit positions.
DDM-003B: Driver's window
DDM-003C: Passenger window
DDM-003D: Left rear side window
DDM-003E: Right rear side window

Is the power window control operating correctly?

Yes - Intermittent fault

No - Checking the operation of the window

Checking the operation of the window

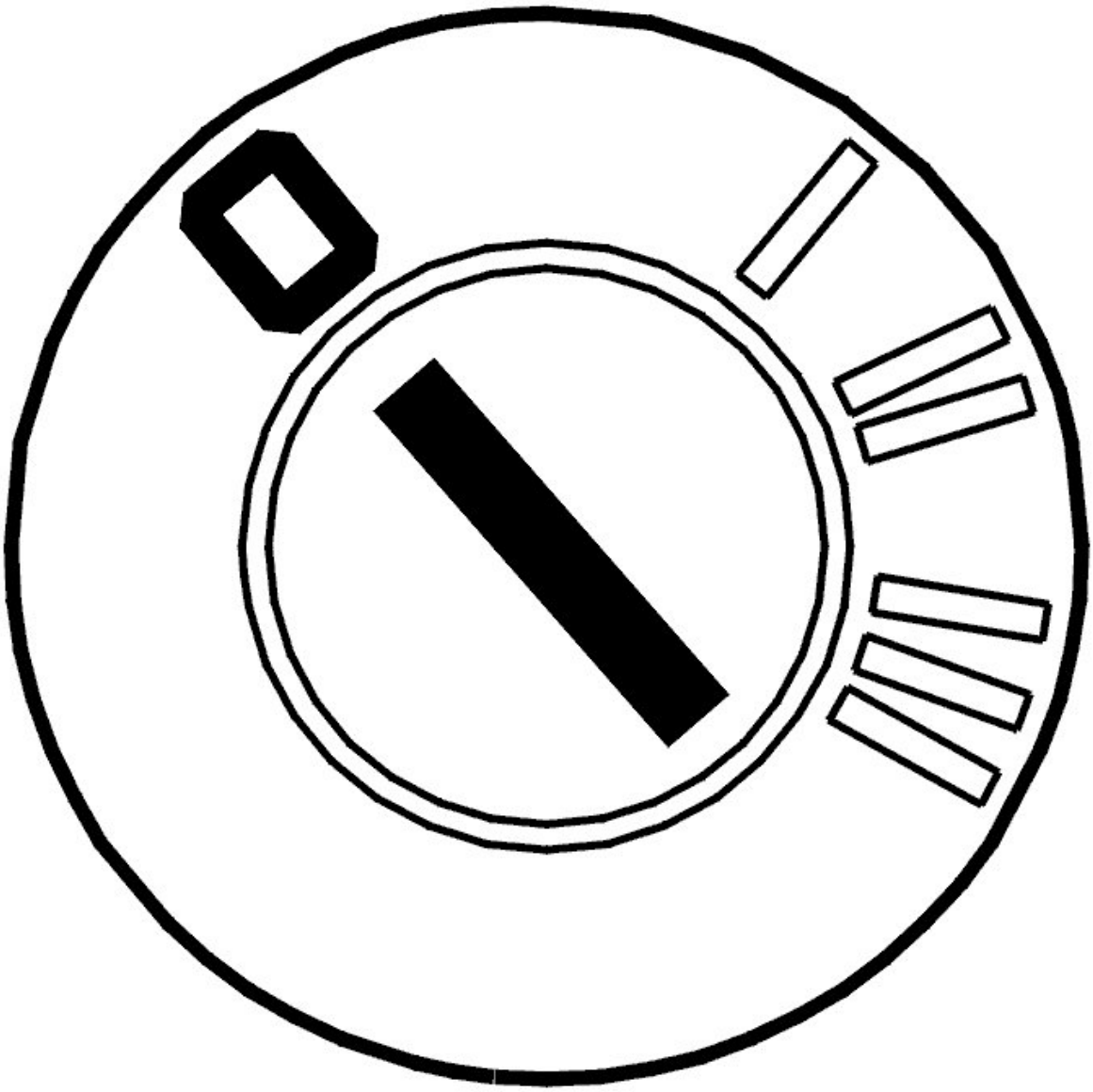
Check that the button for operating the window is in the correct position. Check that the button has not jammed in an incorrect position. Press the button a few times and try to run the window up and down.

Is the power window control operating correctly?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - **DONE**

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - **Attempt New Test**

No - **Fault Found**

FAULT FOUND - **Fault Found**

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that electric window-lift switch on rear right door is activated for more than 60 seconds, diagnostic trouble code DDM-003E is displayed.

Substitute value
- Nothing.

Possible source
- Driver-door switch for rear right door electric window lift has stuck in an activated position.

Fault symptom[s]
- Electric window lift does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults

Operate the window to its limit positions.
DDM-003B: Driver's window
DDM-003C: Passenger window
DDM-003D: Left rear side window
DDM-003E: Right rear side window

Is the power window control operating correctly?

Yes - Intermittent fault

No - Checking the operation of the window

Checking the operation of the window

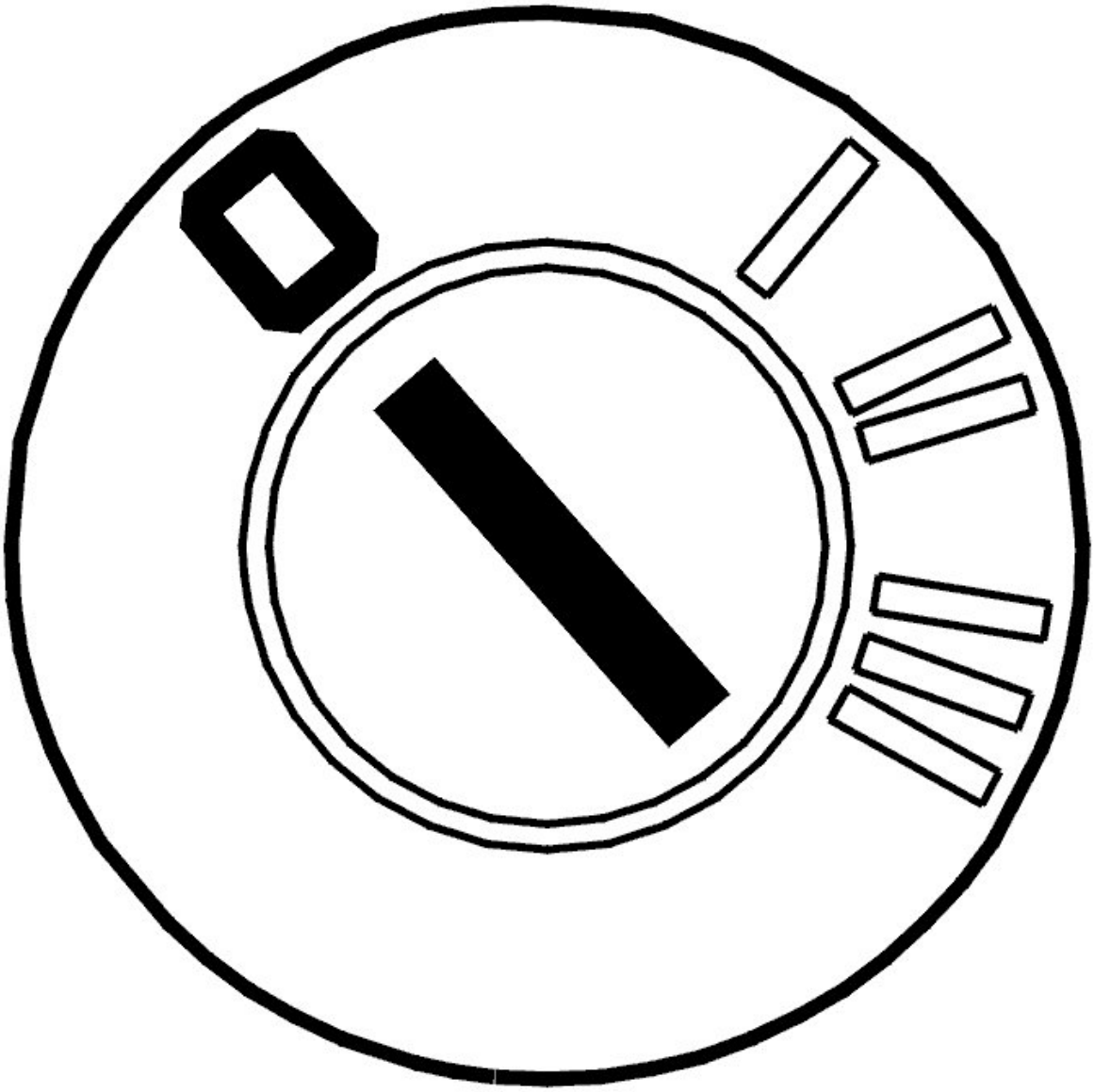
Check that the button for operating the window is in the correct position. Check that the button has not jammed in an incorrect position. Press the button a few times and try to run the window up and down.

Is the power window control operating correctly?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:
- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that operation button for external rear-view mirror electric motors has been activated in one position for more than 60 seconds, diagnostic trouble code DDM-003F is displayed.

Substitute value
- Nothing.

Possible source

- Operation button for external rear-view mirror electric motors has stuck in one position.

Fault symptom[s]

- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults

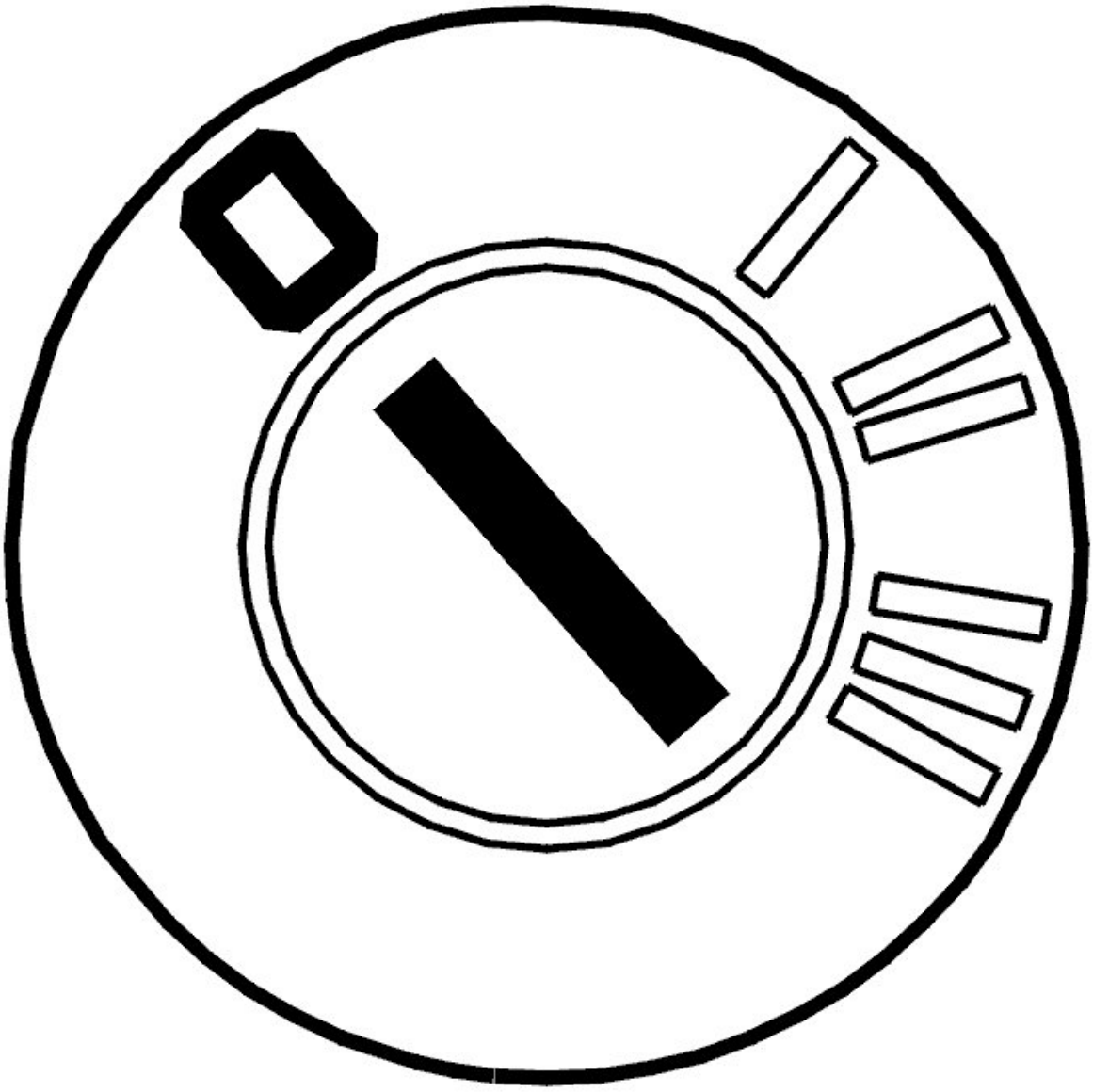
Try to operate the door mirrors to their limit positions in all directions.

Can the door mirrors be operated in all directions?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal from temperature sensor is too high, diagnostic trouble code DDM-004A is displayed.

Substitute value
- Nothing.

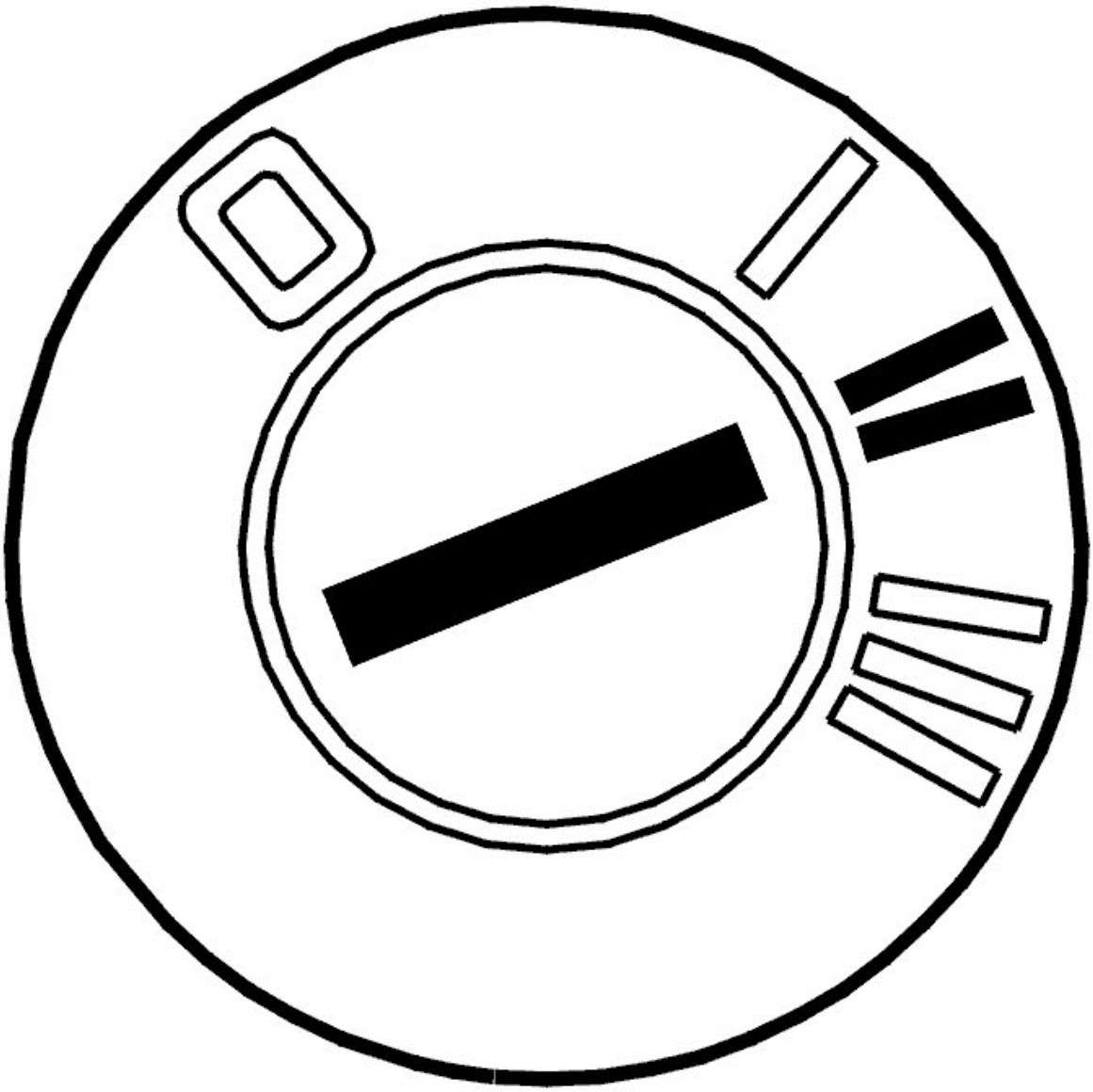
Possible source
- Signal wire short circuited to voltage supply
- Open circuit in signal wire.

Fault symptom[s]
- Outside temperature sensor does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Check the outside temperature.

Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

Is the temperature within its permitted range?

Yes - Intermittent fault

No - Checking for a short-circuit

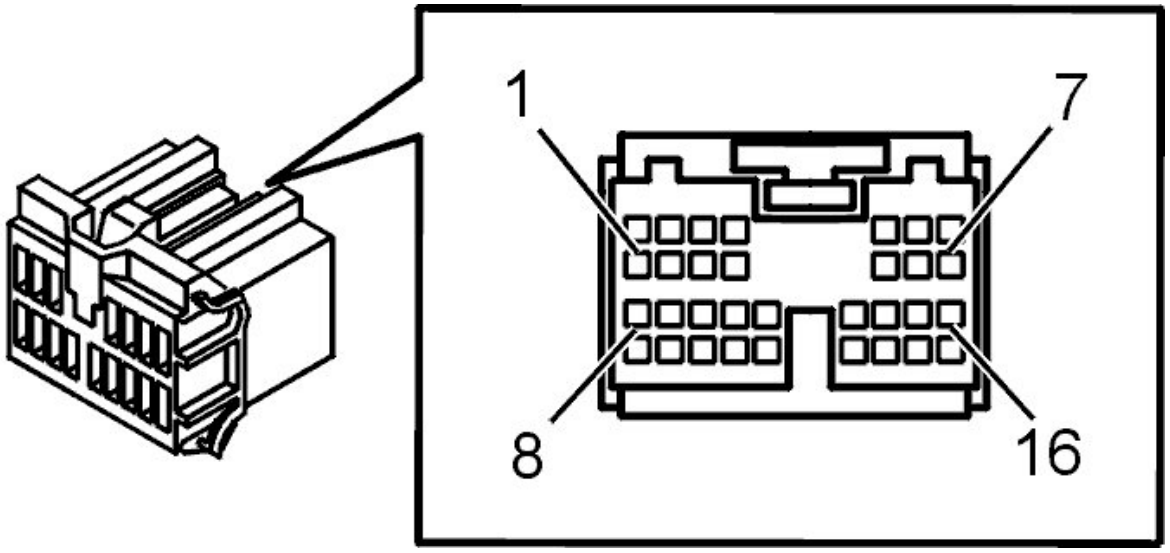
Checking for a short-circuit

If the car is equipped with a 16-pin connector

Check the cable between driver door module (DDM) terminal #18A and power door mirror connector terminal #3. Check for an open-circuit.
Check the cable between driver door module (DDM) terminal #14A and power door mirror connector terminal #2. Check for a short-circuit to supply voltage. Check for an open-circuit.
Replace the cable if a fault is found.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

Intermittent fault

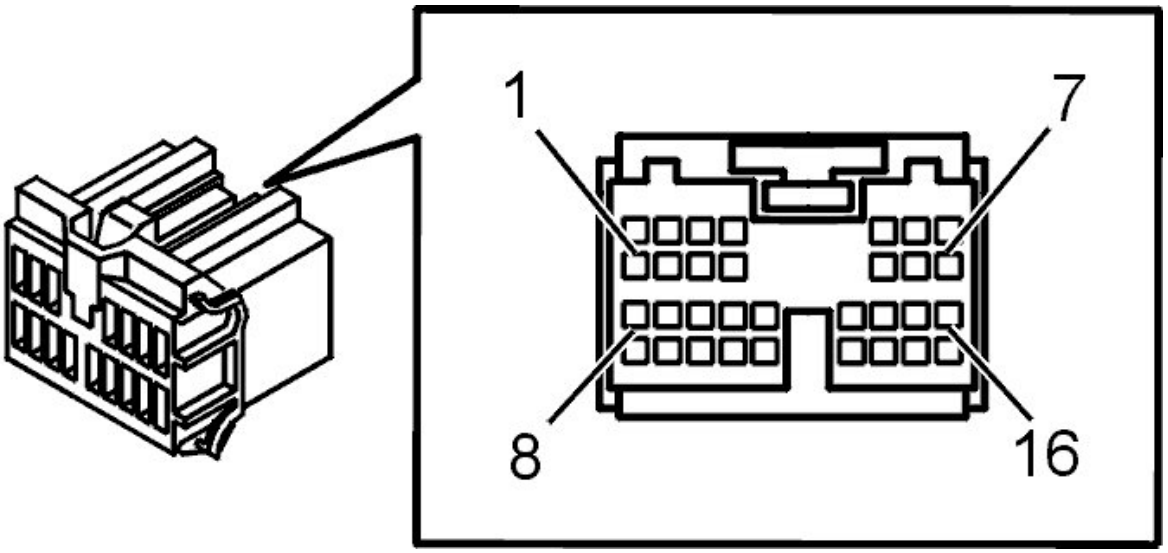
Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.

If the car is equipped with a 16-pin connector

Check the cable between driver door module (DDM) terminal #14A and power door mirror terminal #2. Check the cable between control module terminal #18A and power door mirror terminal #3. Check these cables for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

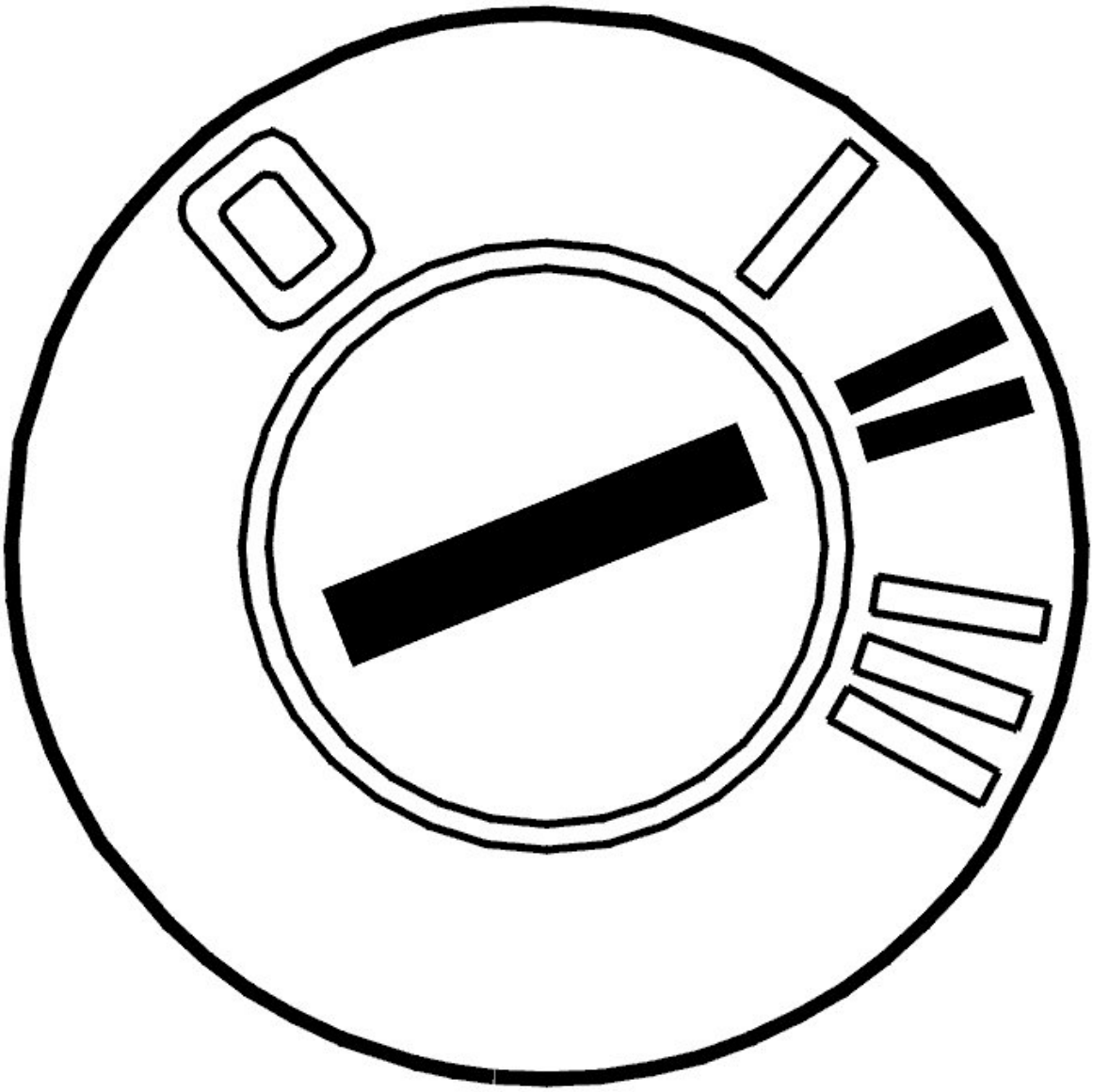
Continue - Fault-tracing information

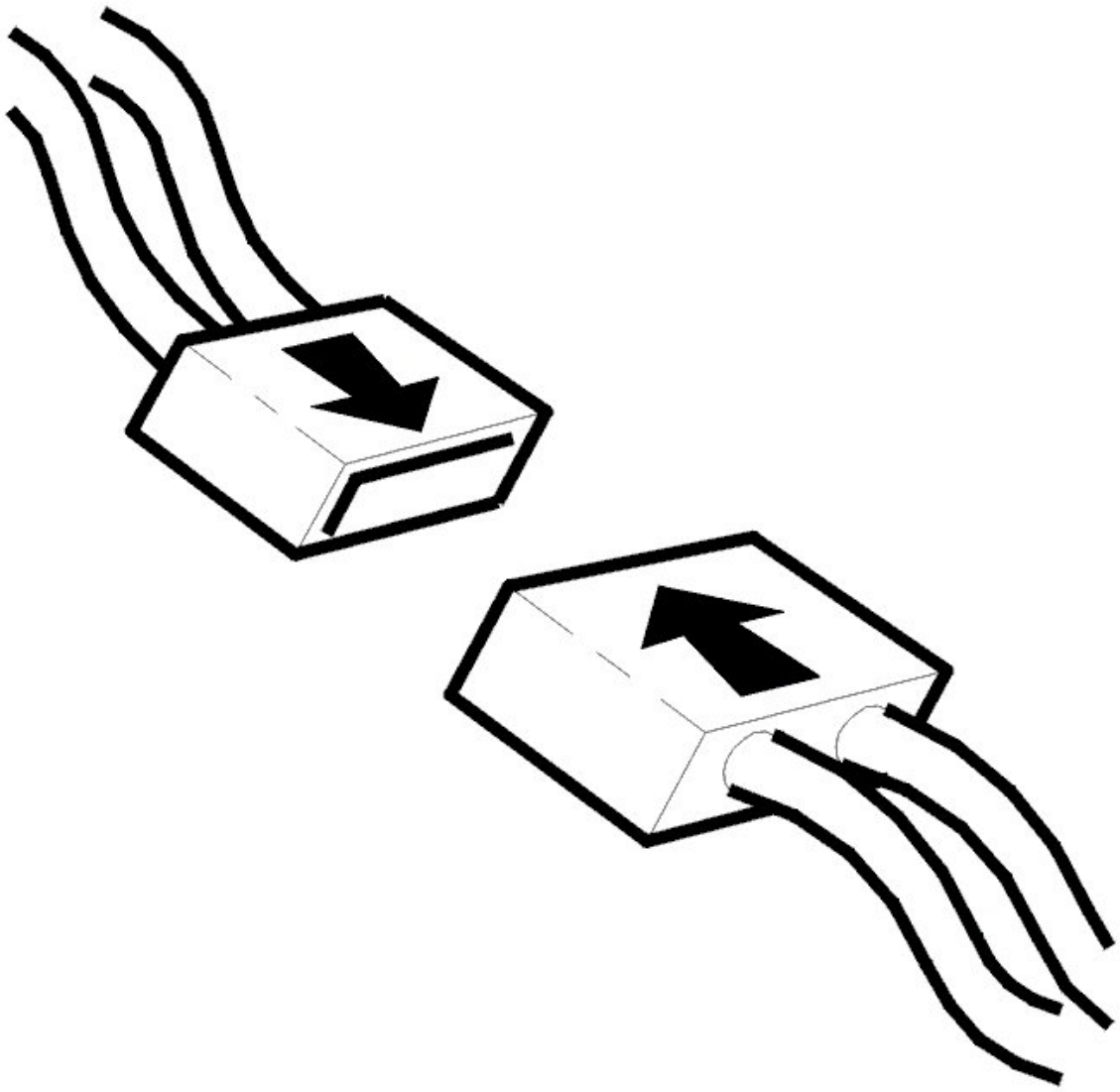
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal from temperature sensor is too low, diagnostic trouble code DDM-004B is displayed.

Substitute value
- Nothing.

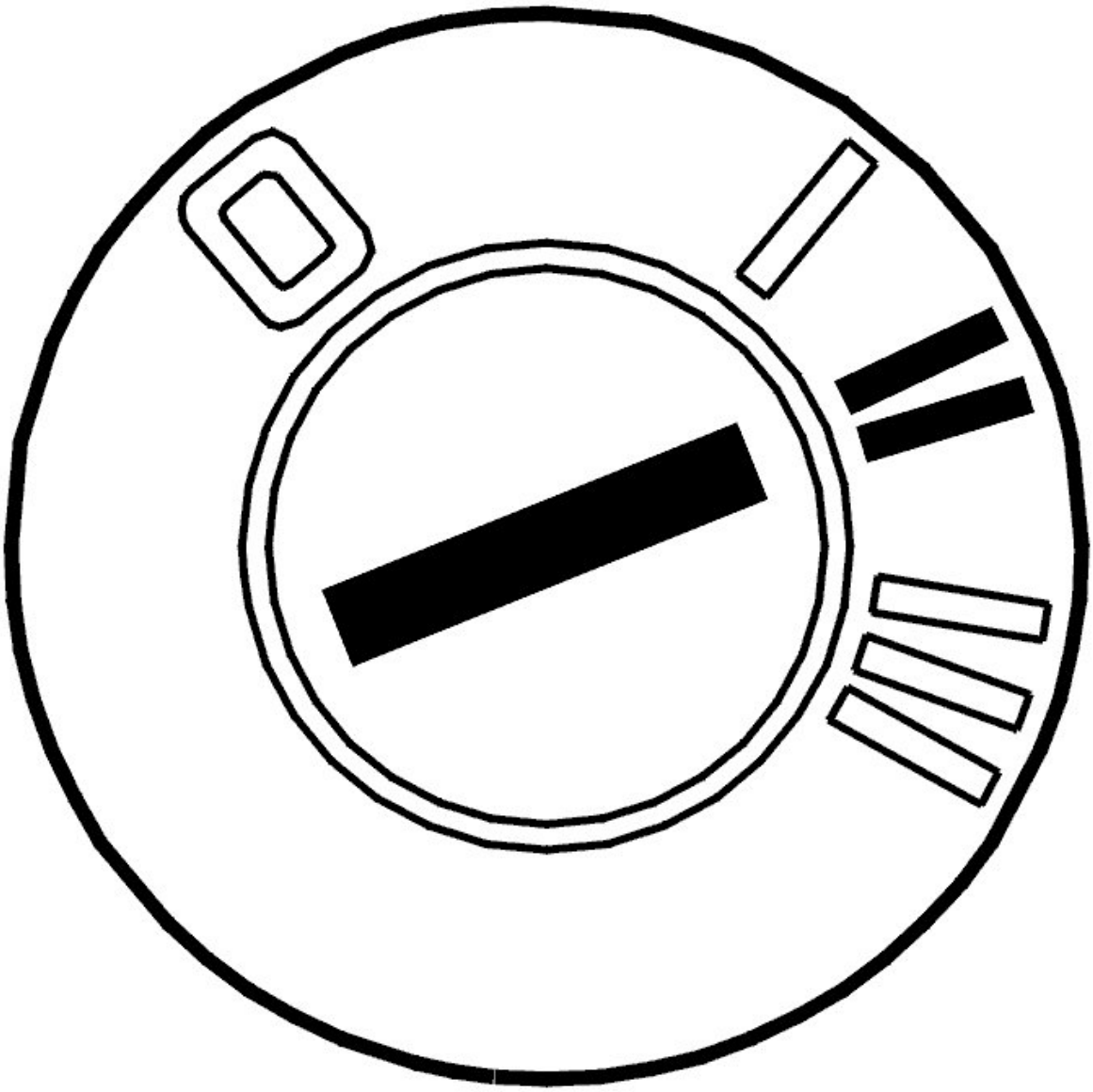
Possible source
- Signal wire short circuited to ground.

Fault symptom[s]
- Outside temperature sensor does not work.

Signal Missing

Signal missing

Checking faults



- Ignition on.

Check the outside temperature.

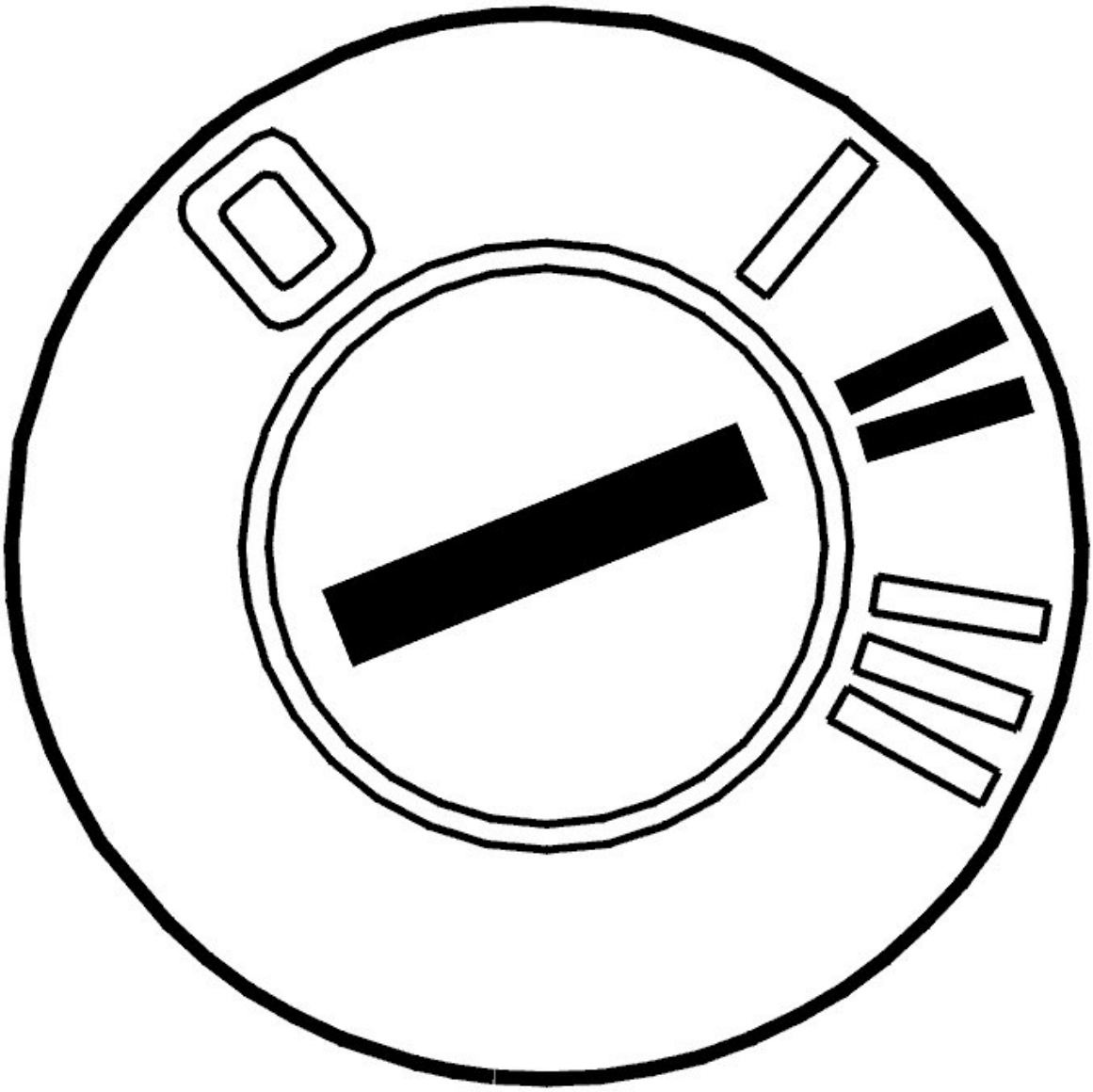
Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

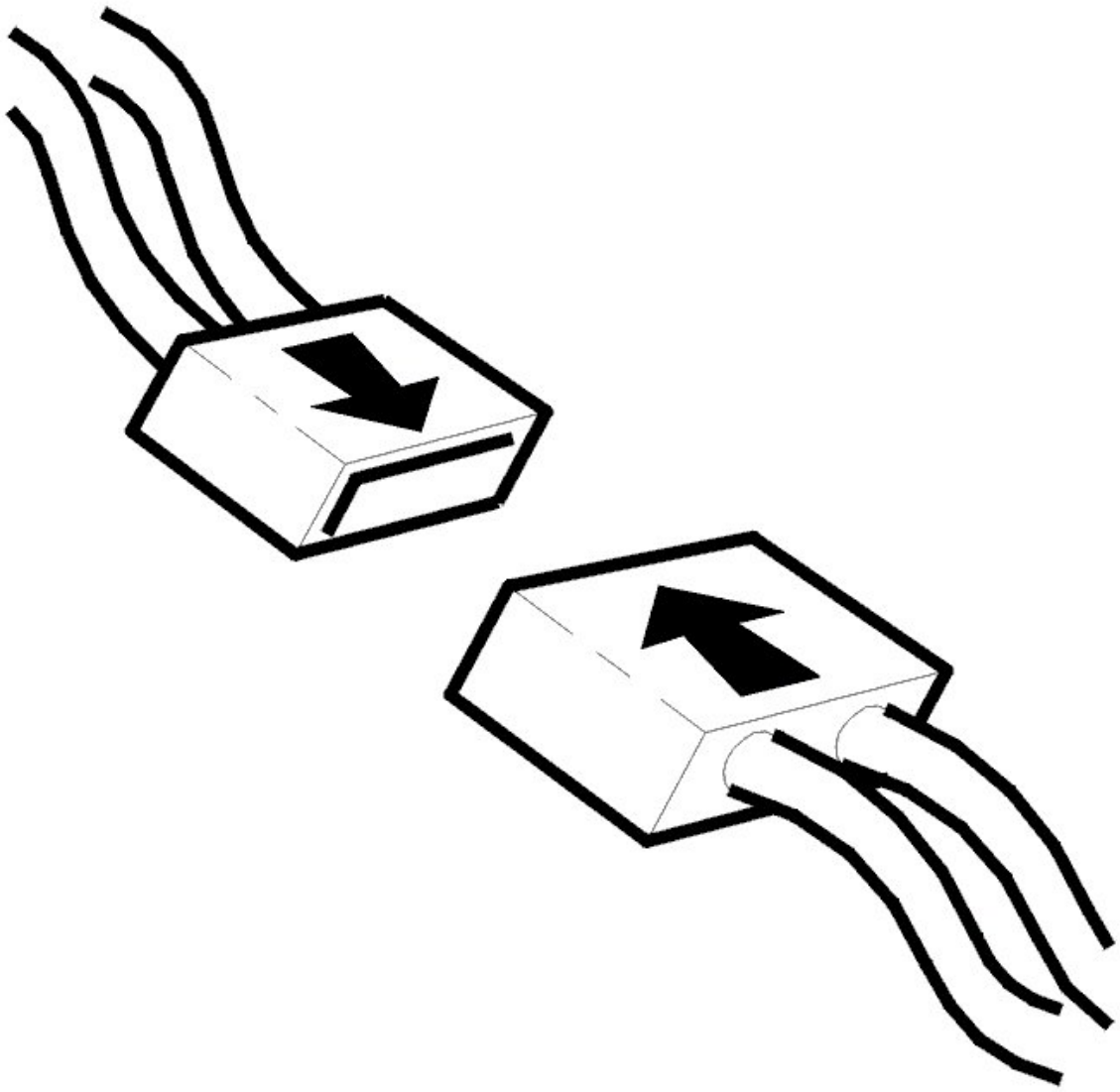
Is the temperature within its permitted range?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors





- Ignition off
- Check the power door mirror connector. Check for contact resistance and oxidation. Remedy if necessary. Check for damage carefully
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check the outside temperature.

Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Is the temperature within its permitted range?

Yes - Verification

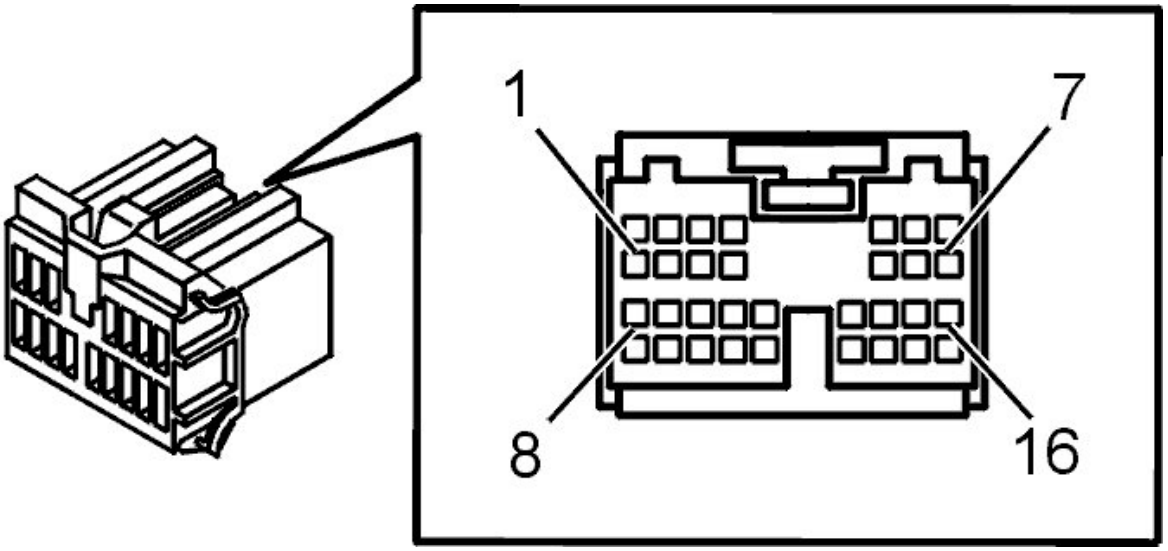
No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between door control module terminal #14A and power door mirror connector terminal #2. Check for a short-circuit to ground. Replace the cable if a fault is found.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

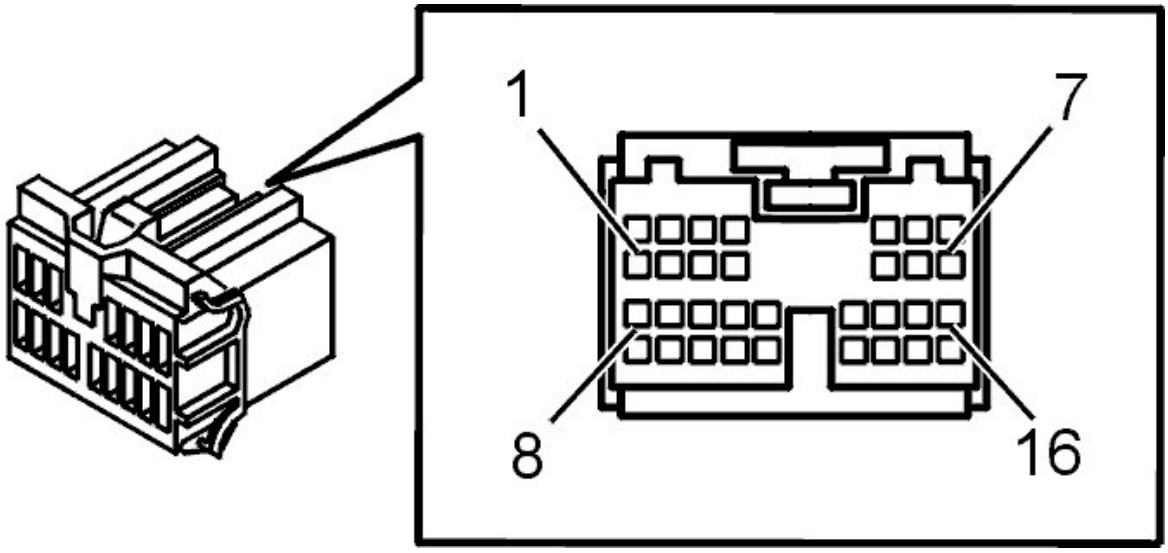
Continue - Verification

Intermittent fault

Check the cable between control module terminal #14A and power door mirror terminal #2. Check for an intermittent short-circuit to ground. Replace the outside temperature sensor if no fault is found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

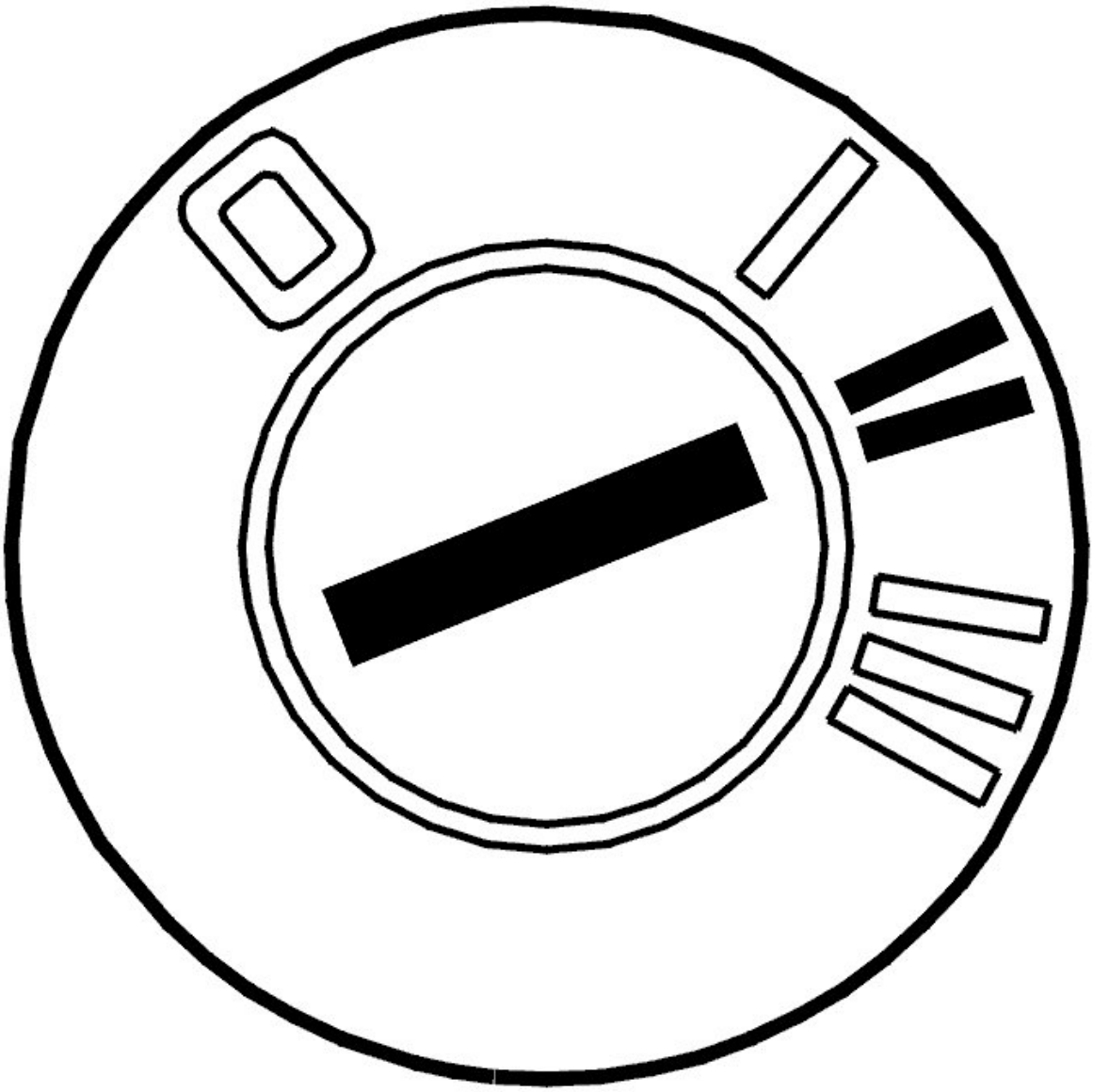
Continue - Fault-tracing information

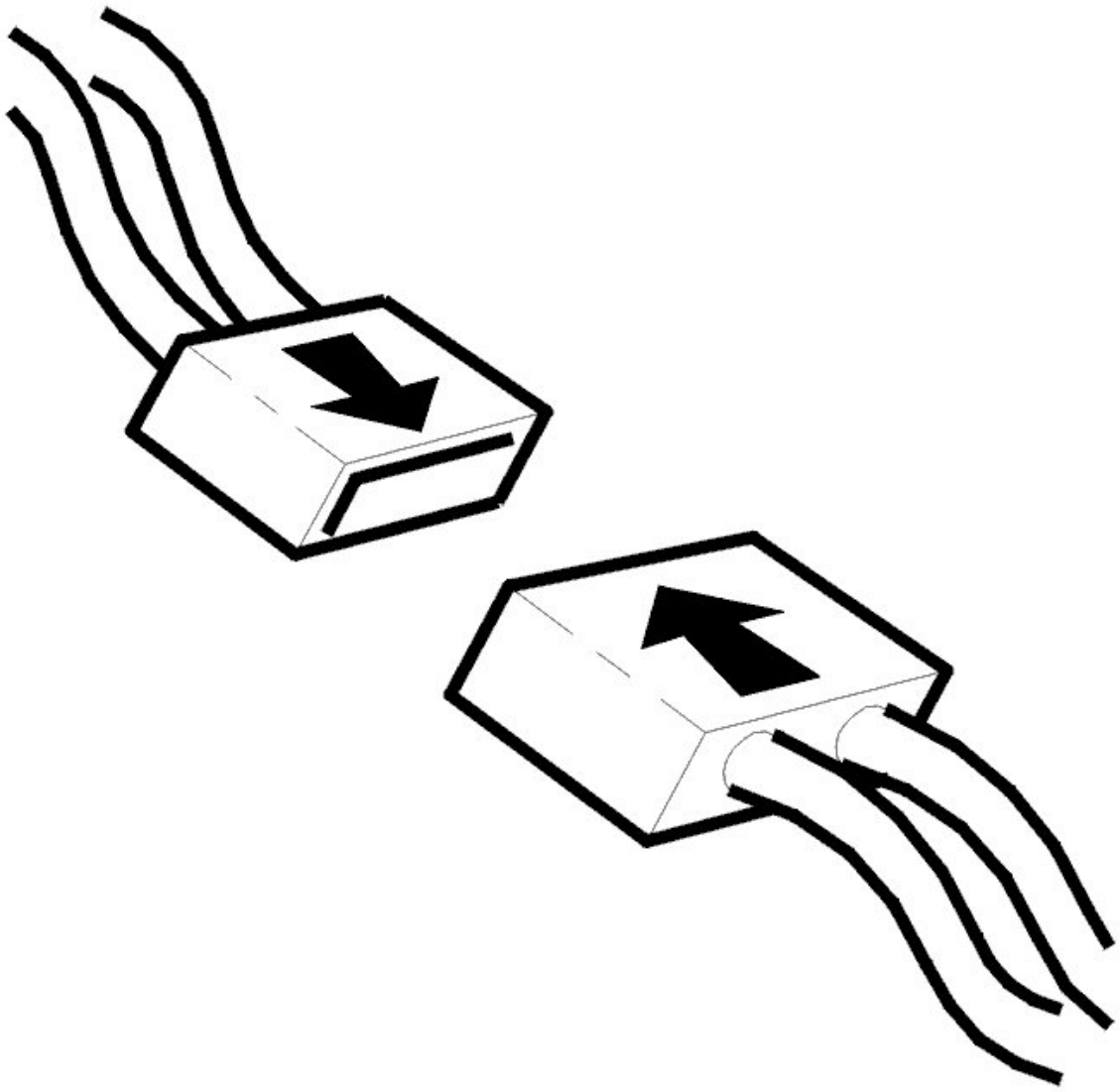
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

The initial set up of the window position is not done at the workshop.

Substitute value
- Nothing.

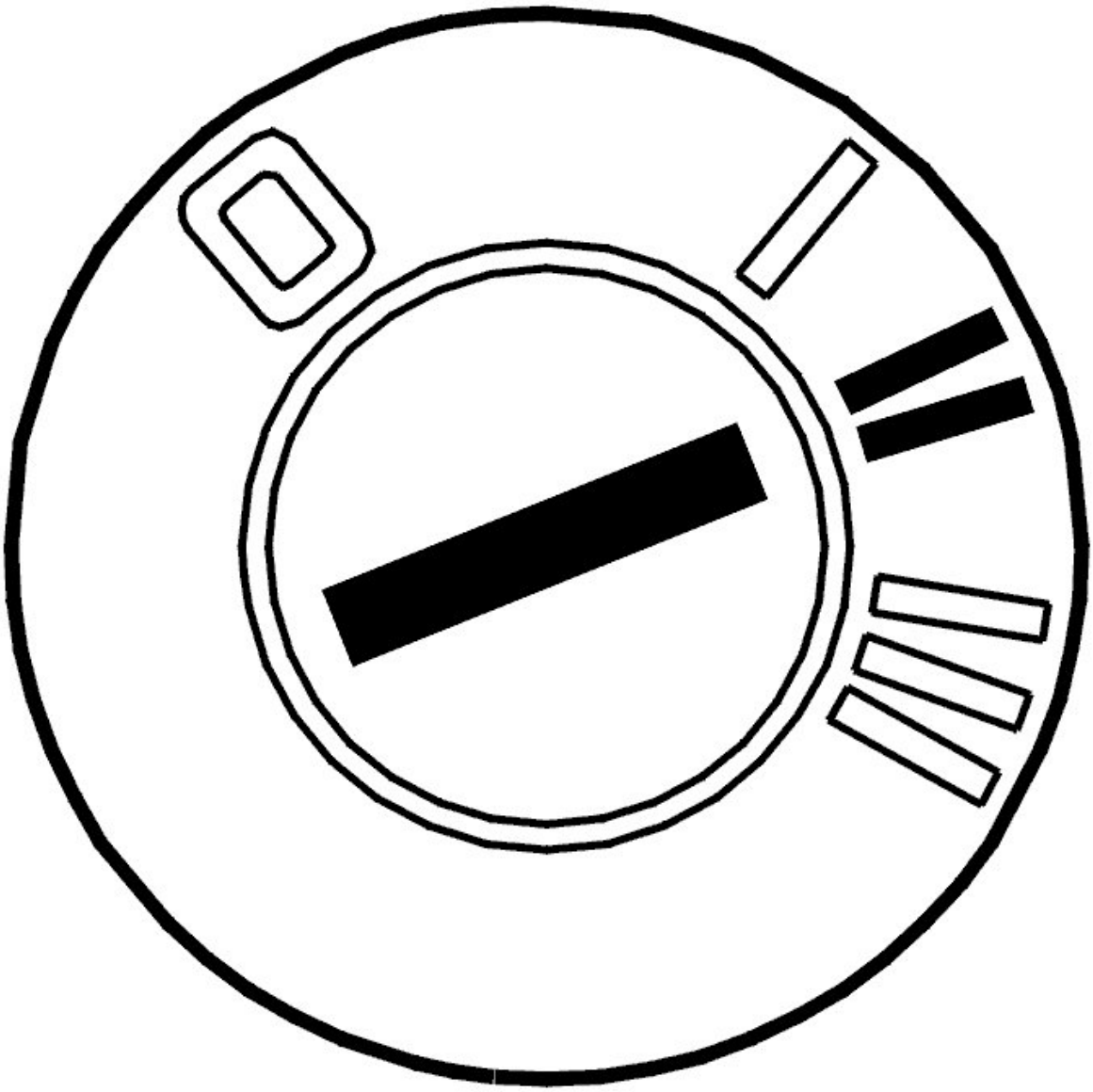
Possible source
- Set up is not done.

Fault symptom[s]
- The automatic window operation does not work.

Internal Fault

Internal fault

Checking faults



- Ignition on.

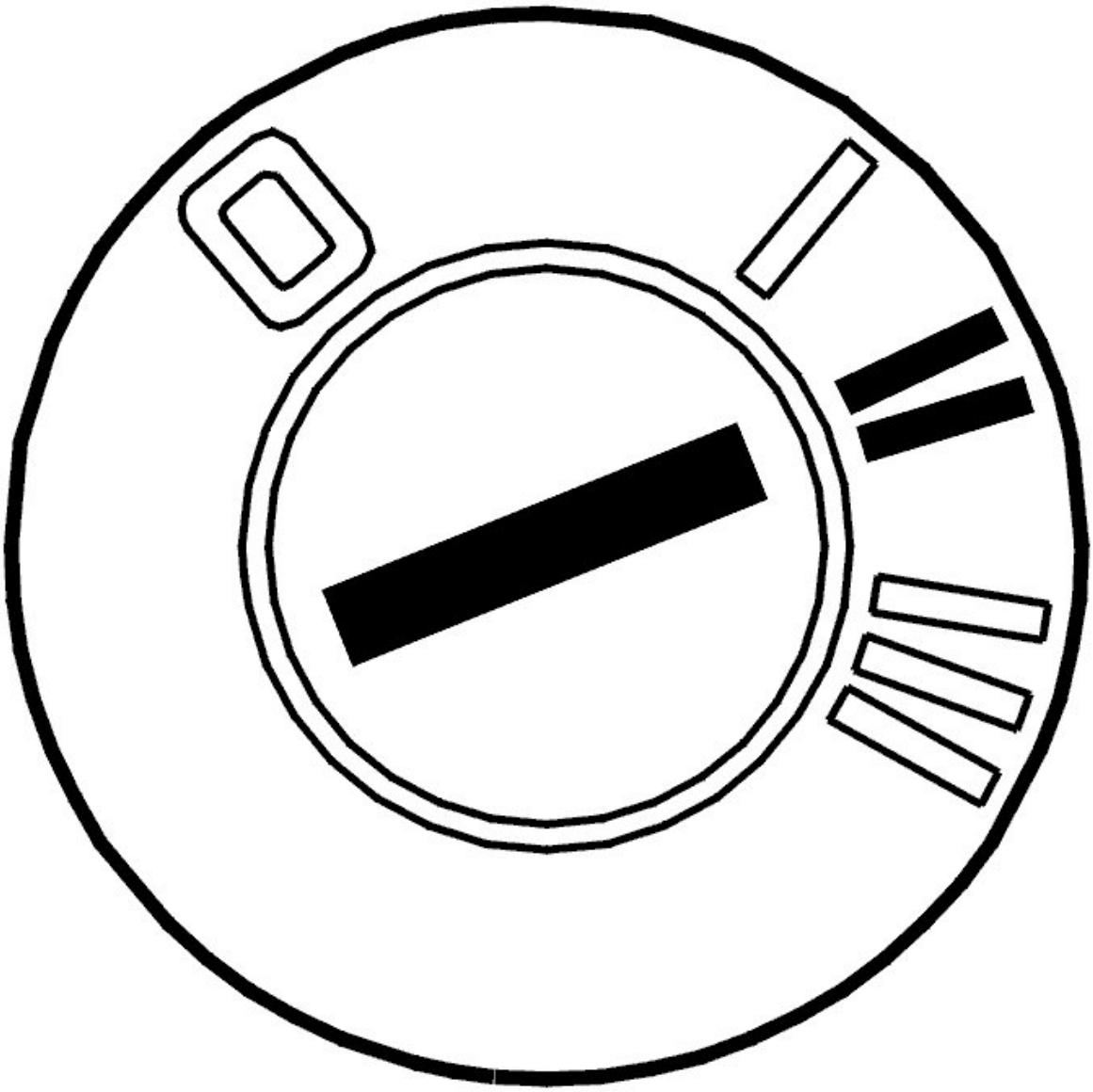
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Initiation

Initiation



- Ignition on.

The window position has never been initiated in the control module.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - **Fault Found**

Intermittent fault

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The window position settings have been lost by the control module. This is due to a voltage drop when the window lift mechanism was activated.

Substitute value
- None.

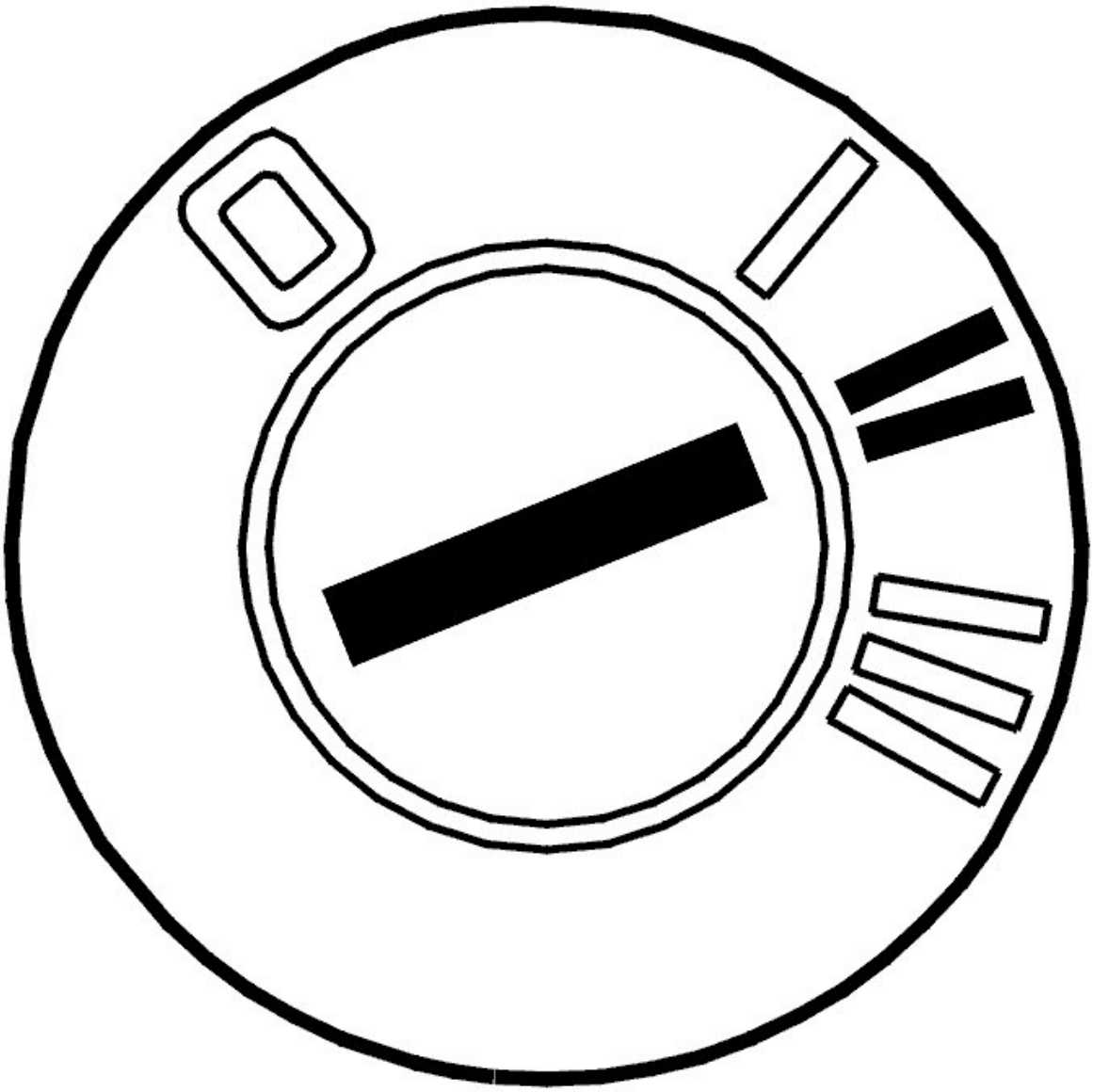
Possible source
- The initialization of the window position is lost.

Fault symptom[s]
- Automatic window operation does not function.

Internal Fault

Internal fault

Checking faults



- Ignition on.

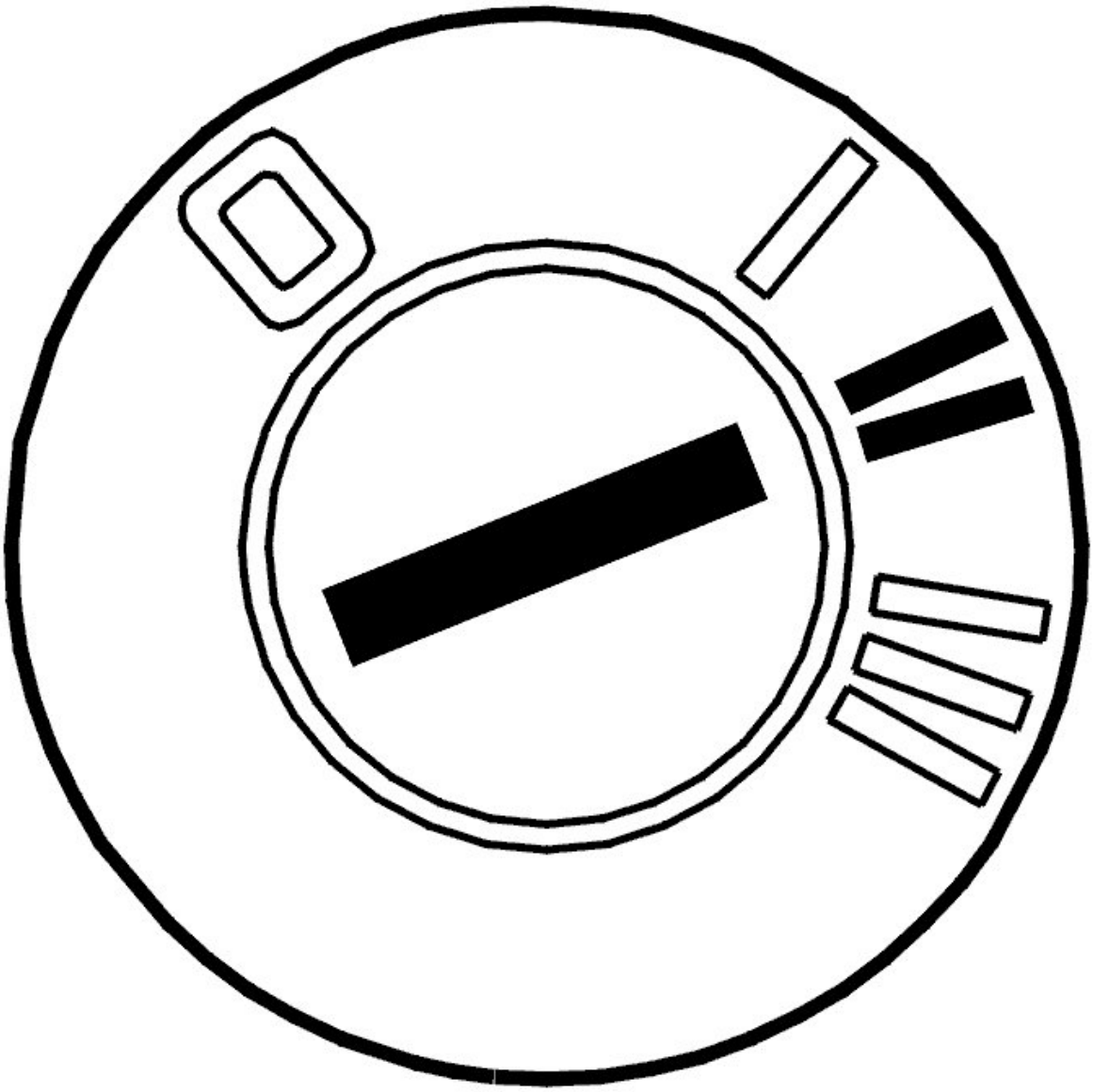
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Initiation

Initiation



- Ignition on.

The control module has registered an internal fault.
The window position must be initialized.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - **Fault Found**

Intermittent fault

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM-0019 is stored if the driver's door module registers a low signal in the lock signal cable for unlocking for more than 10 seconds.

Substitute value
- None.

Possible source
- The lock has jammed in the unlocked position.
- Defective locking switch. (Short-circuit in the locking switch.)
- Short-circuit to ground in the lock signal cable for unlocking.

Fault symptom[s]
- Cannot be operated with a key from the driver's door.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults

Check that the driver's door lock can be operated with the key.

Is the function OK?

Yes - Checking the cable

No - Checking the cable

Checking the cable

Check the cable between the door control module and the lock unit on the driver's door. Check for a short-circuit to ground.

DDM-0019 Central locking input (Unlocking)

Door control module terminal #A12 and driver's door terminal #1.

DDM-001A Central locking input (Locking)

Door control module terminal #A13 and driver's door terminal #5.

DDM-001B Central locking, lock cylinder

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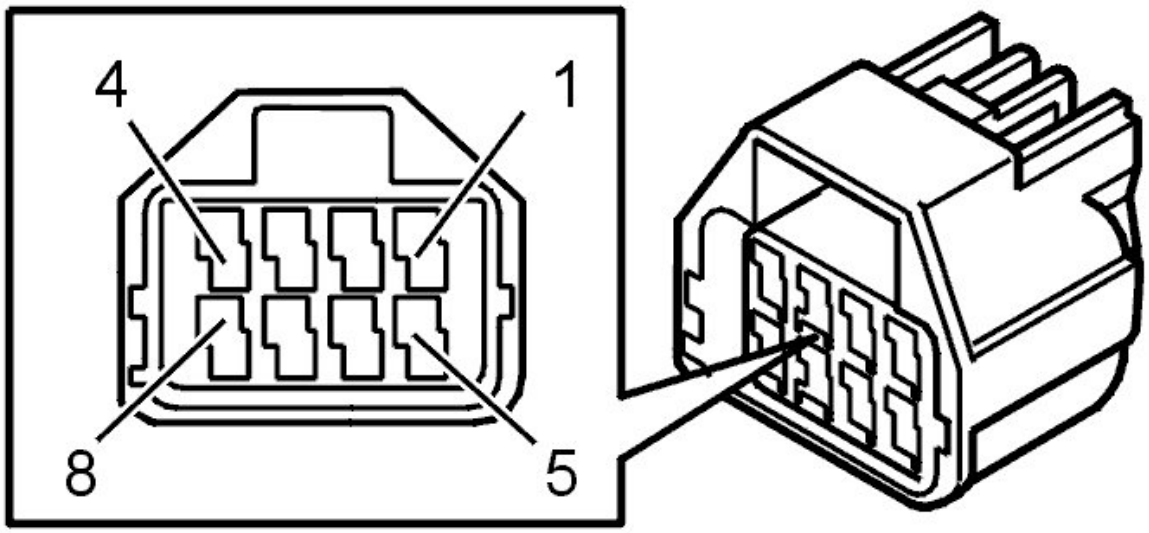
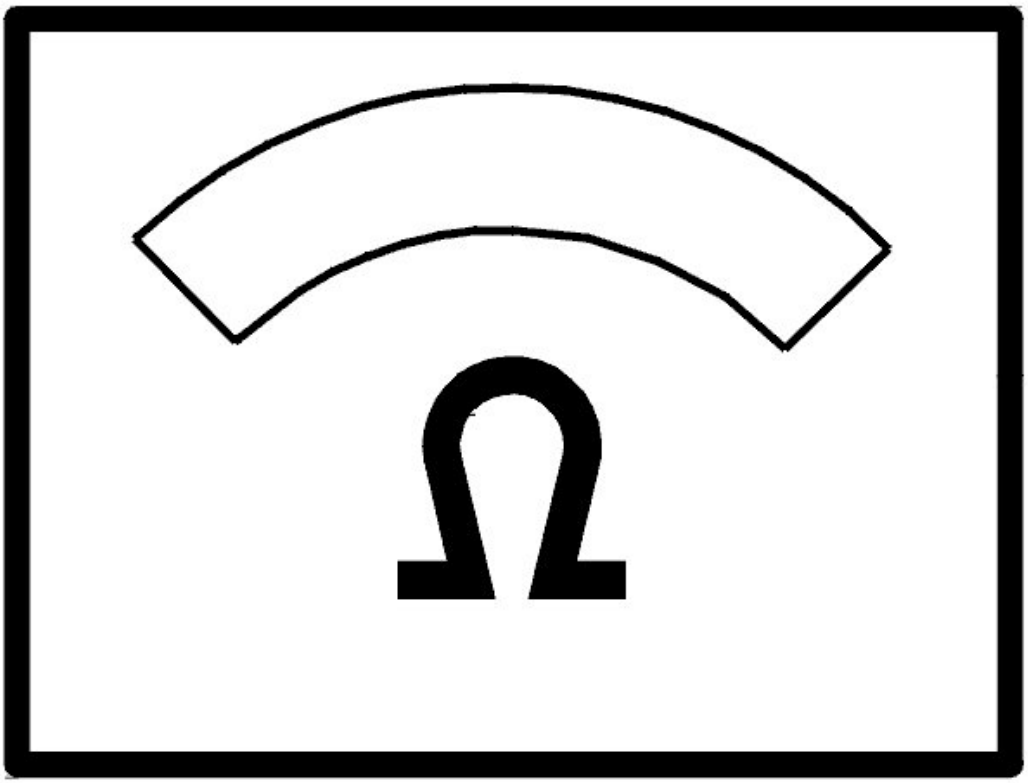
Door control module terminal #A13 and driver's door terminal #5, and door control module terminal #A12 and driver's door terminal #1. Remedy as necessary.

Other information:

- With the ignition off, the voltage between terminal #12B and ground must be battery voltage
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the lock unit, see Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Fault-tracing information

Checking the cable

Check the cable between the door control module and the lock unit on the driver's door. Check for an intermittent short-circuit to ground.

DDM-0019 Central locking input (Unlocking)

Door control module terminal #A12 and driver's door terminal #1.

DDM-001A Central locking input (Locking)

Door control module terminal #A13 and driver's door terminal #5.

DDM-001B Central locking, lock cylinder

Door control module terminal #A13 and driver's door terminal #5, and door control module terminal #A12 and driver's door terminal #1. Remedy as necessary.

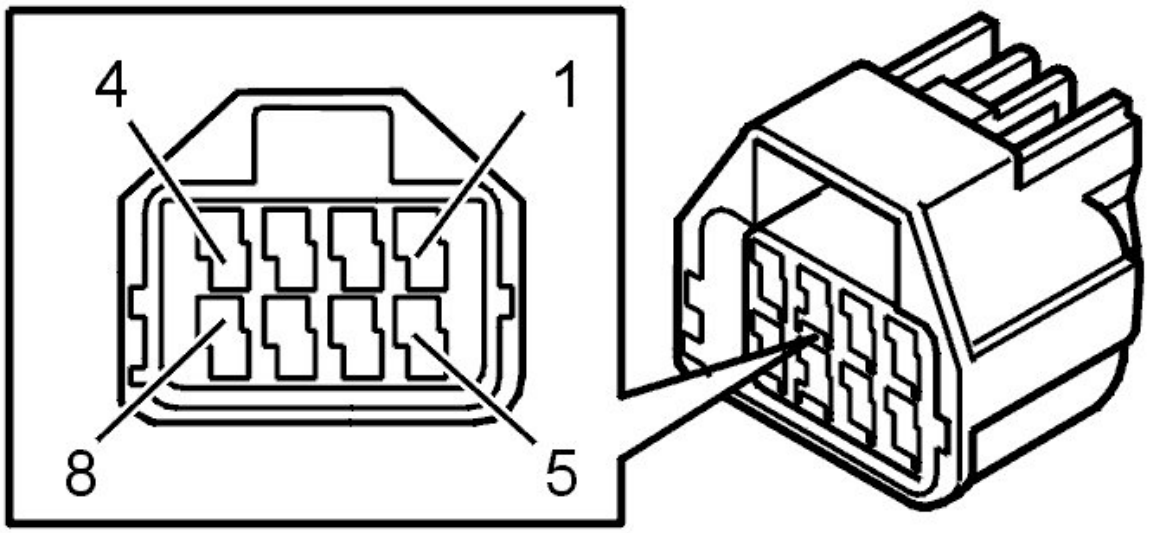
Other information:

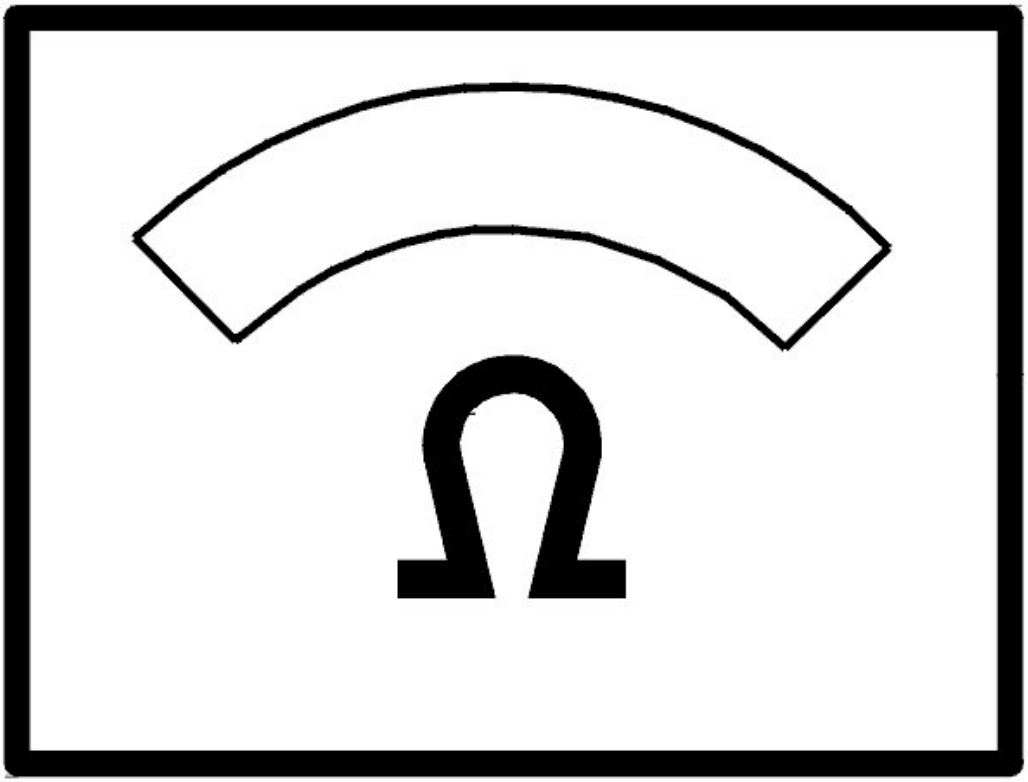
- With the ignition off, the voltage between terminal #12B and ground must be battery voltage
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Inspection/Pinout Values and Diagnostic Parameters

- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the lock unit, see Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





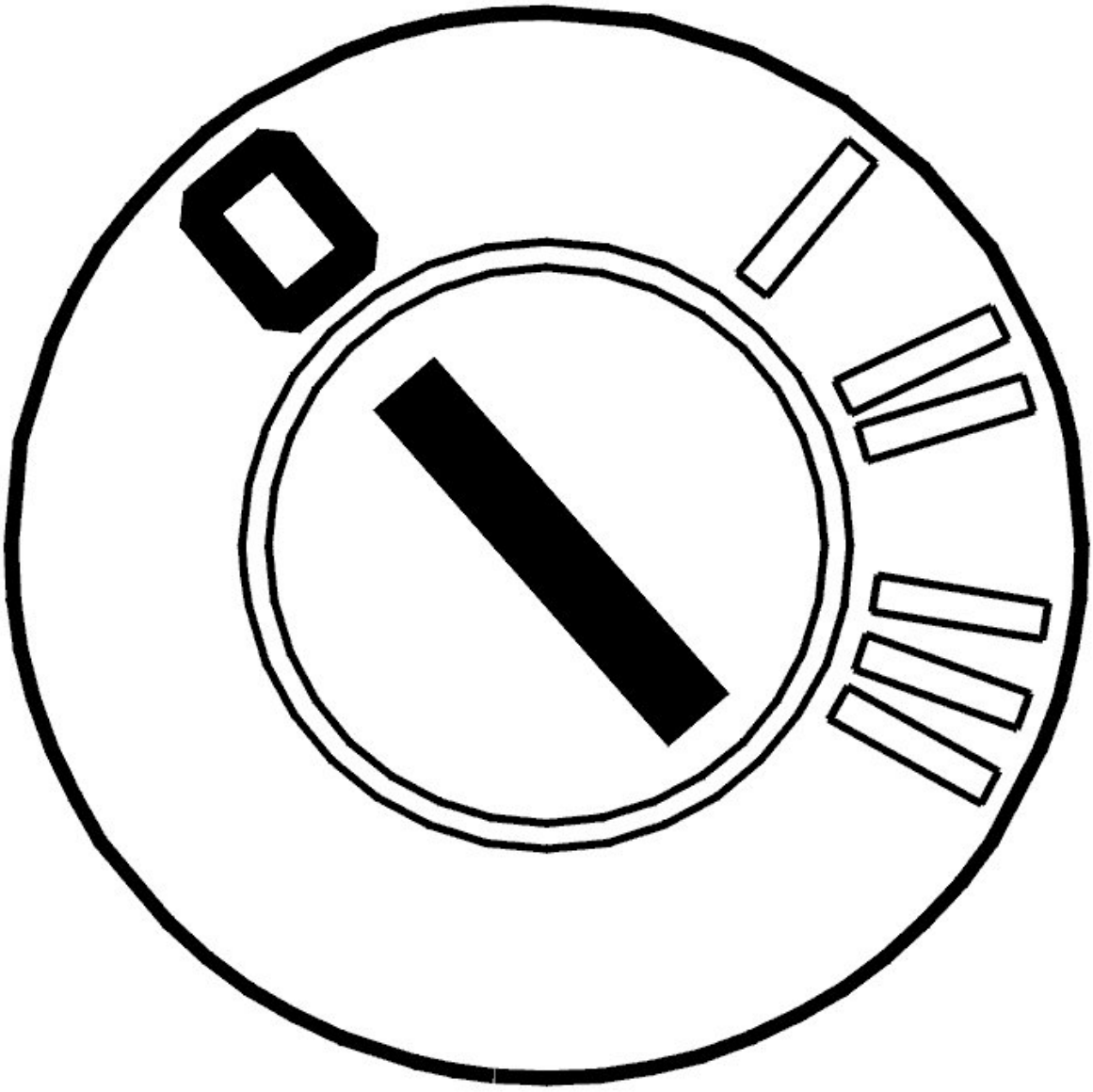
Continue - Fault-tracing information

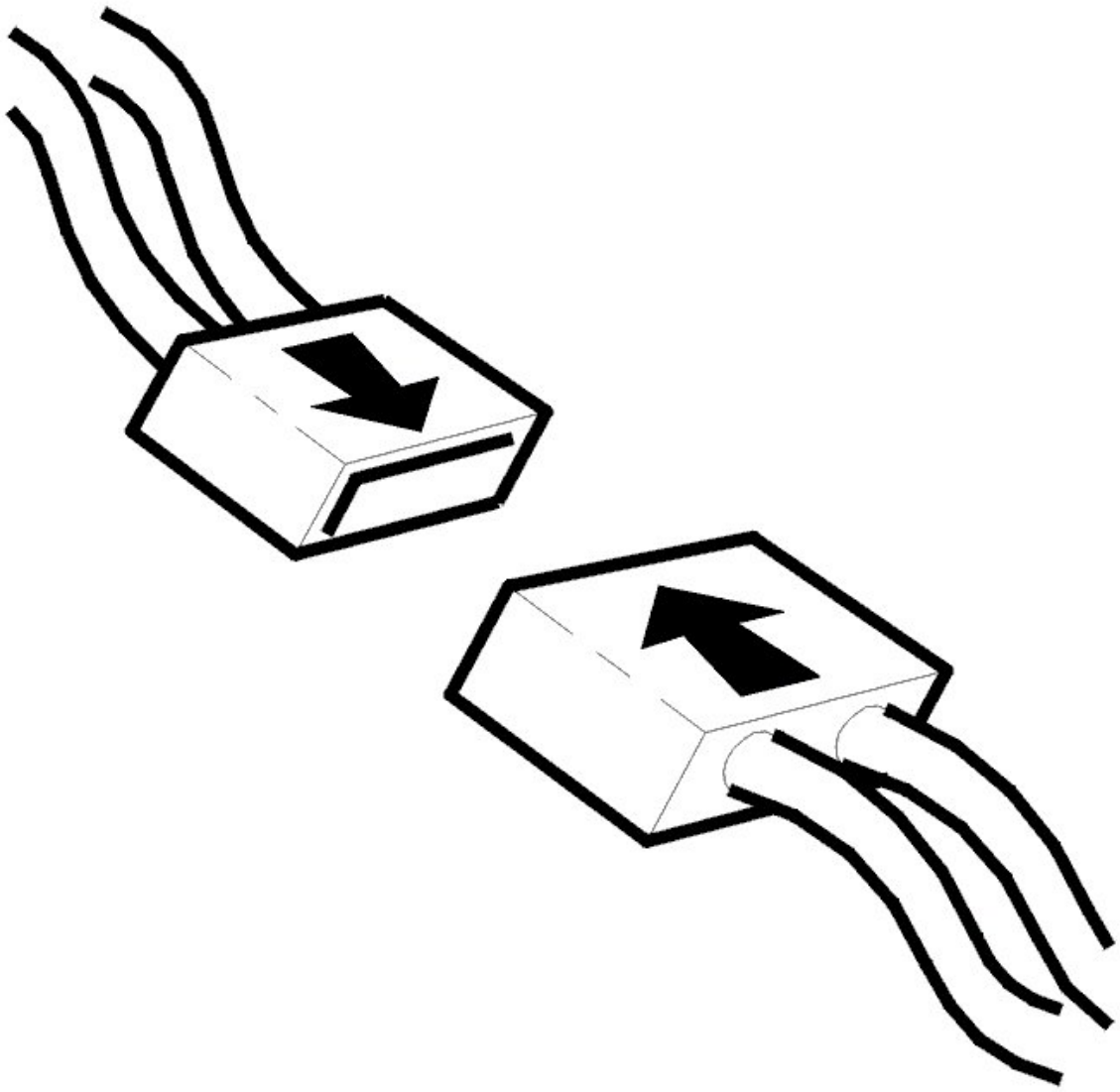
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.

Check that the driver's door lock can be operated with the key.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that UP and DOWN signals to electric window lift on driver door are activated at the same time, diagnostic trouble code DDM-0034 is displayed.

Substitute value
- Nothing.

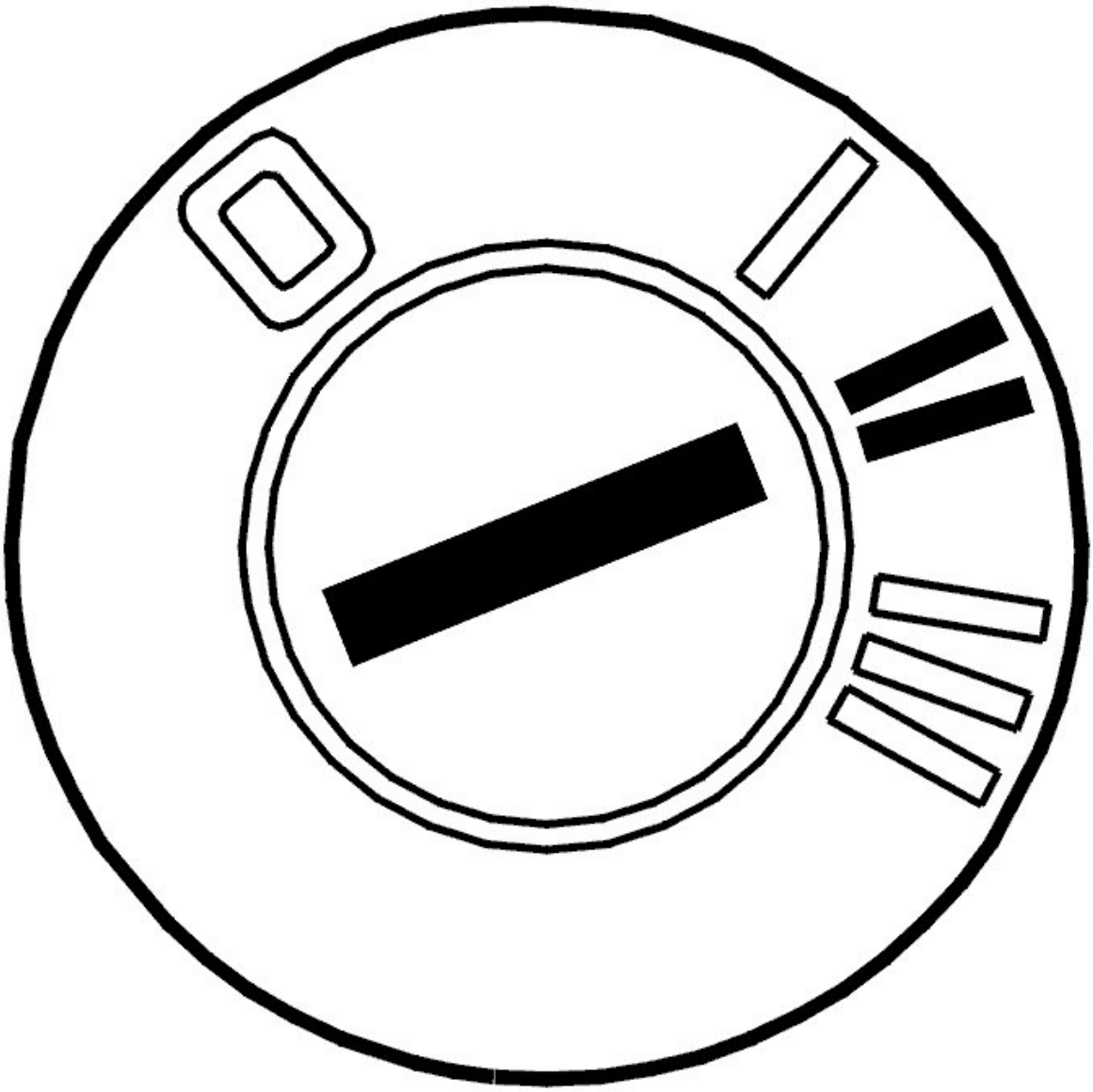
Possible source
- Electric window lift button on driver door is locked in two positions.

Fault symptom[s]
- Electric window lift on driver side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

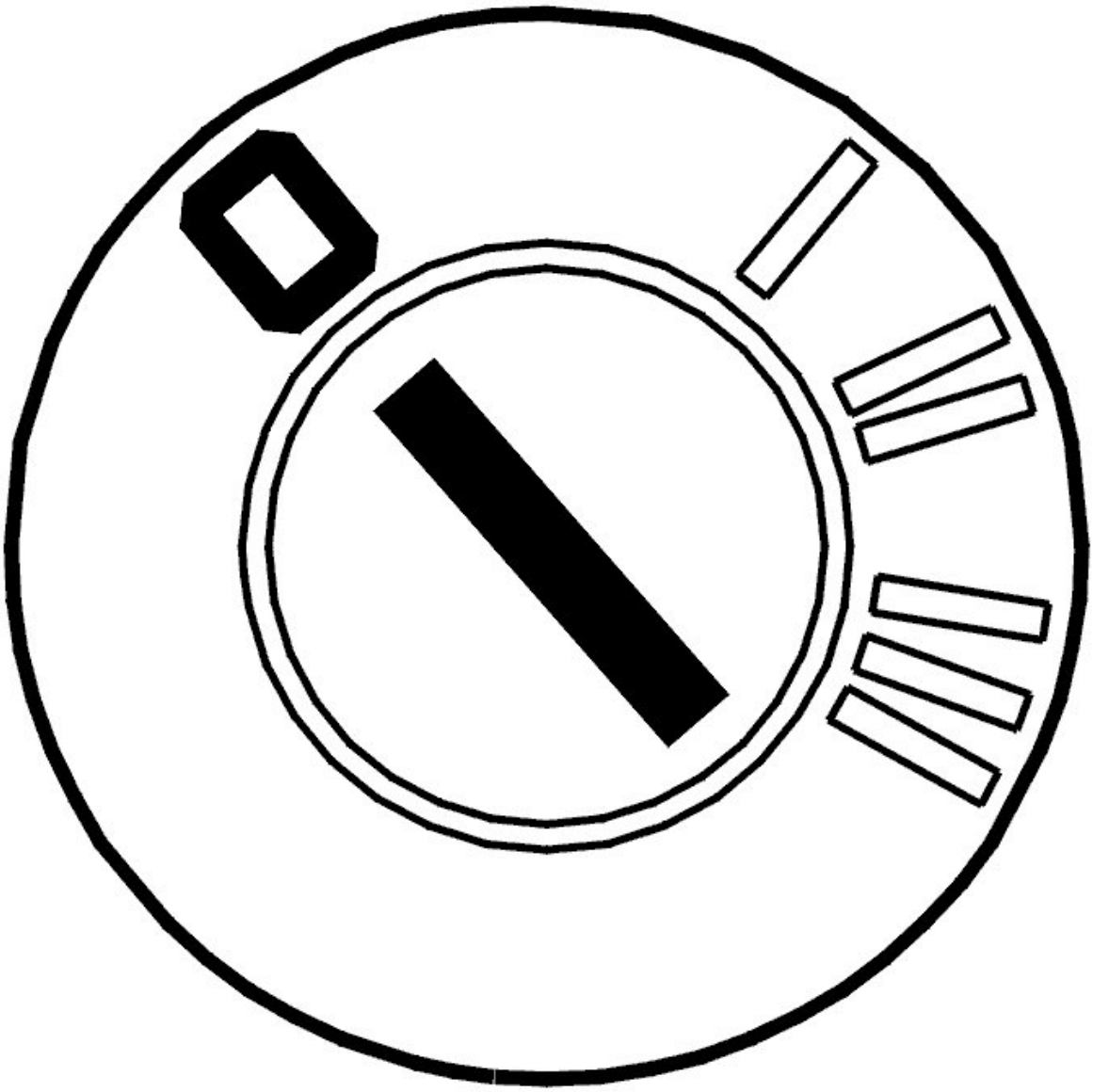
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that UP and DOWN signals to electric window lift on passenger door from driver door are active at the same time, diagnostic trouble code DDM-0035 is displayed.

Substitute value
- Nothing.

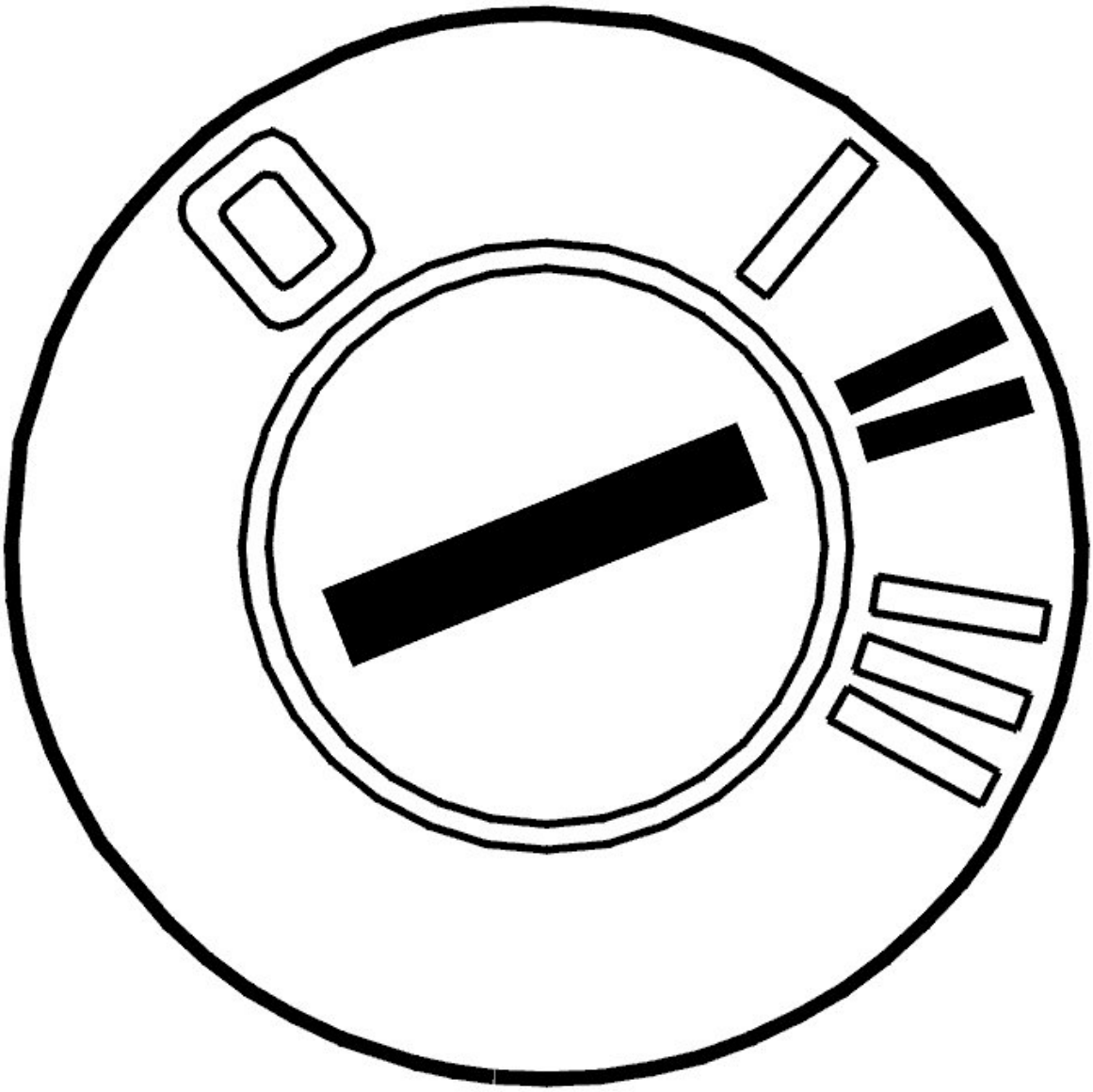
Possible source
- Driver-door switch has stuck in two positions.

Fault symptom[s]
- Electric window lift on passenger side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

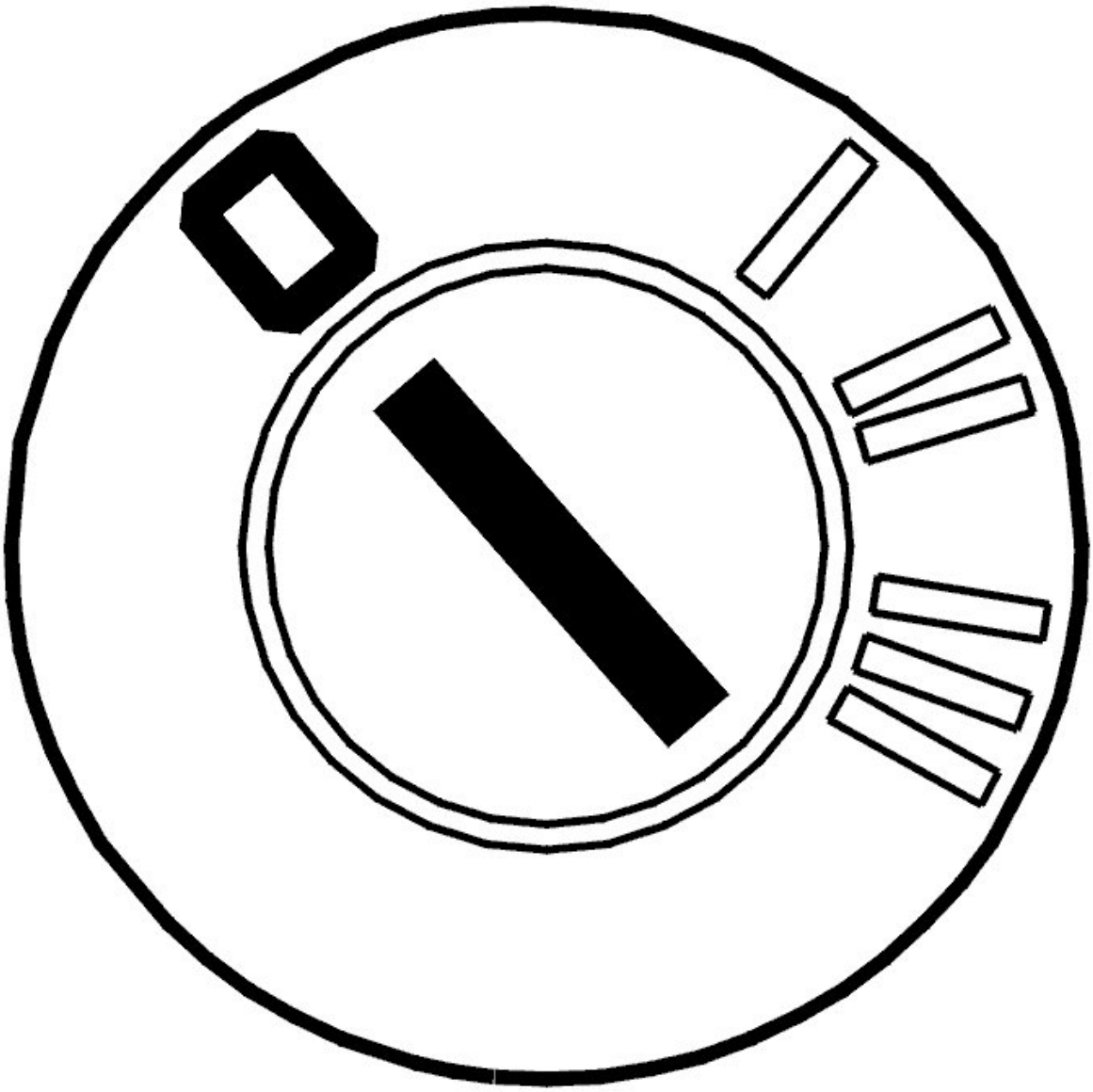
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that UP and DOWN signals to electric window lift on rear left door from driver door are active at the same time, diagnostic trouble code DDM-0036 is displayed.

Substitute value
- Nothing.

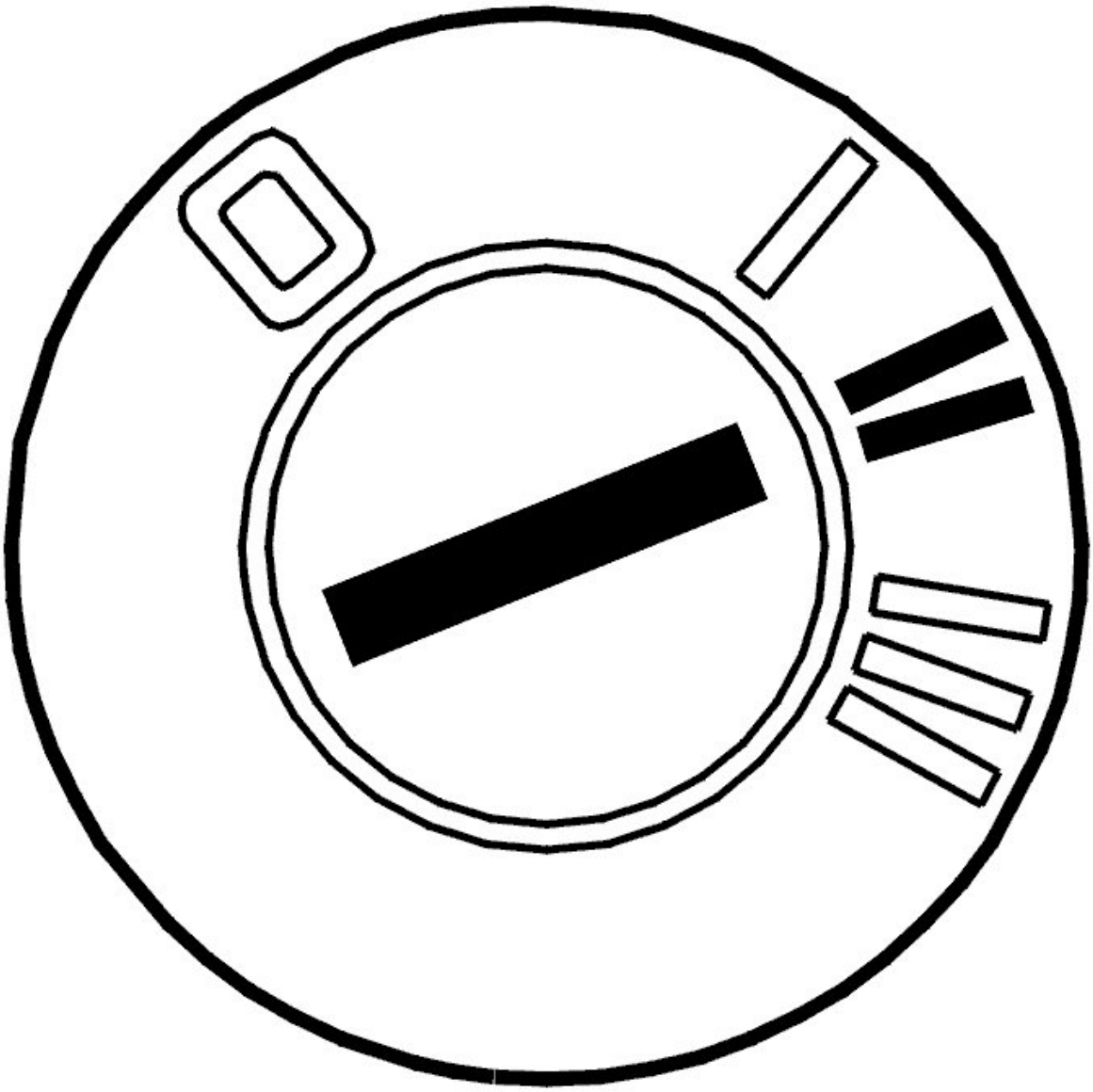
Possible source
- Driver-door switch has stuck in two positions.

Fault symptom[s]
- Electric window lift does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

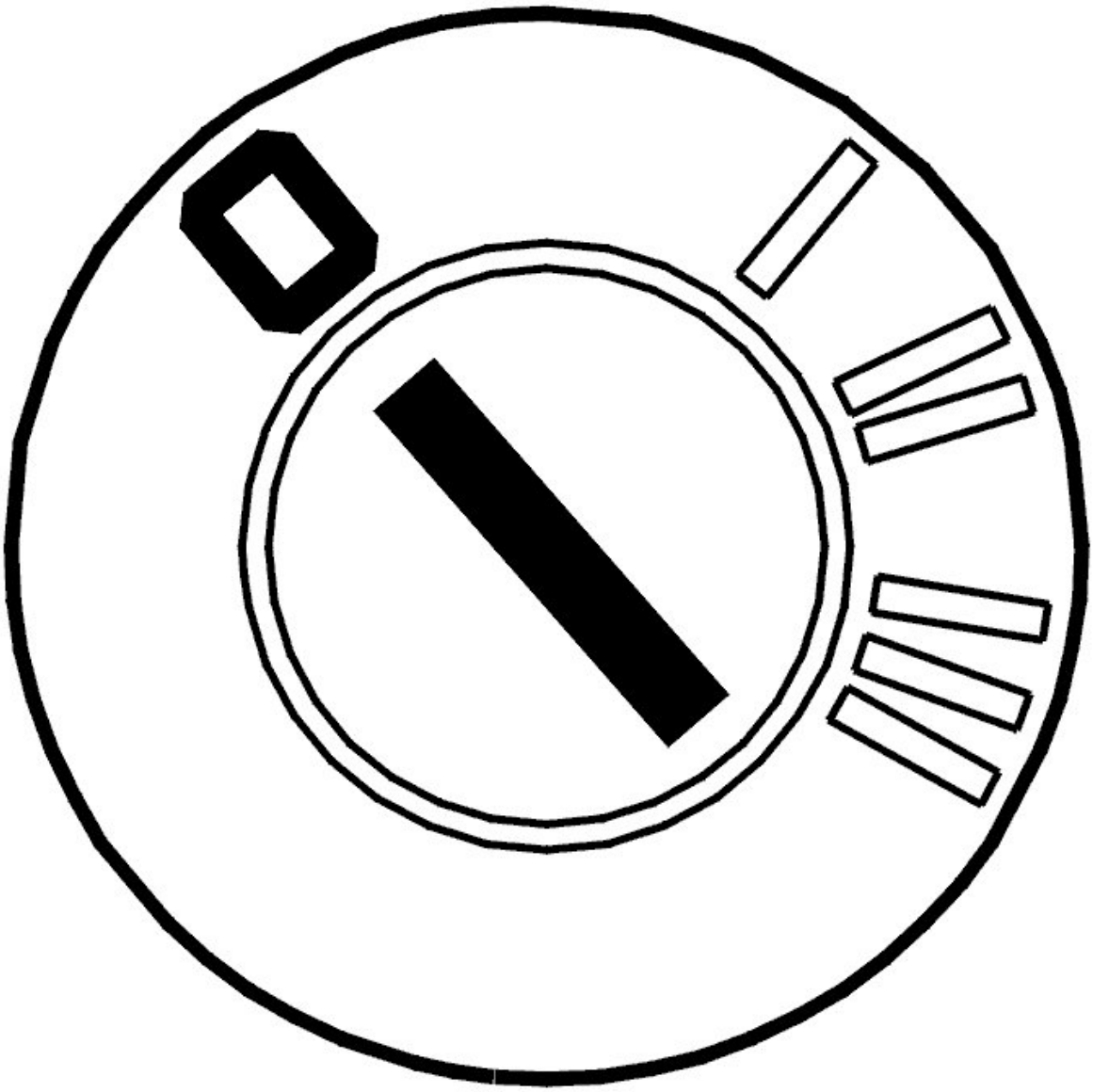
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that UP and DOWN signals to electric window lift on rear right door from driver door are active at the same time, diagnostic trouble code DDM-0037 is displayed.

Substitute value
- Nothing.

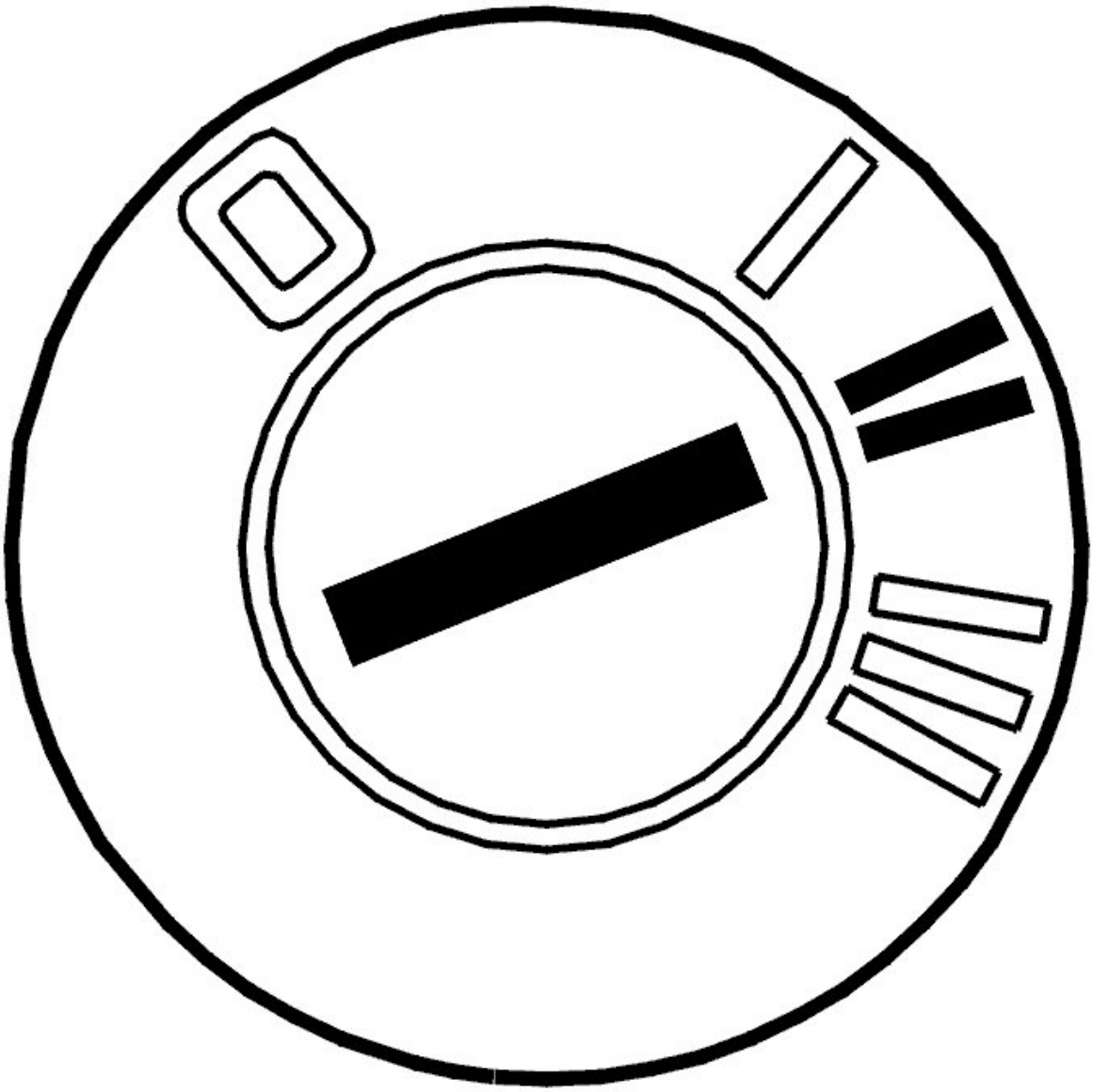
Possible source
- Driver-door switch has stuck in two positions.

Fault symptom[s]
- Electric window lift does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

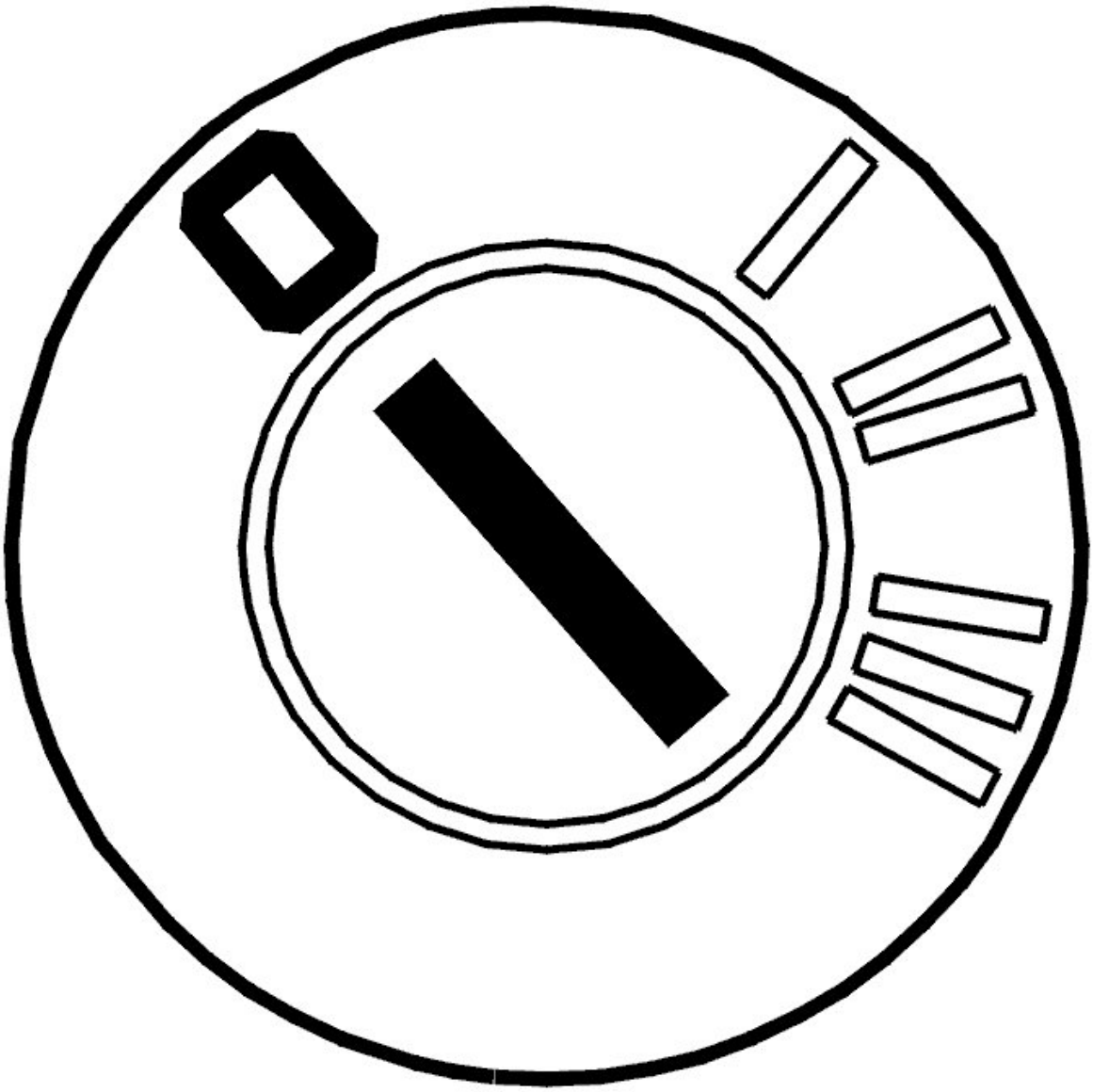
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that operation button for external rear-view mirror electric motors is activated in more than one position at the same time, diagnostic trouble code DDM-0038 is displayed.

Substitute value
- Nothing.

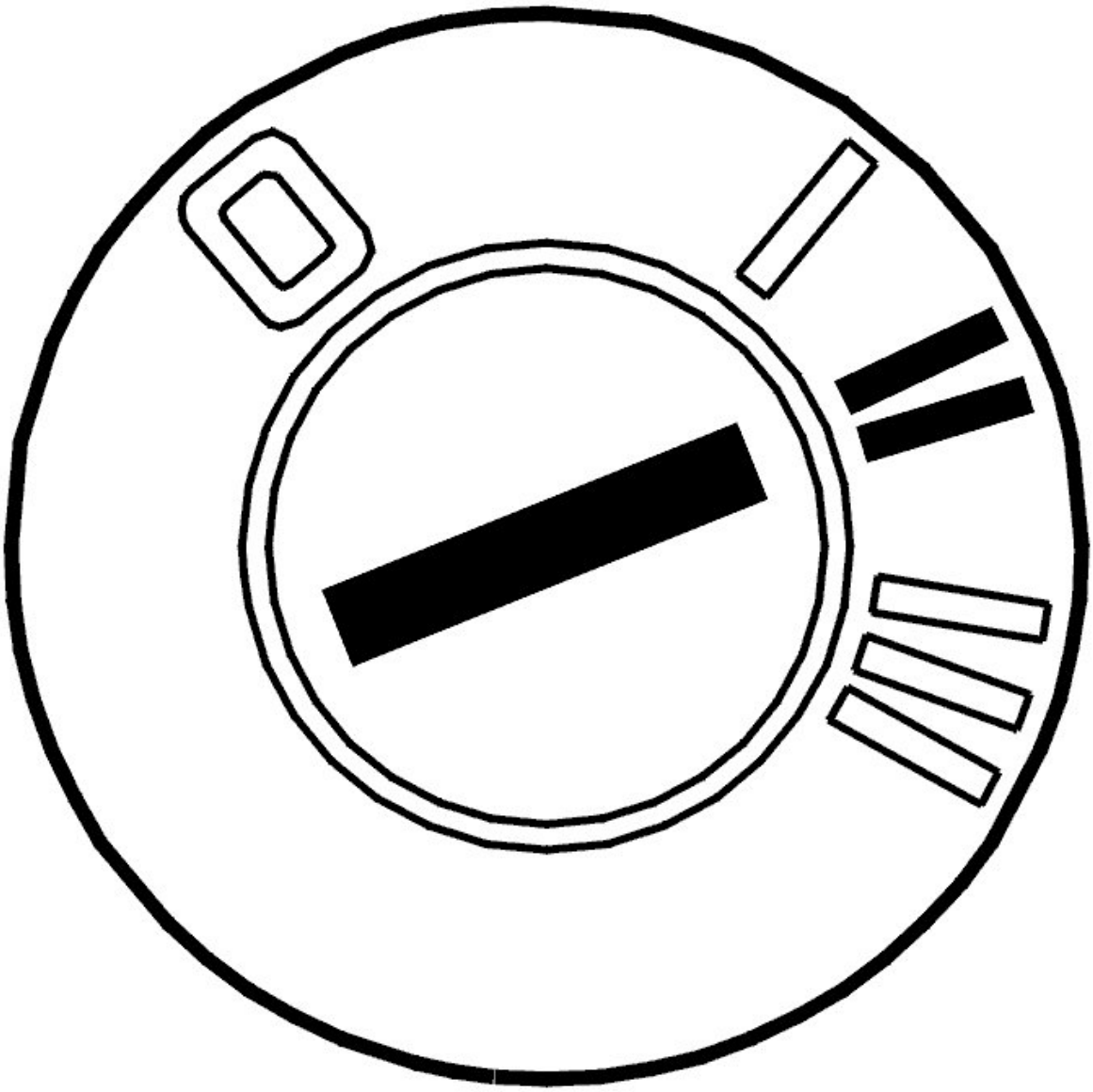
Possible source
- Operation button for external rear-view mirror electric motors does not work.

Fault symptom[s]
- External rear-view mirror operation does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

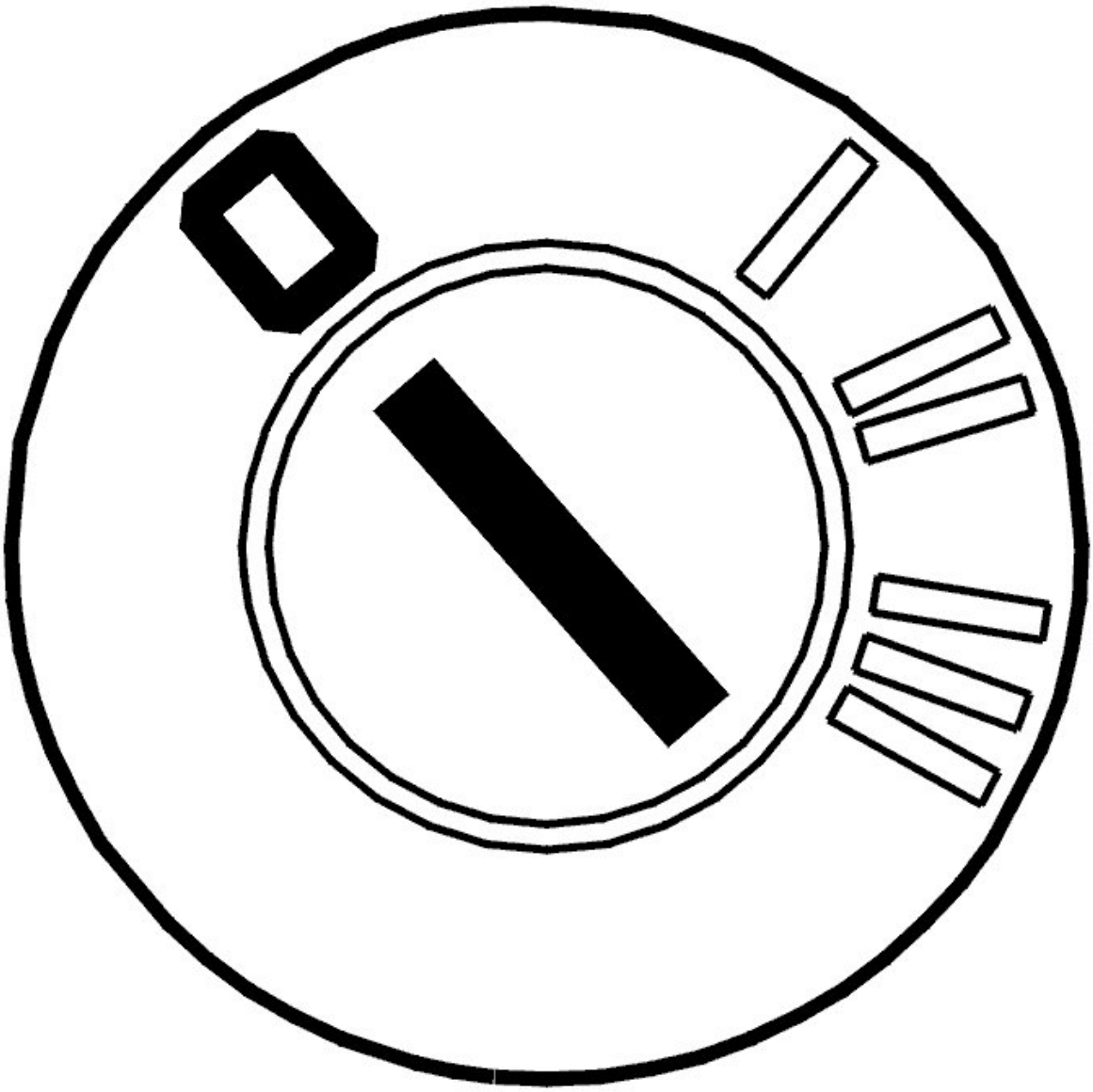
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that CS signal wire is grounded for more than 10 seconds, diagnostic trouble code DDM-0039 is displayed.

Substitute value
- Nothing.

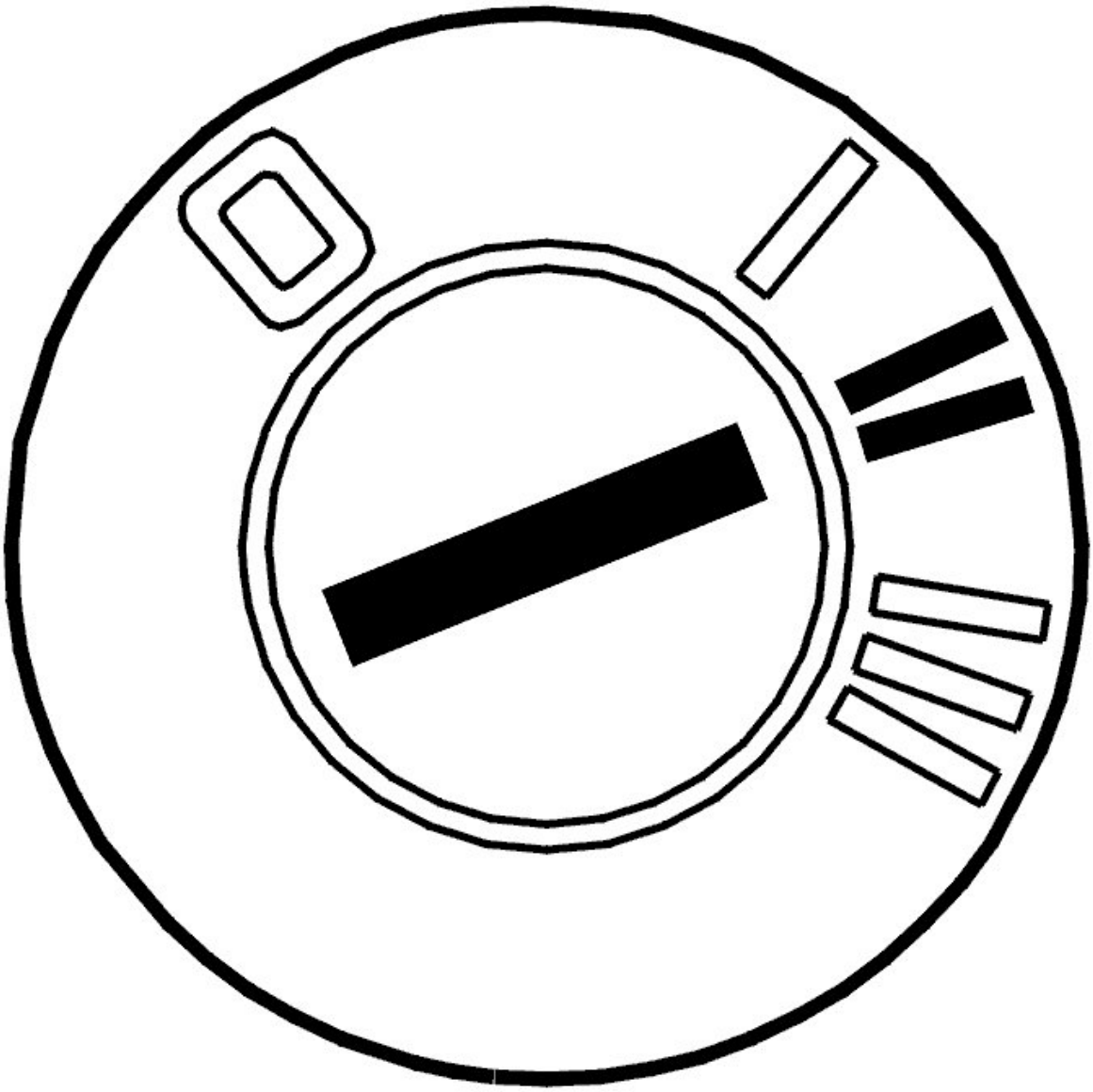
Possible source
- Switch for child safety lock has stuck in one position.

Fault symptom[s]
- Child safety lock not working.

Stuck In the Active Position

Stuck in the active position

Checking for permanent or intermittent faults



- Ignition on.

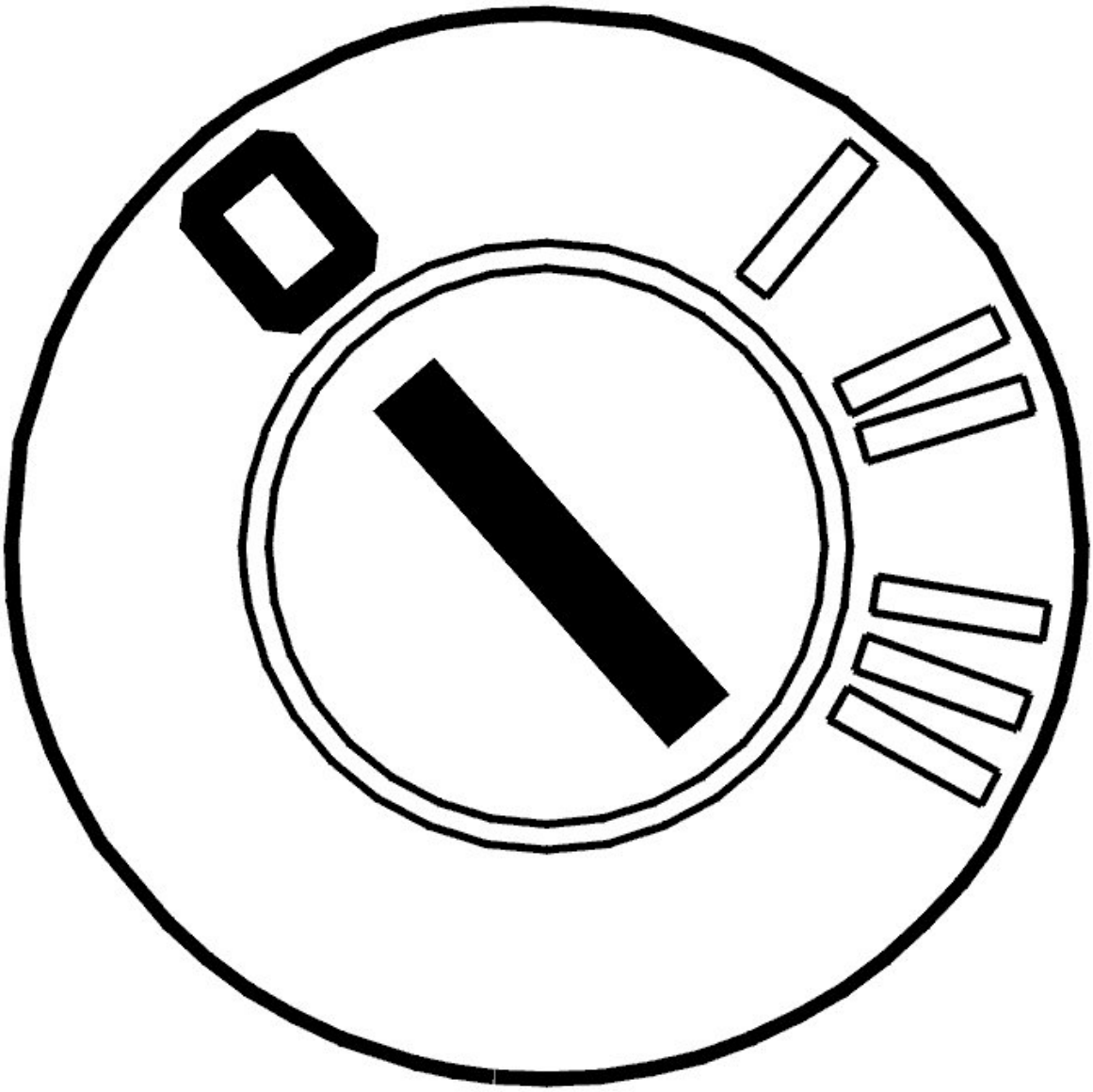
Check if the child-proof lock button is working.

Is the child-proof button working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

- Ignition on.

After replacing the control module the window position must be initialized.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

The control module has previously registered an internal fault.
This may be because the child-proof button has been depressed for more than 10 seconds.
Fault-trace and erase the diagnostic trouble codes (DTCs). Switch the ignition on and off and read off diagnostic trouble codes (DTCs) again.
If the diagnostic trouble code (DTC) is not still stored, the fault is due to the above.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that operation button for external rear-view mirror selector has been activated for more than 60 seconds, diagnostic trouble code DDM-0040 is displayed.

Substitute value
- Nothing.

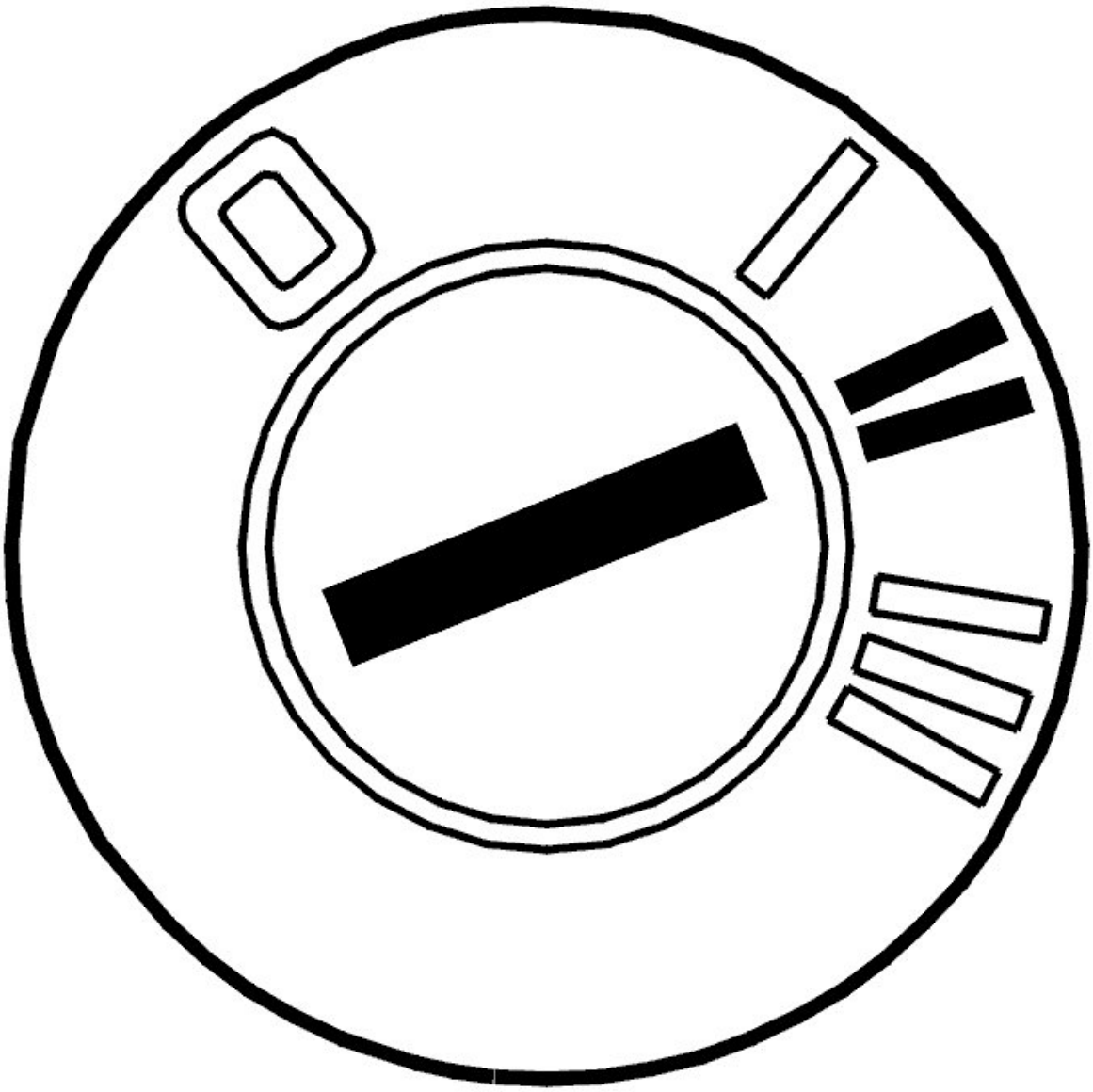
Possible source
- Operation button for external rear-view mirror selector has stuck.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

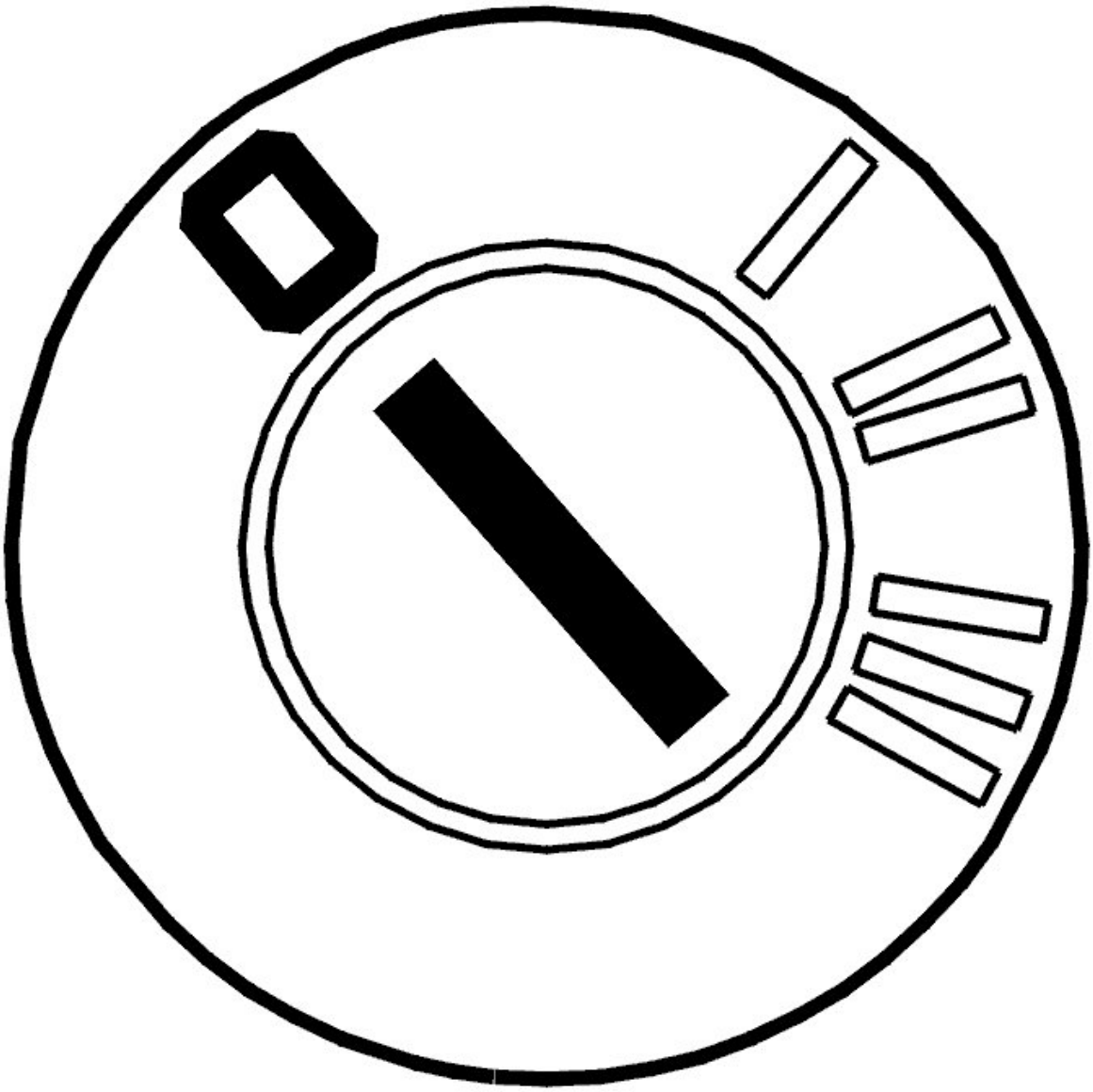
Select one door mirror and maneuver it.
Now select the other door mirror and try to maneuver it.

Can both the door mirrors be operated?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - **DONE**

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - **Attempt New Test**

No - **Fault Found**

FAULT FOUND - **Fault Found**

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM-0045 is stored if the control module registers that there is a short-circuit to ground in the signal supply to the mirror lamps, connected to the driver's door module, at the same time as the control module has requested the door mirror lamp to light.

Substitute value
- None.

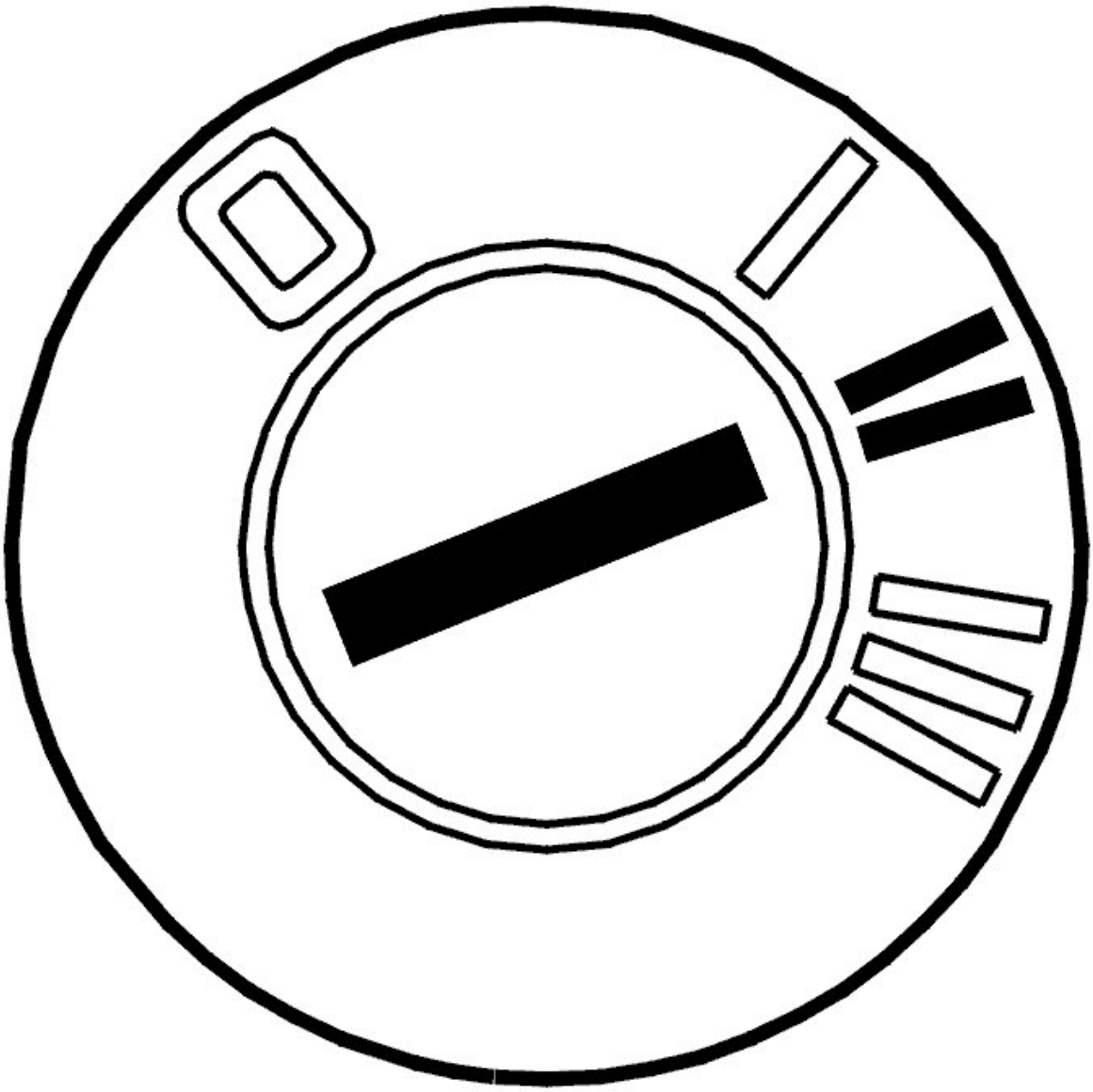
Possible source
- Signal cable to the door mirror lamp, connected to driver's door module, short circuited to ground.

Fault symptom[s]
- Local lighting is not operating.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Check if the lamp in the power door mirror lights up and goes out.

Is the lamp in the power door mirror working?

Yes - Intermittent fault

No - Checking for short-circuits to ground

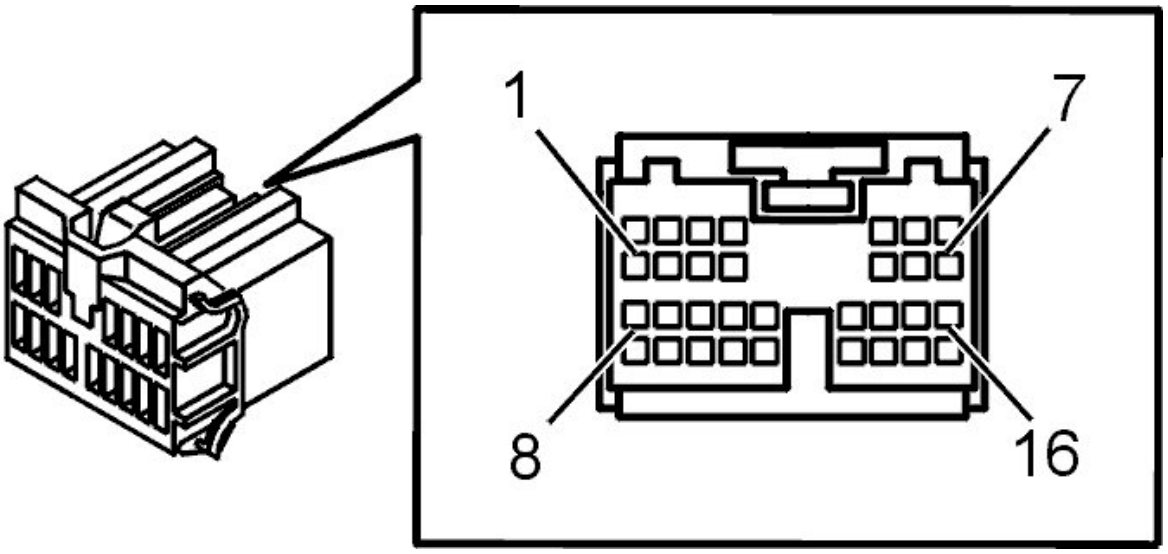
Checking for short-circuits to ground

Check the cable between control module terminal #8B and power door mirror terminal #13. Check for a short-circuit to ground.
Check the ground lead between the control module terminal #10B and the power door mirror terminal #6.
Replace the cable if a fault is found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Were any faults found in the cable?

Yes - Verification

No - Replacing the component

Replacing the component

Check the bulb holder. Check for a short-circuit.
Remedy as necessary.
If no malfunction is found: Replace the bulb.

Other information

- Bulb ground lighting door mirror, replacing See: Lighting and Horns/Courtesy Lamp/Courtesy Lamp Bulb/Service and Repair/Bulb, Ground Lighting, Door Mirror, Replacing

Select Continue.

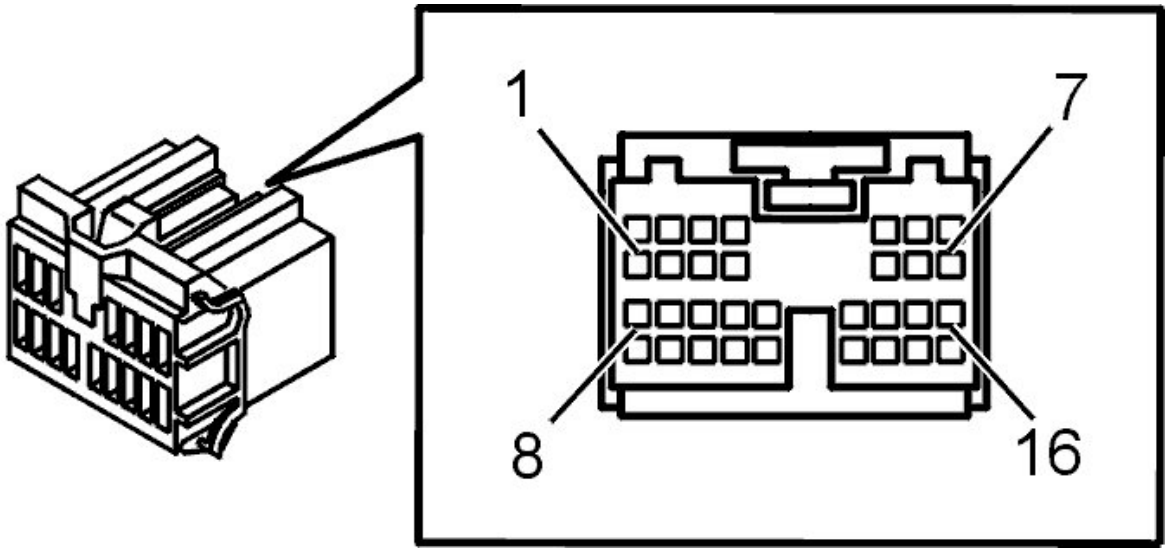
Continue - Verification

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between control module terminal #8B and power door mirror terminal #13. Check for an intermittent short-circuit to ground.
Check for an intermittent open-circuit.
Check the ground lead between the control module terminal #10B and the power door mirror terminal #6.
Check the bulb holder and bulb if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Bulb ground lighting door mirror, replacing See: Lighting and Horns/Courtesy Lamp/Courtesy Lamp Bulb/Service and Repair/Bulb, Ground Lighting, Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

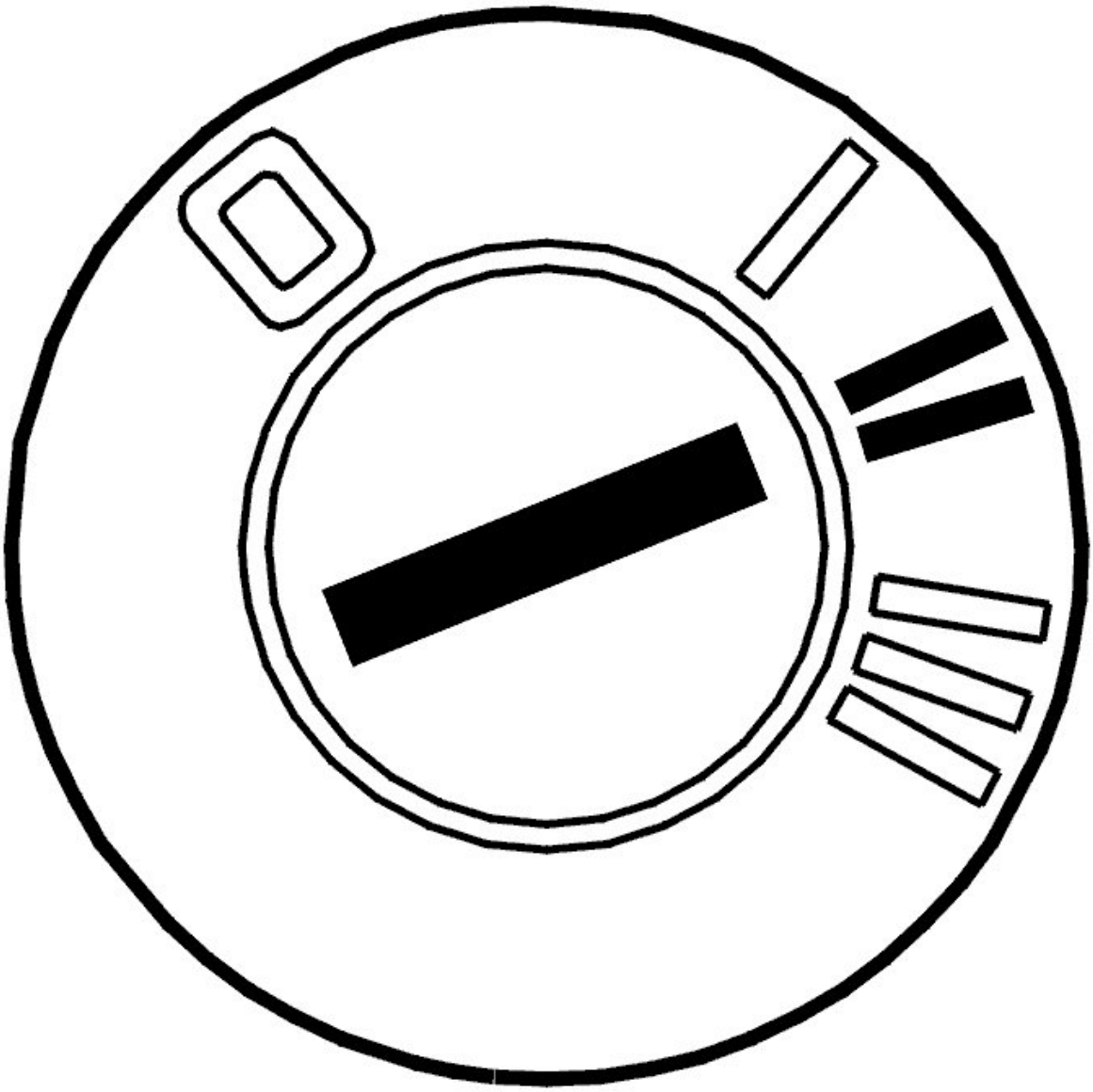
Continue - Fault-tracing information

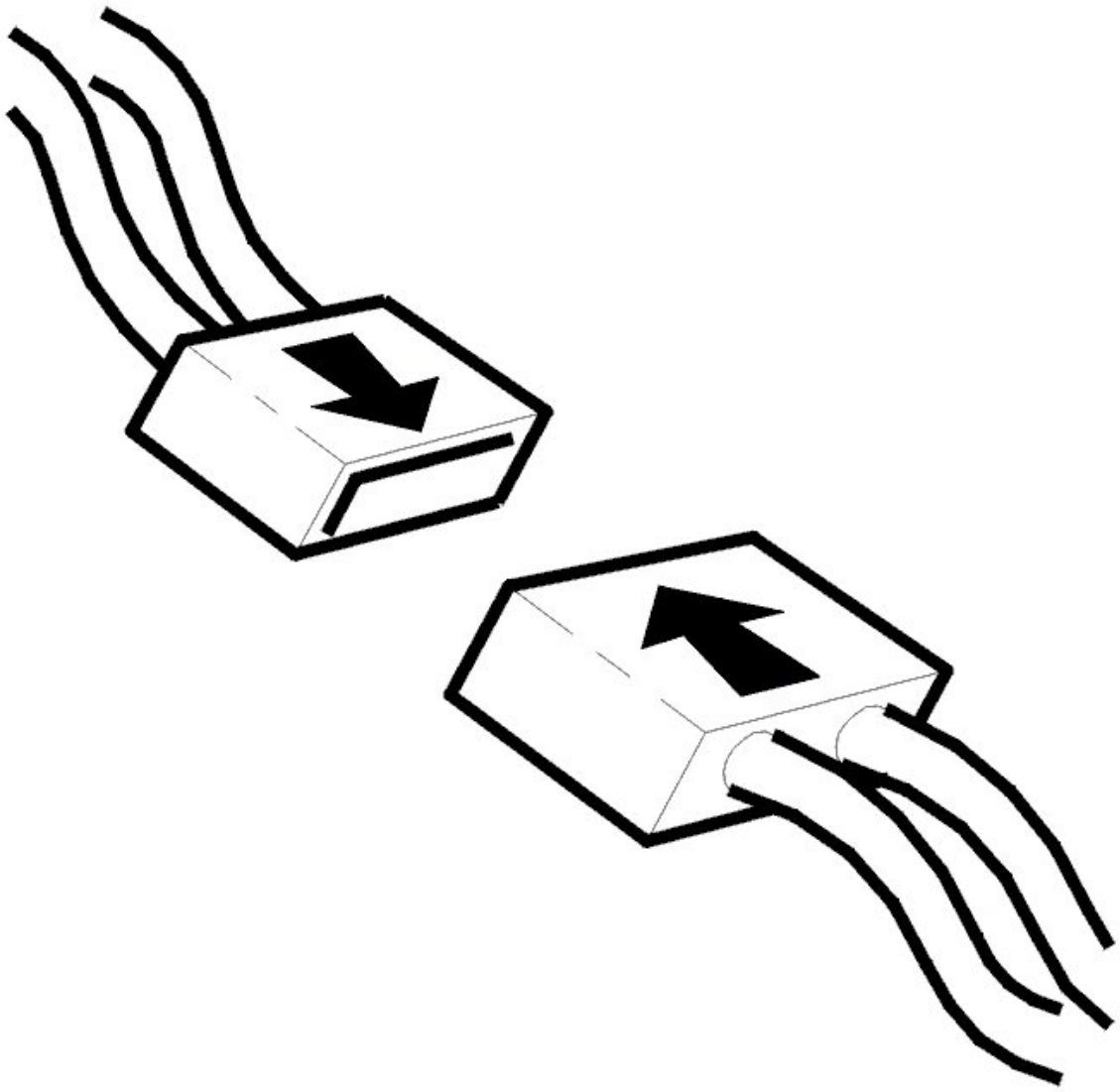
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check if the lamp in the power door mirror lights.

Does the lamp in the power door mirror light?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DDM-0049

Condition

Diagnostic trouble code (DTC) DDM-0049 is stored if the control module registers that a signal has not been updated within the set period.

Substitute value
- The control module "Limp Home" program has been initiated.

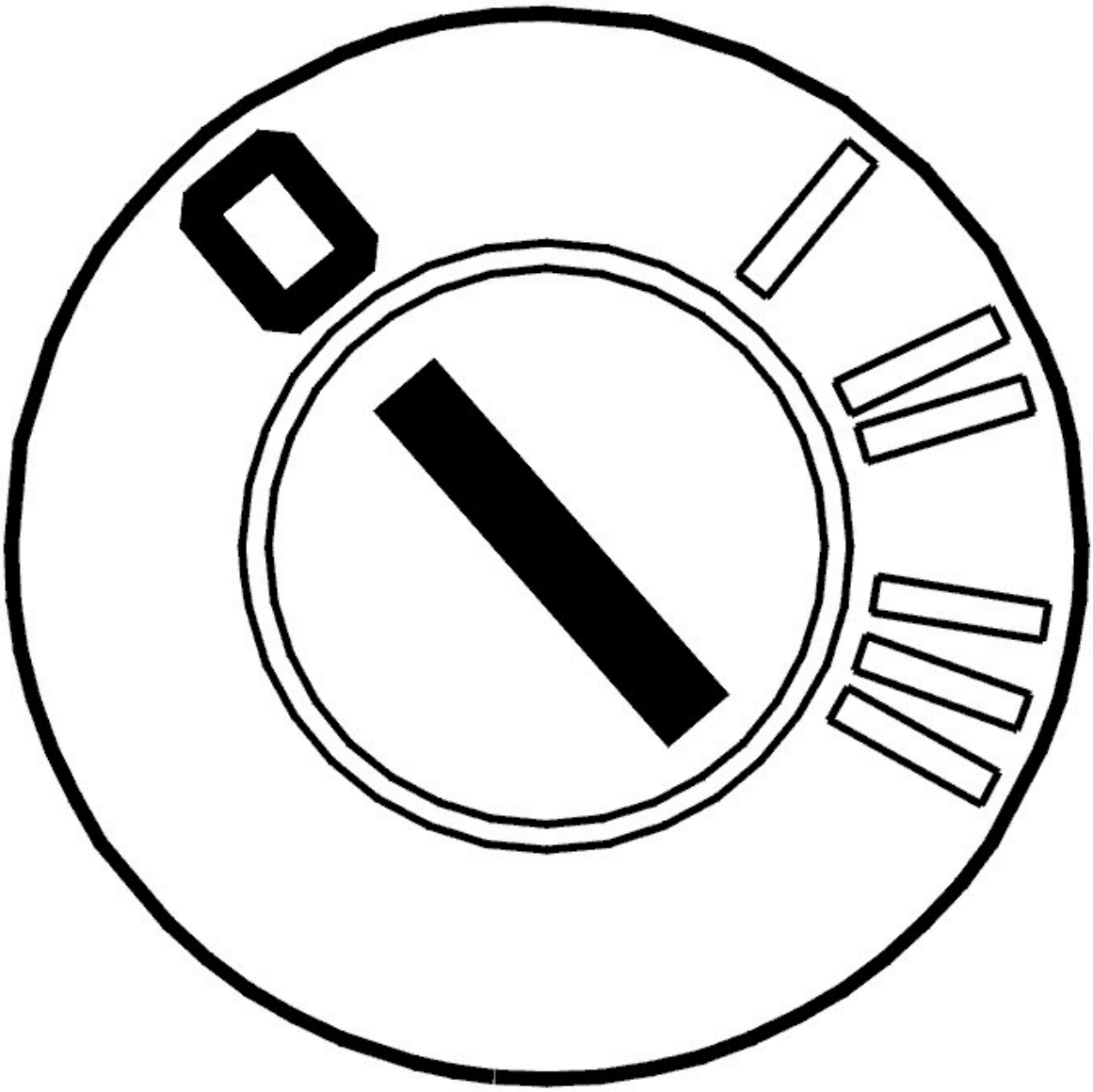
Possible source
- Internal fault.

Fault symptom[s]
- The power window mechanism does not operate
- Door mirror control does not function.

Internal Fault

Internal fault

Replacing the component



- Ignition off.

The driver door module (DDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

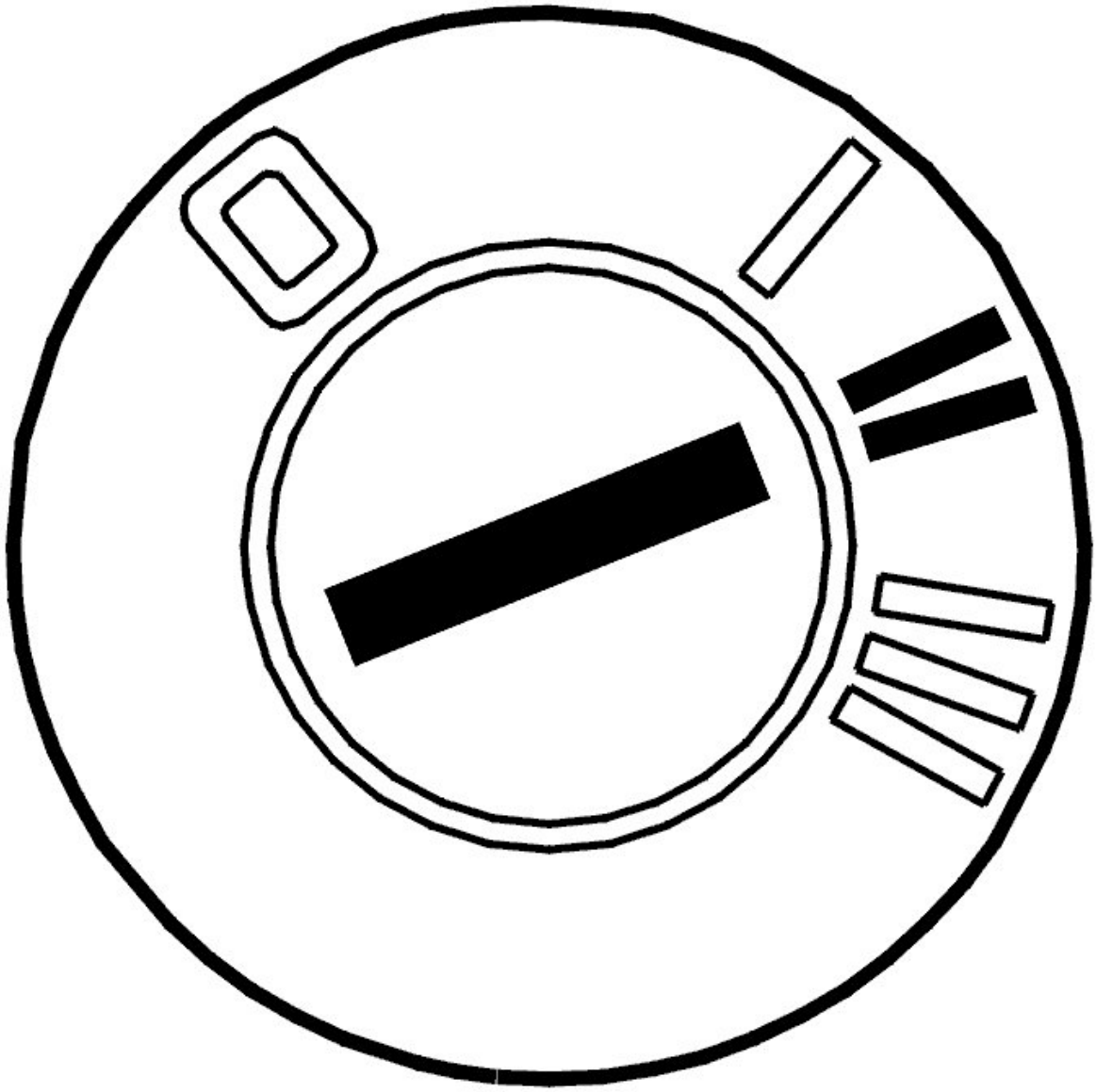
- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

Continue - Fault Found

DDM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DDM/PDM-E010

Condition

The diagnostic trouble code (DTC) is generated if the voltage to the driver door/passenger door module (DDM/PDM) differs from the voltage to the central electronic module (CEM) by more than 2 V.
The driver door/passenger door module (DDM/PDM) receives information on voltage to the central electronic module (CEM) via the CAN network.

The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Substitute value
- None.

Possible source
- Cable short-circuited to ground.
- Open-circuit on cable.
- Contact resistance.
- Half-blown fuse to driver door/passenger door module (DDM/PDM).

Fault symptom[s]
- Driver door/passenger door switch panel not working.

Internal Fault

Internal fault

Checking the power supply
- Ignition off
- Unplug connector B to the driver door/passenger door module (DDM/PDM).
- Ignition on.

Check the power supply to the driver door/passenger door module (DDM/PDM) by:
- Measuring the voltage between #B12 (#26) and #B5 (#19) on control module connector B.
- Measuring battery voltage.

If the difference between the control module supply voltage and battery voltage is greater than 2 V, the fault is in the supply cable or is due to contact resistance.
Also check the fuse of the driver door/passenger door module (DDM/PDM). A half-blown fuse can cause intermittent faults.
If the difference is less than 2 V, there could be an internal fault in the door control module.
Remedy as necessary.

Other information:
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Driver Door Module (DDM) / Passenger Door Module (PDM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

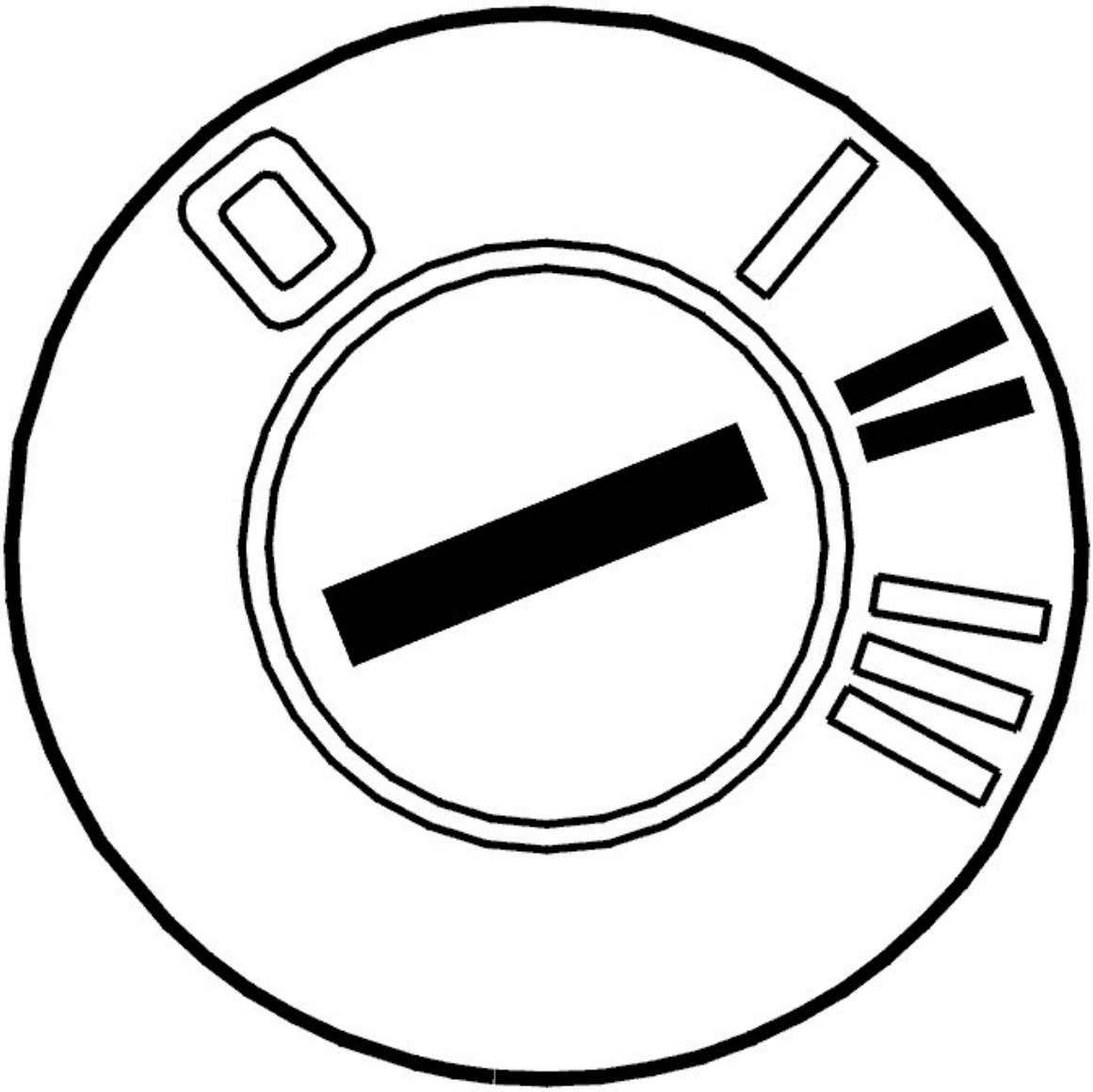
Continue - Verification

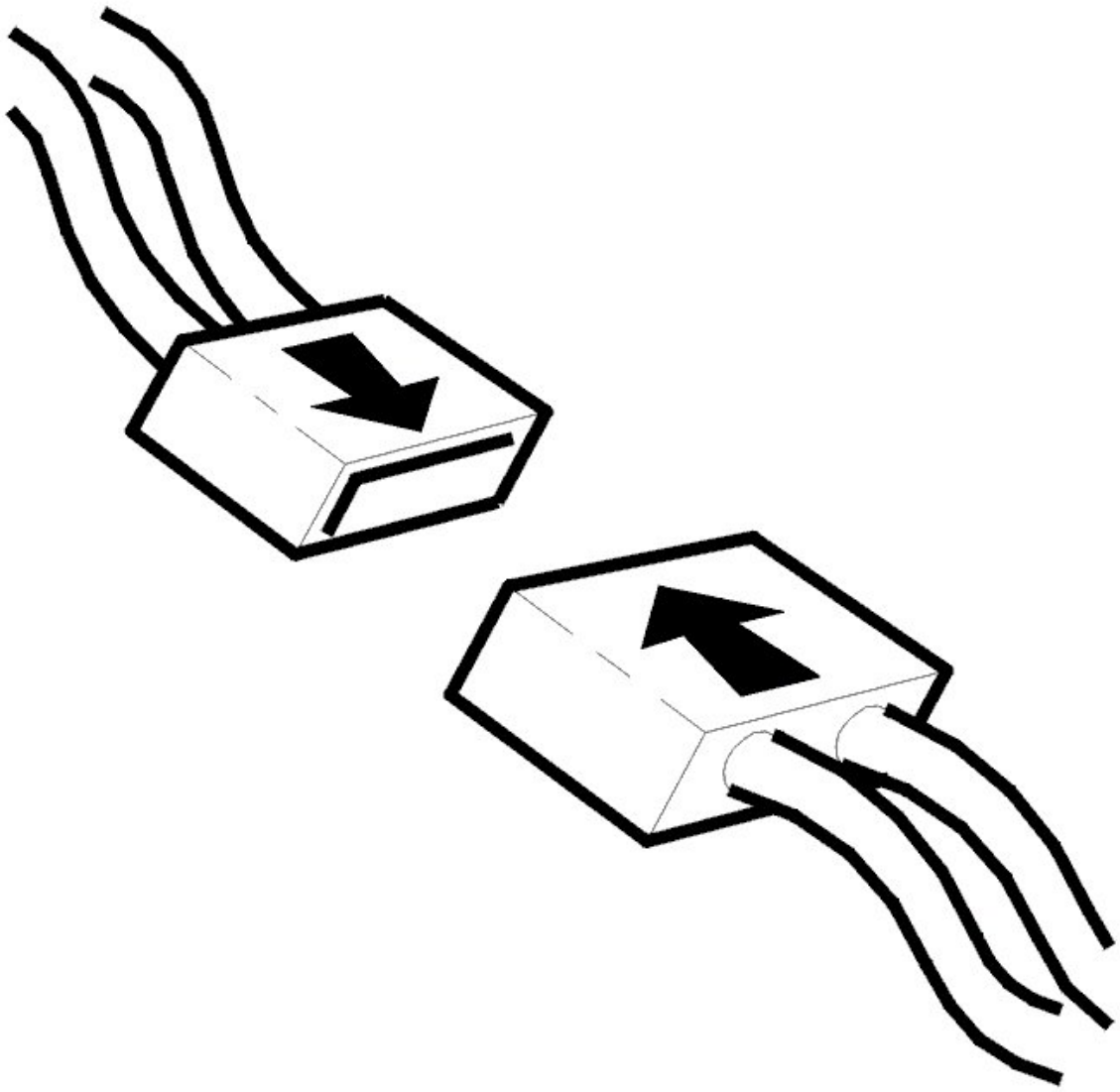
Verification

Verification mixed

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the power window mechanism, door mirrors and central locking operate.

Do all the functions operate normally?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault tracing information

Fault tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking the power supply

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0001 is stored if the transmission control module (TCM) registers that the signal cable M+ or signal cable M- is too high.
Diagnostic Trouble Code (DTC) DDM/PDM-0001 can be diagnosed at terminal 15.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the M+ or M- signal cables.

Fault symptom[s]
- The power window mechanism does not operate.

Signal Too High

Signal too high

Checking components and wiring

Check signal cable M+ between door control module connector terminal #B4 and central locking motor connector terminal #3. Check for a short-circuit to supply voltage.
Check signal cable M- between door control module connector terminal #B3 and central locking motor connector terminal #6. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:
- To fault-trace wiring and terminals see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- For information about signals, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For information about power window mechanisms, see Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing.

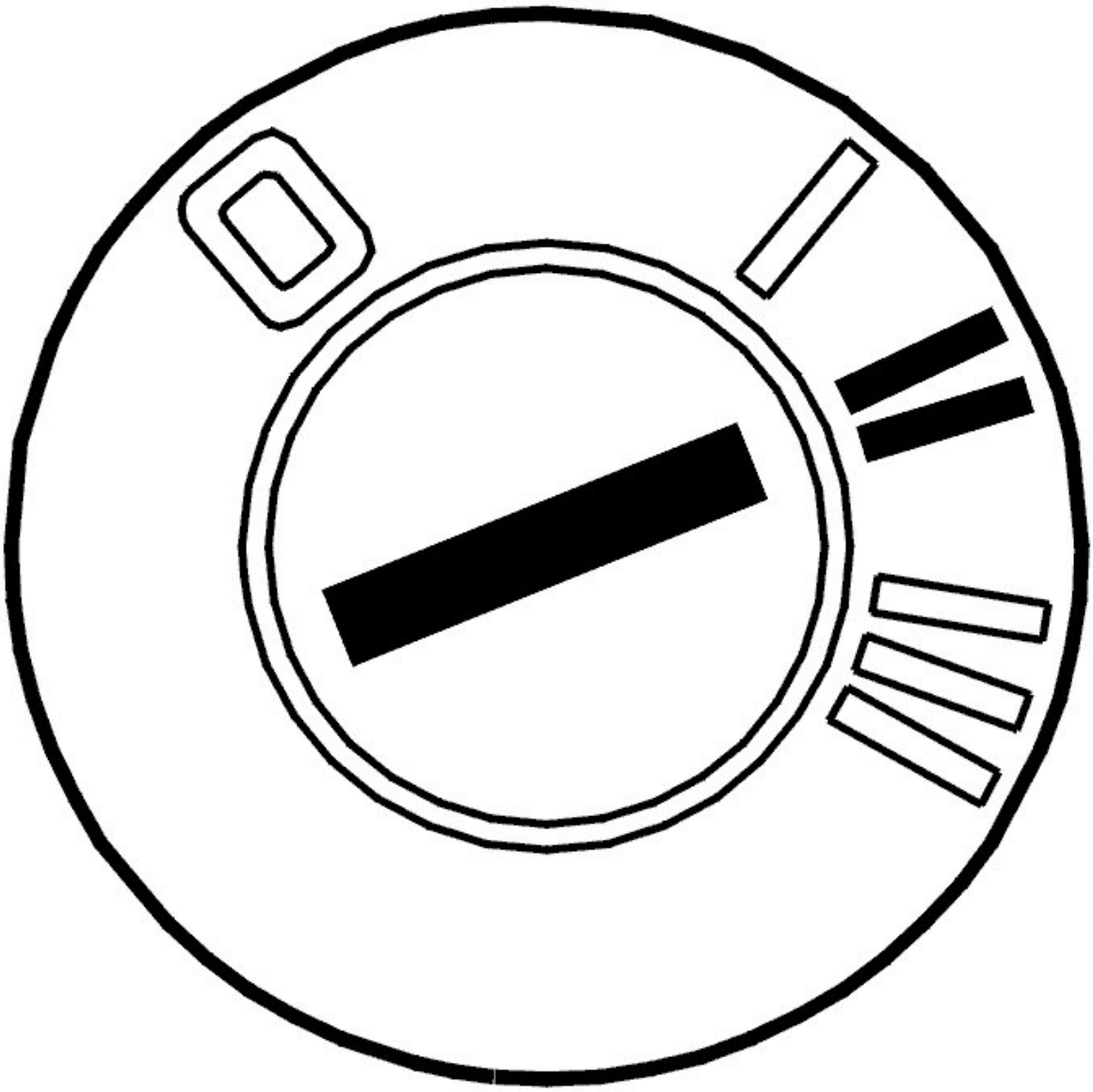
Continue - Verification

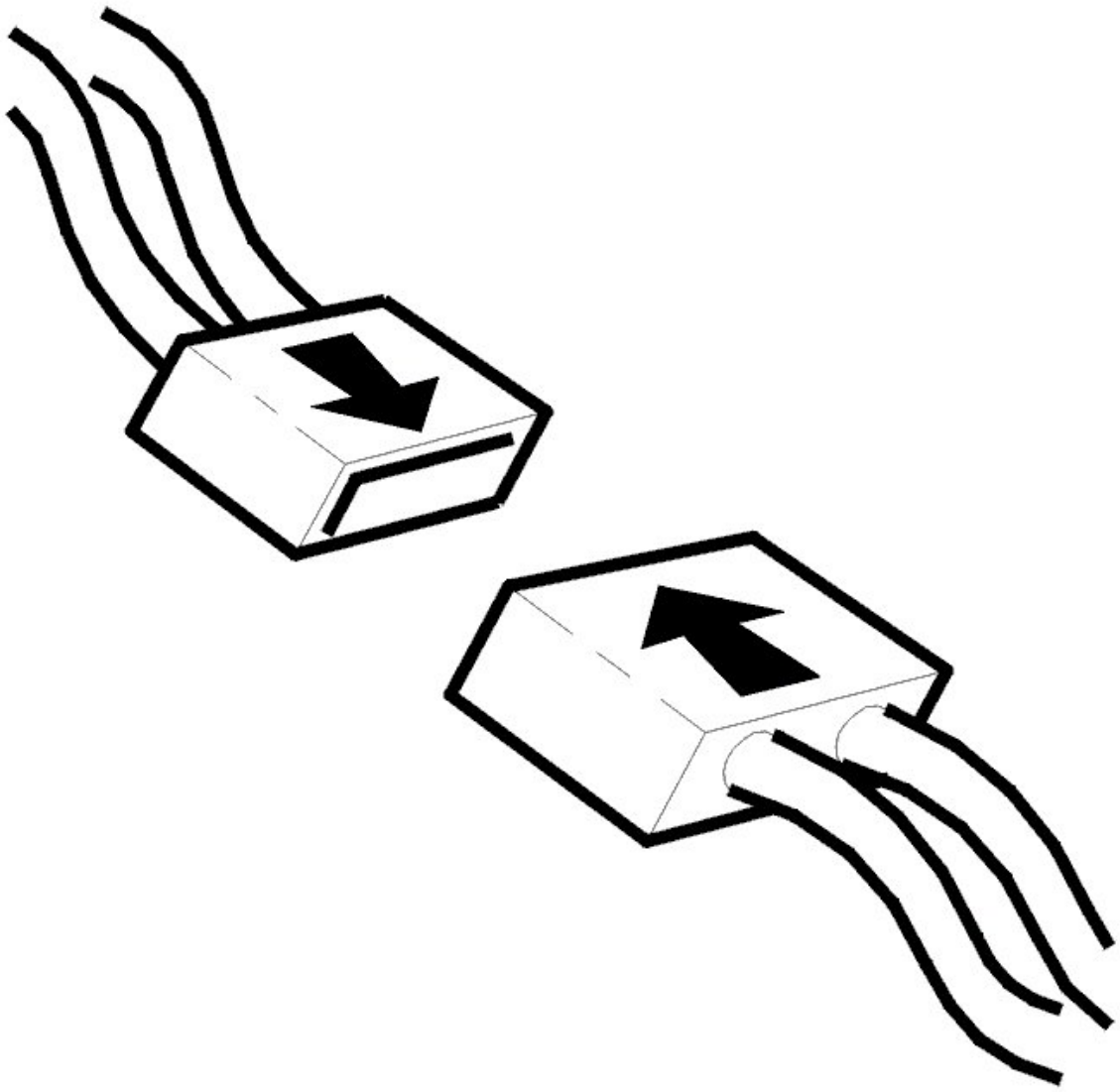
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that window operates by raising/lowering window to its end stops.

Does window operate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that a signal wire for a movement is short circuited to voltage supply when none of the external rear-view mirror motors are active, diagnostic trouble code DDM/PDM-002A is displayed.

Substitute value
- Nothing.

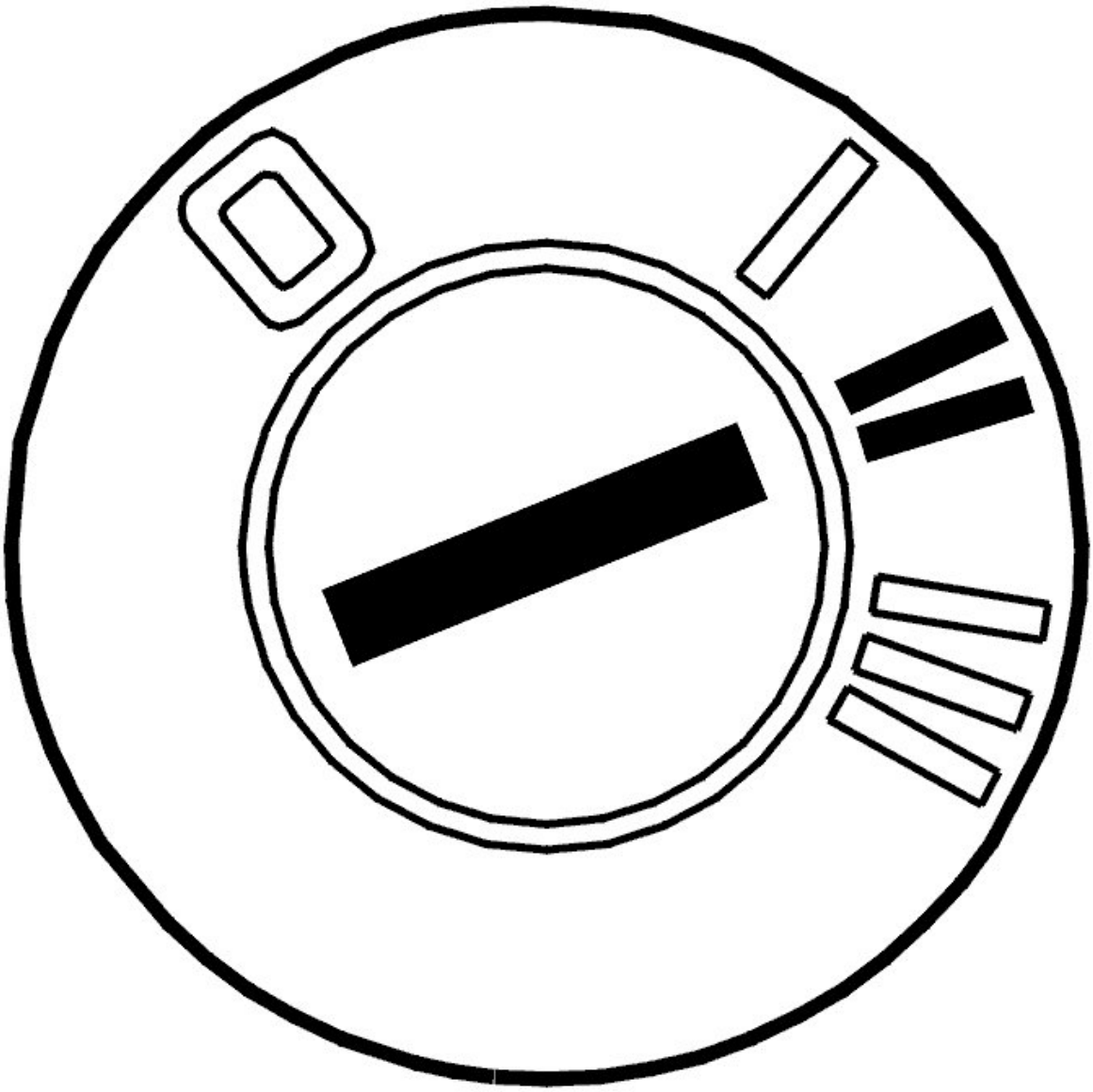
Possible source
- Signal wire MC+ short circuited to voltage supply.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors. Move the door mirrors to their limit position.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

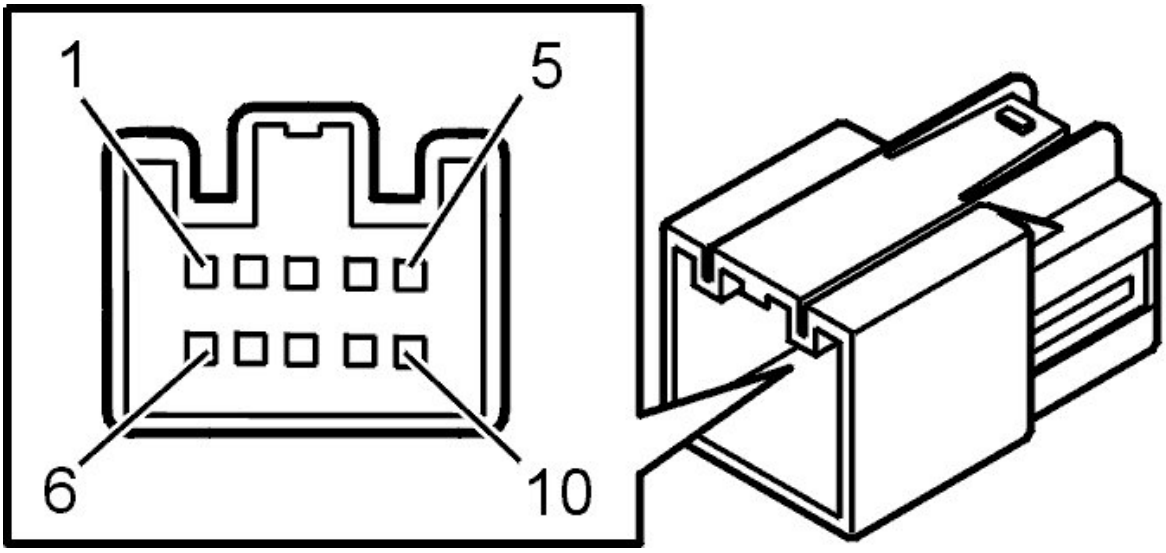
No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between door control module terminal #27A and power door mirror terminal #7 (both 10 and 16-pin connectors). Check for a short-circuit to supply voltage.
Remedy as necessary.
Try a new power door mirror if the cable is OK.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the connector for the power door mirror / replace the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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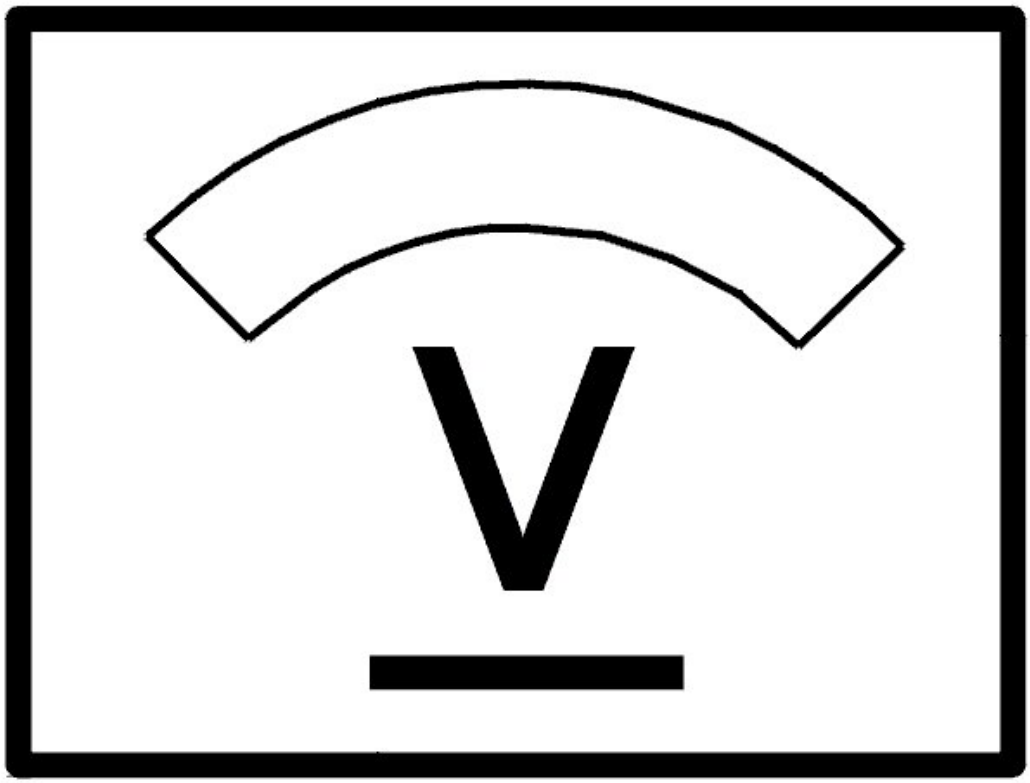
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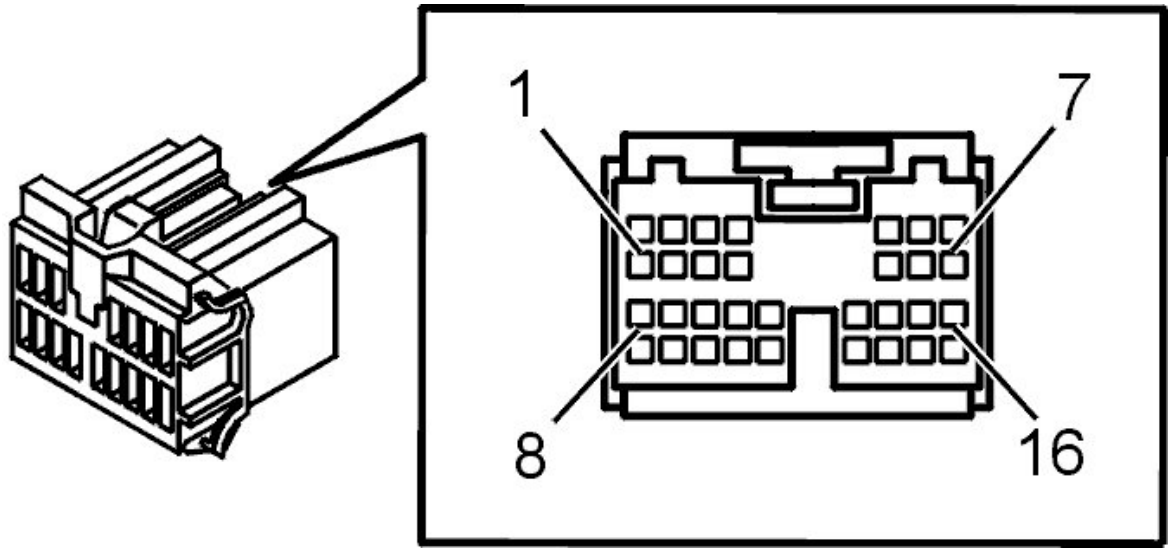

Continue - Verification

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance. Check for oxidation.
Check the cable between door control module terminal #27A and power door mirror terminal #7 (both 10 and 16-pin connectors). Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
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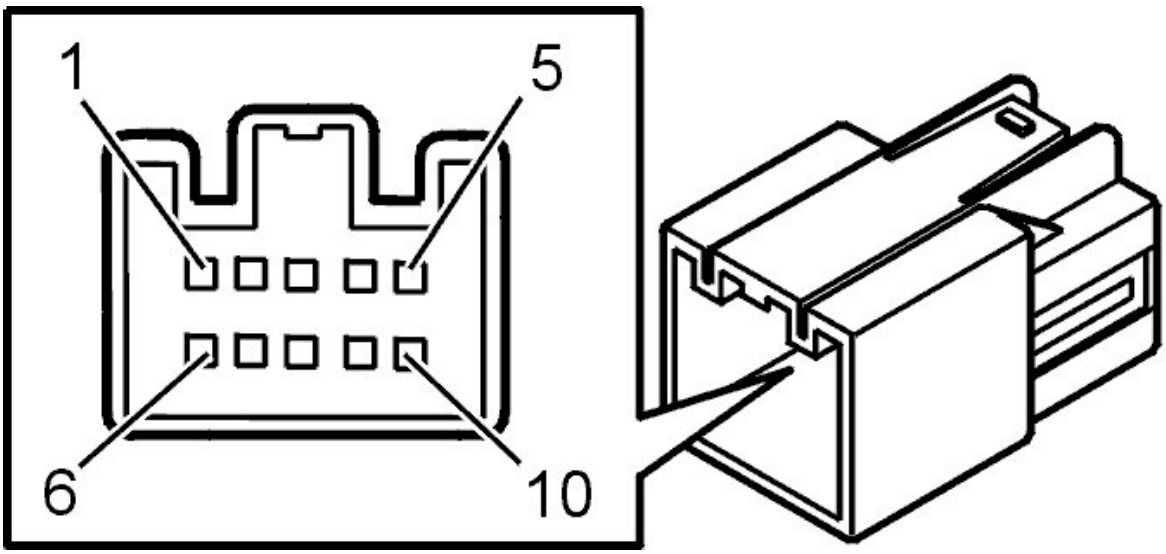
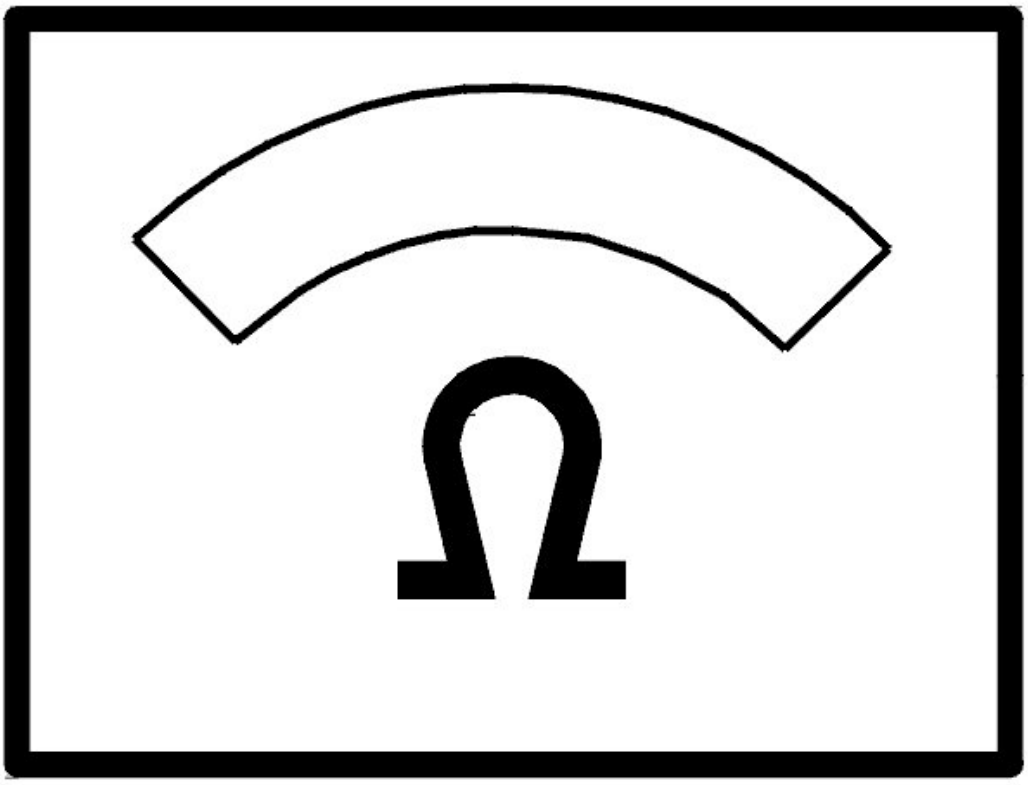
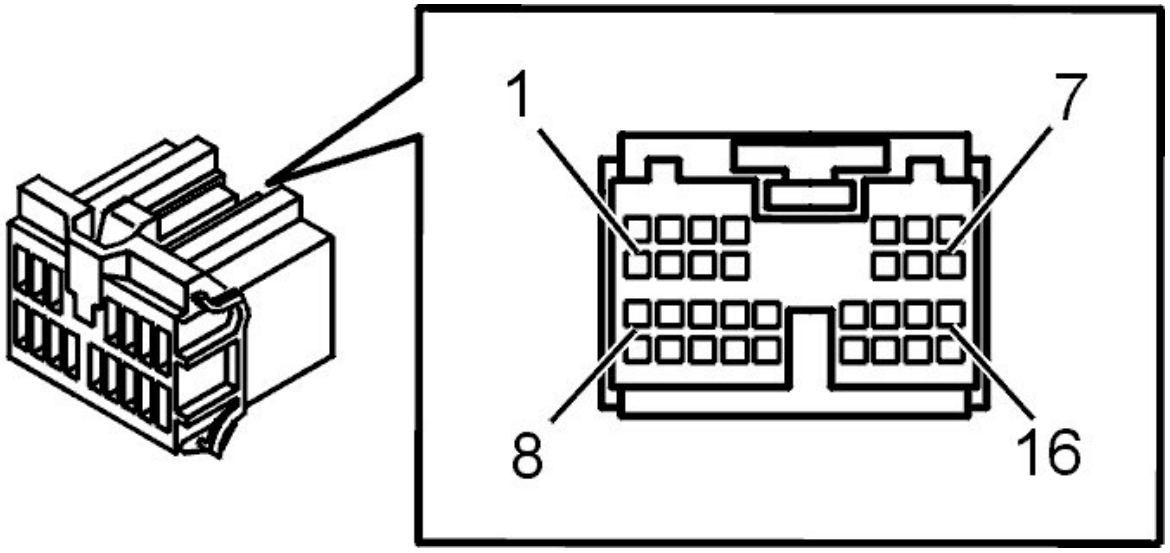
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair.







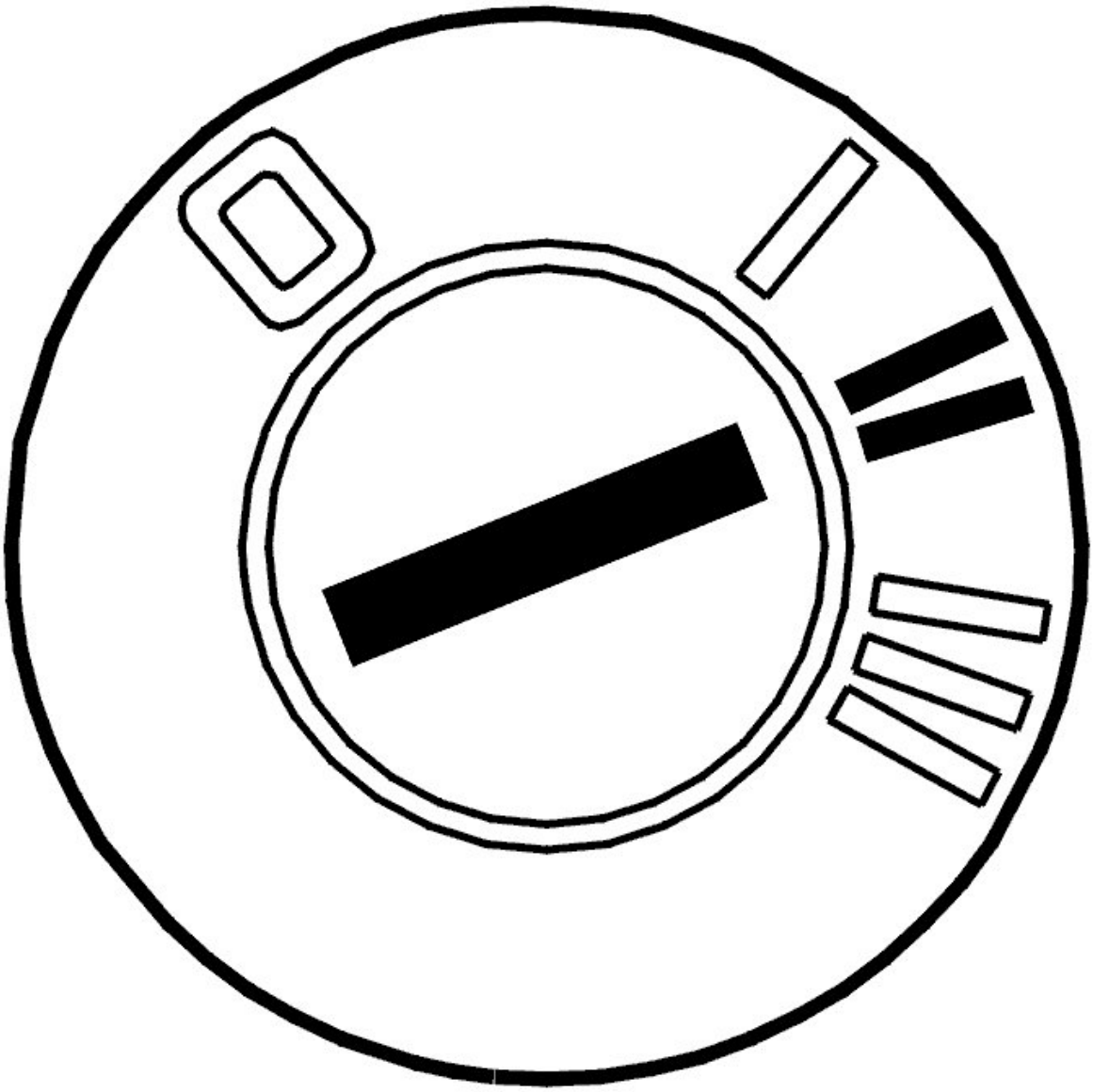
Continue - Fault-tracing information

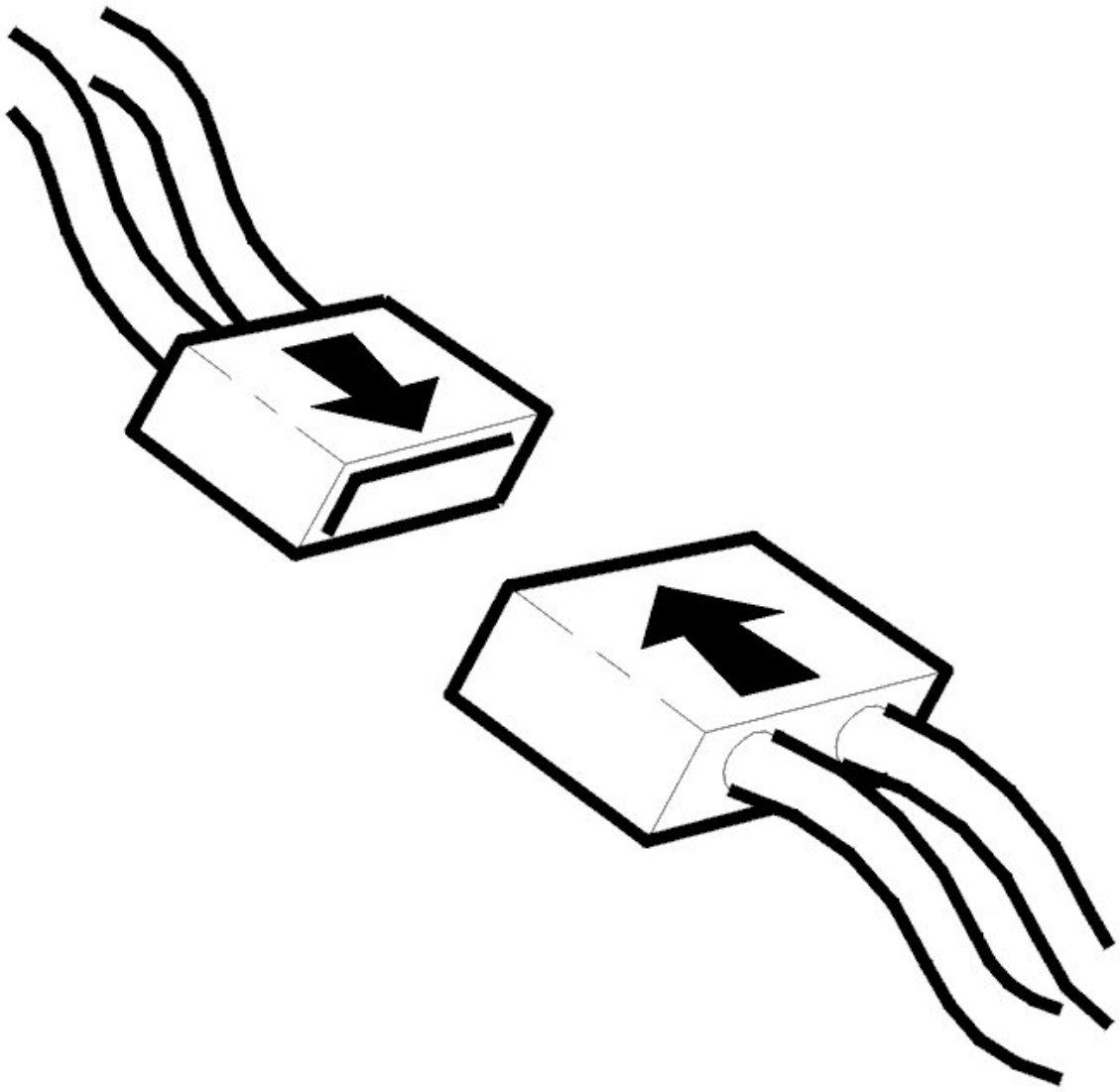
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition on.

Test the rear-view mirror for a few seconds; the mirror should move in opposite directions.

Does the mirror work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that a signal wire for a movement is short circuited to ground when only one of the external rear-view mirror motors is activated, diagnostic trouble code DDM/PDM-002B is displayed.

Substitute value
- Nothing.

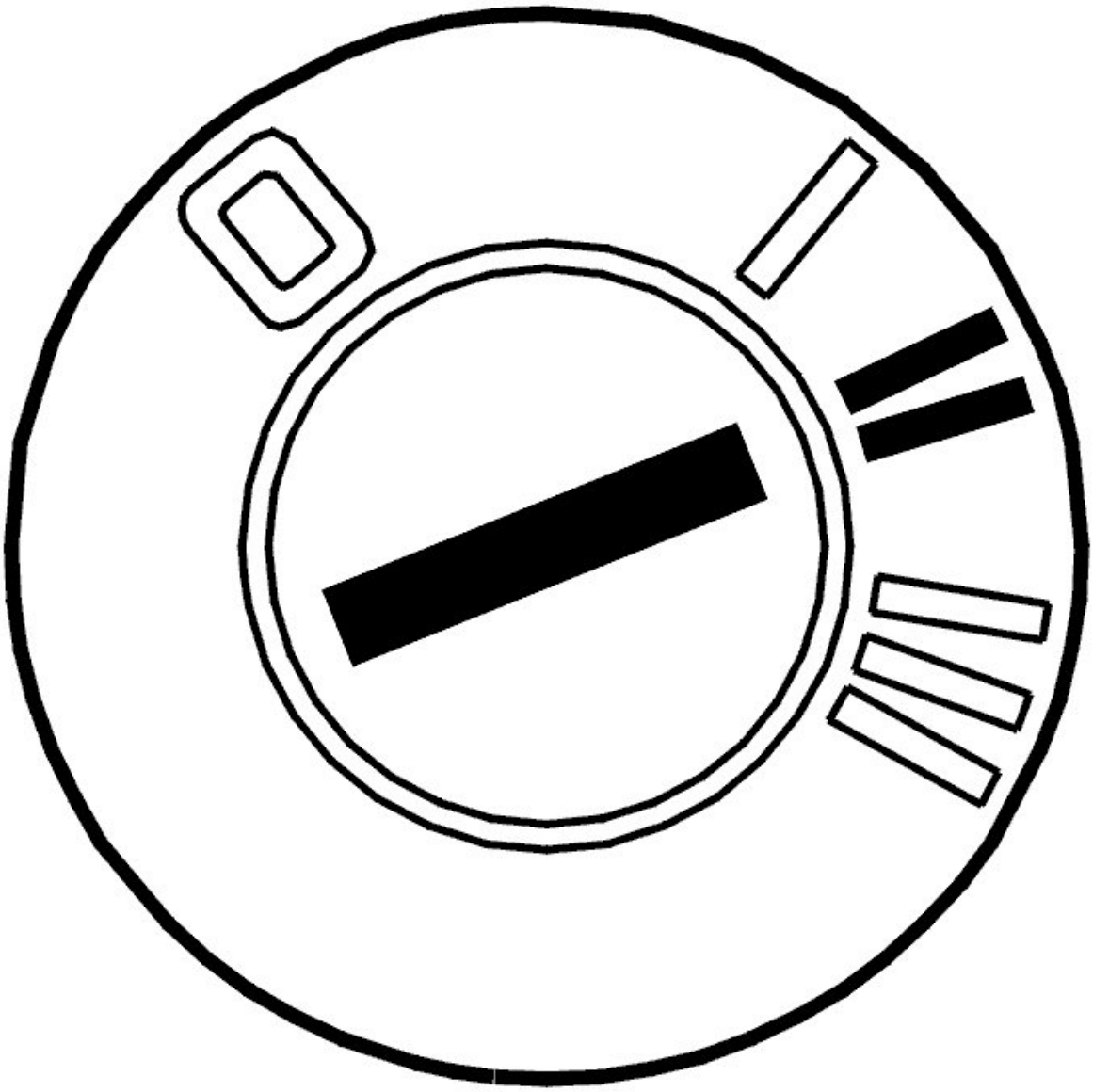
Possible source
- Signal wire MC+ short circuited to ground.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors. Move the door mirrors to their limit position.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

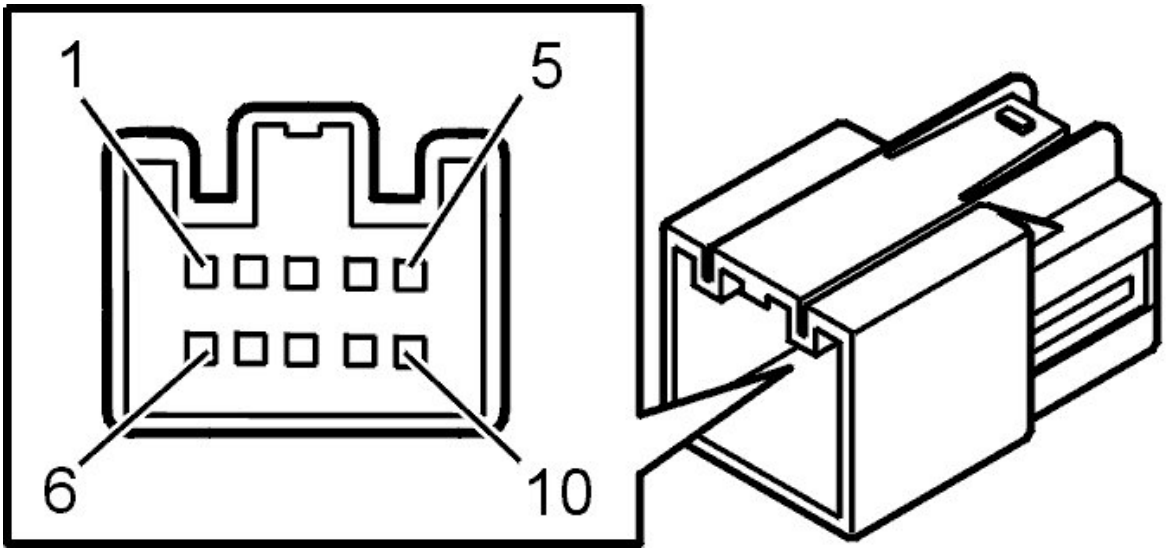
No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between door control module terminal #27A and power door mirror terminal #7 (both 10 and 16-pin connectors). Check for a short-circuit to ground.
Remedy as necessary.
Replace the cable if a fault is found.
Try a new power door mirror if the cable is OK.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the connector for the power door mirror / replace the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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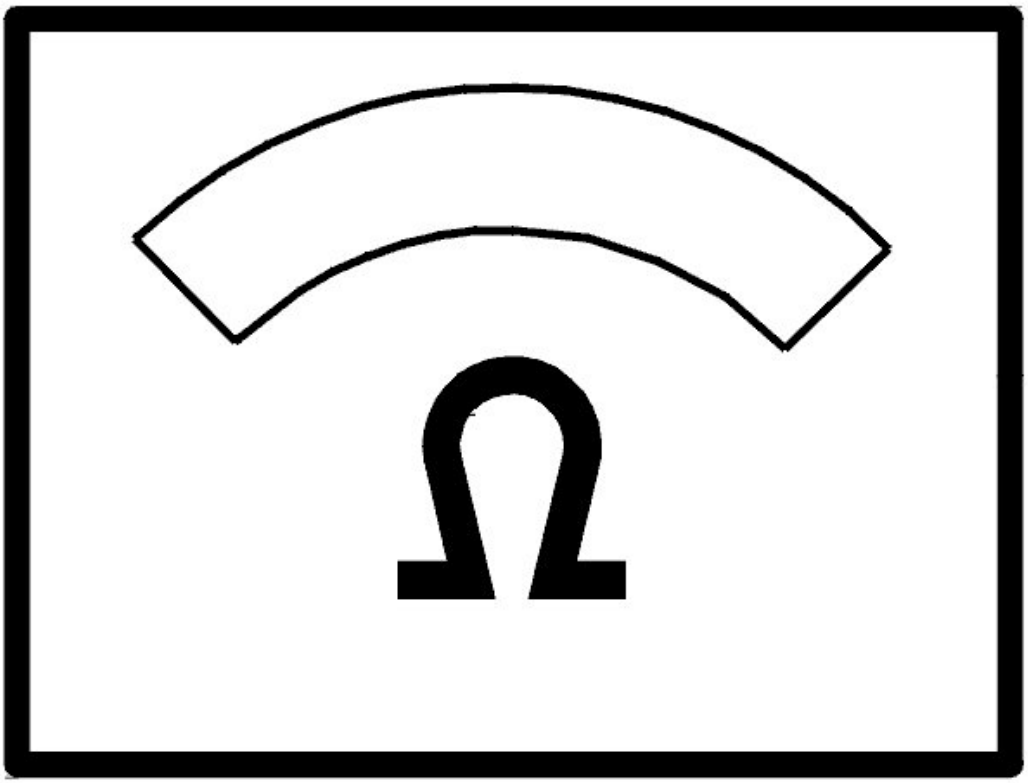
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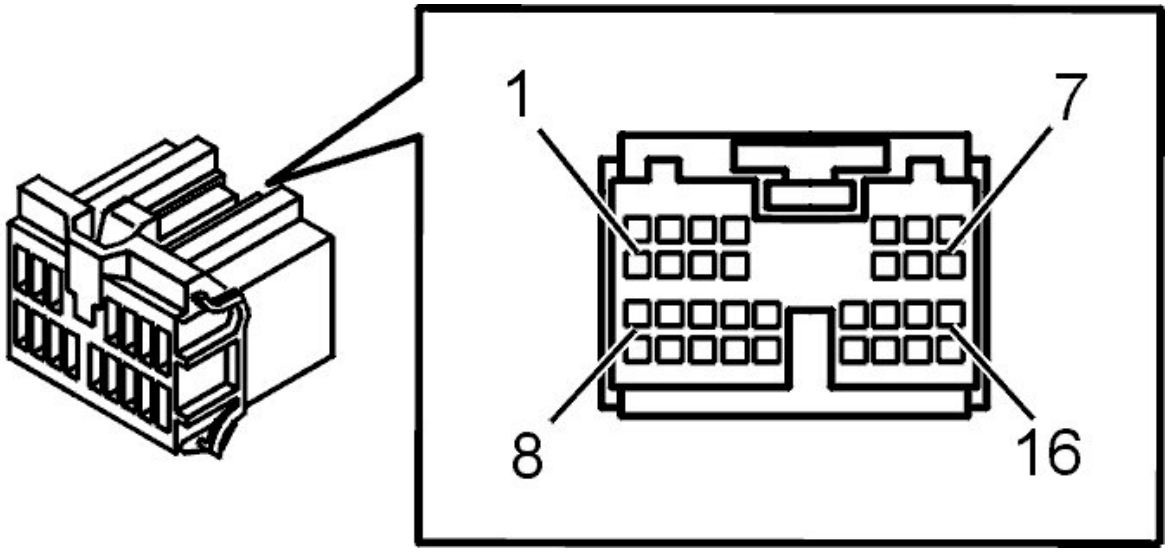


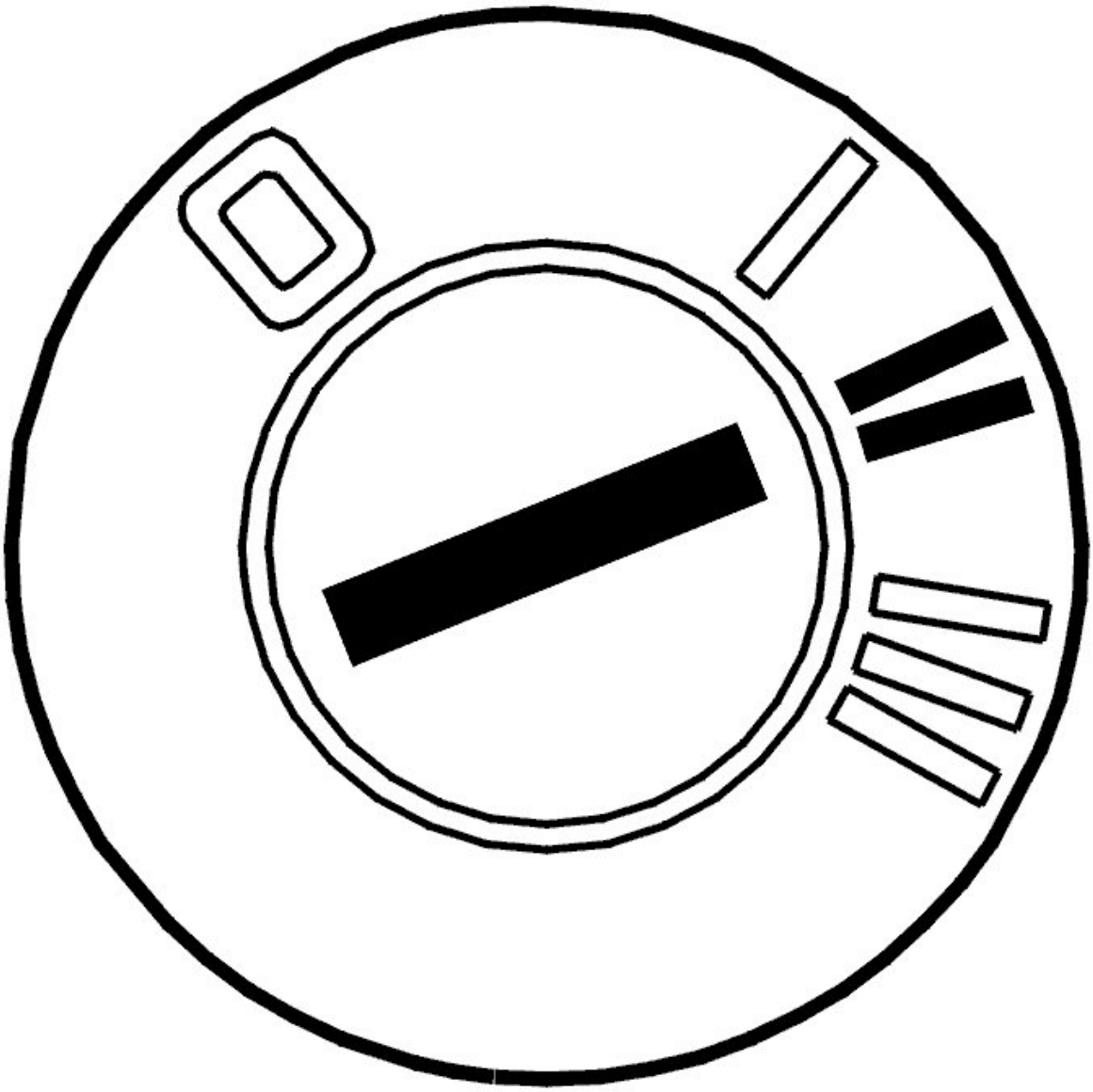
Continue - Verification

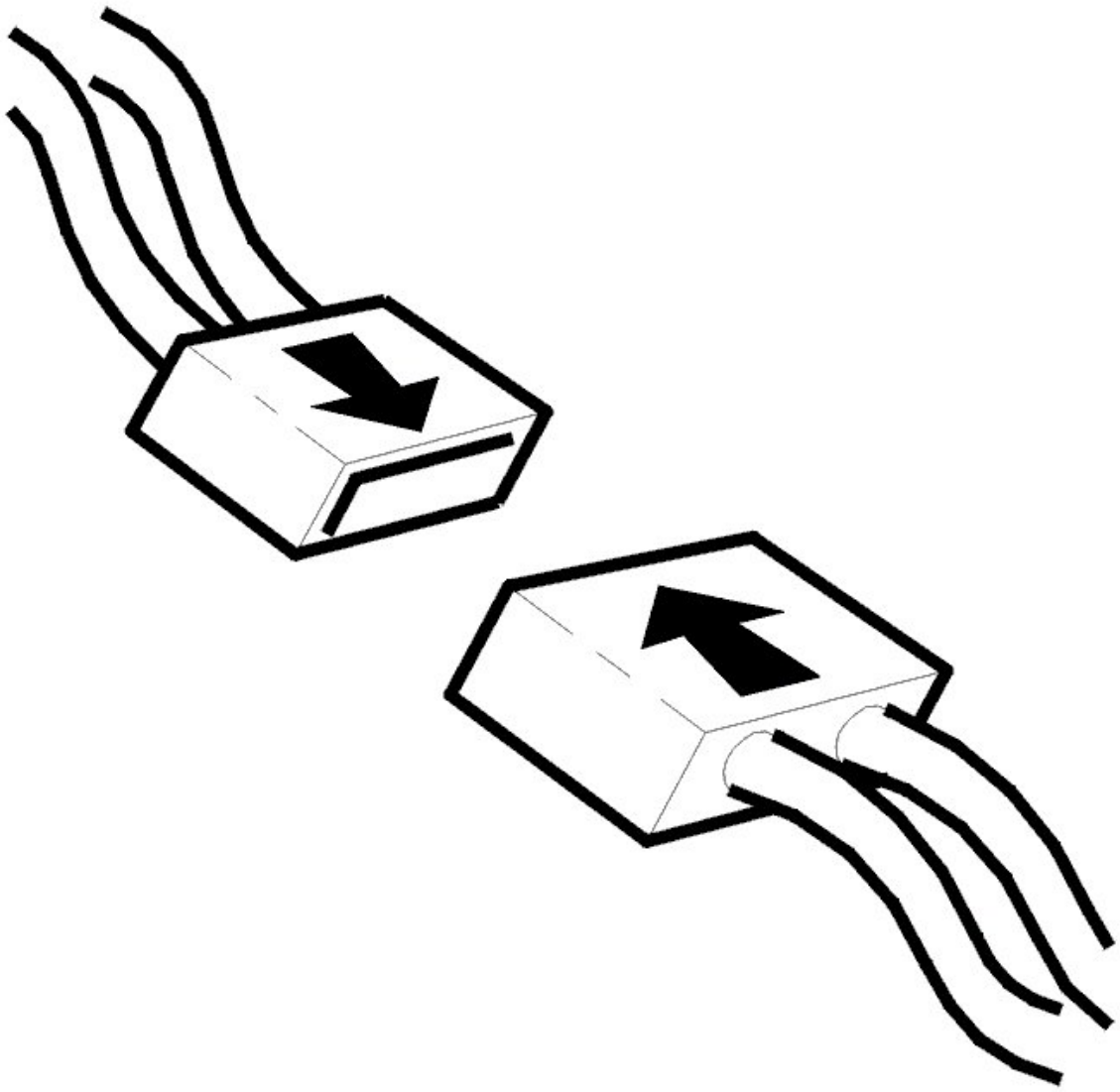
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition on.

Test the rear-view mirror for a few seconds; the mirror should move in opposite directions.

Does the mirror work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

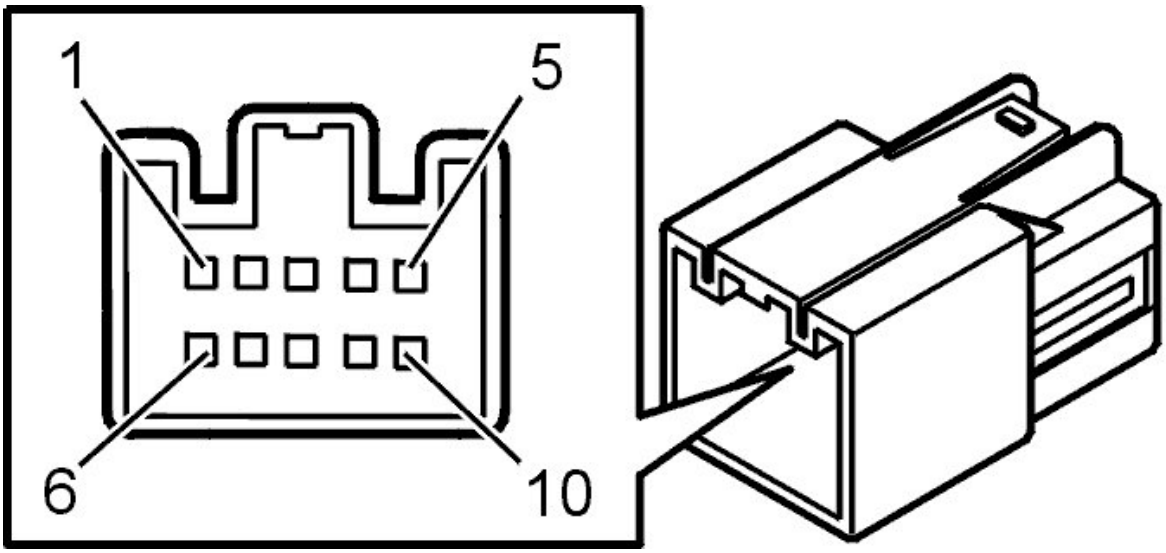
Intermittent fault

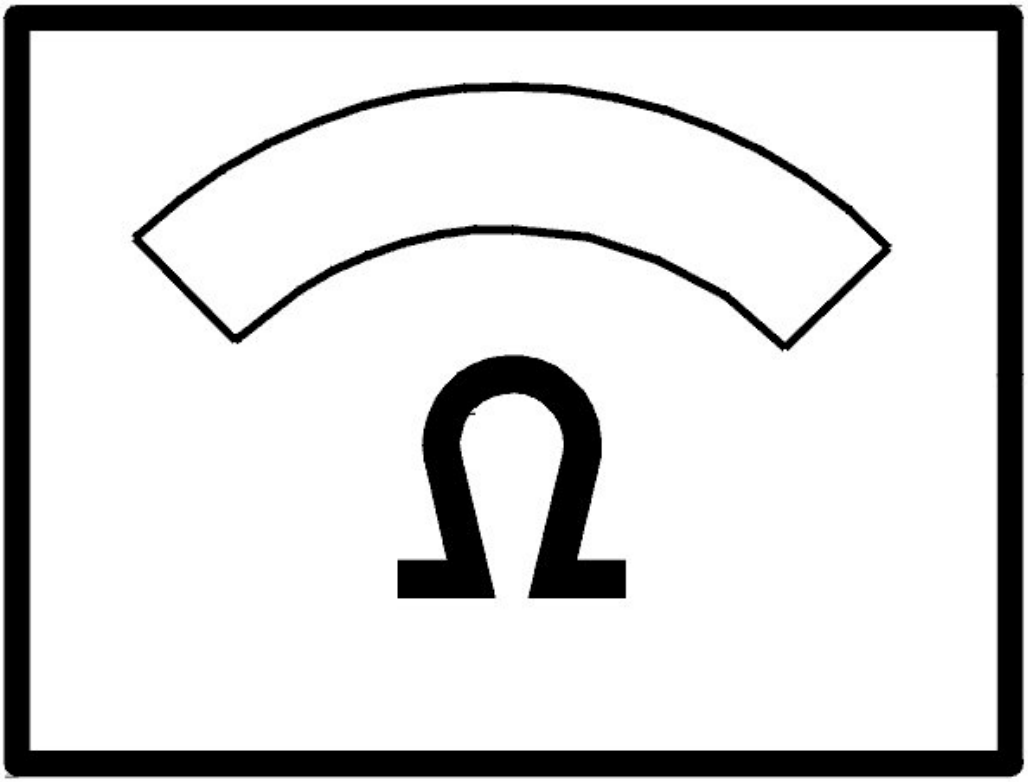
Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between door control module terminal #27A and power door mirror terminal #7 (both 10 and 16-pin connectors). Check for an intermittent short-circuit to ground.

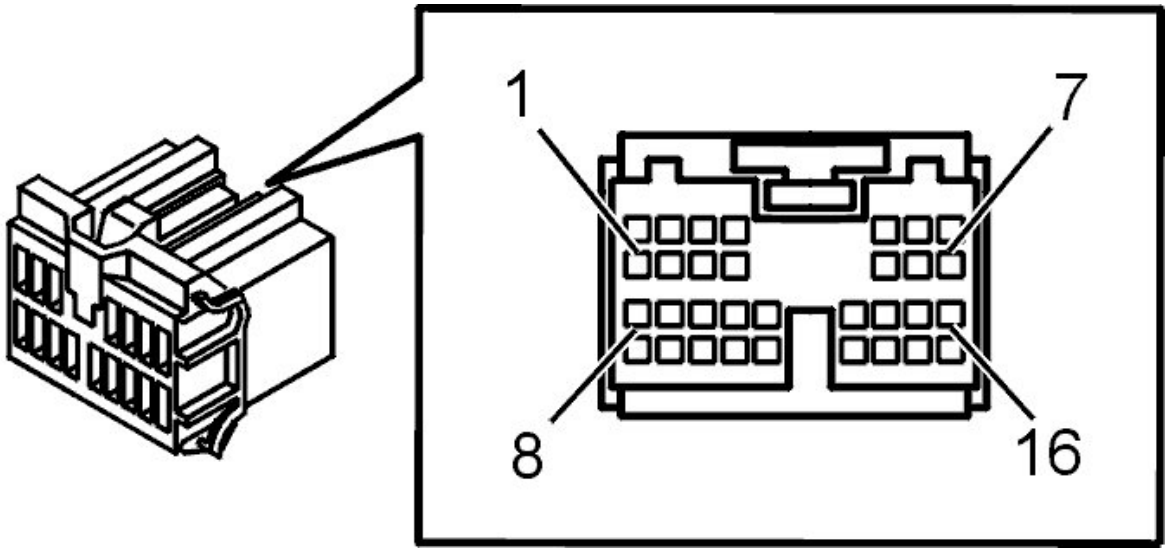
Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters

- To access the connector for the power door mirror / replace the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for external rear-view mirror defroster is short circuited to voltage supply when the function is inactive, diagnostic trouble code DDM/PDM-002C is displayed.

Substitute value
- Nothing.

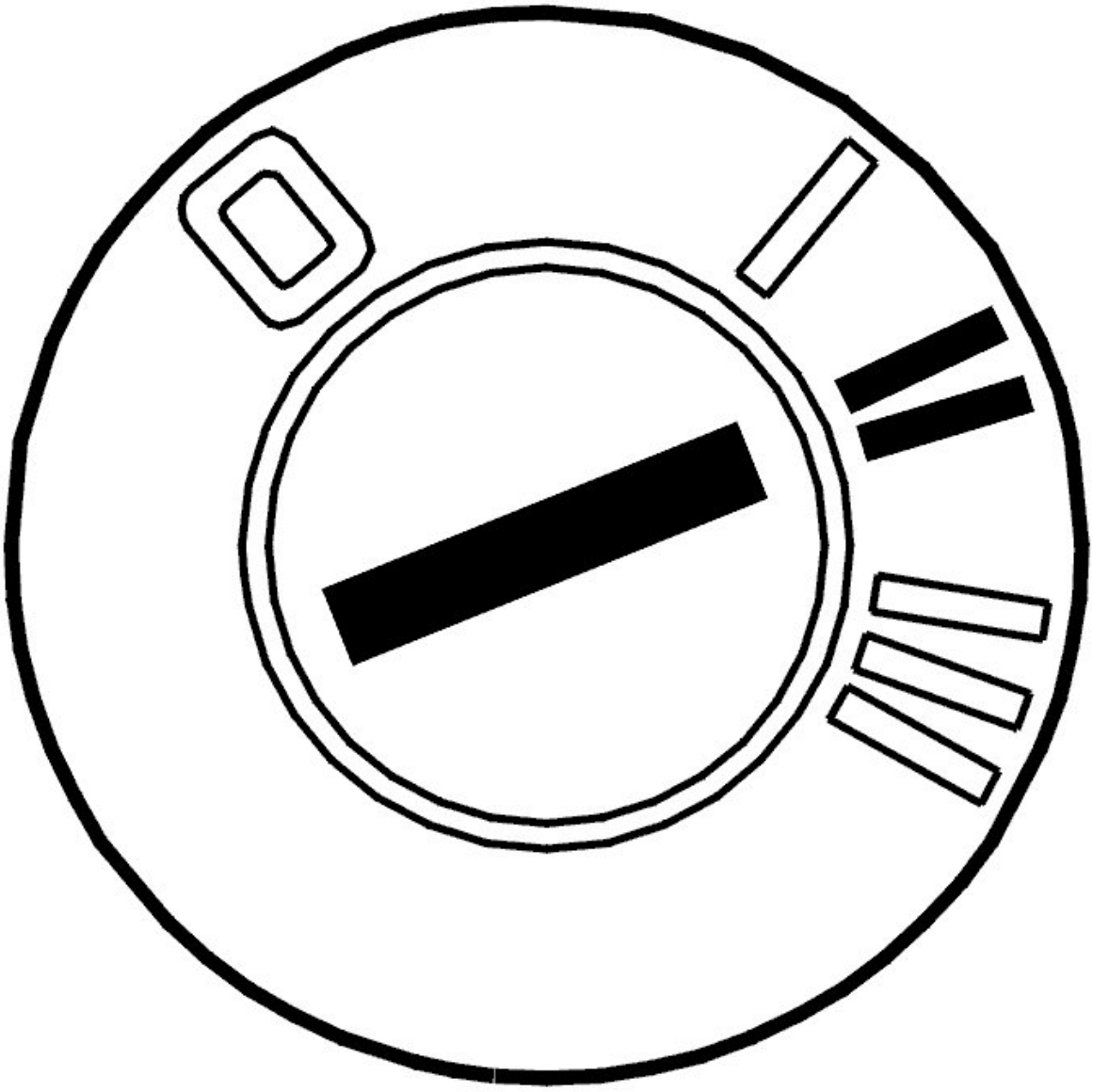
Possible source
- Signal wire to external rear-view mirror defroster short circuited to voltage supply.

Fault symptom[s]
- Engine does not start
- Starter motor does not work
- Mist on windows and/or external rear-view mirrors.

Signal Too High

Signal too high

Checking faults



- Ignition on.

Ensure that the button for the rear defroster is depressed.
Check that the defroster for the door mirrors is activated.

Is the defroster for the door mirror activated?

Yes - Checking for a short-circuit

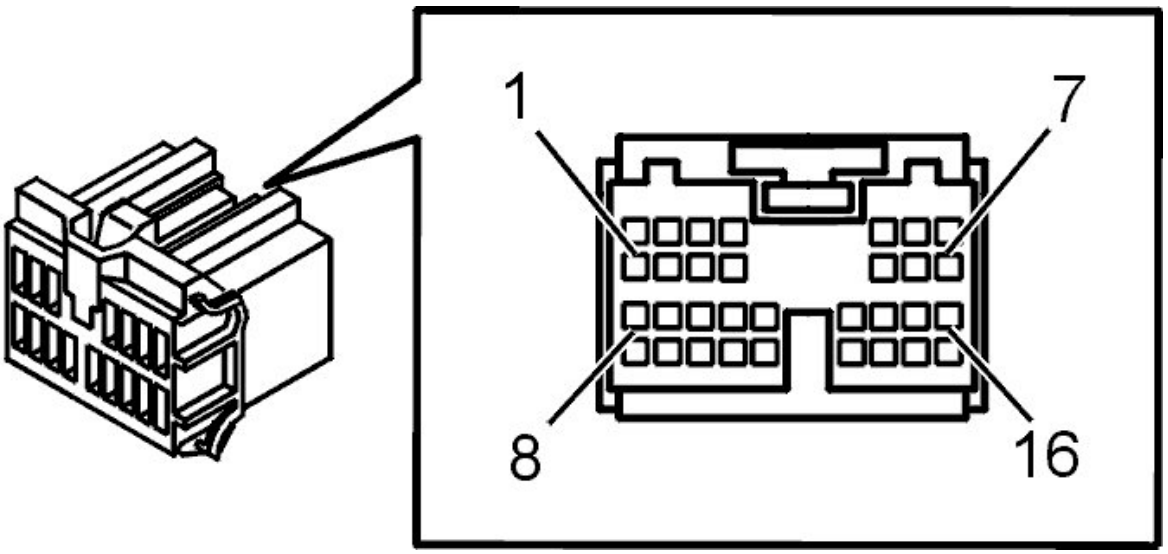
No - Intermittent fault

Checking for a short-circuit

Check the cable between door control module terminal #11B and power door mirror terminal #8. Check for a short-circuit to supply voltage.
Replace the cable if it is faulty.
Replace the power door mirror if the cable is OK.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



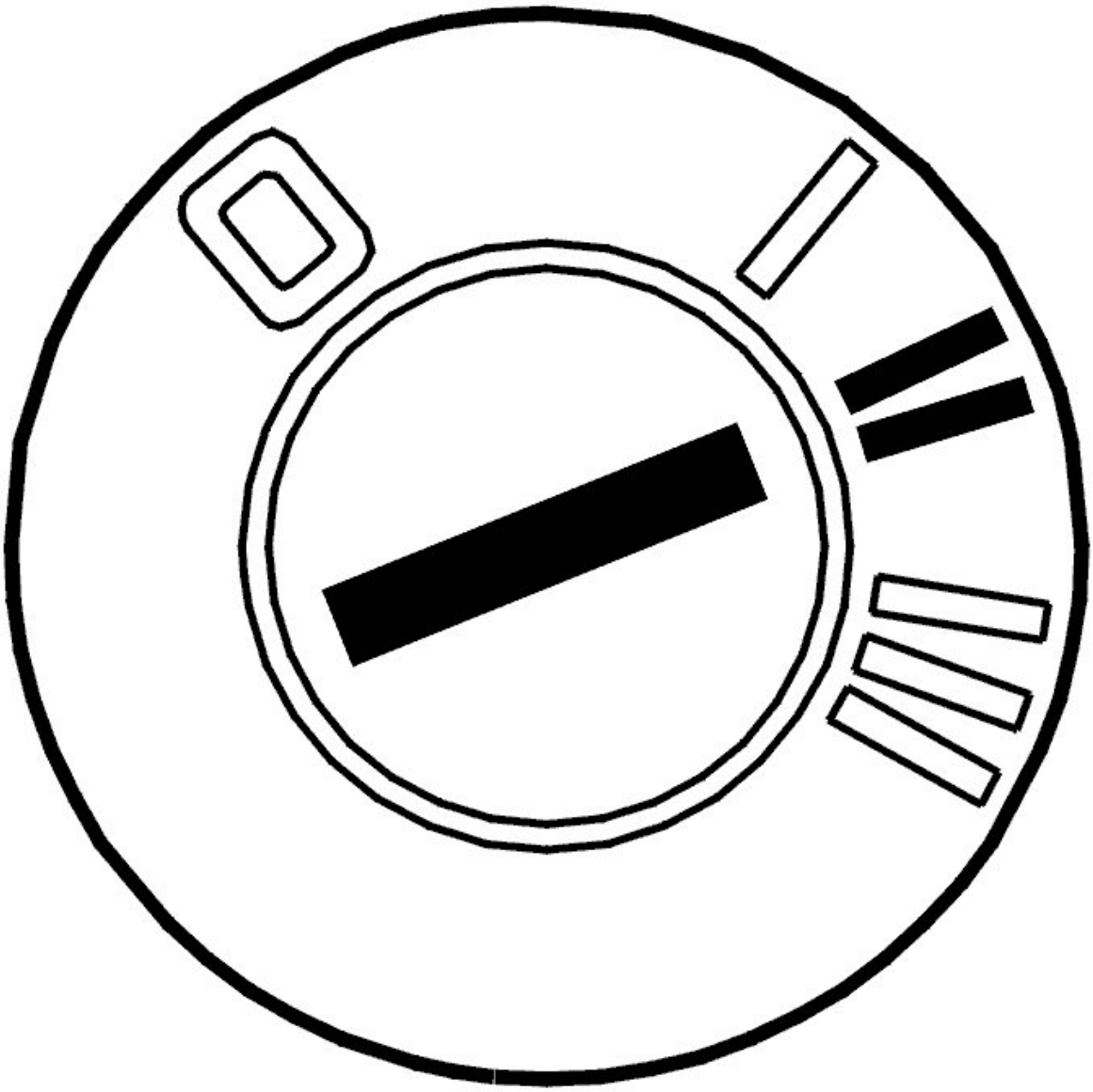
Continue - Verification

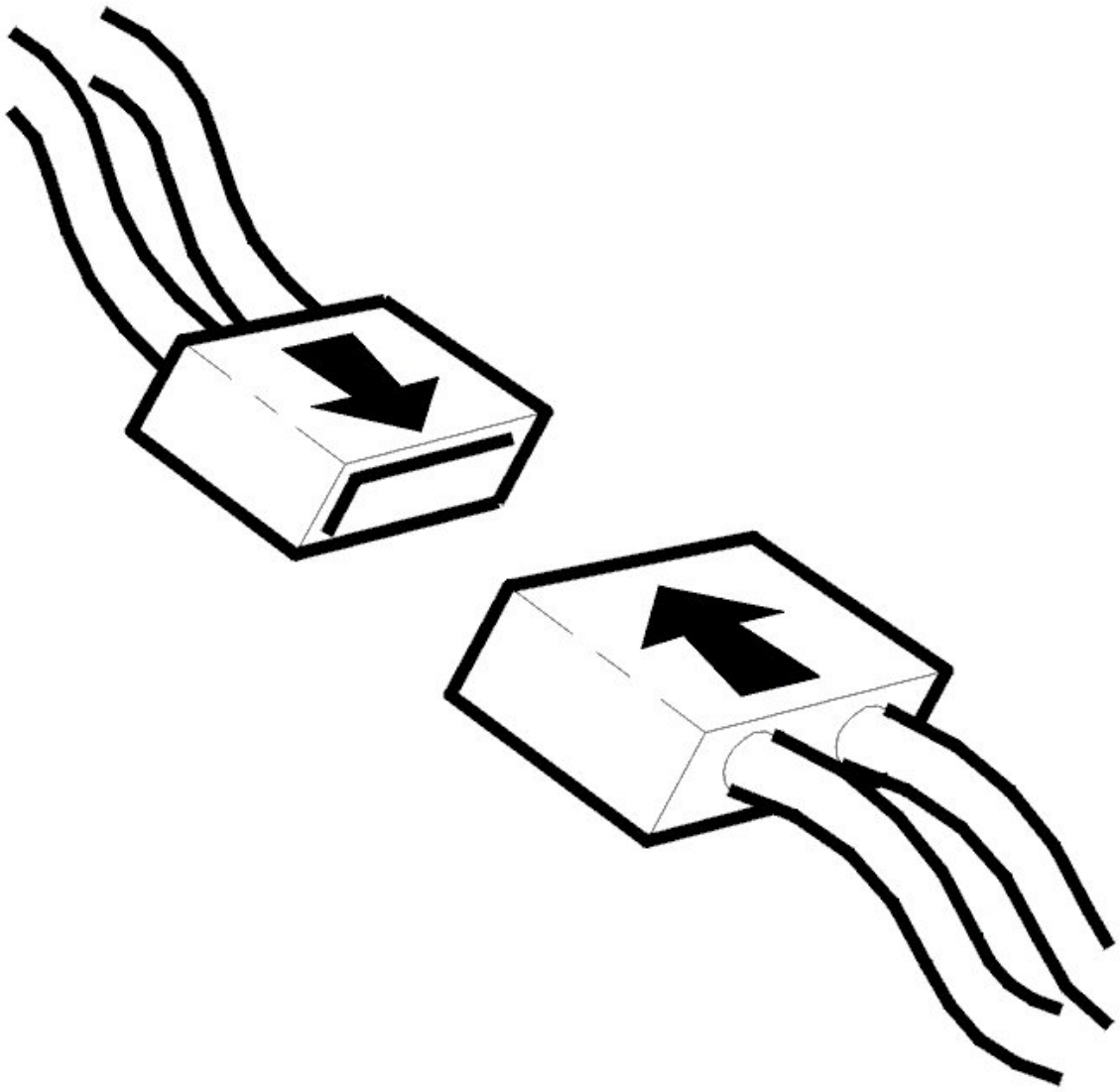
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Ensure that the button for the rear defroster is depressed.
Check that the defroster for the door mirrors is activated.

Is the defroster for the door mirror activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance and oxidation.

Check the cable between door control module terminal #11B and power door mirror terminal #8. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
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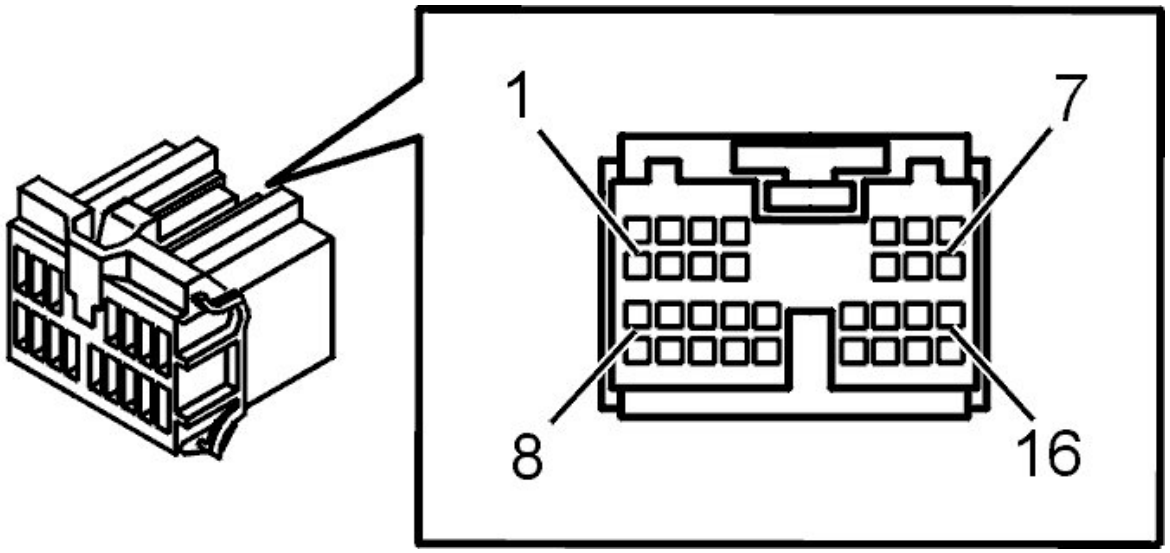


Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking faults

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for external rear-view mirror defroster is short circuited to ground when the function is activated, diagnostic trouble code DDM/PDM-002D is displayed.

Substitute value
- Nothing.

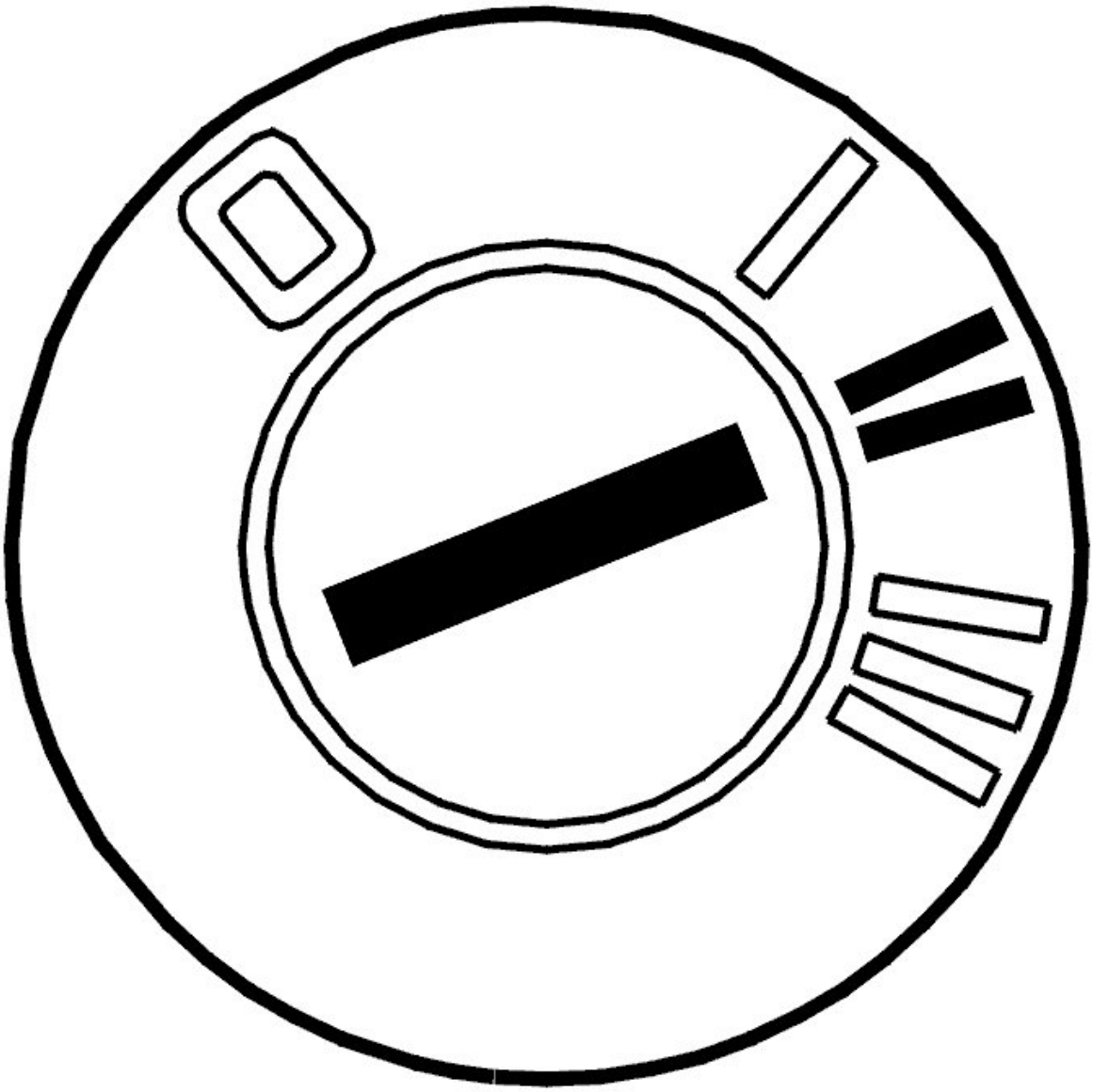
Possible source
- Signal wire to external rear-view mirror defroster short circuited to ground.

Fault symptom[s]
- Mist on windows and/or external rear-view mirrors.

Signal Too Low

Signal too low

Checking faults



- Ignition on.

Ensure that the button for the rear defroster is depressed.
Check that the defroster for the door mirrors is activated.

Is the defroster for the door mirror activated?

Yes - Intermittent fault

No - Checking for a short-circuit

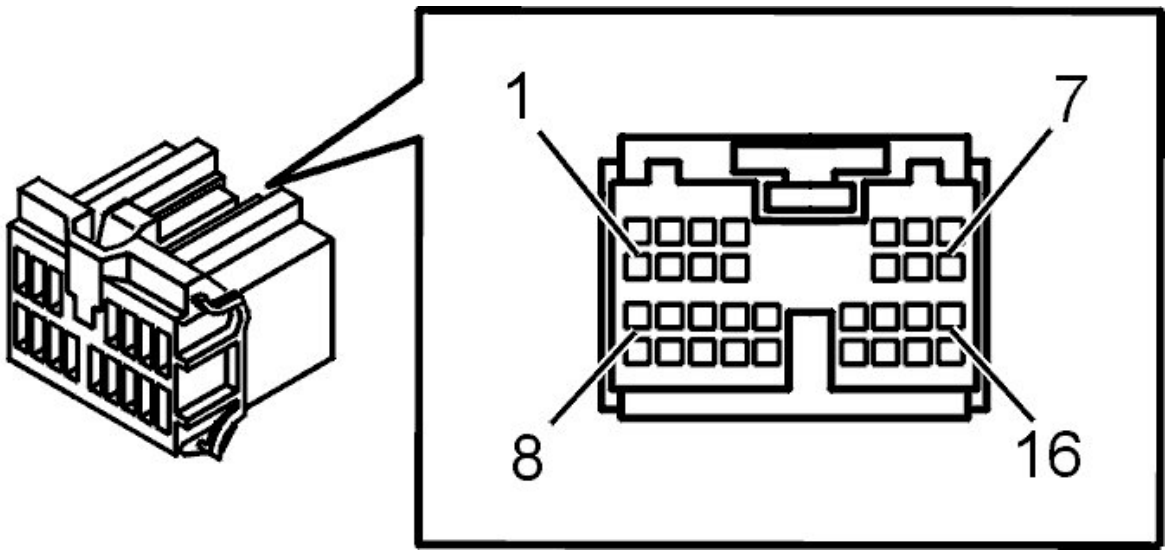
Checking for a short-circuit

Check the cable between door control module terminal #11B and power door mirror terminal #8. Check for a short-circuit to ground.
Replace the cable if it is faulty.
Replace the power door mirror if the cable is OK.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module

/ Passenger Door Module (DDM/PDM), Replacing
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

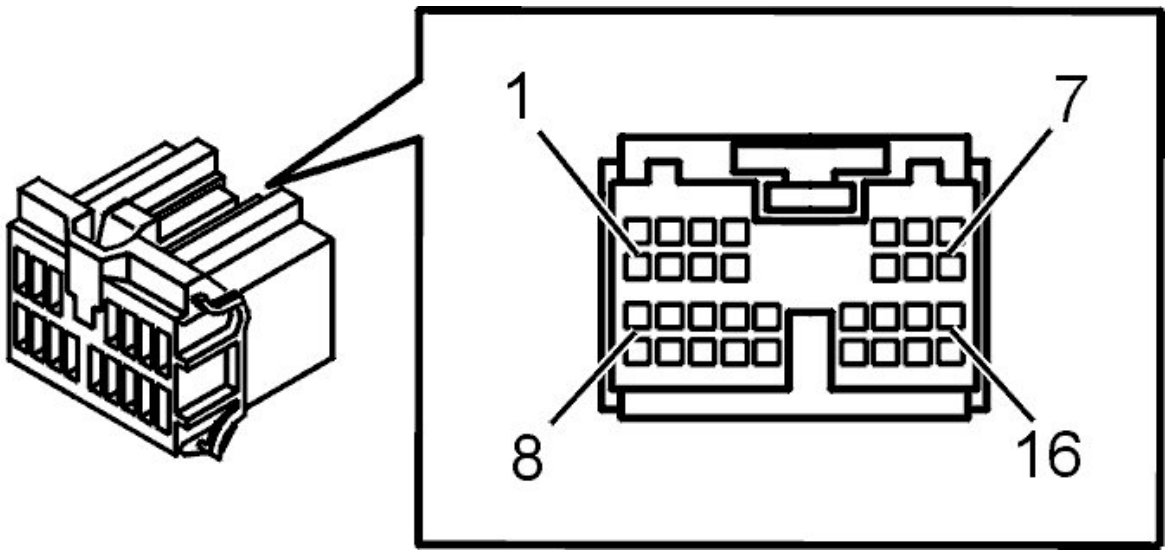


Continue - Verification

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between control module terminal #11B and power door mirror terminal #8. Check for an intermittent short-circuit to ground.

Other information:
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



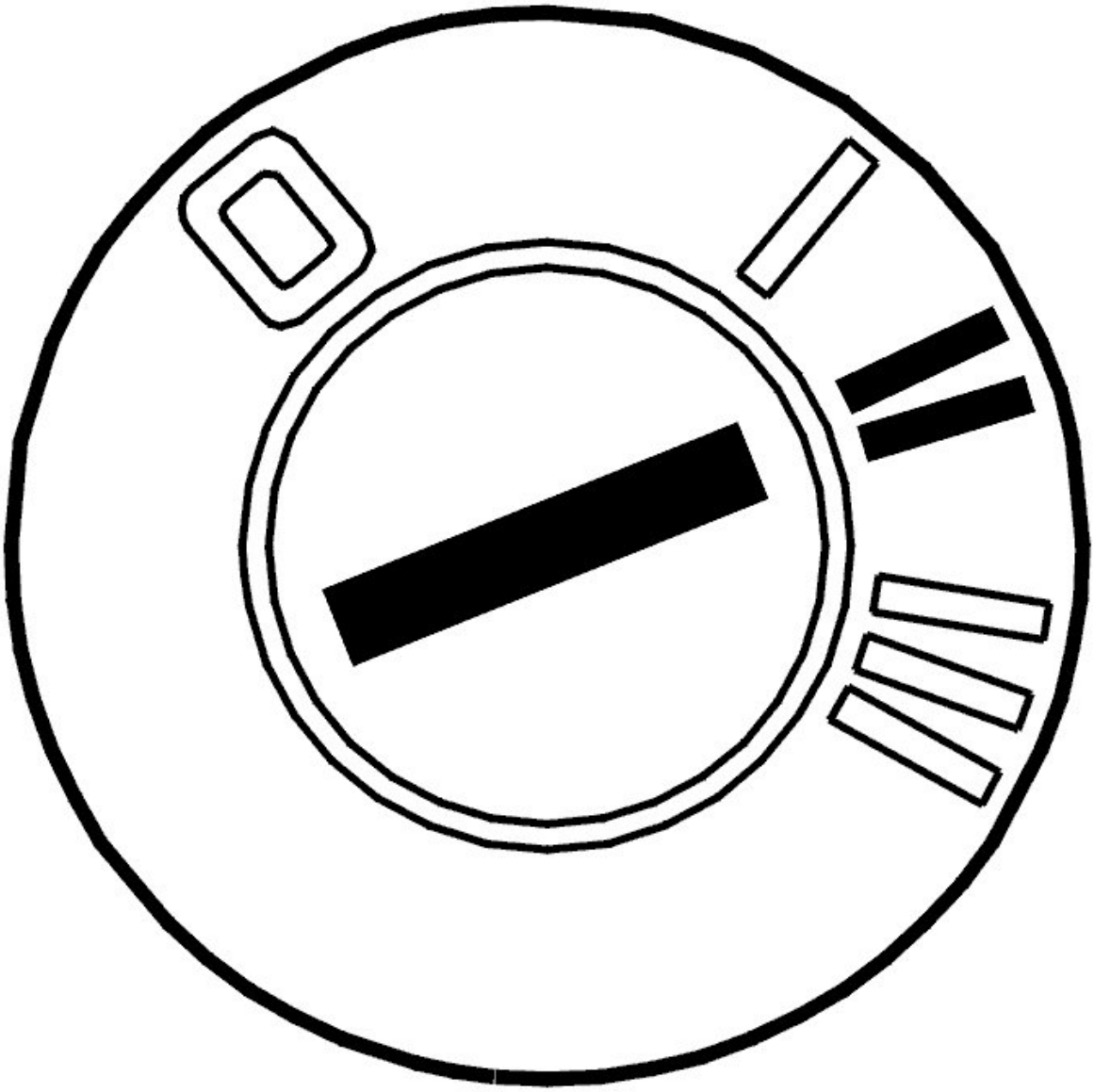
Continue - Fault-tracing information

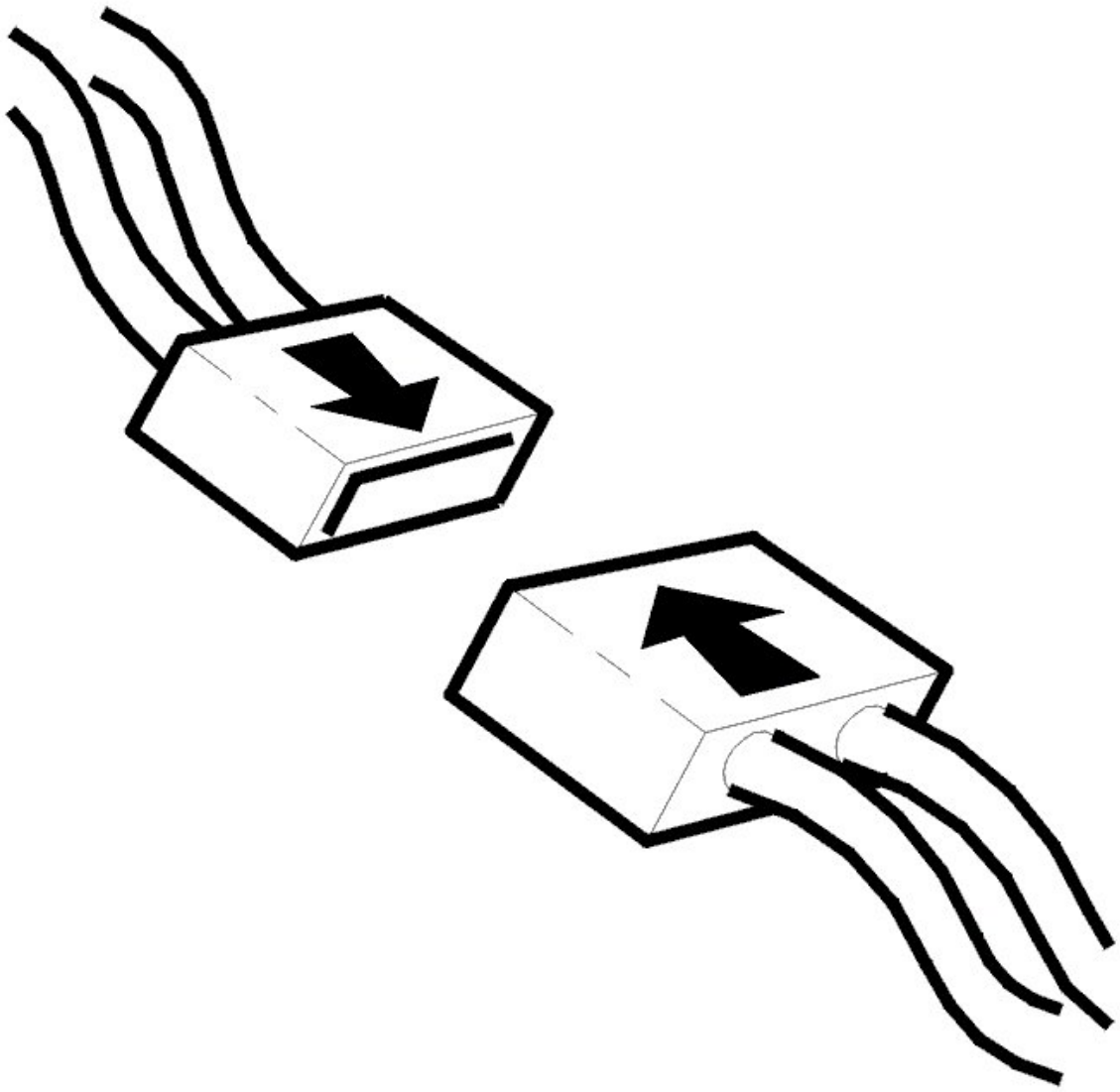
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Ensure that the button for the rear defroster is depressed.
Check that the defroster for the door mirrors is activated.

Is the defroster for the door mirror activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking faults

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that external rear-view mirror defroster overheats when function is activated, diagnostic trouble code DDM/PDM-002E is displayed.

Substitute value
- Nothing.

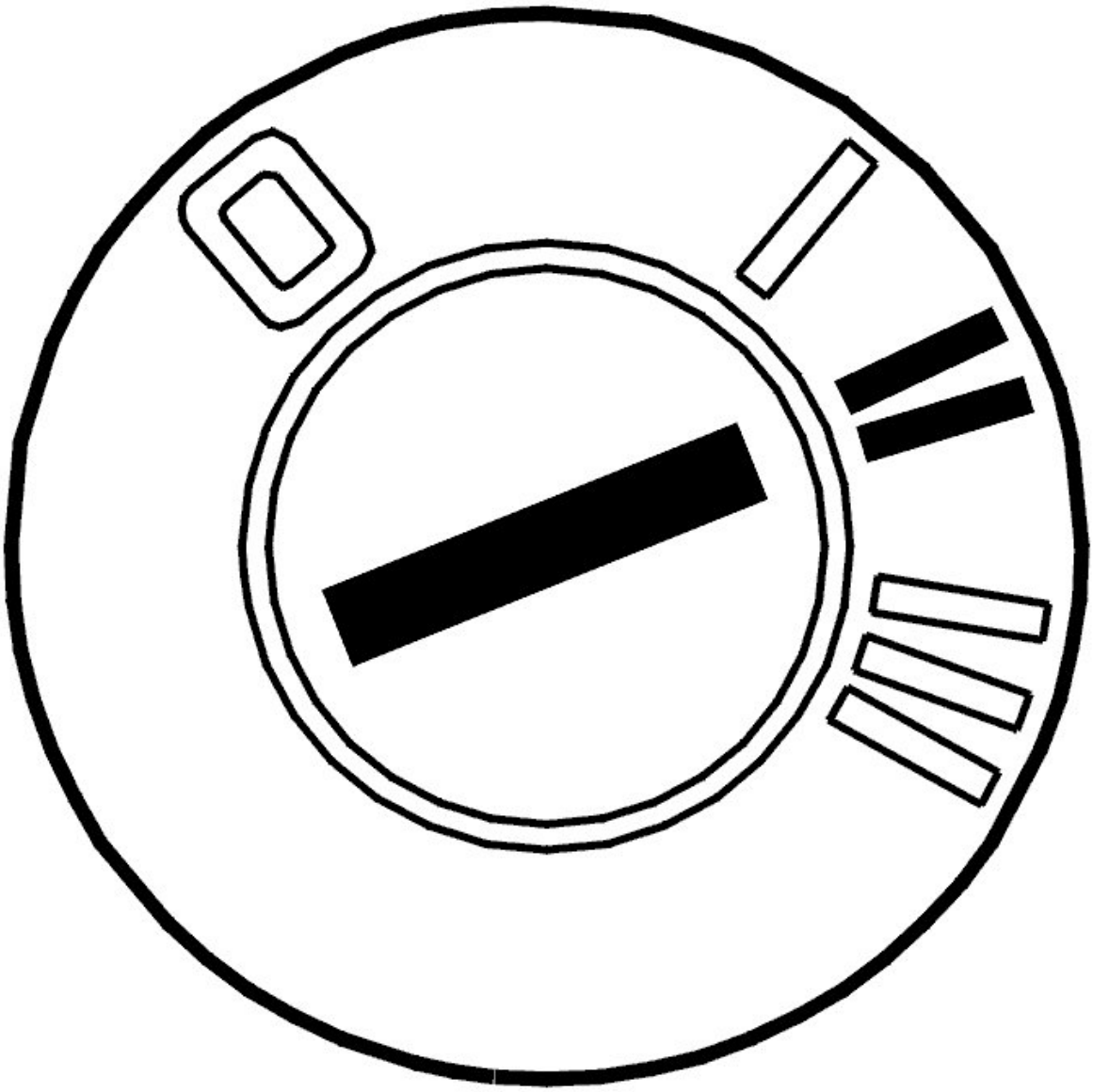
Possible source
- External rear-view mirror heater overheats.

Fault symptom[s]
- Nothing.

Signal Too High

Signal too high

Checking faults



- Ignition on.

Ensure that the button for the rear defroster is not depressed.
Check that the defroster for the door mirrors is not activated.

Is the defroster for the door mirror activated?

Yes - Checking for a short-circuit

No - Intermittent fault

Checking for a short-circuit

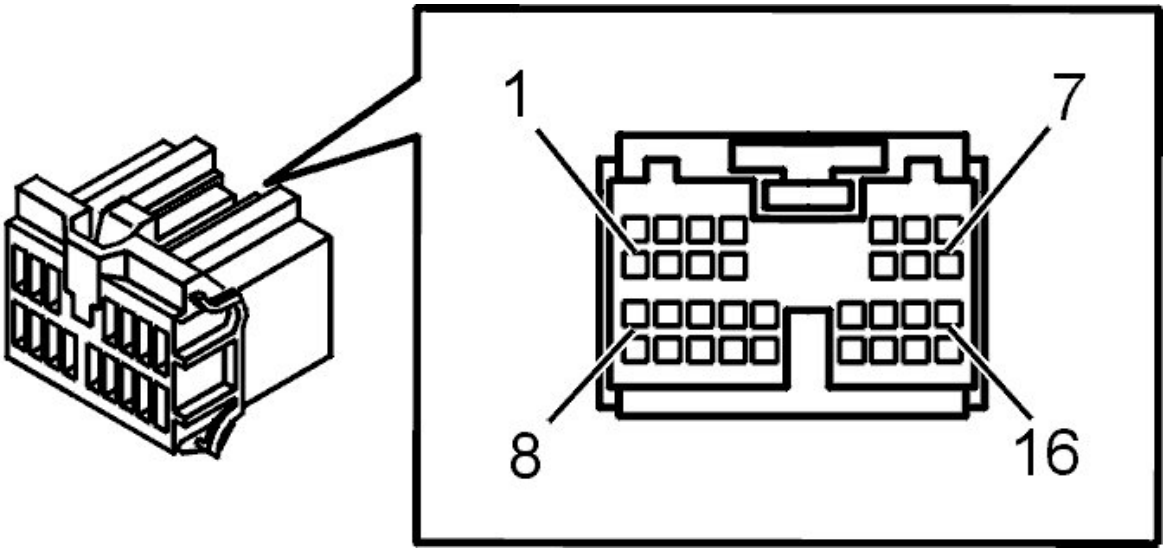
Check the cable between door control module terminal #11B and power door mirror terminal #8. Check for a short-circuit to supply voltage.
Replace the cable if it is faulty.
Replace the power door mirror if the cable is OK.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module

/ Passenger Door Module (DDM/PDM), Replacing

- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



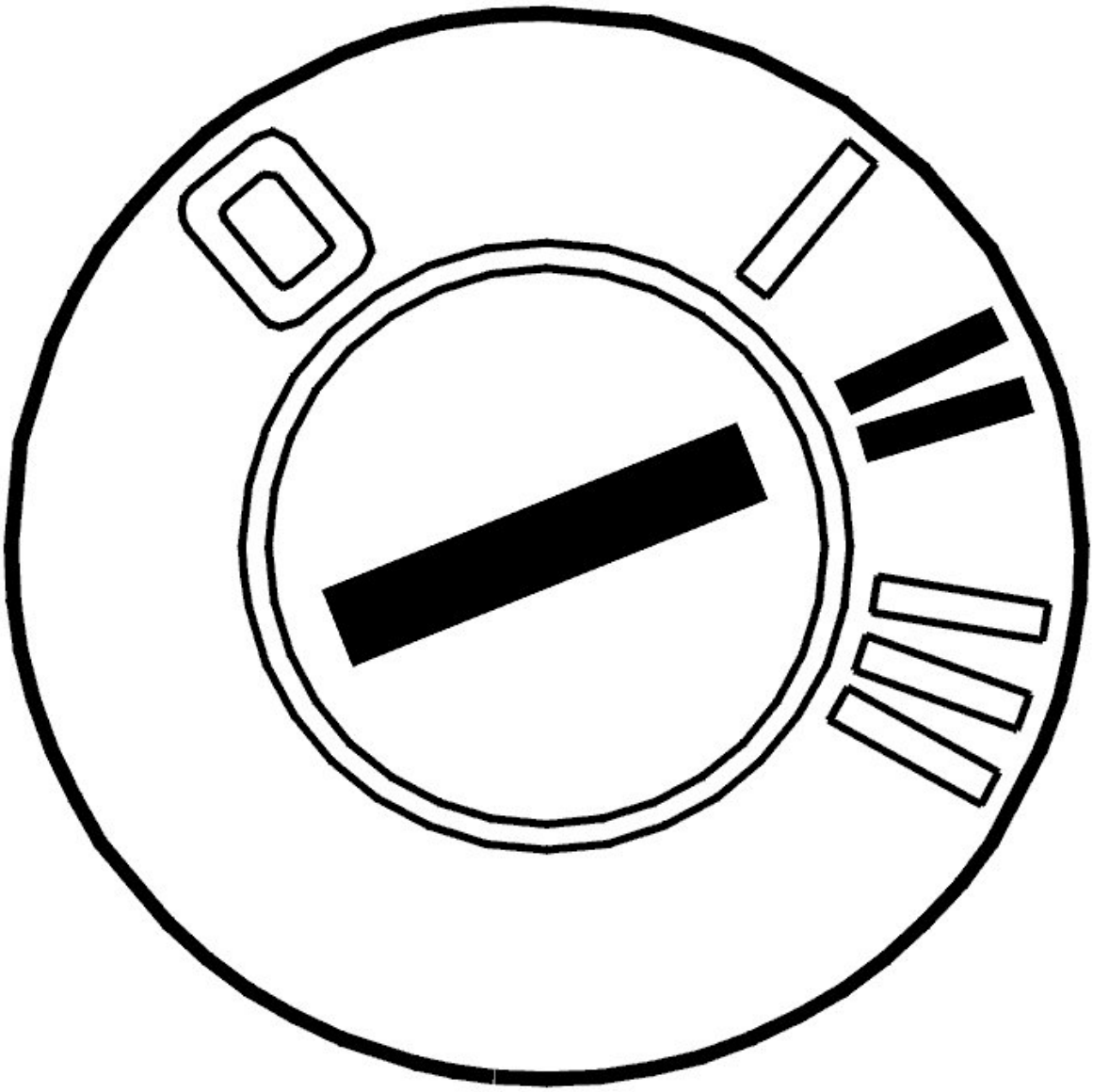
Continue - Verification

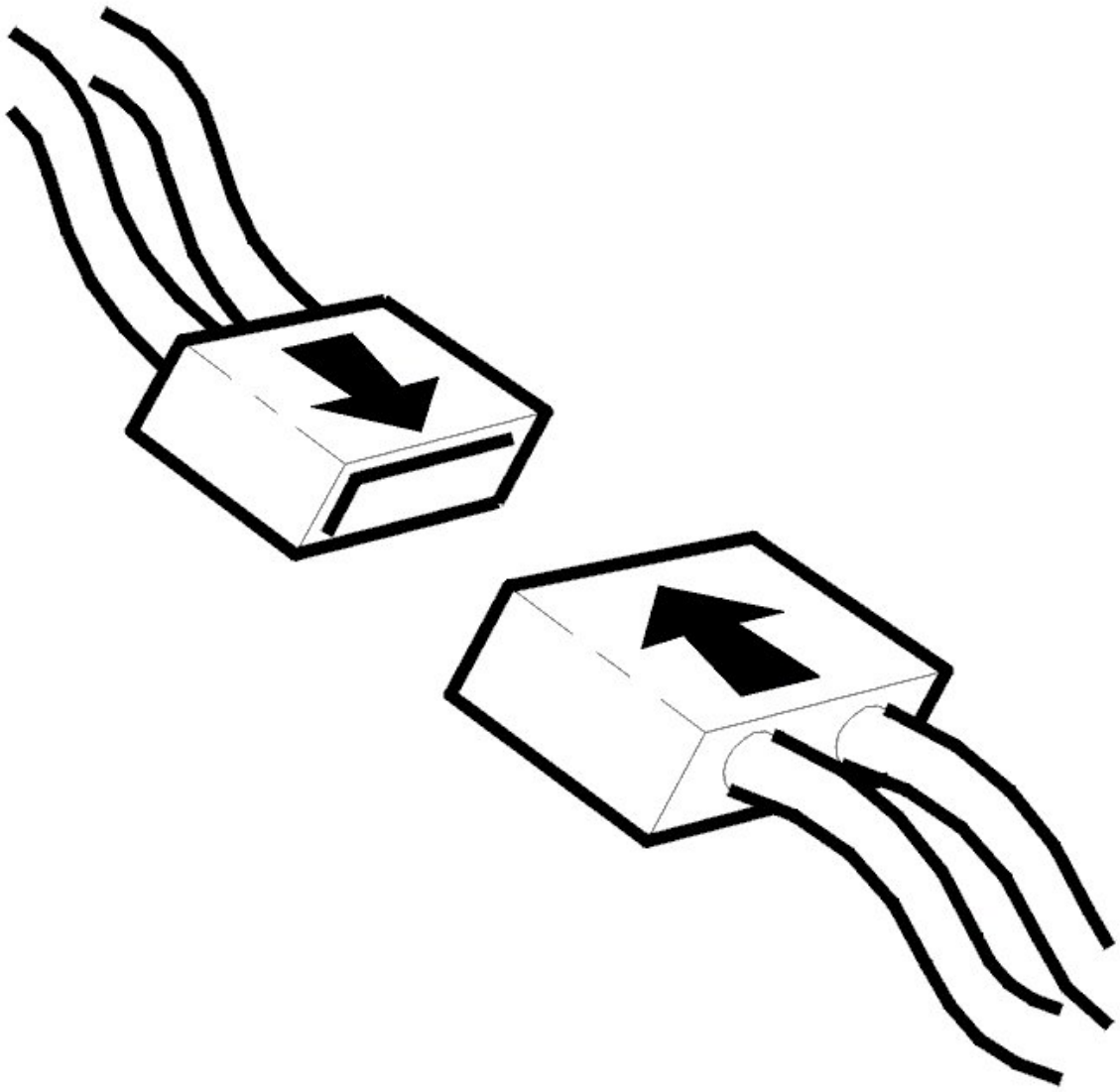
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Ensure that the button for the rear defroster is depressed.
Check that the defroster for the door mirrors is activated.

Is the defroster for the door mirror activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

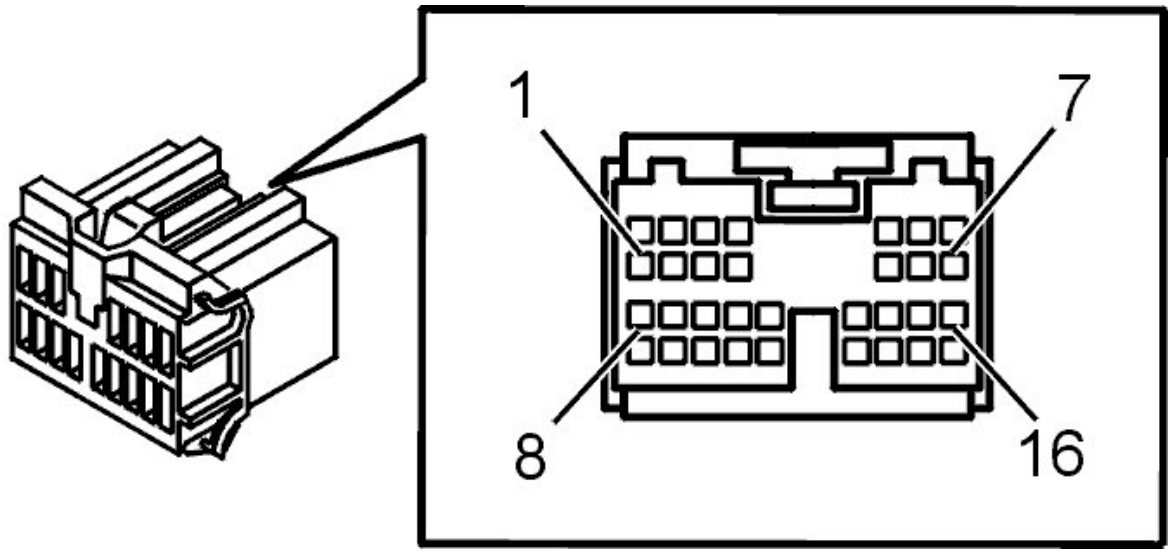
Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance and oxidation.

Check the cable between door control module terminal #11B and power door mirror terminal #8. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking faults

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that voltage is too high in one or more of the signal wires OUT1-OUT5, or that mirror heater overheats when a mirror motor or defroster is activated, diagnostic trouble code DDM/PDM-002F is displayed.

Substitute value
- Nothing.

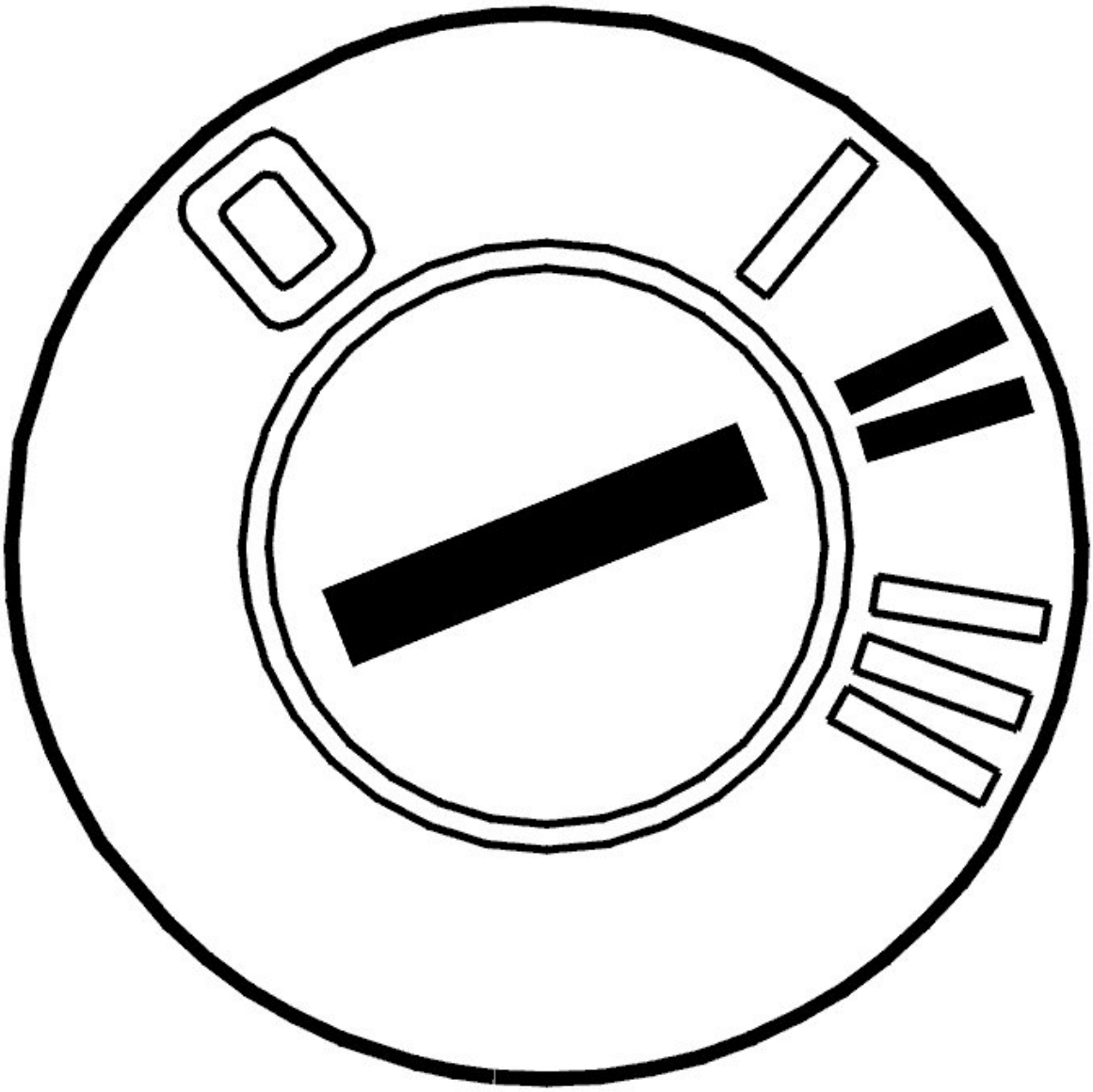
Possible source
- Voltage too high in one or more of signal wires OUT1-OUT5
- External rear-view mirror heater overheats.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the door control module and the power door mirror (as follows). Check for a short-circuit to supply voltage. Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

Control module terminal #26A and power door mirror terminal #9.
Control module terminal #28A and power door mirror terminal #10.
Control module terminal #29A and power door mirror terminal #8.
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #11B and power door mirror terminal #5.

If the car is equipped with a 16-pin connector

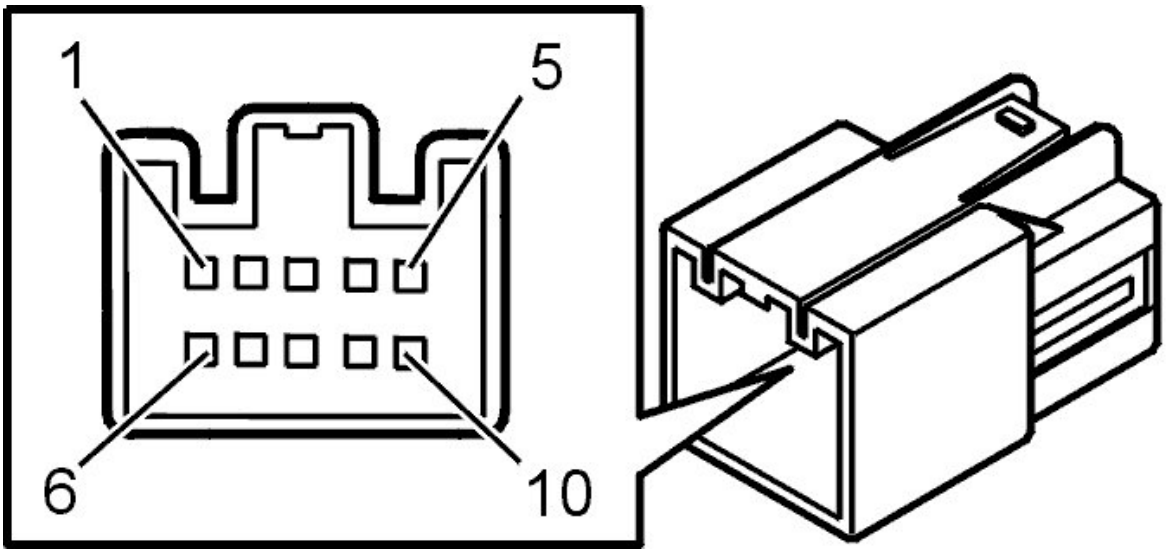
Control module terminal #26A and power door mirror terminal #15.
Control module terminal #28A and power door mirror terminal #16.
Control module terminal #29A and power door mirror terminal #14.

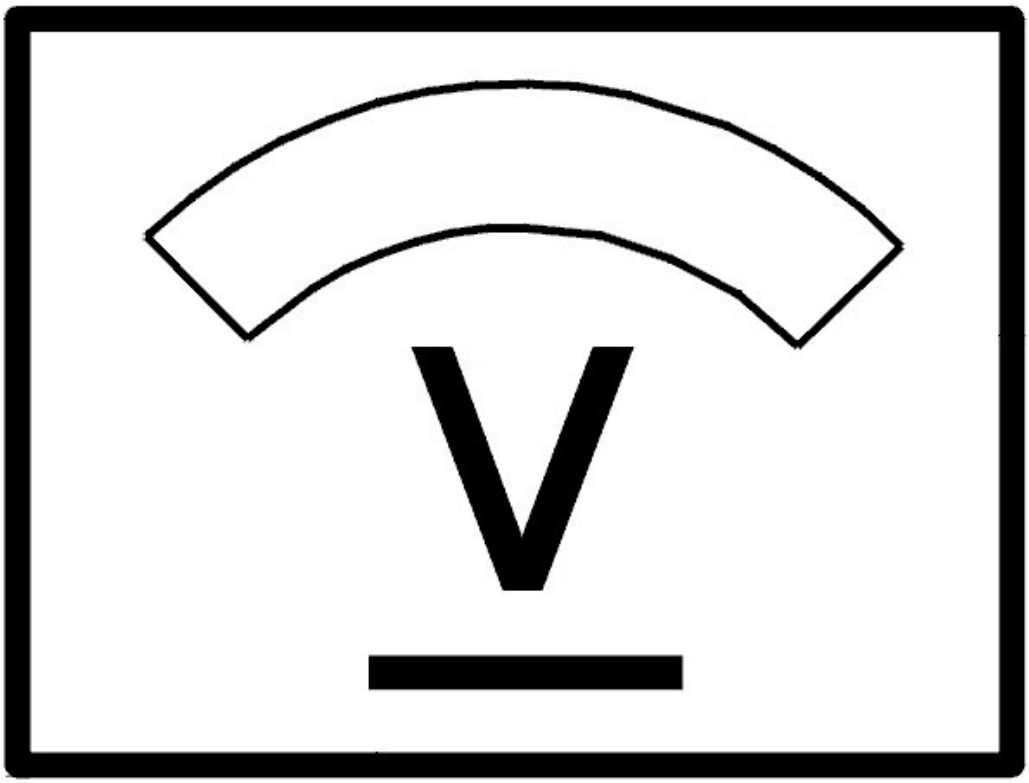
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

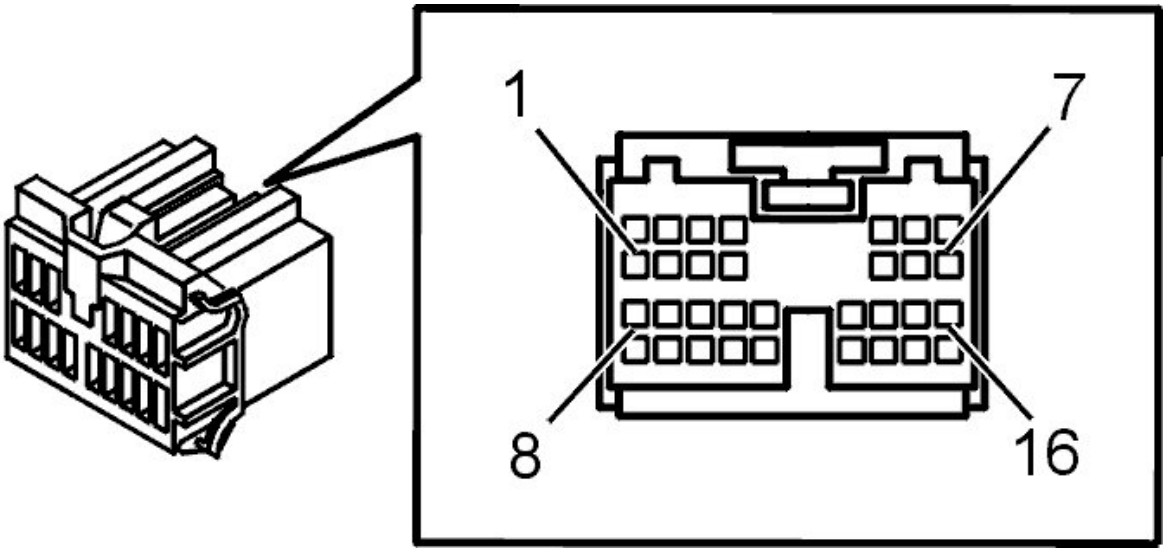
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #11B and power door mirror terminal #8.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access and replace the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Verification

Intermittent fault

Check the door control module and power door mirror connectors. Check for contact resistance. Check for oxidation.
Check the cable between the door control module and the power door mirror (as follows). Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

If the car is equipped with a 10-pin connector

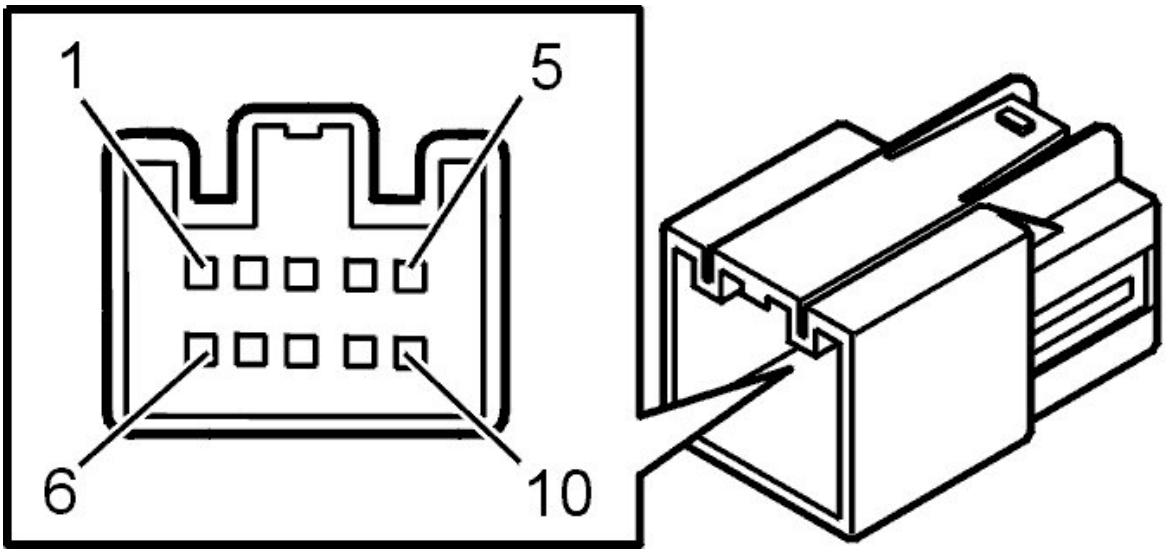
Control module terminal #26A and power door mirror terminal #9.
Control module terminal #28A and power door mirror terminal #10.
Control module terminal #29A and power door mirror terminal #8.
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #11B and power door mirror terminal #5.

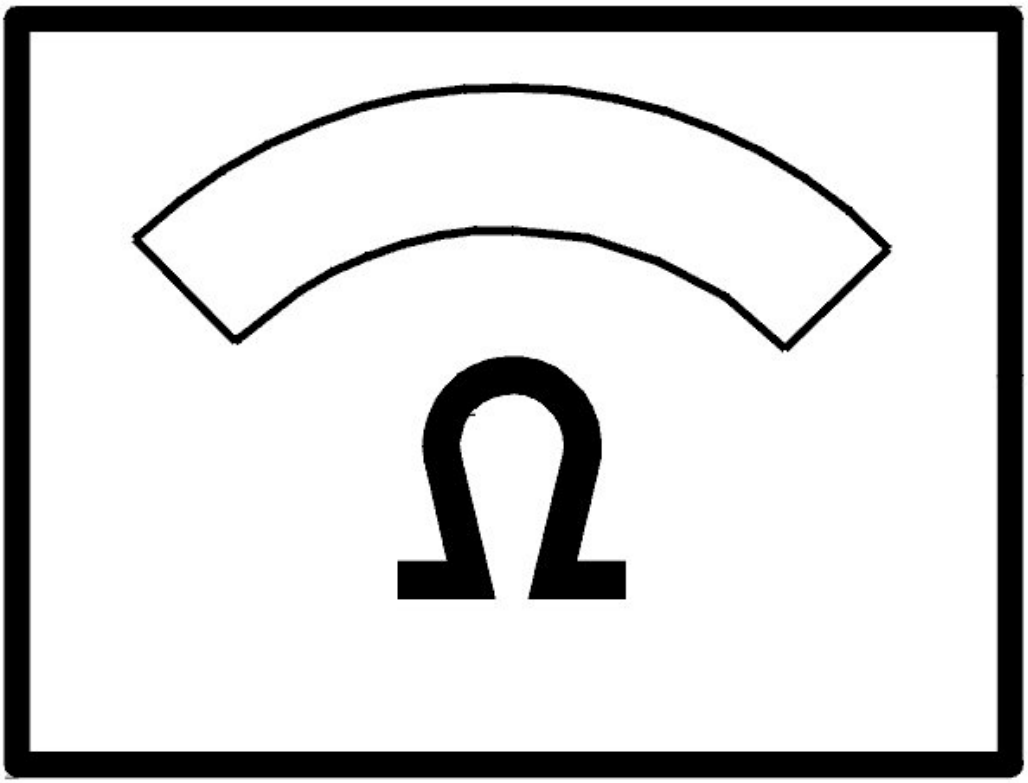
If the car is equipped with a 16-pin connector

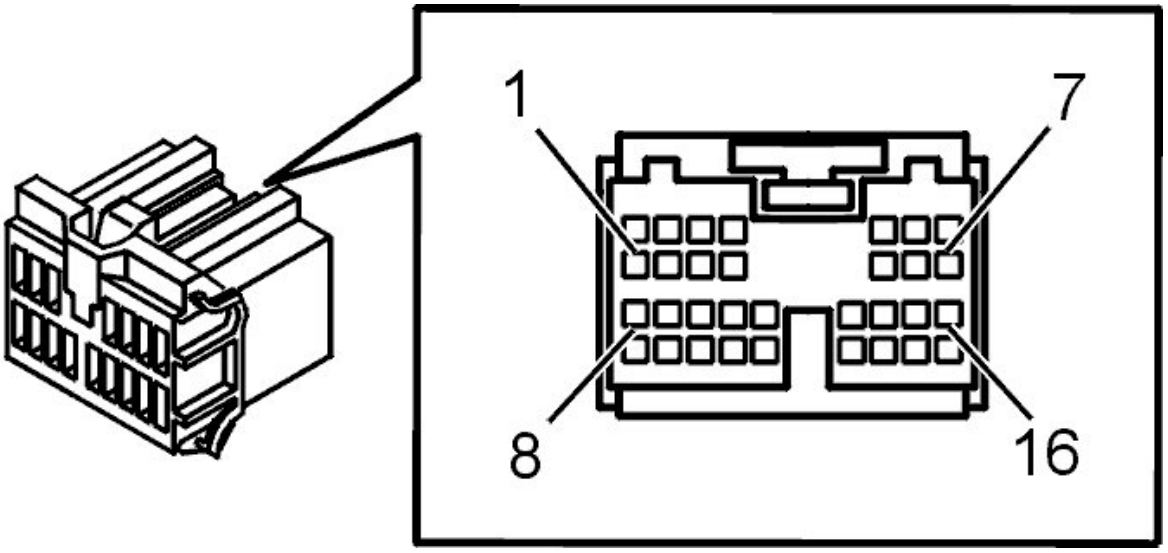
Control module terminal #26A and power door mirror terminal #15.
Control module terminal #28A and power door mirror terminal #16.
Control module terminal #29A and power door mirror terminal #14.
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #11B and power door mirror terminal #8.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







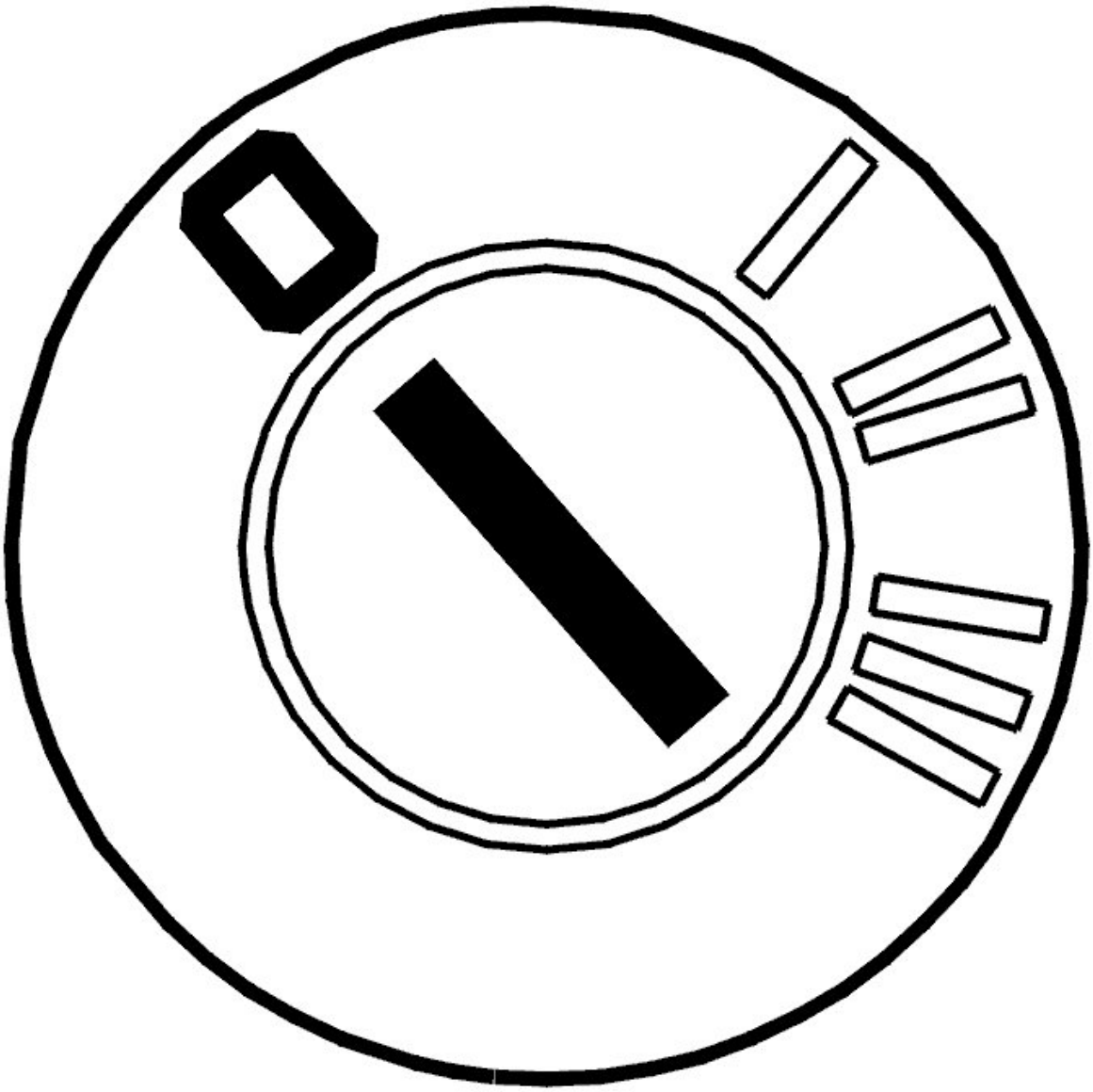
Continue - Fault-tracing information

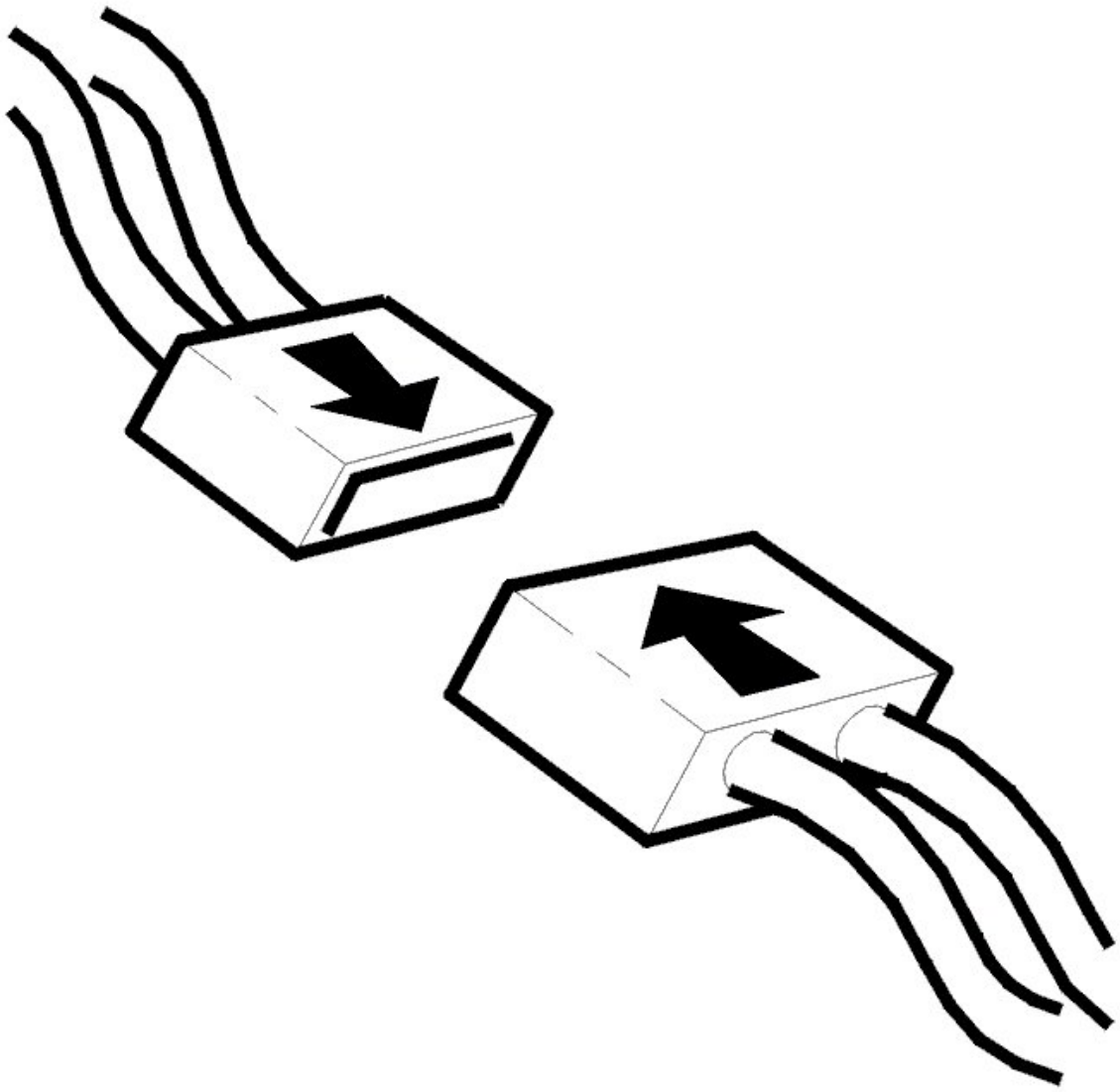
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code DDM/PDM-0005 is stored if the control module registers a low signal or open-circuit in the M+ signal cable or M- signal cable (the power supply wiring to the power window motor) when the window is operated upwards or downwards.
Diagnostic Trouble Code (DTC) DDM/PDM-0005 can be diagnosed when the power window motor is activated.

Substitute value
- None.

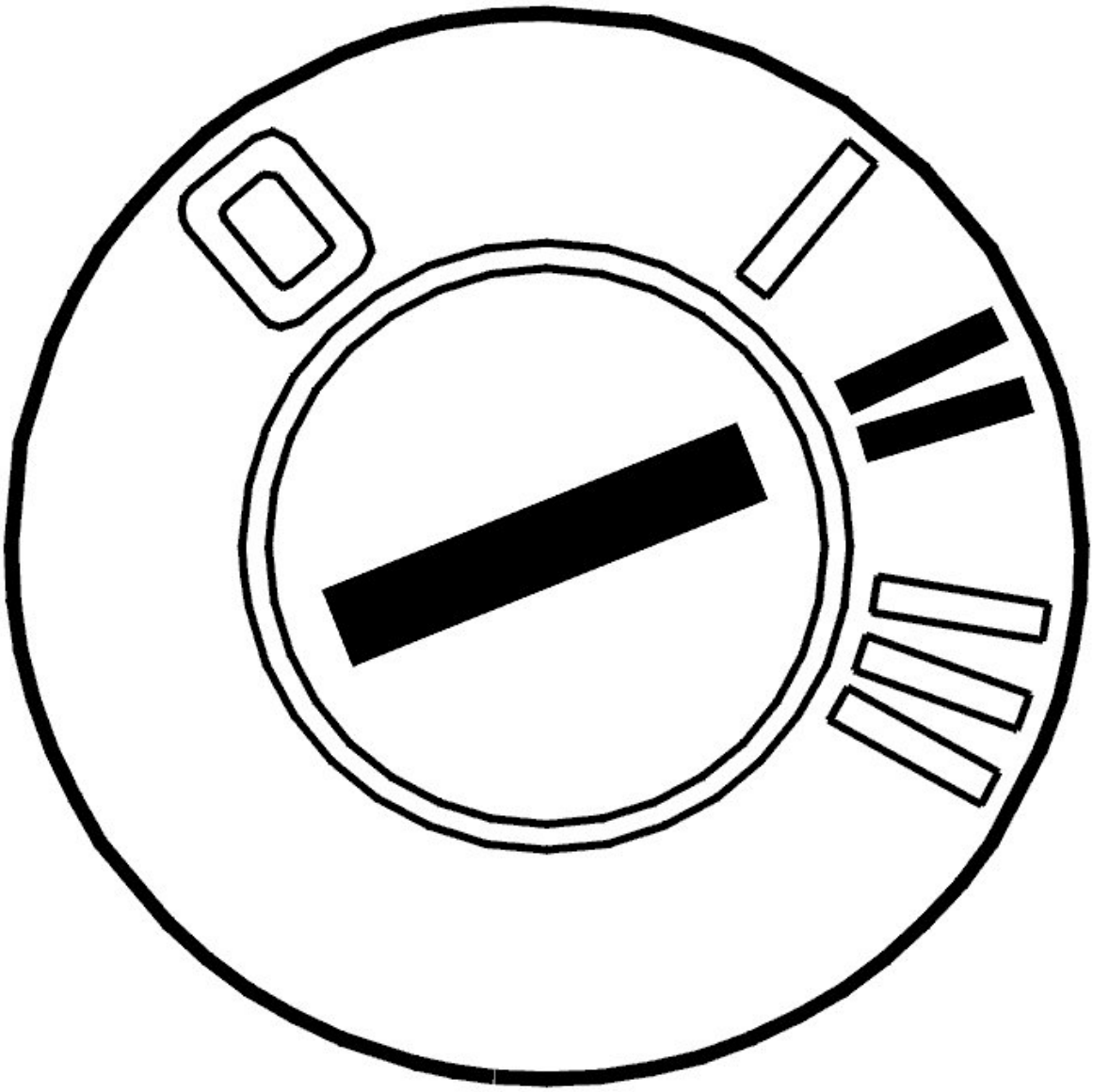
Possible source
- Short-circuit to ground in the M+ or M- signal cables
- Open-circuit in the M+ signal cable or M- signal cable
- Blown fuse.

Fault symptom[s]
- The power window mechanism does not operate.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking for permanent or intermittent faults



- Ignition on.

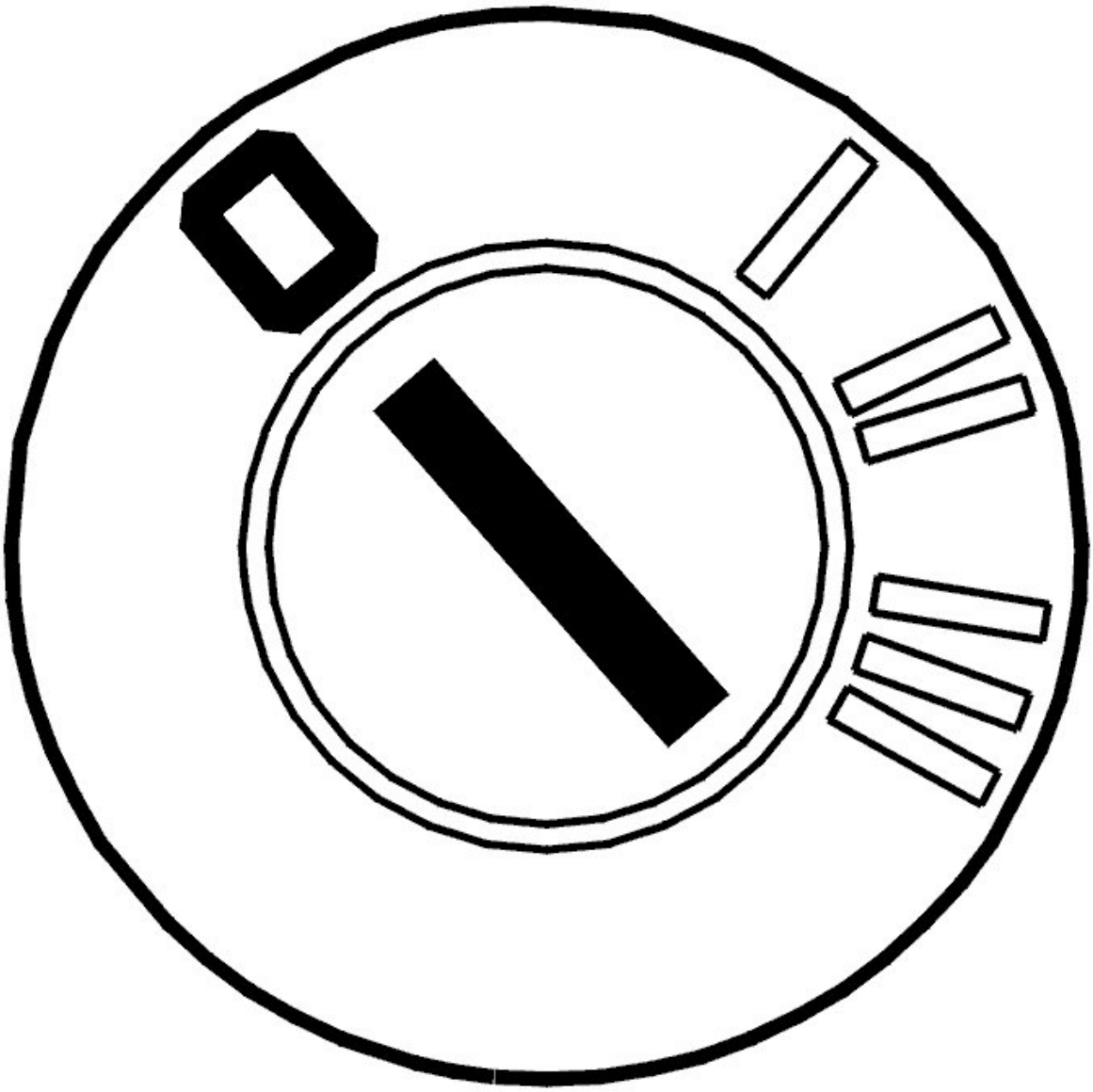
Press the switch for the power window to check the function of the power window mechanism.

Is the power window control operating correctly?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors



- Ignition off.

Check that the fuses are intact.
Check the control module and power window lift motor connectors. Check for contact resistance and oxidation.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking the power supply and ground terminals See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground Terminal, Driver Door Module (DDM)/ Passenger Door Module (PDM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Checking the cable

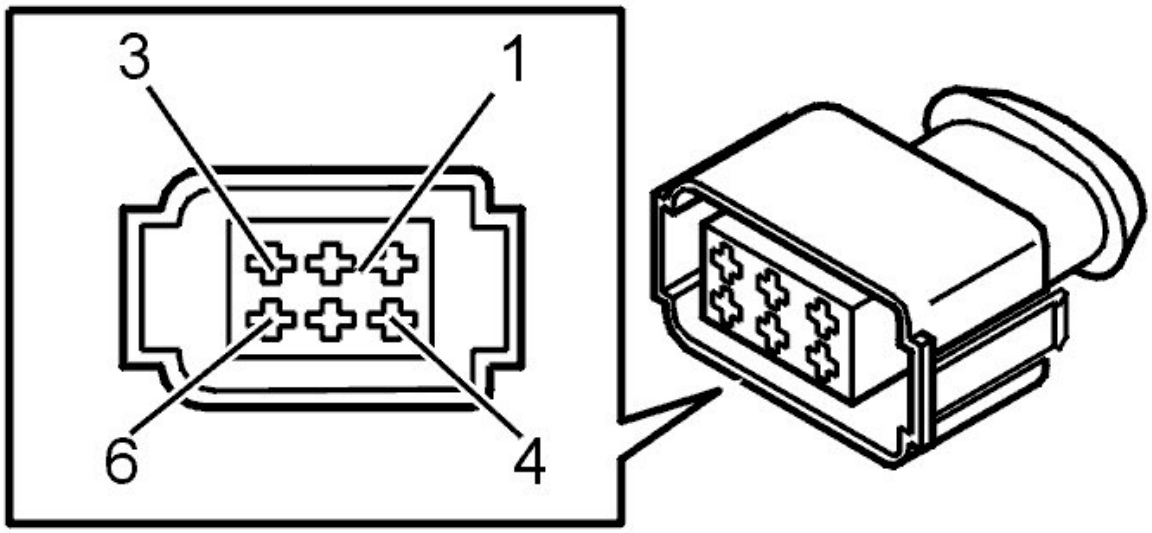
Checking the cable

Check the cable between control module connector terminal #B4 and power window lift motor connector terminal #3. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between control module connector terminal #B3 and power window lift motor connector terminal #6. Check for an open-circuit. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Checking the power supply and ground terminals See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground Terminal, Driver Door Module (DDM)/ Passenger Door Module (PDM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

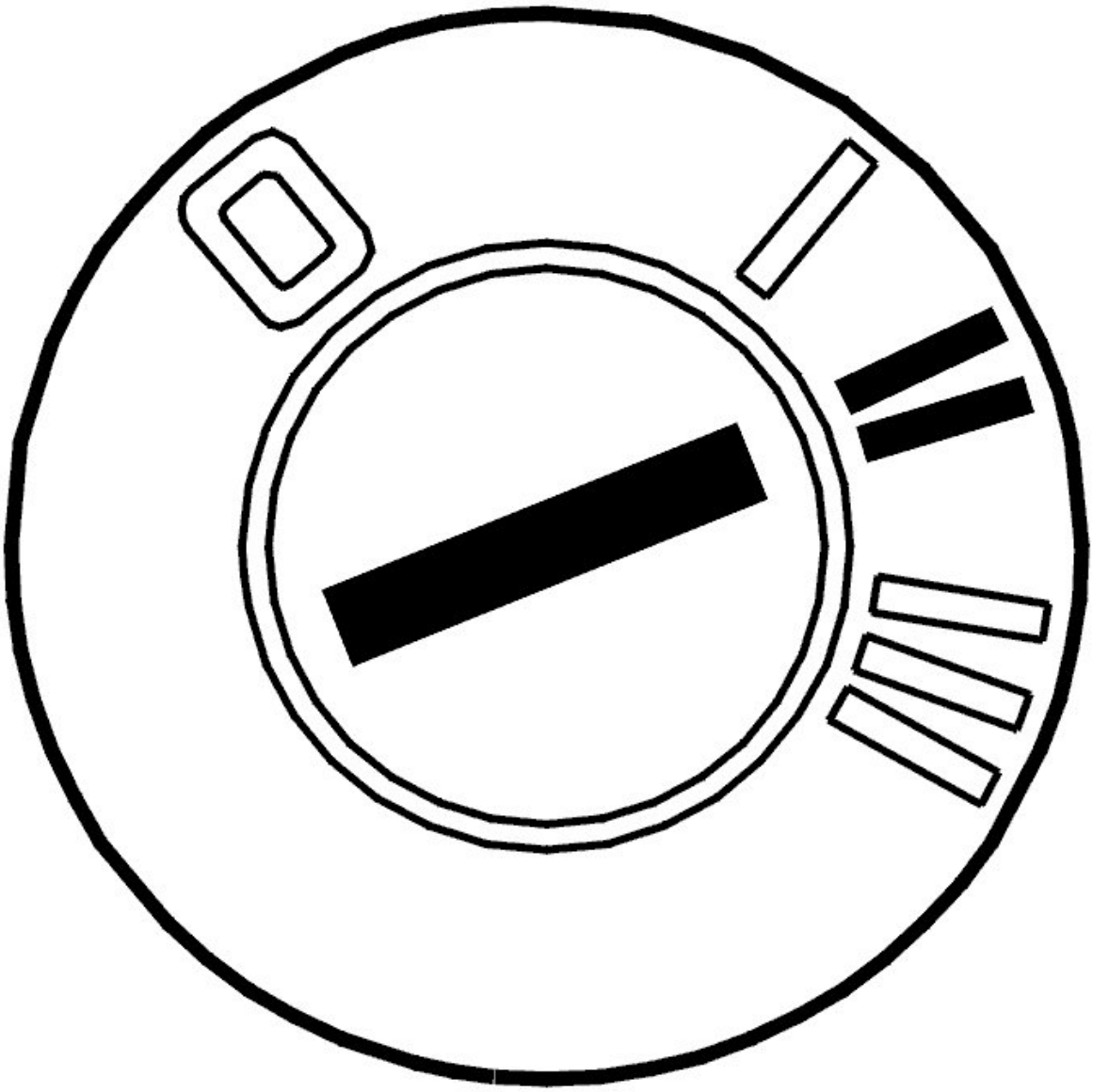


Was the cable OK?

Yes - Replacing the component

No - Verification

Replacing the component



Replace the window lift mechanism.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing

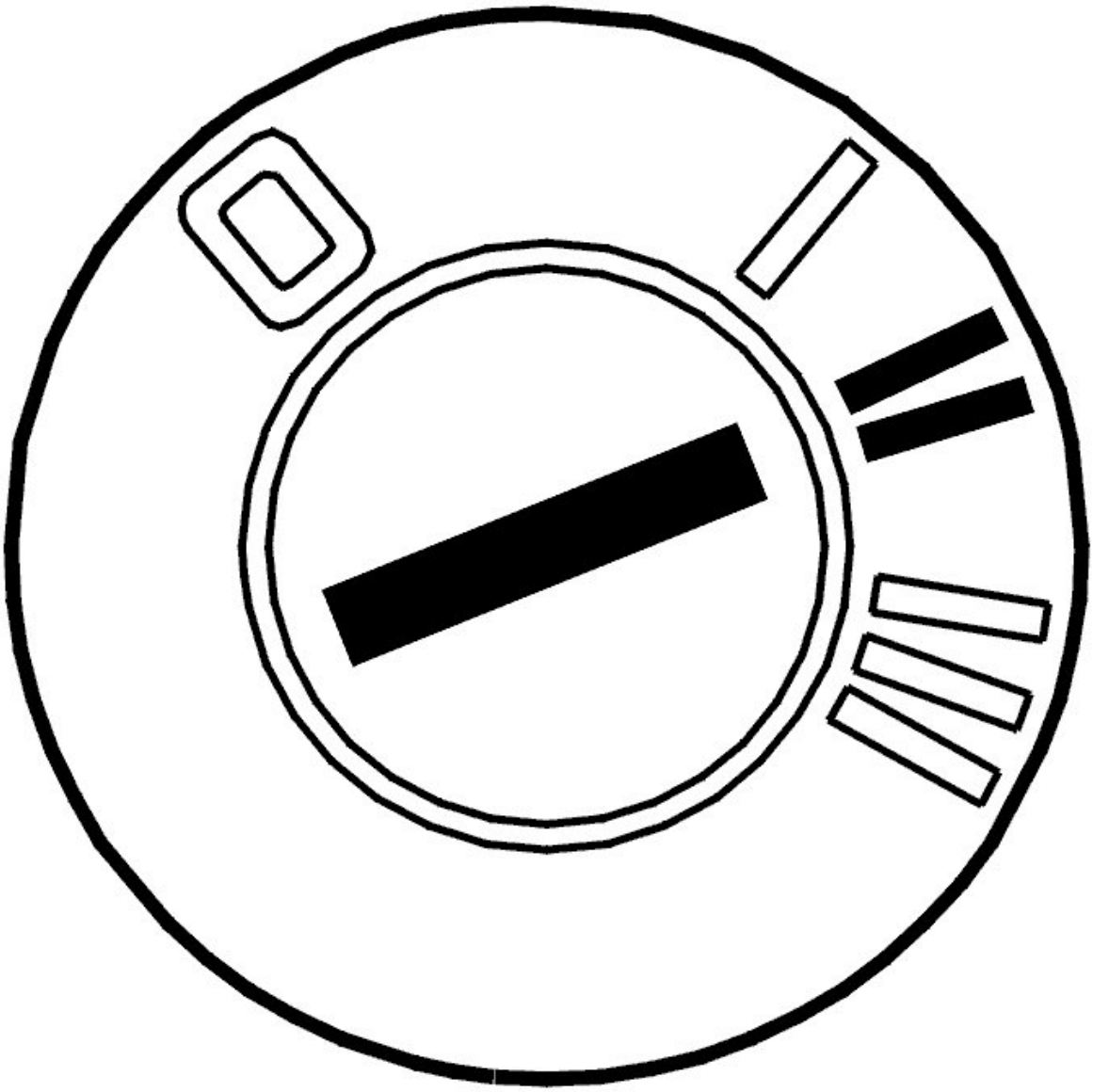
Continue - Verification

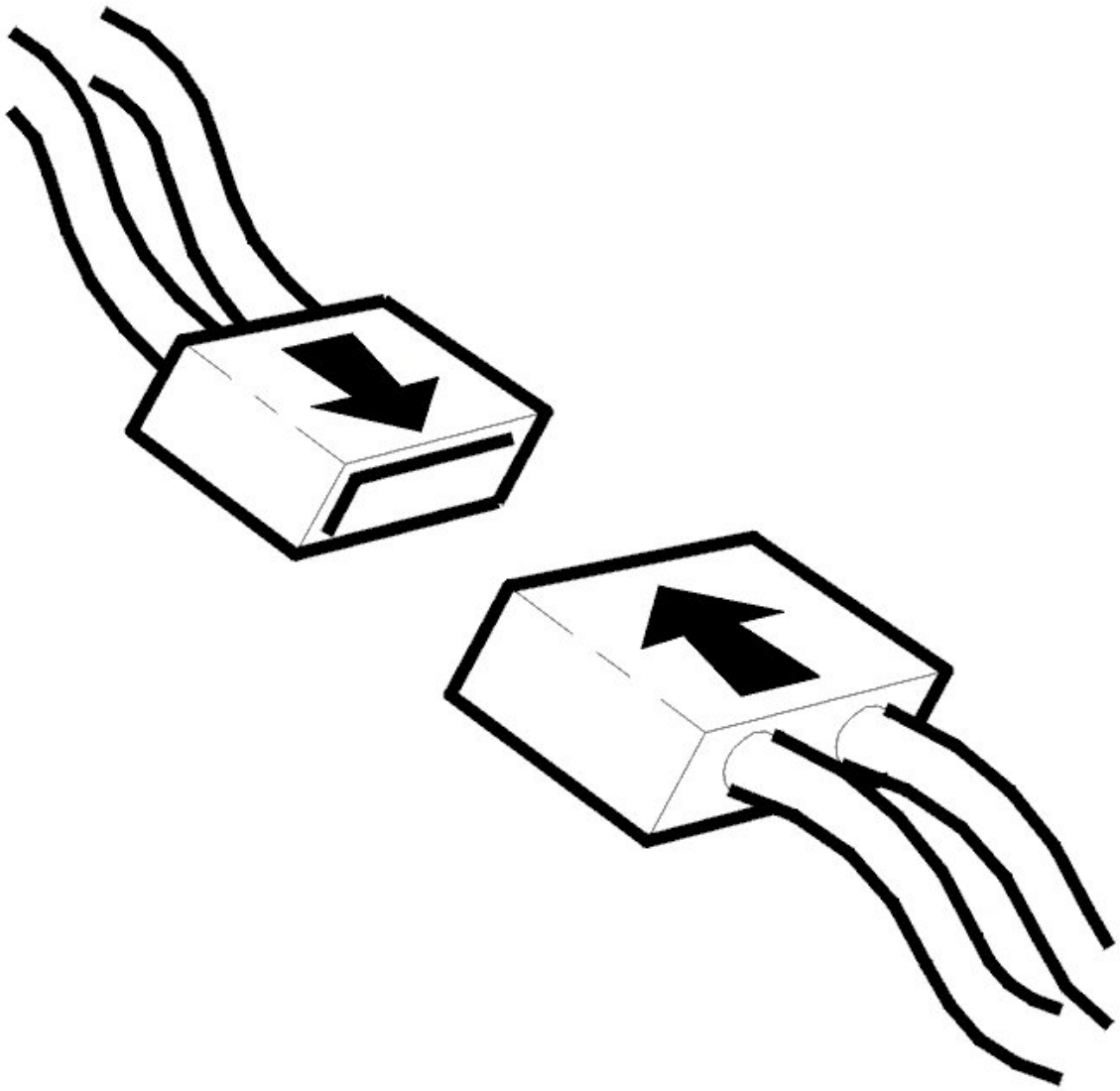
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that window operates by raising/lowering window to its end stops.

Does window operate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

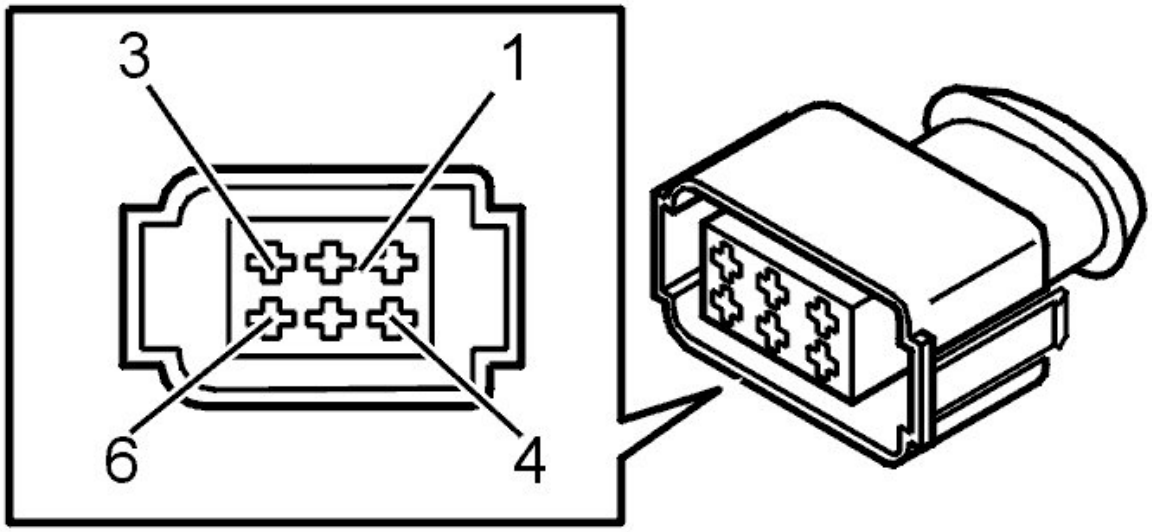
Check the connectors for the control module and power window lift motor. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between control module connector terminal #B4 and power window lift motor connector terminal #3. Check for an intermittent open-circuit.
Check the cable between the control module connector terminal #3B and the power window lift motor connector terminal #6. Check for an intermittent open-circuit.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic

Parameters/Connecting the Breakout Box

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking the power supply and ground terminals See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/Checking the Voltage/Ground Terminal, Driver Door Module (DDM)/ Passenger Door Module (PDM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0010 is stored if the control module registers a short-circuit to ground in signal cable M1.
Diagnostic trouble code (DTC) DDM/PDM-0010 can be diagnosed when the central locking locks or unlocks.

Substitute value
- None.

Possible source
- Signal cable M1 is short-circuited to ground.

Fault symptom[s]
- The central locking system does not function at all.

Signal Too Low

Signal too low

Checking components and wiring

Check signal cable M1 between door control module connector terminal #B2 and central locking motor connector terminal #8. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- For information about signals, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

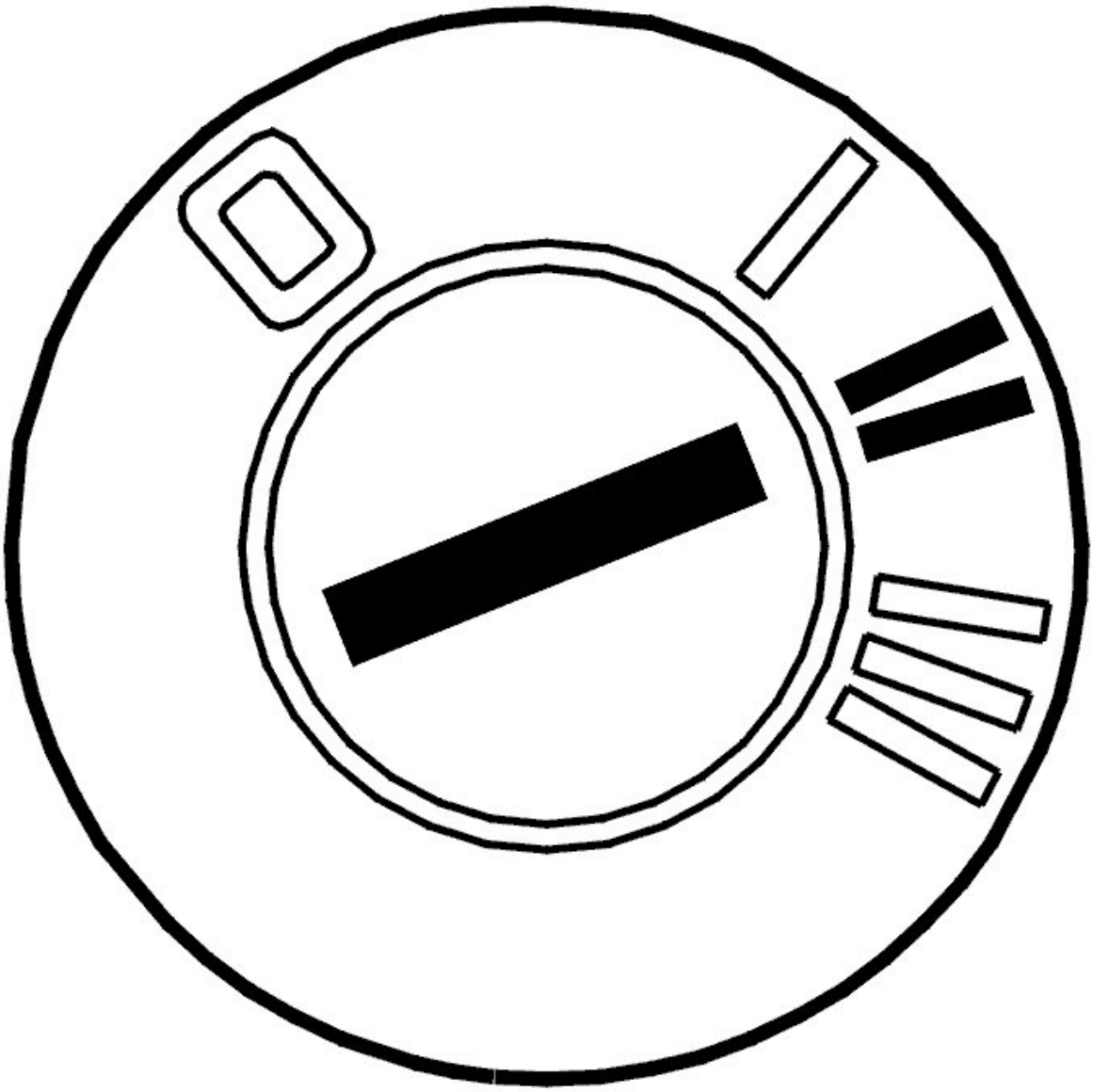
Continue - Verification

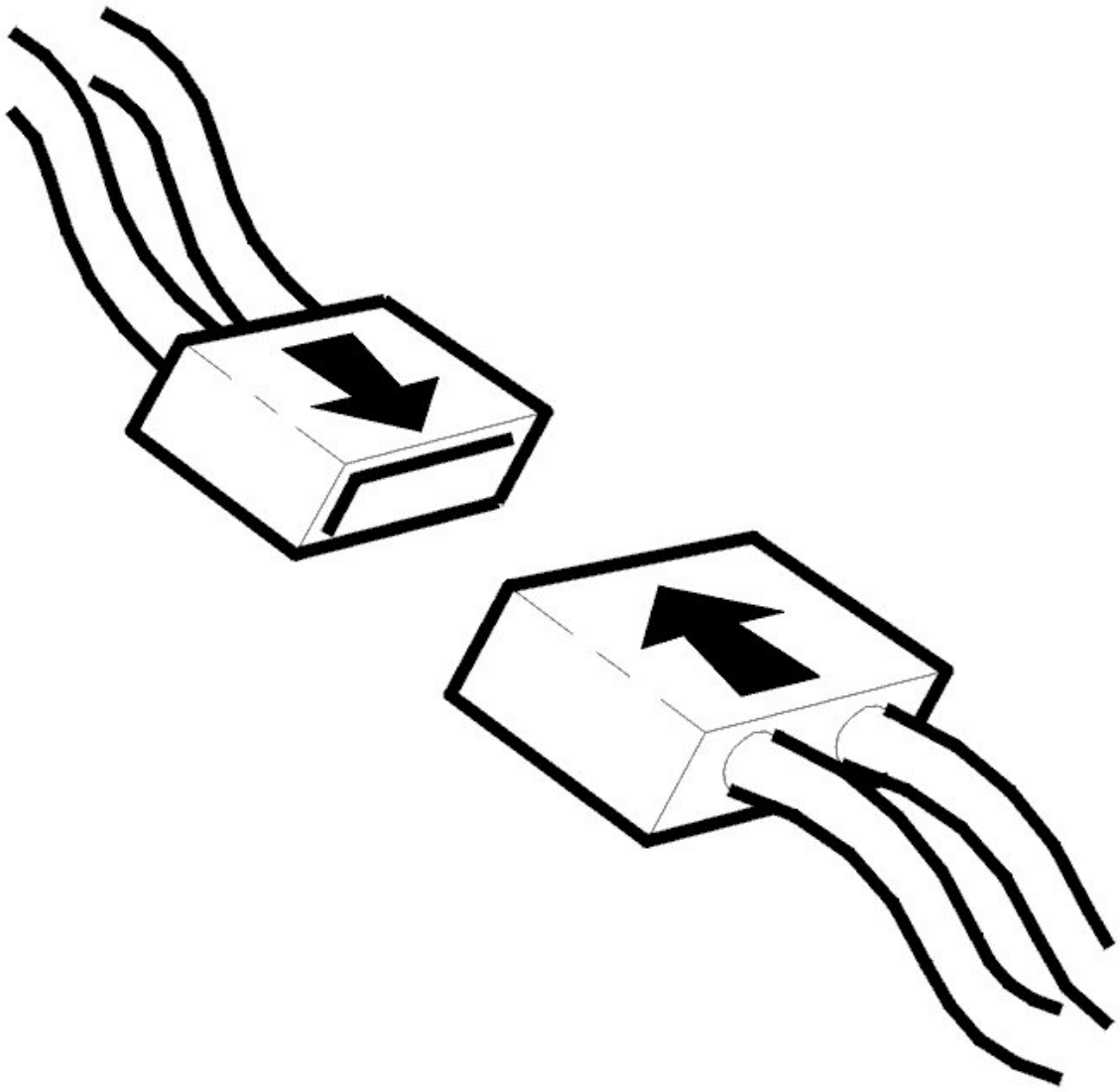
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the central locking system functions.

Does the central locking system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0013 is stored if the control module registers a too low signal in signal cable M3.
Diagnostic trouble code (DTC) DDM/PDM-0013 can be diagnosed when the central locking is activated.

Substitute value
- None.

Possible source
- Signal cable M3 short-circuited to ground.

Fault symptom[s]
- The central locking system does not function at all.

Signal Too Low

Signal too low

Checking components and wiring

Check signal cable M3 between door control module connector terminal #B1 and central locking motor connector terminal #6. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- For information about signals, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

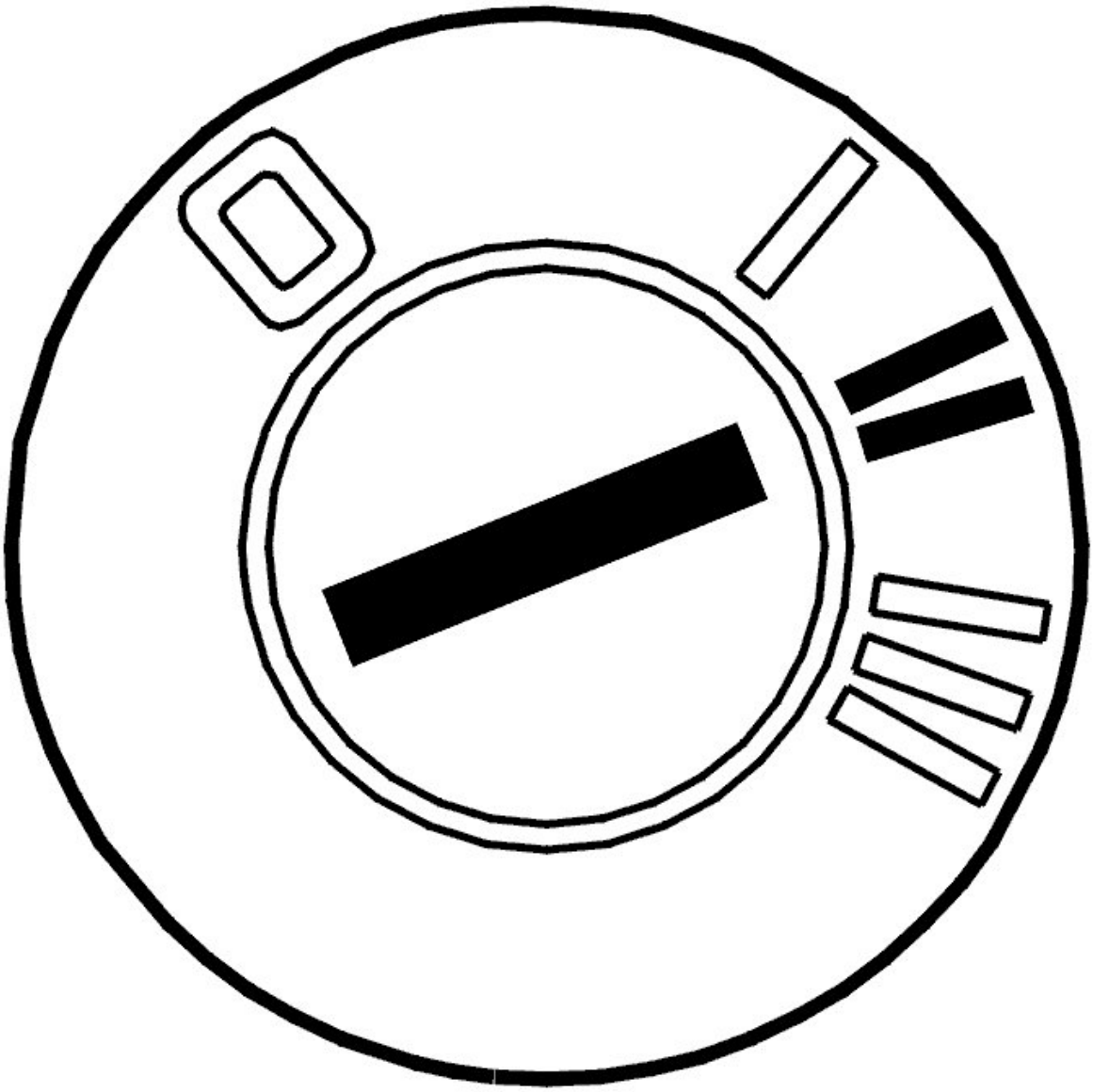
Continue - Verification

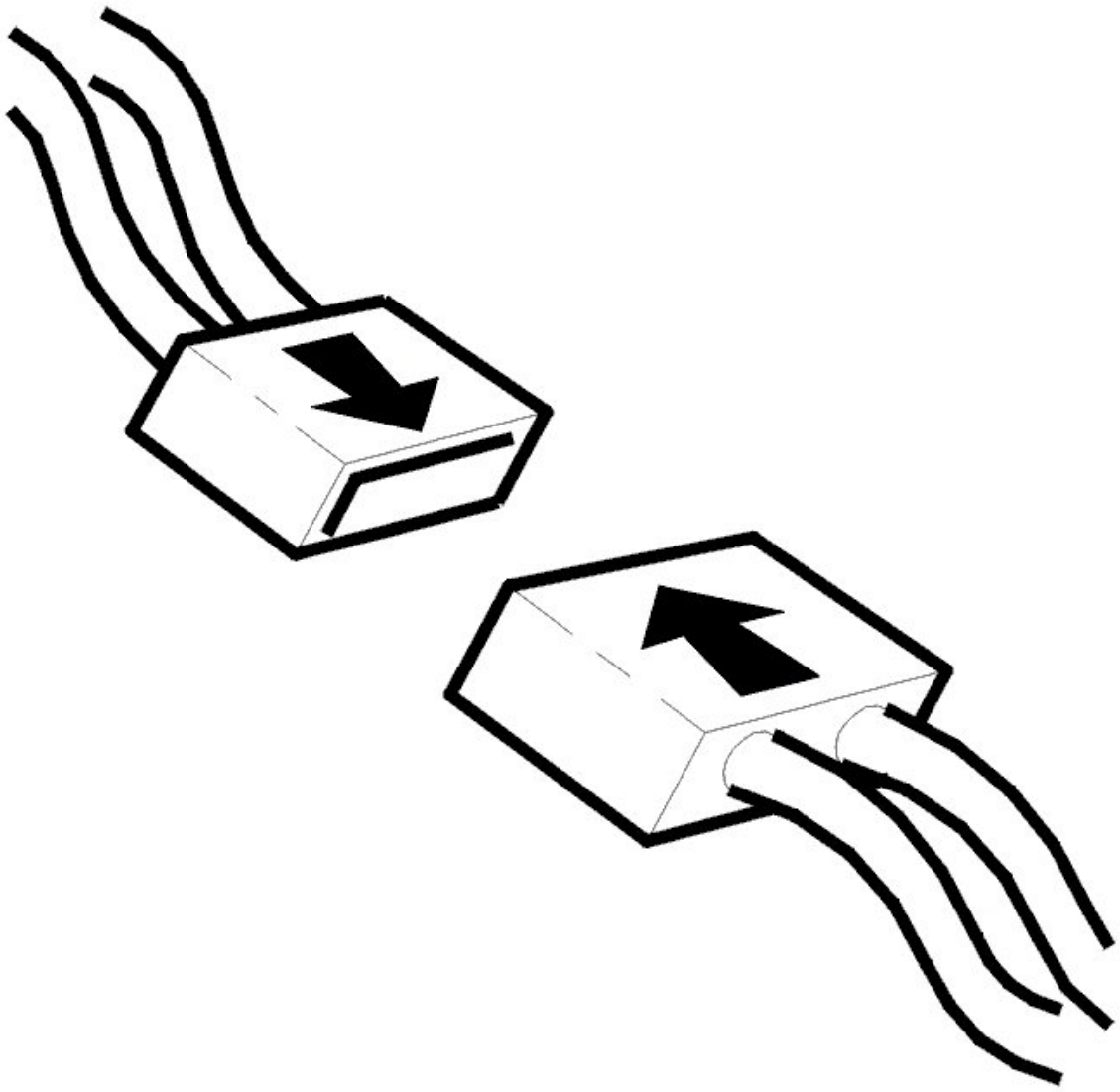
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the central locking system functions.

Does the central locking system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0016 is stored if the control module registers a too low signal in signal cable M2.
Diagnostic trouble code (DTC) DDM/PDM-0016 can be diagnosed when the deadlock activates or deactivates.

Substitute value
- None.

Possible source
- Signal cable M2 short-circuited to ground.

Fault symptom[s]
- Does not deadlock.

Signal Too Low

Signal too low

Checking components and wiring

Check signal cable M2 between door control module connector terminal #B6 and central locking motor connector terminal #7. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the door control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- For information about signals, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

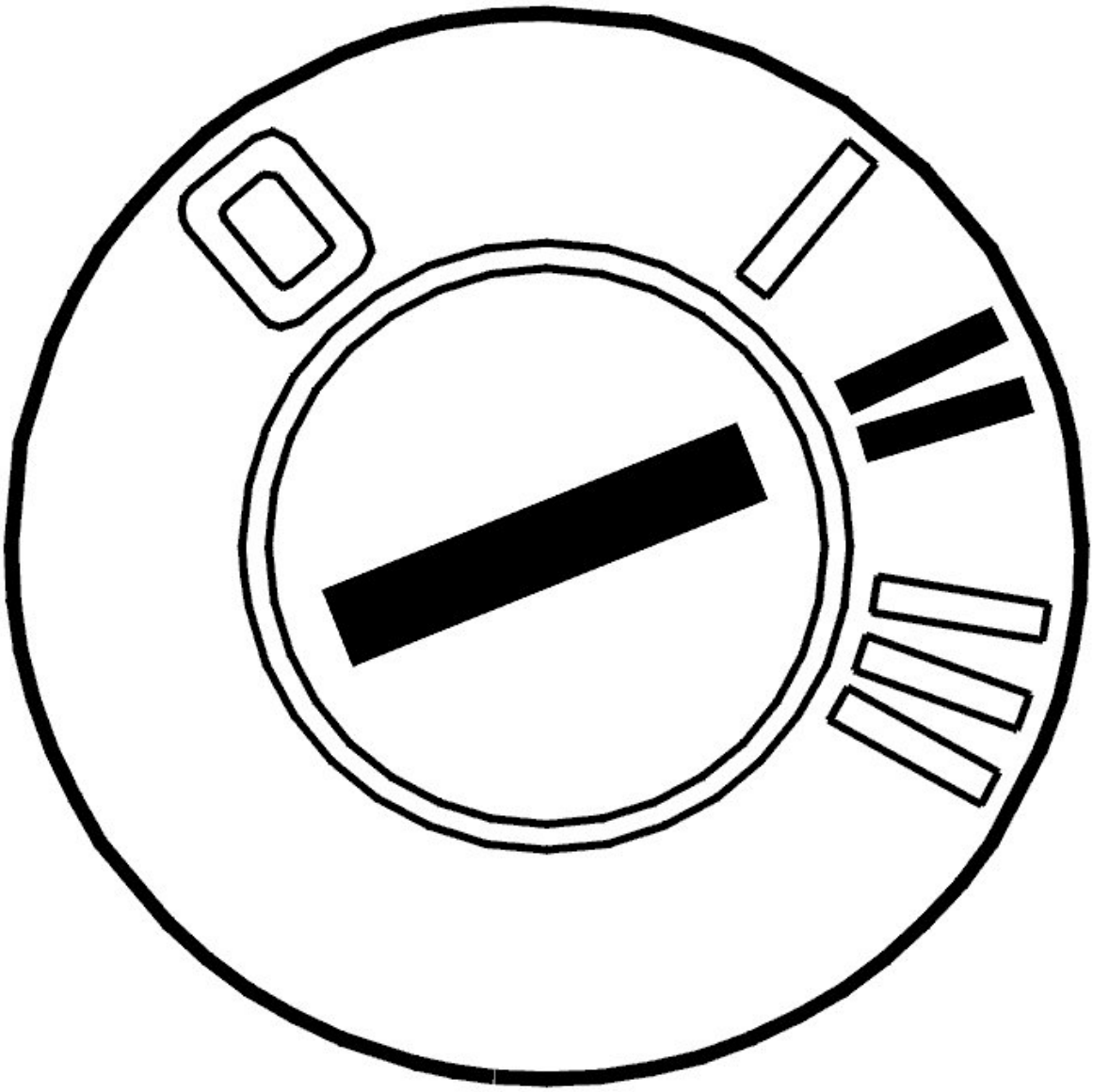
Continue - Verification

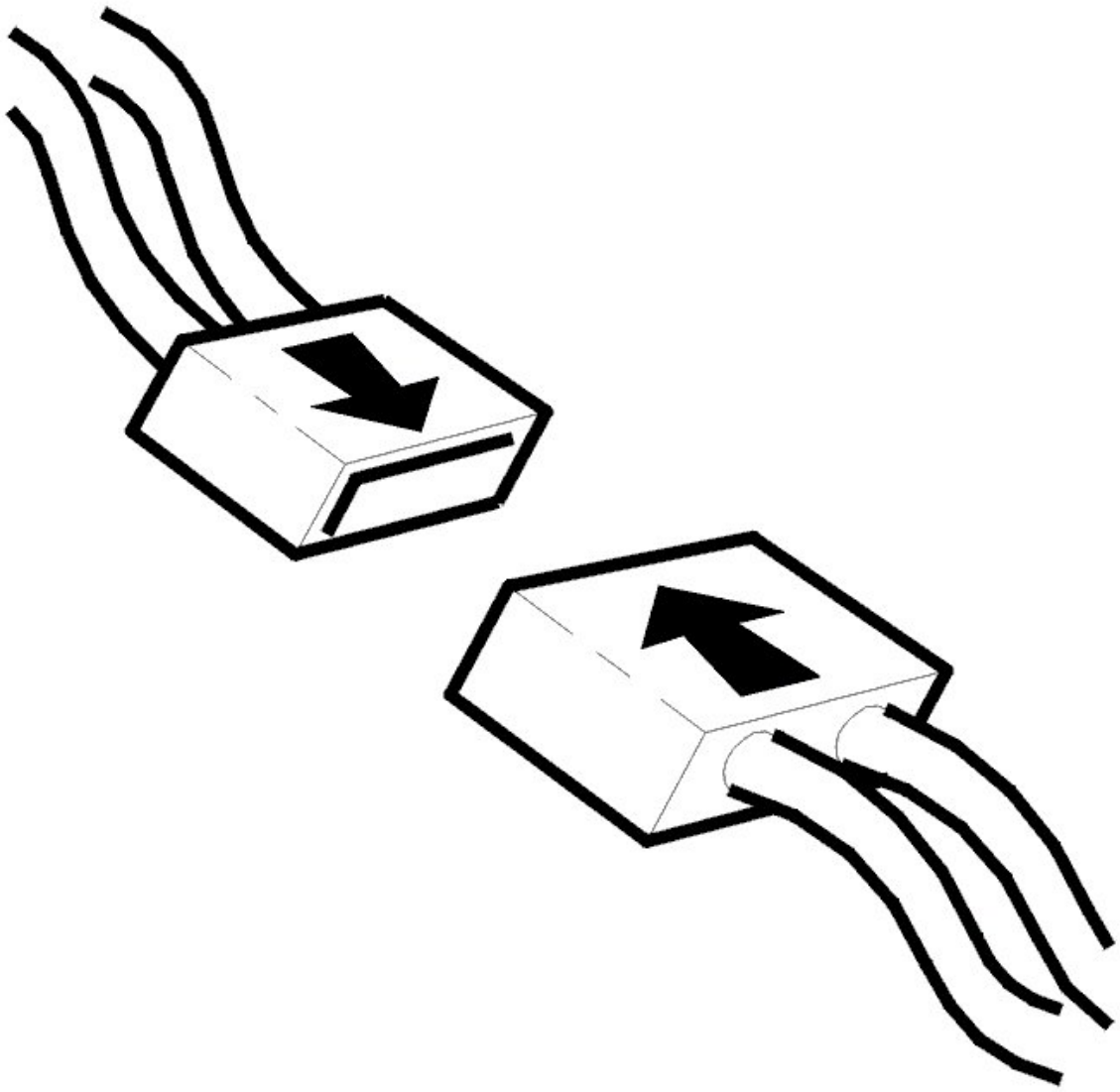
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the central locking system functions.

Does the central locking system function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit does not register a signal from Hall sensor H1 but registers a signal from Hall sensor H2 when window-lifting motor is activated, diagnostic trouble code DDM/PDM-0020 is displayed.

Substitute value
- Nothing.

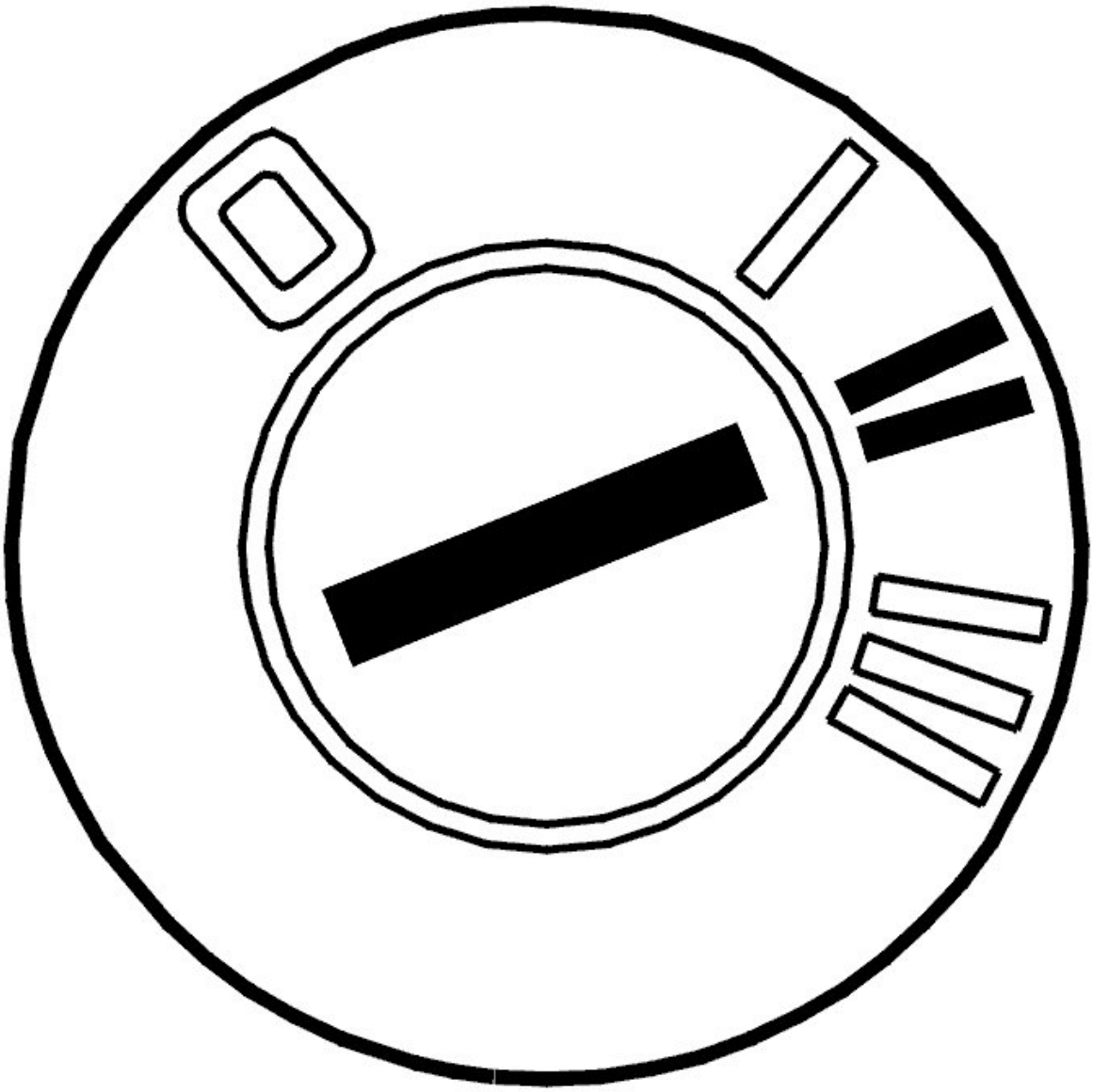
Possible source
- Hall sensor H1 does not work
- Signal wire for Hall sensor H1 short circuited
- Open circuit on Hall sensor H1 signal wire.

Fault symptom[s]
- Automatic window closer does not work.

Faulty Signal

Faulty signal

Checking faults



- Ignition on.

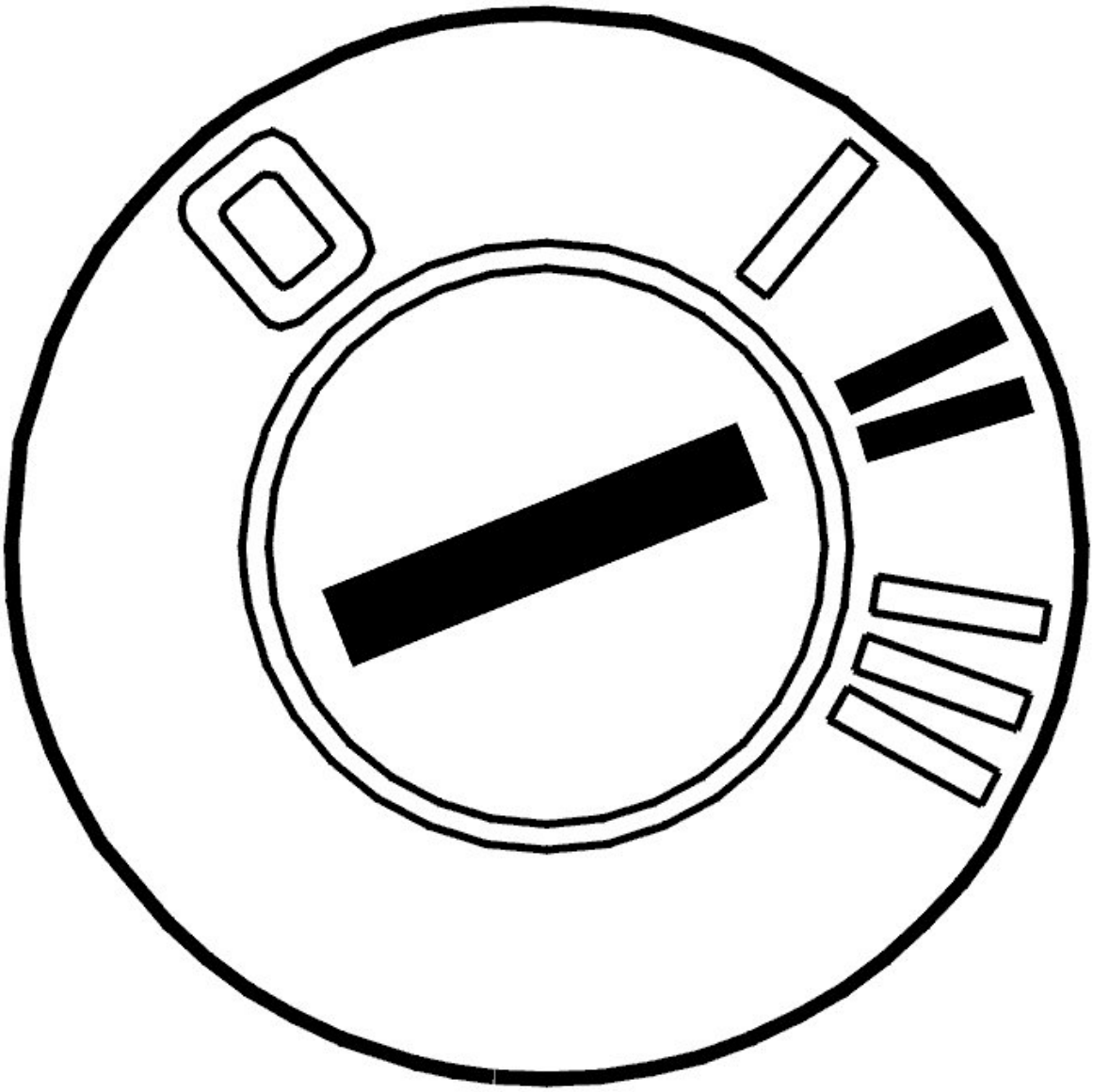
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

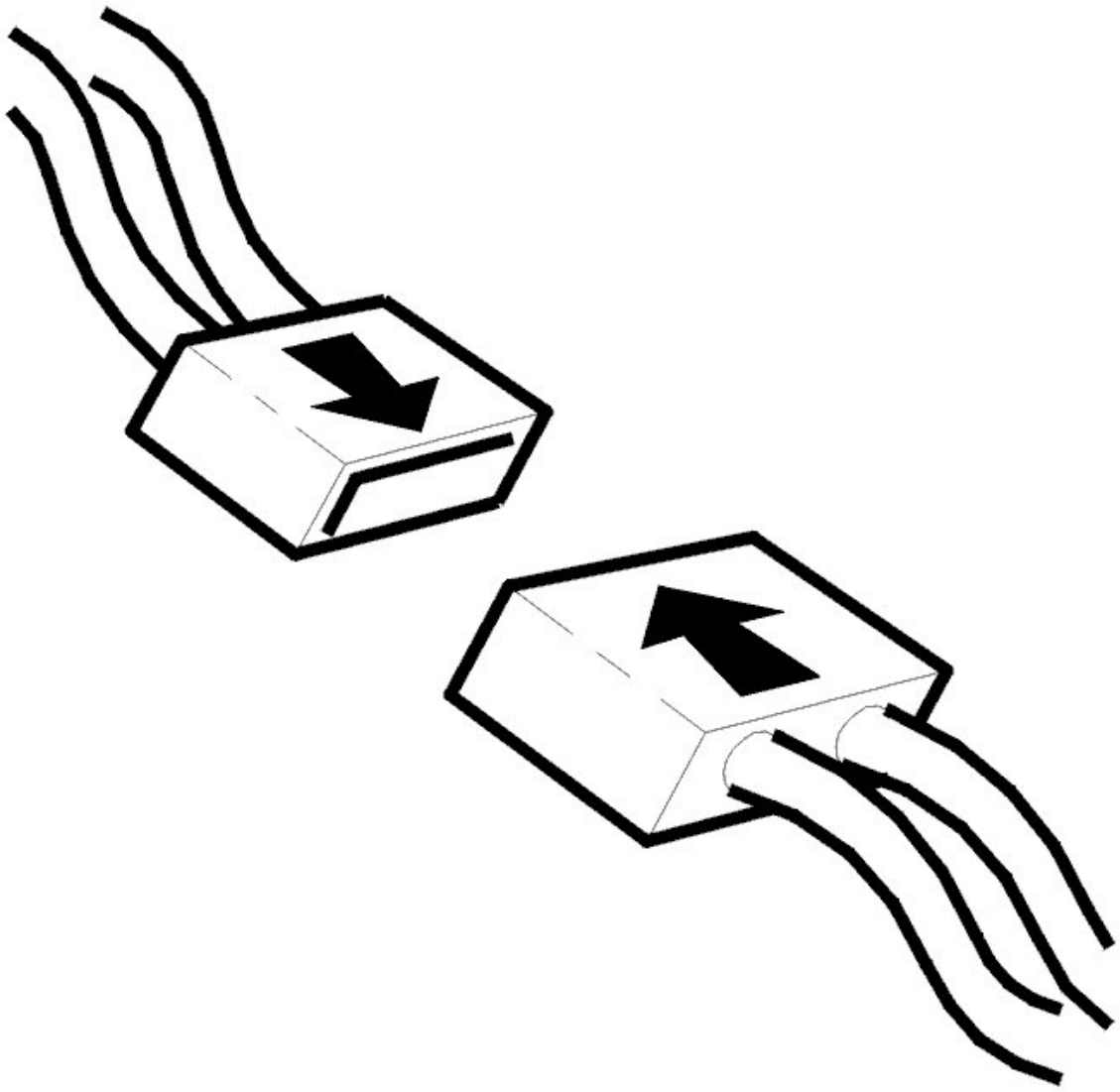
Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors



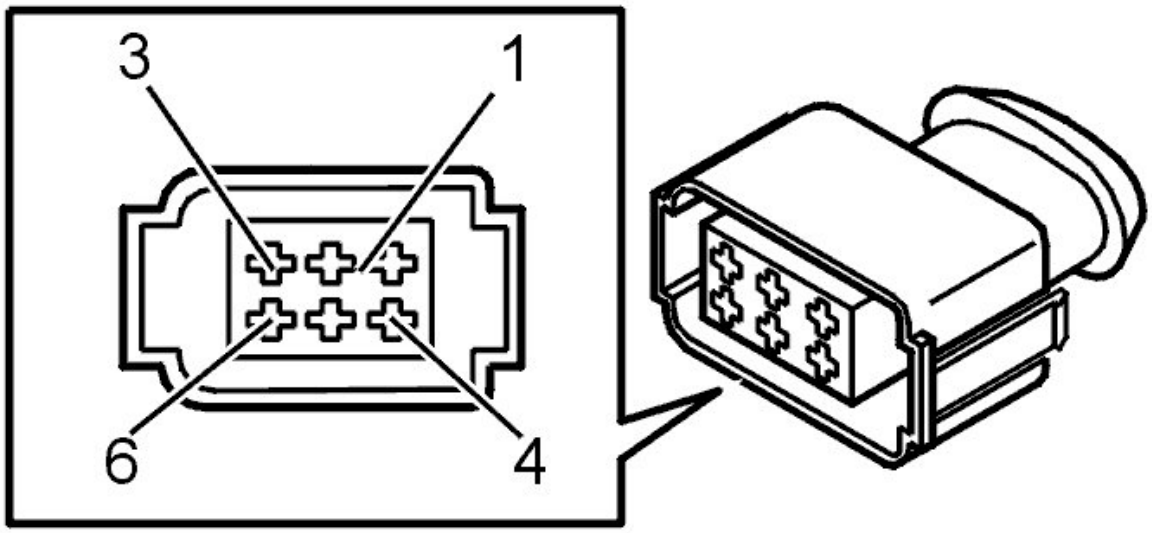


- Ignition off
- Check the power window lift motor connector. Check for contact resistance and oxidation. Remedy if necessary. In particular, check for any damage
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Press the power window switch 2 steps up and down.

Other information:

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Is the automatic power window mechanism functioning?

Yes - **Fault Found**

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

S80

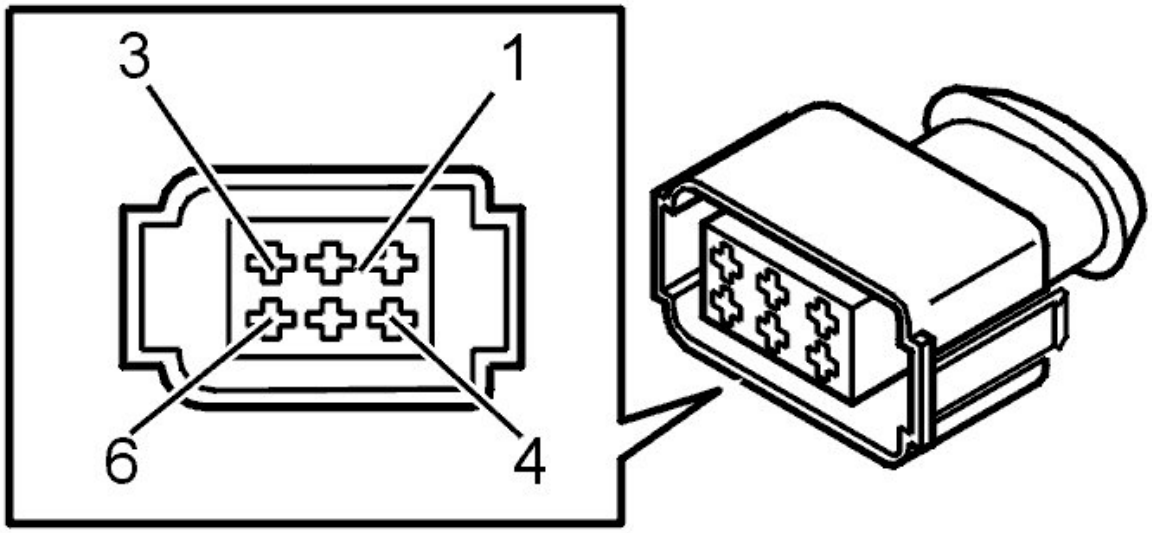
Check the cable between control module terminal #23A and the power window motor #5. Check for a short-circuit to ground. Check for an open-circuit. Check for a short-circuit to supply voltage.
When raising or lowering the window, the voltage between power window lift motor terminal #5 and ground must be 12 V.

S60, V70, XC70 and XC90

Check the cable between control module terminal #23A and power window lift motor terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #2 and ground must be 12 V.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

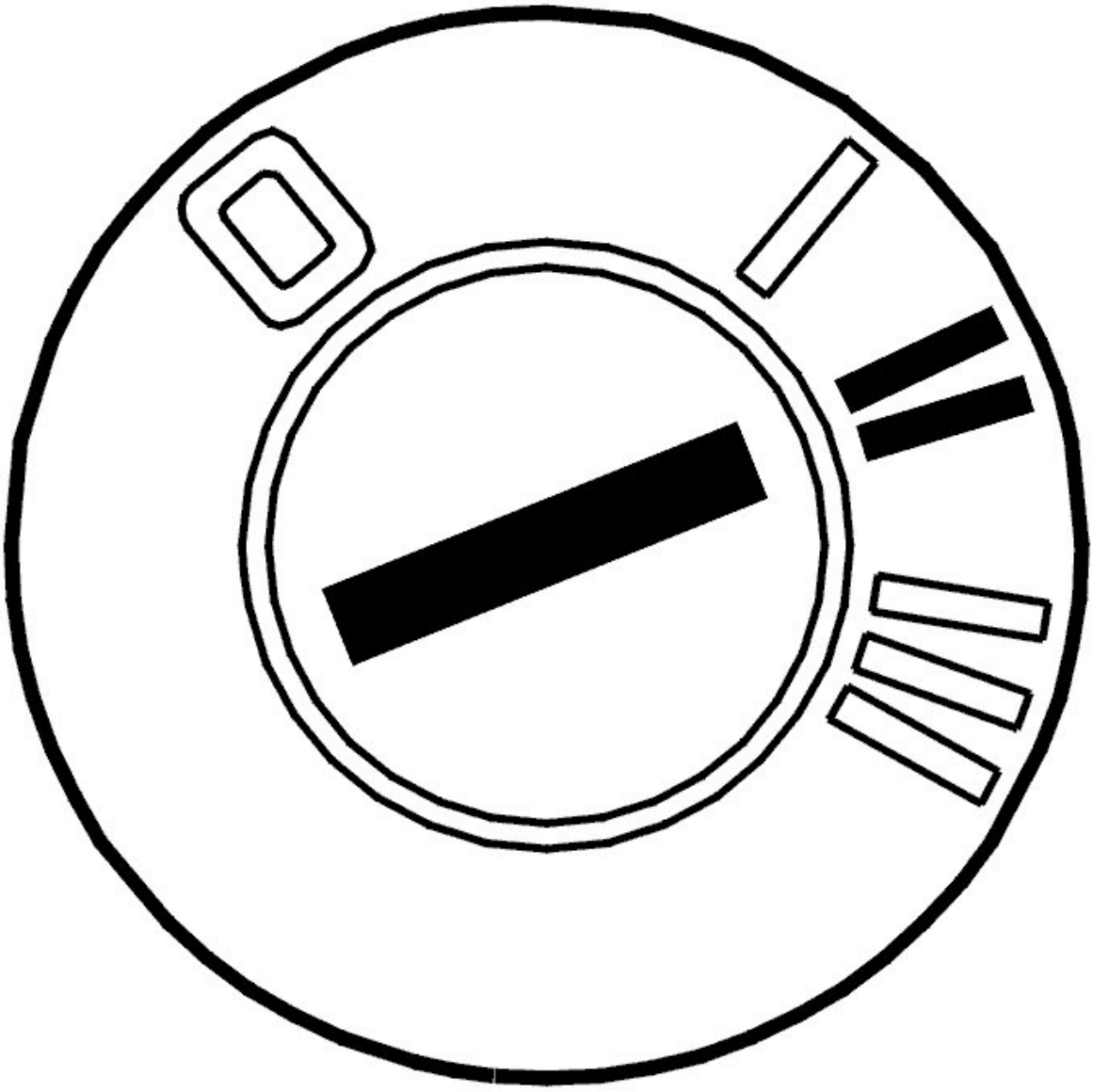


Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component



Replace the window lift mechanism.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing

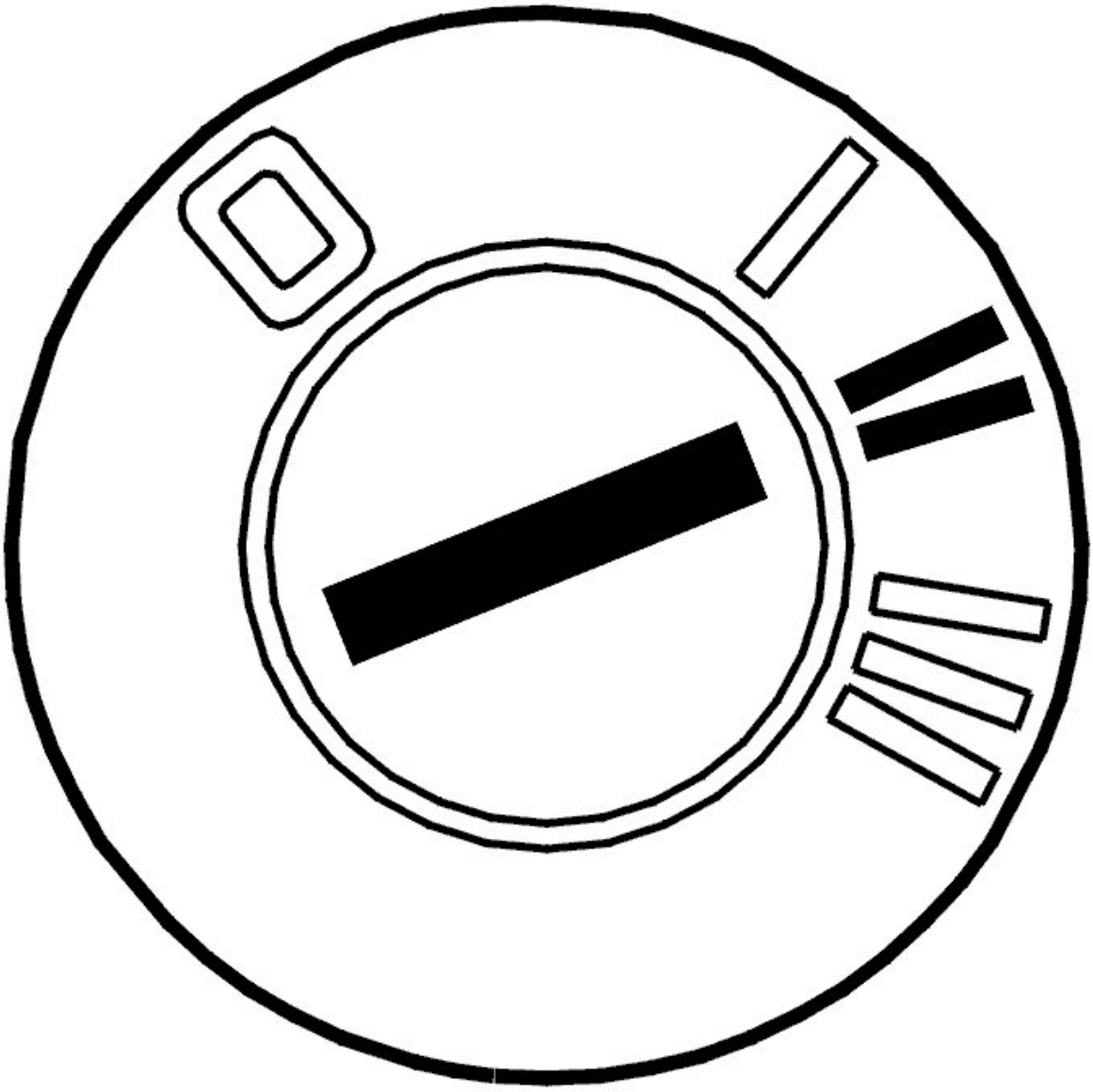
Continue - Verification

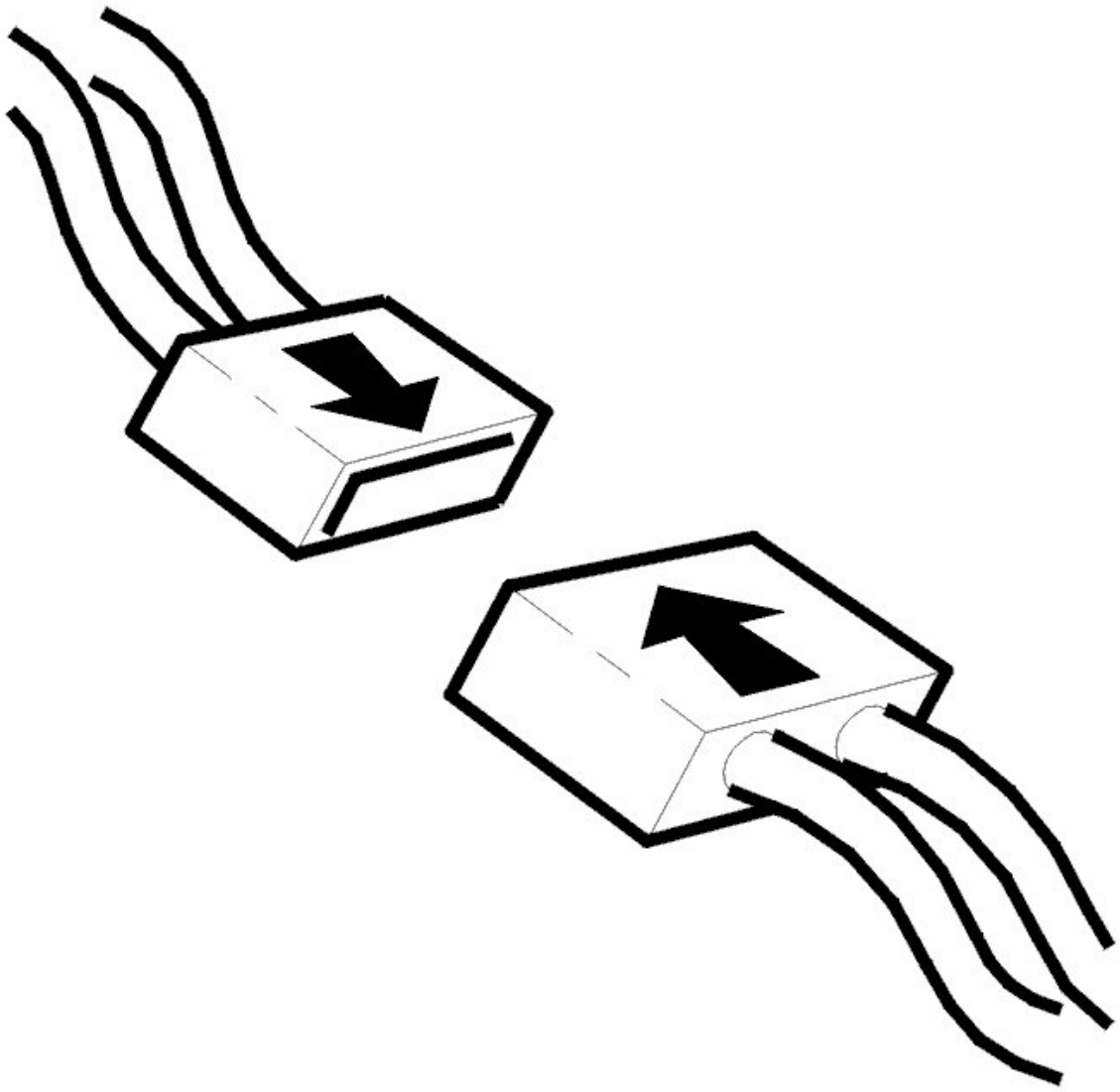
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition on.

Check that the automatic window operation works by pressing in the button 2 stages one way or the other.

Does the automatic window operation work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Intermittent fault

Check the connectors for the control module and power window lift motor. Check for contact resistance and oxidation. Check for loose connections.

S80

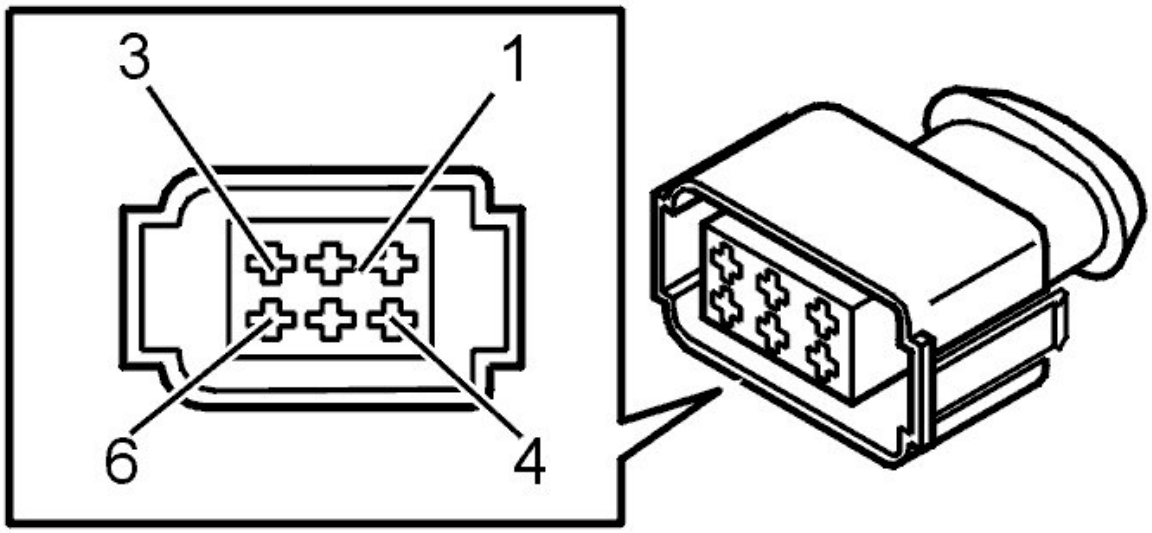
Check the cable between control module terminal #23A and power window motor terminal #5. Check for an intermittent short-circuit to ground. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #5 and ground must be 12 V.

S60, V70, XC70 and XC90

Check the cable between control module terminal #23A and power window lift motor terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #2 and ground must be 12 V.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit does not register a signal from Hall sensor H2 but registers a signal from Hall sensor H1 when window-lifting motor is activated, diagnostic trouble code DDM/PDM-0021 is displayed.

Substitute value
- Nothing.

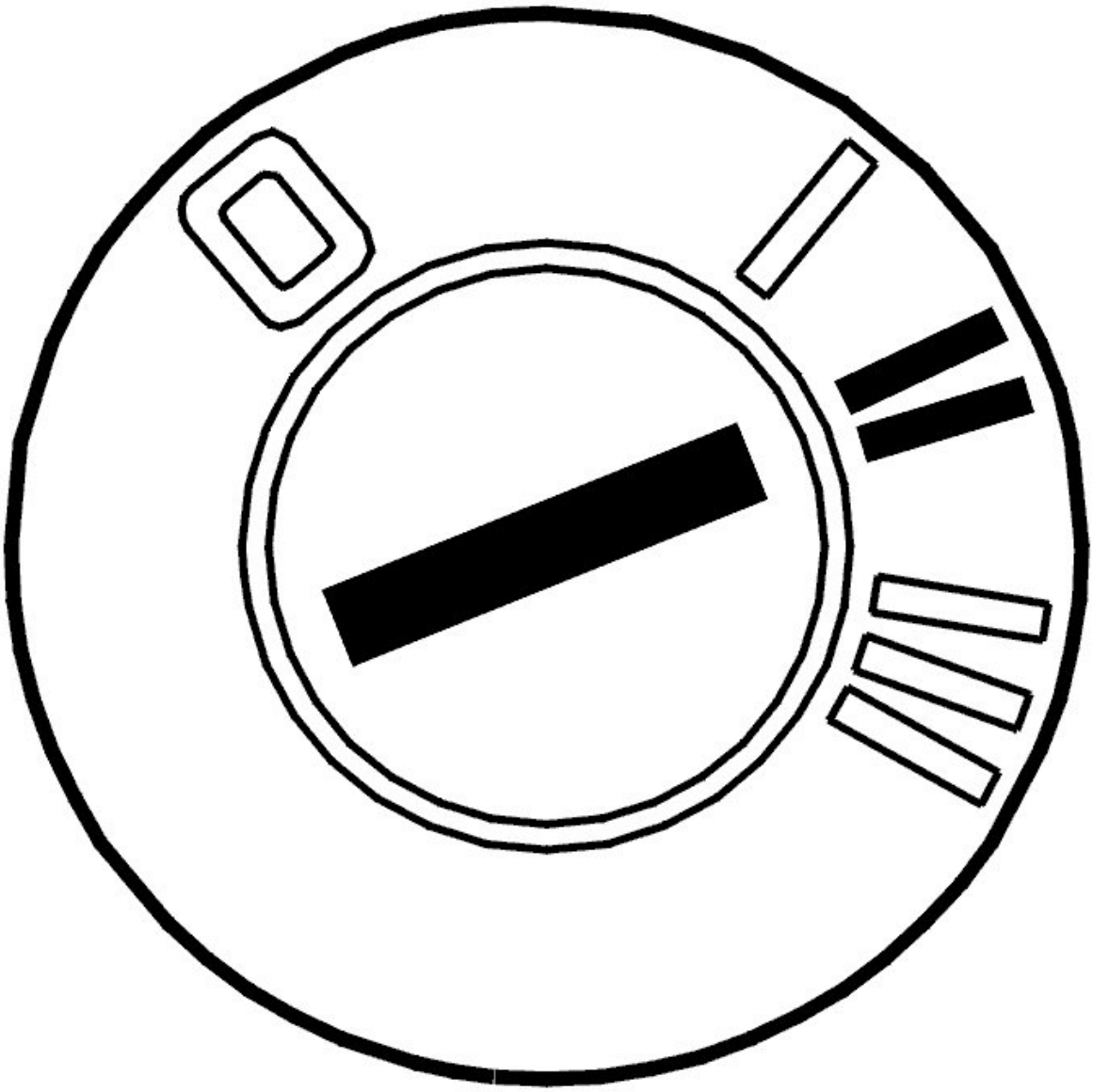
Possible source
- Hall sensor H2 does not work
- Signal wire for Hall sensor H2 short circuited
- Open circuit on Hall sensor H2 signal wire.

Fault symptom[s]
- Automatic window closer does not work.

Faulty Signal

Faulty signal

Checking faults



- Ignition on.

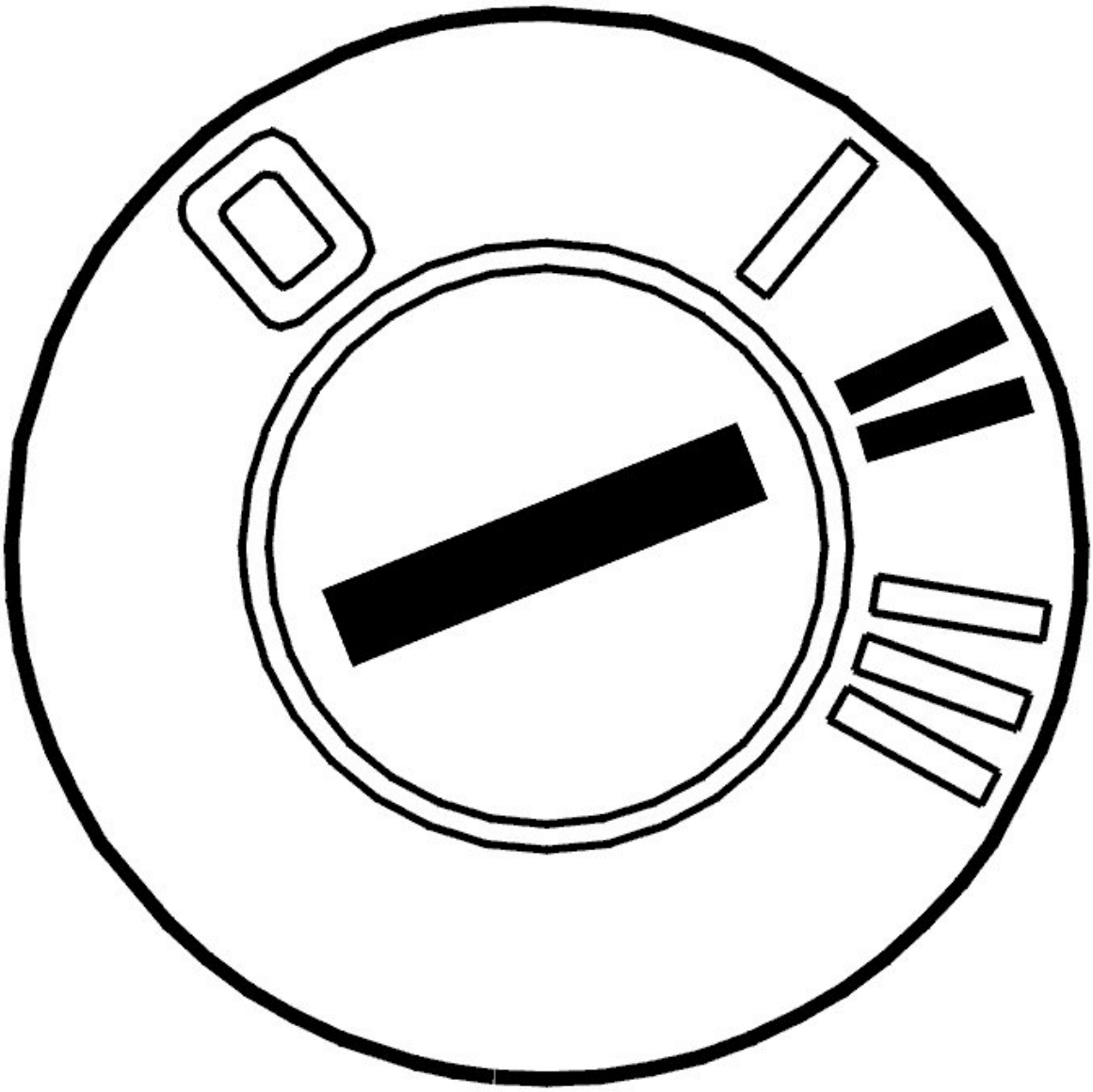
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

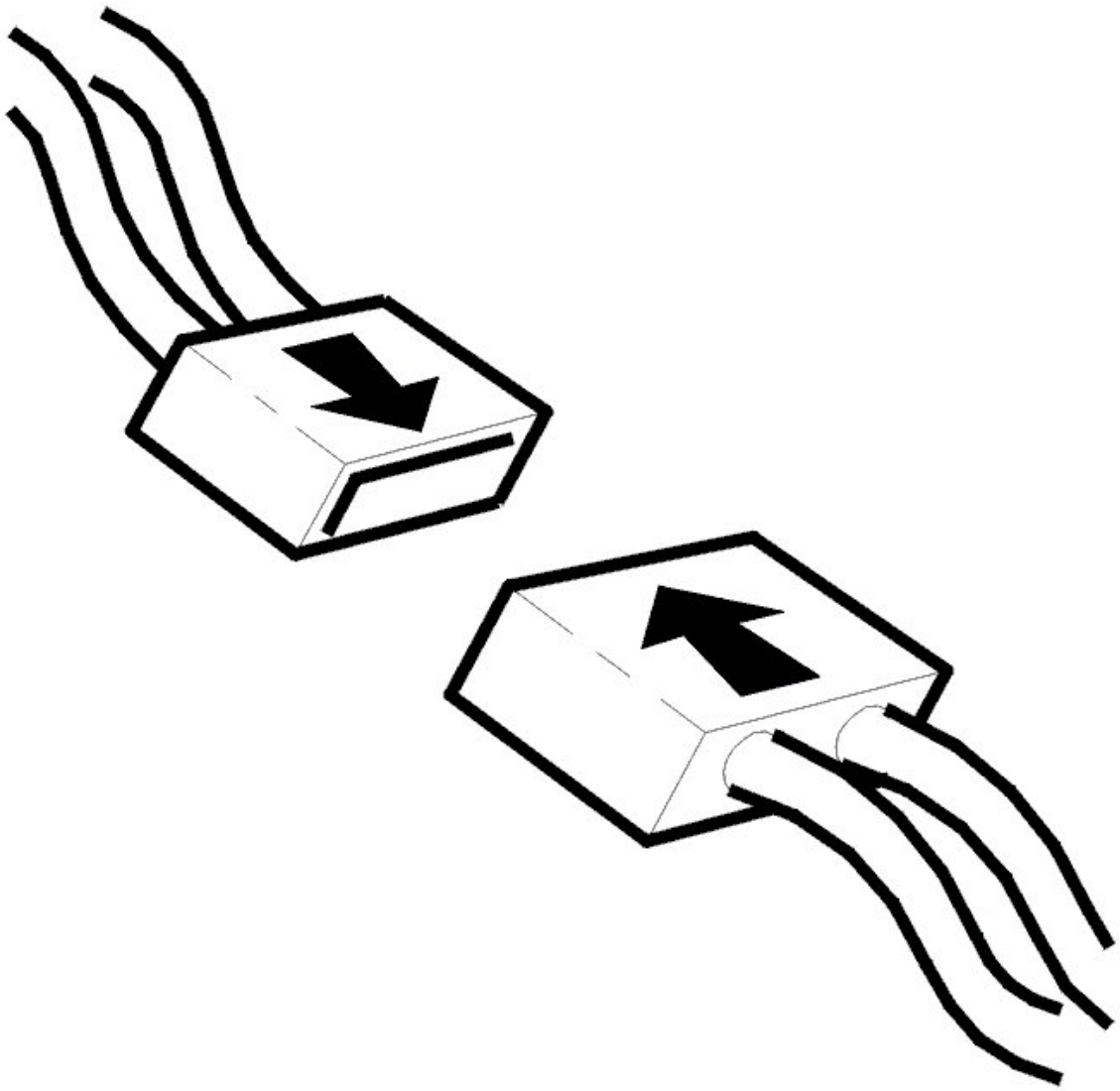
Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors



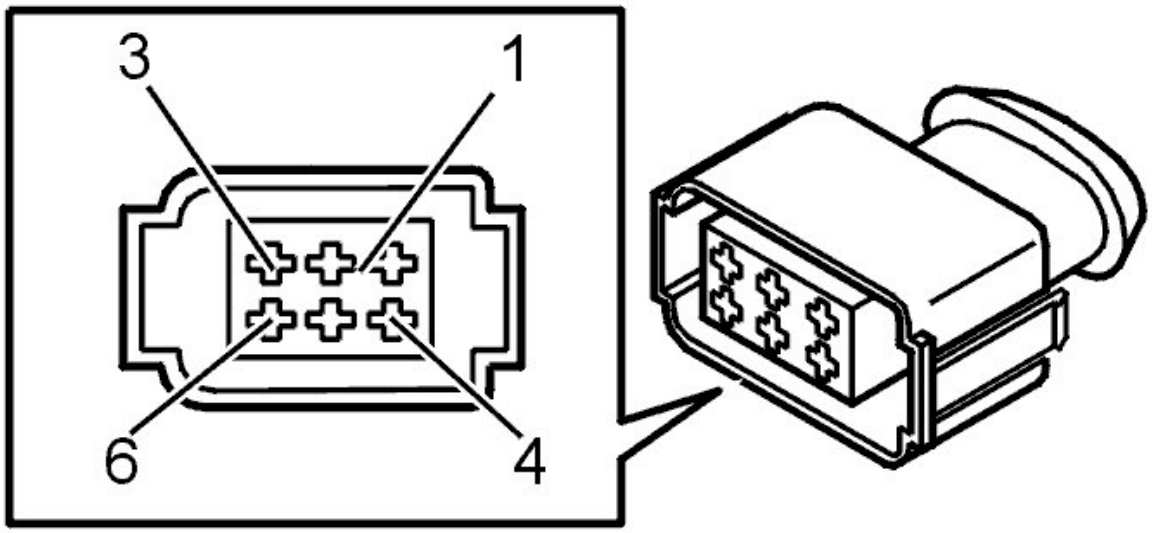


- Ignition off
- Check the power window lift motor connector. Check for contact resistance and oxidation. Check for damage carefully
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Press the power window switch 2 steps up and down.

Other information:

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Is the automatic power window mechanism functioning?

Yes - **Fault Found**

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

S80

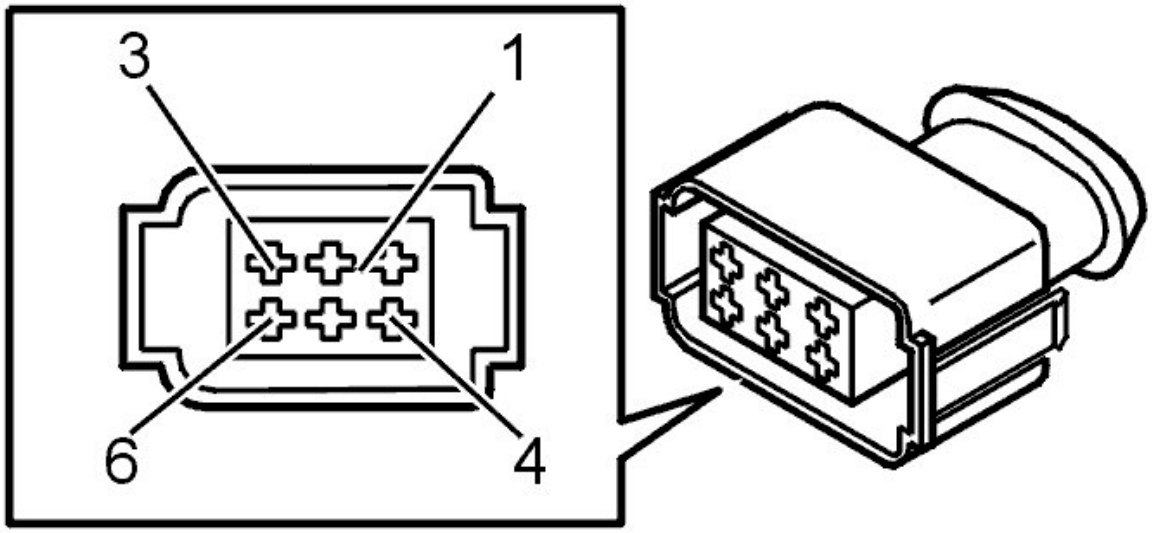
Check the cable between control module terminal #24A and power window motor connector terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open-circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #2 and ground must be 2.4 V

S60, V70, XC70 and XC90

Check the cable between control module terminal #24A and power window lift motor terminal #5. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #5 and ground must be 2.4 V.
Remedy as necessary.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

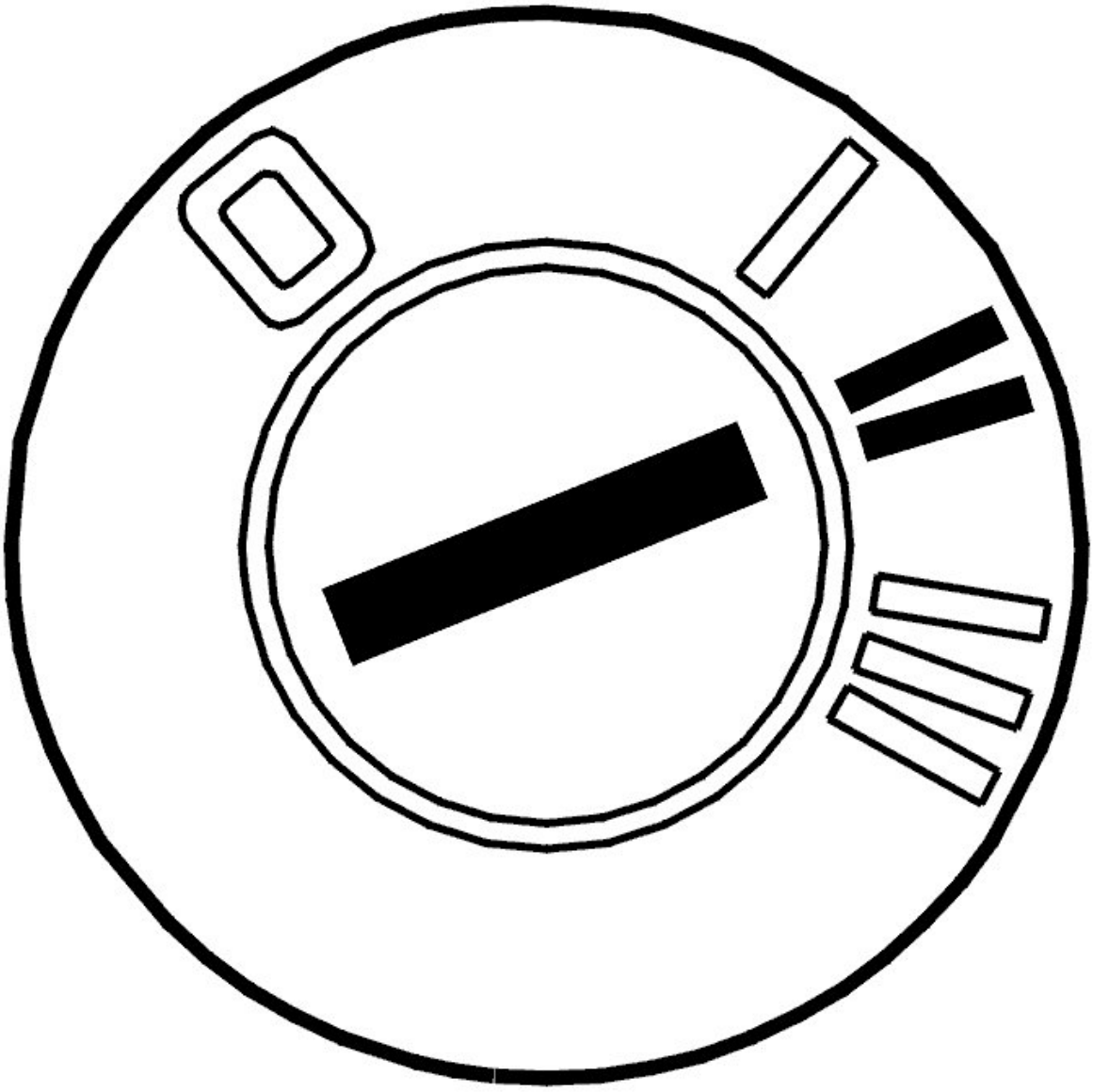


Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component



Replace the window lift mechanism.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing

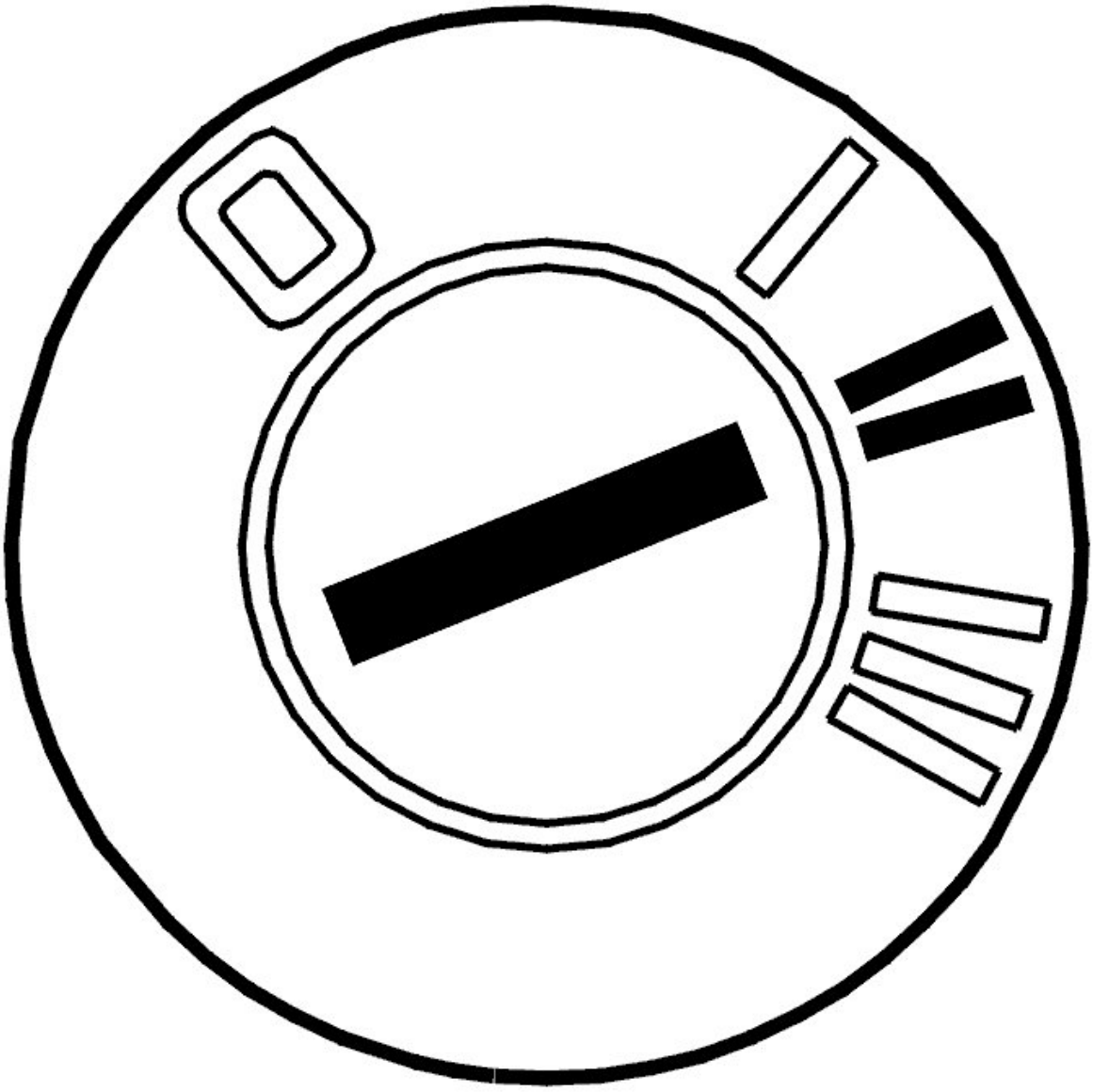
Continue - Verification

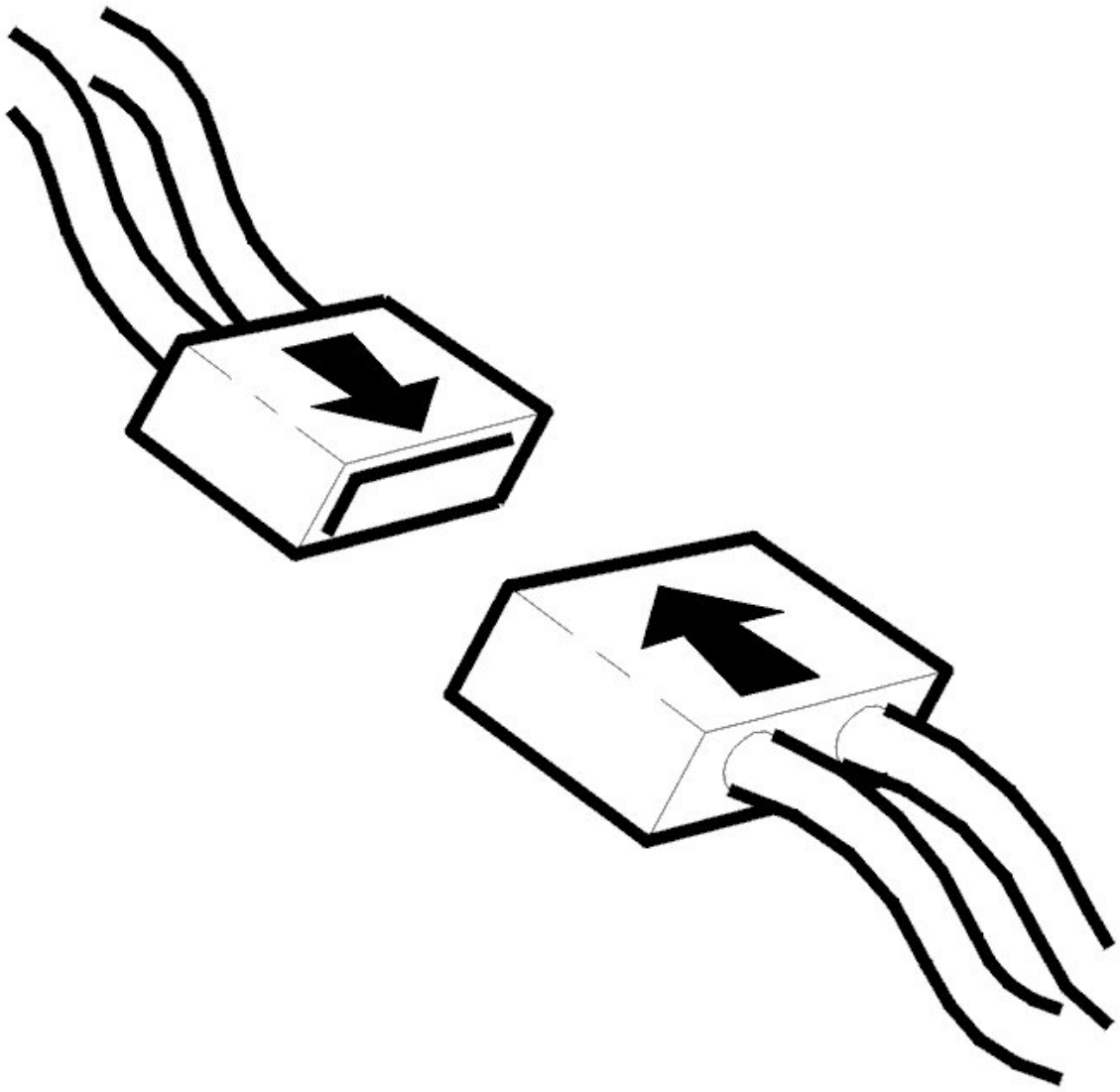
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition on.

Check that the automatic window operation works by pressing in the button 2 stages one way or the other.

Does the automatic window operation work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Intermittent fault

Check the connectors for the control module and power window lift motor. Check for contact resistance and oxidation. Check for loose connections.

S80

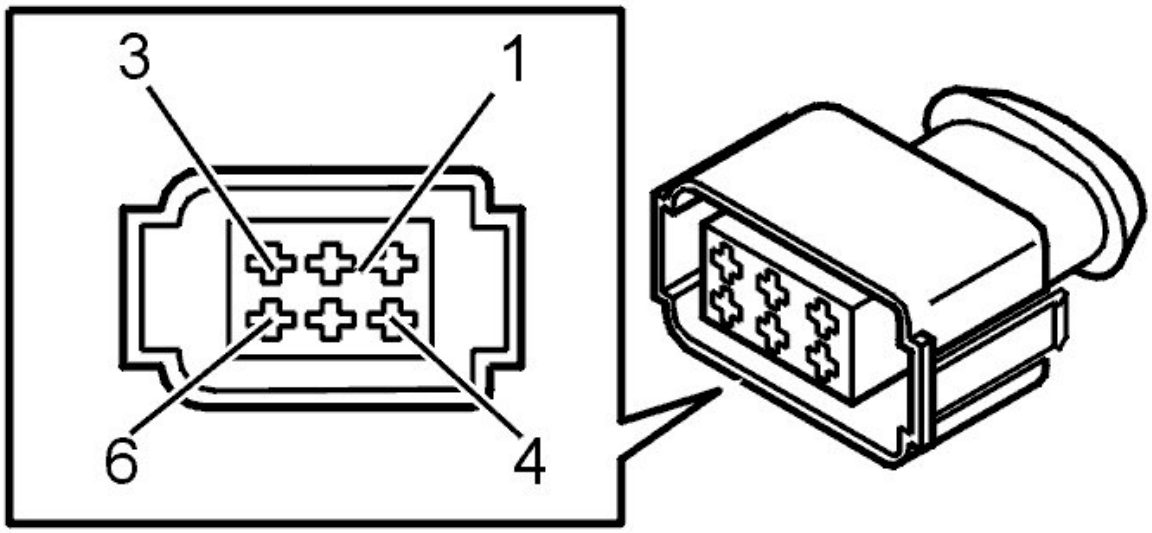
Check the cable between control module terminal #24A and power window motor terminal #2. Check for an intermittent short-circuit to ground. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #2 and ground must be 2.4 V

S60, V70, XC70 and XC90

Check the cable between control module terminal #24A and power window lift motor terminal #5. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
When raising or lowering the window, the voltage between power window lift motor terminal #5 and ground must be 2.4 V.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit does not register a signal from Hall sensors H1 and H2 when window-lifting motor is activated, diagnostic trouble code DDM/PDM-0022 is displayed.

Substitute value
- Nothing.

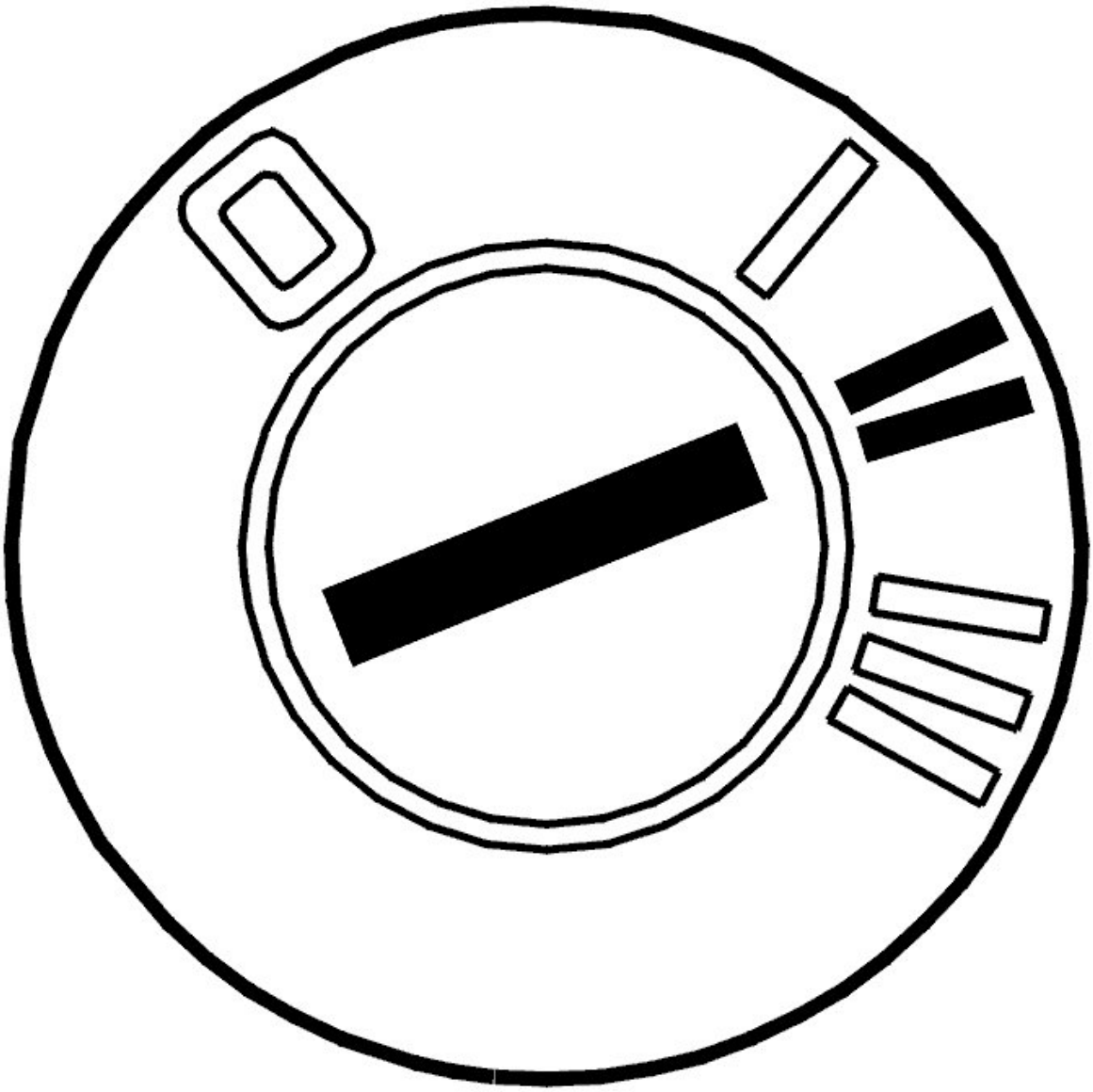
Possible source
- Hall sensors H1 and H2 do not work
- Signal wire for Hall sensors H1 and H2 short circuited
- Open circuit on signal wire for Hall sensors H1 and H2
- Open circuit or short circuit to ground on Hall sensor supply wire or ground.

Fault symptom[s]
- Automatic window closer does not work.

Faulty Signal

Faulty signal

Checking faults



- Ignition on.

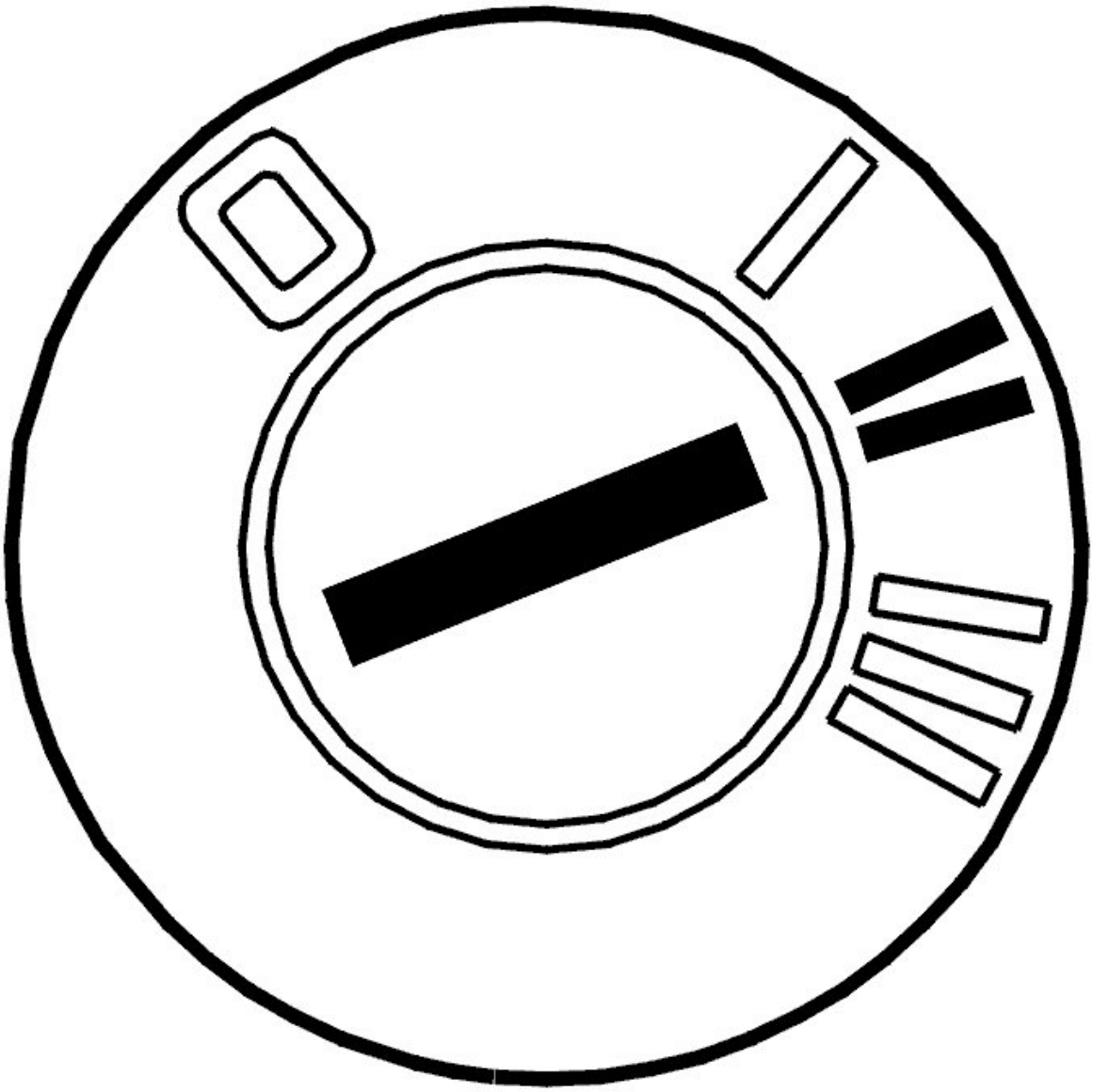
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

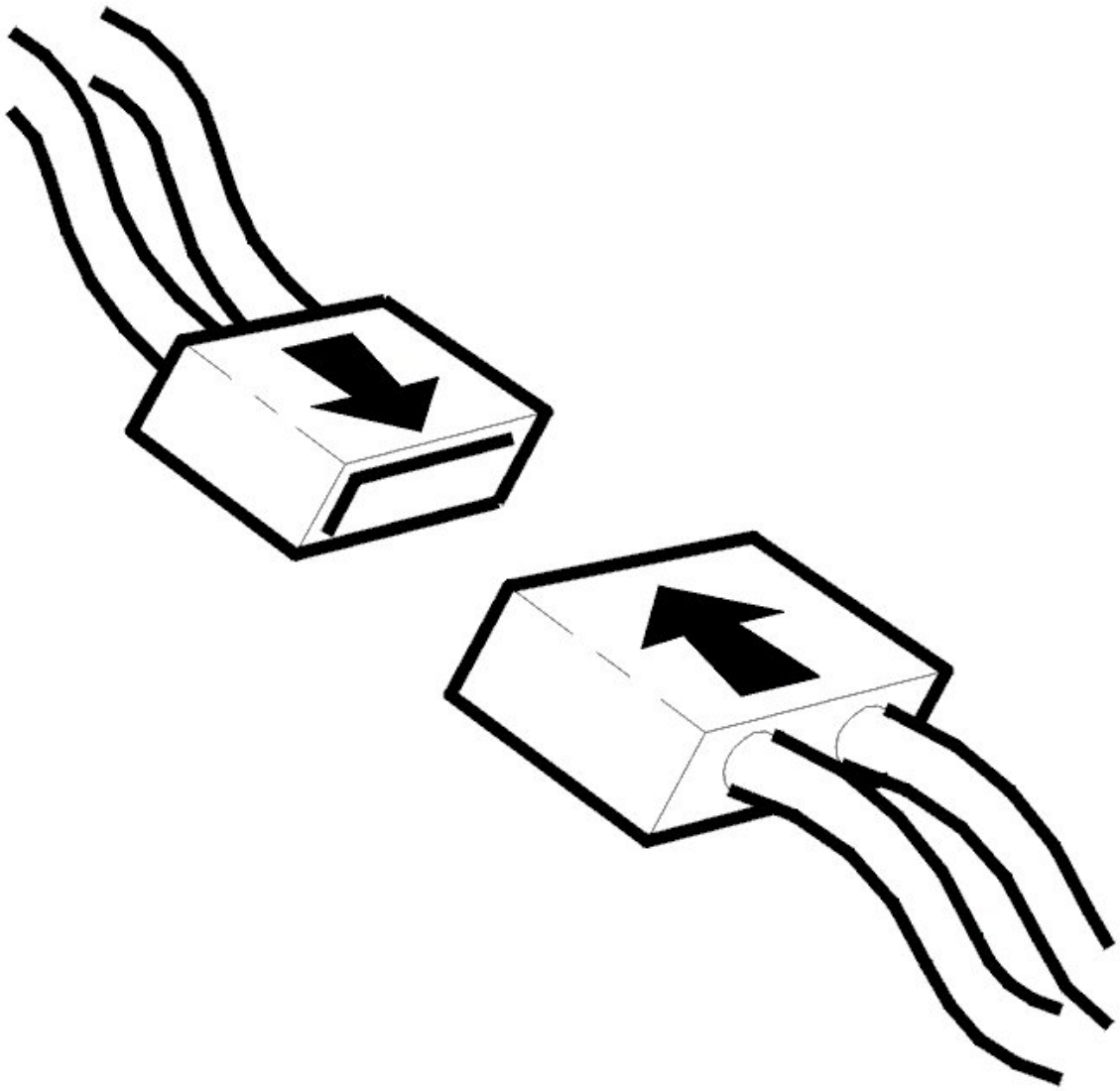
Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors



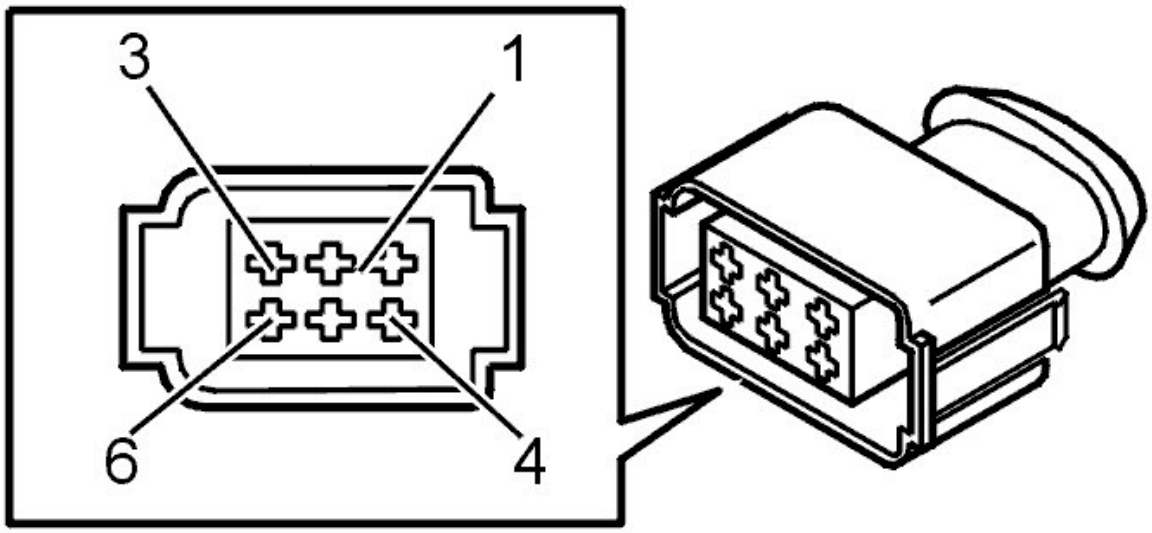


- Ignition off
- Check the power window lift motor connector. Check for contact resistance and oxidation. Check for damage carefully
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Press the power window switch 2 steps up and down.

Other information:

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Is the automatic power window mechanism functioning?

Yes - Verification

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

S80

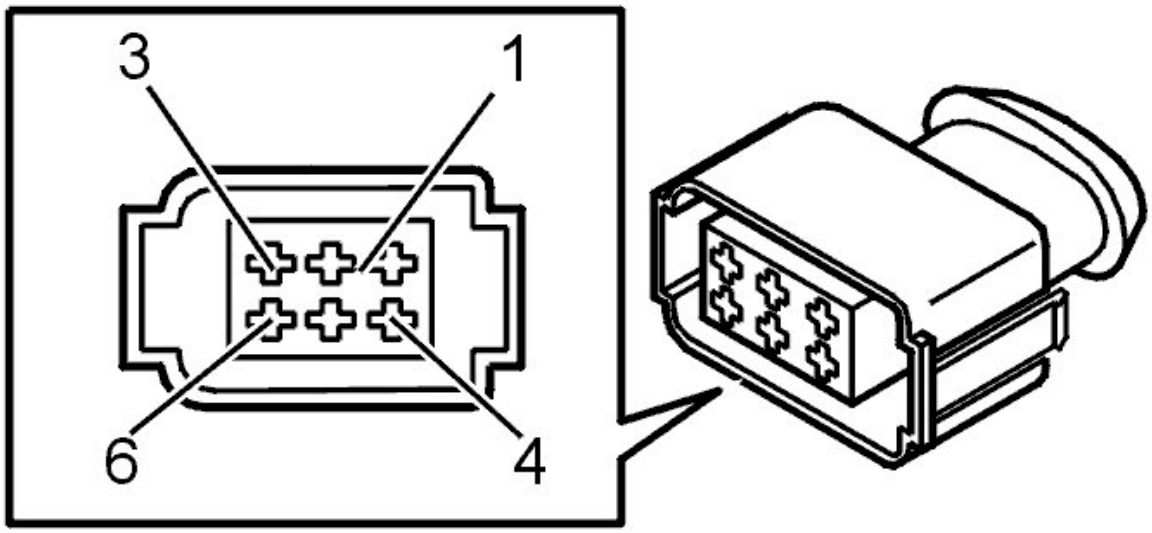
Check the cable between control module terminal #23A and power window motor connector terminal #5. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the cable between control module terminal #16A and power window lift motor connector terminal #4. Check for a short-circuit to ground. Check for an open-circuit.
Check the cable between control module terminal #19A and power window lift motor connector terminal #1. Check for an open-circuit.
Check the cable between control module terminal #24A and power window motor connector terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open-circuit.

S60, V70, XC70 and XC90

Check the cable between control module terminal #23A and power window lift motor terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
Check the cable between control module terminal #16A and power window lift motor connector terminal #4. Check for a short-circuit to ground. Check for an open-circuit.
Check the cable between control module terminal #19A and power window lift motor connector terminal #1. Check for an open-circuit.
Check the cable between control module terminal #24A and power window lift motor terminal #5. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
Remedy as necessary.

Other information:

- The voltage must be approximately 2.4 V between terminal #24A or terminal #23A and ground when the window is being operated up or down
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

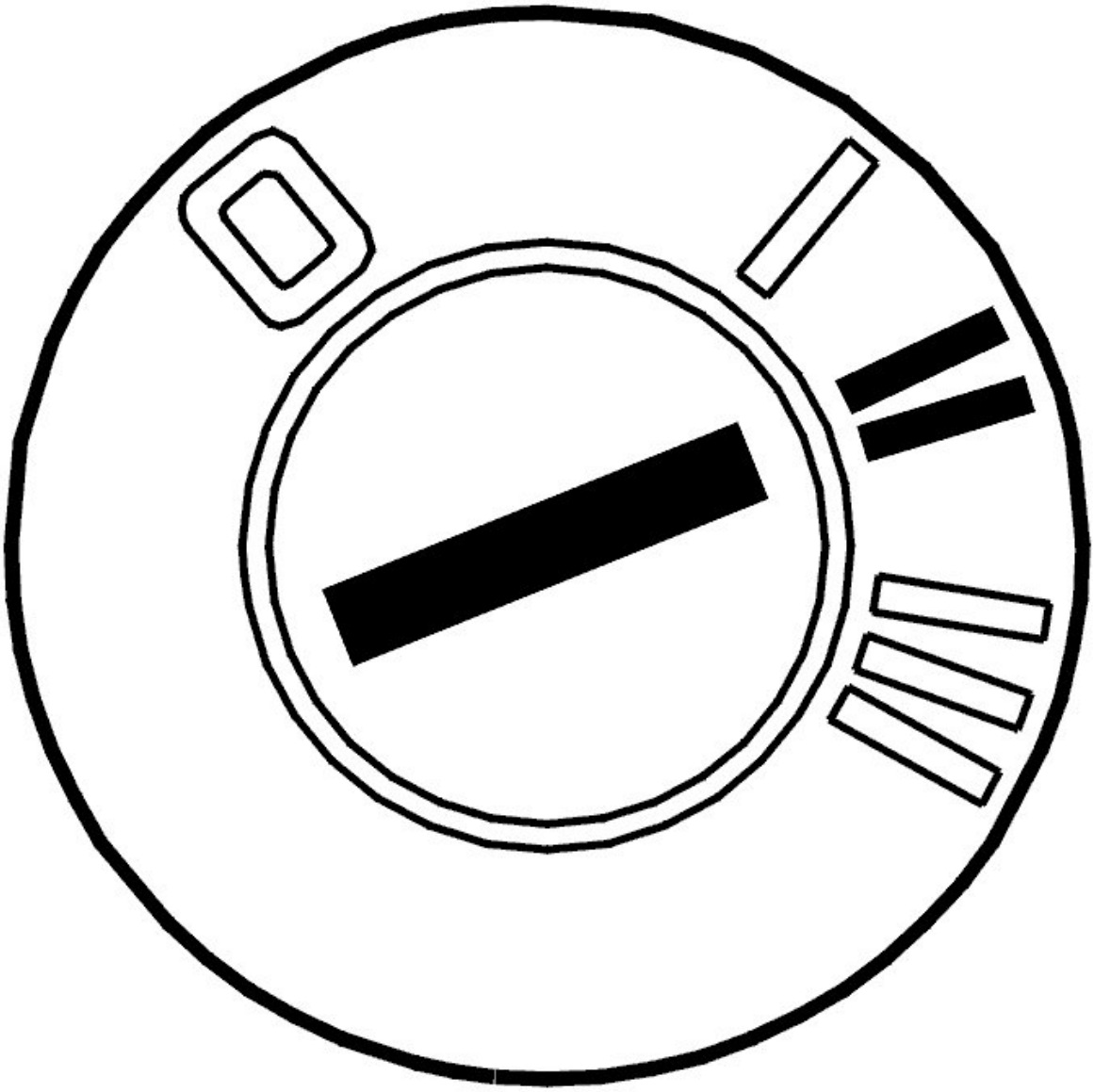


Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component



Replace the window lift mechanism.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information

- Window lift mechanism front side door, replacing See: Body and Frame/Doors, Hood and Trunk/Doors/Front Door/Front Door Window Regulator/Service and Repair/Window Lift Mechanism Front Side Door, Replacing

Continue - Verification

Intermittent fault

Check the connectors for the control module and power window lift motor. Check for contact resistance and oxidation. Check for loose connections.

S80

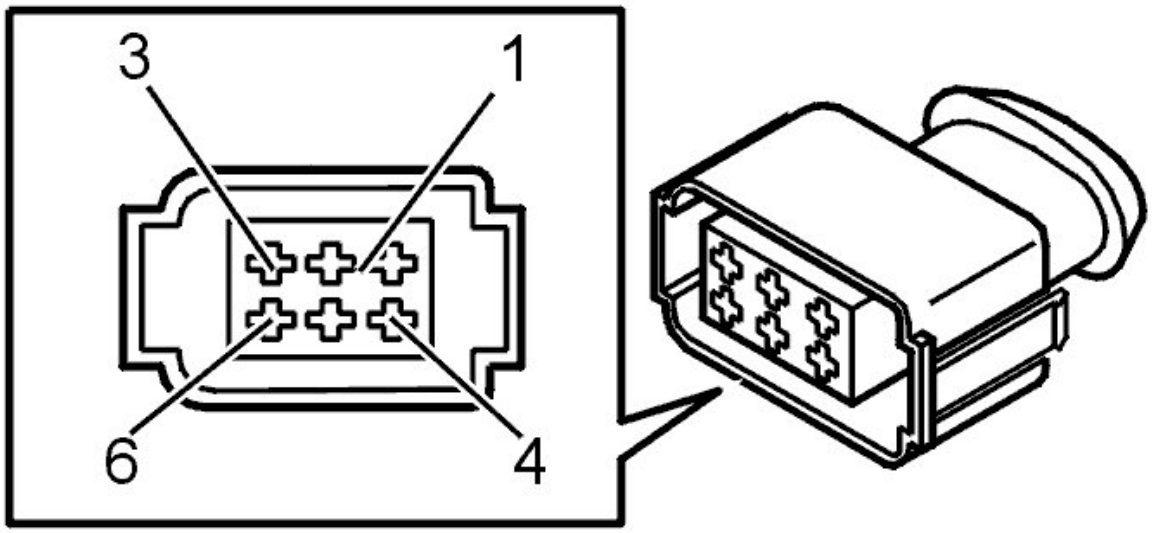
Check the cable between control module terminal #23A and power window lift motor terminal #5. Check the cable between control module terminal #24A and power window lift motor terminal #2. Check for an intermittent short-circuit to ground. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
Check the cable between control module terminal #16A and power window lift motor connector terminal #4. Check for an intermittent short-circuit to ground. Check for an intermittent open-circuit.
Check the cable between control module terminal #19A and power window lift motor connector terminal #1. Check for an intermittent open-circuit.

S60, V70, XC70 and XC90

Check the cable between control module terminal #23A and power window lift motor terminal #2. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit. Check the cable between control module terminal #24A and power window lift motor terminal #5. Check for a short-circuit to ground. Check for a short-circuit to supply voltage. Check for an open circuit.
Check the cable between control module terminal #16A and power window lift motor connector terminal #4. Check for an intermittent short-circuit to ground. Check for an intermittent open-circuit.
Check the cable between control module terminal #19A and power window lift motor connector terminal #1. Check for an intermittent open-circuit.

Other information:

- The voltage must be approximately 2.4 V between terminal #24A or terminal #23A and ground when the window is being operated up or down
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



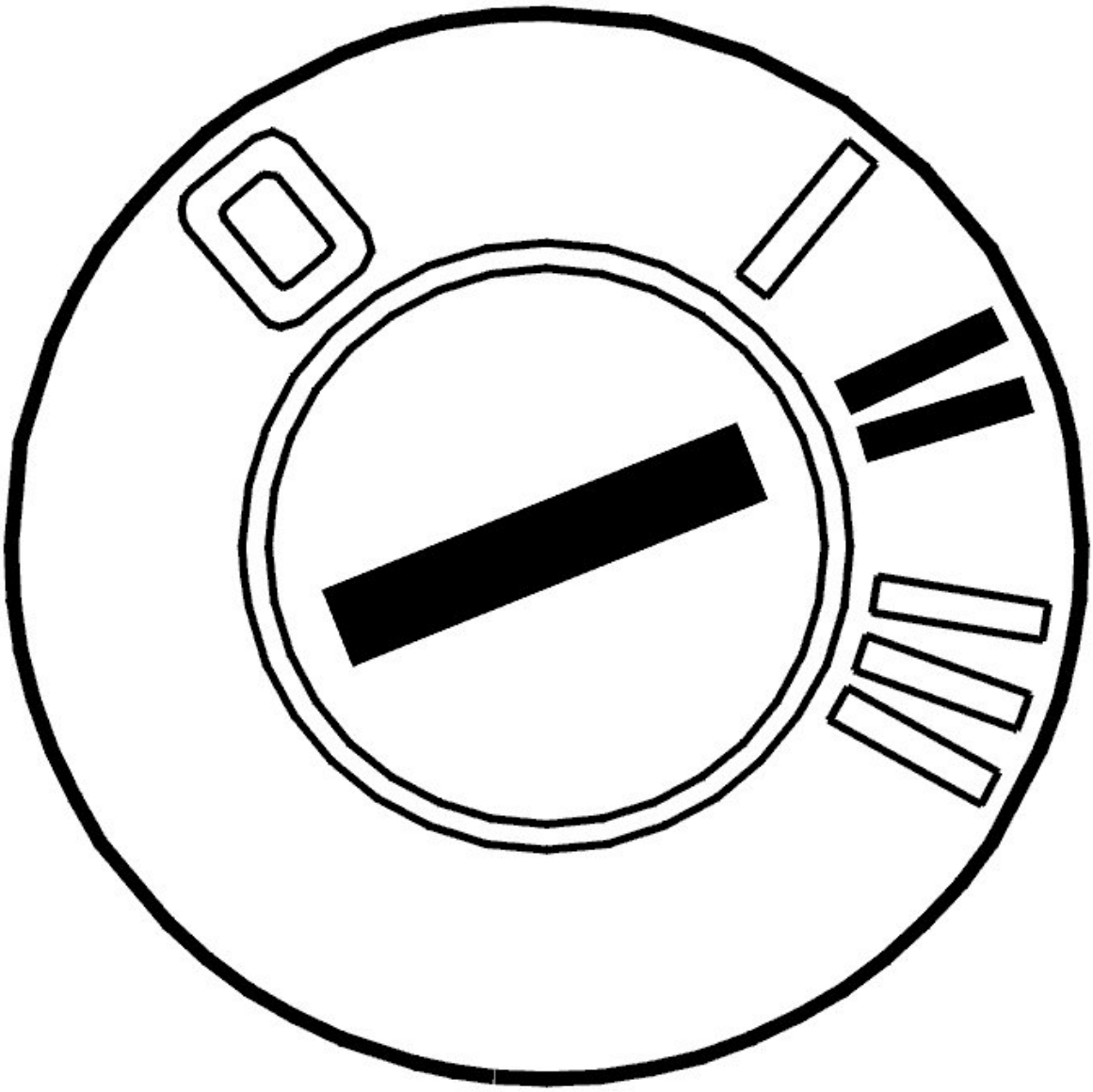
Continue - Fault-tracing information

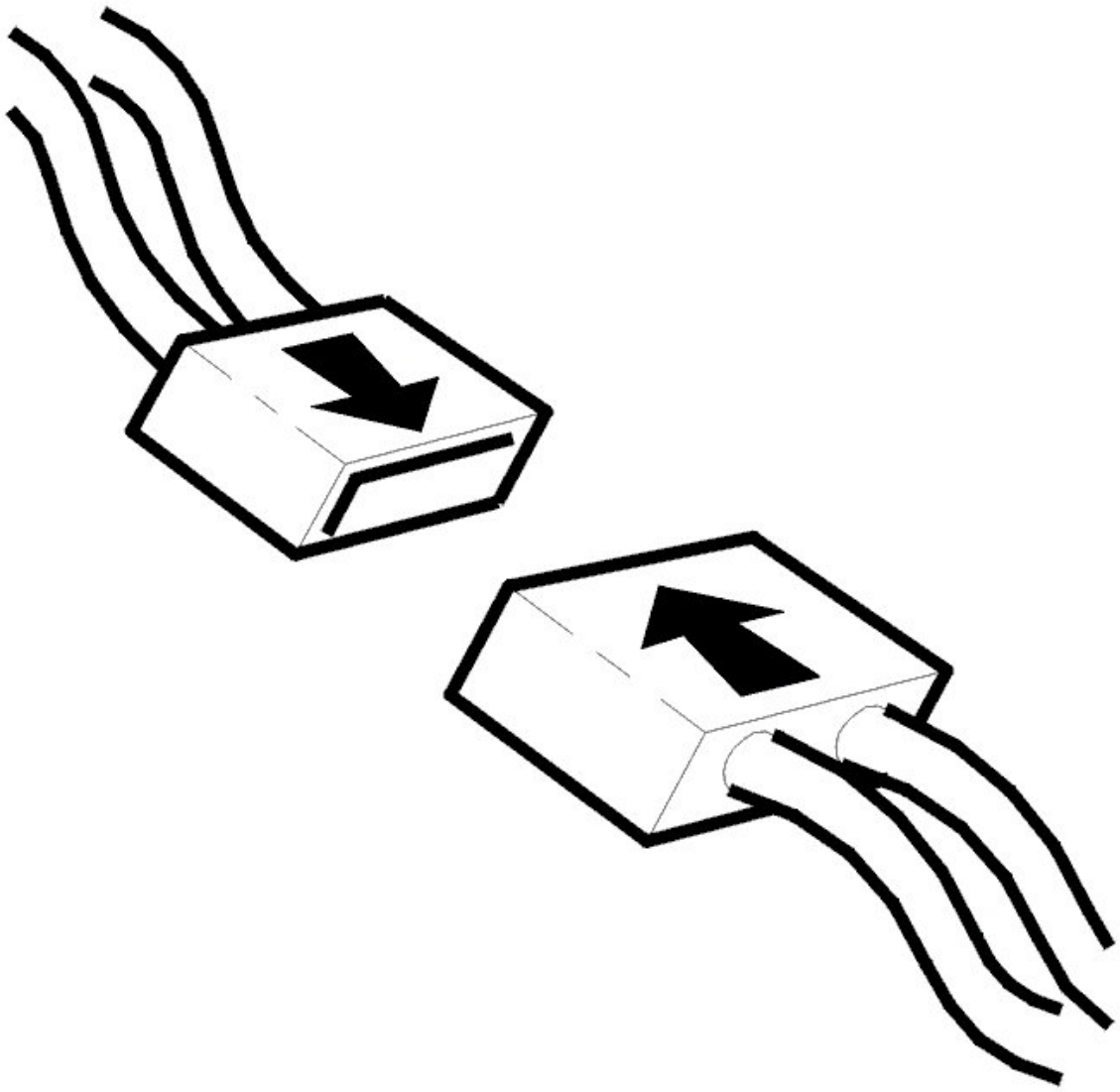
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connectors, install components, etc.
- Ignition on.

Check that the automatic window operation works by pressing in the button 2 stages one way or the other.

Does the automatic window operation work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking faults

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking faults

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0023 is stored if door mirror down is activated at the same time as the control module registers that there is voltage in the cable.

Substitute value
- None.

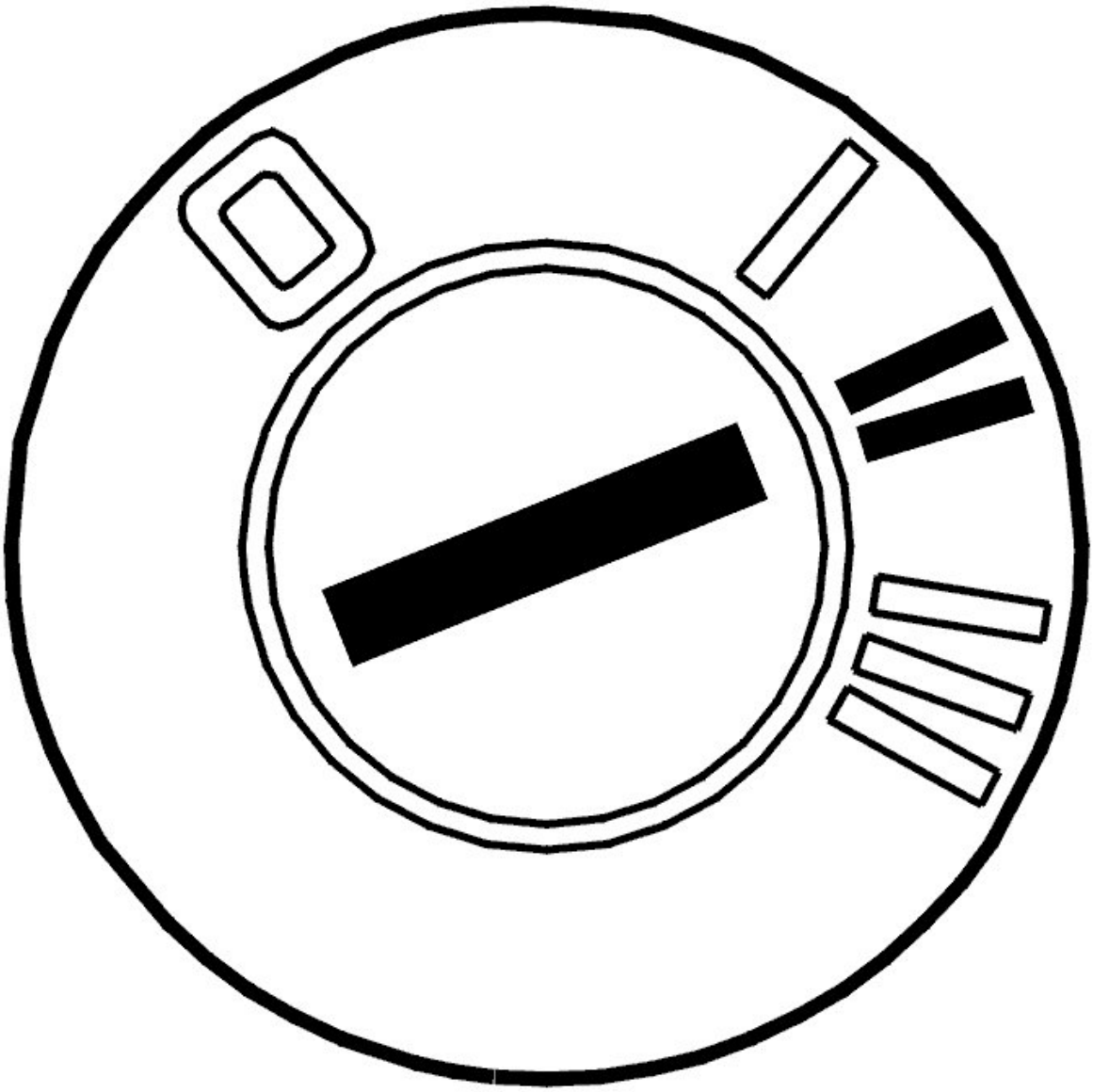
Possible source
- Short-circuit to supply voltage in signal cable MX+.

Fault symptom[s]
- Power door mirror control does not function.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the driver/passenger door control module (DDM/PDM) and the power door mirror (as follows). Check for a short-circuit to supply voltage.
Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

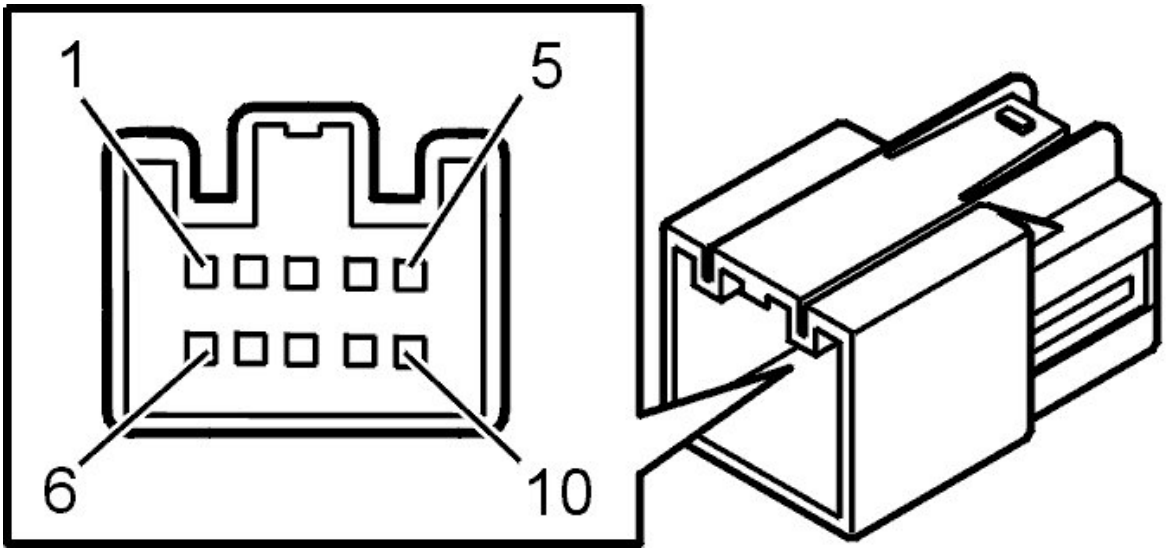
Control module terminal #28A and power door mirror terminal #16.

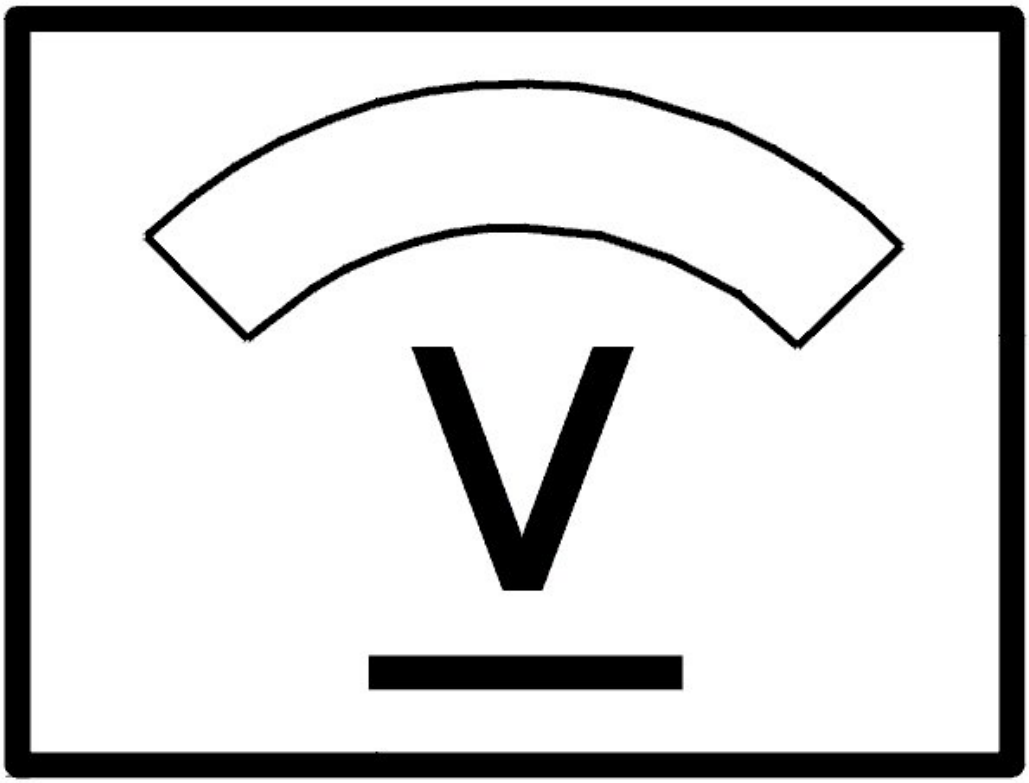
DDM-0028 Door mirror motor MF+

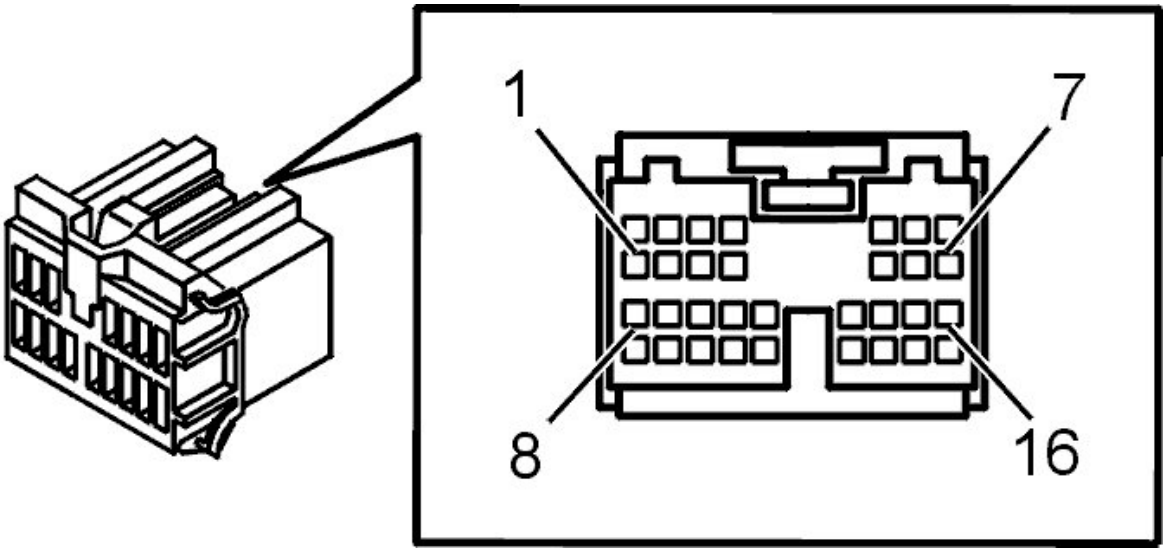
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







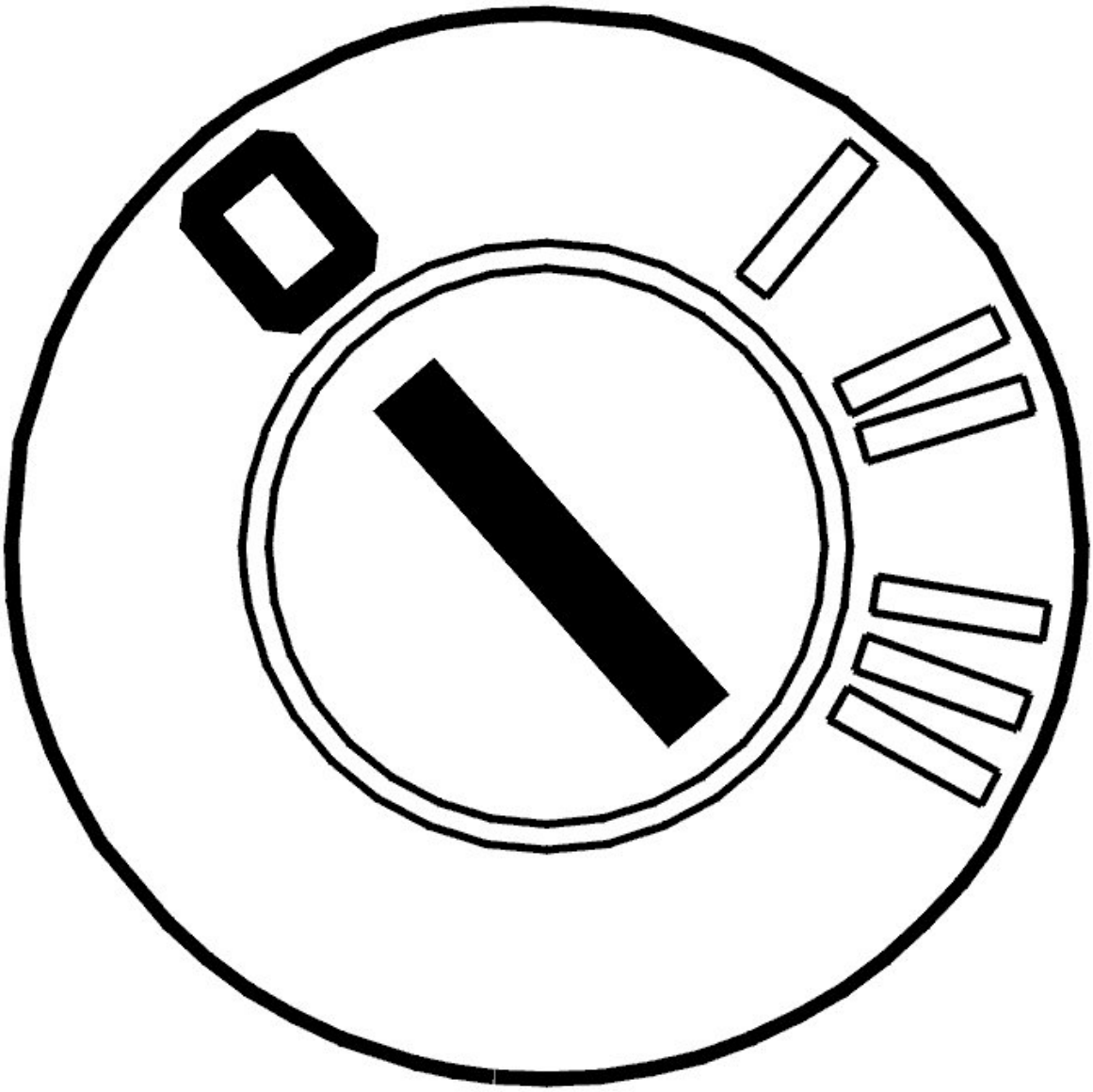
Continue - Verification

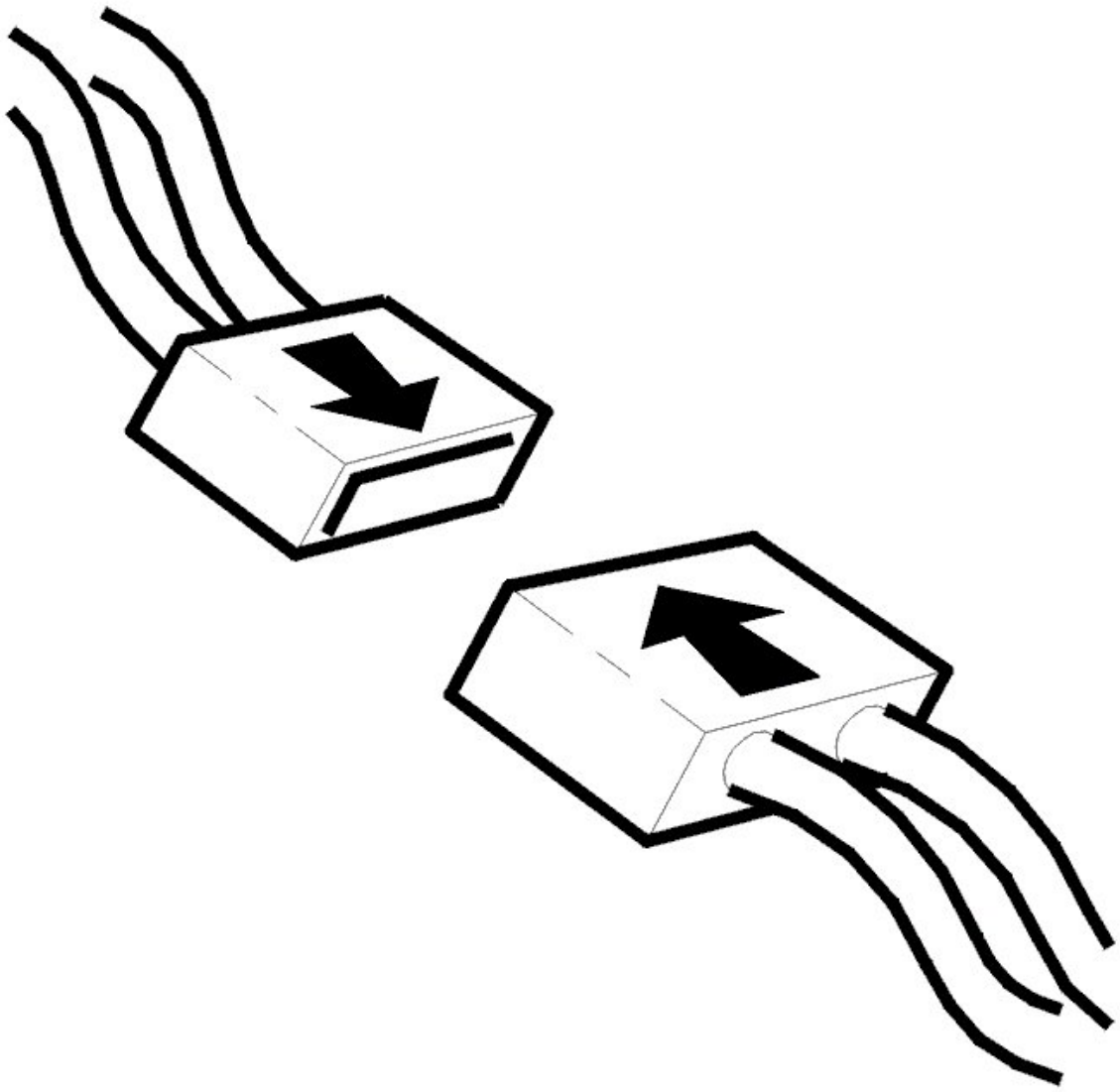
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the driver/passenger door control module (DDM/PDM) and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the door control module and the power door mirror (as follows). Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

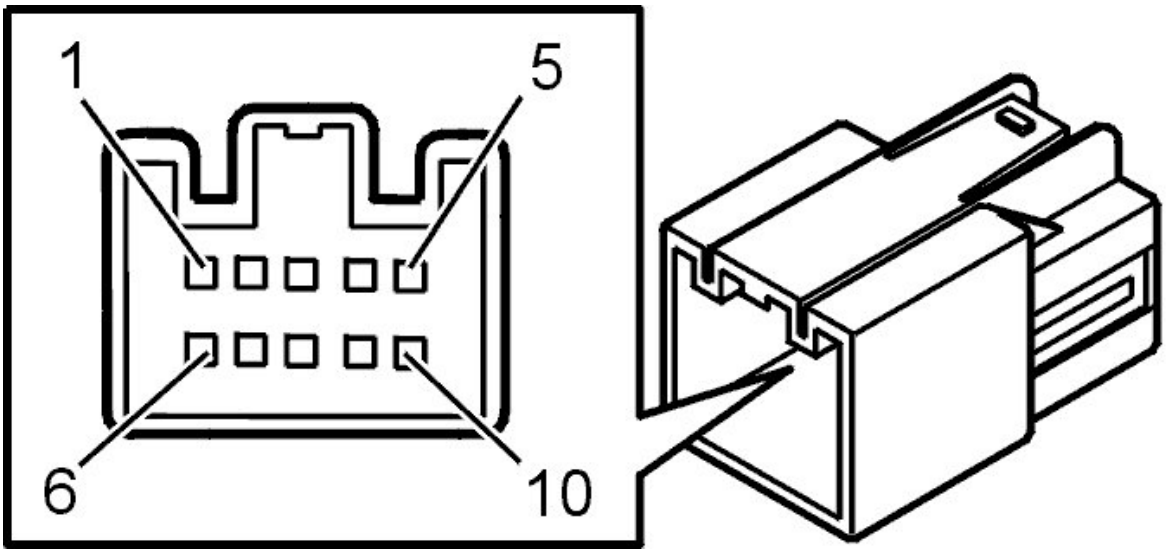
Control module terminal #28A and power door mirror terminal #16.

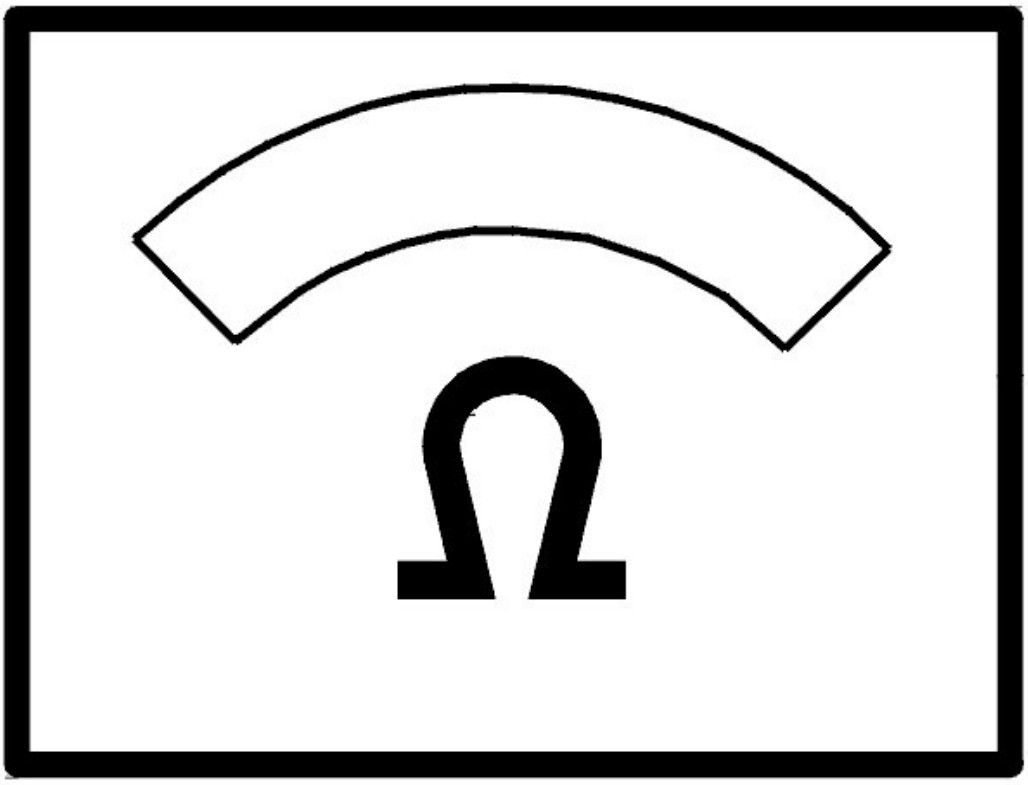
DDM-0028 Door mirror motor MF+

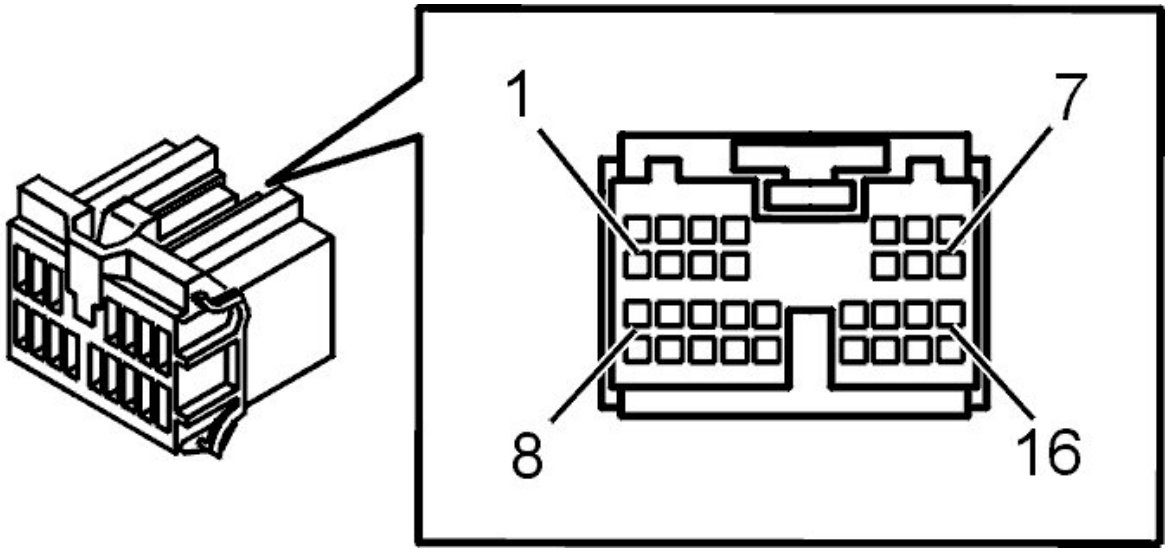
Control module terminal #29A and power door mirror terminal #14.

Other information:

- When the function is not activated the voltage between the control module and ground must be **0 V**
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0024 is stored if power door window up is activated at the same time as the control module registers that there is a short-circuit to ground in the cable.

Substitute value
- None.

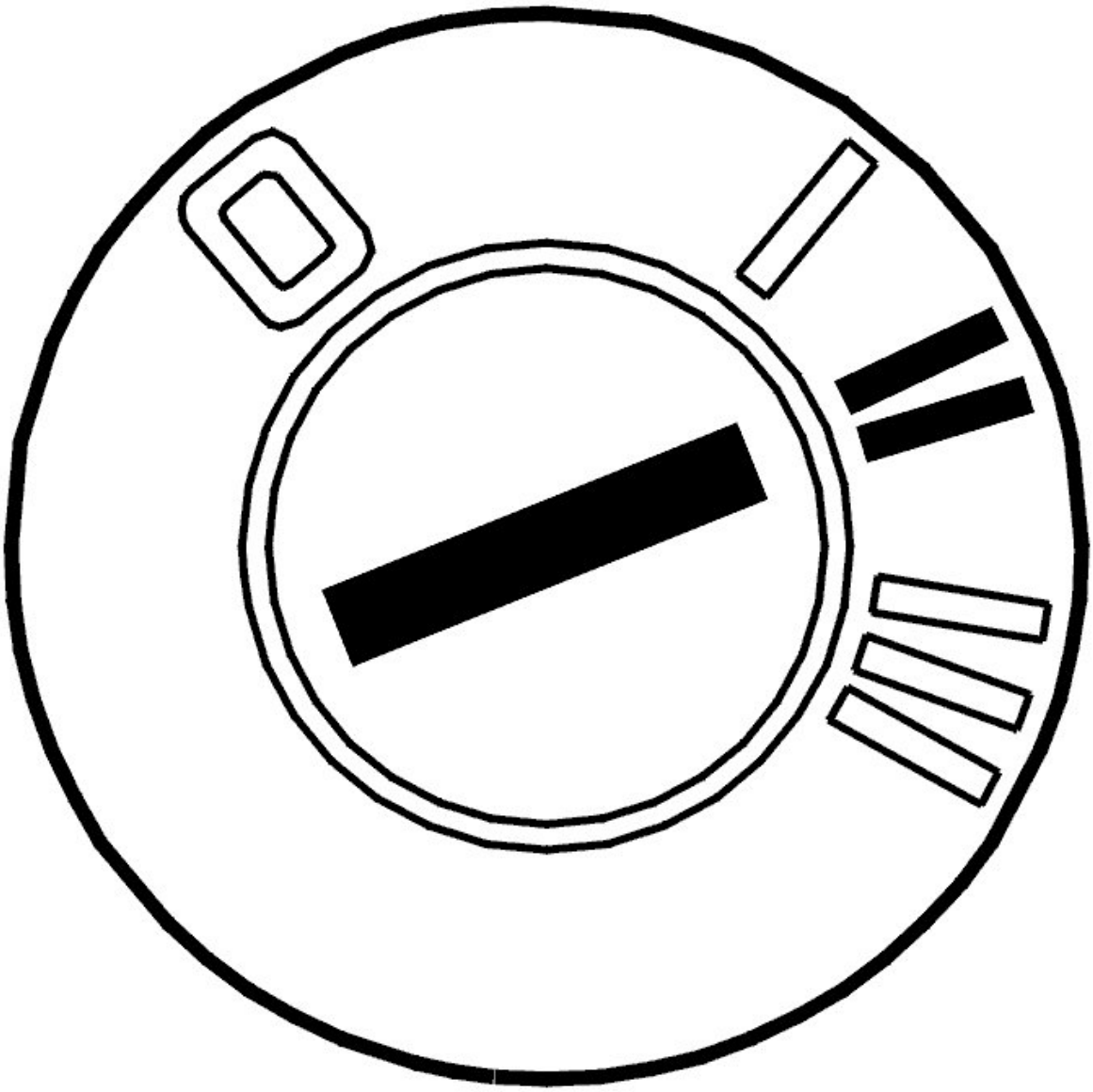
Possible source
- Short-circuit to ground in signal cable MX+.

Fault symptom[s]
- Power door window control does not function.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the door control module and the power door mirror (as follows). Check for a short-circuit to ground. Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0027 Door mirror motor MY+

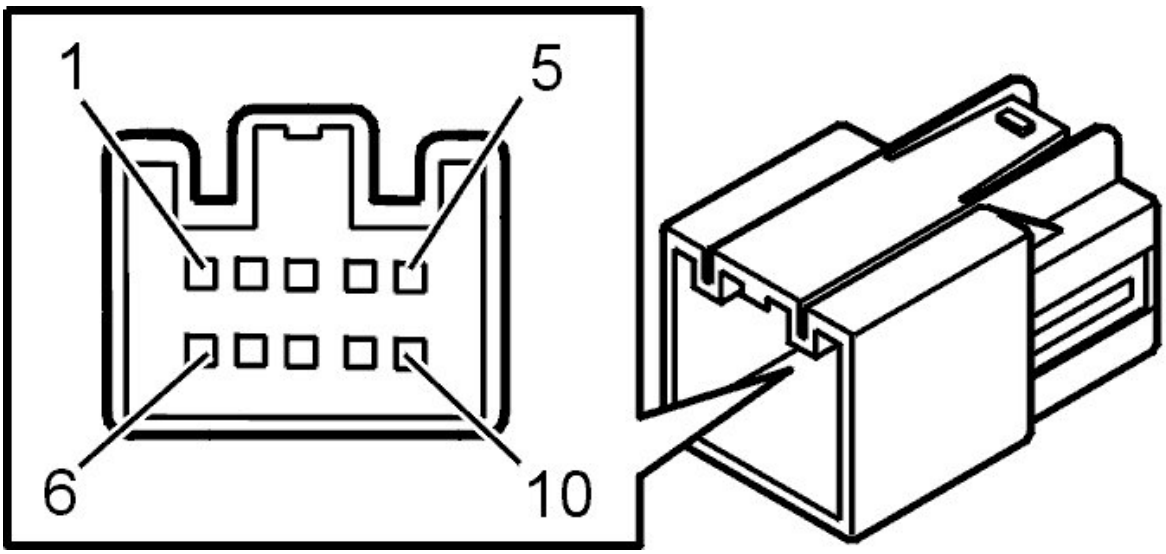
Control module terminal #28A and power door mirror terminal #16.

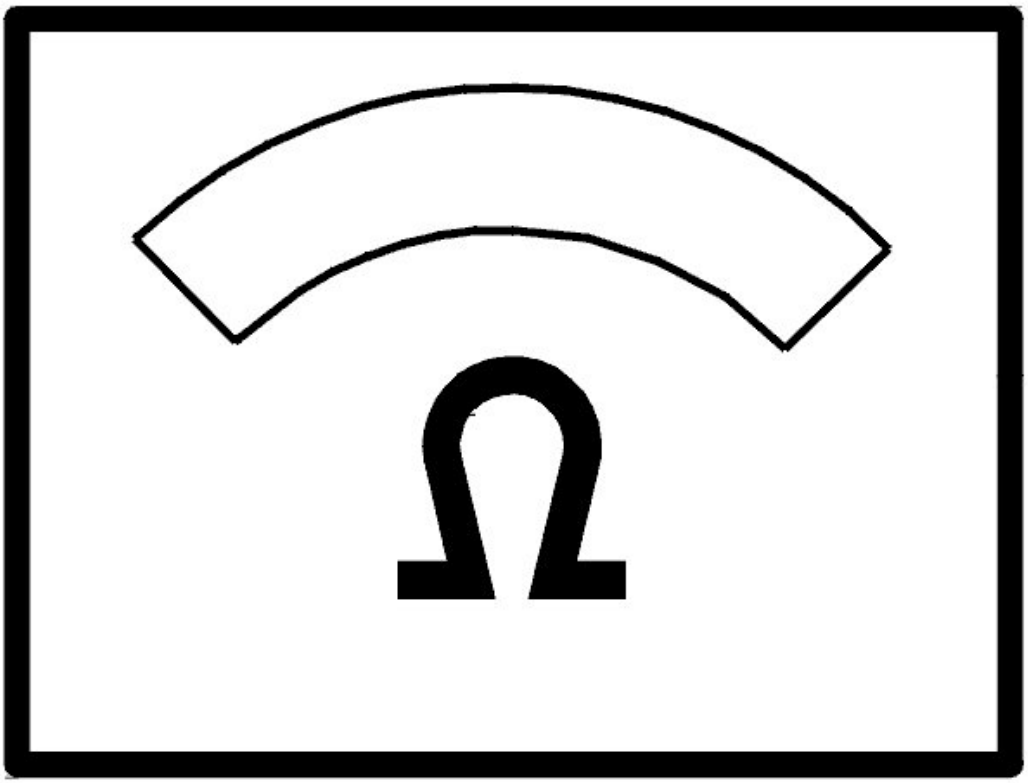
DDM-0029 Door mirror motor MF+

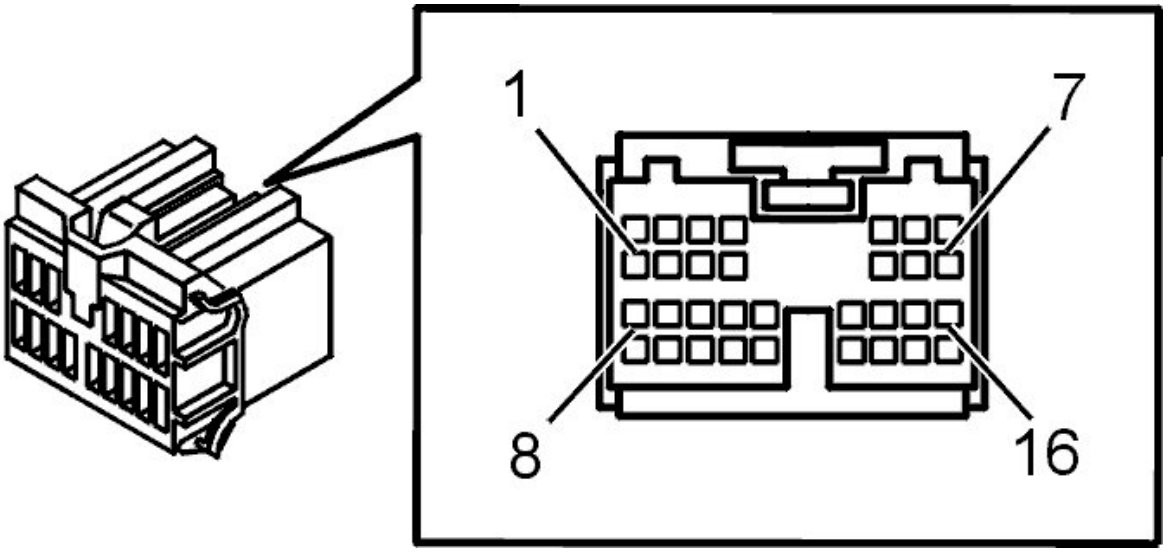
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Select Continue.

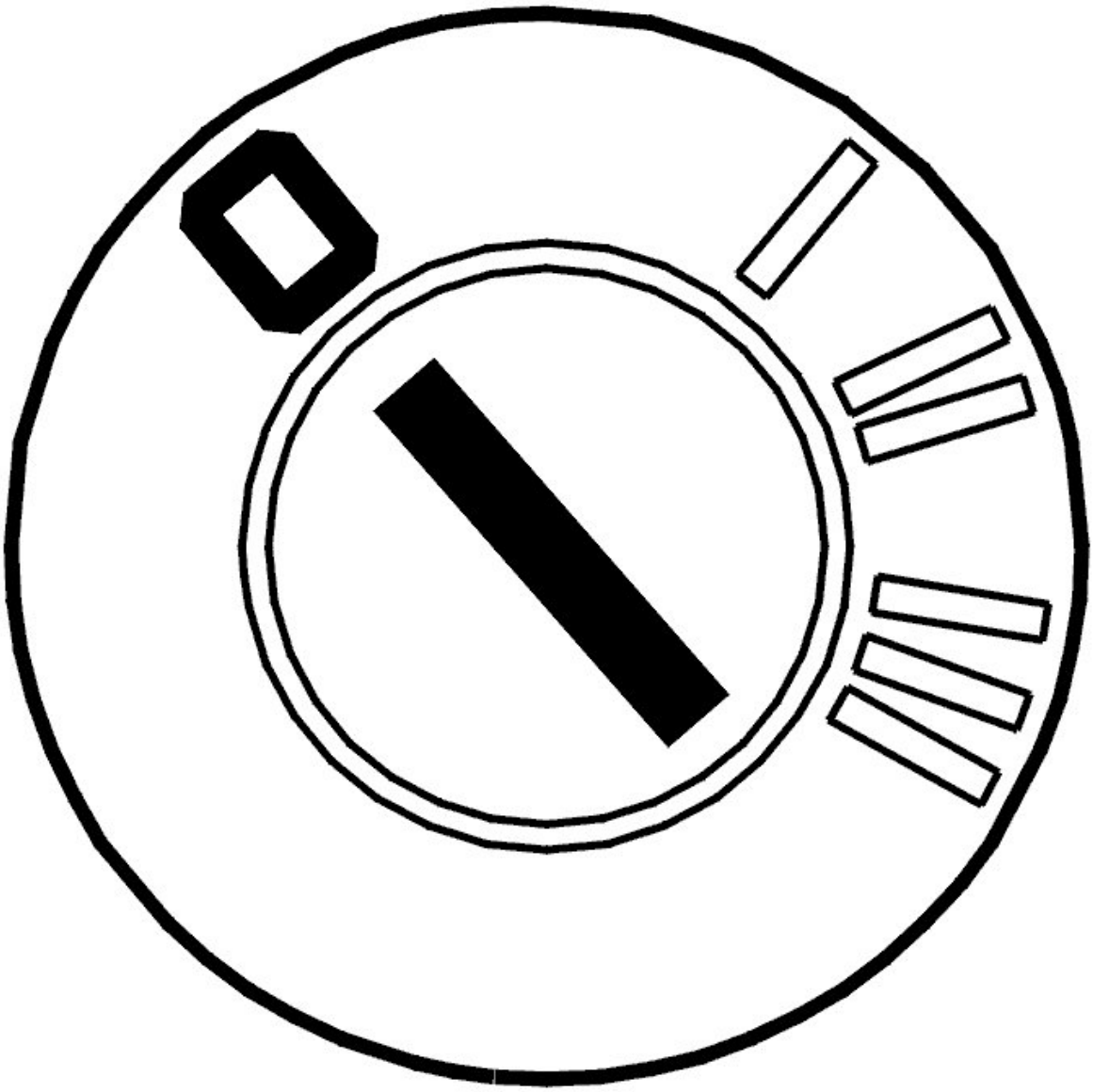
Continue - Verification

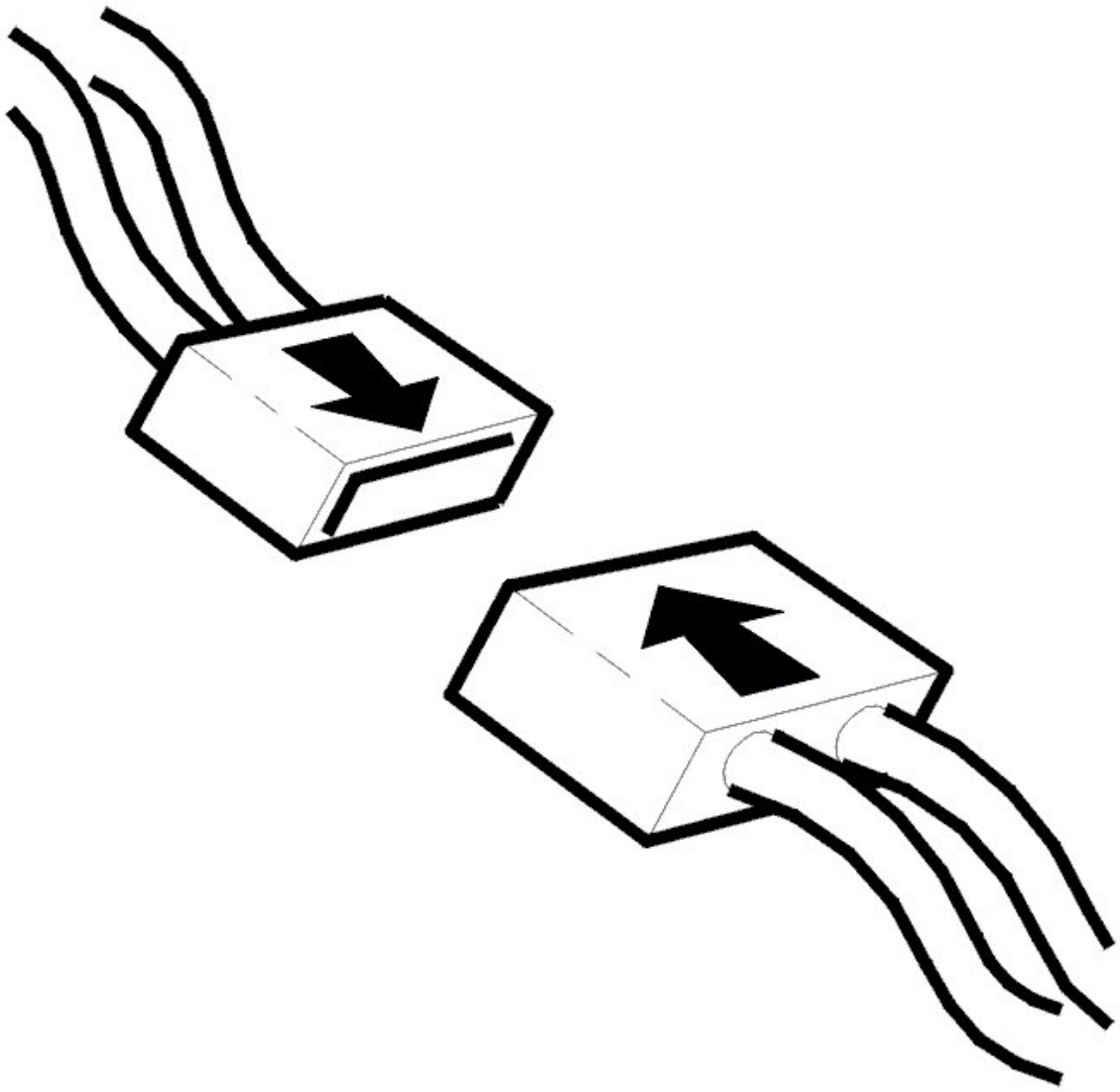
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the control module and the power door mirror. Check for an intermittent short-circuit to ground.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #16.

DDM-0028 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
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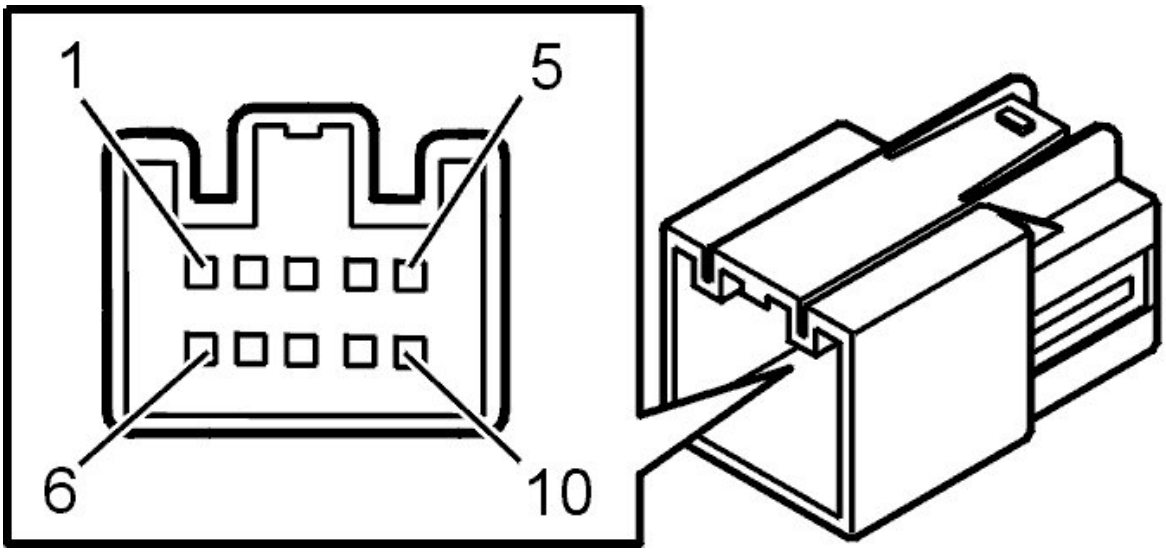
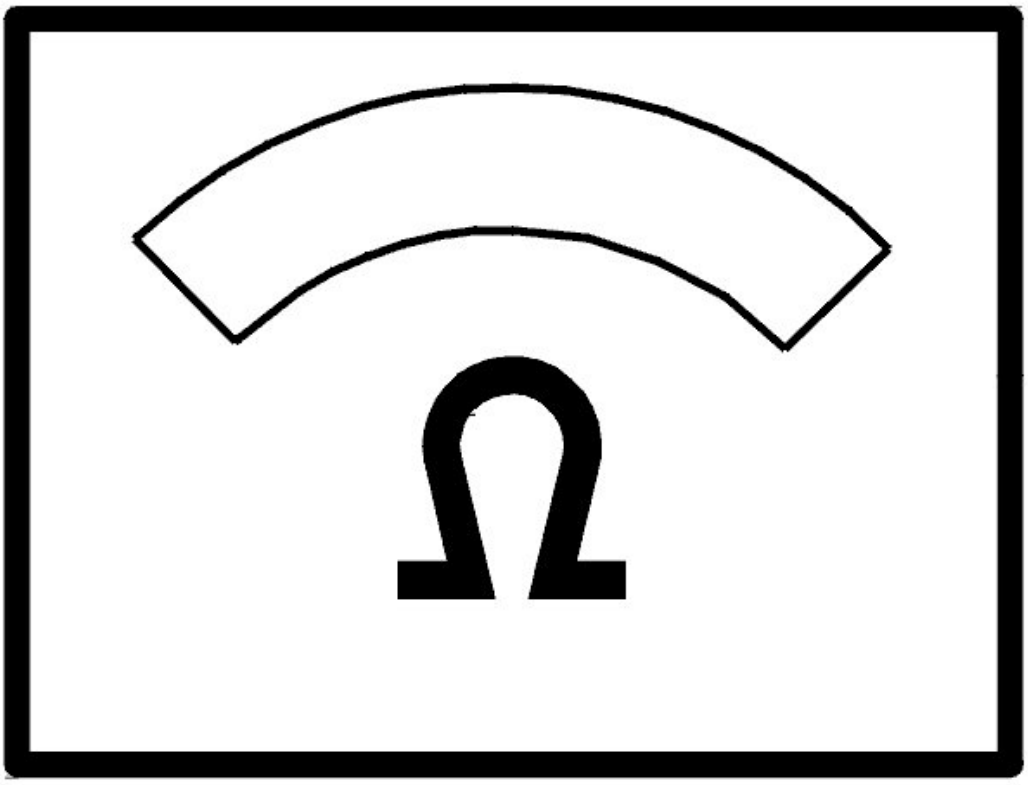
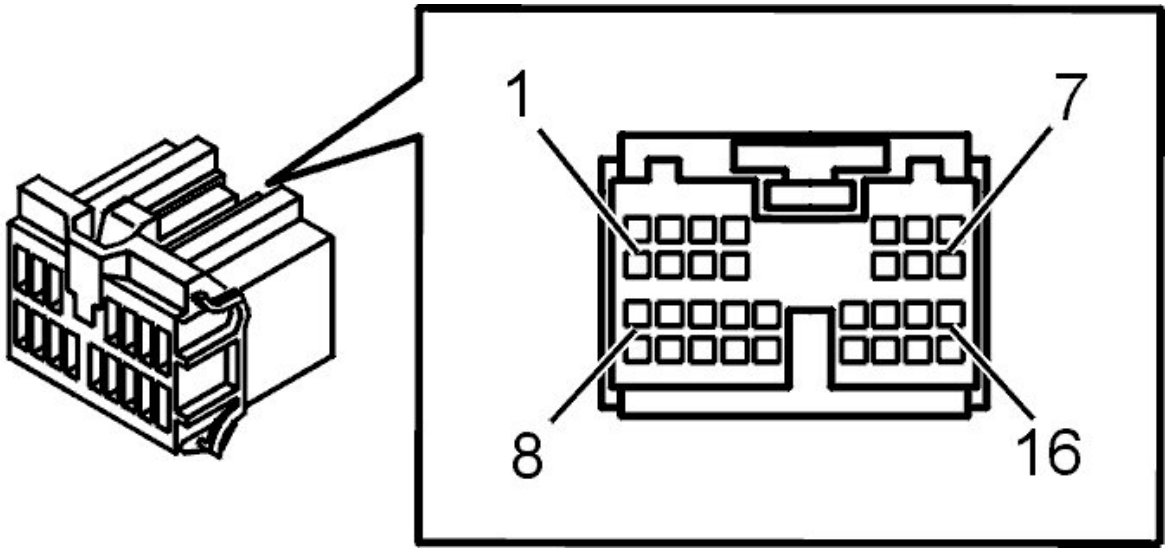
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0025 is stored if the control module registers that the signal cable for one of the power door mirror motors or defroster is interrupted at the same time that the relevant function is activated.

Substitute value
- None.

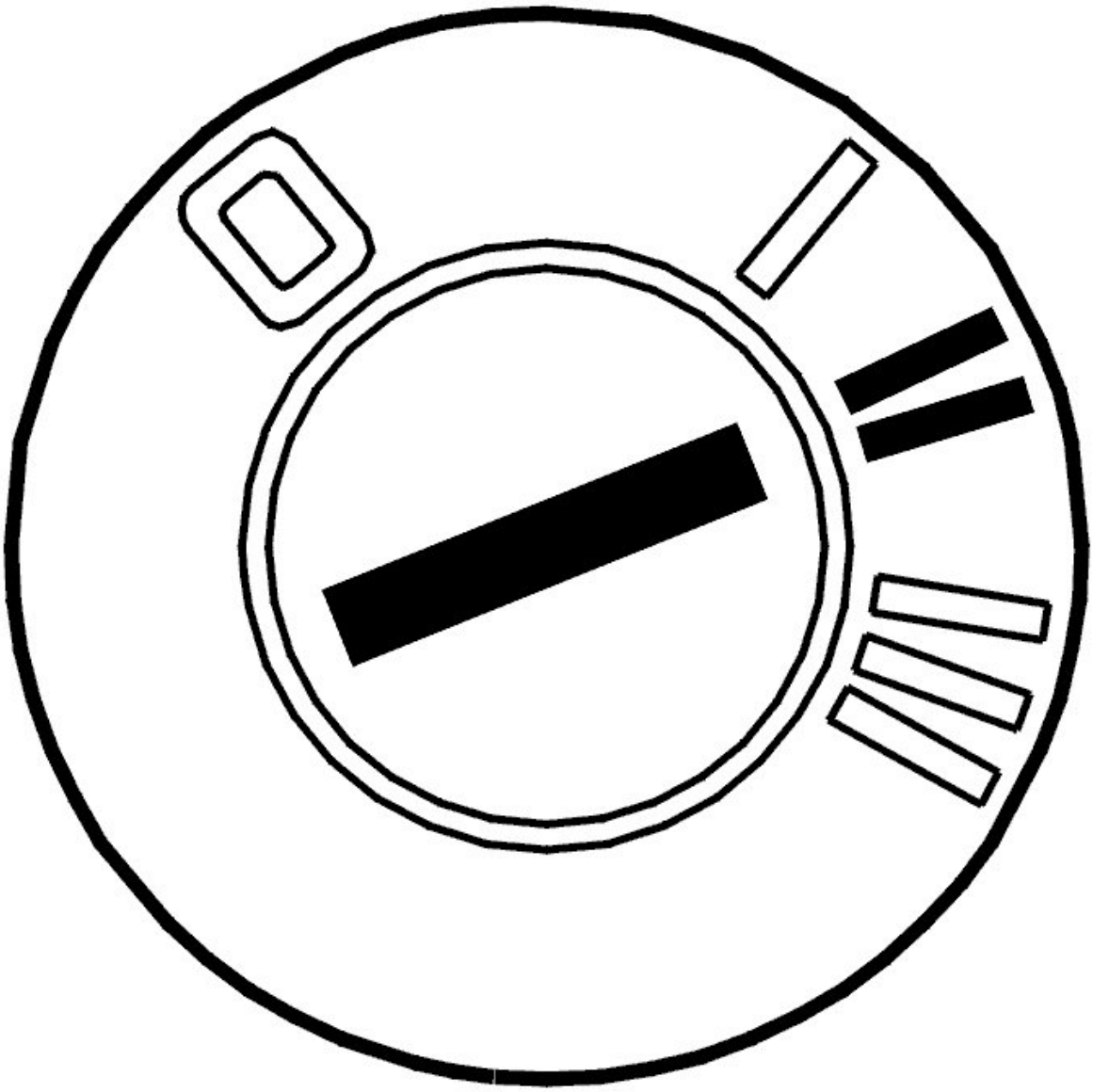
Possible source
- Open-circuit in the signal cable to the door mirror heating or motors (including the motor for electric folding door mirrors)
- Blown fuse 11C/35 or 11C/36.
- Damaged defroster in external mirror.

Fault symptom[s]
- Power door mirror control does not function
- Misting on the windows and/or door mirrors.

Signal Missing

Signal missing

Checking for permanent or intermittent faults



- Ignition on.

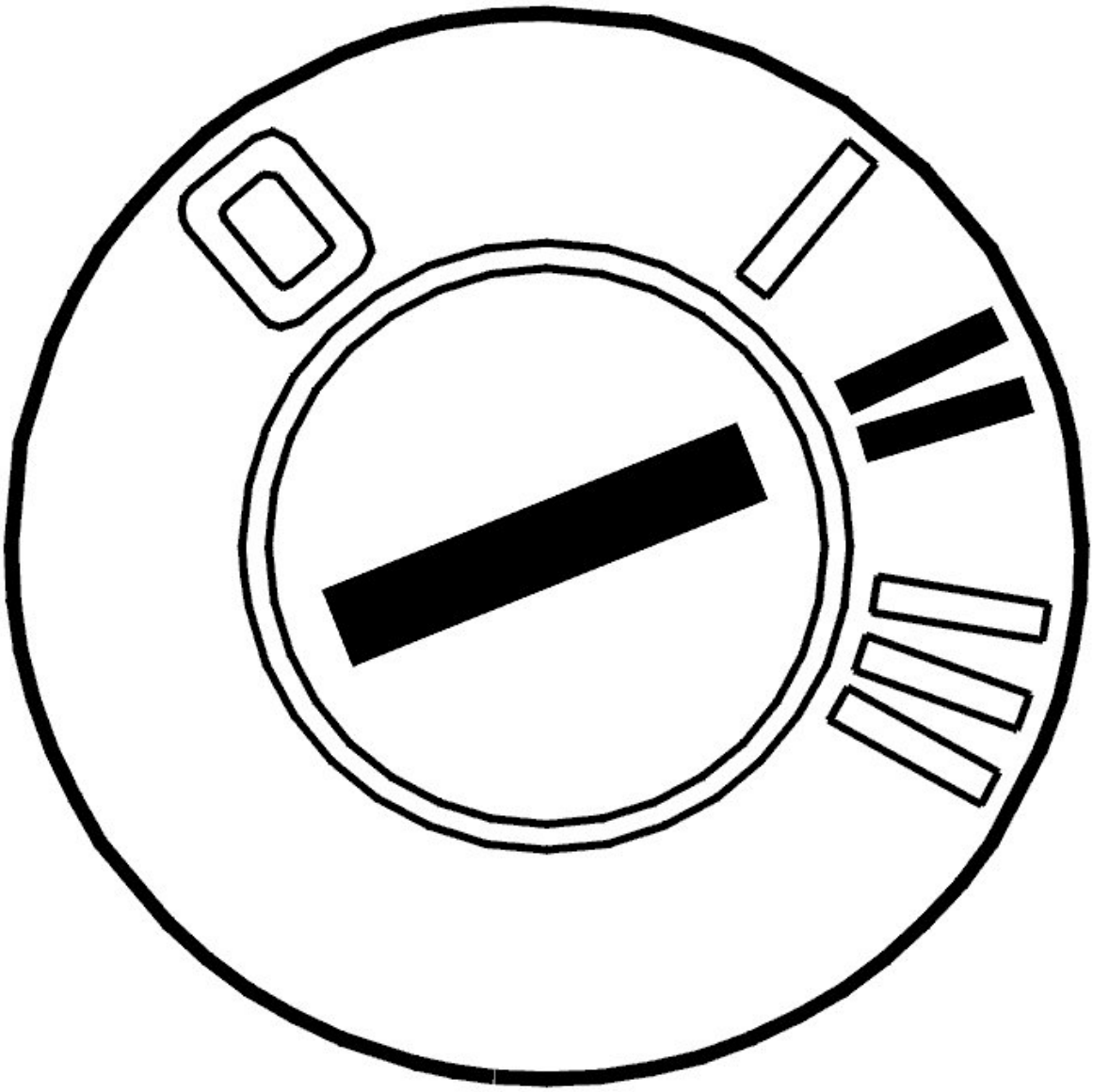
Press the switch for the power door mirrors to check the function of the power door mirrors in all directions.

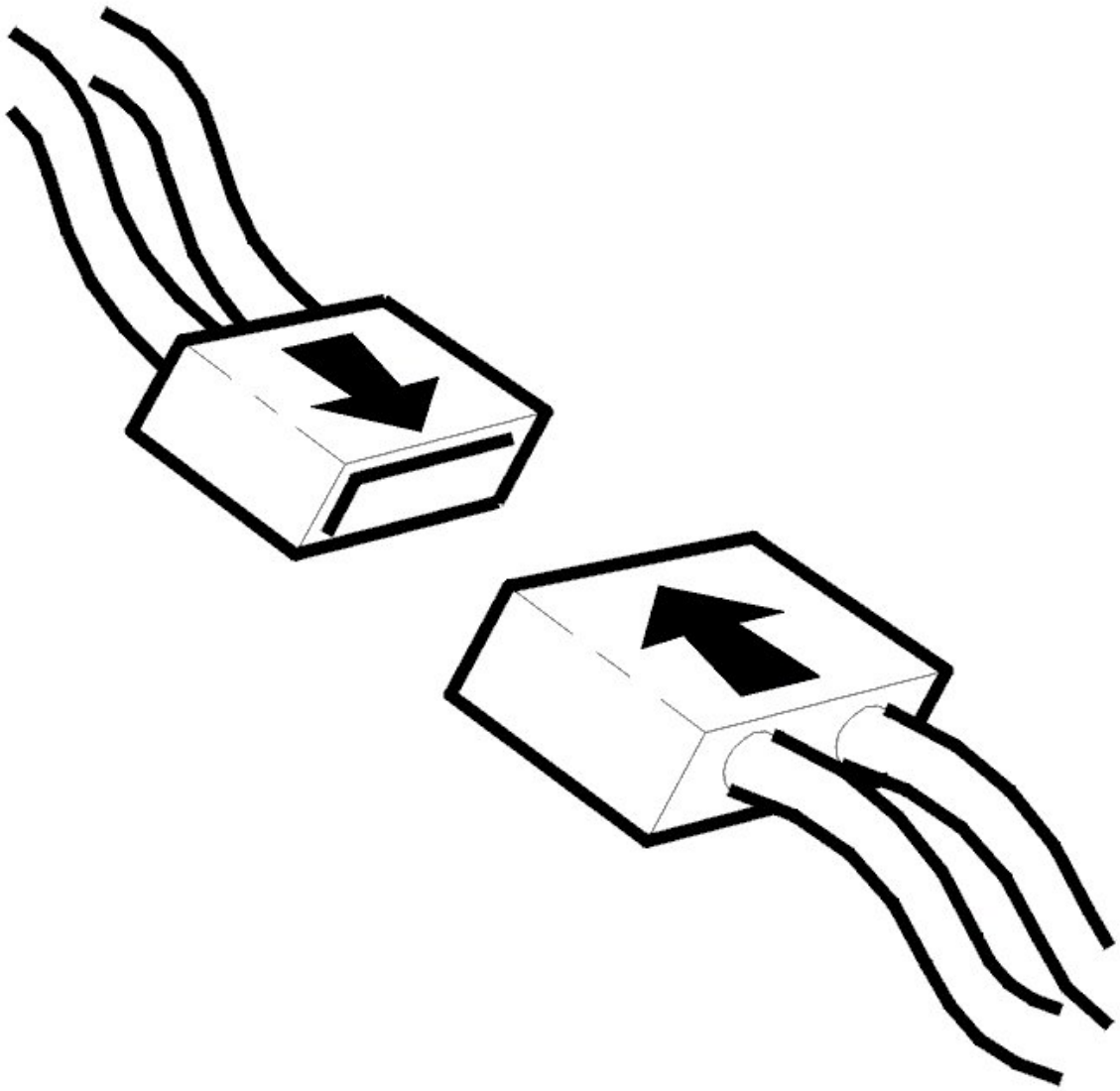
Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors





- Ignition off
- Check that fuse 11C/35 or 11C/36 in the integrated relay / fusebox in the passenger compartment is intact
- Check the power door mirror connector for contact resistance and oxidation. Remedy.

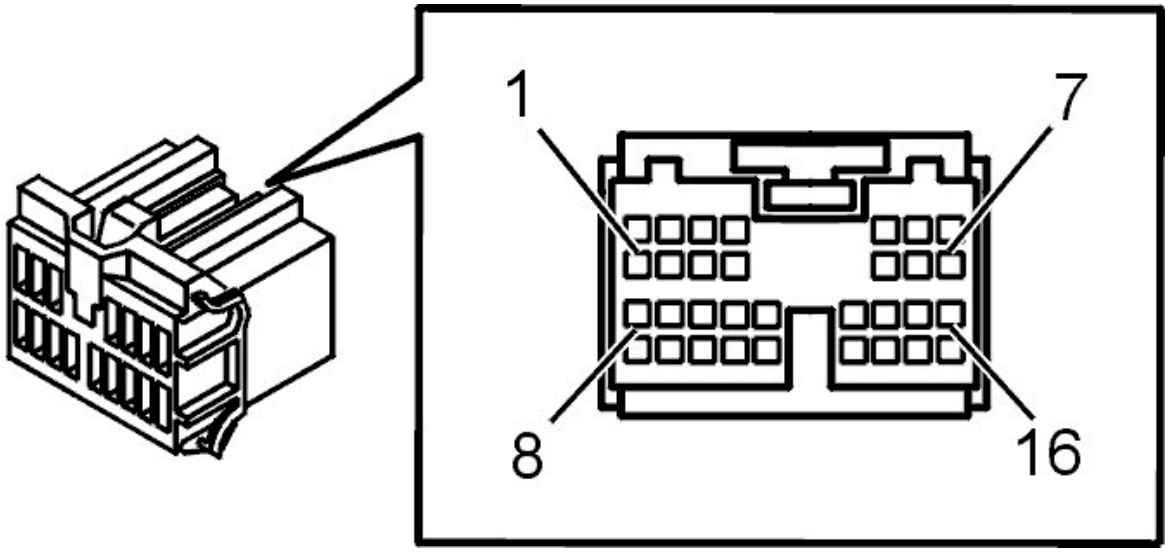
In particular, check for any damage

- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors in all directions.
If no fault is found, try replacing the mirror glass.
Remedy as necessary.

Other information:

- To access the connector for the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Can the power door mirrors be maneuvered?

Yes - Verification

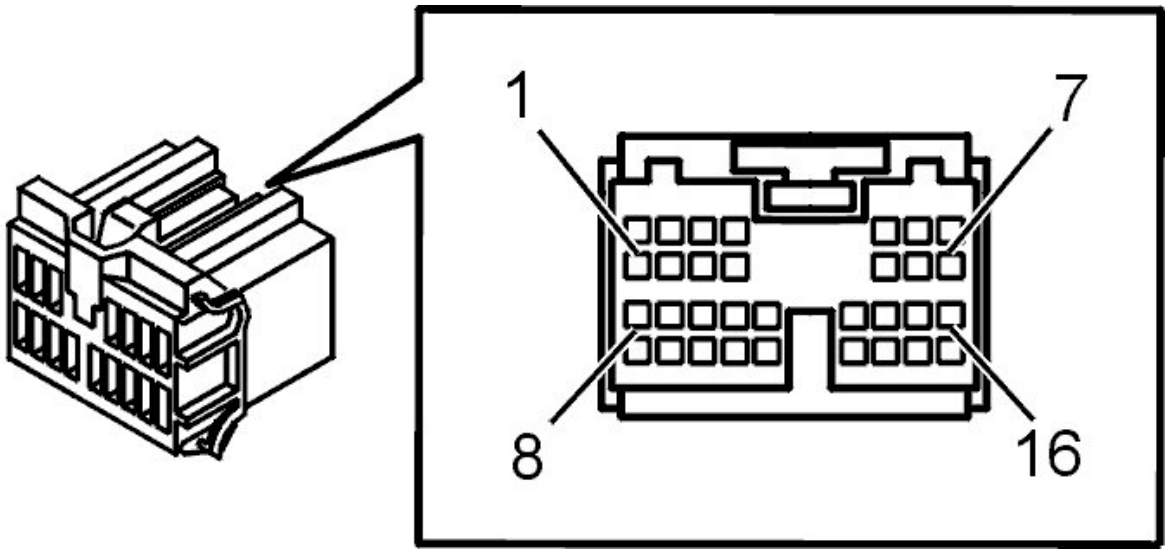
No - Checking for a short-circuit

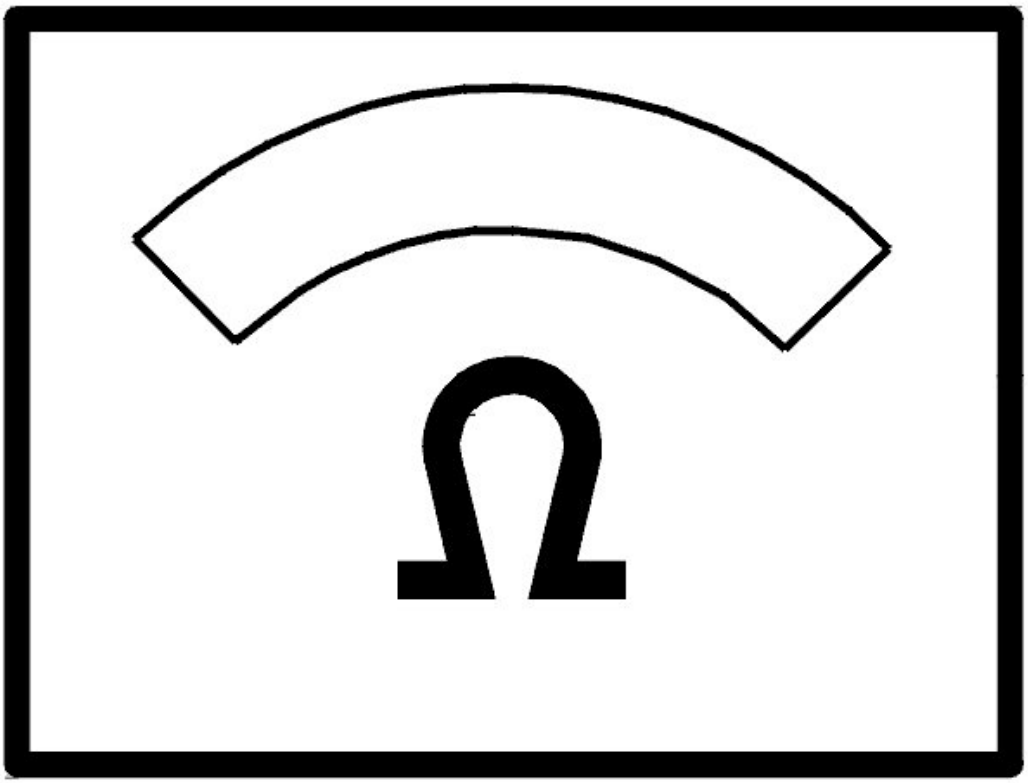
Checking for a short-circuit

Check the cable between the door control module and the power door mirror (as follows). Check for an open-circuit.
Control module terminal #26A and power door mirror terminal #15.
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #28A and power door mirror terminal #16.
Control module terminal #29A and power door mirror terminal #14.
Control module terminal #11B and power door mirror terminal #8.
Remedy as necessary.
If no fault is found, try replacing the mirror glass.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select Continue.

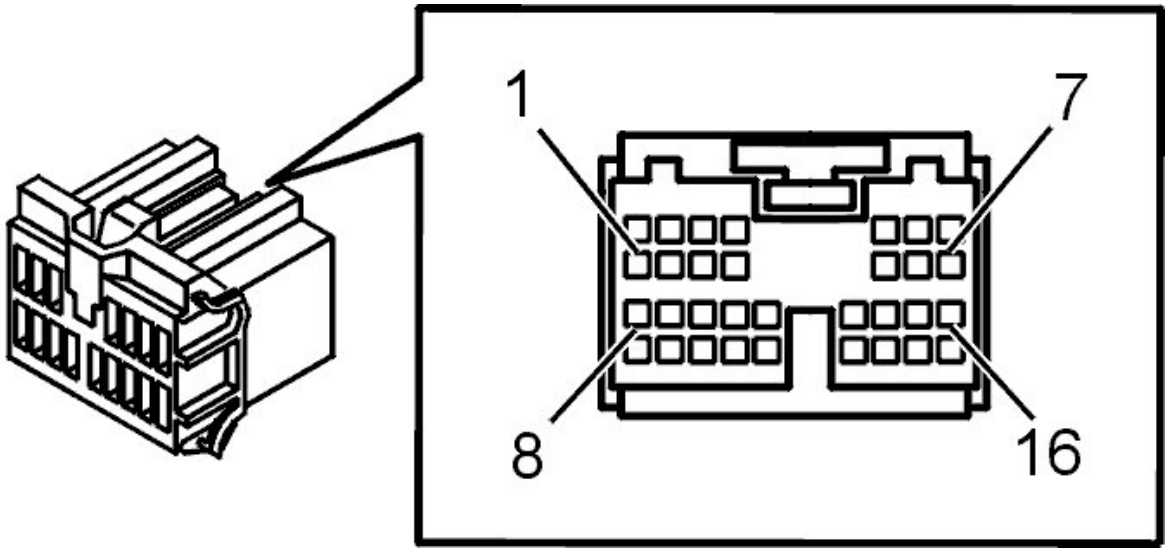
Continue - Verification

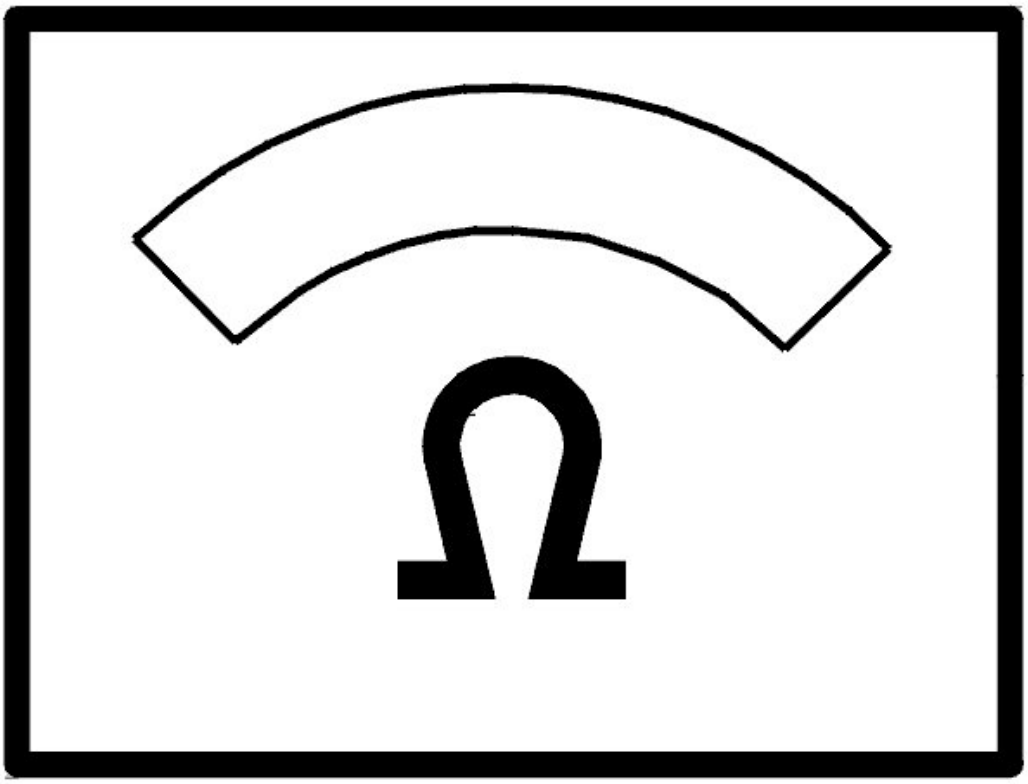
Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the door control module and the power door mirror (as follows). Check for an intermittent open-circuit.
Control module terminal #26A and power door mirror terminal #15.
Control module terminal #27A and power door mirror terminal #7.
Control module terminal #28A and power door mirror terminal #16.
Control module terminal #29A and power door mirror terminal #14.
Control module terminal #11B and power door mirror terminal #8.
If no fault is found, try replacing the mirror glass.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair.





Select Continue.

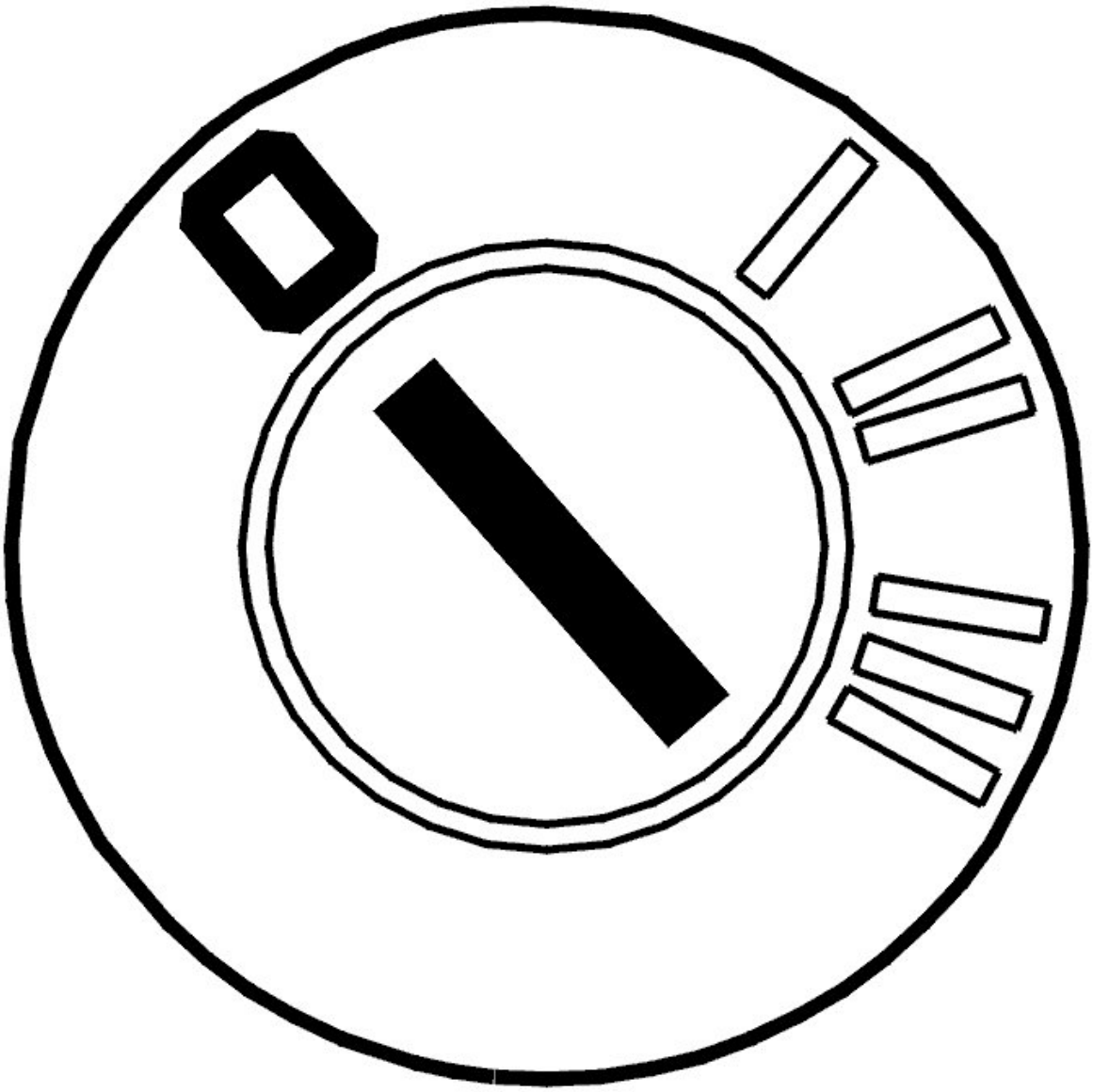
Continue - Fault-tracing information

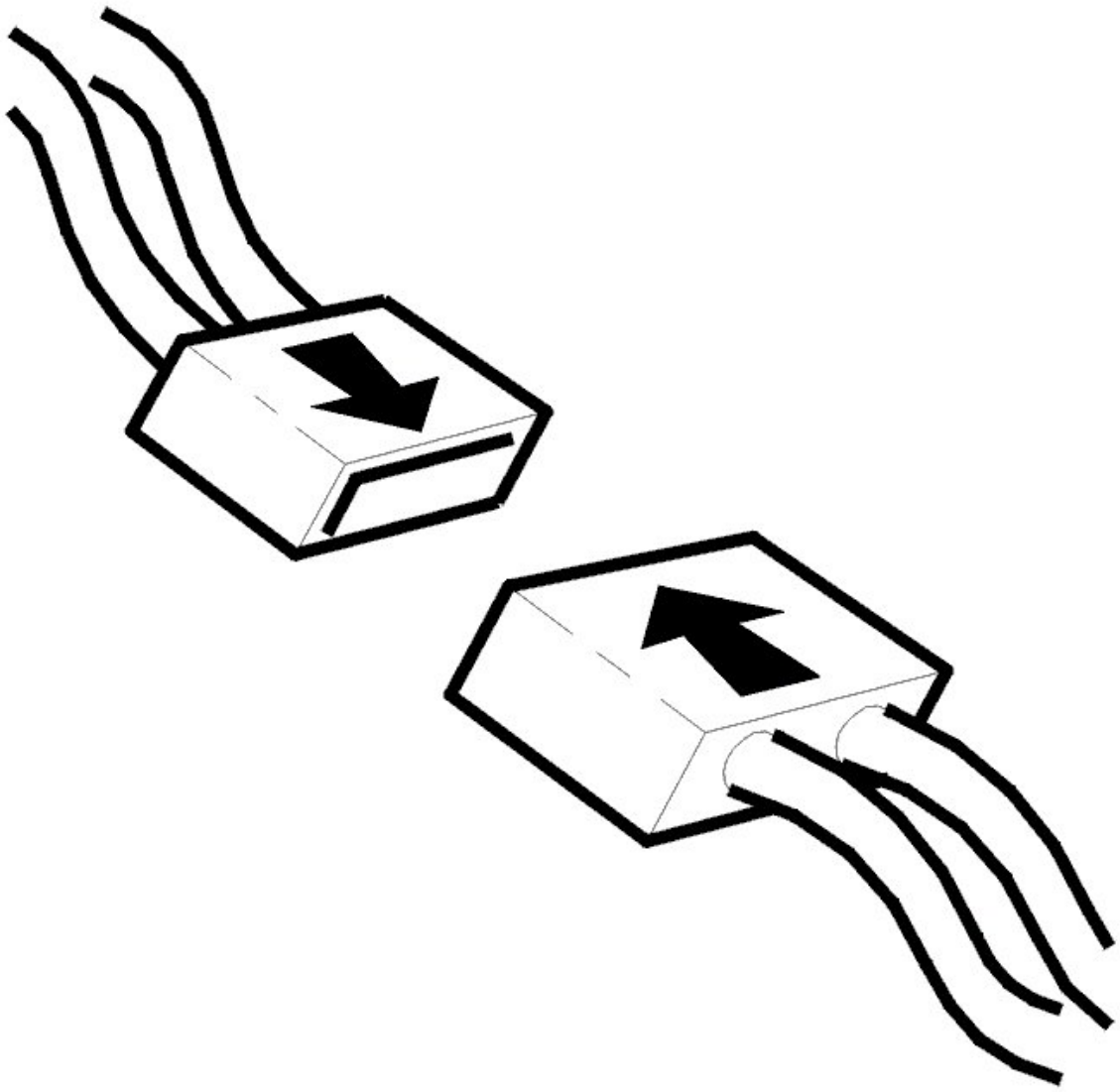
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for lateral adjustment is short circuited to voltage supply when none of the external rear-view mirror motors are activated, diagnostic trouble code DDM/PDM-0026 is displayed.

Substitute value
- Nothing.

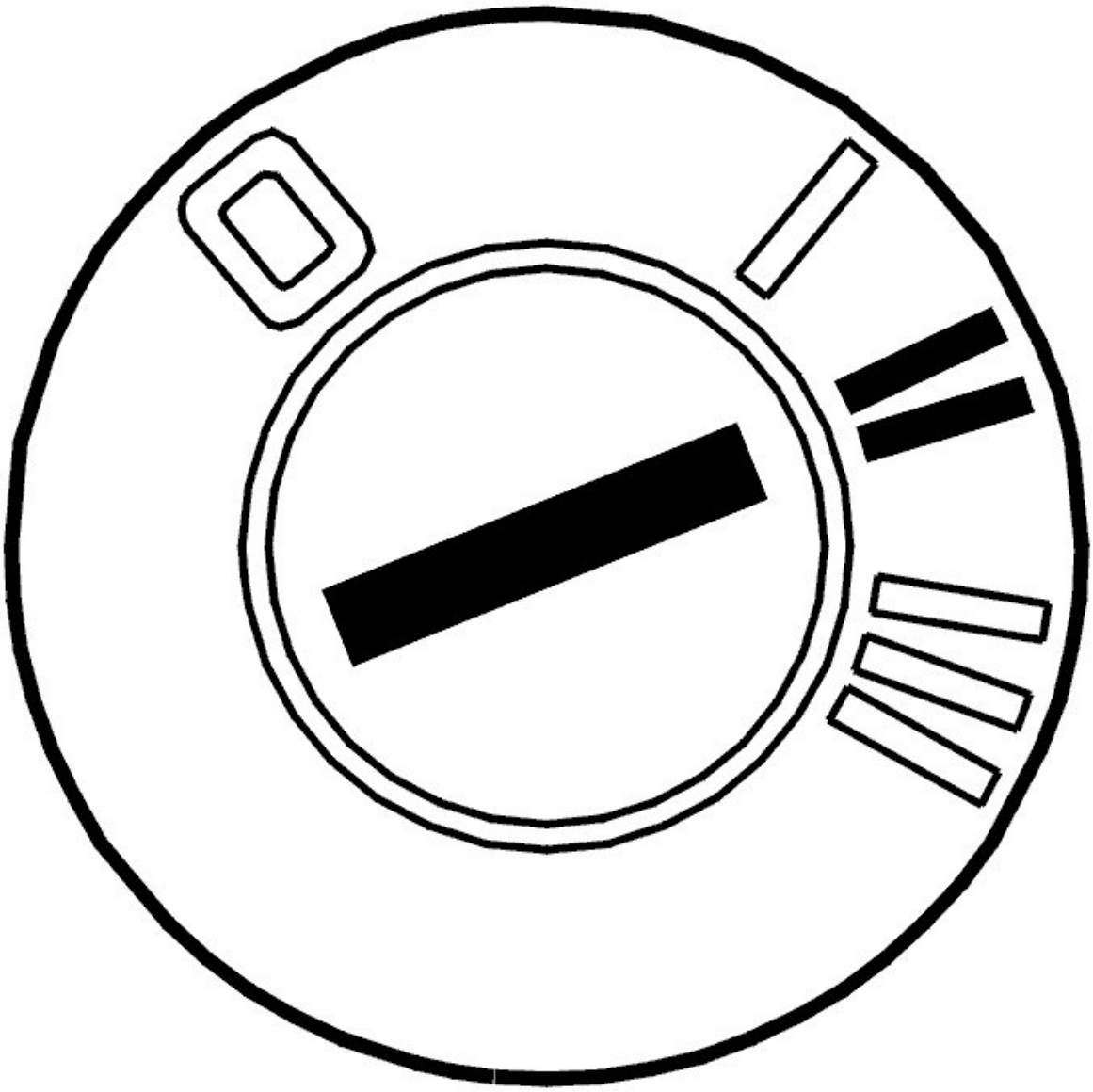
Possible source
- Signal wire MY+ short circuited to voltage supply.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the driver/passenger door control module (DDM/PDM) and the power door mirror (as follows). Check for a short-circuit to supply voltage.
Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

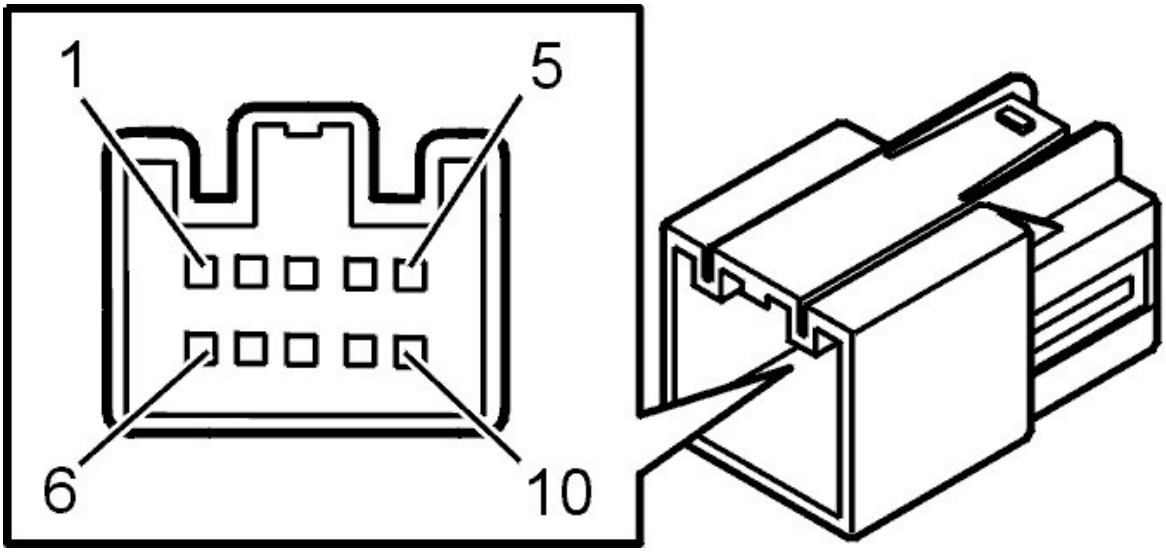
Control module terminal #28A and power door mirror terminal #16.

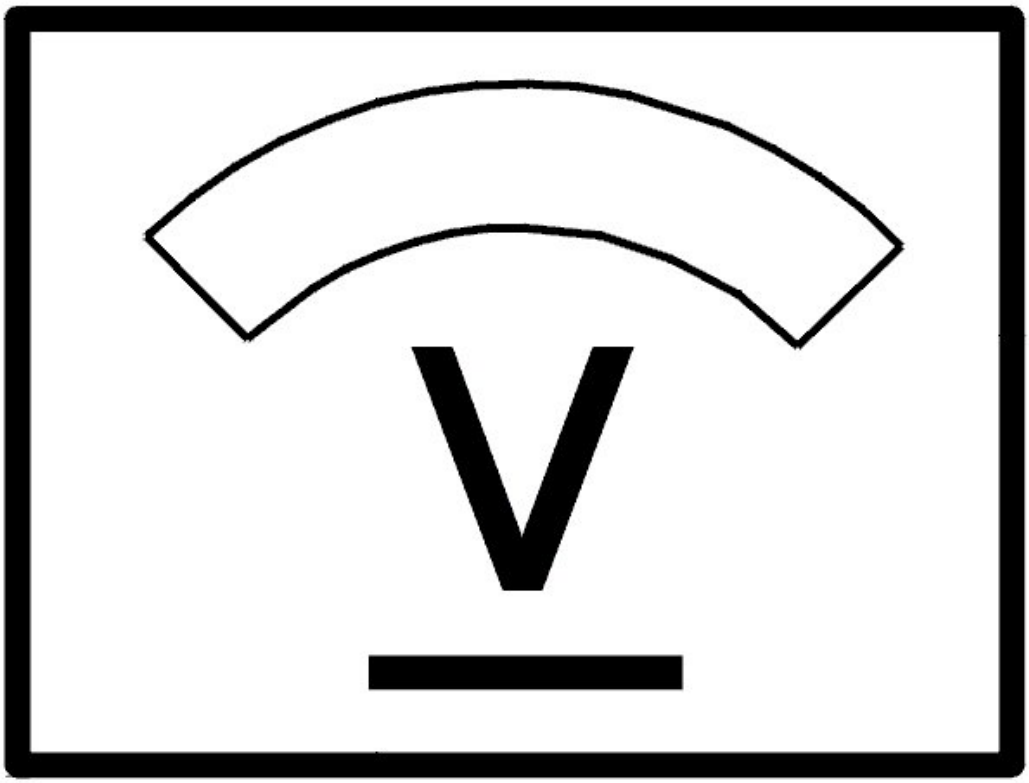
DDM-0028 Door mirror motor MF+

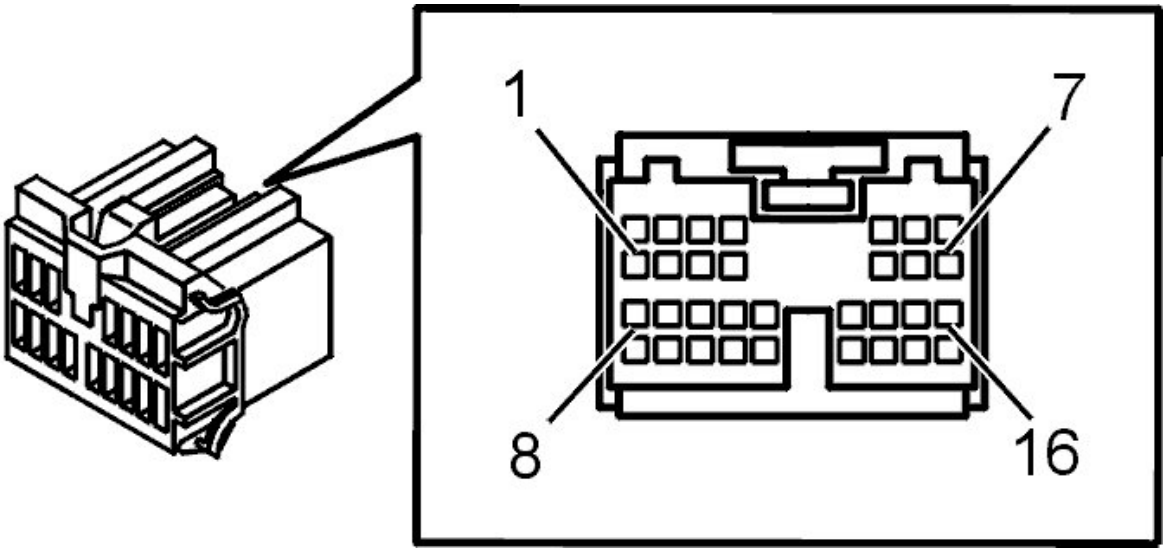
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







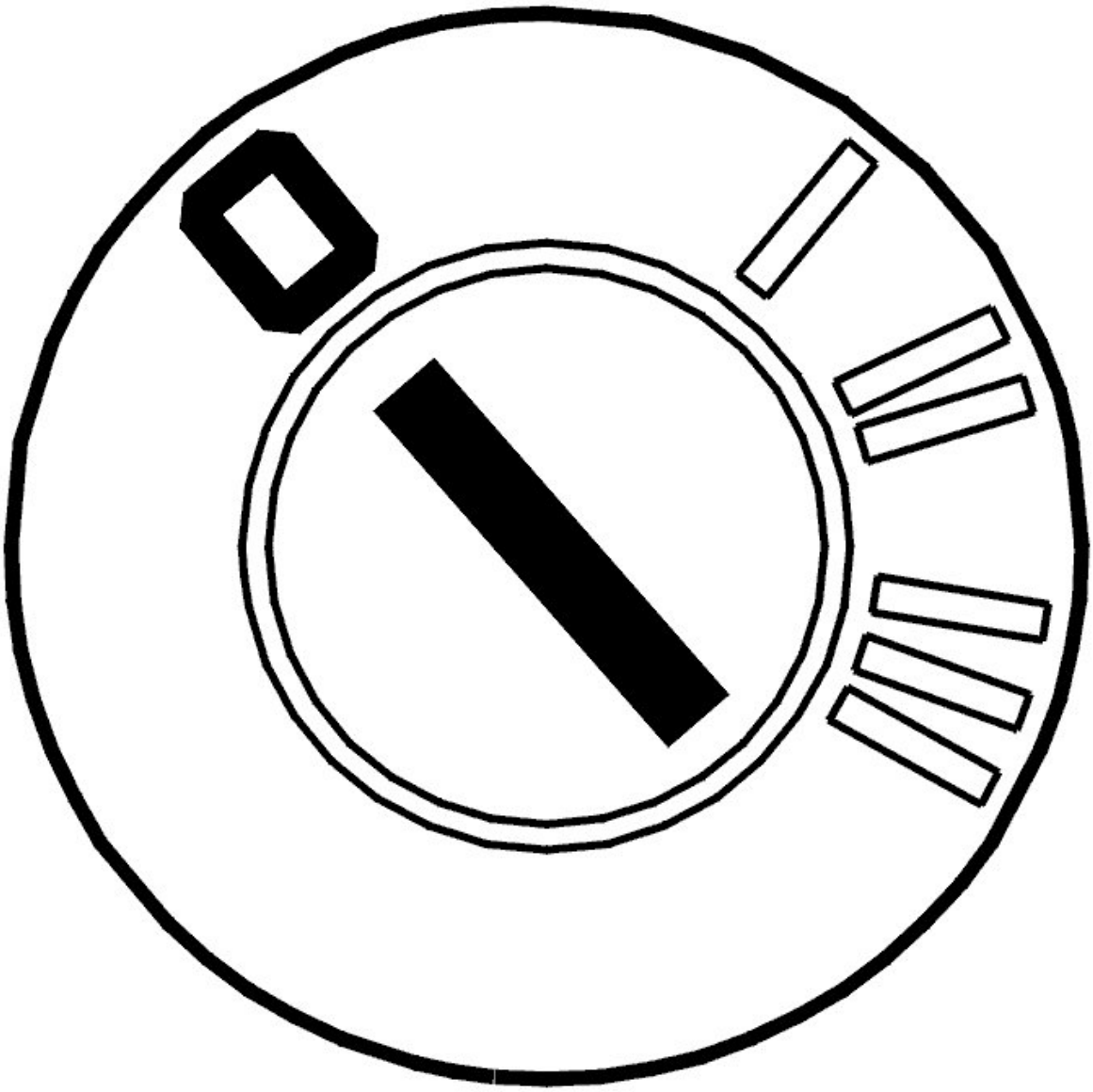
Continue - Verification

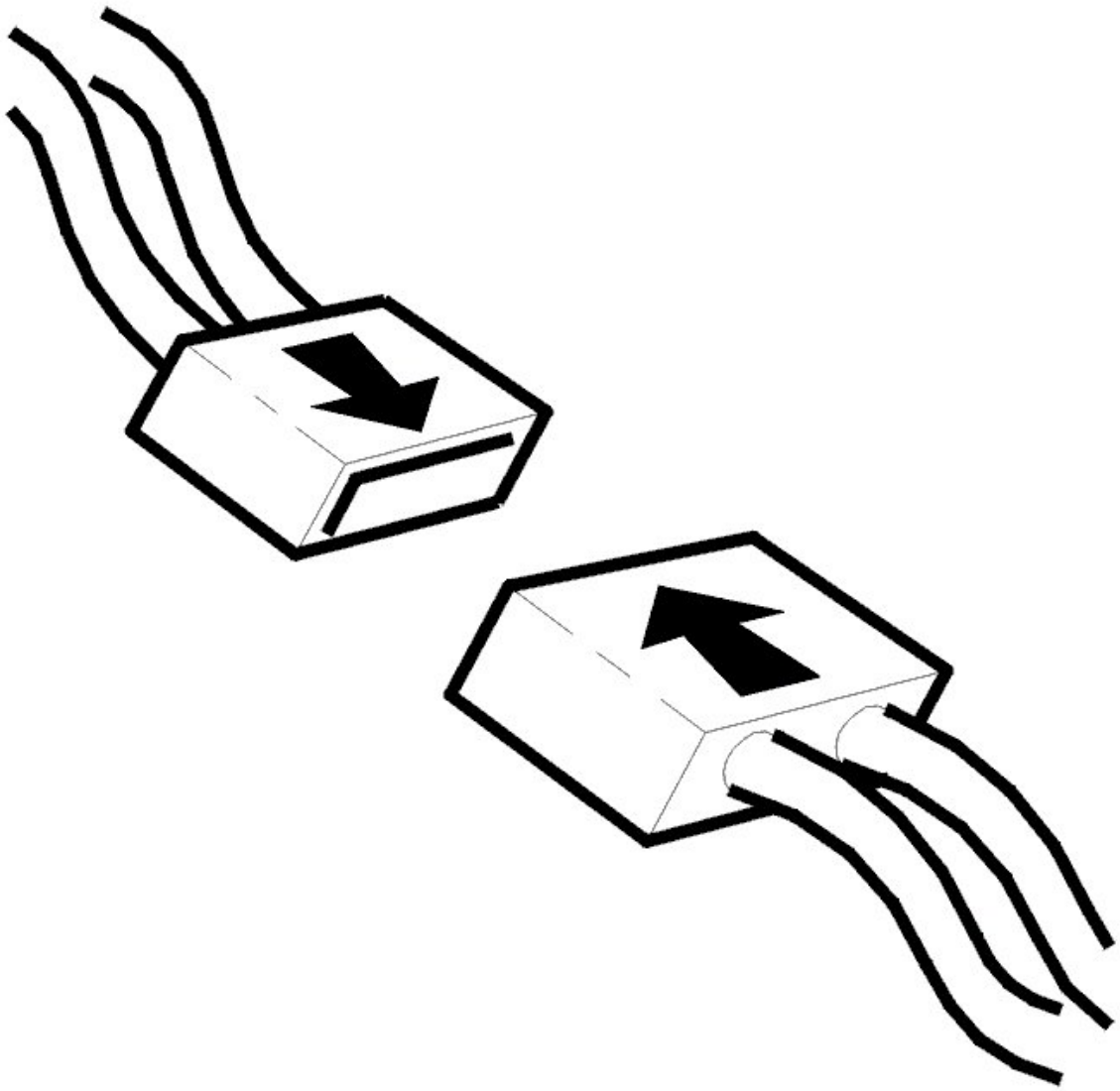
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the driver/passenger door control module (DDM/PDM) and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the door control module and the power door mirror (as follows). Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

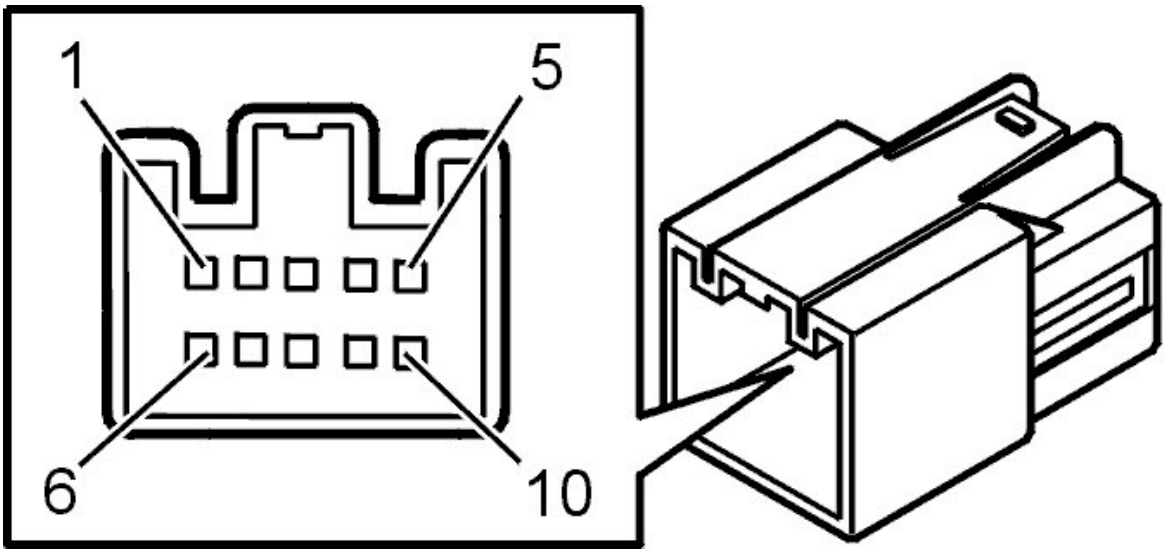
Control module terminal #28A and power door mirror terminal #16.

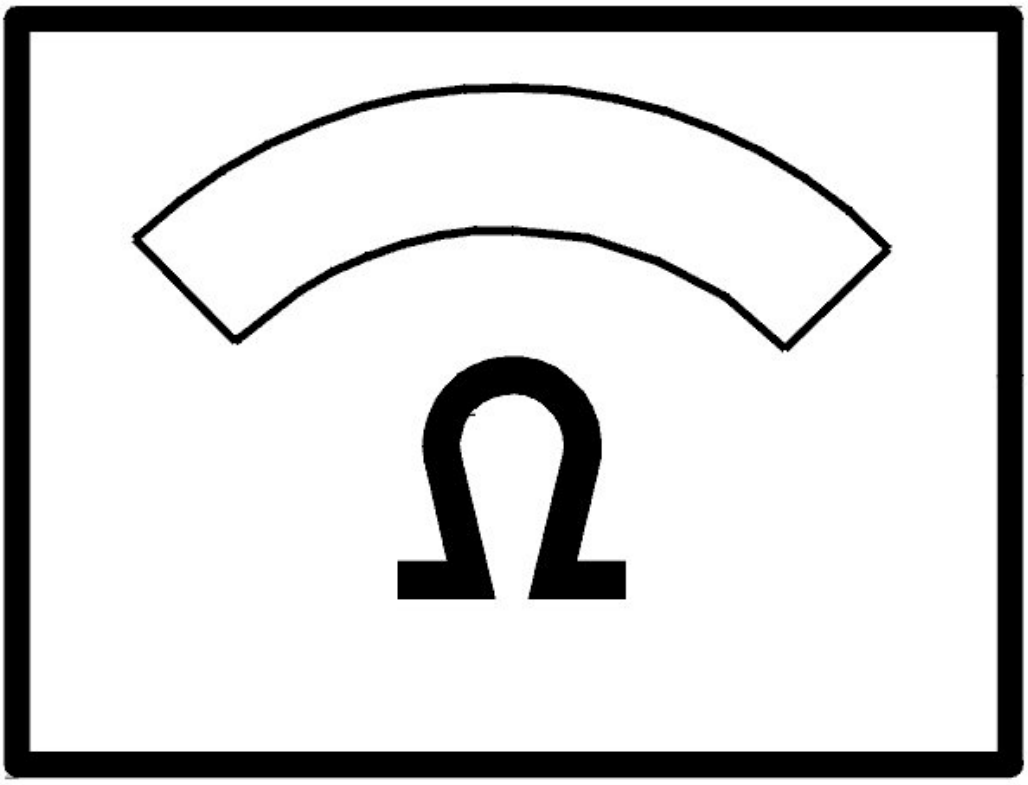
DDM-0028 Door mirror motor MF+

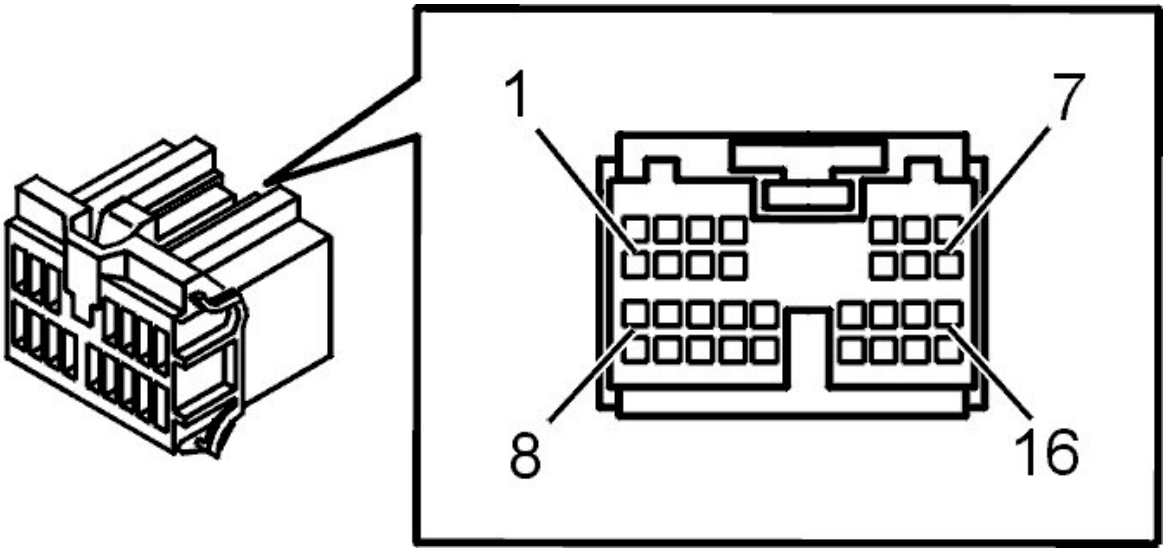
Control module terminal #29A and power door mirror terminal #14.

Other information:

- When the function is not activated the voltage between the control module and ground must be **0 V**
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for lateral adjustment is short circuited to ground when only one of the external rear-view mirror motors is activated, diagnostic trouble code DDM/PDM-0027 is displayed.

Substitute value
- Nothing.

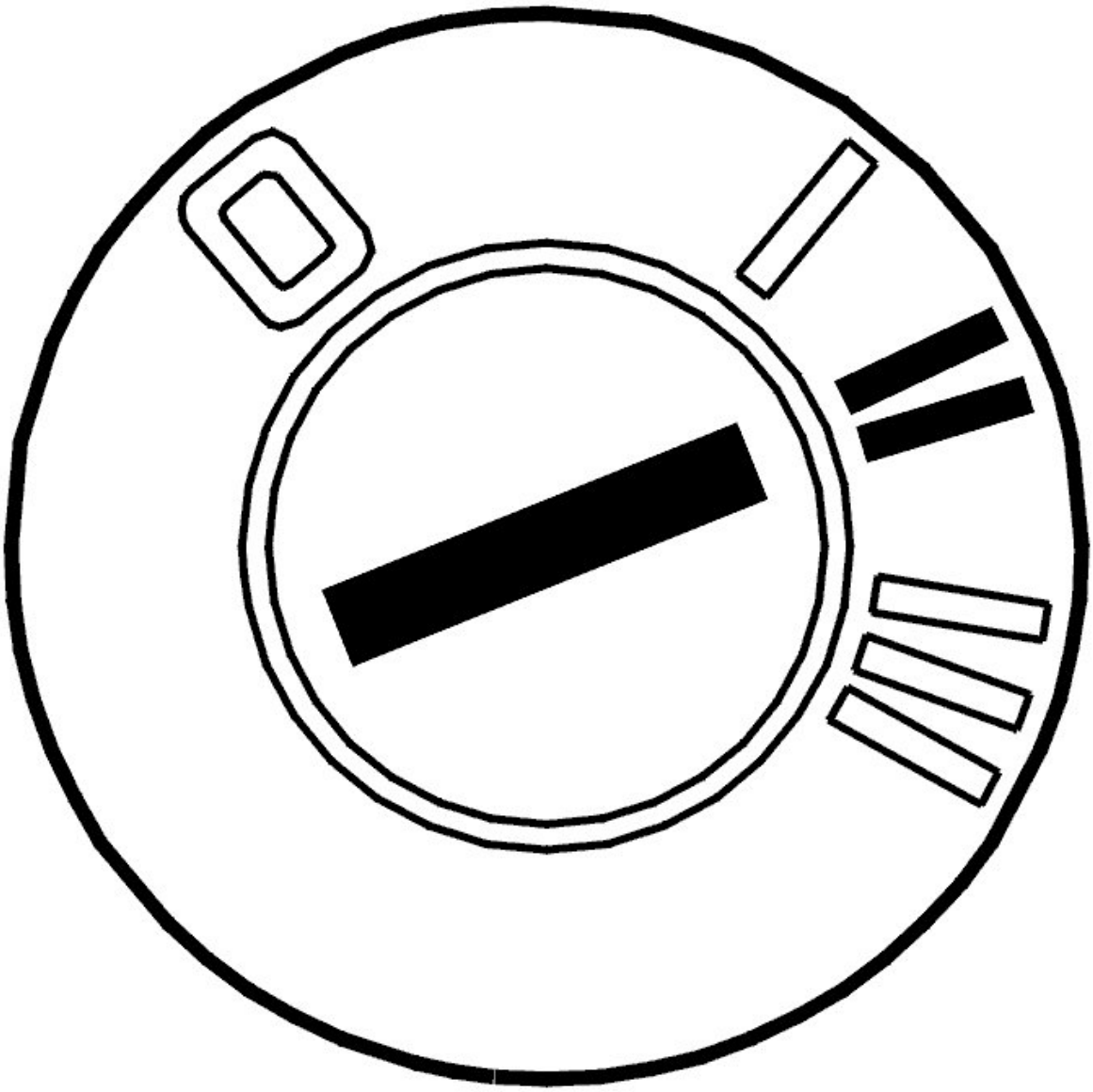
Possible source
- Signal wire MY+ short circuited to ground.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the door control module and the power door mirror (as follows). Check for a short-circuit to ground. Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0027 Door mirror motor MY+

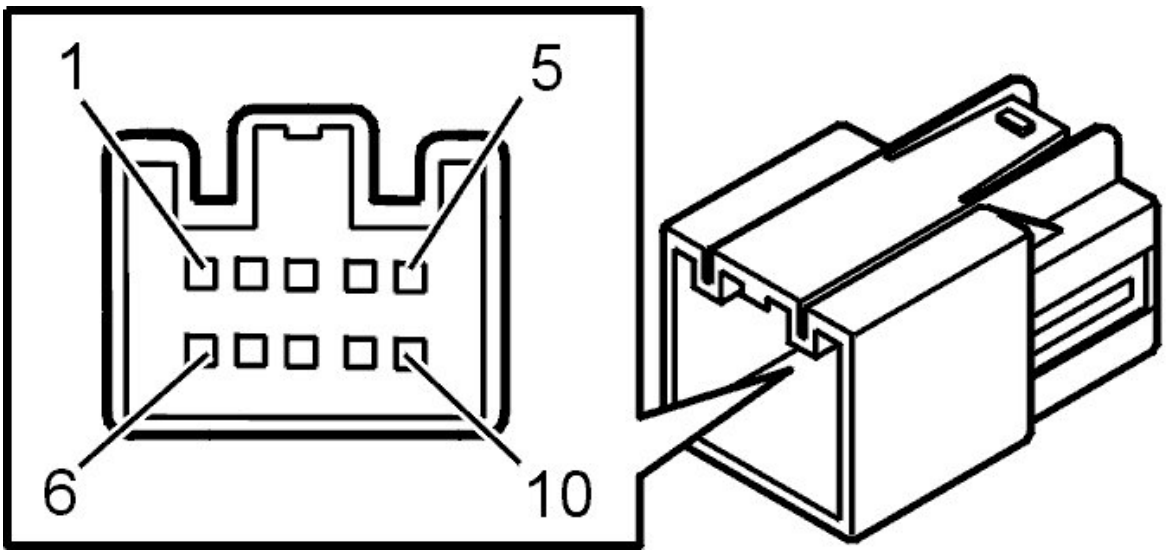
Control module terminal #28A and power door mirror terminal #16.

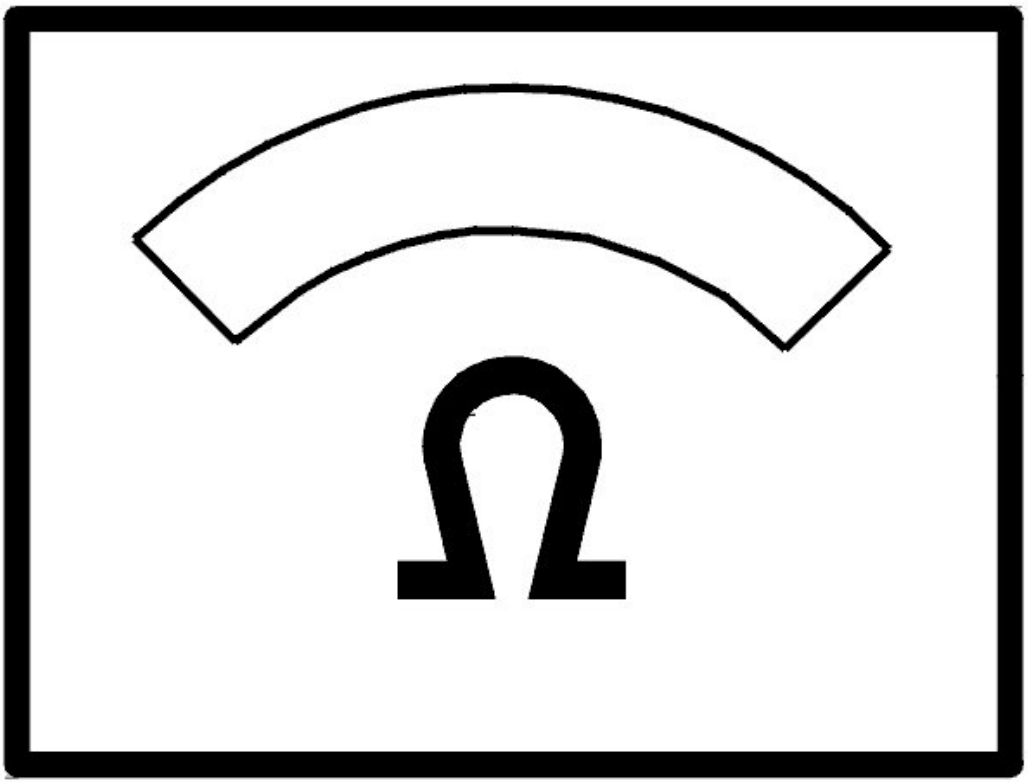
DDM-0029 Door mirror motor MF+

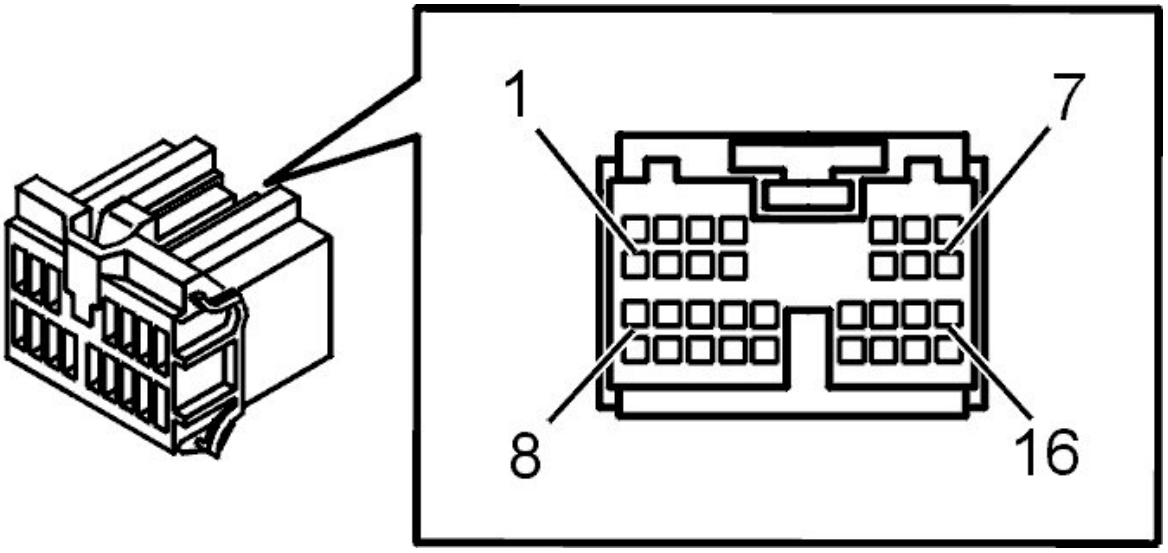
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Select Continue.

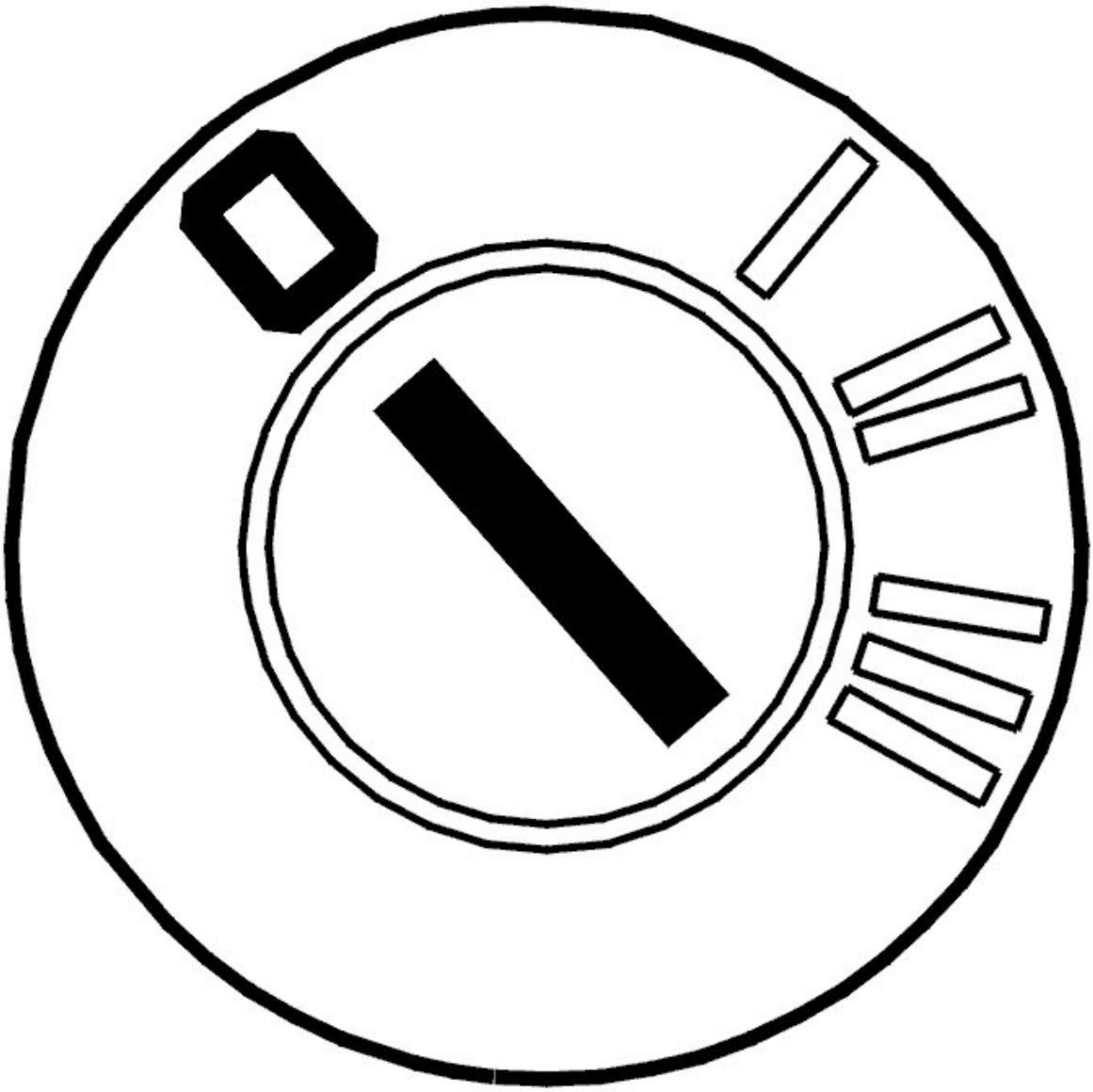
Continue - Verification

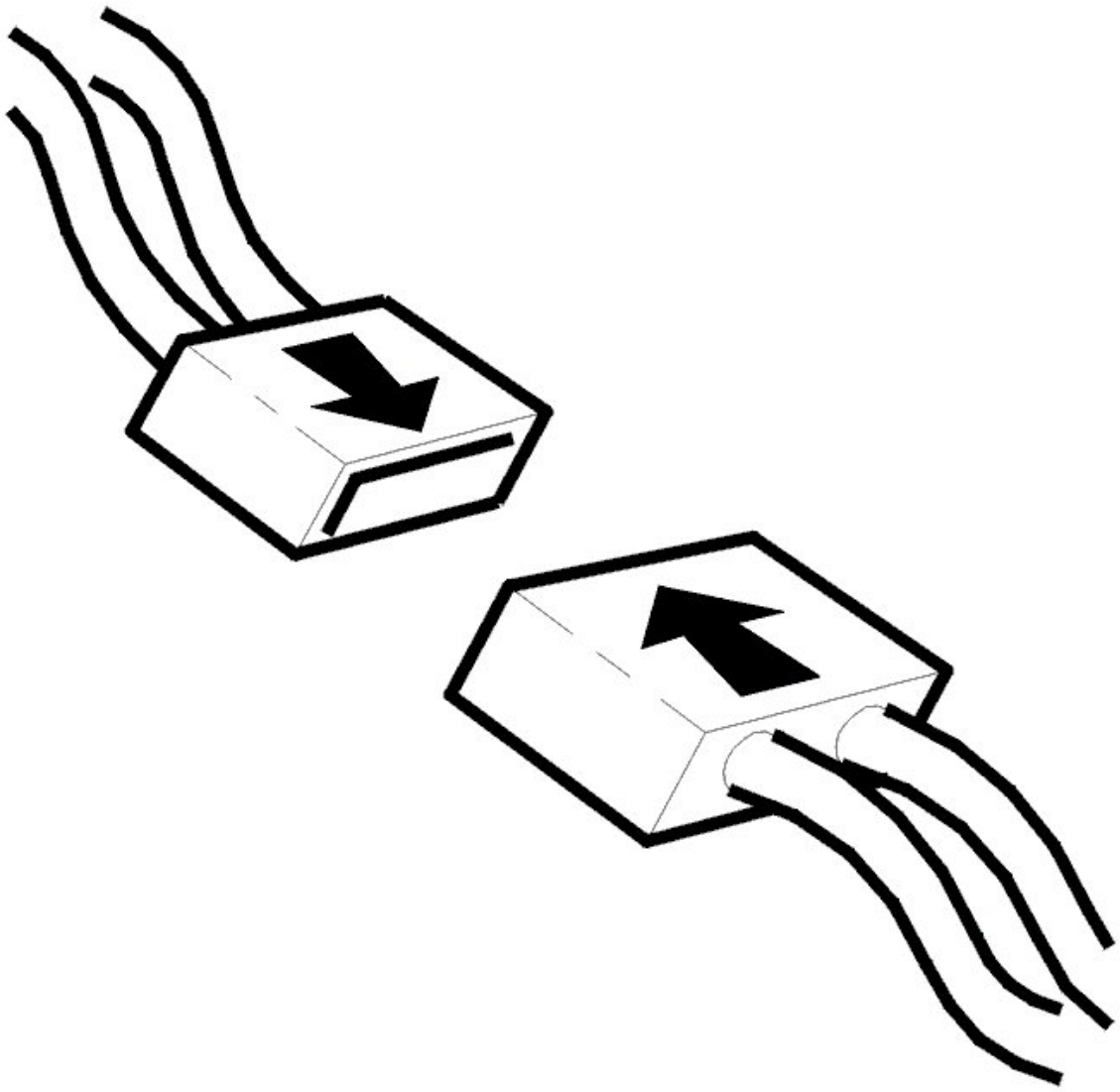
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the control module and the power door mirror. Check for an intermittent short-circuit to ground.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

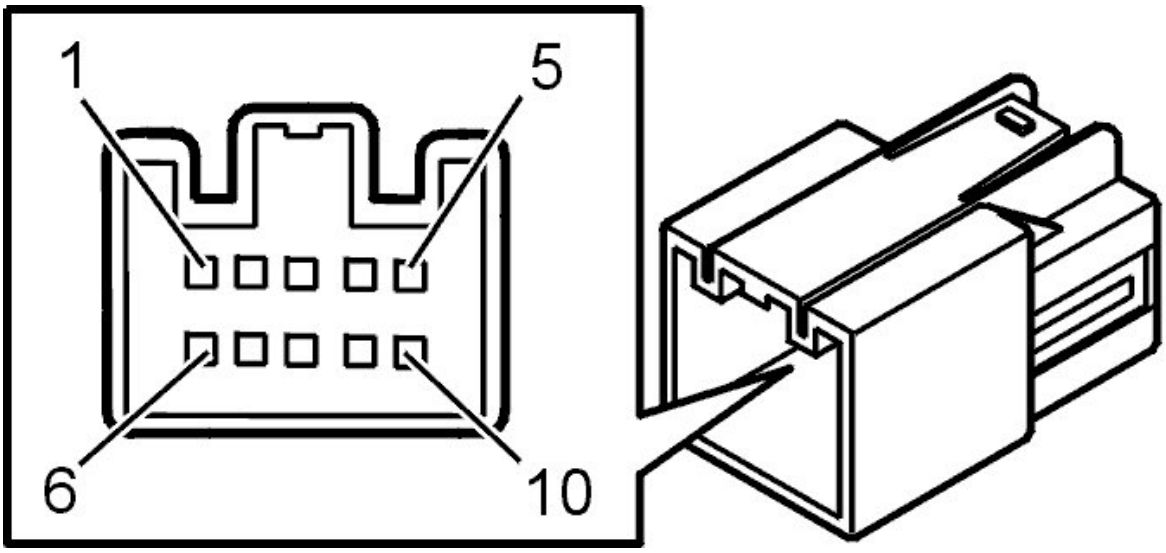
Control module terminal #28A and power door mirror terminal #16.

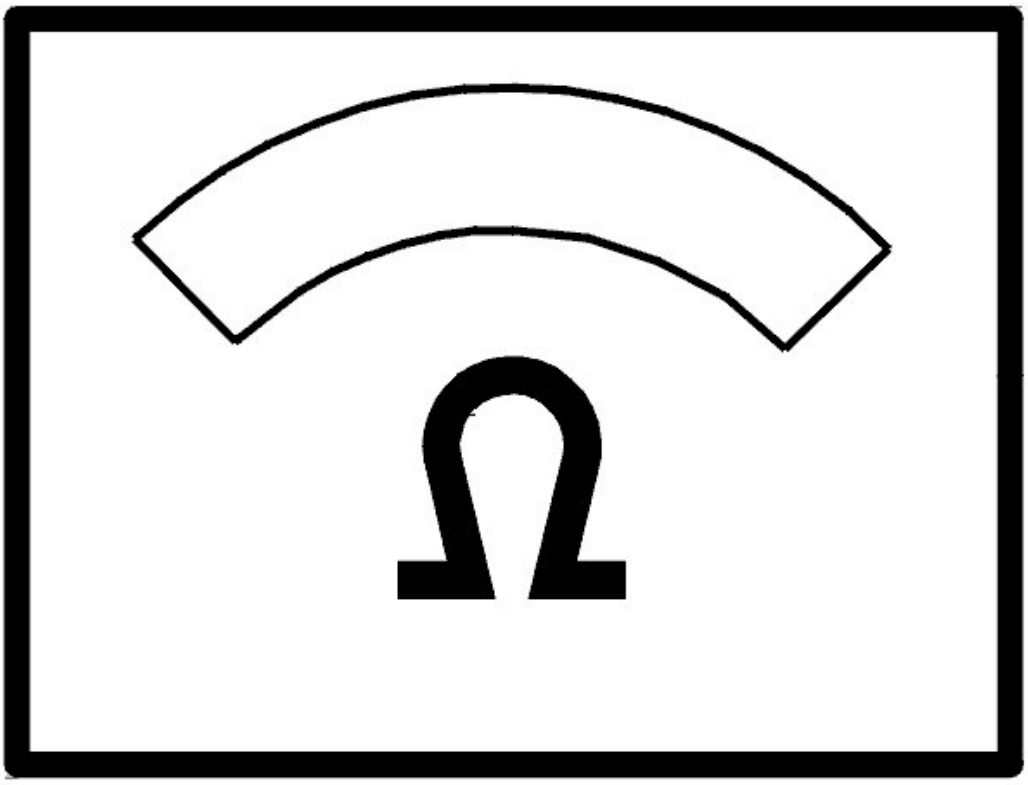
DDM-0028 Door mirror motor MF+

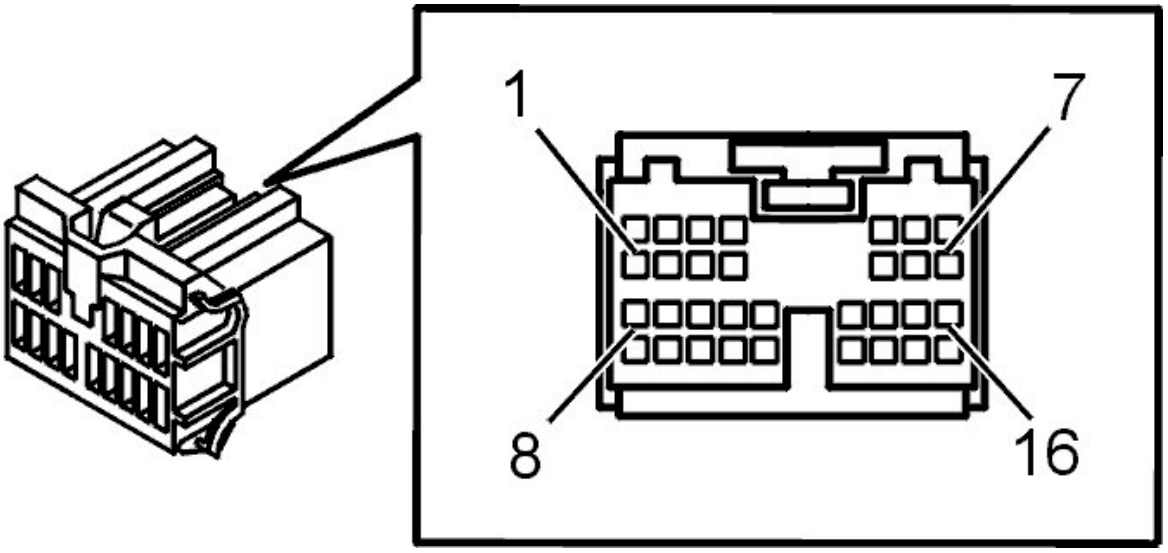
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for lowering of external rear-view mirror is short circuited to voltage supply when none of the external rear-view mirror motors are active, diagnostic trouble code DDM/PDM-0028 is displayed.

Substitute value
- Nothing.

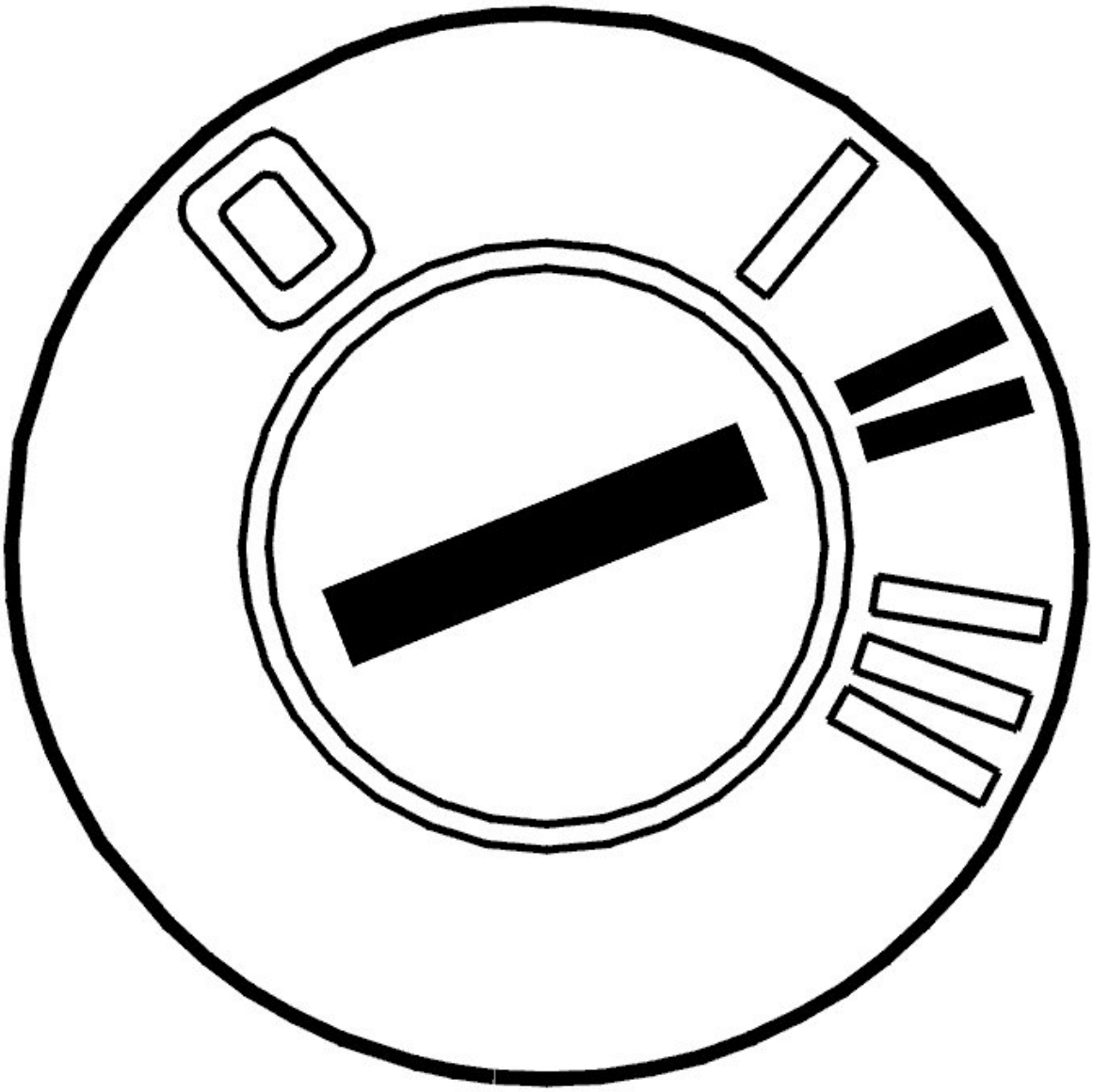
Possible source
- Signal wire MF+ short circuited to voltage supply.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the driver/passenger door control module (DDM/PDM) and the power door mirror (as follows). Check for a short-circuit to supply voltage.
Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

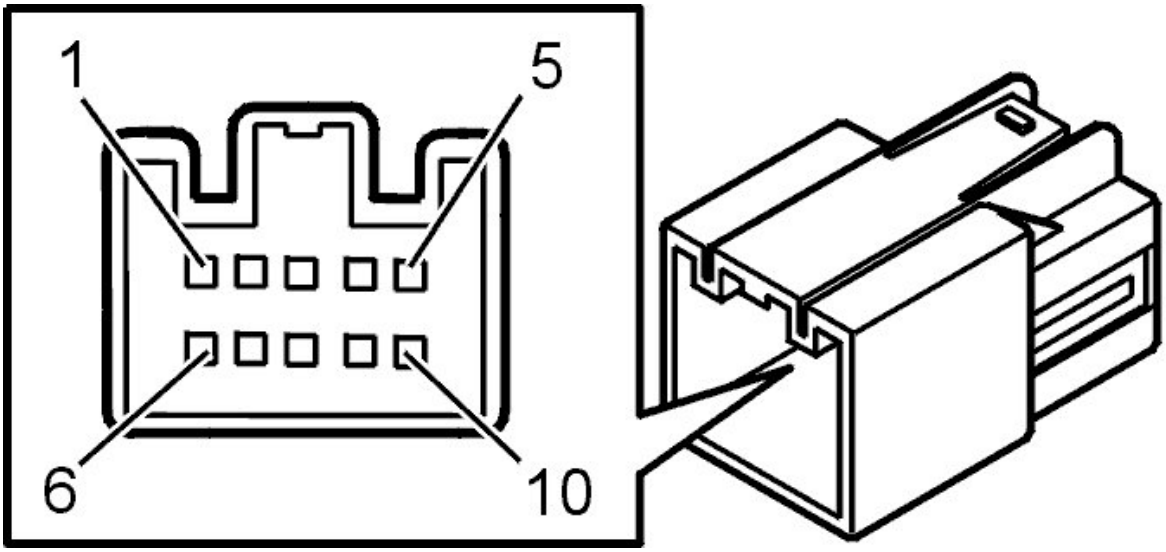
Control module terminal #28A and power door mirror terminal #16.

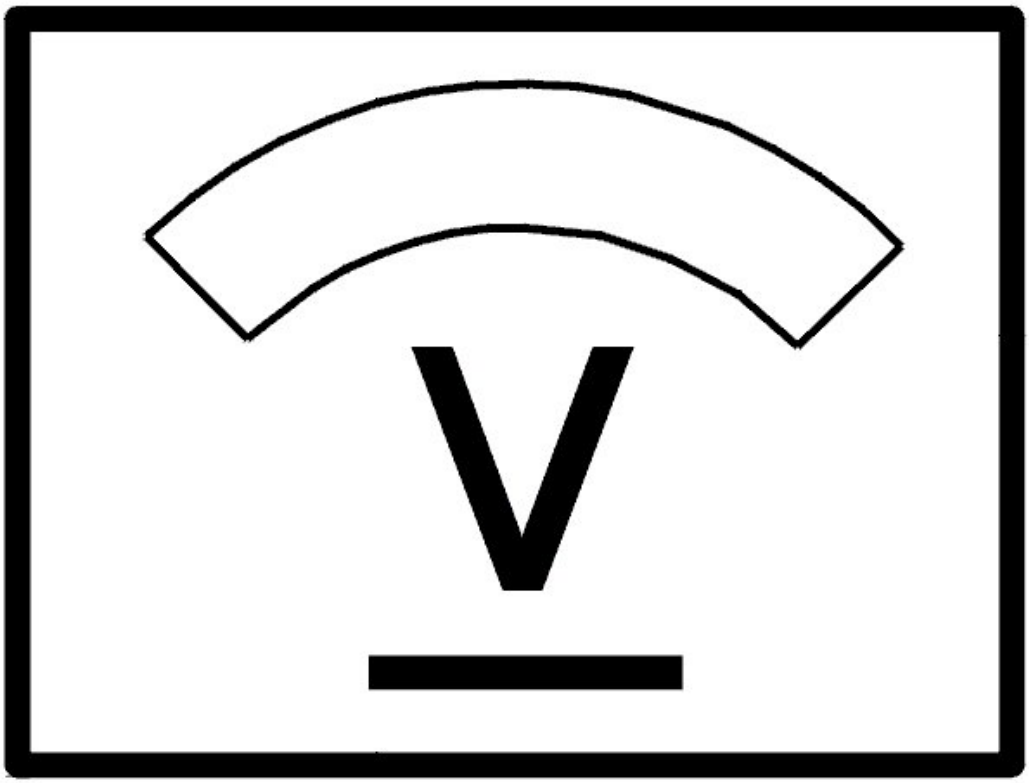
DDM-0028 Door mirror motor MF+

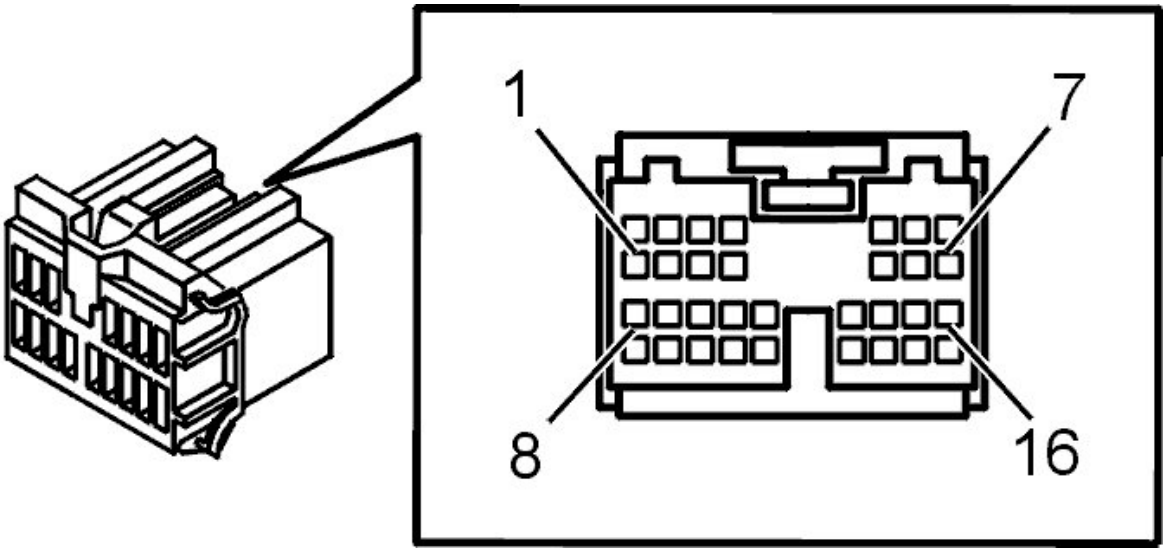
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







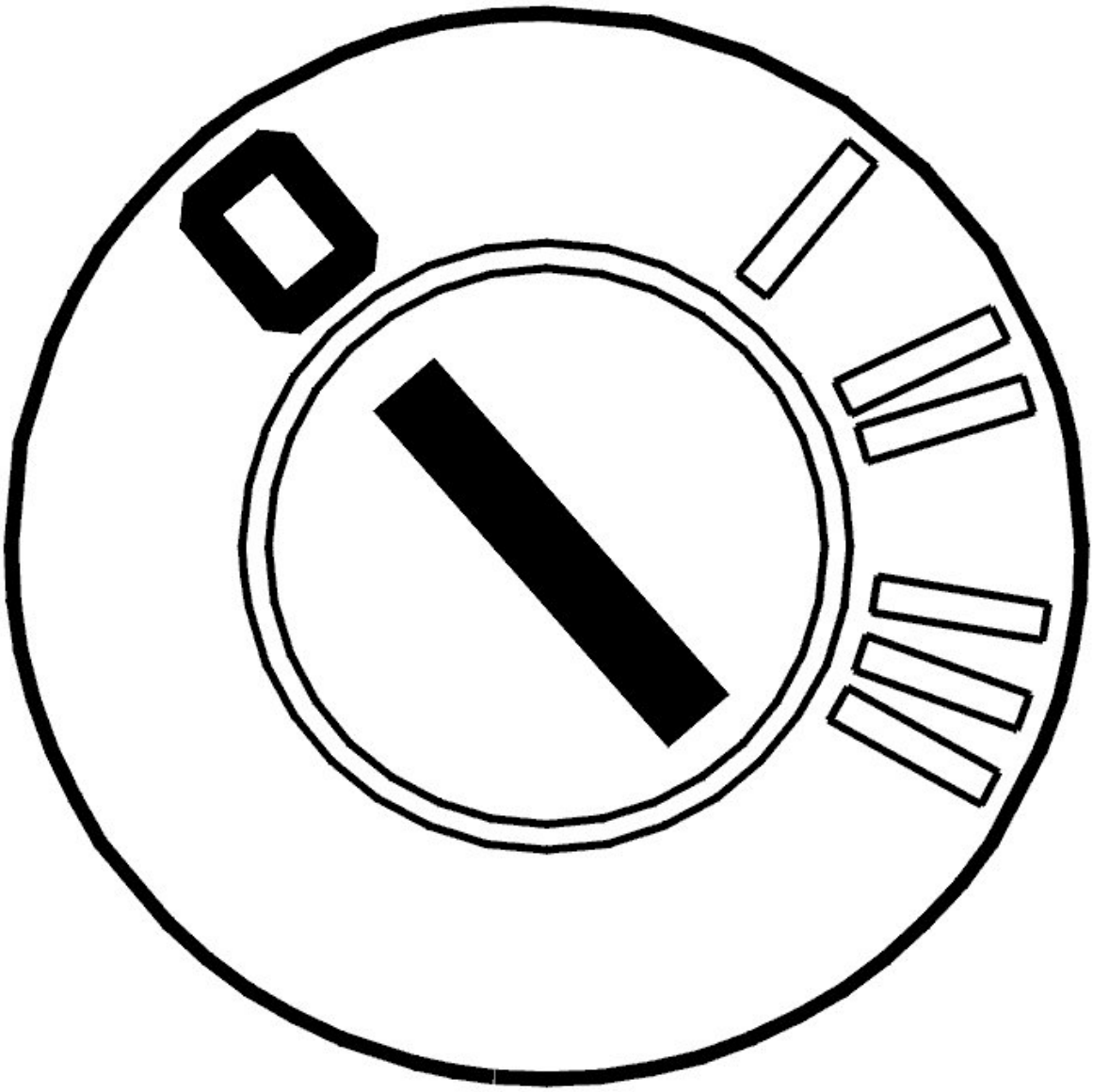
Continue - Verification

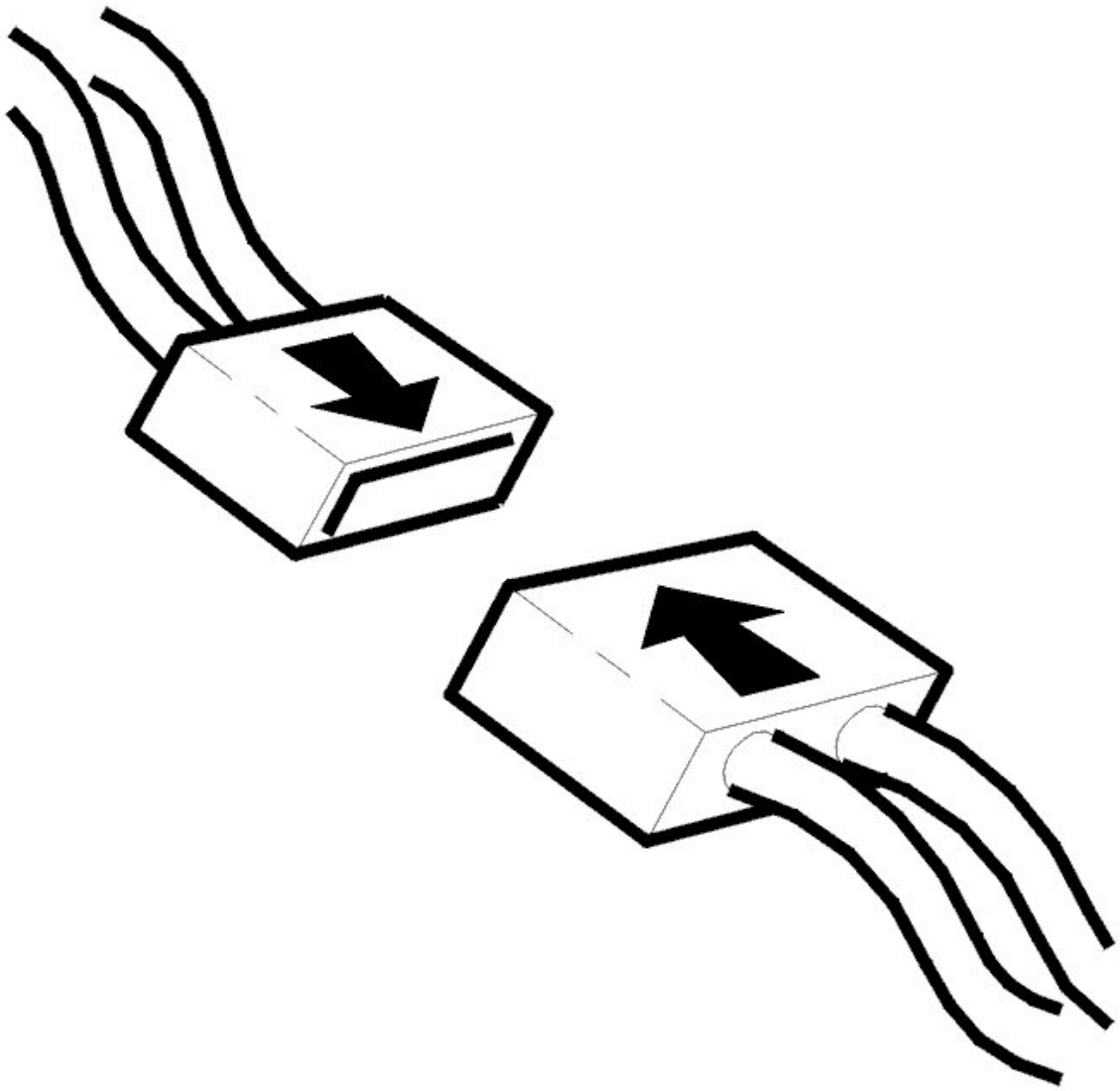
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the driver/passenger door control module (DDM/PDM) and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the door control module and the power door mirror (as follows). Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

If the car is equipped with a 10-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0026 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0028 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

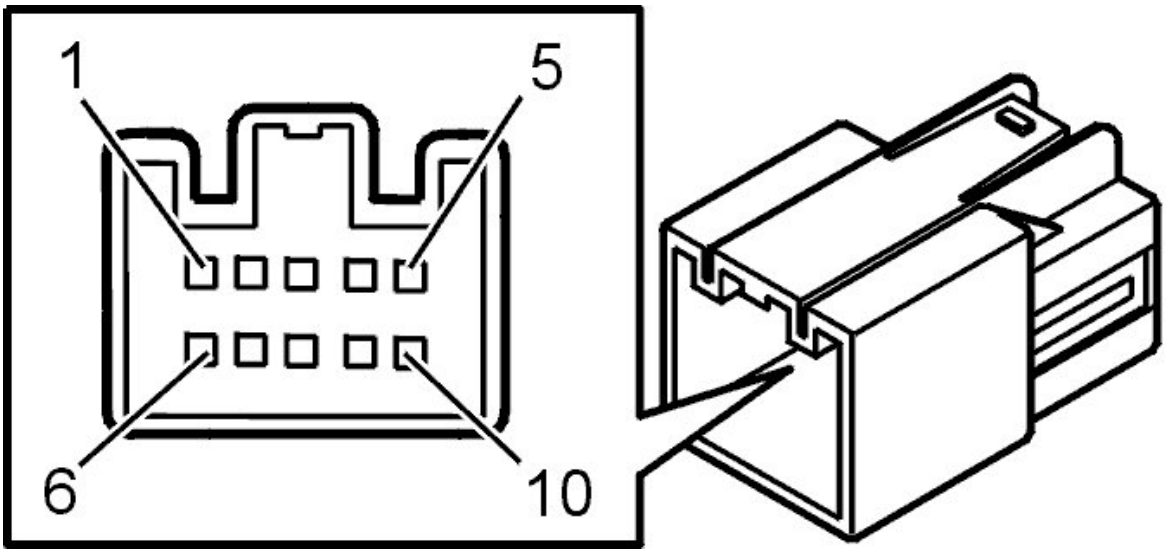
Control module terminal #28A and power door mirror terminal #16.

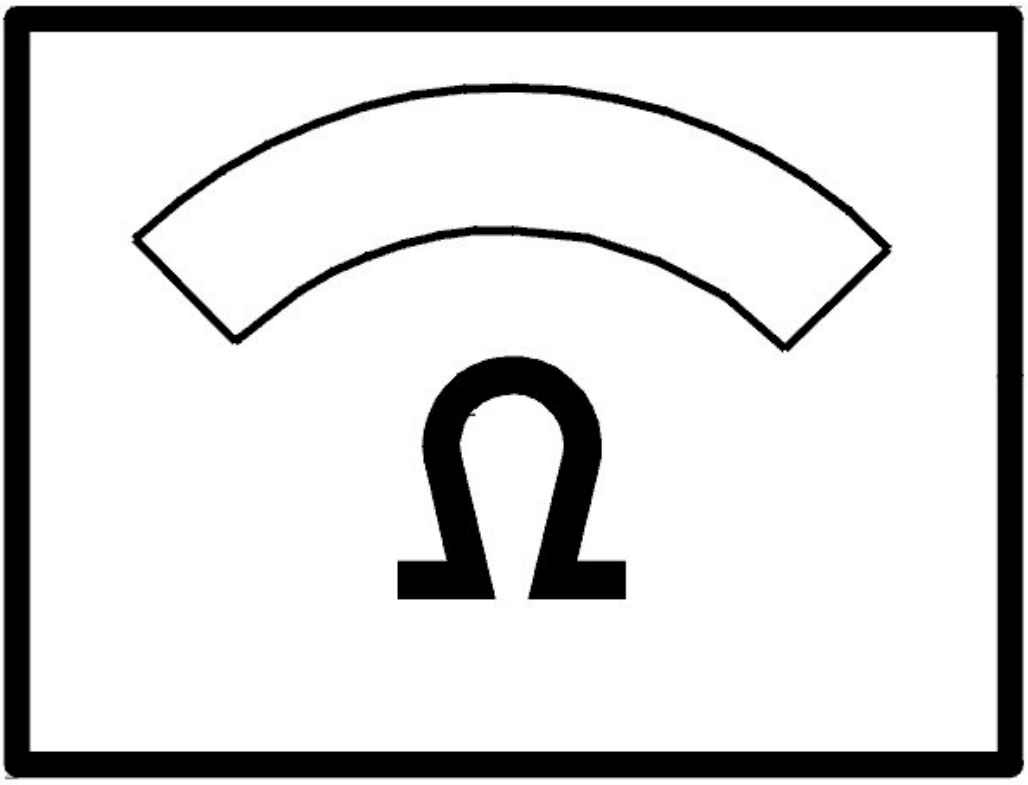
DDM-0028 Door mirror motor MF+

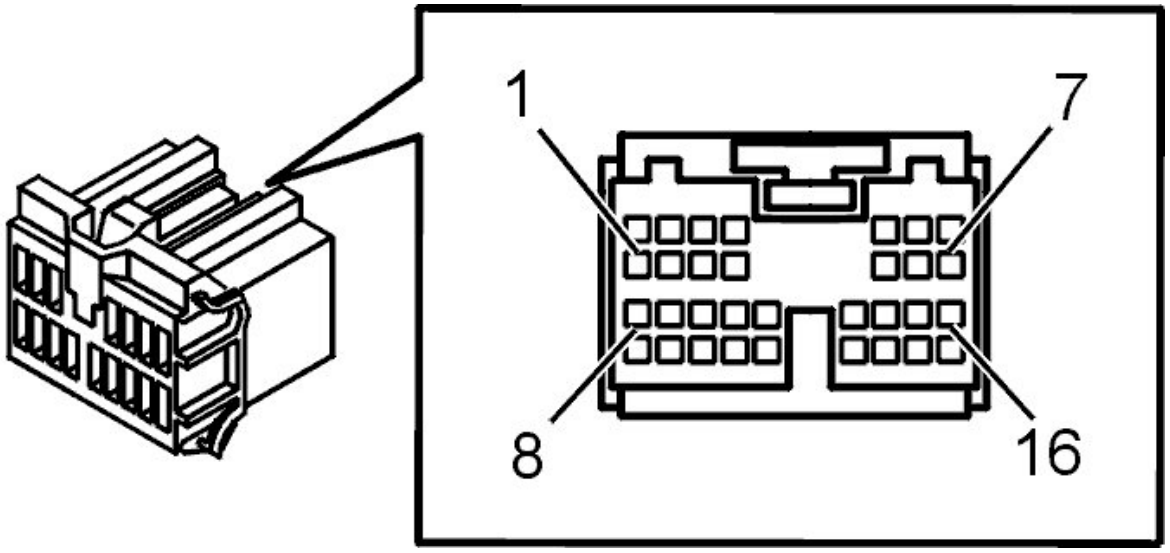
Control module terminal #29A and power door mirror terminal #14.

Other information:

- When the function is not activated the voltage between the control module and ground must be **0 V**
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal wire for lowering of external rear-view mirror is short circuited to ground when only one of the external rear-view mirror motors is activated, diagnostic trouble code DDM/PDM-0029 is displayed.

Substitute value
- Nothing.

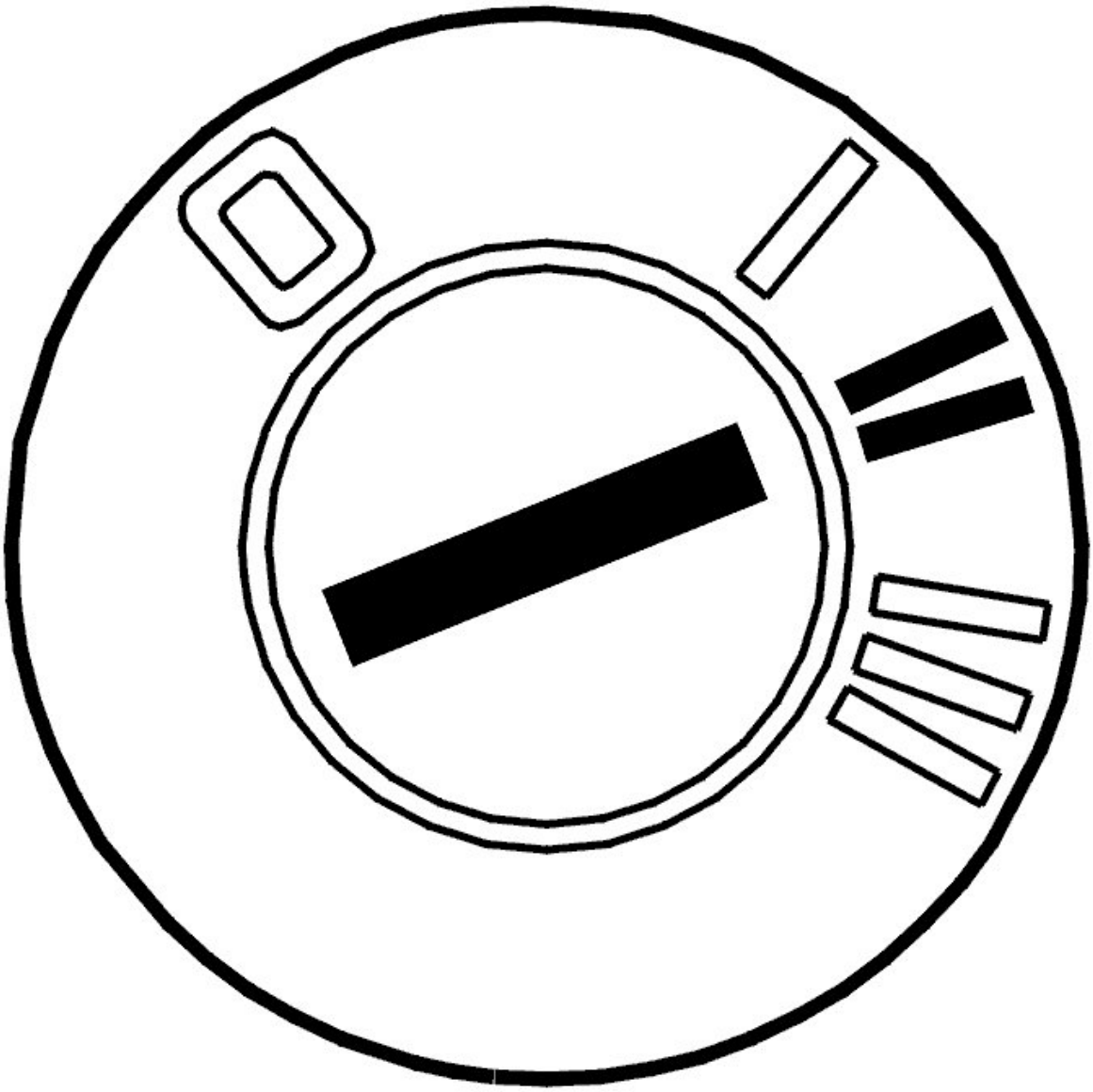
Possible source
- Signal wire MF+ short circuited to ground.

Fault symptom[s]
- External rear-view mirror operation does not work.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Press the switch for the power door mirrors to check the function of the power door mirrors.

Can the power door mirrors be maneuvered?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the door control module and the power door mirror (as follows). Check for a short-circuit to ground. Remedy as necessary.
Try a new power door mirror if the cable is OK.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0027 Door mirror motor MY+

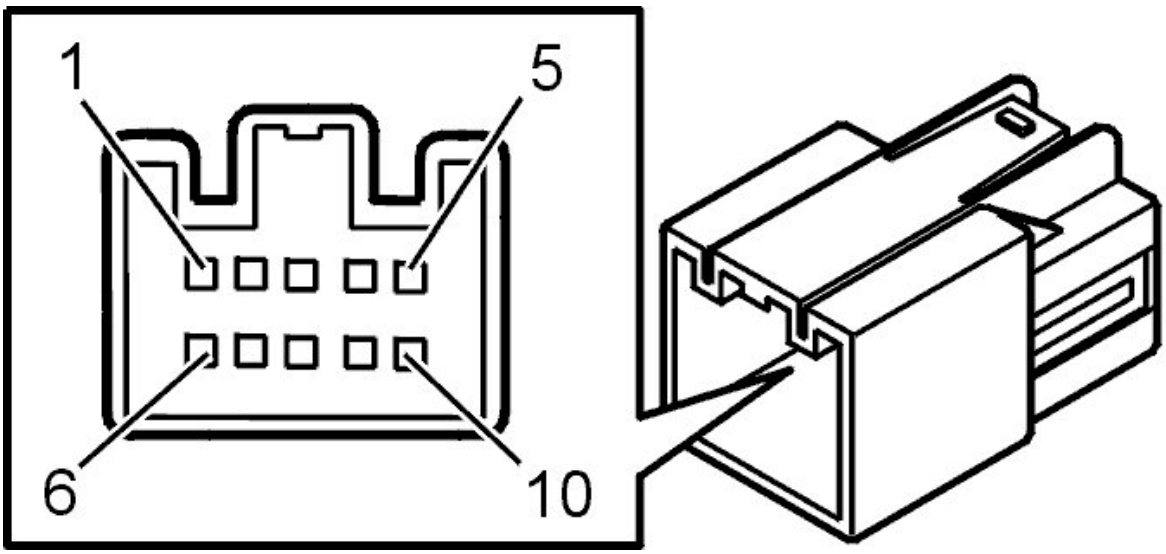
Control module terminal #28A and power door mirror terminal #16.

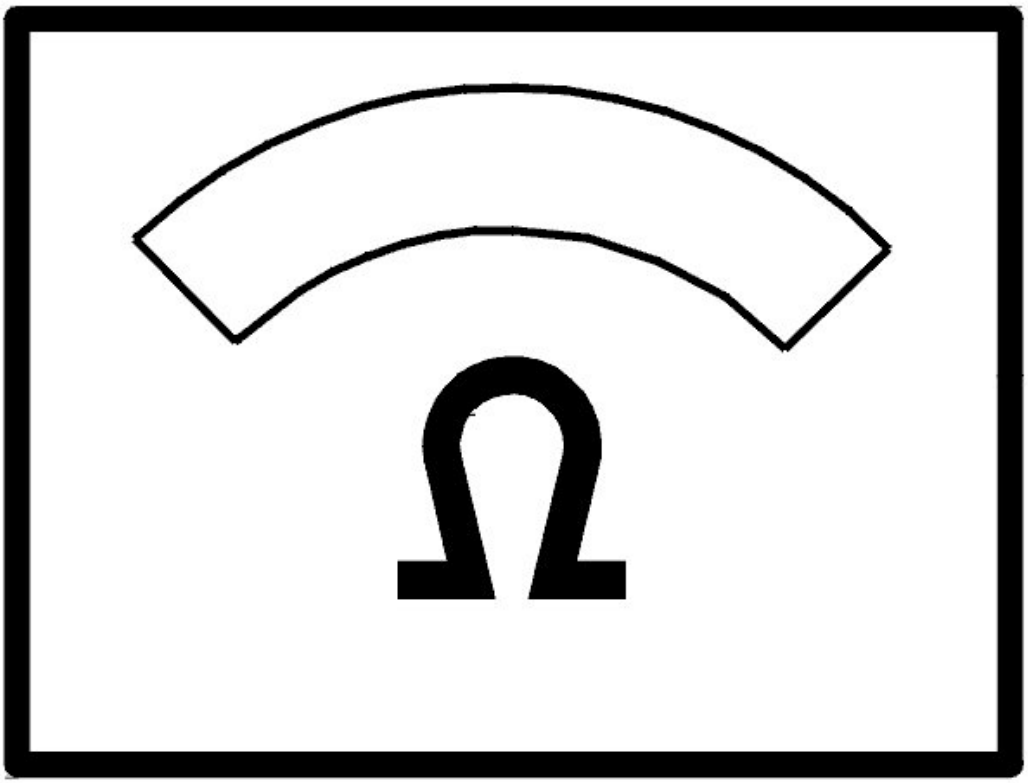
DDM-0029 Door mirror motor MF+

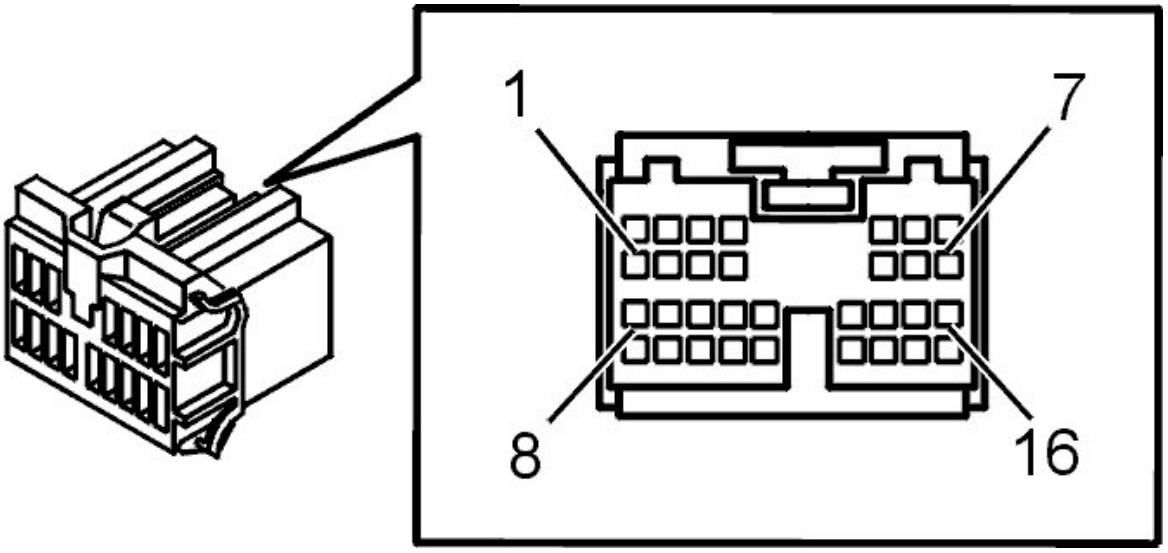
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Select Continue.

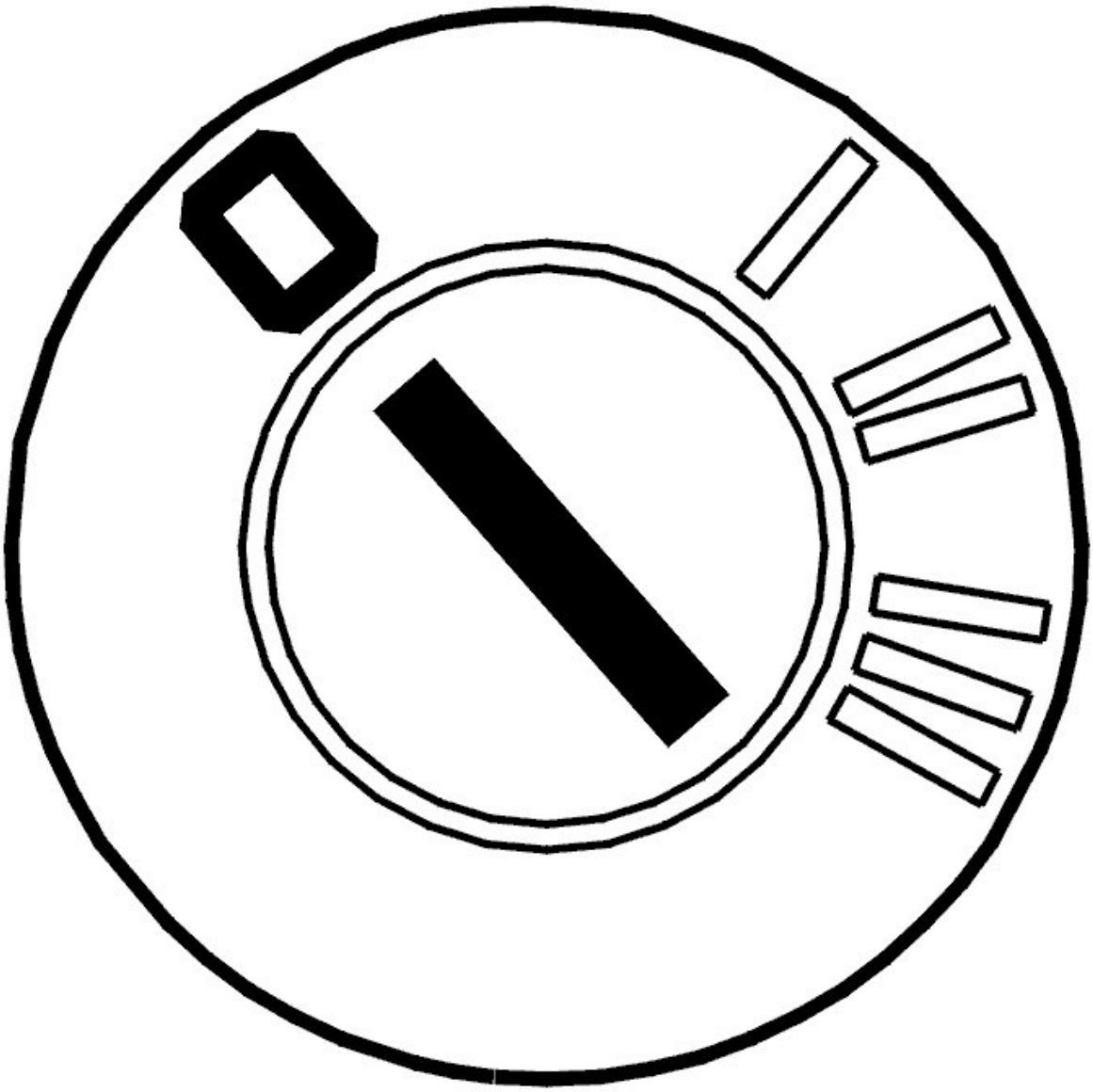
Continue - Verification

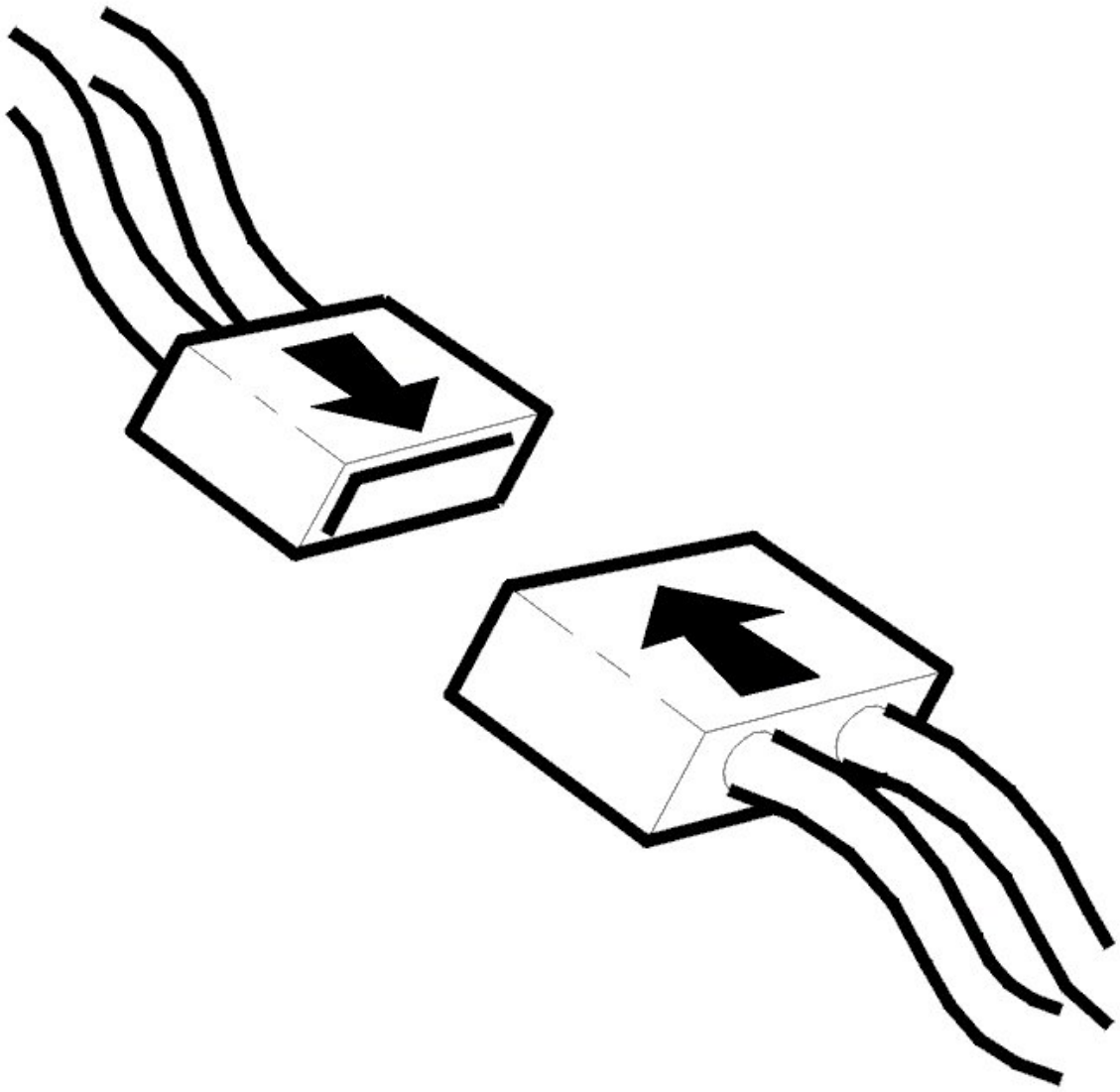
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.

Operate the door mirror to each limit position using the control. The mirror must move in the corresponding directions.

Is the mirror working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.
Check the cable between the control module and the power door mirror. Check for an intermittent short-circuit to ground.

If the car is equipped with a 10-pin connector

DDM-0024 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #9.

DDM-0027 Door mirror motor MY+

Control module terminal #28A and power door mirror terminal #10.

DDM-0029 Door mirror motor MF+

Control module terminal #29A and power door mirror terminal #8.

If the car is equipped with a 16-pin connector

DDM-0023 Door mirror motor MX+

Control module terminal #26A and power door mirror terminal #15.

DDM-0026 Door mirror motor MY+

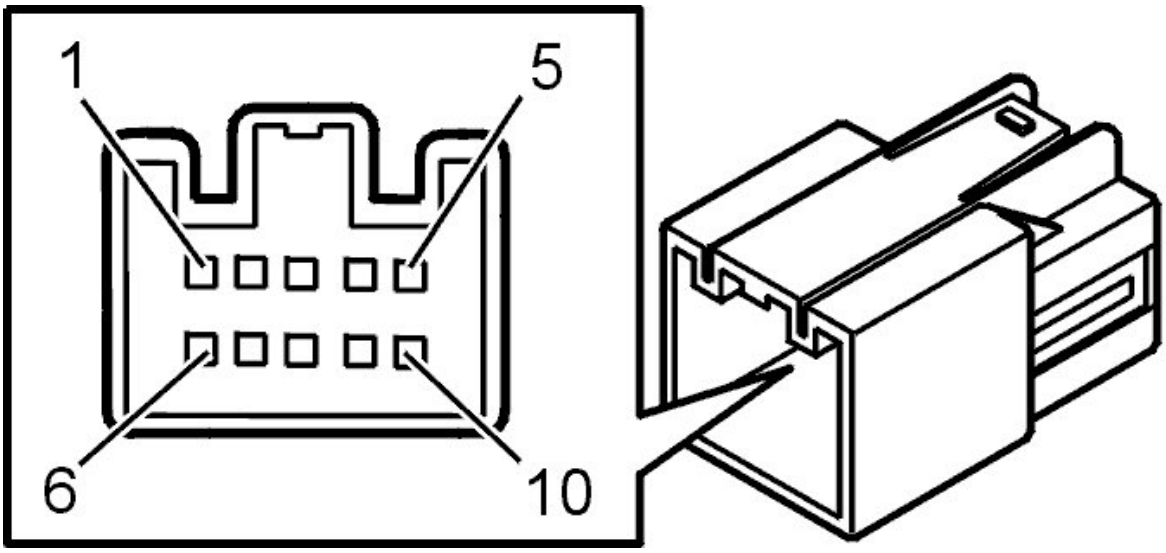
Control module terminal #28A and power door mirror terminal #16.

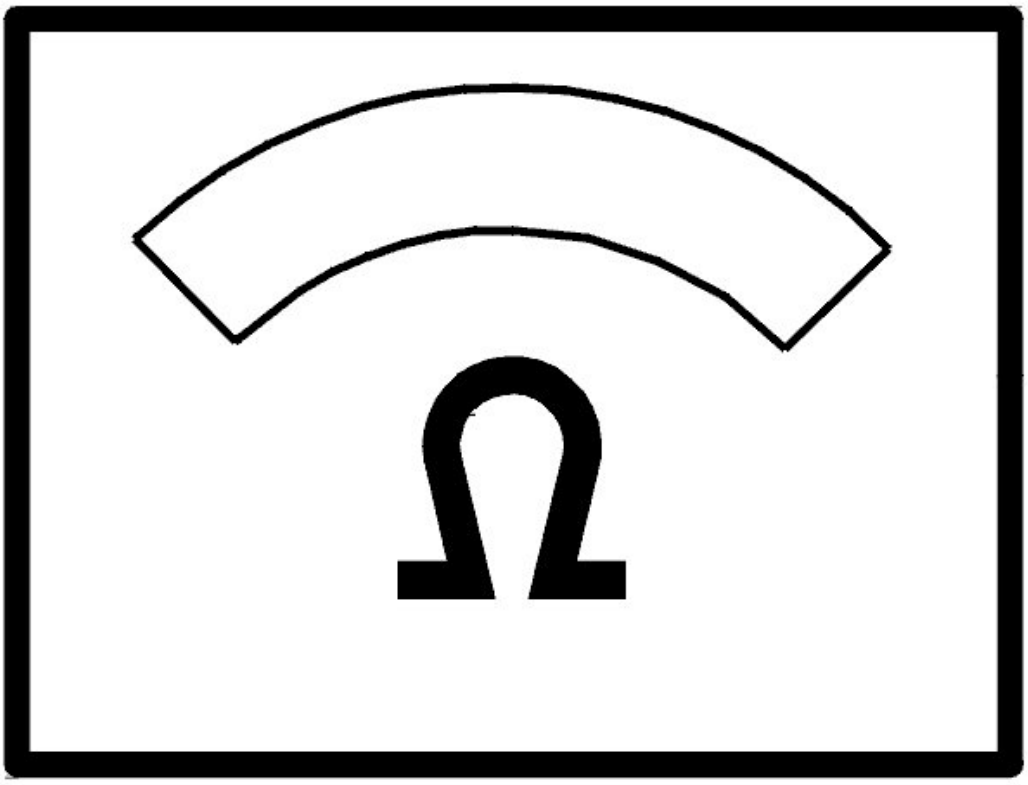
DDM-0028 Door mirror motor MF+

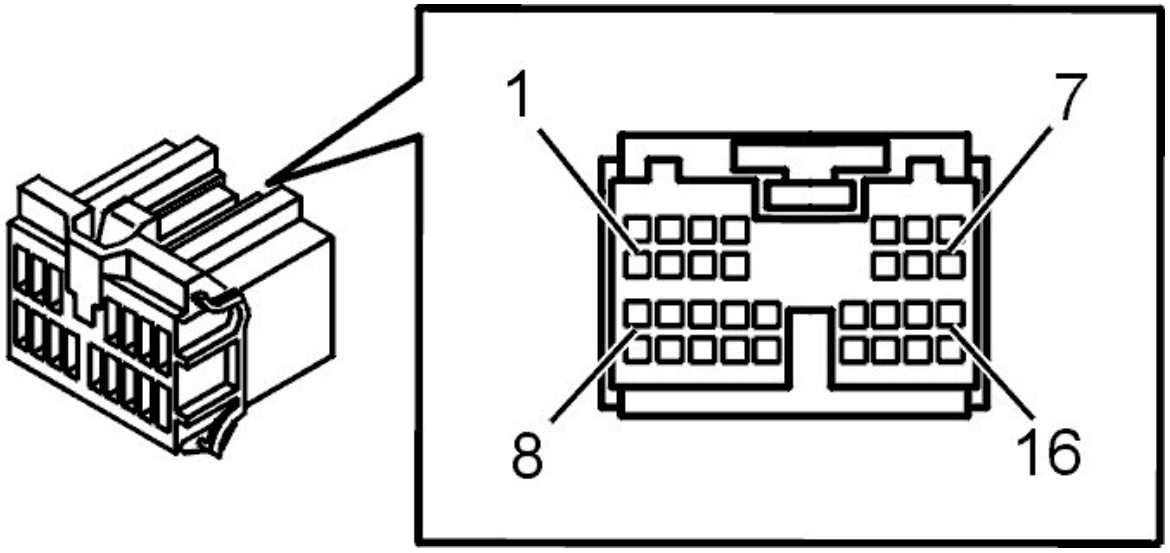
Control module terminal #29A and power door mirror terminal #14.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- To access the driver/passenger door module (DDM/PDM), see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- To access the power door mirror, see Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PDM/DDM-0030 is stored if the control module registers that the signal across the potentiometer for door mirror X axis control (left and right) is too high.

Substitute value
- None.

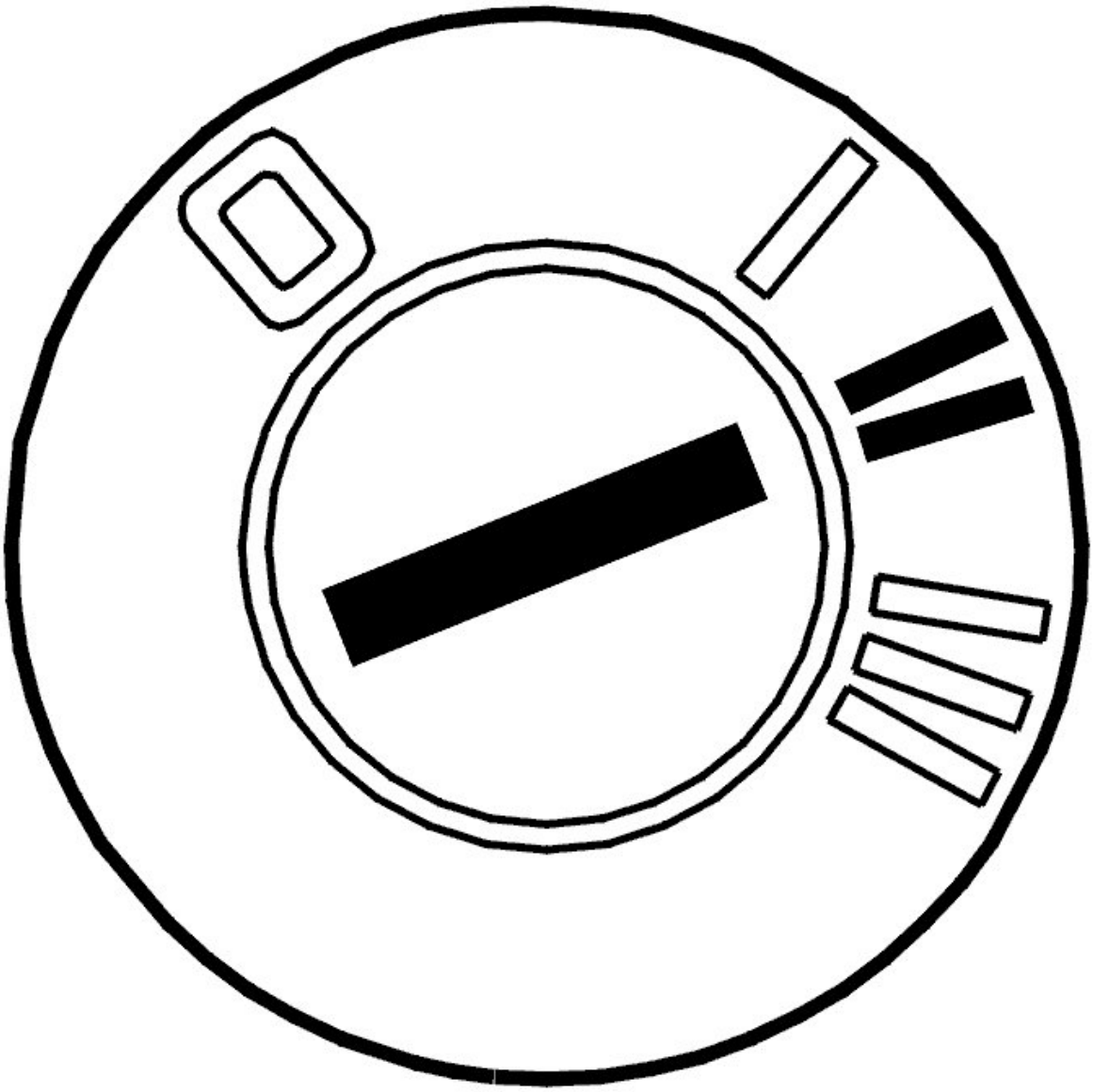
Possible source
- Short-circuit to supply voltage in the signal cable.
- Open-circuit in the signal cable.
- Short-circuit to ground in the power cable.
- Open-circuit in the ground lead.
- Short-circuit to supply voltage in the ground lead.

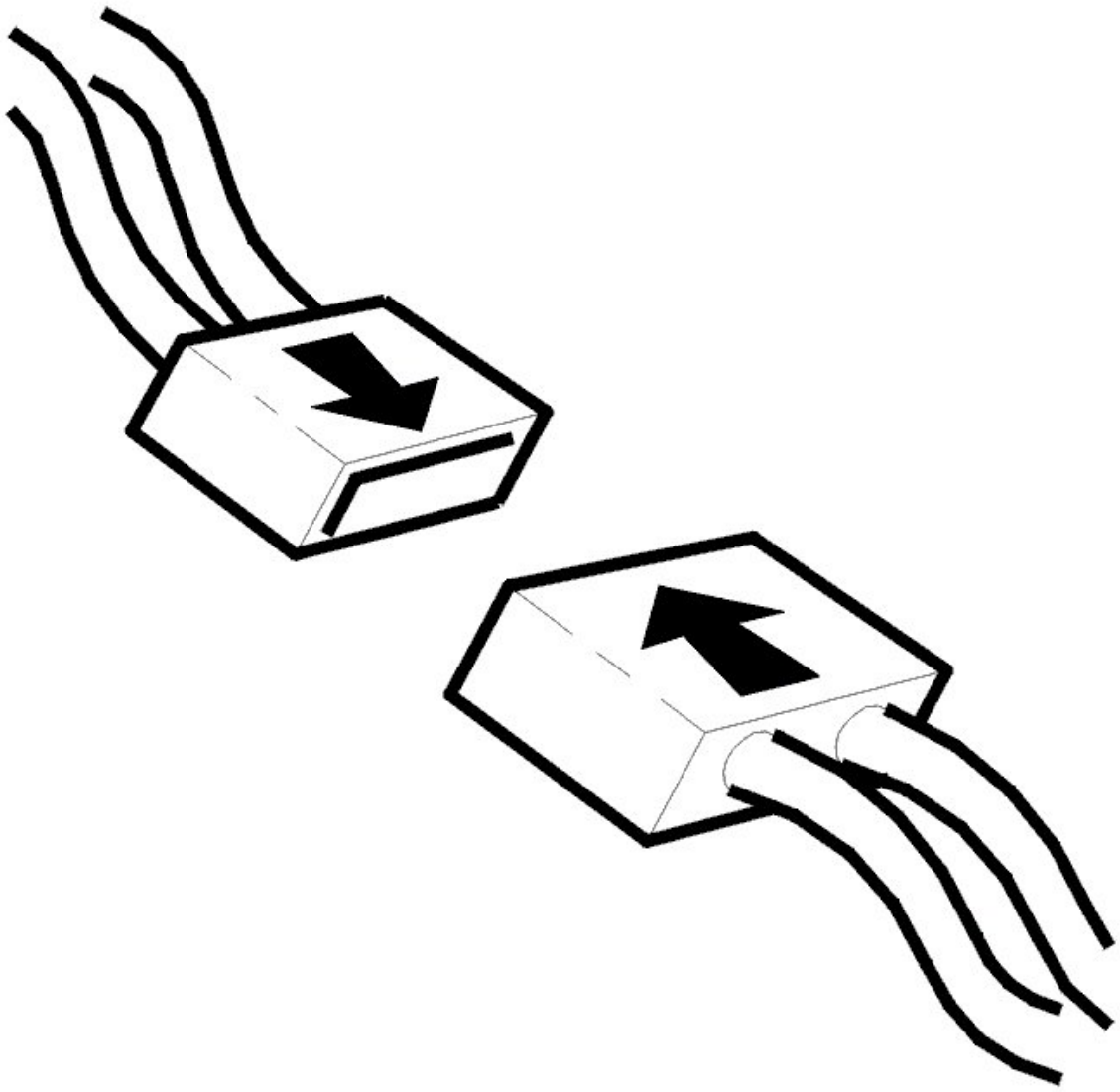
Fault symptom[s]
- The door mirror memory function is not working.

Faulty Signal

Faulty signal

Checking connectors and components





- Check the connector for the control module and door mirror. Check for contact resistance and oxidation.

Remedy as necessary

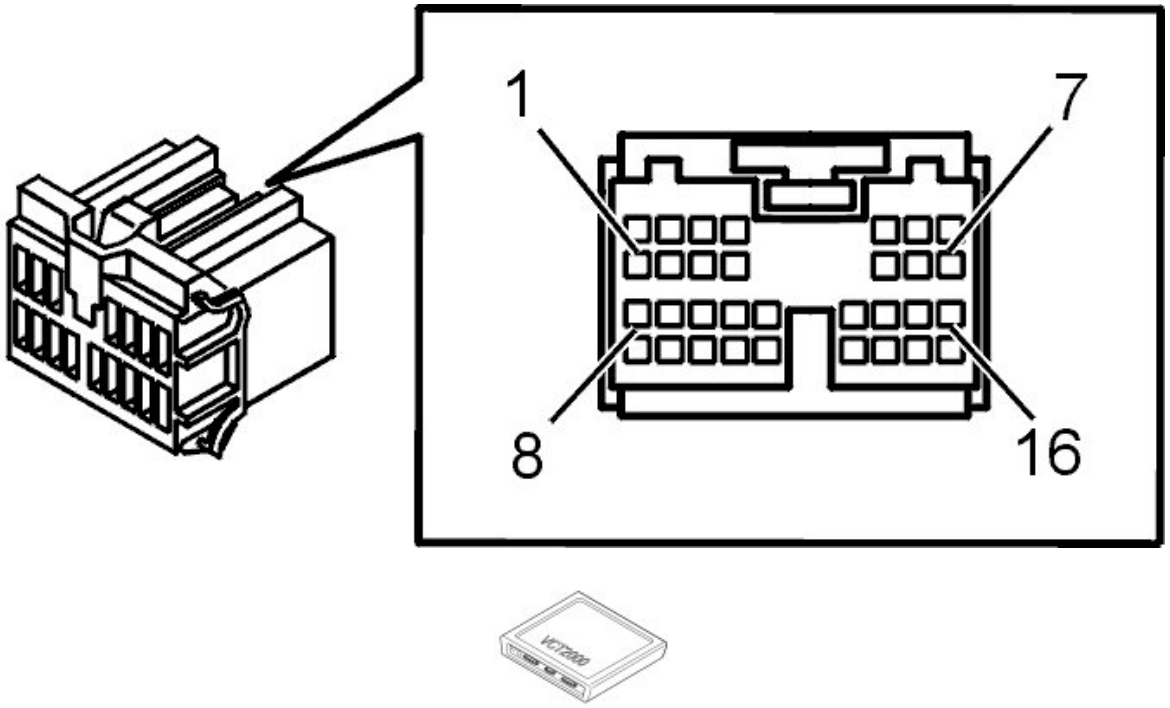
- Reinstall the connectors, components etc.
- Ignition on.

Test the door mirror function by changing its position and reading off the end values registered by the door mirror potentiometer.

Hint: The end values for the door mirror potentiometer should be between 1 and 4 V.

Other information:

- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Does the door mirror potentiometer operate correctly?

Yes - Verification

No - Checking faulty signals

Checking faulty signals

Check the cable between control module terminal #25A and door mirror terminal #1. Check for a short-circuit to ground.
Check the cable between control module terminal #8A and door mirror terminal #11. Check for a short-circuit to supply voltage. Check for an open-circuit.

DDM/PDM-0030 Door mirror potentiometer, faulty signal

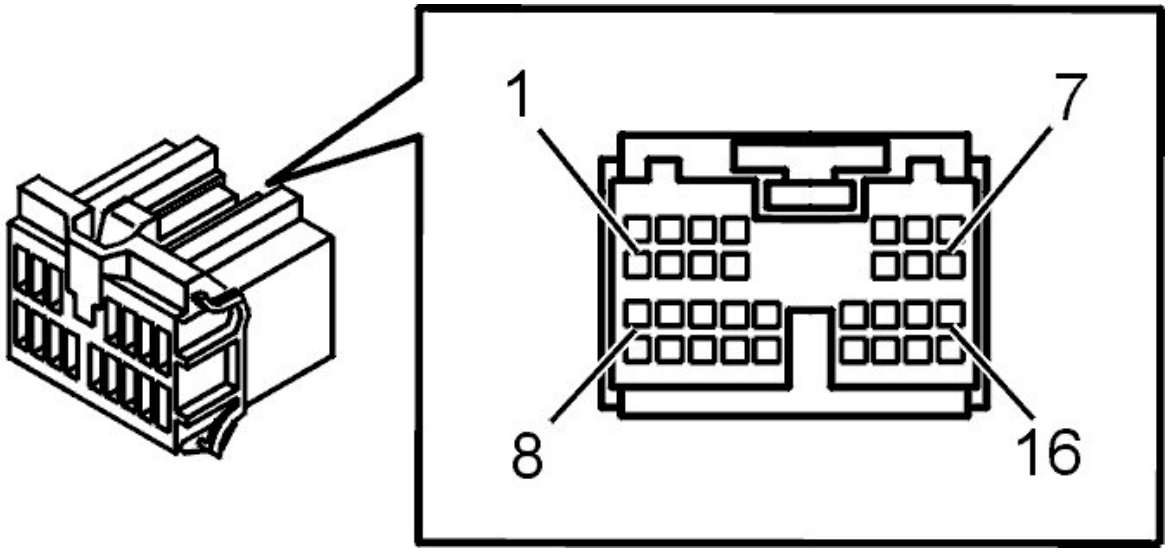
Check the cable between control module terminal #9A and door mirror terminal #9. Check for a short-circuit to supply voltage. Check for an open-circuit.

DDM/PDM-0032 Door mirror potentiometer, faulty signal

Check the cable between control module terminal #10A and door mirror terminal #10. Check for a short-circuit to supply voltage. Check for an open-circuit.

Other information:

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



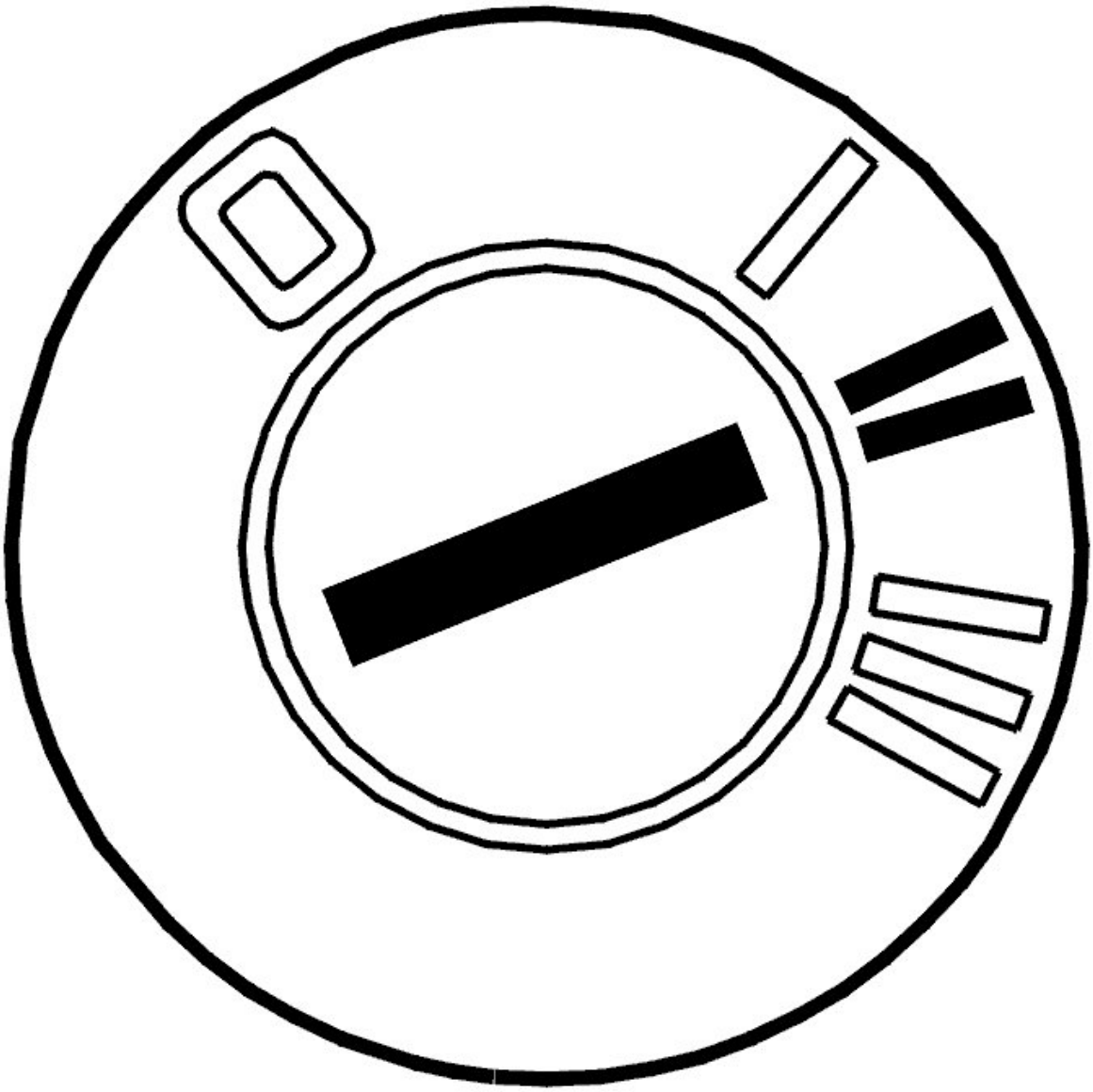
Continue - Verification

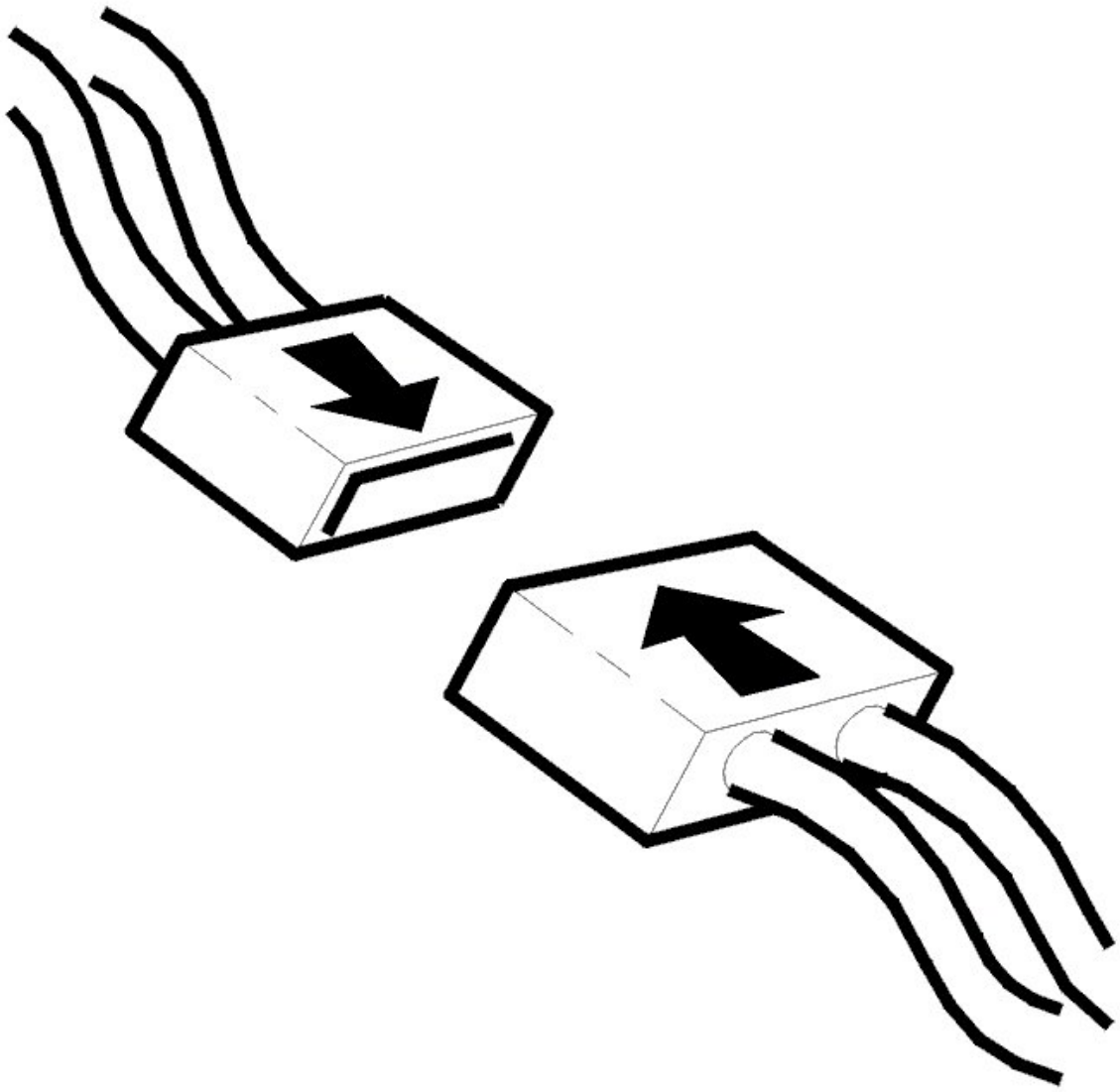
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check that the limit values for the door mirrors are between 1 and 4 V.

Is the response within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0031 is stored if the control module registers that the signal across the potentiometer for door mirror X axis control (left and right) is too low.

Substitute value
- None.

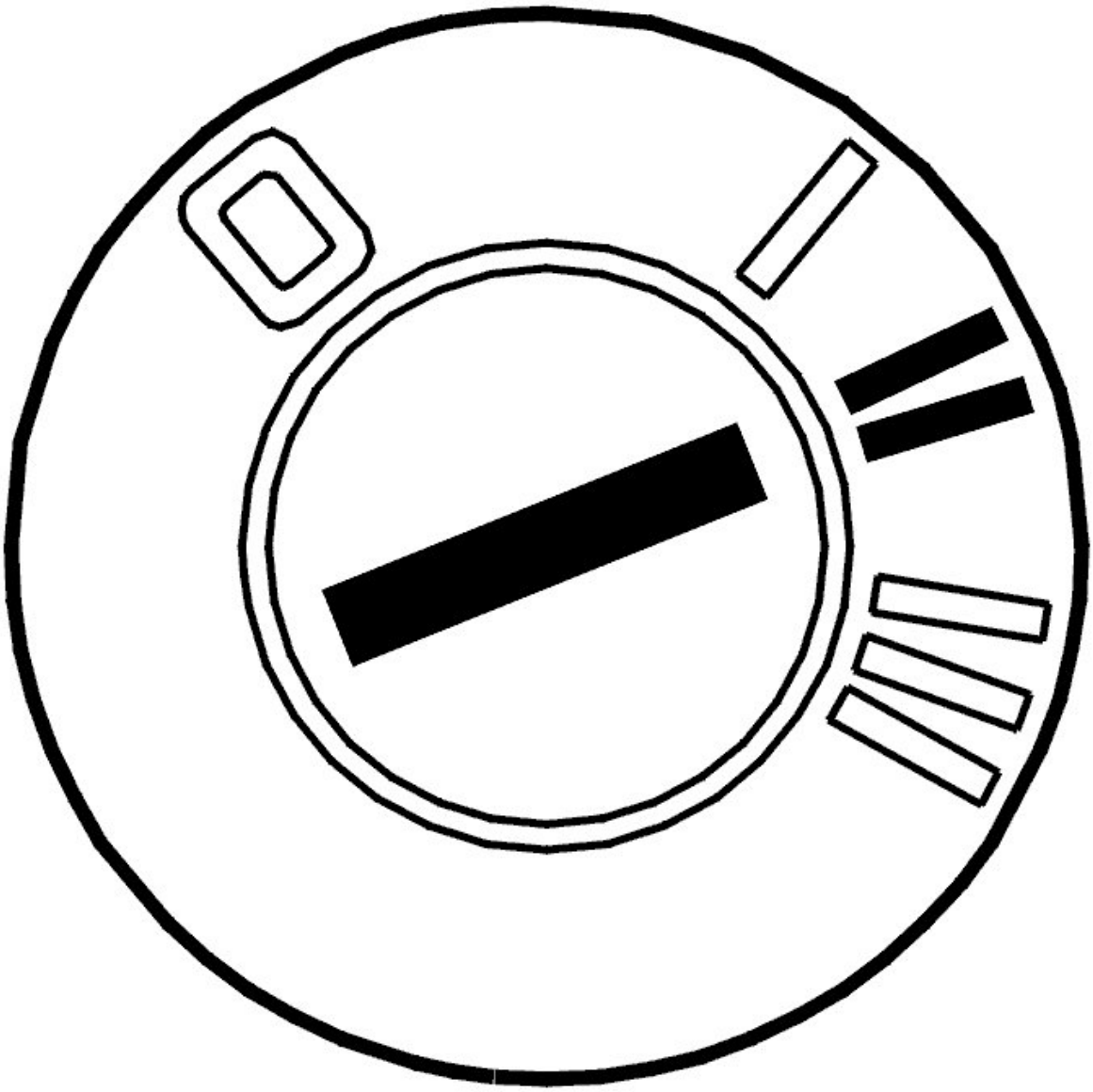
Possible source
- Short-circuit to ground in the signal cable.
- Open-circuit in the power cable.
- Short-circuit to ground in the power cable.

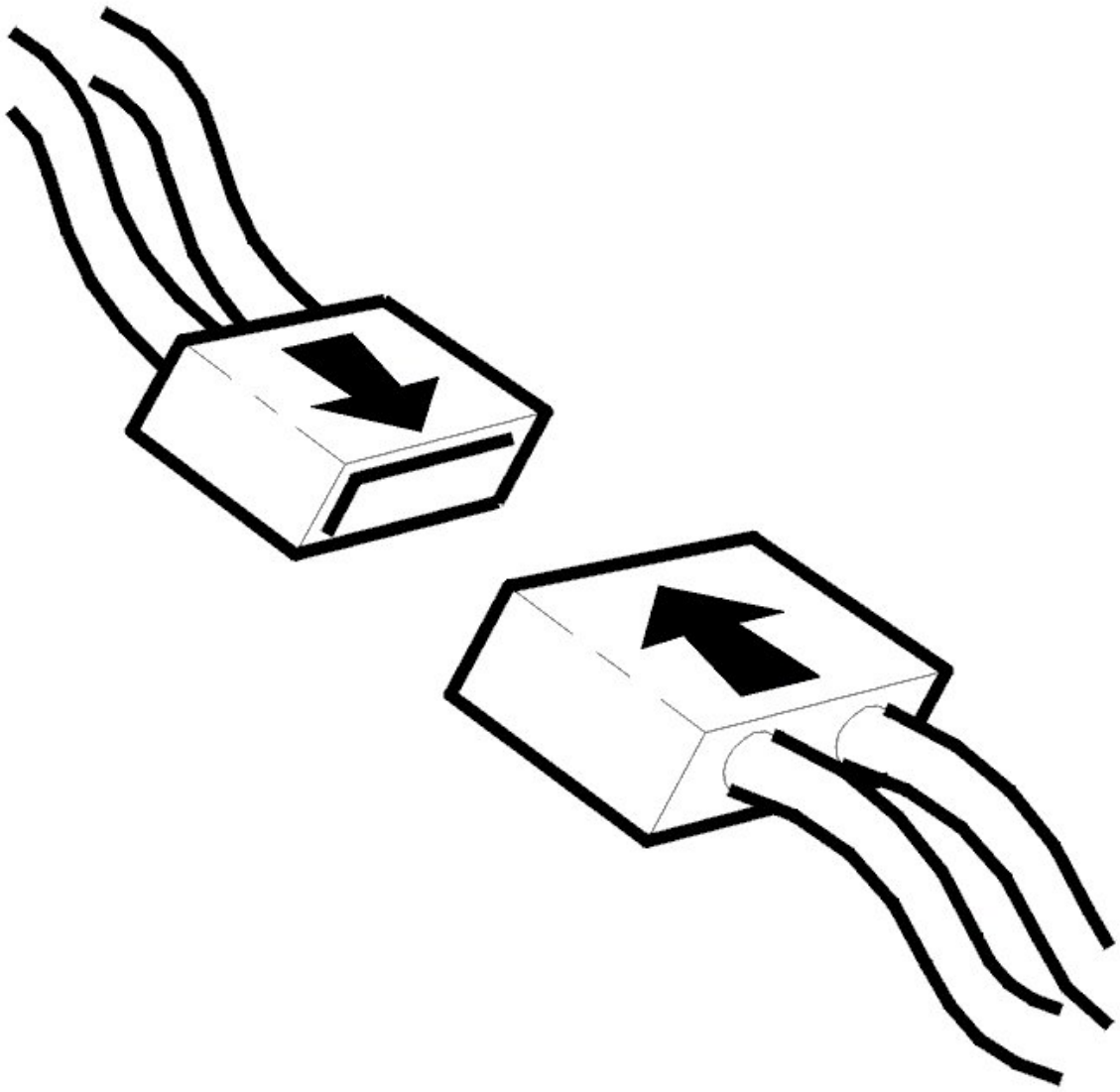
Fault symptom[s]
- The door mirror memory function is not working.

Signal Too Low

Signal too low

Checking connectors and components





- Check the connector for the control module and door mirror. Check for contact resistance and oxidation.

Remedy as necessary

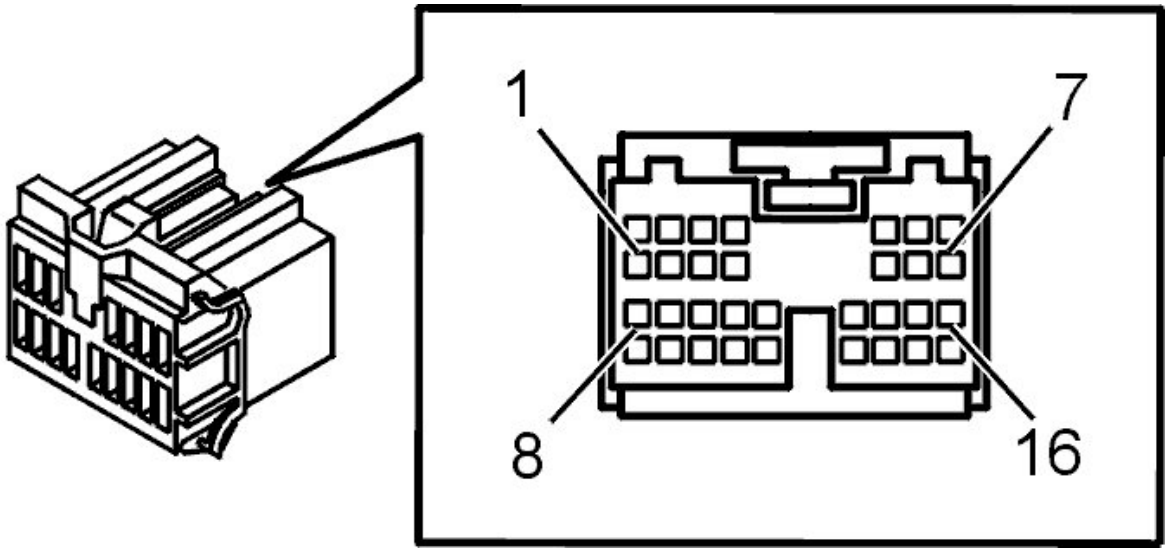
- Reinstall the connectors, components etc.
- Ignition on.

Test the door mirror function by changing its position and reading off the end values registered by the door mirror potentiometer.

Hint: The end values for the door mirror potentiometer should be between approximately 1 V and 4 V.

Other information:

- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Does the door mirror potentiometer operate correctly?

Yes - Verification

No - Checking faulty signals

Checking faulty signals

Check the cable between the control module #25A and the door mirror potentiometer terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

DDM/PDM-0031 Door mirror potentiometer, signal too low

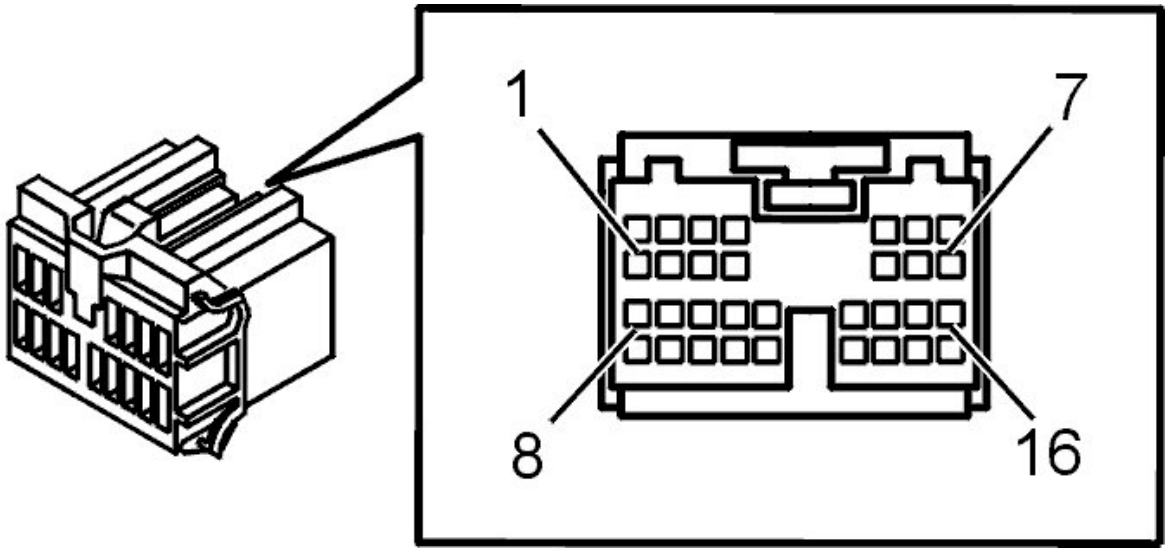
Check the cable between control module #9A and door mirror potentiometer #9. Check for a short-circuit to ground.

DDM/PDM-0033 Door mirror potentiometer, signal too low

Check the cable between control module #10A and door mirror potentiometer #10. Check for a short-circuit to ground.

Other information:

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



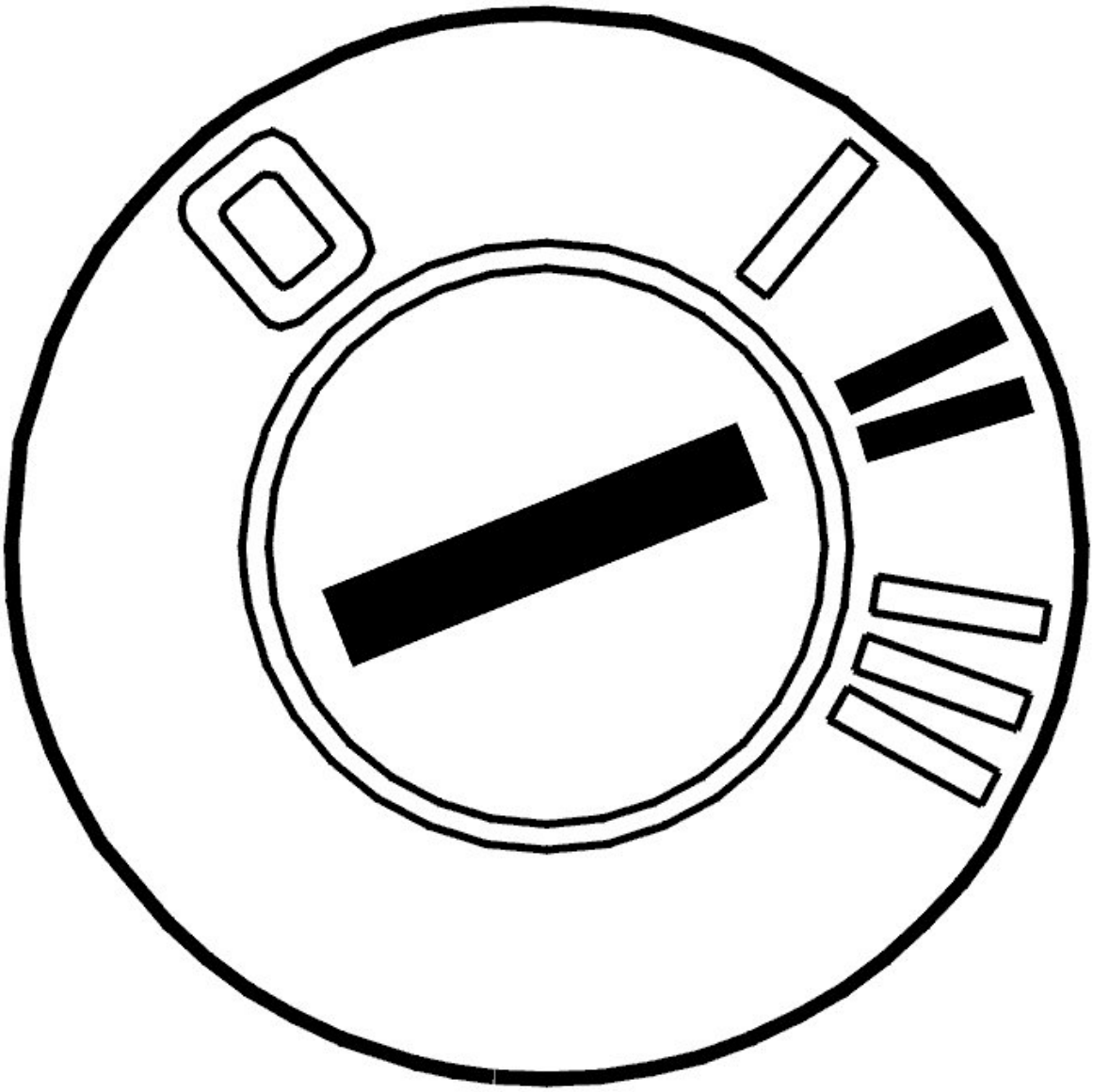
Continue - Verification

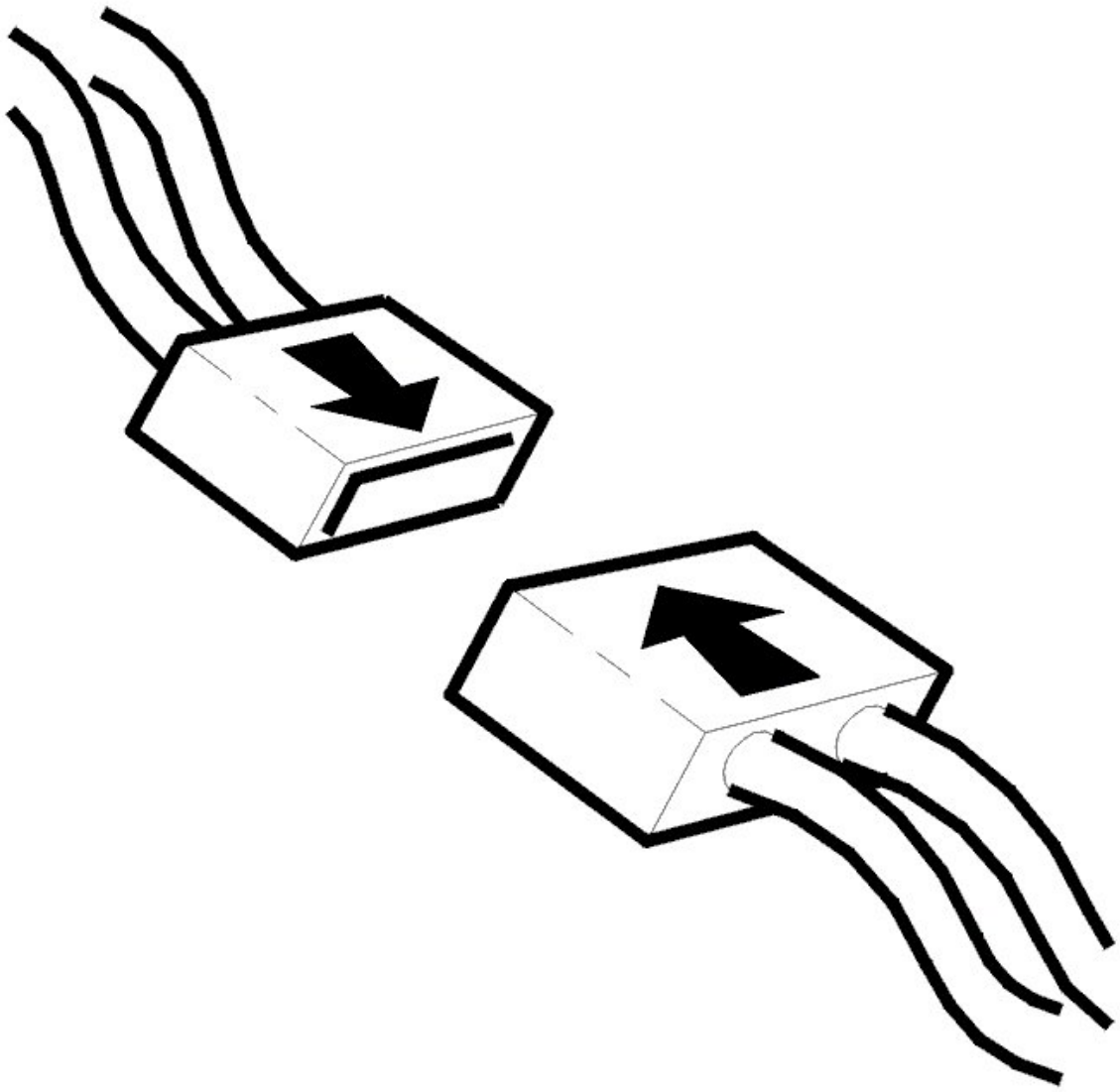
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check that the limit values for the door mirrors are between 1 and 4 V.

Is the response within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0032 is stored if the control module registers that the signal across the potentiometer for door mirror Y axis control (up and down) is too high.

Substitute value
- None.

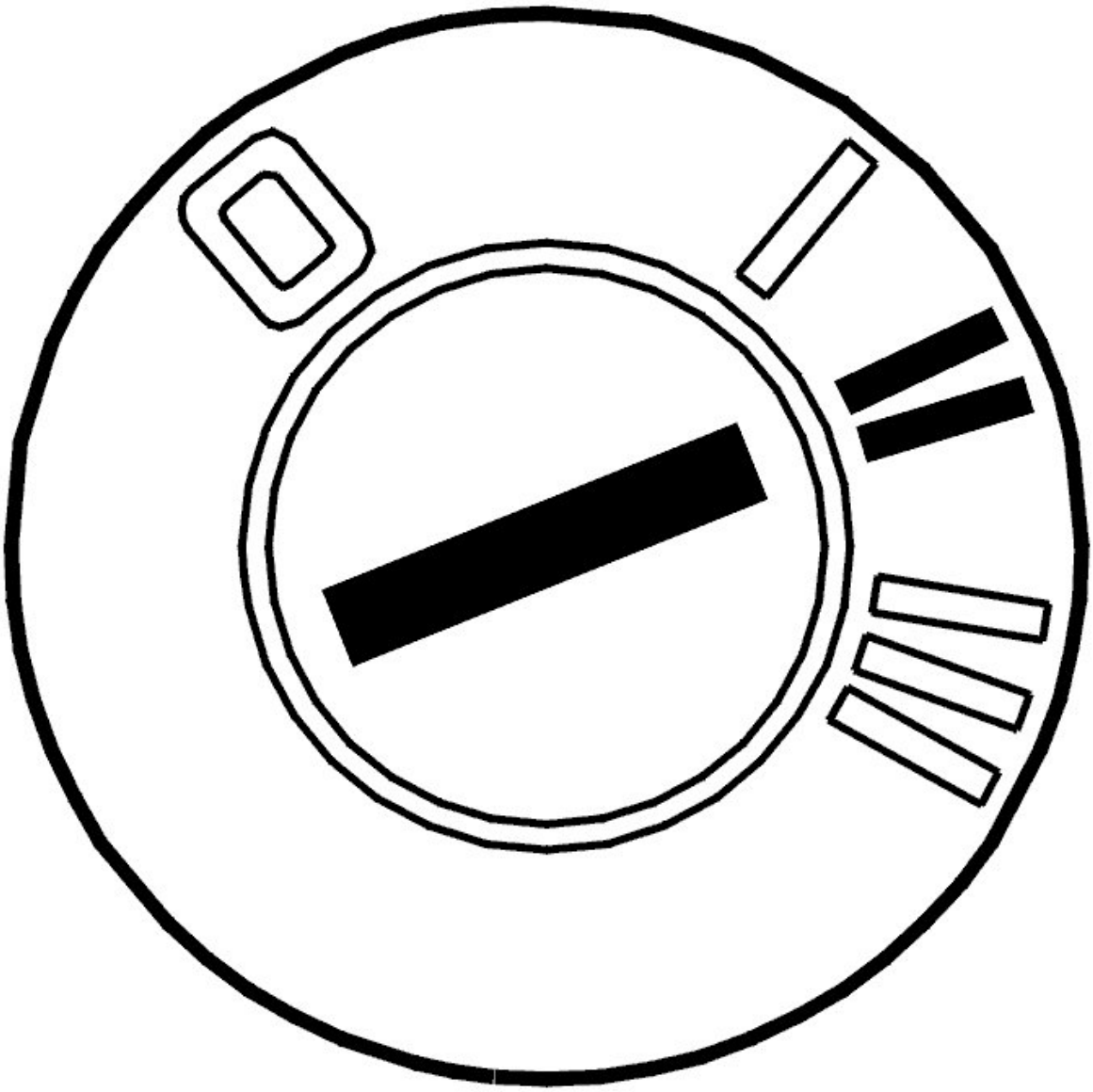
Possible source
- Short-circuit to supply voltage in the signal cable.
- Open-circuit in the signal cable.
- Short-circuit to ground in the power cable.
- Open-circuit in the ground lead.
- Short-circuit to supply voltage in the ground lead.

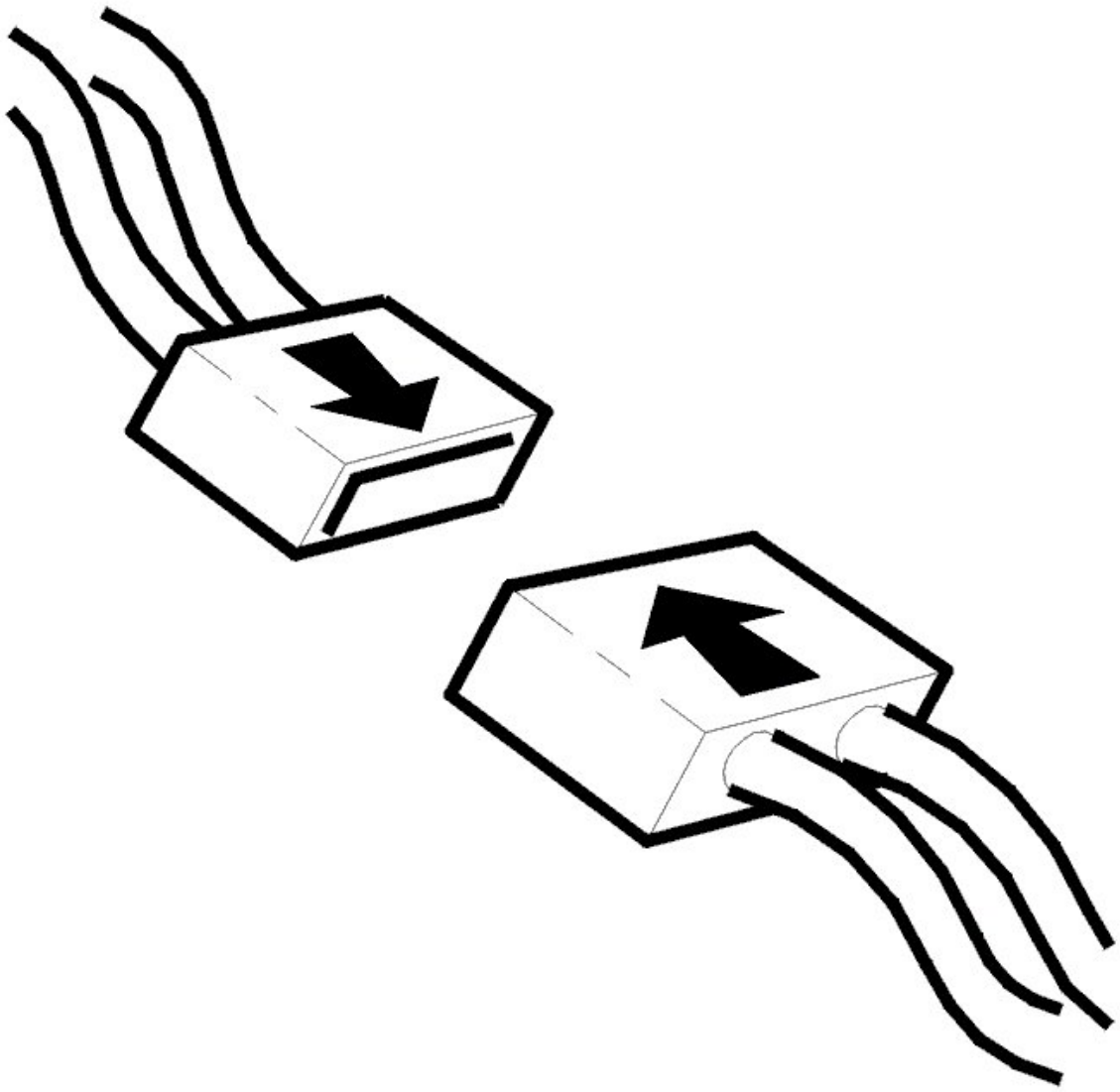
Fault symptom[s]
- The door mirror memory function is not working.

Faulty Signal

Faulty signal

Checking connectors and components





- Check the connector for the control module and door mirror. Check for contact resistance and oxidation.

Remedy as necessary

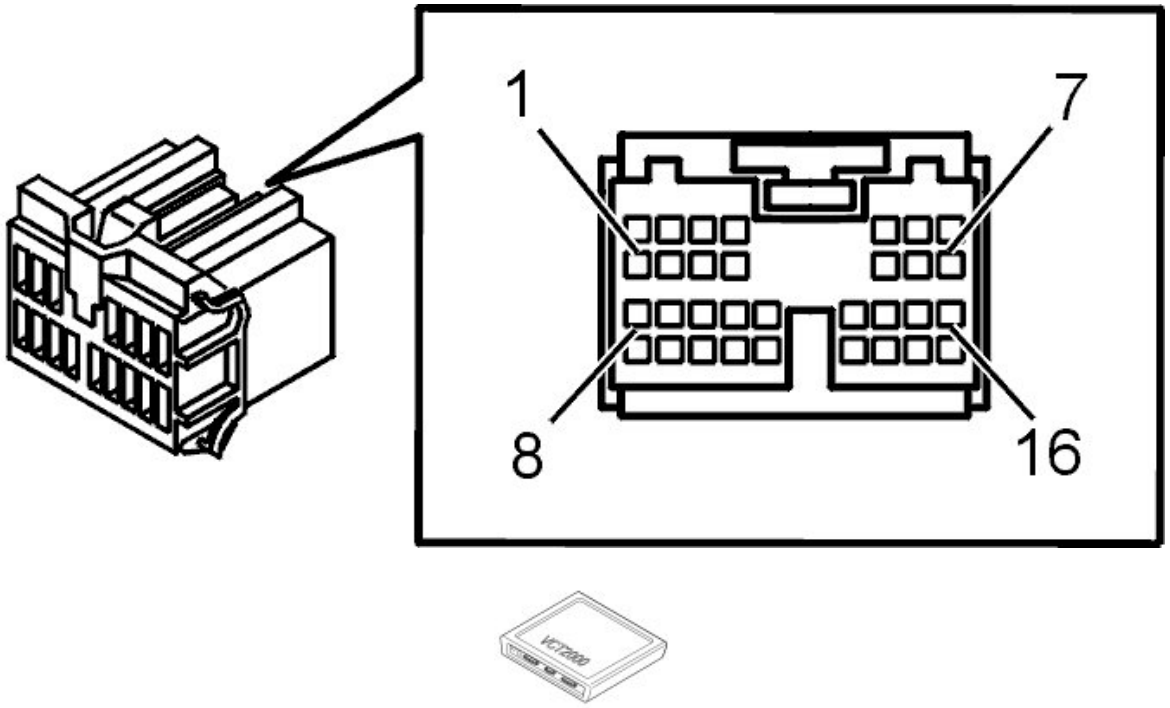
- Reinstall the connectors, components etc.
- Ignition on.

Test the door mirror function by changing its position and reading off the end values registered by the door mirror potentiometer.

Hint: The end values for the door mirror potentiometer should be between 1 and 4 V.

Other information:

- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Does the door mirror potentiometer operate correctly?

Yes - Verification

No - Checking faulty signals

Checking faulty signals

Check the cable between control module terminal #25A and door mirror terminal #1. Check for a short-circuit to ground.
Check the cable between control module terminal #8A and door mirror terminal #11. Check for a short-circuit to supply voltage. Check for an open-circuit.

DDM/PDM-0030 Door mirror potentiometer, faulty signal

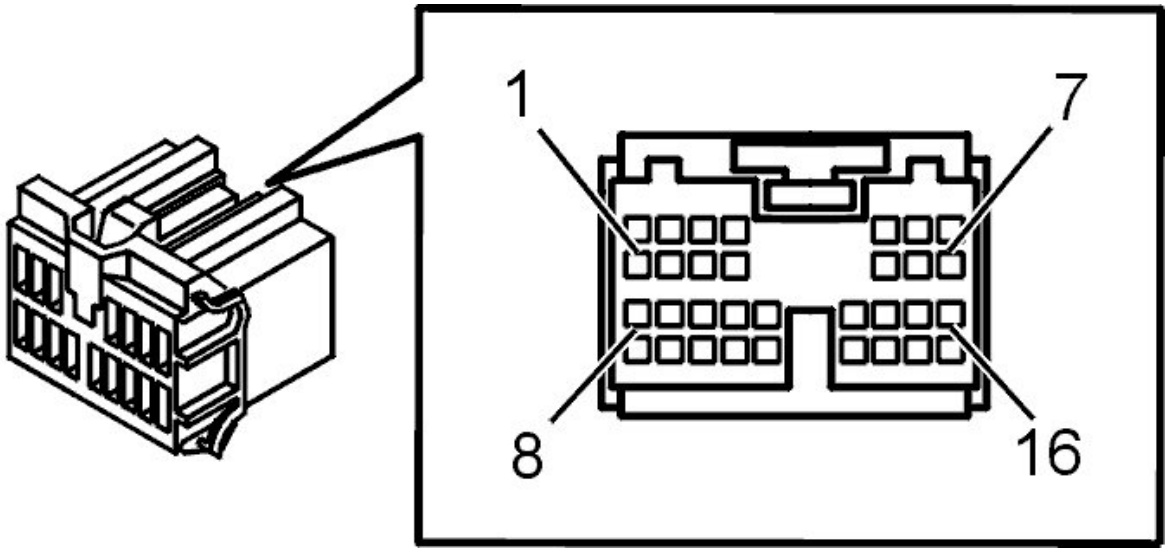
Check the cable between control module terminal #9A and door mirror terminal #9. Check for a short-circuit to supply voltage. Check for an open-circuit.

DDM/PDM-0032 Door mirror potentiometer, faulty signal

Check the cable between control module terminal #10A and door mirror terminal #10. Check for a short-circuit to supply voltage. Check for an open-circuit.

Other information:

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



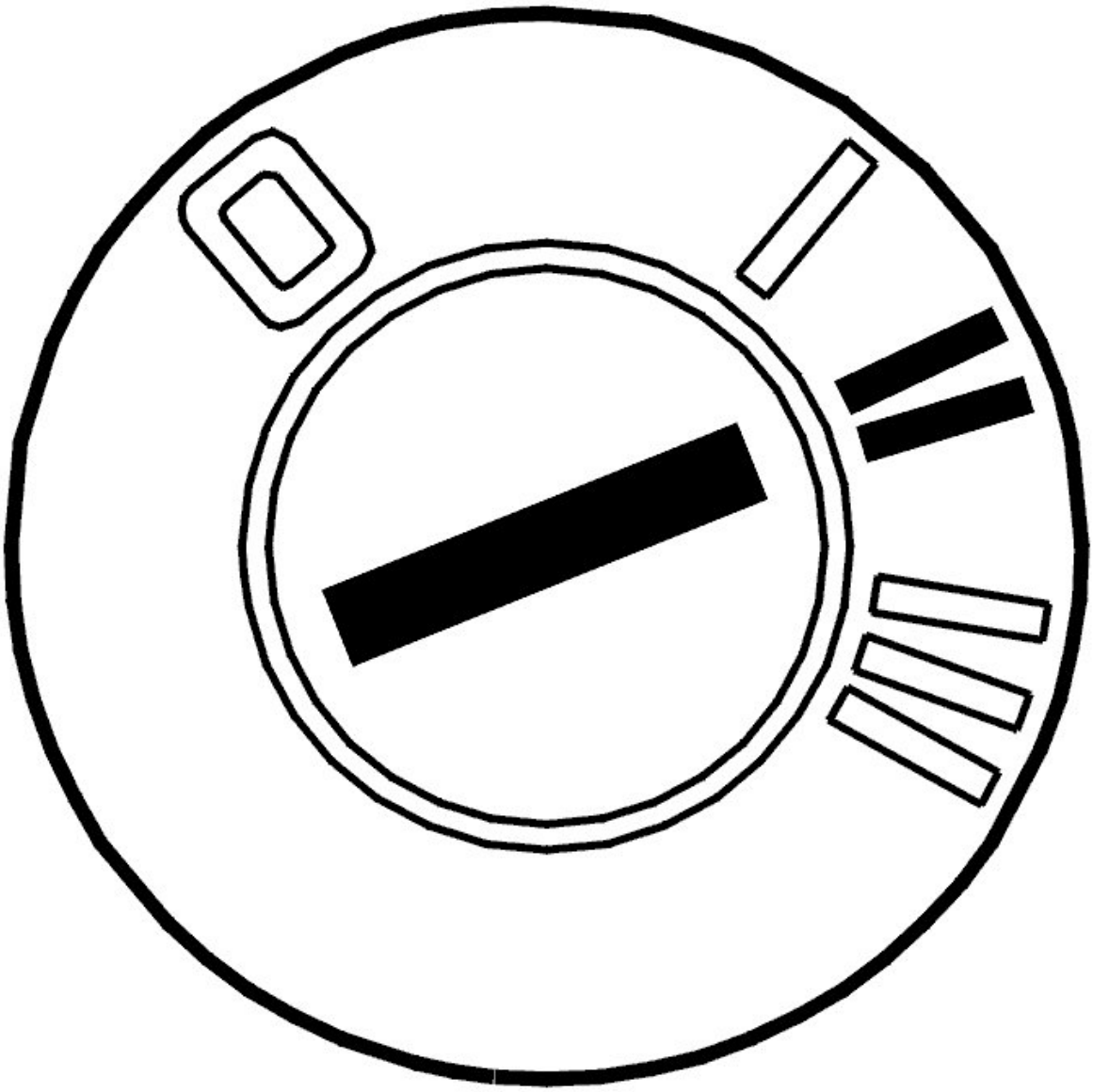
Continue - Verification

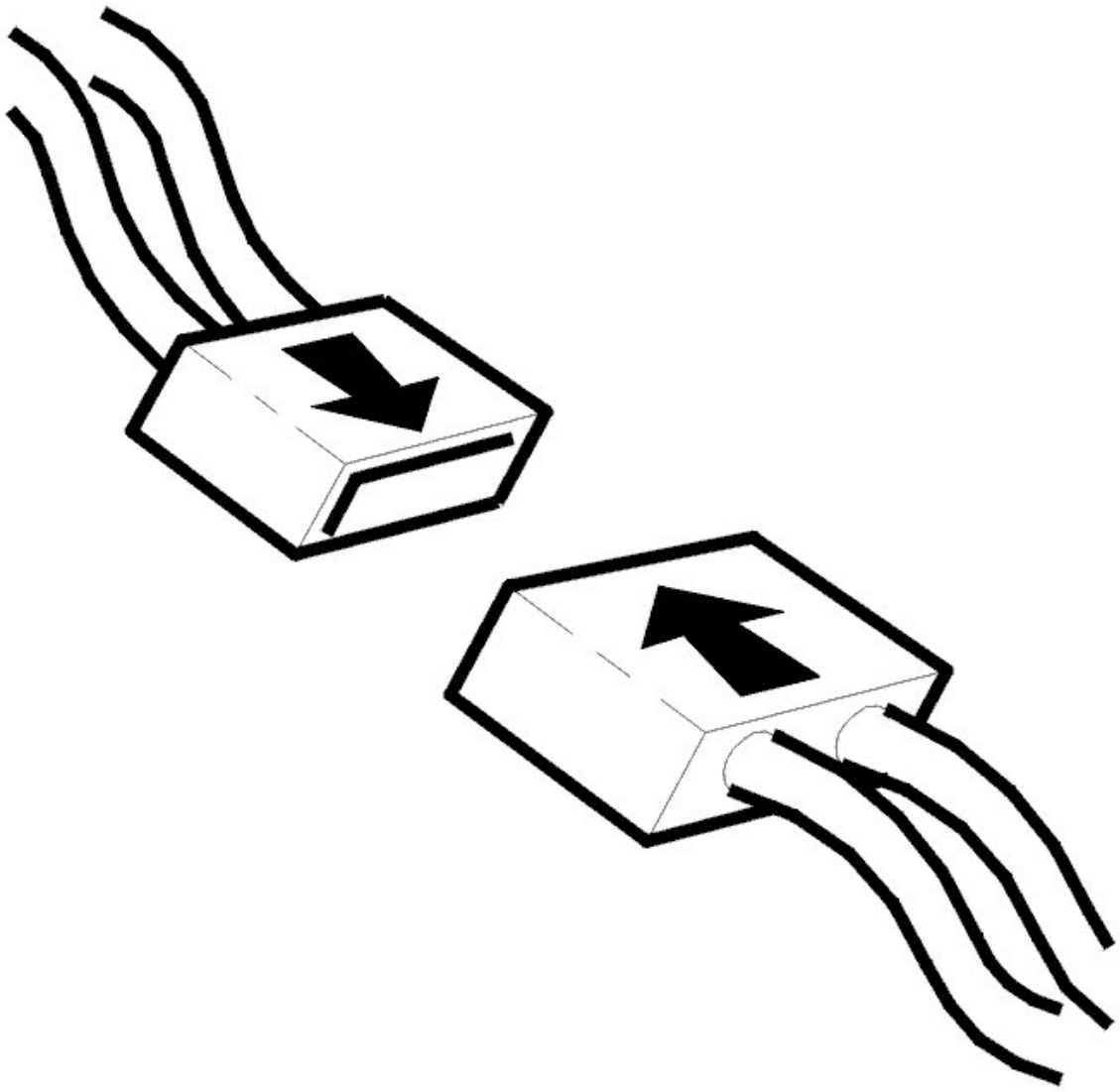
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check that the limit values for the door mirrors are between 1 and 4 V.

Is the response within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) DDM/PDM-0033 is stored if the control module registers that the signal across the potentiometer for door mirror Y axis control (up and down) is too low.

Substitute value
- None.

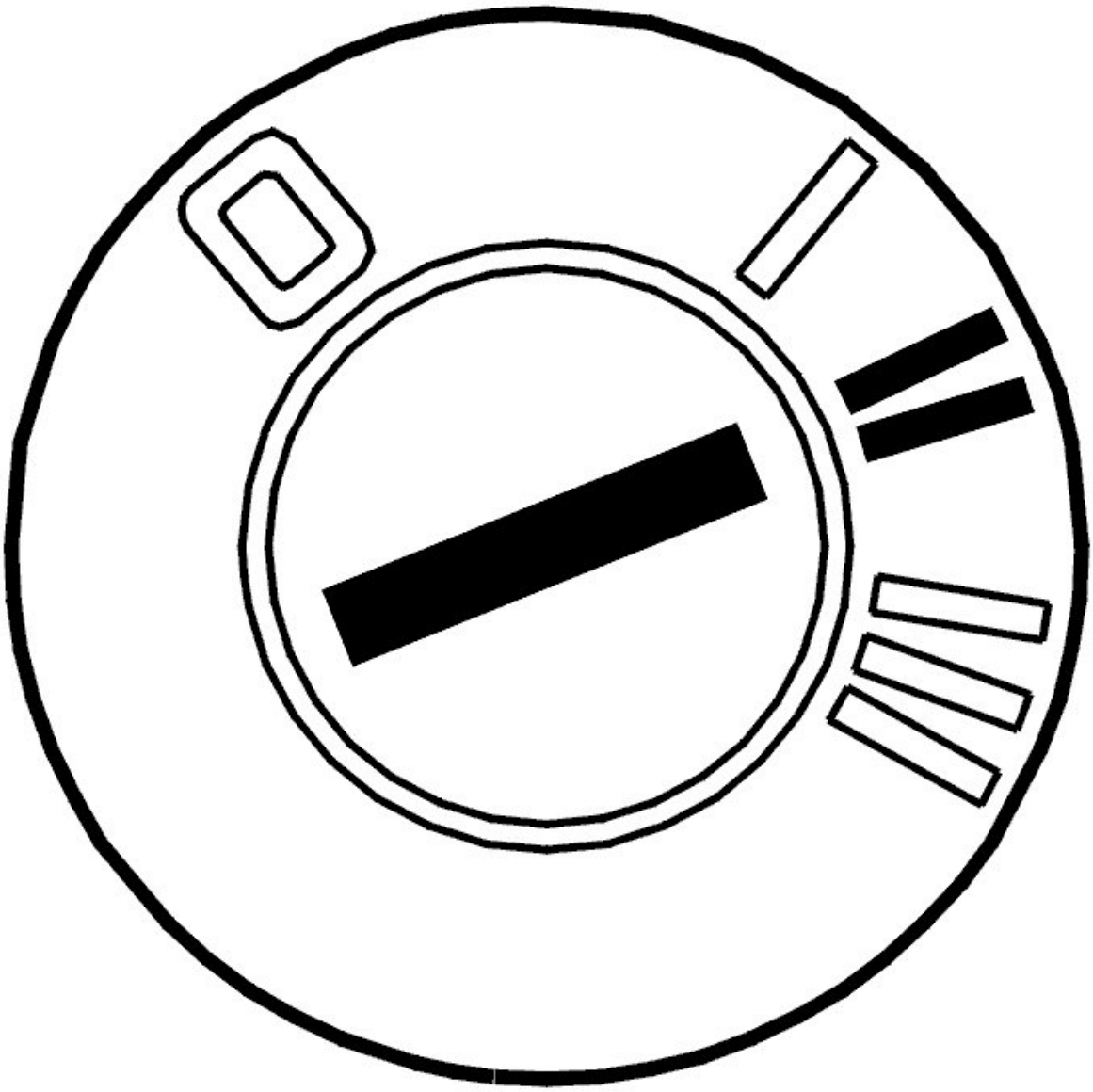
Possible source
- Short-circuit to ground in the signal cable.
- Open-circuit in the power cable.
- Short-circuit to ground in the power cable.

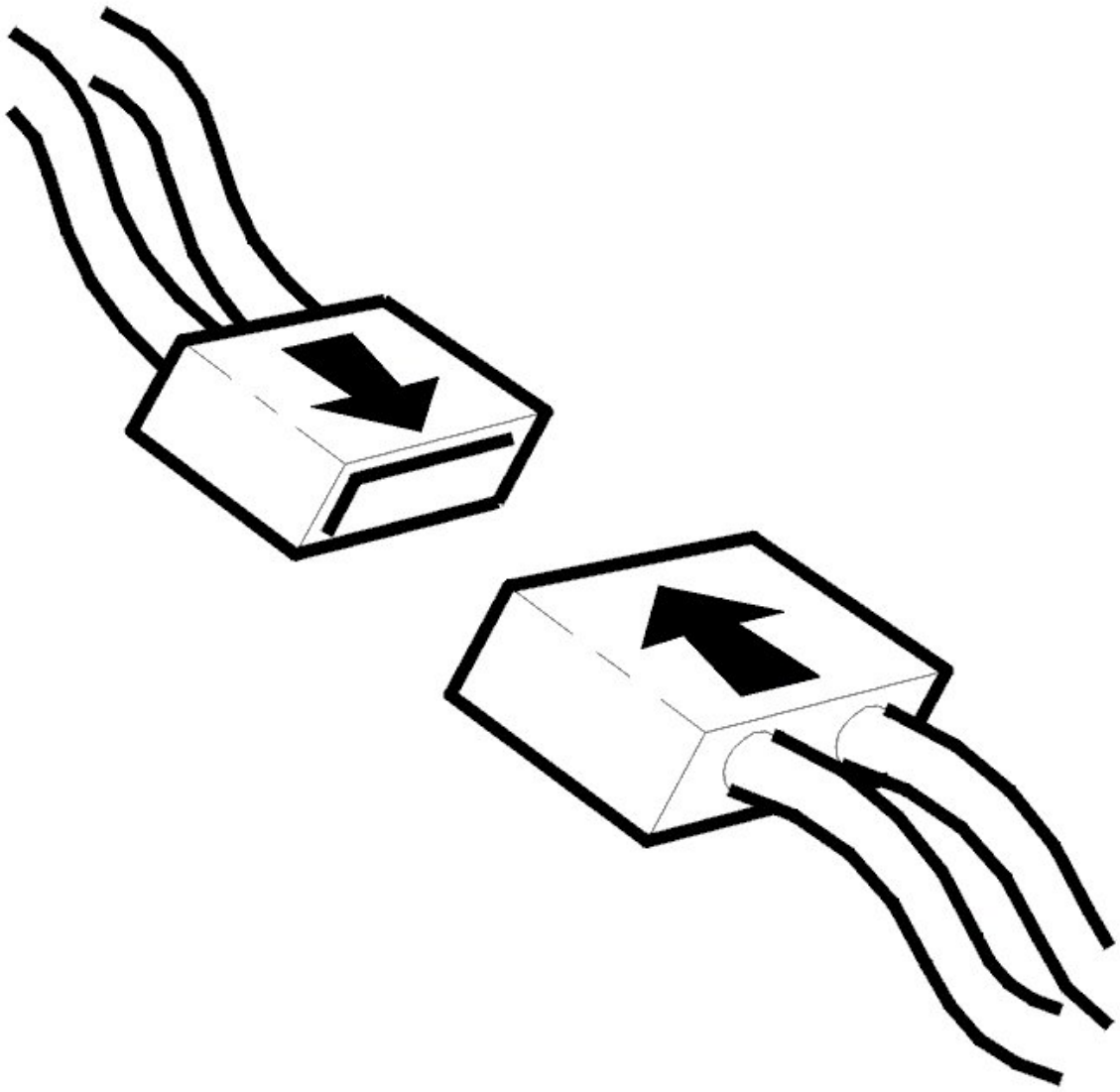
Fault symptom[s]
- The door mirror memory function is not working.

Signal Too Low

Signal too low

Checking connectors and components





- Check the connector for the control module and door mirror. Check for contact resistance and oxidation.

Remedy as necessary

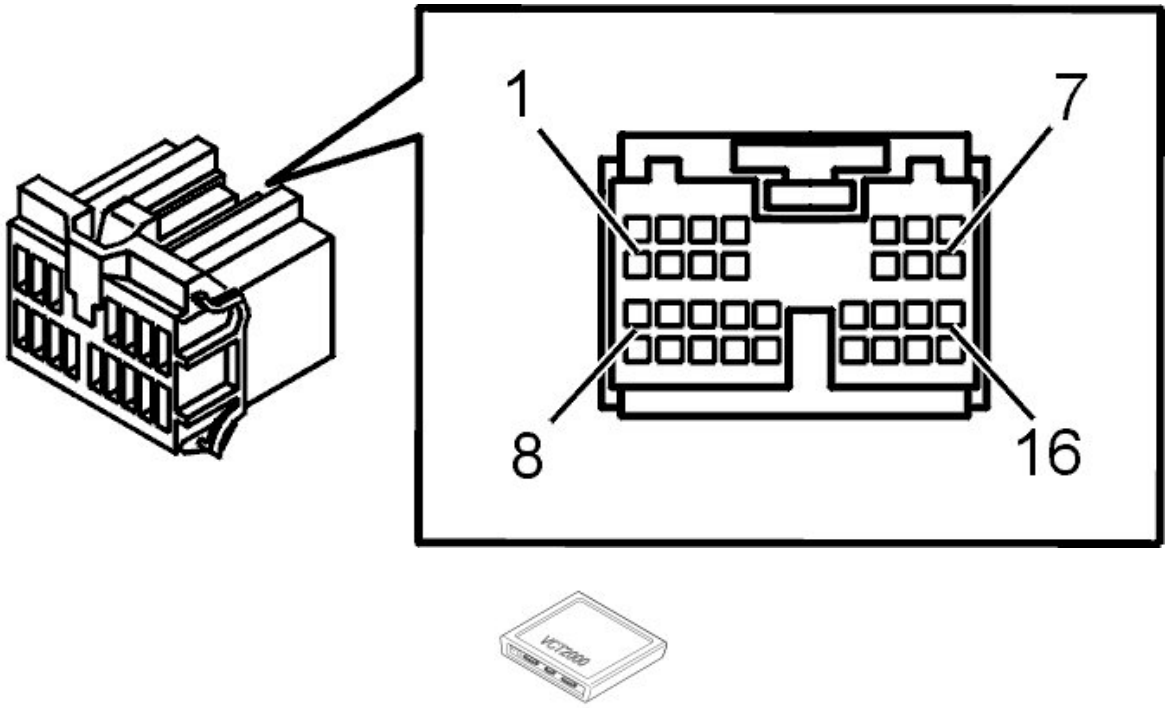
- Reinstall the connectors, components etc.
- Ignition on.

Test the door mirror function by changing its position and reading off the end values registered by the door mirror potentiometer.

Hint: The end values for the door mirror potentiometer should be between approximately 1 V and 4 V.

Other information:

- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Does the door mirror potentiometer operate correctly?

Yes - Verification

No - Checking faulty signals

Checking faulty signals

Check the cable between the control module #25A and the door mirror potentiometer terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

DDM/PDM-0031 Door mirror potentiometer, signal too low

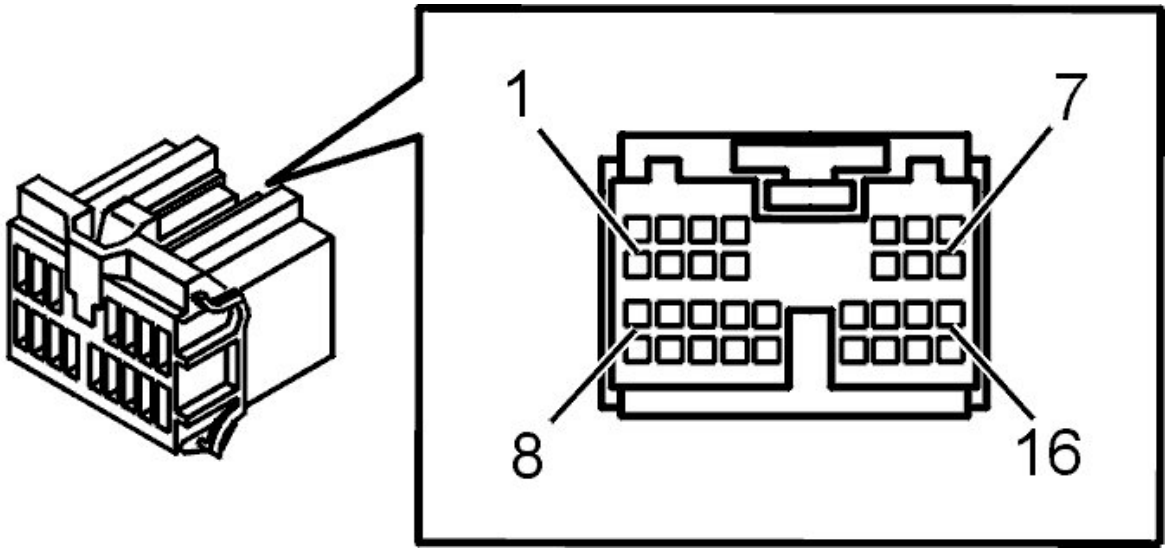
Check the cable between control module #9A and door mirror potentiometer #9. Check for a short-circuit to ground.

DDM/PDM-0033 Door mirror potentiometer, signal too low

Check the cable between control module #10A and door mirror potentiometer #10. Check for a short-circuit to ground.

Other information:

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



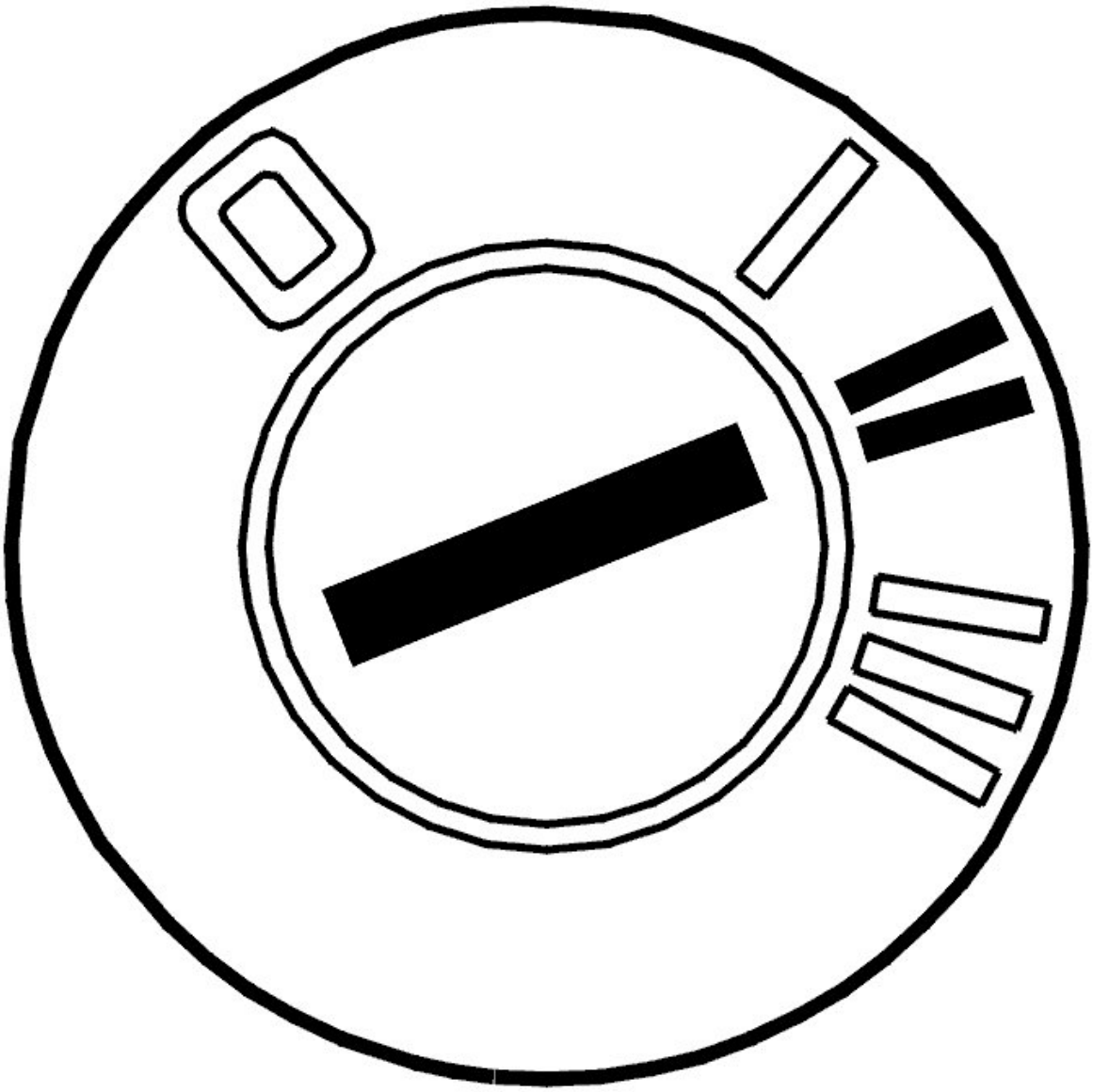
Continue - Verification

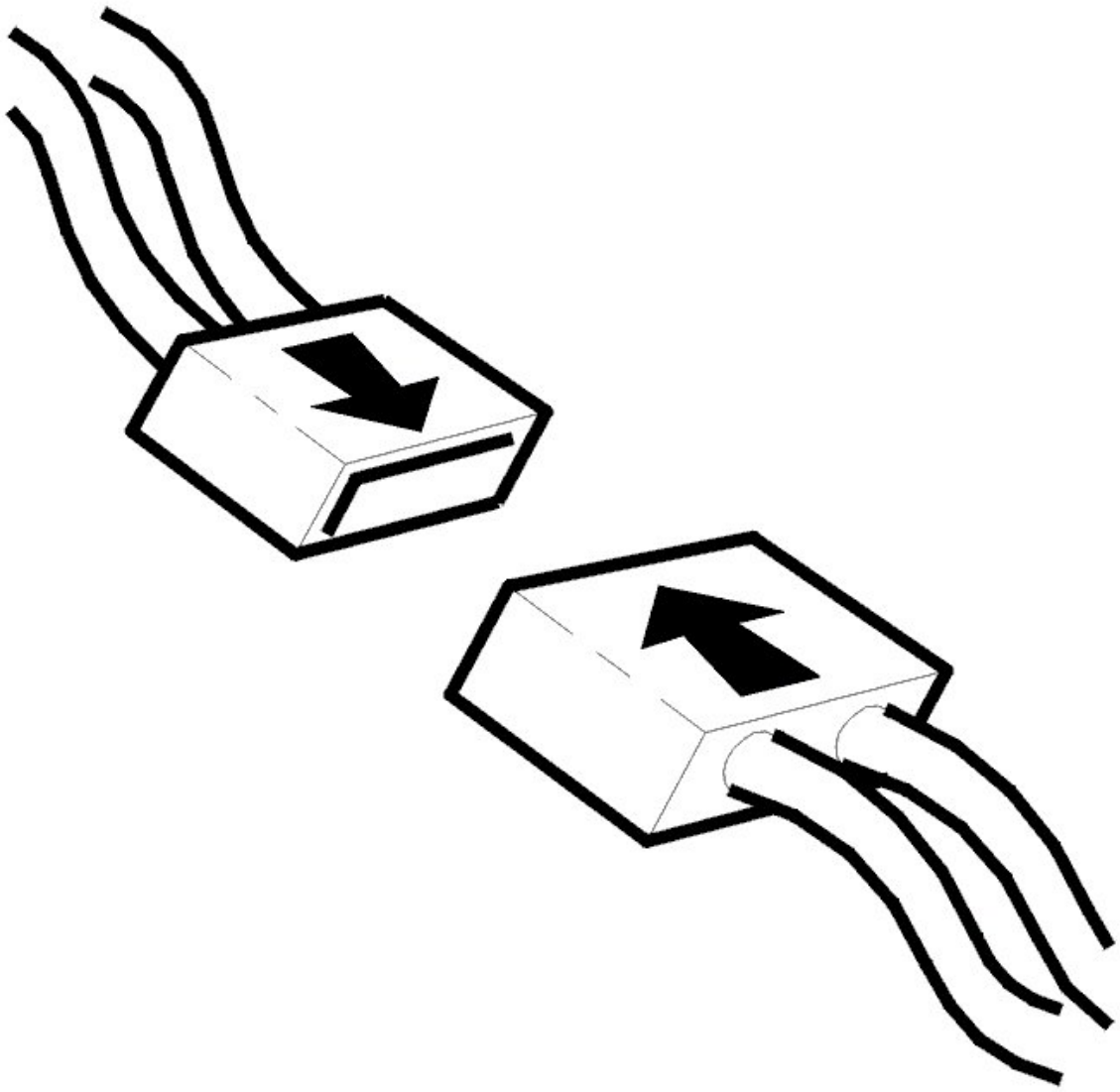
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check that the limit values for the door mirrors are between 1 and 4 V.

Is the response within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

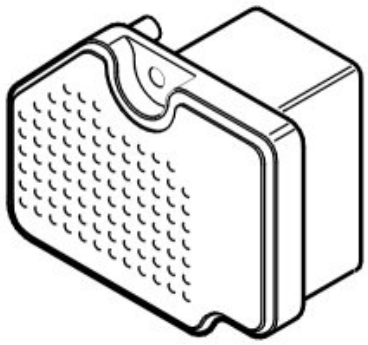
Attempt New Test - Checking connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0001

Condition



The differential electronic module (DEM) checks if the signal from the oil temperature sensor is within the permitted range by comparing the signal with a predefined parameter.
The diagnostic trouble code (DTC) is stored if the signal from the oil temperature sensor corresponds to a temperature lower than -40 °C or higher than +110 °C.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Four wheel drive is disengaged.

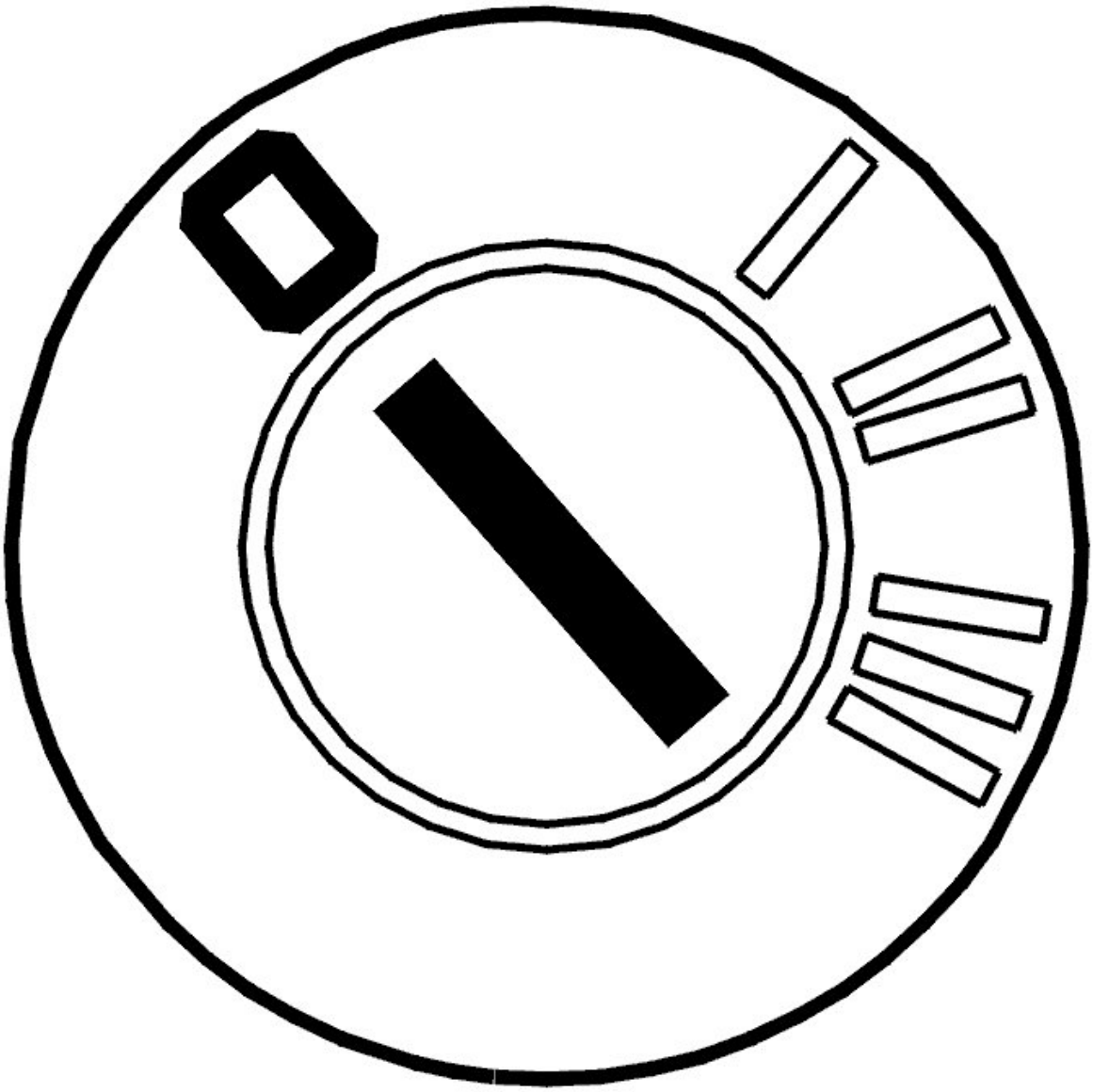
Possible source
- Damaged temperature sensor
- Damaged control module.

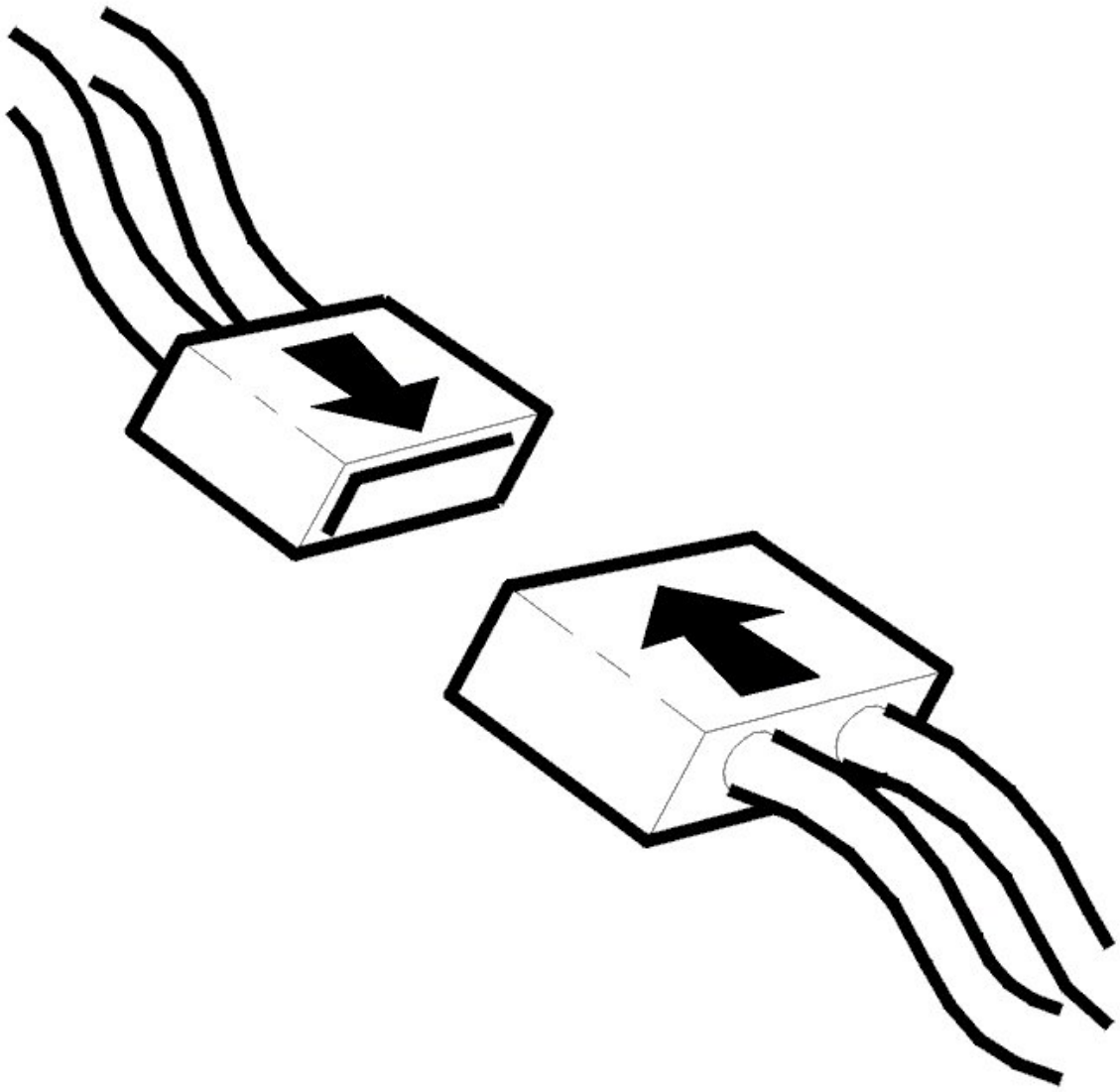
Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Signal

Faulty signal

Checking the connectors and cables





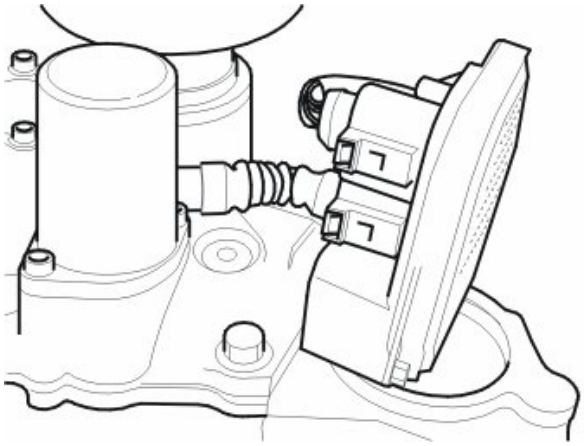
- Ignition off
- Check the connector between the differential electronic module (DEM) and the temperature sensor. Check for contact resistance and oxidation.

Hint: Read off the temperature sensor signal to check the function.

Remedy as necessary.

Other information:

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Temperature / pressure sensor active on demand coupling, replacing, M58, M66 AWD, AW50/51 AWD See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - Differential/Differential Temperature Sensor/Switch/Service and Repair/Temperature / Pressure Sensor Active On Demand Coupling, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



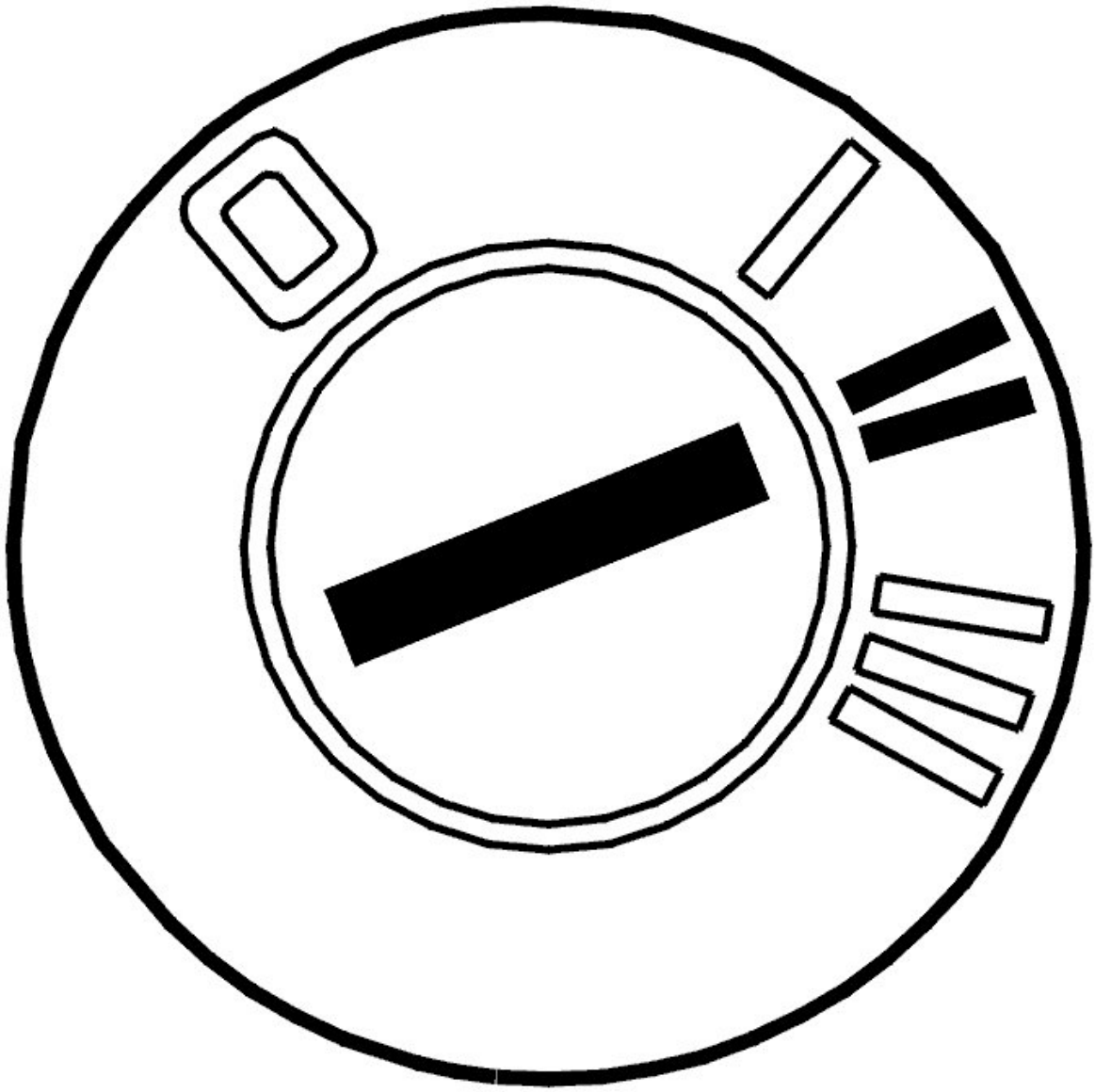
Continue - Verification

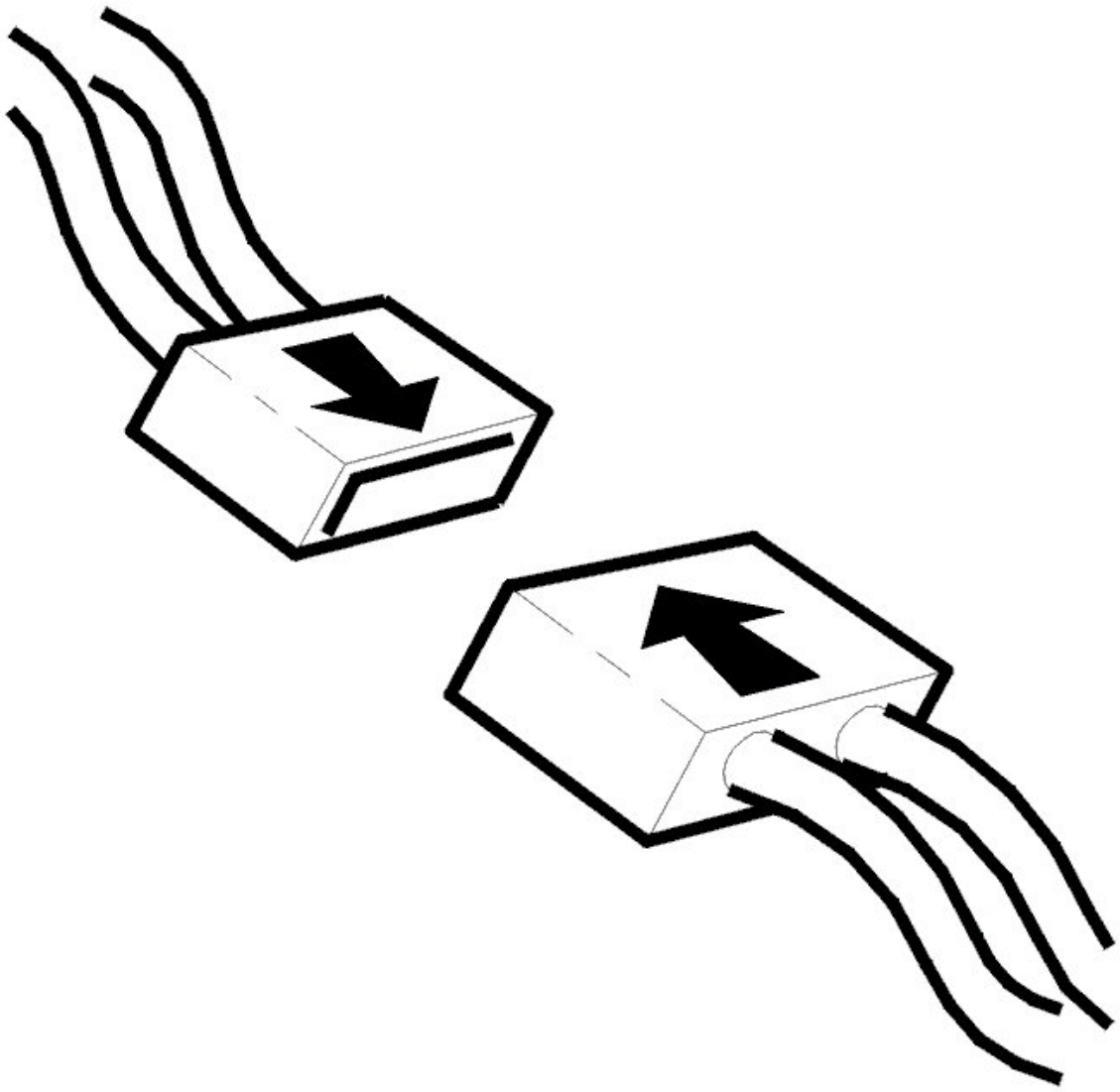
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the temperature.
Check that the value is within its permitted range. Compare it to the ambient temperature.

Is the temperature reading OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

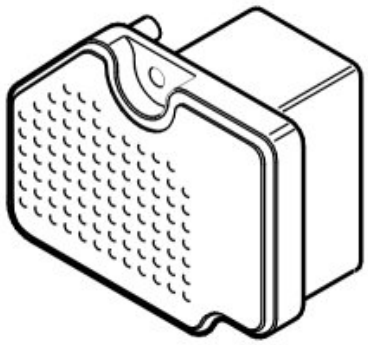
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and cables

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0002

Condition



The differential electronic module (DEM) checks if the signal from the oil pressure sensor is within the permitted range by comparing the signal with a predefined parameter.
The diagnostic trouble code (DTC) is stored if the signal from the oil pressure sensor corresponds to a pressure lower than 0 MPa or higher than 4 MPa.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Four wheel drive is disengaged.

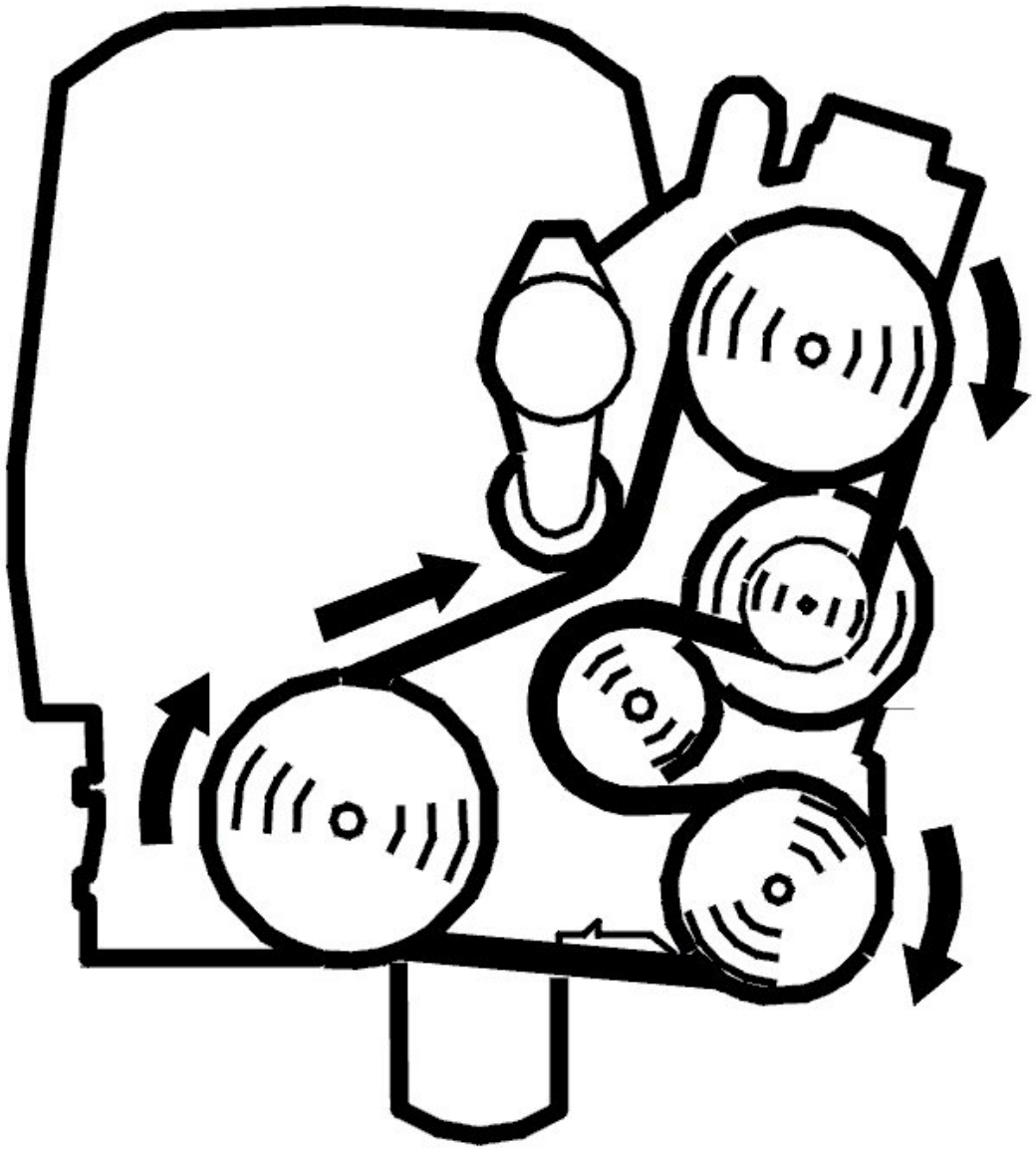
Possible source
- Damaged oil pressure sensor
- Damaged control module.

Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Signal

Faulty signal

Checking the function



Caution! Carry out the test with the vehicle raised so that all four wheels can rotate freely with the mounting at the ends of the control arms to prevent damage to the drive shafts.

Warning! Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

Note! If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control)) the function must be deactivated. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

- Engine idling
- Read off the oil pressure.

Check that the function of the oil pressure sensor is OK. Run the engine with the vehicle on the lift to increase the clutch oil pressure. Read off the pressure during the test drive. Check that the pressure has been updated.

Hint: The oil pressure sensor has a measurement range of 0 to 4 Mpa.

Check the connector between the differential electronic module (DEM) and the oil pressure sensor. Check for contact resistance and oxidation. Also check the clutch for leakage.
Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Temperature / pressure sensor active on demand coupling, replacing, M58, M66 AWD, AW50/51 AWD See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - Differential/Differential Temperature Sensor/Switch/Service and Repair/Temperature / Pressure Sensor Active On Demand Coupling, Replacing
- Active on Demand Coupling (AOC), replacing See: Transmission and Drivetrain/Differential Assembly/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

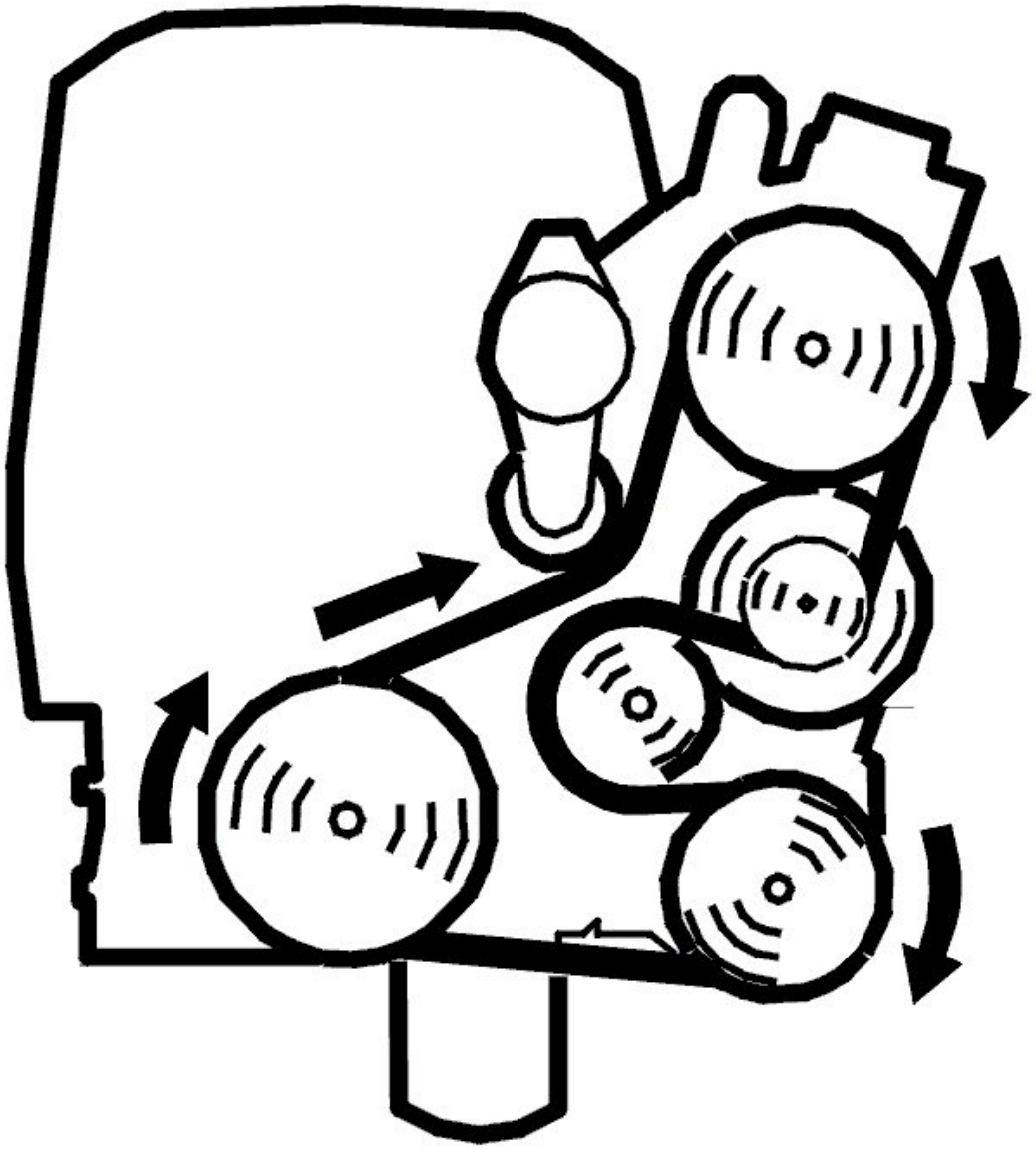
Continue - Verification

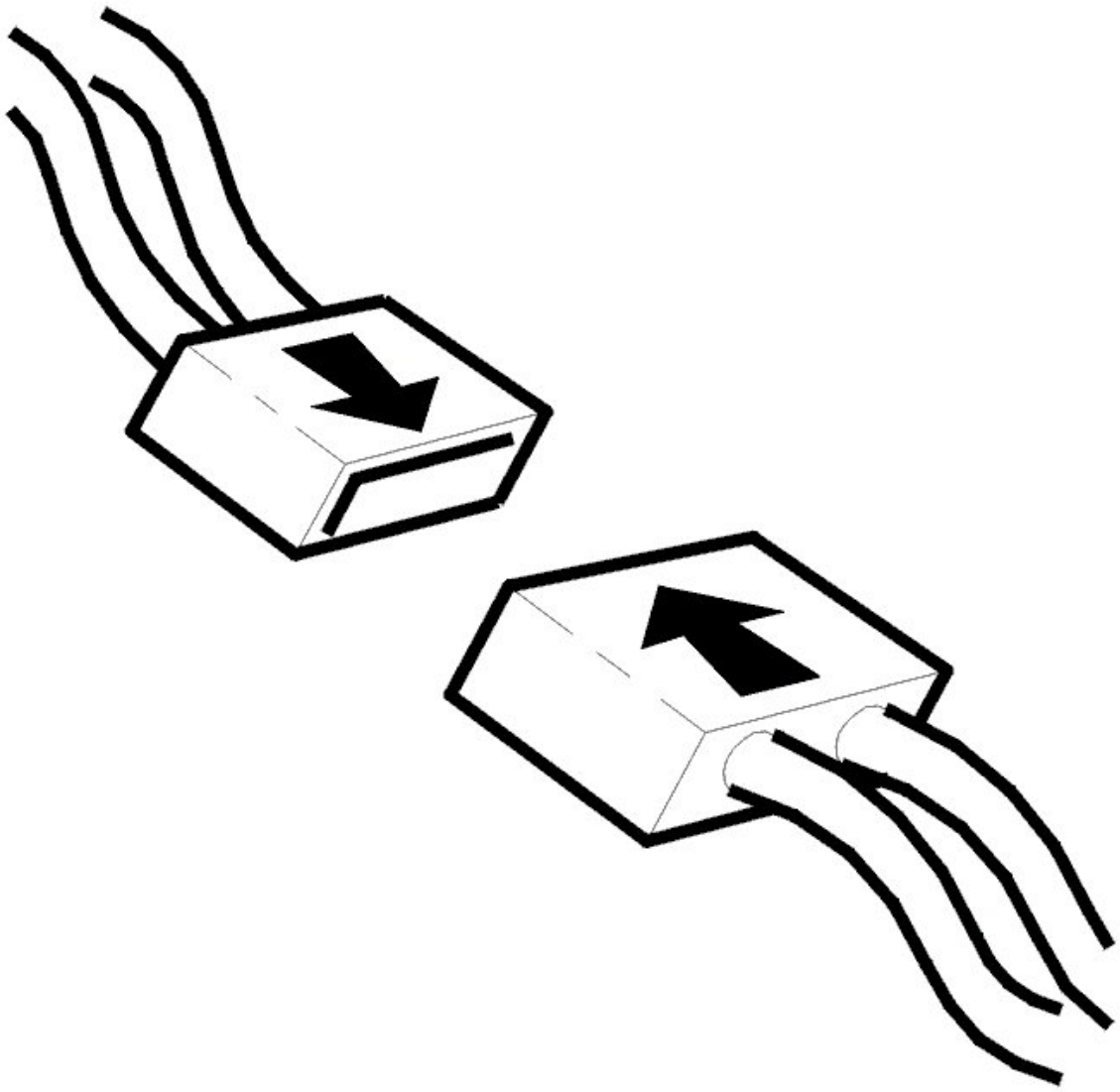
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





Caution! Carry out the test with the vehicle raised so that all four wheels can rotate freely with the mounting at the ends of the control arms to prevent damage to the drive shafts.

Warning! Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

Note! If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control)) the function must be deactivated. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

- Ignition off
- Reinstall the connectors, components etc.
- Engine idling
- Read off the oil pressure.

Check that the function of the oil pressure sensor is OK. Run the engine with the vehicle on the lift to increase the clutch oil pressure. Read off the pressure during the test drive. Check that the pressure has been updated.

Hint: The oil pressure sensor has a measurement range of 0 to 4 Mpa.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

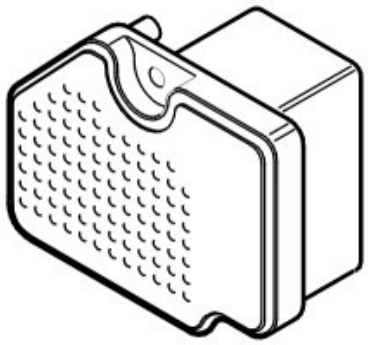
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0003

Condition



The differential electronic module (DEM) checks its voltage supply by comparing the voltage between the differential electronic module (DEM) and the central electronic module (CEM).
Diagnostic trouble code (DTC) is stored if the control module registers a difference in the power supply between the central electronic module (CEM) and the differential electronic module (DEM) which is greater than 2.5 V.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for 10 seconds.

Substitute value
- Four wheel drive is disengaged.

Possible source

Signal too high:
- Short-circuit to supply voltage in signal cable.

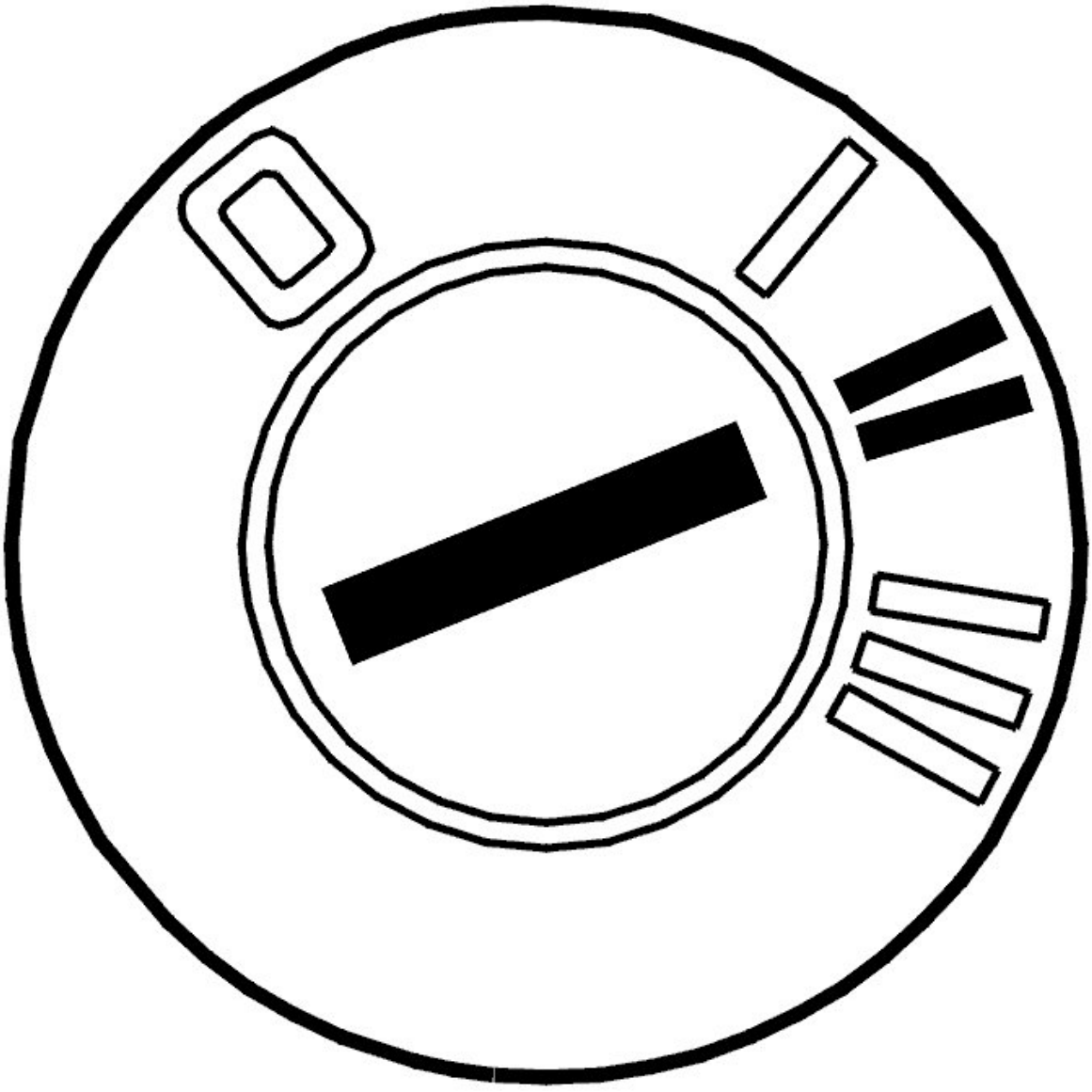
Signal too low:
- Short-circuit to ground in the signal cable
- Open-circuit in the power supply.

Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Voltage

Faulty voltage

Checking the status



- Ignition on.

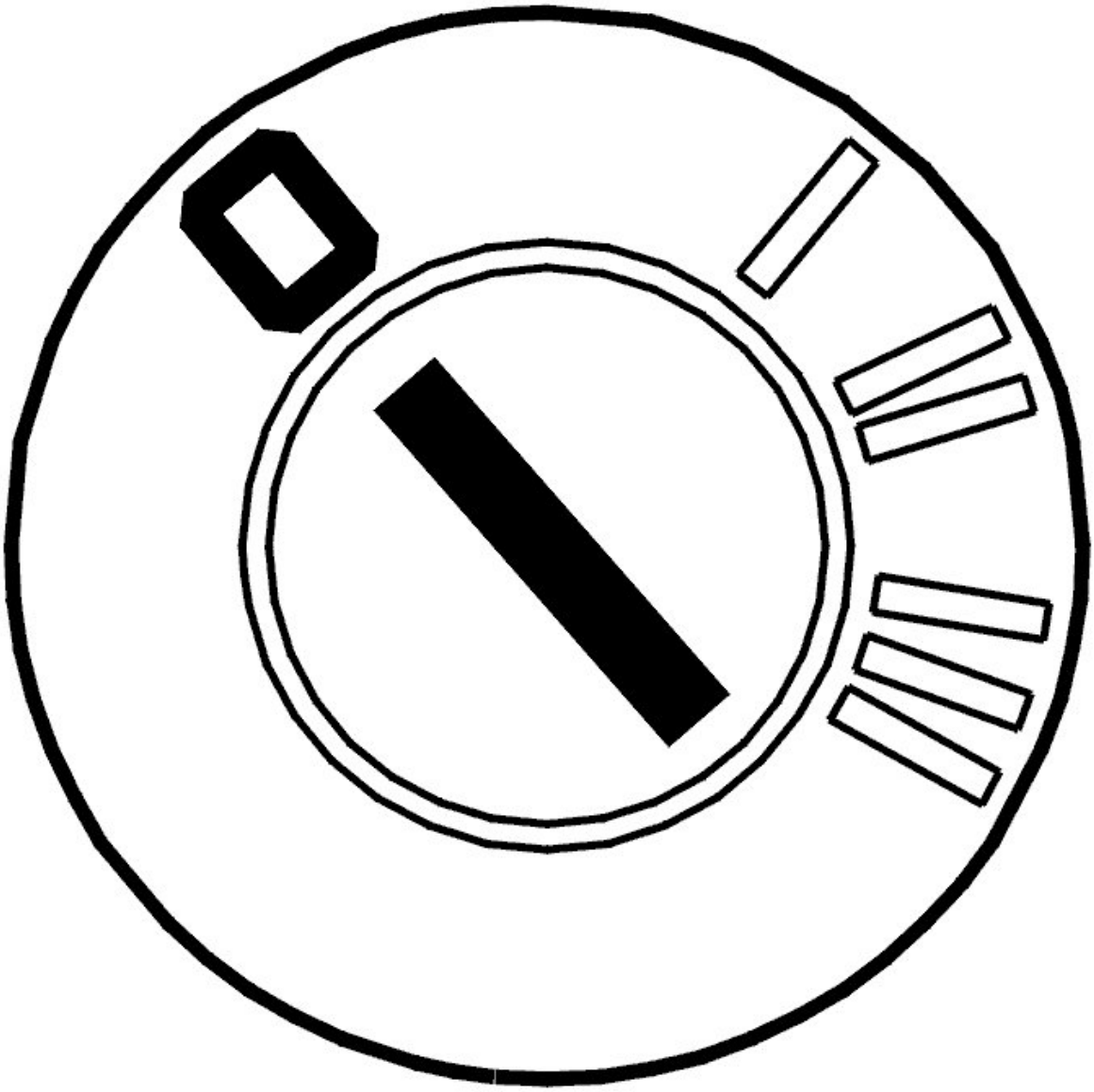
Read off the voltage for the differential electronic module (DEM) and the central electronic module (CEM).
The voltage must be able to be compared with the power supply to the central electronic module (CEM) +/-2.5 V.

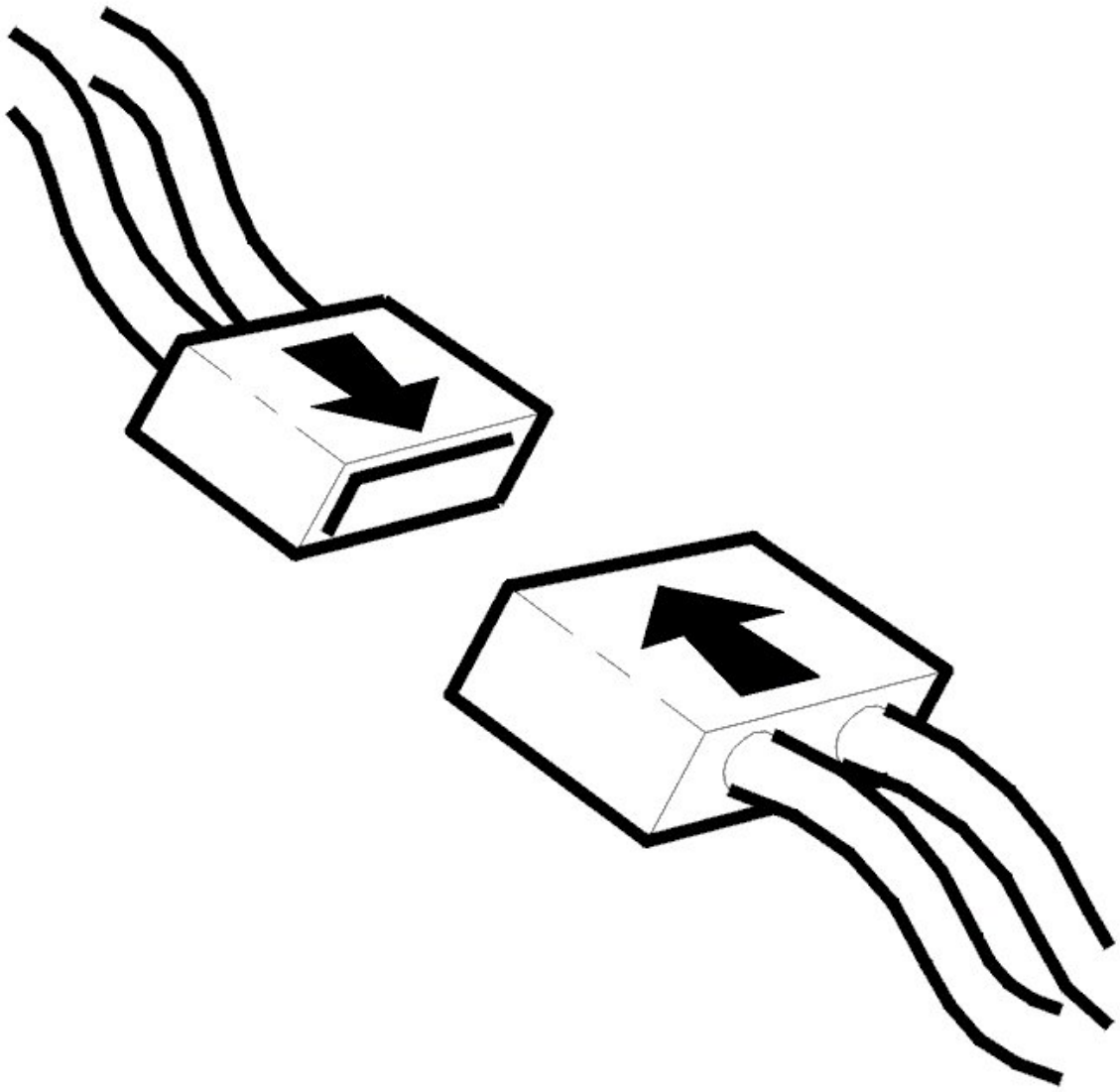
Hint: Compare to the battery voltage.

The fault is permanent if the power supply to the differential electronic module (DEM) deviates by more than 2.5 V from the central electronic module (CEM).
If the voltage is correct, this is an indication that the fault was present previously but is not active at the moment, i.e. an intermittent fault.

Continue - Checking the connectors and cables

Checking the connectors and cables





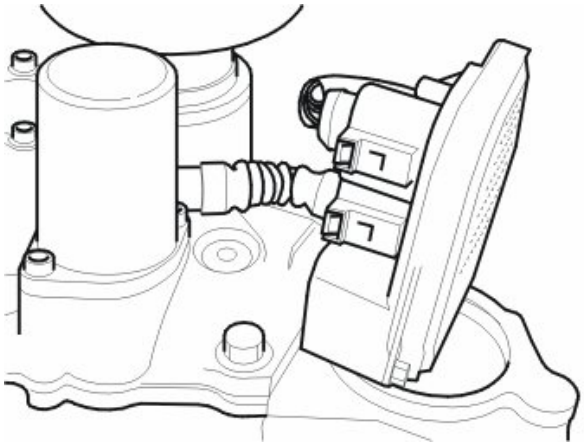
- Ignition off
- Check the connectors between the differential electronic module (DEM) and the Active on Demand Coupling- control module. Check for contact resistance and oxidation
- Check the cable between the differential electronic module (DEM) and the Active on Demand Coupling control module. Check for damage.

Hint: Read off the voltage to check the function.

Remedy as necessary.

Other information:

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



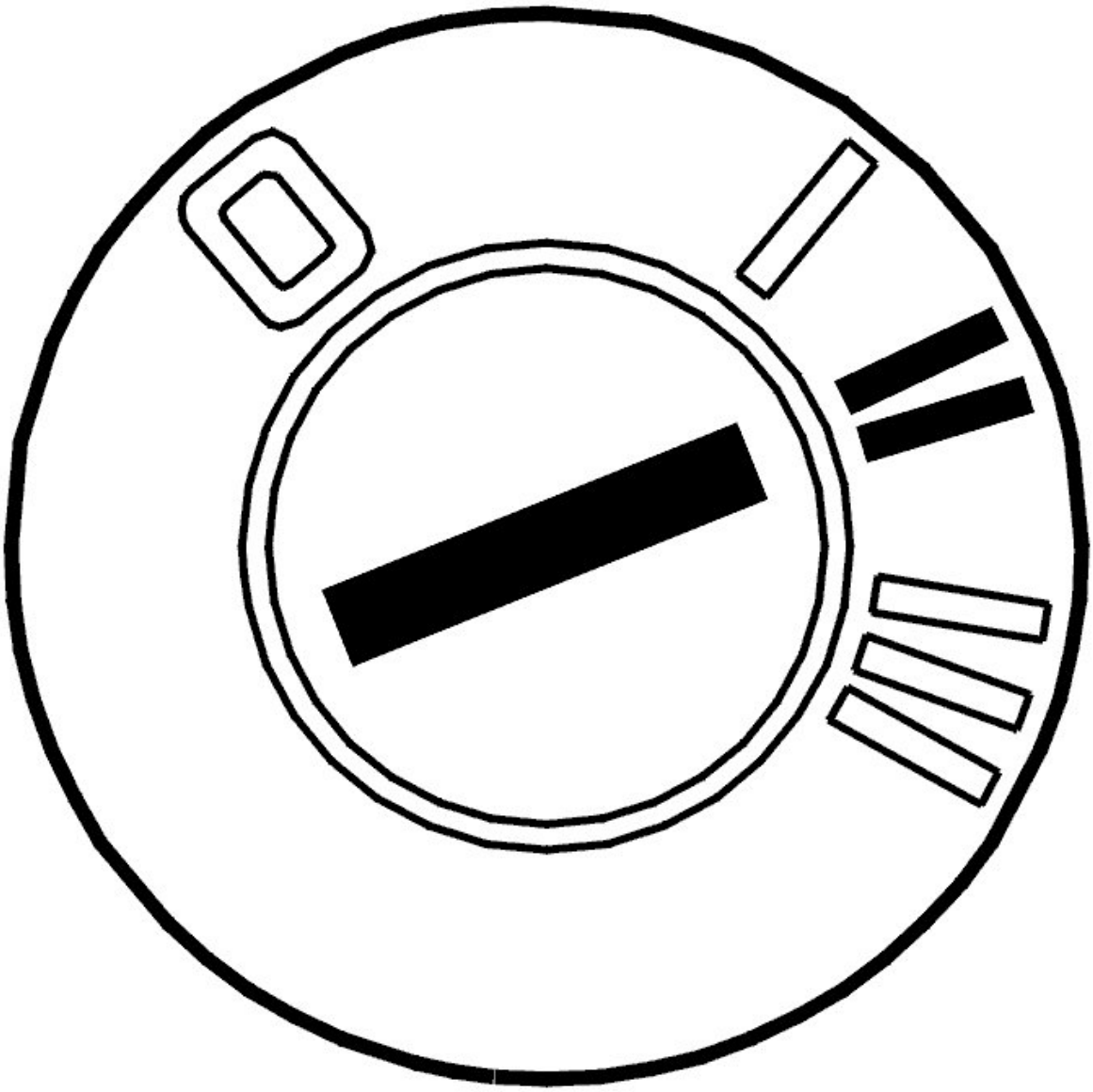
Continue - Verification

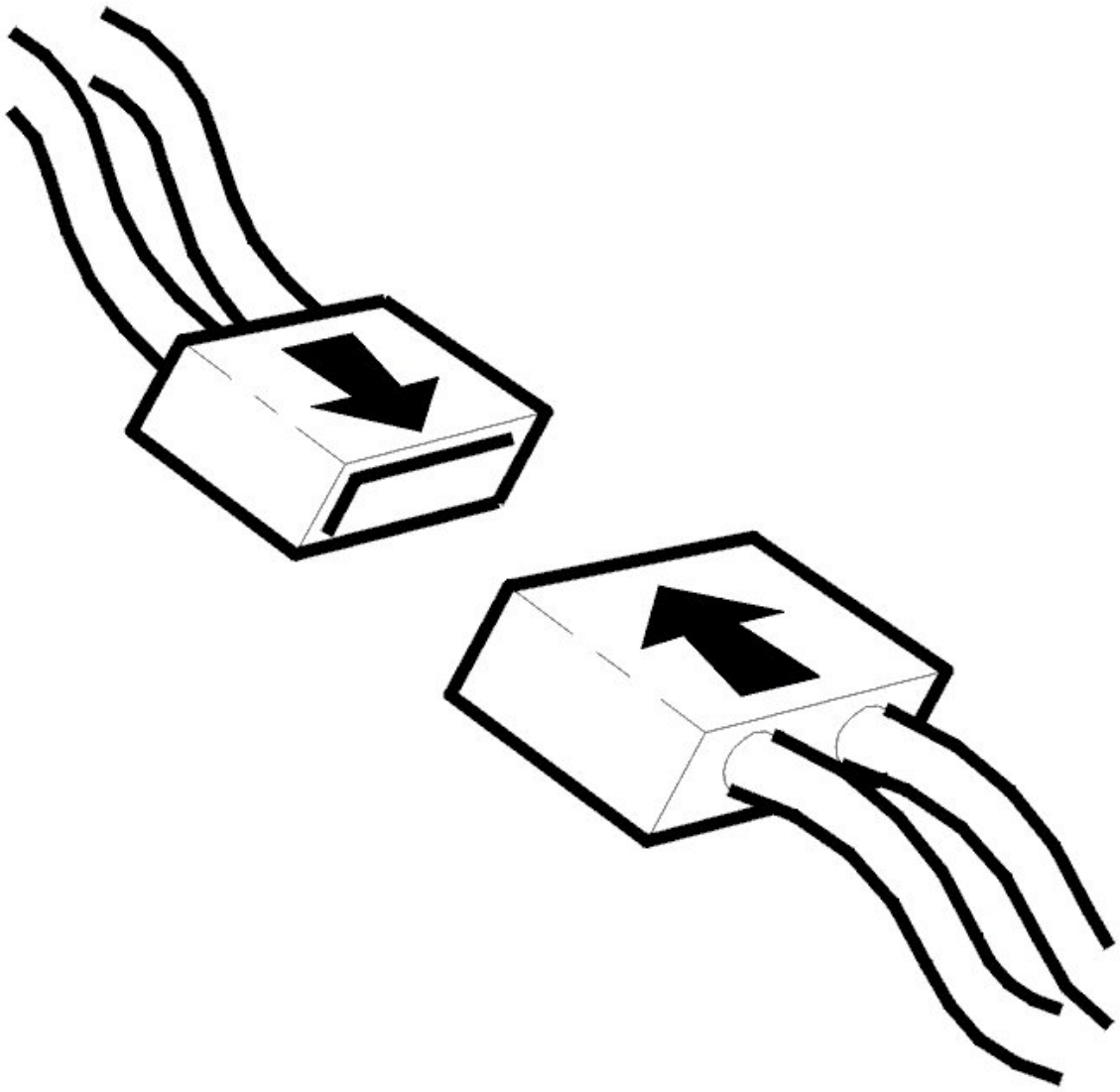
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage to the differential electronic module (DEM).
Check that the value is within its permitted range. The voltage must be able to be compared with the power supply to the central electronic module (CEM) +/-2.5 V.

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

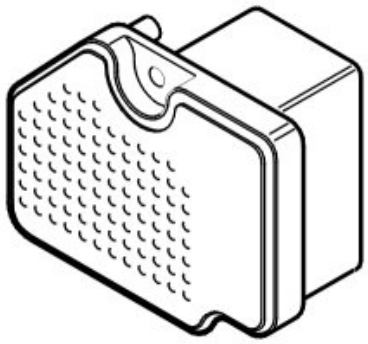
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0005

Condition



The differential electronic module (DEM) checks if the signal from the control valve is within the permitted range by comparing the signal with a predefined parameter.
The diagnostic trouble code (DTC) is stored if the control module registers a incorrect signal, i.e. a current value outside the predefined parameters.
The diagnostic trouble code (DTC) can be diagnosed with the engine running and the engine speed (RPM) greater than 500 rpm.

Substitute value
- Four wheel drive is disengaged.

Possible source
- Damaged control module.

Fault symptom[s]
- Four wheel drive is not functioning.

Internal Fault

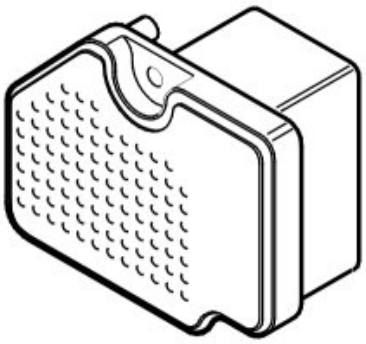
Internal fault

Information

The differential electronic module (DEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the differential electronic module (DEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the differential electronic module (DEM) if the fault recurs.

Other information:

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

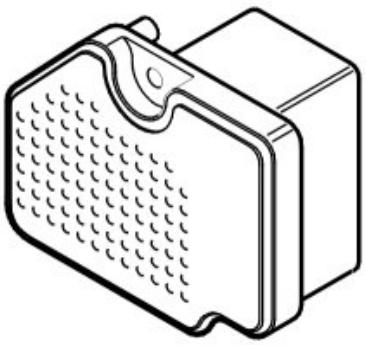
Attempt New Test - Information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0006

Condition



The differential electronic module (DEM) checks if the signal from the feed pump is within the permitted range by comparing the signal with predefined parameters.

The diagnostic trouble code (DTC) is stored if the control module registers a incorrect signal, i.e. a current value outside the predefined parameters.
The diagnostic trouble code (DTC) can be diagnosed with the engine running and the engine speed (RPM) greater than 500 rpm.

Substitute value
- Four wheel drive is disengaged.

Possible source
- Damaged feed pump
- Damaged cable harness to the feed pump

Signal too high
- Short-circuit to ground.

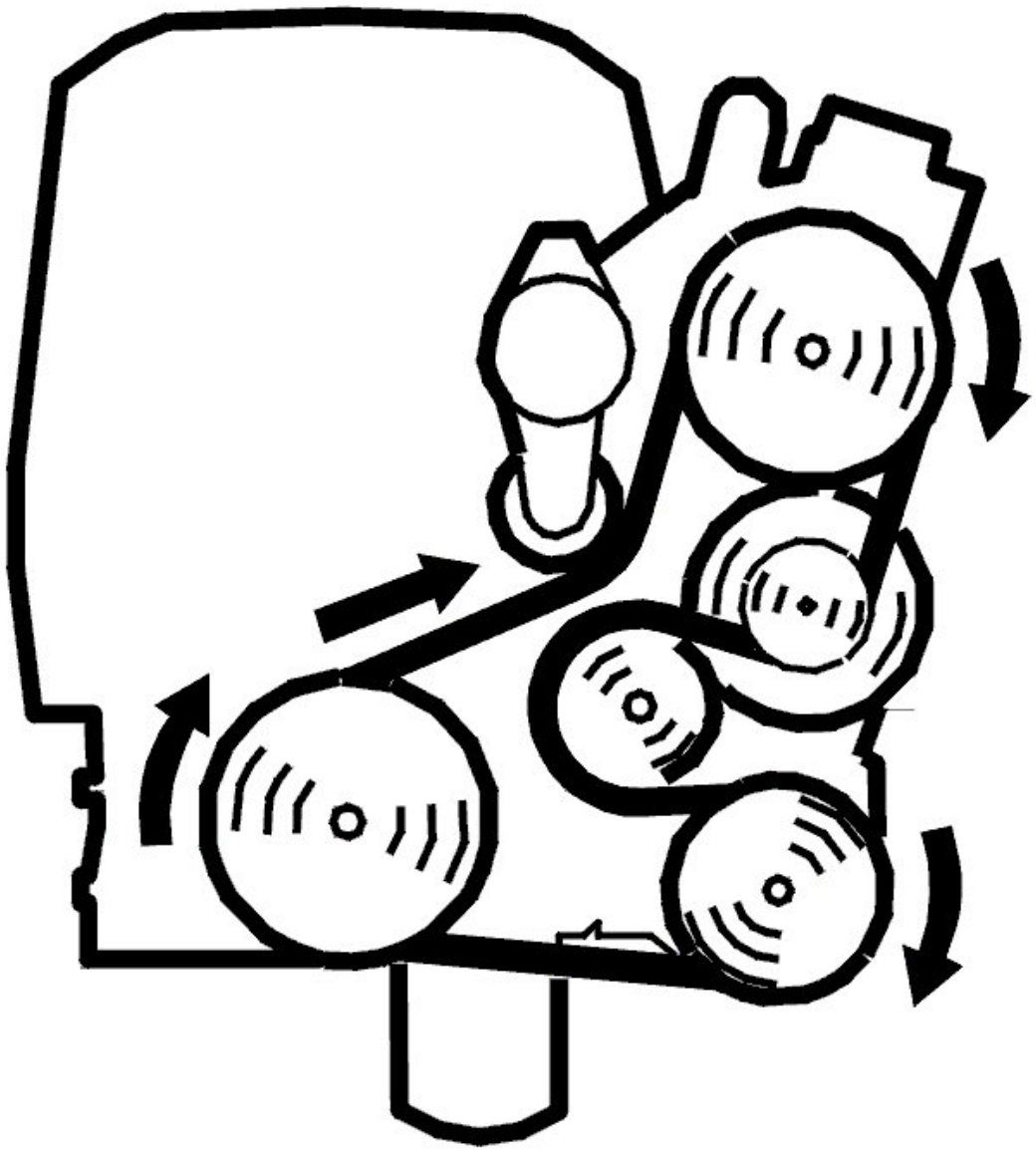
Signal too low
- Open-circuit in the power supply.

Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Signal

Faulty signal

Checking the status

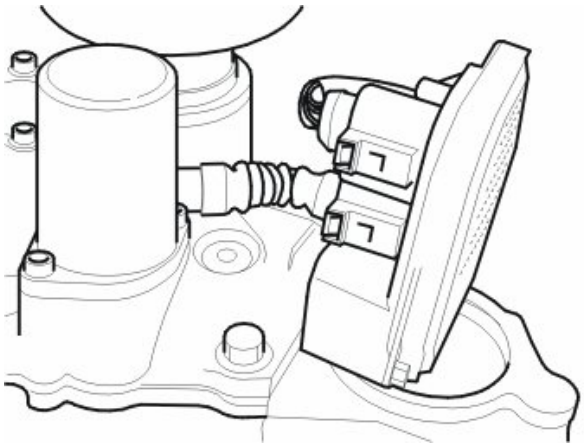


- Engine idling.

Check if the pump motor in the unit for four wheel drive (Active on Demand Coupling) starts and runs normally.

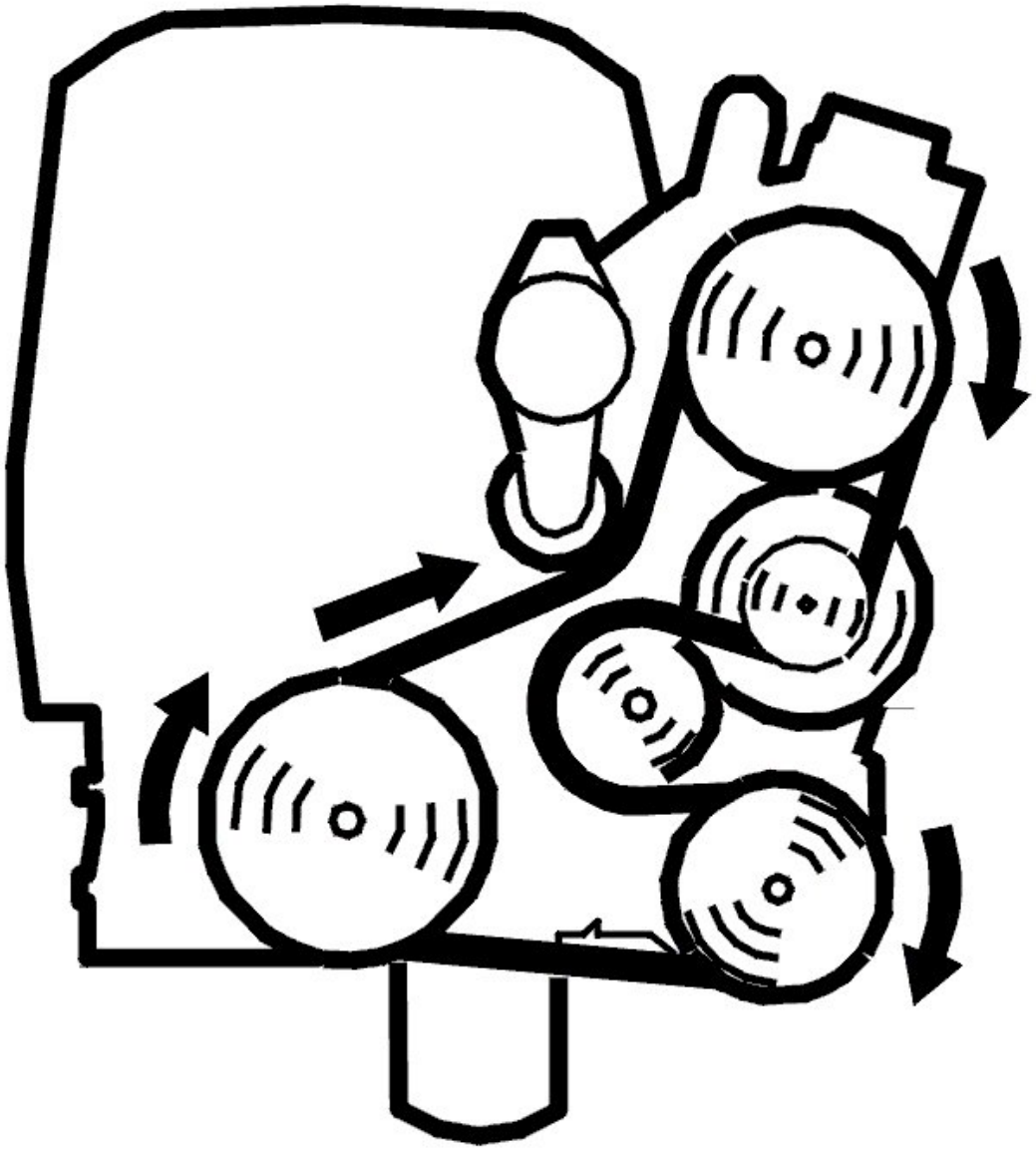
Hint: The motor must hum and vibrate slightly. Listen using a stethoscope or a screwdriver pressed to your ear.

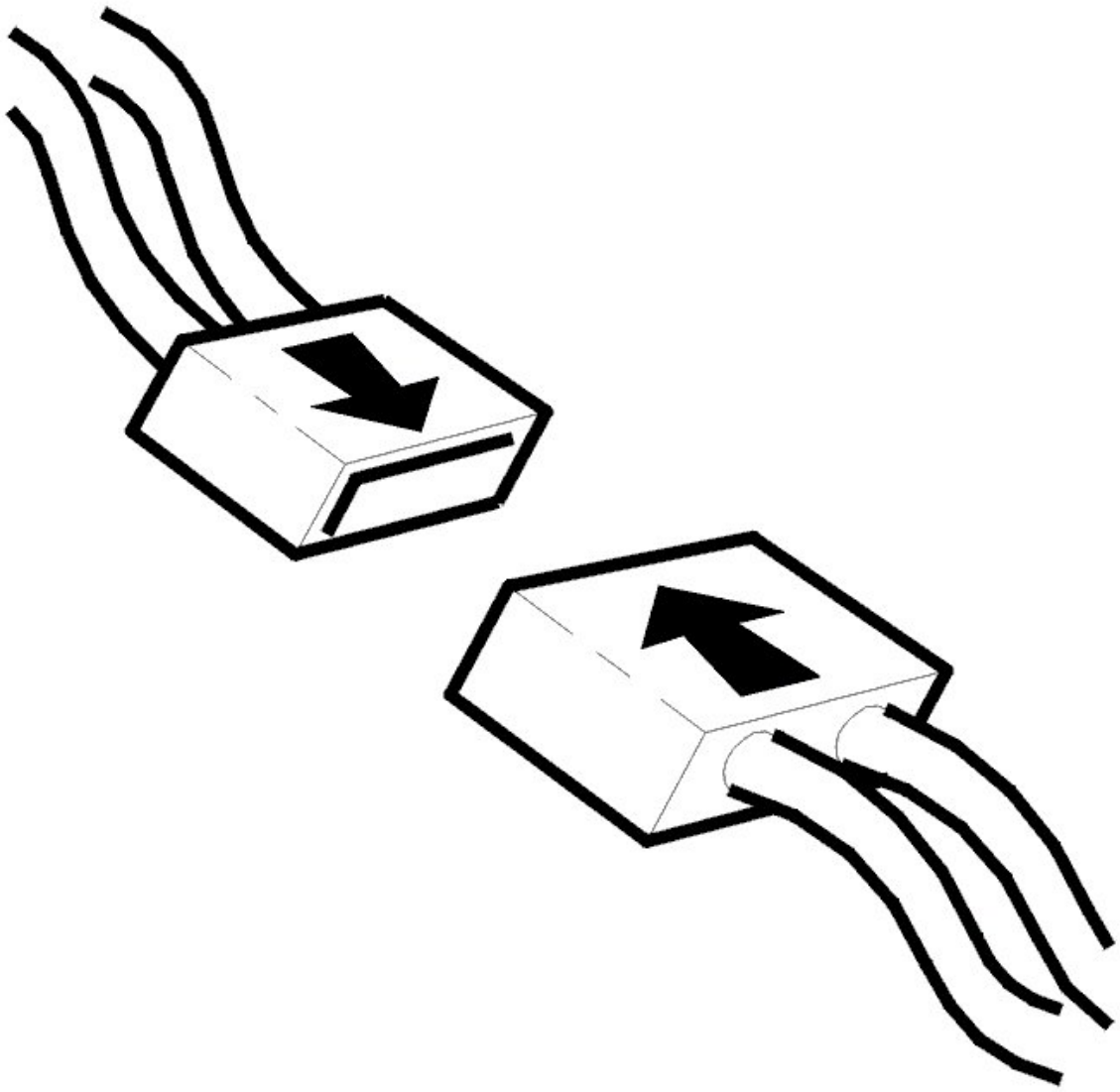
If the pump motor starts, this is an indication that the fault was present previously but that it is not active at the moment, i.e. the fault is intermittent.



Continue - Checking the connectors and cables

Checking the connectors and cables





- Ignition off
- Check the connector between the differential electronic module (DEM) and the feed pump. Check for contact resistance and oxidation
- Check the cable between the differential electronic module (DEM) and the feed pump. Check for damage
- Engine idling.

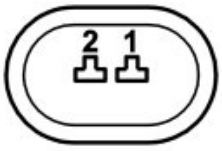
Check the voltage by taking readings using a voltmeter on the control module connector for the pump motor. Take readings between terminals #1 and #2.

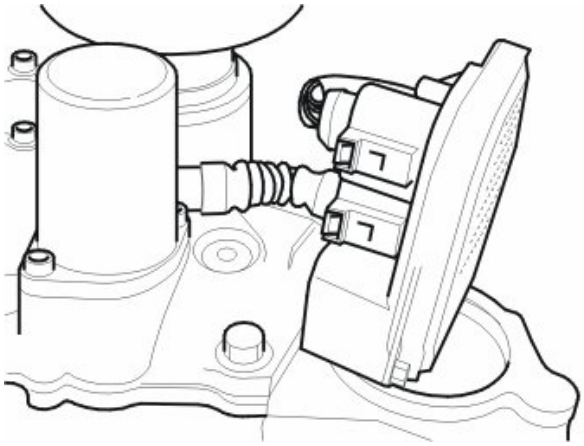
Note! The voltage is a pulse width modulated signal which varies greatly and can only be read off for a short time. The purpose of the reading is only to provide an indication of whether there is an open-circuit or not.

Remedy as necessary.

Other information:

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Oil pump active on demand coupling (AOC), replacing See: Transmission and Drivetrain/Differential Assembly/Service and Repair/Oil Pump Active On Demand Coupling (AOC), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





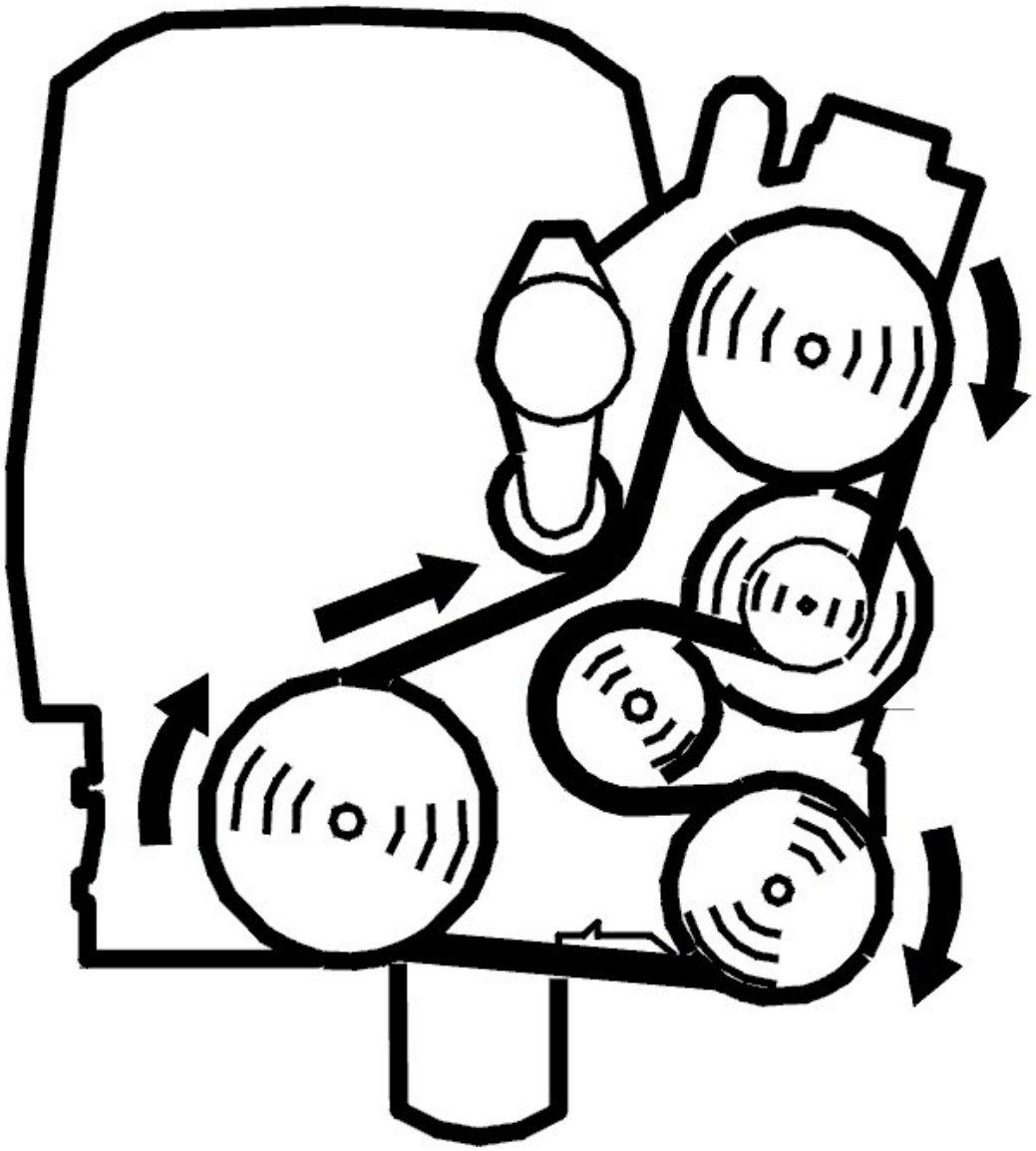
Continue - Verification

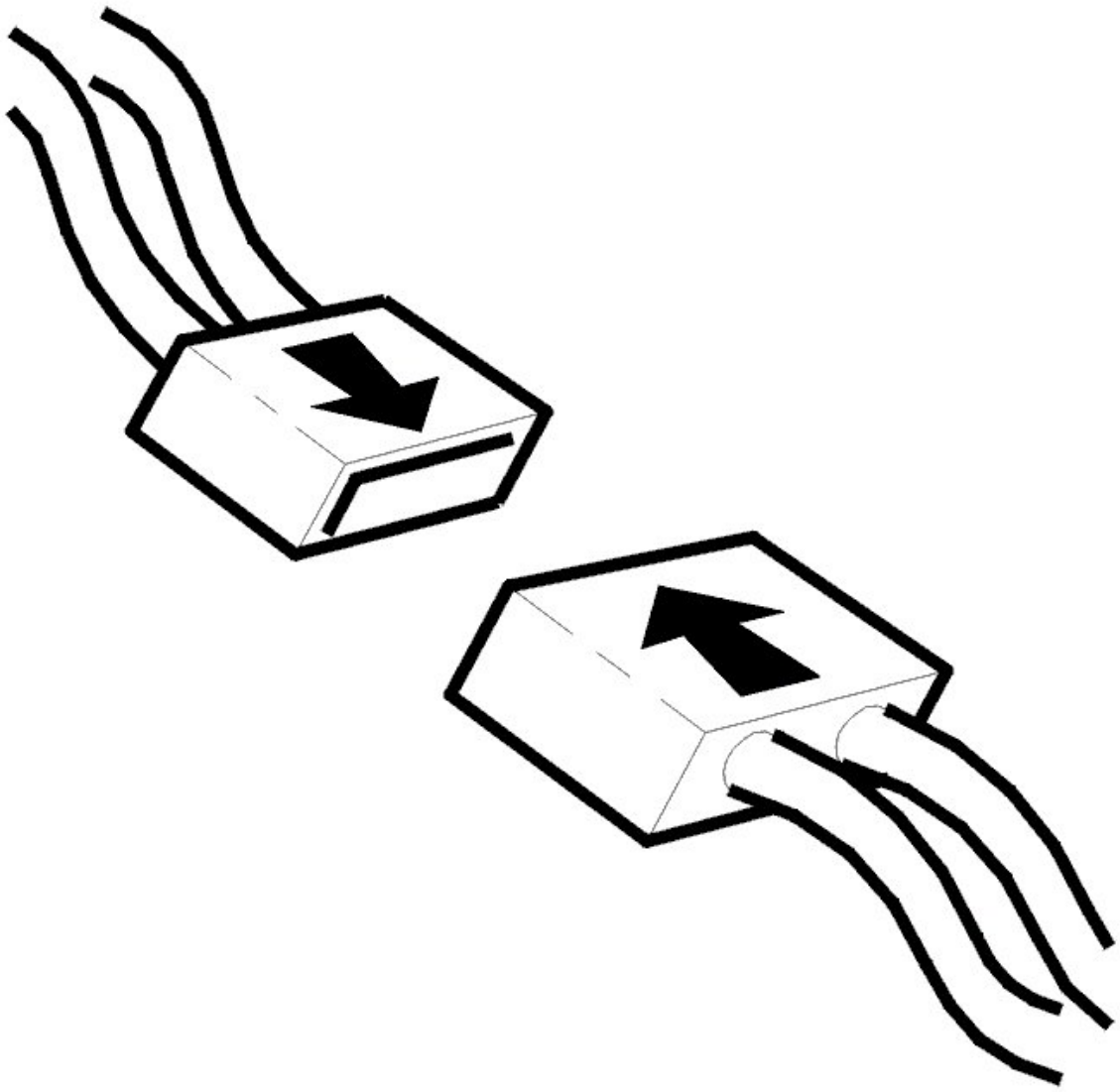
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Engine idling.

Check if the pump motor in the unit for four wheel drive (Active on Demand Coupling) starts and runs normally.

Hint: The motor must hum and vibrate slightly. Listen using a stethoscope or a screwdriver pressed to your ear.

Does the feed pump work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

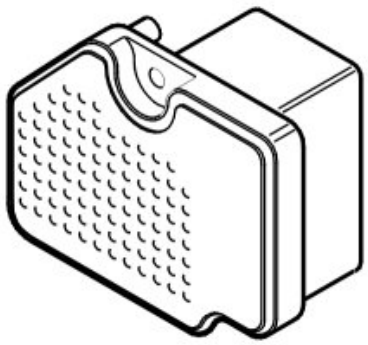
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0007

Condition



The Differential electronic module (DEM) checks the oil pressure in the Haldex clutch using an oil pressure sensor.
When the engine speed exceeds 500 rpm, an initial pressure builds up in the clutch via an electric feed pump.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- Initial pressure not reached within 2-4 minutes.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Engine speed (RPM) higher than 500 rpm.

Substitute value

- Four wheel drive is disengaged.

Possible source

- Damaged pressure sensor.
- Damaged feed pump.
- Too low oil volume in clutch.
- Internal leak in the clutch.

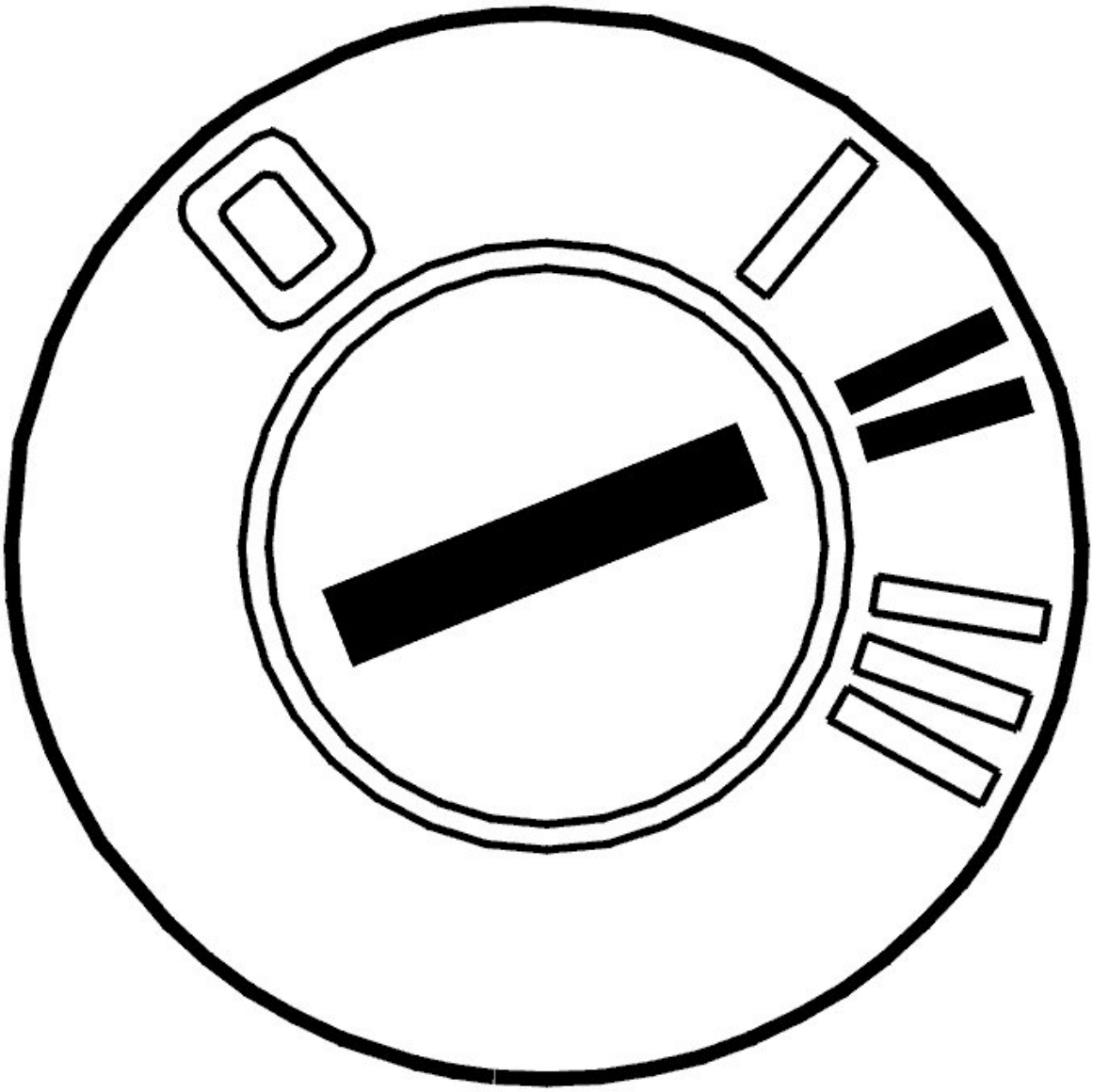
Fault symptom[s]

- Four wheel drive is not functioning.

Incorrect Value

Incorrect value

Checking the oil pressure



- Ignition on.

Read off the oil pressure in the Differential Electronic Module (DEM). The pressure must rise when the engine speed exceeds 500 rpm. Use **VIDA Vehicle communication**.
First read off the oil pressure with the ignition on and then with the engine running. At read out, the oil pressure must rise when the engine rpm exceeds 500 rpm, the pressure must rise immediately after the engine's rpm increases.
If the pressure does not rise, this means that a fault has occurred.

Does the pressure increase?

Yes - Information

No - Checking the component and wiring

Checking the function

- Ignition off.
- Check the connector between the Differential Electronic Module (DEM) and the feed pump with respect to contact resistance and oxidation.
- Check the lead between the Differential Electronic Module (DEM) and the feed pump for damage.

Reinstall the connectors, components etc.

- Ignition on.

Activate the feed pump and check that it starts and runs normally. Listen using a stethoscope or a screwdriver pressed to your ear.

Note! The feed pump may sound like it's running but in certain cases it only oscillates.

Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential

Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)

- Location of components, M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Locations

Select continue when the defect has been remedied.

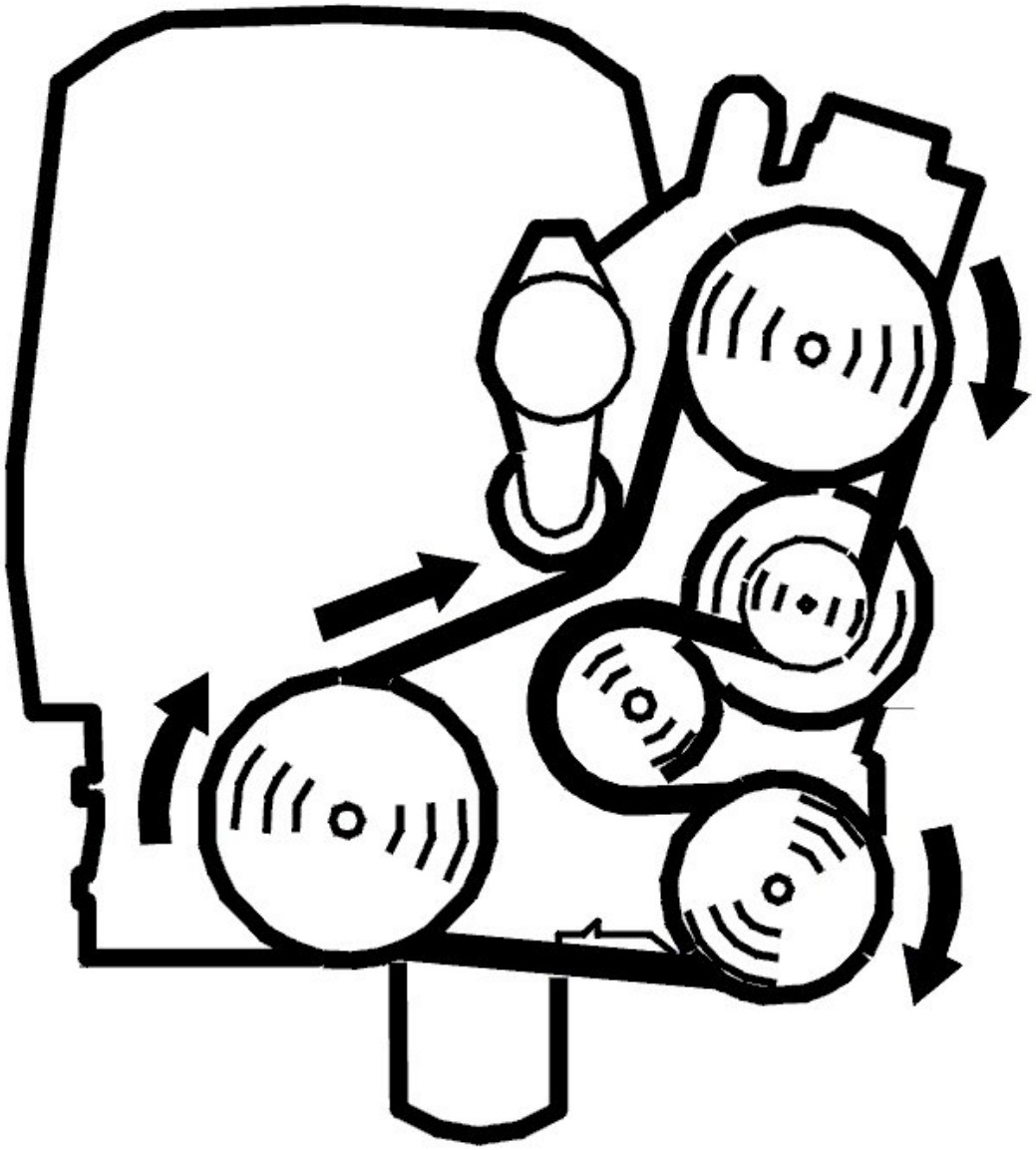
Continue - Information

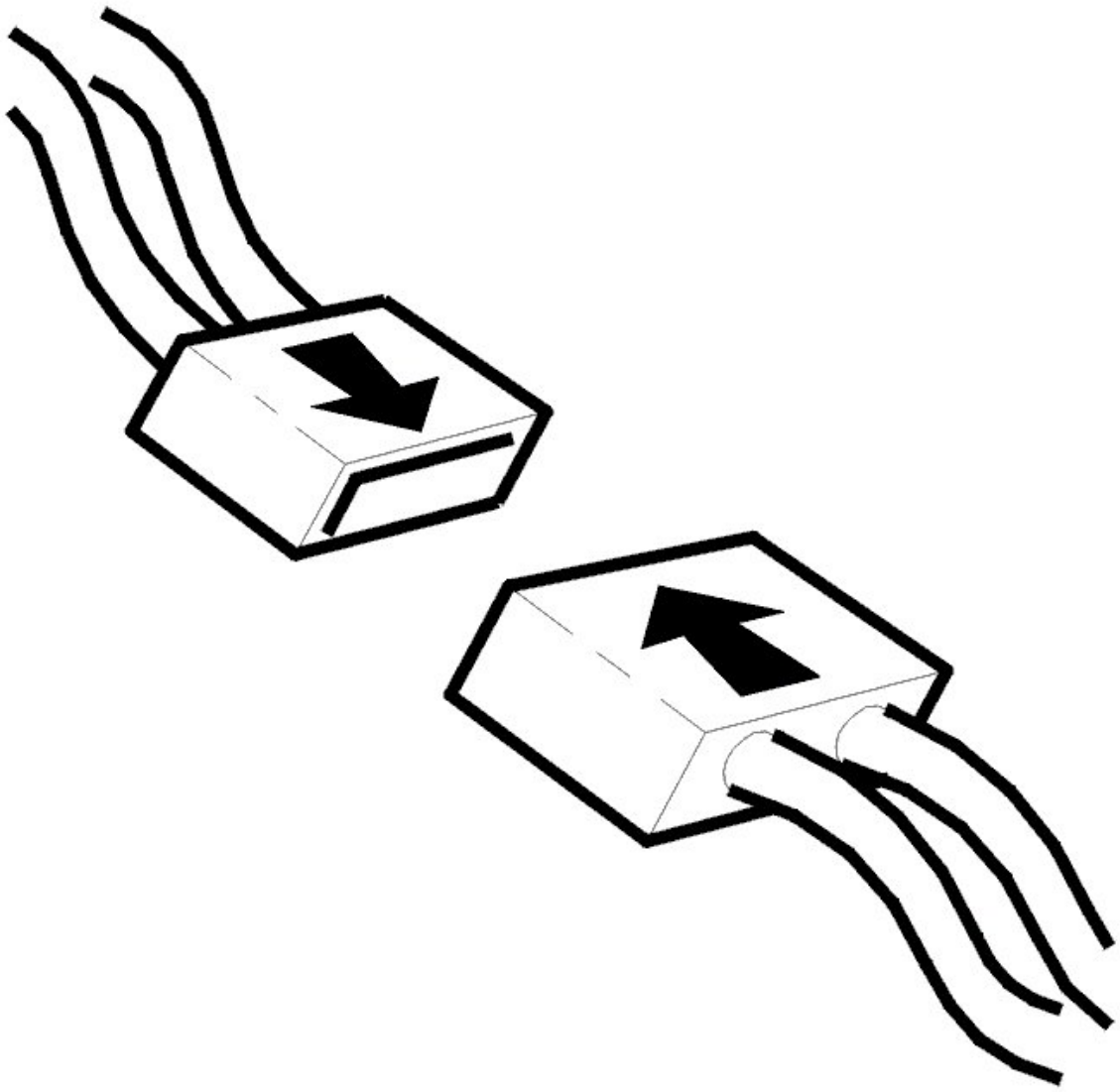
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





Caution! Carry out the test with the vehicle raised so that all four wheels can rotate freely with the mounting at the ends of the control arms to prevent damage to the drive shafts.

Warning! Ensure that the vehicle is safely raised. Check that no objects are caught in the tire treads.

Note! If the vehicle is equipped with TRACS (traction control system) or Traction Control (DSTC (Dynamic stability and traction control), STC (Stability and traction control)) the function must be deactivated. This is carried out by removing the fuse for the brake system pump motor in the engine compartment relay and fusebox. Note that diagnostic trouble codes (DTCs) will be stored in the brake control module (BCM). These must be erased before returning the vehicle to the customer.

- Ignition off
- Reinstall the connectors, components etc.
- Engine idling
- Read off the oil pressure.

Check that the function of the oil pressure sensor is OK. Run the engine with the vehicle on the lift to increase the clutch oil pressure. Read off the pressure during the test drive. Check that the pressure has been updated.

Hint: The oil pressure sensor has a measurement range of 0 to 4 Mpa.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

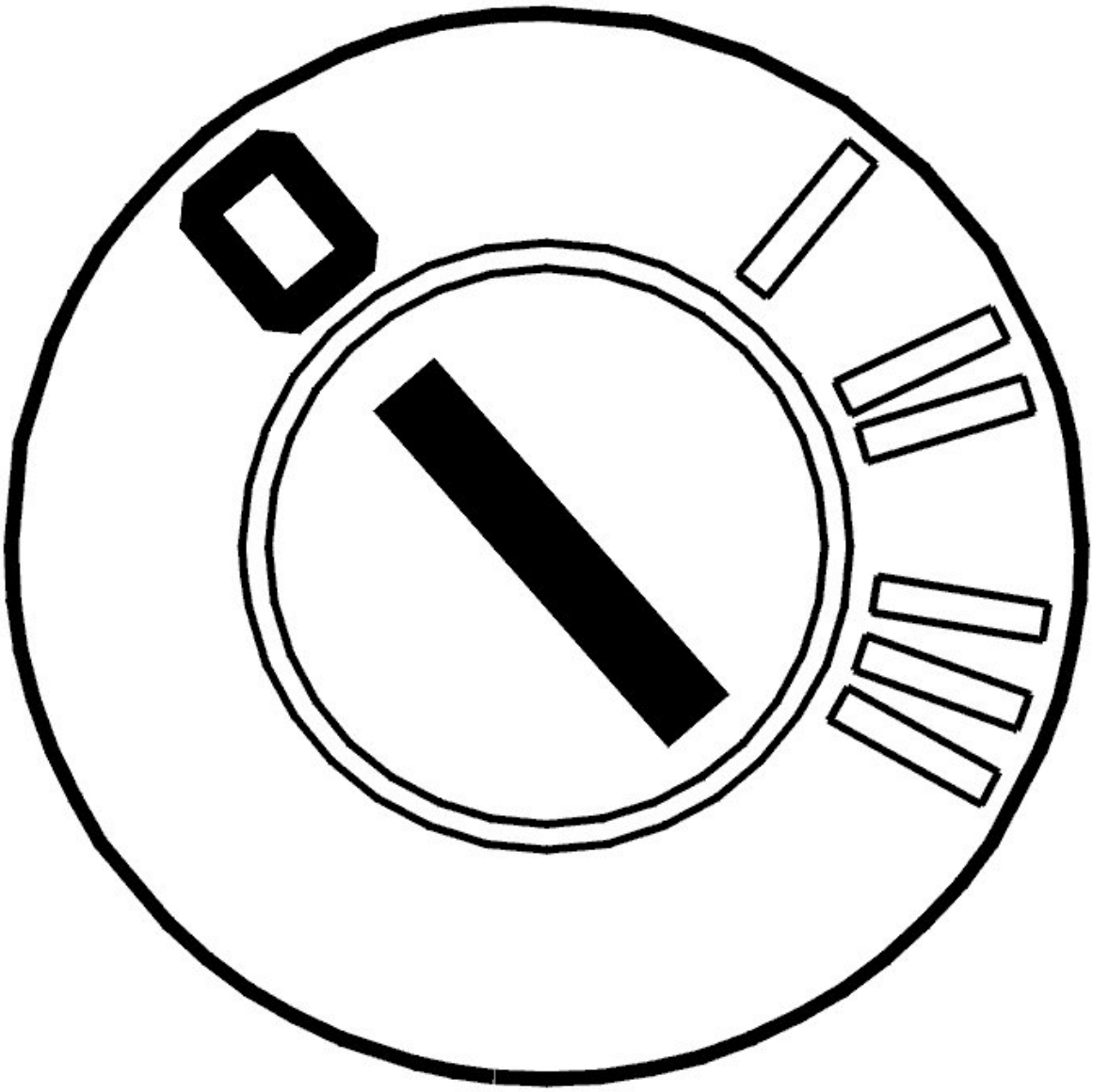
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the oil pressure

Checking the component and wiring

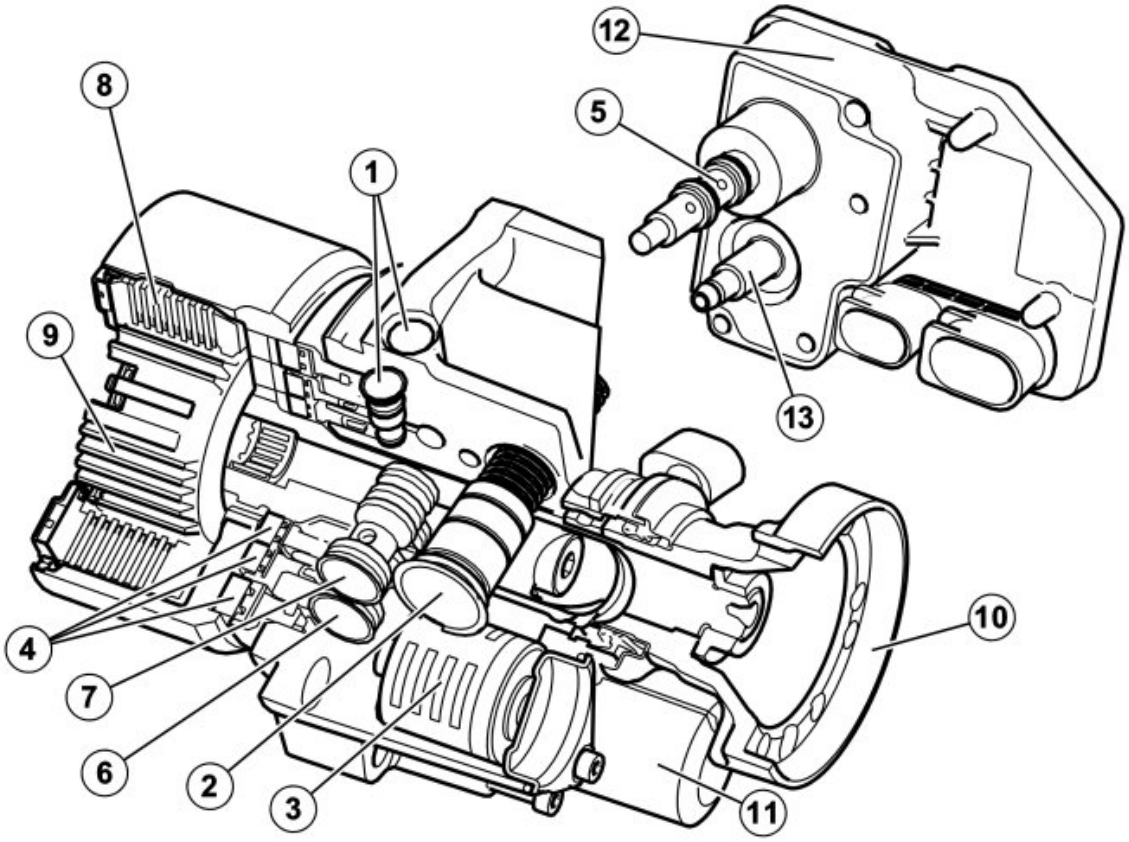


- Ignition off.

Check the connector for the Differential electronic module (DEM). Check for damage and loose connections.
Check that the cable harness is intact and not trapped or damaged.
Check that the oil pressure sensor (13) is correctly installed and that it does not have any external damage. Check that the oil pressure sensor oil ducts are intact and free of dirt.
Remedy as necessary.
If no fault is found, try a new pressure sensor.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Temperature / pressure sensor active on demand coupling (AOC), replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - Differential/Differential Temperature Sensor/Switch/Service and Repair/Temperature / Pressure Sensor Active On Demand Coupling (AOC), Replacing

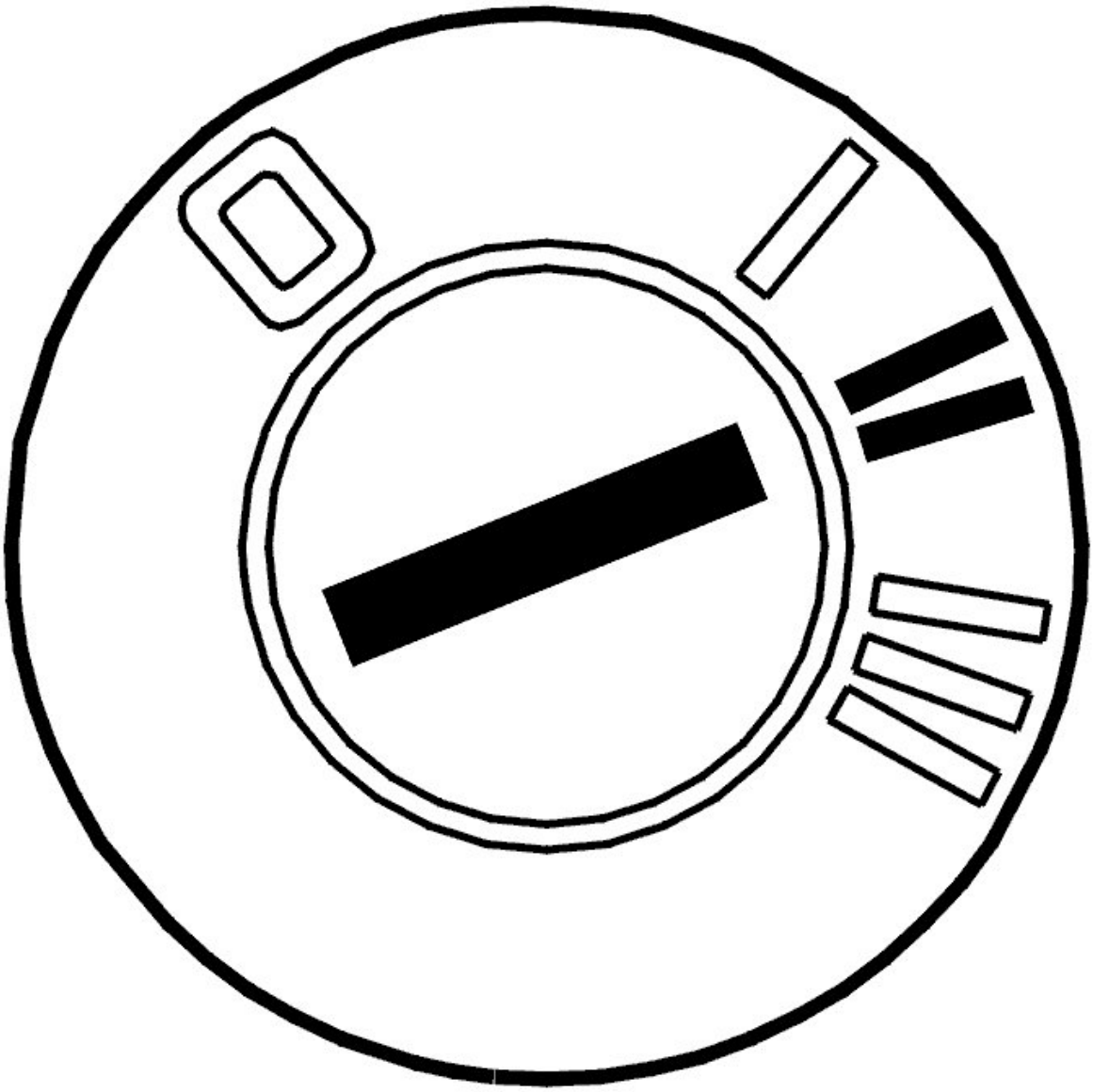


Is the function OK?

Yes - **Fault Found**

No - Checking the function

Information



- Ignition on.

Check status for relevant diagnostic trouble code.
No further corrective action is required if the diagnostic trouble code (DTC) is intermittent and does not recur.
If the DTC status is permanent, continue with fault tracing.

Do you wish to continue with fault tracing?

Yes - Checking the component and wiring

No - Fault Found

Information

Note! The diagnostic trouble code can also be generated due to damaged AOC-unit (clutch). Check the AOC-unit for visible damages. Listen for noise. Check the oil level in the coupling (Active on Demand Coupling).

Continue - Checking the function

Checking the function

Check that the AOC-unit works by test-driving the vehicle on the lift (to increase the clutch oil pressure). Read off the oil pressure during the test-drive.
Test drive the vehicle following:
Checking four wheel drive See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Symptom Related Diagnostic Procedures/Checking Four Wheel Drive Checking four wheel drive, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Symptom Related Diagnostic Procedures/Checking Four Wheel Drive

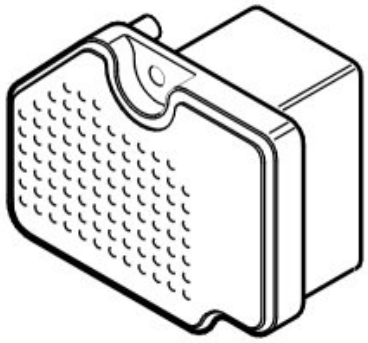
Test driving Active on Demand Coupling, automatic transmission, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Initial Inspection and Diagnostic Overview/Test Driving Active On Demand Coupling, Automatic Transmission

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0008

Condition



The differential electronic module (DEM) checks the software calibration.
The diagnostic trouble code (DTC) is stored if the control module registers a fault in the calibration software.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The control module cannot be calibrated on the after market.

Substitute value
- Four wheel drive is disengaged.

Possible source
- The differential electronic module (DEM) is not calibrated.

Fault symptom[s]
- Four wheel drive is not functioning.

Internal Fault

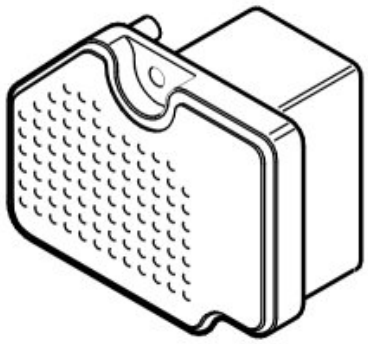
Internal fault

Information

The differential electronic module (DEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the differential electronic module (DEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the differential electronic module (DEM) if the fault recurs.

Other information:

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

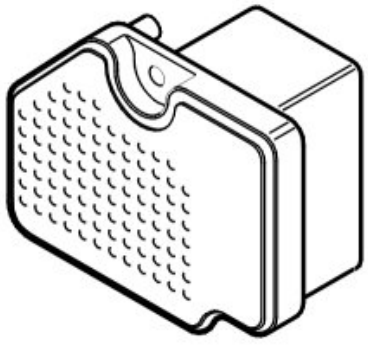
Attempt New Test - Information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-0009

Condition



The differential electronic module (DEM) checks the function at the Analog/Digital converter by comparing the analog power supply with the corresponding digital power supply (after Analog/Digital conversion).
The diagnostic trouble code (DTC) is stored if the signal from the Analog/Digital converter deviates from the power supply.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Four wheel drive is disengaged.

Possible source
- Internal fault (Analog/Digital converter not working).

Fault symptom[s]
- Four wheel drive is not functioning.

Internal Fault

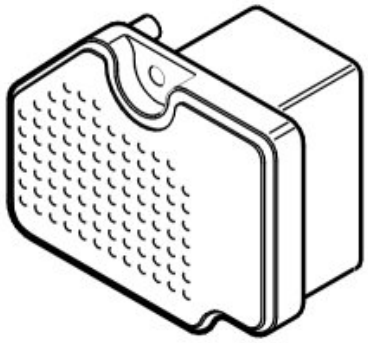
Internal fault

Information

The differential electronic module (DEM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the differential electronic module (DEM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the differential electronic module (DEM) if the fault recurs.

Other information:

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Information

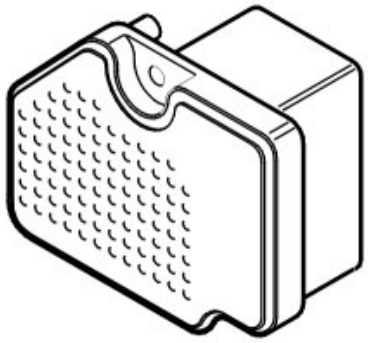
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information DEM-000A

Condition



The differential electronic module (DEM) continuously checks if the power supply to the control module is within its permitted range. The differential electronic module (DEM) compares the signal with the predefined parameter.
Diagnostic trouble code (DTC) DEM is stored if the control module registers a power supply lower than 8.5 V for 25 seconds or greater than 18.5 V for 3 seconds.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Four wheel drive is disengaged.

Possible source

Signal too high:
- Short-circuit to ground.

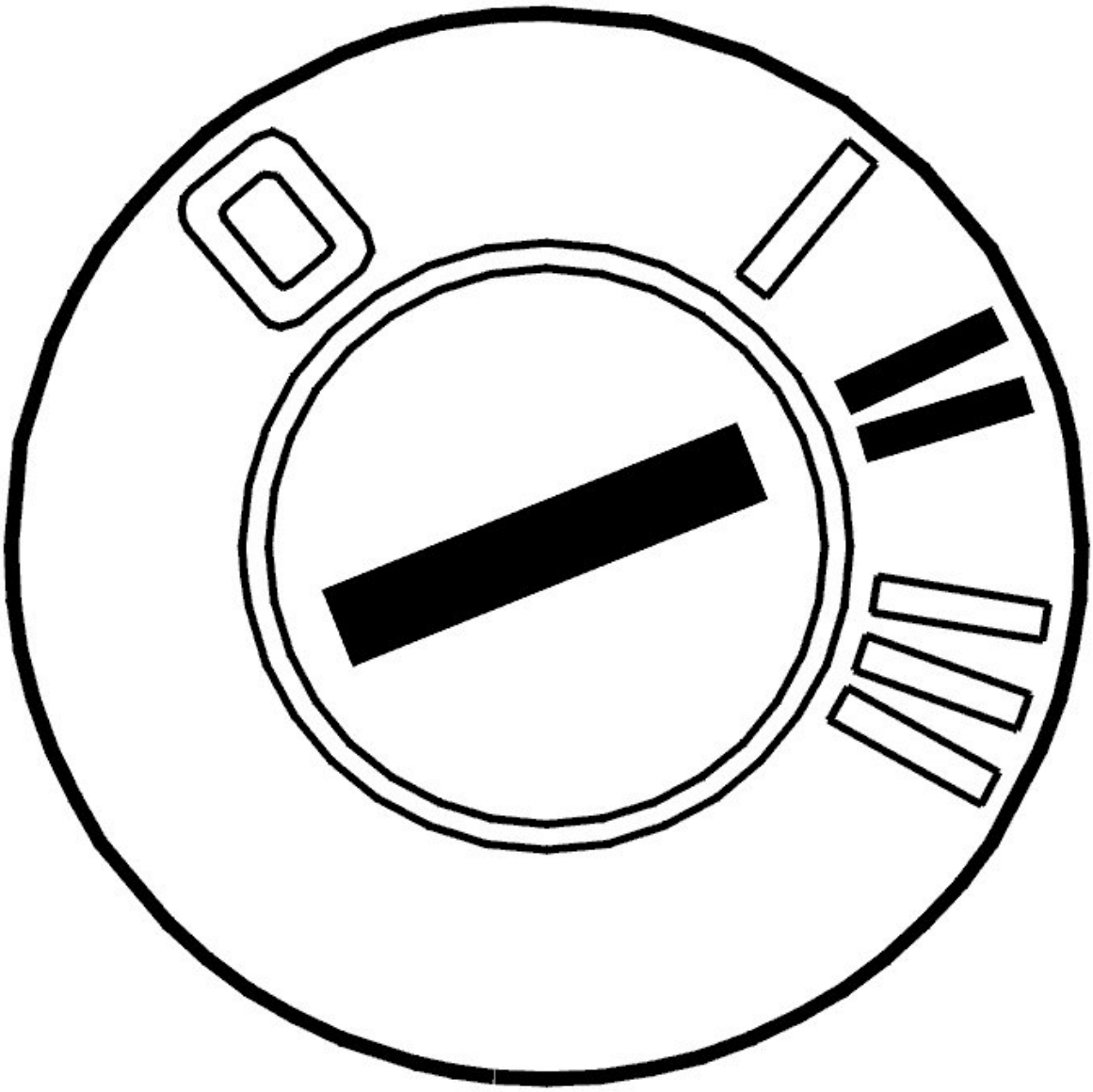
Signal too low:
- Open-circuit in the power supply.

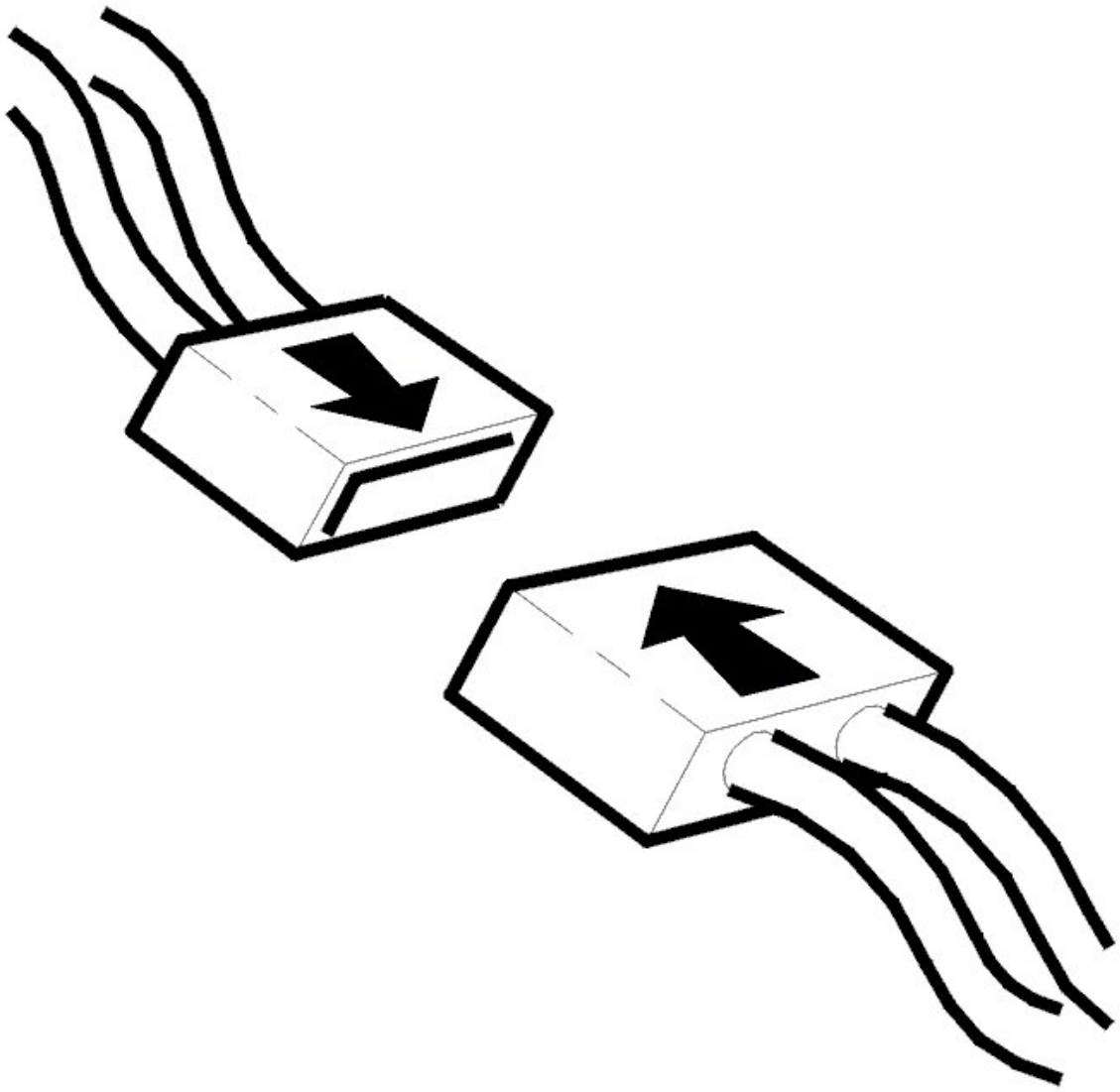
Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Voltage

Faulty voltage

Checking the connectors and cables





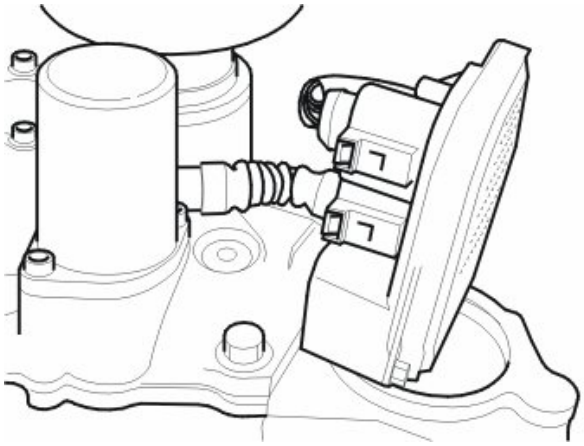
- Ignition off
- Check the connector between the differential electronic module (DEM) and the Active on Demand Coupling control module. Check for contact resistance and oxidation
- Check the cable between the differential electronic module (DEM) and the Active on Demand Coupling control module. Check for damage
- Ignition on.

Hint: Read off the voltage to check the function. Voltage should be approximately battery voltage.

Remedy as necessary.

Other information:

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



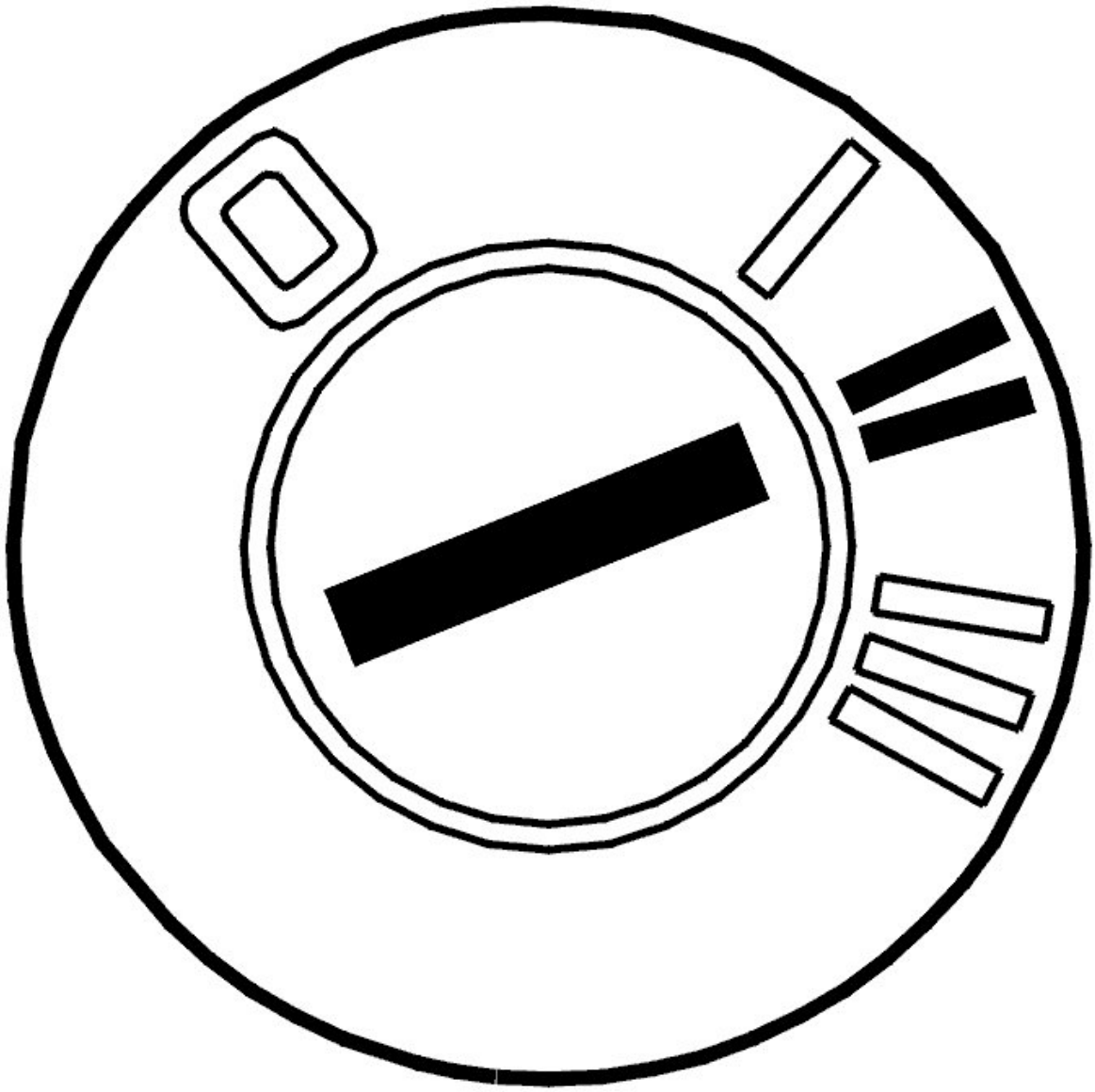
Continue - Verification

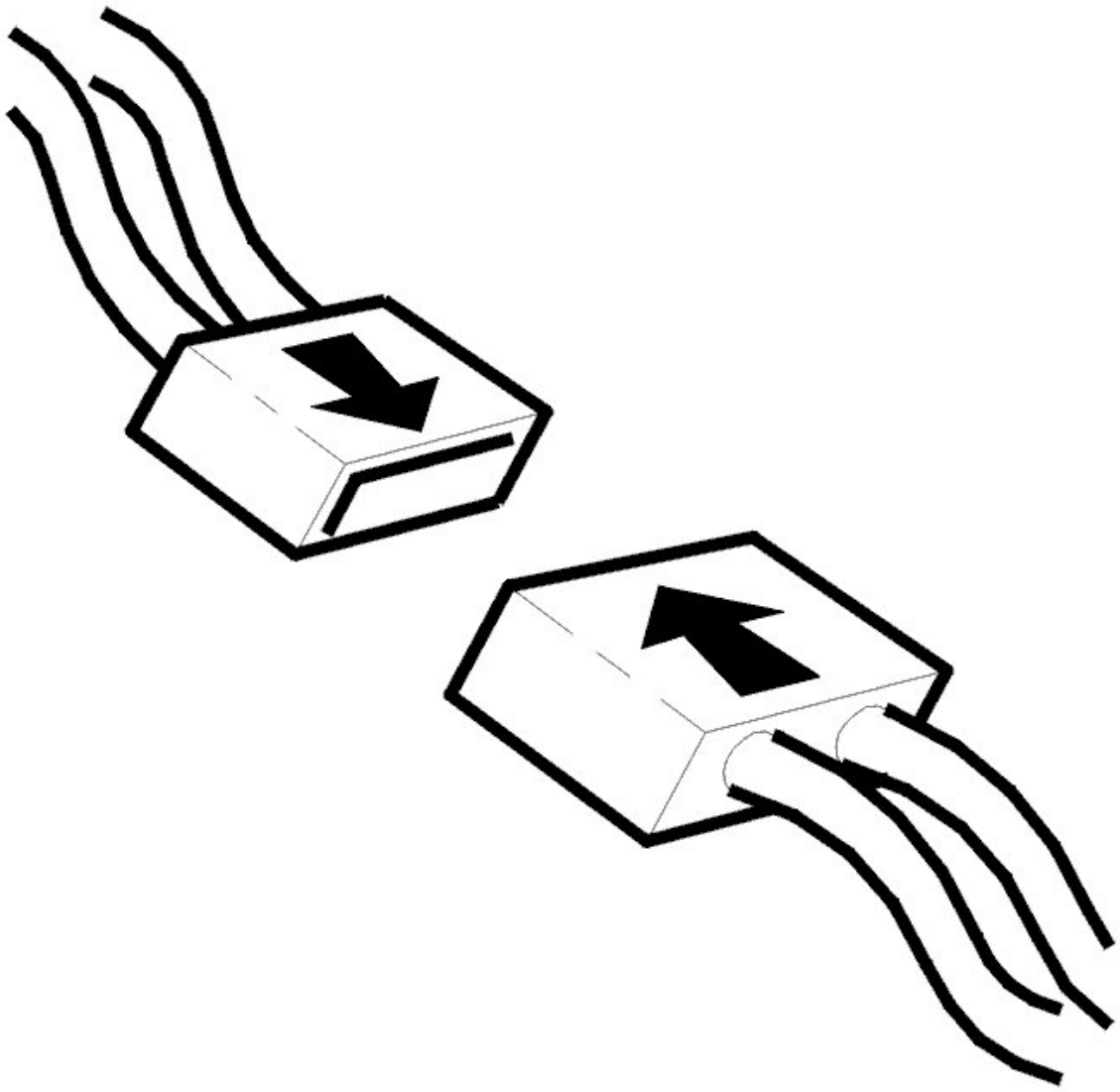
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage to the differential electronic module (DEM).
Voltage should be approximately battery voltage.

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

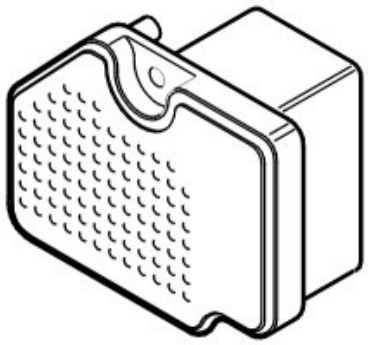
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and cables

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-000B

Condition



Differential Electronic Module (DEM) calculates an expected oil pressure increase in the AOC-unit (the mechanical clutch) during driving. The control module checks how reasonable the oil pressure change is by comparing the calculated value with the signal from the oil pressure sensor. If the signal deviates too much from the expected value the control module interprets this as a malfunction, and the diagnostic trouble code is generated.
The diagnostic trouble code (DTC) can be diagnosed when driving.

Substitute value
- Four wheel drive is disengaged.

Possible source
- Damaged temperature sensor.
- Damaged AOC unit (mechanic clutch).
- Oil leakage.
- Damaged Differential Electronic Module (DEM).

Fault symptom[s]
- Four wheel drive is not functioning.

Incorrect Value

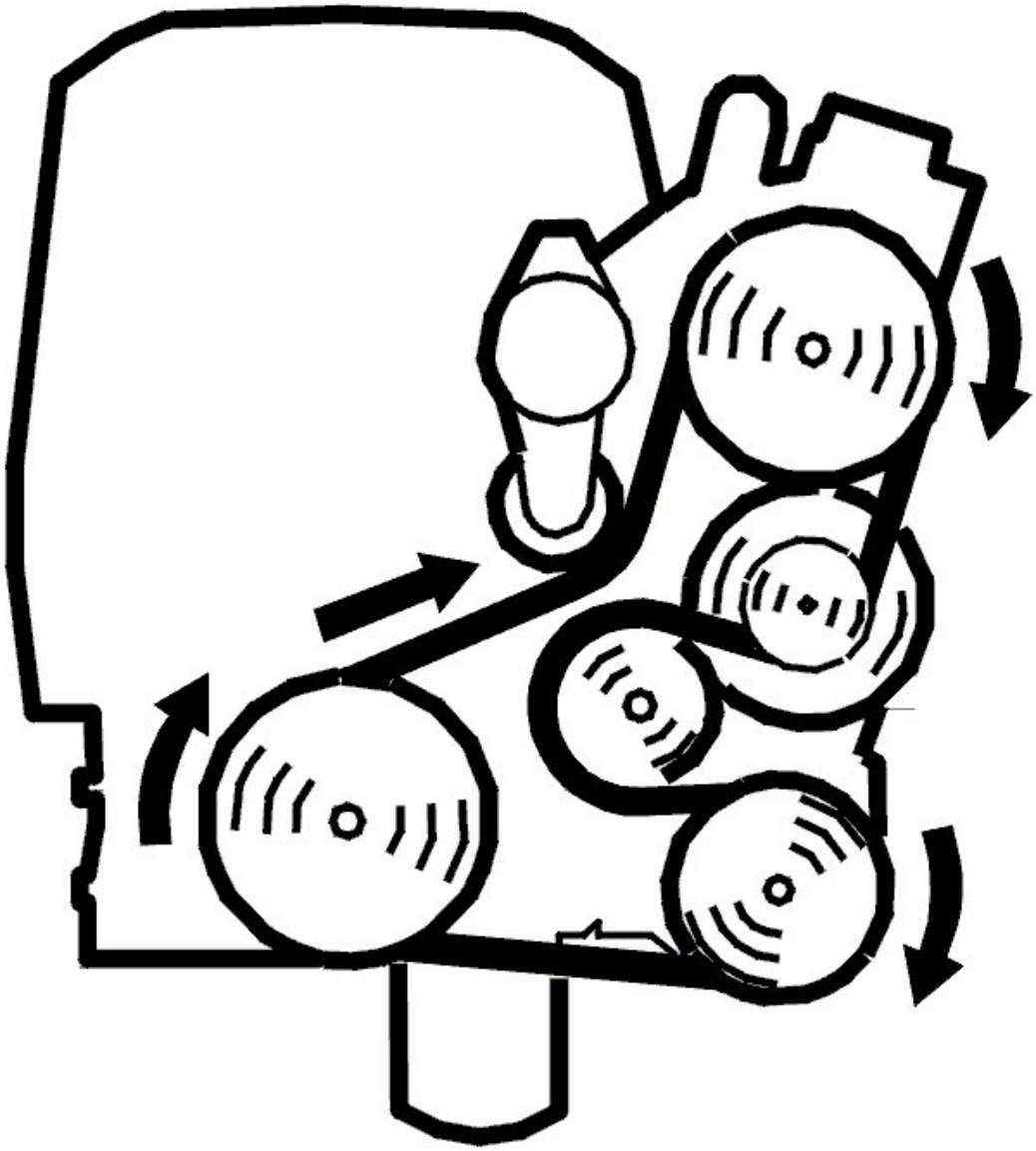
Incorrect value

Information

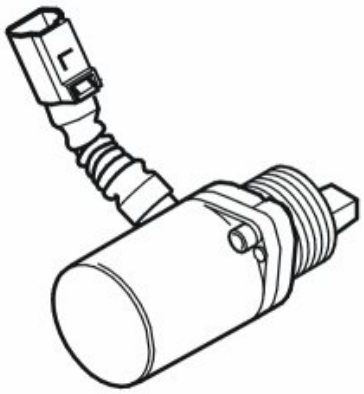
Note! The diagnostic trouble code can also be generated due to damaged AOC-unit (clutch).Check the AOC-unit for visible damages. Listen for noise.Check the oil level in the coupling (Active on Demand Coupling).

Continue - Checking components

Checking components



- Engine idling.



Check the function of the oil pump.
Listen using a stethoscope or a screwdriver pressed to your ear. The oil pump motor shall hum and vibrate slightly.

Note! The pump motor may sound like it's running but in certain cases it only oscillates.

Is the feed pump working?

Yes - Information

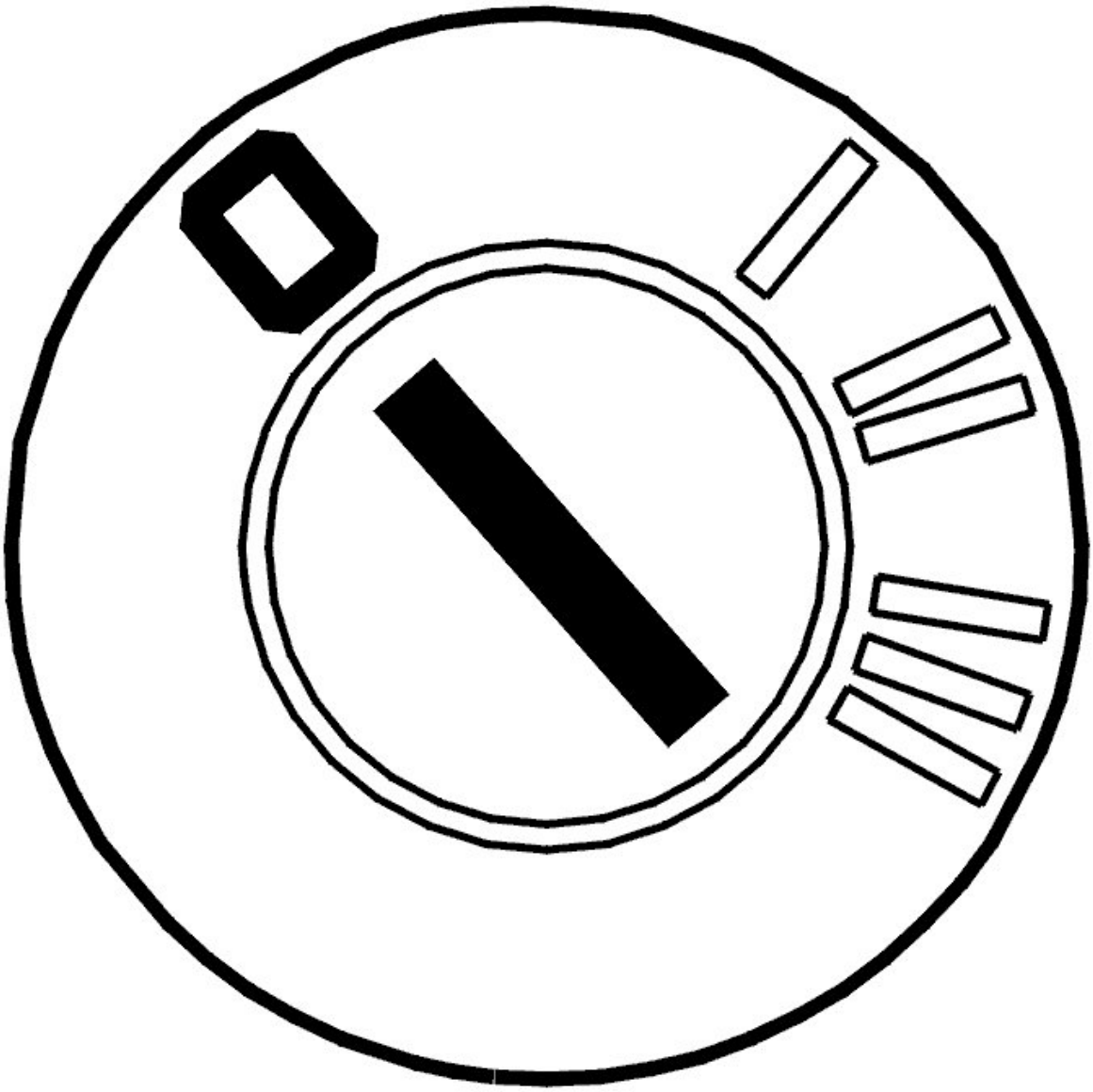
No - Checking the connectors and cables

Information

Note! The brake control module (BCM) can cause interference in the differential electronic module (DEM). For example, incorrect information from one of the wheel speed sensors causes the information from the Brake control module (BCM) to store a diagnostic trouble code (DTC). Therefore, troubleshoot the Brake Control Module (BCM) for incorrect signals from the wheel speed sensors.

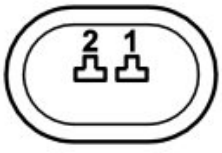
Continue - Checking the function

Checking the connectors and cables

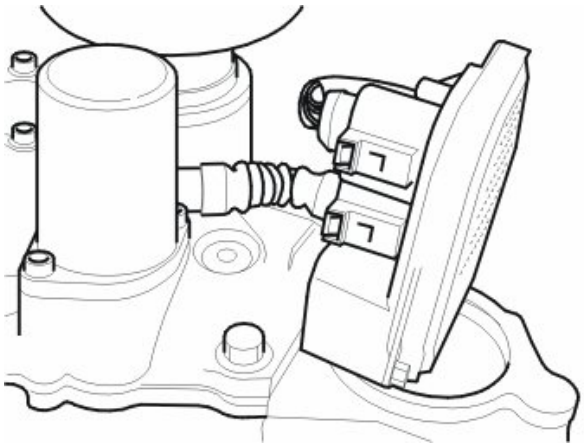


- Ignition off.

Check the connector between the Differential Electronic Module (DEM) and the feed pump with respect to contact resistance and oxidation.
Check the lead between the Differential Electronic Module (DEM) and the feed pump for damage.
Reinstall the connectors, components etc.



- Engine idling.



Check the function of the oil pump.
Listen using a stethoscope or a screwdriver pressed to your ear. The oil pump motor shall hum and vibrate slightly.

Note! The pump motor may sound like it's running but in certain cases it only oscillates.

Remedy as necessary.

Other information

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Active on Demand Coupling (AOC), replacing See: Transmission and Drivetrain/Differential Assembly/Service and Repair
- Differential electronic module (DEM), replacement See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - Differential/Control Unit/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

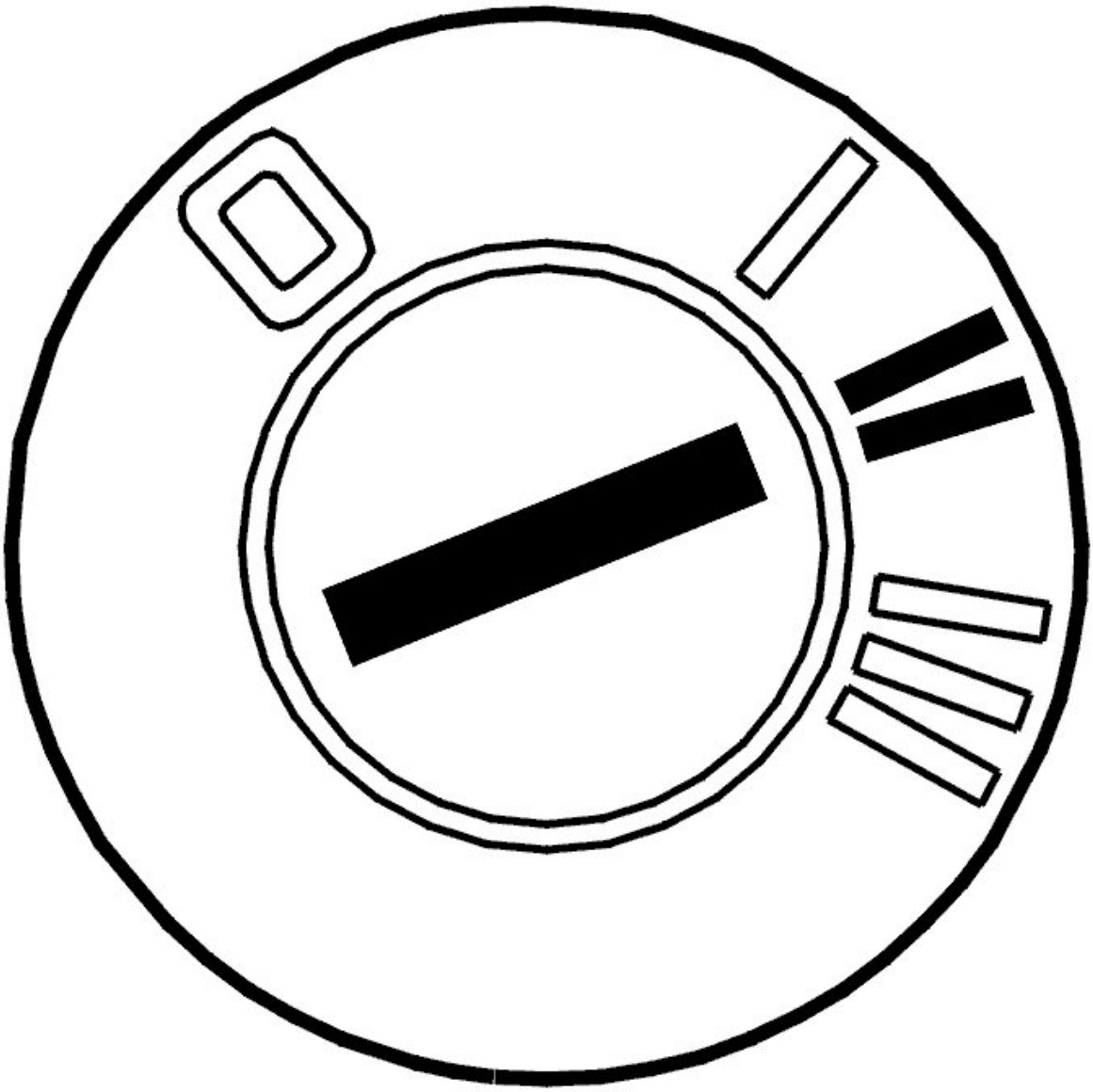
Is the feed pump working?

Yes - Verification

No - Fault-tracing information

Checking the function

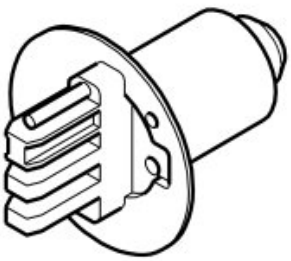
Note! Reading out of oil pressure can take place first after the diagnostic trouble code (DTC) has been deleted. Therefore frozen values should be printed and saved before deleting takes place.



- Ignition on.

Read the oil pressure sensor signal to check the function.
At ignition on the oil pressure shall be 0.00 +/- 0.04 MPa.

- Engine idling.



For engine at idle speed the oil pressure shall be 0.38 +/- 0.04 MPa.

Is the function OK?

Yes - Checking the function

No - Replacement of temperature/pressure sensor

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Test-driving is required to ensure that the malfunction has been fixed.
Test drive the vehicle following:
Test driving on lift, automatic transmission, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Testing and Inspection/Initial Inspection and Diagnostic Overview
Check that the diagnostic trouble code (DTC) is not generated again after the test-drive.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

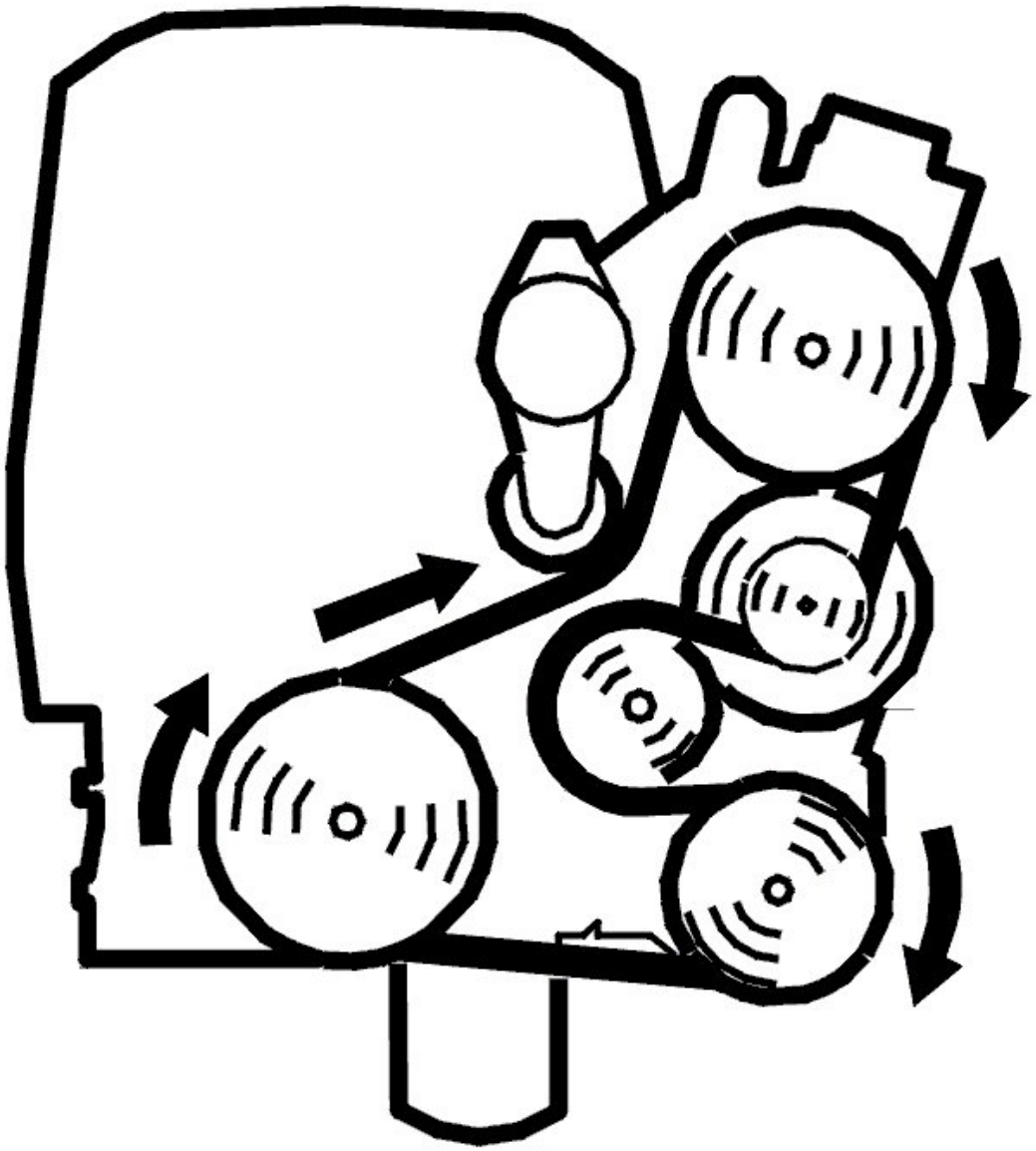
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Information

Checking the function

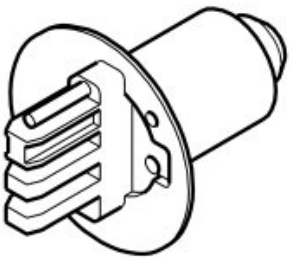


Check that the AOC-unit works by test-driving the vehicle on the lift (to increase the clutch oil pressure). Read off the oil pressure during the test-drive.
Test drive the vehicle following:
Test driving on lift, automatic transmission, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Testing and Inspection/Initial Inspection and Diagnostic Overview

Hint: If the AOC-unit is not working, try with replacing control module.
Repeat the test-drive.

Other information

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Active on Demand Coupling (AOC), replacing See: Transmission and Drivetrain/Differential Assembly/Service and Repair
- Differential electronic module (DEM), replacement See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - Differential/Control Unit/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

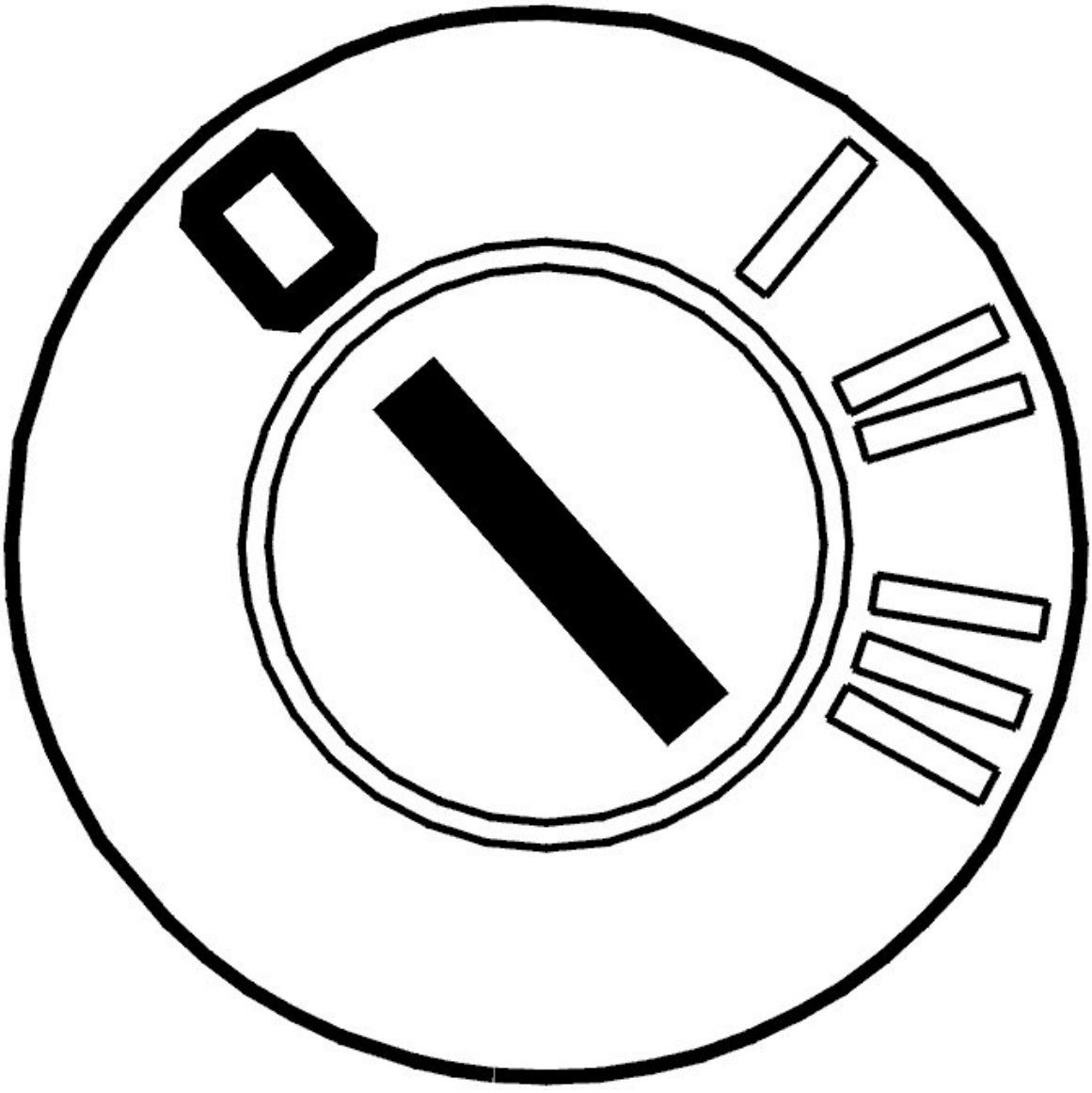


Is the function OK?

Yes - Verification

No - Fault-tracing information

Replacement of temperature/pressure sensor



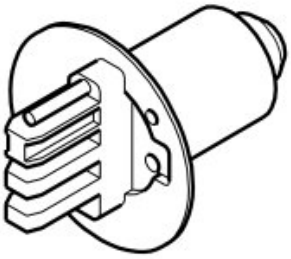
- Ignition off.

Replace oil pressure sensor.

Hint: The oil pressure sensor is integrated with the oil temperature sensor and these are located together with the Differential Electronic Module (DEM). Temperature/pressure sensor is replaceable.

Check that the oil pressure sensor works after the replacement.

- Ignition on.



Read the oil pressure sensor signal to check the function.
At ignition on the oil pressure shall be 0.00 +/- 0.04 MPa.

- Engine idling.

Read the oil pressure sensor signal to check the function.
For engine at idle speed the oil pressure shall be 0.38 +/- 0.04 MPa.

Other information

- Signal specification, differential electronic module (DEM) , M58, AW50/51 AWD See: Transmission and Drivetrain/Differential Assembly/Differential Lock/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Differential Electronic Module (DEM)
- Temperature / pressure sensor active on demand coupling, replacing, M58, M66 AWD, AW50/51 AWD See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - Differential/Differential Temperature Sensor/Switch/Service and Repair/Temperature / Pressure Sensor Active On Demand Coupling, Replacing
- Differential electronic module (DEM), replacement See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - Differential/Control Unit/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Is the function OK?

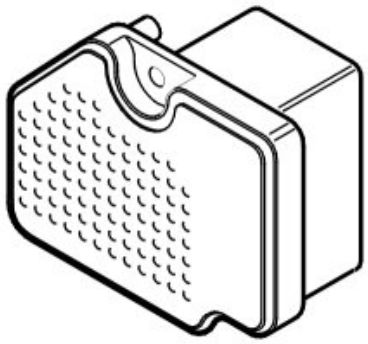
Yes - Verification

No - Checking the function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-000C

Condition



The differential electronic module (DEM) checks the configuration in the connector to the control module for the Active on Demand Coupling. This is to prevent a control module from another make of car being installed by accident.

Note! A control module from another make of car with the same four wheel drive system can be incorrectly installed in a Volvo.

The diagnostic trouble code (DTC) is stored if the control module does not recognize the configuration.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Four wheel drive is disengaged.

Possible source
- Incorrect control module.

Fault symptom[s]
- Four wheel drive is not functioning.

Faulty Hardware

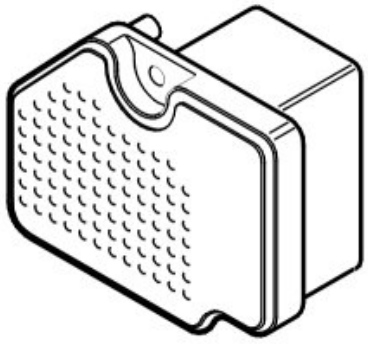
Faulty hardware

Information

The software does not correspond to the hardware. Check that the correct hardware is installed.

Other information:

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

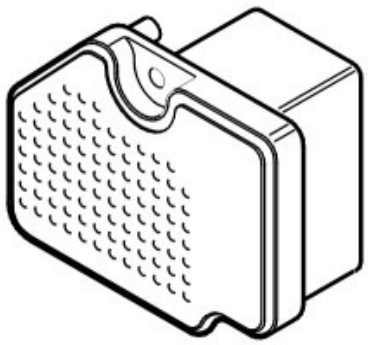
Attempt New Test - Information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-E000

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

Hint: Control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- Four wheel drive is not functioning
- Message in the display
- The anti-spin warning lamp is lit
- General warning lamp lit.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

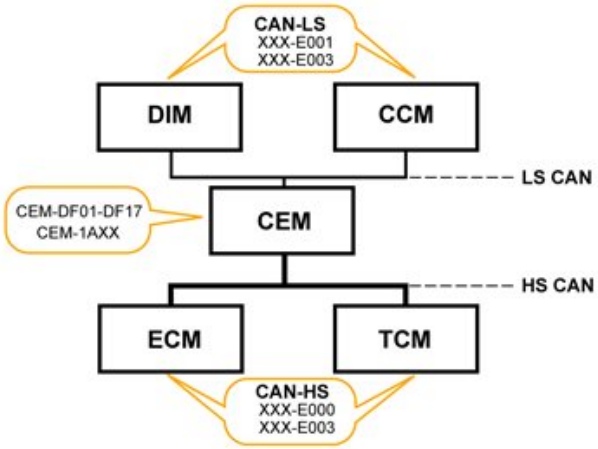
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

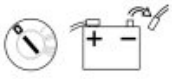
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

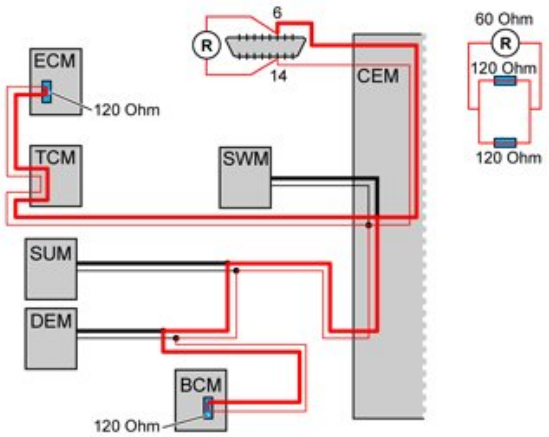
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

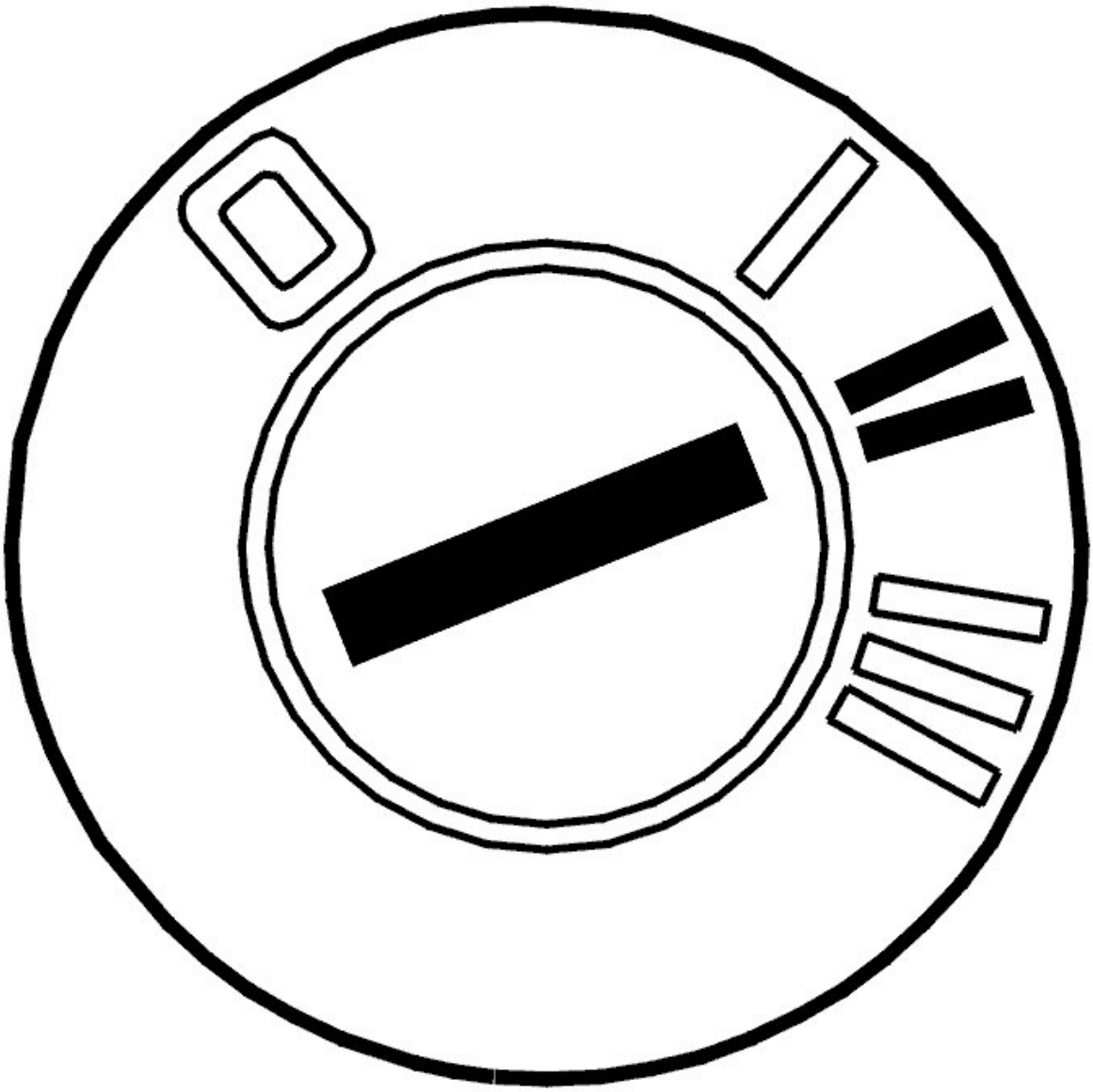


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

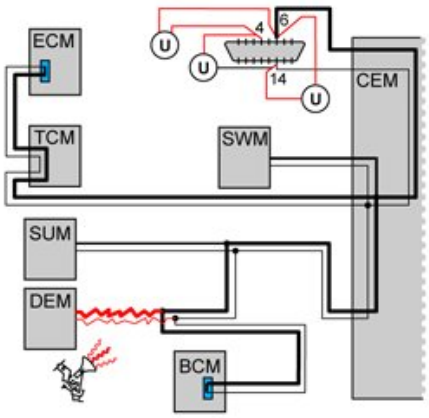
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

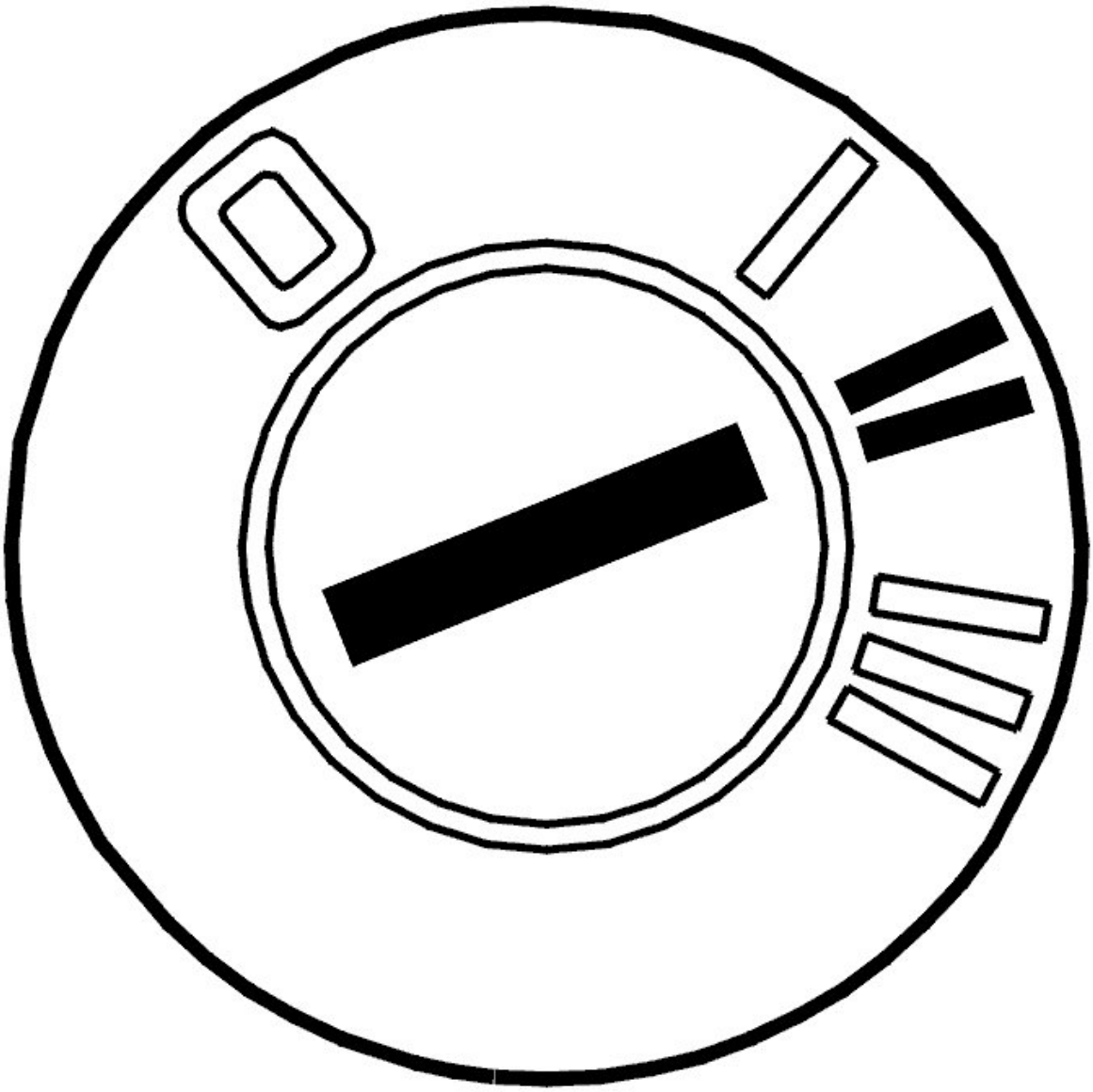


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

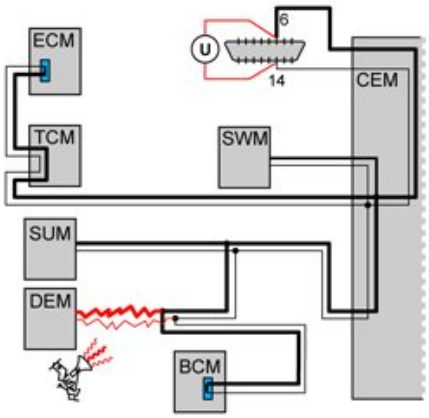
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

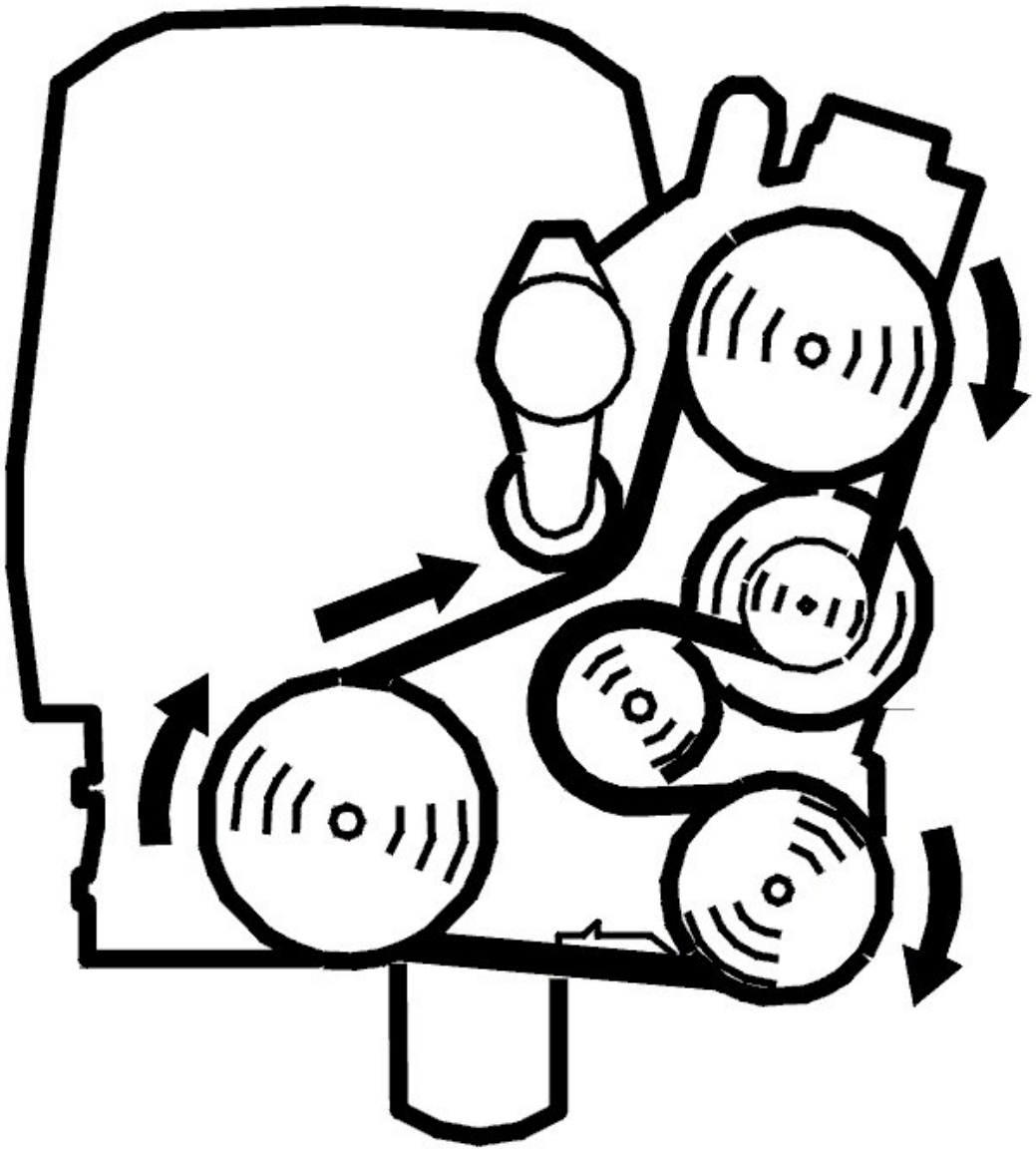
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

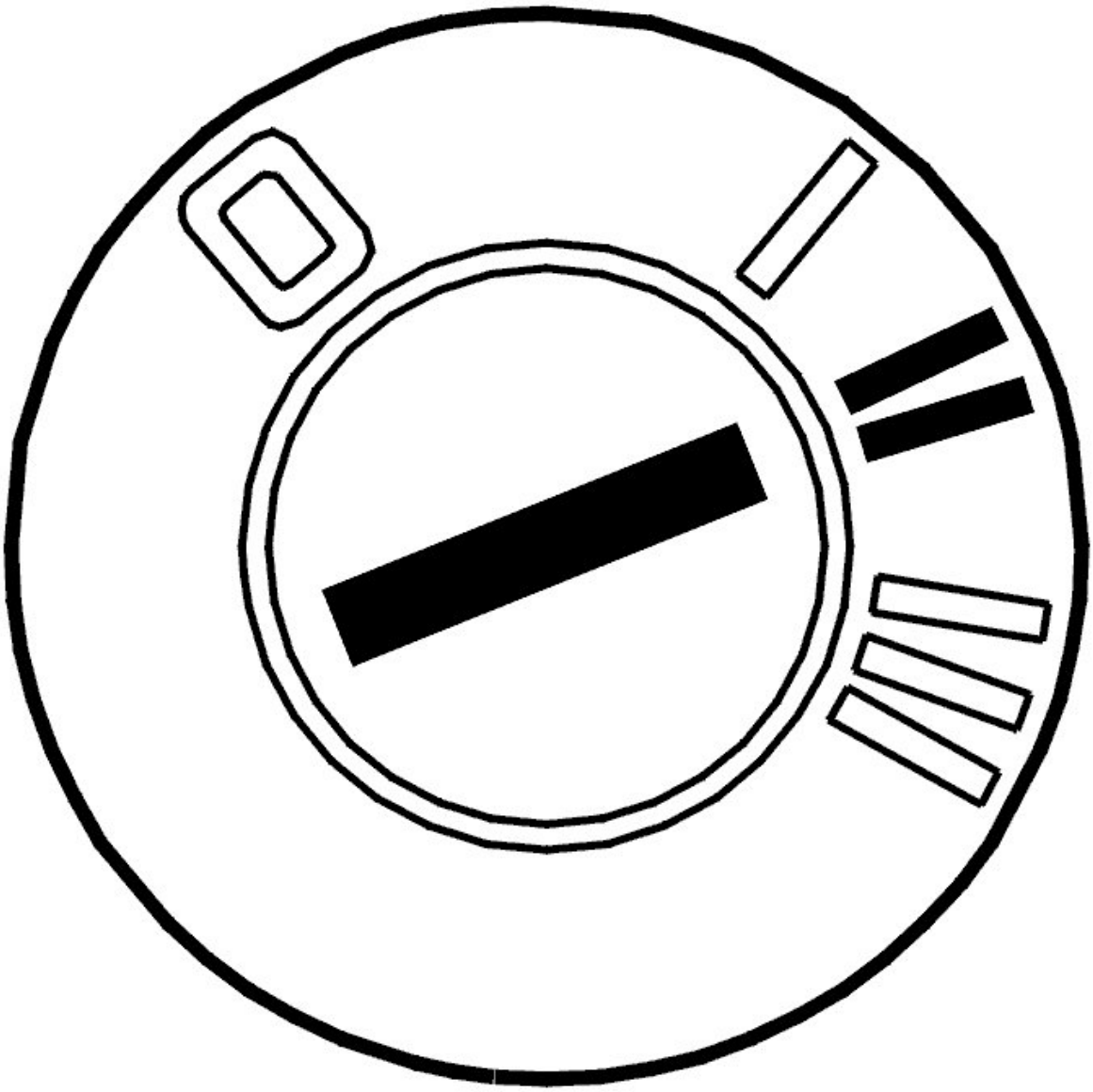


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

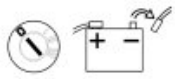
Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **FAULT-TRACING FAILED**

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

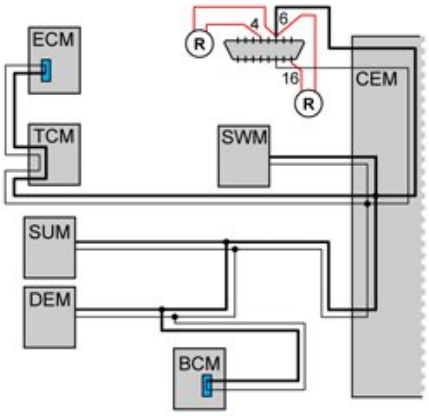
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

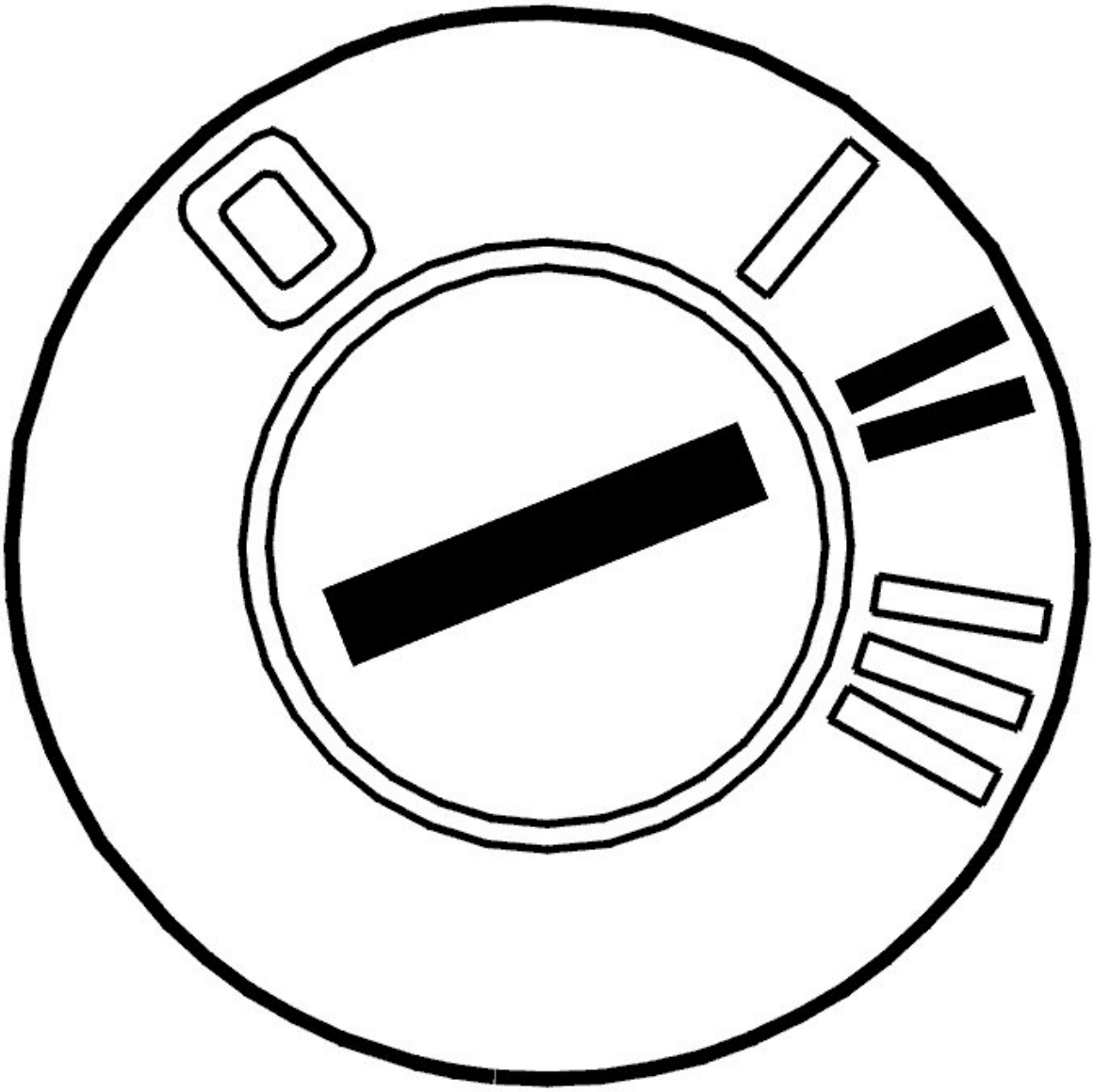


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

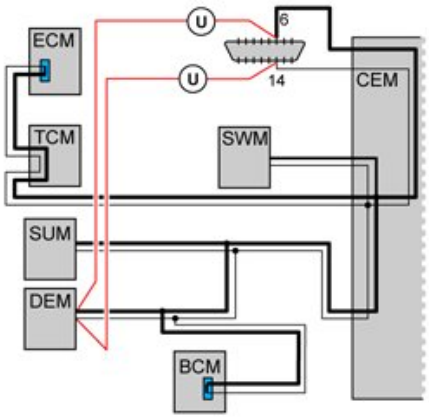
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

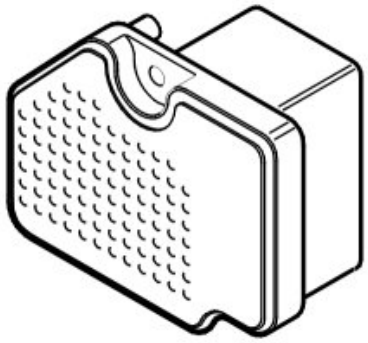


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DEM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion-mode").

Substitute value
- None.

Possible source
- Incorrect CAN configuration ID. (The node is not intended for this vehicle, for example, a used control module with different software/hardware)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- Four wheel drive is not functioning
- Message in the display
- The anti-spin warning lamp is lit
- General warning lamp lit.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

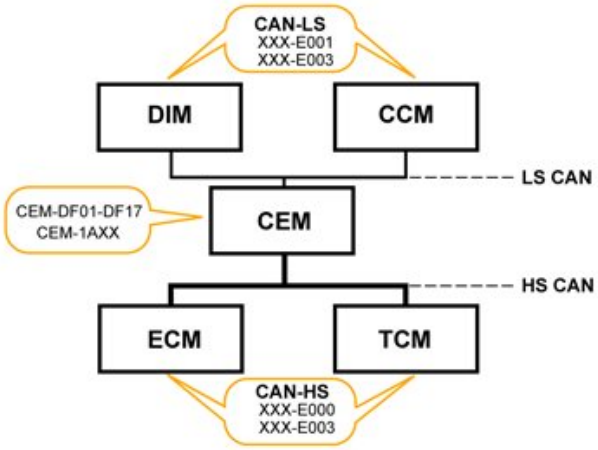
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.

Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

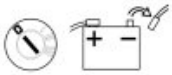
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

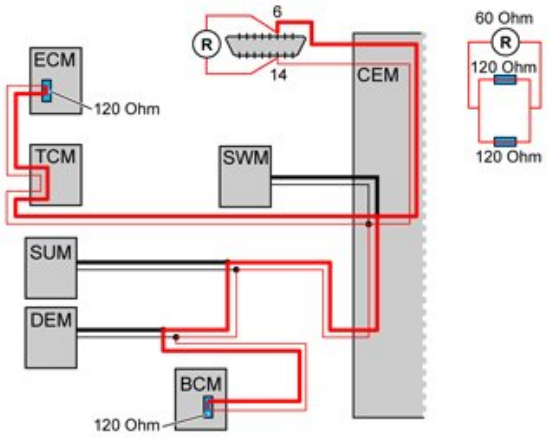
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they

work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

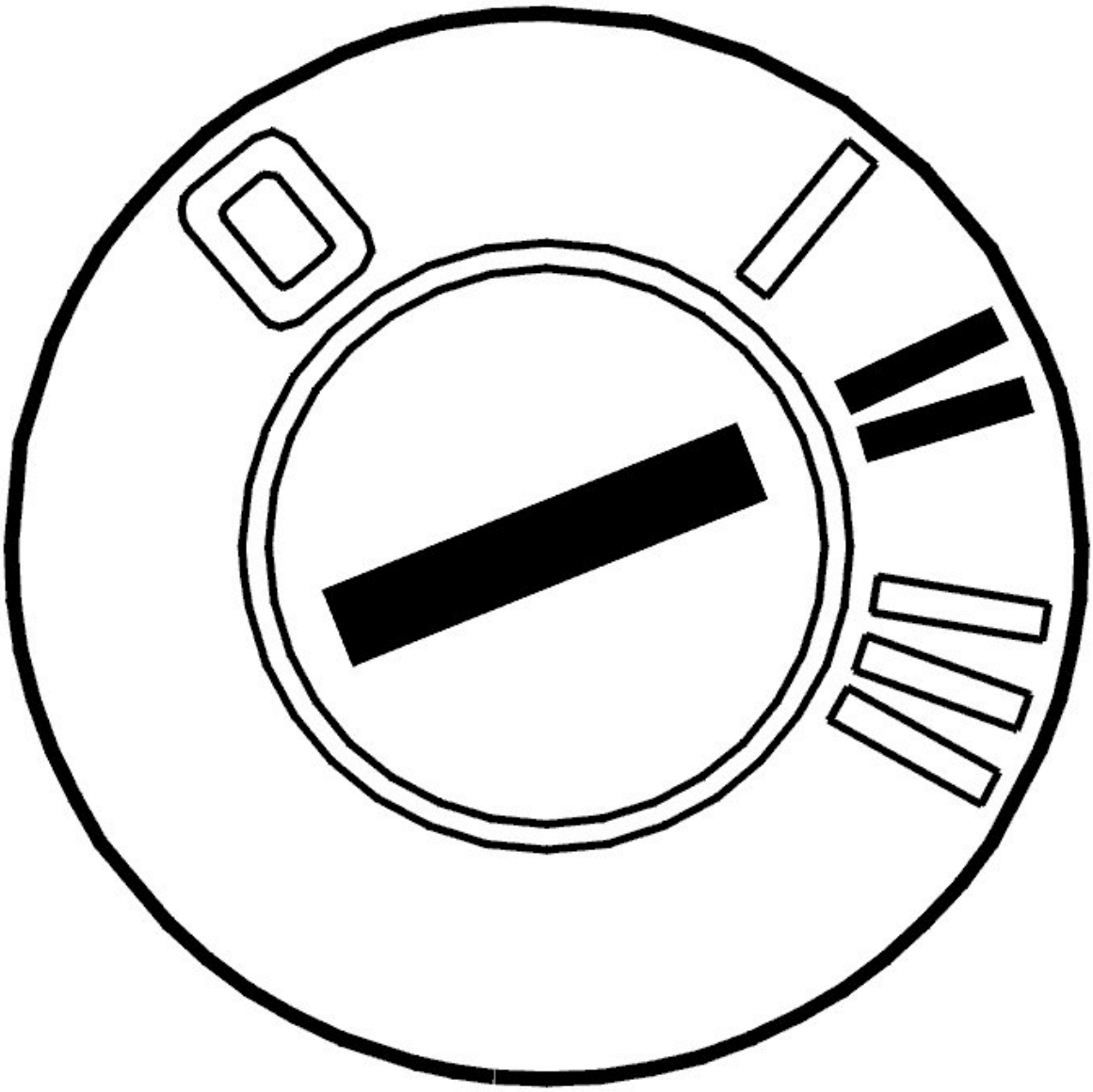


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

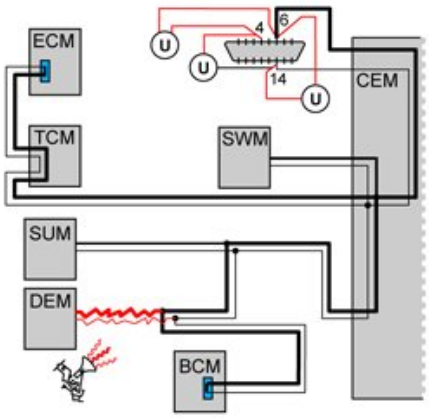
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

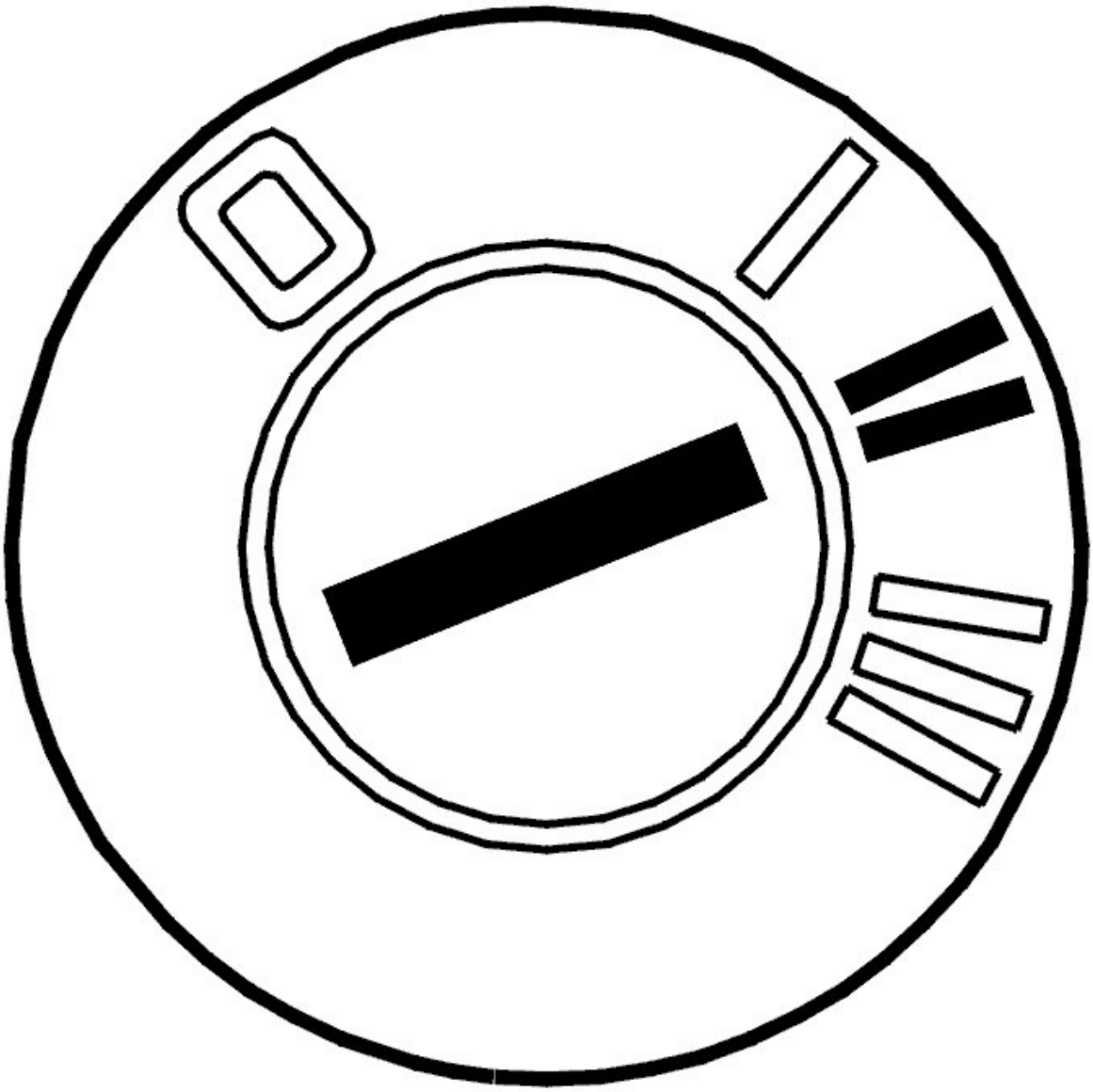


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

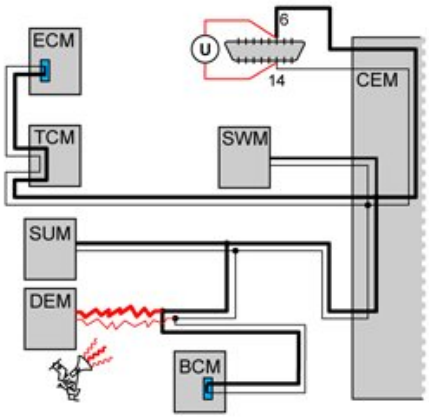
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

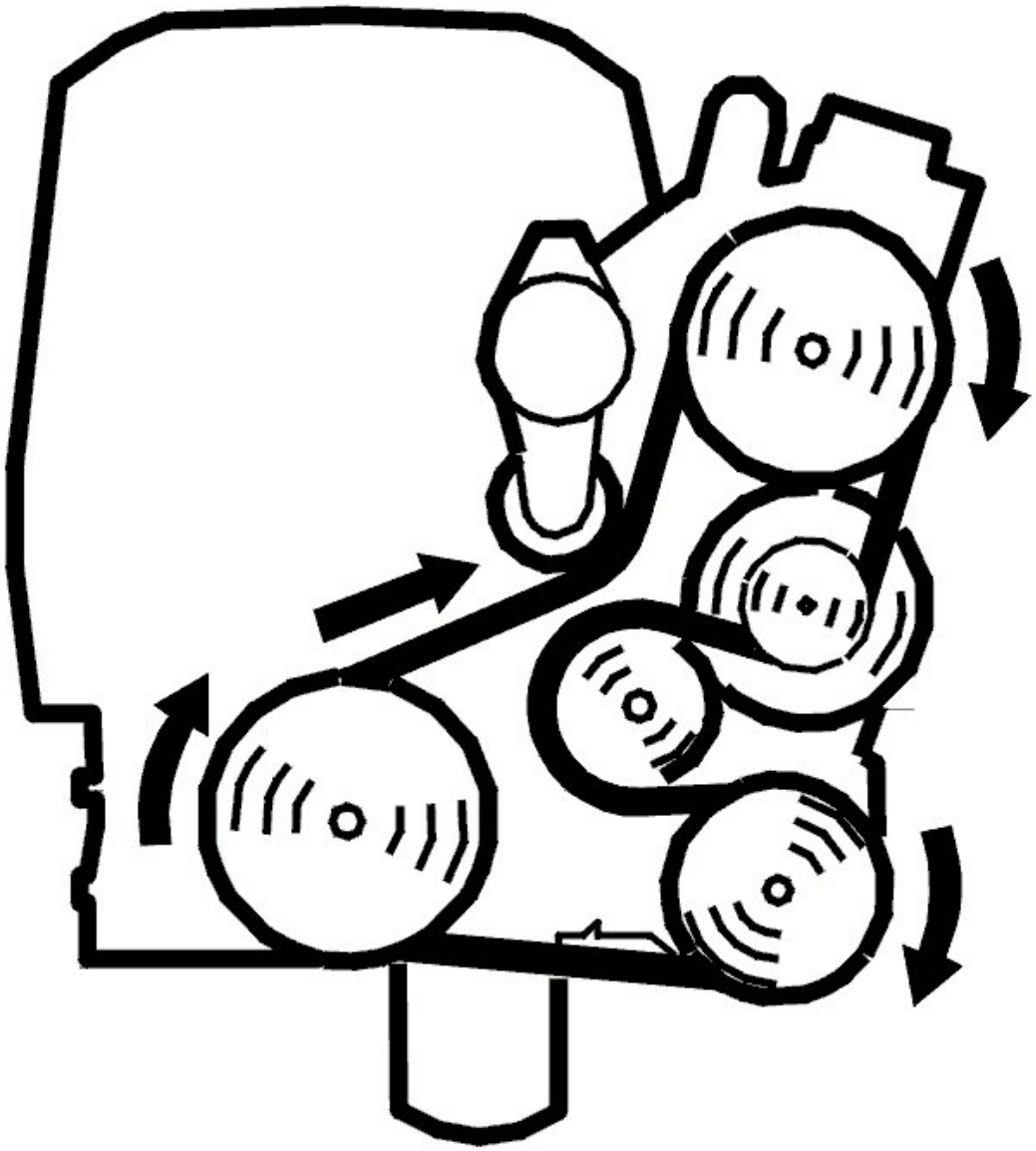
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

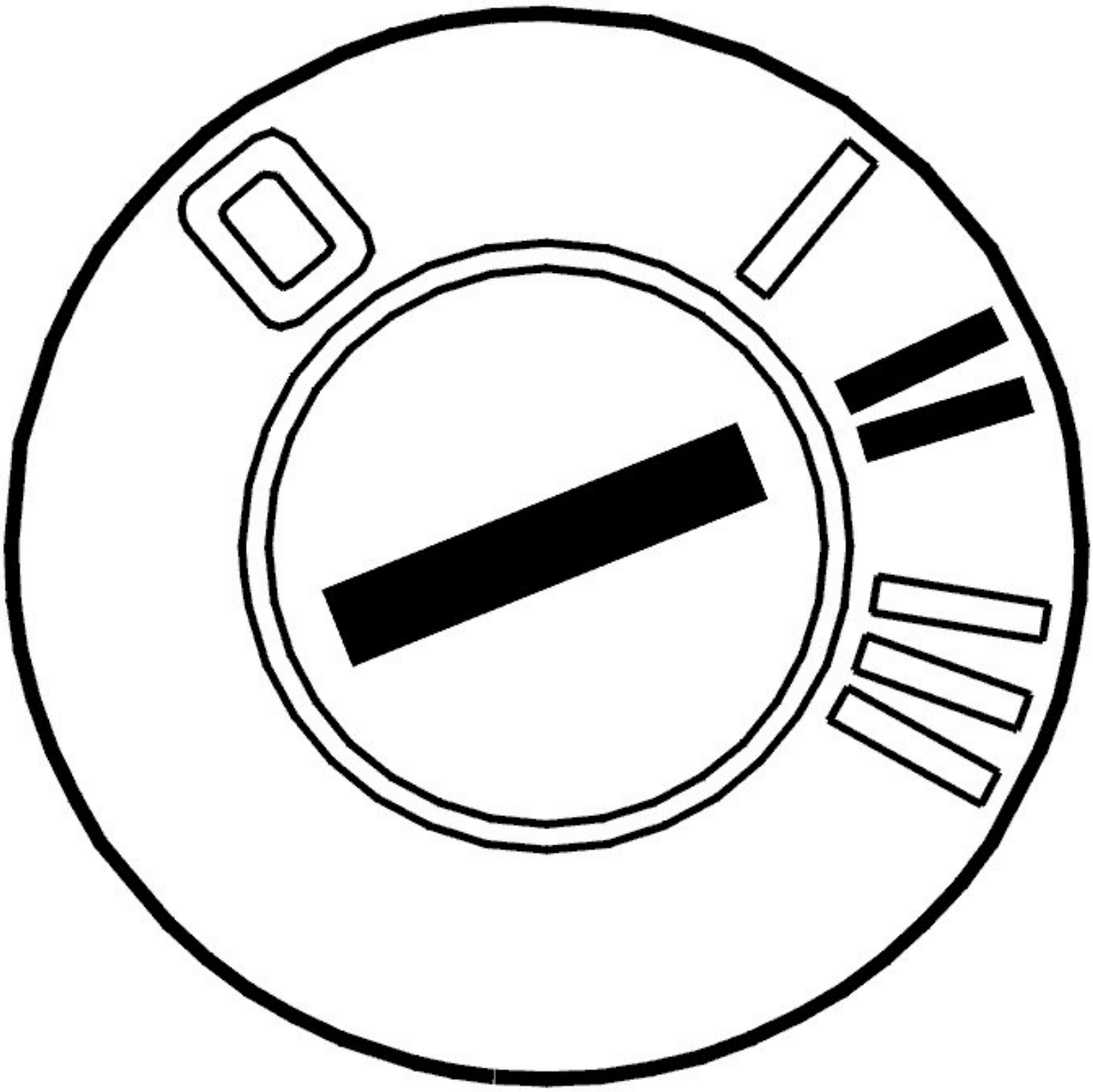


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

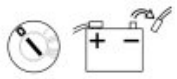
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

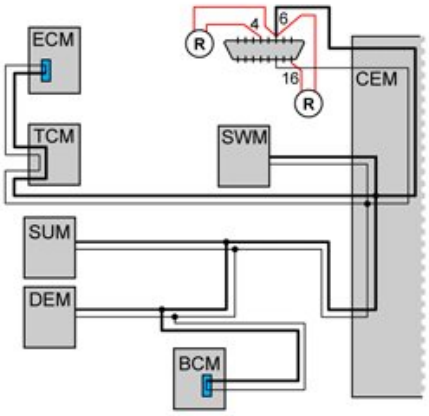
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

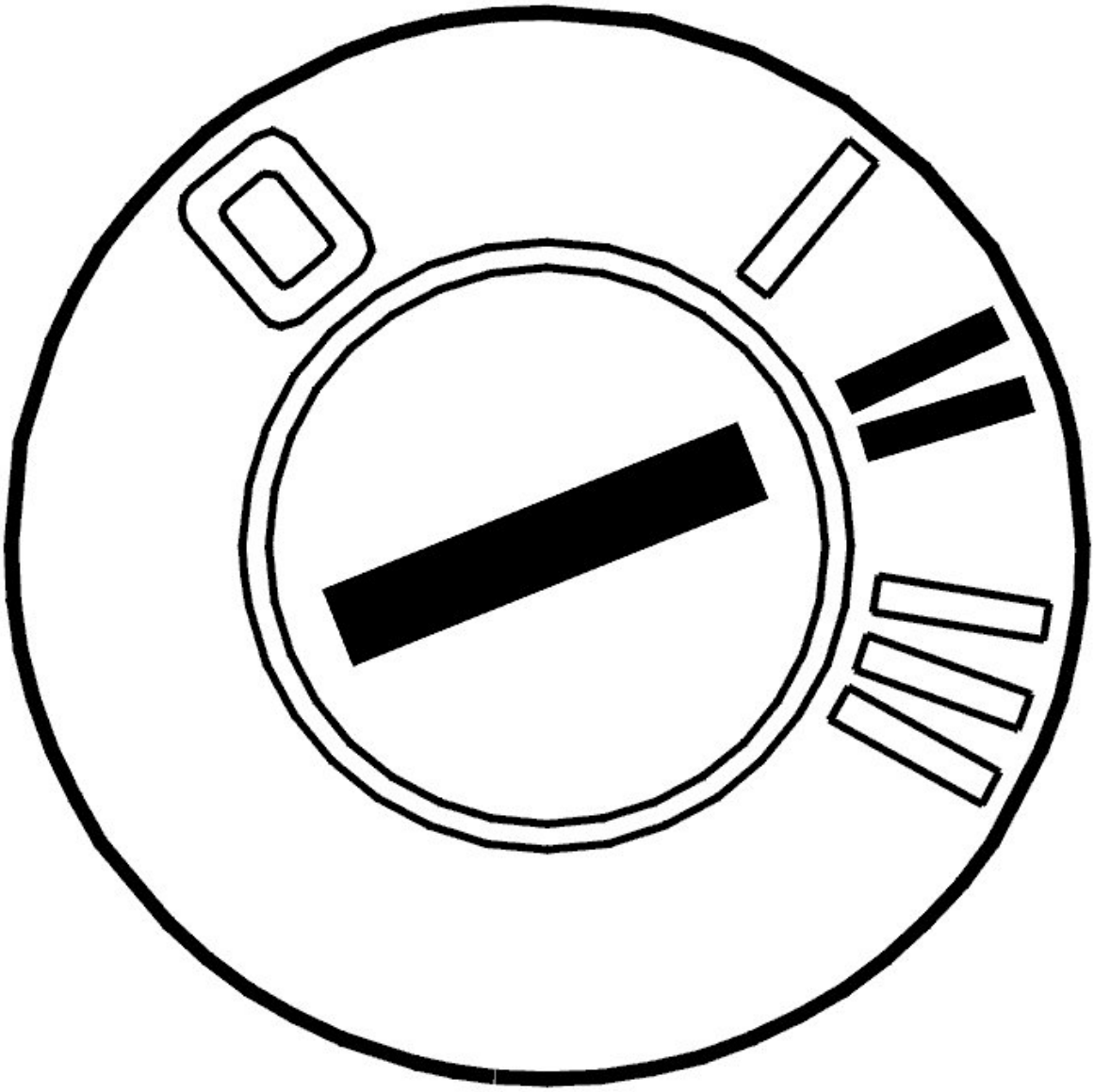


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

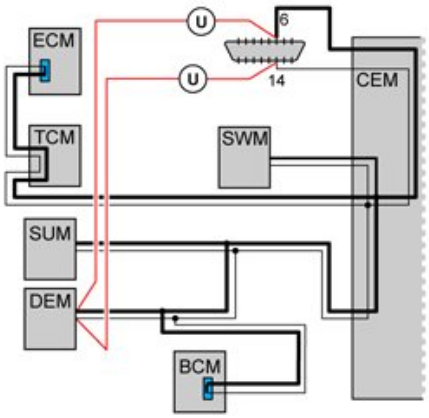
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

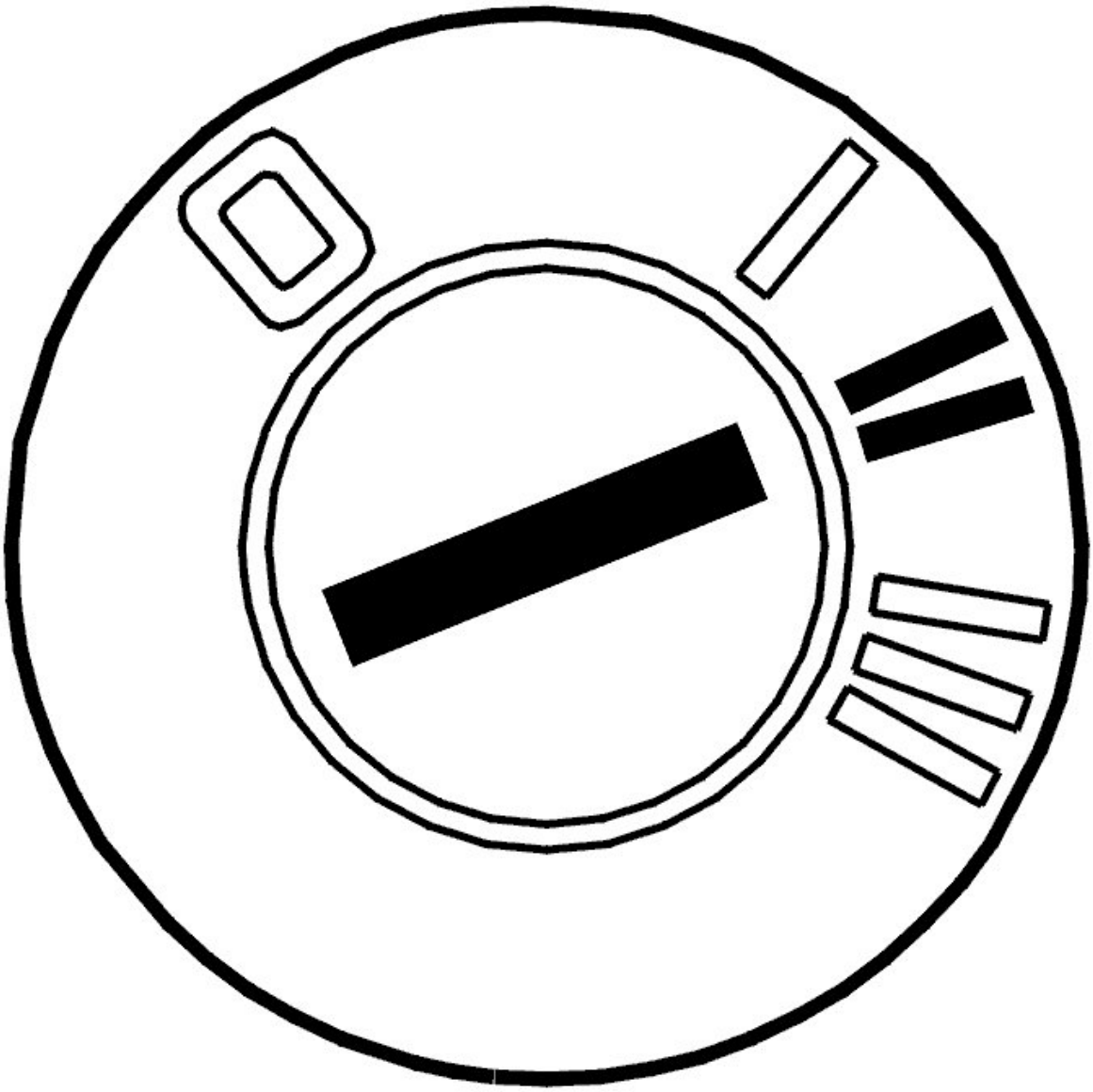


Continue - Verification

DEM-XXXX

Unknown diagnostic trouble code (DTC) for the present control module version

Reading off diagnostic trouble codes (DTC)



- Switch on the ignition. Wait for 10 seconds.

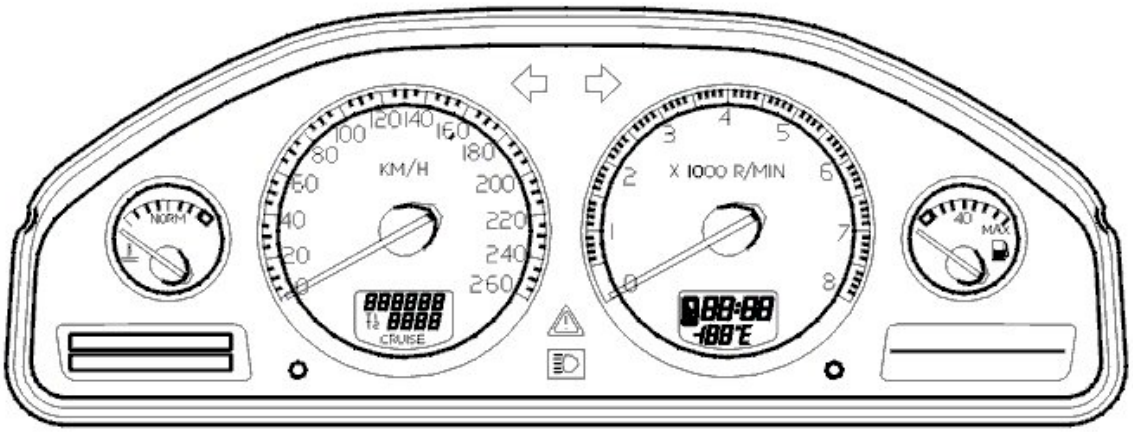
Read off the diagnostic trouble code (DTC) that is stored in the vehicle.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

DIM-0001

Diagnostic trouble code (DTC) information DIM-0001

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the driver information module (DIM) registers that the stored mileage value differs by more than 500 km from the most recently stored mileage. The diagnostic trouble code (DTC) is also stored if the voltage to the driver information module (DIM) is interrupted before the new mileage is stored in the central electronic module (CEM).

Substitute value
- None.

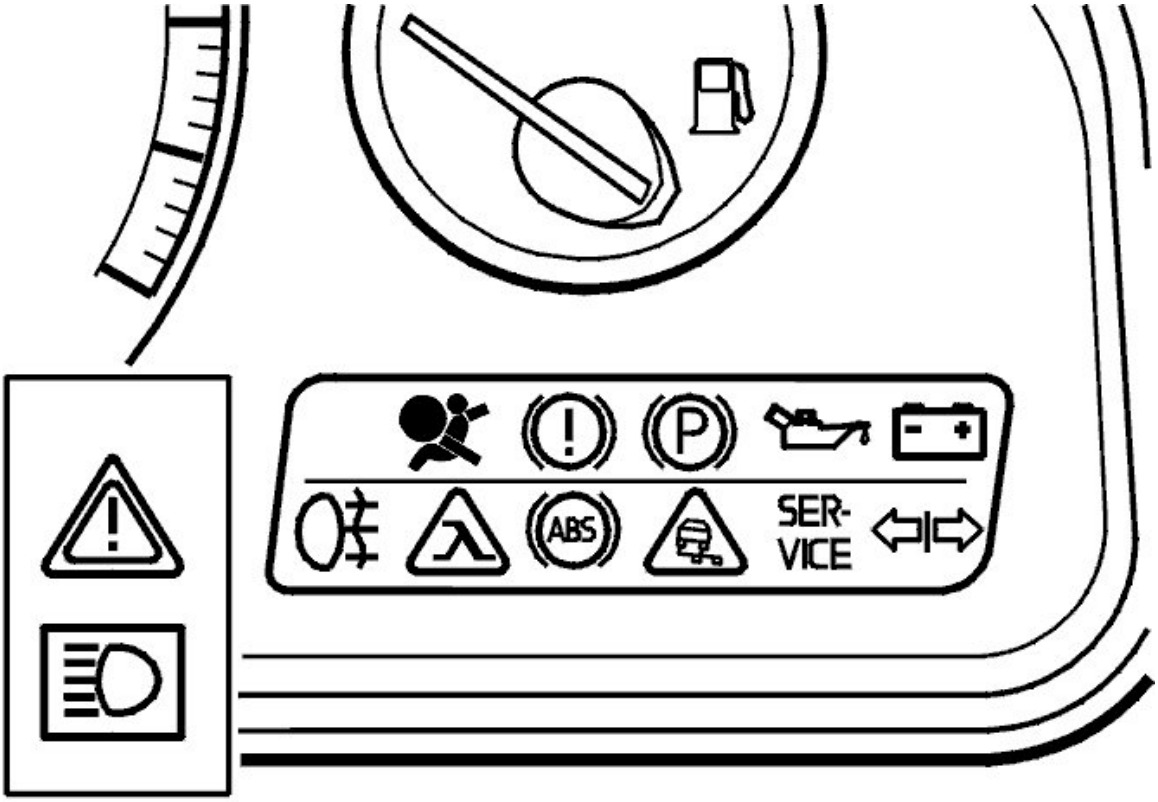
Possible source
- Software fault in the control module.

Fault symptom[s]
- No symptom.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-0002

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the driver information module (DIM) detects an internal open-circuit in the circuit for the ABS warning lamp.

Substitute value
- None.

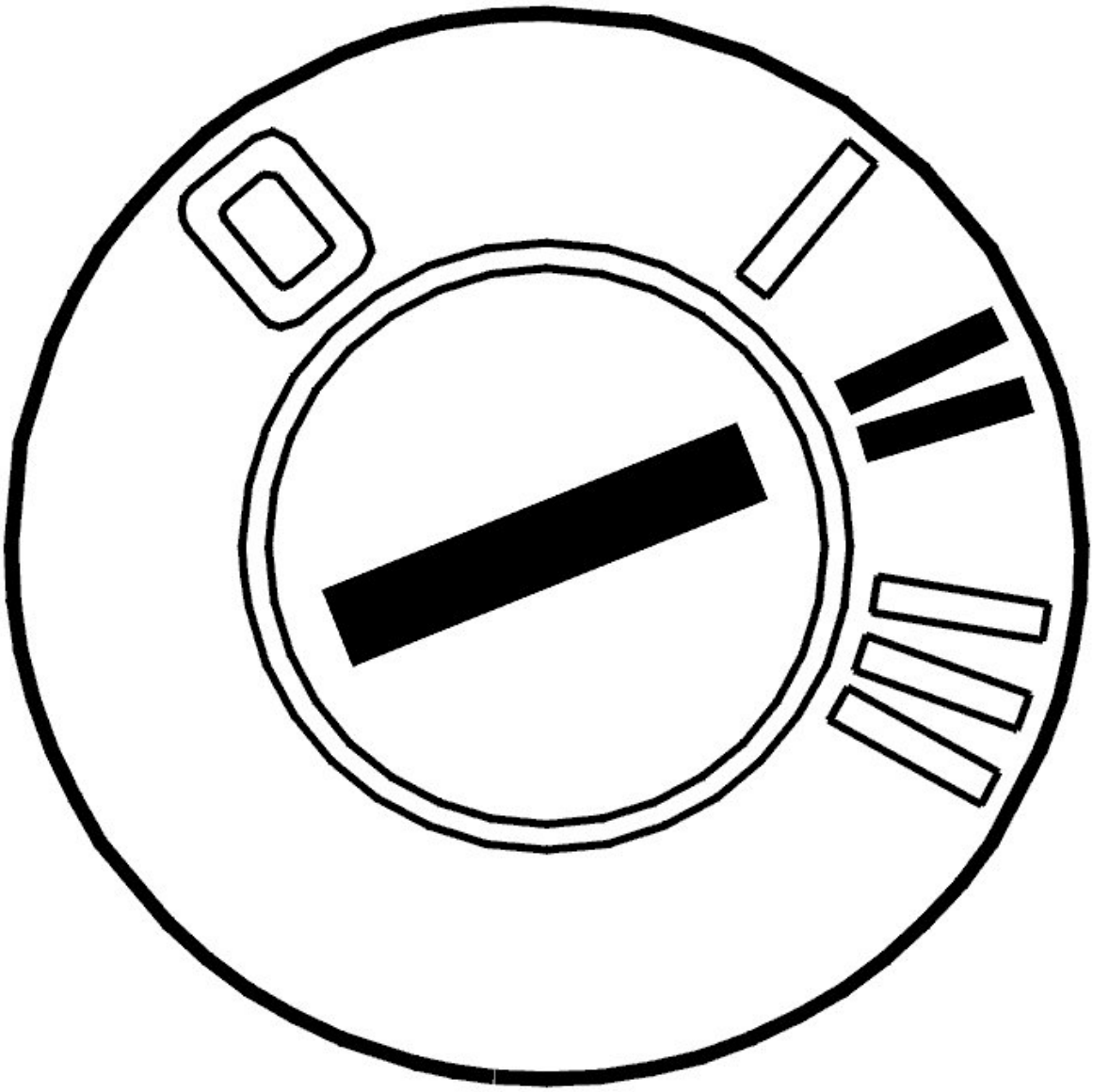
Possible source
- Software fault in the control module.

Fault symptom[s]
- The ABS warning lamp does not light
- General orange warning lamp lit.

Faulty Circuit

Faulty circuit

Checking the function of the lamp



- Ignition on.

Check whether the lamp lights when the ignition is on.

Does the lamp function?

Yes - DONE

No - Replacing the driver information module (DIM)

Replacing the driver information module (DIM)

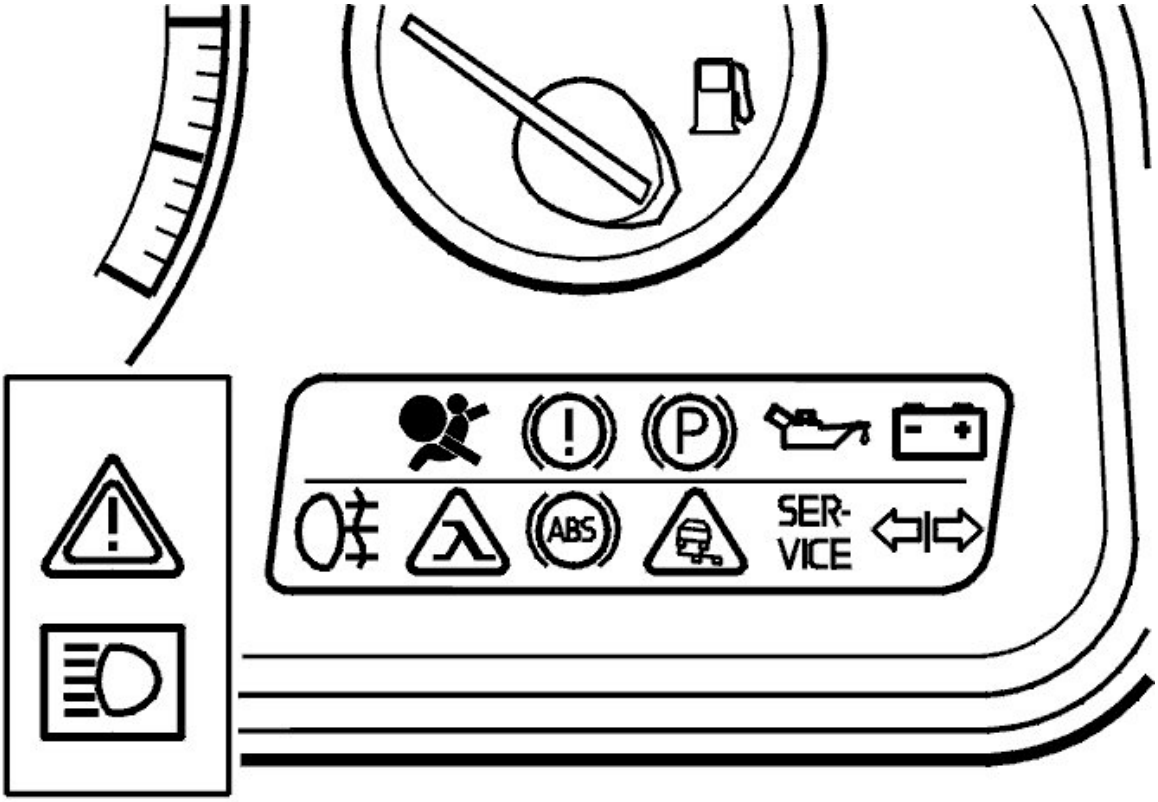
Replace the driver information module (DIM). See Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-0003

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the driver information module (DIM) detects an internal open-circuit in the circuit for the SRS warning lamp.

Substitute value
- None.

Possible source
- Software fault in the control module.

Fault symptom[s]
- The SRS warning lamp does not light
- General red warning lamp lit.

Faulty Circuit

Faulty circuit

Checking the diagnostic trouble codes (DTCs)

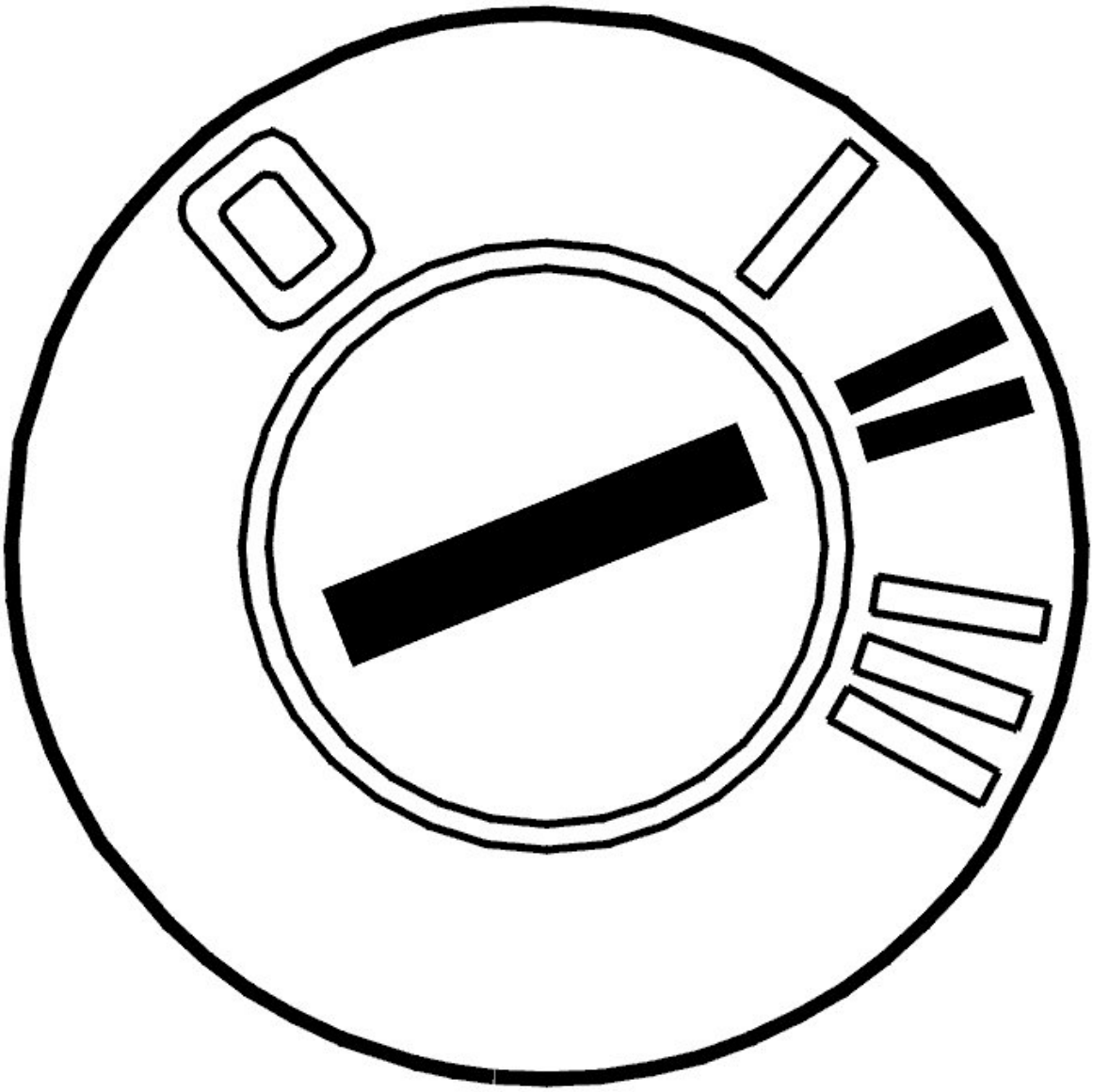
Check and remedy any diagnostic trouble codes (DTCs) in the central electronic module (CEM) before fault-tracing this diagnostic trouble code (DTC).

Were diagnostic trouble codes (DTCs) stored in the central electronic module (CEM)?

Yes - DONE

No - Checking the function of the lamp

Checking the function of the lamp



- Ignition on.

Check whether the lamp lights when the ignition is on.

Does the lamp function?

Yes - DONE

No - Replacing the driver information module (DIM)

Replacing the driver information module (DIM)

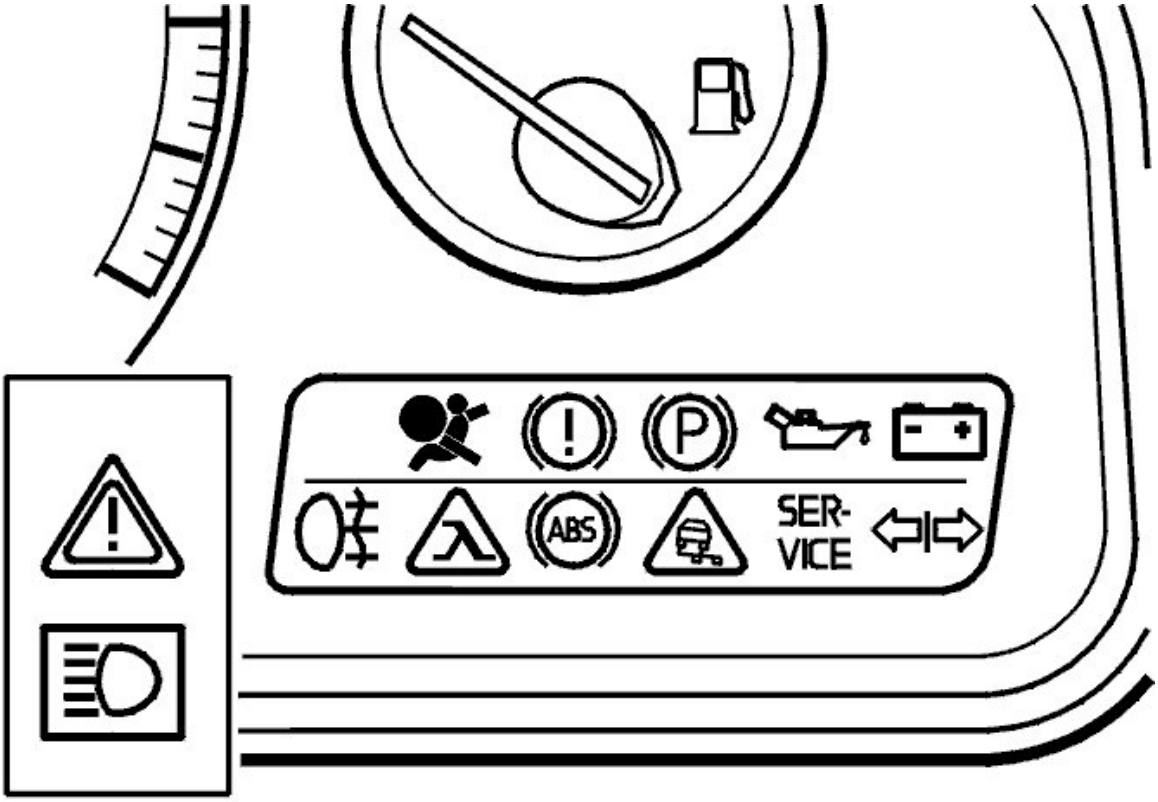
Replace the driver information module (DIM). See Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-0005

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the driver information module (DIM) detects an internal open-circuit in the circuit for the general red warning lamp.

Substitute value
- None.

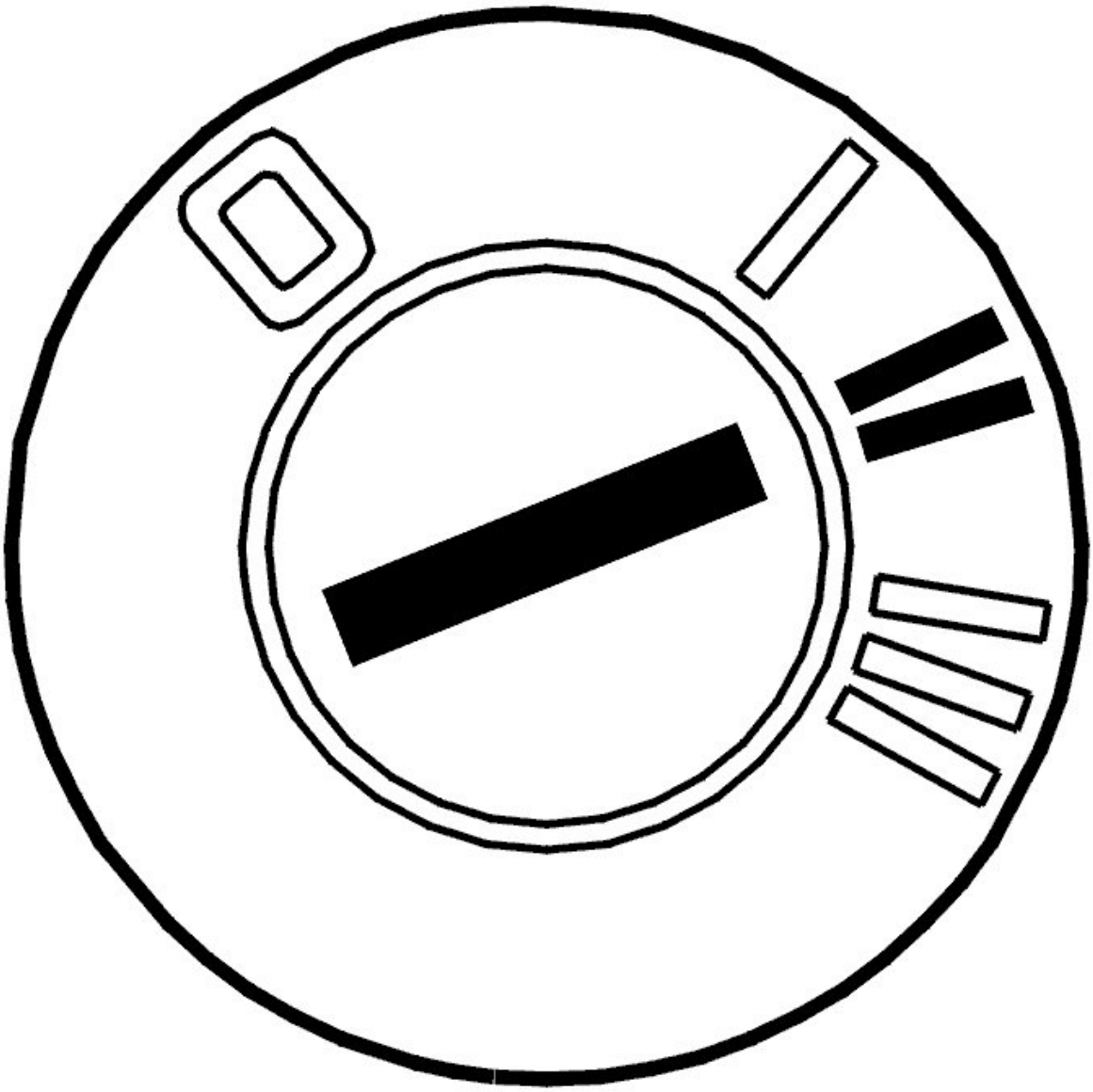
Possible source
- Software fault in the control module.

Fault symptom[s]
- The general red warning lamp does not light.

Faulty Circuit

Faulty circuit

Checking the function of the lamp



- Ignition on.

Activate the warning lamp.

Does the lamp function?

Yes - DONE

No - Replacing the combined instrument panel

Replacing the combined instrument panel

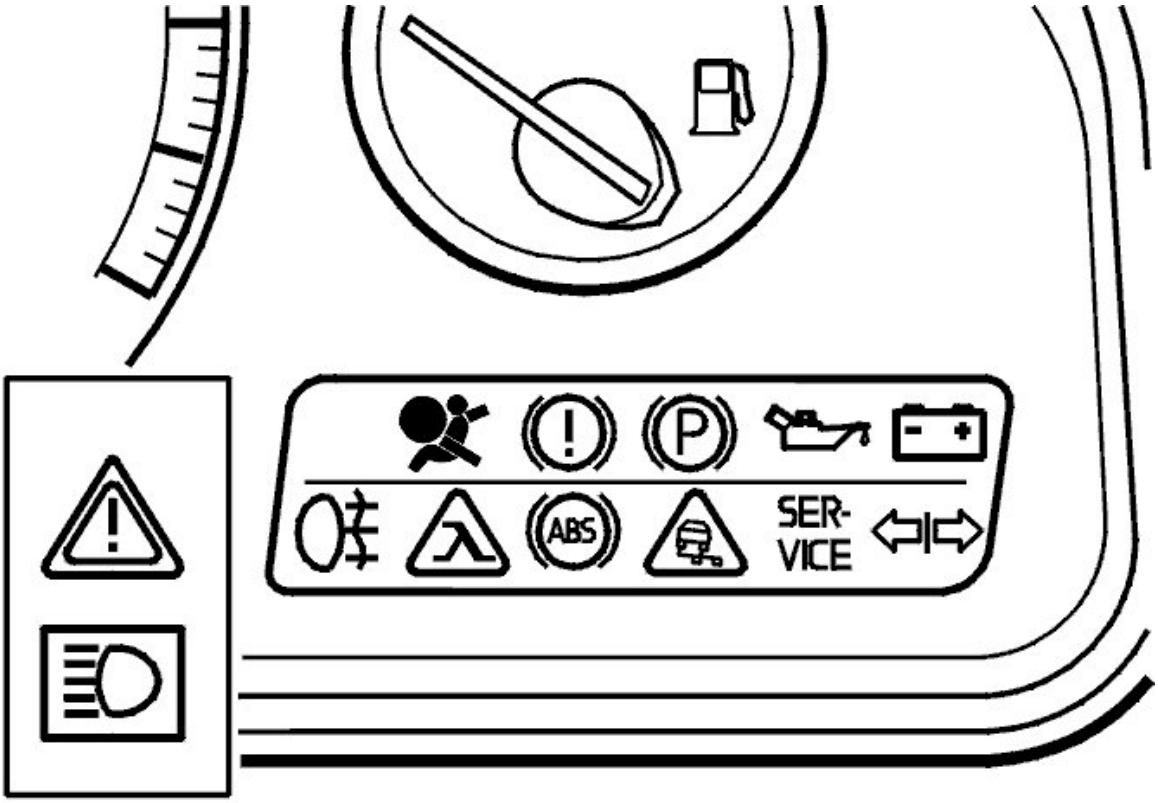
Replace the driver information module (DIM). See Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-0006

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the driver information module (DIM) detects an internal open-circuit in the circuit for the general orange warning lamp.

Substitute value
- None.

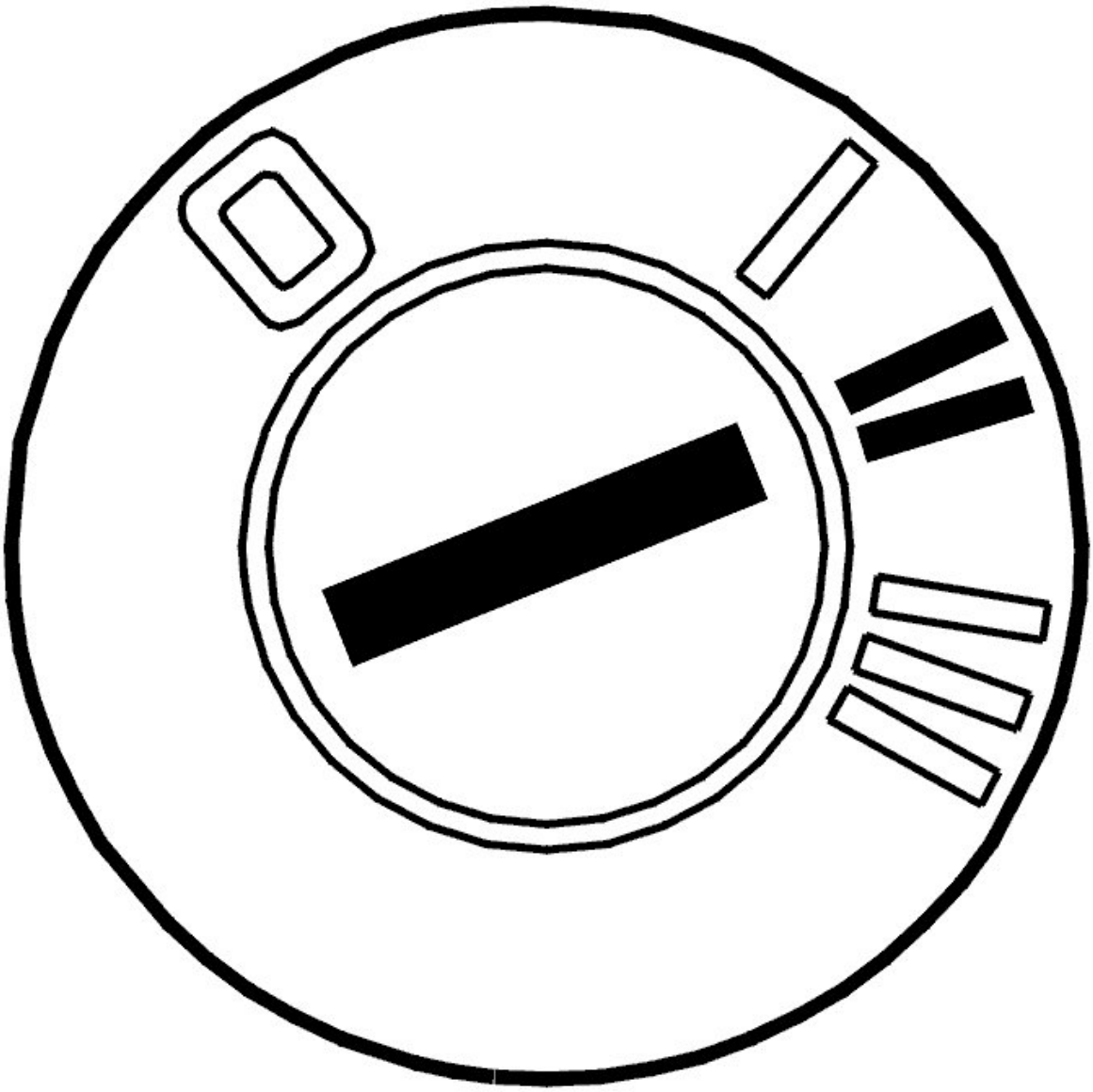
Possible source
- Software fault in the control module.

Fault symptom[s]
- The general orange warning lamp does not light.

Faulty Circuit

Faulty circuit

Checking the function of the lamp



- Ignition on.

Activate the warning lamp.

Does the lamp function?

Yes - DONE

No - Replacing the driver information module (DIM)

Replacing the driver information module (DIM)

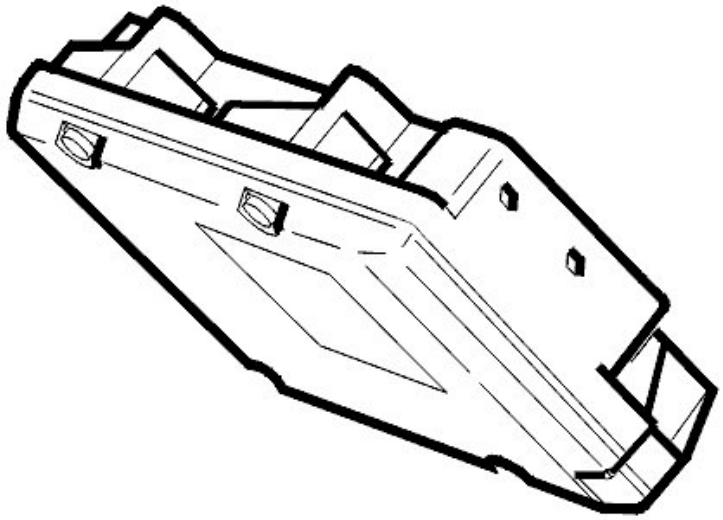
Replace the driver information module (DIM). See Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-0007

Condition



Note! The illustrations in this service information are used for different model years and / or models. Some variation may occur. However, the essential information in the illustrations is always correct.

The diagnostic trouble code (DTC) is stored if the control module detects that one of the global parameters used by the driver's information module (DIM) is not updated or defined.

Substitute value
- None.

Possible source
- Communication fault
- Incorrectly downloaded software in the central electronic module (CEM) (Carconfig).

Fault symptom[s]
- The driver information module (DIM) is not functioning.

Internal Fault

Internal fault

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Select "Continue" to exit.

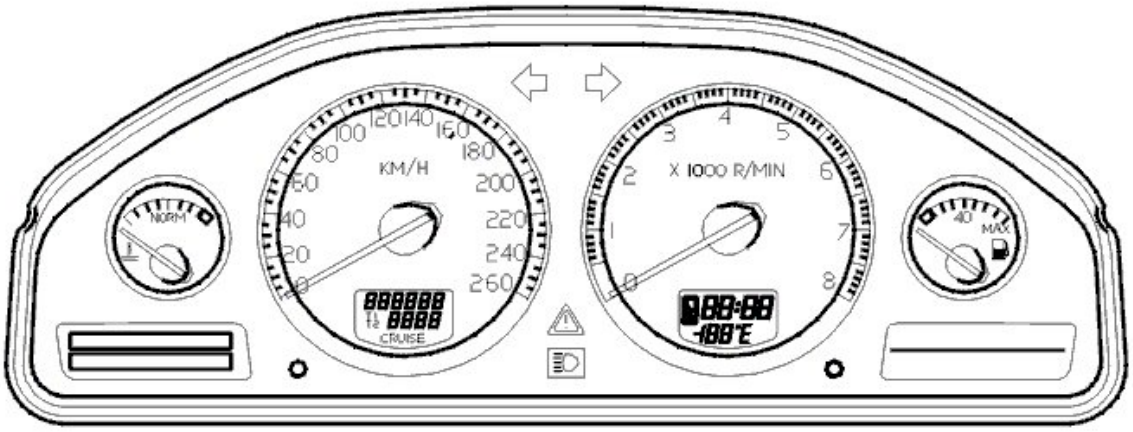
Continue - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information DIM-000C

Condition



The diagnostic trouble code (DTC) is stored if the control module detects a damaged memory element.

Substitute value
- None.

Possible source
- Damaged memory in the instrument.

Fault symptom[s]
- The combined instrument panel is not functioning.

Internal Fault

Internal fault

Damaged memory element

The diagnostic trouble code (DTC) is stored if the control module has detected a damaged memory element in the driver information module (DIM). This can affect the control module, although not necessarily. Replace the driver information module (DIM) if the customer complains.

Do you want to replace the driver information module (DIM)?

Yes - Replacing the combined instrument panel

No - No Fault Found

Replacing the combined instrument panel

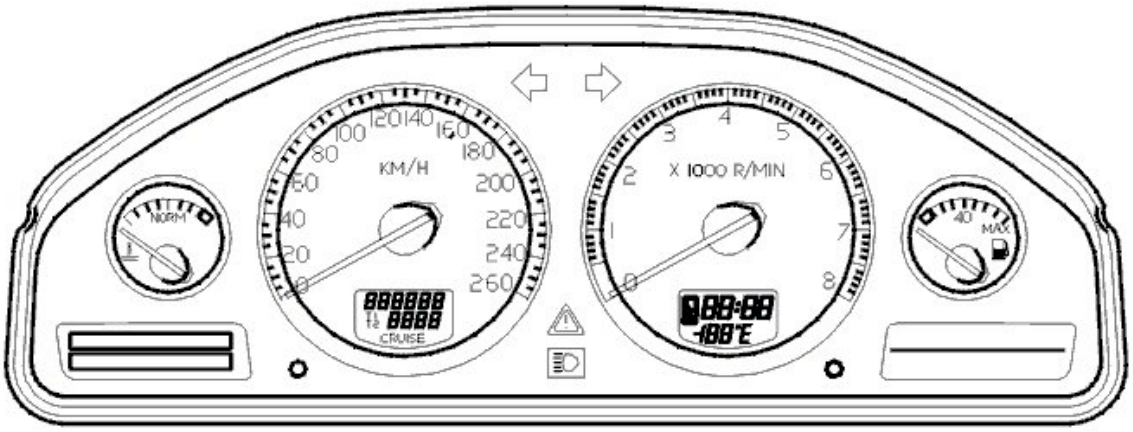
Replace the combined instrument panel. See Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing.

Continue - Fault Found

DIM-E001

Diagnostic trouble code (DTC) information DIM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference on the low speed network (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

Hint: The driver information module (DIM) will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- The ABS warning lamp is lit
- The SPIN warning lamp is lit
- The general red warning lamp is lit
- No vehicle speed display (because there is no signal to the combined instrument panel)
- No gauges working.

DIM-E003

Diagnostic trouble code (DTC) information DIM-E003

Condition

The driver information module (DIM) compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control

module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic commands. However, normal control area network (CAN) communication does not work ("Expulsion mode").

Substitute value
- None.

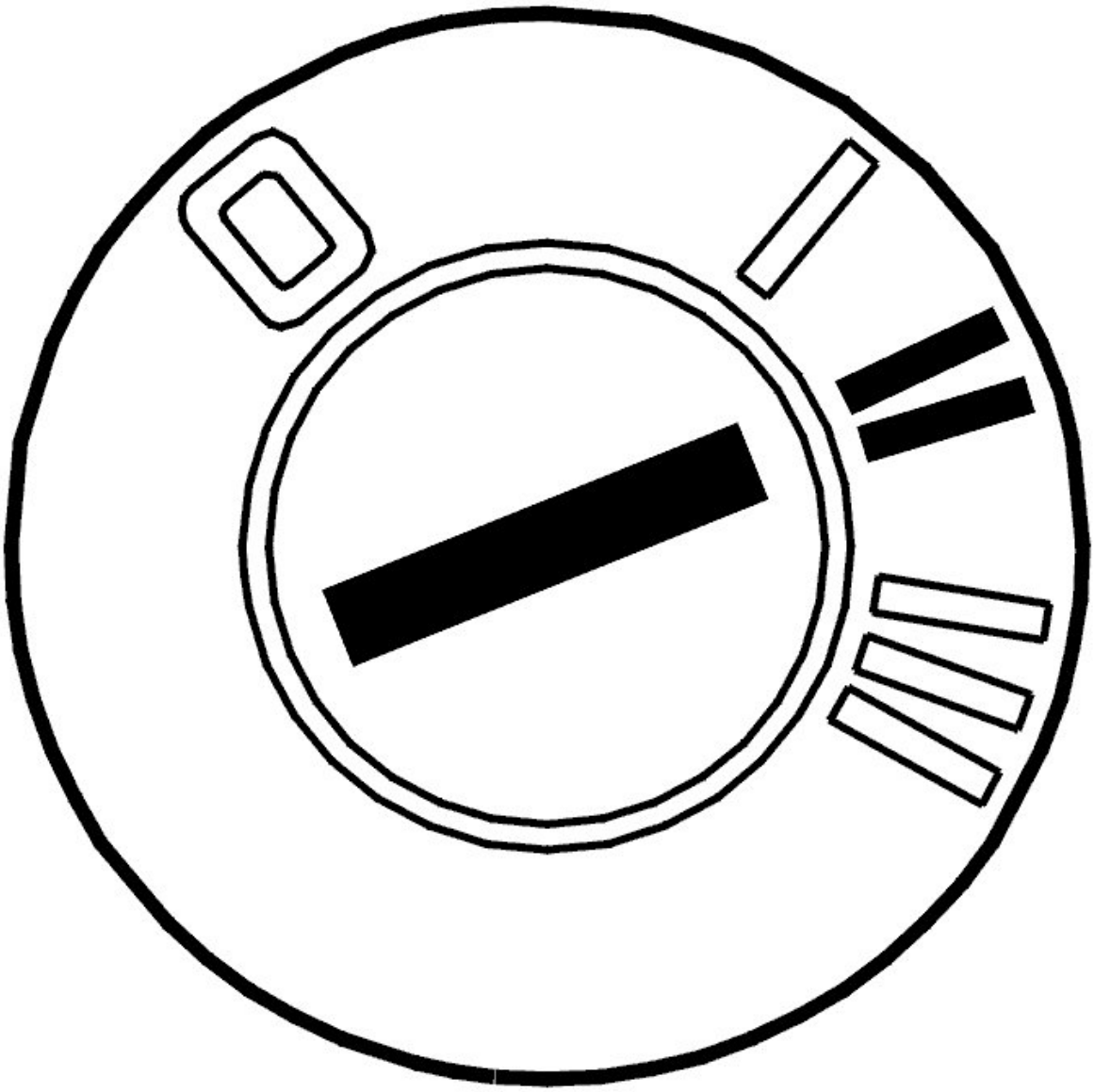
Possible source
- Incorrect control area network (CAN) configuration ID (the control module is not intended for this car, for example it is a used control module with different software/hardware)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The driver information module (DIM) panel does not function if there is no CAN communication.

DIM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

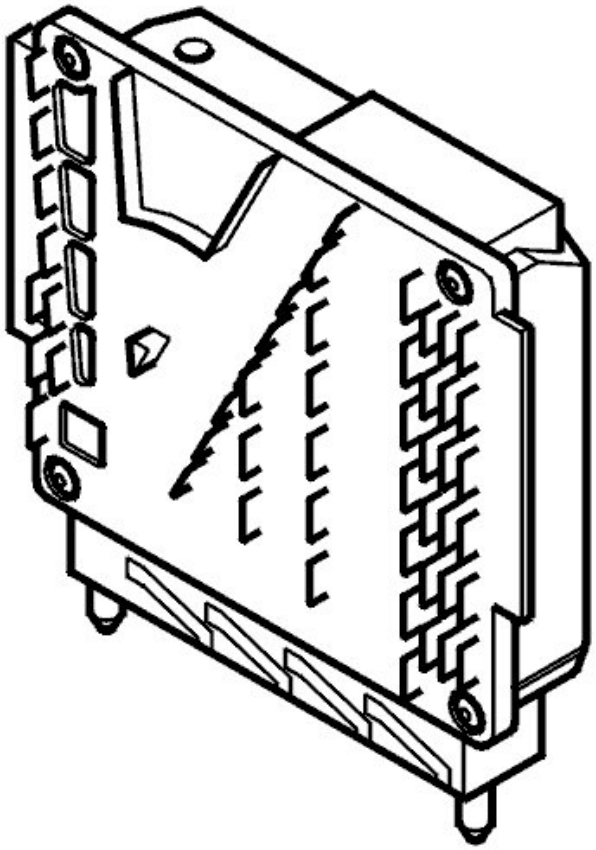
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-112C

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the internal atmospheric pressure sensor is higher than a certain value for a certain amount of time. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

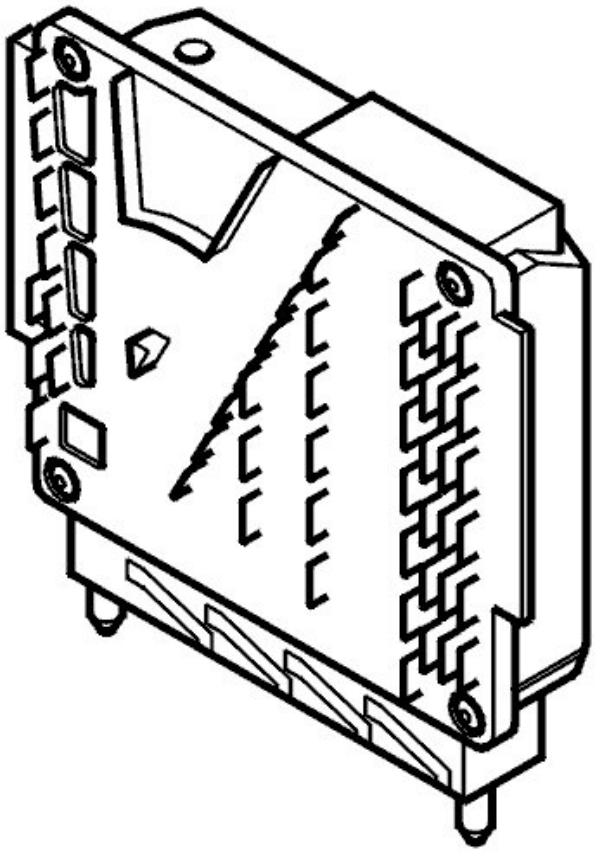
Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how

it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

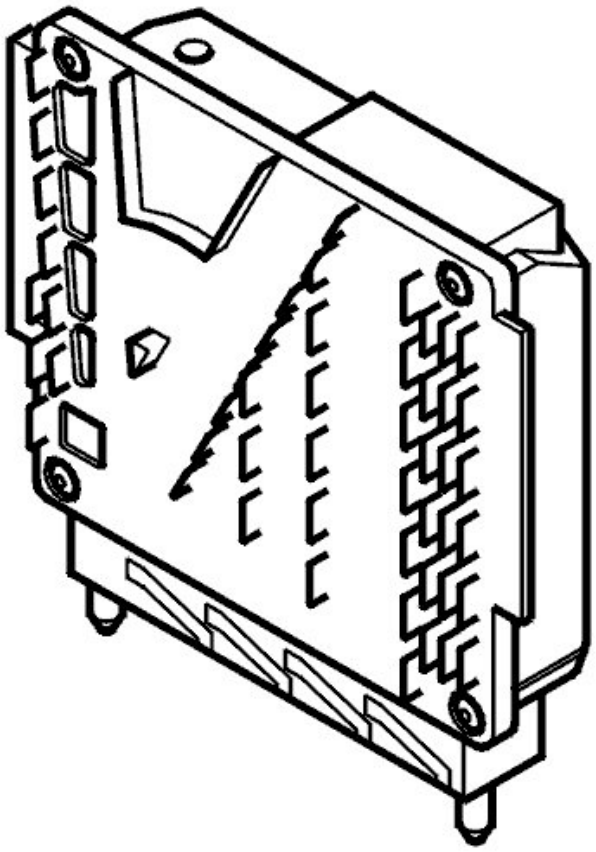
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-112D

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the internal atmospheric pressure sensor is lower than a certain value for a certain amount of time. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

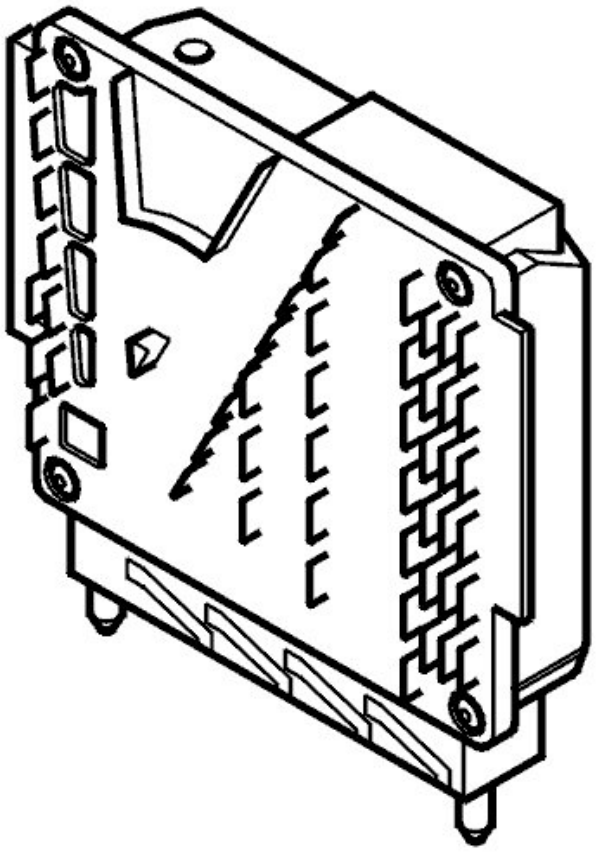
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

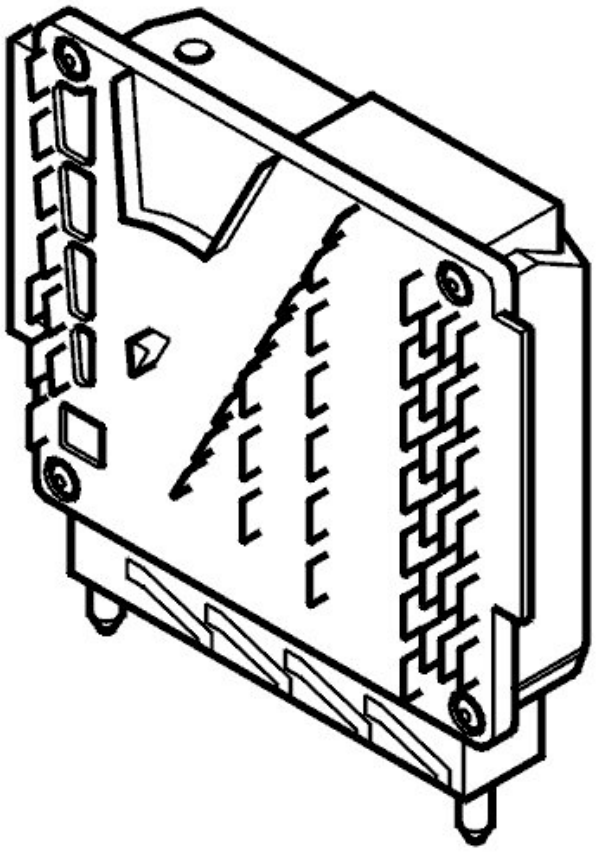
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-1130

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a faulty signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for at least 20 seconds.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

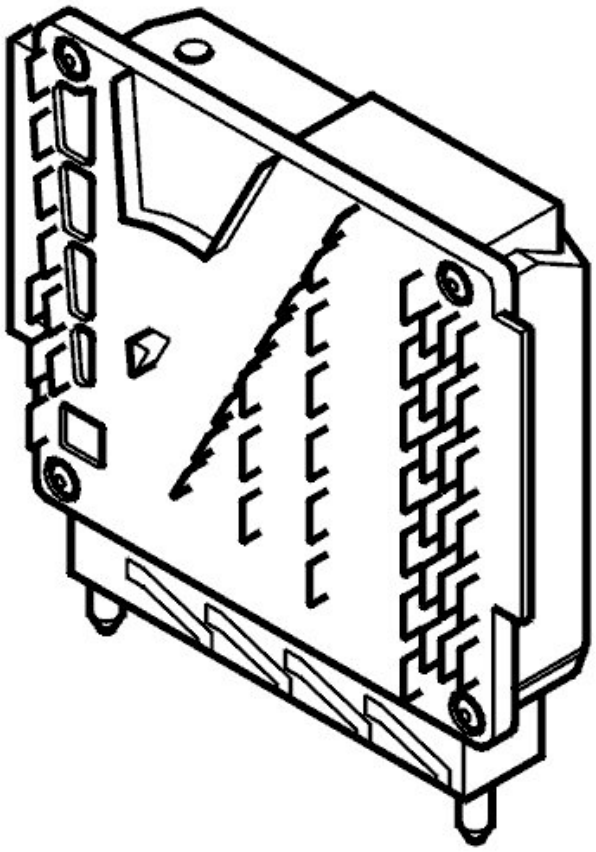
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

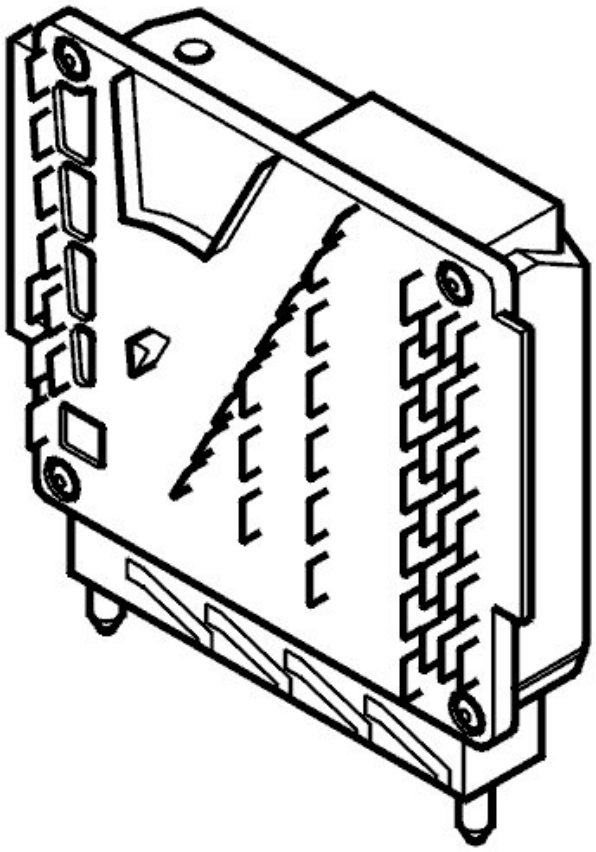
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-113B

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a faulty signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for at least 20 seconds.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

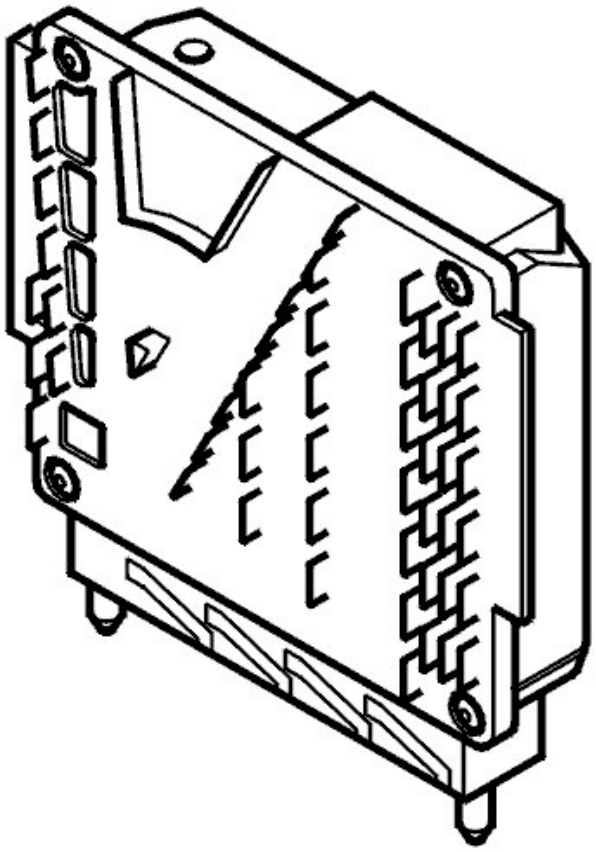
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

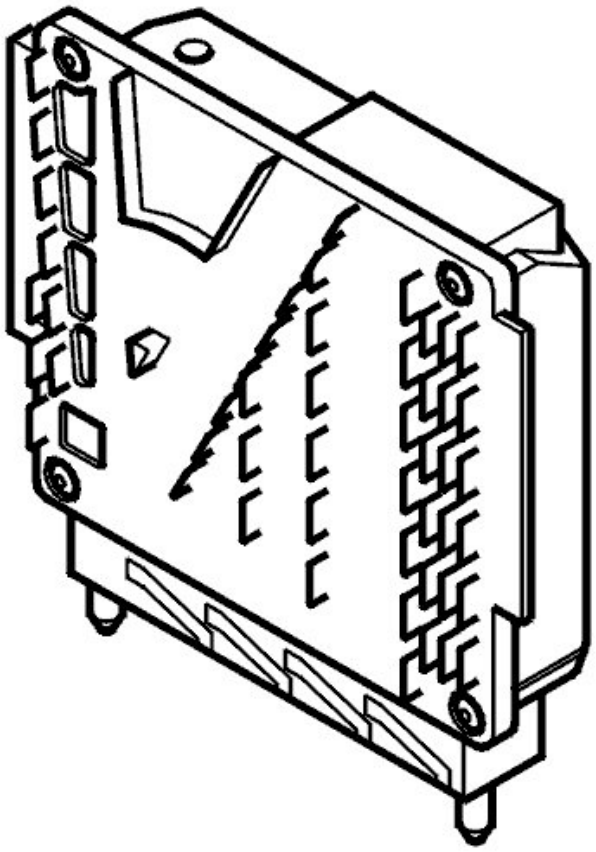
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-113C

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a faulty signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for at least 20 seconds.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

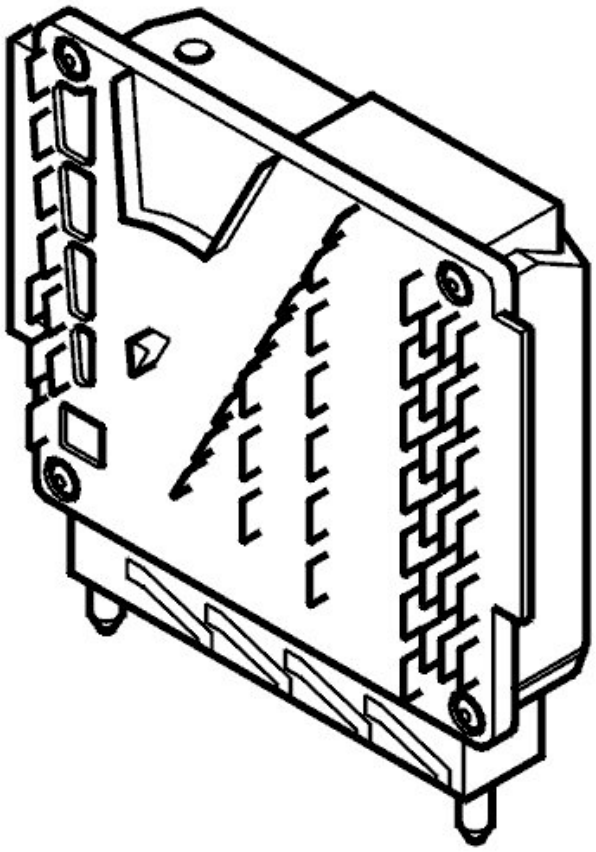
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

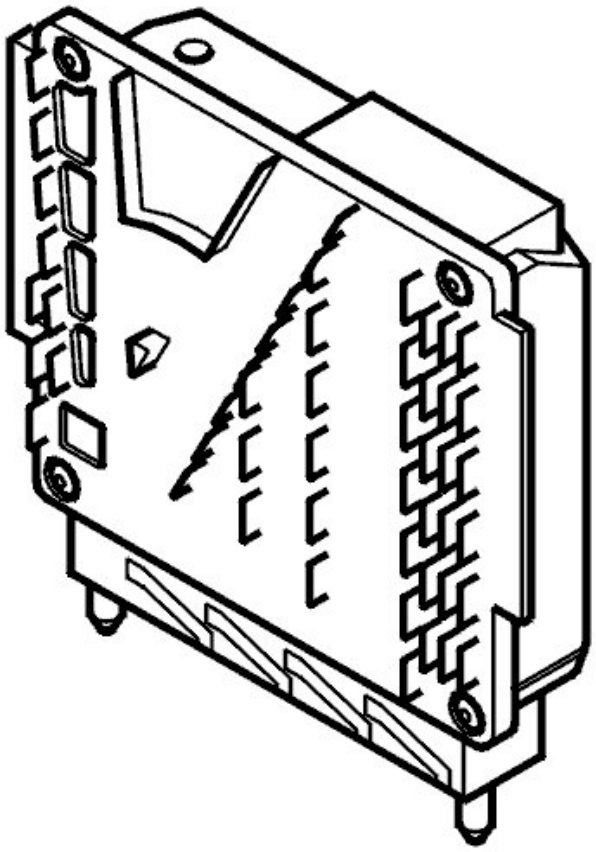
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-113D

Condition



The engine control module (ECM) checks the signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a faulty signal from the internal atmospheric pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition has been on for at least 20 seconds.

Substitute value
- 1013 hPa (atmospheric pressure corresponding to sea level).

Possible source
- Damaged engine control module (ECM).

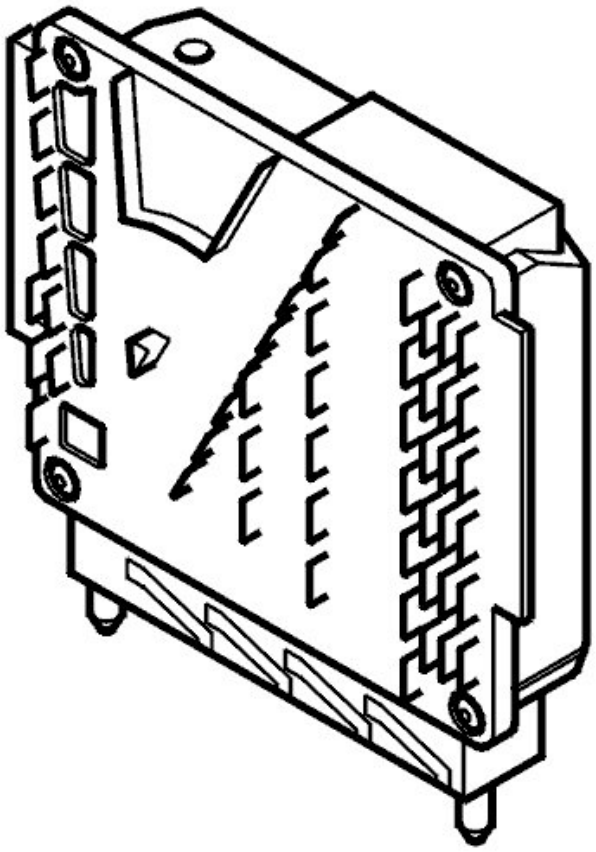
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

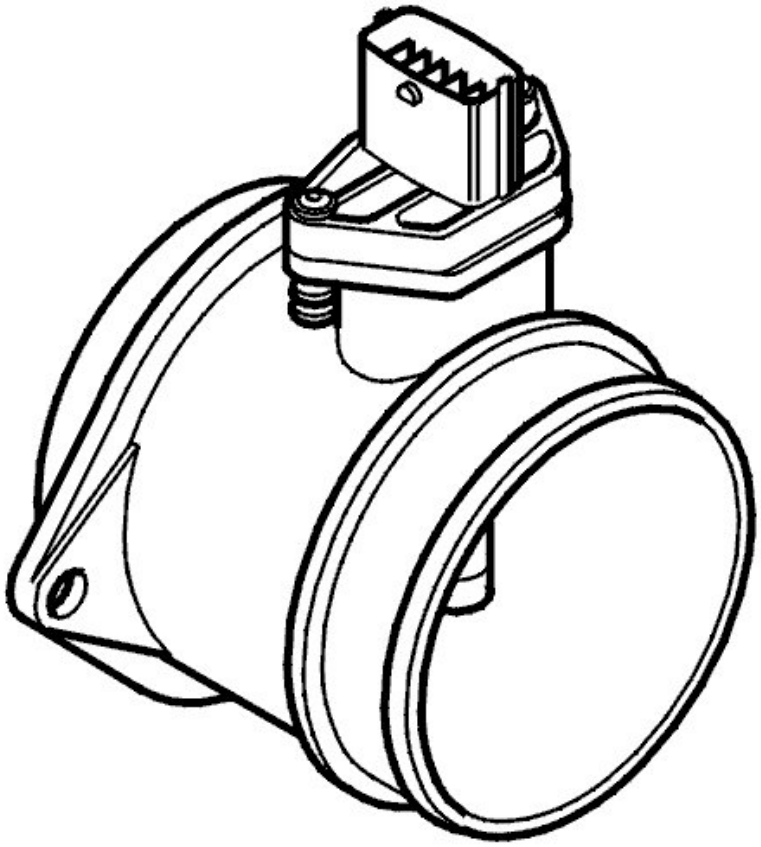
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-120C

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is divided (/) by the measured value from the mass air flow (MAF) sensor (= correction value, mass air flow). The diagnostic trouble code (DTC) is stored if the correction value deviates from 1 (higher than 1) i.e. the calculated air mass is higher than the measured air mass.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Air leakage in the intake system
- Contaminated throttle body (TB).
- Blocked intake system
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.
- Uneven idle

Flow Too Low or Too High

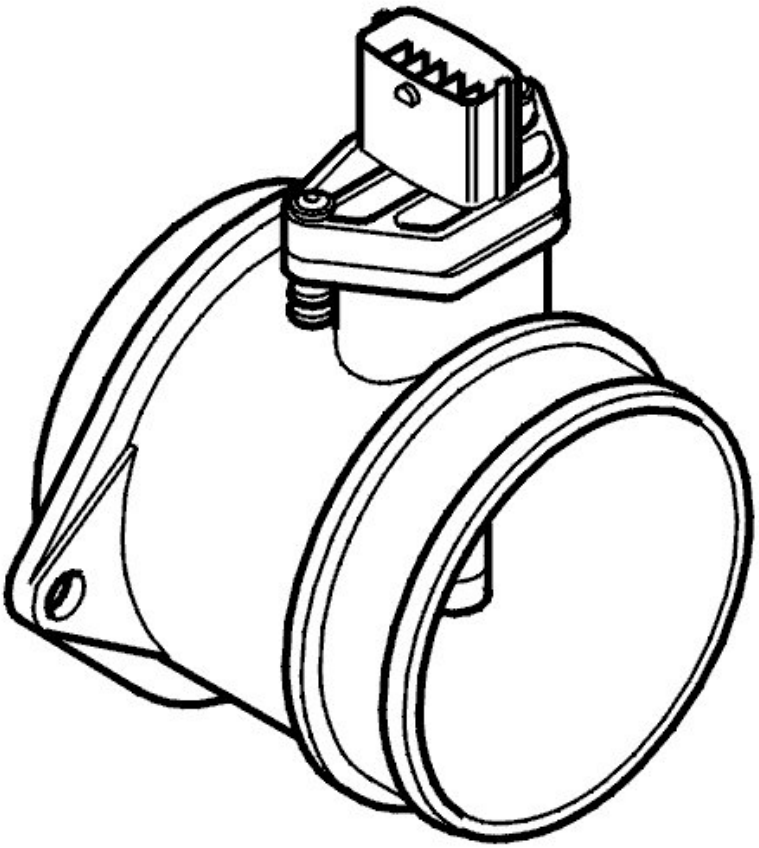
Flow too low or too high

Checking the intake system

Check the mass air flow (MAF) sensor connector. Check for contact resistance and oxidation.
Check the intake system for leakage. In particular, check the hoses and hose connectors between the mass air flow (MAF) sensor and the throttle unit. Check for leakage and damage.
Check the inside of the throttle body (TB). Check for contamination. When the throttle body (TB) is contaminated, the air flow to the engine is impaired and diagnostic trouble code (DTCs) or fault symptoms can occur.
Clean the throttle body (TB) if needed.
If no fault is found, try a new mass air flow(MAF) sensor.
Remedy as necessary.

Other information
- Air leakage in the intake system, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Throttle body (TB), cleaning, B5254T2 See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Mass air flow (MAF) sensor, replacing See: Air Flow Meter/Sensor/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



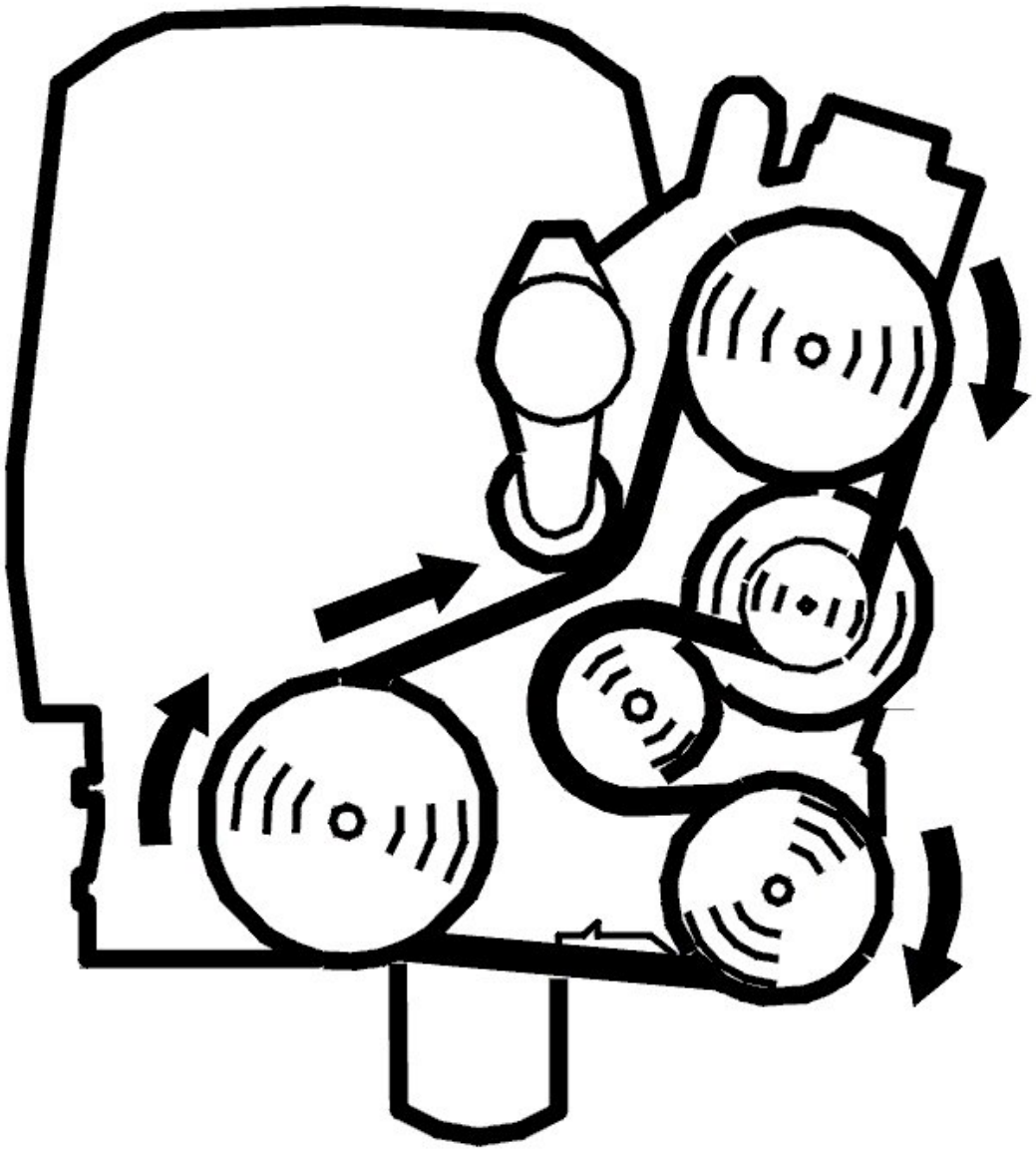
Continue - Verification

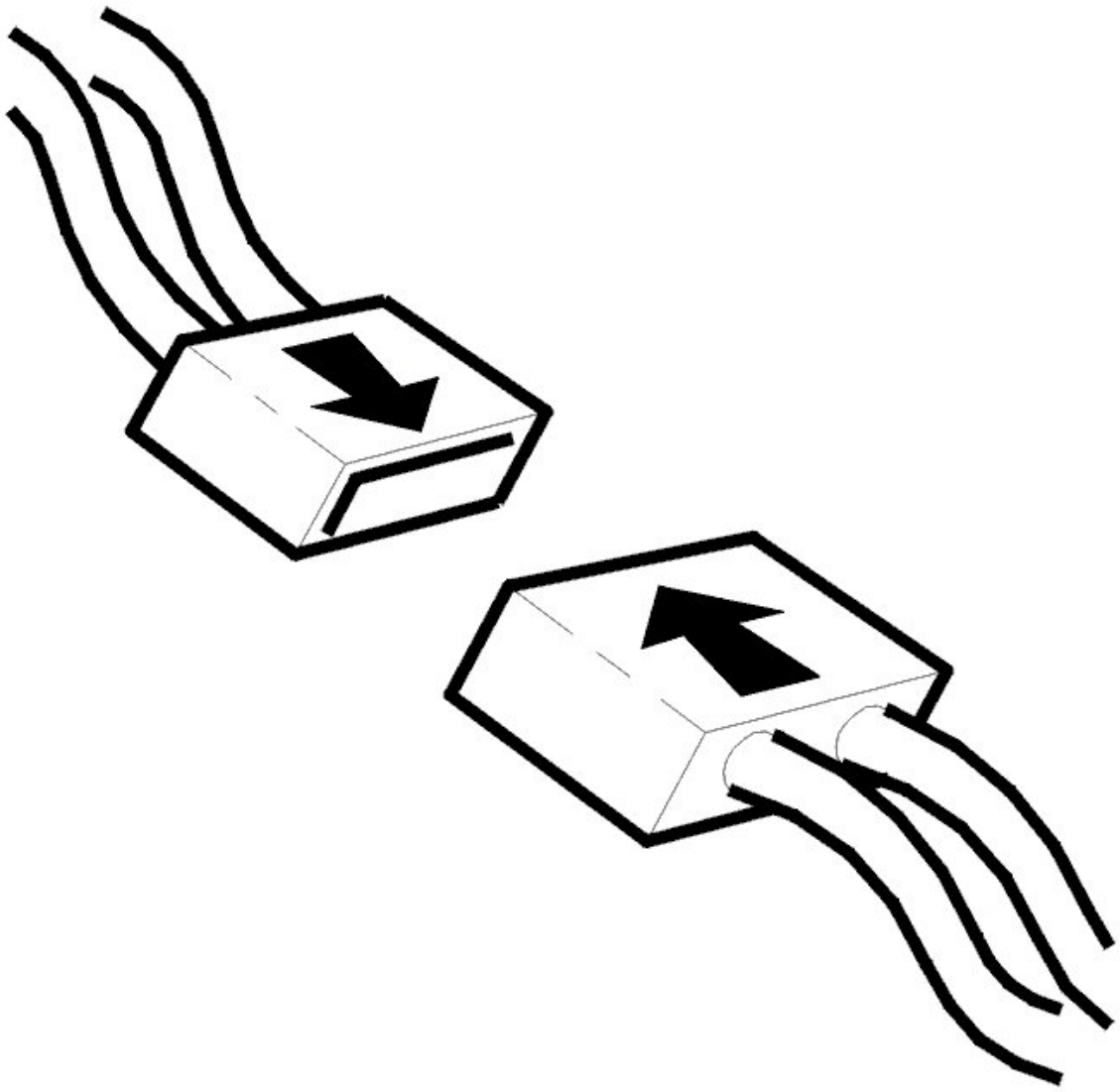
Verification

Verification

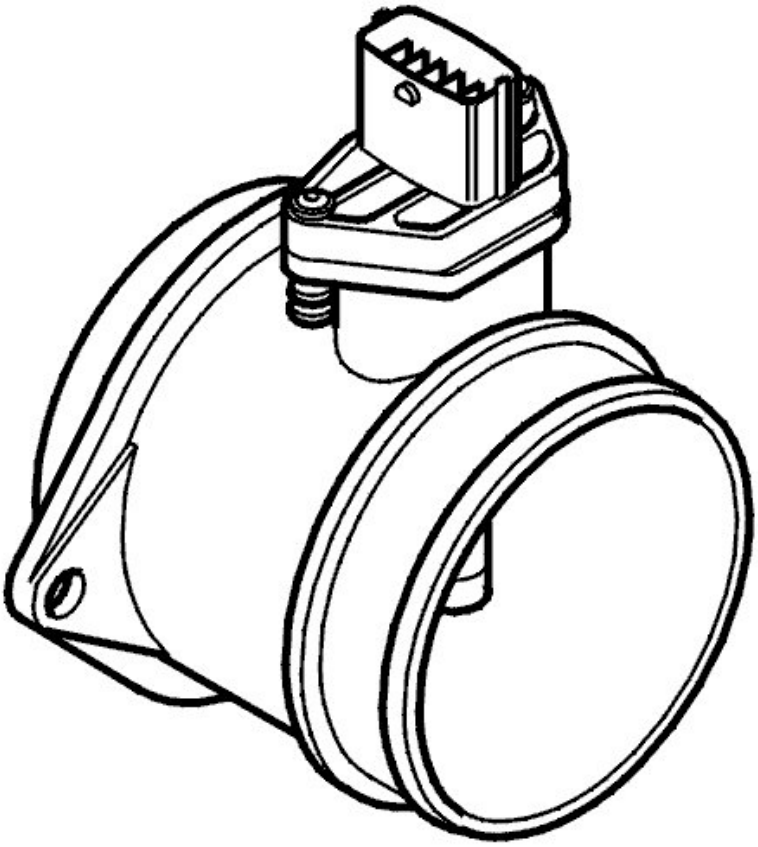
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off and make a note of the adaptation value.
- Start the engine. Increase the engine speed (RPM) a couple of times.
- Read off the adaptation value and check that the adaptation value approaches 1.



Does the adaptation value approach 1?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

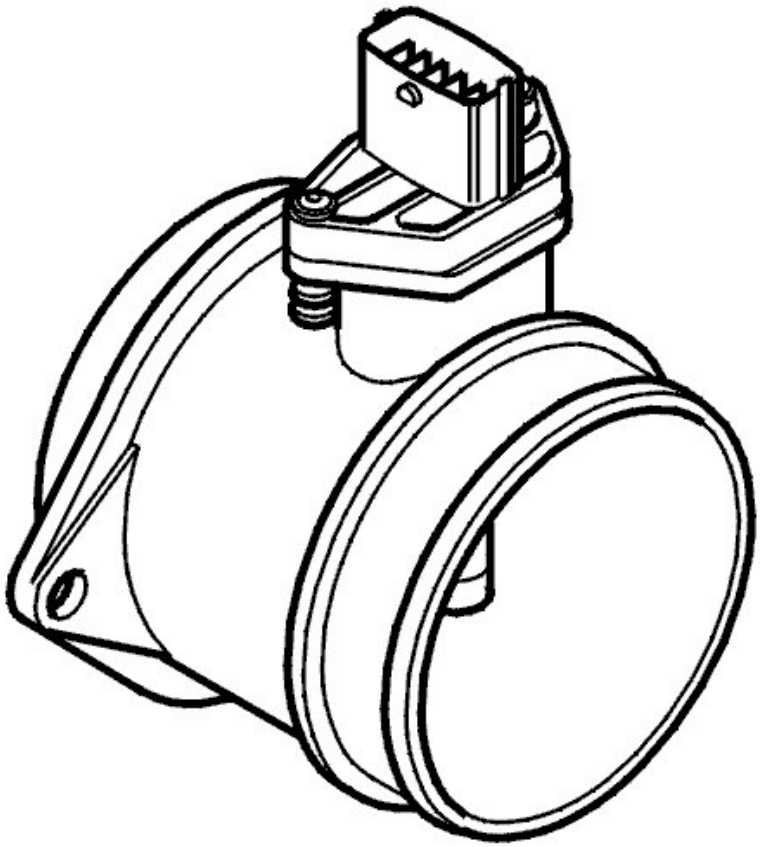
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the intake system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-120D

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is divided (/) by the measured value from the mass air flow (MAF) sensor (= correction value, mass air flow). The diagnostic trouble code (DTC) is stored if the correction value deviates from 1 (lower than 1) i.e. the calculated air mass is lower than the measured air mass.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Air leakage in the intake system.
- Contaminated throttle body (TB).
- Blocked intake system
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.
- Uneven idle

Signal Too Low

Signal too low

Checking the intake system

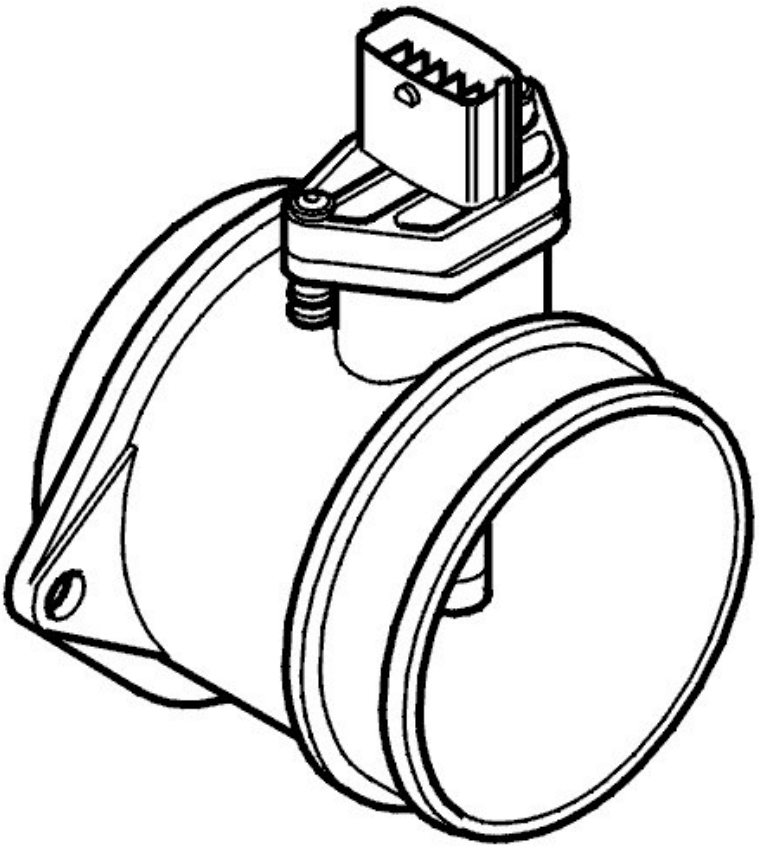
Check the mass air flow (MAF) sensor connector. Check for contact resistance and oxidation.
Check the induction system for air leaks. In particular, check the hoses and hose connectors between the mass air flow (MAF) sensor and the throttle unit. Check for leakage and damage.
Check the inside of the throttle body (TB). Check for contamination. When the throttle body (TB) is contaminated, the air flow to the engine is impaired and diagnostic trouble code (DTCs) or fault symptoms can occur. Clean the throttle body (TB) if needed.
Remedy as necessary.

Other information
- Air leakage in the intake system, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Intake System, Checking

- Throttle body (TB), cleaning, B5254T2 See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Mass air flow (MAF) sensor, replacing See: Air Flow Meter/Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



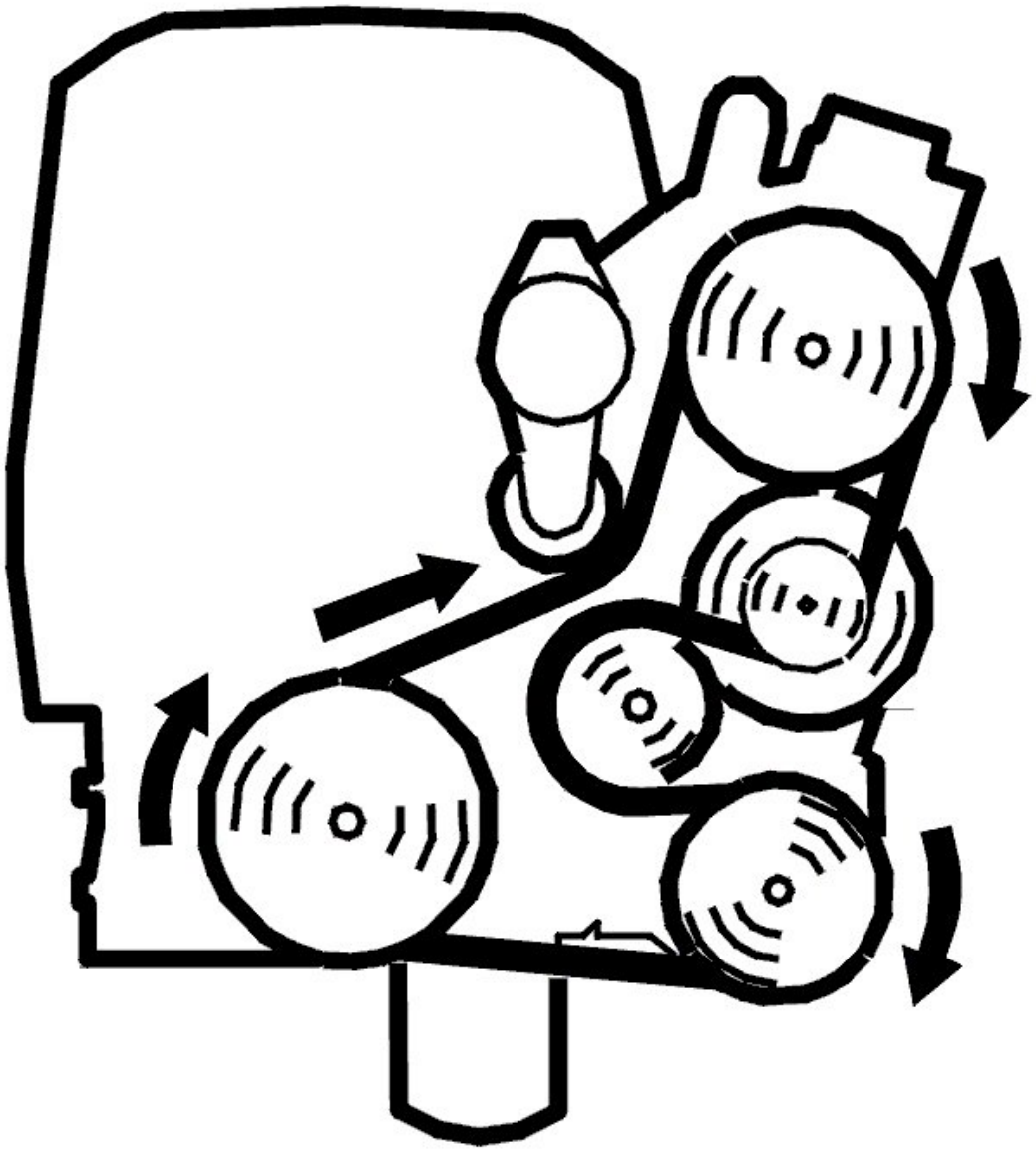
Continue - Verification

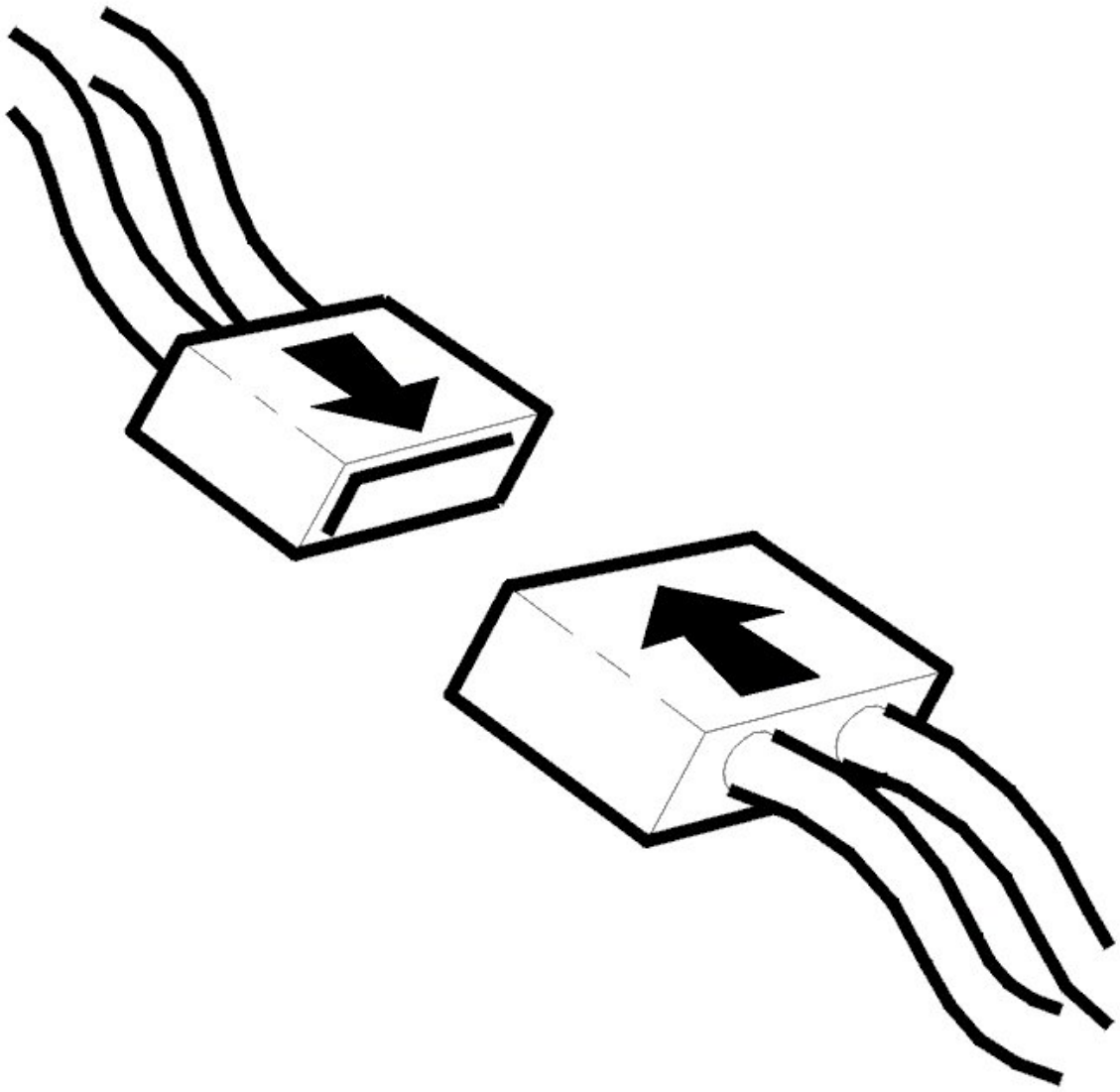
Verification

Verification

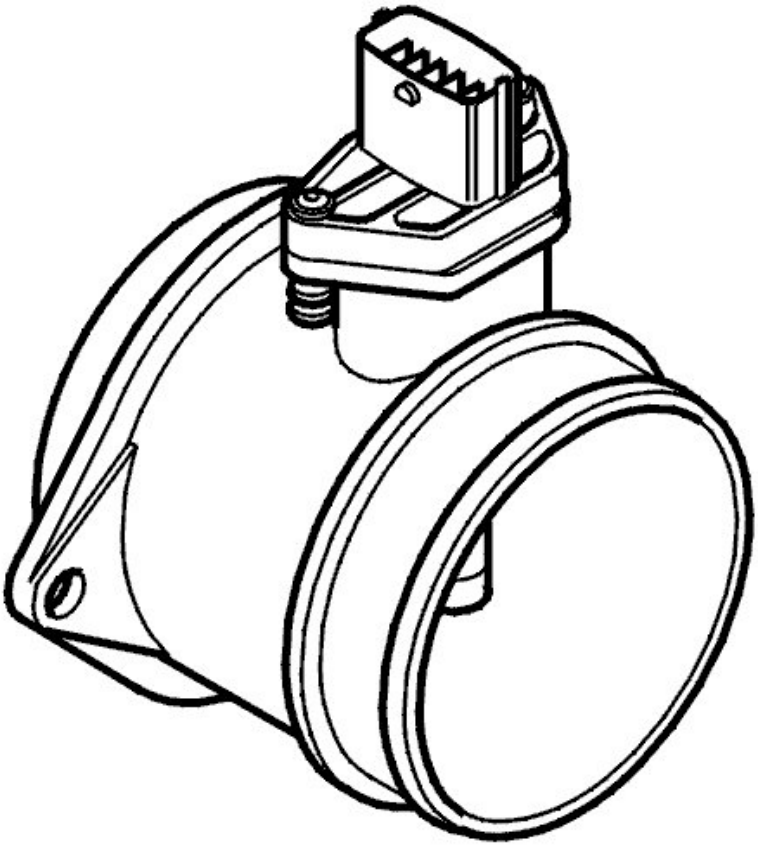
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off and make a note of the adaptation value.
- Start the engine. Increase the engine speed (RPM) a couple of times.
- Read off the adaptation value and check that the adaptation value approaches 1.



Does the adaptation value approach 1?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

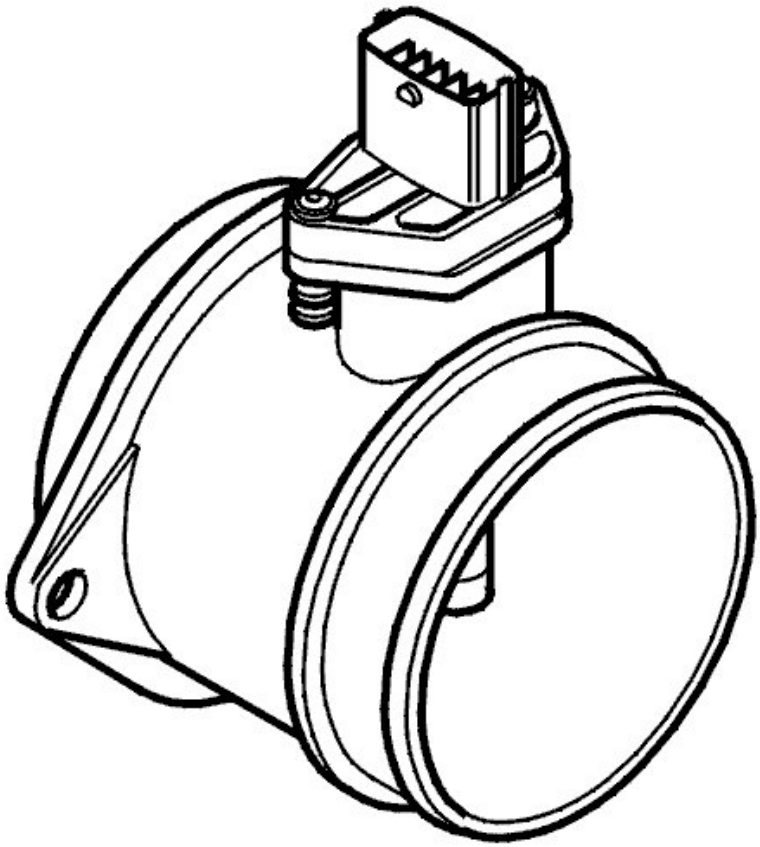
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the intake system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-1210

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is then compared with the measured value from the mass air flow (MAF) sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the correction factor for the air mass (measured air mass/desired air mass value) is too high, while the long-term fuel trim is above or below a set value.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Calculated boost pressure
- Calculated air mass
- Rear heated oxygen sensor (HO2S) control shut off
- Misfire diagnostic shut off.

Possible source
- Contact resistance or oxidation in the mass air flow (MAF) connectors
- Air leakage in the intake system
- Blocked intake system
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Flow Too Low or Too High

Flow too low or too high

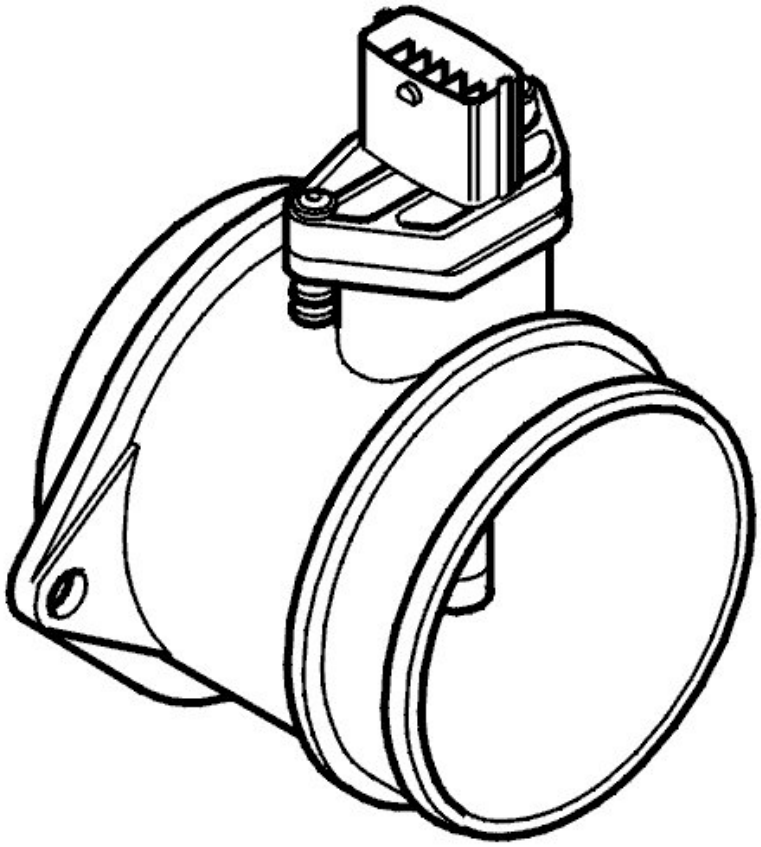
Checking the intake system

Check the mass air flow (MAF) sensor connector. Check for contact resistance and oxidation.
Check the intake system for leakage. In particular, check the hoses and hose connectors between the mass air flow (MAF) sensor and the throttle unit. Check for leakage and damage.
Check the inside of the throttle body (TB). Check for contamination. When the throttle body (TB) is contaminated, the air flow to the engine is impaired and diagnostic trouble code (DTCs) or fault symptoms can occur.
Clean the throttle body (TB) if needed.
If no fault is found, try a new mass air flow(MAF) sensor.

Remedy as necessary.

Other information

- Air leakage in the intake system, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Throttle body (TB), cleaning, B5254T2 See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Mass air flow (MAF) sensor, replacing See: Air Flow Meter/Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



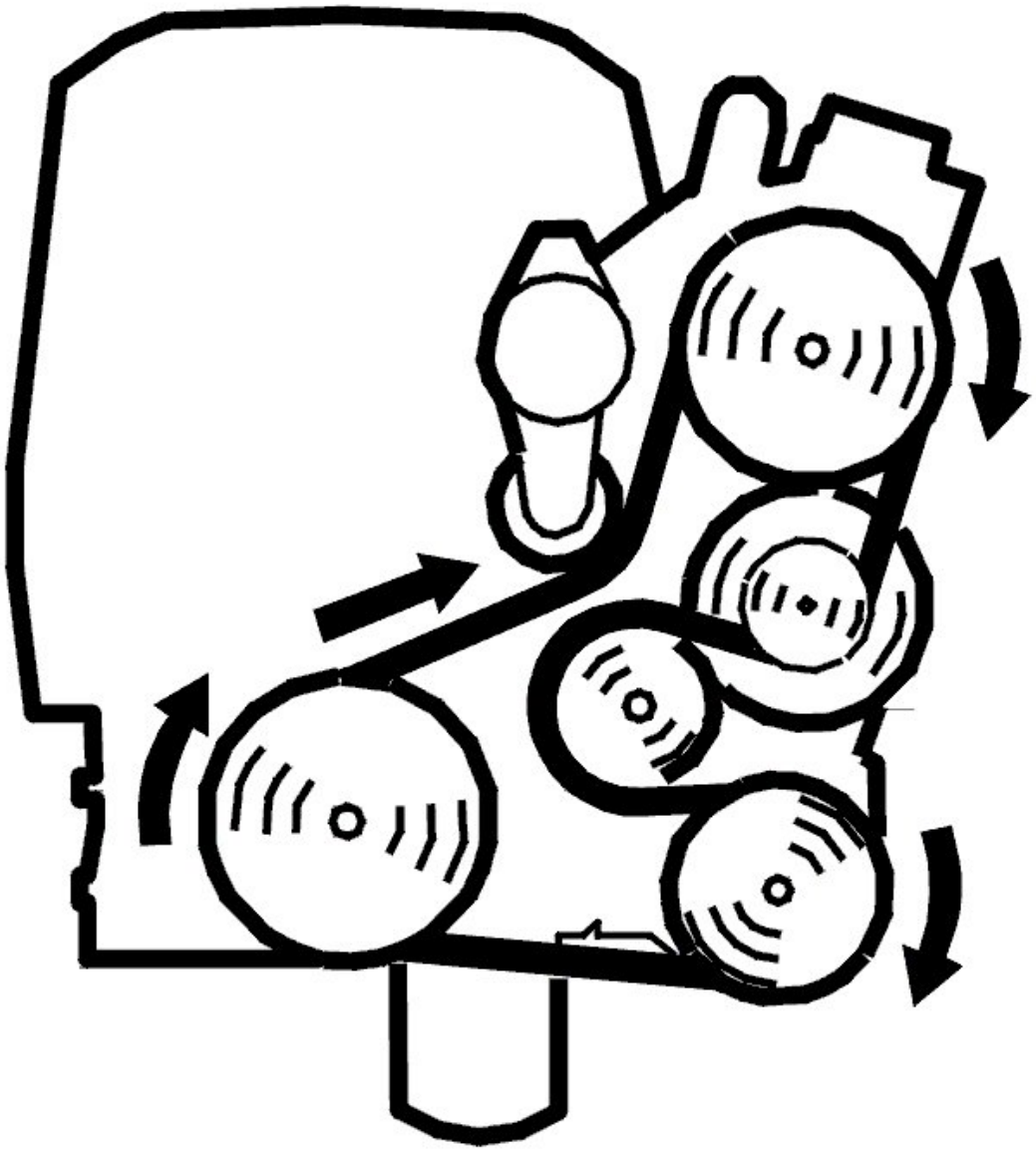
Continue - Verification

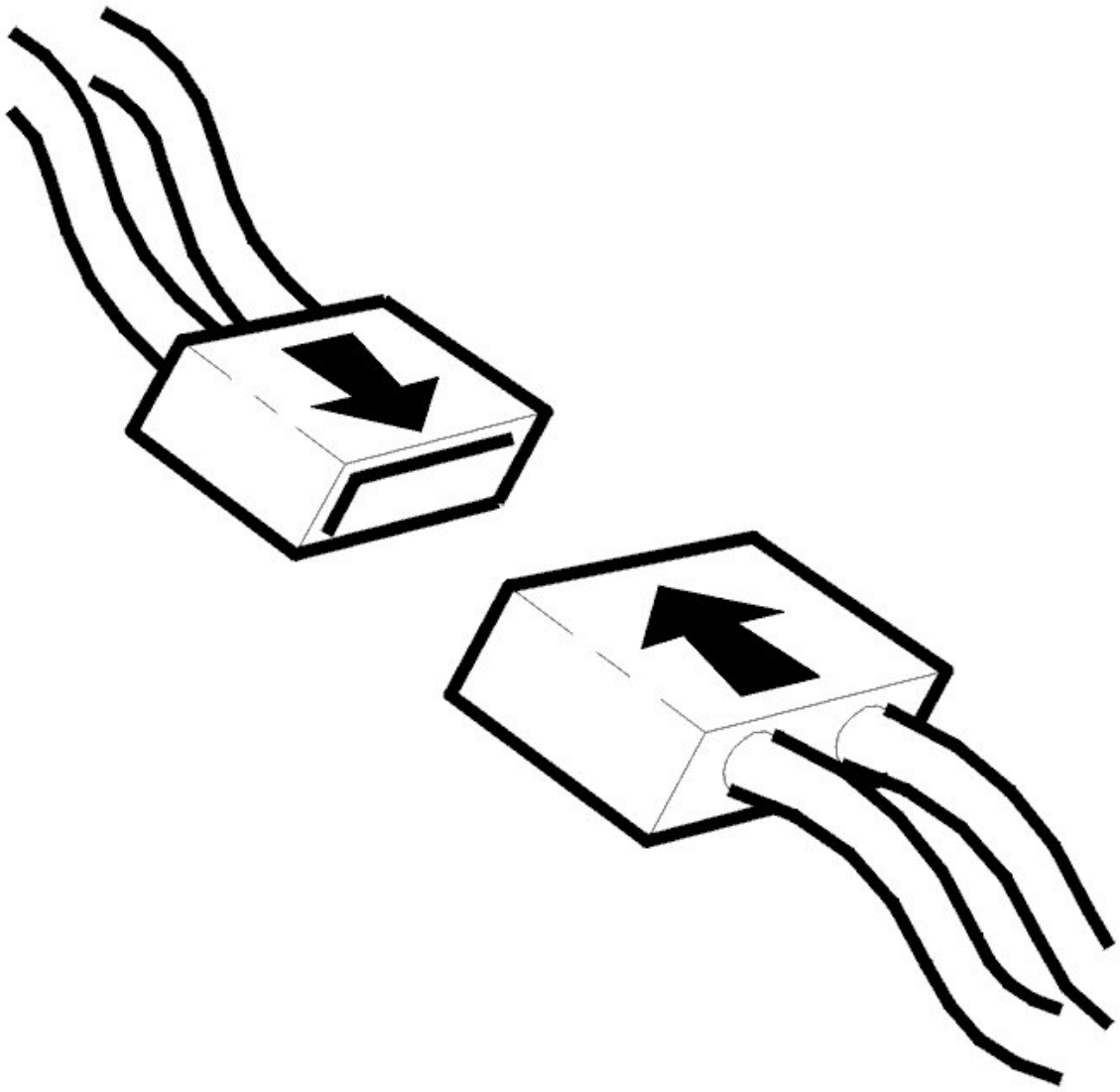
Verification

Verification

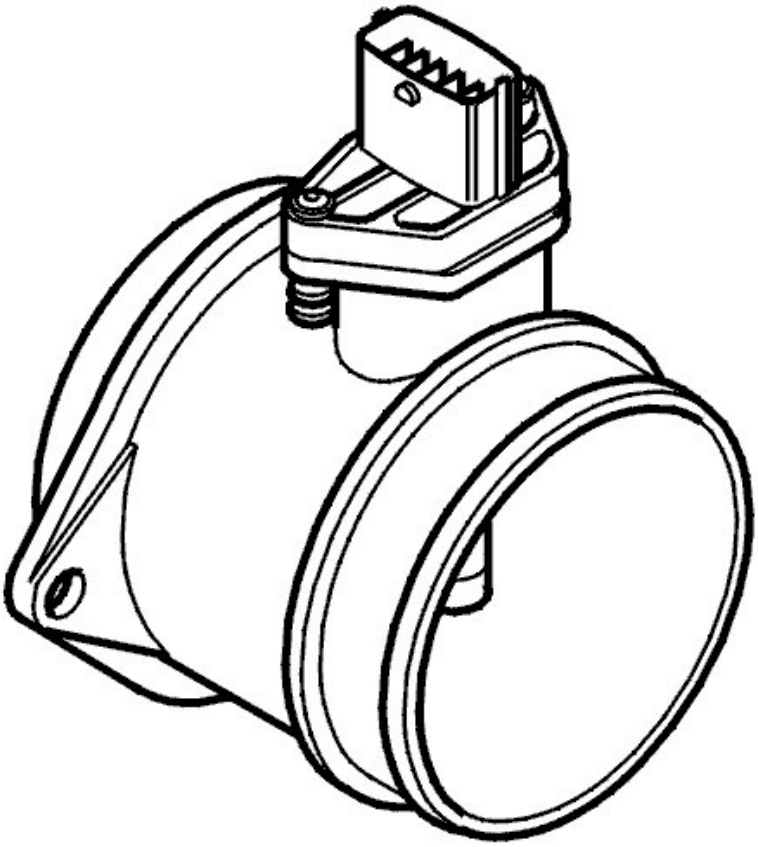
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off and make a note of the adaptation value.
- Start the engine. Increase the engine speed (RPM) a couple of times.
- Read off the adaptation value and check that the adaptation value approaches 1.



Does the adaptation value approach 1?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

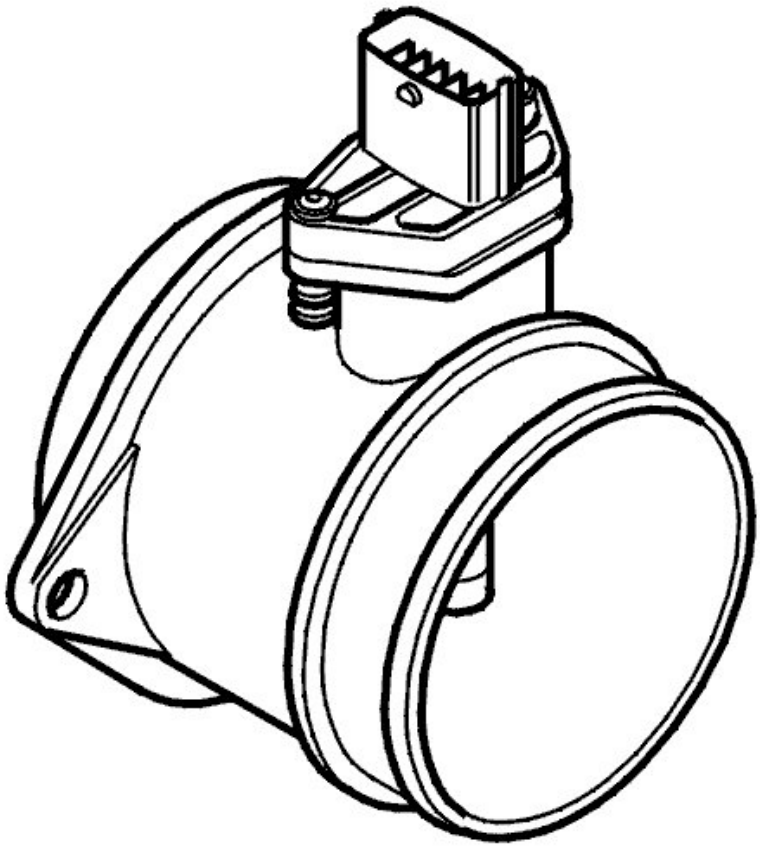
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the intake system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-121B

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is then compared with the measured value from the mass air flow (MAF) sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the correction factor for the air mass (measured air mass/desired air mass value) is too low, while the long-term fuel trim is above or below a set value.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Calculated boost pressure
- Calculated air mass
- Rear heated oxygen sensor (HO2S) control shut off
- Misfire diagnostic shut off.

Possible source
- Contact resistance or oxidation in the mass air flow (MAF) connectors
- Air leakage in the intake system
- Blocked intake system
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Flow Too Low or Too High

Flow too low or too high

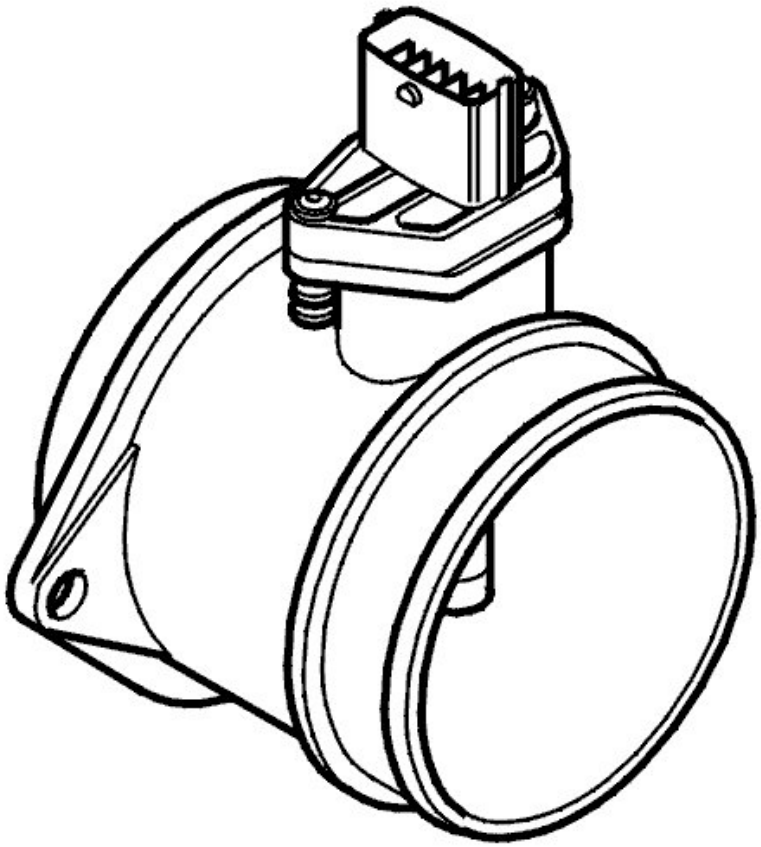
Checking the intake system

Check the mass air flow (MAF) sensor connector. Check for contact resistance and oxidation.
Check the intake system for leakage. In particular, check the hoses and hose connectors between the mass air flow (MAF) sensor and the throttle unit. Check for leakage and damage.
Check the inside of the throttle body (TB). Check for contamination. When the throttle body (TB) is contaminated, the air flow to the engine is impaired and diagnostic trouble code (DTCs) or fault symptoms can occur.
Clean the throttle body (TB) if needed.

If no fault is found, try a new mass air flow(MAF) sensor.
Remedy as necessary.

Other information

- Air leakage in the intake system, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Throttle body (TB), cleaning, B5254T2 See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Mass air flow (MAF) sensor, replacing See: Air Flow Meter/Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



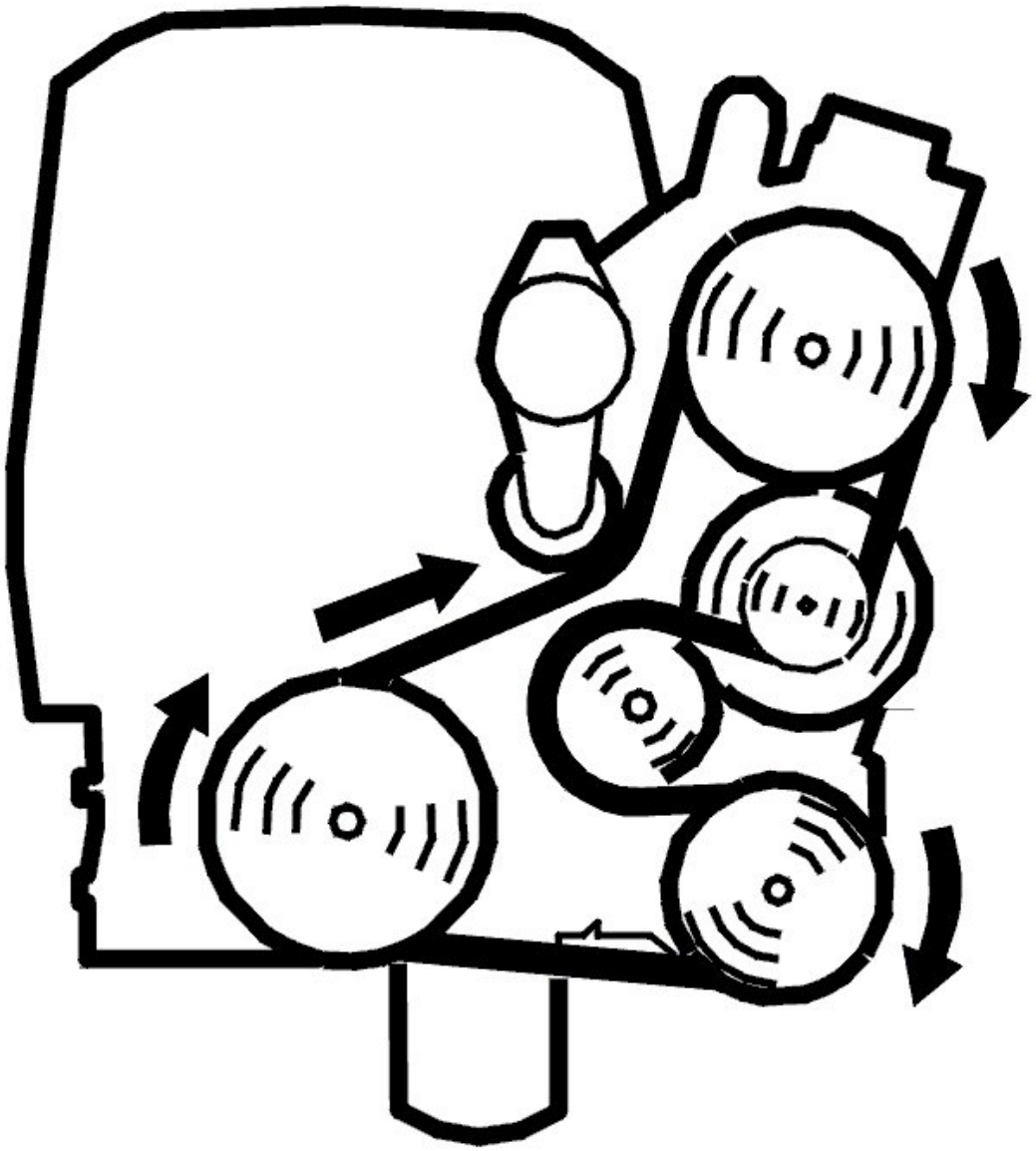
Continue - Verification

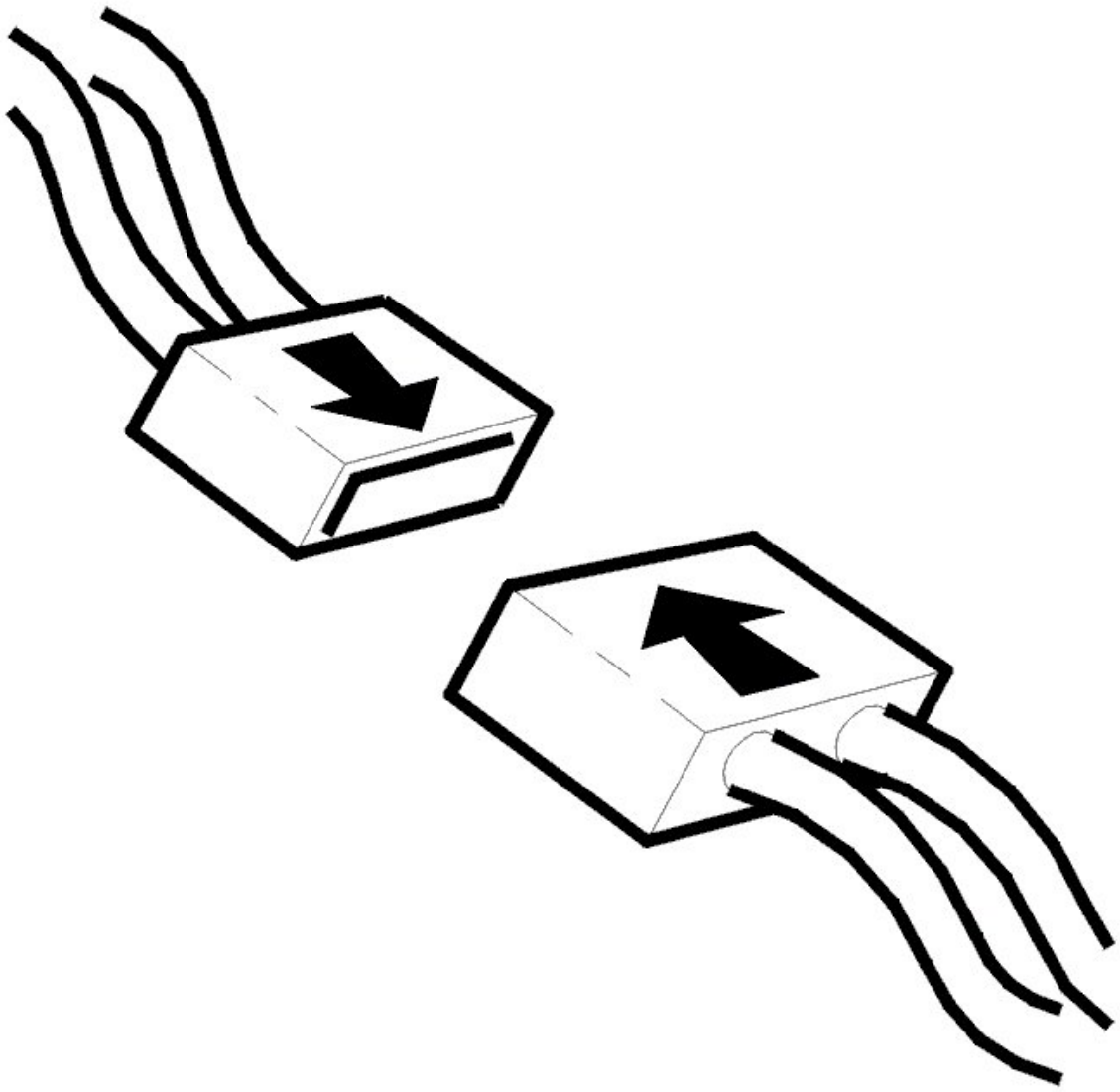
Verification

Verification

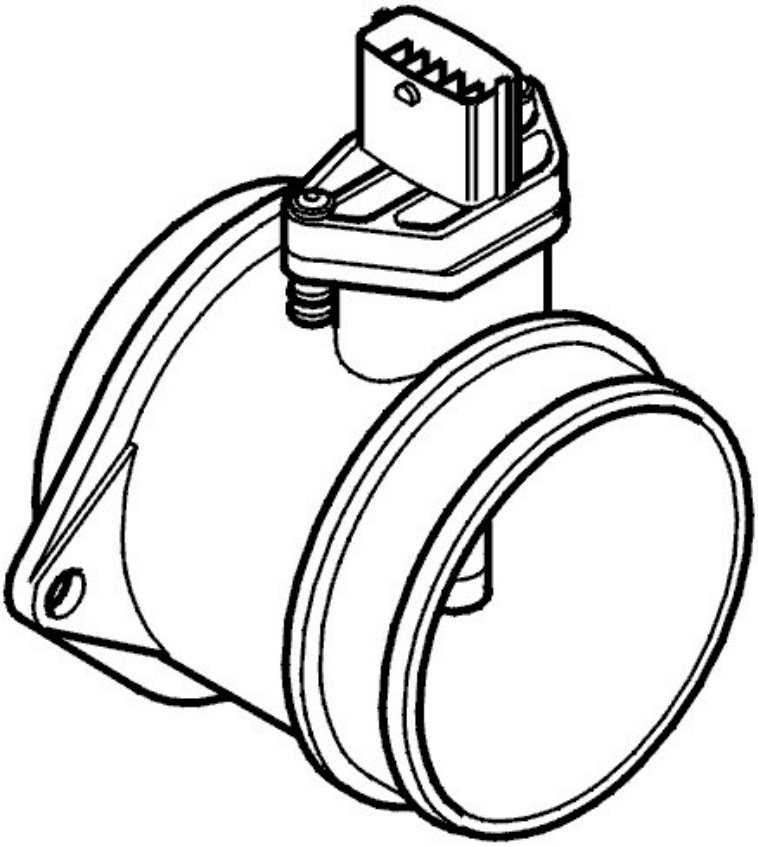
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off and make a note of the adaptation value.
- Start the engine. Increase the engine speed (RPM) a couple of times.
- Read off the adaptation value and check that the adaptation value approaches 1.



Does the adaptation value approach 1?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

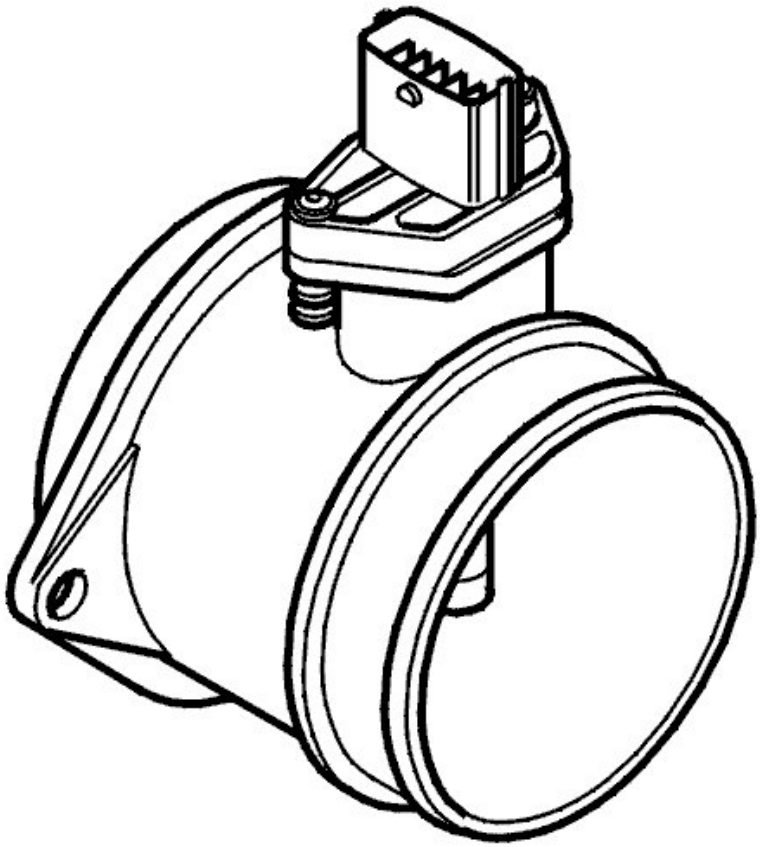
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the intake system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-121C

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is then compared with the measured value from the mass air flow (MAF) sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the value for the measured air mass is higher than the calculated value for air mass.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Calculated boost pressure
- Calculated air mass
- Rear heated oxygen sensor (HO2S) control shut off
- Misfire diagnostic shut off.

Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the ground lead
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

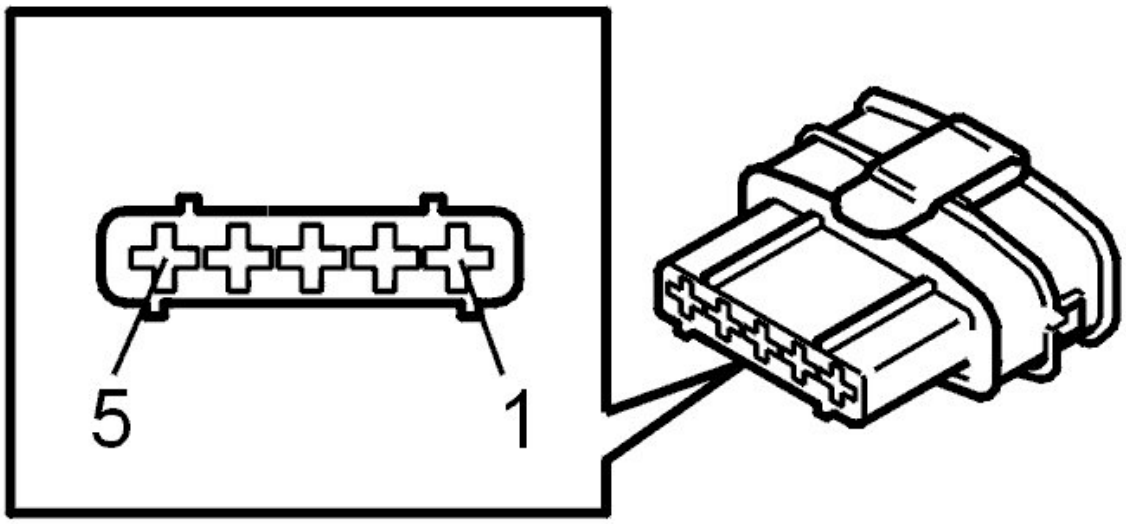
Signal too high

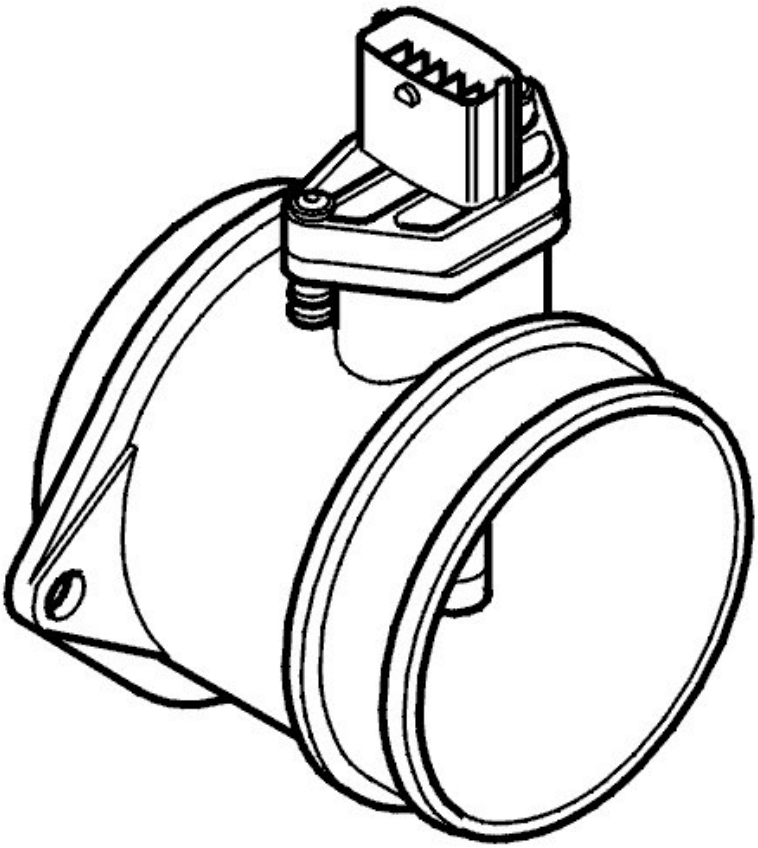
Checking the wiring

Check the cable between engine control module (ECM) terminal #A22 (#A22) and mass air flow (MAF) sensor terminal #5. Check for a short-circuit to supply voltage.
Check the ground lead between terminal #A58 (#A58) and mass air flow (MAF) sensor terminal #3. Check for an open-circuit.
With the ignition on and the mass air flow (MAF) sensor connector disconnected, the voltage at mass air flow (MAF) terminal #2 must be approximately Ubat, at mass air flow (MAF) terminal #3 it must be ground and at terminal #5 approximately 1 V.
Remedy as necessary

Other information:

- Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification





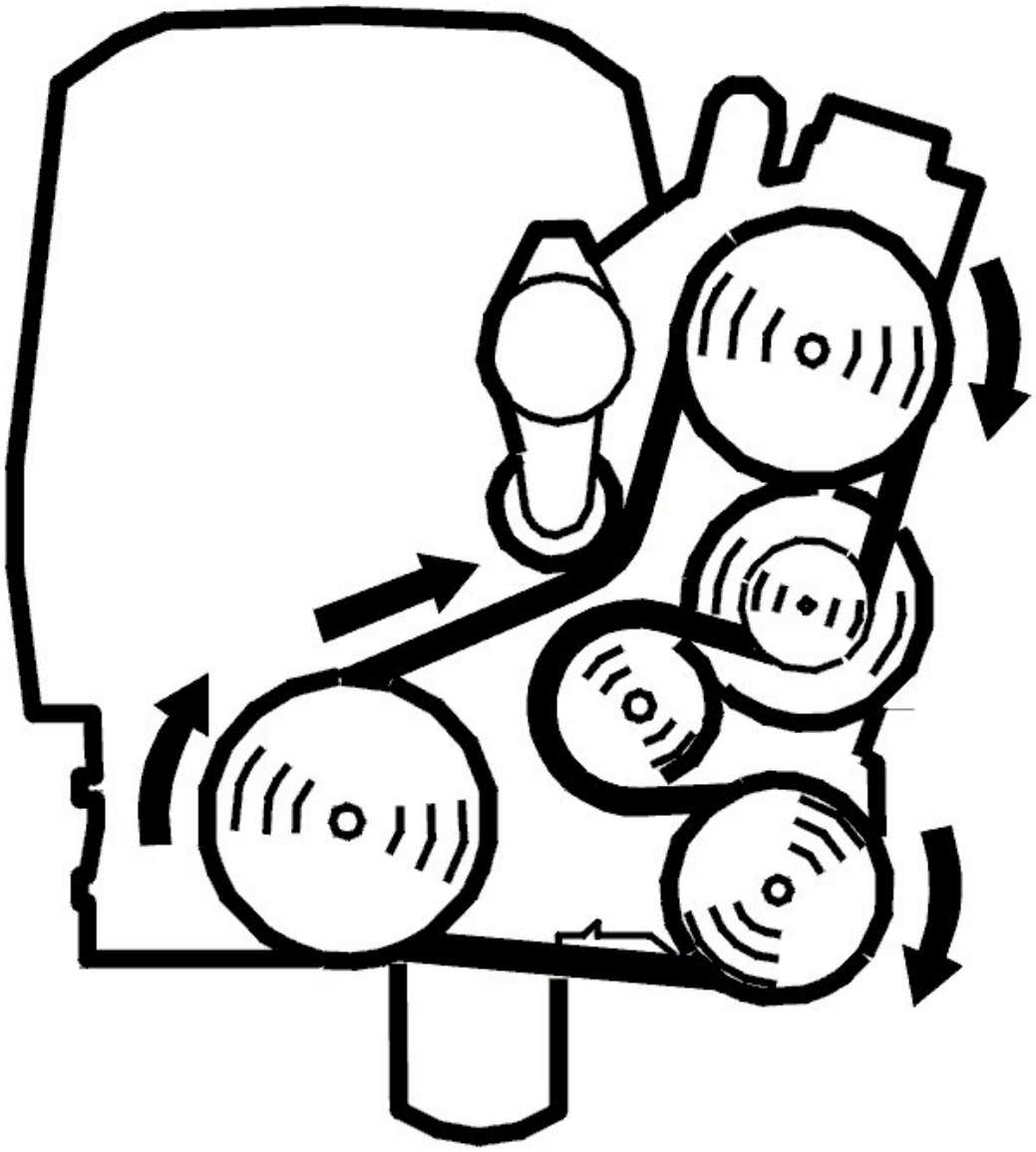
Continue - Verification

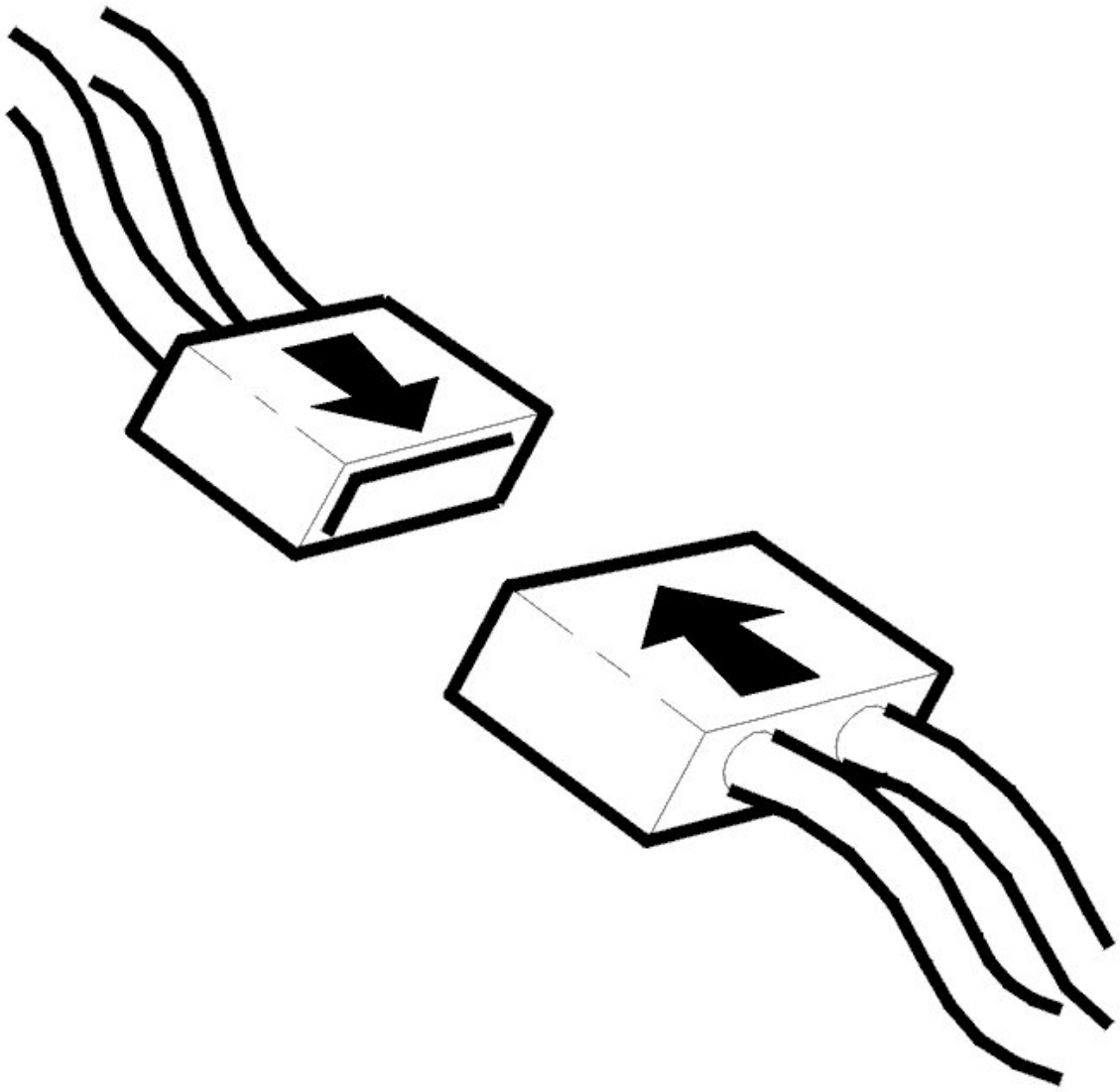
Verification

Verification

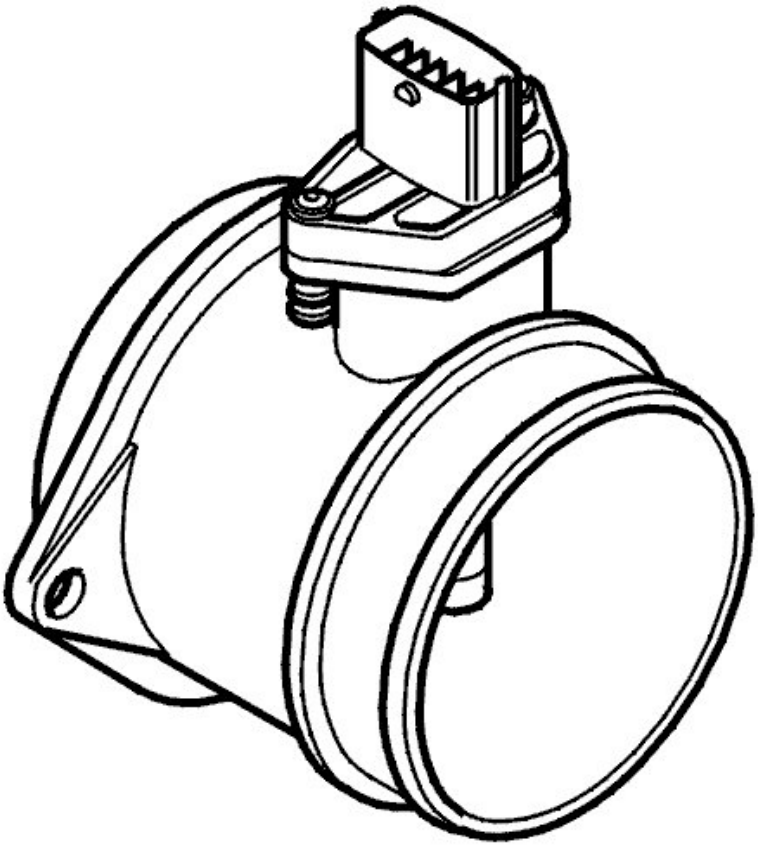
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Check that the air flow is correct. The value must be approximately 0 kg/h with the engine switched off
- Start the engine. Read off the air flow. The value may vary by between 12-20 kg/h at idle speed, depending on the engine load and temperature. The value may be in excess of 20 kg/h if the engine is cold
- Increase the engine speed (RPM) and check that the air flow increases with increased engine speed.



Are the values correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

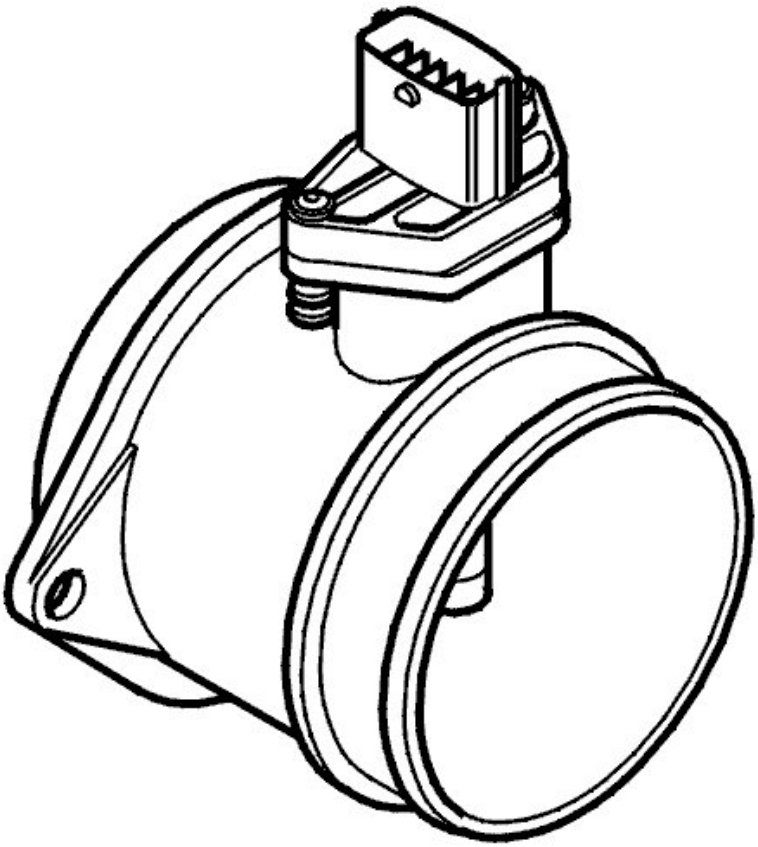
Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-121D

Condition



The engine control module (ECM) calculates the expected mass air flow. The calculation is based on a number of different parameters. The calculated value for mass air flow is then compared with the measured value from the mass air flow (MAF) sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the value for the measured air mass is lower than the calculated value for air mass.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Calculated boost pressure
- Calculated air mass
- Rear heated oxygen sensor (HO2S) control shut off
- Misfire diagnostic shut off.

Possible source
- Air leakage in the intake system
- Contact resistance in the mass air flow (MAF) sensor connectors
- Short-circuit to ground in the signal cable
- Open-circuit in the signal cable
- Open-circuit in the power supply
- Damaged mass air flow (MAF) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too Low

Signal too low

Checking components and wiring

Check the mass air flow (MAF) sensor connector. Check for contact resistance and oxidation.
Check for air leakage in the intake system and for damage to hoses etc.
Check the power supply cable between system relay terminal #5 and mass air flow (MAF) sensor terminal #2. Check for an open-circuit.
Check the signal cable between engine control module (ECM) terminal #A22 (#A22) and mass air flow (MAF) sensor terminal #5. Check for an

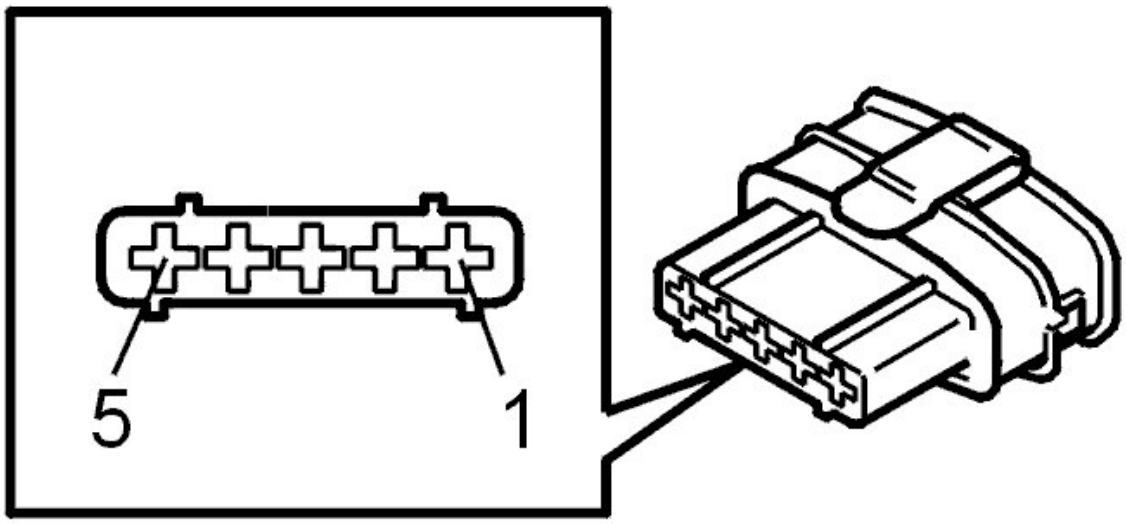
open-circuit. Check for a short-circuit to ground.
Check the power supply cable between engine control module (ECM) terminal #A39 (#A39) and mass air flow (MAF) sensor terminal #4. Check for an open-circuit.

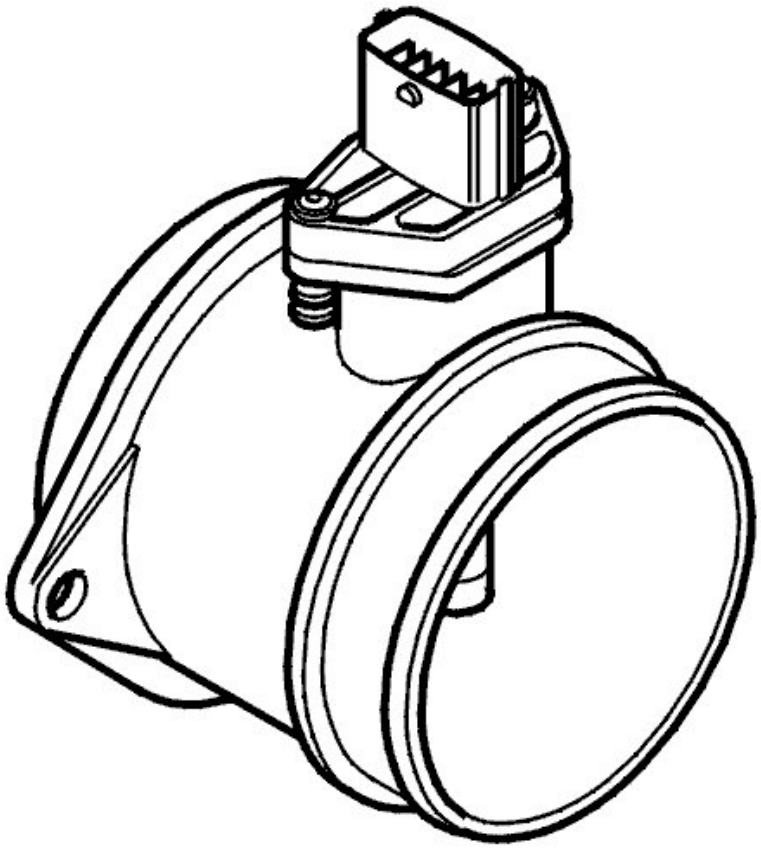
Hint: With the ignition on and the mass air flow (MAF) sensor connector connected the voltage at mass air flow (MAF) sensor terminal #2 must be approximately U bat.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





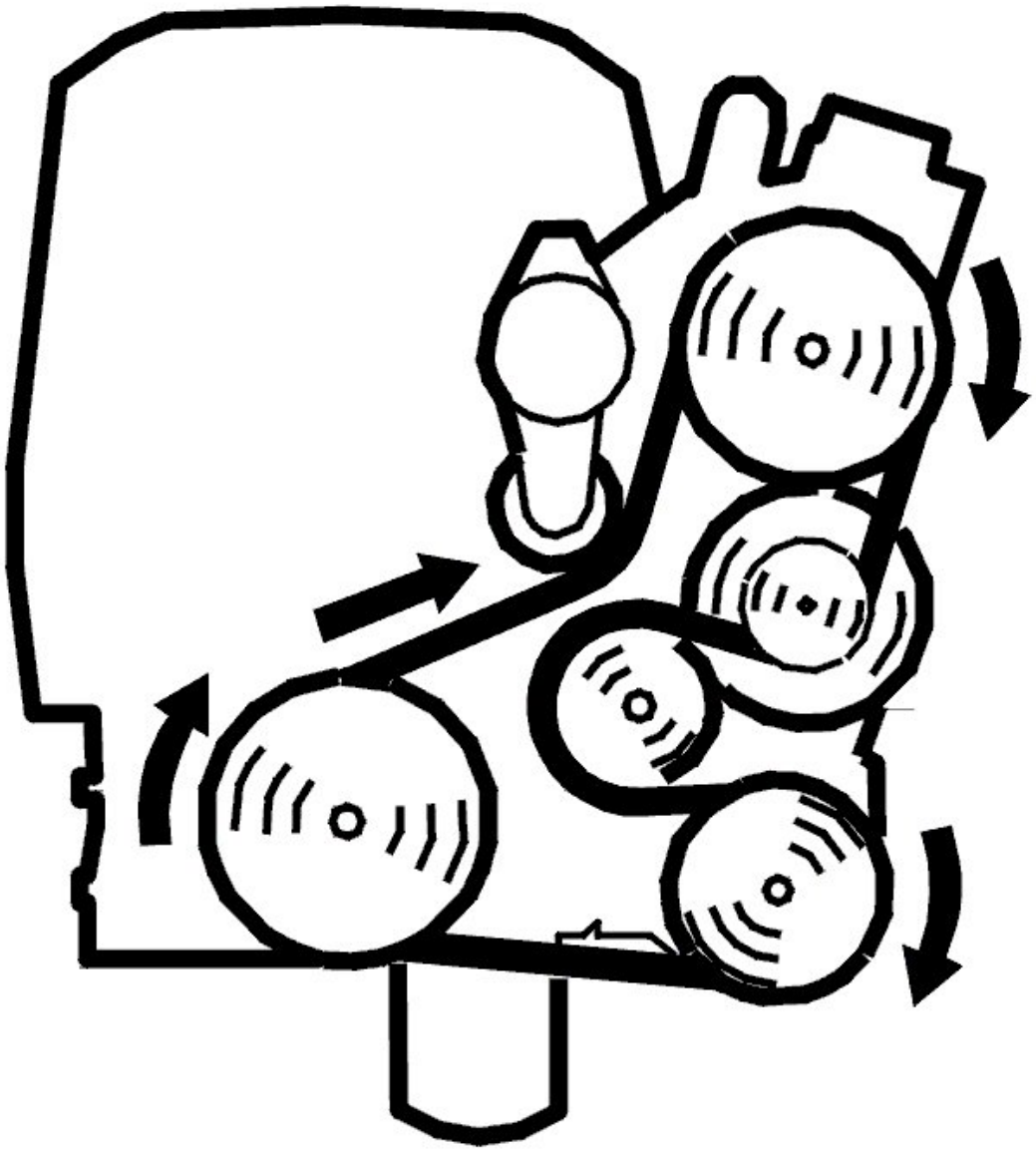
Continue - Verification

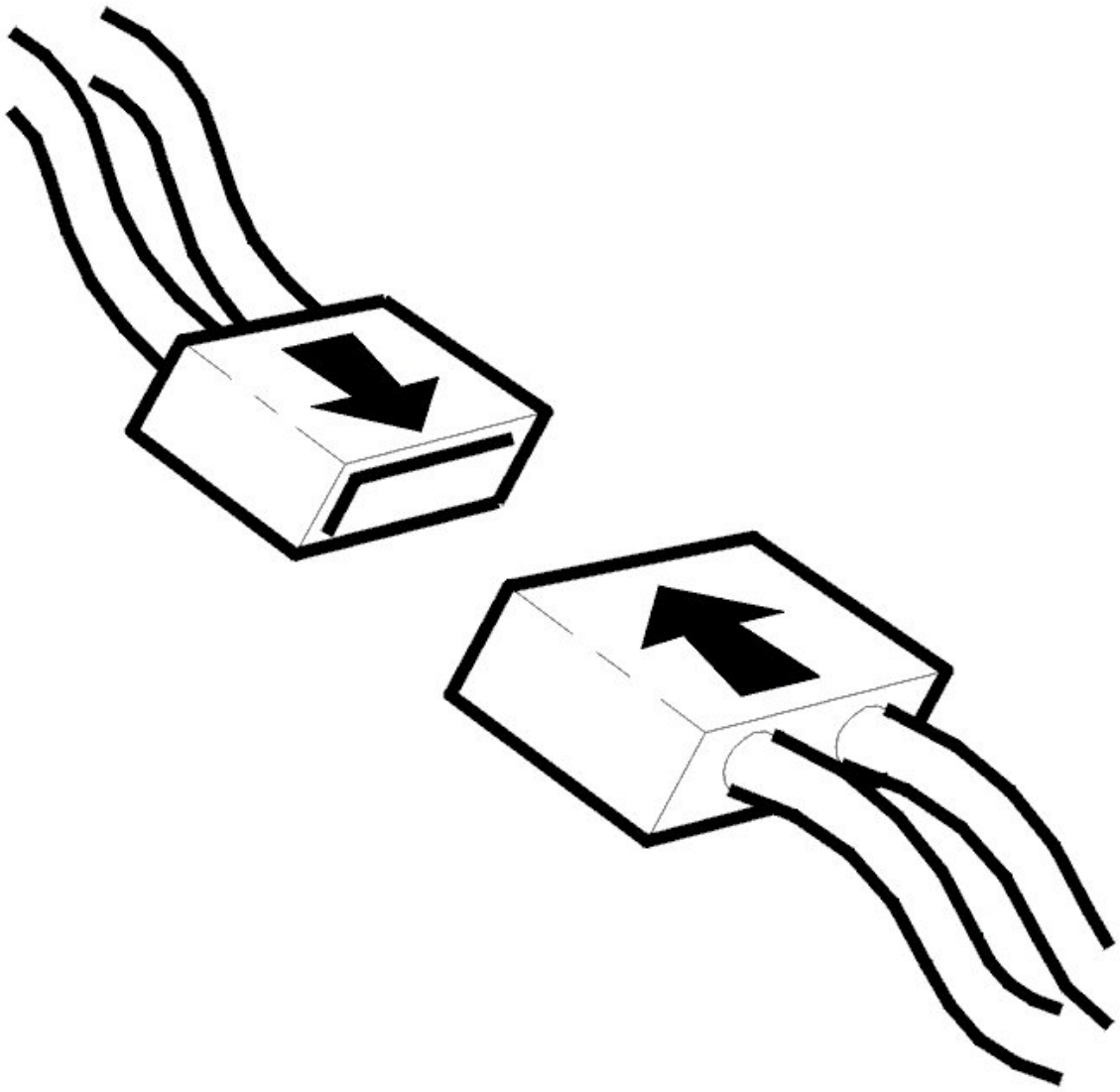
Verification

Verification

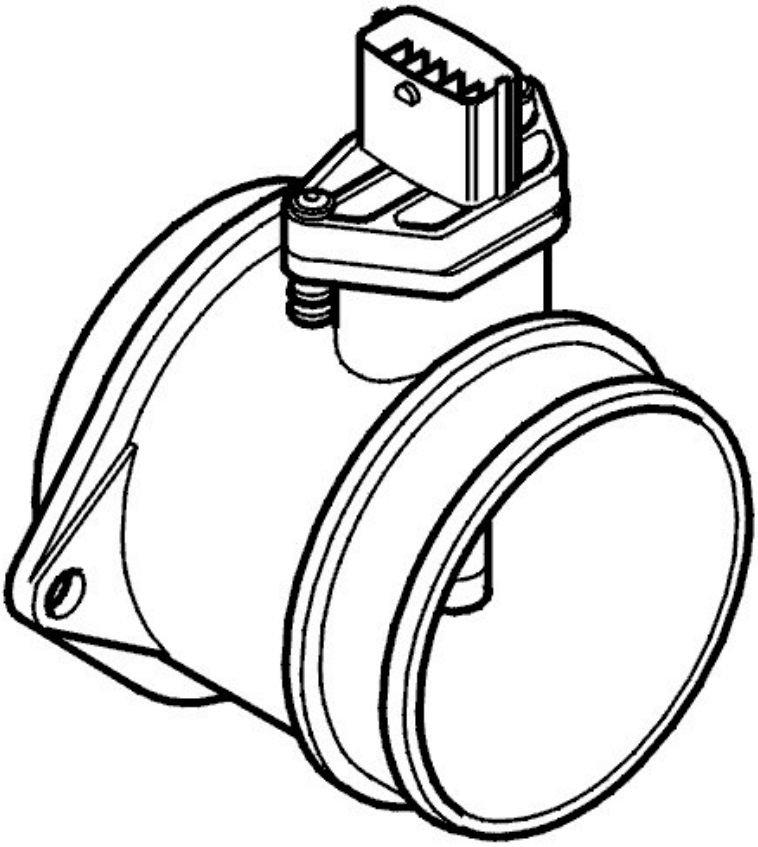
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Check that the air flow is correct. The value must be approximately 0 kg/h with the engine switched off
- Start the engine. Read off the air flow. The value may vary by between 12-20 kg/h at idle speed, depending on the engine load and temperature. The value may be in excess of 20 kg/h if the engine is cold
- Increase the engine speed (RPM) and check that the air flow increases with increased engine speed.



Are the values correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

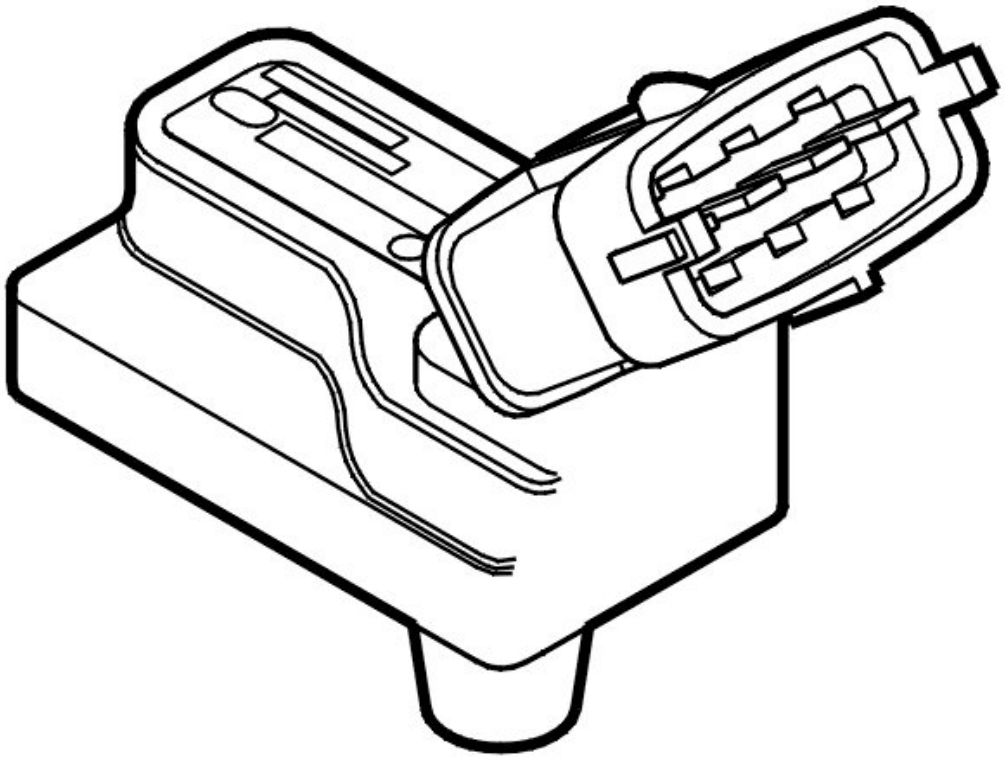
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-125C

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the boost pressure sensor is higher than a certain value for a certain amount of time.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- Open-circuit in the signal ground cable
- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

Signal too high

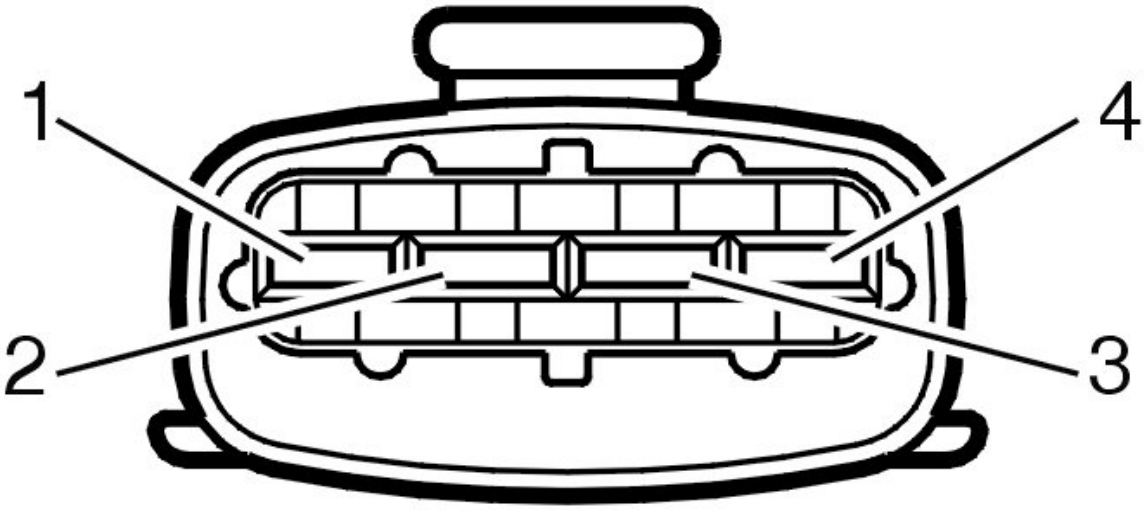
Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

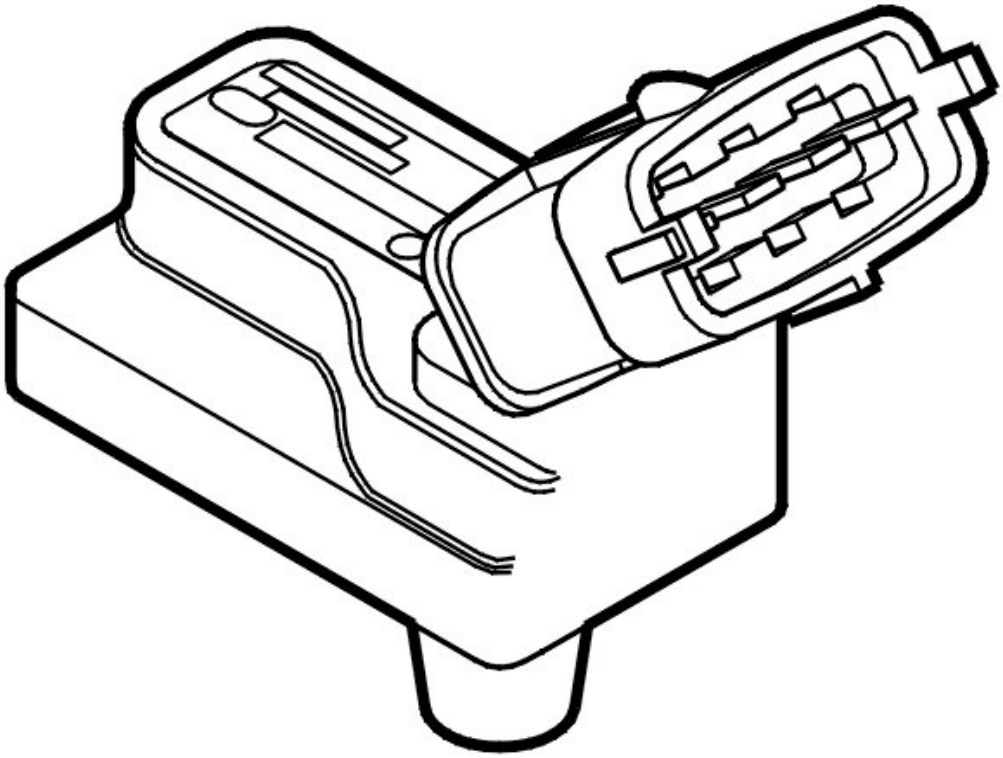
Check the signal cable between engine control module (ECM) terminal #A23 (#A23) and boost pressure sensor terminal #4. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead between control module terminal #A60 (#A60) and boost pressure sensor terminal #1. Check for an open-circuit.
Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description /

Specification

- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





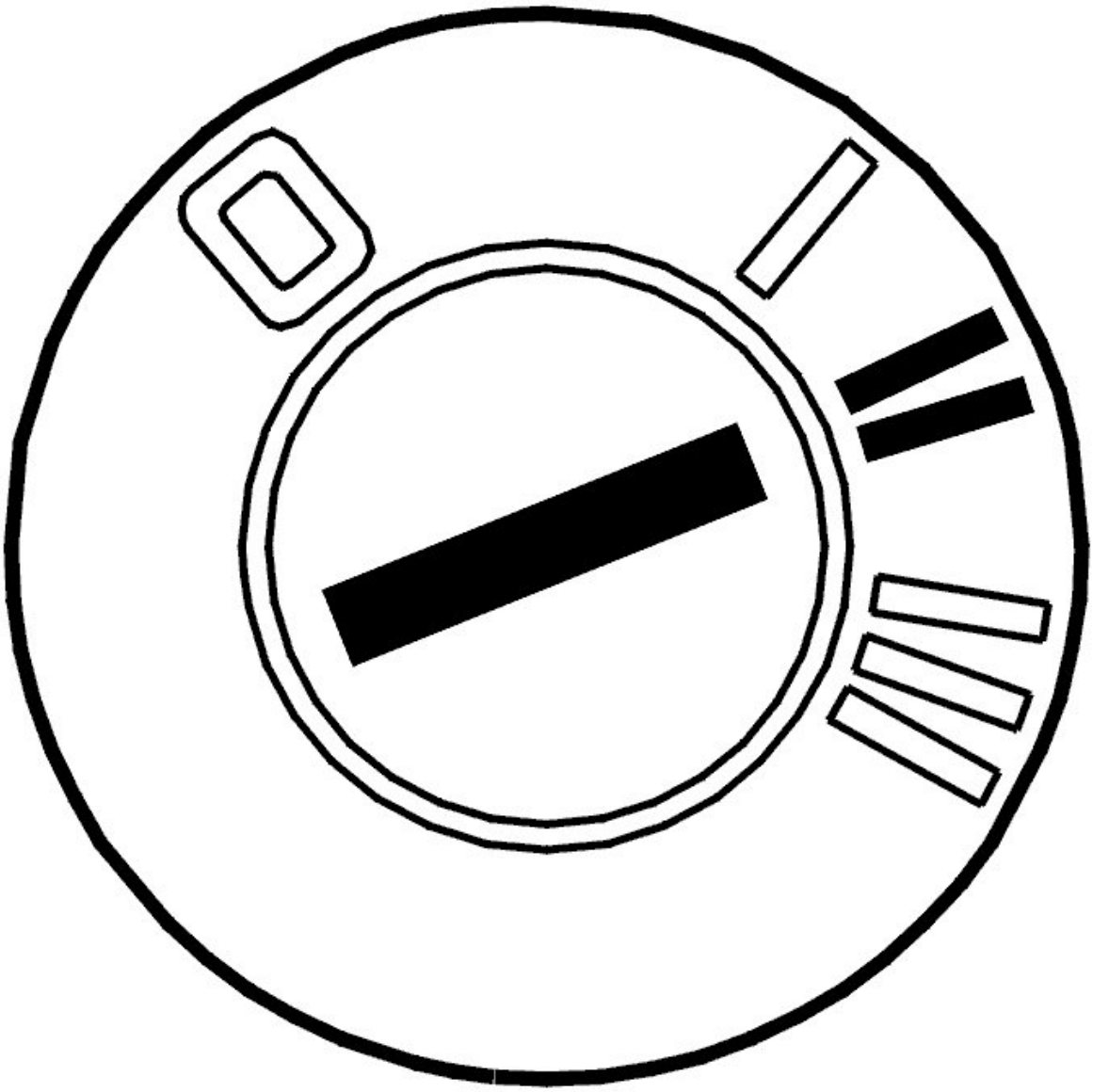
Continue - Verification

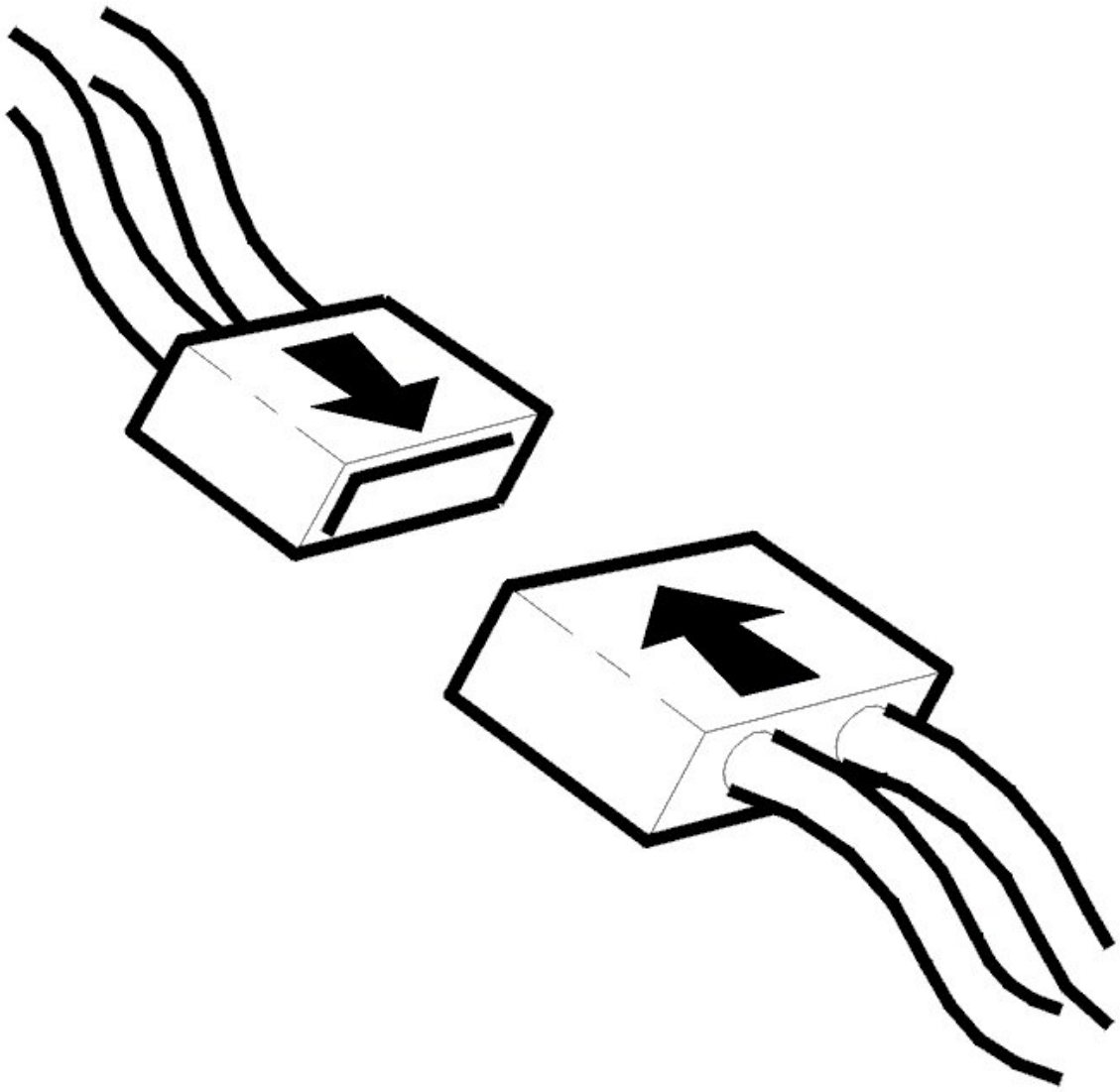
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

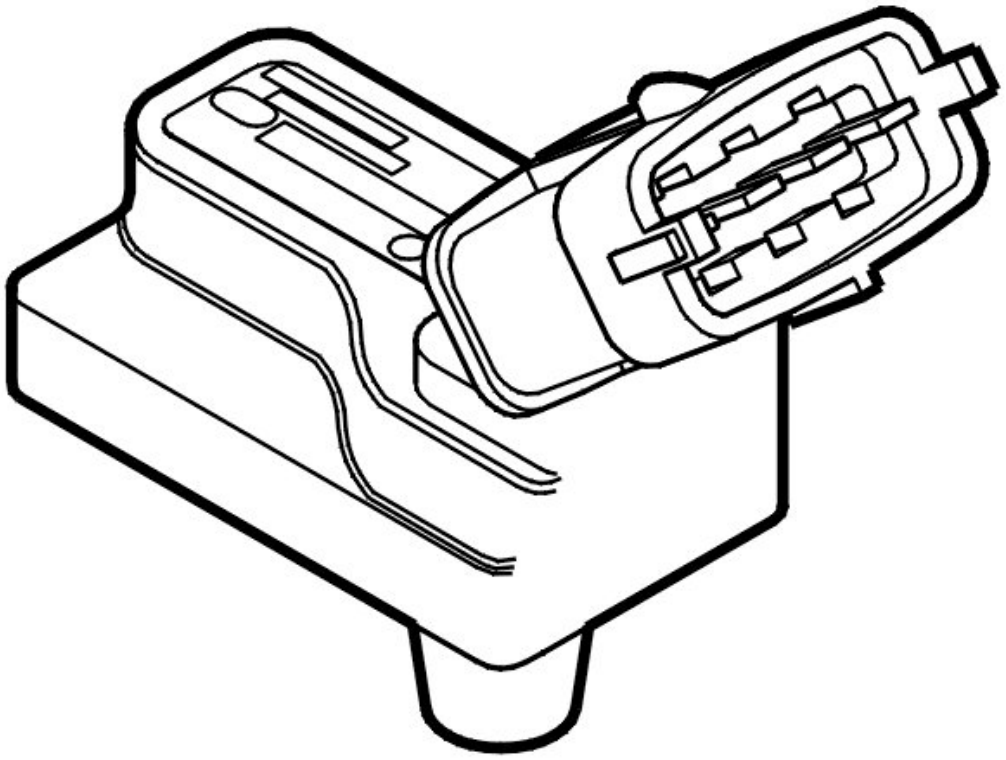
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-125D

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the boost pressure sensor is lower than a certain value for a certain amount of time.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to ground in the signal cable
- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

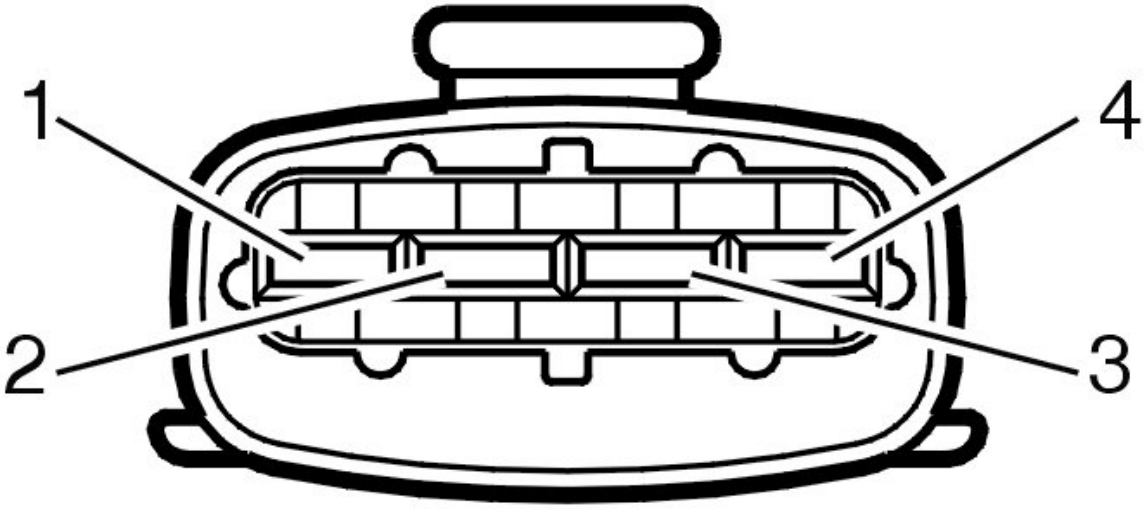
Signal Too Low/ Signal Too High

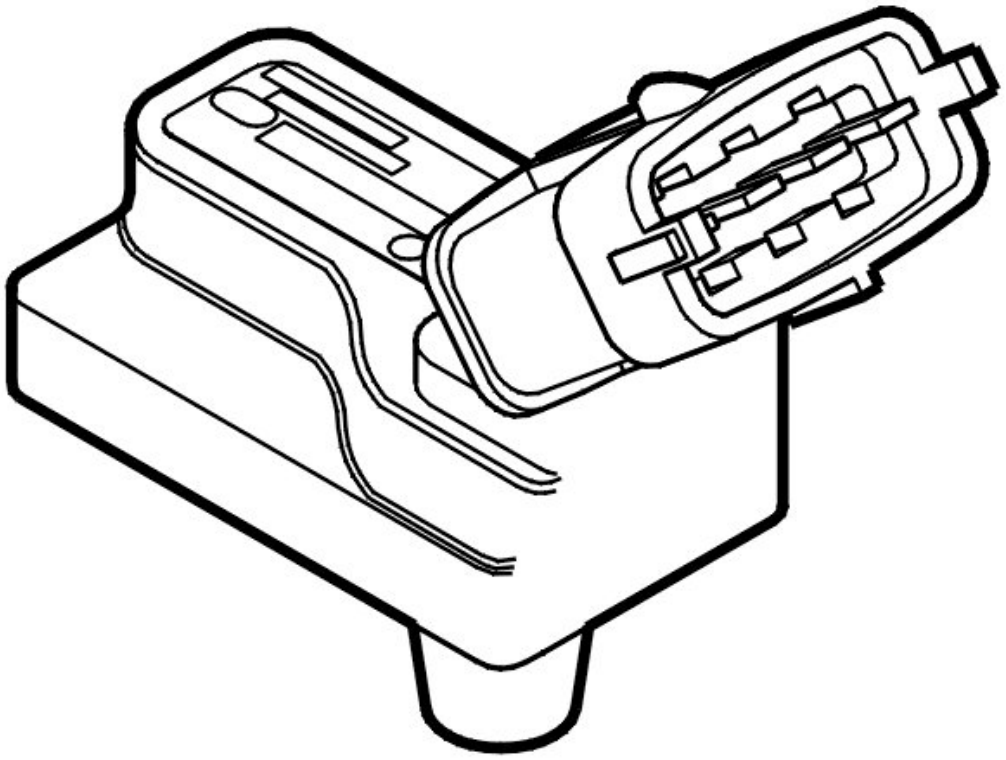
Signal too low / signal too high

Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #A23 (#A23) and boost pressure sensor terminal #4. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





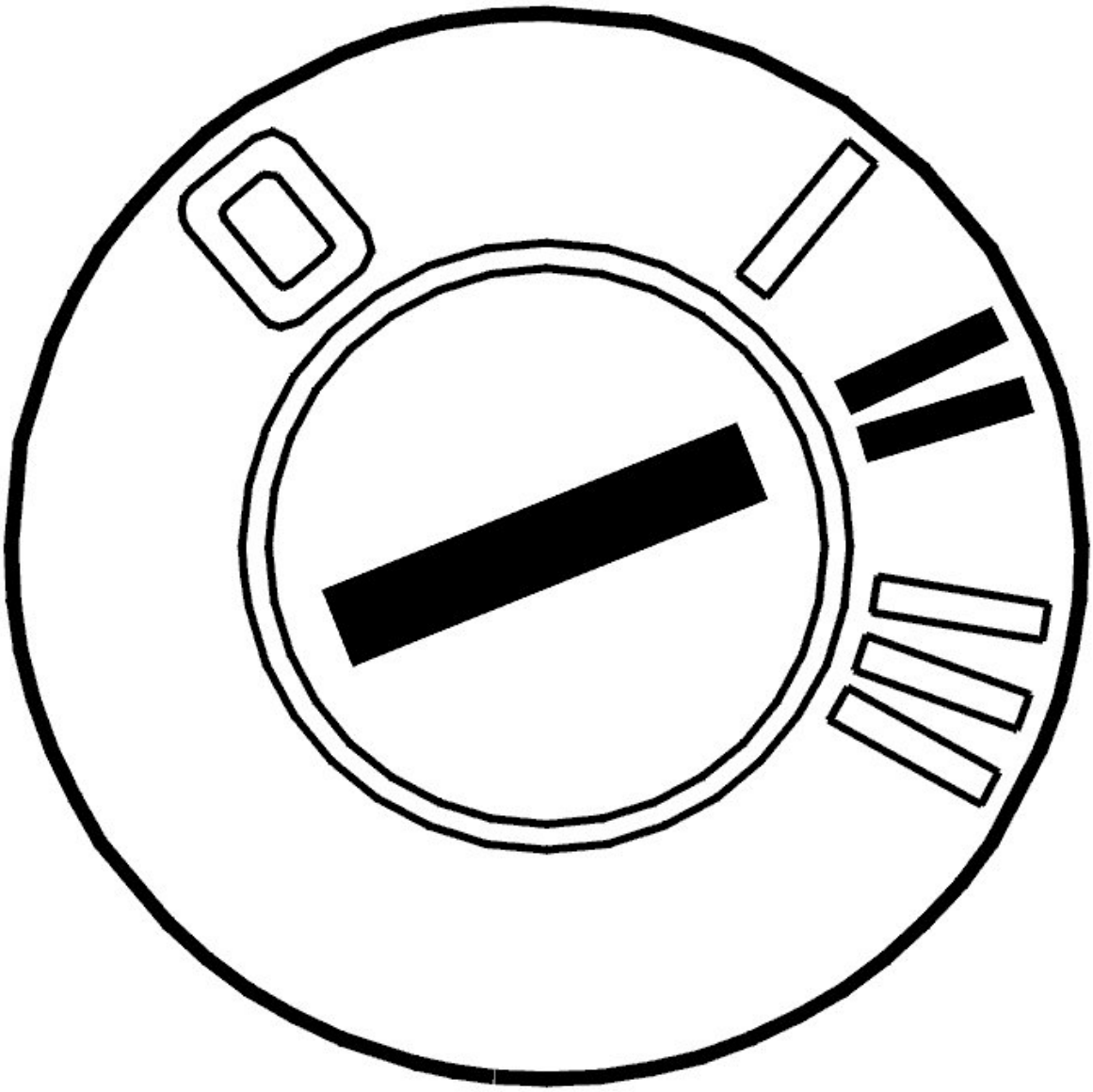
Continue - Verification

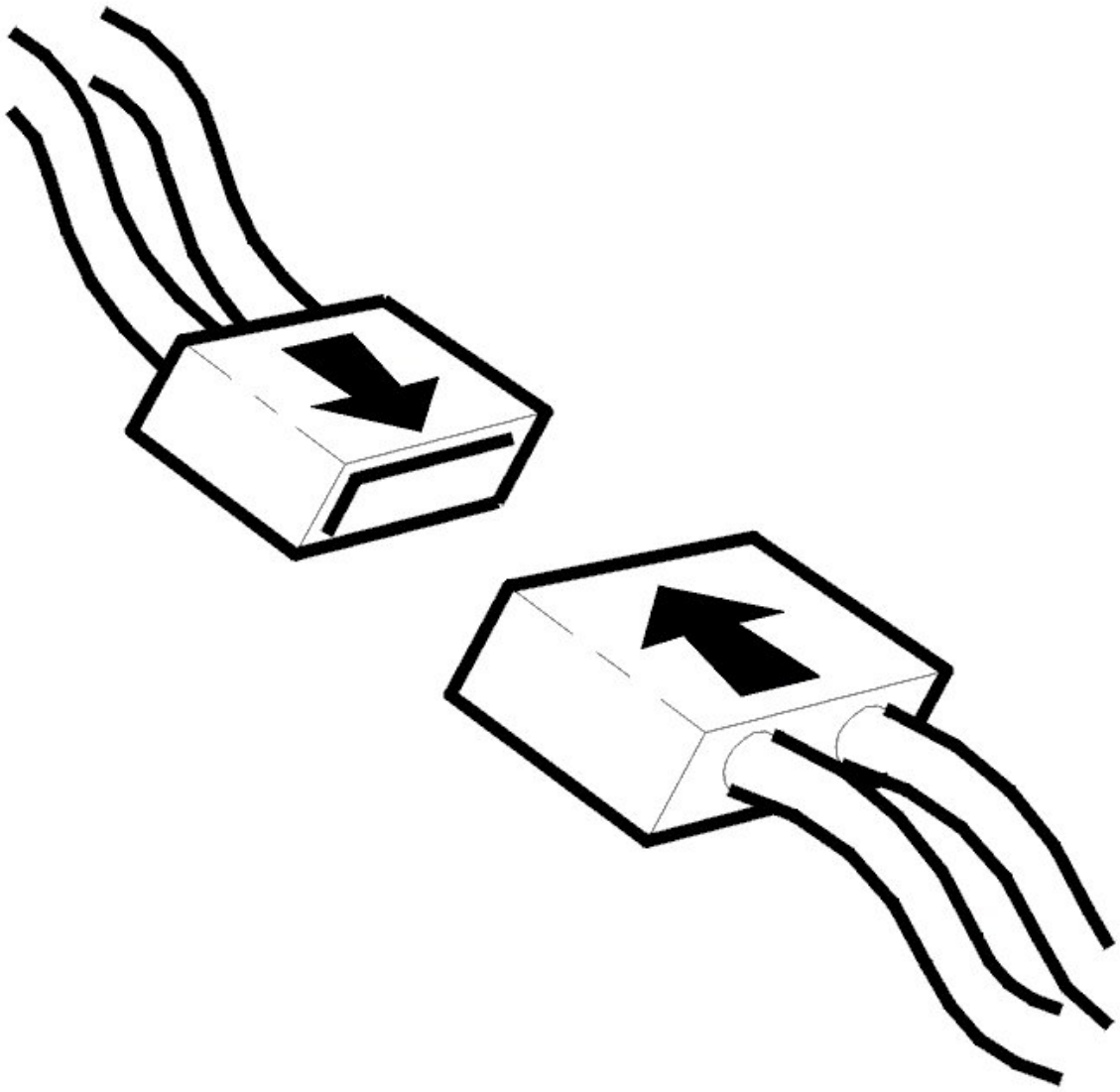
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

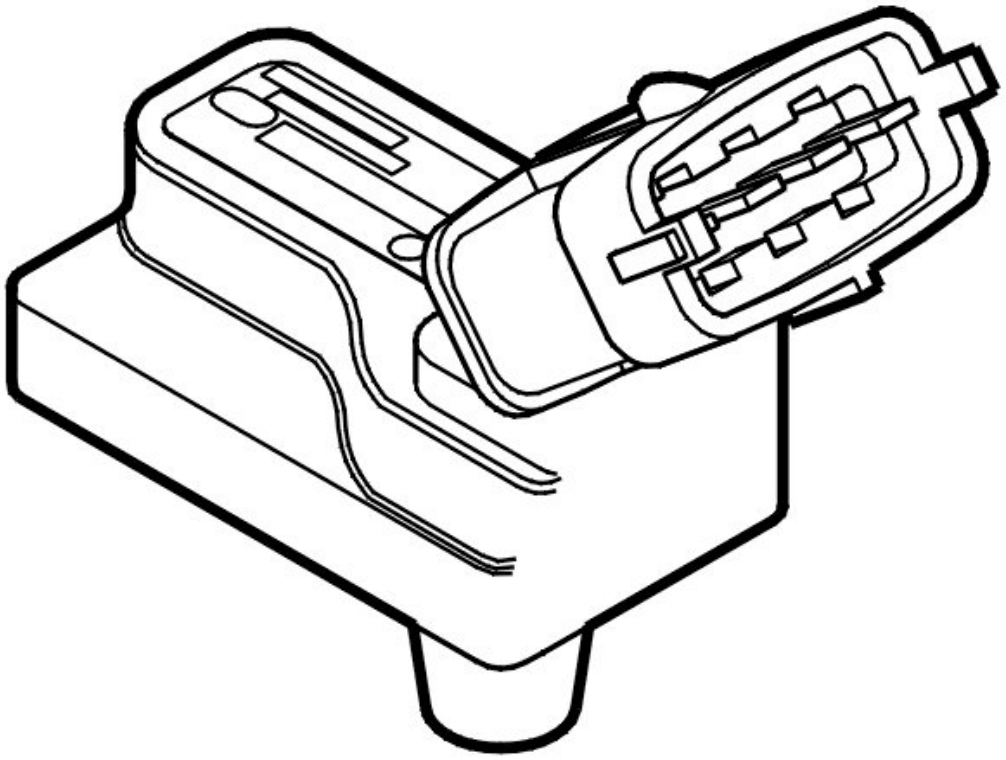
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-1260

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the boost pressure sensor signal is within its normal range is higher than a calculated value from the atmospheric pressure sensor.
The diagnostic trouble code (DTC) is diagnosed by the control module when the engine is running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

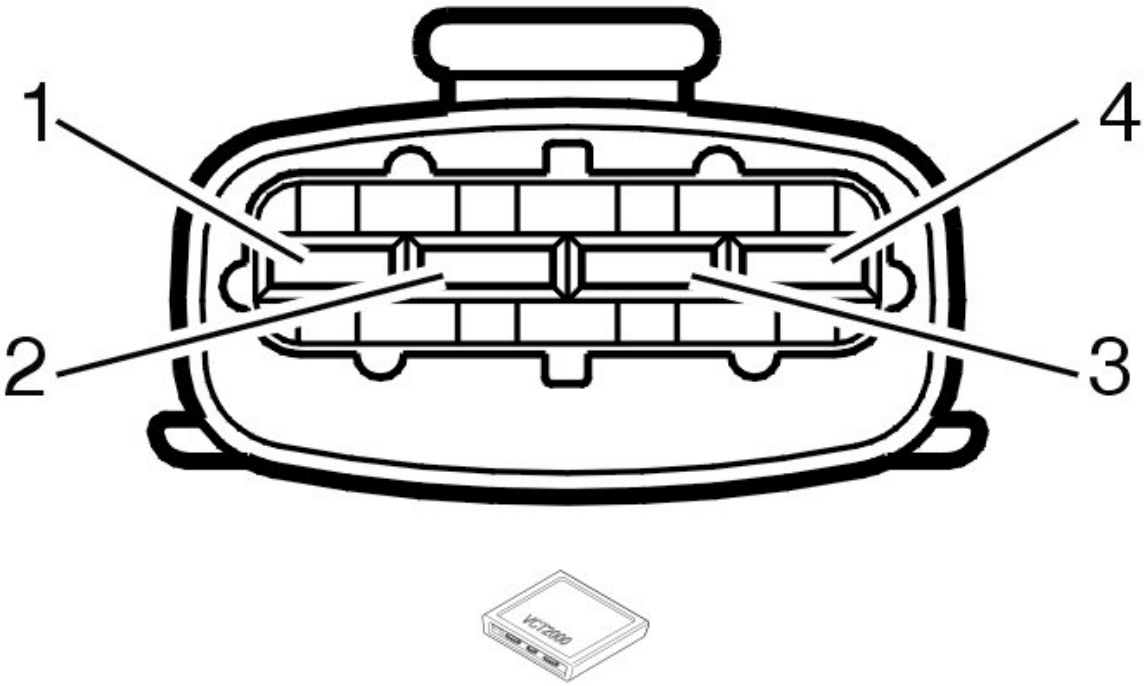
Faulty signal

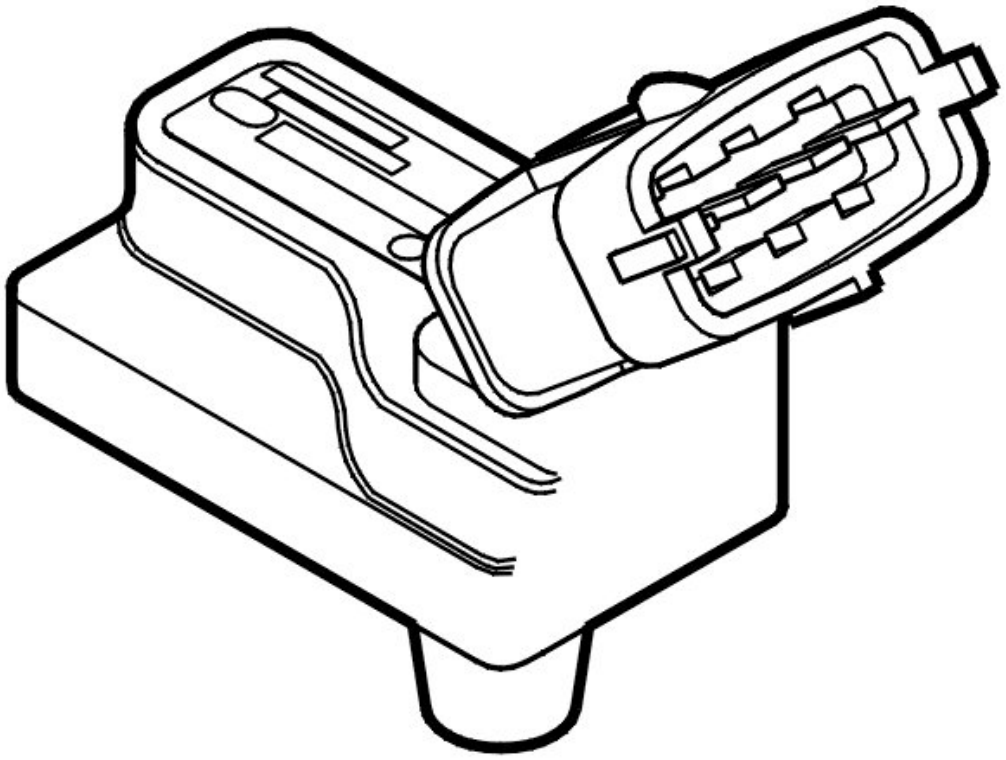
Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

Hint: The diagnostic trouble code (DTC) may be caused by a damaged boost pressure sensor.

Remedy as necessary.

Other information:
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





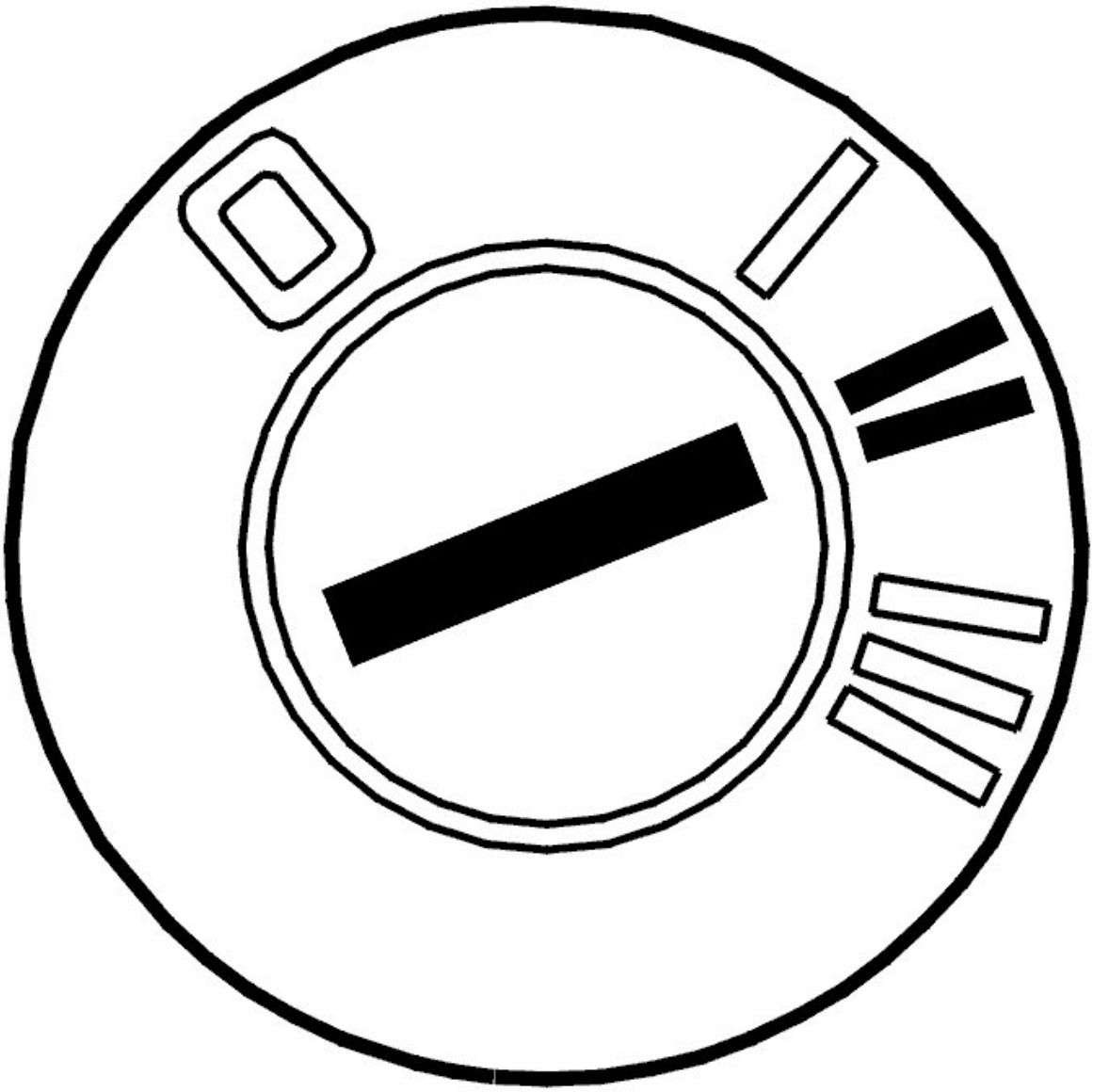
Continue - Verification

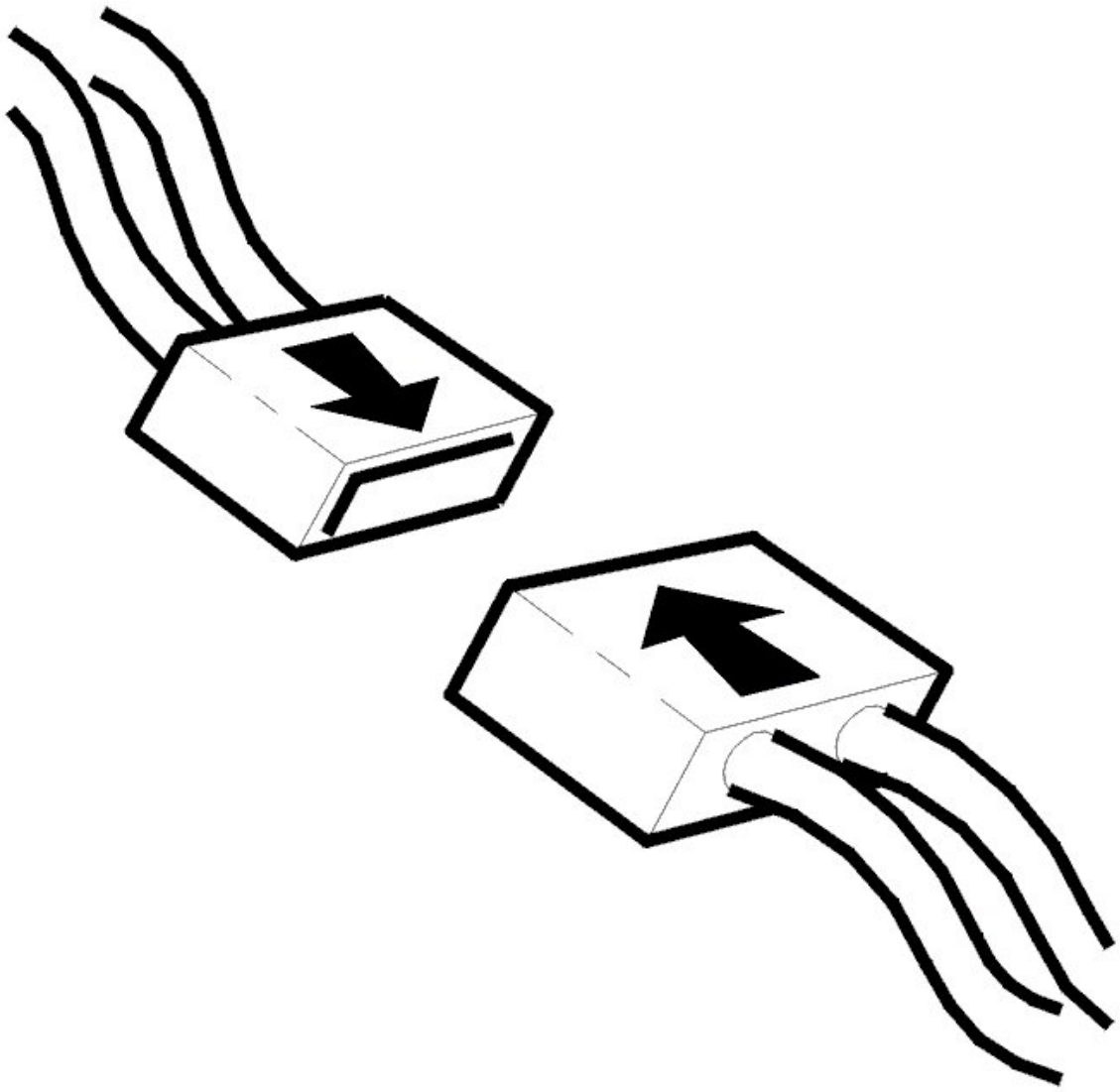
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

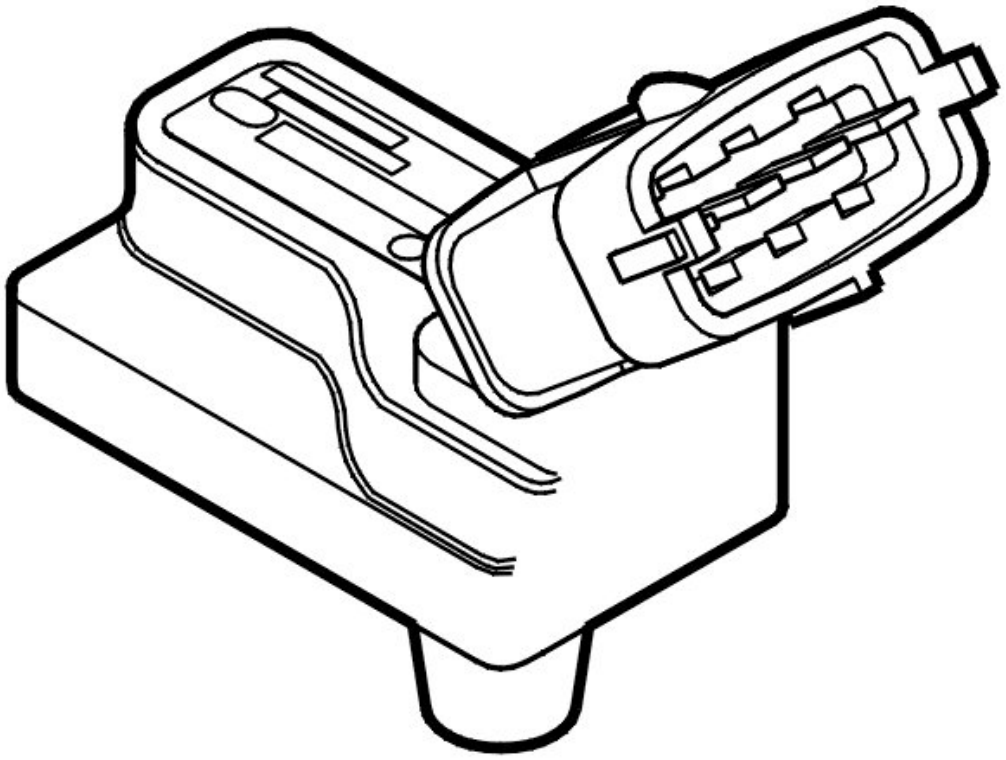
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-126B

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the boost pressure sensor signal is within its normal range but the signal is lower than a calculated value from the atmospheric pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Loose boost pressure sensor

- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Missing

Signal missing

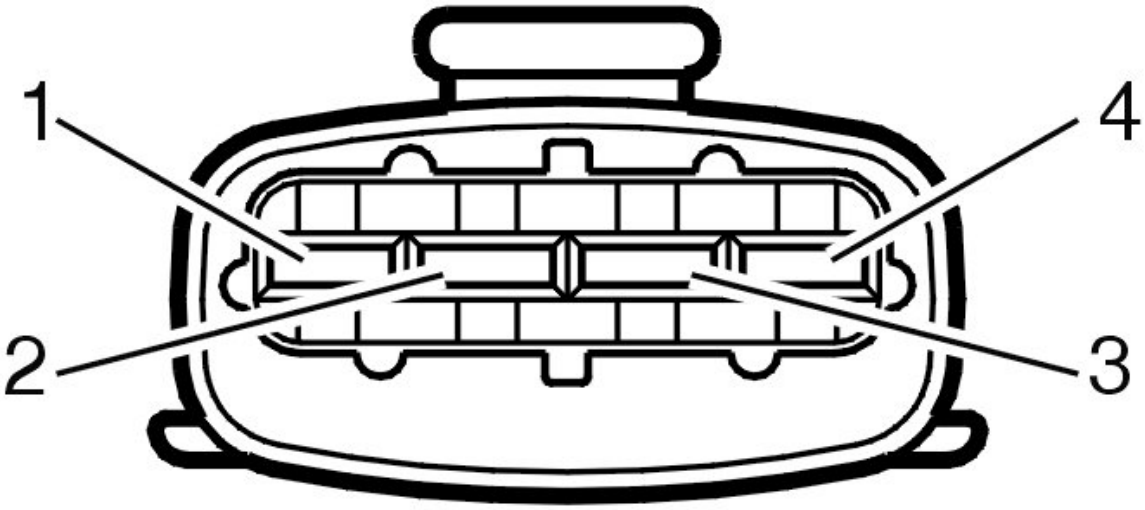
Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

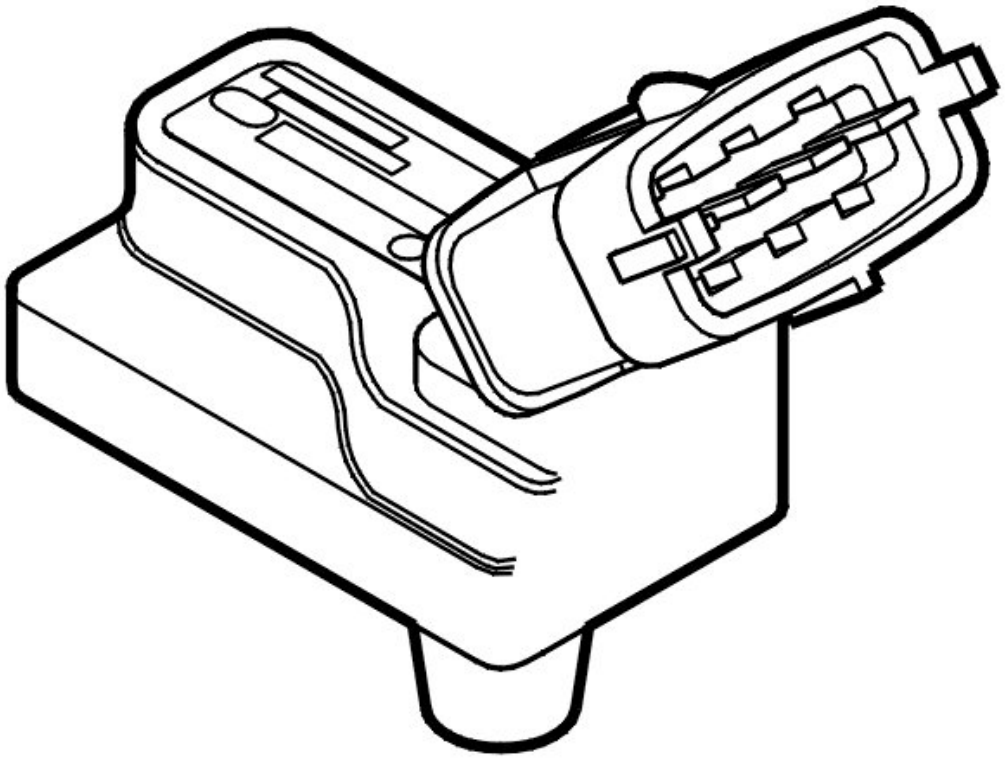
Check that the boost pressure sensor is correctly installed and that there is no air leakage.

Hint: The diagnostic trouble code (DTC) may be caused by a damaged boost pressure sensor.

Remedy as necessary.

Other information:
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





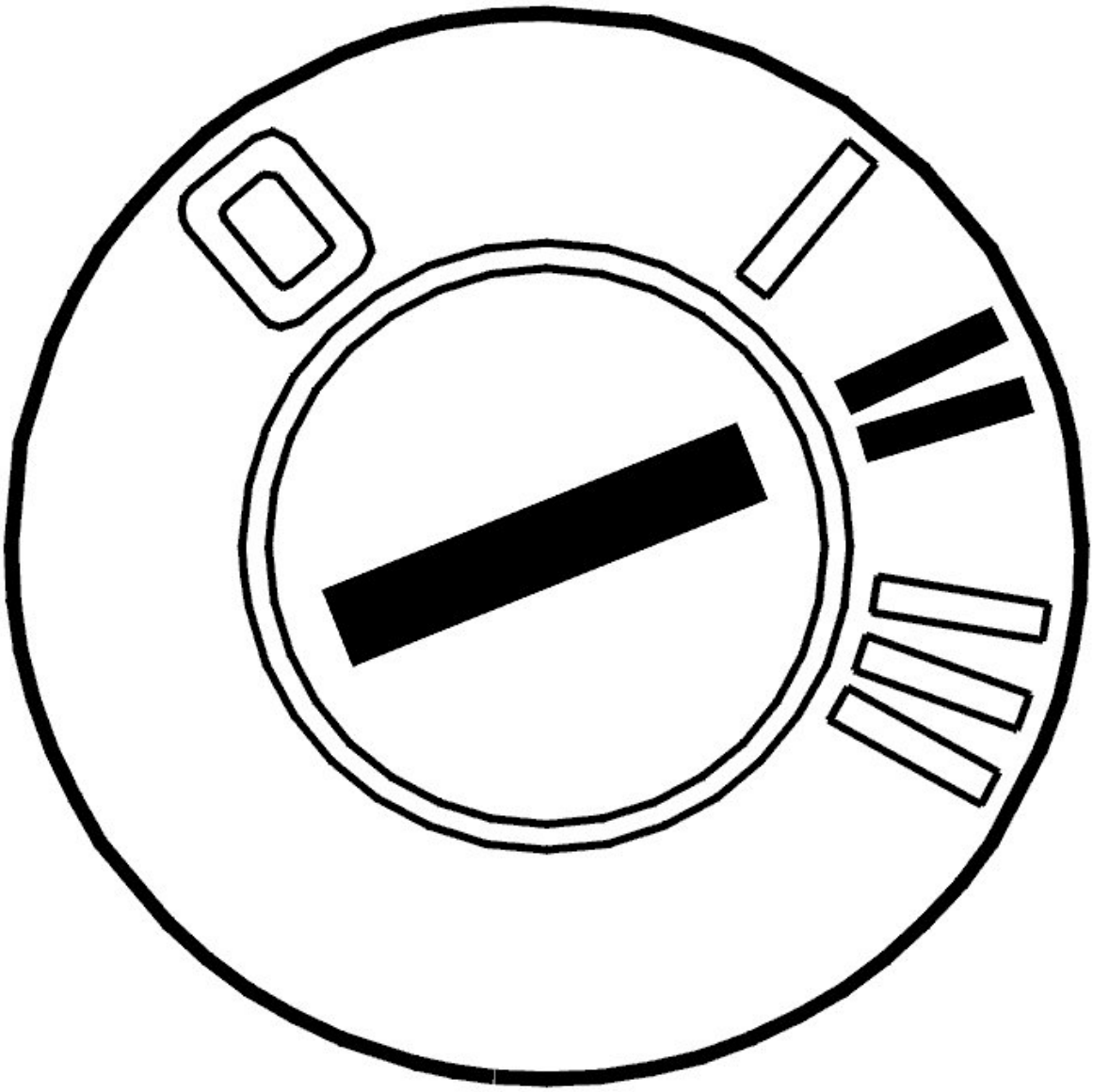
Continue - Verification

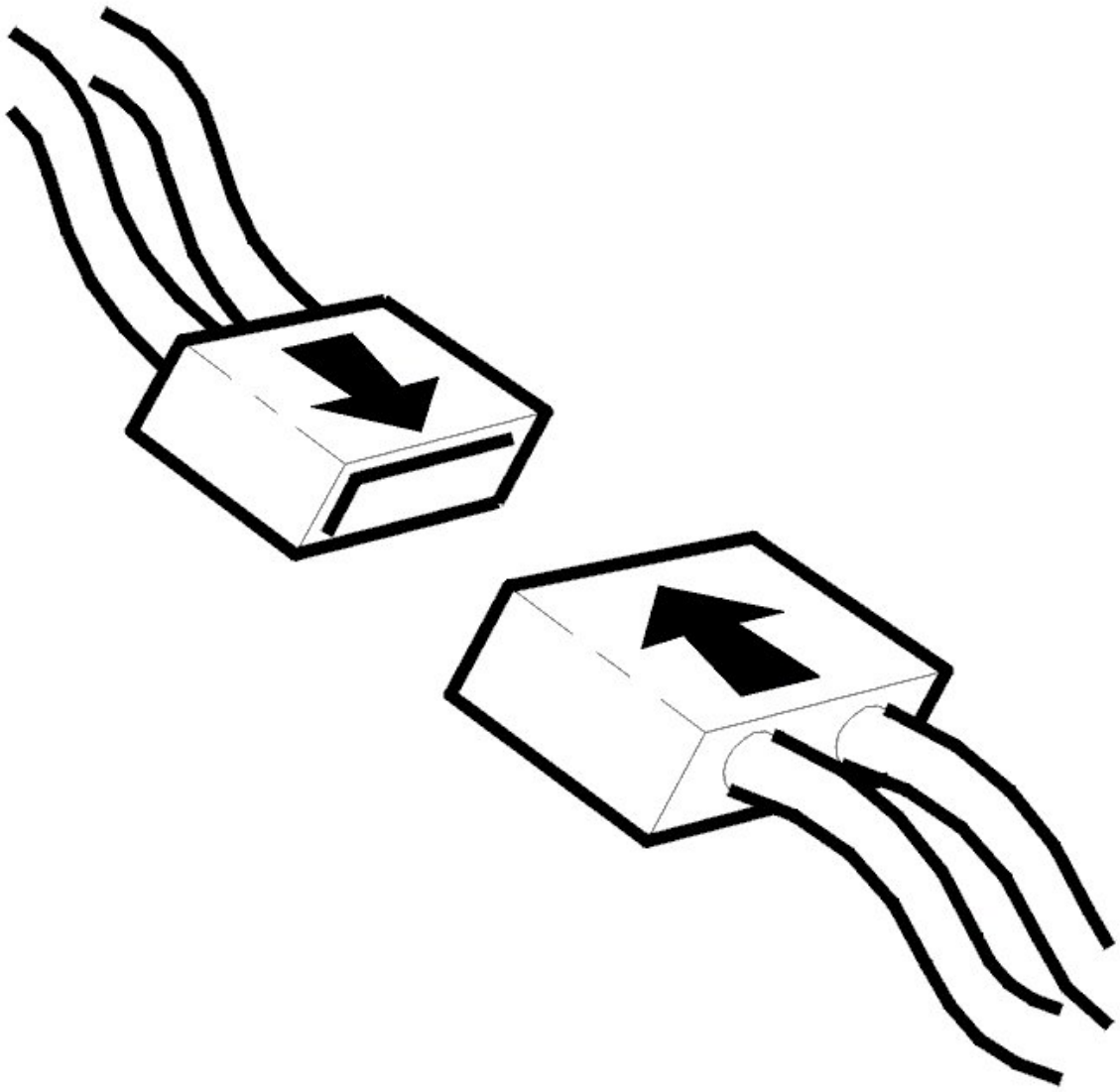
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

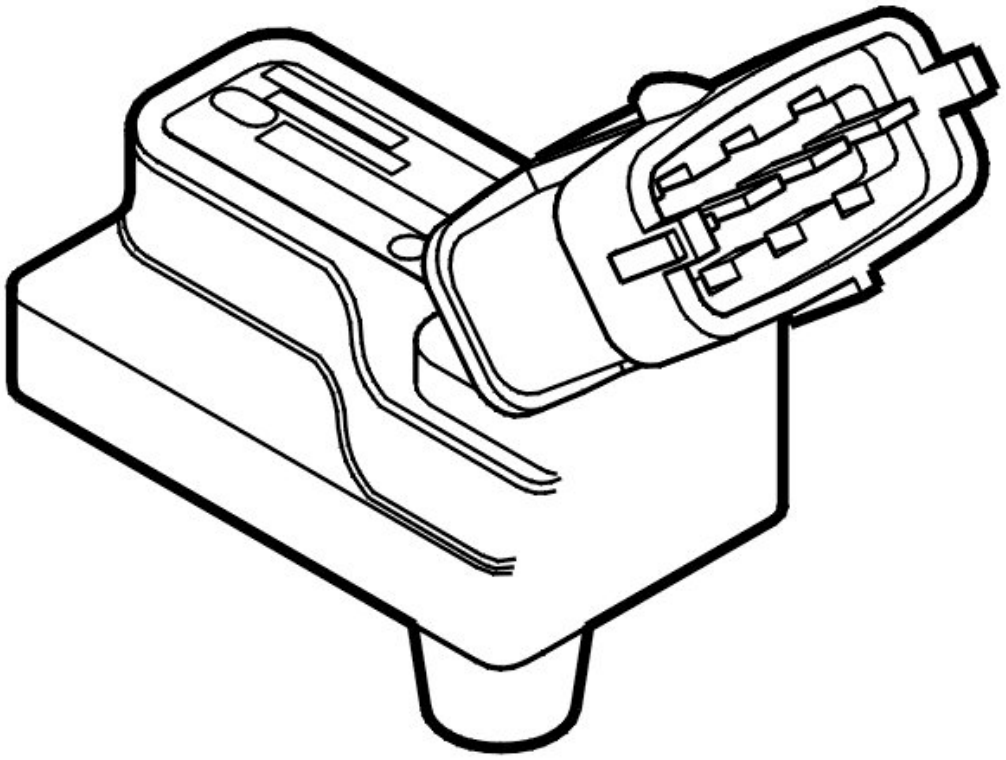
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-126C

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the boost pressure sensor is higher than a certain value for a certain amount of time.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable

- Open-circuit on signal ground cable
- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

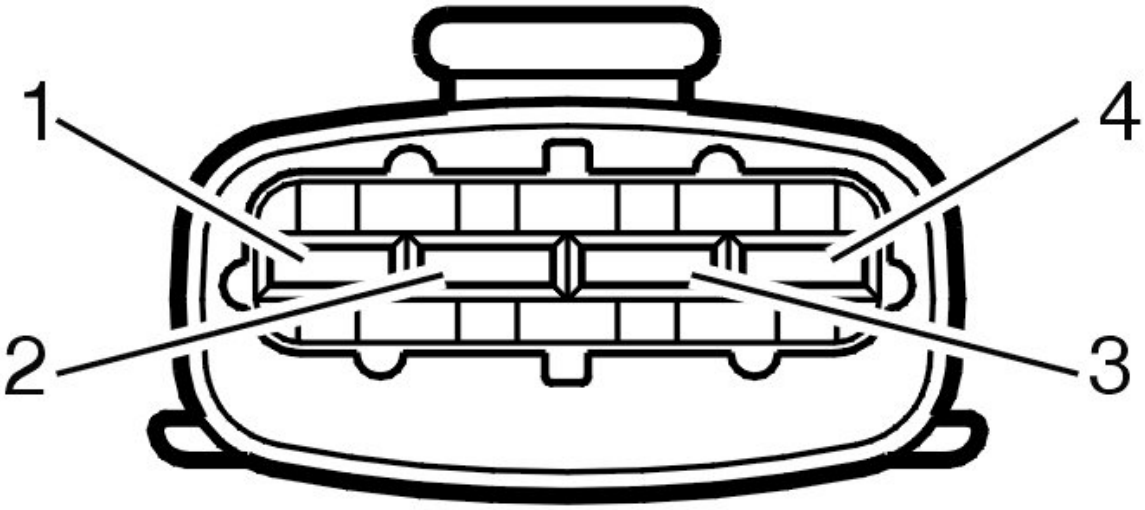
Signal Too High

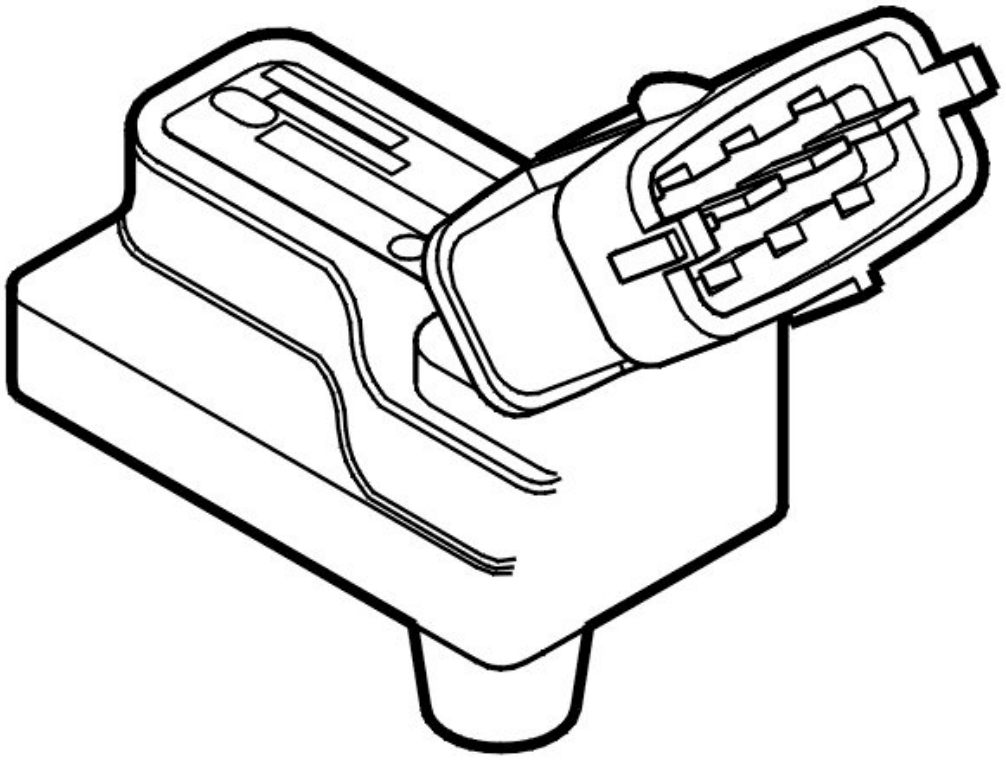
Signal too high

Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #A23 (#A23) and boost pressure sensor terminal #4. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead between control module terminal #A60 (#A60) and boost pressure sensor terminal #1. Check for an open-circuit.
Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





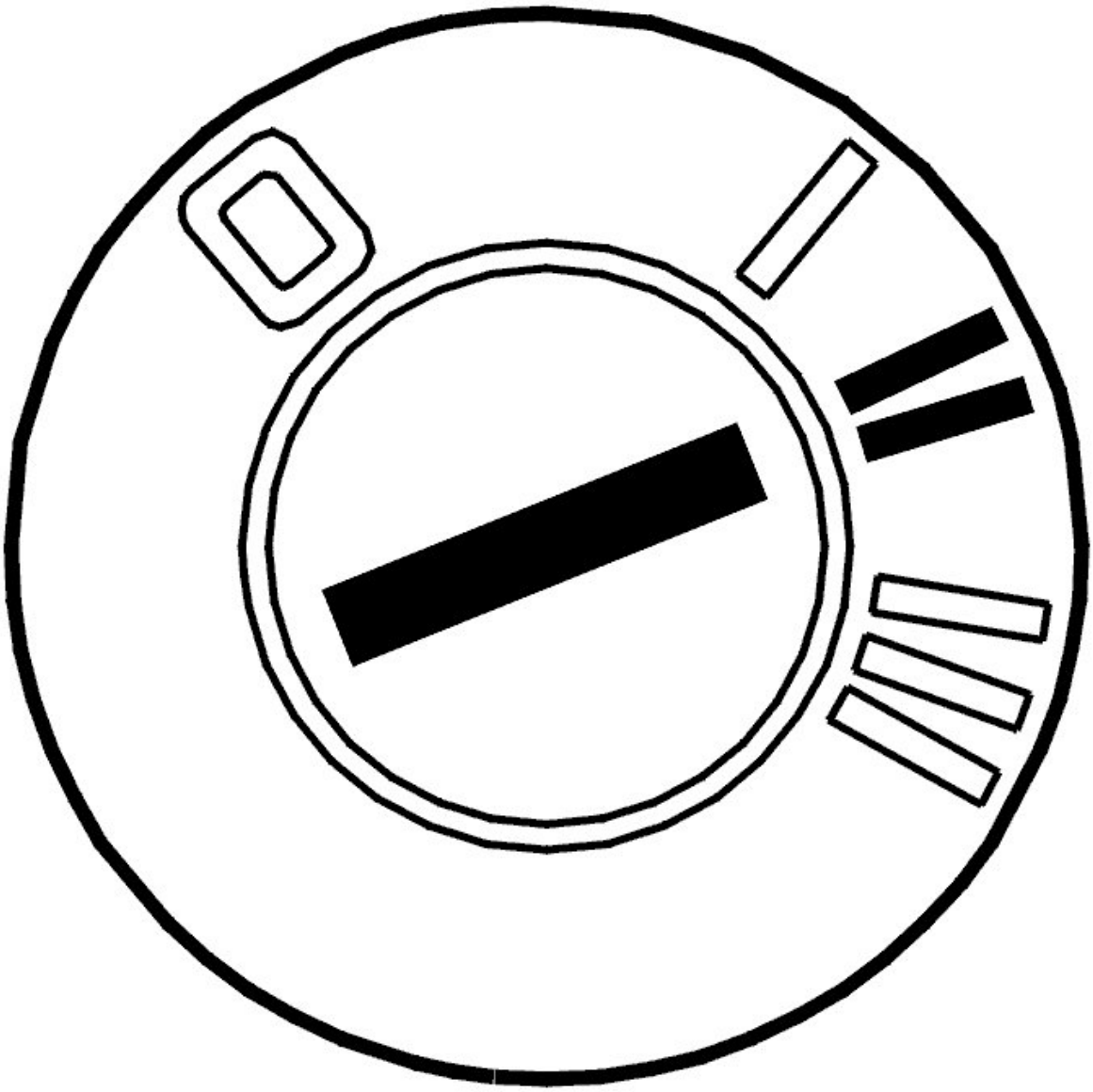
Continue - Verification

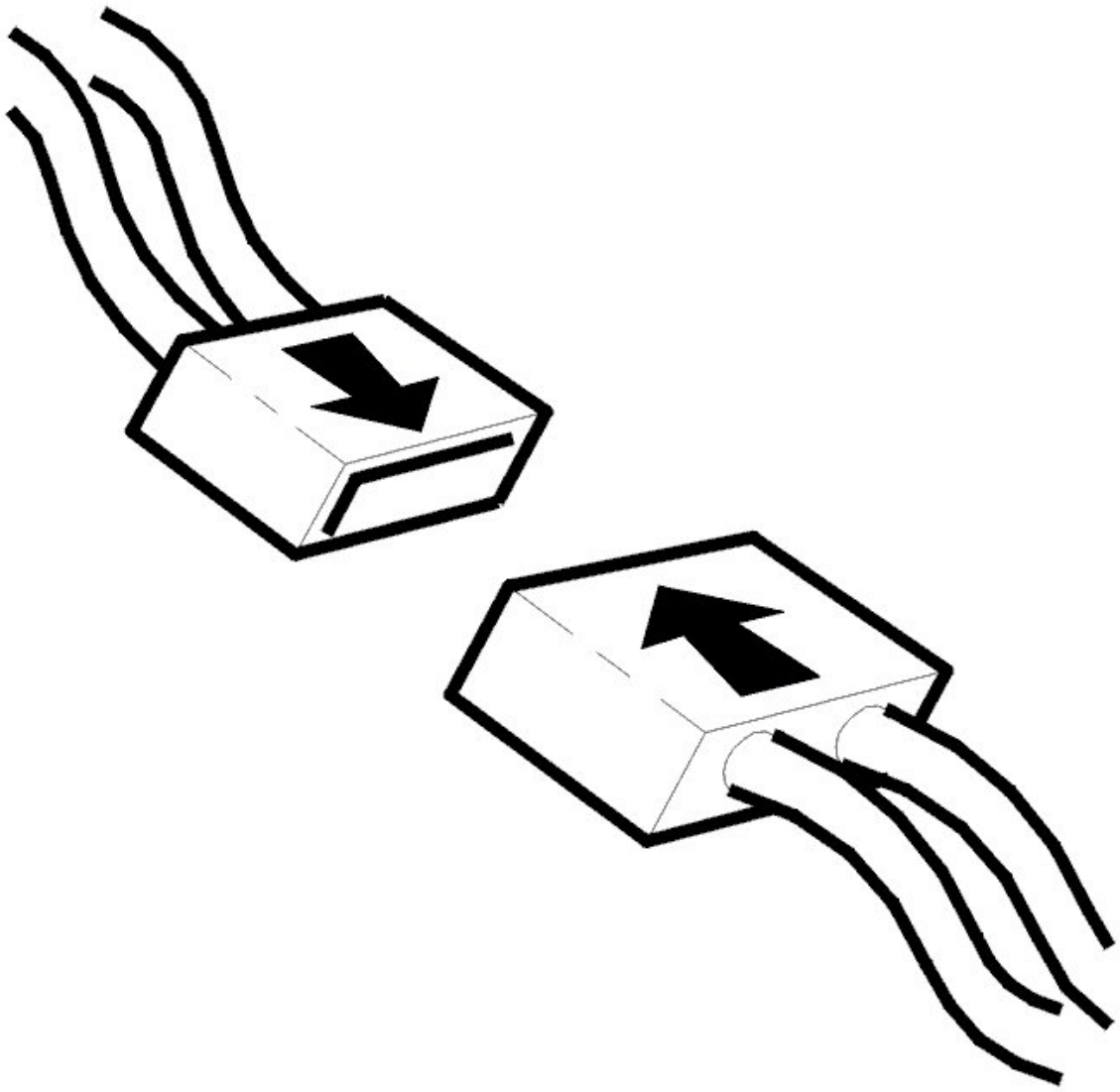
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

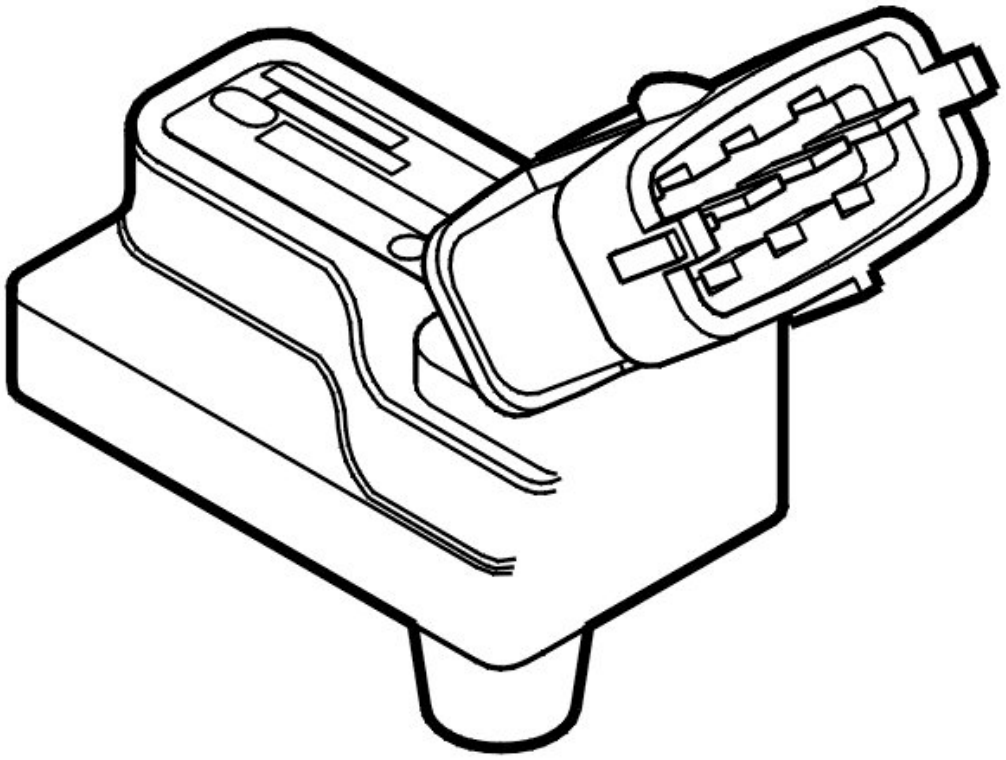
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-126D

Condition



The engine control module (ECM) checks the signal from the boost pressure sensor.
The diagnostic trouble code (DTC) is stored if the signal from the boost pressure sensor is lower than a certain value for a certain amount of time.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- Limited boost pressure.

Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to ground in the signal cable
- Damaged boost pressure sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

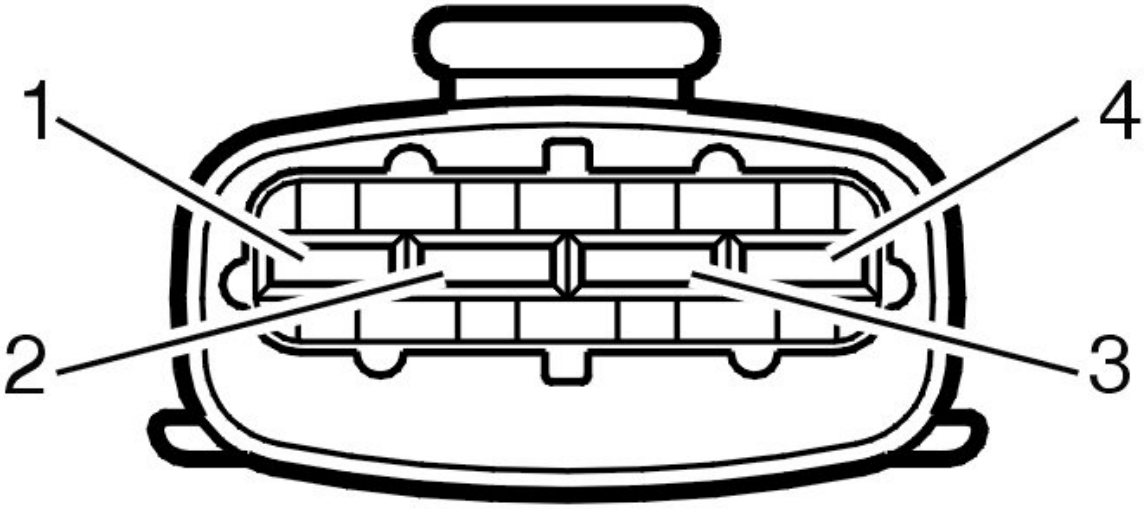
Signal Too Low/Signal Too High

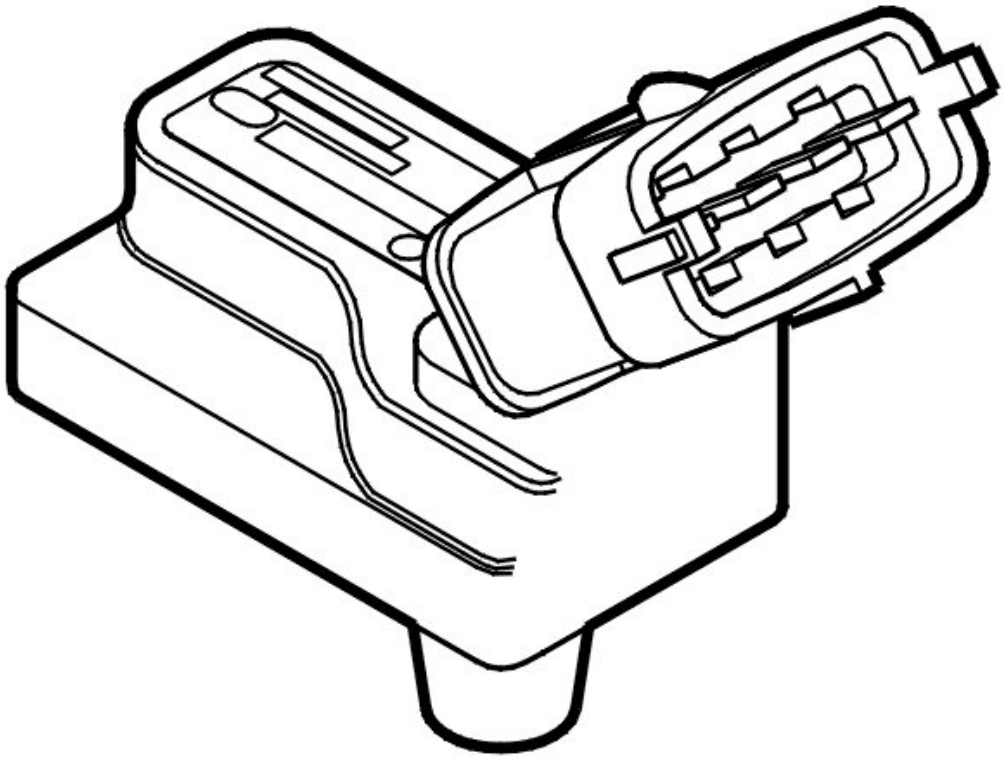
Signal too low / signal too high

Checking components and wiring
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #A23 (#A23) and boost pressure sensor terminal #4. Check for a short-circuit to ground.
Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





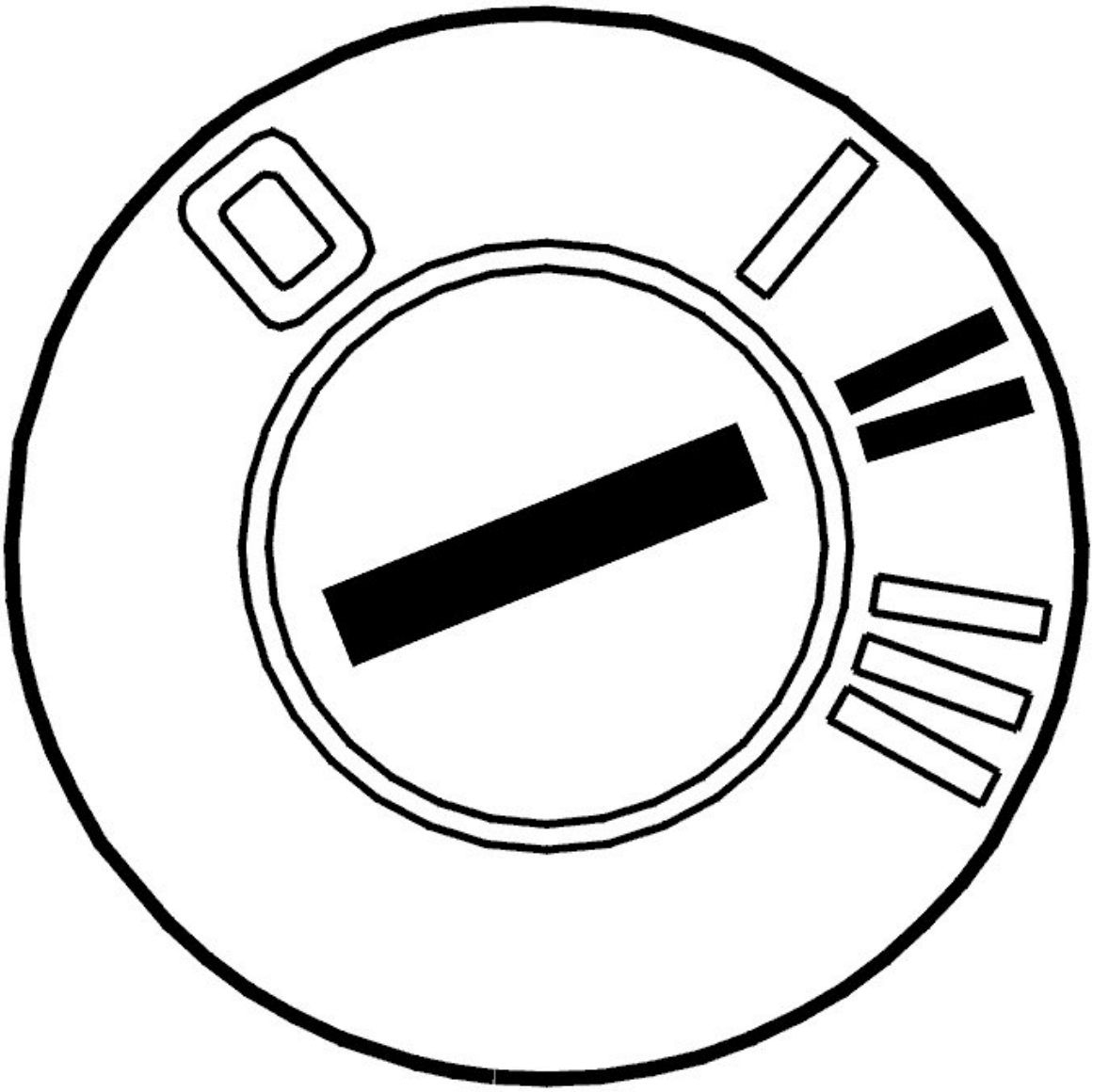
Continue - Verification

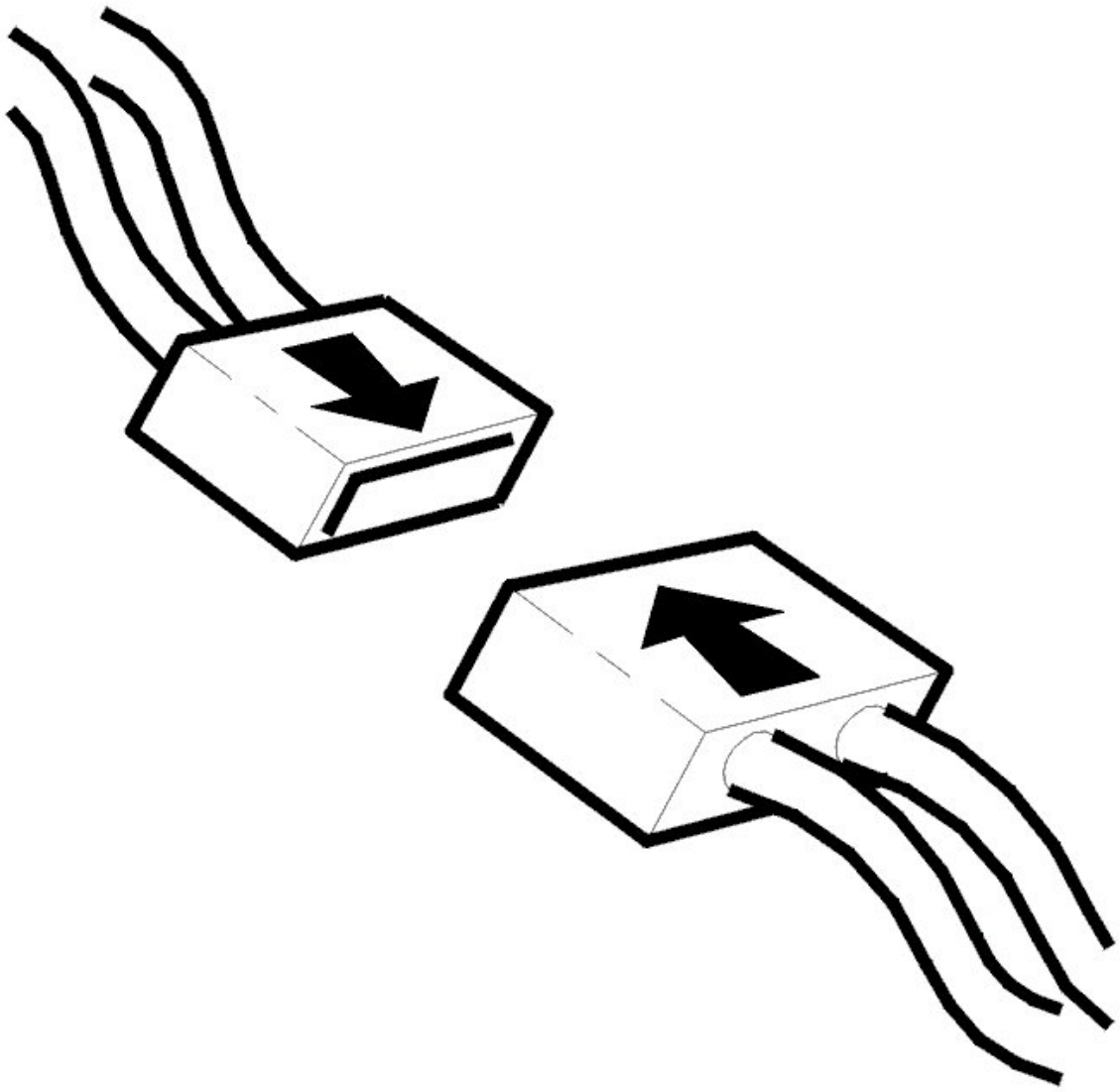
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the boost pressure sensor pressure and atmospheric pressure sensor pressure
- The difference between the pressure sensors should not be greater than 140 hPa.

Is the difference between the pressure sensors less than 140hPa?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

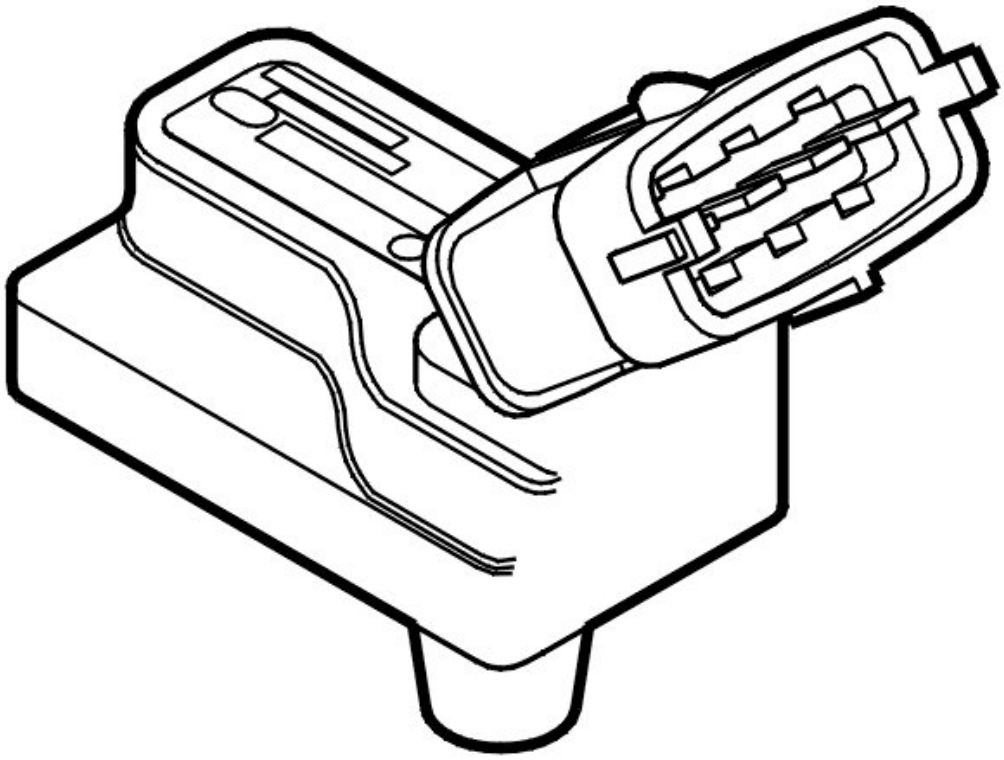
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-131C

Condition



The engine control module (ECM) checks the signal for the intake air temperature.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the intake air temperature corresponds to a temperature that is higher than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Predefined value for intake air temperature
- Three-way catalytic converter (TWC) preheating and idle air trim diagnostics are disabled.

Possible source
- Short-circuit to ground in the signal cable

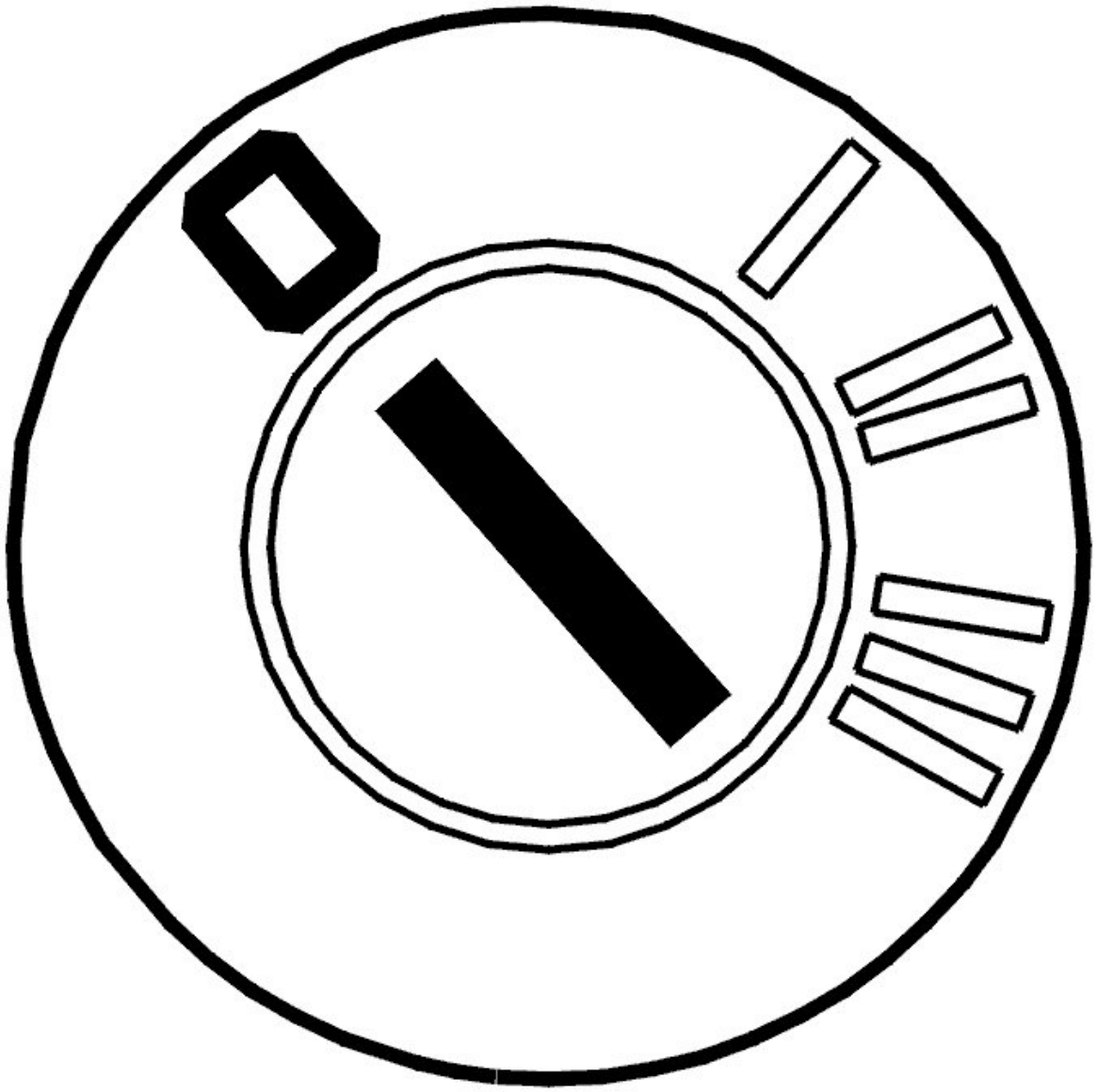
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

Signal too high

Checking the wiring and component



- Ignition off.

Check the intake air temperature (IAT) sensor resistance between terminals #1 and #2 on the boost pressure sensor.

Note! The intake air temperature (IAT) sensor is integrated in the boost pressure sensor.

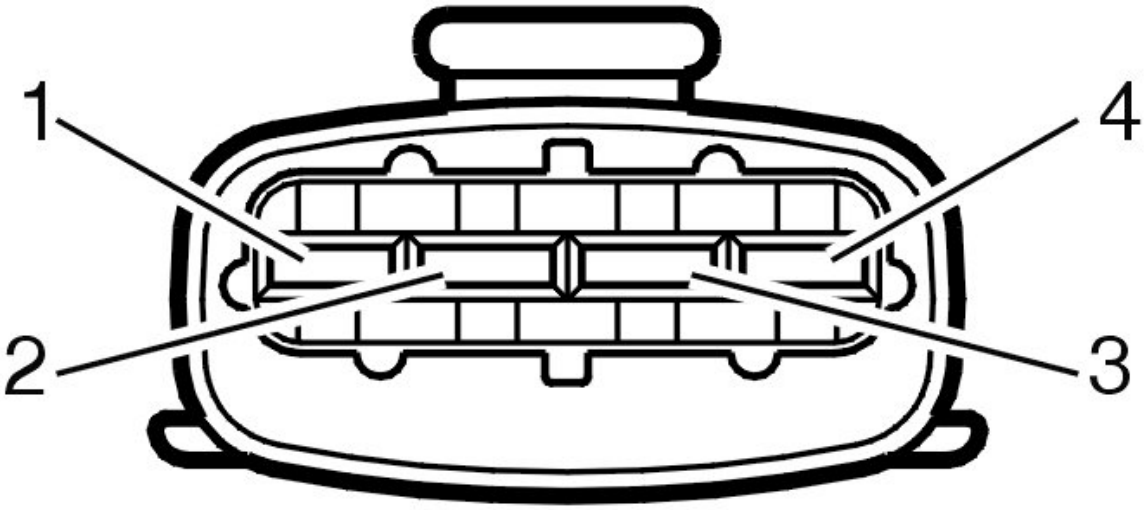
Check the signal cable between engine control module (ECM) terminal #A5 (#A5) and boost pressure sensor terminal #2 for short circuit to ground.

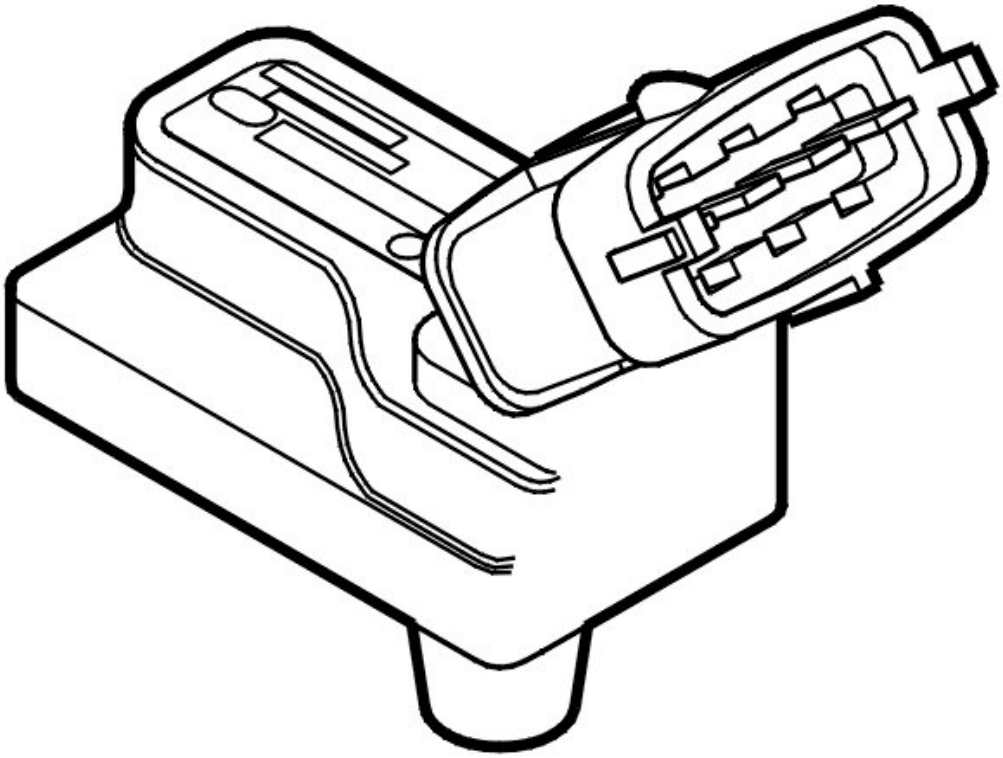
Hint: With the ignition on and the boost pressure sensor connector unplugged, the voltage between terminal #2 and the grounding terminal should be 5 V, measured at the connector. Read off air temperature by clicking on the VCT2000 symbol.

If no errors are found and the fault is permanent, replace the intake air temperature (IAT) sensor.
Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information on signals, 5-cyl: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information on signals, 6-cyl: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification

- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- For information on resistance values: Component specifications See: Engine Control Module/Specifications
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



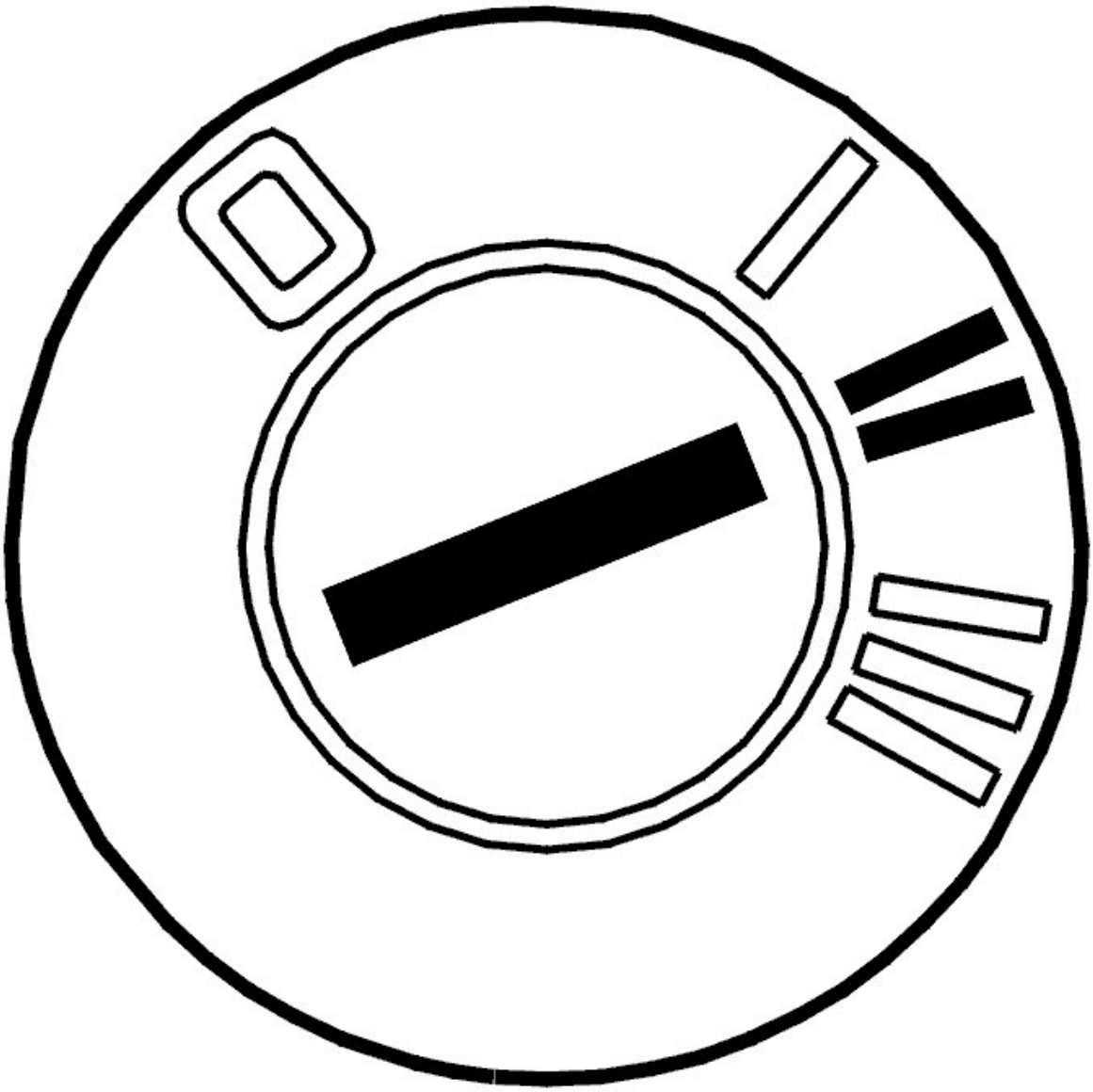


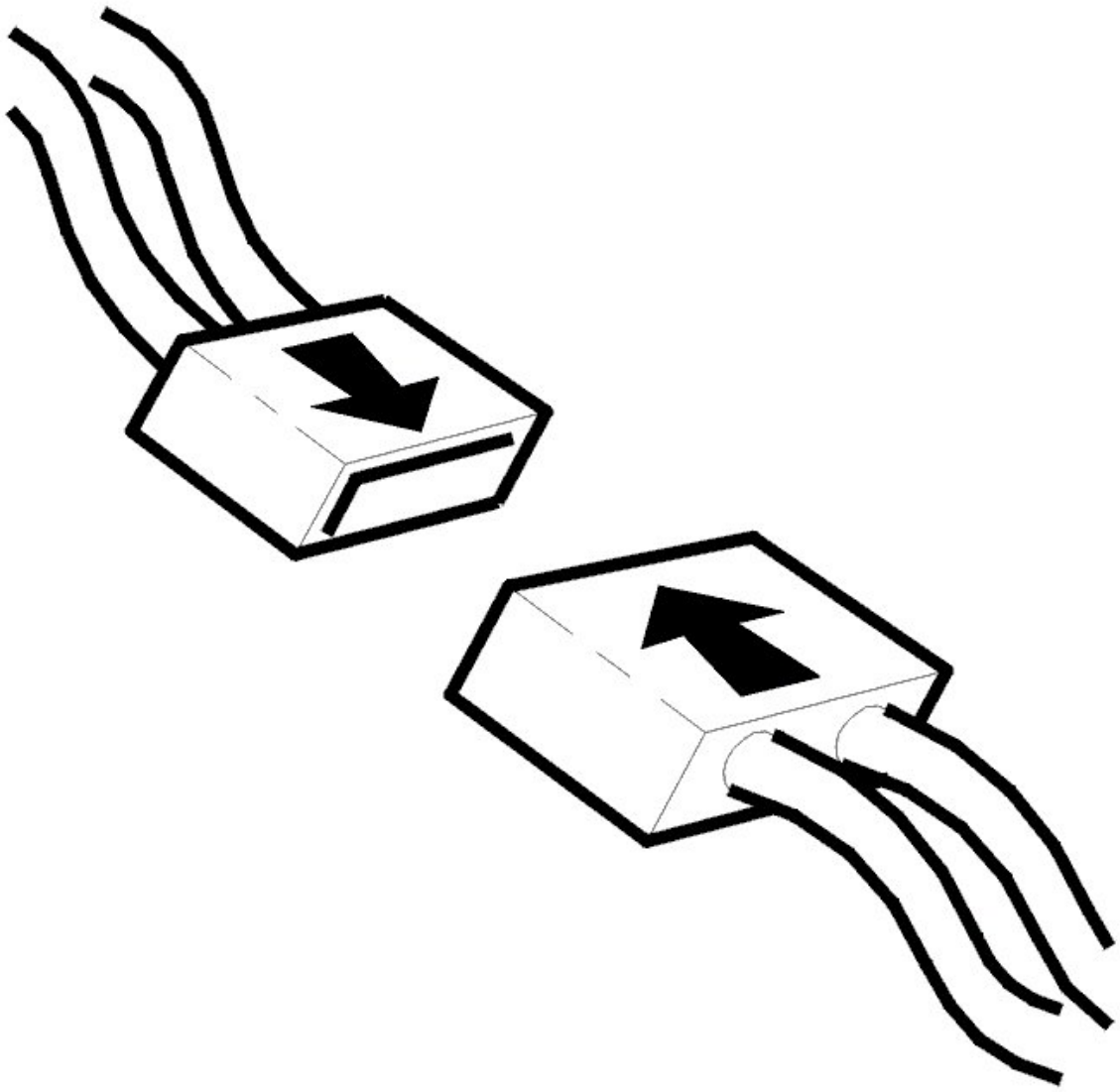
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the intake air temperature (IAT).

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

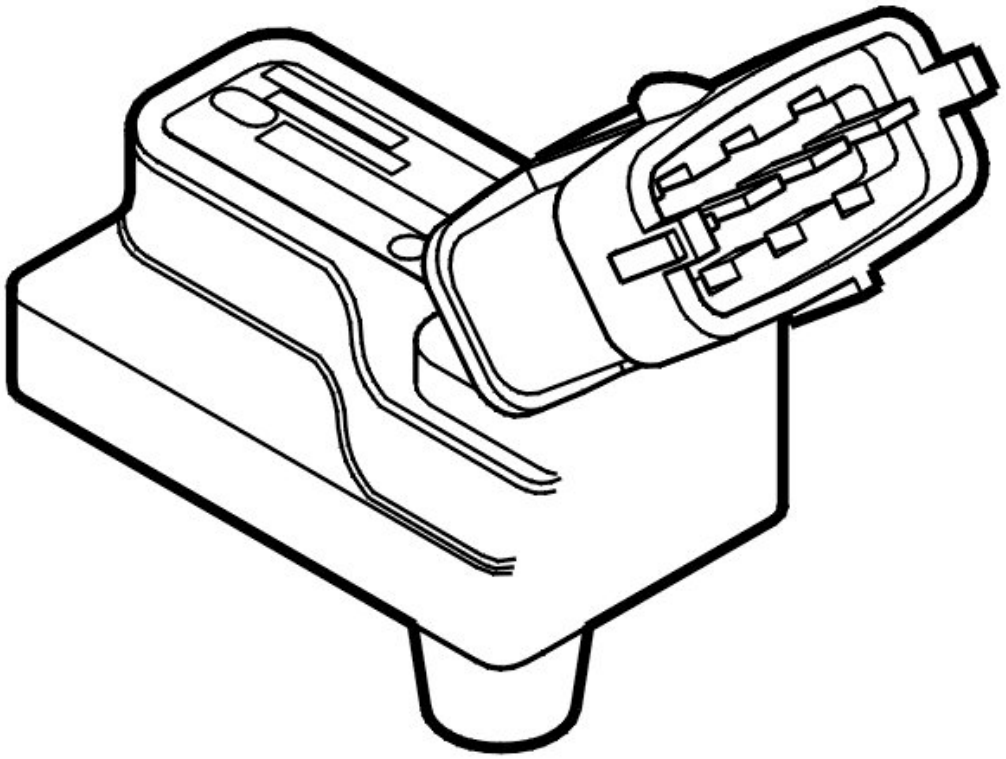
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-131D

Condition



The engine control module (ECM) checks the signal for the intake air temperature.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the intake air temperature corresponds to a temperature that is lower than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Predefined value for intake air temperature
- Three-way catalytic converter (TWC) preheating and idle air trim diagnostics are disabled.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Short-circuit to supply voltage in the signal cable

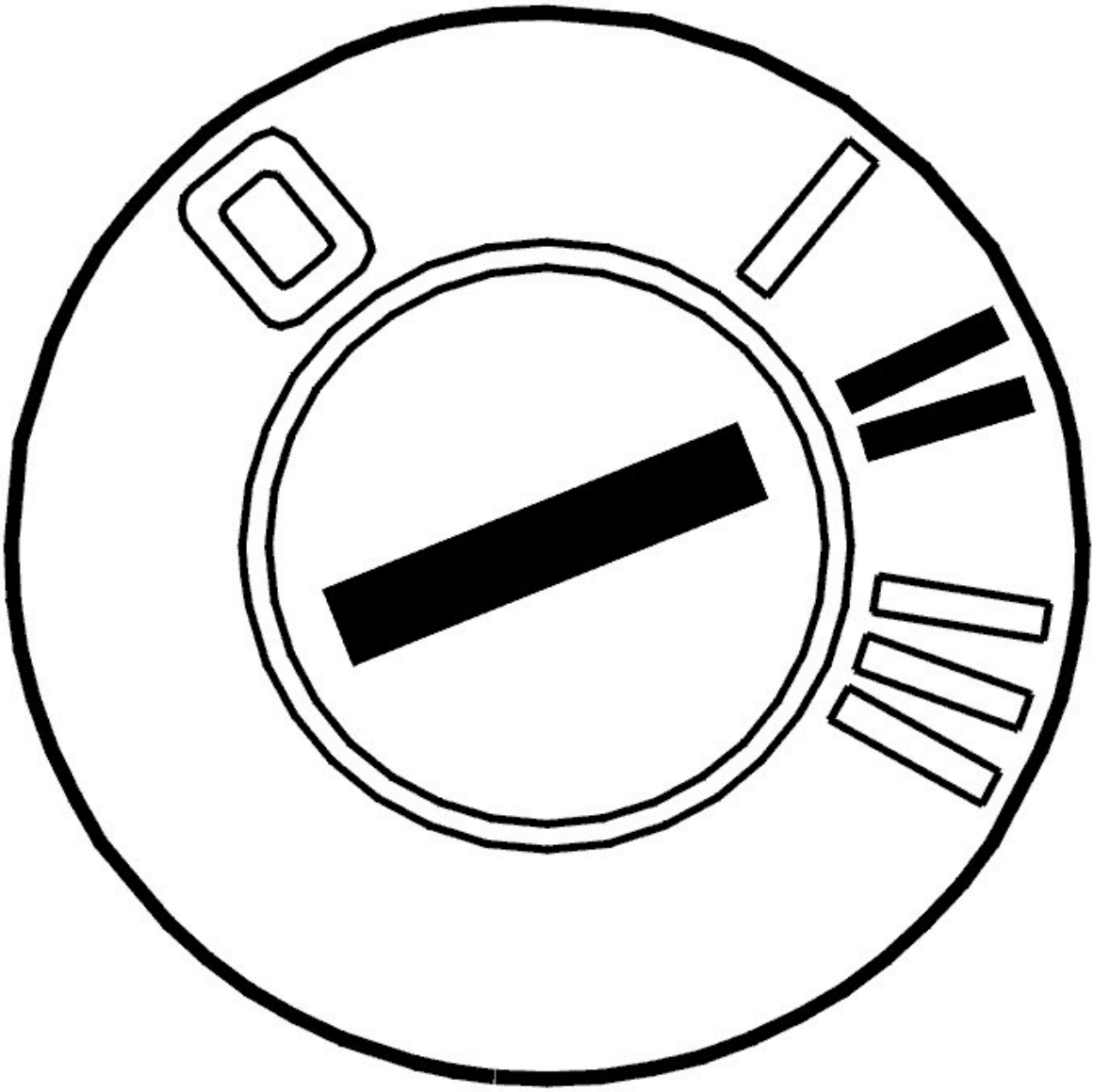
- Damaged intake air temperature (IAT) sensor.

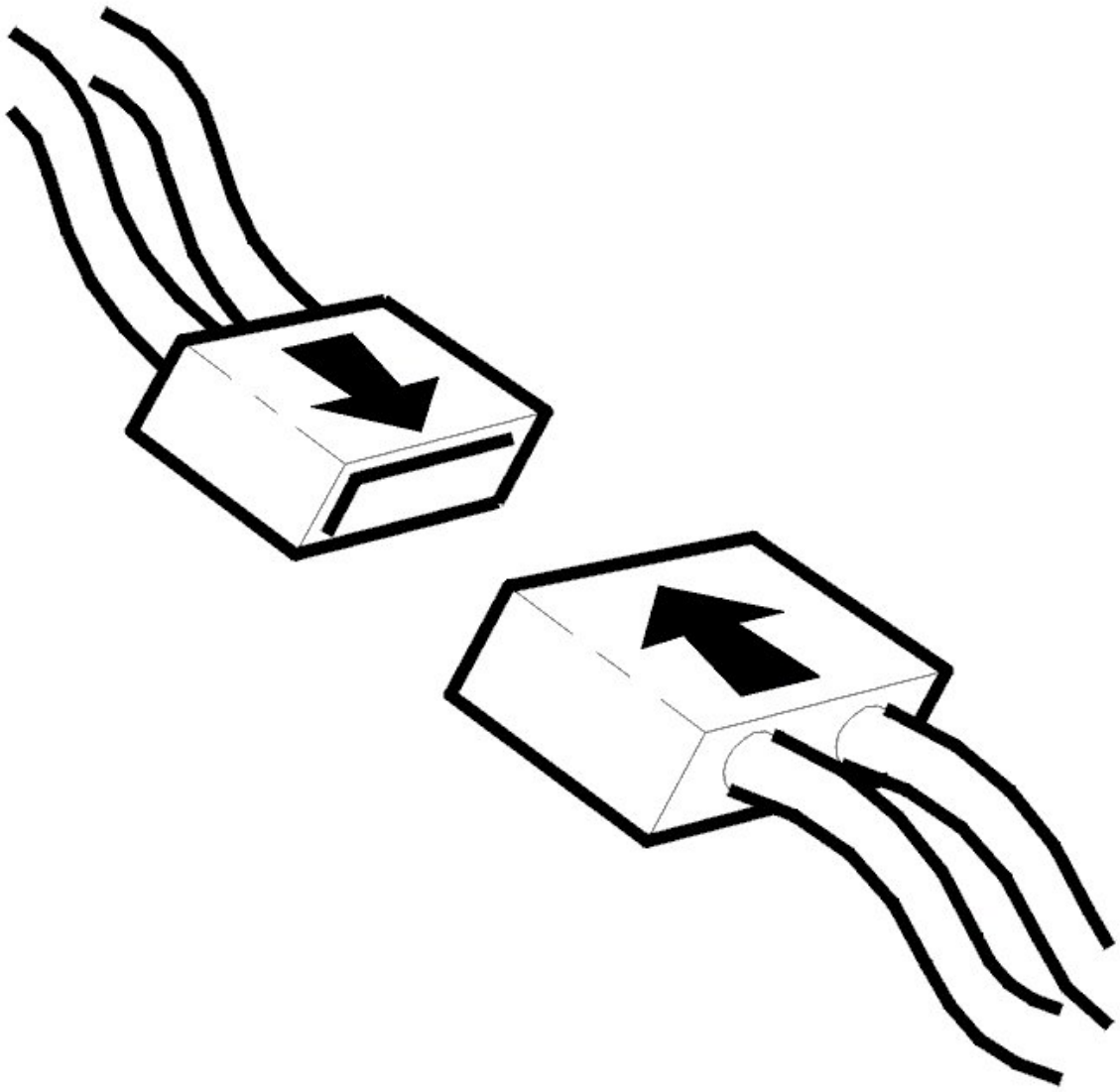
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too Low

Signal too low

Checking the connector





- Ignition off
- Check the boost pressure sensor connector. Check for contact resistance and oxidation.

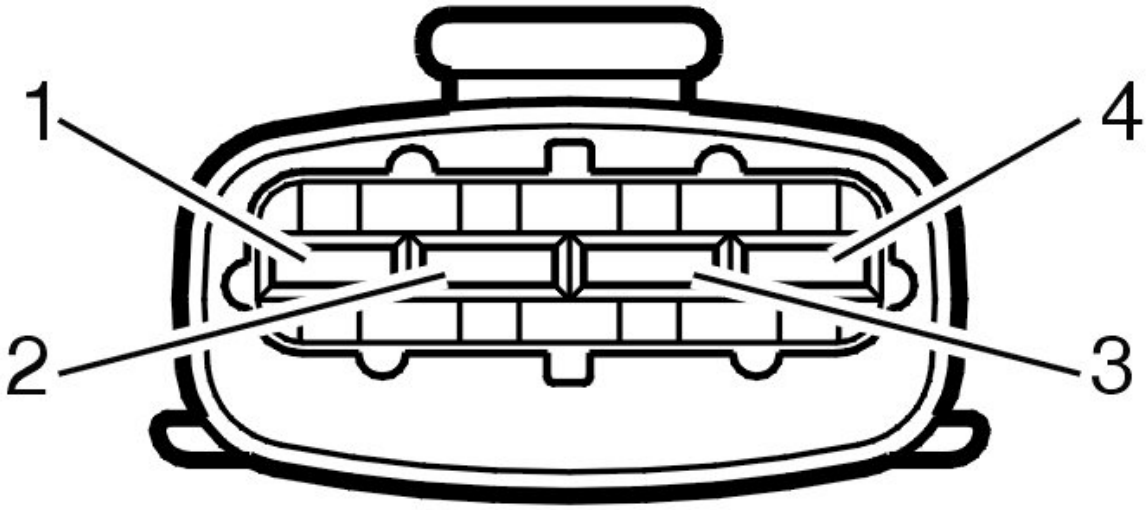
Note! The intake air temperature (IAT) sensor is integrated in the boost pressure sensor

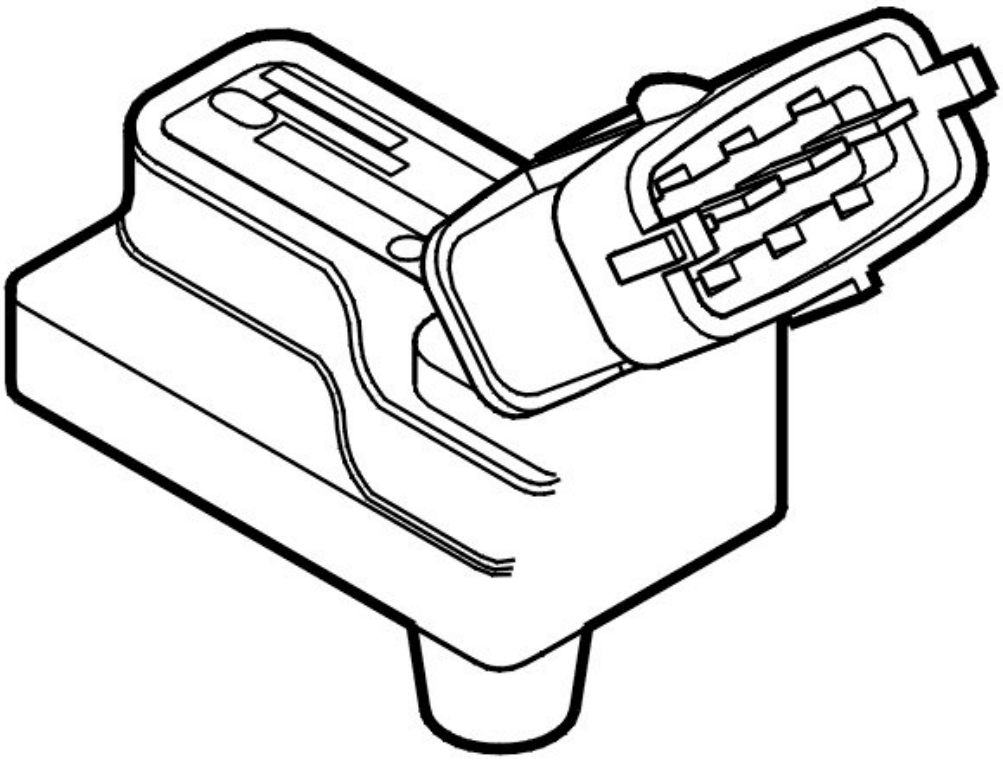
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the intake air temperature (IAT).

Check that the intake air temperature (IAT) is within its permitted range. If the intake air temperature (IAT) is now within its permitted range, the fault was caused by loose connections in the connector.

Other information:

- To access or replace the intake air temperature (IAT) sensor, see Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair.



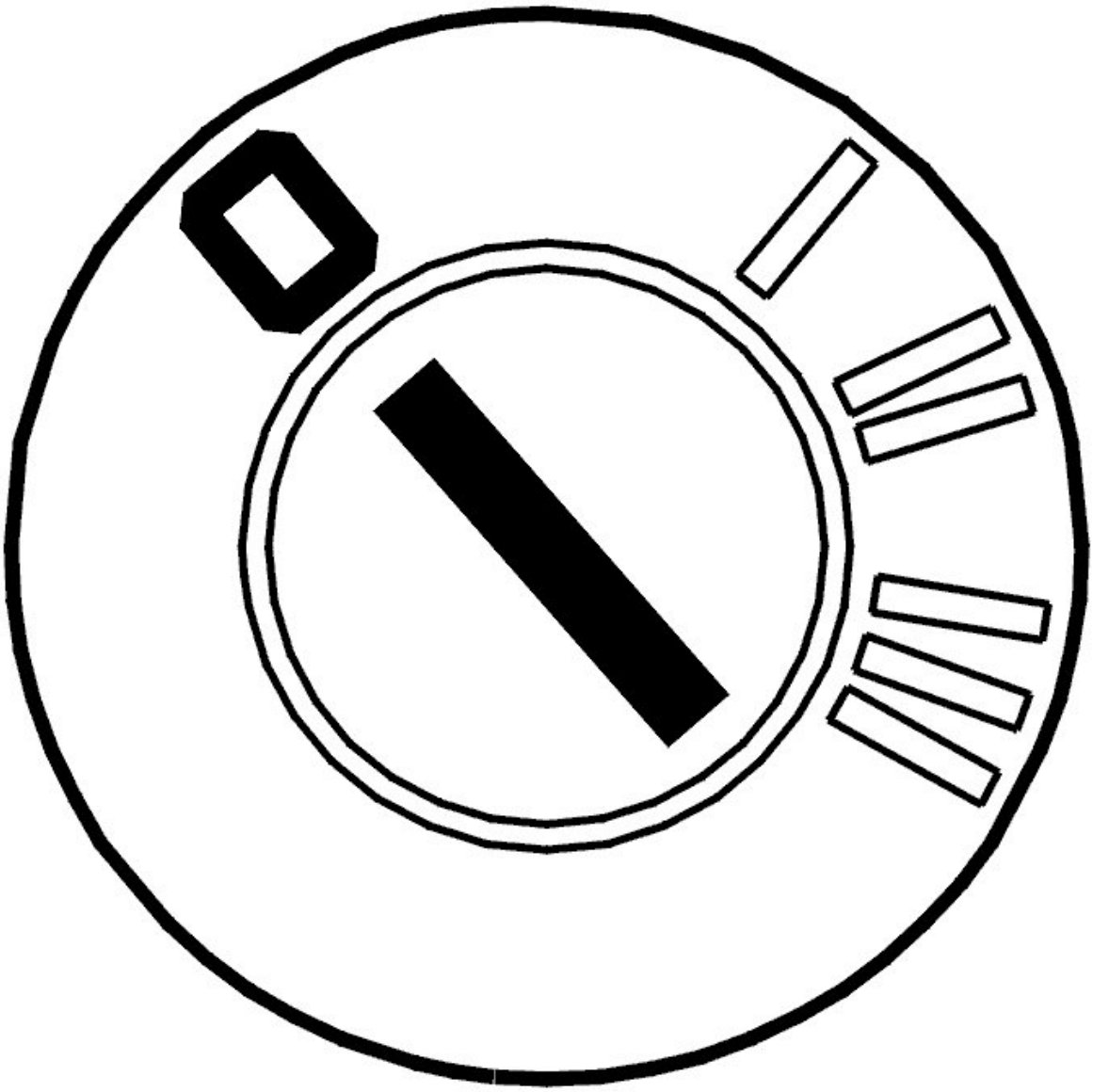


Is the temperature within its permitted range?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component



- Ignition off.

Check the intake air temperature (IAT) sensor resistance between terminals #1 and #2 on the boost pressure sensor.

Note! The intake air temperature (IAT) sensor may be defective if there gas been a short-circuit to supply voltage in the signal cable. Check this before replacing the sensor.

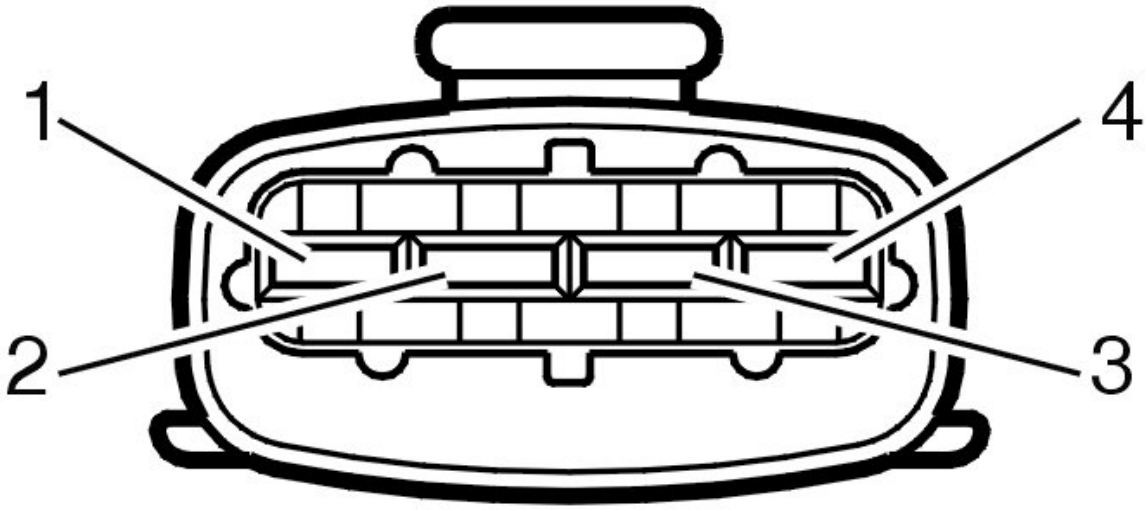
Check the signal cable between control module terminal #A5 (#A5) and boost pressure sensor terminal #2. Check for a short-circuit to supply voltage. Check for an open-circuit.

Hint: With the ignition on and the boost pressure sensor connector disconnected, the voltage between terminal #2 and ground must be approximately 5 V.

Check the ground lead between control module terminal #A60 (#A60) and boost pressure sensor terminal #1. Check for an open-circuit.
If no errors are found and the fault is permanent, replace the intake air temperature (IAT) sensor.
Remedy as necessary.

Other information:

- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the intake air temperature (IAT) sensor, see Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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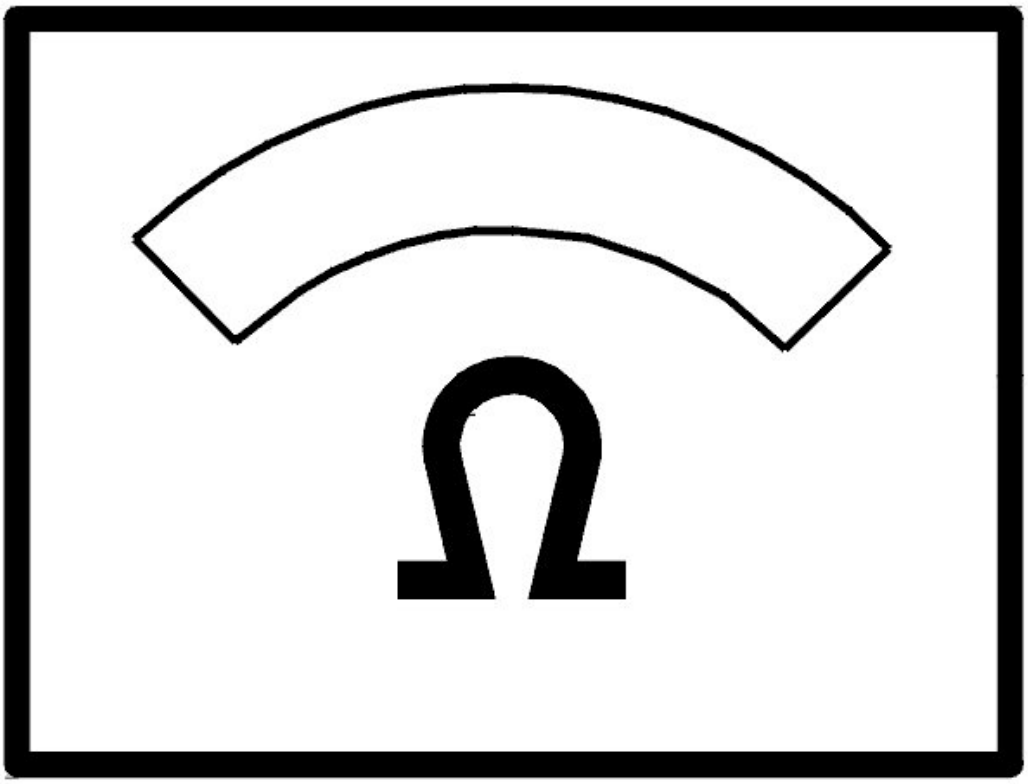
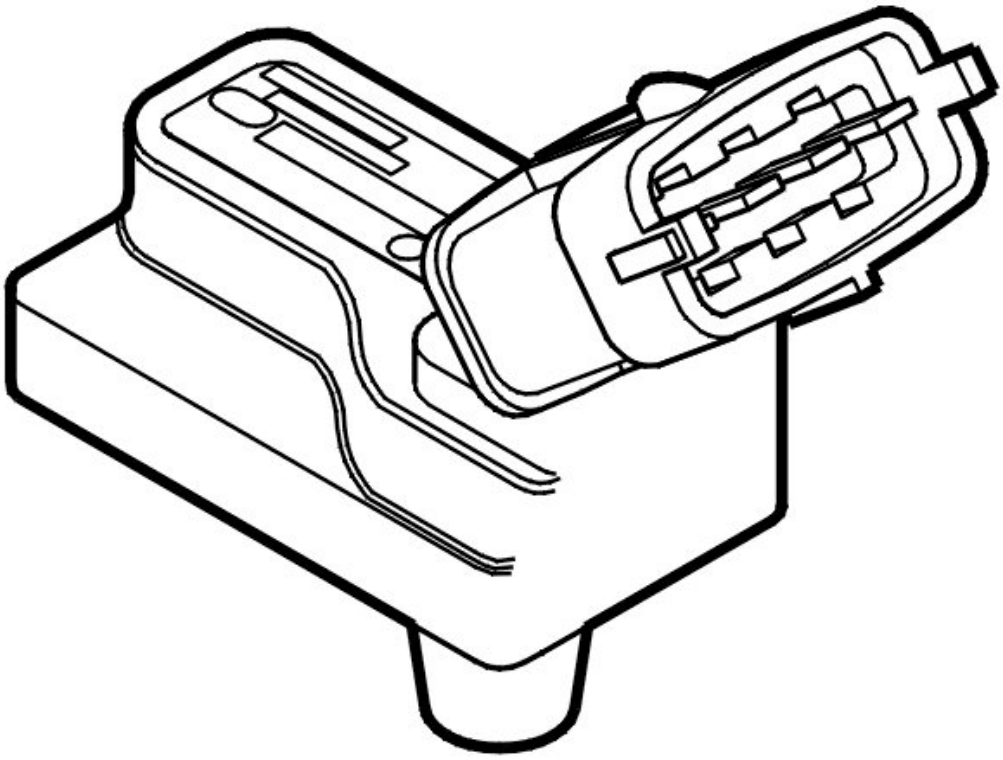


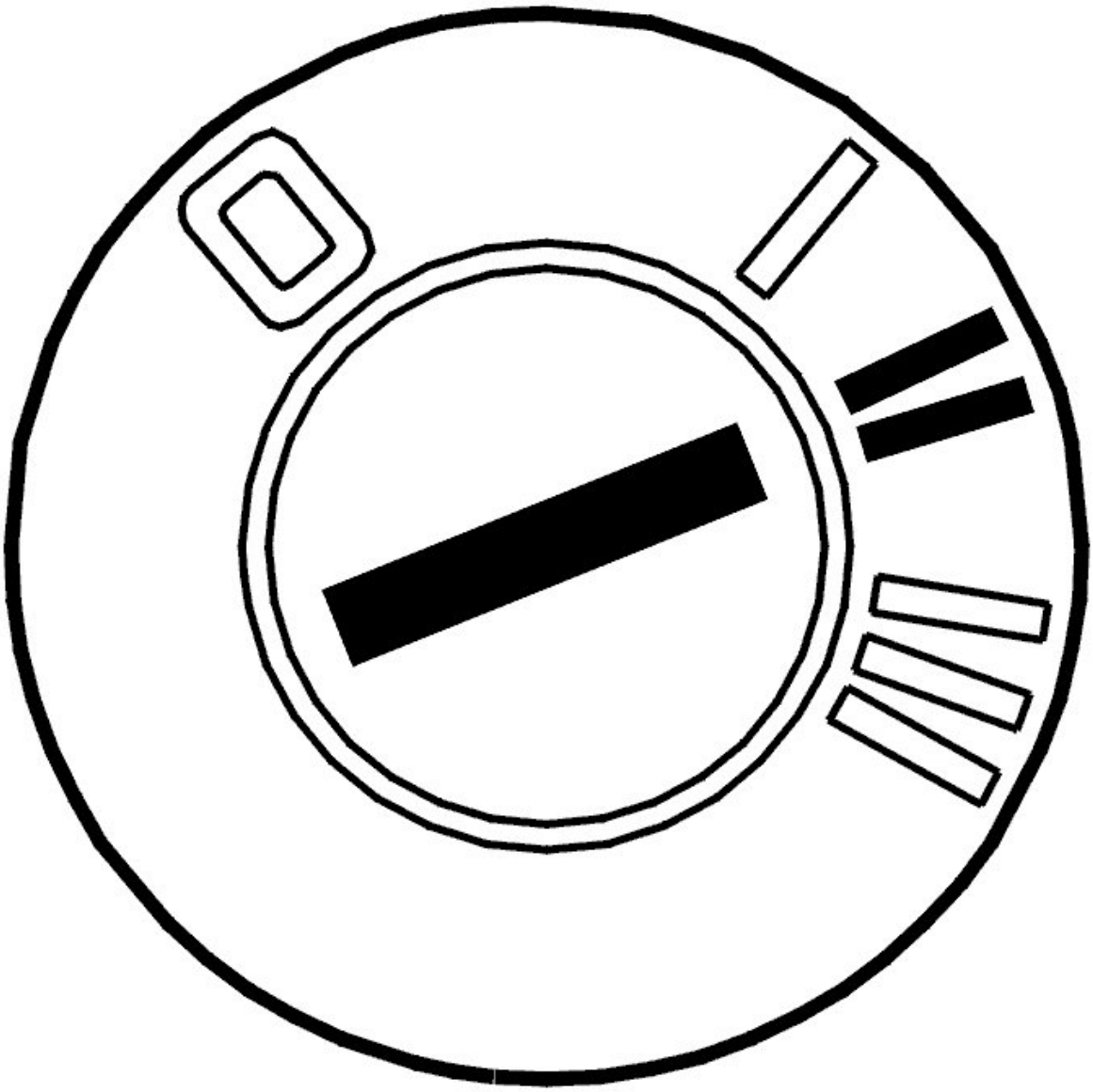


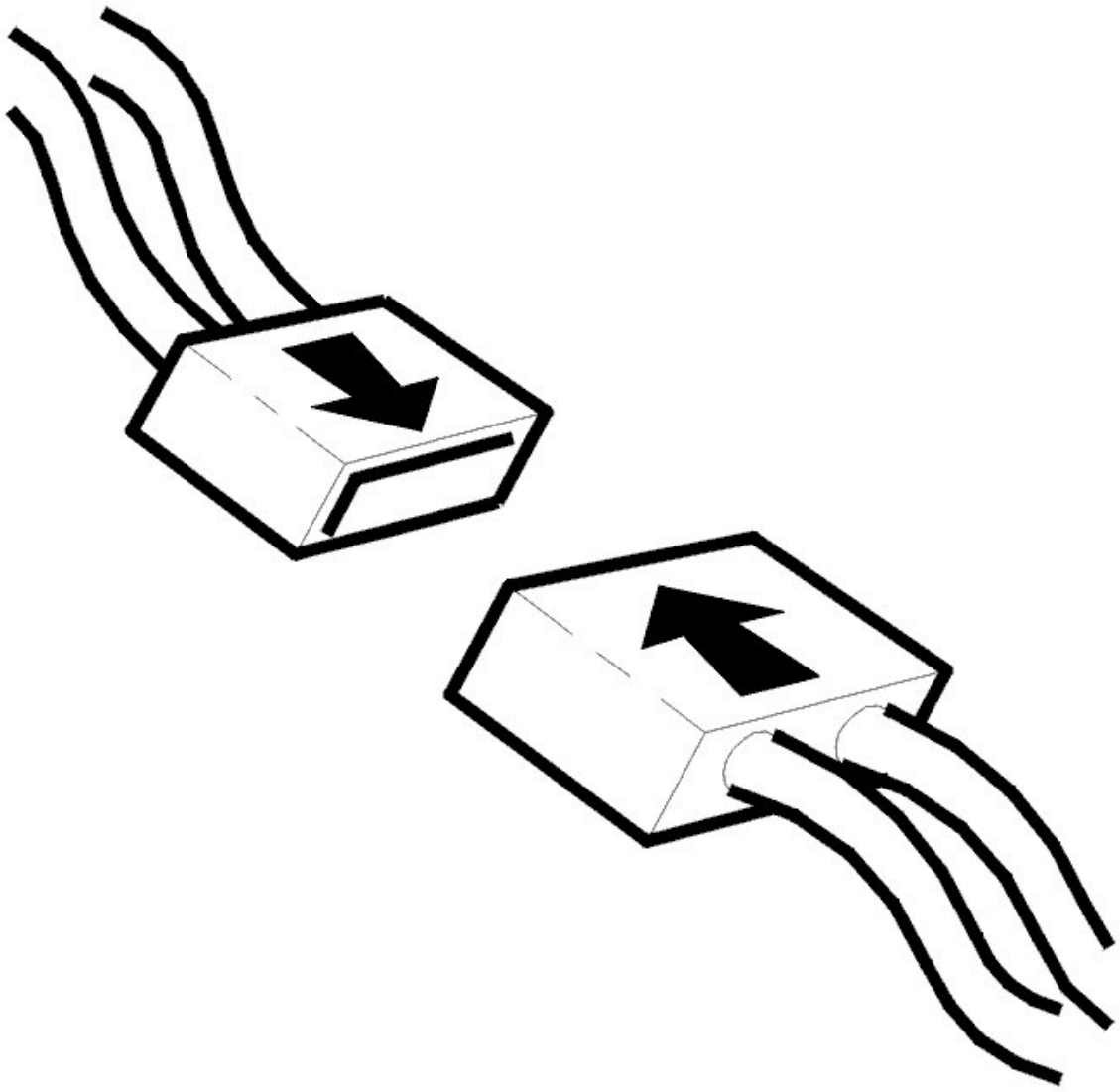
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the intake air temperature (IAT).

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

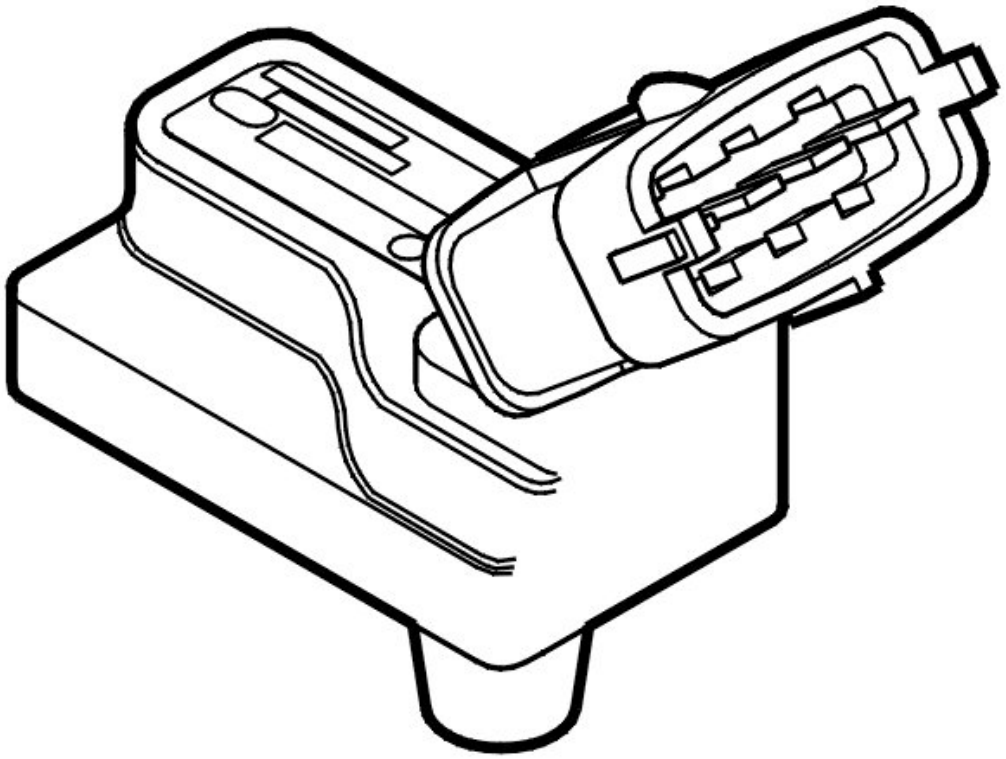
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-1320

Condition



The engine control module (ECM) checks the signal for the intake air temperature.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal does not follow a certain characteristic over a period of time.
The diagnostic trouble code (DTC) can be diagnosed under specific driving conditions.

Substitute value
- Predefined value for intake air temperature
- Three-way catalytic converter (TWC) preheating and idle air trim diagnostics are disabled.

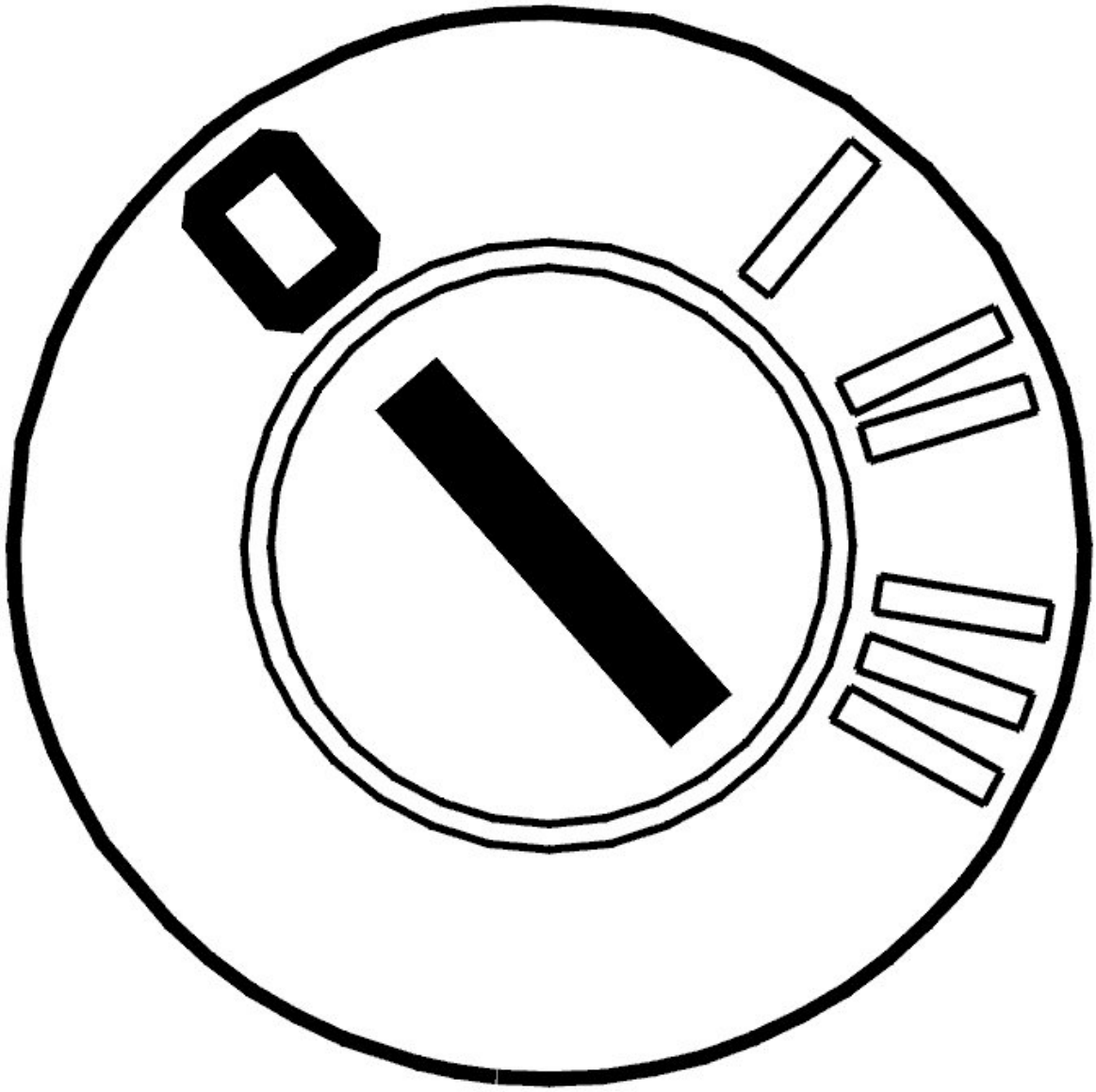
Possible source
- Contact resistance or oxidation in the intake air temperature (IAT) sensor terminals
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

Faulty signal

Checking components and connectors

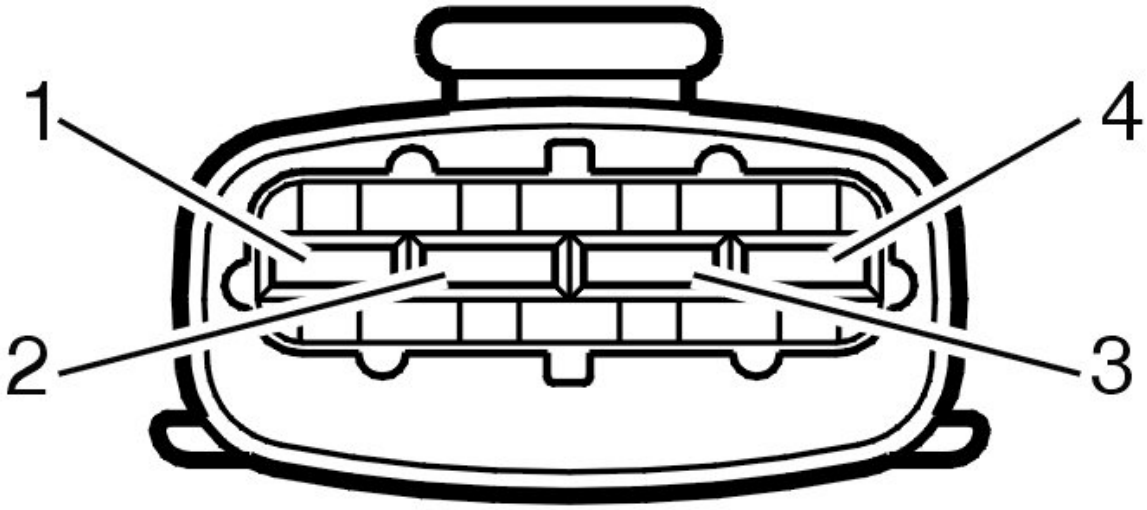


- Ignition off
- Check the boost pressure sensor connector and terminal. Check for contact resistance and oxidation.

Note! The intake air temperature (IAT) sensor is integrated in the boost pressure sensor.

If no errors are found and the fault is permanent, replace the intake air temperature (IAT) sensor.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To access or replace the intake air temperature (IAT) sensor, see Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair.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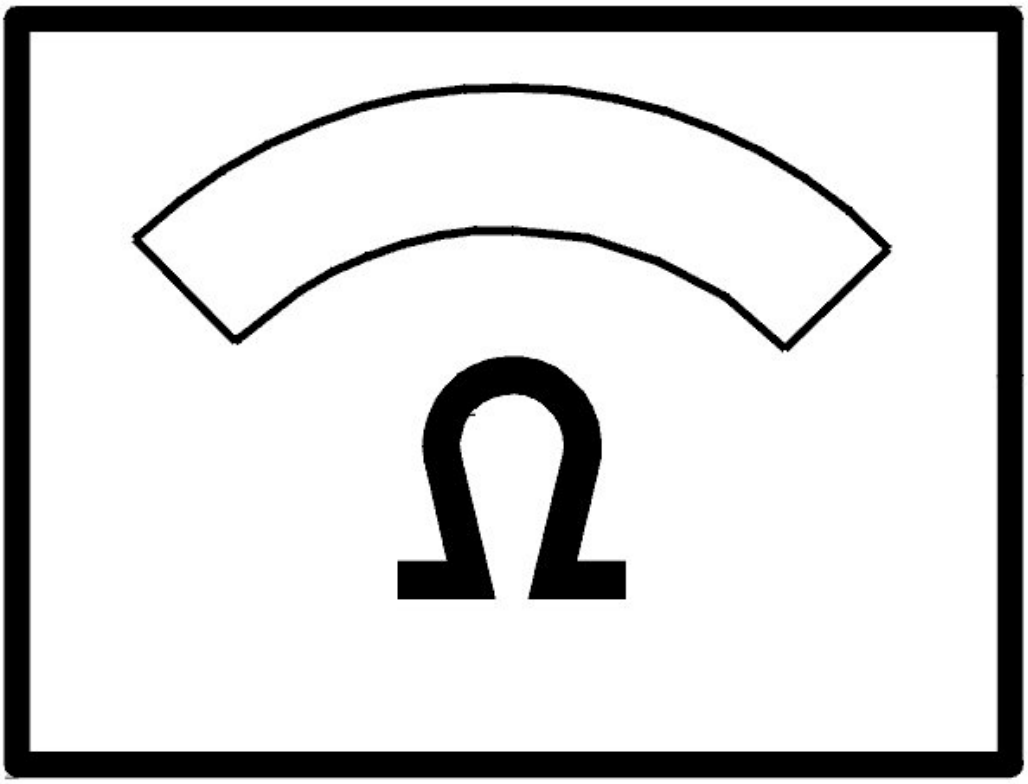
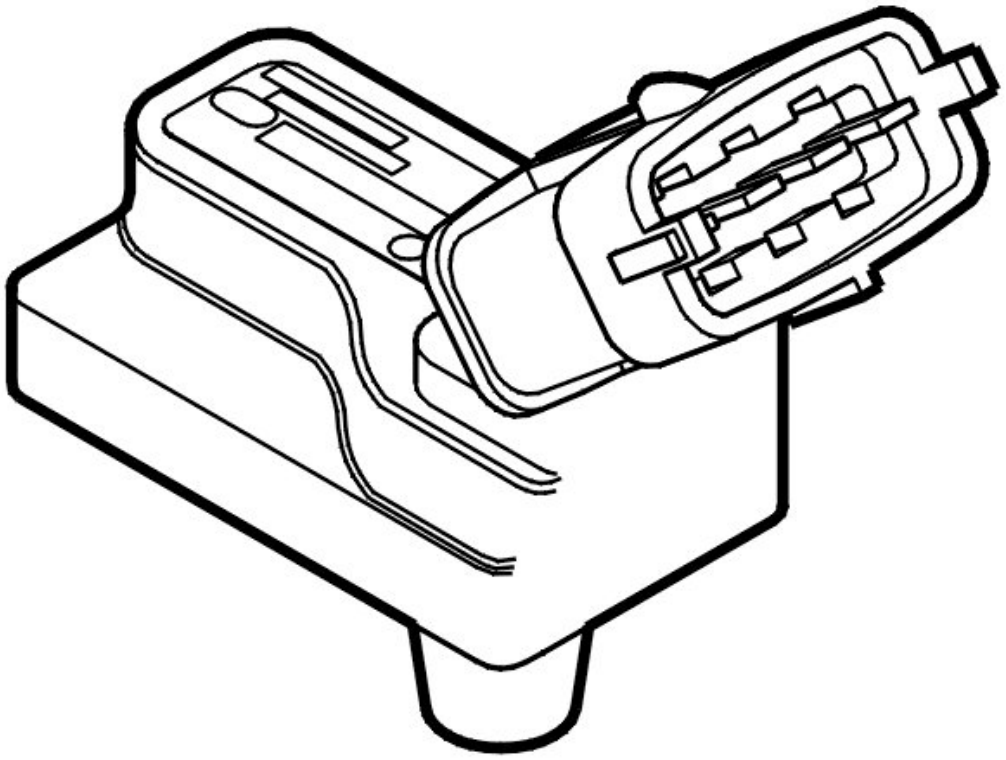




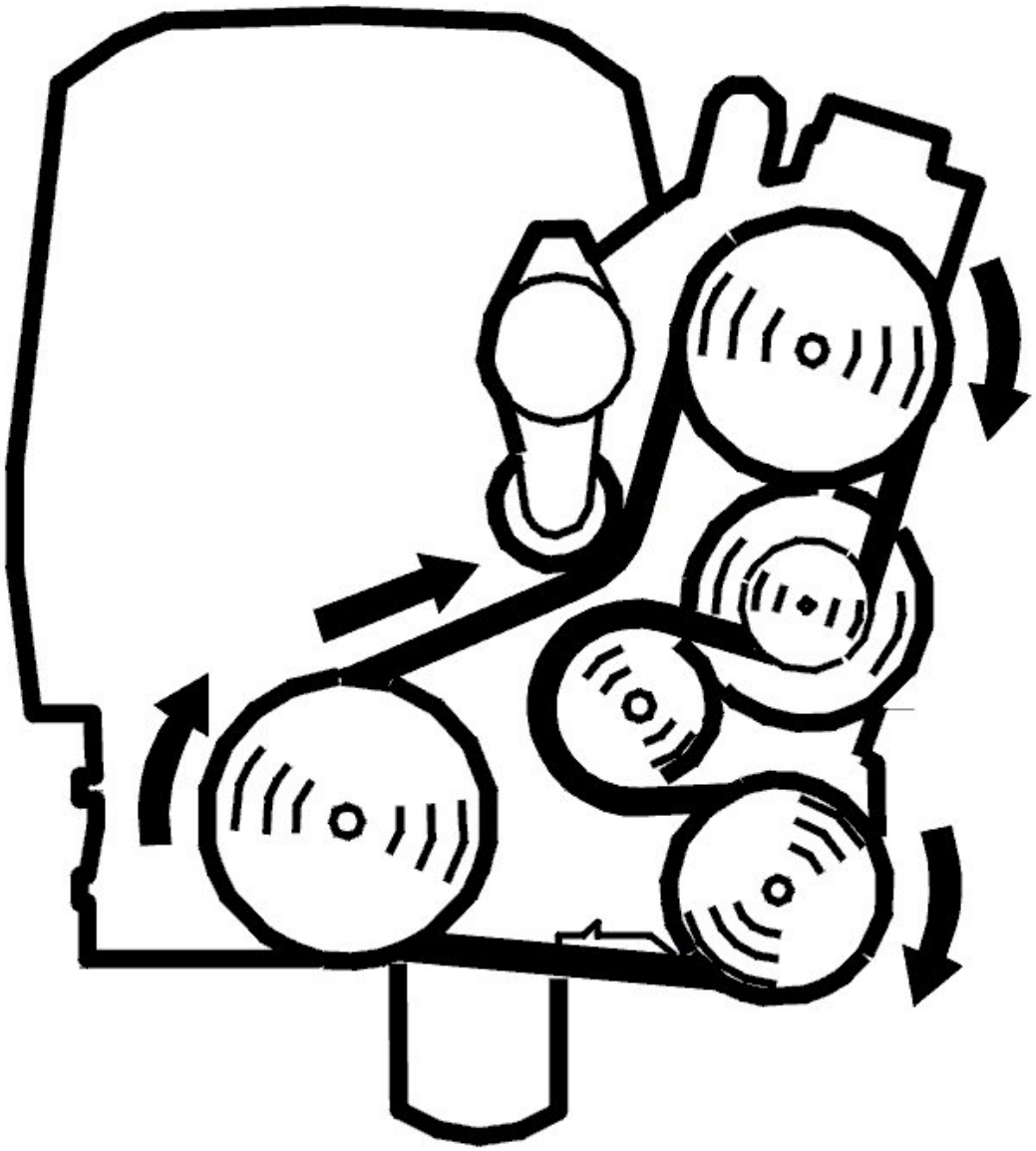
Continue - Verification

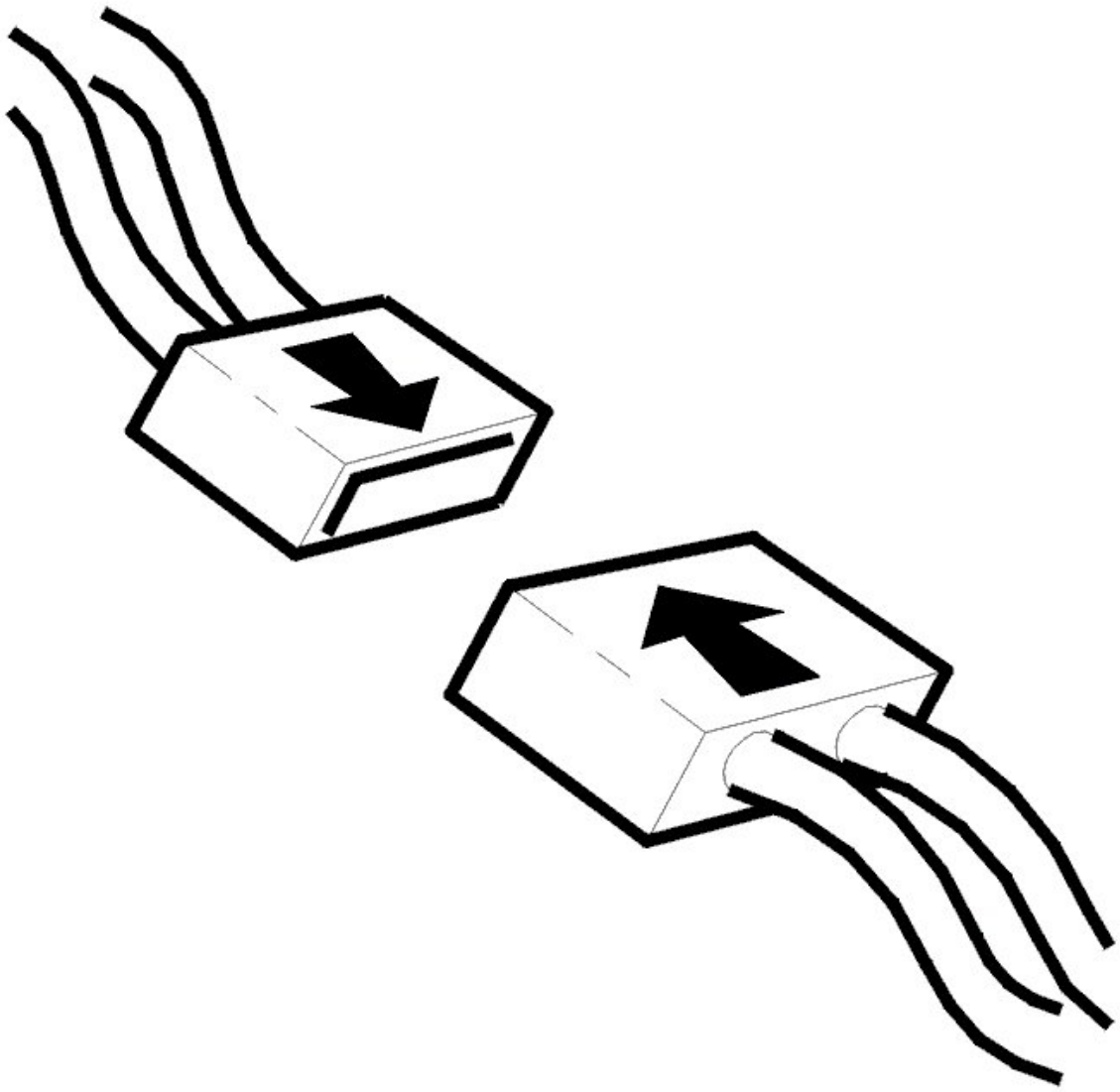
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for 5 minutes
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

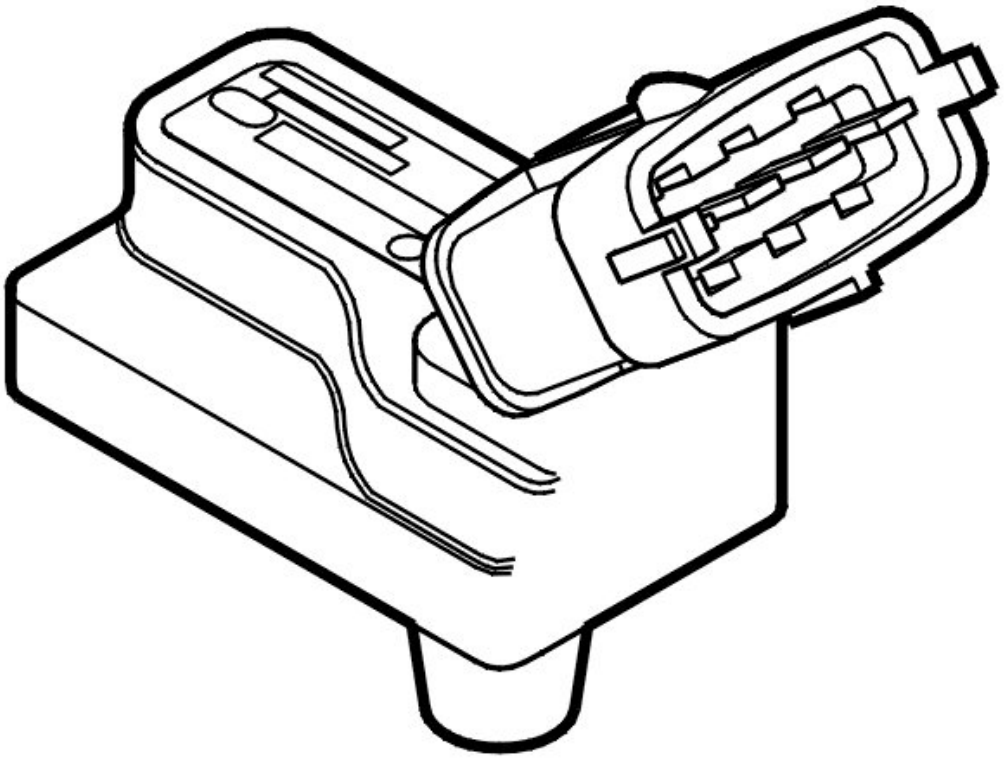
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-132C

Condition



The engine control module (ECM) checks the signal for the intake air temperature.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the intake air temperature (IAT) sensor is higher than a calculated desired value.
The diagnostic trouble code (DTC) can be diagnosed under specific driving conditions.

Substitute value
- Predefined value for intake air temperature
- Three-way catalytic converter (TWC) preheating and idle air trim diagnostics are disabled.

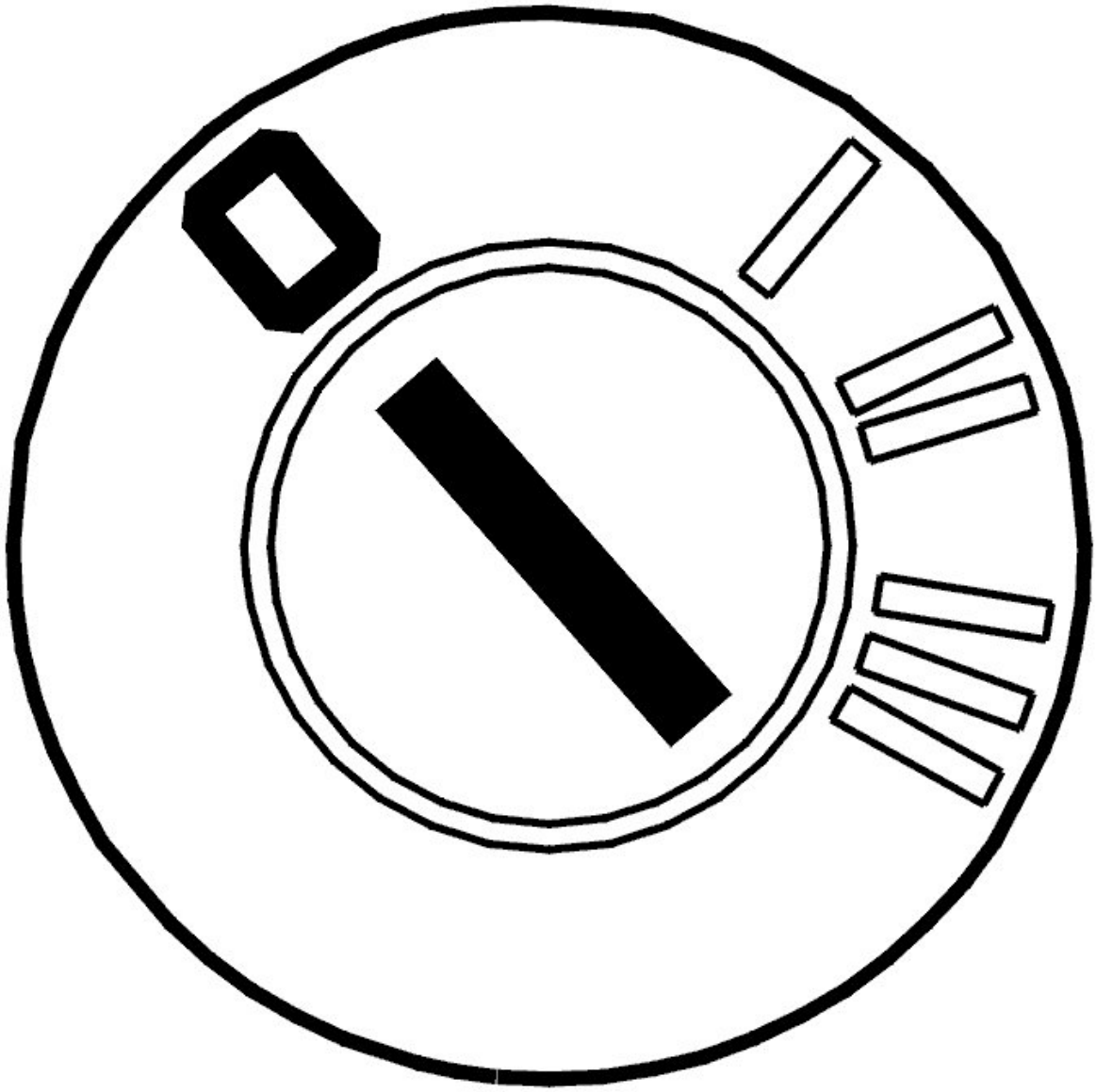
Possible source
- Contact resistance or oxidation in the intake air temperature (IAT) sensor terminals
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking components and connectors

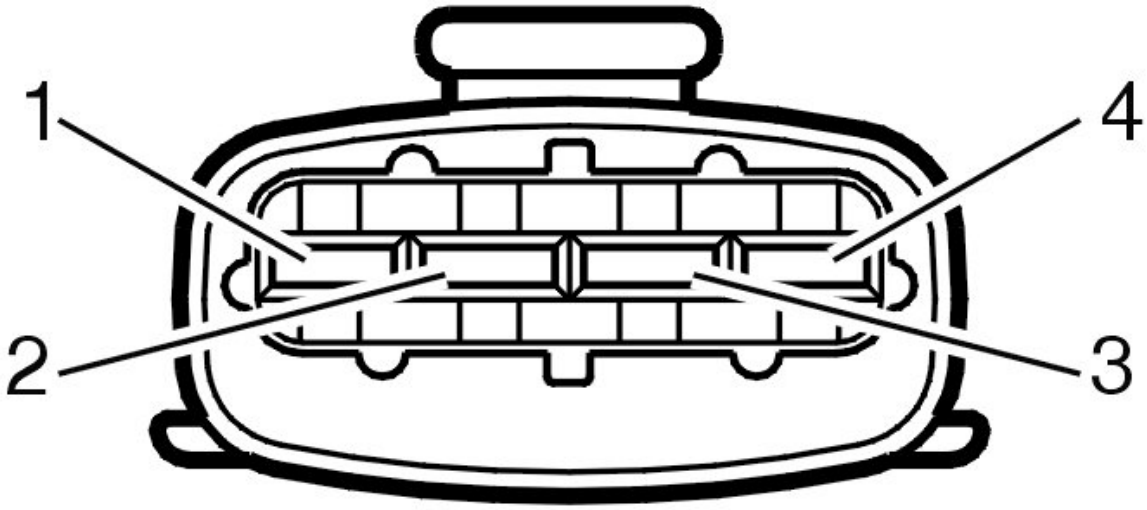


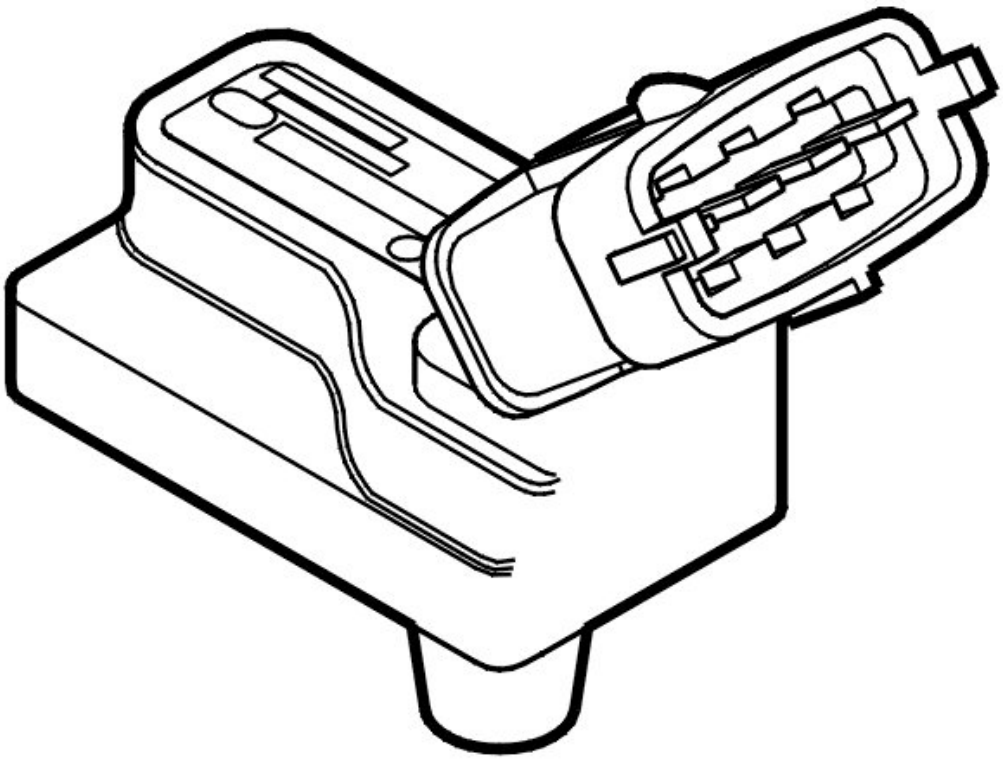
- Ignition off
- Check the boost pressure sensor connector and terminal. Check for contact resistance and oxidation.

Note! The intake air temperature (IAT) sensor is integrated in the boost pressure sensor.

If no errors are found and the fault is permanent, replace the intake air temperature (IAT) sensor.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair





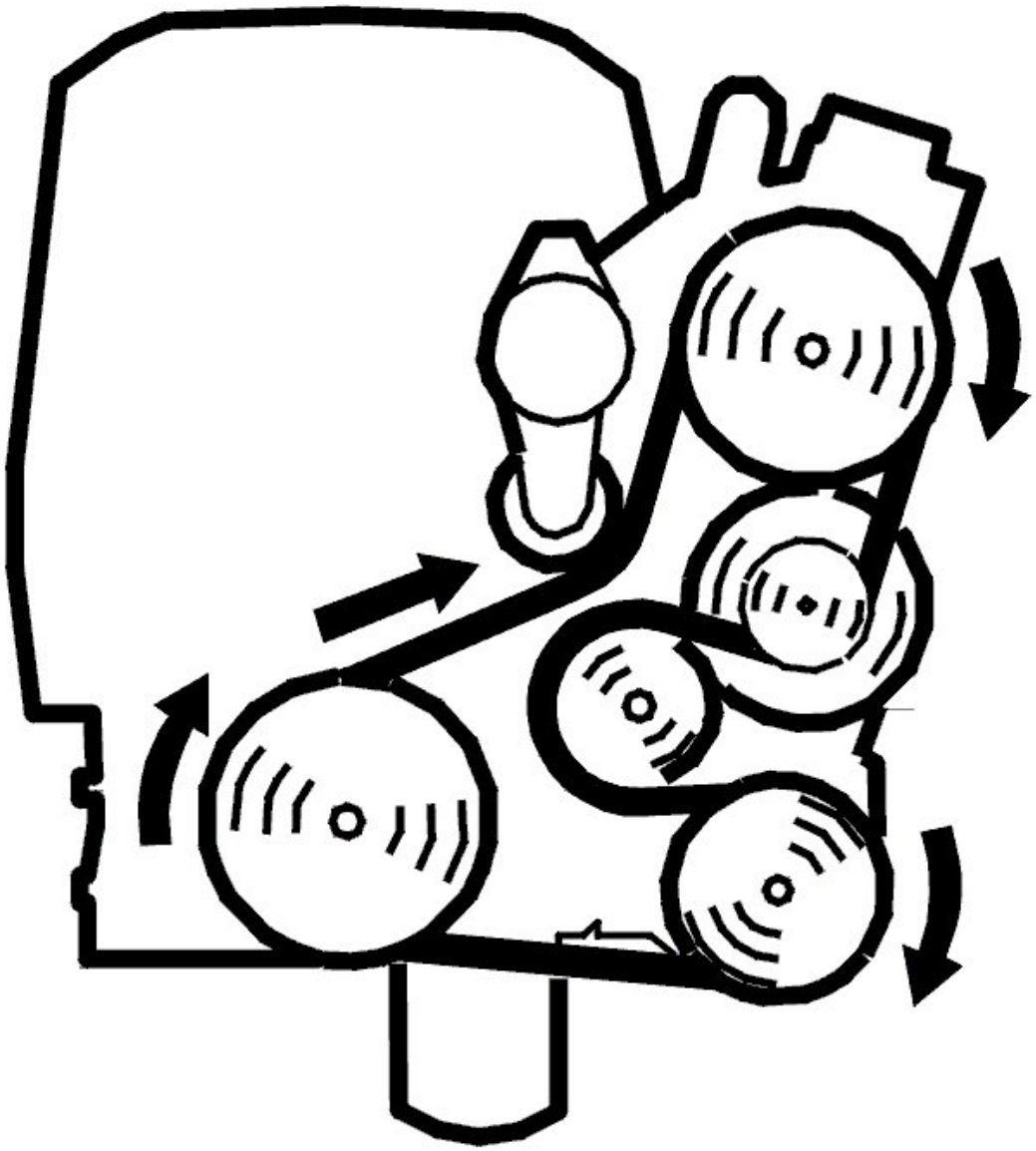
Continue - Verification

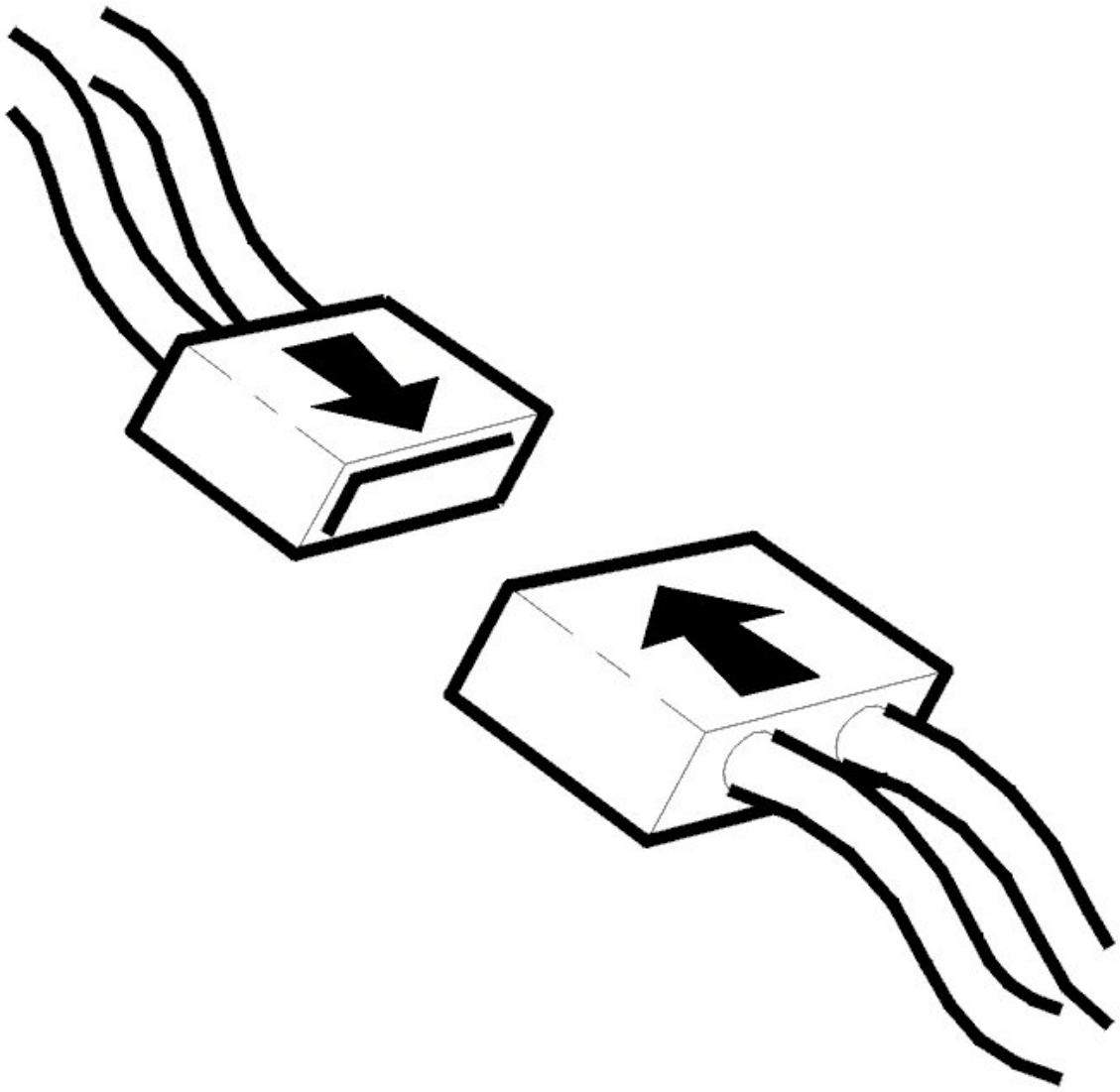
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for 5 minutes
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

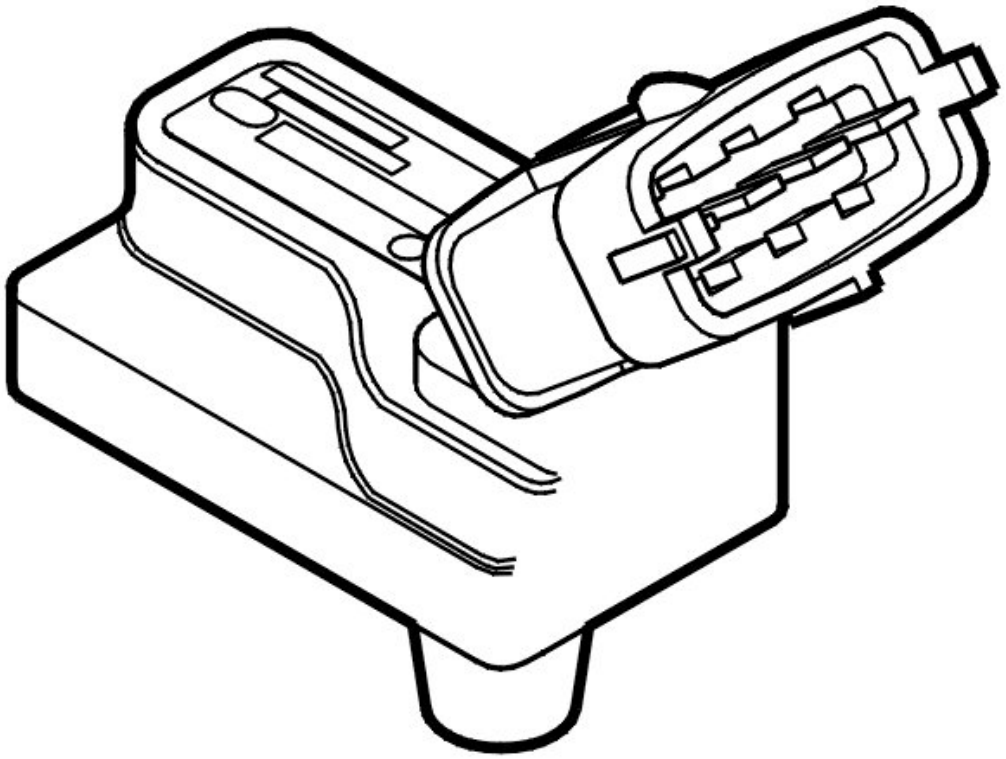
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-132D

Condition



The engine control module (ECM) checks the signal for the intake air temperature.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the difference between the signals from the intake air temperature (IAT) sensor and the engine coolant temperature (ECT) sensor is more than 50 °C after the engine has been off for a certain amount of time.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Predefined value for intake air temperature
- Three-way catalytic converter (TWC) preheating and idle air trim diagnostics are disabled.

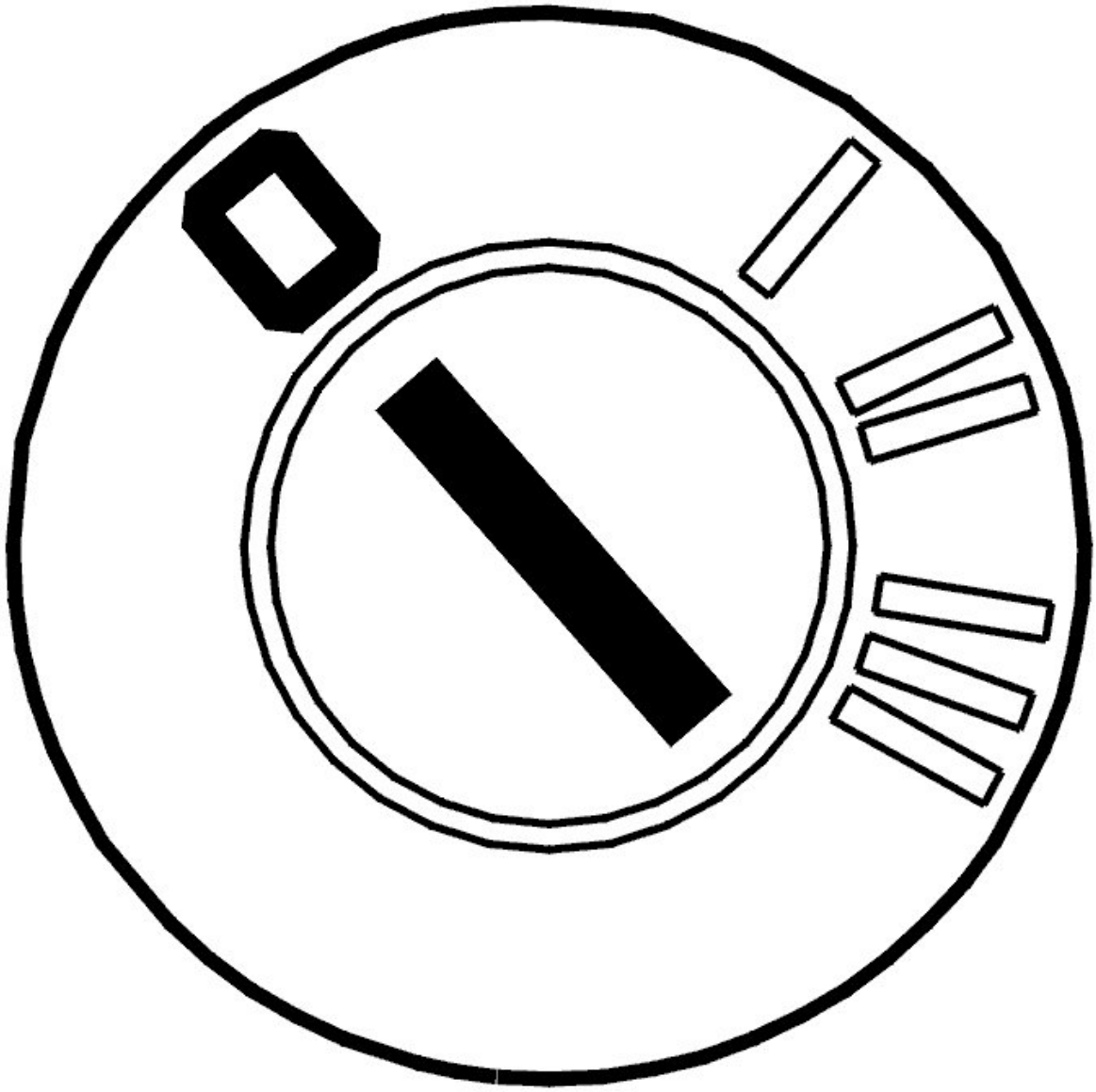
Possible source
- Contact resistance or oxidation in the intake air temperature (IAT) sensor terminals
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking components and connectors

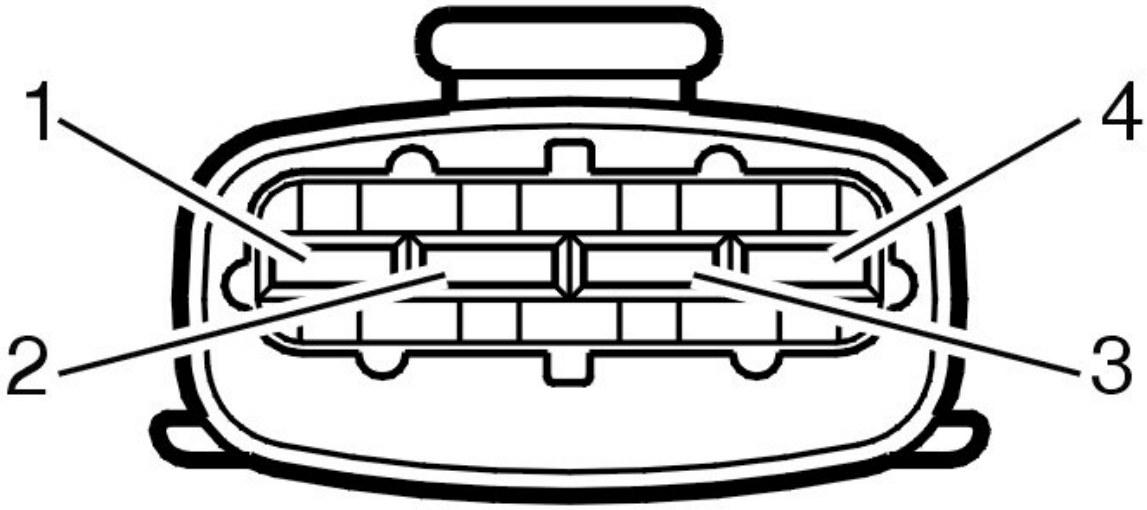


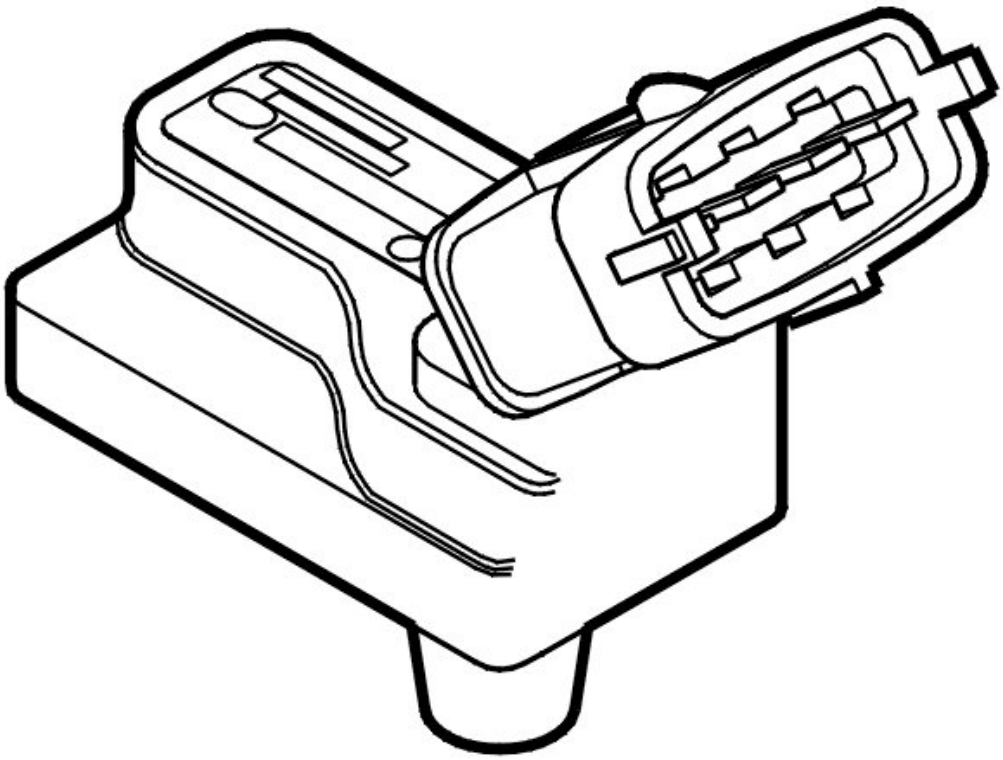
- Ignition off
- Check the boost pressure sensor connector and terminal. Check for contact resistance and oxidation.

Note! The intake air temperature (IAT) sensor is integrated in the boost pressure sensor.

If no errors are found and the fault is permanent, replace the intake air temperature (IAT) sensor.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair





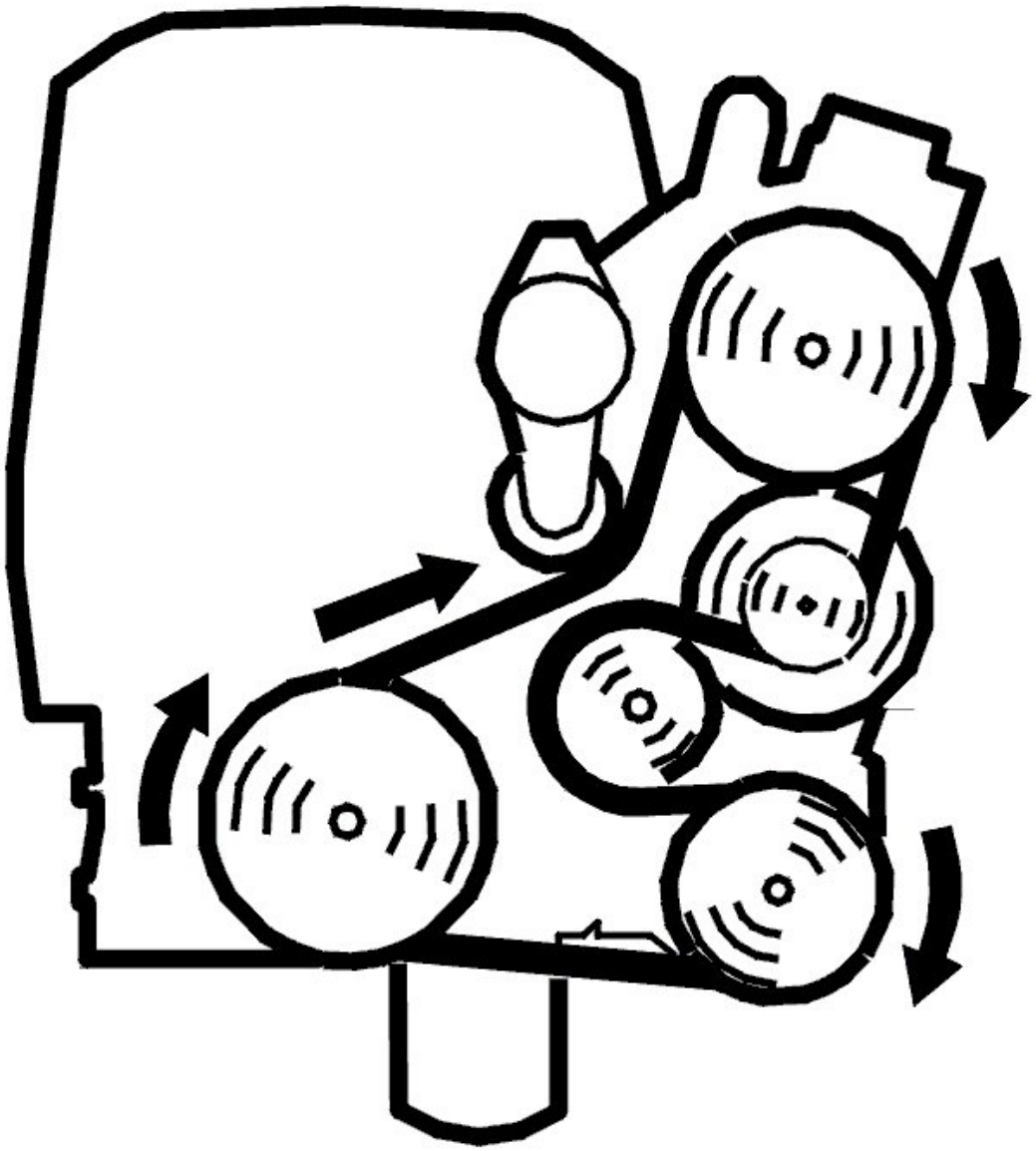
Continue - Verification

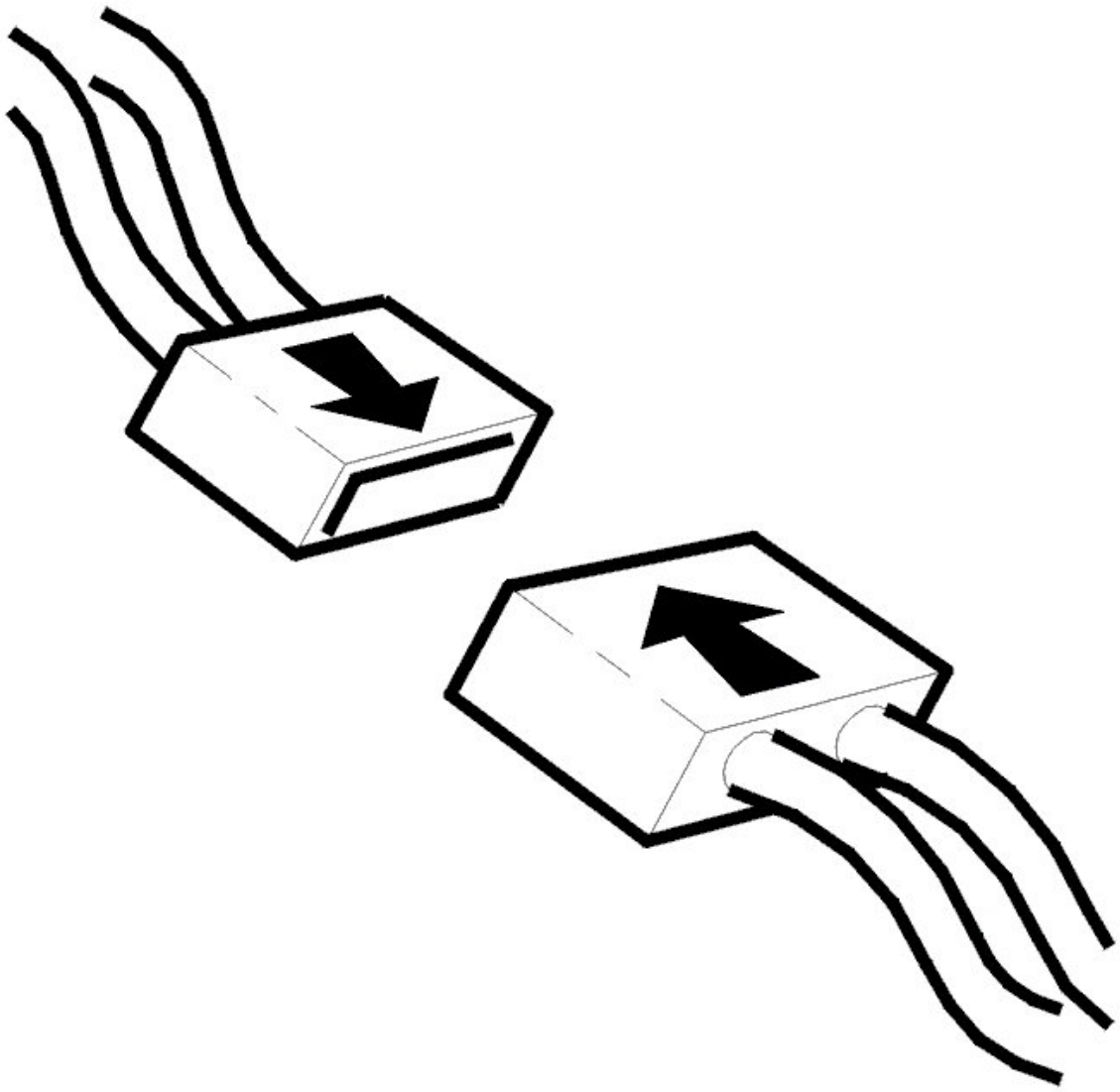
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for 5 minutes
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-140C

Condition

The diagnostic trouble code (DTC) is stored if there is a short-circuit to ground in the outside temperature sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The value is taken from the intake air temperature (IAT) sensor.

Possible source
- Contact resistance in the terminals
- Short-circuit to ground in the signal cable
- Damaged outside temperature sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

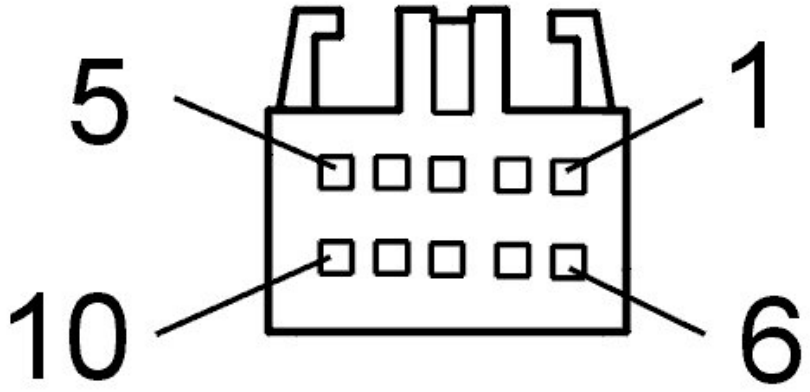
Checking components and wiring

Check the resistance of the outside temperature sensor.
Check the signal cable between control module terminal #B29 (#B39) and outside temperature sensor terminal #2. Check for a short-circuit to ground.

Hint: With the ignition on and the outside temperature sensor connector disconnected, the voltage between #2 and the ground terminal must be approximately 5V.

Remedy as necessary.

Other information:
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the outside temperature sensor, see Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.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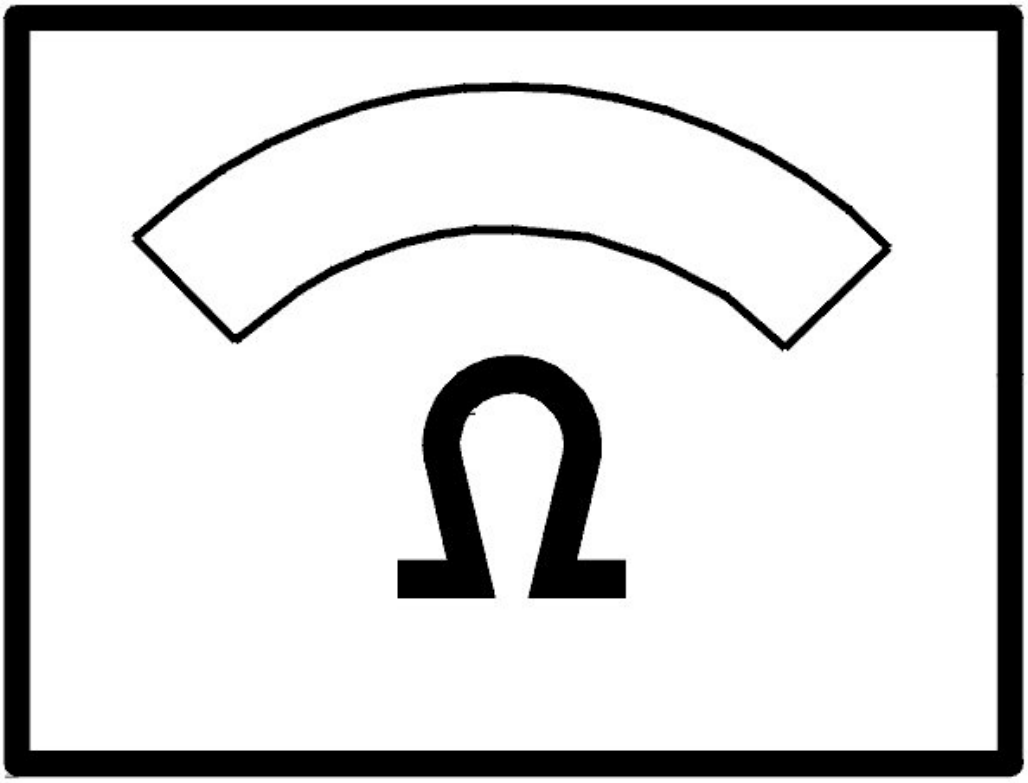
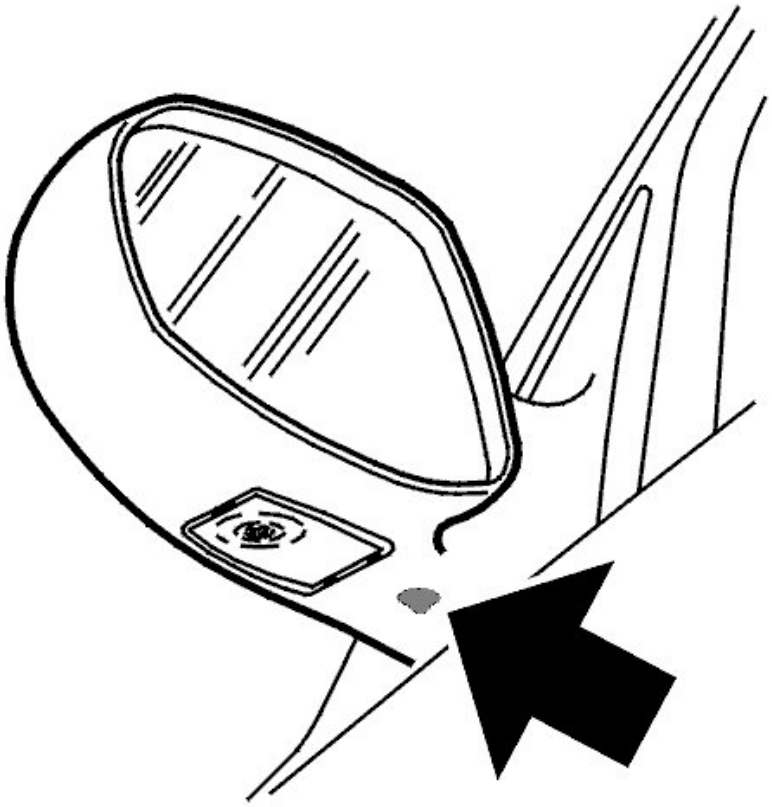




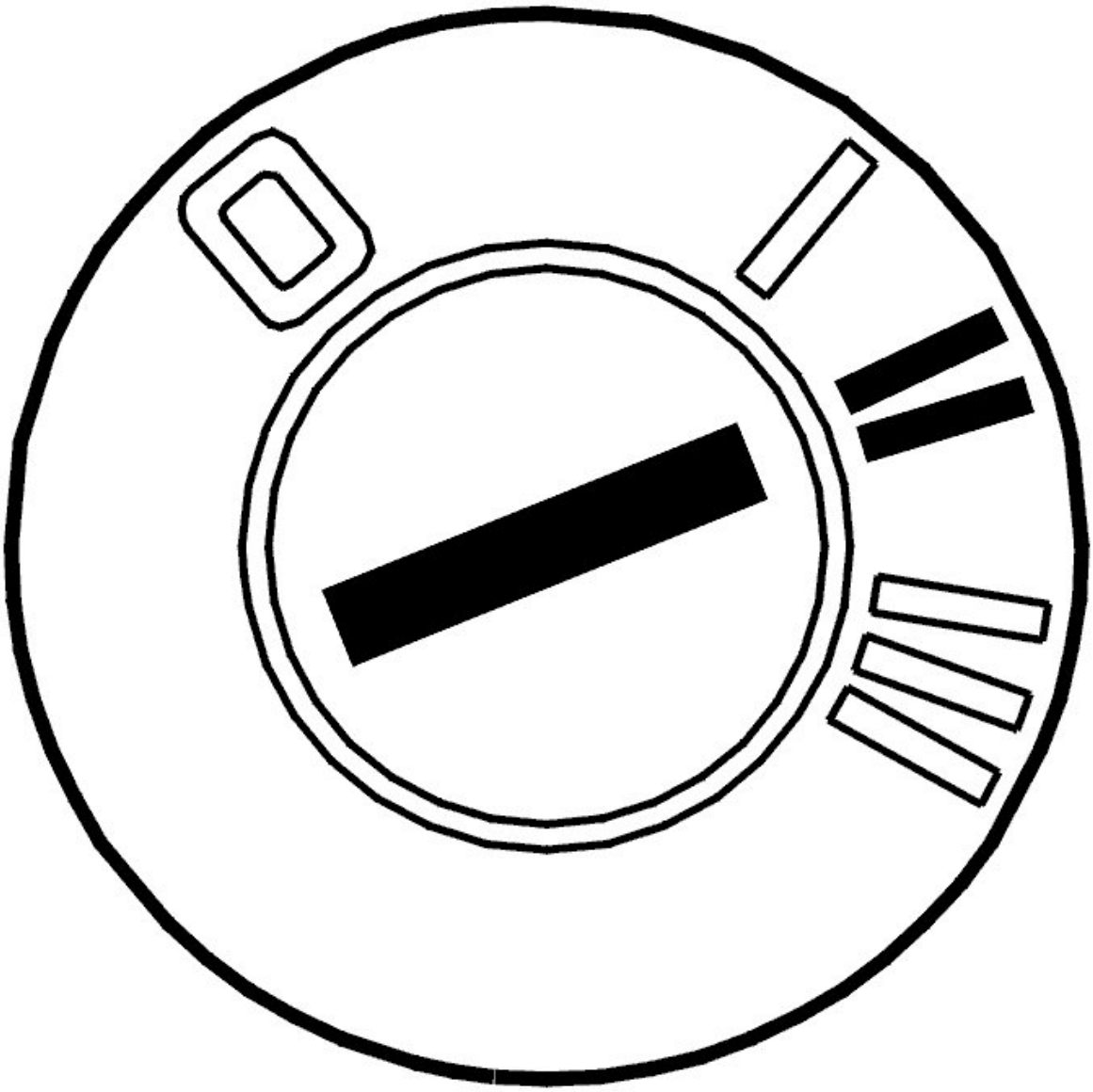
Continue - Verification

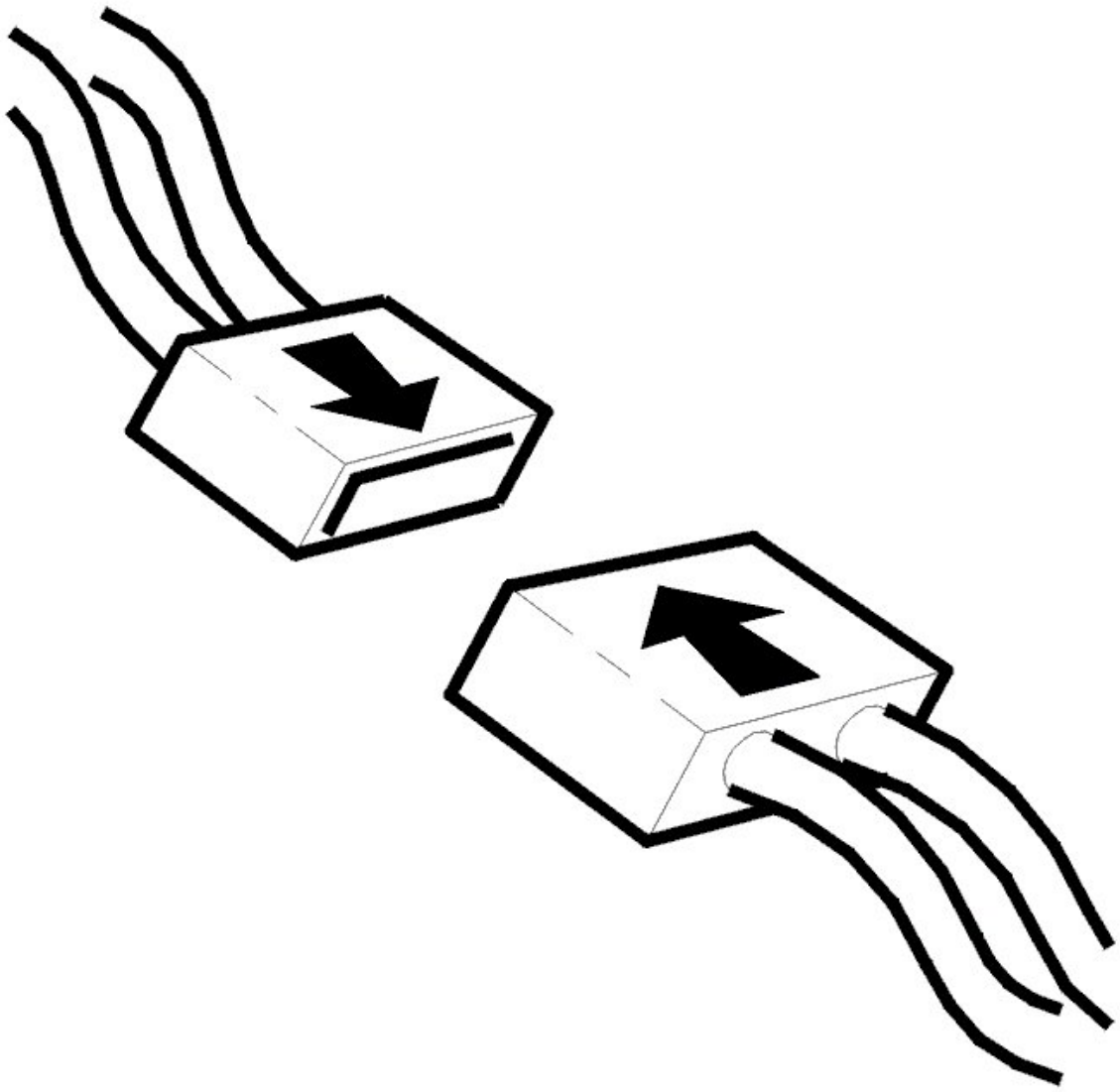
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components.
- Ignition on.
- Read off outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-140D

Condition

The diagnostic trouble code (DTC) is stored if there is a short-circuit to supply voltage in the outside temperature sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The value is taken from the intake air temperature (IAT) sensor.

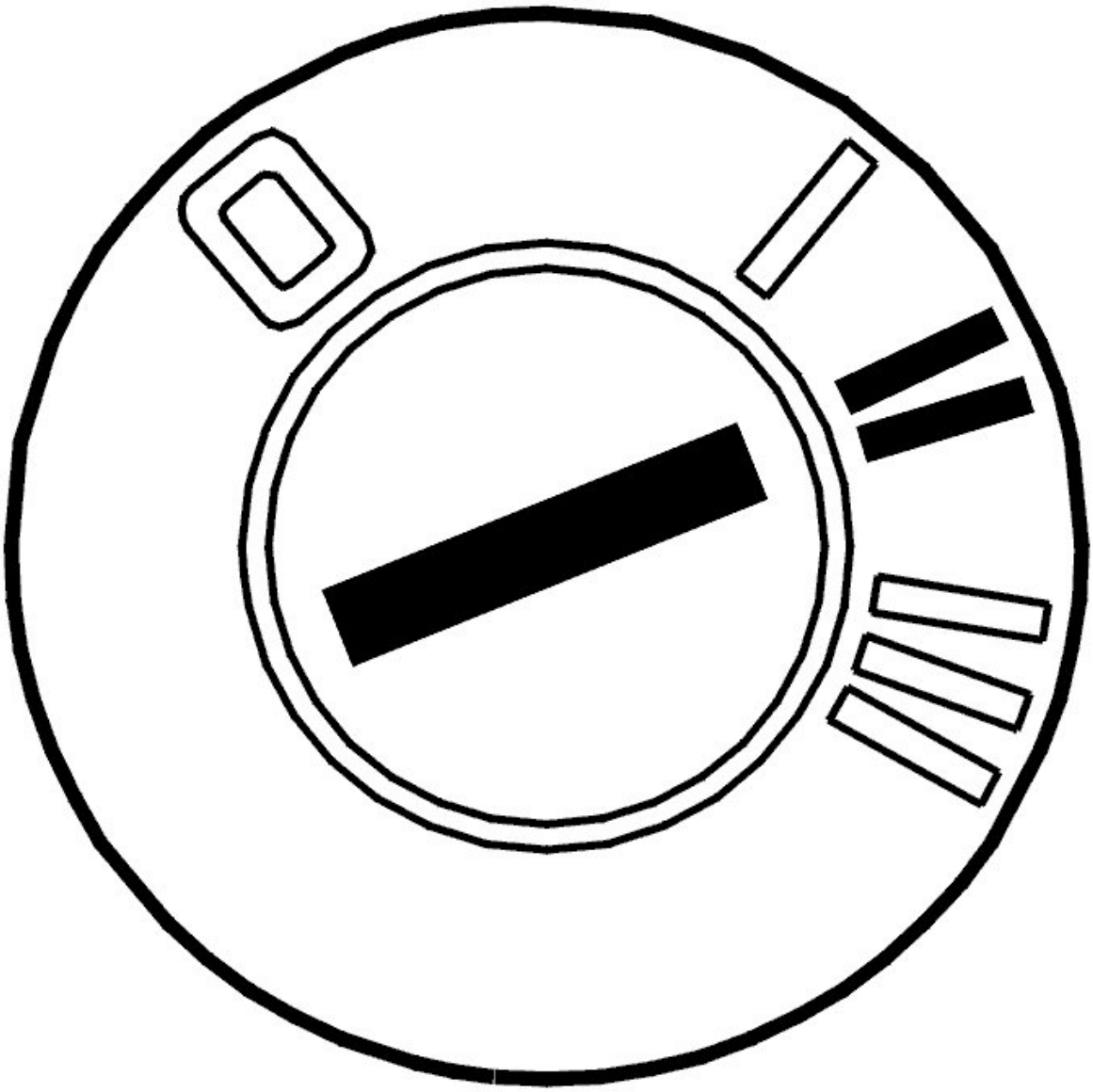
Possible source
- Contact resistance in the terminals
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- Damaged outside temperature sensor.

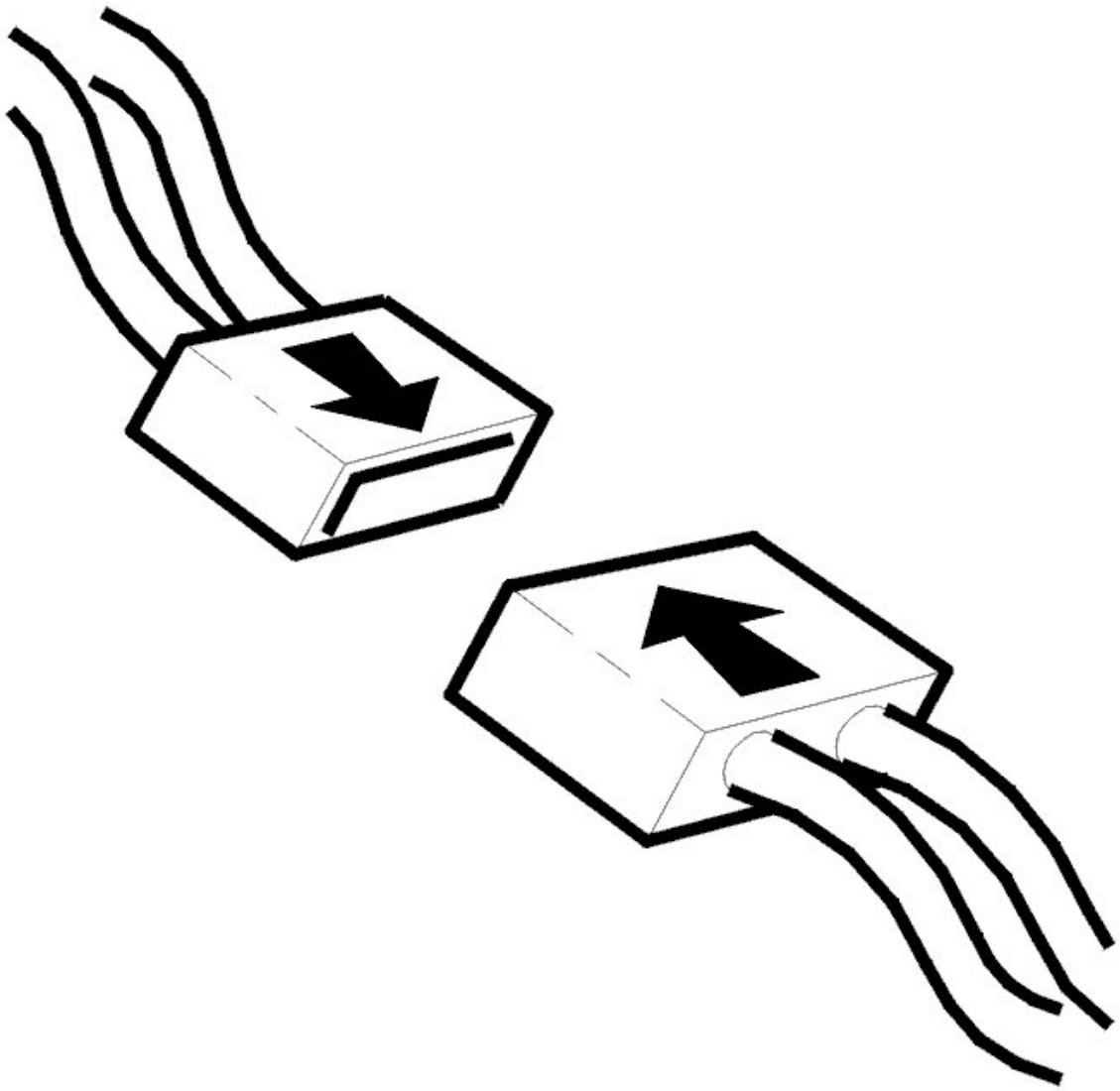
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

Signal too low

Checking the connector



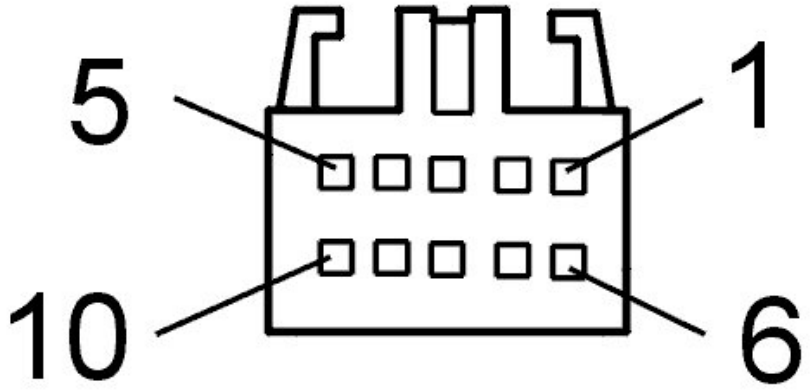


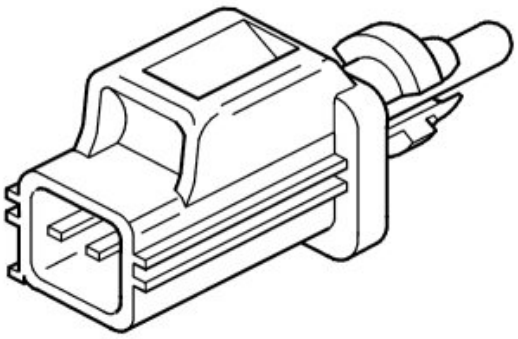
- Ignition off
- Check the wiring and connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the outside temperature.

If the temperature is now within its permitted range, the fault was caused by loose connections in the connector.

Other information

- To access and replace the outside temperature sensor, see Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing.





Is the temperature within its permitted range?

Yes - Fault Found

No - Checking components and wiring

Checking components and wiring

Check the resistance of the outside temperature sensor.

Note! The outside temperature sensor may be defective if there was a short-circuit to supply voltage in the signal cable. Check this before replacing the sensor.

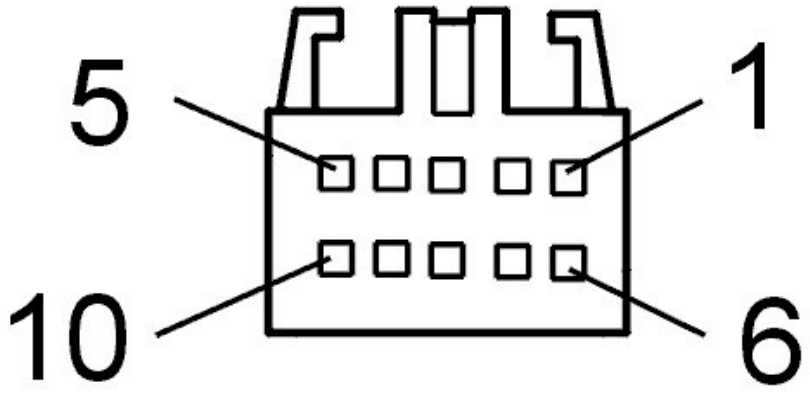
Check the signal cable between control module terminal #B29 (#B39) and outside temperature sensor terminal #2. Check for a short-circuit to supply voltage. Check for an open-circuit.

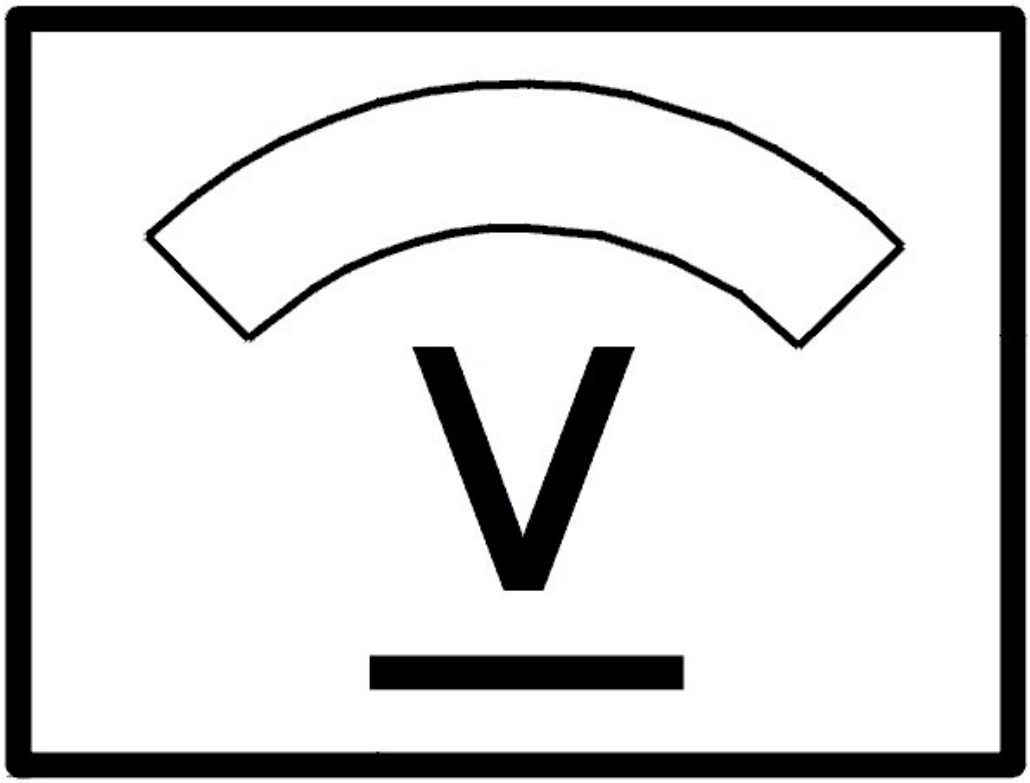
Hint: With the ignition on and the outside temperature sensor connector disconnected, the voltage between #2 and ground must be approximately 5 V.

Check the ground lead between control module terminal #B4 (#B14) and outside temperature sensor terminal #3. Check for an open-circuit. Remedy as necessary.

Other information

- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the outside temperature sensor, see Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

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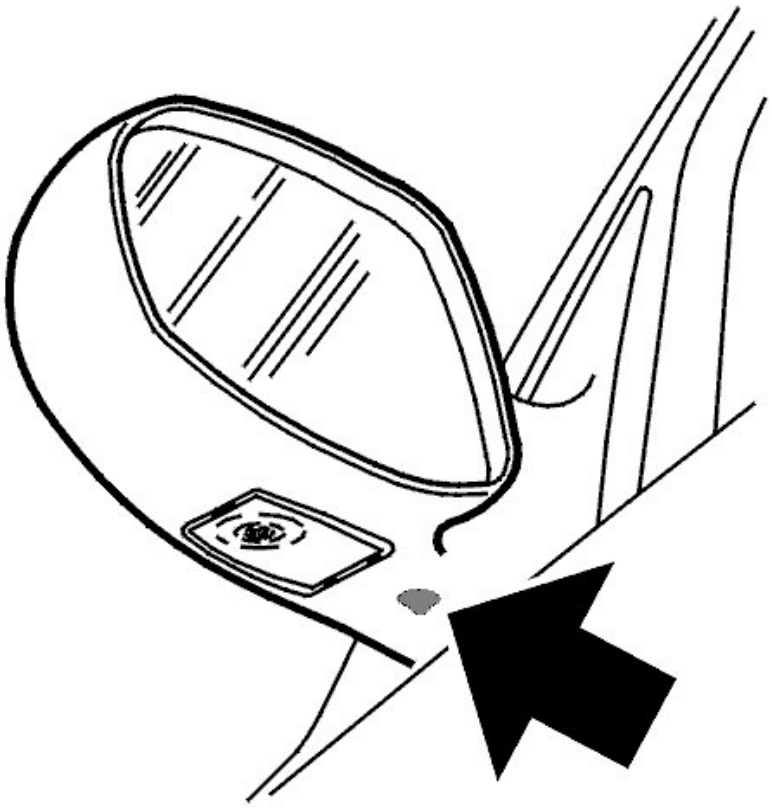


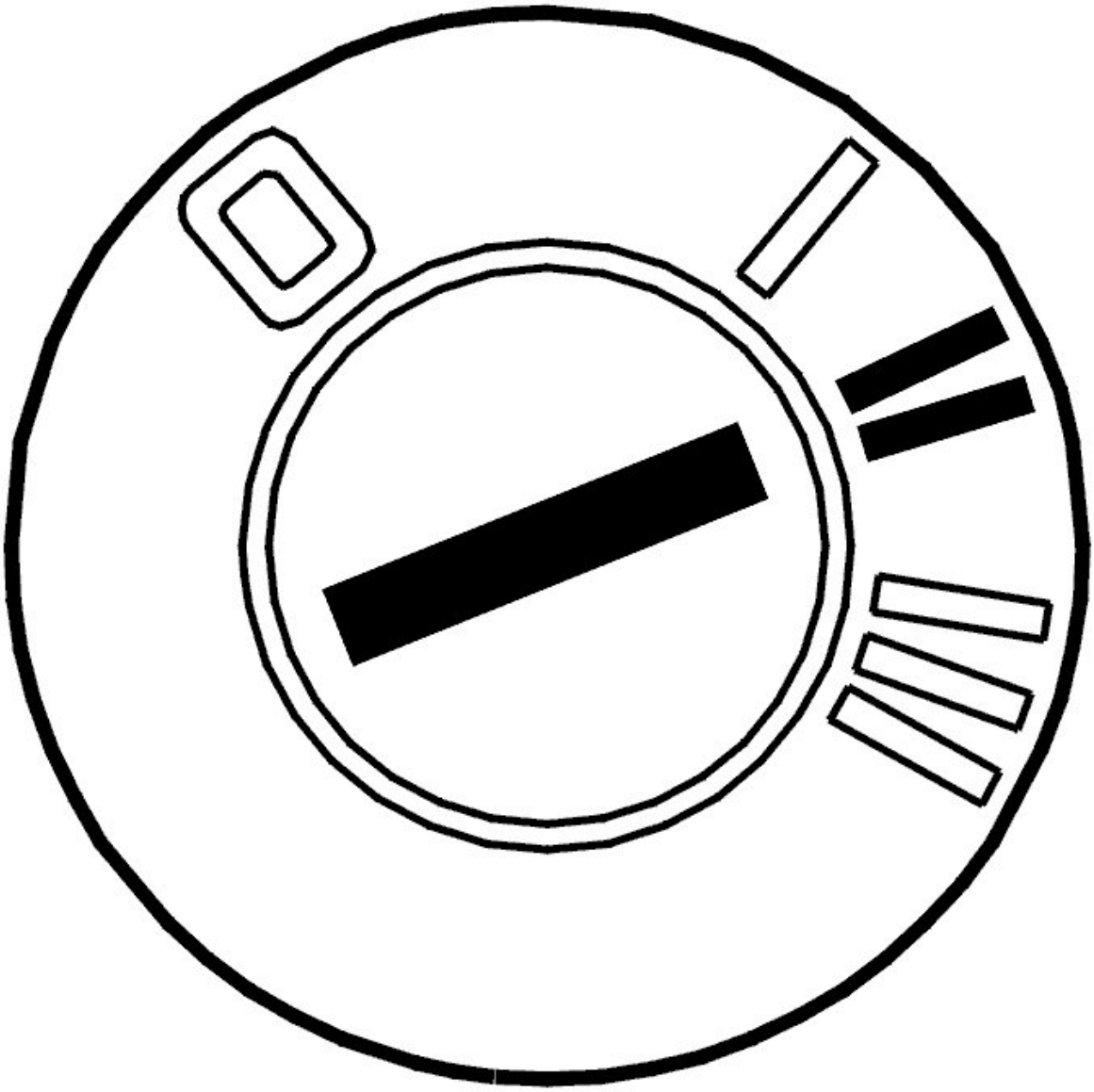
Continue - Verification

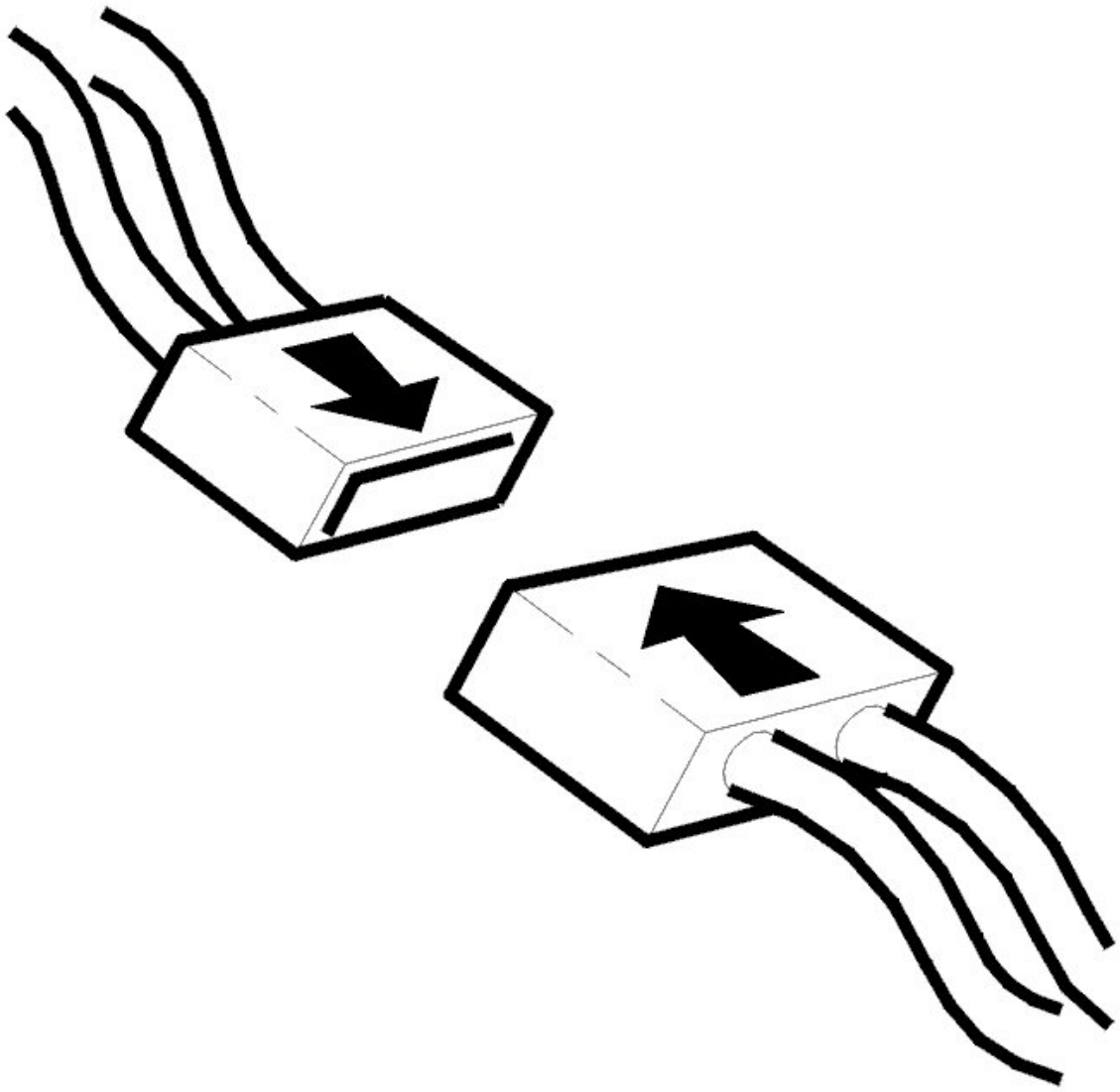
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components.
- Ignition on.
- Read off outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-1410

Condition

The diagnostic trouble code (DTC) is stored if the outside temperature sensor signal is higher than the calculated signal.
The diagnostic trouble code (DTC) can be diagnosed after 5 minutes driving at an engine speed above 1700 rpm and a speed above 50 km/h.

Substitute value
- The value from the engine intake air temperature (IAT) sensor.

Possible source
- Contact resistance in the terminals
- Damaged outside temperature sensor
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking components and wiring

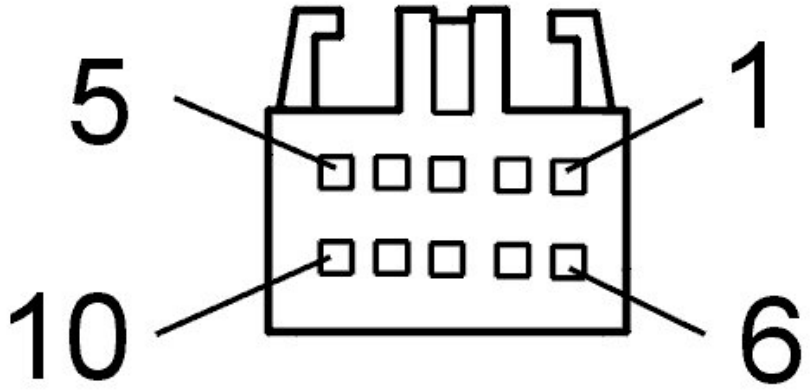
Hint: If a diagnostic trouble code (DTC) for the intake air temperature (IAT) sensor is also stored, this code must be fault-traced first.

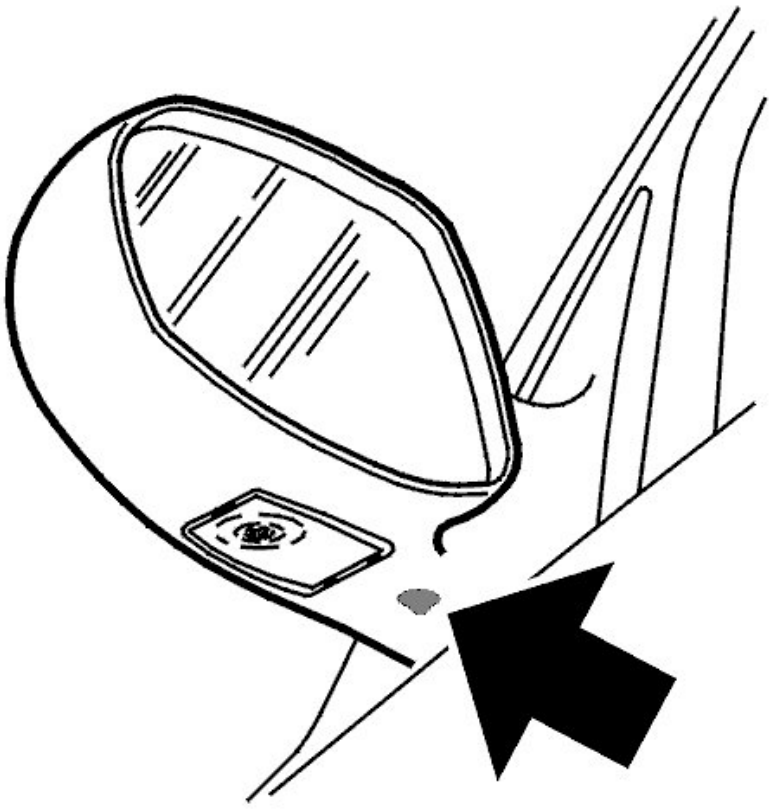
Check the connector for the outside temperature sensor. Check for contact resistance and oxidation.
Check the resistance of the outside temperature sensor.

Hint: With the ignition on and the outside temperature sensor connector disconnected, the voltage between terminal #2 and ground must be approximately 5 V.

Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Component specifications See: Engine Control Module/Specifications
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing.





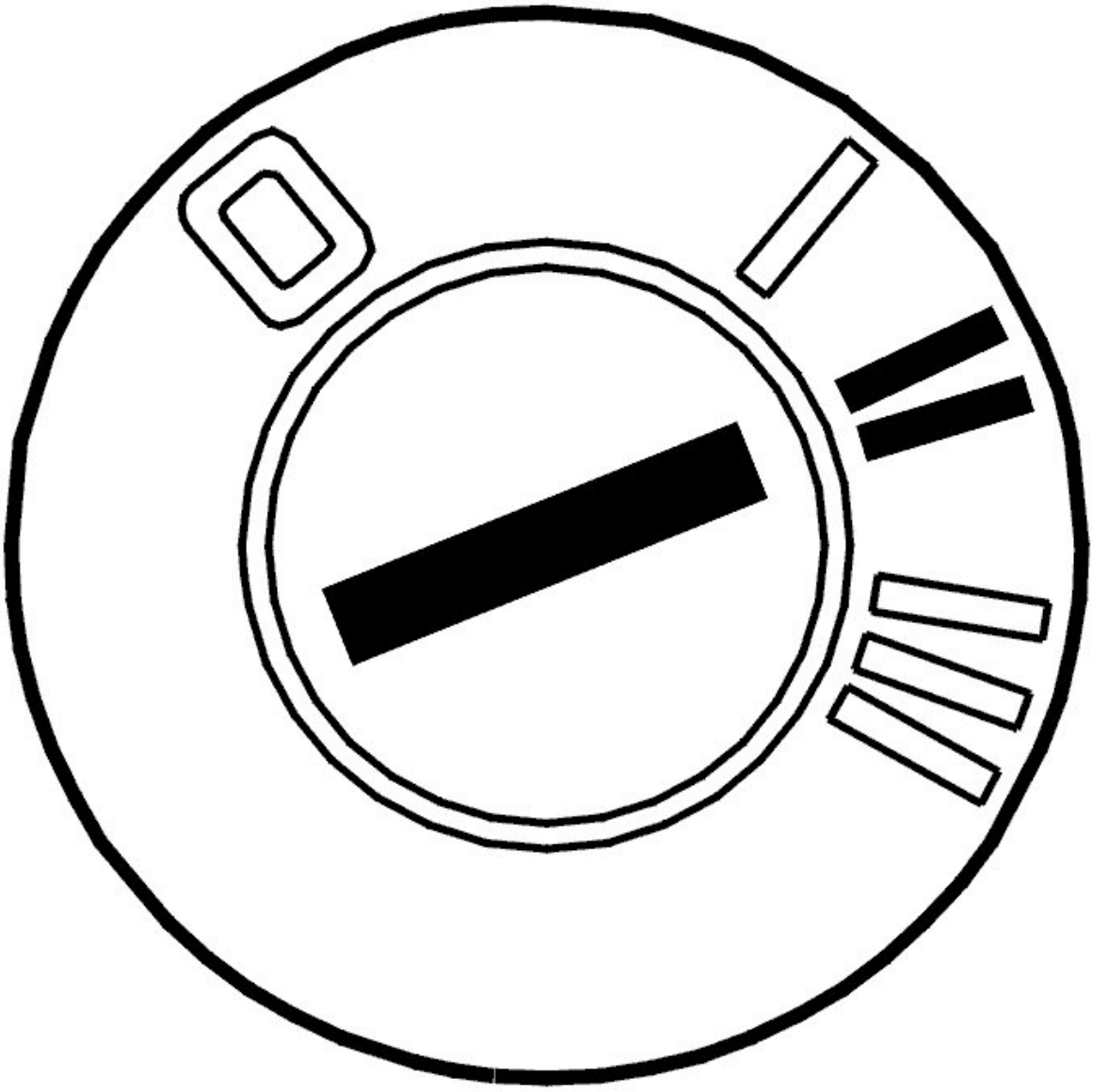
Continue - Verification

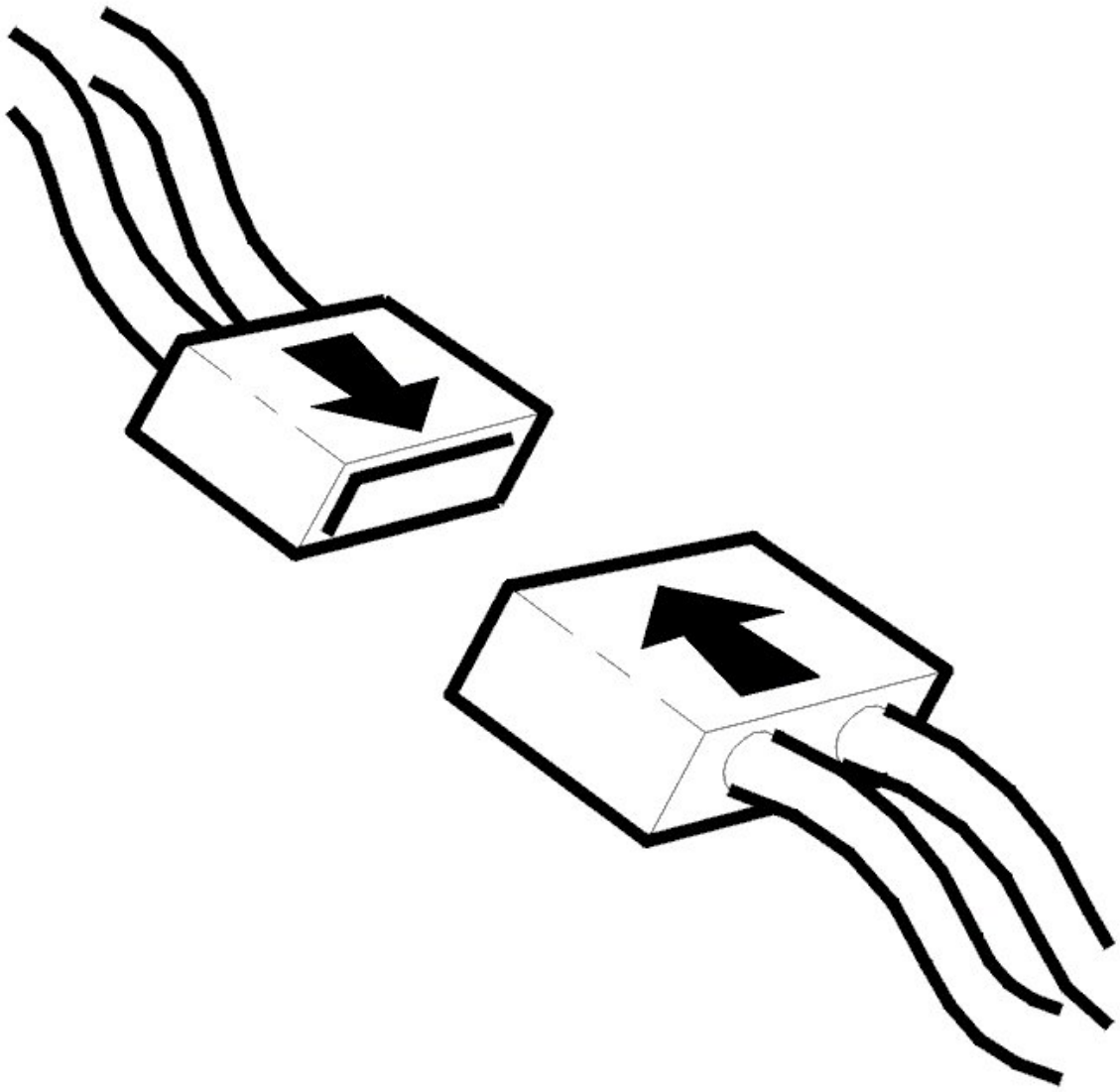
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components.
- Ignition on.
- Read off outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-141B

Condition

The diagnostic trouble code (DTC) is stored if the outside temperature sensor signal is lower than the calculated signal.
The diagnostic trouble code (DTC) can be diagnosed after 5 minutes driving at an engine speed above 1700 rpm and a speed above 50 km/h.

Substitute value
- The values from the engine intake air temperature (IAT) sensor.

Possible source
- Contact resistance in the terminals
- Damaged outside temperature sensor
- Damaged intake air temperature (IAT) sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking components and wiring

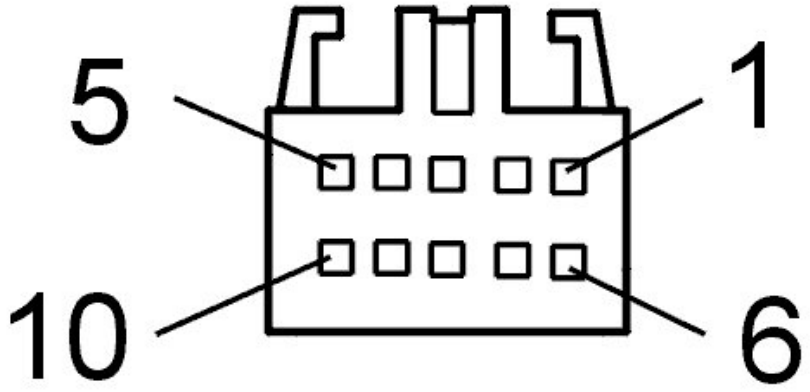
Hint: If a diagnostic trouble code (DTC) for the intake air temperature (IAT) sensor is also stored, this code must be fault-traced first.

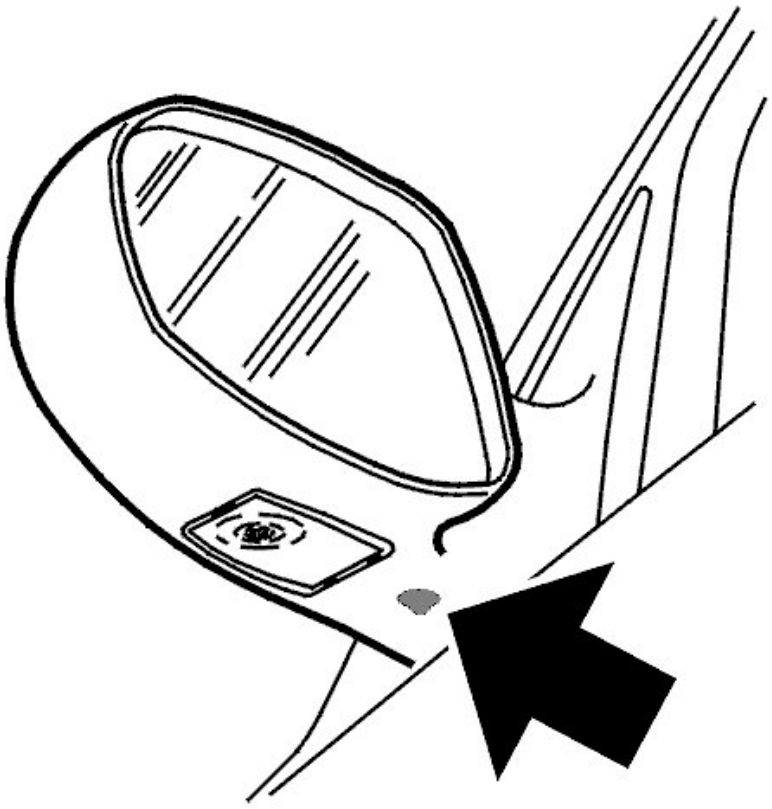
Check the connector for the outside temperature sensor. Check for contact resistance and oxidation.
Check the resistance of the outside temperature sensor.

Hint: With the ignition on and the outside temperature sensor connector disconnected, the voltage between terminal #2 and ground must be approximately 5 V.

Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Component specifications See: Engine Control Module/Specifications
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing.





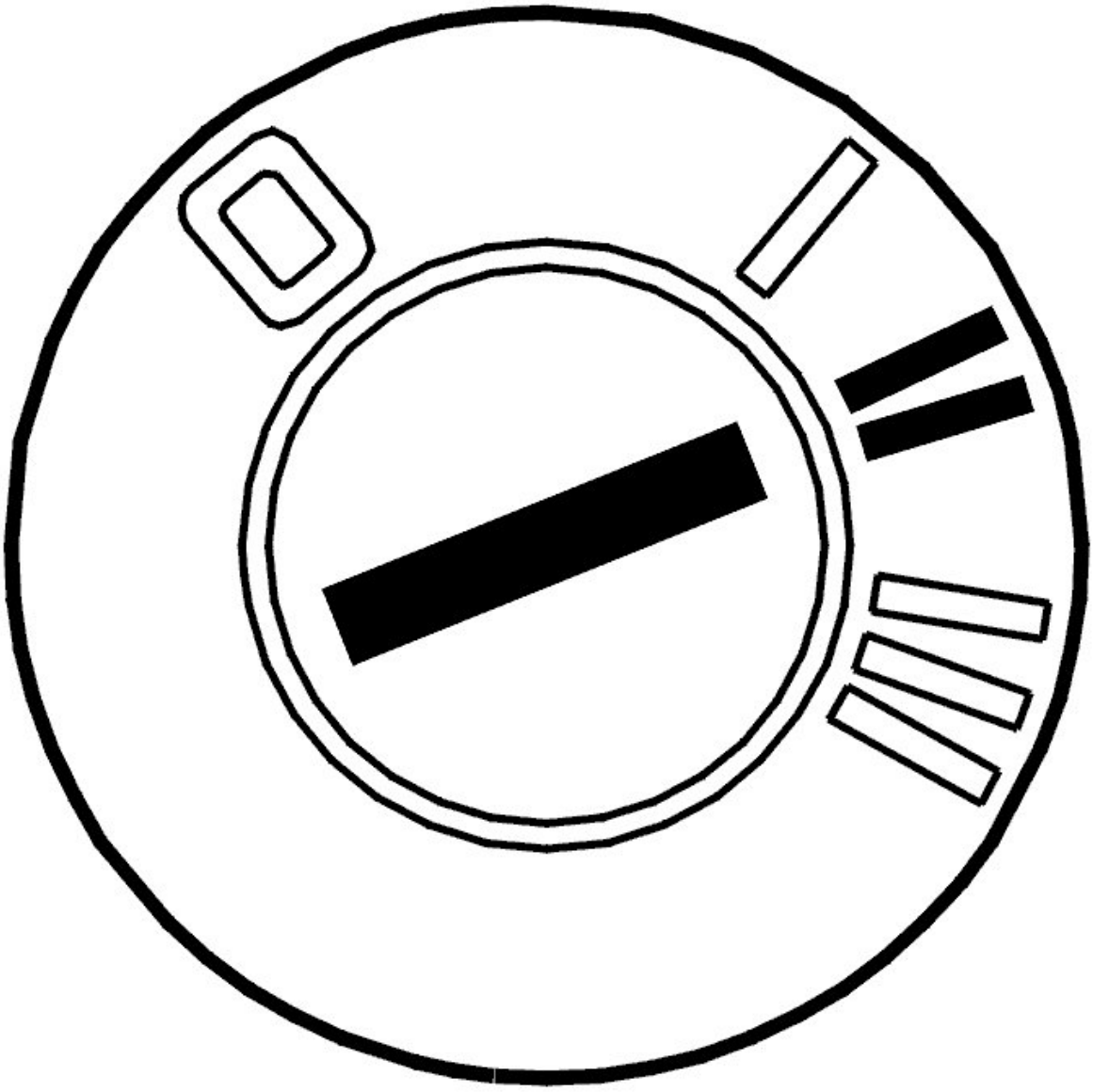
Continue - Verification

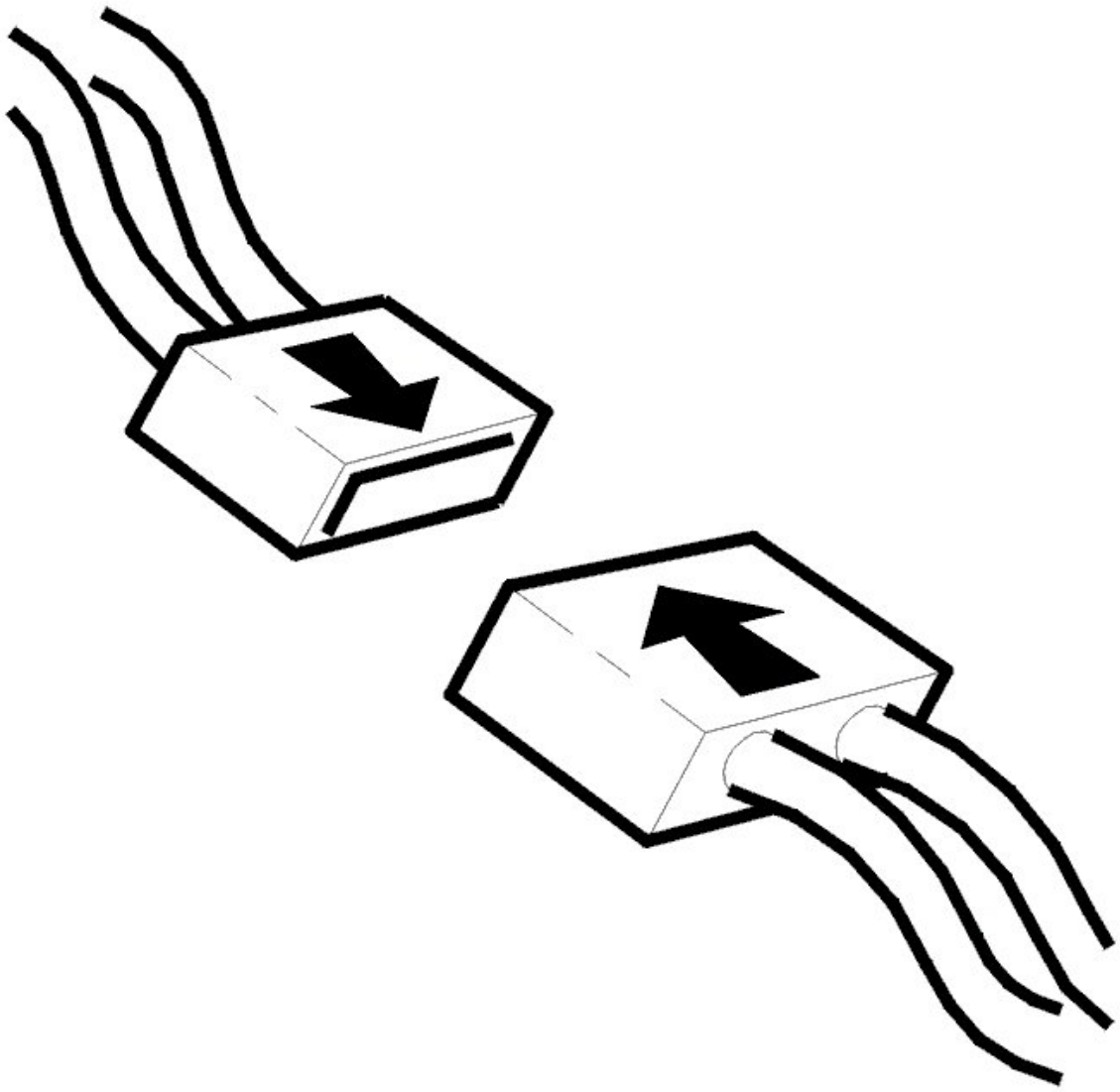
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components.
- Ignition on.
- Read off outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

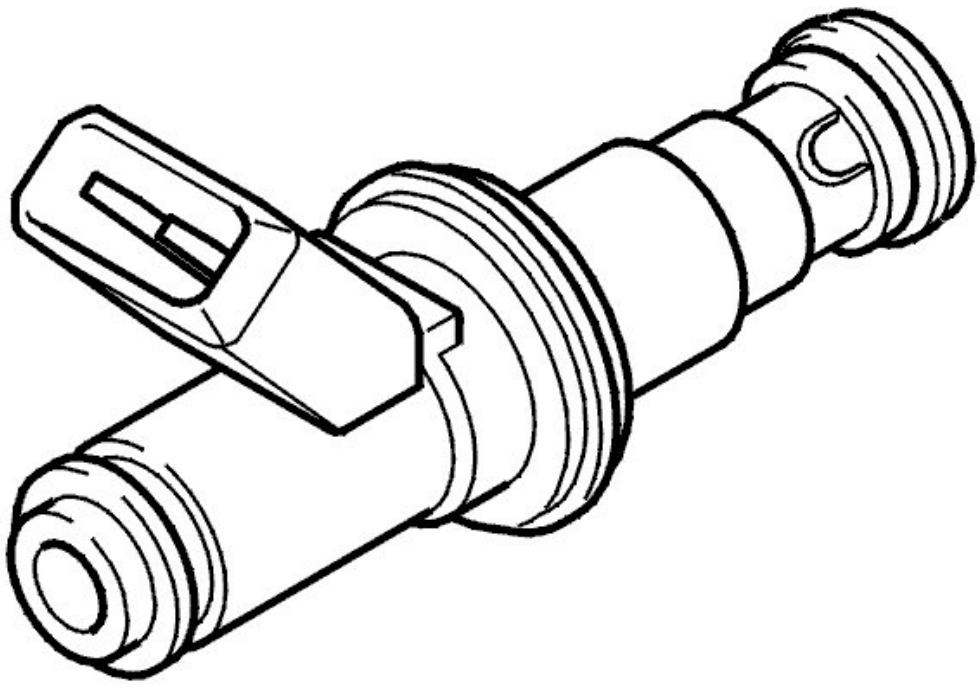
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is missing.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200B: injector 1
- ECM-201B: injector 2
- ECM-202B: injector 3
- ECM-203B: injector 4
- ECM-204B: injector 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the injector
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

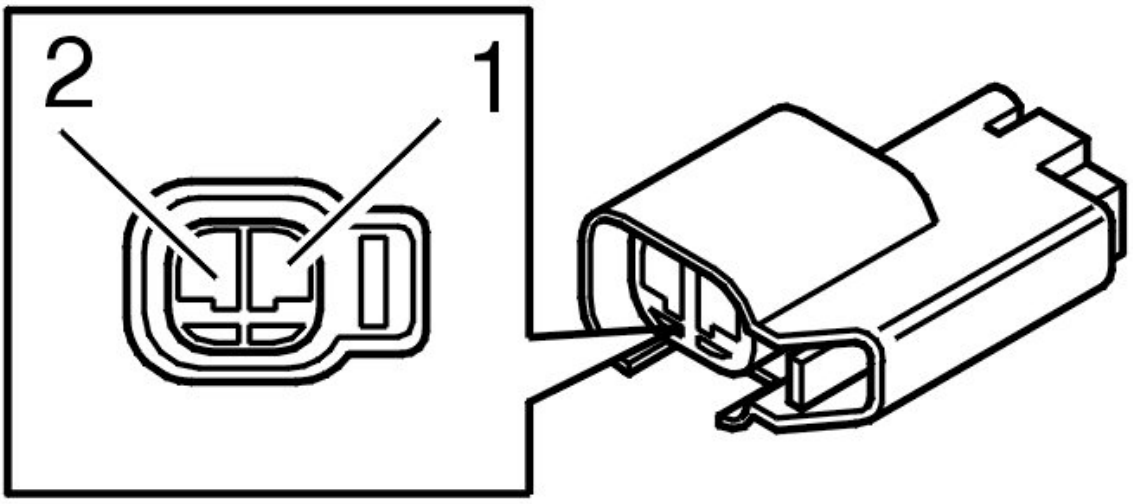
Signal missing

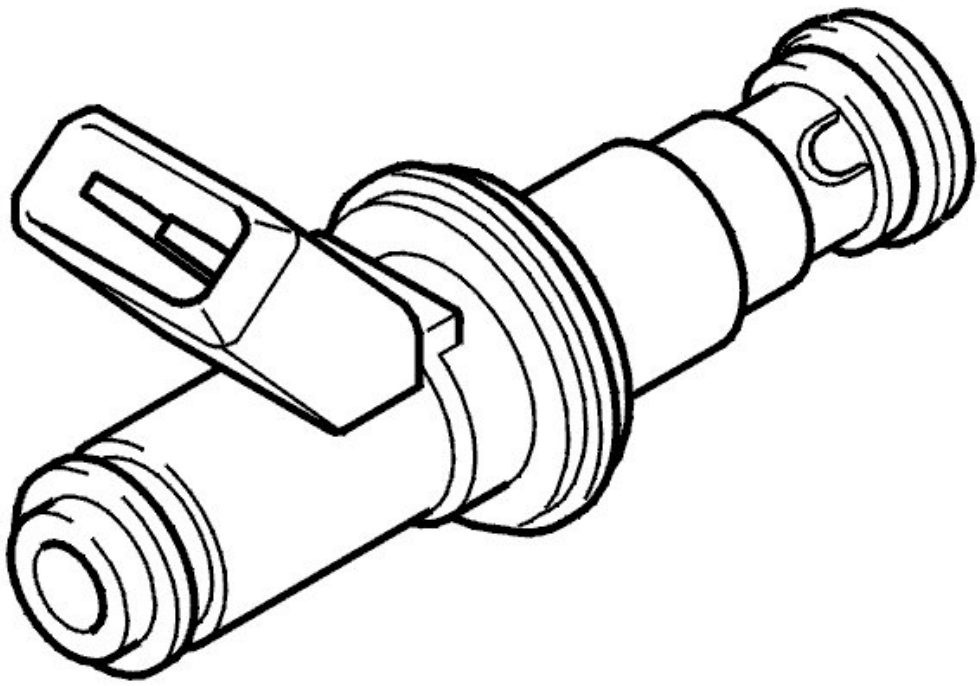
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200B, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201B, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202B, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203B, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204B, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



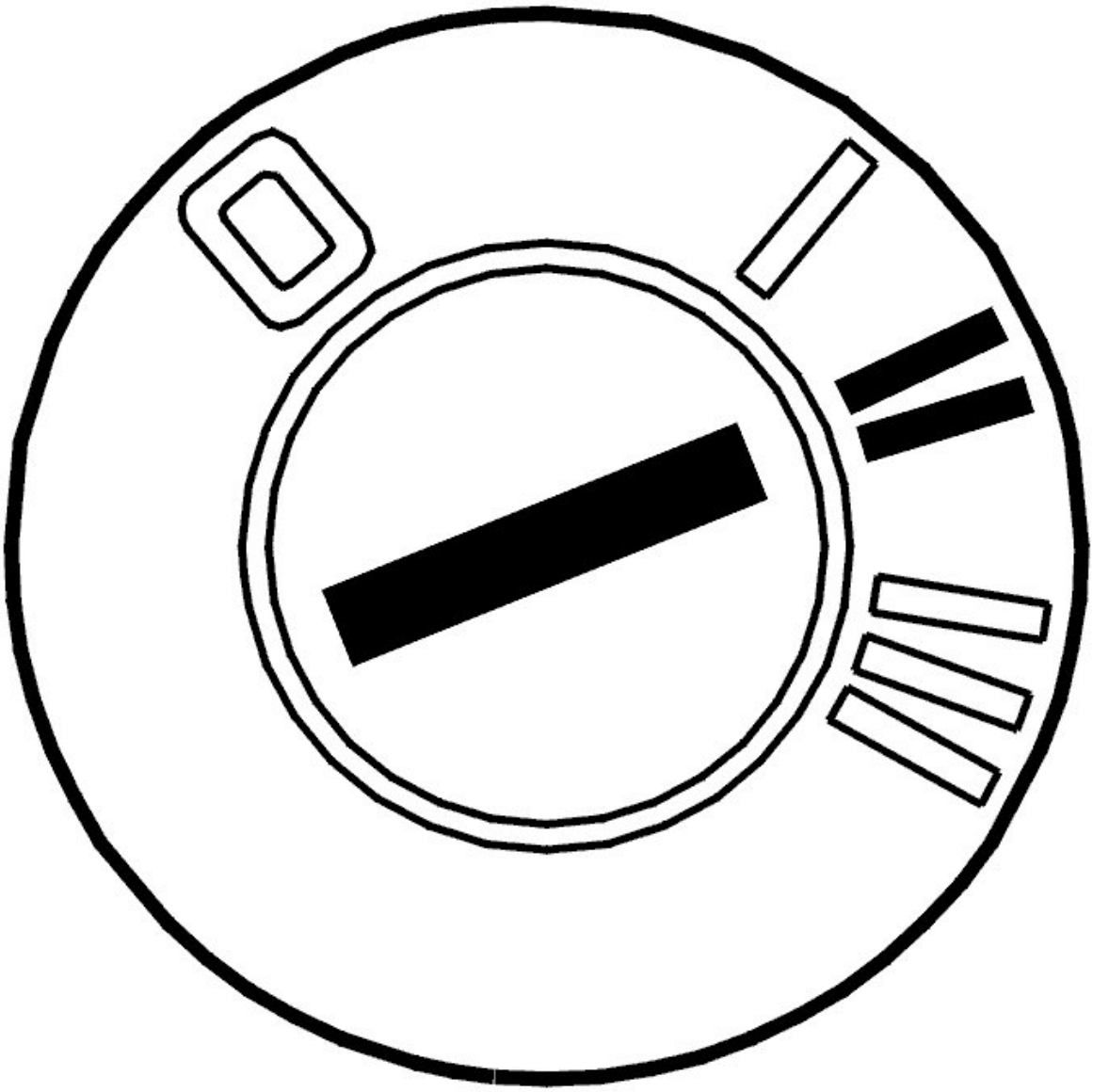


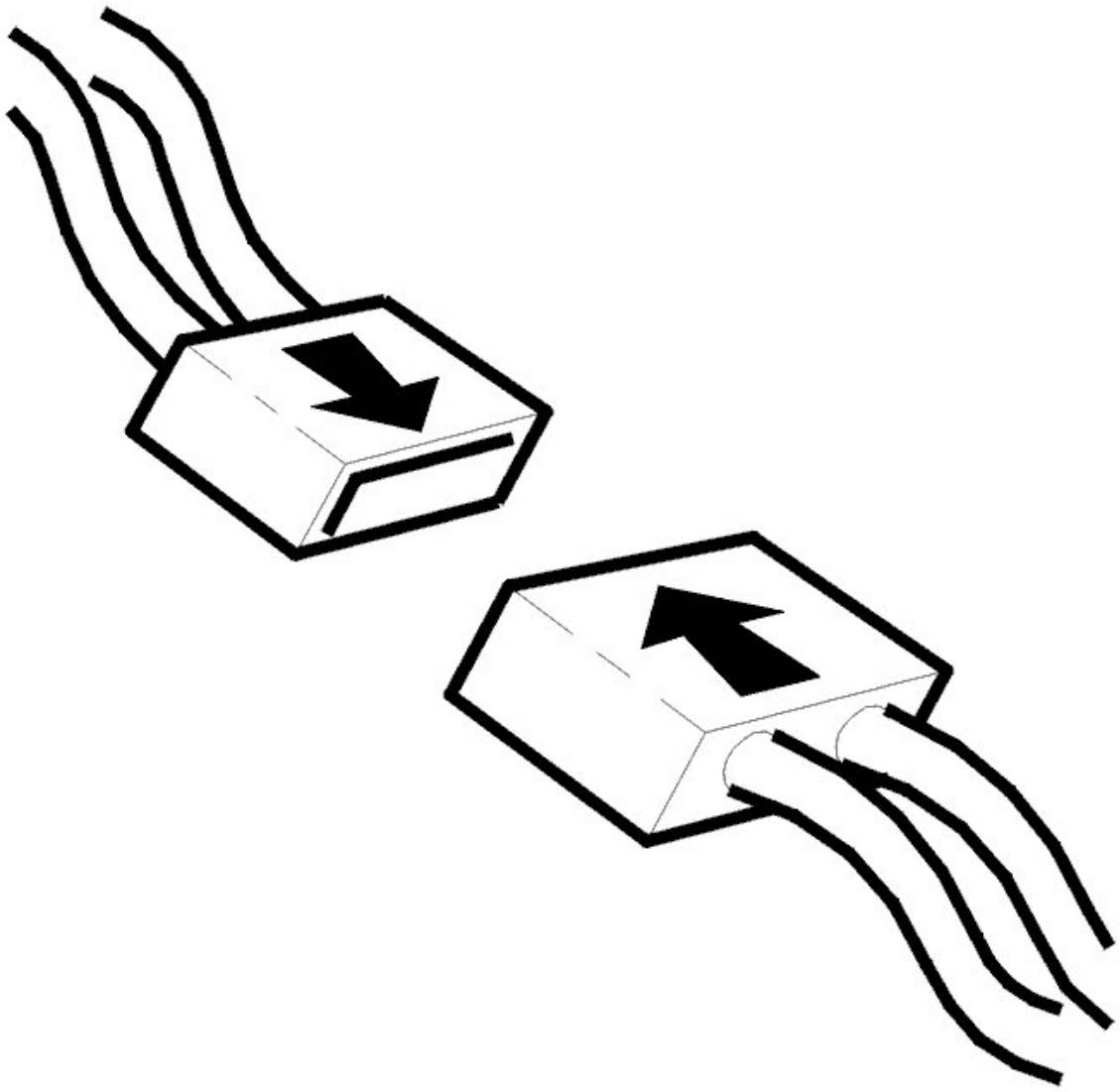
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

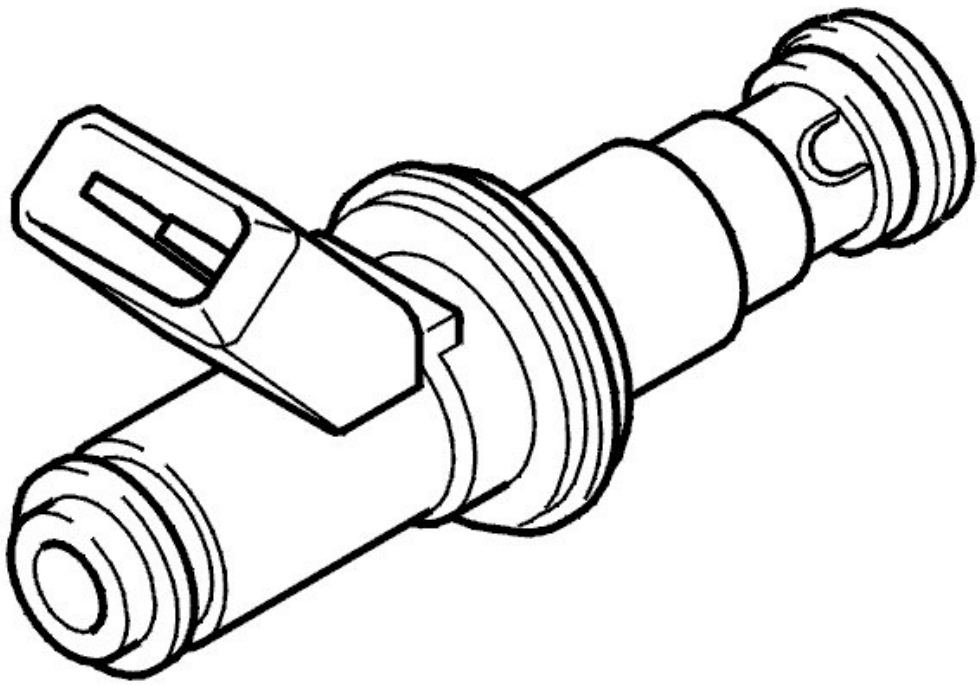
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too high.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200C: injector 1
- ECM-201C: injector 2
- ECM-202C: injector 3
- ECM-203C: injector 4
- ECM-204C: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

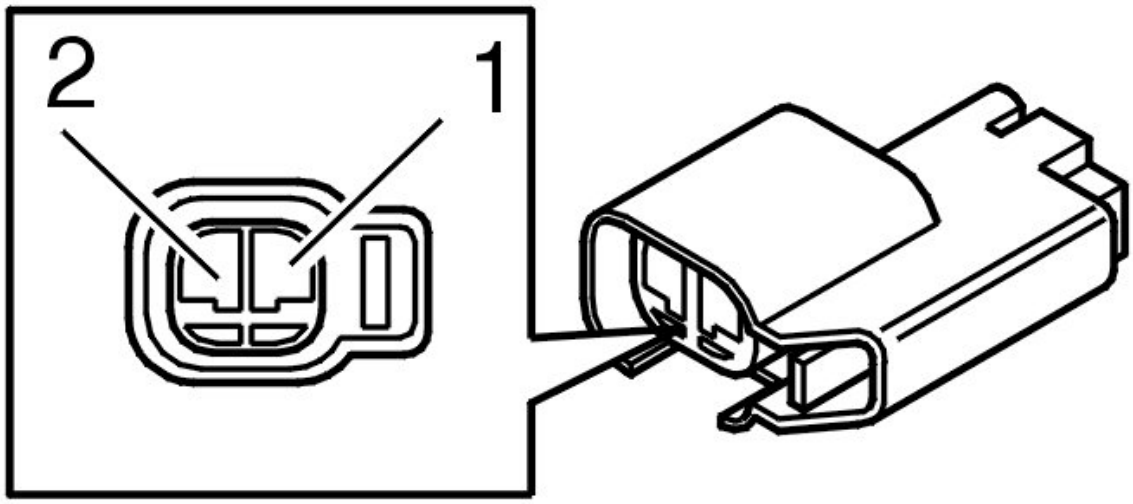
Signal too high

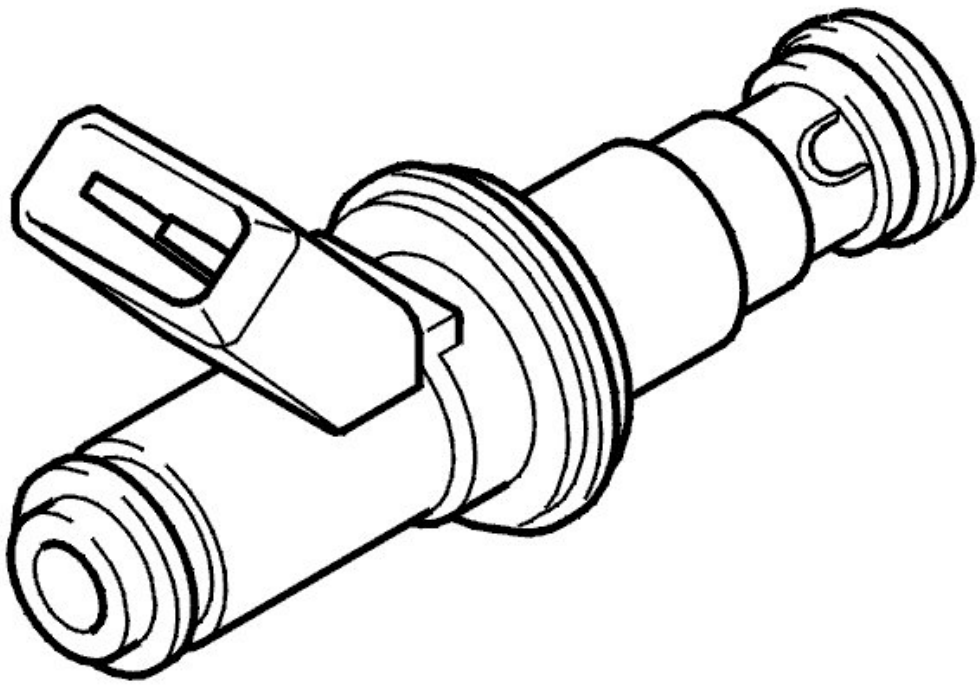
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200C, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201C, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202C, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203C, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204C, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



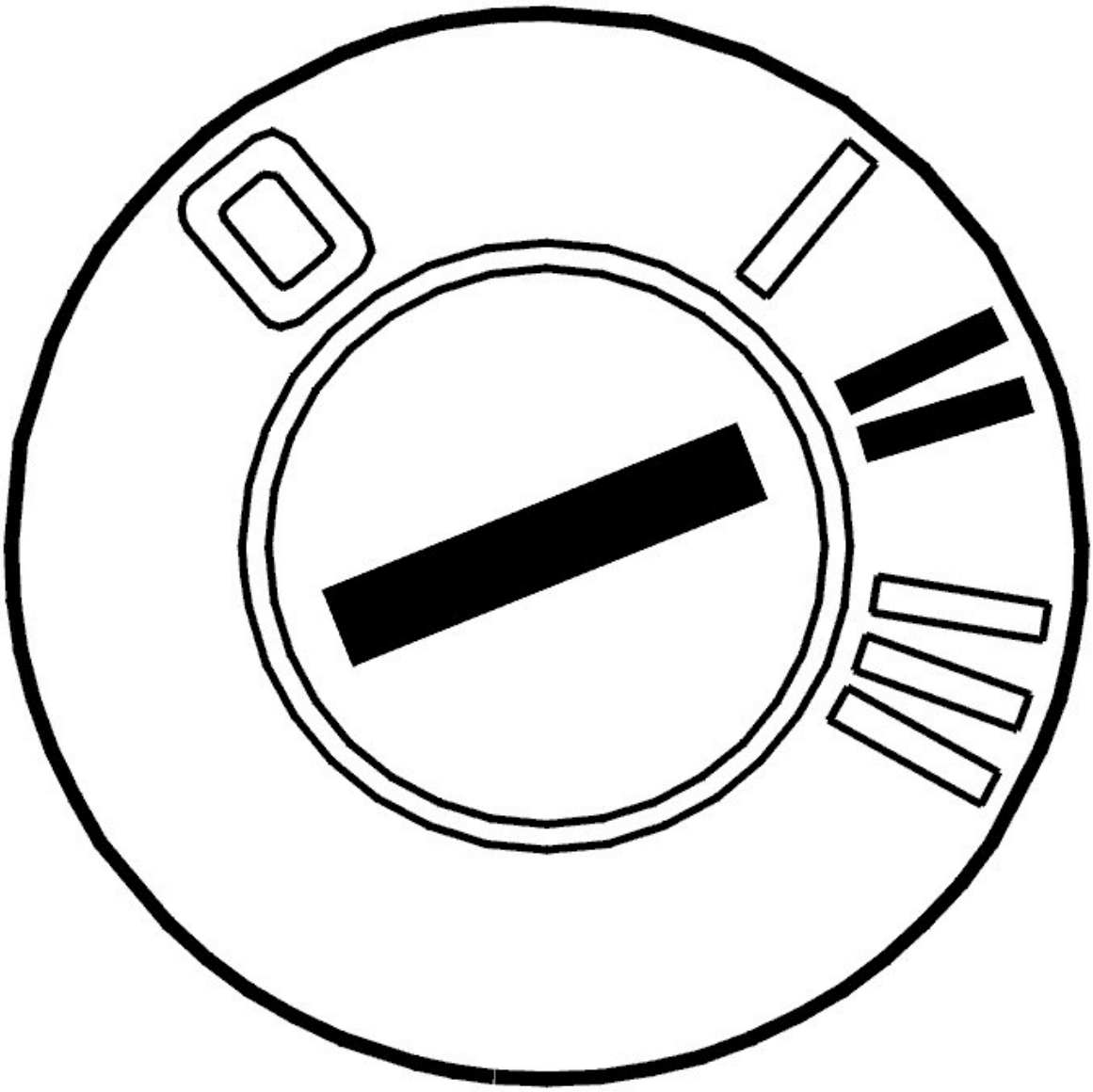


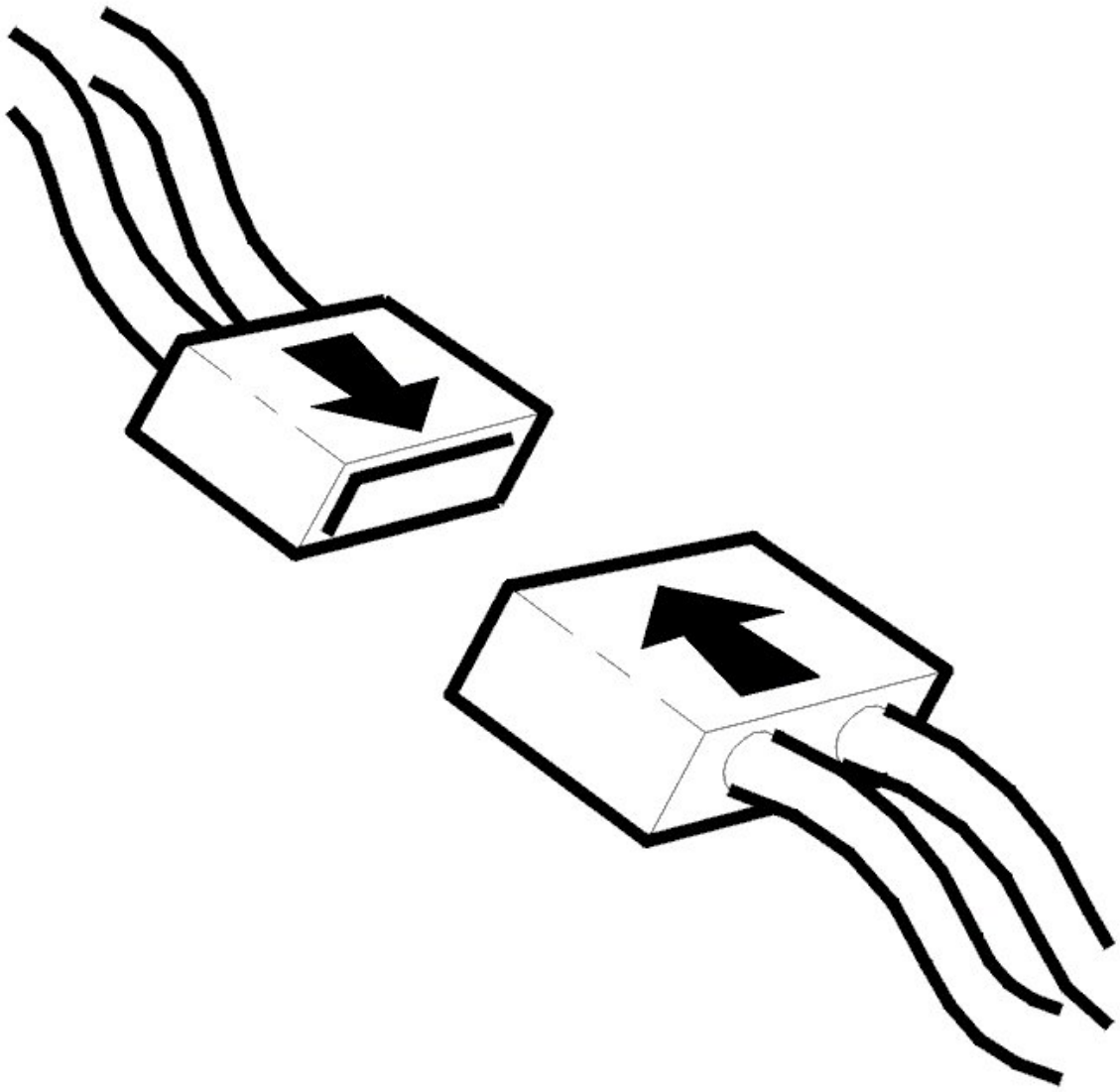
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

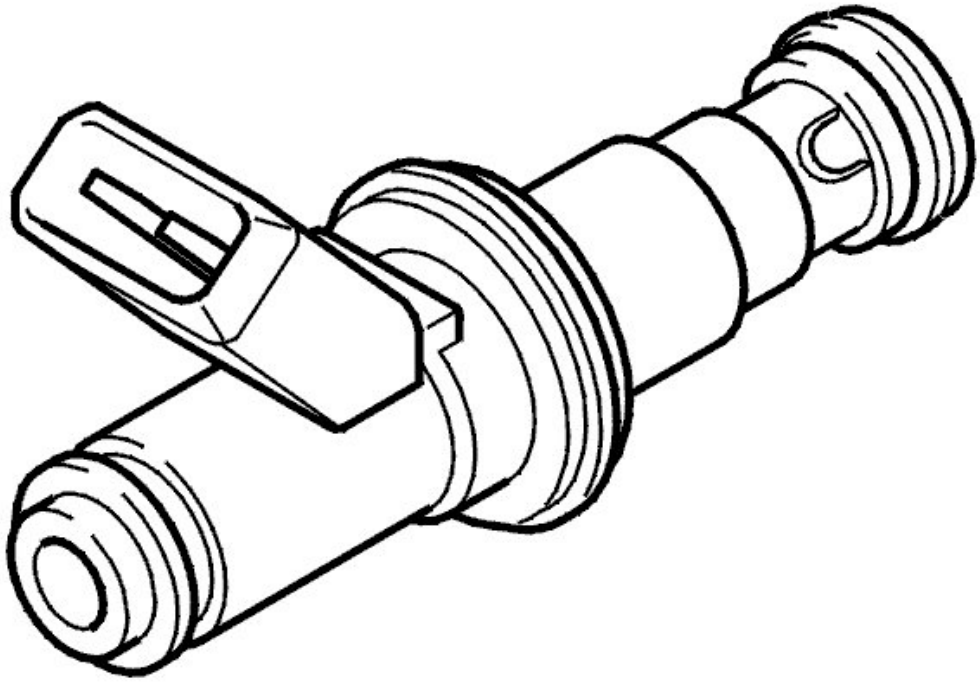
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too low.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200D: injector 1
- ECM-201D: injector 2
- ECM-202D: injector 3
- ECM-203D: injector 4
- ECM-204D: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

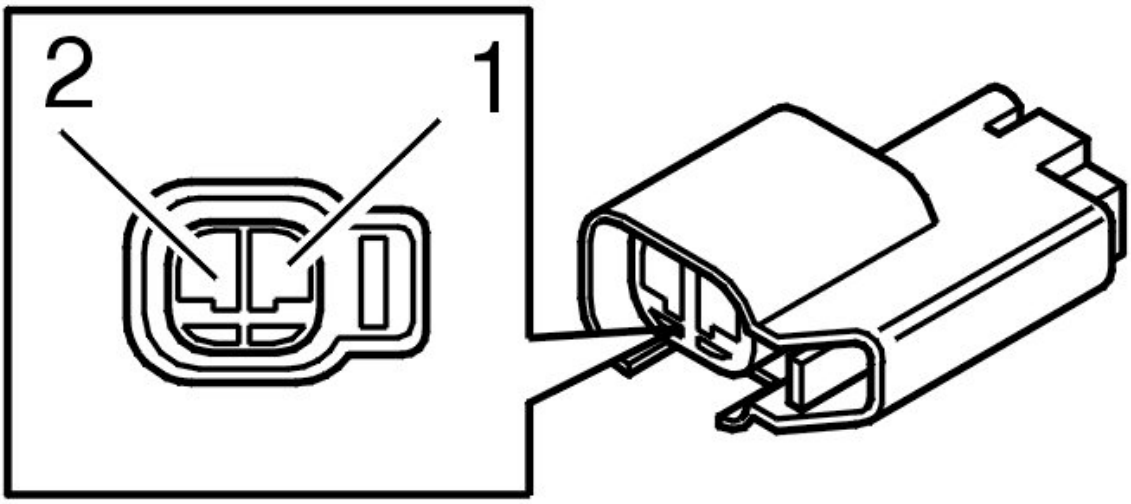
Signal too low

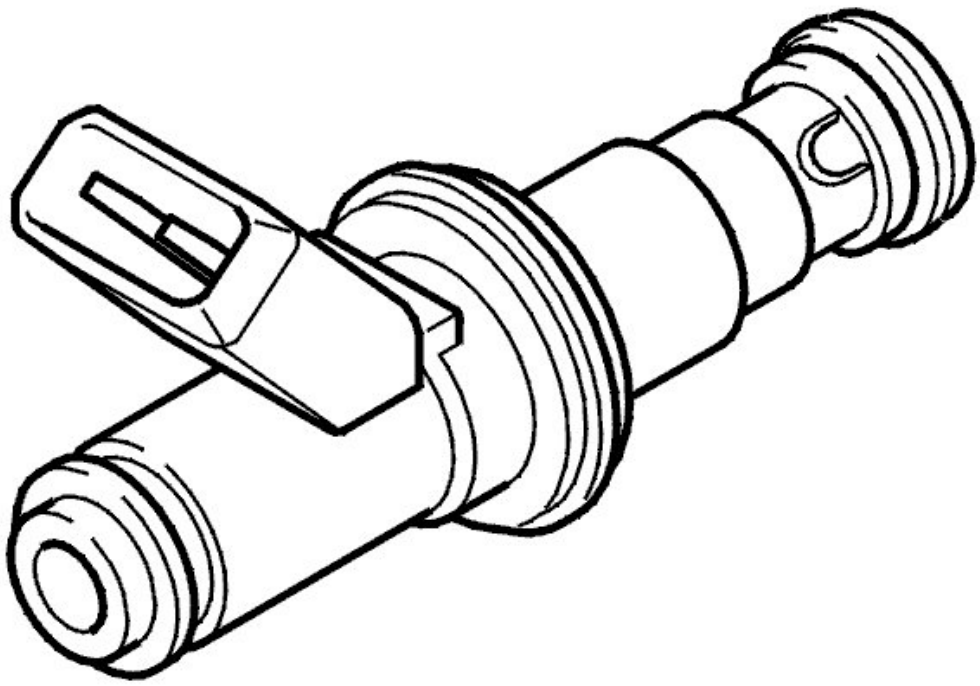
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200D, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201D, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202D, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203D, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204D, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



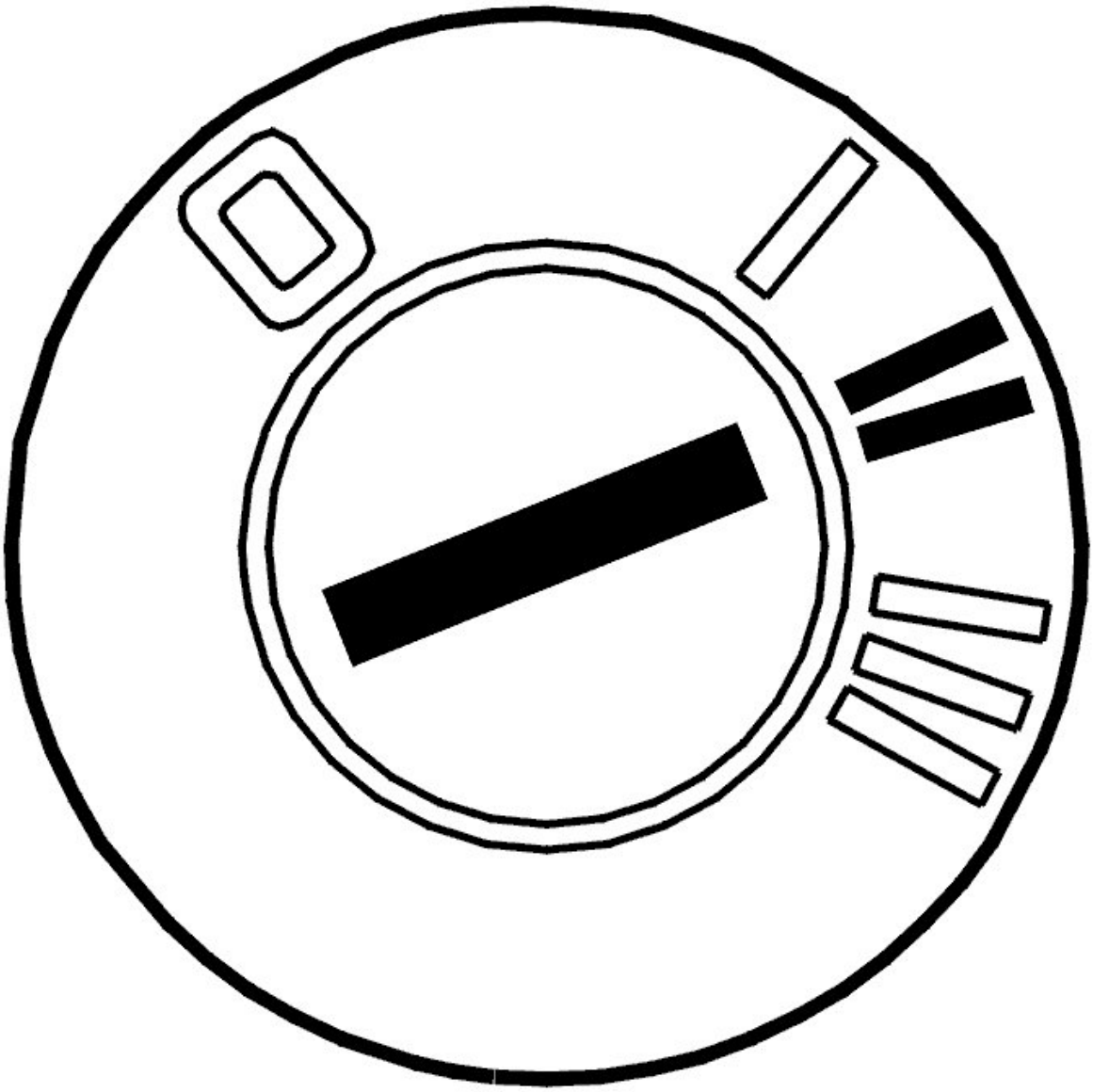


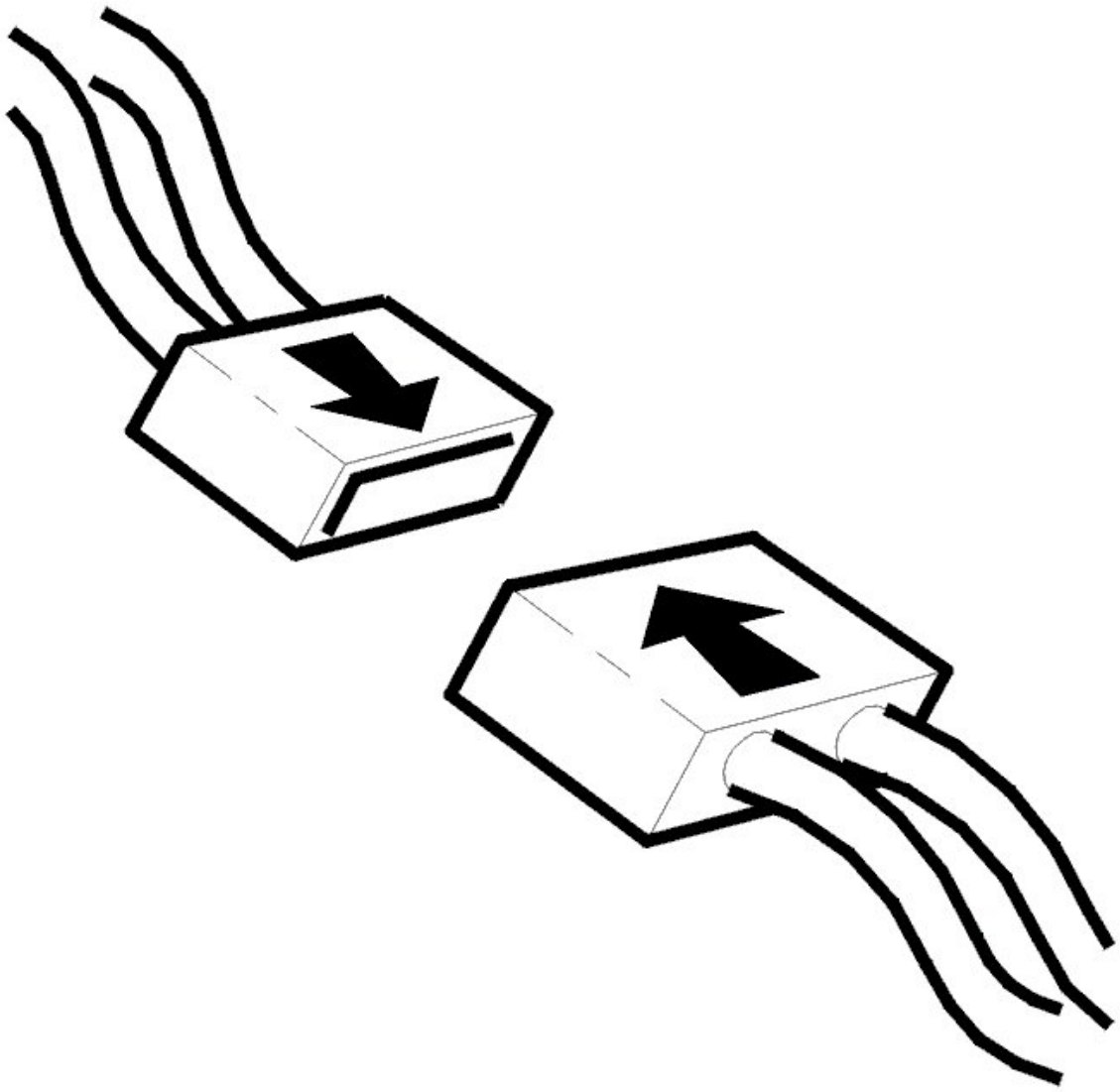
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

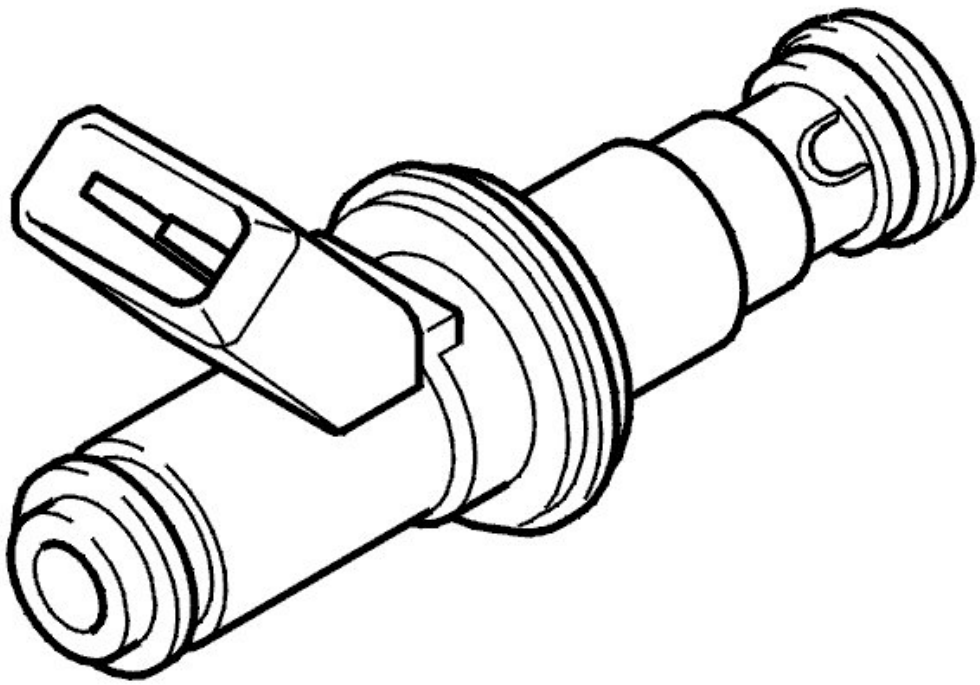
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is missing.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200B: injector 1
- ECM-201B: injector 2
- ECM-202B: injector 3
- ECM-203B: injector 4
- ECM-204B: injector 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the injector
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

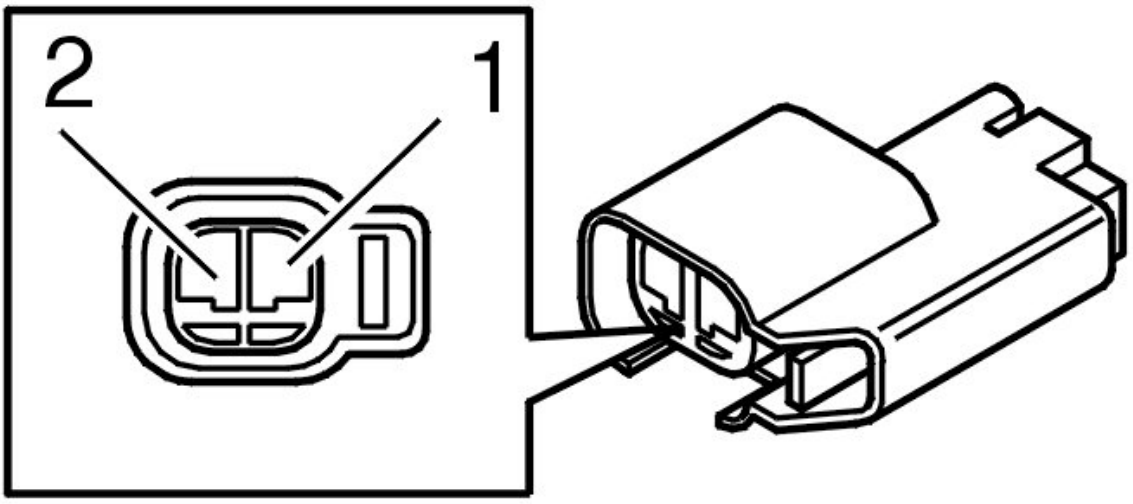
Signal missing

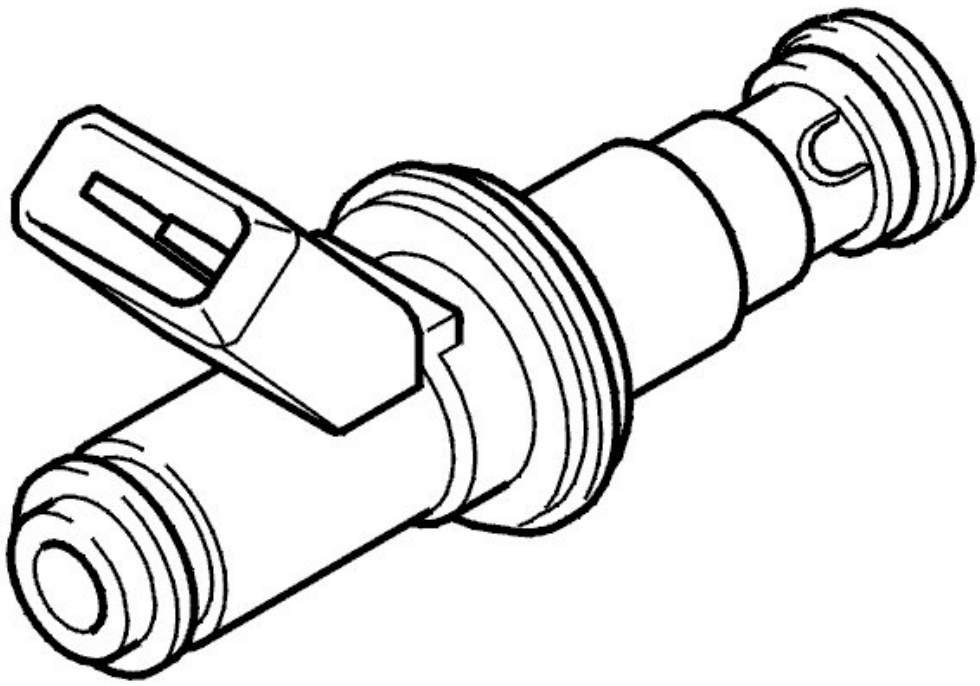
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200B, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201B, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202B, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203B, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204B, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



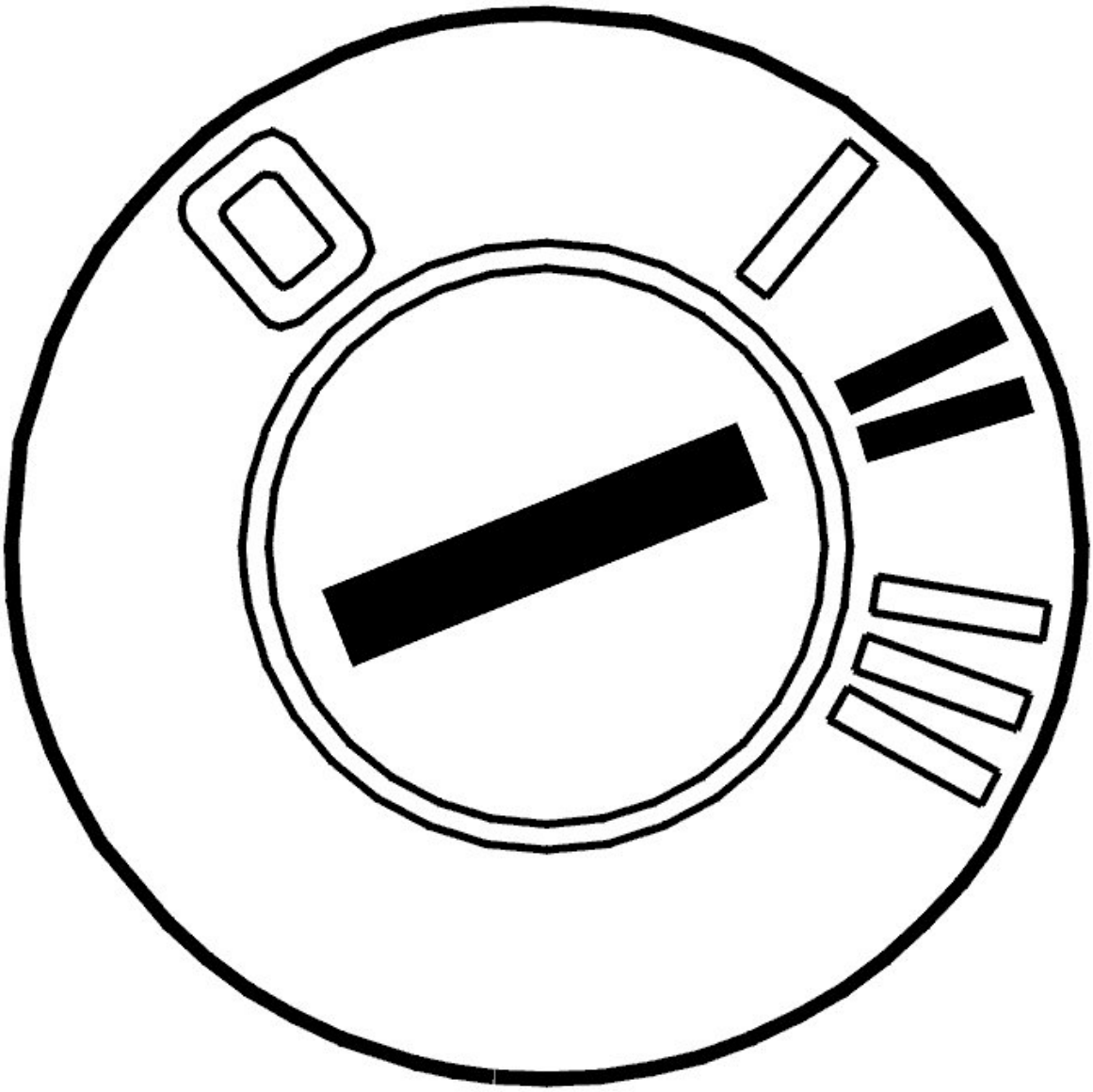


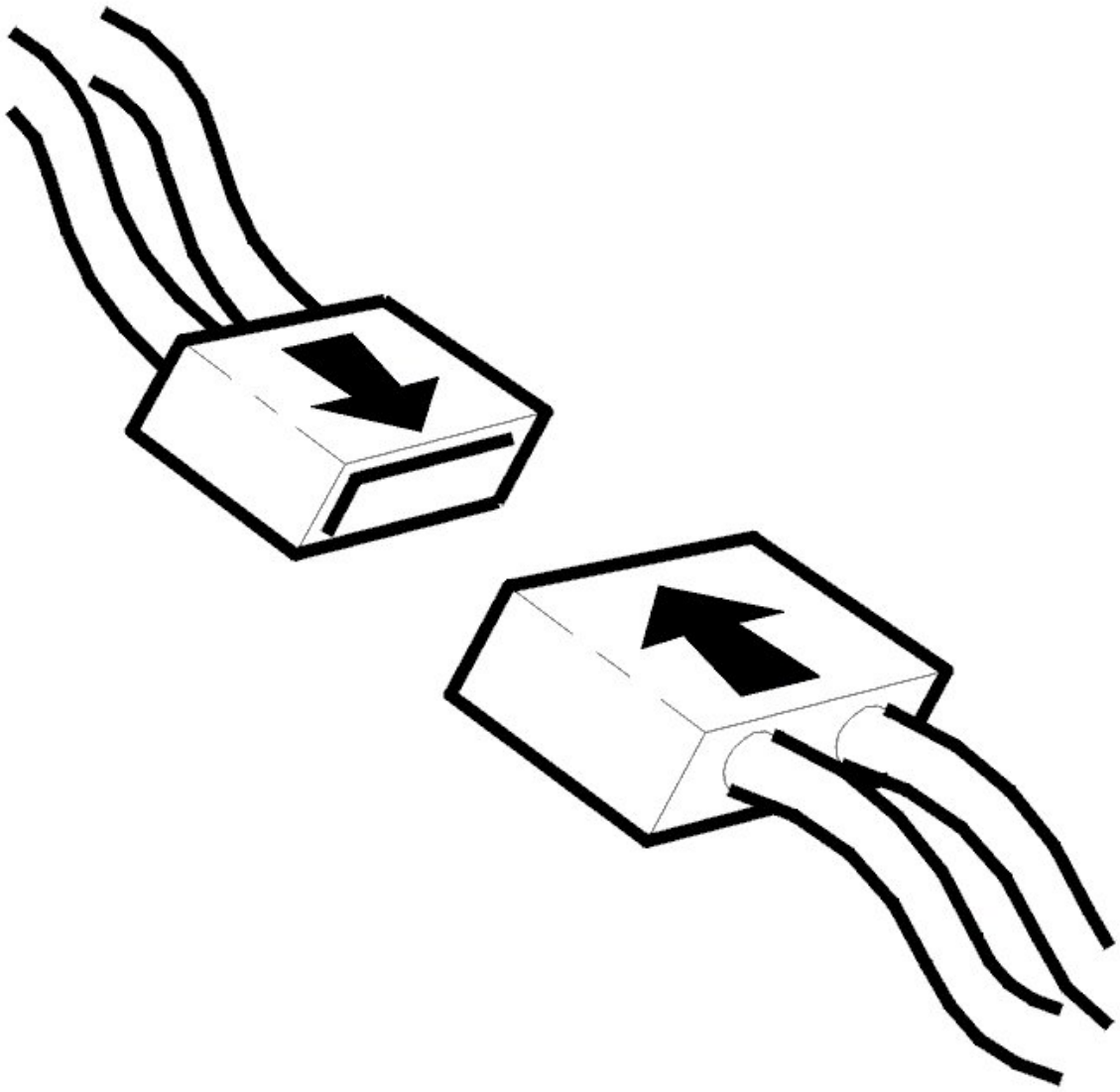
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

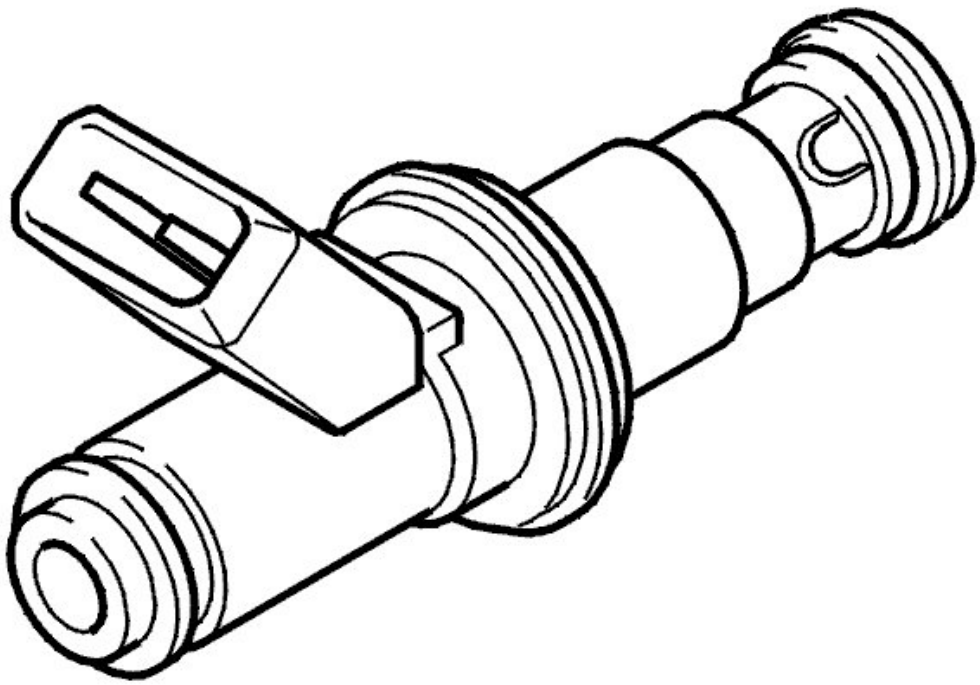
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too high.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200C: injector 1
- ECM-201C: injector 2
- ECM-202C: injector 3
- ECM-203C: injector 4
- ECM-204C: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

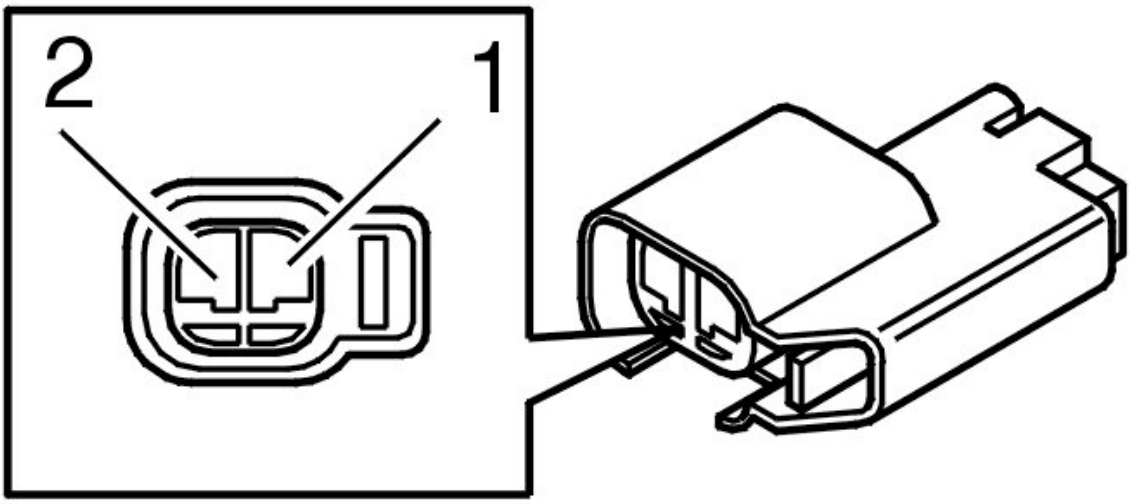
Signal too high

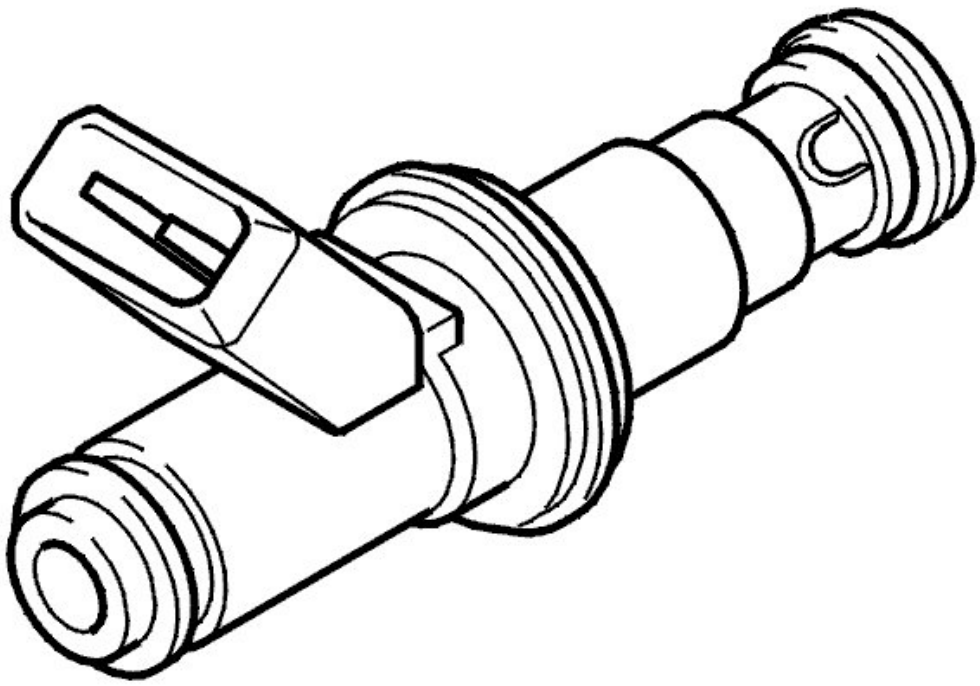
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200C, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201C, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202C, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203C, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204C, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



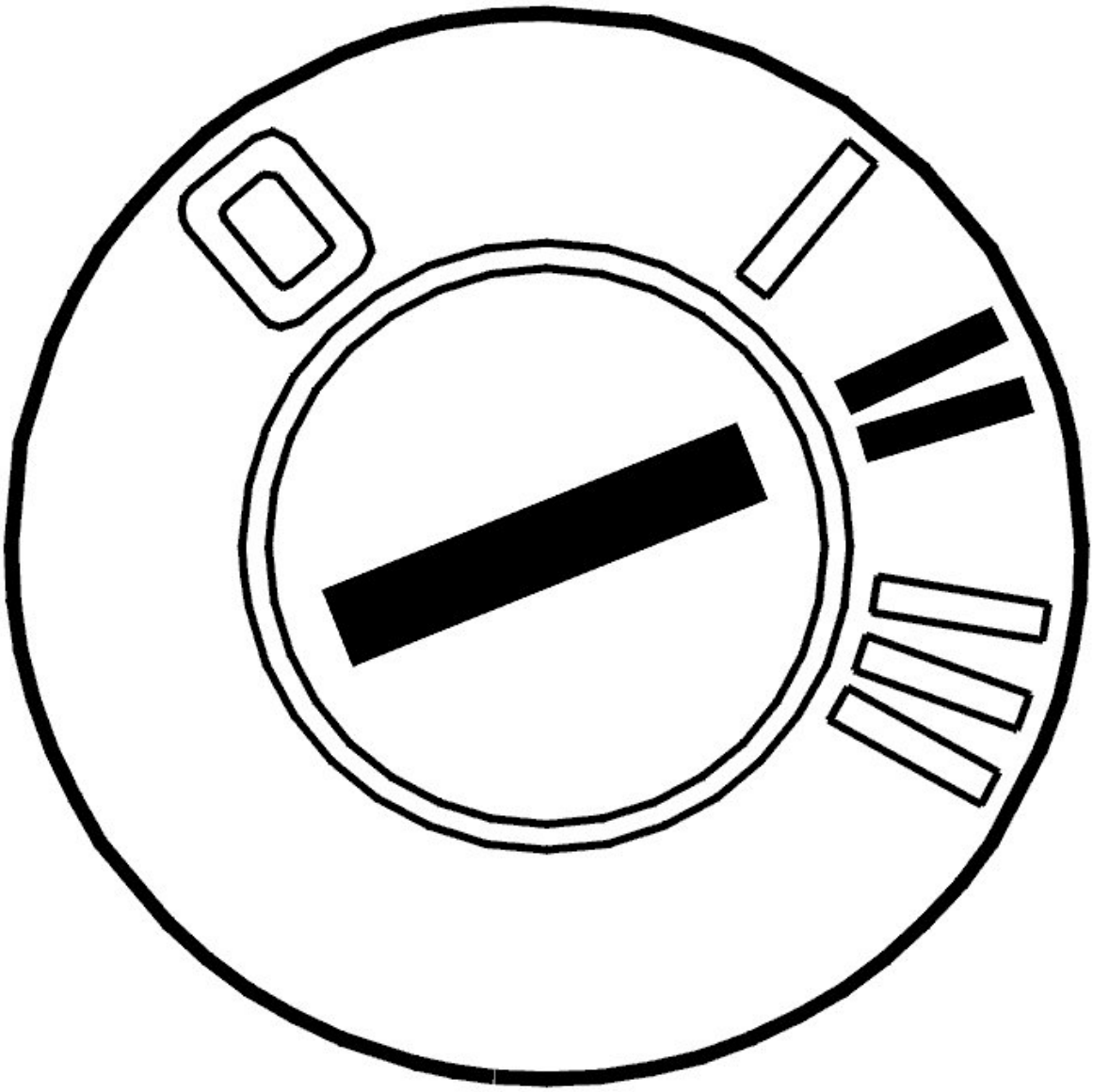


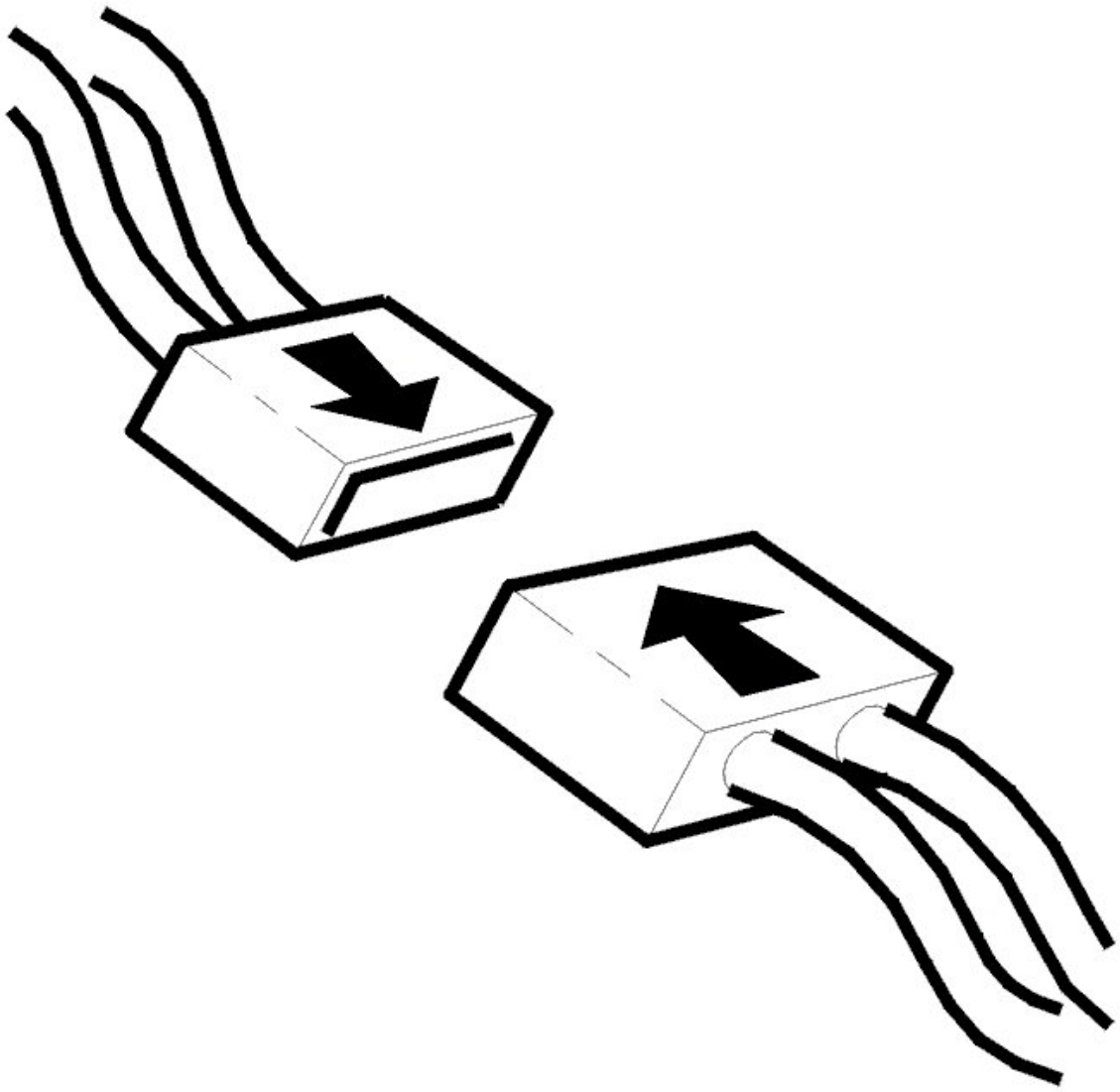
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

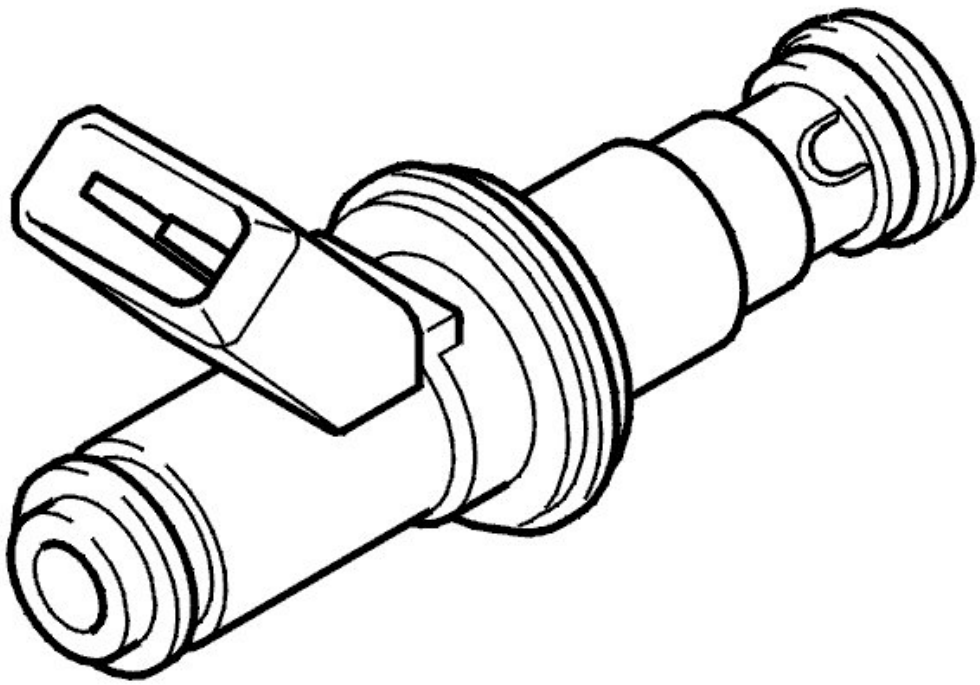
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too low.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200D: injector 1
- ECM-201D: injector 2
- ECM-202D: injector 3
- ECM-203D: injector 4
- ECM-204D: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

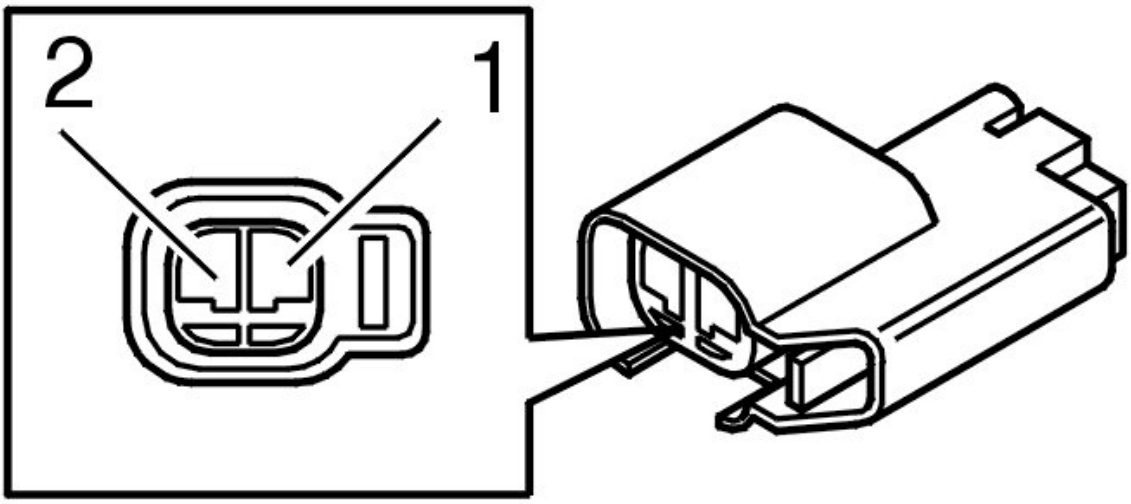
Signal too low

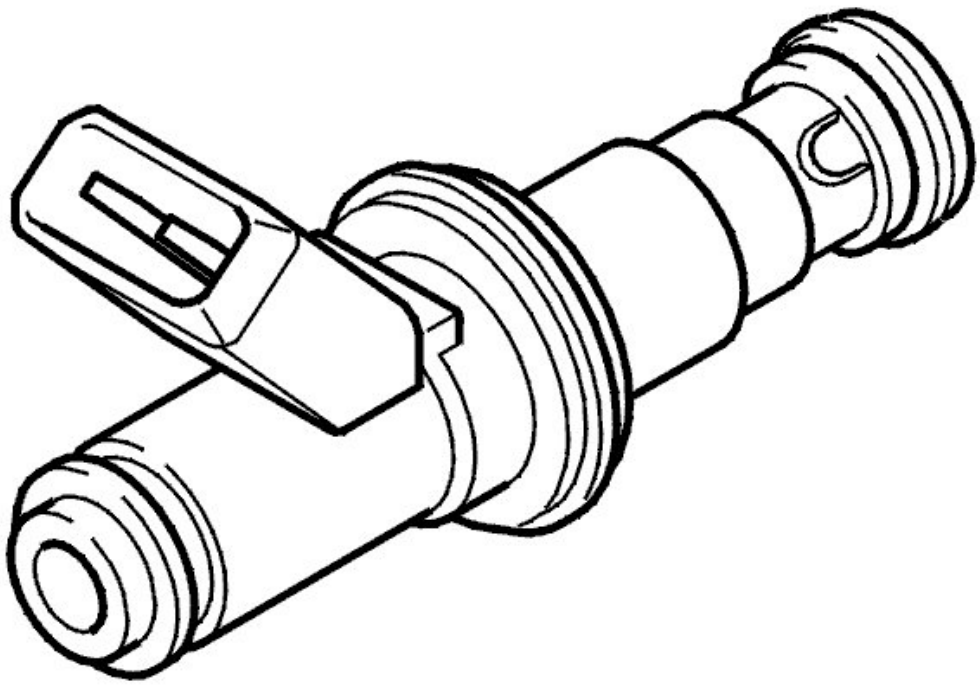
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200D, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201D, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202D, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203D, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204D, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



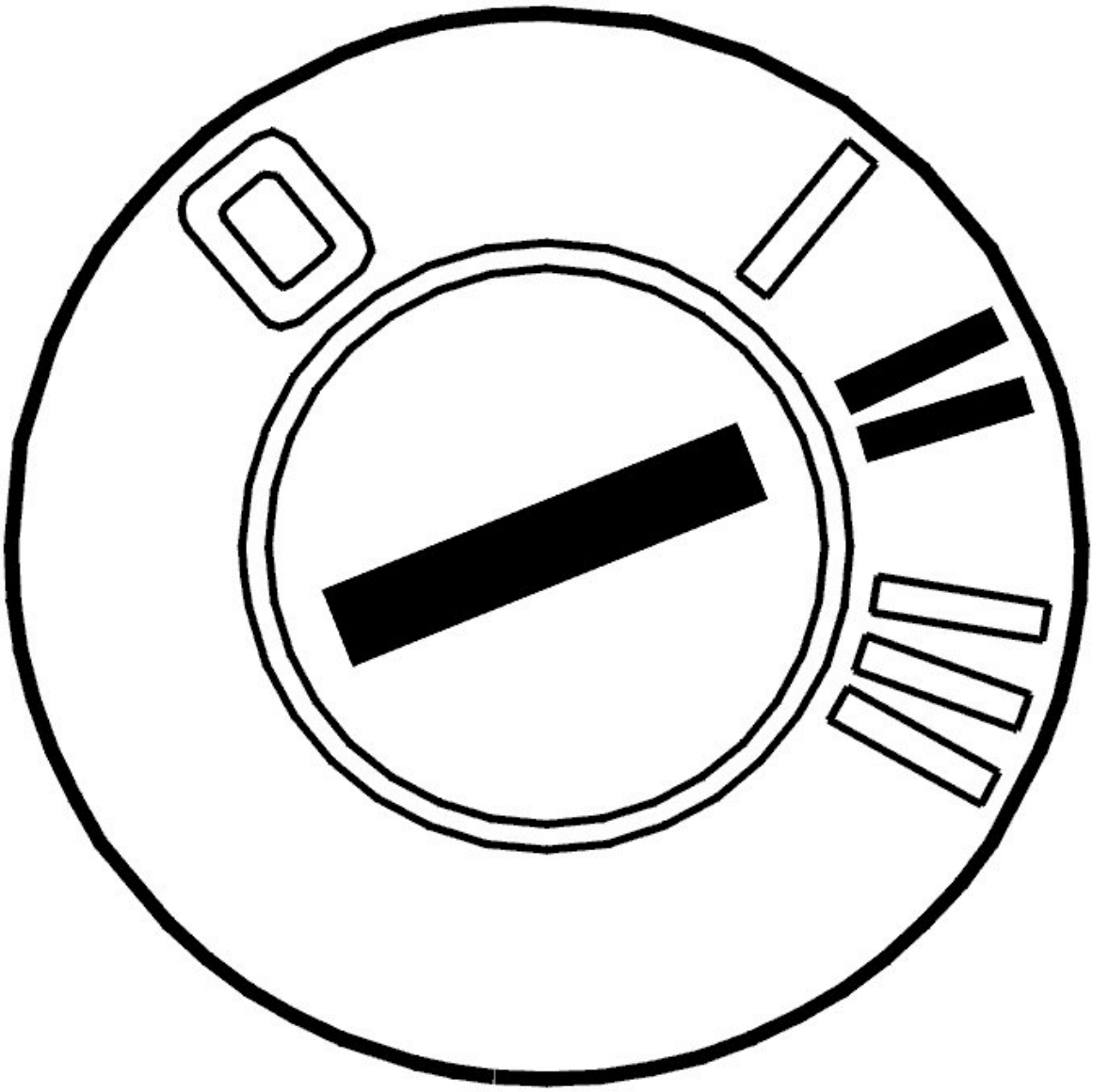


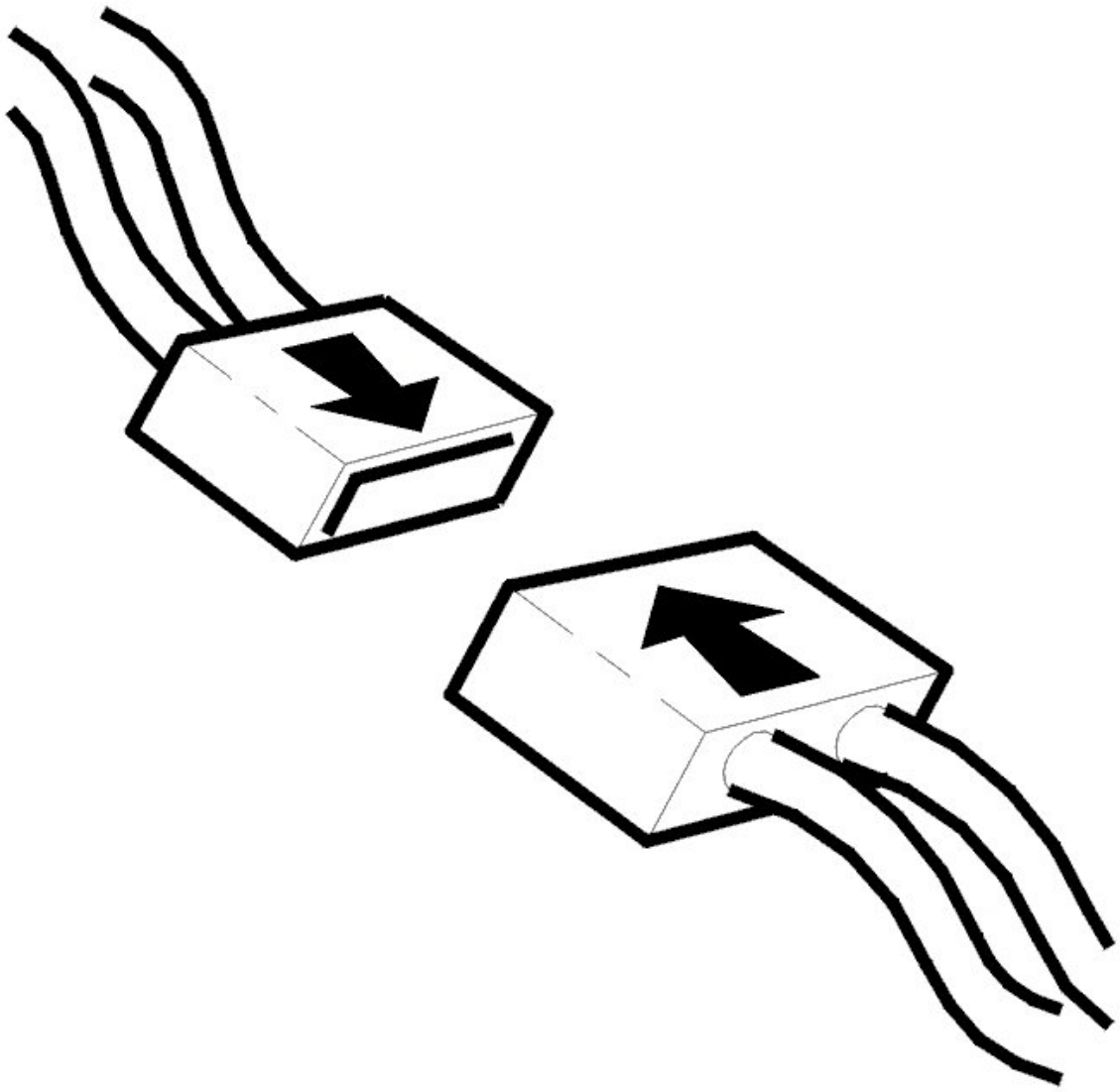
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

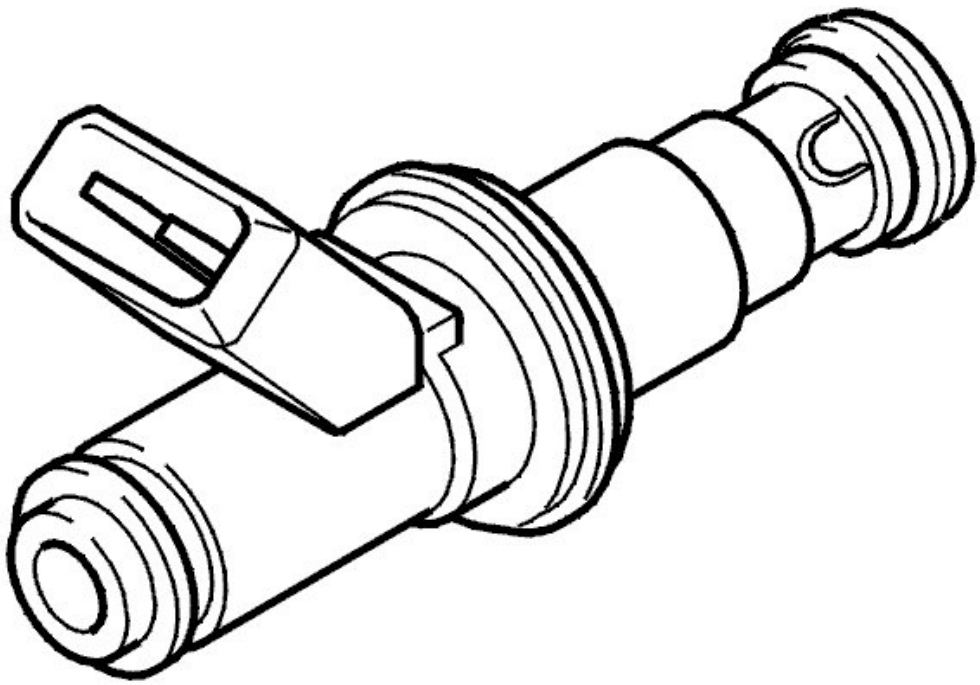
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is missing.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200B: injector 1
- ECM-201B: injector 2
- ECM-202B: injector 3
- ECM-203B: injector 4
- ECM-204B: injector 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the injector
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

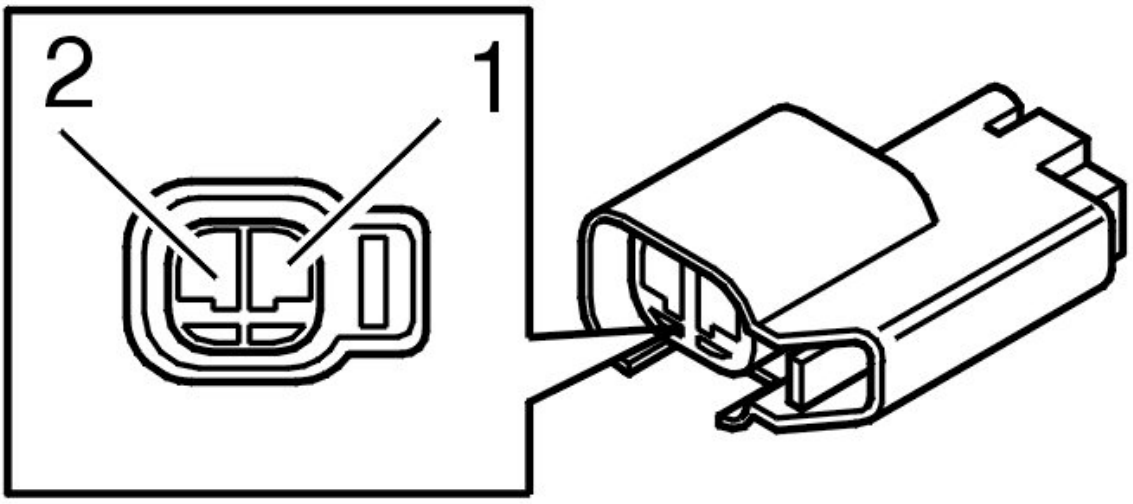
Signal missing

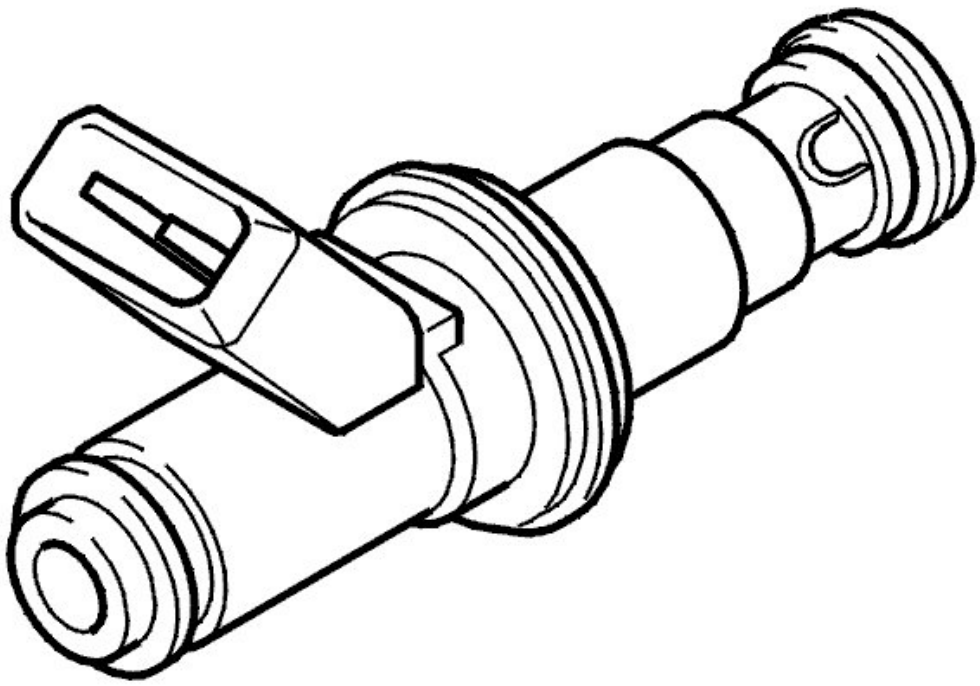
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200B, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201B, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202B, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203B, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204B, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



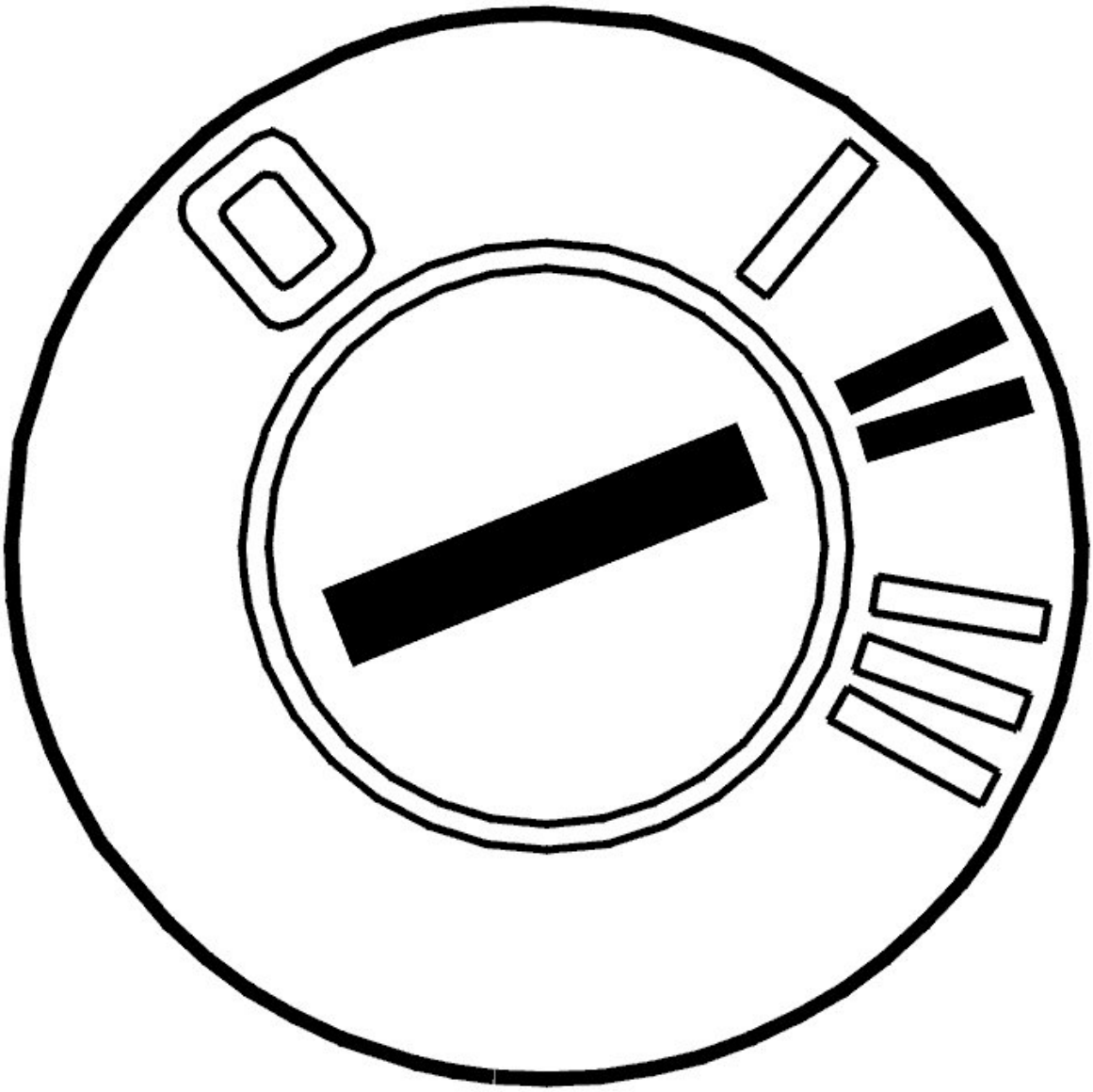


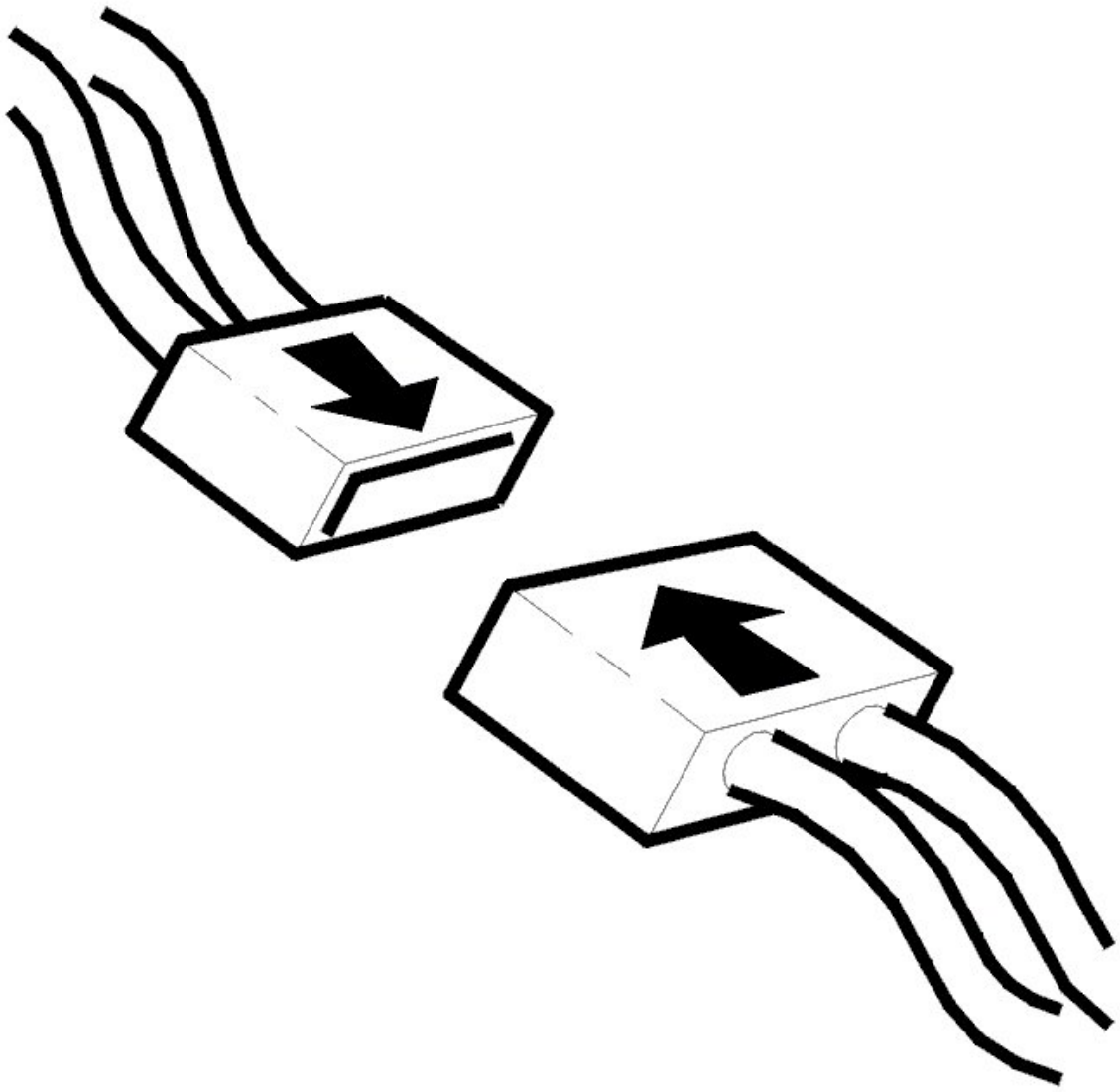
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

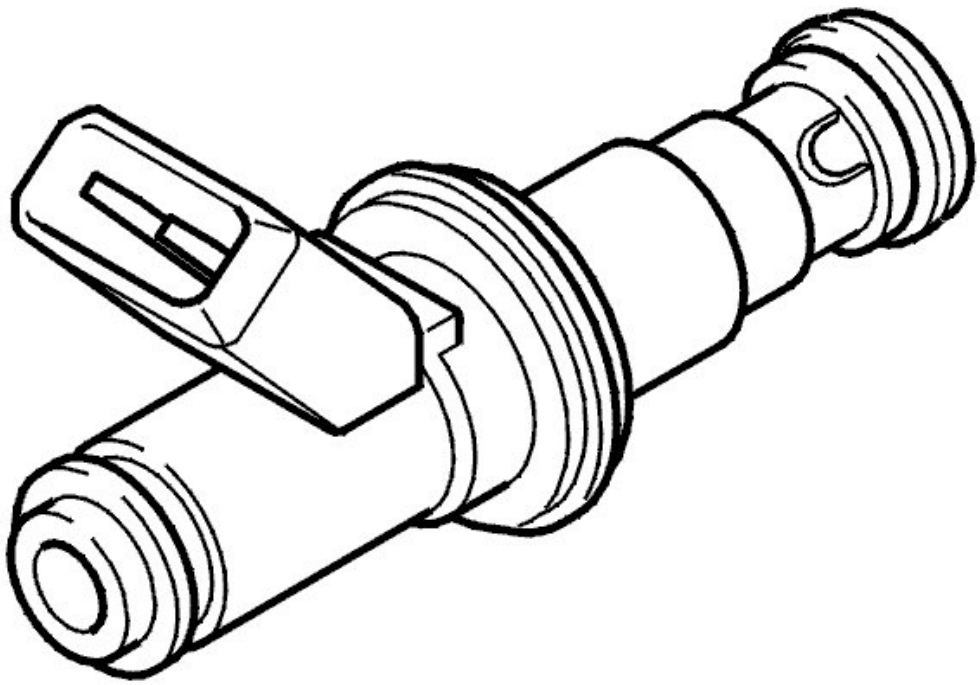
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too high.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200C: injector 1
- ECM-201C: injector 2
- ECM-202C: injector 3
- ECM-203C: injector 4
- ECM-204C: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

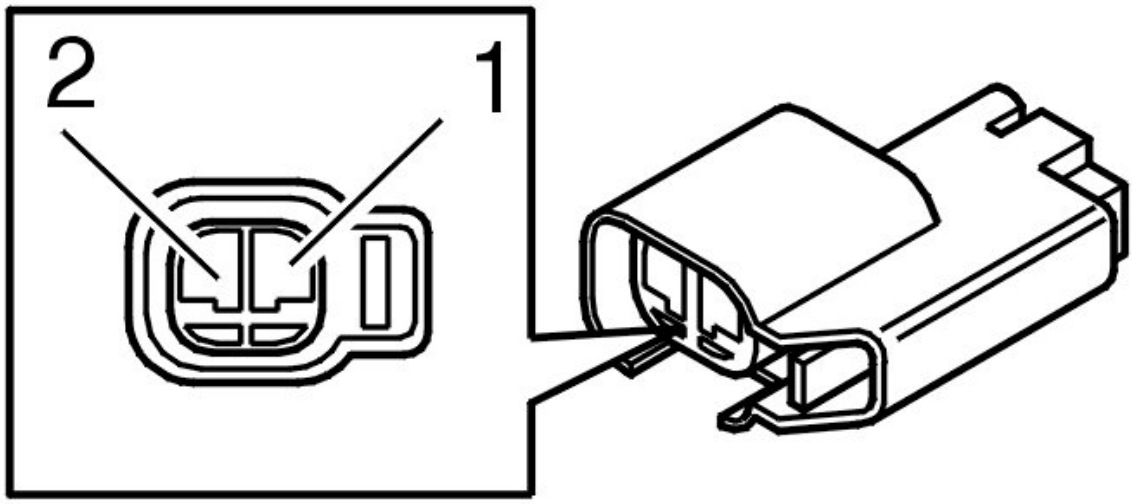
Signal too high

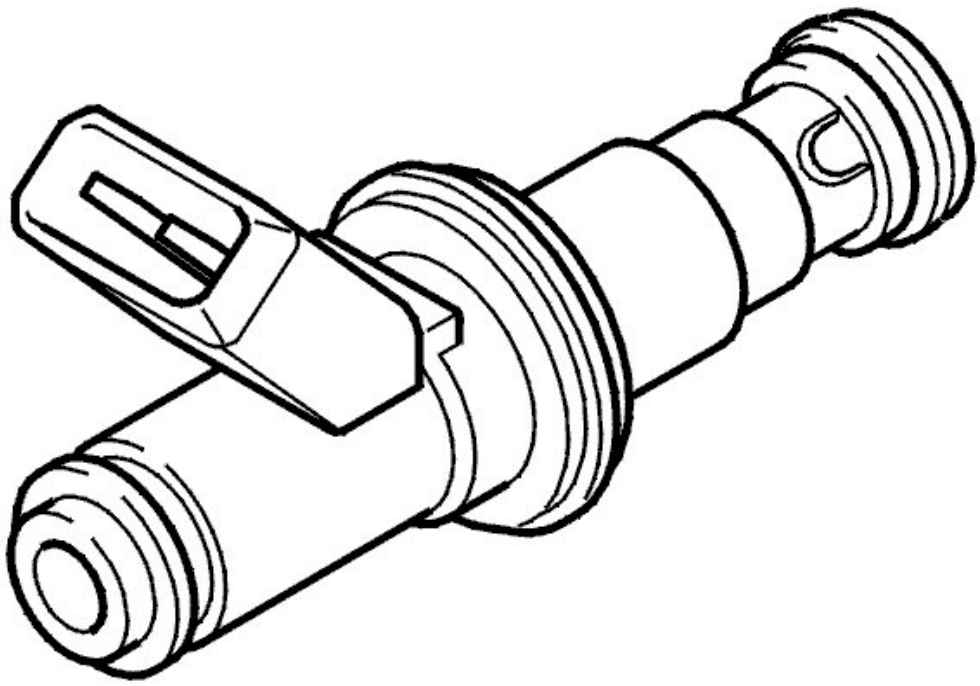
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200C, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201C, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202C, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203C, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204C, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



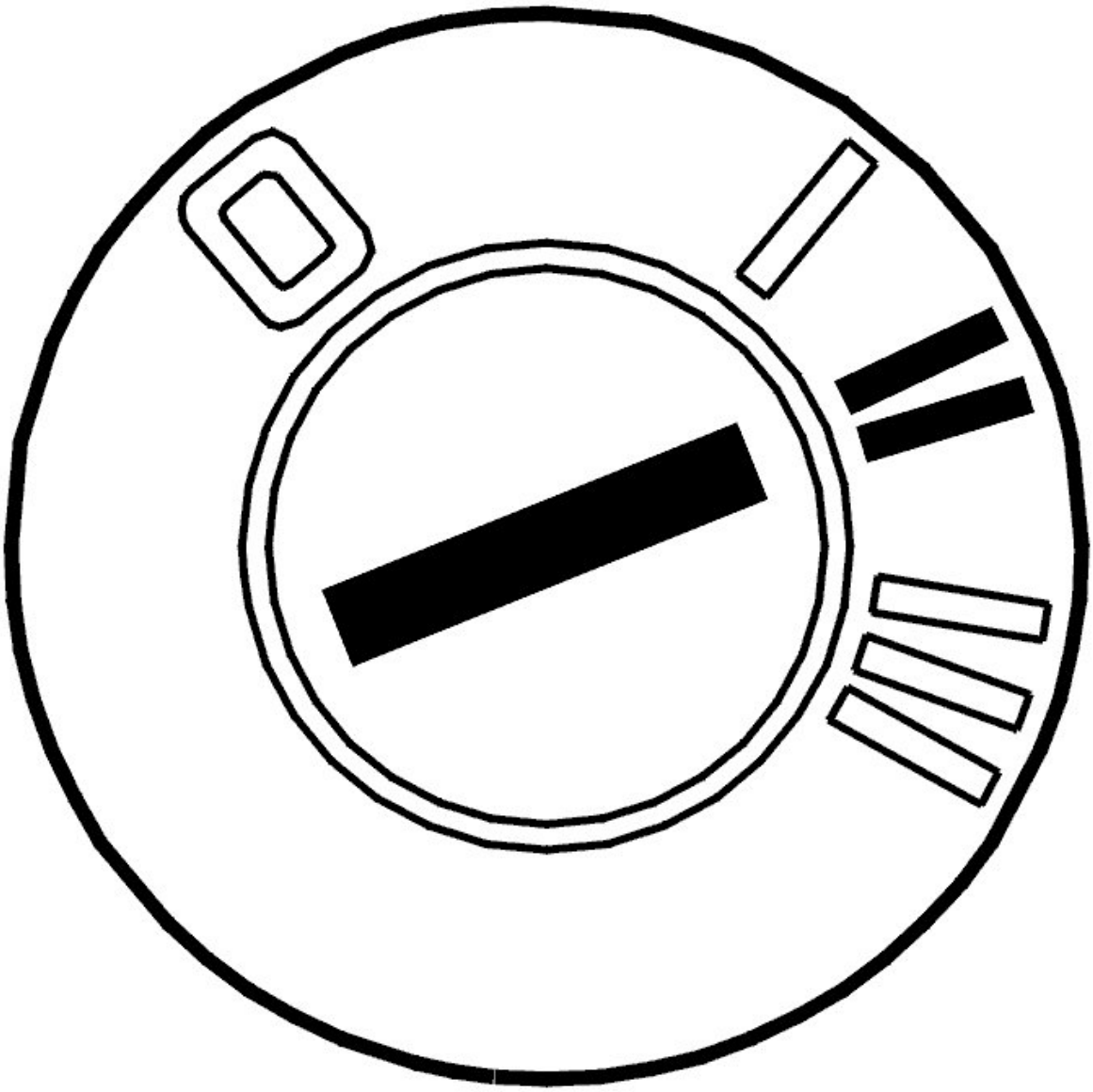


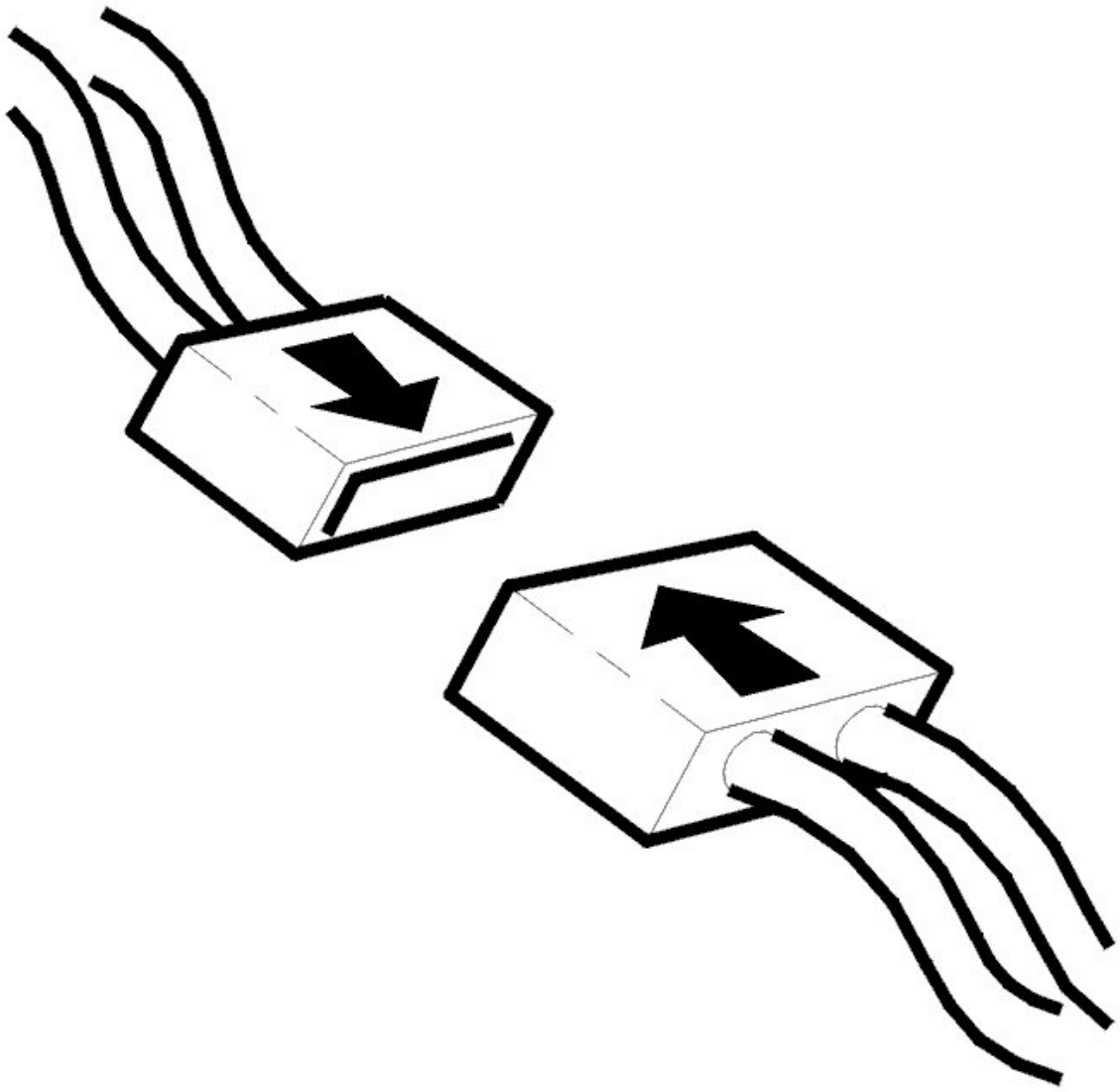
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

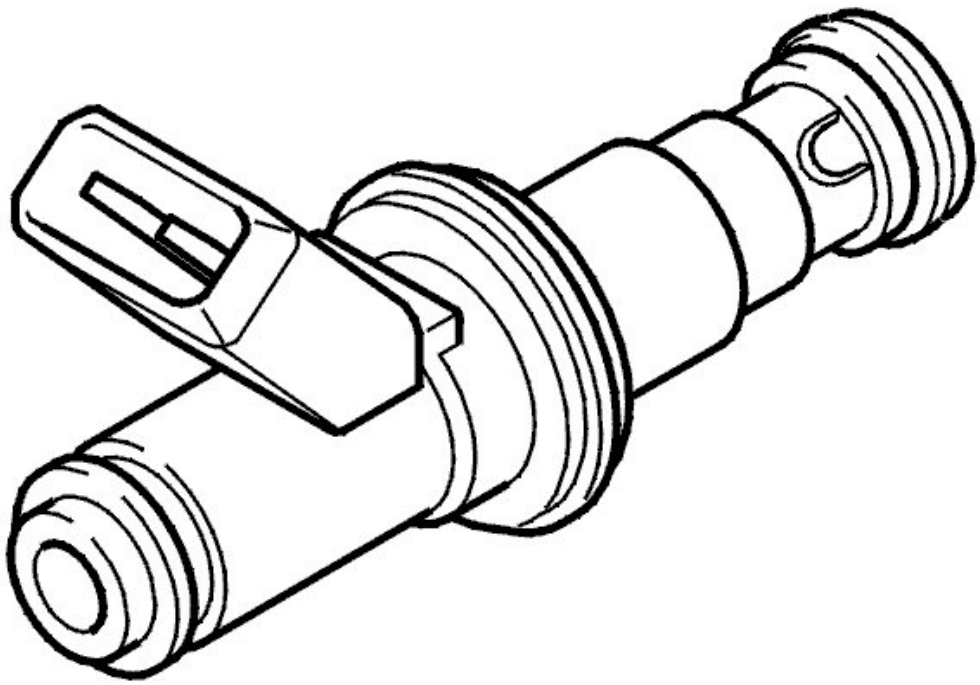
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too low.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200D: injector 1
- ECM-201D: injector 2
- ECM-202D: injector 3
- ECM-203D: injector 4
- ECM-204D: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

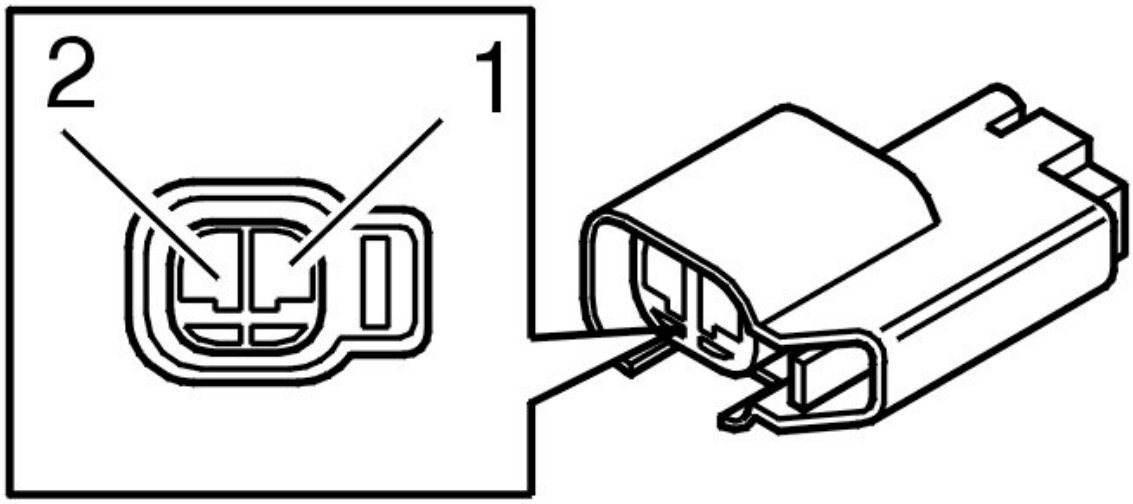
Signal too low

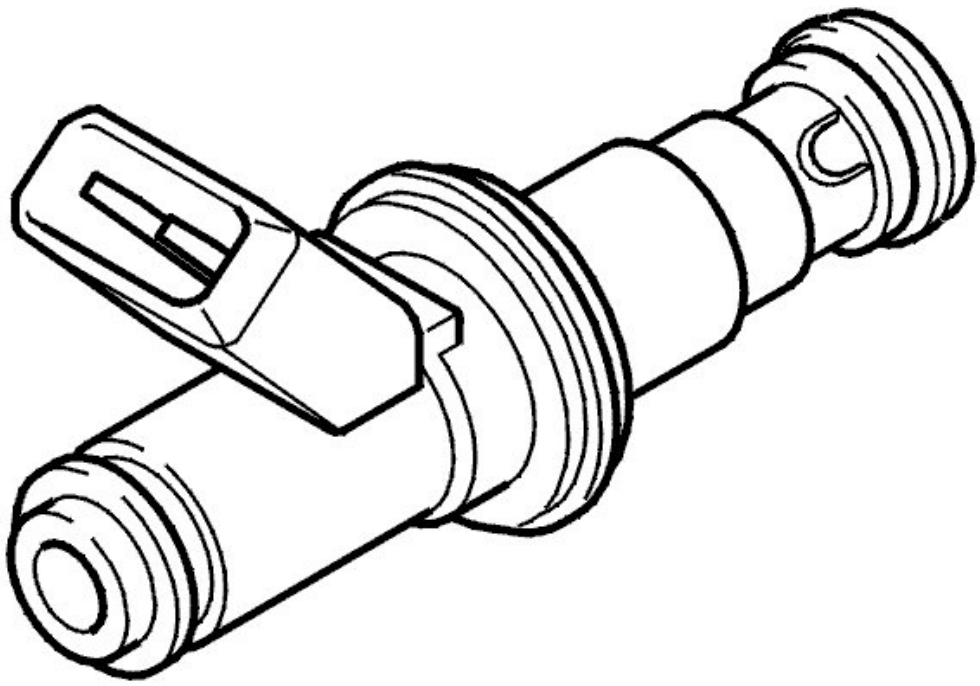
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200D, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201D, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202D, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203D, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204D, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



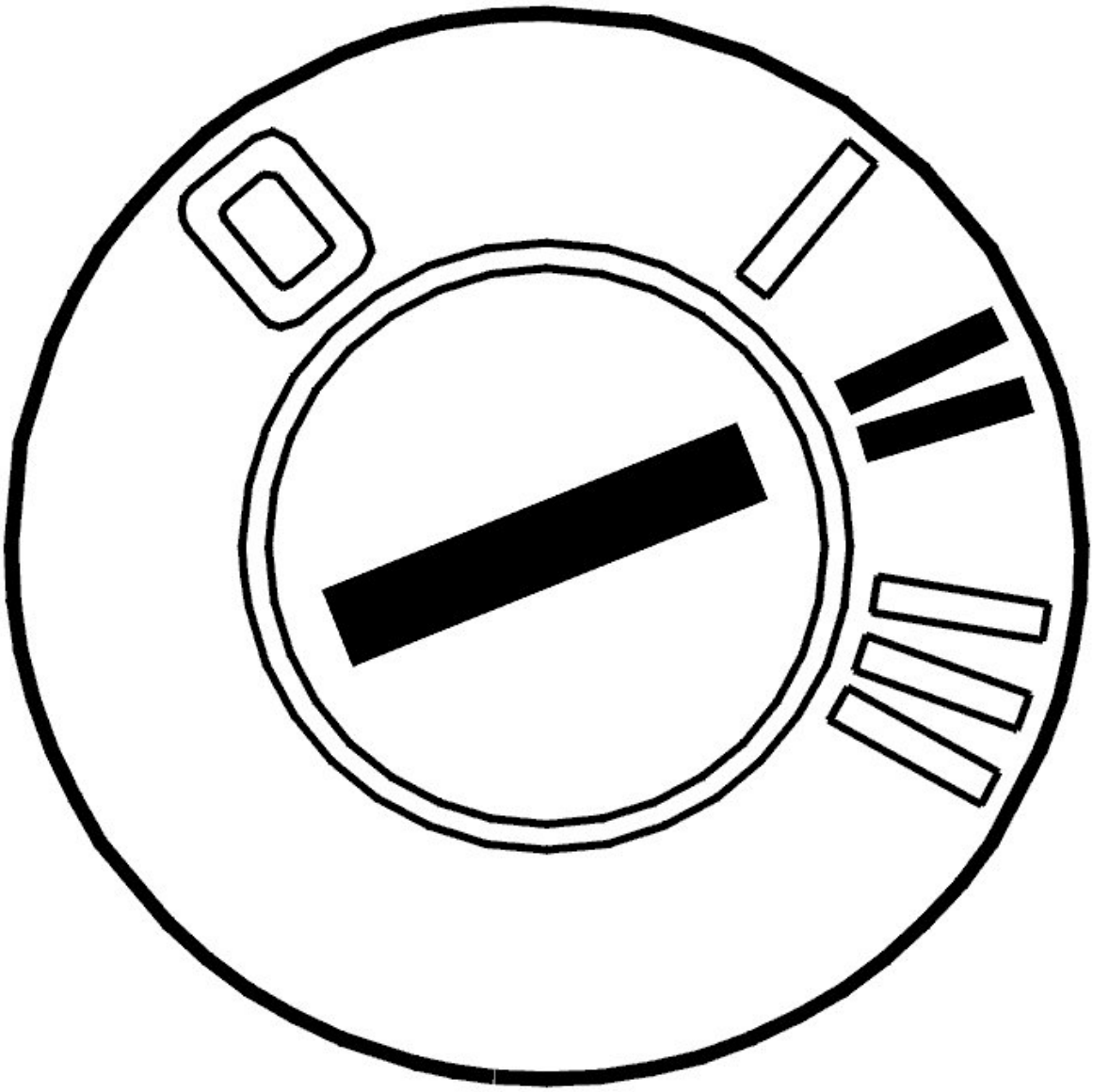


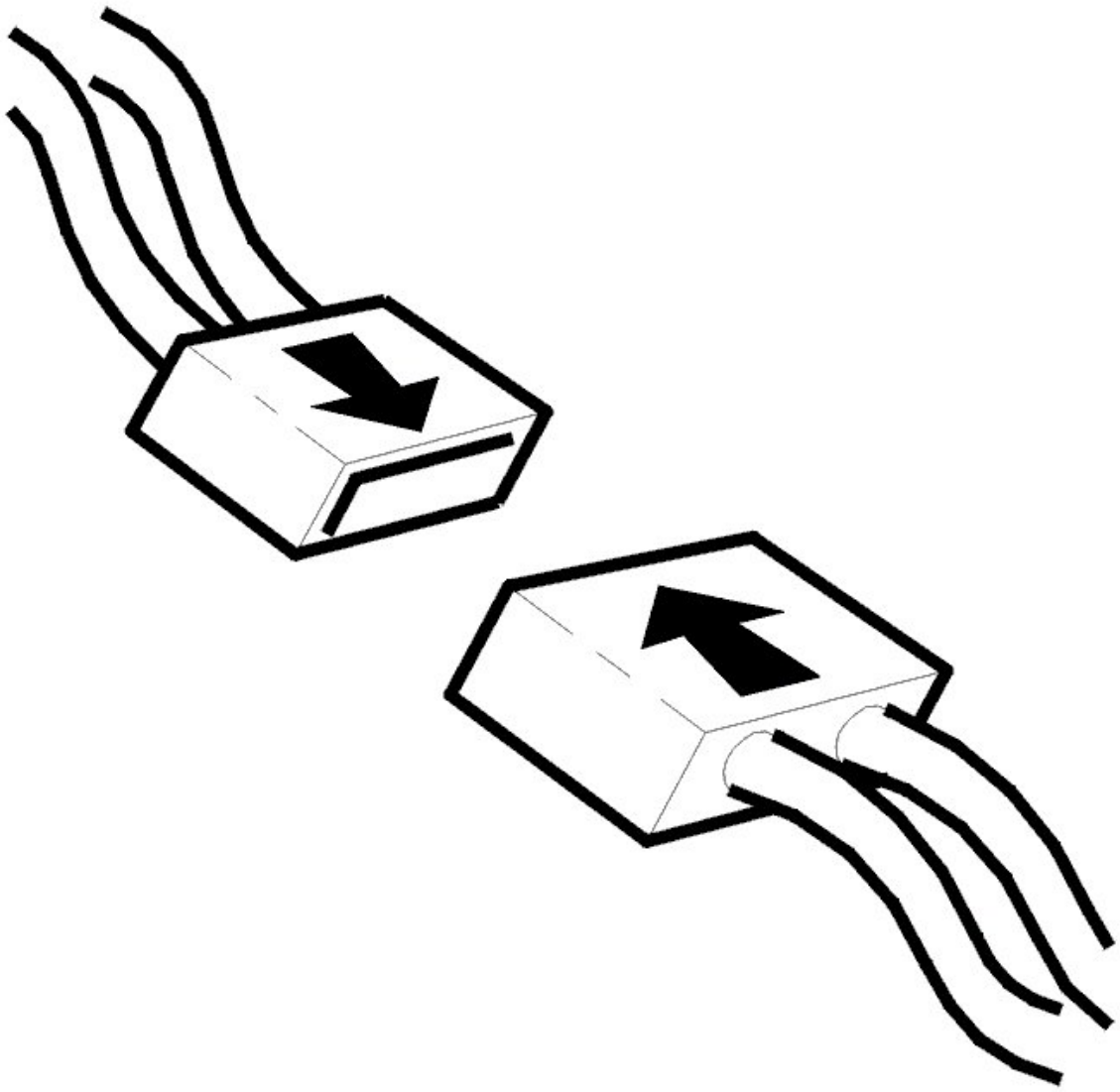
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

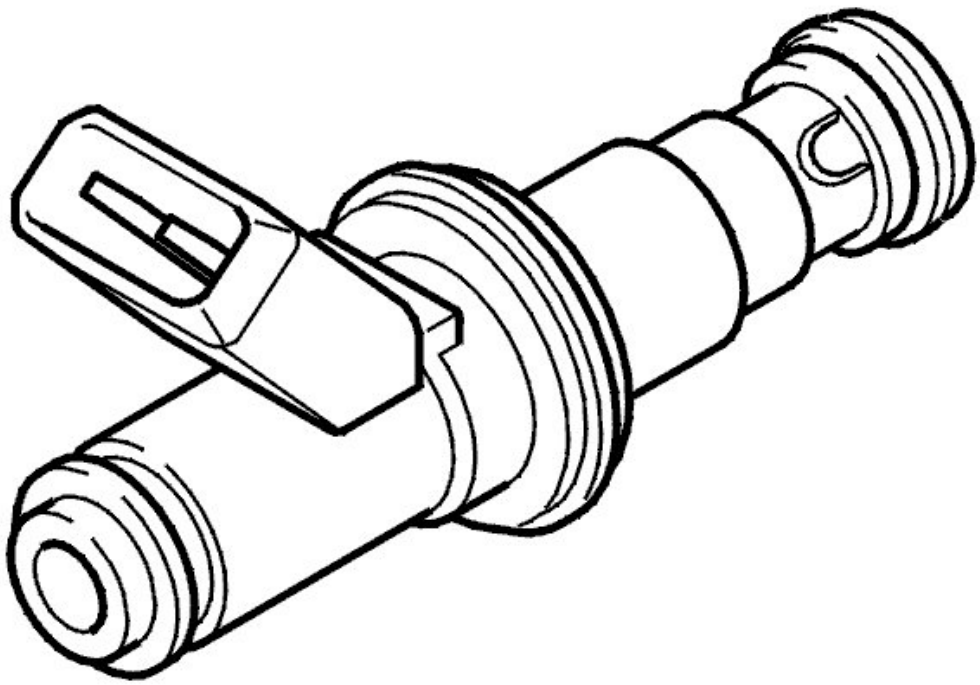
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is missing.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200B: injector 1
- ECM-201B: injector 2
- ECM-202B: injector 3
- ECM-203B: injector 4
- ECM-204B: injector 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the injector
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

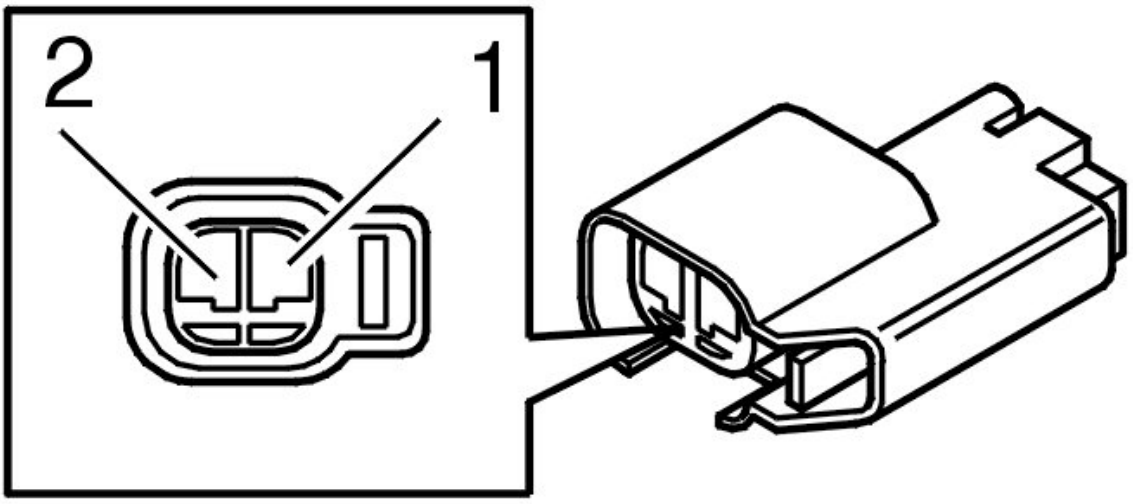
Signal missing

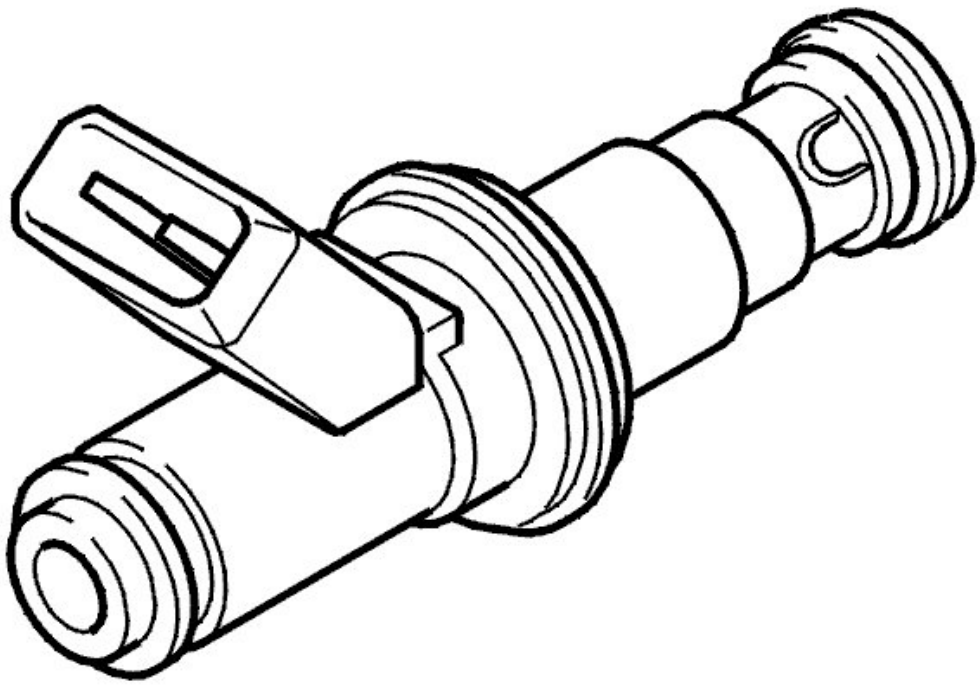
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200B, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201B, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202B, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203B, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204B, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



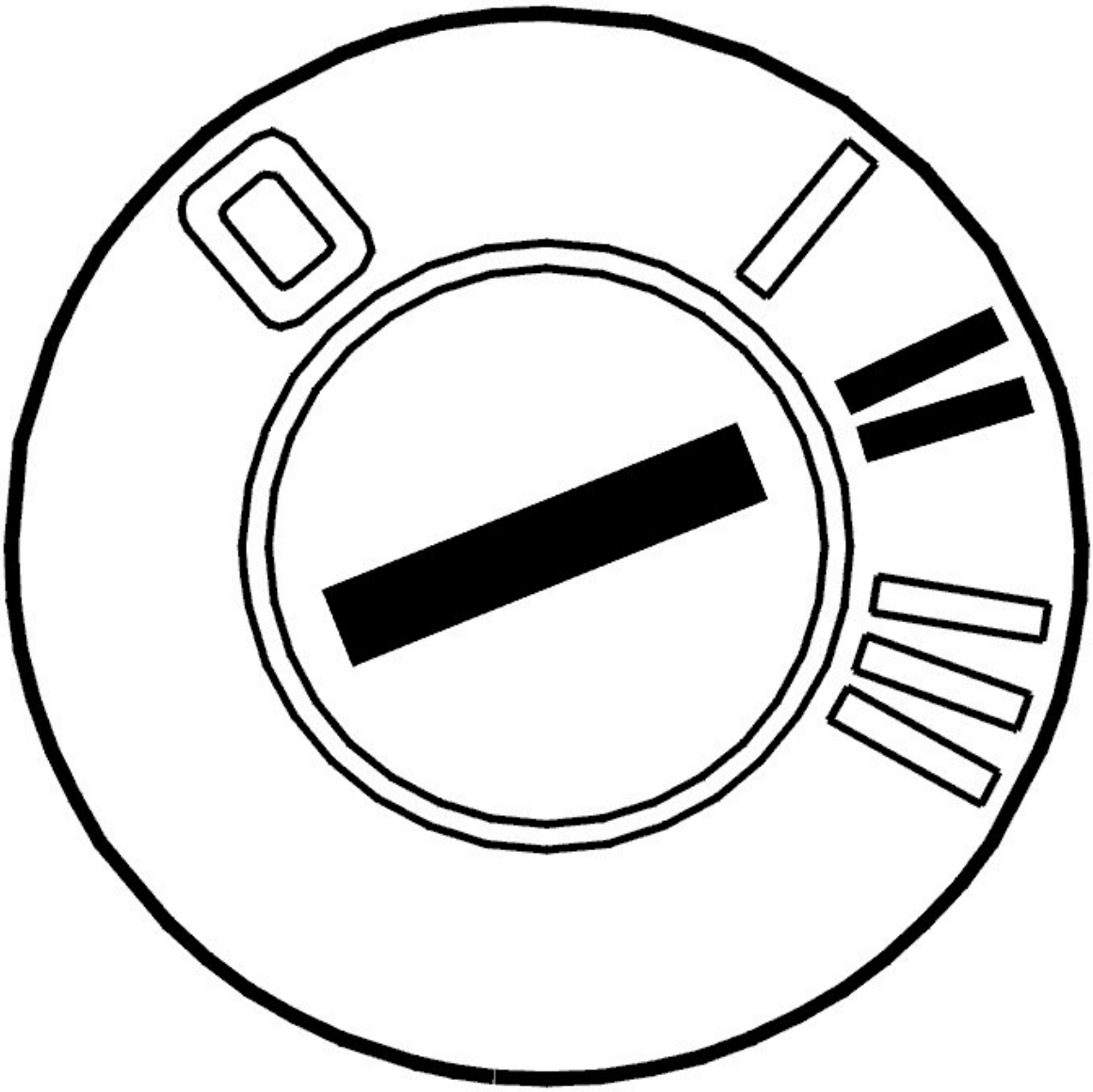


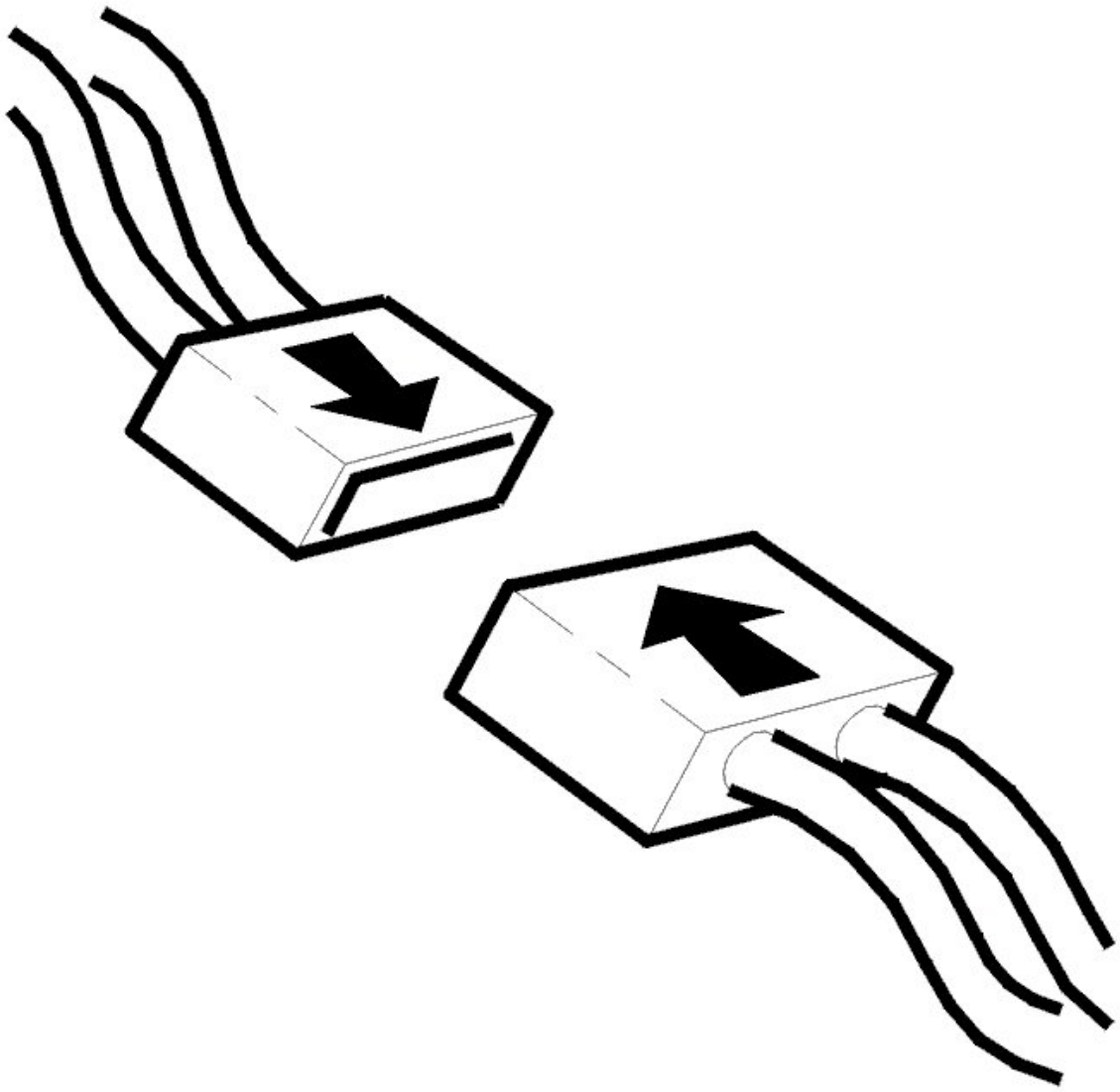
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

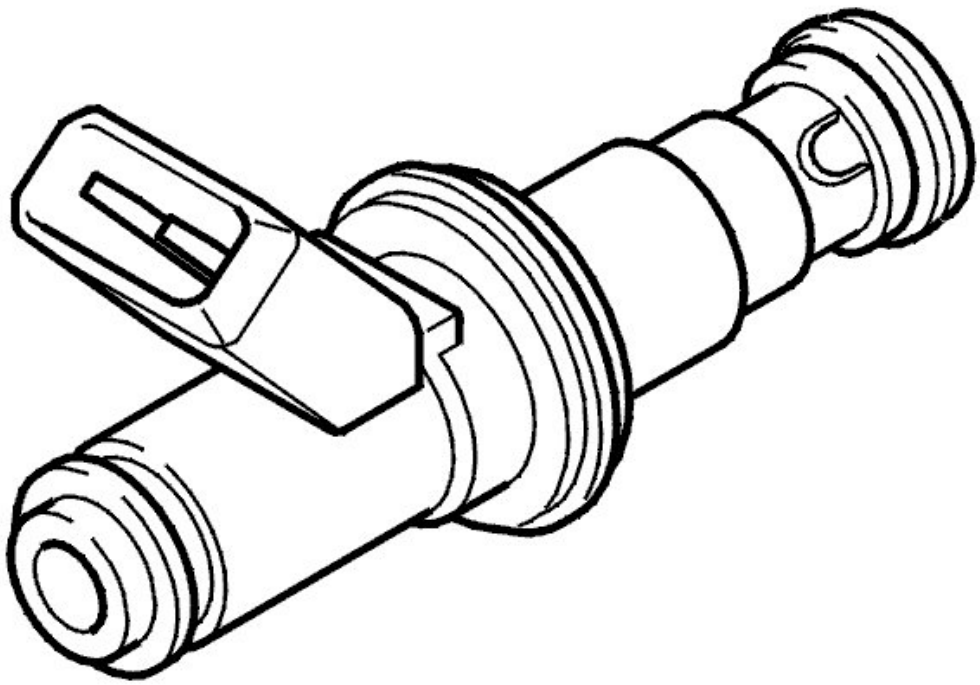
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too high.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200C: injector 1
- ECM-201C: injector 2
- ECM-202C: injector 3
- ECM-203C: injector 4
- ECM-204C: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

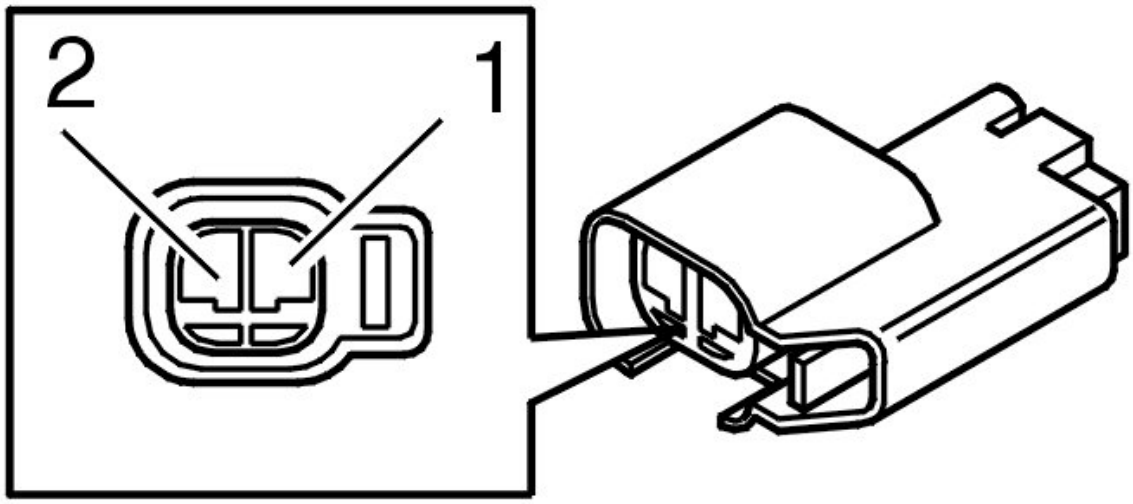
Signal too high

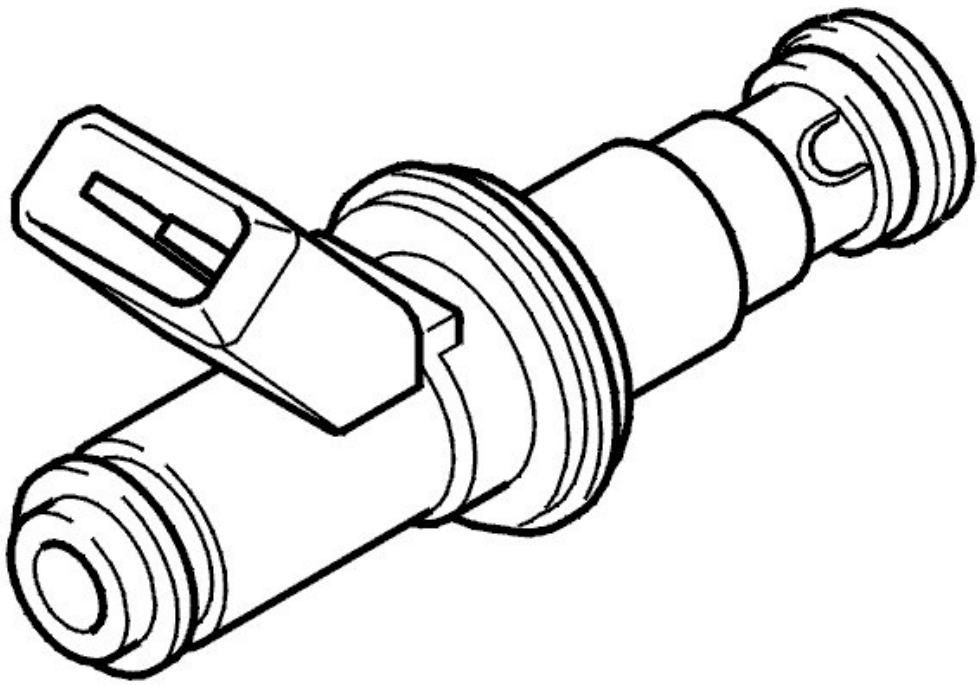
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200C, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201C, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202C, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203C, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204C, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



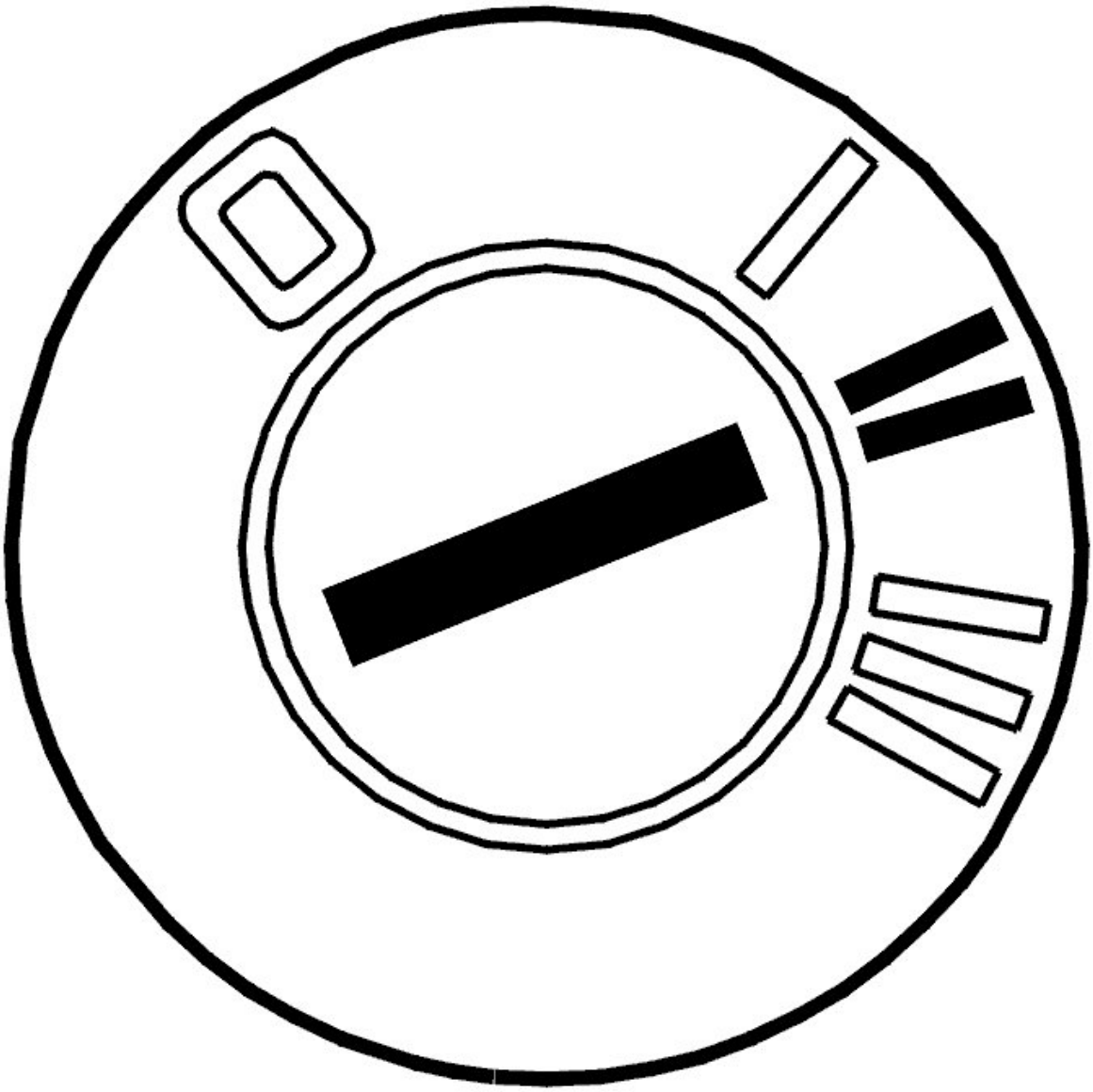


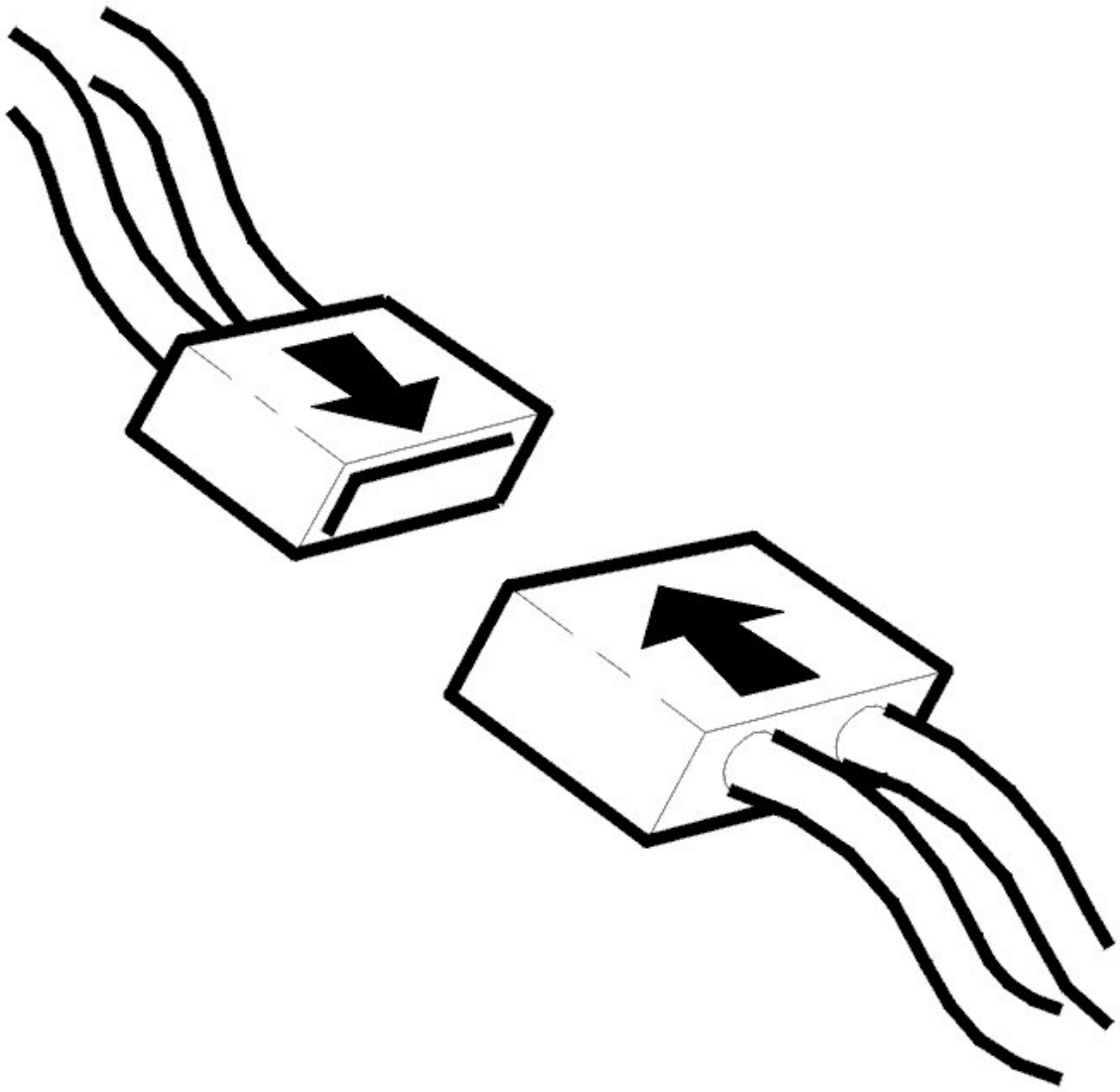
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

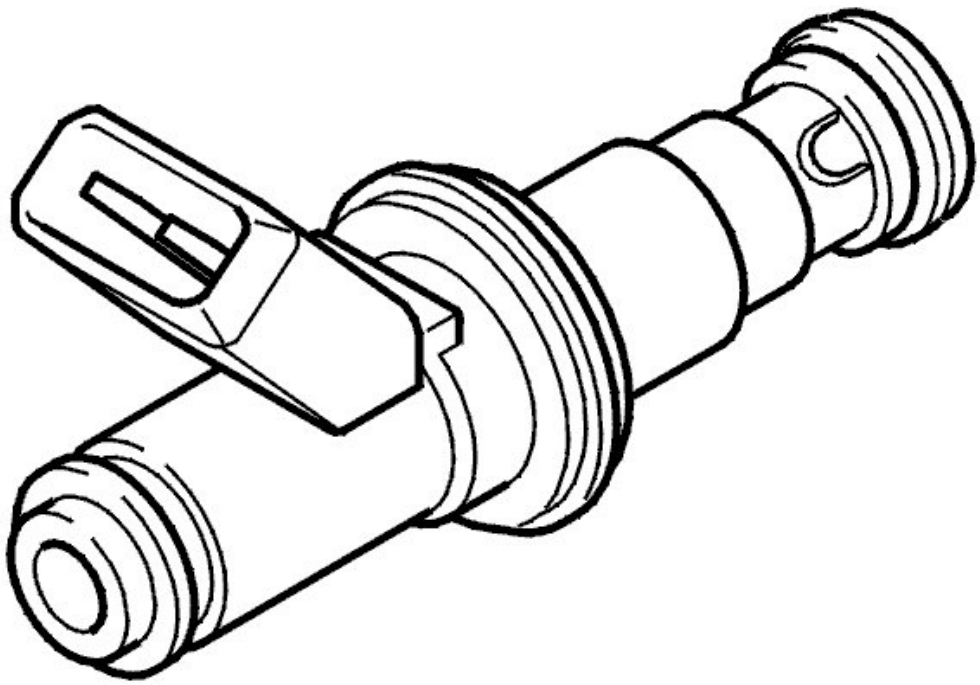
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too low.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200D: injector 1
- ECM-201D: injector 2
- ECM-202D: injector 3
- ECM-203D: injector 4
- ECM-204D: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

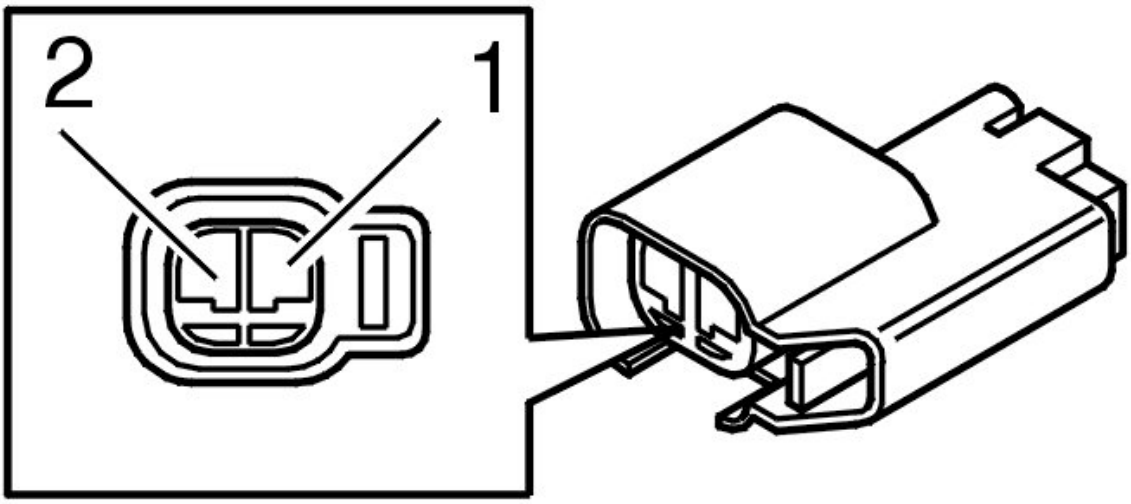
Signal too low

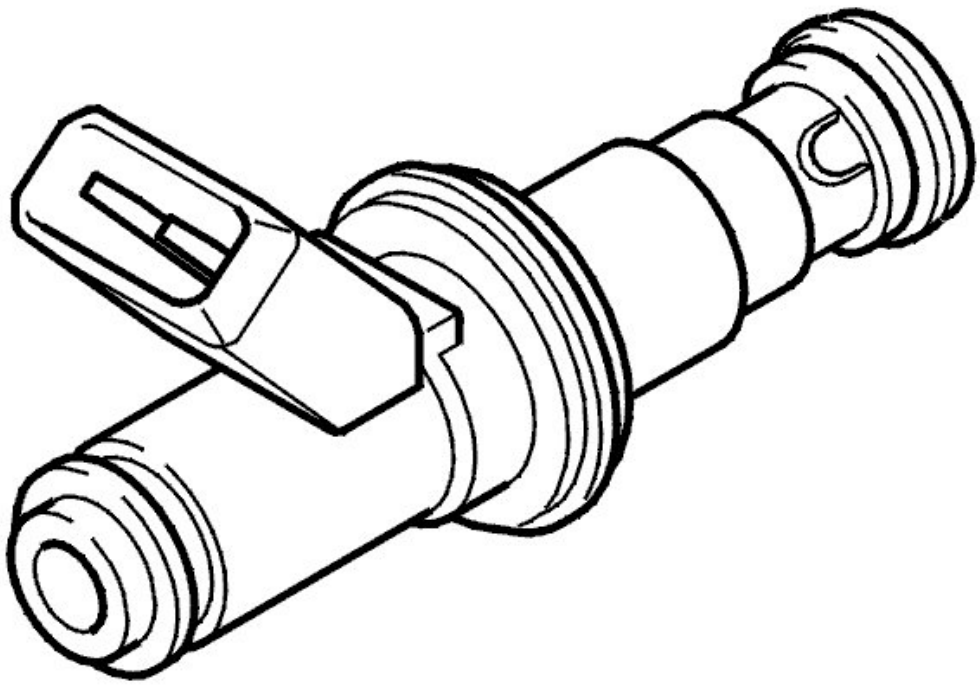
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200D, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201D, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202D, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203D, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204D, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



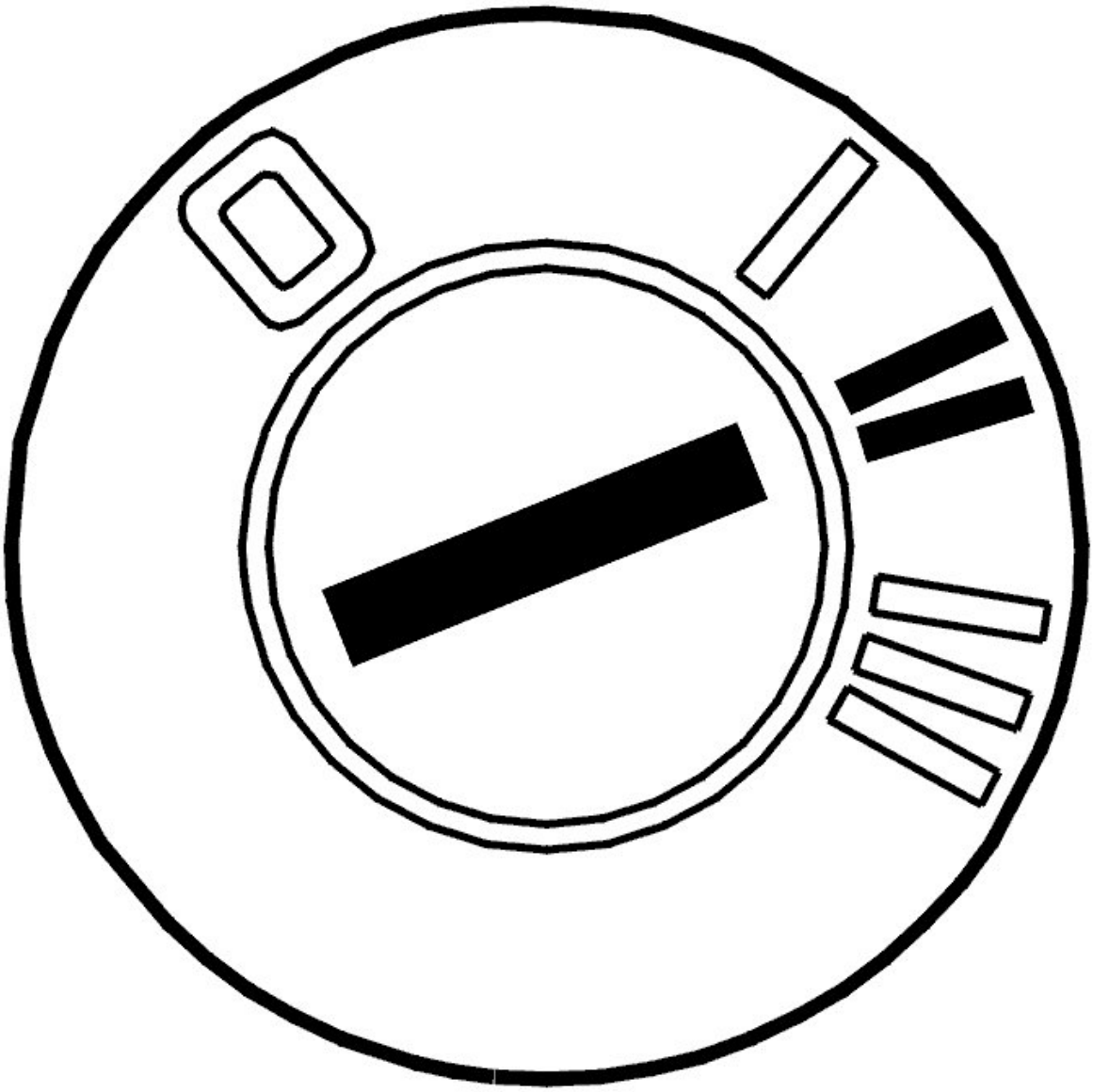


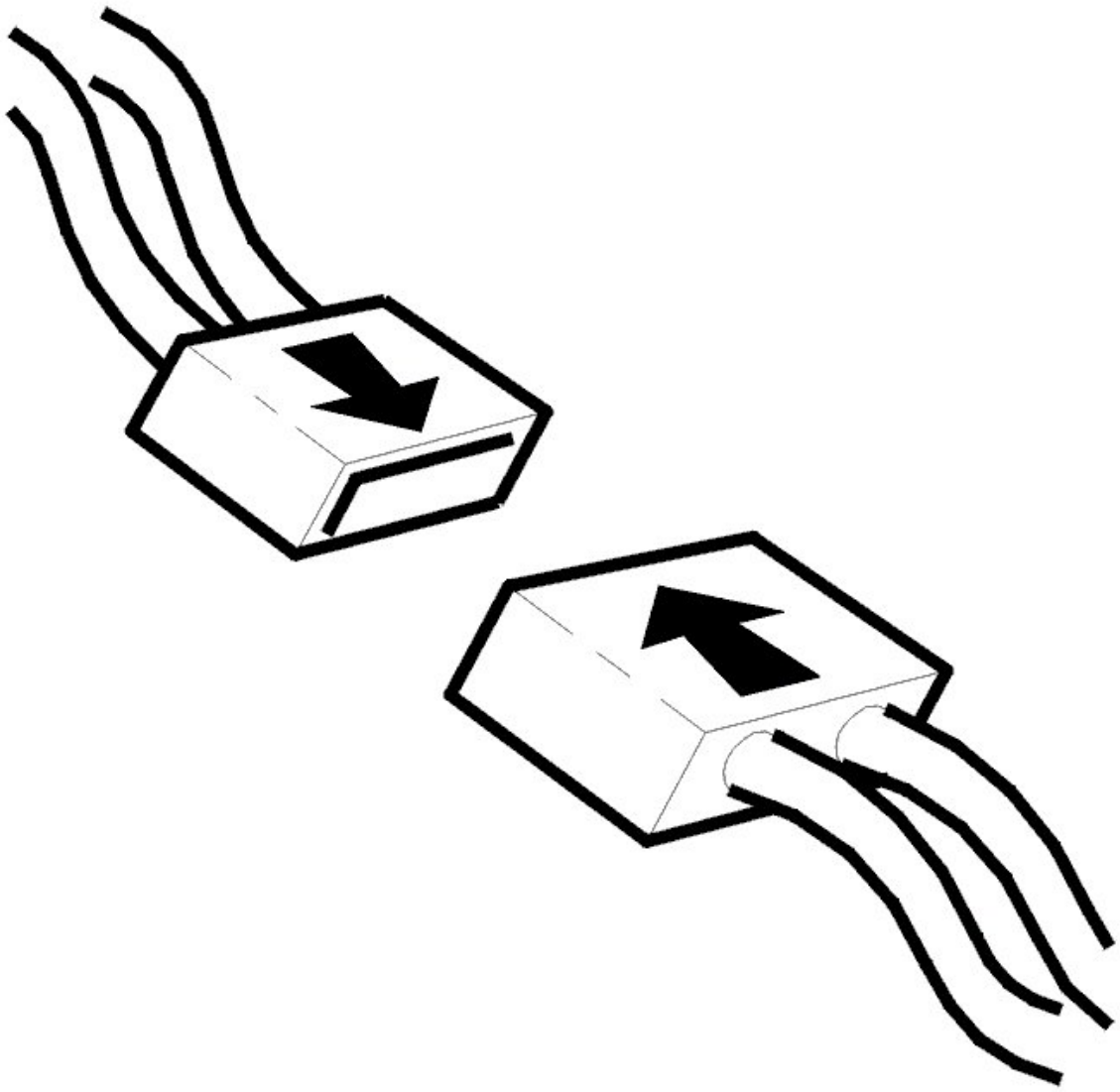
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

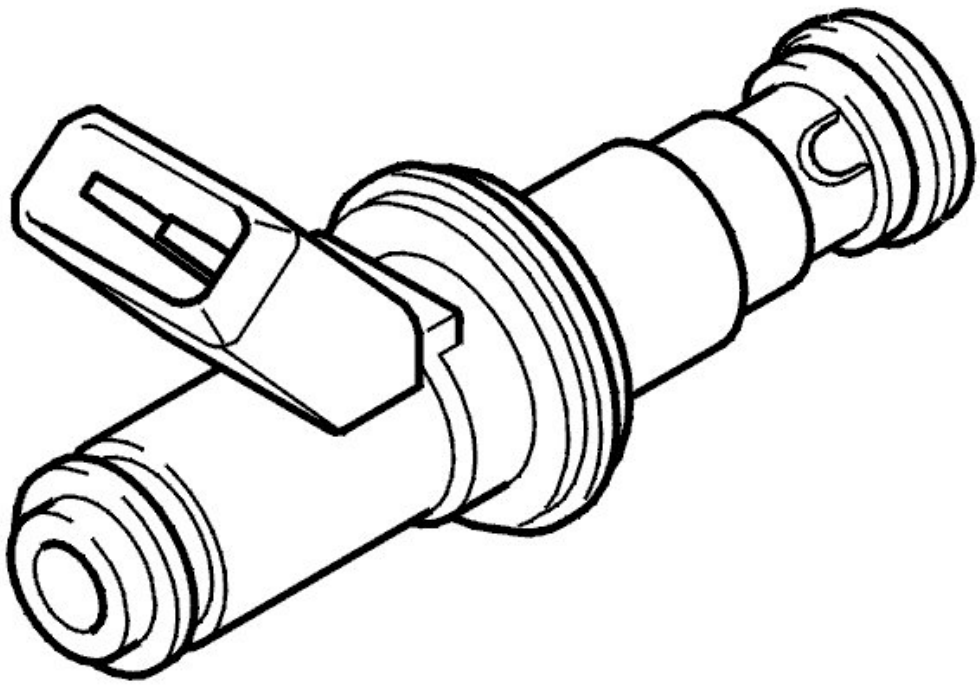
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is missing.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200B: injector 1
- ECM-201B: injector 2
- ECM-202B: injector 3
- ECM-203B: injector 4
- ECM-204B: injector 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the injector
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

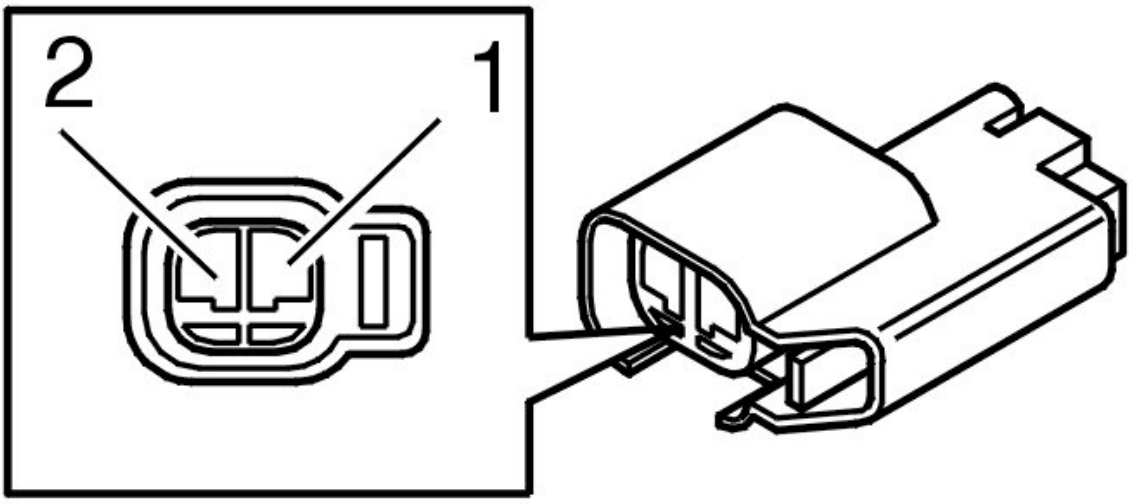
Signal missing

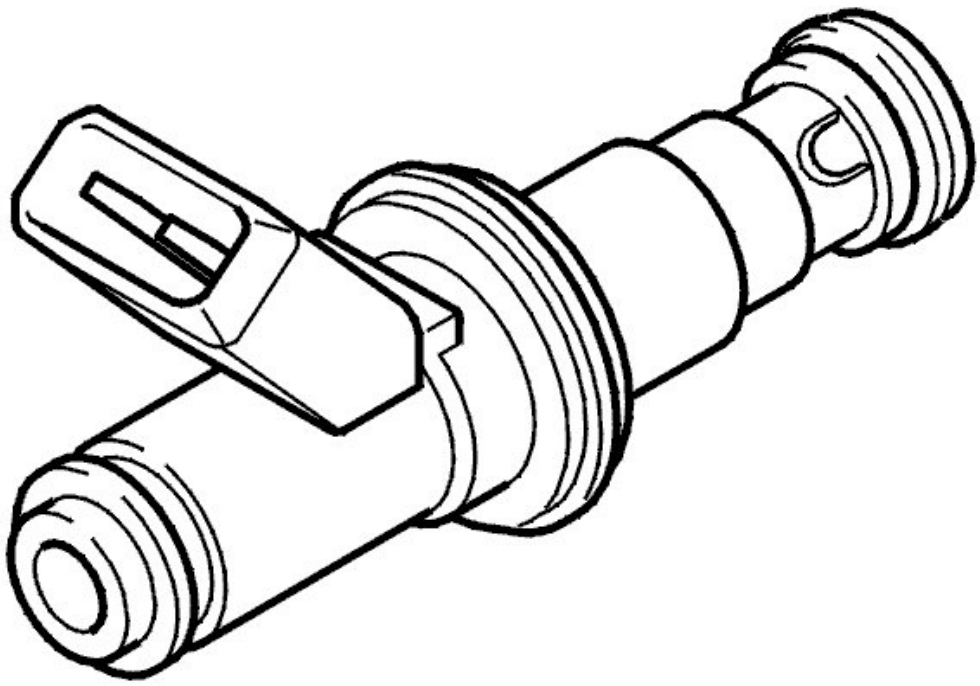
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200B, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201B, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202B, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203B, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204B, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



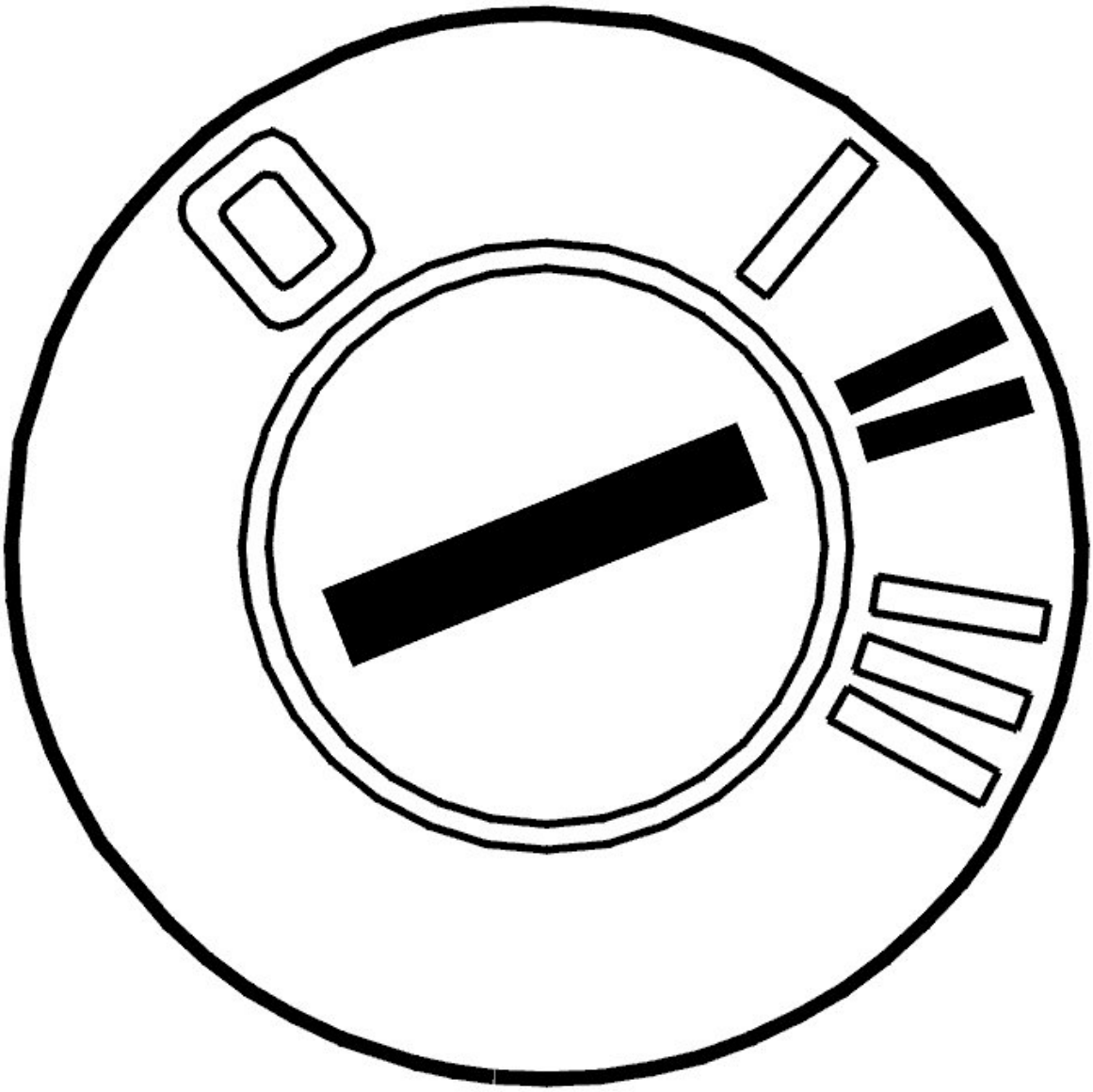


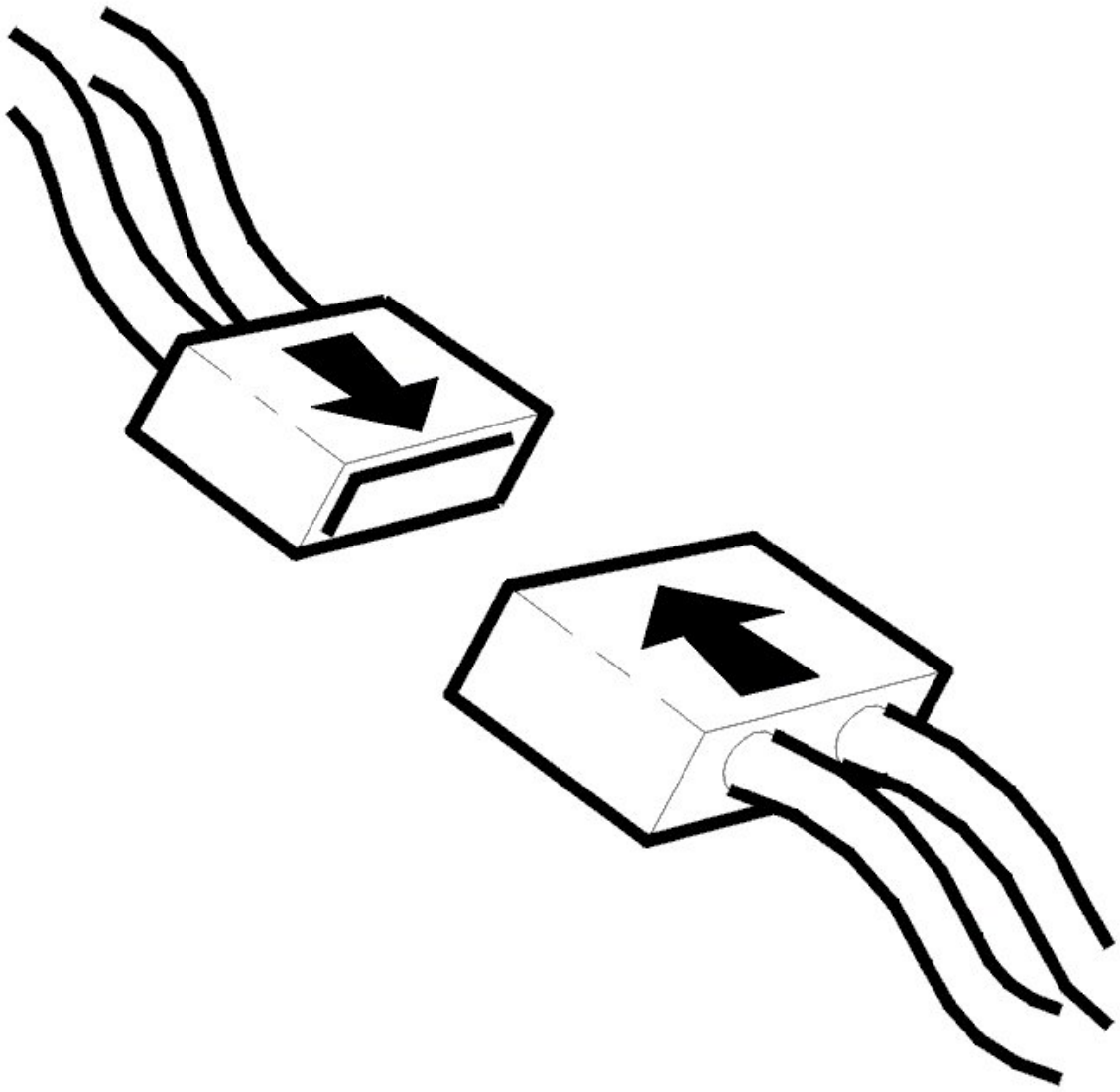
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

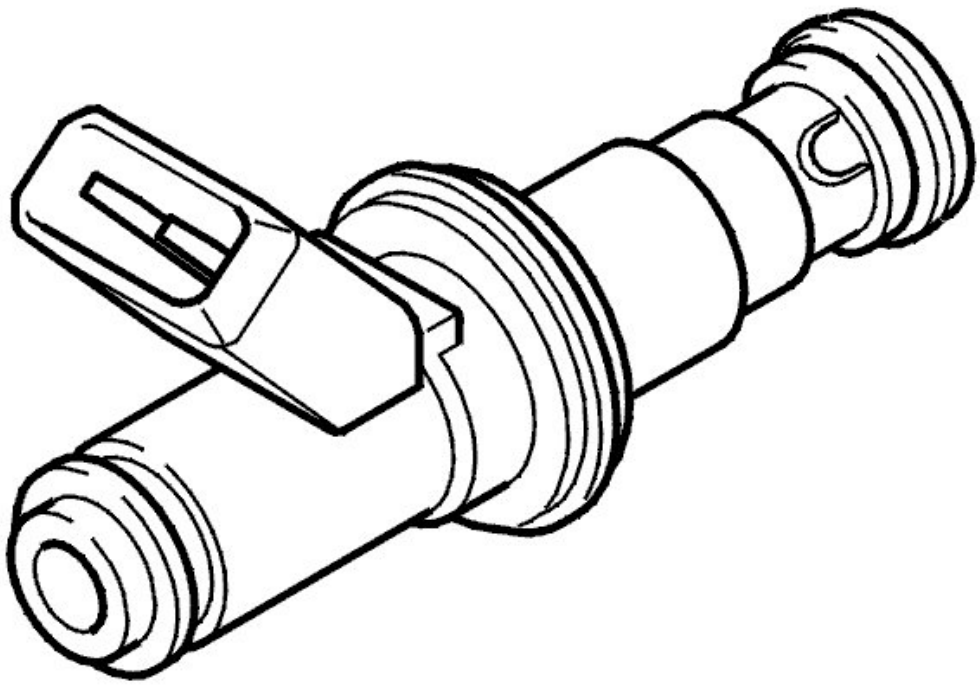
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too high.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200C: injector 1
- ECM-201C: injector 2
- ECM-202C: injector 3
- ECM-203C: injector 4
- ECM-204C: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

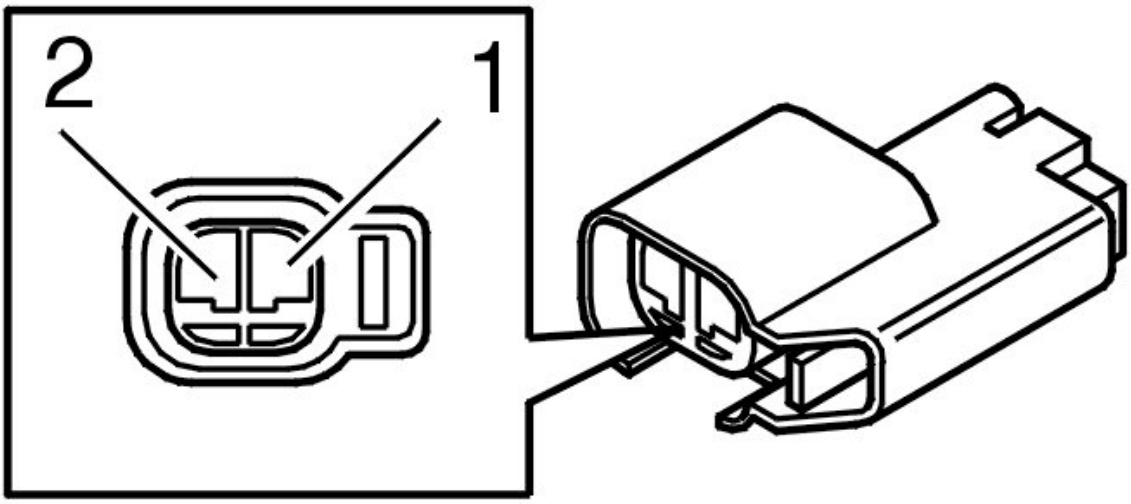
Signal too high

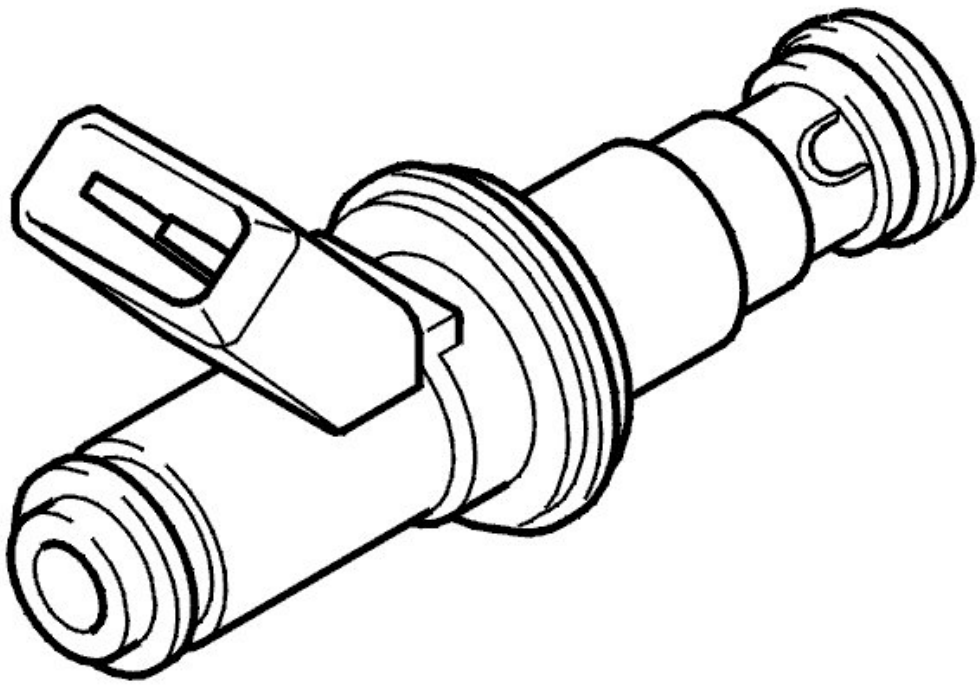
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200C, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201C, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202C, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203C, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204C, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



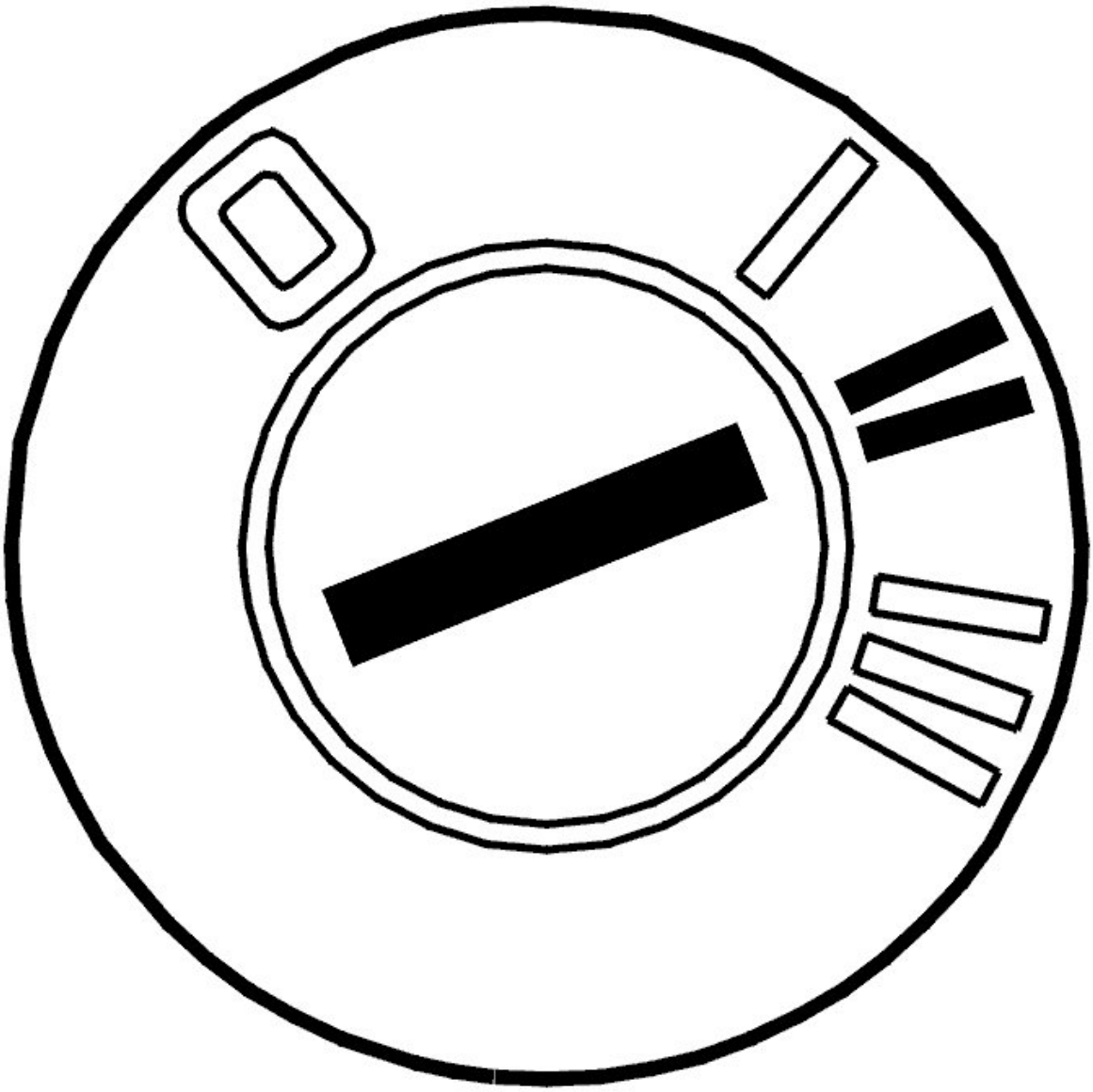


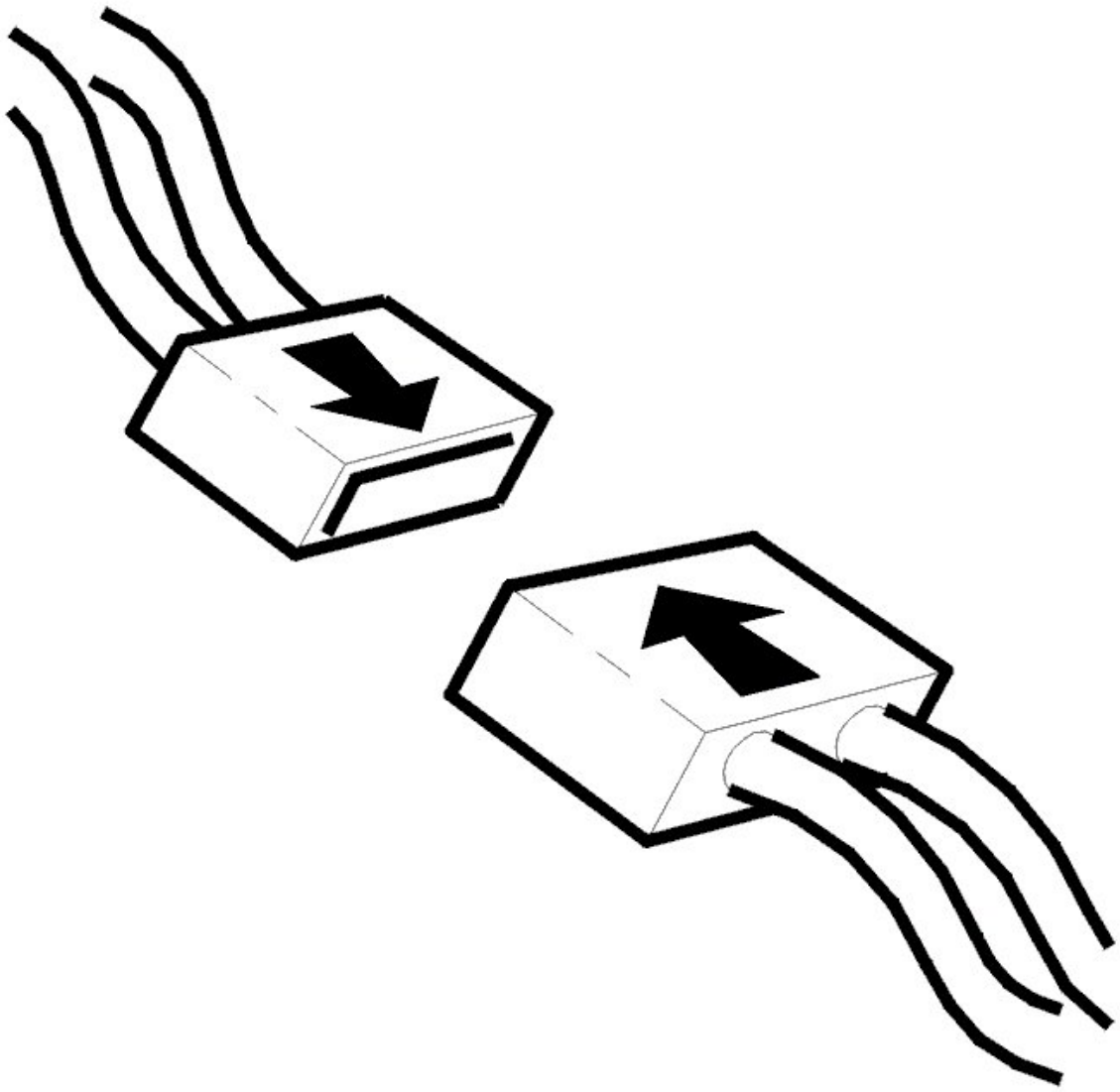
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

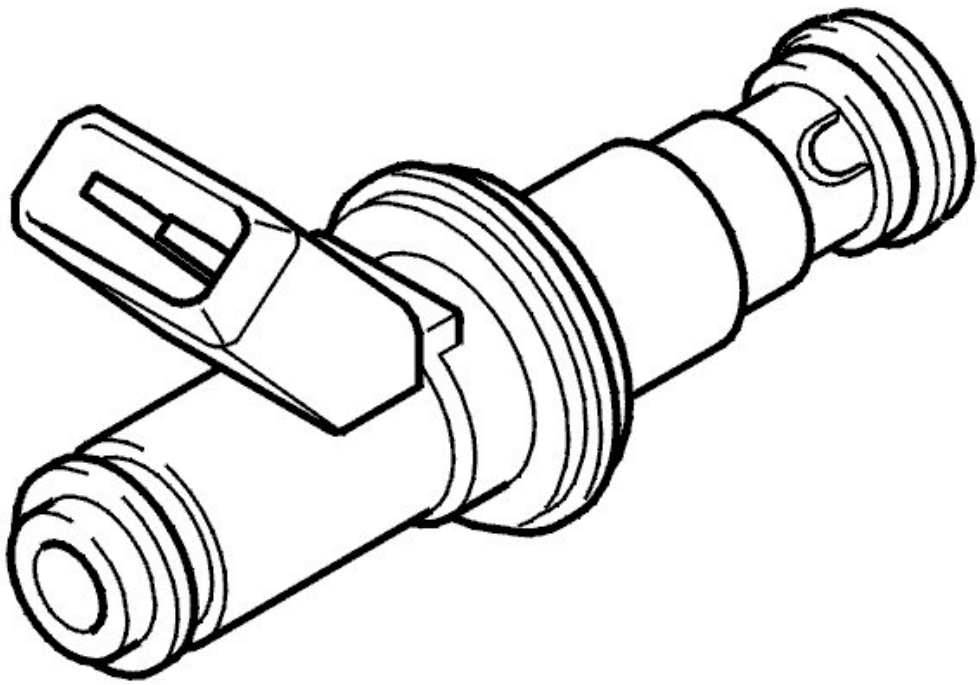
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the circuit for the injectors.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for one of the injector circuits is too low.
The diagnostic trouble code (DTC) indicates which injector is being referred to.

- ECM-200D: injector 1
- ECM-201D: injector 2
- ECM-202D: injector 3
- ECM-203D: injector 4
- ECM-204D: injector 5.

The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged injector.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

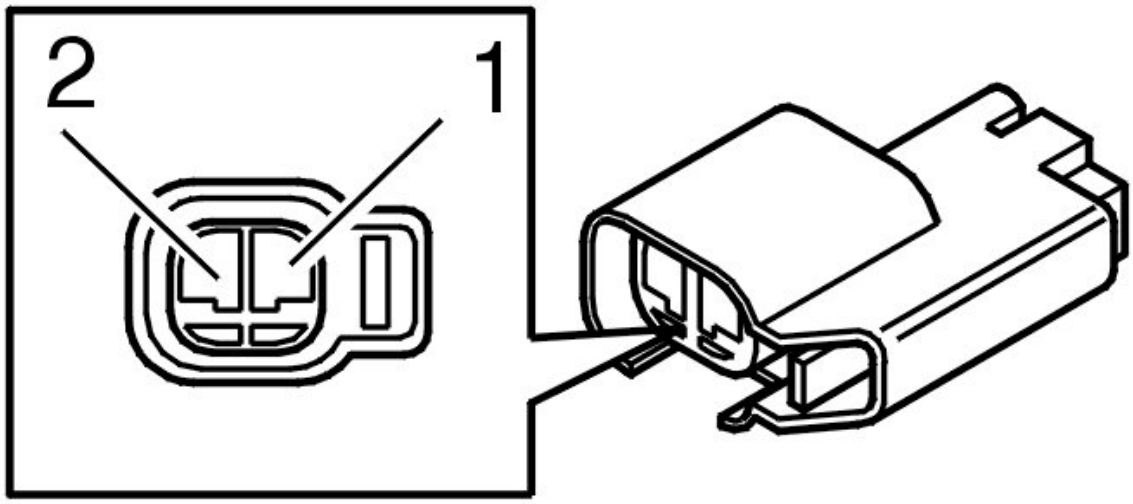
Signal too low

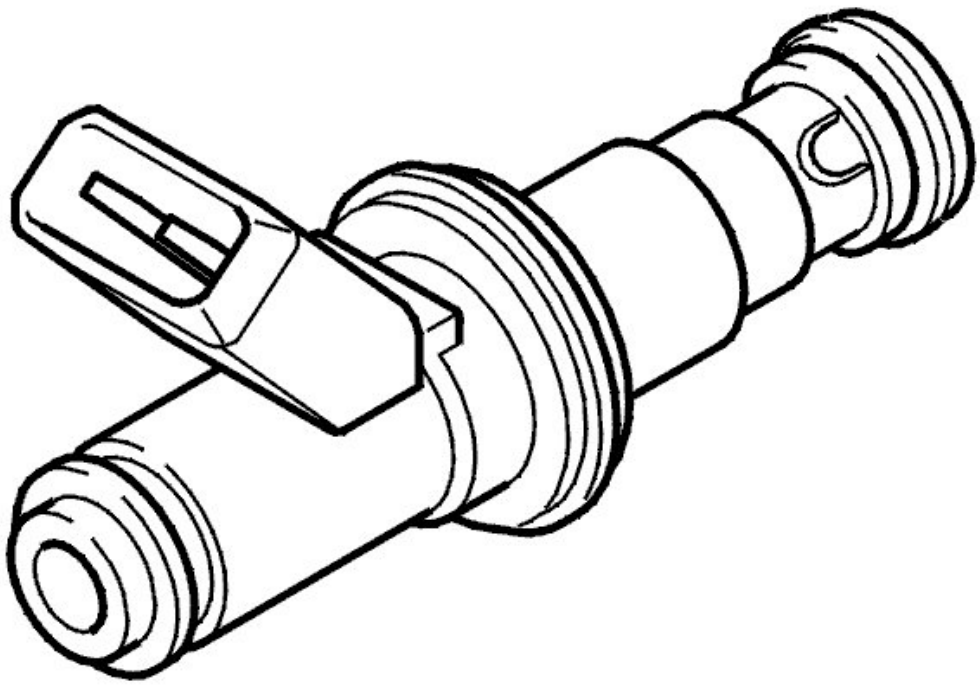
Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) terminal #A16 (#A16) and injector terminal #2 (ECM-200D, injector 1)
- Engine control module (ECM) terminal #A34 (#A34) and injector terminal #2 (ECM-201D, injector 2)
- Engine control module (ECM) terminal #A15 (#A15) and injector terminal #2 (ECM-202D, injector 3)
- Engine control module (ECM) terminal #A33 (#A33) and injector terminal #2 (ECM-203D, injector 4)
- Engine control module (ECM) terminal #A14 (#A14) and injector terminal #2 (ECM-204D, injector 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Injectors/pulsation dampers, replacing See: Fuel Delivery and Air Induction/Fuel Pressure Pulsation Damper/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



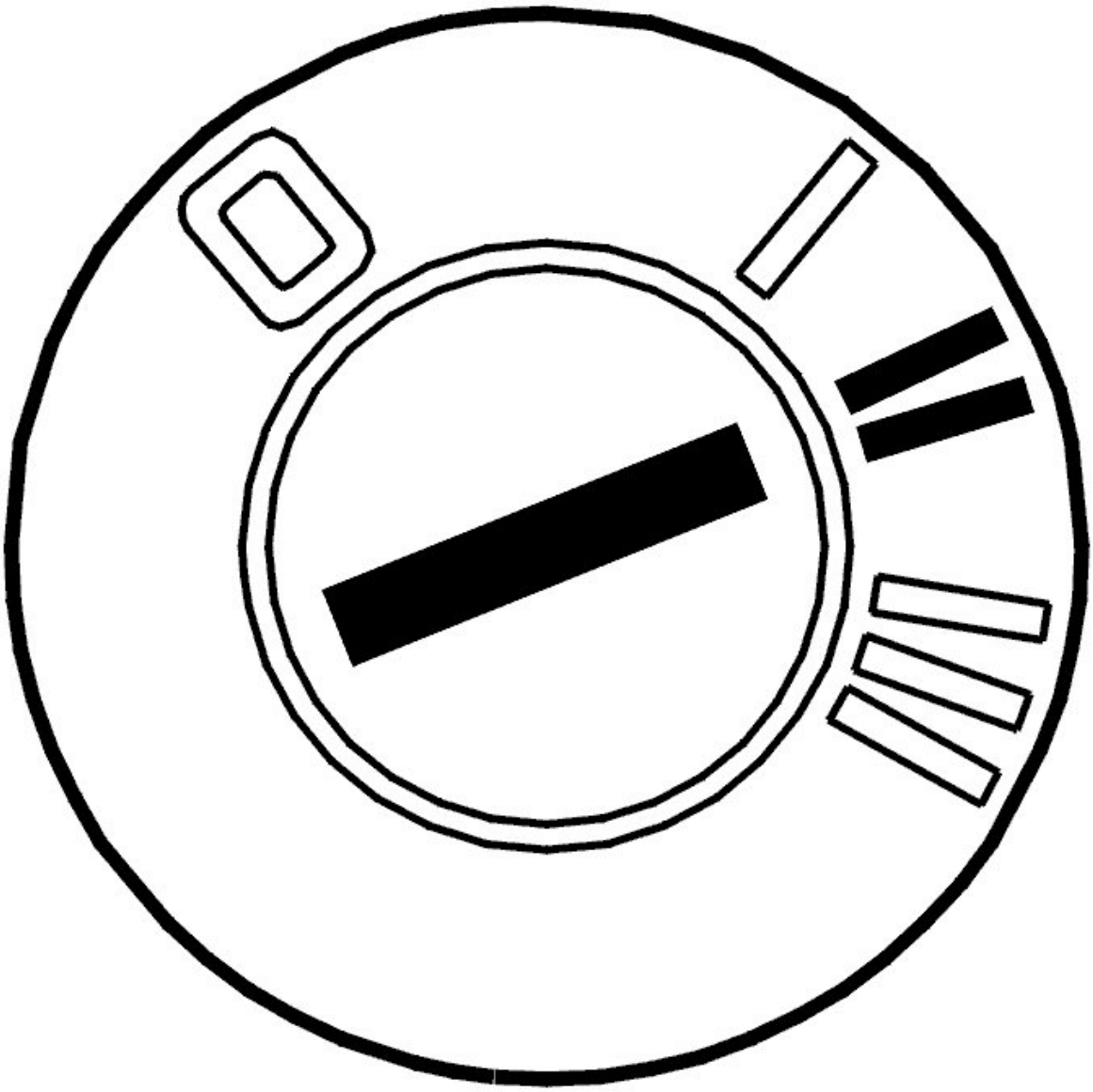


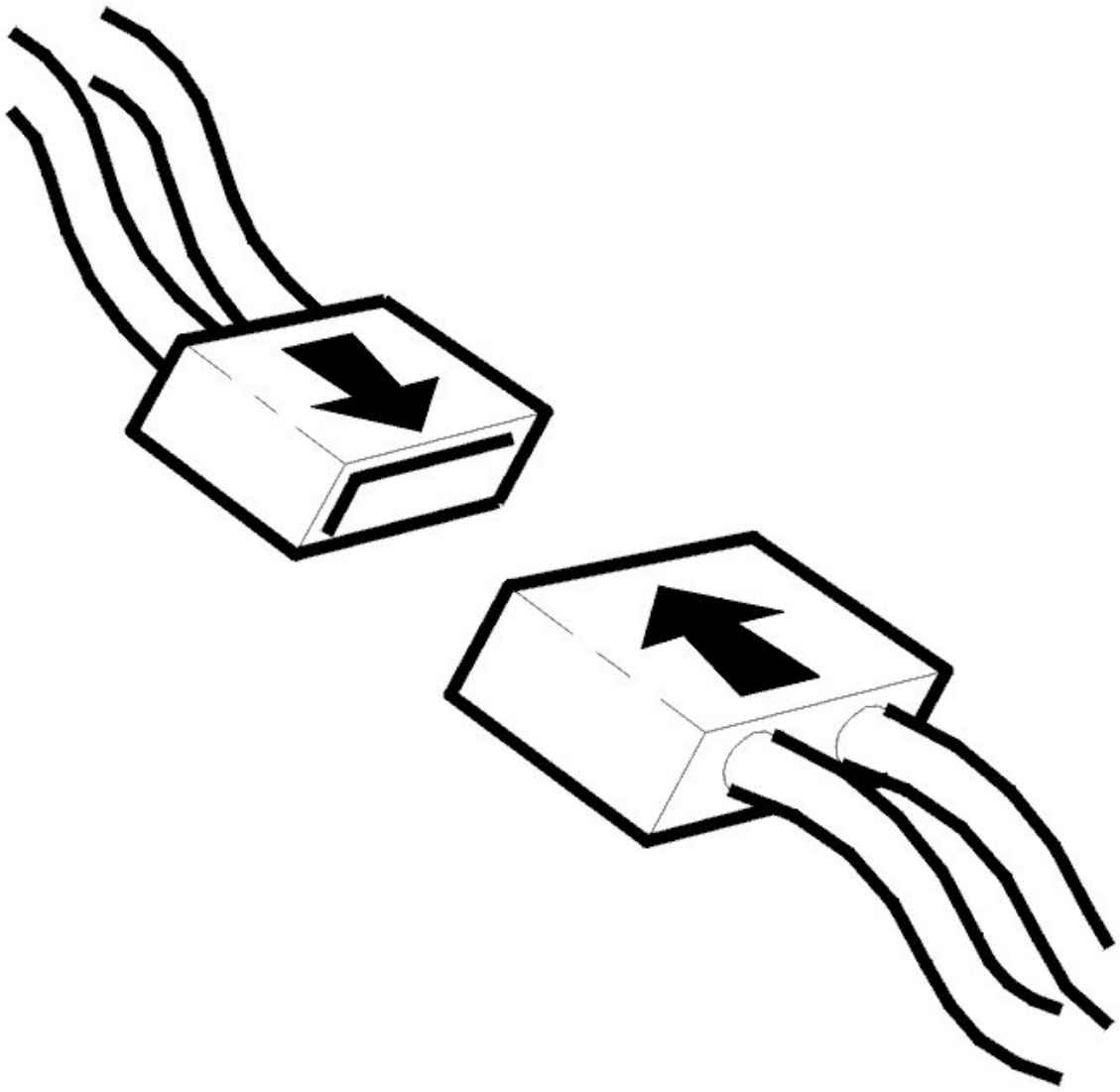
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Ignition on
- Activate the relevant injector.

A "click" should be heard when the injector is activated.

Is the injector working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-210C

Condition

The engine control module (ECM) receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the upper and lower part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) is stored when the long-term trim must be adjusted to almost maximum in the upper part load area.

Substitute value
- None.

Possible source
- Intake air leakage
- Air leakage in the exhaust system
- Low fuel pressure
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Check the fuel pressure.
Test drive the car for approximately 10 minutes.
Check the mass air flow (MAF) sensor. Read off its correction factor. The value must be between 0.8 and 1.2.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information
- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking

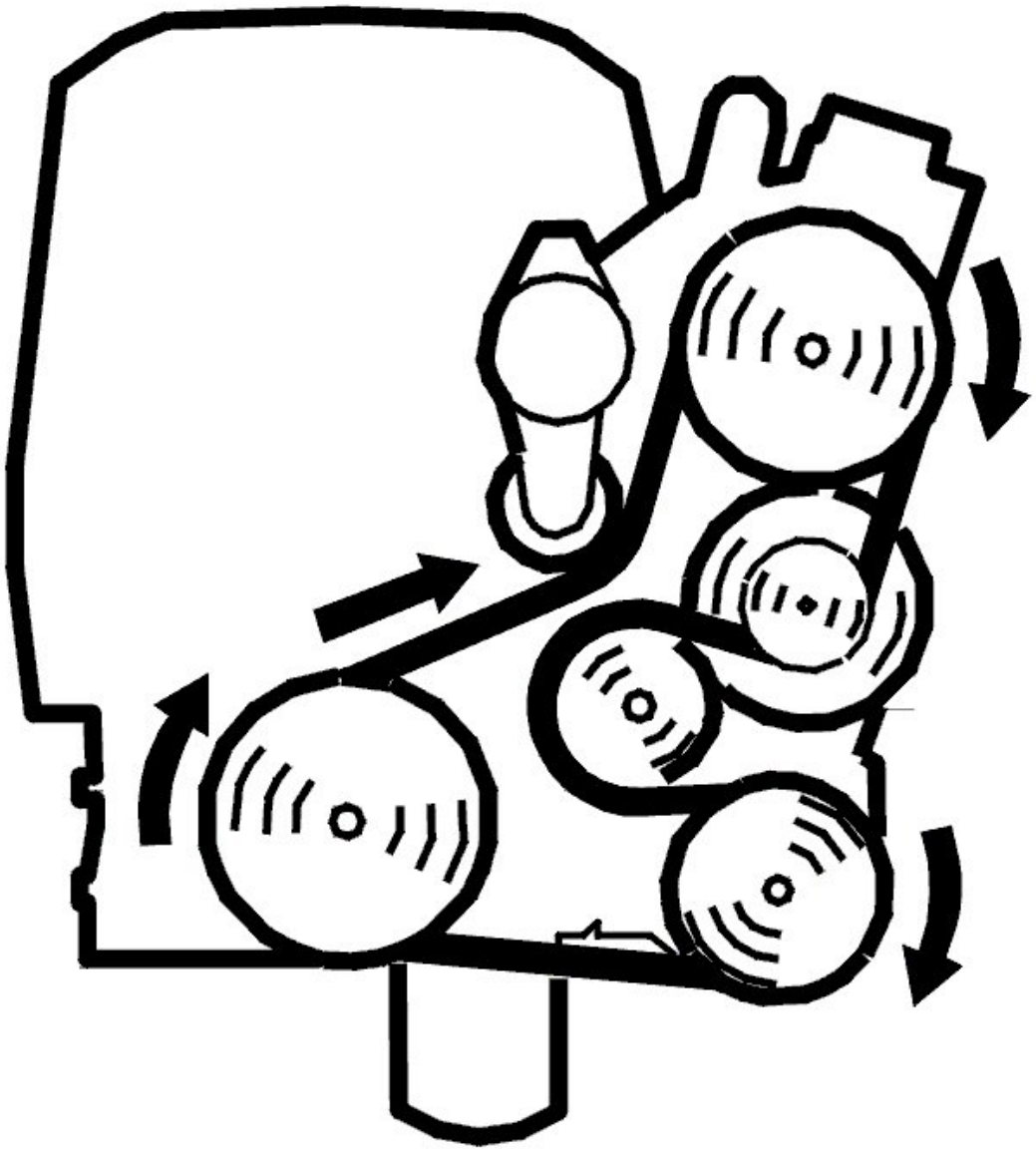
Continue - Verification

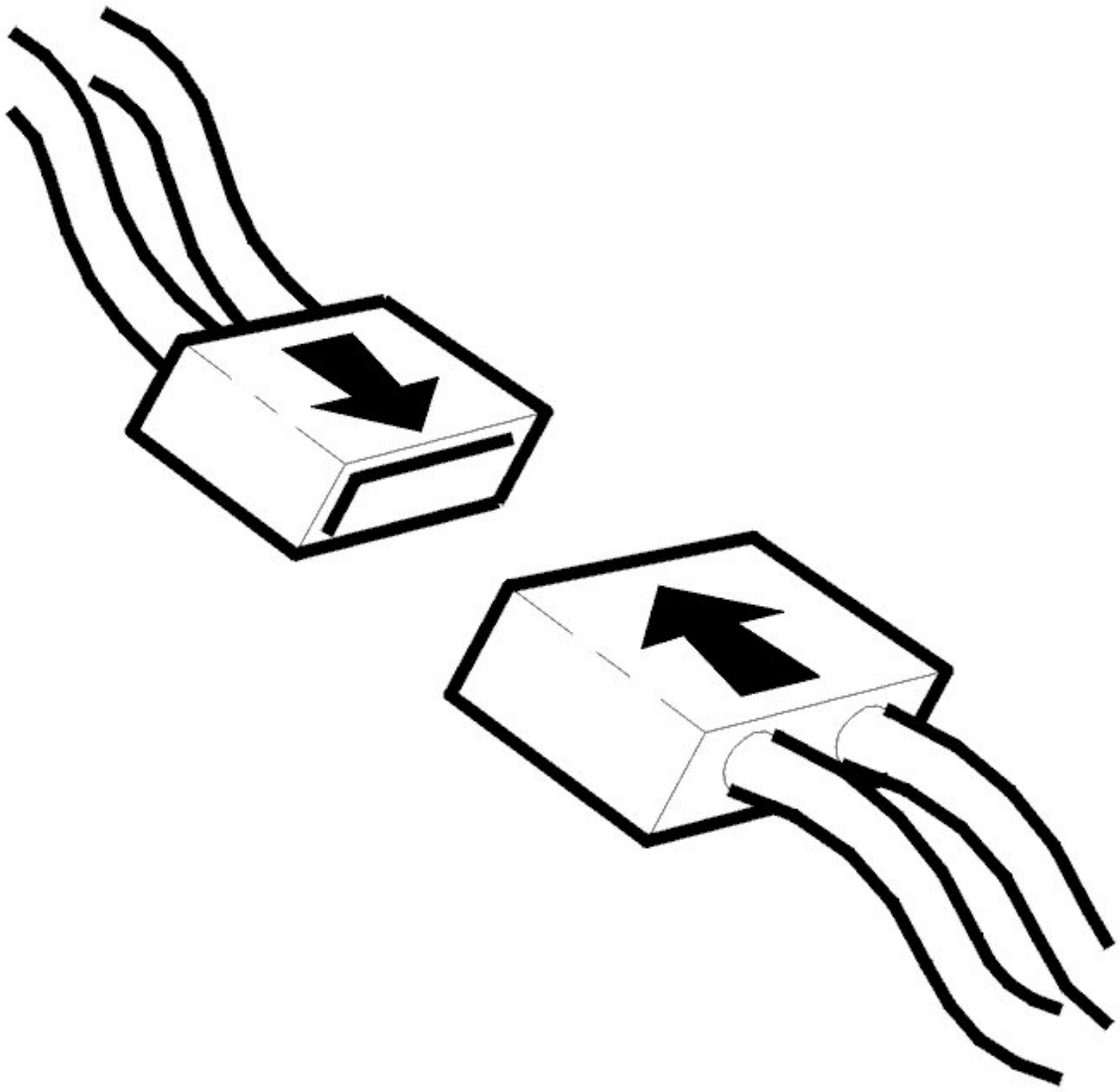
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-210D

Condition

The engine control module (ECM) receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the upper and lower part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) is stored when the long-term trim must be adjusted to almost maximum in the upper part load area.

Substitute value
- None.

Possible source
- Intake air leakage
- High fuel pressure
- Leaking injectors
- Damaged mass air flow (MAF) sensor
- Contaminated engine oil
- Oil level too high
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- None.

Signal Too Low

Signal too low

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Check the exhaust system for leakage.
Check the fuel pressure and residual pressure.
Check that the oil level is within the minimum and maximum markings.

Check the viscosity of the engine oil by reading off the short-term fuel trim with the engine running. Plug the crankcase ventilation and read off the short-term fuel trim again. The value must be more or less unchanged.
Remedy as necessary.

Other information:

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check

Was a fault detected?

Yes - Verification

No - Checking the mass air flow (MAF) sensor

Checking the mass air flow (MAF) sensor

Test drive the car for approximately 10 minutes.
Read off the correction factor of the mass air flow (MAF) sensor. The value must be between 0.8 and 1.2.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- .

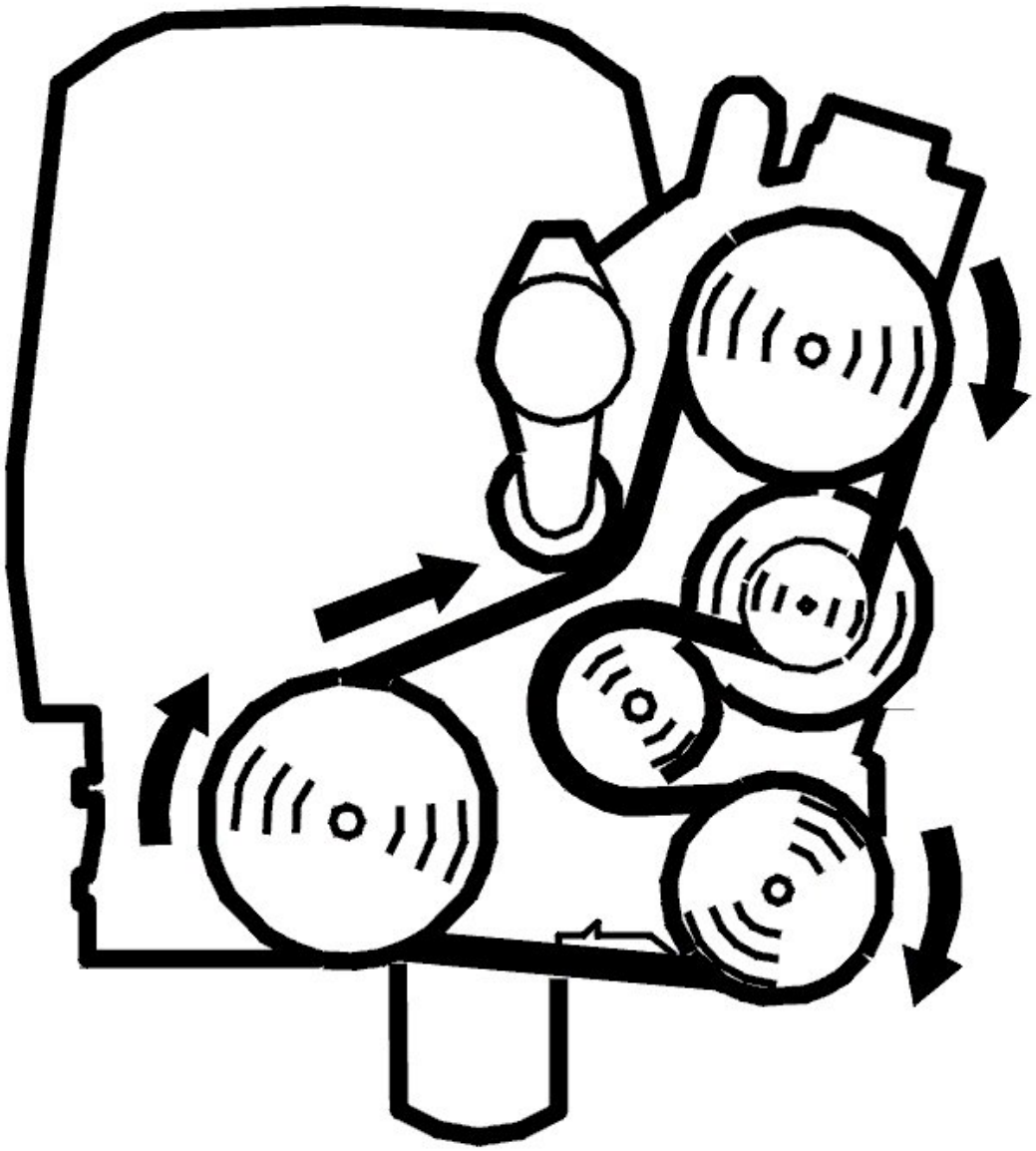
Continue - Verification

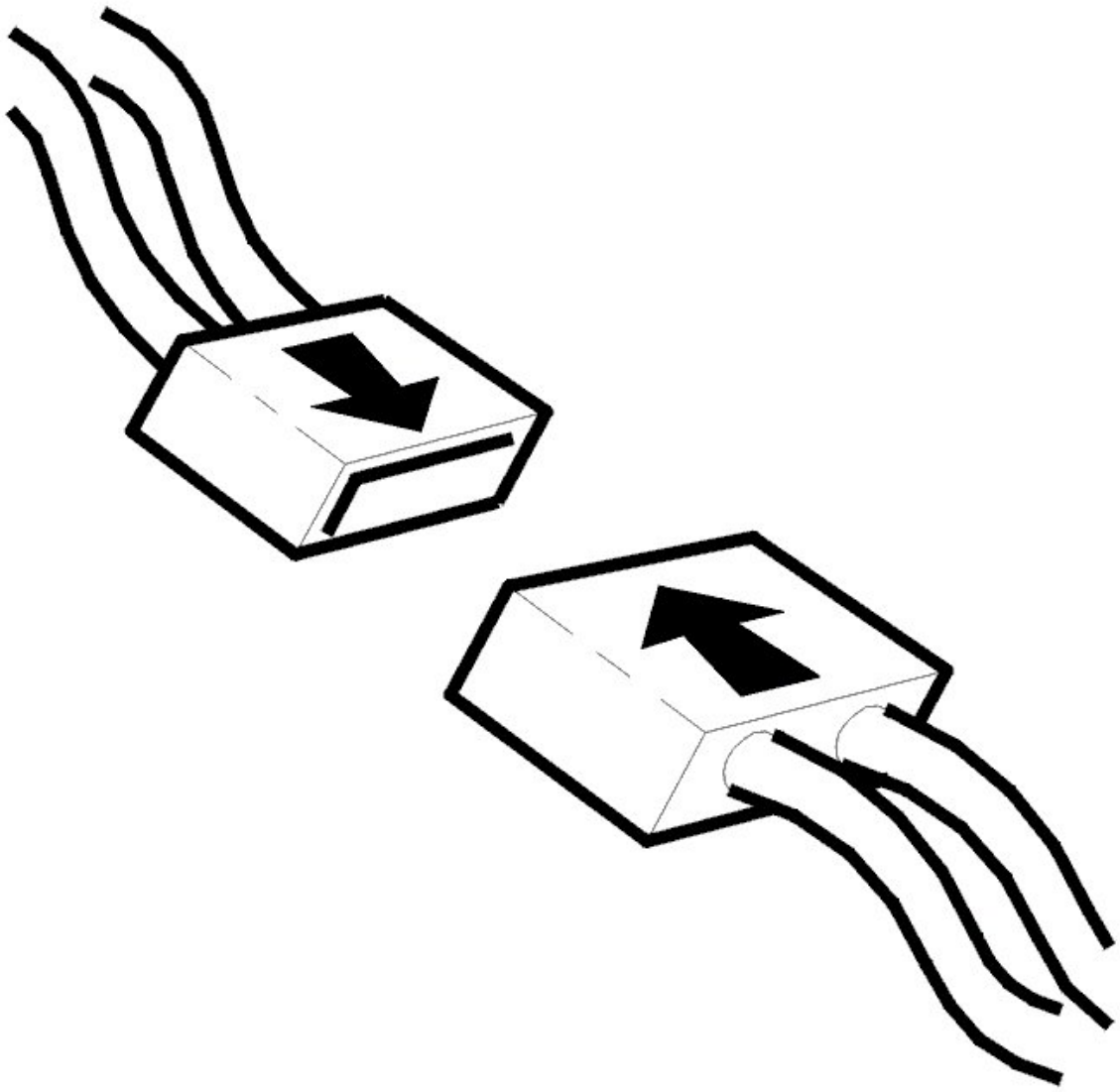
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-212C

Condition

The engine control module (ECM) receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the upper and lower part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) is stored when the long-term trim must be adjusted to almost maximum in the lower part load area.

Substitute value
- None.

Possible source
- Intake air leakage
- Air leakage in the exhaust system
- Low fuel pressure
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Check the fuel pressure.
Test drive the car for approximately 10 minutes.
Read off the correction factor of the mass air flow (MAF) sensor. The value must be between 0.8 and 1.2.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking

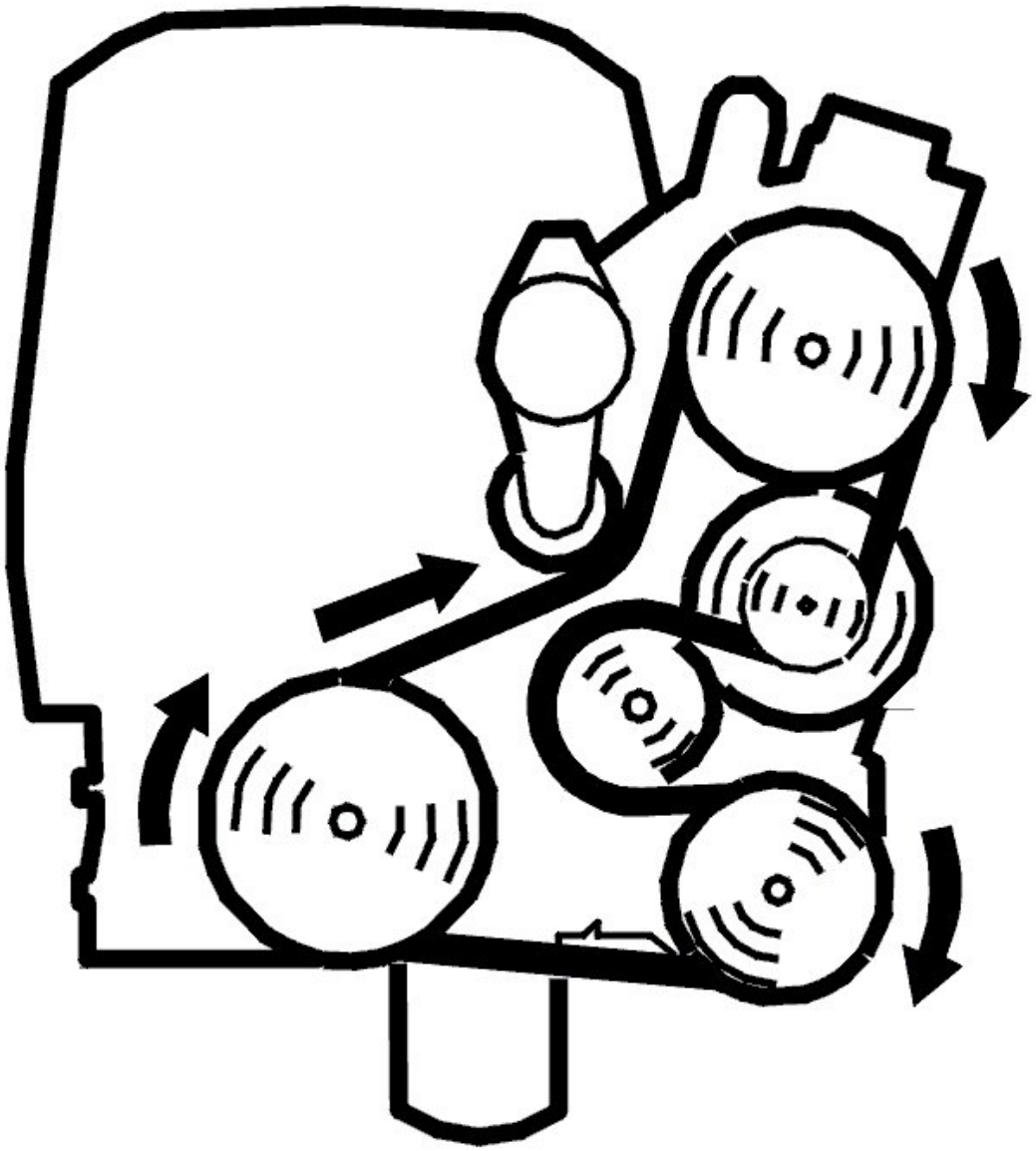
Continue - Verification

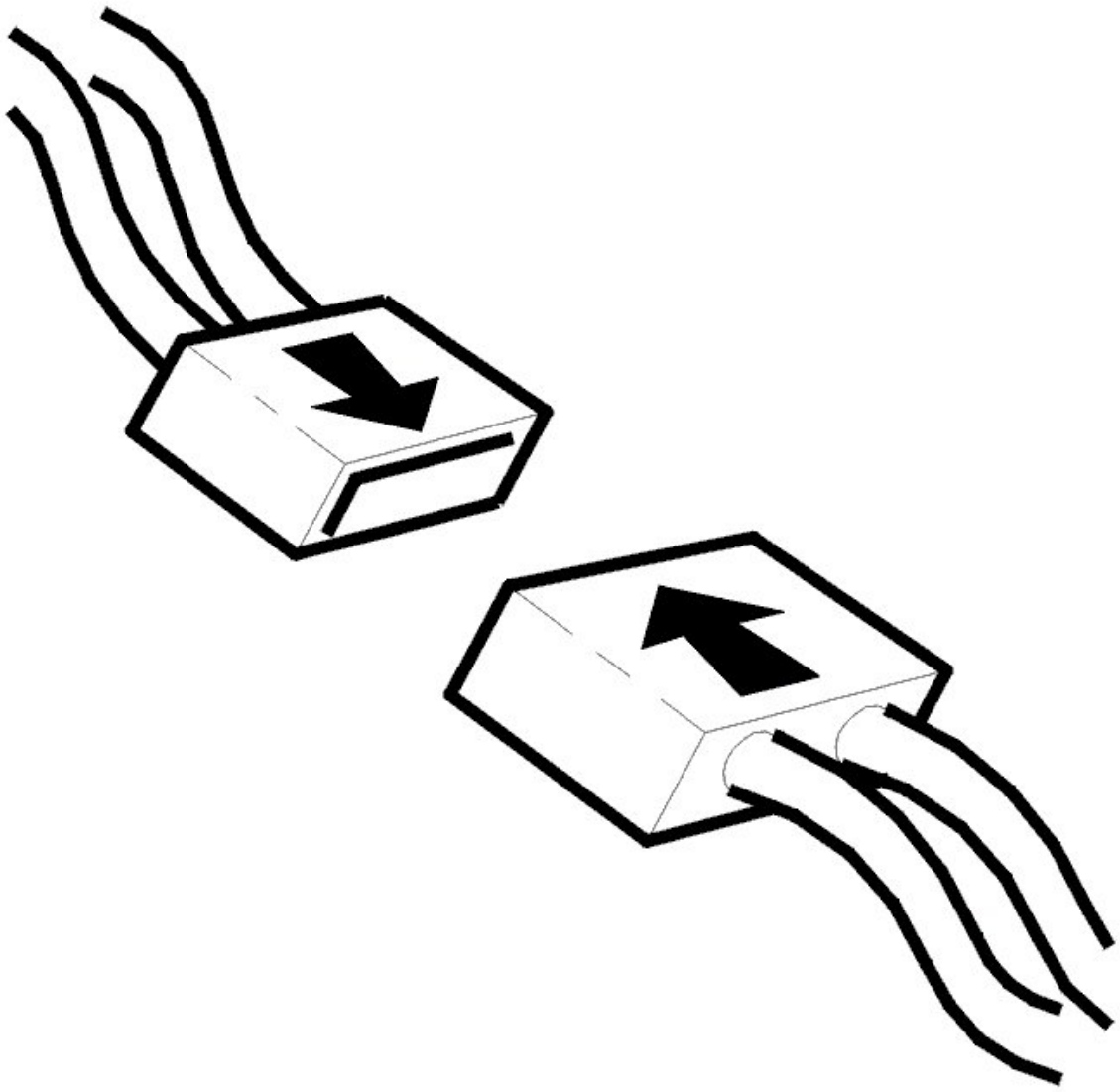
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-212D

Condition

The engine control module (ECM) receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the upper and lower part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) is stored when the long-term trim must be adjusted to almost maximum in the lower part load area.

Substitute value
- None.

Possible source
- Intake air leakage
- High fuel pressure
- Leaking injectors
- Damaged mass air flow (MAF) sensor
- Contaminated engine oil
- Oil level too high
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- Fuel system/Excessive fuel consumption

Signal Too Low

Signal too low

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Check the exhaust system for leakage.
Check the fuel pressure and residual pressure.
Check that the oil level is within the minimum and maximum markings.

Check the viscosity of the engine oil by reading off the short-term fuel trim with the engine running. Plug the crankcase ventilation and read off the short-term fuel trim again. The value must be more or less unchanged.
Remedy as necessary.

Other information:

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check

Was a fault detected?

Yes - Verification

No - Checking the mass air flow (MAF) sensor

Checking the mass air flow (MAF) sensor

Test drive the car for approximately 10 minutes.
Read off the correction factor of the mass air flow (MAF) sensor. The value must be between 0.8 and 1.2.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- .

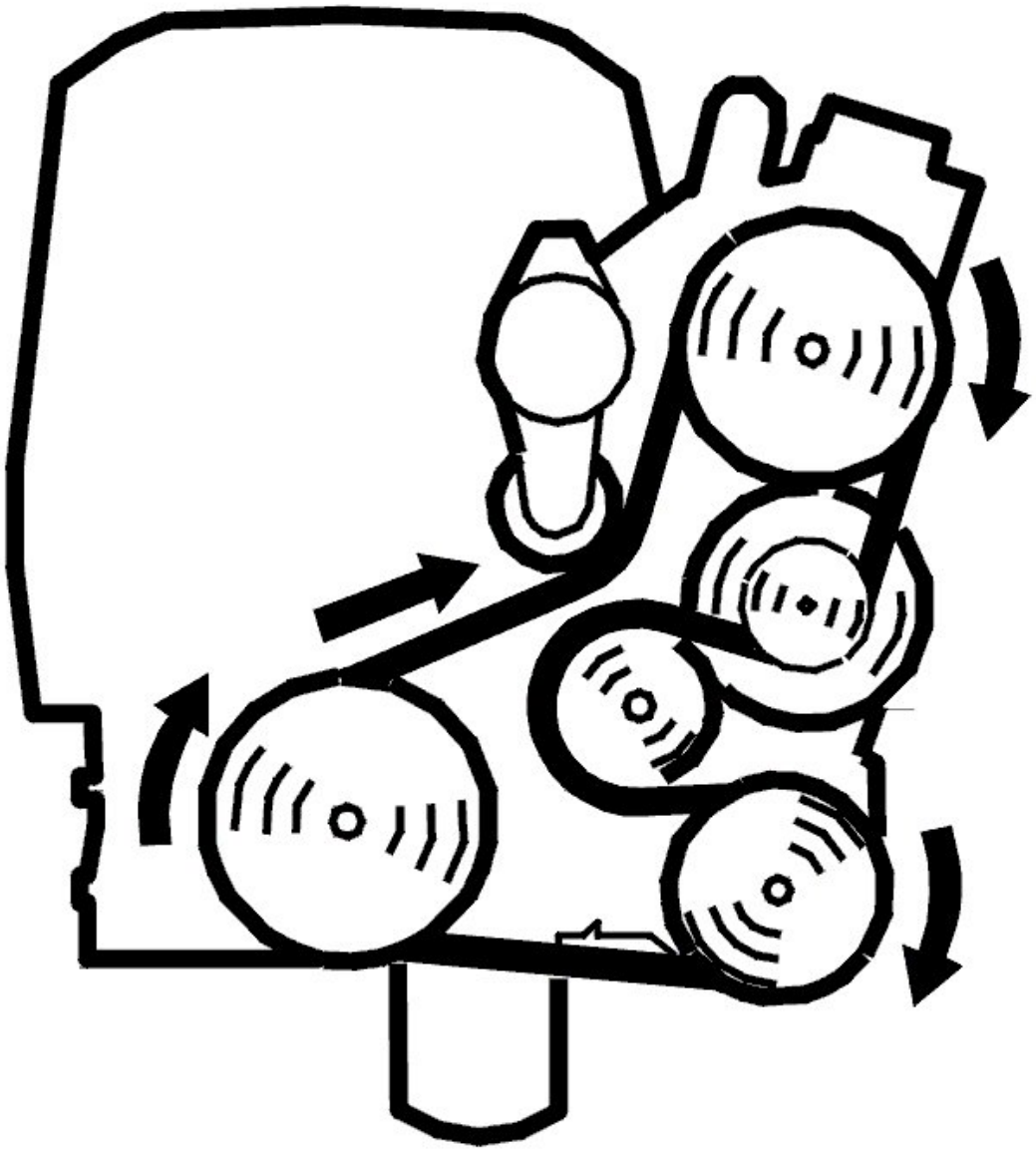
Continue - Verification

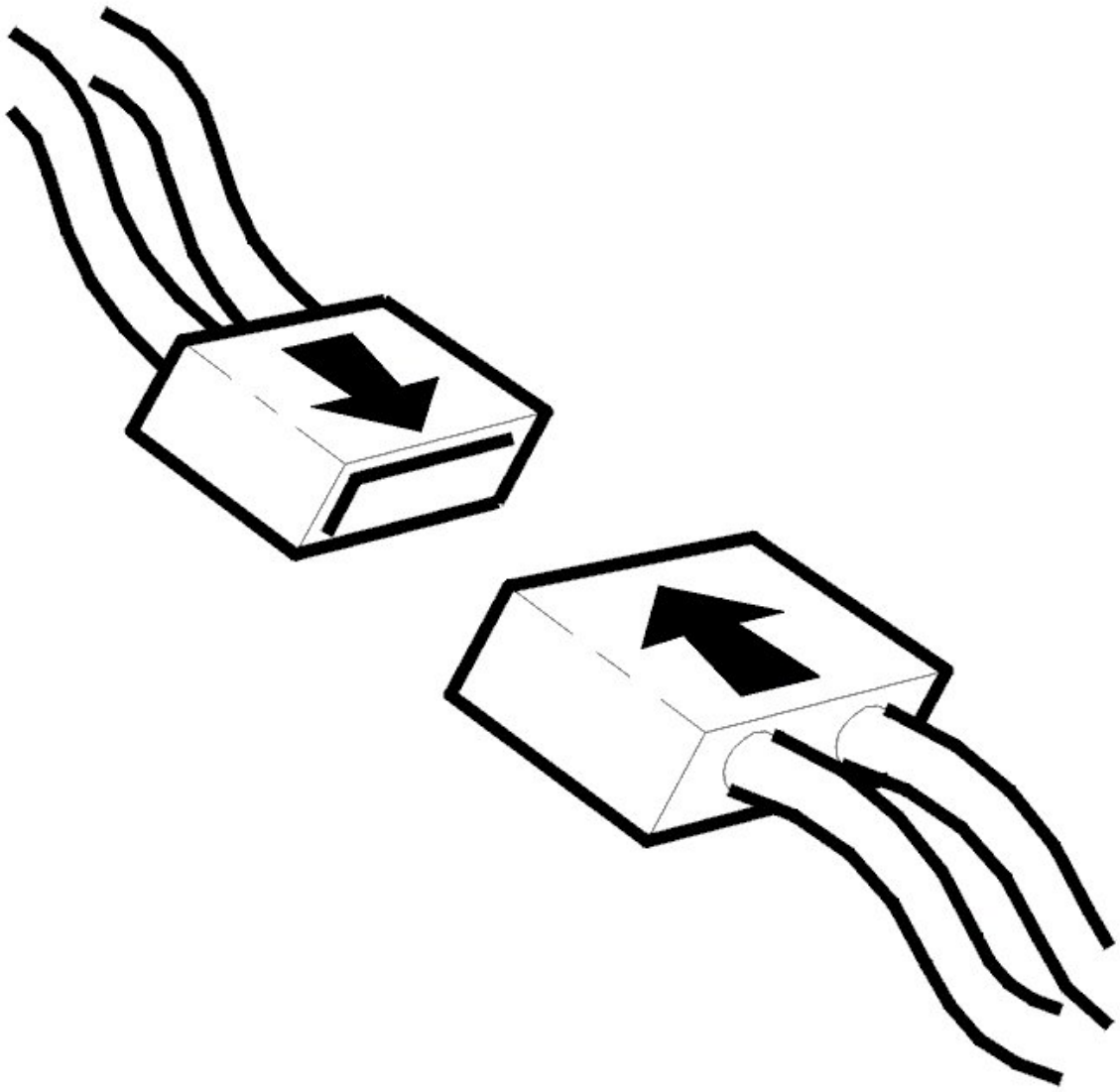
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-216C

Condition

The engine control module (ECM) receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the upper and lower part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) will be stored when the long-term trim must be adjusted almost to maximum in the idle range.

Substitute value
- None.

Possible source
- Intake air leakage
- Air leakage in the exhaust system
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Start the engine. Allow the engine to run at idle speed for 10 minutes.
Check the mass air flow (MAF) sensor. Read off its correction factor. The value must be between 2 and 12.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- .

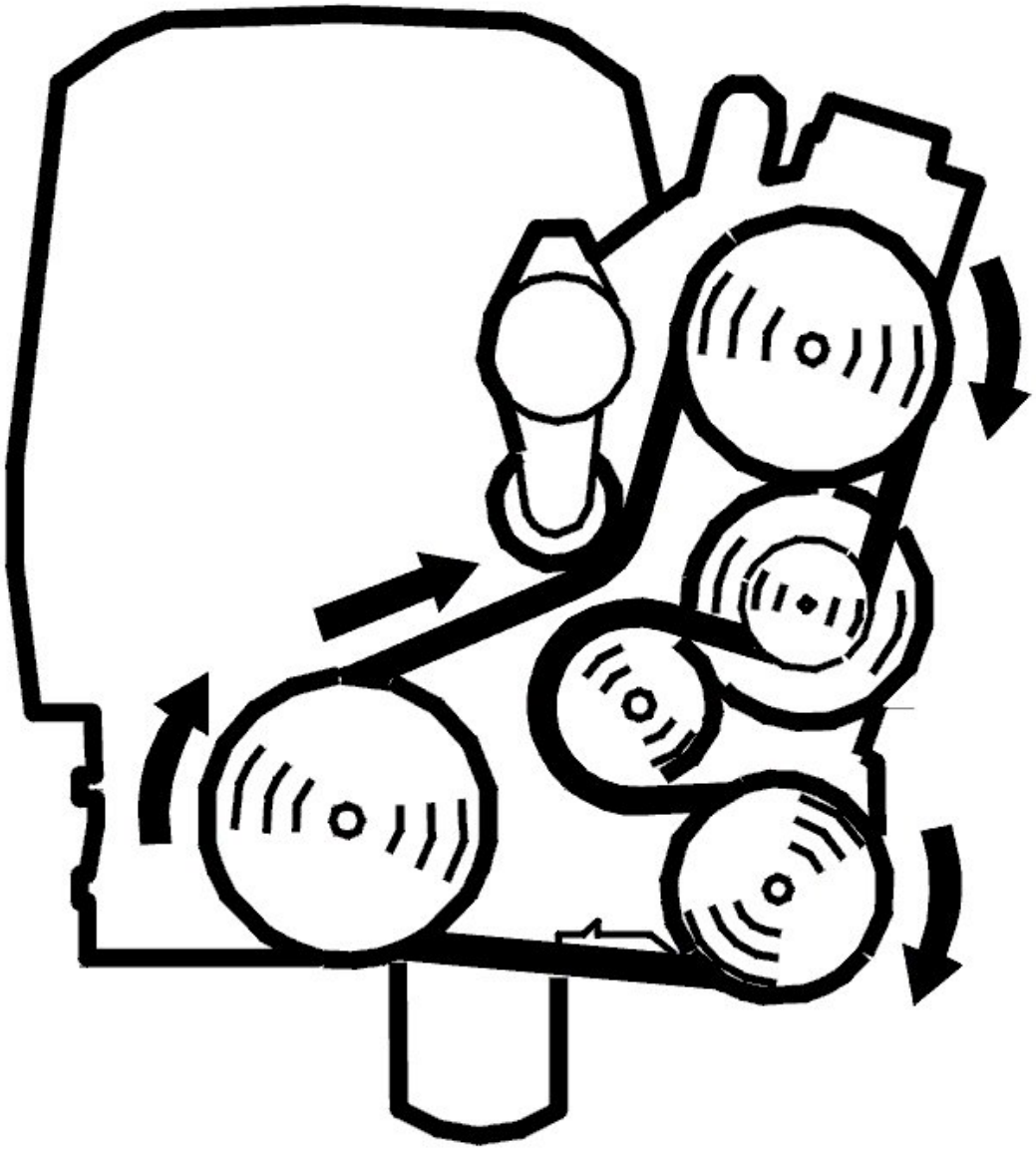
Continue - Verification

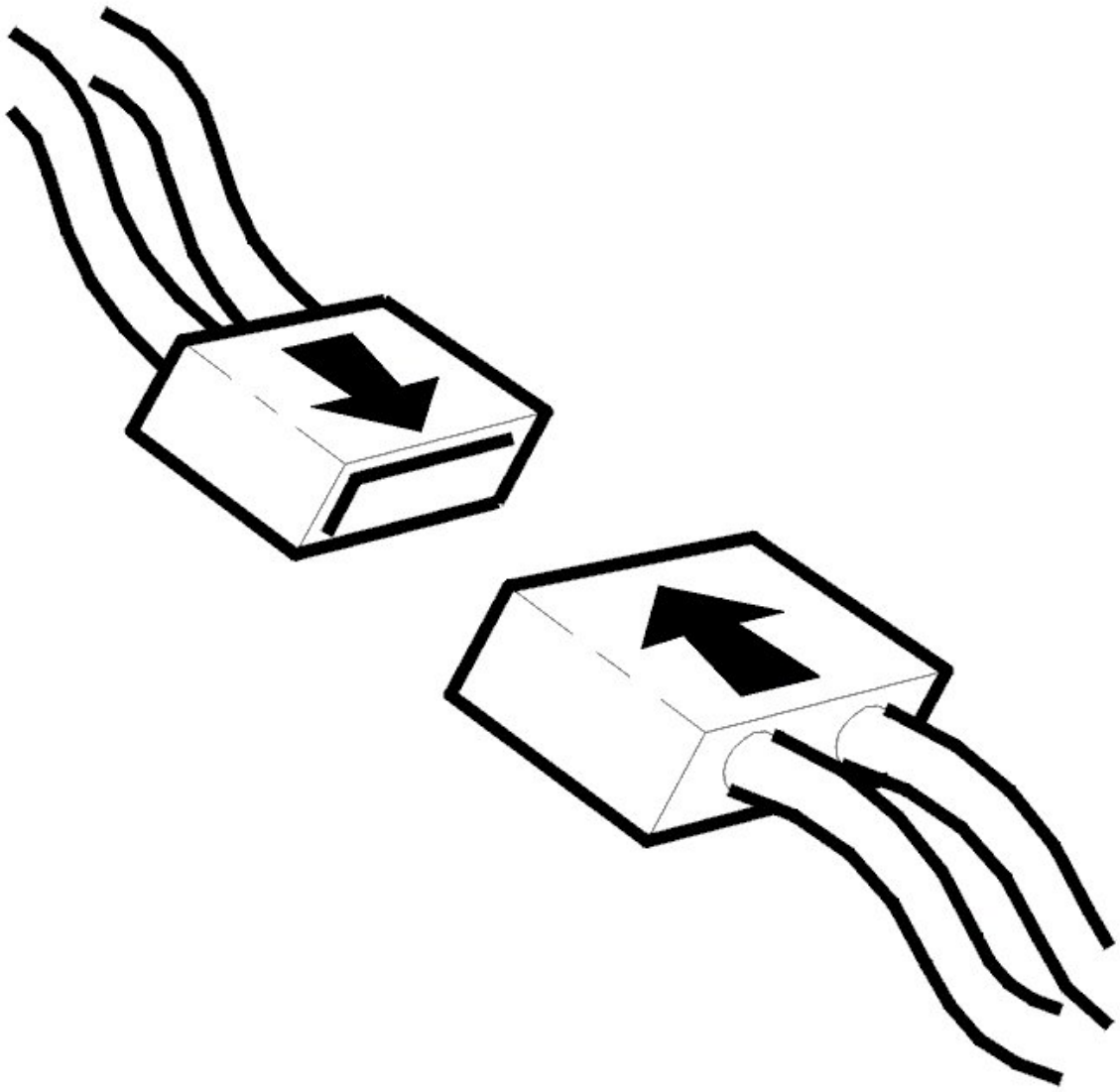
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-216D

Condition

The control module receives information from the heated oxygen sensor (HO2S) (bank 1) about the fuel / air mixture when idling and at both the lower and upper part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) will be stored when the long-term trim must be adjusted almost to maximum in the idle range.

Substitute value
- None.

Possible source
- Intake air leakage
- High fuel pressure
- Leaking injectors
- Damaged mass air flow (MAF) sensor
- Contaminated engine oil
- Oil level too high
- Damaged heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- None.

Signal Too Low

Signal too low

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Check the exhaust system for leakage.
Check the fuel pressure and residual pressure.
Check that the oil level is within the minimum and maximum markings.
Check the viscosity of the engine oil by reading off the short-term fuel trim with the engine running. Plug the crankcase ventilation and read off the

short-term fuel trim again. The value must be more or less unchanged.
Remedy as necessary.

Other information:

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check

Continue - Checking the mass air flow (MAF) sensor

Checking the mass air flow (MAF) sensor

Read off the correction factor of the mass air flow (MAF) sensor. The value must be between 2 and 12.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- .

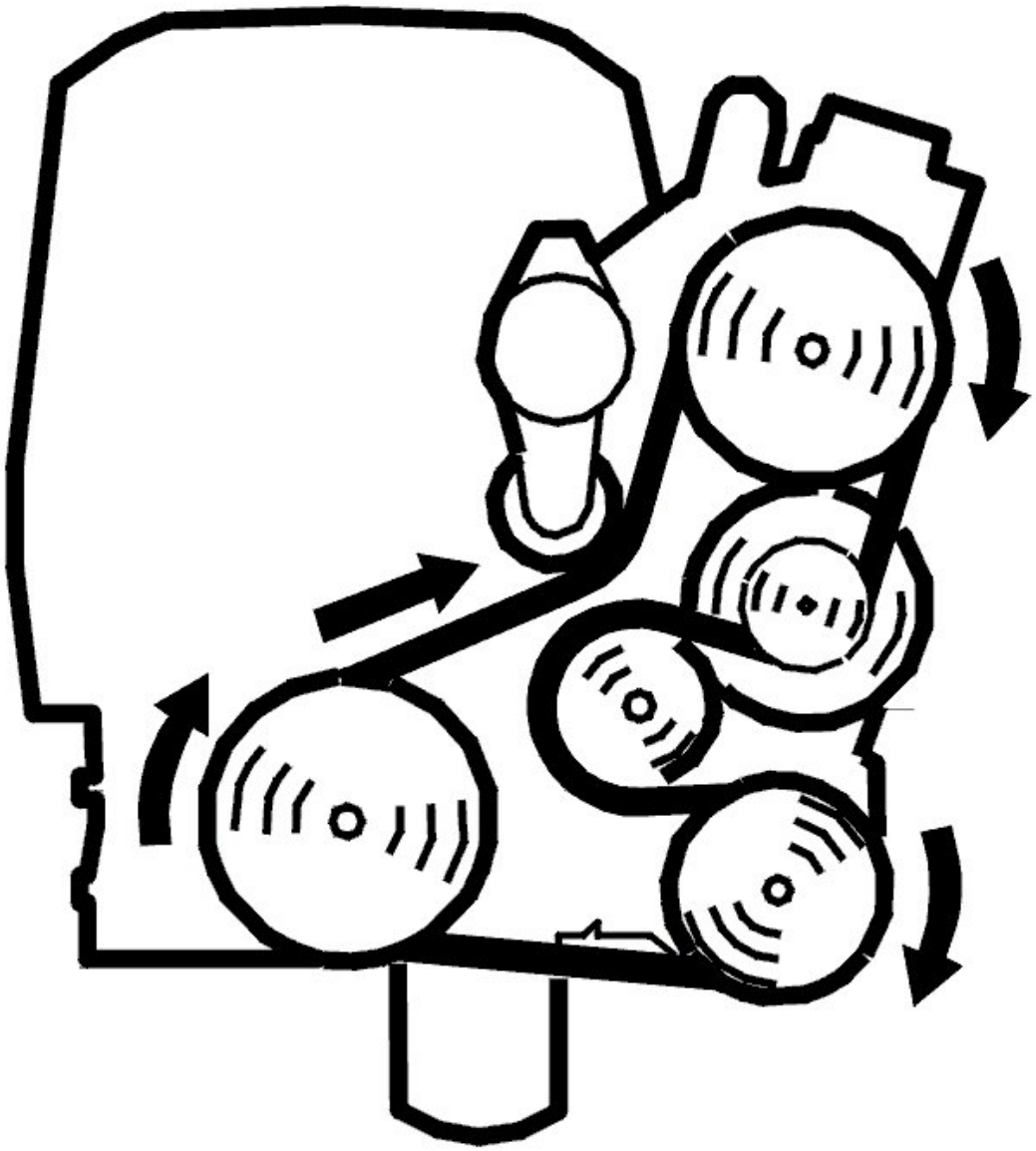
Continue - Verification

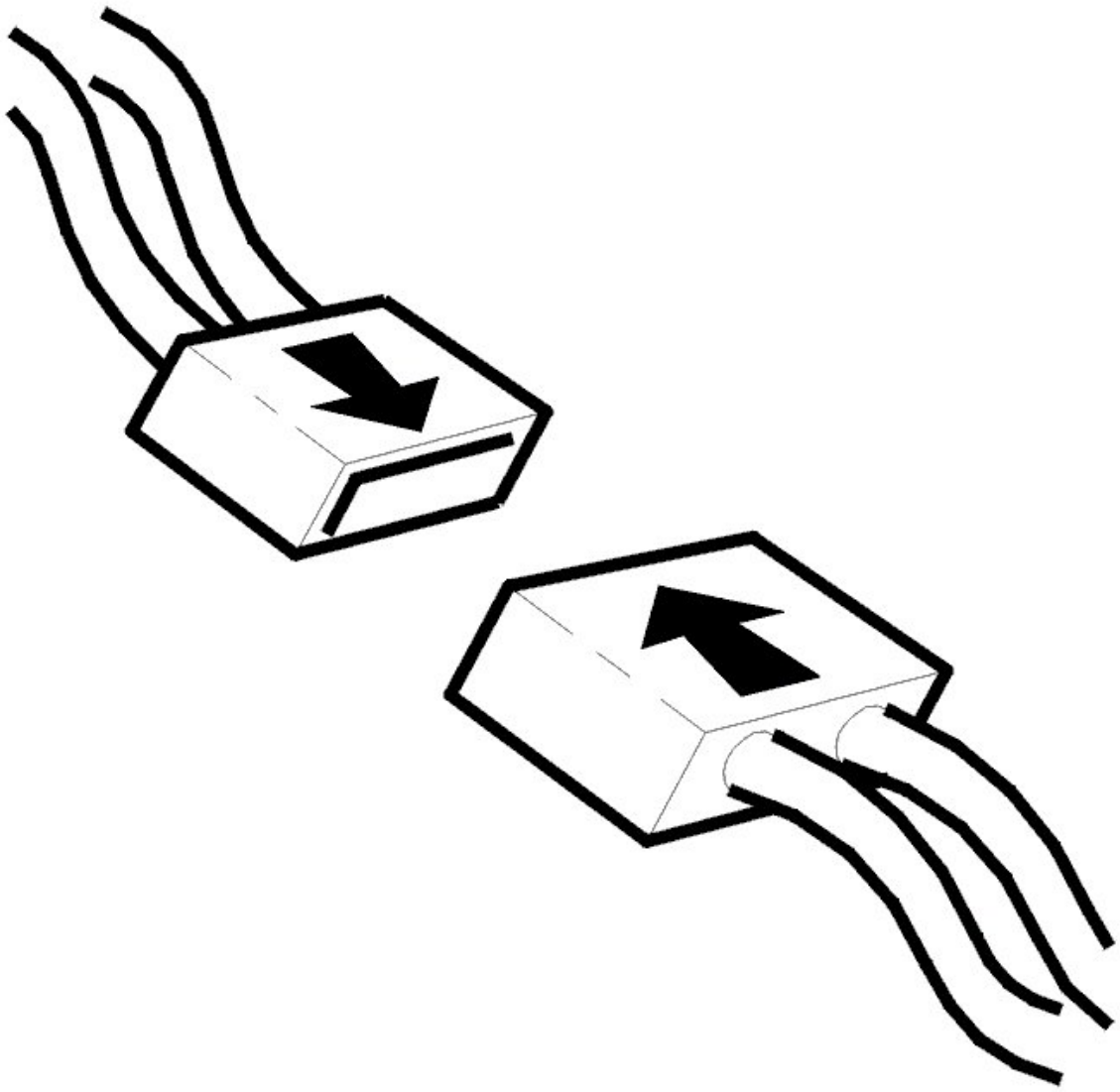
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-217C

Condition

The control module receives information from the heated oxygen sensor (HO2S) (bank 2) about the fuel / air mixture when idling and at both the lower and upper part-load range. If the fuel / air mixture deviates from lambda=1, the short-term fuel trim will compensate for this by adjusting the injection time so that lambda=1 is achieved. When the short-term fuel trim makes an adjustment, the integrator median must be adjusted by the long-term trim. The diagnostic trouble code (DTC) will be stored when the long-term trim must be adjusted almost to maximum in the idle range.

Substitute value
- None.

Possible source
- Intake air leakage
- Air leakage in the exhaust system
- Damaged heated oxygen sensor (HO2S) (bank 2).

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the fuel injection system

Check the intake system for air leakage.

Hint: Air leakage in the intake system can occur through the evaporative emission system (EVAP) valve, the secondary air solenoid valve or the power brake booster.

Start the engine. Allow the engine to run at idle speed for 10 minutes.
Check the mass air flow (MAF) sensor. Read off its correction factor. The value must be between 2 and 12.

Note! There must not be any air leakage when this test is carried out.

Remedy as necessary.

Other information

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- .

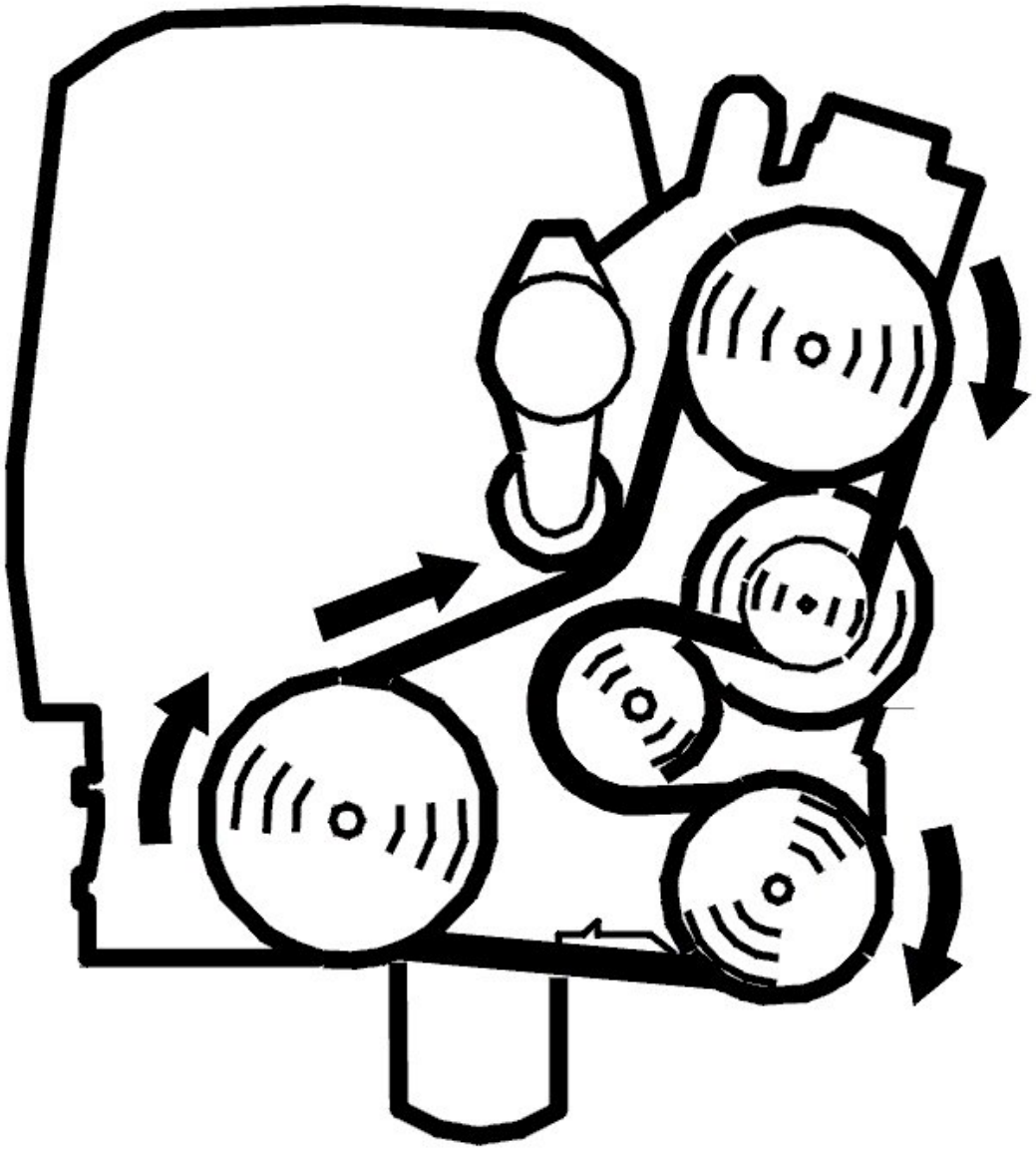
Continue - Verification

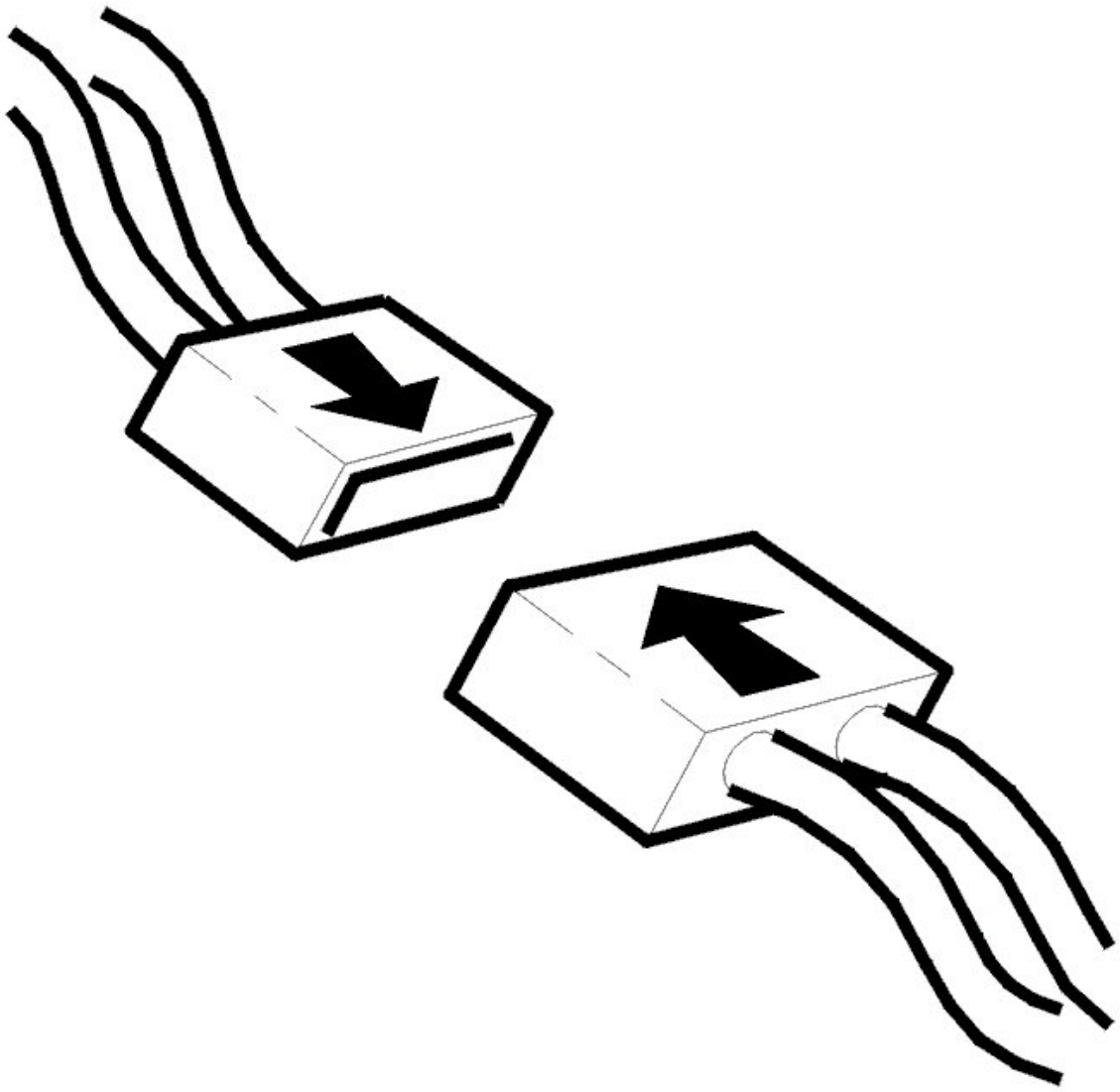
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the fuel injection system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The engine control module (ECM) stores information about fuel trim in the various adaptation ranges. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that one of the codes for fuel trim (bank 1) is stored in two consecutive operating cycles. The diagnostic trouble code is a collective code for diagnostic trouble codes having to do with the fuel adaptation. The diagnostic trouble code is always stored together with one of the following diagnostic trouble codes:

- **ECM-210C**
- **ECM-210D**
- **ECM-212C**
- **ECM-212D**
- **ECM-216C**
- **ECM-216D**

If any or some of these diagnostic trouble codes above are stored, then troubleshoot these according to each troubleshooting.

Substitute value

- None.

Possible source

- Locate the fault cause in the diagnostic trouble codes (DTCs) covering "Long-term fuel trim".

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The engine control module (ECM) stores information about fuel trim in the various adaptation ranges. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that one of the codes for fuel trim (bank 1) is stored in two consecutive operating cycles. The diagnostic trouble code is a collective code for diagnostic trouble codes having to do with the fuel adaptation. The diagnostic trouble code is always stored together with one of the following diagnostic trouble codes:

- **ECM-210C**
- **ECM-210D**
- **ECM-212C**
- **ECM-212D**
- **ECM-216C**
- **ECM-216D**

If any or some of these diagnostic trouble codes above are stored, then troubleshoot these according to each troubleshooting.

Substitute value

- None.

Possible source

- Locate the fault cause in the diagnostic trouble codes (DTCs) covering "Long-term fuel trim".

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The engine control module (ECM) stores information about fuel trim in the various adaptation ranges. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that one of the codes for fuel trim (bank 1) is stored in two consecutive operating cycles. The diagnostic trouble code is a collective code for diagnostic trouble codes having to do with the fuel adaptation. The diagnostic trouble code is always stored together with one of the following diagnostic trouble codes:

- **ECM-210C**
- **ECM-210D**
- **ECM-212C**
- **ECM-212D**
- **ECM-216C**
- **ECM-216D**

If any or some of these diagnostic trouble codes above are stored, then troubleshoot these according to each troubleshooting.

Substitute value

- None.

Possible source

- Locate the fault cause in the diagnostic trouble codes (DTCs) covering "Long-term fuel trim".

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The engine control module (ECM) stores information about fuel trim in the various adaptation ranges. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that one of the codes for fuel trim (bank 1) is stored in two consecutive operating cycles. The diagnostic trouble code is a collective code for diagnostic trouble codes having to do with the fuel adaptation. The diagnostic trouble code is always stored together with one of the following diagnostic trouble codes:

- **ECM-210C**
- **ECM-210D**
- **ECM-212C**
- **ECM-212D**
- **ECM-216C**
- **ECM-216D**

If any or some of these diagnostic trouble codes above are stored, then troubleshoot these according to each troubleshooting.

Substitute value

- None.

Possible source

- Locate the fault cause in the diagnostic trouble codes (DTCs) covering "Long-term fuel trim".

Fault symptom[s]

- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Description of Diagnostic Trouble Code (DTC) Status

Description of diagnostic trouble code (DTC) status

The purpose of "Reading off the diagnostic trouble code (DTC) status" is to determine whether the diagnostic trouble code (DTC) is permanent or intermittent. Because of the different criteria for diagnostics, the text message "Diagnostic function not ready" may appear when reading off. Below is an explanation of the different statuses which may occur.

Diagnostic function not ready

To run a diagnostic, all conditions must be met for the test of the relevant component or sub-system. For certain components/sub-systems, switching on the ignition is sufficient to run the diagnostic. Other require more specific conditions, such as engine speed and temperature etc. This means for example, that diagnostics requiring an engine speed above 3000 rpm will never run on a stationary car when the engine is only idling. In such cases, where the diagnostic has not run in the present operating cycle, the test message "Diagnostic function not ready" will be displayed.

Permanent

If a diagnostic trouble code (DTC) with a permanent status is stored, the control module has registered a fault and the fault is still present.

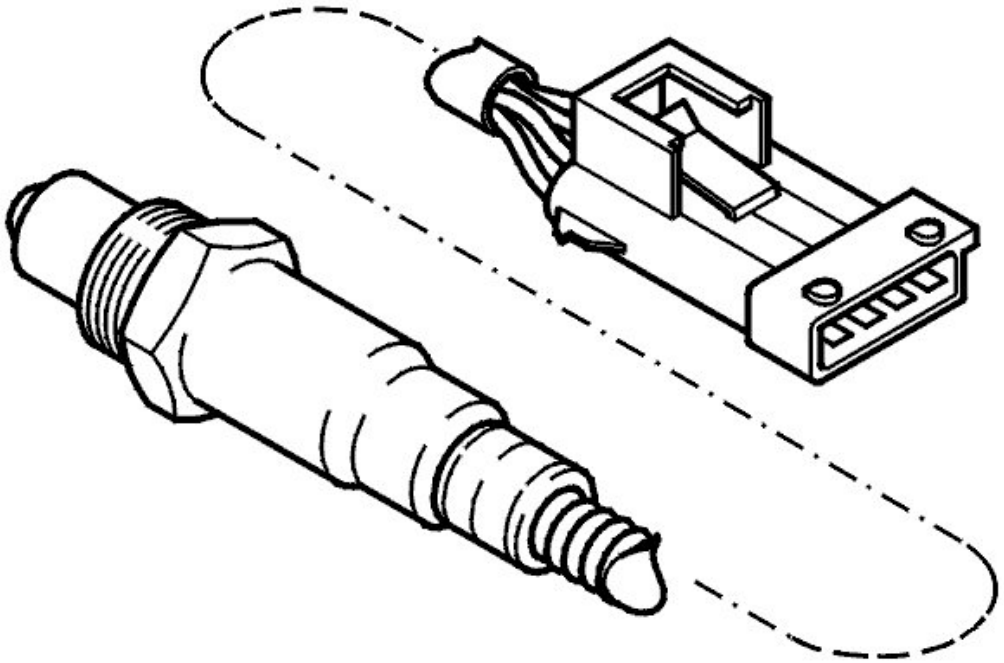
Intermittent

If a diagnostic trouble code (DTC) with an intermittent status is stored, the control module has registered a fault and the fault is not present at the moment.
An intermittent electrical fault can be caused by faults in the wiring, components or connectors.
Intermittent functional faults could be caused by mechanical defects in the components.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2200

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the resistance of the rear heated oxygen sensor (HO2S) in the pre-heating circuit is too high for a certain amount of time.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the terminals
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

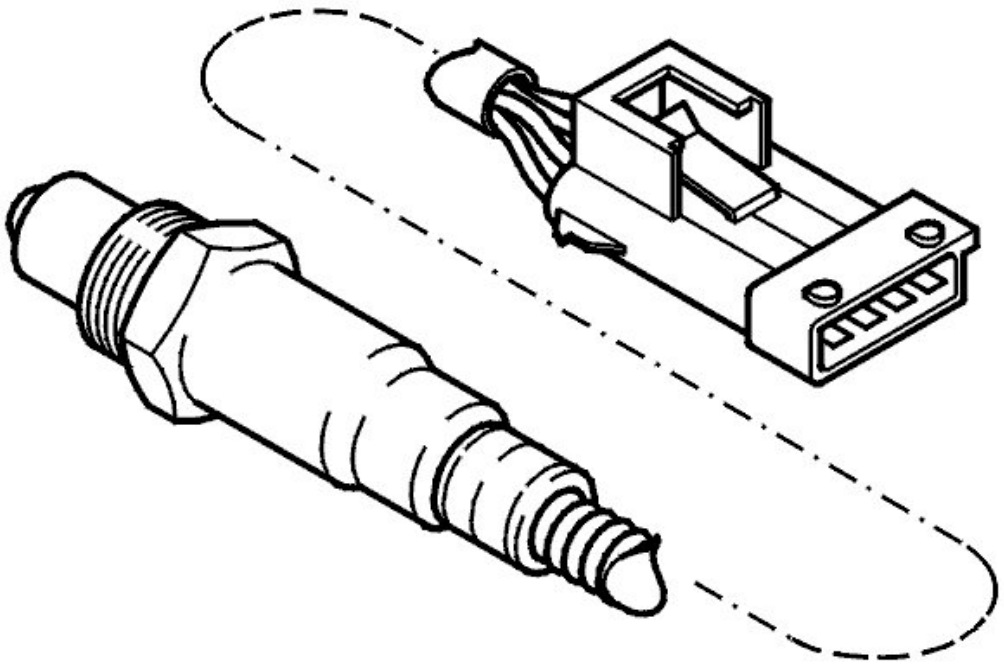
Faulty Signal

Faulty signal

Checking the connector

Check power cable terminal #1 in the rear heated oxygen sensor (HO2S) connector. Check for contact resistance. Check for oxidation.
Check ground lead terminal #2 in the rear heated oxygen sensor (HO2S) connector. Check for contact resistance. Check for oxidation.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



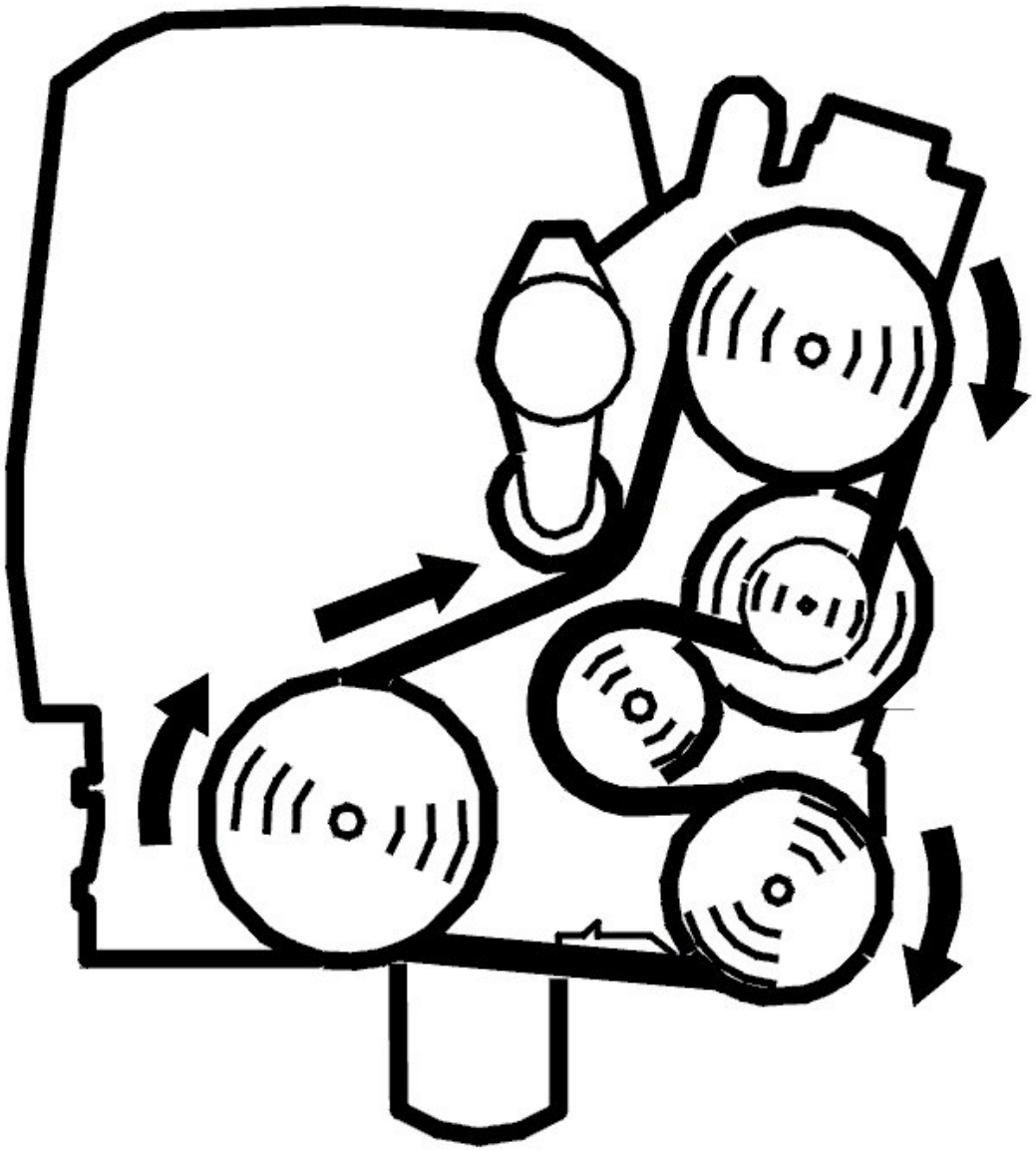
Continue - Verification

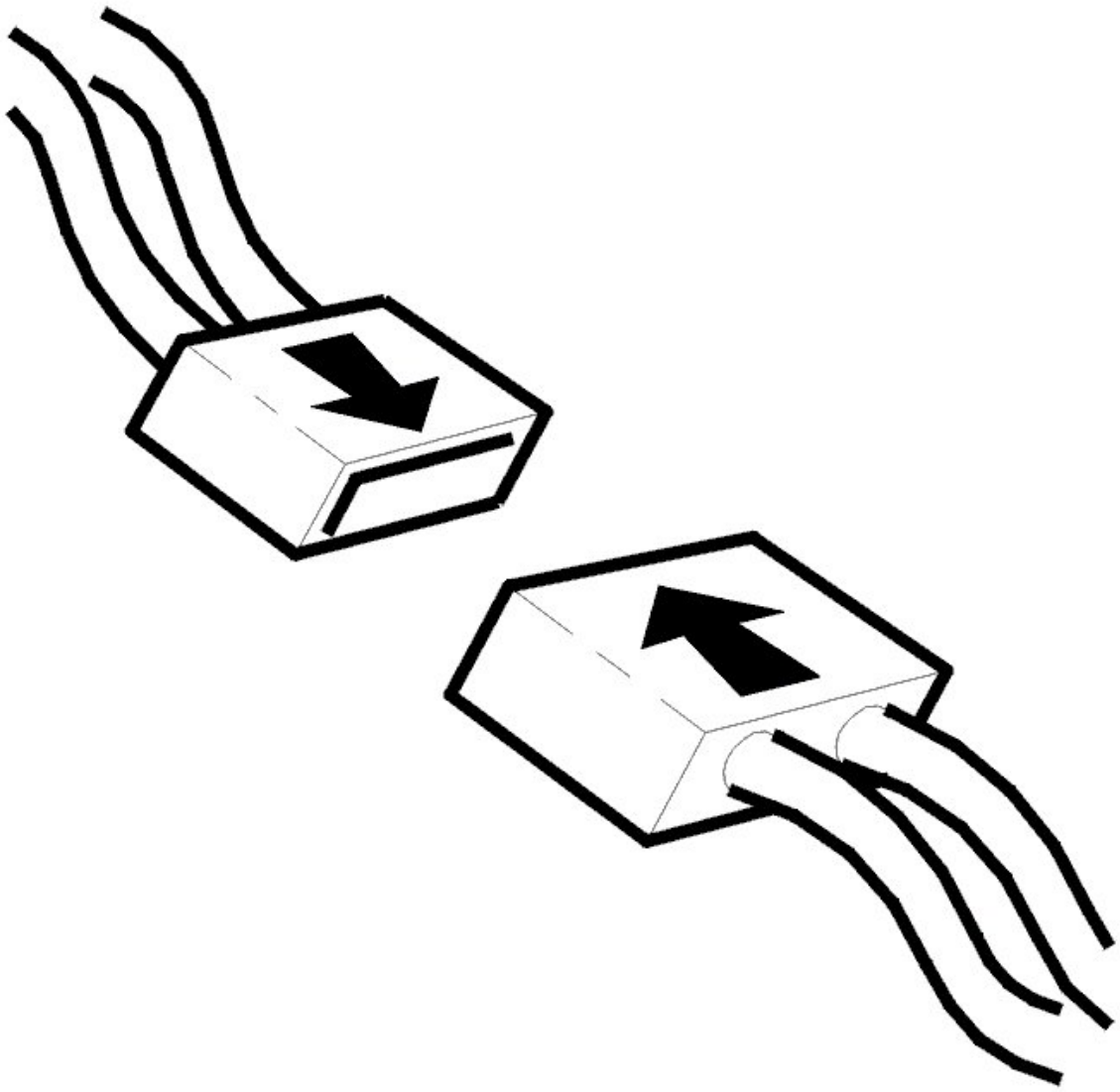
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed to 2500 rpm until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

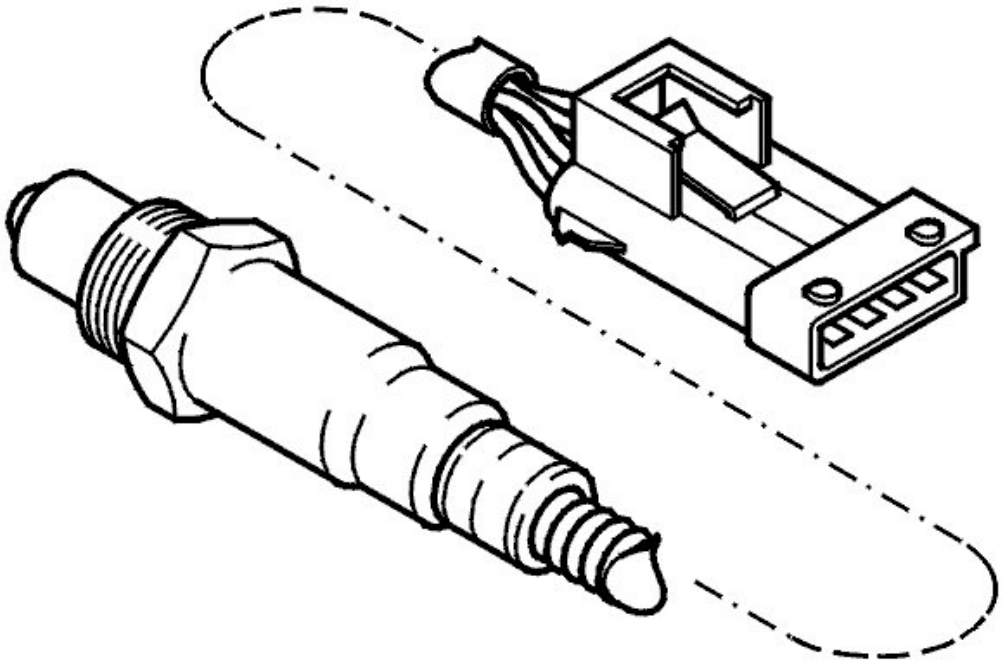
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-221B

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) does not register a signal from the rear heated oxygen sensor (HO2S).

Substitute value
- None.

Possible source
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high/Signal too low/Signal missing

Checking the components and wiring

Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the exhaust system for air leakage.
If no fault is discovered, try using a new rear heated oxygen sensor (HO2S), as a damaged rear heated oxygen sensor (HO2S) can cause a diagnostic trouble code (DTC) to be stored.
Remedy as necessary

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

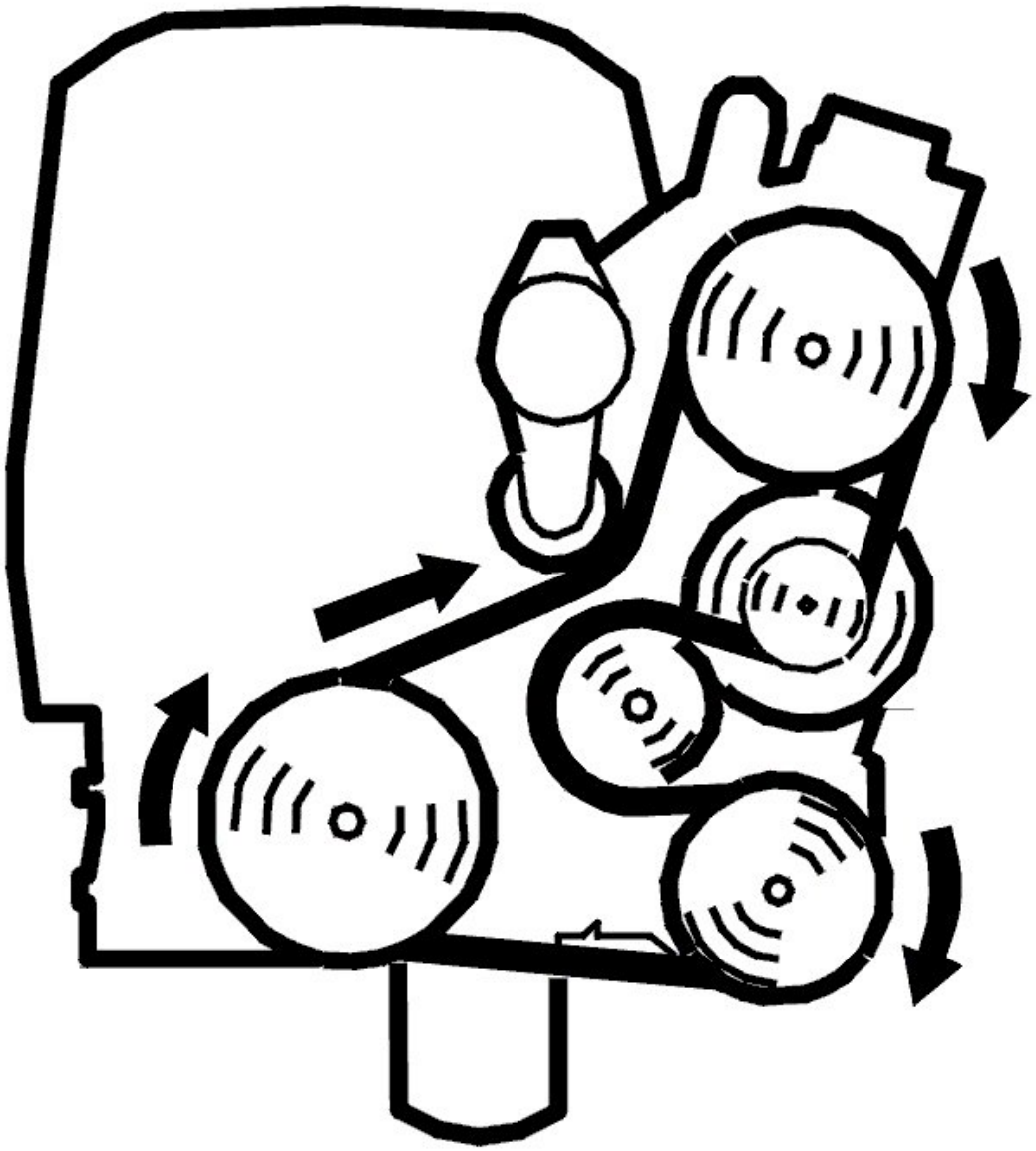
Continue - Verification

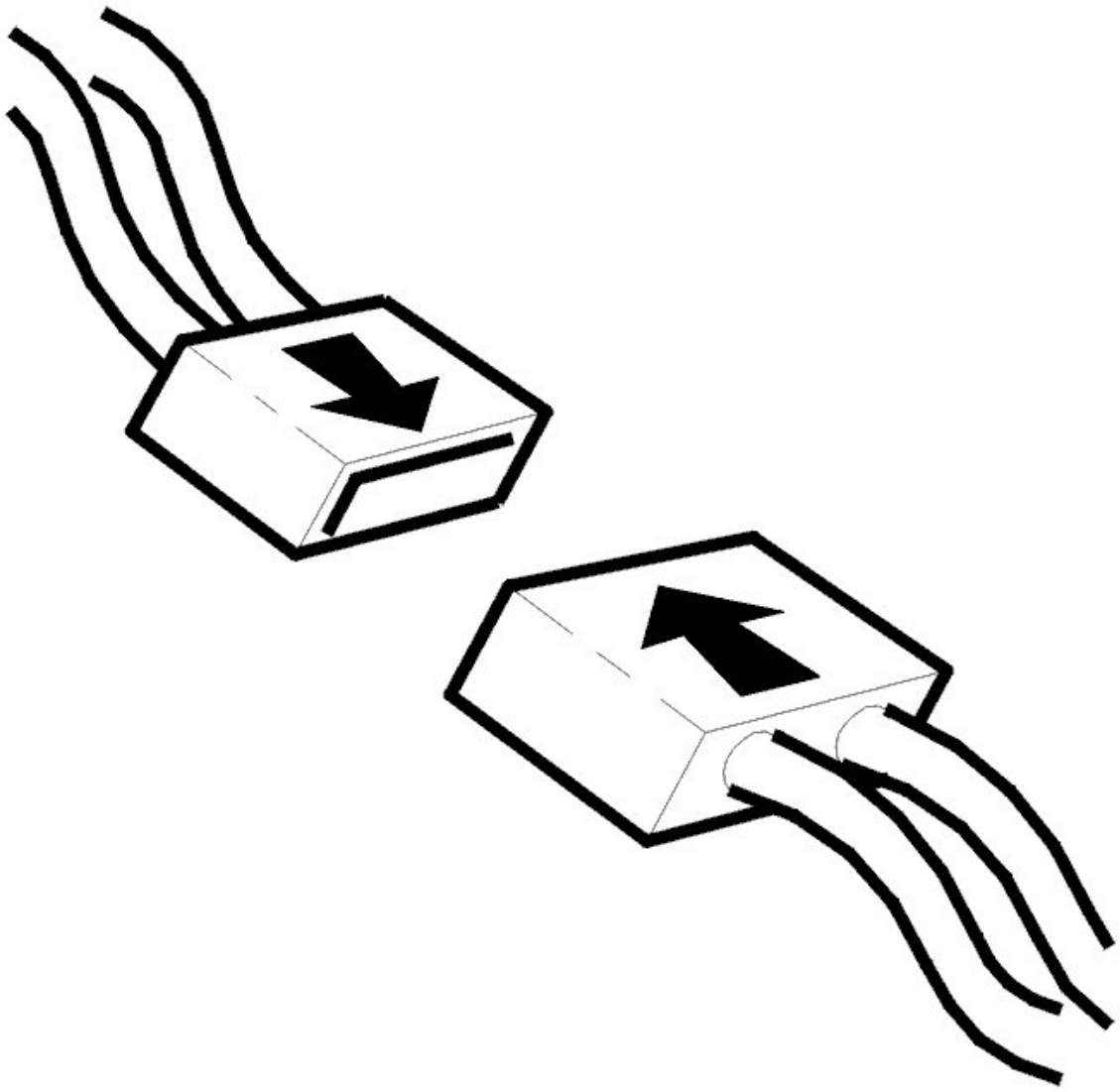
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

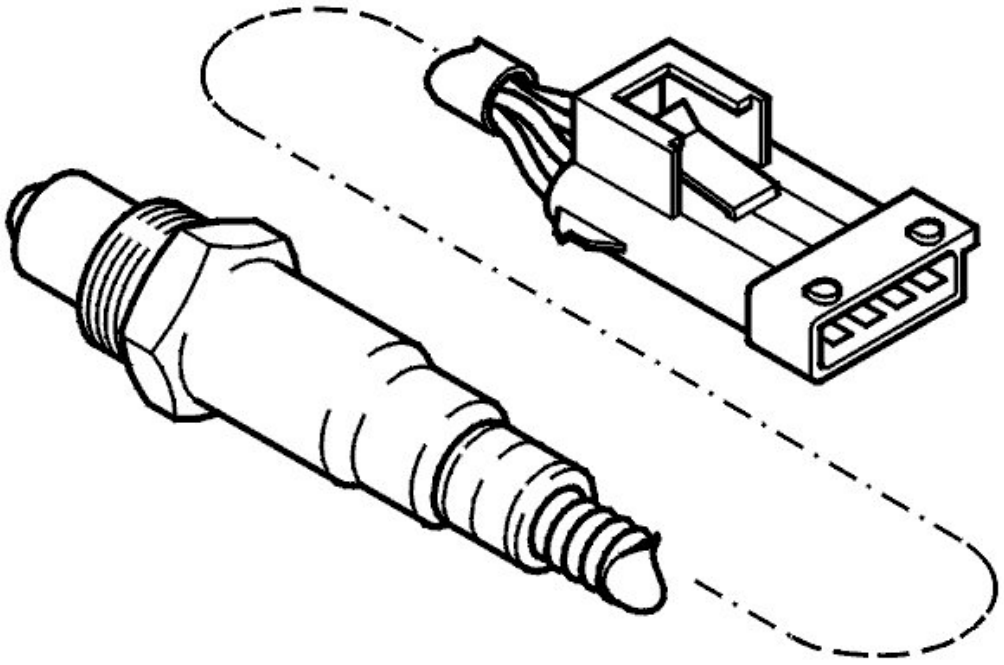
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-221C

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The engine control module (ECM) checks that the probe has registered a rich fuel/air mixture. If this is not the case, the engine control module (ECM) changes the fuel/air mixture. The diagnostic trouble code (DTC) is stored if the rear probe has still not registered a rich fuel / air mixture.

Substitute value

- None.

Possible source
- Leakage in the exhaust system
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high/Signal too low/Signal missing

Checking the components and wiring

Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the exhaust system for air leakage.
If no fault is discovered, try using a new rear heated oxygen sensor (HO2S), as a damaged rear heated oxygen sensor (HO2S) can cause a diagnostic trouble code (DTC) to be stored.
Remedy as necessary

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

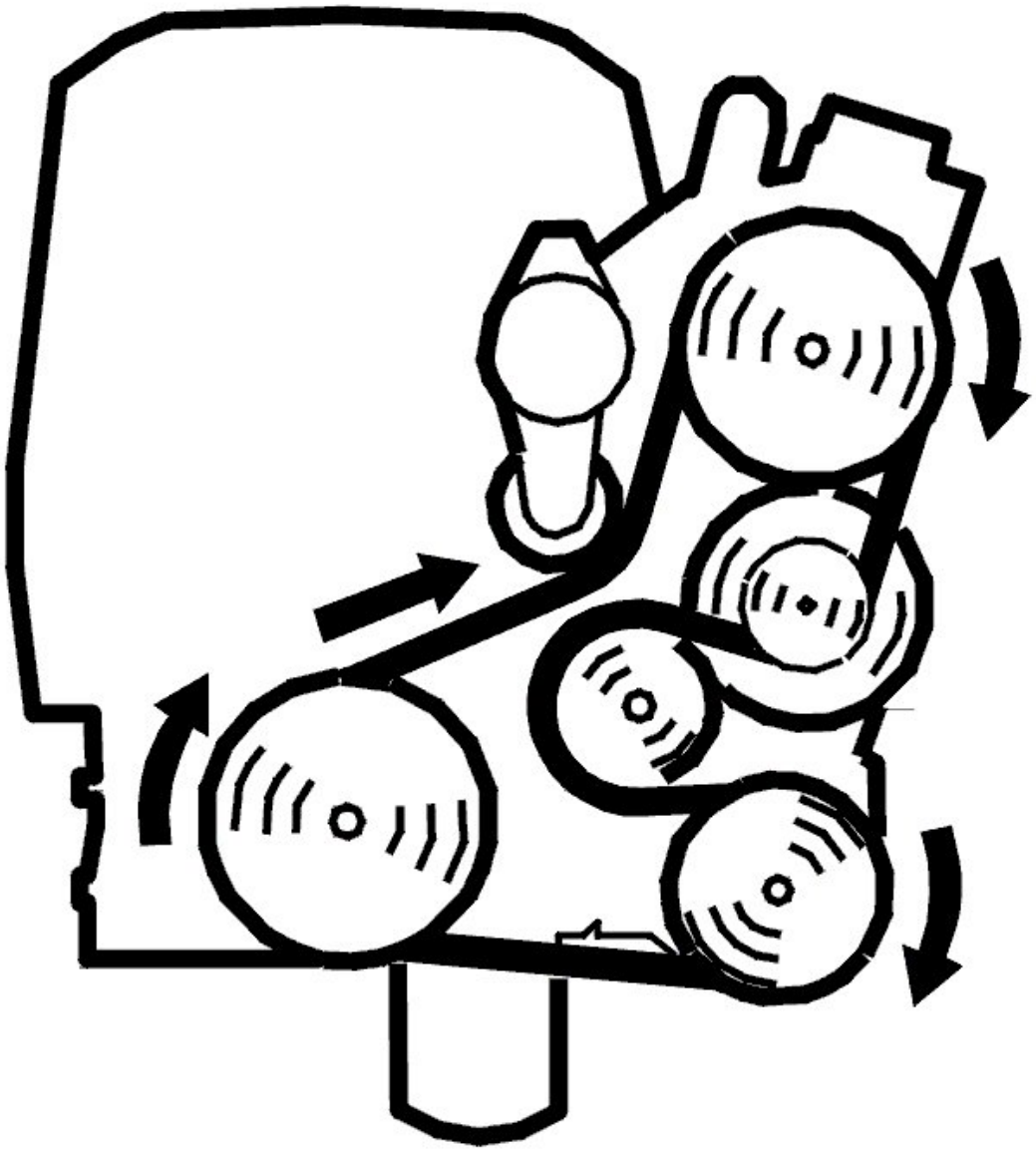
Continue - Verification

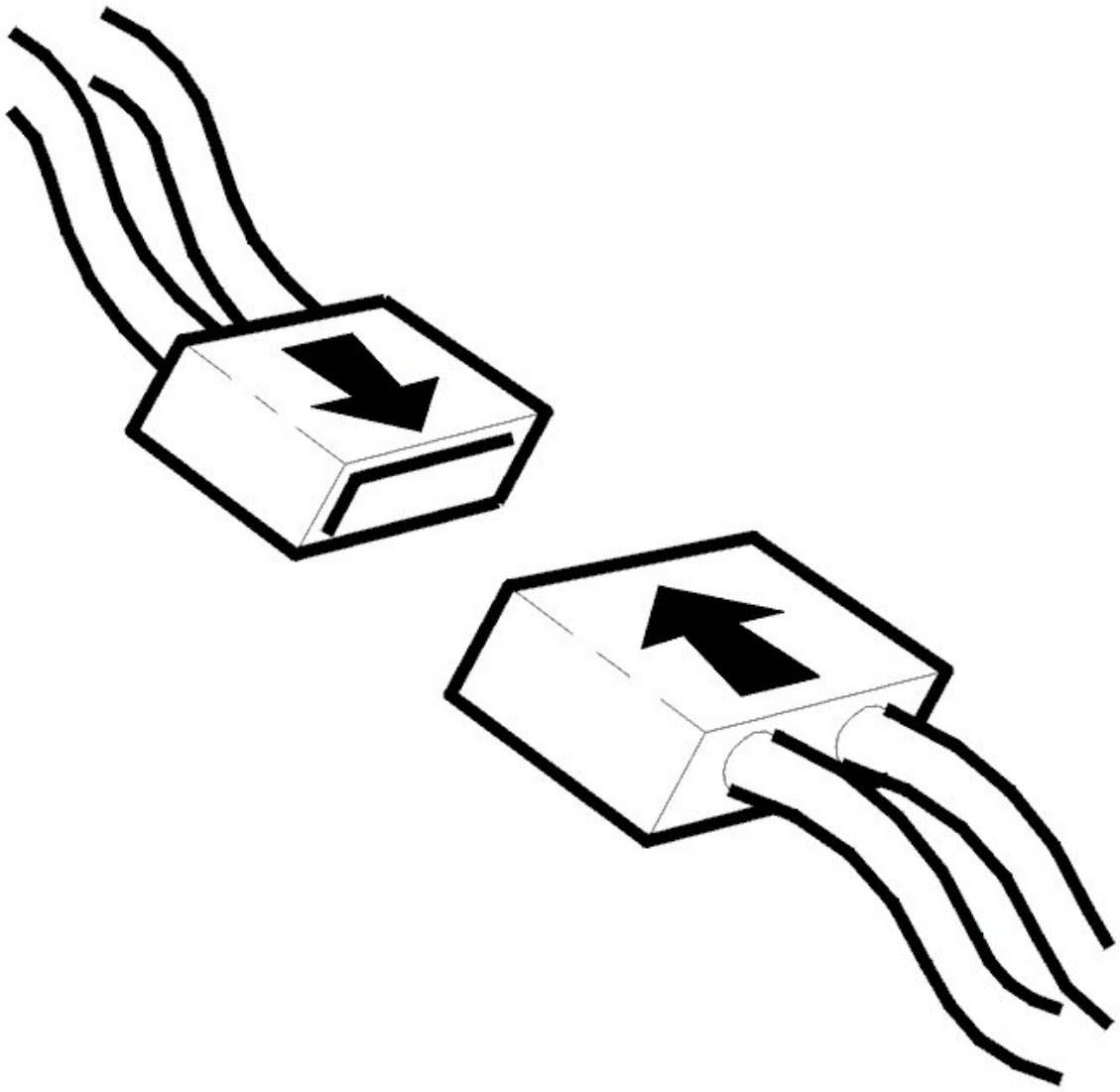
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

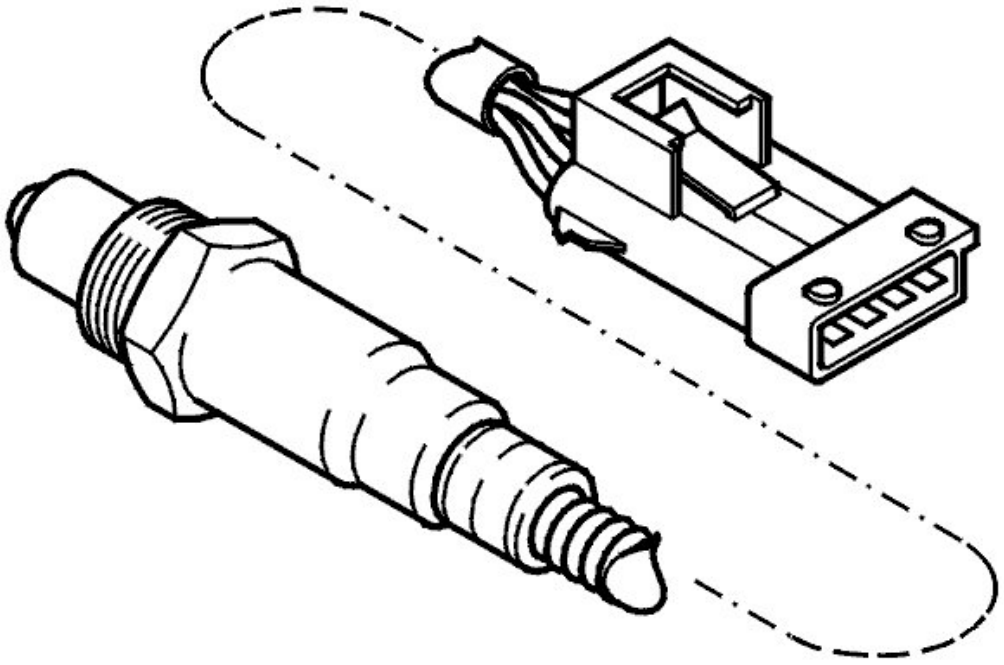
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-221D

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The engine control module (ECM) checks that the probe has registered a lean fuel/air mixture. If this is not the case, the engine control module (ECM) changes the fuel/air mixture. The diagnostic trouble code (DTC) is stored if the rear probe has still not registered a lean fuel / air mixture.

Note! At fuel shut-off, the probe must show a lean fuel/air mixture. The diagnostic trouble code (DTC) is also stored if the switch-over time

to a lean fuel/air mixture is too long.

Substitute value
- None.

Possible source
- Leakage in the exhaust system
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high/Signal too low/Signal missing

Checking the components and wiring

Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the exhaust system for air leakage.
If no fault is discovered, try using a new rear heated oxygen sensor (HO2S), as a damaged rear heated oxygen sensor (HO2S) can cause a diagnostic trouble code (DTC) to be stored.
Remedy as necessary

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

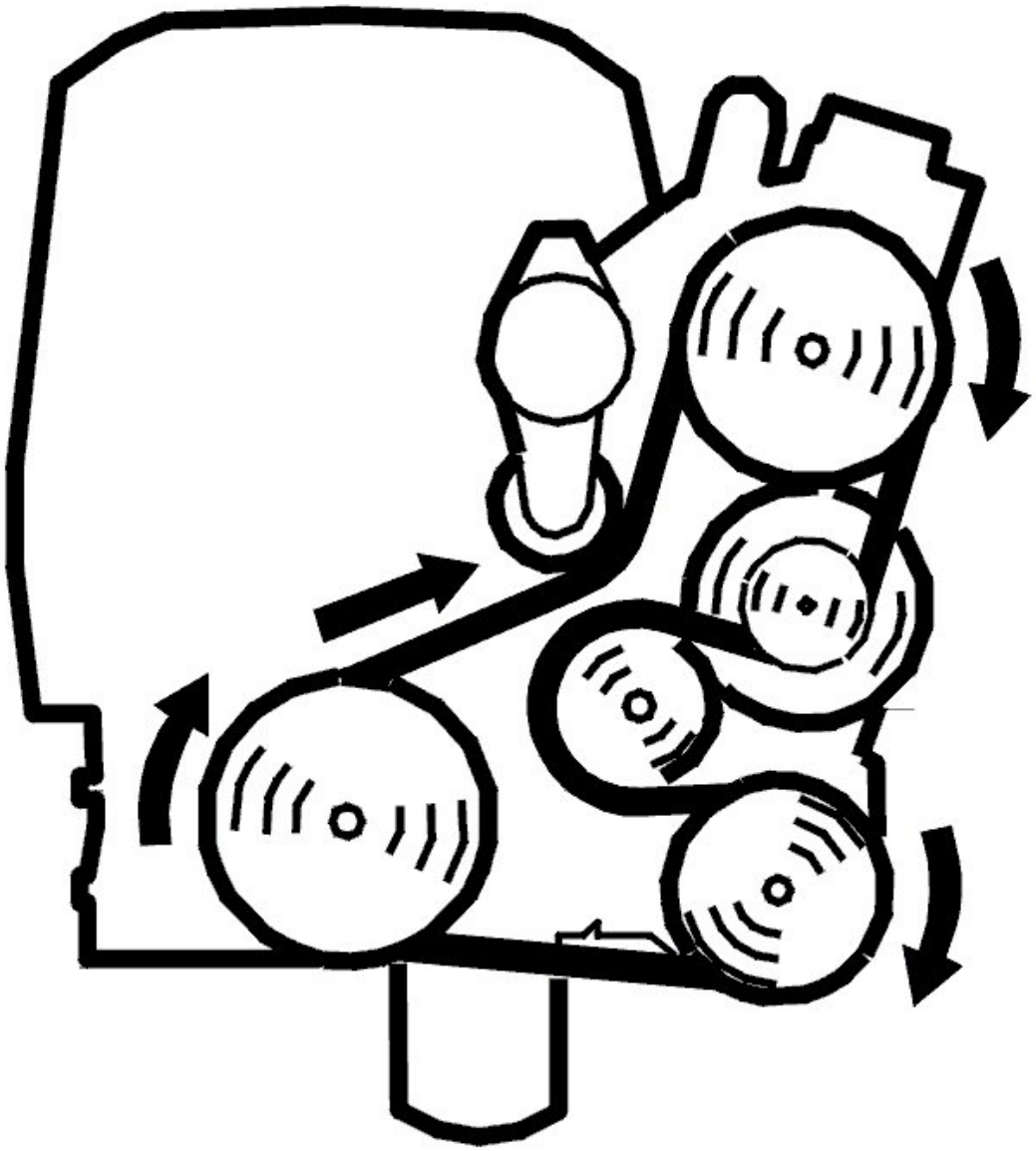
Continue - Verification

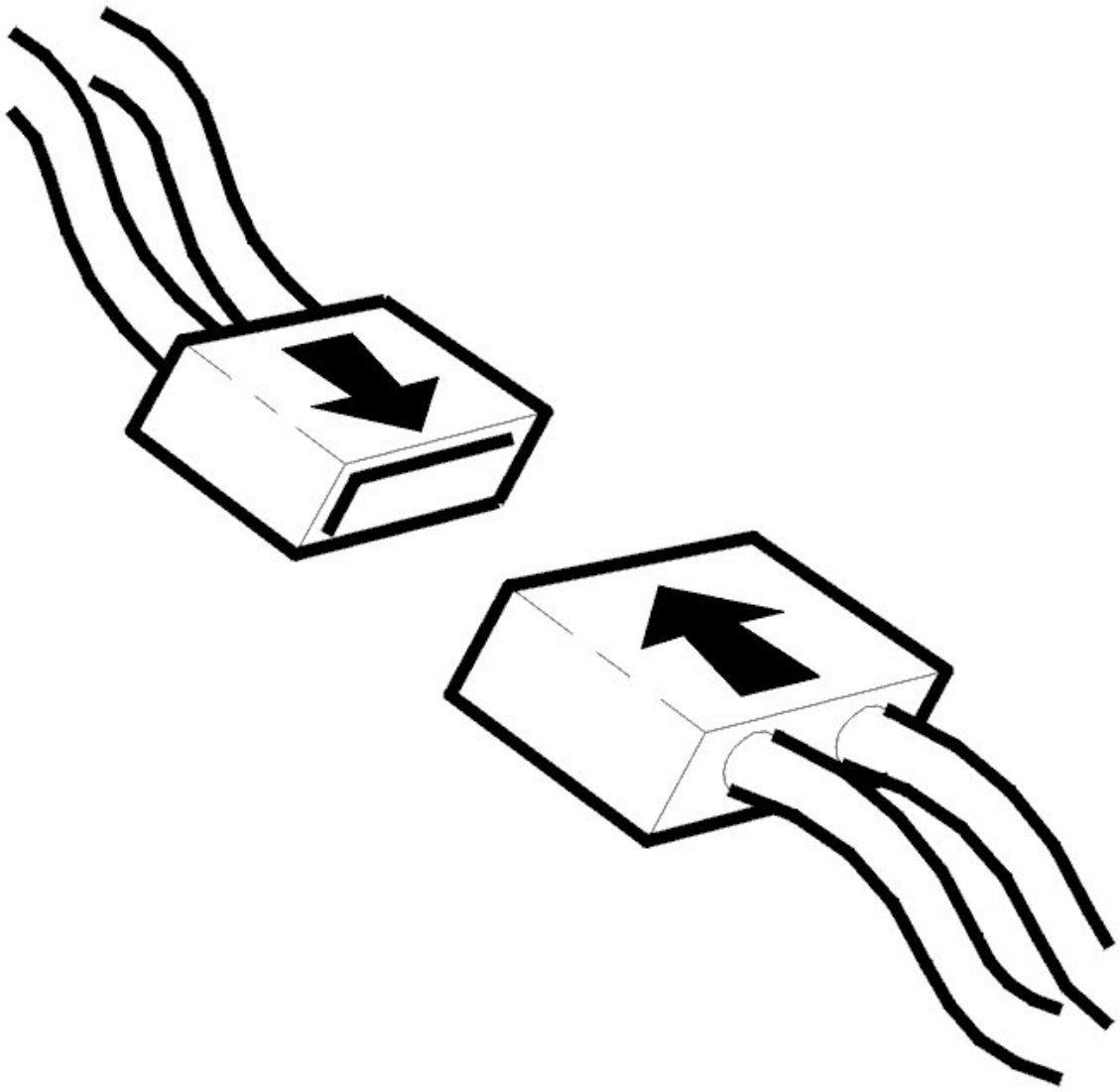
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

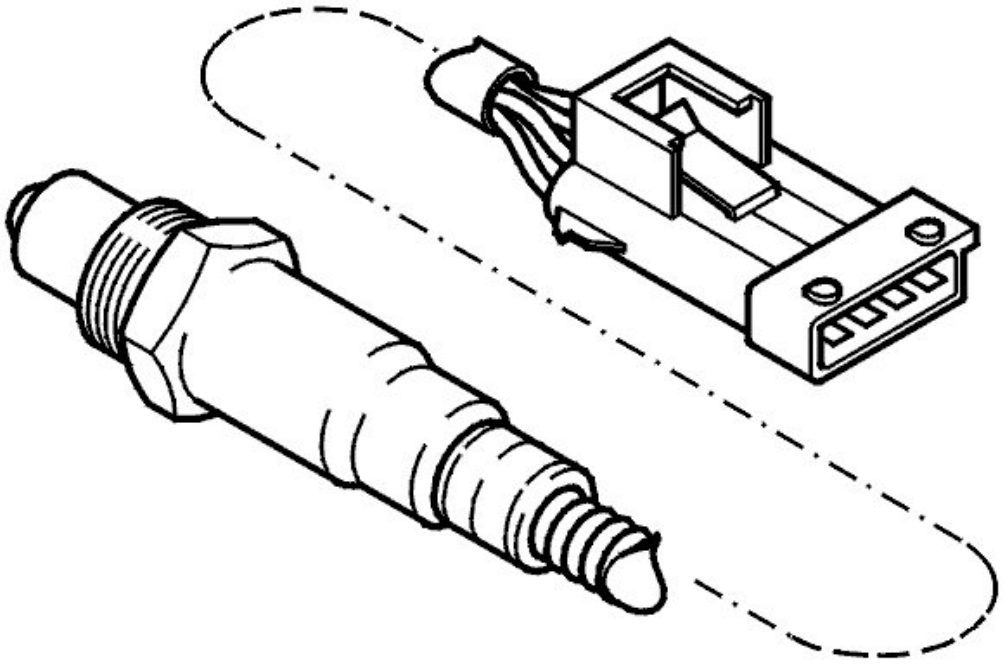
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2220

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal deviates from its permitted operational range or if the voltage for the heated oxygen sensor (HO2S) preheating disrupts the heated oxygen sensor (HO2S) signal.

Substitute value

- Rear heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Short-circuit in the signal cable for the pre-heating circuit
- Short-circuit in the ground lead for the preheating circuit
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

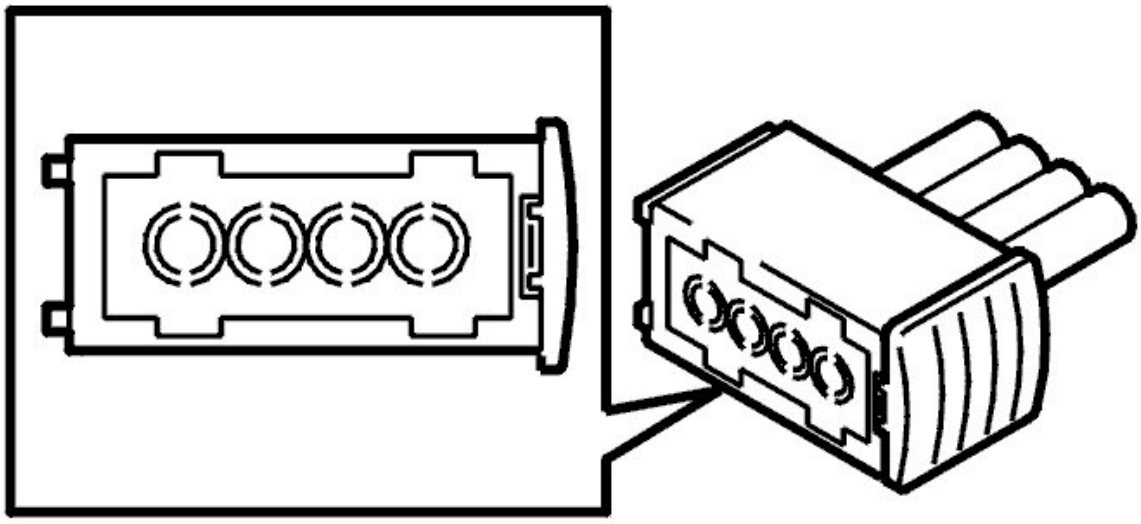
Checking the components and wiring

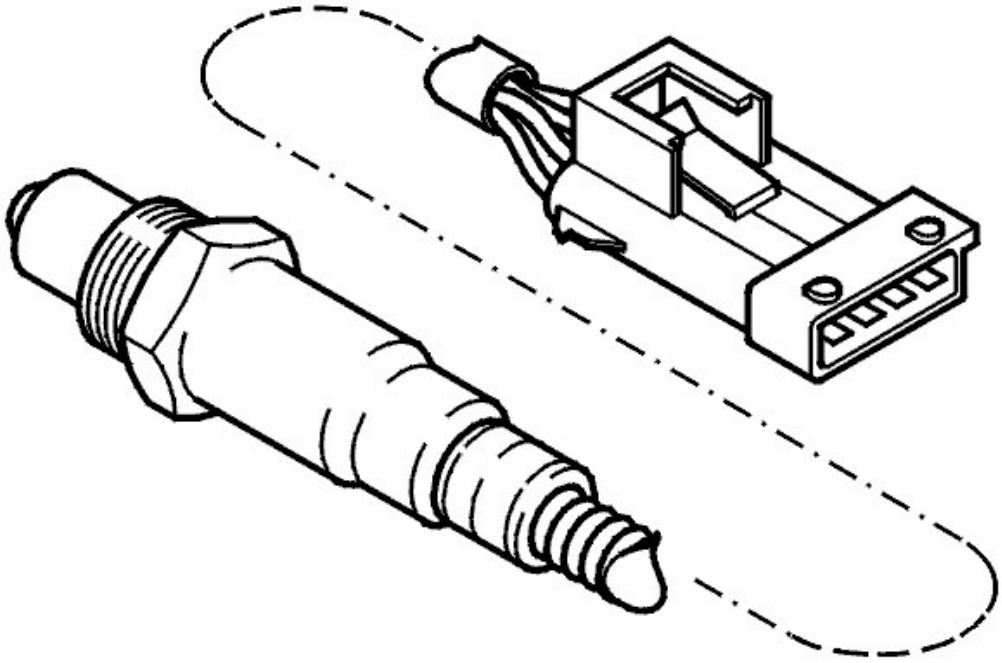
Check the following cables for a short-circuit to each other.
- Engine control module (ECM) terminal #A61 (#B1) and heated oxygen sensor (HO2S) terminal #4
- Engine control module (ECM) terminal #A6 (#A6) and heated oxygen sensor (HO2S) terminal #2
- Heated oxygen sensor (HO2S) terminal #1 and the system relay.

Check the following cables for a short-circuit to each other.
- Engine control module (ECM) terminal #A62 (#B2) and heated oxygen sensor (HO2S) terminal #3
- Engine control module (ECM) terminal #A6 (#A6) and heated oxygen sensor (HO2S) terminal #2
- Heated oxygen sensor (HO2S) terminal #1 and the system relay.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





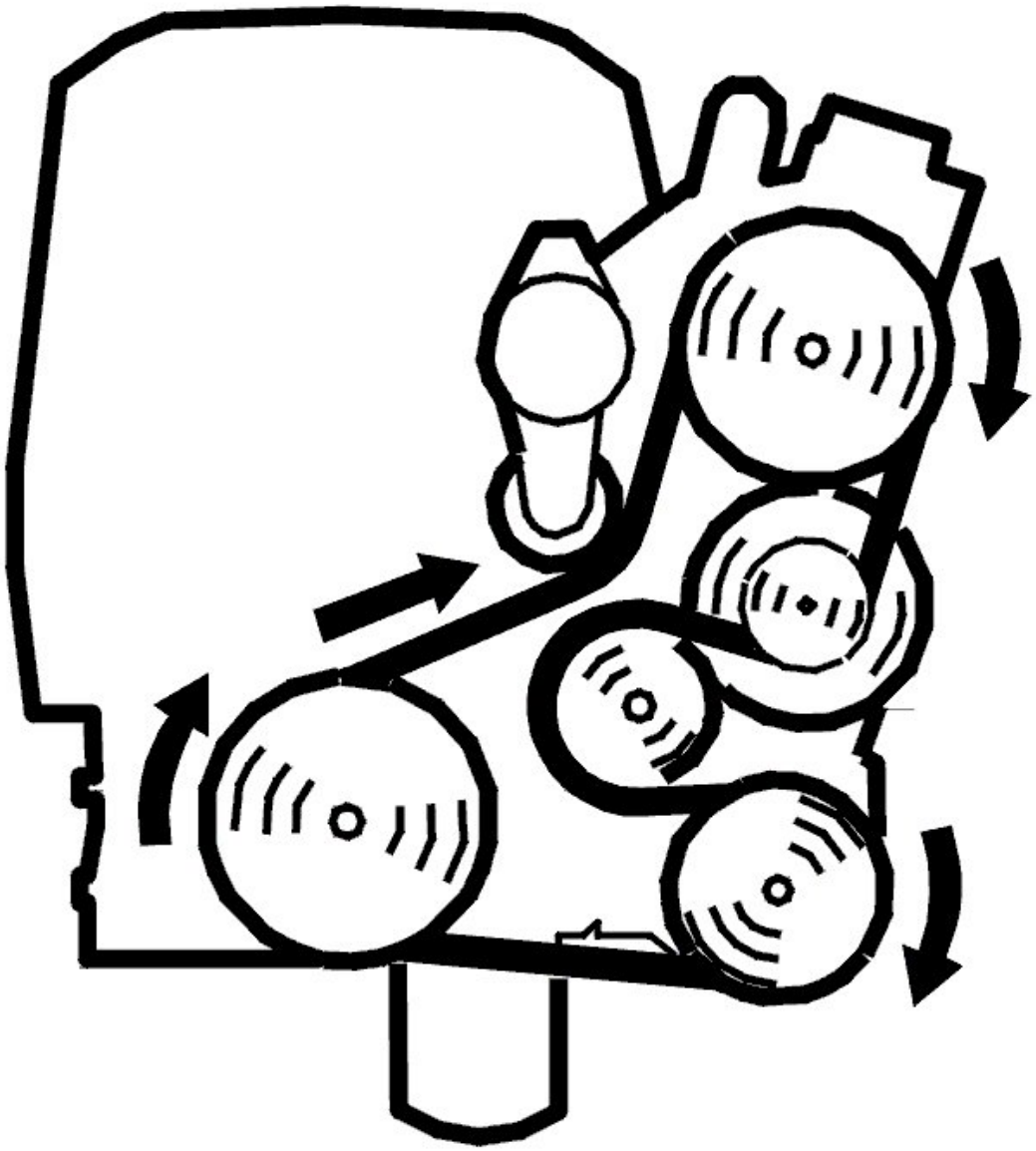
Continue - Verification

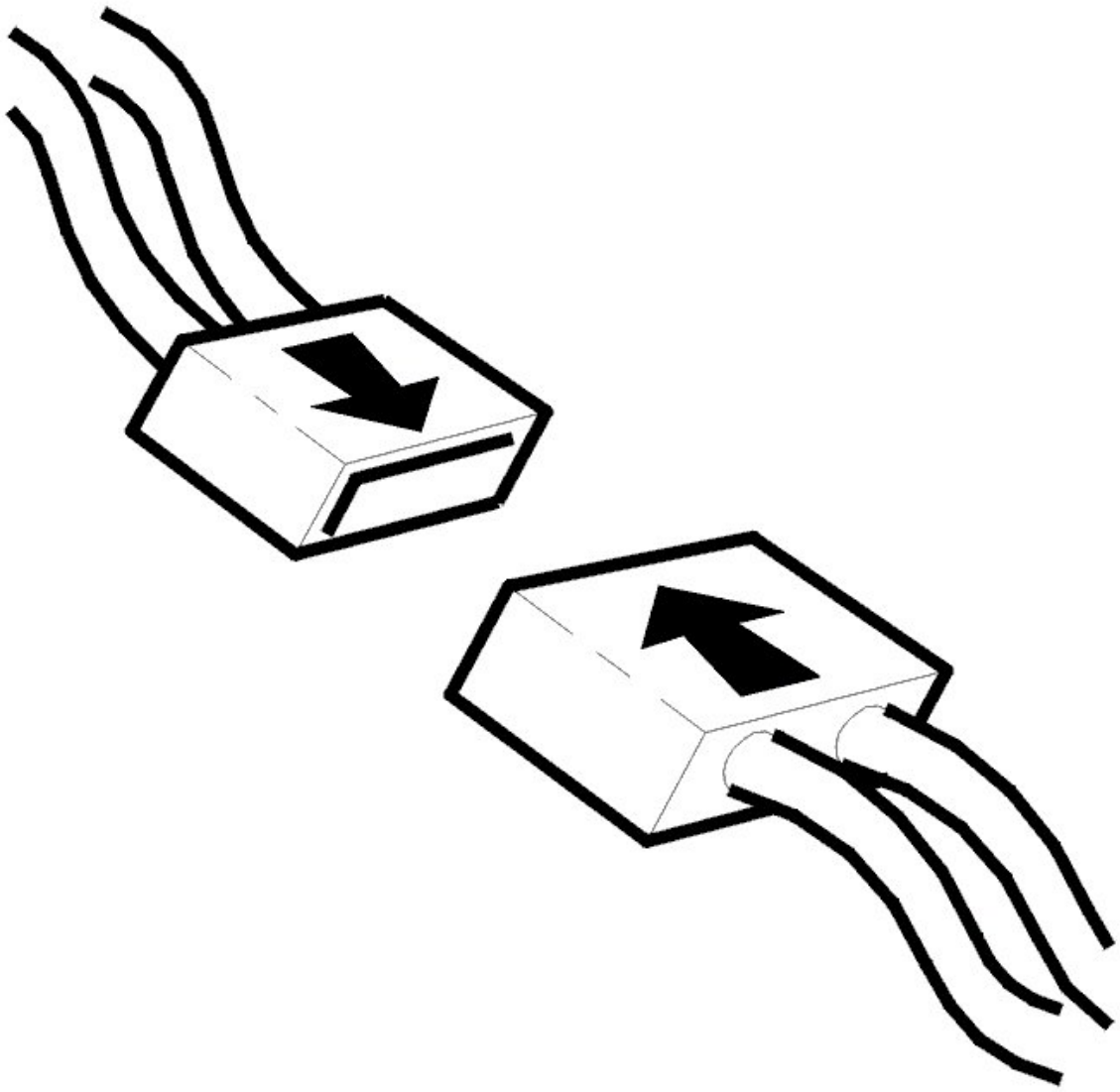
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine and run it until the engine coolant temperature exceeds 60 °C
- Switch off the engine and allow it to cool (below 40 °C)
- Test drive the car on the road (engine speed (RPM) above 2000 rpm, never idling) for at least 15 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

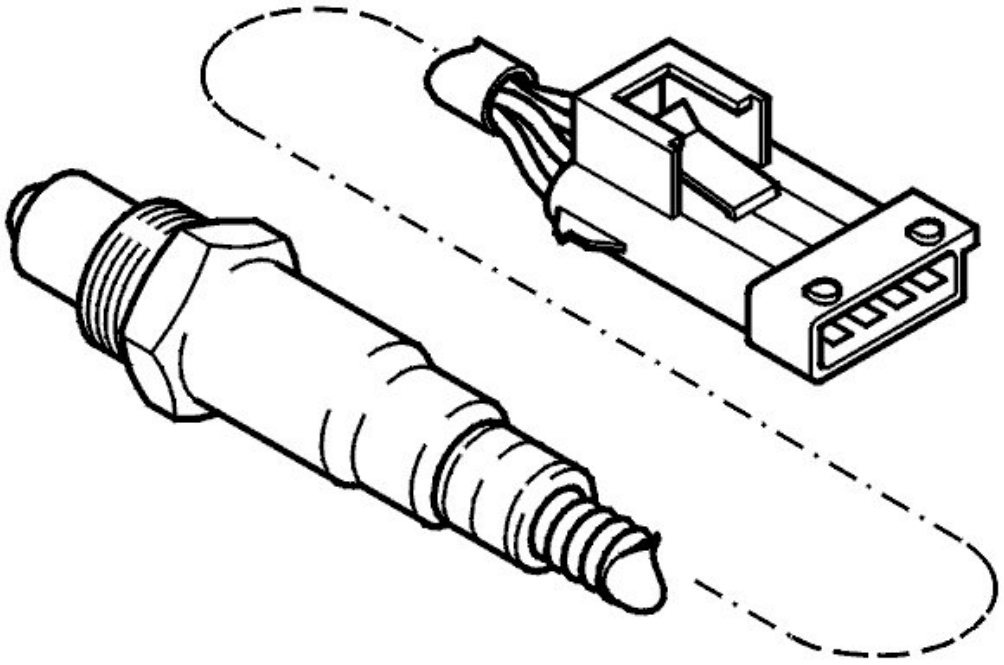
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-222B

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal deviates from its permitted operational range or if the voltage for the heated oxygen sensor (HO2S) preheating disrupts the heated oxygen sensor (HO2S) signal.

Substitute value

- Rear heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Contact resistance or oxidation in the connectors
- Open-circuit in the signal cable
- Open-circuit in the ground lead
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

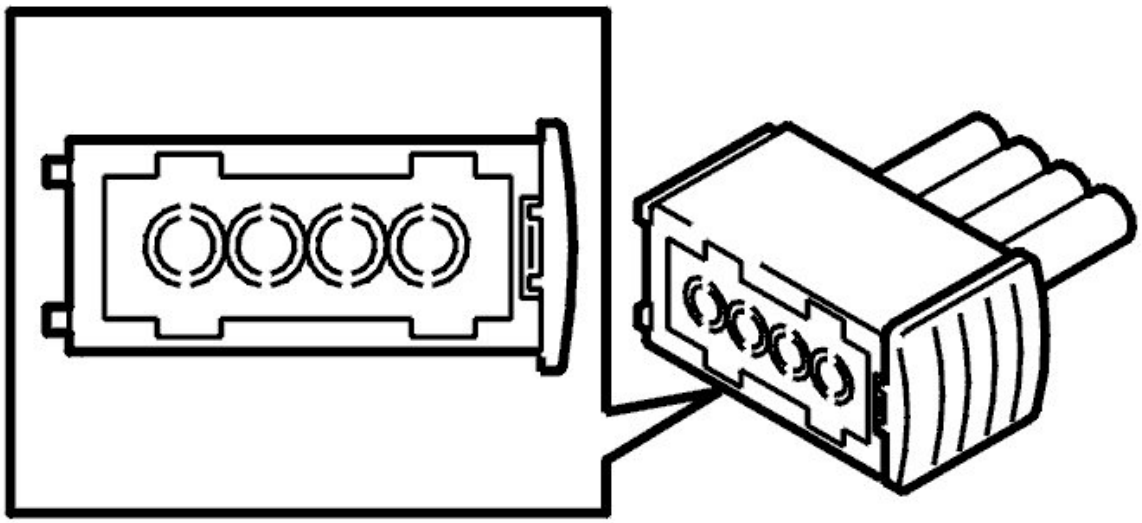
Signal Missing

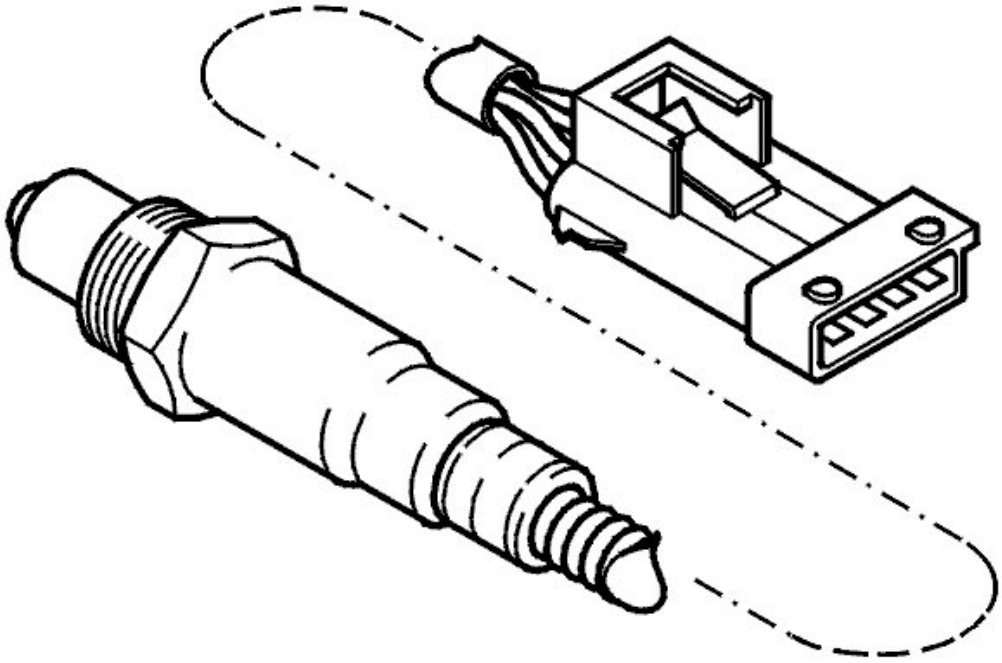
Signal missing

Checking the components and wiring

Check the rear heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.
Check the cable between engine control module (ECM) terminal #A61 (#B1) and heated oxygen sensor (HO2S) terminal #4. Check for an open-circuit.
Check the cable between engine control module (ECM) terminal #A62 (#B2) and heated oxygen sensor (HO2S) terminal #3. Check for an open-circuit.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





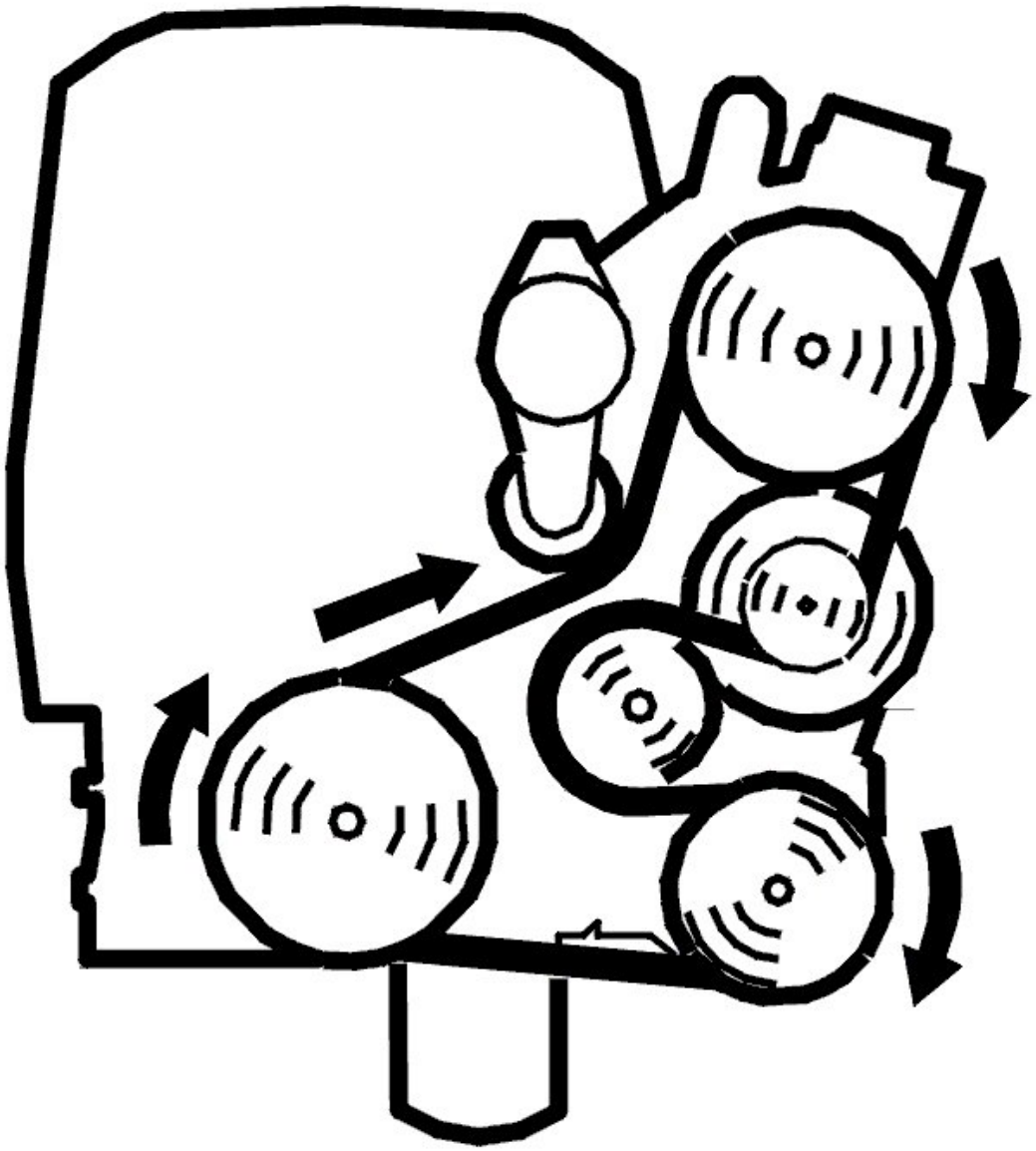
Continue - Verification

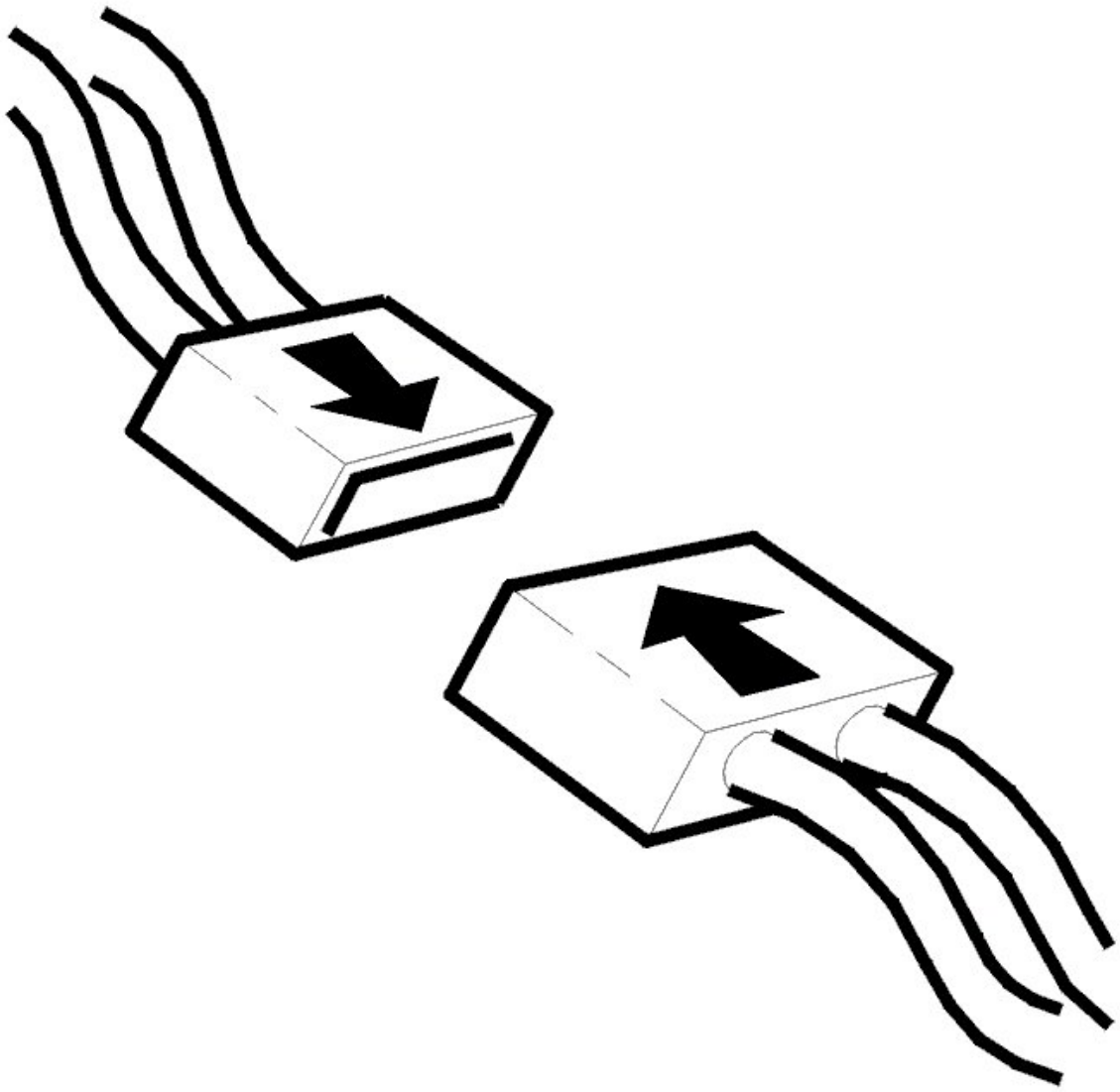
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine and run it until the engine coolant temperature exceeds 60 °C
- Switch off the engine and allow it to cool (below 40 °C)
- Test drive the car on the road (engine speed (RPM) above 2000 rpm, never idling) for at least 15 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

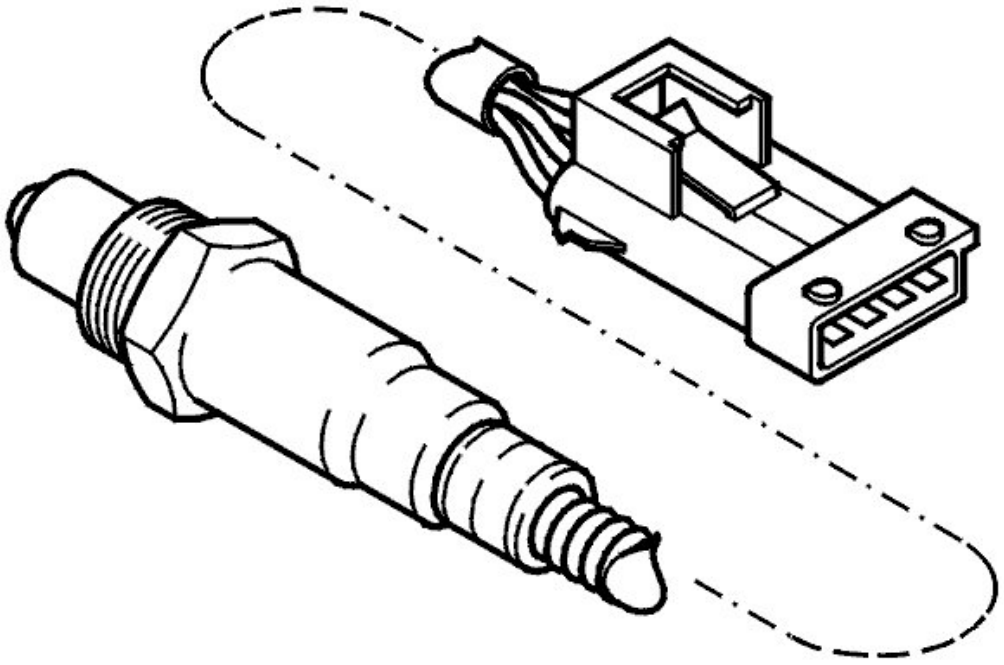
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-222C

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal deviates from its permitted operational range or if the voltage for the heated oxygen sensor (HO2S) preheating disrupts the heated oxygen sensor (HO2S) signal.

Substitute value

- Rear heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Short-circuit to supply voltage in the signal cable
- Short-circuit to supply voltage in the ground lead
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

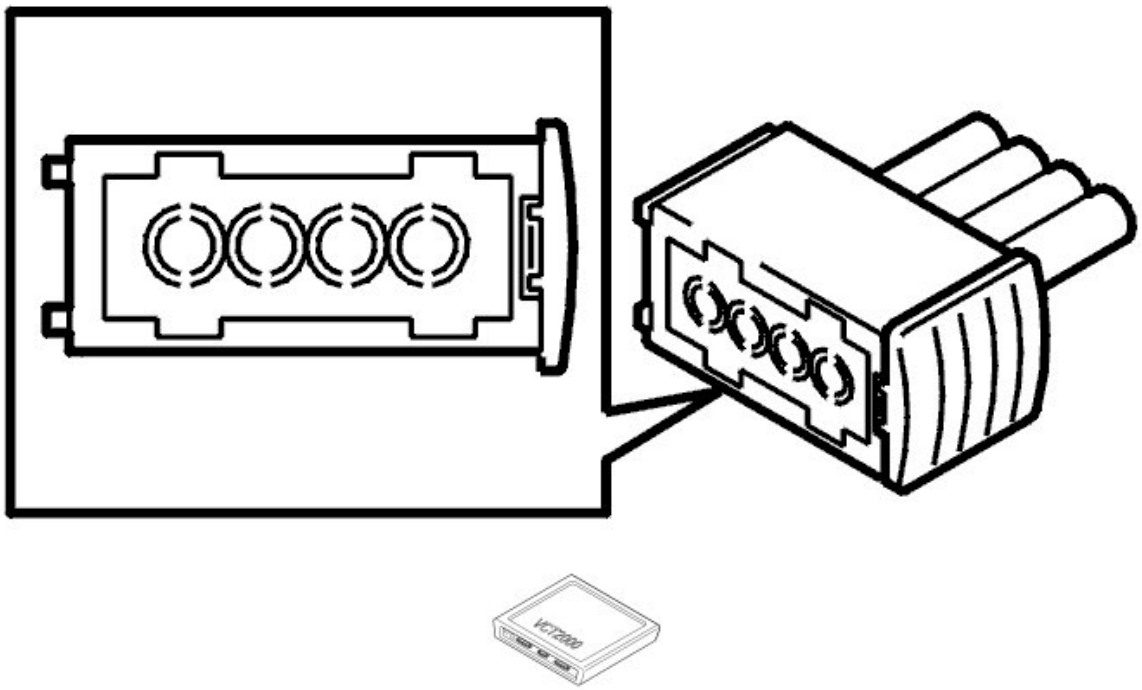
Signal Too High

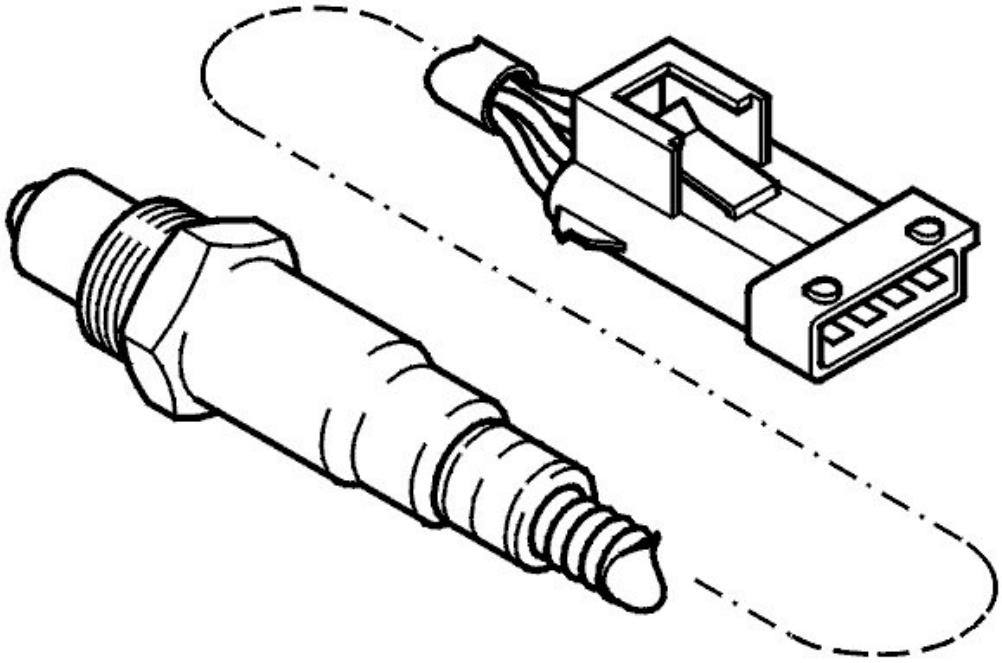
Signal too high

Checking the components and wiring

Check the cable between engine control module (ECM) terminal #A61 (#B1) and heated oxygen sensor (HO2S) terminal #4. Check for a short-circuit to supply voltage.
Check the cable between engine control module (ECM) terminal #A62 (#B2) and heated oxygen sensor (HO2S) terminal #3. Check for a short-circuit to supply voltage.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





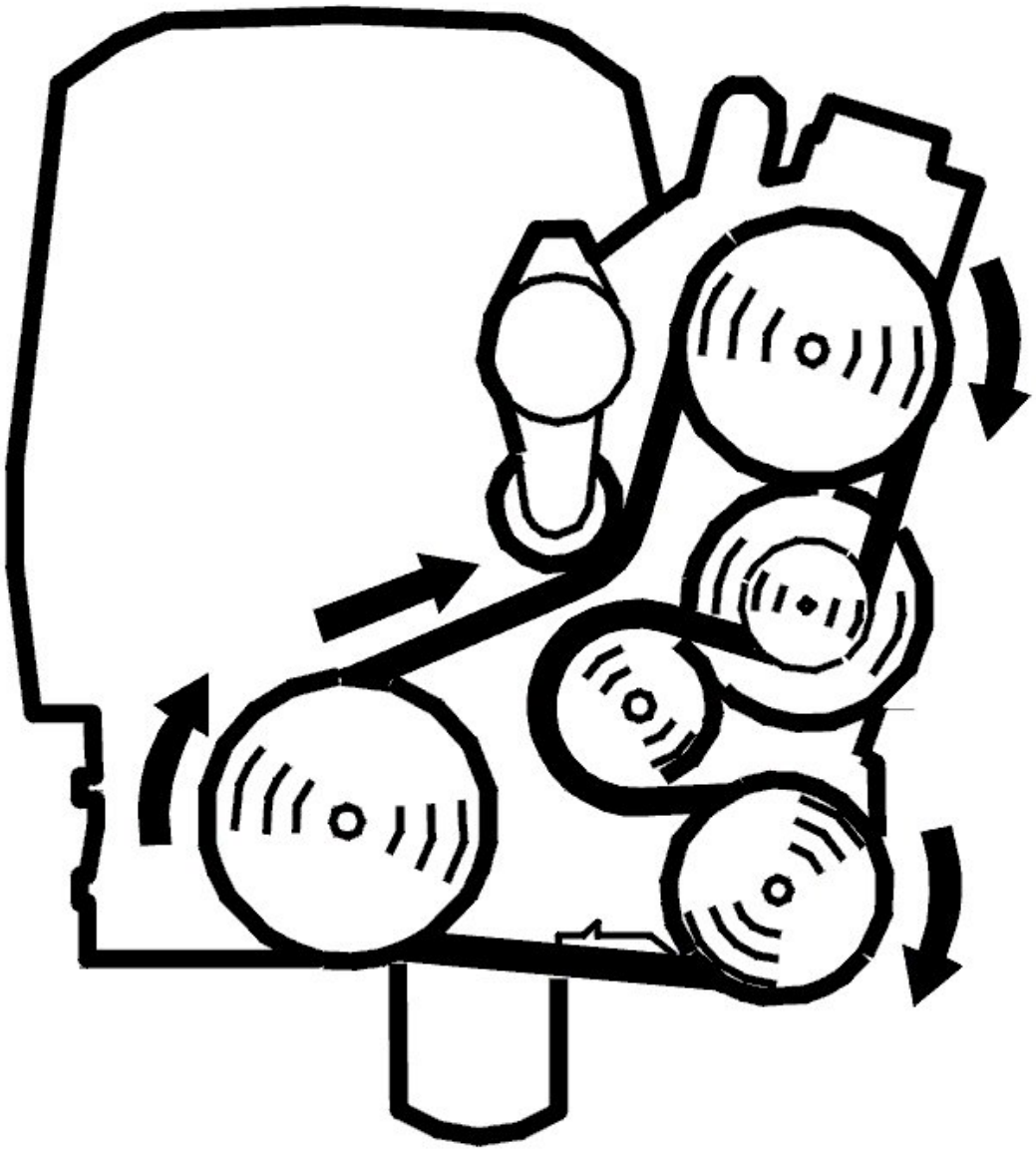
Continue - Verification

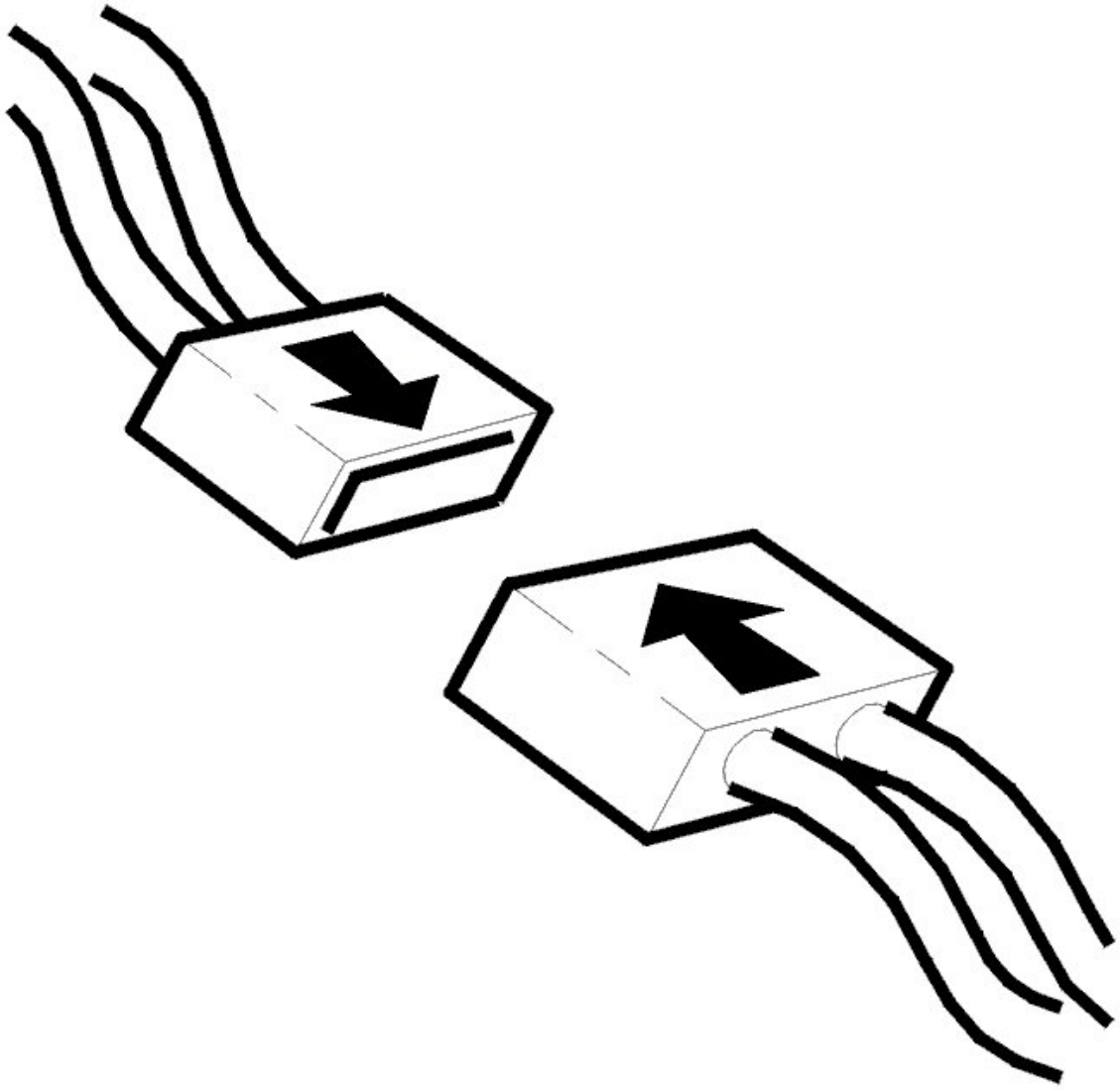
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine and run it until the engine coolant temperature exceeds 60 °C
- Switch off the engine and allow it to cool (below 40 °C)
- Test drive the car on the road (engine speed (RPM) above 2000 rpm, never idling) for at least 15 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

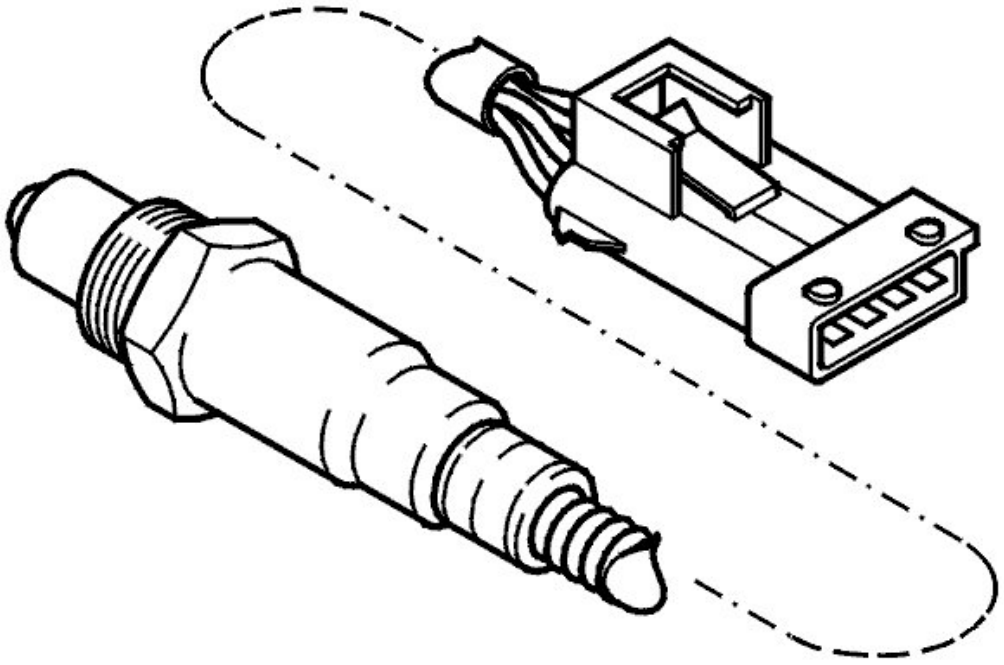
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-222D

Condition



The engine control module (ECM) monitors the operation of the rear heated oxygen sensor (HO2S) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal deviates from its permitted operational range or if the voltage for the heated oxygen sensor (HO2S) preheating disrupts the heated oxygen sensor (HO2S) signal.

Substitute value

- Rear heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Short-circuit to ground in the signal cable
- Short-circuit to ground in the ground lead
- Damaged rear heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

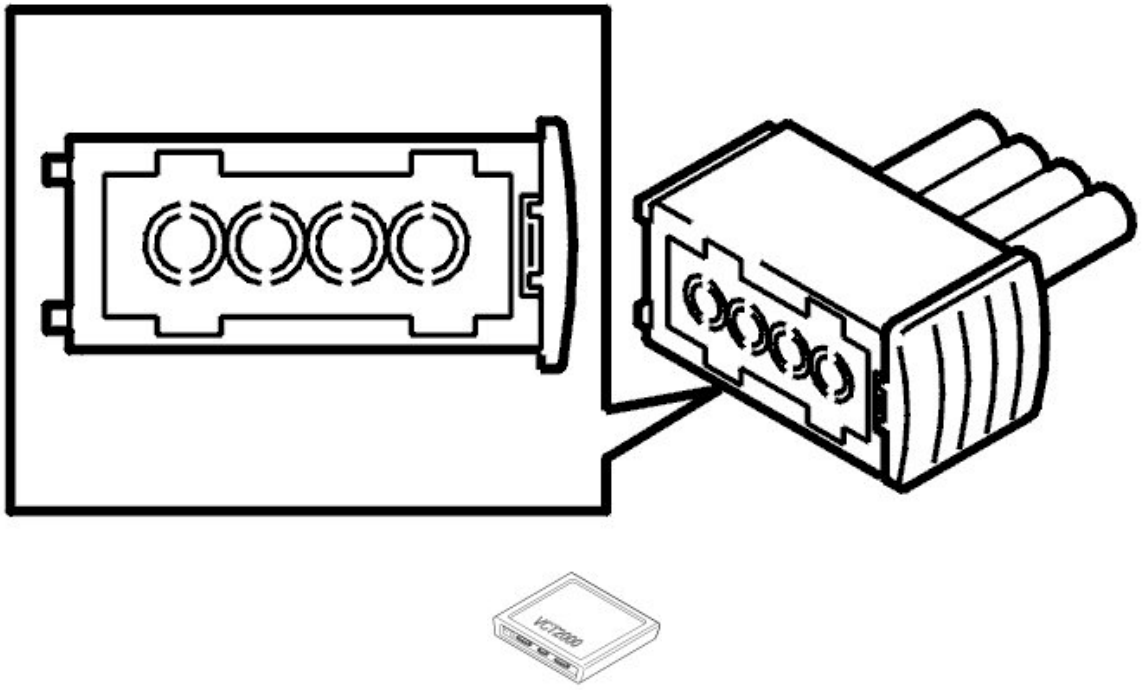
Signal Too Low

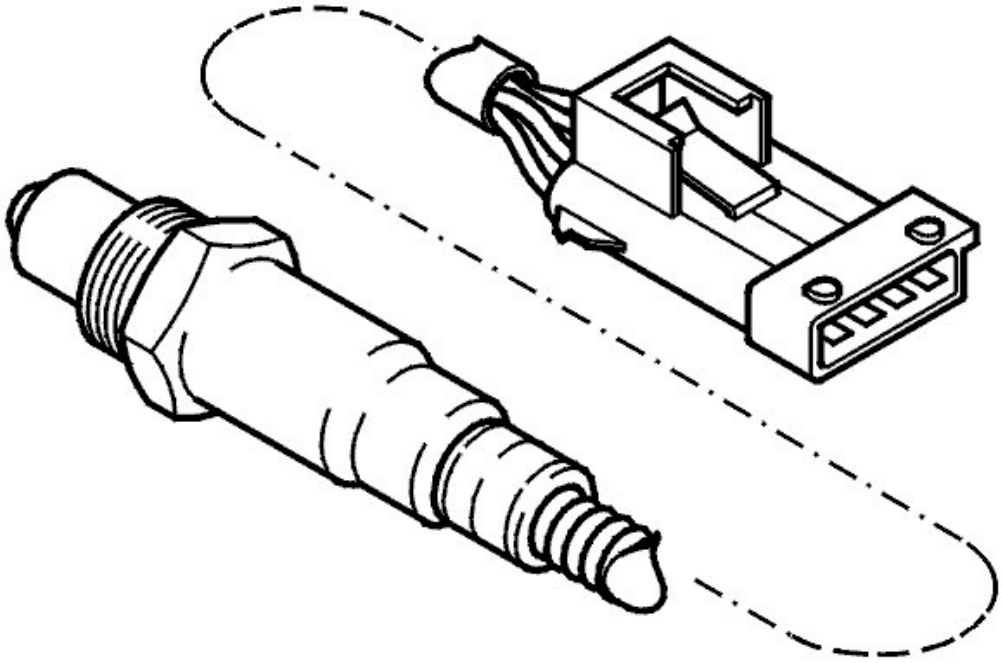
Signal too low

Checking the components and wiring

Check the cable between engine control module (ECM) terminal #A61 (#B1) and heated oxygen sensor (HO2S) terminal #4. Check for a short-circuit to ground.
Check the cable between engine control module (ECM) terminal #A62 (#B2) and heated oxygen sensor (HO2S) terminal #3. Check for a short-circuit to ground.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





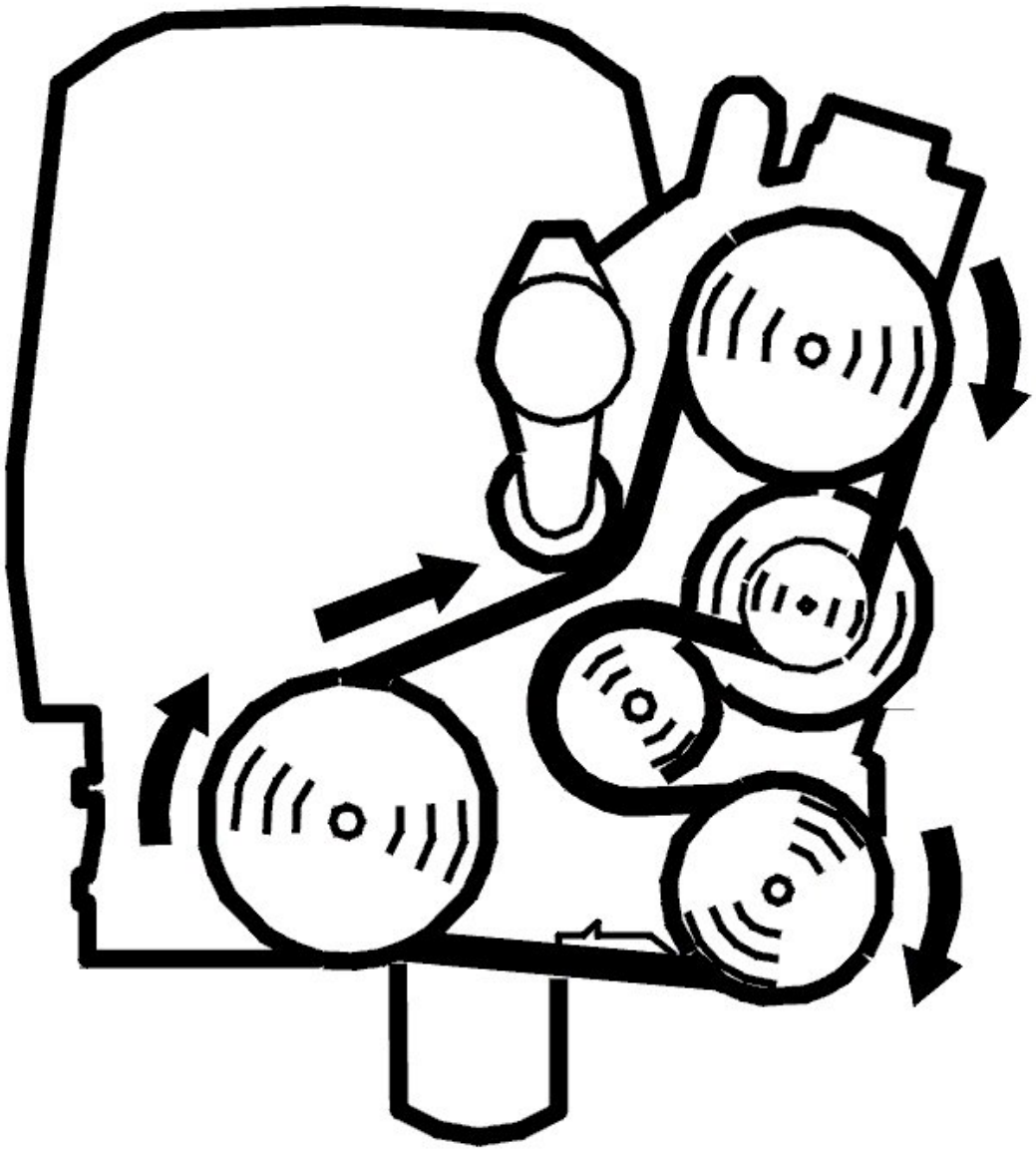
Continue - Verification

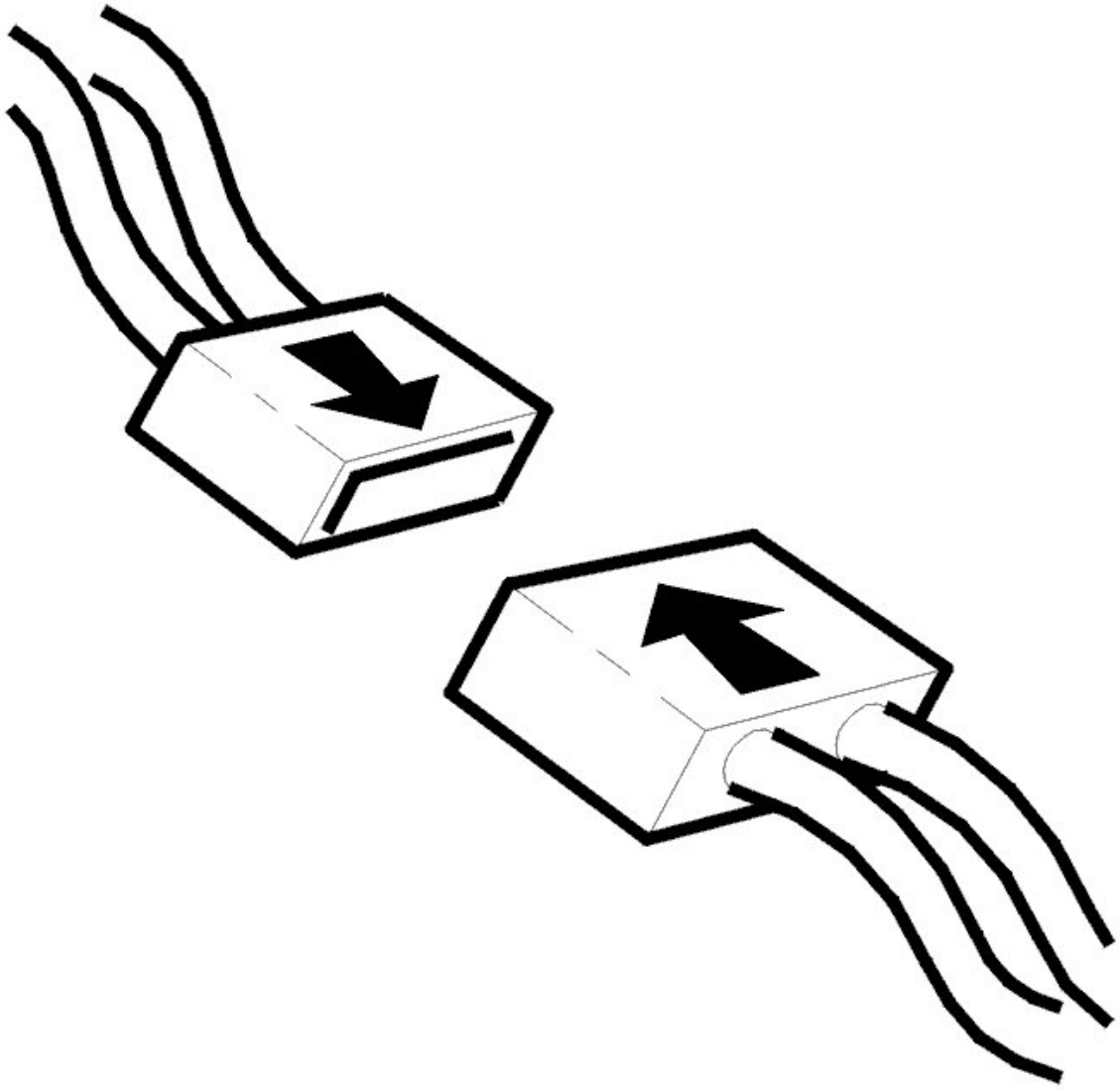
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine and run it until the engine coolant temperature exceeds 60 °C
- Switch off the engine and allow it to cool (below 40 °C)
- Test drive the car on the road (engine speed (RPM) above 2000 rpm, never idling) for at least 15 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

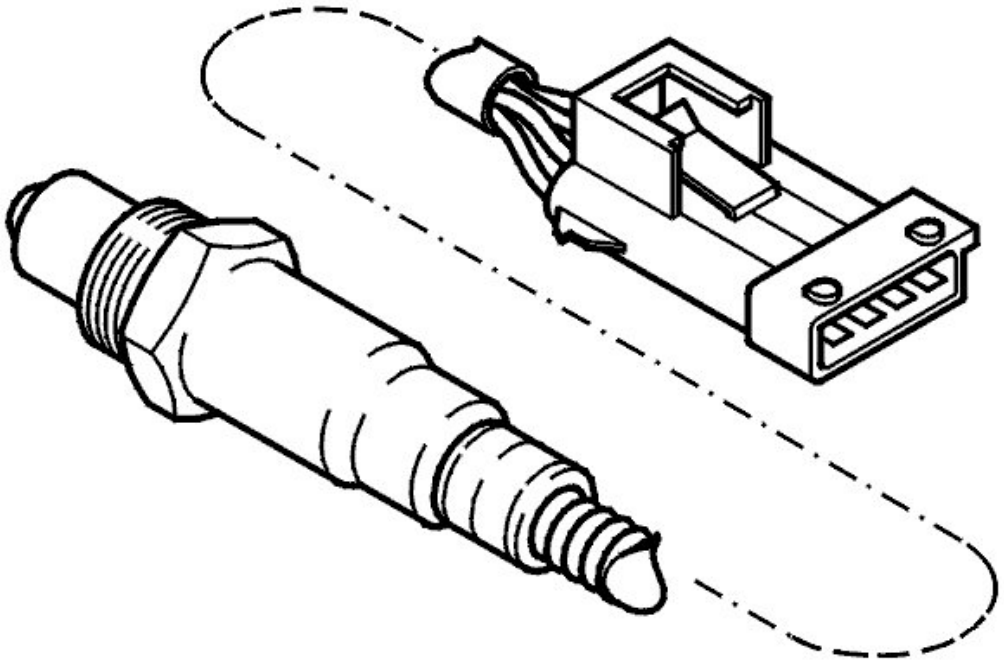
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-223B

Condition



The engine control module (ECM) controls the preheating of the rear heated oxygen sensor (HO2S) by pulsing the current to the positive temperature coefficient (PTC) element in the heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is lower than a certain value when preheating is deactivated.

Substitute value
- The fuel trim is shut off.

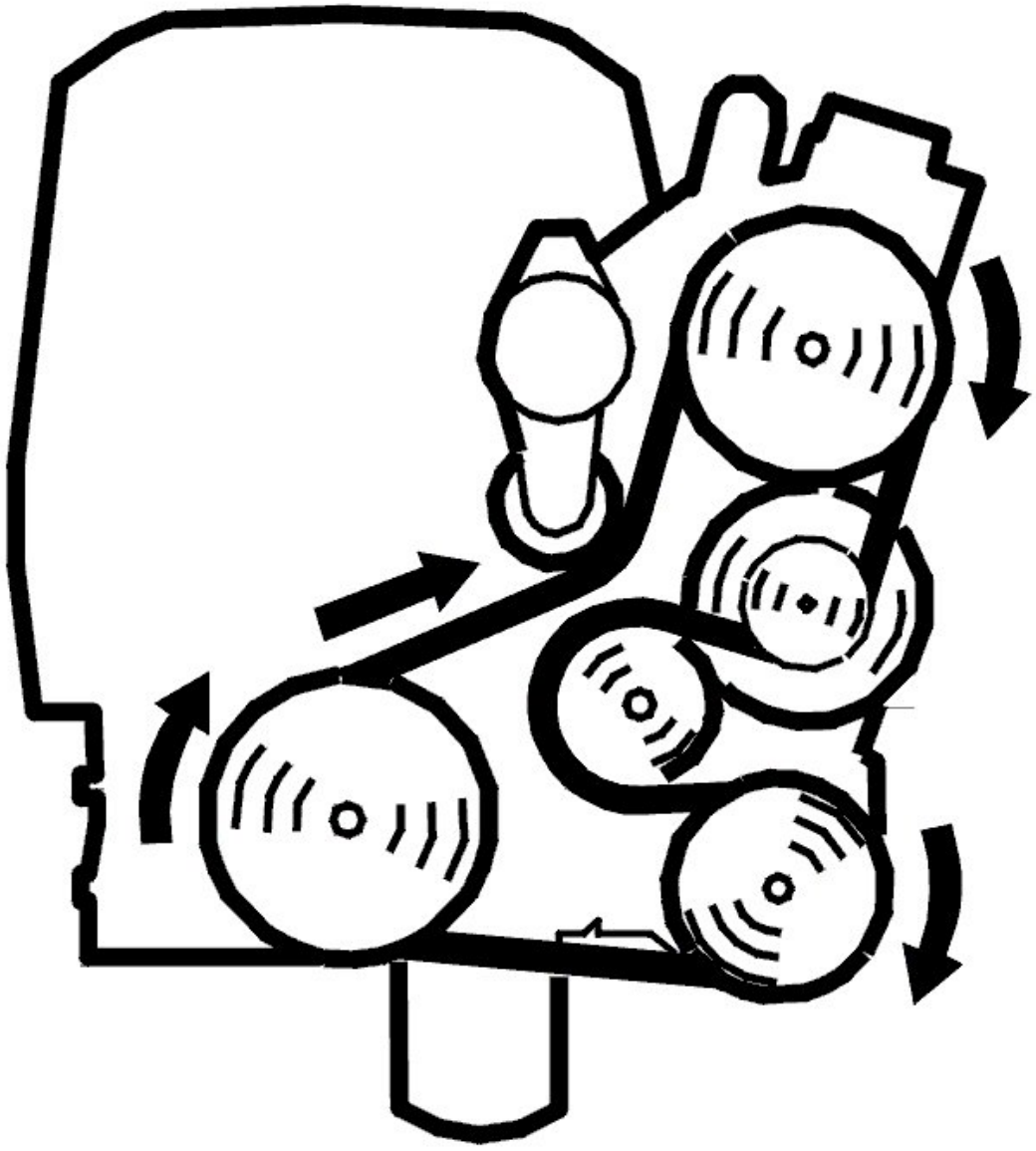
Possible source
- Contact resistance and oxidation in the terminals
- Open-circuit in the power supply from the system relay
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the status

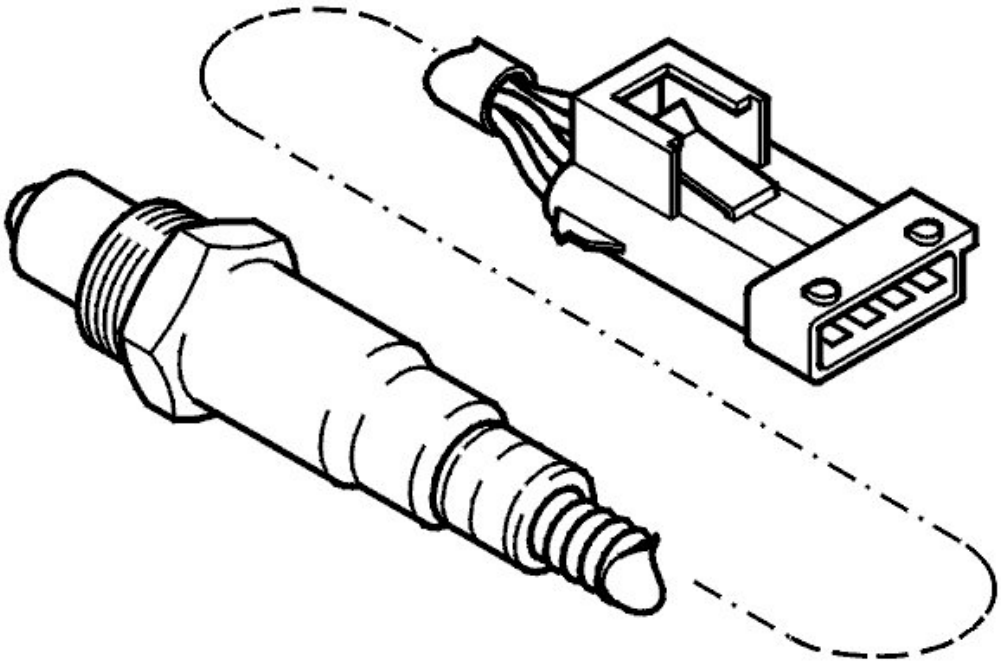


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed to 2500 rpm until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



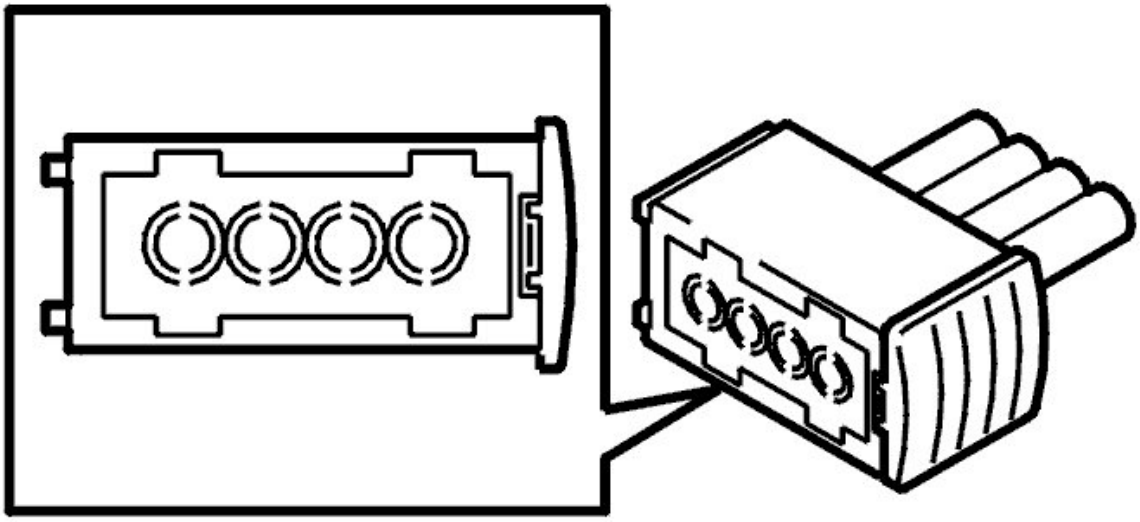
Continue - Checking the components and wiring

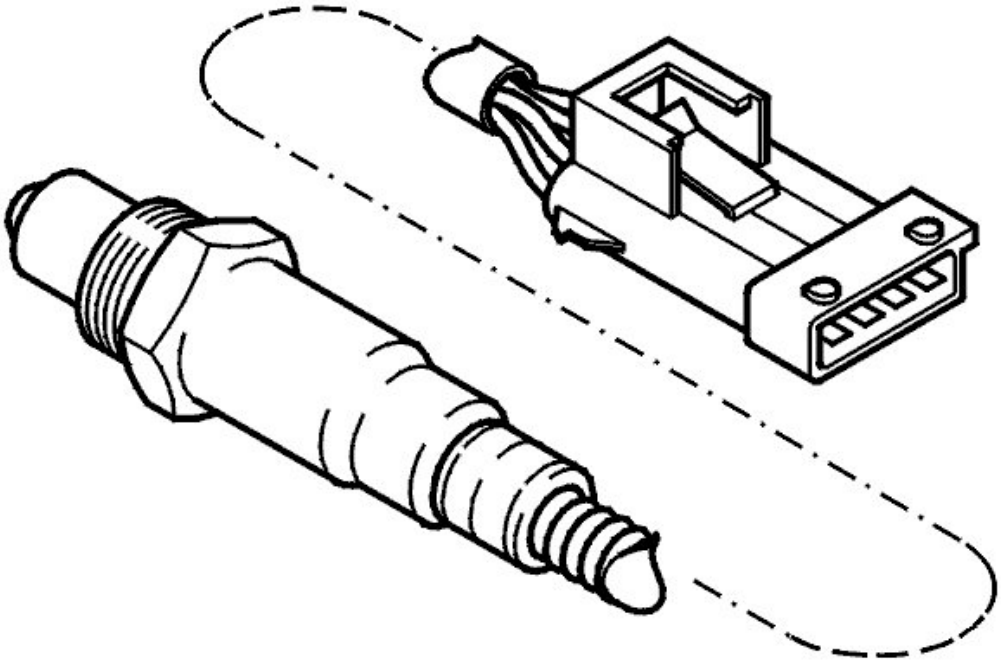
Checking the components and wiring

Check the resistance of the heated oxygen sensor (HO2S) between terminals #1 and #2.
Check the signal cable between heated oxygen sensor (HO2S) terminal #2 and control module terminal #A6 (#A6).
Check the power supply between system relay terminal #3 and heated oxygen sensor (HO2S) terminal #1. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





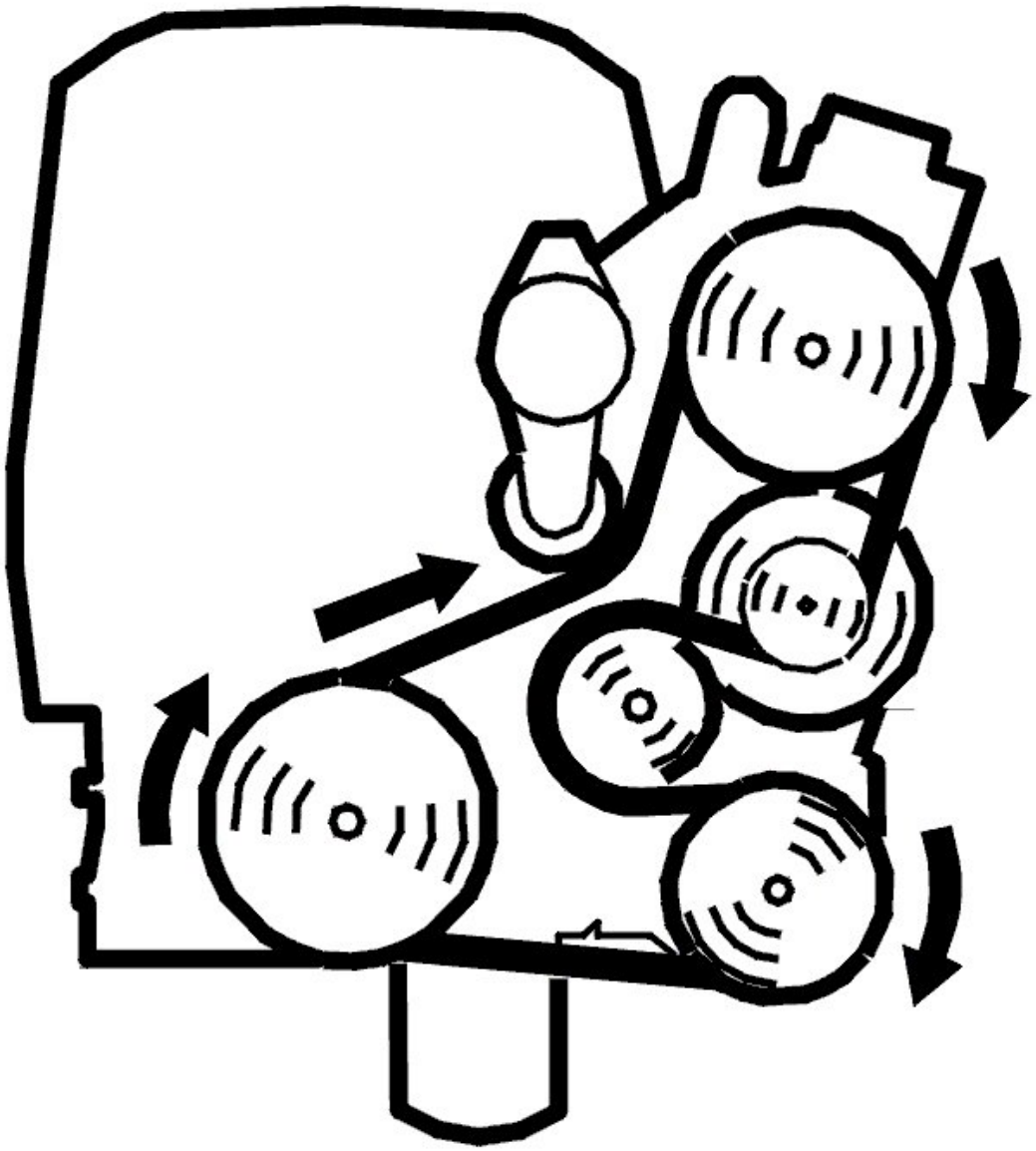
Continue - Verification

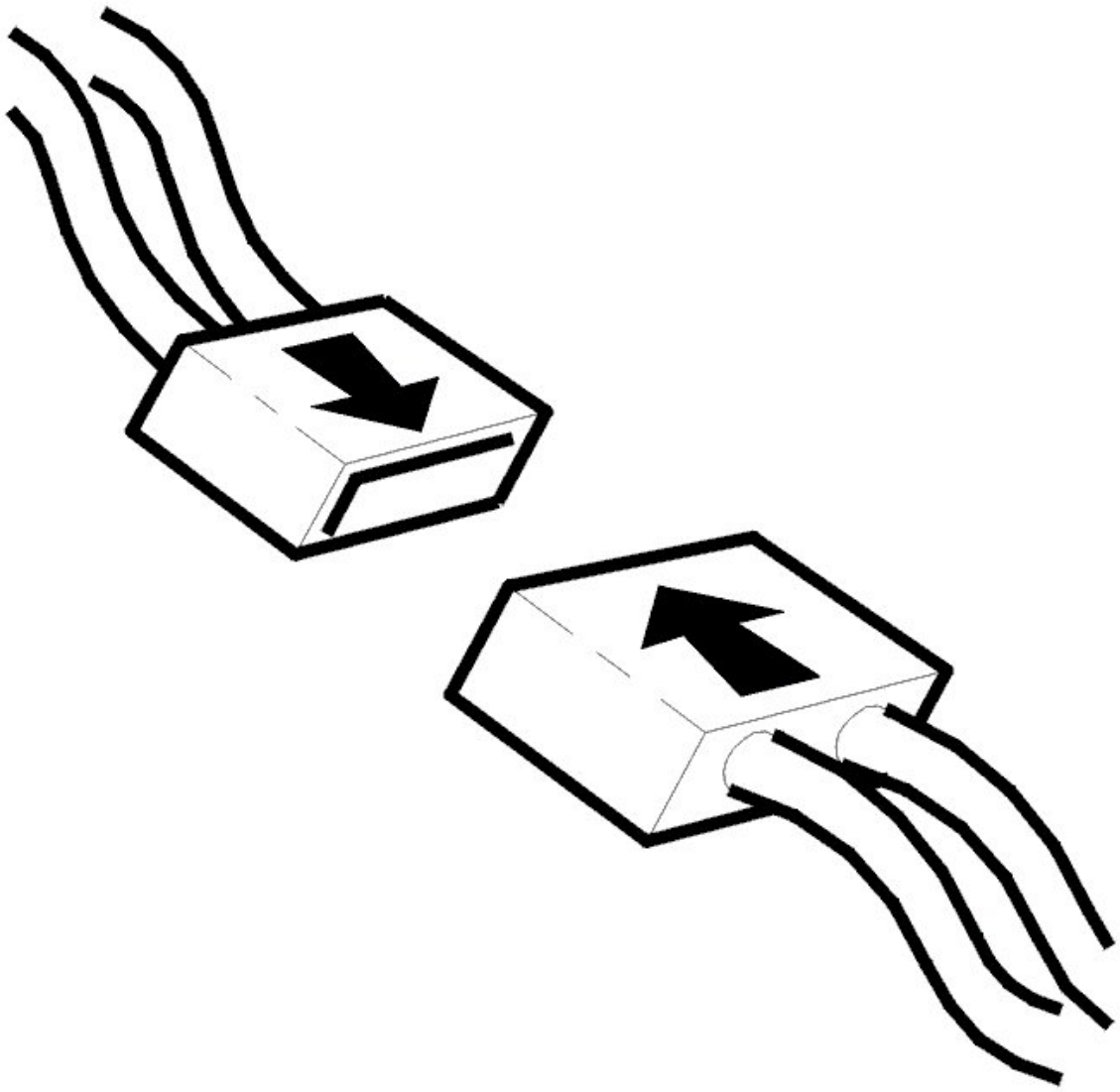
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed to 2500 rpm until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

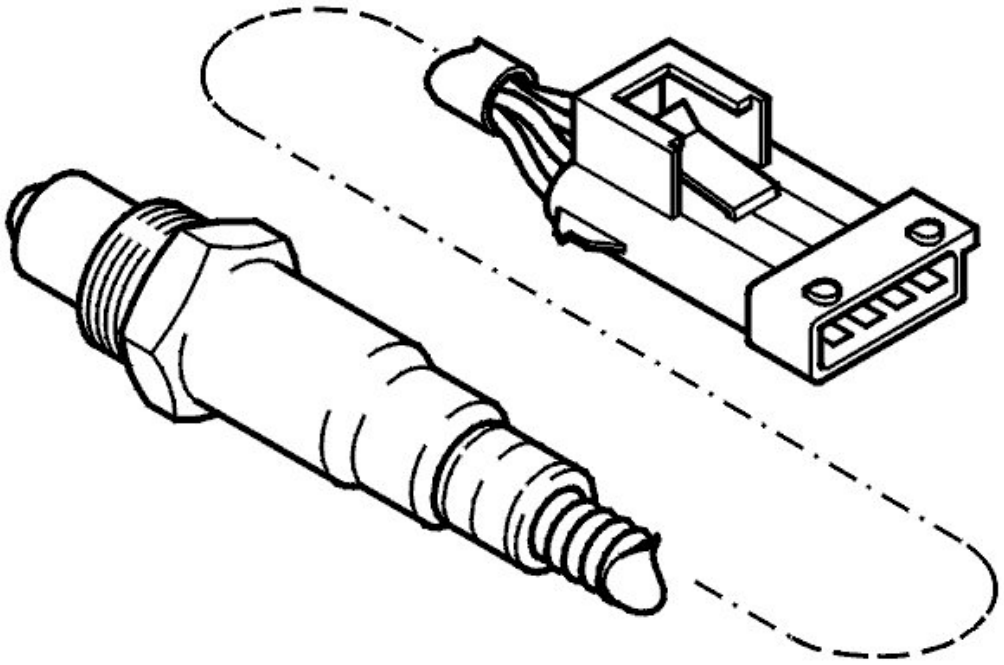
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-223C

Condition



The engine control module (ECM) controls the preheating of the rear heated oxygen sensor (HO2S) by pulsing the current to the positive temperature coefficient (PTC) element in the heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is higher than a certain value when preheating is active.

Substitute value

- The fuel trim is shut off.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

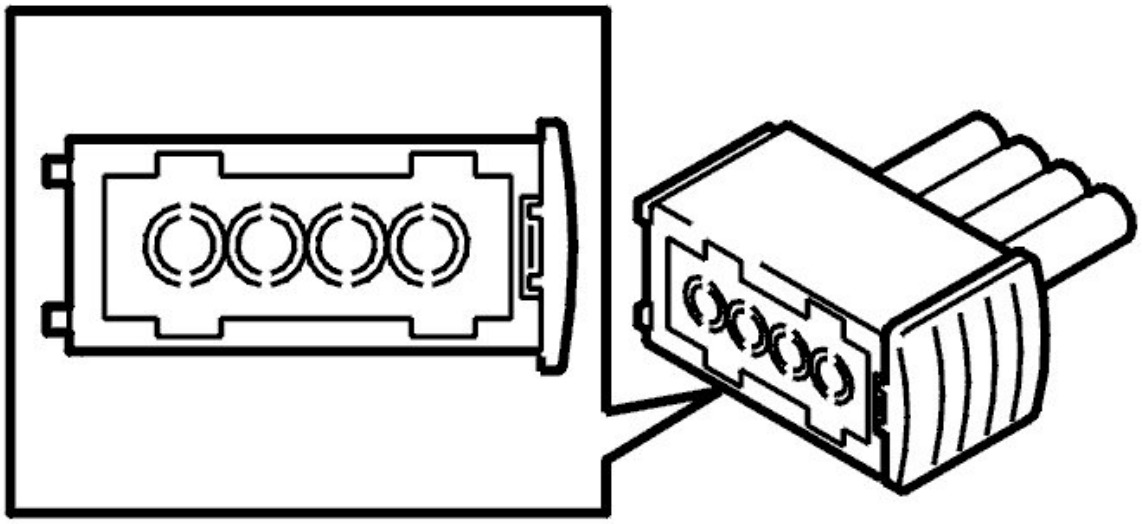
Signal Too High

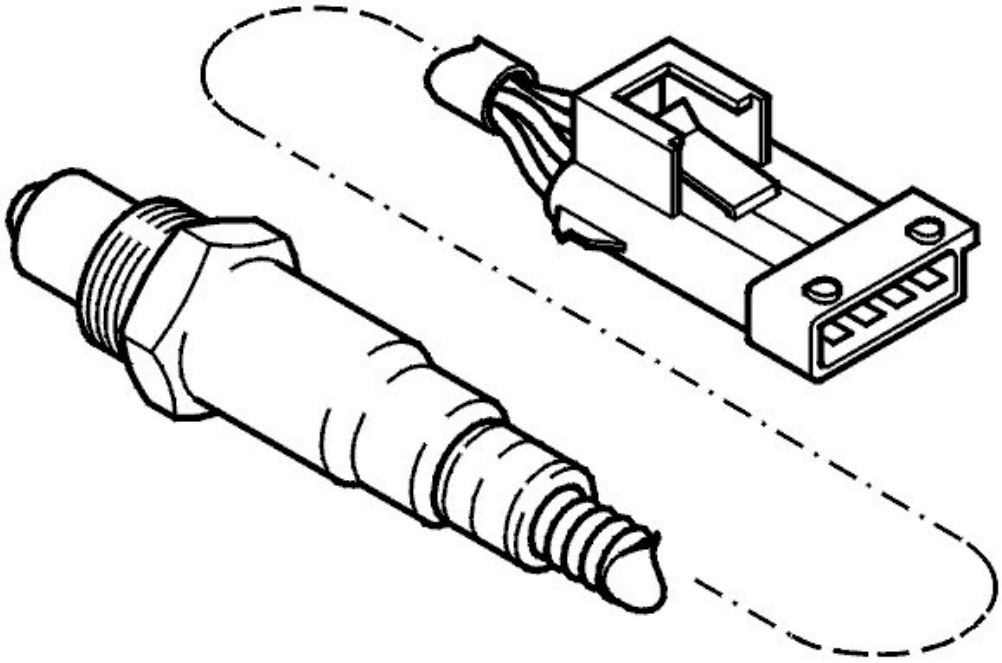
Signal too high

Checking the components and wiring

Check the resistance of the heated oxygen sensor (HO2S) between terminals #1 and #2.
Check the signal cable between heated oxygen sensor (HO2S) terminal #2 and control module terminal #A6 (#A6). Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





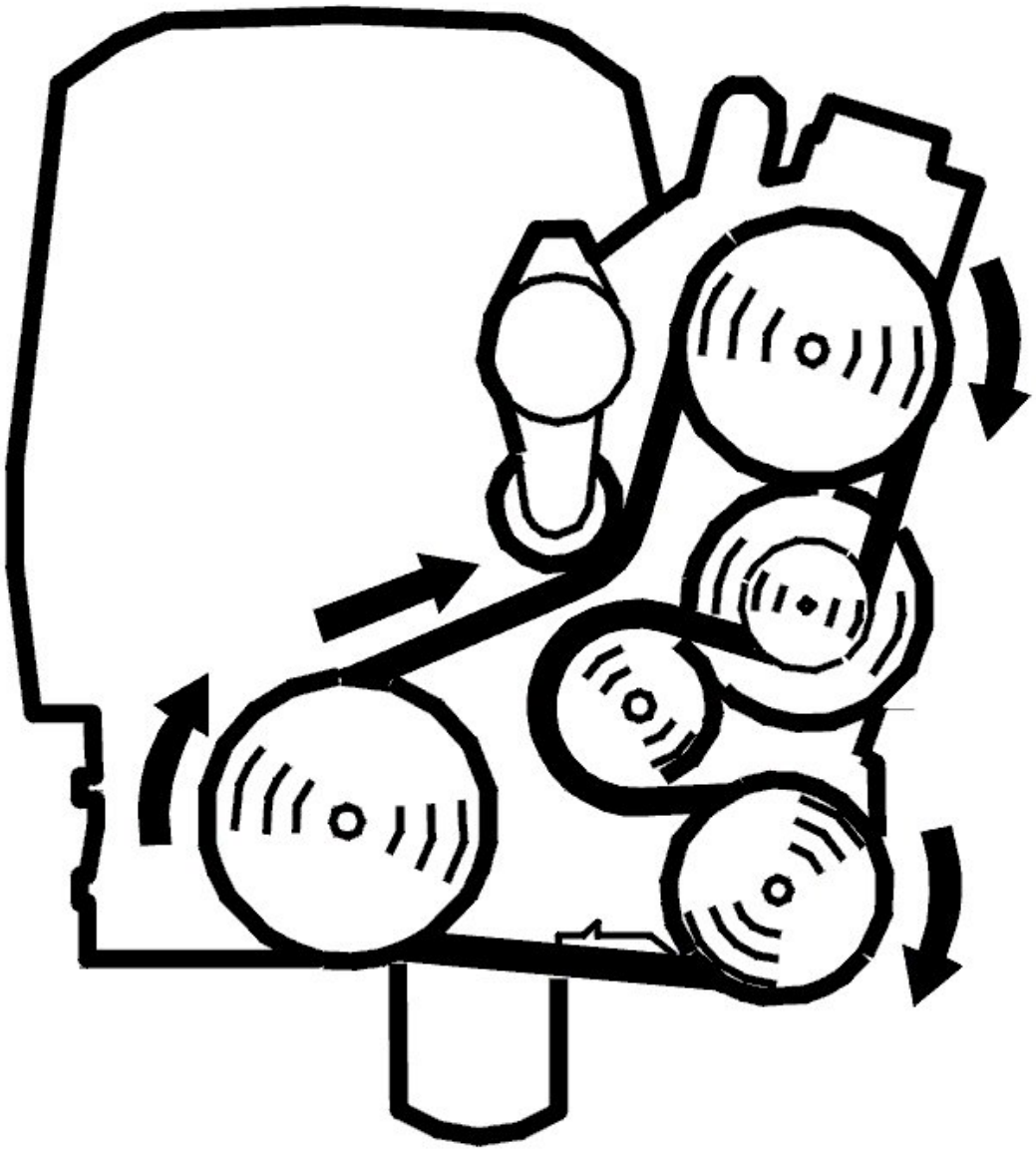
Continue - Verification

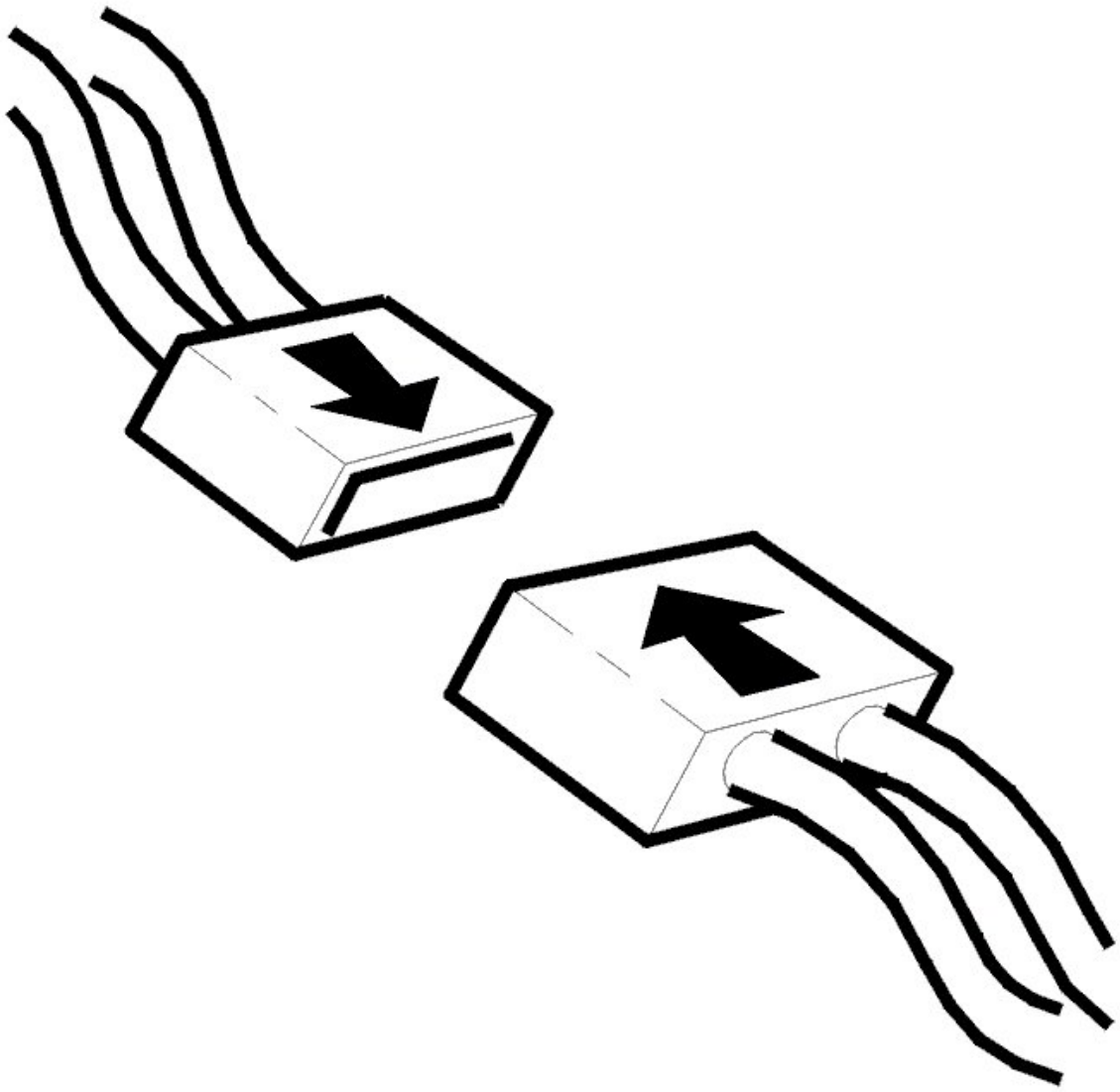
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed to 2500 rpm until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

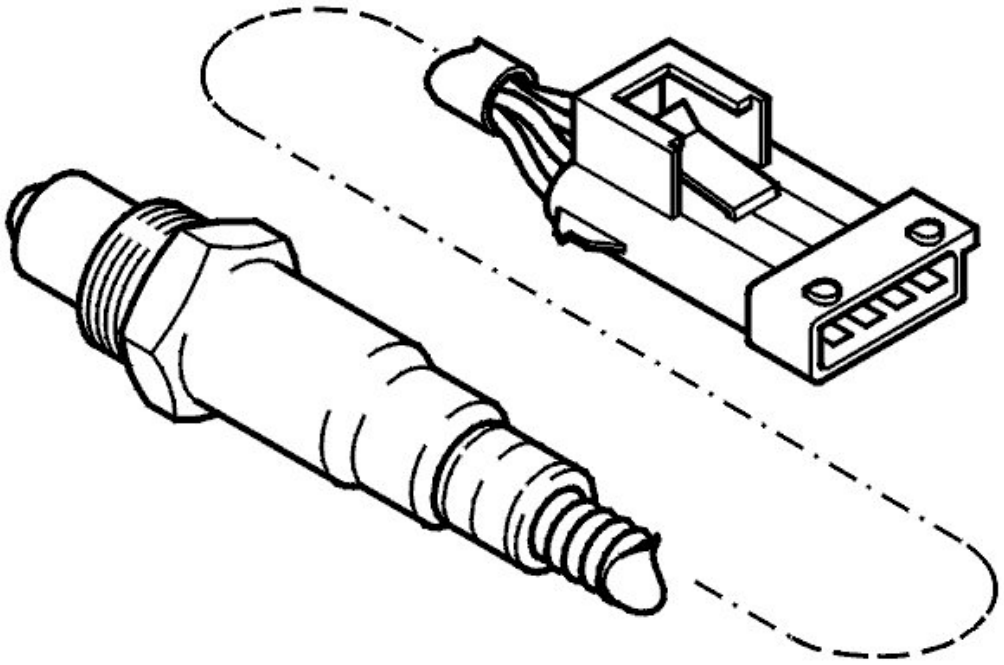
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-223D

Condition



The engine control module (ECM) controls the preheating of the rear heated oxygen sensor (HO2S) by pulsing the current to the positive temperature coefficient (PTC) element in the heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is lower than a certain value when preheating is deactivated.

Substitute value

- The fuel trim is shut off.

Possible source
- Short-circuit to ground in the signal cable
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

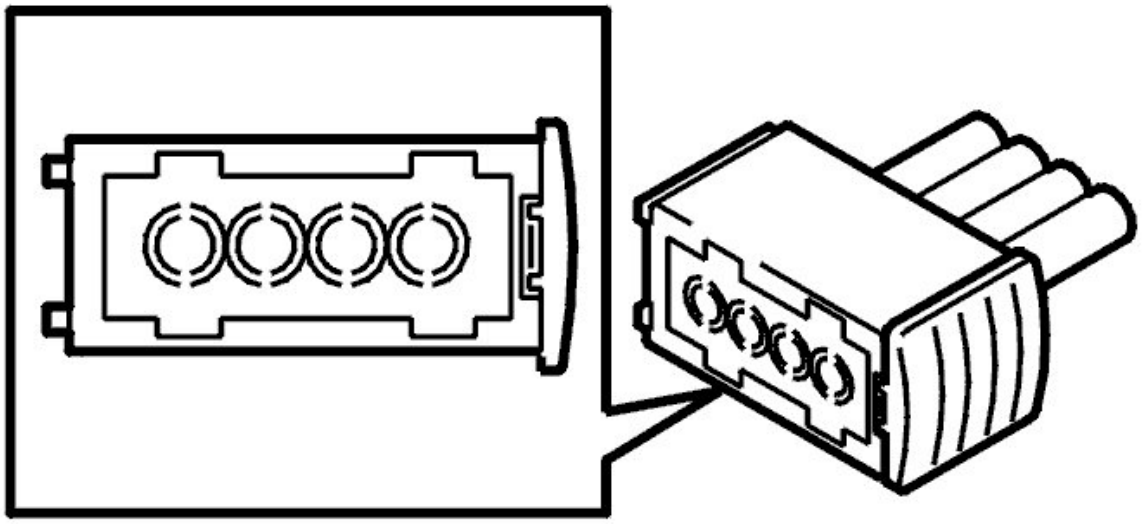
Signal Too Low

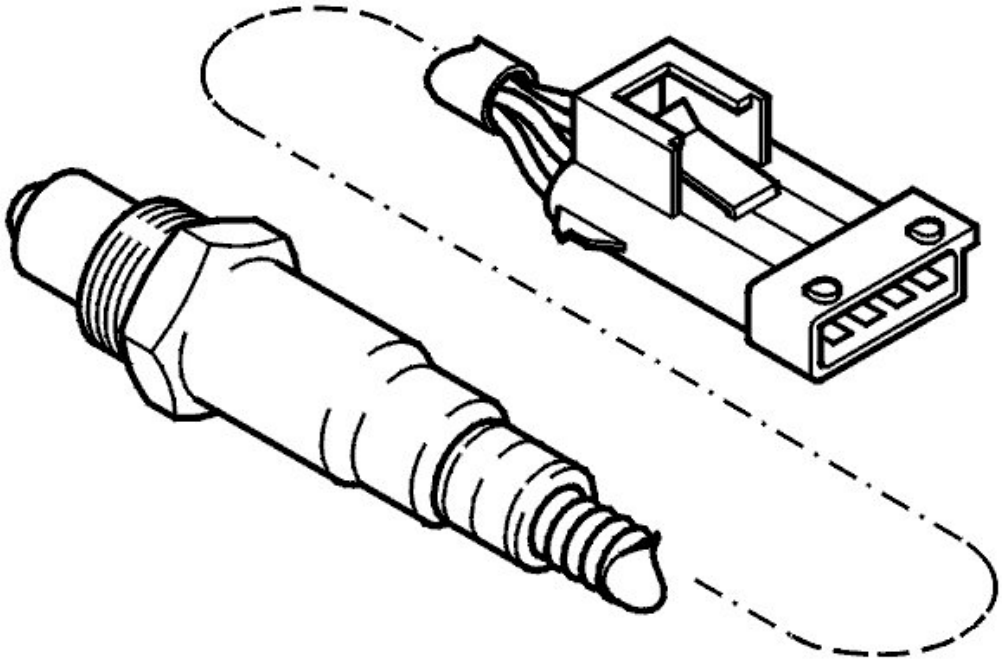
Signal too low

Checking the components and wiring

Check the resistance of the heated oxygen sensor (HO2S) between terminals #1 and #2.
Check the signal cable between heated oxygen sensor (HO2S) terminal #2 and control module terminal #A6 (#A6). Check for a short-circuit to ground.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





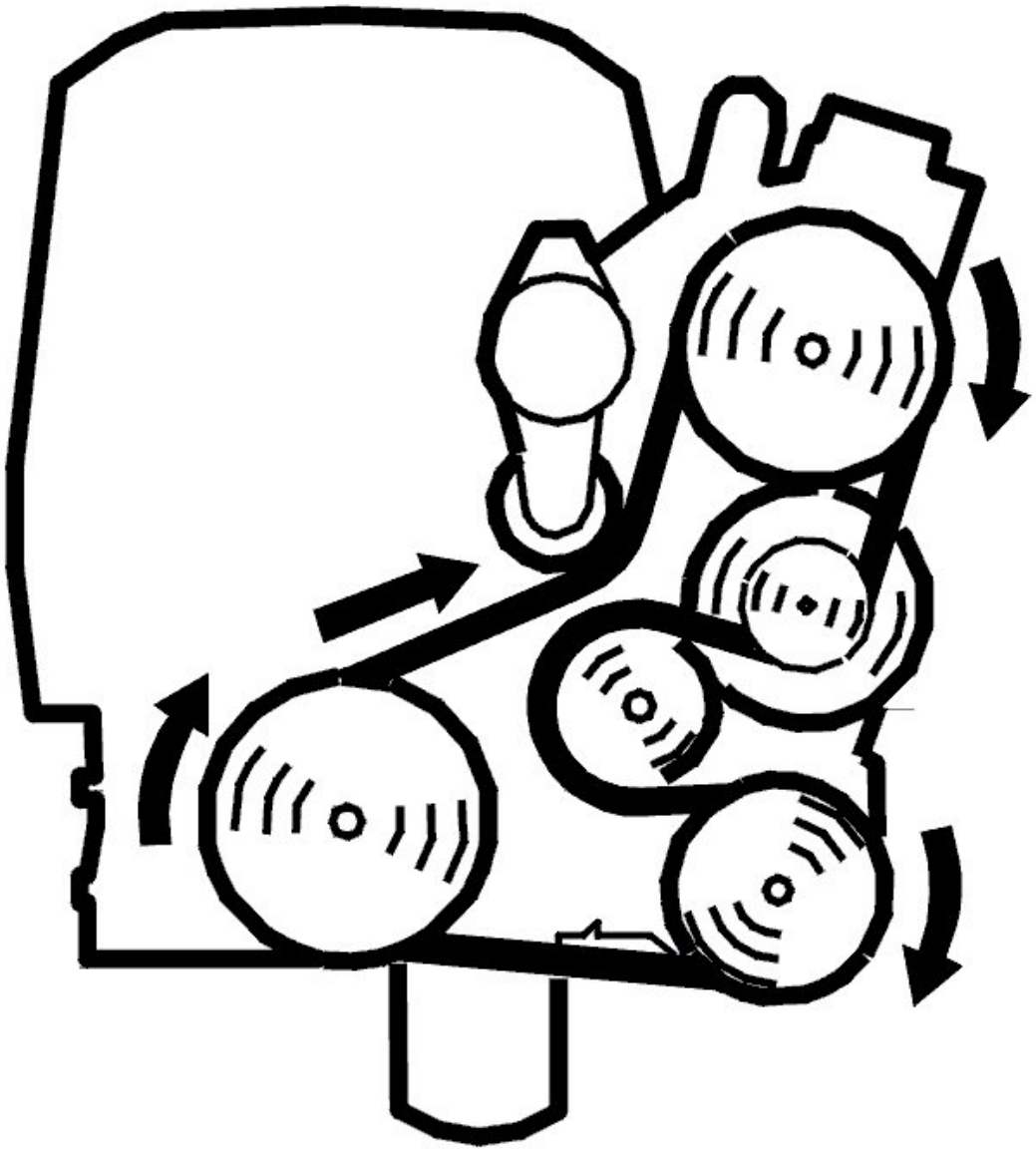
Continue - Verification

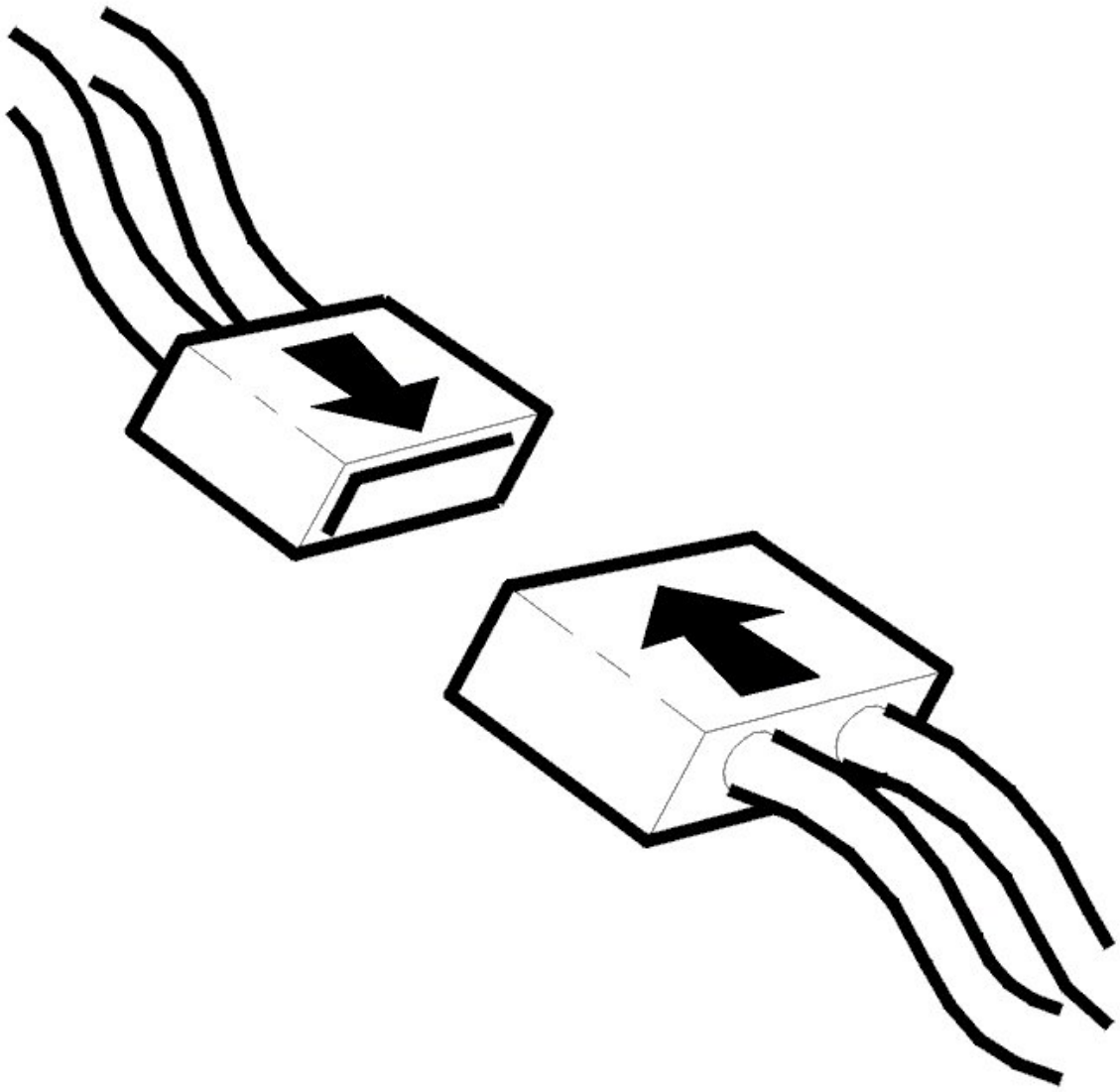
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed to 2500 rpm until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2240

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the rear heated oxygen sensors (HO2S) (banks 1 and 2) have been switched.
The diagnostic trouble code (DTC) is diagnosed when the engine has been idling for 10 minutes.

Substitute value
- The heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- The rear heated oxygen sensors (HO2S) have been installed in the wrong bank
- Both the rear heated oxygen sensors (HO2S) are damaged.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

Checking the components and wiring

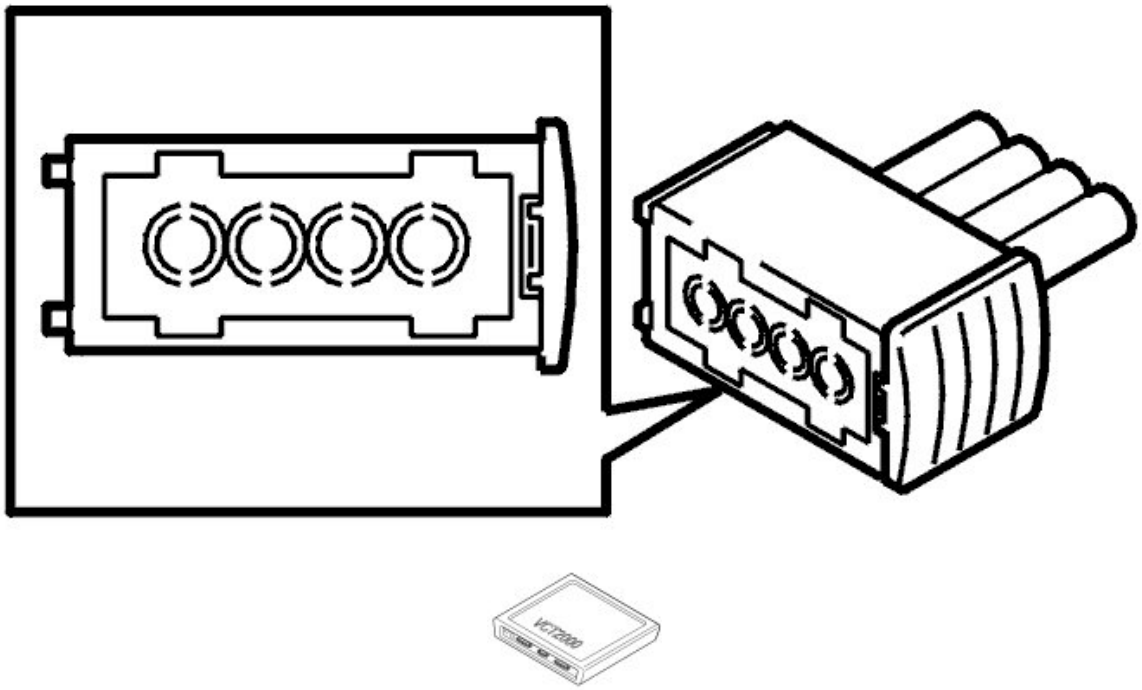
Visually check that the rear heated oxygen sensors (HO2S) have not been mounted in the wrong bank on banks 1 and 2.
Read off the voltage of the probe on the rear heated oxygen sensor (HO2S) for bank 1.
Read off the voltage of the probe on the rear heated oxygen sensor (HO2S) for bank 2.

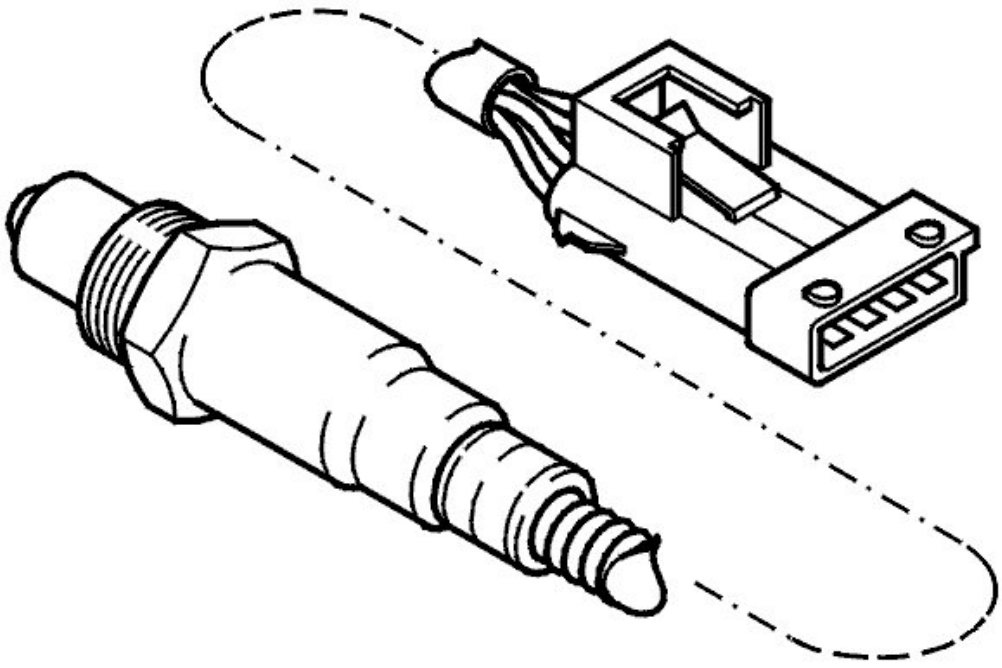
Hint: If the voltage is constantly close to 0 V on one bank and 1 V on the other bank, or vice-versa, the rear heated oxygen sensors (HO2S) have been switched.

Try new heated oxygen sensors (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals





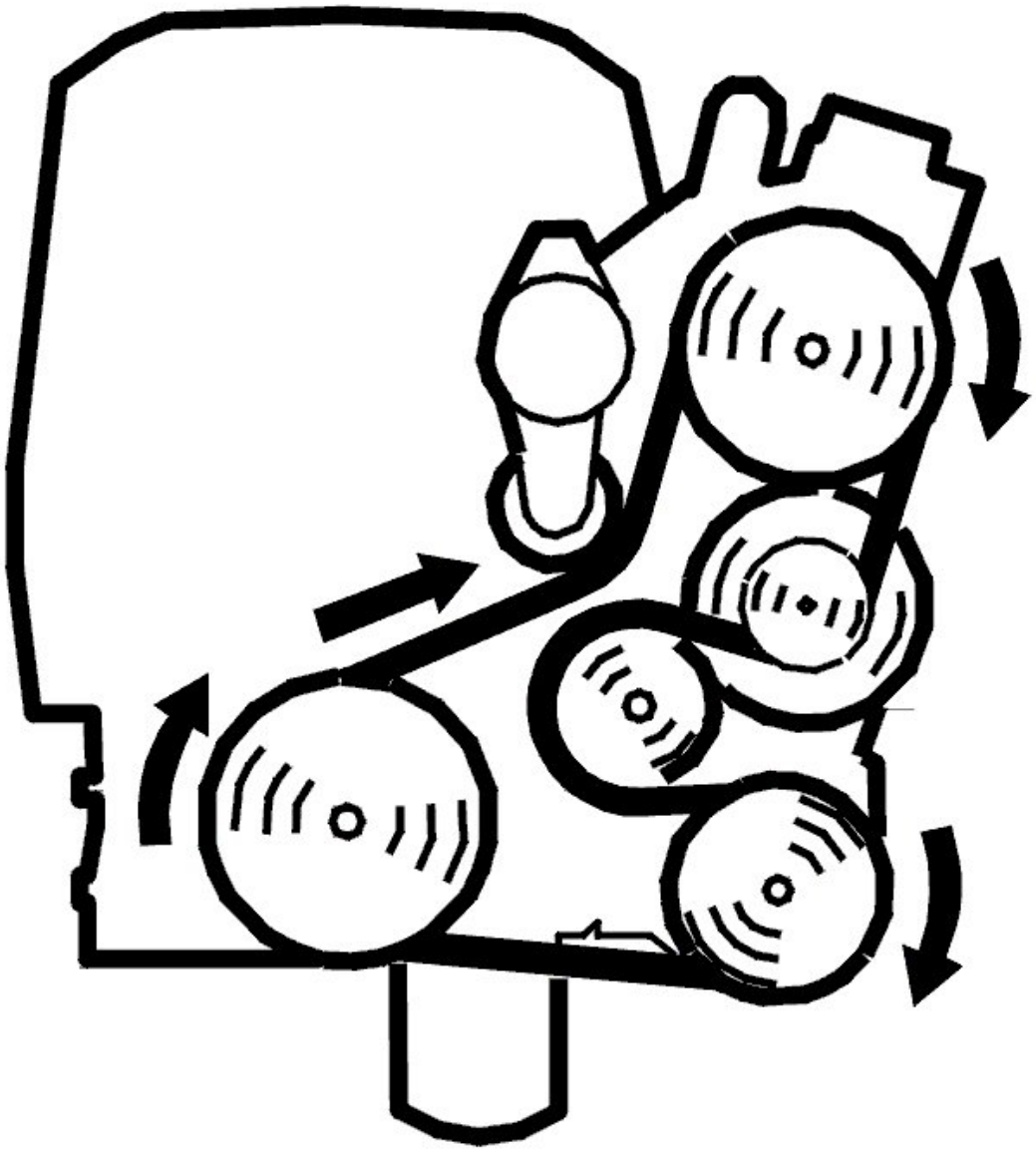
Continue - Verification

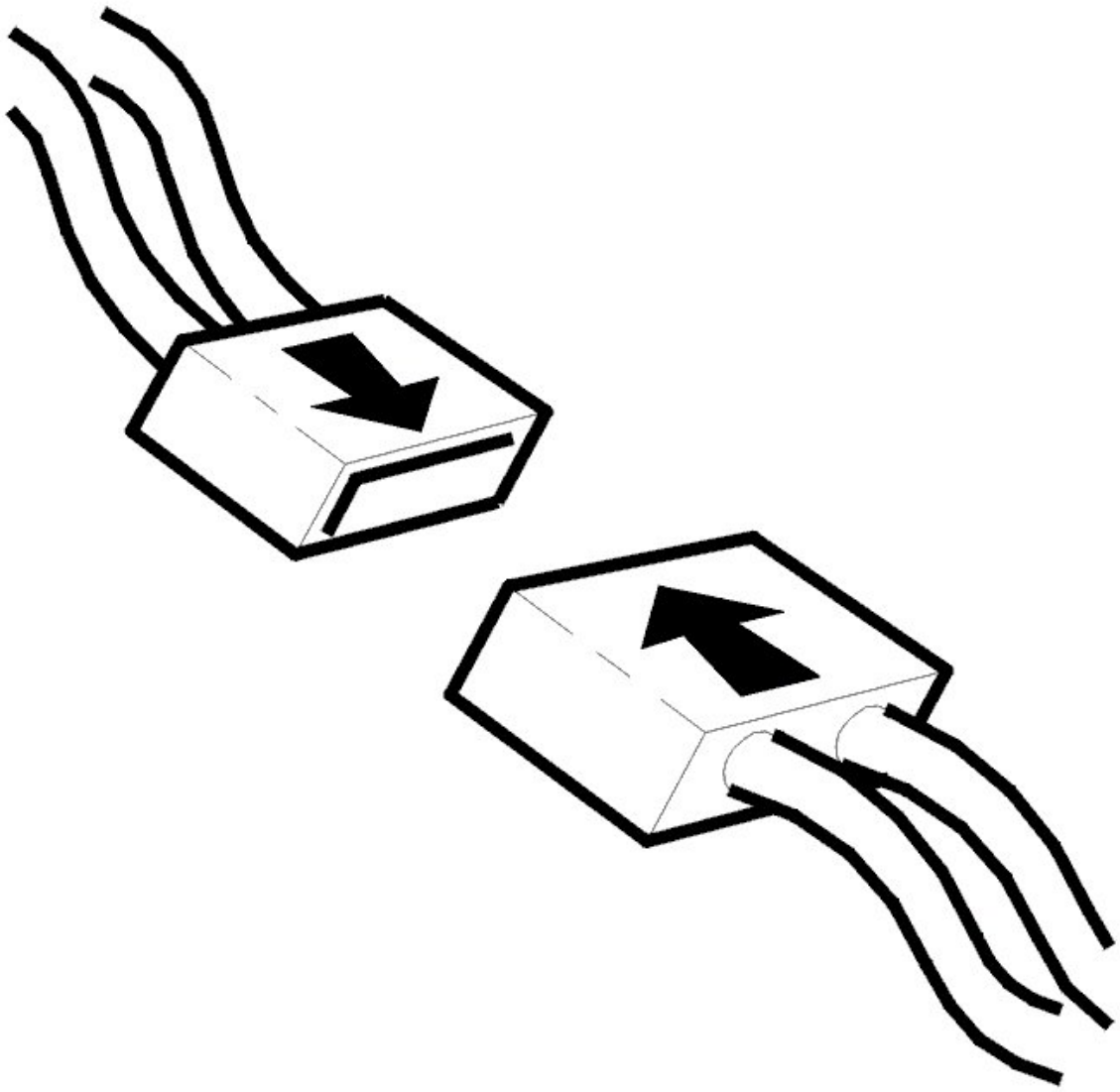
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to run at idle speed for 10 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

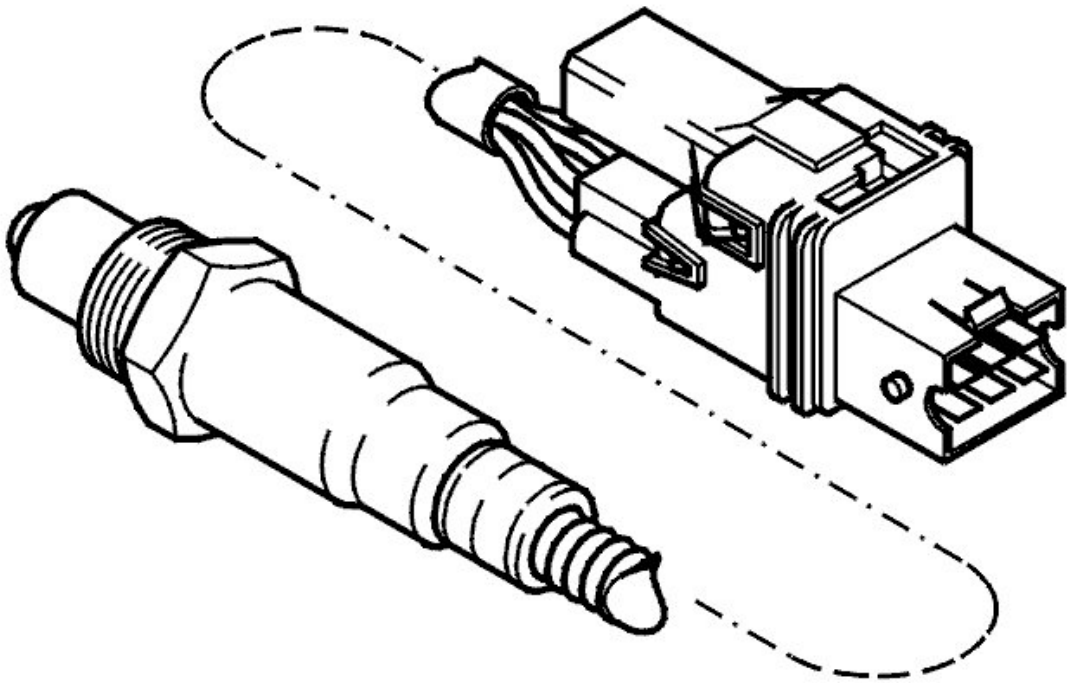
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2400

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the front heated oxygen sensor (HO2S) (bank 1) has not reached normal operating temperature.

Substitute value

- None.

Possible source

- Contact resistance and oxidation in the terminals
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

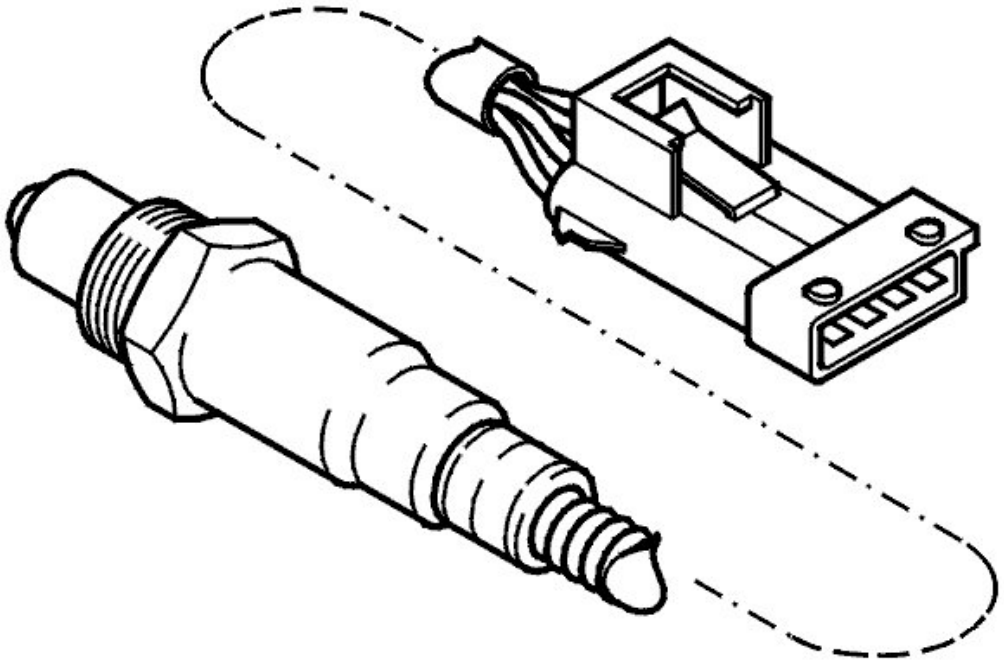
Faulty Signal

Faulty signal

Checking the connector

Check the connector for the rear heated oxygen sensor (HO2S). Check for contact resistance and oxidation. Remedy if necessary.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.

Other information
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



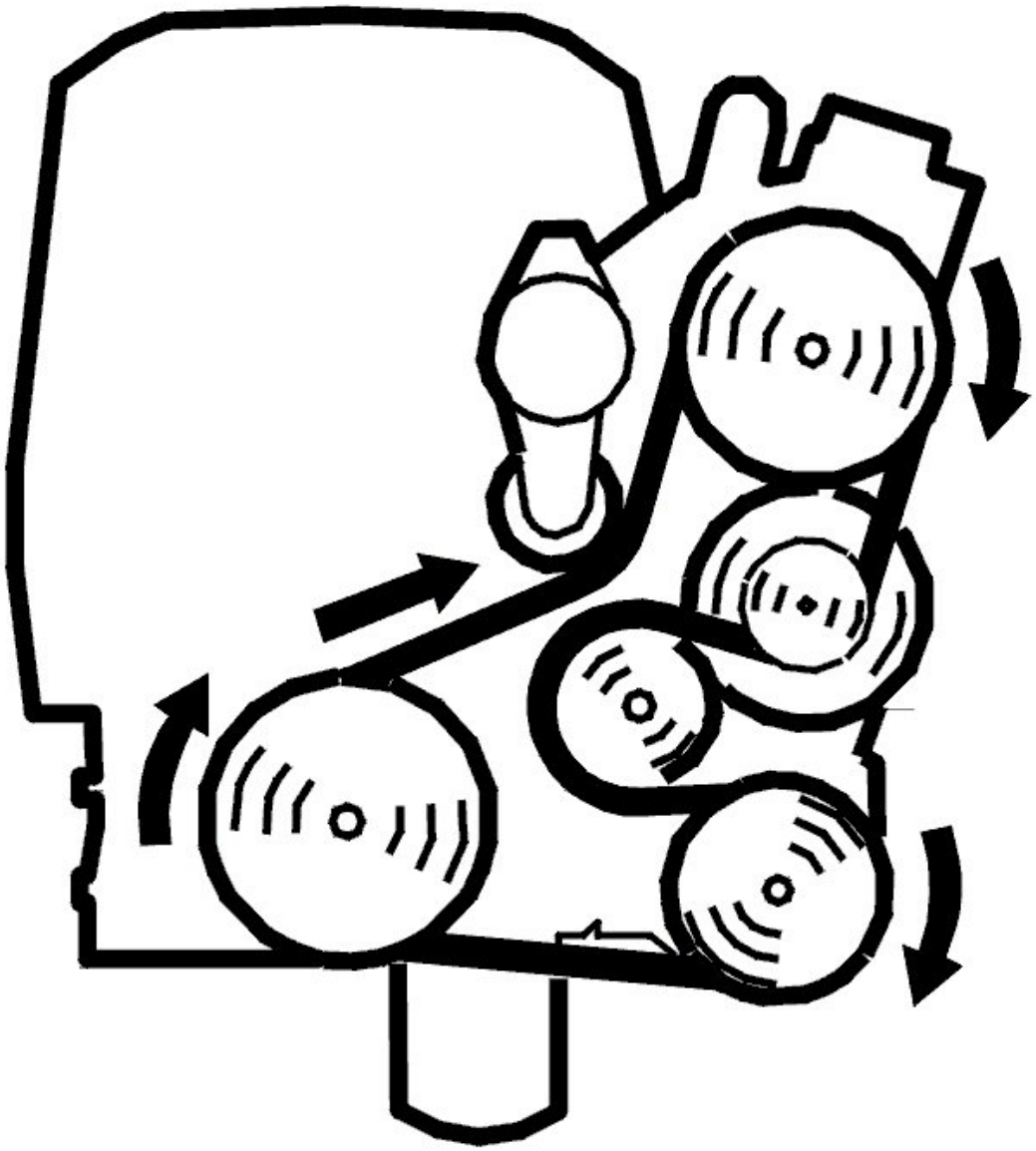
Continue - Verification

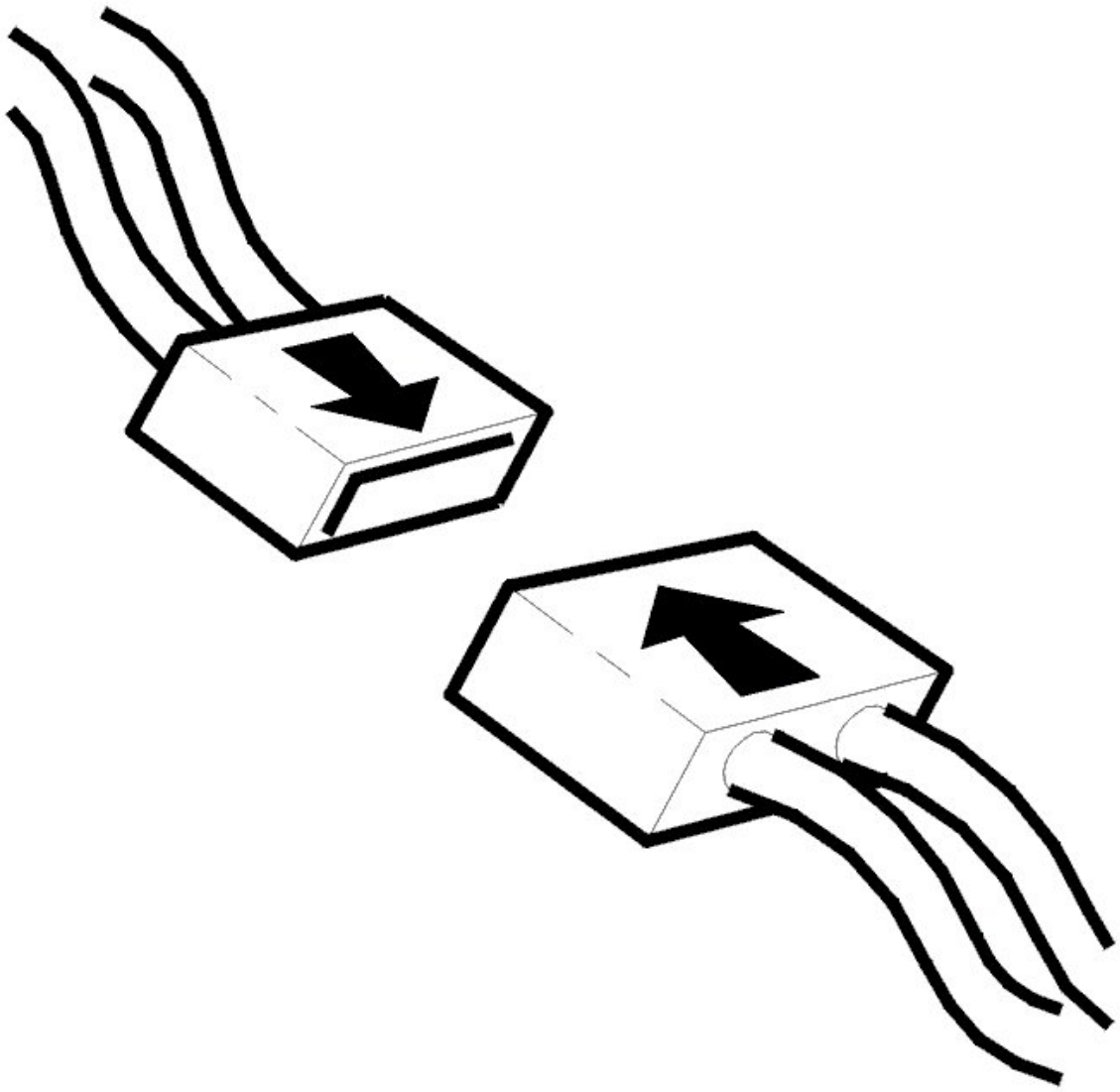
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

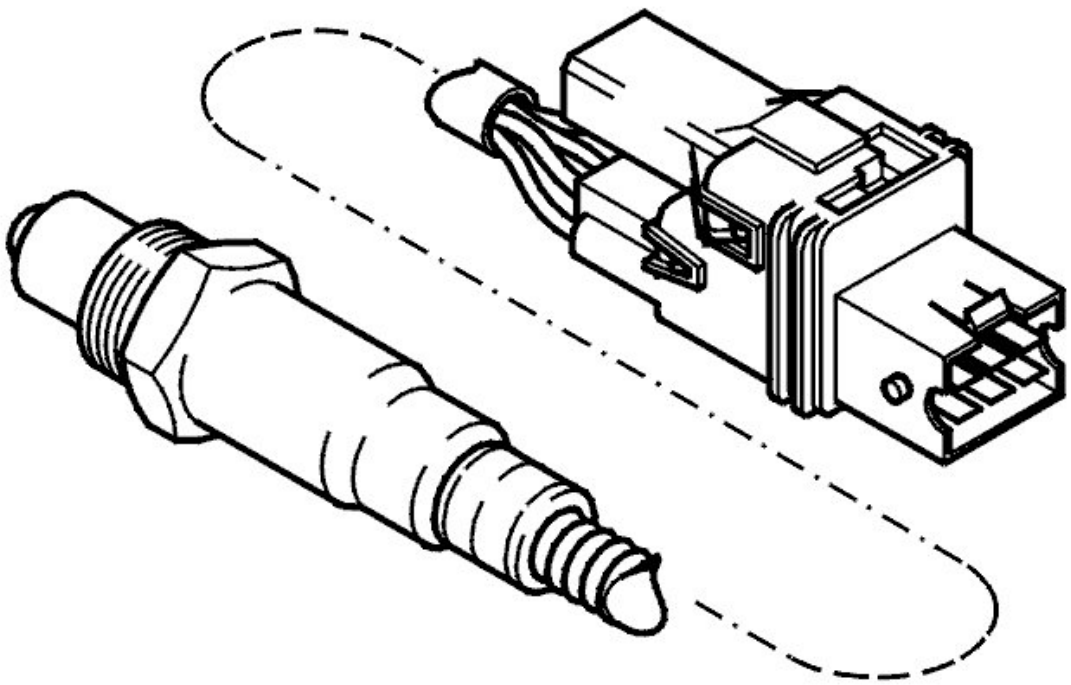
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-240B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that there has been no control of the heater element for the front heated oxygen sensor (HO2S) (bank 1) for a certain amount of time.

Substitute value

- None.

Possible source
- Contact resistance and oxidation in the terminals
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high/Signal too low/Signal missing

Checking the components and wiring

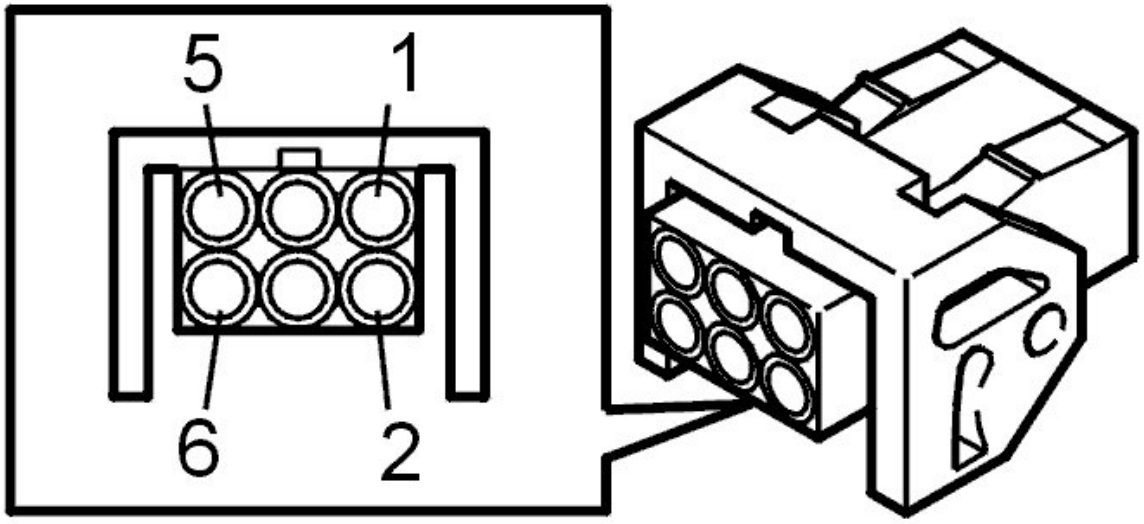
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

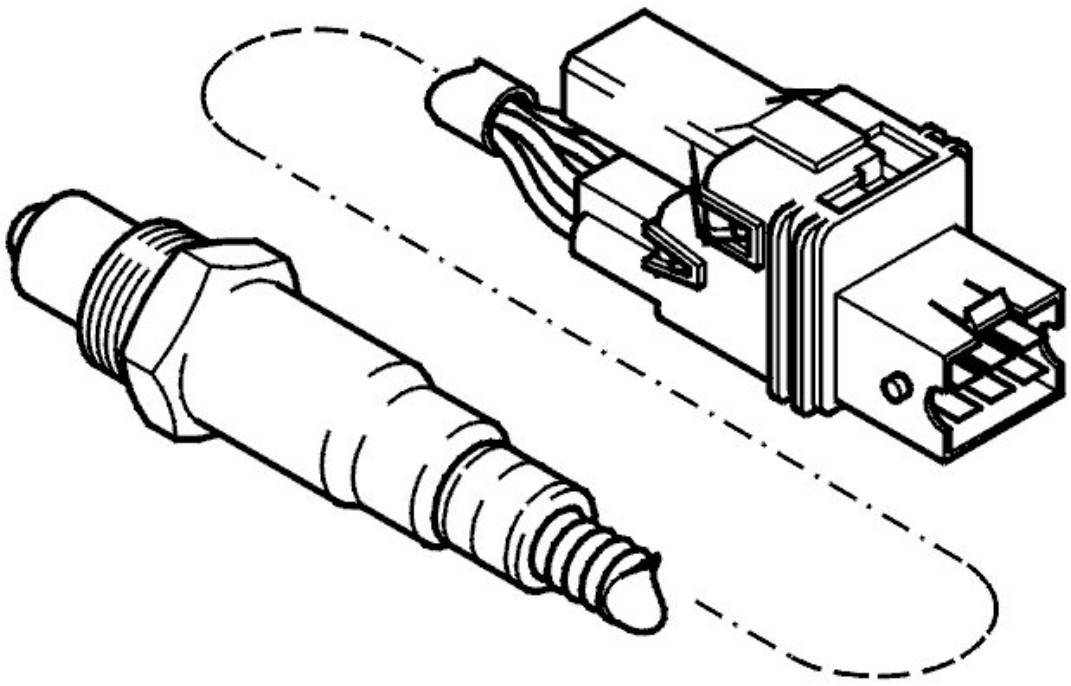
Check the heated oxygen sensor (HO2S) pre-heating circuit. Measure the resistance between terminals #3 and #4 in the probe connector.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





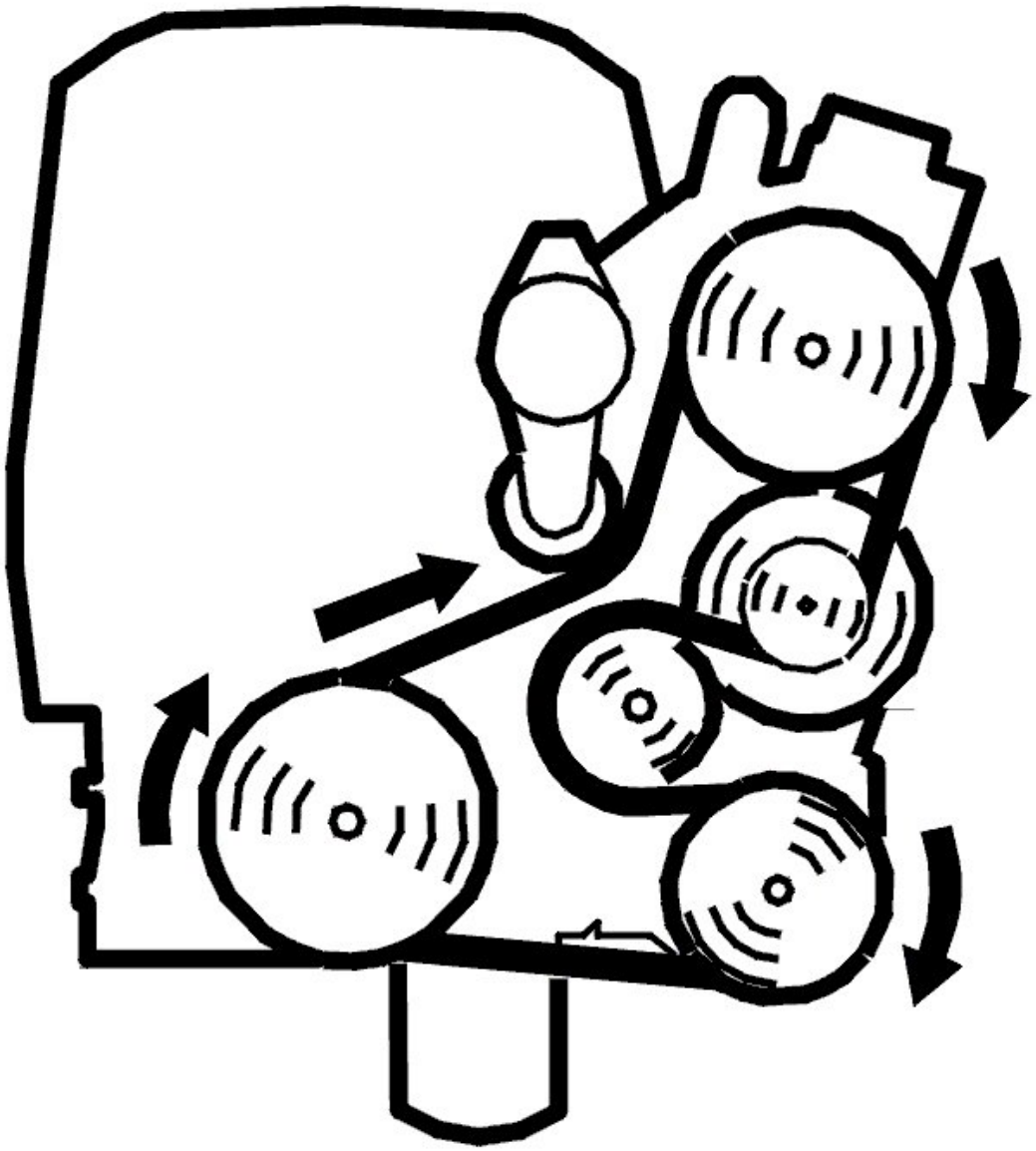
Continue - Verification

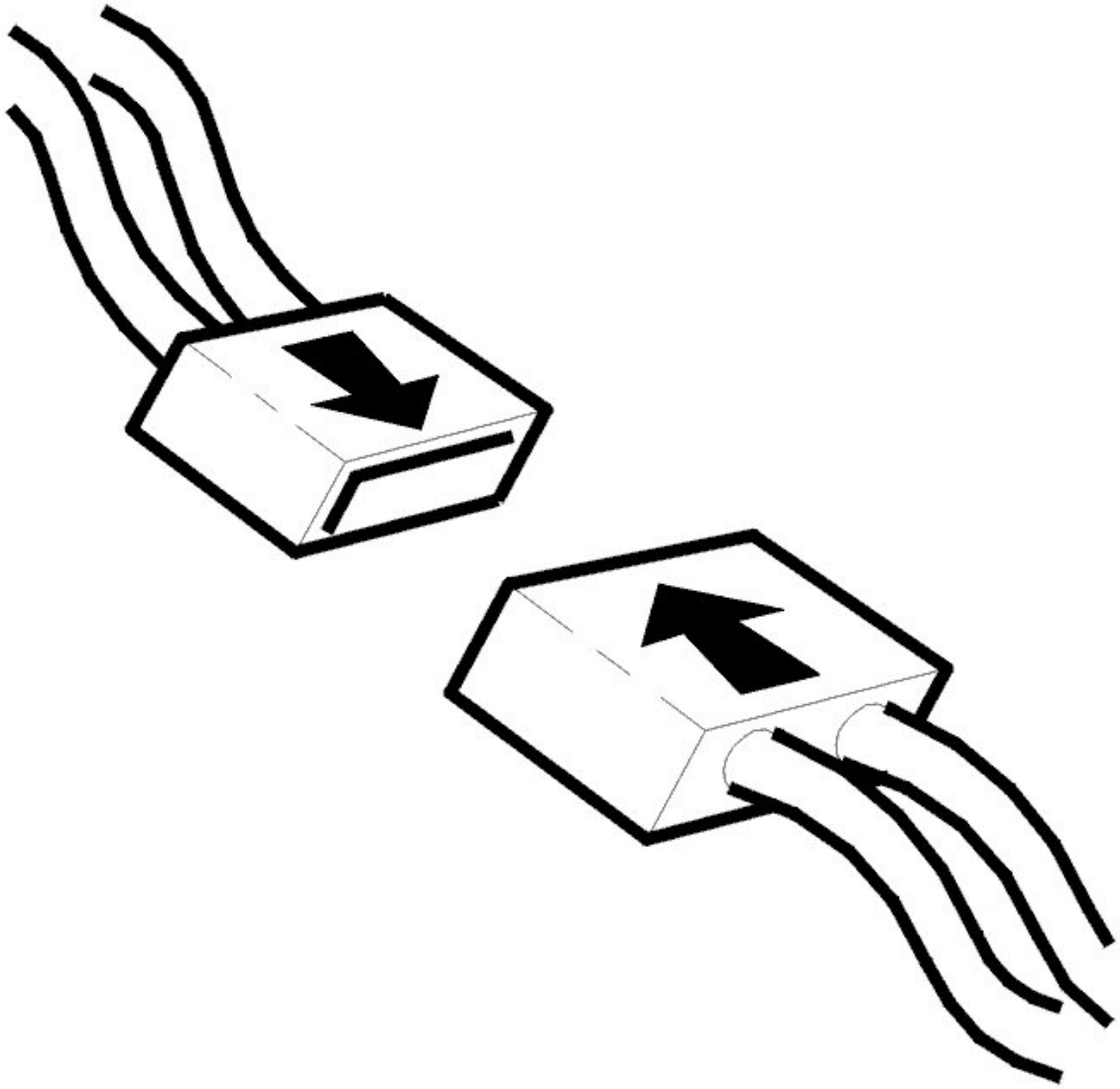
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

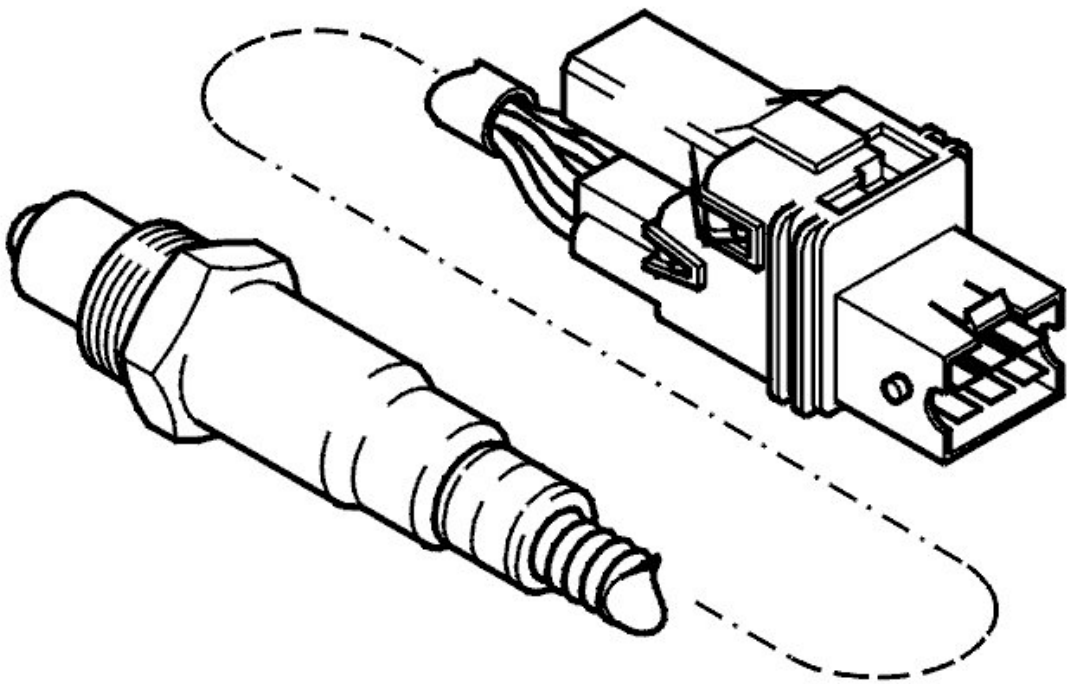
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-240C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the resistance in the preheating circuit for the front heated oxygen sensor (HO2S) (bank 1) is too high.

Substitute value

- None.

Possible source
- Contact resistance and oxidation in the terminals
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high/Signal too low/Signal missing

Checking the components and wiring

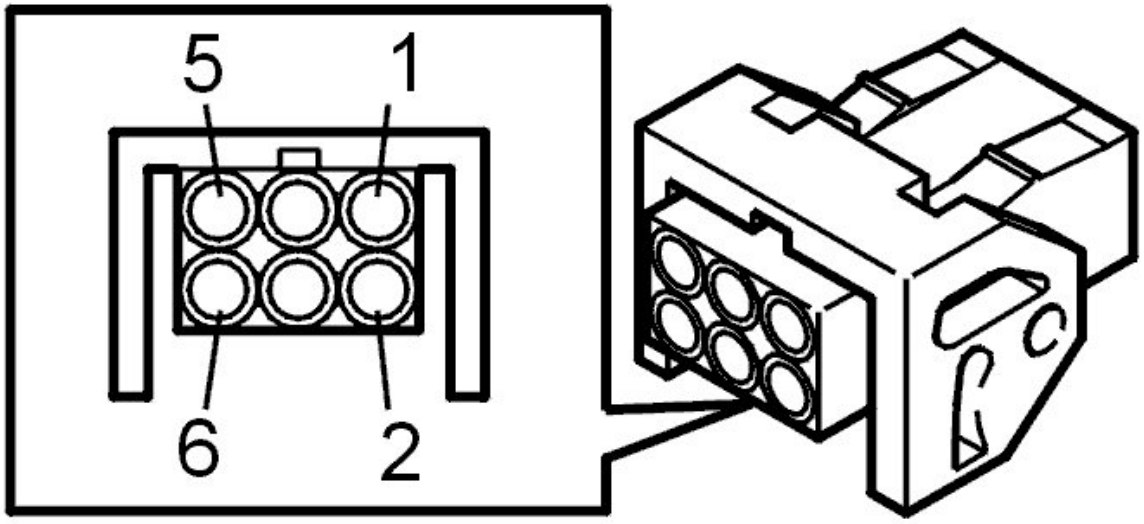
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

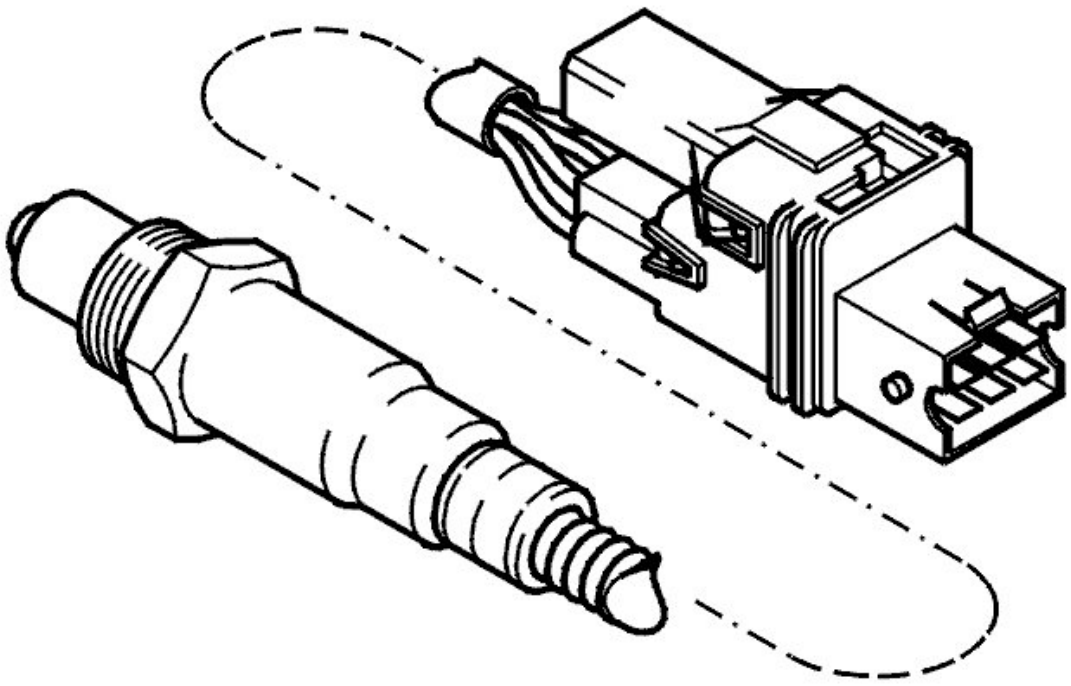
Check the heated oxygen sensor (HO2S) pre-heating circuit. Measure the resistance between terminals #3 and #4 in the probe connector.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





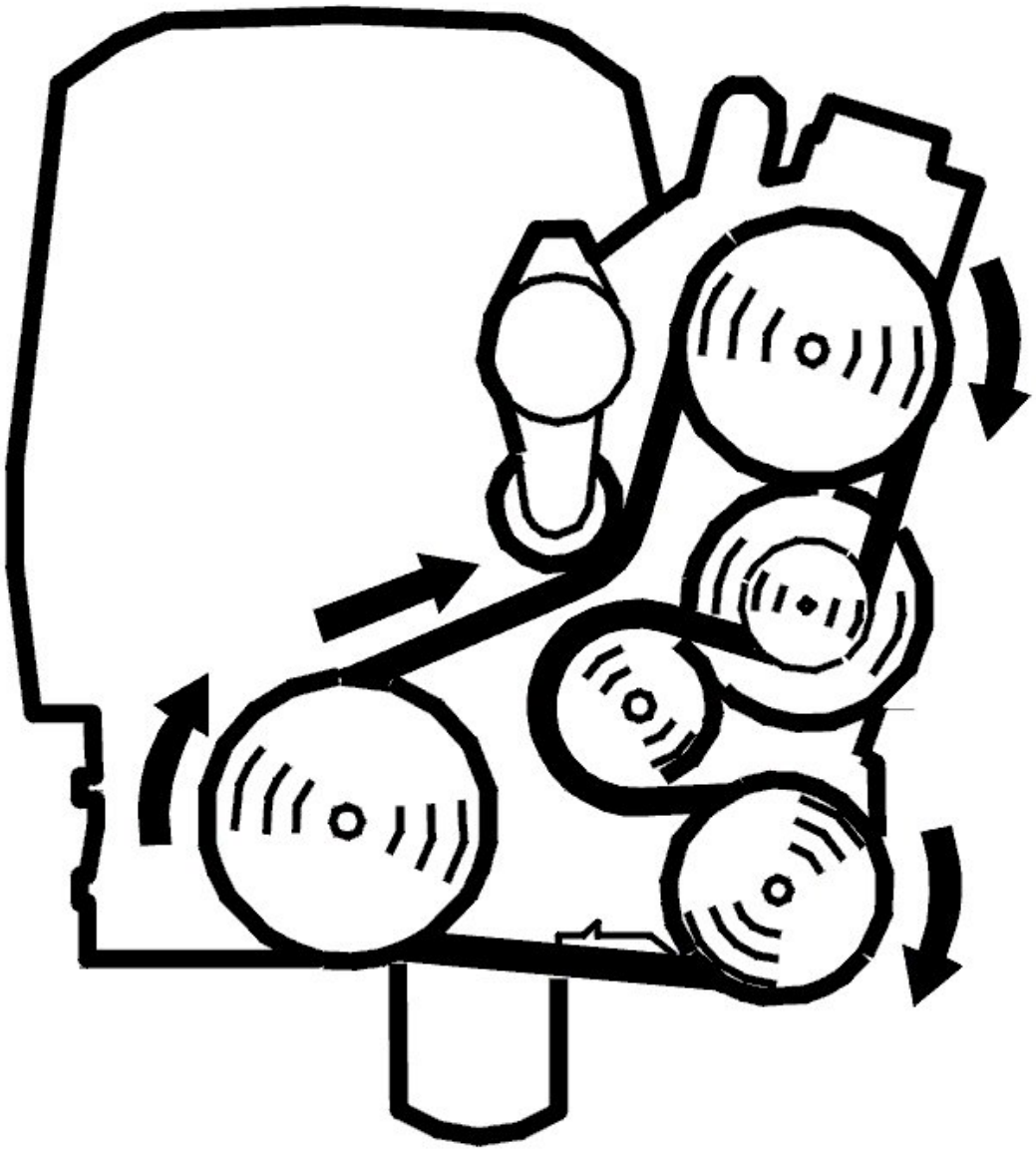
Continue - Verification

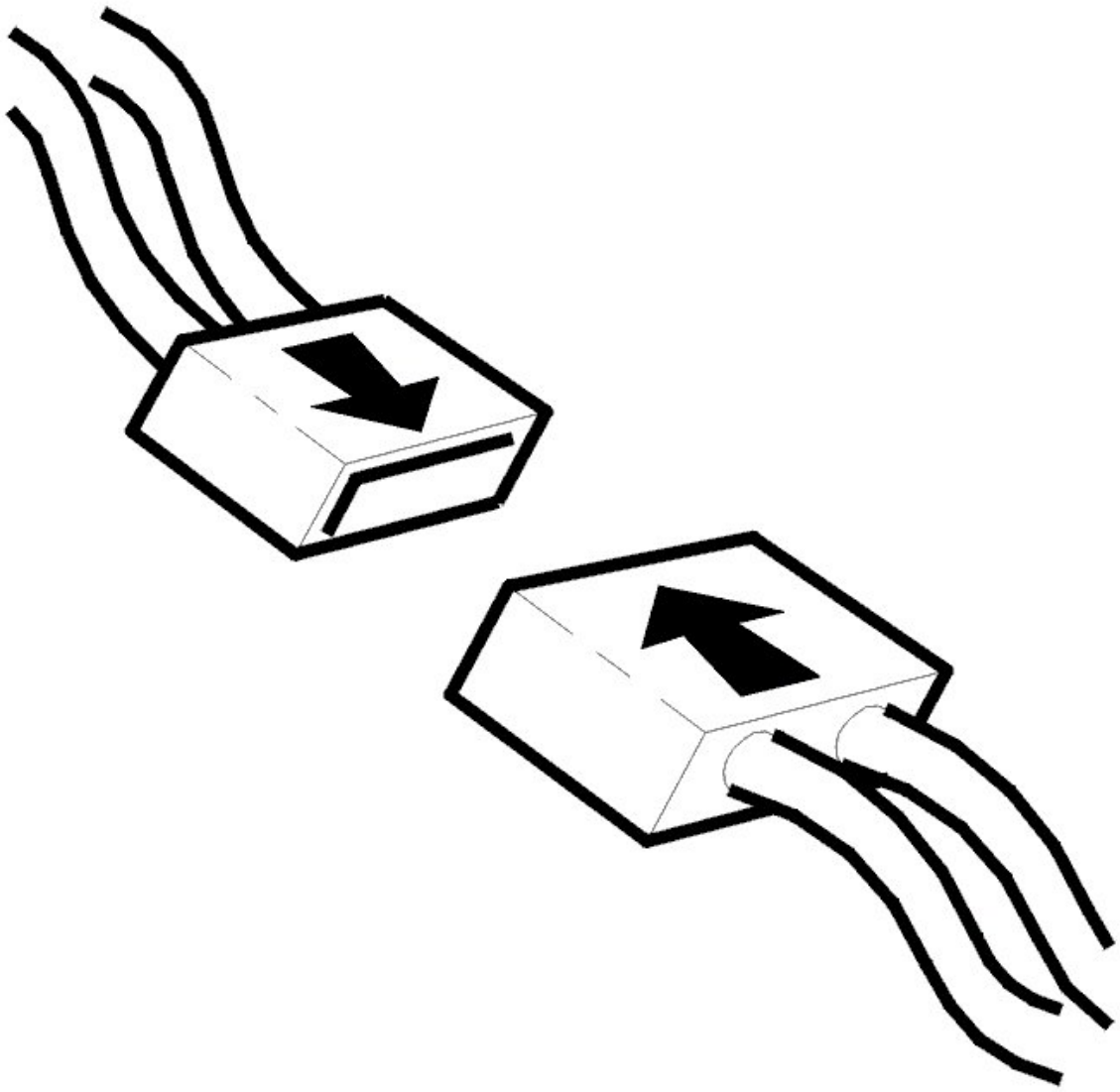
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for at least 1 minute
- Test drive the car at an even speed (approximately 80 km/h for at least 5 minutes)
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

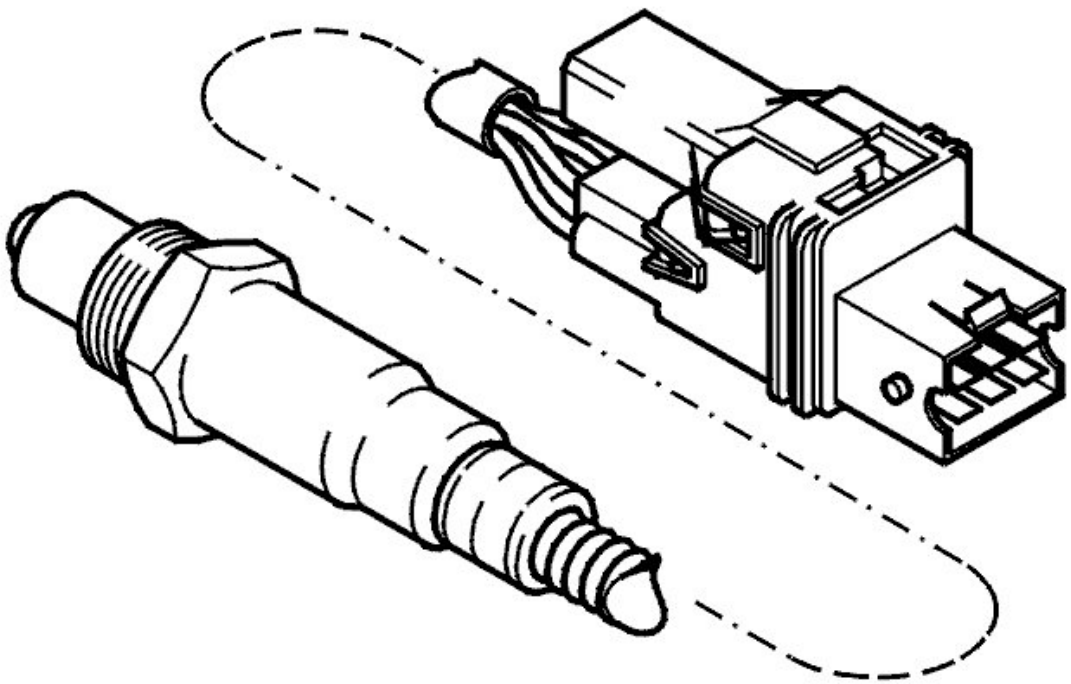
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-242D

Condition



The engine control module (ECM) monitors the aging of the front heated oxygen sensor (HO2S) by checking its ability to react to changes in the exhaust gases. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the heated oxygen sensor (HO2S) reacts too slowly to changes in the fuel/air mixture.

Substitute value

- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- The cables for the calibration current and the pump current are short-circuited to each other
- Open-circuit in signal cable (-)
- Open-circuit in the cable for calibration current
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking components and wiring

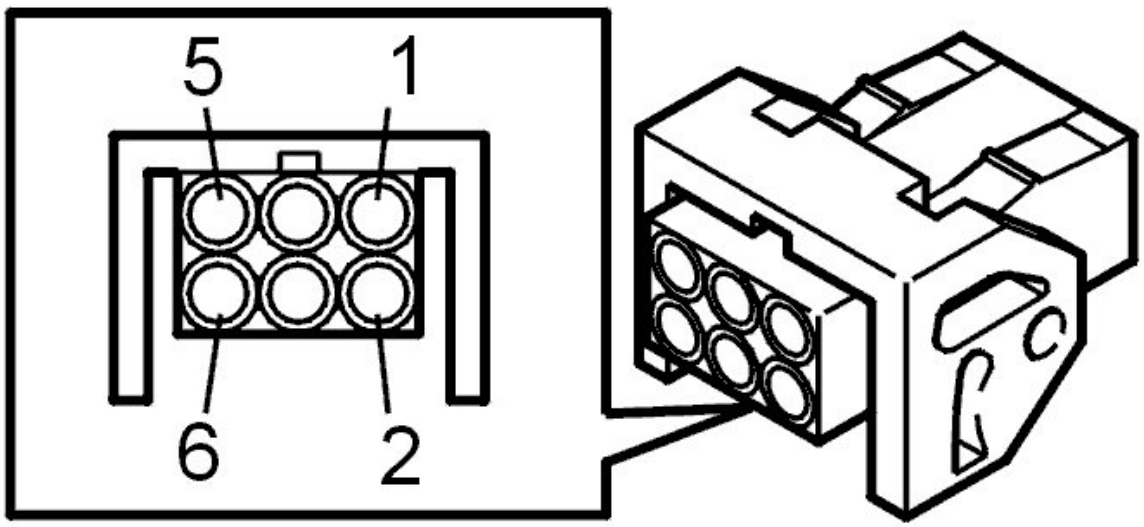
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

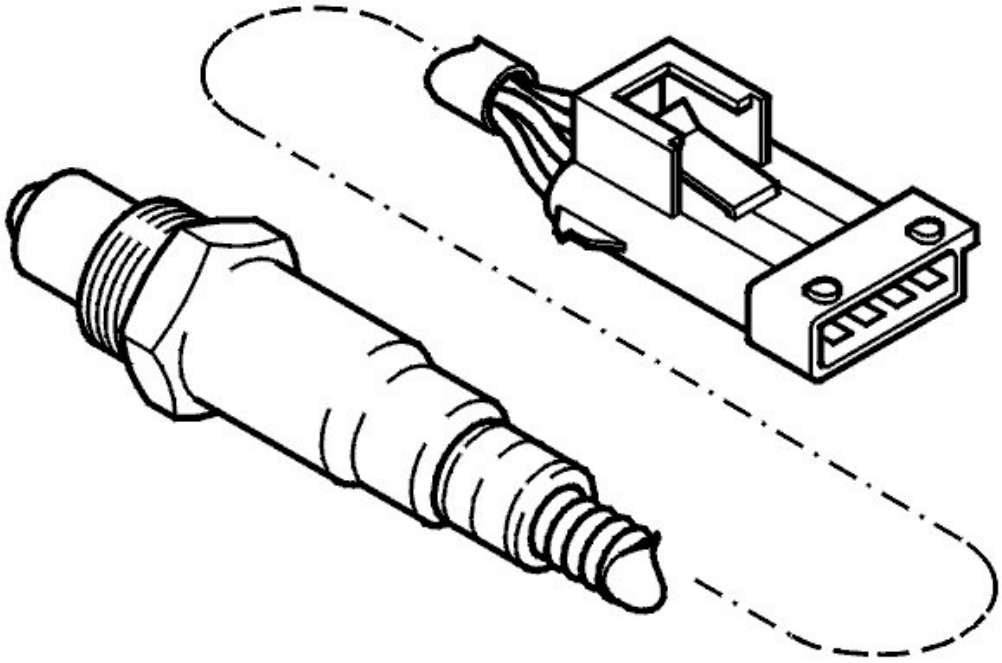
- Check the heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.

Check the cable for calibration current between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2.
Check the cable for pump current between heated oxygen sensor (HO2S) terminal #6 and engine control module (ECM) terminal #A24 (#A24).
Check for a short-circuit to each other.
Check the cable for an open-circuit.
Check between:
- Heated oxygen sensor (HO2S) terminal #5 and engine control module (ECM) terminal #A42 (#A42)
- Heated oxygen sensor (HO2S) terminal #2 and engine control module (ECM) terminal #A28 (#A28).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





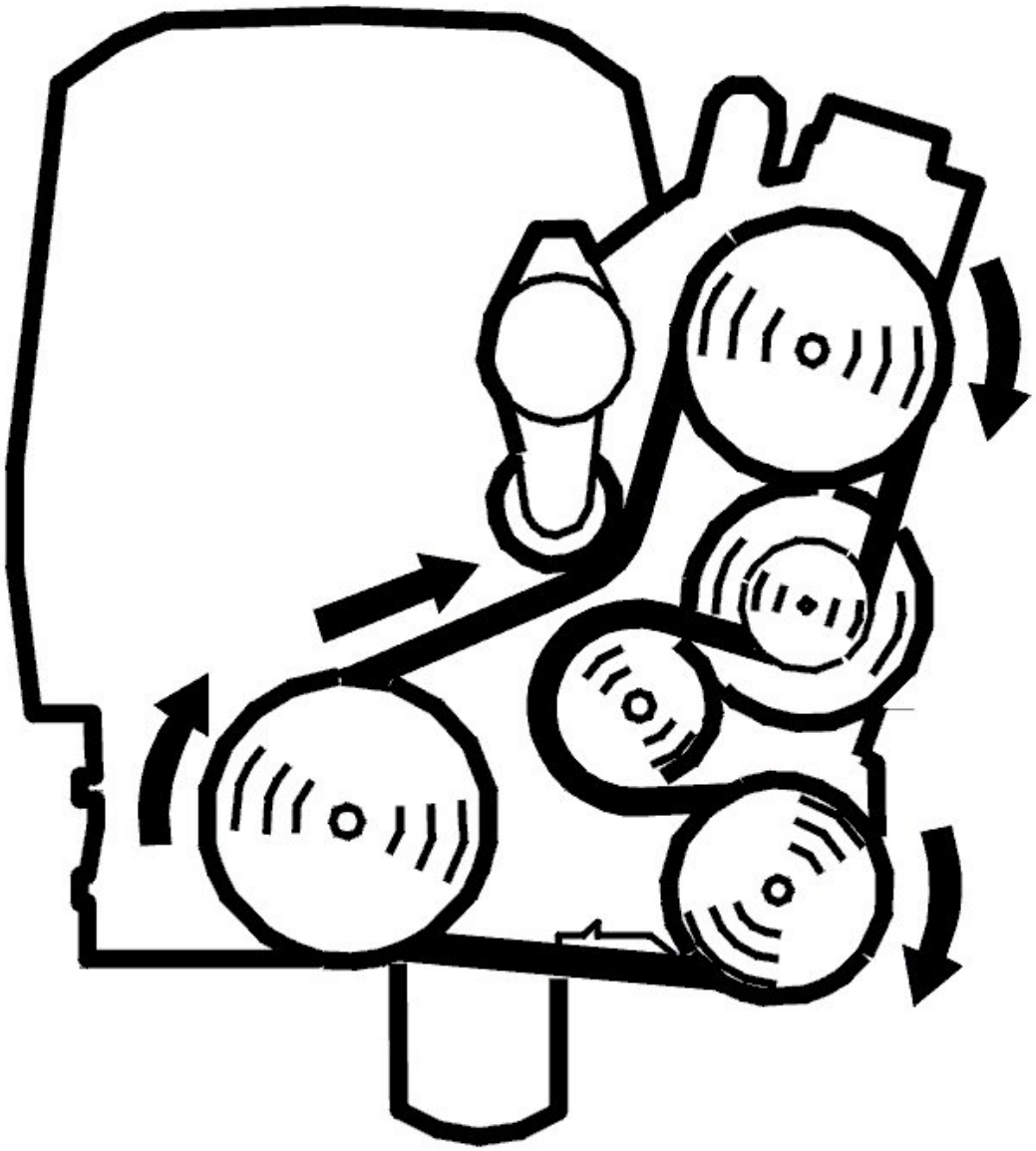
Continue - Verification

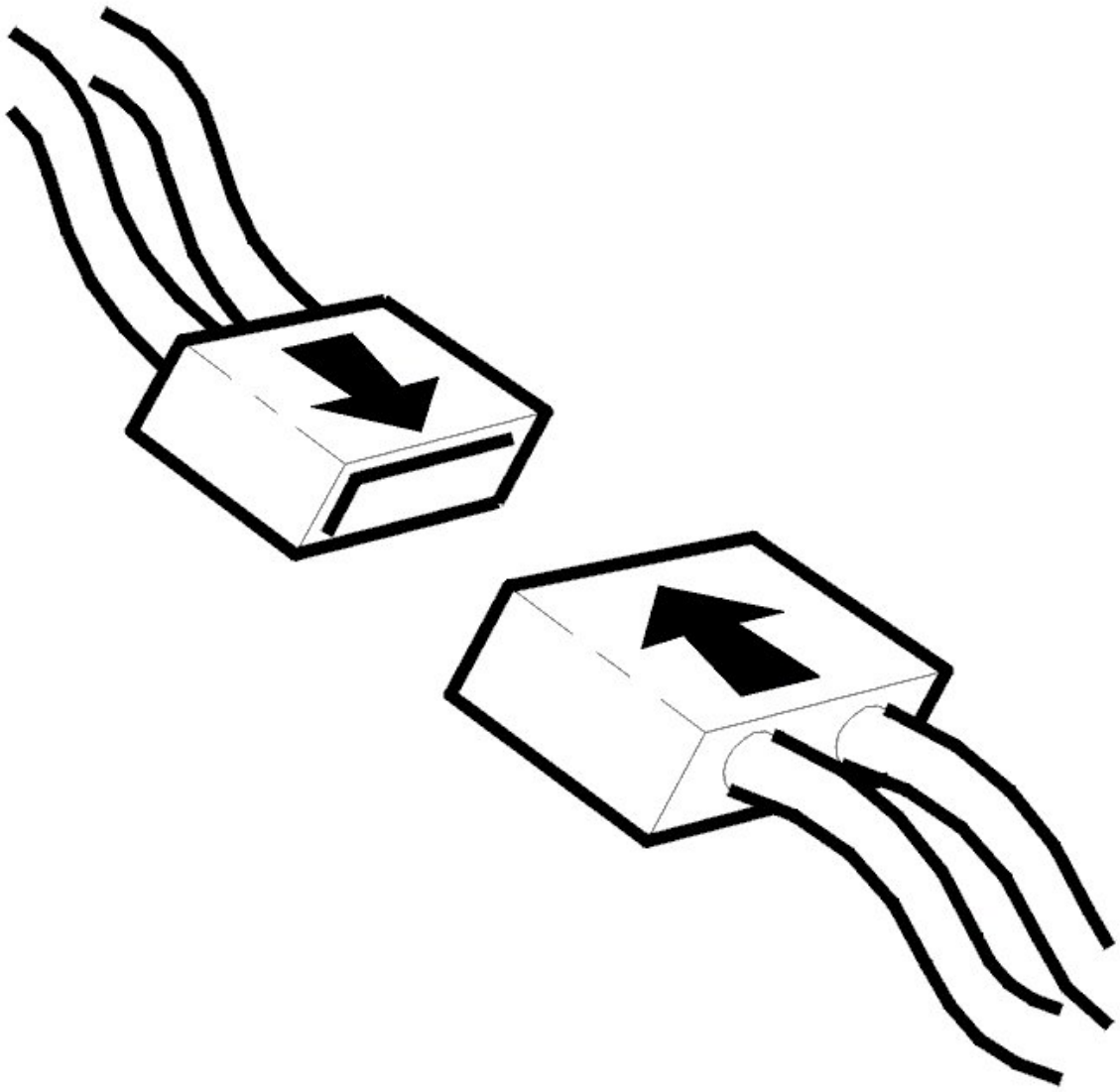
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car and perform a TRIP schedule: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the dynamic for the front heated oxygen sensor (HO2S).
The value should be higher than 1.0.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

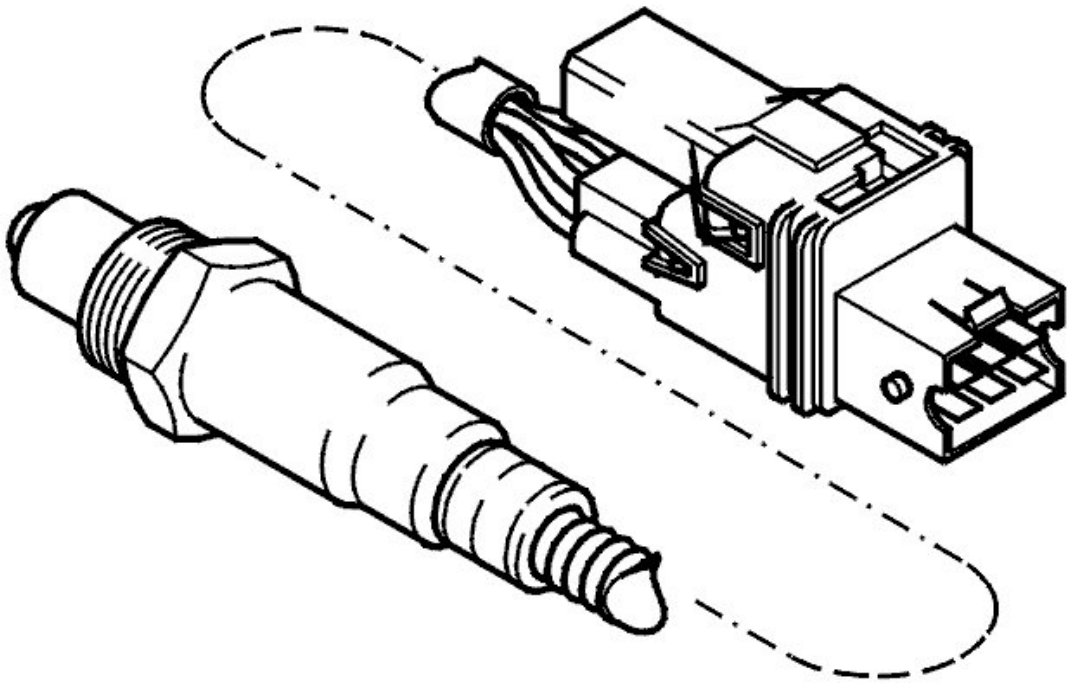
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-243B

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The diagnostic trouble code (DTC) is stored if the voltage for the heated oxygen sensor (HO2S) preheating disrupts the heated oxygen sensor (HO2S) signal.

Substitute value

- The heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source

- One of the cables for heated oxygen sensor (HO2S) preheating is short-circuited to the probe's other signal cables
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

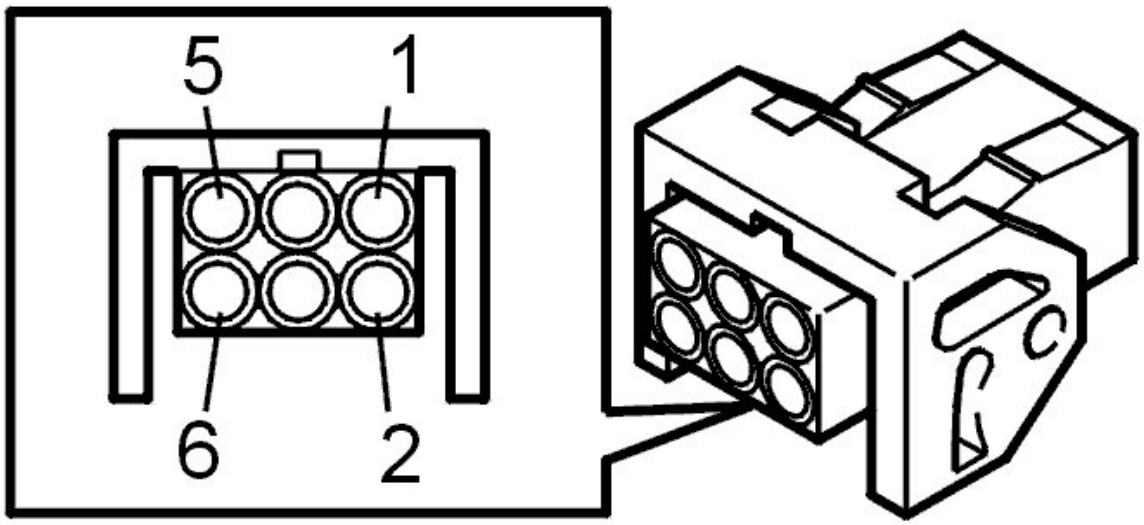
Checking the components and wiring

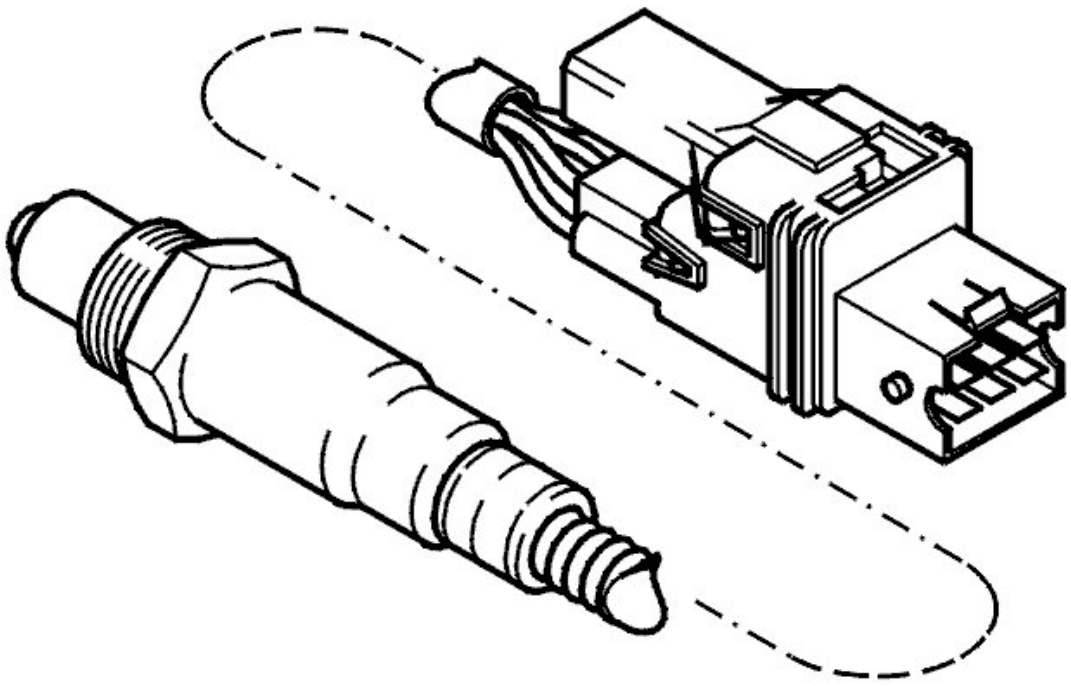
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the power cable between the engine control module (ECM) and heated oxygen sensor (HO2S) connector terminal #3. Check for a short-circuit to the other signal cables for the heated oxygen sensor (HO2S).
Check the ground lead between engine control module (ECM) terminals #A18 (#A18) and heated oxygen sensor (HO2S) connector terminal #4. Check for a short-circuit to the other signal cables for the heated oxygen sensor (HO2S).
Try a new heated oxygen sensor (HO2S) if the wiring is OK.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





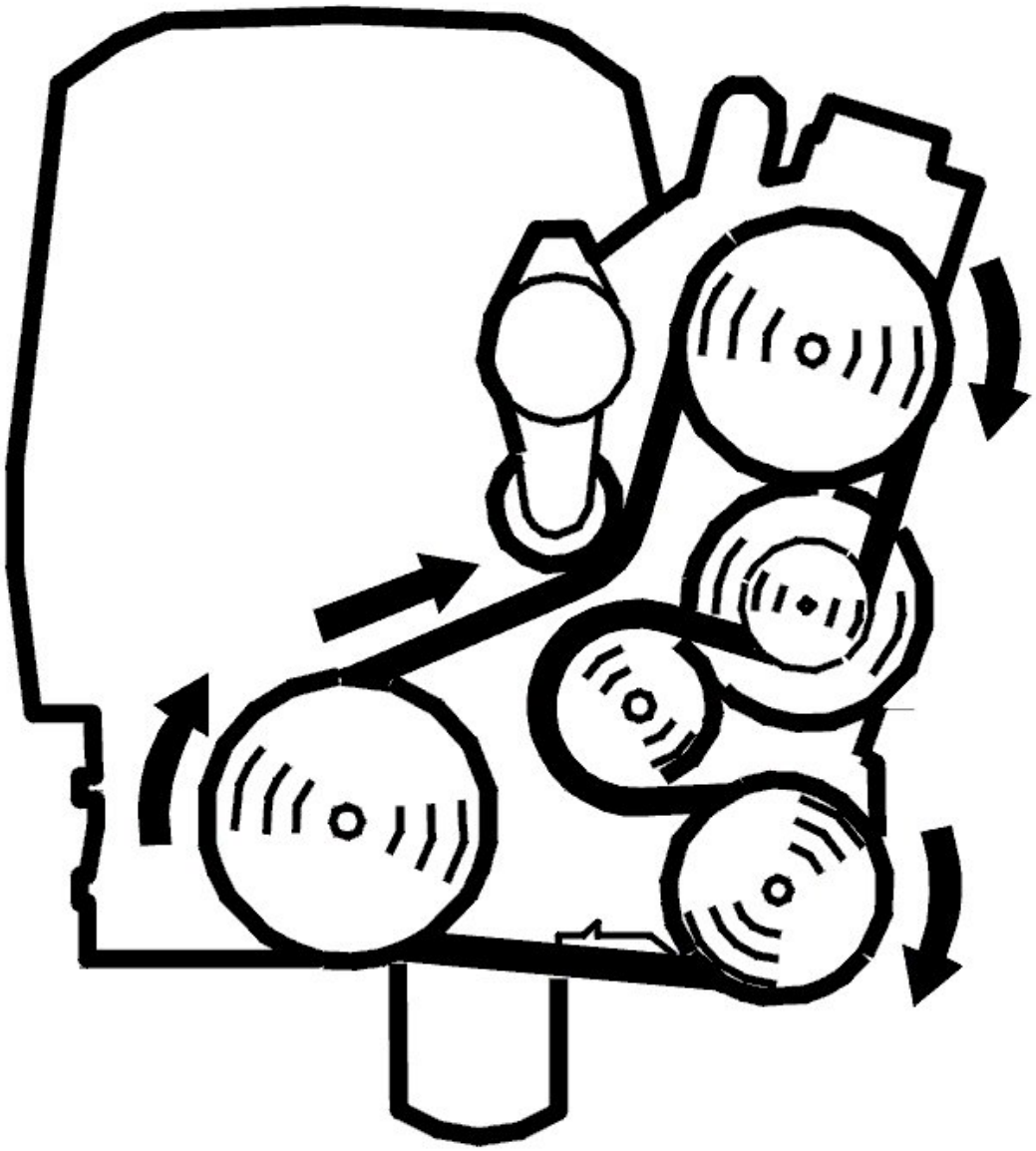
Continue - Verification

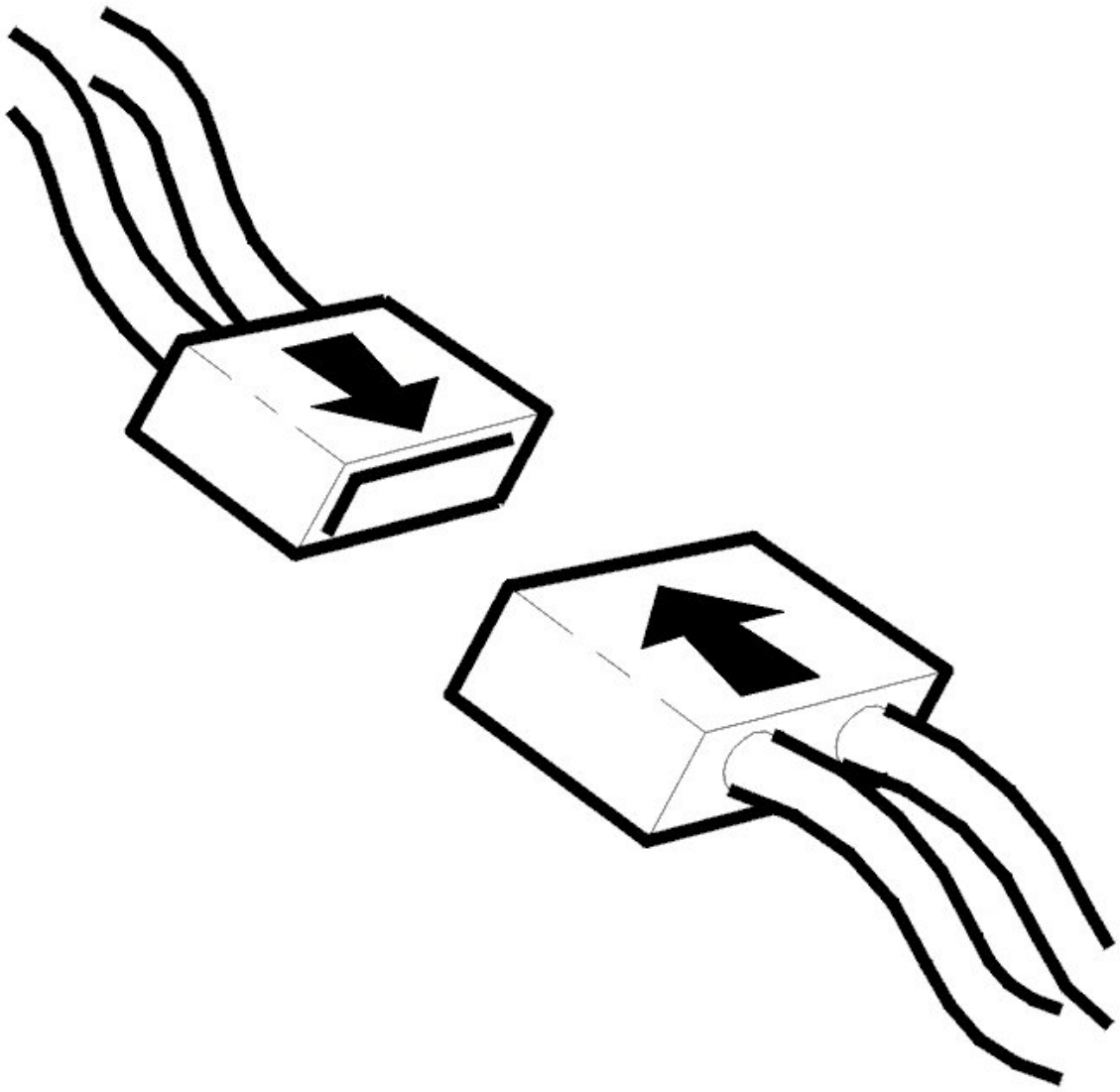
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Allow the engine to cool (to below 40 °C). Then start the engine
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

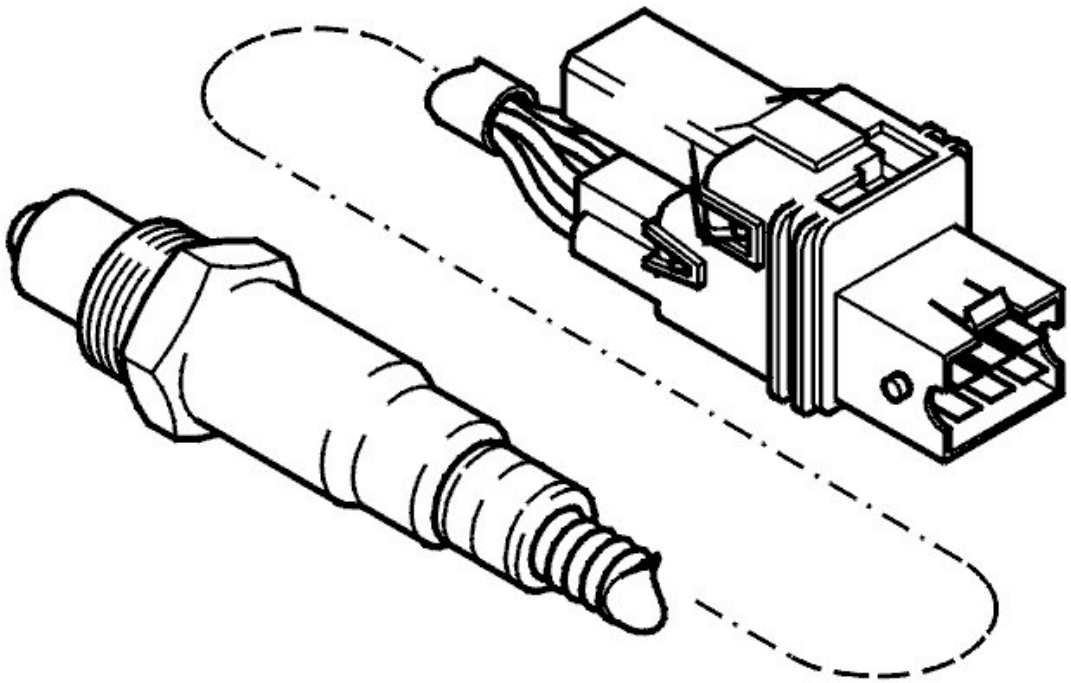
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-244B

Condition



The engine control module (ECM) controls preheating by pulsing the current to the positive temperature coefficient (PTC) element in the front heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is lower than a certain value when preheating is deactivated.

Substitute value

- Heated oxygen sensor (HO2S) control is disabled.

Possible source
- Contact resistance and oxidation in the terminals
- Open-circuit in the power supply from the system relay
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the components and wiring

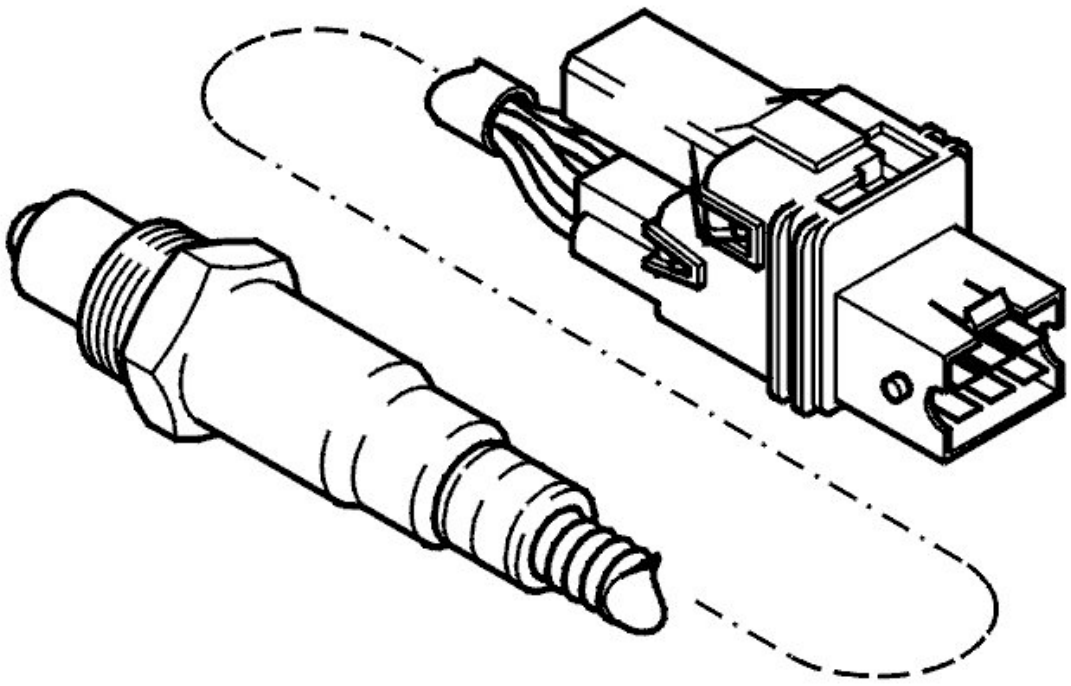
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the signal cable between heated oxygen sensor (HO2S) #3 and the system relay. Check for contact resistance and oxidation.
Check the power supply between the system relay and heated oxygen sensor (HO2S) terminal #3. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



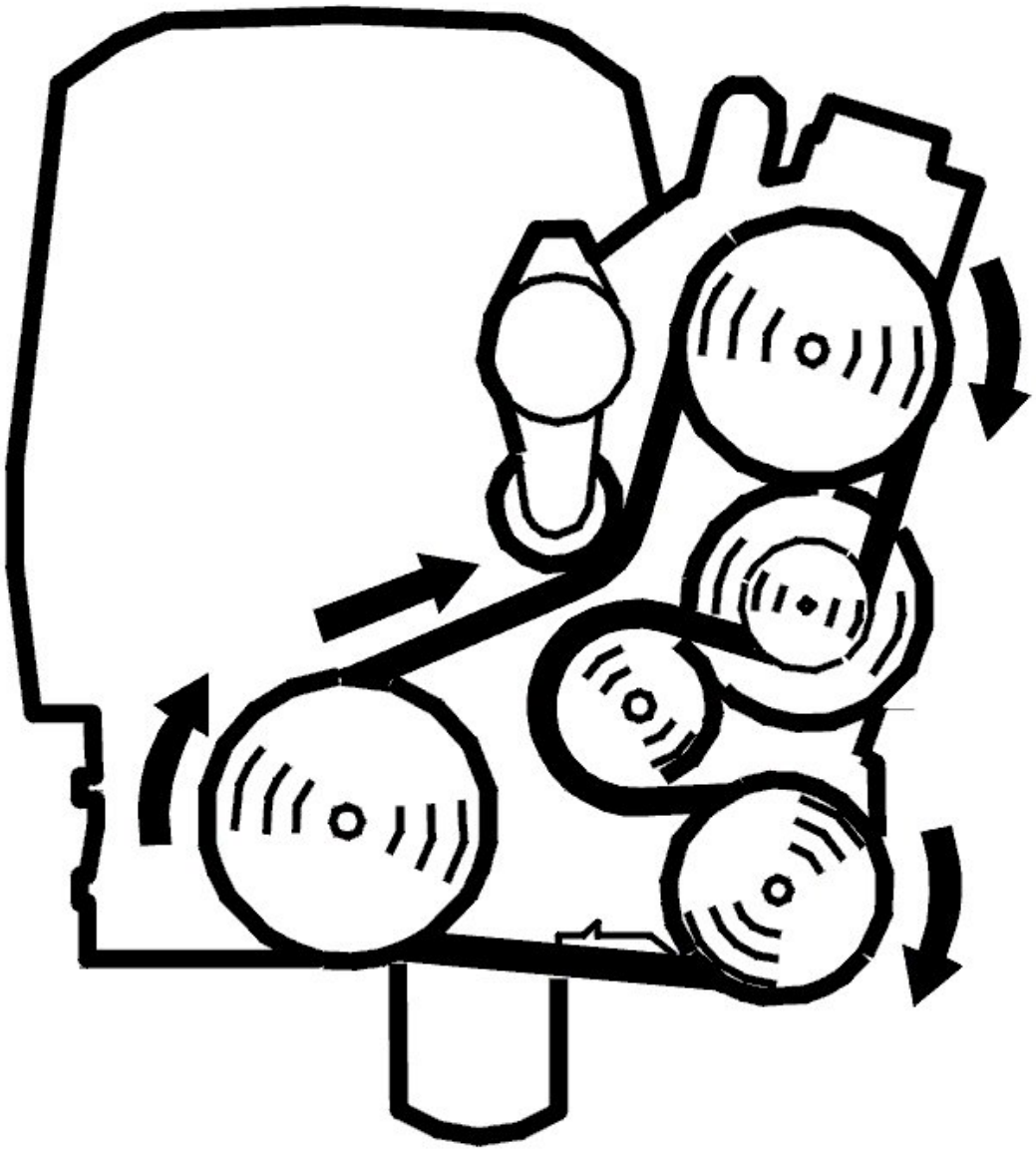
Continue - Verification

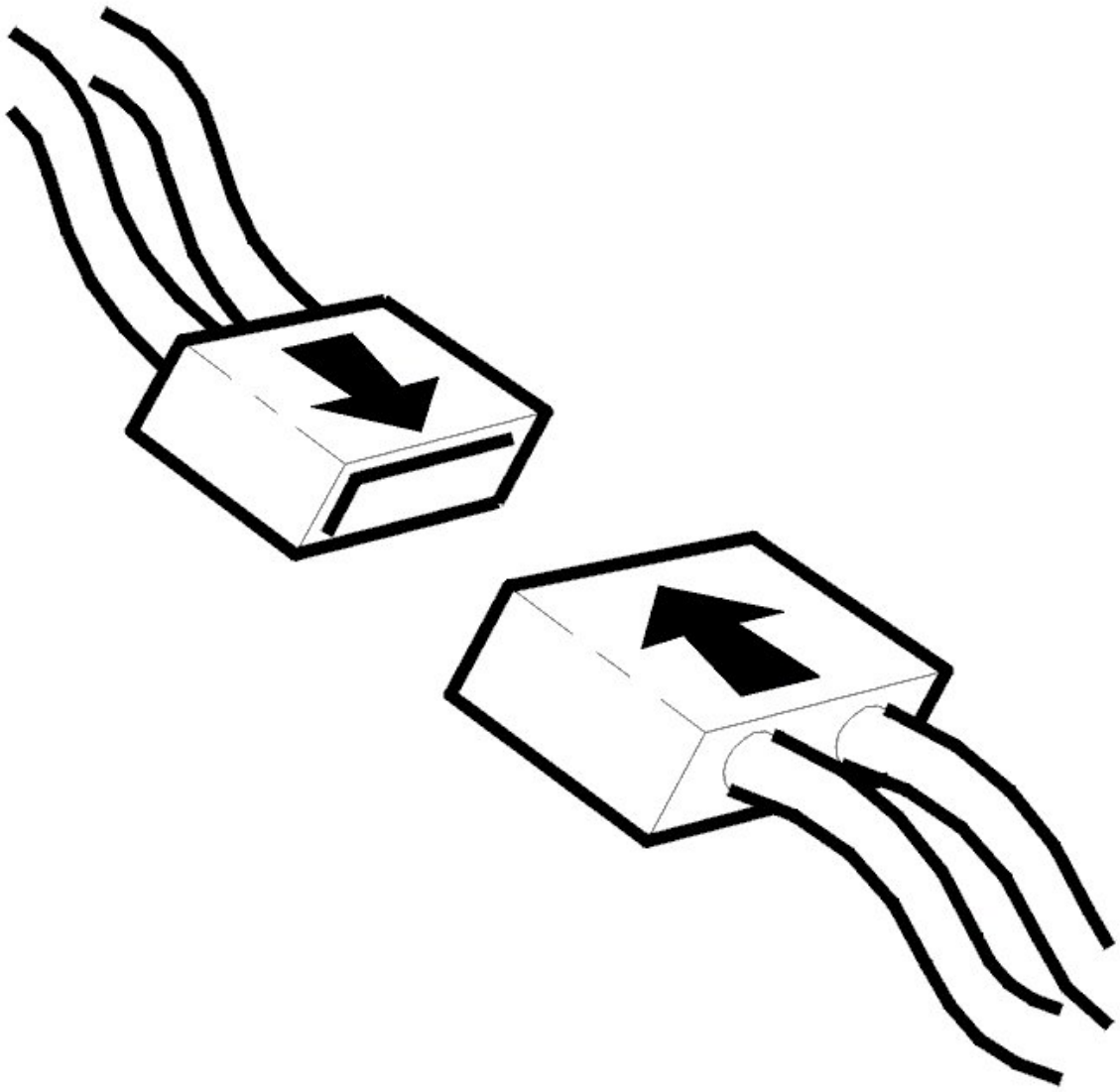
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

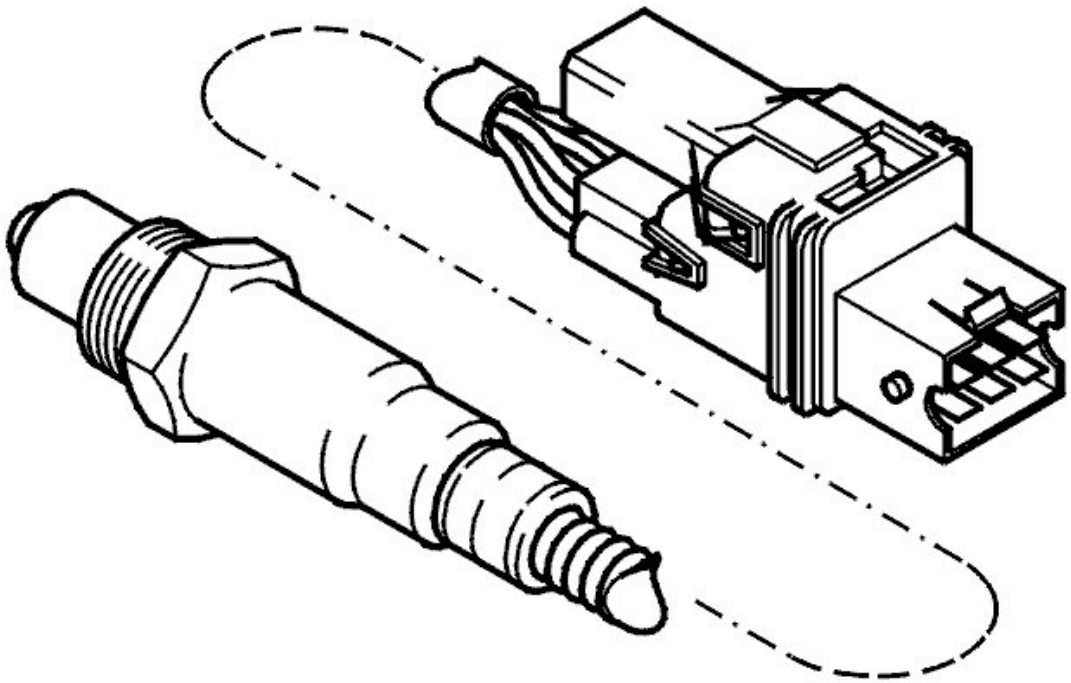
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-244C

Condition



The engine control module (ECM) controls preheating by pulsing the current to the positive temperature coefficient (PTC) element in the front heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is higher than a certain value when preheating is active.

Substitute value

- Heated oxygen sensor (HO2S) control is disabled.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the components and wiring

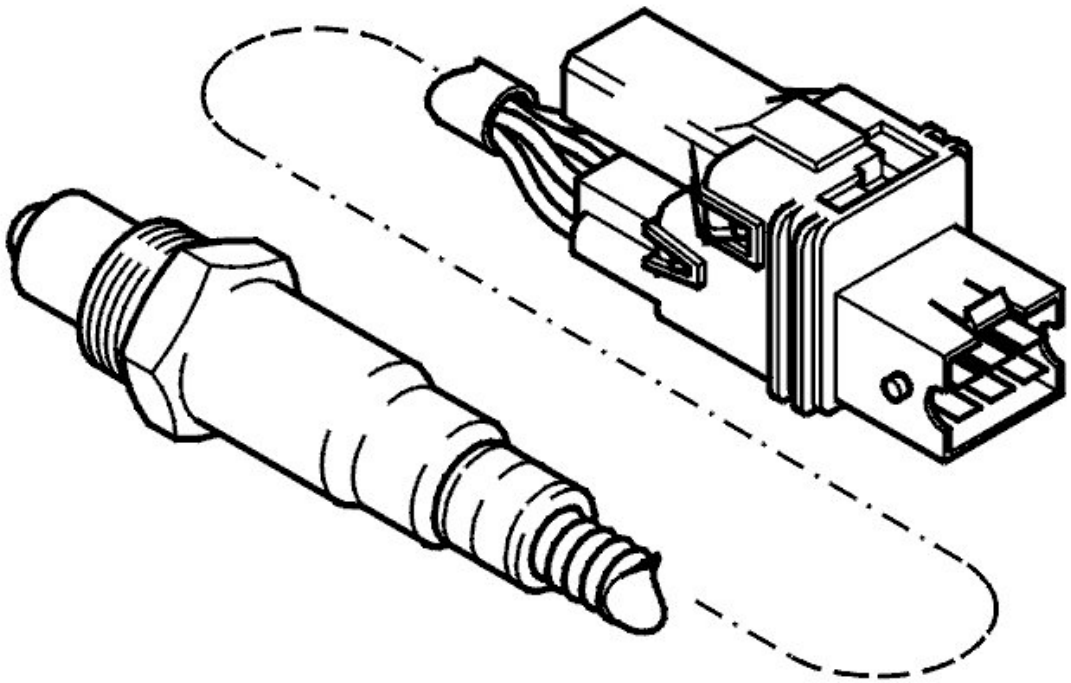
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the signal cable between heated oxygen sensor (HO2S) #3 and the system relay. Check for a short-circuit to supply voltage.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



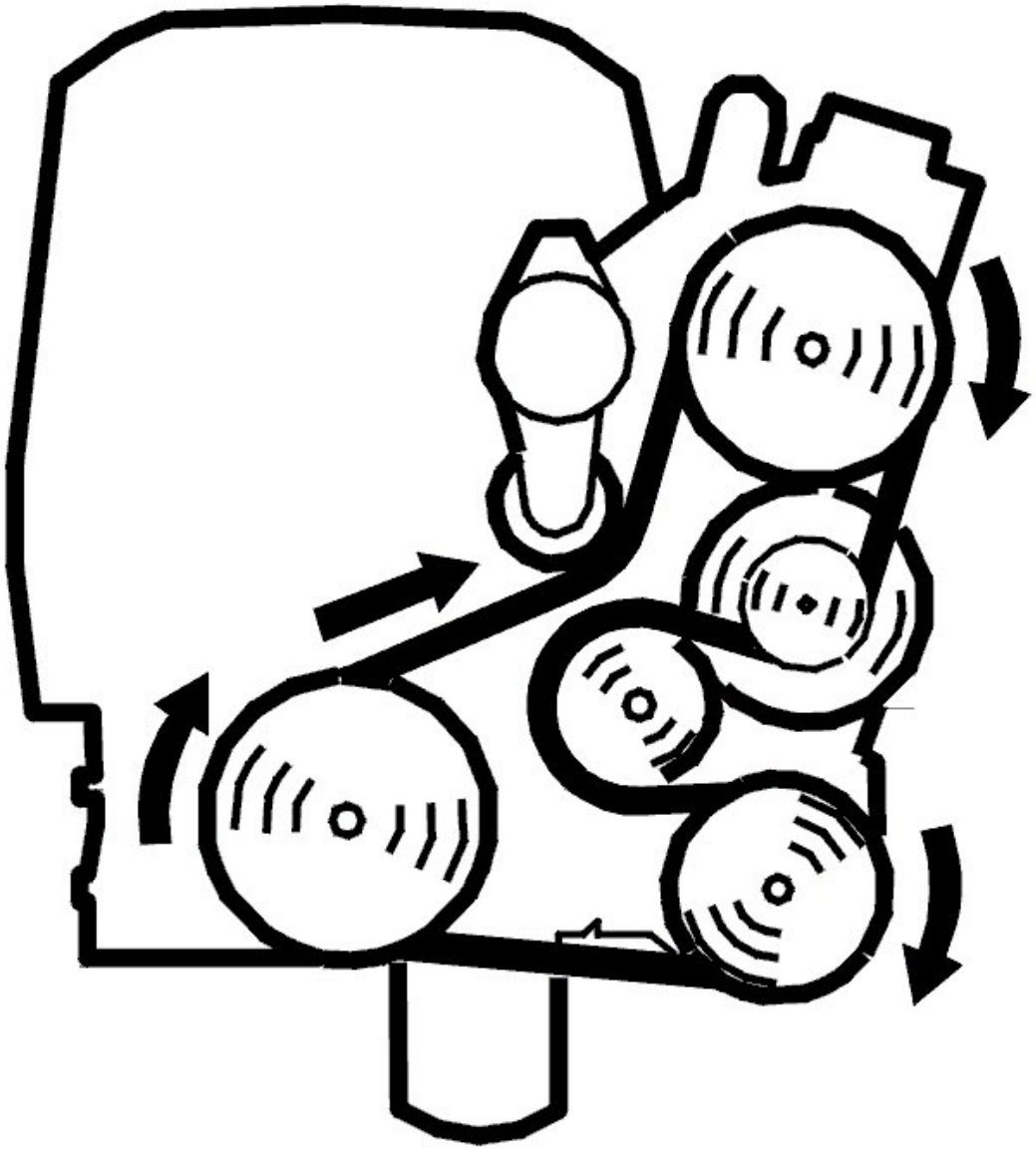
Continue - Verification

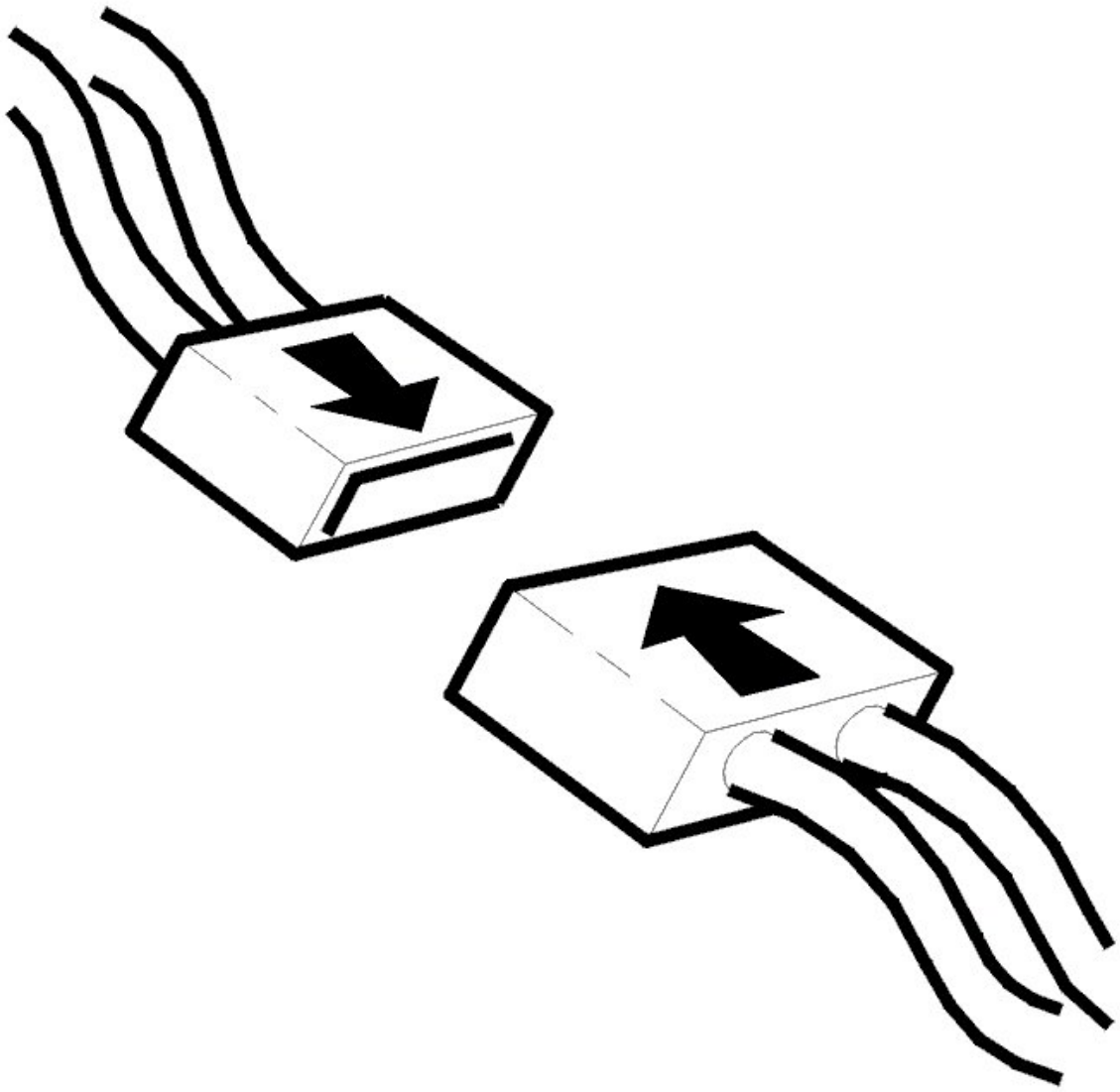
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

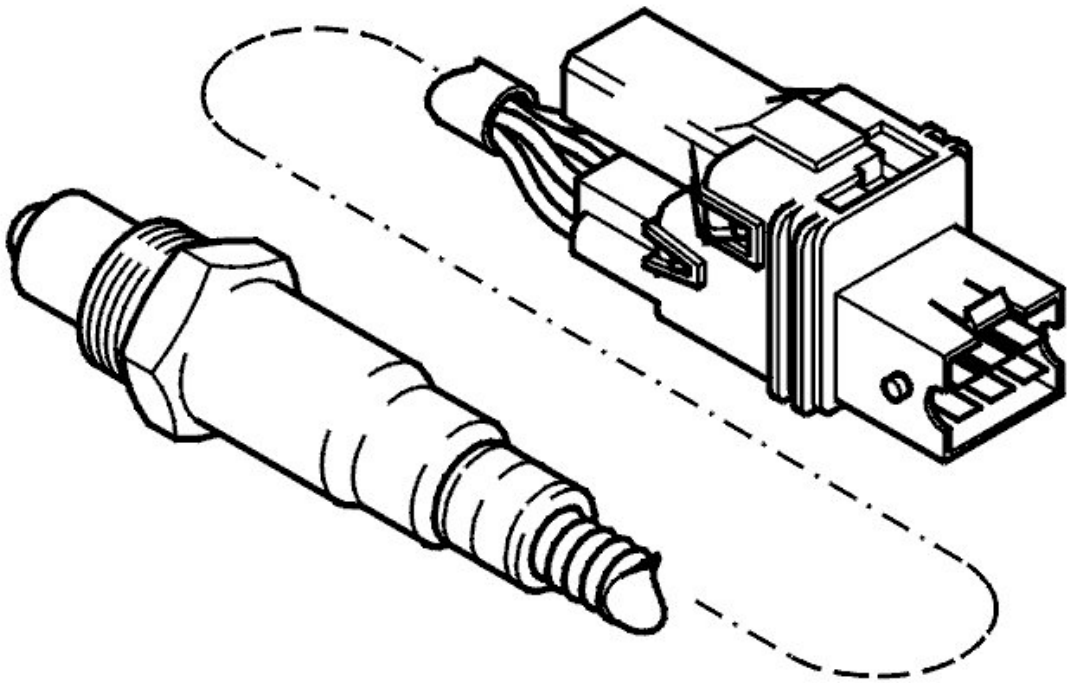
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-244D

Condition



The engine control module (ECM) controls preheating by pulsing the current to the positive temperature coefficient (PTC) element in the front heated oxygen sensor (HO2S). Pulse lengths are dependent on the temperature of the heated oxygen sensor (H02S).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal is lower than a certain value when preheating is deactivated.

Substitute value

- Heated oxygen sensor (HO2S) control is disabled.

Possible source
- Short-circuit to ground in the signal cable
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

Signal too low

Checking the components and wiring

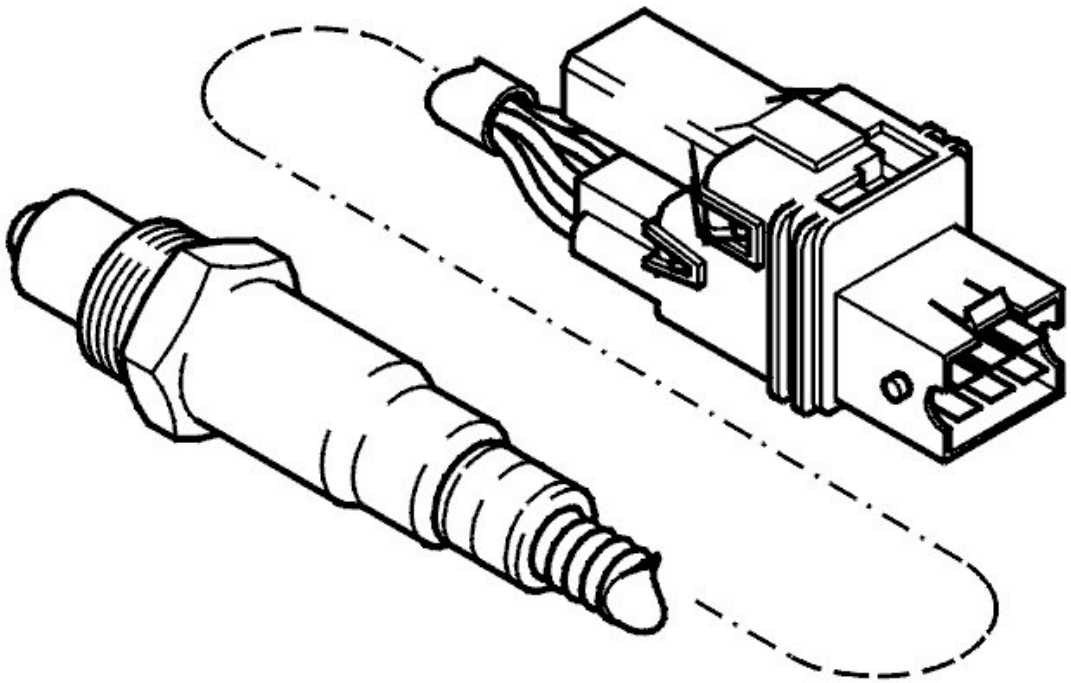
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the signal cable between heated oxygen sensor (HO2S) terminal #3 and the system relay. Check for a short-circuit to ground.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



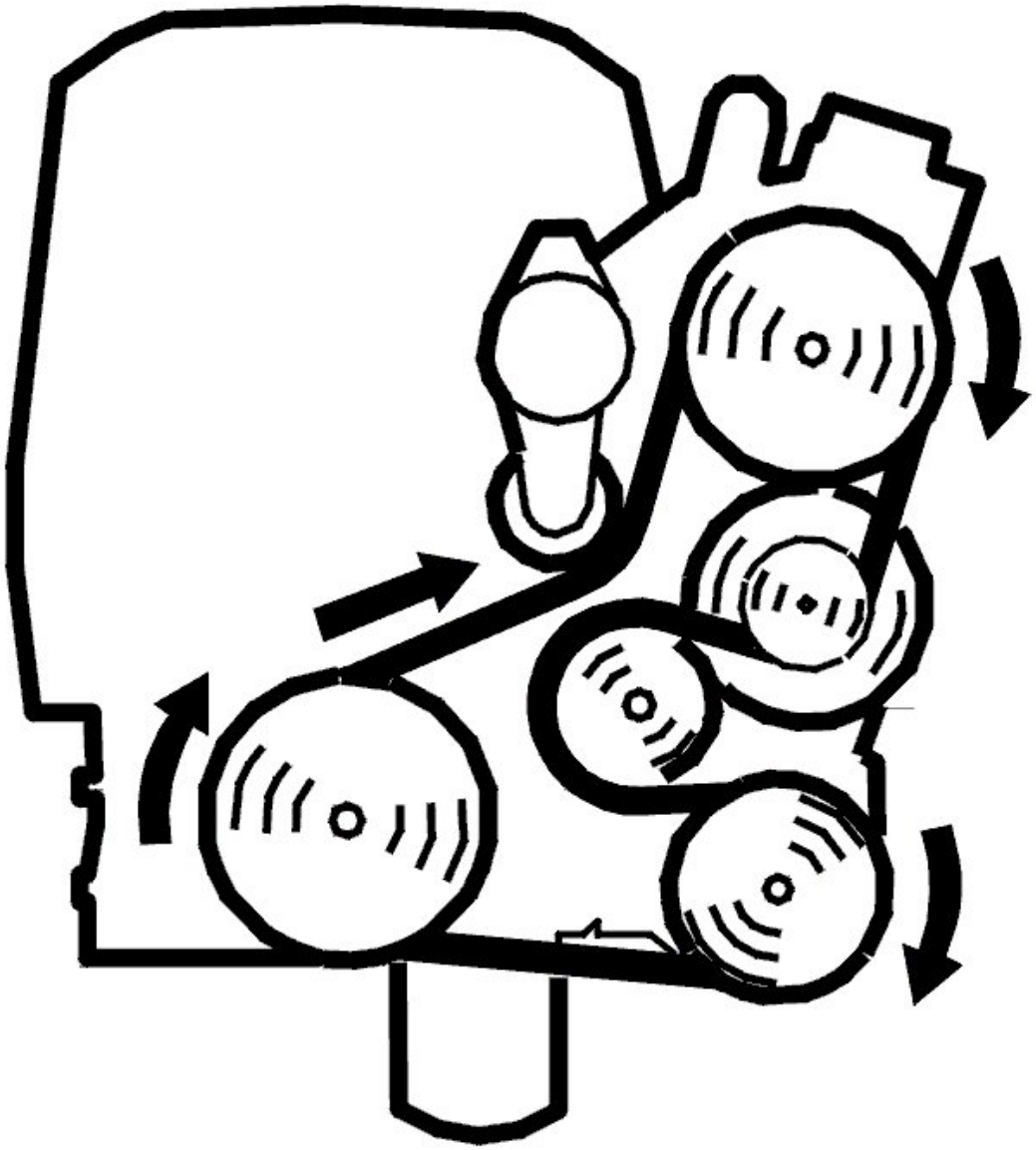
Continue - Verification

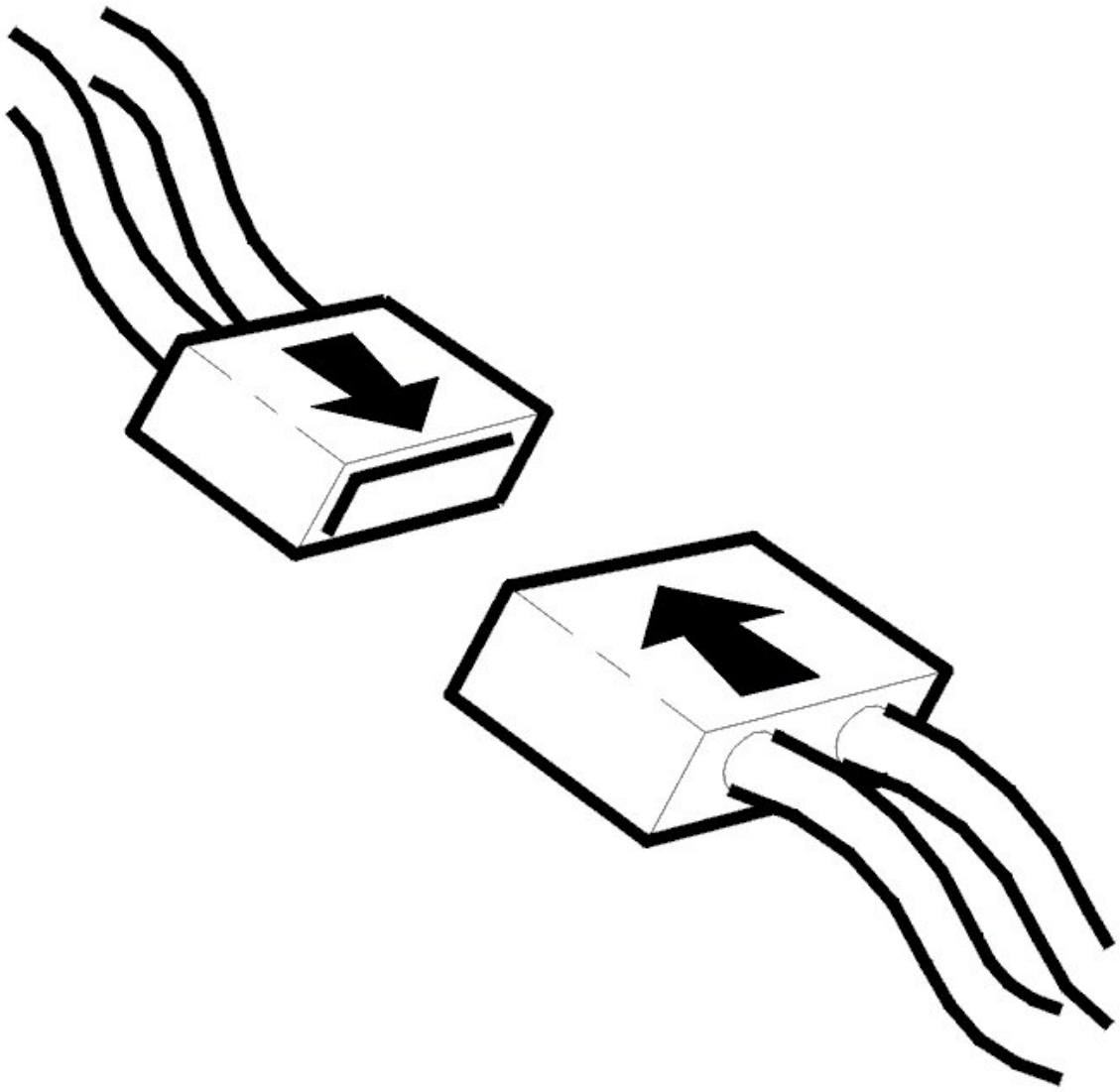
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

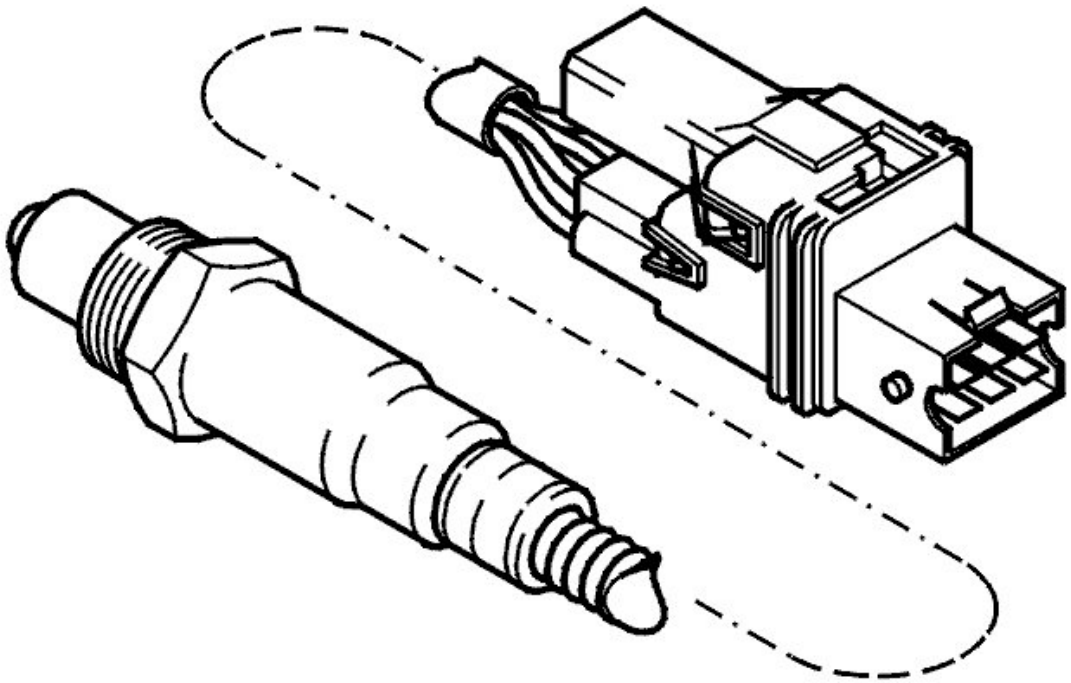
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2450

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault in the control for the heated oxygen sensors (HO2S).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

- None.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Possible source
- Damaged engine control module (ECM).

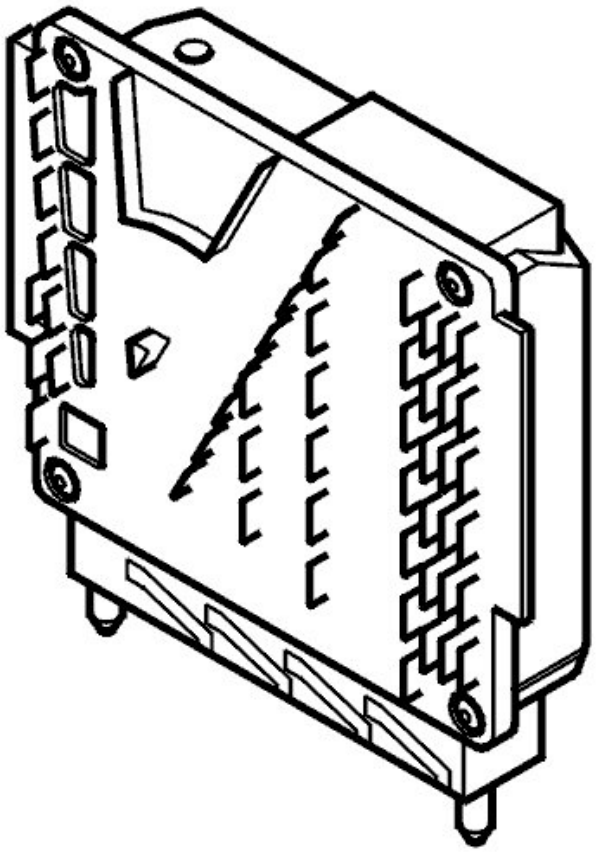
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

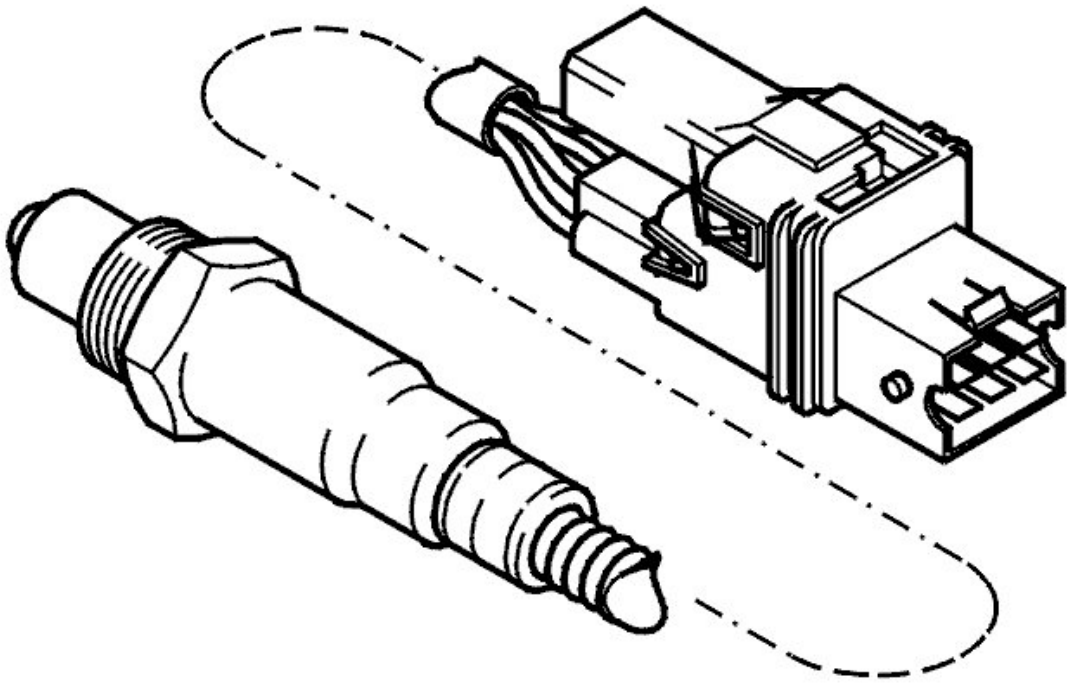
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-245B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault in the control for the heated oxygen sensors (HO2S).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

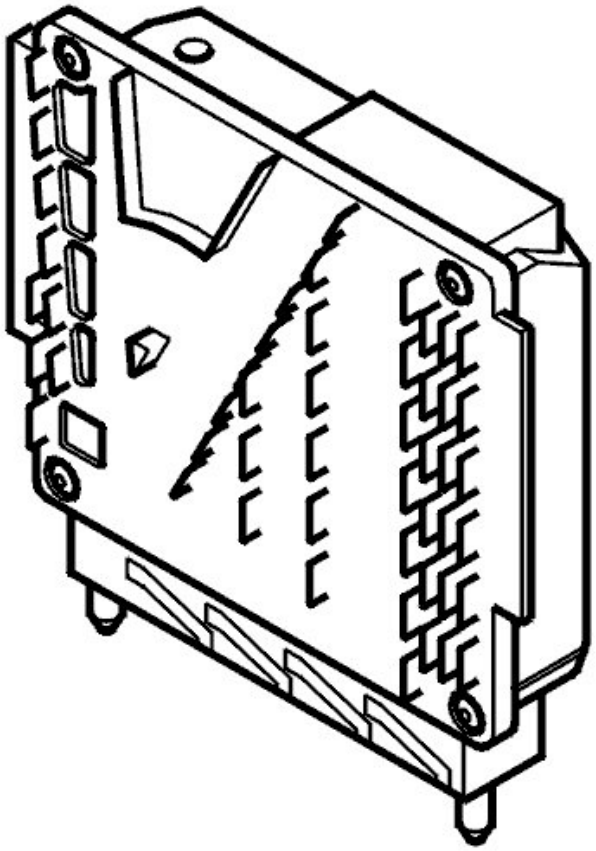
Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.

Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

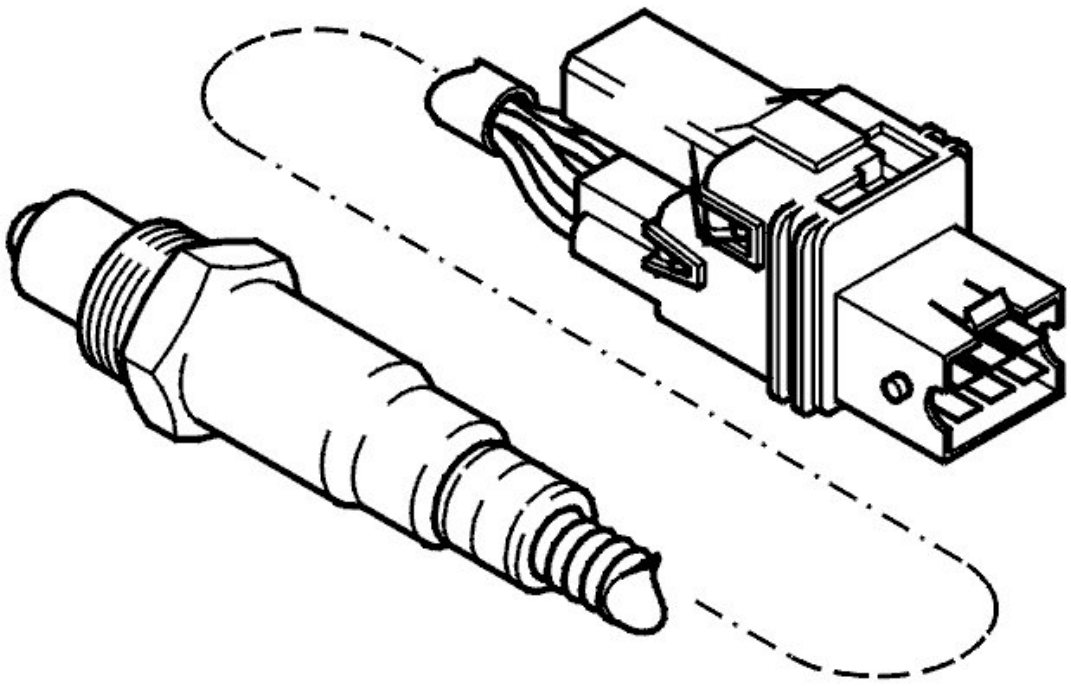
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-245C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault in the control for the heated oxygen sensors (HO2S).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

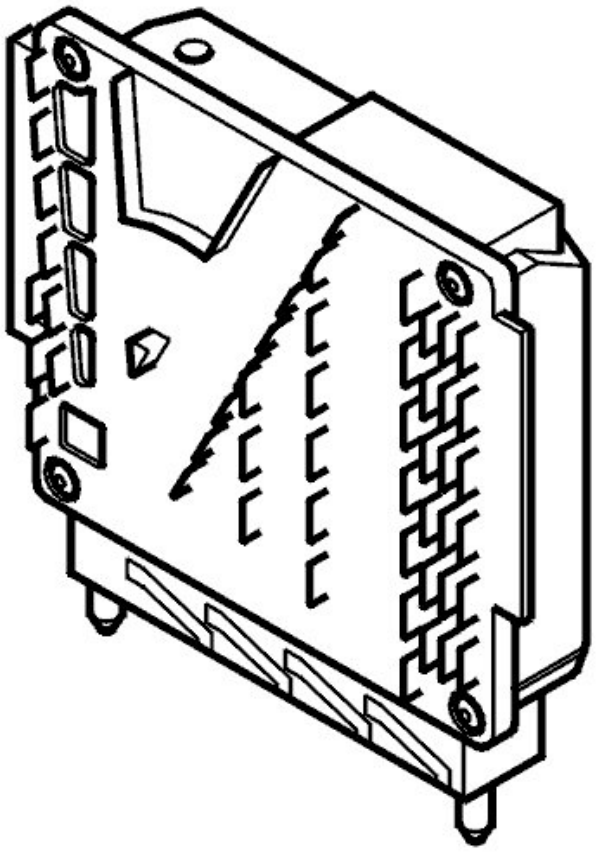
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

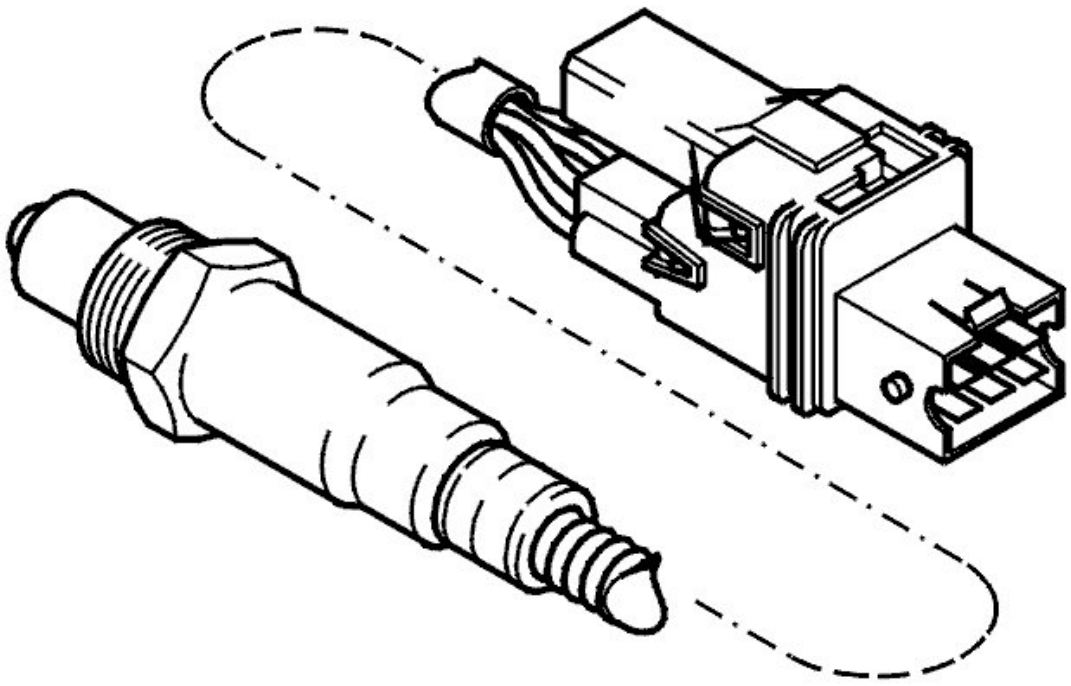
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-245D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault in the control for the heated oxygen sensors (HO2S).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

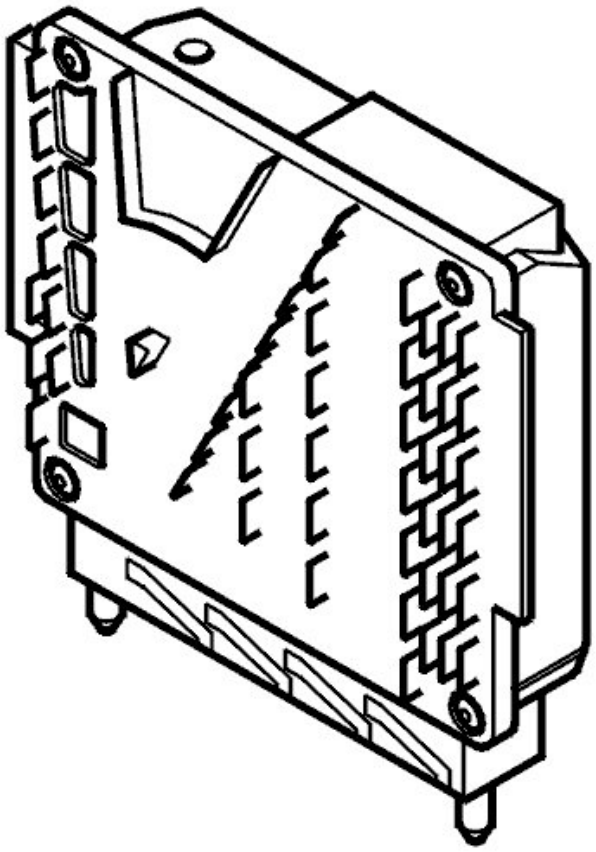
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

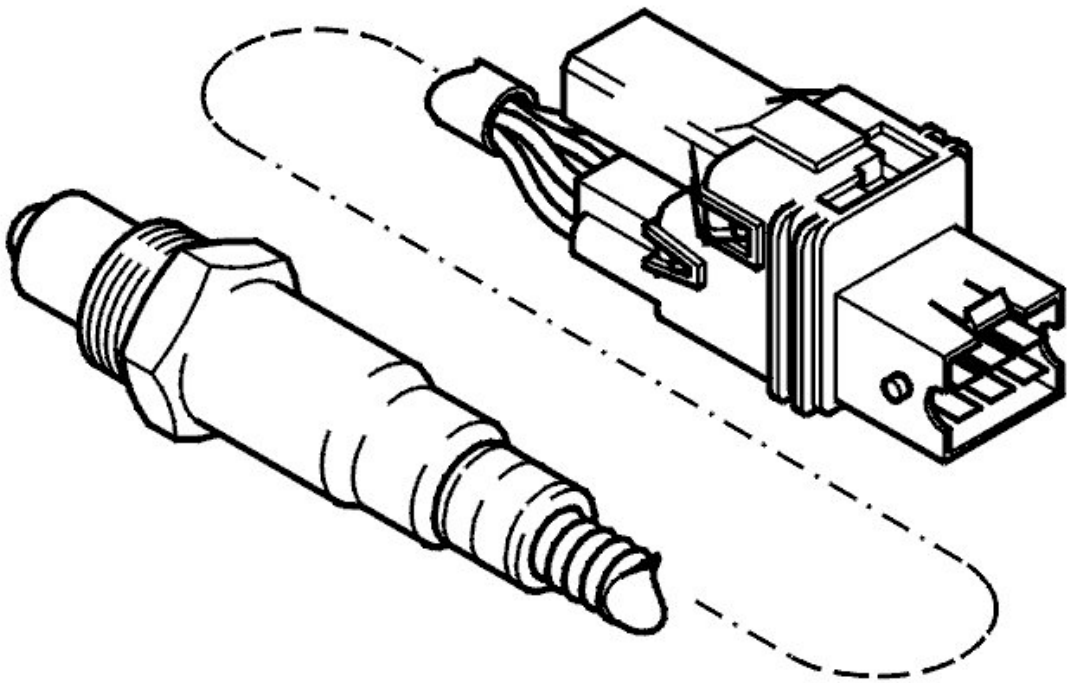
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-246B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the calibration current has ceased and the front heated oxygen sensor (HO2S) signal (bank 1) is implausibly high at fuel shut-off.

Substitute value
- None.

Possible source
- Contact resistance and oxidation in the terminals
- Open-circuit in the cable for calibration current
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the components and wiring

Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

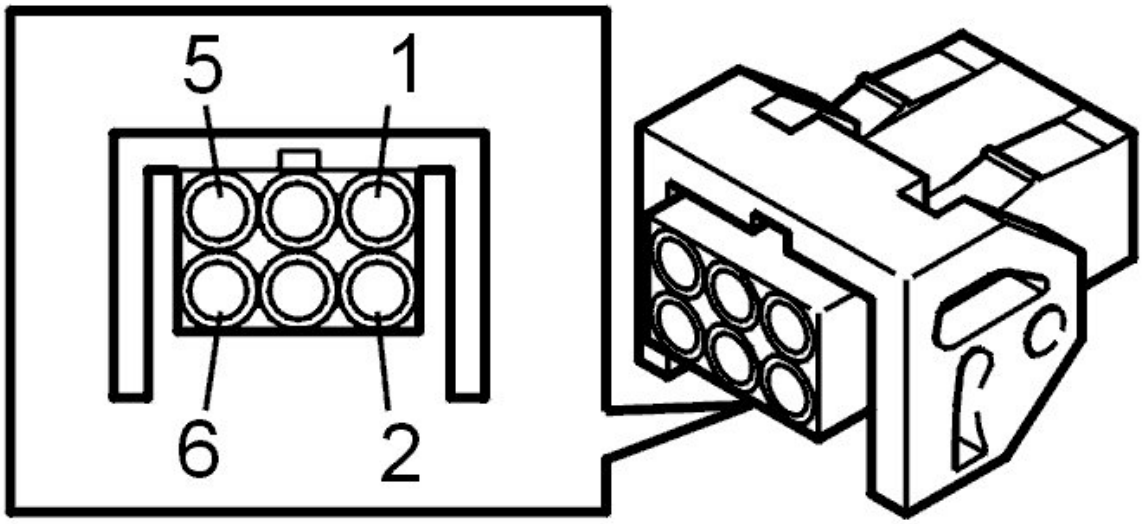
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.
Check the cable between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2. Check for an open-circuit.

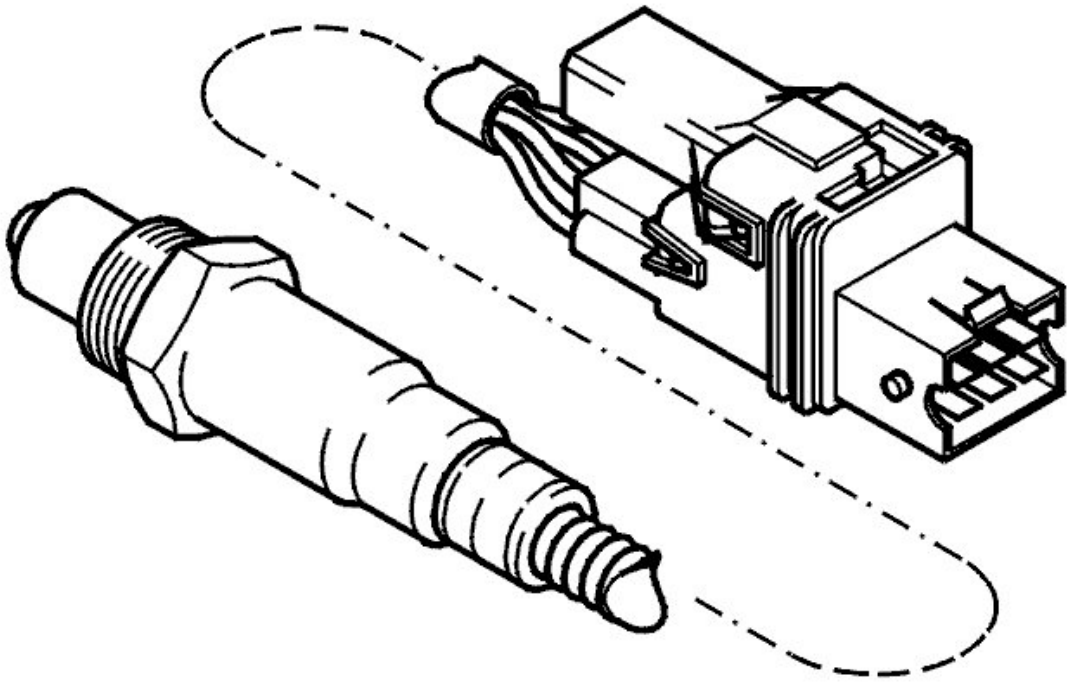
Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals





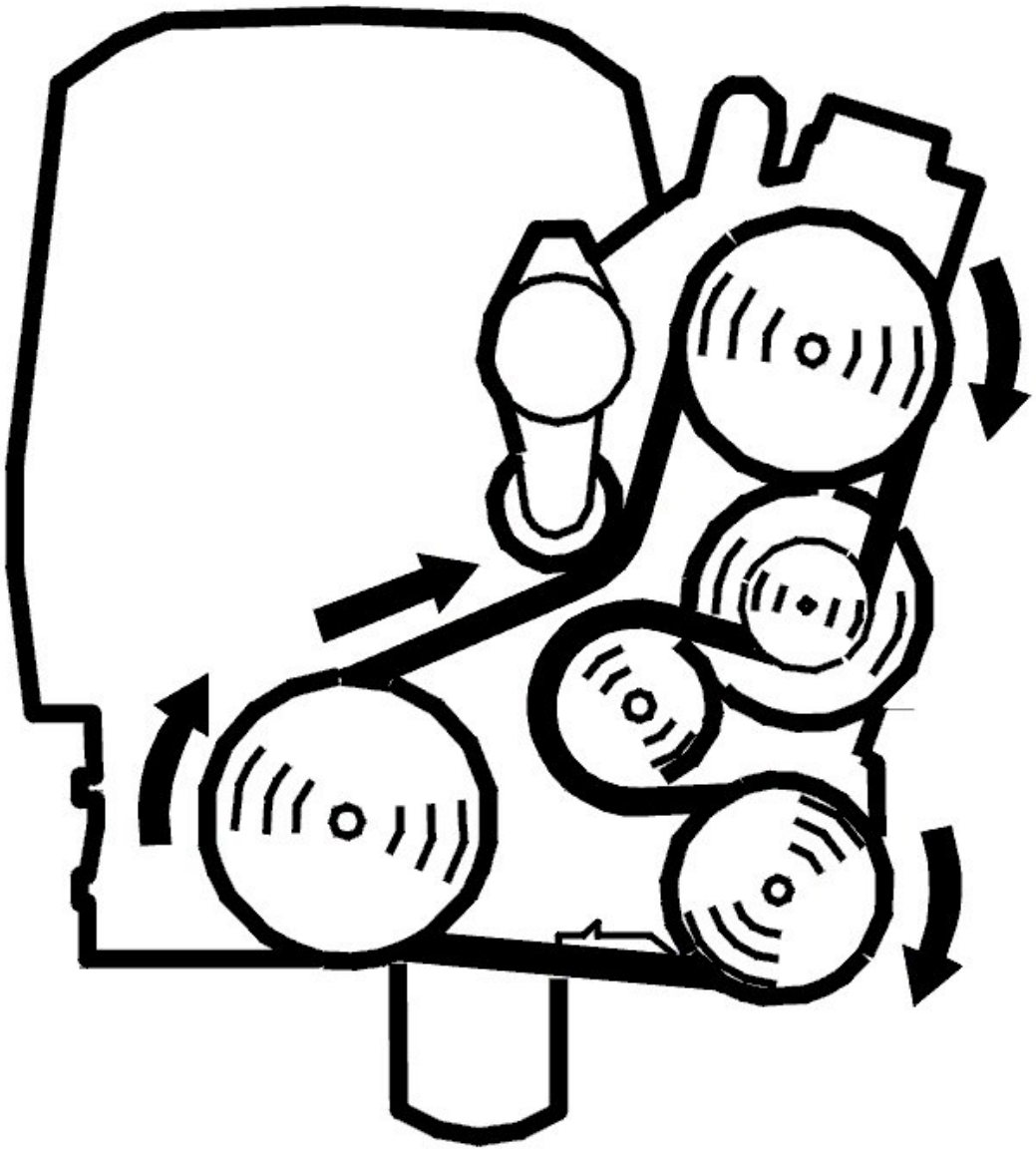
Continue - Verification

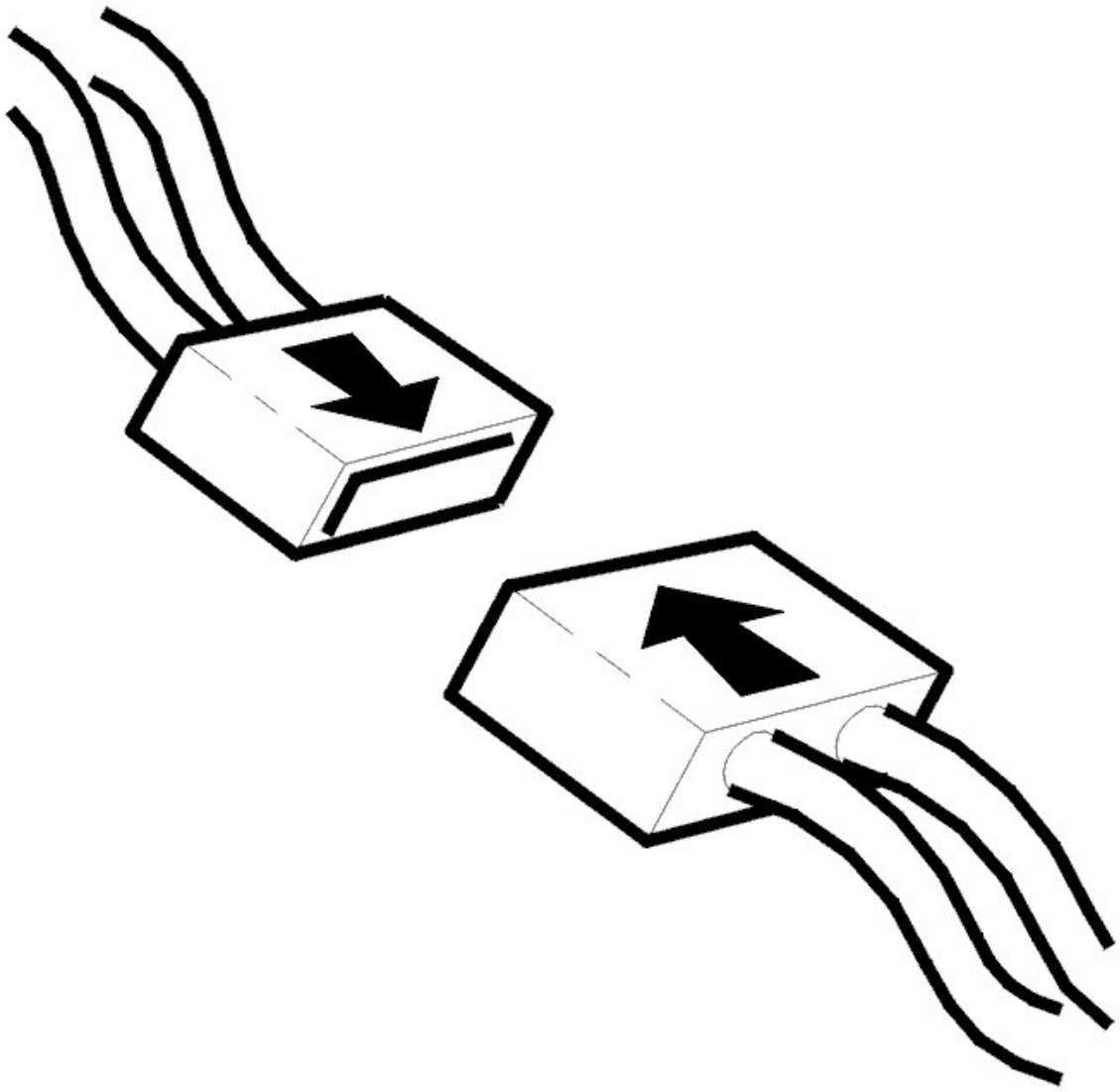
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

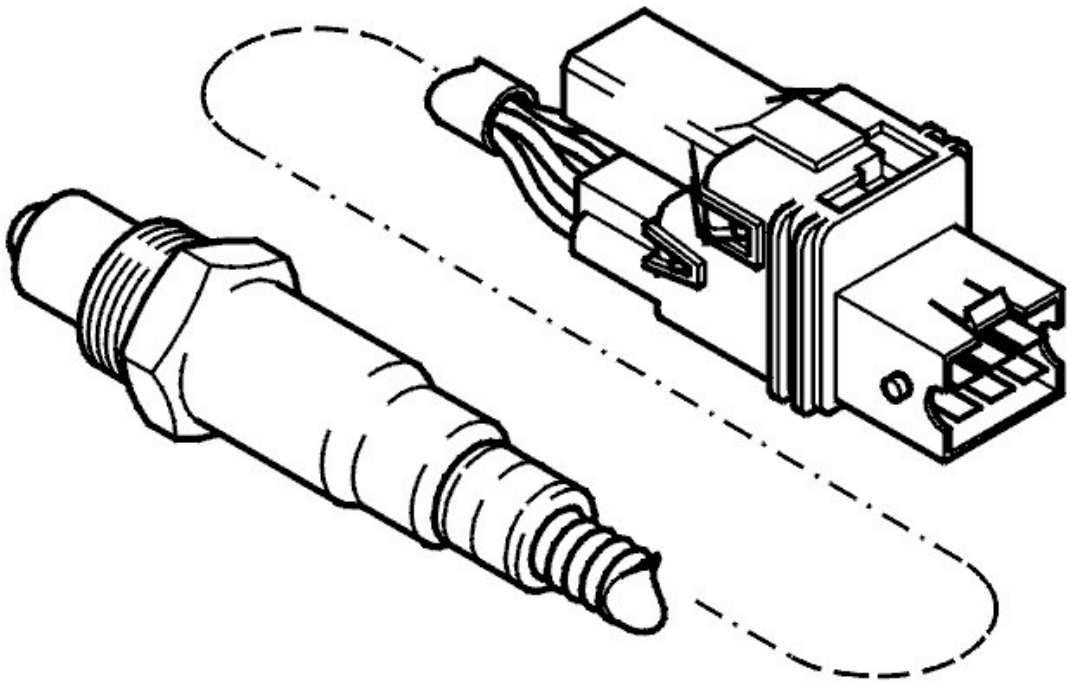
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2470

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the pump current has ceased and the front heated oxygen sensor (HO2S) signal (bank 1) has been set to a default value.

Substitute value
- None.

Possible source

- Contact resistance and oxidation in the terminals
- Open-circuit in the cable for pump current
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing

Signal too high / Signal missing / Faulty signal

Checking the components and wiring

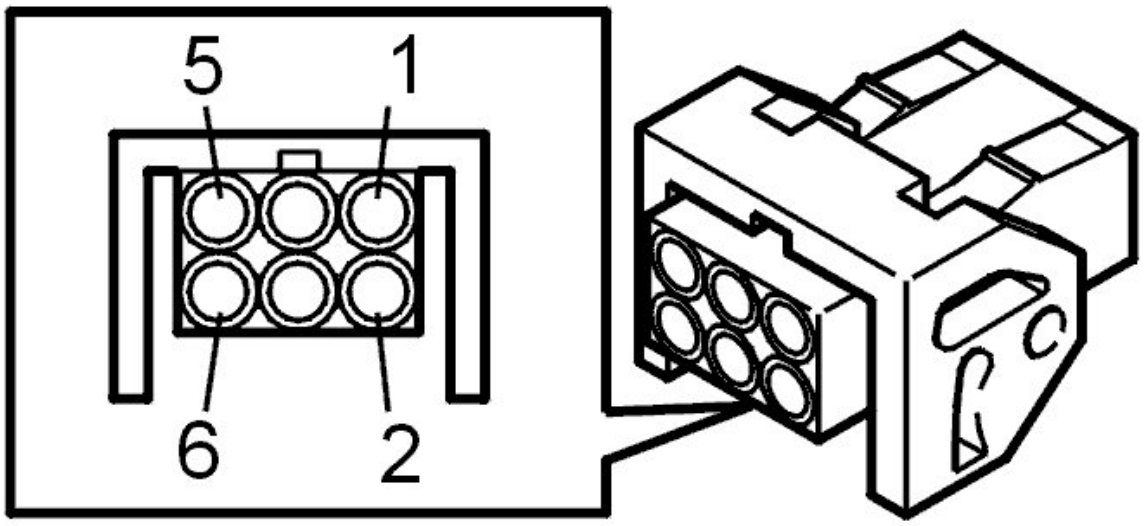
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

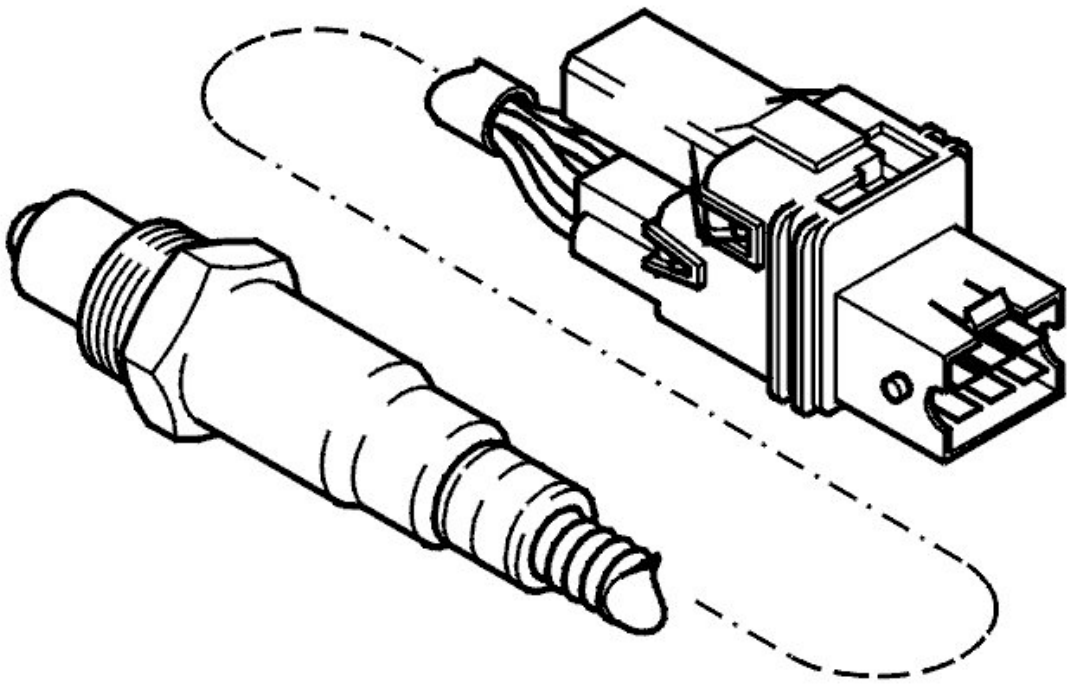
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.
Check the cable between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





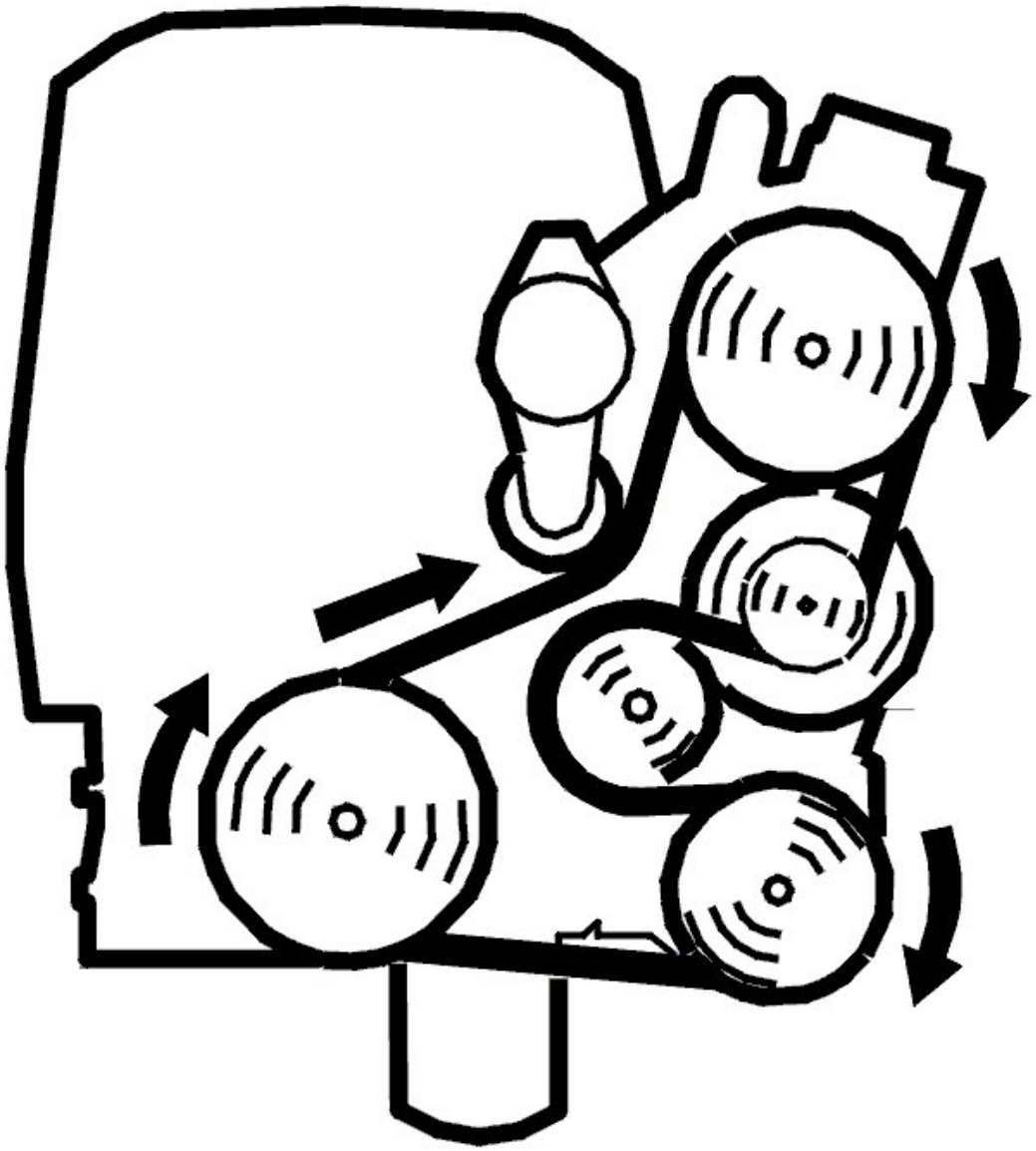
Continue - Verification

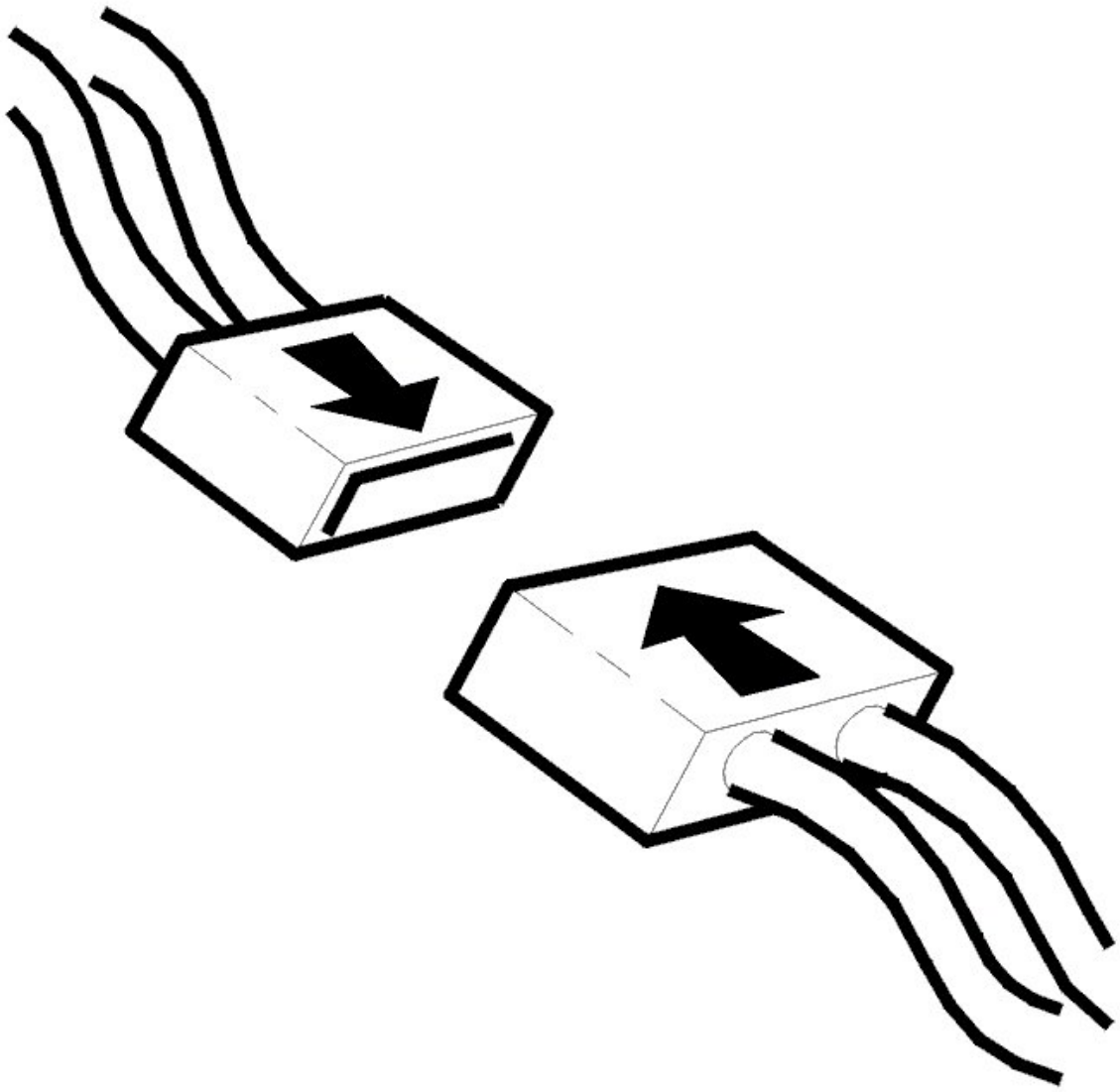
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

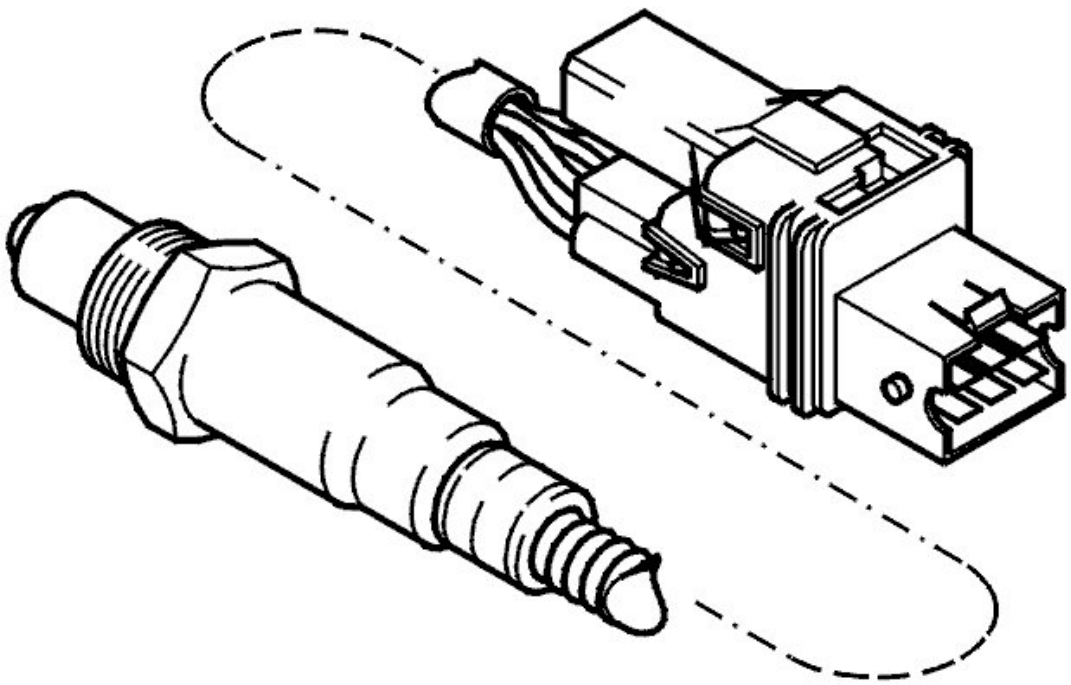
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-247B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the pump current has ceased and the front heated oxygen sensor (HO2S) signal (bank 1) has been set to a default value.

Substitute value

- None.

Possible source
- Contact resistance and oxidation in the terminals
- Open-circuit in the cable for pump current
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing/Faulty Signal

Signal too high / Signal missing / Faulty signal

Checking the components and wiring

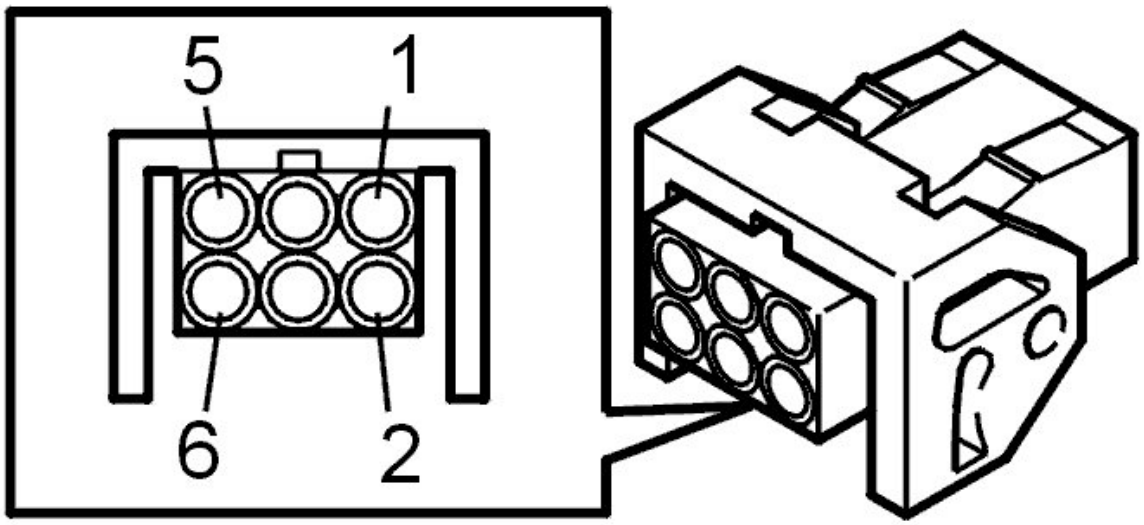
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

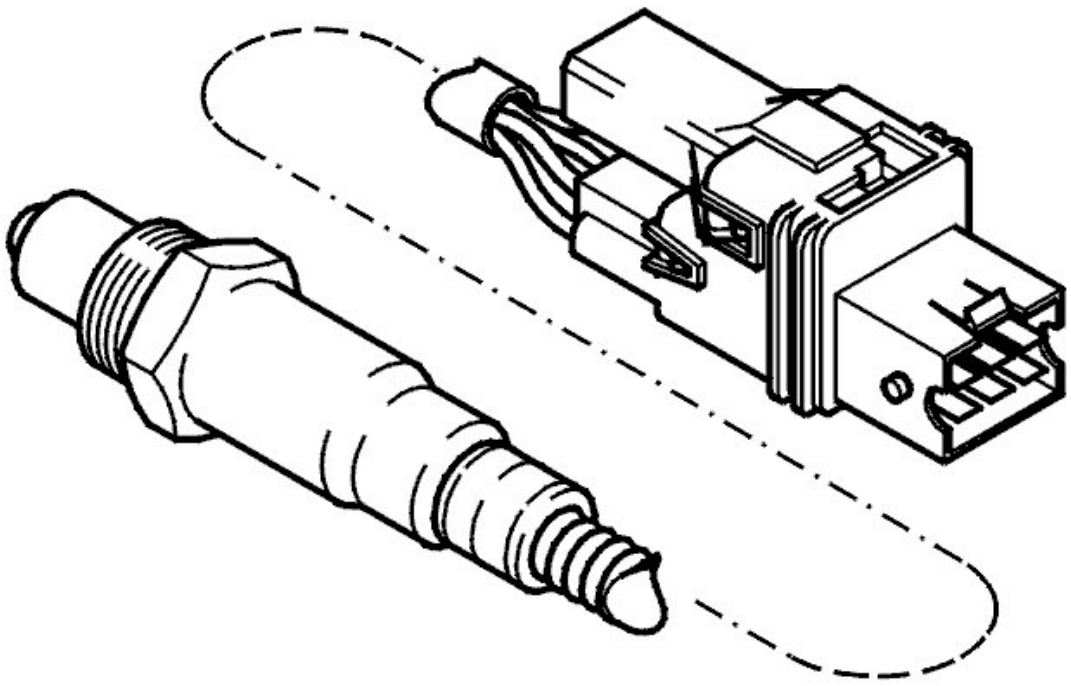
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.
Check the cable between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





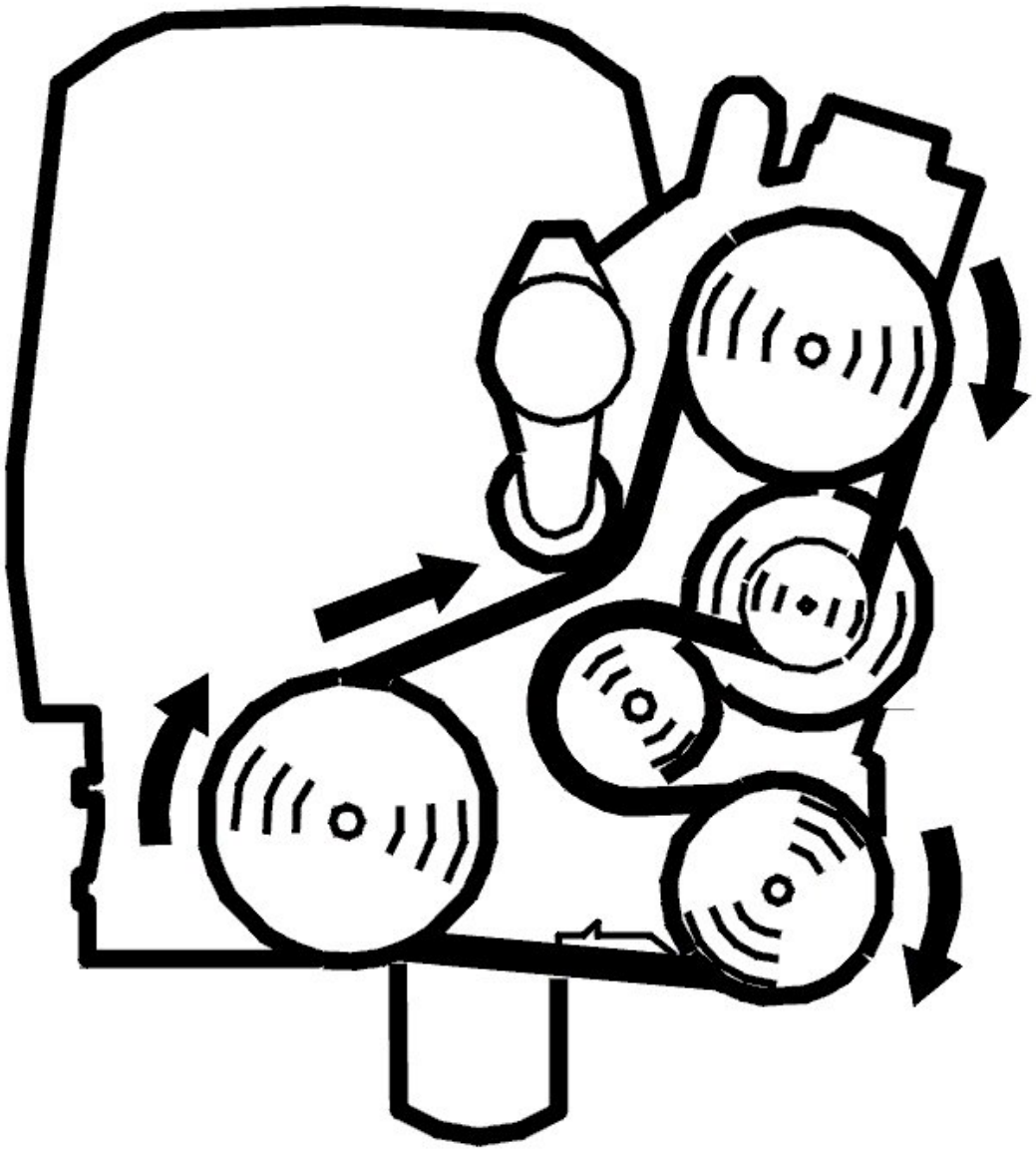
Continue - Verification

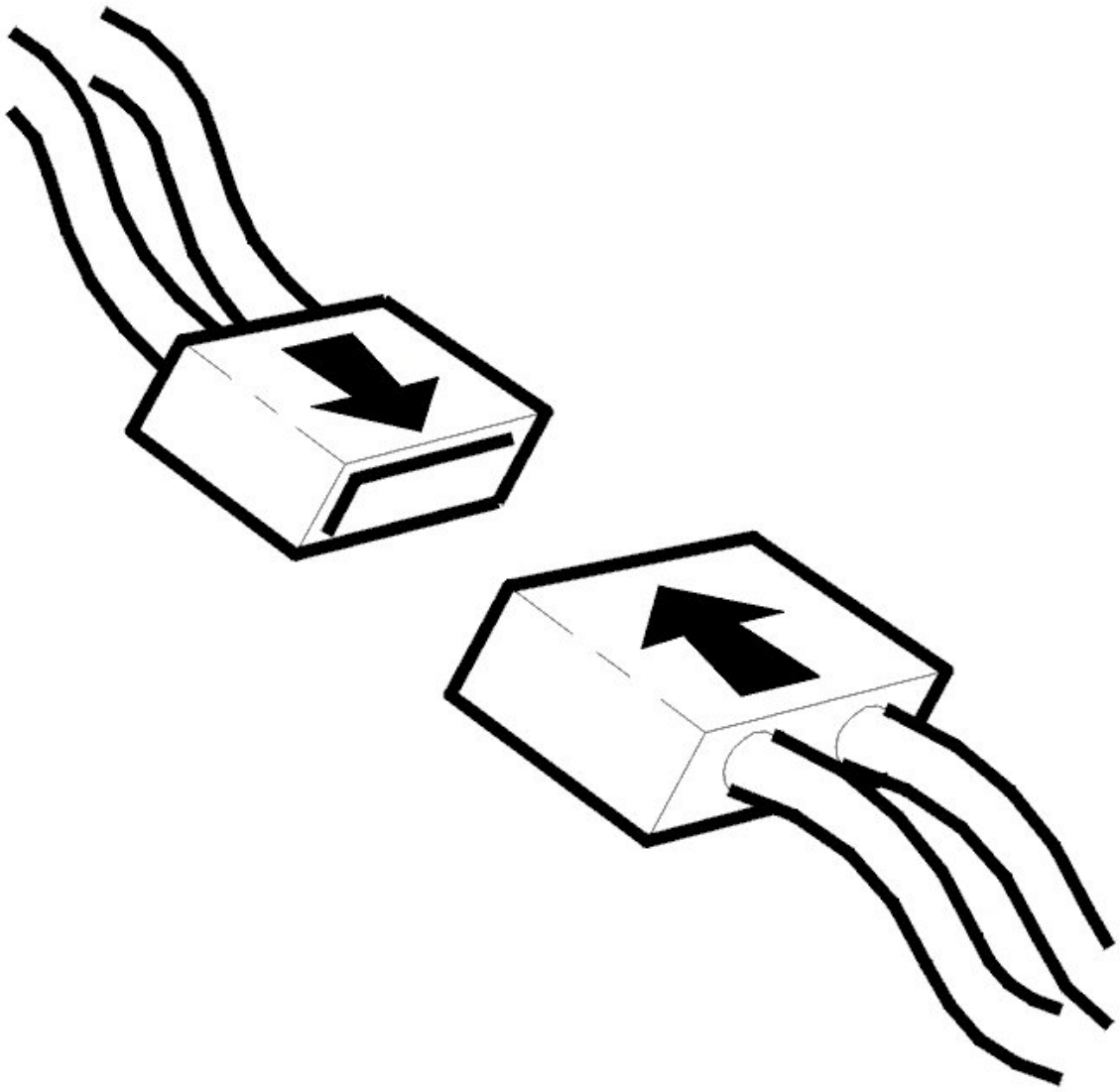
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

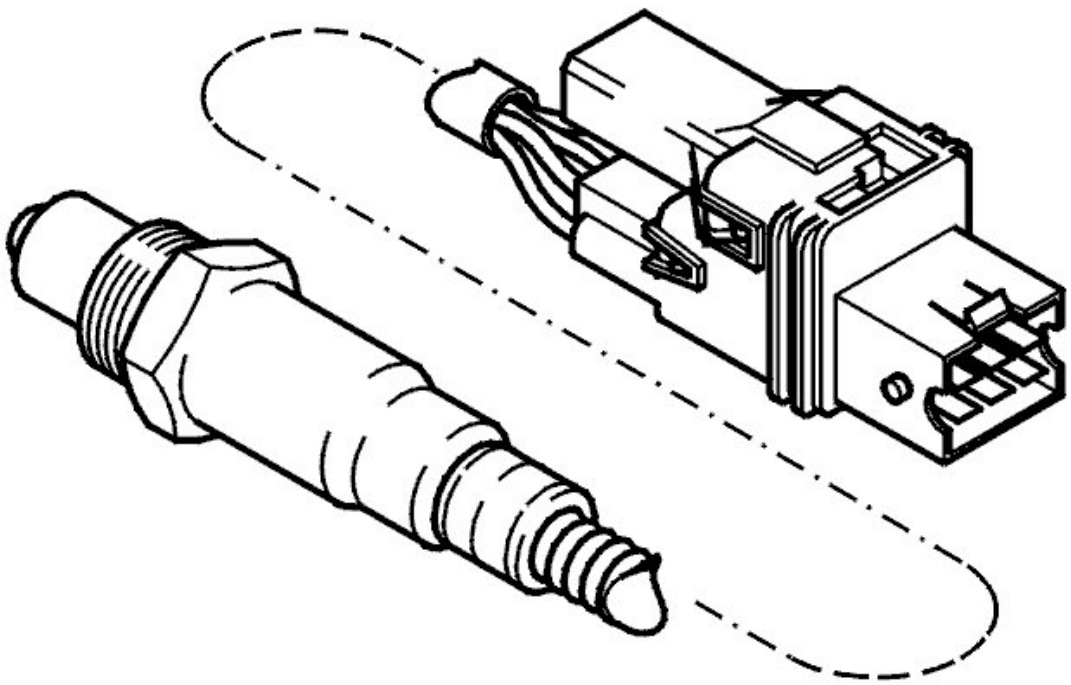
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-247C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the pump current has ceased and the front heated oxygen sensor (HO2S) signal (bank 1) has been set to a default value.

Substitute value

- None.

Possible source
- Contact resistance and oxidation in the terminals
- Open-circuit in the cable for pump current
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low/Signal Missing/Faulty Signal

Signal too high / Signal missing / Faulty signal

Checking the components and wiring

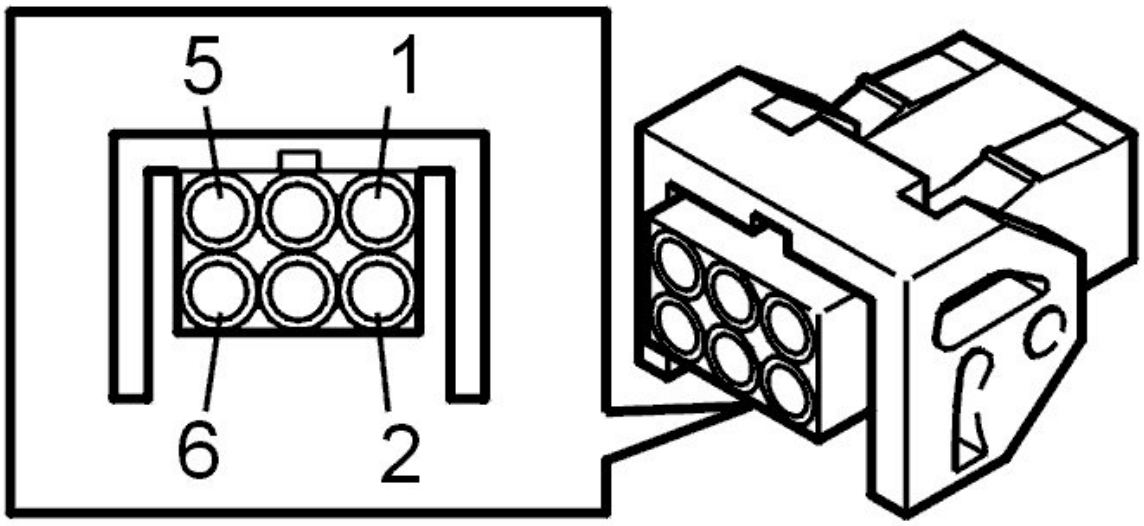
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

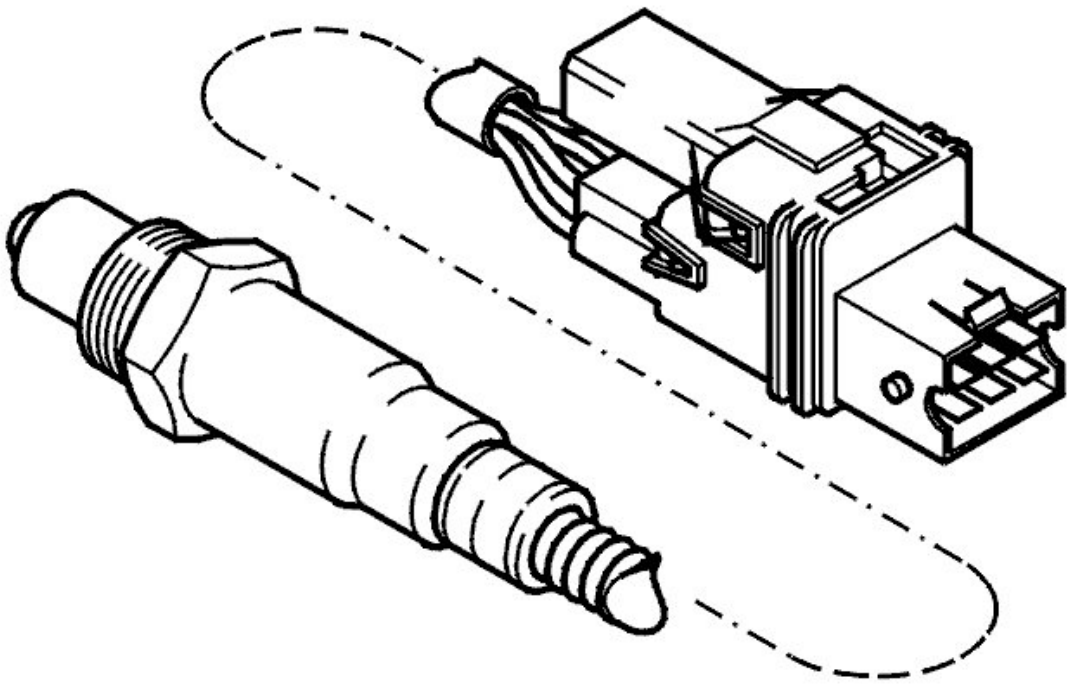
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance and oxidation.
Check the cable between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





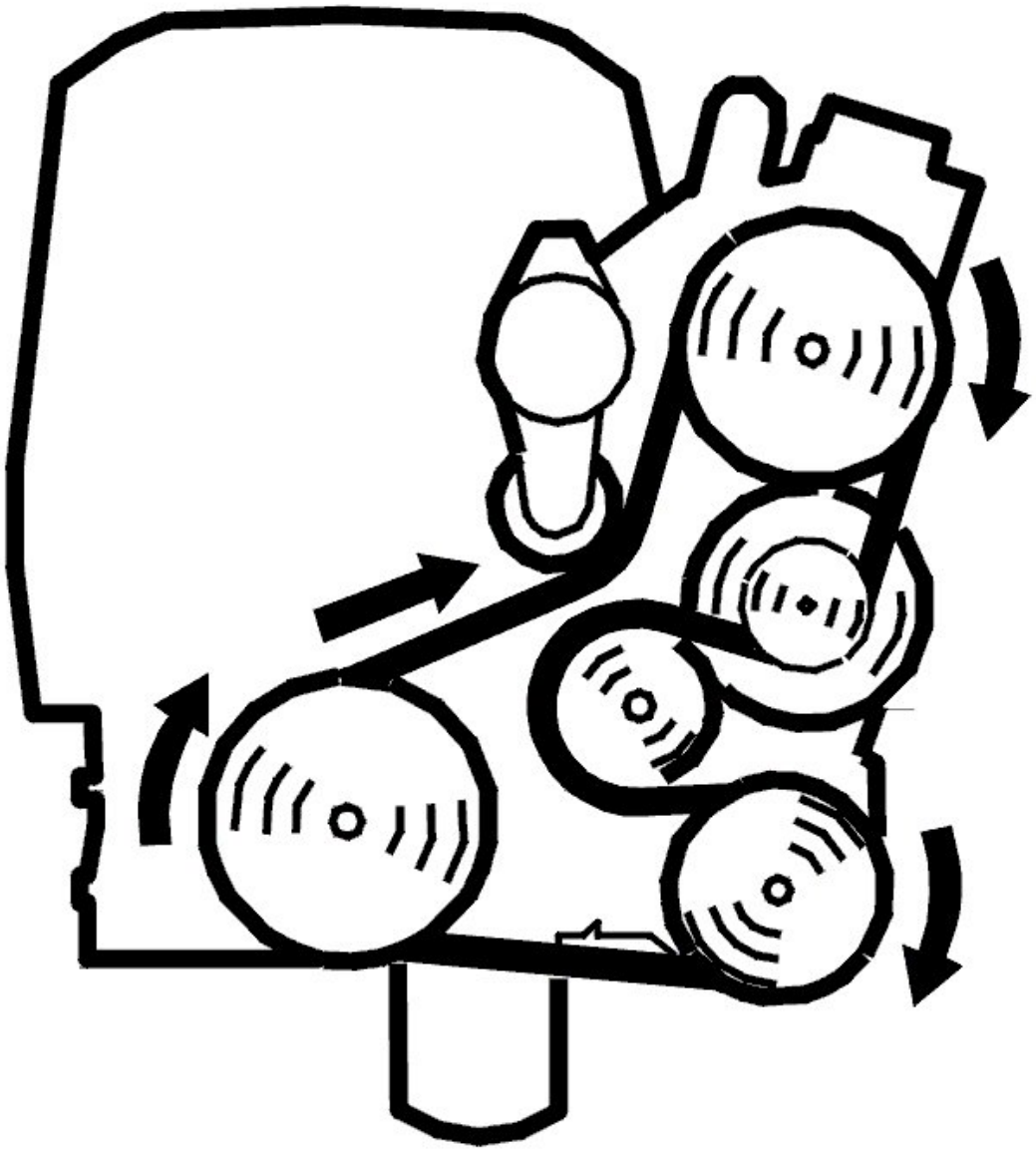
Continue - Verification

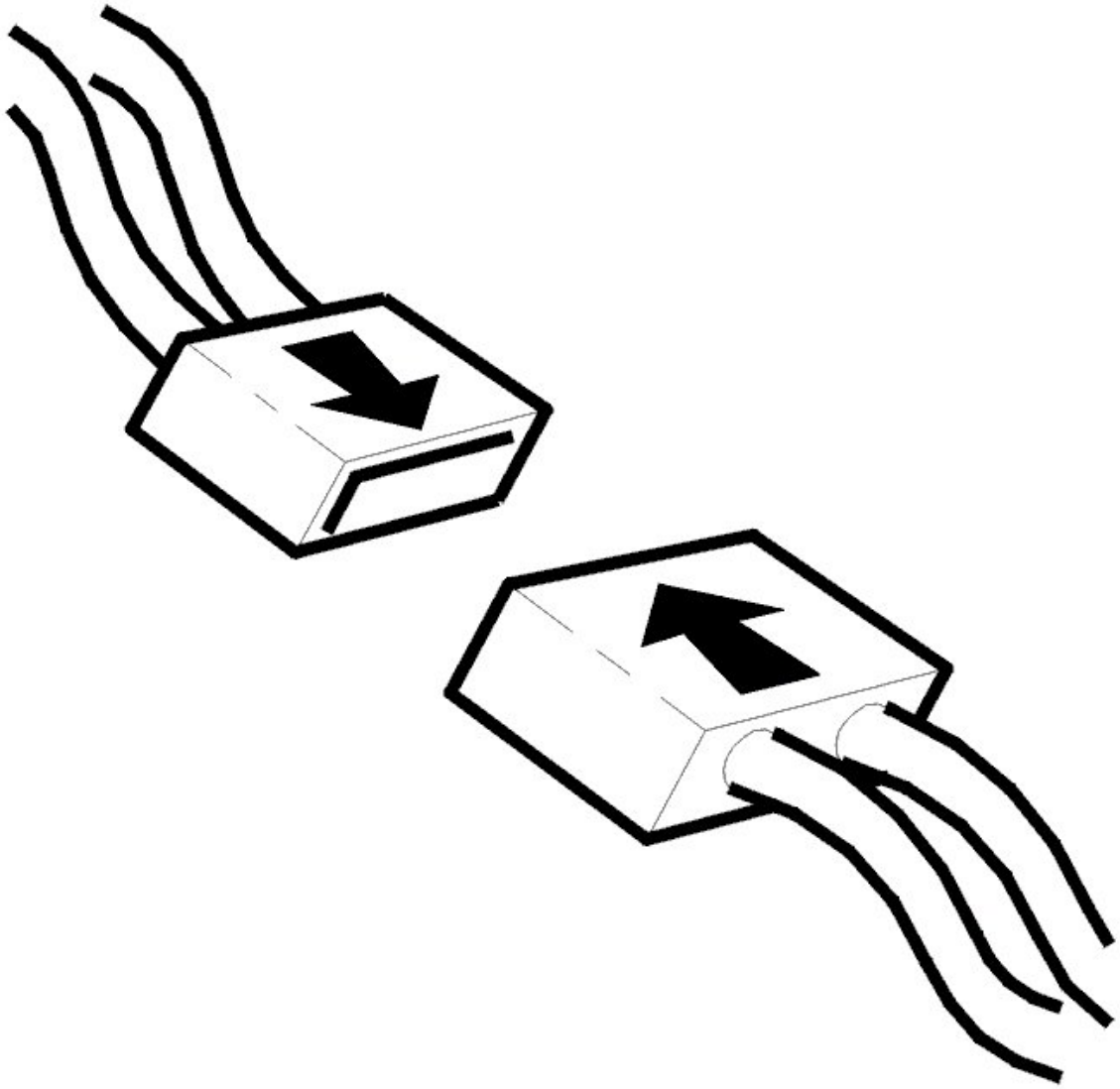
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

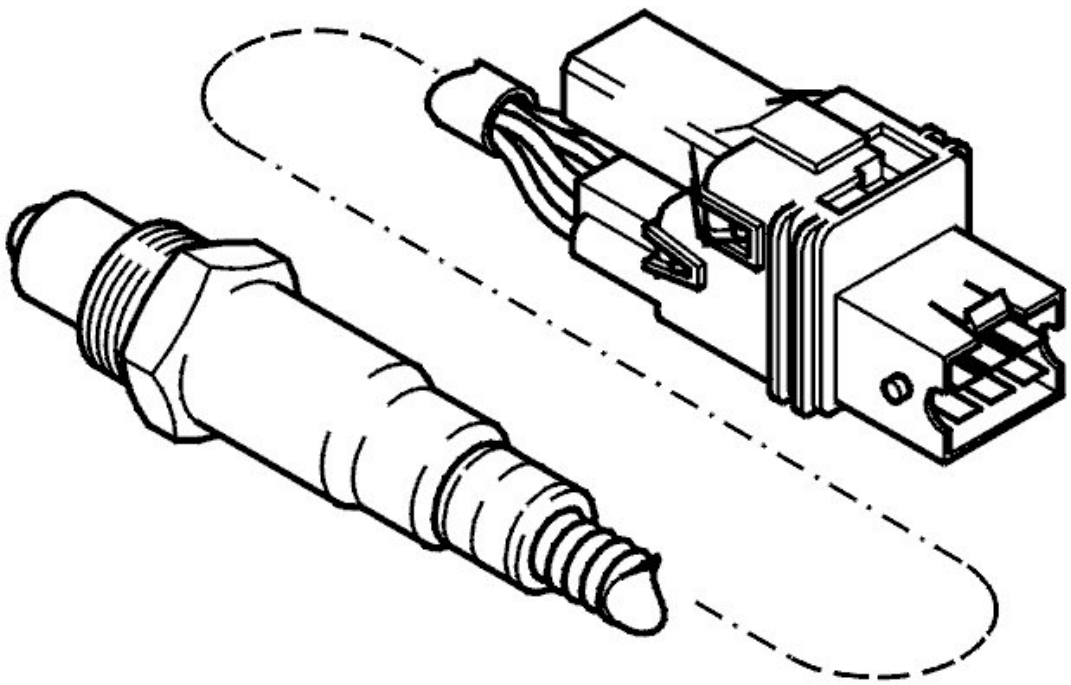
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-248C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that there is a short-circuit to supply voltage in the signal cables for the front heated oxygen sensor (HO2S) (bank 1).

Substitute value

- None.

Possible source
- Short-circuit in the signal cables
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the components and wiring

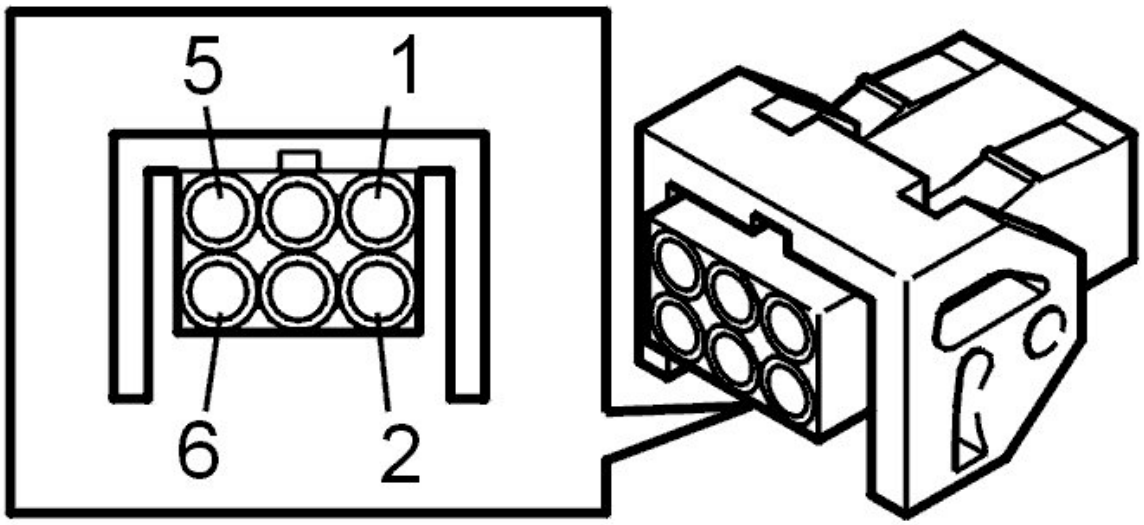
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

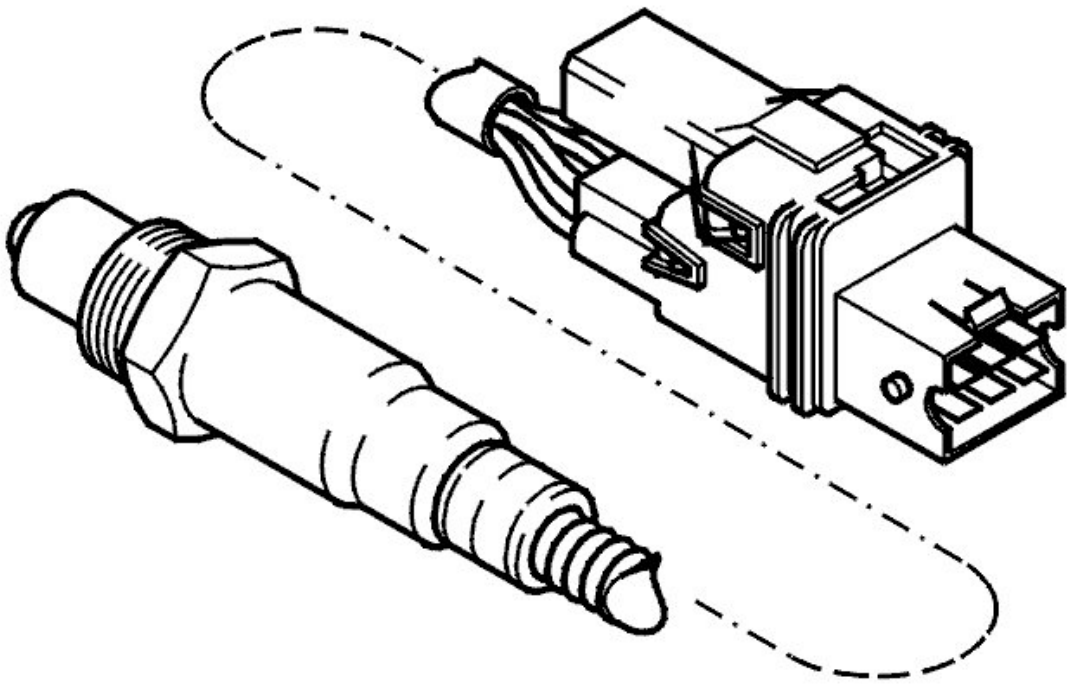
Check the cable for a short-circuit to supply voltage.
Check between:
- The system relay and heated oxygen sensor (HO2S) terminal #3
- Engine control module (ECM) terminal #A18 (#A18) and heated oxygen sensor (HO2S) terminal #4.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





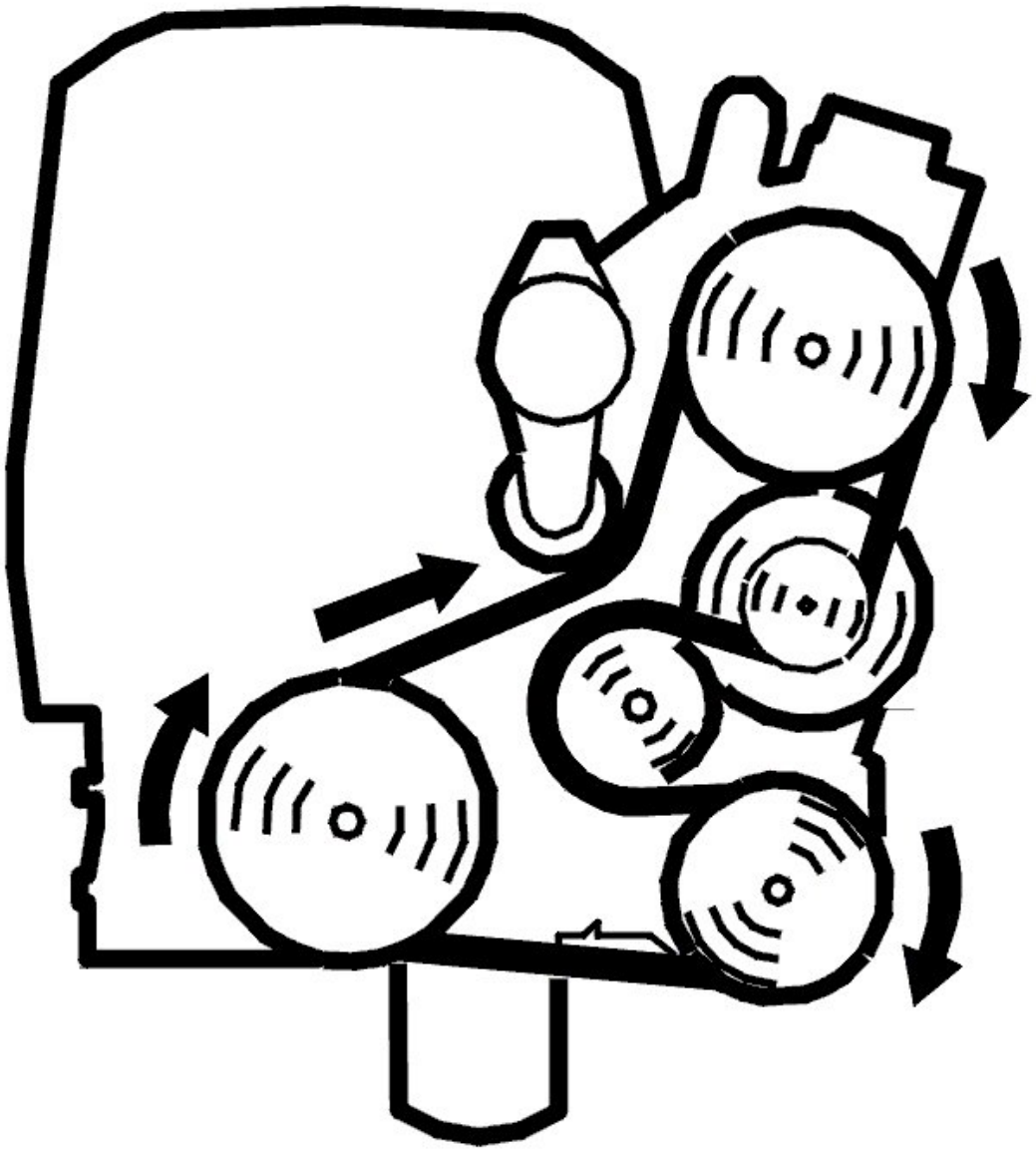
Continue - Verification

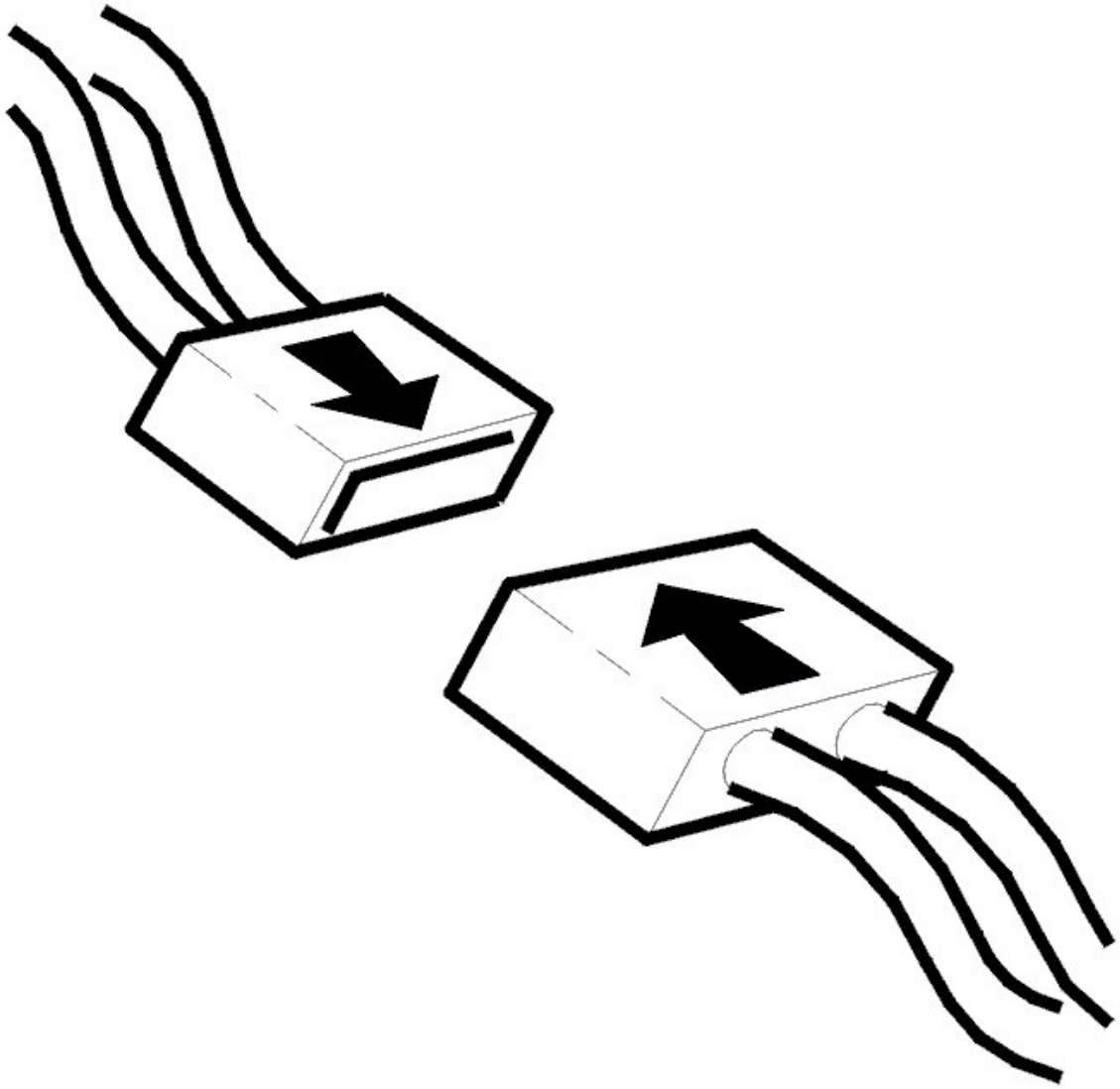
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

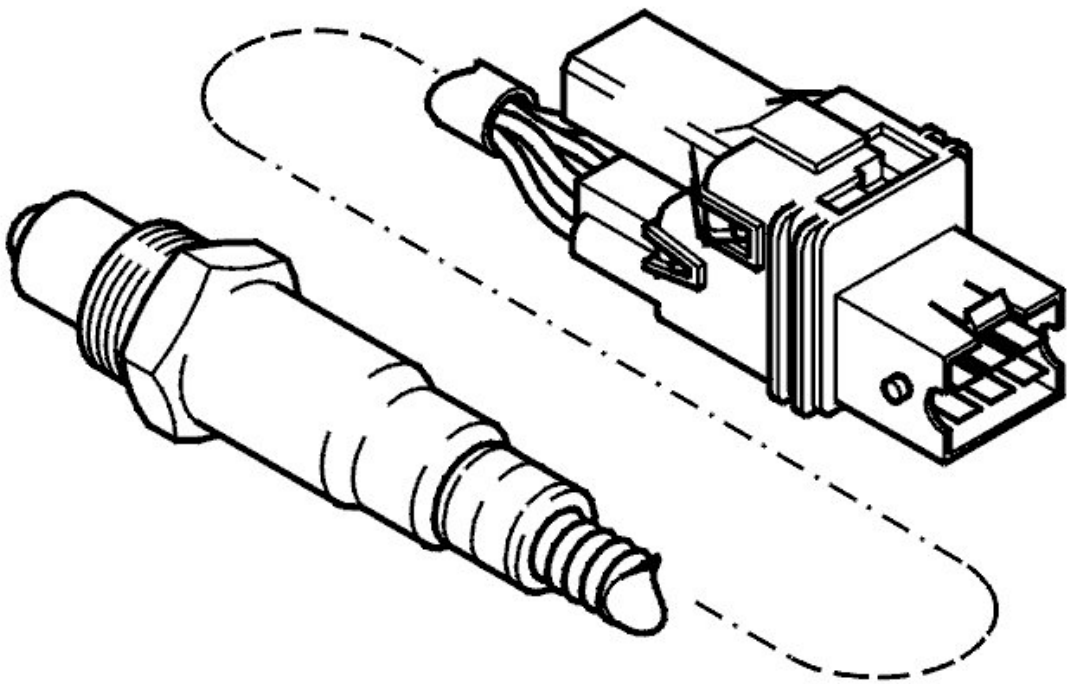
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-248D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that there is a short-circuit to ground in the signal cables for the front heated oxygen sensor (HO2S) (bank 1).

Substitute value

- None.

Possible source
- Short-circuit in the signal cables
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

Signal too low

Checking the components and wiring

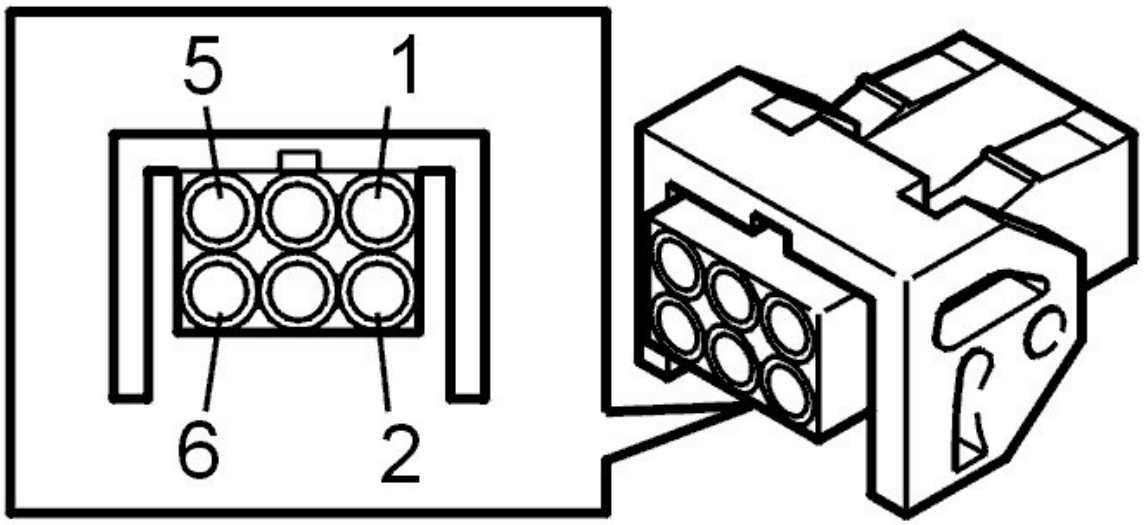
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

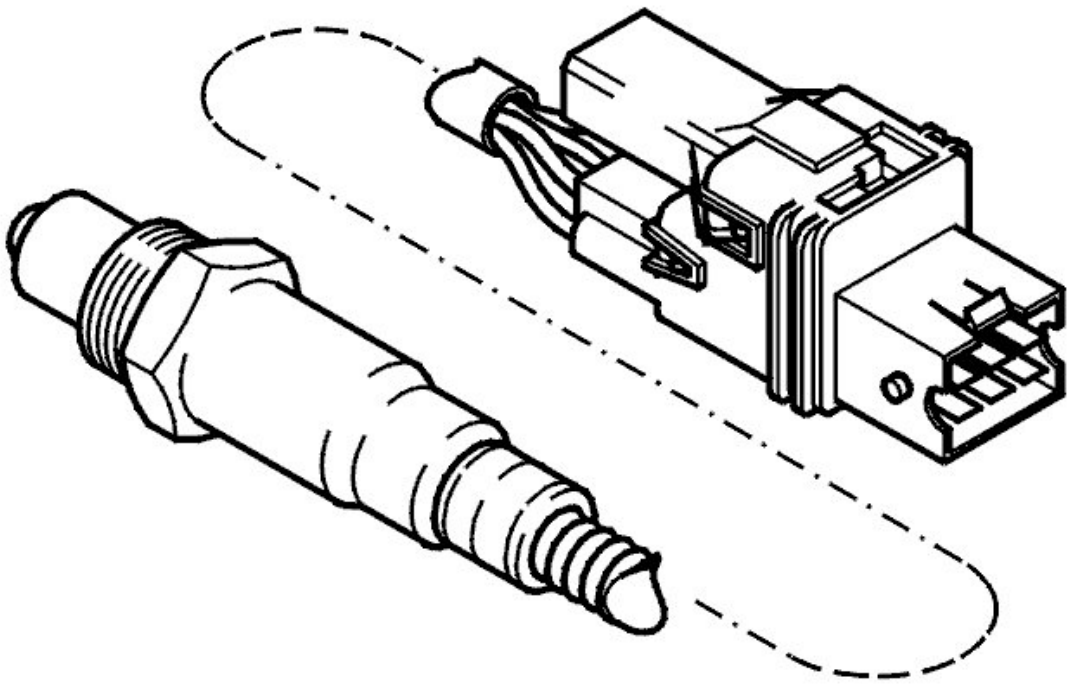
Check the cable for a short-circuit to ground.
Check between:
- The system relay and heated oxygen sensor (HO2S) terminal #3
- Engine control module (ECM) terminal #A18 (#A18) and heated oxygen sensor (HO2S) terminal #4.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





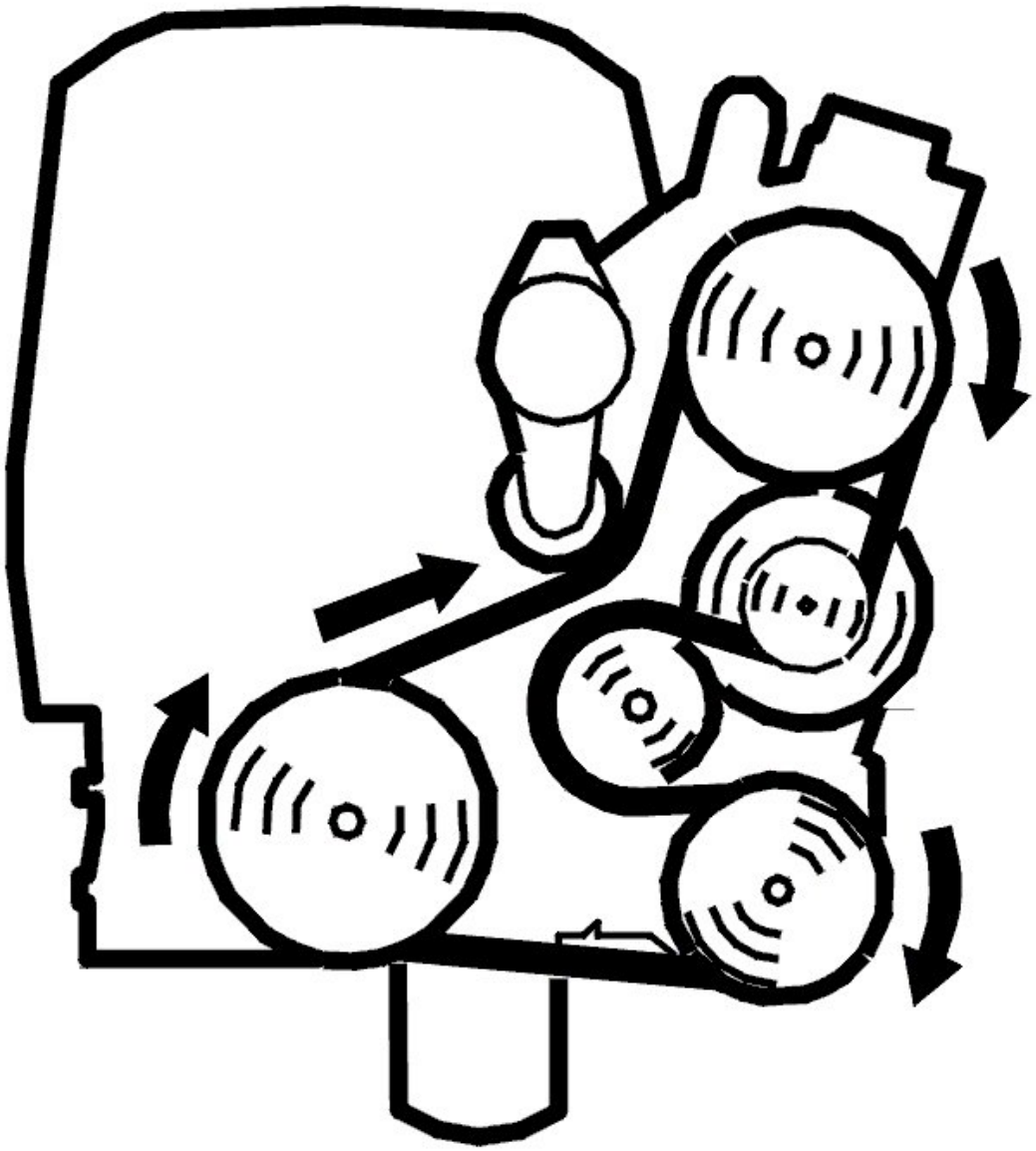
Continue - Verification

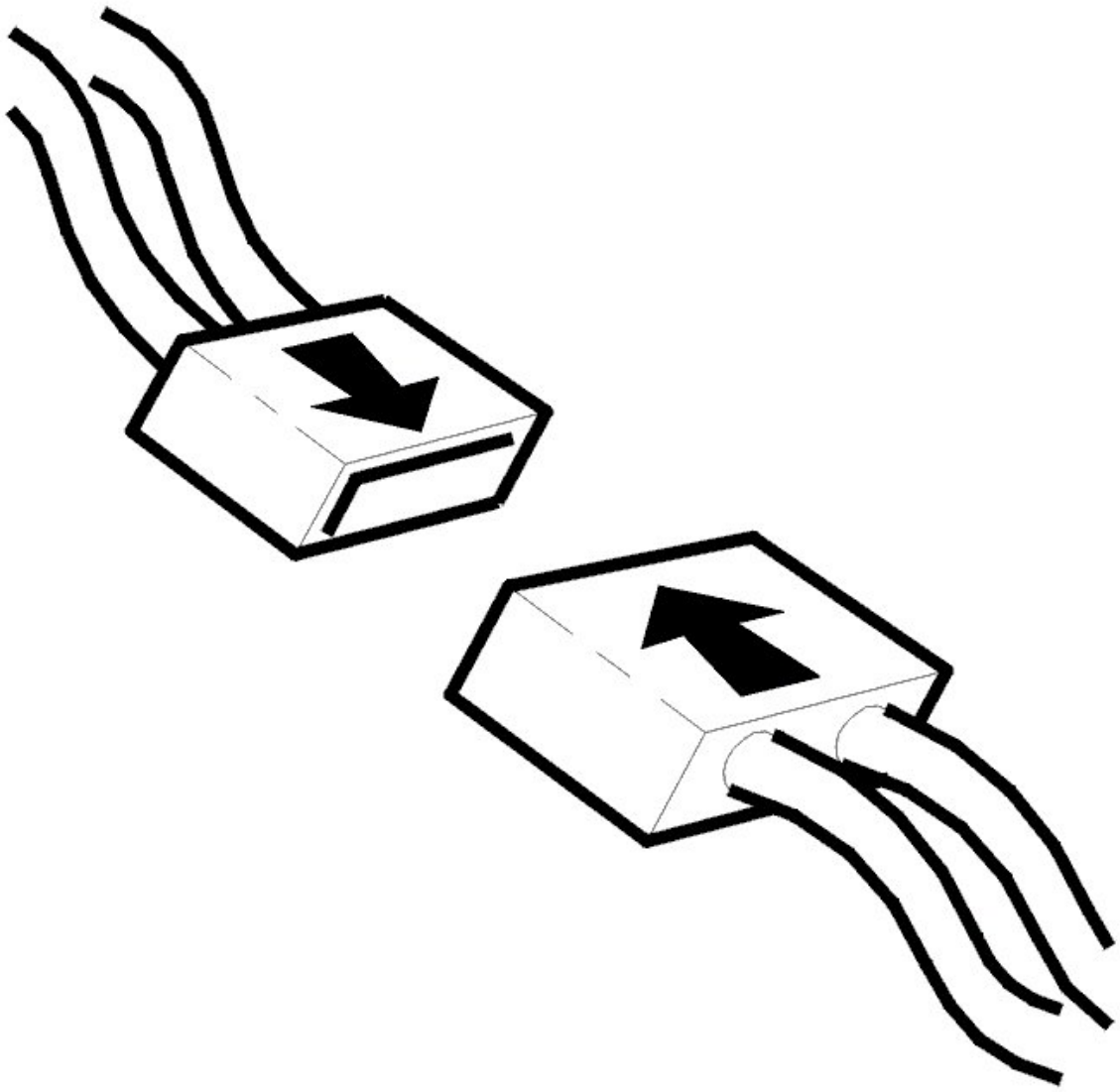
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

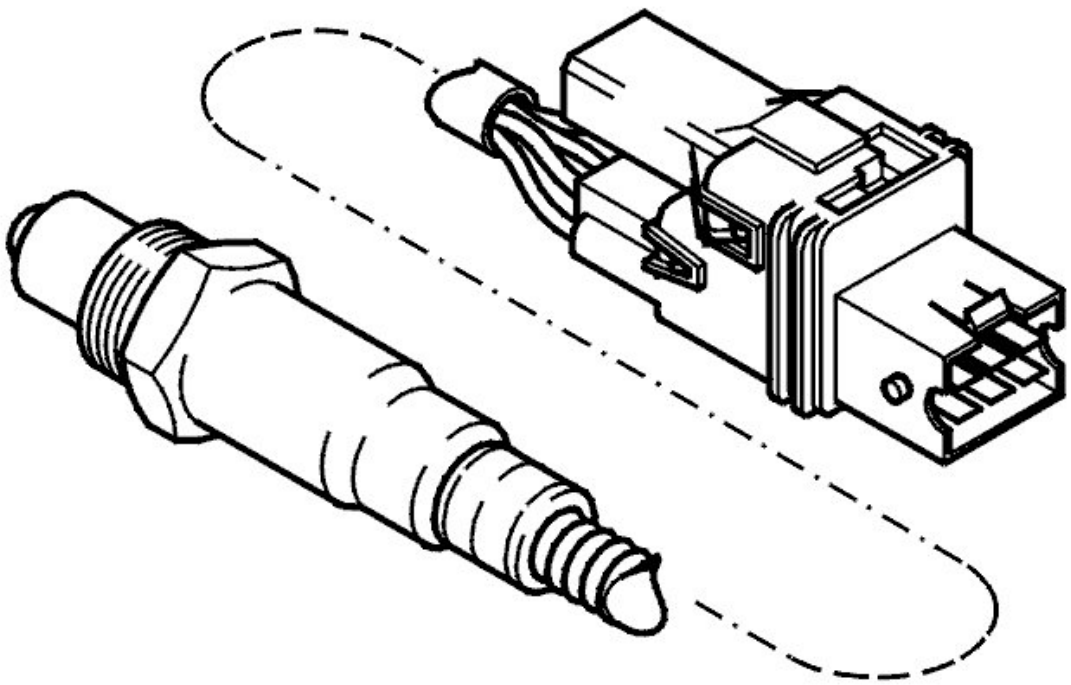
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-249B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an open-circuit in the signal cable to the section of the front heated oxygen sensor (HO2S) (bank 1) that detects the oxygen content of the exhaust gases.

Substitute value

- None.

Possible source
- Contact resistance or oxidation on the signal cable
- Open-circuit in the signal cable
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the components and wiring

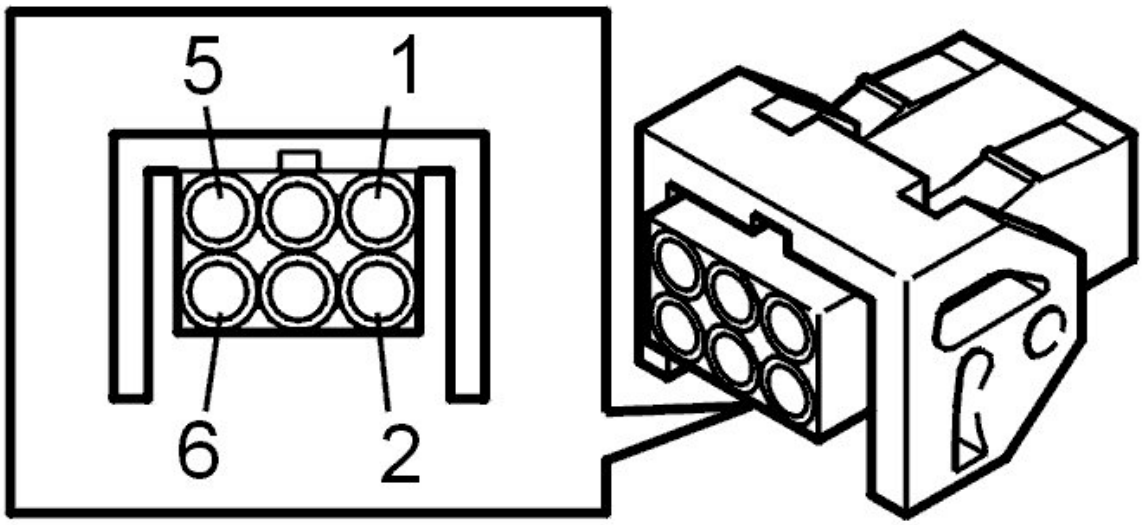
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

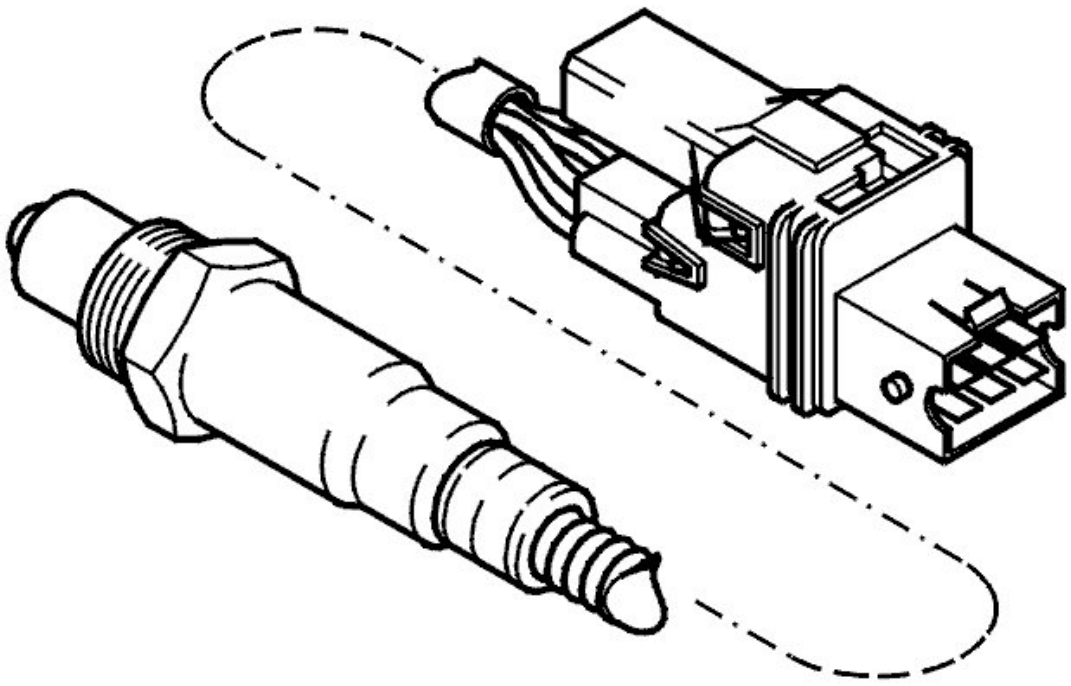
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance. Check for an open-circuit. Check for oxidation.
Check the cable between engine control module (ECM) terminal #A41 (#A41) and heated oxygen sensor (HO2S) terminal #1. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





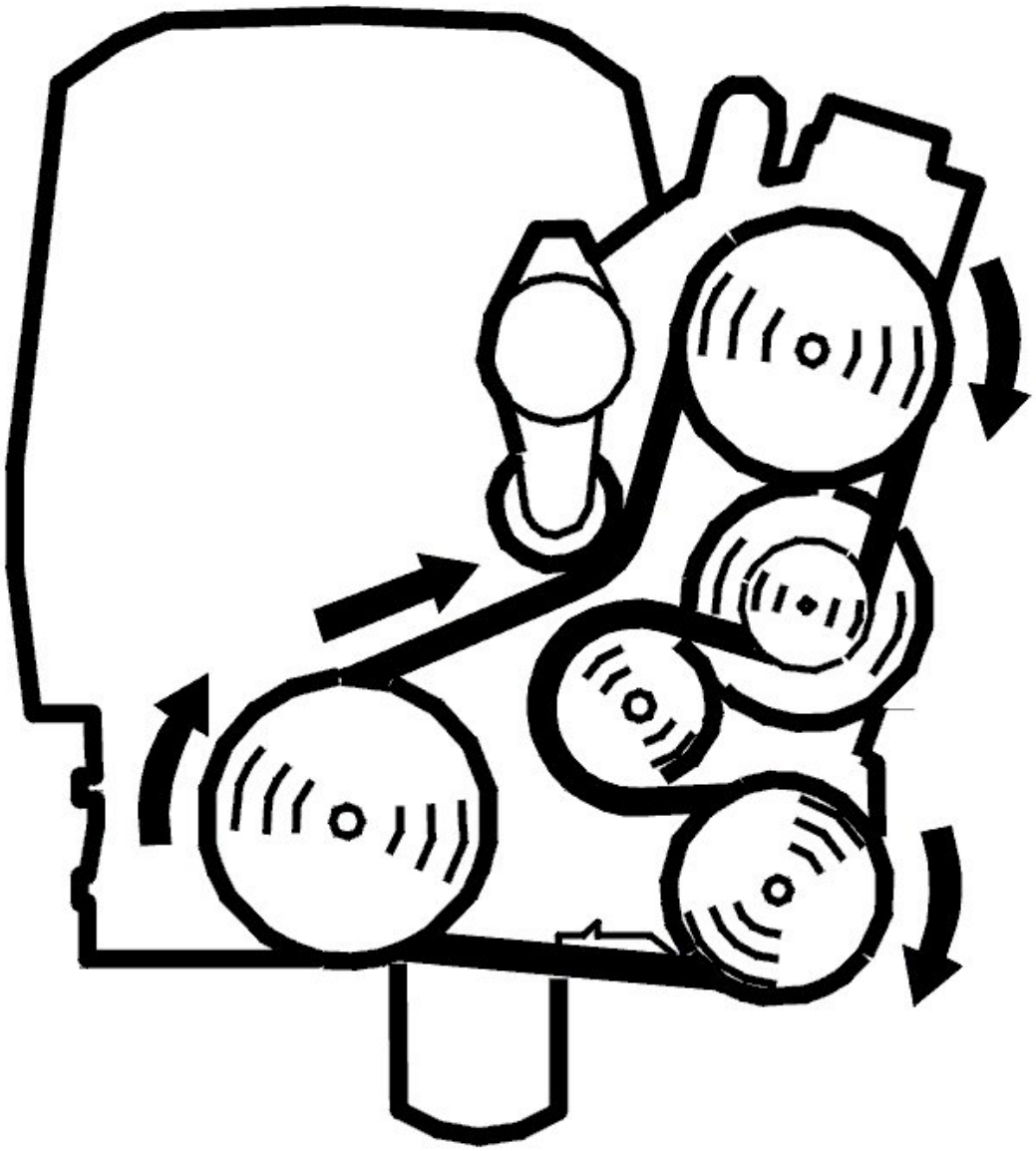
Continue - Verification

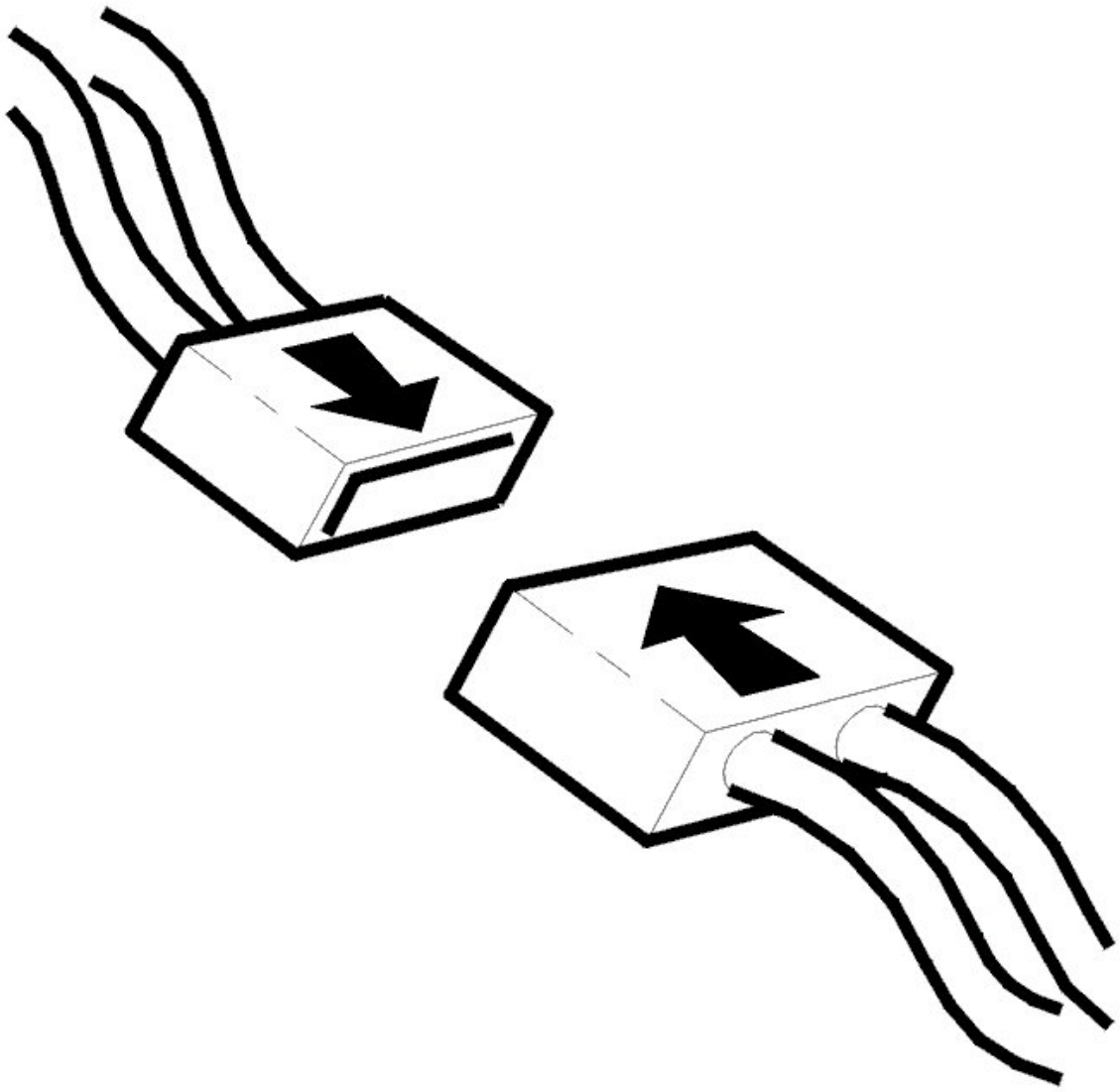
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

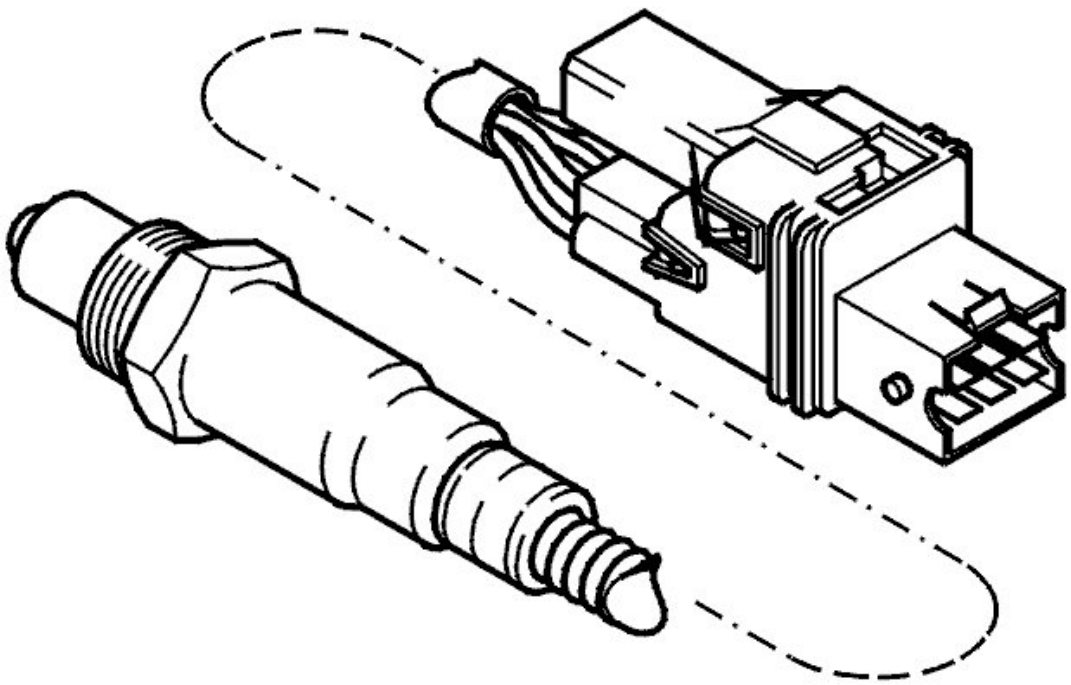
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24AB

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an open-circuit in the ground lead for the front heated oxygen sensor (HO2S) (bank 1).

Substitute value

None.

Possible source
- Open-circuit in the ground lead
- Damaged front heated oxygen sensor (HO2S) (bank 1).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the components and wiring

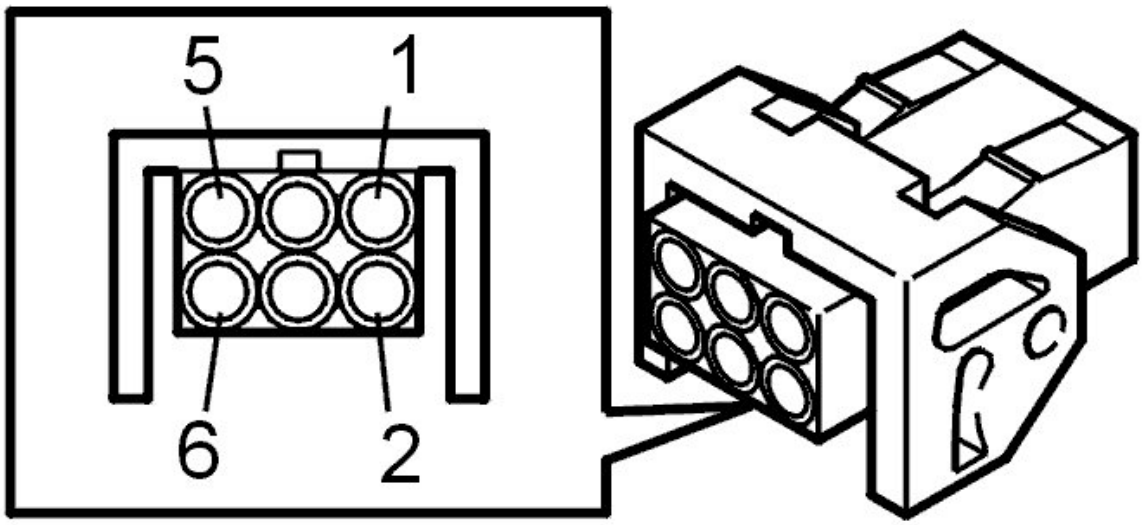
Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

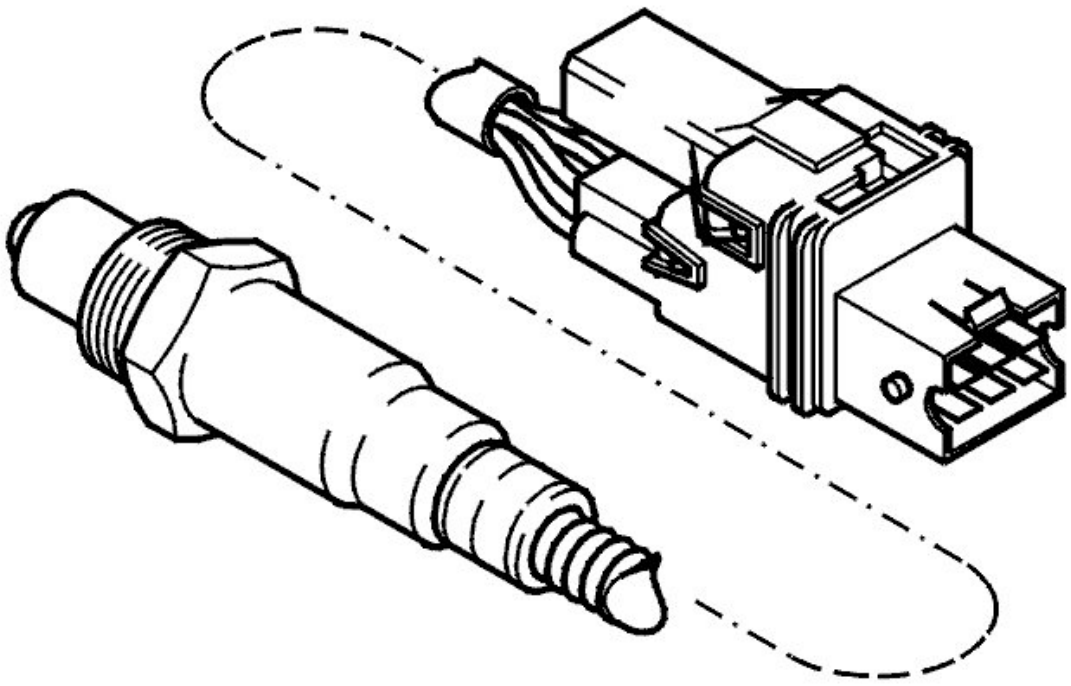
Check the heated oxygen sensor (HO2S) connector. Check for contact resistance. Check for an open-circuit. Check for oxidation.
Check the cable between engine control module (ECM) terminal #A42 (#A42) and heated oxygen sensor (HO2S) terminal #5. Check for an open-circuit.

Note! If possible, measure from the rear of the affected connectors in order to minimize any damage and future loose connections.

Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





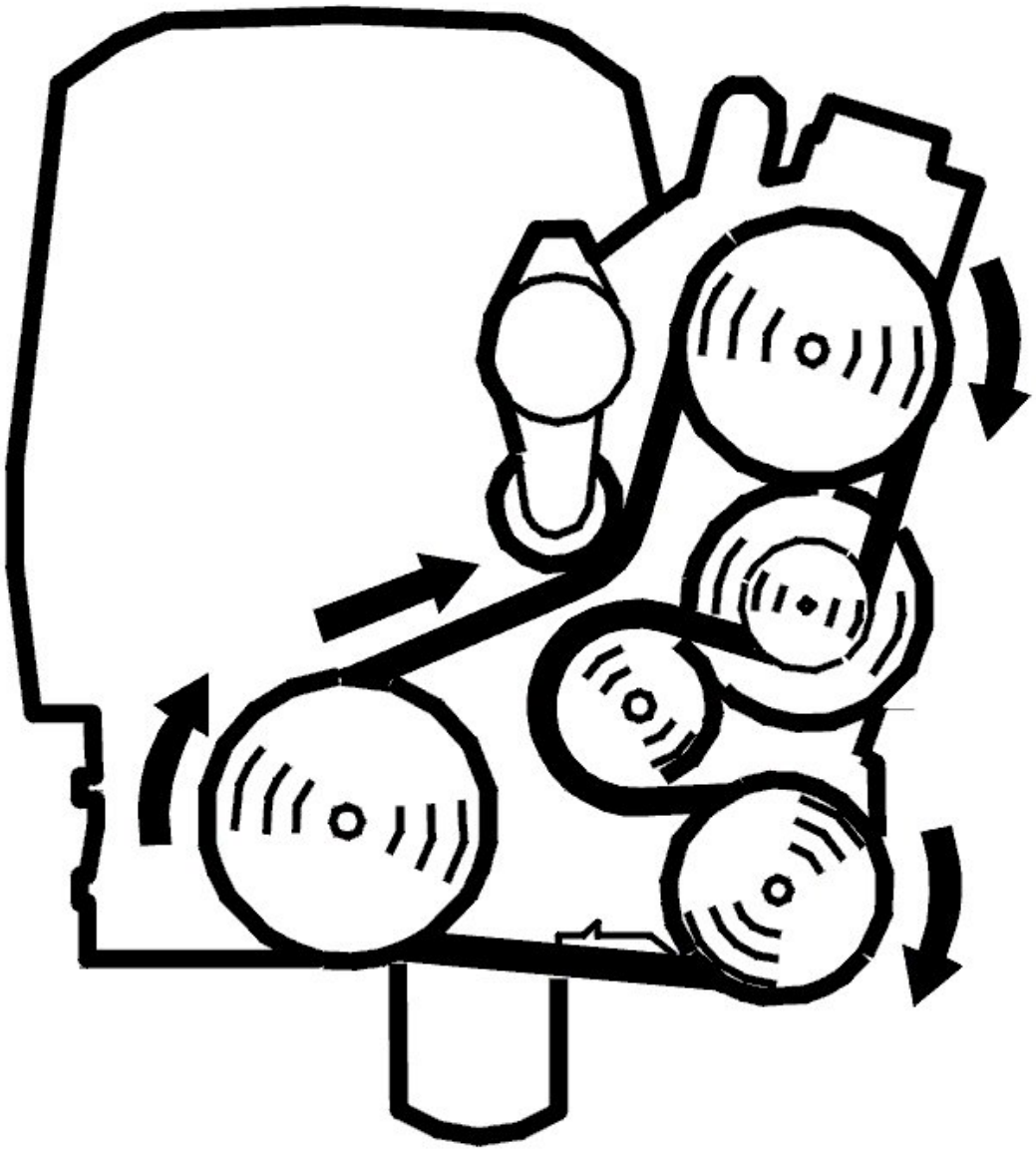
Continue - Verification

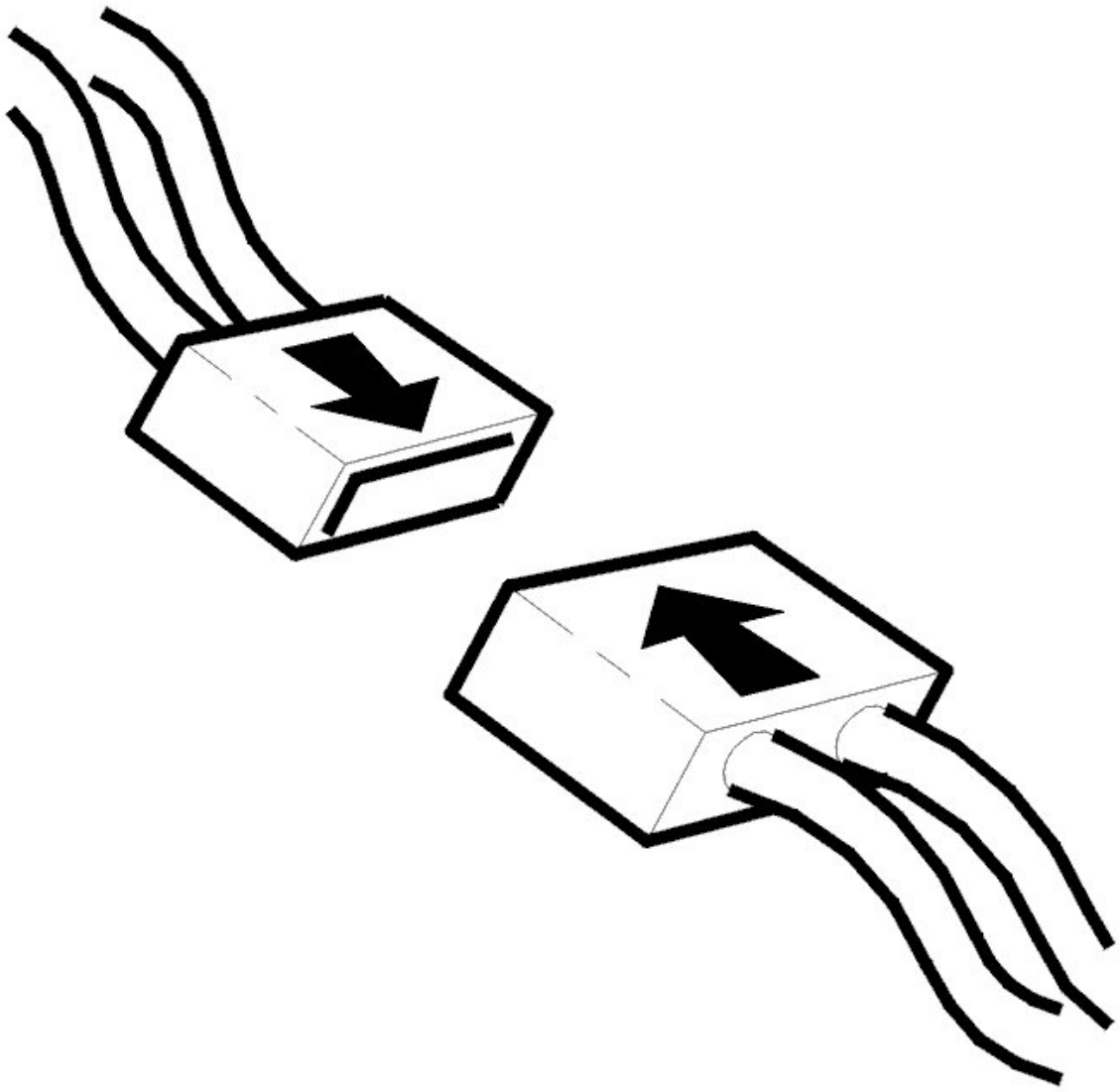
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24A0

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the front heated oxygen sensors (HO2S) (bank 1 and bank 2) have been switched. This means they are installed in the incorrect bank of cylinders.
The diagnostic trouble codes (DTCs) are diagnosed when the engine has been idling for 10 minutes

Substitute value
- The heated oxygen sensor (HO2S) control is disabled
- Three-way catalytic converter (TWC) diagnostics are disabled.

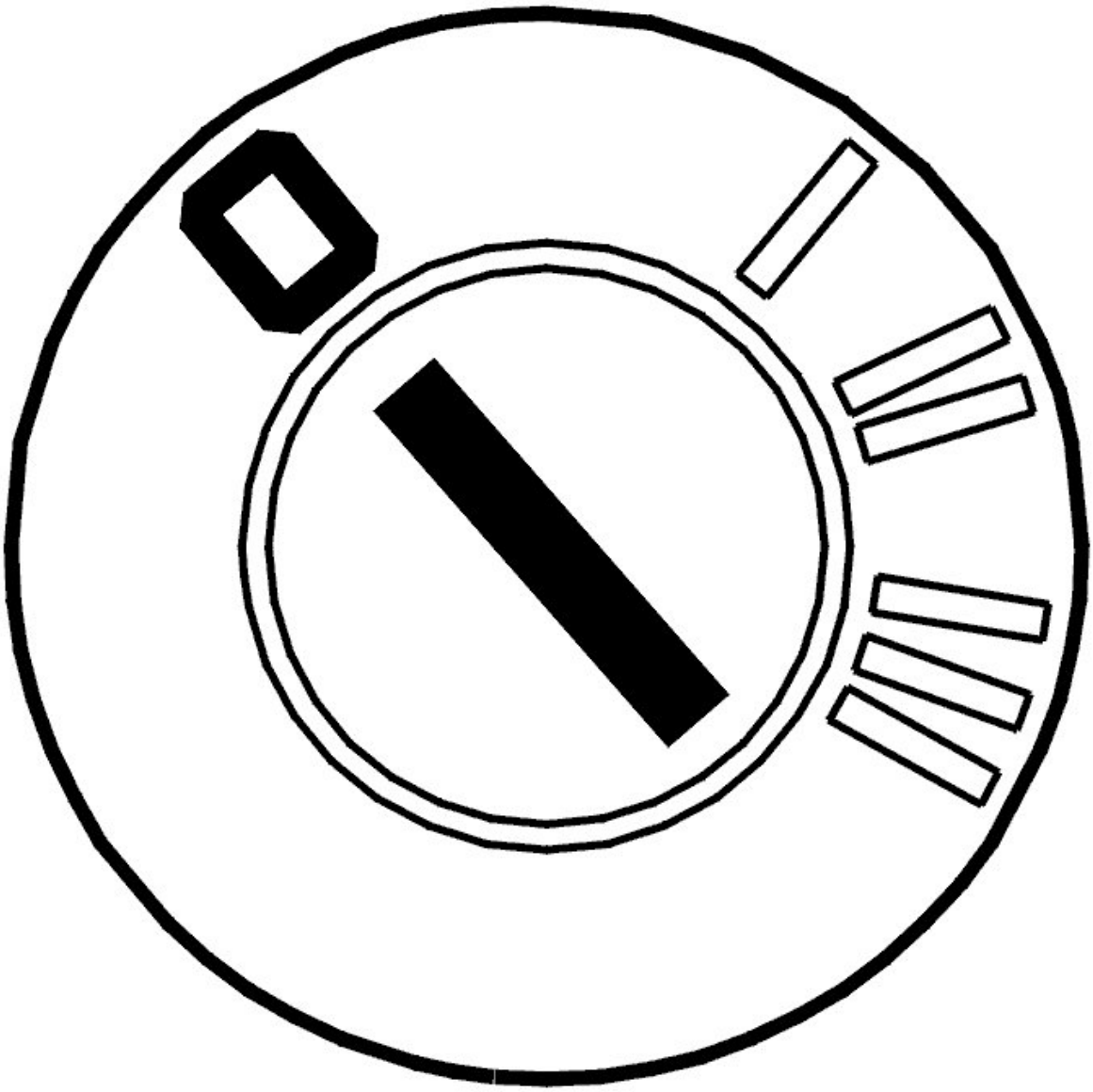
Possible source
- The front heated oxygen sensors (HO2S) are mounted in the incorrect cylinder banks
- Leakage in the fuel injection system
- Both the front heated oxygen sensors (HO2S) are damaged.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

Checking the component



- Ignition off
- Check that the front heated oxygen sensors (HO2S) bank 1 and bank 2 have not been switched (mounted in the incorrect bank of cylinders)
- Remedy as necessary.

Other information:
- To access or replace the front heated oxygen sensors (HO2S), see Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing.

Have the heated oxygen sensors (HO2S) been switched?

Yes - Verification

No - Checking the fuel injection system for leakage

Checking the fuel injection system for leakage
- Check the fuel injection system for leakage
- Remedy as necessary.

If no faults are found during the checks and the fault recurs as permanent, replace both heated oxygen sensors (HO2S).

Other information:
- To access or replace the front heated oxygen sensors (HO2S), see Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing.

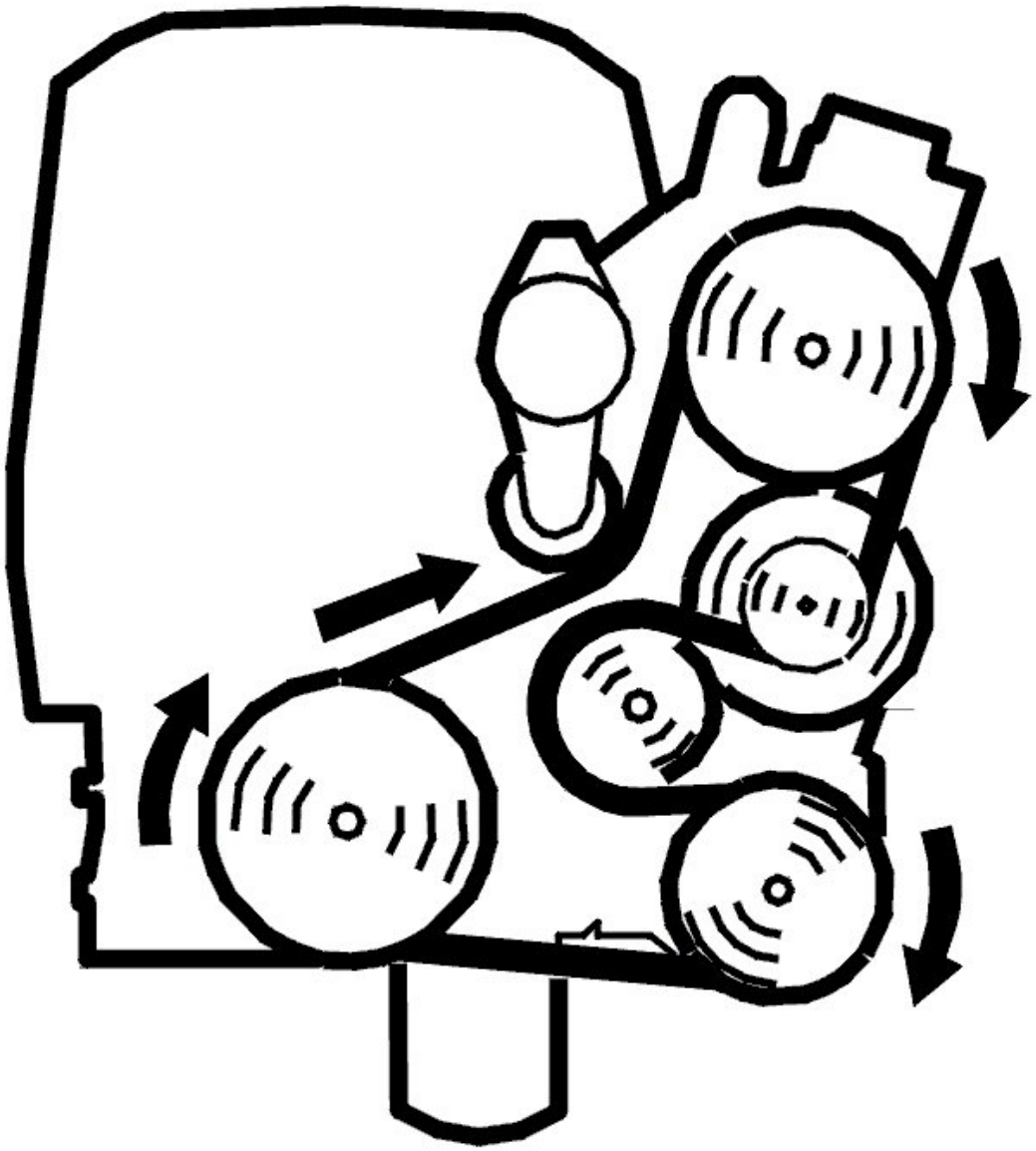
Continue - Verification

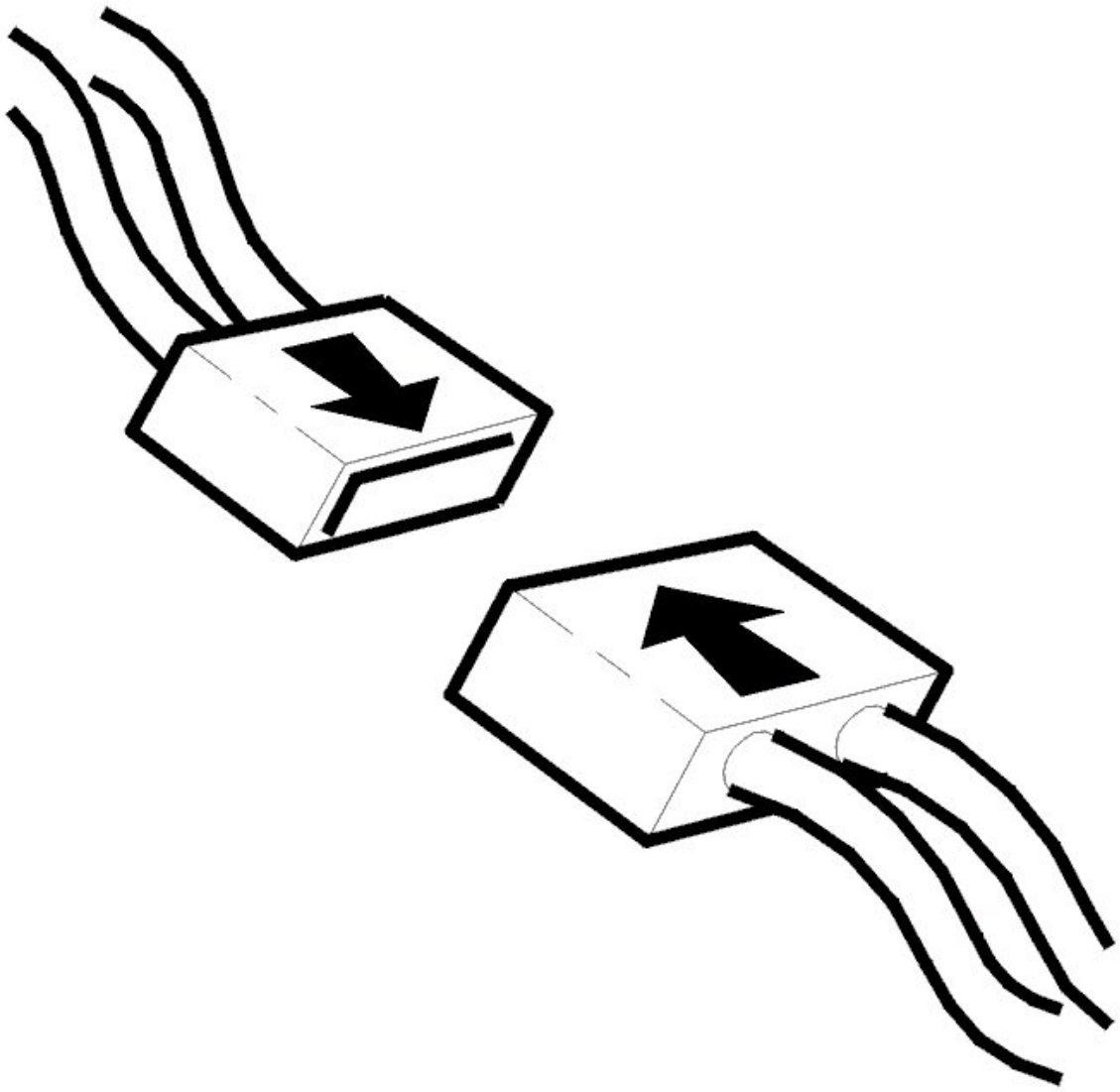
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine. Allow the engine to idle for 10 minutes
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

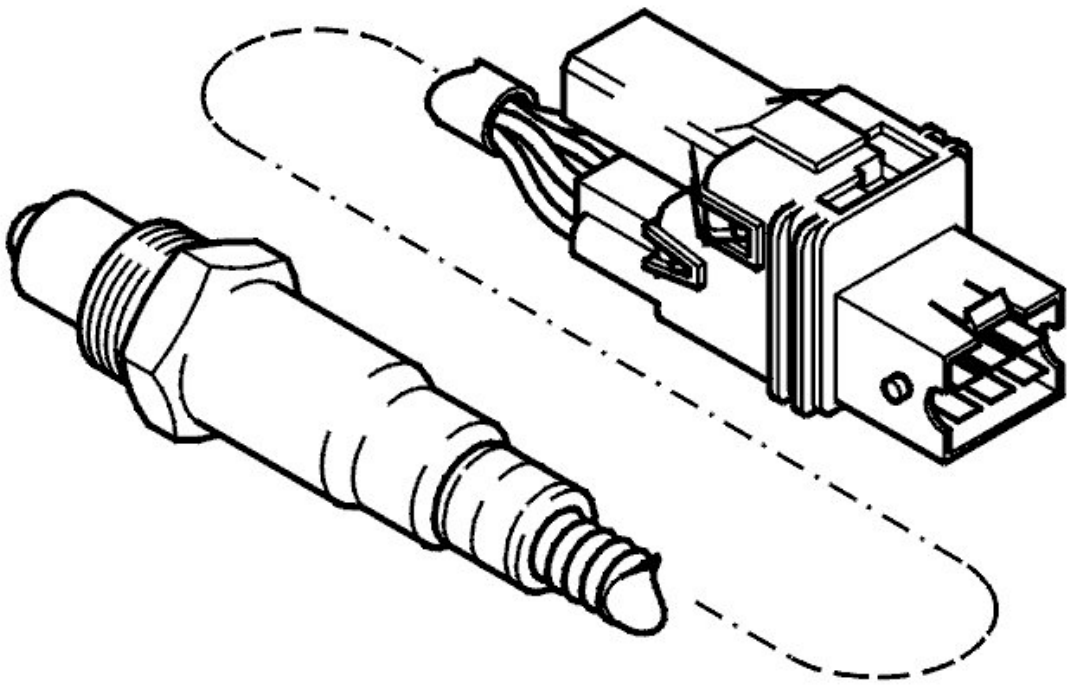
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24BB

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The engine control module (ECM) compares the adaptation values of the front and rear heated oxygen sensor (HO2S). The diagnostic trouble code (DTC) is stored when the values deviate by more than 3%.

Note! The fault may be in the front or rear heated oxygen sensor (HO2S) circuit.

Substitute value
- Long-term fuel trim is switched off
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Leakage in the exhaust system
- Heated oxygen sensor (HO2S) indicates an incorrectly rich fuel/air mixture

- Contact resistance or oxidation in the terminals
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking components

Check the connectors for the heated oxygen sensors (HO2S). Check for contact resistance. Check for oxidation.
Check the exhaust system for air leakage.

Hint: If the above fault-tracing does not remedy the fault, try replacing the heated oxygen sensors (HO2S), as the diagnostic trouble code (DTC) can also be stored by a damaged front/rear heated oxygen sensor (HO2S).

Remedy as necessary.

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

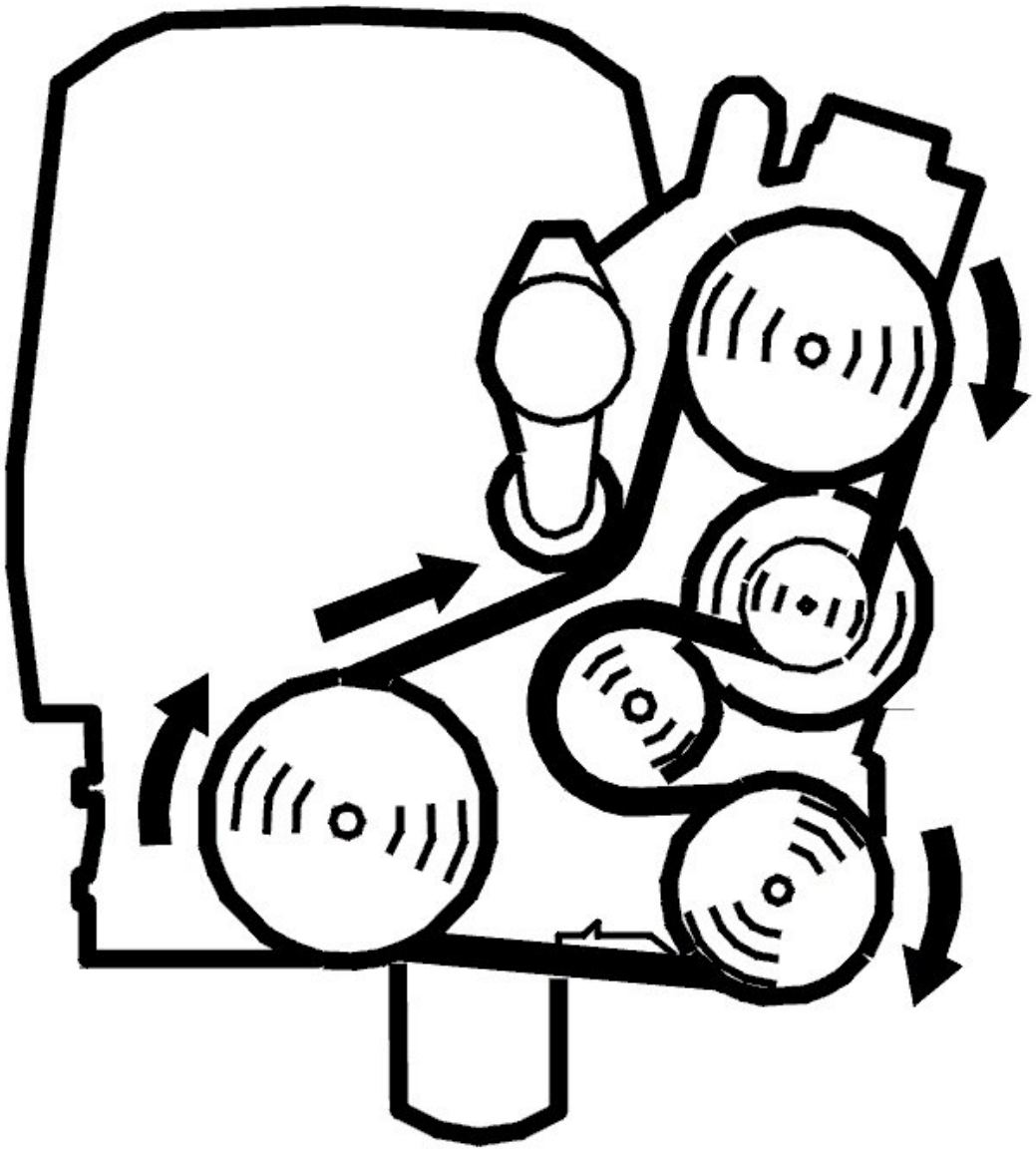
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 10 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read out the deviation between the front and rear heated oxygen sensor (HO2S).
Check that the value is between -0.03 and +0.03.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

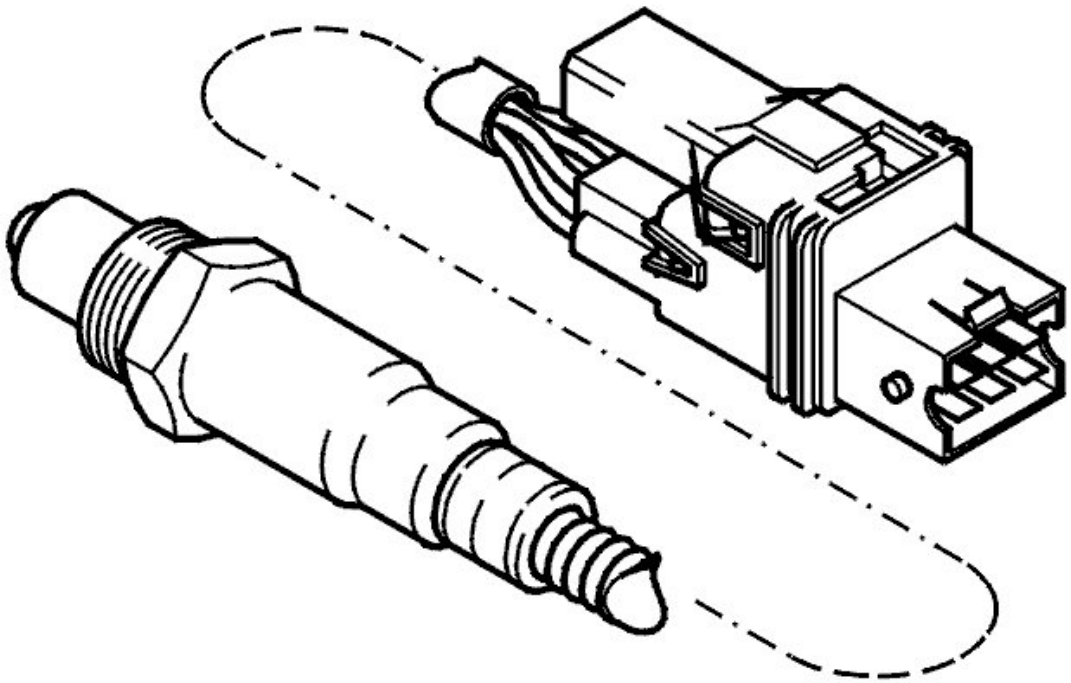
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24BC

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the front heated oxygen sensor (HO2S) indicates a rich fuel/air mixture while the signal from the rear heated oxygen sensor (HO2S) indicates a lean fuel/air mixture.

Note! The fault may be in the front or rear heated oxygen sensor (HO2S) circuit.

Substitute value

- Long-term fuel trim is switched off
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Leakage in the exhaust system
- Heated oxygen sensor (HO2S) indicates an incorrectly lean fuel/air mixture
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking components

Check the exhaust system for air leakage

Hint: If the above fault-tracing does not remedy the fault, try replacing the heated oxygen sensors (HO2S), as the diagnostic trouble code (DTC) can also be stored by a damaged front/rear heated oxygen sensor (HO2S).

Remedy as necessary.

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

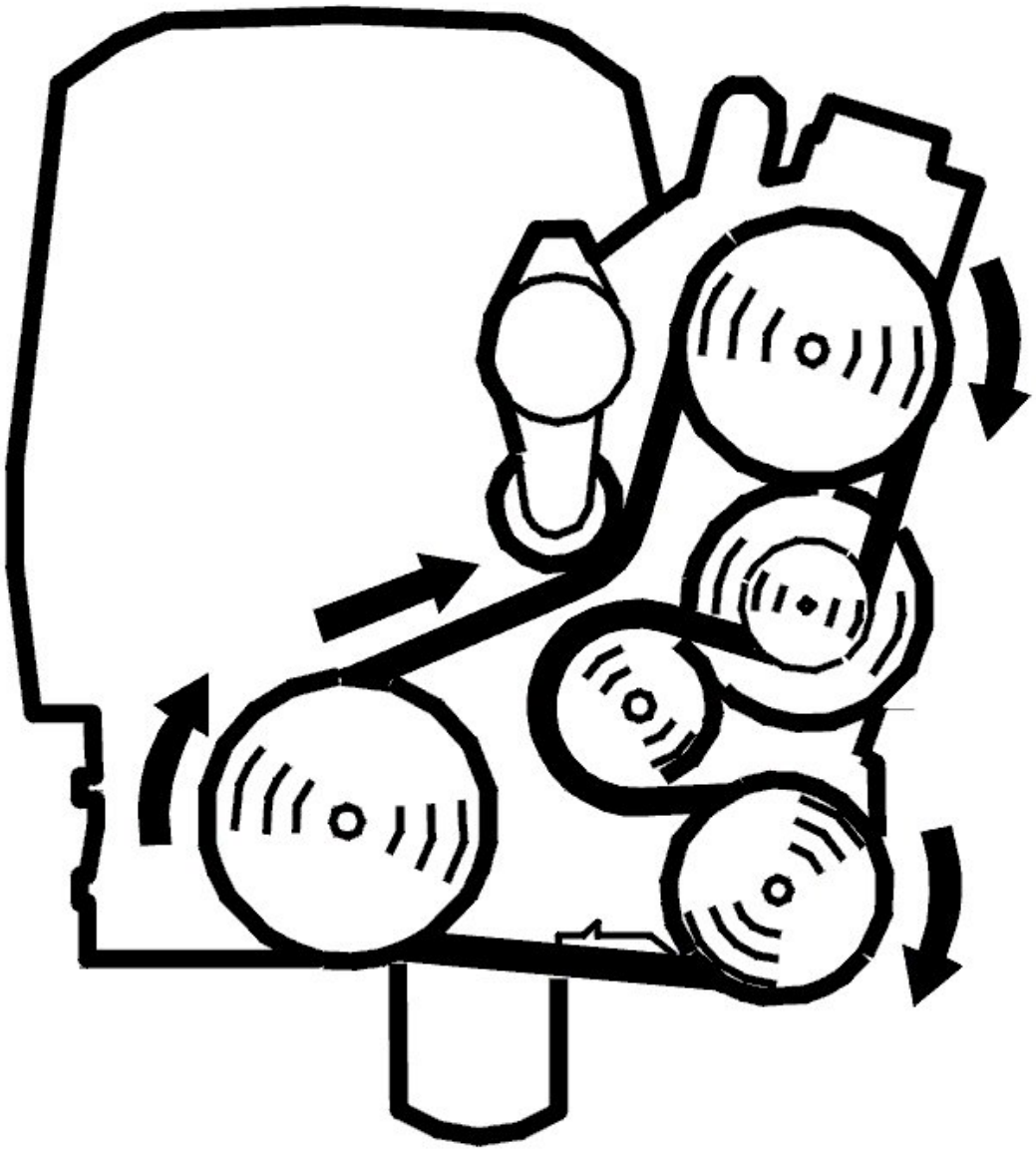
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 10 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read out the deviation between the front and rear heated oxygen sensor (HO2S).
Check that the value is between -0.03 and +0.03.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

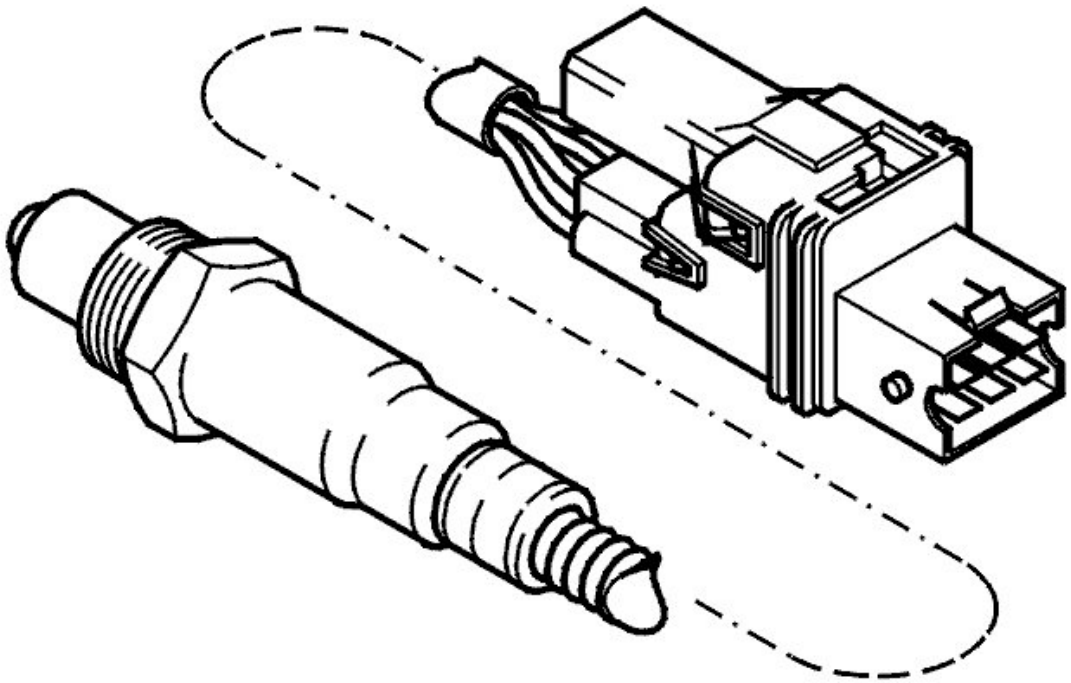
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24BD

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the front heated oxygen sensor (HO2S) indicates a lean fuel/air mixture while the signal from the rear heated oxygen sensor (HO2S) indicates a rich fuel/air mixture.

Note! The fault may be in the front or rear heated oxygen sensor (HO2S) circuit.

Substitute value

- Long-term fuel trim is switched off
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Leakage in the exhaust system
- Heated oxygen sensor (HO2S) indicates an incorrectly rich fuel/air mixture
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking components

Check the exhaust system for air leakage

Hint: If the above fault-tracing does not remedy the fault, try replacing the heated oxygen sensors (HO2S), as the diagnostic trouble code (DTC) can also be stored by a damaged front/rear heated oxygen sensor (HO2S).

Remedy as necessary.

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

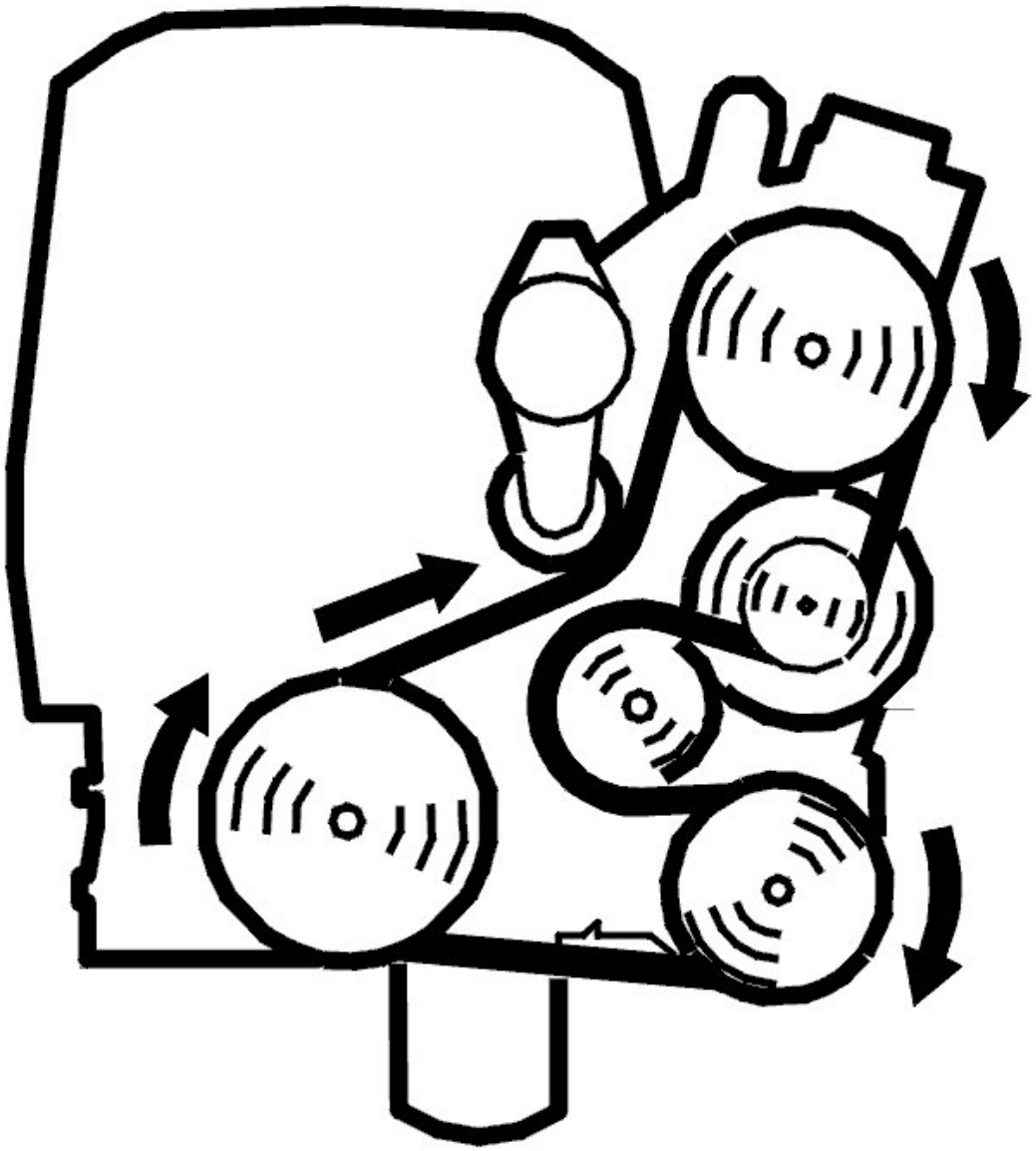
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 10 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read out the deviation between the front and rear heated oxygen sensor (HO2S).
Check that the value is between -0.03 and +0.03.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

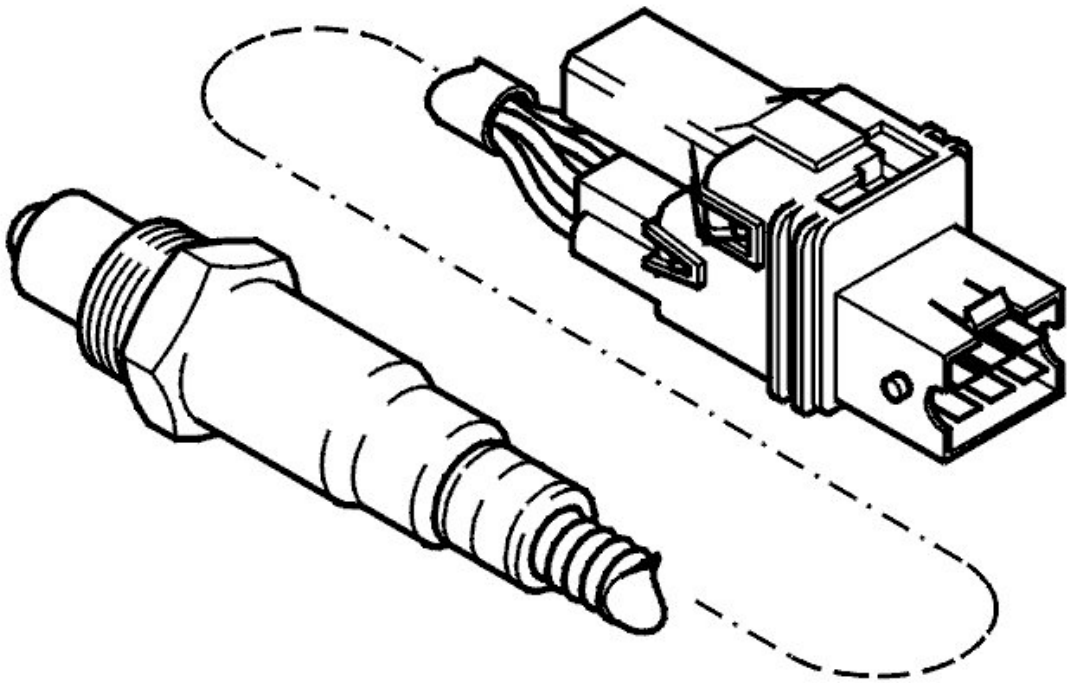
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24B0

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the heated oxygen sensor (HO2S) indicates an incorrect lean or rich fuel/air mixture compared to that anticipated by the engine control module (ECM).

Note! The fault may be in the front or rear heated oxygen sensor (HO2S) circuit.

Substitute value

- Long-term fuel trim is switched off
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Leakage in the exhaust system
- Short-circuit to supply voltage or ground in signal cable (-)
- Short-circuit to supply voltage or ground in the pump supply cable
- Short-circuit to supply voltage or ground in calibration supply cable
- Open-circuit in signal cable (+)
- Damaged heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

Checking components

Check the exhaust system for air leakage.
Check the cable for a short-circuit to supply voltage or ground.
Check between:
- The cable between engine control module (ECM) terminal #A42 (#A42) and heated oxygen sensor (HO2S) terminal #5
- The cable for pump current between engine control module (ECM) terminal #A24 (#A24) and heated oxygen sensor (HO2S) terminal #6
- The cable for calibration current between engine control module (ECM) terminal #A28 (#A28) and heated oxygen sensor (HO2S) terminal #2.

Check the cable between engine control module (ECM) terminal #A41 (#A41) and heated oxygen sensor (HO2S) terminal #1. Check for an open-circuit.

Hint: If the above fault-tracing does not remedy the fault, try replacing the heated oxygen sensors (HO2S), as the diagnostic trouble code (DTC) can also be stored by a damaged front/rear heated oxygen sensor (HO2S).

Remedy as necessary.

Other information
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

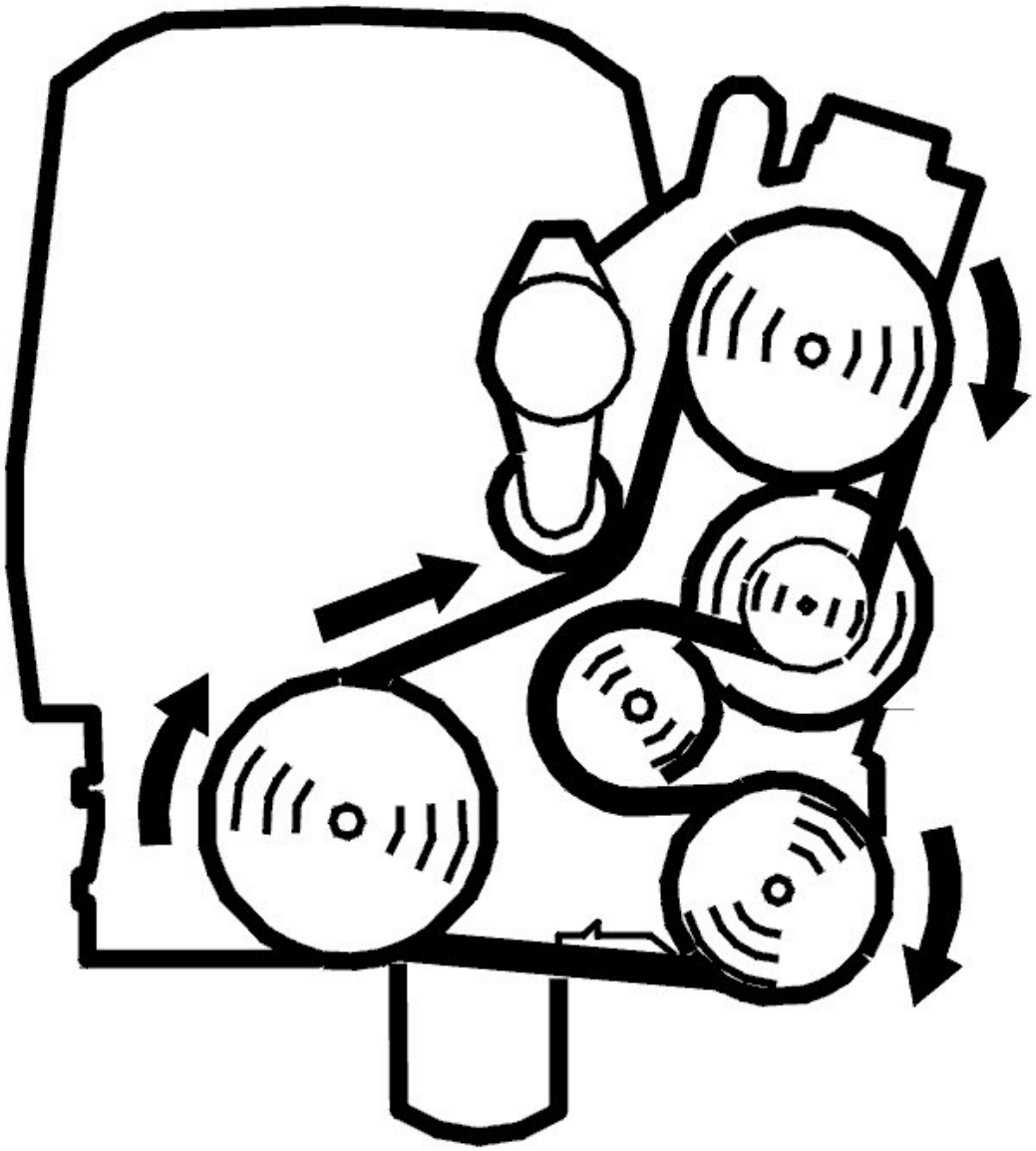
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 10 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read out the deviation between the front and rear heated oxygen sensor (HO2S).
Check that the value is between -0.03 and +0.03.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

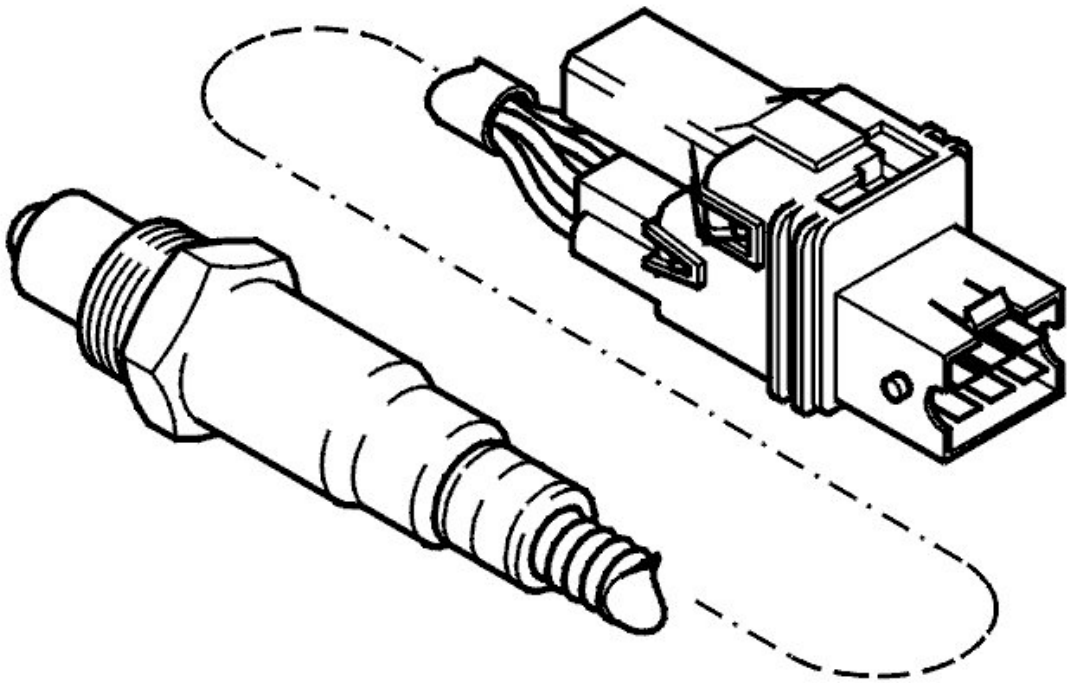
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-24C0

Condition



The engine control module (ECM) monitors the function of the front heated oxygen sensor (HO2S) (bank 1) by checking its signal. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the heated oxygen sensor (HO2S) only indicates air and no fuel/air mixture.

Substitute value

- Long-term fuel trim is switched off
- Three-way catalytic converter (TWC) diagnostics are disabled.

Possible source
- Incorrectly installed heated oxygen sensor (HO2S)
- Damaged front heated oxygen sensor (HO2S).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

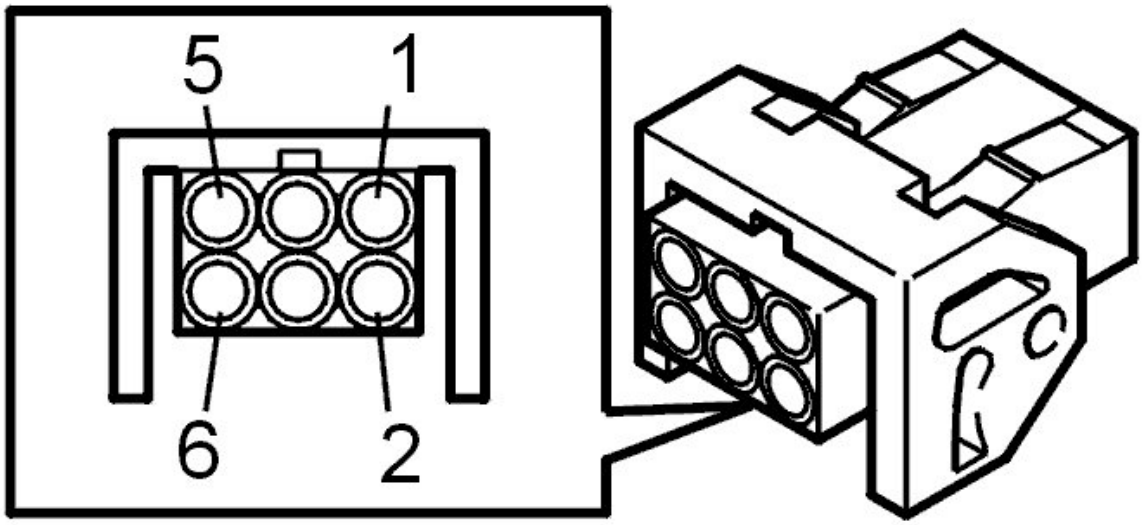
Faulty signal

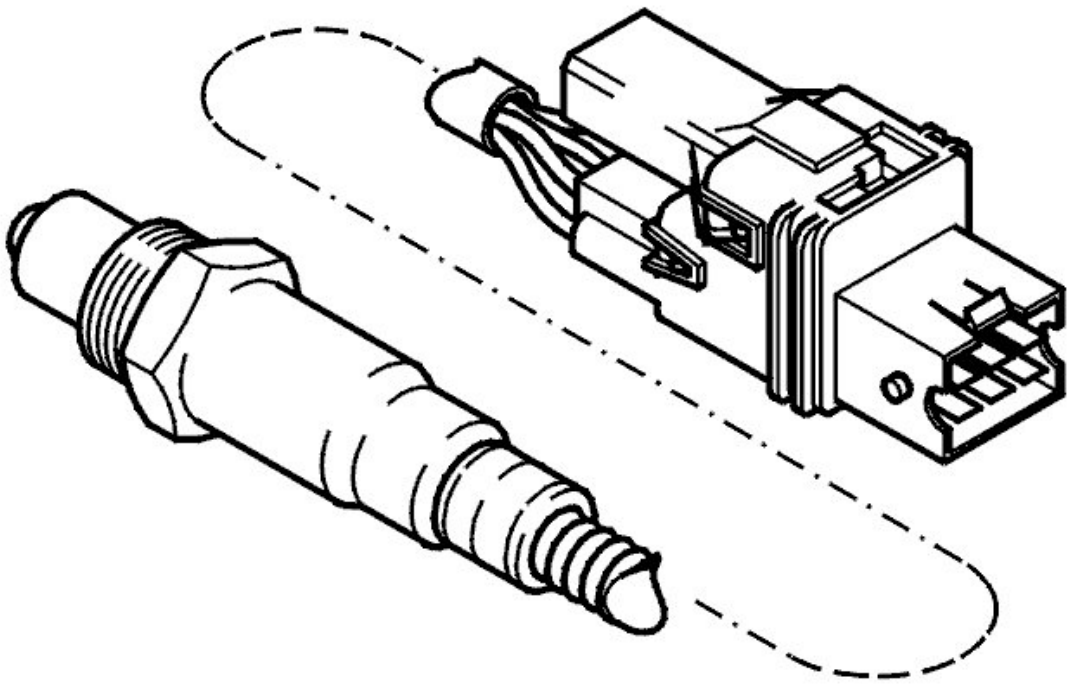
Checking the components and wiring

Caution! Do not apply rust solvent spray or grease to the heated oxygen sensor (HO2S) connector.

Check the heated oxygen sensor (HO2S) connector. Check for contact resistance. Check for an open-circuit. Check for oxidation.
Check that the heated oxygen sensor (HO2S) is correctly installed in the exhaust system.
Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.
Remedy as necessary.

Other information
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Heated oxygen sensor (HO2S), replacing See: Oxygen Sensor/Service and Repair/Heated Oxygen Sensor (HO2S), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





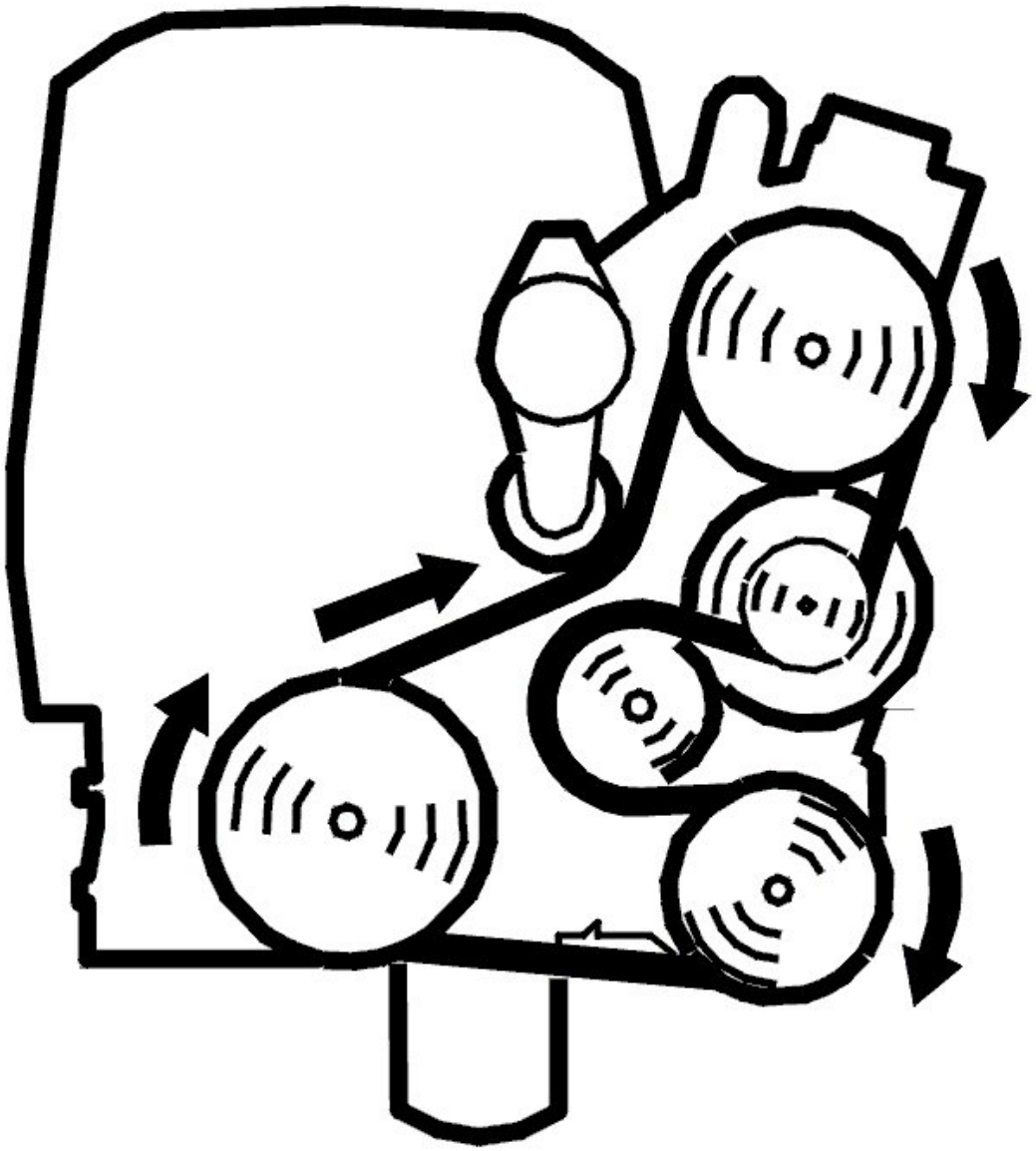
Continue - Verification

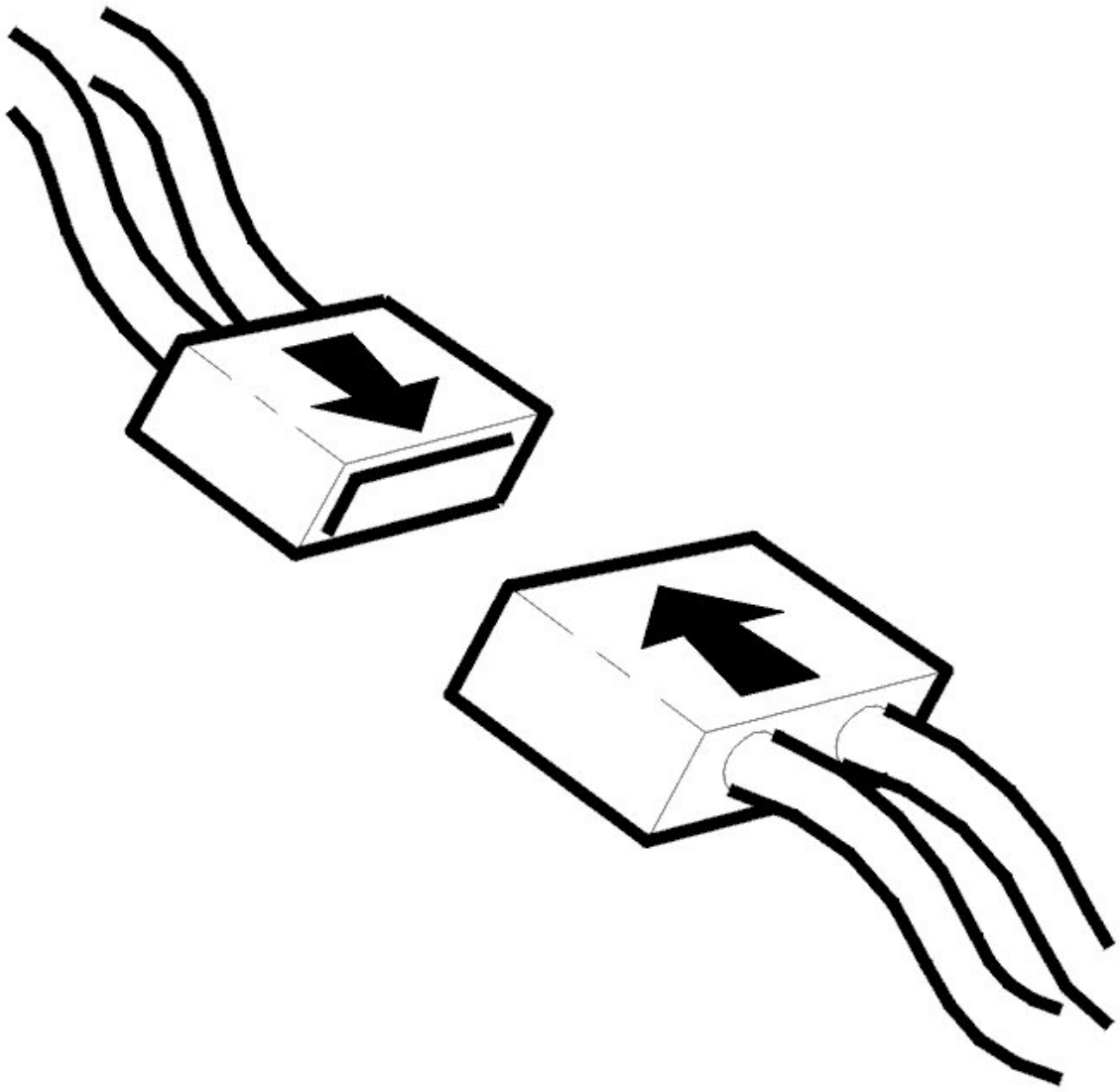
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car at an even speed (engine speed (RPM) above 2000 rpm) for at least 5 minutes
- Release the accelerator pedal (AP) quickly at least three times to simulate fuel shut-off
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

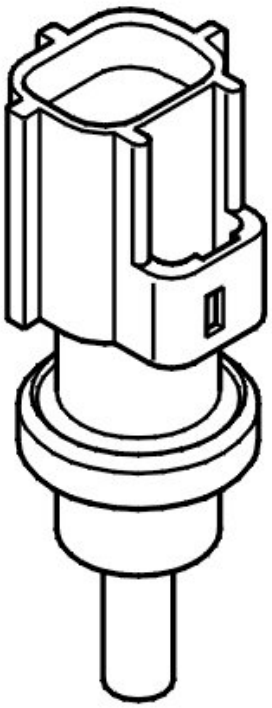
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal for engine coolant temperature (ECT).
After the engine is started, the engine control module (ECM) calculates the theoretical engine coolant temperature (ECT) based on factors such as time since start, engine speed (RPM) and load. The diagnostic trouble code (DTC) is stored if the signal from the engine coolant temperature (ECT) sensor is static and does not correspond to the calculated temperature.
The diagnostic trouble code (DTC) is stored together with another diagnostic trouble code (DTC) for the engine coolant temperature (ECT) sensor.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the connectors
- Damaged temperature sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is difficult to start.

Fault-Tracing

Fault-tracing

Checking the component

Warning! Engine cooling fan (FC) can also operate if the ignition is switched off when this diagnostic trouble code (DTC) is stored.

Hint: To avoid injury, disconnect the power supply to the engine cooling fan (FC) during fault-tracing.

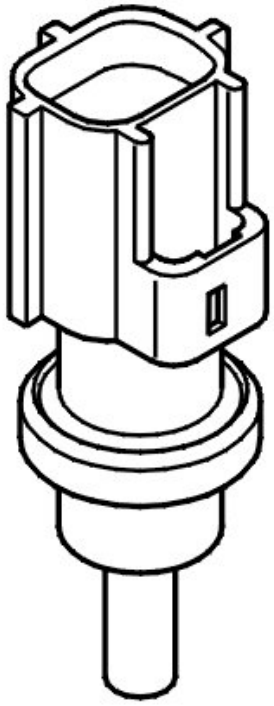
- Check the connector on the engine coolant temperature (ECT) sensor. Check for contact resistance and oxidation.

This diagnostic trouble code (DTC) is stored if the engine coolant temperature (ECT) sensor freezes. This may happen if the coolant level is low or there is too little glycol in the coolant. Check the engine coolant level and its freezing point.

Hint: The diagnostic trouble code (DTC) can be caused by a thermostat that doesn't open.

Replace the engine coolant temperature (ECT) sensor if the above does not remedy the fault.
Remedy as necessary.

Other information
- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

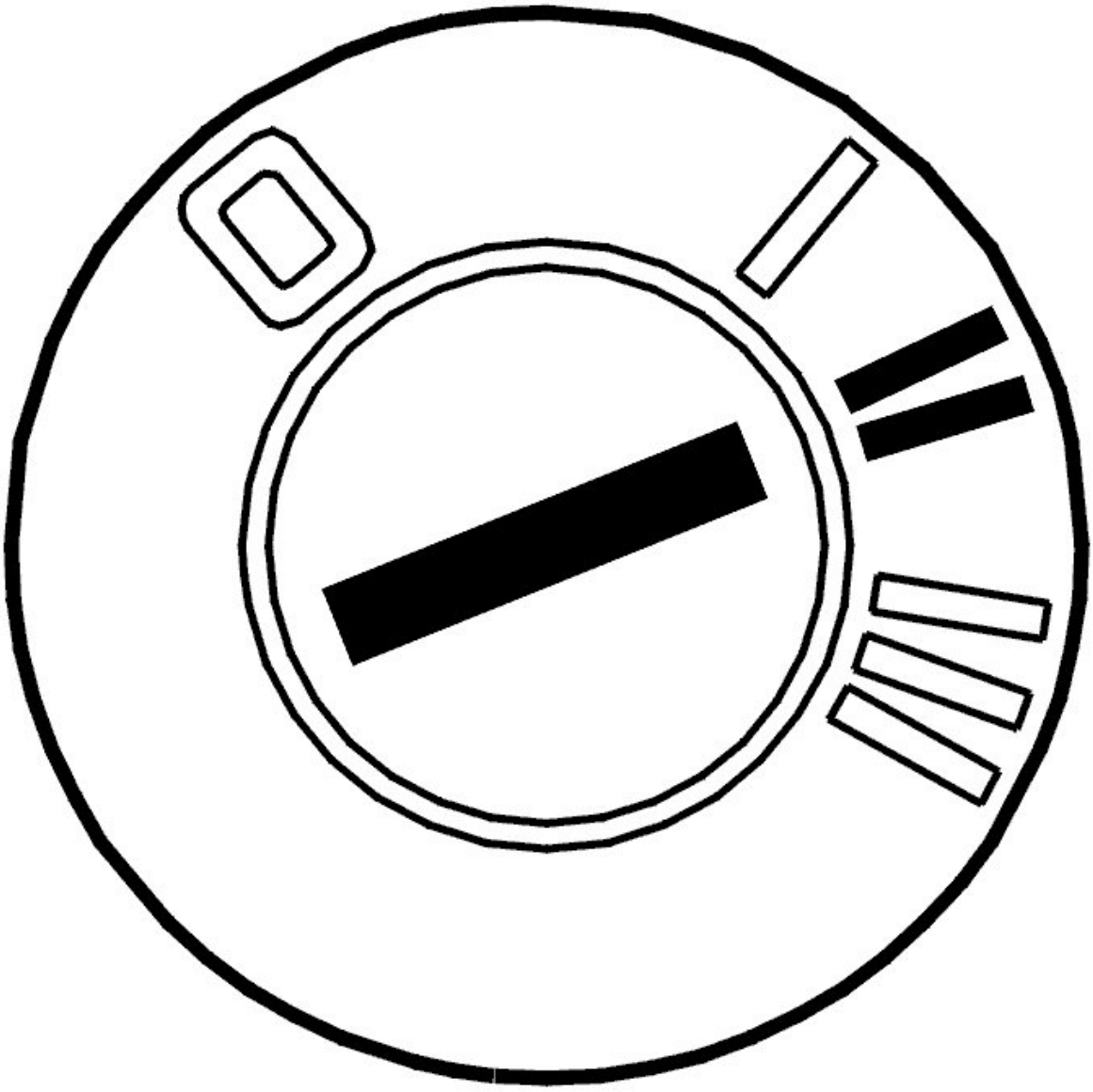


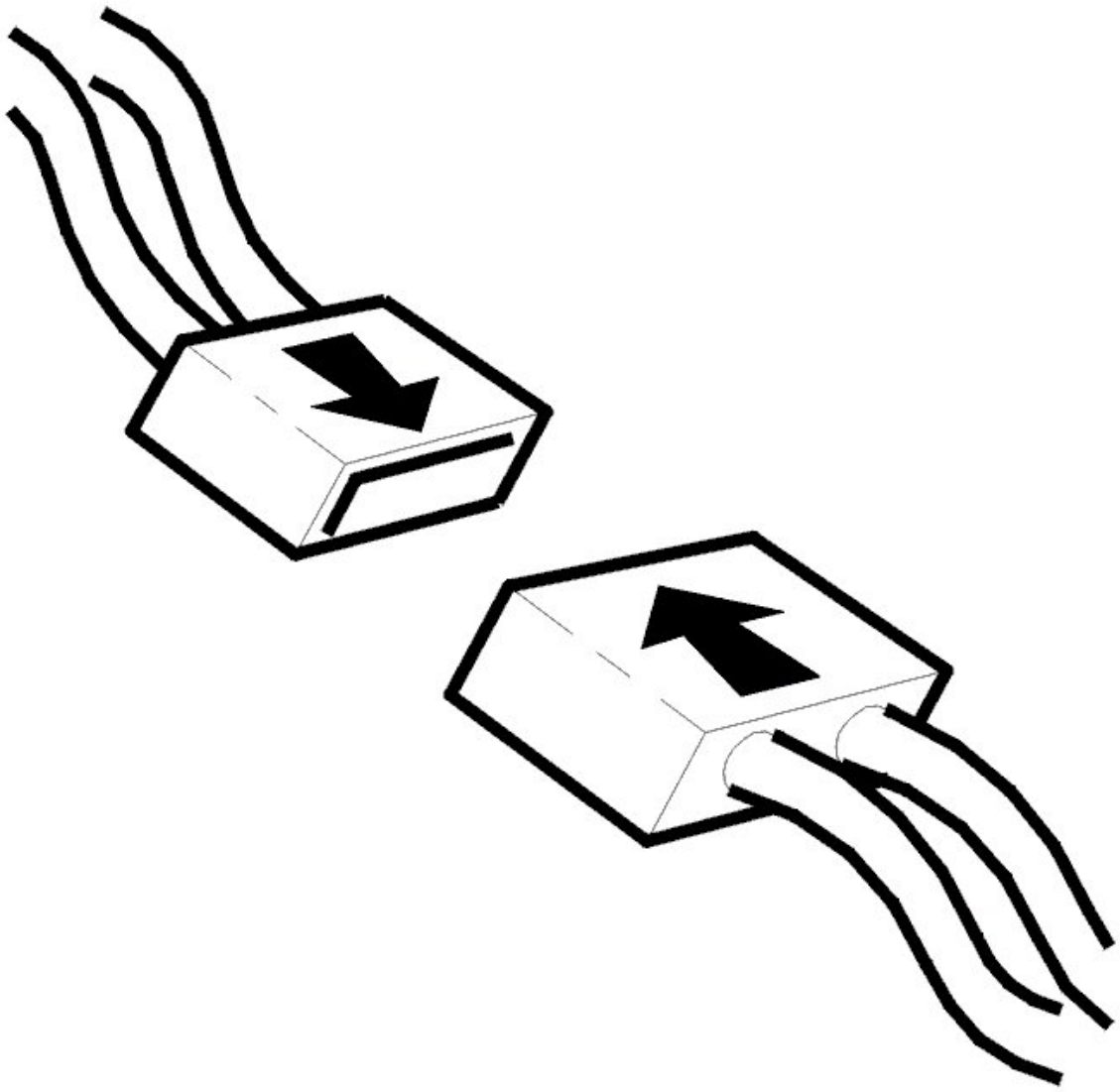
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

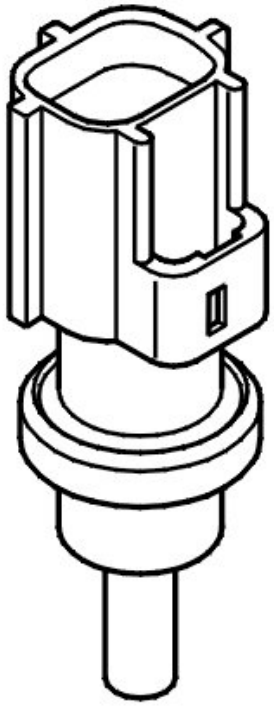
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal for engine coolant temperature (ECT).
After the engine is started, the engine control module (ECM) calculates the theoretical engine coolant temperature (ECT) based on factors such as time since start, engine speed (RPM) and load. The diagnostic trouble code (DTC) is stored if the signal from the engine coolant temperature (ECT) sensor is lower than the calculated temperature.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the connectors
- Damaged temperature sensor.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is difficult to start.

Fault-Tracing

Fault-tracing

Checking the component

Warning! Engine cooling fan (FC) can also operate if the ignition is switched off when this diagnostic trouble code (DTC) is stored.

Hint: To avoid injury, disconnect the power supply to the engine cooling fan (FC) during fault-tracing.

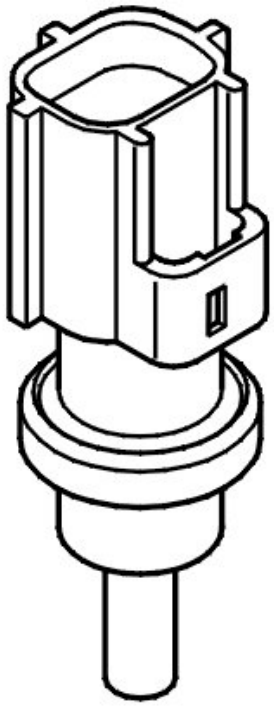
- Check the connector on the engine coolant temperature (ECT) sensor. Check for contact resistance and oxidation.

This diagnostic trouble code (DTC) is stored if the engine coolant temperature (ECT) sensor freezes. This may happen if the coolant level is low or there is too little glycol in the coolant. Check the engine coolant level and its freezing point.

Hint: The diagnostic trouble code (DTC) can be caused by a thermostat that doesn't open.

Replace the engine coolant temperature (ECT) sensor if the above does not remedy the fault.
Remedy as necessary.

Other information
- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

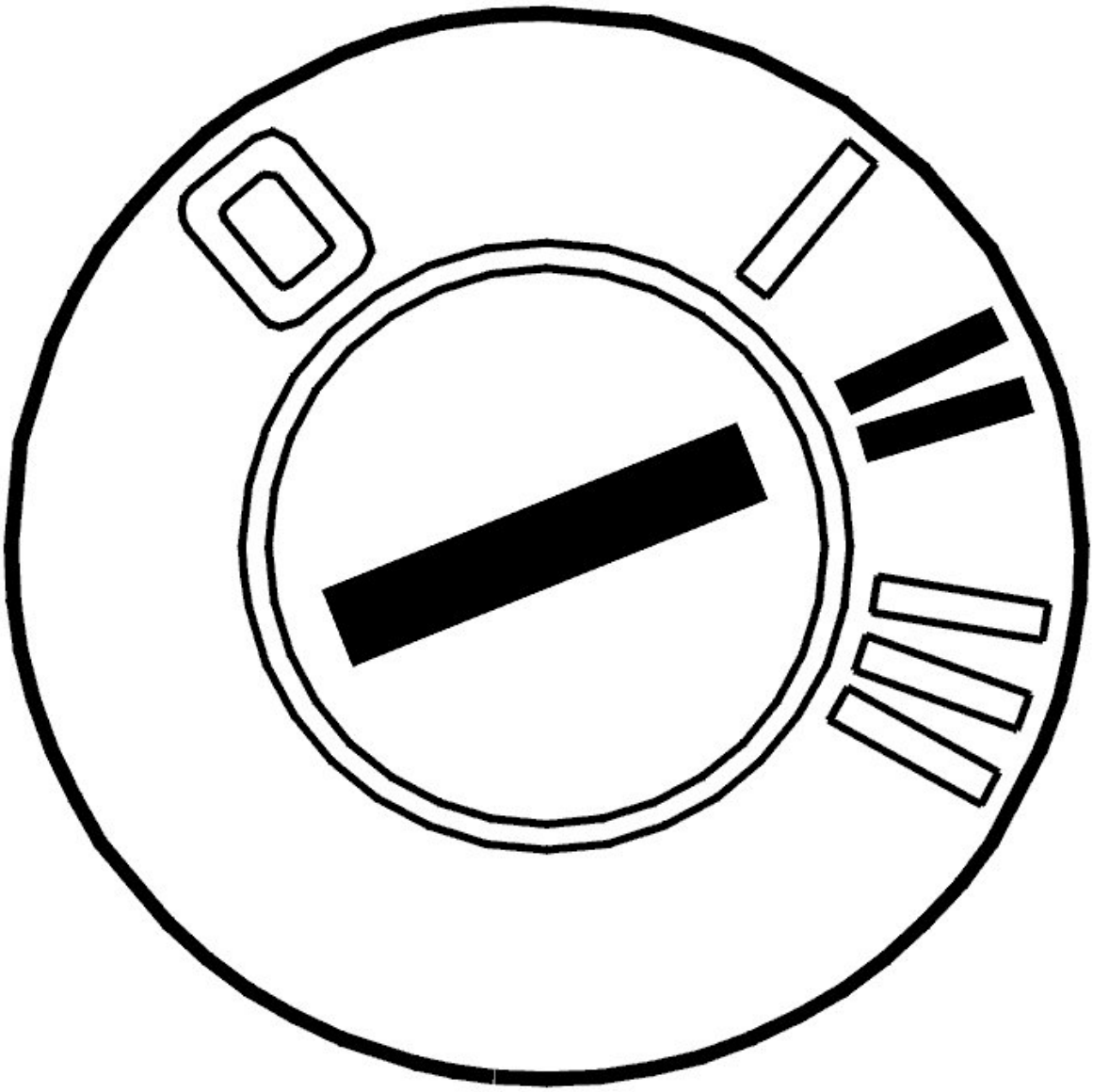


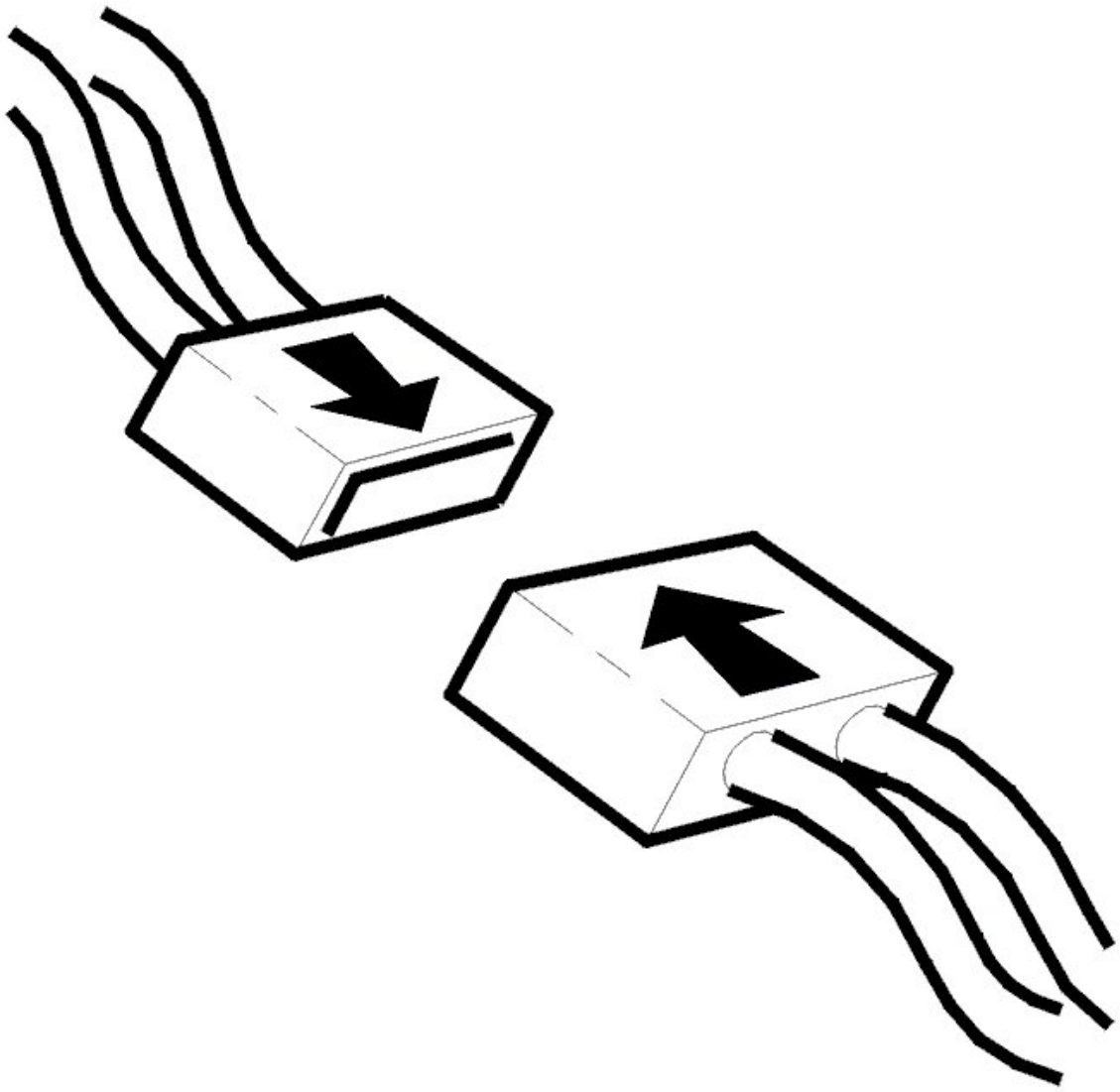
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

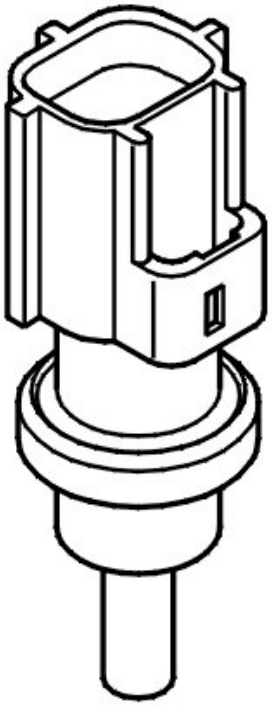
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-273C

Condition



The engine control module (ECM) checks the signal for engine coolant temperature (ECT).
A diagnostic trouble code (DTC) is stored if the engine control module (ECM) receives a signal from the engine coolant temperature (ECT) sensor corresponding to a temperature that is higher than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Initial boost pressure
- The engine coolant temperature (ECT) is calculated based on a model. Three-way catalytic converter (TWC) heating and fuel trim at start (starting trim), idle diagnostic and misfire diagnostic are disabled
- The engine cooling fan (FC) runs at a predefined speed.

Possible source
- Short-circuit to ground in the signal cable

- Damaged temperature sensor.

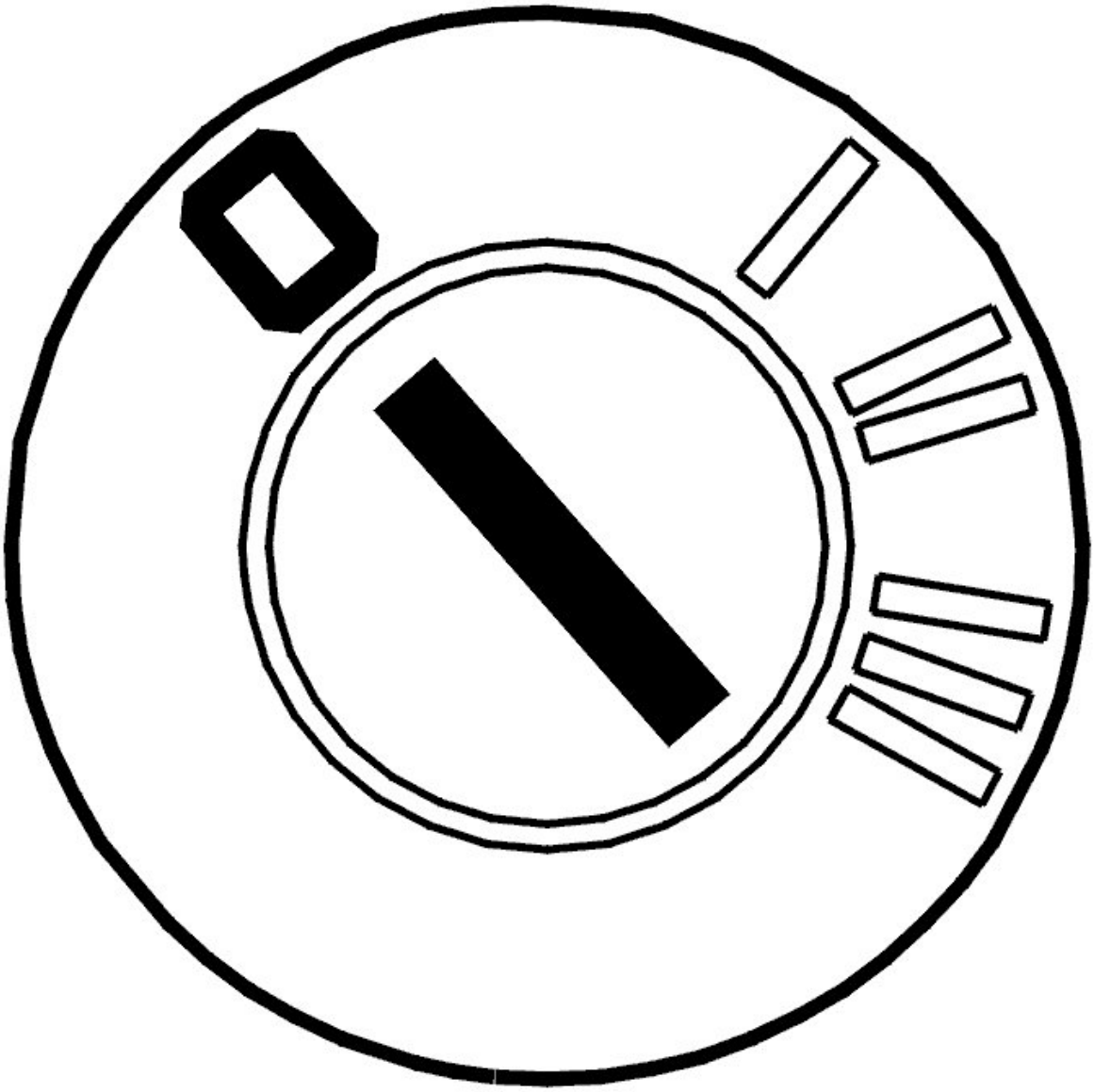
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is difficult to start.

Signal Too High

Signal too high

Checking the wiring and component

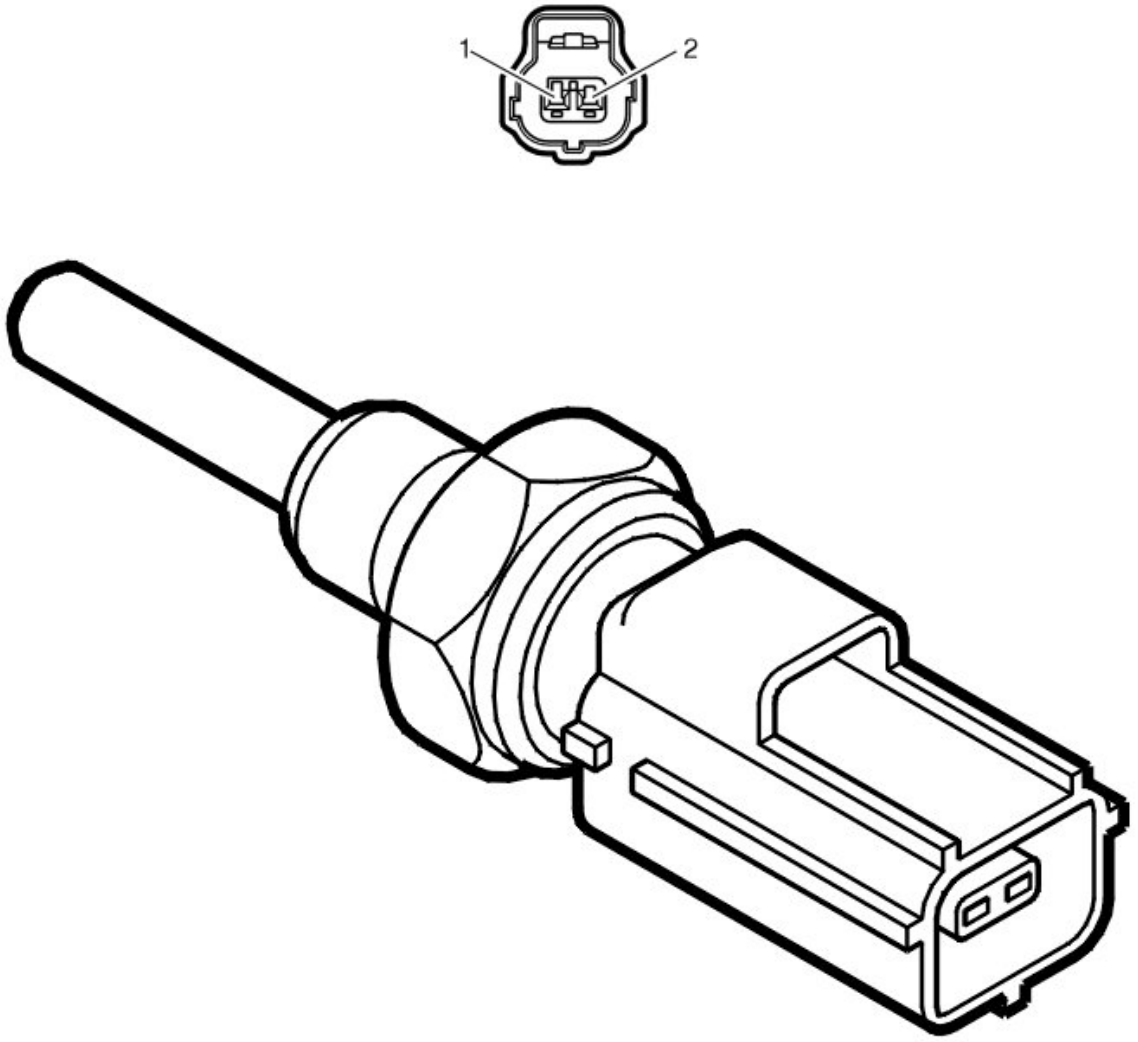
Warning! Before fault-tracing can begin, the engine cooling fan (FC) connector must be disconnected to prevent the engine cooling fan (FC) engaging. A diagnostic trouble code (DTC) for engine cooling fan (FC) low-speed may be stored. After fault-tracing the connector must be reconnected.



- Ignition off.

Check the resistance of the engine coolant temperature (ECT) sensor. Take readings between terminals #1 and #2 on the component.
Check the signal cable between engine control module (ECM) terminal #A4 (#A4) and engine coolant temperature (ECT) sensor terminal #1.
Check for a short-circuit to ground.
If no faults are found and the fault is permanent, replace the engine coolant temperature (ECT) sensor.
Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Component specifications See: Engine Control Module/Specifications
- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

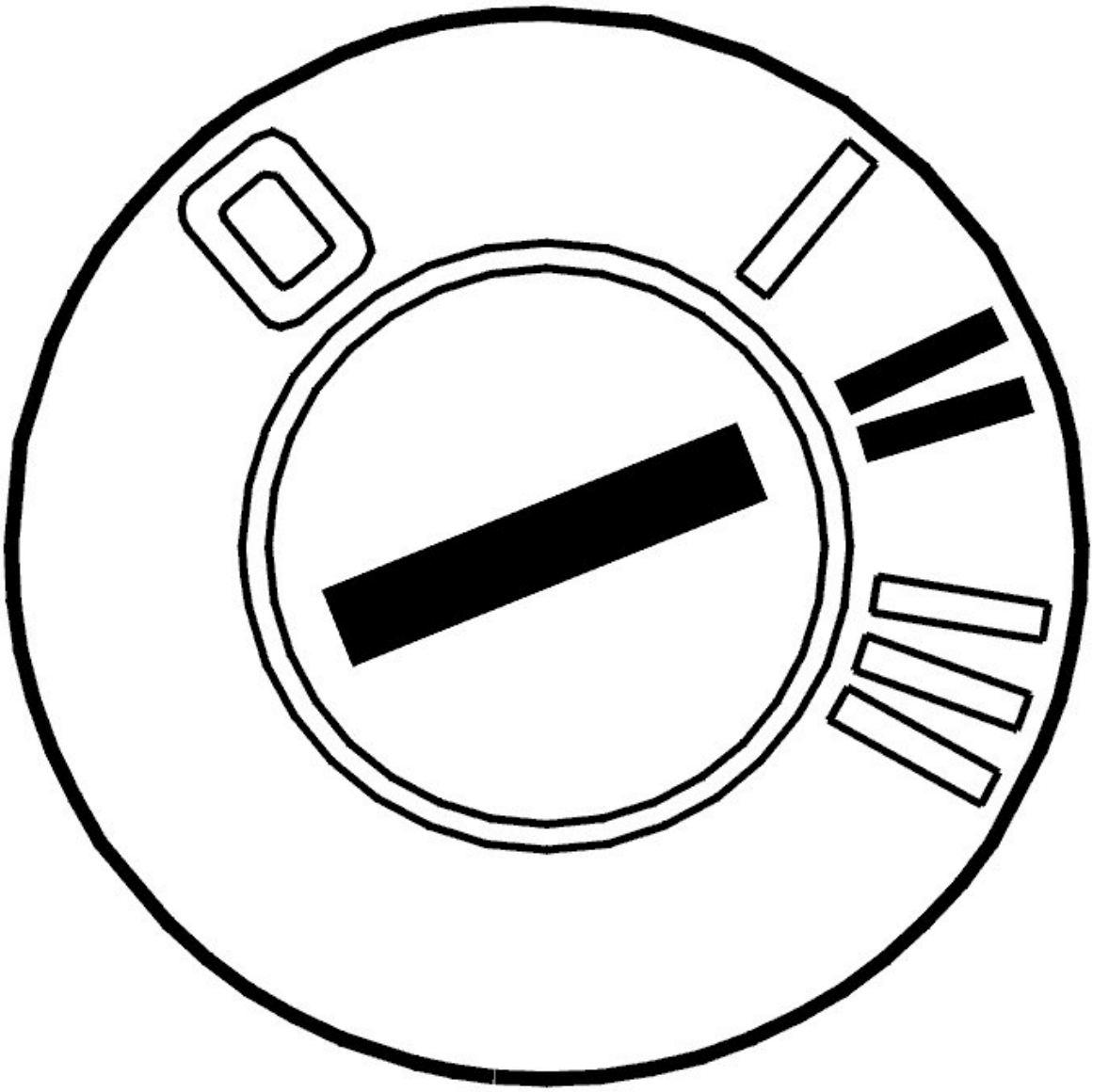


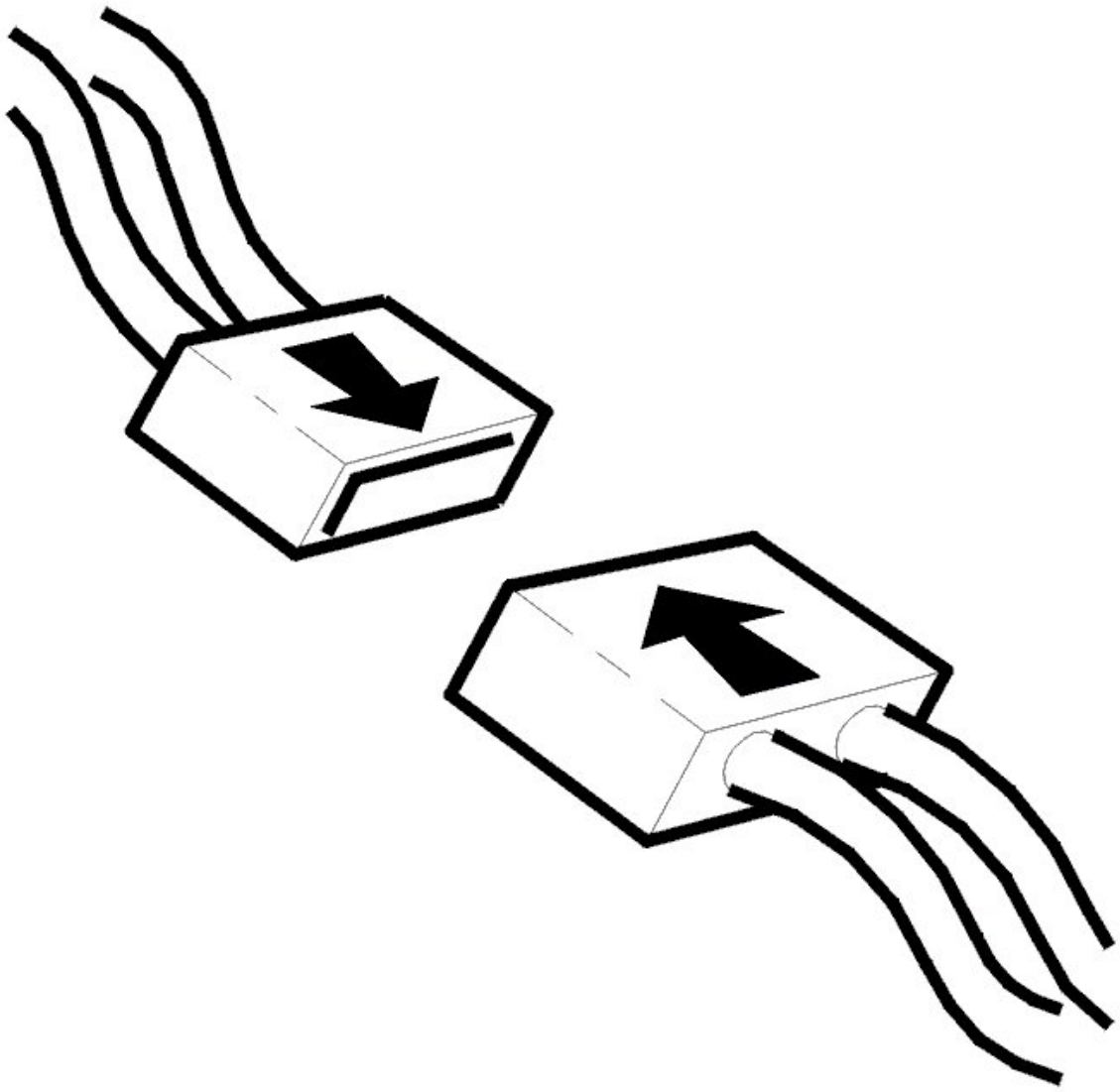
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

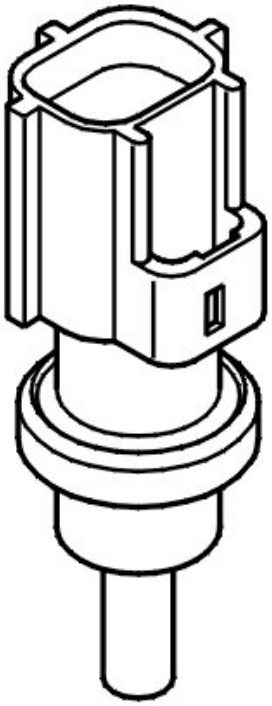
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-273D

Condition



The engine control module (ECM) checks the signal for engine coolant temperature (ECT).
A diagnostic trouble code (DTC) is stored if the engine control module (ECM) receives a signal from the engine coolant temperature (ECT) sensor corresponding to a temperature that is lower than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Initial boost pressure
- The engine coolant temperature (ECT) is calculated based on a model. Three-way catalytic converter (TWC) heating and fuel trim at start (starting trim), idle diagnostic and misfire diagnostic are disabled
- The engine cooling fan (FC) runs at a predefined speed.

Possible source
- Contact resistance and oxidation in the terminals

- Open-circuit in the signal cable
- Open-circuit in the signal ground cable
- Short-circuit to supply voltage in the signal cable
- Damaged temperature sensor.

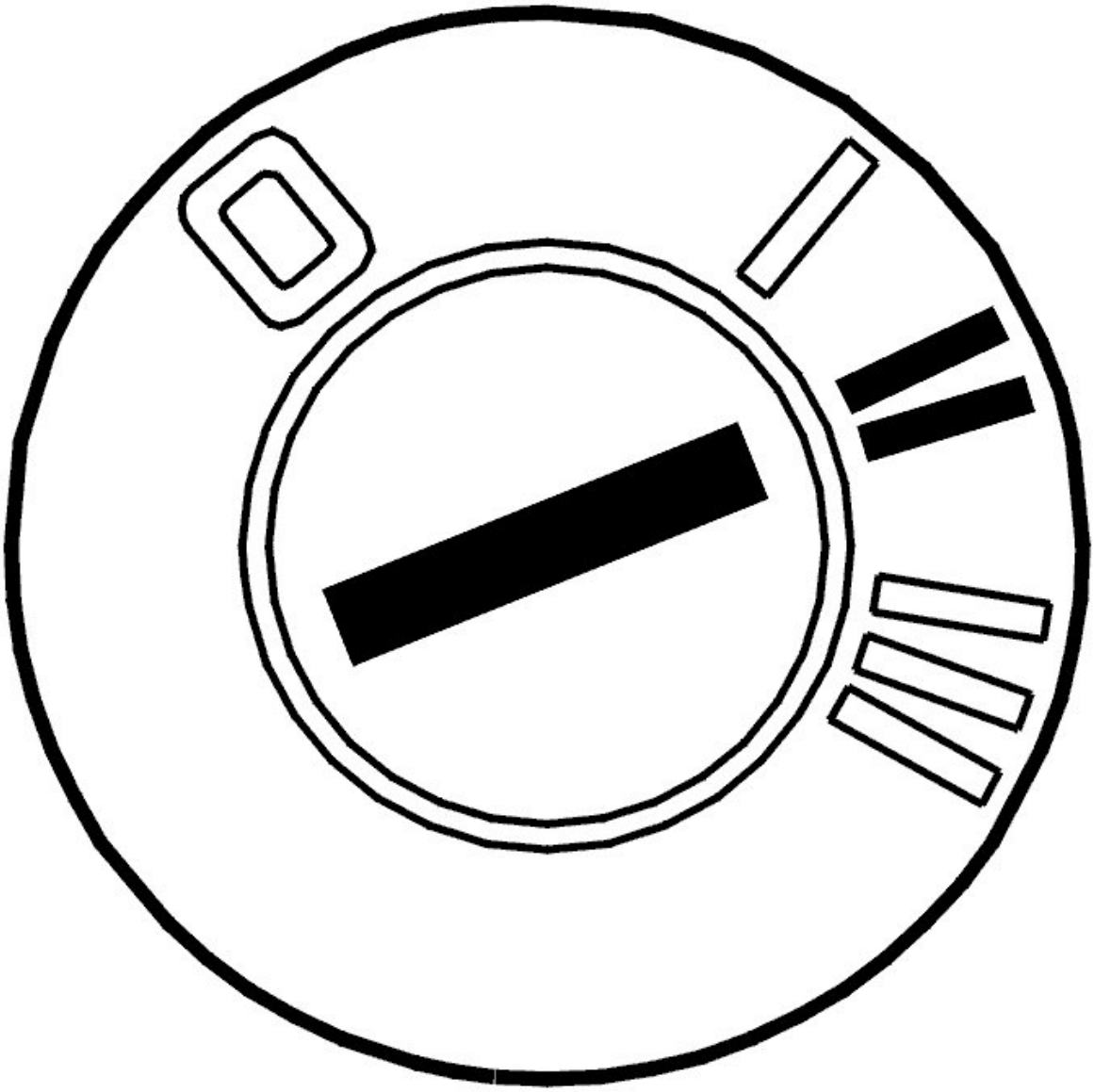
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is difficult to start.

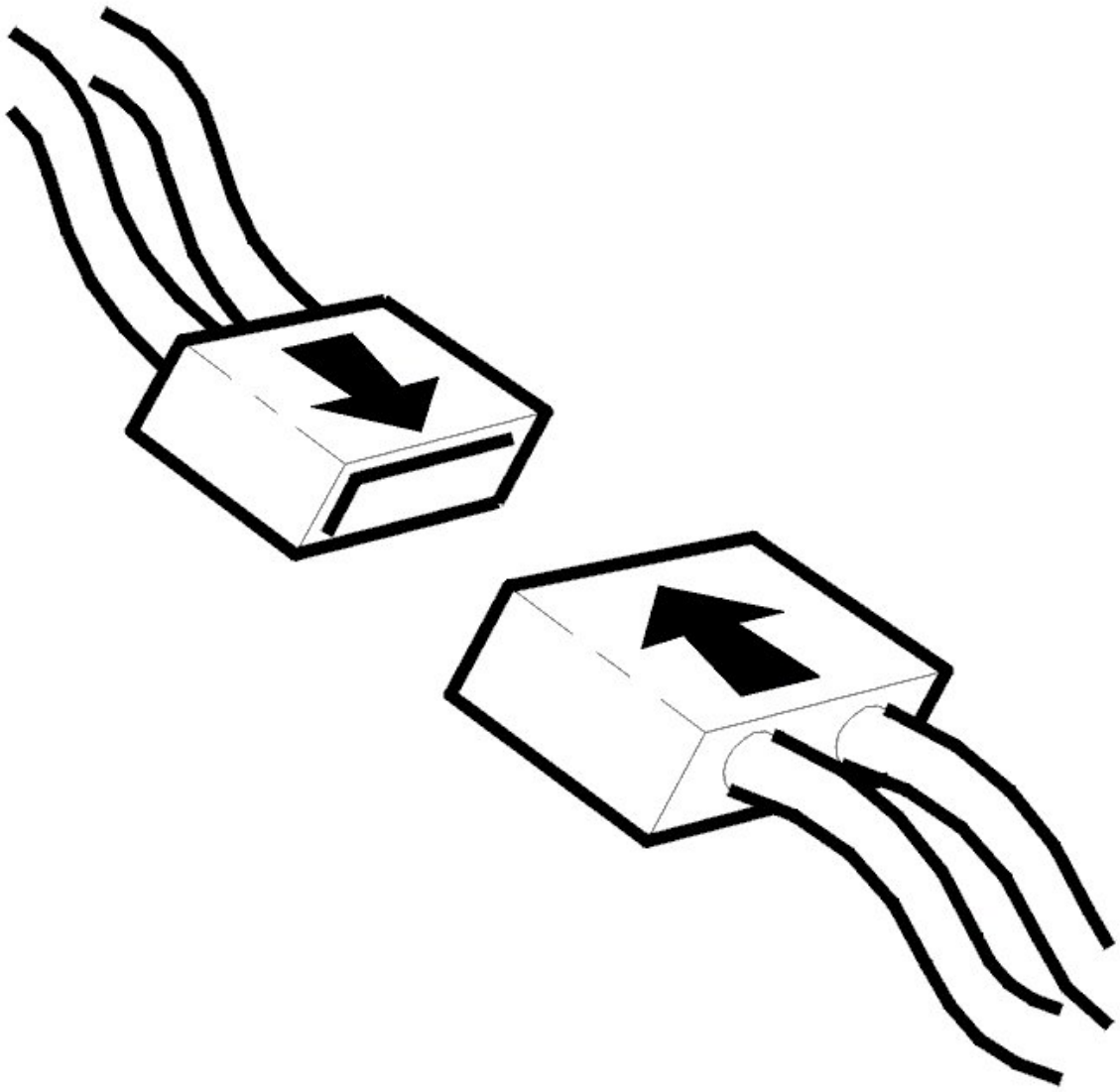
Signal Too Low

Signal too low

Checking the connector

Warning! Before fault-tracing can begin, the engine cooling fan (FC) connector must be disconnected to prevent the engine cooling fan (FC) engaging. A diagnostic trouble code (DTC) for the engine cooling fan (FC) control module may be stored. After fault-tracing the connector must be reconnected.



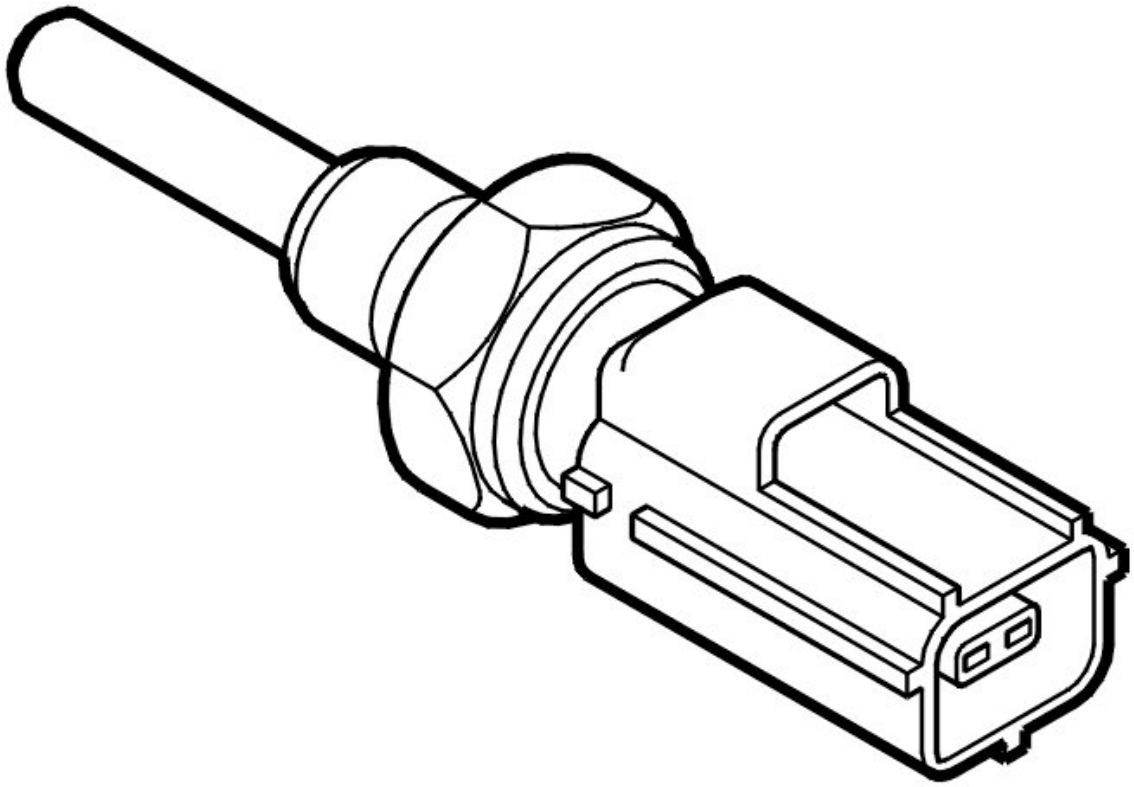


- Ignition off
- Check the connector on the engine coolant temperature (ECT) sensor. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

If the temperature is now within its permitted range, the fault was caused by poor contact in the connector.

Other information

- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

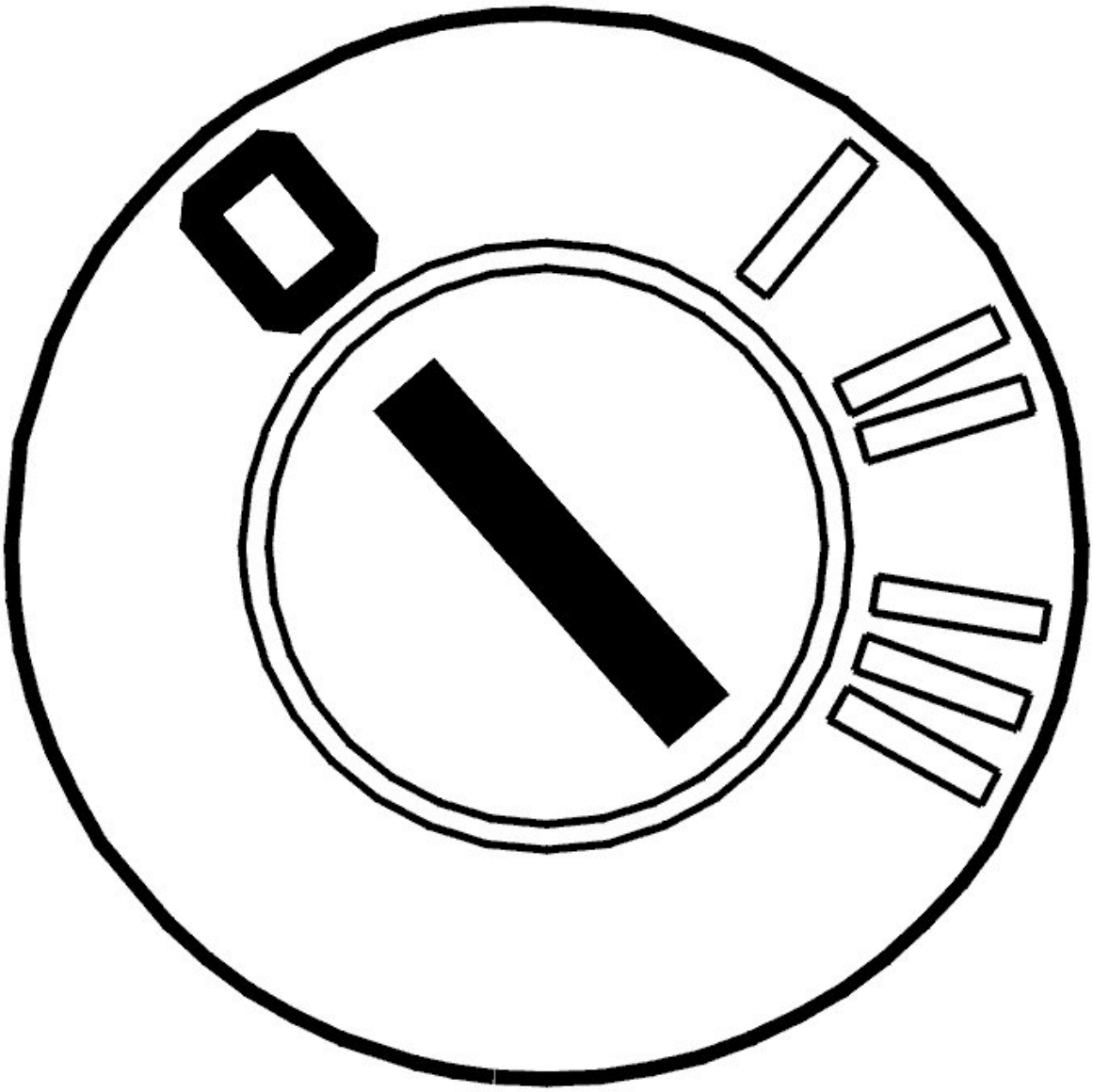


Is the temperature within its permitted range?

Yes - Fault Found

No - Checking the wiring and component

Checking the wiring and component



- Ignition off.

Check the resistance of the engine coolant temperature (ECT) sensor between terminals #1 and #2 (component side).

Note! The engine coolant temperature (ECT) sensor may be damaged if there has been a short-circuit to supply voltage in the signal cable. Check this before replacing the sensor.

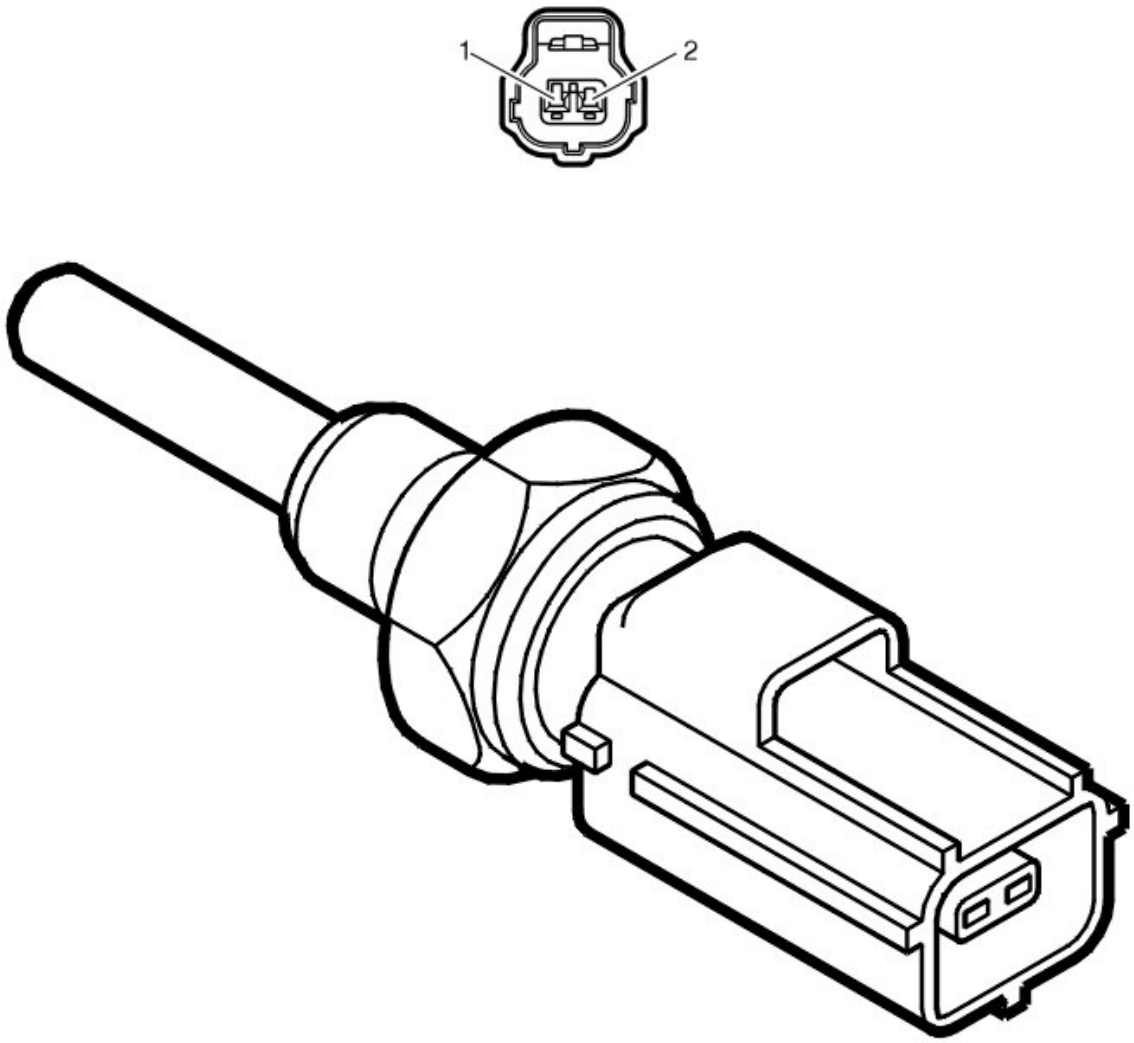
Check the signal cable between engine control module (ECM) terminal #A4 (#A4) and engine coolant temperature (ECT) sensor terminal #1. Check for an open-circuit. Check for a short-circuit to supply voltage.

Hint: With the ignition on and engine coolant temperature (ECT) sensor connector disconnected the voltage between terminal #1 and ground terminal should be approximately 5 V.

Check the ground lead between control module terminal #A60 (#A60) and engine coolant temperature (ECT) sensor terminal #2. Check for an open-circuit.
If no faults are found and the fault is permanent, replace the engine coolant temperature (ECT) sensor.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Component specifications See: Engine Control Module/Specifications
- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

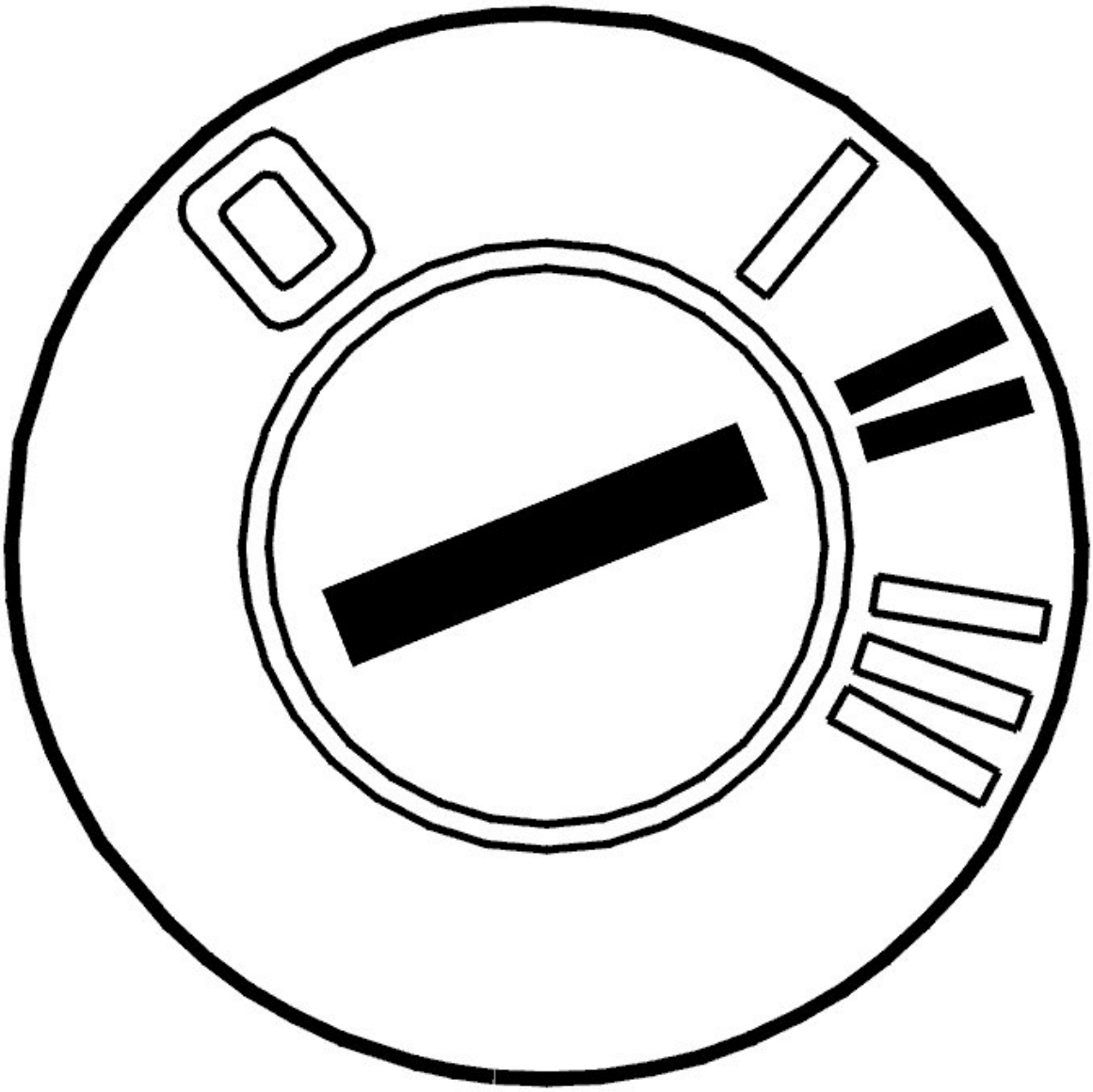


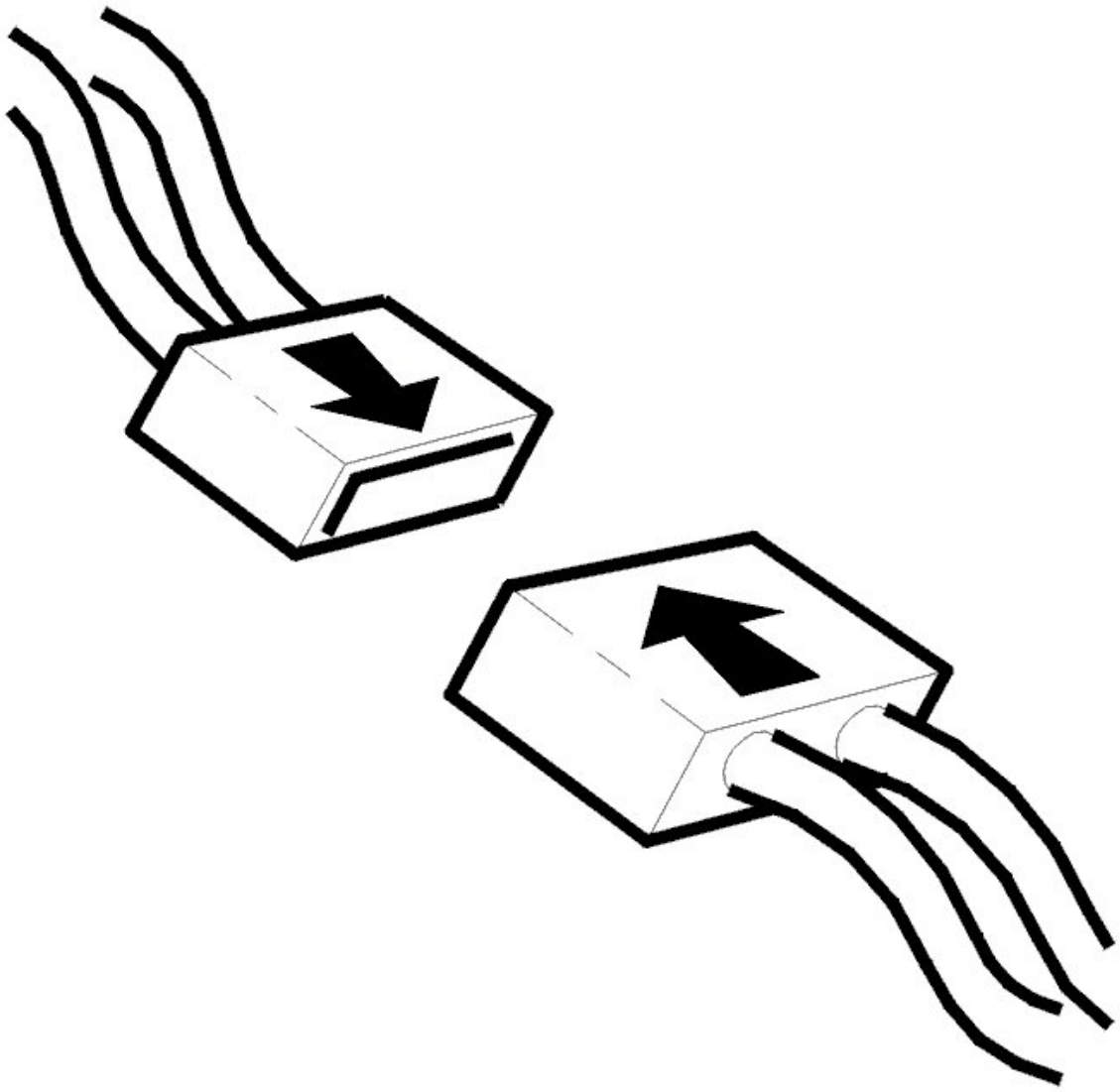
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

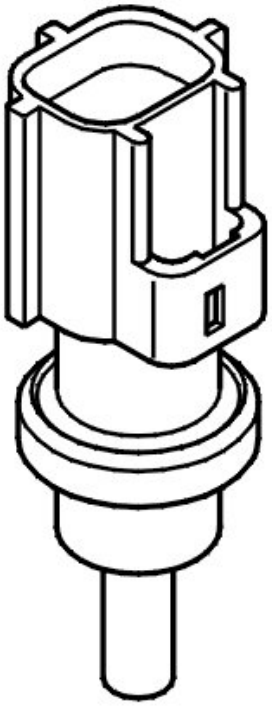
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal for engine coolant temperature (ECT).
After the engine is started, the engine control module (ECM) calculates the theoretical engine coolant temperature (ECT) based on factors such as time since start, engine speed (RPM) and load. The diagnostic trouble code (DTC) is stored if the signal from the engine coolant temperature (ECT) sensor is lower than the calculated temperature.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the connectors
- Damaged temperature sensor.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is difficult to start.

Faulty Signal/Fault-Tracing

Fault-tracing

Checking the component

Warning! Engine cooling fan (FC) can also operate if the ignition is switched off when this diagnostic trouble code (DTC) is stored.

Hint: To avoid injury, disconnect the power supply to the engine cooling fan (FC) during fault-tracing.

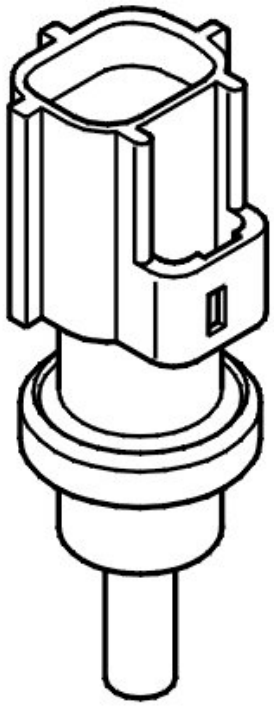
- Check the connector on the engine coolant temperature (ECT) sensor. Check for contact resistance and oxidation.

This diagnostic trouble code (DTC) is stored if the engine coolant temperature (ECT) sensor freezes. This may happen if the coolant level is low or there is too little glycol in the coolant. Check the engine coolant level and its freezing point.

Hint: The diagnostic trouble code (DTC) can be caused by a thermostat that doesn't open.

Replace the engine coolant temperature (ECT) sensor if the above does not remedy the fault.
Remedy as necessary.

Other information
- Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

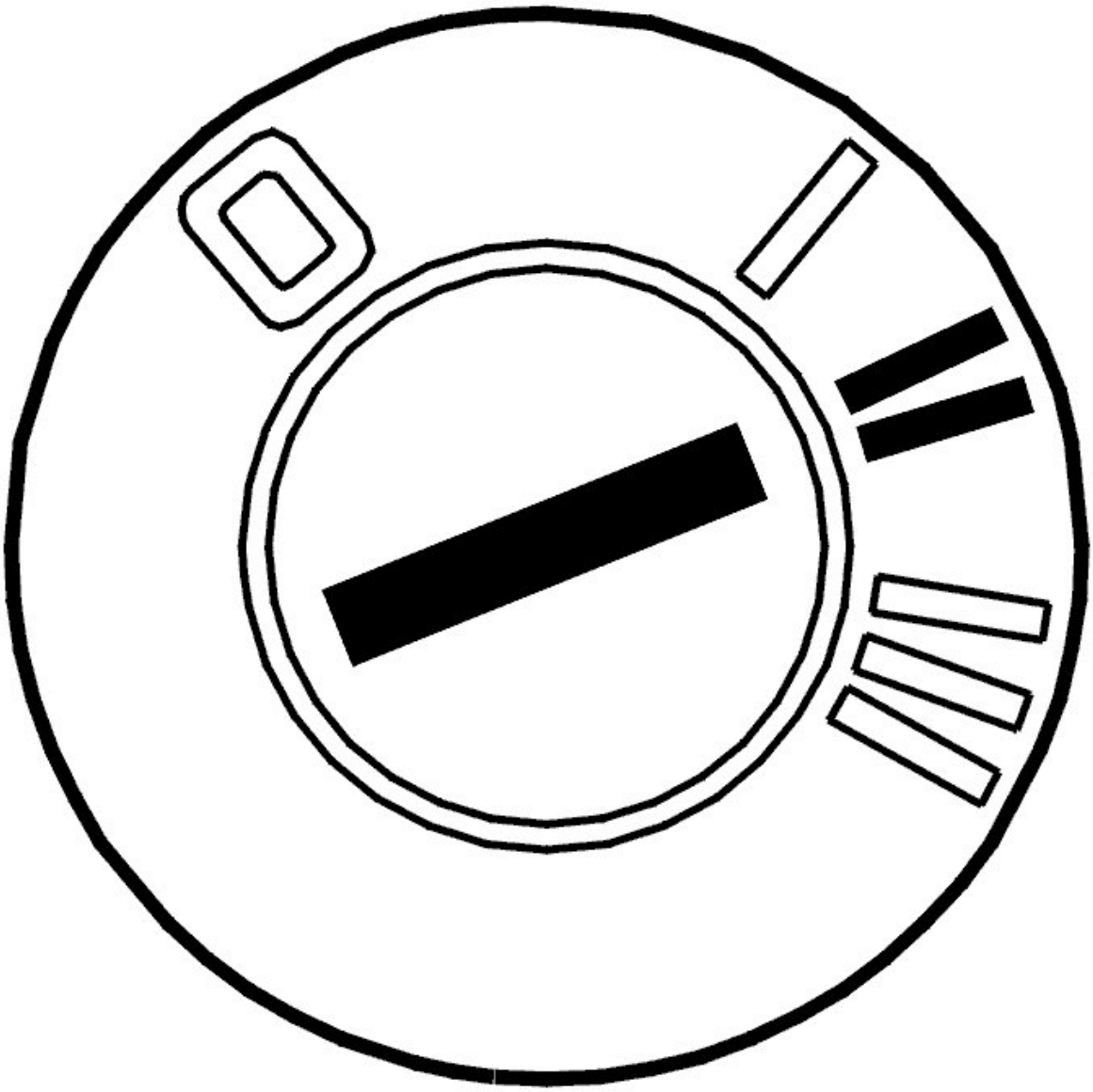


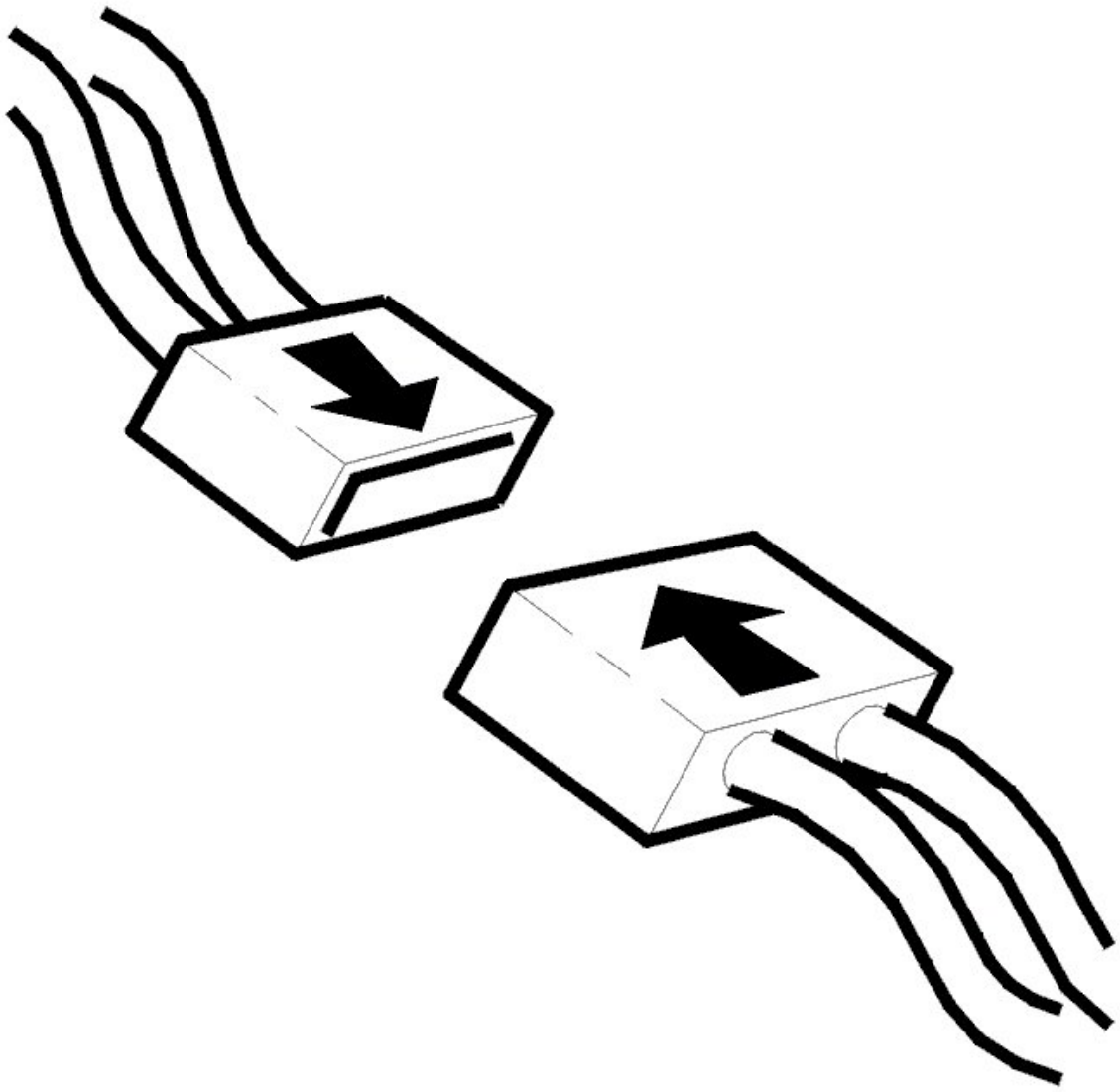
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the engine coolant temperature (ECT) sensor.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

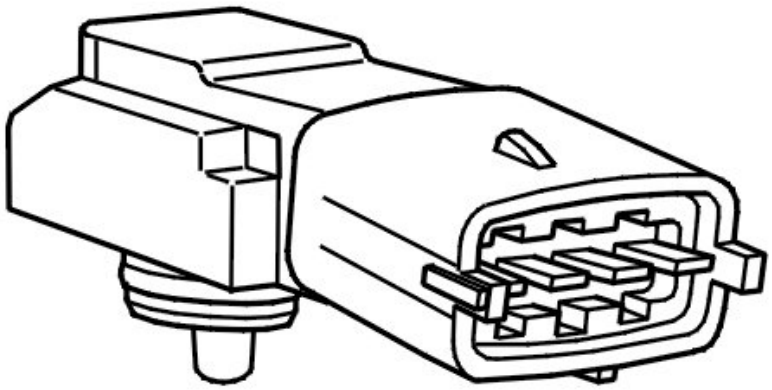
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2800

Condition



The engine control module (ECM) checks the signal from the fuel pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the fuel pressure sensor is within the normal signal range of the sensor but that the signal is below a calculated desired value for the fuel pressure.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged fuel pressure sensor.

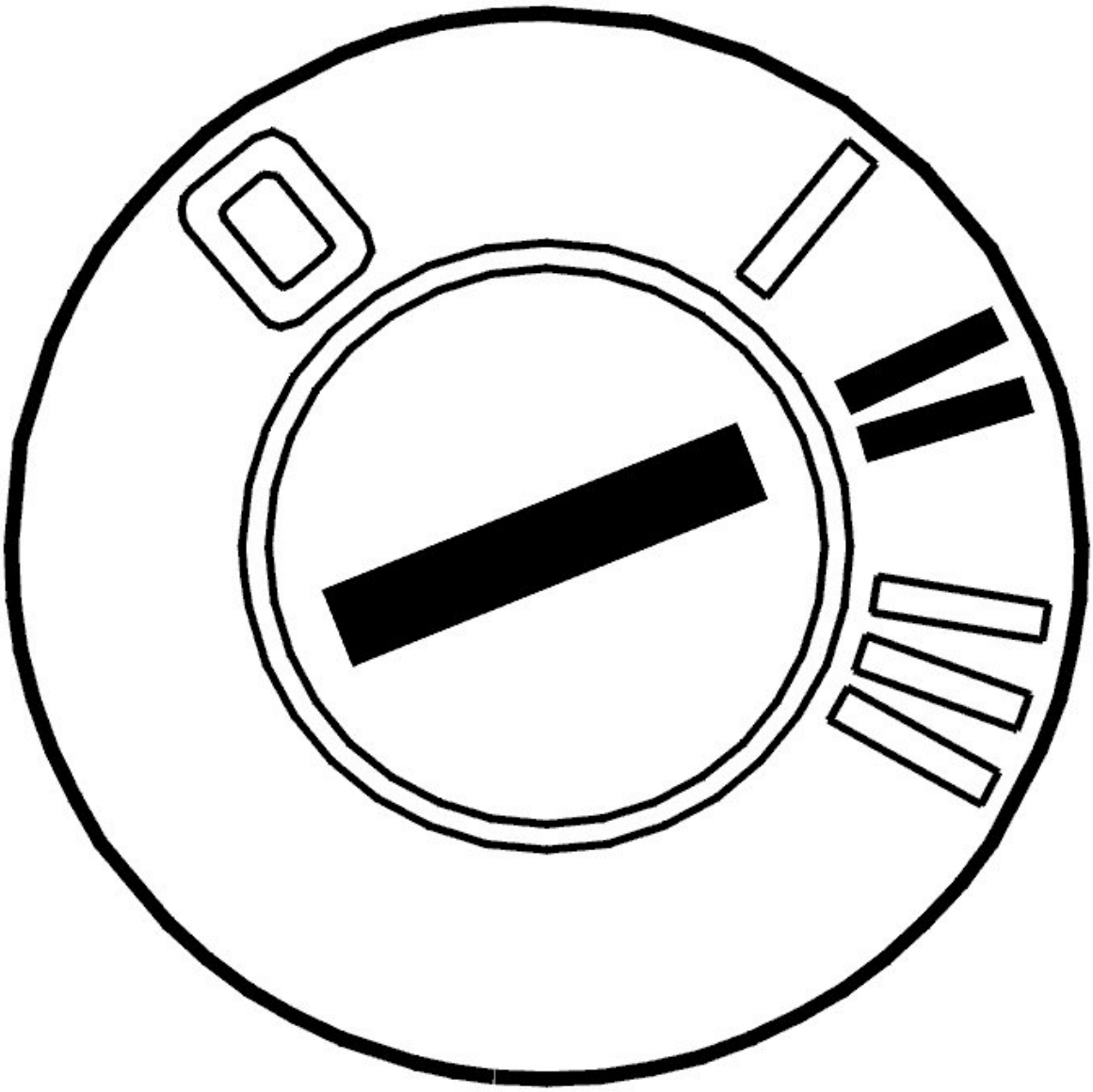
Fault symptom[s]

- Driving/Poor performance/lacks power
- Driving/Engine stalls/Unsure when/at all times

Signal Too Low

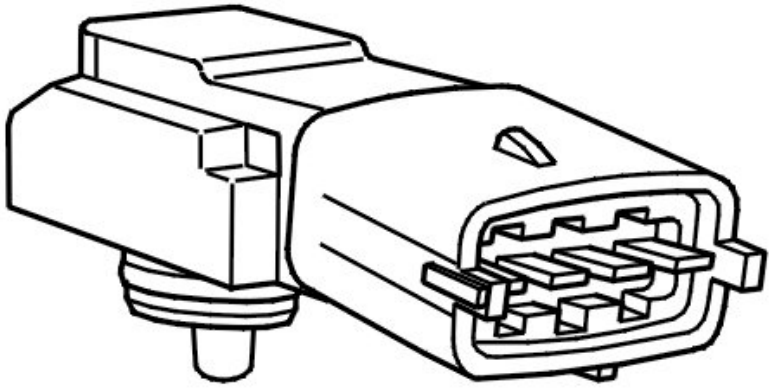
Signal too low

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
With the engine at operating temperature and idling, the signal must be approximately 400 kPa.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



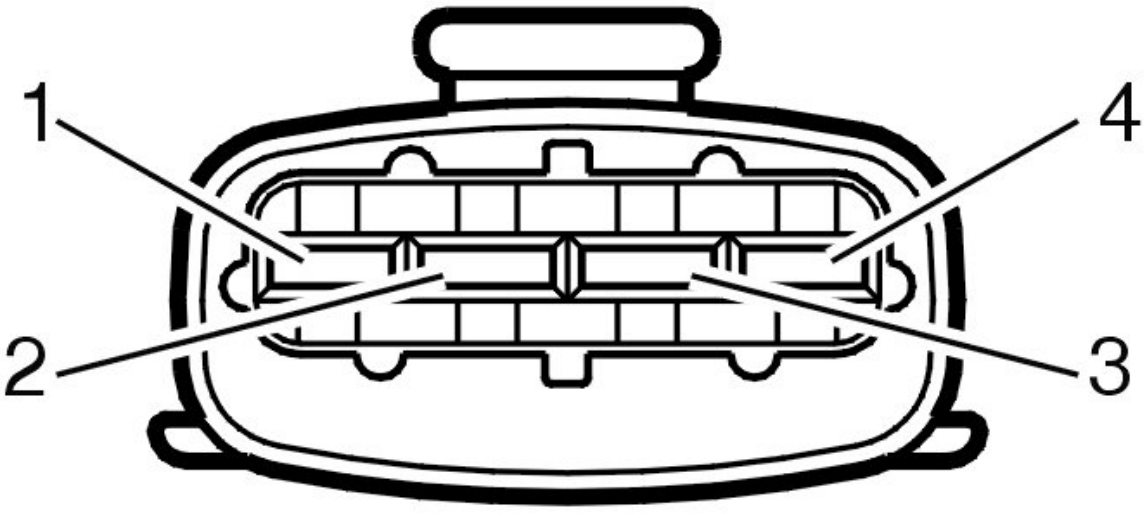
Continue - Checking components and wiring

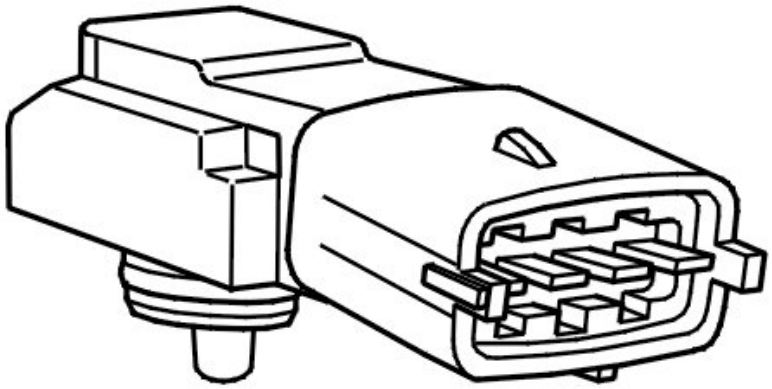
Checking components and wiring

Check the signal cable between control module terminal #A2 (#A2) and fuel pressure sensor terminal #4. Check for a short-circuit to ground. Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.





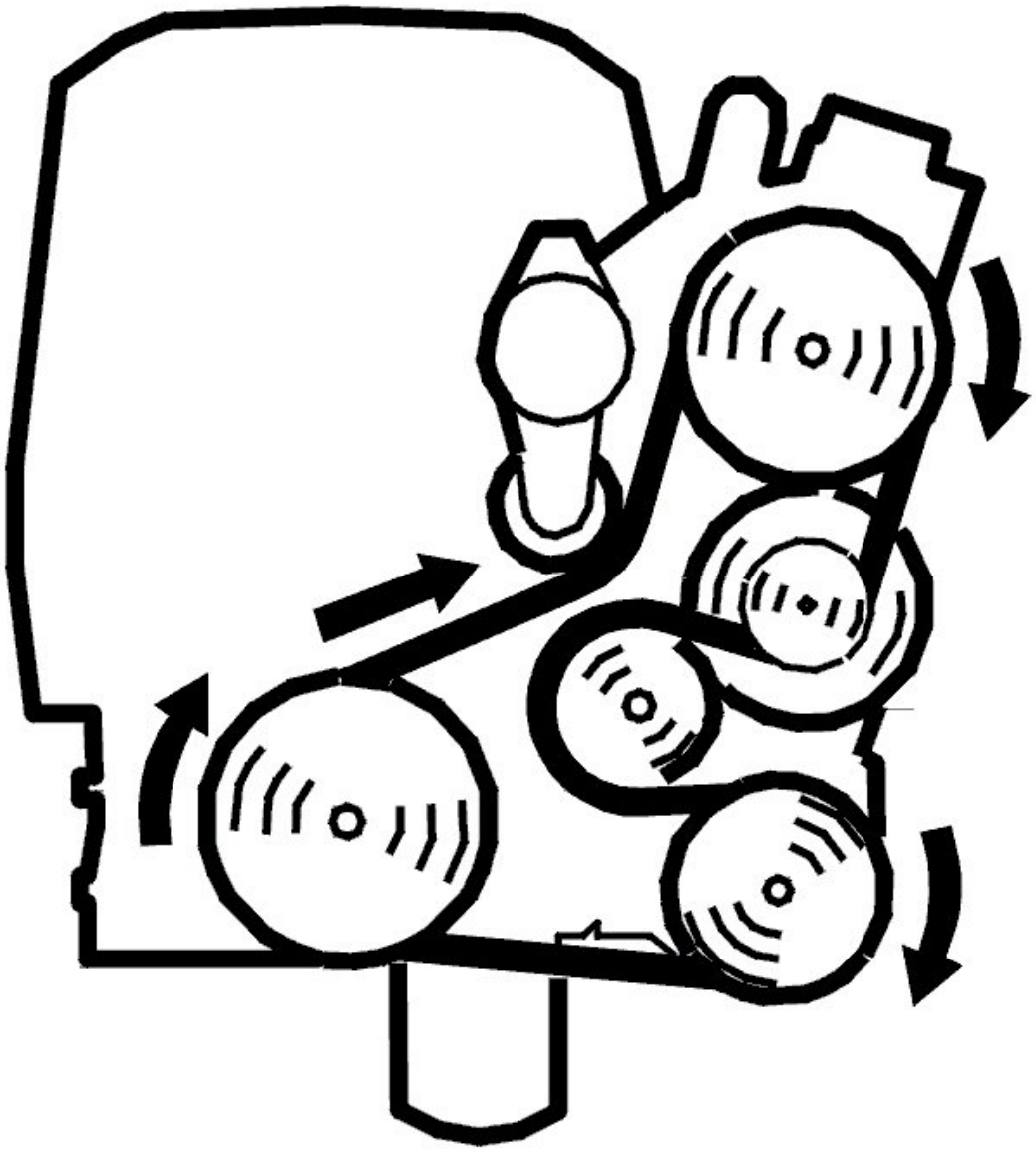
Continue - Verification

Verification

Verification

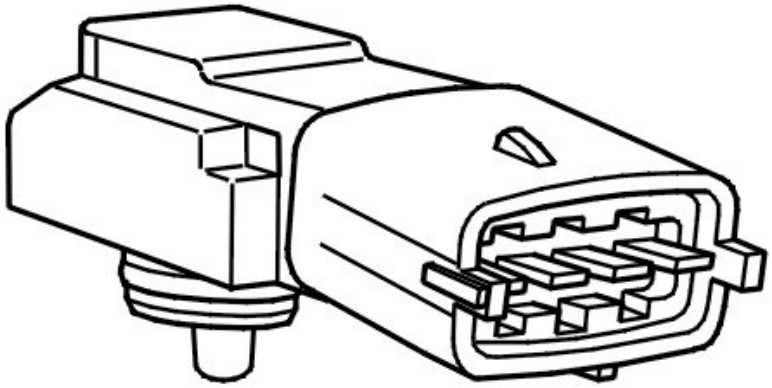
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pressure sensor signal.

Check that the fuel pressure is approximately 400 kPa with the engine idling at operating temperature.



Is the fuel pressure correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

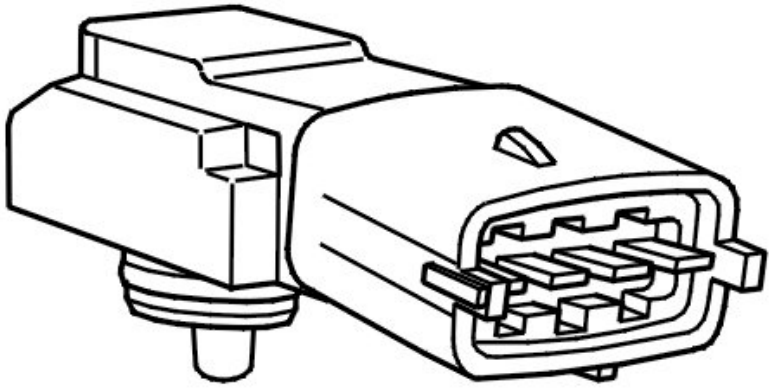
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-280B

Condition



The engine control module (ECM) checks the signal from the fuel pressure sensor.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the fuel pressure sensor is within the normal signal range of the sensor but that the signal is below a calculated desired value for the fuel pressure.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

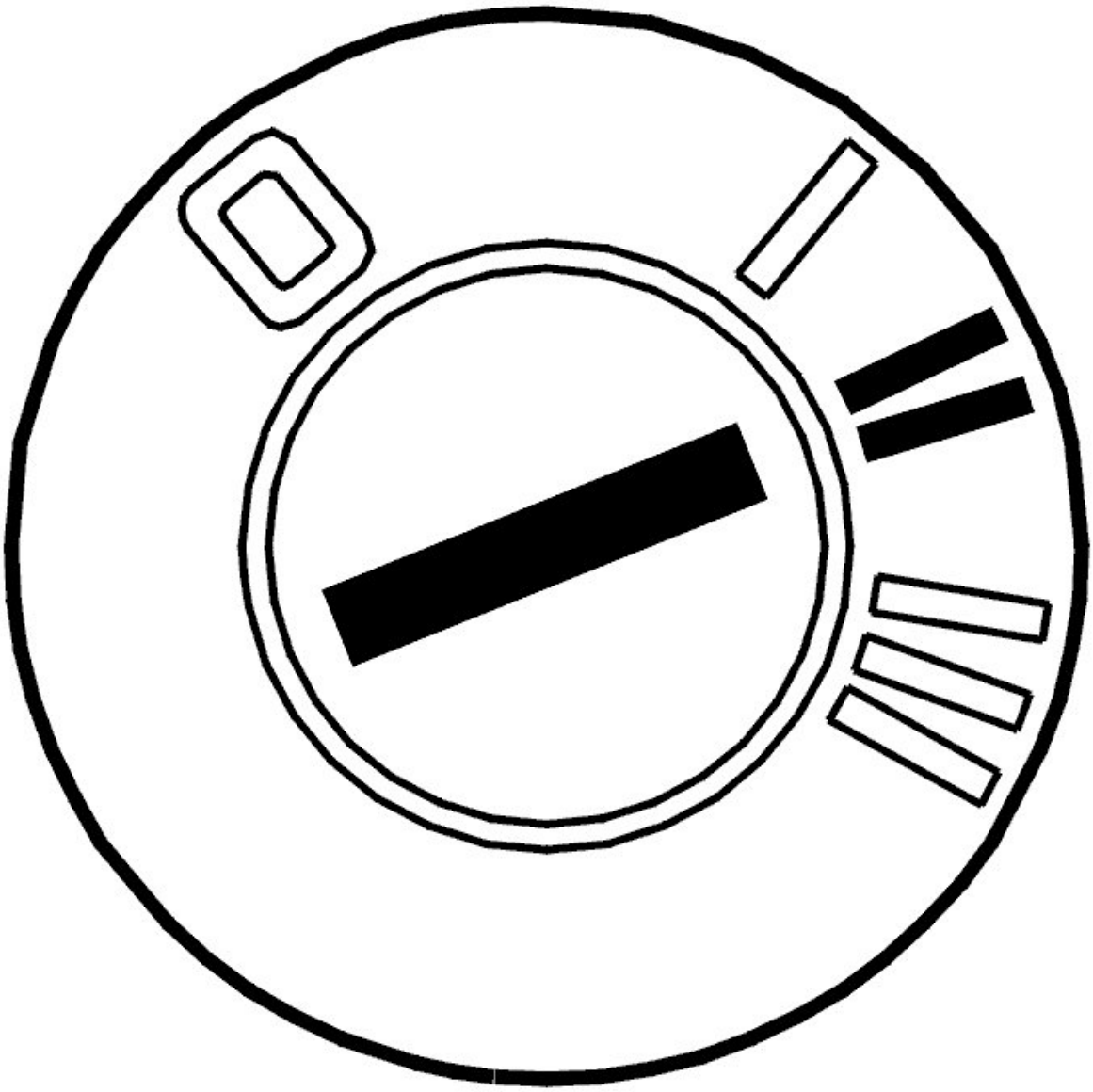
Possible source
- Short-circuit to ground in the signal cable
- Damaged fuel pressure sensor.

Fault symptom[s]
- Driving/Poor performance/lacks power
- Driving/Engine stalls/Unsure when/at all times

Signal Missing

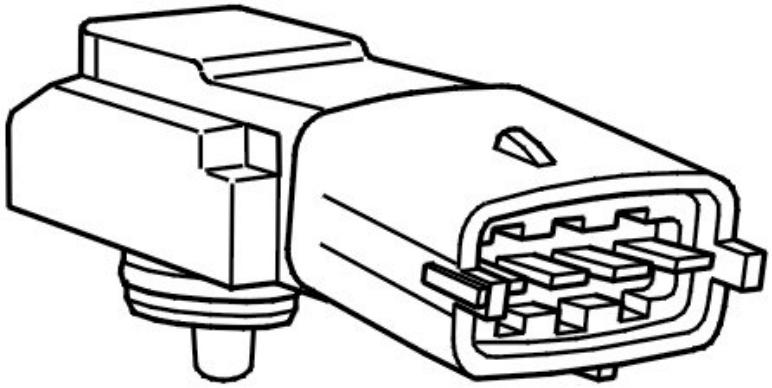
Signal missing

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
With the engine at operating temperature and idling, the signal must be approximately 400 kPa.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



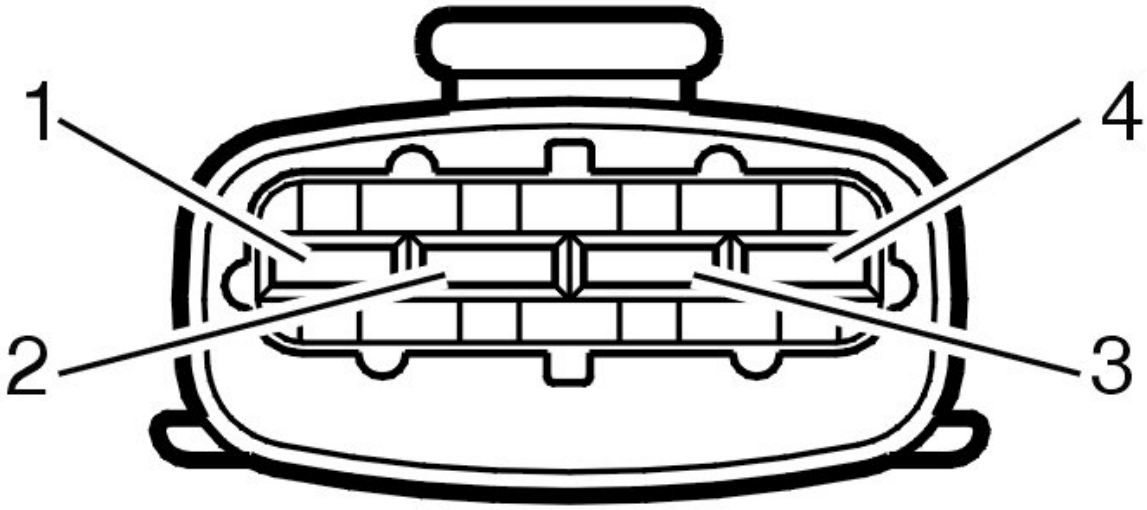
Continue - Checking components and wiring

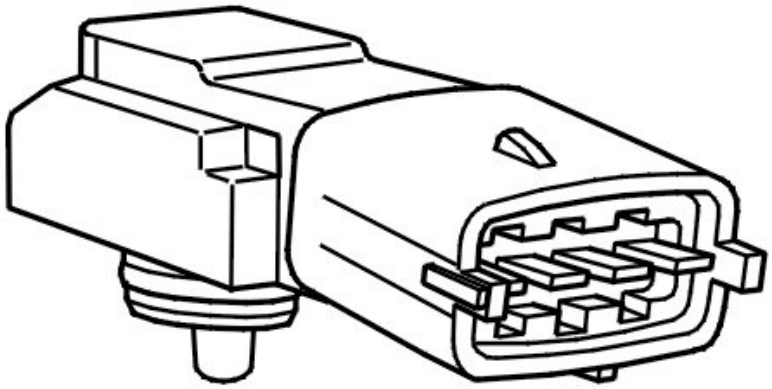
Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #A2 (#A2) and fuel pressure sensor terminal #4. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead between control module terminal #A60 (#A60) and fuel pressure sensor terminal #1. Check for an open-circuit.
Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





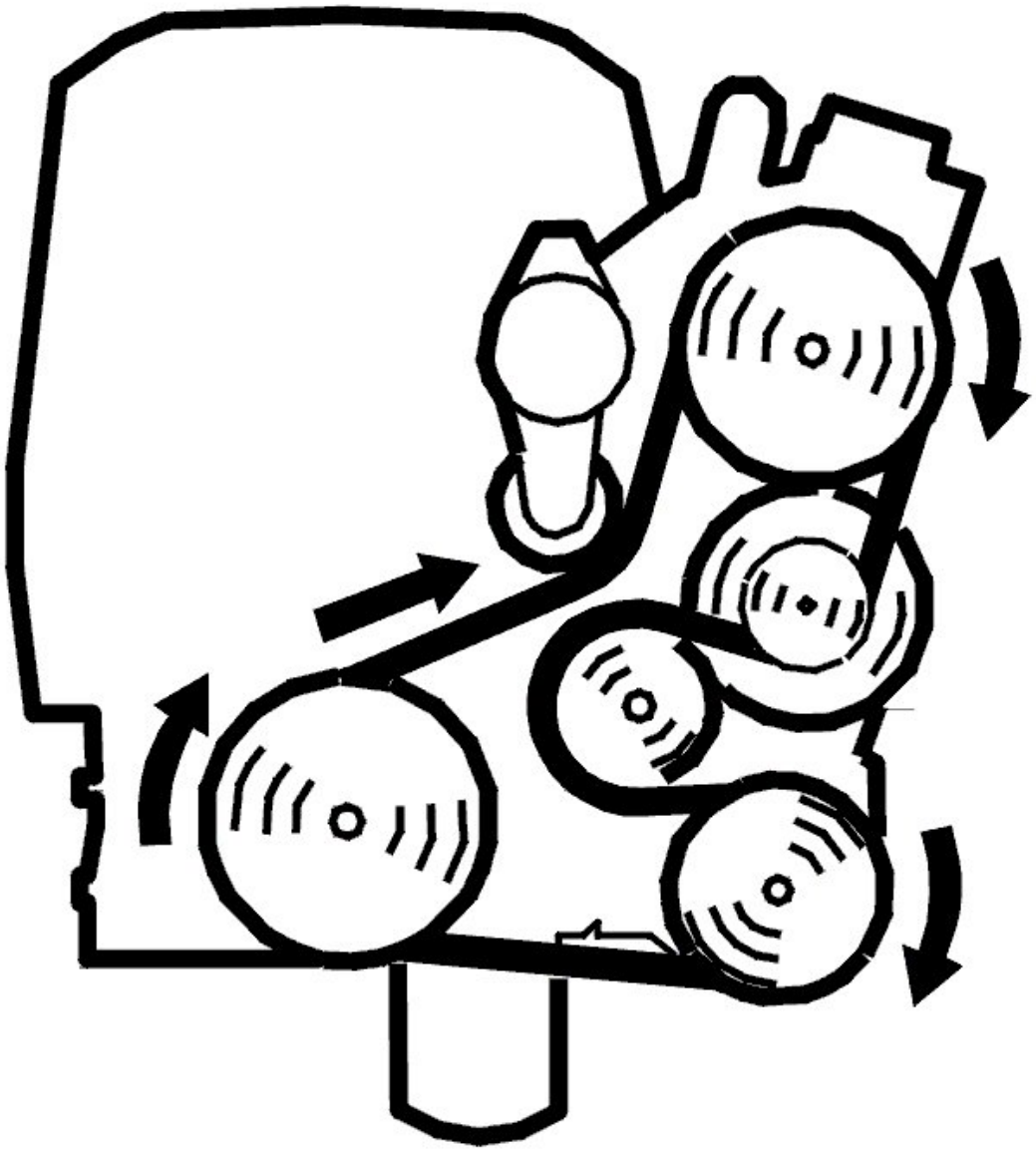
Continue - Verification

Verification

Verification

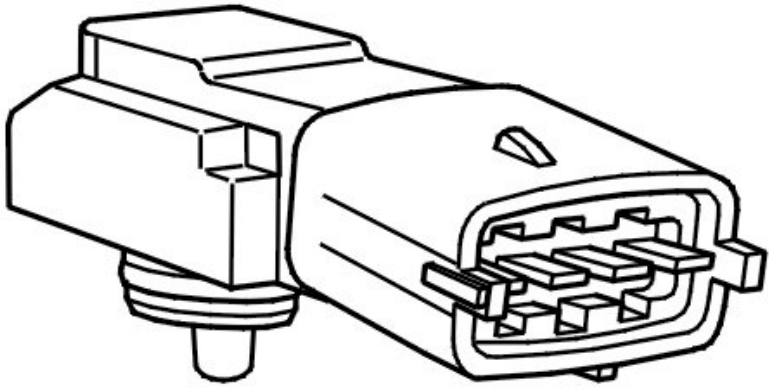
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pressure sensor signal.

Check that the fuel pressure is approximately 400 kPa with the engine idling at operating temperature.



Is the fuel pressure correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

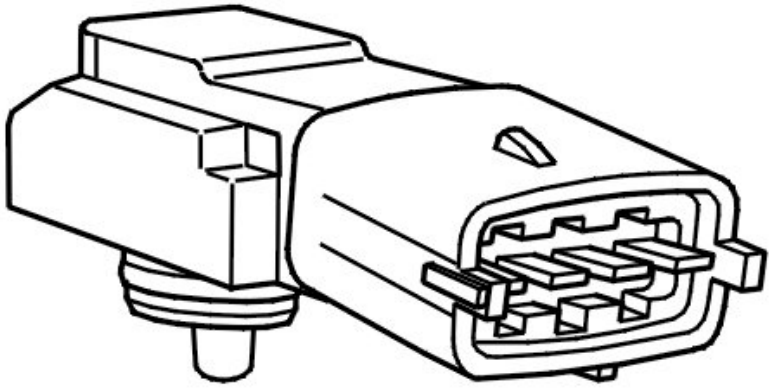
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-280C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the fuel pressure sensor is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

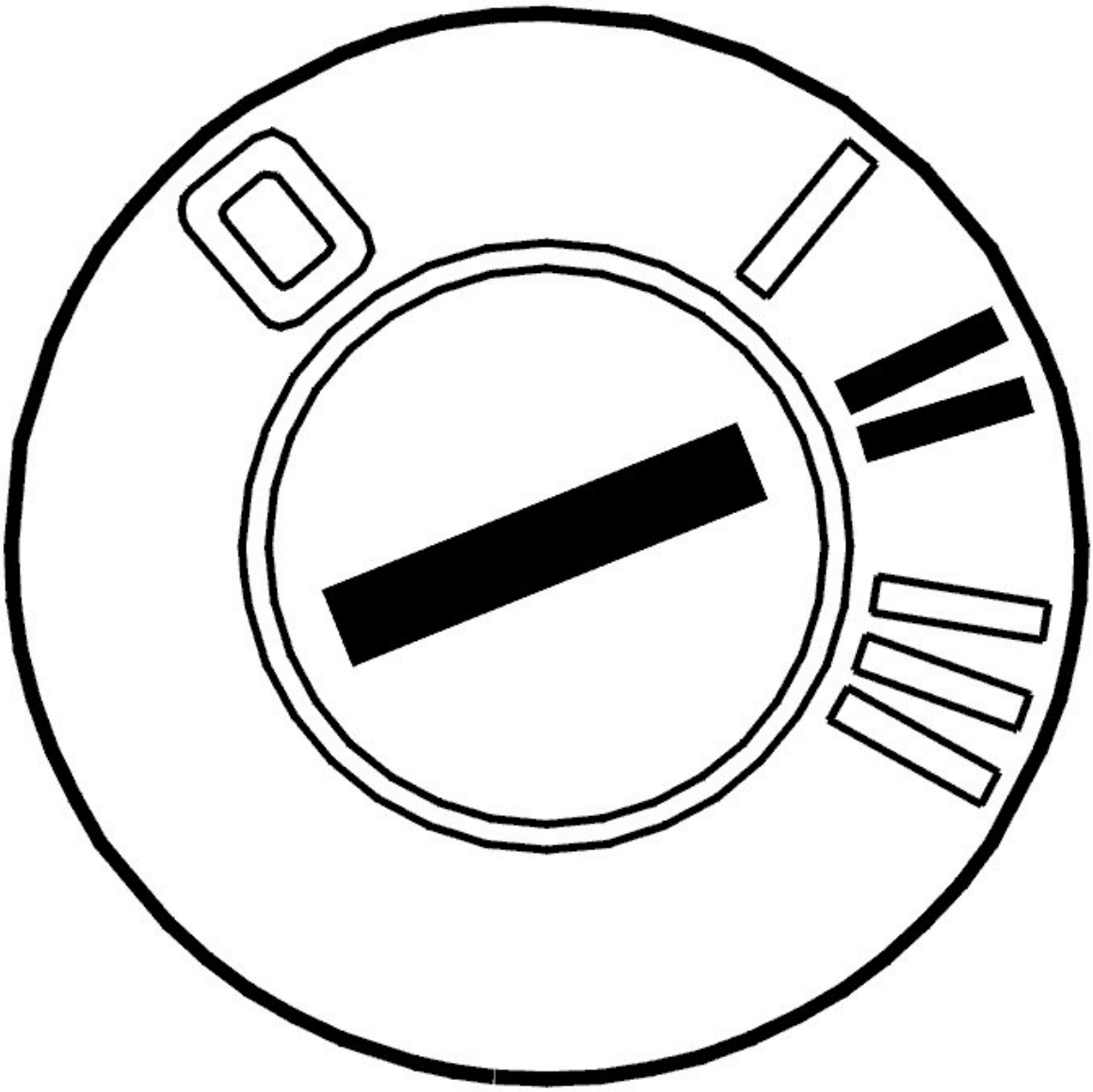
Possible source
- Short-circuit to ground in the signal cable
- Damaged temperature sensor.

Fault symptom[s]
- None.

Signal Too High

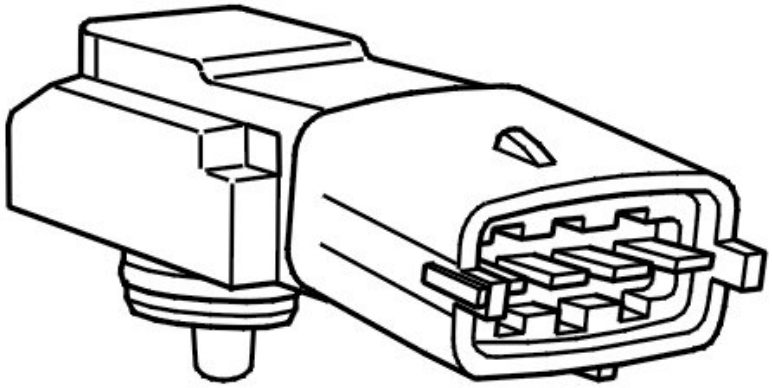
Signal too high

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
With the engine at operating temperature and idling, the signal must be approximately 400 kPa.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



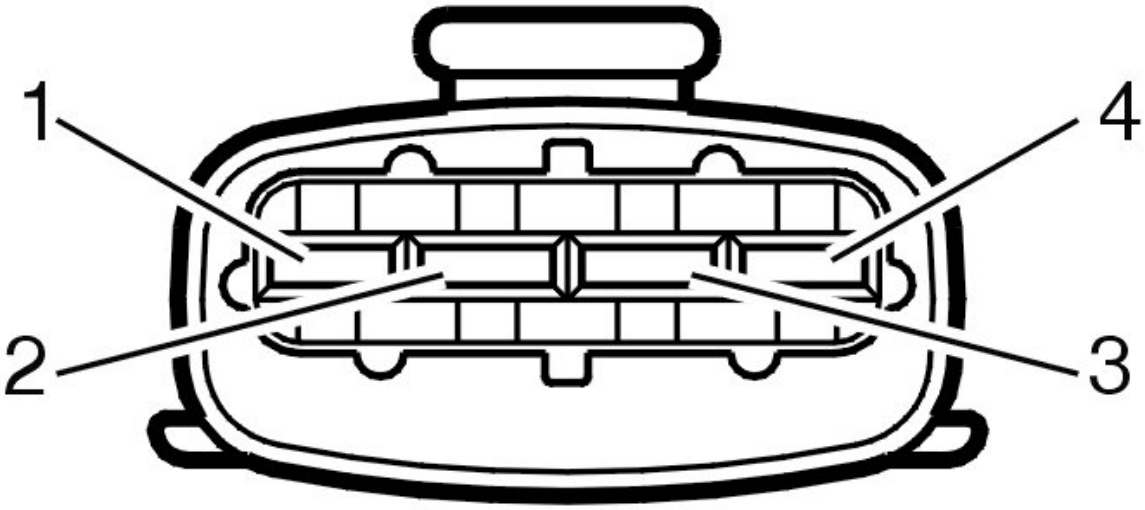
Continue - Checking components and wiring

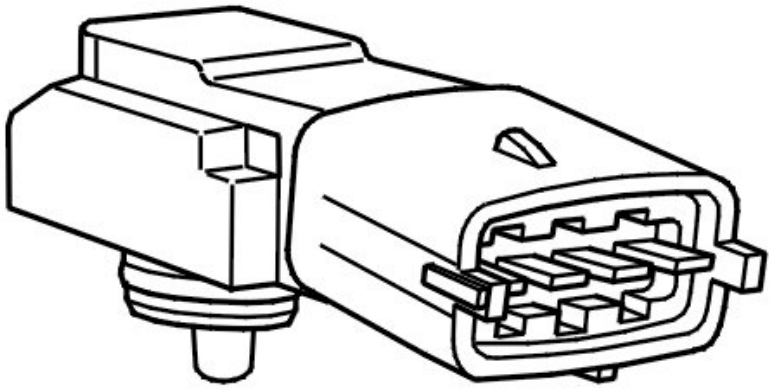
Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Check the signal cable between control module terminal #A2 (#A2) and fuel pressure sensor terminal #4. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead between control module terminal #A60 (#A60) and fuel pressure sensor terminal #1. Check for an open-circuit. Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.





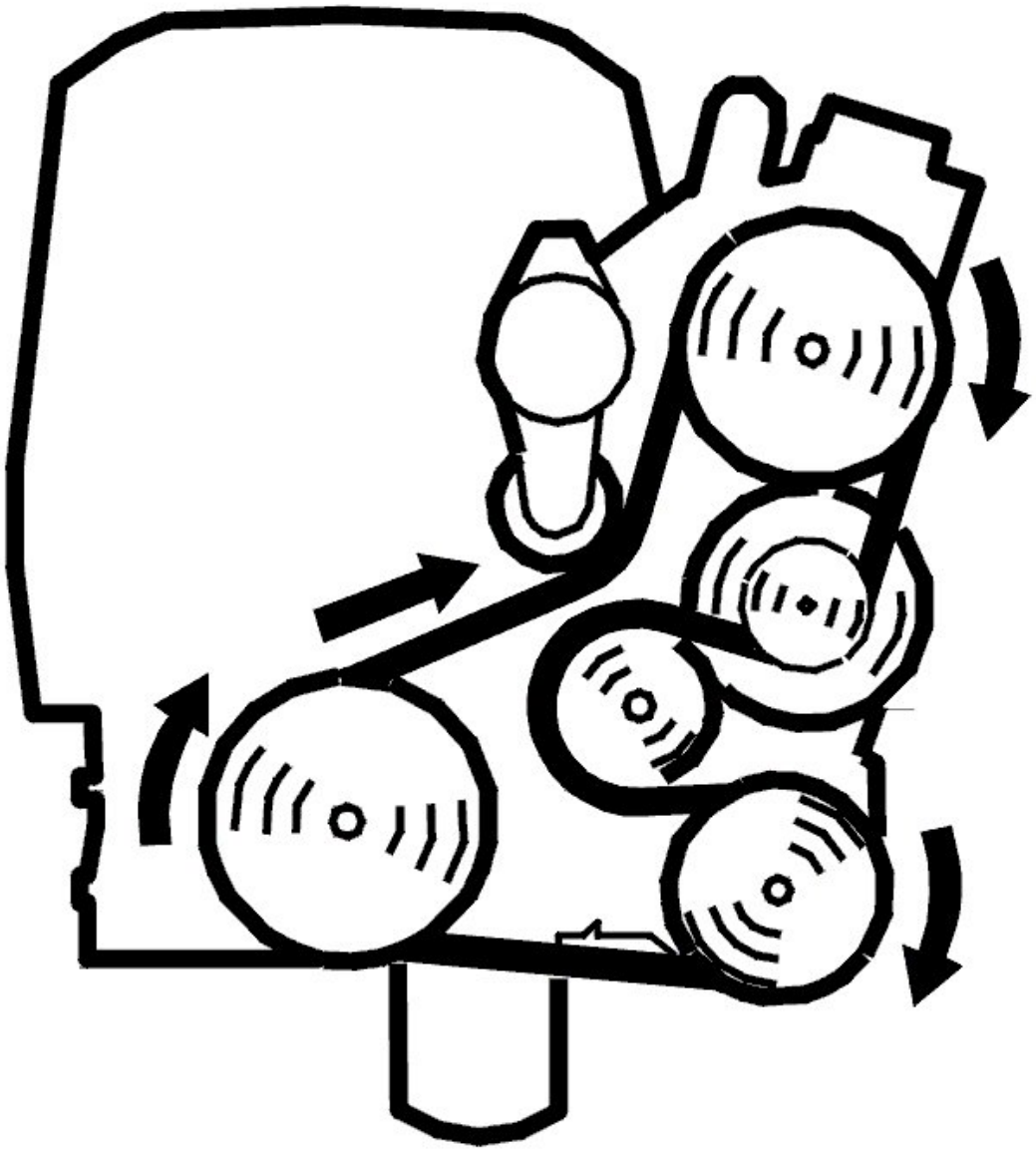
Continue - Verification

Verification

Verification

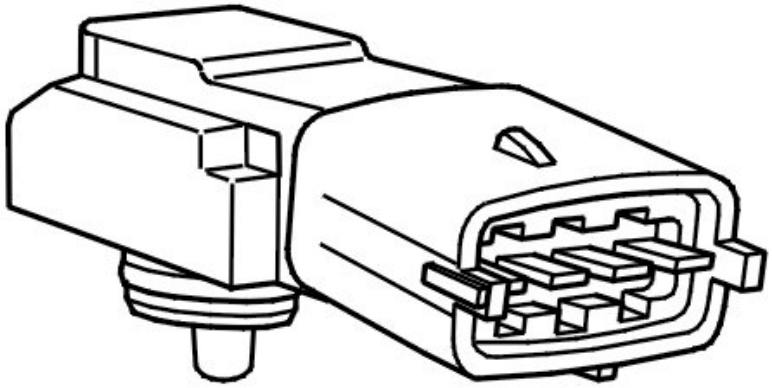
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pressure sensor signal.

Check that the fuel pressure is approximately 400 kPa with the engine idling at operating temperature.



Is the fuel pressure correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

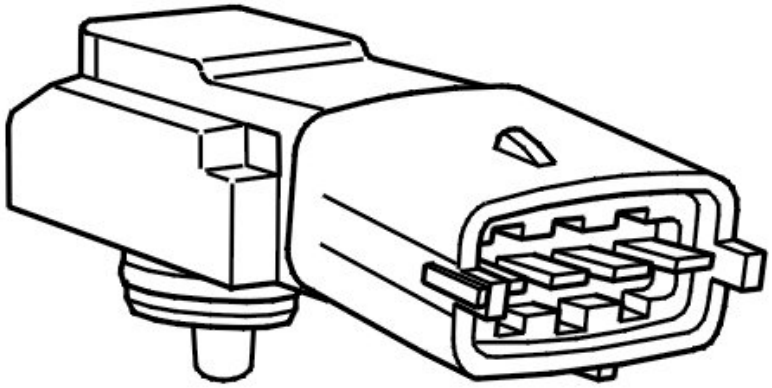
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-280D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the fuel pressure sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

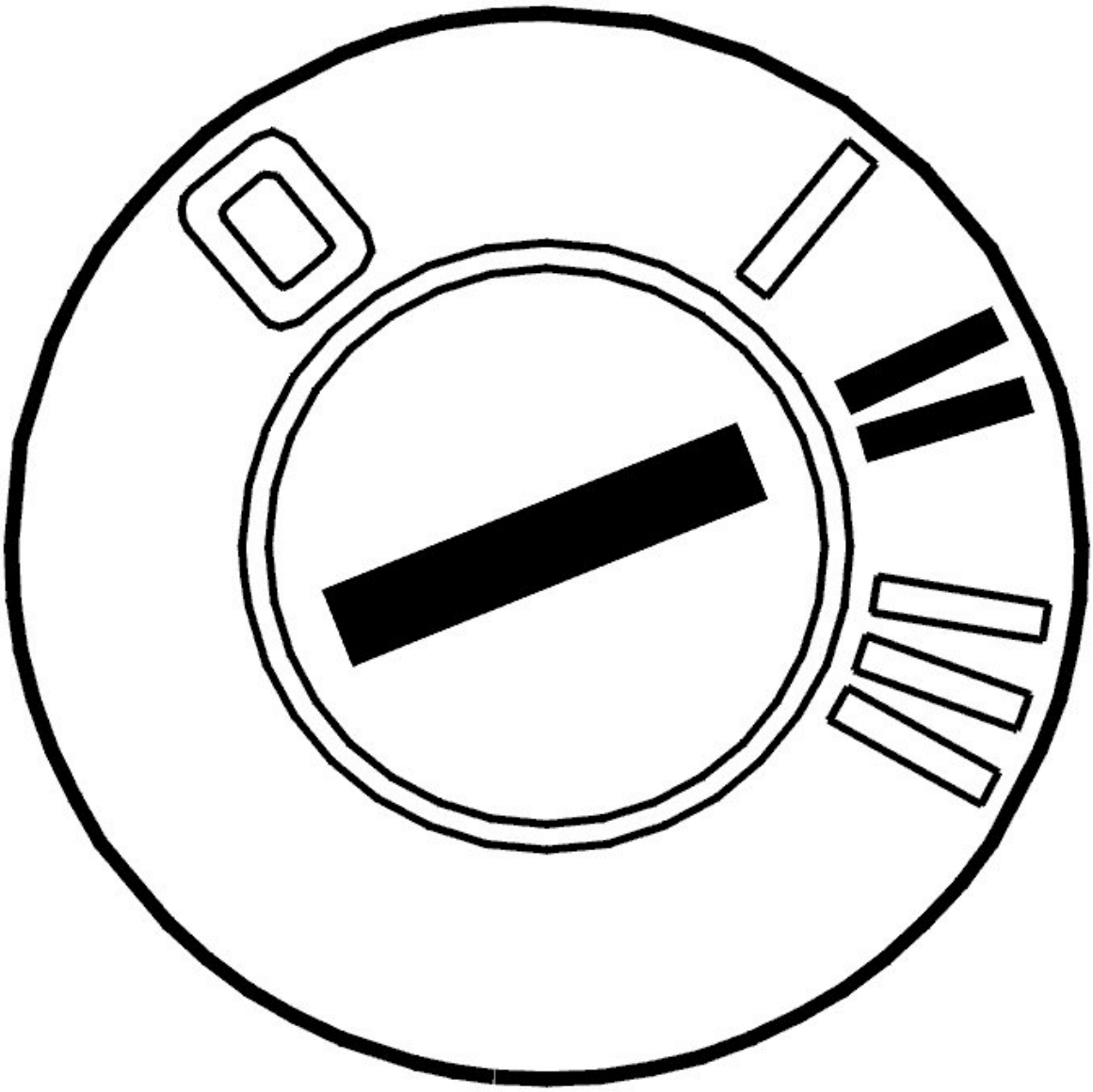
Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- Open-circuit in the signal ground cable
- Damaged temperature sensor.

Fault symptom[s]
- None.

Signal Too Low

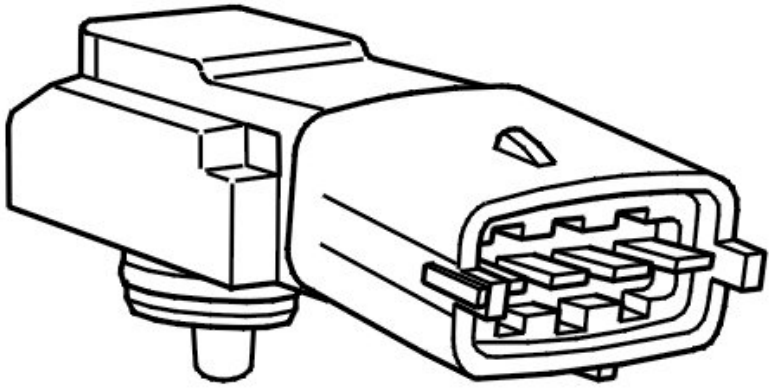
Signal too low

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
With the engine at operating temperature and idling, the signal must be approximately 400 kPa.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

Checking components and wiring

Check the signal cable between control module terminal #A2 (#A2) and fuel pressure sensor terminal #4. Check for a short-circuit to ground. Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
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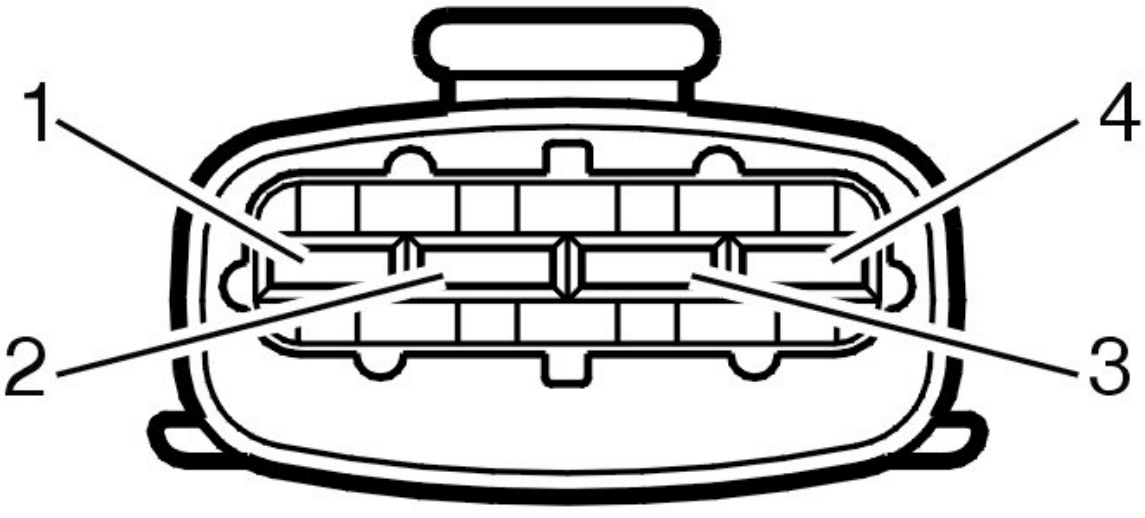
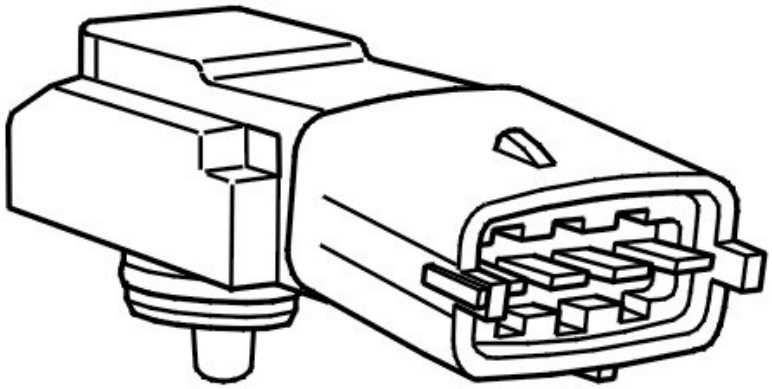




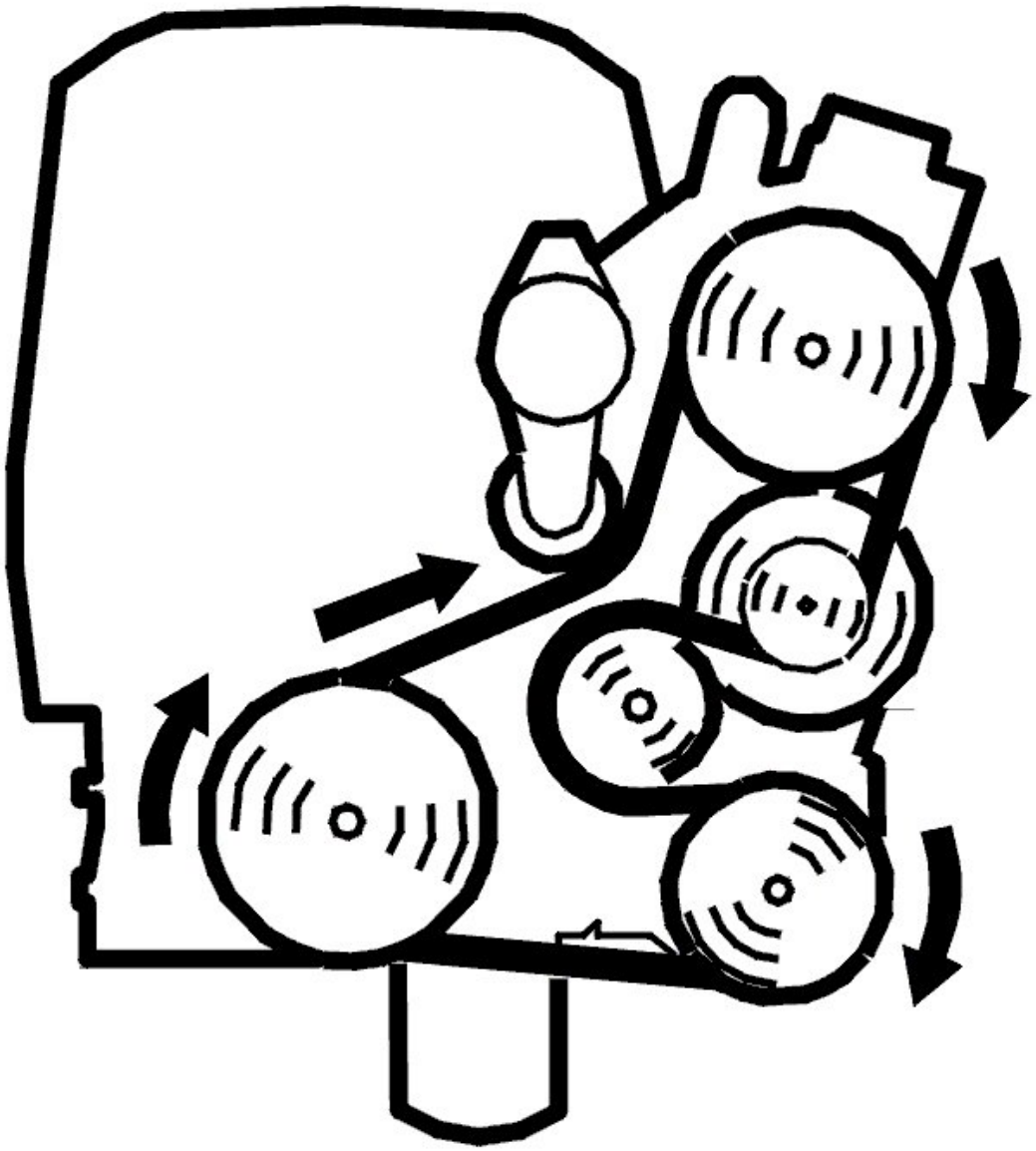
Continue - Verification

Verification

Verification

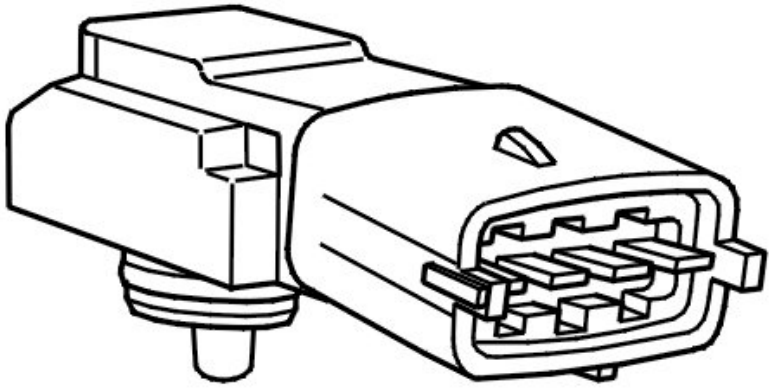
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pressure sensor signal.

Check that the fuel pressure is approximately 400 kPa with the engine idling at operating temperature.



Is the fuel pressure correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

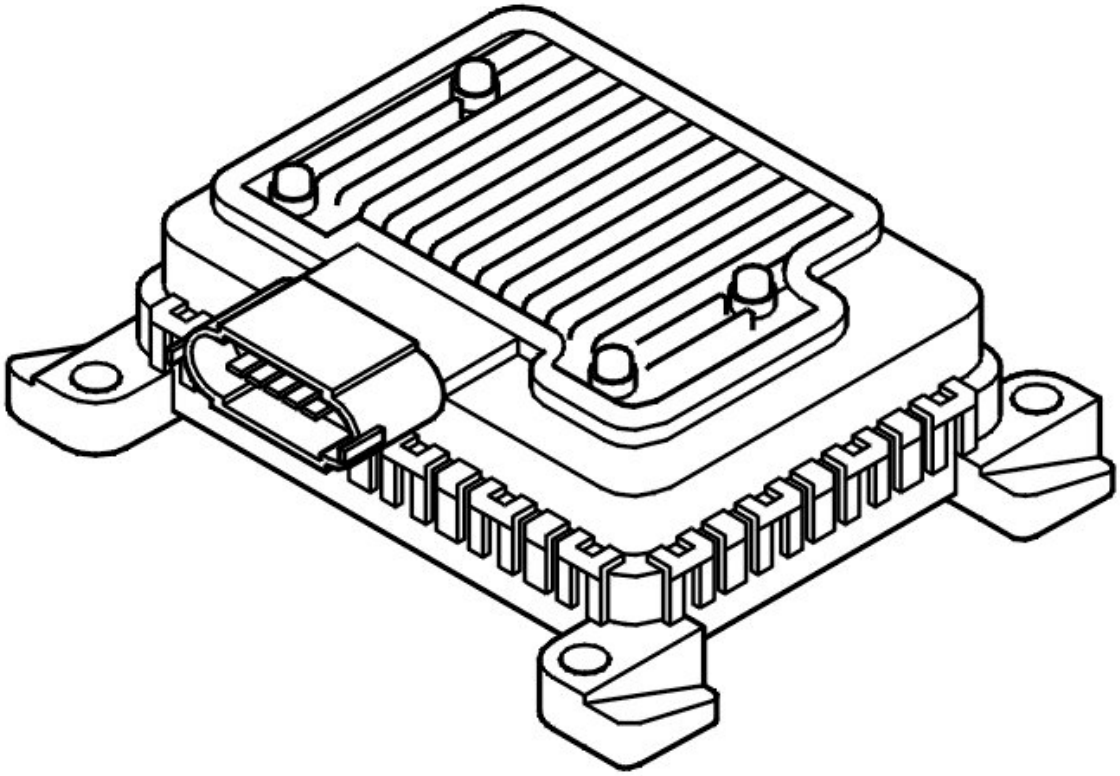
Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-2900

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the control capacity of the engine control module (ECM) for fuel pressure reaches the highest or lowest value and the desired fuel pressure (target value) is not achieved.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

Possible source
- Leakage in the fuel lines
- Damaged fuel pressure sensor
- Damaged fuel pump
- Damaged fuel pump control module.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Deterioration in performance
- The engine stops.

Faulty Signal

Faulty signal

Checking the diagnostic trouble codes (DTCs)

Check if there are diagnostic trouble codes stored for fuel pressure sensor or ambient pressure sensor, in that case troubleshoot and fix these first.

Do you want to continue with this procedure?

Yes - Checking the fuel pressure sensor

No - ANOTHER TEST

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

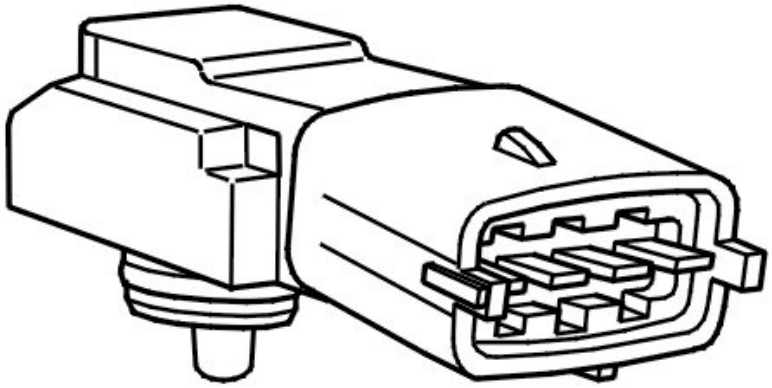
Checking the fuel pressure sensor

Note! If diagnostic trouble codes (DTC) for the fuel pressure sensor or atmospheric pressure sensor are stored, these diagnostic trouble codes (DTC) must be fault-traced and remedied first.

Hint: The method below is used to check whether the diagnostic trouble code (DTC) was caused by a faulty fuel pressure sensor. This can be done by comparing the fuel pressure sensor signal (displayed in VIDA) with the actual fuel pressure (displayed on a manometer connected to the wiring for the fuel injection system). This method assumes that the manometer for measuring fuel pressure is correctly calibrated.

- To connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).
Check that the value on the manometer and the value displayed in VIDA are the same. If the values are different, the circuit for the fuel pressure sensor is defective.



Are the values equal?

Yes - Checking components

No - Checking components and wiring

Checking components

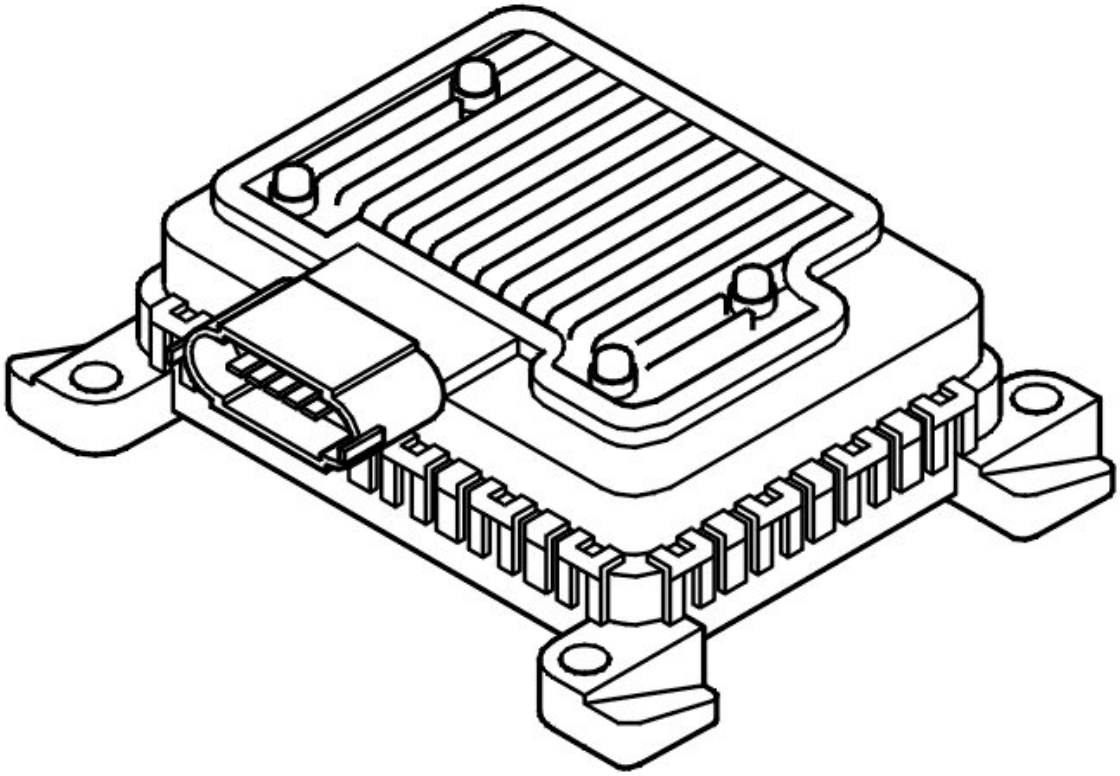
Check that the fuel level in the tank is not too low (almost no fuel).

Check the connectors between the pump control module and the fuel pump (FP). Check for contact resistance and oxidation.
Check the fuel lines and fuel filter for blockage and leaks.
Remedy as necessary.
Try a new fuel pump (FP) if no fault is found during the above fault-tracing.

Hint: The diagnostic trouble code (DTC) can also be caused by a defective pump control module.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To access or replace the fuel pump (FP), see
- To access or replace the pump control module see Control module fuel pump (FP), replacing, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair.



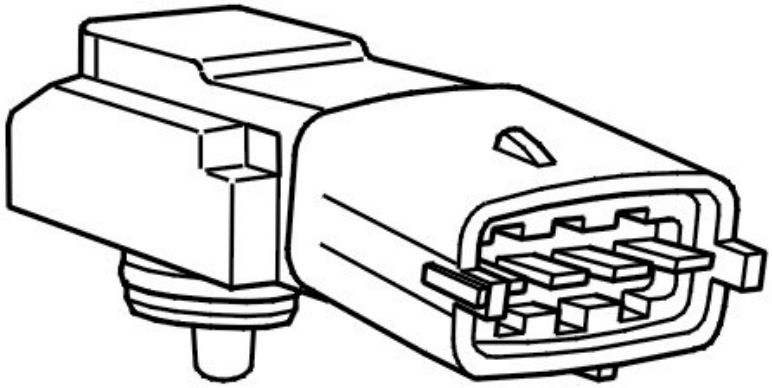
Continue - Verification

Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.



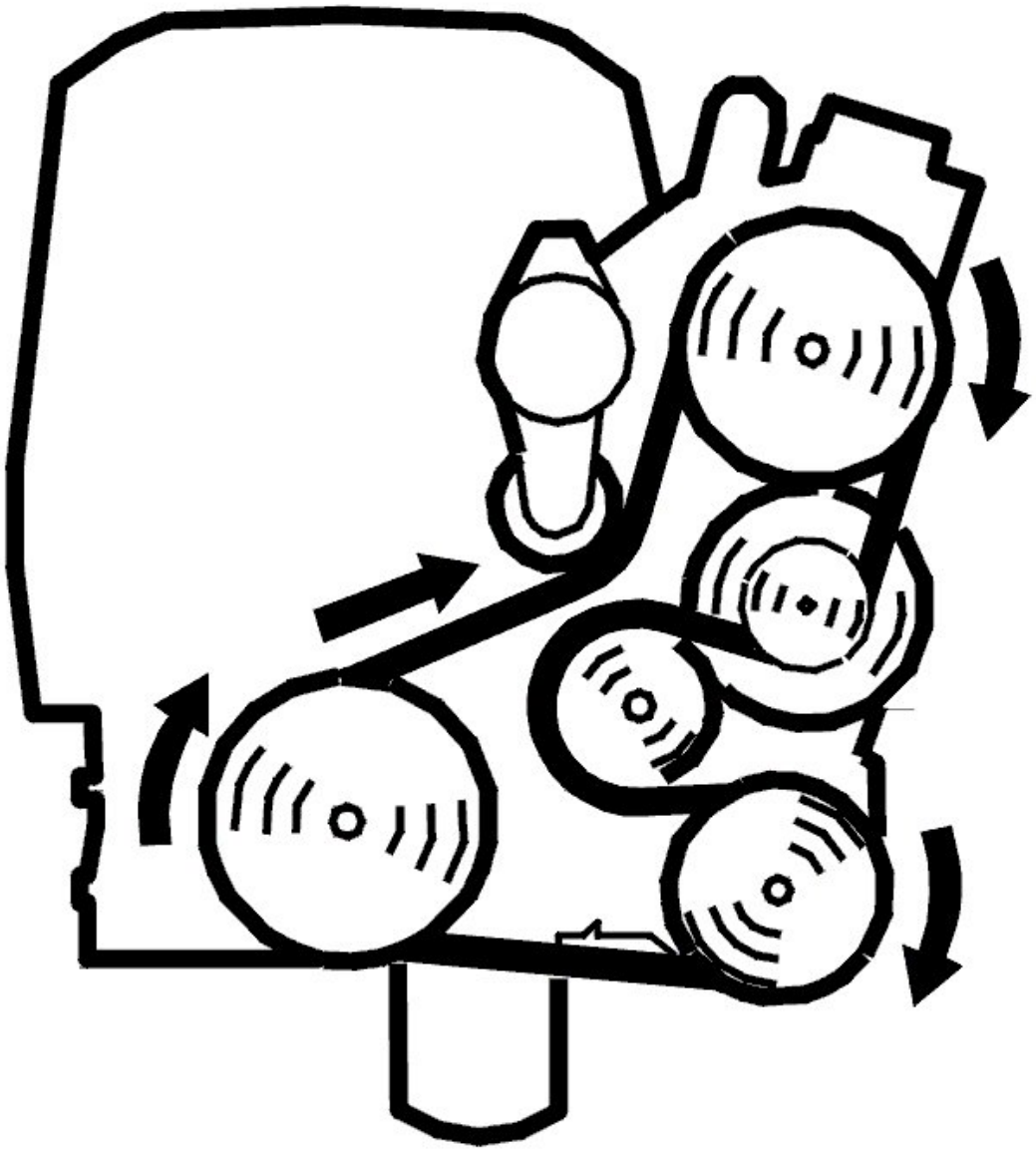
Continue - Verification

Verification

Verification

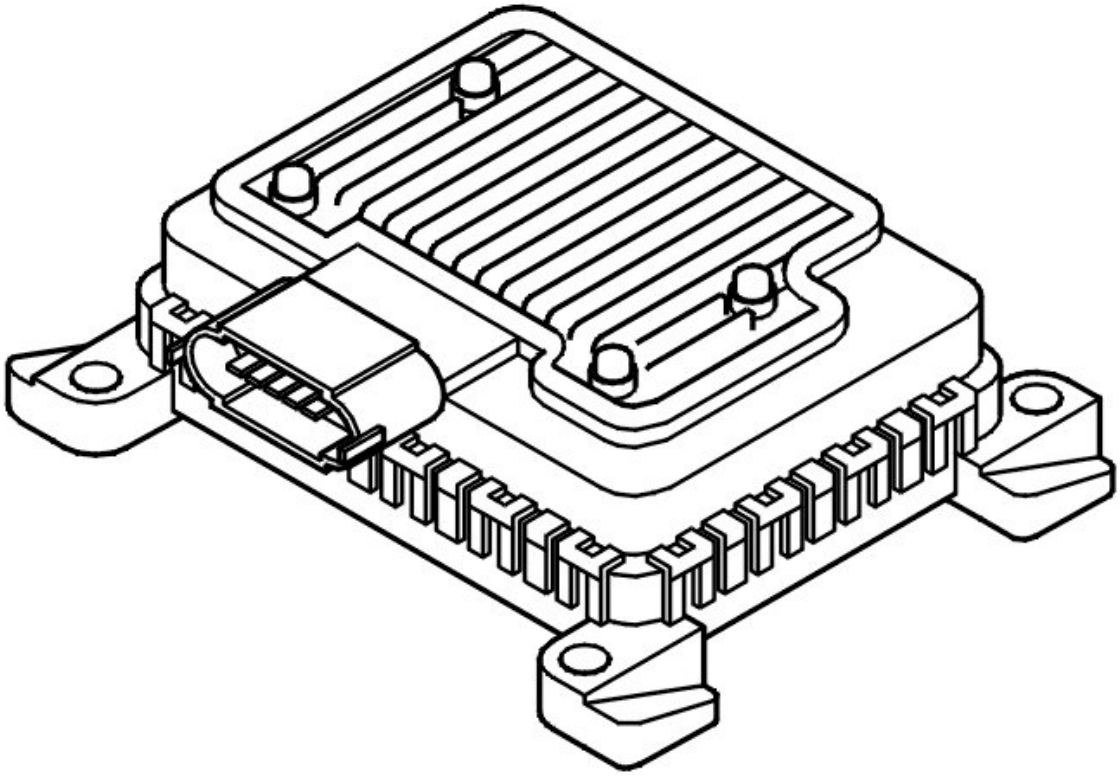
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check that the engine starts and that the signal is approximately 35% (±5%) when the engine is idling at operating temperature.



Is the function correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

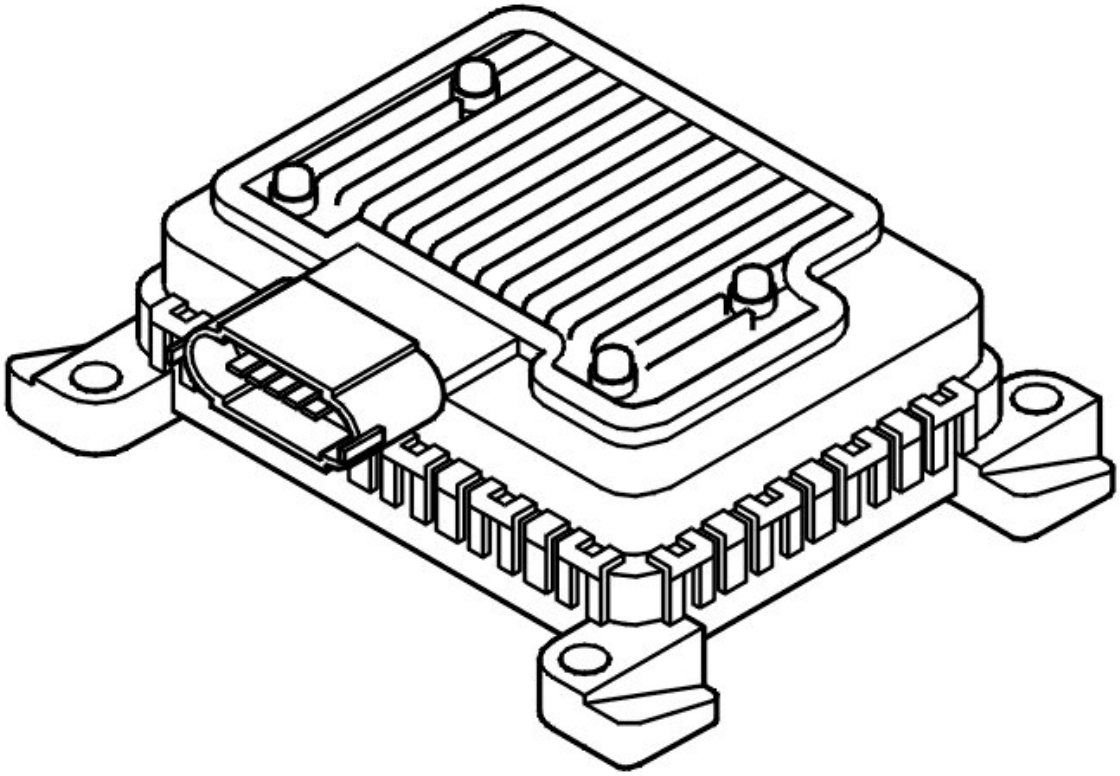
Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-290B

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the actual pressure (measured pressure from the fuel pressure sensor) pulses too much.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

Possible source
- Air in the fuel lines
- Blocked fuel lines
- Damaged fuel pressure sensor
- Damaged fuel pump
- Damaged fuel pump control module.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Deterioration in performance
- The engine stops.

Signal Missing

Signal missing

Checking the diagnostic trouble codes (DTCs)

Check if there are diagnostic trouble codes stored for fuel pressure sensor or ambient pressure sensor, in that case troubleshoot and fix these first.

Do you want to continue with this procedure?

Yes - Checking the fuel pressure sensor

No - ANOTHER TEST

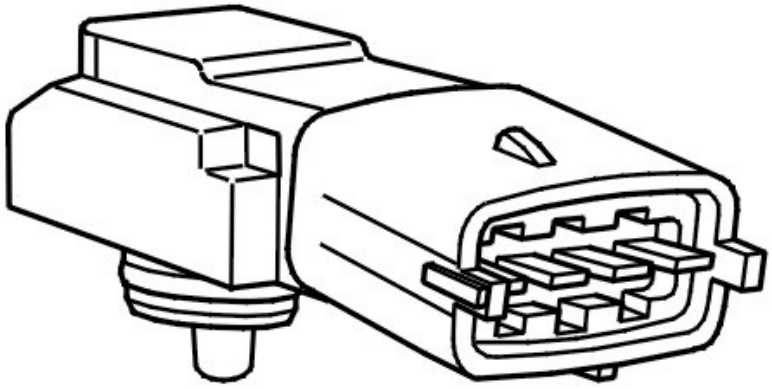
Checking the fuel pressure sensor

Note! If diagnostic trouble codes (DTC) for the fuel pressure sensor or atmospheric pressure sensor are stored, these diagnostic trouble codes (DTC) must be fault-traced and remedied first.

Hint: The method below is used to check whether the diagnostic trouble code (DTC) was caused by a faulty fuel pressure sensor. This can be done by checking whether the fuel pressure sensor signal (displayed in VIDA) is unstable, while the actual fuel pressure (displayed on a manometer connected to the wiring for the fuel injection system) is stable.

- To connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).
Check the value on the manometer and the value displayed in VIDA. If the fuel pressure sensor signal (displayed in VIDA) is unstable while the actual fuel pressure (displayed on the manometer connected to the wiring for the fuel injection system) is stable, this indicates that the circuit for the fuel pressure sensor is defective.



Are the values equal?

Yes - Checking components

No - Checking components and wiring

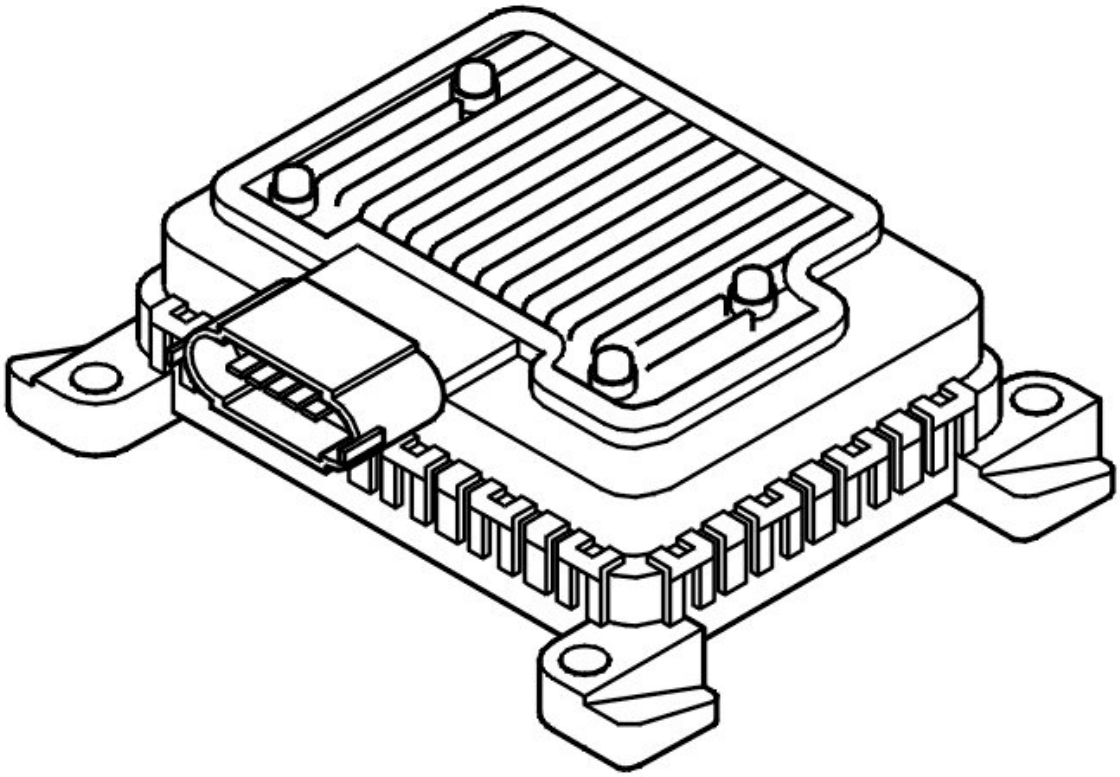
Checking components

Check that the fuel level in the tank is not too low (almost no fuel).
Check the connectors between the pump control module and the fuel pump (FP). Check for contact resistance and oxidation.
Check the fuel lines and fuel filter for blockage and leaks.
Remedy as necessary.
Try a new fuel pump (FP) if no fault is found during the above fault-tracing.

Hint: The diagnostic trouble code (DTC) can also be caused by a defective pump control module.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Level sensor, fuel tank/fuel pump, replacement See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair/Level Sensor, Fuel Tank/Fuel Pump, Replacement
- Control module fuel pump (FP), replacing See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair



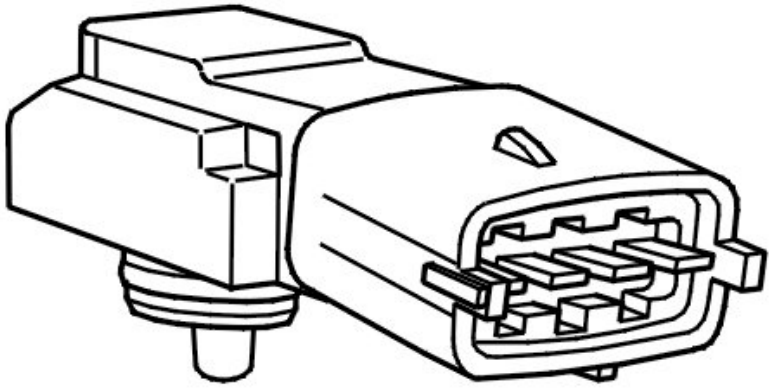
Continue - Verification

Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair



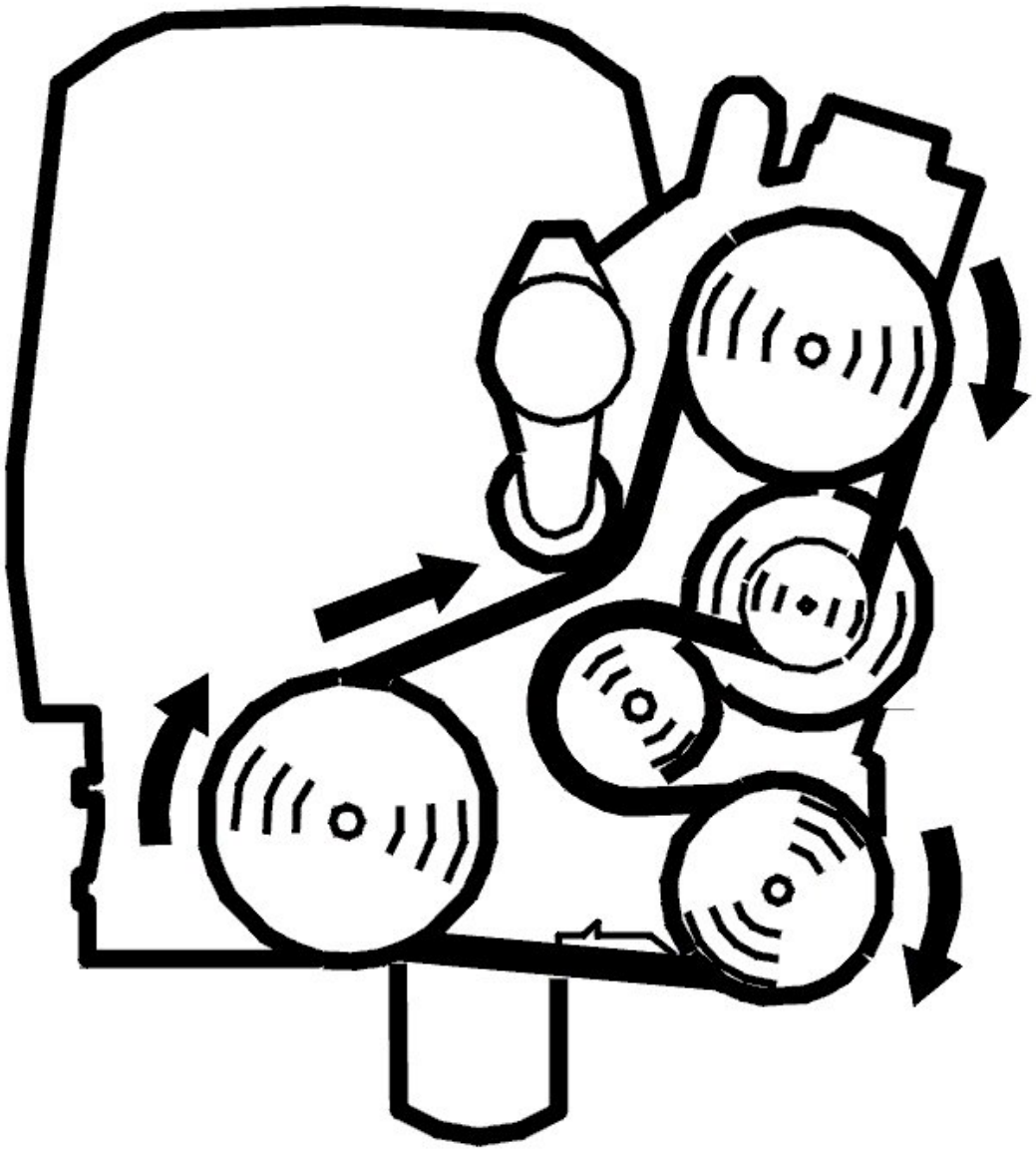
Continue - Verification

Verification

Verification

Verification

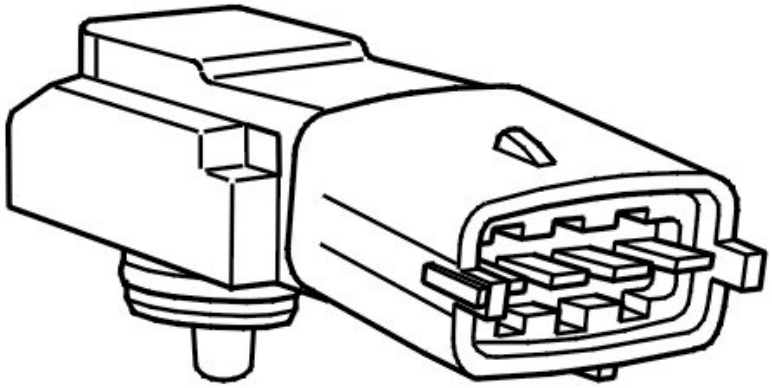
Hint: After carrying out the repair, check that the fault has been remedied.



- Connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).

Check that the value on the manometer and the value displayed in VIDA are the same. If the values are different, this indicates incorrect function.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

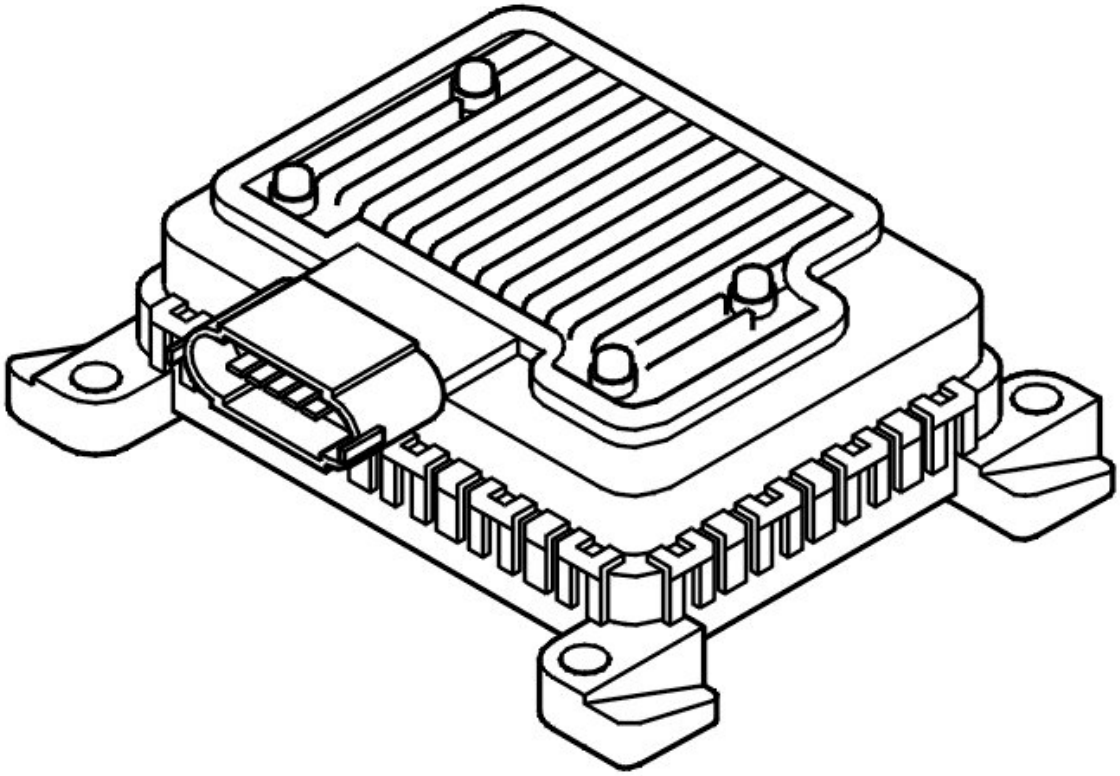
Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-290C

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the actual pressure (measured pressure from the fuel pressure sensor) rises too high in comparison with the requested pressure (target pressure) during a certain time frame.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

Possible source
- Damaged fuel pressure sensor
- Damaged fuel pump control module.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Deterioration in performance
- The engine stops.

Signal Too High

Signal too high

Checking the diagnostic trouble codes (DTCs)

Check if there are diagnostic trouble codes stored for fuel pressure sensor or ambient pressure sensor, in that case troubleshoot and fix these first.

Do you want to continue with this procedure?

Yes - Checking the fuel pressure sensor

No - **ANOTHER TEST**

Checking the fuel pressure sensor

Note! If diagnostic trouble codes (DTC) for the fuel pressure sensor or atmospheric pressure sensor are stored, these diagnostic trouble codes (DTC) must be fault-traced and remedied first.

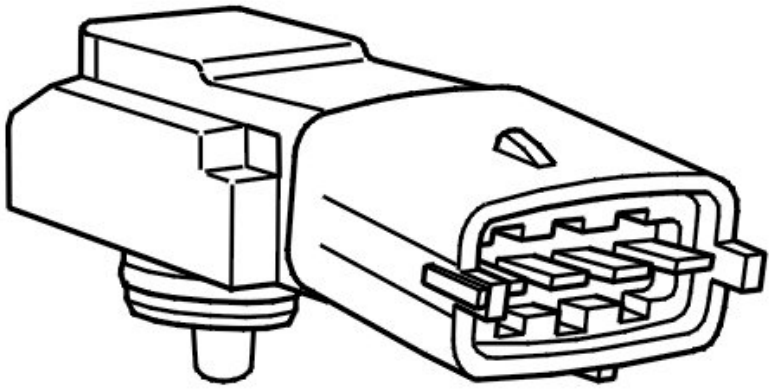
Hint: The method below is used to check whether the diagnostic trouble code (DTC) was caused by a faulty fuel pressure sensor. This can be done by comparing the fuel pressure sensor signal (displayed in VIDA) with the actual fuel pressure (displayed on a manometer connected to the wiring for the fuel injection system).

- Connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge.

Note! The pressure in the fuel injection system can reach approximately 650 kPa when this diagnostic trouble code (DTC) is stored. Use an adapted manometer.

- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).
Check that the value on the manometer and the value displayed in VIDA are roughly the same. If the values are different, the circuit for the fuel pressure sensor is defective.



Are the values equal?

Yes - Checking components

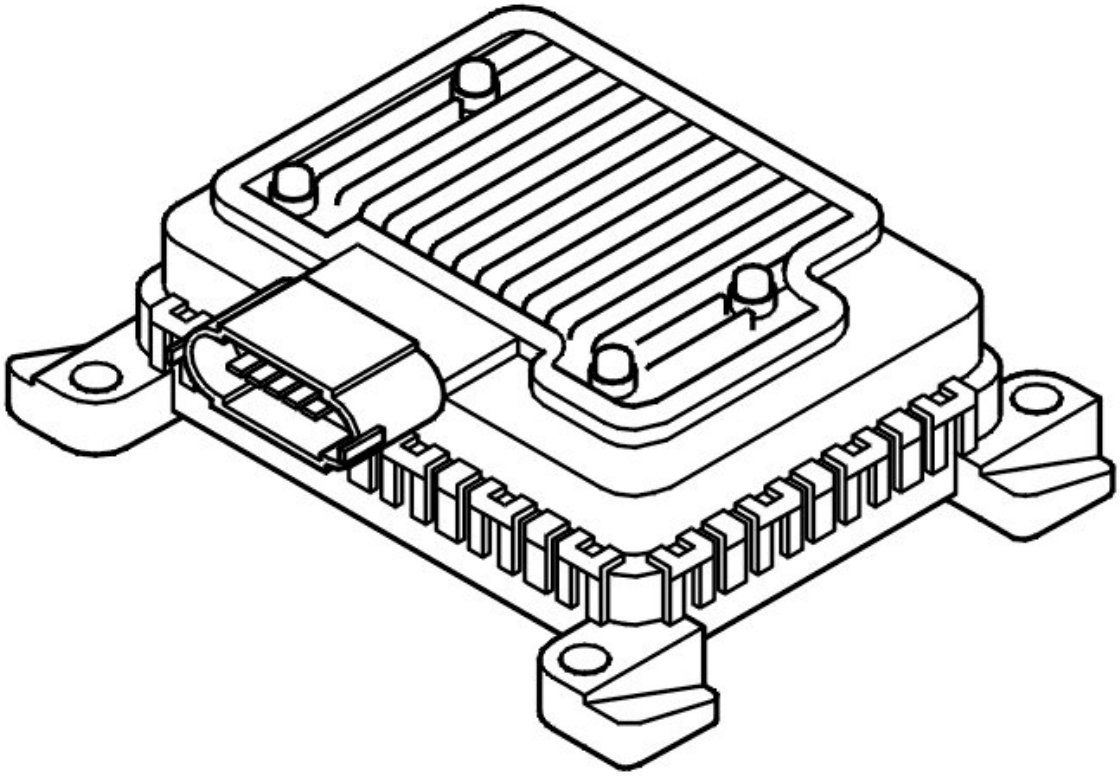
No - Checking components and wiring

Checking components

Check the connectors between the pump control module and the fuel pump (FP). Check for contact resistance and oxidation.
Remedy as necessary.
Try a new pump unit if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To access or replace the pump control module see Control module fuel pump (FP), replacing, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair.



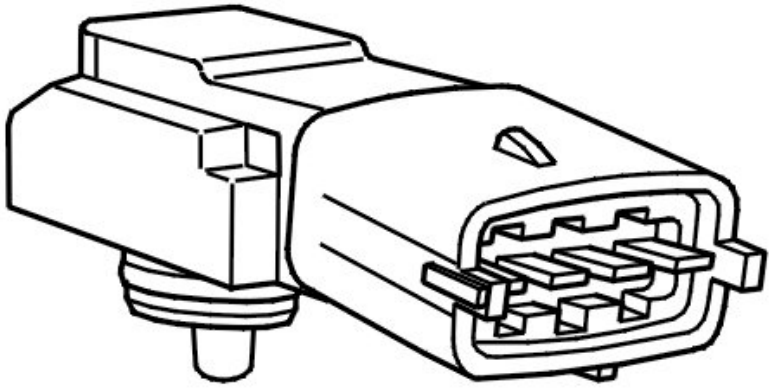
Continue - Verification

Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.



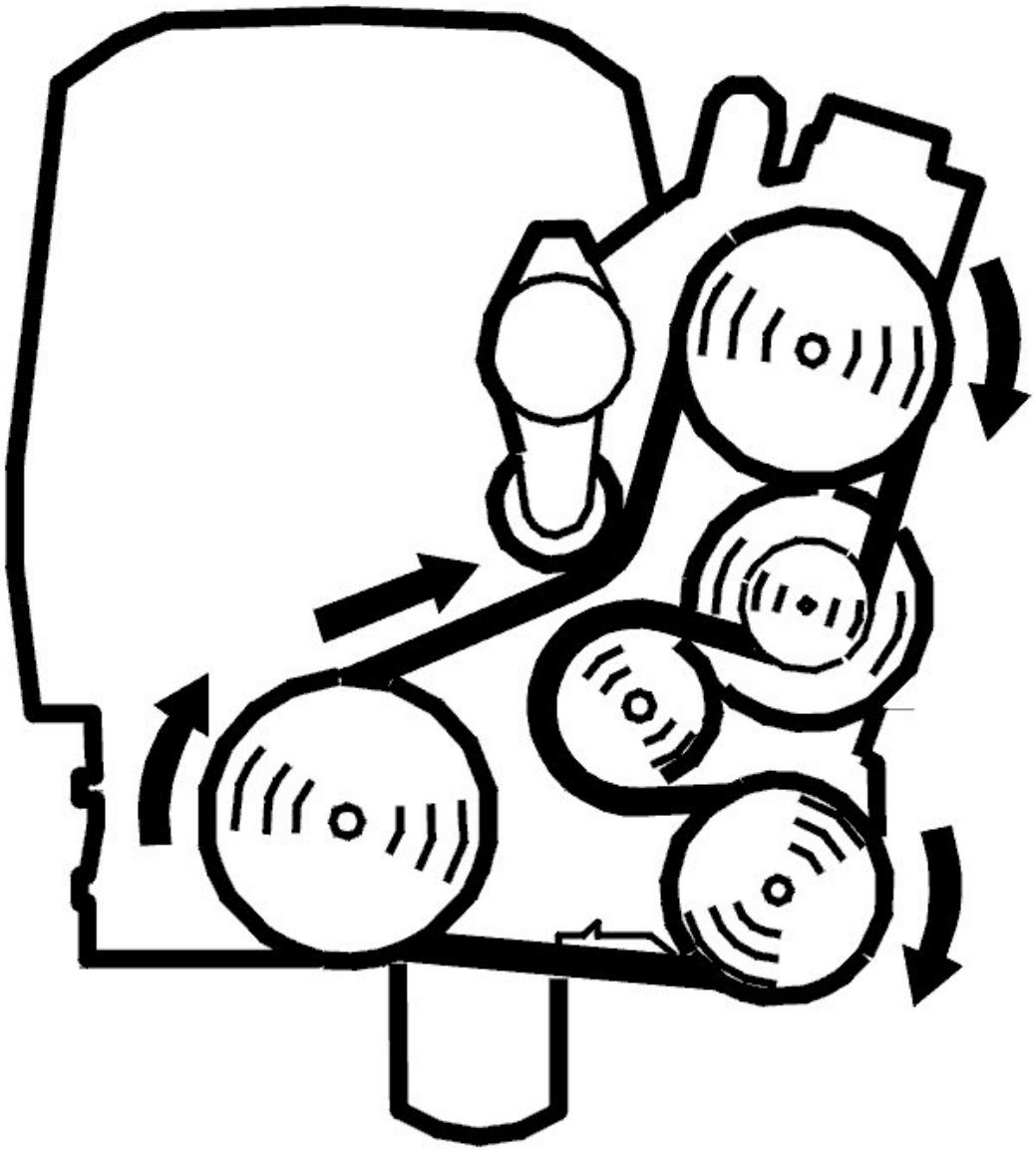
Continue - Verification

Verification

Verification

Verification

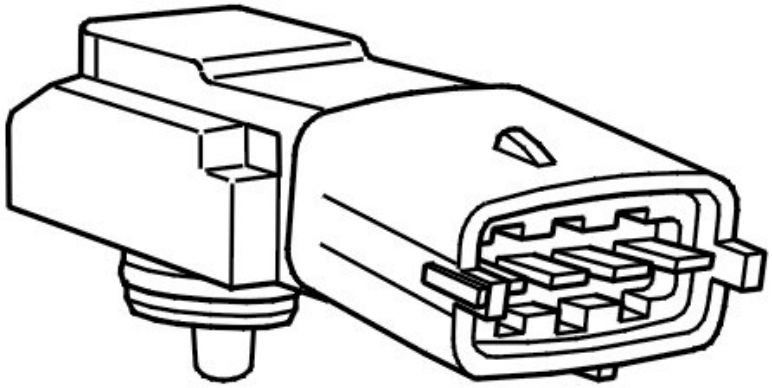
Hint: After carrying out the repair, check that the fault has been remedied.



- Connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).

Check that the value on the manometer and the value displayed in VIDA are the same. If the values are different, this indicates incorrect function.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

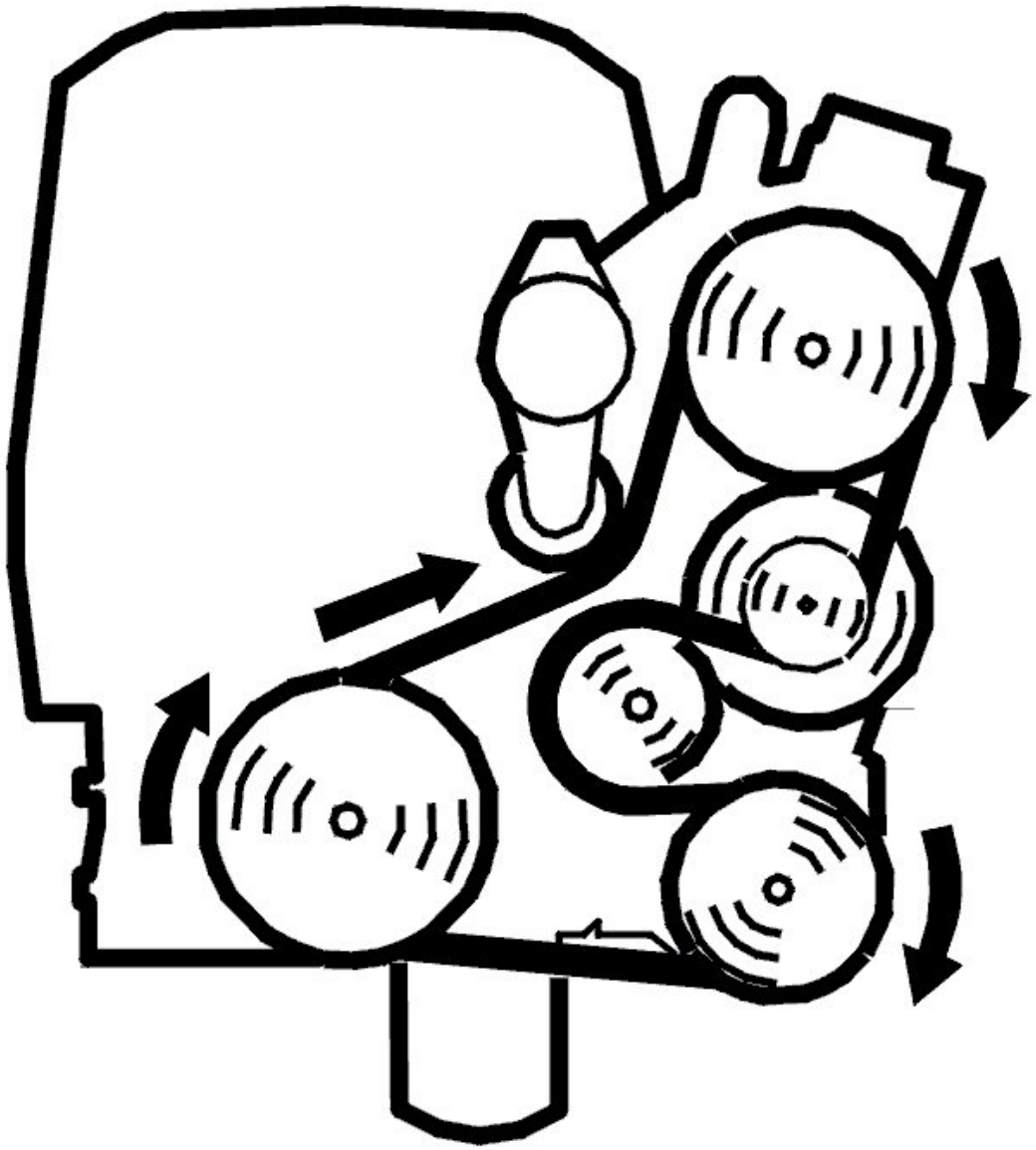
VERIFICATION FAILED - Fault-tracing information

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the fuel pressure and the fuel pressure desired value
- Start the quick test when the engine is running at idling.

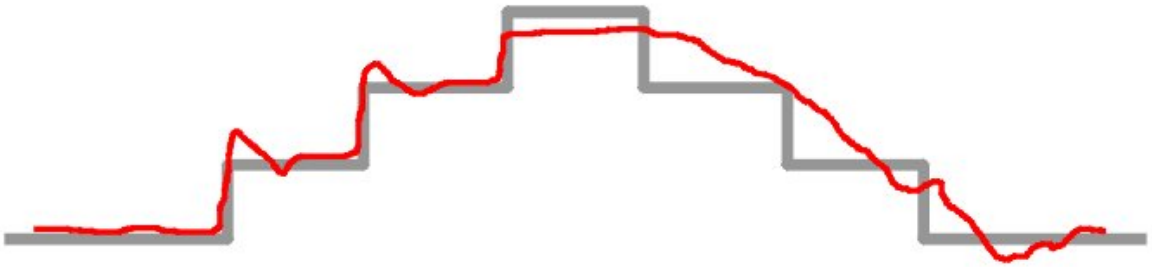
During the course of the quick test, the control module will steer the pressure to different target values in different stages (400, 500, 600 and finally 700 kPa), after which the pressure will be decreased in stages to the same pressure. Each stage lasts for approximately 5 seconds.

Note! Because the by-pass valve in the fuel pump (FP) will be open at approximately 650 kPa, the pressure will not go higher than this.

Hint: The illustration to the left shows an example of normal regulation.

- The upper digital display and the graphic display (red font color) indicate the absolute fuel pressure, calculated from the fuel pressure sensor
- The lower digital display and the graphic display (yellow font color) indicate the control module target value for the absolute fuel pressure
- The lower digital display indicates the relative fuel pressure (white font color), calculated from the fuel pressure sensor and the atmospheric pressure sensor (= absolute pressure minus atmospheric pressure). If a manometer is connected during the test, it should indicate this pressure.

Check that the value for absolute fuel pressure is the same as the target value for absolute fuel pressure. If the values are not the same, this indicates a fault in the pressure regulation. The values may differ during the quick test when the target value is changed. This is due to sluggishness in the fuel regulation and is normal. In some cases, it can take up to 5 seconds before the fuel pressure reaches the target value for the fuel pressure.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

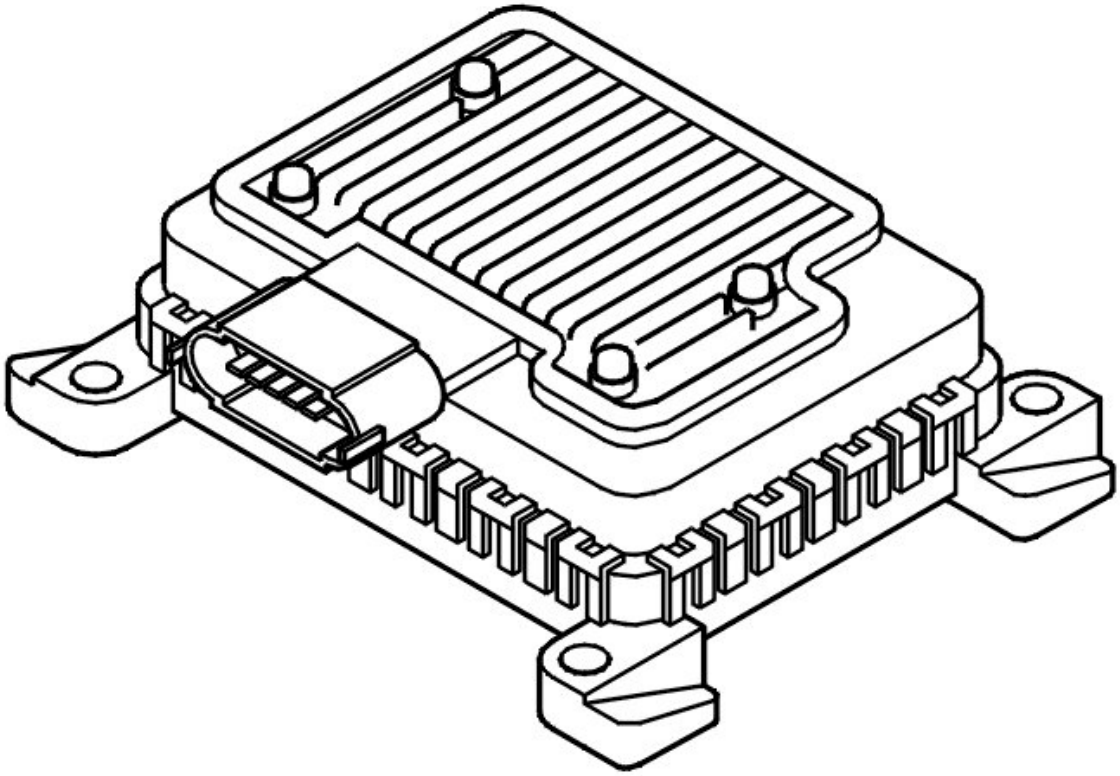
Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-290D

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the actual pressure (measured pressure from the fuel pressure sensor) is too low in comparison with the requested pressure (target pressure) during a certain time frame.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

Possible source
- Leakage at the fuel lines
- Damaged fuel pressure sensor
- Damaged fuel pump
- Damaged fuel pump control module.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Deterioration in performance
- The engine stops.

Signal Too Low

Signal too low

Checking the diagnostic trouble codes (DTCs)

Check if there are diagnostic trouble codes stored for fuel pressure sensor or ambient pressure sensor, in that case troubleshoot and fix these first.

Do you want to continue with this procedure?

Yes - Checking the fuel pressure sensor

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

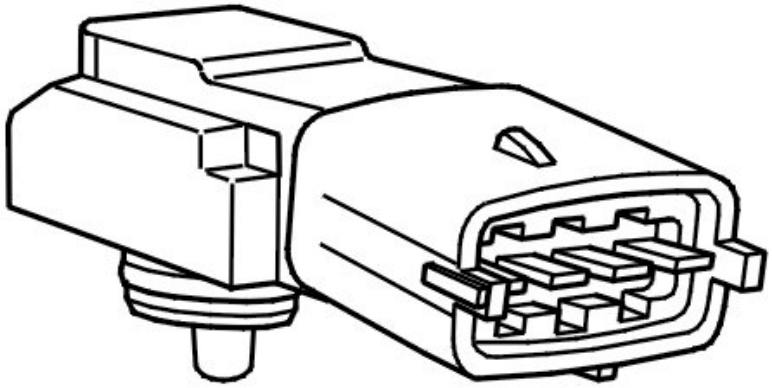
Checking the fuel pressure sensor

Note! If diagnostic trouble codes (DTC) for the fuel pressure sensor or atmospheric pressure sensor are stored, these diagnostic trouble codes (DTC) must be fault-traced and remedied first.

Hint: The method below is used to check whether the diagnostic trouble code (DTC) was caused by a faulty fuel pressure sensor. This can be done by comparing the fuel pressure sensor signal (displayed in VIDA) with the actual fuel pressure (displayed on a manometer connected to the wiring for the fuel injection system). This method assumes that the manometer for measuring fuel pressure is correctly calibrated.

- To connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).
Check that the value on the manometer and the value displayed in VIDA are the same. If the values are different, the circuit for the fuel pressure sensor is defective.



Is the fuel pressure sensor correct?

Yes - Checking regulation of the fuel pressure

No - Checking components and wiring

Checking regulation of the fuel pressure

Warning! In this test, the pressure in the fuel injection system will reach approximately 650 kPa. Disconnect the pressure gauge, as it is not

intended to be used at such high pressures.

Hint: The method described below is used to check the control of the pressure in the fuel injection system by activating the quick test for the fuel pump (FP). If the pressure gauge for pressures up to 650 kPa is connected, the fuel pressure sensor can also be checked during this test.

Note! In this test, the complete flow capacity of the system is not tested.

- Disconnect the manometer unless it is adapted for pressures higher than 650 kPa
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the fuel pressure and the fuel pressure desired value
- Start the quick test when the engine is running at idling.

During the course of the quick test, the control module will steer the pressure to different target values in different stages (400, 500, 600 and finally 700 kPa), after which the pressure will be decreased in stages to the same pressure. Each stage lasts for approximately 5 seconds.

Note! Because the by-pass valve in the fuel pump (FP) will be open at approximately 650 kPa, the pressure will not go higher than this.

Hint: The illustration to the left shows an example of normal regulation.

- The upper digital display and the graphic display (red font color) indicate the absolute fuel pressure, calculated from the fuel pressure sensor
- The lower digital display and the graphic display (yellow font color) indicate the control module target value for the absolute fuel pressure
- The lower digital display indicates the relative fuel pressure (white font color), calculated from the fuel pressure sensor and the atmospheric pressure sensor (= absolute pressure minus atmospheric pressure). If a manometer is connected during the test, it should indicate this pressure.

Check that the value for absolute fuel pressure is the same as the target value for absolute fuel pressure. If the values are not the same, this indicates a fault in the pressure regulation. The values may differ during the quick test when the target value is changed. This is due to sluggishness in the fuel regulation and is normal. In some cases, it can take up to 5 seconds before the fuel pressure reaches the target value for the fuel pressure.

Is the pressure regulation correct?

Yes - Checking components

No - Checking components

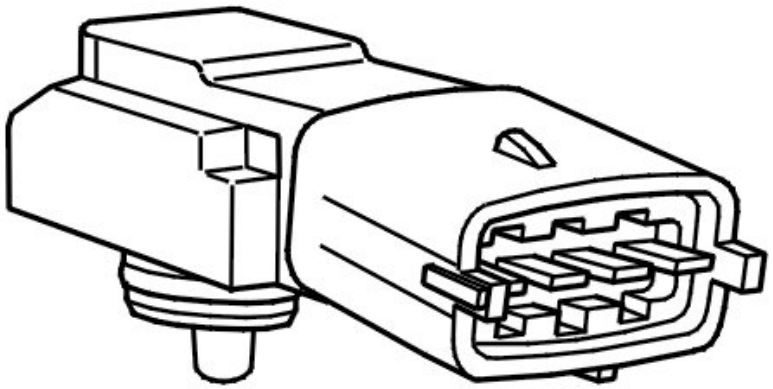
Checking components

Hint: The fault may be intermittent or be due to the flow capacity in the system being too low.

Check that the fuel level in the tank is not too low (almost no fuel).
Check the fuel lines between the fuel pump (FP) and the fuel rail for the injectors for leakage.
Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Check the pump control module connector. Check for contact resistance and oxidation.
Check the fuel lines and fuel filter for blockage.
Remedy as necessary.
Try a new fuel pump (FP) if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pump (FP), see
- To access or replace the pump control module see Control module fuel pump (FP), replacing, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair.



Select Continue

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the fuel pressure sensor

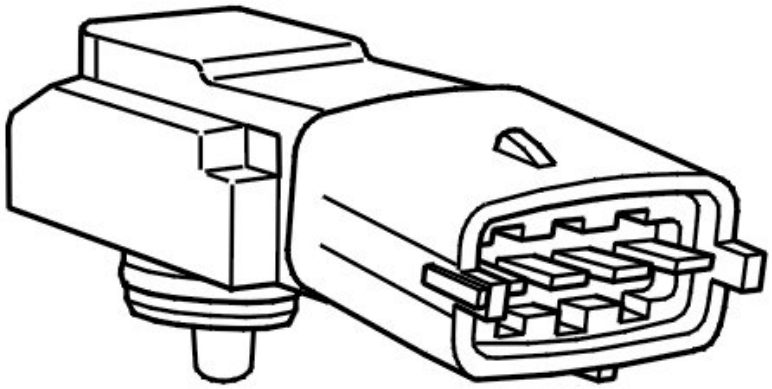
FAULT FOUND - DONE

Checking components and wiring

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new fuel pressure sensor if no fault is found during the above fault-tracing.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.



Continue - Verification

Checking components

Check that the fuel level in the tank is not too low (almost no fuel).
Check the connectors between the pump control module and the fuel pump (FP). Check for contact resistance and oxidation.
Check the fuel lines and fuel filter for blockage.
Remedy as necessary.

Try a new fuel pump (FP) if no fault is found during the above fault-tracing.

Hint: The diagnostic trouble code (DTC) can also be caused by a defective pump control module.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To access or replace the fuel pump (FP), see
- To access or replace the pump control module see Control module fuel pump (FP), replacing, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair.

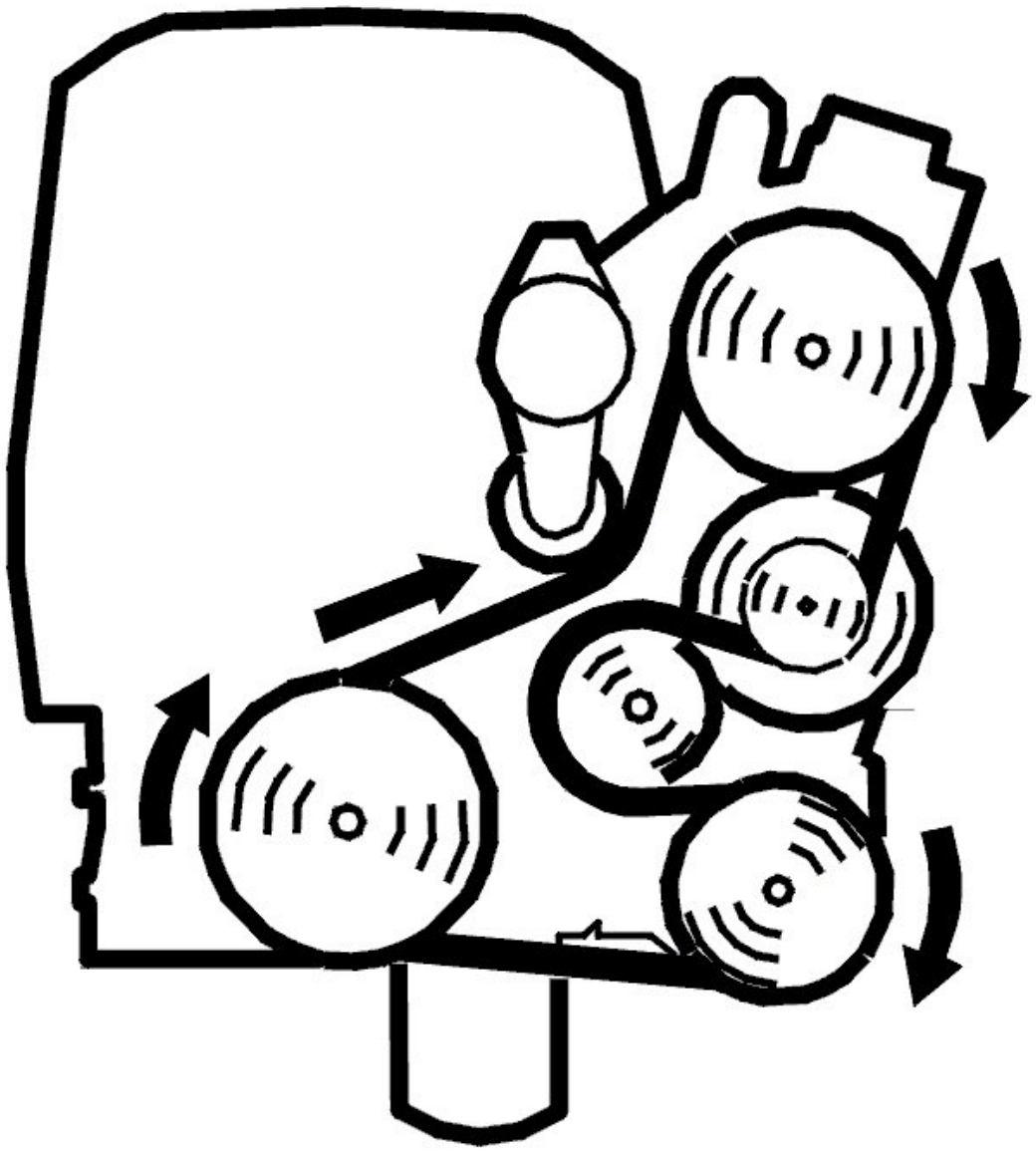
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the fuel pressure and the fuel pressure desired value
- Start the quick test when the engine is running at idling.

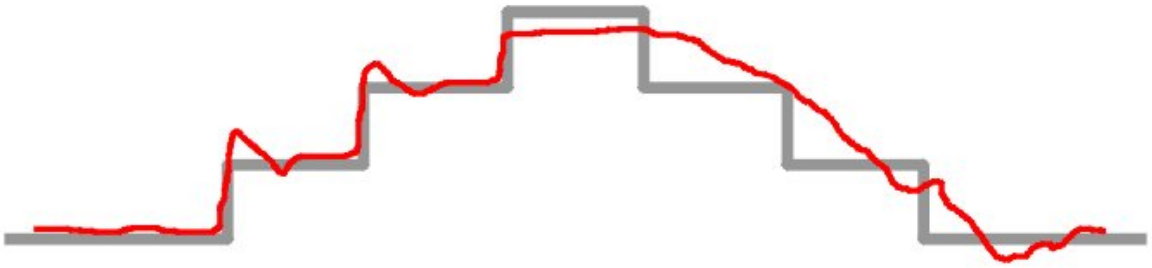
During the course of the quick test, the control module will steer the pressure to different target values in different stages (400, 500, 600 and finally 700 kPa), after which the pressure will be decreased in stages to the same pressure. Each stage lasts for approximately 5 seconds.

Note! Because the by-pass valve in the fuel pump (FP) will be open at approximately 650 kPa, the pressure will not go higher than this.

Hint: The illustration to the left shows an example of normal regulation.

- The upper digital display and the graphic display (red font color) indicate the absolute fuel pressure, calculated from the fuel pressure sensor
- The lower digital display and the graphic display (yellow font color) indicate the control module target value for the absolute fuel pressure
- The lower digital display indicates the relative fuel pressure (white font color), calculated from the fuel pressure sensor and the atmospheric pressure sensor (= absolute pressure minus atmospheric pressure). If a manometer is connected during the test, it should indicate this pressure.

Check that the value for absolute fuel pressure is the same as the target value for absolute fuel pressure. If the values are not the same, this indicates a fault in the pressure regulation. The values may differ during the quick test when the target value is changed. This is due to sluggishness in the fuel regulation and is normal. In some cases, it can take up to 5 seconds before the fuel pressure reaches the target value for the fuel pressure.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

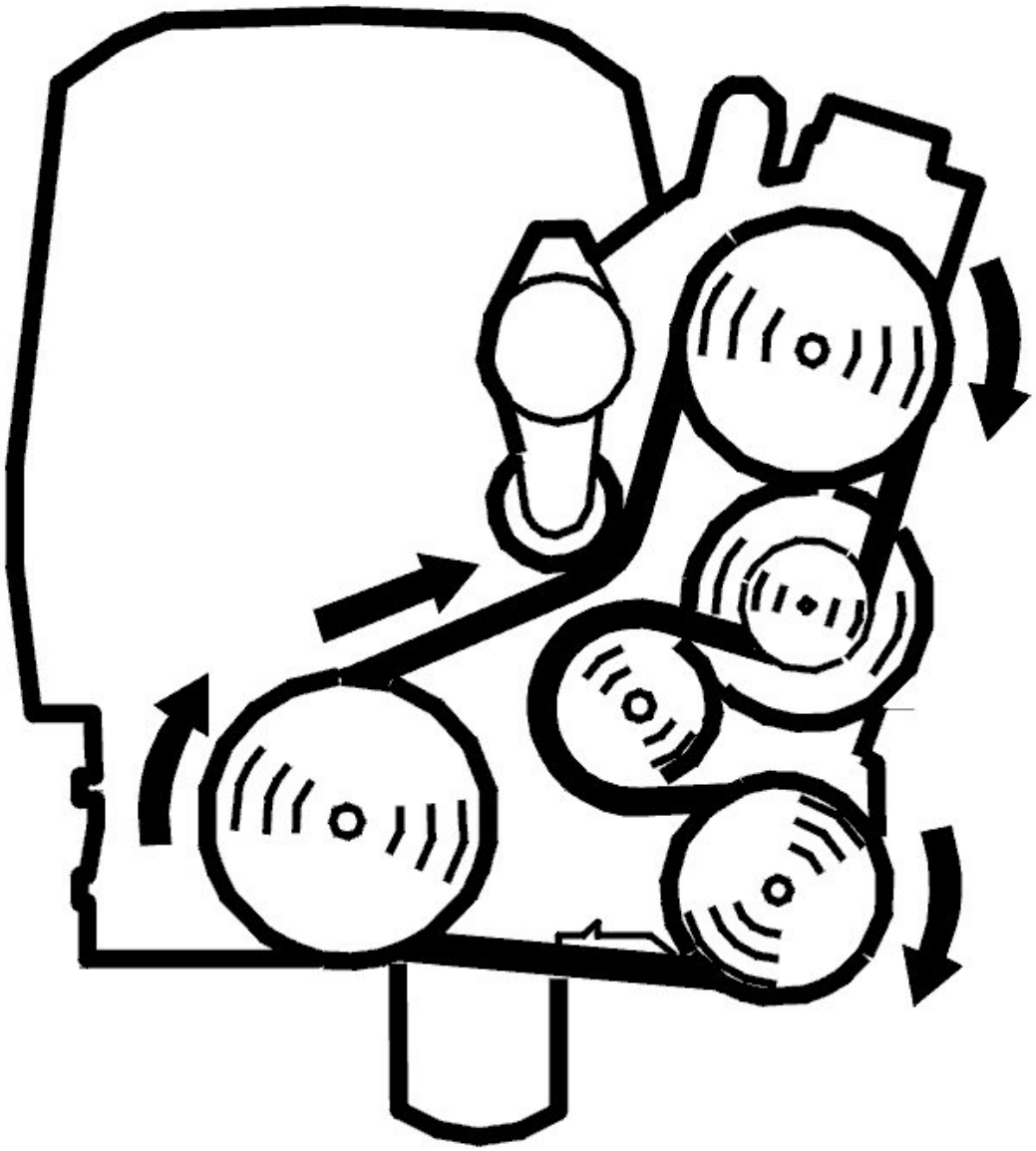
VERIFICATION FAILED - Fault-tracing information

Verification

Verification

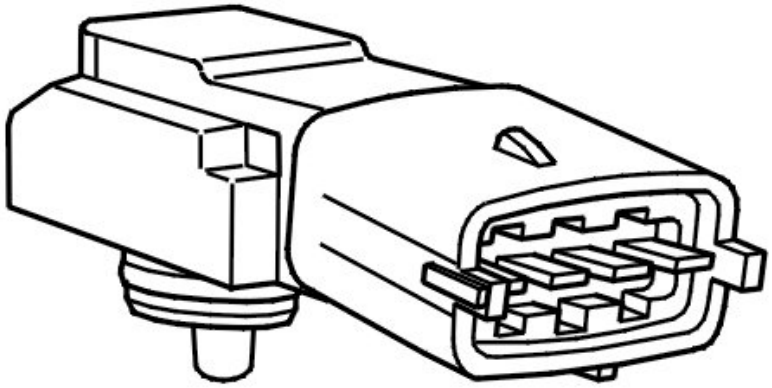
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Connect the manometer, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Run the engine to operating temperature. Allow the engine to idle
- air conditioning (A/C) off
- Read off the relative fuel pressure.

The relative fuel pressure is calculated from the fuel pressure sensor and the atmospheric pressure sensor signal (= absolute pressure minus atmospheric pressure).
Check that the value on the manometer and the value displayed in VIDA are the same. If the values are different, this indicates incorrect function.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

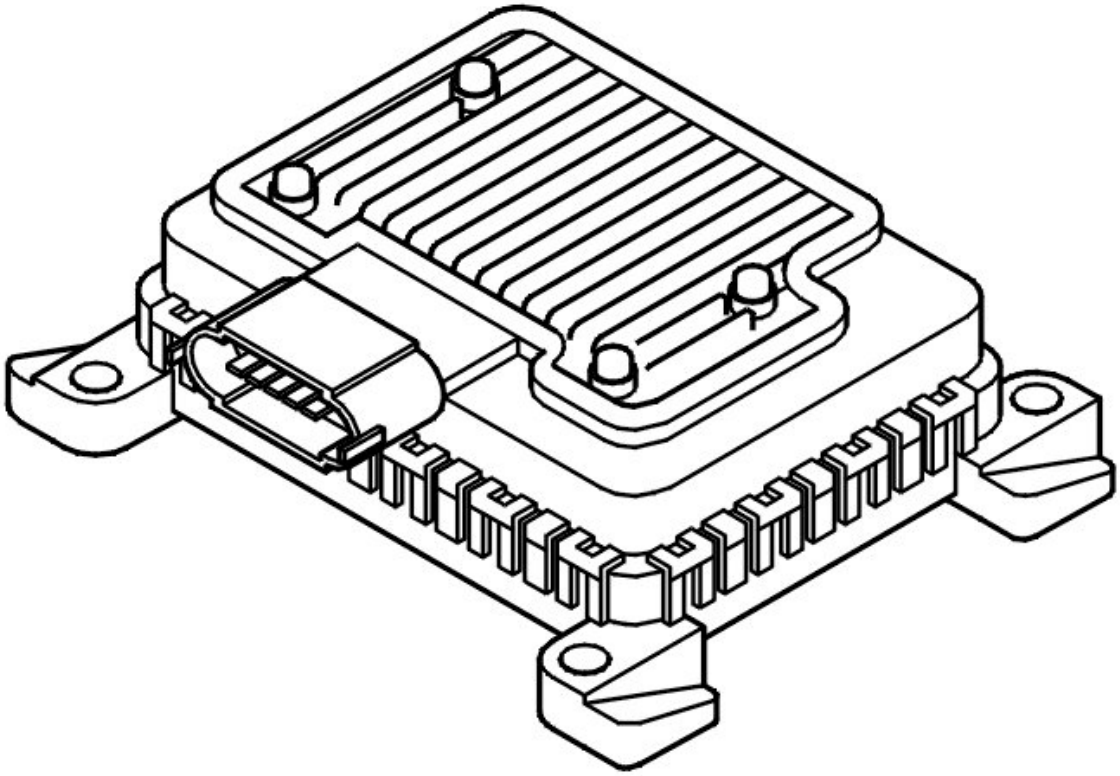
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-291B

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if there is no PWM signal between the engine control module (ECM) and the fuel pump (FP) control module.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

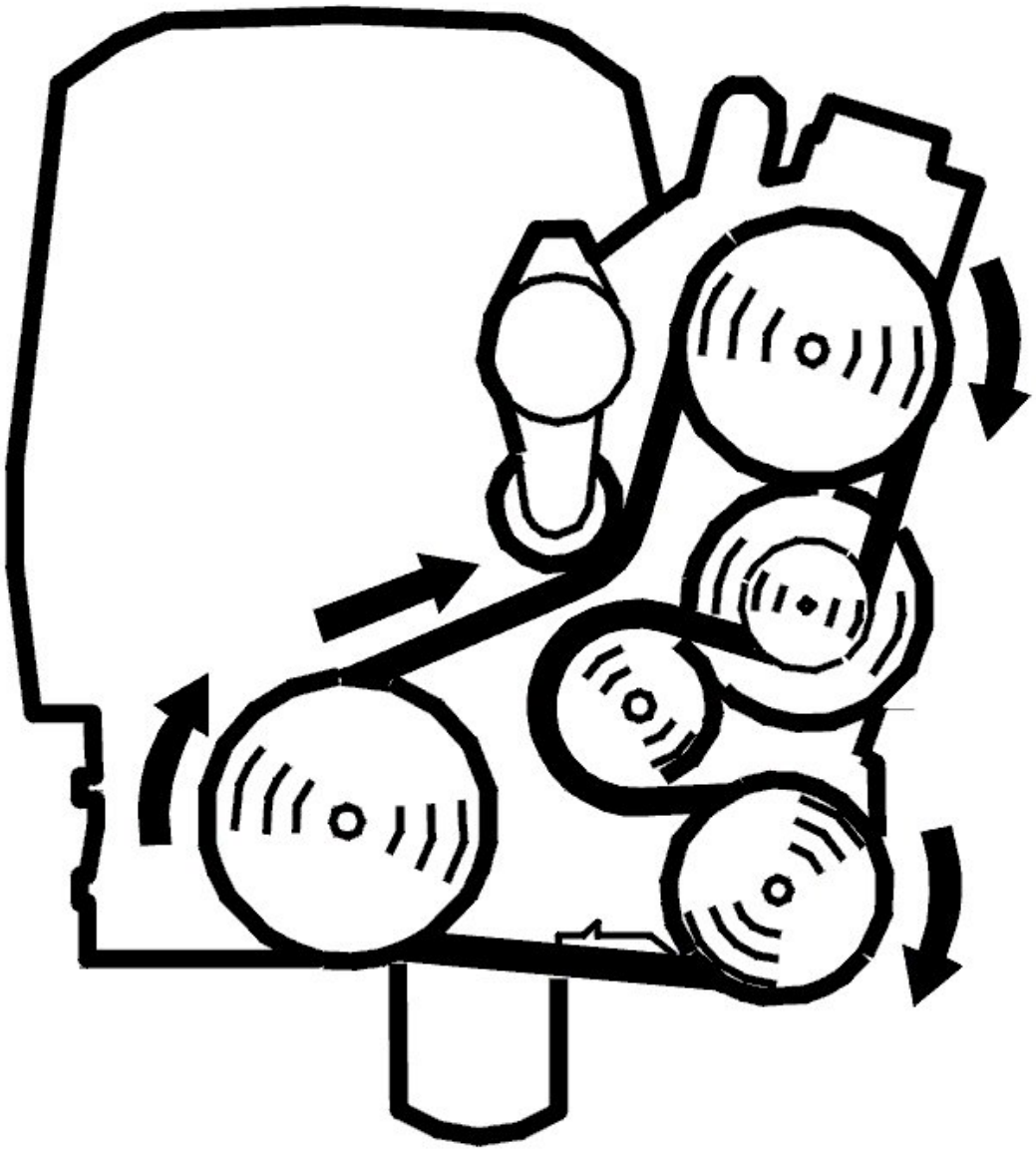
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged fuel pump control module.

Fault symptom[s]
- The starter motor turns but the engine does not start
- The engine stops.

Signal Too High/Signal Too Low/Signal Missing

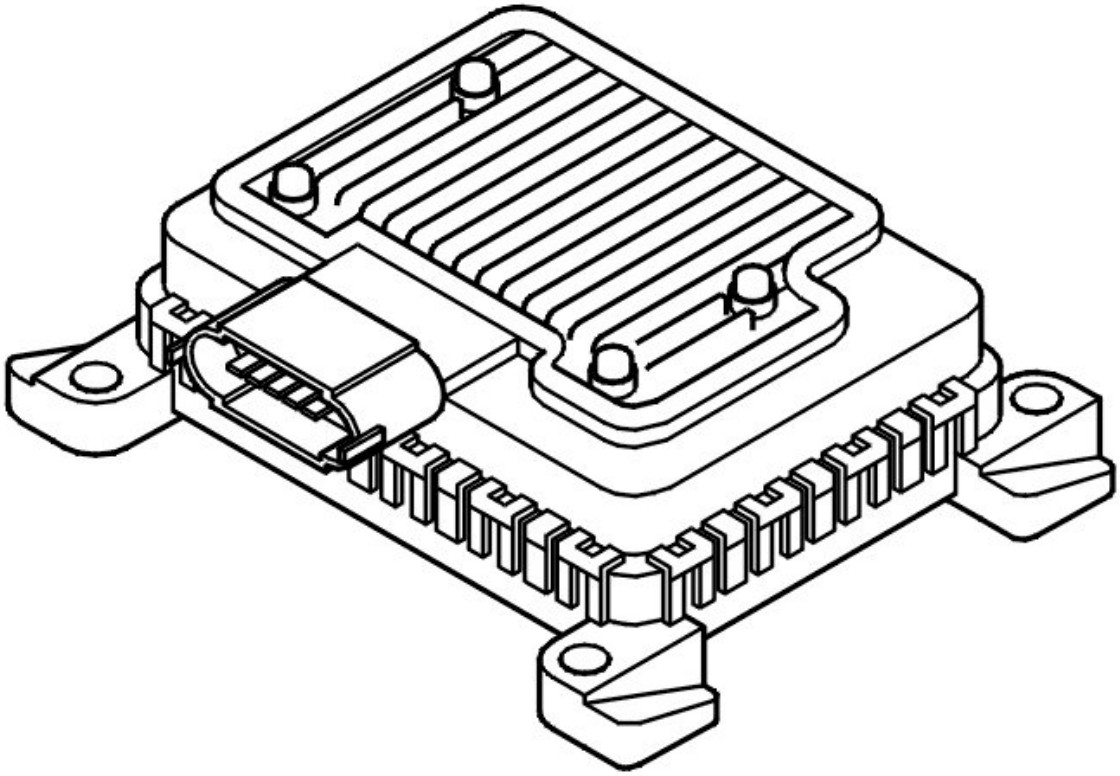
Signal too high/signal too low/signal missing

Checking the status



- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check whether the fault is permanent or intermittent by checking the value of the fuel pump (FP) load (signal from the engine control module (ECM) to the fuel pump (FP) control module).
Check that the signal is approximately 35% (±5%) with the engine idling at operating temperature.
The fault is permanent if the signal is incorrect or the engine will not start.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

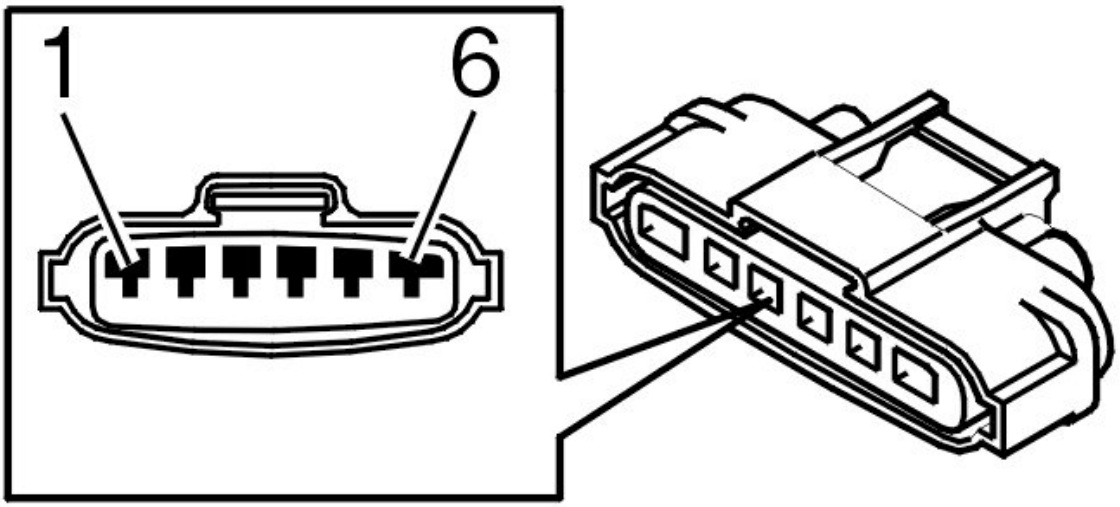
Checking components and wiring

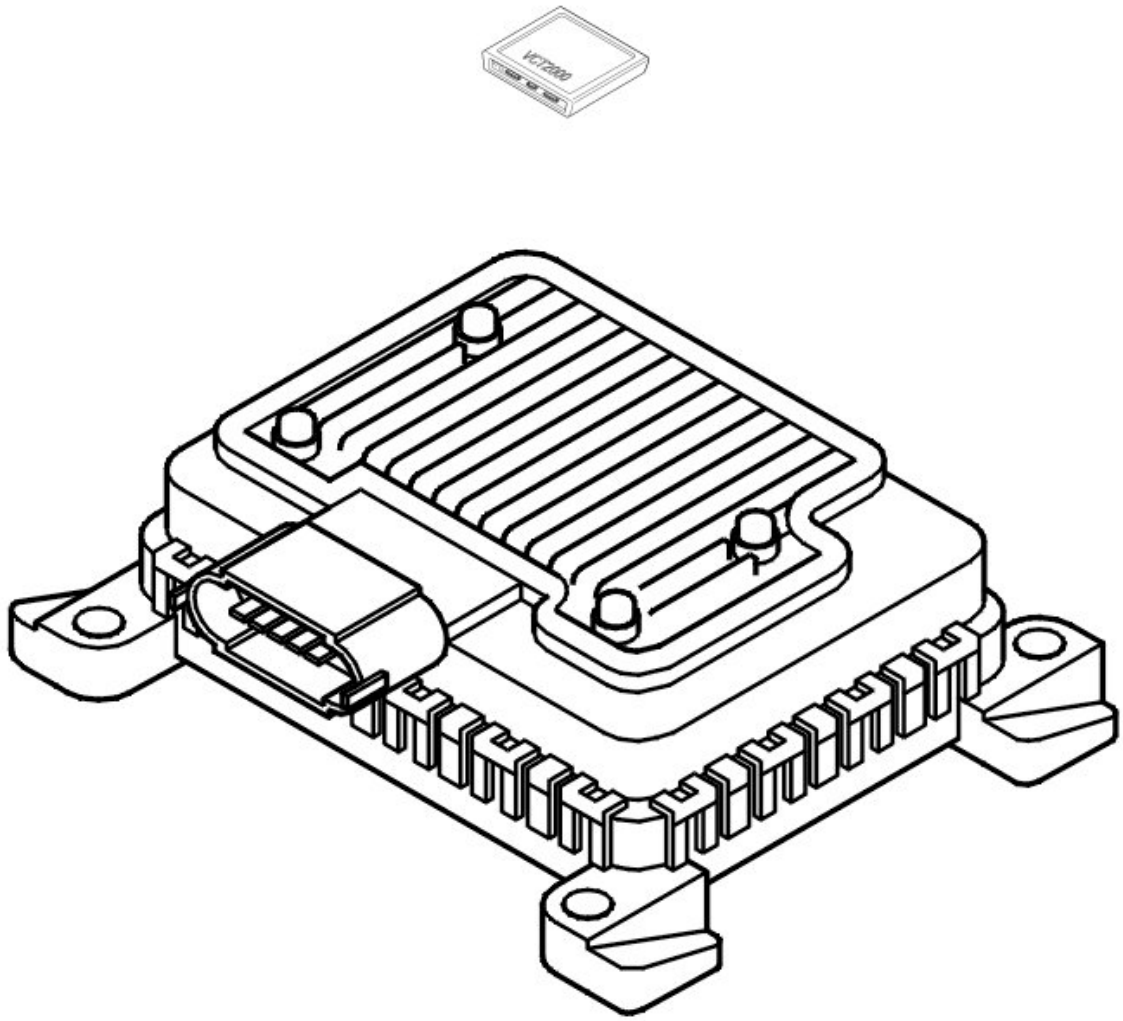
Check the pump control module connector. Check for contact resistance and oxidation.
Check the cable between Engine Control Module (ECM) terminal #B47 (#B57) and pump control module terminal #1. Check for an open circuit, short circuit to ground and supply voltage.
Remedy as necessary.

Hint: The diagnostic trouble code (DTC) may be caused by a defective pump control module.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Control module fuel pump (FP), replacing See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair





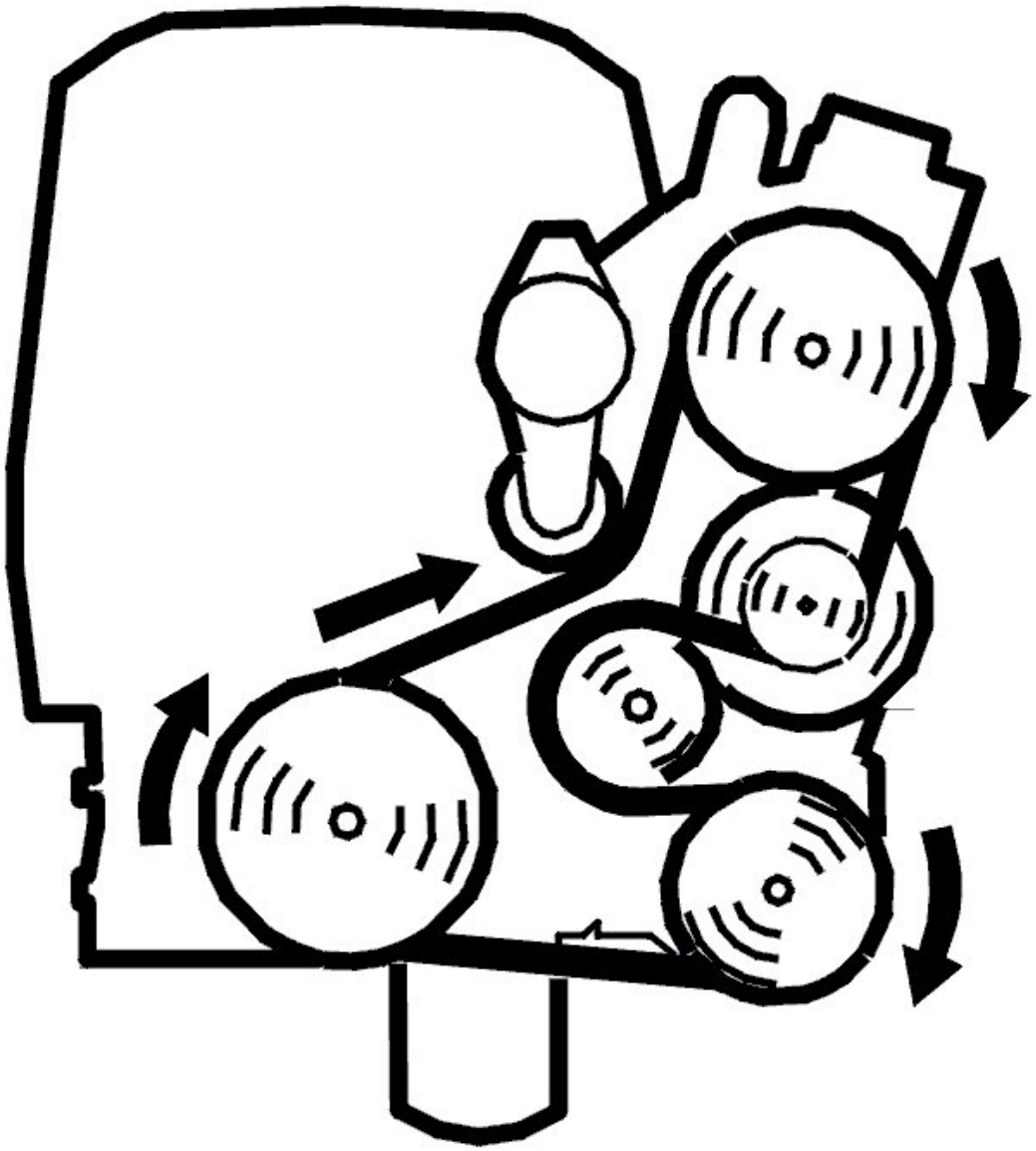
Continue - Verification

Verification

Verification

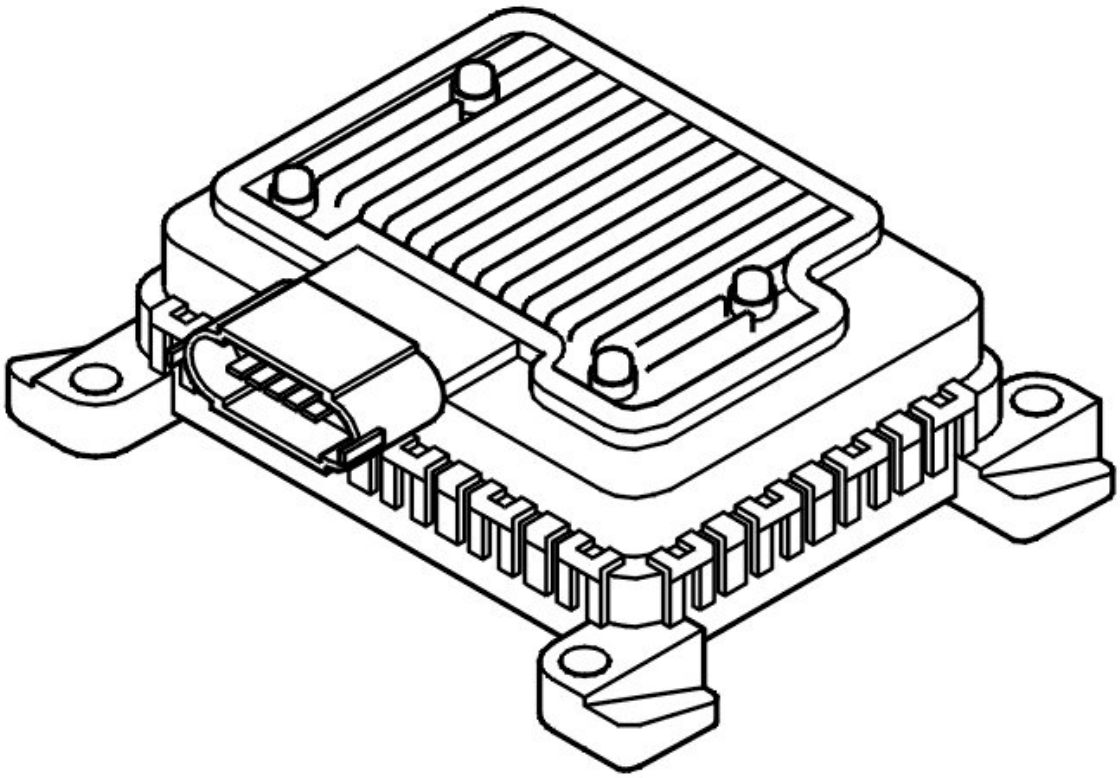
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check that the engine starts and that the signal is approximately 35% (±5%) when the engine is idling at operating temperature.



Is the function correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

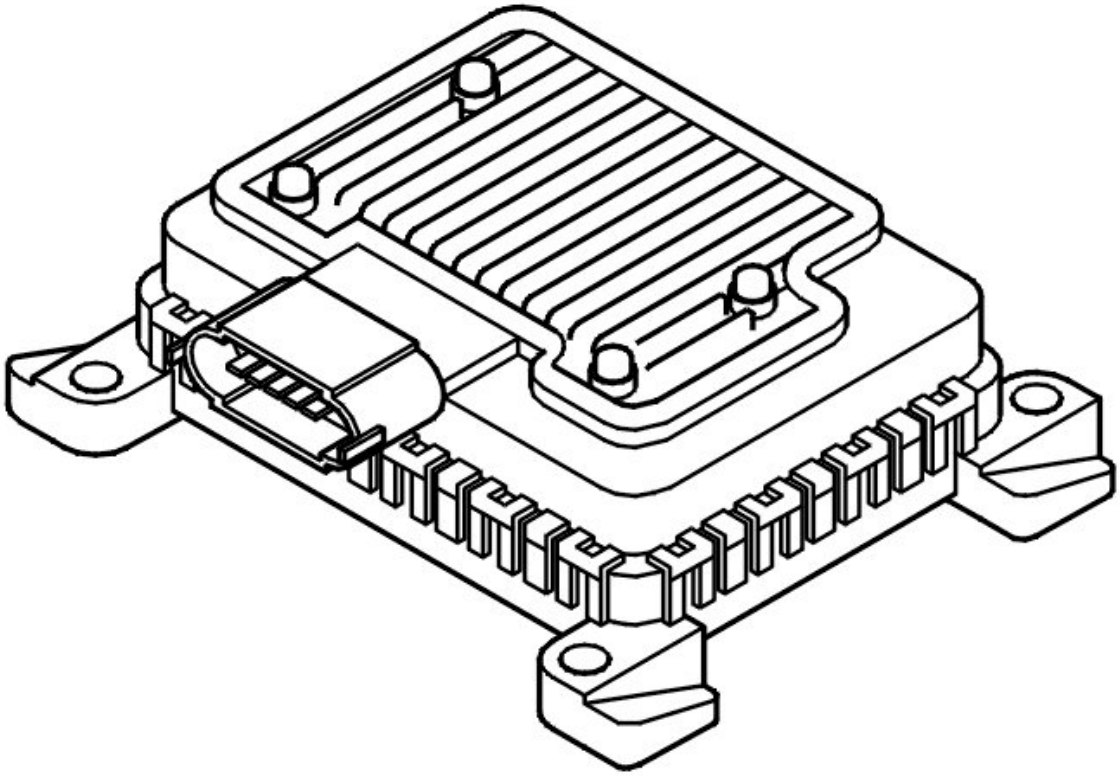
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-291C

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the PWM signal between the engine control module (ECM) and the fuel pump (FP) control module is too high.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

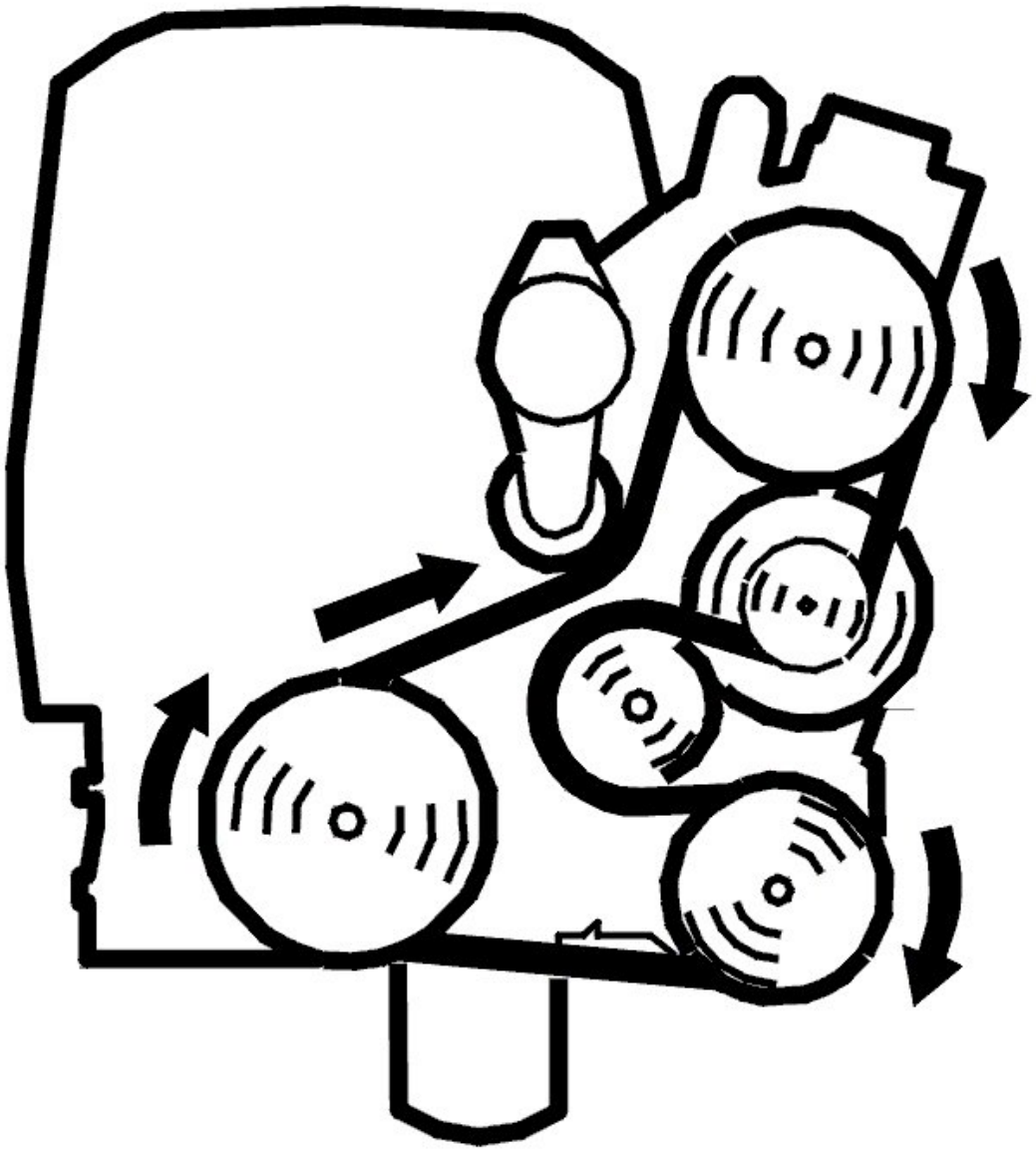
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged fuel pump control module.

Fault symptom[s]
- The starter motor turns but the engine does not start
- The engine stops.

Signal Too High/Signal Too Low/Signal Missing

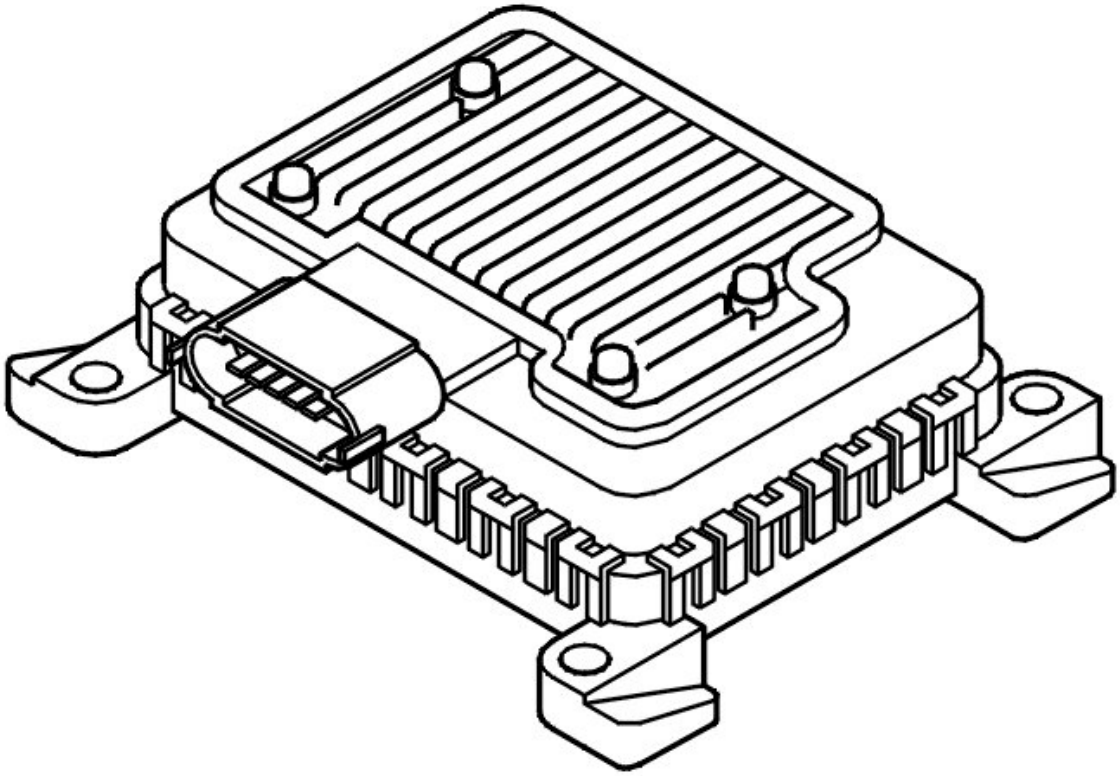
Signal too high/signal too low/signal missing

Checking the status



- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check whether the fault is permanent or intermittent by checking the value of the fuel pump (FP) load (signal from the engine control module (ECM) to the fuel pump (FP) control module).
Check that the signal is approximately 35% (±5%) with the engine idling at operating temperature.
The fault is permanent if the signal is incorrect or the engine will not start.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

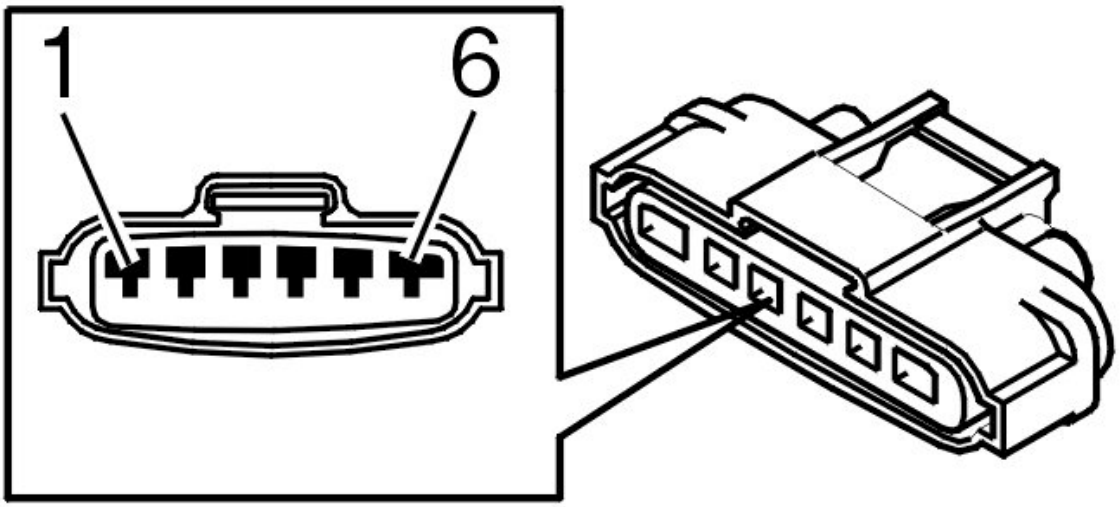
Checking components and wiring

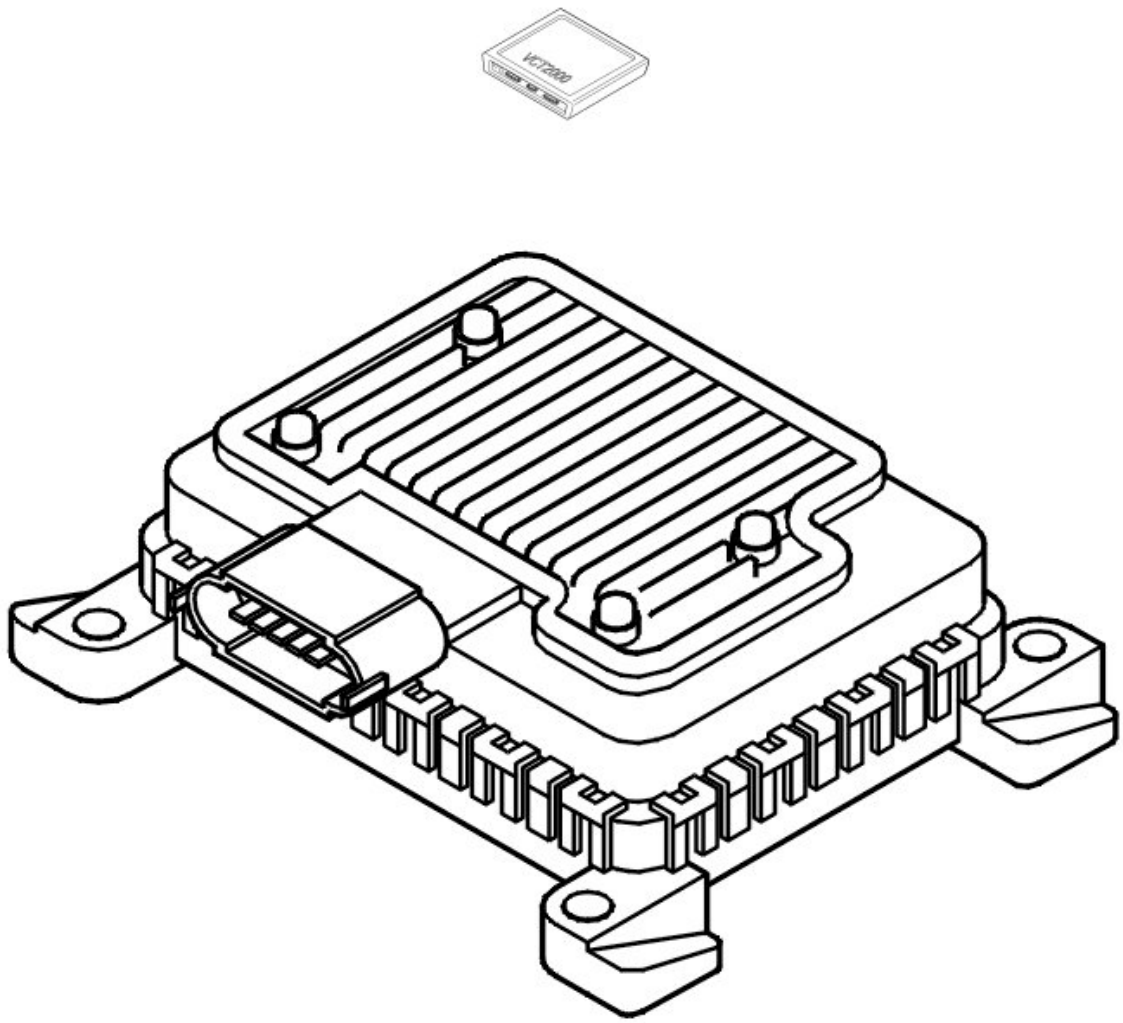
Check the pump control module connector. Check for contact resistance and oxidation.
Check the cable between Engine Control Module (ECM) terminal #B47 (#B57) and pump control module terminal #1. Check for an open circuit, short circuit to ground and supply voltage.
Remedy as necessary.

Hint: The diagnostic trouble code (DTC) may be caused by a defective pump control module.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Control module fuel pump (FP), replacing See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair





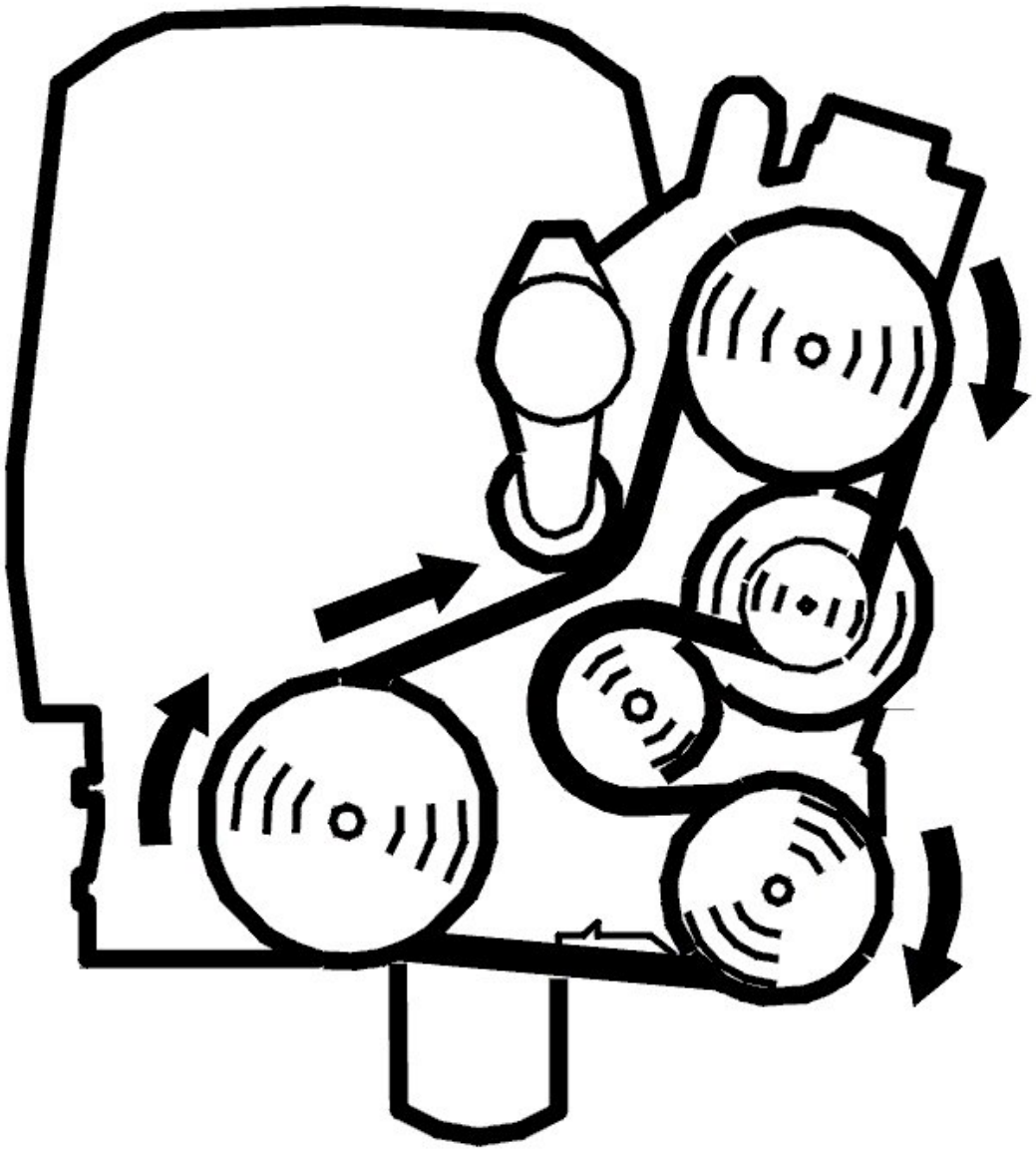
Continue - Verification

Verification

Verification

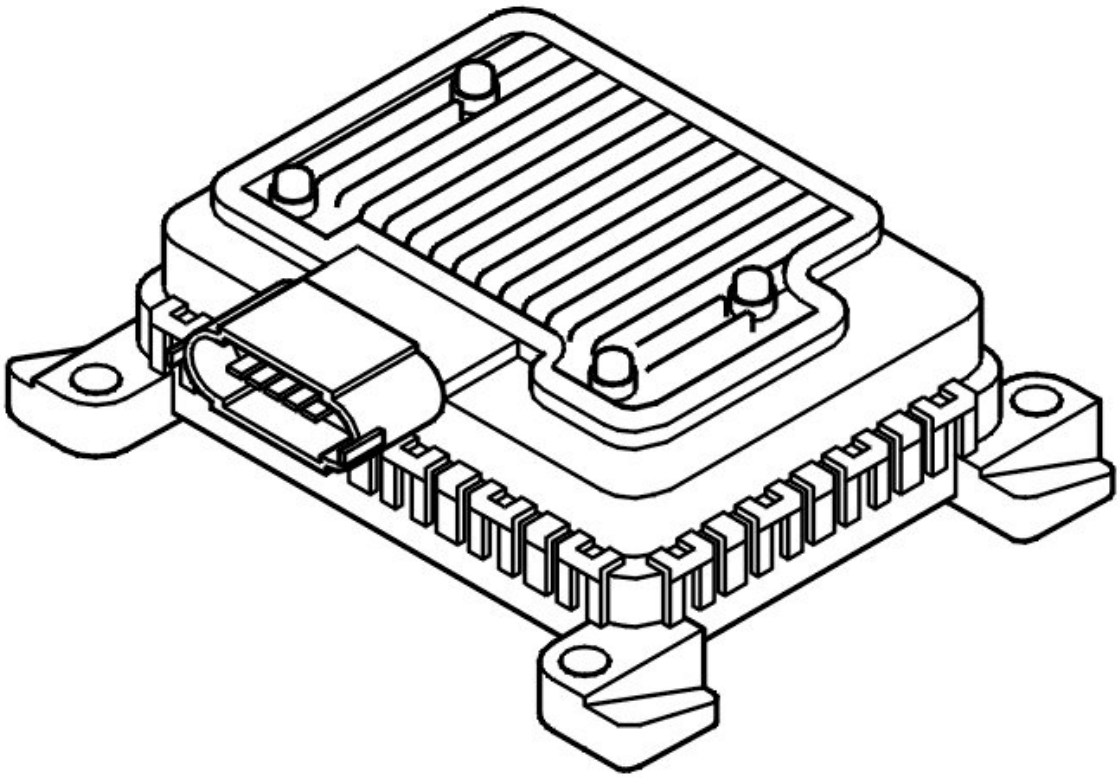
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check that the engine starts and that the signal is approximately 35% (±5%) when the engine is idling at operating temperature.



Is the function correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

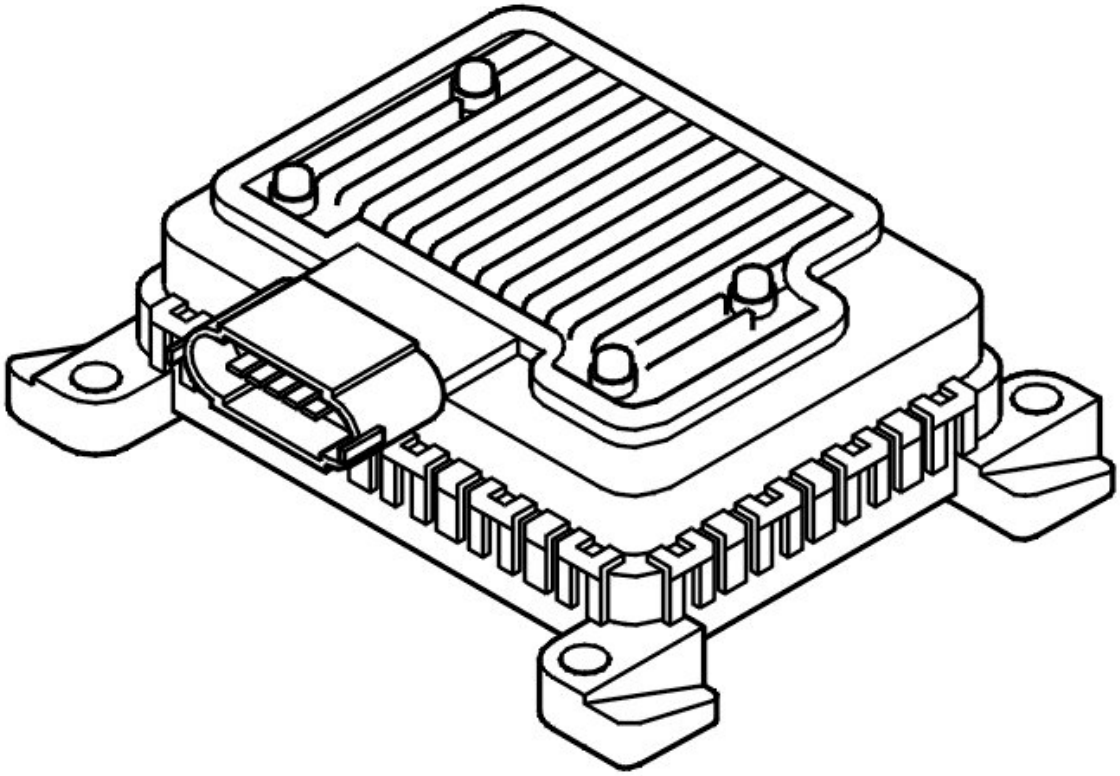
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-291D

Condition



The engine control module (ECM) controls the fuel pressure via the fuel pump (FP) control module using a pulse width modulation (PWM) signal.
The fuel pump (FP) control module then controls the fuel pump (FP) depending on the pressure requested by the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the PWM signal between the engine control module (ECM) and the fuel pump (FP) control module is too low.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

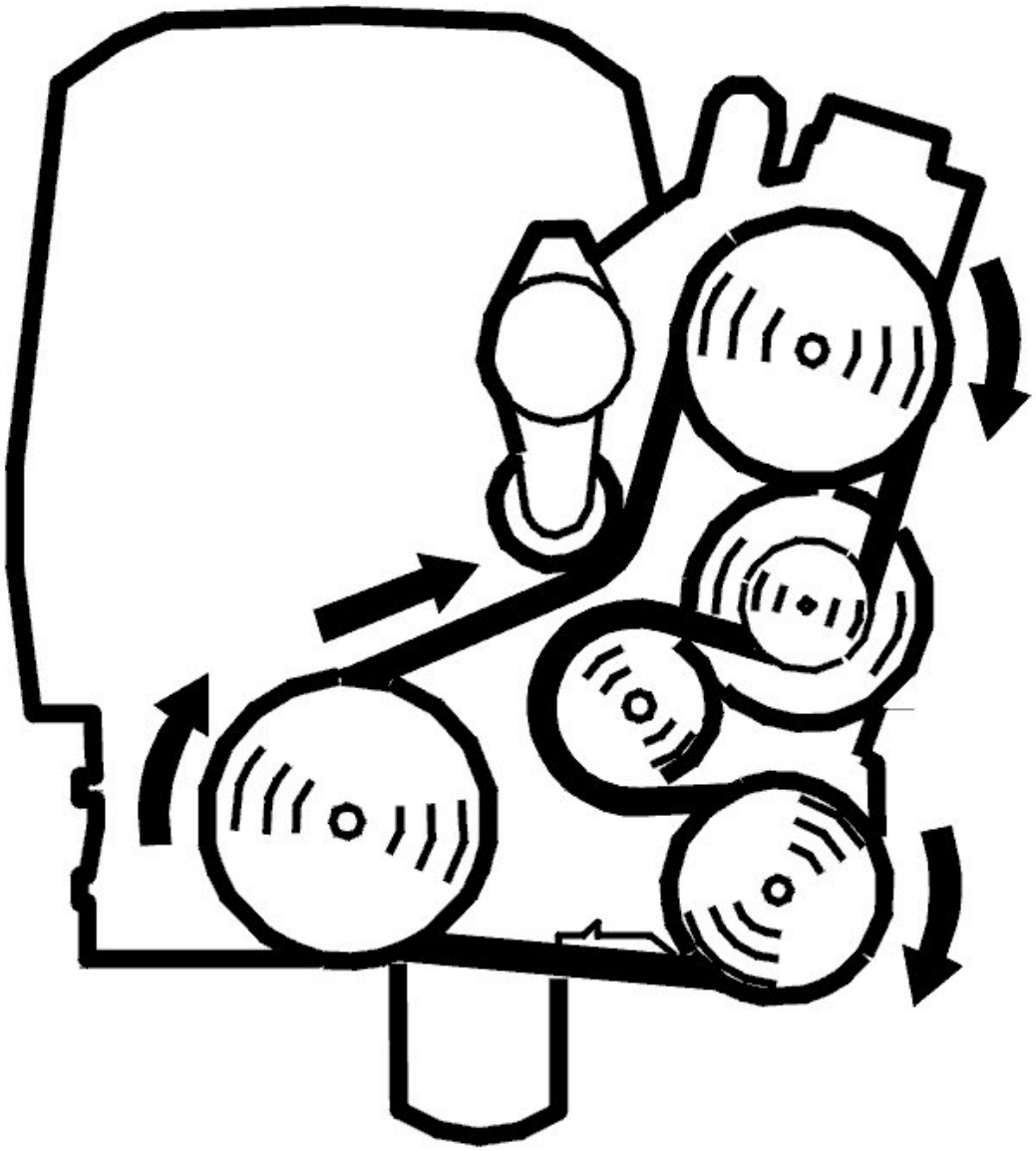
Possible source
- Short-circuit to ground in the signal cable
- Damaged fuel pump control module.

Fault symptom[s]
- The starter motor turns but the engine does not start
- The engine stops.

Signal Too High/Signal Too Low/Signal Missing

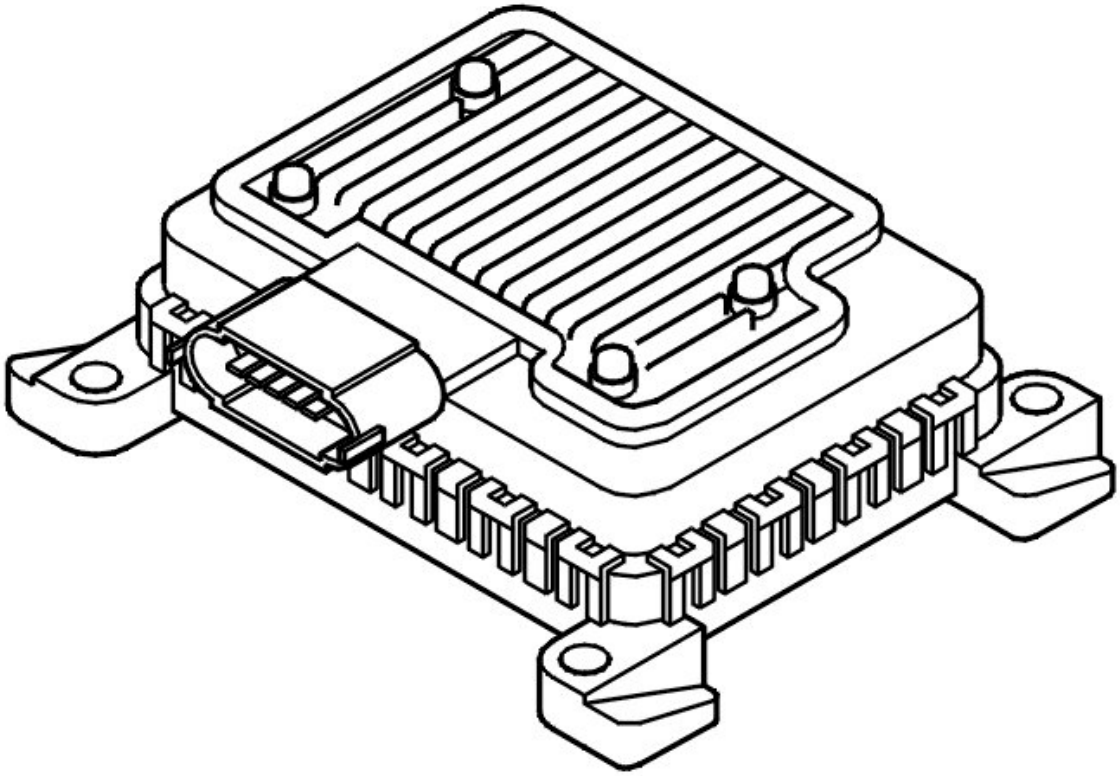
Signal too high/signal too low/signal missing

Checking the status



- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check whether the fault is permanent or intermittent by checking the value of the fuel pump (FP) load (signal from the engine control module (ECM) to the fuel pump (FP) control module).
Check that the signal is approximately 35% (±5%) with the engine idling at operating temperature.
The fault is permanent if the signal is incorrect or the engine will not start.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

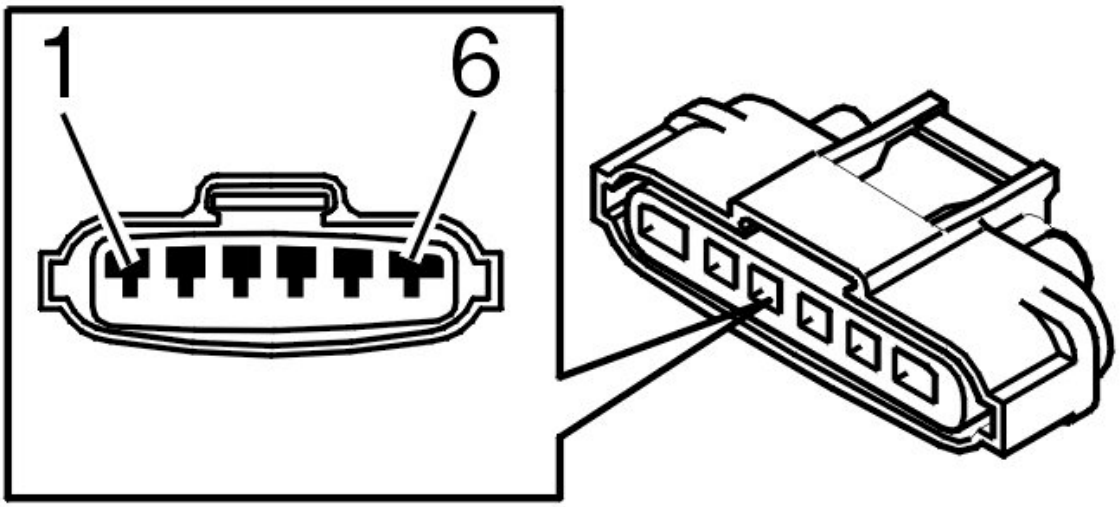
Checking components and wiring

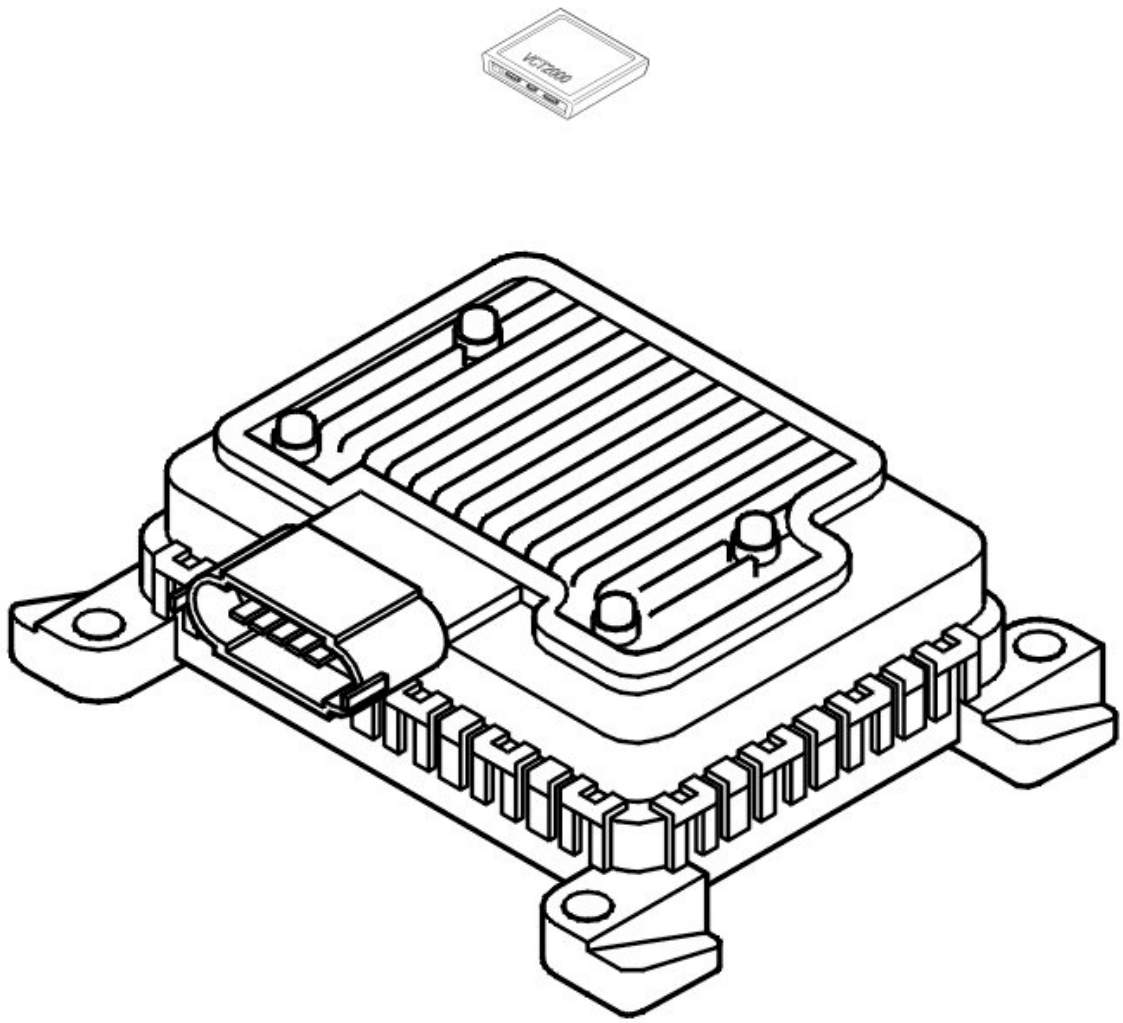
Check the pump control module connector. Check for contact resistance and oxidation.
Check the cable between Engine Control Module (ECM) terminal #B47 (#B57) and pump control module terminal #1. Check for an open circuit, short circuit to ground and supply voltage.
Remedy as necessary.

Hint: The diagnostic trouble code (DTC) may be caused by a defective pump control module.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Control module fuel pump (FP), replacing See: Fuel Delivery and Air Induction/Fuel Pump/Fuel Pump Control Unit/Service and Repair





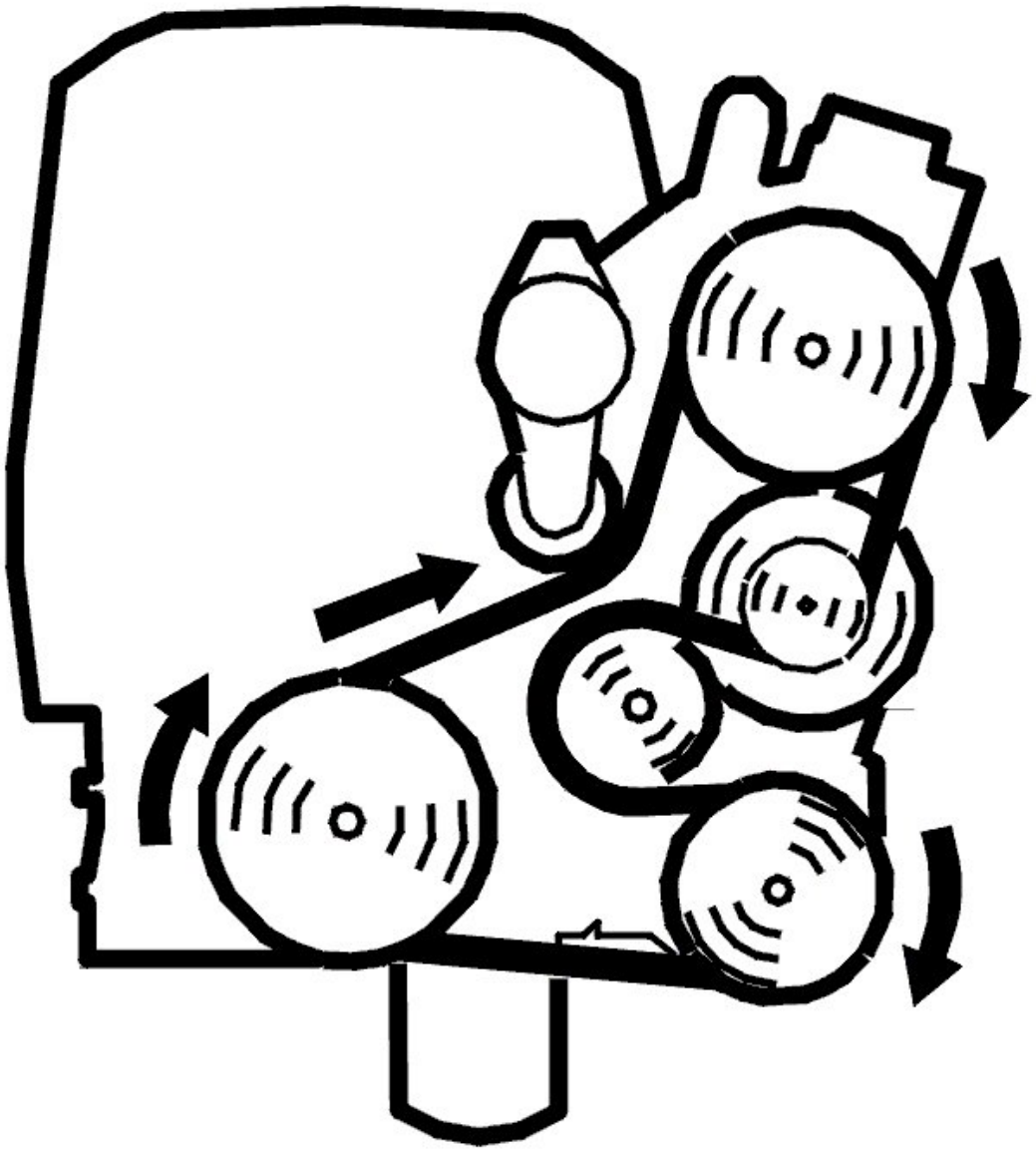
Continue - Verification

Verification

Verification

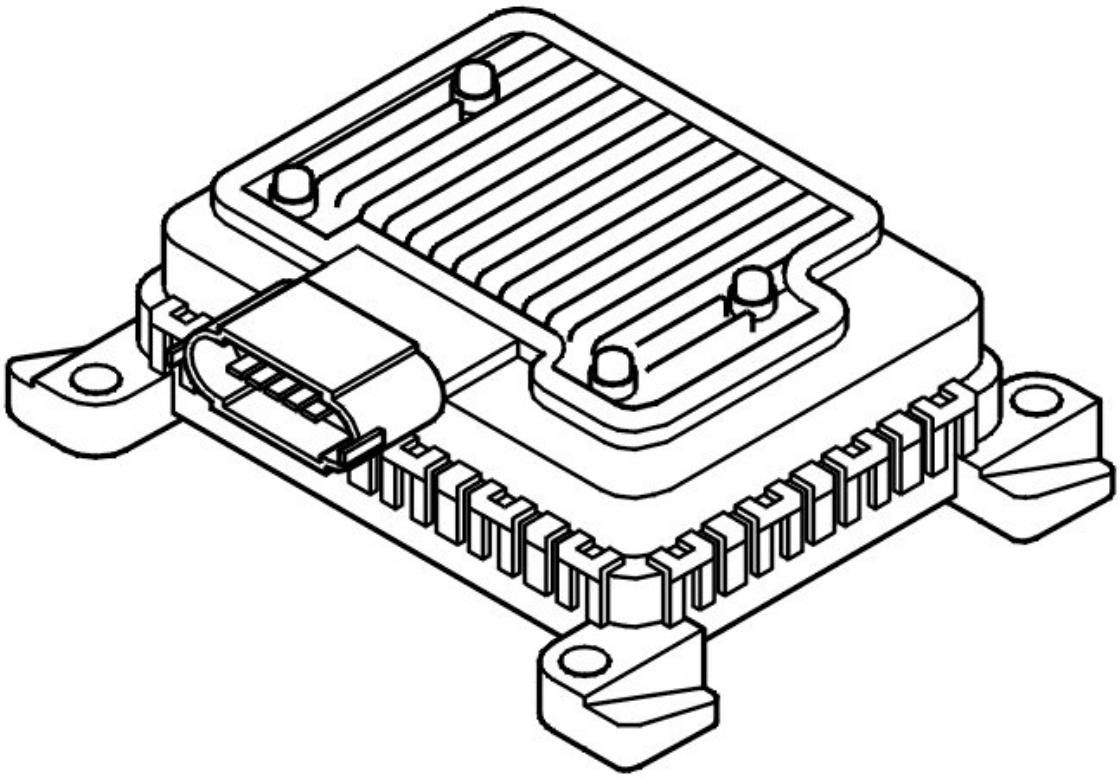
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel pump (FP) load.

Check that the engine starts and that the signal is approximately 35% (±5%) when the engine is idling at operating temperature.



Is the function correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

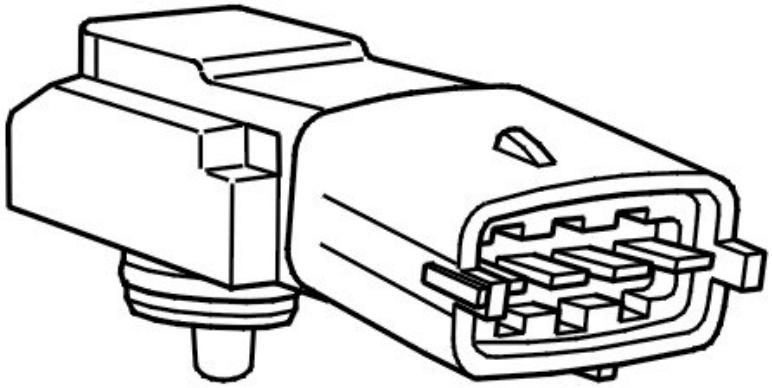
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2A0C

Condition



The engine control module (ECM) checks the signal from the fuel temperature sensor. The fuel temperature sensor is integrated in the fuel pressure sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the fuel temperature sensor is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

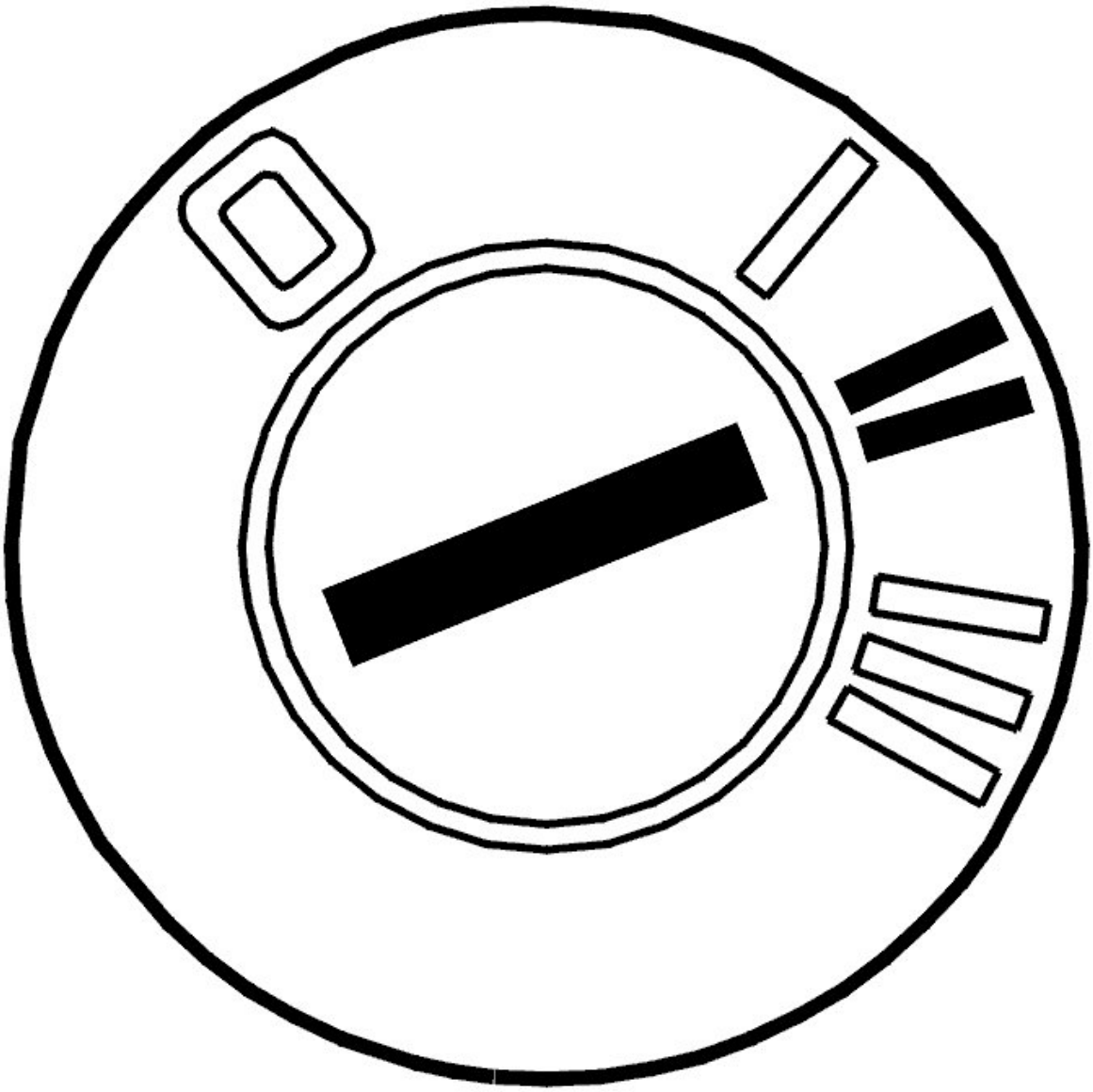
Possible source
- Short-circuit to ground in the signal cable
- Damaged temperature sensor.

Fault symptom[s]
- None.

Signal Too High

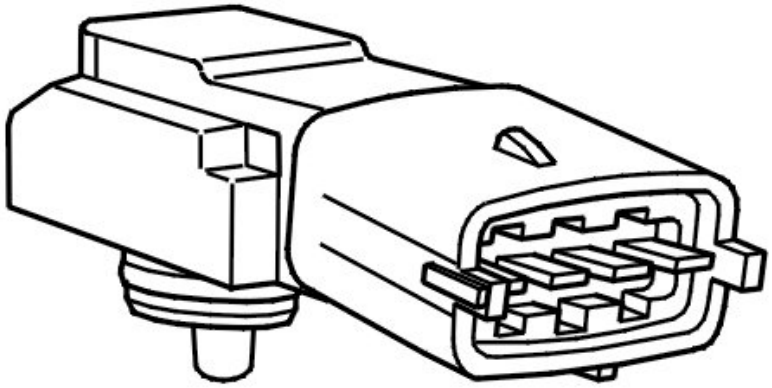
Signal too high

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
Check that the signal is within its permitted range. The signal is measured in the fuel rail for the injectors.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

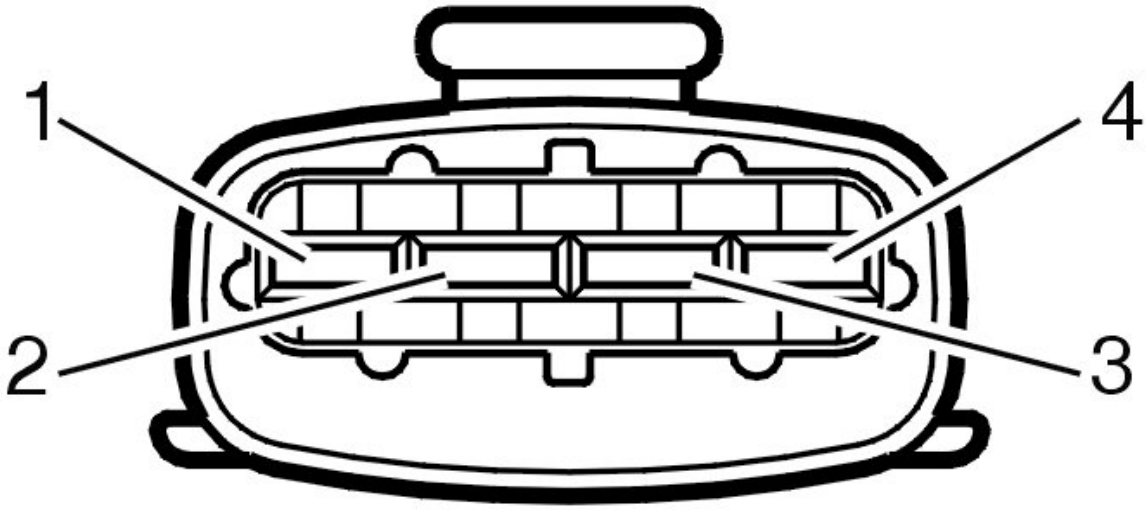
Checking components and wiring

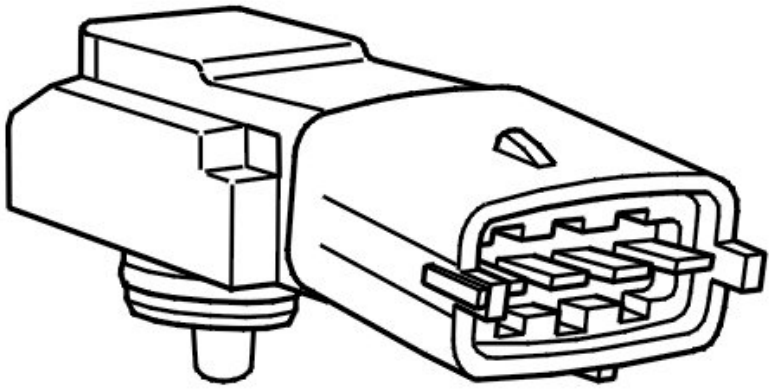
Hint: The fuel temperature sensor is integrated in the fuel pressure sensor.

Check the fuel pressure sensor resistance. Take readings between terminals #1 and #2.
Check the signal cable between control module terminal #A3 (#A3) and fuel pressure sensor terminal #2. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.





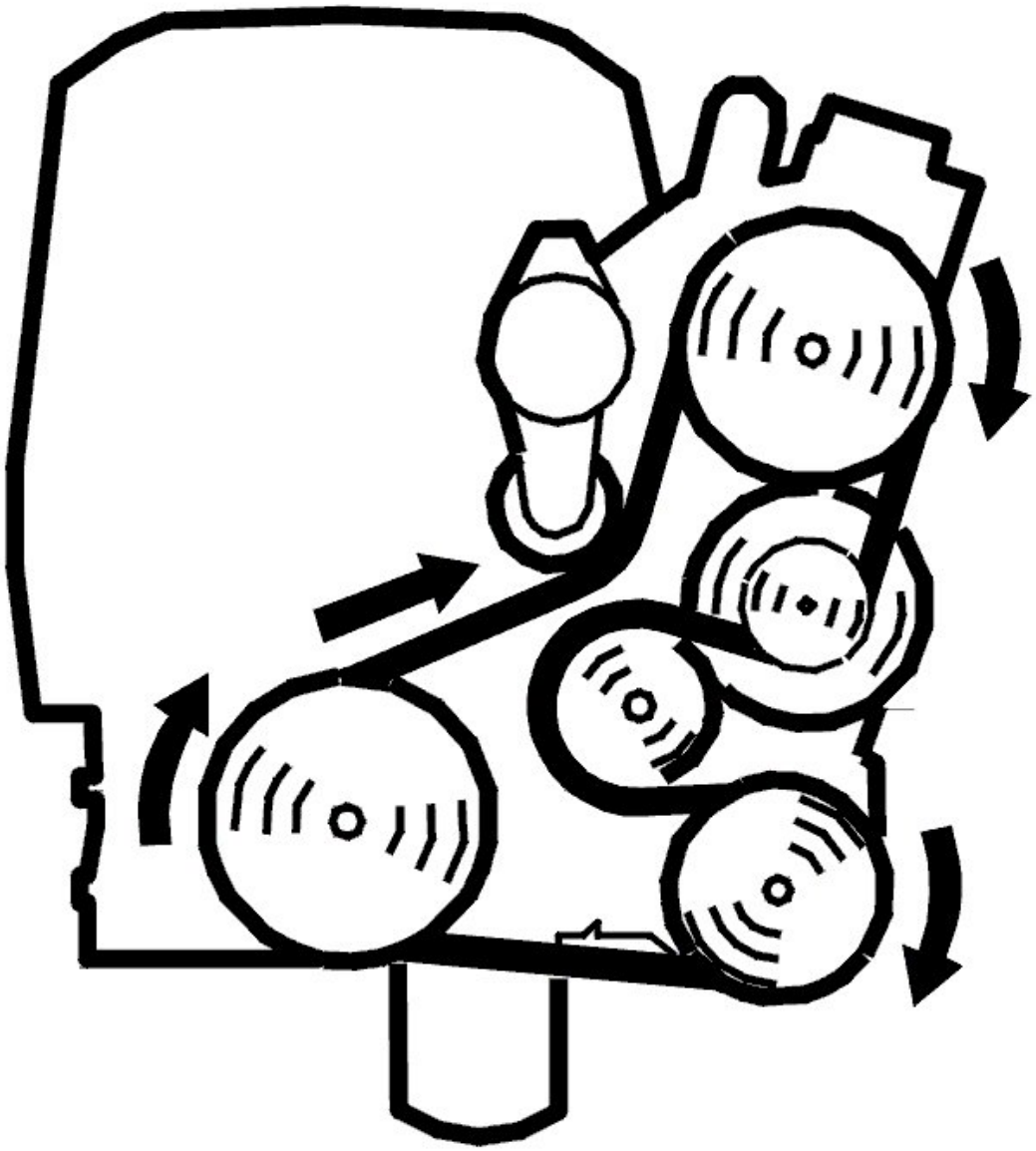
Continue - Verification

Verification

Verification

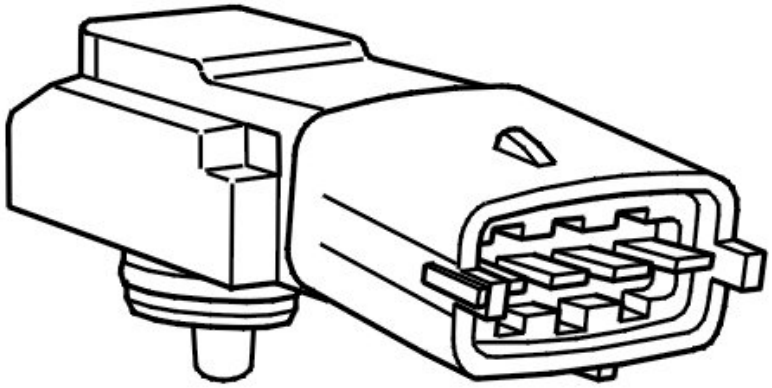
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel temperature sensor signal.

Check that the signal is within its permitted range. The signal is measured in the fuel rail for the injectors.



Is the signal OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

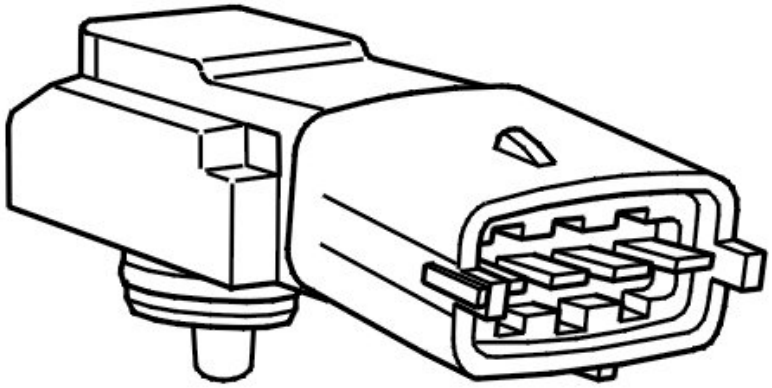
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2A0D

Condition



The engine control module (ECM) checks the signal from the fuel temperature sensor. The fuel temperature sensor is integrated in the fuel pressure sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the engine coolant temperature (ECT) sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.
For information about fuel pressure regulation, see VIDA Design and Function.

Substitute value
- None.

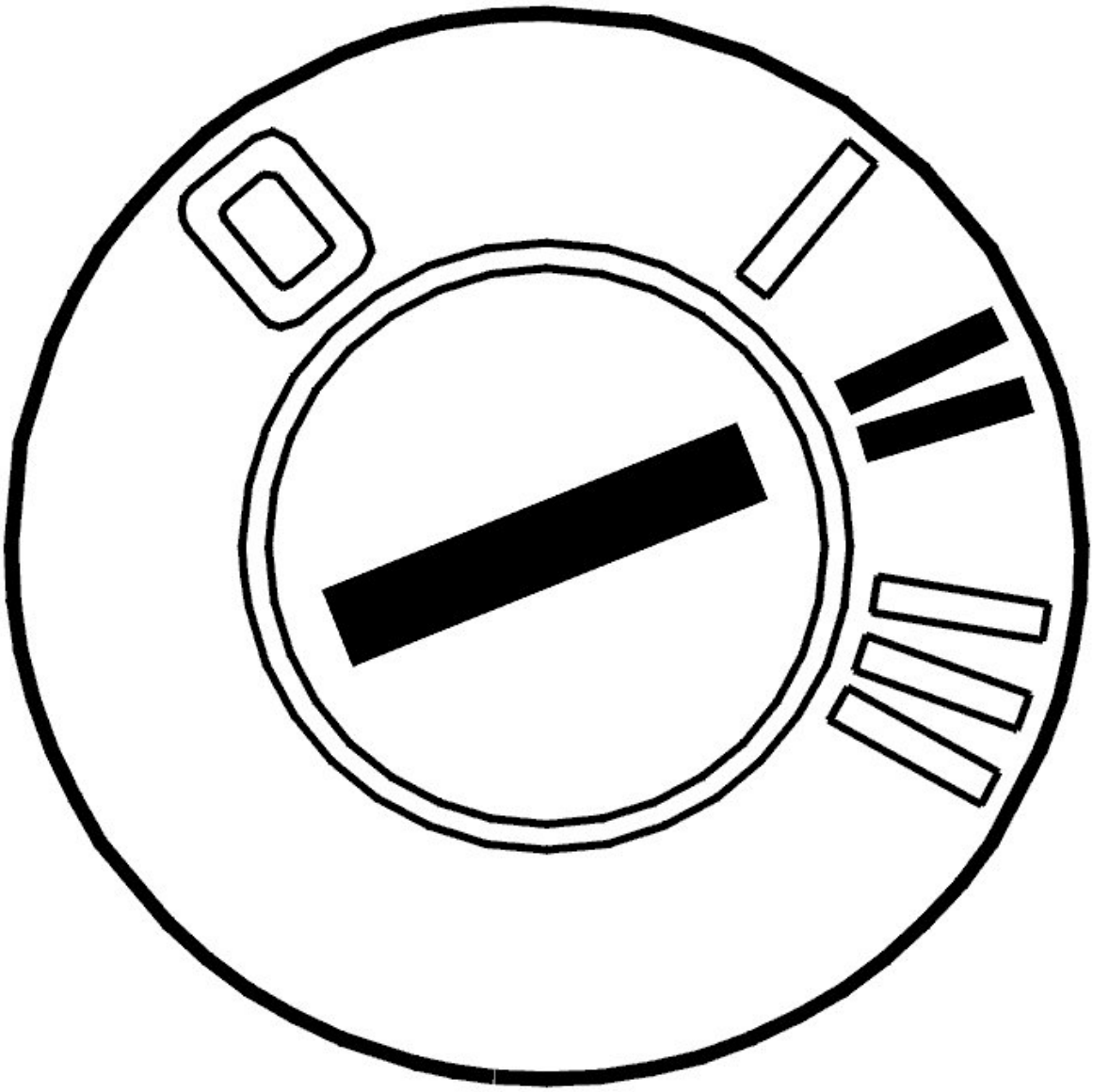
Possible source
- Contact resistance or oxidation in the terminals
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable
- Open-circuit in the signal ground cable
- Damaged temperature sensor.

Fault symptom[s]
- None.

Fault-Tracing

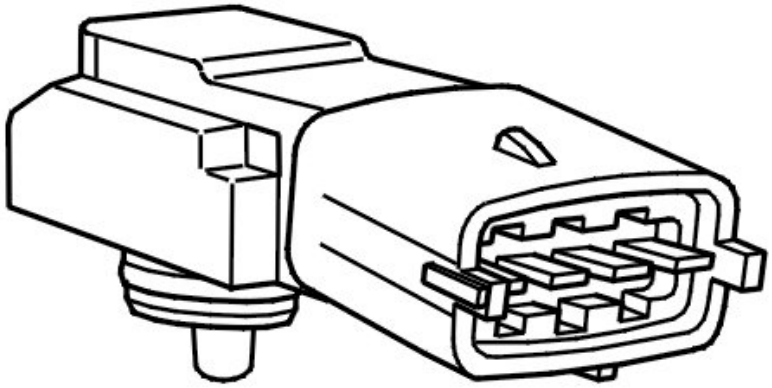
Fault-tracing

Checking the status



- Ignition on.

Check whether the fault is permanent or intermittent by reading off the signal from the fuel pressure sensor.
Check that the signal is within its permitted range. The signal is measured in the fuel rail for the injectors.
The fault is permanent if the signal is incorrect.
The fault is intermittent if the signal is correct.



Continue - Checking components and wiring

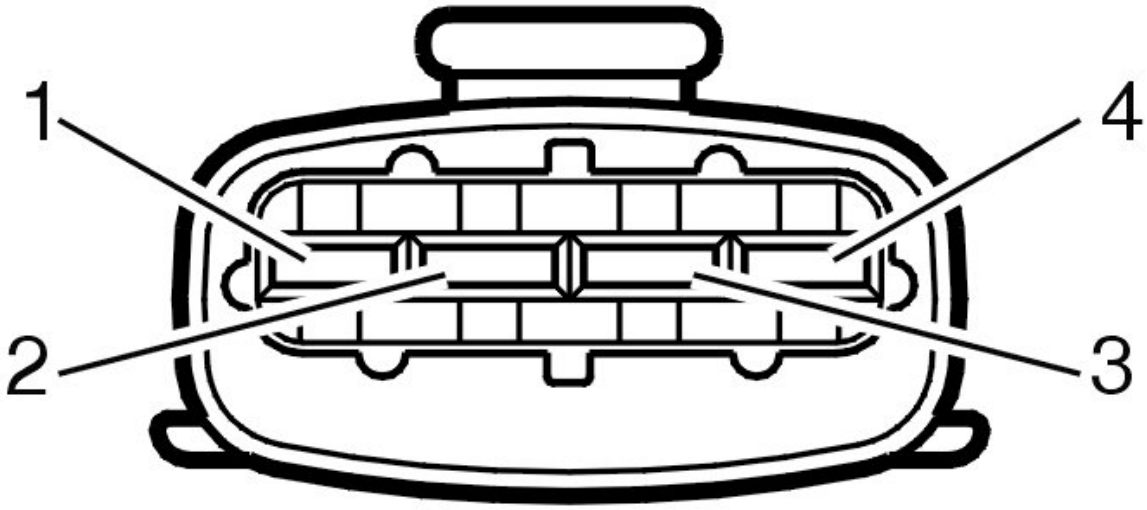
Checking components and wiring

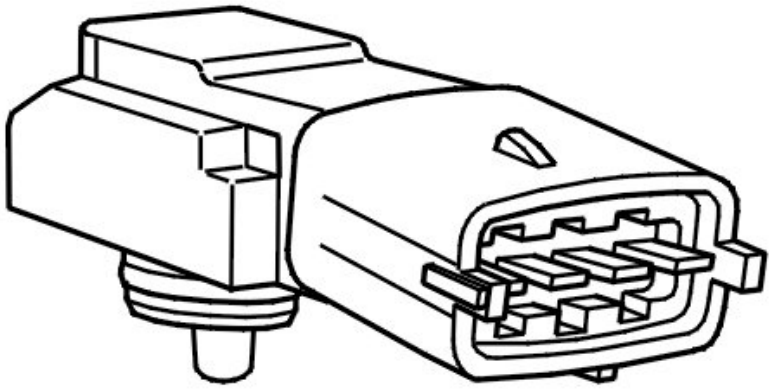
Hint: The fuel temperature sensor is integrated in the fuel pressure sensor.

Check the fuel pressure sensor connectors. Check for contact resistance and oxidation.
Check the fuel pressure sensor resistance. Take readings between terminals #1 and #2.
Check the signal cable between control module terminal #A3 (#A3) and fuel pressure sensor terminal #2. Check for a short-circuit to supply voltage. Check for an open-circuit.
Check the ground lead between control module terminal #A60 (#A60) and fuel pressure sensor terminal #1. Check for an open-circuit.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the fuel pressure sensor, see Fuel pressure sensor, replacement, B5244T5, B5254T2 See: Fuel Pressure Sensor/Service and Repair.





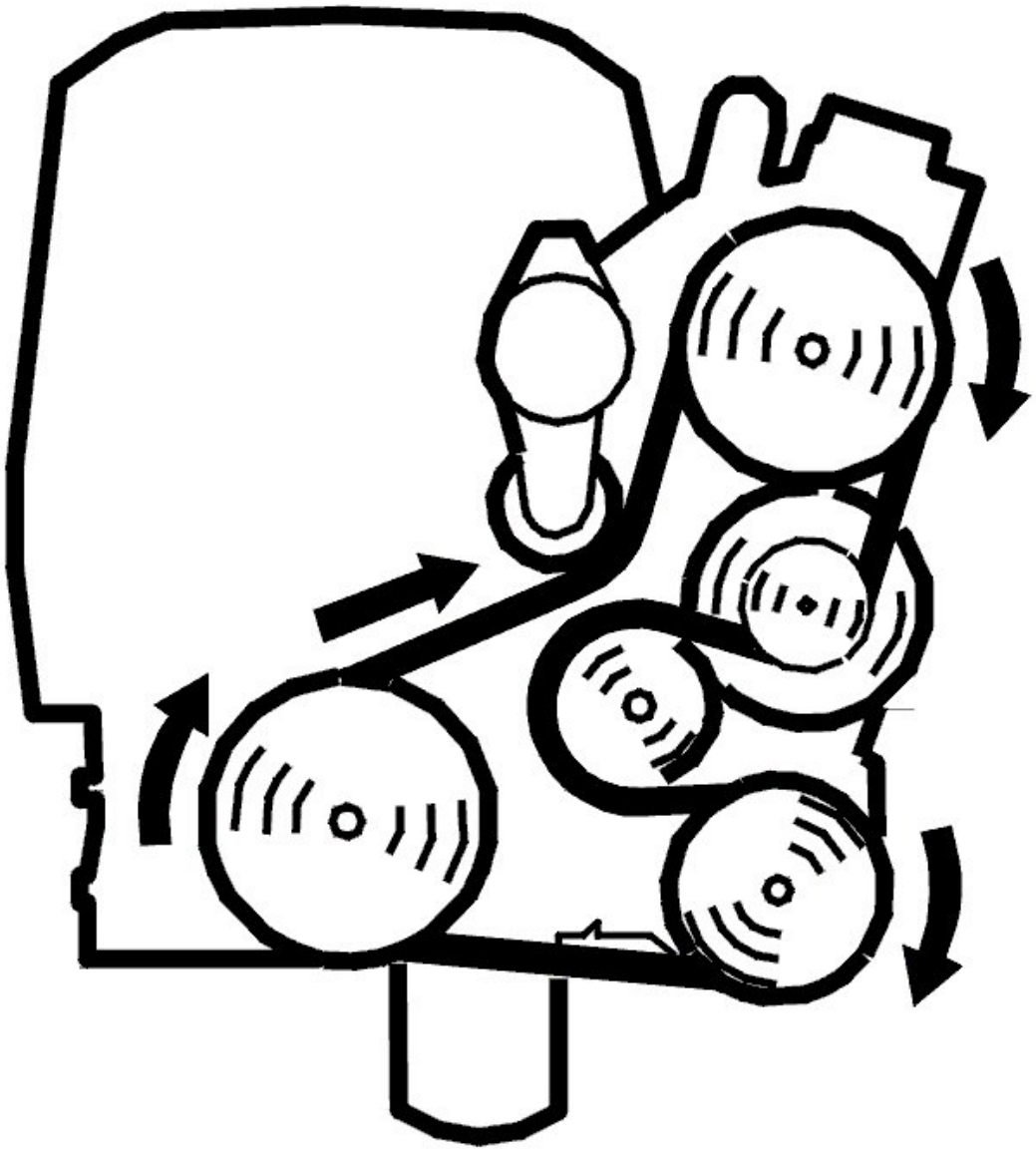
Continue - Verification

Verification

Verification

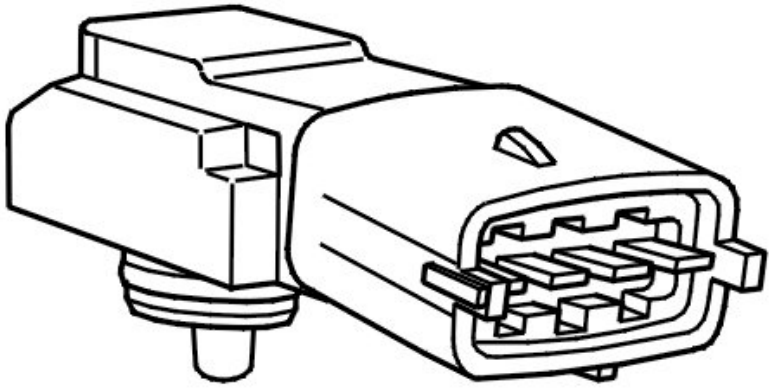
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components etc.
- Start the engine and run it to normal operating temperature
- Read off the fuel temperature sensor signal.

Check that the signal is within its permitted range. The signal is measured in the fuel rail for the injectors.



Is the signal OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-2B00

Condition

During the engine warm up phase the way the engine temperature should increase is calculated. Factors such as engine load and the start temperature are taken into account. This test takes place during the engine warm-up phase (under "normal operation") and continues until the engine temperature has reached 84 °C. For the test to start, the starting temperature of the engine must be below 35 °C, the outside temperature must be -7 to +35 °C and at least 15 minutes must have passed since the engine was last run.
The diagnostic trouble code (DTC) is stored if the calculated increase in temperature does not correspond to the actual increase (measured by the engine coolant temperature (ECT) sensor).

Hint: This diagnostic trouble code (DTC) can also be caused by faults that store diagnostic trouble codes (DTCs) for outside temperature sensors.

Substitute value
- None.

Possible source
- Damaged engine coolant temperature (ECT) sensor
- Damaged thermostat.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

Replacing the thermostat

Note! This diagnostic trouble code (DTC) is stored if the engine coolant temperature (ECT) sensor freezes. This may happen if the coolant level is low or there is too little glycol in the coolant. Check the engine coolant level and its freezing point. Remedy as necessary.

The engine control module (ECM) has registered that the actual temperature increase has deviated from the calculated temperature increase. This deviation is due to a defective thermostat.
Try replacing the thermostat. See Temperature sensor engine coolant, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

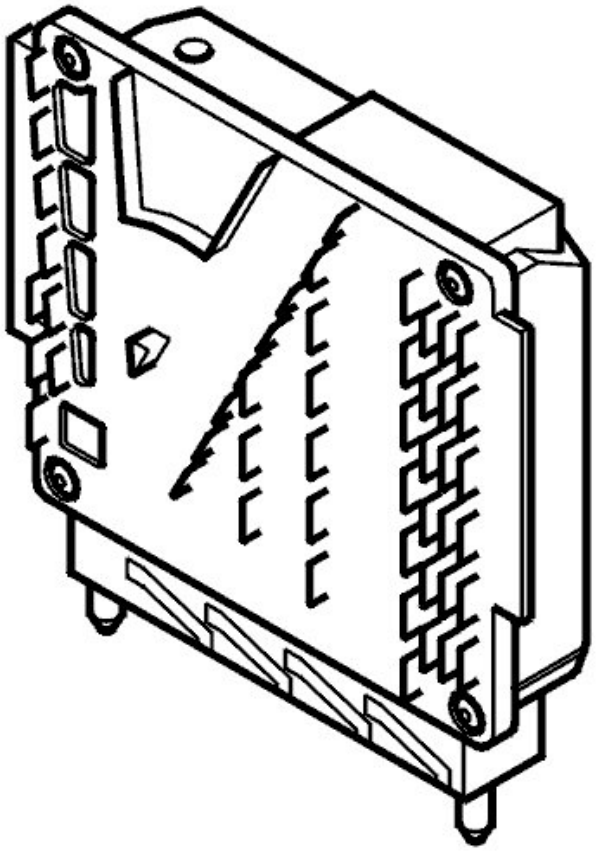
Attempt New Test - Replacing the thermostat

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-3000

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a fault in the control module internal circuit for knock control.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Damaged engine control module (ECM).

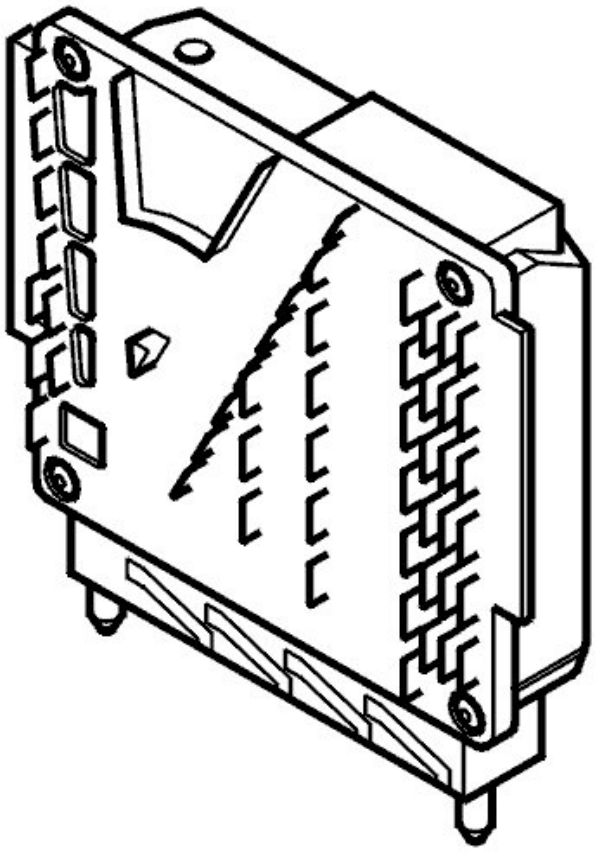
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

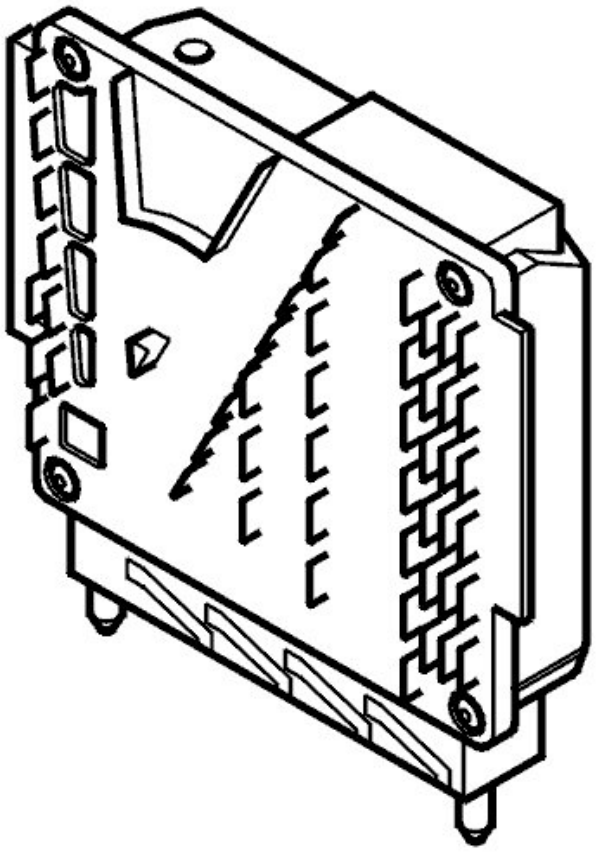
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-3010

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a fault in the control module internal circuit for knock control.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Damaged engine control module (ECM).

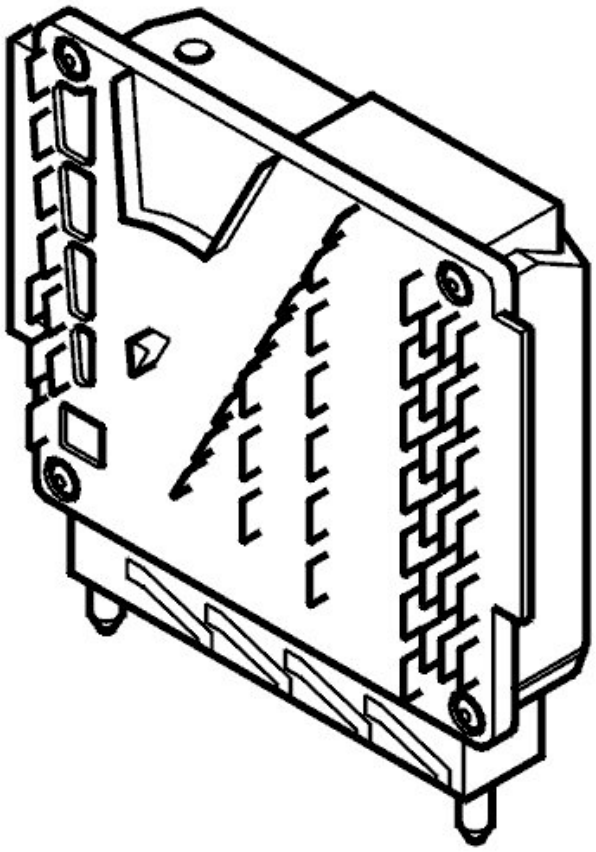
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

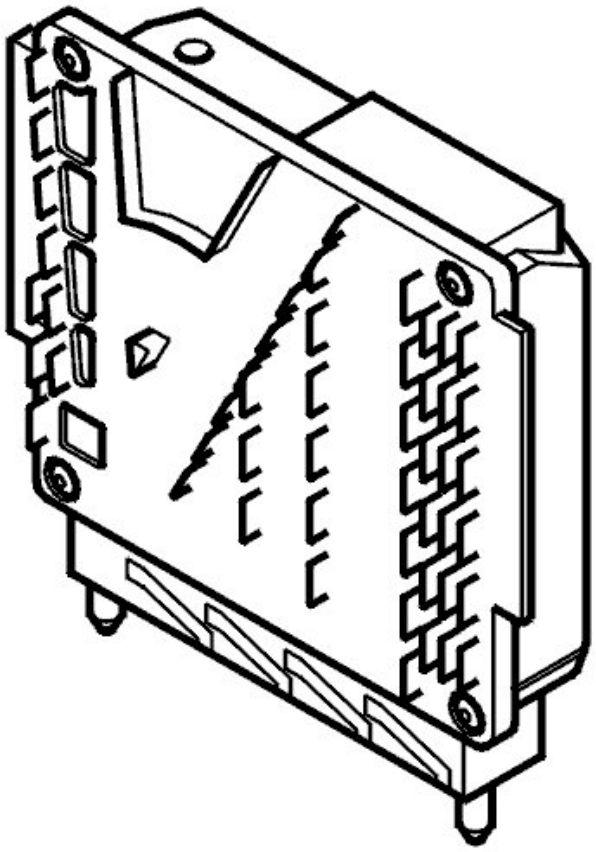
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-3020

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a fault in the control module internal circuit for knock control.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Damaged engine control module (ECM).

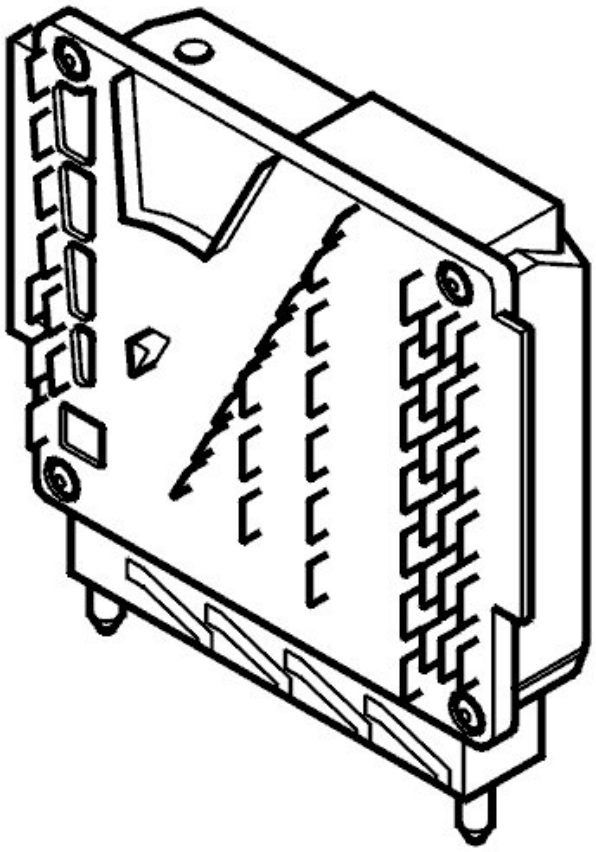
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

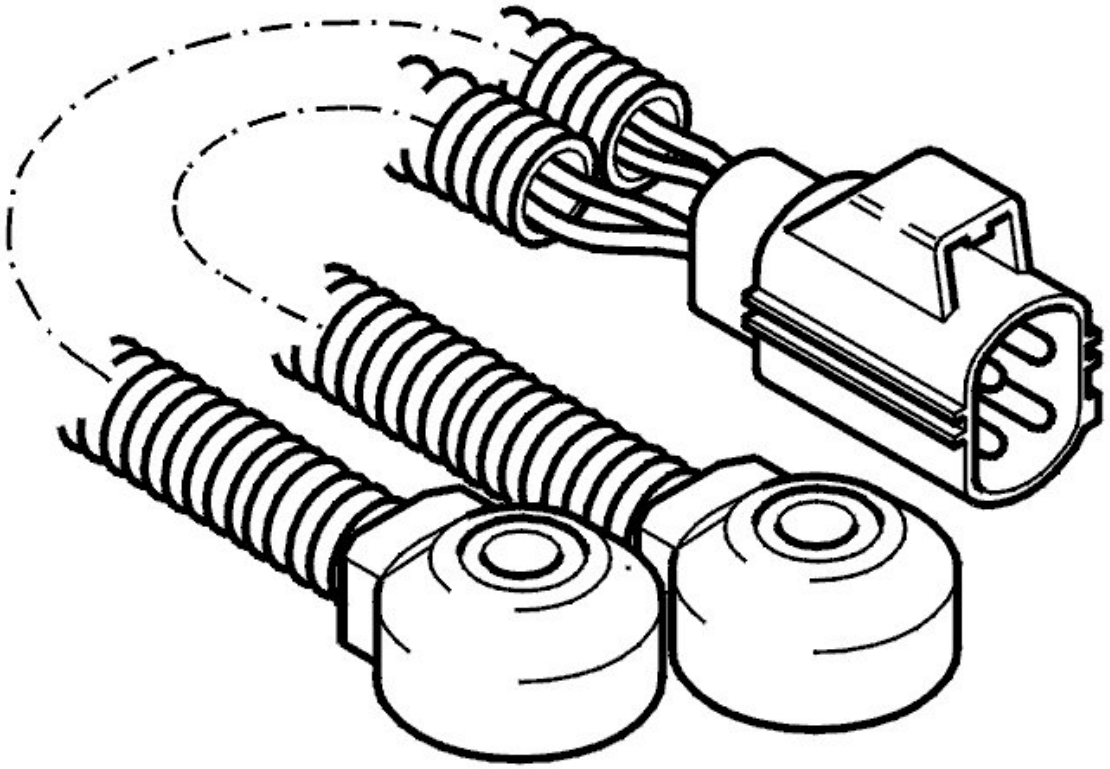
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-303C

Condition



In certain operating conditions the engine control module (ECM) checks the signal from the front knock sensor (KS). The diagnostic trouble code (DTC) is stored if the signal from the front knock sensor (KS) is too high.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Short-circuit to supply voltage in the signal cable
- Noise from the engine.

Fault symptom[s]
- Poor performance.

Signal Too High

Signal too high. Permanent fault

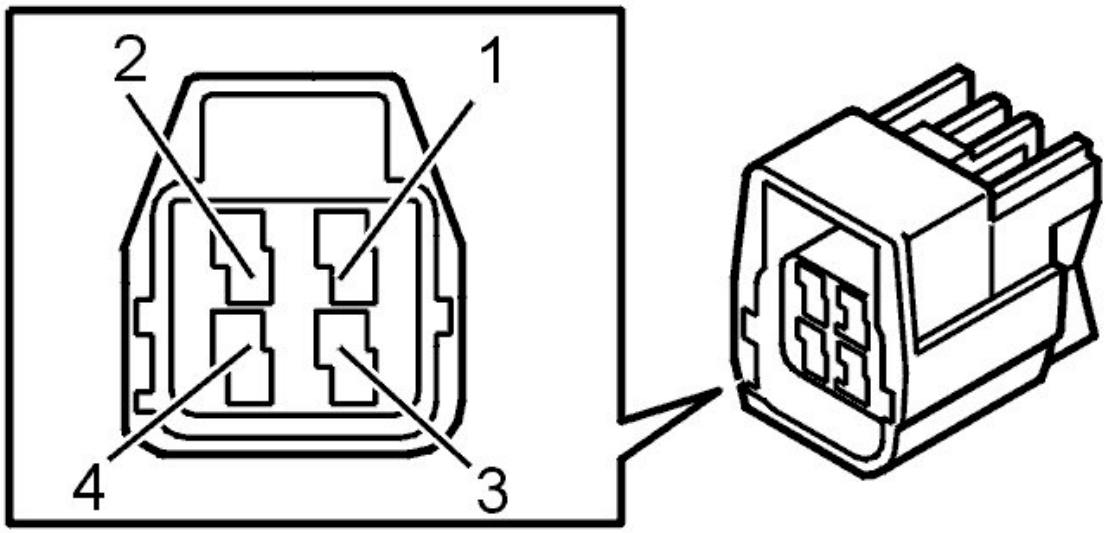
Checking components and wiring

Check the signal cable between knock sensor (KS) terminal #1 and control module terminal #A46 (#A46). Check the ground lead between knock sensor (KS) terminal #2 and control module terminal #A64 (#B4). Check for a short-circuit to supply voltage.
Check that the knock sensor (KS) is tightened to the correct torque.

Hint: The diagnostic trouble code (DTC) may be caused by a worn engine. Start the engine and listen for noise.

Remedy as necessary.

Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals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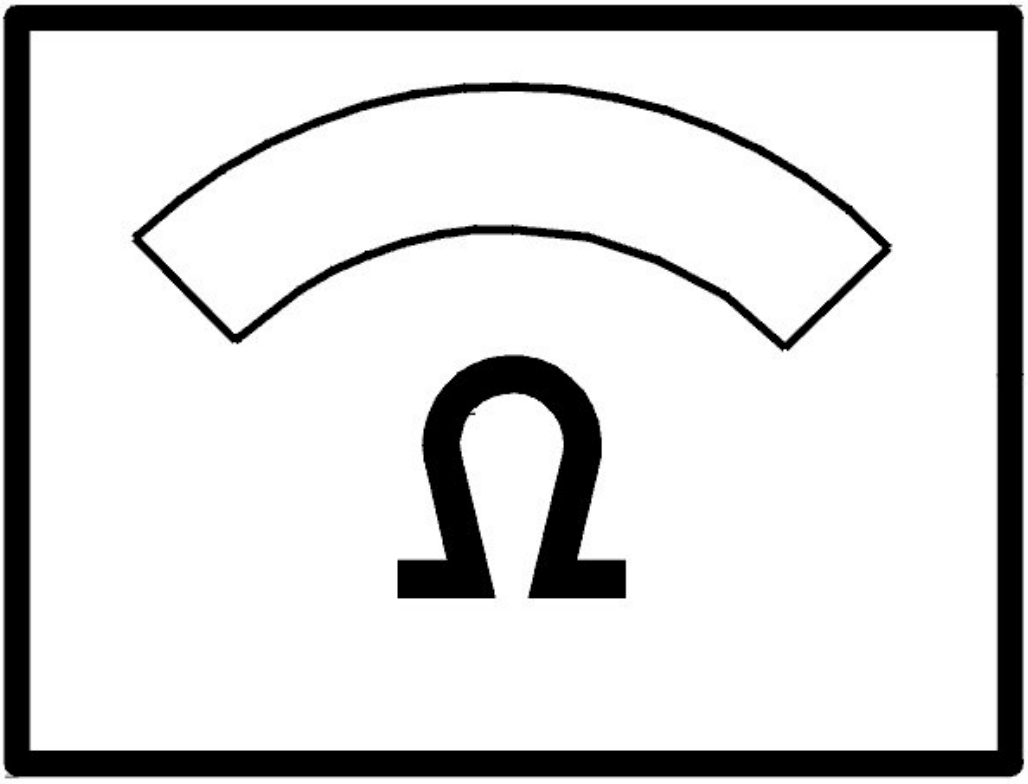
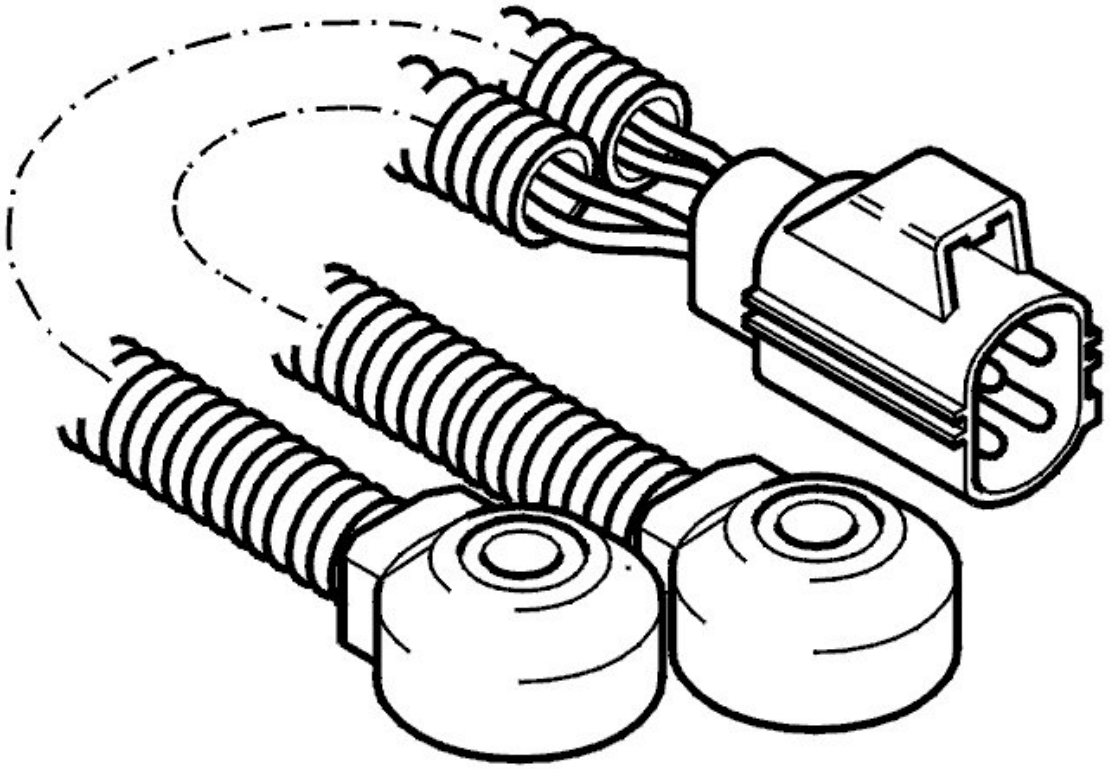


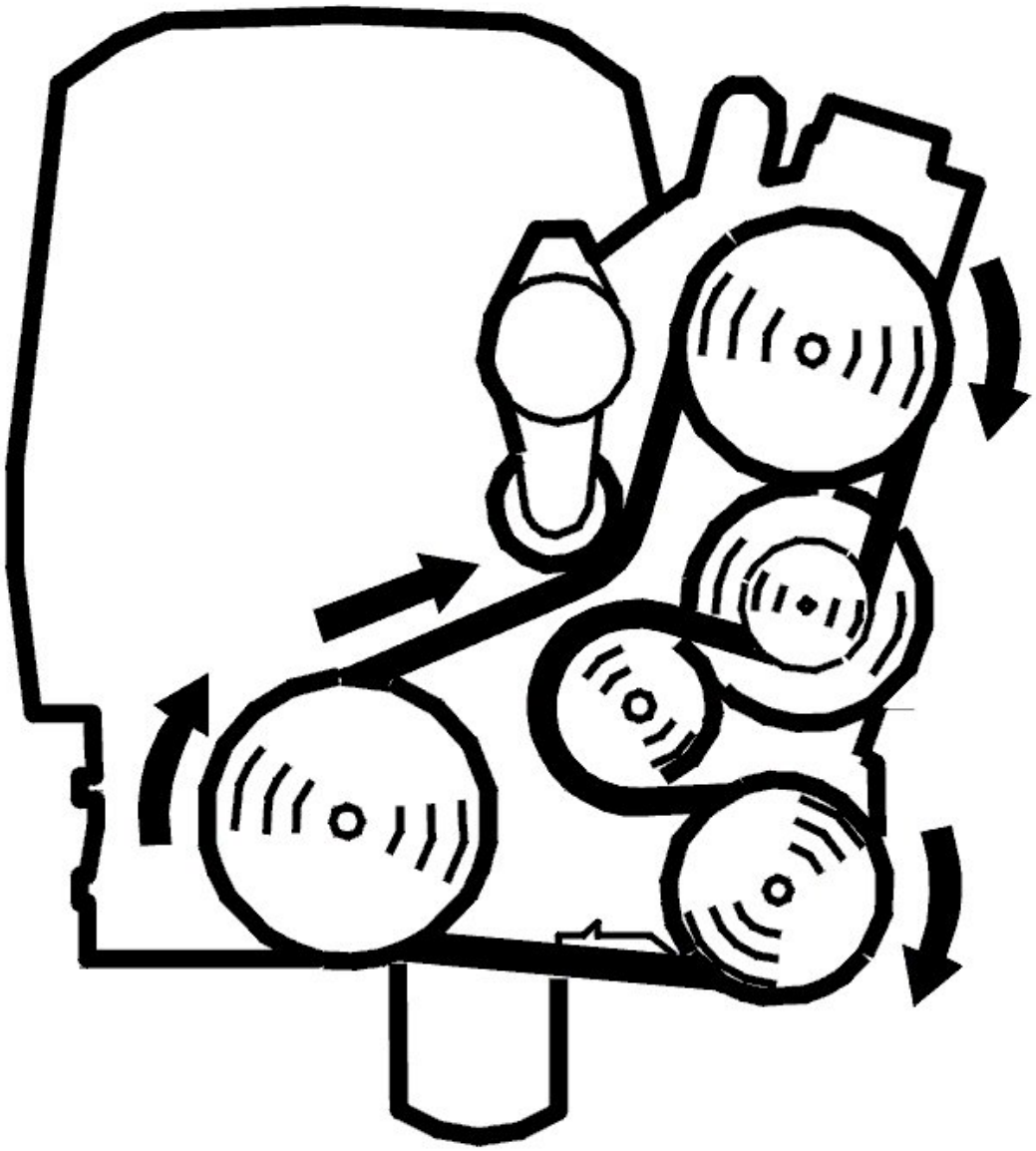


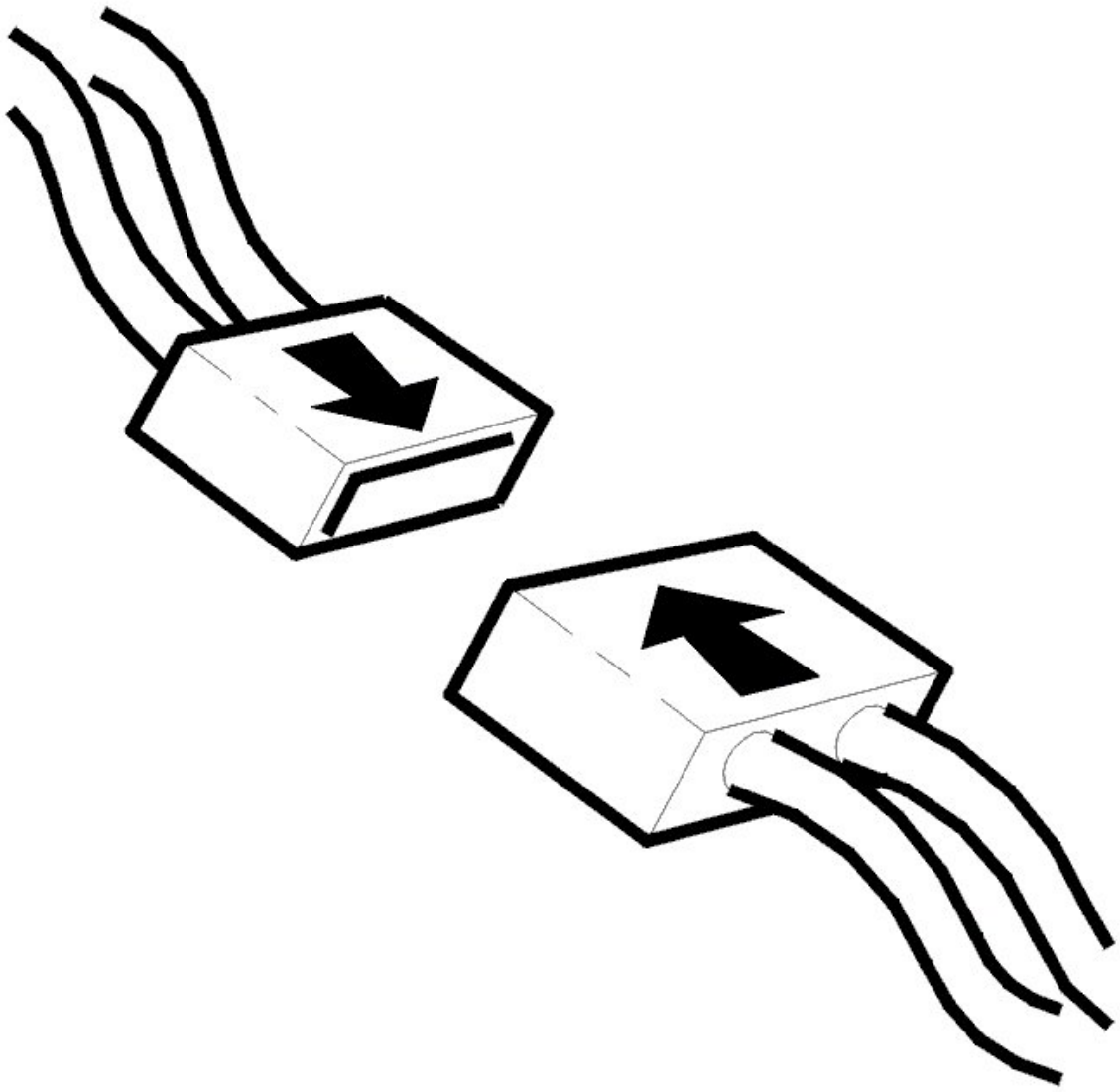
Continue - Verification

Verification

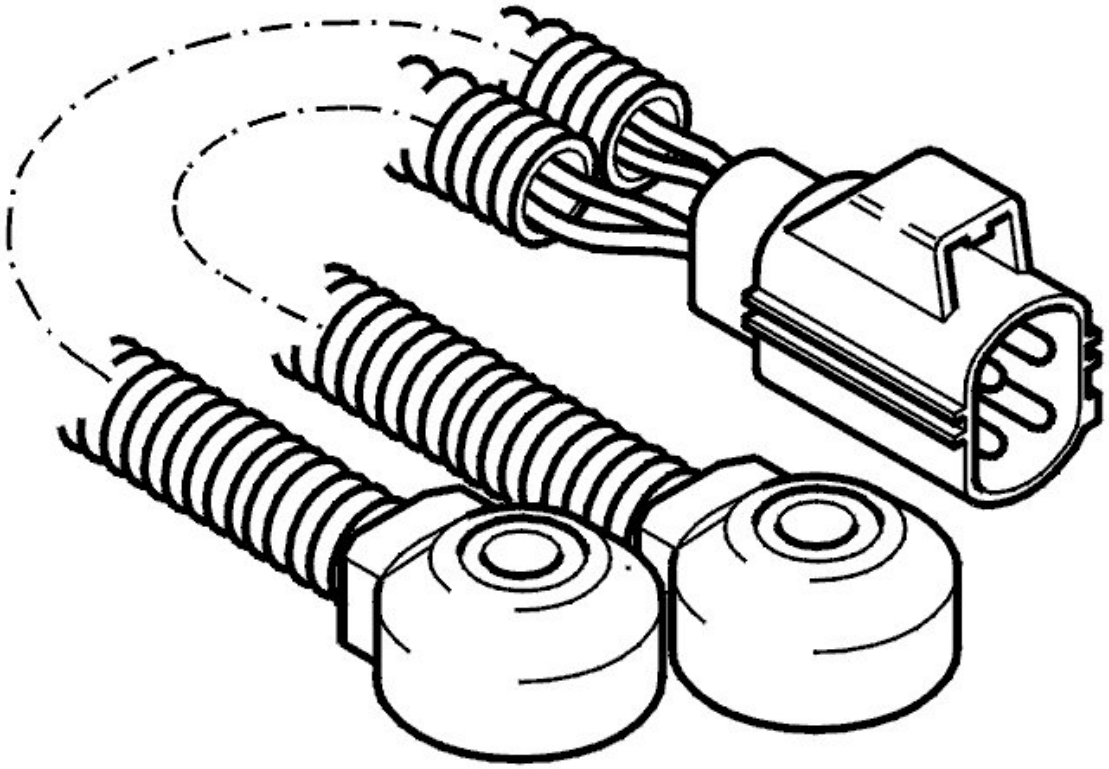
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Start engine and run to normal operating temperature.
- Rev the engine to 3500 rpm and read off the value of the knock sensor (KS) signal..



Is the value between 2-6?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

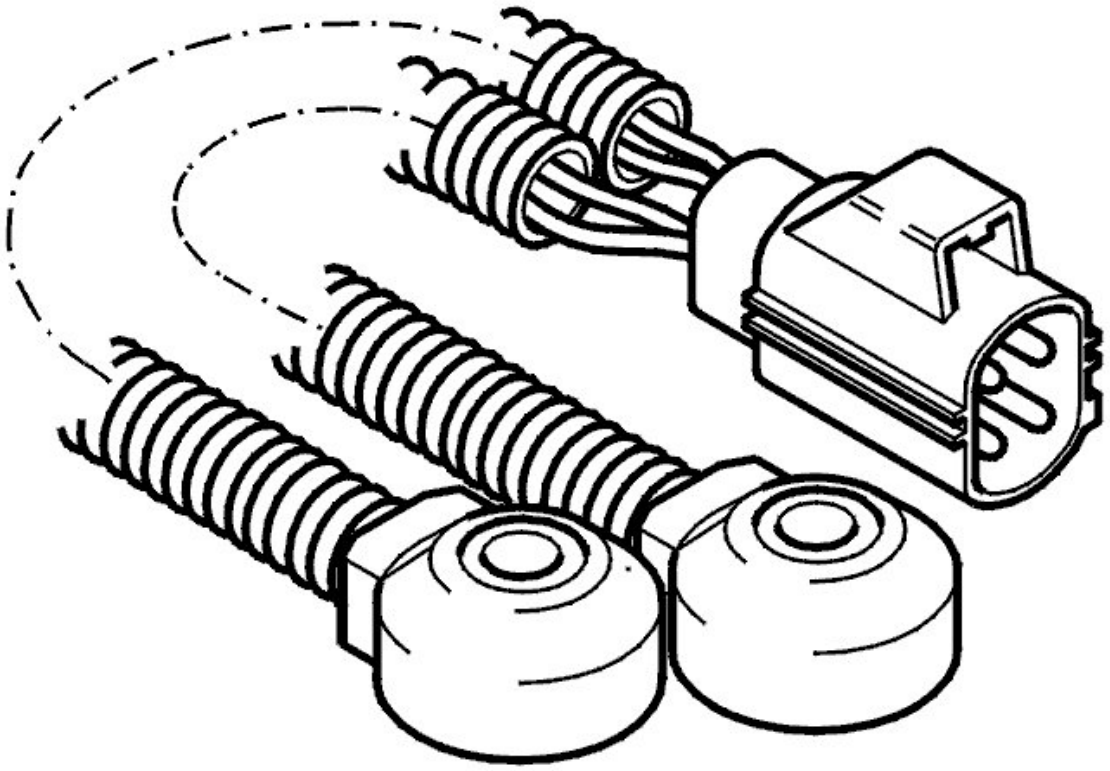
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-303D

Condition



In certain operating conditions the engine control module (ECM) checks the signal from the front knock sensor (KS). The diagnostic trouble code (DTC) is stored if the signal from the front knock sensor (KS) is too low.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Contact resistance in the knock sensor (KS) terminals
- Open-circuit in the signal cable
- Short-circuit between the knock sensor (KS) signal cables
- Damaged knock sensor (KS).

Fault symptom[s]
- Poor performance.

Signal Too Low

Signal too low. Permanent fault

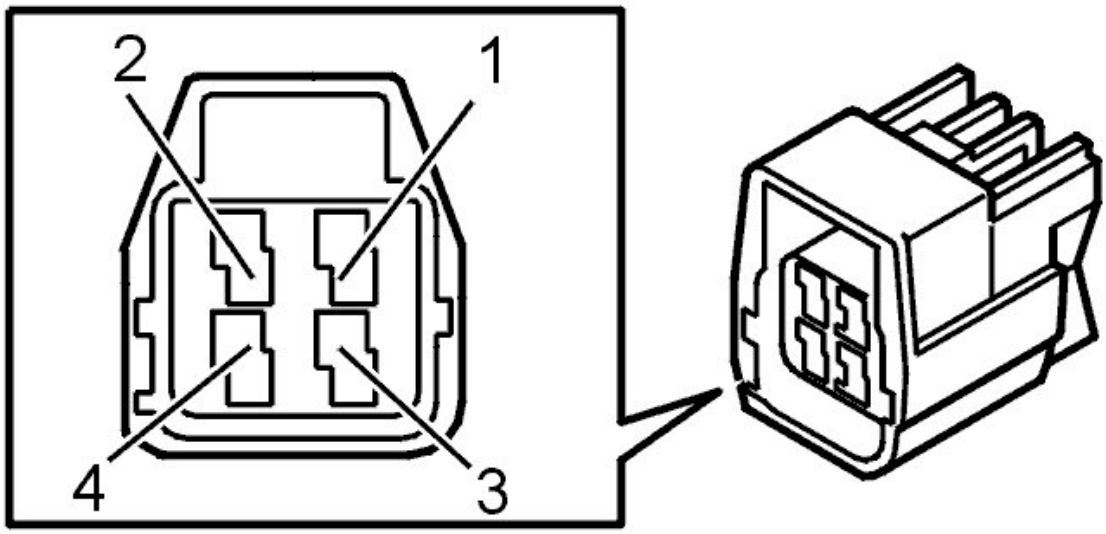
Checking wiring and connectors

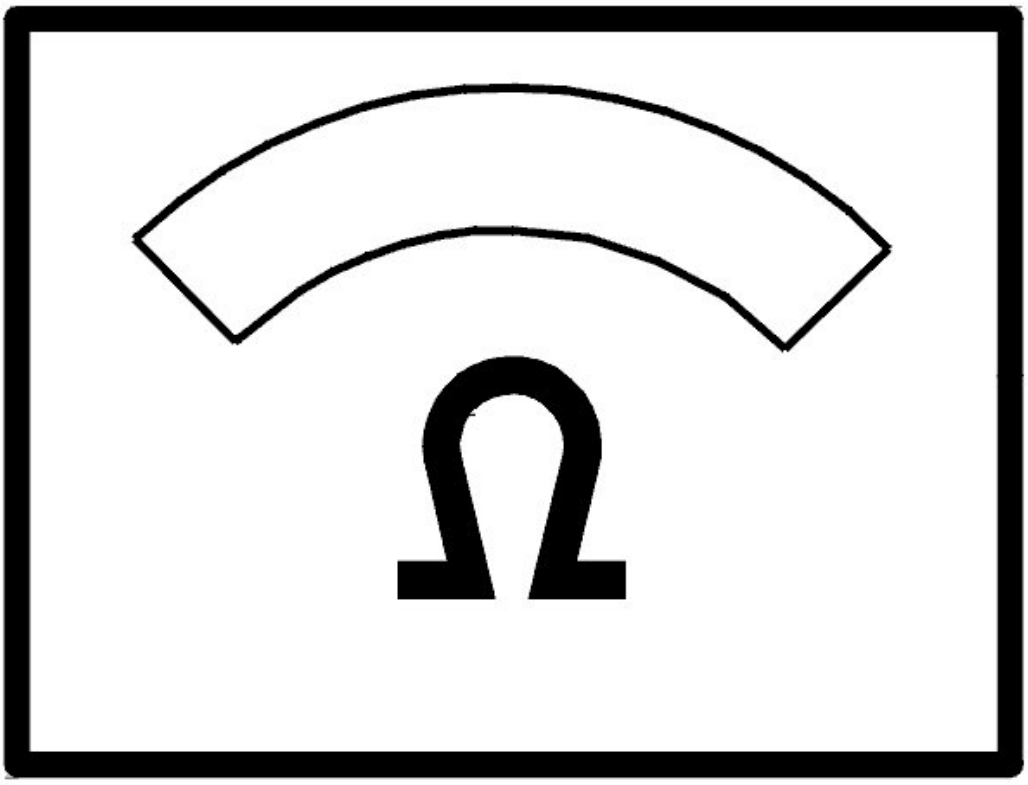
Check the knock sensor (KS) connector. Check for contact resistance and oxidation.
Check the signal cable between knock sensor (KS) terminal #1 and control module terminal #A46 (#A46). Check the ground lead between knock sensor (KS) terminal #2 and control module terminal #A64 (#B4). Check for an open-circuit. Check for a short-circuit to ground.
Check that the knock sensor (KS) is tightened to the correct torque.
Remedy as necessary.

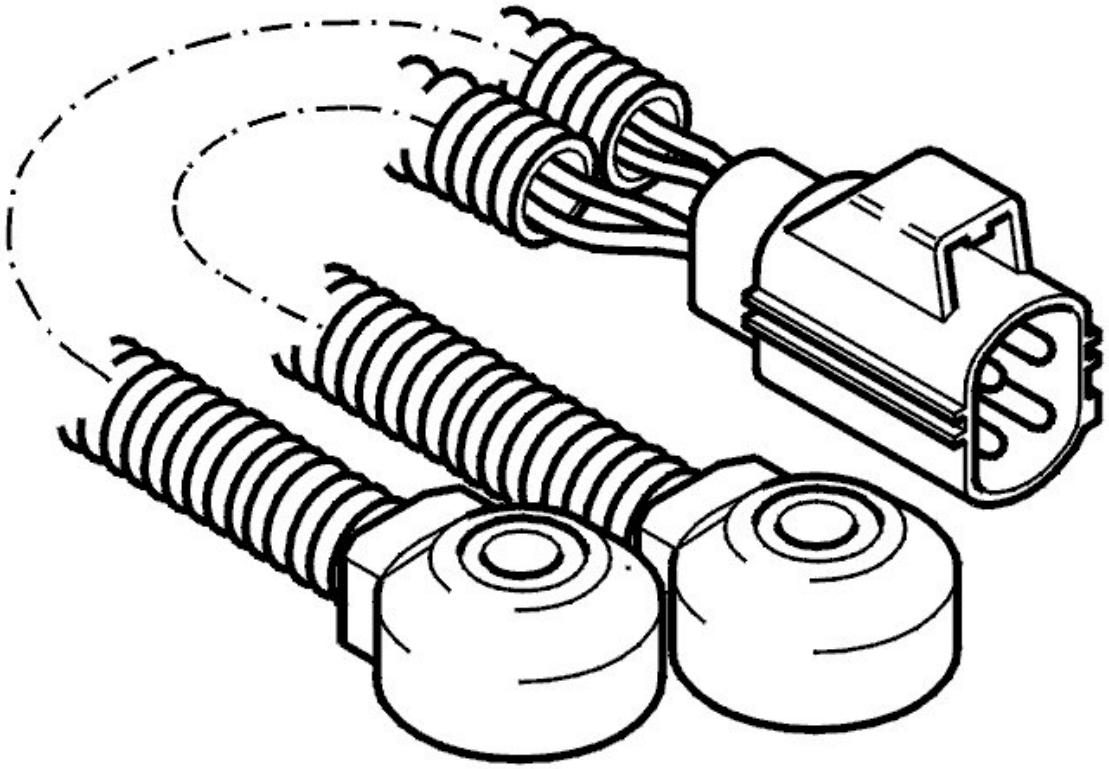
Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal

Description / Specification

- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

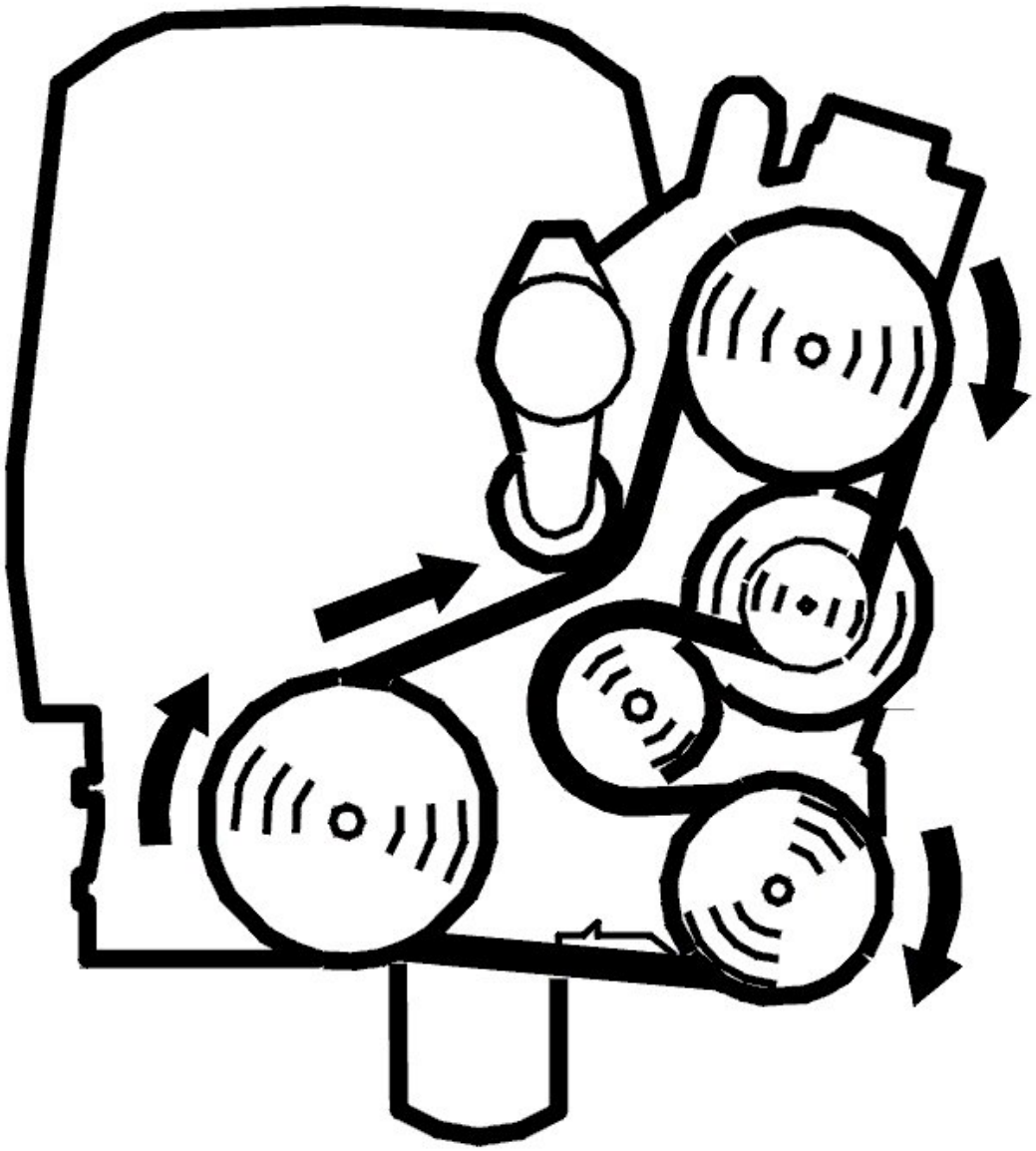


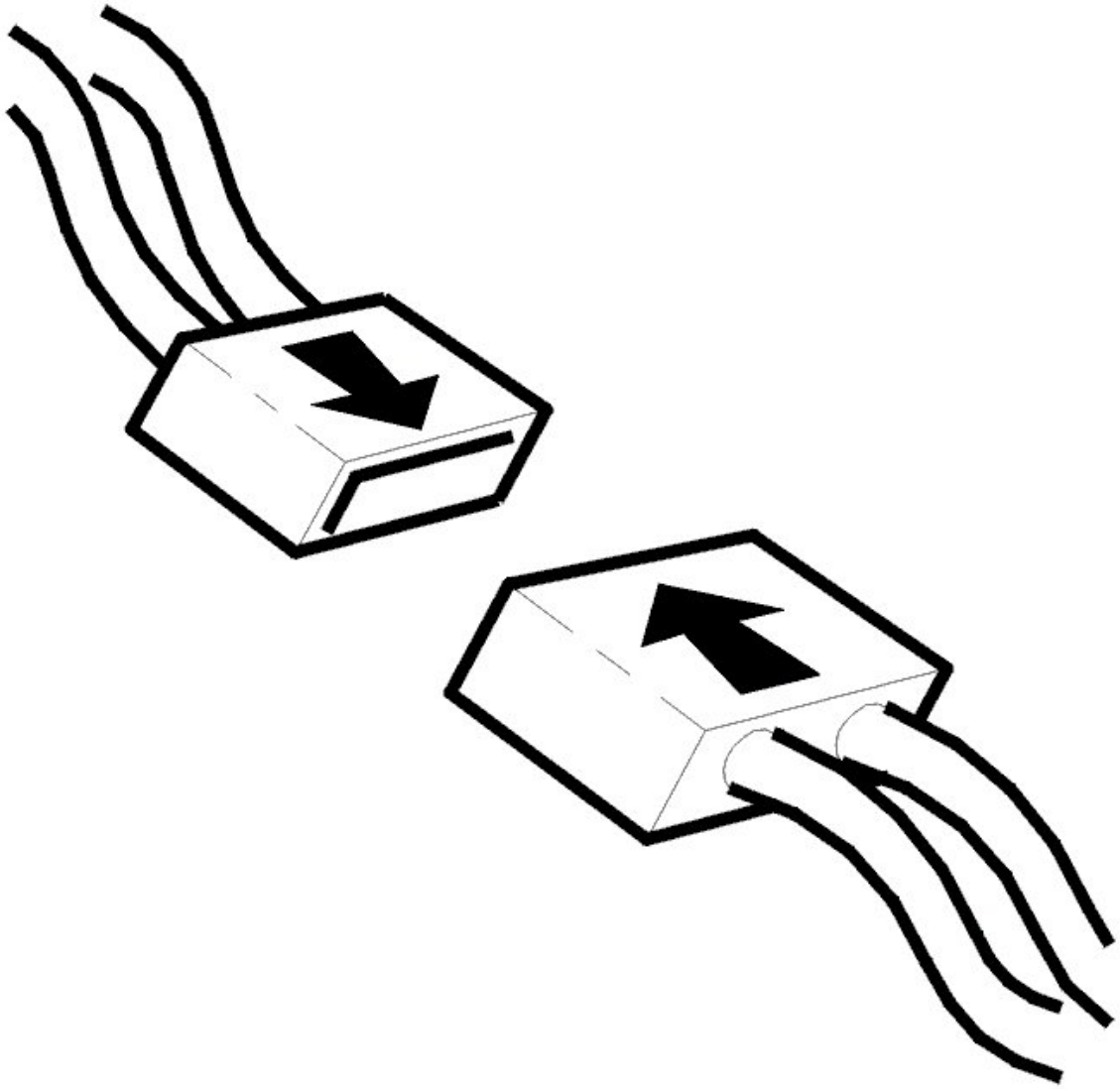




Continue - Checking the knock sensor (KS) signal

Checking the knock sensor (KS) signal



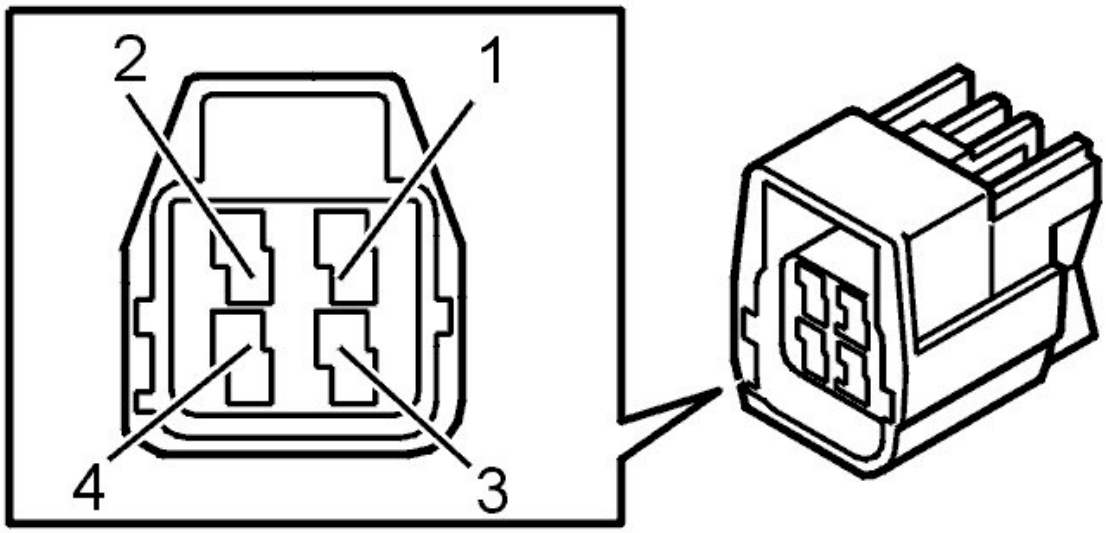


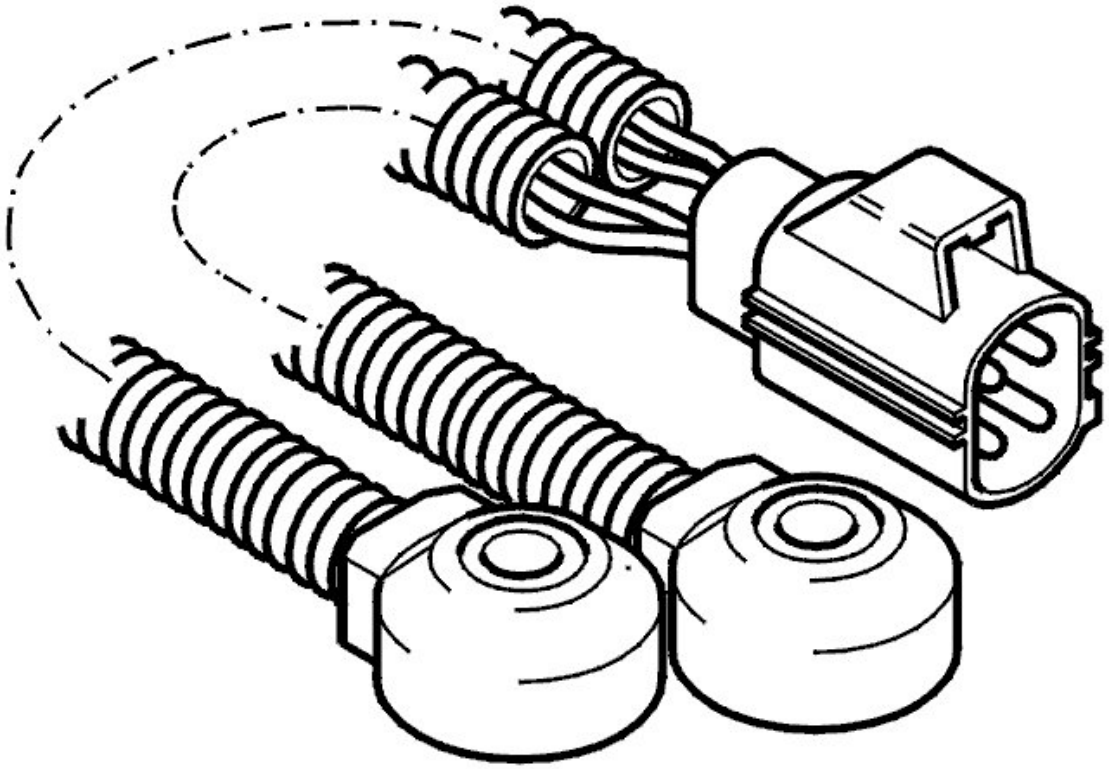
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Start the engine and run it to normal operating temperature
- Rev the engine to 3500 rpm. Read off the value of the knock sensor (KS) signal.

The value must be between 2 and 6.
If the value is now OK it means that the cause of the fault was loose connections in connector.

Other information

- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.





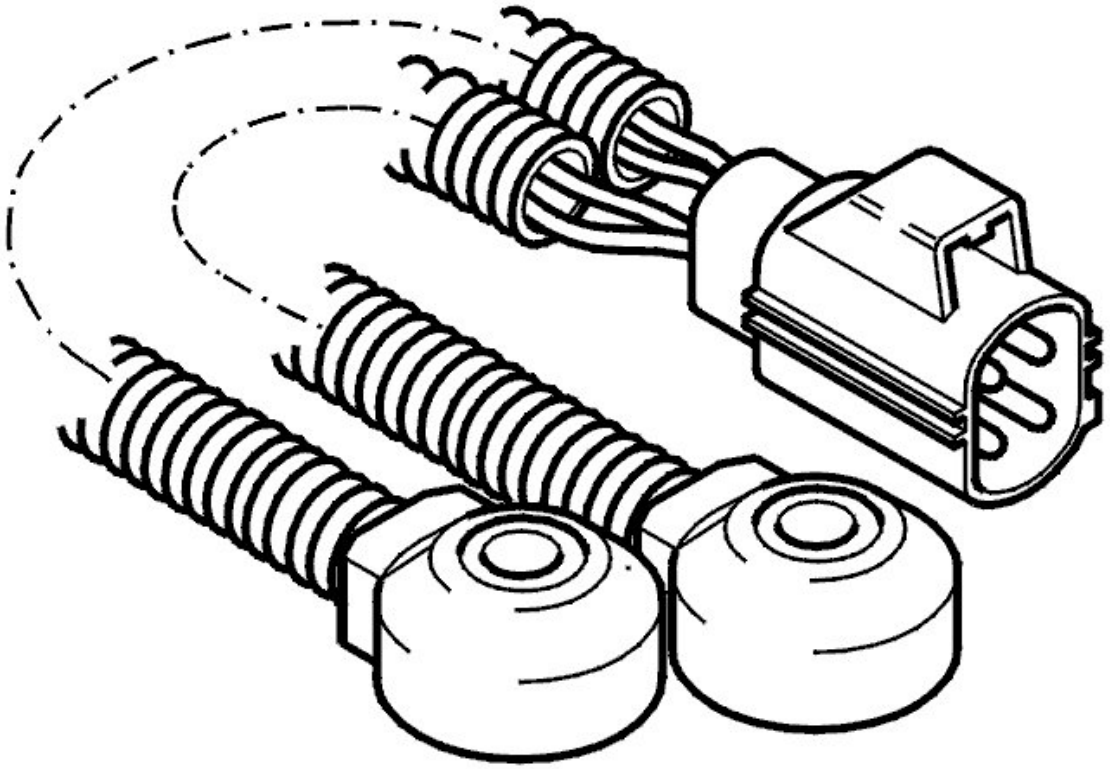
Is the value between 2 and 6?

OK - **Fault Found**

Not OK - Replacing the component

Replacing the component

Replace the knock sensor (KS). See Knock sensor (KS), replacing See: Knock Sensor/Service and Repair.

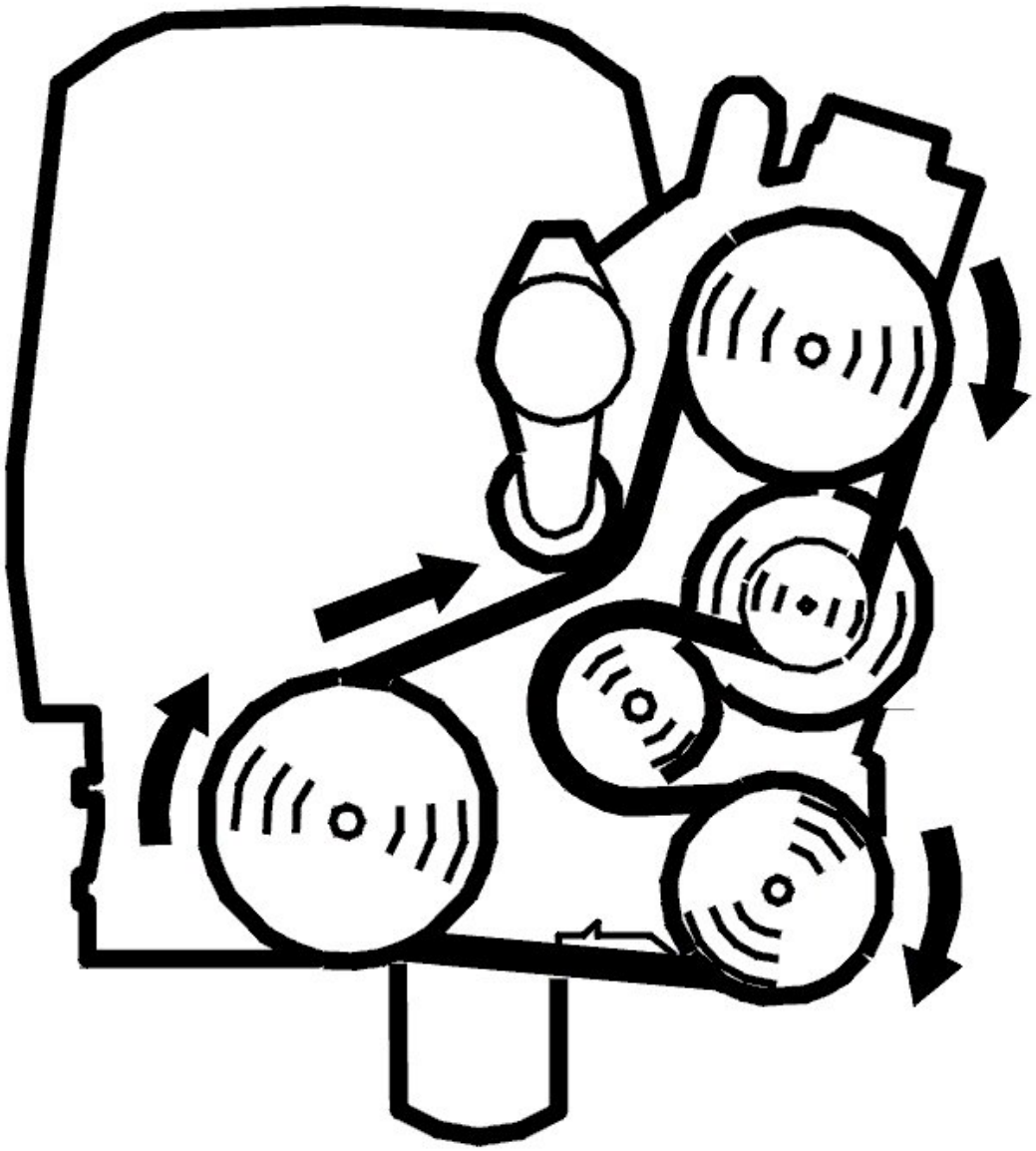


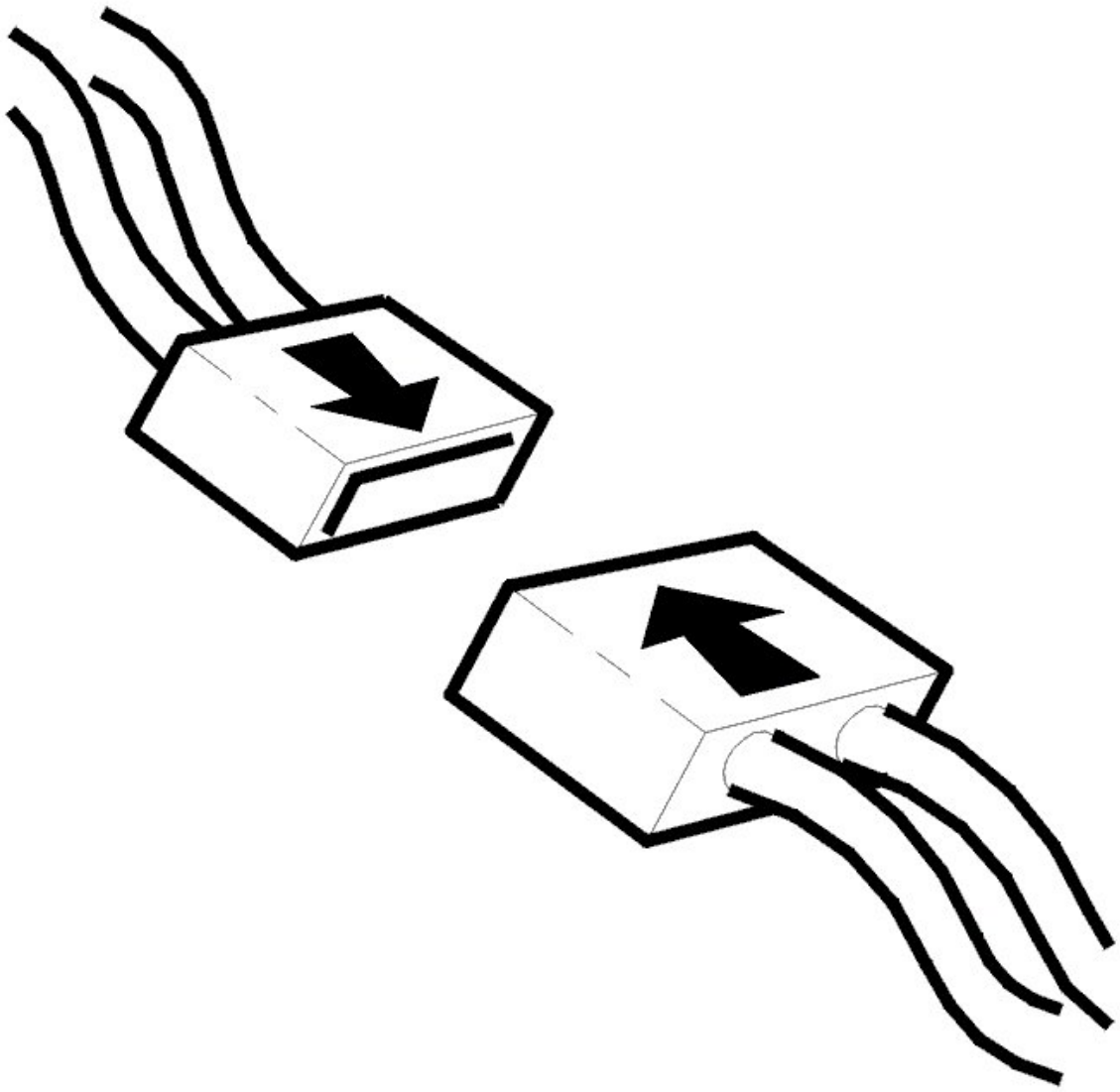
Continue - Verification

Verification

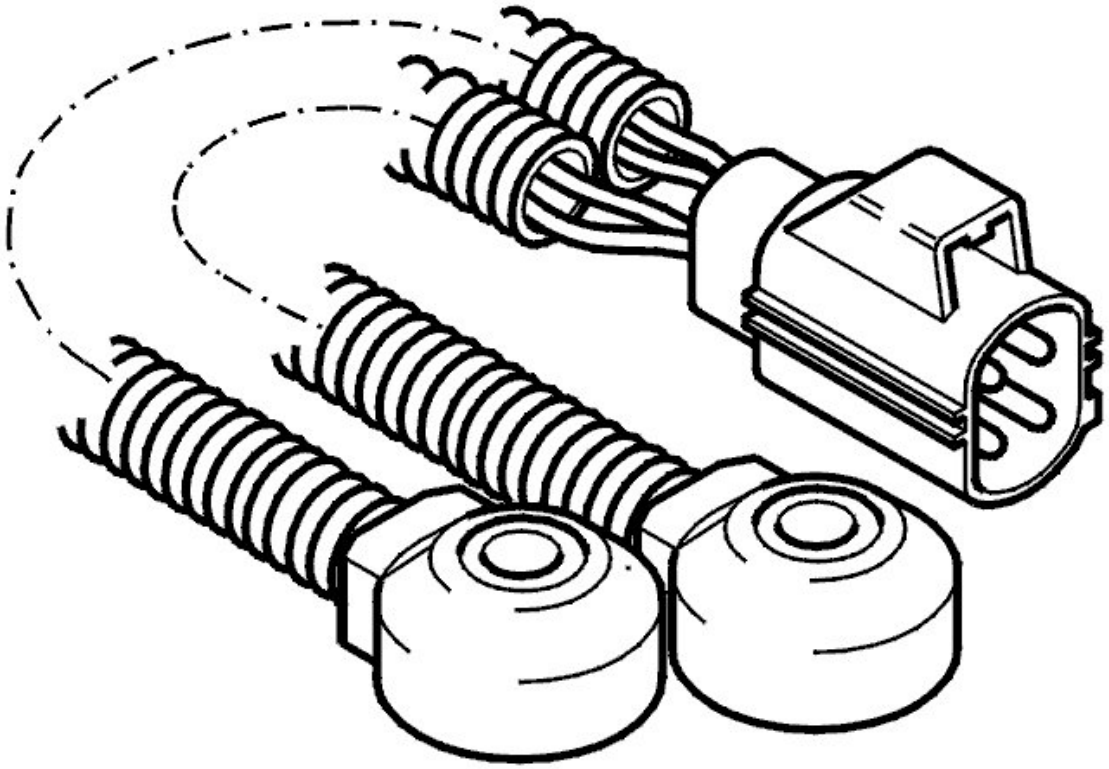
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Start engine and run to normal operating temperature.
- Rev the engine to 3500 rpm and read off the value of the knock sensor (KS) signal..



Is the value between 2-6?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

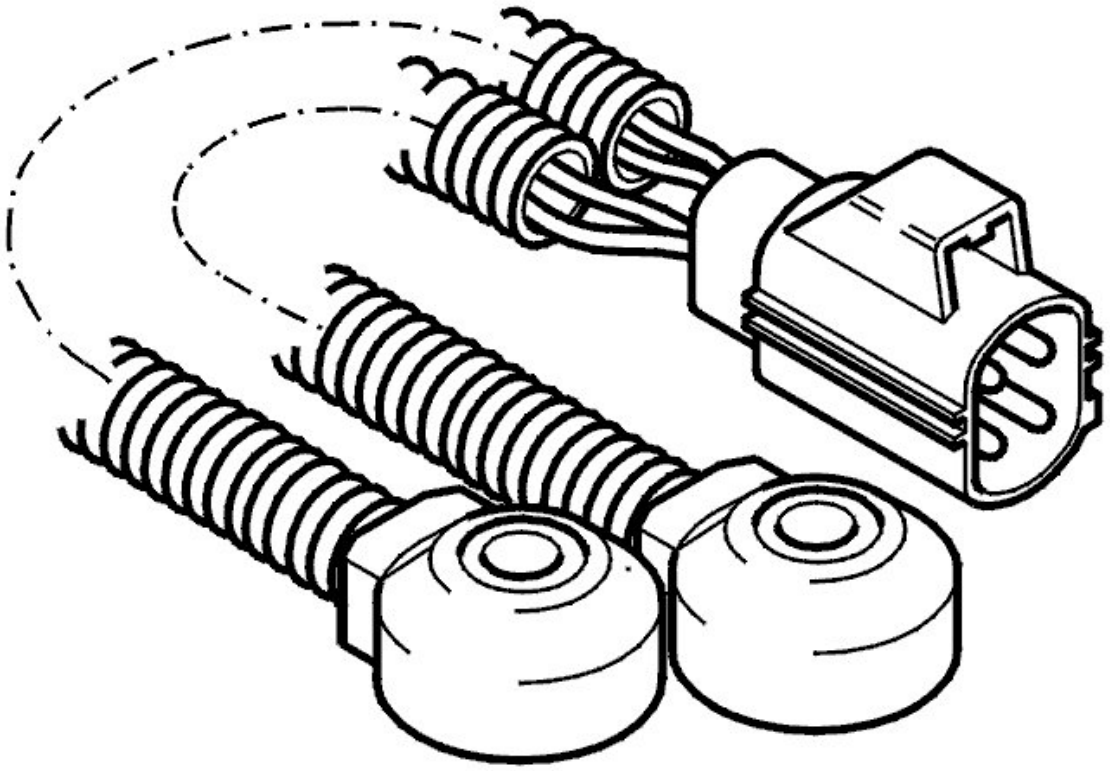
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking wiring and connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-304C

Condition



In certain operating conditions the engine control module (ECM) checks the signal from the rear knock sensor (KS). The diagnostic trouble code (DTC) is stored if the signal from the rear knock sensor (KS) is too high.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Short-circuit to supply voltage in the signal cable
- Noise from the engine.

Fault symptom[s]
- Poor performance.

Signal Too High

Signal too high. Permanent fault

Checking components and wiring

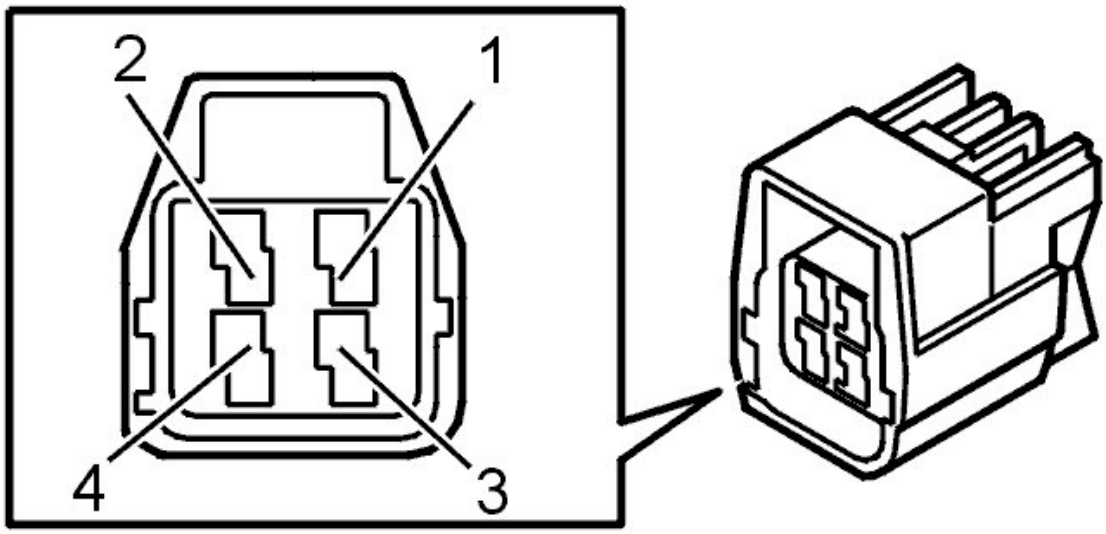
Check the signal cable between knock sensor (KS) terminal #3 and control module terminal #A45 (#A45). Check the ground lead between knock sensor (KS) terminal #4 and control module #A67 (#B7). Check for a short-circuit to supply voltage.
Check that the knock sensor (KS) is tightened to the correct torque.

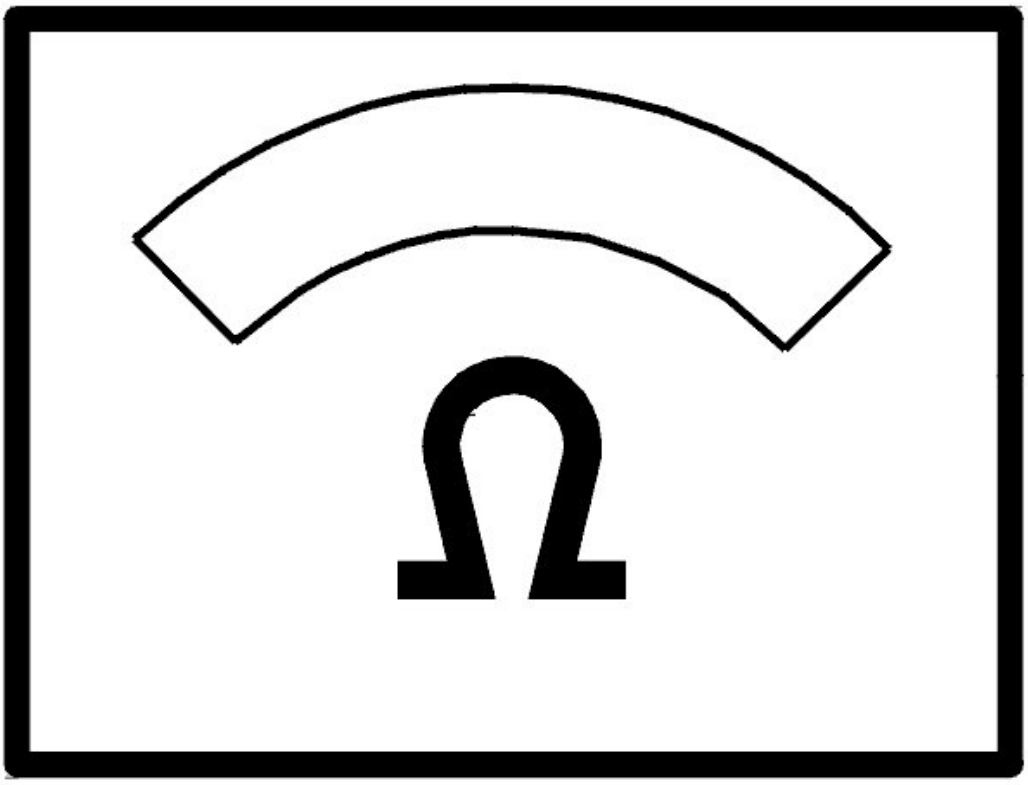
Hint: The diagnostic trouble code (DTC) may be caused by a worn engine. Start the engine and listen for noise.

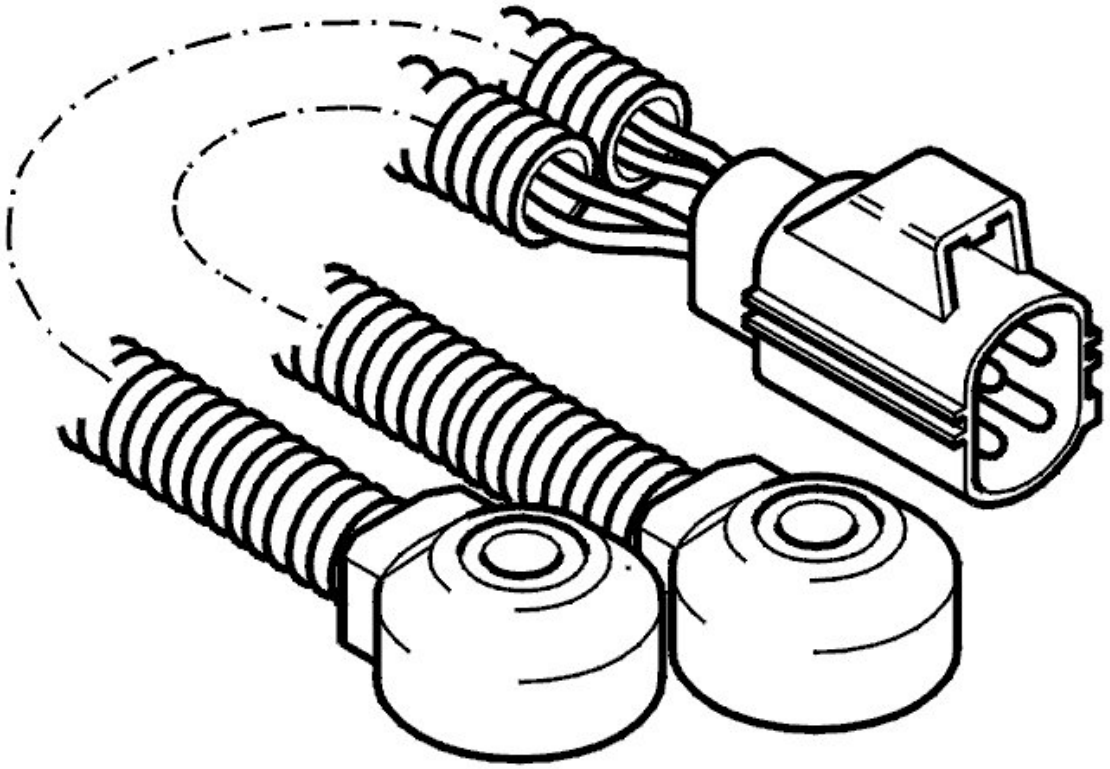
Remedy as necessary.

Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification

- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





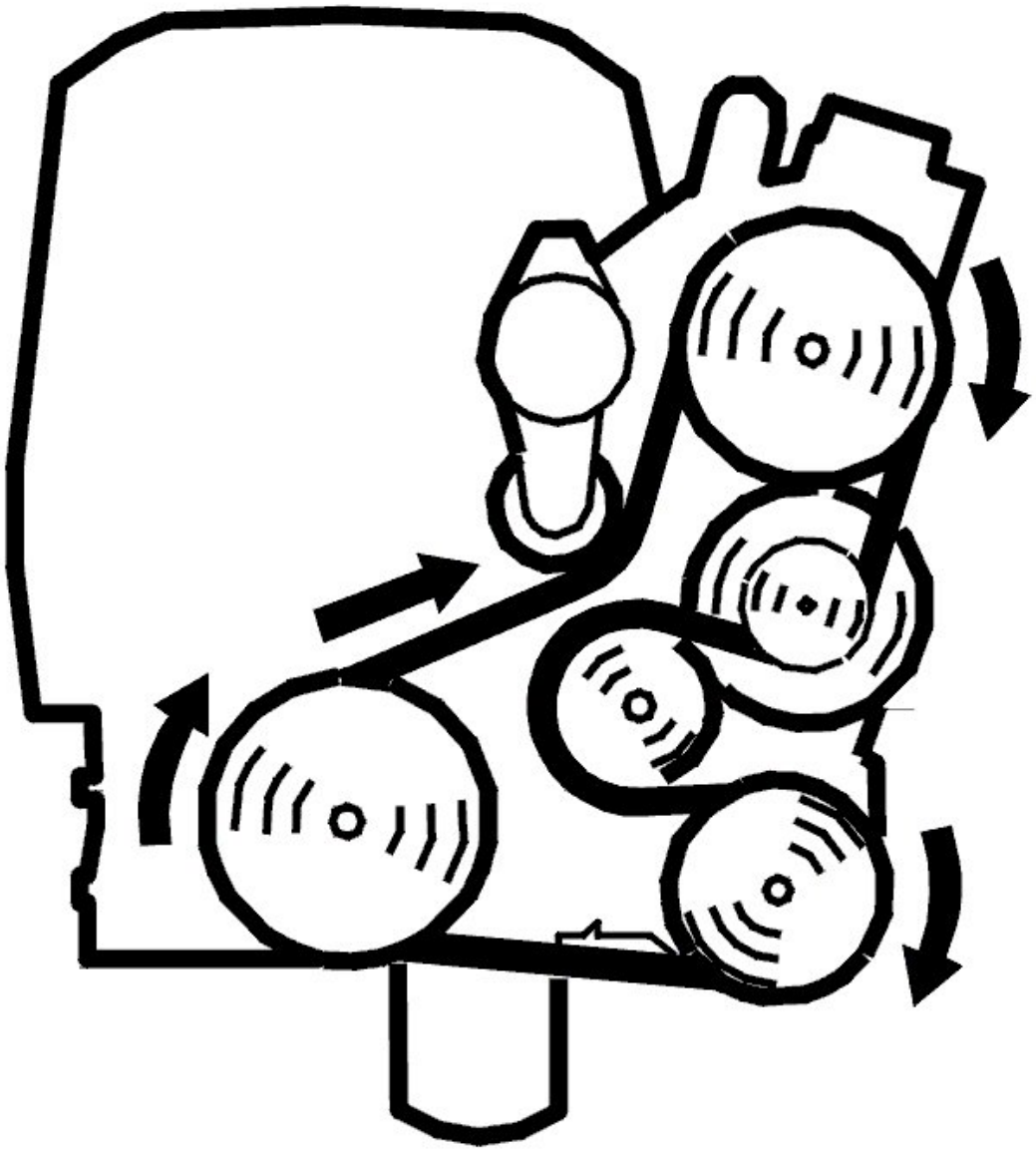


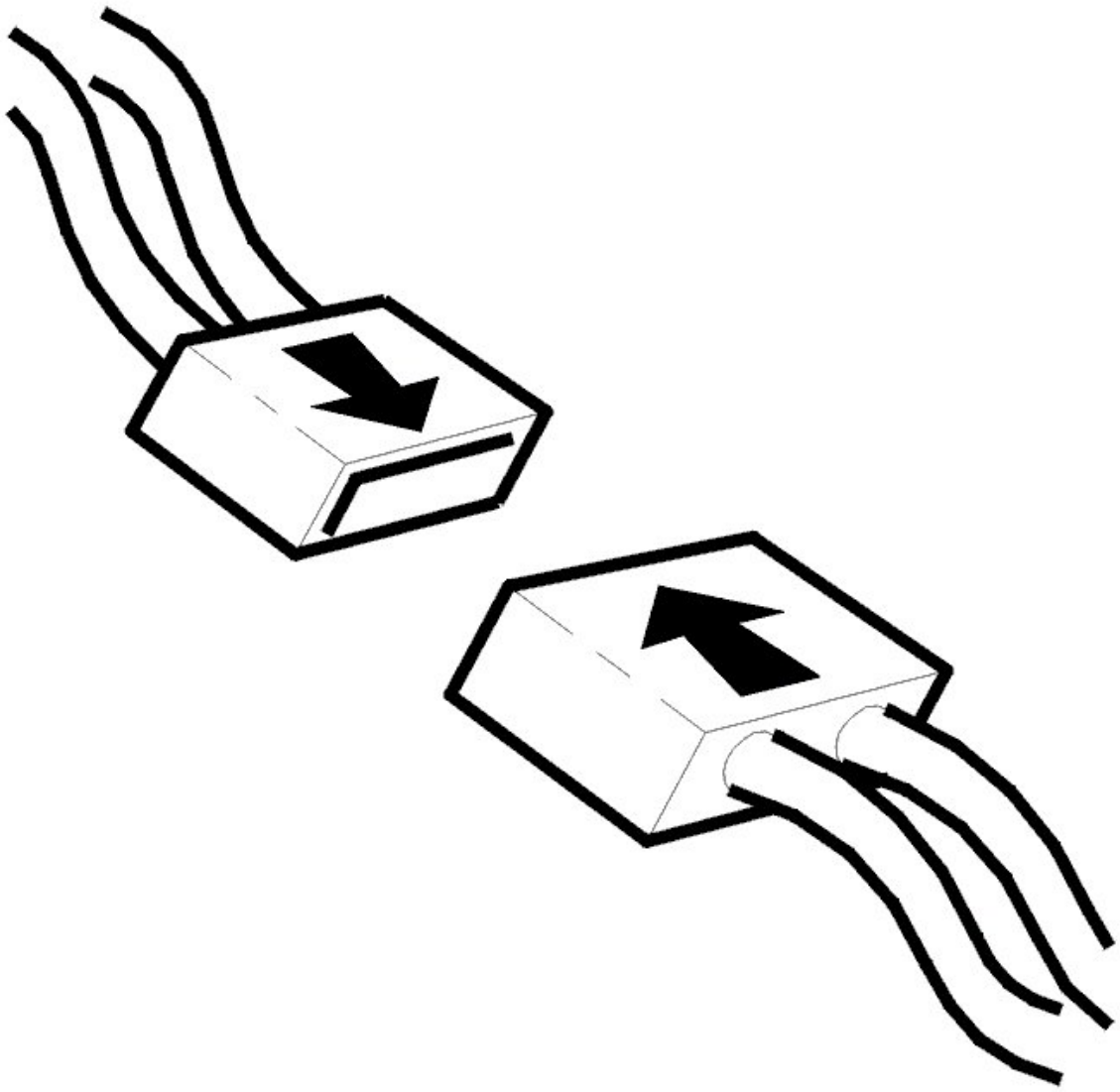
Continue - Verification

Verification

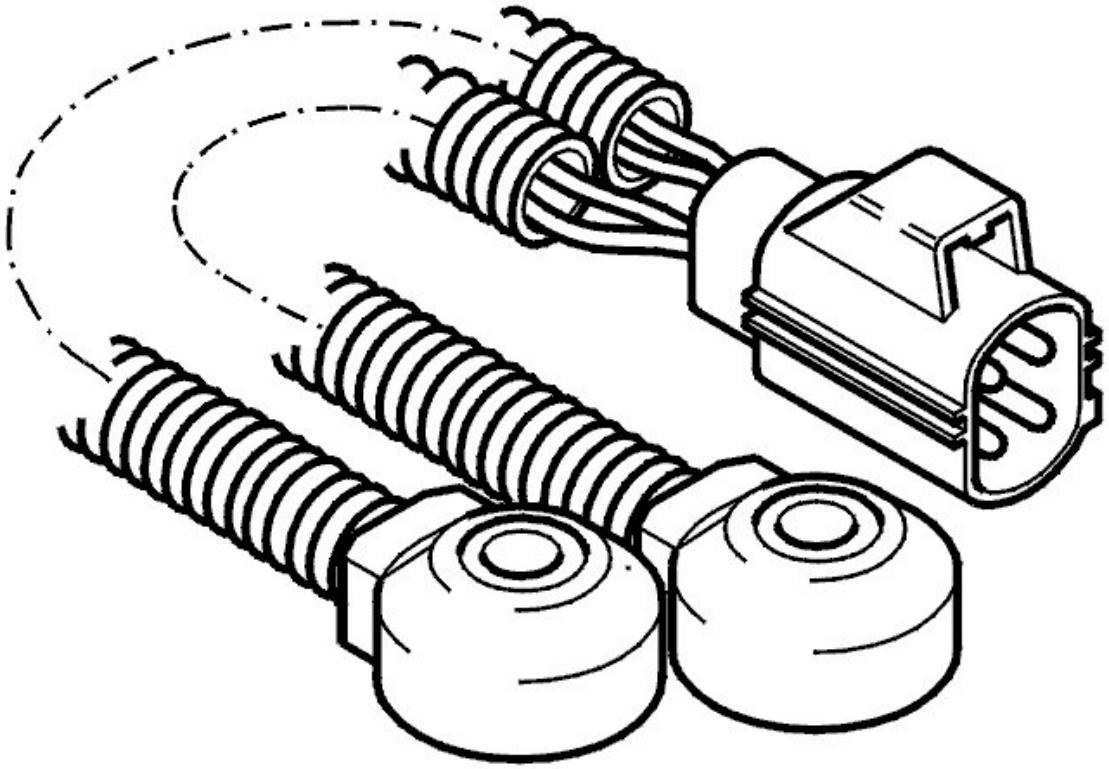
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Start engine and run to normal operating temperature.
- Rev the engine to 3500 rpm and read off the value of the knock sensor (KS) signal..



Is the value between 2-6?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

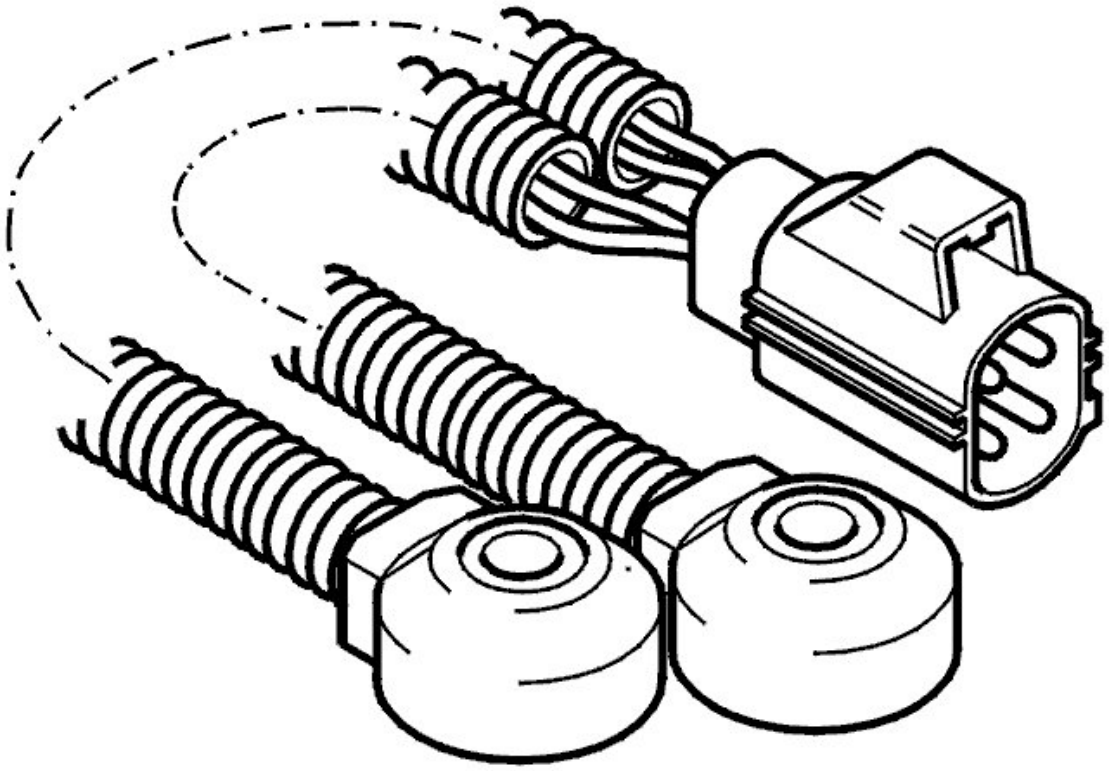
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-304D

Condition



In certain operating conditions the engine control module (ECM) checks the signal from the rear knock sensor (KS). The diagnostic trouble code (DTC) is stored if the signal from the rear knock sensor (KS) is too low.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Safety retardation of ignition advance
- Reduced boost pressure.

Possible source
- Contact resistance in the knock sensor (KS) terminals
- Open-circuit in the signal cable
- Short-circuit between the knock sensor (KS) signal cables
- Damaged knock sensor (KS).

Fault symptom[s]
- Poor performance.

Signal Too Low

Signal too low. Permanent fault

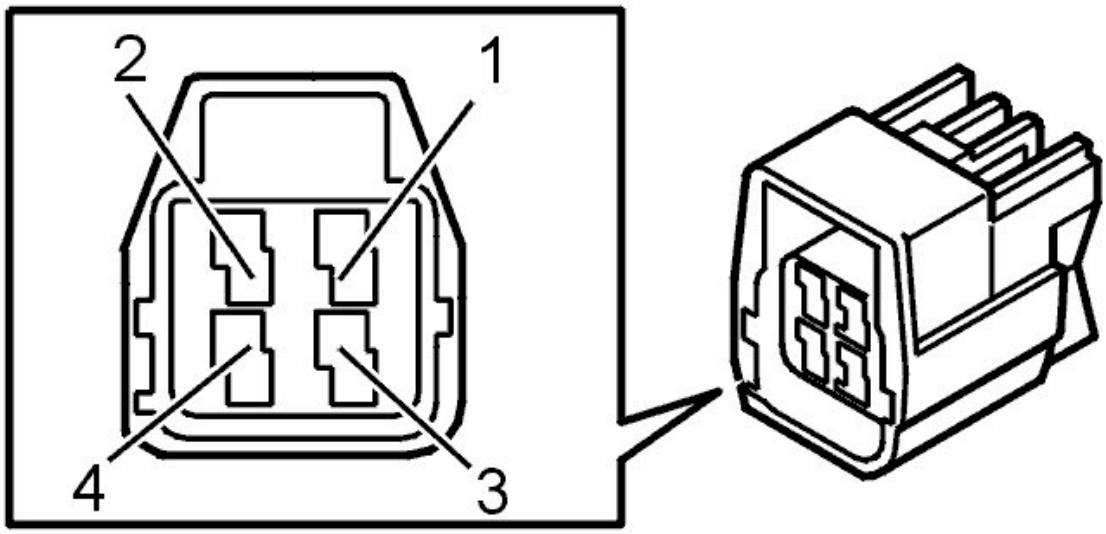
Checking wiring and connectors

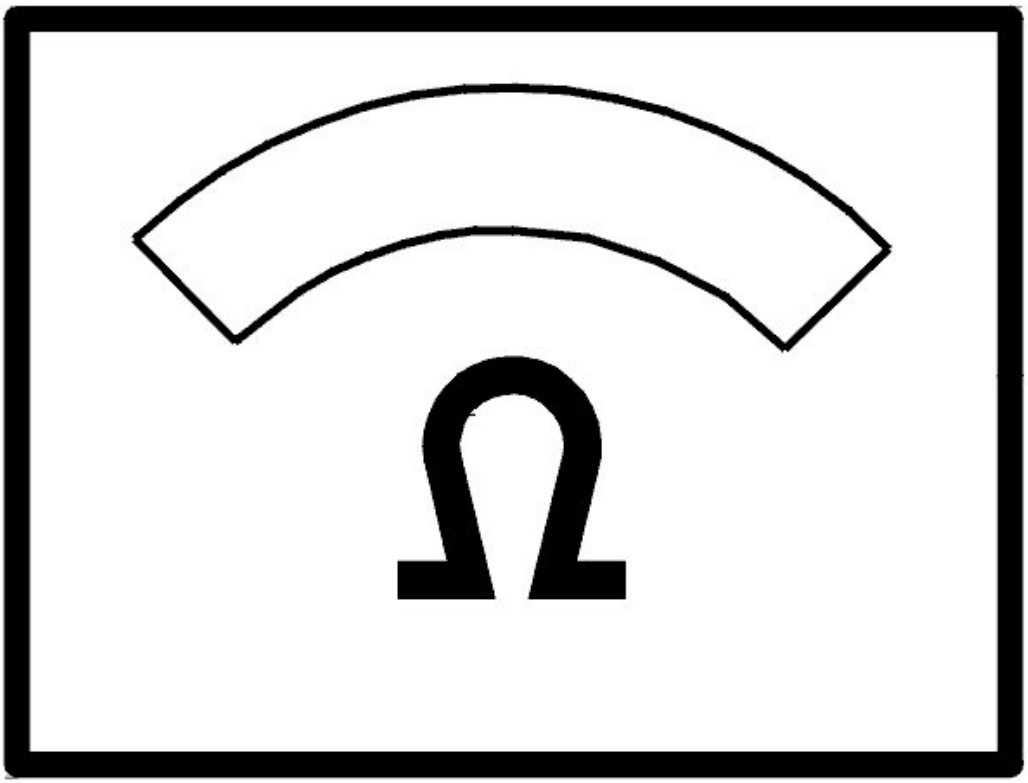
Check the knock sensor (KS) connector. Check for contact resistance and oxidation.
Check the signal cable between knock sensor (KS) terminal #3 and control module terminal #A45 (#A45). Check the ground lead between knock sensor (KS) terminal #4 and control module terminal #A67 (#B7). Check for an open-circuit. Check for a short-circuit to ground.
Check that the knock sensor (KS) is tightened to the correct torque.
Remedy as necessary.

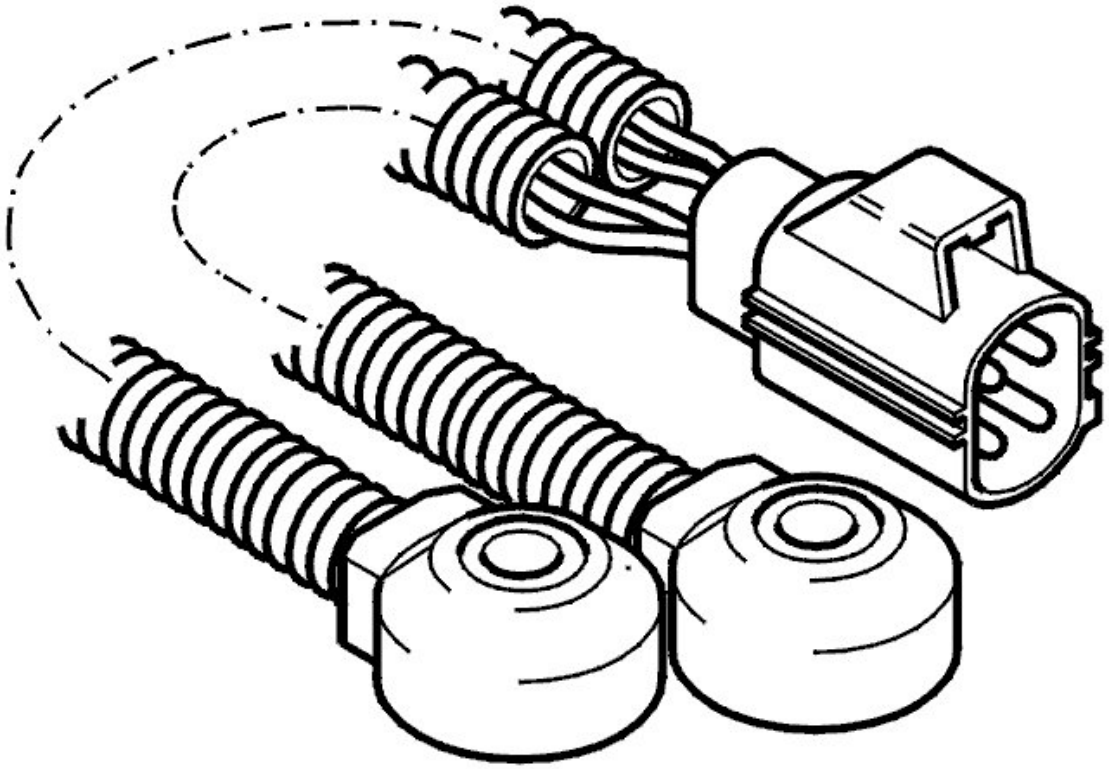
Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal

Description / Specification

- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

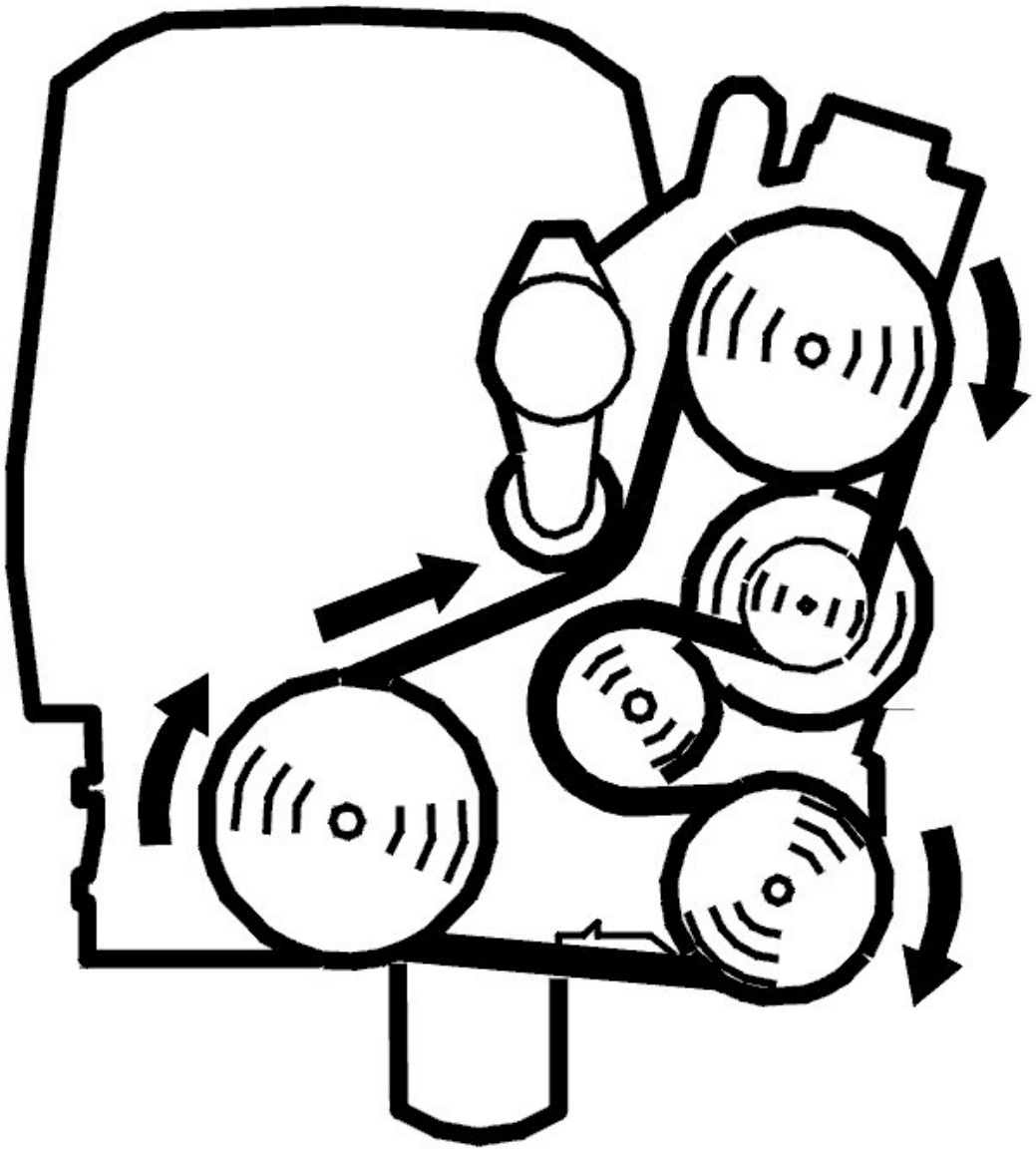


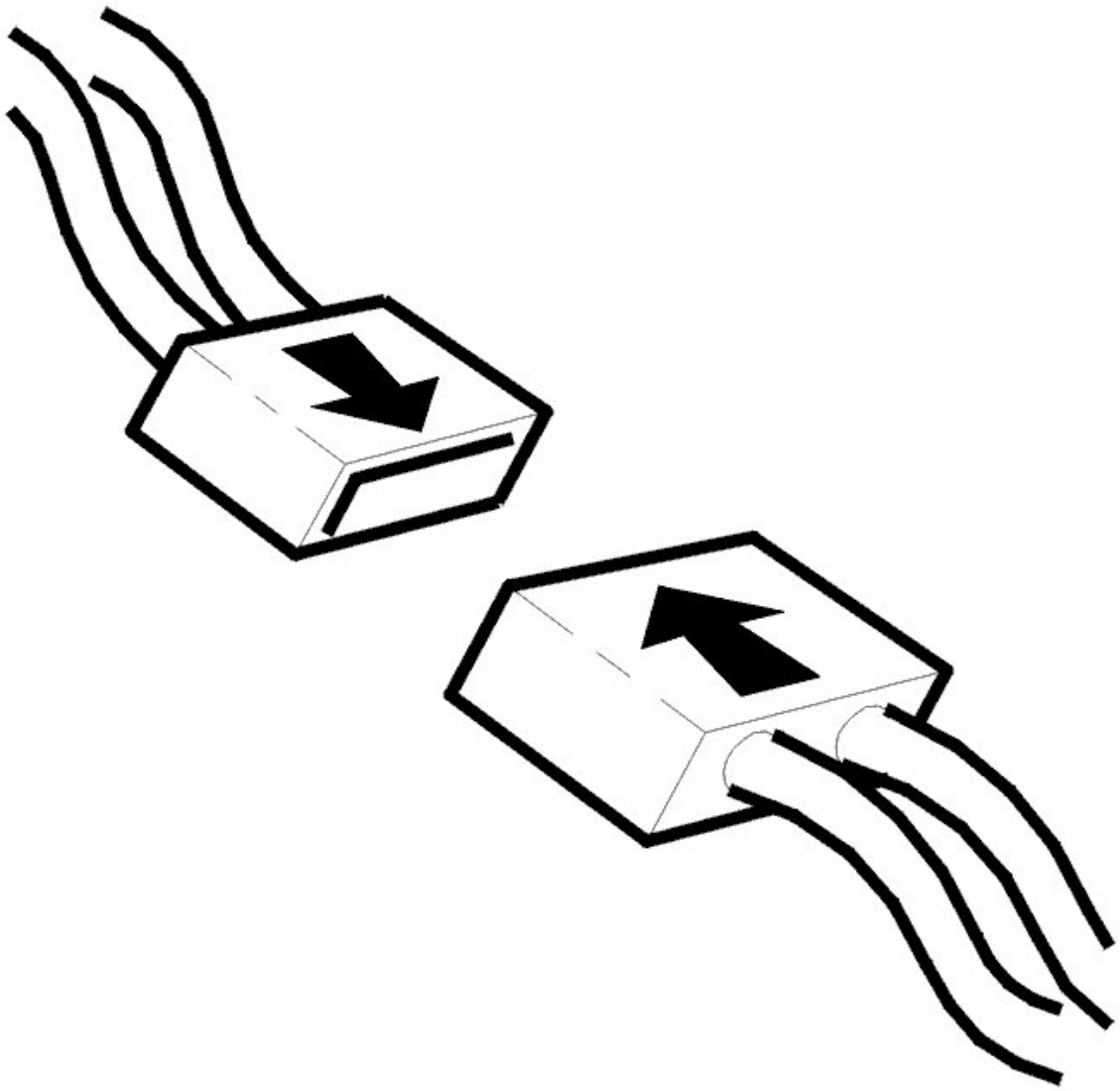




Continue - Checking the knock sensor (KS) signal

Checking the knock sensor (KS) signal



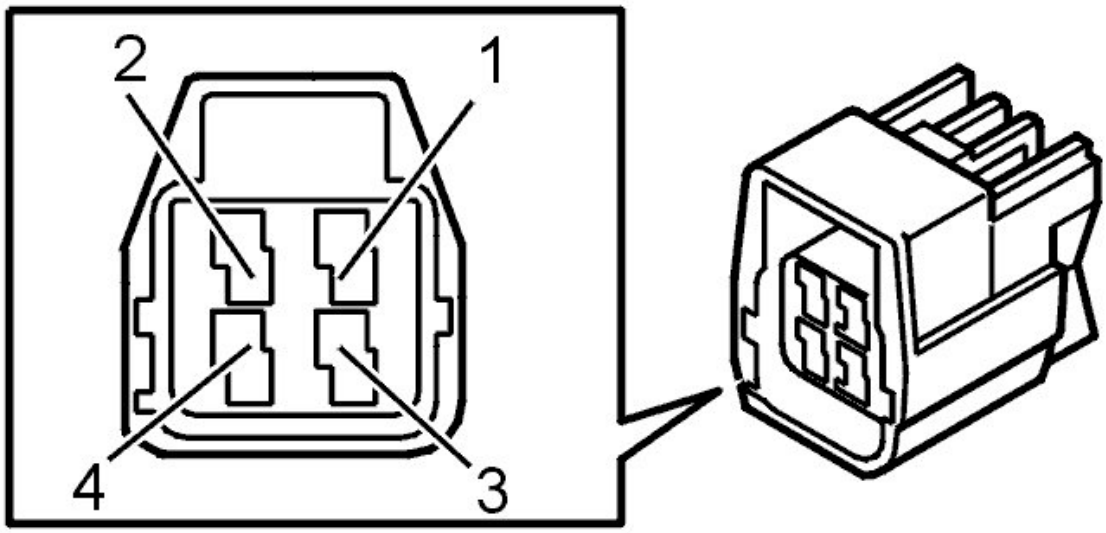


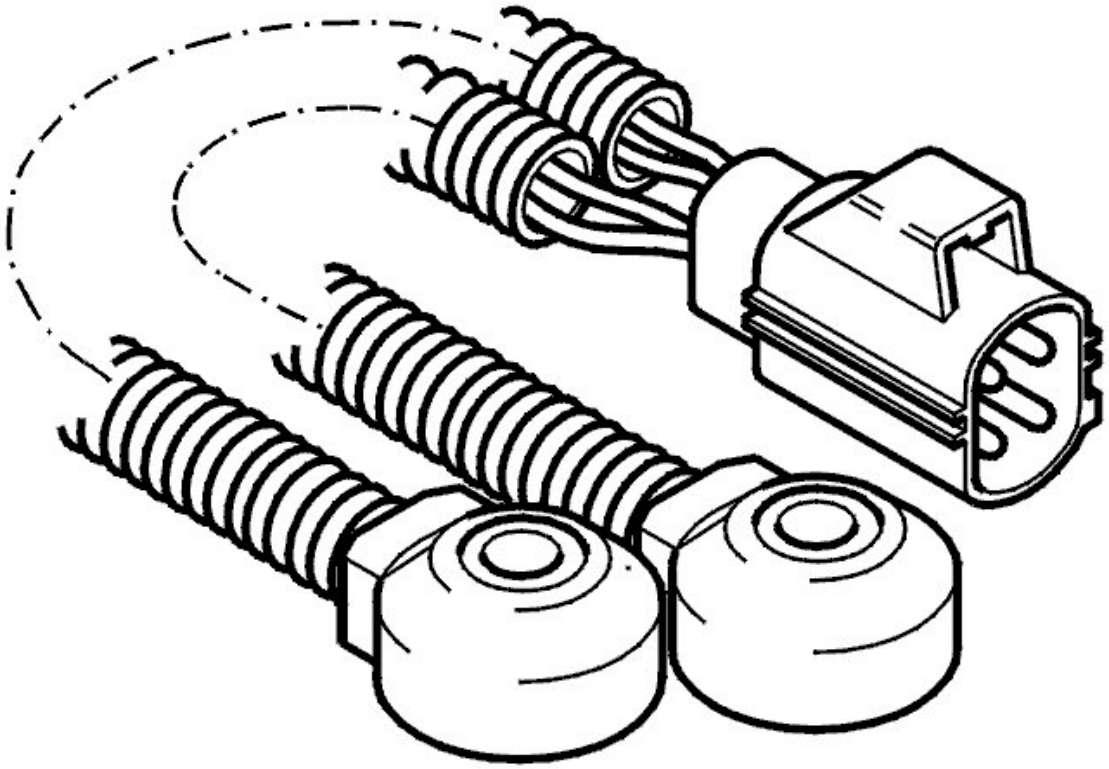
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Start the engine and run it to normal operating temperature
- Rev the engine to 3500 rpm. Read off the value of the knock sensor (KS) signal.

The value must be 2-6.
If the value is now OK it means that the cause of the fault was loose connections in connector.

Other information

- To access or replace the knock sensor (KS), see Knock sensor (KS), replacing See: Knock Sensor/Service and Repair
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.



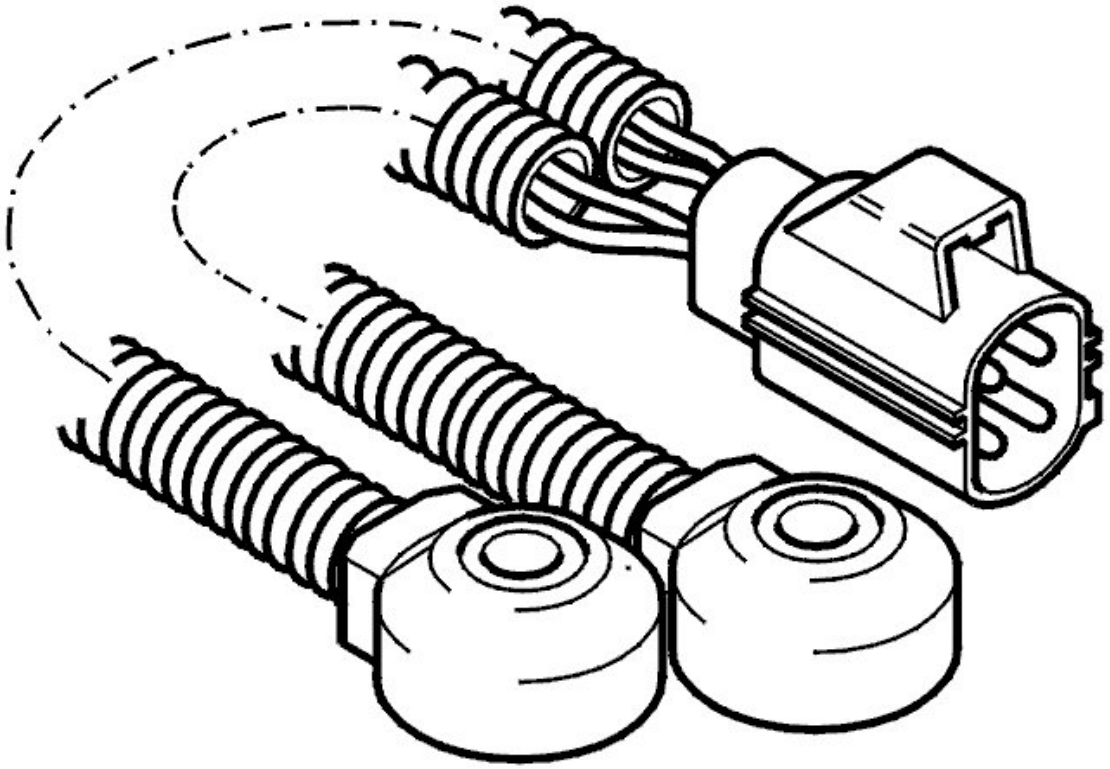


OK - **Fault Found**

Not OK - Replacing the component

Replacing the component

Replace the knock sensor (KS). See Knock sensor (KS), replacing See: Knock Sensor/Service and Repair.

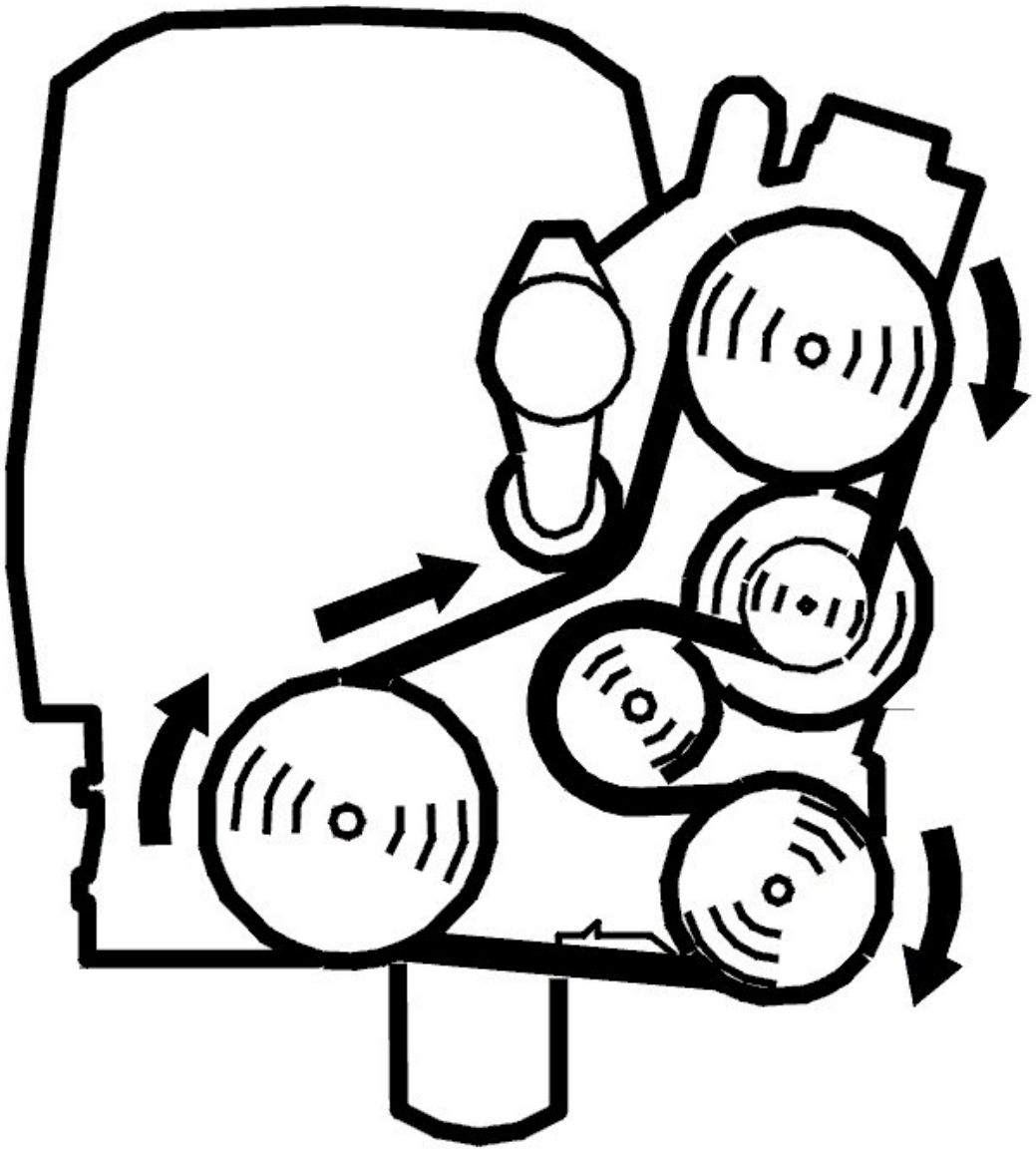


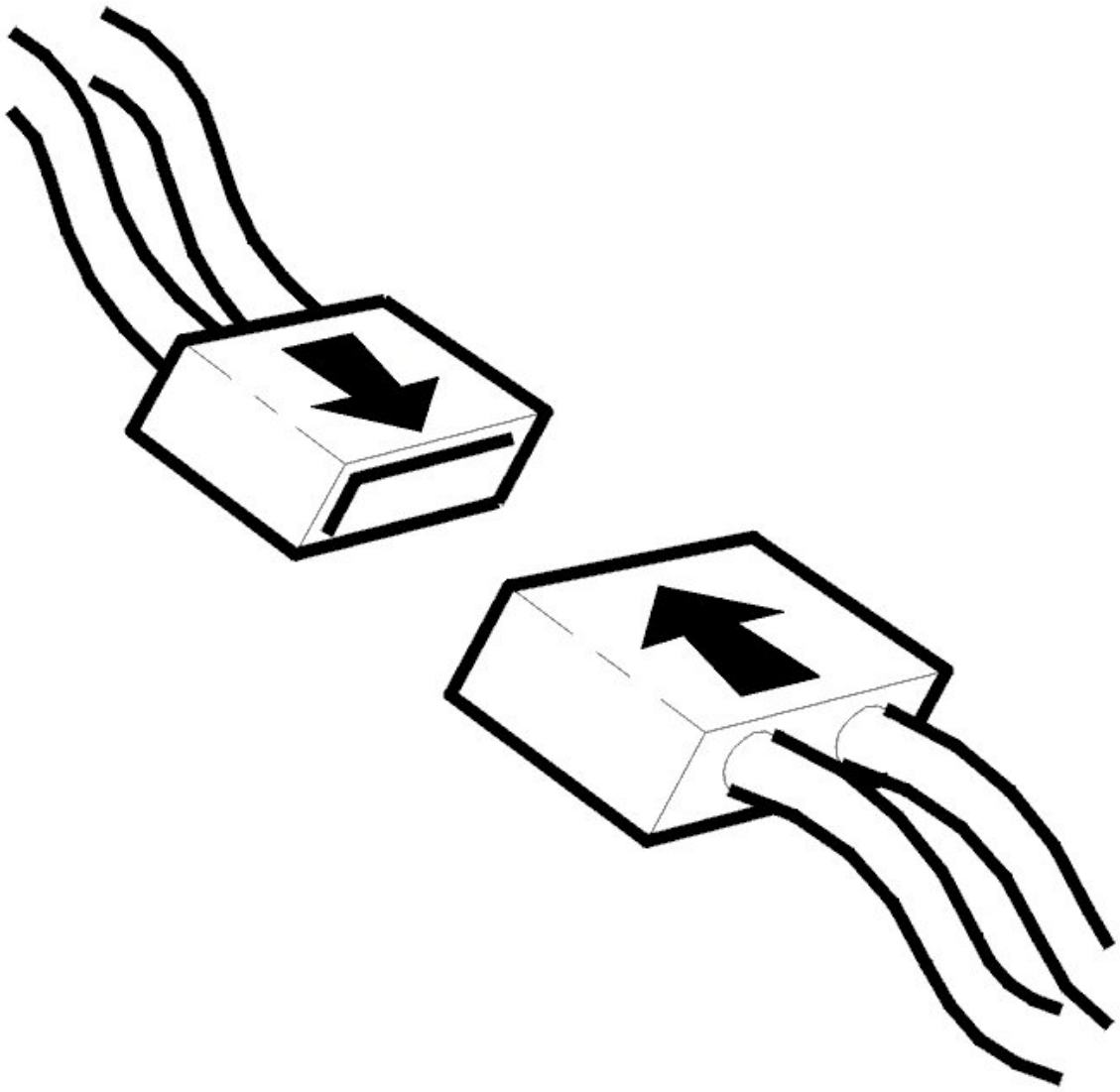
Continue - Verification

Verification

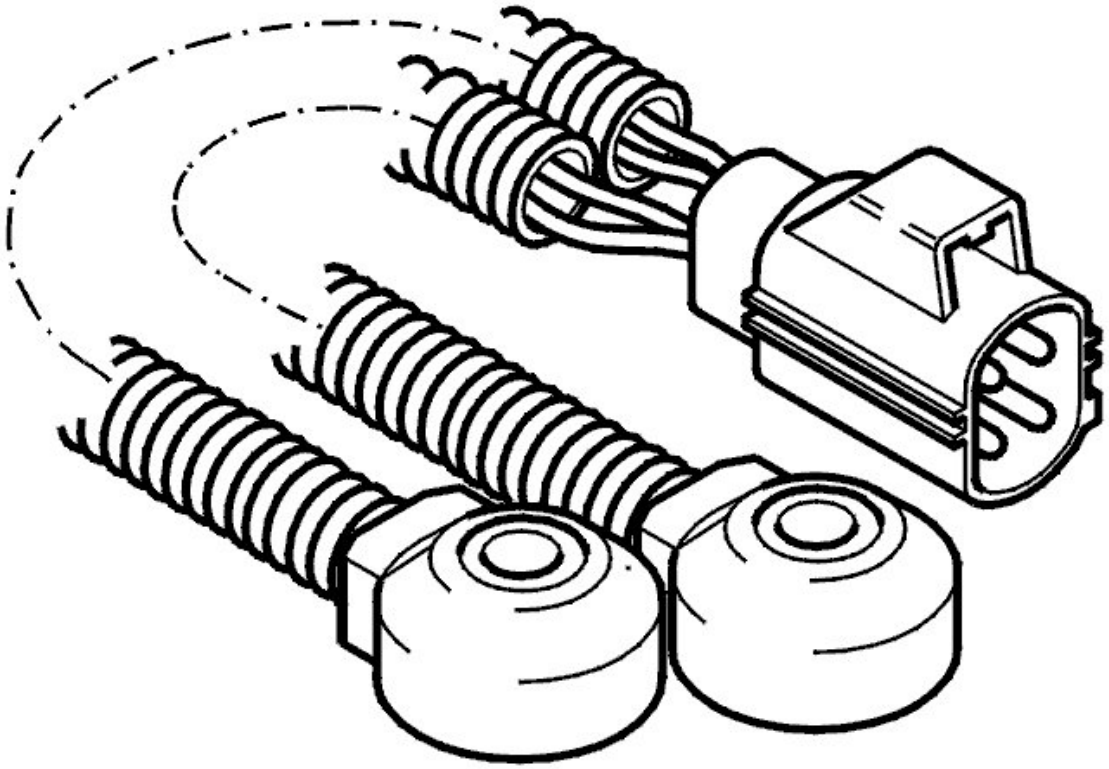
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Start engine and run to normal operating temperature.
- Rev the engine to 3500 rpm and read off the value of the knock sensor (KS) signal..



Is the value between 2-6?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking wiring and connectors

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-3100

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a certain number of misfires during the first 1000 engine revolutions after the engine is started.
This diagnostic trouble code (DTC) is stored together with other diagnostic trouble codes (DTCs) which indicate which cylinders are misfiring.

Substitute value
- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source
- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Blocked / leaking injector
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information
- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

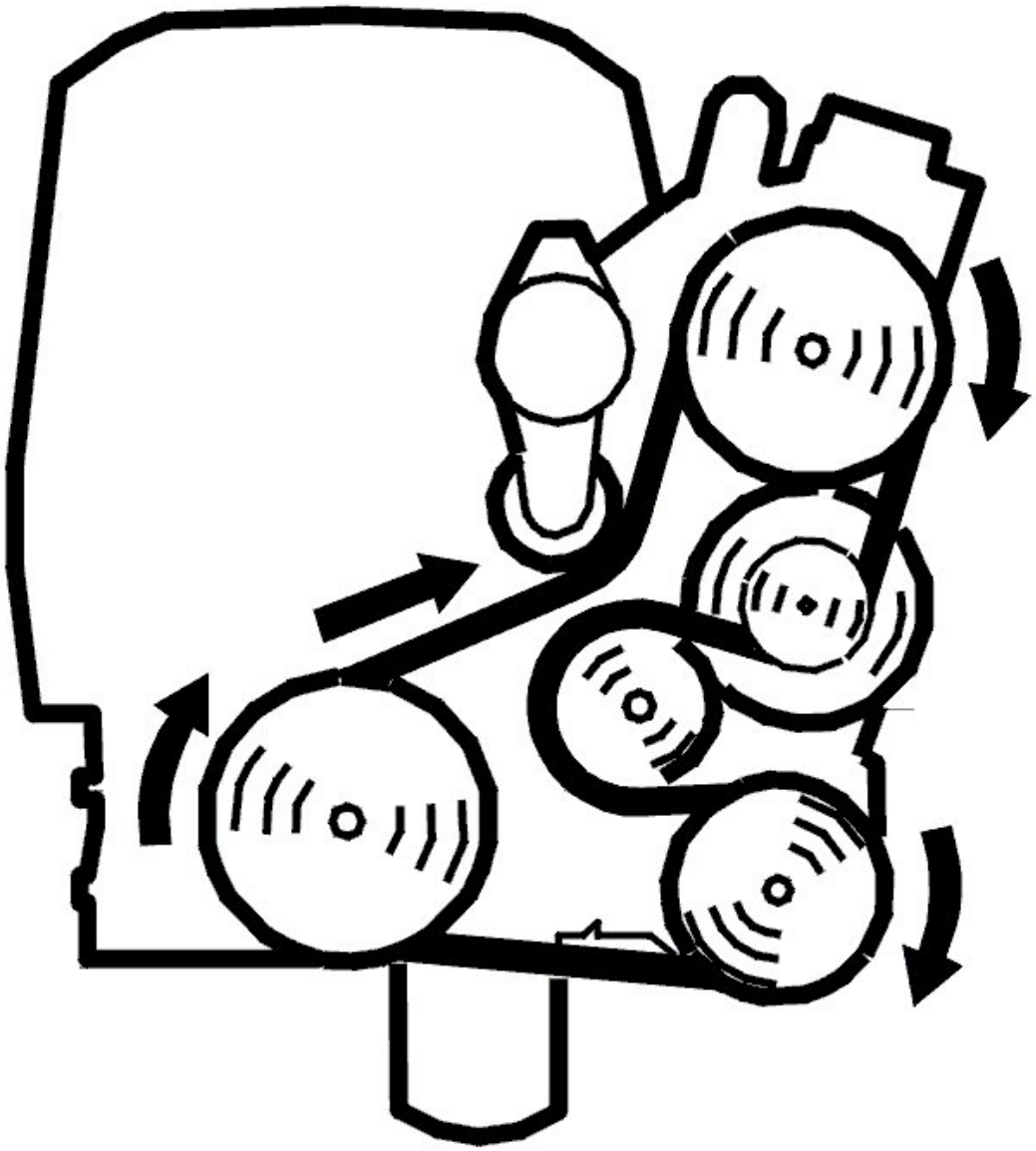
Continue - Verification

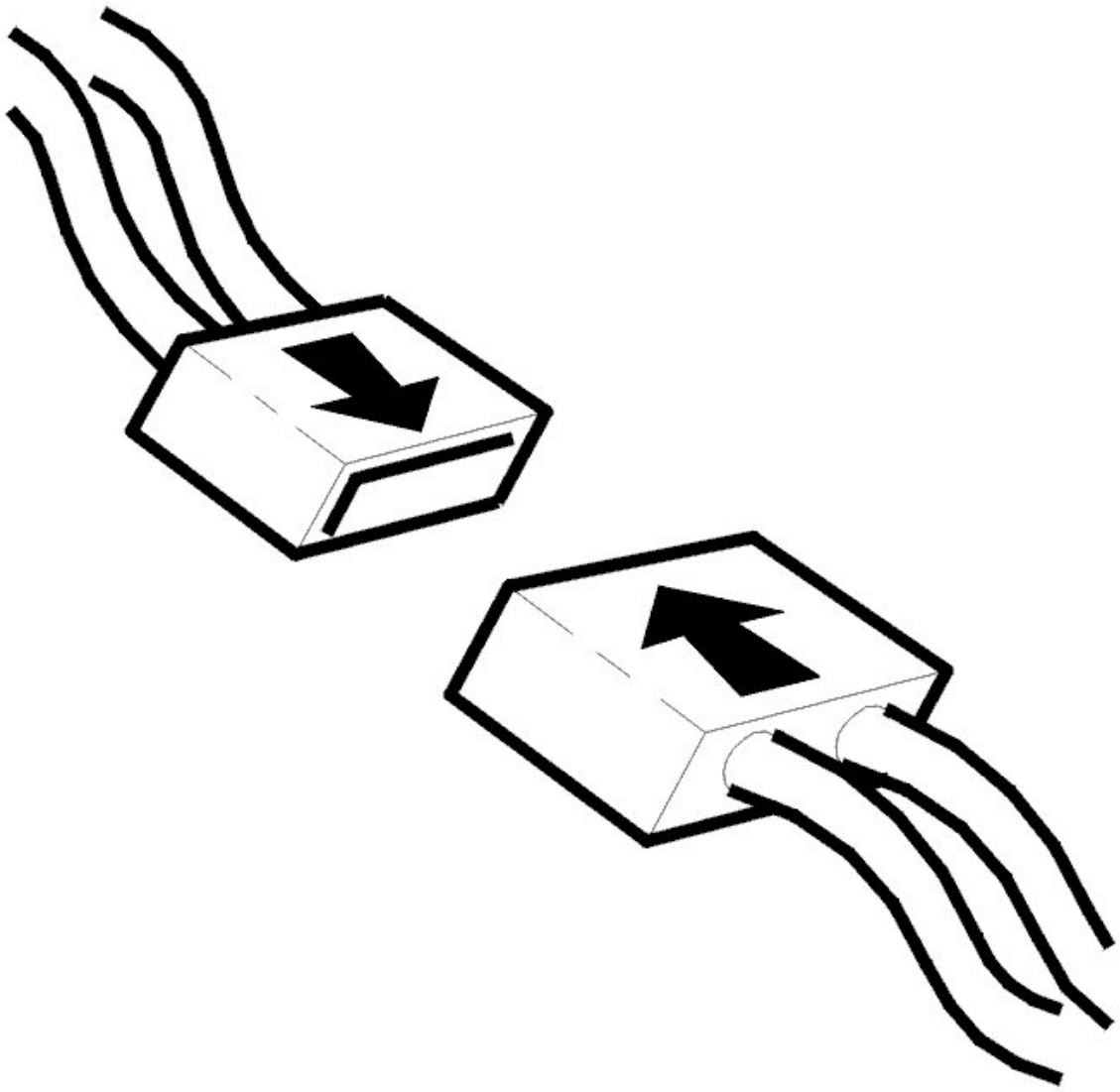
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-310C

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfires in more than one cylinder which could damage the catalytic converter. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
This diagnostic trouble code (DTC) is stored together with other diagnostic trouble codes (DTCs) which indicate which cylinders are misfiring.

Substitute value
- Three-way catalytic converter (TWC) diagnosis shut off
- Leak diagnostic shut off
- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source
- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Blocked / leaking injector
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

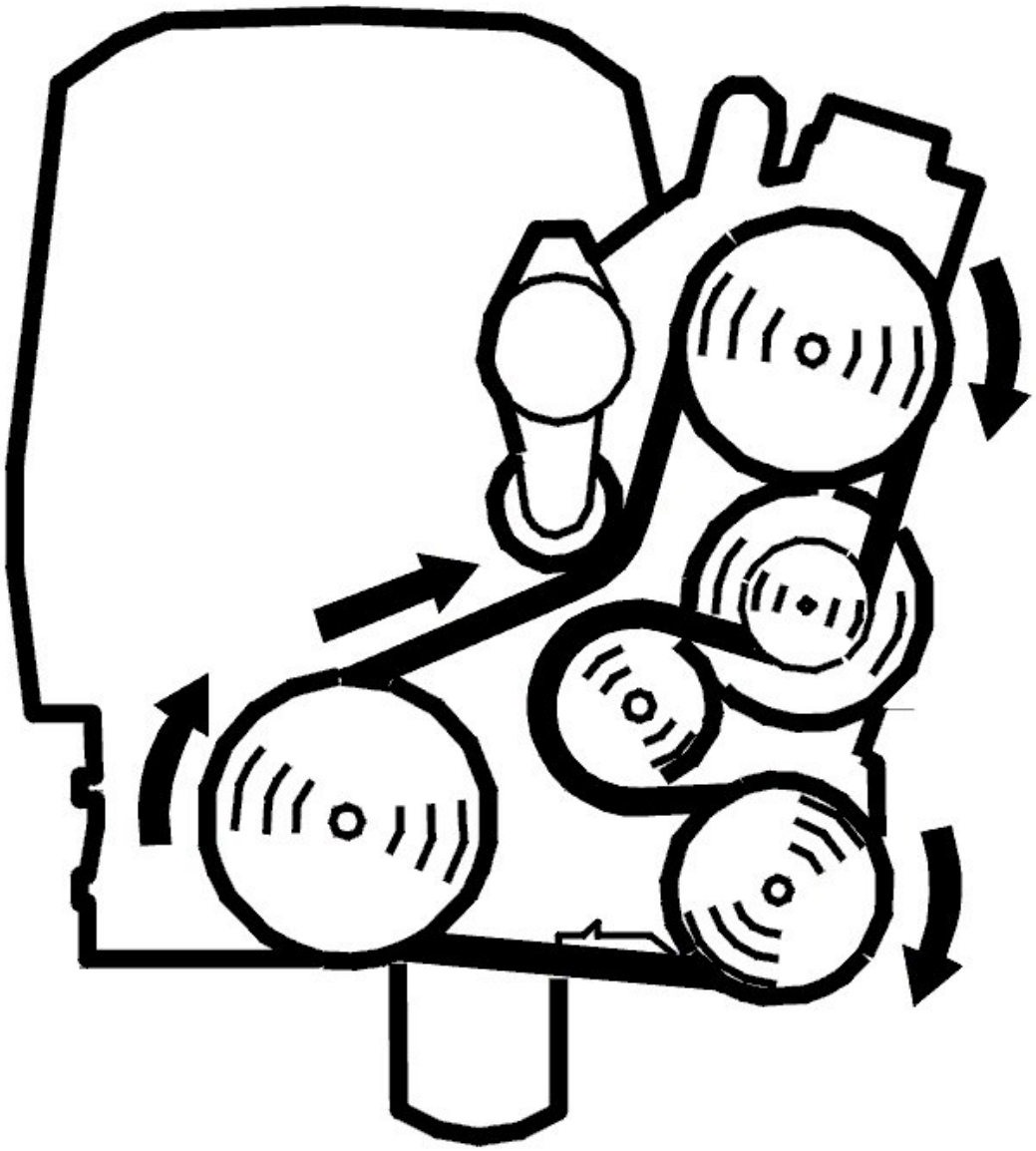
Continue - Verification

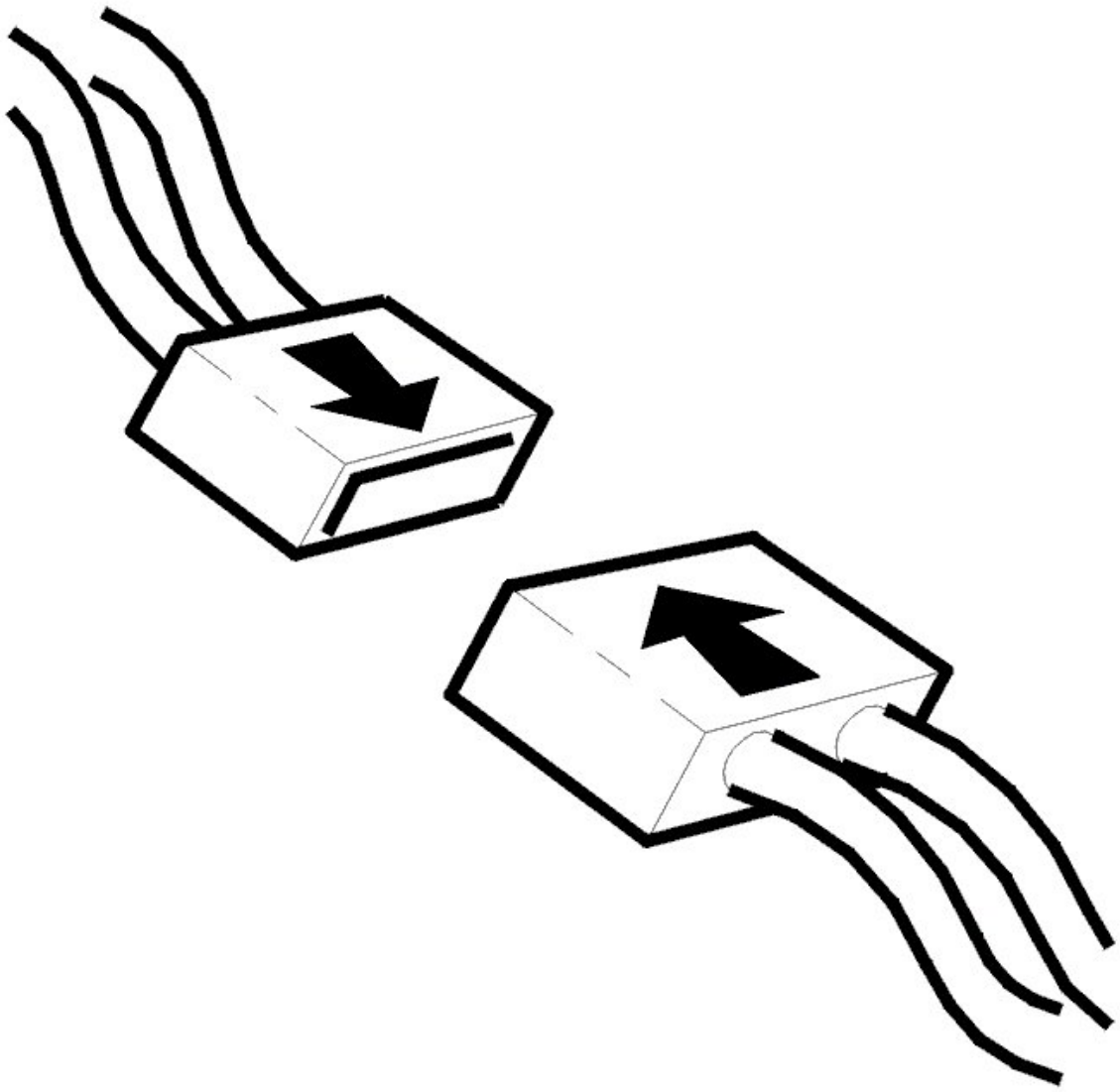
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-310D

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfires in more than one cylinder which could affect emissions. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.
This diagnostic trouble code (DTC) is stored together with other diagnostic trouble codes (DTCs) which indicate which cylinders are misfiring.

Substitute value
- Three-way catalytic converter (TWC) diagnosis shut off
- Leak diagnostic shut off
- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source
- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

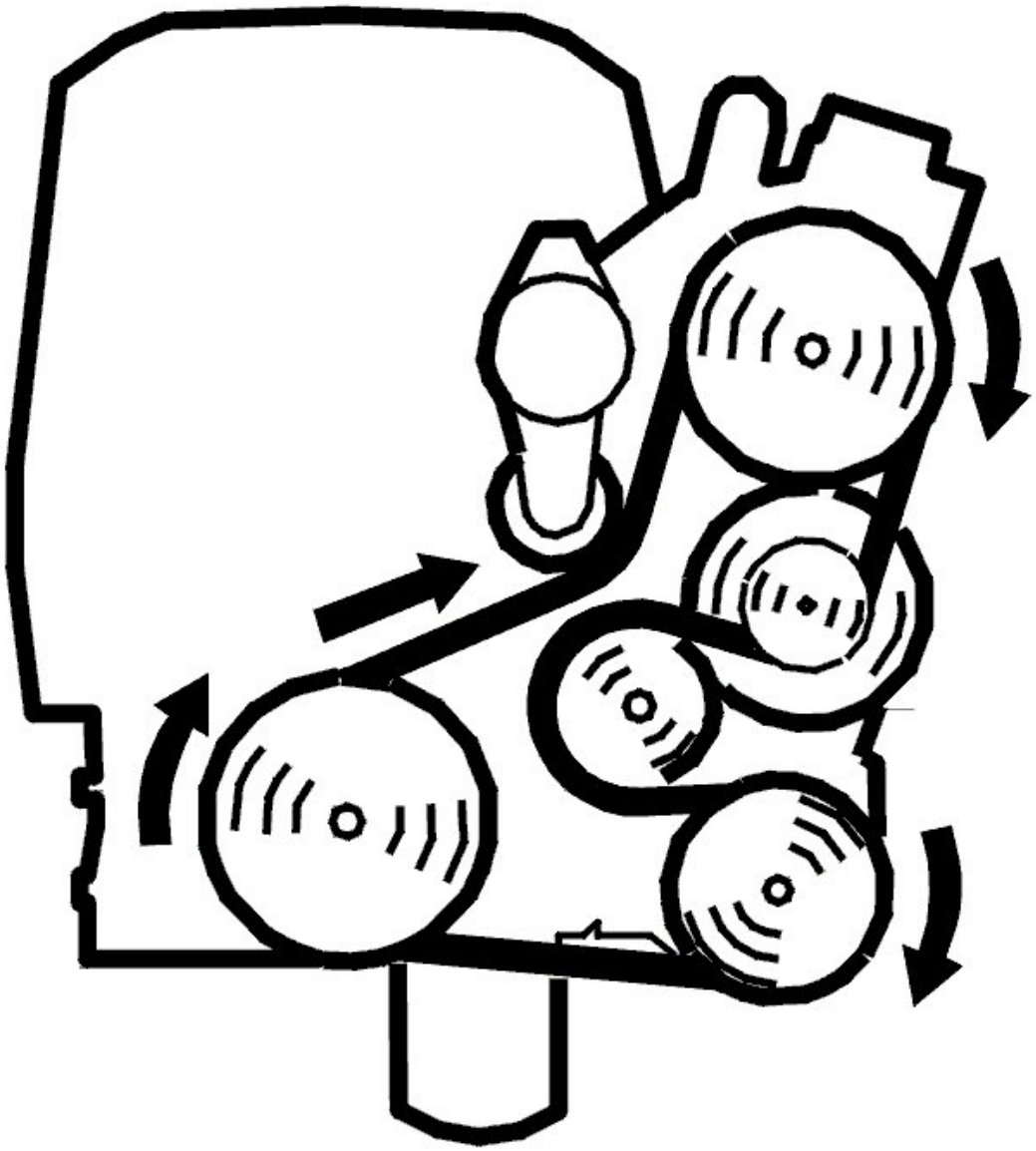
Continue - Verification

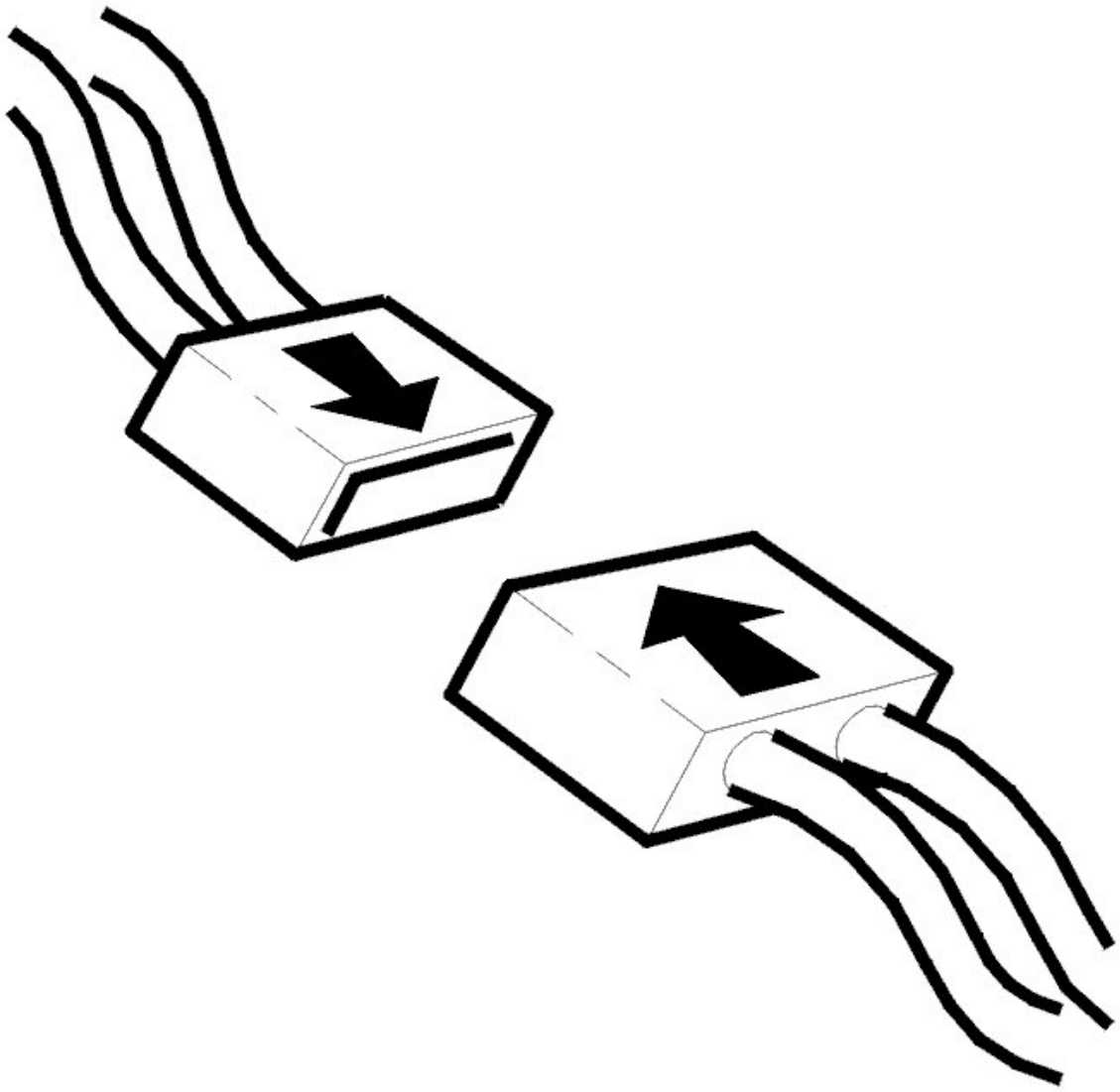
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring during the first 1000 engine revolutions. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

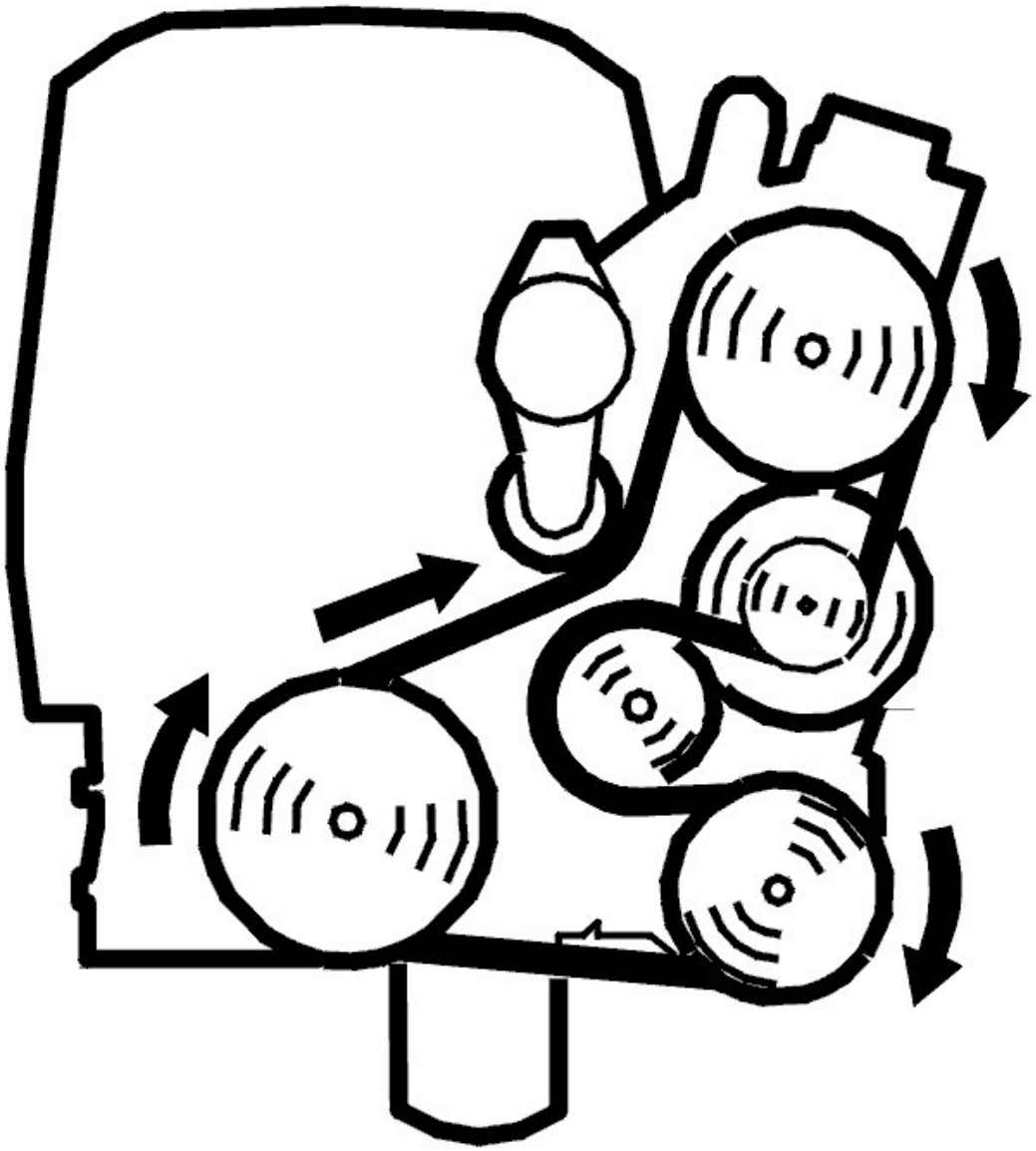
Continue - Verification

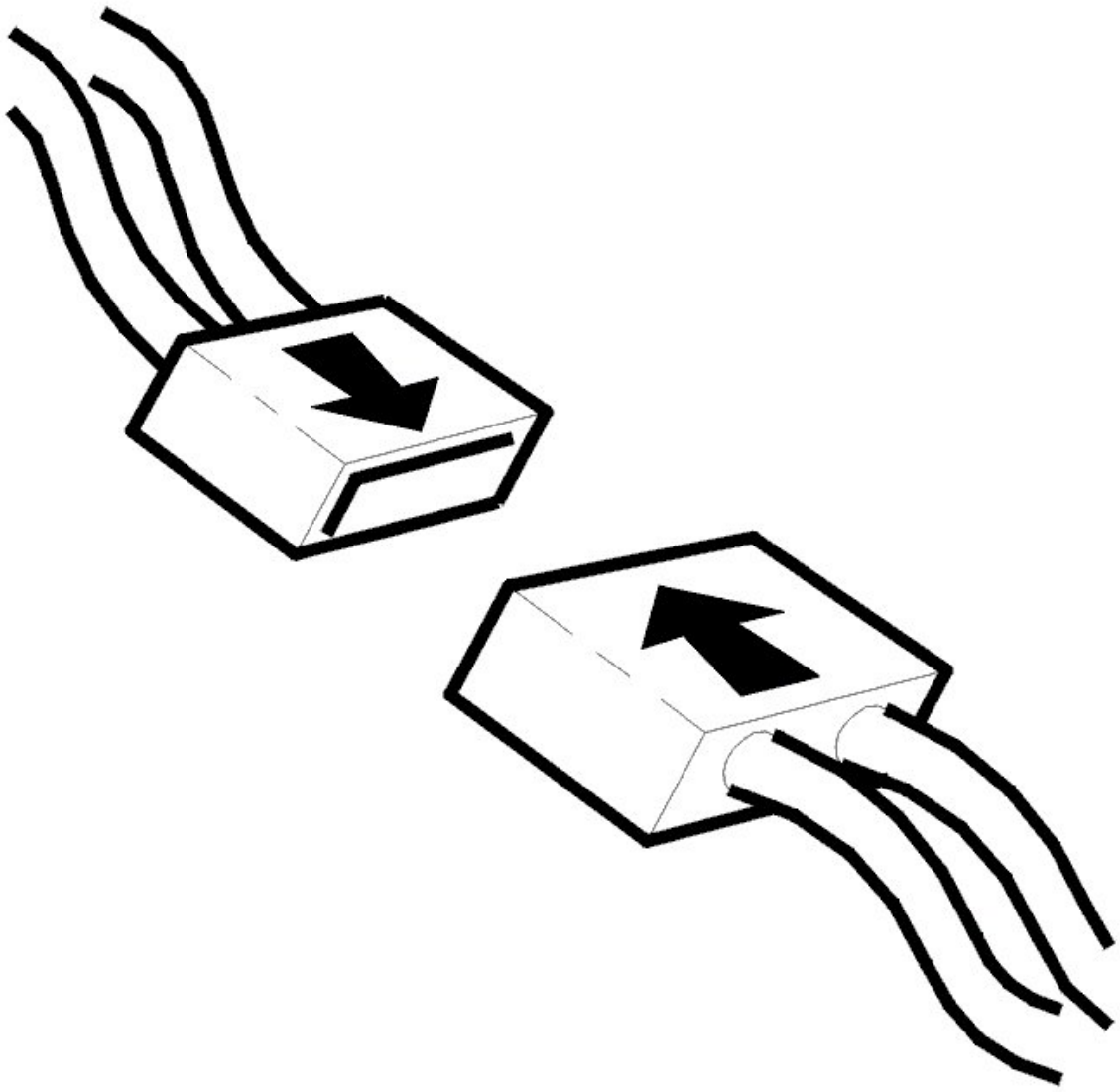
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which could damage the catalytic converter after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

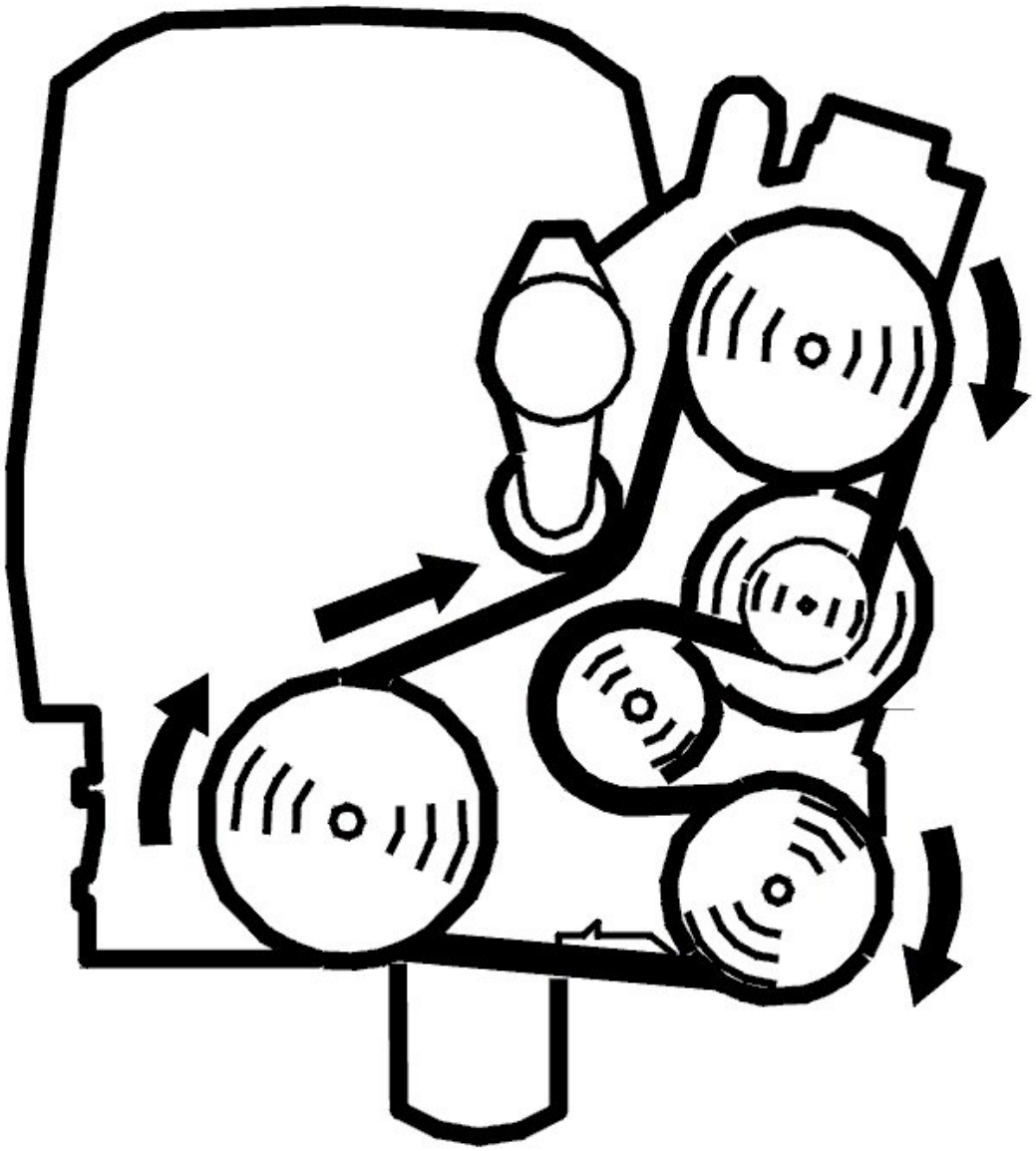
Continue - Verification

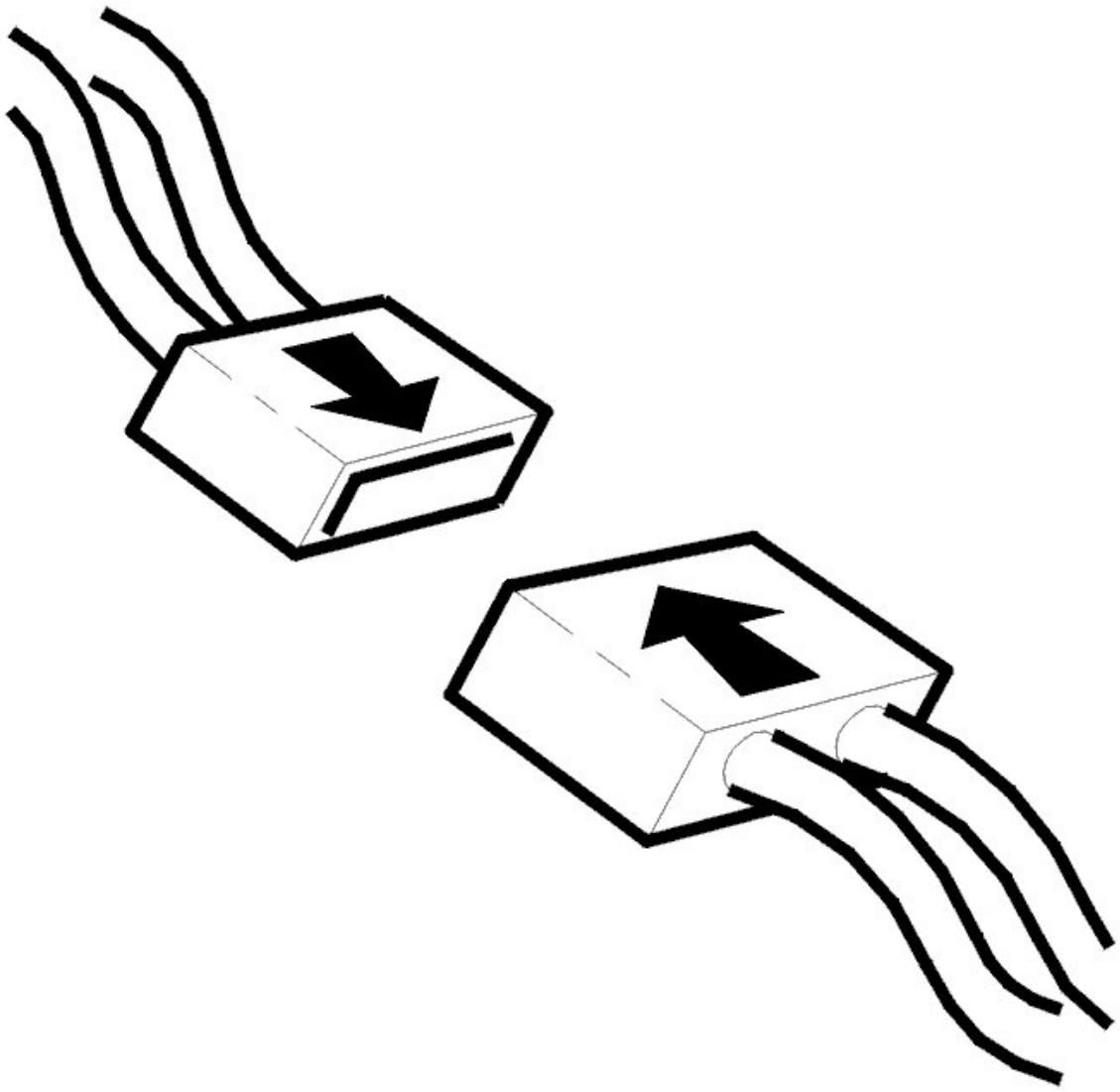
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which affects emissions after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

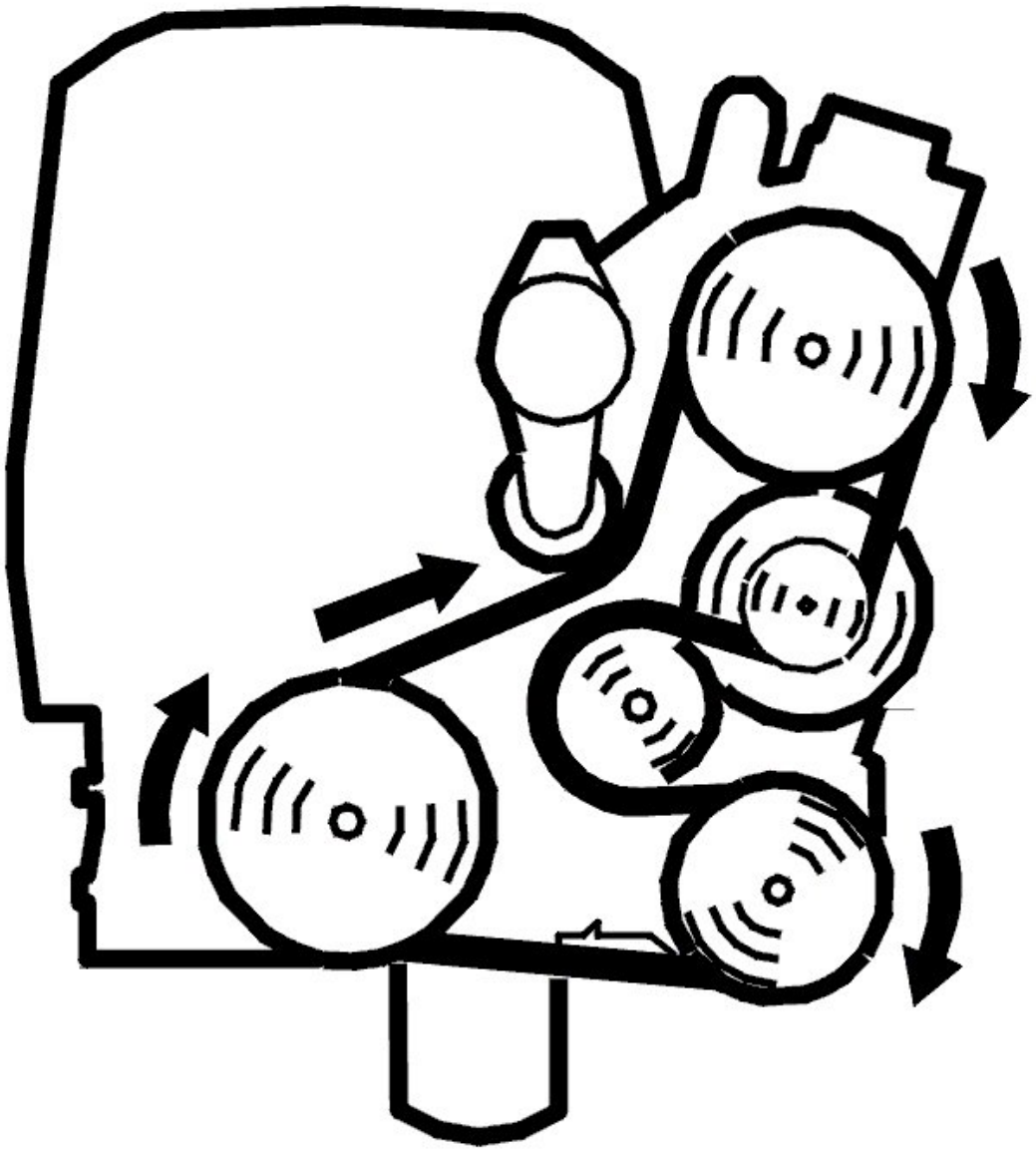
Continue - Verification

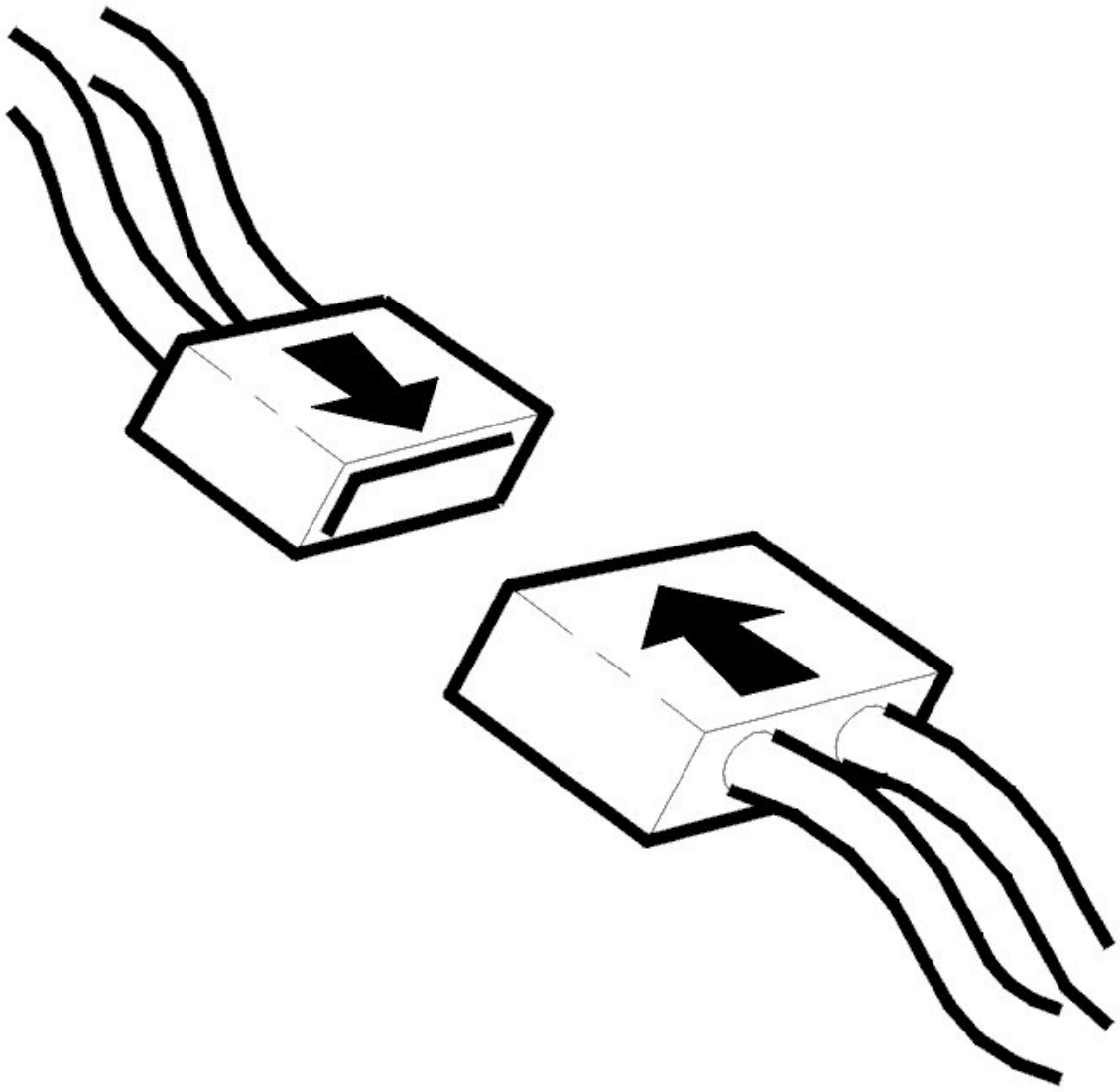
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring during the first 1000 engine revolutions. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

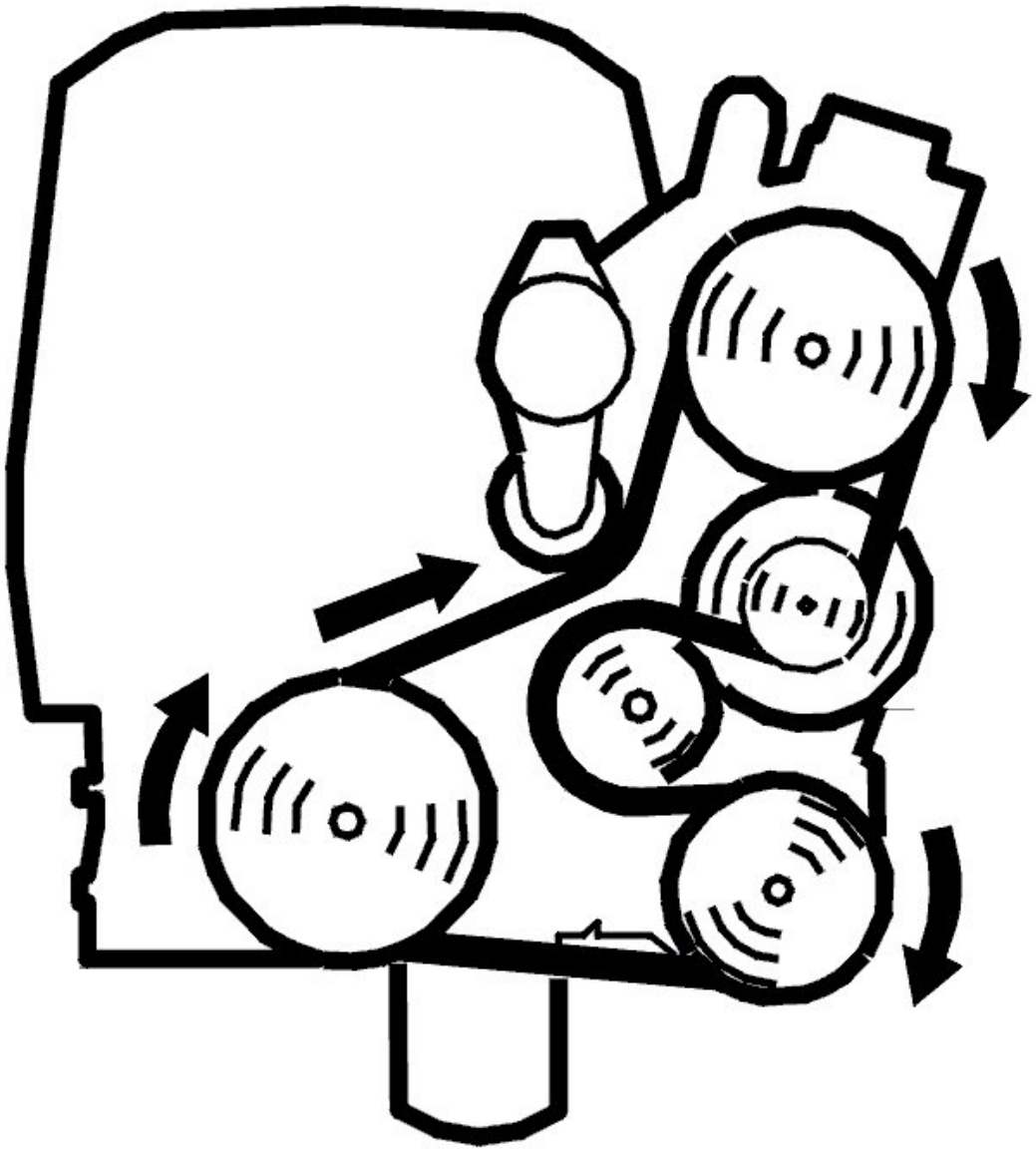
Continue - Verification

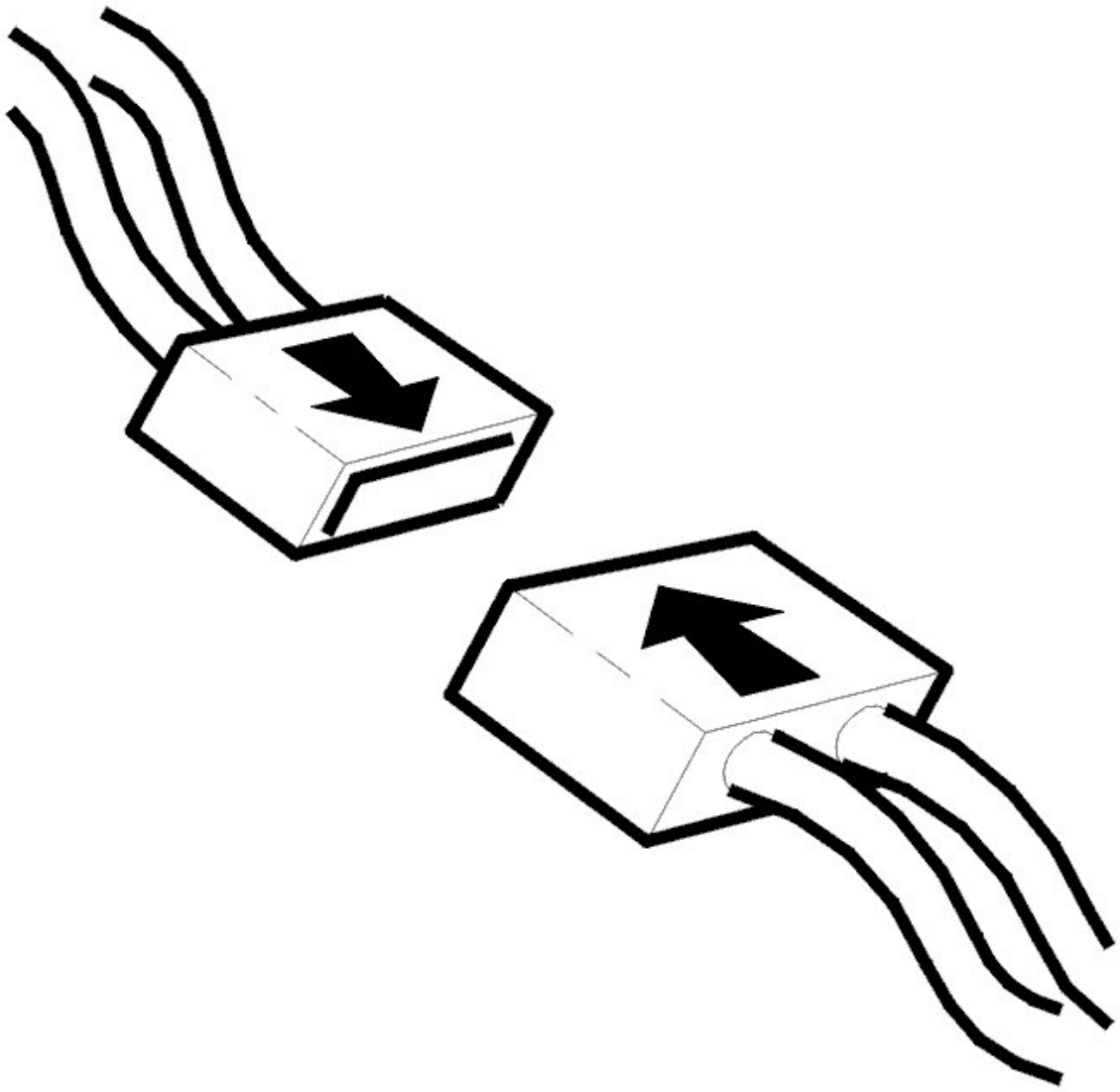
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which could damage the catalytic converter after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

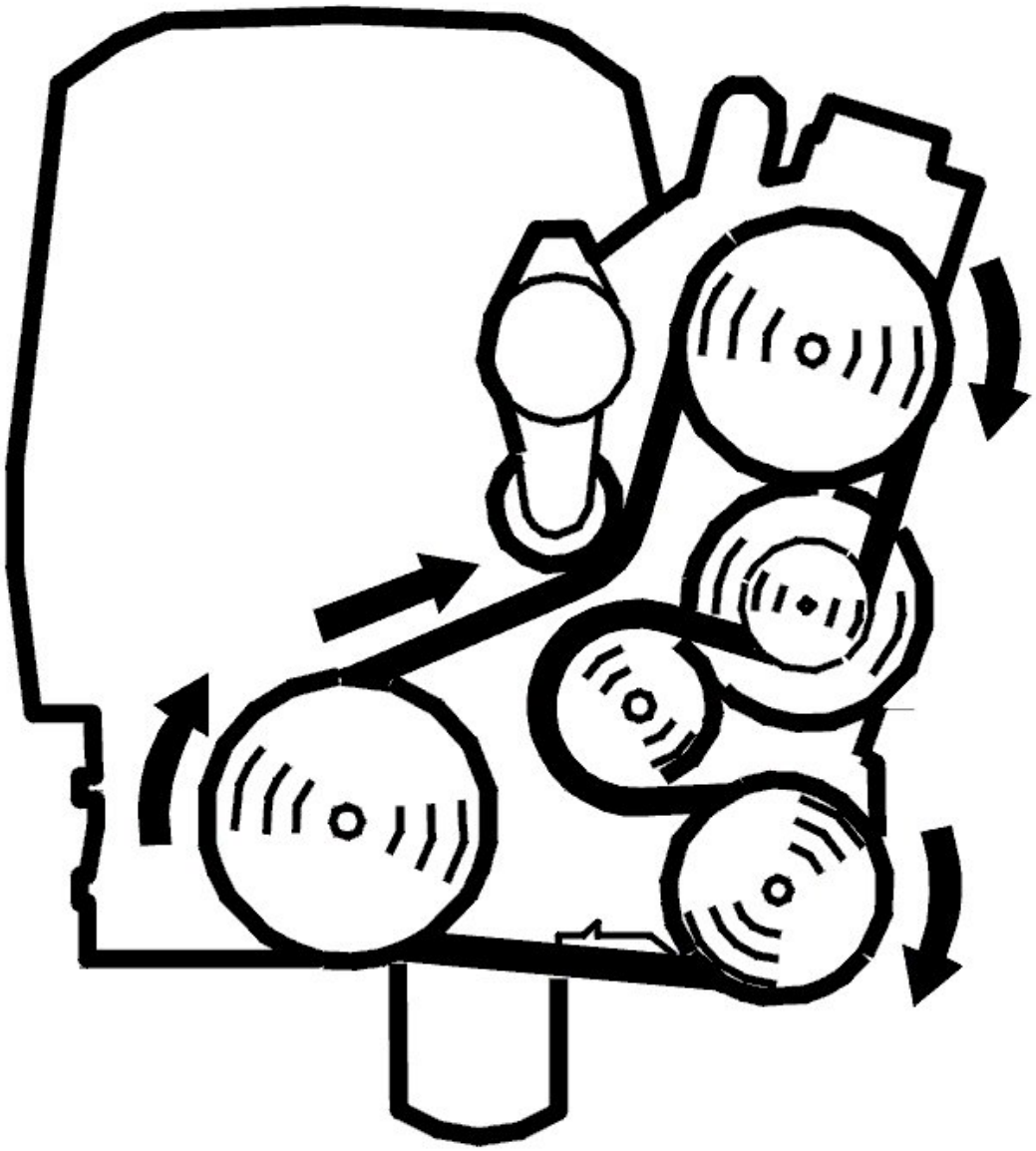
Continue - Verification

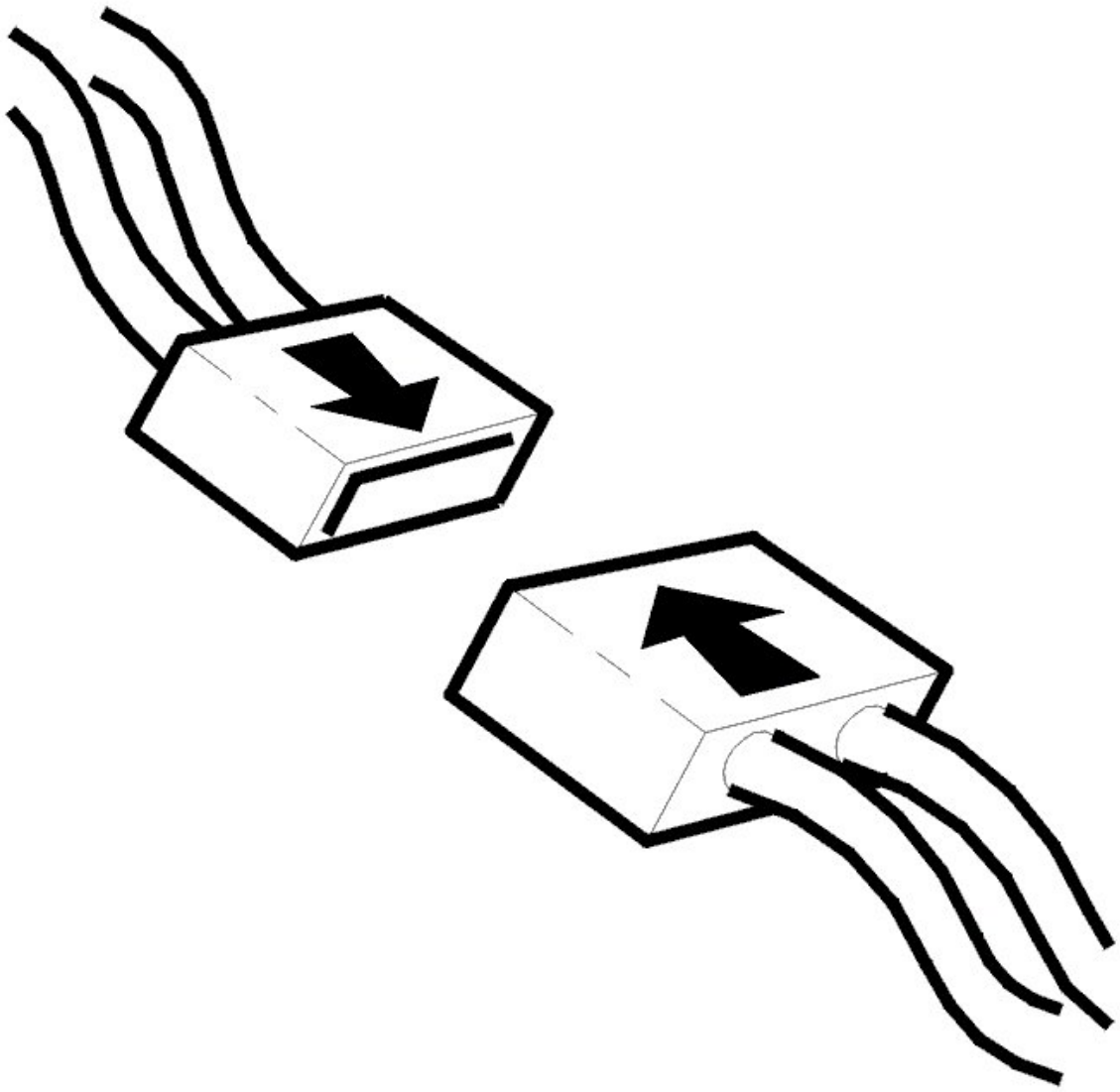
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which affects emissions after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

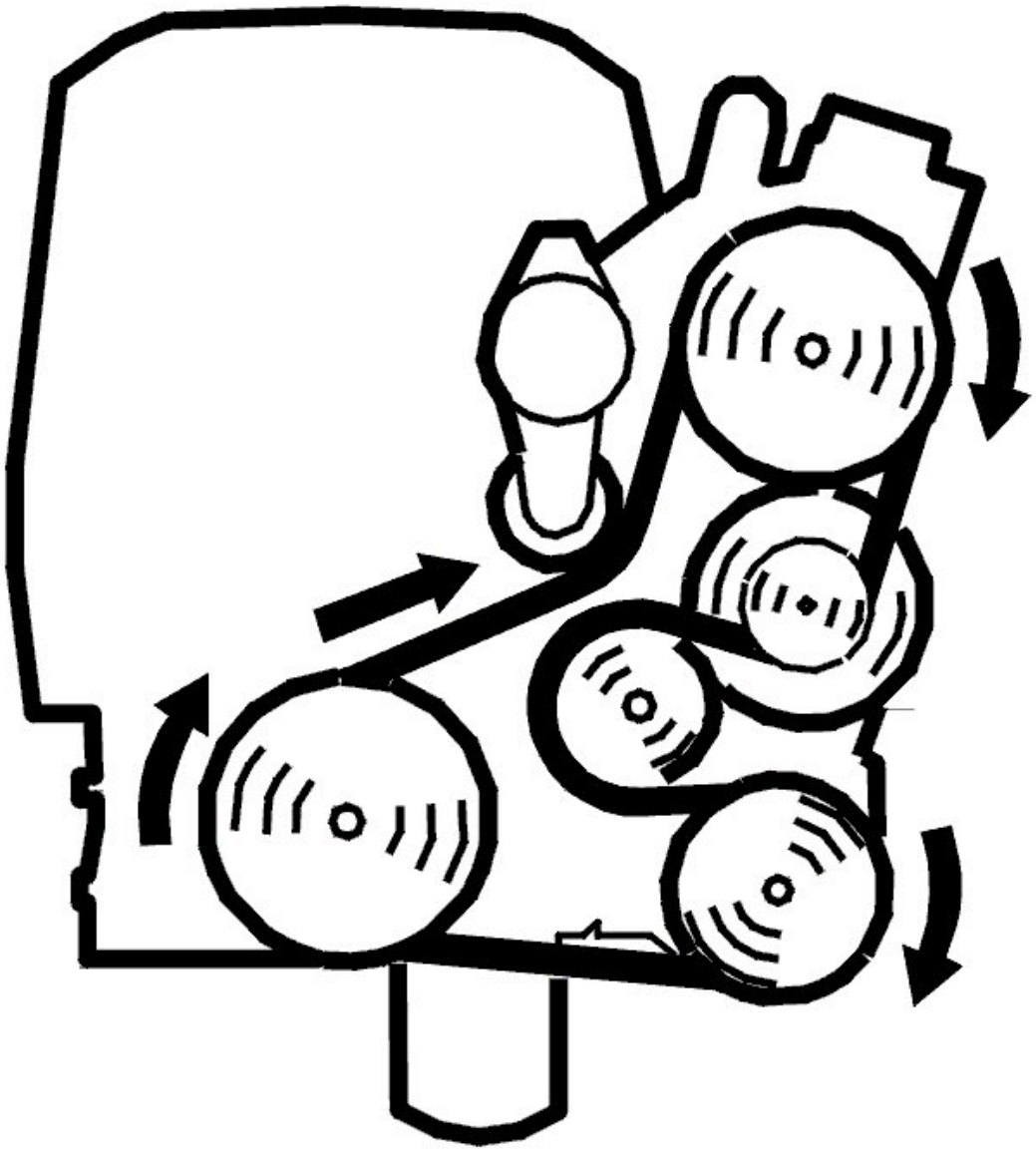
Continue - Verification

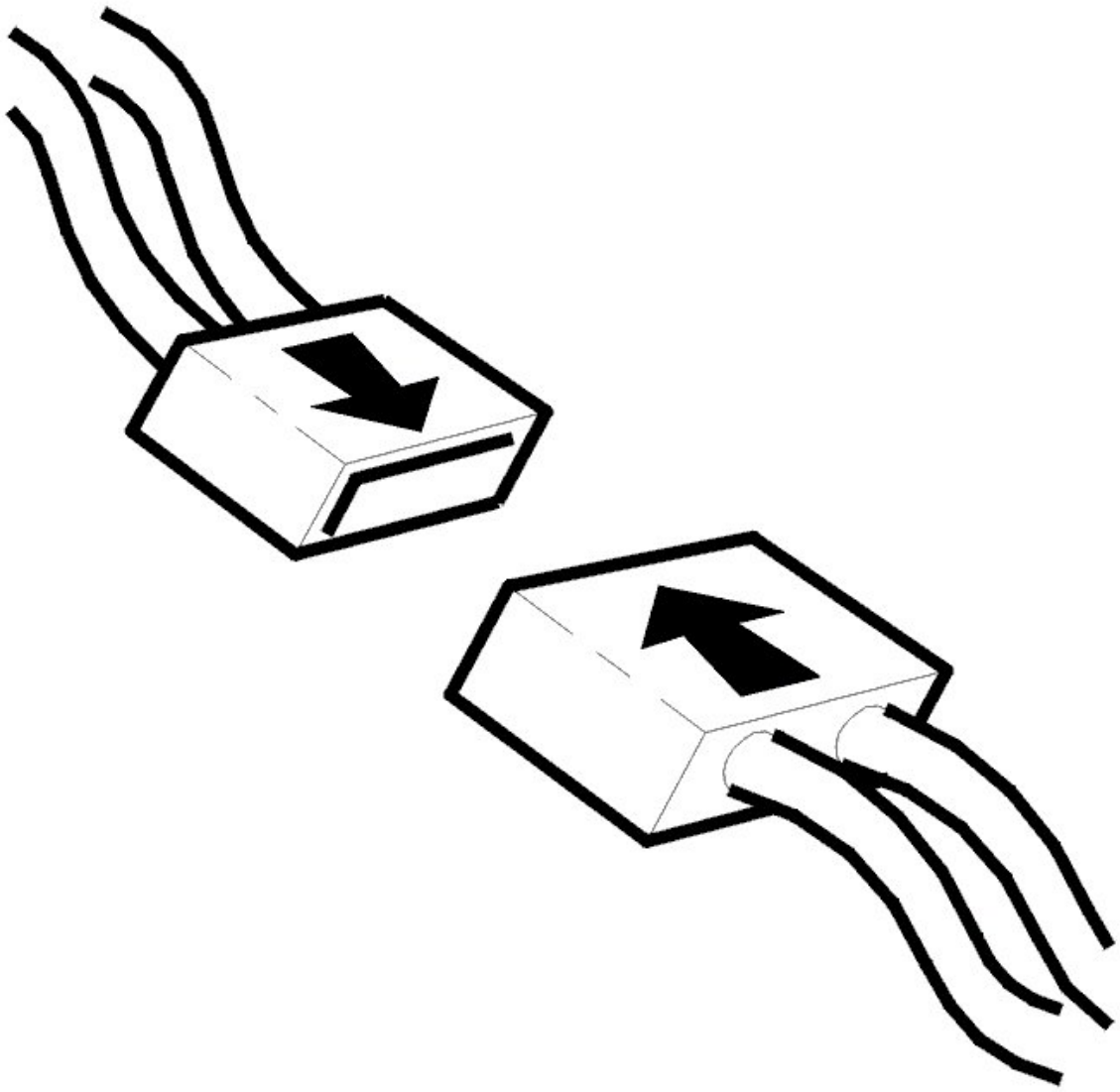
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring during the first 1000 engine revolutions. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

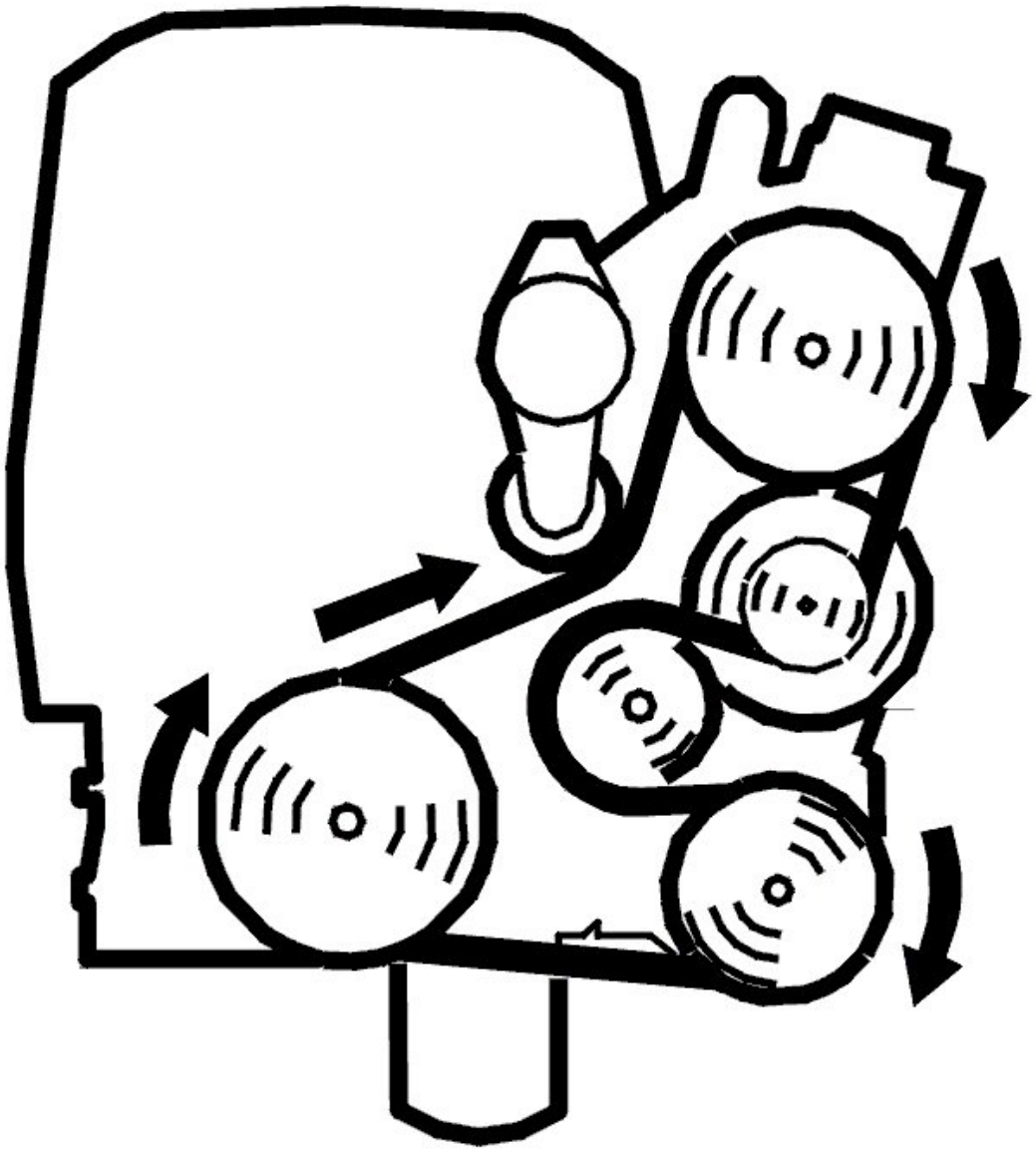
Continue - Verification

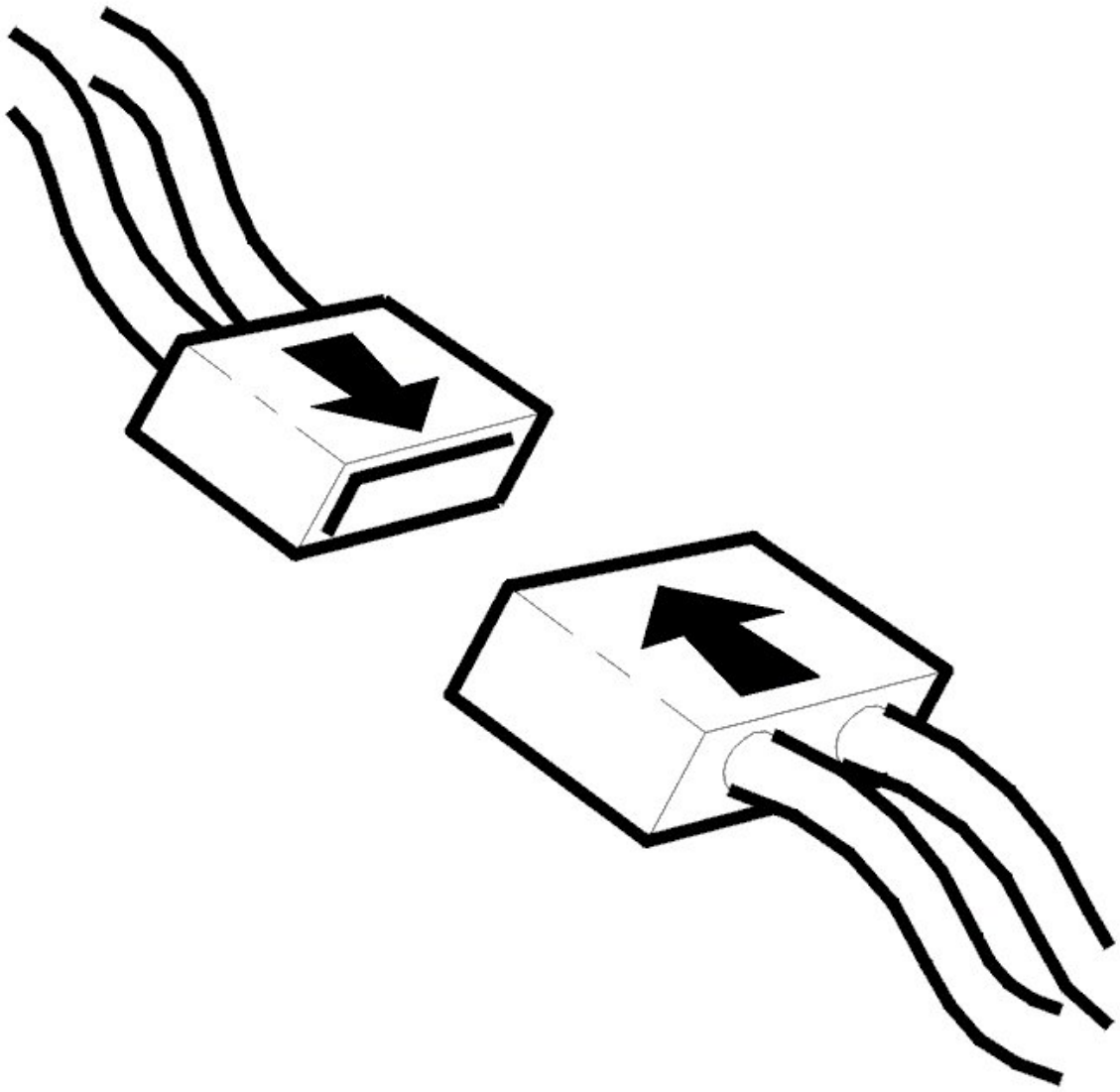
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which could damage the catalytic converter after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
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Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

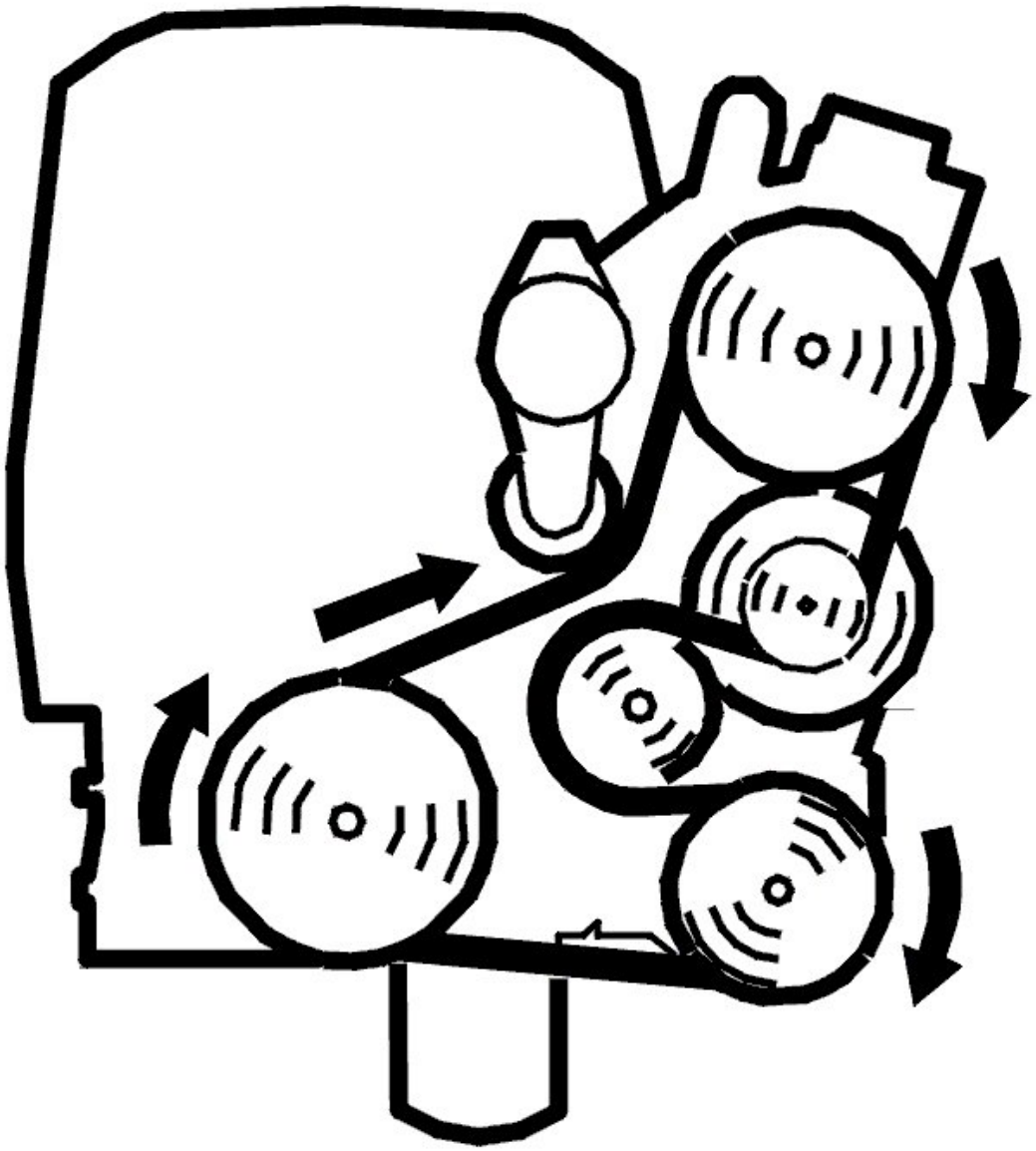
Continue - Verification

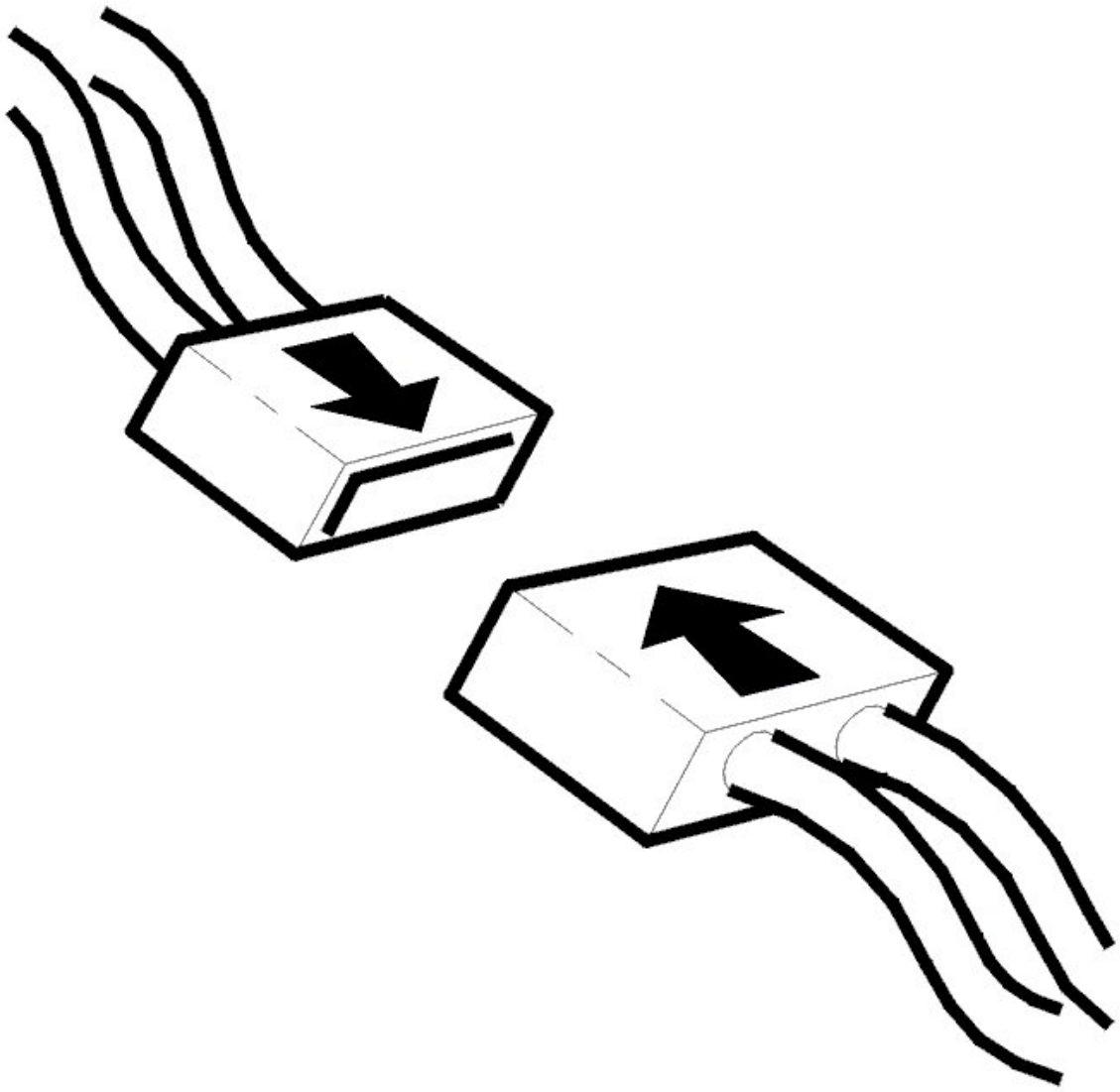
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which affects emissions after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

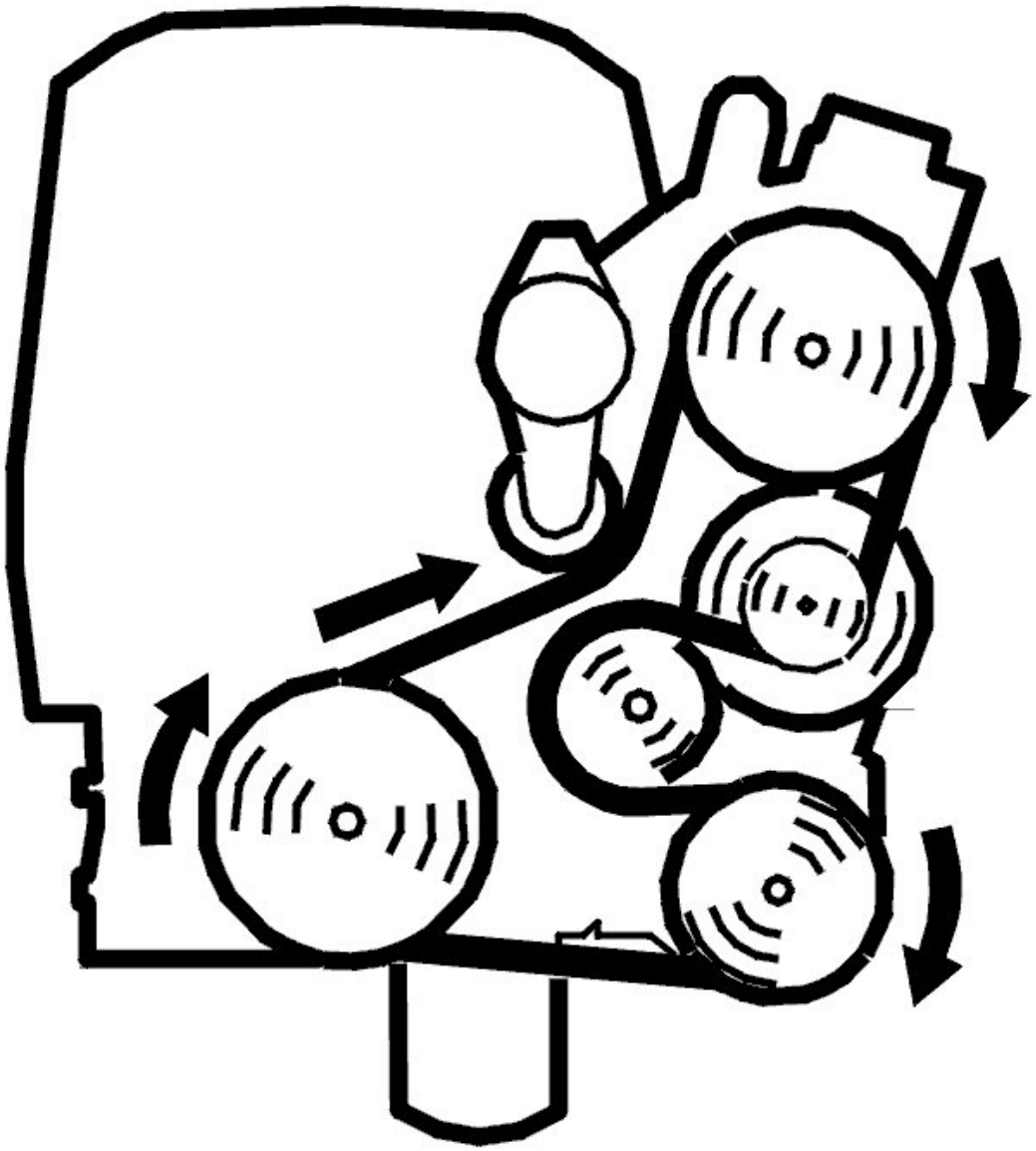
Continue - Verification

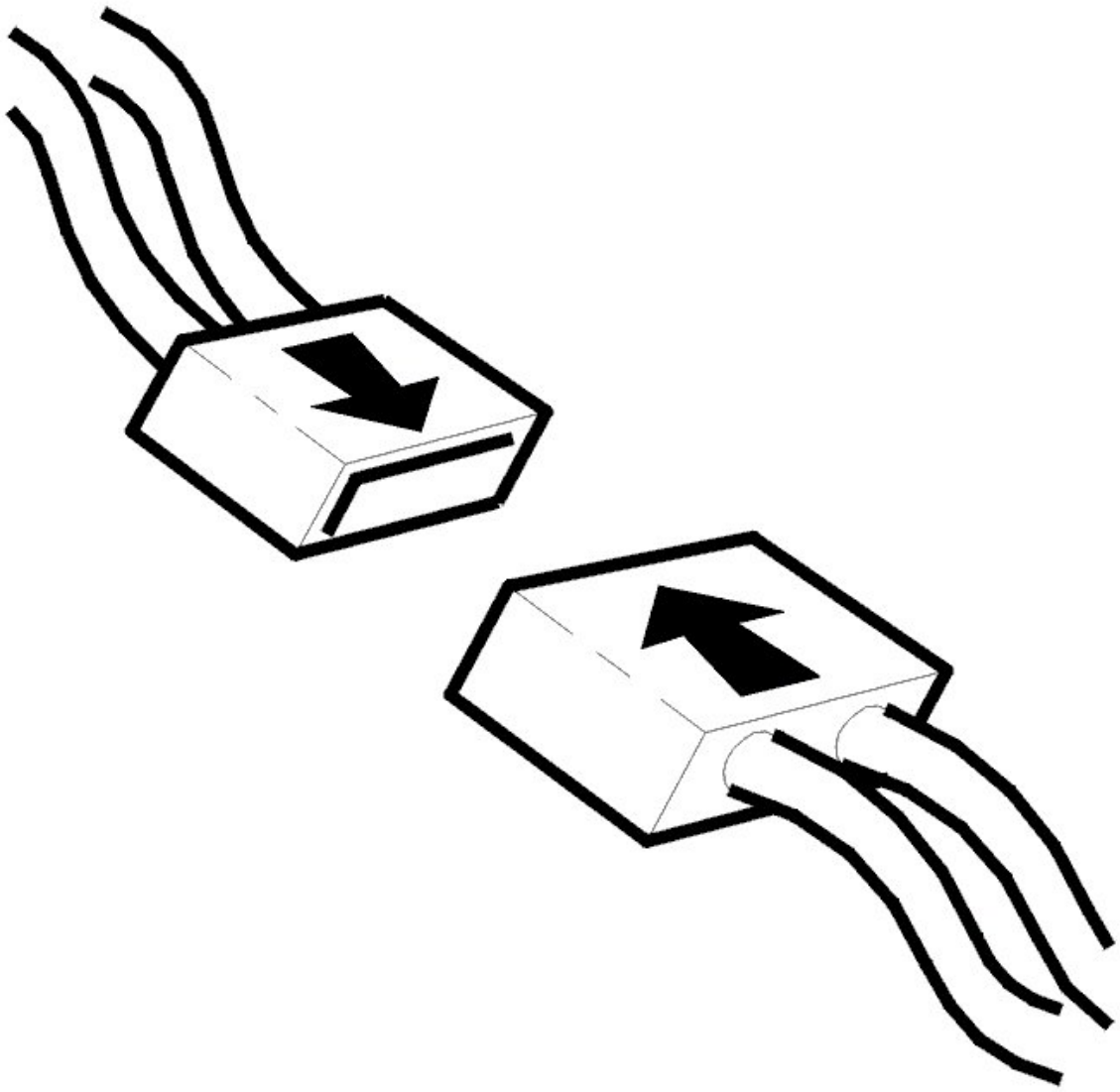
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring during the first 1000 engine revolutions. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
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Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
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- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

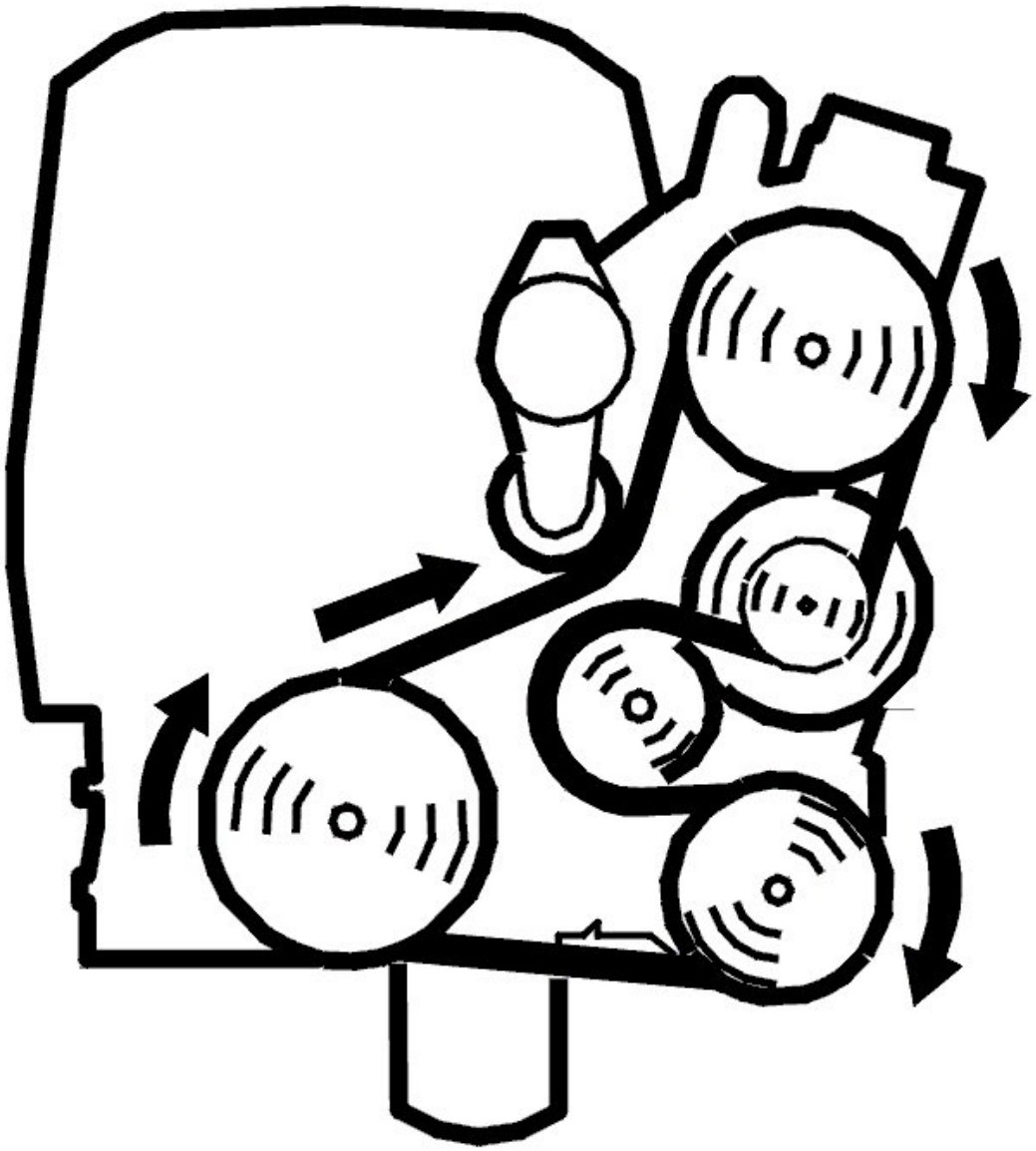
Continue - Verification

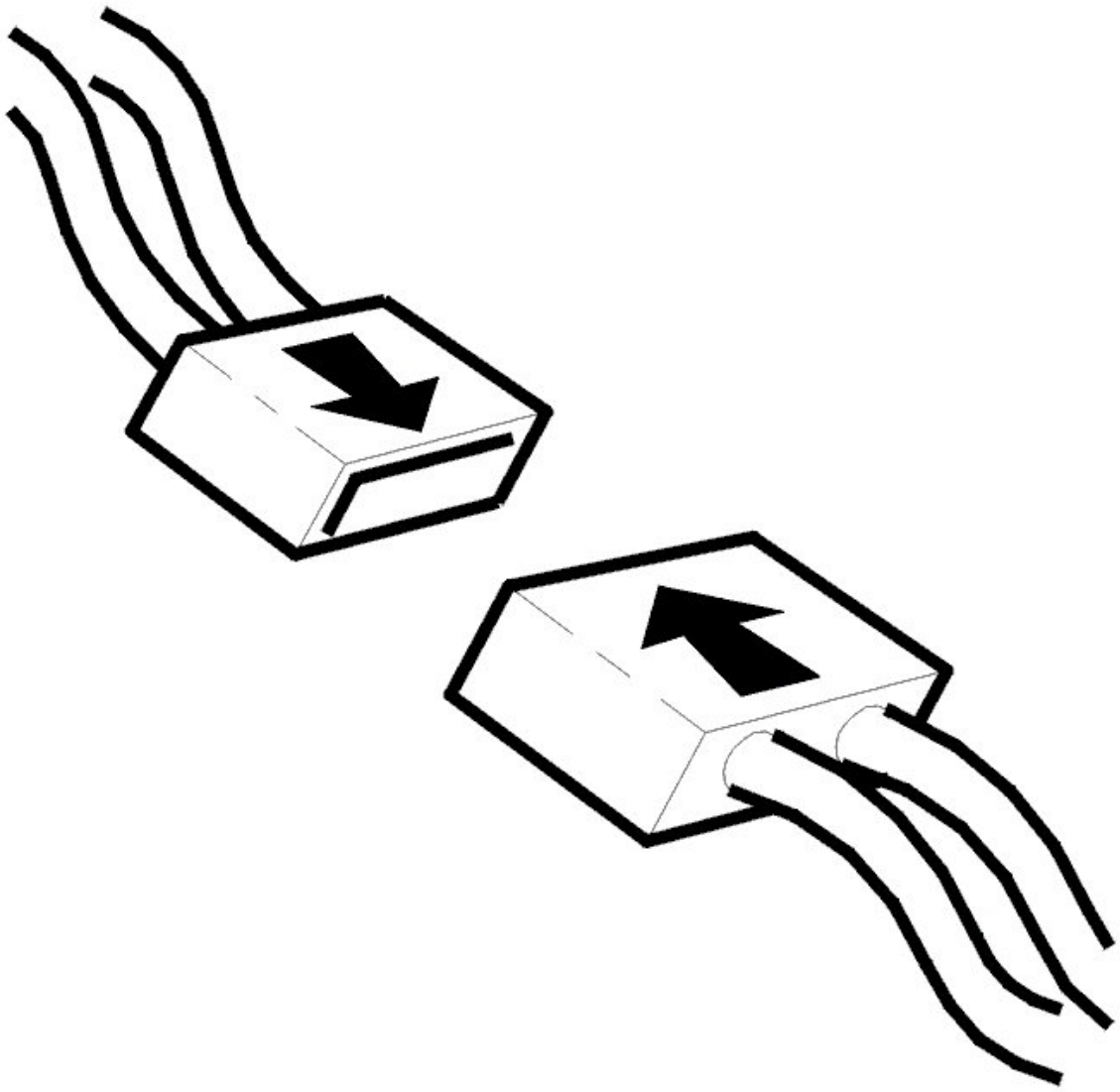
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which could damage the catalytic converter after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

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Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

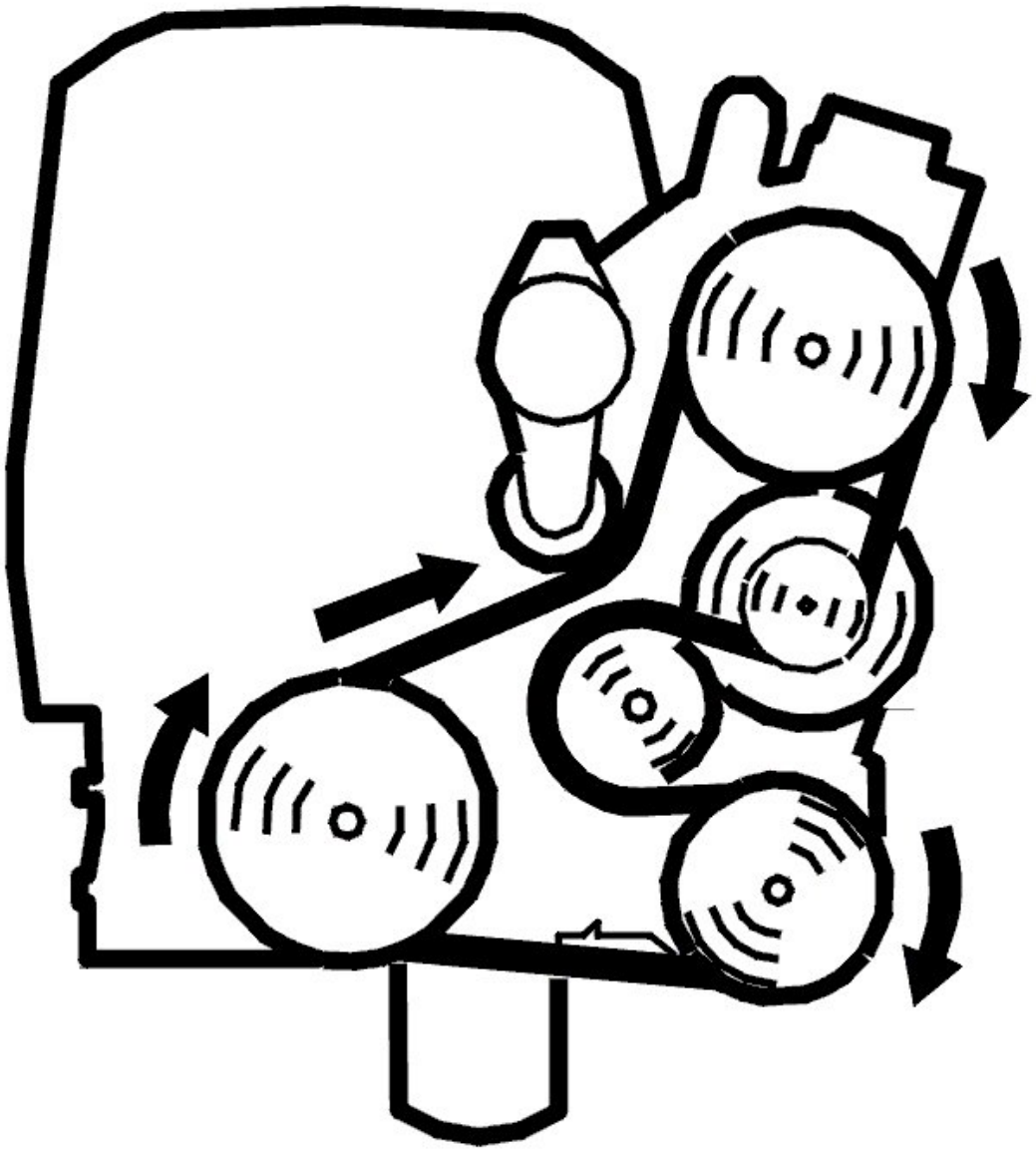
Continue - Verification

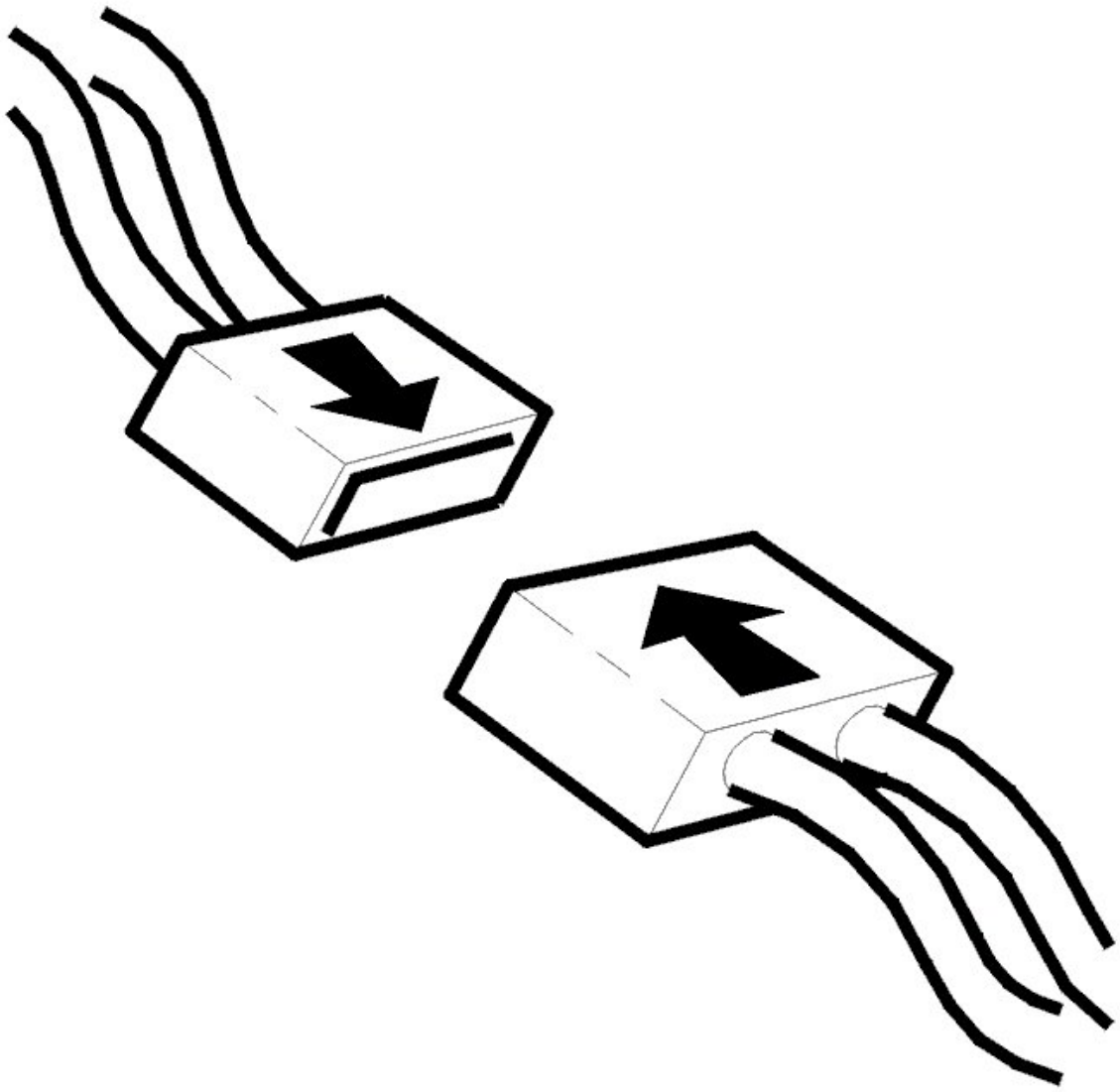
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which affects emissions after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

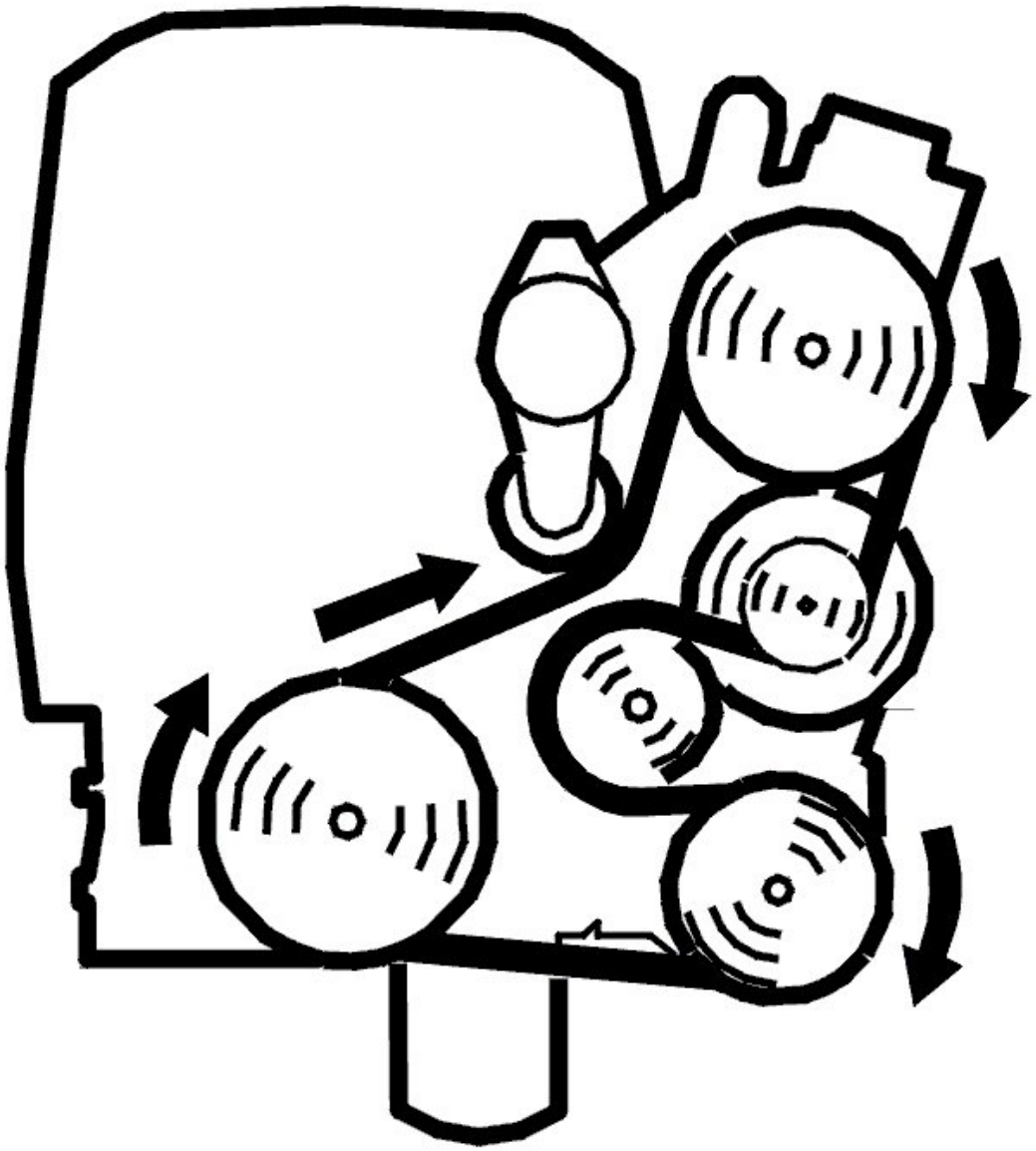
Continue - Verification

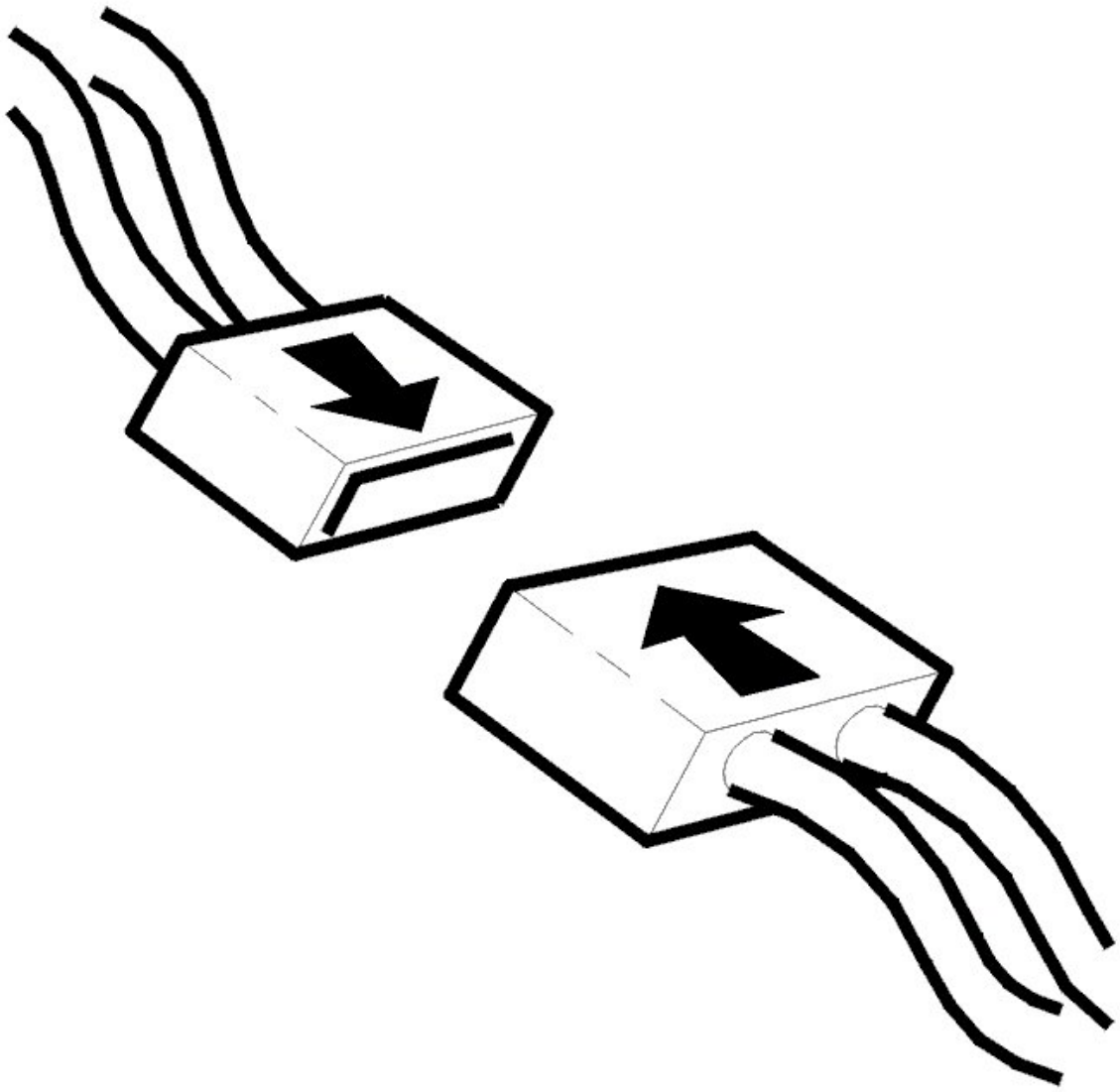
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring during the first 1000 engine revolutions. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

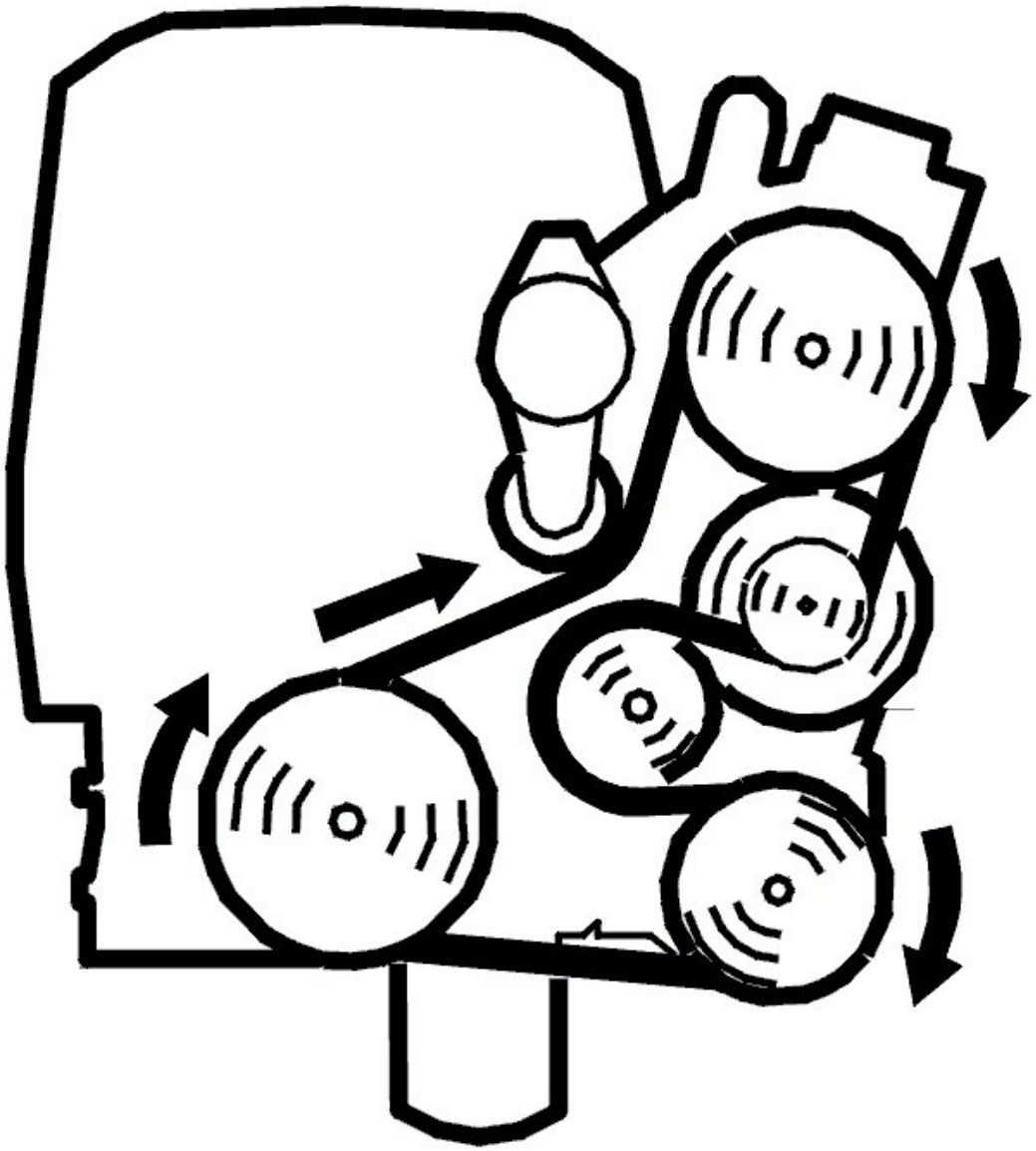
Continue - Verification

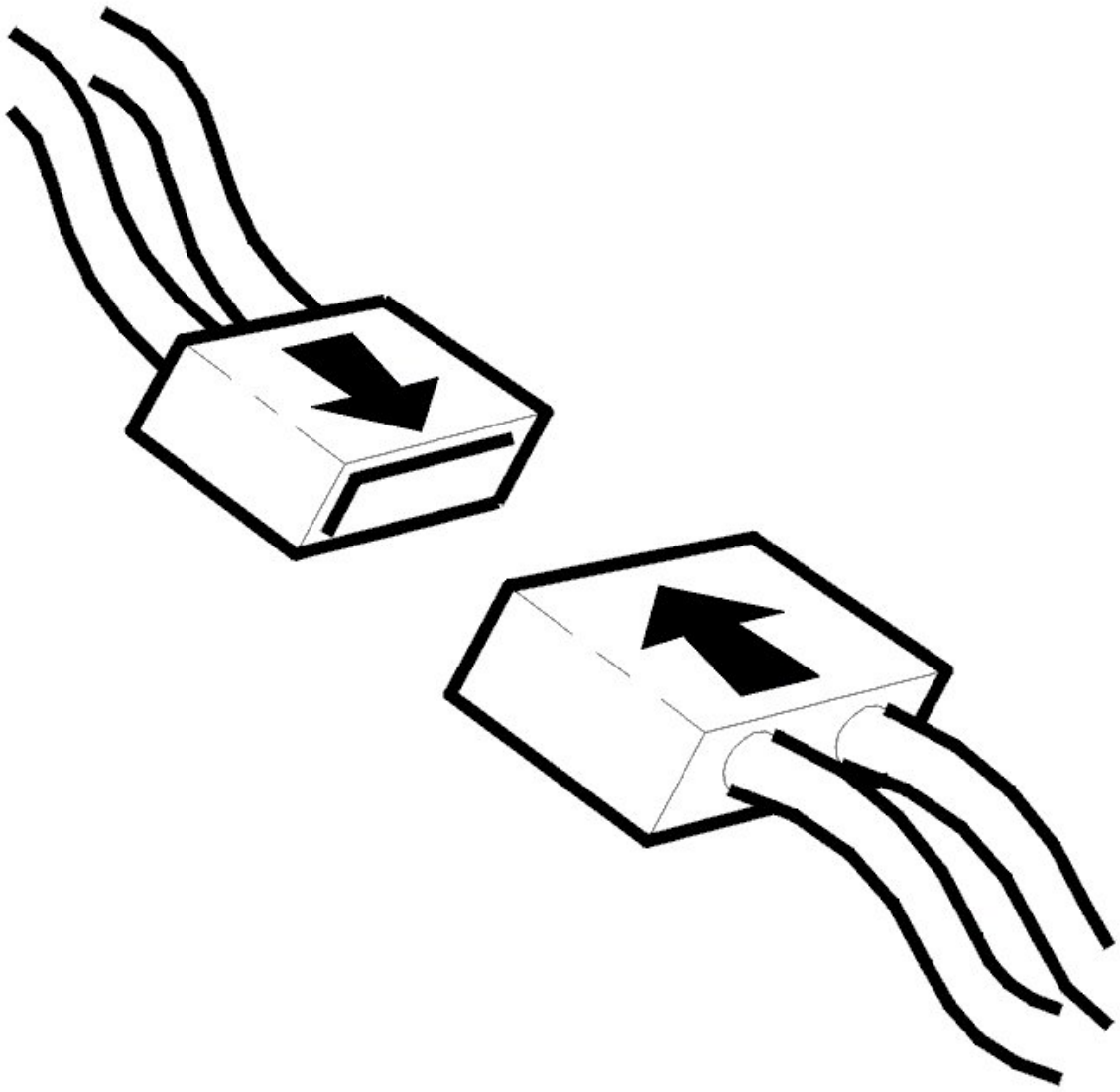
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which could damage the catalytic converter after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

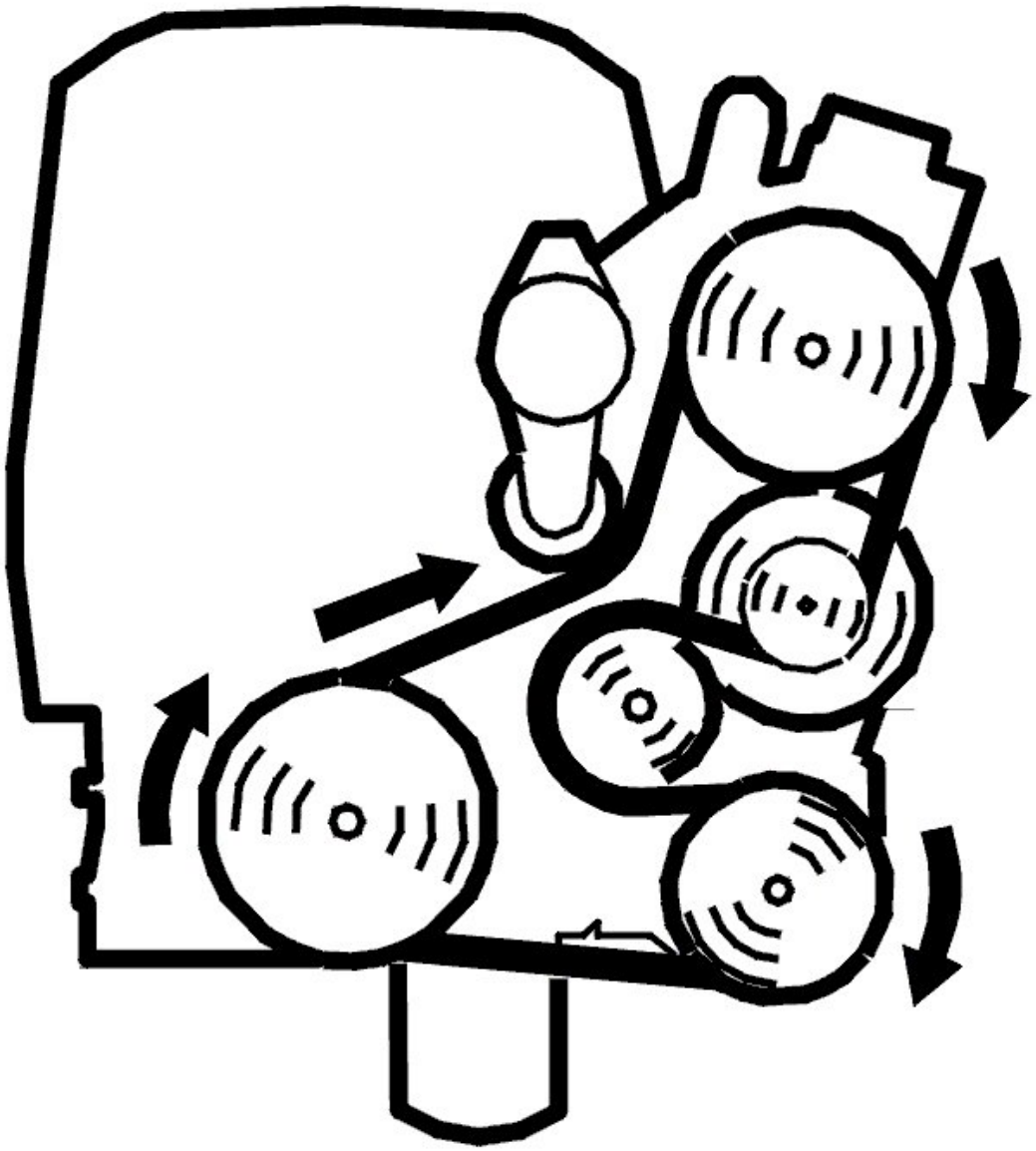
Continue - Verification

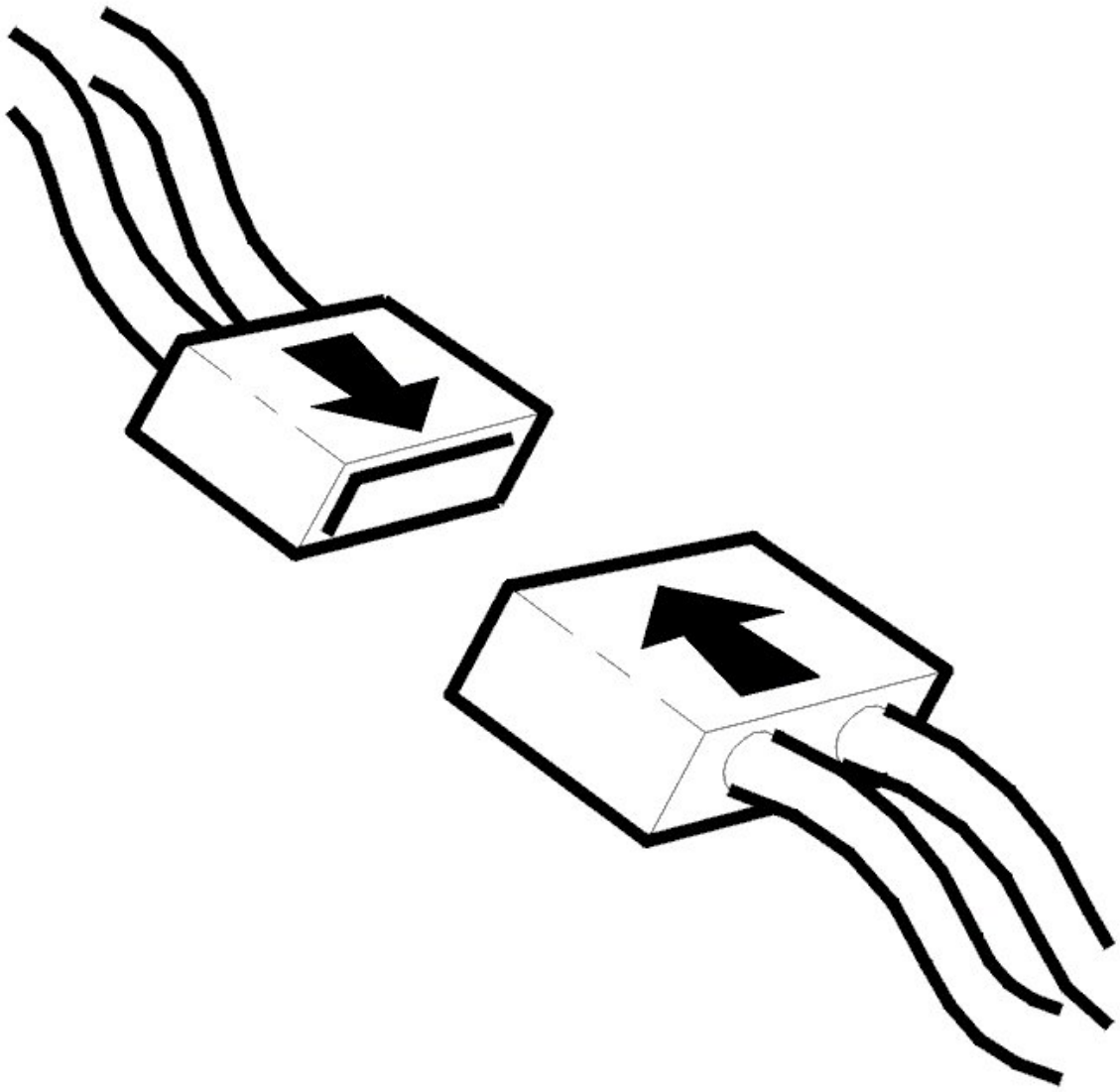
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects misfiring which affects emissions after the first 1000 engine revolutions after the engine is started. The diagnostic trouble code (DTC) indicates which cylinder is misfiring. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

- ECM-3110: cylinder 1
- ECM-3120: cylinder 2
- ECM-3130: cylinder 3
- ECM-3140: cylinder 4
- ECM-3150: cylinder 5.

Substitute value

- Rear heated oxygen sensor control shut off
- Fuel trim switched off.

Possible source

- Low fuel level
- Engine does not reach normal operating temperature between several cold starts
- Water in the spark plug wells
- Damaged spark plug
- Contaminated or incorrect fuel
- Poor fuel quality (summer fuel in winter).
- Air leakage
- Blocked crankcase ventilation.
- Damaged VVT-unit.
- Blocked / leaking injector
- Faulty fuel pressure
- Uneven compression

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine misfires
- The engine is difficult to start
- Deterioration in performance
- Uneven idle
- The engine is not firing on all cylinders.

Emissions Impact / Catalytic Converter Damage / Start Up

Emissions impact / Catalytic converter damage / Start up

Checking the fuel injection system, ignition system and components

Note! In the event of diagnostic trouble codes (DTCs), that affect camshaft control or camshaft reset valve, these must be fault-traced first.

Hint: In certain cases, the engine control module (ECM) can determine which cylinder has misfired.

Check the fuel level in the fuel tank.
Check that the engine oil level is correct.
Look for moisture in the electrical terminals for the ignition coils and in the spark plug wells.
Check the spark plugs. Check for damage in the insulation and for any other damage.
Check the engine intake system for leakage.
Check the crankcase ventilation. Check for blockage.
Check the fuel pressure and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Other information

- For information about the misfire diagnostic, see "Design and Function, Diagnostic function".
- Air leaks in the intake system, checking See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leaks in the Intake System, Checking
- Fuel system pressure, checking See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking Fuel system pressure, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Fuel System Pressure, Checking
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test

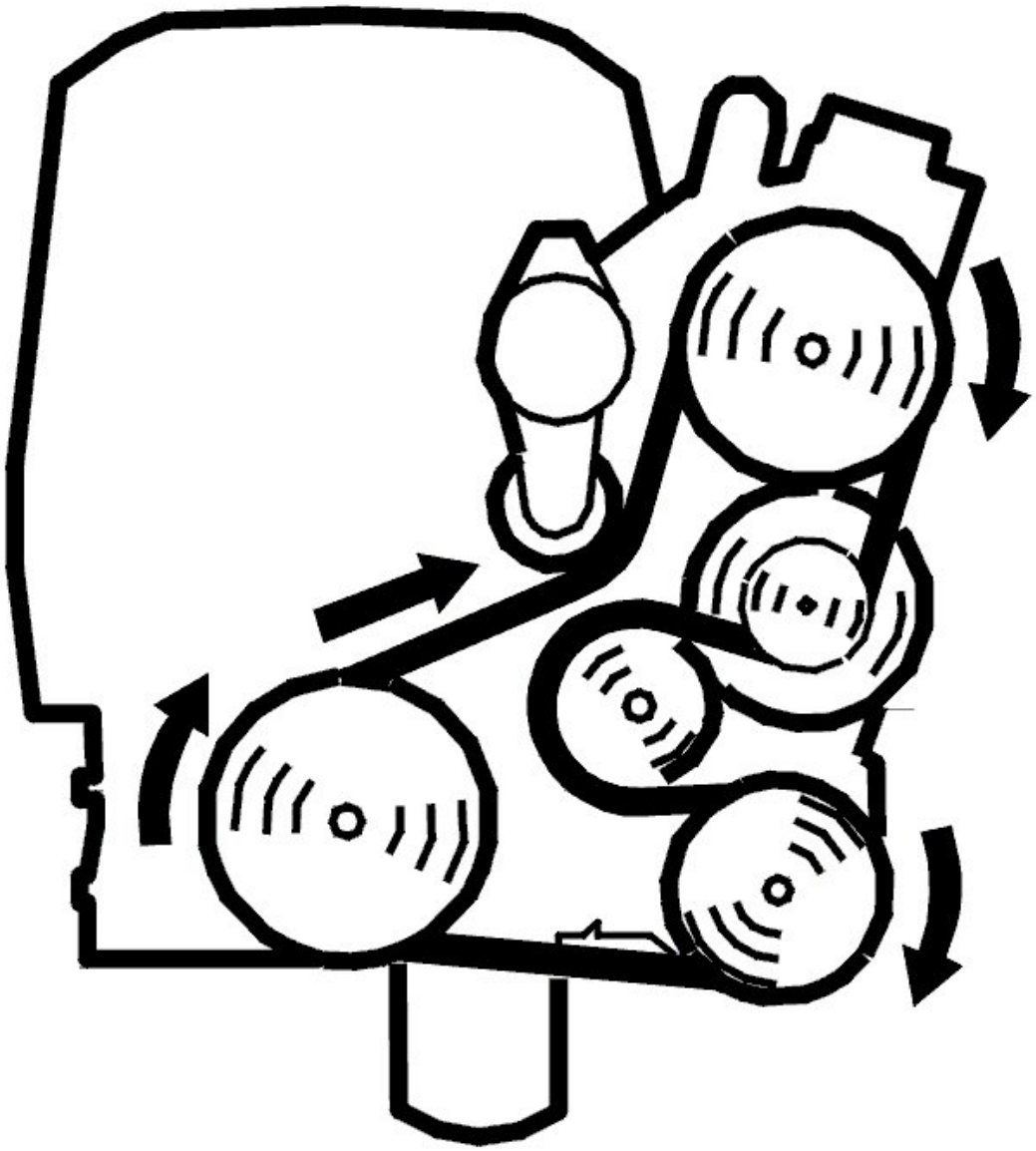
Continue - Verification

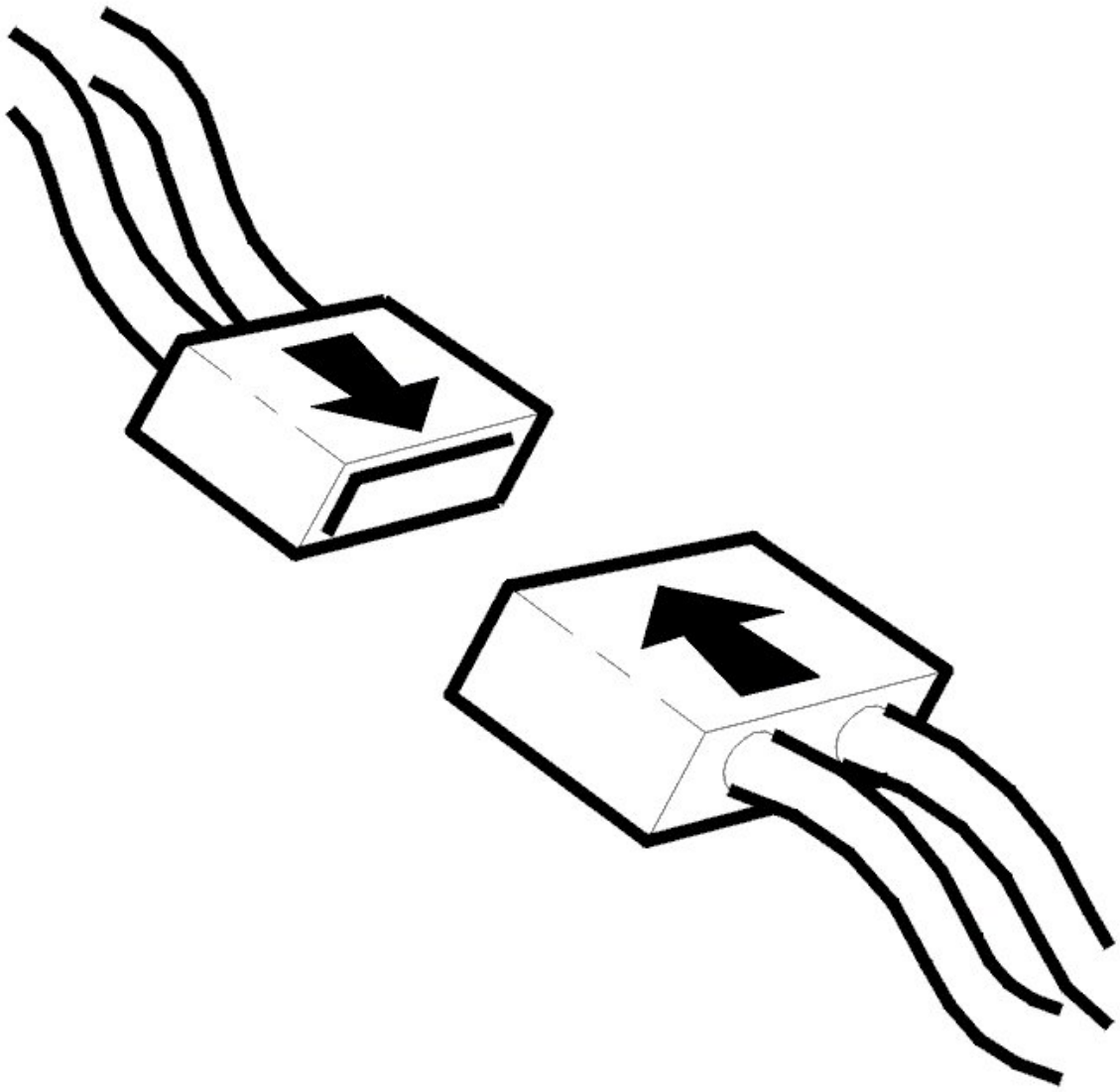
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine.

Check that the misfire counter is not counting upwards. Check that the engine is firing on all cylinders.

Note! Misfire can occur at different engine speeds and loads.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - ignition system and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-330B

Condition

If there is no signal from the engine speed (RPM) sensor or if its signal is lower than the engine speed signal from the camshaft position (CMP) sensor, the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

The engine control module (ECM) uses the signal from the camshaft position (CMP) sensor if the camshaft position (CMP) sensor has been adapted.

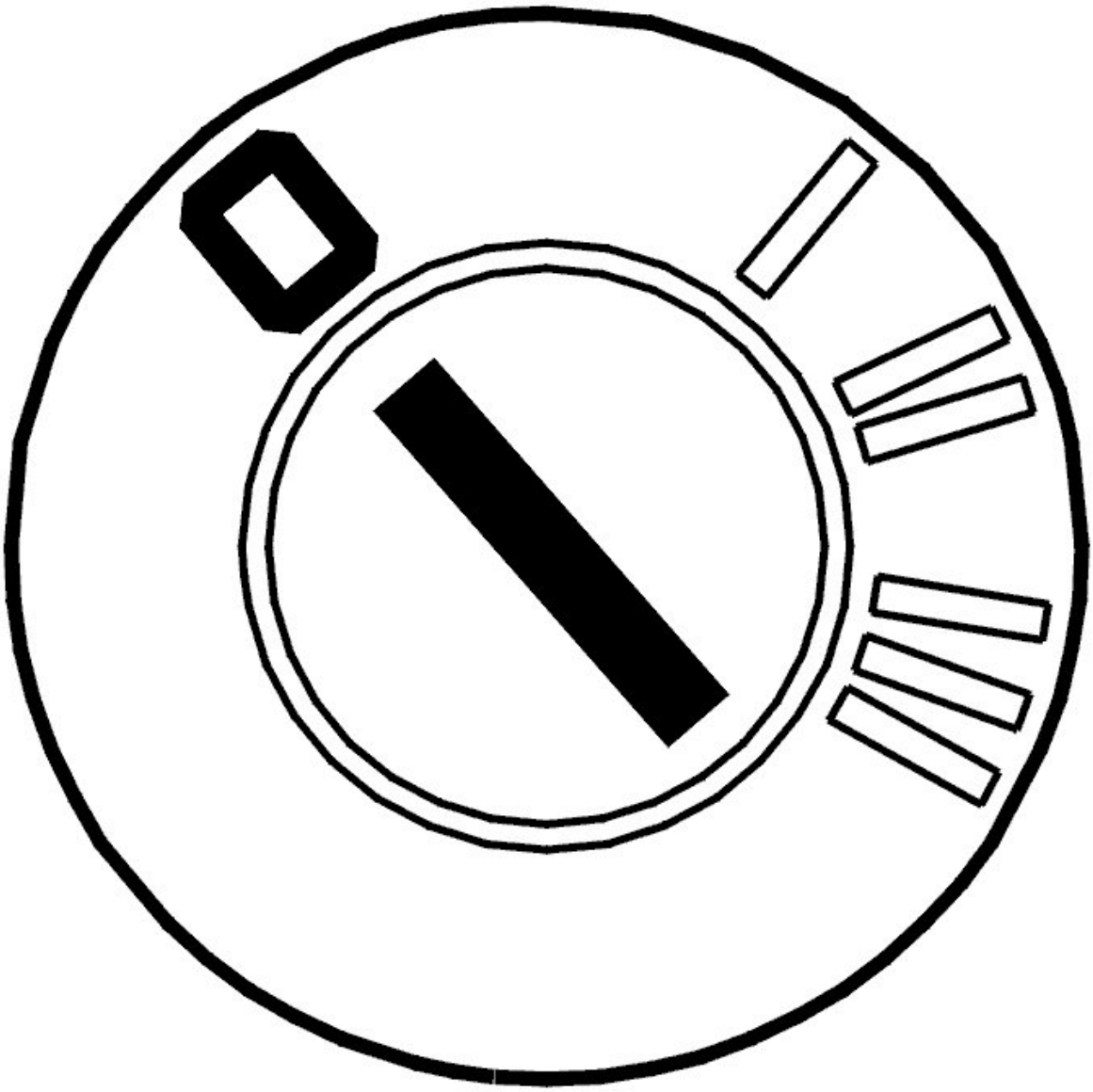
Possible source
- Open-circuit in the signal cable or ground lead
- Short-circuit to ground or supply voltage in the signal cable
- Contact resistance in the terminals
- Damaged engine speed (RPM) sensor
- Damaged carrier plate.

Fault symptom[s]
- The engine does not start
- The engine stops.

Signal Missing

Signal missing

Checking connectors and wiring



- Ignition off.

Check the engine speed (RPM) sensor connector. Check for contact resistance and oxidation.

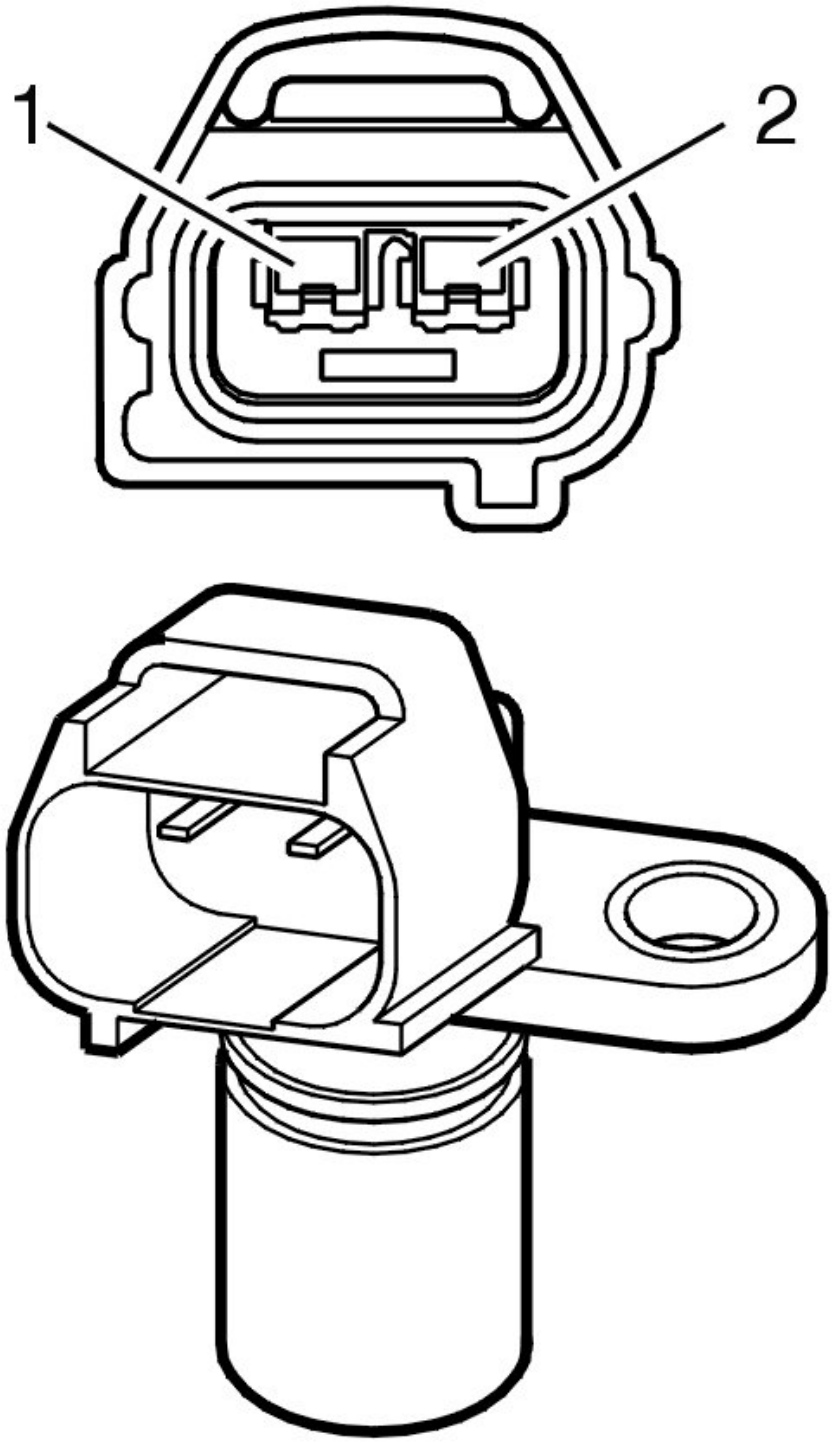
Check the signal cable between:

- The engine speed (RPM) sensor terminal #1 and Engine control module (ECM) terminal #A48 (#A48).
- The engine speed (RPM) sensor terminal #2 and Engine control module (ECM) terminal #A66 (#B6).

Check the signal line for open circuit, short-circuit to ground and short-circuit to voltage.
Check the carrier plate.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine speed (RPM) sensor, replacing See: Crankshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



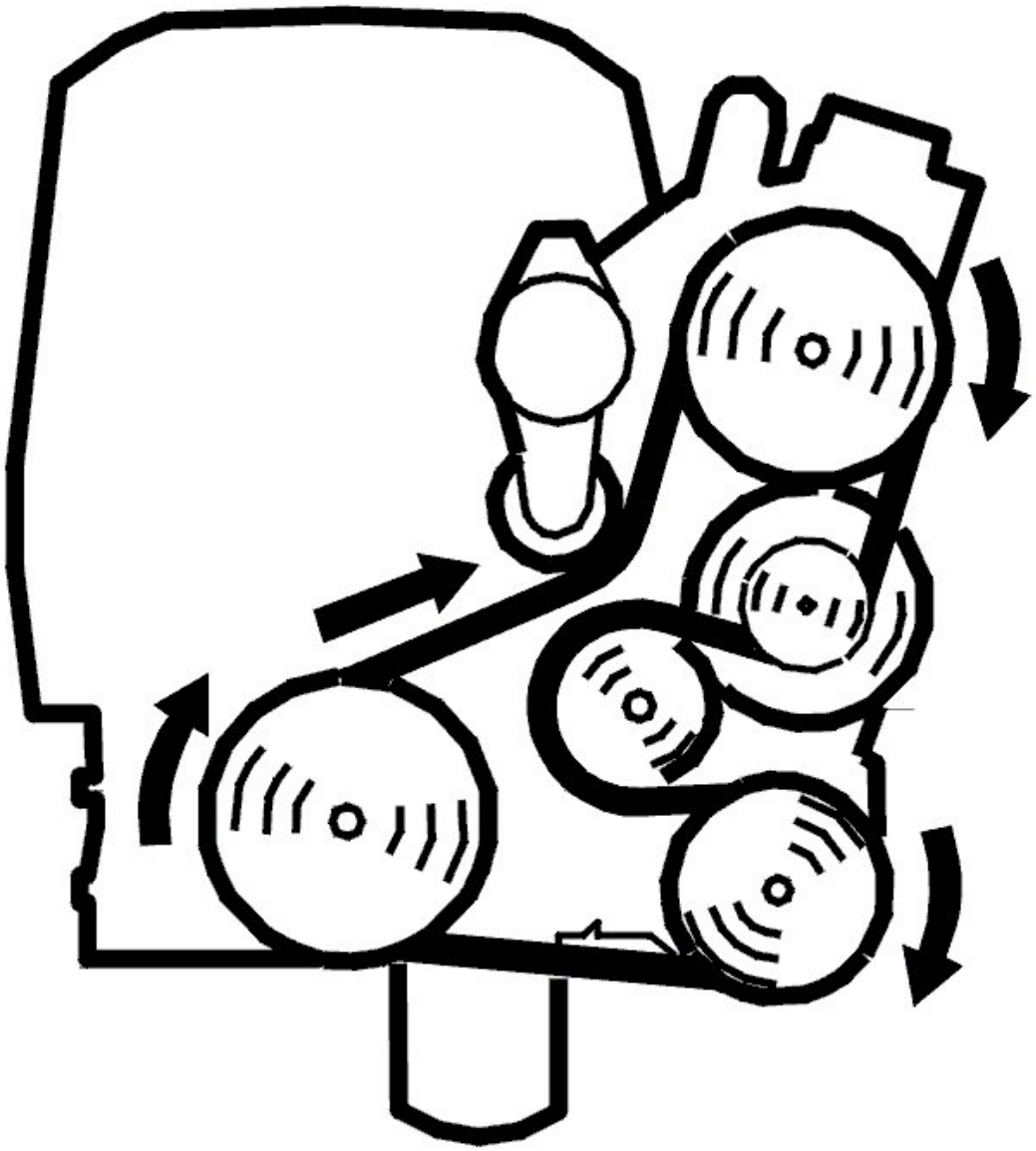
Continue - Verification

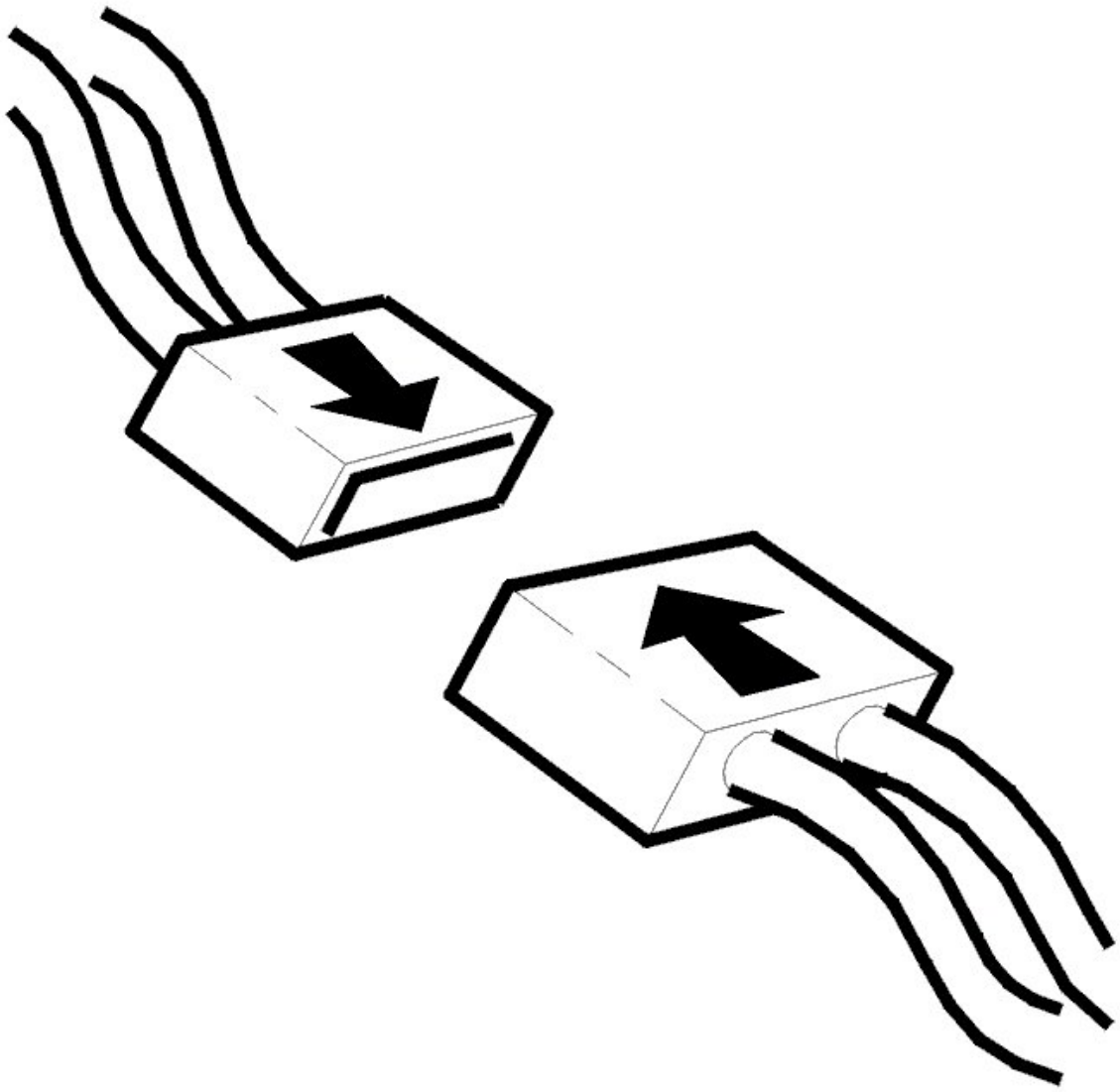
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

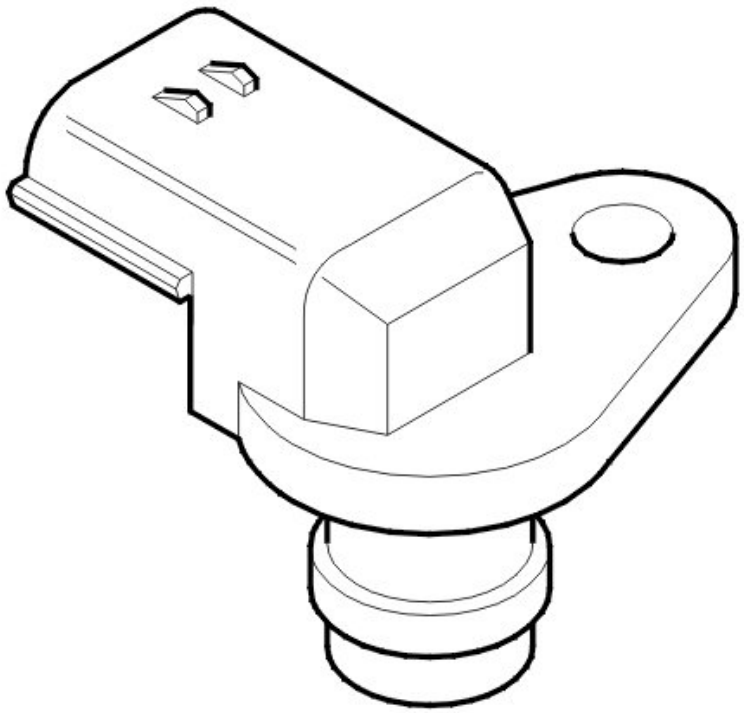
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking connectors and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340B is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341B is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
If there is no signal from the camshaft position (CMP) sensor although it appears sporadically, the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

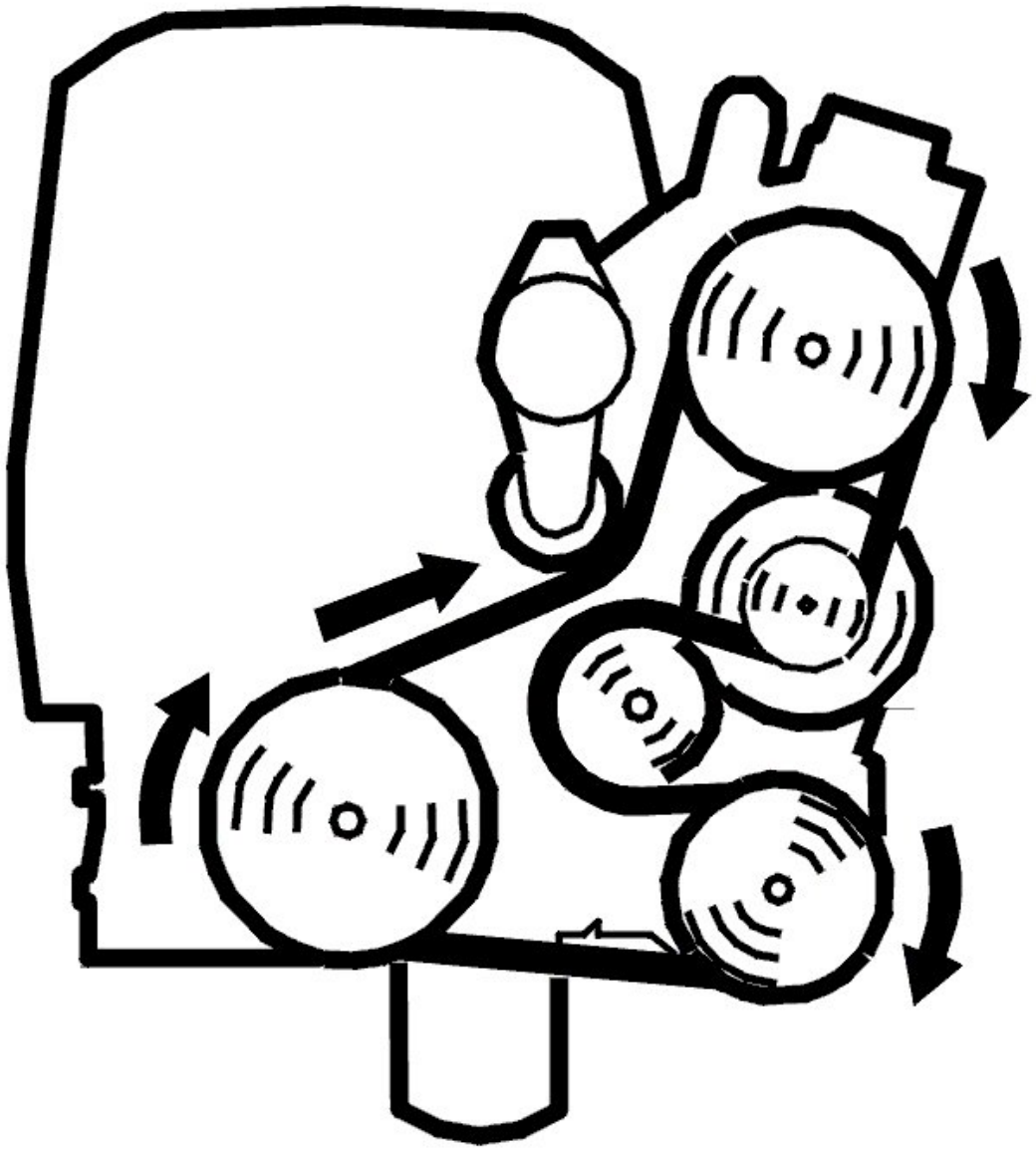
Possible source
- The camshaft position (CMP) sensor is in the wrong position
- Damaged camshaft position (CMP) sensor
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the status

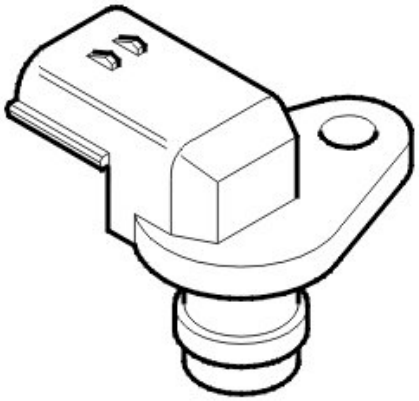


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

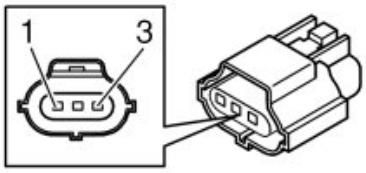
Check that the camshaft position (CMP) sensor is correctly installed. Check that neither the camshaft position (CMP) sensor nor the housing is damaged. Damage may affect the position of the sensor in relation to the camshaft rotor.

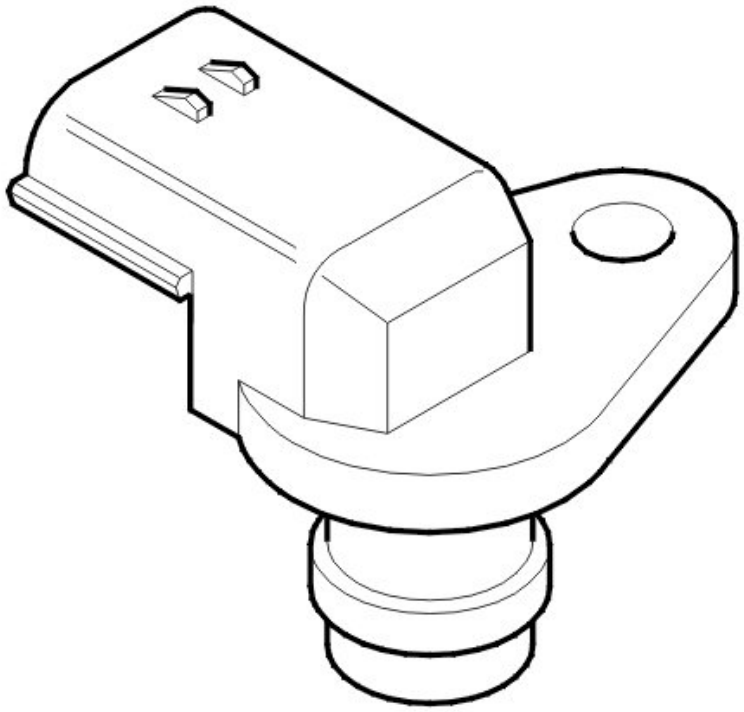
Hint: This diagnostic trouble code (DTC) may be caused by a faulty camshaft position (CMP) sensor.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





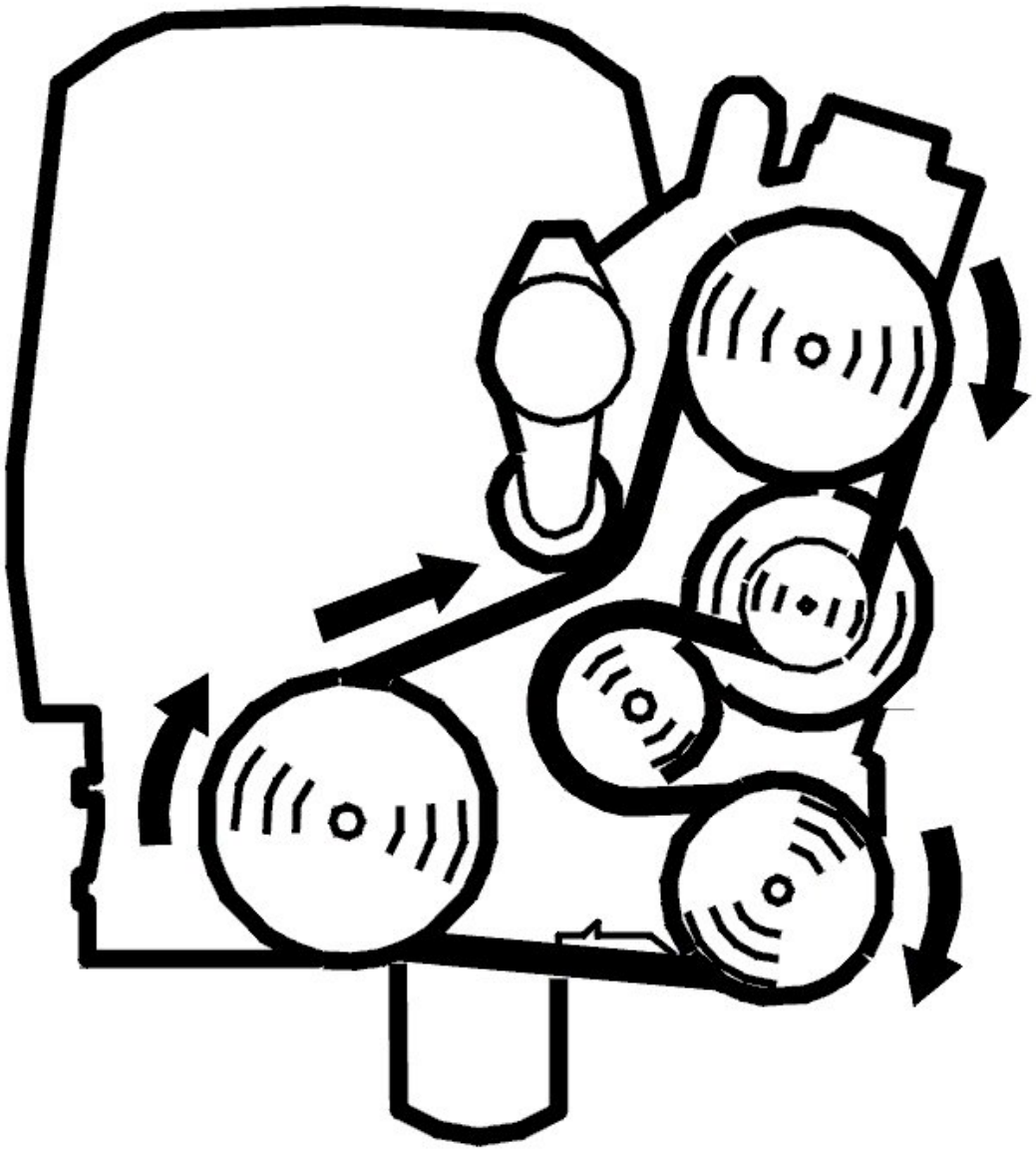
Continue - Verification

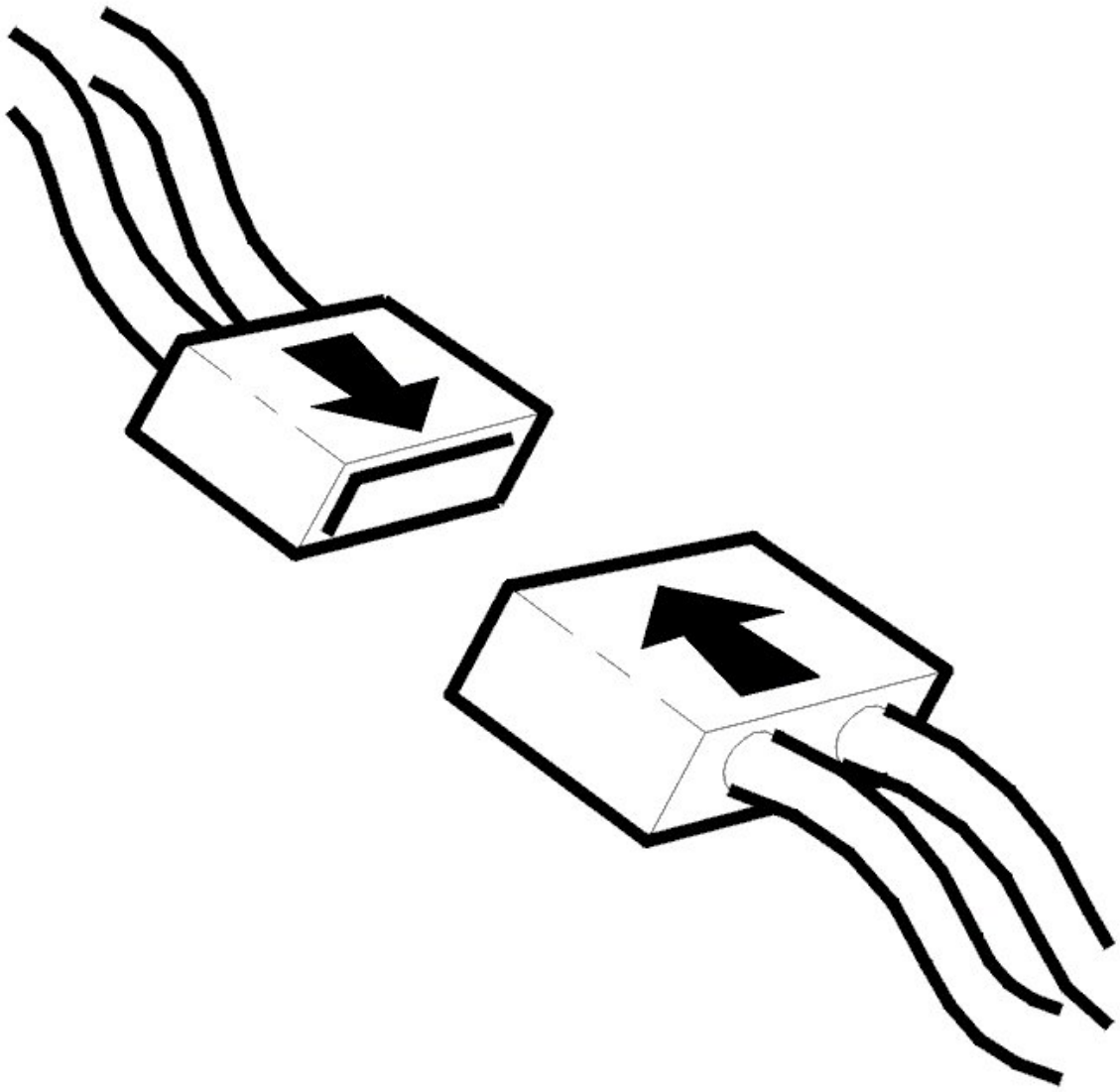
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

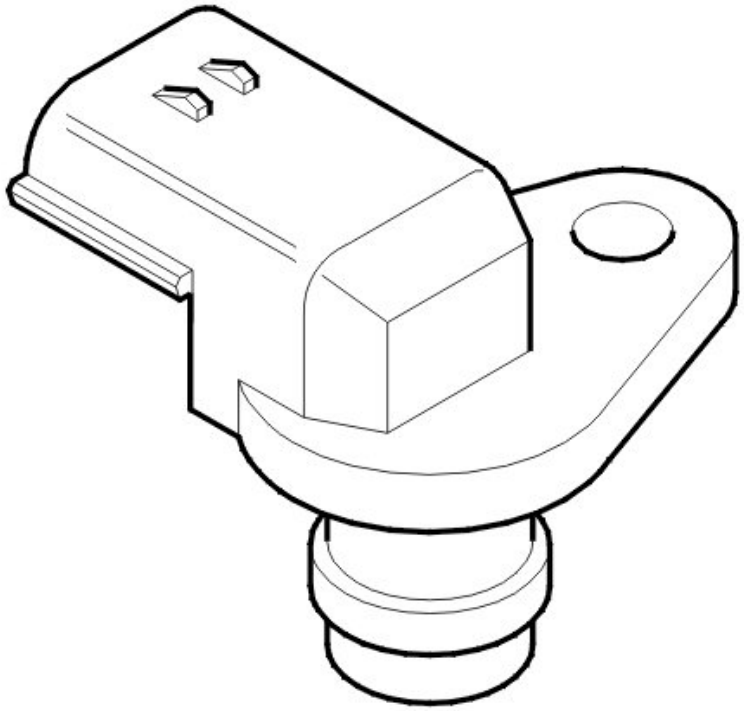
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340C is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341C is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is constantly high. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

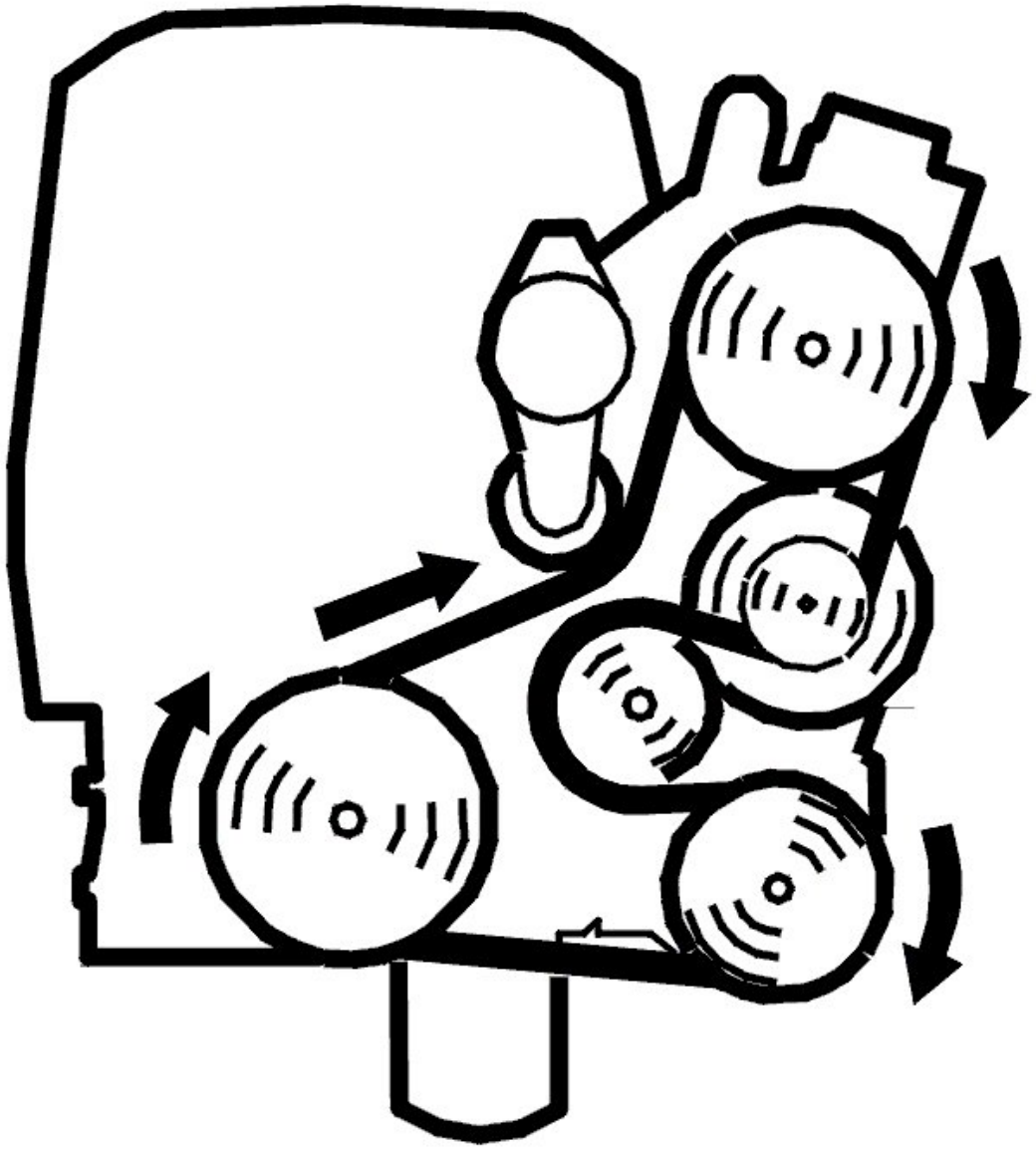
Possible source
- Open-circuit in the signal cable
- Short-circuit to supply voltage in the signal cable
- Short-circuit to ground in the power cable
- Open-circuit in the ground lead
- Damaged camshaft position (CMP) sensor.

Fault symptom[s]
- The engine is difficult to start.

Signal Too High

Signal too high

Checking the status



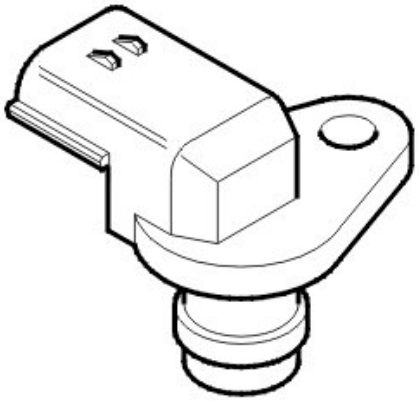
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Checking components and wiring

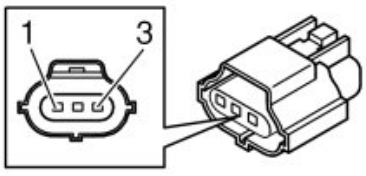
Checking components and wiring

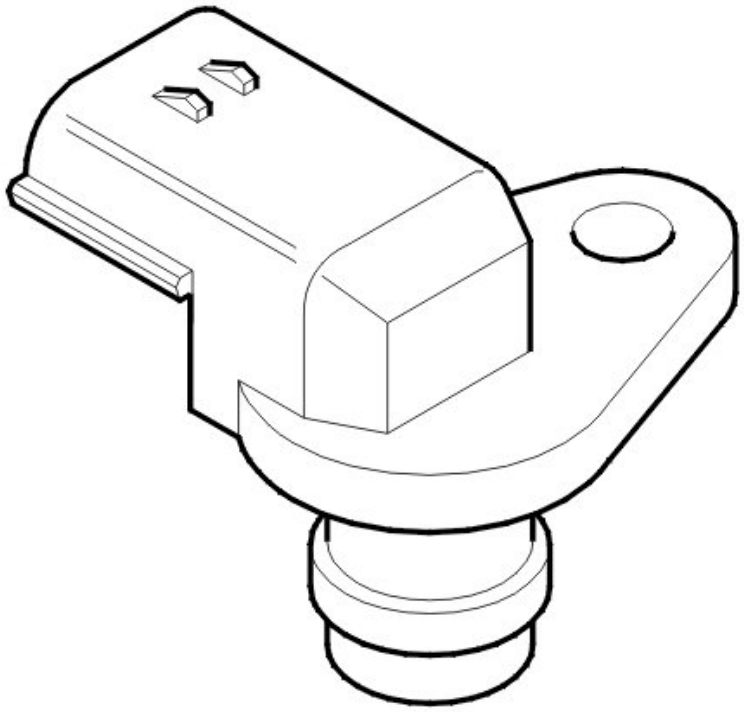
- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #A47 (#A47) and camshaft position (CMP) sensor connector terminal #3.
Check for an open-circuit. Check for a short-circuit to supply voltage.
Check the ground lead between engine control module (ECM) terminal #A65 (#B5) and camshaft position (CMP) sensor connector terminal #2.
Check for an open-circuit.
Check the power cable between engine control module (ECM) terminal #A29 (#A29) and camshaft position (CMP) sensor connector terminal #1.
Check for a short-circuit to ground.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





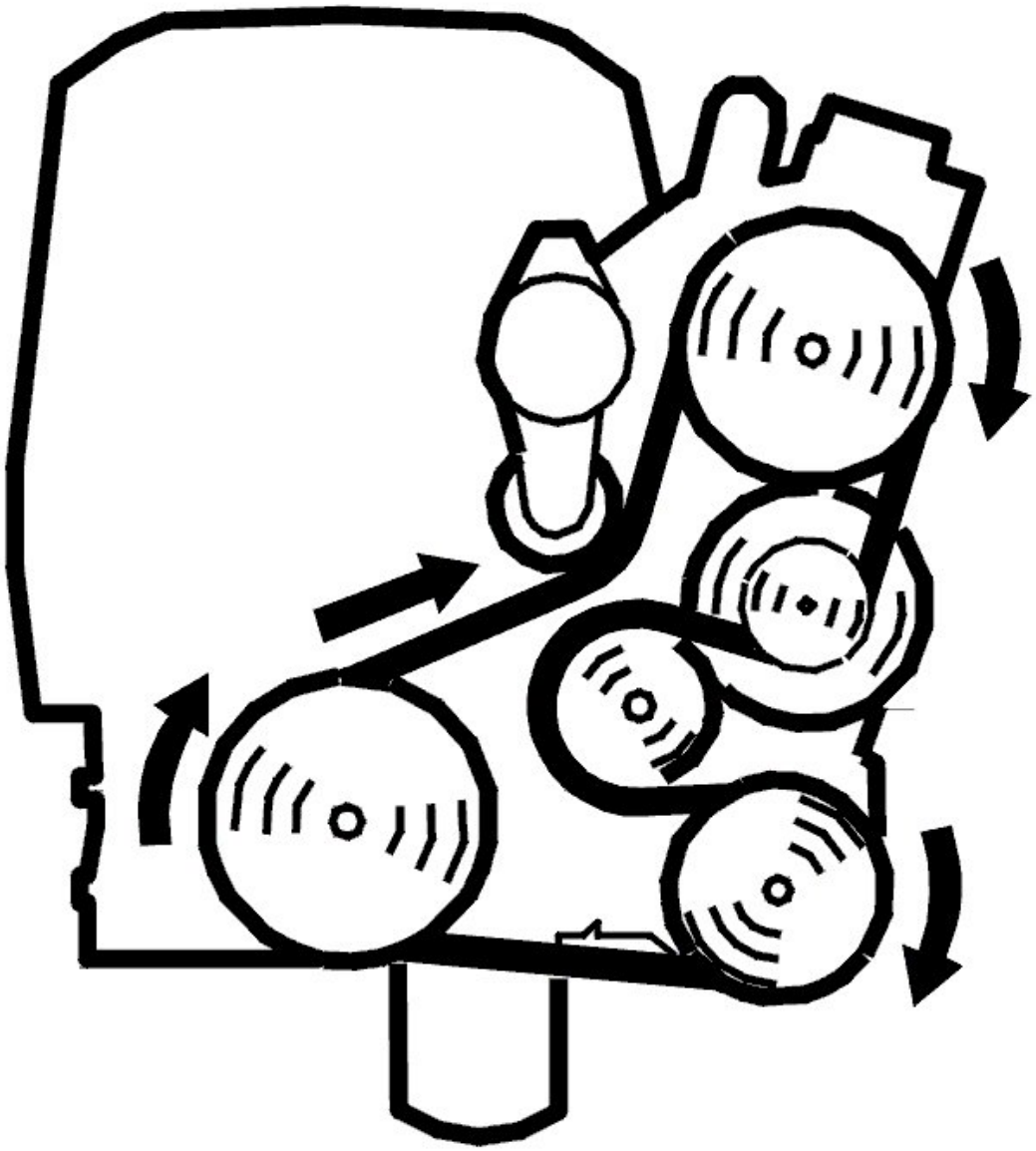
Continue - Verification

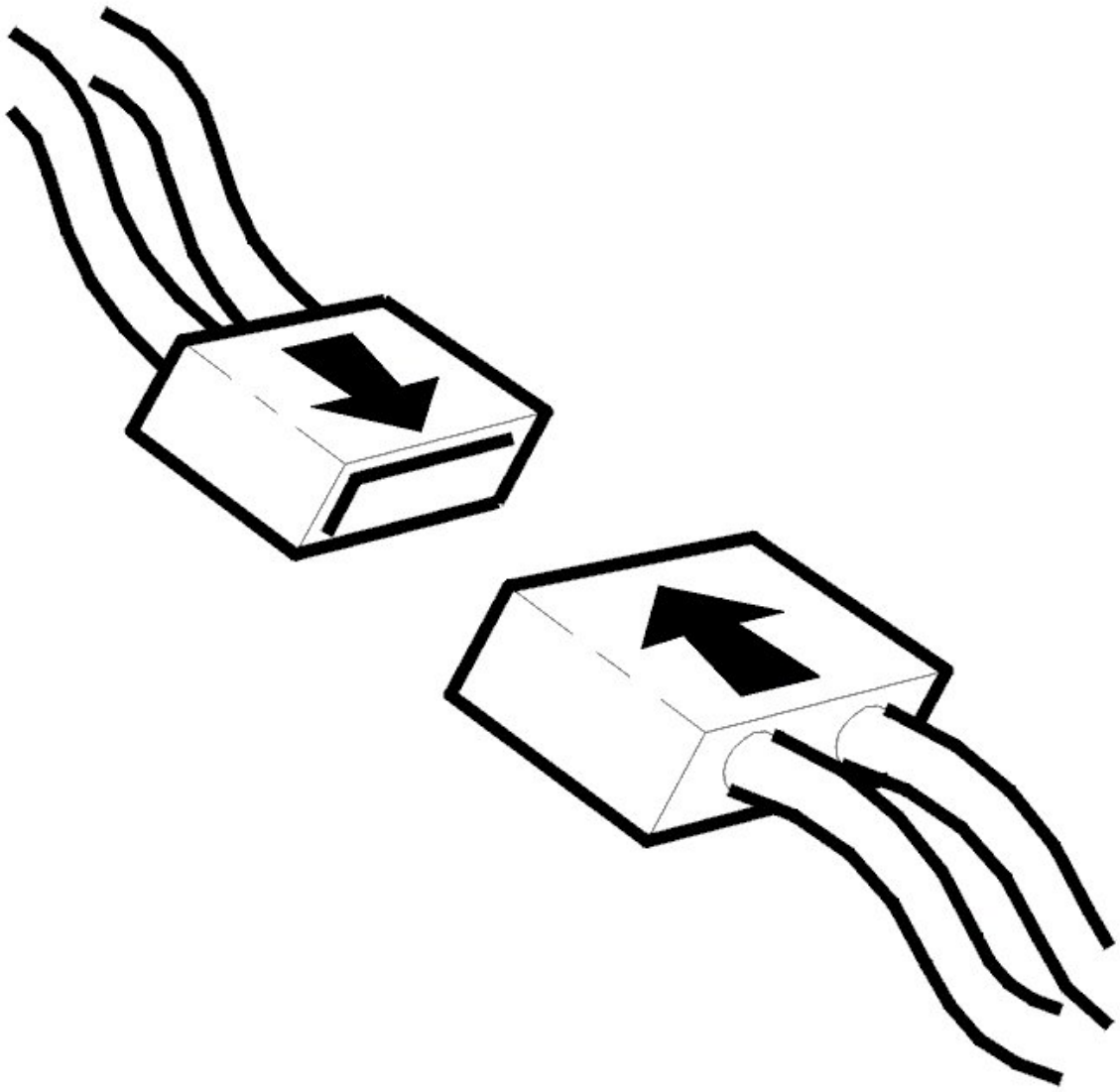
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

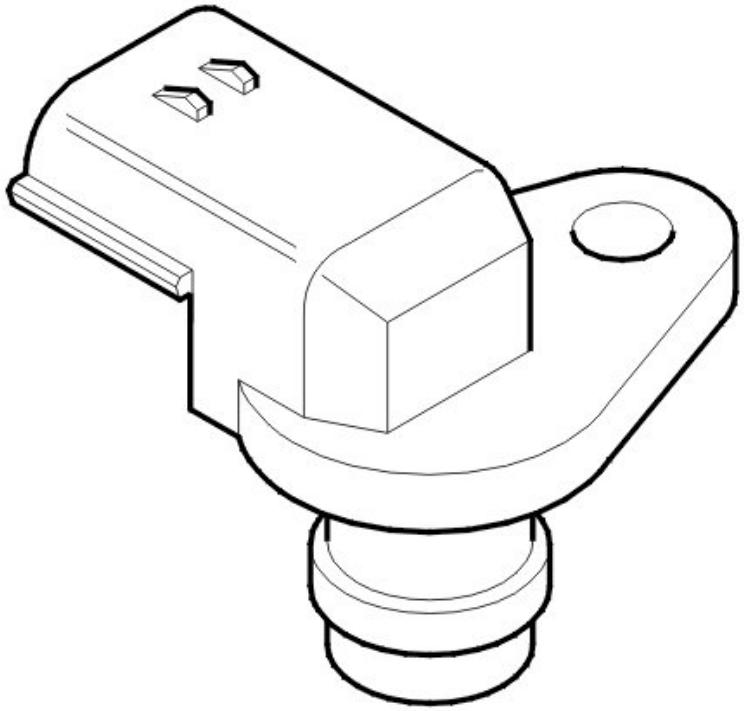
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340D is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341D is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is constantly low. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

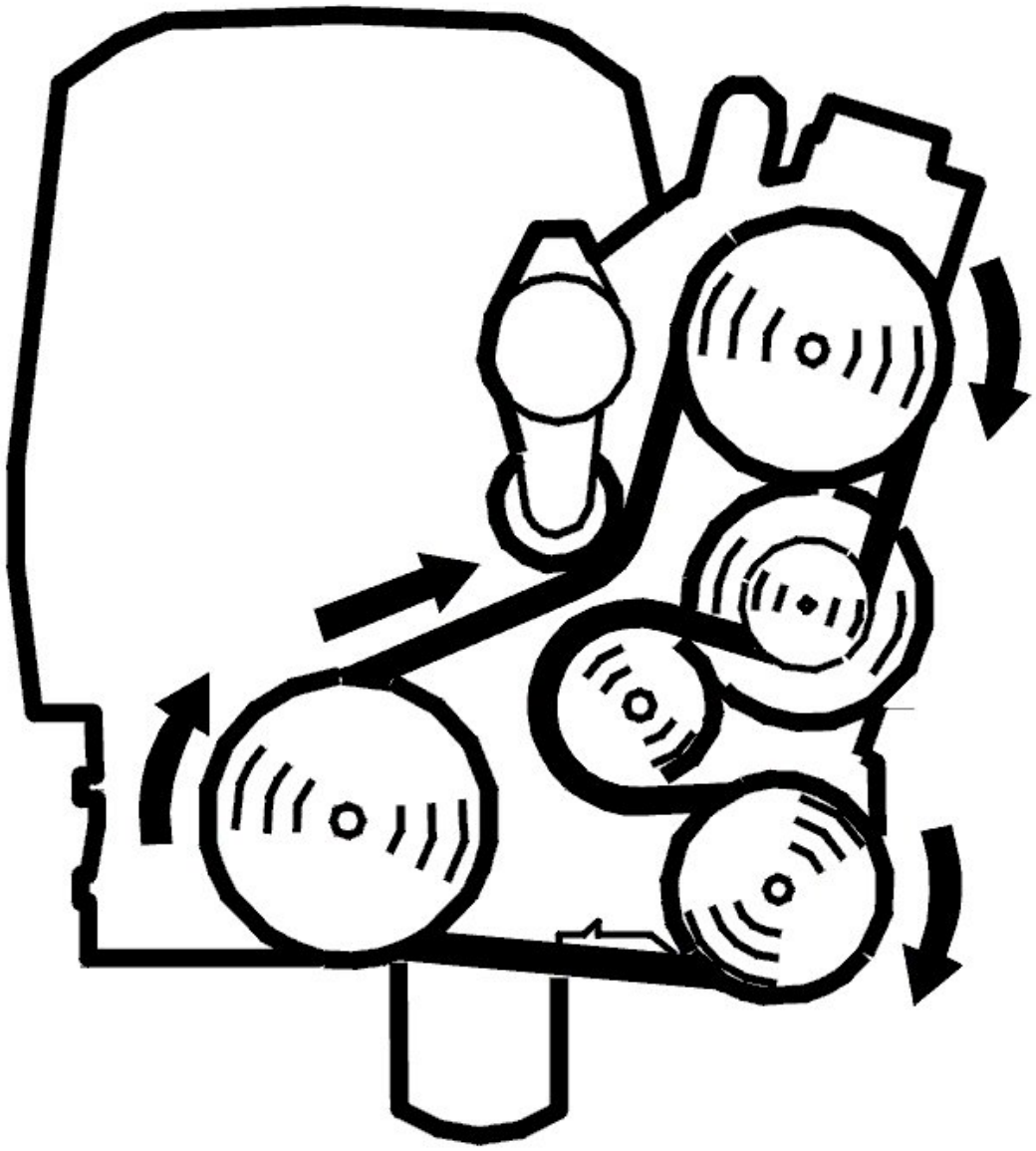
Possible source
- Short-circuit to ground in the signal cable
- Open-circuit in the power cable
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Signal Too Low

Signal too low

Checking the status

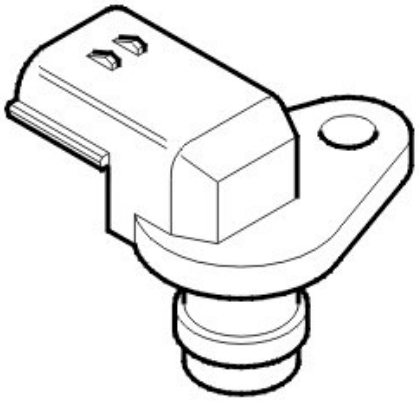


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

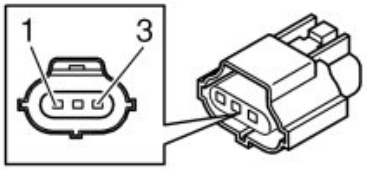
Check the signal cable between engine control module (ECM) terminal #A47 (#A47) and camshaft position (CMP) sensor connector terminal #3. Check for a short-circuit to ground.
Check the power cable between engine control module (ECM) terminal #A29 (#A29) and camshaft position (CMP) sensor connector terminal #1. Check for an open-circuit.

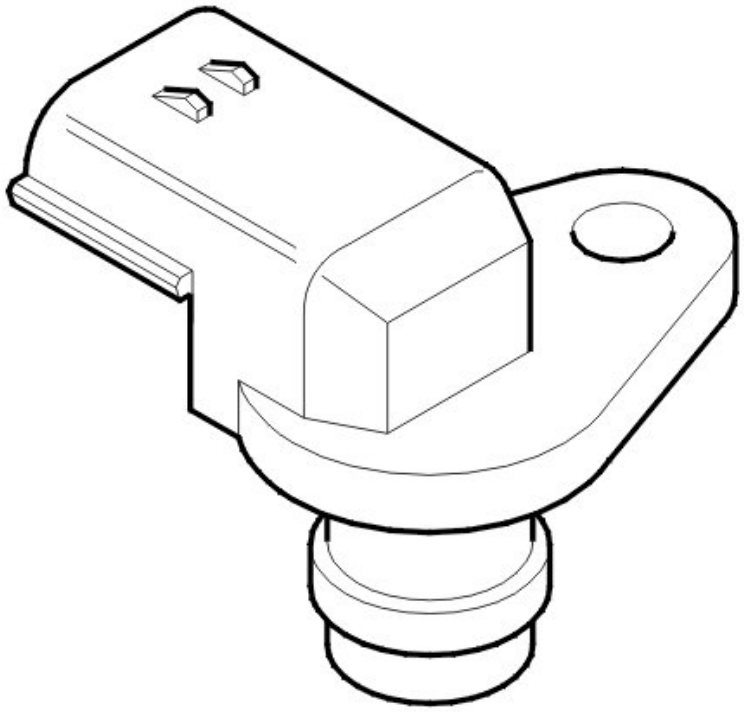
Hint: With the ignition on and the camshaft position (CMP) sensor connector disconnected, the voltage between terminal #1 and ground terminal should be approximately 5 V.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





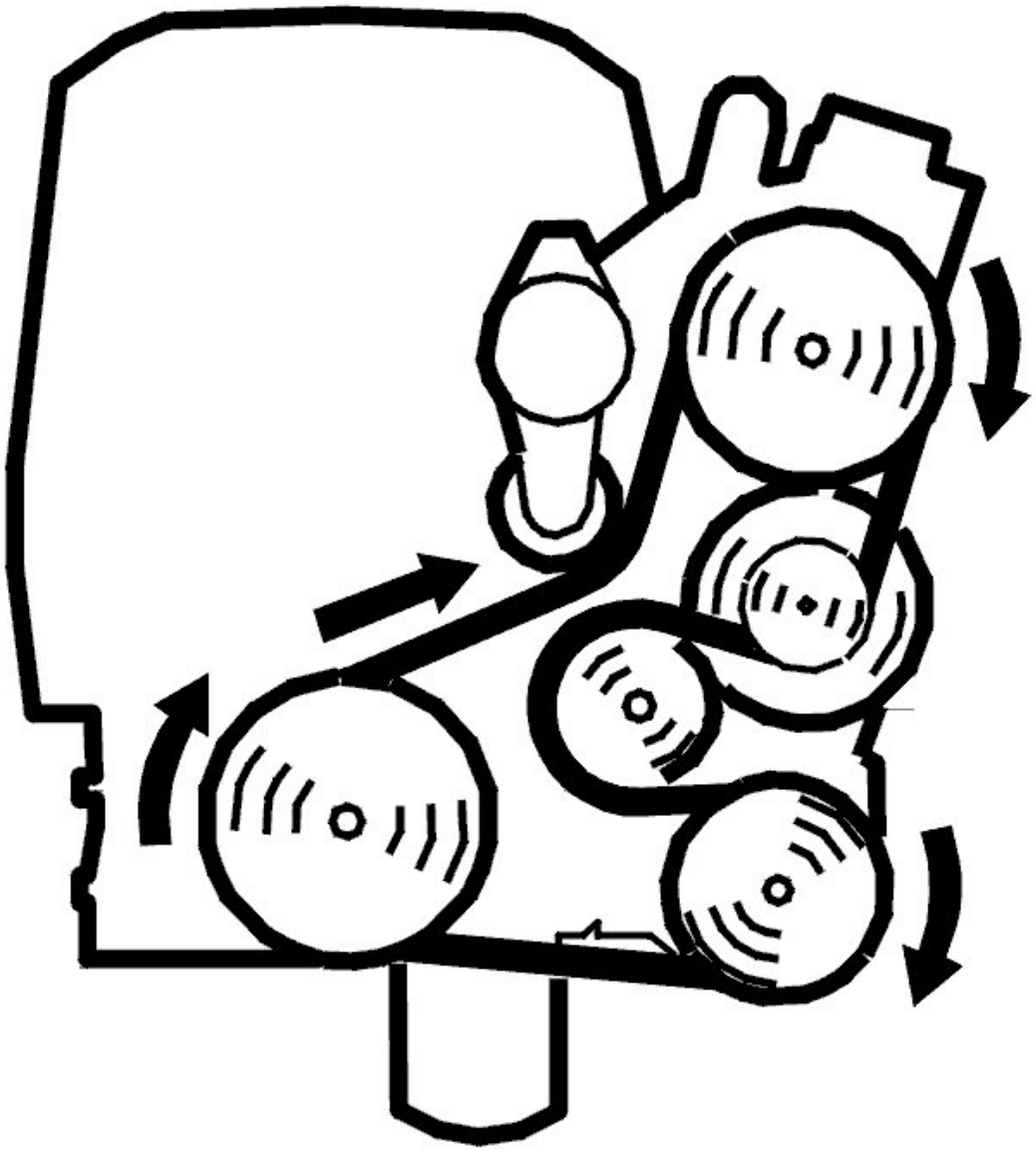
Continue - Verification

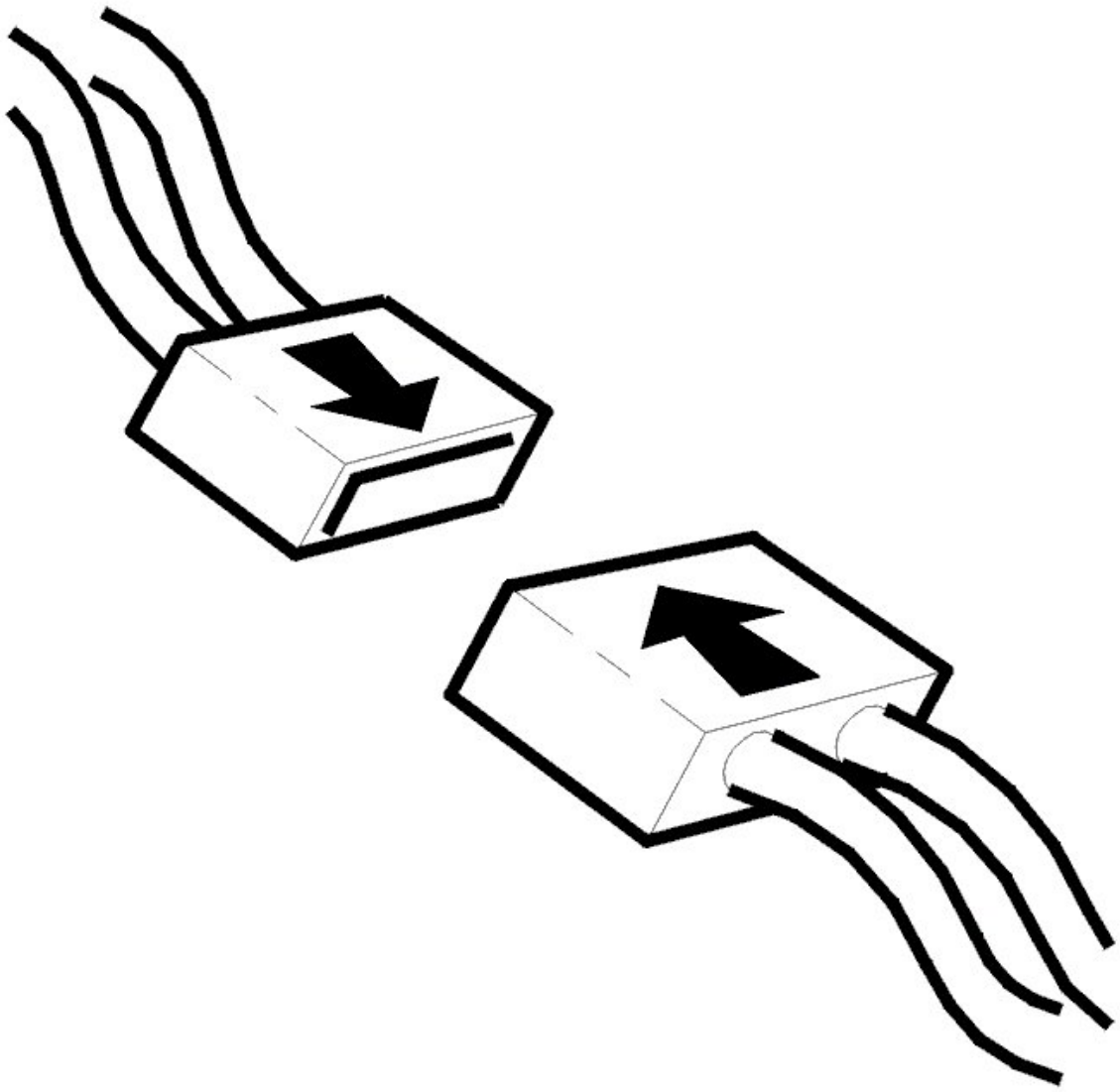
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

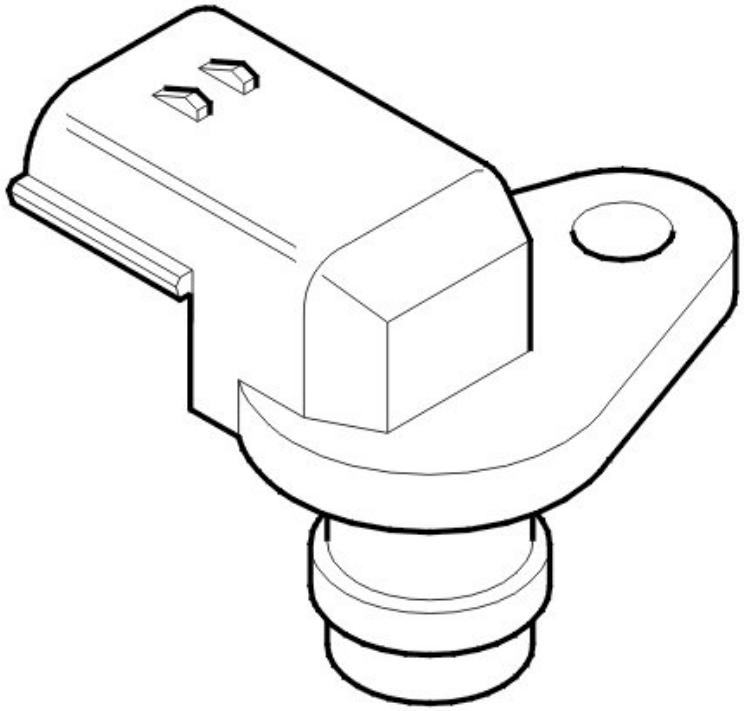
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340B is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341B is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
If there is no signal from the camshaft position (CMP) sensor although it appears sporadically, the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

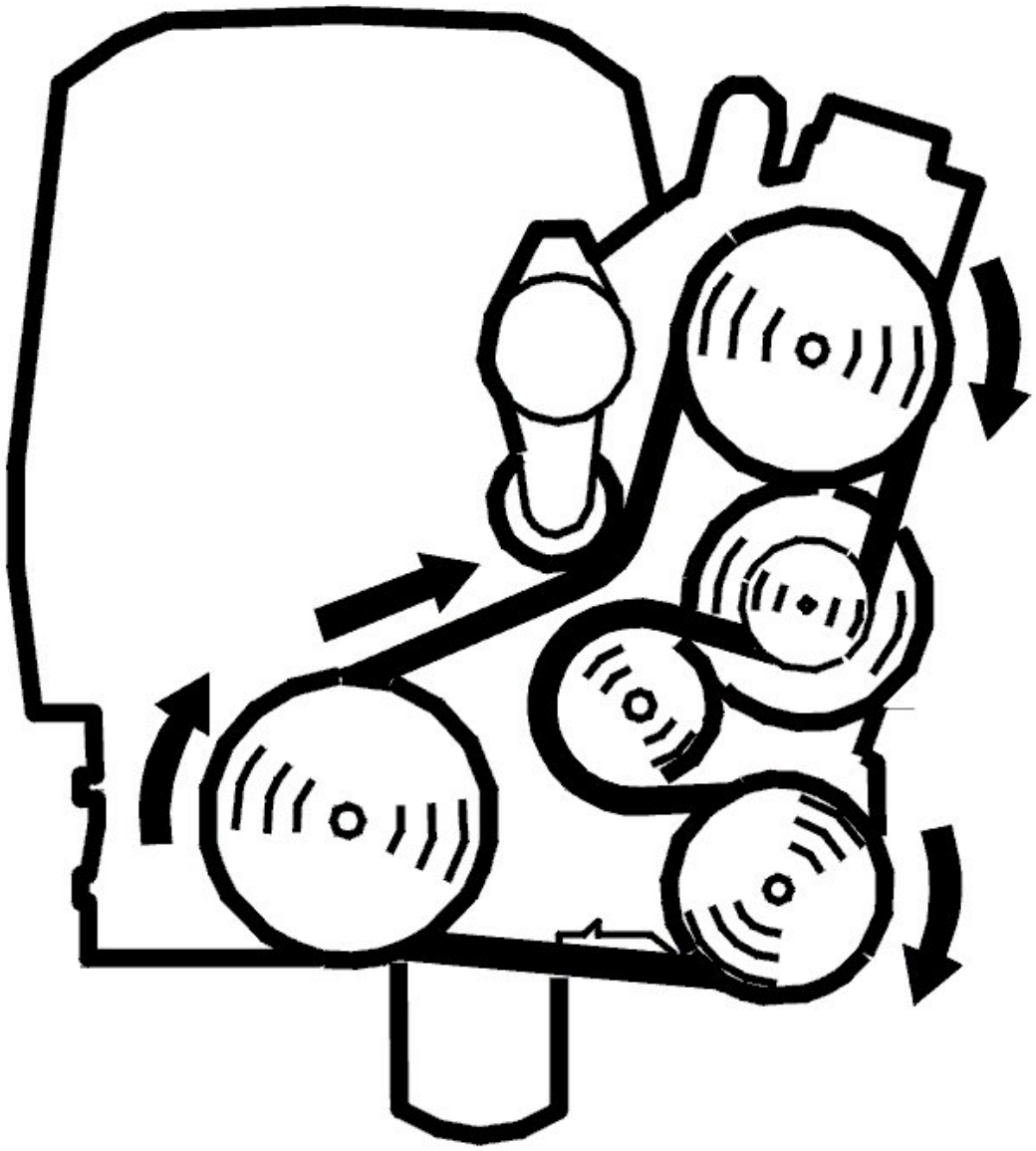
Possible source
- The camshaft position (CMP) sensor is in the wrong position
- Damaged camshaft position (CMP) sensor
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the status

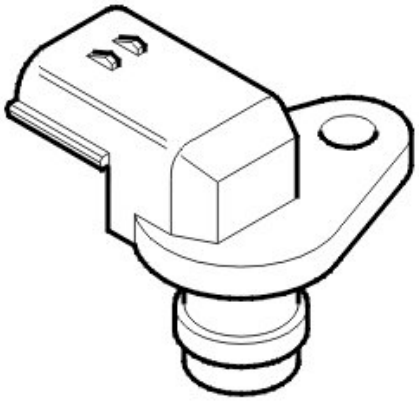


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

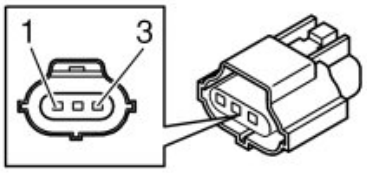
Check that the camshaft position (CMP) sensor is correctly installed. Check that neither the camshaft position (CMP) sensor nor the housing is damaged. Damage may affect the position of the sensor in relation to the camshaft rotor.

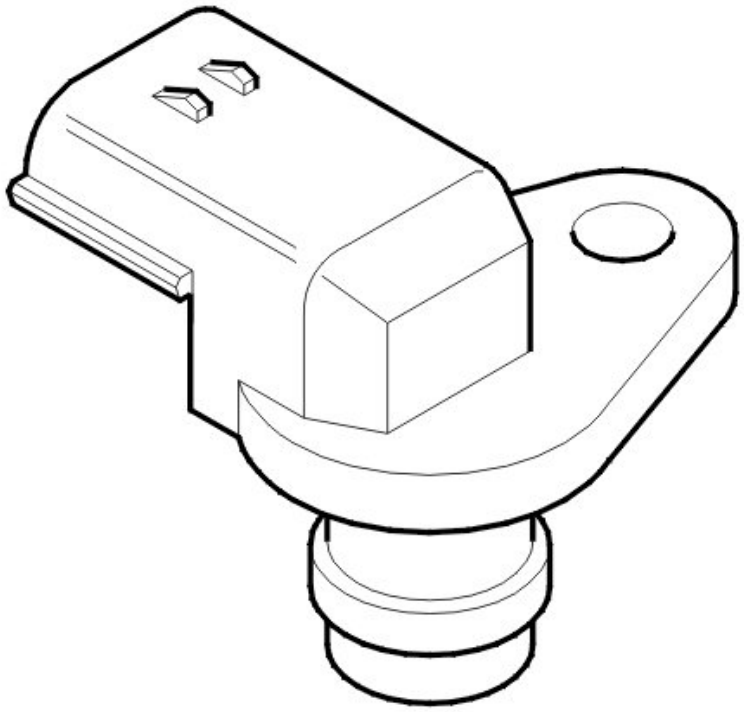
Hint: This diagnostic trouble code (DTC) may be caused by a faulty camshaft position (CMP) sensor.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





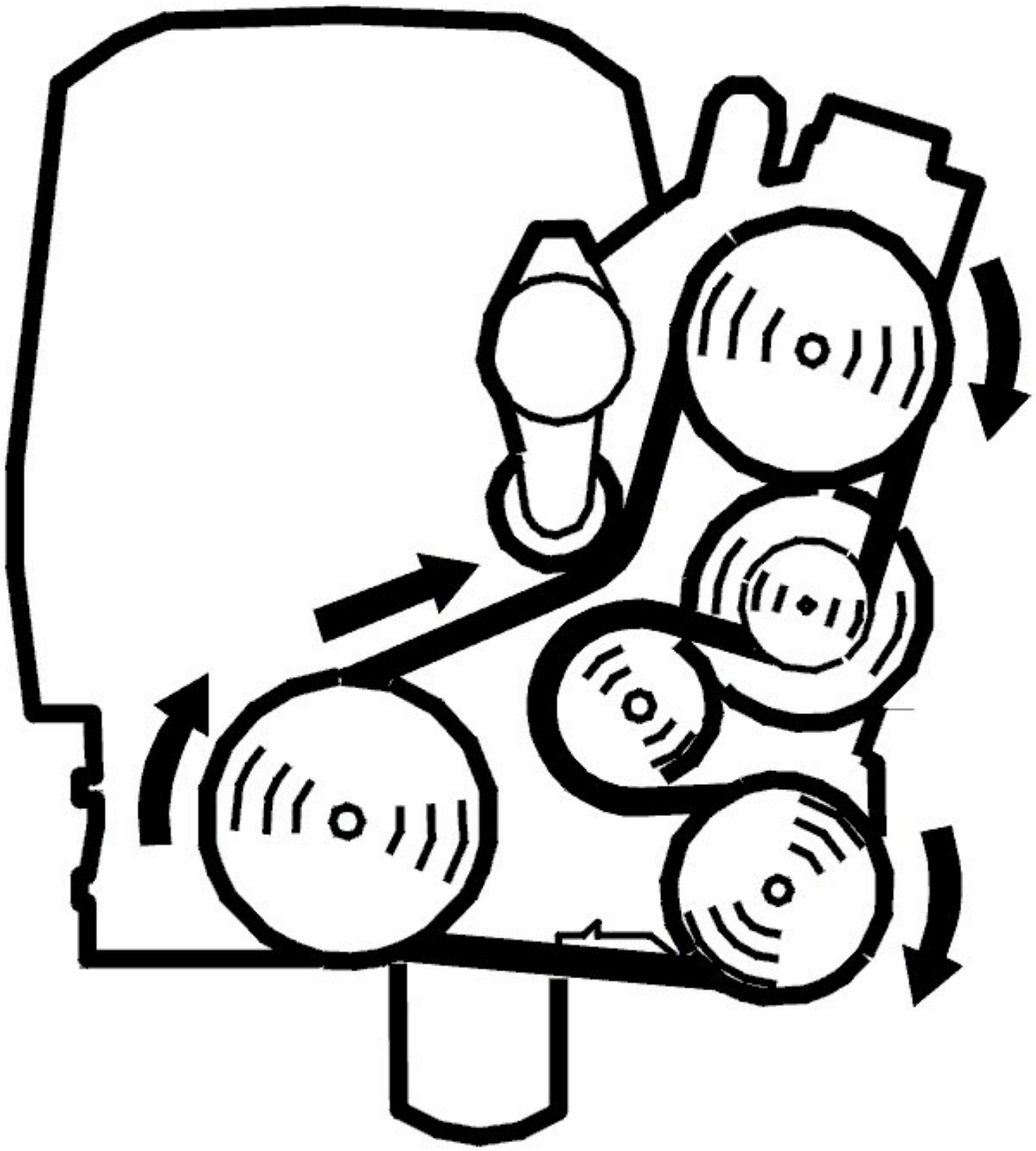
Continue - Verification

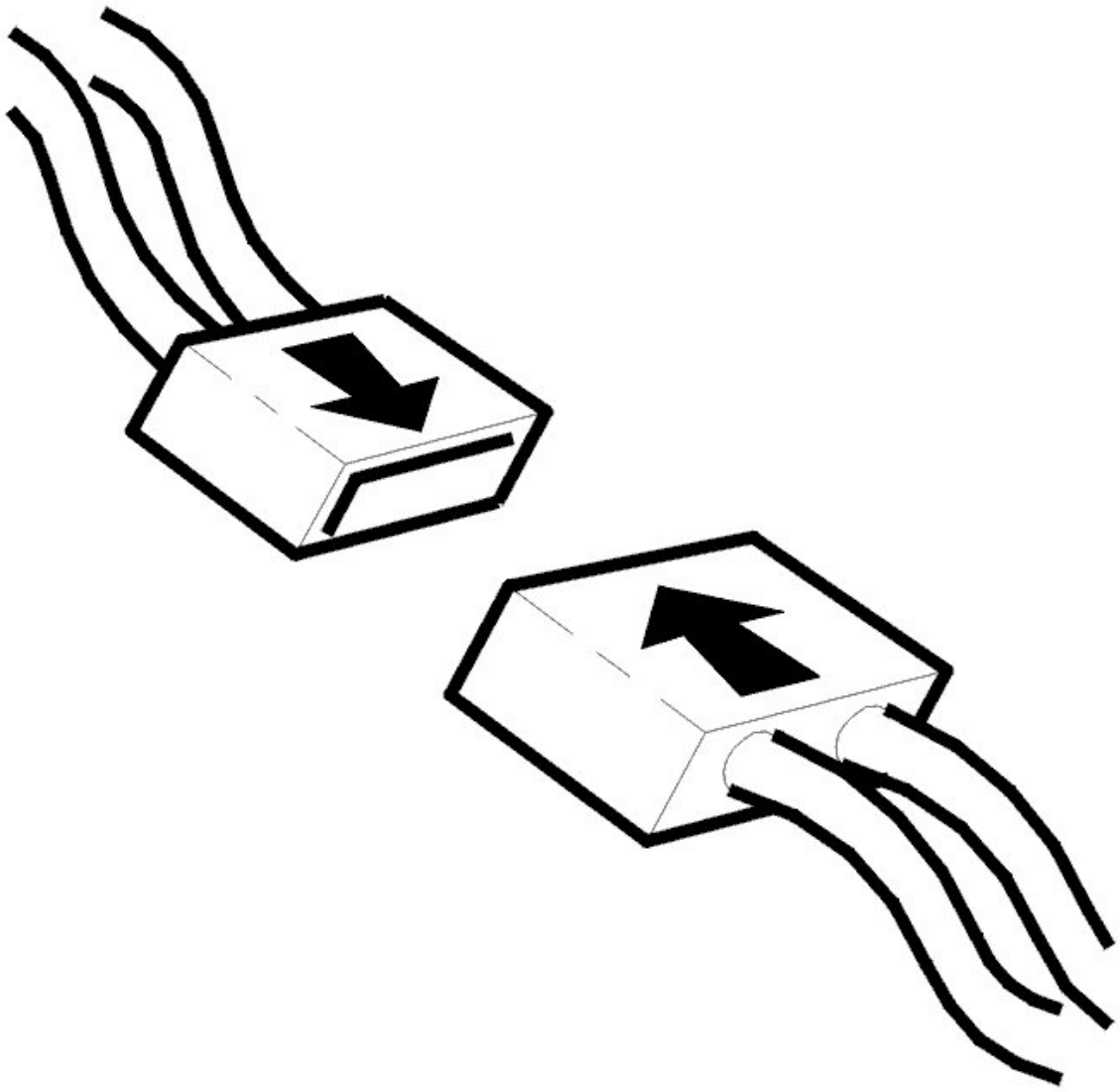
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

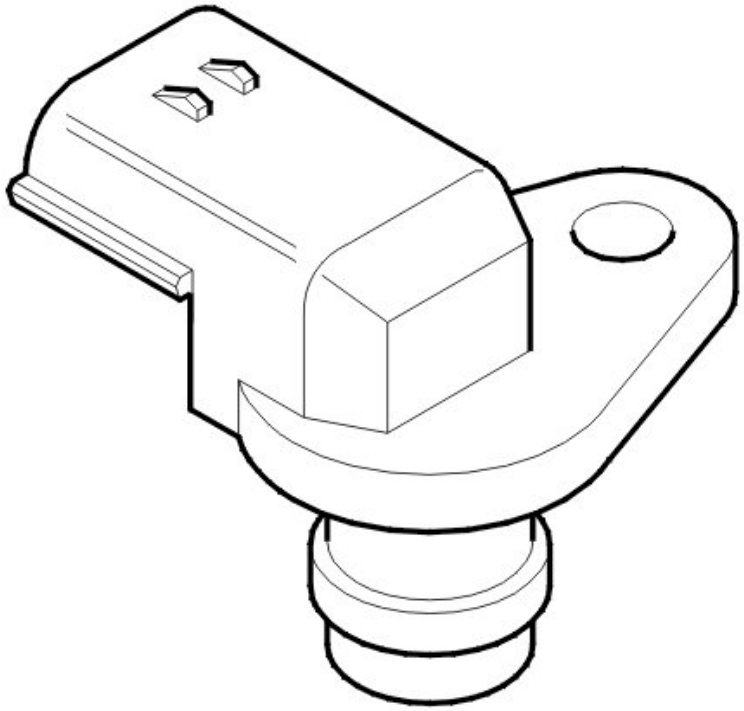
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340C is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341C is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is constantly high. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

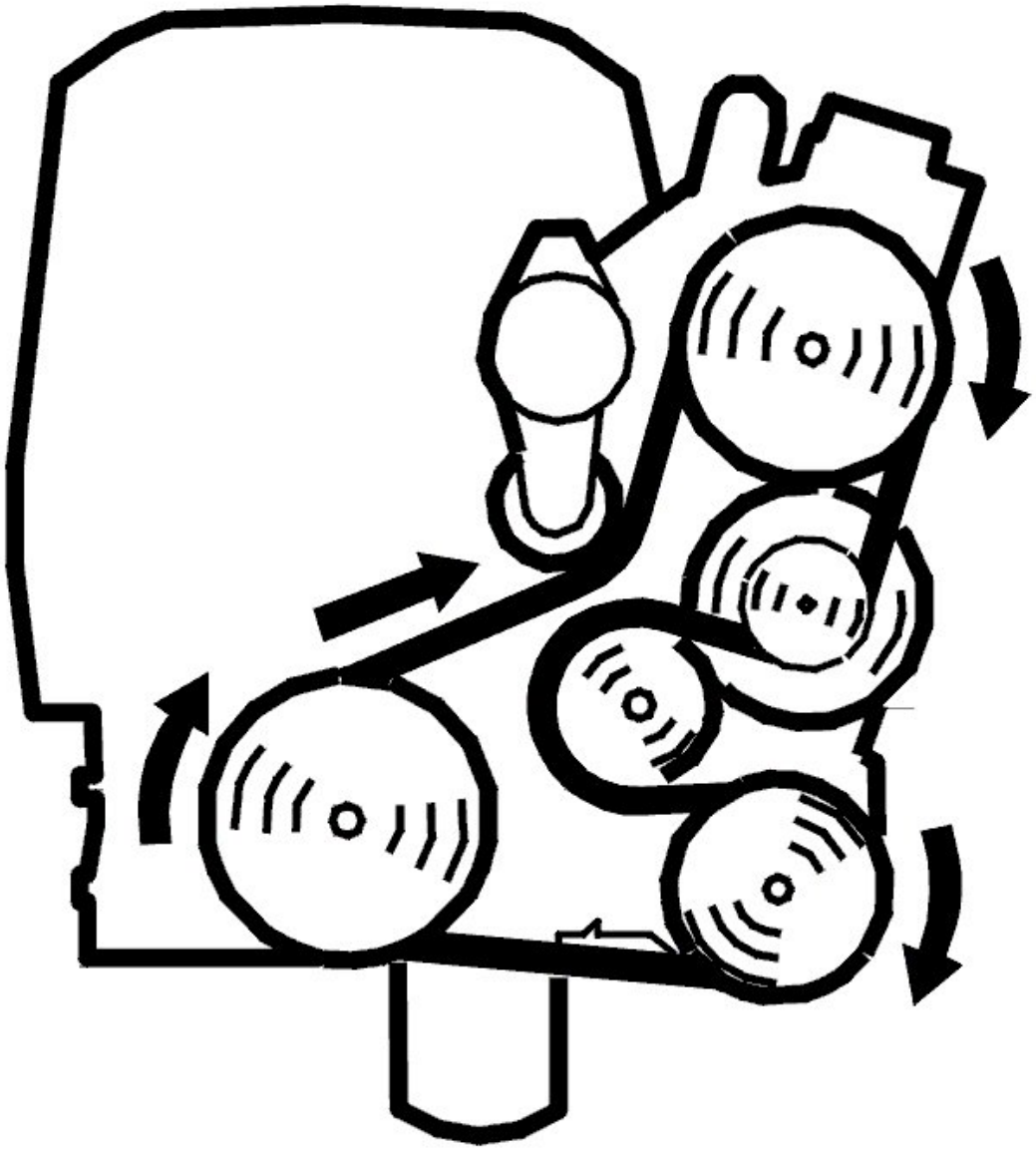
Possible source
- Open-circuit in the signal cable
- Short-circuit to supply voltage in the signal cable
- Short-circuit to ground in the power cable
- Open-circuit in the ground lead
- Damaged camshaft position (CMP) sensor.

Fault symptom[s]
- The engine is difficult to start.

Signal Too High

Signal too high

Checking the status

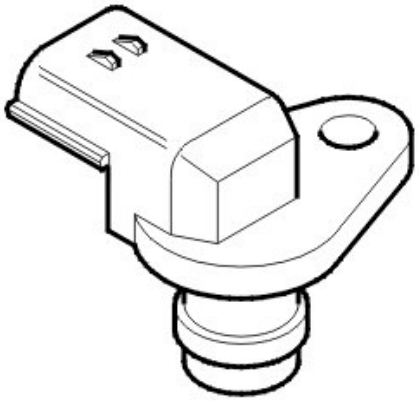


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

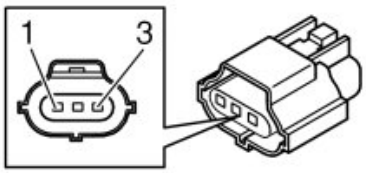
Checking components and wiring

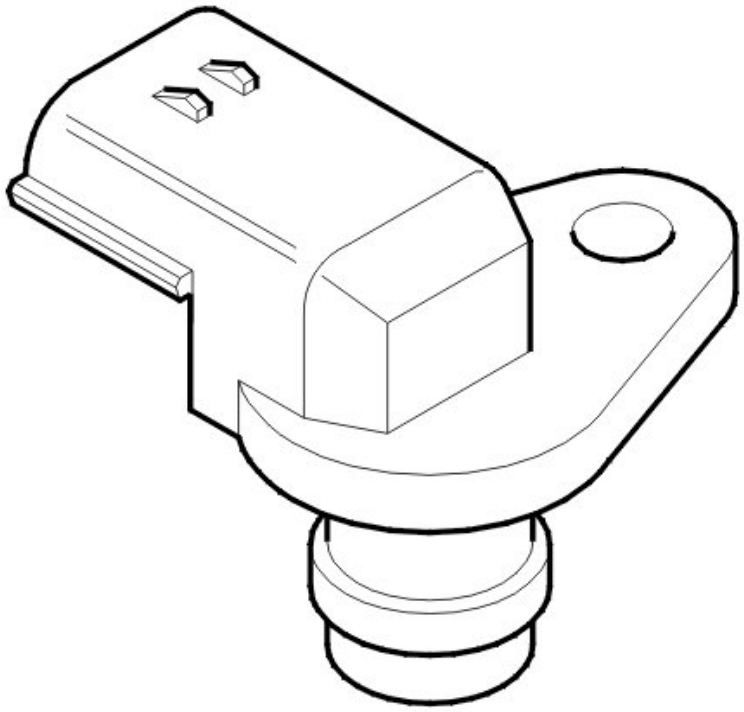
- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #A27 (#A27) and camshaft position (CMP) sensor connector terminal #3.
Check for an open-circuit. Check for a short-circuit to supply voltage.
Check the ground lead between engine control module (ECM) terminal #A65 (#B5) and camshaft position (CMP) sensor connector terminal #2.
Check for an open-circuit.
Check the power cable between engine control module (ECM) terminal #A29 (#A29) and camshaft position (CMP) sensor connector terminal #1.
Check for a short-circuit to ground.
Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





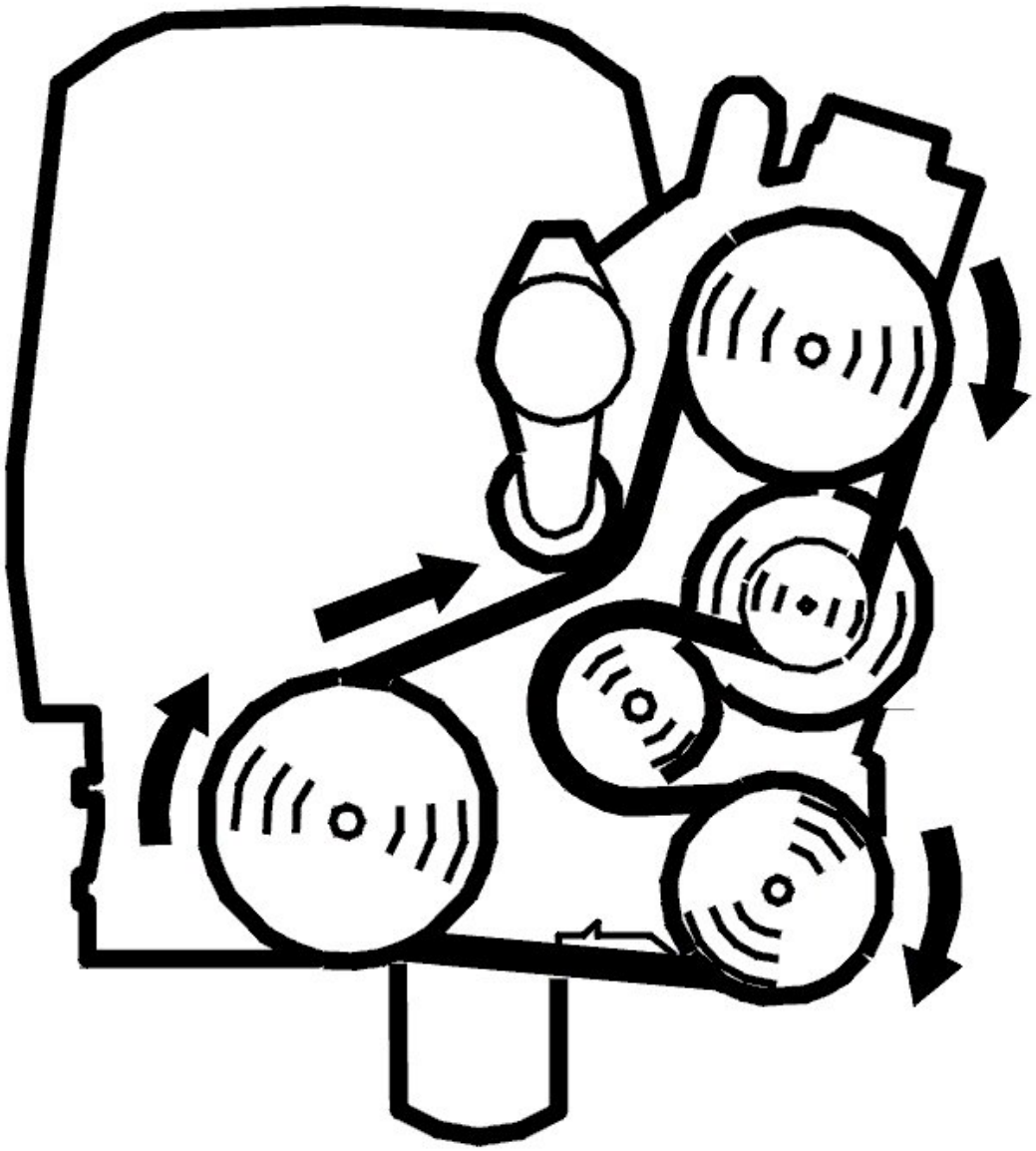
Continue - Verification

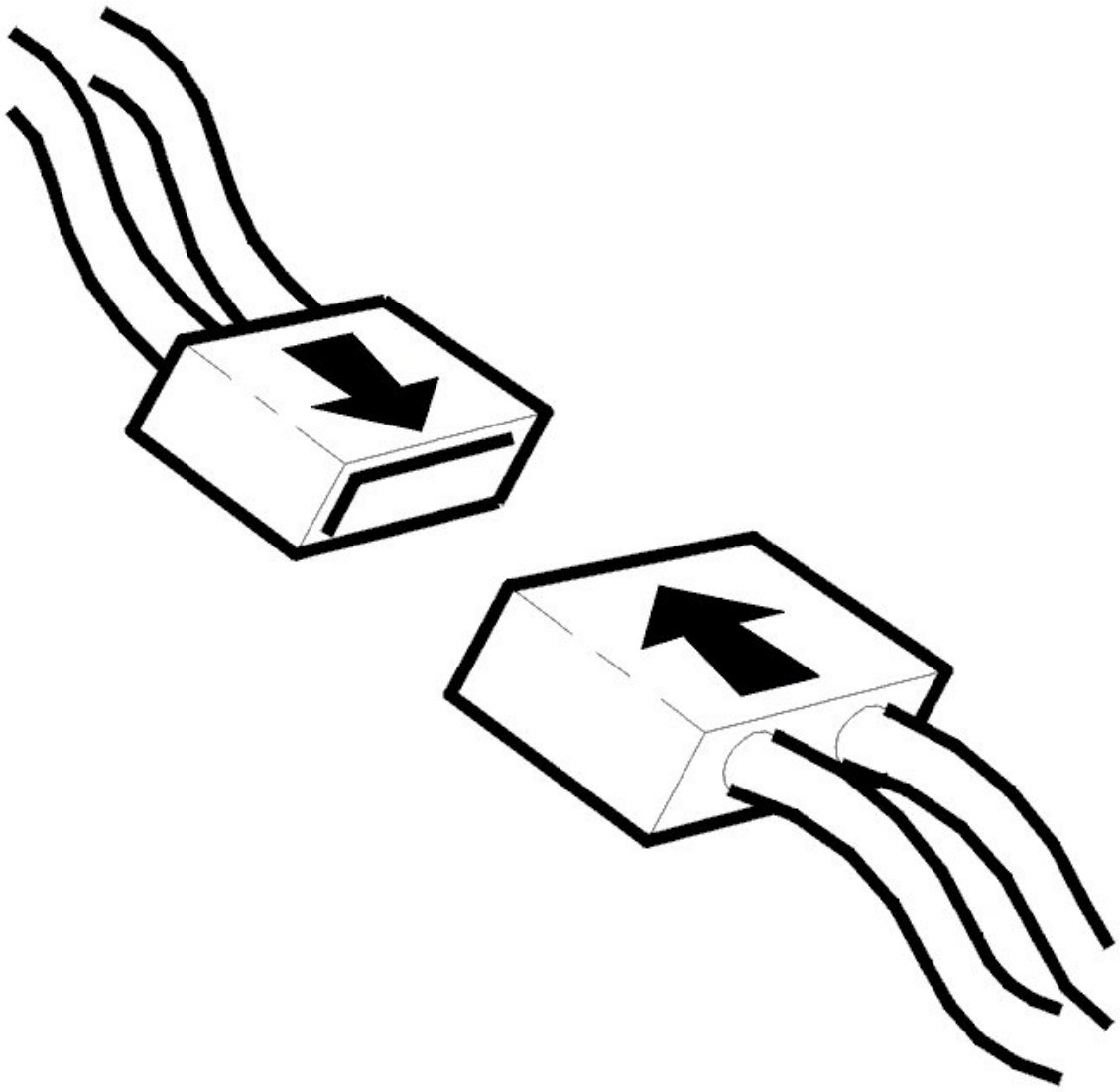
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

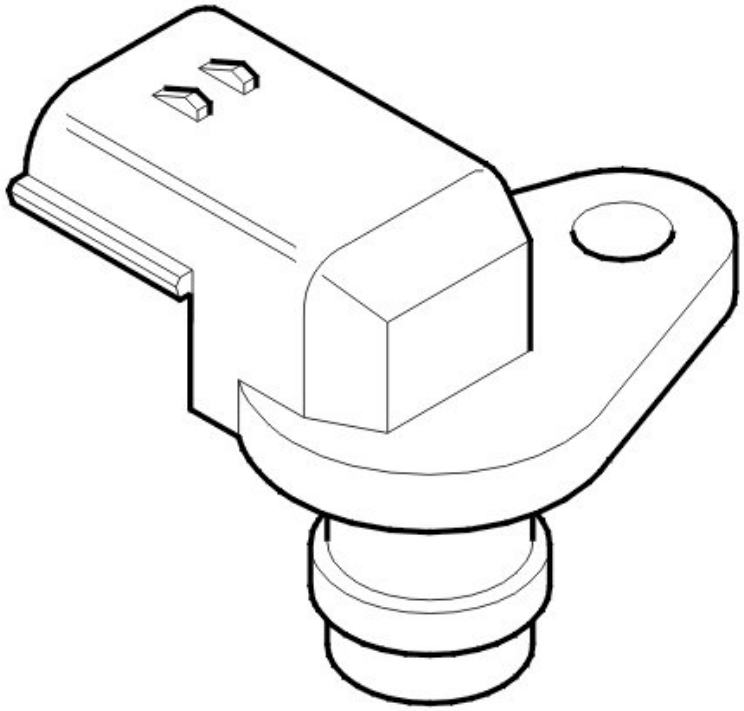
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-340D is for the camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-341D is for the camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is constantly low. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

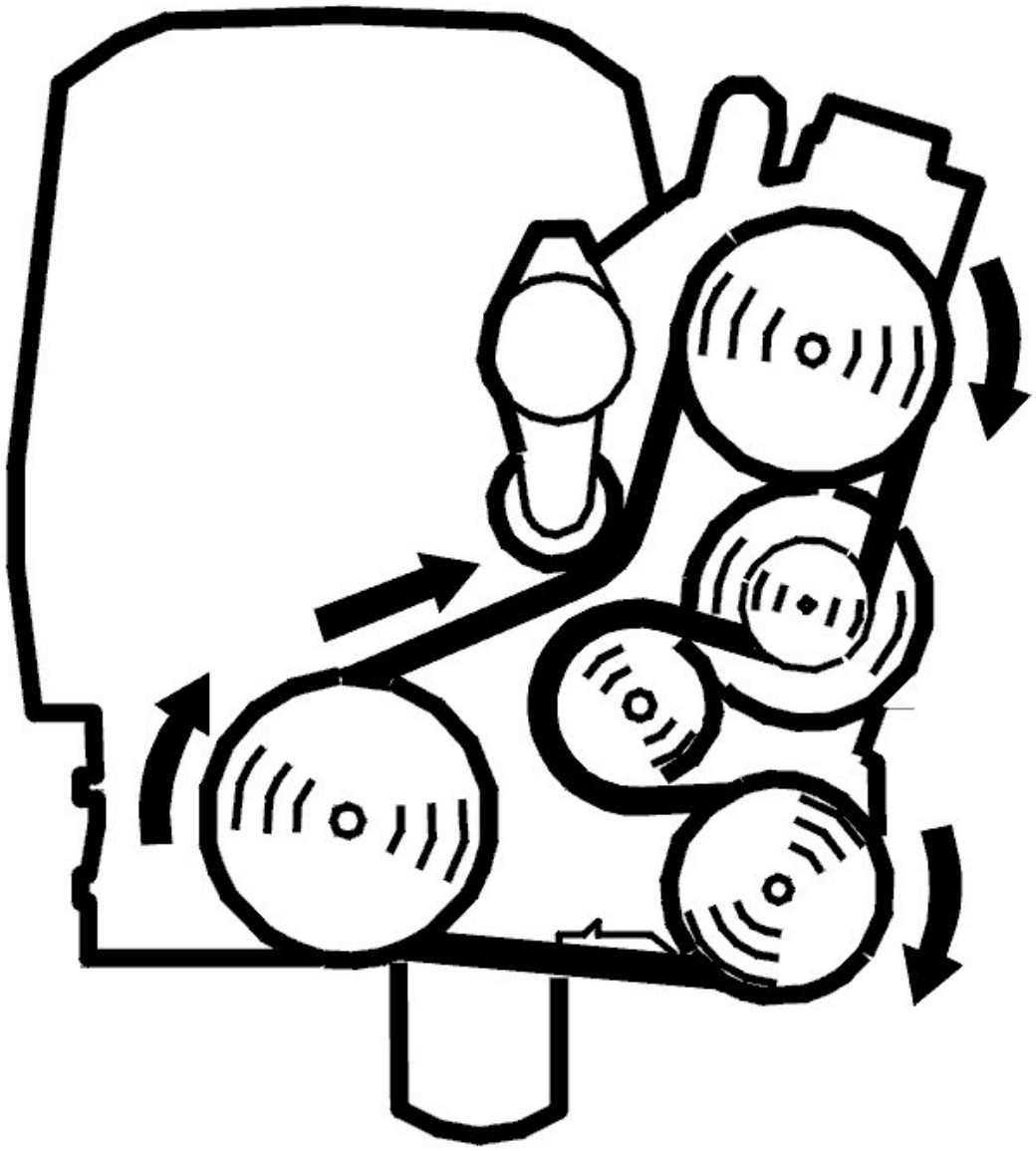
Possible source
- Short-circuit to ground in the signal cable
- Open-circuit in the power cable
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Signal Too Low

Signal too low

Checking the status

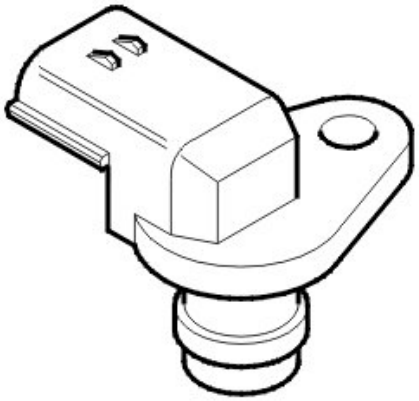


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

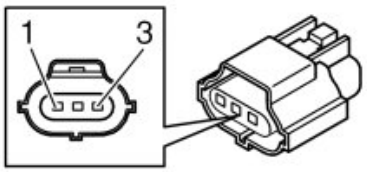
Check the signal cable between engine control module (ECM) terminal #A46 (#A46) and camshaft position (CMP) sensor connector terminal #3. Check for a short-circuit to ground.
Check the power cable between engine control module (ECM) terminal #A29 (#A29) and camshaft position (CMP) sensor connector terminal #1. Check for an open-circuit.

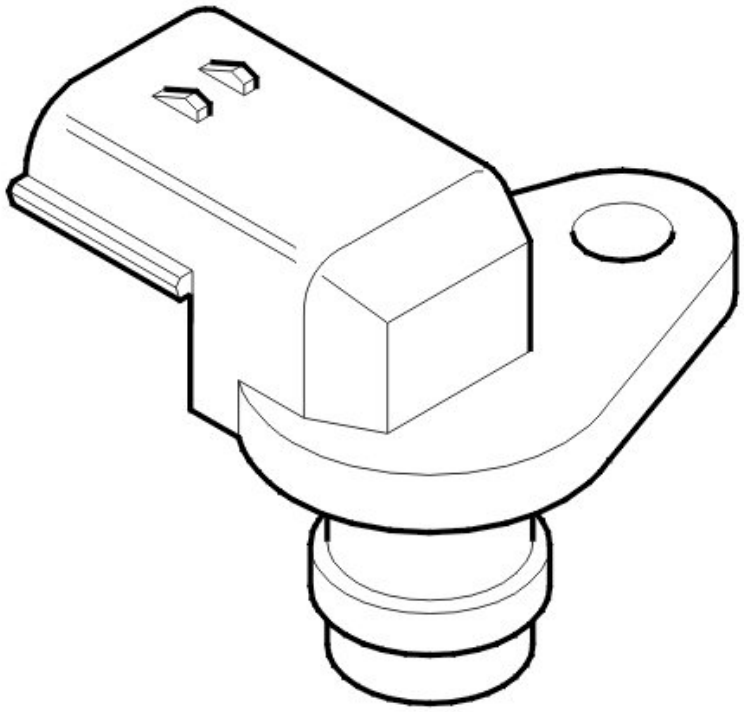
Hint: With the ignition on and the camshaft position (CMP) sensor connector disconnected, the voltage between terminal #1 and ground terminal should be approximately 5 V.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





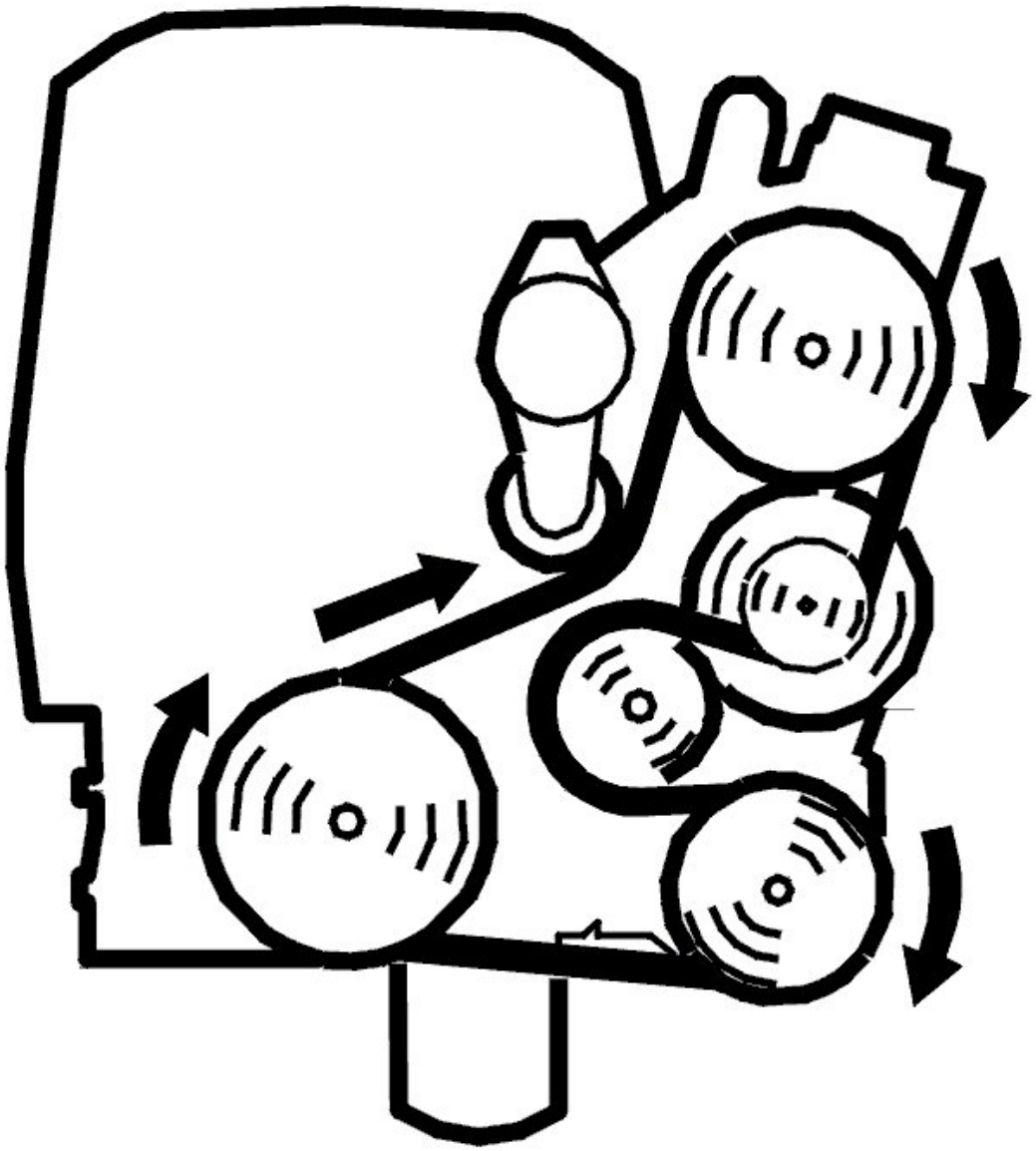
Continue - Verification

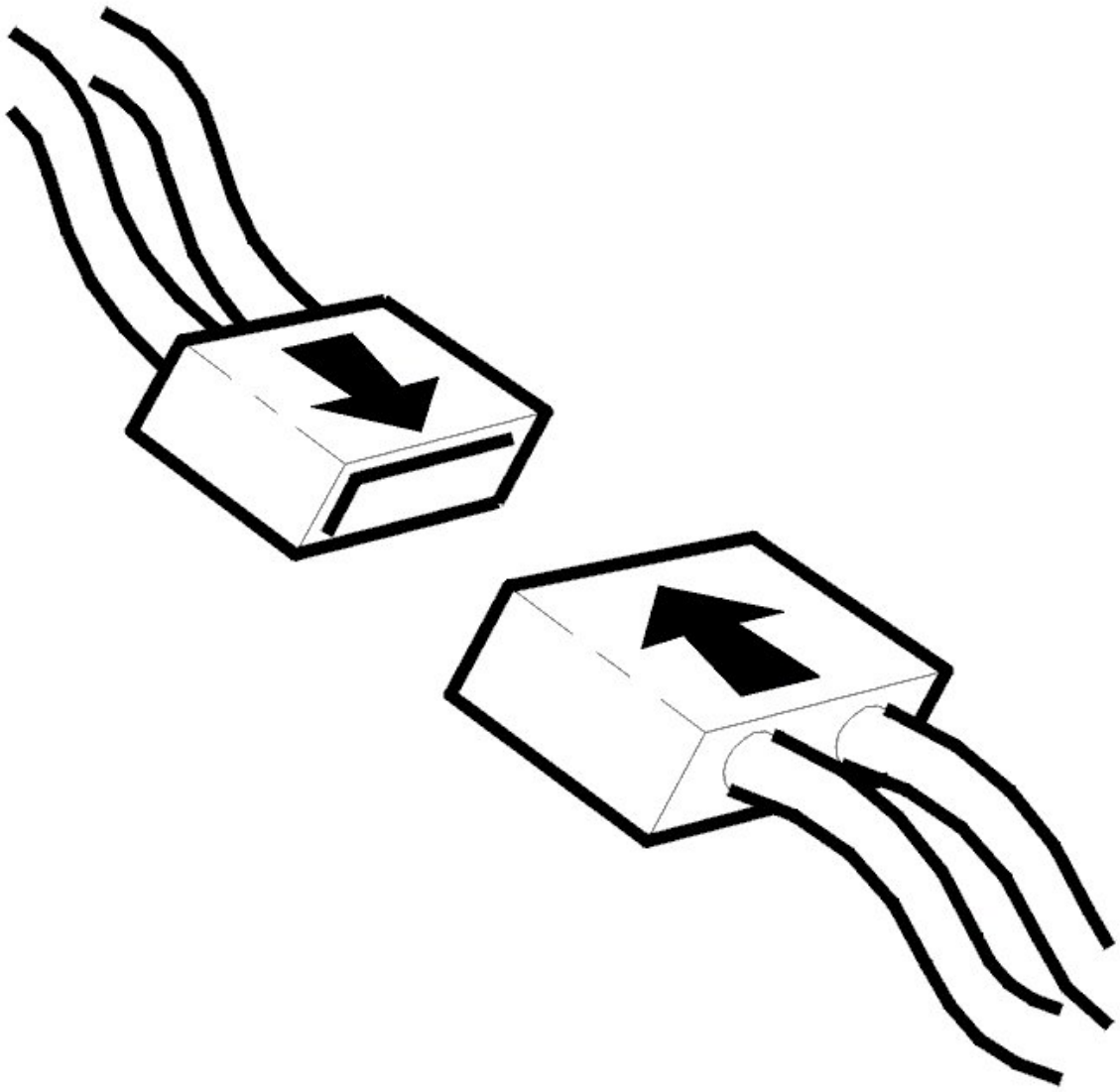
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

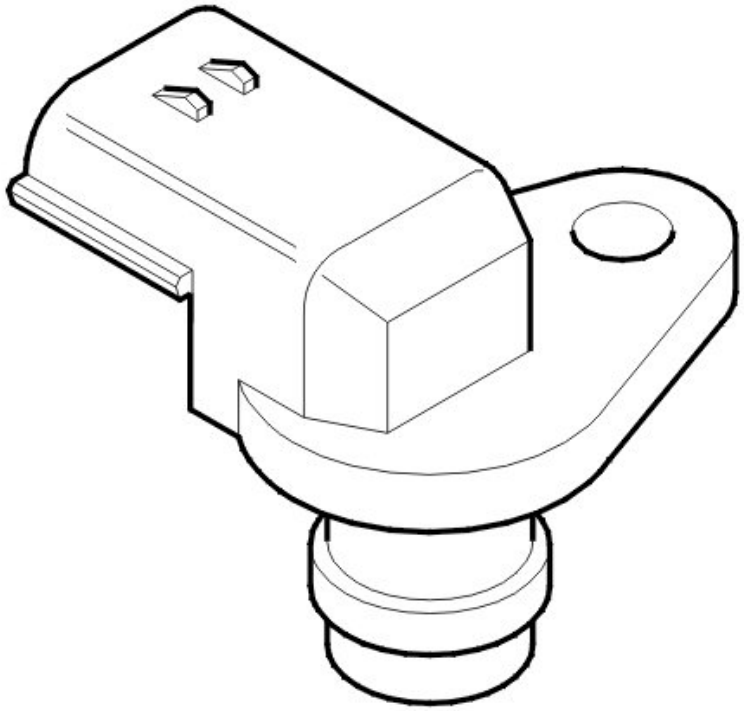
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-3400 covers camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-3410 covers camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is missing sporadically. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

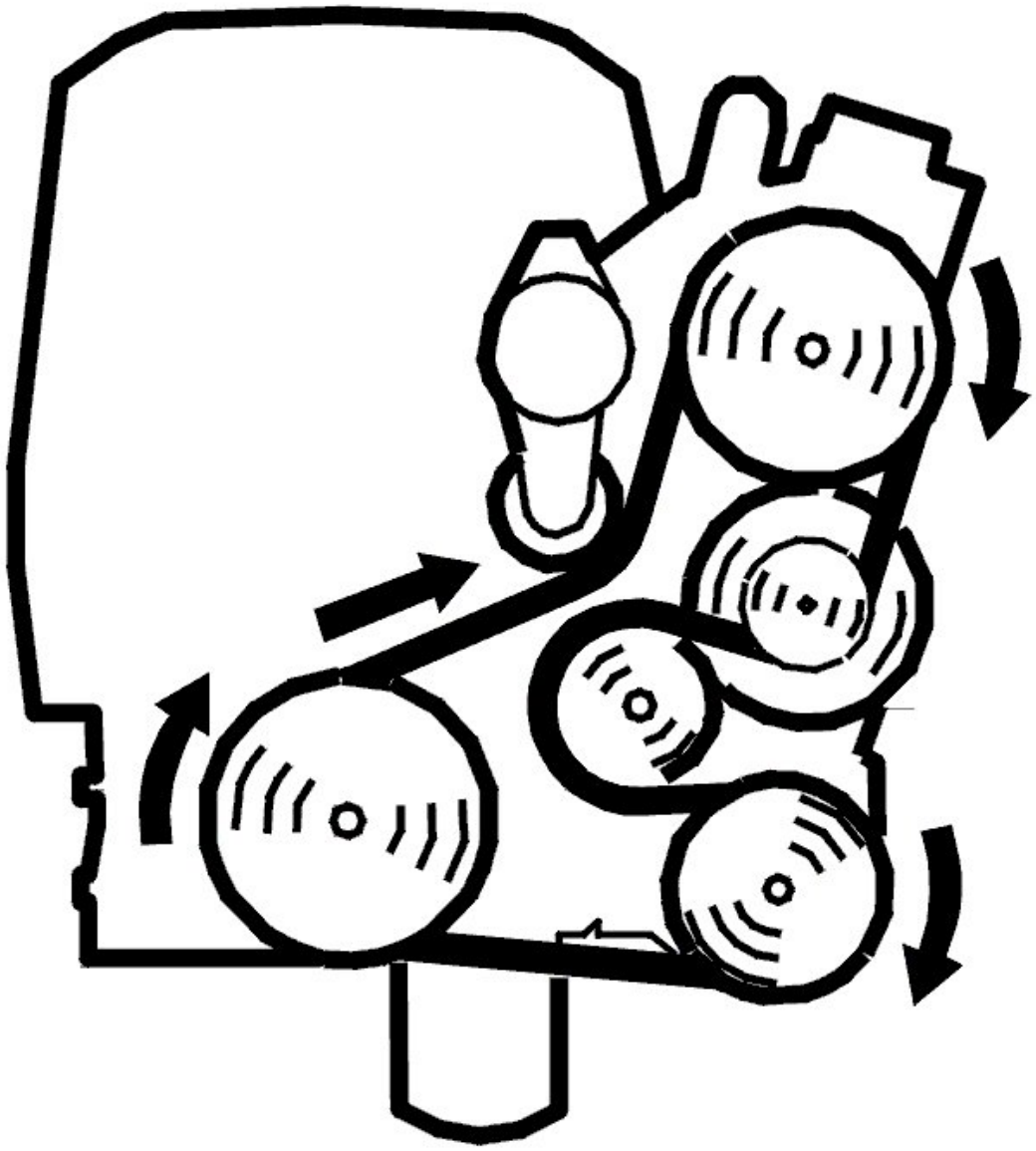
Possible source
- The camshaft position (CMP) sensor is in the wrong position
- Damaged camshaft position (CMP) sensor
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the status

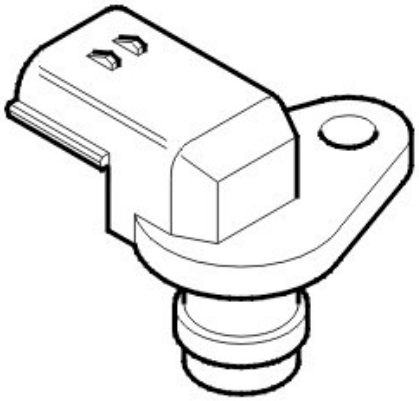


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

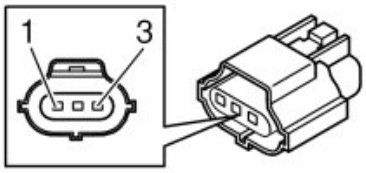
Check that the camshaft position (CMP) sensor is correctly installed. Check that neither the camshaft position (CMP) sensor nor the housing is damaged. Damage may affect the position of the sensor in relation to the camshaft rotor.

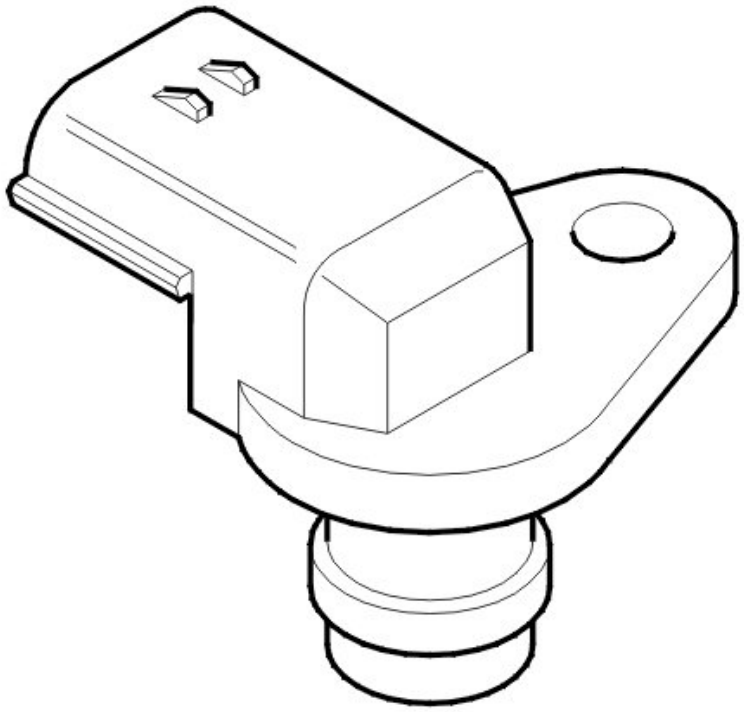
Hint: This diagnostic trouble code (DTC) may be caused by a faulty camshaft position (CMP) sensor.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





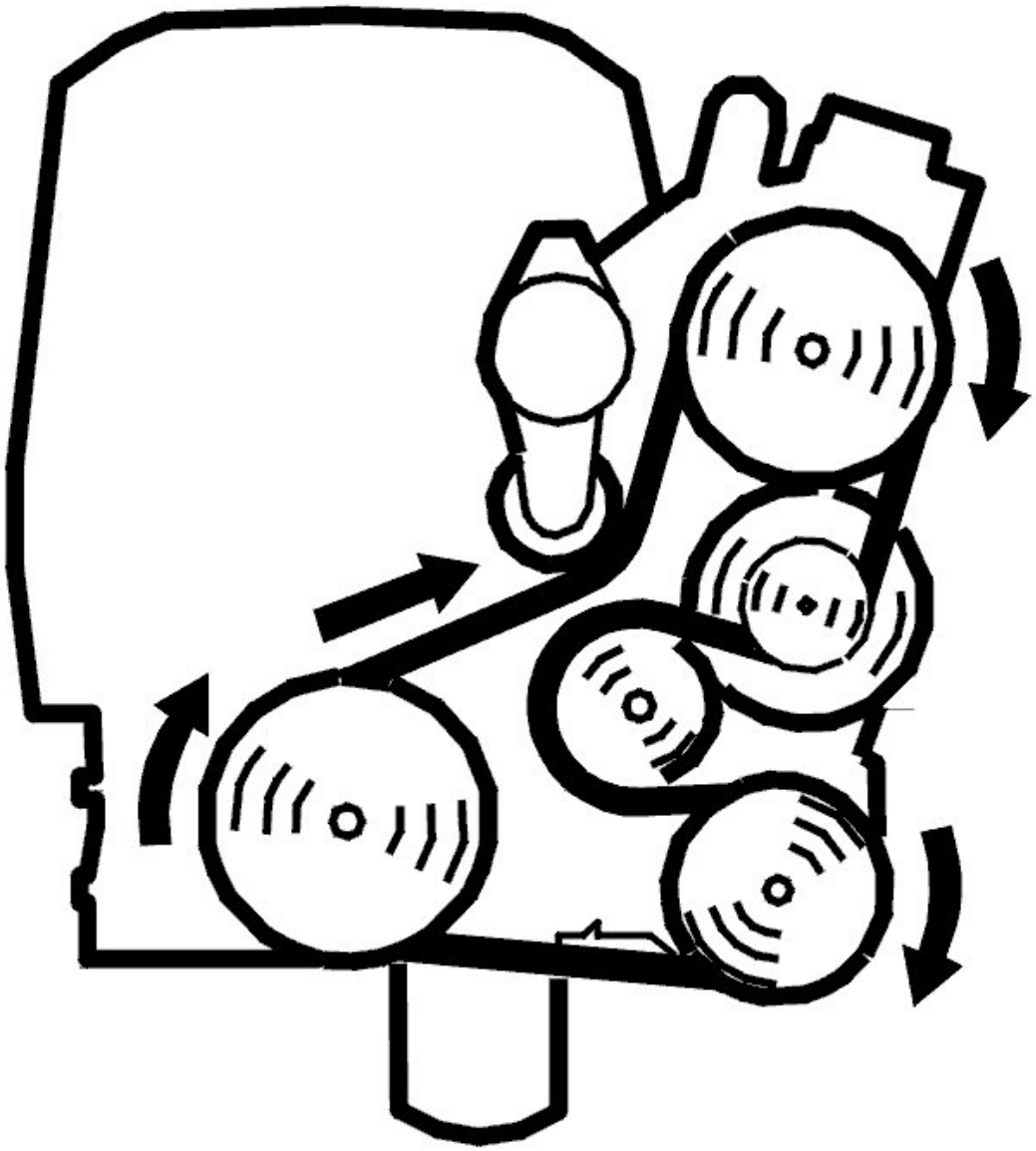
Continue - Verification

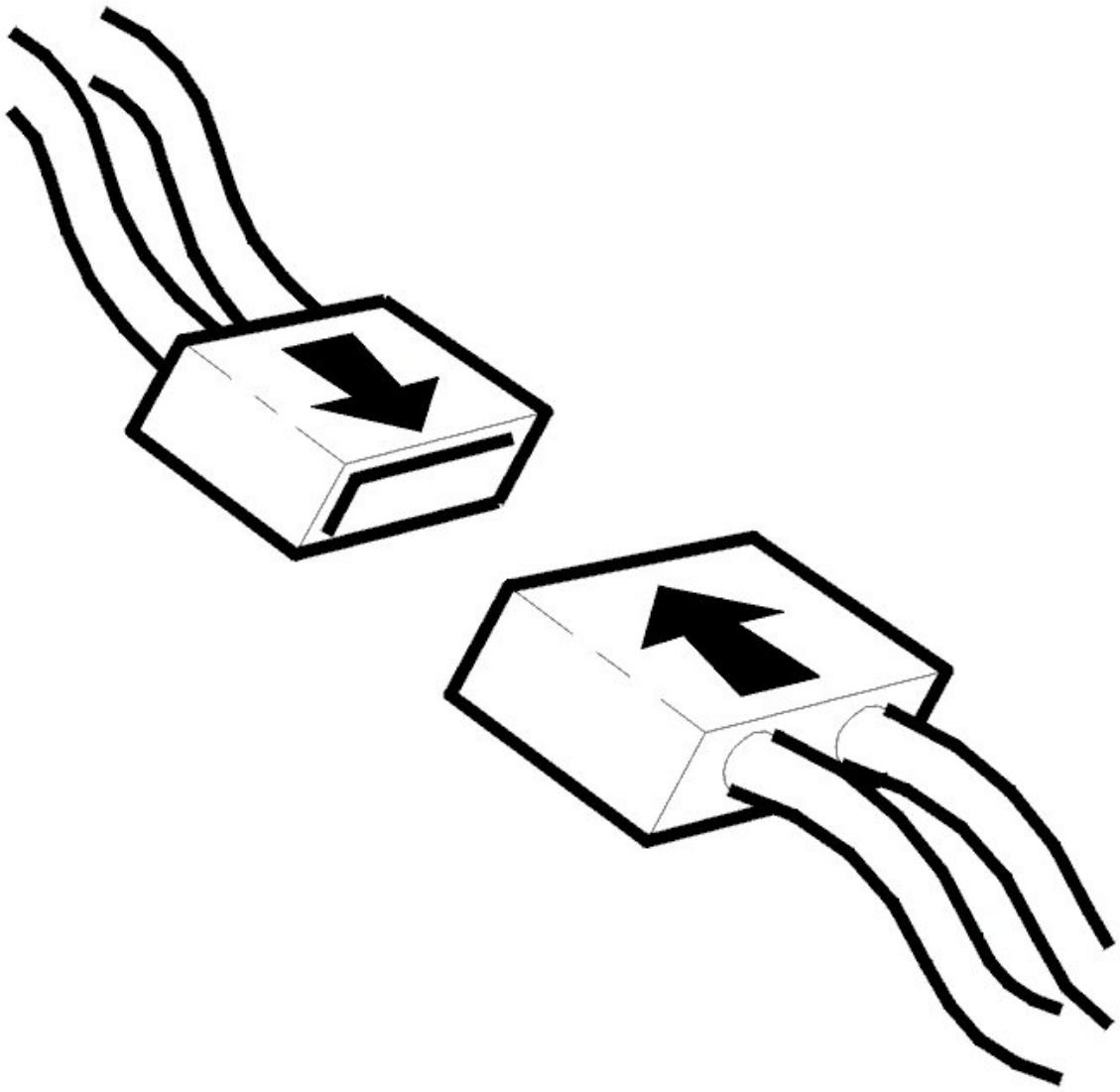
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

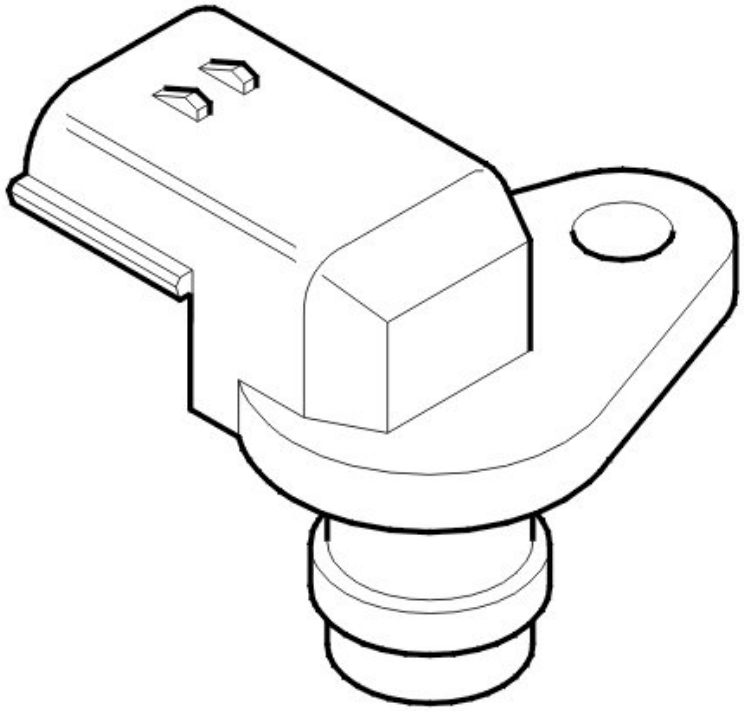
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) ECM-3400 covers camshaft position (CMP) sensor, intake.
Diagnostic trouble code (DTC) ECM-3410 covers camshaft position (CMP) sensor, exhaust.
The engine control module (ECM) checks the pulse width modulation (PWM) signal from the camshaft position (CMP) sensor.
The diagnostic trouble code (DTC) is stored if the signal from the camshaft position (CMP) sensor is missing sporadically. This is interpreted by the engine control module (ECM) as a fault. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

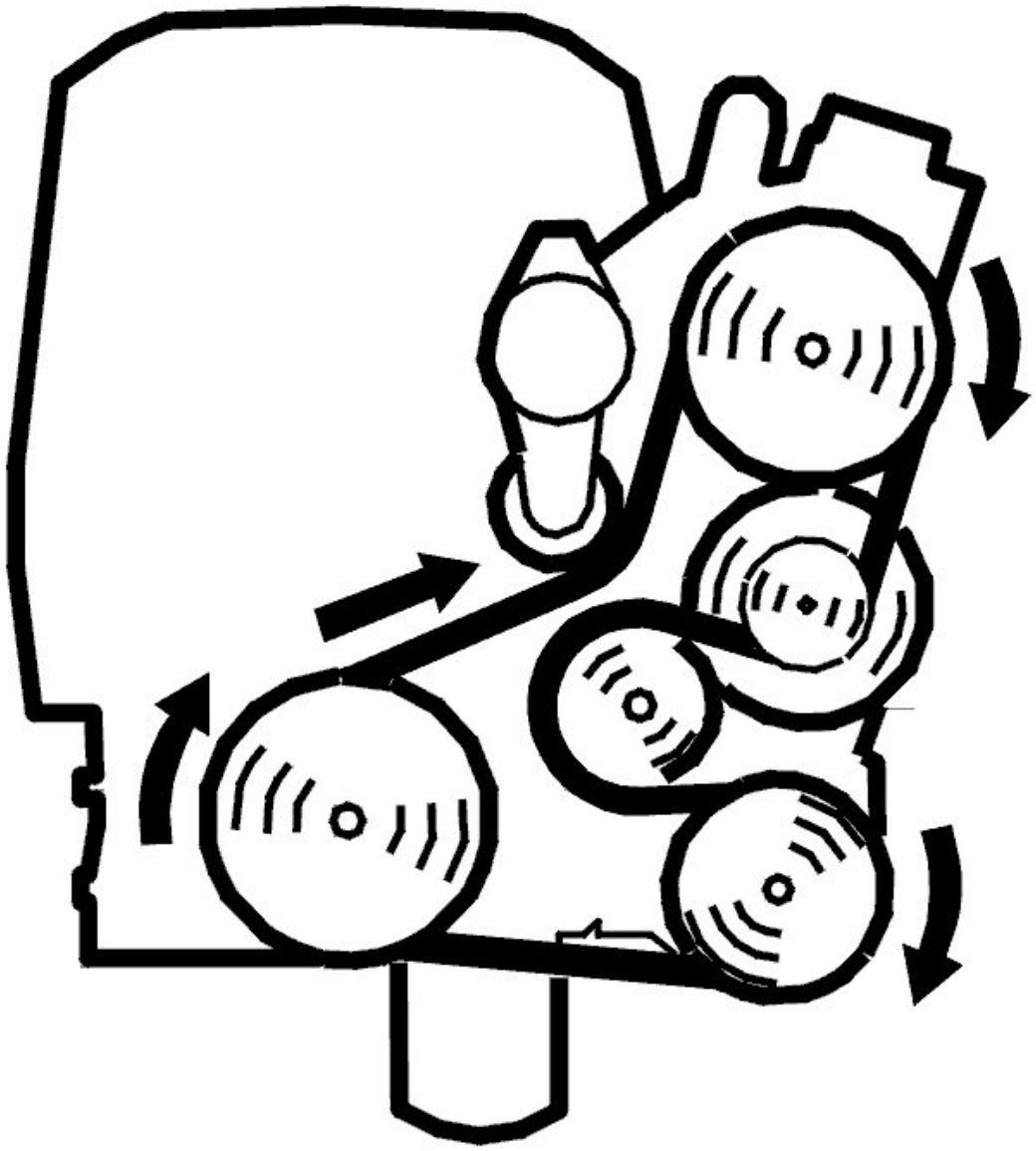
Possible source
- The camshaft position (CMP) sensor is in the wrong position
- Damaged camshaft position (CMP) sensor
- Loose connections.

Fault symptom[s]
- The engine is difficult to start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the status

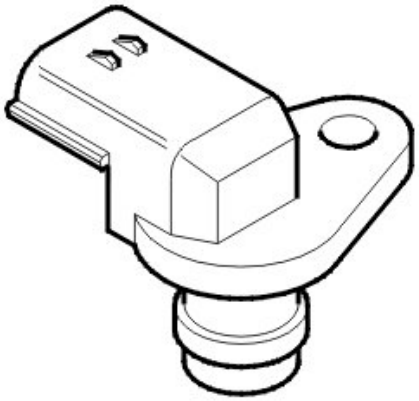


- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Increase the engine speed a number of times until the diagnostic is "Complete".
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. This affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.



Continue - Checking components and wiring

Checking components and wiring

- Check the connector for the camshaft position (CMP) sensor. Check for contact resistance and oxidation.

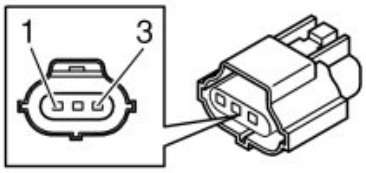
Check that the camshaft position (CMP) sensor is correctly installed. Check that neither the camshaft position (CMP) sensor nor the housing is damaged. Damage may affect the position of the sensor in relation to the camshaft rotor.

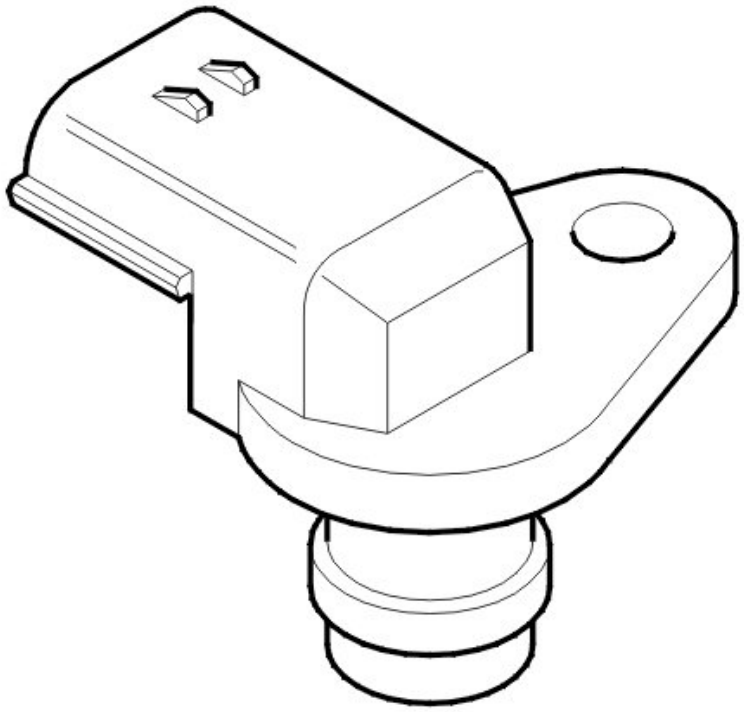
Hint: This diagnostic trouble code (DTC) may be caused by a faulty camshaft position (CMP) sensor.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing the camshaft position sensor (CMP) See: Camshaft Position Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





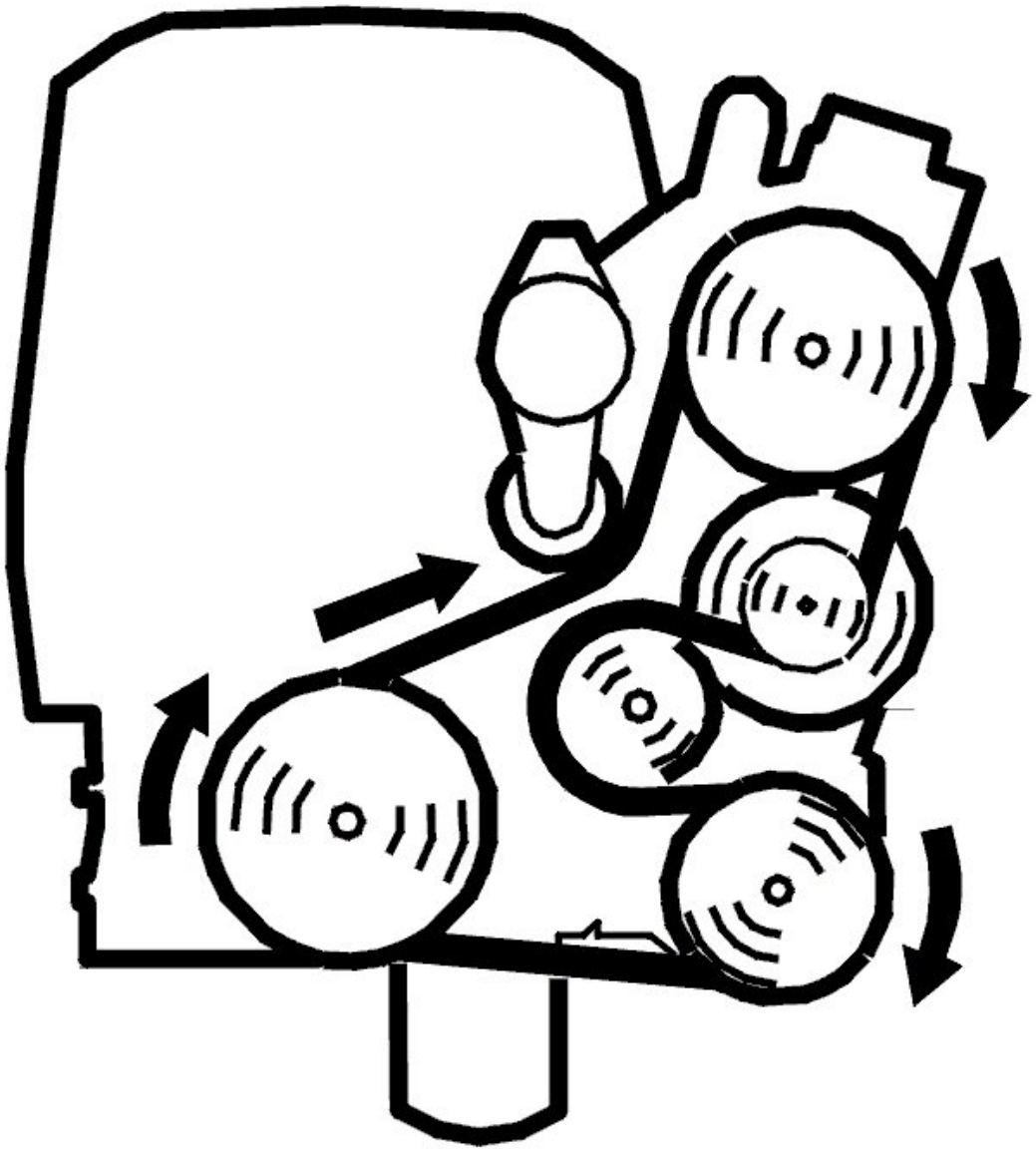
Continue - Verification

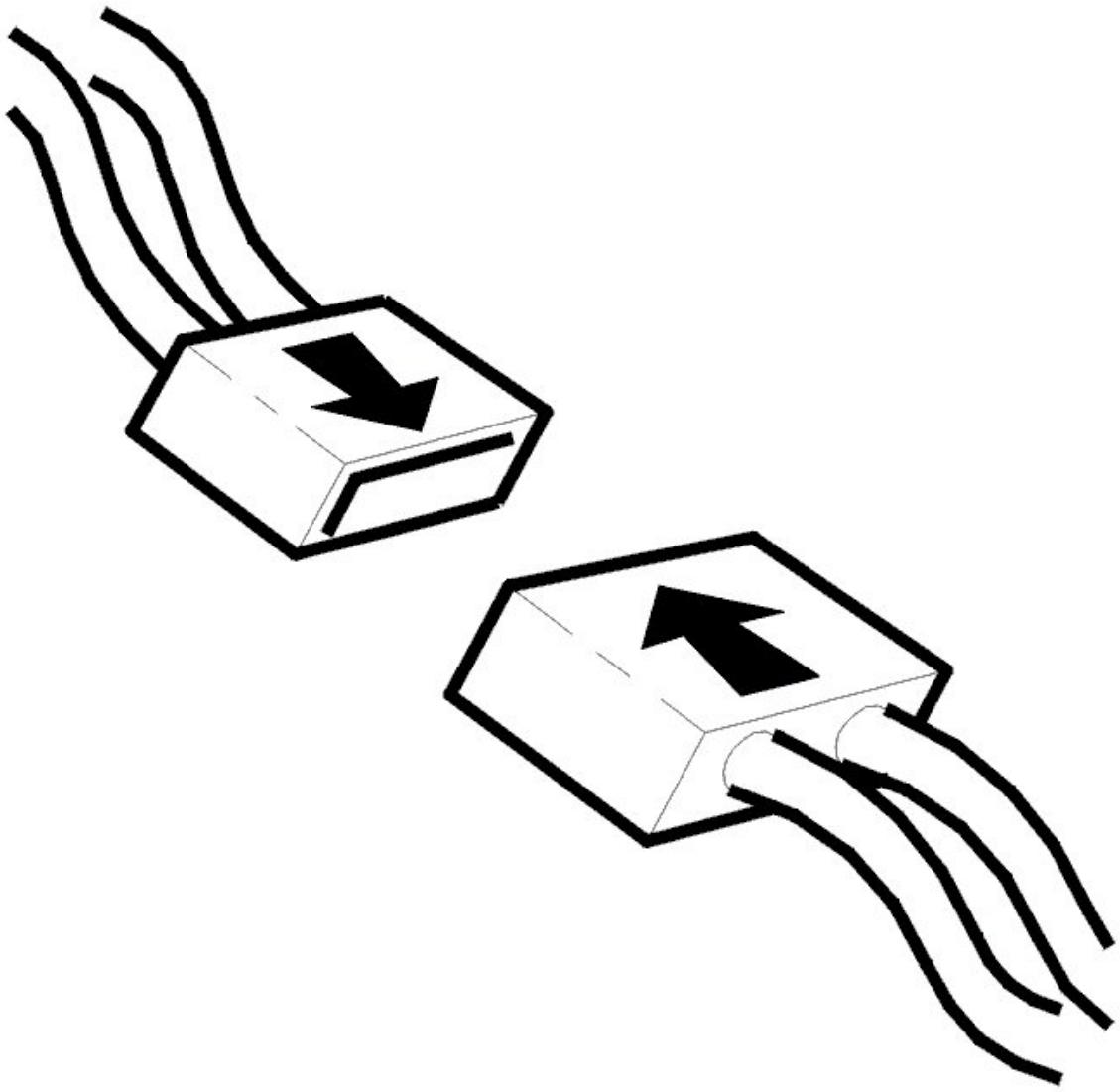
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

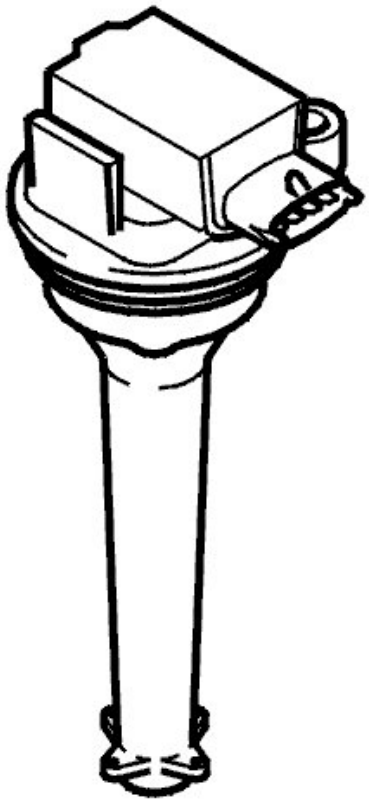
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.

- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3

- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

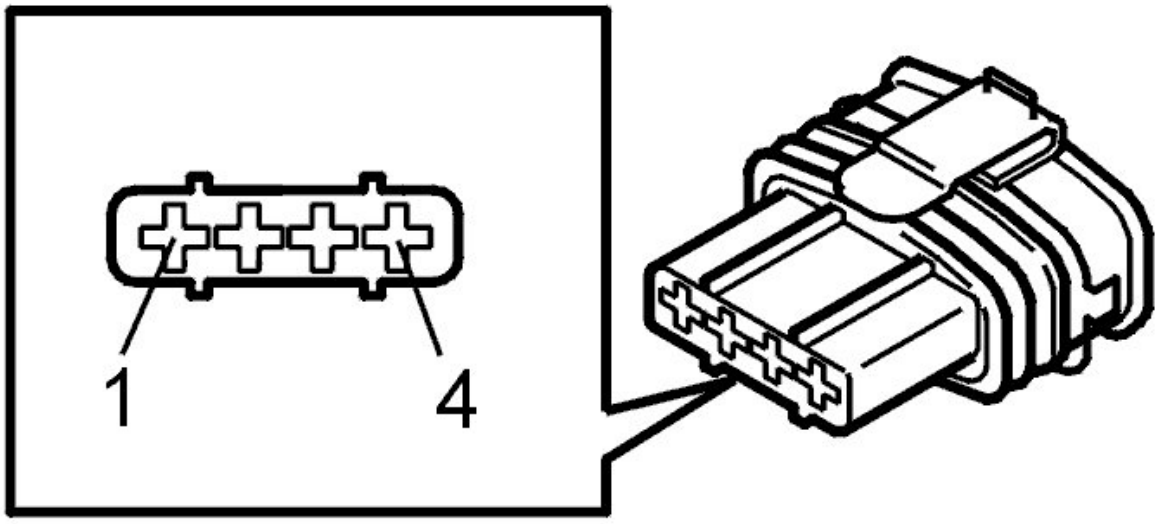
Signal missing

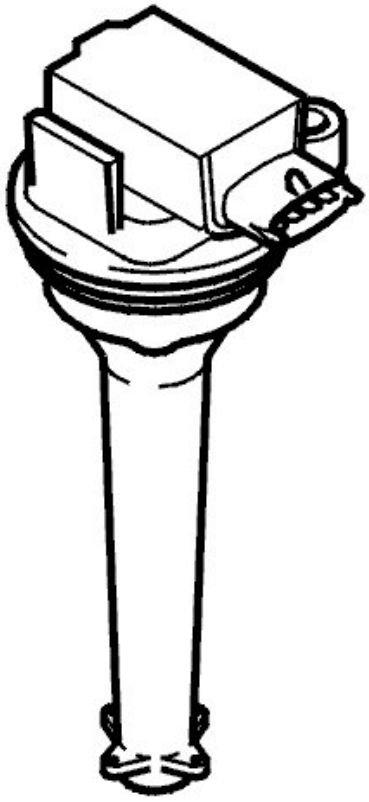
Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350B: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351B: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352B: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353B: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354B: ignition coil D, cylinder 5).

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



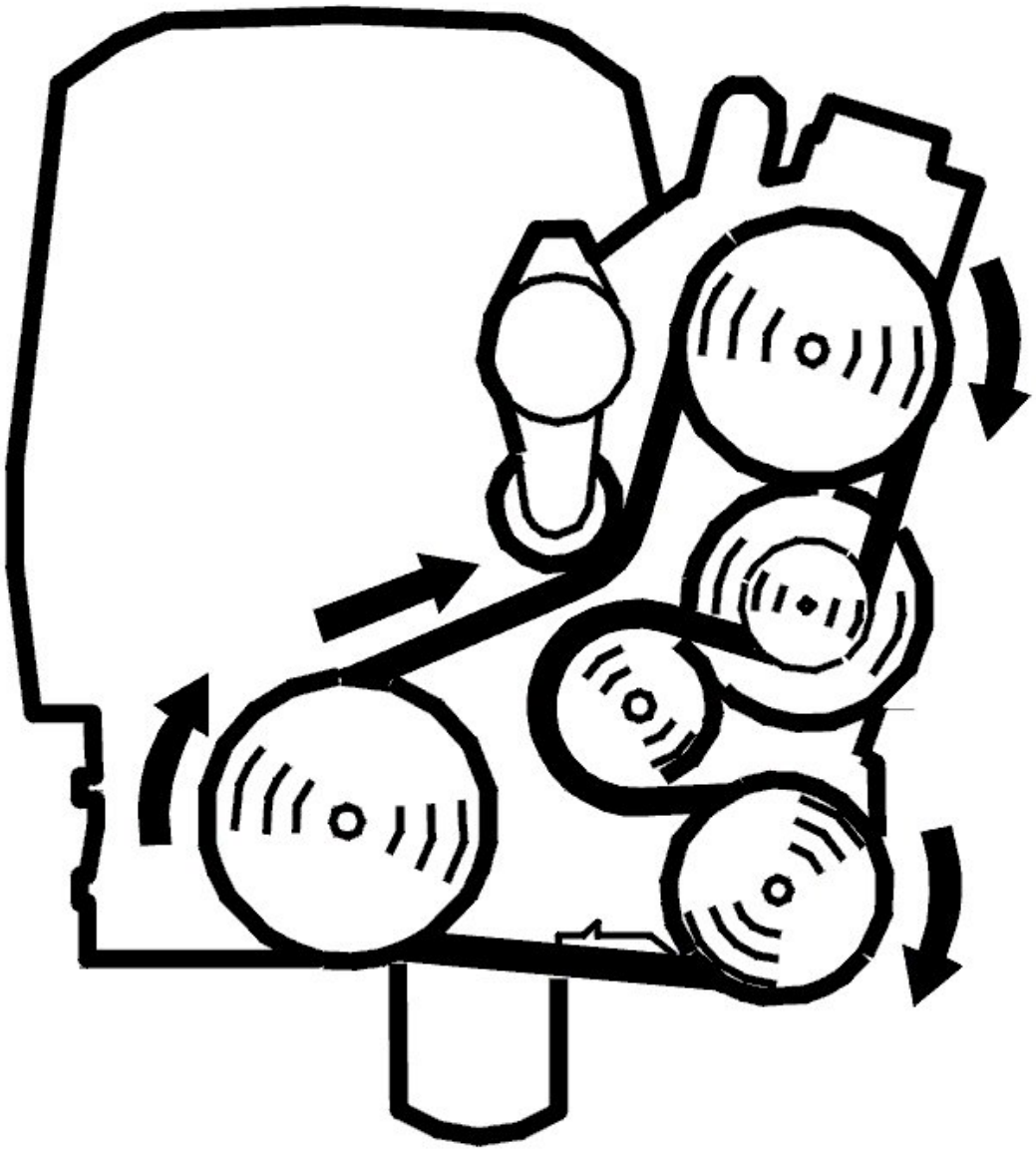


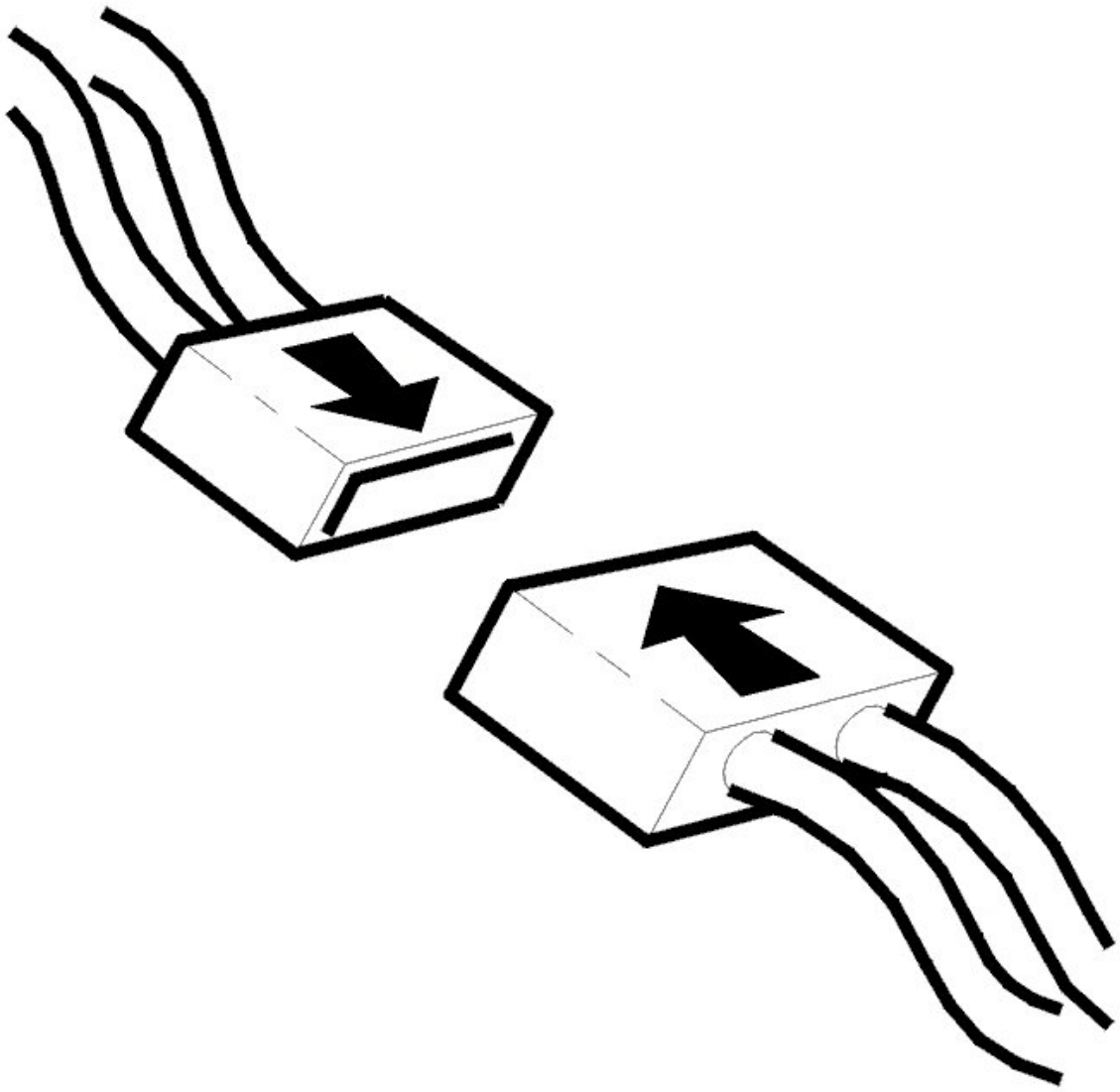
Continue - Verification

Verification

Verification

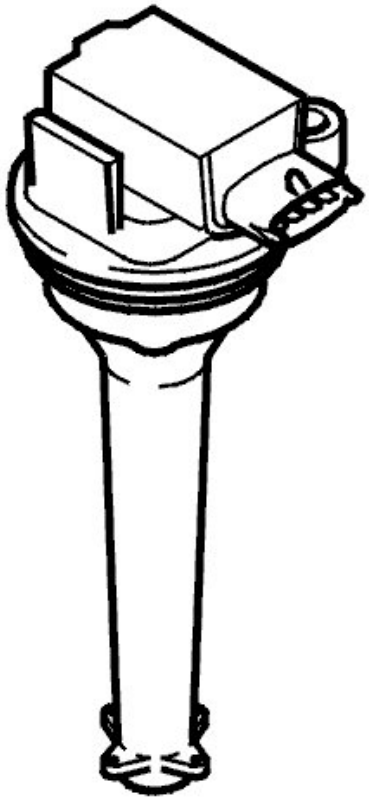
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

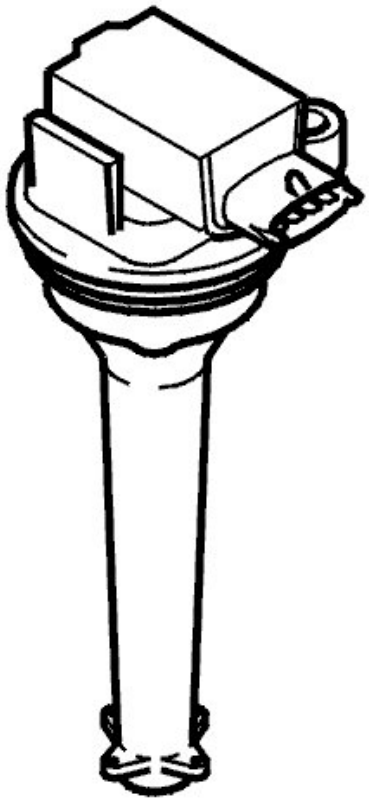
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too high.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.

- ECM-350C: ignition coil 1
- ECM-351C: ignition coil 2
- ECM-352C: ignition coil 3
- ECM-353C: ignition coil 4
- ECM-354C: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in the signal cable
- Damaged ignition coil.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

Signal too high

Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:

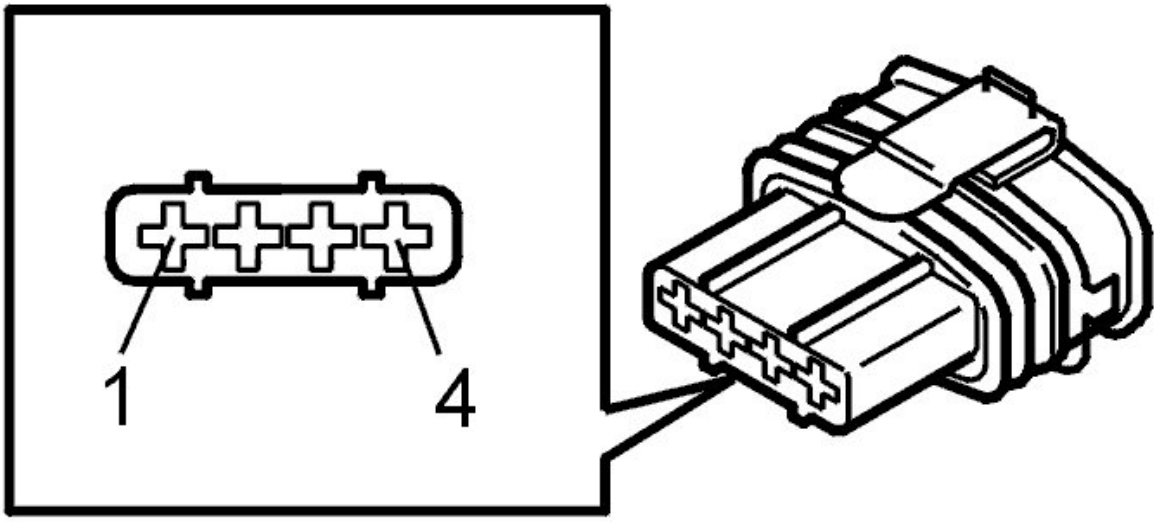
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350C: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351C: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352C: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353C: ignition coil C, cylinder 4).

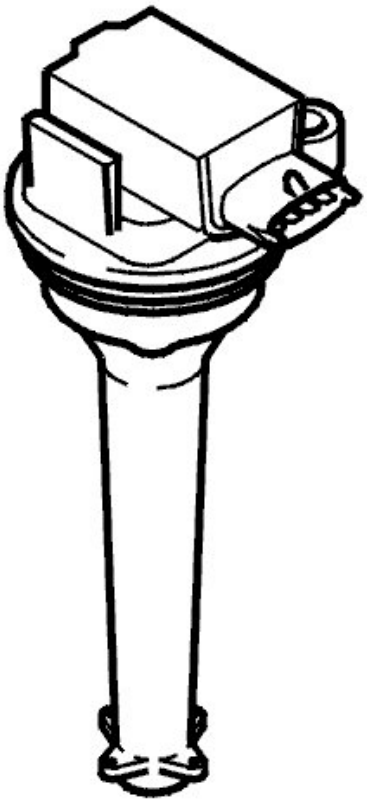
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354C: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



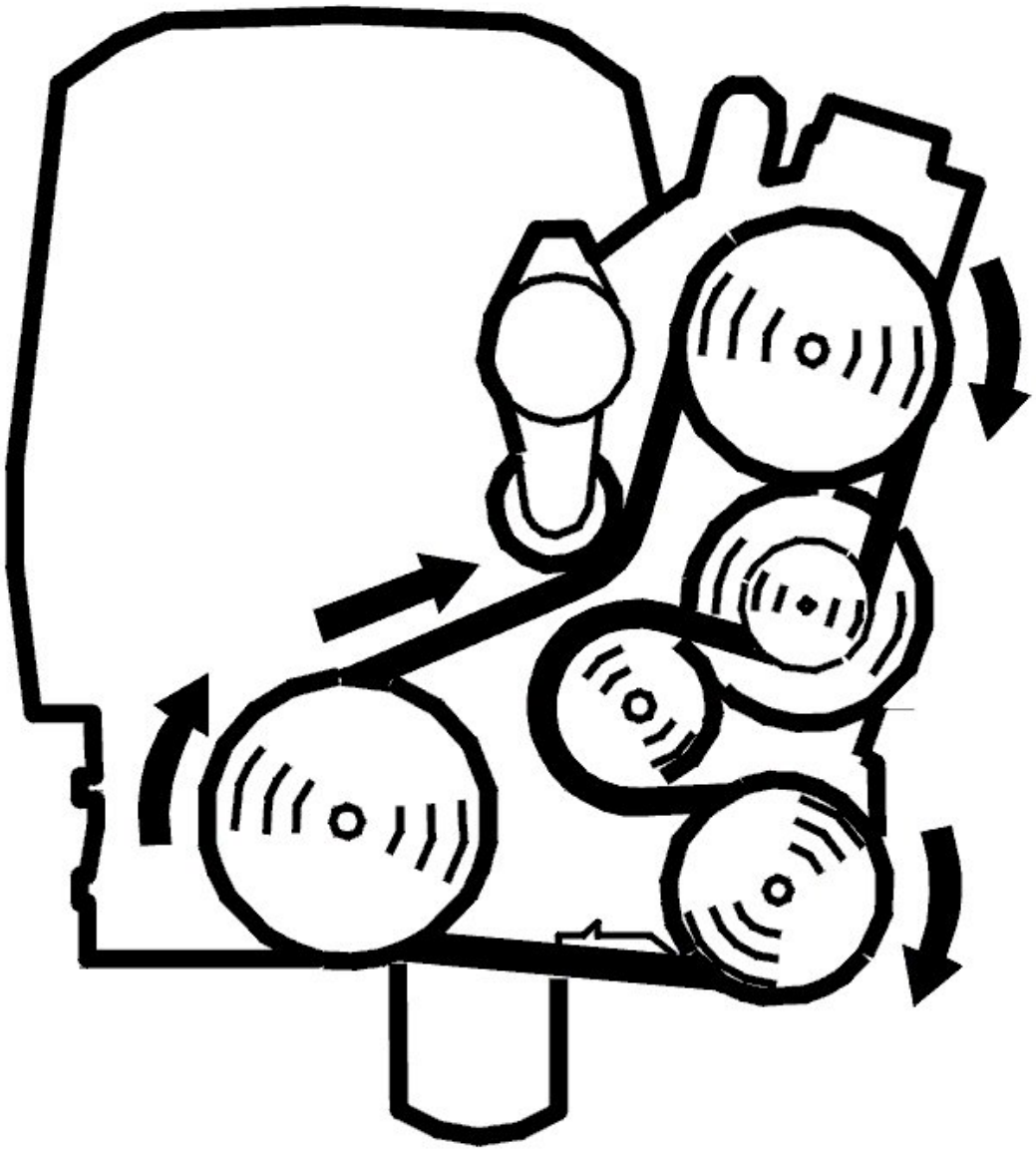


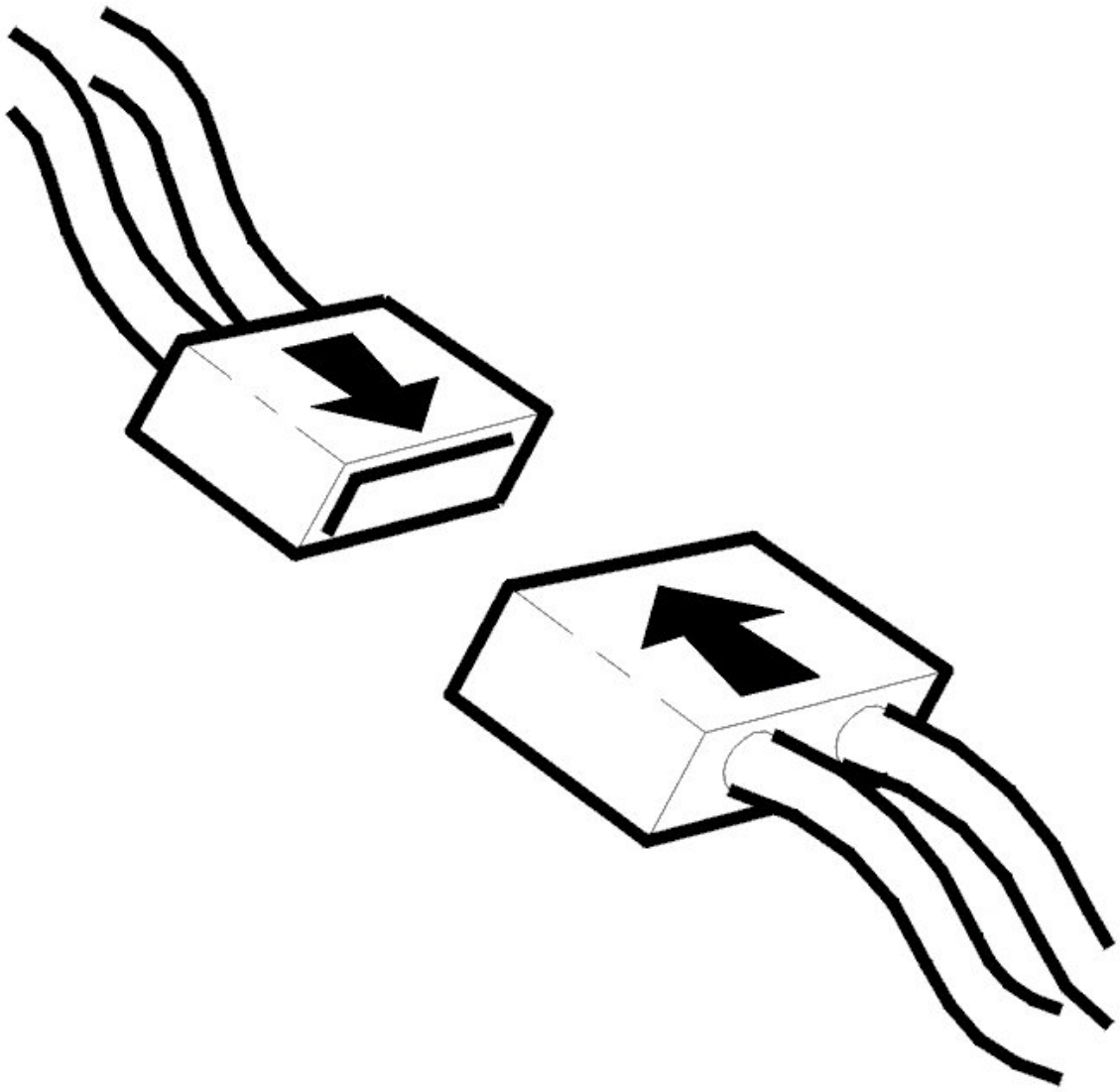
Continue - Verification

Verification

Verification

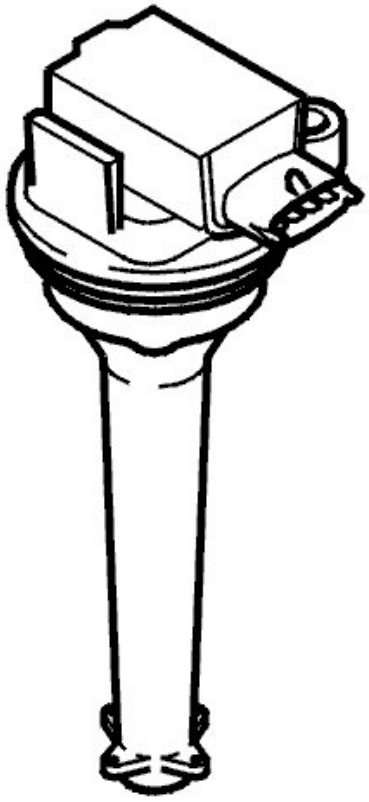
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

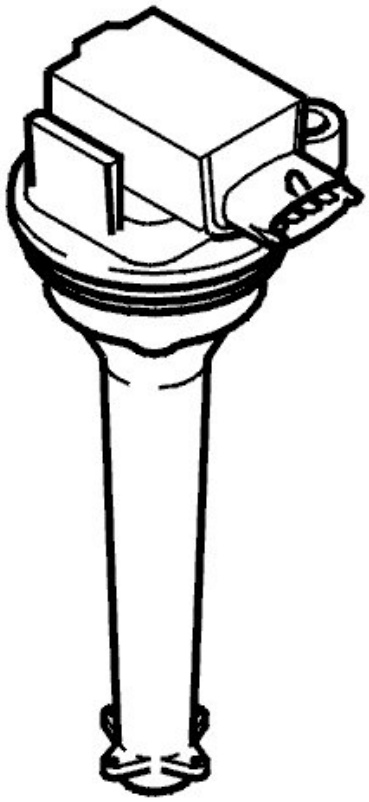
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too low.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350D: ignition coil 1
- ECM-351D: ignition coil 2
- ECM-352D: ignition coil 3
- ECM-353D: ignition coil 4
- ECM-354D: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

Signal too low

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

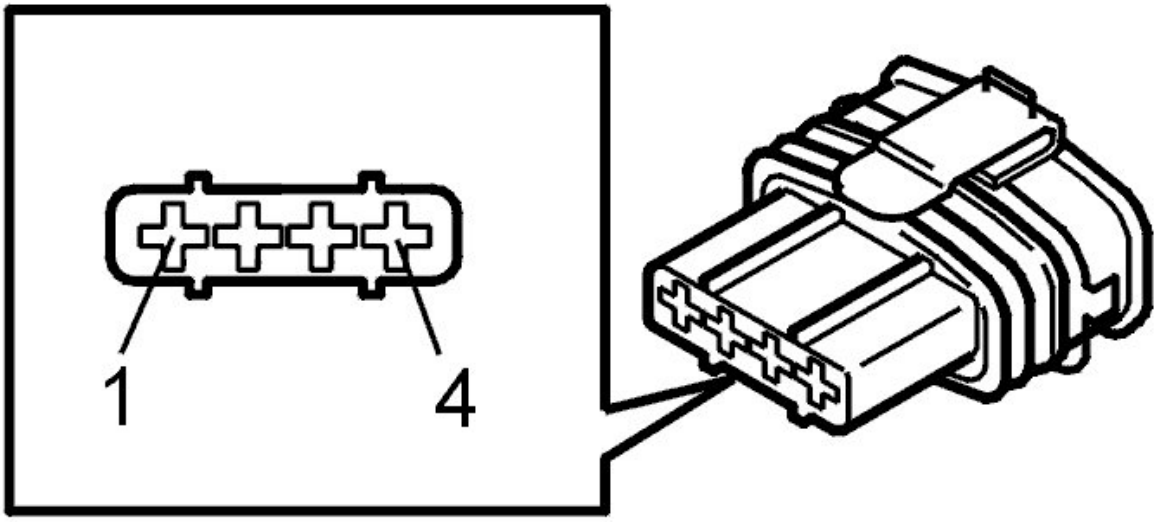
Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350D: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351D: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352D: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353D: ignition coil C, cylinder 4).

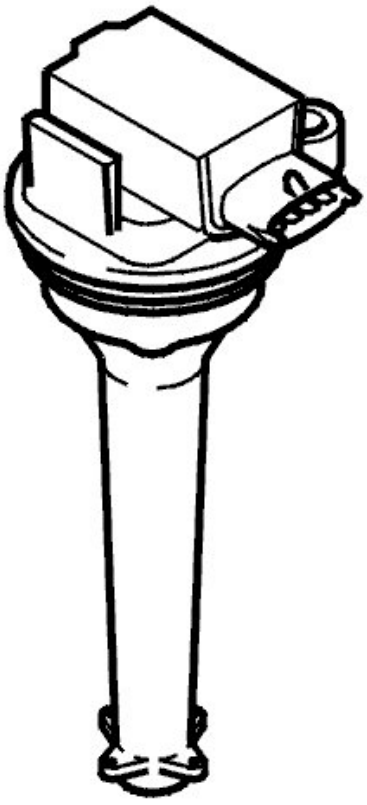
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354D: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



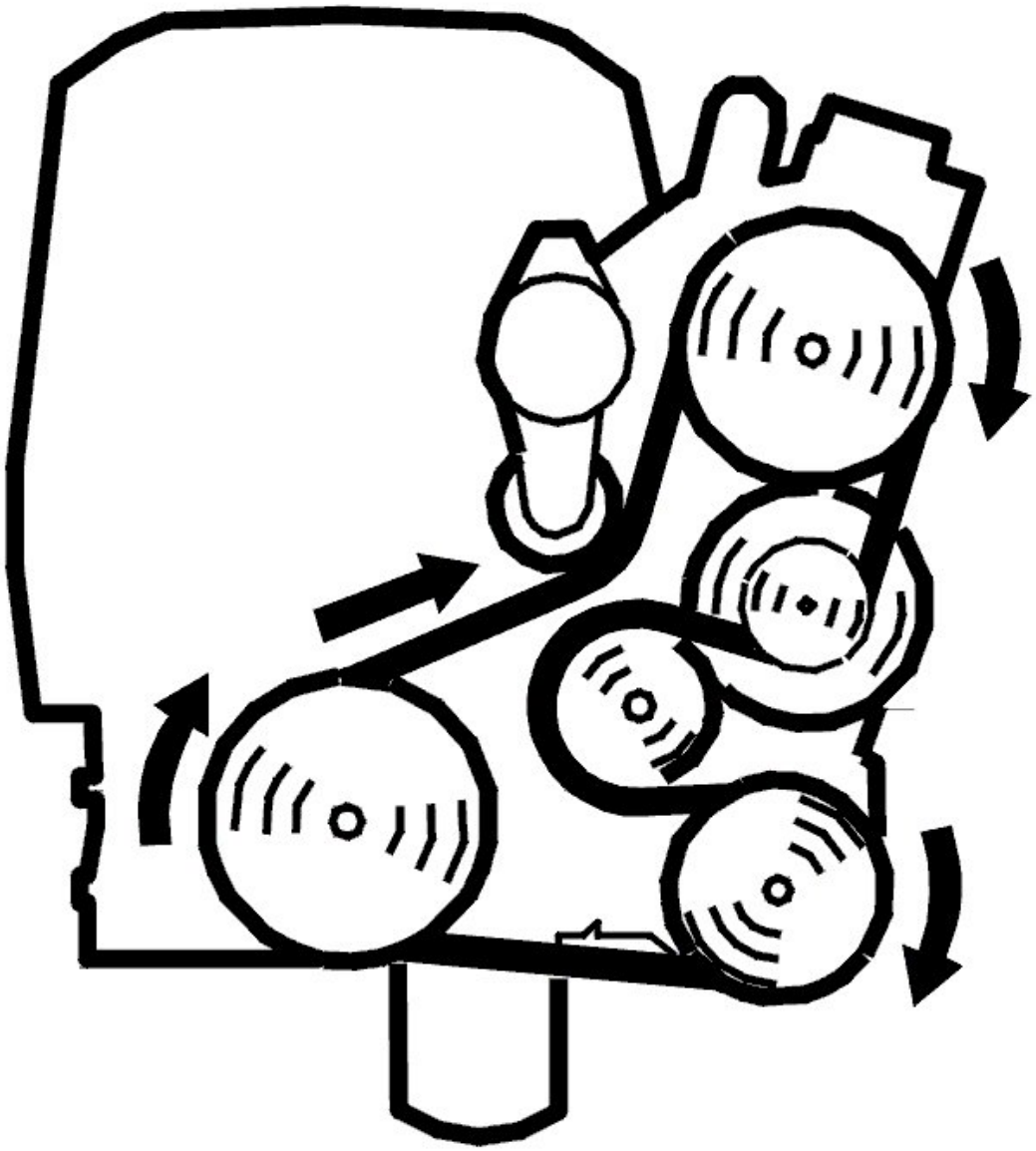


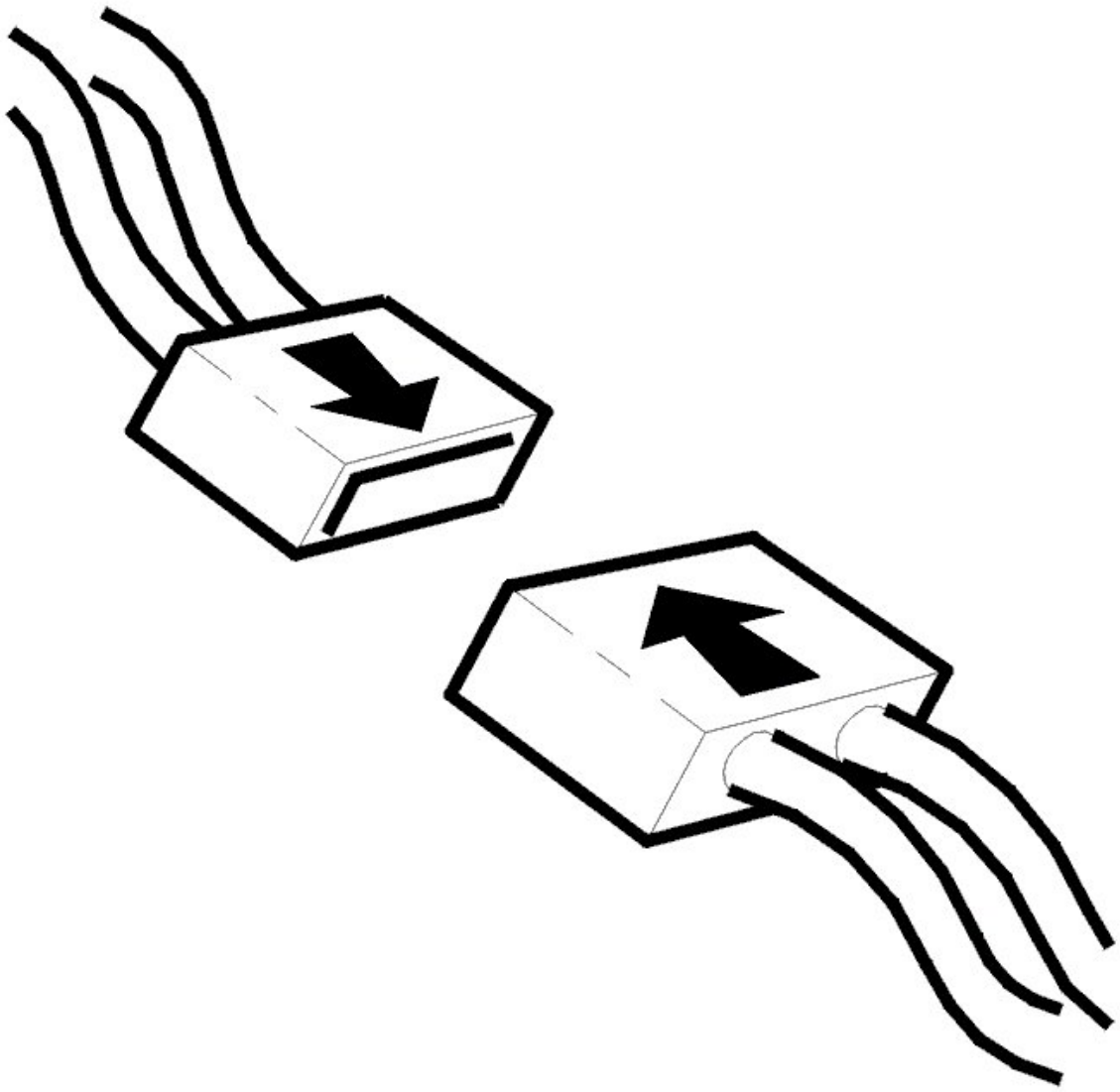
Continue - Verification

Verification

Verification

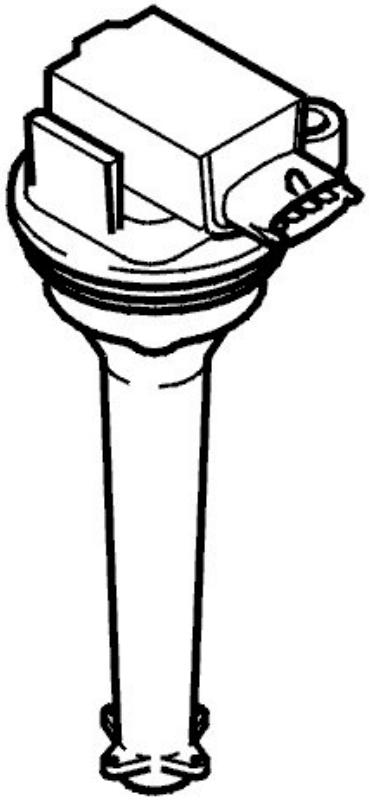
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

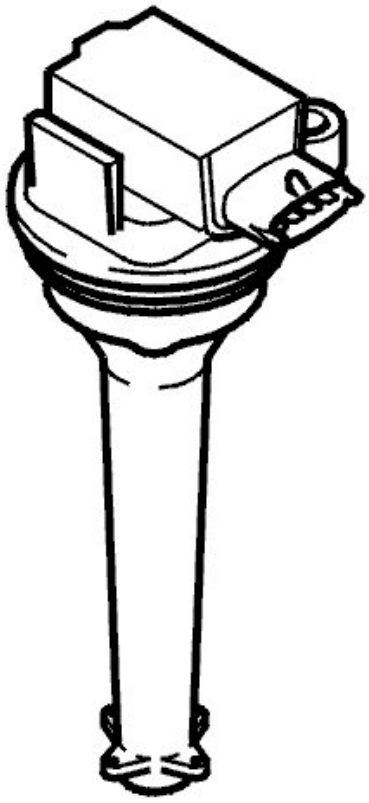
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

Signal missing

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

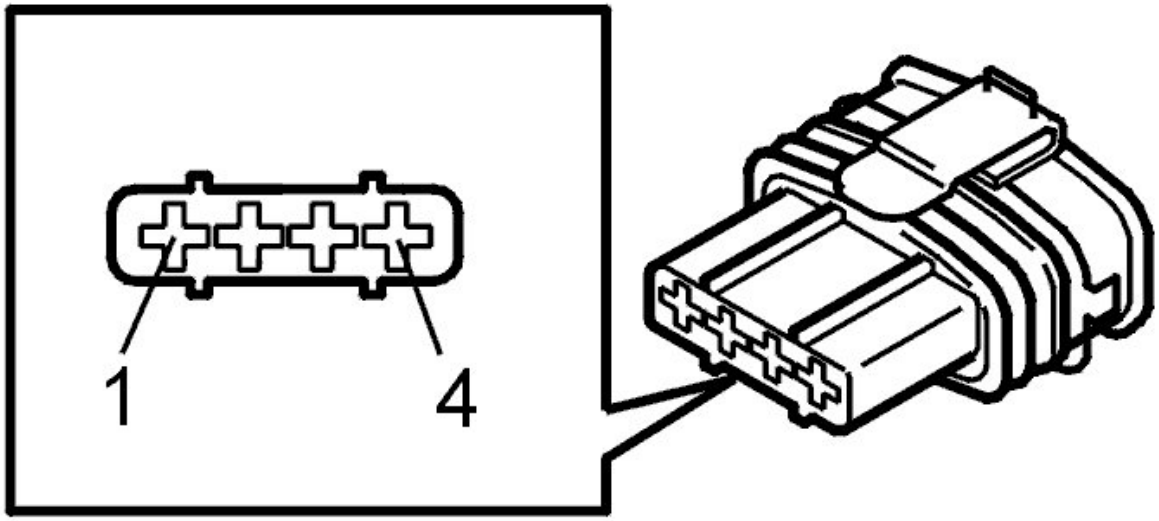
Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350B: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351B: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352B: ignition coil E, cylinder 3).

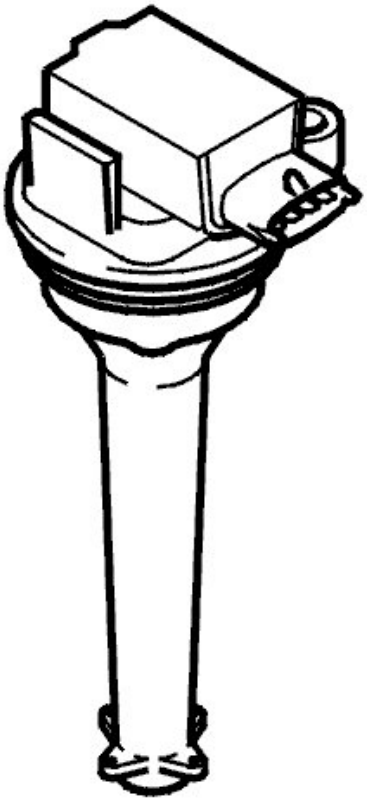
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353B: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354B: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



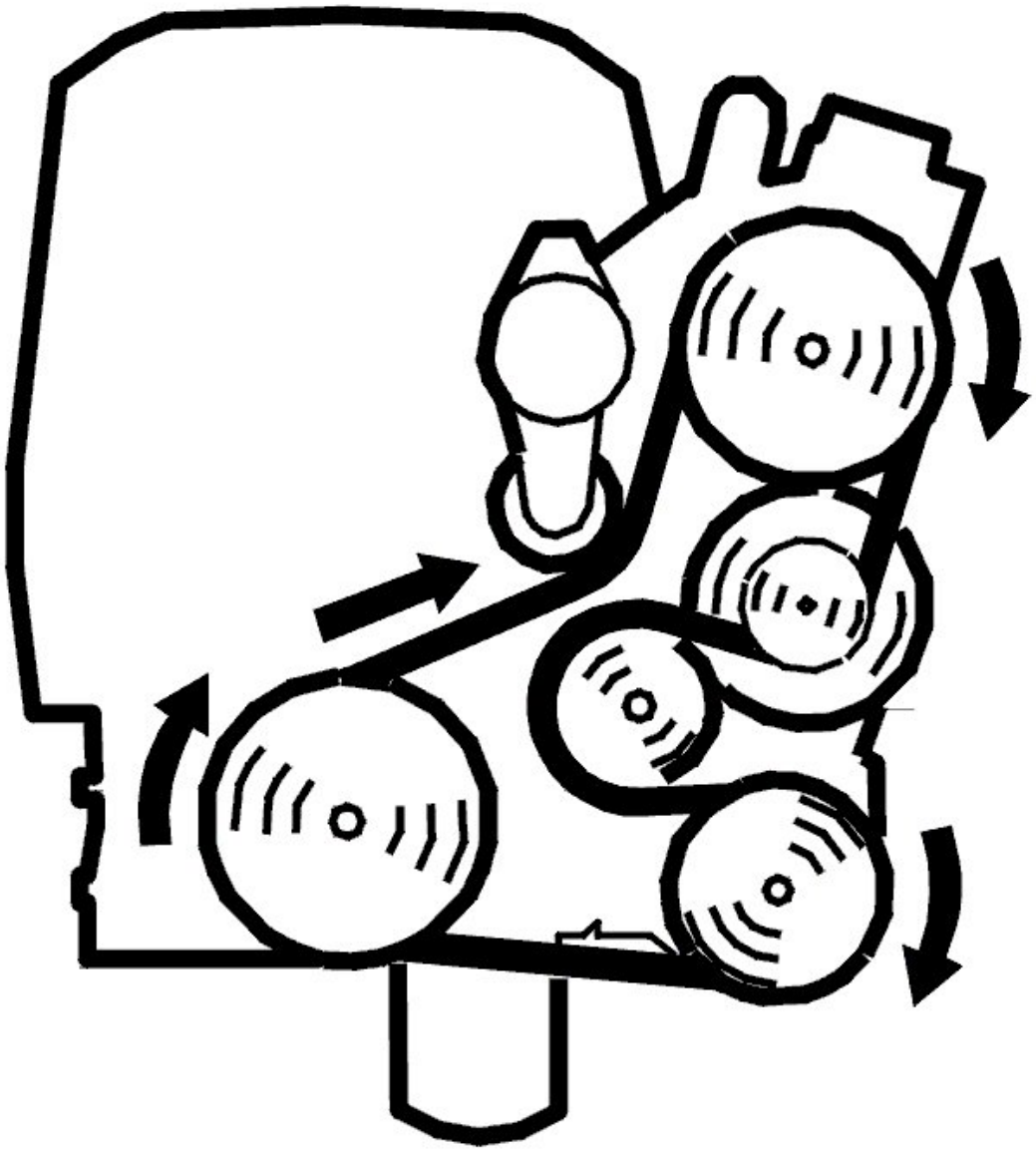


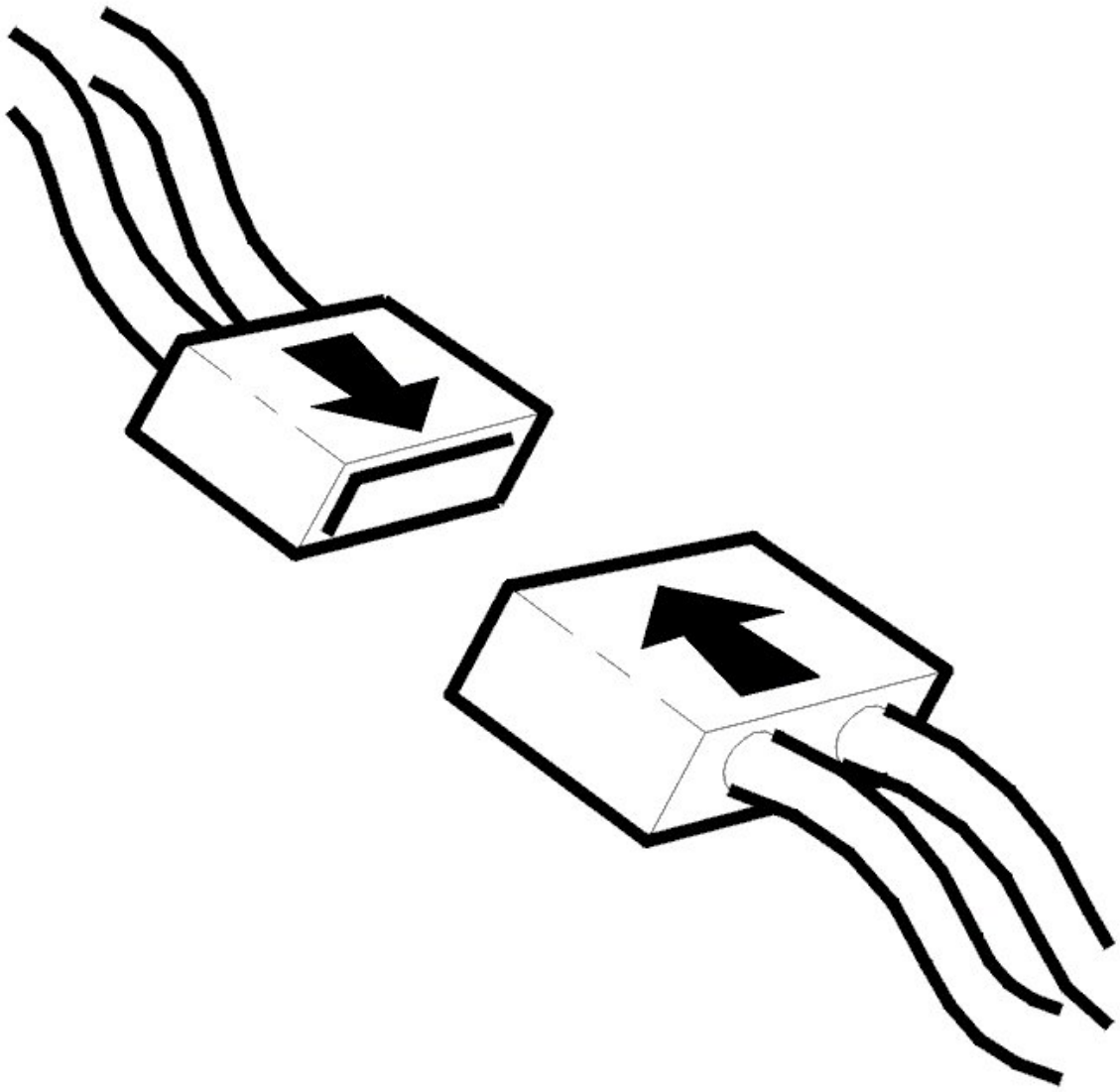
Continue - Verification

Verification

Verification

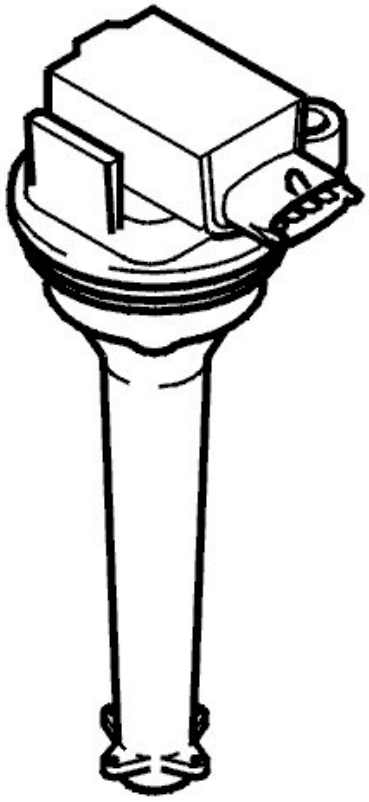
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

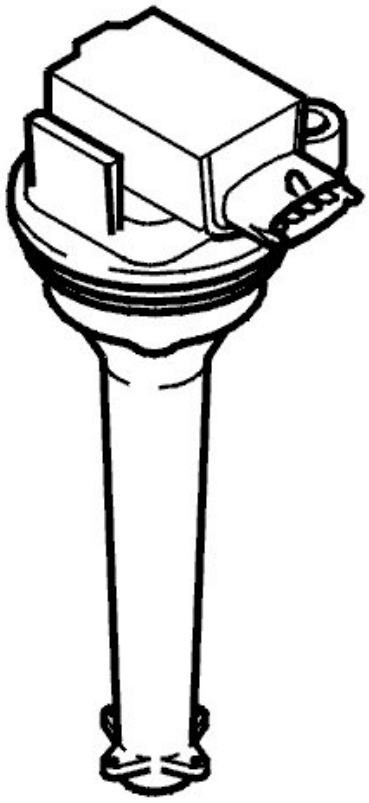
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too high.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350C: ignition coil 1
- ECM-351C: ignition coil 2
- ECM-352C: ignition coil 3
- ECM-353C: ignition coil 4
- ECM-354C: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

Signal too high

Checking components and wiring

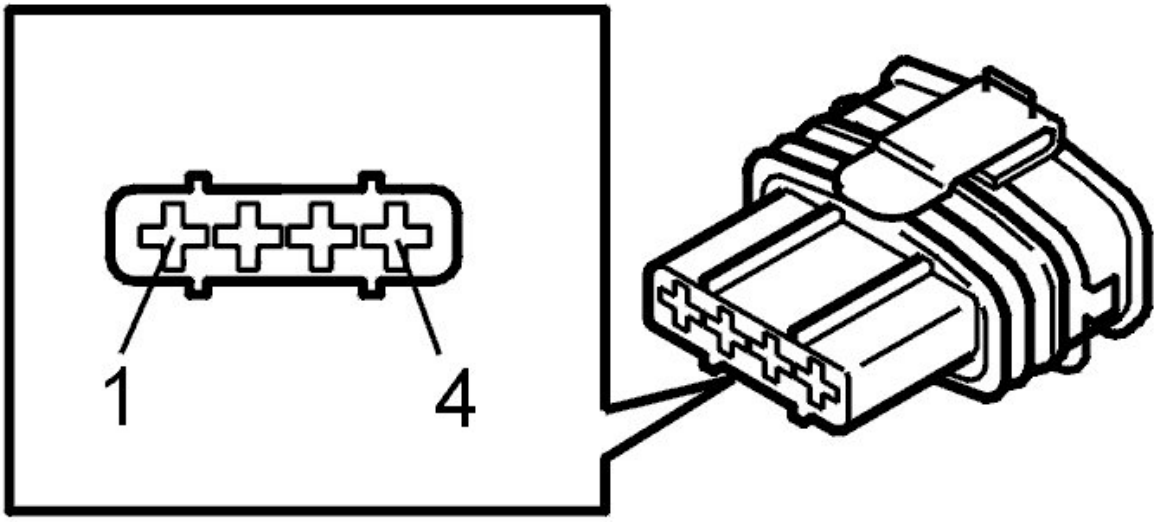
Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350C: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351C: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352C: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353C: ignition coil C, cylinder 4).

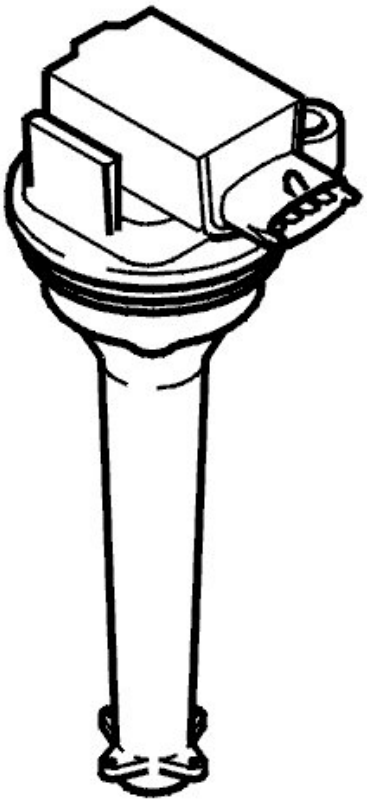
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354C: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



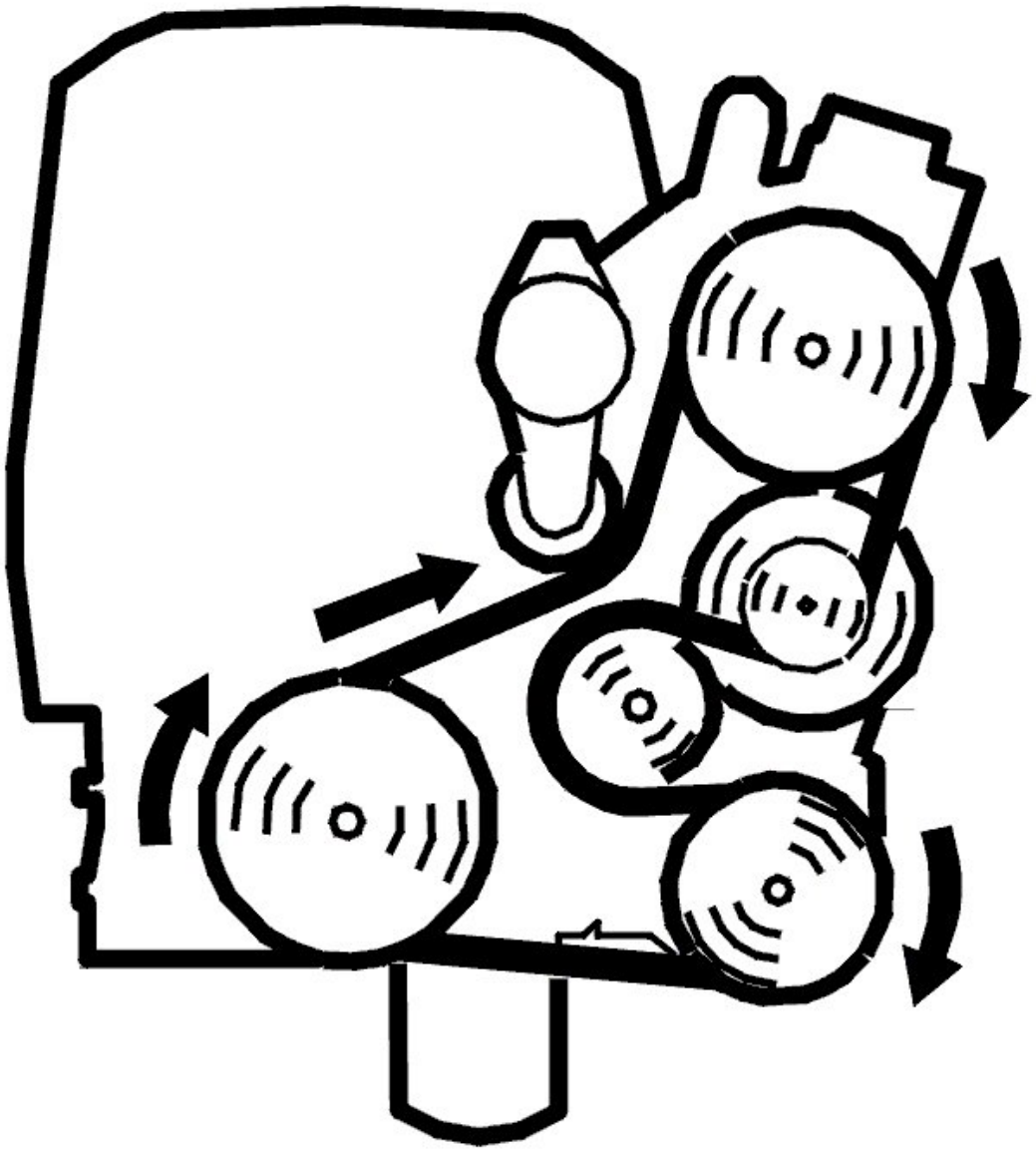


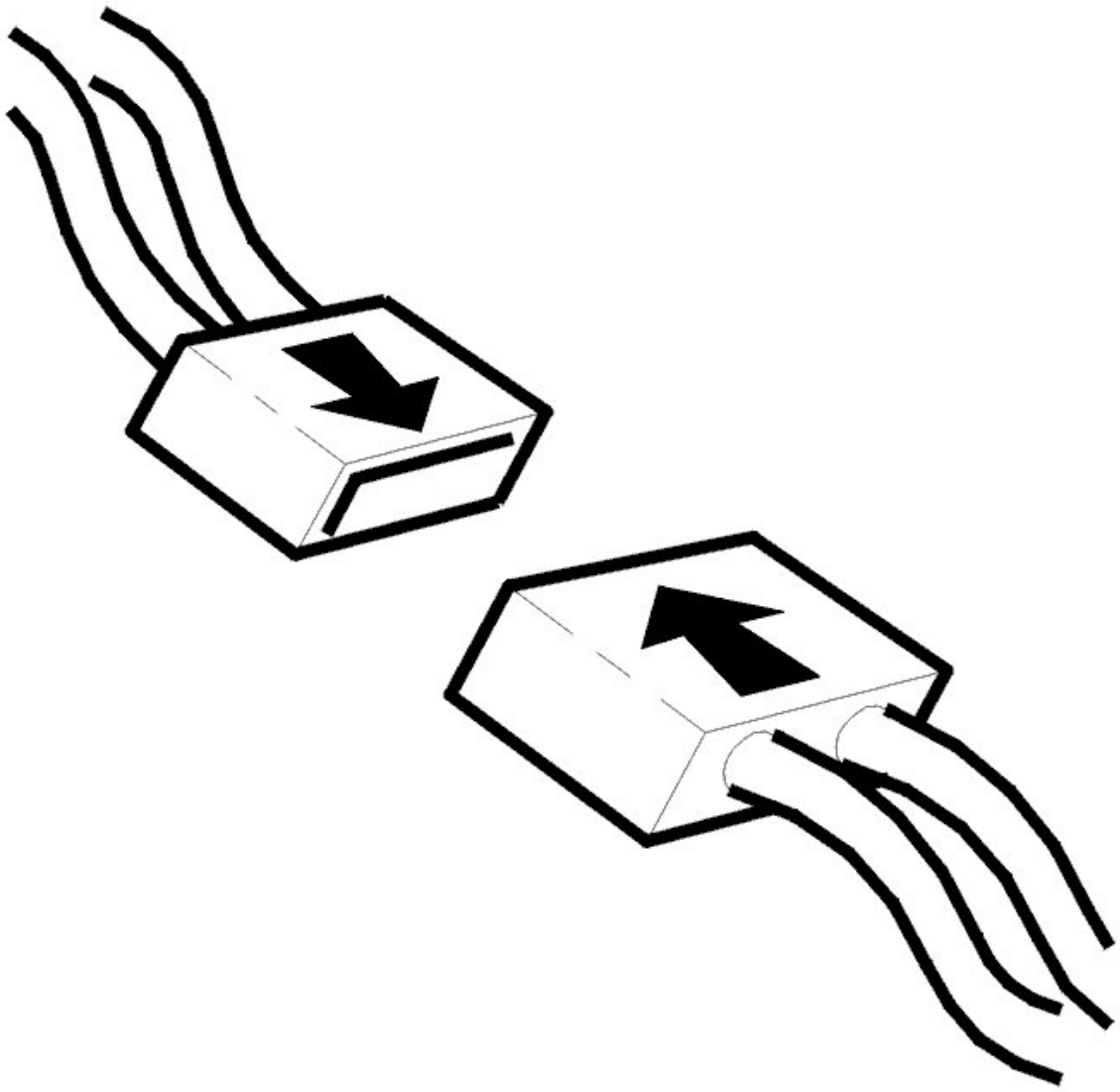
Continue - Verification

Verification

Verification

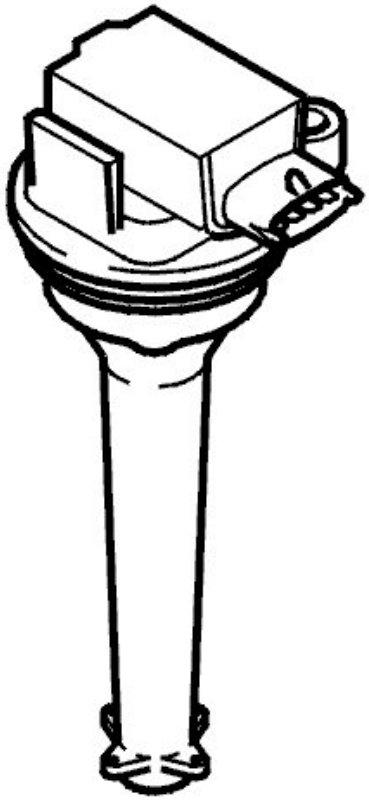
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

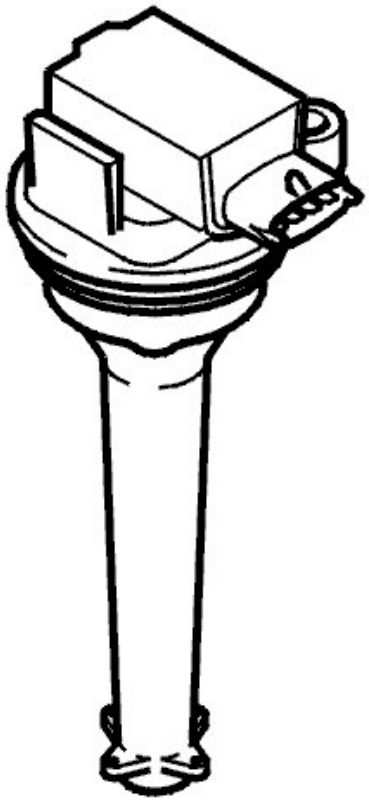
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too low.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350D: ignition coil 1
- ECM-351D: ignition coil 2
- ECM-352D: ignition coil 3
- ECM-353D: ignition coil 4
- ECM-354D: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

Signal too low

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

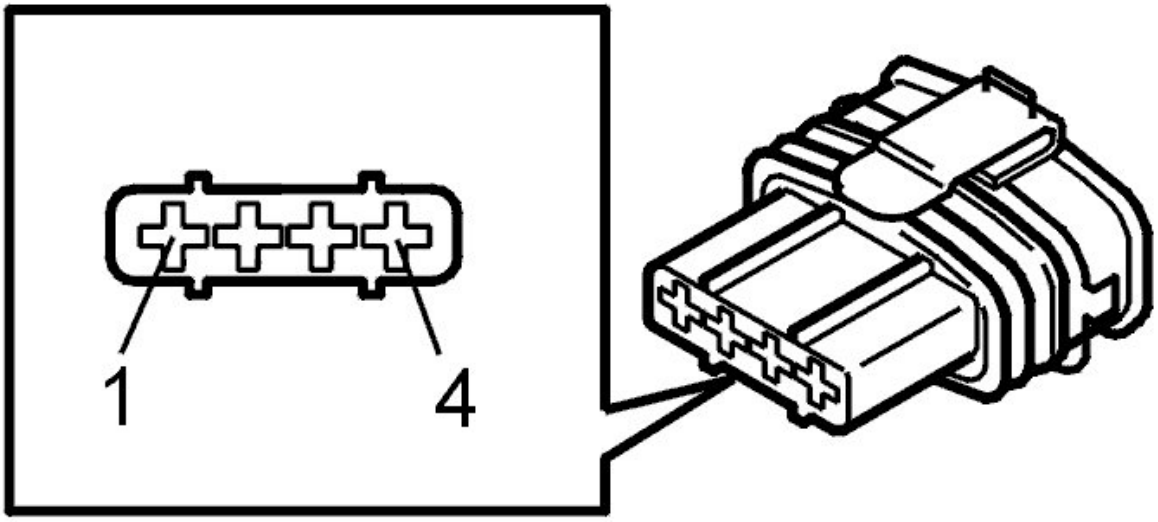
Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350D: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351D: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352D: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353D: ignition coil C, cylinder 4).

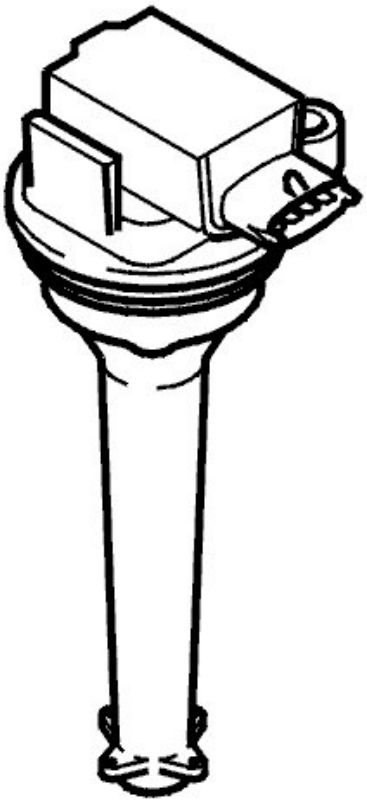
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354D: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



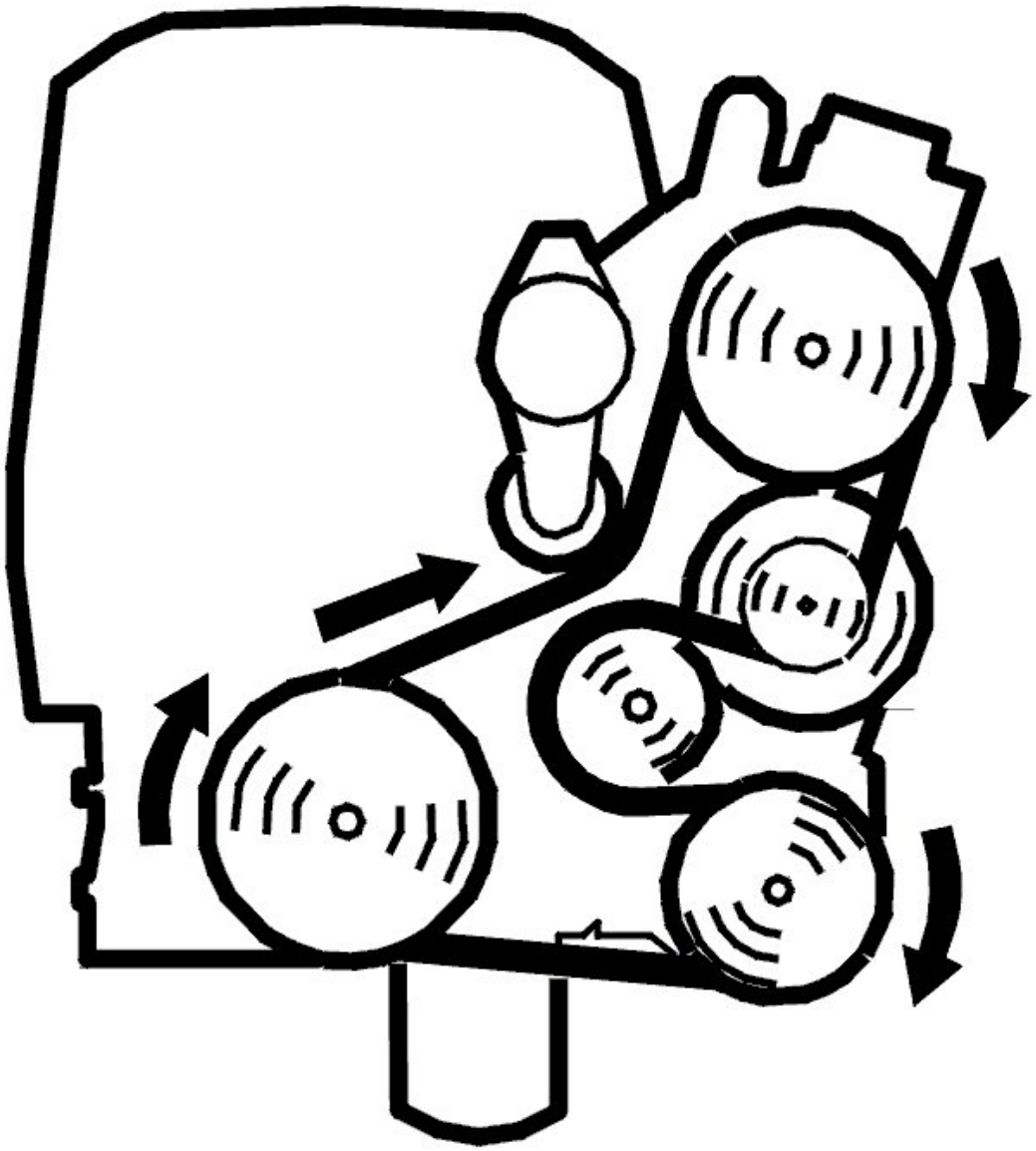


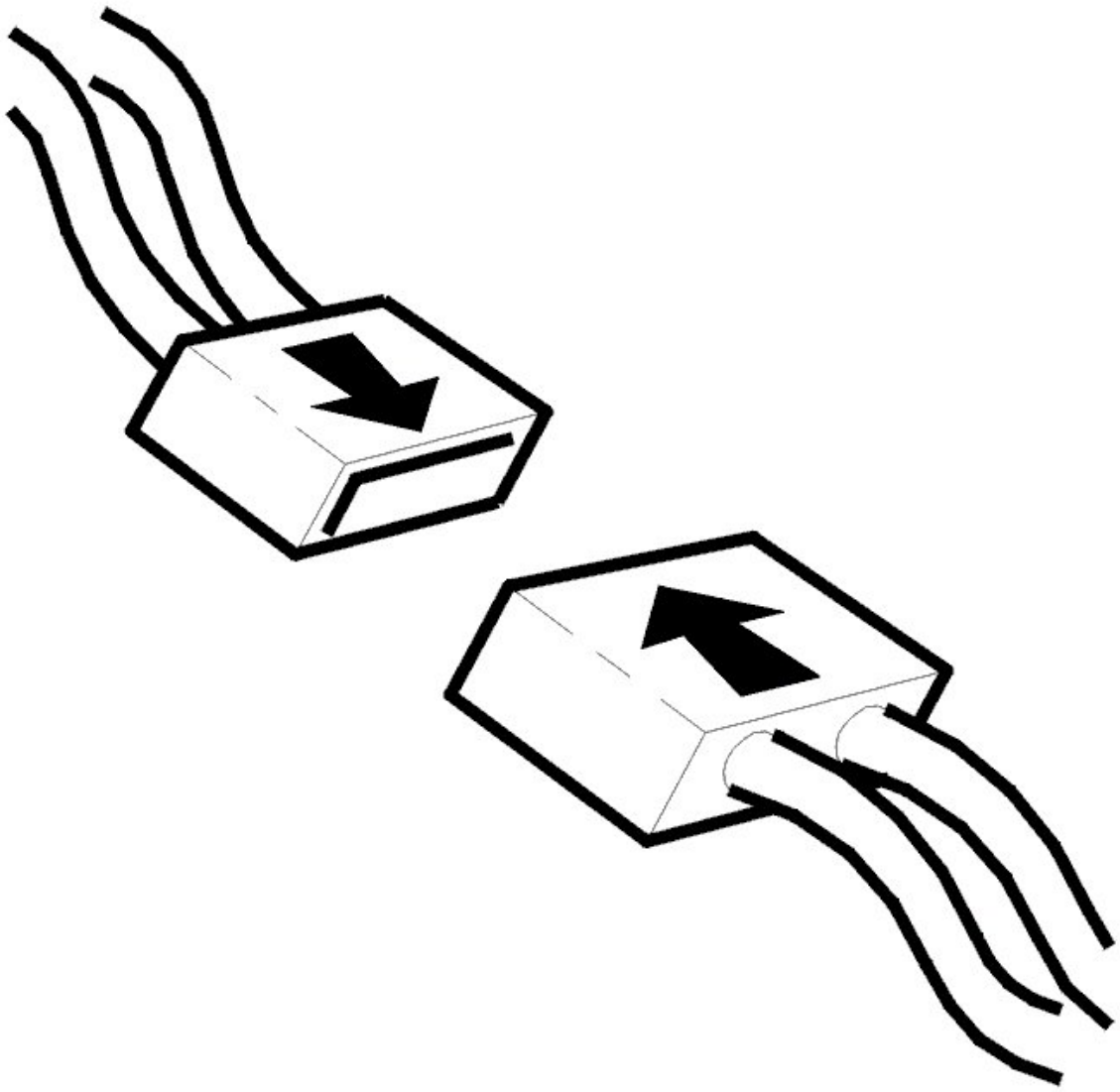
Continue - Verification

Verification

Verification

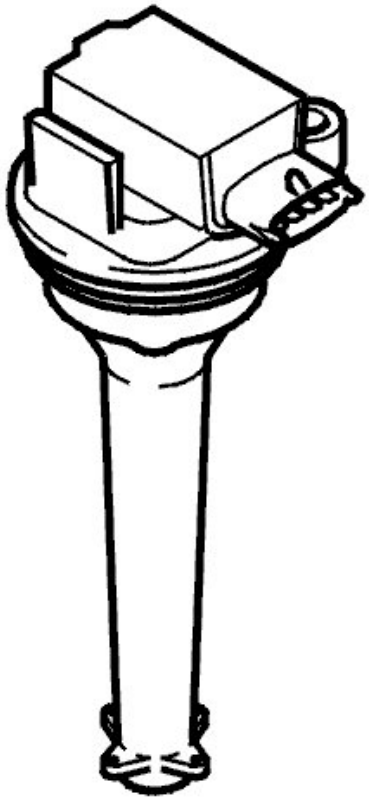
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

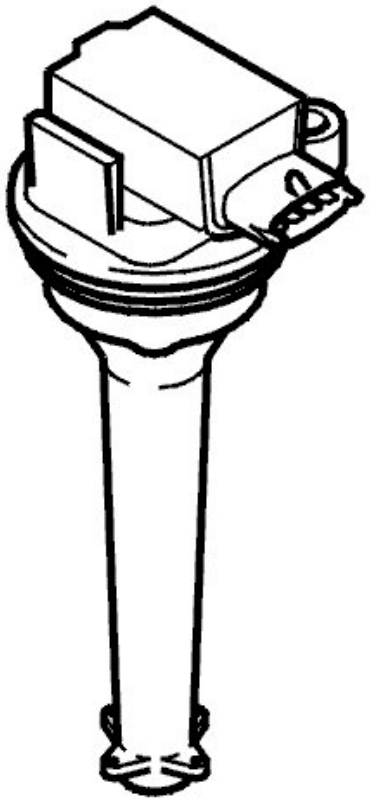
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

Signal missing

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

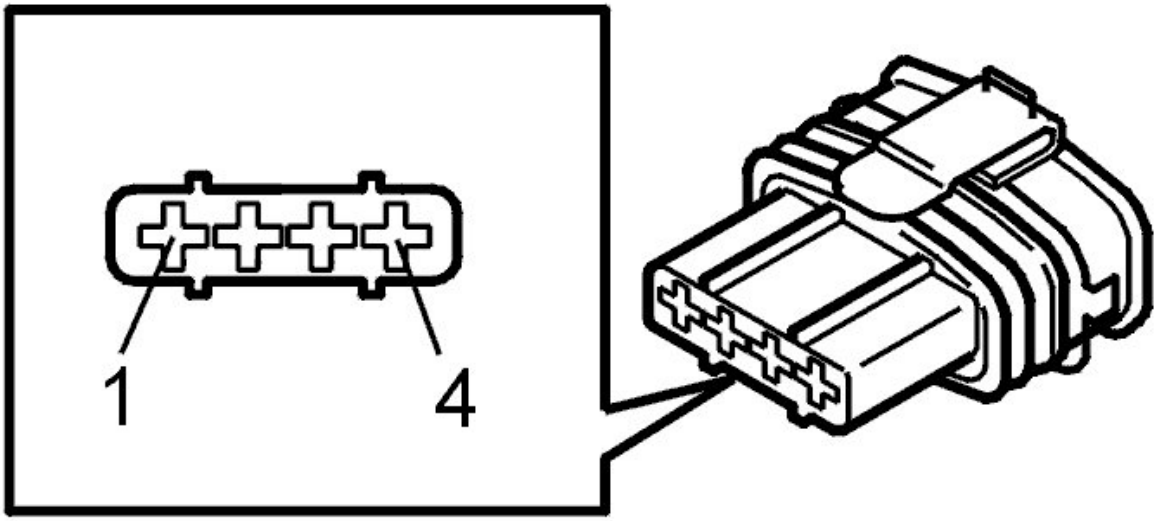
Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350B: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351B: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352B: ignition coil E, cylinder 3).

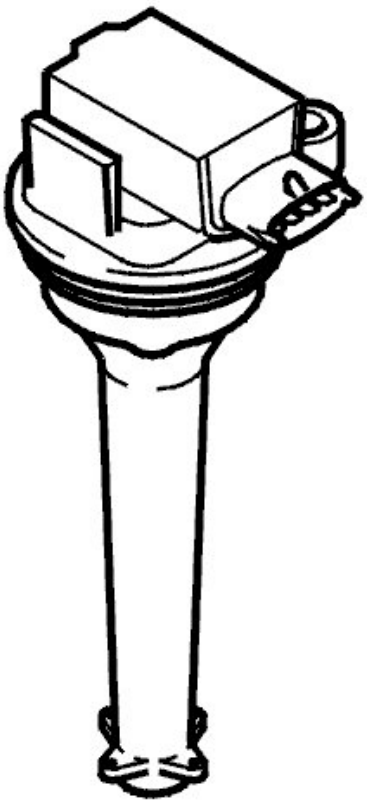
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353B: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354B: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



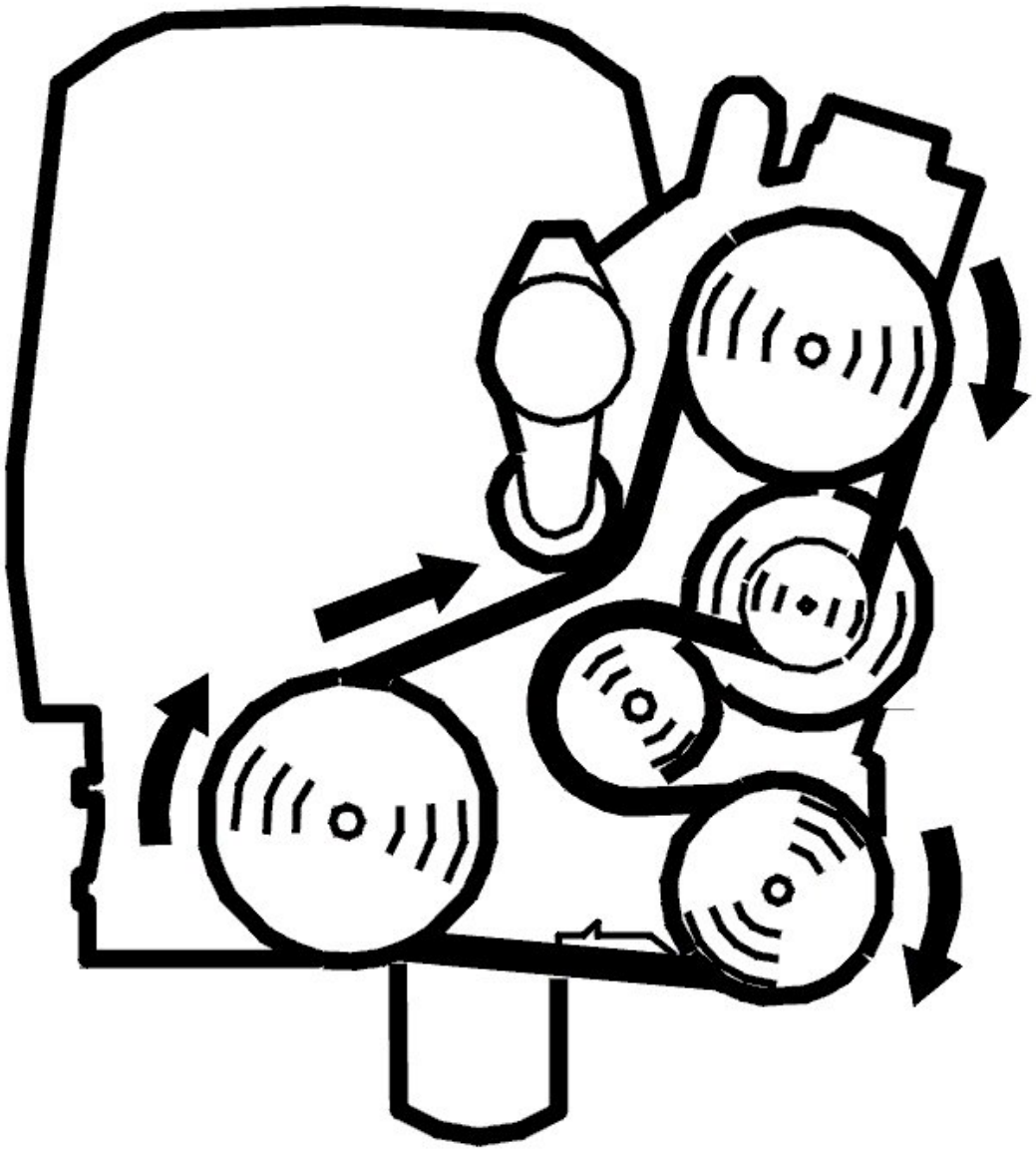


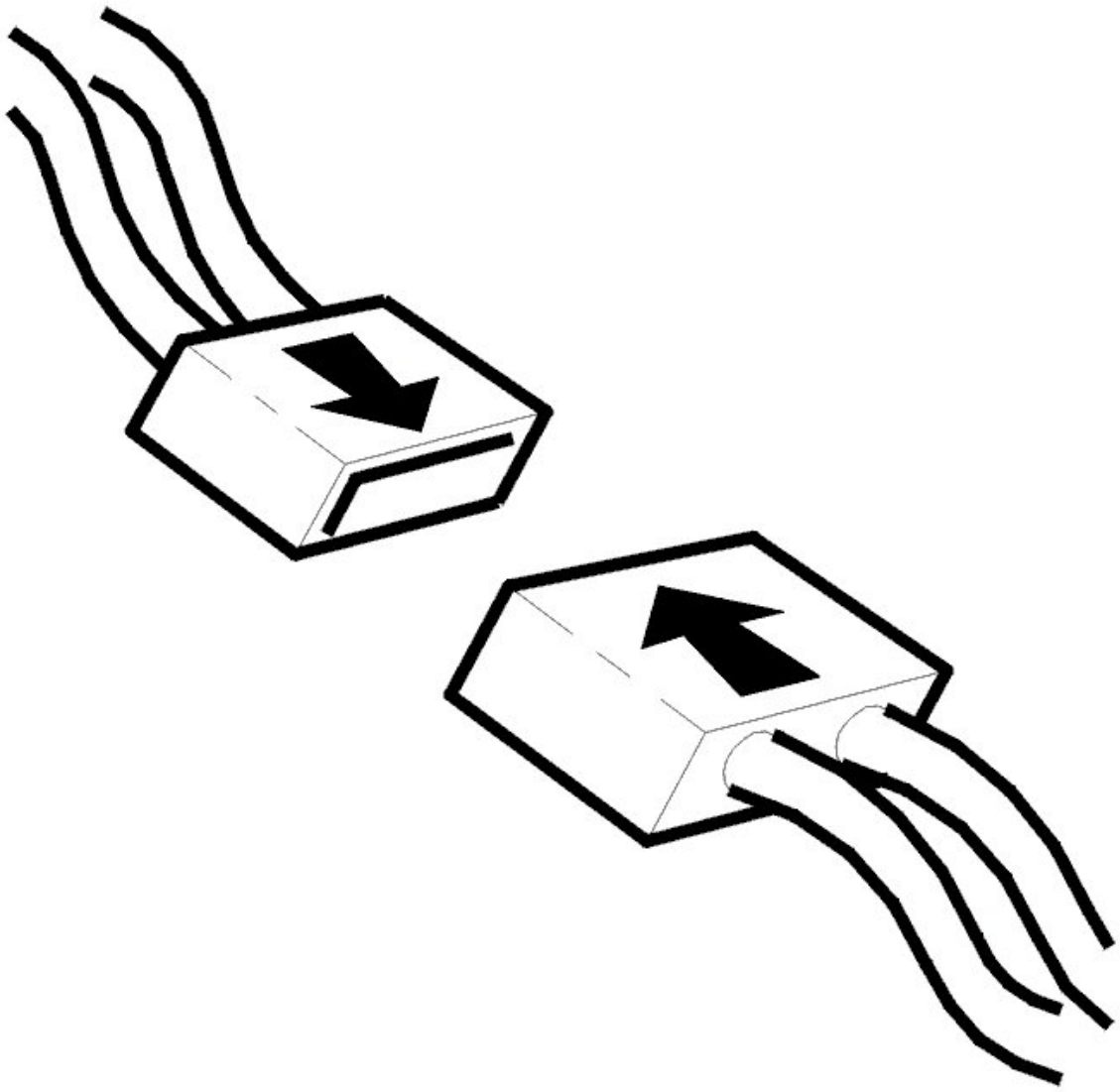
Continue - Verification

Verification

Verification

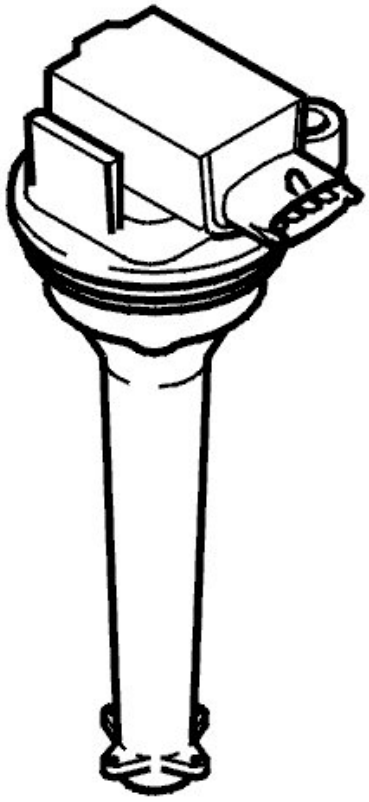
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

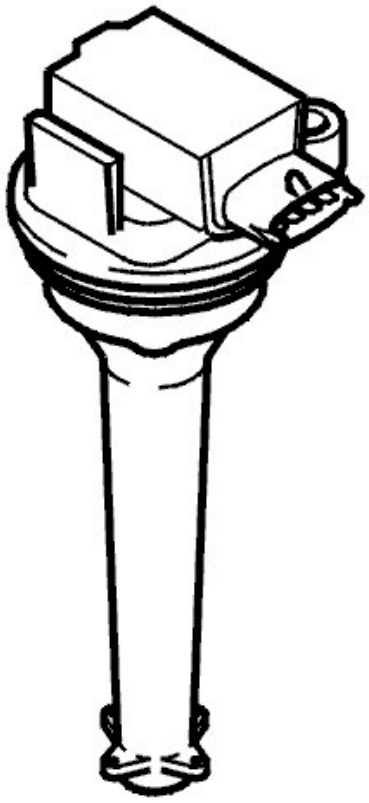
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too high.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350C: ignition coil 1
- ECM-351C: ignition coil 2
- ECM-352C: ignition coil 3
- ECM-353C: ignition coil 4
- ECM-354C: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

Signal too high

Checking components and wiring

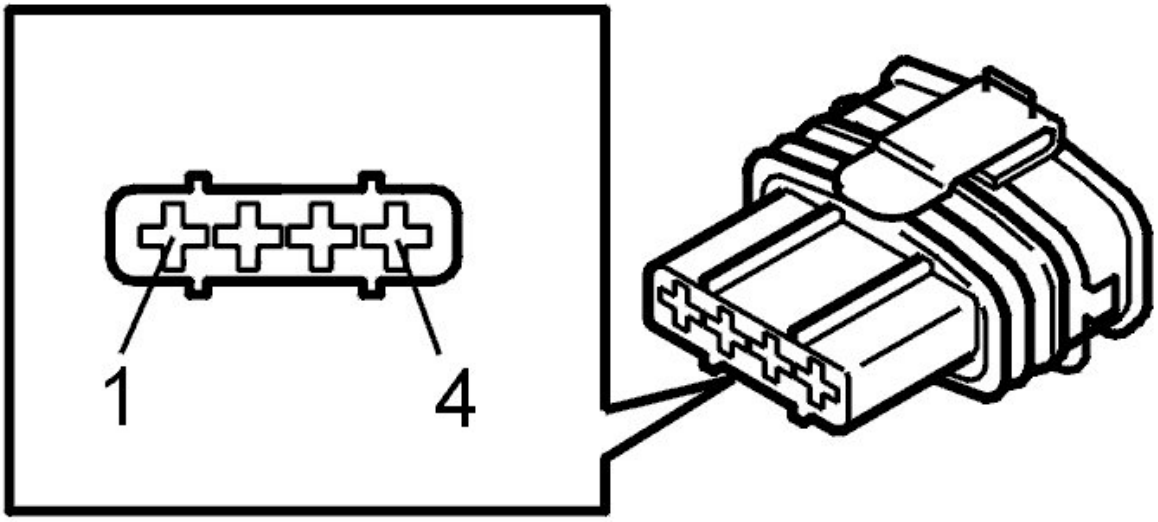
Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350C: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351C: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352C: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353C: ignition coil C, cylinder 4).

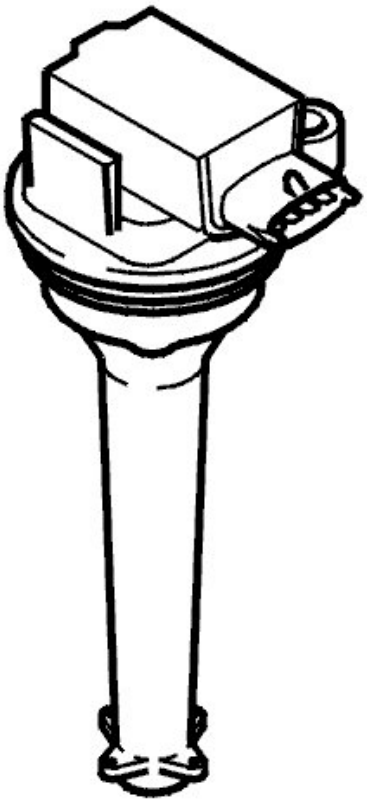
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354C: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



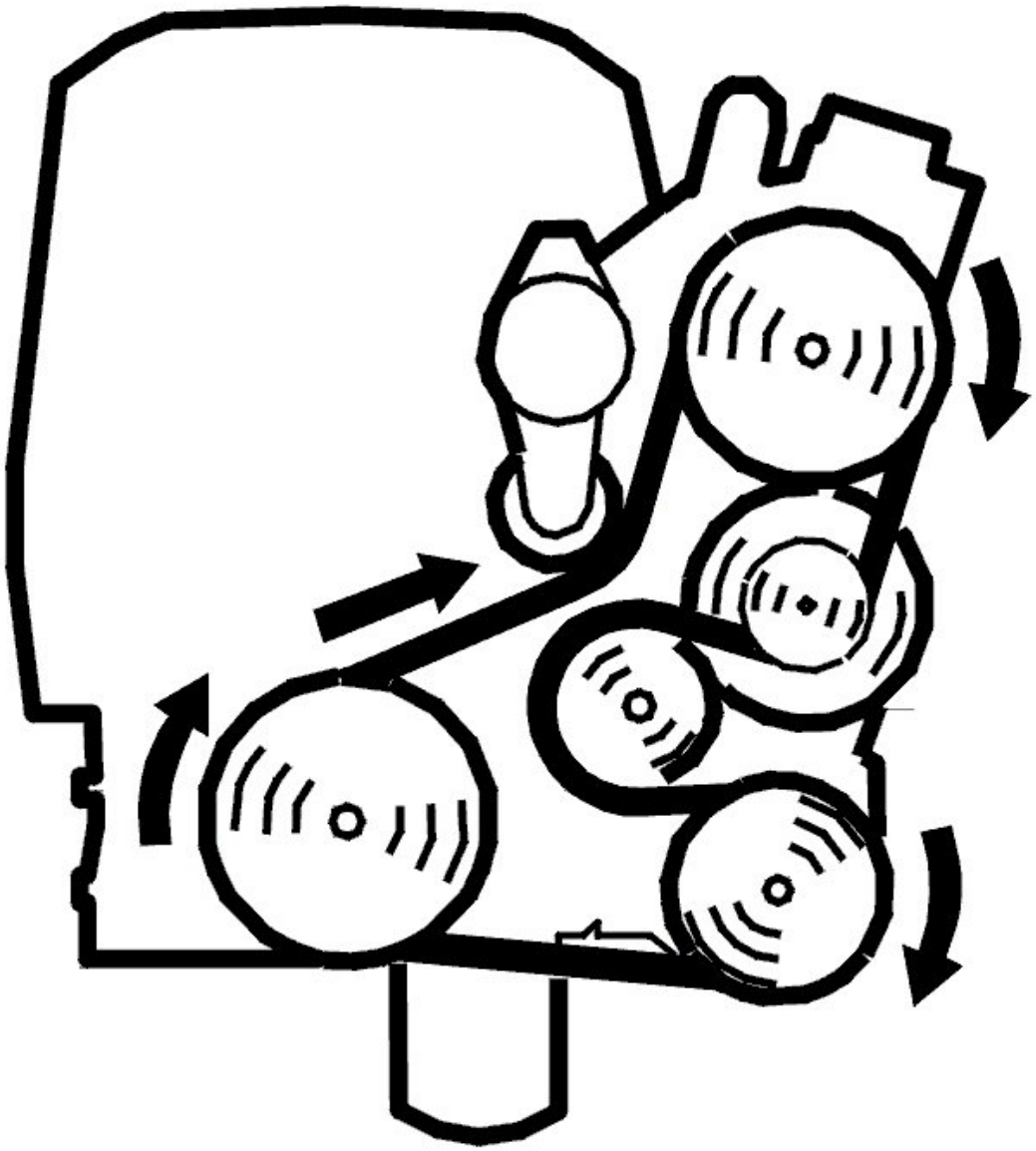


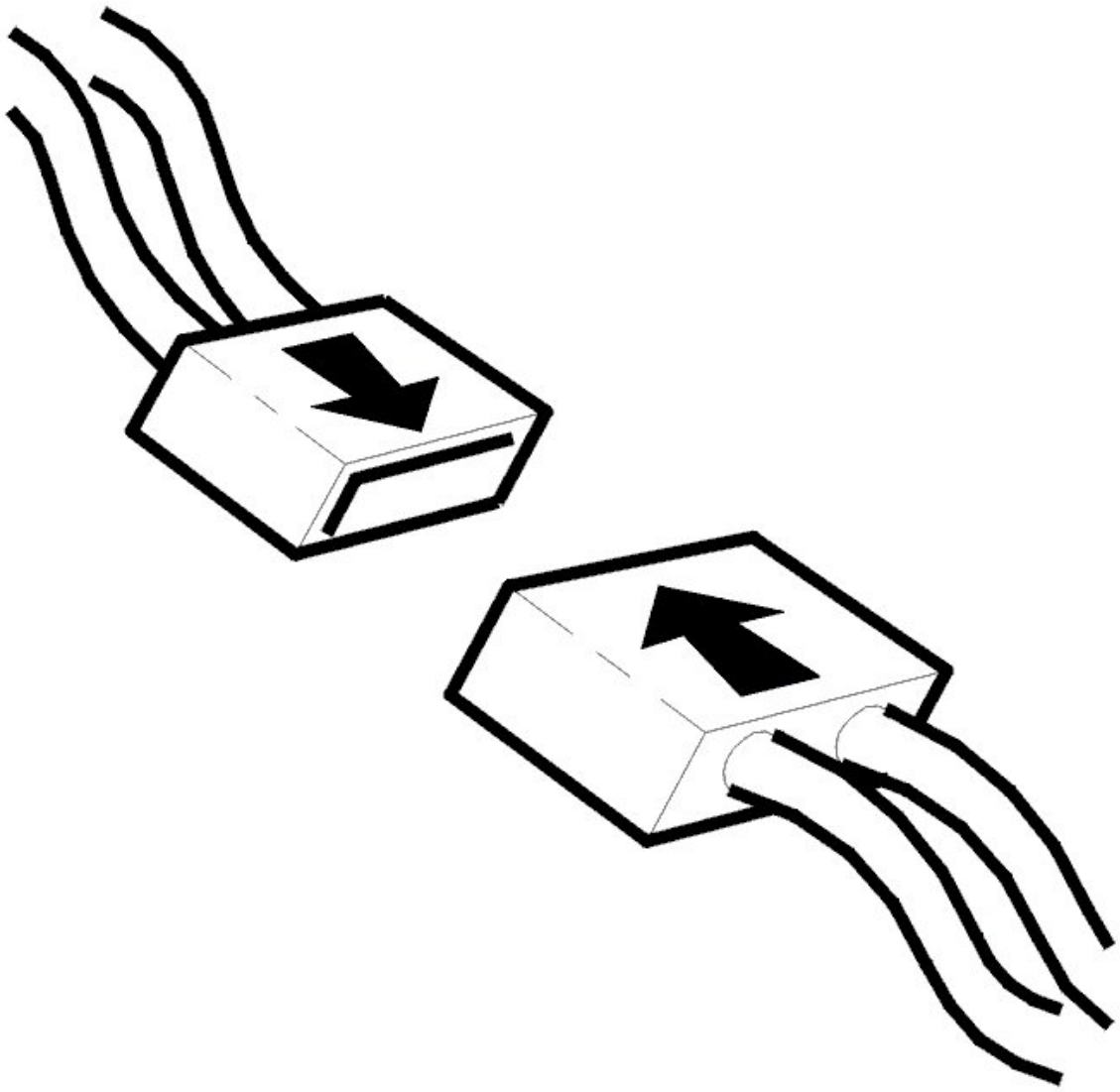
Continue - Verification

Verification

Verification

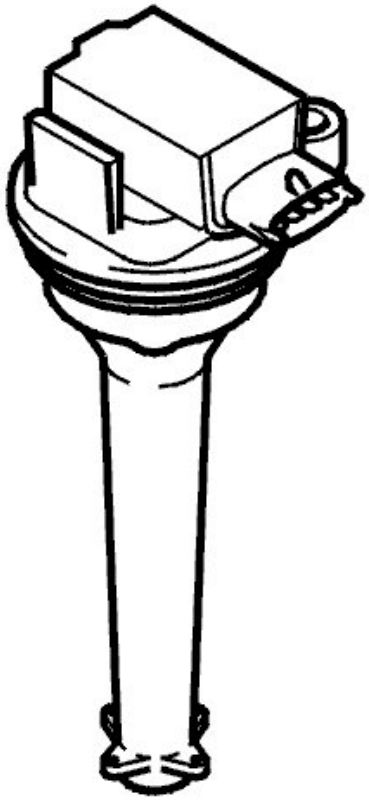
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

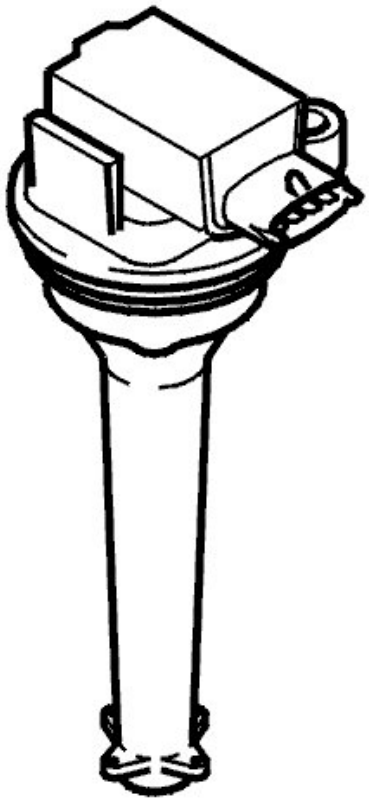
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too low.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350D: ignition coil 1
- ECM-351D: ignition coil 2
- ECM-352D: ignition coil 3
- ECM-353D: ignition coil 4
- ECM-354D: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

Signal too low

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

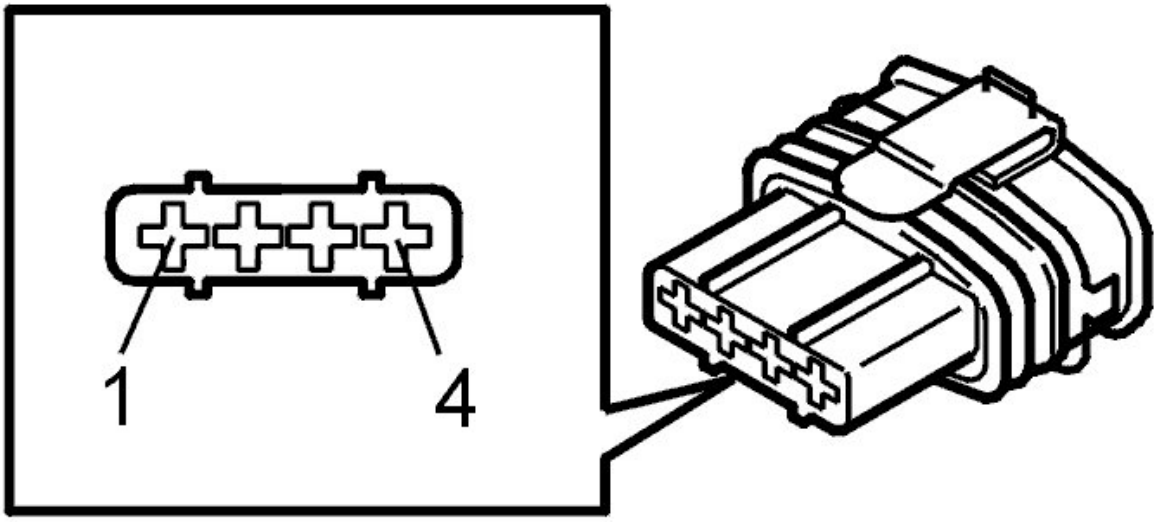
Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350D: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351D: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352D: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353D: ignition coil C, cylinder 4).

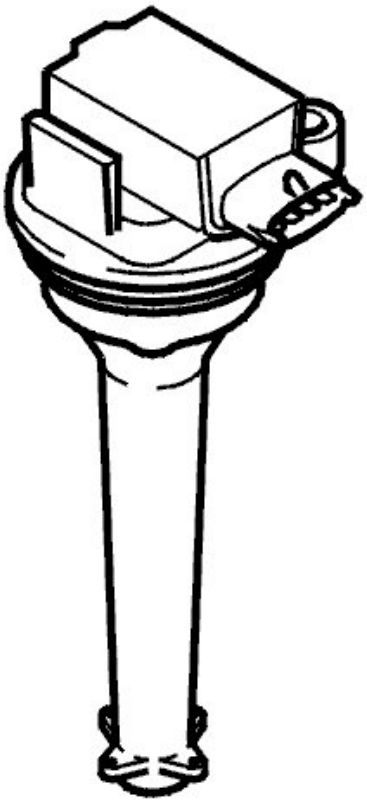
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354D: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



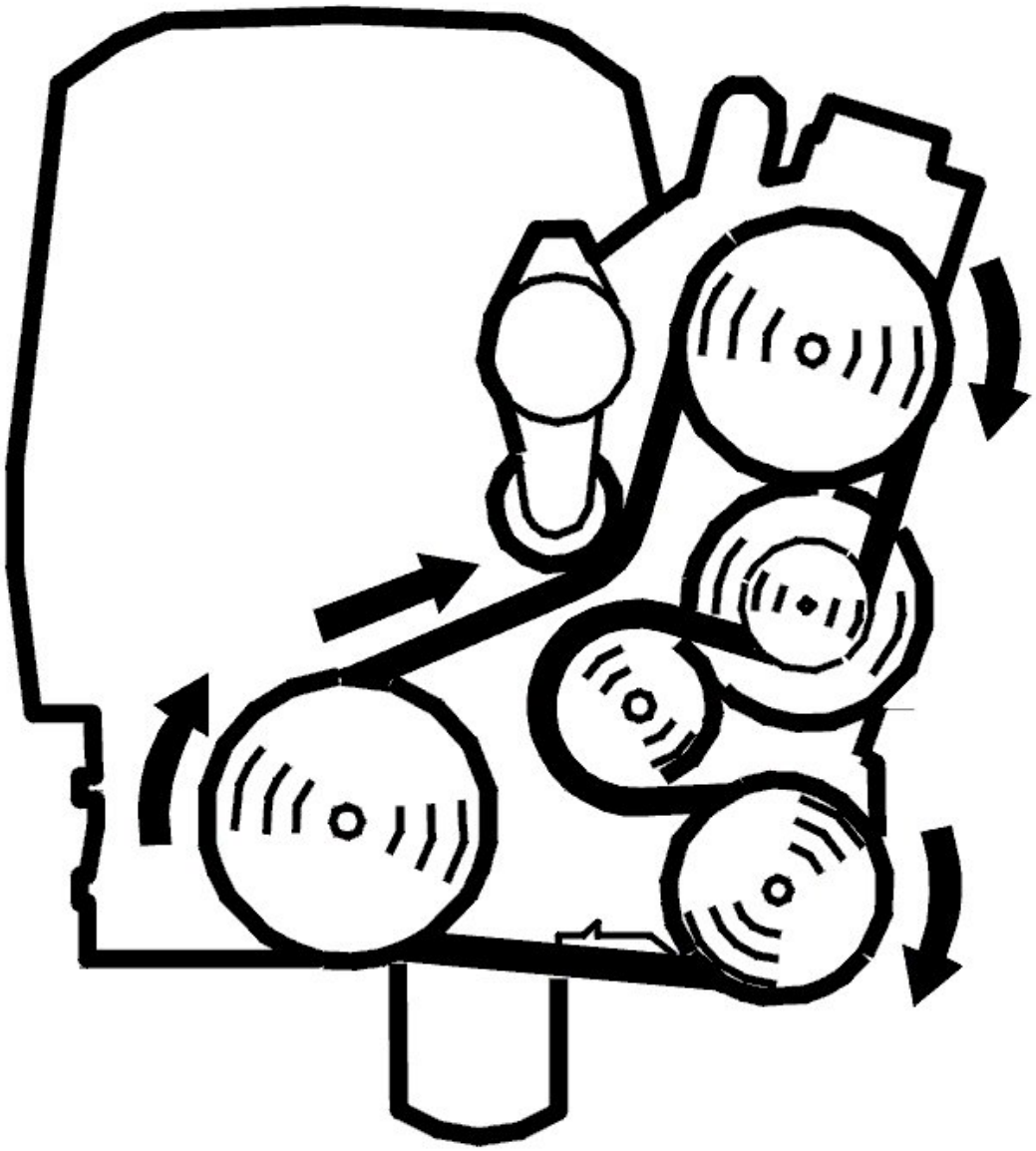


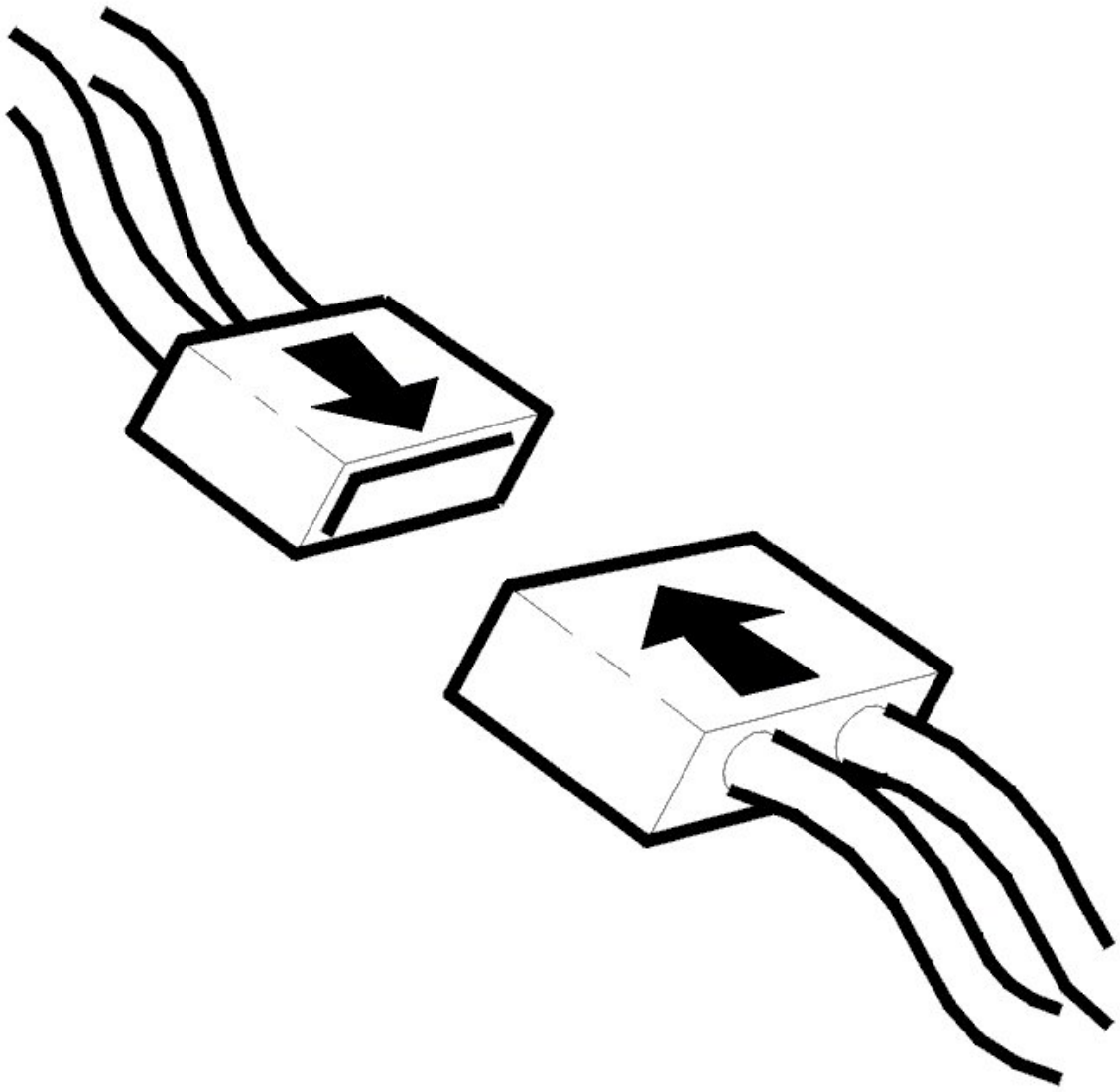
Continue - Verification

Verification

Verification

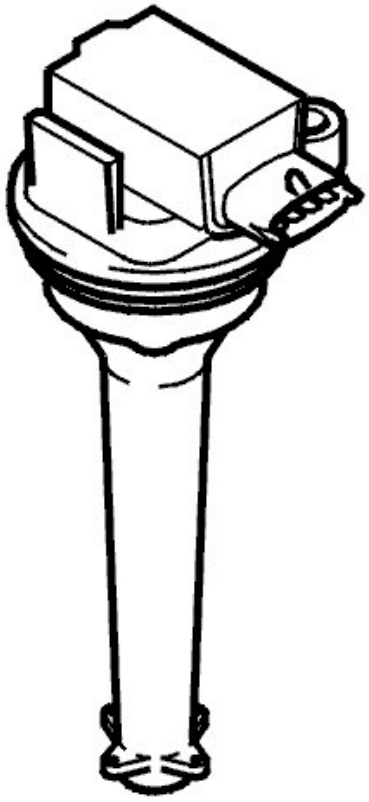
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

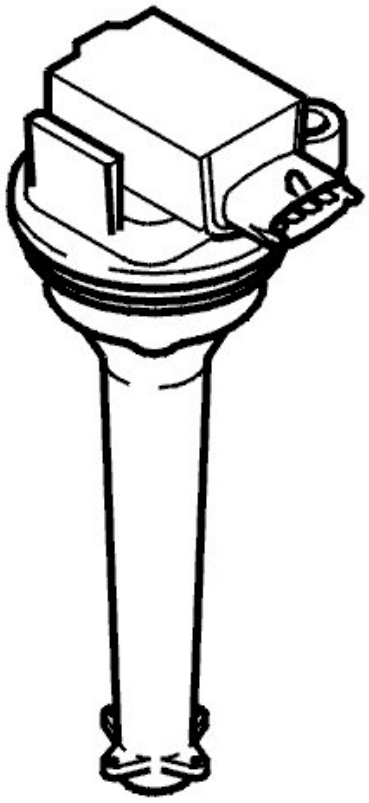
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

Signal missing

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

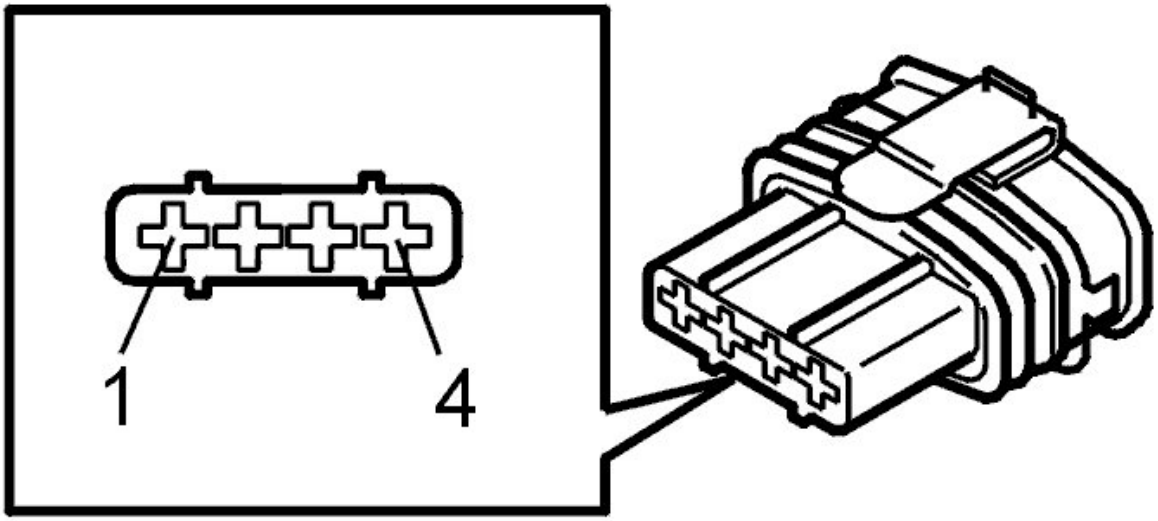
Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350B: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351B: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352B: ignition coil E, cylinder 3).

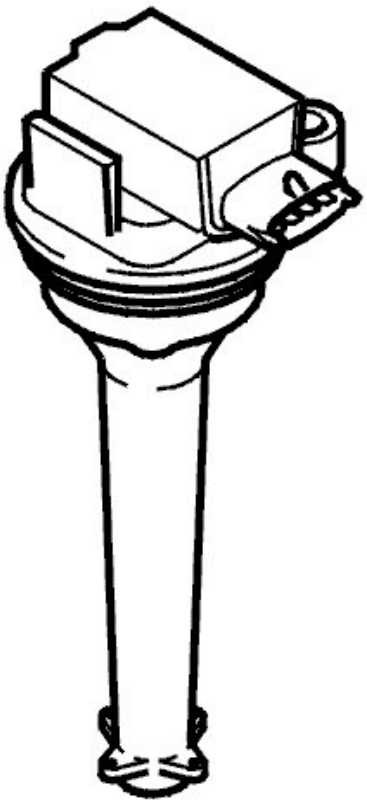
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353B: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354B: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



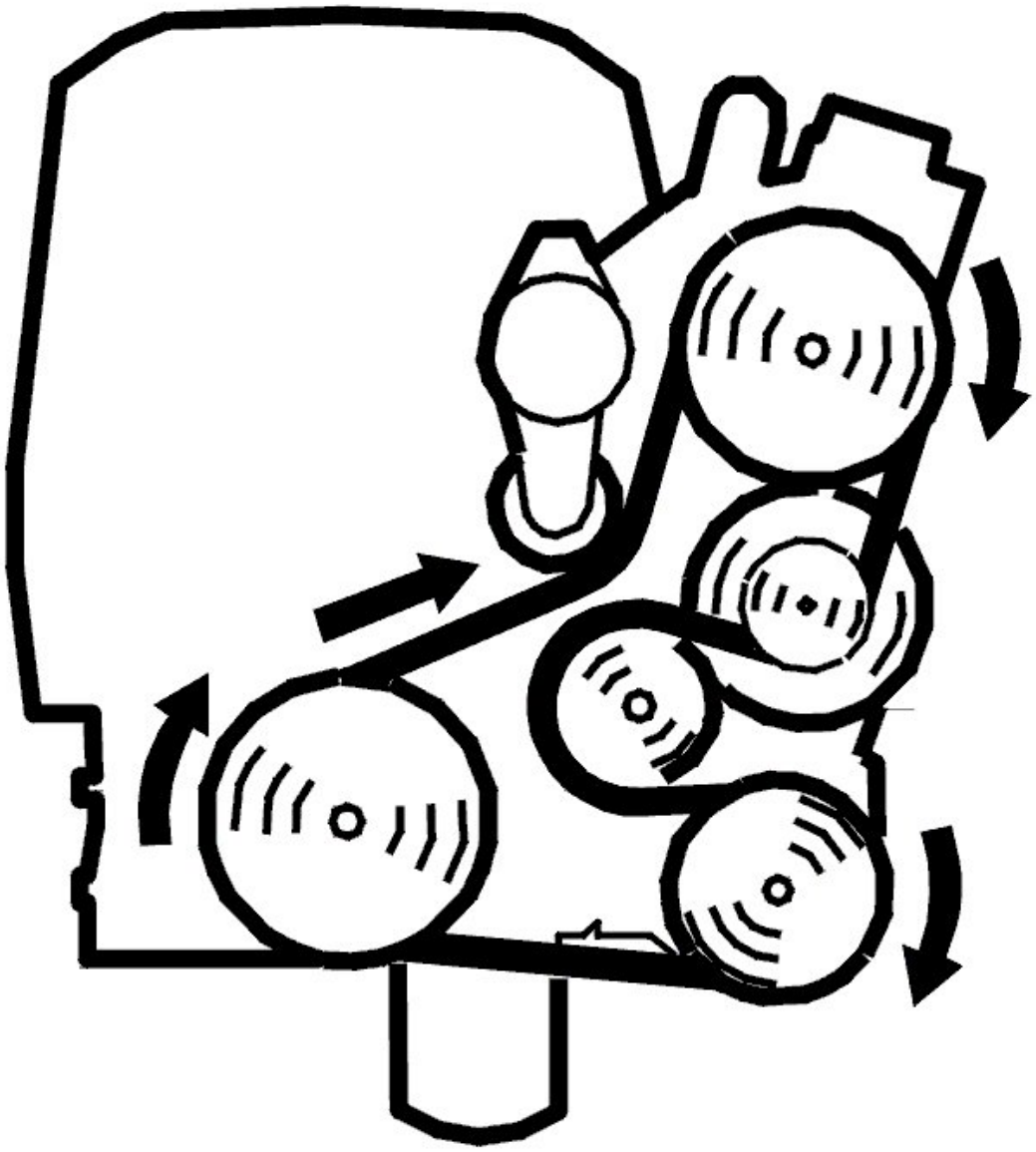


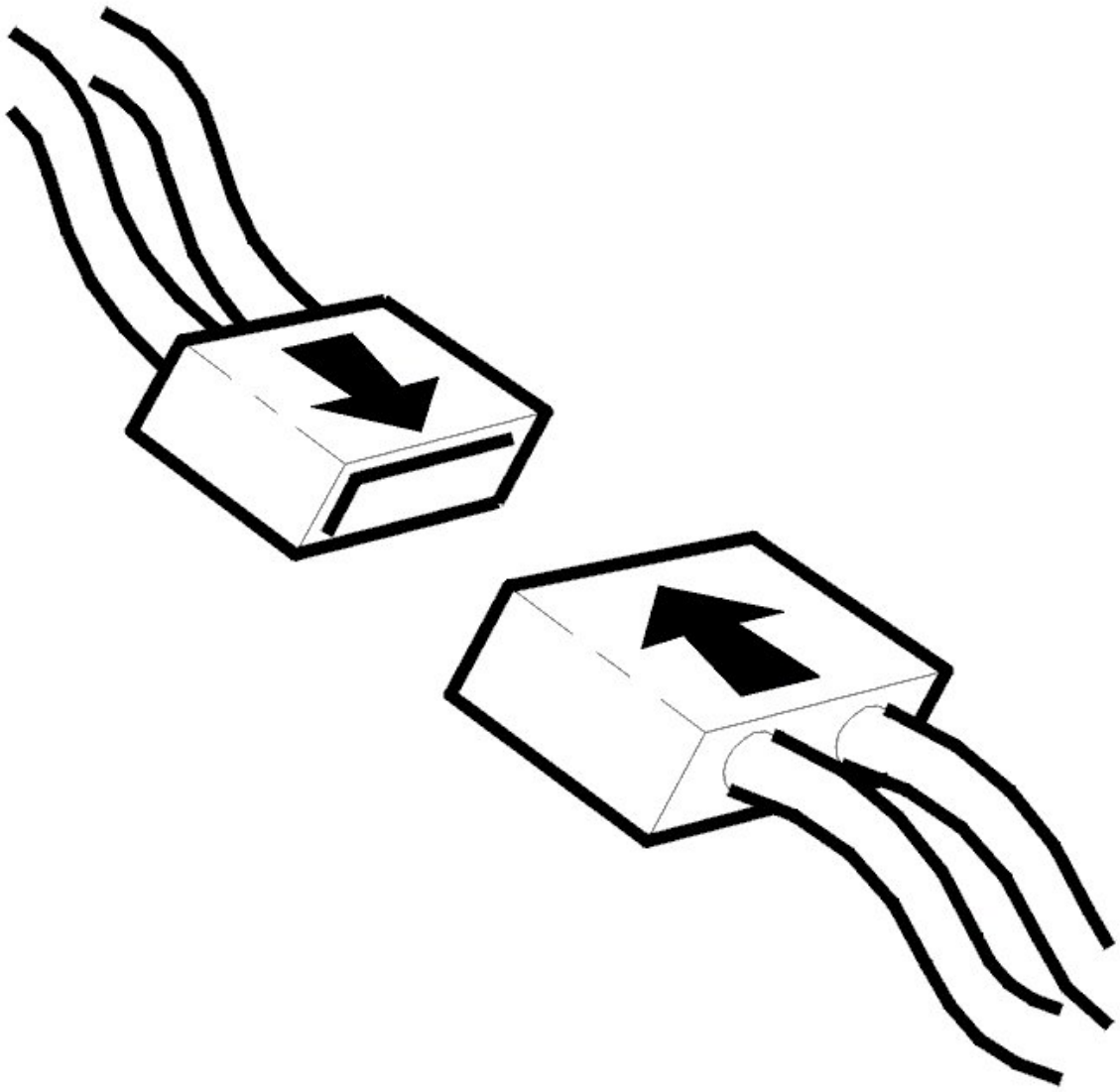
Continue - Verification

Verification

Verification

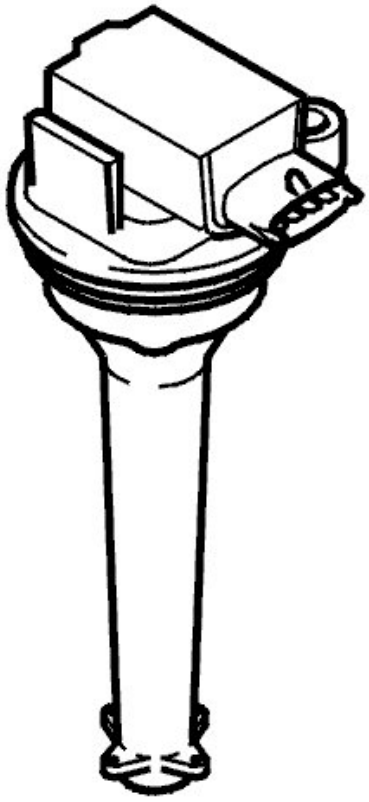
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

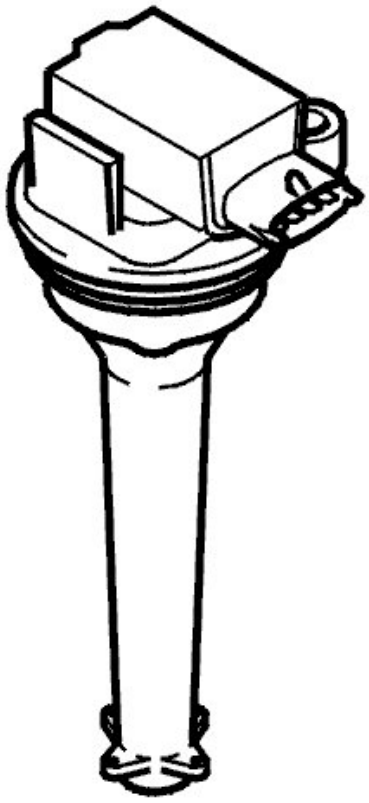
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.

- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source

- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

Signal too high

Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:

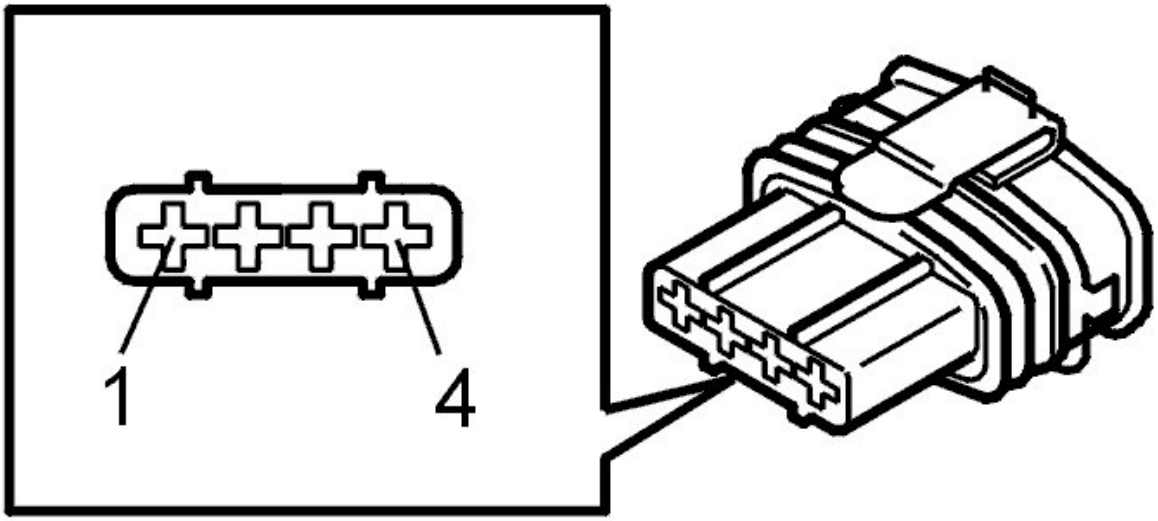
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350C: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351C: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352C: ignition coil E, cylinder 3).

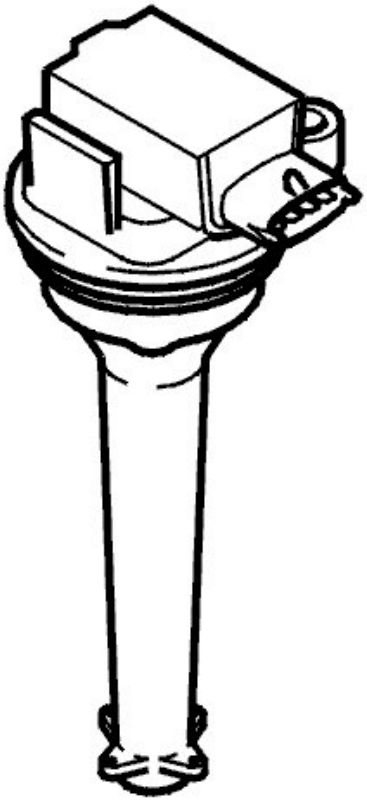
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353C: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354C: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



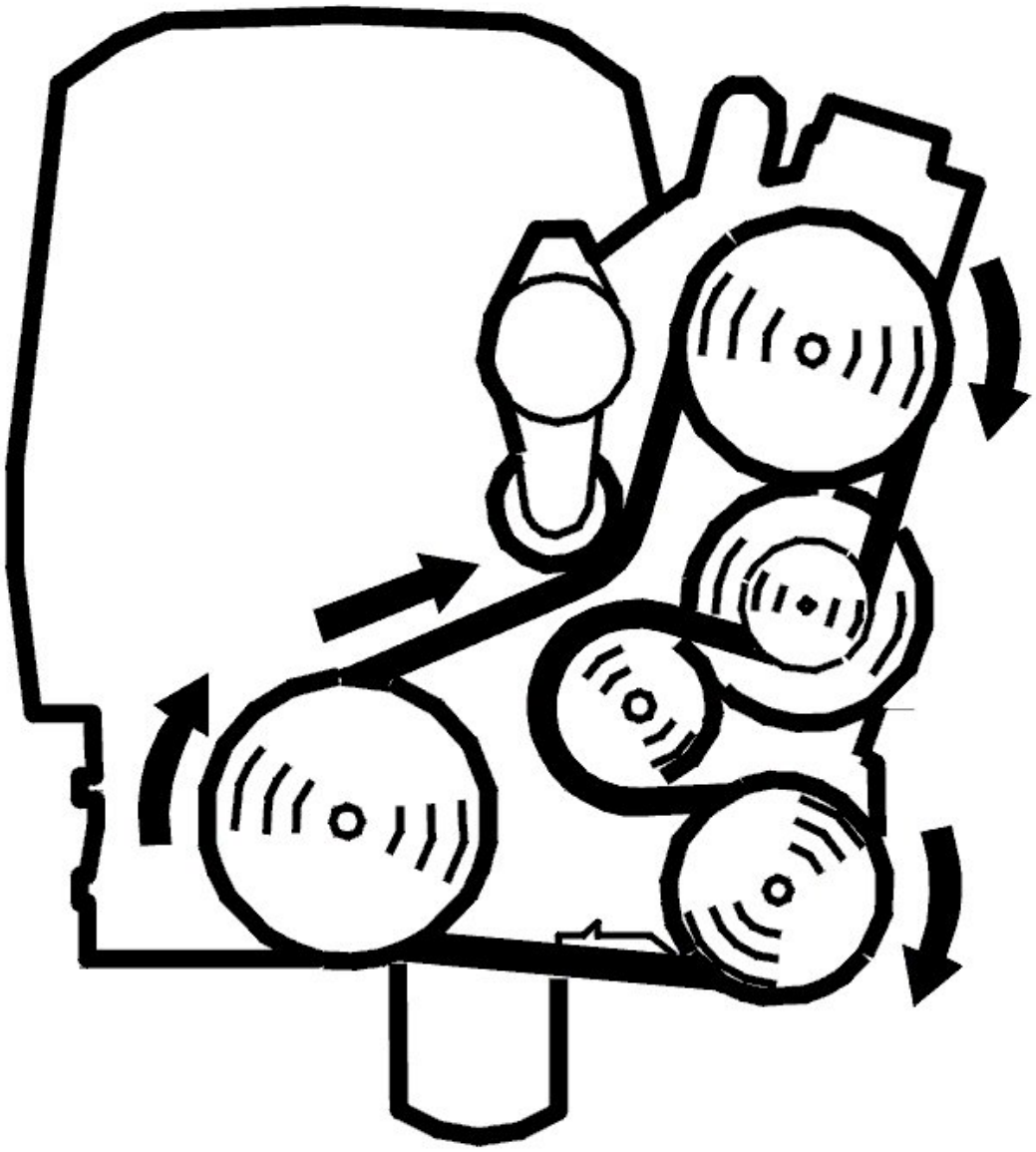


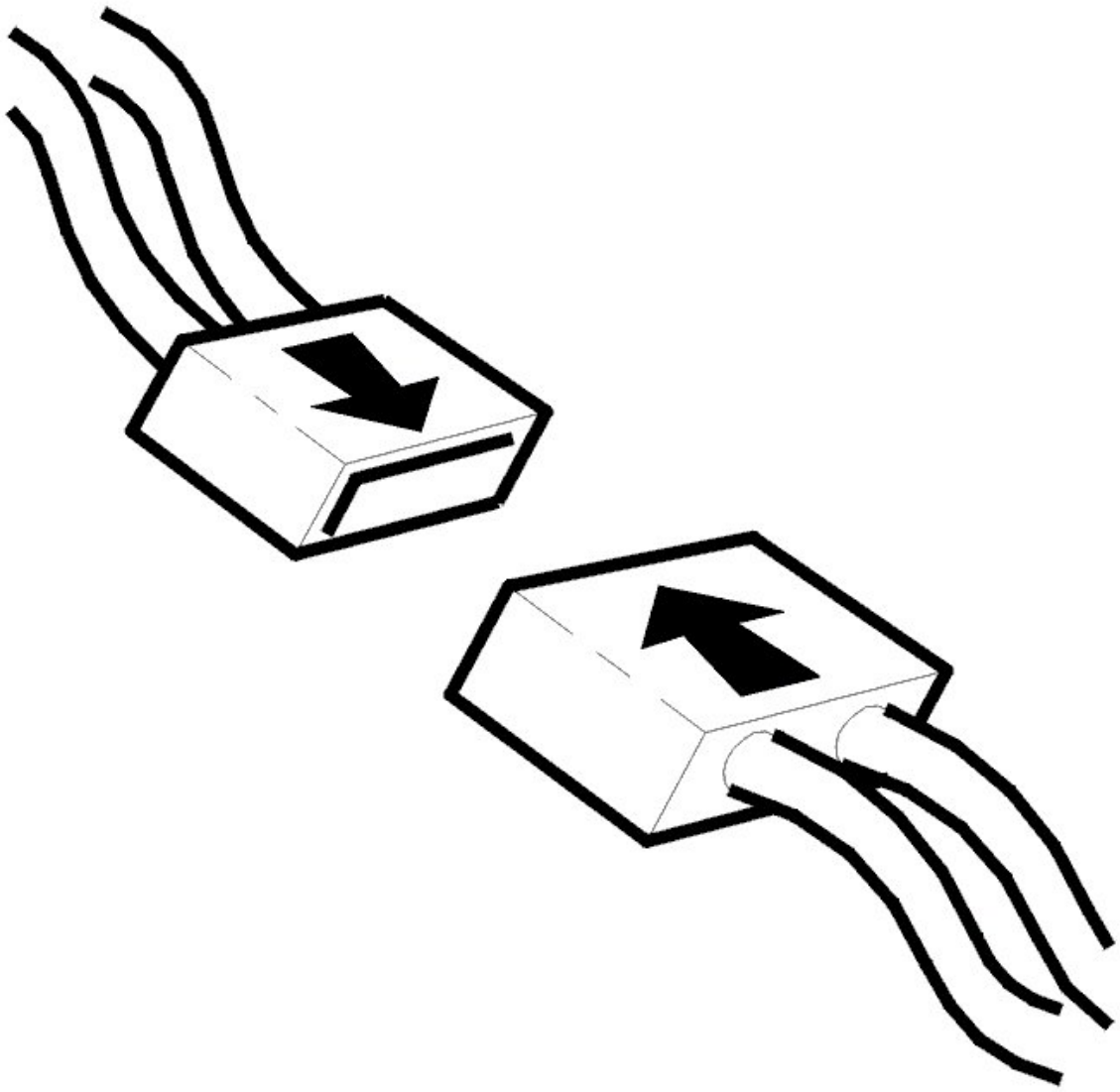
Continue - Verification

Verification

Verification

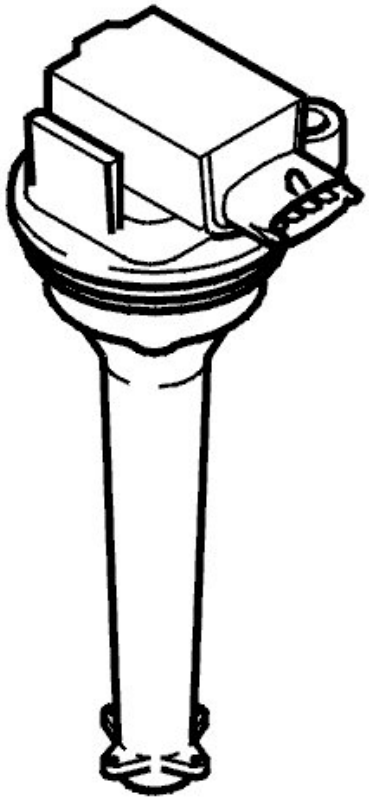
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

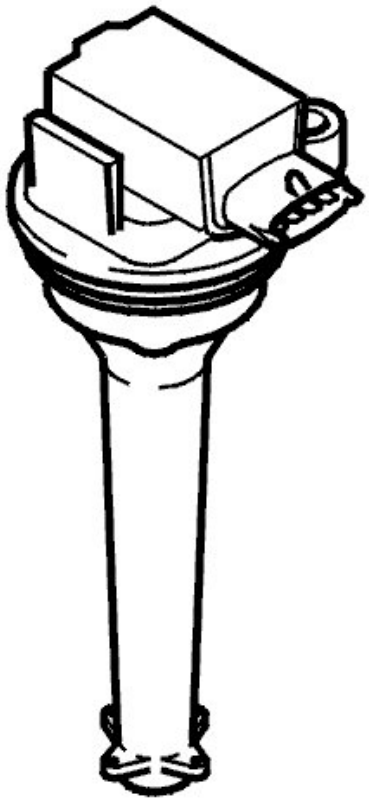
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too low.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350D: ignition coil 1
- ECM-351D: ignition coil 2
- ECM-352D: ignition coil 3
- ECM-353D: ignition coil 4
- ECM-354D: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

Signal too low

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350D: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351D: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352D: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353D: ignition coil C, cylinder 4).

- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354D: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Replacing ignition coils, B5244T5, B5254T2 See: Ignition System/Ignition Coil/Service and Repair
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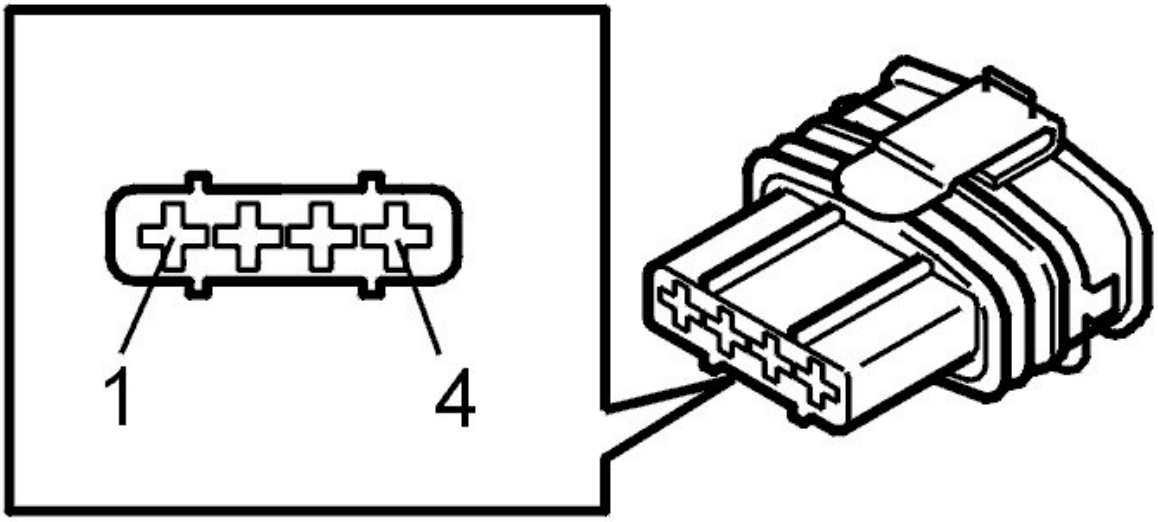
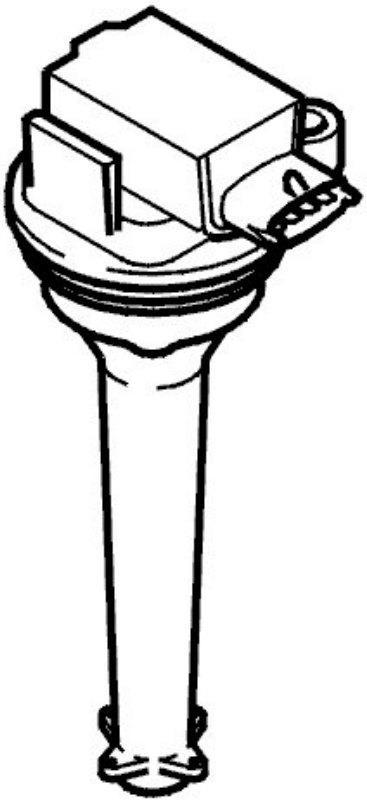


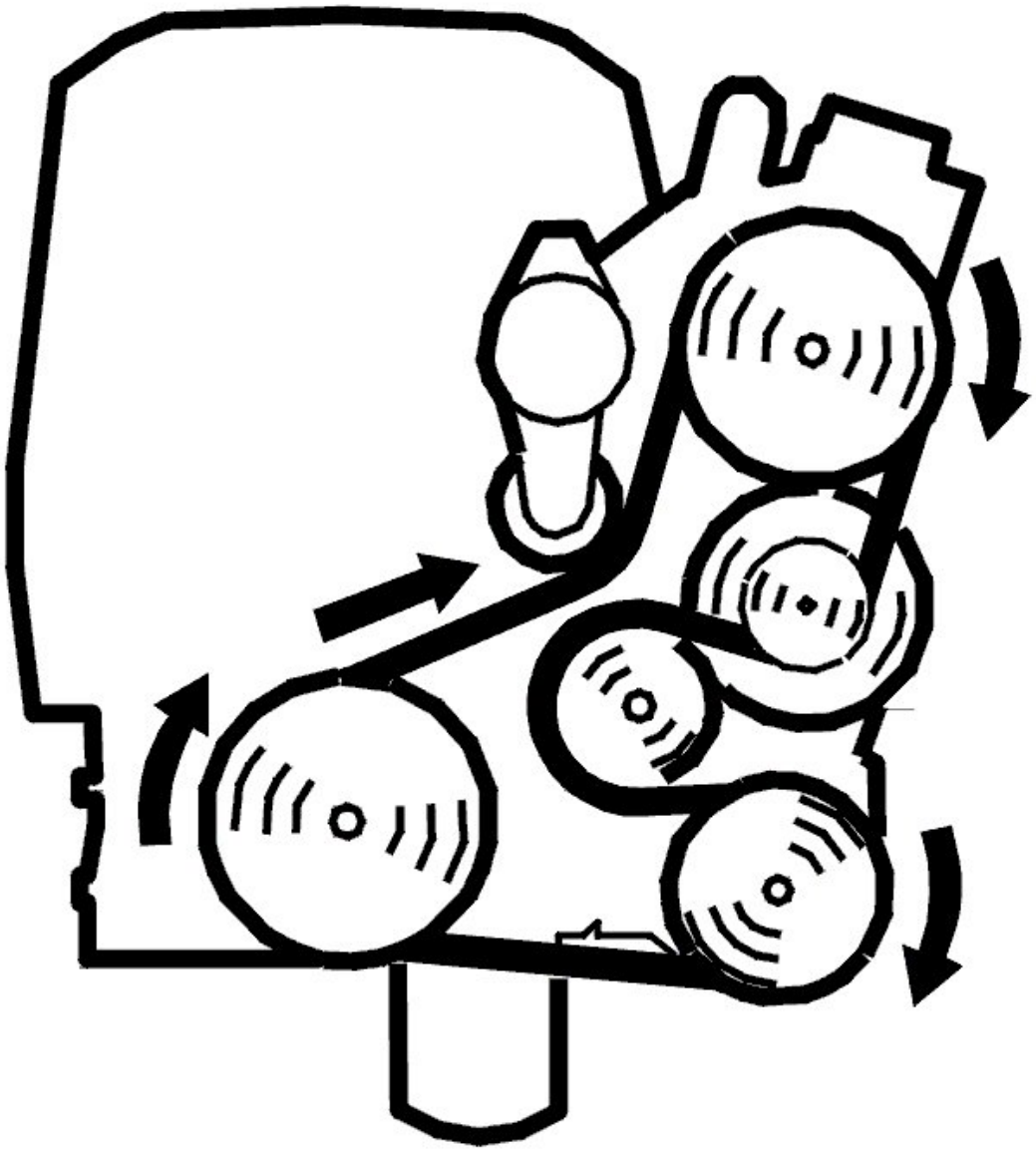


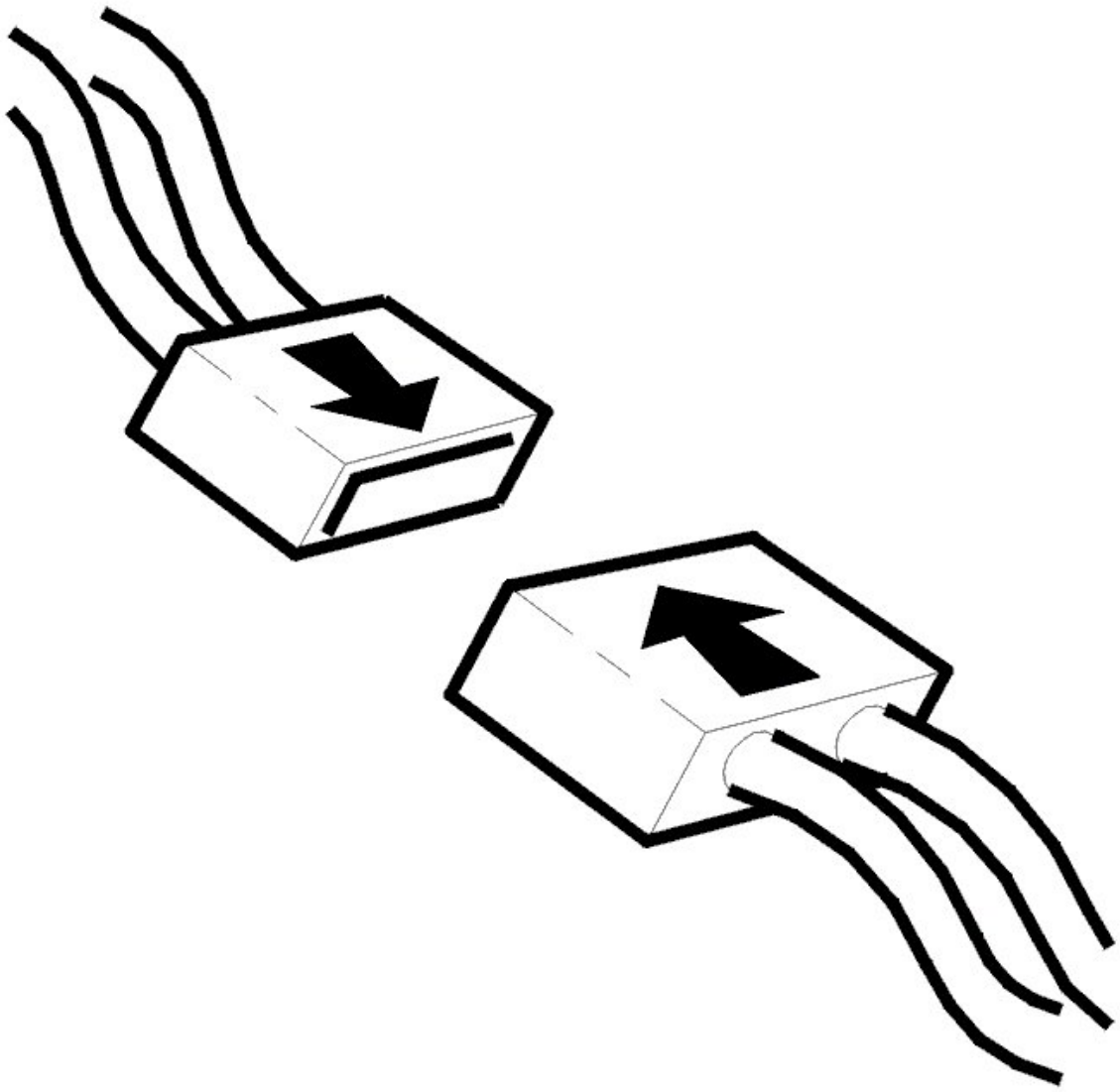
Continue - Verification

Verification

Verification

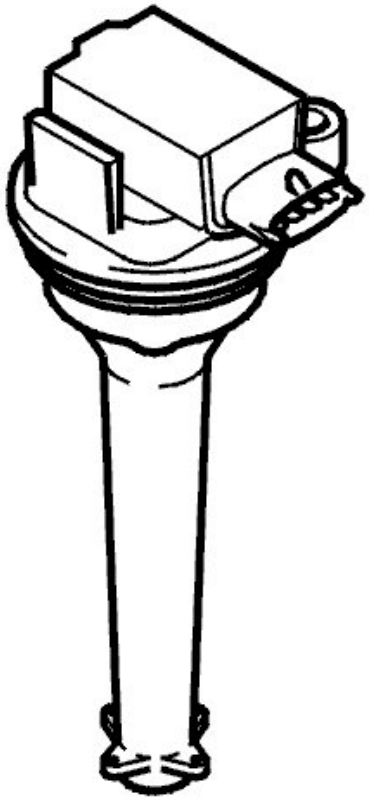
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

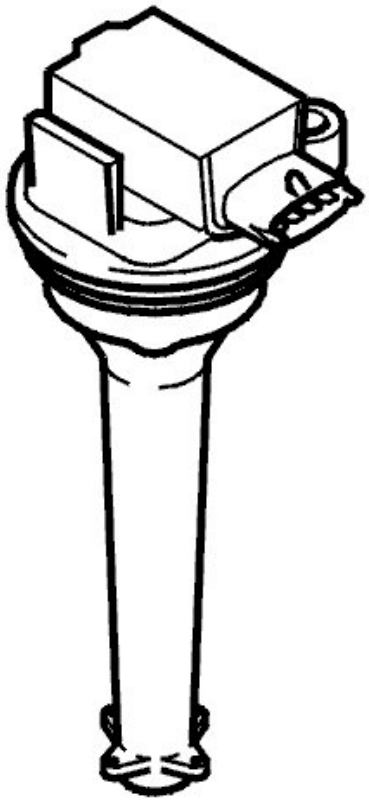
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is missing.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Missing

Signal missing

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

Check the cable that relates to the diagnostic trouble code (DTC). Check for an open-circuit.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350B: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351B: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352B: ignition coil E, cylinder 3).

- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353B: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354B: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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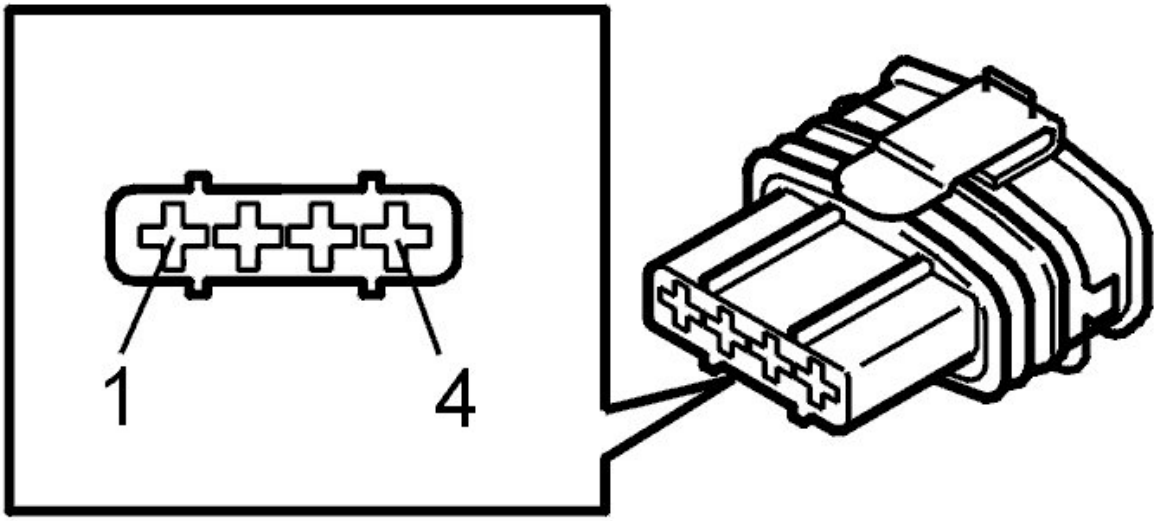
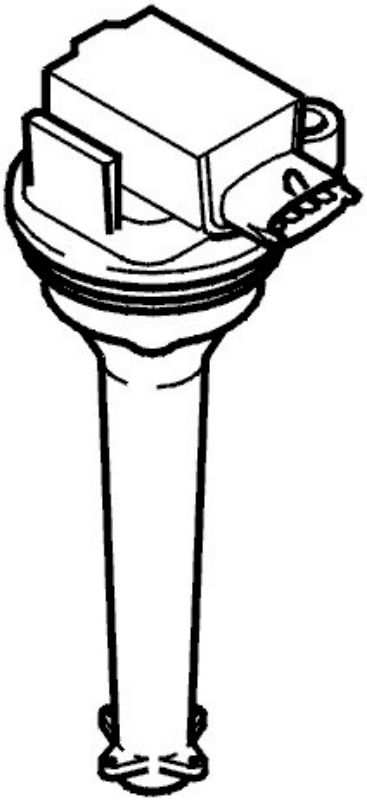


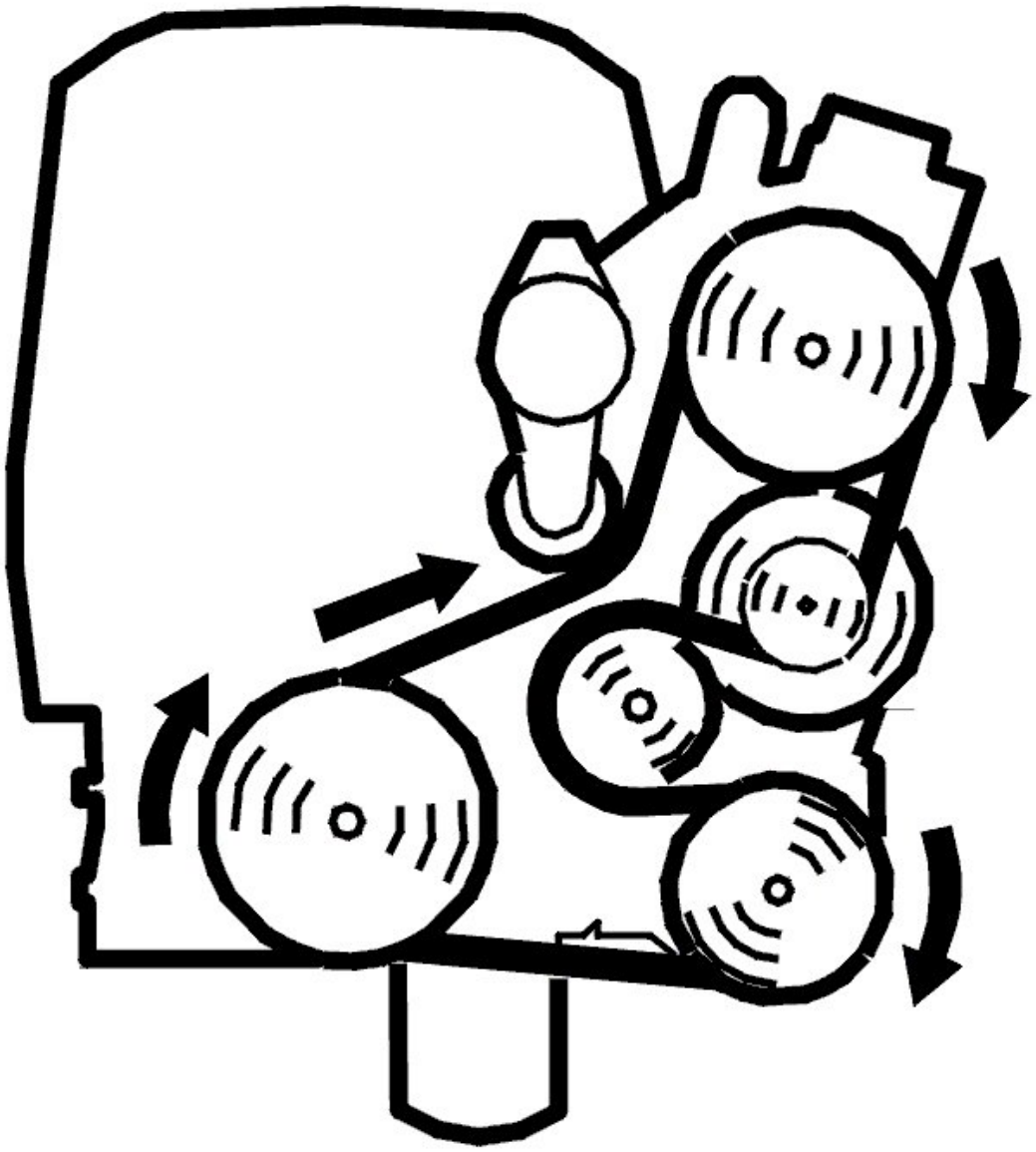


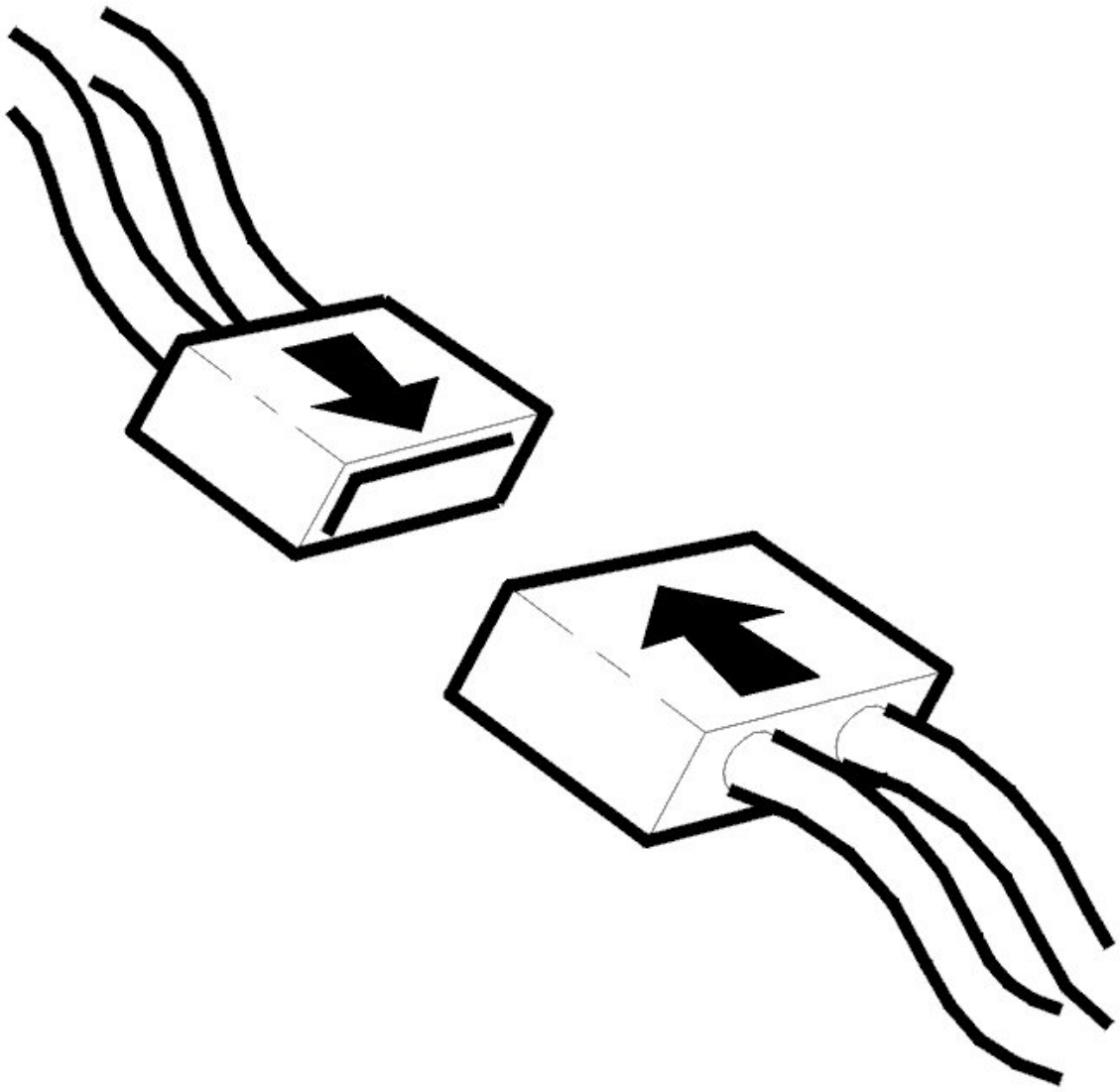
Continue - Verification

Verification

Verification

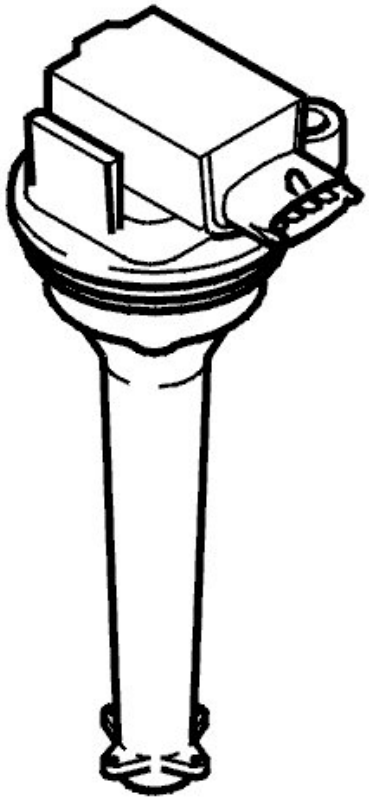
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

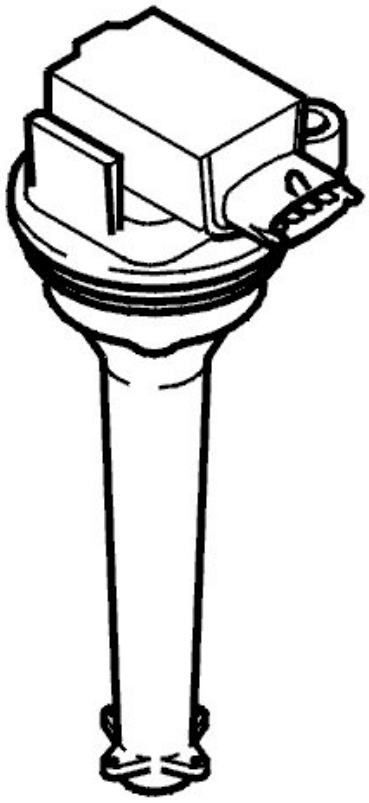
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
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The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.

- ECM-350B: ignition coil 1
- ECM-351B: ignition coil 2
- ECM-352B: ignition coil 3
- ECM-353B: ignition coil 4
- ECM-354B: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source

- Contact resistance in the terminals
- Open-circuit in the signal cable
- Damaged ignition coil.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too High

Signal too high

Checking components and wiring

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to supply voltage.
Check between:

- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350C: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351C: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352C: ignition coil E, cylinder 3).

- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353C: ignition coil C, cylinder 4).
- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354C: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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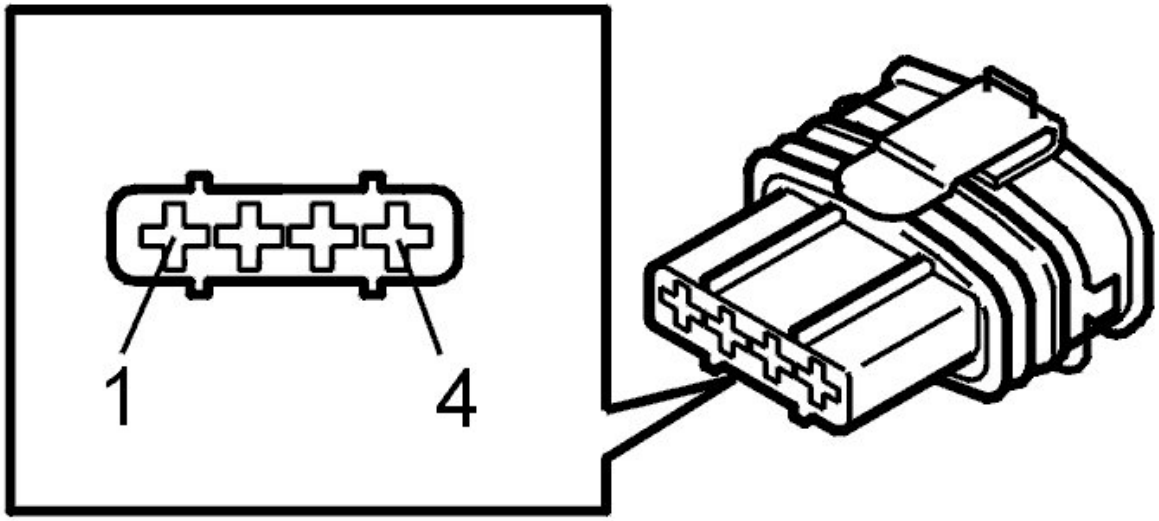
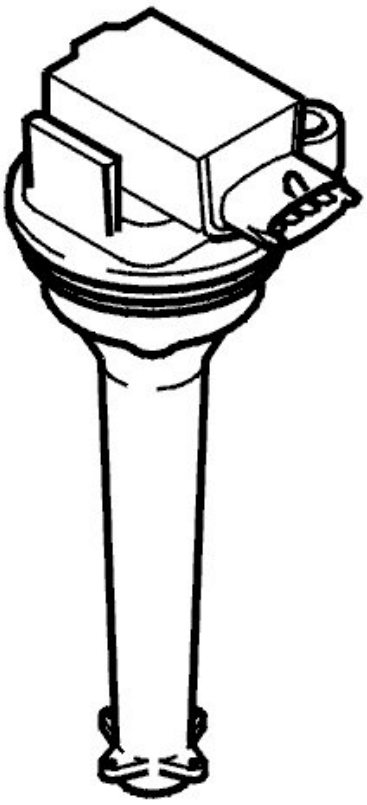


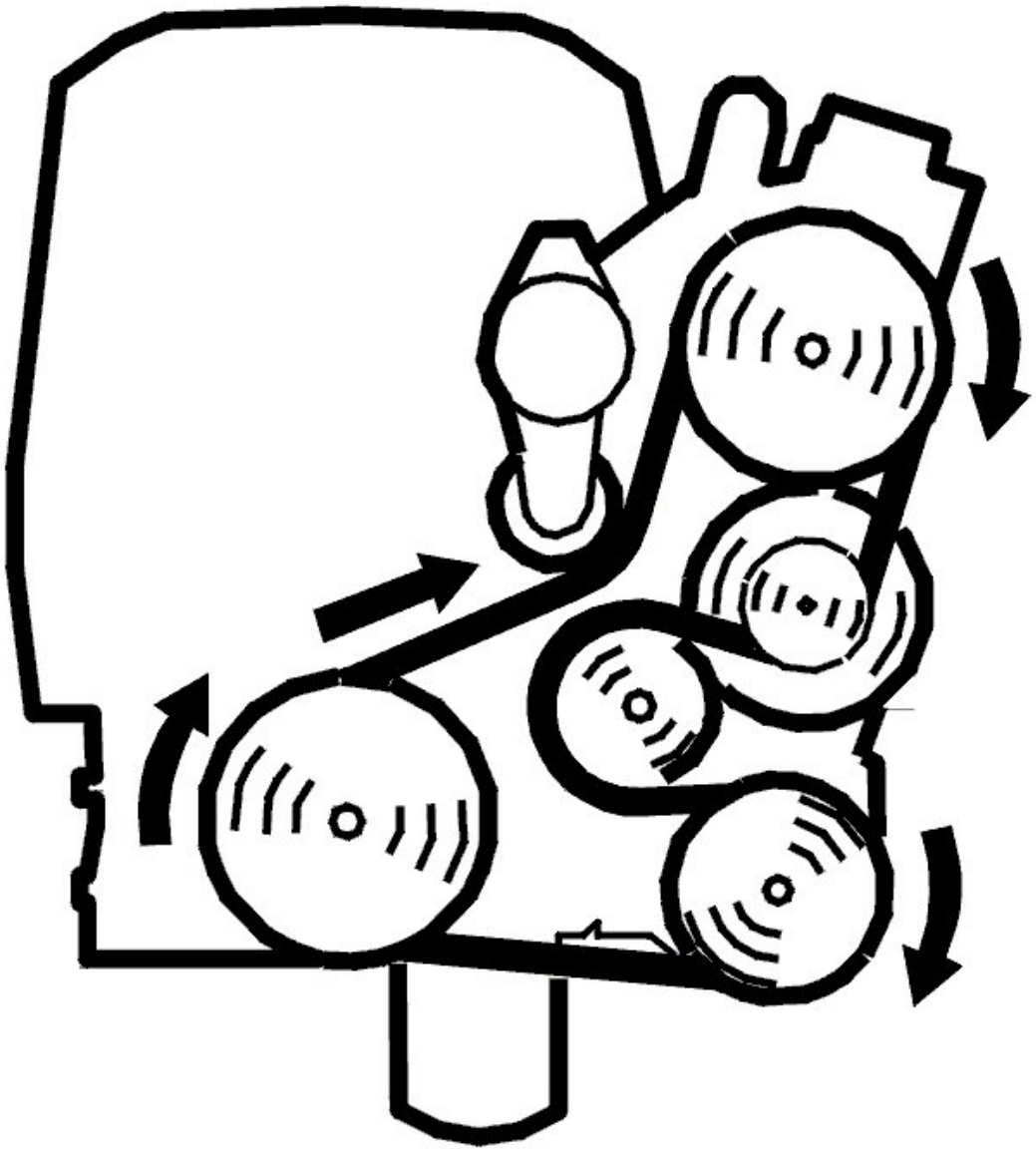


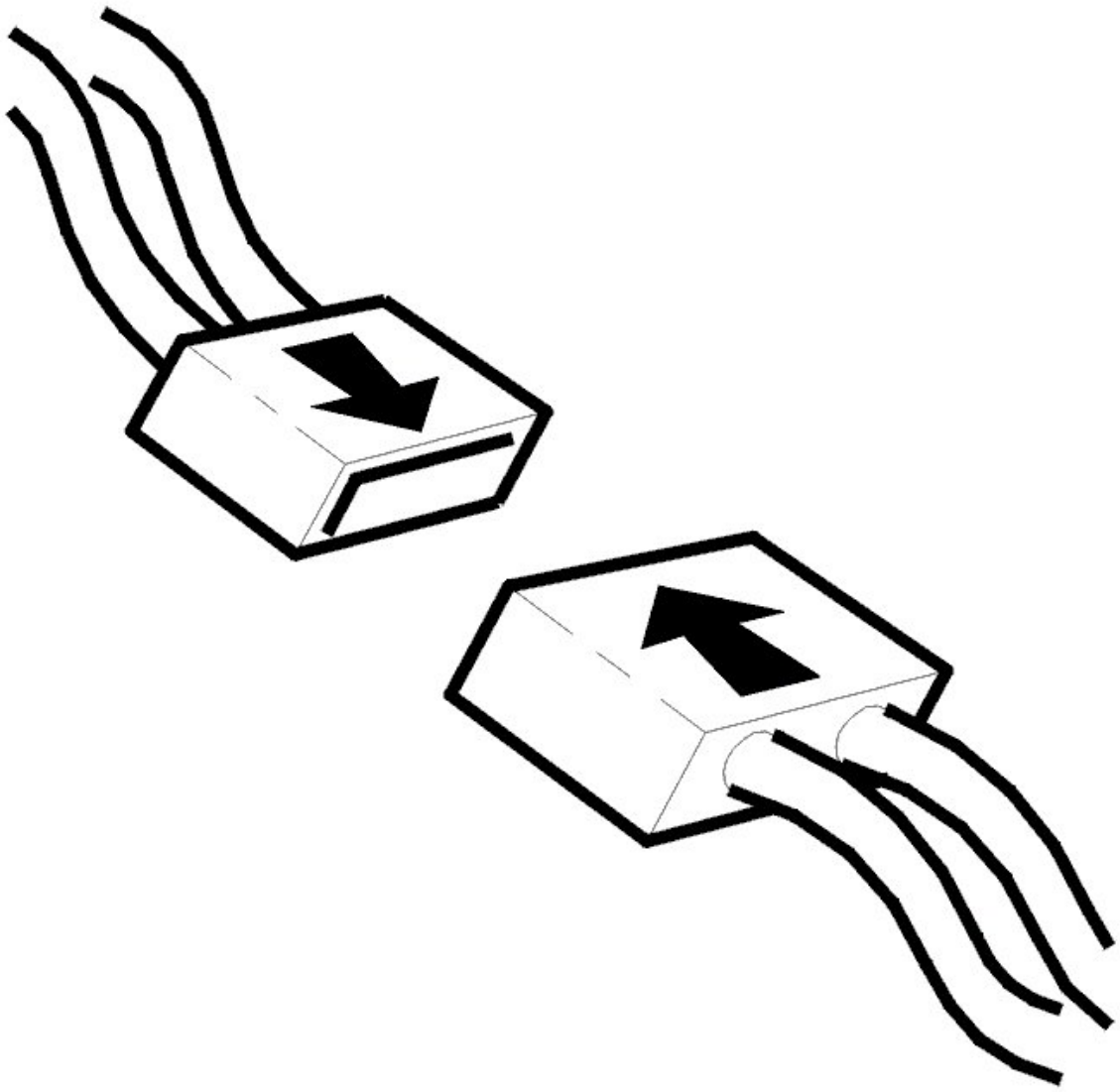
Continue - Verification

Verification

Verification

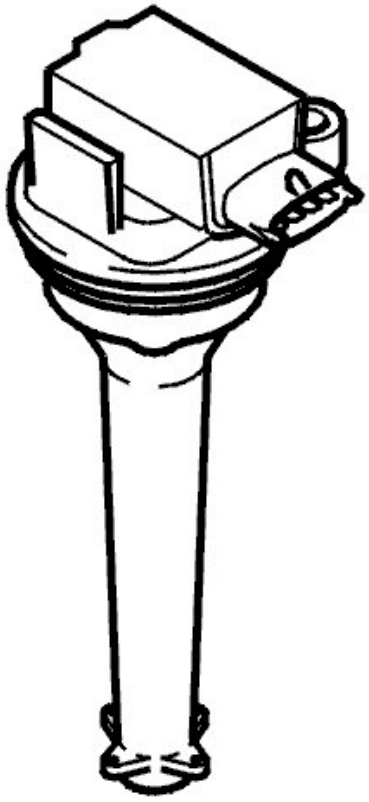
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

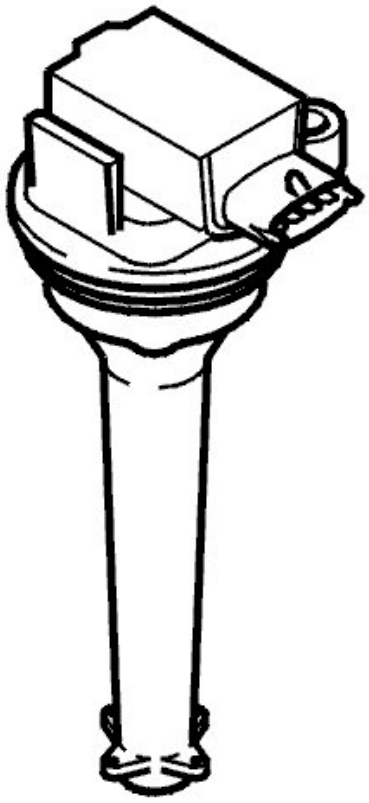
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The engine control module (ECM) checks the signal cable for the ignition coil primary winding.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the primary winding for the ignition coil is too low.
The diagnostic trouble code (DTC) indicates which ignition coil is being referred to.
- ECM-350D: ignition coil 1
- ECM-351D: ignition coil 2
- ECM-352D: ignition coil 3
- ECM-353D: ignition coil 4
- ECM-354D: ignition coil 5.

The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged ignition coil.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The engine is not firing on all cylinders.

Signal Too Low

Signal too low

Checking components and wiring
- Check the connector for the ignition coil. Check for contact resistance. Check for oxidation.

Check the cable that relates to the diagnostic trouble code (DTC). Check for a short-circuit to ground.
Check between:
- Engine control module (ECM) #A50 (#A50) and ignition coil pin #2 (ECM-350D: ignition coil A, cylinder 1).
- Engine control module (ECM) #A31 (#A31) and ignition coil pin #2 (ECM-351D: ignition coil B, cylinder 2).
- Engine control module (ECM) #A51 (#A51) and ignition coil pin #2 (ECM-352D: ignition coil E, cylinder 3).
- Engine control module (ECM) #A30 (#A30) and ignition coil pin #2 (ECM-353D: ignition coil C, cylinder 4).

- Engine control module (ECM) #A52 (#A52) and ignition coil pin #2 (ECM-354D: ignition coil D, cylinder 5).

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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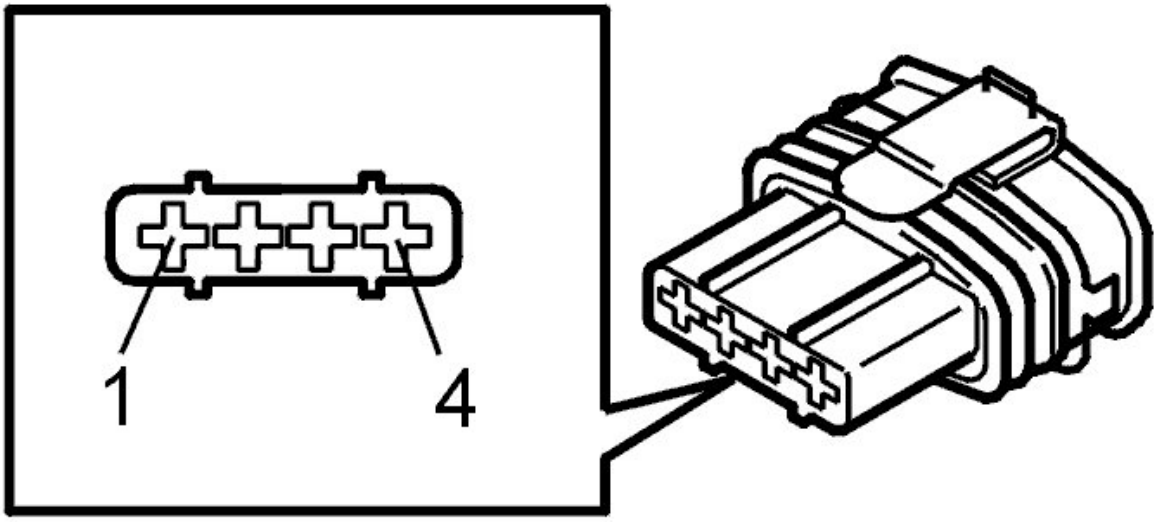
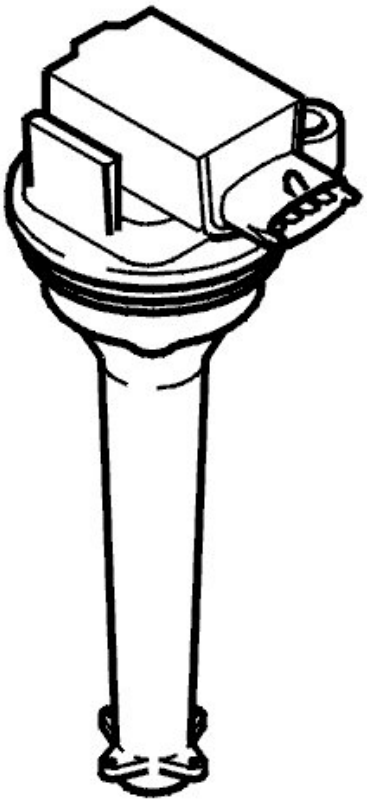


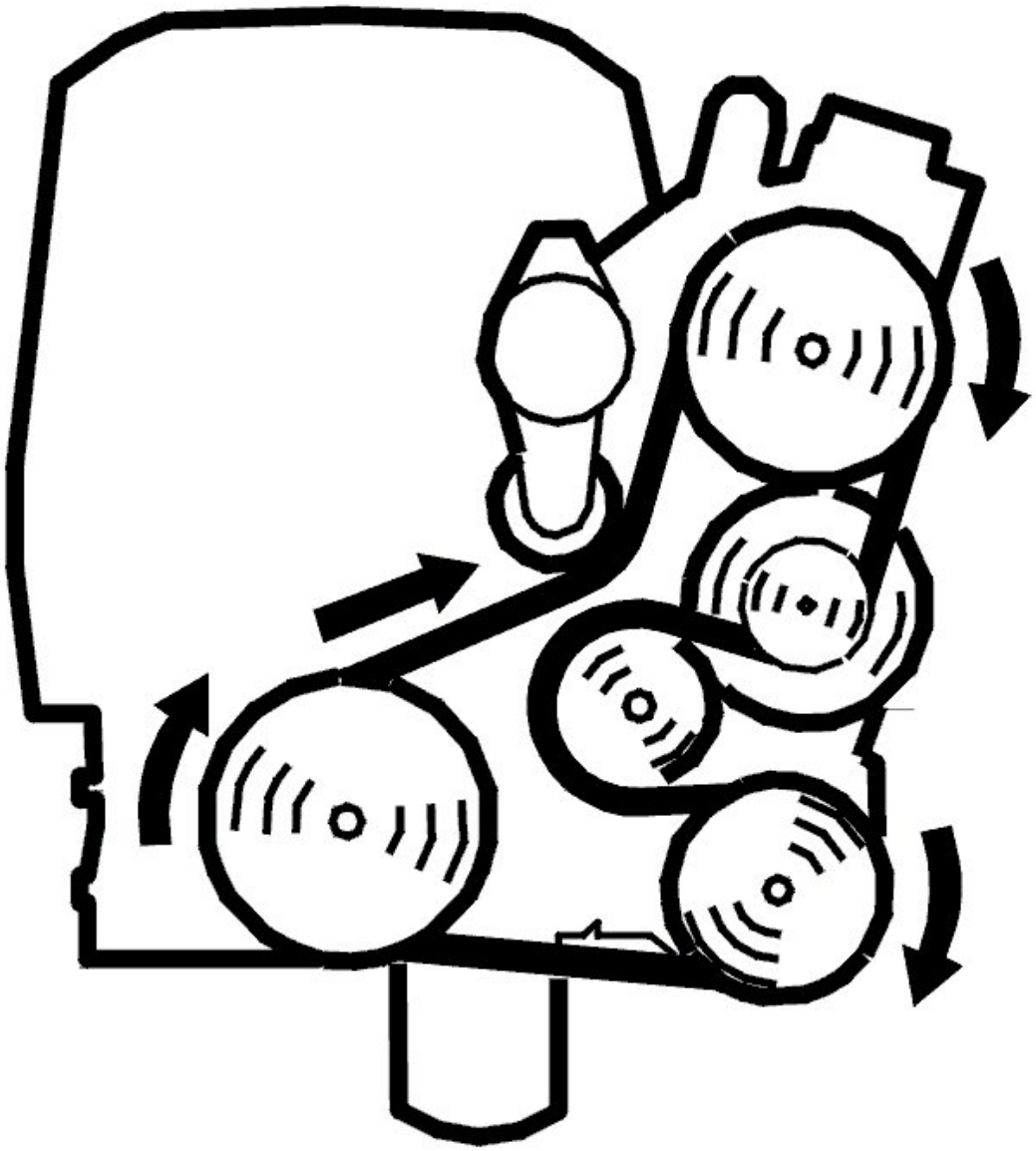


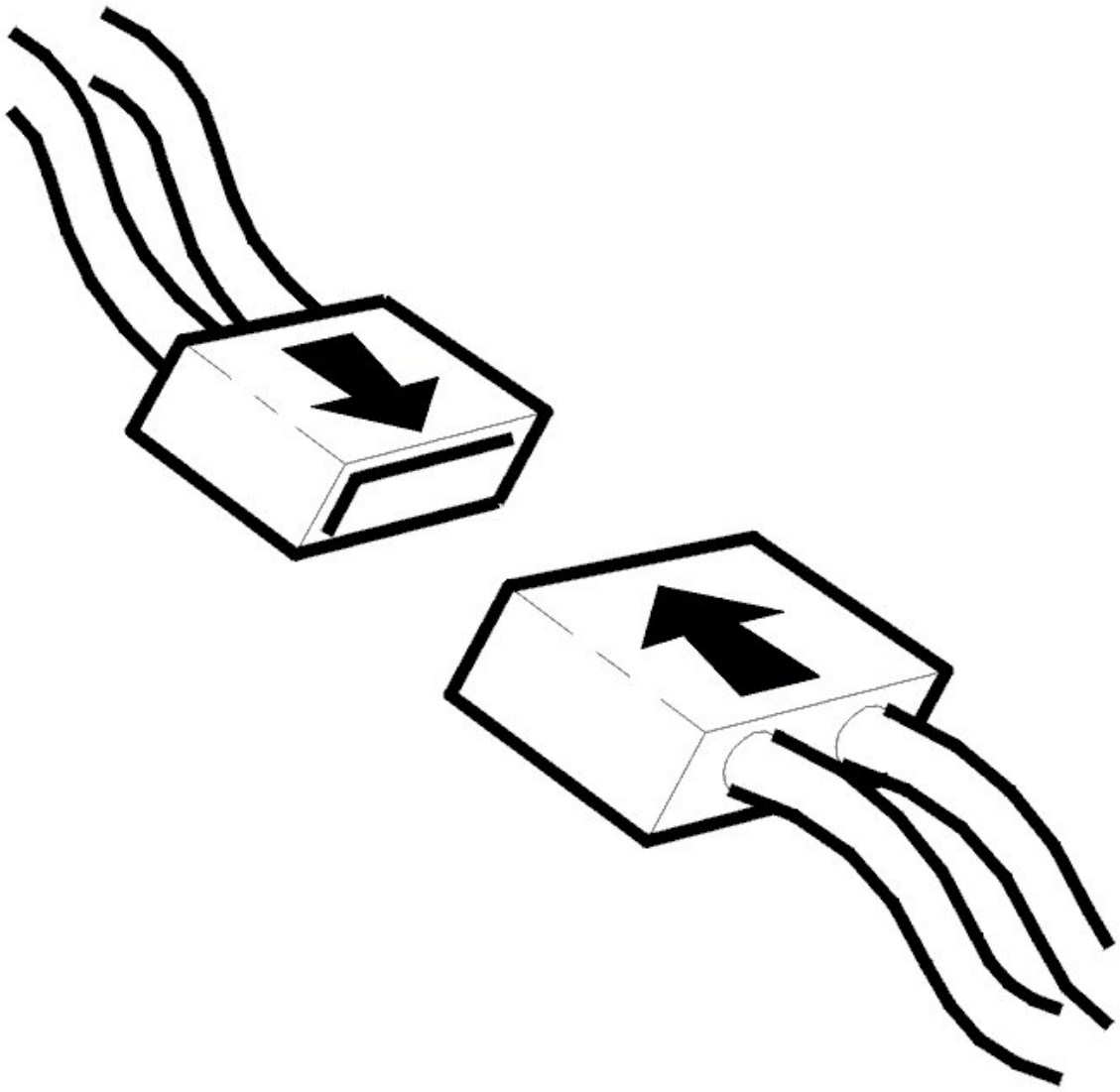
Continue - Verification

Verification

Verification

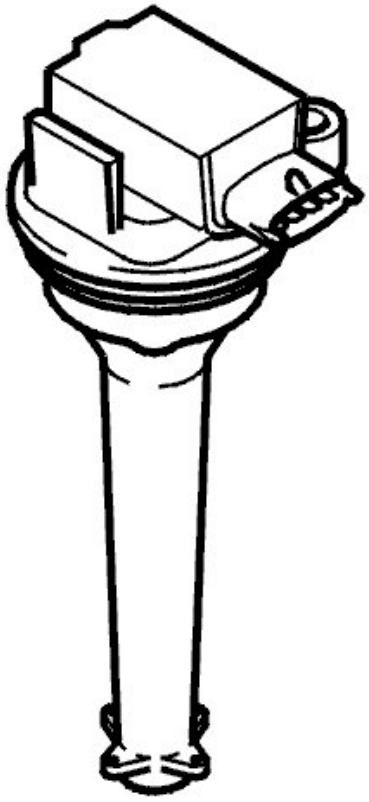
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect connectors, reinstall components etc.
- Start the engine. Allow the engine to idle.

The engine must fire on all cylinders.



Is the engine idling evenly?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-400C

Condition

The engine control module (ECM) continuously checks three-way catalytic converter (TWC) efficiency (bank 1) by comparing signals from the rear heated oxygen sensor (HO2S) with the signal from the front heated oxygen sensor (HO2S). The diagnostic trouble code (DTC) is stored if the efficiency of the three-way catalytic converter (TWC) deviates too much.
The diagnostic trouble code (DTC) is diagnosed when driving under specific driving conditions.

Substitute value
- The rear long-term fuel trim is disabled.

Possible source
- Misfiring
- Leakage in the intake system
- Leakage in the exhaust system
- Faulty fuel pressure
- Uneven compression
- Damaged catalytic converter.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the components and wiring

Check the intake system for air leakage.
Check the exhaust system for air leakage.
Checking fuel and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Note! Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.

Other information
- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test
- Three-way catalytic converter (TWC), replacing See: Emission Control Systems/Catalytic Converter/Service and Repair

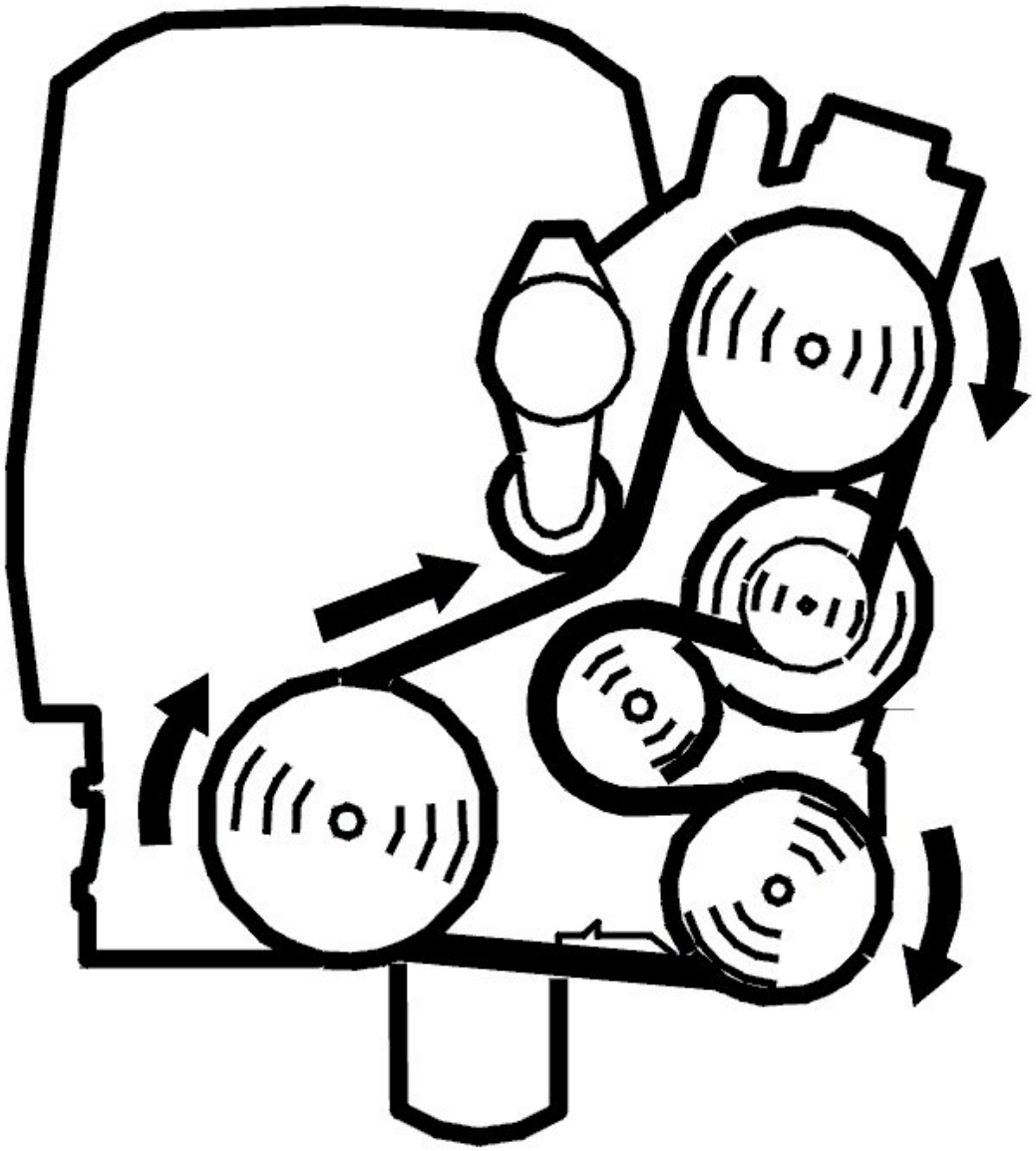
Continue - Verification

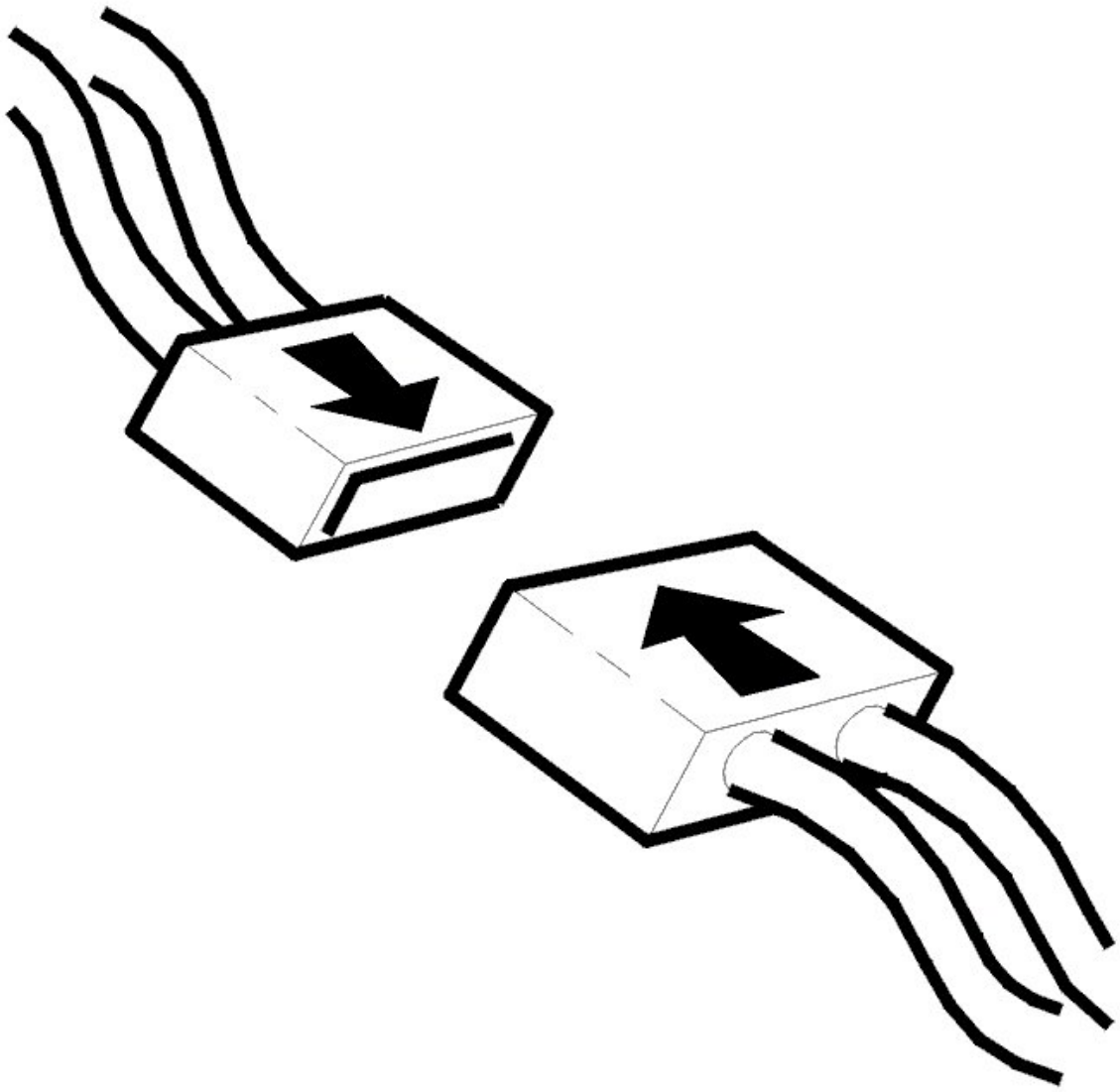
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-401C

Condition

The engine control module (ECM) continuously checks three-way catalytic converter (TWC) efficiency (bank 2) by comparing signals from the rear heated oxygen sensor (HO2S) with the signal from the front heated oxygen sensor (HO2S). The diagnostic trouble code (DTC) is stored if the efficiency of the three-way catalytic converter (TWC) deviates too much.
The diagnostic trouble code (DTC) is diagnosed when driving under specific driving conditions.

Substitute value

The rear long-term fuel trim is disabled.

Possible source
- Misfiring
- Leakage in the intake system
- Leakage in the exhaust system
- Faulty fuel pressure
- Uneven compression
- Damaged catalytic converter.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the components and wiring

Check the intake system for air leakage.
Check the exhaust system for air leakage.
Checking fuel and residual pressure.
Check the compression of the engine.
Remedy as necessary.

Note! Try a new heated oxygen sensor (HO2S) if the above fault-tracing does not remedy the fault.

Other information

- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Checking for air leakage in the exhaust system See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Air Leakage Exhaust System, Check
- Cylinder leakage test See: Engine, Cooling and Exhaust/Engine/Testing and Inspection/Cylinder Leakage Test
- Three-way catalytic converter (TWC), replacing See: Emission Control Systems/Catalytic Converter/Service and Repair

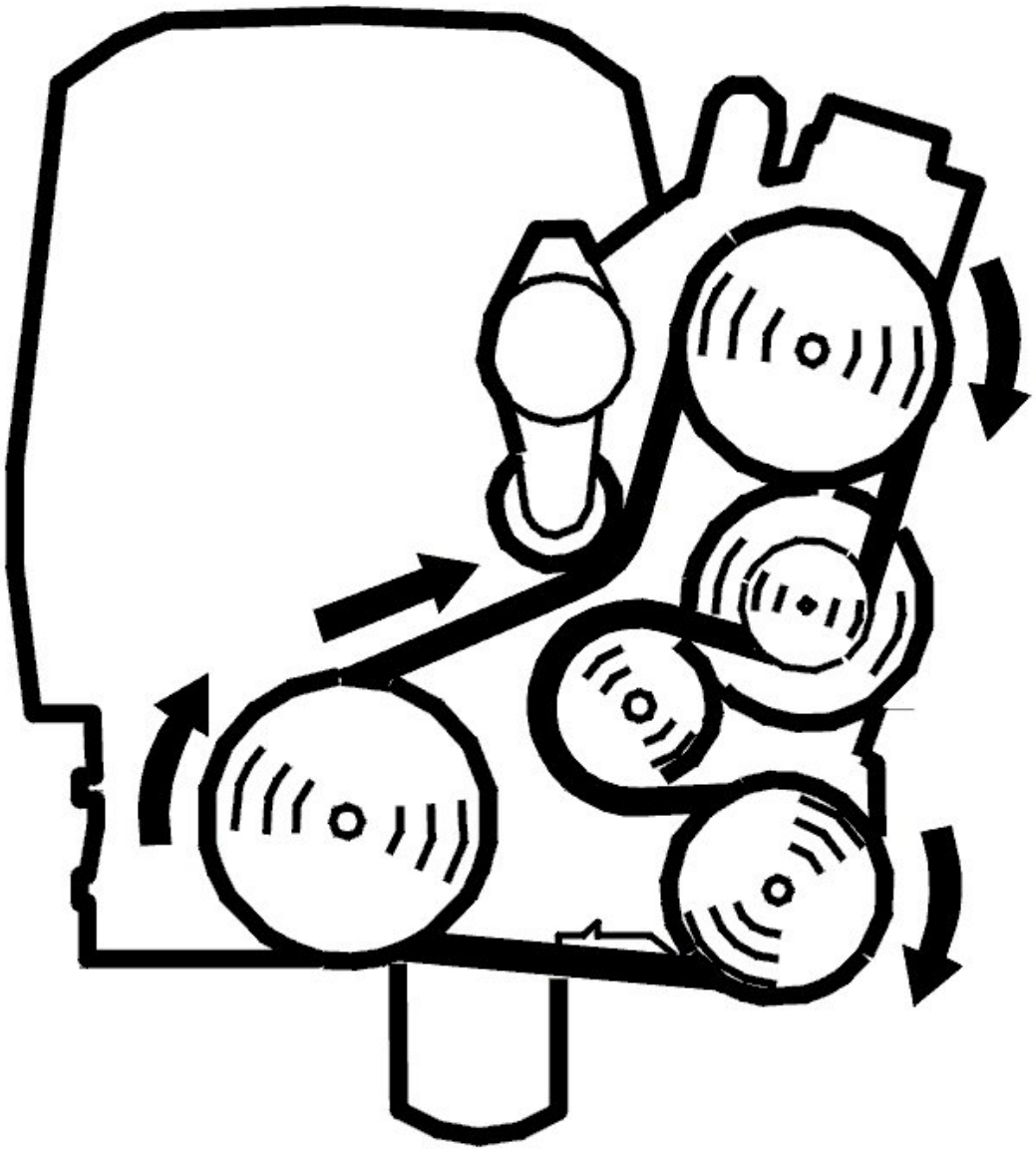
Continue - Verification

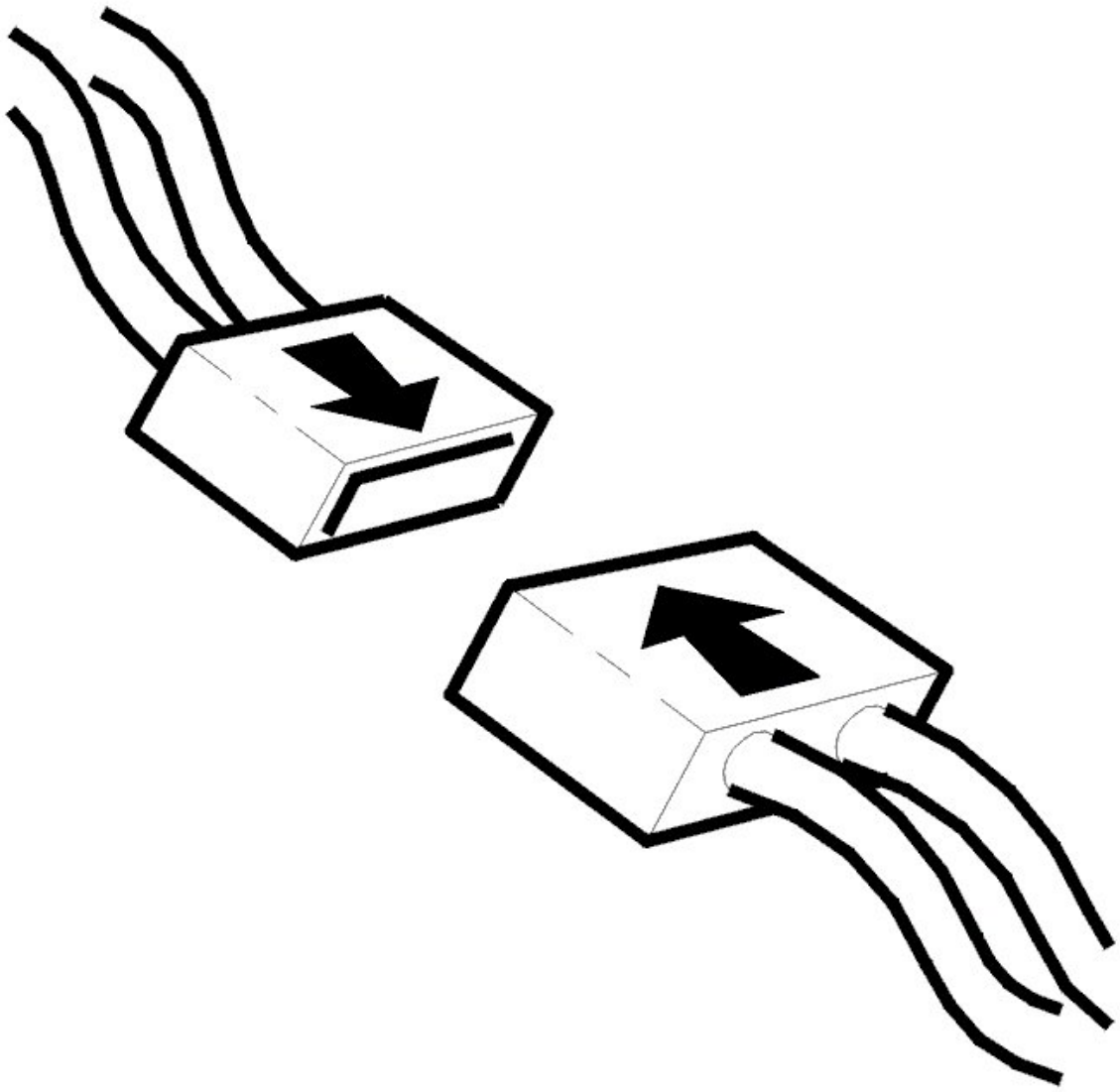
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Run a TRIP schedule so that the engine control module (ECM) compares the diagnostics. To run a TRIP schedule, see: Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

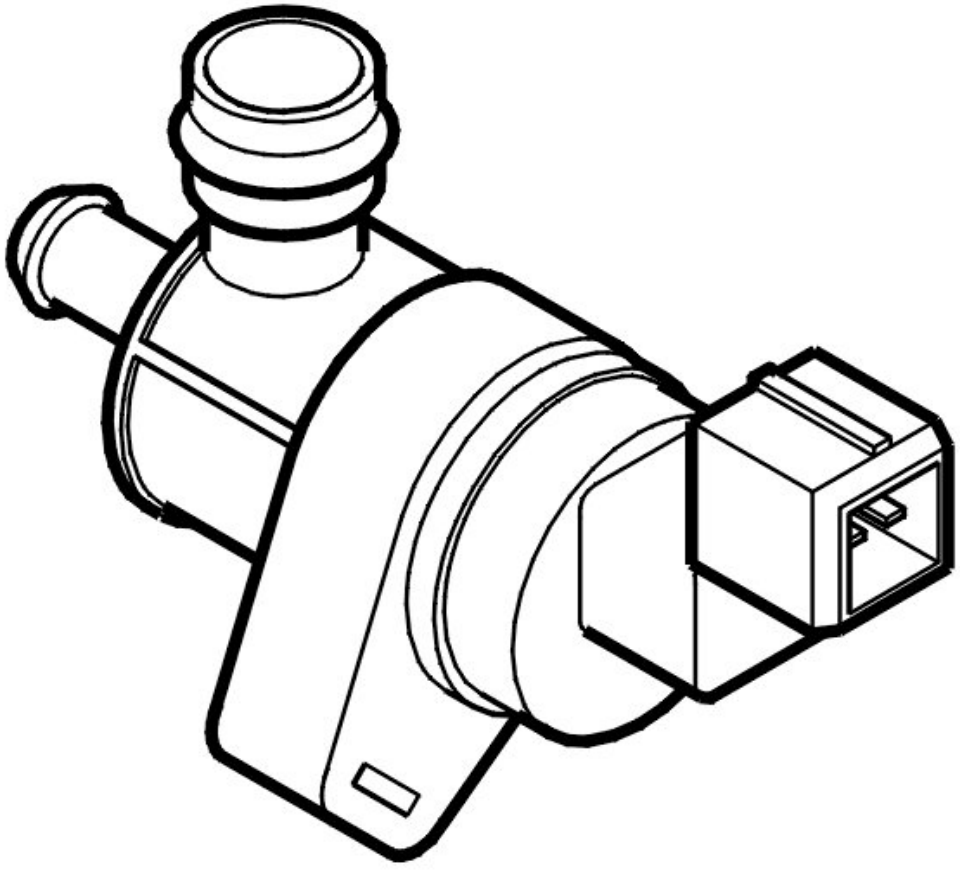
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-420C

Condition



When the control module activates evaporative emission system (EVAP) control, the idle air trim or short-term fuel trim will change. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) does not detect any change in the idle air trim or the long term fuel trim when evaporative emission (EVAP) control is active. The engine control module (ECM) interprets this as a damaged evaporative emission (EVAP) system.

Substitute value
- None.

Possible source
- Damaged evaporative emission system (EVAP) valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

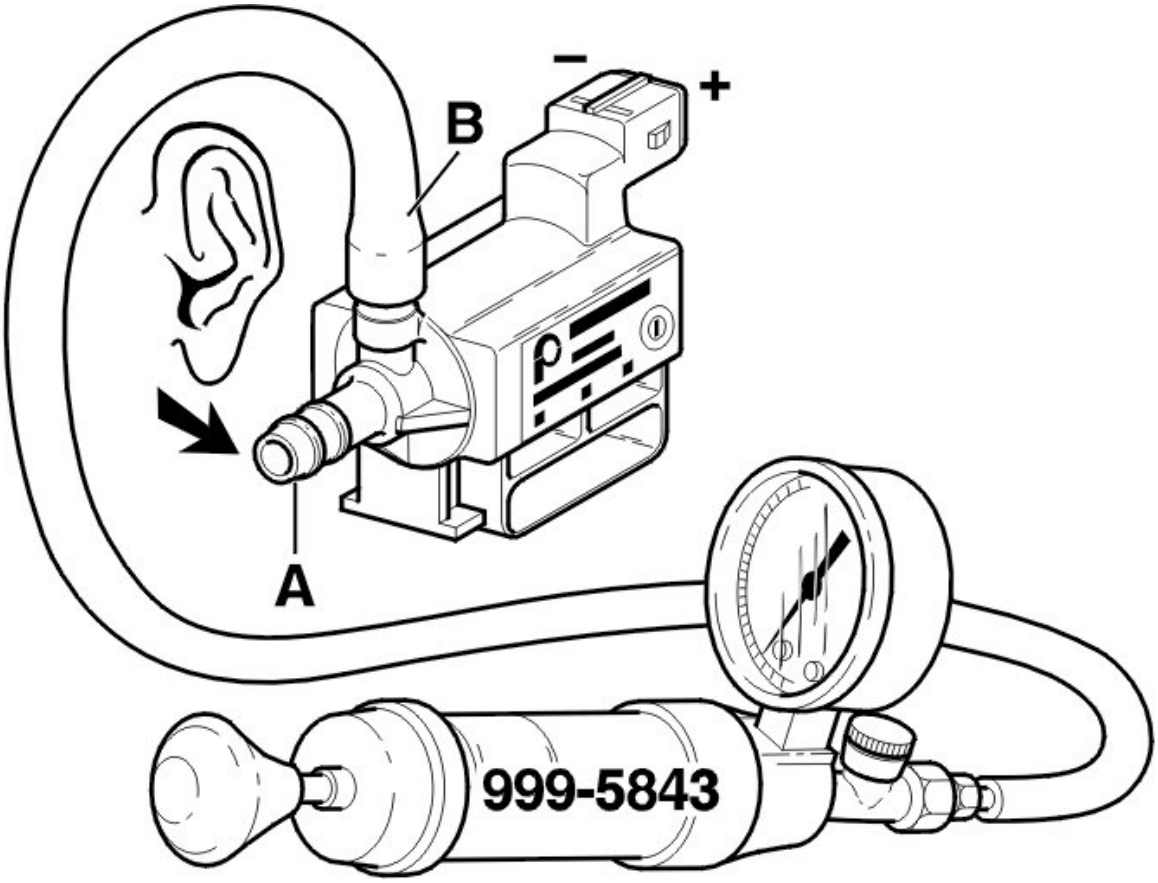
Open

Open

Checking the component
- Slacken off the evaporative emission system (EVAP) valve
- Connect a vacuum pump to the evaporative emission system (EVAP) valve terminal (B). Pump a vacuum. Check that there is no leakage through the evaporative emission system (EVAP) valve by listening to and checking via the pump gauge that the pressure is stable
- Connect the Evaporative emission system (EVAP) valve connector
- Ignition on
- Activate the evaporative emission system (EVAP) valve. When the Evaporative emission system (EVAP) valve is activated, the valve opens and clicks. Check on the pump gauge that the vacuum drops (the pressure evens out) when the evaporative emission system (EVAP) valve opens.

If the function is OK, there must be no leakage when the evaporative emission system (EVAP) valve is closed (stable pressure on the pump gauge) and the vacuum must drop when the evaporative emission system (EVAP) valve opens (the pressure evens out).
The evaporative emission system (EVAP) valve is damaged if the function is faulty.
If the function of the evaporative emission system (EVAP) valve is correct, check the hose and hose connections between the evaporative emission system (EVAP) valve for leakage.
Remedy as necessary.

Other information
- Location of components, 6 cylinder turbocharged engines: Location of components See: Locations
- Location of components, 6 cylinder normally aspirated engines: Location of components See: Locations
- Location of components, on 5 cylinder engines: Location of components See: Locations



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

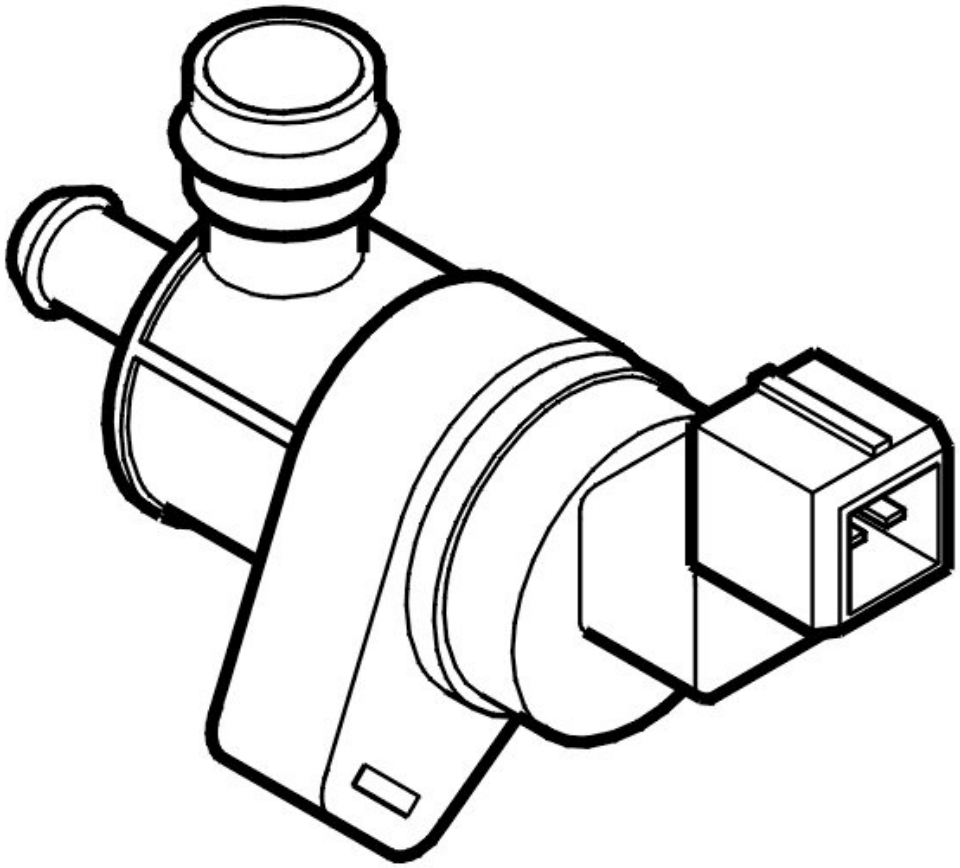
Attempt New Test - Checking the component

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-420D

Condition



When the control module activates evaporative emission system (EVAP) control, the idle air trim or short-term fuel trim will change. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) does not detect any change in the idle air trim or the long term fuel trim when evaporative emission (EVAP) control is active. The engine control module (ECM) interprets this as a damaged evaporative emission (EVAP) system.

Substitute value
- None.

Possible source
- Blocked hose between the EVAP canister and the evaporative emission system (EVAP) valve
- Blocked hose between the evaporative emission system (EVAP) valve and the intake manifold
- Damaged evaporative emission system (EVAP) valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Closed

Closed

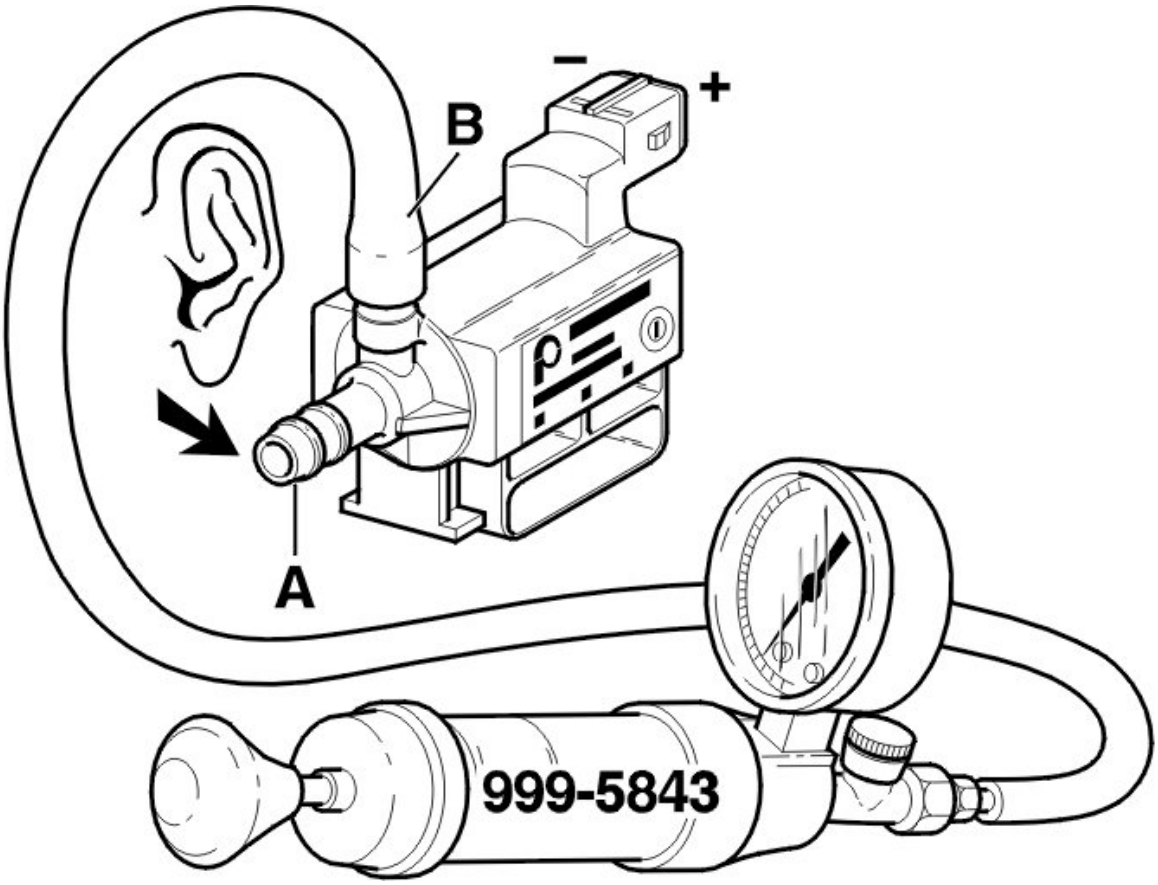
Checking the component
- Slacken off the evaporative emission system (EVAP) valve
- Connect a vacuum pump to the evaporative emission system (EVAP) valve terminal (B). Pump a vacuum. Check that there is no leakage through the evaporative emission system (EVAP) valve by listening to and checking via the pump gauge that the pressure is stable
- Connect the Evaporative emission system (EVAP) valve connector
- Ignition on
- Activate the evaporative emission system (EVAP) valve. When the Evaporative emission system (EVAP) valve is activated, the valve opens and clicks. Check on the pump gauge that the vacuum drops (the pressure evens out) when the evaporative emission system (EVAP) valve opens.

If the function is OK, there must be no leakage when the evaporative emission system (EVAP) valve is closed (stable pressure on the pump gauge) and the vacuum must drop when the evaporative emission system (EVAP) valve opens (the pressure evens out).
The evaporative emission system (EVAP) valve is damaged if the function is faulty.
If the function of the Evaporative emission system (EVAP) valve is OK, check:
- The hose and hose terminals between the Evaporative emission system (EVAP) valve and the intake manifold. Check for leakage and blockages
- Check the hose and hose terminals between the EVAP canister and the Evaporative emission system (EVAP) valve. Check for leakage and blockages.

Remedy as necessary.

Other information

- Location of components, 6 cylinder turbocharged engines: Location of components See: Locations
- Location of components, 6 cylinder normally aspirated engines: Location of components See: Locations
- Location of components, on 5 cylinder engines: Location of components See: Locations
- Carbon filter container, replacing See: Emission Control Systems/Evaporative Emissions System/Evaporative Emission Control Canister/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the component

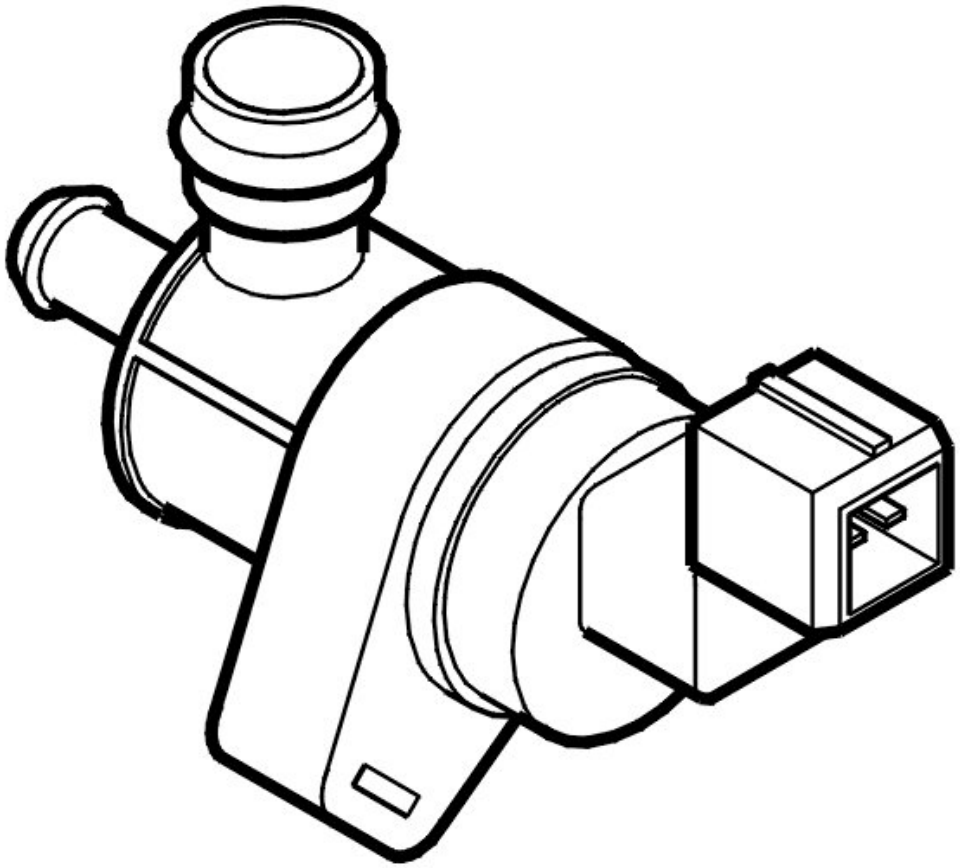
FAULT FOUND - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-421B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that there is no signal from the evaporative emission system (EVAP) valve.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- twin heated oxygen sensor (HO2S) control disabled.

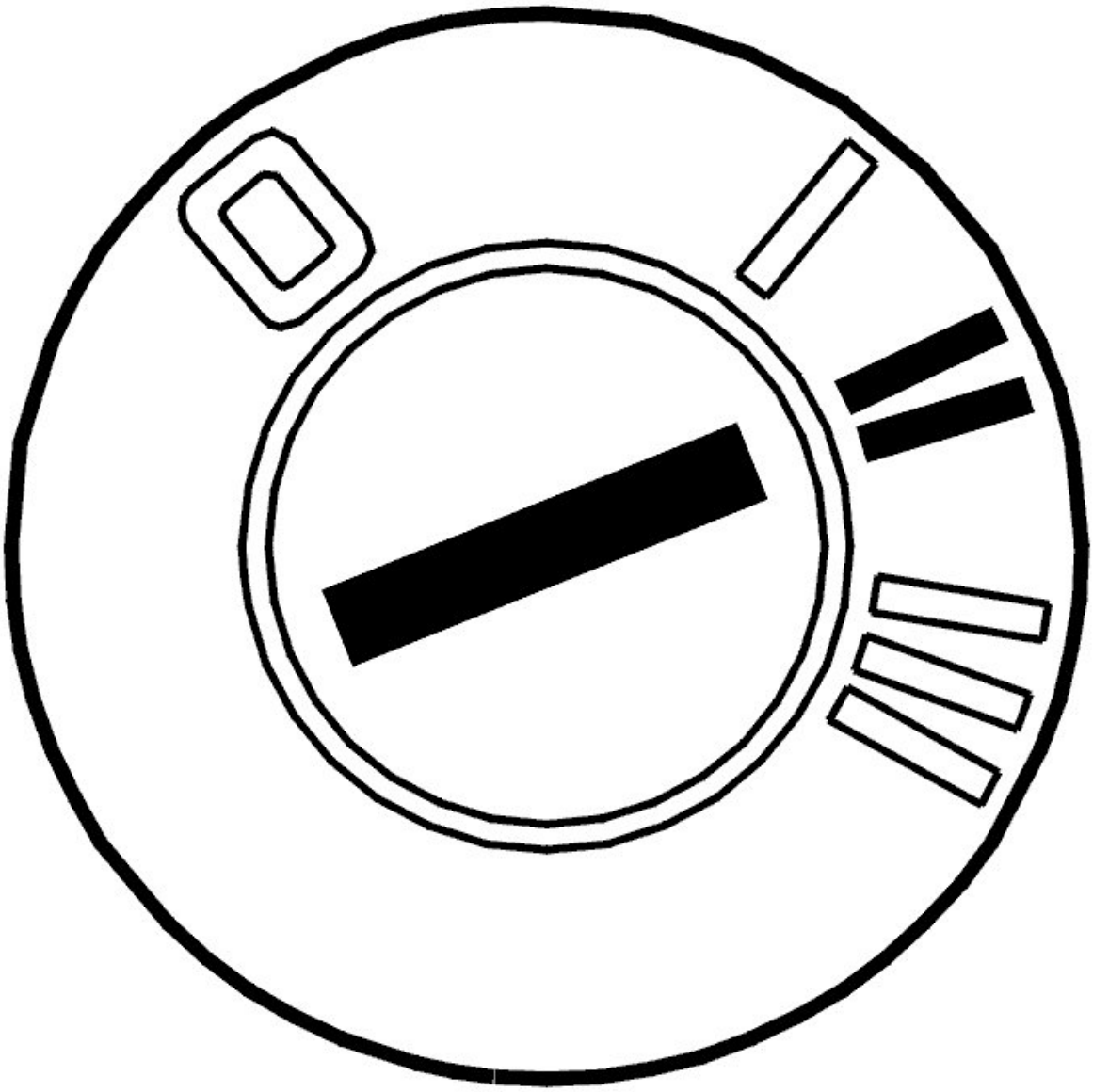
Possible source
- Open-circuit in the signal cable
- Damaged evaporative emission system (EVAP) valve
- Contact resistance in the terminals
- Open-circuit in the power cable.

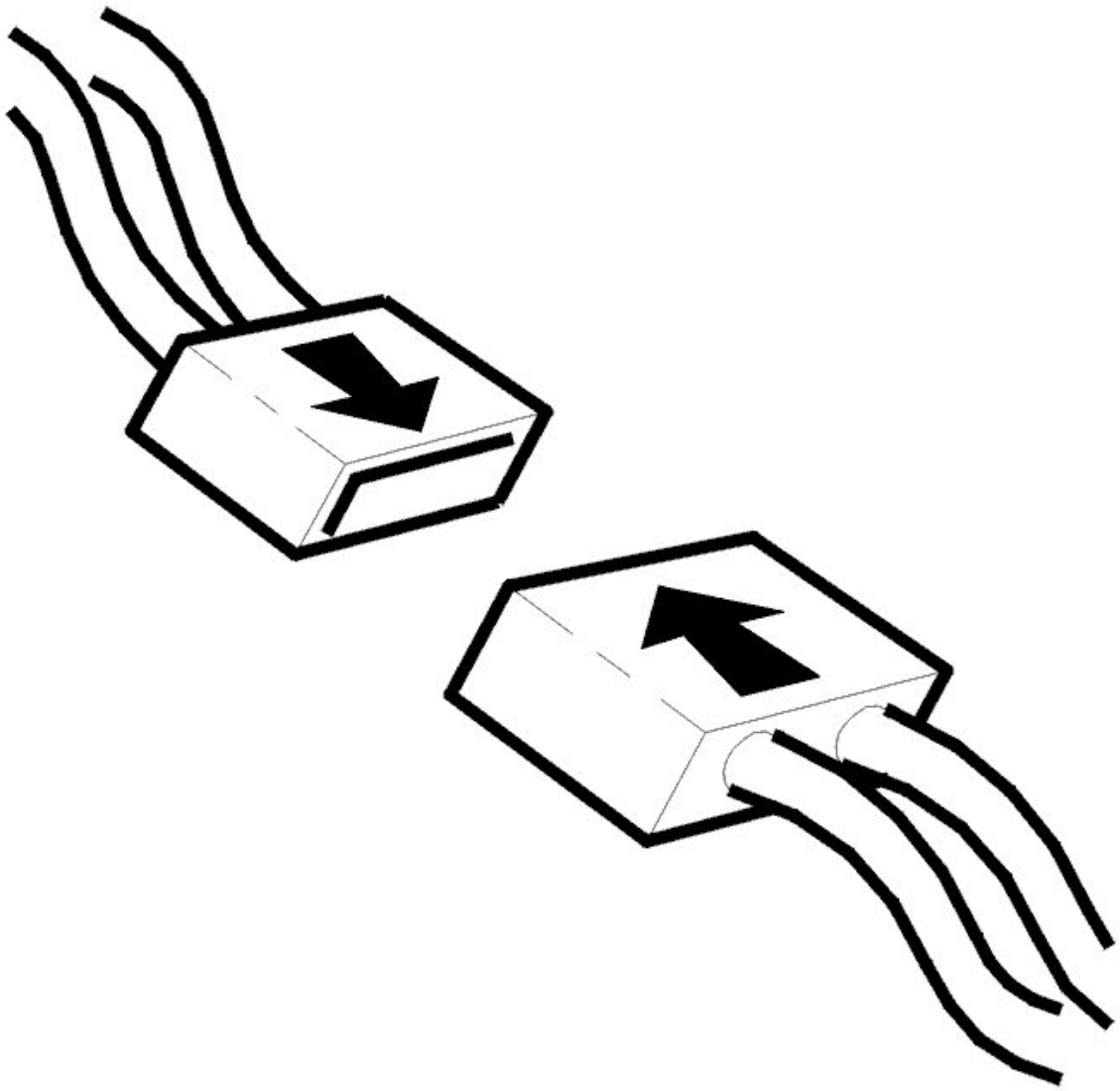
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the connector



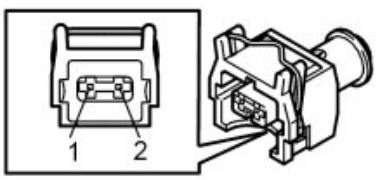


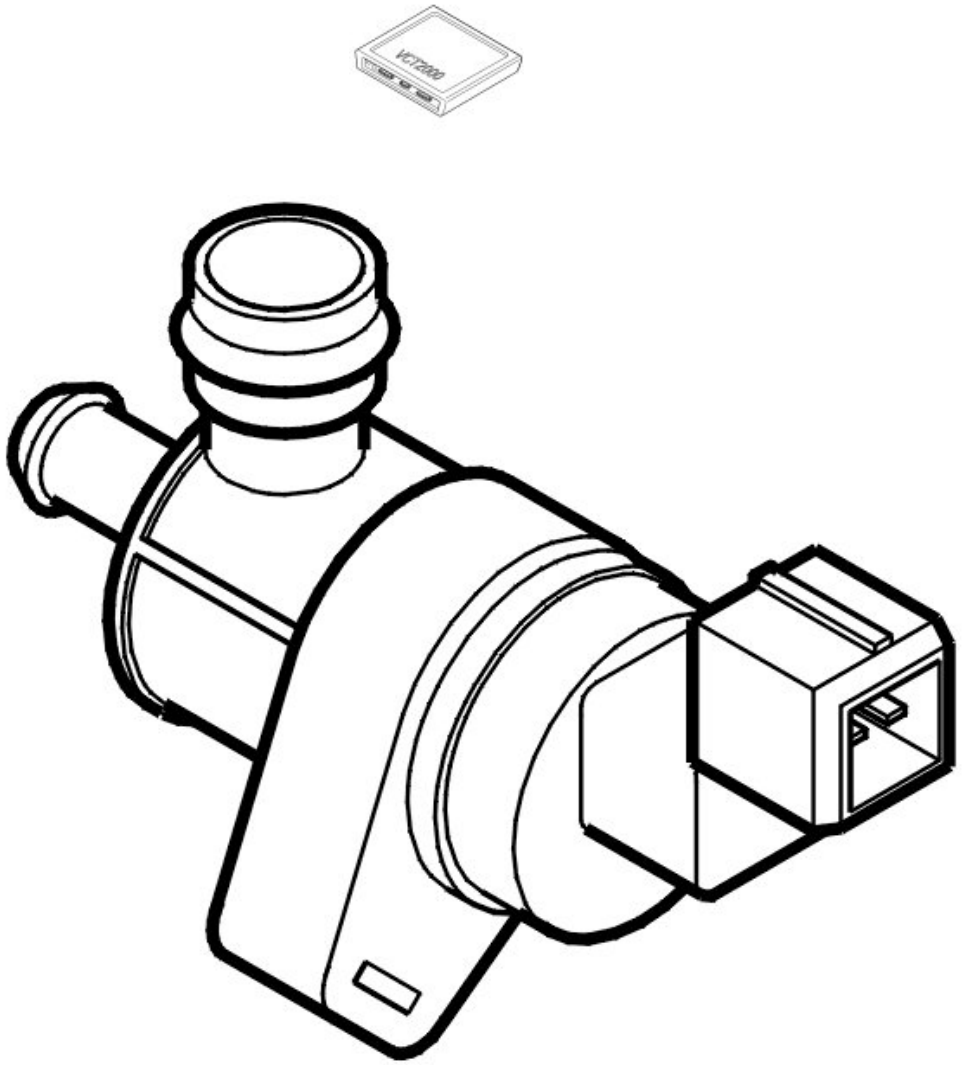
- Ignition off
- Check the evaporative emission system (EVAP) valve connector. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate the evaporative emission system (EVAP) valve.

A click should be heard when the evaporative emission system (EVAP) valve is activated.
If the evaporative emission system (EVAP) valve is now OK this indicates that the fault was caused by poor contact in the connector.

Other information

- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For the location of components on 5 cylinder engines, see: Location of components See: Locations
- For the location of components on 6 cylinder naturally aspirated engines, see: Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see: Location of components See: Locations
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Is the evaporative emission system (EVAP) valve working?

Yes - Fault Found

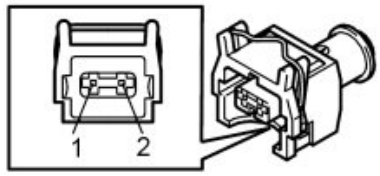
No - Checking the components and wiring

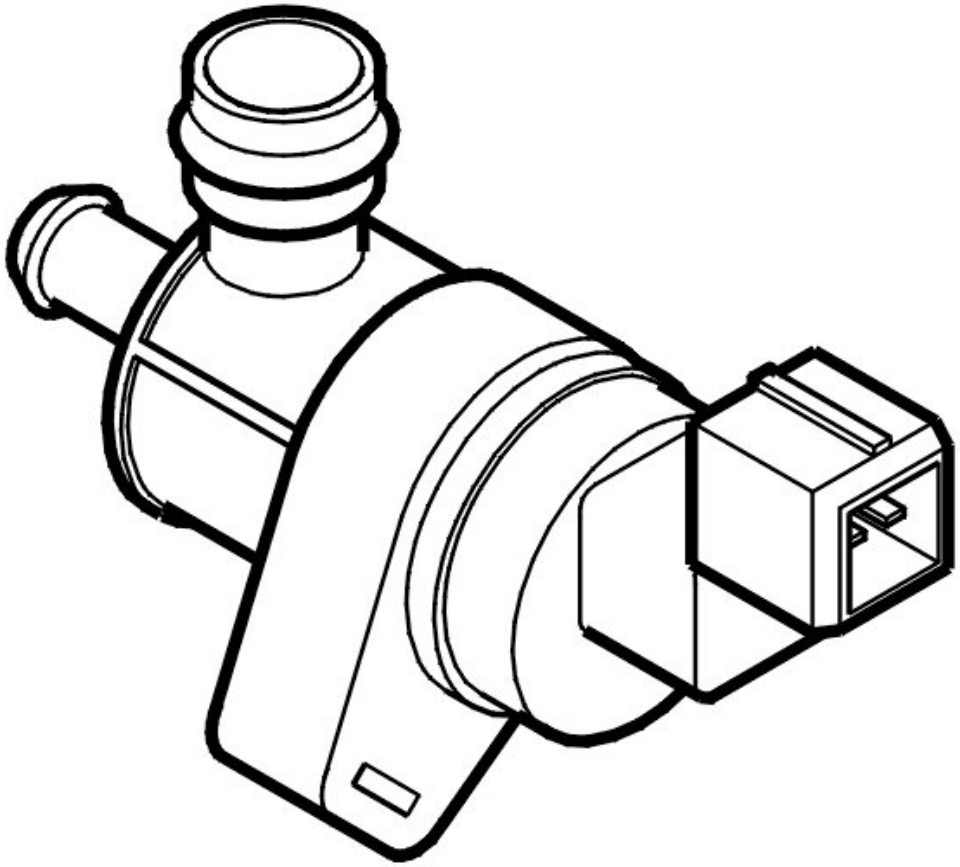
Checking the components and wiring

Check the resistance of the evaporative emission system (EVAP) valve.
Check the signal cable between engine control module (ECM) terminal #A9 (#A9) and evaporative emission system (EVAP) valve terminal #2. Check for an open-circuit.
Check the power supply between system relay terminal #3 and evaporative emission system (EVAP) valve terminal #1. Check for an open-circuit.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For the location of components on 5 cylinder engines, see: Location of components See: Locations
- For the location of components on 6 cylinder naturally aspirated engines, see: Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see: Location of components See: Locations
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



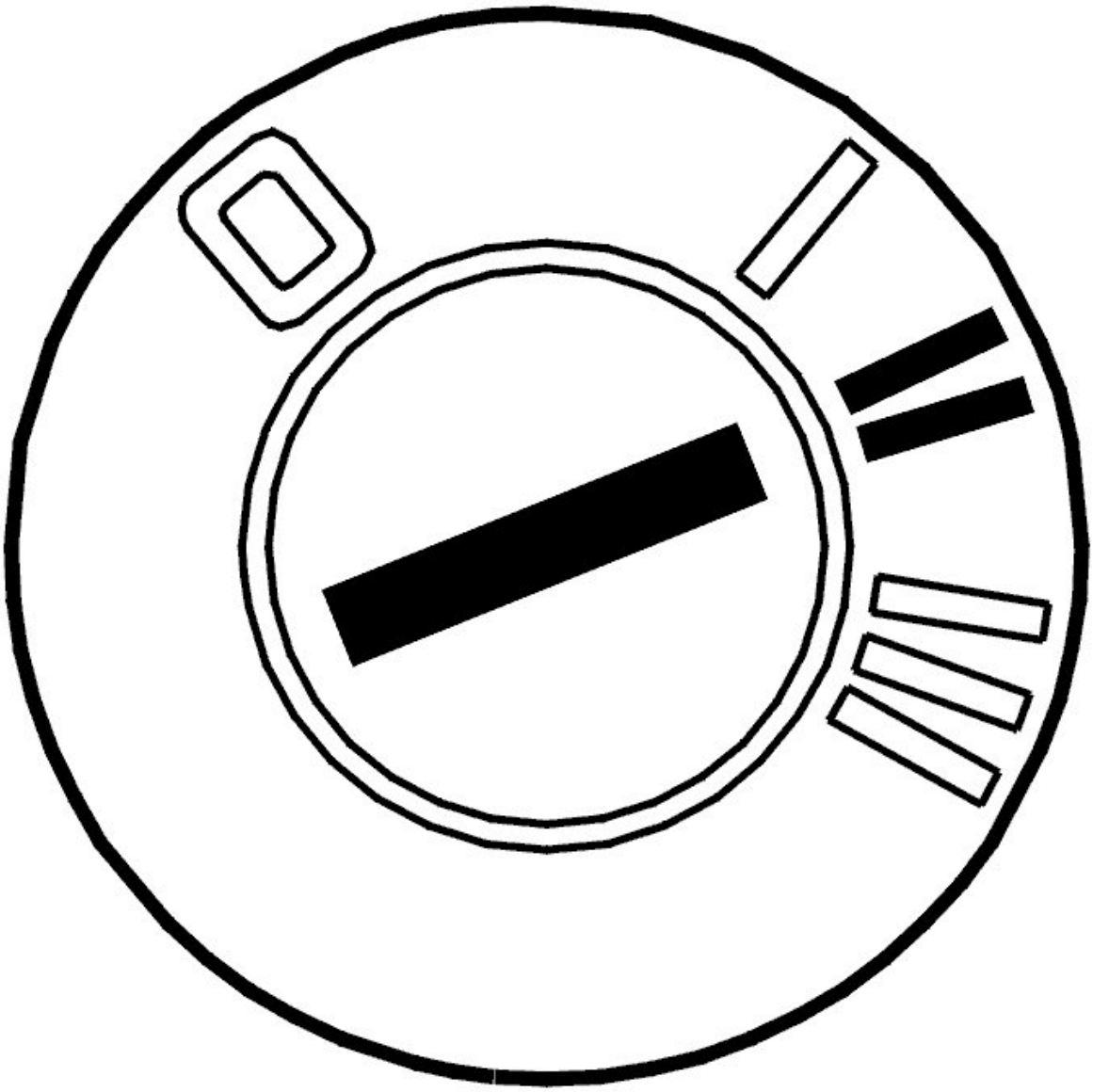


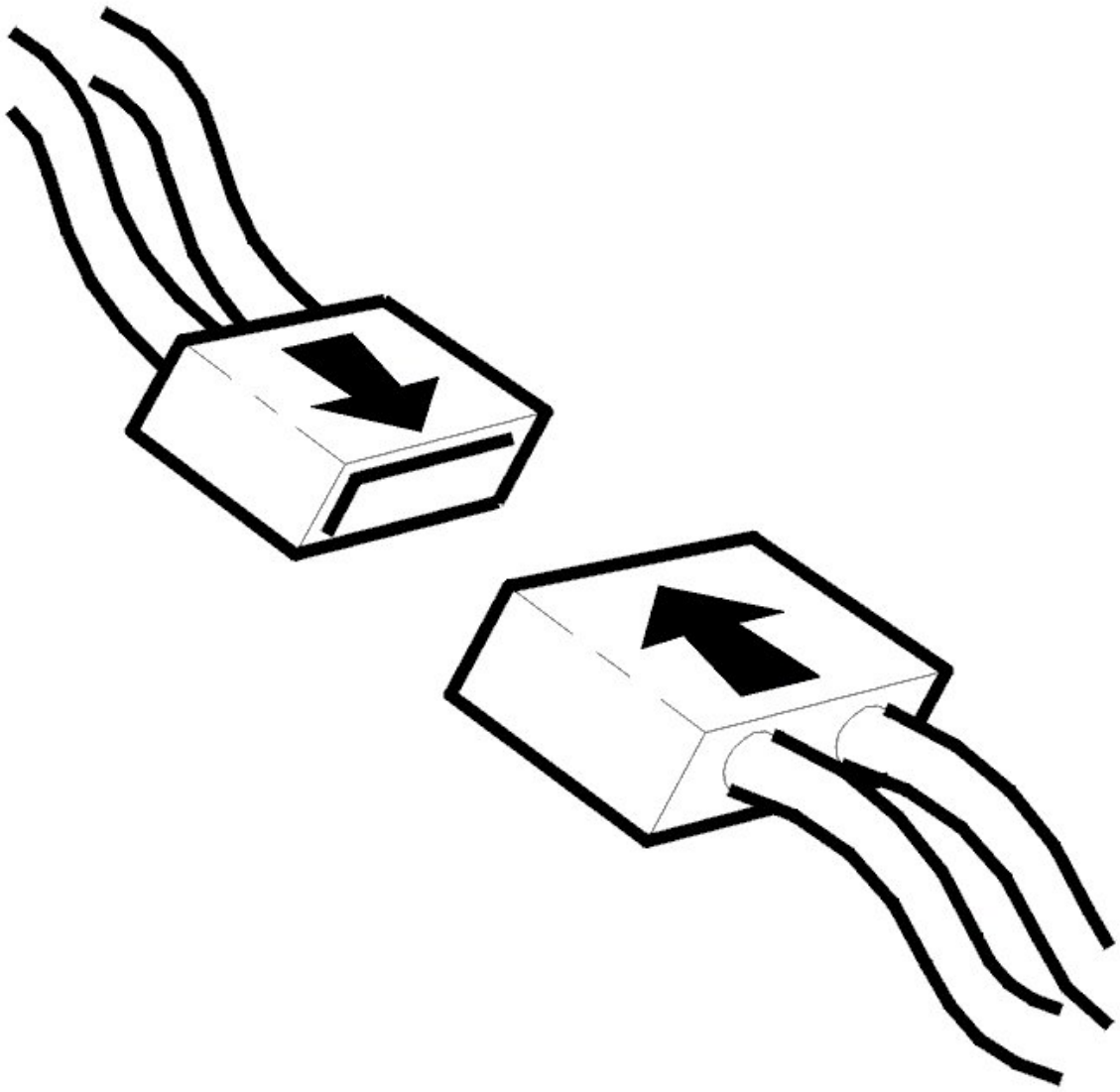
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Activate the evaporative emission system (EVAP) valve.

A click should be heard when the evaporative emission system (EVAP) valve is activated.

Is the evaporative emission system (EVAP) valve working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

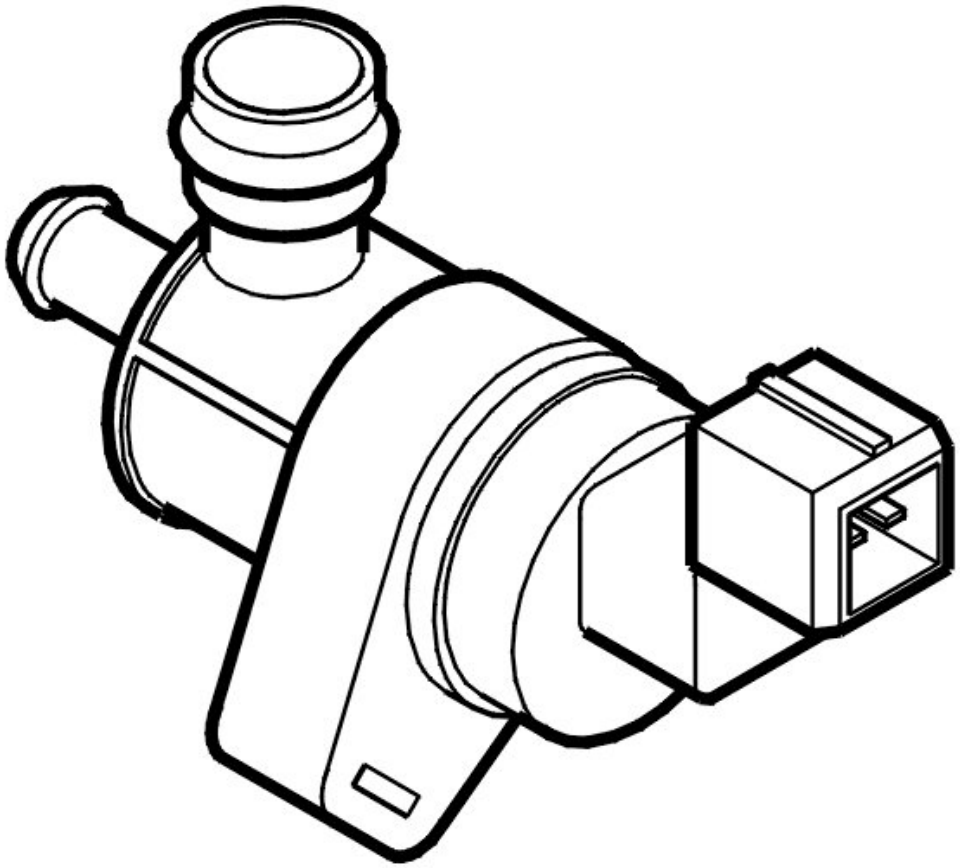
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-421C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the evaporative emission system (EVAP) valve is too high.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- twin heated oxygen sensor (HO2S) control disabled.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged evaporative emission system (EVAP) valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the components and wiring

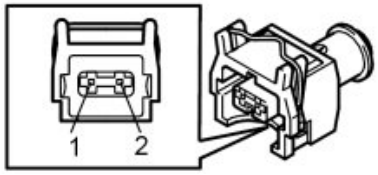
Check the resistance of the evaporative emission system (EVAP) valve.
Check the signal cable between engine control module (ECM) terminal #A9 (#A9) and evaporative emission system (EVAP) valve terminal #2.
Check for a short-circuit to supply voltage.

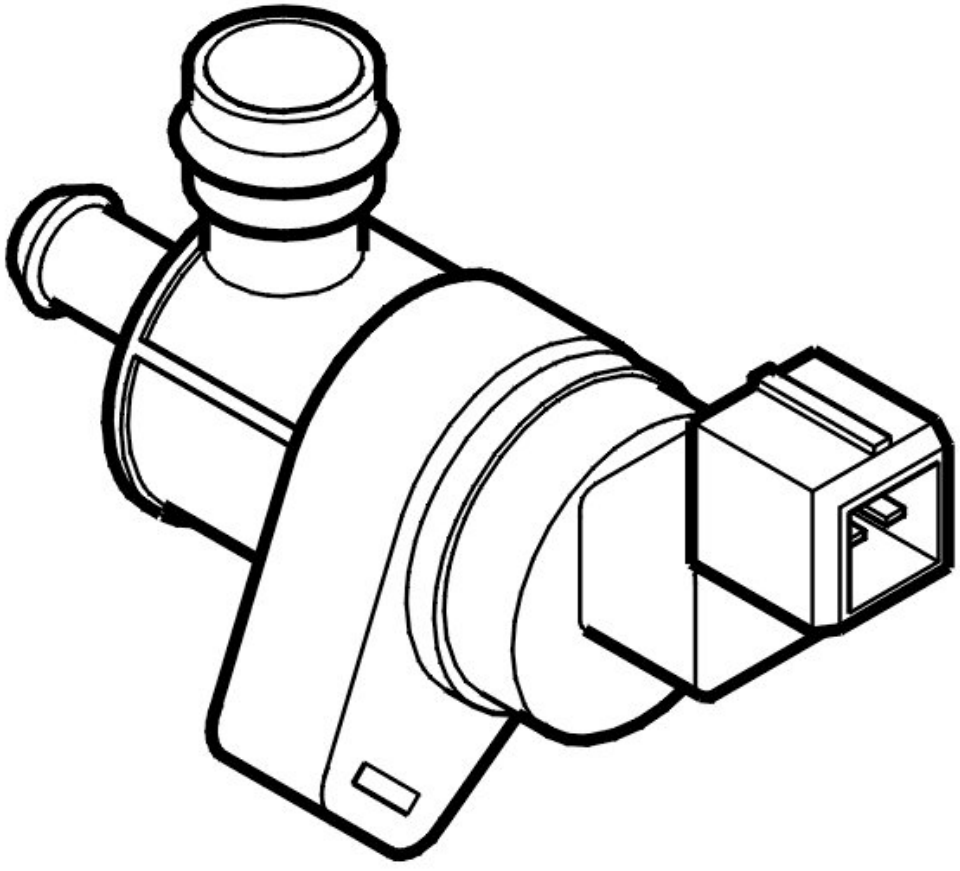
Hint: Use an electrician's screwdriver with at least a 3 W bulb to determine whether there is a short-circuit to supply voltage in the cable.

Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Component specifications See: Engine Control Module/Specifications
- For the location of components on 5 cylinder engines, see: Location of components See: Locations
- For the location of components on 6 cylinder naturally aspirated engines, see: Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see: Location of components See: Locations
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



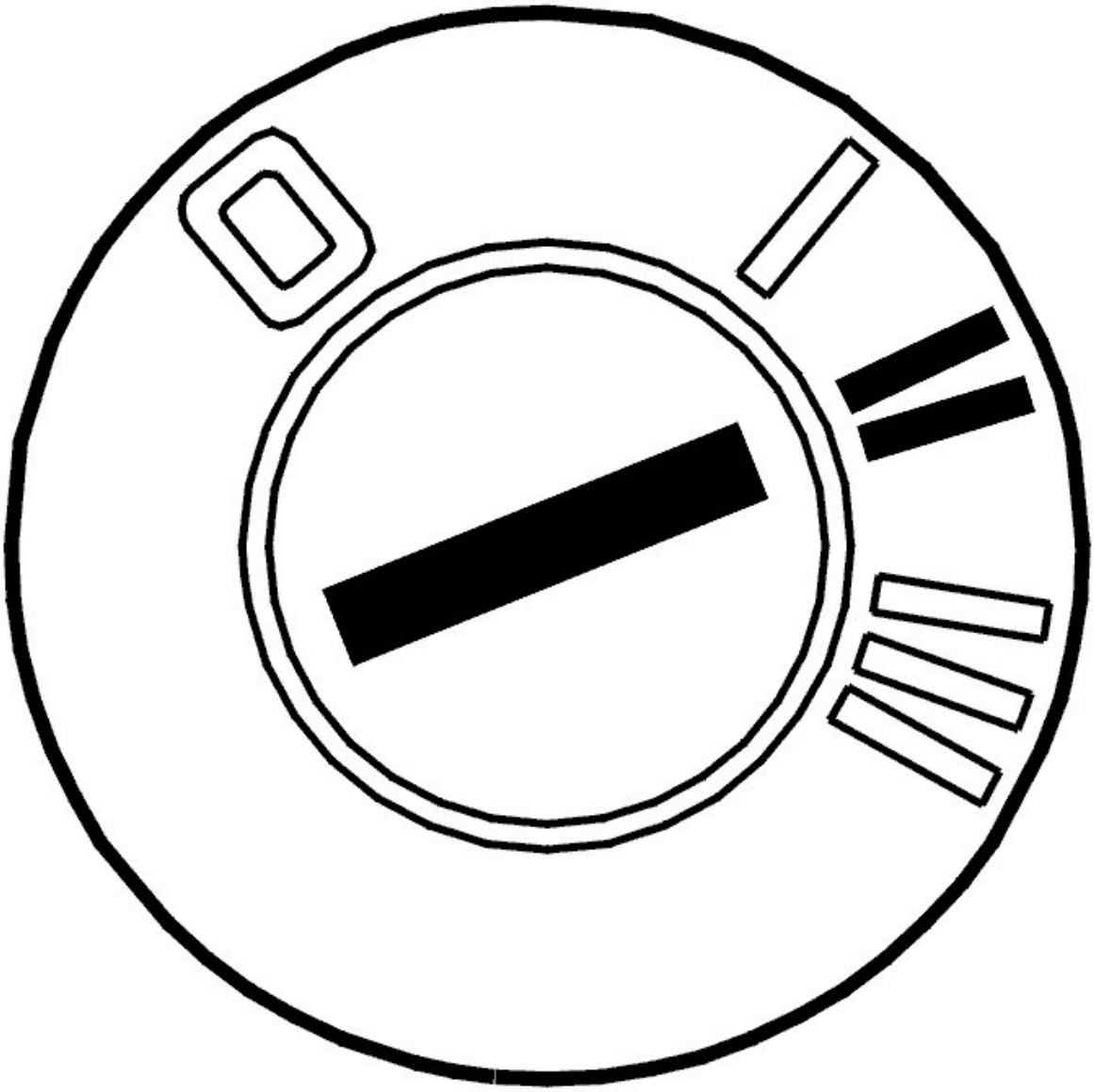


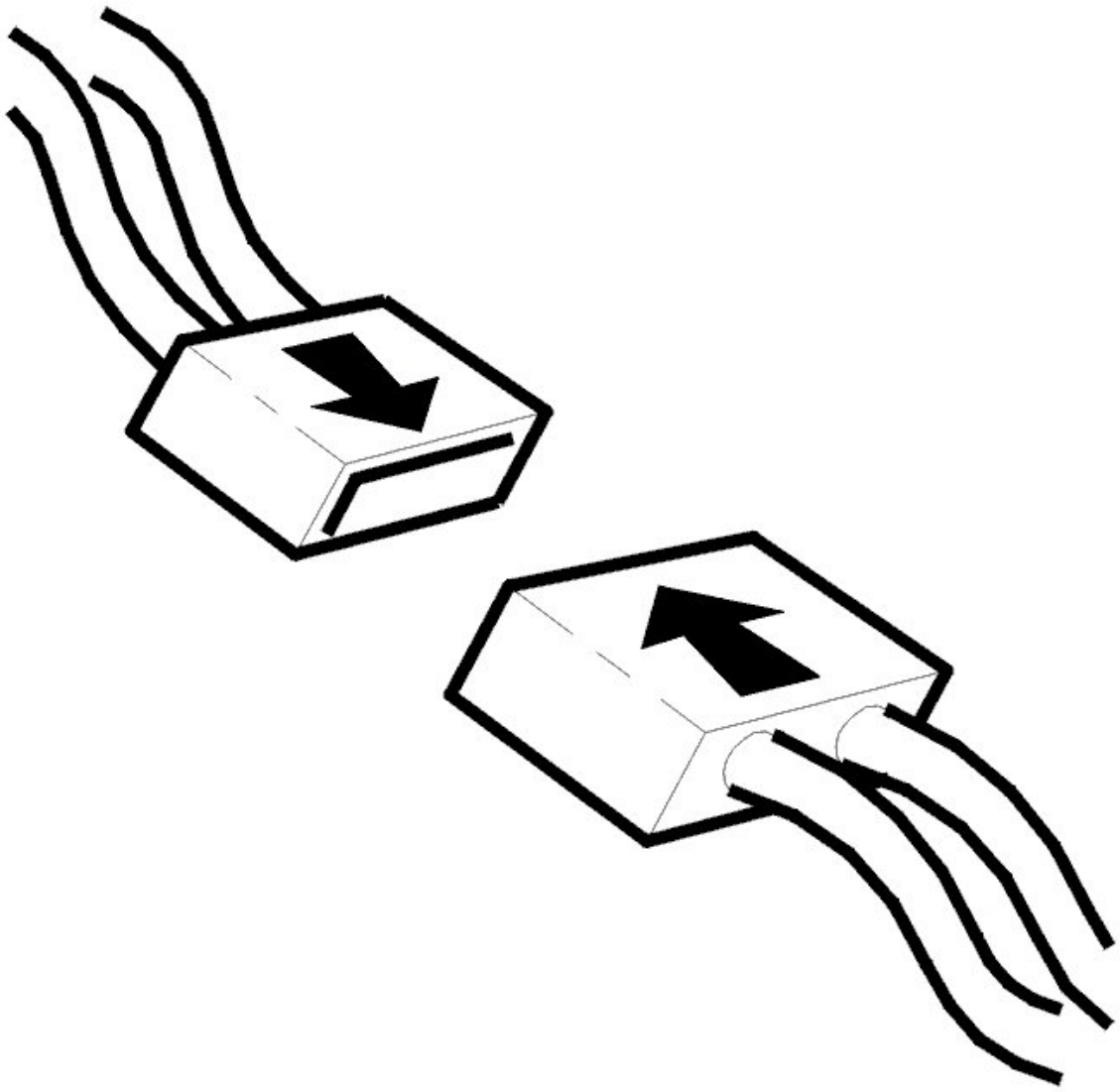
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Activate the evaporative emission system (EVAP) valve.

A click should be heard when the evaporative emission system (EVAP) valve is activated.

Is the evaporative emission system (EVAP) valve working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

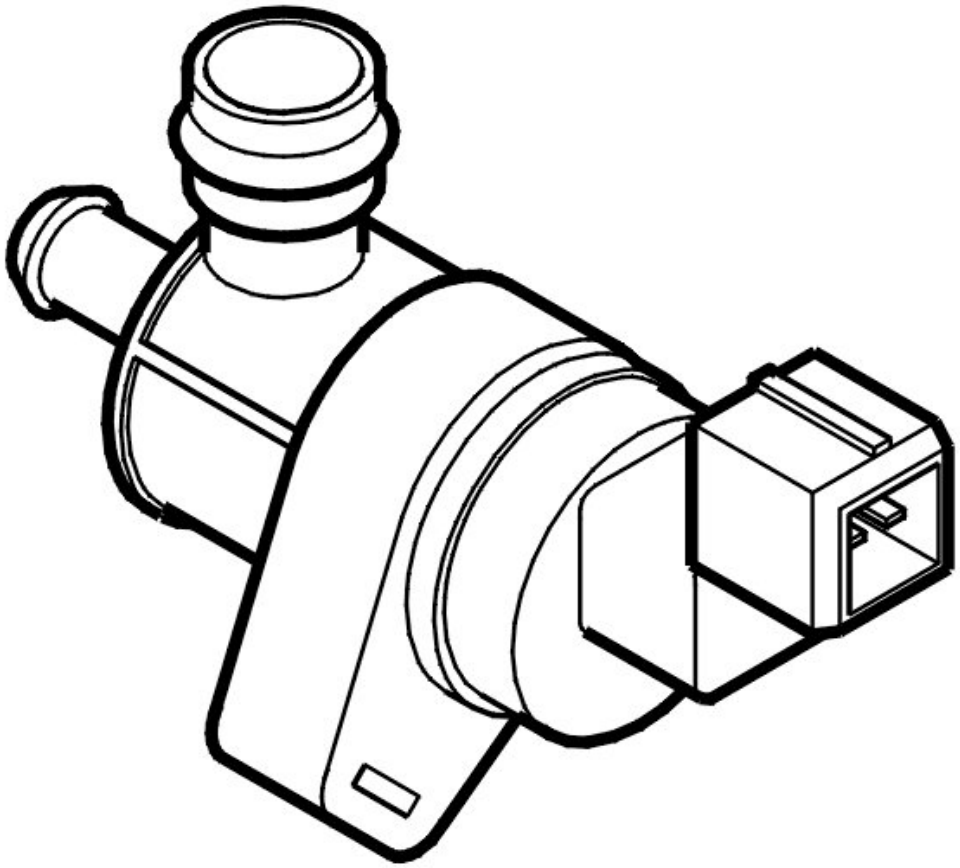
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-421D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the evaporative emission system (EVAP) valve is too low.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- twin heated oxygen sensor (HO2S) control disabled.

Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

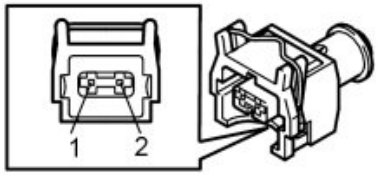
Signal too low

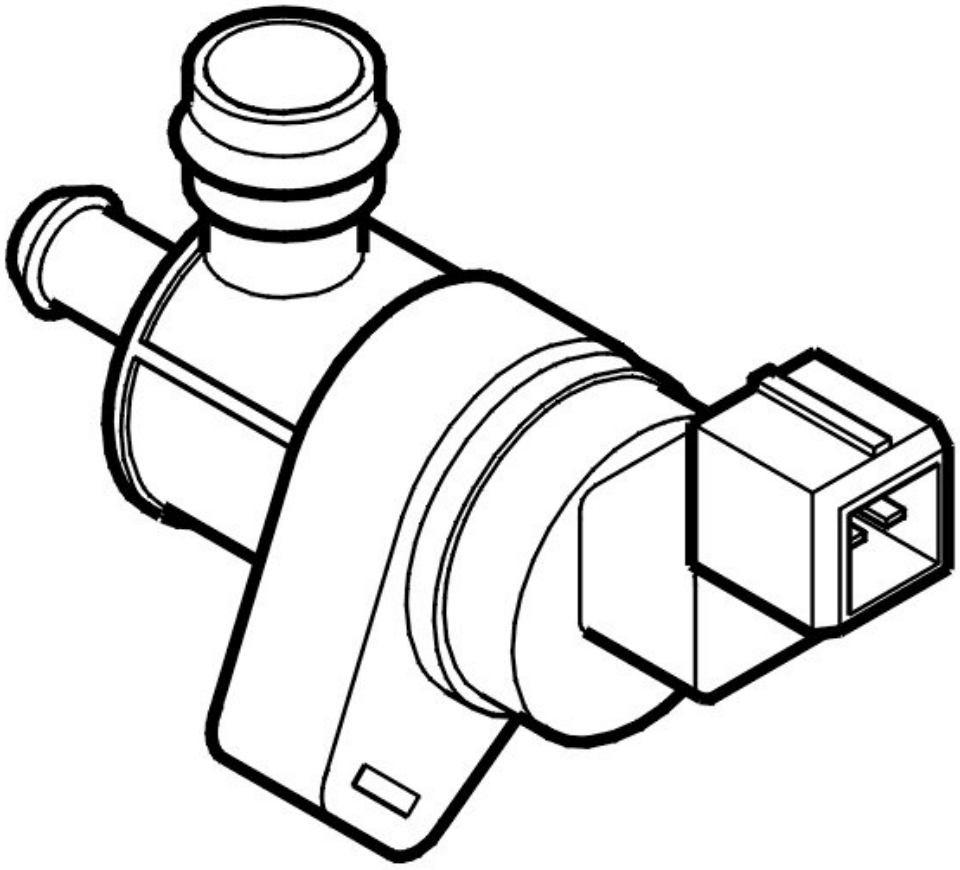
Checking the components and wiring

Check the resistance of the evaporative emission system (EVAP) valve.
Check the signal cable between engine control module (ECM) terminal #A9 (#A9) and evaporative emission system (EVAP) valve terminal #2.
Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For the location of components on 5 cylinder engines, see: Location of components See: Locations
- For the location of components on 6 cylinder naturally aspirated engines, see: Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see: Location of components See: Locations
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



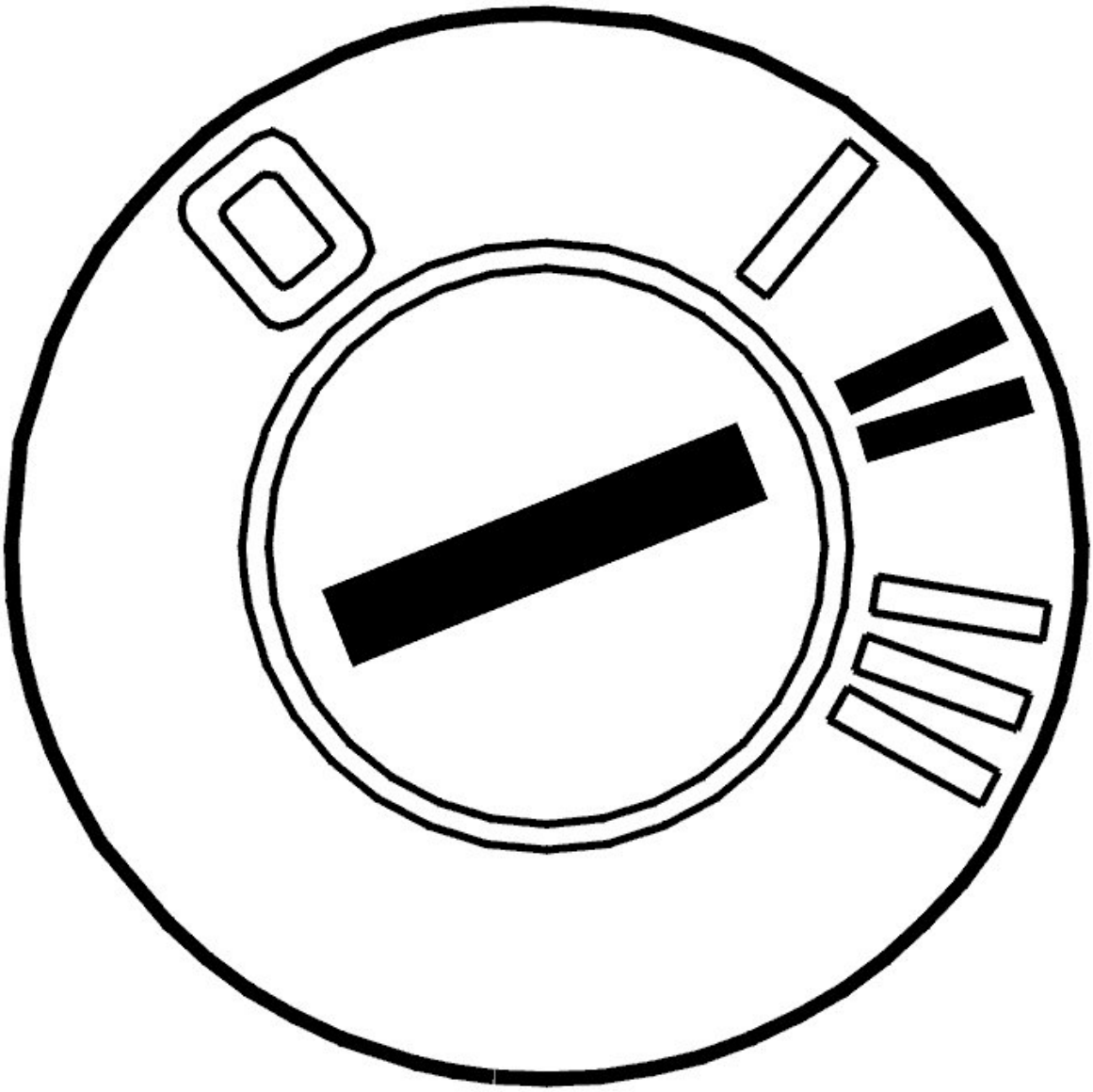


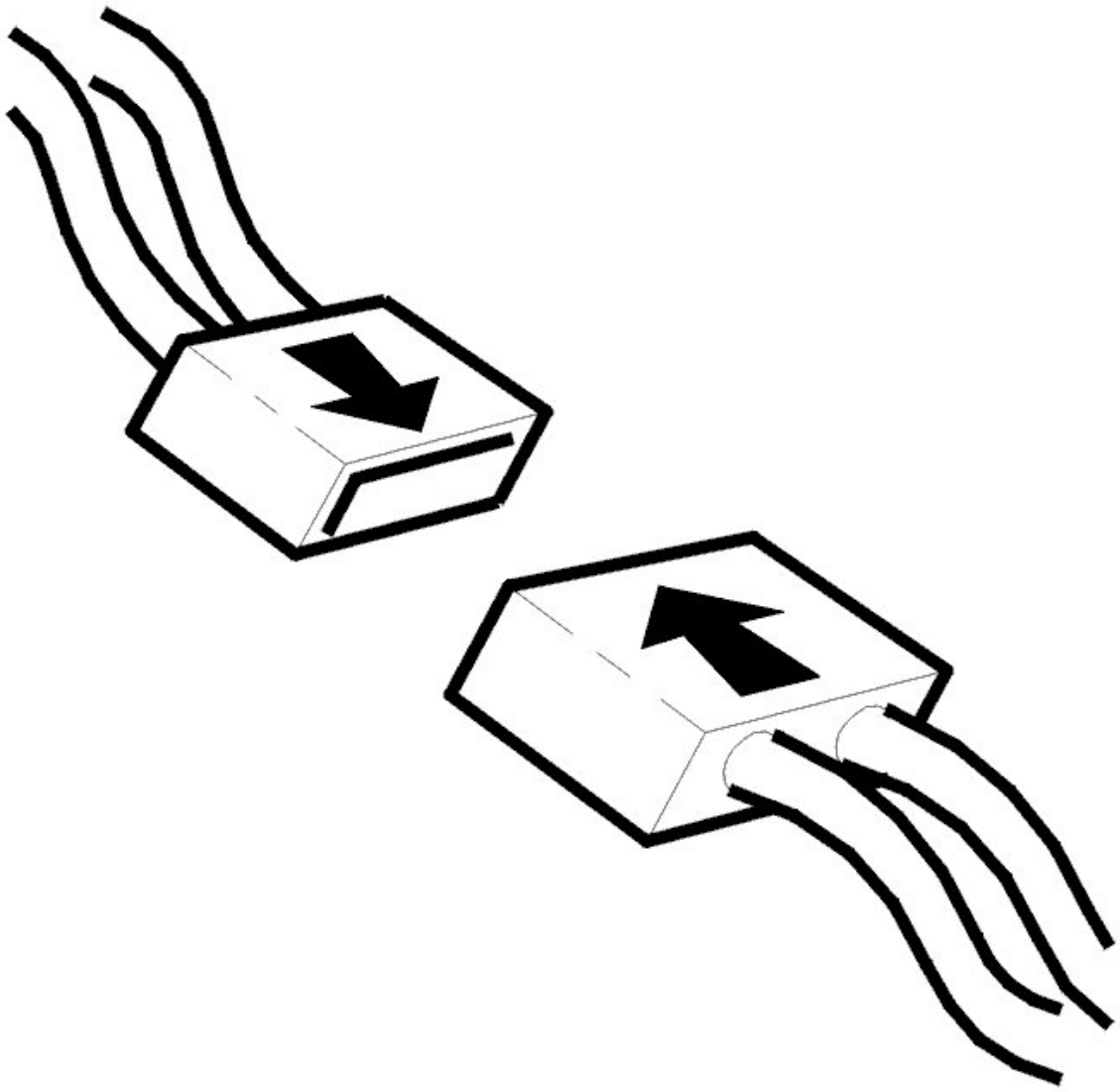
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Activate the evaporative emission system (EVAP) valve.

A click should be heard when the evaporative emission system (EVAP) valve is activated.

Is the evaporative emission system (EVAP) valve working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-430C

Condition

If the engine control module (ECM) registers that fuel filling has been carried out through the fuel level being changed, the position and installation of the fuel tank filler cap is checked. This is carried out by quicker leak diagnostics.
The check is carried out a few minutes after start if the vehicle speed is constant and exceeds 30 km/h and only if no fault is detected on the leak diagnostic unit.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a leak after filling. This is interpreted as fuel tank filler cap missing or loosely installed.

Substitute value

None.

Possible source
- The fuel tank filler cap is missing or not properly tightened.

Fault symptom[s]
- None.

Fuel Tank Filler Cap Missing

Fuel tank filler cap missing

Checking other diagnostic trouble codes (DTCs), engine control module (ECM)

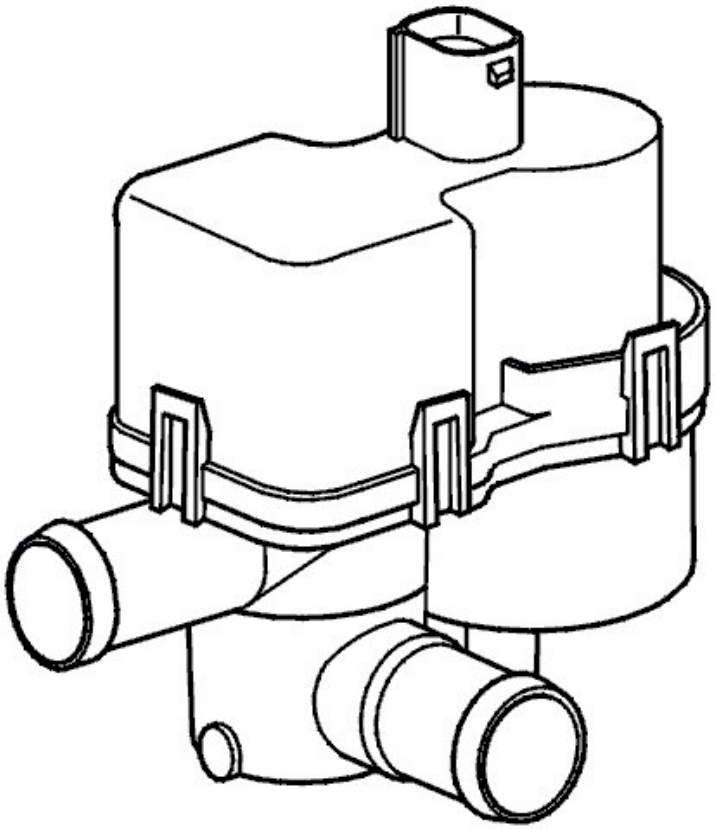
Hint: This diagnostic trouble code (DTC) can only be stored after a refueling. The diagnostic detects major leaks in the fuel tank system. The most likely cause is that the fuel tank filler cap has not been installed correctly. For further information about this diagnostic trouble code (DTC), see Diagnostic Trouble Code (DTC) Information.
In the event of a permanent fault, a diagnostic trouble code (DTC) for a "Major leak" will also be stored after the major leak diagnostic is complete.

- Check if the diagnostic trouble code (DTC) for "Major leak" is stored in the engine control module (ECM), if so, fault-trace from it instead.
- If no diagnostic trouble code for "Major leak" is stored, perform a quick test of the tank system via VEHICLE COMMUNICATION to ensure that the fault was intermittent and probably caused by the fuel tank filler cap.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-431B

Condition



The engine control module (ECM) checks the control signal to the heater element in the leak diagnostic unit.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal is too high.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.

Substitute value
- None.

Possible source
- Open-circuit in the signal cable.
- Damaged leak diagnostic pump.

Fault symptom[s]
- None.

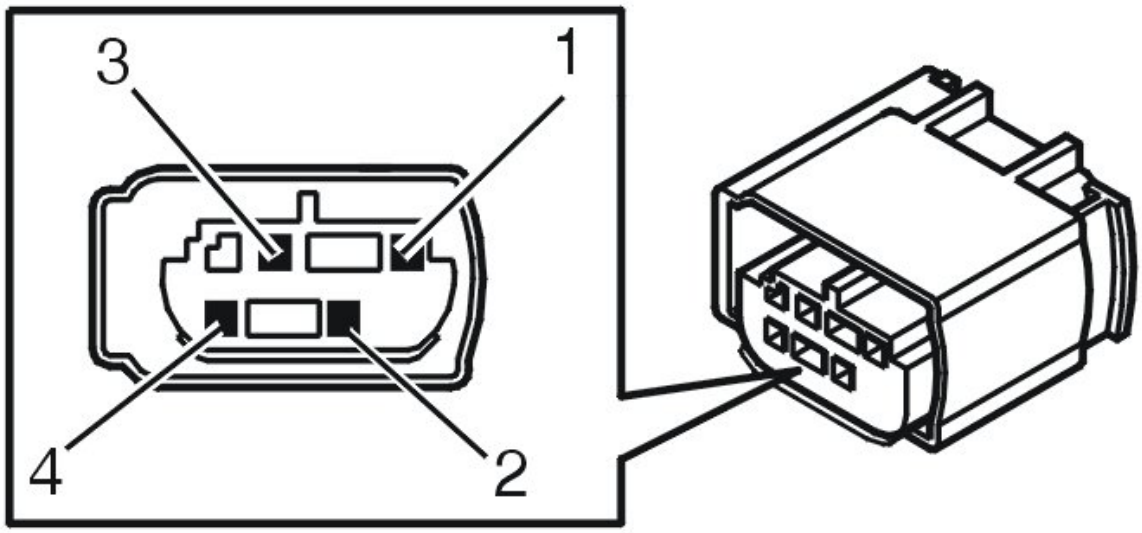
Signal Missing

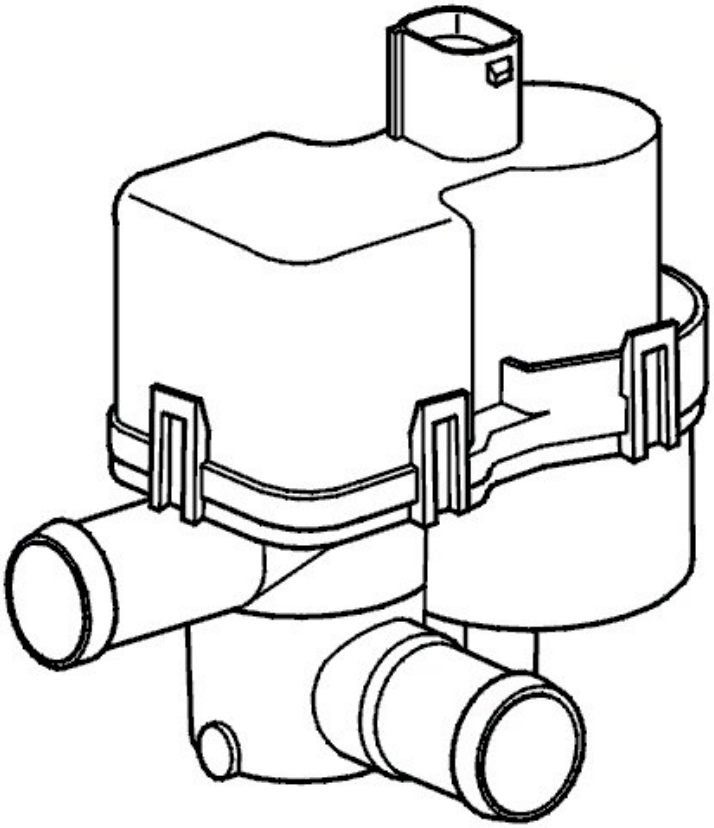
Signal missing

Checking the wiring

Check the cable between engine control module (ECM) terminal #B34 (#B44) and leak diagnostic unit terminal #2. Check for an open-circuit. Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Fault Found

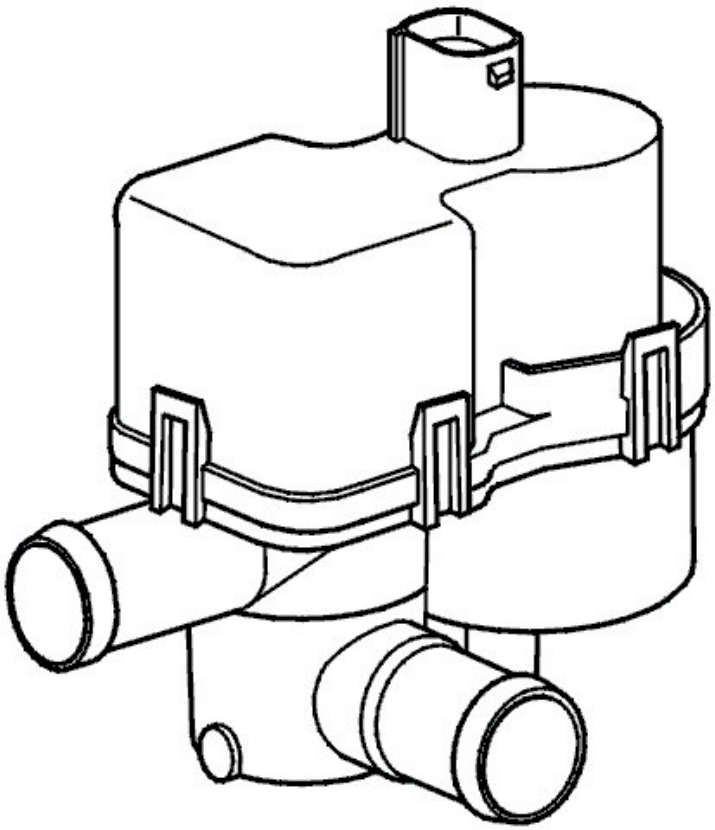
Attempt New Test - Checking the wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-431C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the control signal to the heater element (PTC resistor) for the leak diagnostic unit is too high.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running and the control module activates or deactivates preheating for the heater element for the leak diagnostic unit.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged leak diagnostic unit.

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the wiring

Check the signal cable. Check for a short-circuit to supply voltage.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

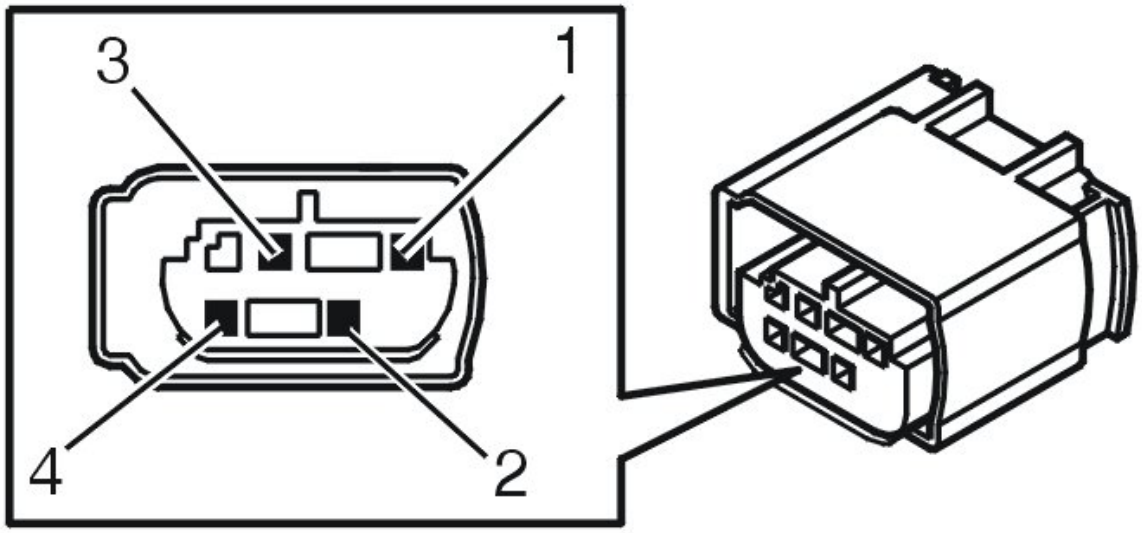
Take readings between:

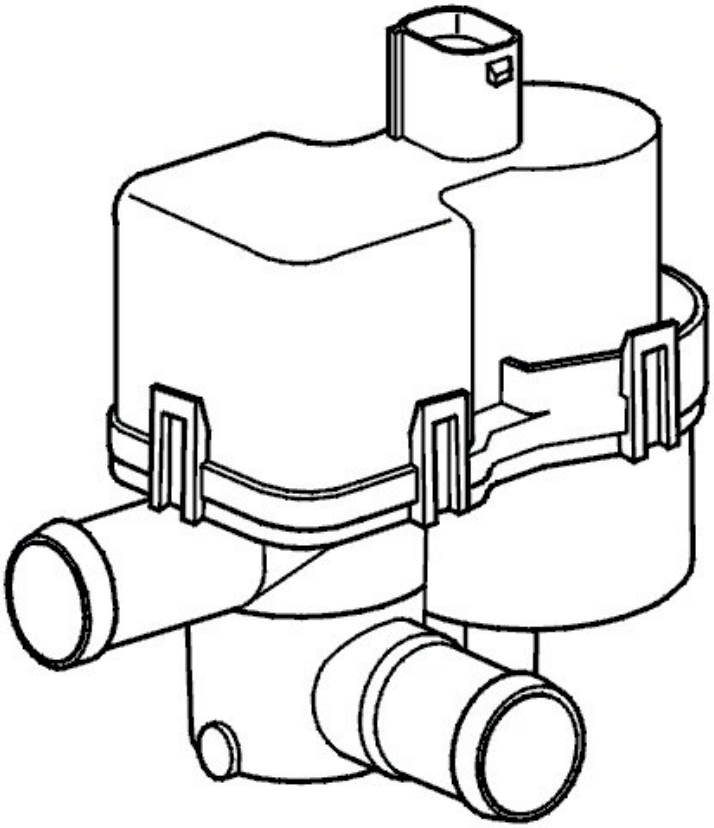
- Engine control module (ECM) #B34 (#C44) and leakage diagnostic unit #2.

Remedy as necessary.

Other information

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

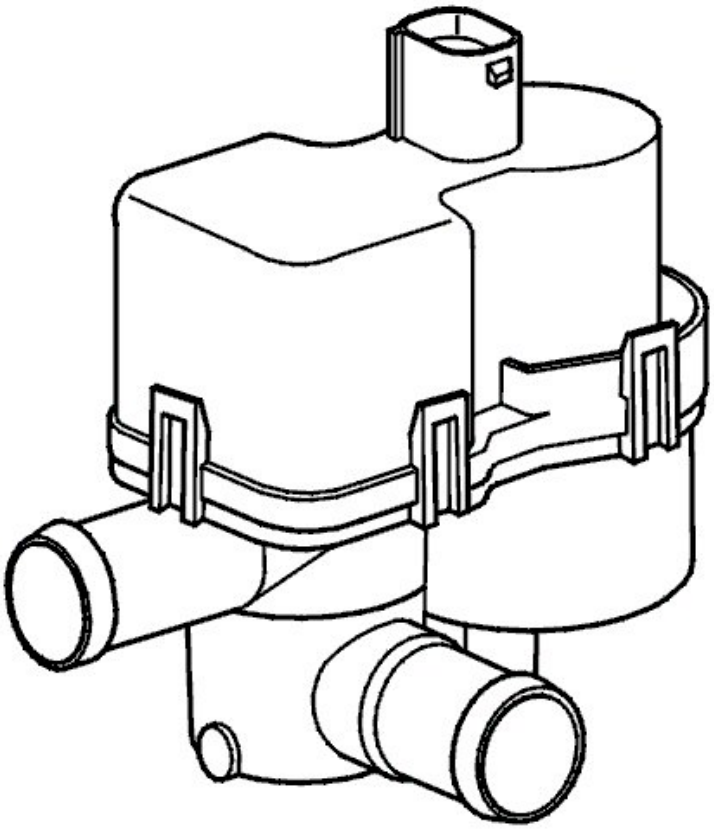
Attempt New Test - Checking the wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-431D

Condition



The engine control module (ECM) checks the control signal to the heater element in the leak diagnostic unit.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal is too low.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable.

- Damaged leak diagnostic pump.

Fault symptom[s]
- None.

Signal Too Low

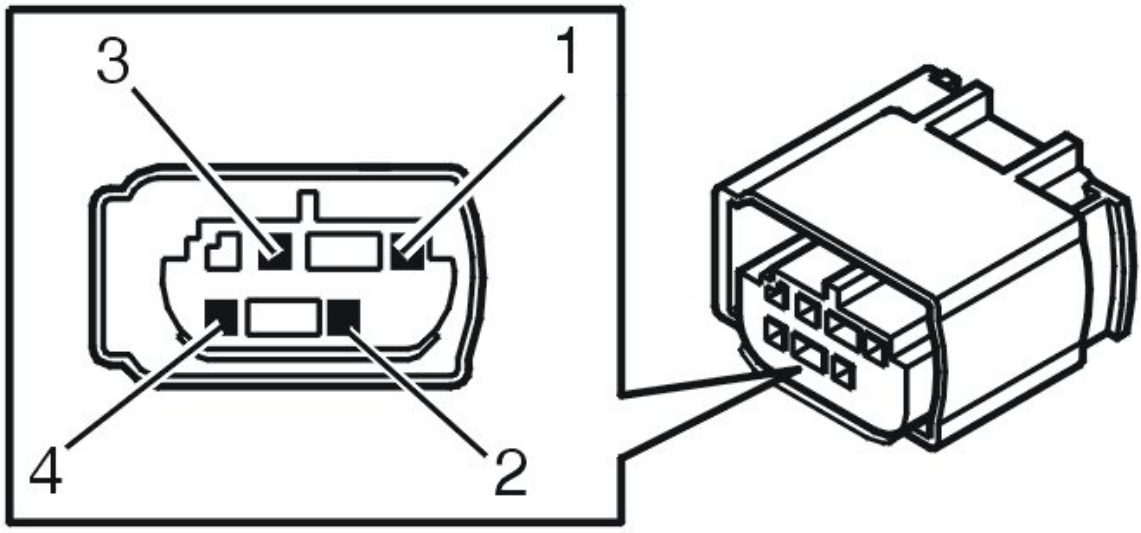
Signal too low

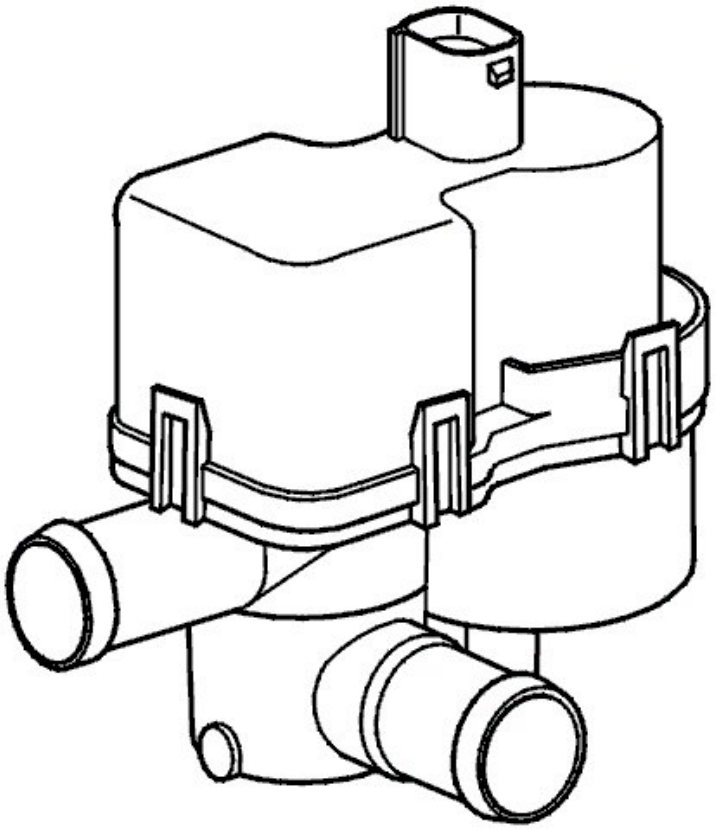
Checking the wiring

Check the signal cable. Check for a short-circuit to ground. Take readings between:
- Engine control module (ECM) #B34 (#C44) and leakage diagnostic unit #2.

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

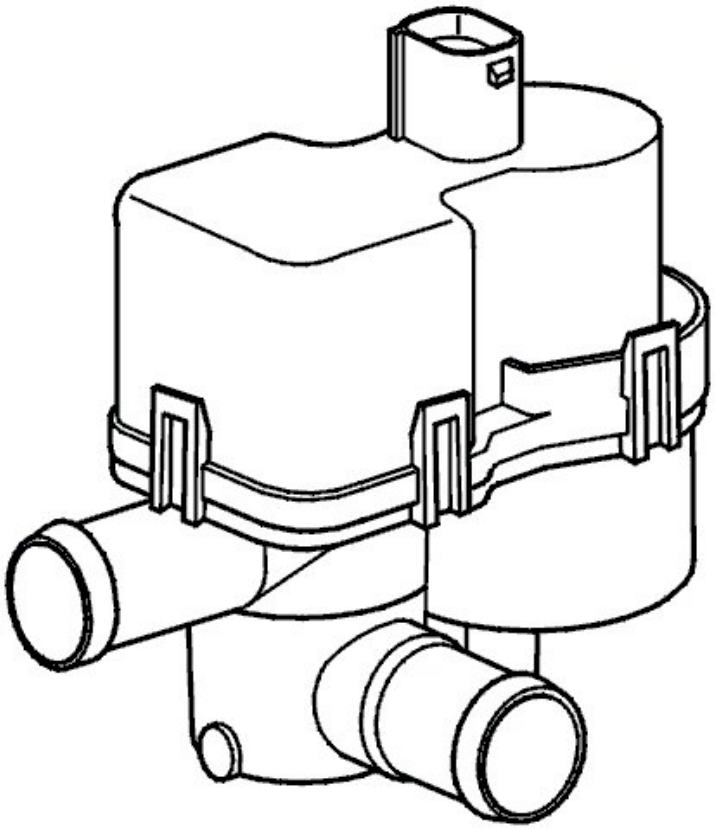
Attempt New Test - Checking the wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-432B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that there is no signal from the valve in the pump for the leak diagnostic when the valve is activated.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.

Substitute value
- The leak diagnostic is disabled.

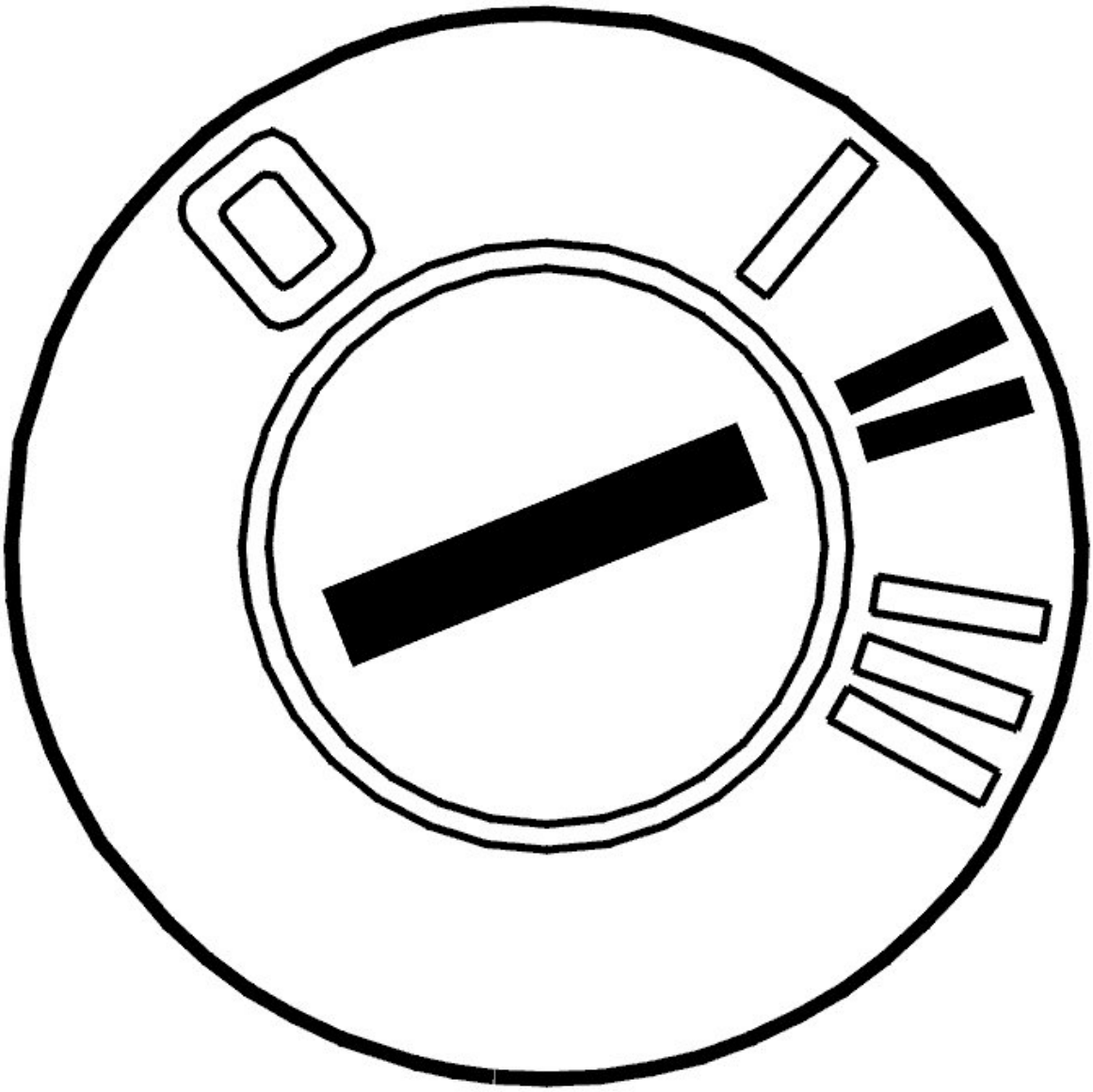
Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

Checking the status



- Ignition on.

Activate the valve in the leak diagnostic unit to check whether the fault is permanent or intermittent.
The valve clicks when it is activated.
The fault is permanent if the valve does not activate.
The fault is intermittent if the valve activates.

Continue - Checking components and wiring

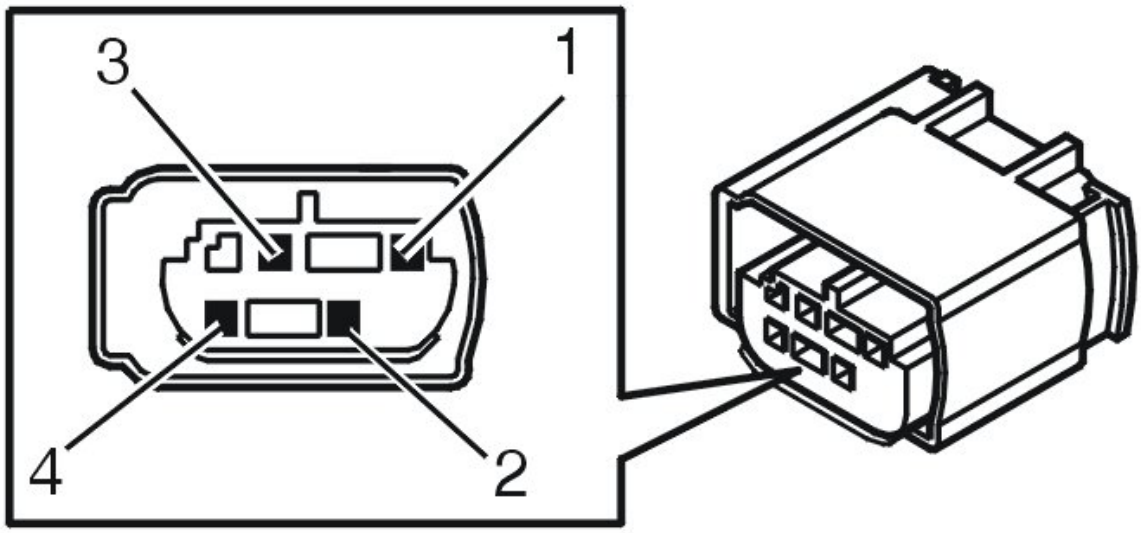
Checking components and wiring

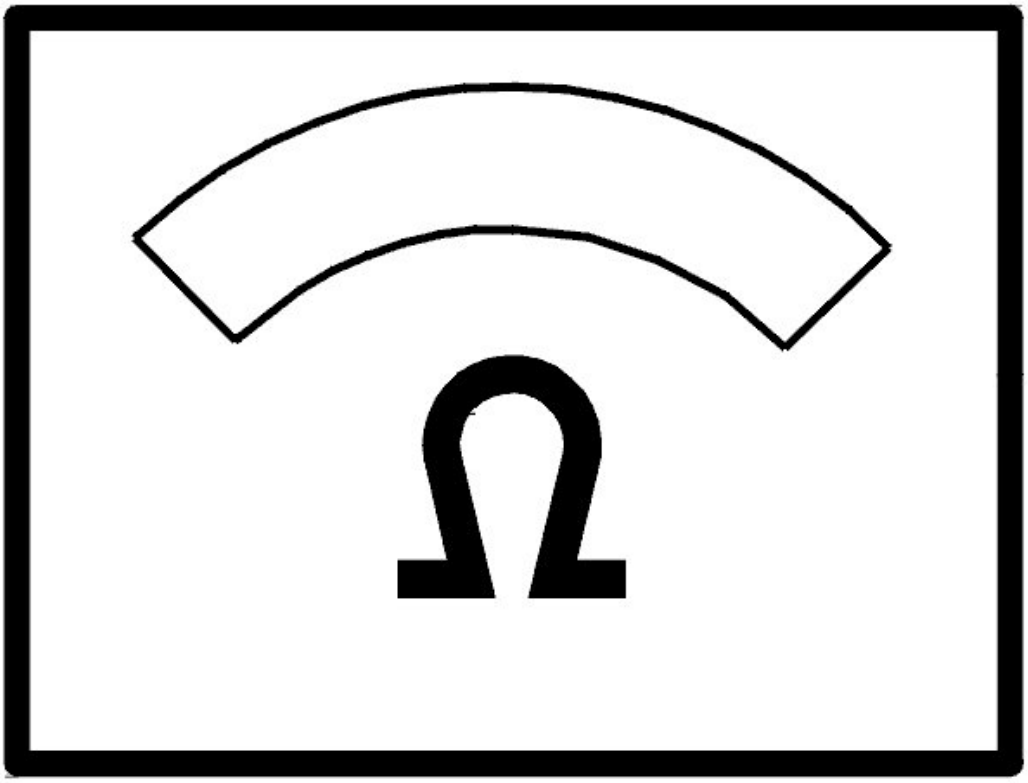
Check the fuse before the circuit.
Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the resistance of the valve between the leak diagnostic pump connector terminals #3 and #4 (leak diagnostic unit side).
Check the signal cable between control module terminal #B40 (#B50) and leak diagnostic unit terminal #3. Check for an open-circuit.
Check the power supply cable between system relay terminal #5 and leak diagnostic unit terminal #4. Check for an open-circuit.
Remedy as necessary.

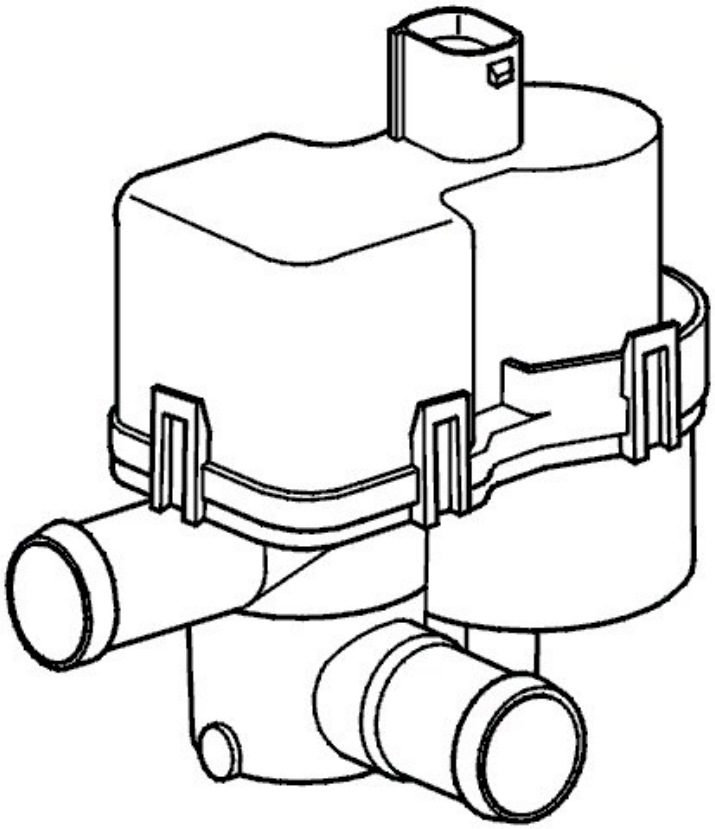
Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the leak diagnostic unit, see Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair
- For further information about the fuses and relays, see the Wiring Diagram.







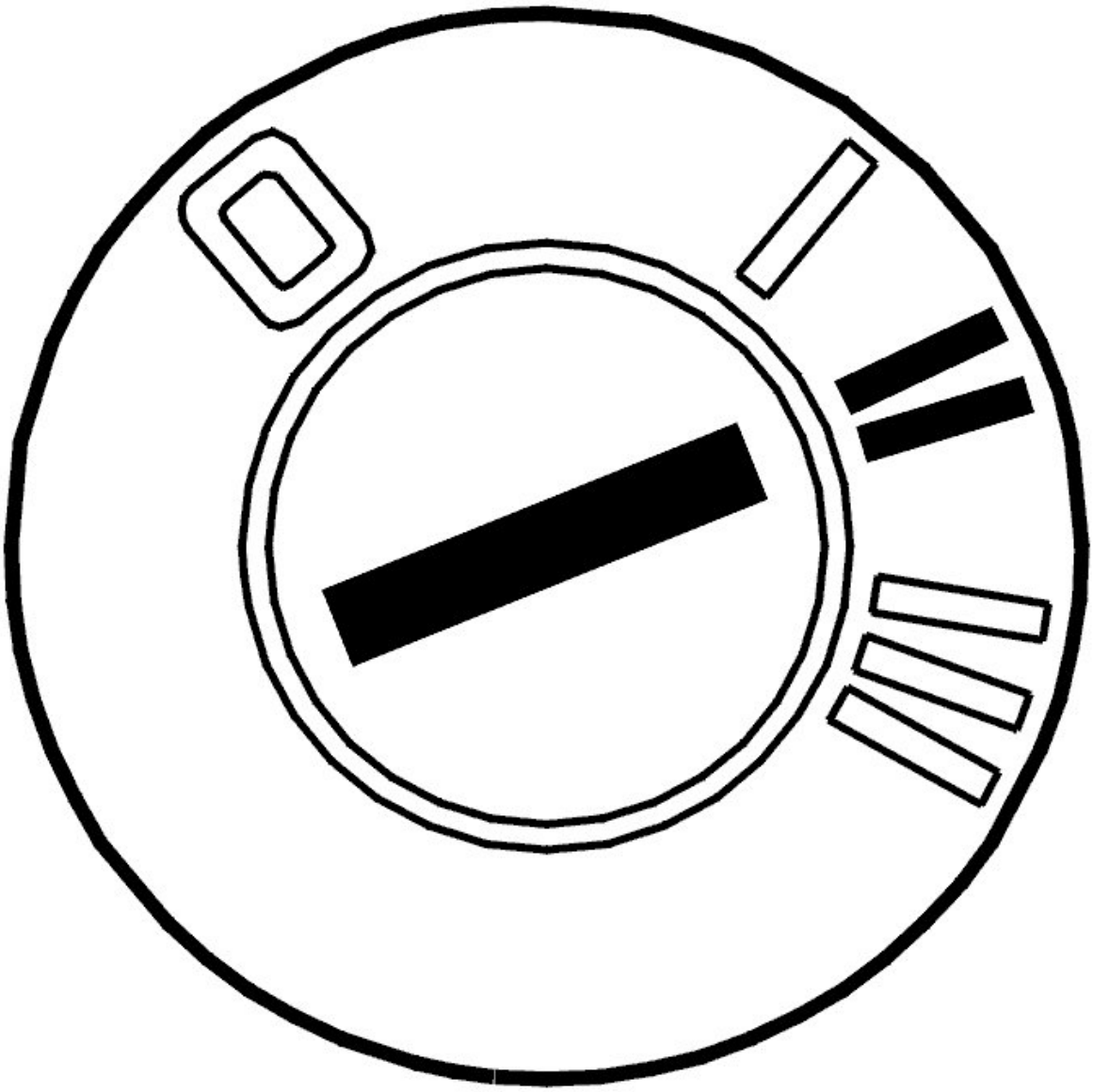
Continue - Verification

Verification

Verification

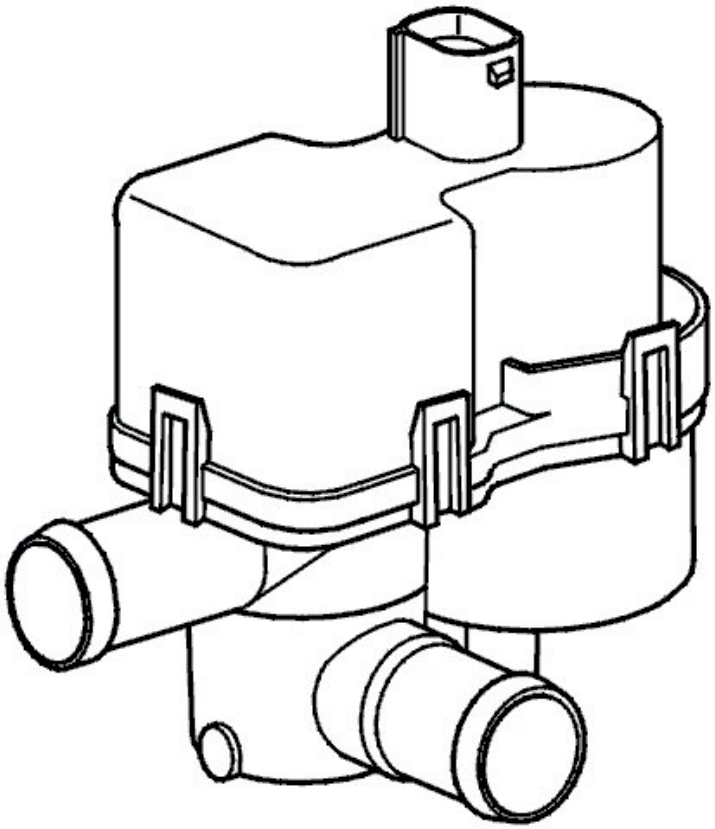
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Activate the valve in the leak diagnostic unit.

The valve should click.
Check that the function is OK.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

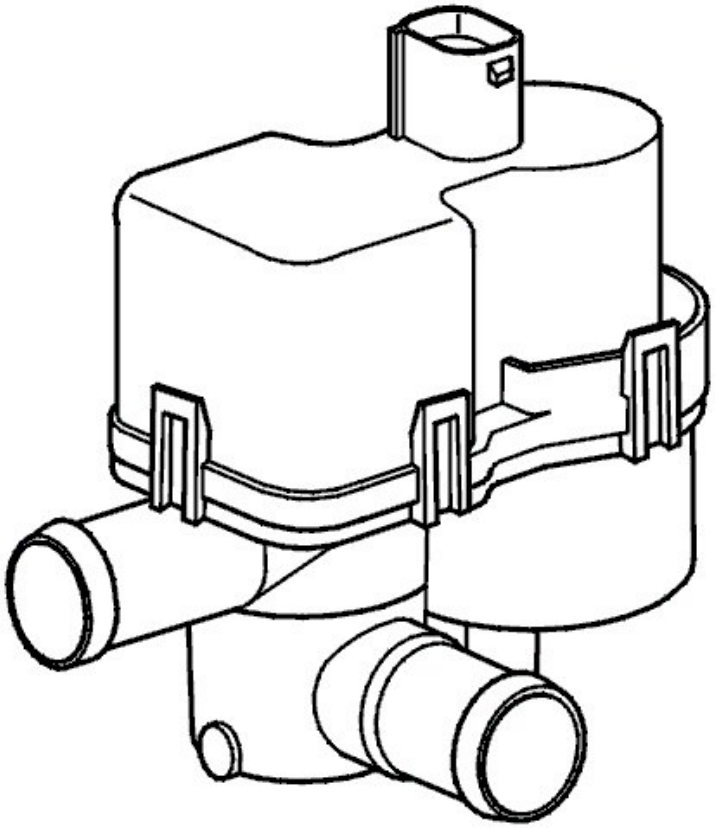
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-432C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the valve in the pump for the leak diagnostic is too high when the valve is activated.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.

Substitute value
- The leak diagnostic is disabled.

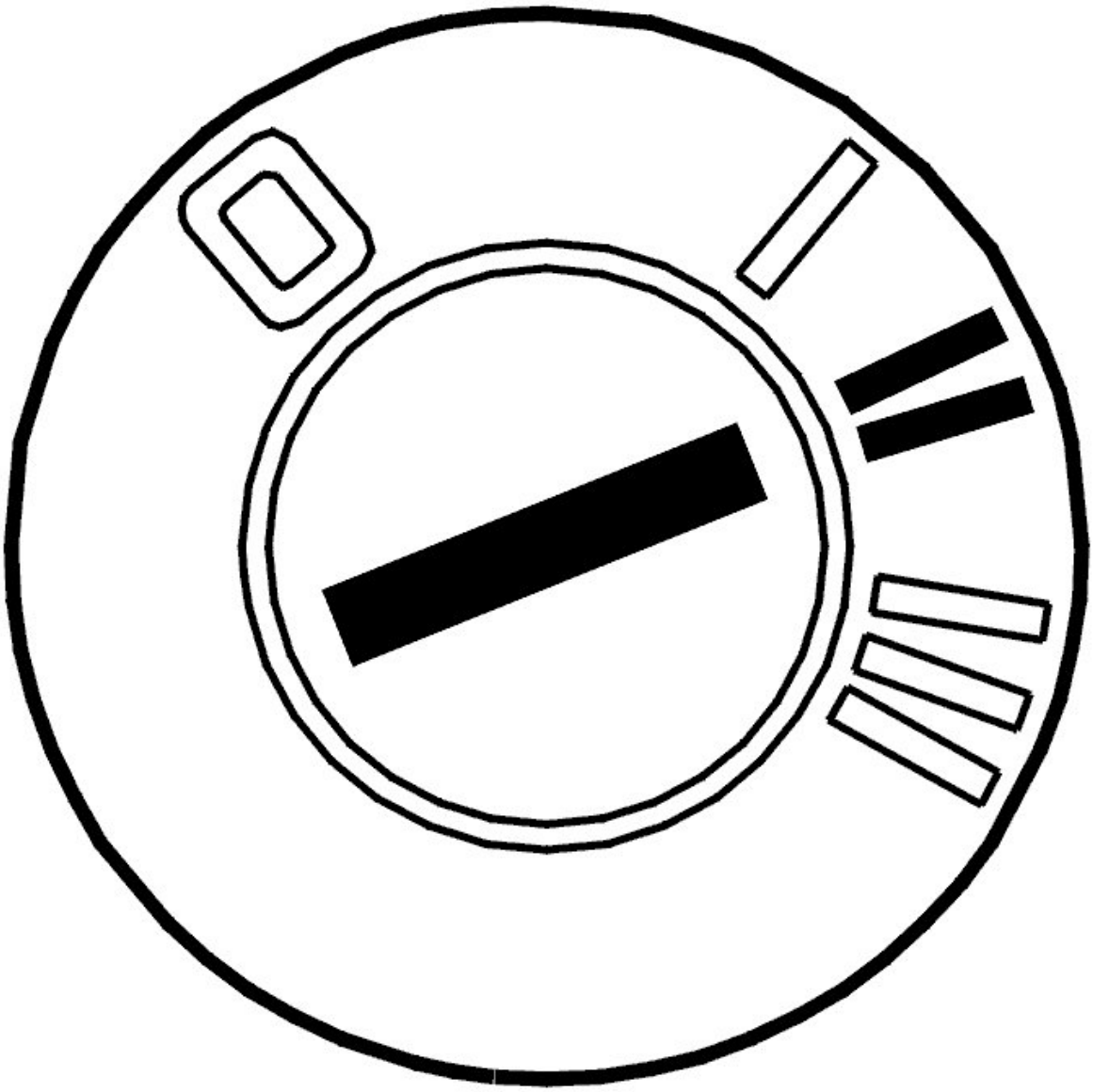
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the status



- Ignition on.

Activate the valve in the leak diagnostic unit to check whether the fault is permanent or intermittent.
The valve clicks when it is activated.
The fault is permanent if the valve does not activate.
The fault is intermittent if the valve activates.

Continue - Checking components and wiring

Checking components and wiring

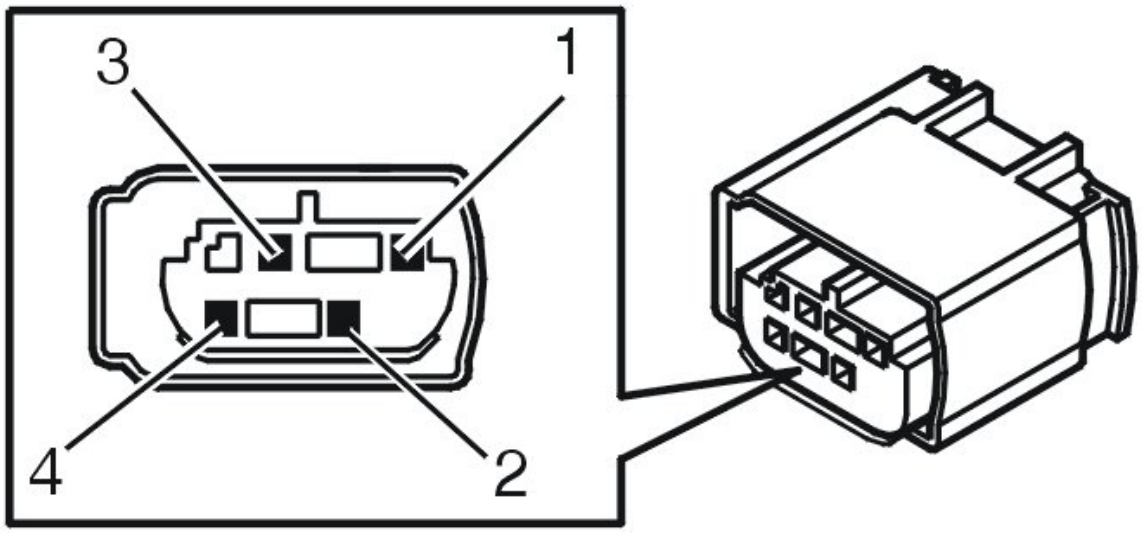
Check the resistance of the valve between the leak diagnostic unit connector terminals #3 and #4 (leak diagnostic pump side).
Check the signal cable between control module terminal #B40 (#B50) and leak diagnostic unit terminal #3. Check for a short-circuit to supply voltage.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.
Remedy as necessary.

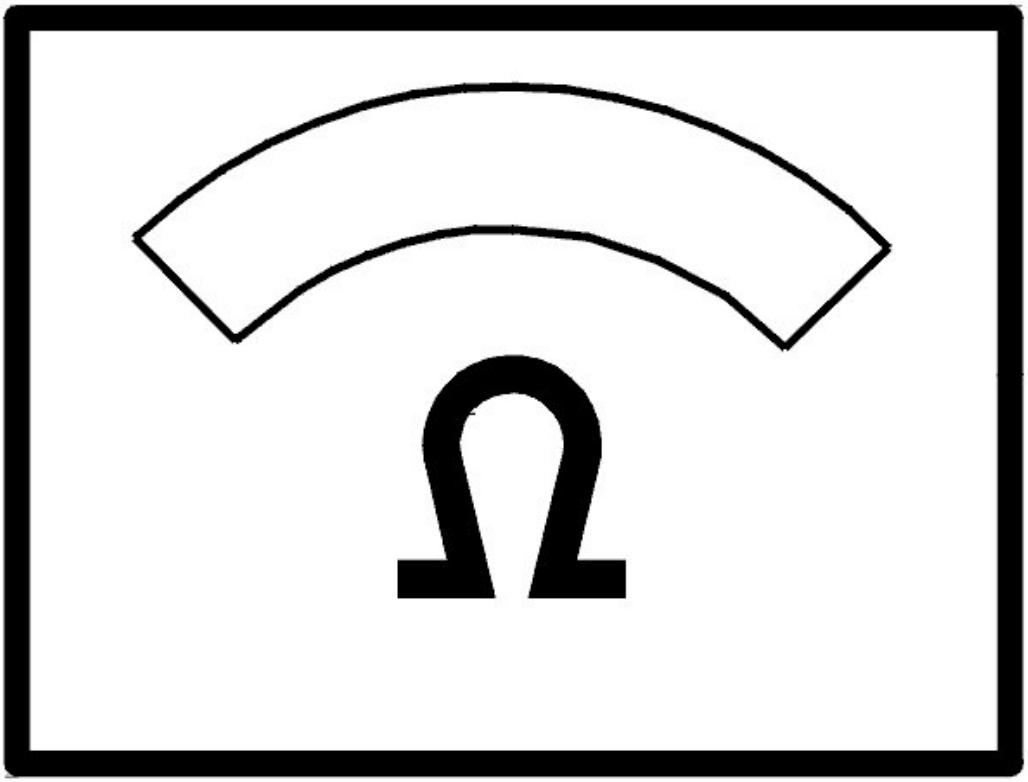
Other information:

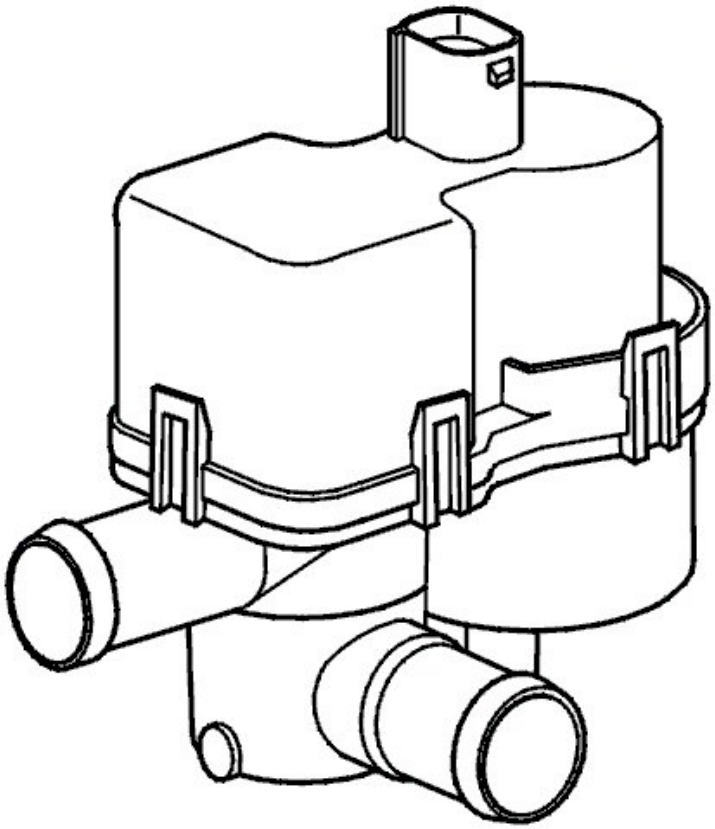
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic

Parameters/Connecting the Breakout Box

- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the leak diagnostic unit, see Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair.







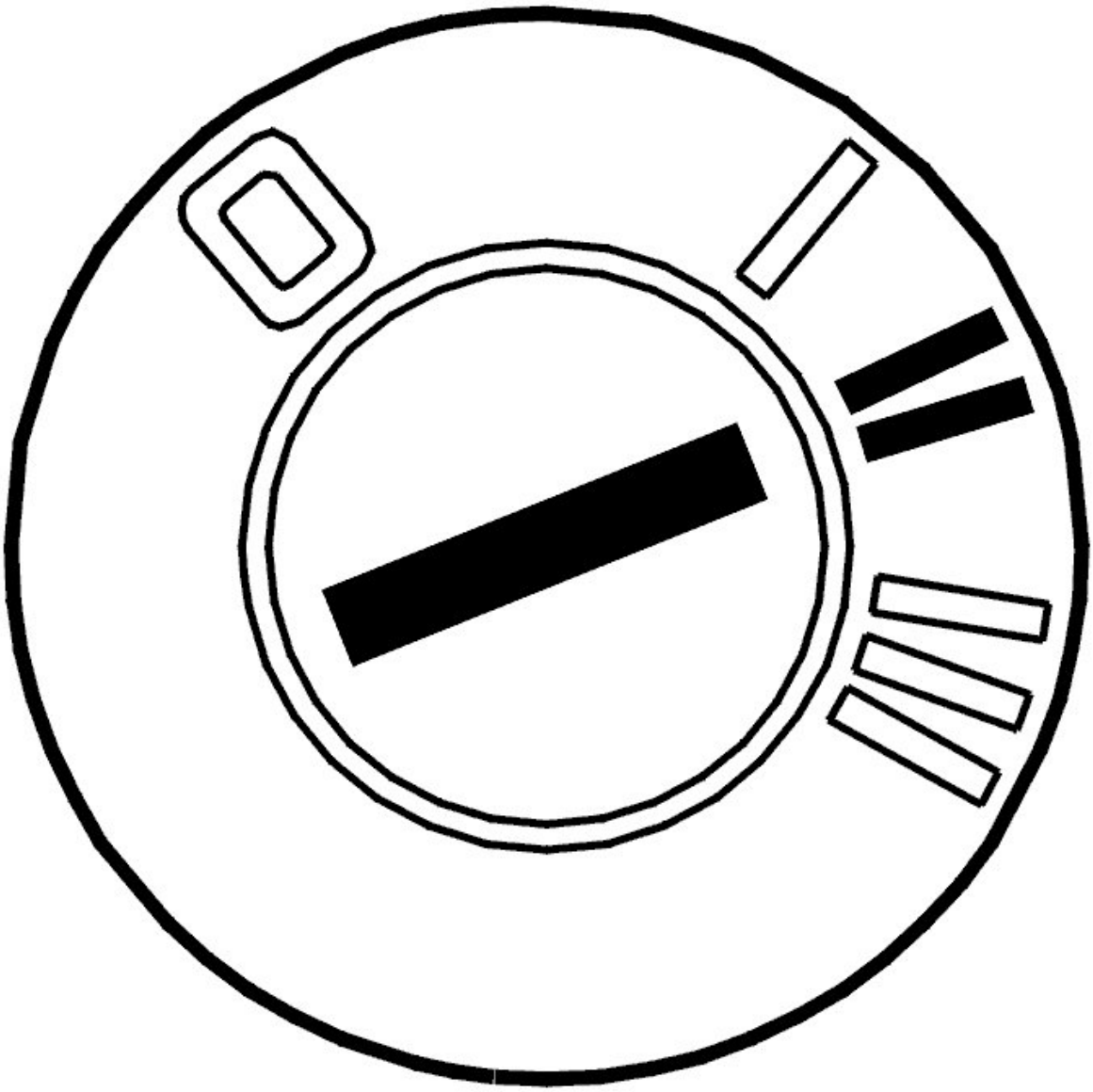
Continue - Verification

Verification

Verification

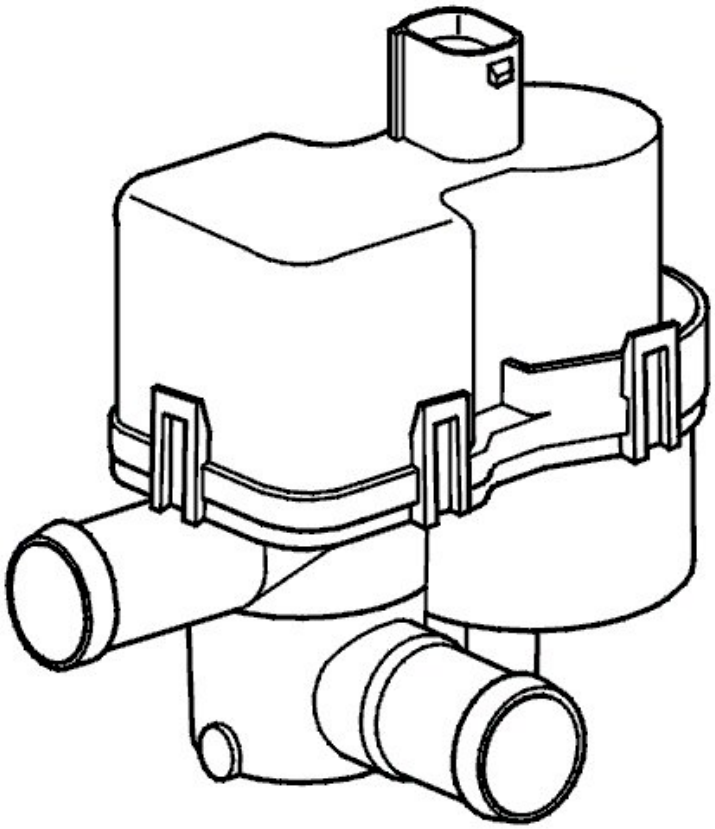
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Activate the valve in the leak diagnostic unit.

The valve should click.
Check that the function is OK.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

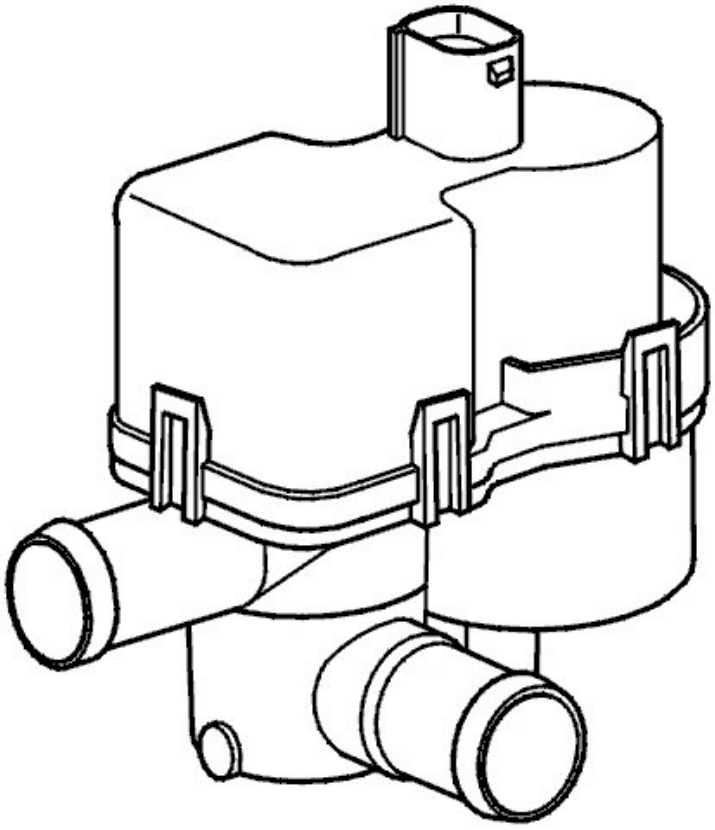
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-432D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the valve in the pump for the leak diagnostic is too low when the valve is activated.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.

Substitute value
- The leak diagnostic is disabled.

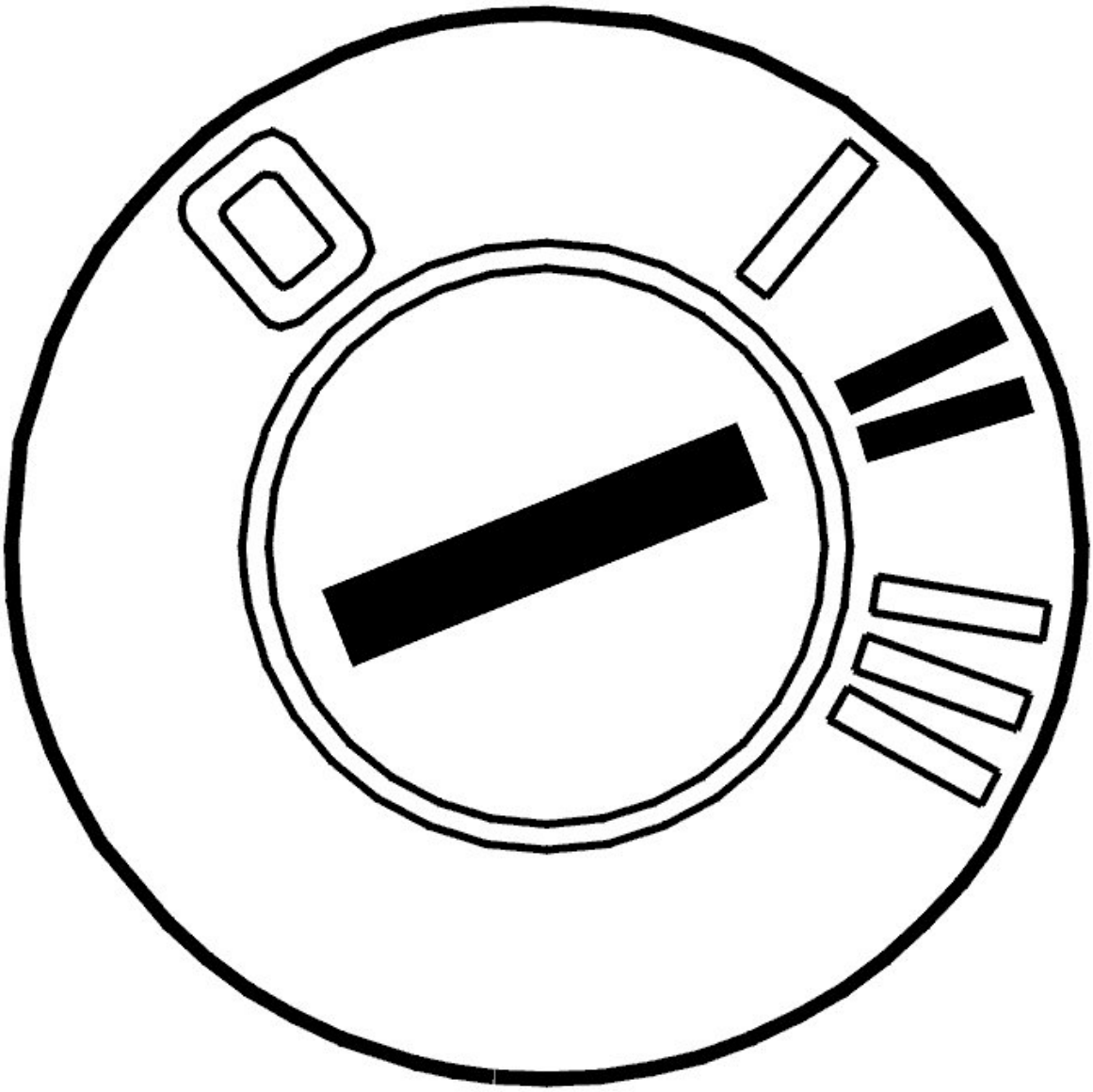
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

Signal too low

Checking the status



- Ignition on.

Activate the valve in the leak diagnostic unit to check whether the fault is permanent or intermittent.
The valve clicks when it is activated.
The fault is permanent if the valve does not activate.
The fault is intermittent if the valve activates.

Continue - Checking components and wiring

Checking components and wiring

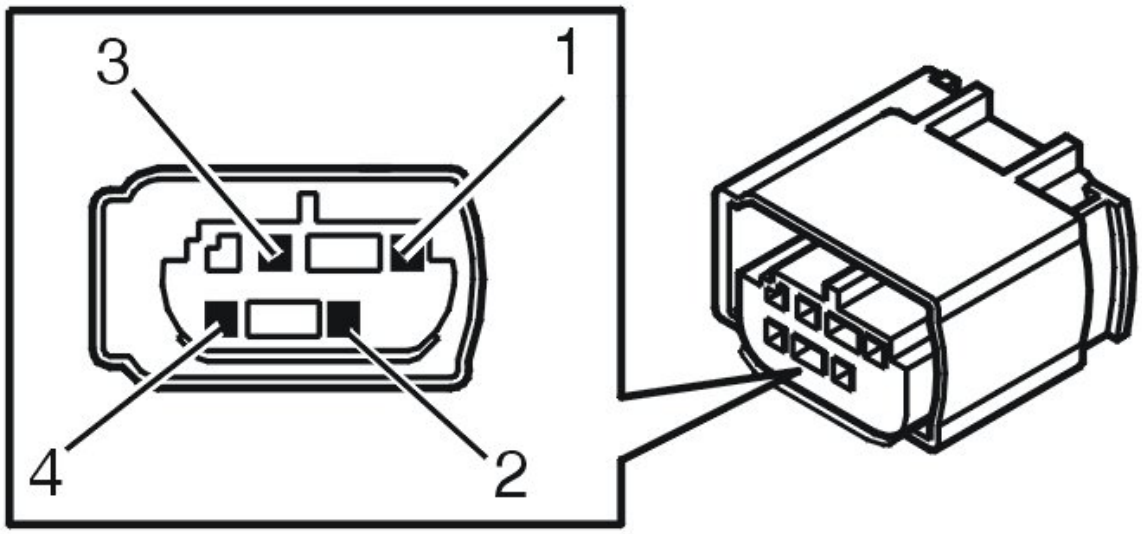
Check the resistance of the valve between the leak diagnostic unit connector terminals #3 and #4 (leak diagnostic pump side).
Check the signal cable between engine control module (ECM) terminal #B40 (#B50) and leak diagnostic unit terminal #3. Check for a short-circuit to supply voltage.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.
Remedy as necessary.

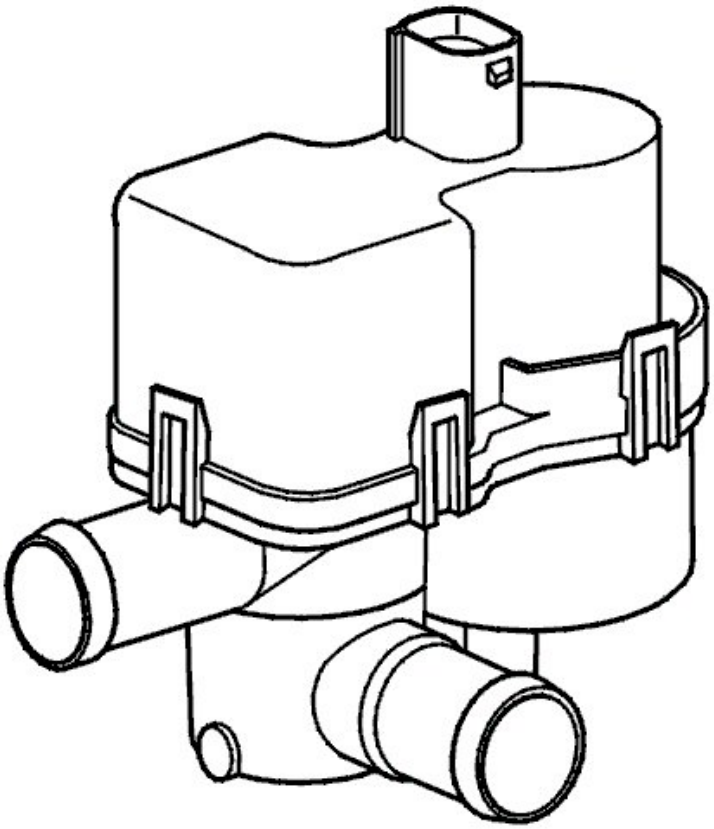
Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description /

Specification

- For resistance values: Component specifications See: Engine Control Module/Specifications
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





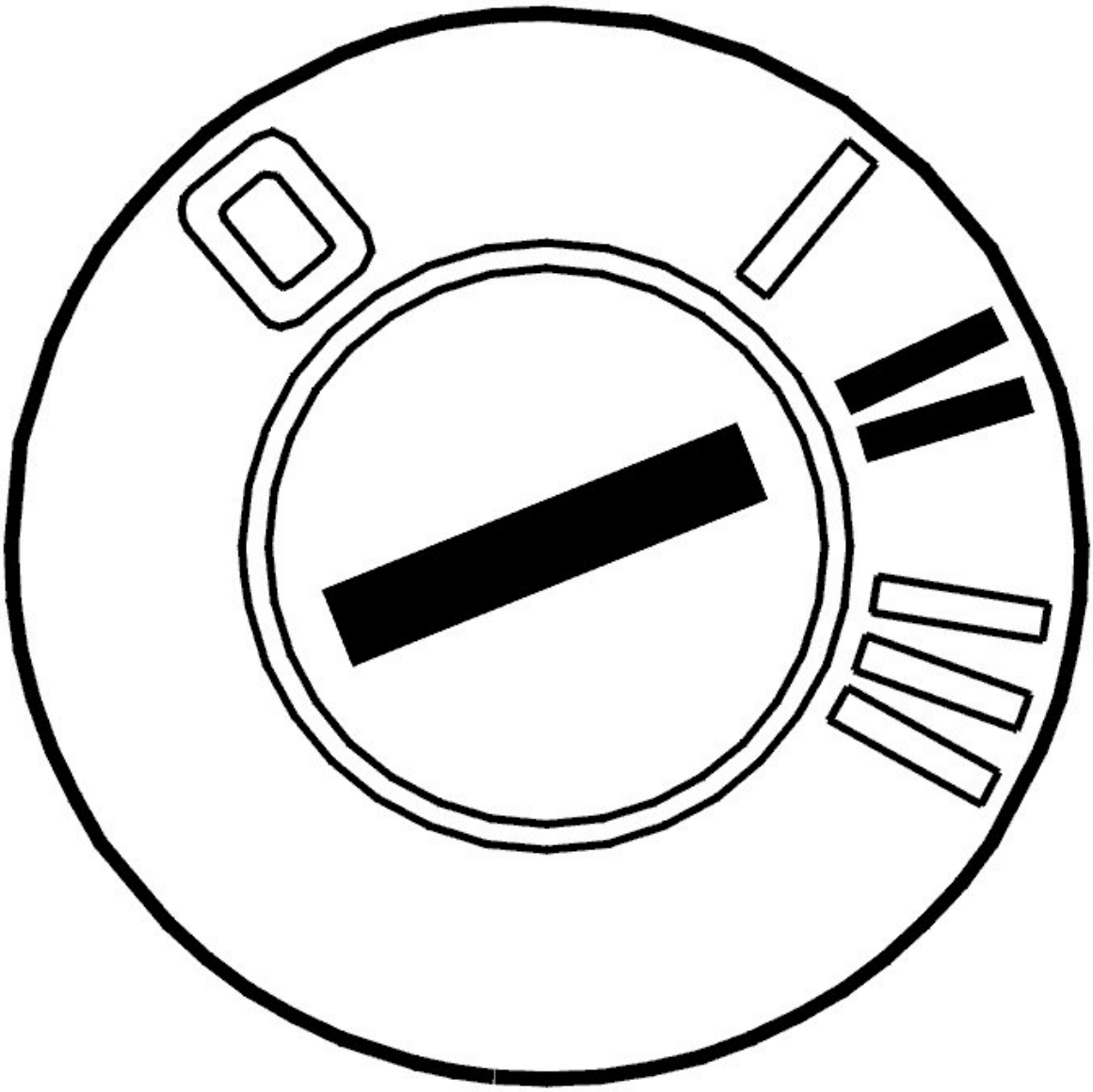
Continue - Verification

Verification

Verification

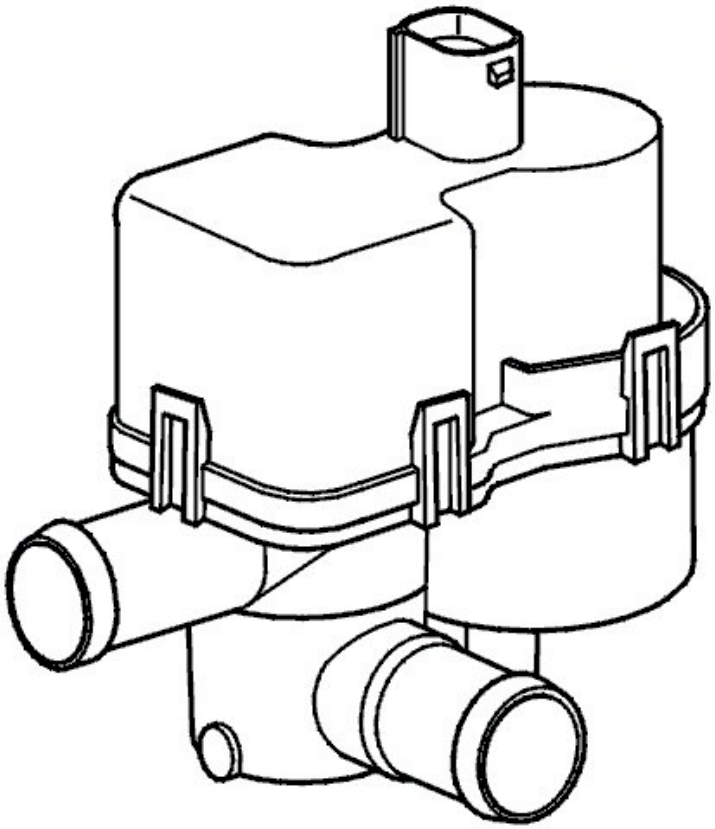
Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Activate the valve in the leak diagnostic unit.

The valve should click.
Check that the function is OK.



Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

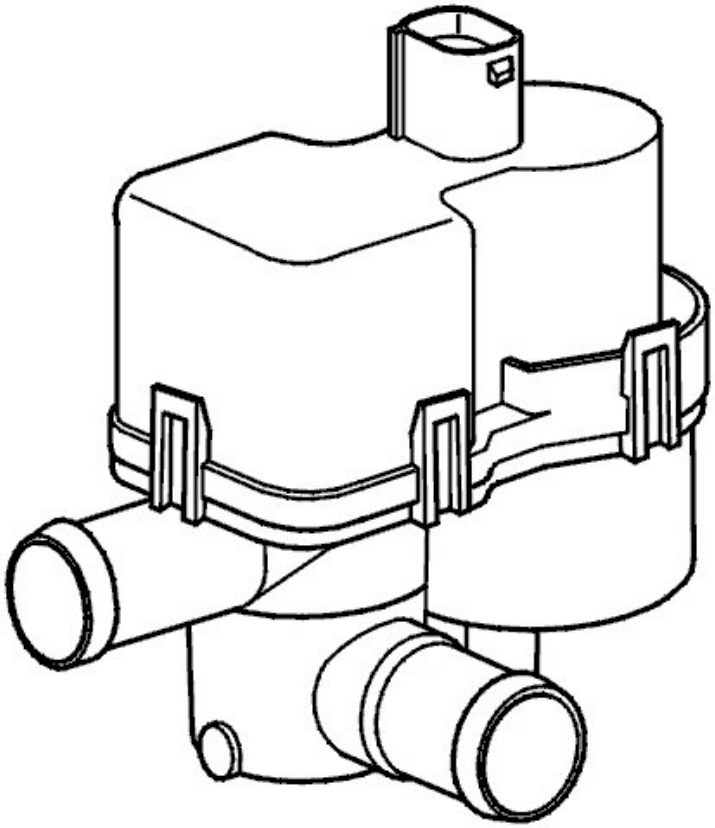
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-433B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that there is no signal from the leak diagnostic pump.
The diagnostic trouble code (DTC) can be diagnosed when leak diagnostics is run.

Substitute value
- The leak diagnostic is disabled.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged pump.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

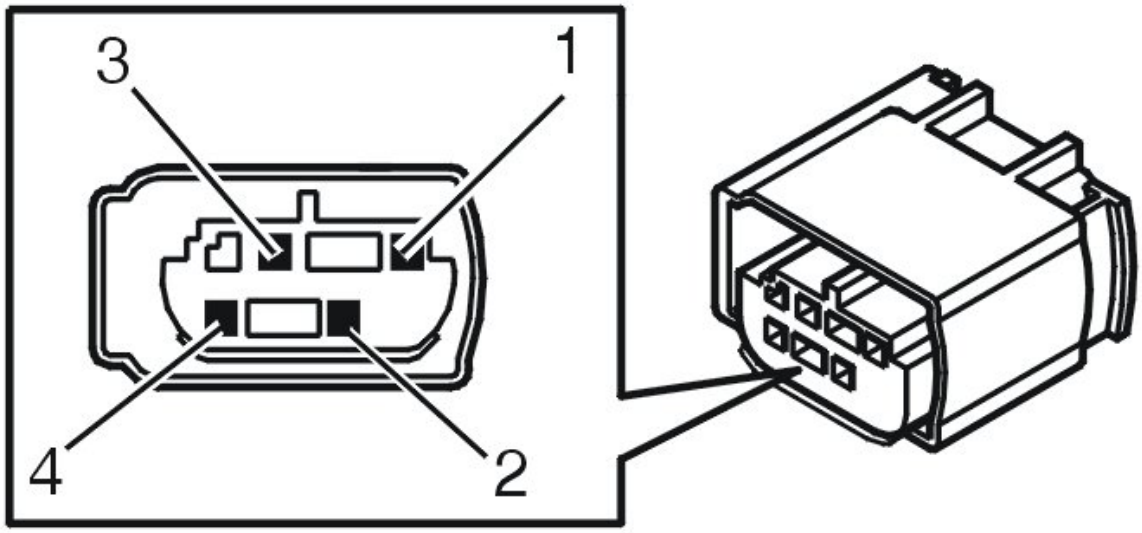
Signal missing

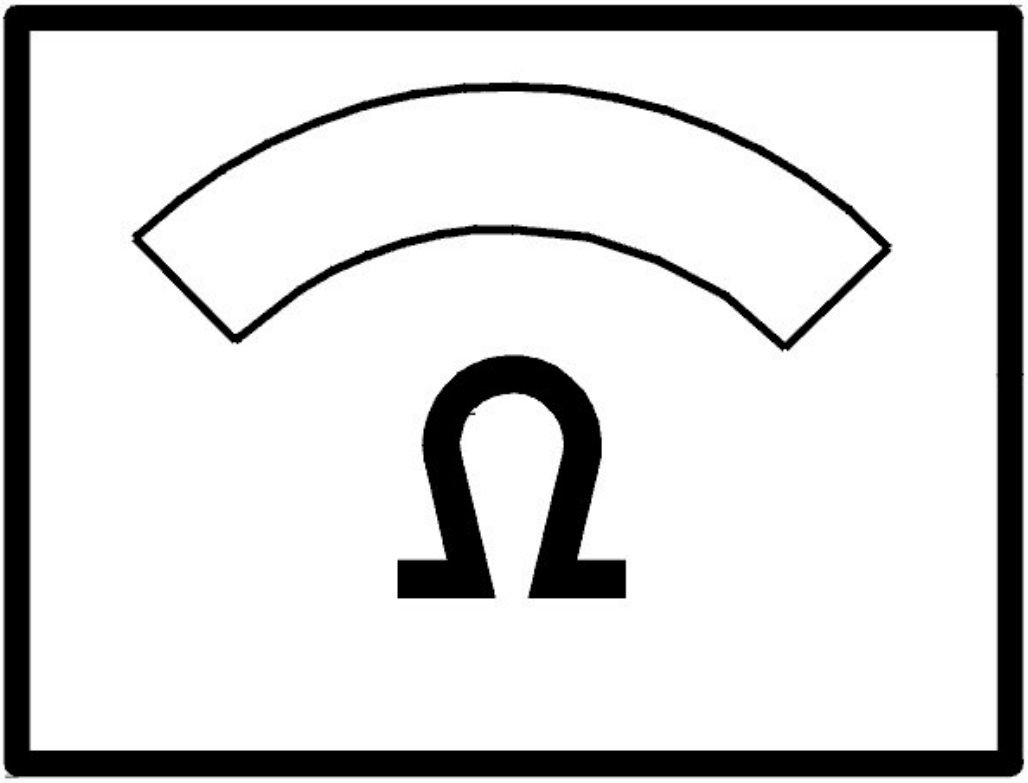
Checking components and wiring

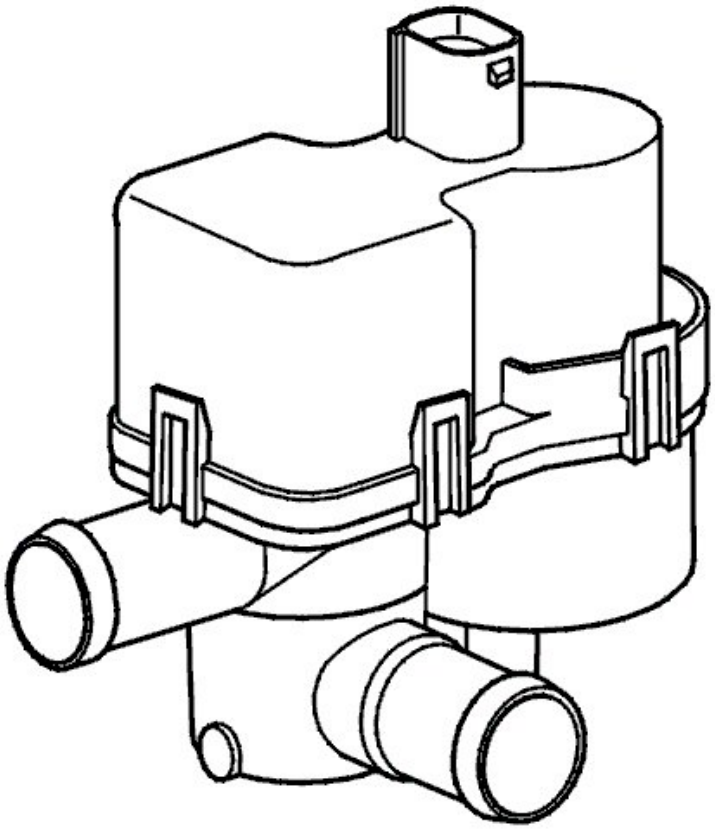
Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the resistance of the pump motor between the leak diagnostic unit connector terminals #1 and #4 (leak diagnostic pump side).
Check the signal cable between engine control module (ECM) terminal #B7 (#B17) and leak diagnostic pump terminal #1. Check for an open-circuit.
Check the power supply cable between system relay terminal #5 and leak diagnostic unit terminal #4. Check for an open-circuit.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box

- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the leak diagnostic unit, see Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

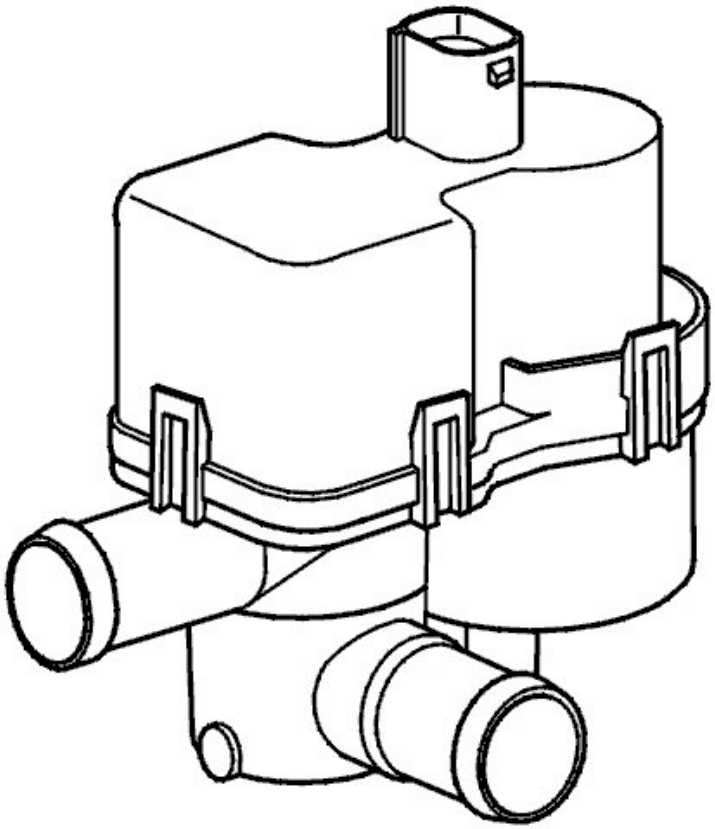
Attempt New Test - Checking components and wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-433C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the pump for the leak diagnostic unit is too high.
The diagnostic trouble code (DTC) can be diagnosed when leak diagnostics is run.

Substitute value
- The leak diagnostic is disabled.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged pump.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

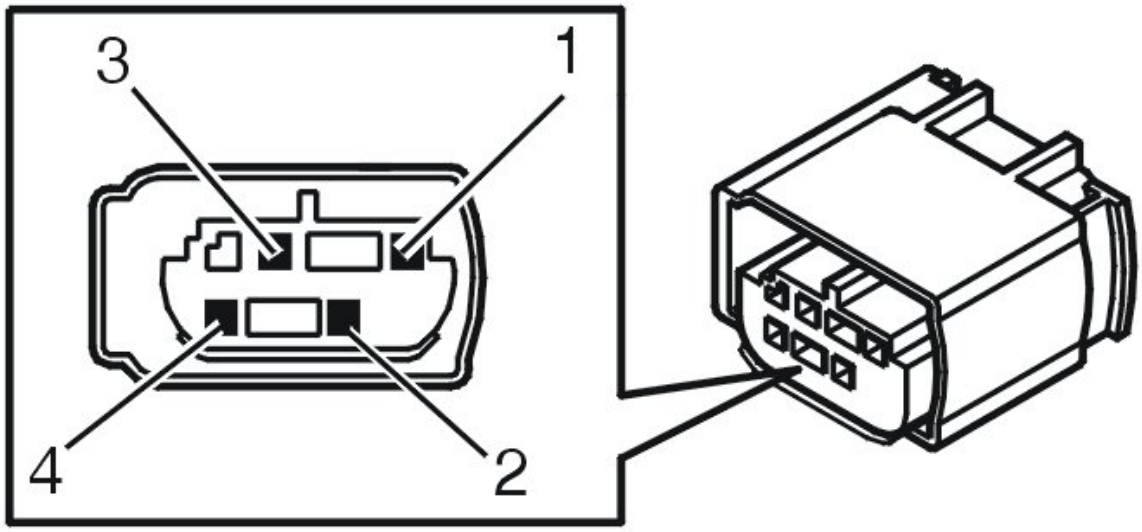
Signal Too High

Signal too high

Checking components and wiring

Check the resistance of the pump motor between the leak diagnostic unit connector terminals #1 and #4 (leak diagnostic pump side).
Check the signal cable between engine control module (ECM) terminal #B7 (#B17) and leak diagnostic unit terminal #1. Check for a short-circuit to supply voltage.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the leak diagnostic unit, see Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair.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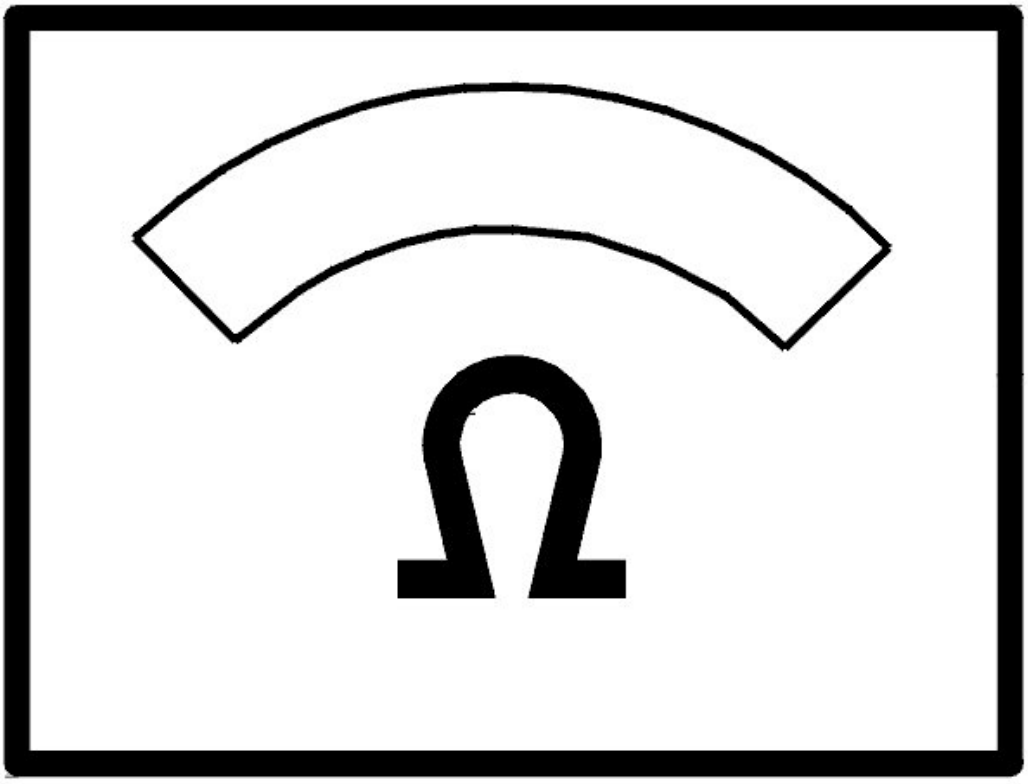
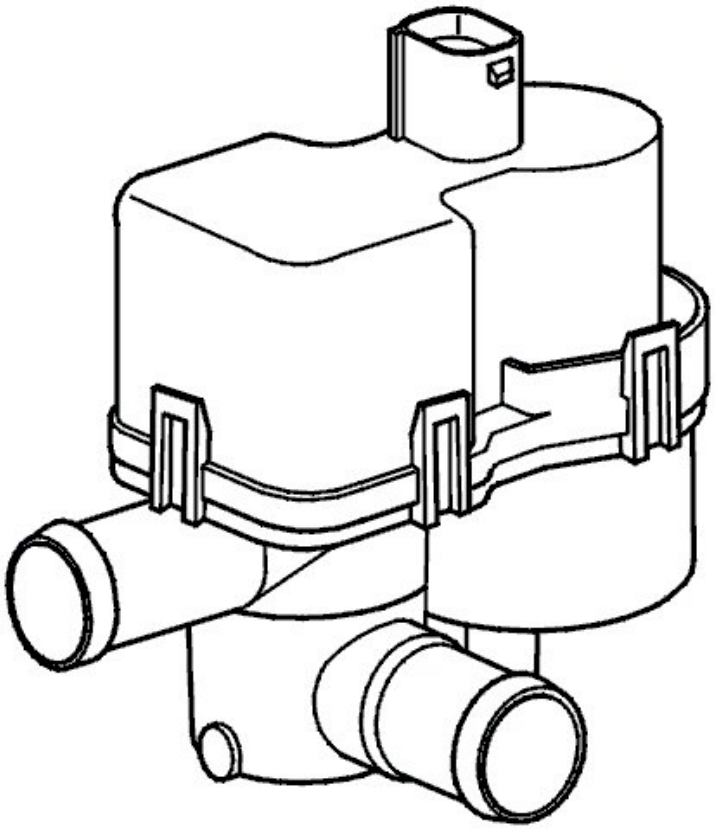




Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

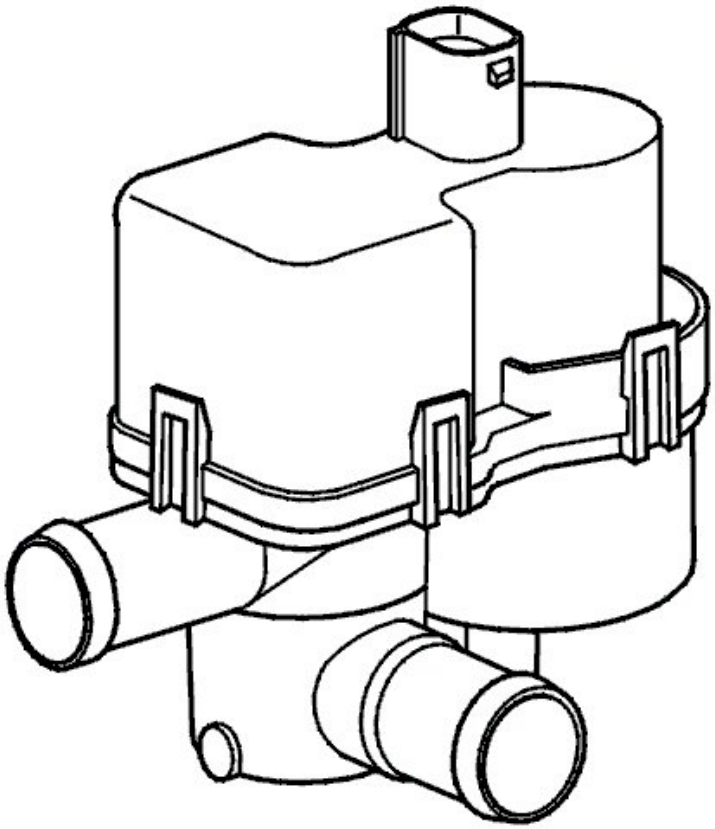
Attempt New Test - Checking components and wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-433D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the pump for the leak diagnostic unit is too low.
The diagnostic trouble code (DTC) can be diagnosed when leak diagnostics is run.

Substitute value
- The leak diagnostic is disabled.

Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

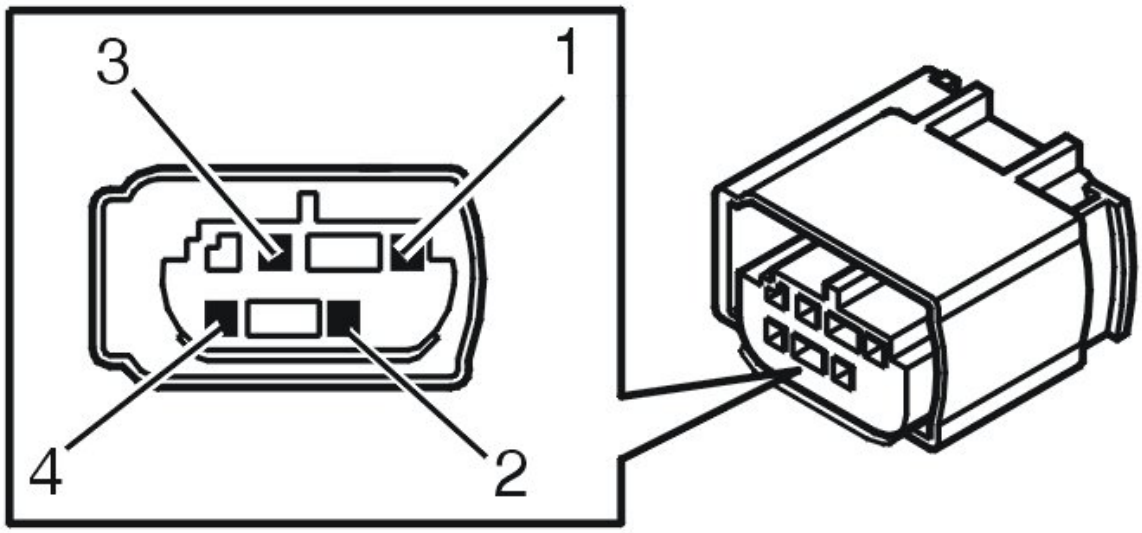
Signal Too Low

Signal too low

Checking the wiring

Check the signal cable between engine control module (ECM) terminal #B7 (#B17) and leak diagnostic unit terminal #1. Check for a short-circuit to ground.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.
Remedy as necessary.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the leak diagnostic unit, see Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair.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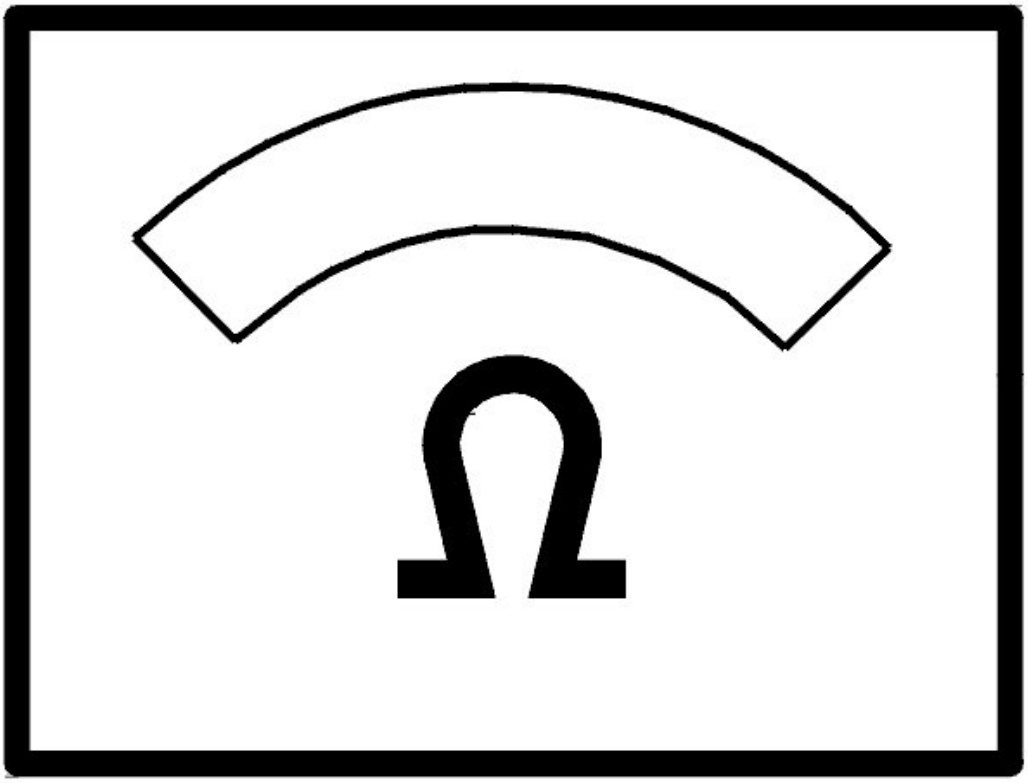
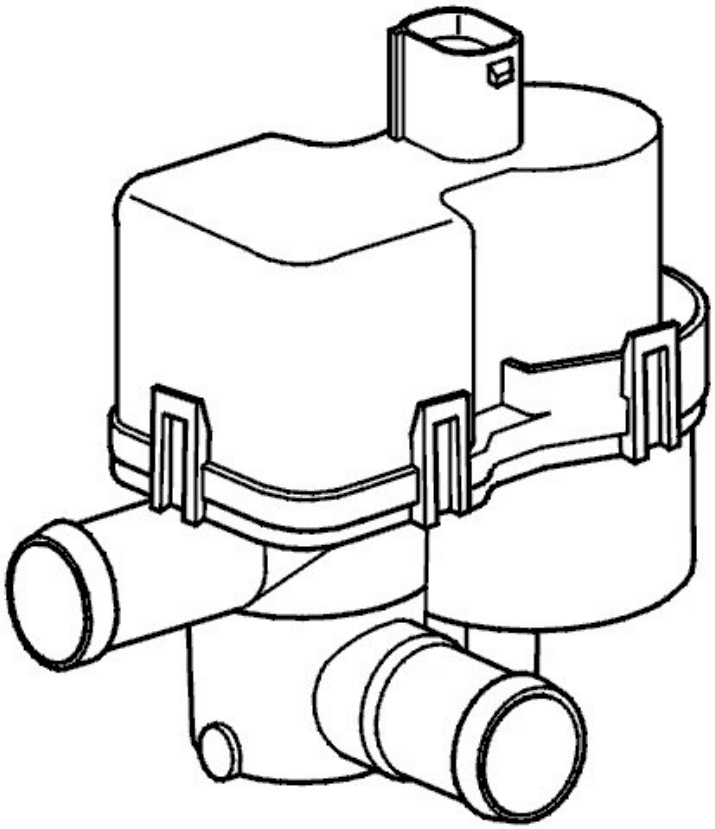




Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

Fault-tracing is not followed by verification for this fault.

Hint: After the diagnostic trouble codes (DTCs) are erased, the function of the leak diagnostic unit can be checked by running a quick test of the fuel tank system in the vehicle communication socket. If there is a fault, the fault status will be "FAULT FOUND" on the leak diagnostic unit.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

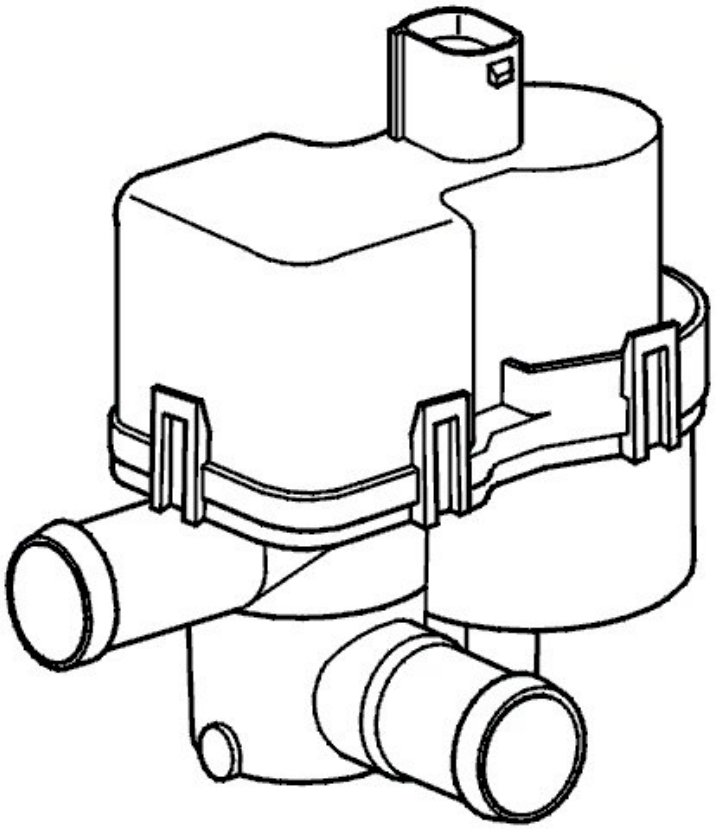
Attempt New Test - Checking the wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-434C

Condition



If no fault has been detected in the leak diagnostic unit, the engine control module (ECM) carries out a leak diagnostic of the fuel tank system. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a leak which is 0.5-1.0 mm.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

None.

Possible source

- A leak that is 0.5-1.0 mm or smaller in the fuel tank, fuel filler pipe, fuel tank filler cap, EVAP canister, evaporative emission system (EVAP) valve, or in the hoses between these components.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

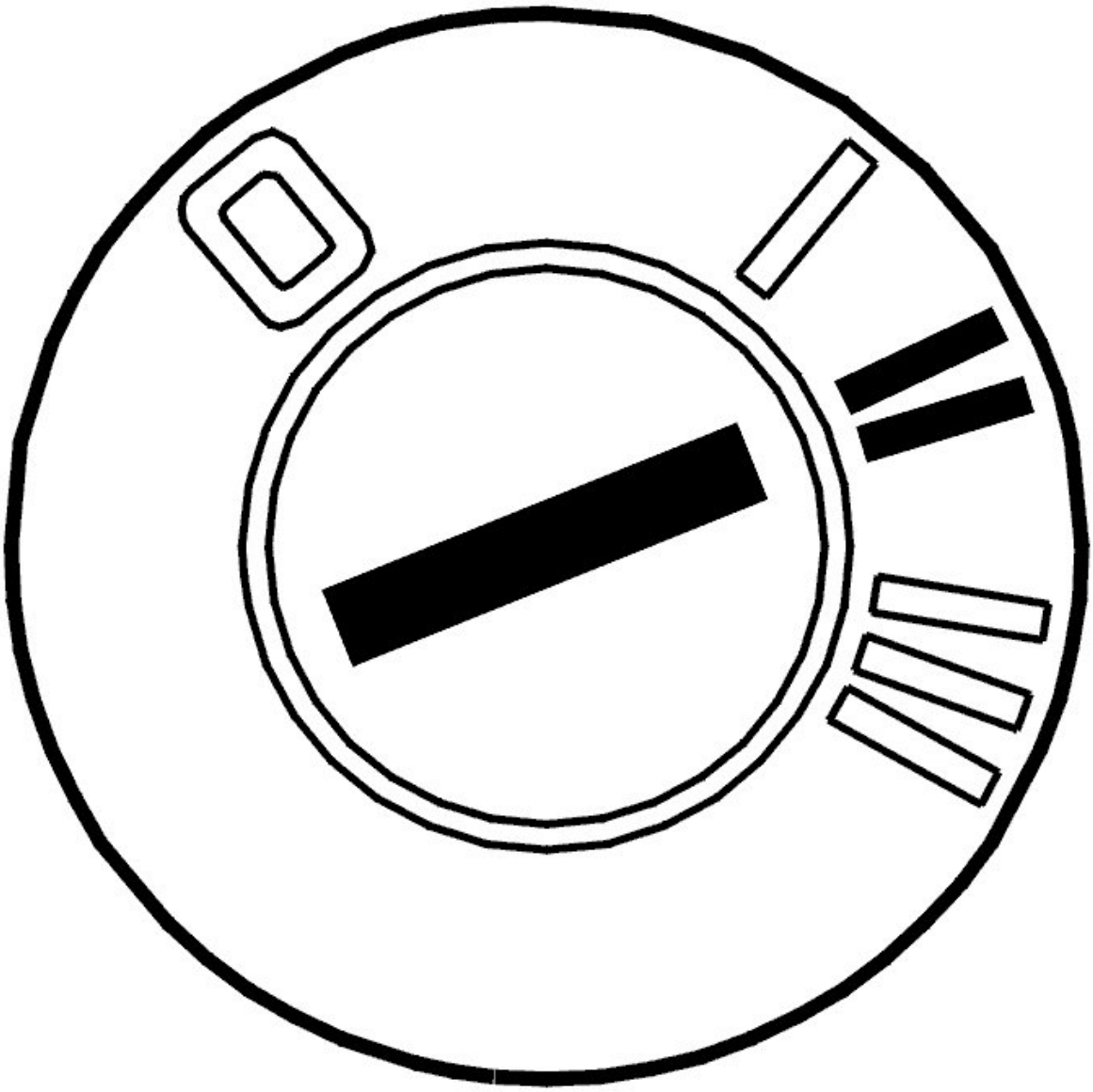
Leakage

Leakage

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

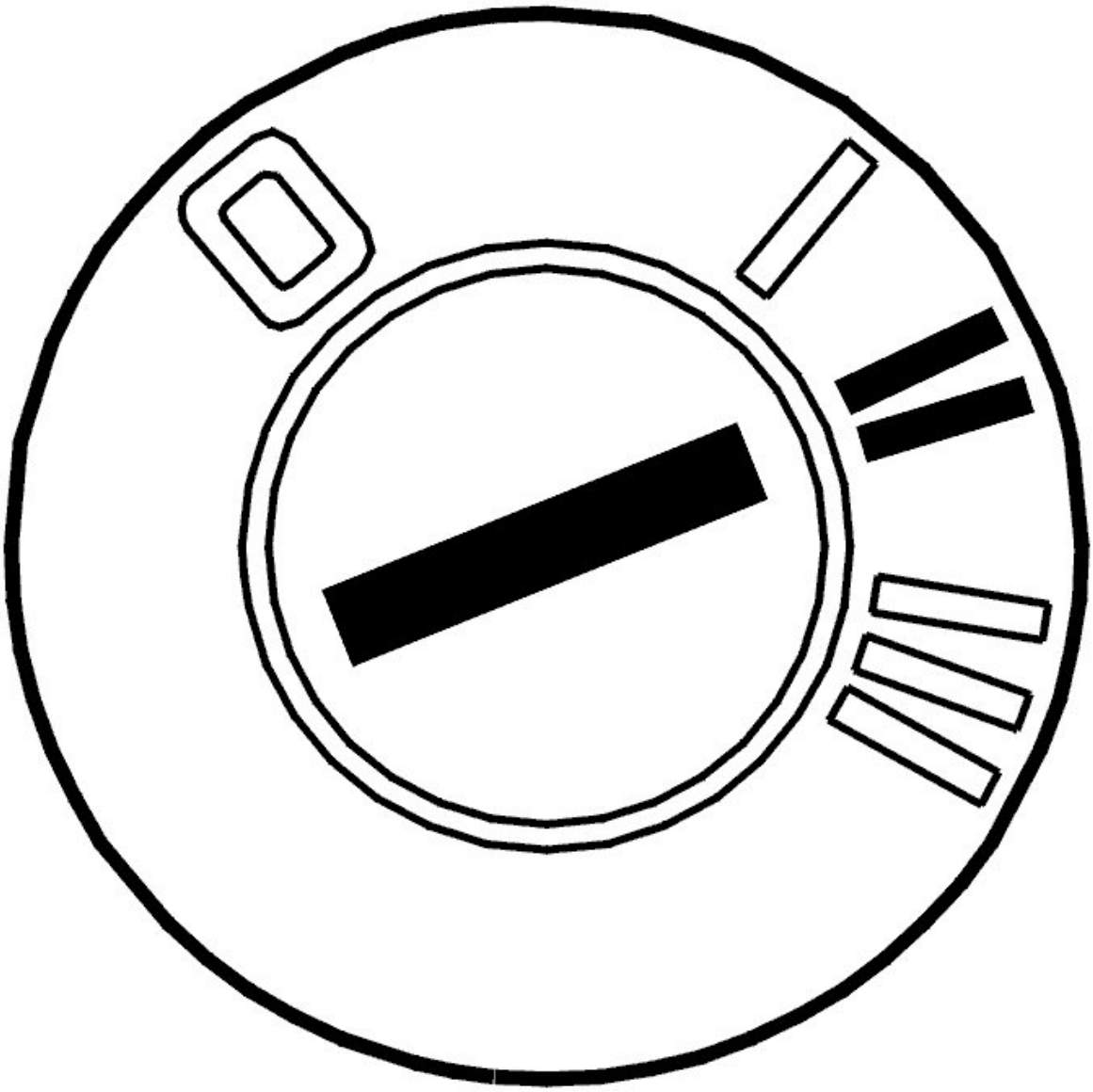
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - **ANOTHER TEST**

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

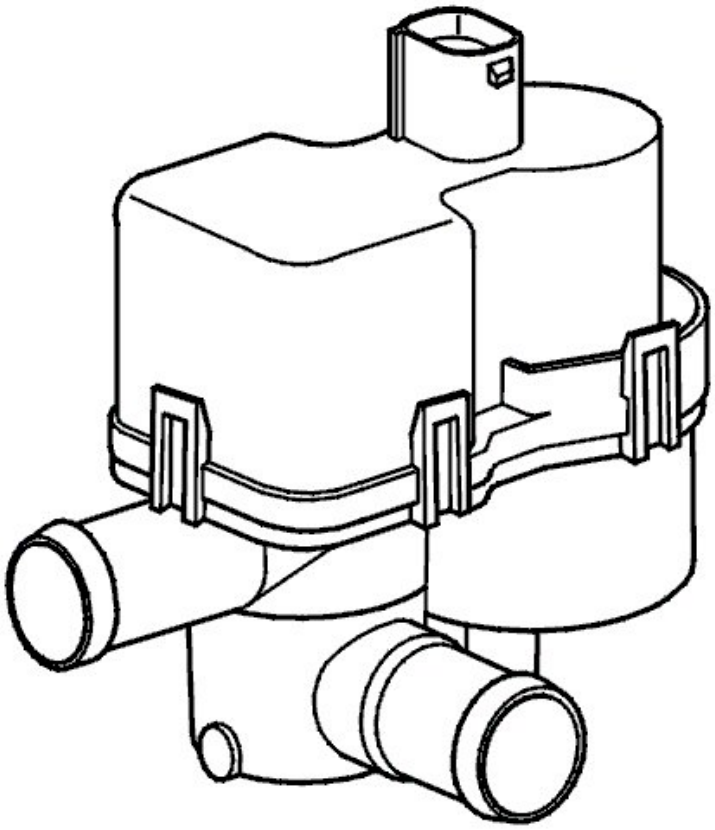
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Location of components, engine compartment, B5244T5, B5254T2 See: Locations
- Fuel tank system, check See: Fuel Delivery and Air Induction/Fuel Tank/Testing and Inspection/Fuel Tank System, Check
- Test pressurizing the tank system See: Fuel Delivery and Air Induction/Fuel Tank/Testing and Inspection/Test Pressurizing the Tank System

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Minor leakage found"
4. Tank system, test result = "Major leakage found"
5. DMTL, test result and Tank system, test result = "Unknown"
6. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Minor leakage found"

4 - test result = "Major leakage found"

5 - test result and Tank system, test result = "Unknown"

6 - **No Fault Found**

DMTL, test result = "Problem found"

If a problem is detected on the leakage diagnostics unit (DMTL), this may have been caused during the test itself. Checks on DMTL are normal electric checks of leakage diagnostics unit and cabling and is no indication of if there is leakage or not.

- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Note! The tank system's status is unknown since the test was interrupted.

Continue - **ANOTHER TEST**

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
If no leakage was found, the Engine control module (ECM) has detected leakage in the tank system earlier, but the problem is not active at this time. The fault could be caused by leakage in the tank, filler pipe, fuel tank filler cap, canister, EVAP valve, leakage diagnosis unit or hoses between these components.

Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - **Fault Found**

Tank system, test result = "Minor leakage found"

Diagnostic trouble code limit: Estimated leakage = 0.40 mm

- Check that the tank cap is properly fitted and that its seal is undamaged.
- Check the hoses and connections on the leak diagnostic unit, the canister,EVAP-valve and the fuel filler pipe visually. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Note! By blocking the hose between canister and EVAP-valve and then repeating quick-test tank system, leakage through the EVAP-valve can be detected. If leakage was detected in a previous quick test of the fuel tank system but is not now detected when the hose between the canister and the EVAP valve is blocked, the leakage may be through the EVAP valve.

- Disconnect the hose between the EVAP canister purge valve and the EVAP canister from the connection to the EVAP canister purge valve.
- Block the hose while running the quick test of the fuel tank system.

Continue - Perform quick-test tank system

DMTL, test result and Tank system, test result = "Unknown"

Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.

- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Tank system, test result = "Major leakage found"

Diagnostic trouble code limit: Tank pressure lower than 1500 Pa after 450 seconds in test phase "Major leakage".

- Check that the tank cap is properly fitted and that its seal is undamaged.

- Check the hoses and connections on the leak diagnostic unit, the canister,EVAP-valve and the fuel filler pipe visually. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

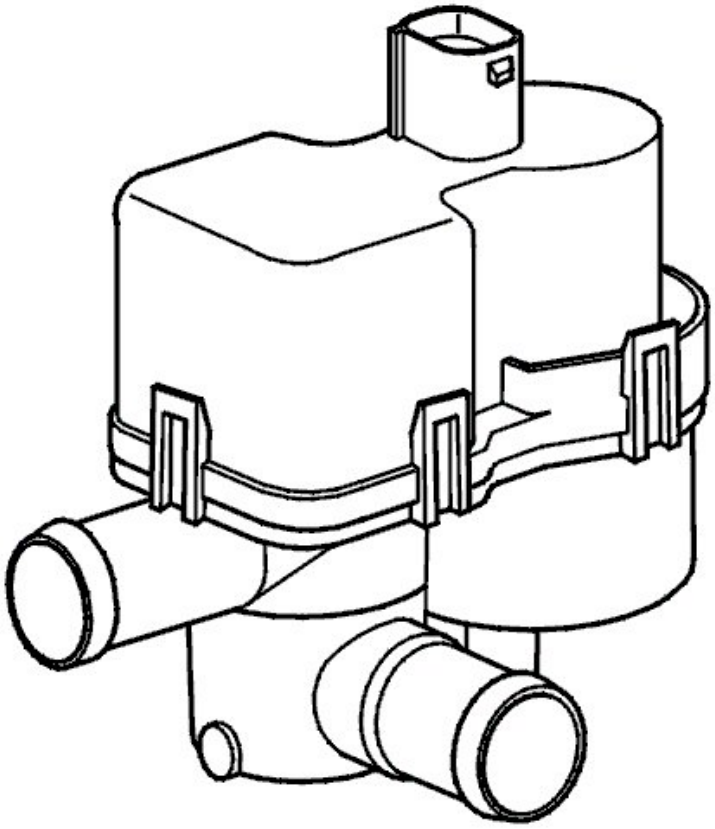
Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-4360

Condition



The power consumption of the pump must drop when the leak diagnostic pump valve moves from the reference check to pressurizing the fuel tank system. Diagnostic trouble code is stored if the value for the power consumption of the pump drops too quickly, slowly or not at all.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

The leak diagnostic is disabled.

Possible source
- Contact resistance in the terminals
- Damaged leak diagnostic unit
- Damaged control heater pad.

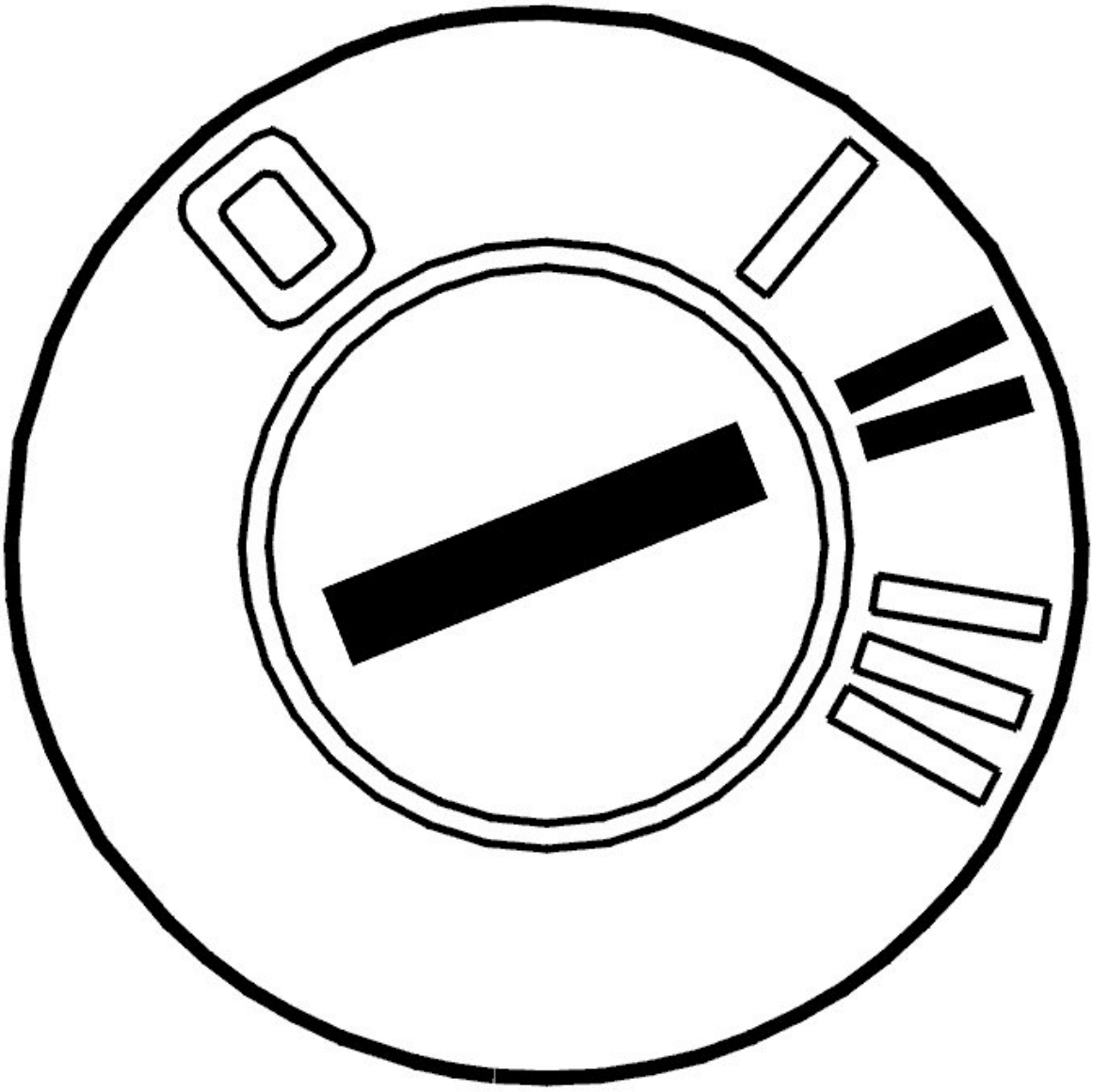
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing

Fault-tracing

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

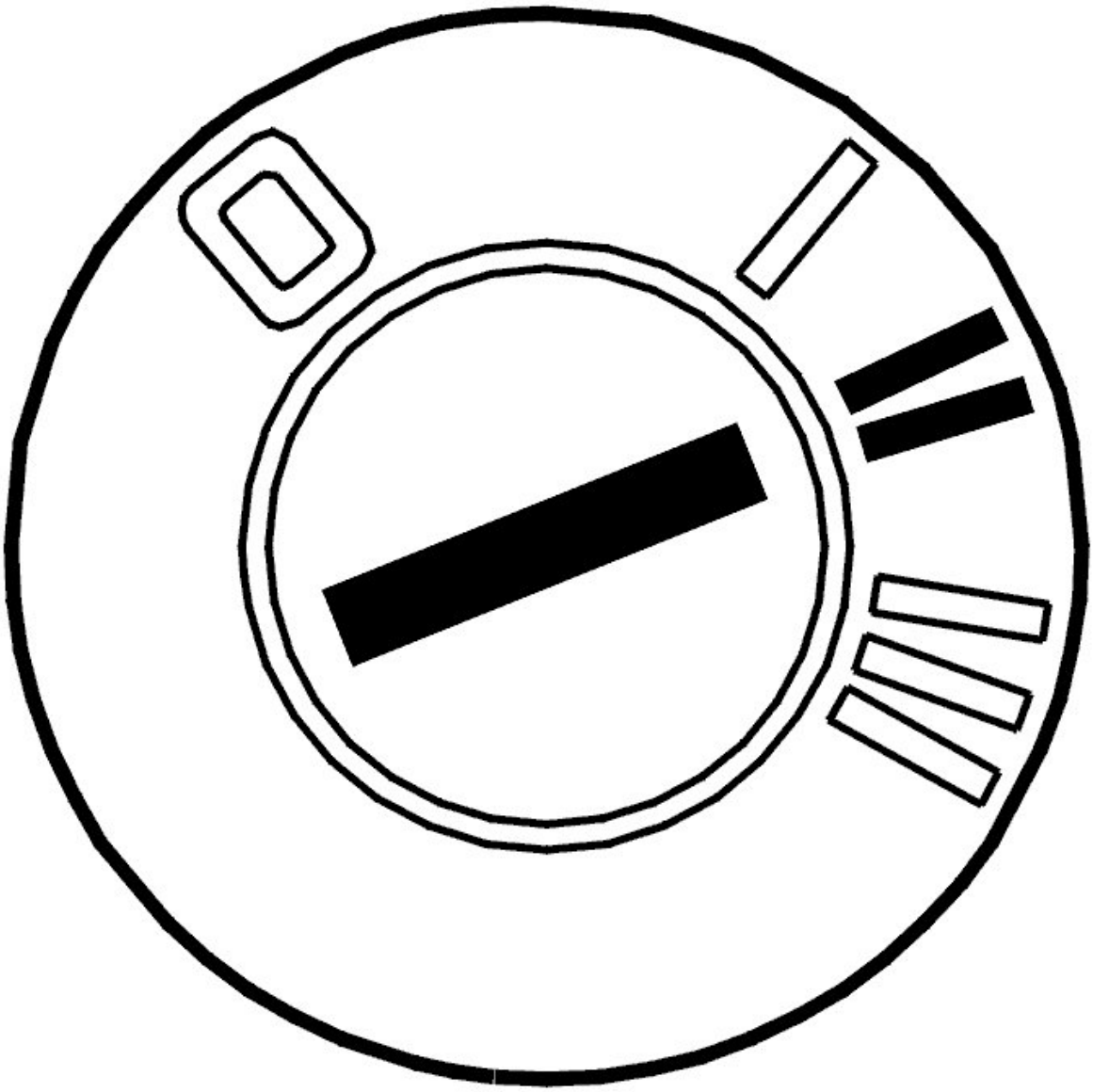
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - ANOTHER TEST

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

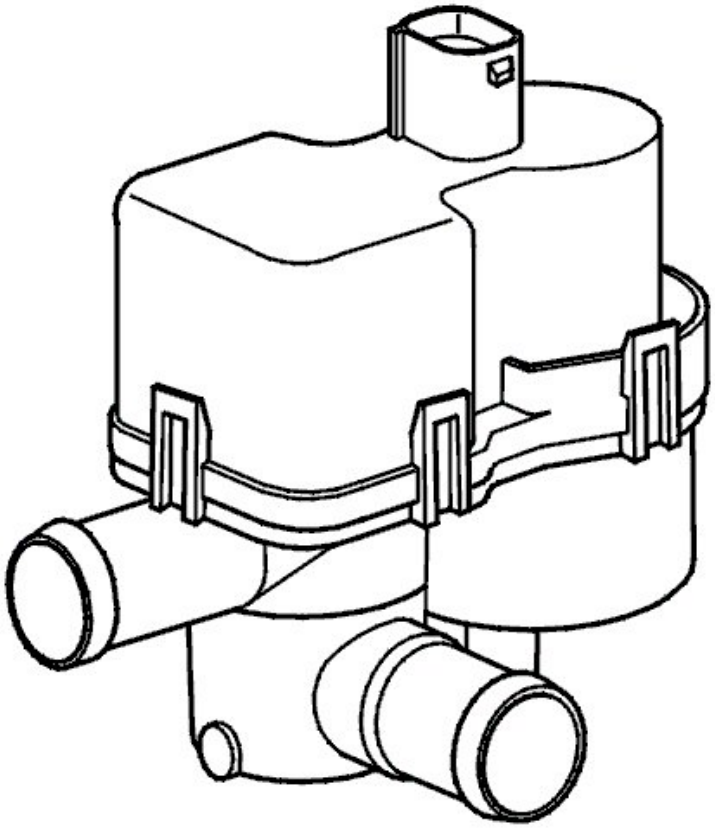
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Major leakage found" or "Minor leakage found"
4. DMTL, test result and Tank system, test result = "Unknown"
5. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Major leakage found" or "Minor leakage found"

4 - test result and Tank system, test result = "Unknown"

5 - **No Fault Found**

DMTL, test result = "Problem found"

Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the hose between the leak diagnostic unit and the EVAP canister. Check for blockages.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.

- Perform "Quick-test tank system" again to verify that the problem has been solved.

Note! The tank system's status is unknown since the test was interrupted.

Continue - Perform quick-test tank system

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
No problem has been detected on leakage diagnostics unit and fuel tank system is OK. The vehicle is ready to be delivered back to customer.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - Fault Found

Tank system, test result = "Major leakage found" or "Minor leakage found"

If a leakage is detected during this test, it indicates that the problem with the leakage diagnostics unit (DMTL) is solved. Now the Engine control module (ECM) has the possibility to check the fuel tank system. A leakage has been found.
- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Select "Continue" to exit.

Continue - ANOTHER TEST

DMTL, test result and Tank system, test result = "Unknown"

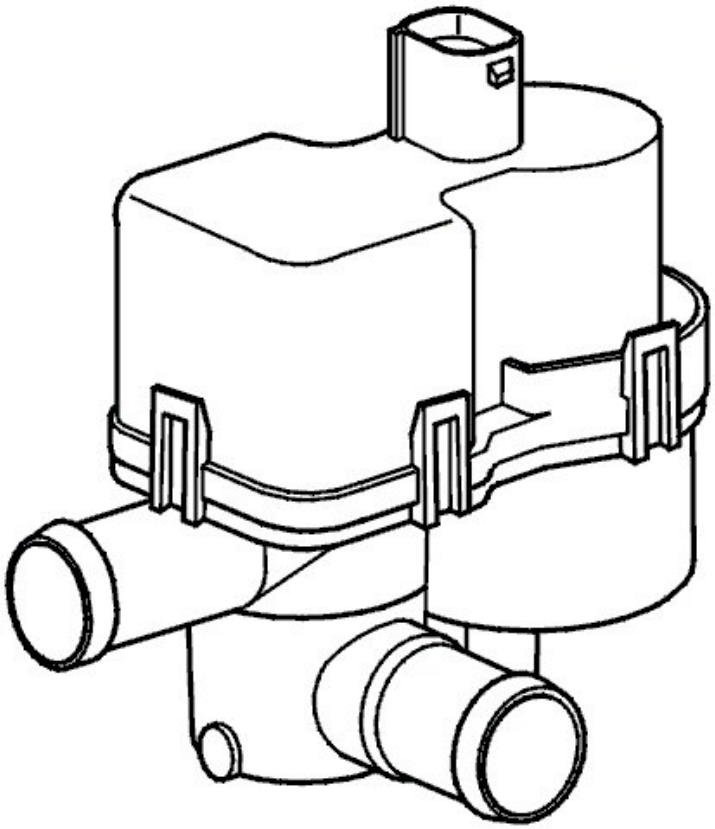
Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.
- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-436B

Condition



The engine control module (ECM) checks power consumption on the leak diagnostic unit pump.
A diagnostic trouble code is stored if the current consumption of the pump in the leak diagnostic unit varies too much during the reference phase.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

The leak diagnostic is disabled.

Possible source
- Contact resistance in the terminals
- Blocked hose between the filter and the leak diagnostic unit
- Damaged leak diagnostic unit.

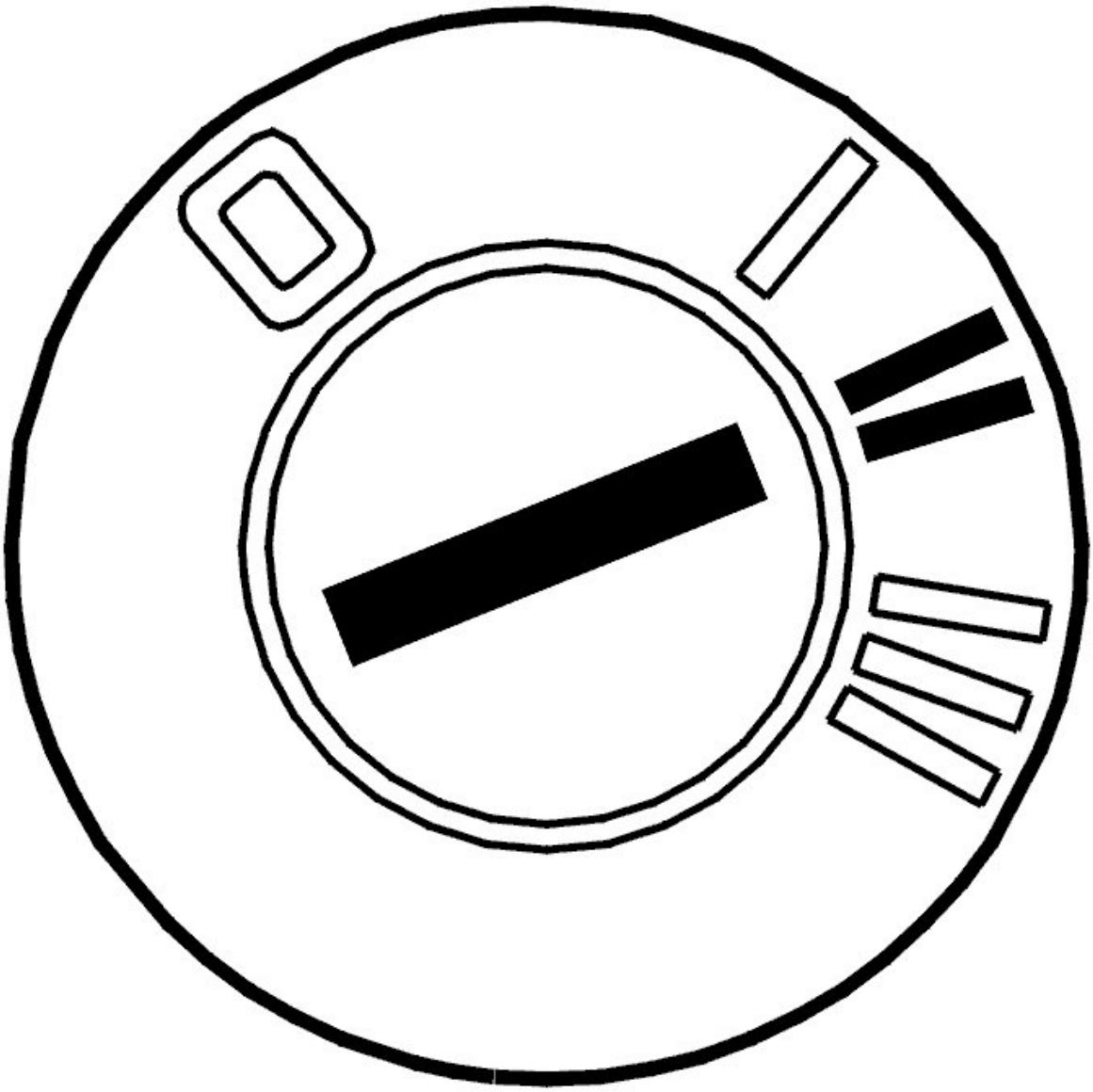
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Fault-tracing

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

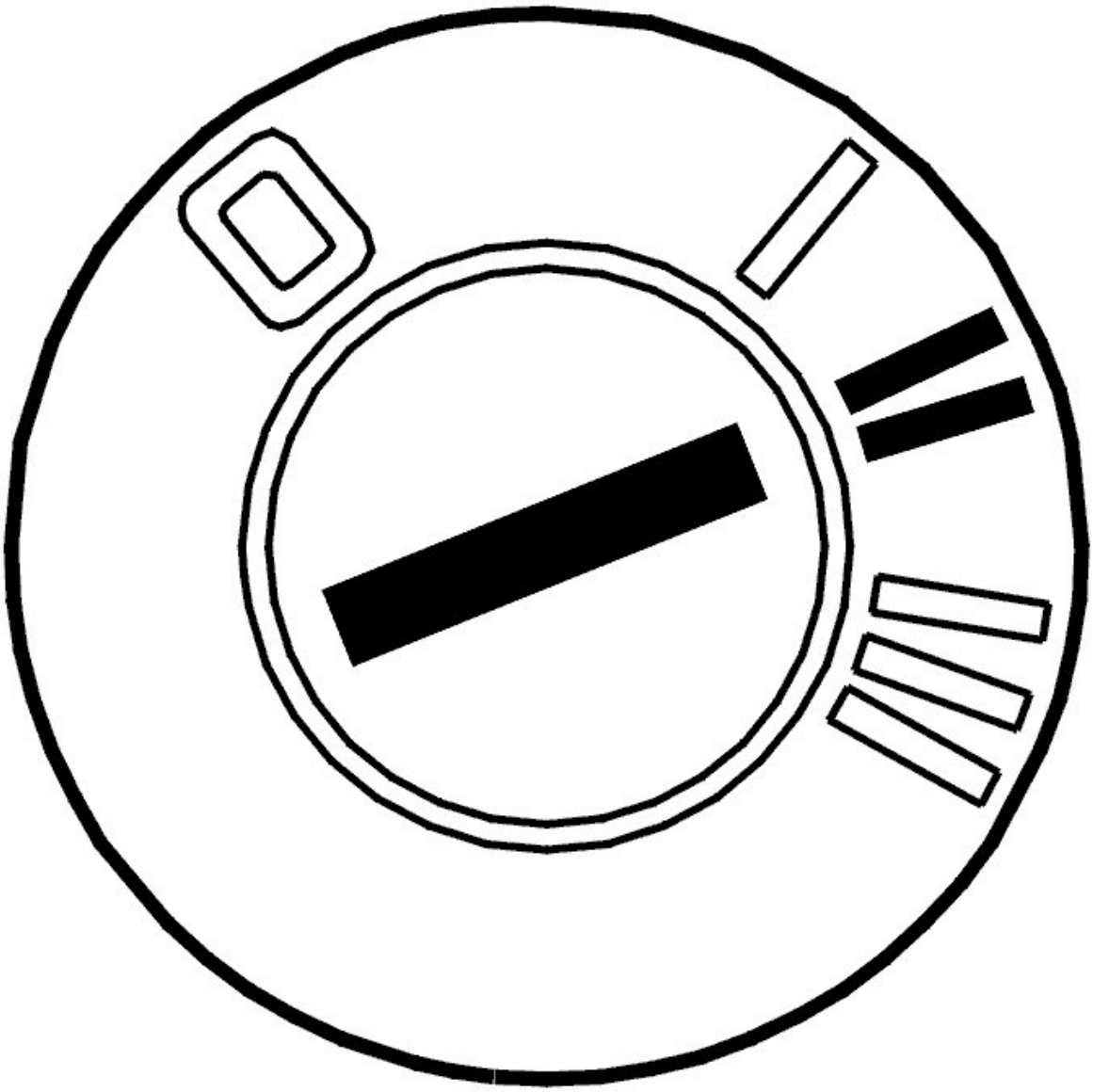
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - **ANOTHER TEST**

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

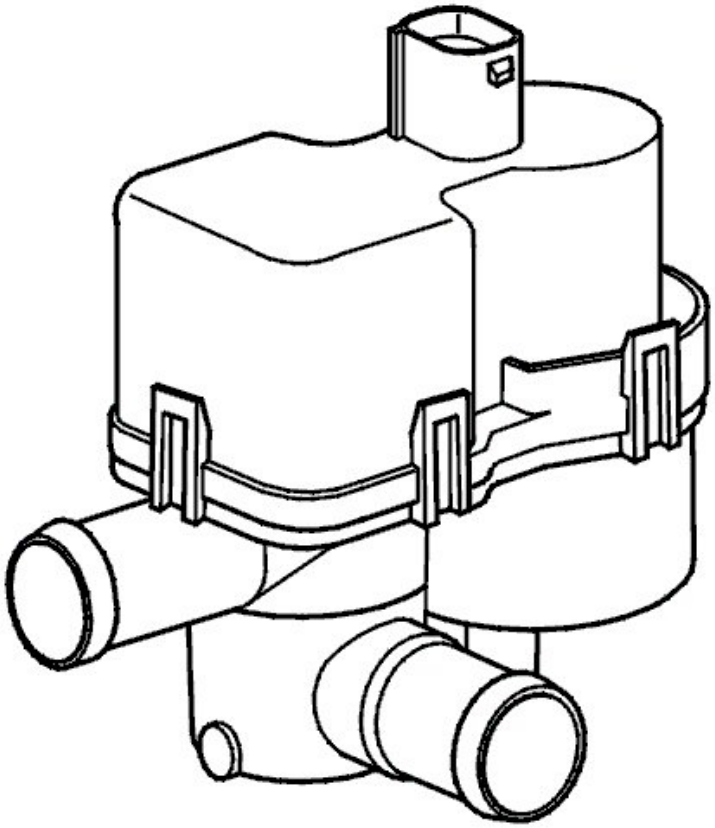
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Major leakage found" or "Minor leakage found"
4. DMTL, test result and Tank system, test result = "Unknown"
5. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Major leakage found" or "Minor leakage found"

4 - test result and Tank system, test result = "Unknown"

5 - **No Fault Found**

DMTL, test result = "Problem found"

Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the hose between the leak diagnostic unit and the EVAP canister. Check for blockages.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.

- Perform "Quick-test tank system" again to verify that the problem has been solved.

Note! The tank system's status is unknown since the test was interrupted.

Continue - Perform quick-test tank system

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
No problem has been detected on leakage diagnostics unit and fuel tank system is OK. The vehicle is ready to be delivered back to customer.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - Fault Found

Tank system, test result = "Major leakage found" or "Minor leakage found"

If a leakage is detected during this test, it indicates that the problem with the leakage diagnostics unit (DMTL) is solved. Now the Engine control module (ECM) has the possibility to check the fuel tank system. A leakage has been found.
- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Select "Continue" to exit.

Continue - ANOTHER TEST

DMTL, test result and Tank system, test result = "Unknown"

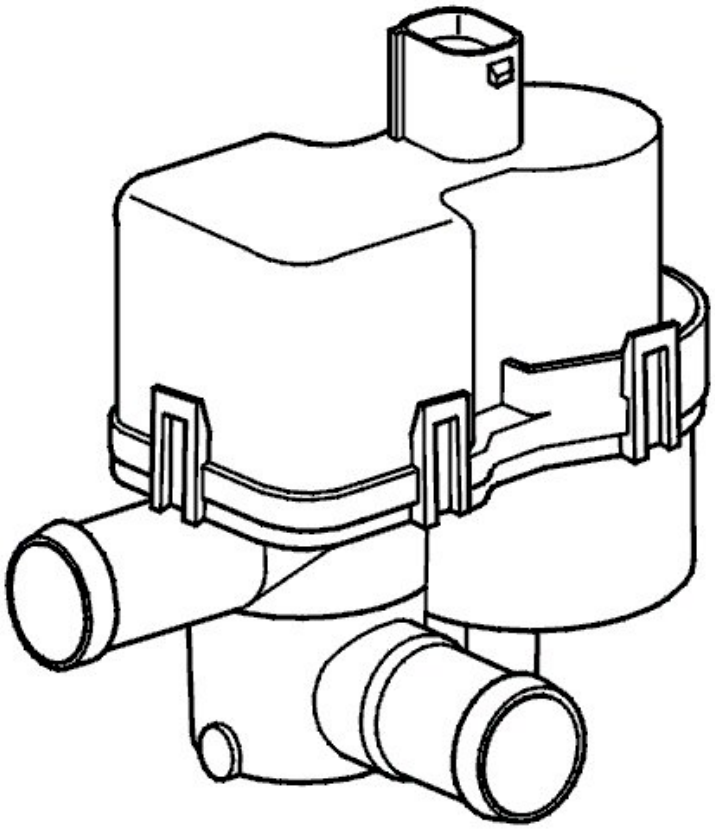
Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.
- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-436C

Condition



The diagnostic trouble code (DTC) is stored if the power consumption of the pump in the leak diagnostic unit is higher than a certain value during the reference phase.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

The leak diagnostic is disabled.

Possible source
- Contact resistance in the terminals
- Blocked filter in the leak diagnostic unit
- Blocked hose between the filter and the leak diagnostic unit
- Damaged leak diagnostic unit.

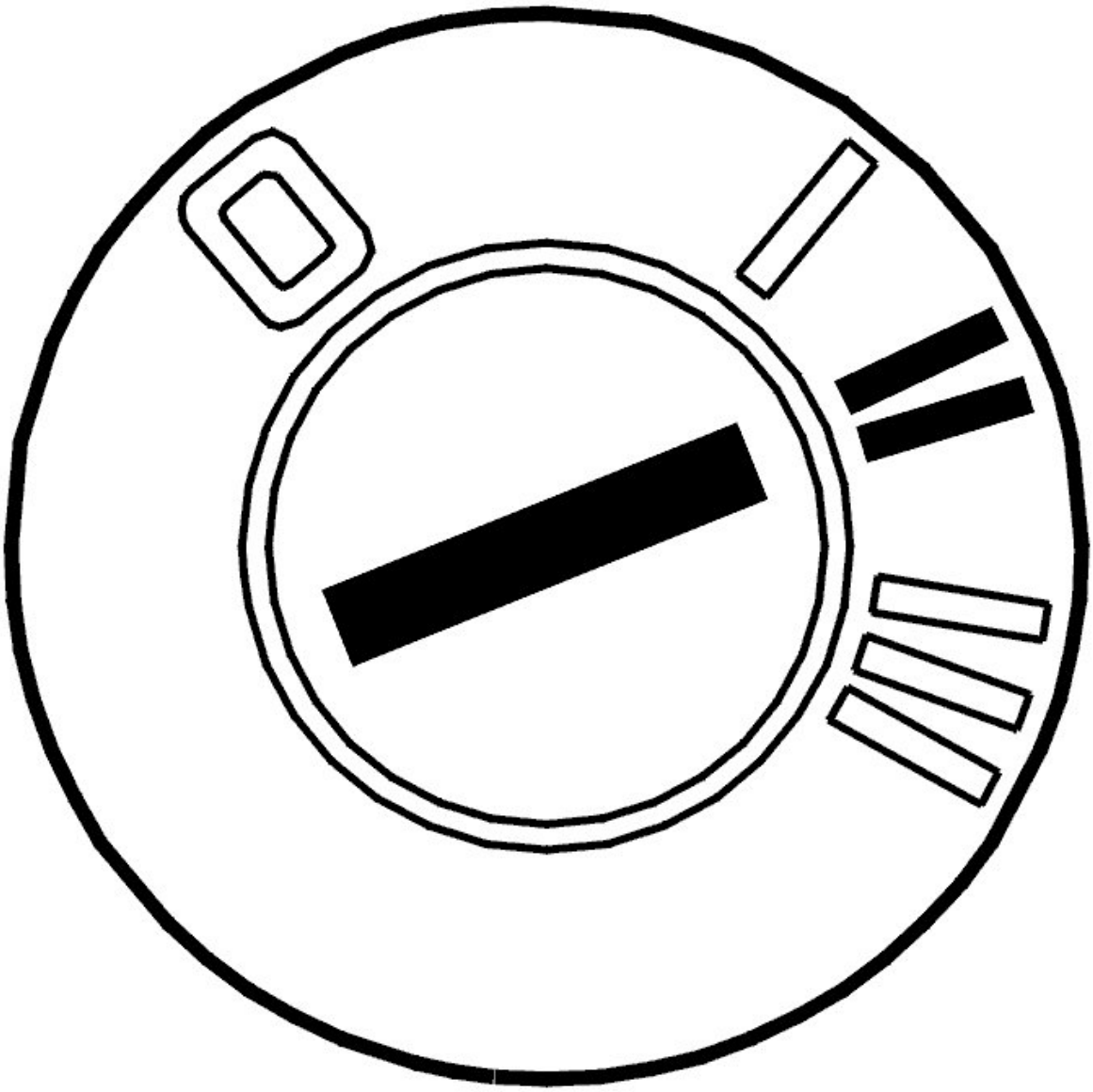
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Fault-tracing

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

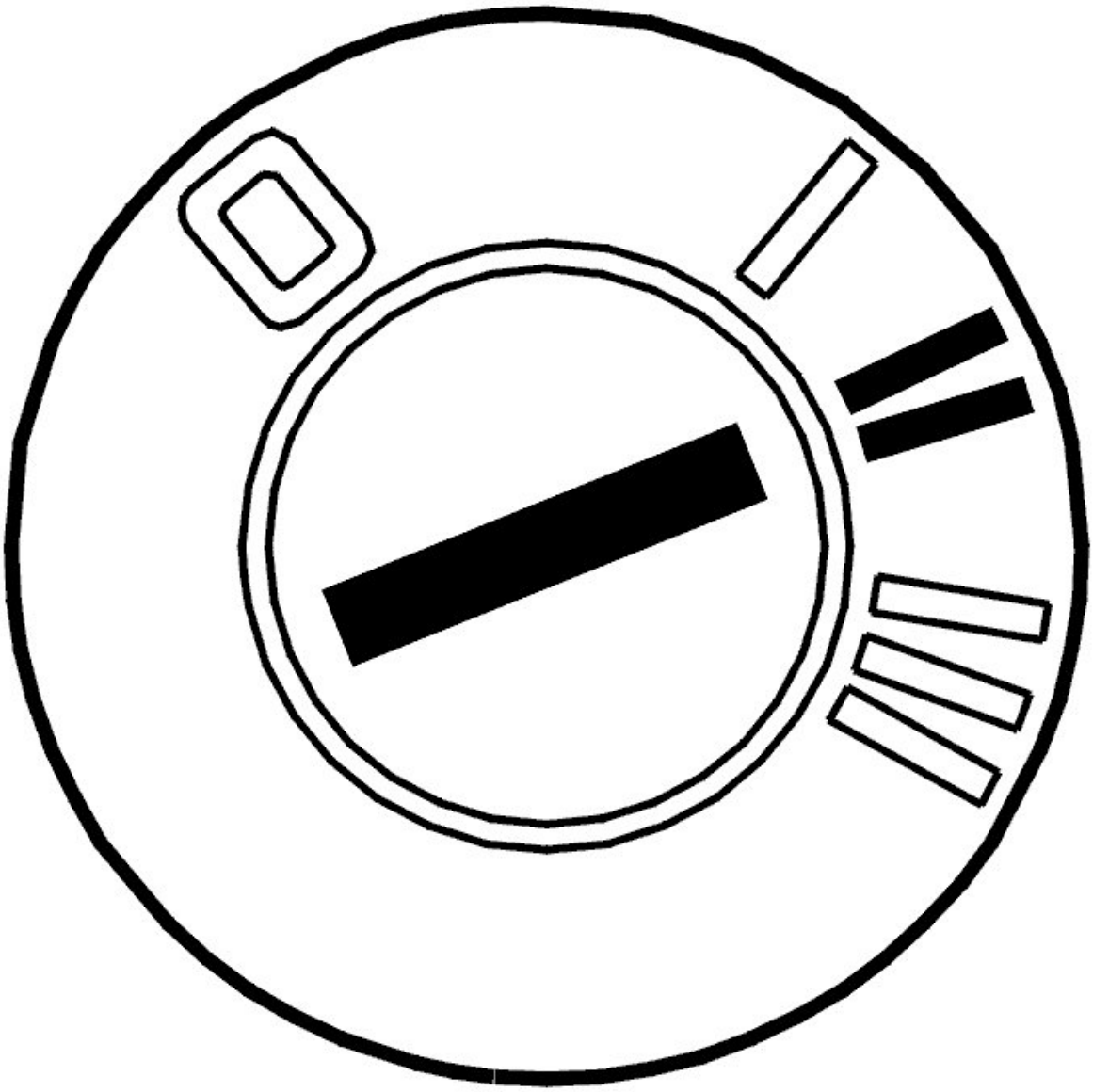
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - **ANOTHER TEST**

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

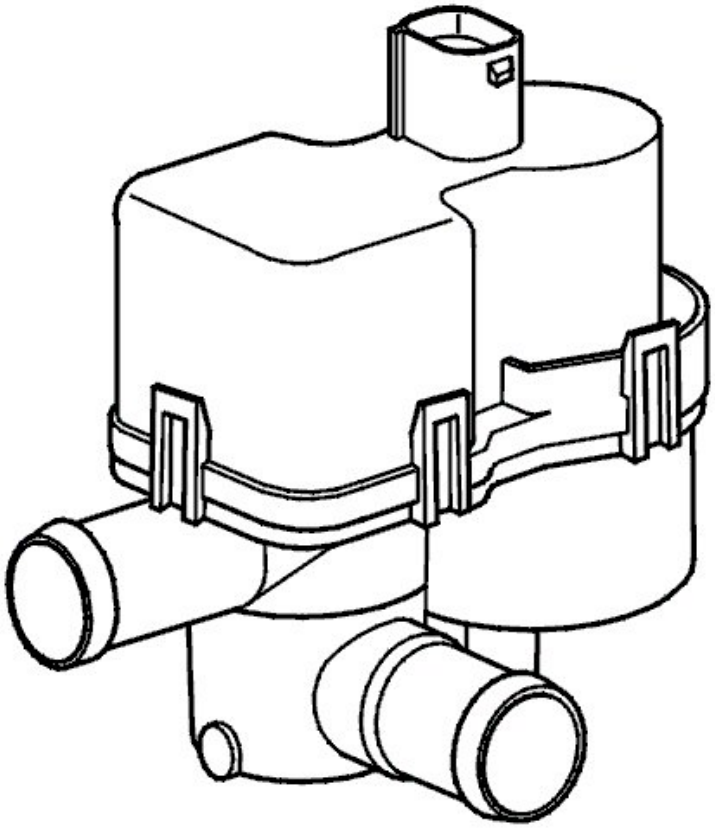
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Major leakage found" or "Minor leakage found"
4. DMTL, test result and Tank system, test result = "Unknown"
5. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Major leakage found" or "Minor leakage found"

4 - test result and Tank system, test result = "Unknown"

5 - **No Fault Found**

DMTL, test result = "Problem found"

Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the hose between the leak diagnostic unit and the EVAP canister. Check for blockages.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.

- Perform "Quick-test tank system" again to verify that the problem has been solved.

Note! The tank system's status is unknown since the test was interrupted.

Continue - Perform quick-test tank system

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
No problem has been detected on leakage diagnostics unit and fuel tank system is OK. The vehicle is ready to be delivered back to customer.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - Fault Found

Tank system, test result = "Major leakage found" or "Minor leakage found"

If a leakage is detected during this test, it indicates that the problem with the leakage diagnostics unit (DMTL) is solved. Now the Engine control module (ECM) has the possibility to check the fuel tank system. A leakage has been found.
- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Select "Continue" to exit.

Continue - ANOTHER TEST

DMTL, test result and Tank system, test result = "Unknown"

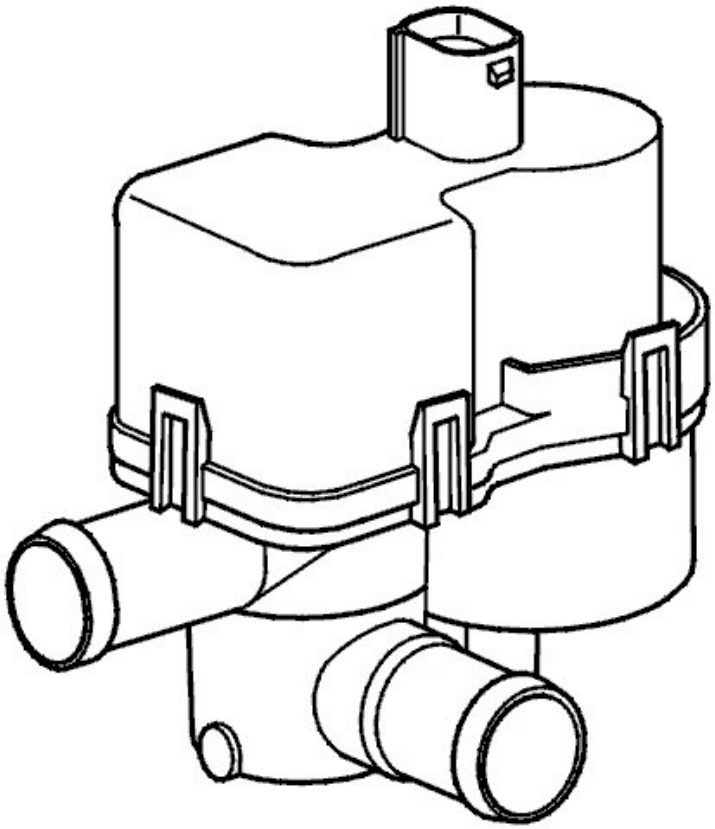
Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.
- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-436D

Condition



The diagnostic trouble code (DTC) is stored if the power consumption of the pump in the leak diagnostic unit is lower than a certain value during the reference phase.
The diagnostic trouble code (DTC) can be diagnosed when the leak diagnostic system is run.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

The leak diagnostic is disabled.

Possible source
- Contact resistance in the terminals
- Damaged leak diagnostic unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

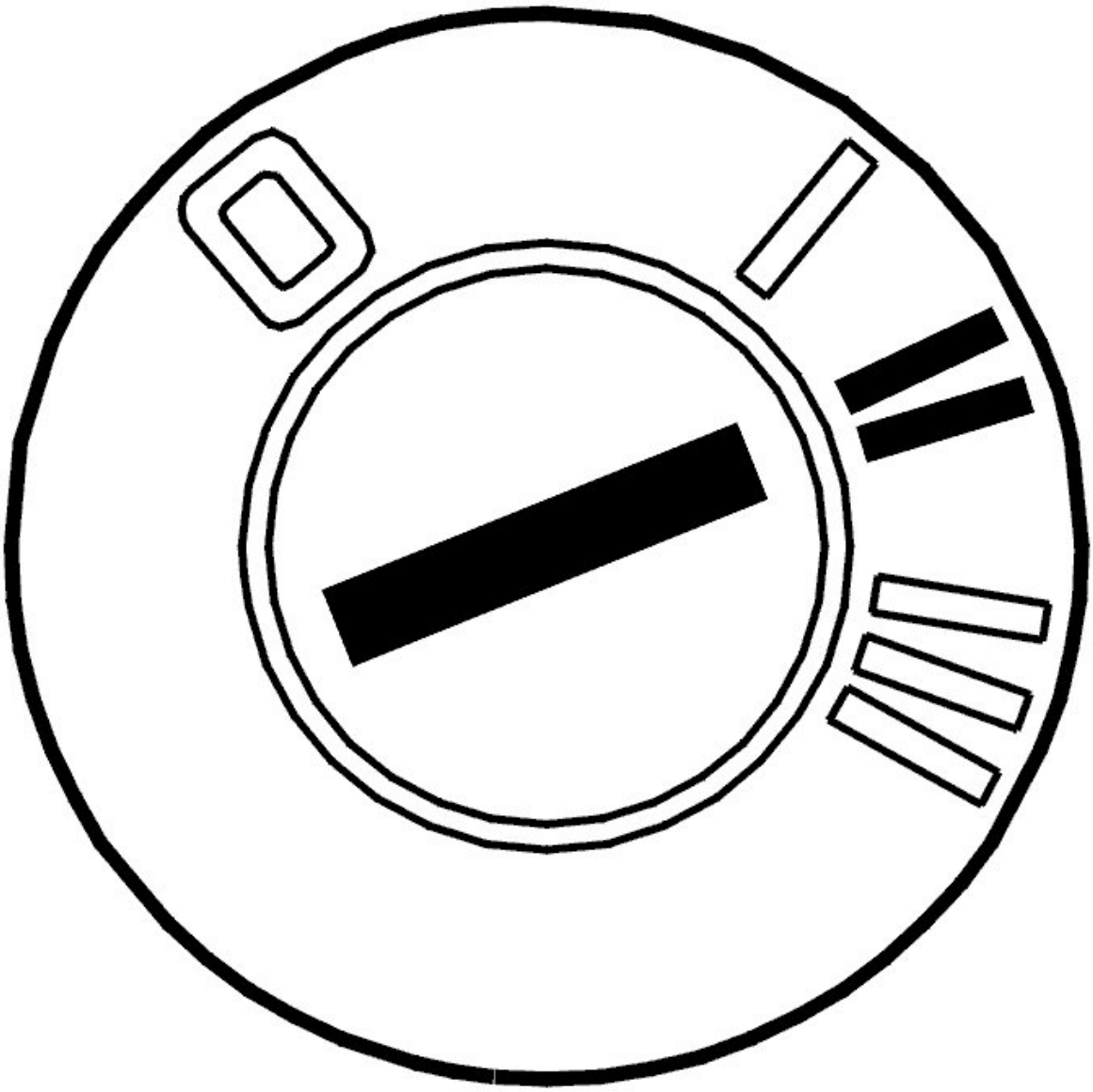
Signal Too Low

Fault-tracing

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

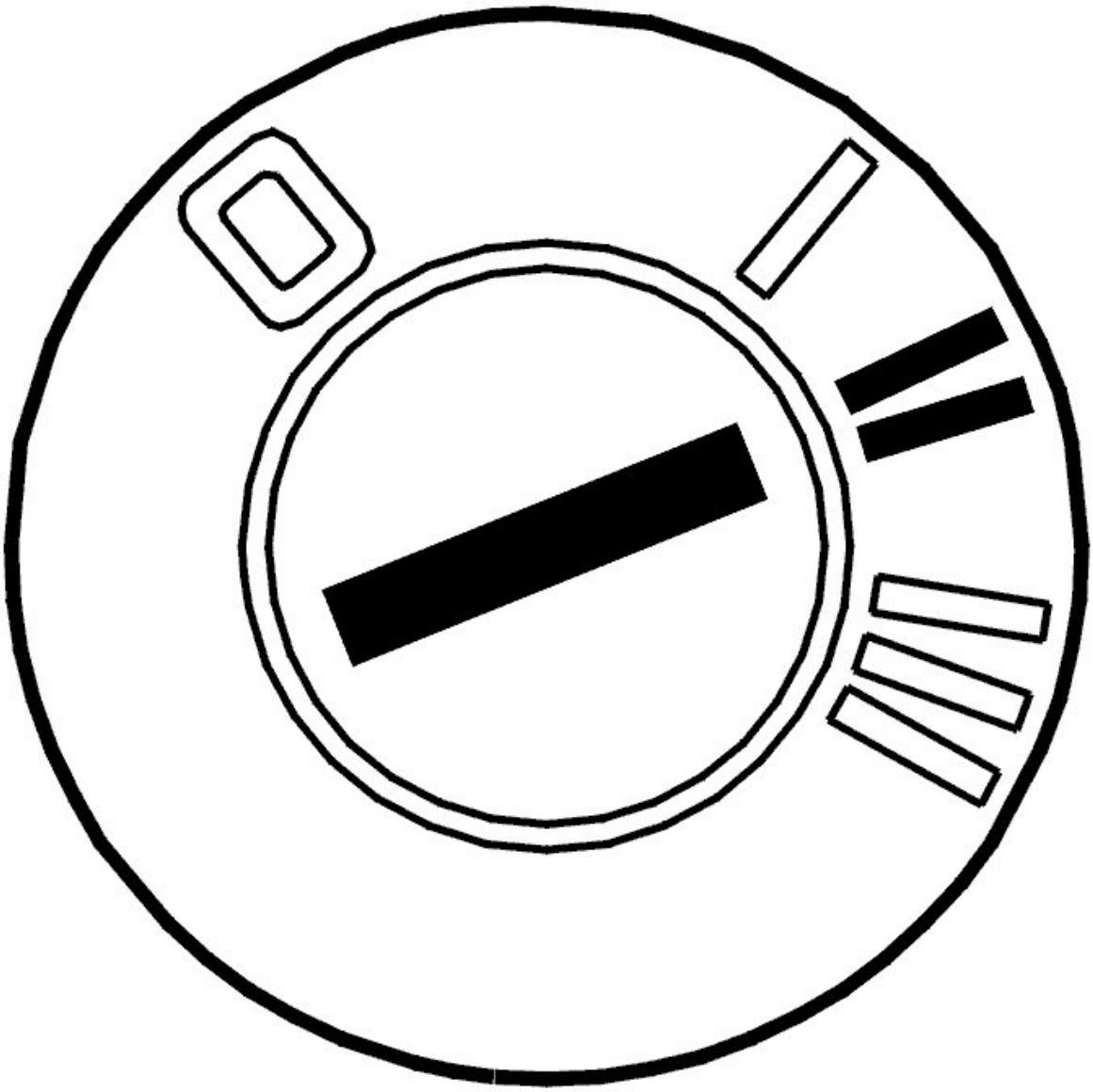
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - **ANOTHER TEST**

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

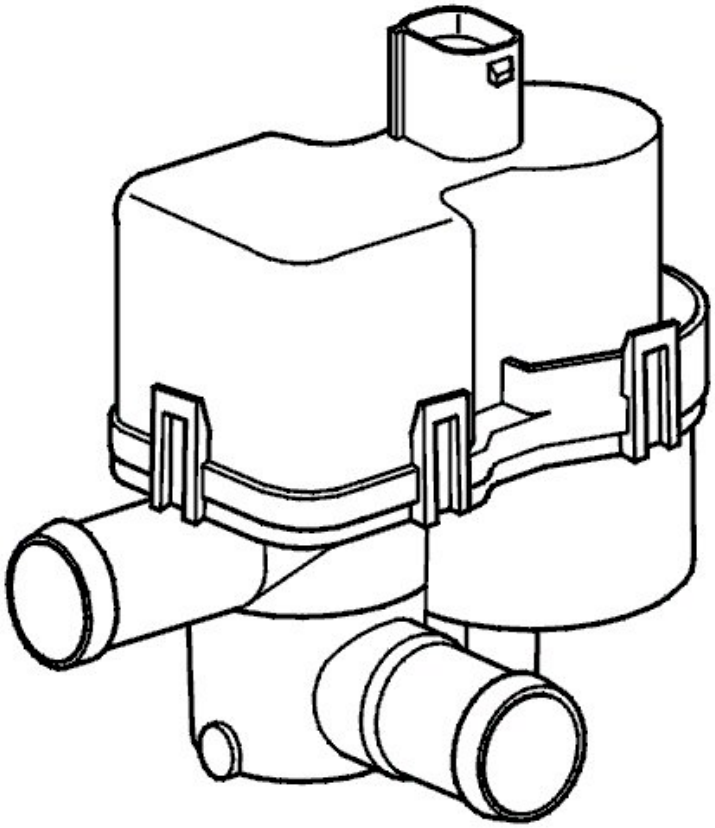
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Leak diagnostic pump, replacing See: Emission Control Systems/Evaporative Emissions System/Leak Detection Pump/Service and Repair

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Major leakage found" or "Minor leakage found"
4. DMTL, test result and Tank system, test result = "Unknown"
5. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Major leakage found" or "Minor leakage found"

4 - test result and Tank system, test result = "Unknown"

5 - **No Fault Found**

DMTL, test result = "Problem found"

Check the leak diagnostic unit connectors. Check for contact resistance and oxidation.
Check the hose between the leak diagnostic unit and the EVAP canister. Check for blockages.
Try a new leak diagnostic unit if no fault is found during the above fault-tracing.

- Perform "Quick-test tank system" again to verify that the problem has been solved.

Note! The tank system's status is unknown since the test was interrupted.

Continue - Perform quick-test tank system

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
No problem has been detected on leakage diagnostics unit and fuel tank system is OK. The vehicle is ready to be delivered back to customer.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - Fault Found

Tank system, test result = "Major leakage found" or "Minor leakage found"

If a leakage is detected during this test, it indicates that the problem with the leakage diagnostics unit (DMTL) is solved. Now the Engine control module (ECM) has the possibility to check the fuel tank system. A leakage has been found.
- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Select "Continue" to exit.

Continue - ANOTHER TEST

DMTL, test result and Tank system, test result = "Unknown"

Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.
- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-4380

Condition

If the engine control module (ECM) registers that fuel filling has been carried out through the fuel level being changed, the position and installation of the fuel tank filler cap is checked. This is carried out by quicker leak diagnostics.
The check is carried out a few minutes after start if the vehicle speed is constant and exceeds 30 km/h and only if no fault is detected on the leak diagnostic unit.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a leak after filling. This is interpreted as fuel tank filler cap missing or loosely installed.
This diagnostic trouble code (DTC) cannot occur alone but follows another stored diagnostic trouble code (DTC) for the fuel tank filler cap. The diagnostic trouble code (DTC) only remains during one operating cycle and lights a message in the display indicating that the fuel tank filler cap is not correctly positioned.

Substitute value
- None.

Possible source
- The diagnostic trouble code (DTC) is caused by another diagnostic trouble code (DTC) being stored in the engine control module (ECM).

Fault symptom[s]
- Message in the display.

Fault-Tracing Information

Fault-tracing information

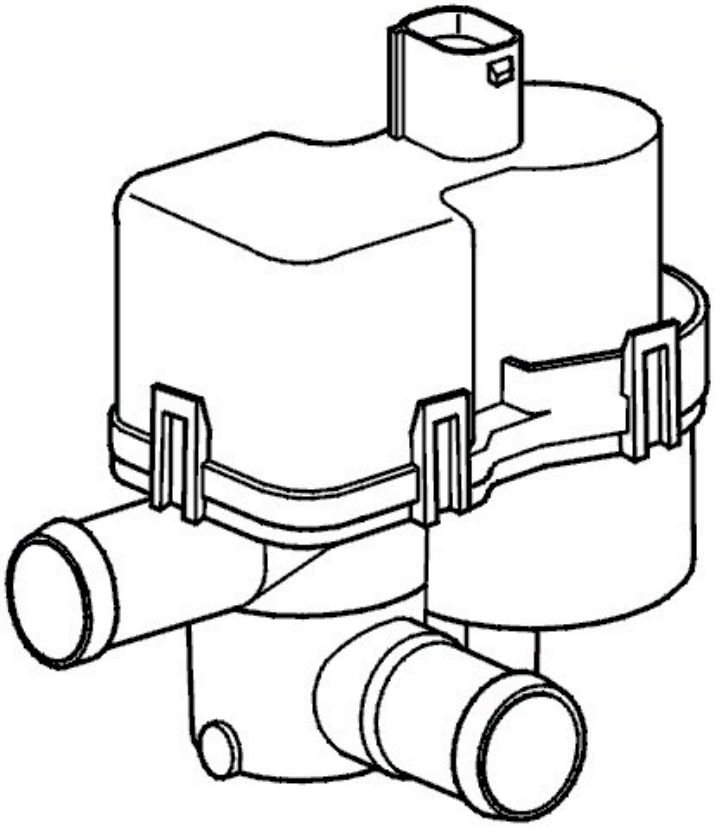
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-439C

Condition



If no fault has been detected in the leak diagnostic unit, the engine control module (ECM) carries out a leak diagnostic of the fuel tank system. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a leak which is larger than 1.0 mm.
For further information about leak diagnostics, see VIDA Design and Function.

Substitute value

None.

Possible source
- The fuel tank filler cap is missing or not properly tightened
- Leakage that is 1.0 mm or greater in the fuel tank, fuel filler pipe, fuel tank filler cap, EVAP canister, canister purge (CP) valve, or in the hoses between these components.

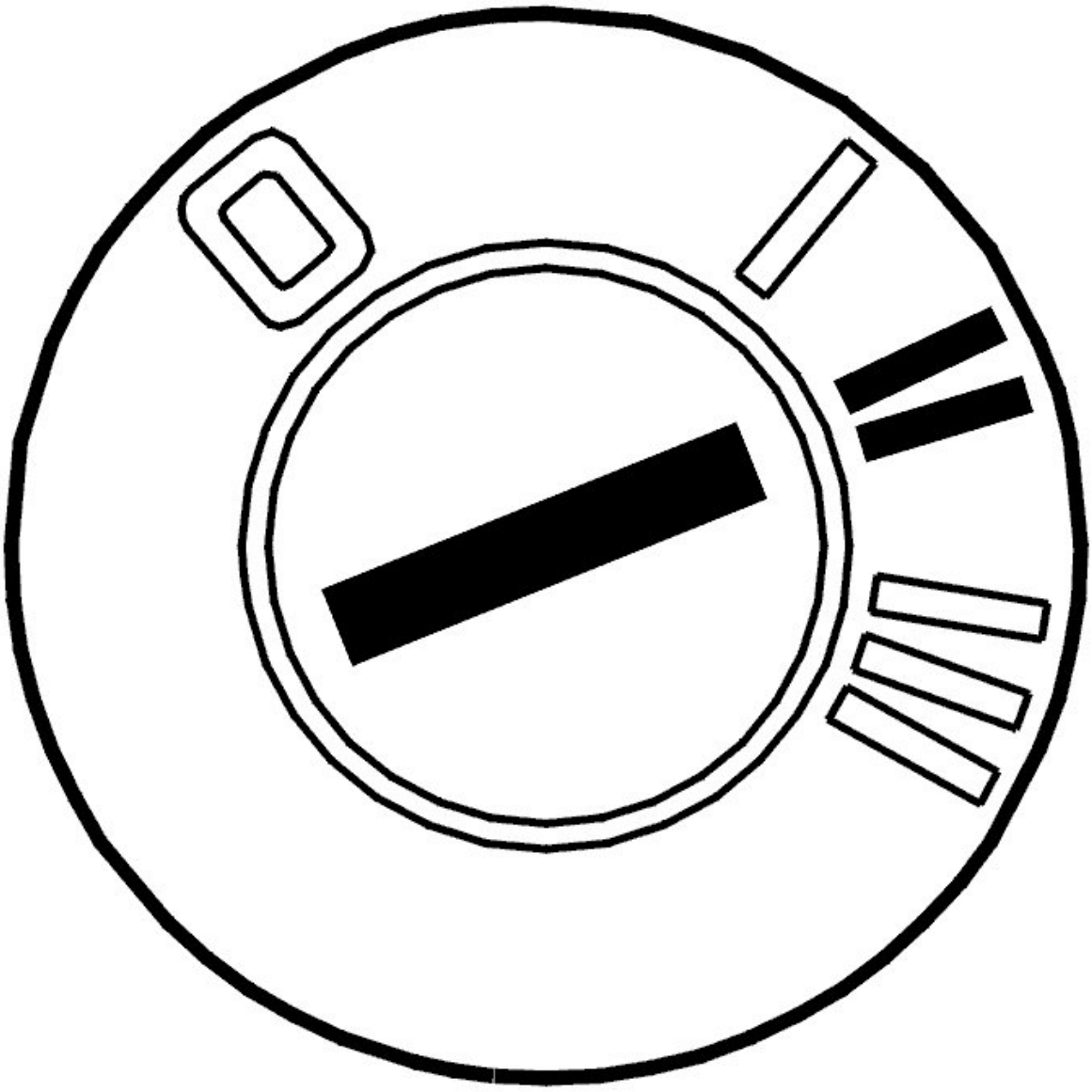
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Leakage

Leakage

Checking software

Hint: For vehicles of model year 2003-2008, the software in engine control module (ECM) should be checked before fault tracing of the fault relating to the leak from the tank system is carried out.



- Ignition on.

Click on the VCT2000 symbol to start the read out and check the software version in the Engine control module (ECM).

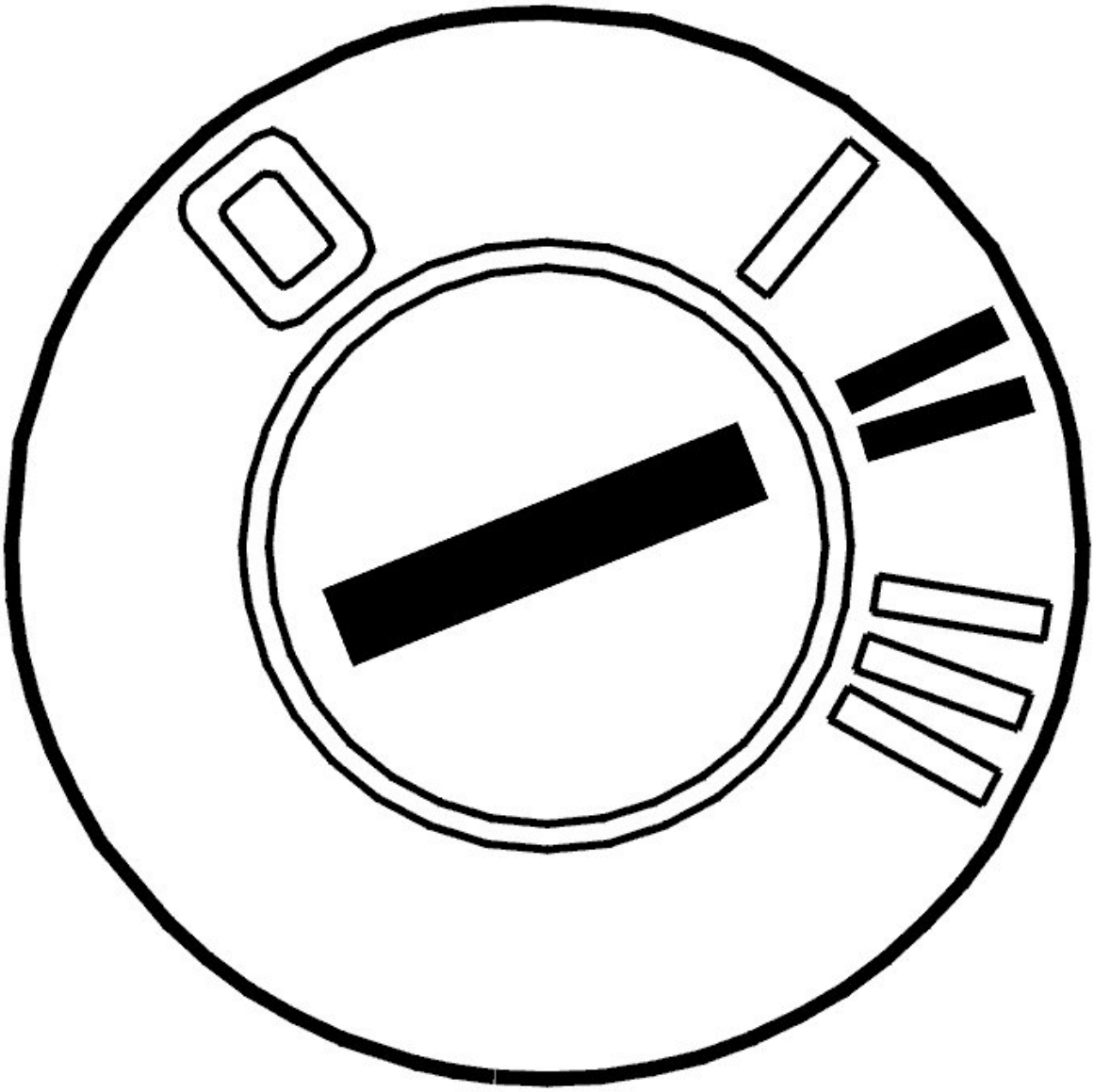
Note! More instructions follow together with the read out.

Has the latest software been downloaded to the control module?

Yes - Perform quick-test tank system

No - **ANOTHER TEST**

Perform quick-test tank system



- Activate the test by pressing on the symbol for VCT2000.
- Read off initial parameters and check them according to start conditions for performing the test.
- Press the button "Start" to start the quick-test.
- Check that the test has started. Parameters run status shall go to "In progress" and the test phase shall go to "Reference".

Note! If the test does not start, check that the start conditions are fulfilled.

When the reference phase is finished, check of the tank system starts. The pressure in the tank starts to increase, see graph. Within 15 minutes the Engine control module (ECM) makes a decision as to whether there is leakage in the tank system or not. The test is finished.

- Check parameters for test result and follow relevant instructions below.

Note! Estimated leakage shall be used to get an idea of the proximity to the diagnostic trouble code limit. If the estimated leakage is very near the diagnostic trouble code limit, troubleshooting should probably be performed despite the Tank system, test result shows "No leakage found", especially if diagnostic trouble code for leakage has been stored earlier.

Note! Use diagnostic trouble code counter to see the frequency of the problem. Also use frozen values to get an idea if external conditions may have affected the result. Compare with current conditions in the workshop.

Conditions for starting the quick test of the fuel tank system

- No DTCs related to EVAP purge valve or ambient air pressure sensor set.
- Battery voltage 11-15 V.
- Atmospheric pressure higher than 750 hPa, appr. 2500 m (8200 ft).
- Fuel level 0-85 %.
- Ambient air temperature 4-35 °C (39-95 °F).

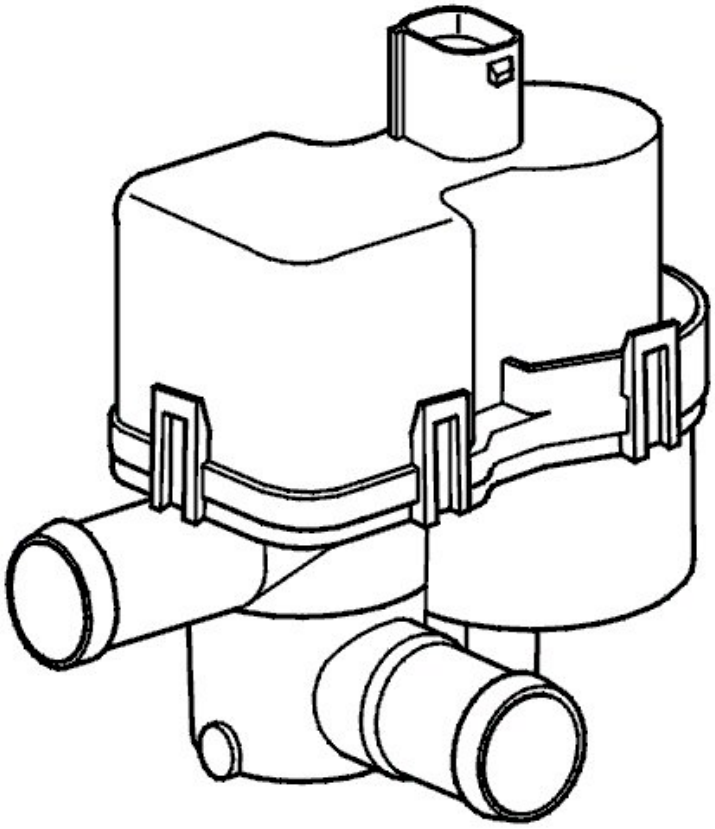
Note! The battery voltage must be correct throughout the entire test. The test can take up to 15 minutes, depending on the quantity of fuel in the fuel tank. It is highly recommended to use the constant voltage charger, Midtronics PSC-550, during the test. For more information, see TNN 30-04 (USA/CDN).

Other information

- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System
- For information on leakage diagnosis, see Design and Function.
- Location of components, engine compartment, B5244T5, B5254T2 See: Locations
- Fuel tank system, check See: Fuel Delivery and Air Induction/Fuel Tank/Testing and Inspection/Fuel Tank System, Check
- Test pressurizing the tank system See: Fuel Delivery and Air Induction/Fuel Tank/Testing and Inspection/Test Pressurizing the Tank System

Select alternative according to relevant test results:

1. DMTL, test result = "Problem found"
2. Tank system, test result = "No leakage found"
3. Tank system, test result = "Minor leakage found"
4. Tank system, test result = "Major leakage found"
5. DMTL, test result and Tank system, test result = "Unknown"
6. Cancel fault-tracing.



1 - test result = "Problem found"

2 - test result = "No leakage found"

3 - test result = "Minor leakage found"

4 - test result = "Major leakage found"

5 - test result and Tank system, test result = "Unknown"

6 - **No Fault Found**

DMTL, test result = "Problem found"

If a problem is detected on the leakage diagnostics unit (DMTL), this may have been caused during the test itself. Checks on DMTL are normal electric checks of leakage diagnostics unit and cabling and is no indication of if there is leakage or not.

- Cancel troubleshooting for this problem.
- Read off diagnostic trouble codes again and start troubleshooting for the new diagnostic trouble code.

Note! The tank system's status is unknown since the test was interrupted.

Continue - ANOTHER TEST

Tank system, test result = "No leakage found"

Diagnostic trouble code limit (minor leakage): Estimated leakage = 0.40 mm
If no leakage was found, the Engine control module (ECM) has detected leakage in the tank system earlier, but the problem is not active at this time. The fault could be caused by leakage in the tank, filler pipe, fuel tank filler cap, canister, EVAP valve, leakage diagnosis unit or hoses between these components.

Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Note! The parameter estimated leakage does not necessarily have to show 0 mm for a sealed system.

Select "Continue" to exit.

Continue - Fault Found

Tank system, test result = "Minor leakage found"

Diagnostic trouble code limit: Estimated leakage = 0.40 mm

- Check that the tank cap is properly fitted and that its seal is undamaged.
- Check the hoses and connections on the leak diagnostic unit, the canister,EVAP-valve and the fuel filler pipe visually. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Note! By blocking the hose between canister and EVAP-valve and then repeating quick-test tank system, leakage through the EVAP-valve can be detected. If leakage was detected in a previous quick test of the fuel tank system but is not now detected when the hose between the canister and the EVAP valve is blocked, the leakage may be through the EVAP valve.

- Disconnect the hose between the EVAP canister purge valve and the EVAP canister from the connection to the EVAP canister purge valve.
- Block the hose while running the quick test of the fuel tank system.

Continue - Perform quick-test tank system

DMTL, test result and Tank system, test result = "Unknown"

Engine control module (ECM) cannot perform check of tank system. This may be due to the conditions for start of the quick-test not being fulfilled,that they have changed during the course of the test, or that a problem has occurred during troubleshooting.

- Check that all conditions for start of the quick-test are fulfilled.
- Visually check hoses and connections on leakage diagnostics unit, canister, EVAP-valve, and filler pipe. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

Continue - Perform quick-test tank system

Tank system, test result = "Major leakage found"

Diagnostic trouble code limit: Tank pressure lower than 1500 Pa after 450 seconds in test phase "Major leakage".

- Check that the tank cap is properly fitted and that its seal is undamaged.
- Check the hoses and connections on the leak diagnostic unit, the canister,EVAP-valve and the fuel filler pipe visually. Check for damage or incorrect/loose installation.
- Remedy as necessary.
- Restart the test.

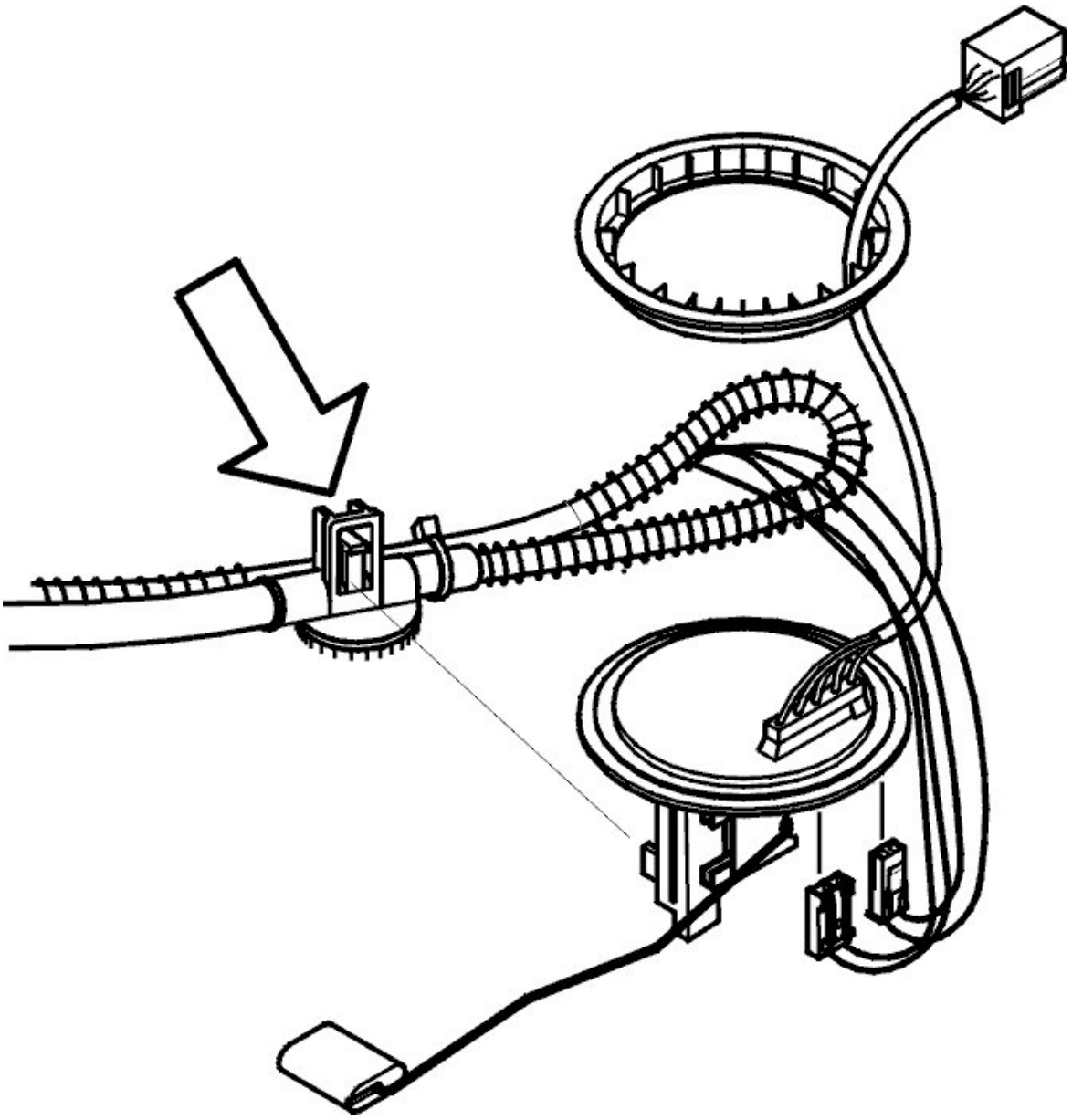
Note! Problems caused by a loose tank cap or loose hose connections may be difficult to find. If no leakage was found in the quick-test of the tank system after completed checks and actions according to the above, the problem has likely been repaired.

Continue - Perform quick-test tank system

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-4400

Condition



The rear electronic module (REM) transmits information about the fuel level and fault status of the fuel level sensor to the central electronic module (CEM). The central electronic module (CEM) then transmits this information on to the engine control module (ECM).
The engine control module (ECM) compares the engine fuel consumption with the change in fuel level over a set period of time. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an implausibly small reduction in the fuel level compared with calculated fuel consumption.

Substitute value

- None.

Possible source
- Fault trace the rear electronic module (REM)
- Damaged fuel level sensor.

Fault symptom[s]
- Gauges/Fuel level not accurate/Value too low

Fault-Tracing Information

Fault-tracing information

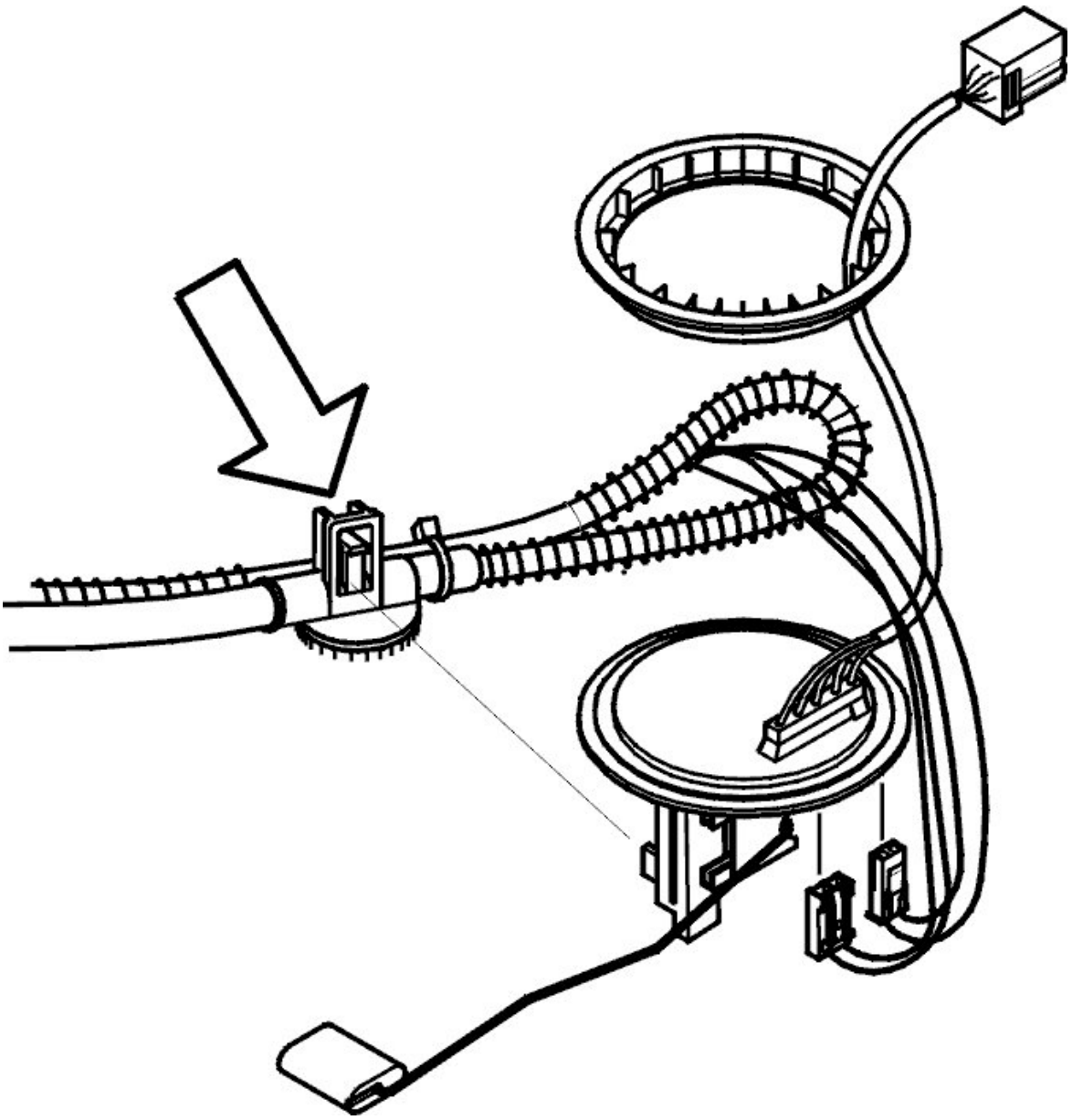
Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-440B

Condition



The rear electronic module (REM) transmits information about the fuel level and fault status of the fuel level sensor to the central electronic module

(CEM). The central electronic module (CEM) then transmits this information on to the engine control module (ECM).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a communication problem with the central electronic module (CEM).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Open-circuit in the control area network (CAN) wiring
- Short-circuit between the control area network (CAN) wiring
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- Gauges/Fuel level not accurate/Value too low

Fault-Tracing Information

Fault-tracing information

Information

No fault-tracing has been developed for this diagnostic trouble code (DTC). A diagnostic trouble code for CAN communication can also be generated in the Central Electronic Module (CEM). This diagnostic trouble code shall not be cleared until the trouble code in the central electronic module (CEM) and in other affected control modules has been remedied and cleared. Therefore, first read the diagnostic trouble codes in the Central Electronic Module (CEM) and other affected control modules, perform fault tracing and remedy as necessary. This diagnostic trouble code (DTC) can then be erased. For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Other information
- S40 (04-)/V50:
- S60/S80/V70/XC70/XC90:

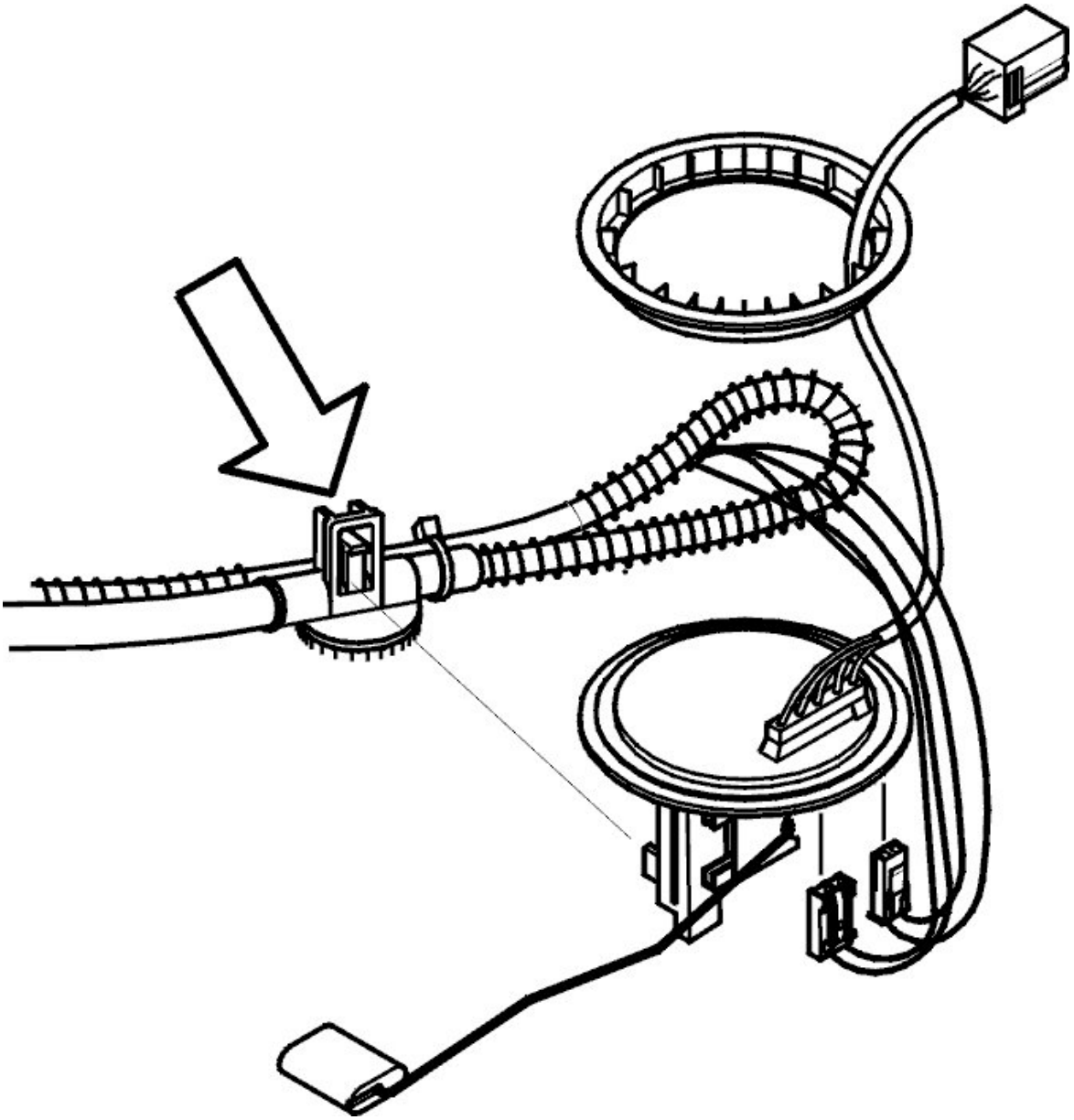
Select "Continue" to exit.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-440C

Condition



The rear electronic module (REM) transmits information about the fuel level and fault status of the fuel level sensor to the central electronic module (CEM). The central electronic module (CEM) then transmits this information on to the engine control module (ECM).
A diagnostic trouble code (DTC) is stored in the rear electronic module (REM) if it registers an electrical fault with the fuel level sensor. A diagnostic trouble code (DTC) will be stored in the engine control module (ECM) at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault trace the rear electronic module (REM).

Fault symptom[s]
- Gauges/Fuel level not accurate/Value too low

Fault-Tracing Information

Fault-tracing information

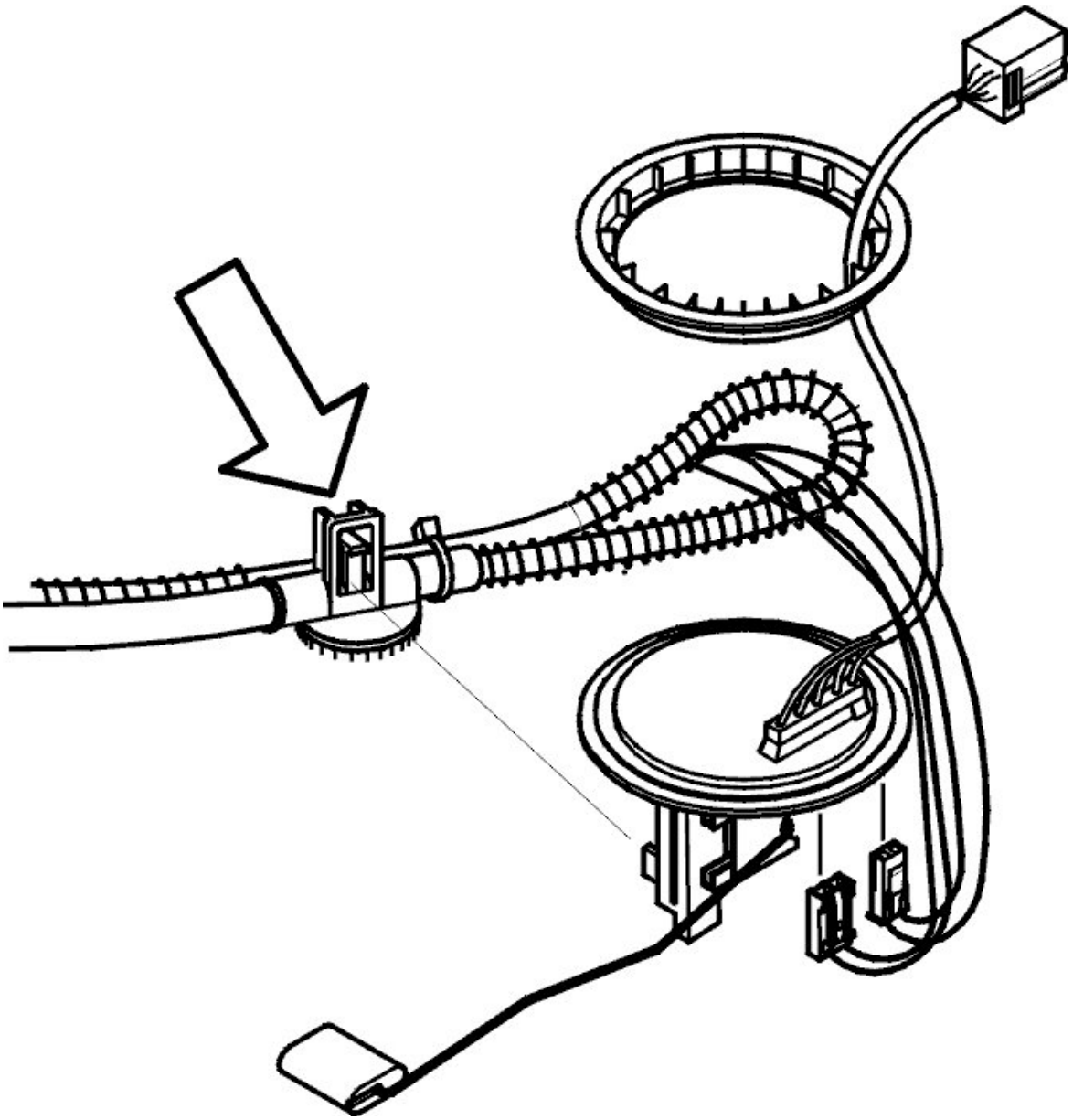
Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-440D

Condition



The rear electronic module (REM) transmits information about the fuel level and fault status of the fuel level sensor to the central electronic module (CEM). The central electronic module (CEM) then transmits this information on to the engine control module (ECM).
A diagnostic trouble code (DTC) is stored in the rear electronic module (REM) if it registers an electrical fault with the fuel level sensor. A diagnostic trouble code (DTC) will be stored in the engine control module (ECM) at the same time.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault trace the rear electronic module (REM).

Fault symptom[s]
- Gauges/Fuel level not accurate/Value too low

Fault-Tracing Information

Fault-tracing information

Information

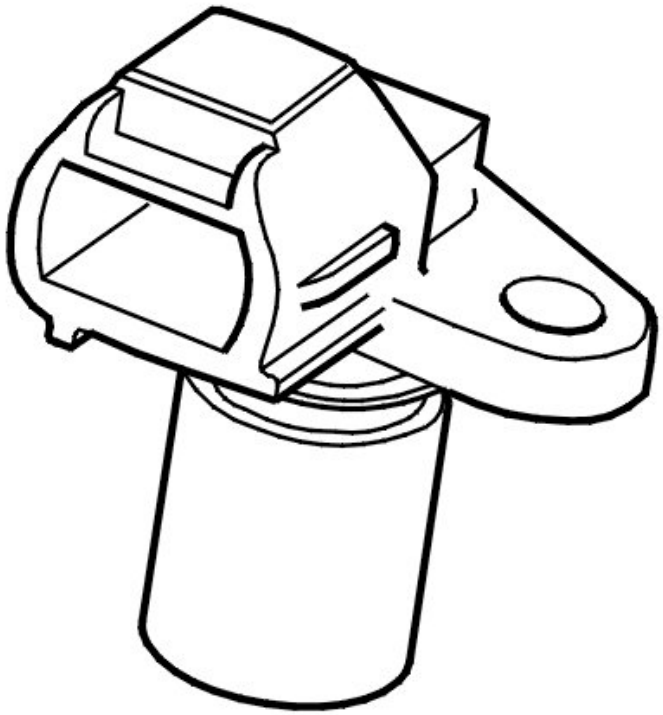
The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5000

Condition



The engine control module (ECM) detects the flywheel position for TDC using the signal from the engine speed (RPM) sensor. The diagnostic trouble code (DTC) is stored if the position for TDC is missing sporadically. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- The engine control module (ECM) uses the signal from the camshaft position (CMP) sensor if the camshaft position (CMP) sensor has been adapted
- Variable valve timing control is blocked.

Possible source
- Signal interference
- Contact resistance and oxidation
- Intermittent fault causes in the engine speed (RPM) sensor wiring.

Fault symptom[s]
- The engine is difficult to start
- Poor performance.

Faulty Signal

Faulty signal

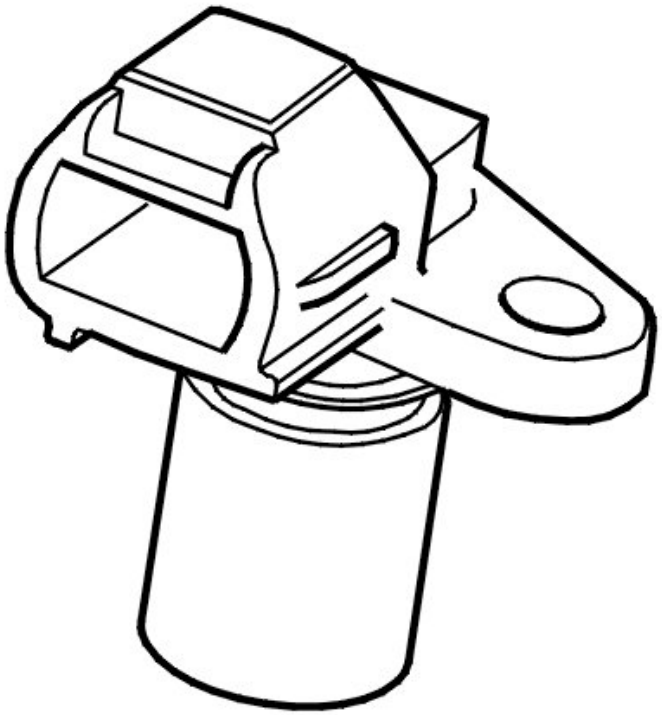
Checking components

Check that the engine speed (RPM) sensor is correctly installed.
Check the engine speed (RPM) sensor. Check that it is not damaged or dirty.

Hint: The diagnostic trouble code (DTC) can be caused by damage in the flywheel / carrier plate. Look for damage to the flywheel / carrier plate.

Other information

- Engine speed (RPM) sensor, replacing See: Crankshaft Position Sensor/Service and Repair



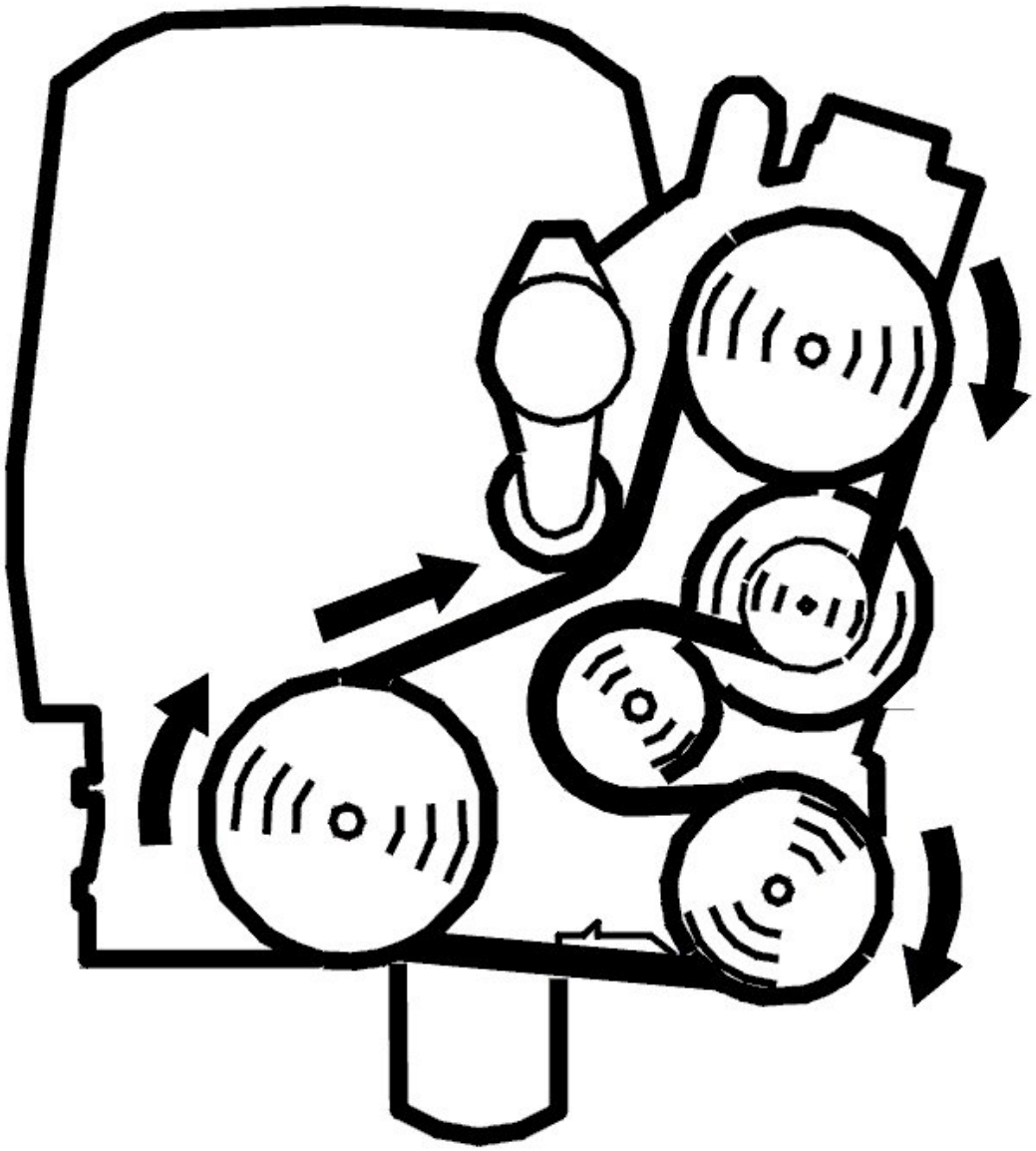
Continue - Verification

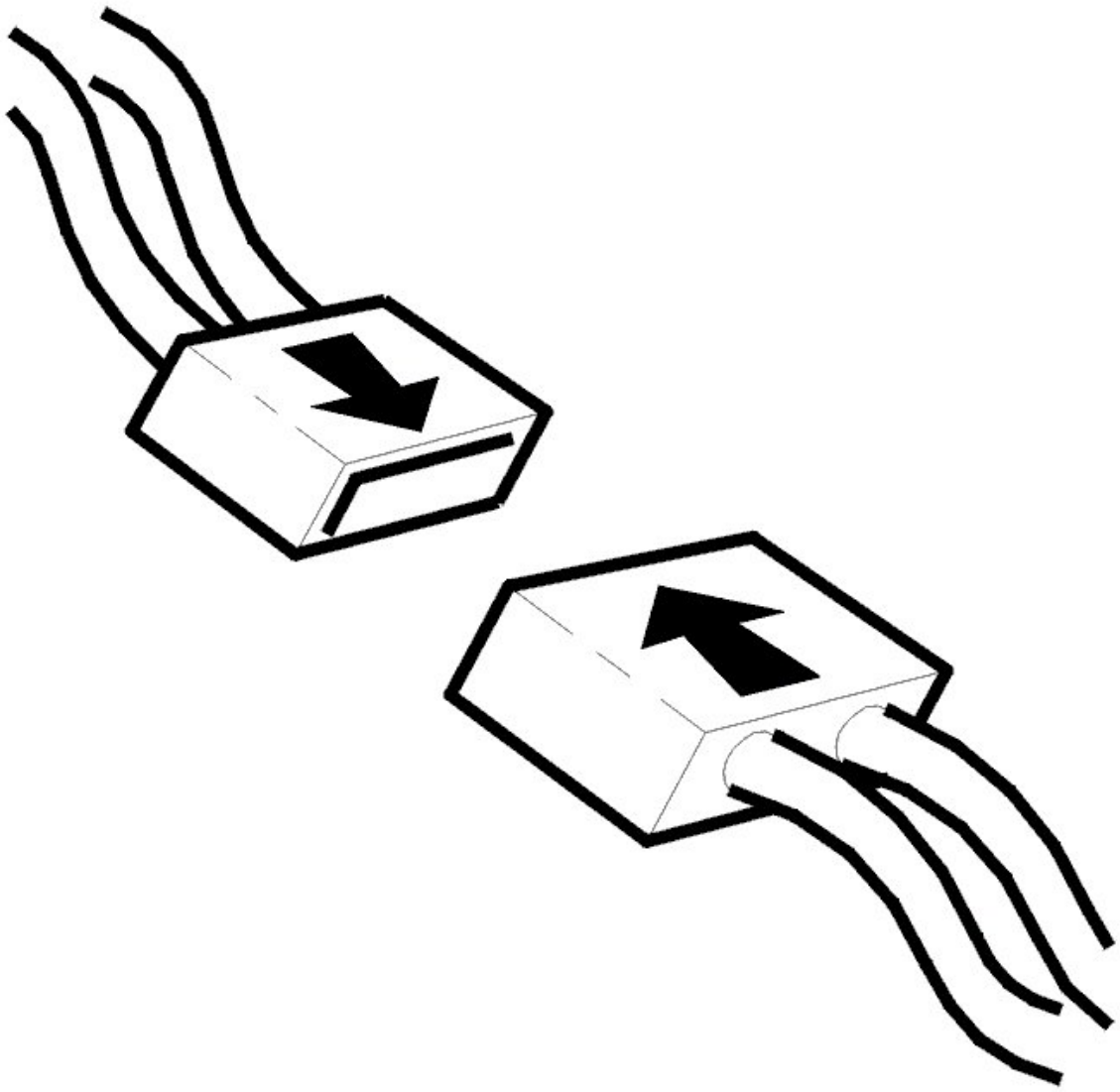
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

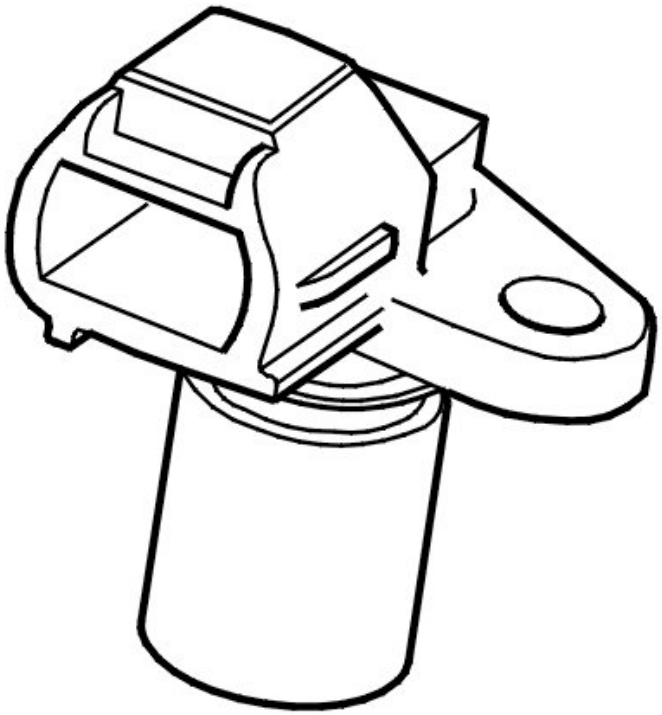
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-500B

Condition



The engine control module (ECM) detects the flywheel position for TDC using the signal from the engine speed (RPM) sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) is unable to detect TDC at the flywheel. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- The control module uses the signal from the camshaft position (CMP) sensor if the camshaft position (CMP) sensor has been adapted
- Variable valve timing control is blocked.

Possible source
- Signal interference
- Contact resistance in the terminals
- Incorrectly installed engine speed (RPM) sensor
- Intermittent fault causes in the engine speed (RPM) sensor wiring.

Fault symptom[s]
- The engine is difficult to start
- Poor performance.

Signal Missing

Signal missing

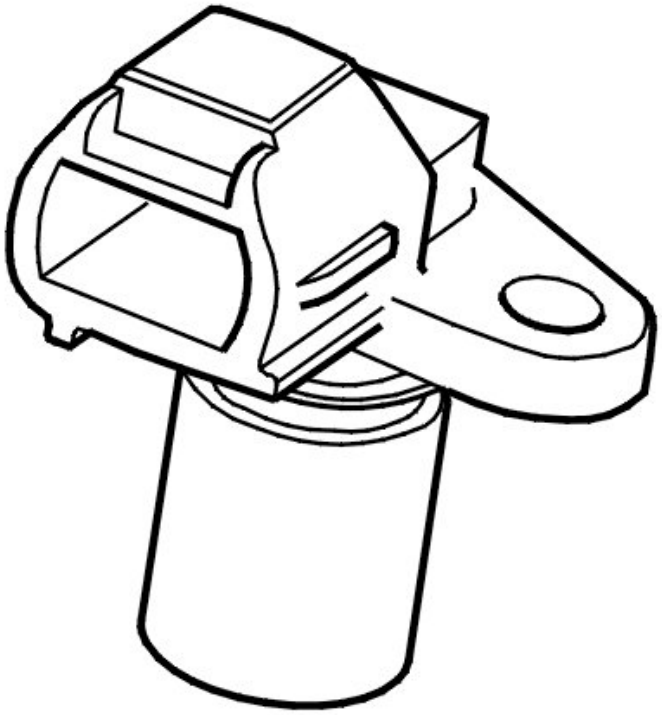
Checking components and wiring

Check the engine speed (RPM) sensor connector. Check for intermittent contact resistance and oxidation.

Hint: The engine speed (RPM) sensor and its wiring are sensitive to interference from surrounding cables, the starter motor cable for example, or similar high amperage cables.

Interference can cause difficulty in starting the engine, prevent the engine starting at all, or cause intermittent operation of the tachometer, etc. Check whether any cables with high power consumption are incorrectly installed, i.e. too close to the engine speed (RPM) sensor or its wiring. Remedy as necessary.

Other information
- Engine speed (RPM) sensor, replacing See: Crankshaft Position Sensor/Service and Repair



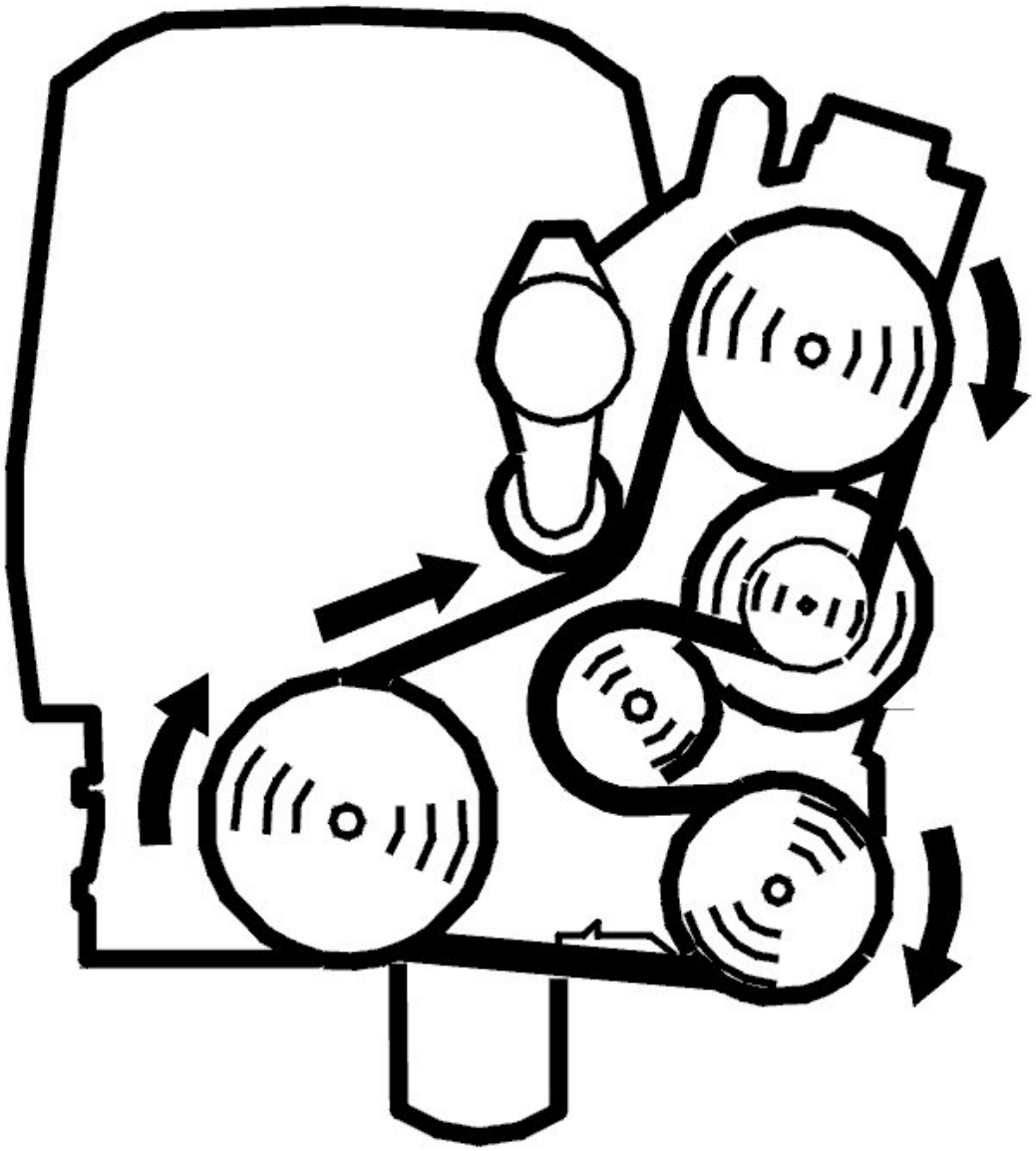
Continue - Verification

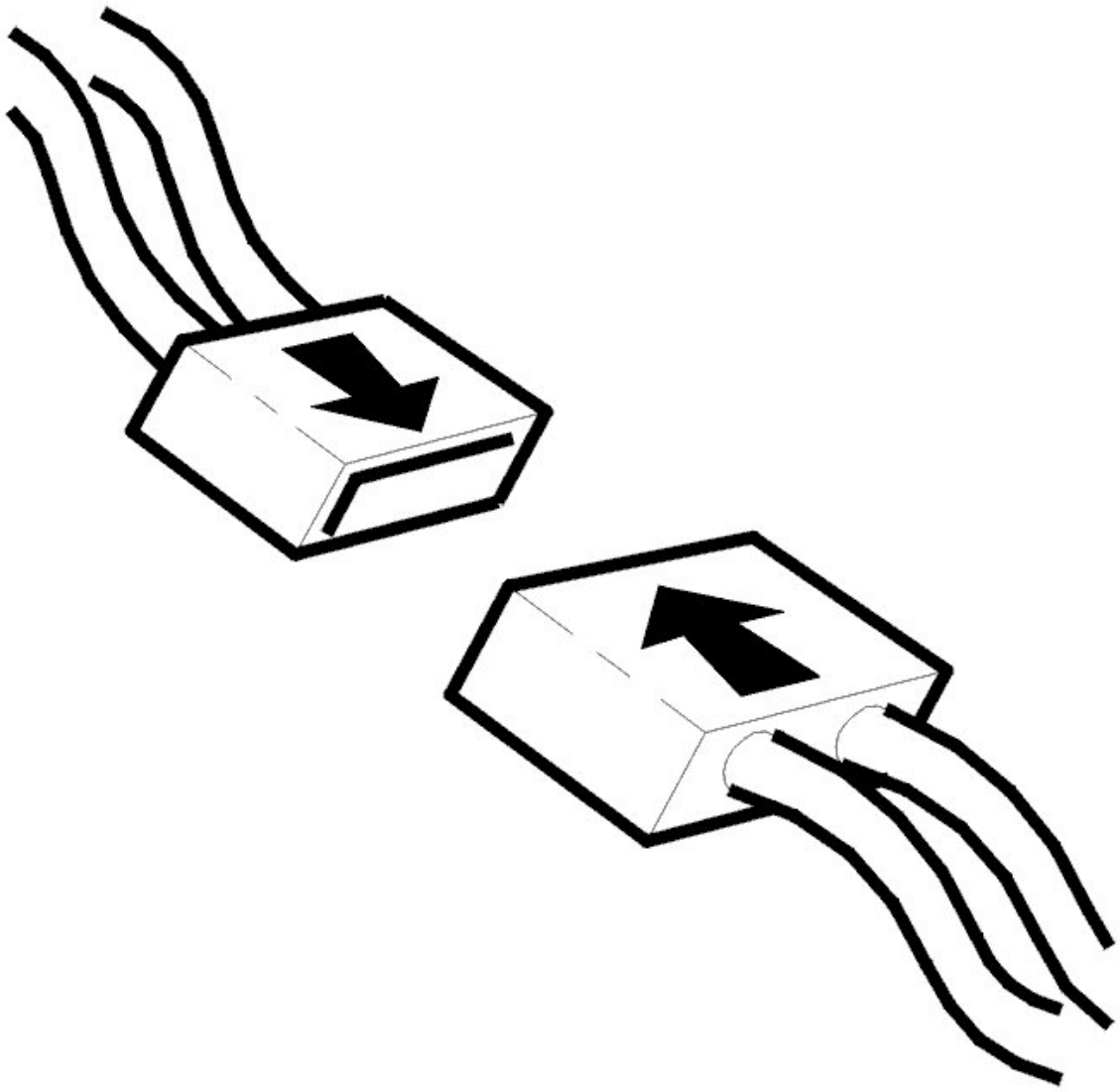
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

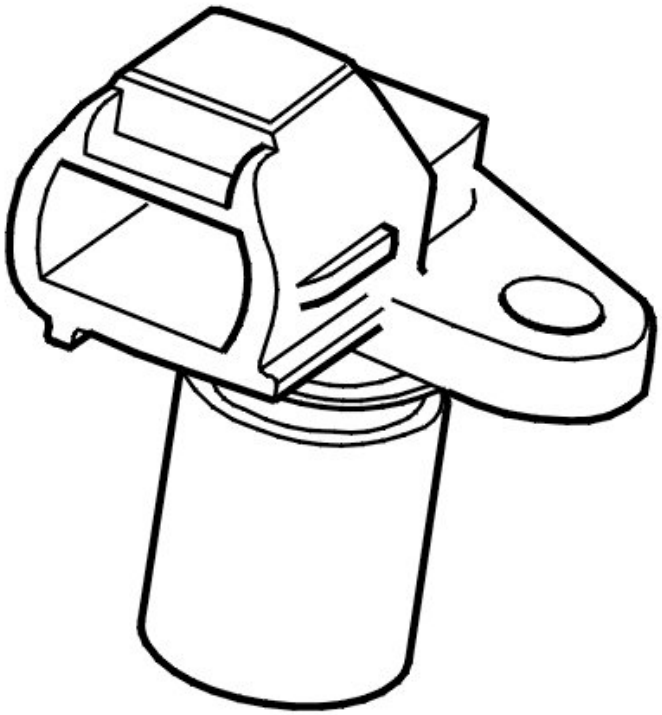
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-500C

Condition



The engine control module (ECM) counts the number of teeth on the flywheel using the signal for the engine speed (RPM) sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects at least one tooth too many during a certain number of engine revolutions. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- The engine control module (ECM) uses the signal from the camshaft position (CMP) sensor if the camshaft position (CMP) sensor has been adapted

- Variable valve timing control is blocked.

Possible source
- Signal interference
- Damaged flywheel or ring gear.

Fault symptom[s]
- The engine is difficult to start
- Poor performance.

Signal Too High

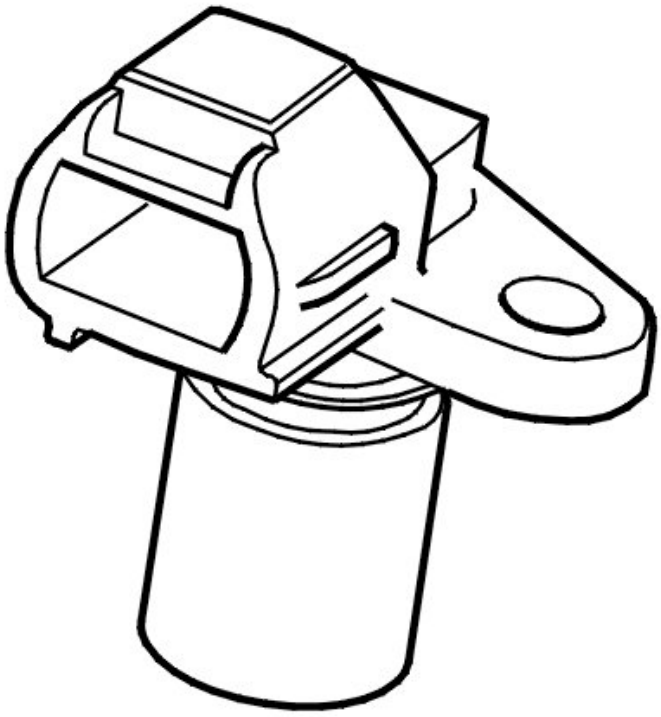
Signal too high

Checking the component and wiring
- Check the engine speed (RPM) sensor connector. Check for intermittent contact resistance and oxidation.

Hint: The engine speed (RPM) sensor and its wiring are sensitive to interference from surrounding cables, the starter motor cable for example, or similar high amperage cables.

Interference can cause difficulty in starting the engine, prevent the engine starting at all, or cause intermittent operation of the tachometer, etc. Check whether any cables with high power consumption are incorrectly installed, i.e. too close to the engine speed (RPM) sensor or its wiring. Remedy as necessary

Other information
- Engine speed (RPM) sensor, replacing See: Crankshaft Position Sensor/Service and Repair



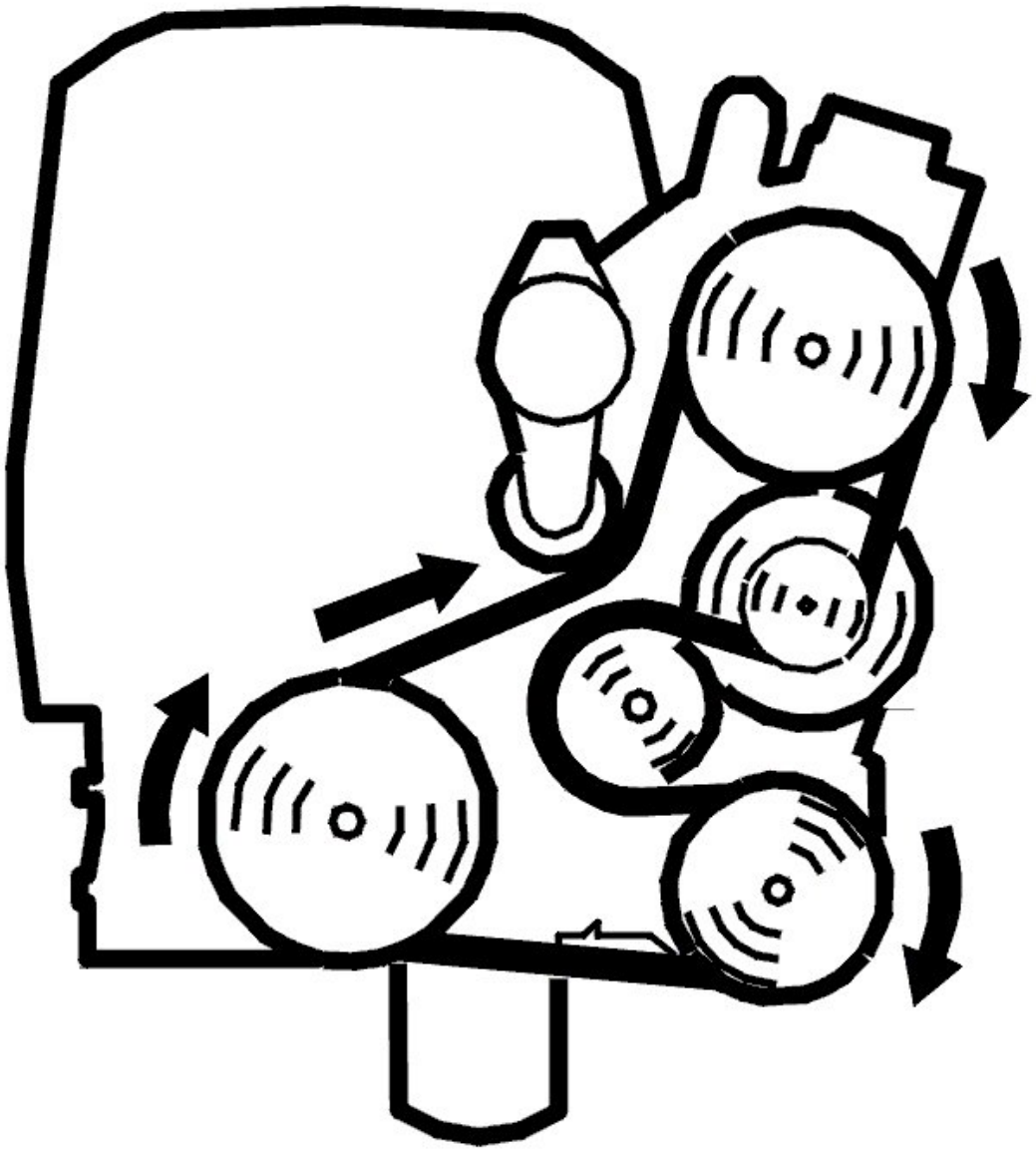
Continue - Verification

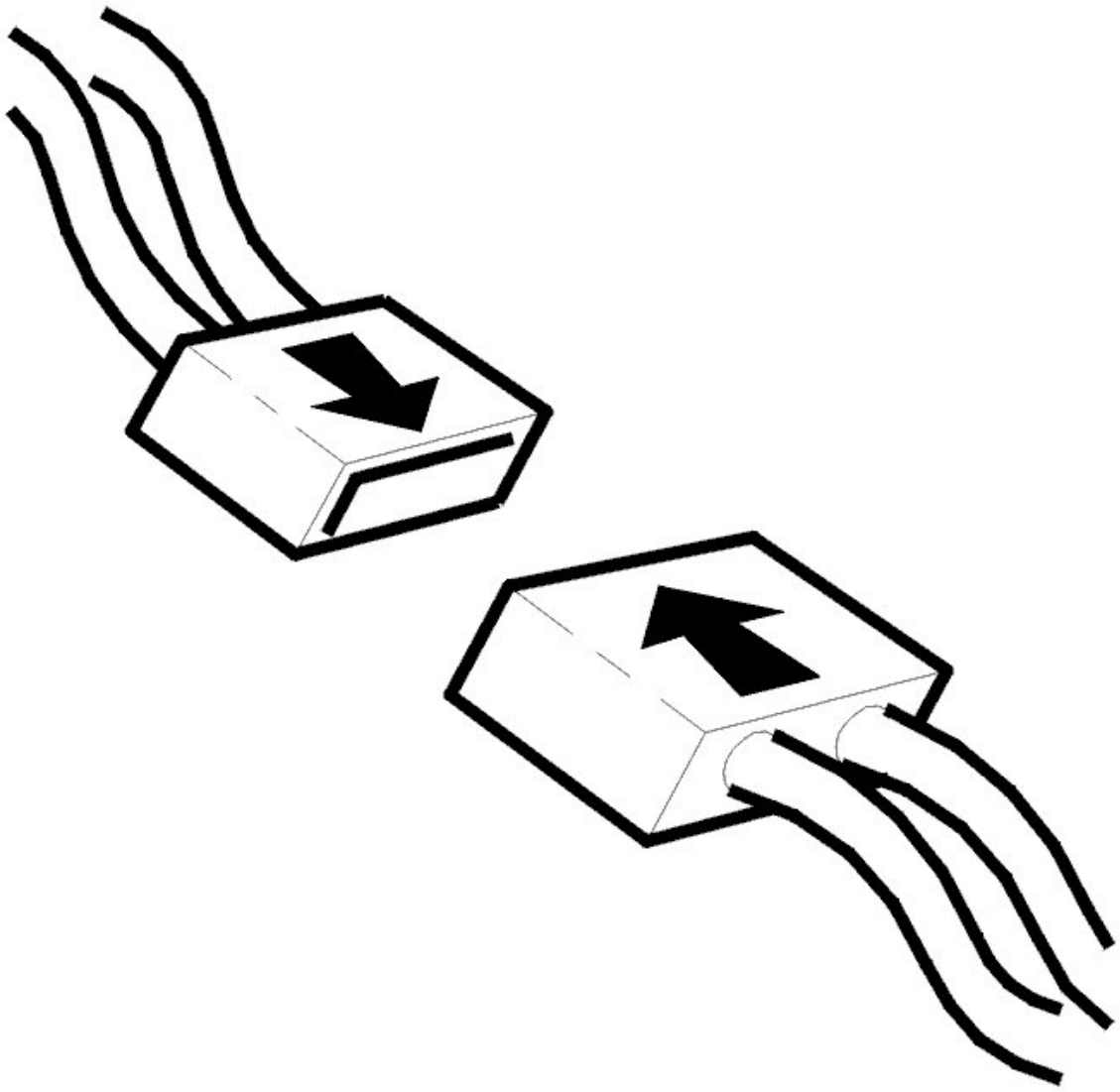
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

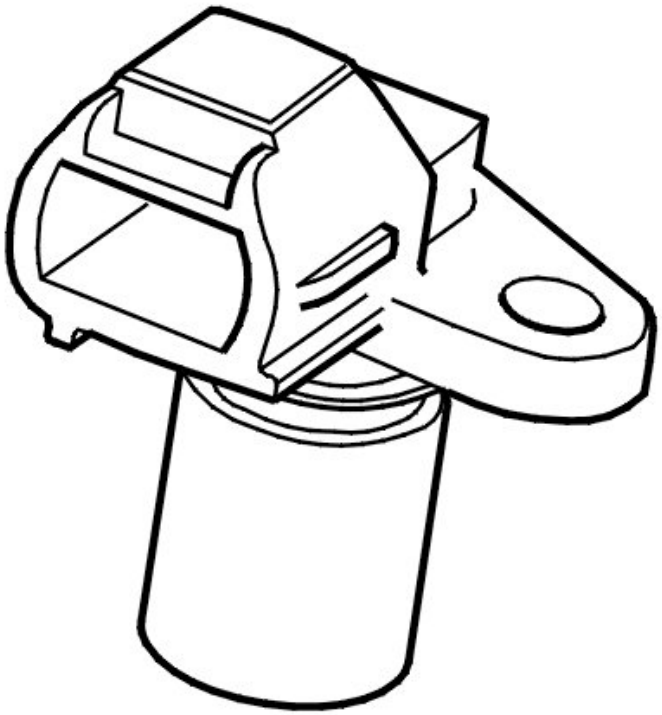
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-500D

Condition



The engine control module (ECM) counts the number of teeth on the flywheel using the signal for the engine speed (RPM) sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects at least one tooth too few during a certain number of engine revolutions. The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- The control module uses the signal from the camshaft position (CMP) sensor if the camshaft position (CMP) sensor has been adapted
- Variable valve timing control is blocked.

Possible source
- Signal interference
- Incorrectly installed engine speed (RPM) sensor
- Damaged flywheel or ring gear.

Fault symptom[s]
- The engine is difficult to start
- Poor performance.

Signal Too Low

Signal too low

Checking components

Check that the engine speed (RPM) sensor is correctly installed.
Check the engine speed (RPM) sensor connector. Check for intermittent contact resistance and oxidation.

Hint: The engine speed (RPM) sensor and its wiring are sensitive to interference from surrounding cables, the starter motor cable for example, or similar high amperage cables.

Interference can cause difficulty in starting the engine, prevent the engine from starting at all or cause the tachometer to flicker during start attempts etc.

Causes of interference can be:
- nearby cables, such as an incorrectly routed cable for the starter motor
- incorrectly tightened bolted joints securing the transmission to the engine.

Checking power cable

Check for incorrectly routed cables (routed too close to the engine speed (RPM) sensor).

Checking bolted joints

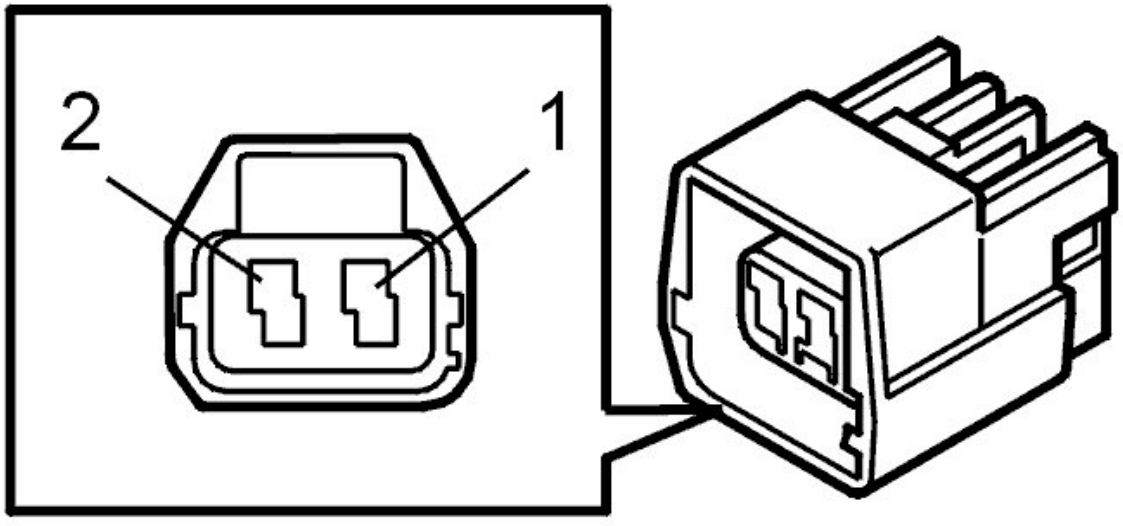
When removing and installing the transmission it is important that all the bolts for the engine are correctly tightened. Incorrectly tightened bolts can cause poor ground connection and interfere with the engine speed (RPM) sensor. Check that all the bolts from the transmission to the engine are correctly tightened.

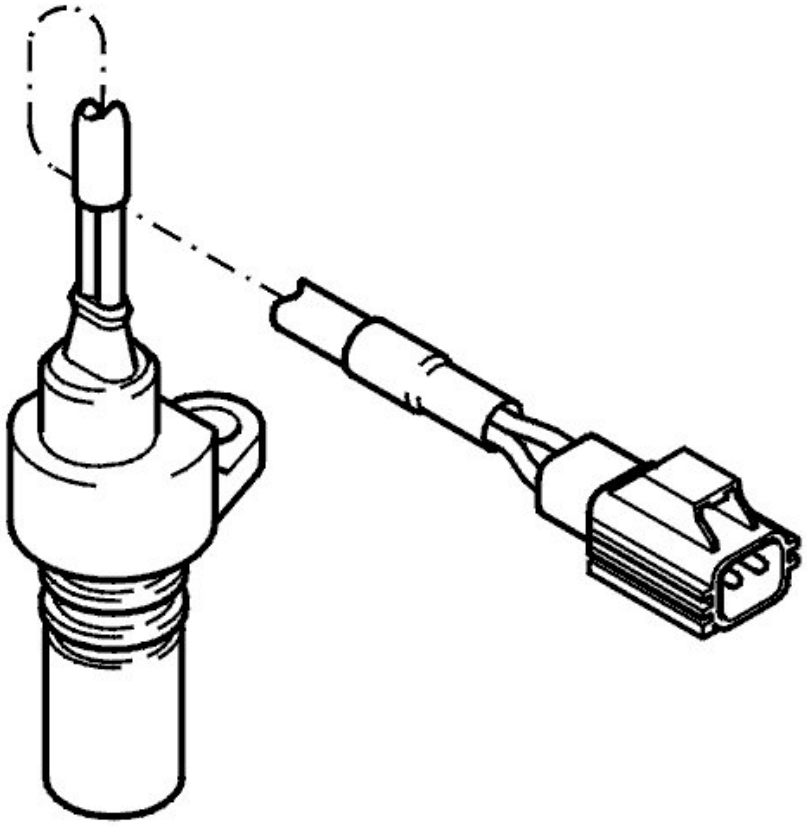
Checking the wiring

Check the signal cable between the engine speed (RPM) sensor terminal #1 and engine control module (ECM) terminal #A48 (#A48) and between the engine speed (RPM) sensor terminal #2 and engine control module (ECM) terminal #A66 (#B6). Check for an intermittent short-circuit to supply voltage. Check for an intermittent short-circuit to ground. Check for an intermittent open-circuit.

Other information:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Engine speed (RPM) sensor, replacing See: Crankshaft Position Sensor/Service and Repair.

Remedy as necessary.





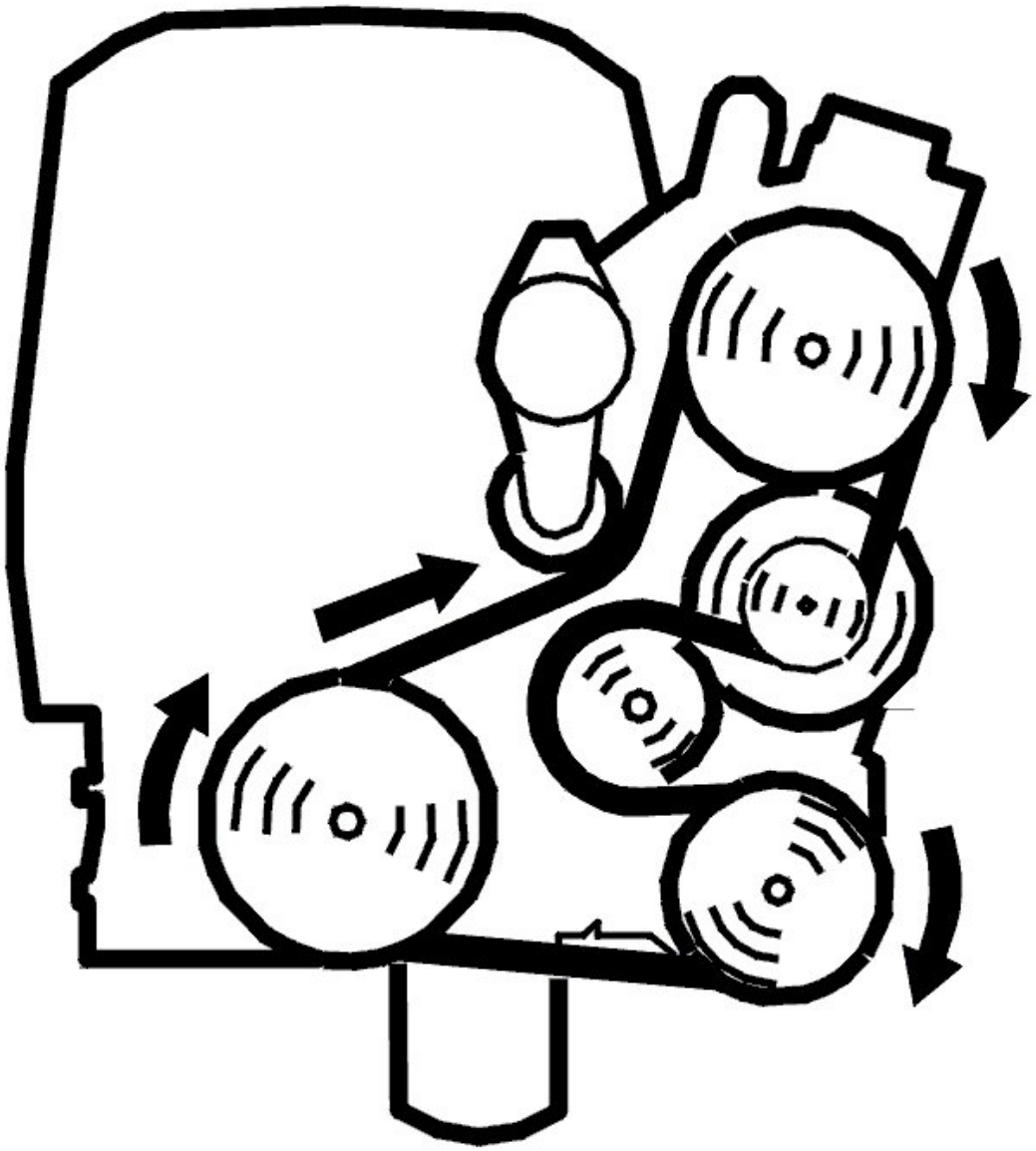
Continue - Verification

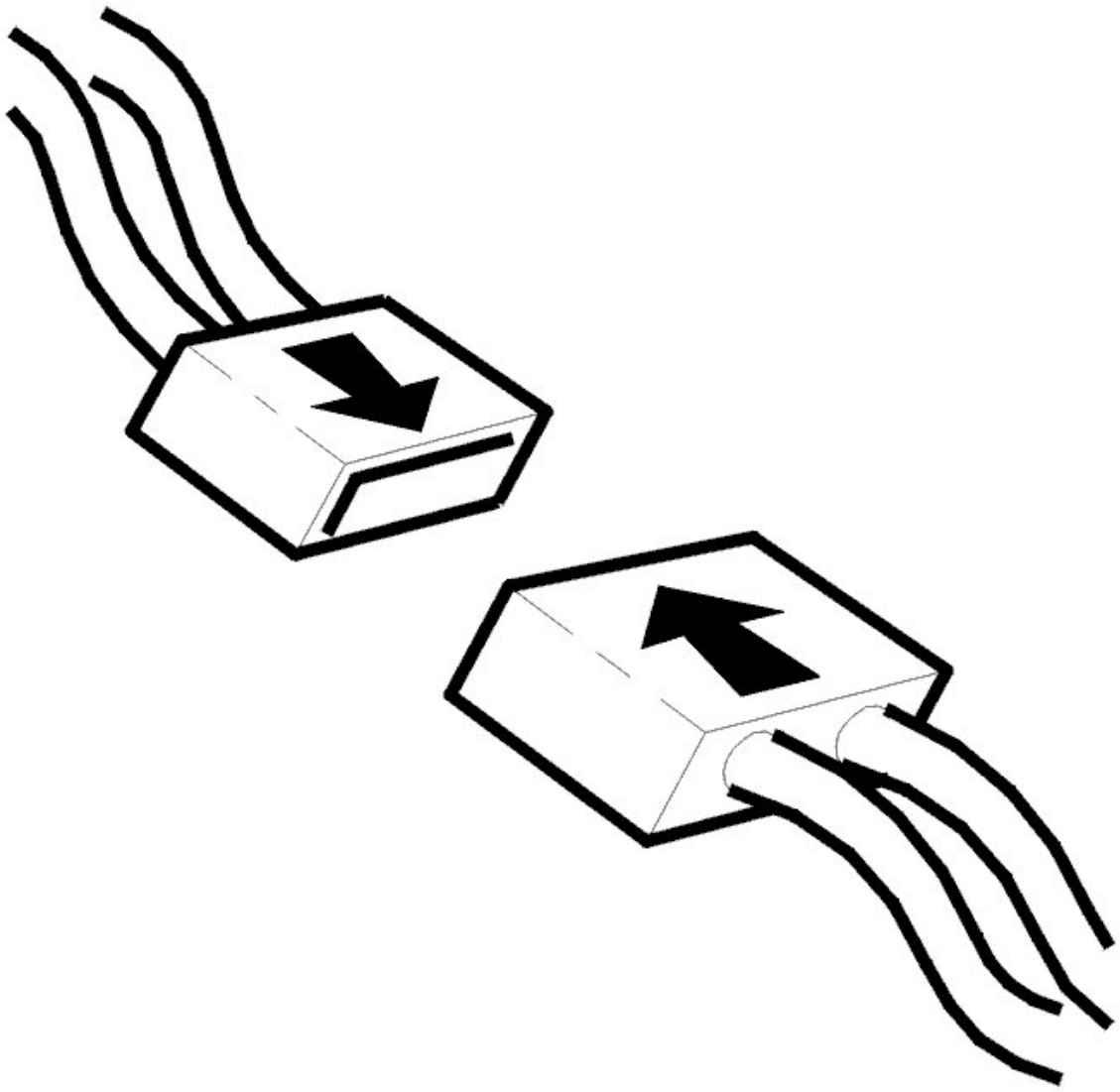
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Increase the engine speed a number of times until the diagnostic is "Complete".
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5100

Condition

One or more diagnostic trouble codes (DTCs) which affect emissions are stored in the transmission control module (TMC).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the transmission control module (TCM) has transmitted a request to light the malfunction indicator lamp (MIL).
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault trace the transmission control module (TCM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

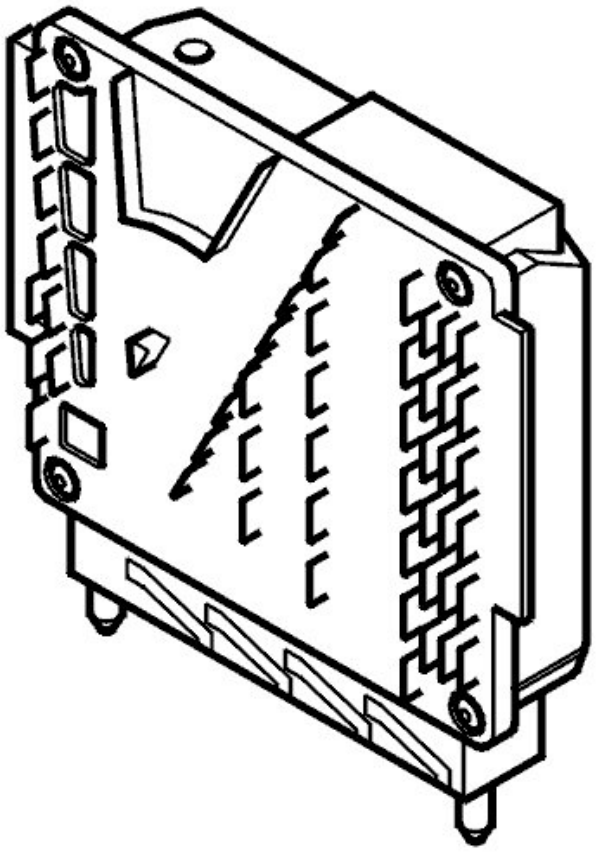
Information

No fault-tracing has been developed for this diagnostic trouble code (DTC). A diagnostic trouble code (DTC) for this fault is stored in the transmission control module (TCM) first and then in the engine control module (ECM). This diagnostic trouble code (DTC) can not be erased before the diagnostic trouble code (DTC) in the transmission control module (TCM) has been erased and remedied.
First read off the diagnostic trouble codes (DTCs) in the transmission control module (TCM). Fault-trace and remedy as required. This diagnostic trouble code (DTC) can then be erased. For further information about this diagnostic trouble code (DTC), see Diagnostic Trouble Code (DTC) Information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5110

Condition



The diagnostic trouble code (DTC) is stored if the central electronic module (CEM) detects a fault in the software for the engine control module (ECM) (incorrect check sum).

Substitute value
- None.

Possible source
- Incorrect engine control module (ECM) for this vehicle
- Changed software in the engine control module (ECM)
- Damaged engine control module (ECM).

Fault symptom[s]
- None.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-512B

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the CAN communication between the transmission control module (TCM) and the engine control module (ECM).
The diagnostic trouble code (DTC) is diagnosed with the engine running and with battery voltage above 10.5 V.

Substitute value
- None.

Possible source

- Open-circuit in the control area network (CAN) wiring
- Short-circuit between the control area network (CAN) wiring
- Internal fault in the engine control module (ECM)
- Internal fault in the transmission control module (TCM)
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- No accelerator pedal (AP) response.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5130

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the transmission control module (TCM) has transmitted a request to save the frozen values.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault trace the transmission control module (TCM).

Fault symptom[s]
- Warning lights and chimes/Malfunction Indicator Light ("Check engine" light) indication/no indication

Fault-Tracing Information

Fault-tracing information

Information

No fault-tracing has been developed for this diagnostic trouble code (DTC). A diagnostic trouble code (DTC) for this fault is stored in the transmission control module (TCM) first and then in the engine control module (ECM). This diagnostic trouble code (DTC) can not be erased before the diagnostic trouble code (DTC) in the transmission control module (TCM) has been erased and remedied.
First read off the diagnostic trouble codes (DTCs) in the transmission control module (TCM). Fault-trace and remedy as required. This diagnostic trouble code (DTC) can then be erased. For further information about this diagnostic trouble code (DTC), see Diagnostic Trouble Code (DTC) Information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-513B

Condition

The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the transmission control module (TCM) has transmitted a request to save the frozen values.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Fault trace the transmission control module (TCM).

Fault symptom[s]
- Varies depending on the diagnostic trouble code (DTC) stored in the transmission control module (TCM).

Fault-Tracing Information

Fault-tracing information

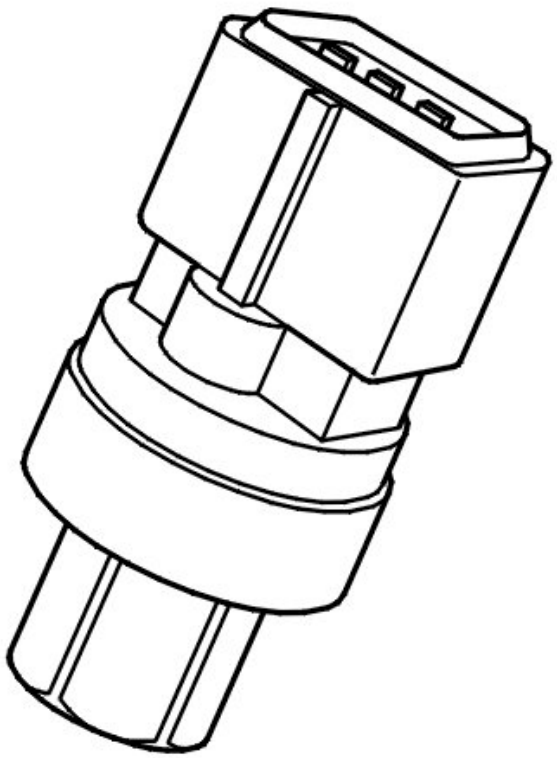
Information

No fault-tracing has been developed for this diagnostic trouble code (DTC). A diagnostic trouble code (DTC) for this fault is stored in the transmission control module (TCM) first and then in the engine control module (ECM). This diagnostic trouble code (DTC) can not be erased before the diagnostic trouble code (DTC) in the transmission control module (TCM) has been erased and remedied.
First read off the diagnostic trouble codes (DTCs) in the transmission control module (TCM). Fault-trace and remedy as required. This diagnostic trouble code (DTC) can then be erased. For further information about this diagnostic trouble code (DTC), see Diagnostic Trouble Code (DTC) Information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5200

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the pressure in the air conditioning (A/C) system has not increased for a certain time following activation of the air conditioning (A/C) compressor.
The diagnostic trouble code (DTC) can be diagnosed while the engine is running and air conditioning (A/C) control is active.

Substitute value
- None.

Possible source
- Damaged A/C pressure sensor
- Low pressure in the air conditioning (A/C) system.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Fault-Tracing Information

Fault-tracing information

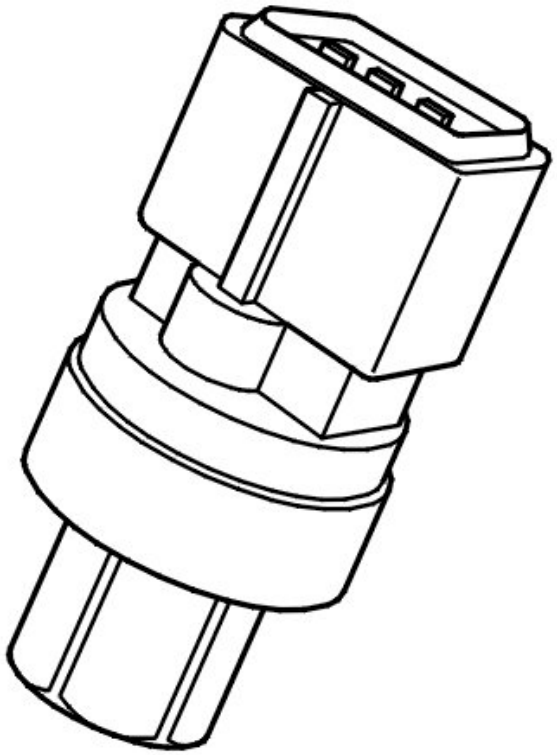
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-520B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that there is no signal from the air conditioning (A/C) pressure sensor.
The diagnostic trouble code (DTC) can be diagnosed while the engine is running and while air conditioning (A/C) control is active.

Substitute value
- Predefined value for the air conditioning pressure.

Possible source
- Open-circuit in the signal cable
- Damaged A/C pressure sensor.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Signal Missing Permanent Fault

Signal missing. Permanent fault

Checking component and wiring

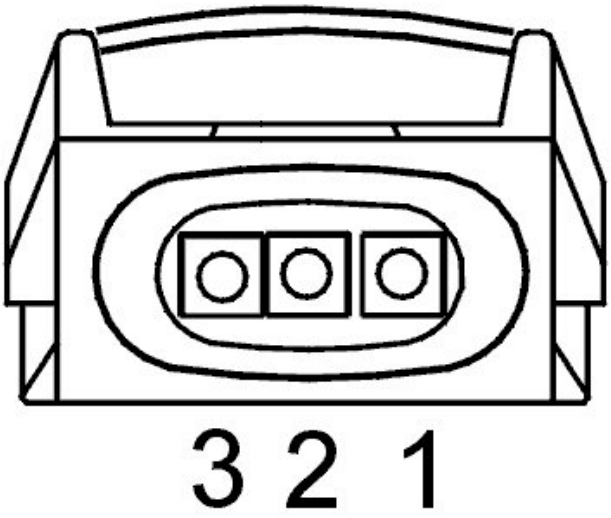
Check if there is any refrigerant in the air conditioning (A/C).

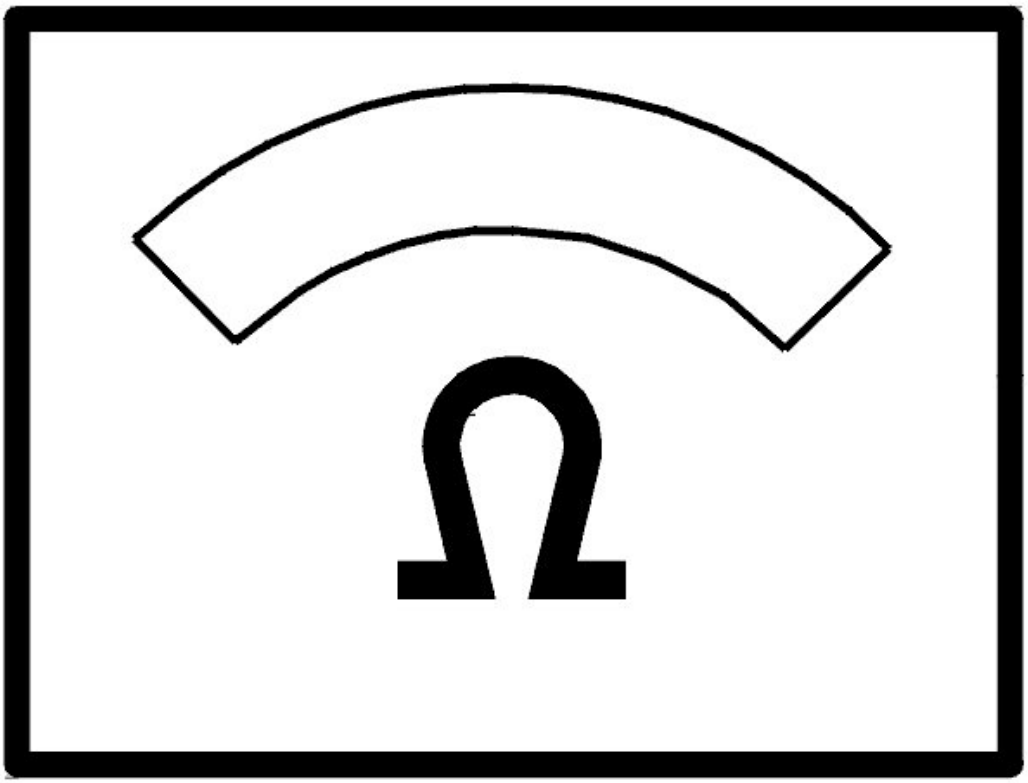
Hint: If there is refrigerant in the A/C system there is probably a fault in the A/C pressure sensor.

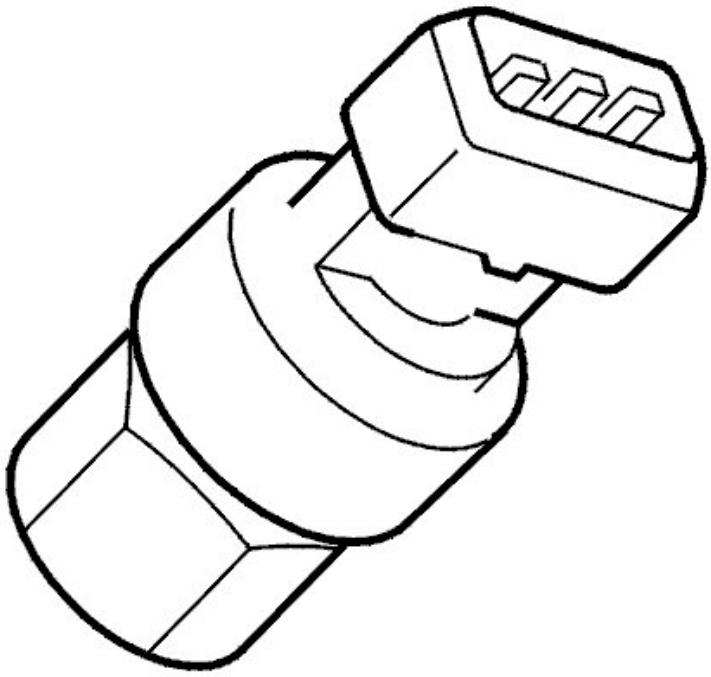
Check air conditioning (A/C) system for damage and leakage.
Remedy as necessary.

Other information:

- Connecting the breakout box/accessing the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- Air conditioning (A/C) pressure sensor #2 is the signal cable, #3 is the power supply (5V) and #1 is the signal ground.
- For resistance values, see Component specifications See: Engine Control Module/Specifications.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.







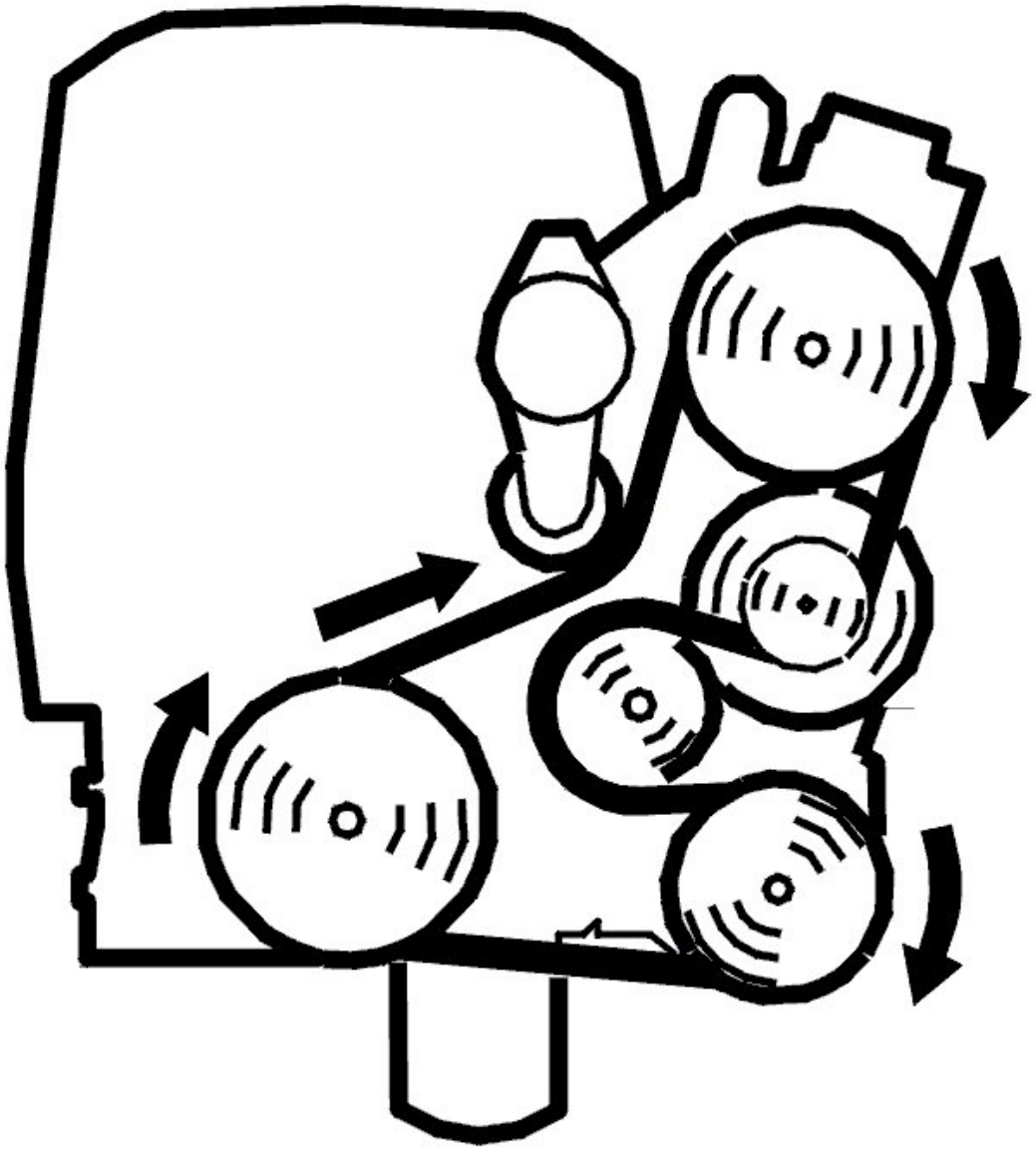
Continue - Verification

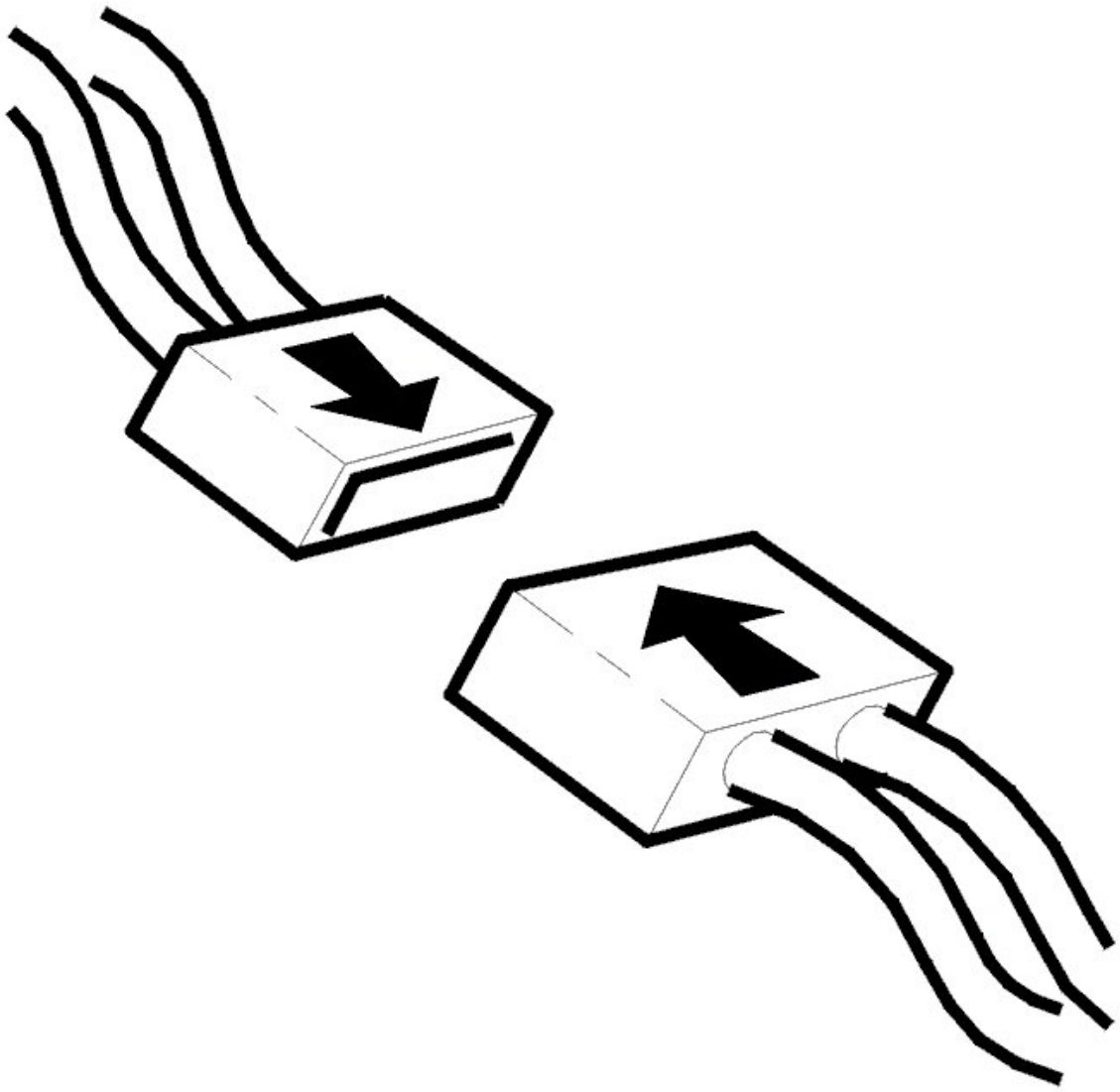
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

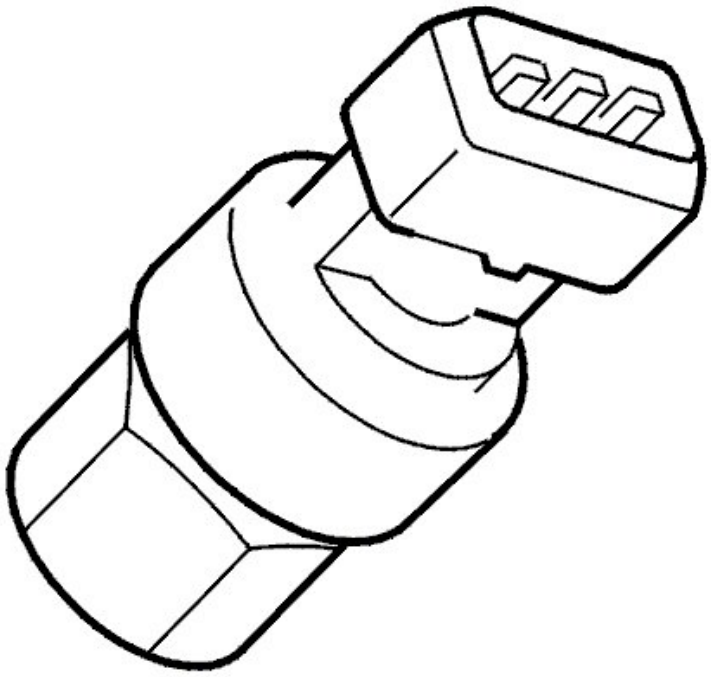




- Ignition off.
- Reinstall connectors, components etc.
- Start the engine.
- Air conditioning (A/C) switch on
- Start the blower fan

Check that the pressure increases in the air conditioning (A/C) system when the air conditioning (A/C) compressor engages. Also check if cold air blows into the passenger compartment when at the coolest setting.

Note! The air conditioning (A/C) pressure is given in volts for values see Component specifications See: Engine Control Module/Specifications.



Does the pressure in air conditioning (A/C) system change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

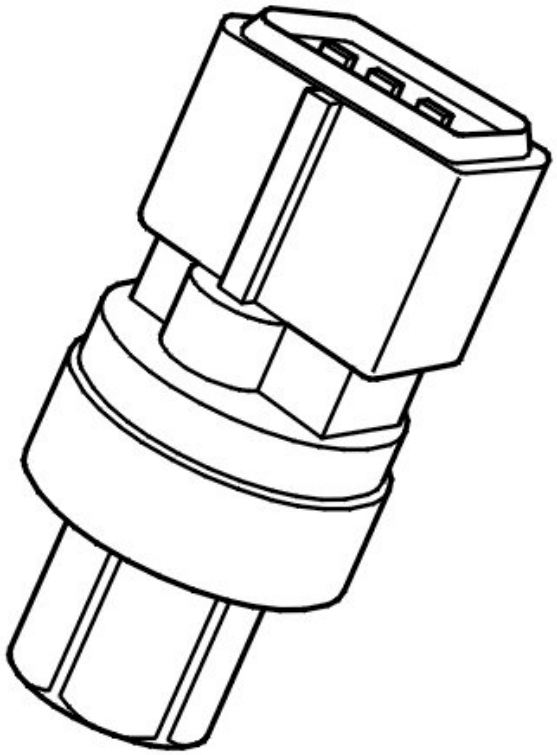
Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-520C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the air conditioning (A/C) pressure sensor is higher than the normal operating range.
The diagnostic trouble code (DTC) can be diagnosed while the engine is running and while air conditioning (A/C) control is active.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the power supply
- Open-circuit in the ground lead
- Damaged A/C pressure sensor.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Signal Too High Permanent Fault

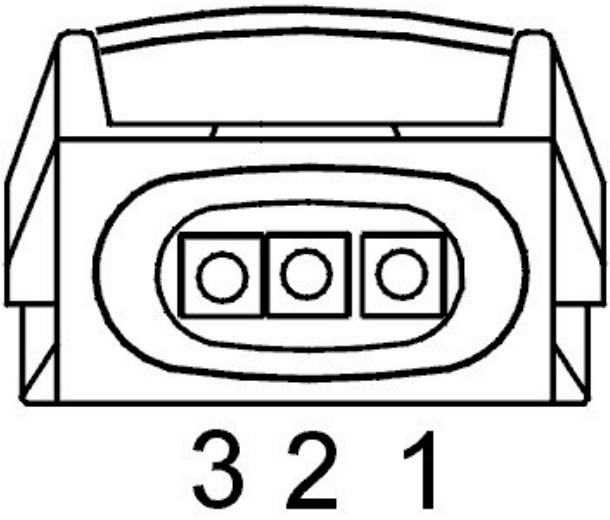
Signal too high. Permanent fault

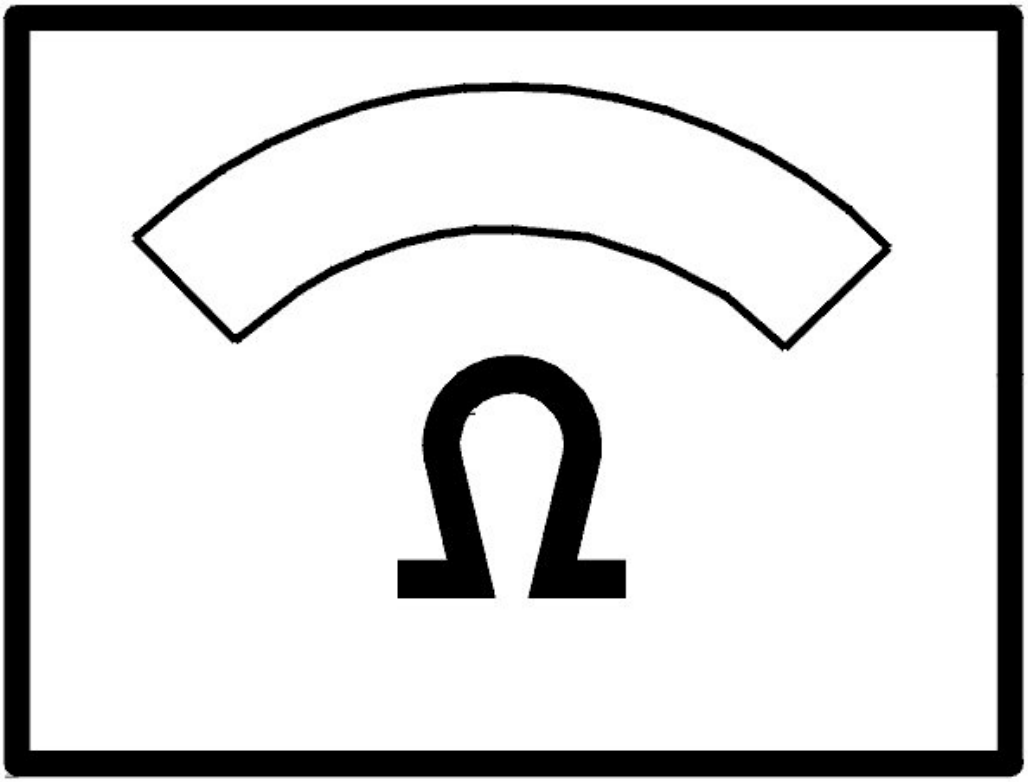
Checking component and wiring

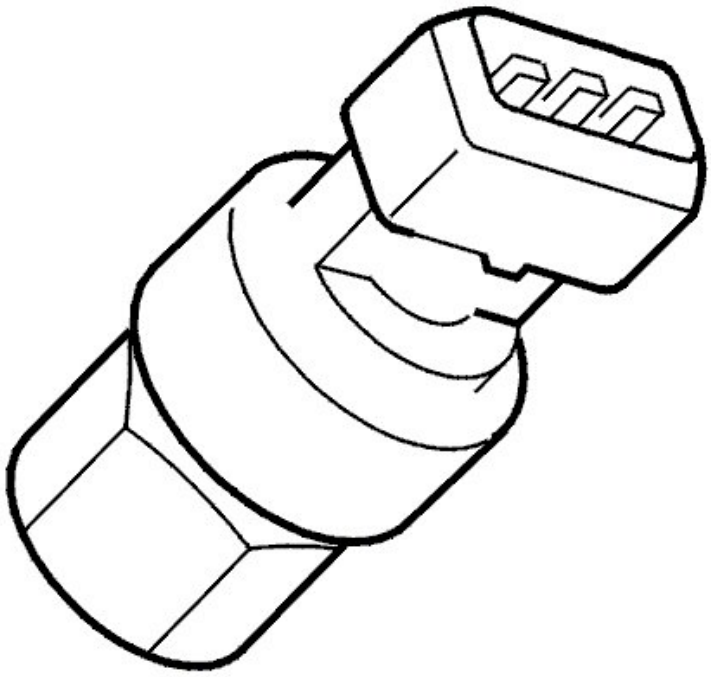
Check signal cable between engine control module (ECM) #A68 (#B8) and air conditioning (A/C) pressure sensor #2 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check power supply cable between engine control module (ECM) #A39 (#A39) and air conditioning (A/C) pressure sensor #3 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check power supply cable between engine control module (ECM) #A60 (#A60) and air conditioning (A/C) pressure sensor #1 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- Connecting the breakout box/accessing the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- Air conditioning (A/C) pressure sensor #2 is the signal cable, #3 is the power supply (5V) and #1 is the signal ground.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.







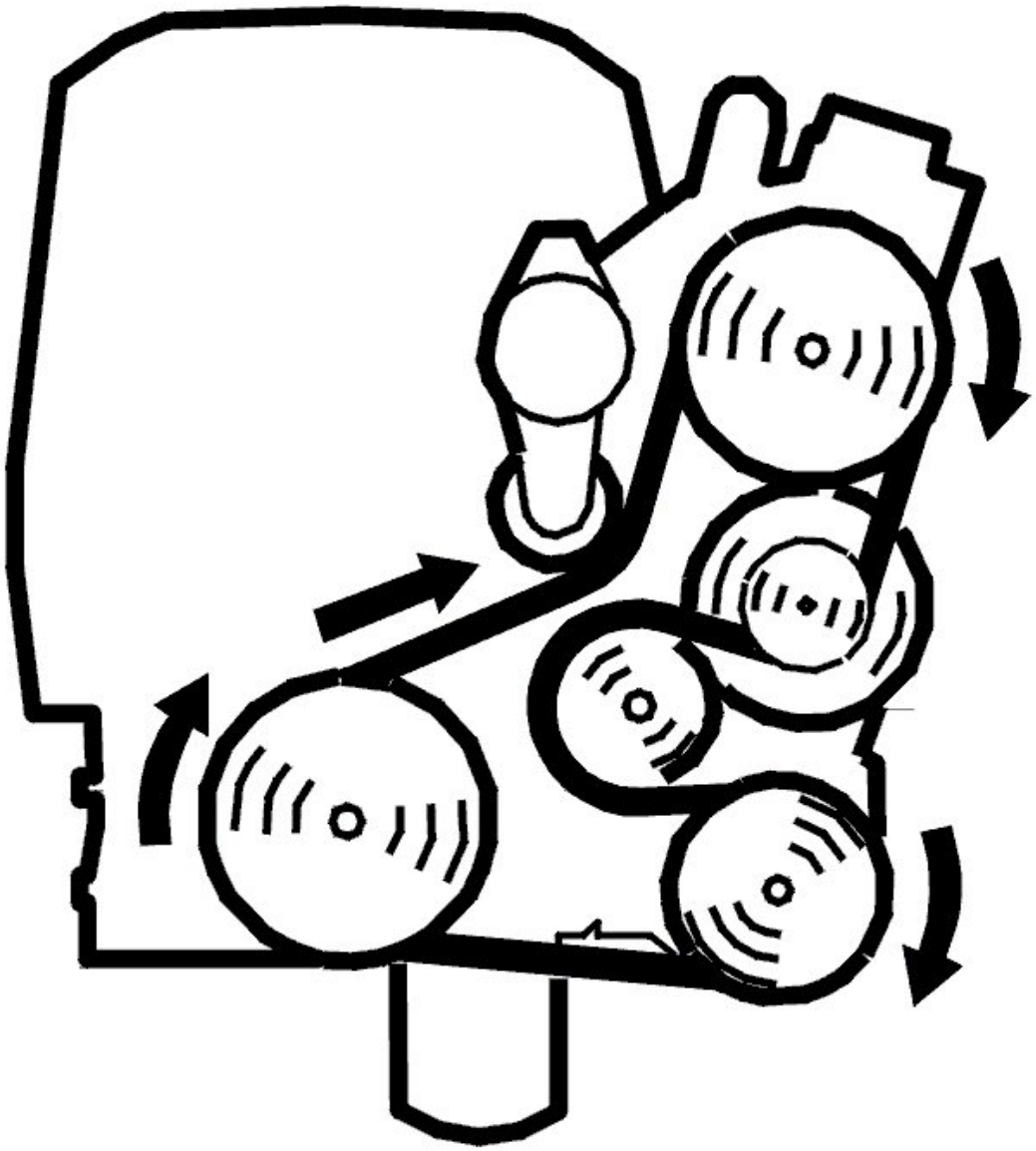
Continue - Verification

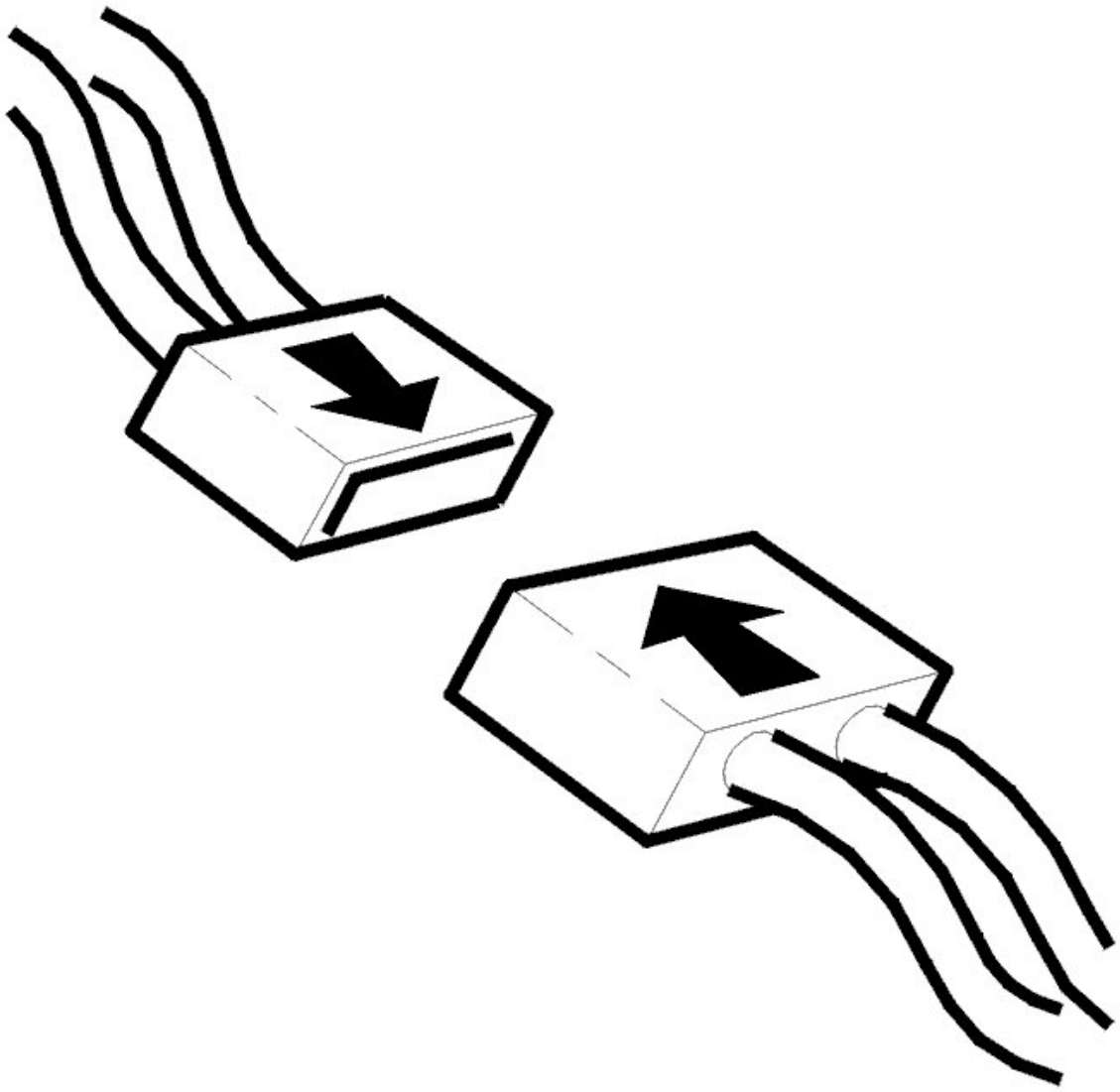
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

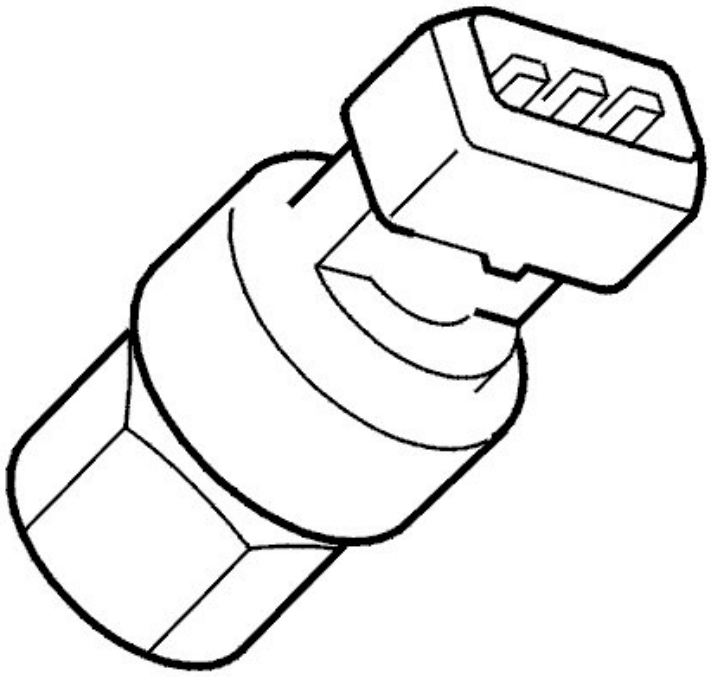




- Ignition off.
- Reinstall connectors, components etc.
- Start the engine.
- Air conditioning (A/C) switch on
- Start the blower fan

Check that the pressure increases in the air conditioning (A/C) system when the air conditioning (A/C) compressor engages. Also check if cold air blows into the passenger compartment when at the coolest setting.

Note! The air conditioning (A/C) pressure is given in volts for values see Component specifications See: Engine Control Module/Specifications.



Does the pressure in air conditioning (A/C) system change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

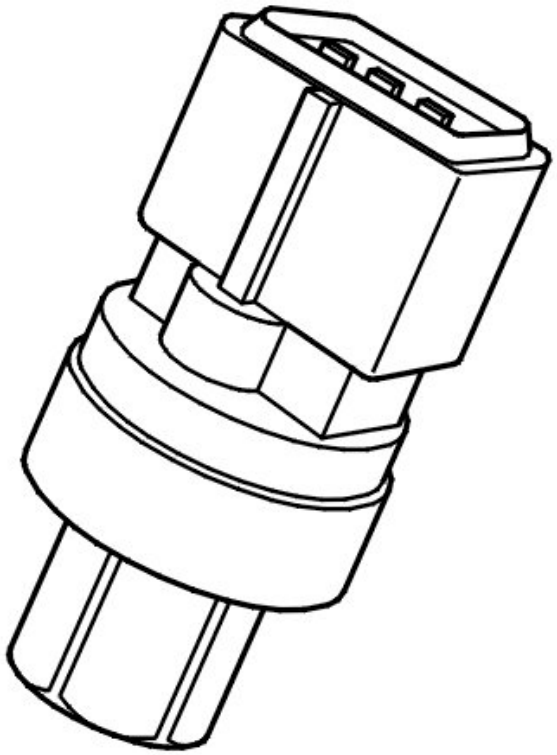
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-520D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the air conditioning (A/C) pressure sensor is lower than the normal operating range.
The diagnostic trouble code (DTC) can be diagnosed while the engine is running and while air conditioning (A/C) control is active.

Substitute value
- None.

Possible source
- Open-circuit in the power supply
- Open-circuit in the ground lead
- Damaged A/C pressure sensor.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Signal Too Low Permanent Fault

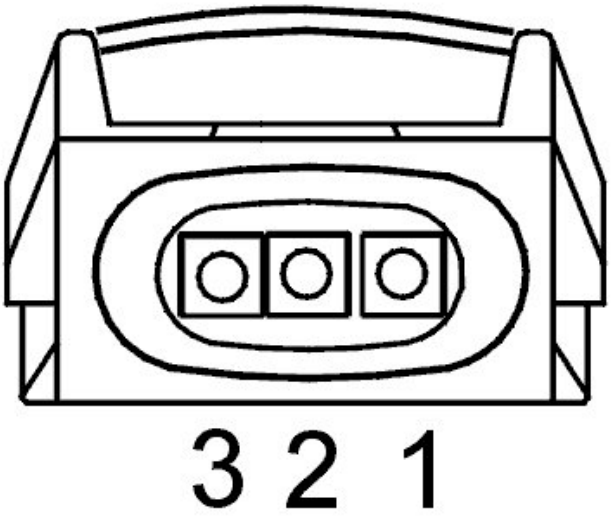
Signal too low. Permanent fault

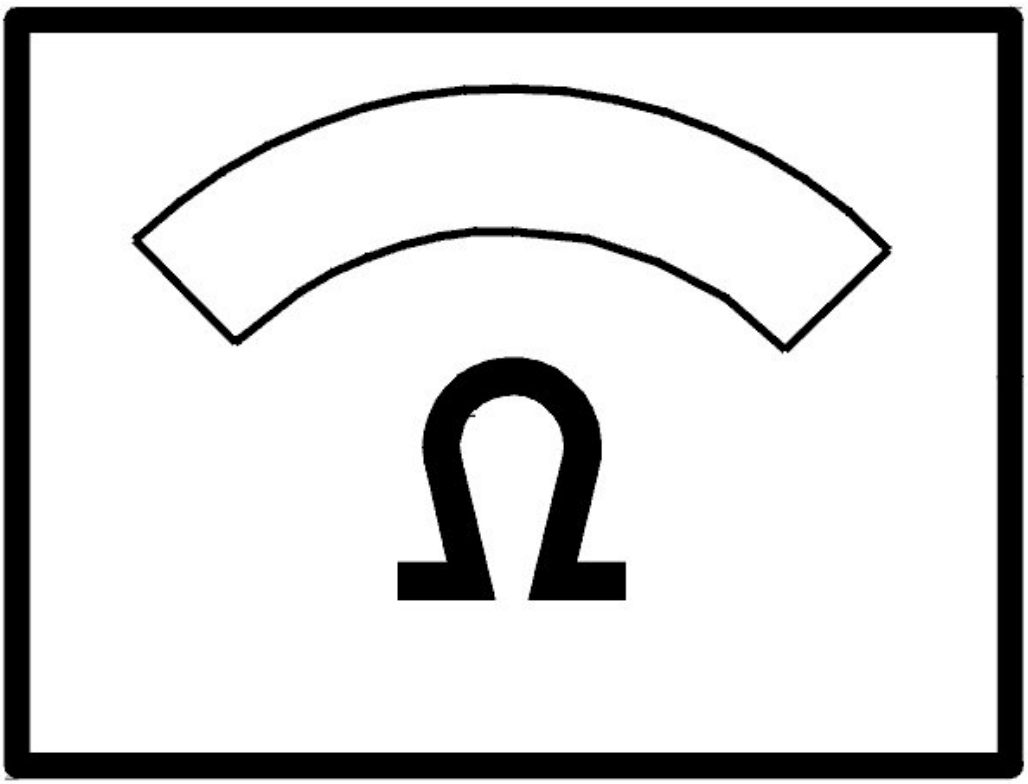
Checking component and wiring

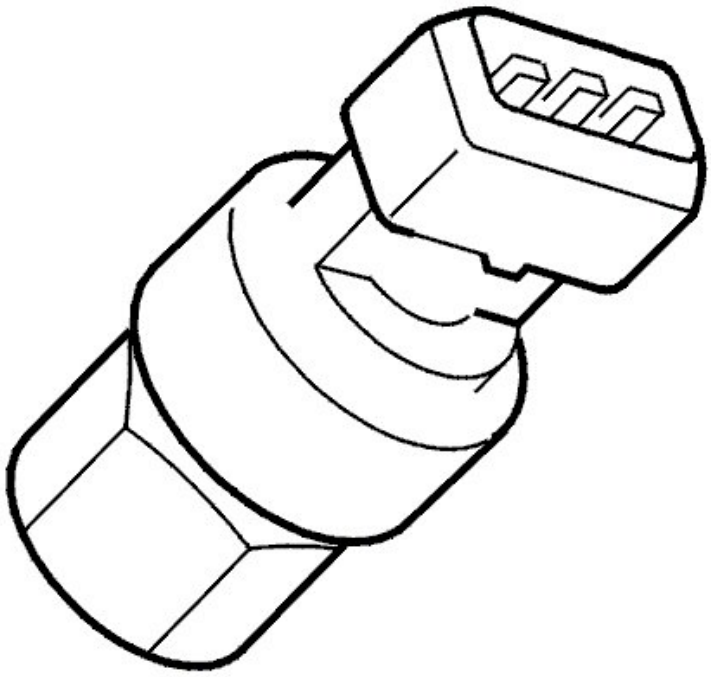
Check air conditioning (A/C) pressure sensor connector for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check signal cable between engine control module (ECM) #A68 (#B8) and air conditioning (A/C) pressure sensor #2 for an short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check signal cable between engine control module (ECM) #A68 (#B8) and air conditioning (A/C) pressure sensor #2 for an open circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check power supply cable between engine control module (ECM) #A39 (#A39) and air conditioning (A/C) pressure sensor #3 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- Connecting the breakout box/accessing the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- Air conditioning (A/C) pressure sensor #2 is the signal cable, #3 is the power supply (5 V) and #1 is the signal ground.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.







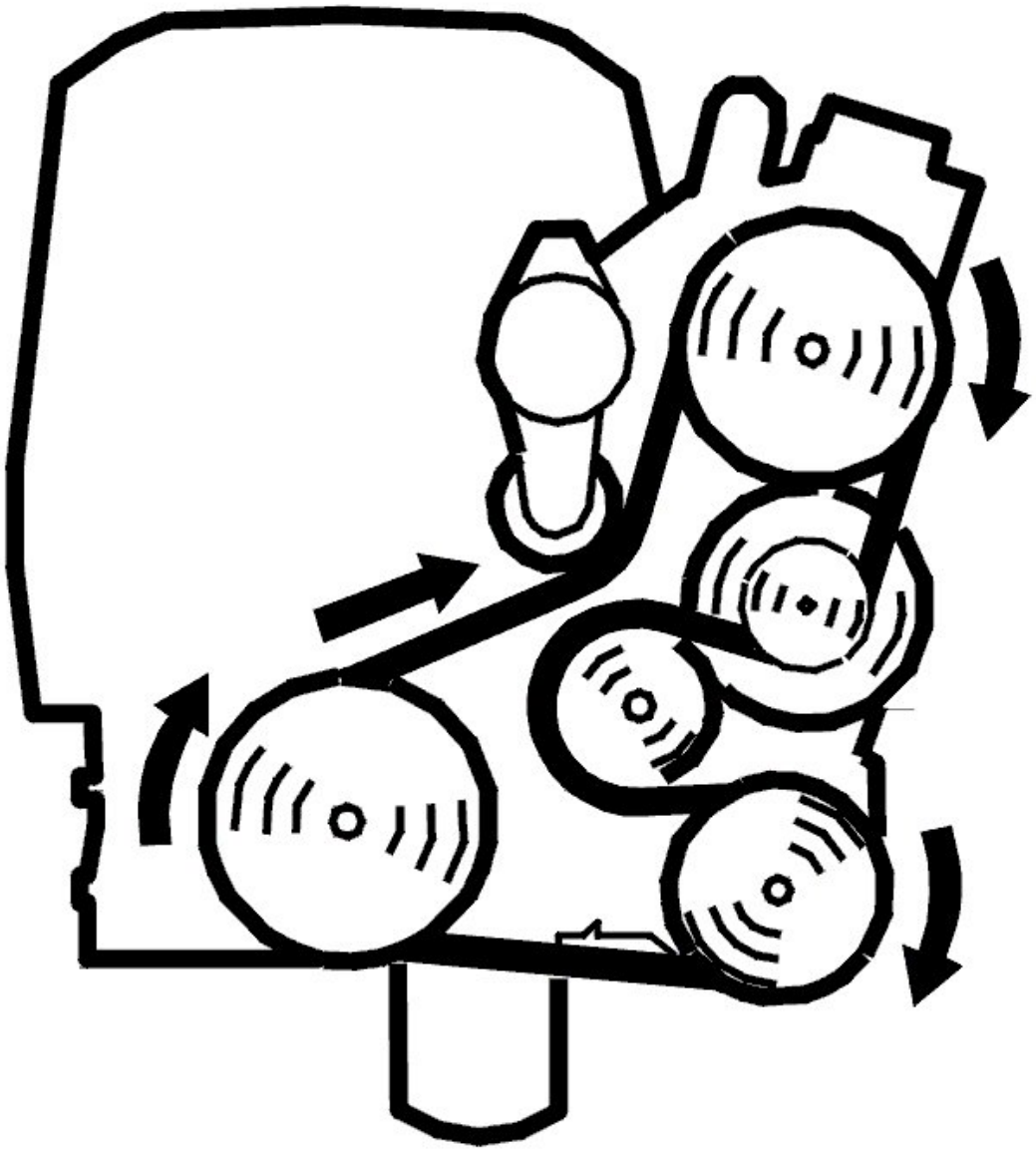
Continue - Verification

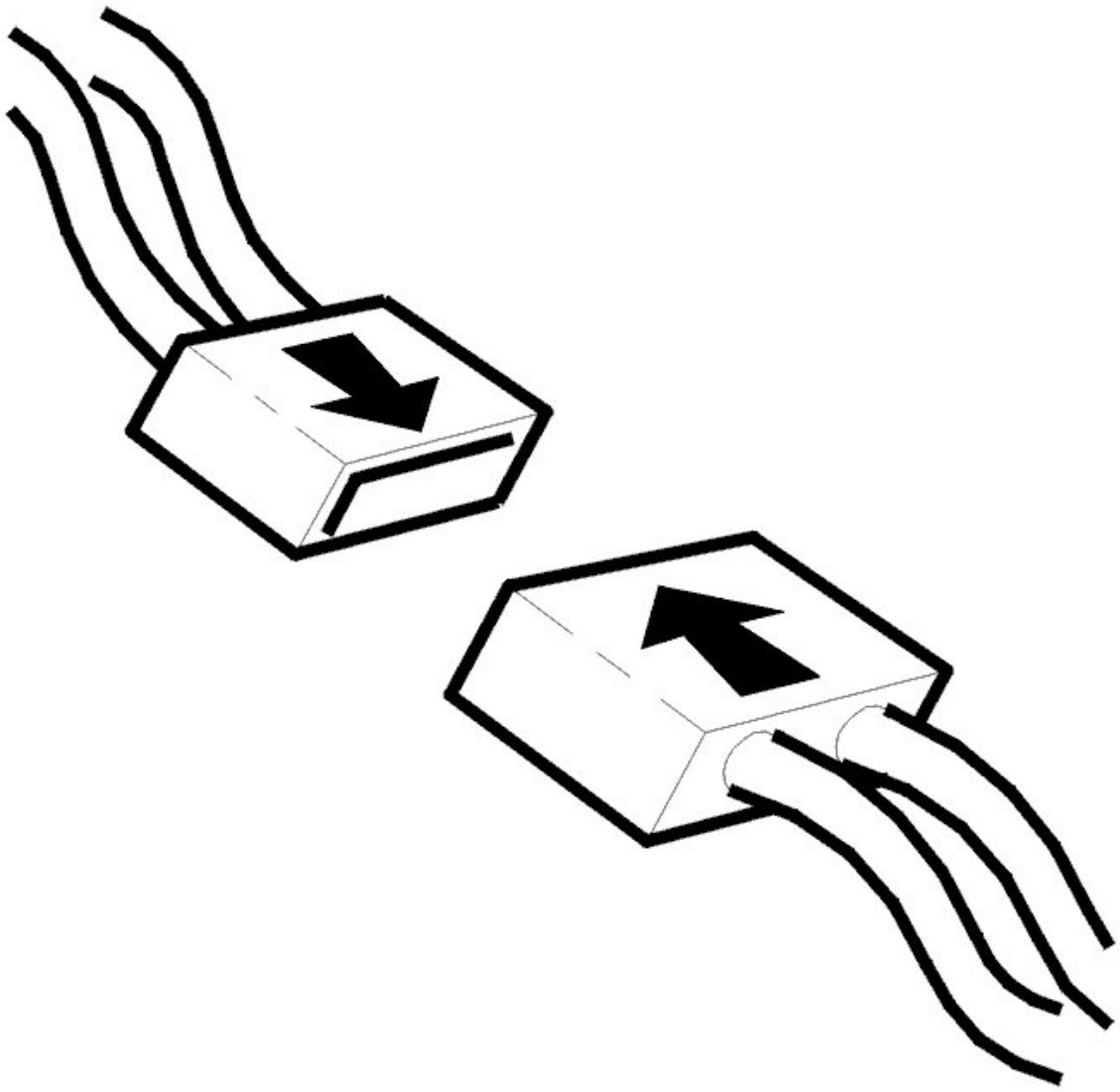
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

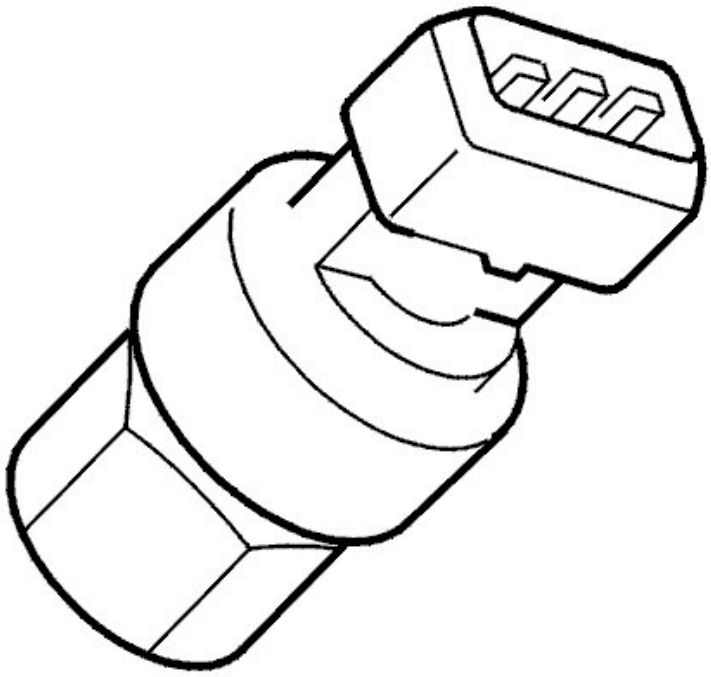




- Ignition off.
- Reinstall connectors, components etc.
- Start the engine.
- Air conditioning (A/C) switch on
- Start the blower fan

Check that the pressure increases in the air conditioning (A/C) system when the air conditioning (A/C) compressor engages. Also check if cold air blows into the passenger compartment when at the coolest setting.

Note! The air conditioning (A/C) pressure is given in volts for values see Component specifications See: Engine Control Module/Specifications.



Does the pressure in air conditioning (A/C) system change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5300

Condition

Internal functions in the engine control module (ECM) check important parameters.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an incorrect parameter.
The diagnostic trouble code (DTC) can be diagnosed when driving under specific driving conditions.

Substitute value
- None.

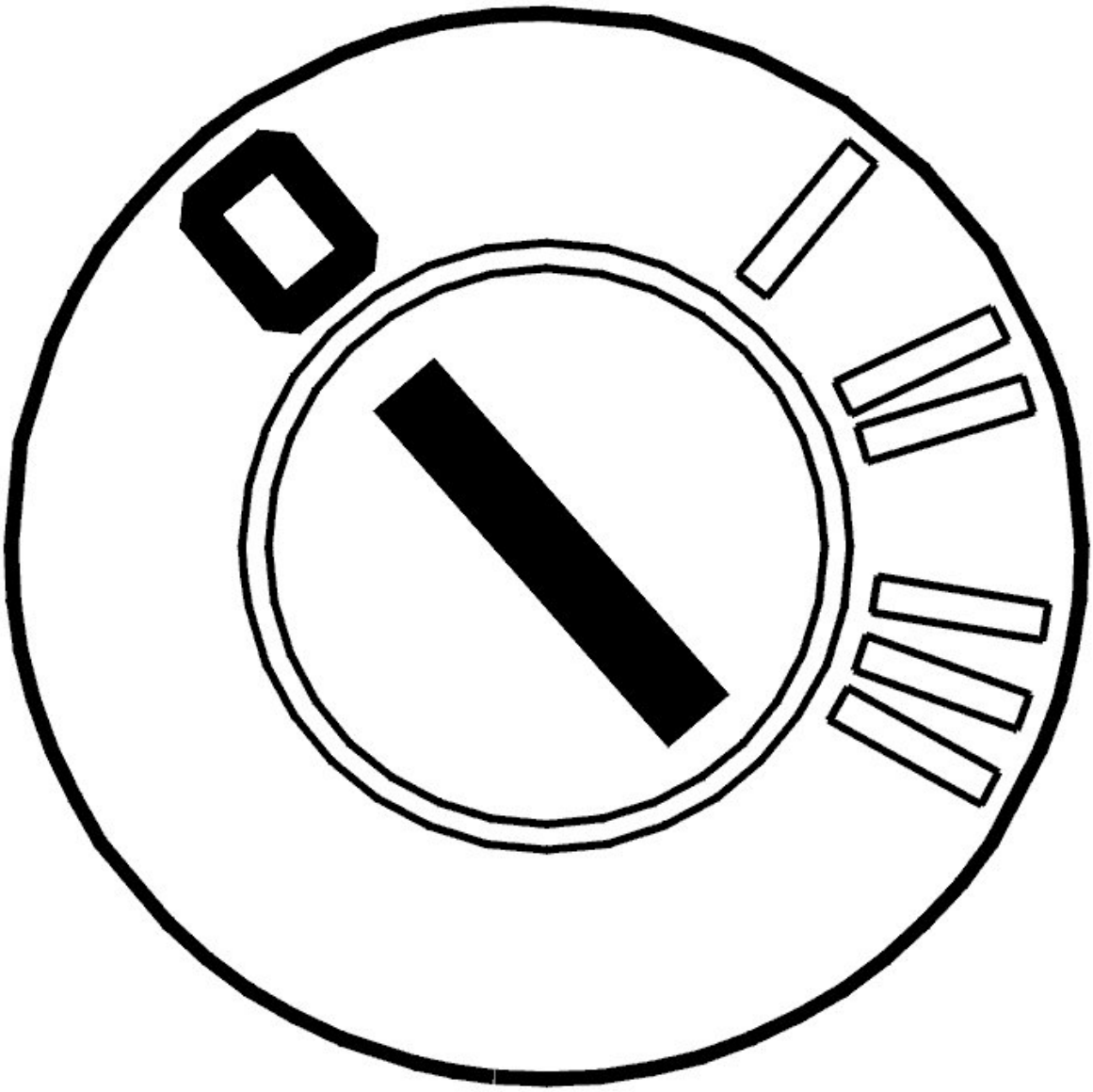
Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Faulty Signal

Faulty signal

Programming/replacing the engine control module (ECM)

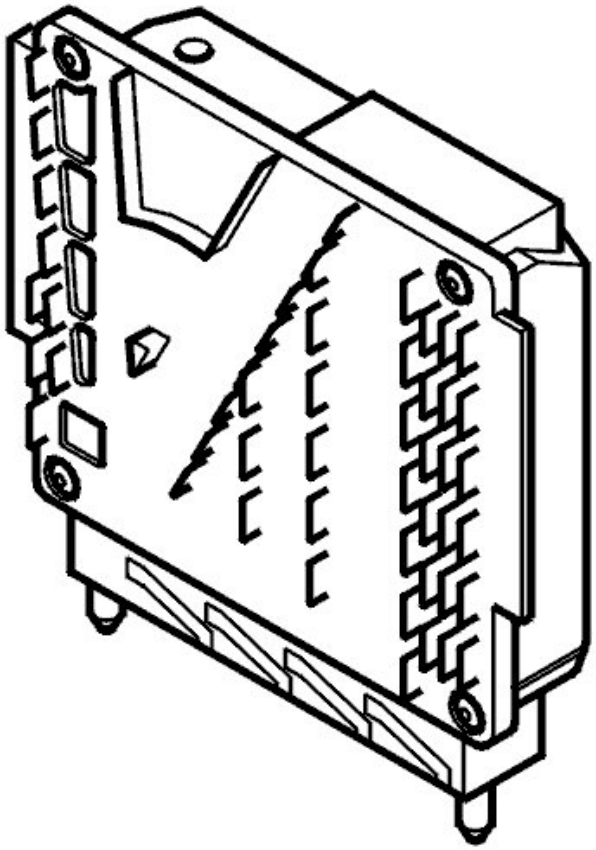


- Ignition off.

The engine control module (ECM) has registered an internal fault or a fault in the software. Try downloading new software into the control module.
To download new software or replace the engine control module (ECM), see:
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair.
If software cannot be downloaded or new software does not solve the problem, replace the engine control module (ECM) and download the relevant software to the new control module.

Note! After downloading new software or replacing the engine control module (ECM), the throttle unit must be adapted according to VIDA Vehicle communication: "Throttle unit adaptation".

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Programming/replacing the engine control module (ECM)

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-530B

Condition

Internal functions in the engine control module (ECM) check important parameters.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an incorrect parameter.
The diagnostic trouble code (DTC) can be diagnosed when driving under specific driving conditions.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM)
- Damaged brake control module (BCM)
- Open-circuit or short-circuit in the CAN wiring.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-530C

Condition

Internal functions in the engine control module (ECM) check important parameters.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the speed has exceeded a maximum value.

Substitute value
- None.

Possible source
- Faulty speed signal from the brake control module (BCM)
- Faulty speed signal from the transmission control module (TCM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-530D

Condition

Internal functions in the engine control module (ECM) check important parameters.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the speed has not changed over a certain number of seconds.

Substitute value

- None.

Possible source
- Faulty speed signal from the brake control module (BCM)
- Faulty speed signal from the transmission control module (TCM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-tracing Information

Fault-tracing information

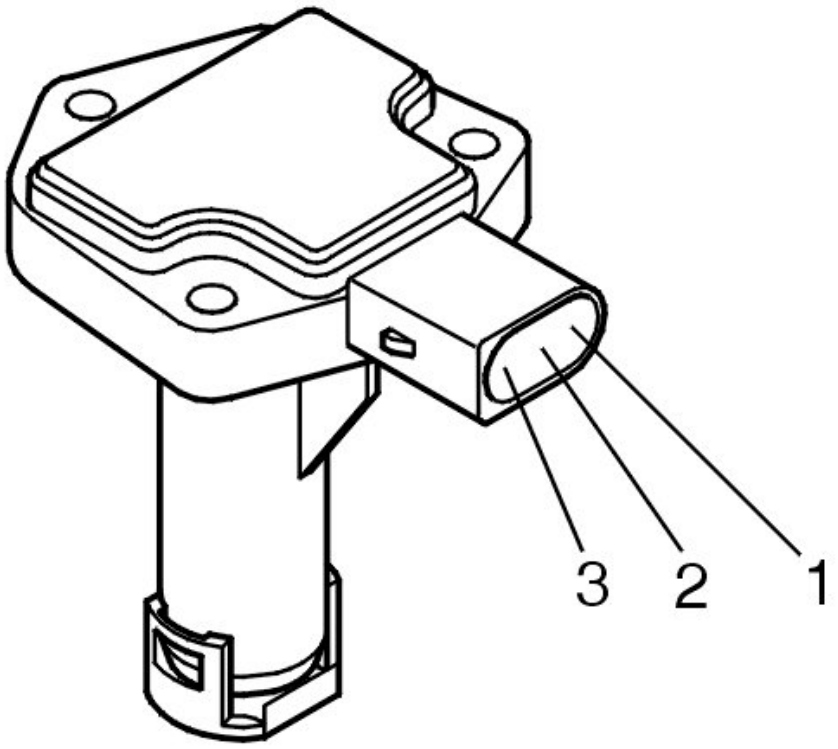
Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-540B

Condition



The engine control module (ECM) checks the signal from the oil level sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that there is no signal from the oil level sensor.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

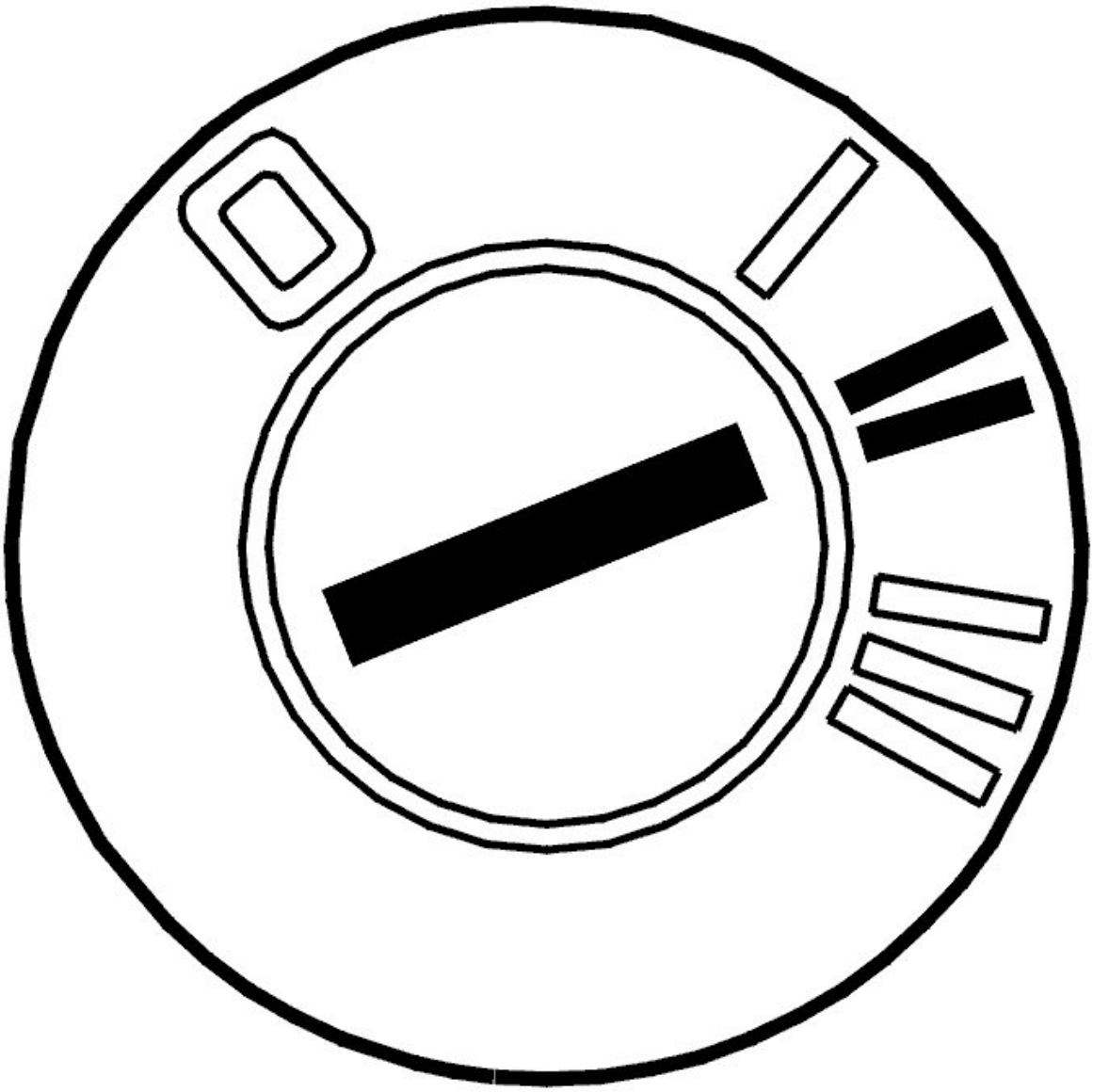
Possible source
- Loose connections, contact resistance or oxidation in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply
- Damaged oil level sensor.

Fault symptom[s]
- None.

Faulty Signal

Faulty signal

Checking the status



- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault is intermittent at the moment if all the values are OK.

Continue - Checking connectors and wiring

Checking connectors and wiring

Check the oil level sensor connector. Check for loose connections, contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #A40 and oil level sensor terminal #1. Check for an open-circuit.

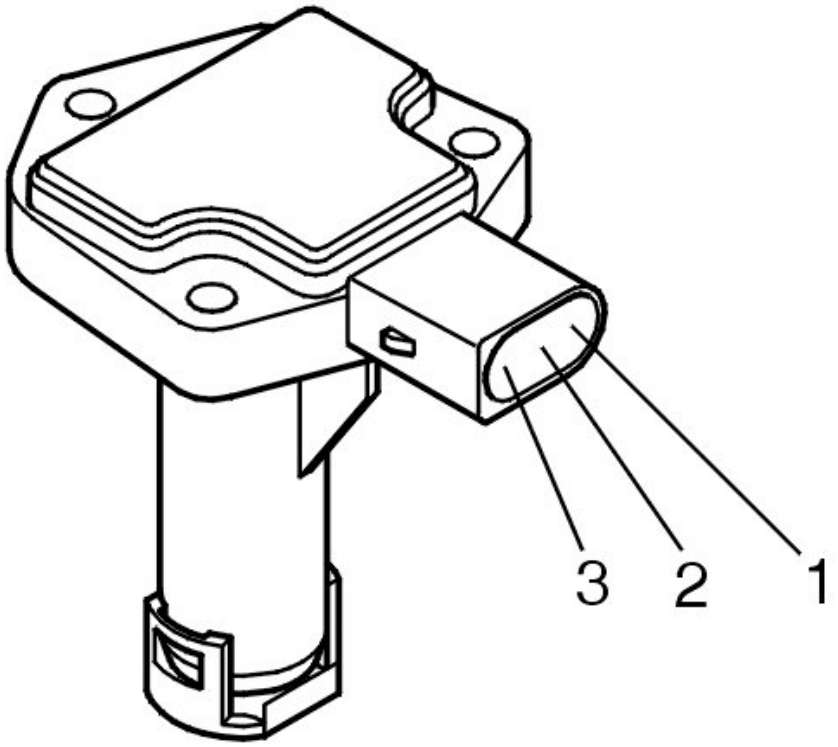
Check the cable between engine control module (ECM) terminal #A39 and oil level sensor terminal #3. Check for an open-circuit.
Check the cable between engine control module (ECM) terminal #A60 and oil level sensor terminal #2. Check for an open-circuit.

Hint: With the ignition on, the voltage between terminals #2 and #3 must be 5 V, with the reading taken at the oil level sensor connector.

Try a new oil level sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Oil level sensor, replacing See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



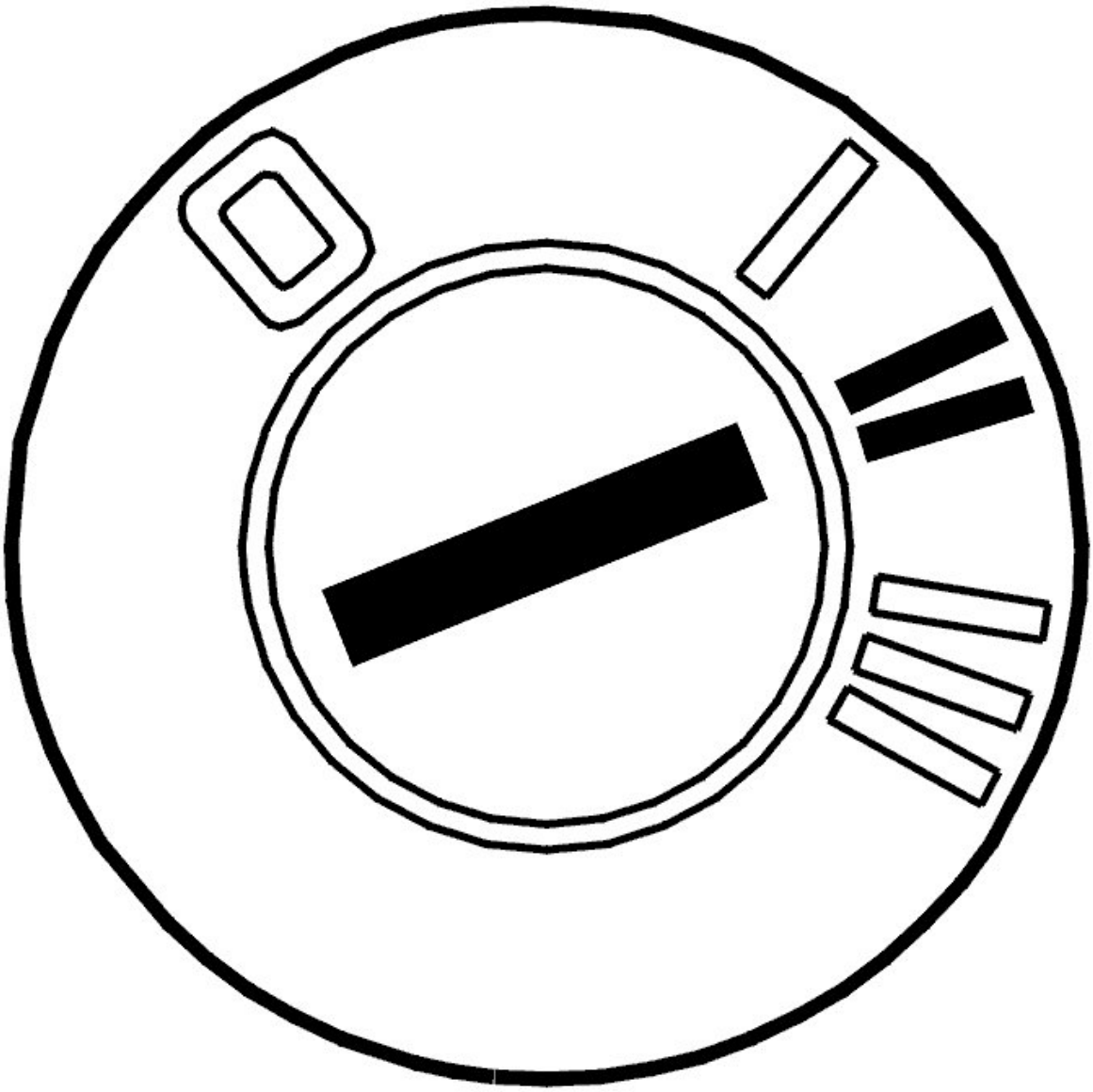
Continue - Verification

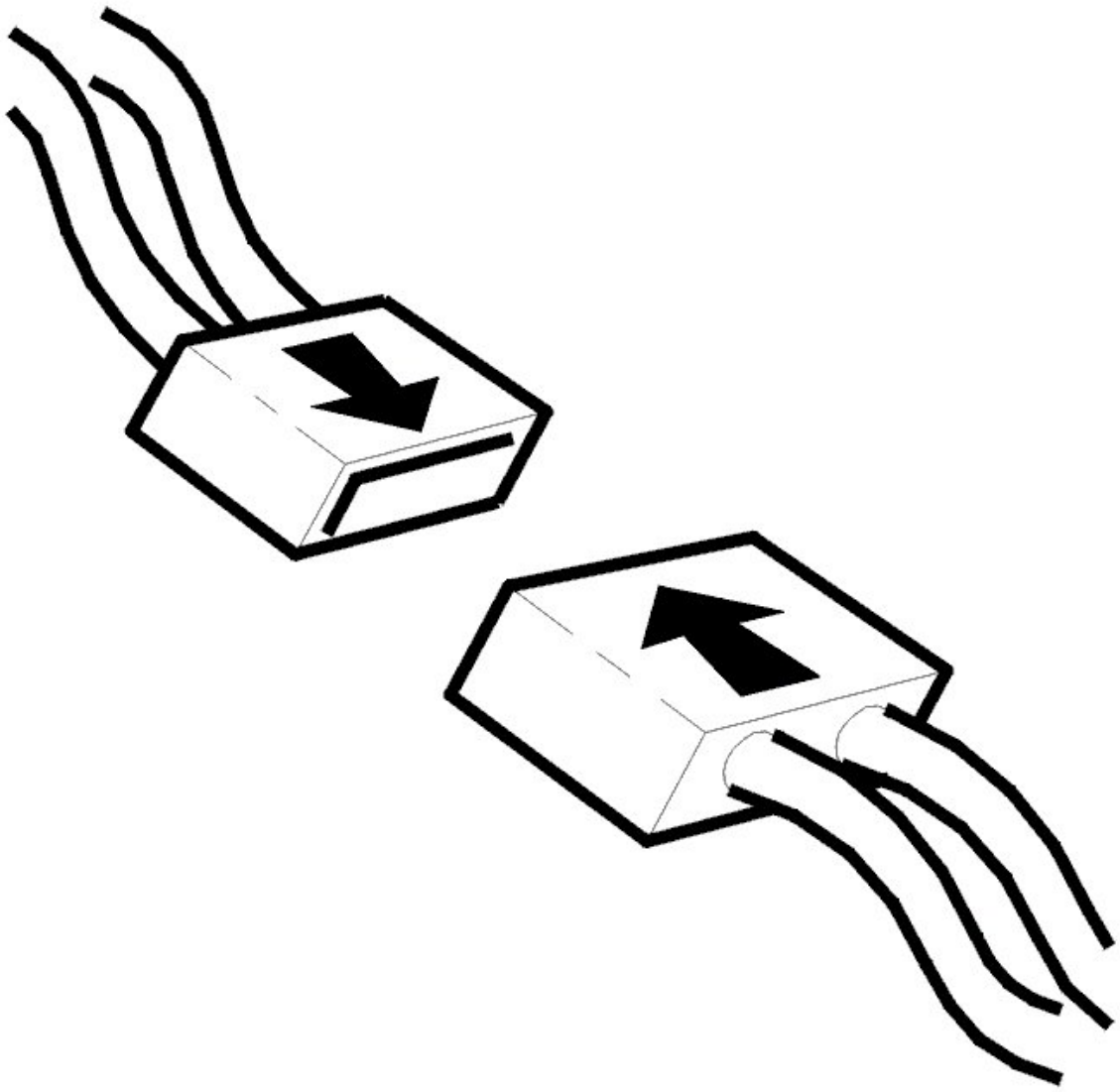
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault has been remedied if all the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

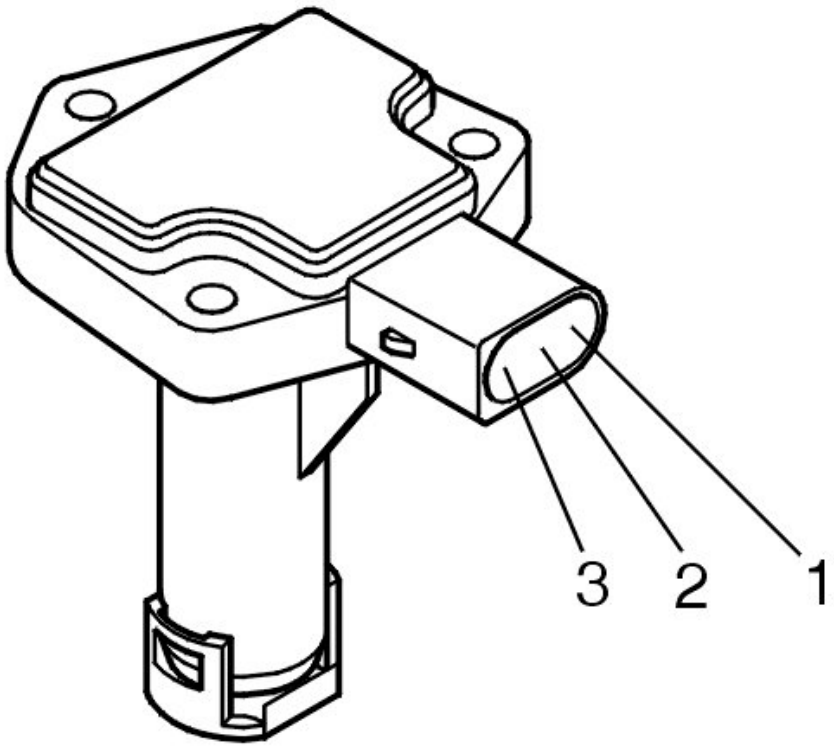
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-540C

Condition



The engine control module (ECM) checks the signal from the oil level sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the oil level sensor is too high.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

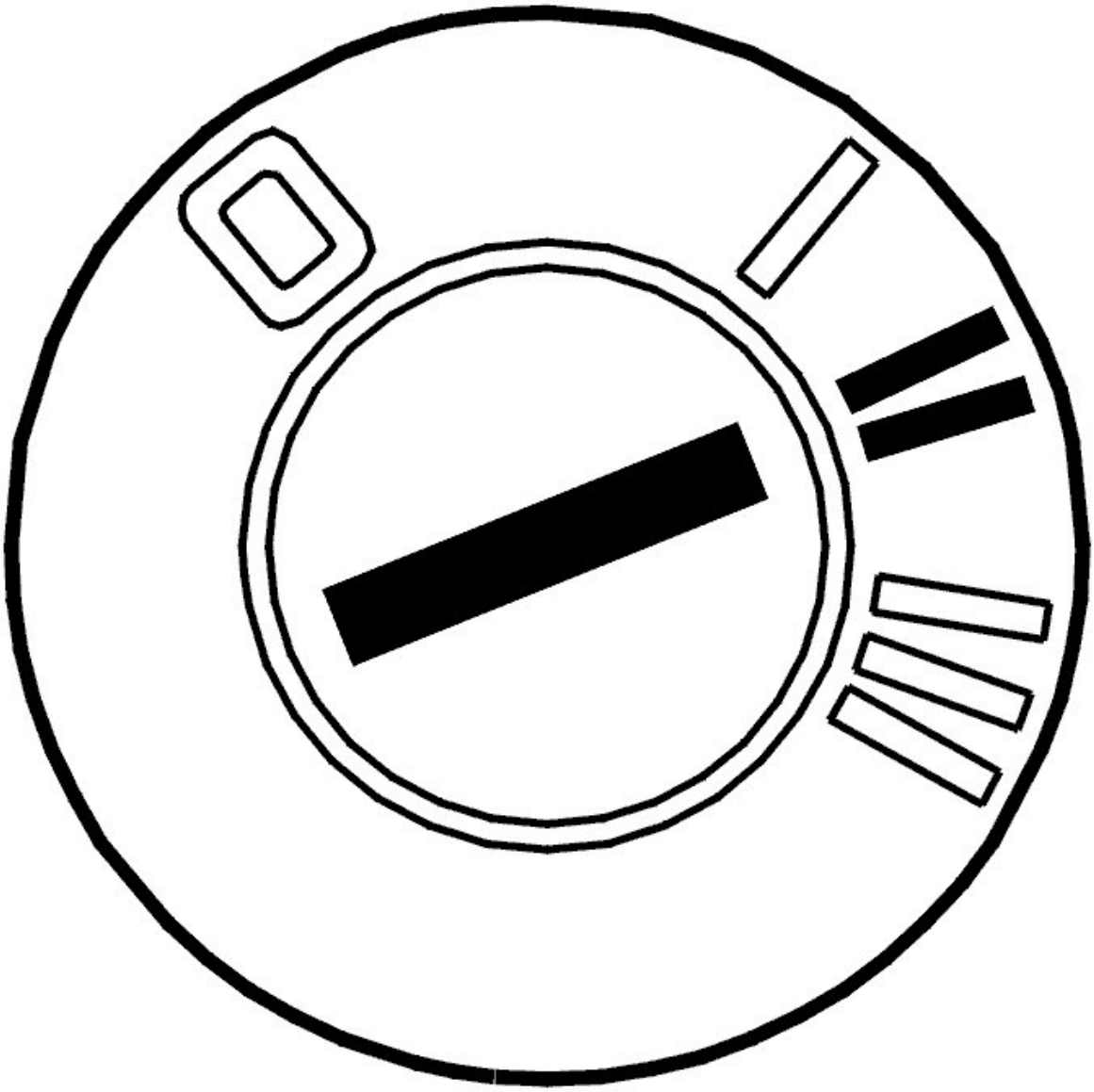
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged oil level sensor.

Fault symptom[s]
- None.

Signal Too High

Signal too high

Checking the status



- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault is intermittent at the moment if all the values are OK.

Continue - Checking the wiring

Checking the wiring

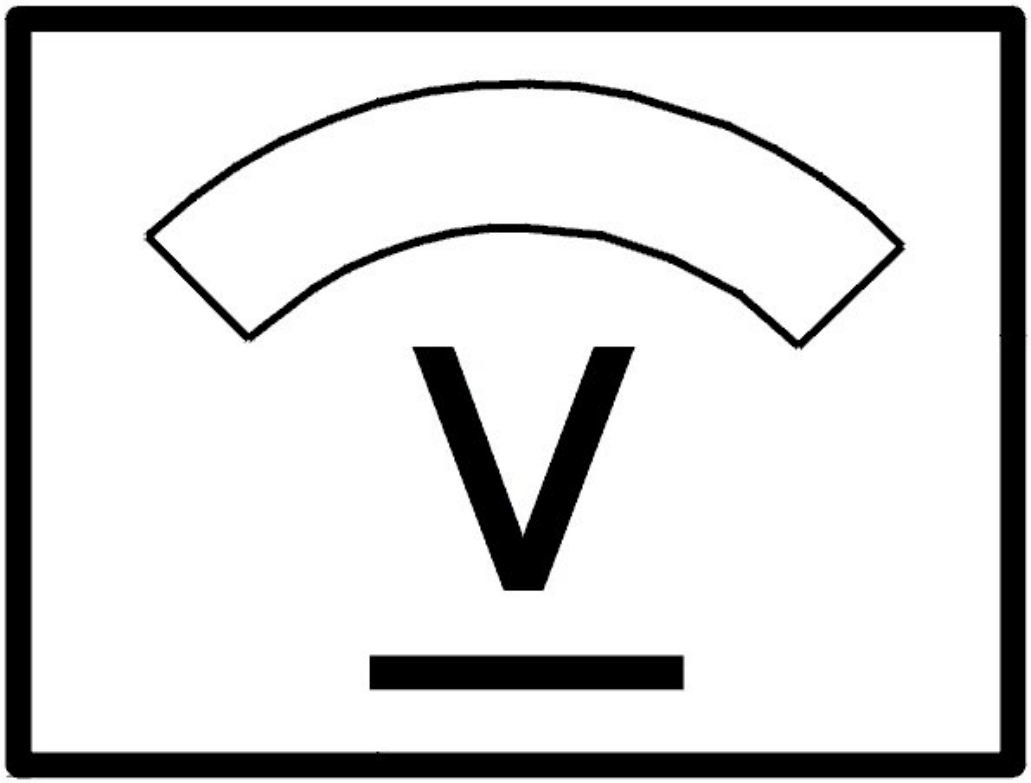
Check the signal cable between engine control module (ECM) terminal #A40 and oil level sensor terminal #1. Check for a short-circuit to supply voltage.

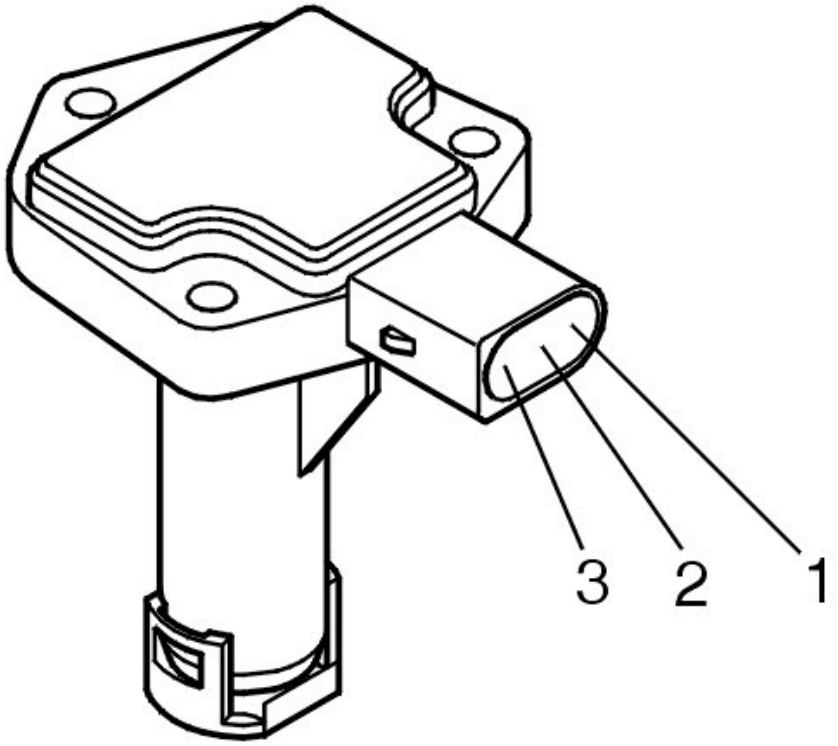
Hint: With the ignition on, the voltage between terminals #2 and #3 must be 5 V, with the reading taken at the oil level sensor connector.

Try a new oil level sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the oil level sensor see Oil level sensor, replacing See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Service and Repair.





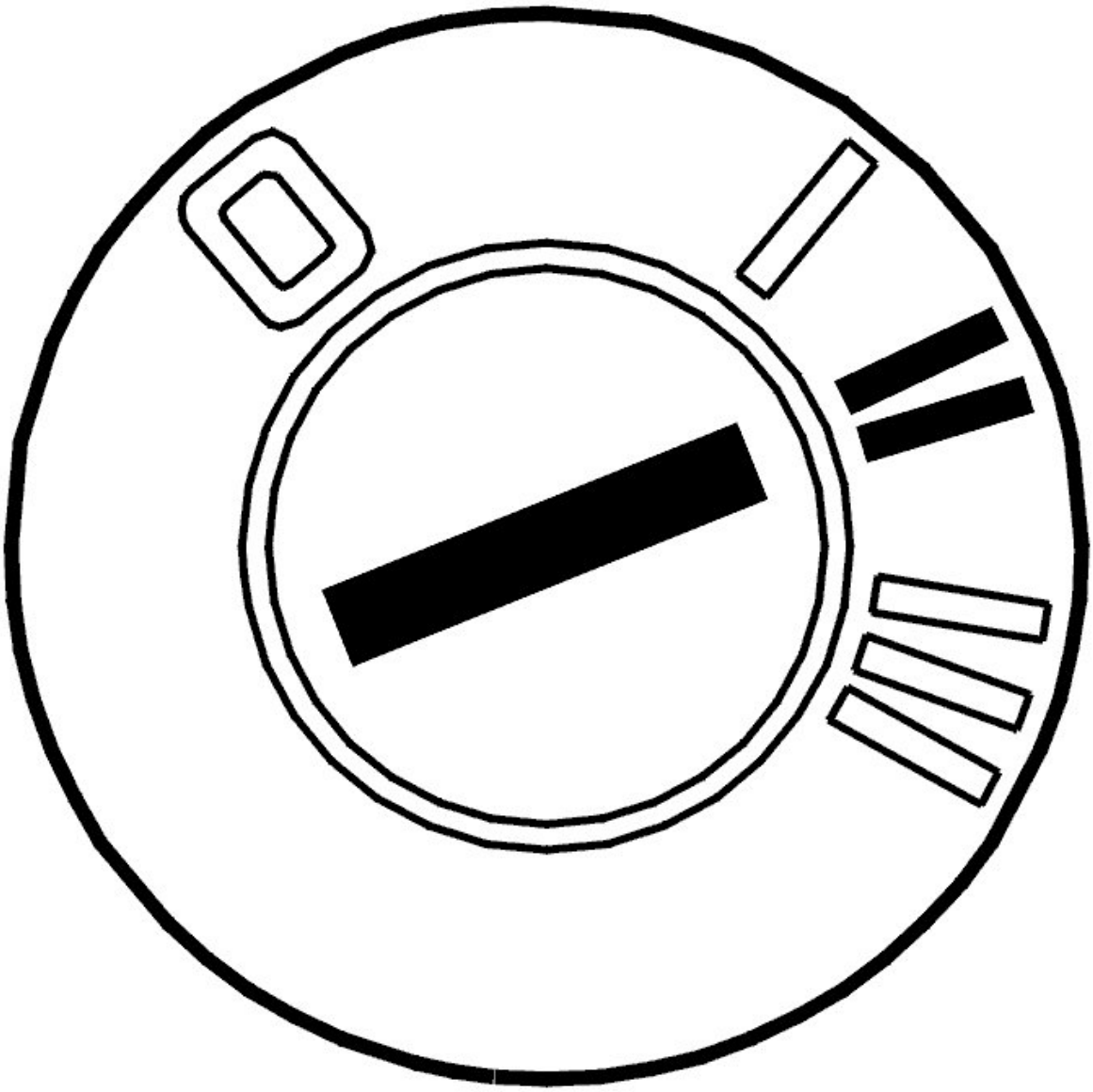
Continue - Verification

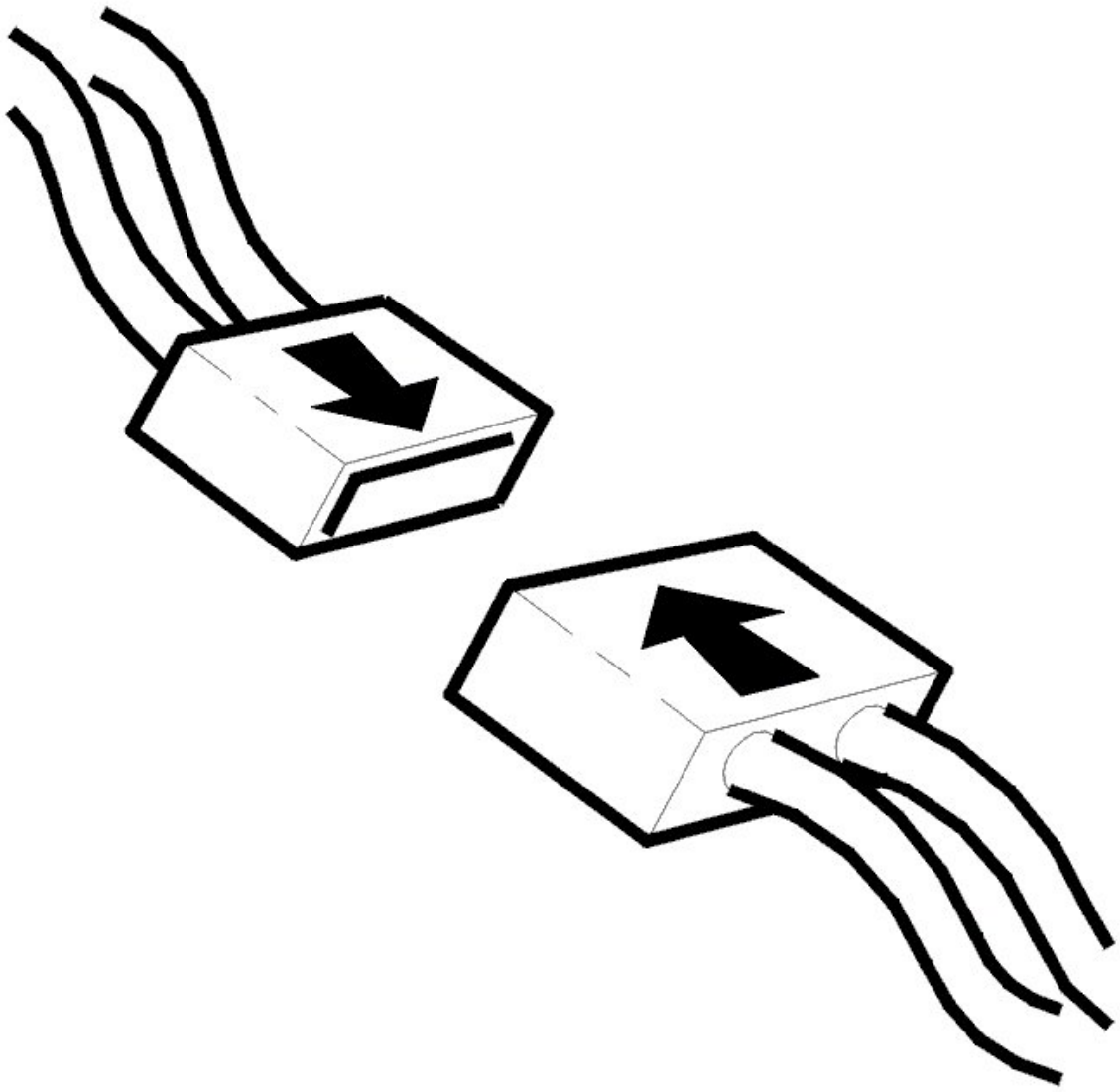
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault has been remedied if all the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

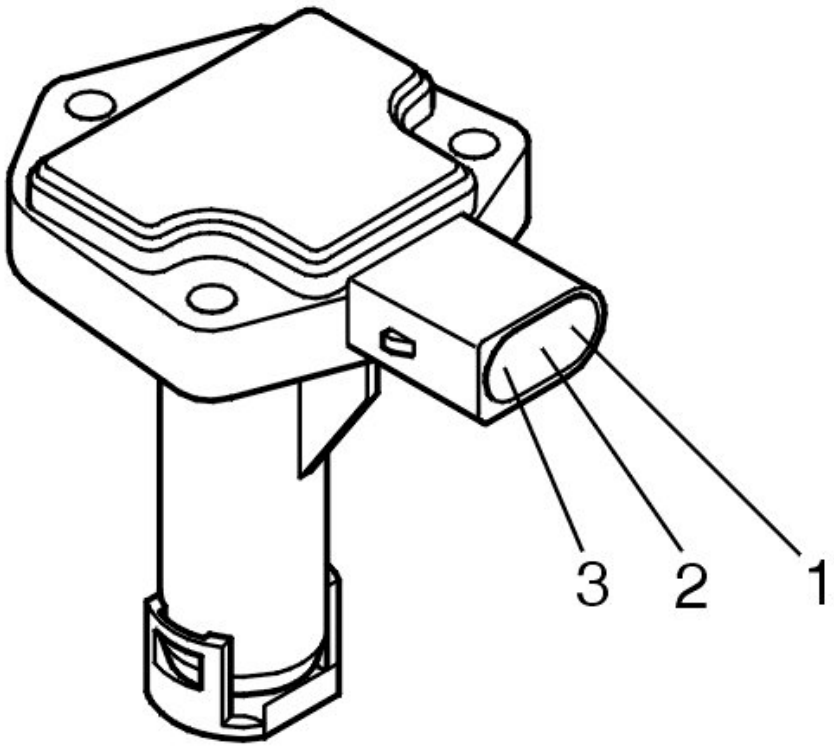
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-540D

Condition



The engine control module (ECM) checks the signal from the oil level sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the oil level sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

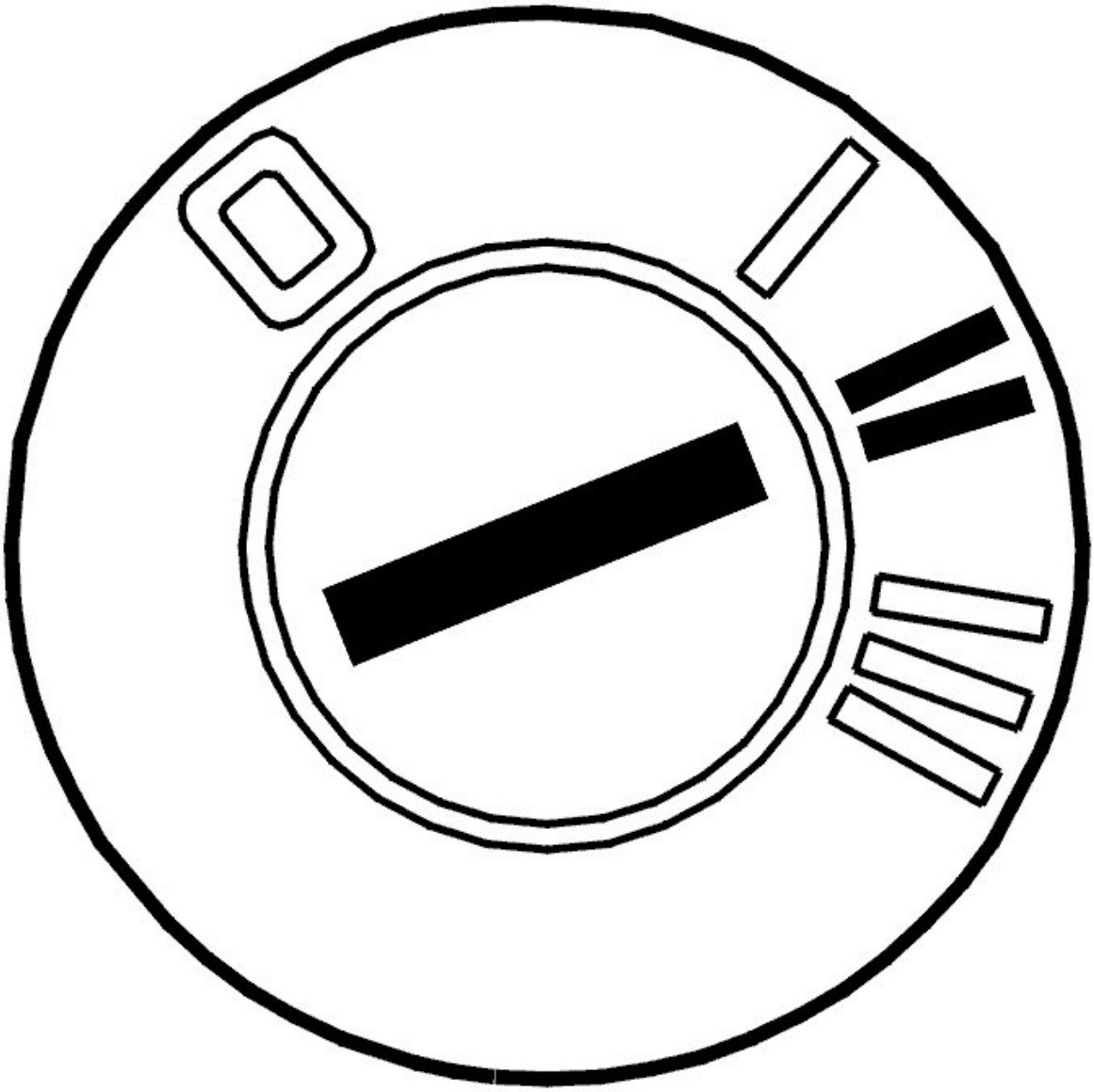
Possible source
- Short-circuit to ground in the signal cable
- Damaged oil level sensor.

Fault symptom[s]
- None.

Signal Too Low

Signal too low

Checking the status



- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault is intermittent at the moment if all the values are OK.

Continue - Checking the wiring

Checking the wiring

Check the signal cable between engine control module (ECM) terminal #A40 and oil level sensor terminal #1. Check for a short-circuit to ground.

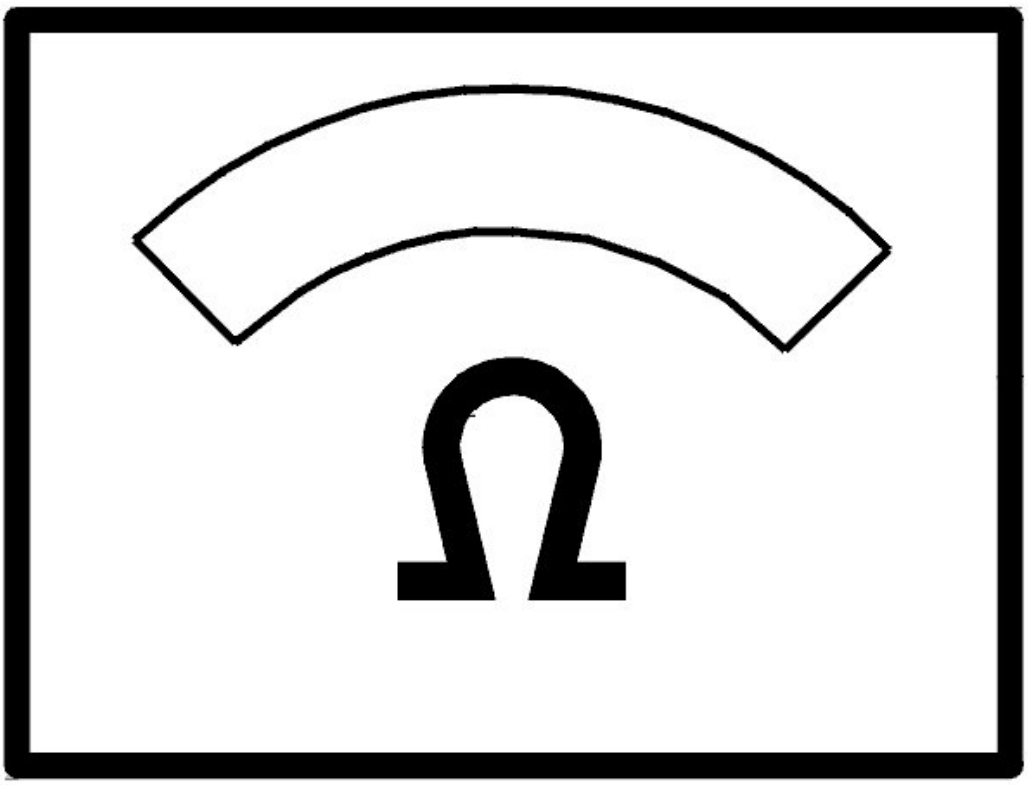
Hint: With the ignition on, the voltage between terminals #2 and #3 must be 5 V, with the reading taken at the oil level sensor connector.

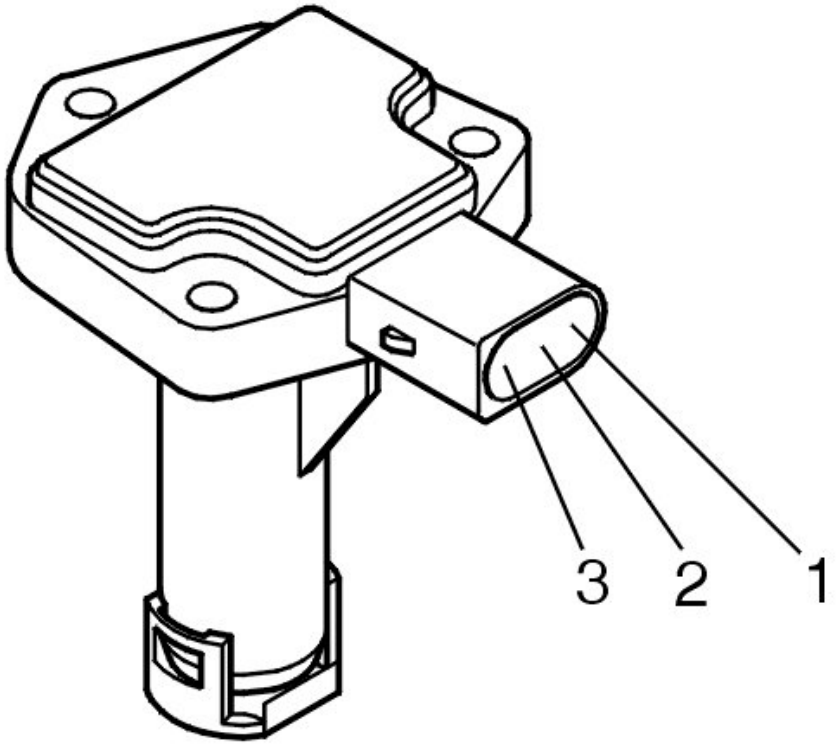
Try a new oil level sensor if no fault is found and the fault is permanent.

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the oil level sensor see Oil level sensor, replacing See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Service and Repair.





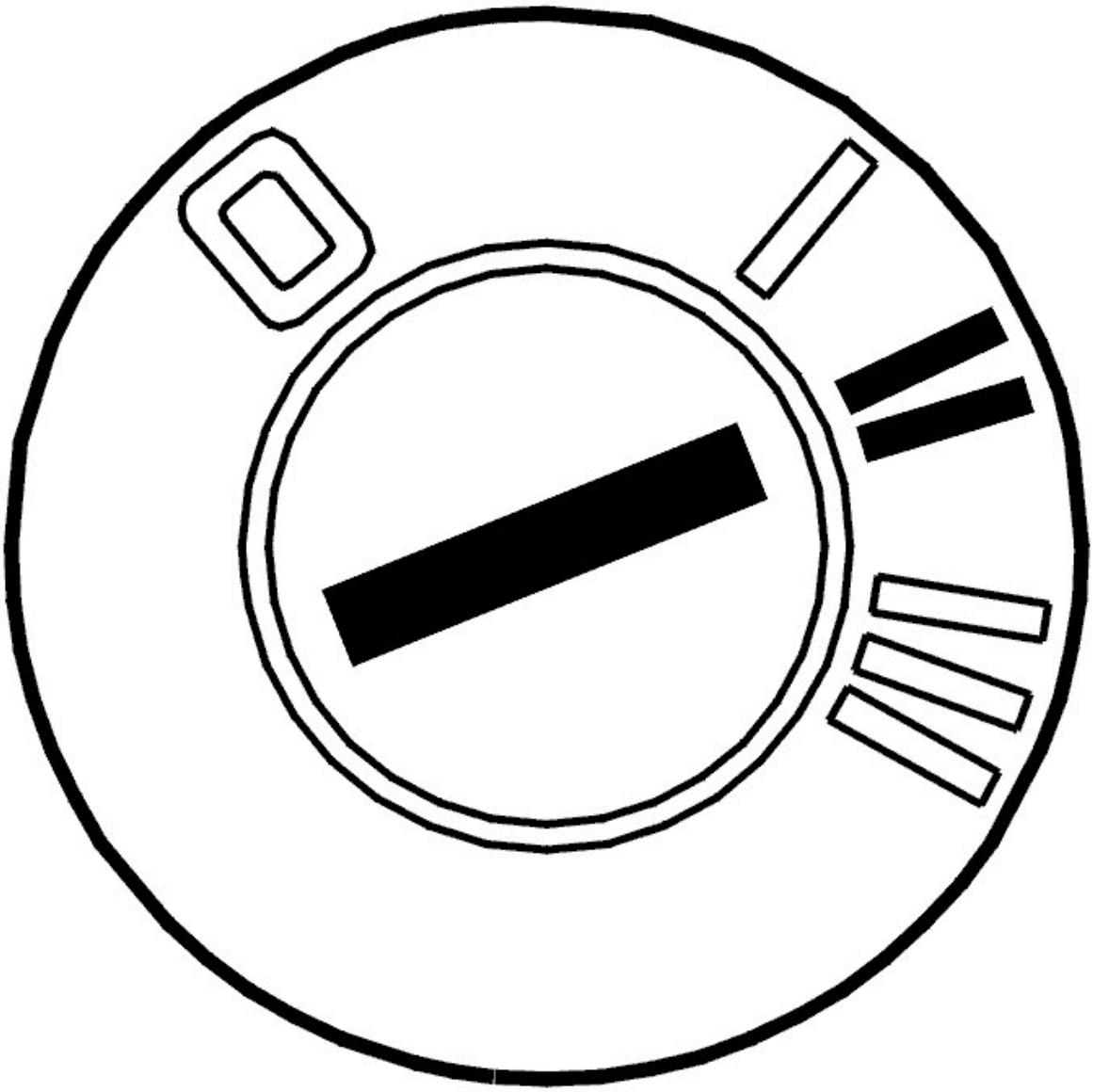
Continue - Verification

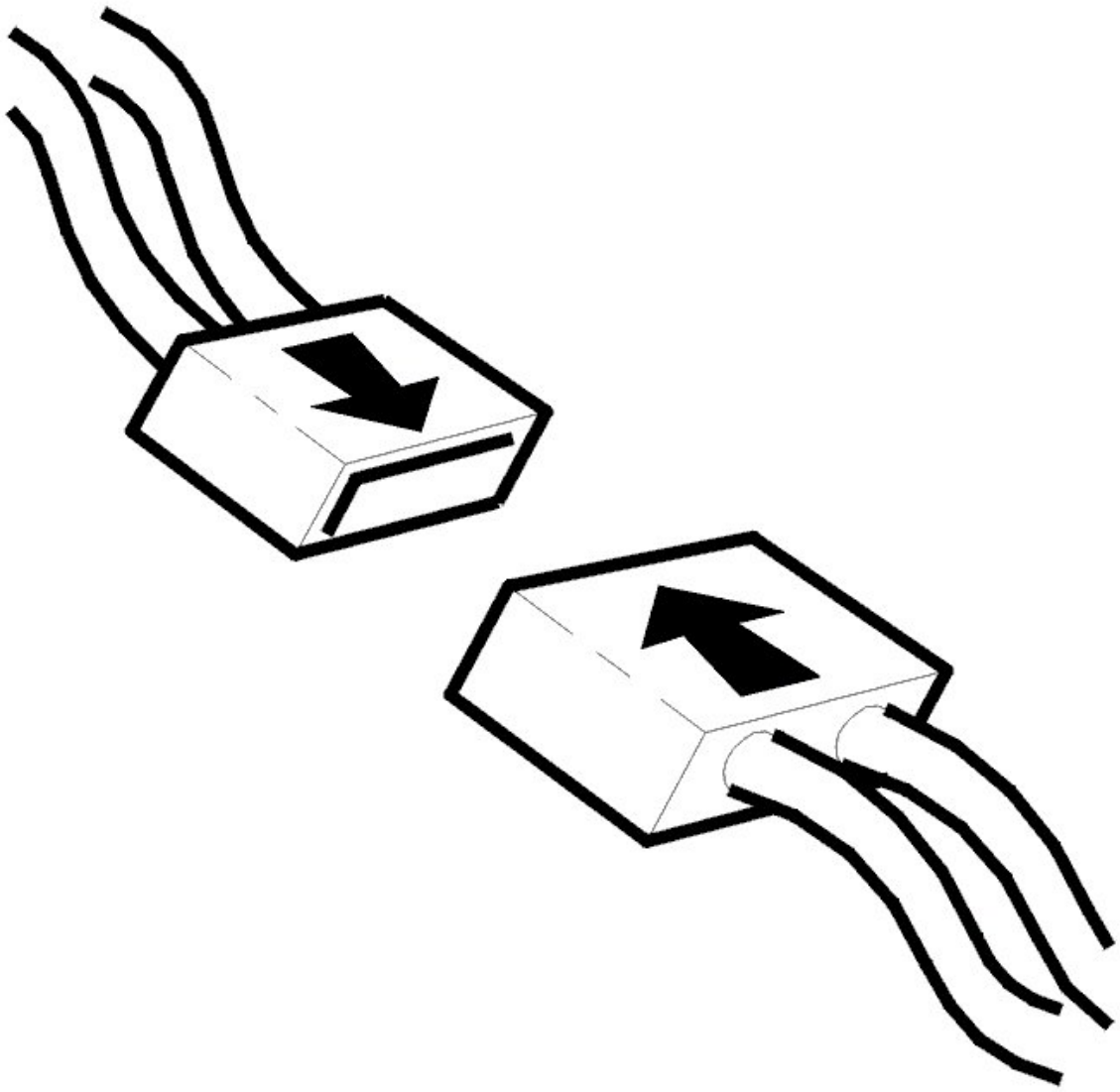
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the oil level sensor signal.

Check that all three values for oil level, oil temperature and oil grade are between 17-83%. The fault has been remedied if all the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

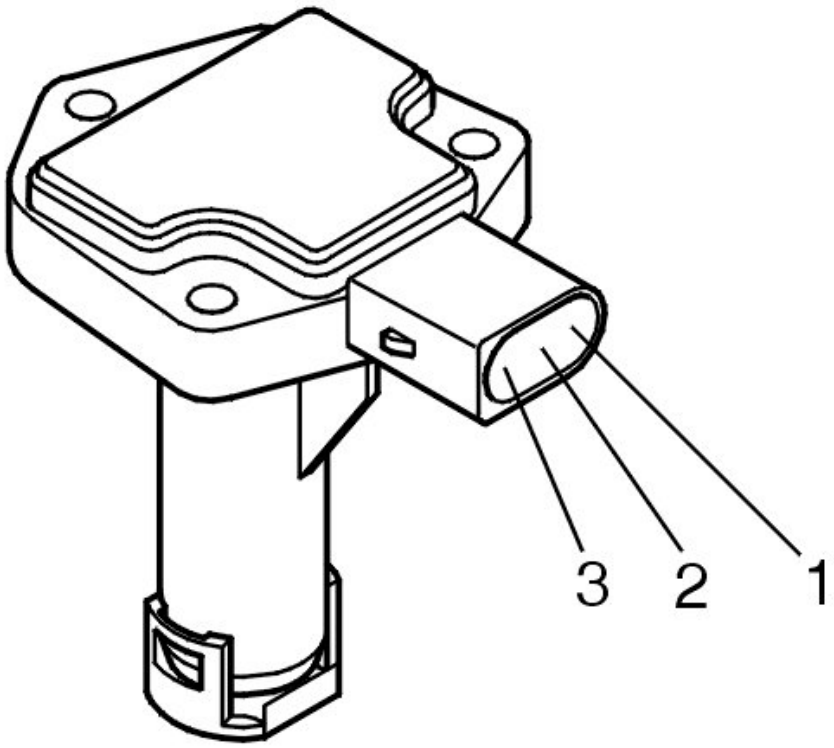
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-5500

Condition



The engine control module (ECM) checks the signal from the oil level sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the oil level sensor is outside a reasonable operating range.
The diagnostic trouble code (DTC) can diagnosed after a number of different criteria (engine speed (RPM), vehicle speed, etc.) have been reached.

Substitute value
- None.

Possible source
- Engine oil leak
- Loose connections, contact resistance or oxidation in the terminals
- Damaged oil level sensor.

Fault symptom[s]

- Warning lights and chimes/Oil pressure indication/no indication

Faulty Signal

Faulty signal

Checking for oil leakage and replacing the component

Note! If diagnostic trouble codes (DTCs) ECM-540X and ECM-550X are stored at the same time, codes ECM-540X must be remedied first.

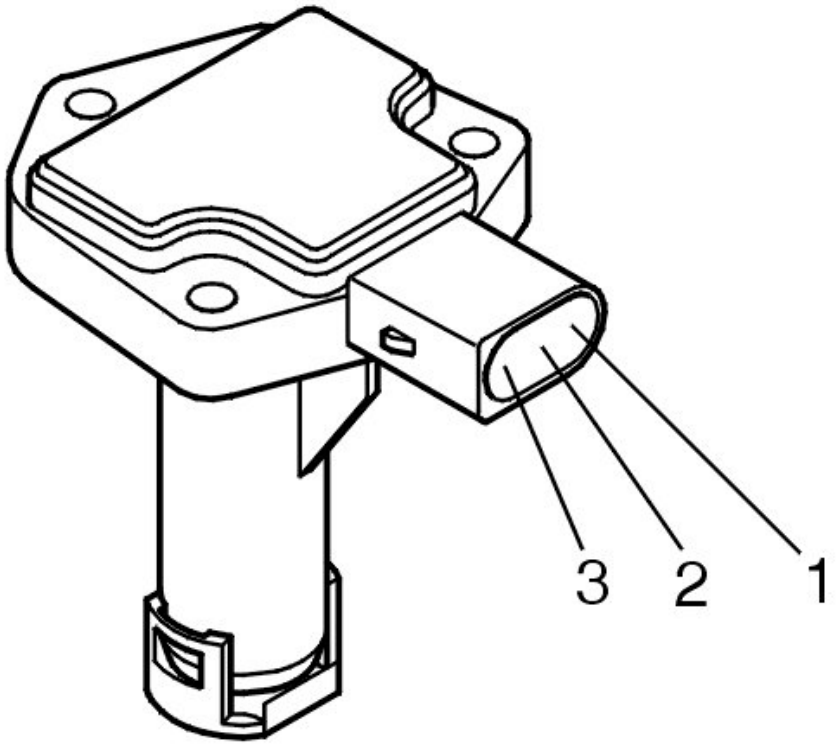
- Checking the engine for oil leakage
- Also check the oil level sensor connector. Check for loose connections, contact resistance or oxidation.

Hint: This diagnostic trouble code (DTC) may be stored if the engine oil is significantly mixed with fuel or coolant for example.

Try a new oil level sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the oil level sensor, see Oil level sensor, replacing See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

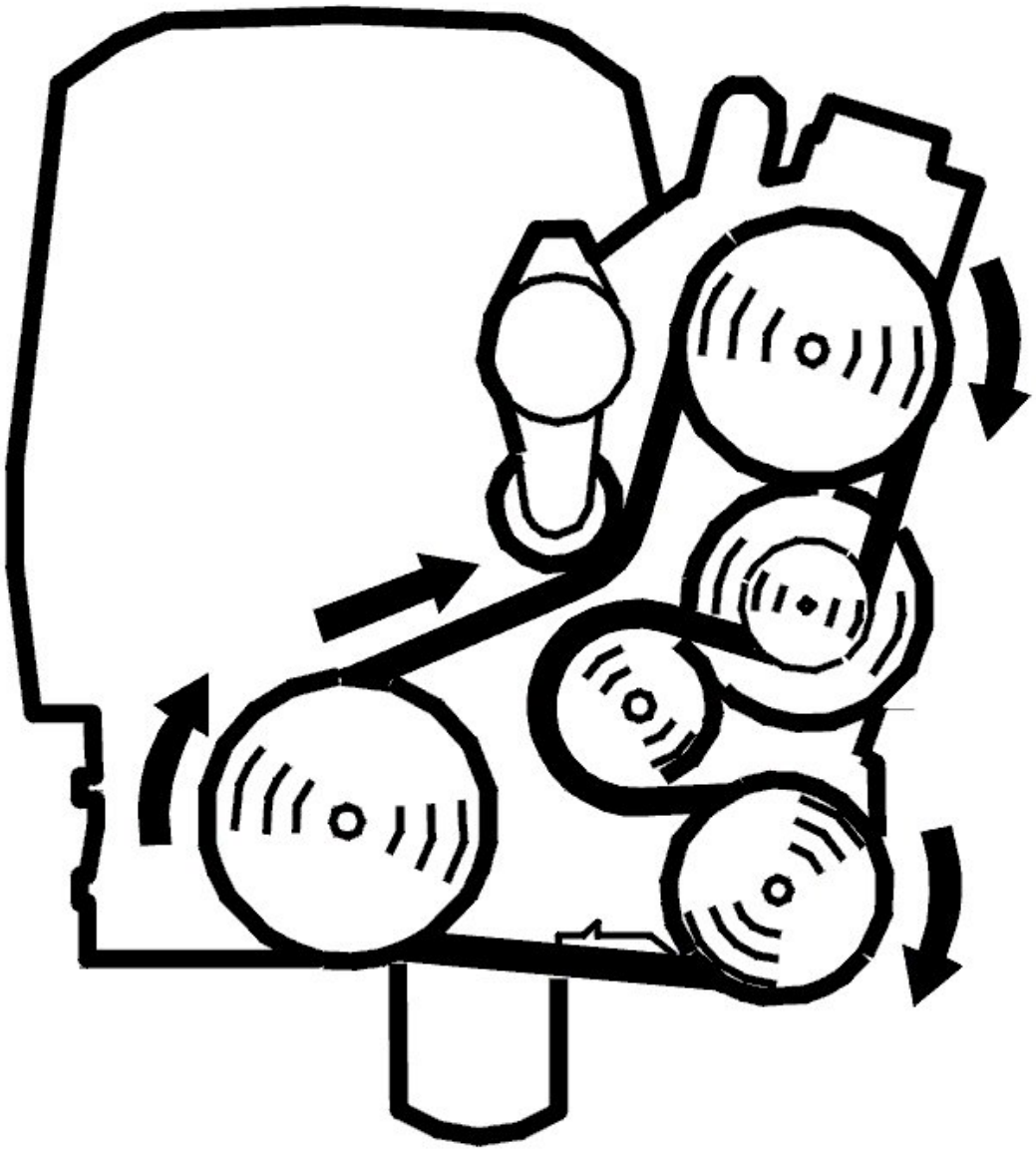


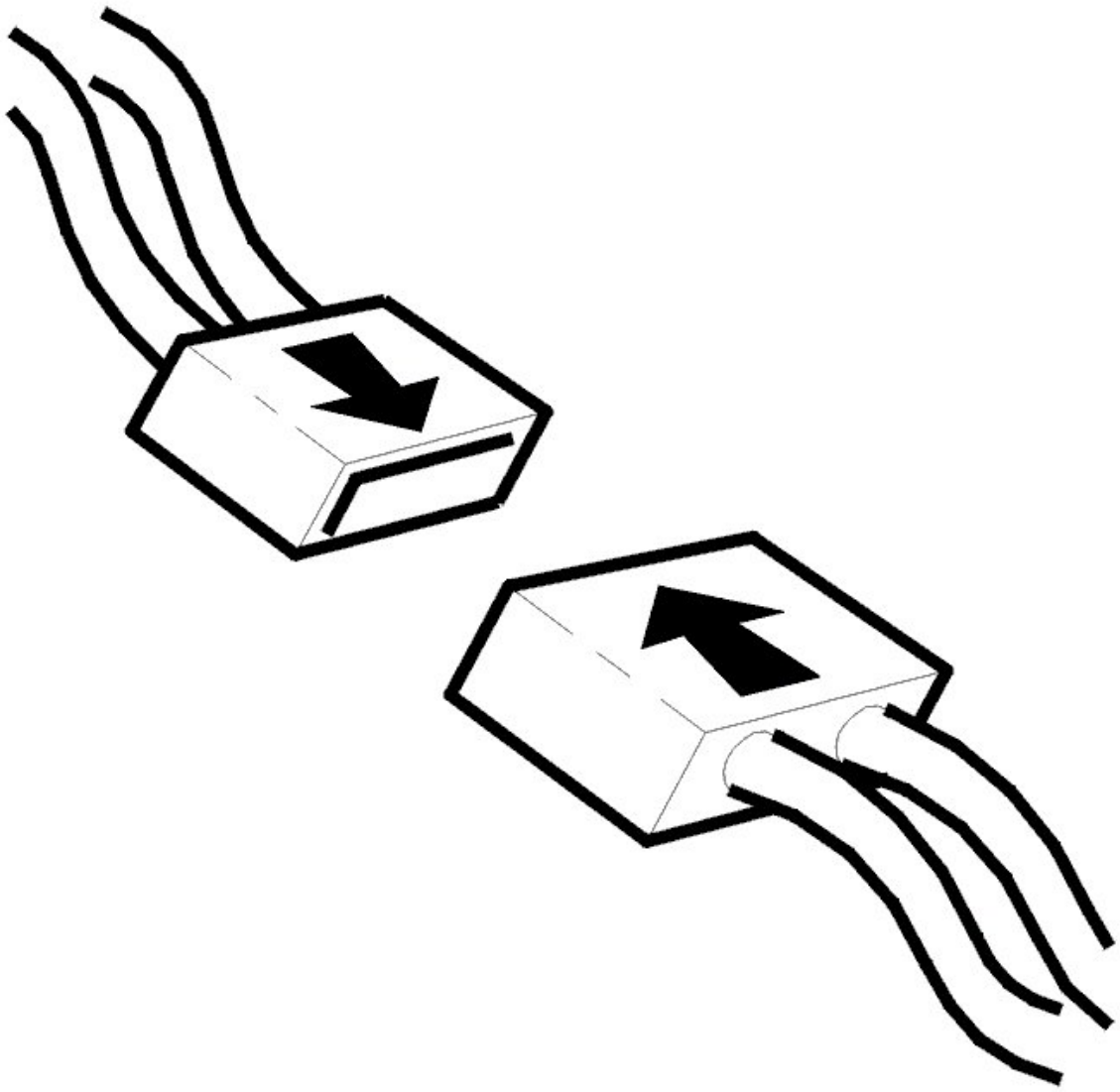
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine. Allow the engine to idle for 1 minute. Increase the engine speed (RPM) to approximately 5100 rpm for at least 1 second. The car must then be driven at a speed of more than 50 km/h.

Note! The above instructions must be followed and carried out in the specified order.

- Read off the status of the diagnostic trouble code (DTC).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for oil leakage and replacing the component

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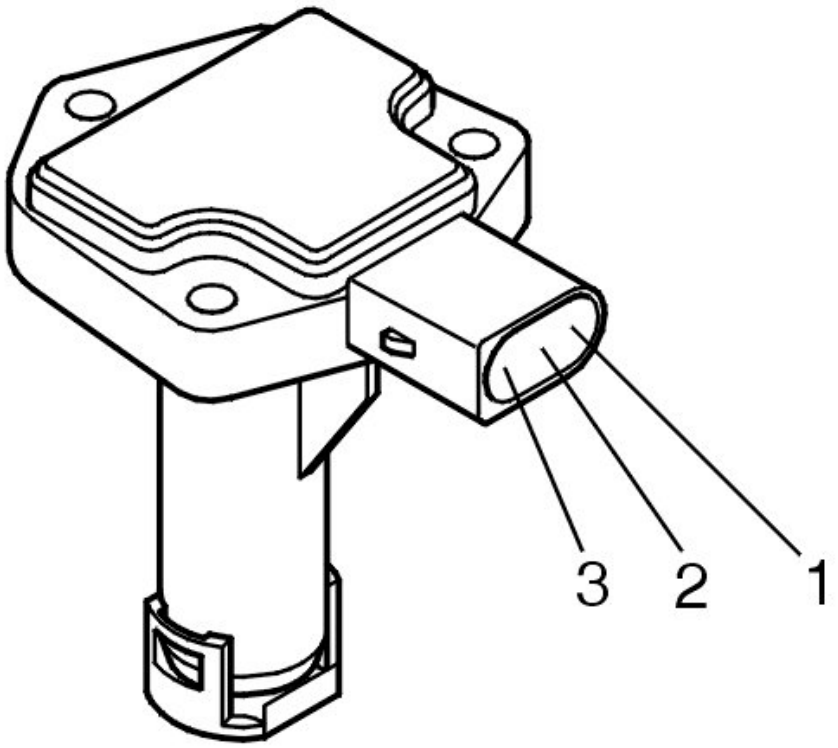
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-550D

Condition



The engine control module (ECM) checks the signal from the oil level sensor. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the signal from the oil level sensor is outside a reasonable operating range.
The diagnostic trouble code (DTC) is diagnosed when the engine is idling.

Substitute value
- None.

Possible source
- Extremely low oil level

- Damaged oil level sensor.

Fault symptom[s]
- Warning lights and chimes/Oil pressure indication/no indication

Signal Too Low

Signal too low

Checking the oil level and replacing the component

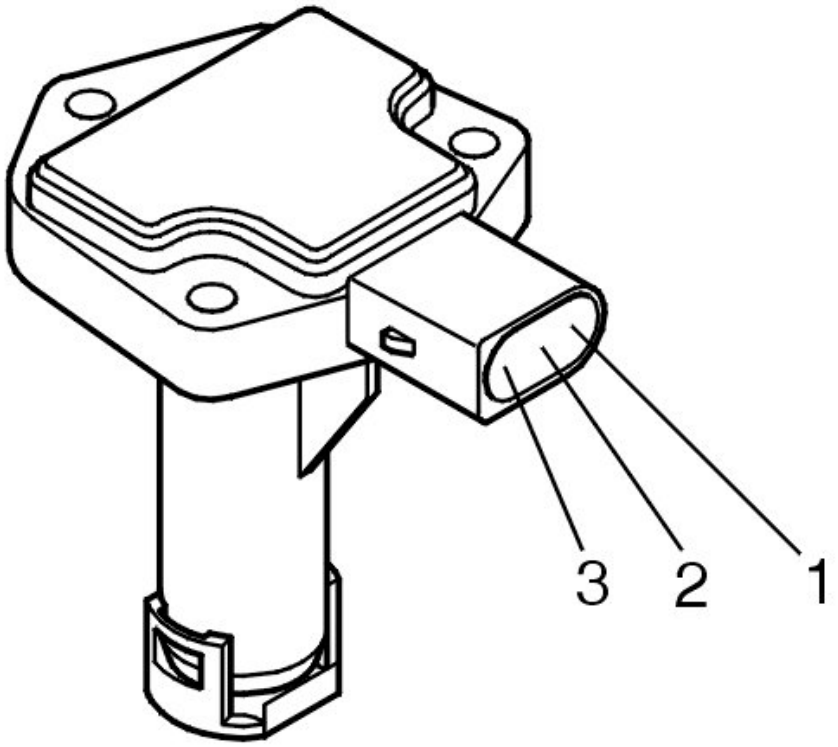
Note! If diagnostic trouble codes (DTCs) ECM-540X and ECM-550X are stored at the same time, codes ECM-540X must be remedied first.

- Check that the oil level in the engine is not too low. Ensure that the level is correct.

Hint: This diagnostic trouble code (DTC) may be stored if the engine oil is significantly mixed with fuel or coolant for example.

Try a new oil level sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Oil level sensor, replacing See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Oil Level Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



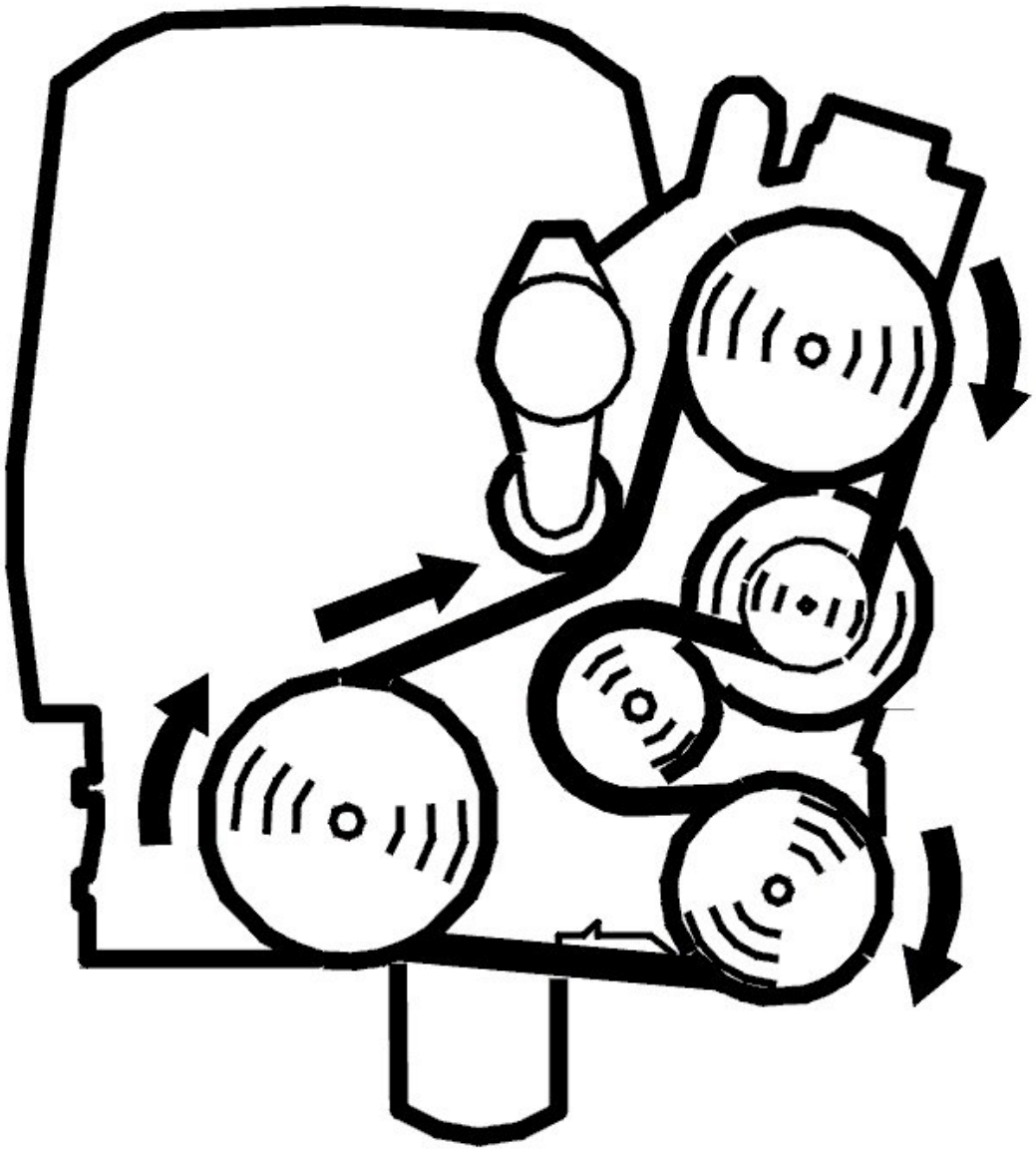
Continue - Verification

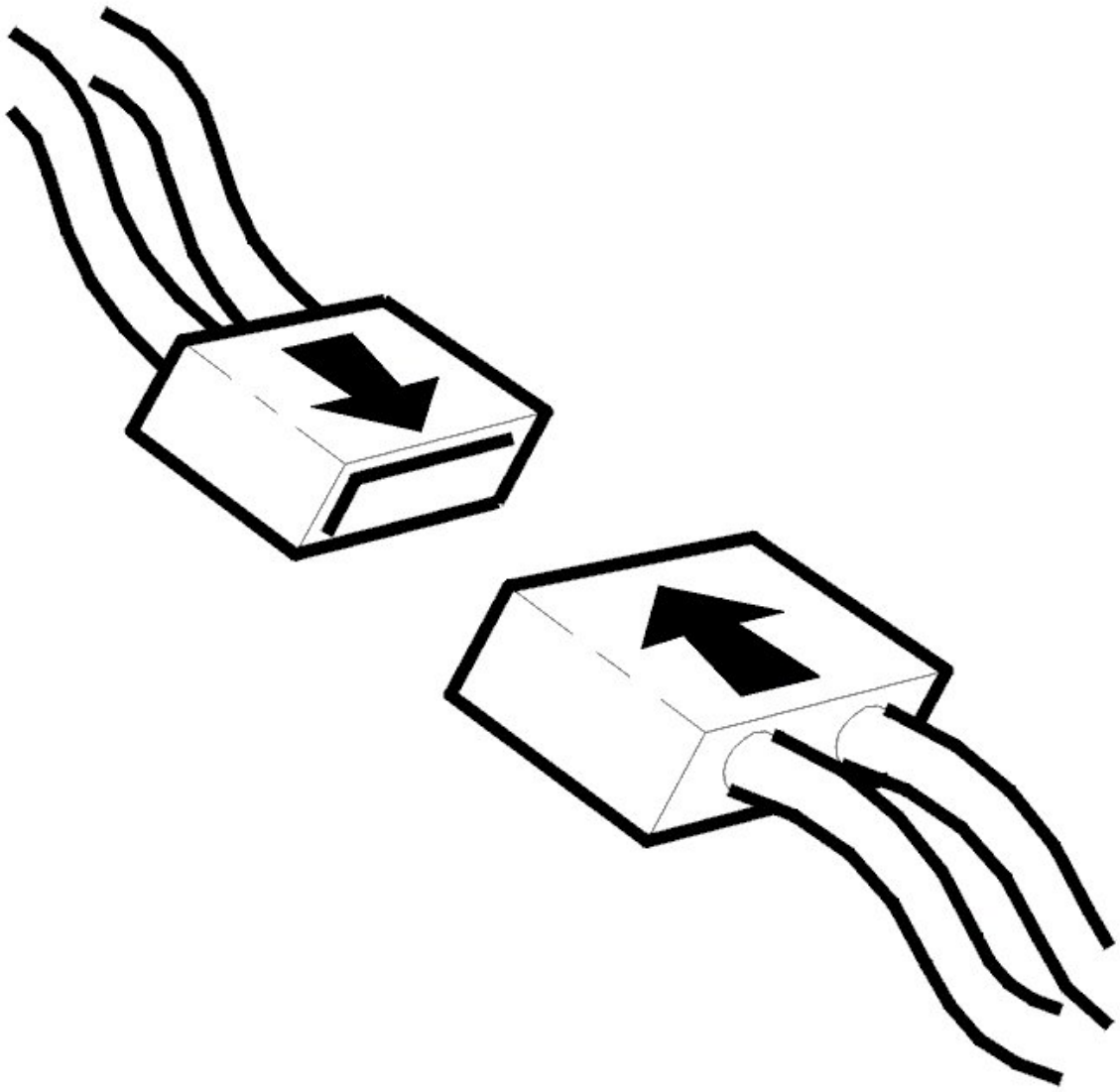
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine and allow to idle for approximately 1 minute
- Read off the status of the diagnostic trouble code (DTC).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the oil level and replacing the component

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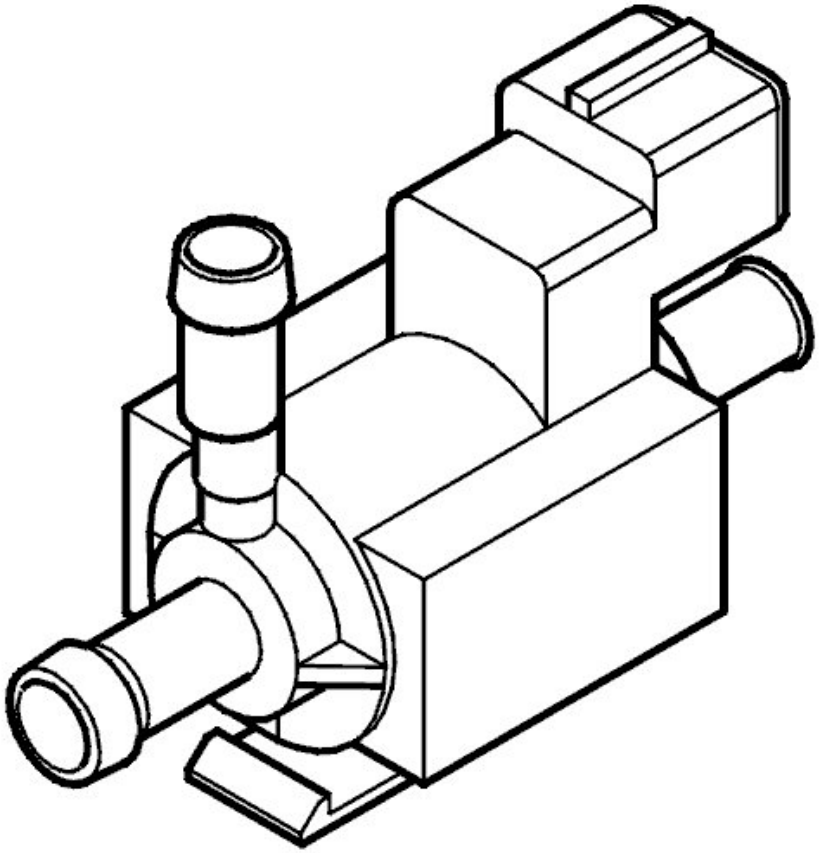
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-600B

Condition



The engine control module (ECM) checks the signal cable for the turbocharger (TC) control valve.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an open-circuit in the signal cable for the turbocharger (TC) control valve.
The diagnostic trouble code (DTC) can be diagnosed during control of the boost pressure.

Substitute value
- None.

Possible source
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged turbocharger (TC) control valve.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

Signal Missing - Intermittent Fault

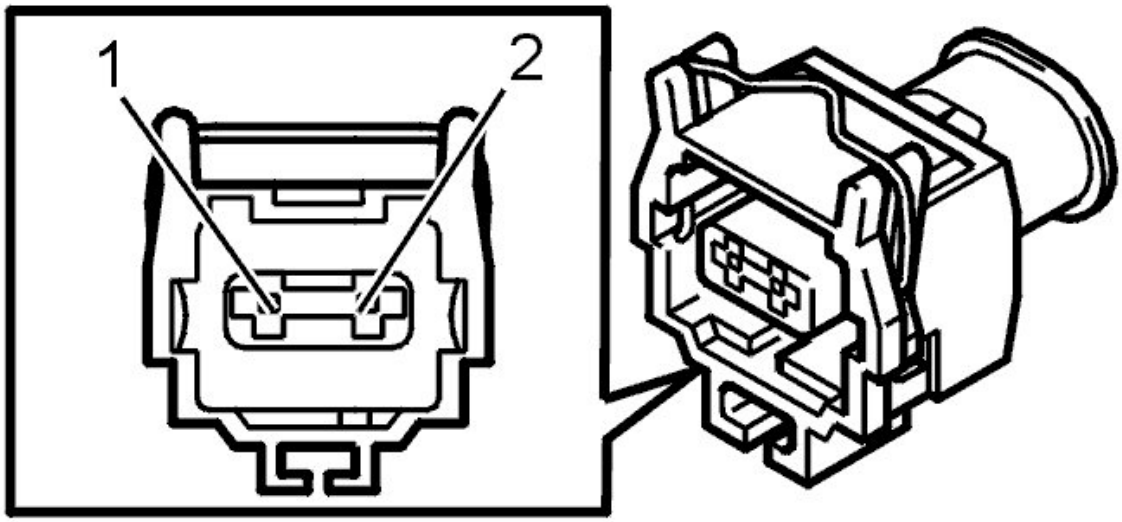
Signal missing. Intermittent fault

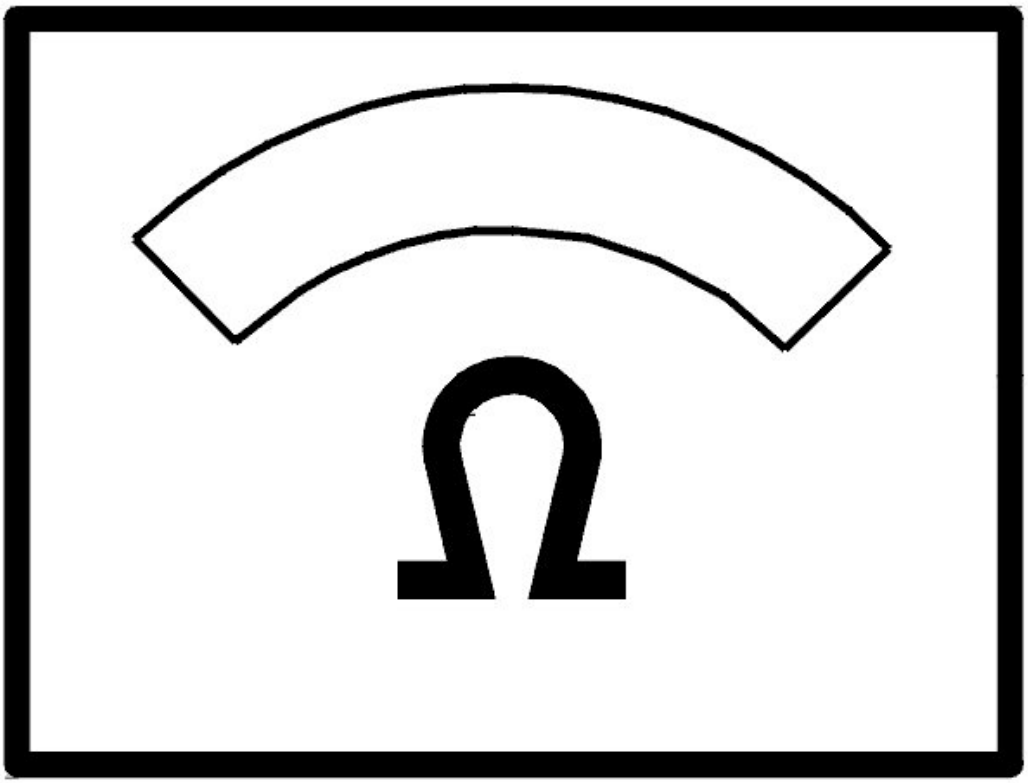
Checking the component, wiring and connector

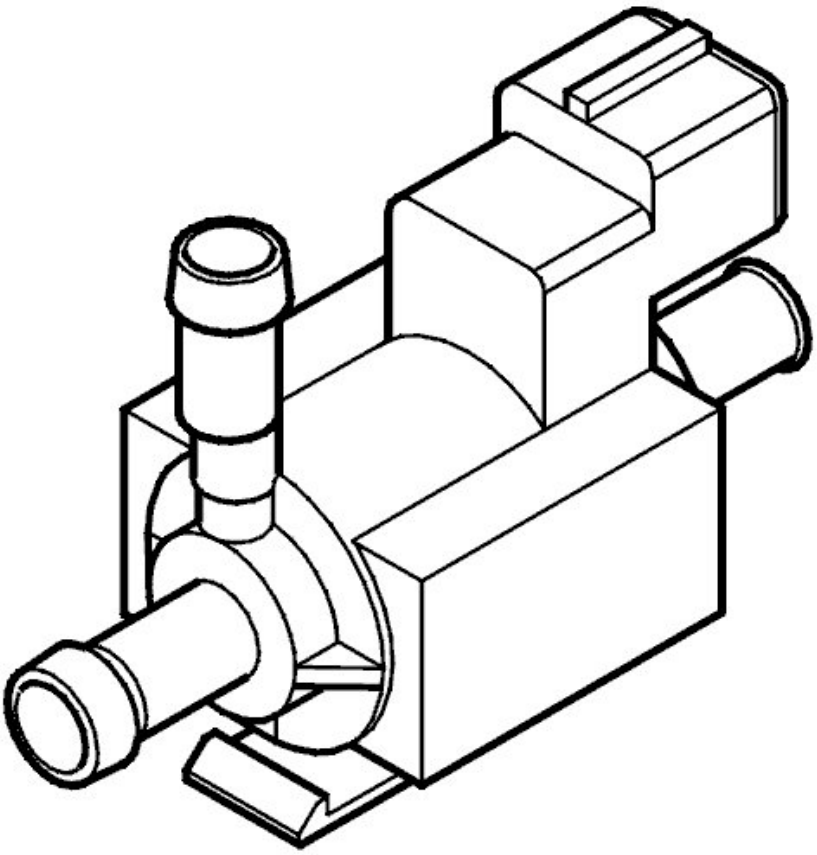
Check turbocharger (TC) control valve connector for intermittent contact resistance or oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and intermittent loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check signal cable between engine control module (ECM) #A38 (#A38) and turbocharger (TC) control valve #2 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check power supply turbocharger (TC) control valve between turbocharger (TC) control valve #1 and system relay for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary

Other information

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.
- Turbocharger (TC) control valve #1 has power supply via the system relay.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

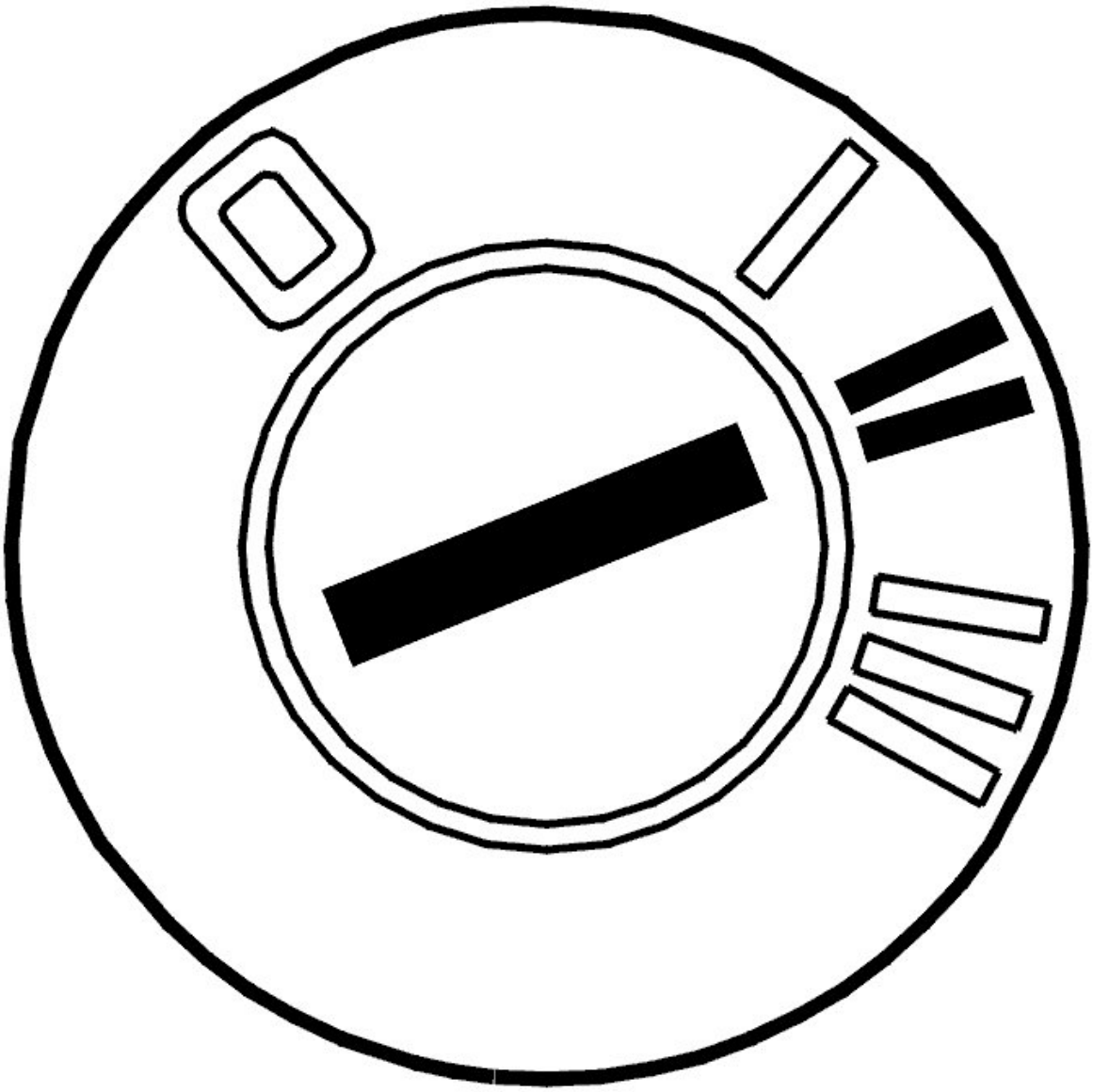
Attempt New Test - wiring and connector

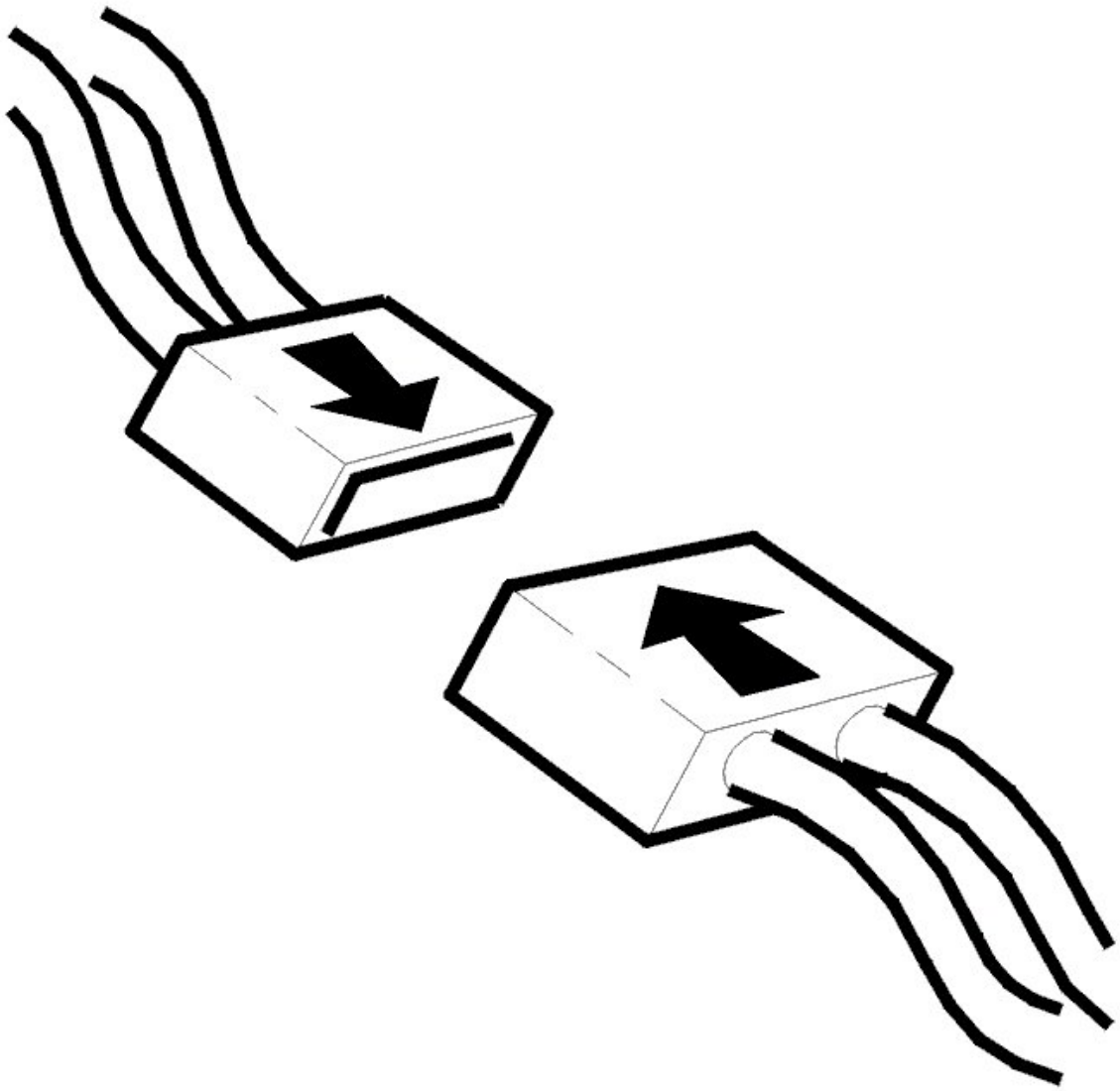
FAULT FOUND - DONE

Signal Missing - Permanent Fault

Signal missing. Permanent fault

Checking connector



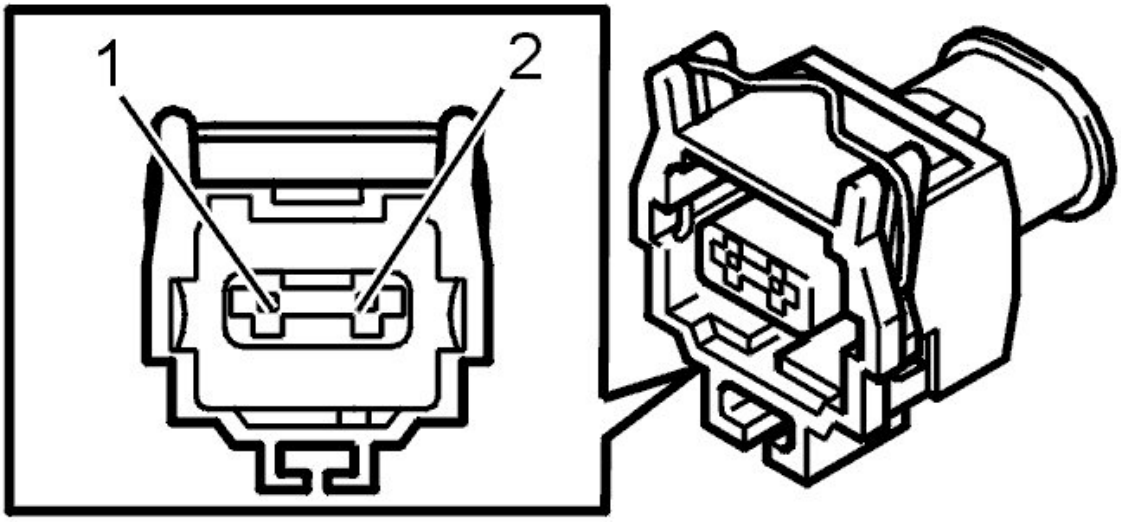


- Ignition off.
- Check turbocharger (TC) control valve connector for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
- Reinstall components, reconnect connectors etc.
- Ignition on.
- Activate turbocharger (TC) control valve.
- A click should be heard from the turbocharger (TC) control valve.

If the function is OK the cause of the fault was loose connections in the connector.

Other information

- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair



Is the function OK?

Yes - Fault Found

No - Checking component and wiring

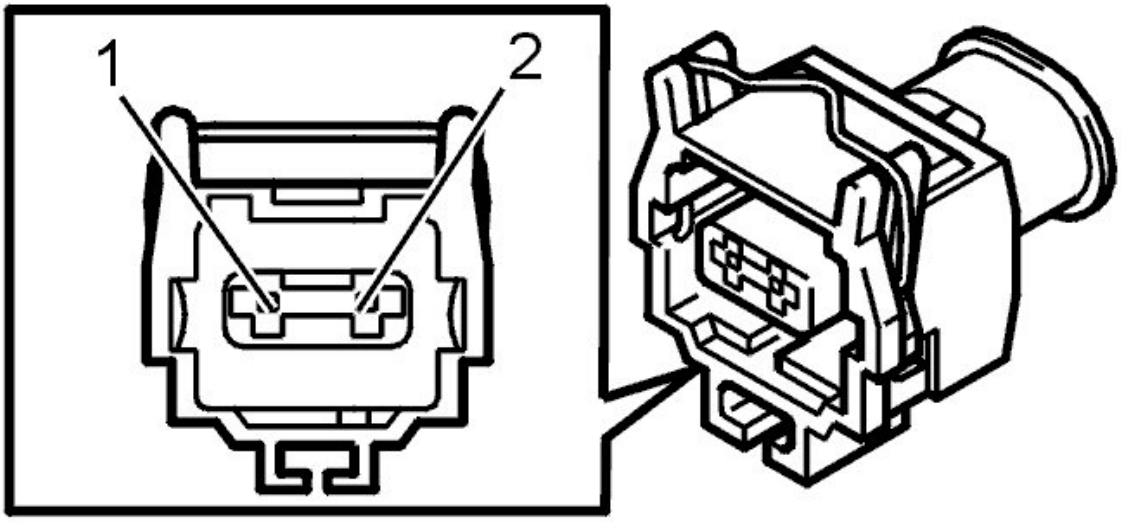
Checking component and wiring

Check signal cable between engine control module (ECM) #A38 (#A38) and turbocharger (TC) control valve #2 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check power supply cable between turbo charger valve #1 and system relay for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

- Turbocharger (TC) control valve #1 has power supply via the system relay.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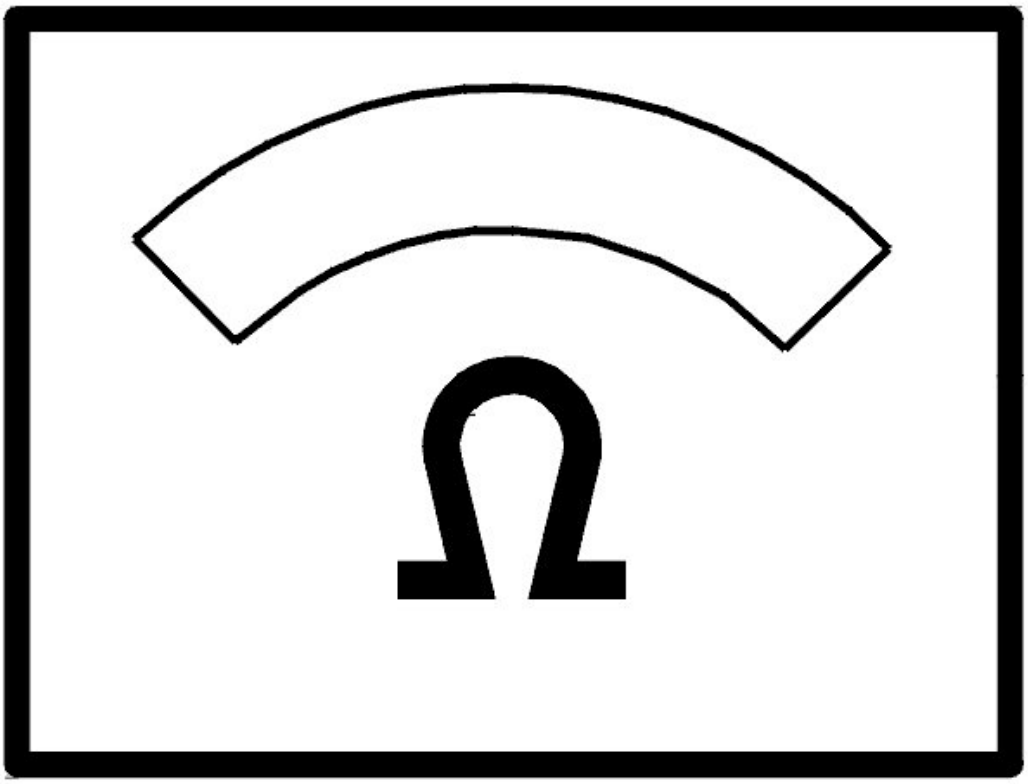
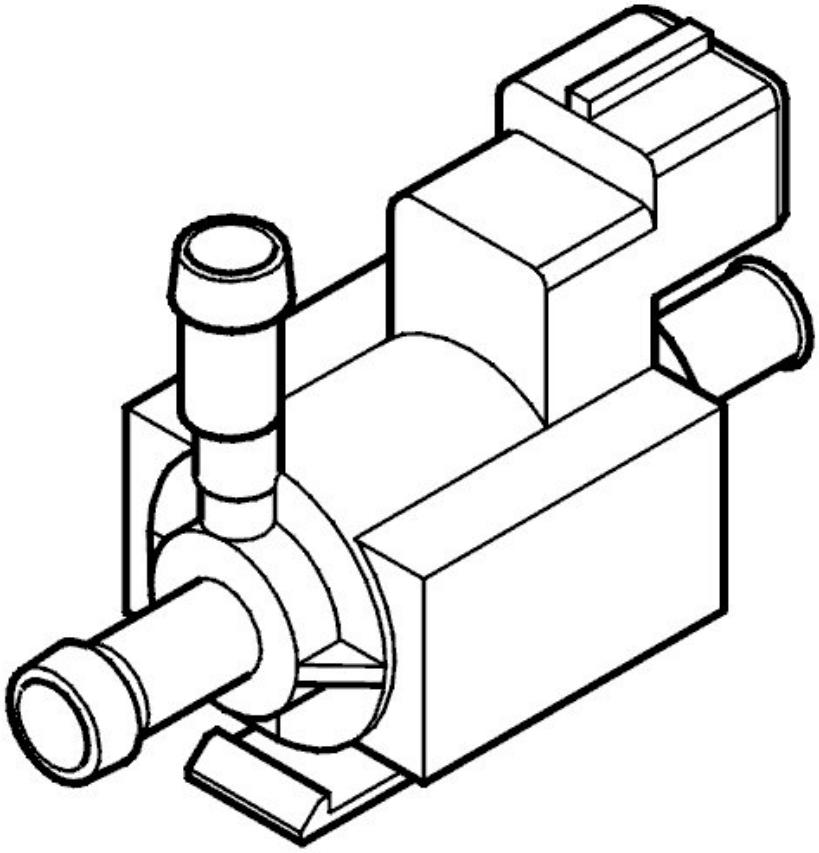




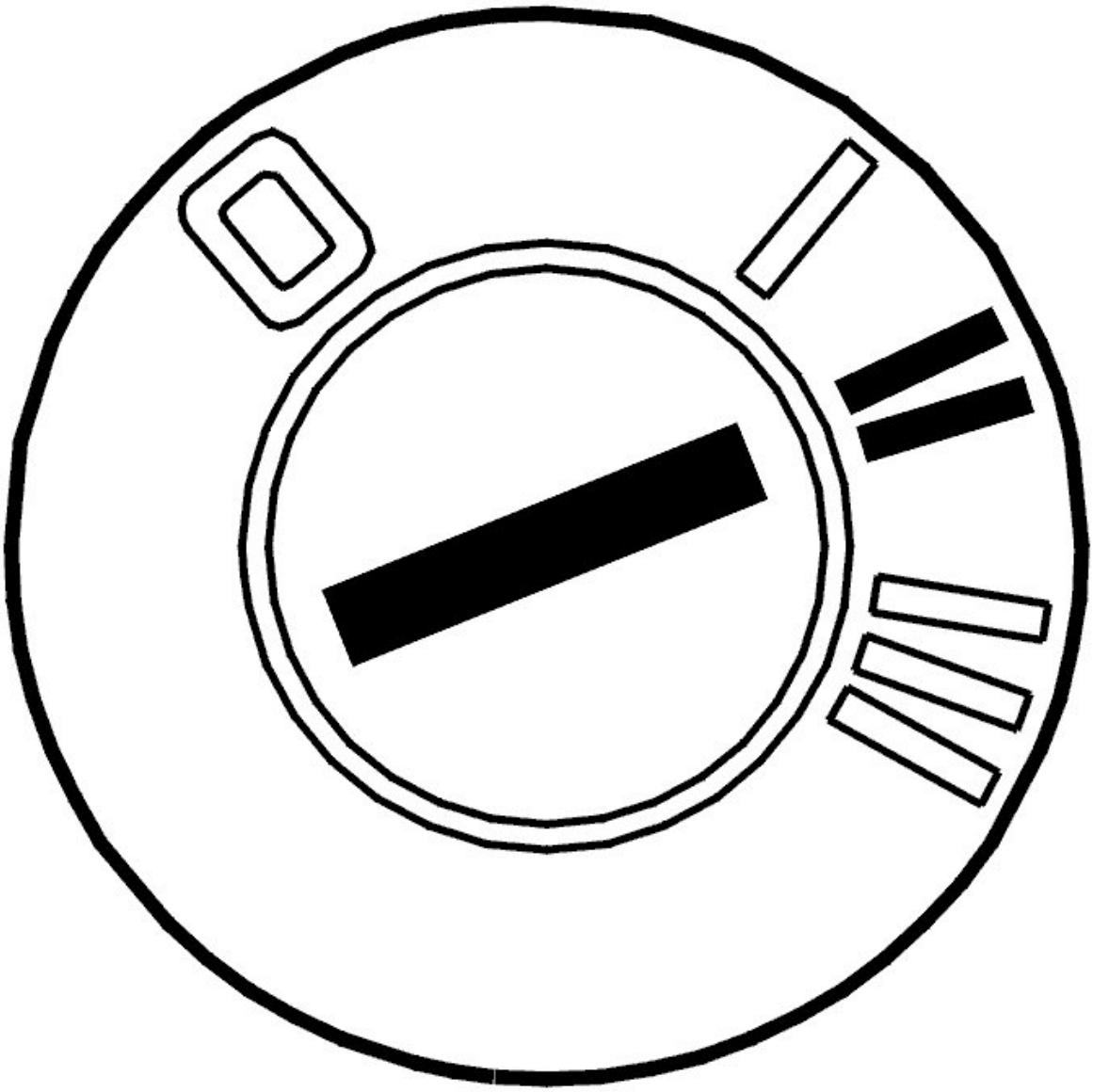
Continue - Verification

Verification

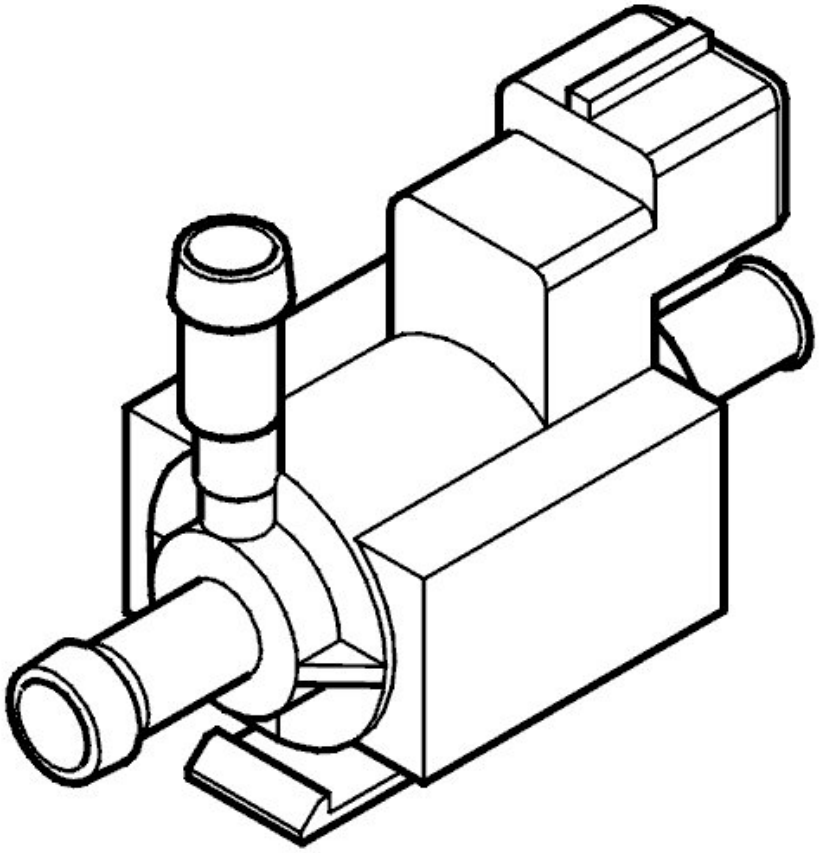
Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Activate turbocharger (TC) control valve
- A click should be heard from the turbocharger (TC) control valve.
- Check that the function is OK.



Is function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

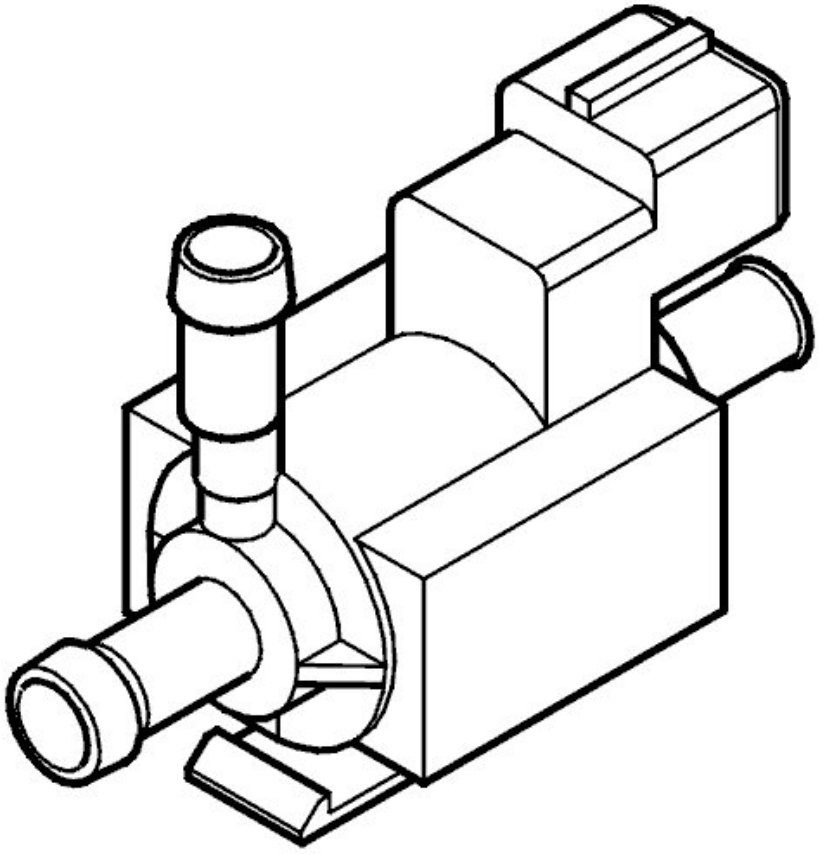
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-600C

Condition



The engine control module (ECM) checks the signal cable for the turbocharger (TC) control valve.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the voltage in the signal cable from the turbocharger (TC) control valve is too high.
The diagnostic trouble code (DTC) can be diagnosed during control of the boost pressure.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged turbocharger (TC) control valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High - Intermittent Fault

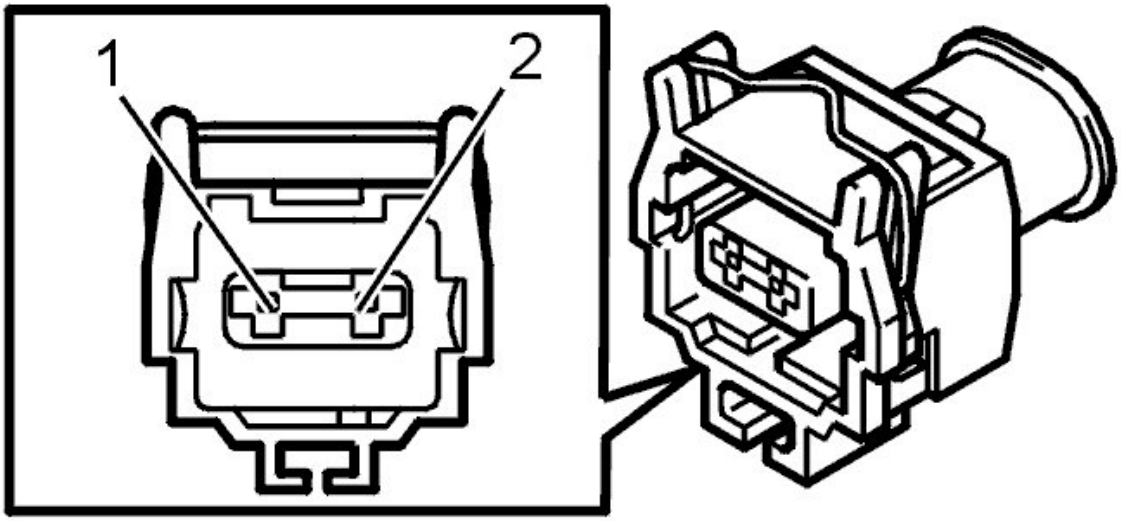
Signal too high. Intermittent fault

Checking component and wiring

Check cables between engine control module (ECM) #A38 (#A38) and turbocharger (TC) control valve #2 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary

Other information
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

- Turbocharger (TC) control valve terminal 1 has Ubat power supply from the system relay.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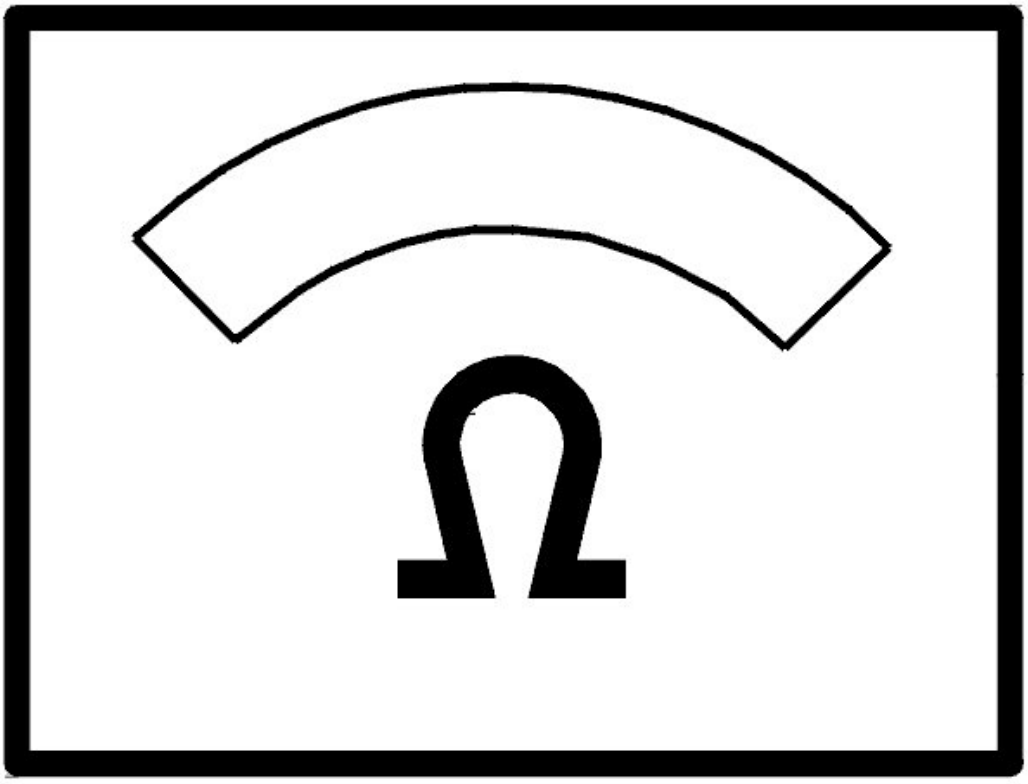
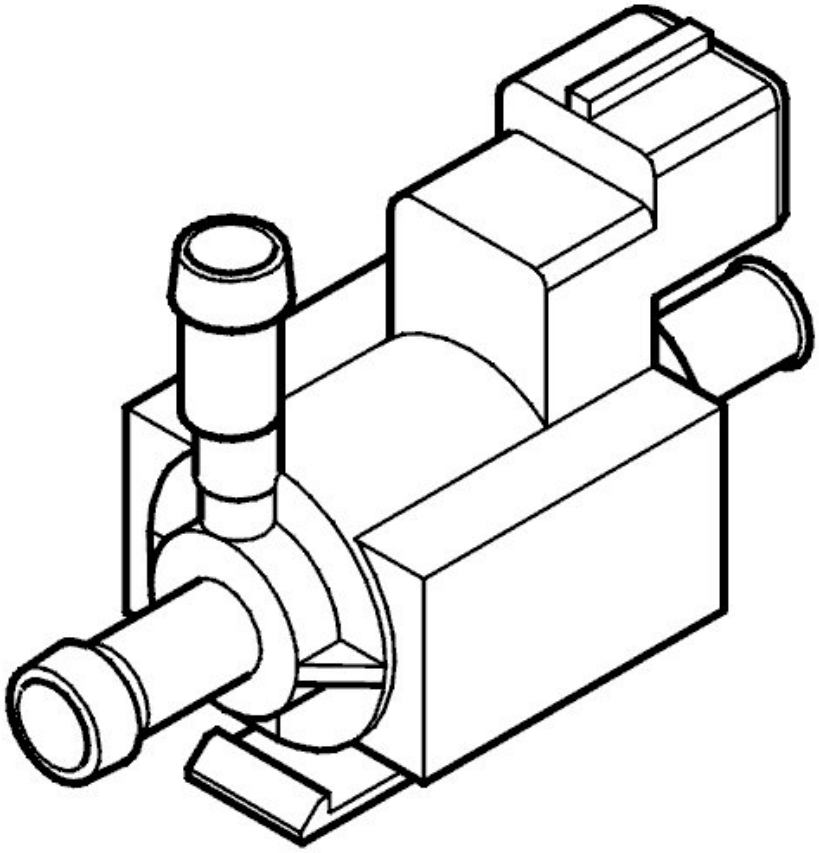




Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking component and wiring

FAULT FOUND - DONE

Signal Too High - Permanent Fault

Signal too high. Permanent fault

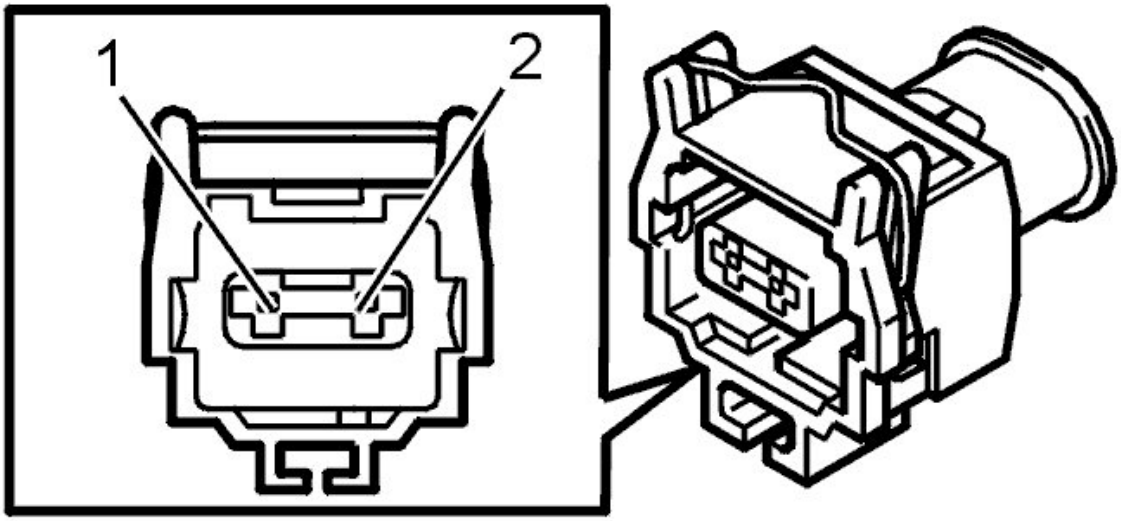
Checking component and wiring

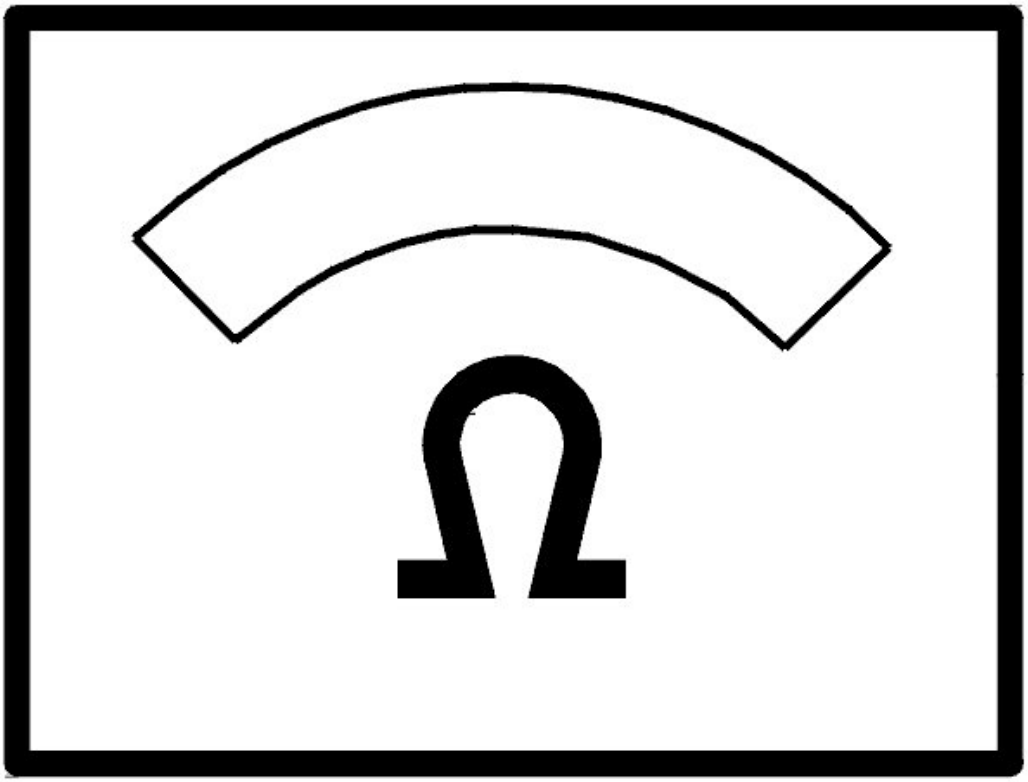
Check the cable between #A38 (#A38) and turbocharger (TC) control valve #2 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary

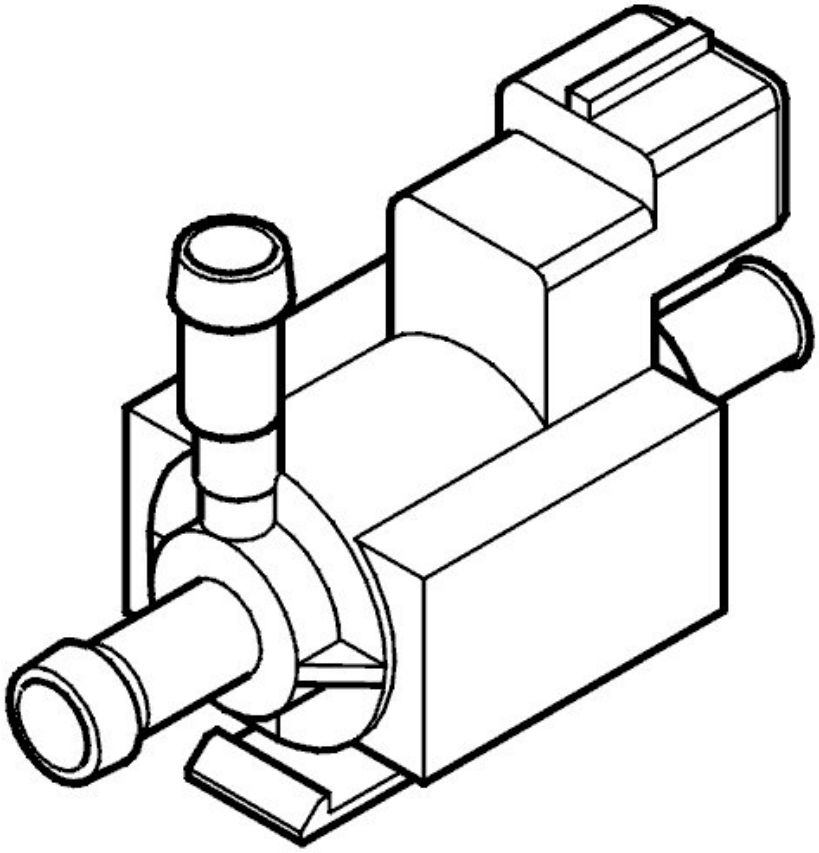
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair
- Turbocharger (TC) control valve #1 has Ubat power supply from the system relay.







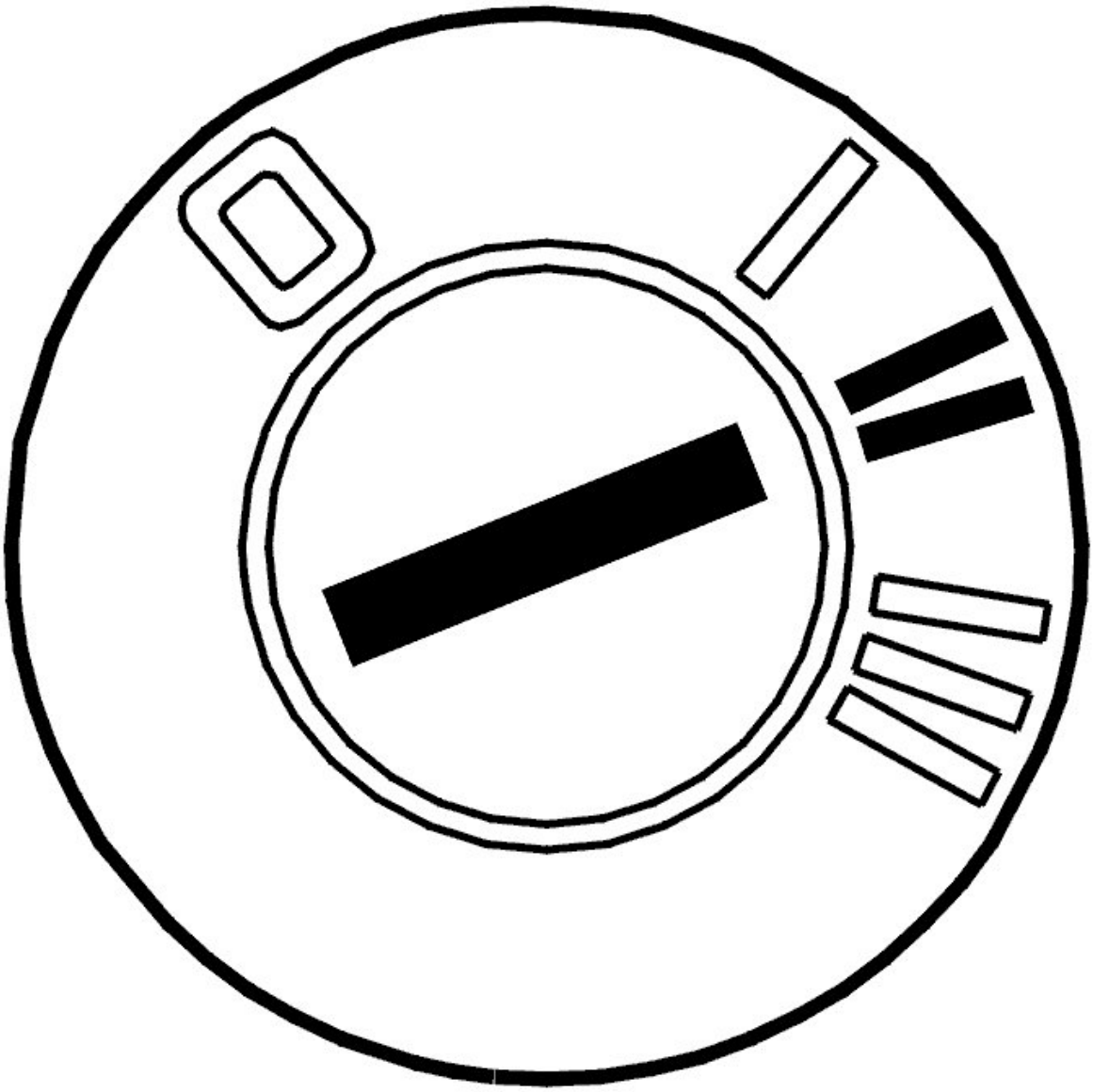
Continue - Verification

Verification

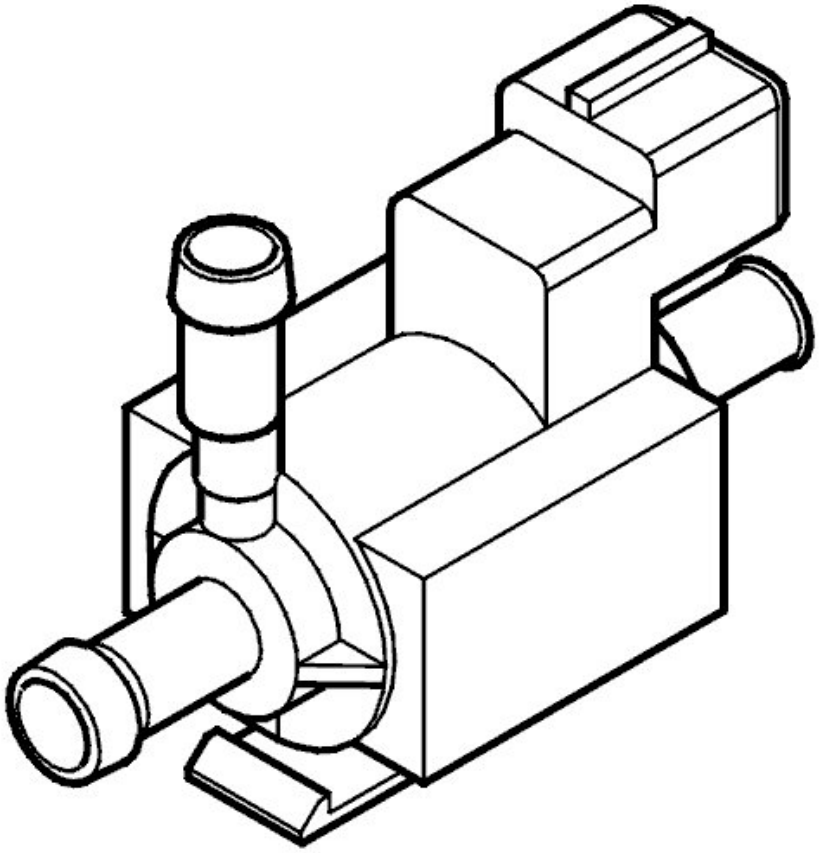
Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Activate turbocharger (TC) control valve
- A click should be heard from the turbocharger (TC) control valve.
- Check that the function is OK.



Is function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

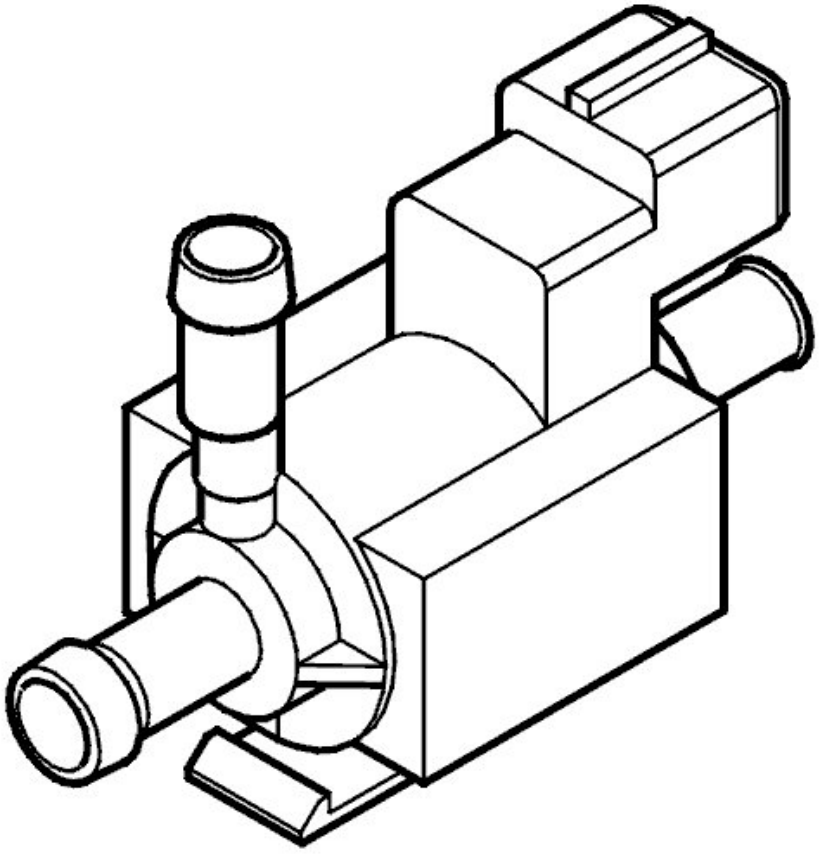
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-600D

Condition



The engine control module (ECM) checks the signal cable for the turbocharger (TC) control valve.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the voltage in the signal cable from the turbocharger (TC) control valve is too low.
The diagnostic trouble code (DTC) can be diagnosed during control of the boost pressure.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged turbocharger (TC) control valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

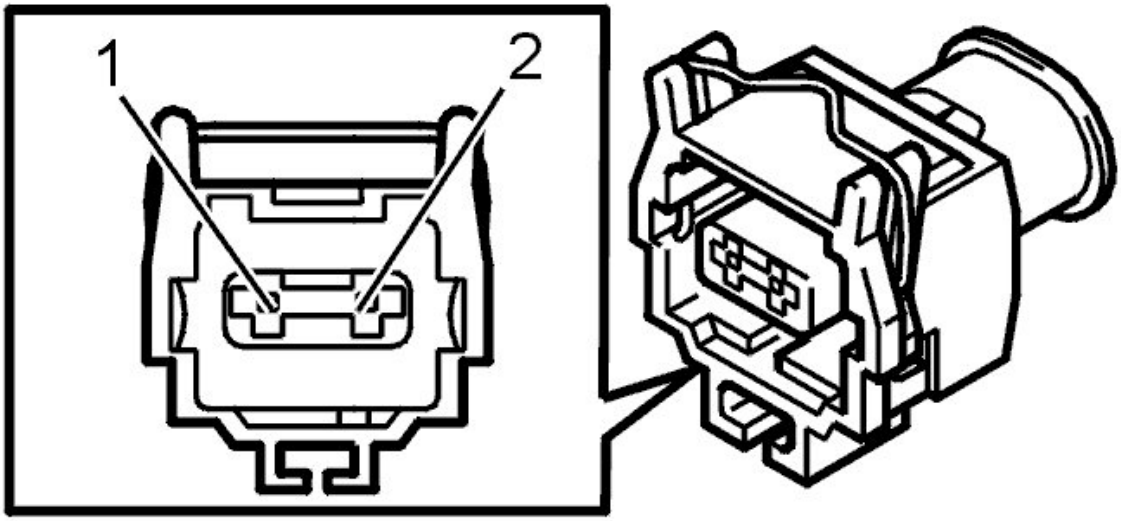
Signal Too Low - Intermittent Fault

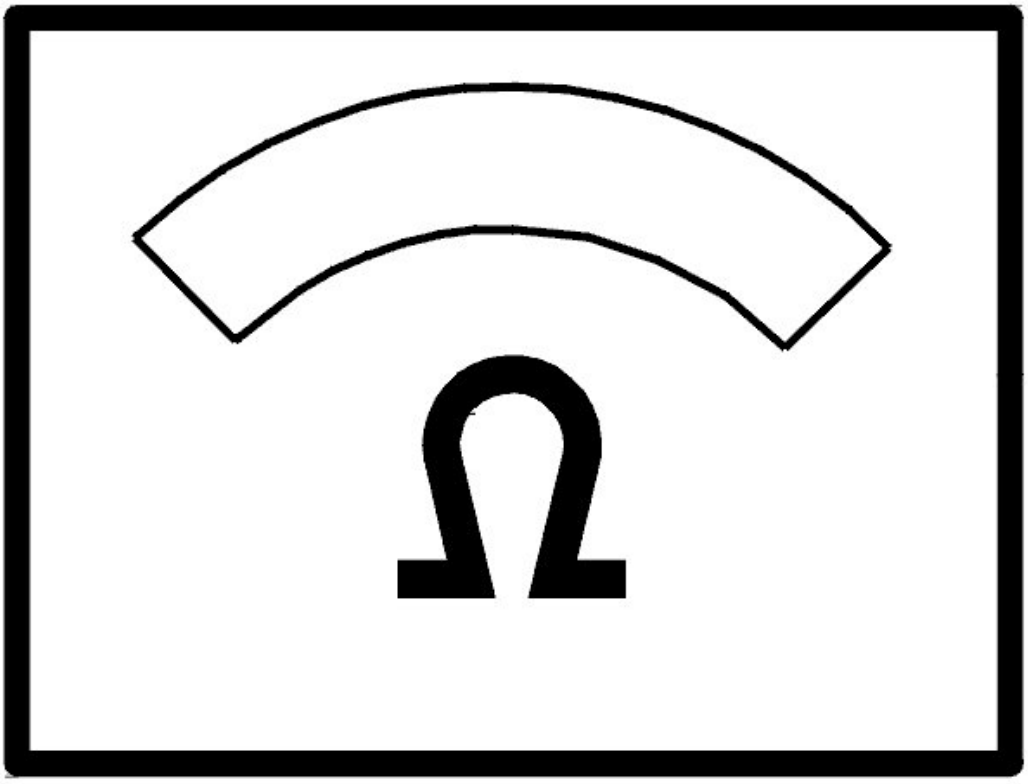
Signal too low. Intermittent fault

Checking component and wiring

Check cables between engine control module (ECM) #A38 (#A38) and turbocharger (TC) control valve #2 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary

Other information
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.
- Turbocharger (TC) control valve #1 has Ubat power supply from the system relay.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.


1
2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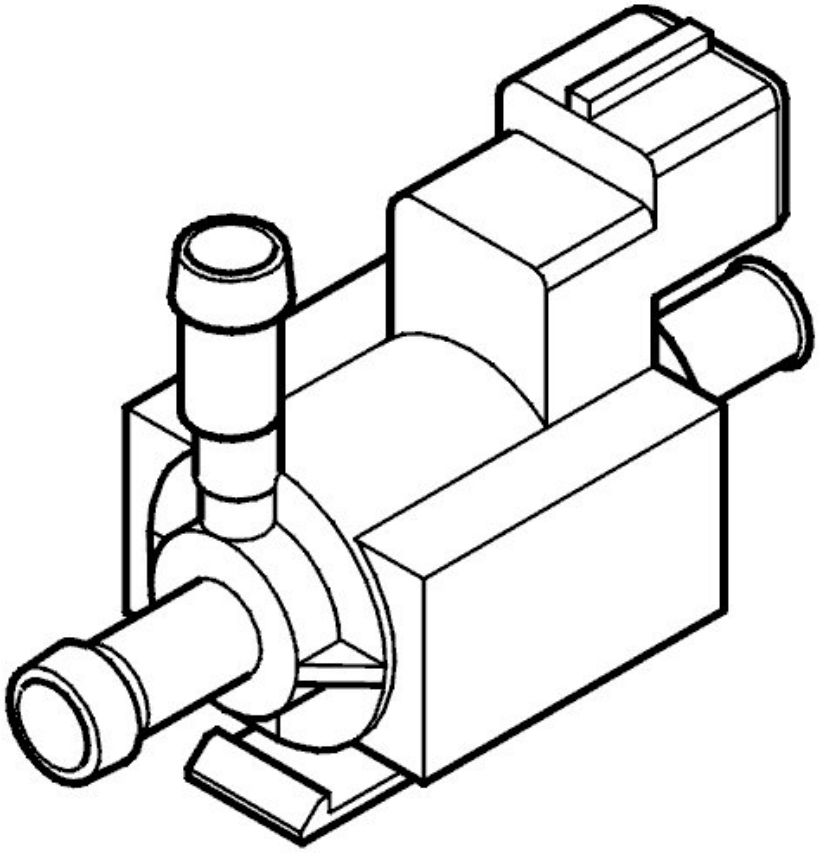


Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking component and wiring

FAULT FOUND - DONE

Signal Too Low - Permanent Fault

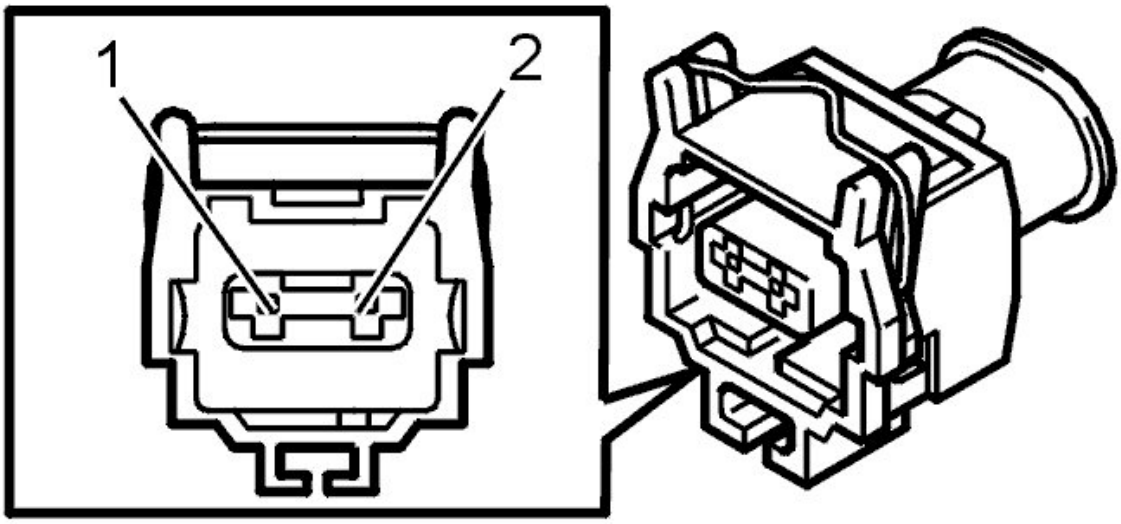
Signal too low. Permanent fault

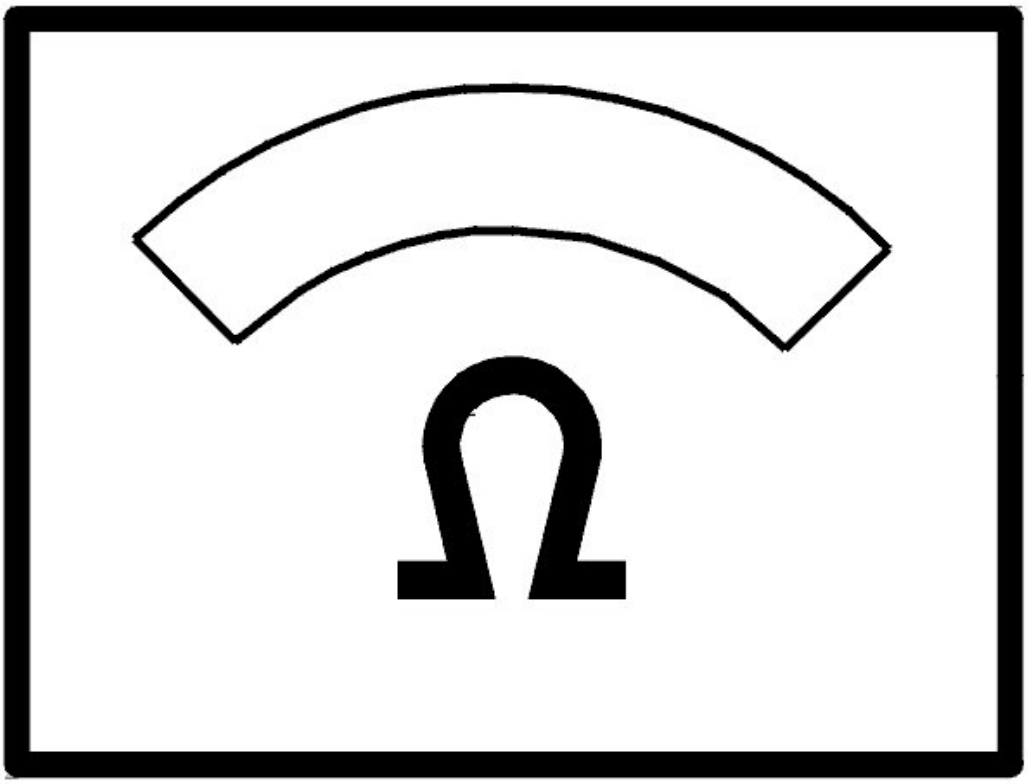
Checking component and wiring

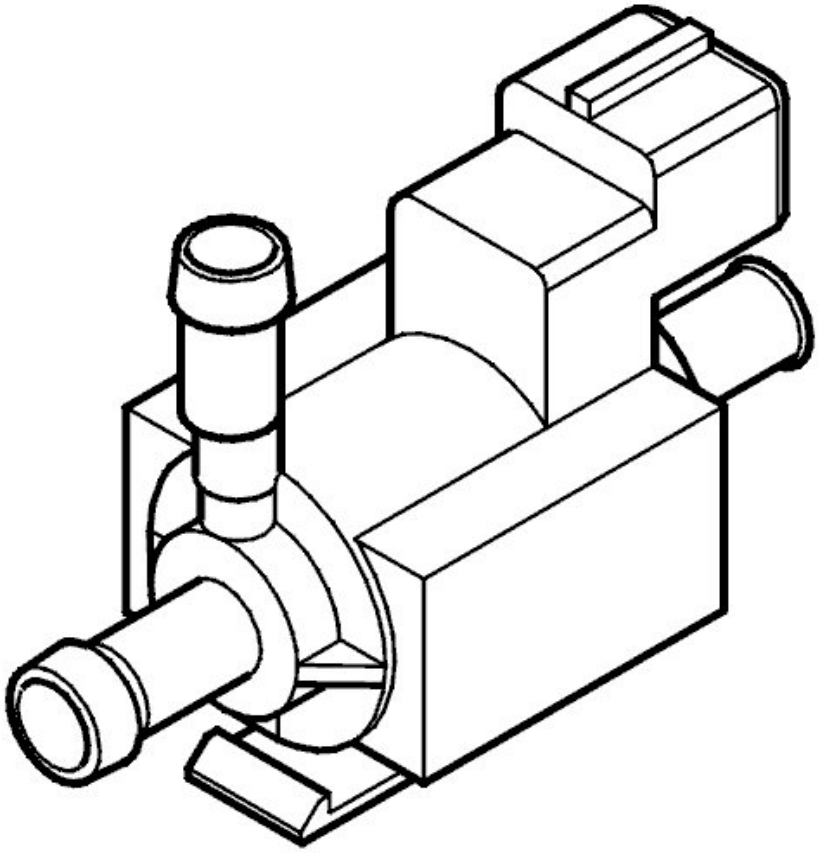
Check cable between engine control module (ECM) #A38 (#A38) and turbocharger (TC) control valve #2 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access/replace the turbocharger (TC) control valve, see Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.
- Turbocharger (TC) control valve #1 has Ubat power supply from the system relay.
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.







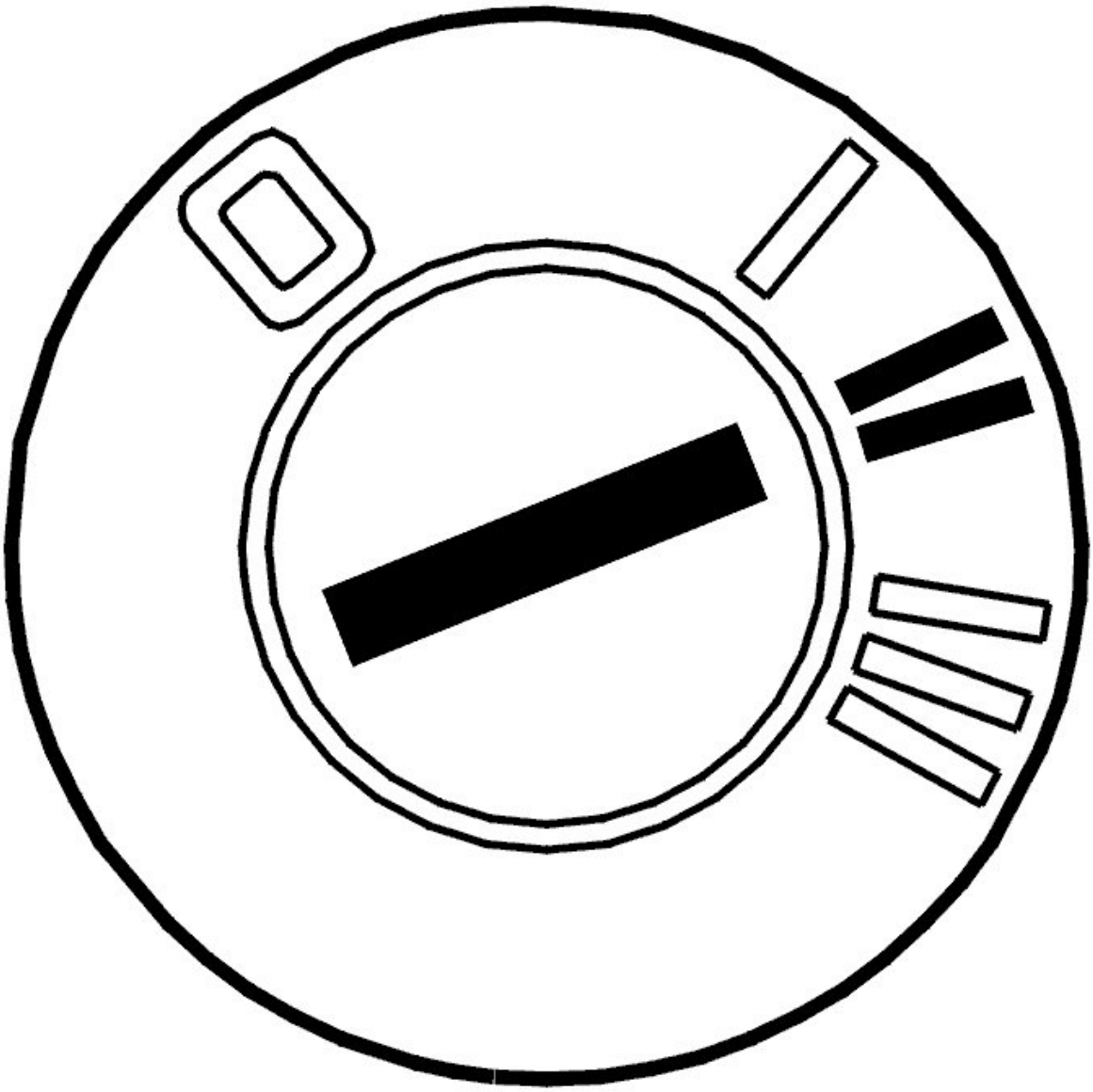
Continue - Verification

Verification

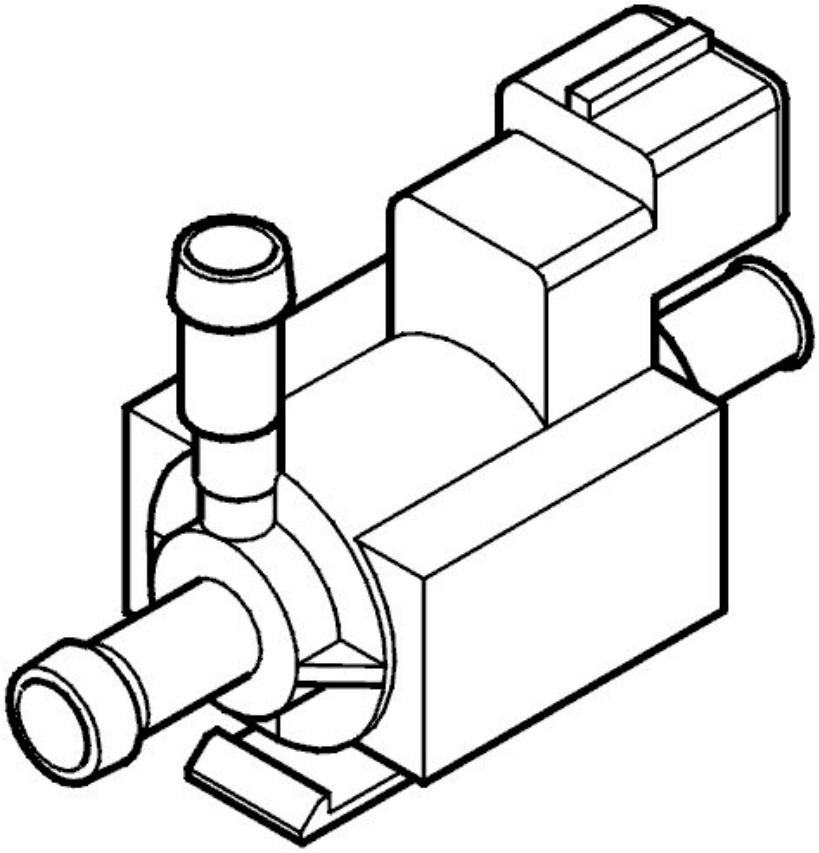
Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off.
- Reinstall connectors, components etc.
- Ignition on.
- Activate turbocharger (TC) control valve
- A click should be heard from the turbocharger (TC) control valve.
- Check that the function is OK.



Is function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

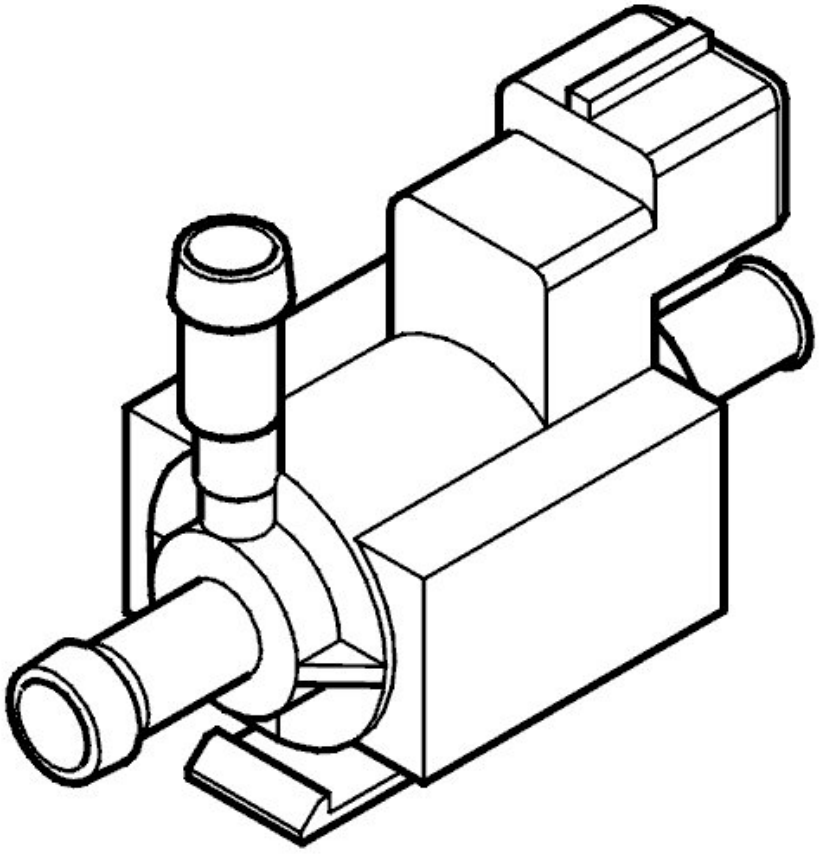
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-601C

Condition



The engine control module (ECM) checks the function of the turbocharger (TC) control system.
The diagnostic trouble code (DTC) is stored if the pressure measured by the boost pressure sensor is higher than a calculated desired value. This is interpreted as a fault by the control module.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Reduced throttle angle.

Possible source
- Damaged turbocharger (TC) control valve
- The hoses between the pressure servo for the boost pressure control (BPC) valve and the turbocharger (TC) control valve have come loose or are blocked or damaged
- The hoses between the turbocharger (TC) control valve and the charge air pipe (between the turbocharger (TC) and the charge air cooler (CAC)) are blocked or damaged
- Pressure servo for the boost pressure control (BPC) valve is incorrectly adjusted
- Damaged boost pressure control (BPC) valve pressure servo
- Sticking boost pressure control (BPC) valve.

Fault symptom[s]
- Poor performance.

Signal Too High

Signal too high

Checking hoses and the turbocharger (TC) control valve

Check the hoses between the pressure servo for the boost pressure control (BPC) valve and the turbocharger (TC) control valve. Check that the hoses are not trapped, blocked or damaged.
Check the hoses between the turbocharger (TC) control valve and the charge air pipe (between the turbocharger (TC) and the charge air cooler (CAC)). Check that the hoses are not trapped, blocked or damaged.
Check the turbocharger (TC) control valve by activating it. The turbocharger (TC) control valve must click when it is activated.

5 cylinder engines:

Check the setting of the pressure servo for the boost pressure control (BPC) valve. Check the boost pressure control (BPC) valve. Check that the pressure servo and the boost pressure control (BPC) valve are functioning correctly and are not sticking:
Wastegate valve, adjusting, B5254T2 See: Fuel Delivery and Air Induction/Turbocharger/Wastegate Actuator/Adjustments

6 cylinder engines:

Check the setting of the pressure servo for the boost pressure control (BPC) valve. Check the boost pressure control (BPC) valve. Check that the pressure servo and the boost pressure control (BPC) valve are functioning correctly and are not sticking:

Other information:

- Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair.

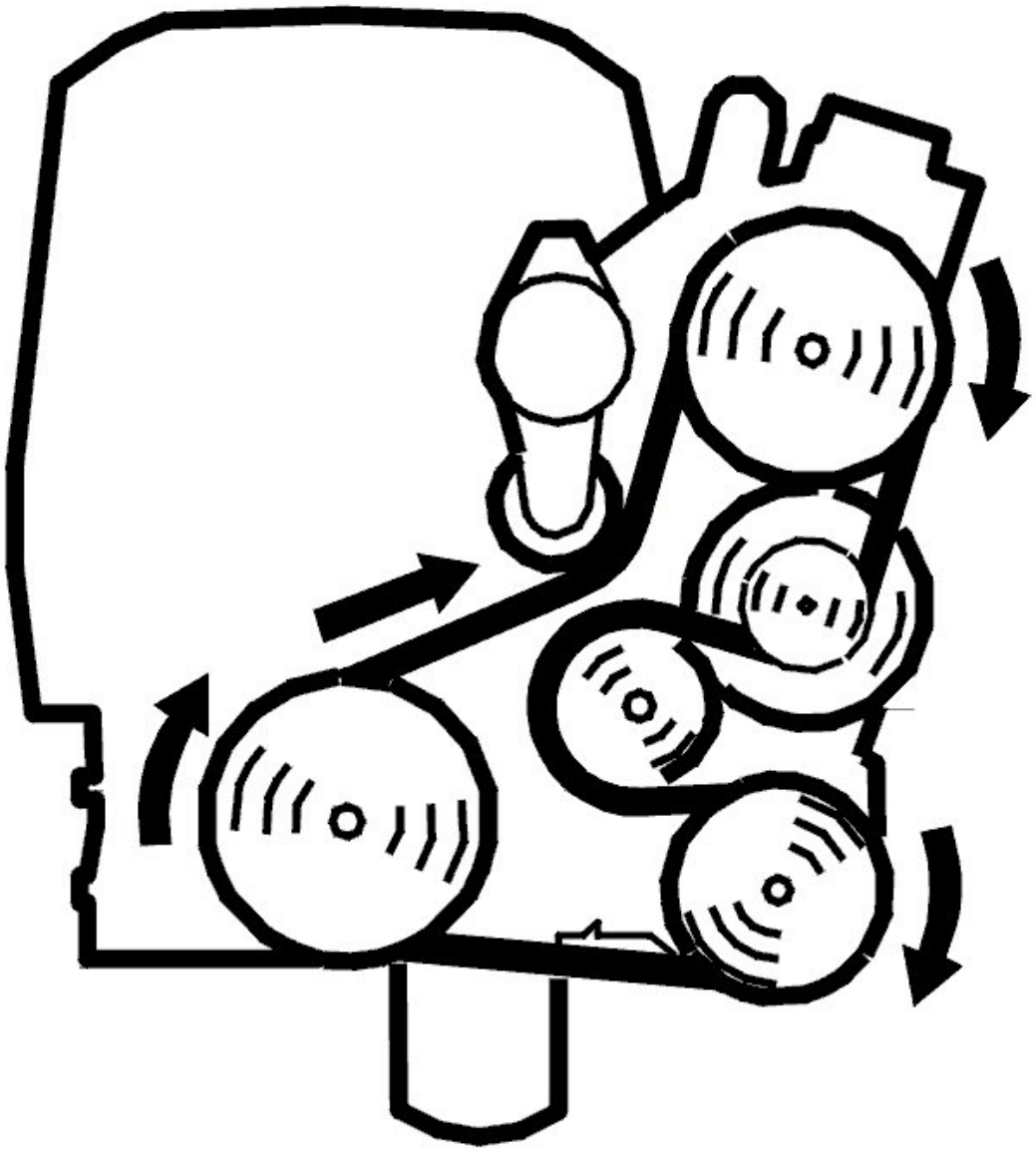
Continue - Verification

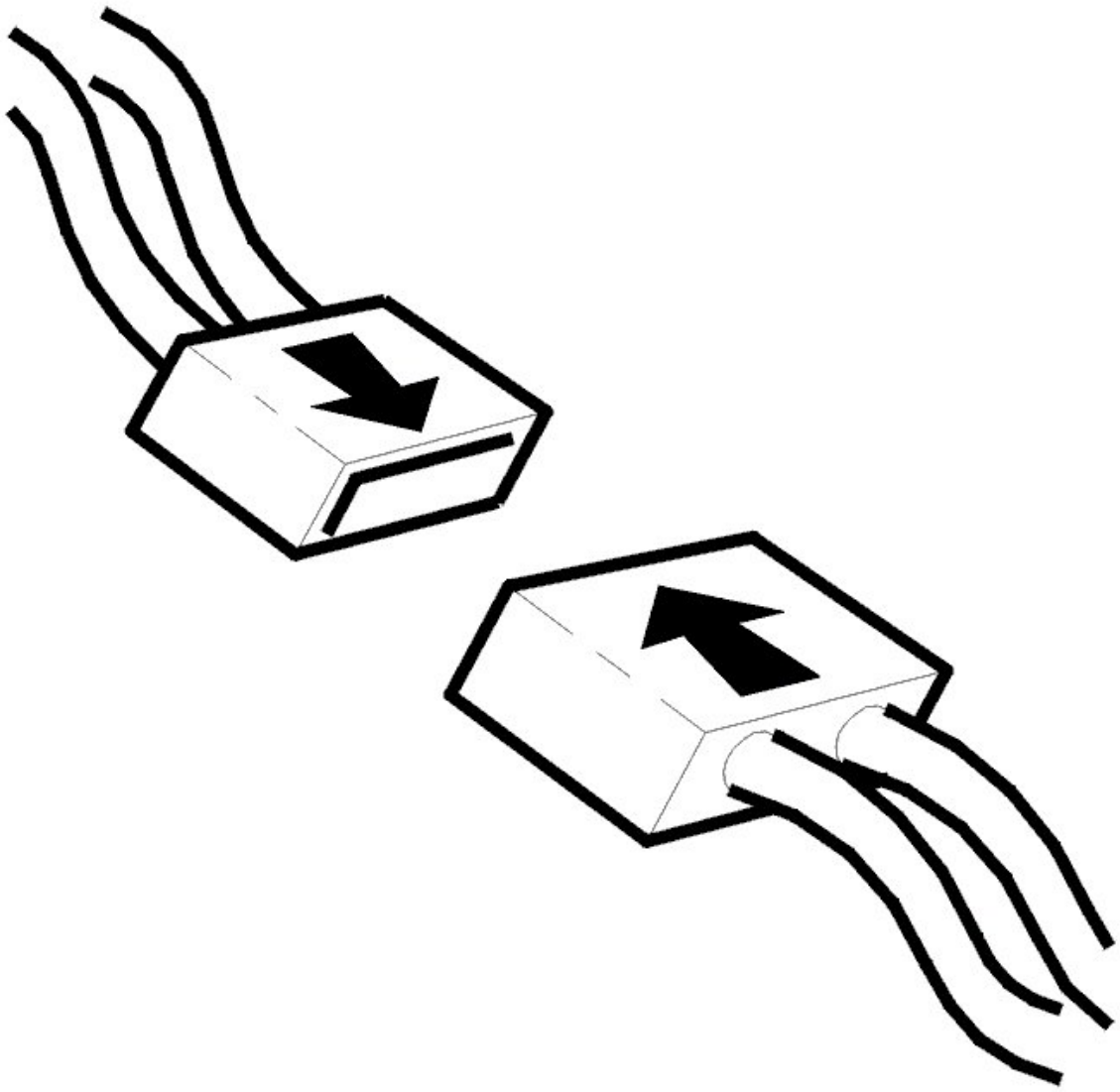
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Ensure that high boost pressure is reached (high load) so that the engine control module (ECM) can run the diagnostic
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking hoses and the turbocharger (TC) control valve

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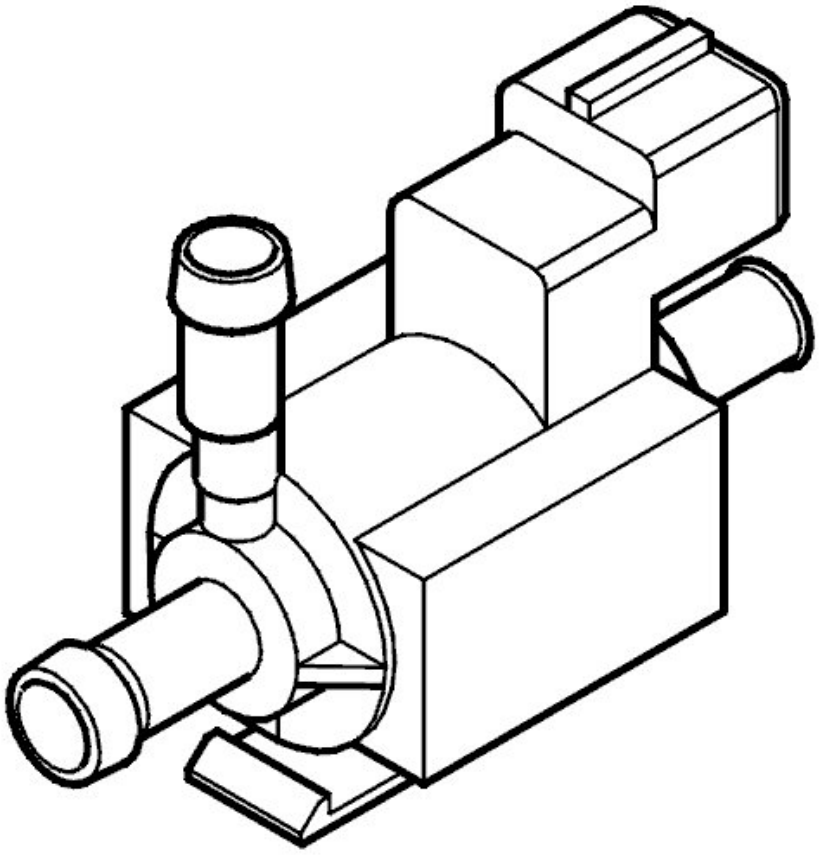
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-602D

Condition



The engine control module (ECM) checks the function of the turbocharger (TC) control system.
The diagnostic trouble code (DTC) is stored if the control module deployment of the turbocharger (TC) control valve is high (the control module requests maximum boost pressure) and the measured boost pressure (from the boost pressure sensor) is lower than a calculated desired value.
The diagnostic trouble code (DTC) can be diagnosed when the engine speed (RPM) and load are above a certain value.

Substitute value
- Reduced boost pressure.

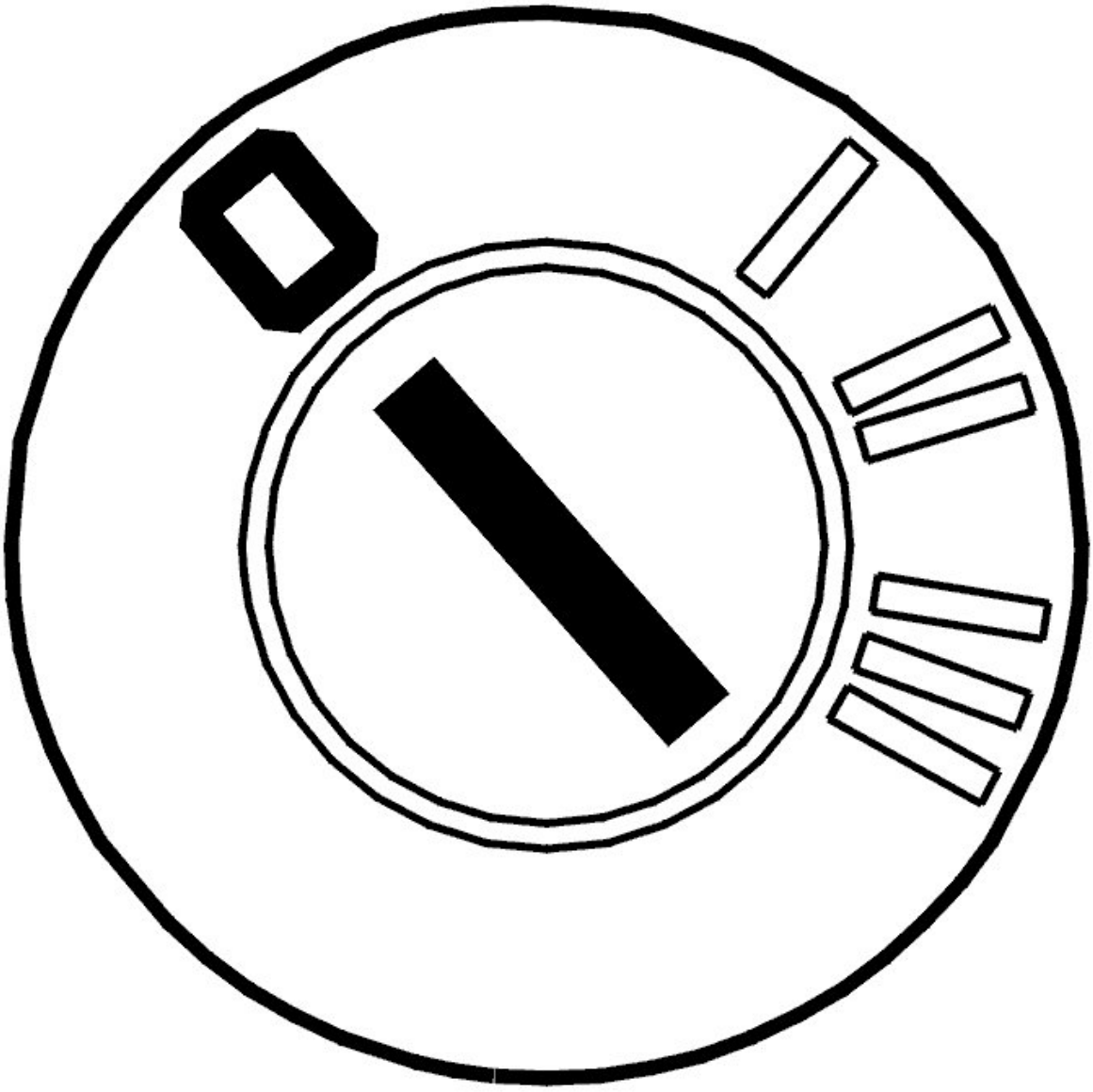
Possible source
- Air leakage in the intake system.
- Damaged turbocharger (TC) control valve.
- Incorrect adjustment of the pressure servo for the boost pressure control (BPC) valve
- Sticking boost pressure control (BPC) valve.
- Damaged turbo charger (TC).

Fault symptom[s]
- Poor performance.

Signal Too Low

Signal too low

Checking for air leakage



- Ignition off.

Check the intake system for air leakage and loose charge-air pipe.
Air leakage in the intake system, checking, B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking

Does the problem persist?

Yes - Checking hoses and the turbocharger (TC) control valve

No - Verification

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking hoses and the turbocharger (TC) control valve

Check the turbocharger (TC) control valve by activating it. The turbocharger (TC) control valve must click when it is activated.
Check the setting of the pressure servo for the boost pressure control (BPC) valve. Check the boost pressure control (BPC) valve. Check that the pressure servo and the boost pressure control (BPC) valve are functioning correctly and are not sticking: Wastegate valve, adjusting, B5254T2 See: Fuel Delivery and Air Induction/Turbocharger/Wastegate Actuator/Adjustments

Other information

- Replacing the turbocharger (TC) control valve, B5244T5, B5254T2 See: Boost Solenoid/Service and Repair
- Quick check, turbocharger (TC), B5244T5, B5254T2 See: Fuel Delivery and Air Induction/Turbocharger/Testing and Inspection
- Turbocharger (TC), replacing, B5254T2 See: Fuel Delivery and Air Induction/Turbocharger/Service and Repair

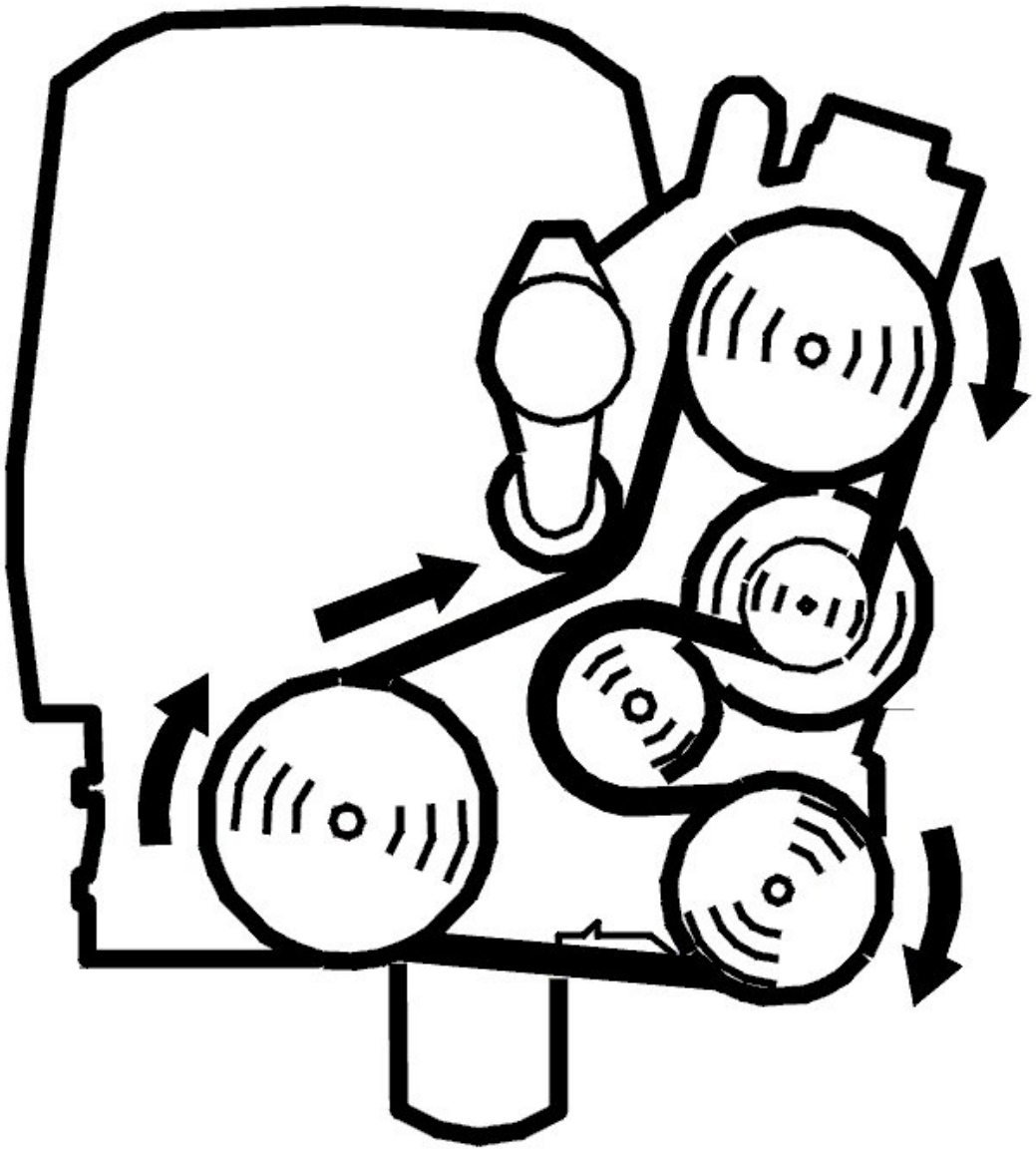
Continue - Verification

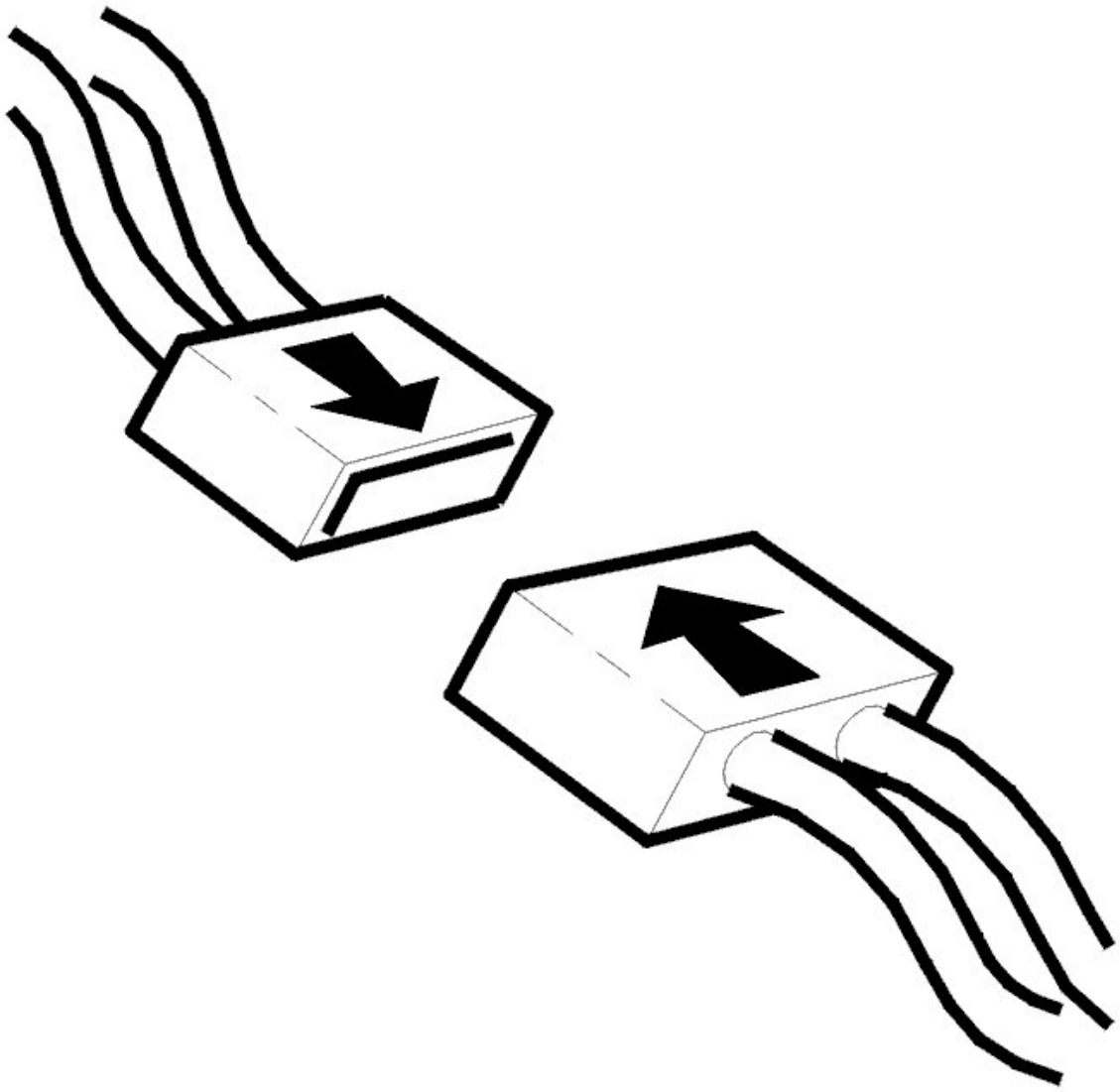
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Ensure that high boost pressure is reached (high load) so that the engine control module (ECM) can run the diagnostic
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

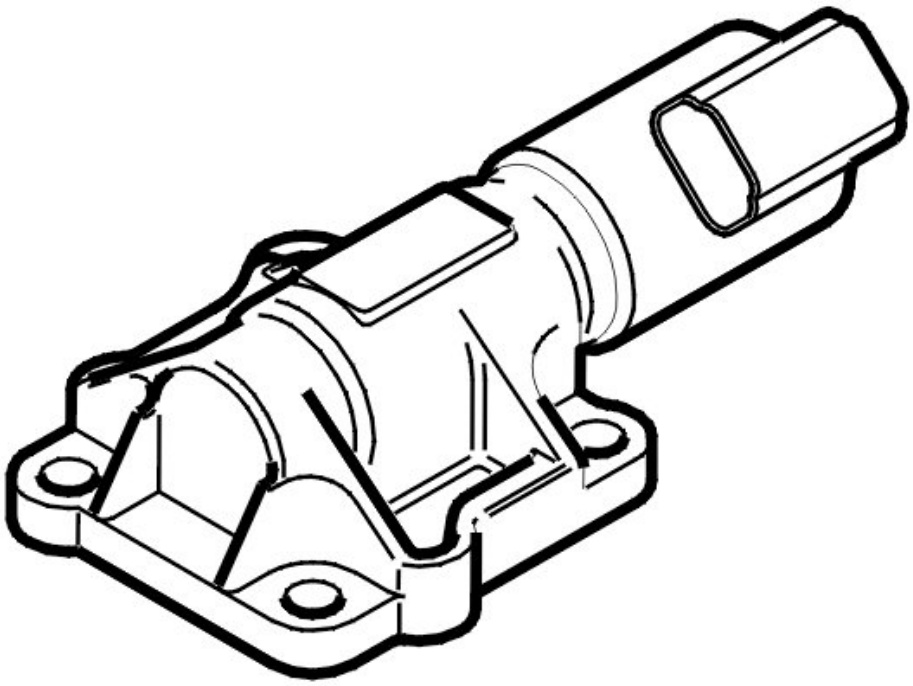
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for air leakage

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-6110

Condition



The engine control module (ECM) checks that control of the intake camshaft is quick enough. This means that the intake camshaft (actual value) reaches the position requested by the engine control module (ECM) quickly enough. The diagnostic trouble code (DTC) is stored if the requested position is not reached within a certain time.
The diagnostic trouble code (DTC) can be diagnosed by the engine control module (ECM) when the engine is running and the camshaft control is active.

Substitute value
- None.

Possible source
- Low oil pressure
- Poor oil quality
- Damaged reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

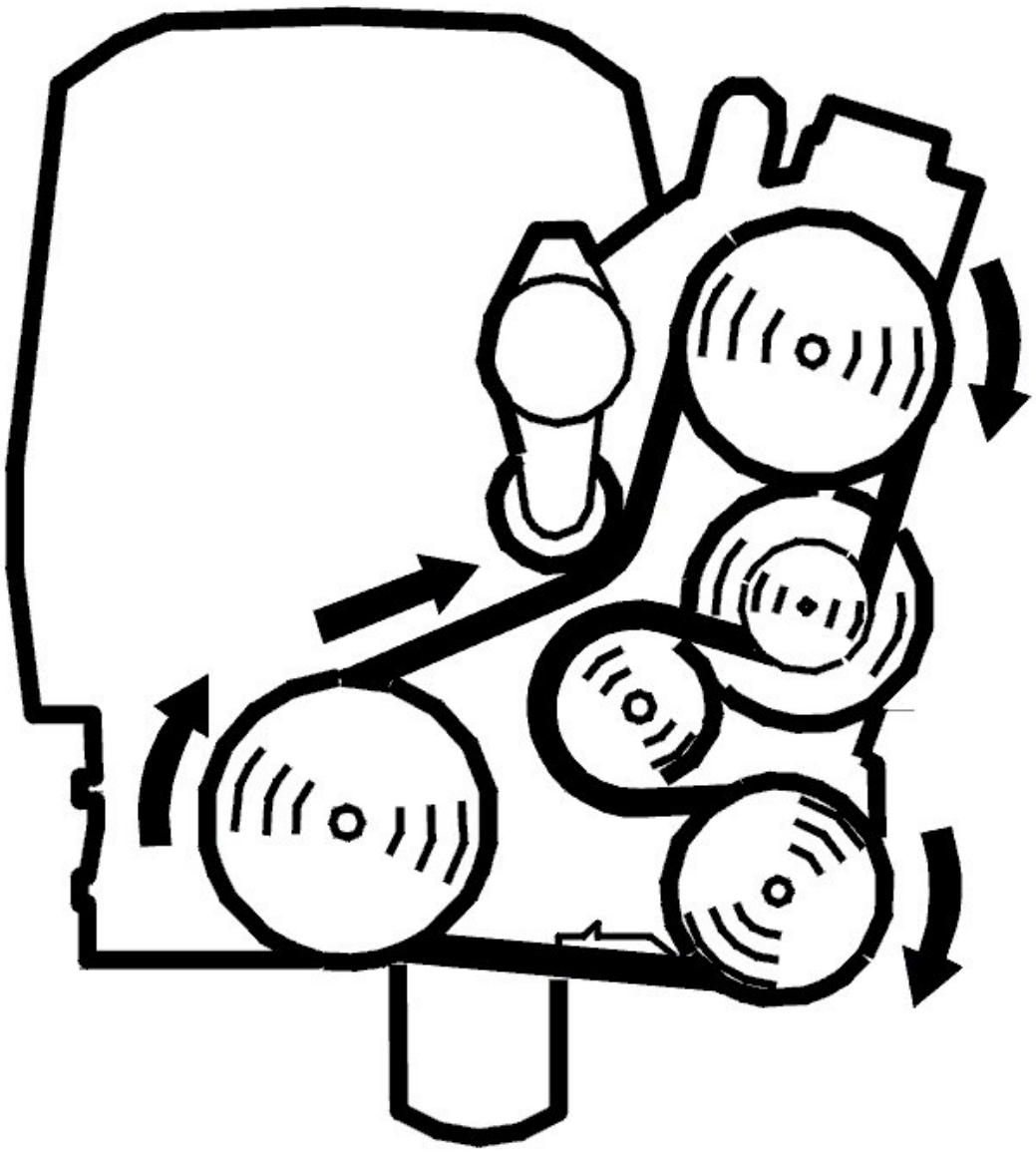
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Slow/Faulty

Slow/Faulty

Checking the status

Hint: Diagnostic trouble code (DTC) may be caused by a damaged fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.

Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the vehicle is delivered to the customer.

Continue - Checking components

Checking components

Check the level and quality of the engine oil. Check for contaminants in particular.
Check the engine oil pressure.
Remove the camshaft reset valve. Check the oil ducts for the cylinder head for the camshaft reset valve (intake) for blockages and dirt.

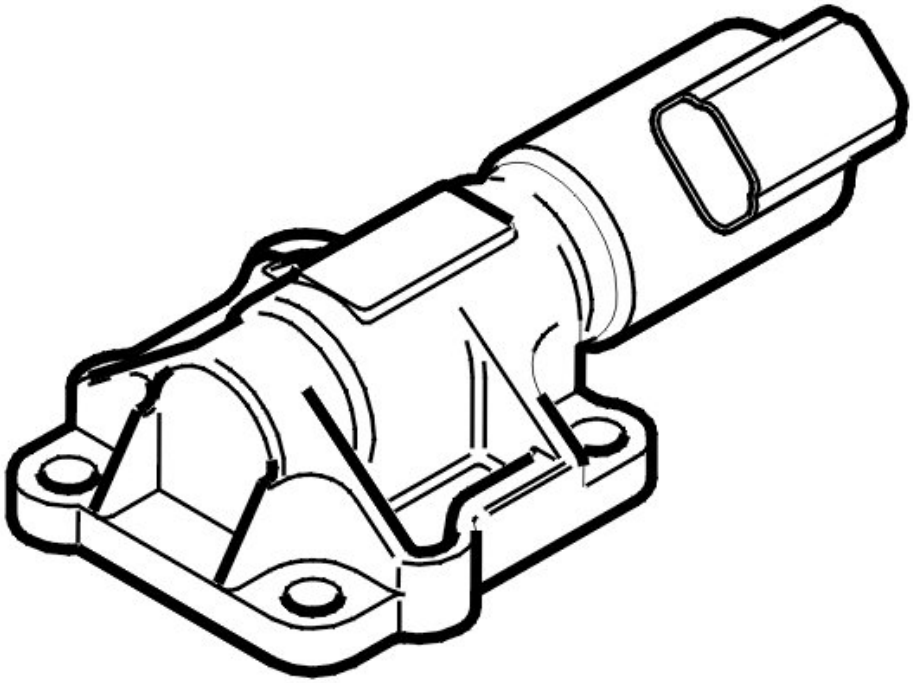
Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Remedy as necessary.
Try a new intake camshaft reset valve if the above remedy does not solve the fault.

Hint: The fault may also have been caused by an internal fault in the variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- Checking oil pressure, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Testing and Inspection/Checking Oil Pressure
- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



Continue - Verification

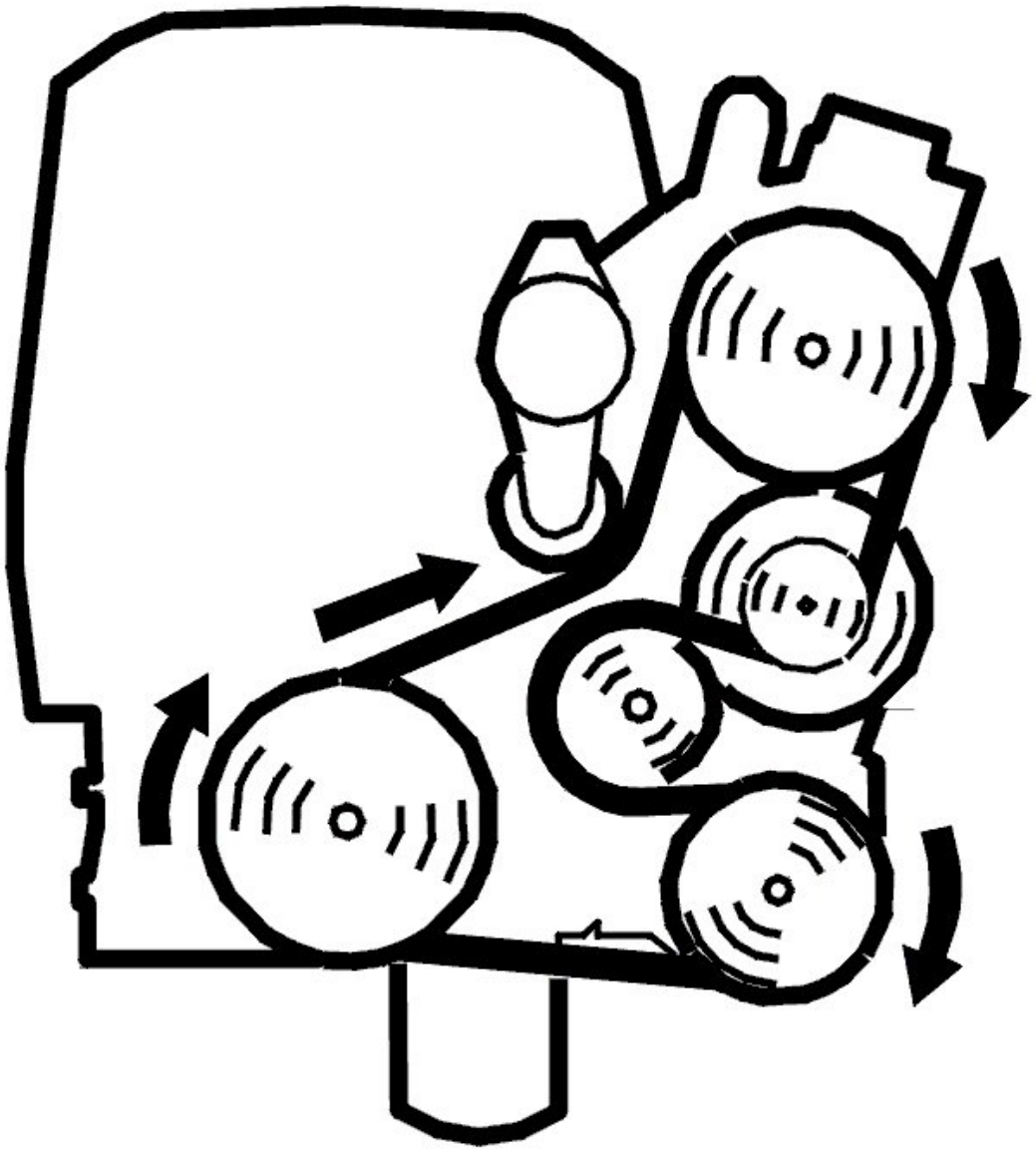
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

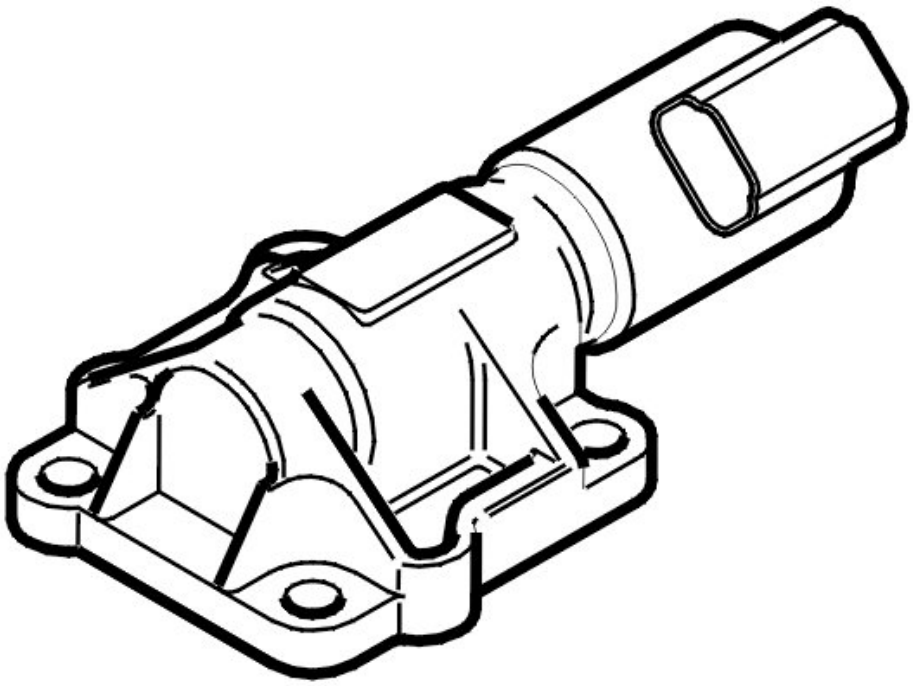
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-611B

Condition



The engine control module (ECM) checks that the position of the intake camshaft (actual value) corresponds to the requested position (desired value).
The diagnostic trouble code (DTC) is stored if the requested position is not reached.
The diagnostic trouble code (DTC) is diagnosed by the engine control module (ECM) when the engine is running and the camshaft control is active.

Substitute value
- None.

Possible source
- Low oil pressure
- Poor oil quality
- Damaged reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

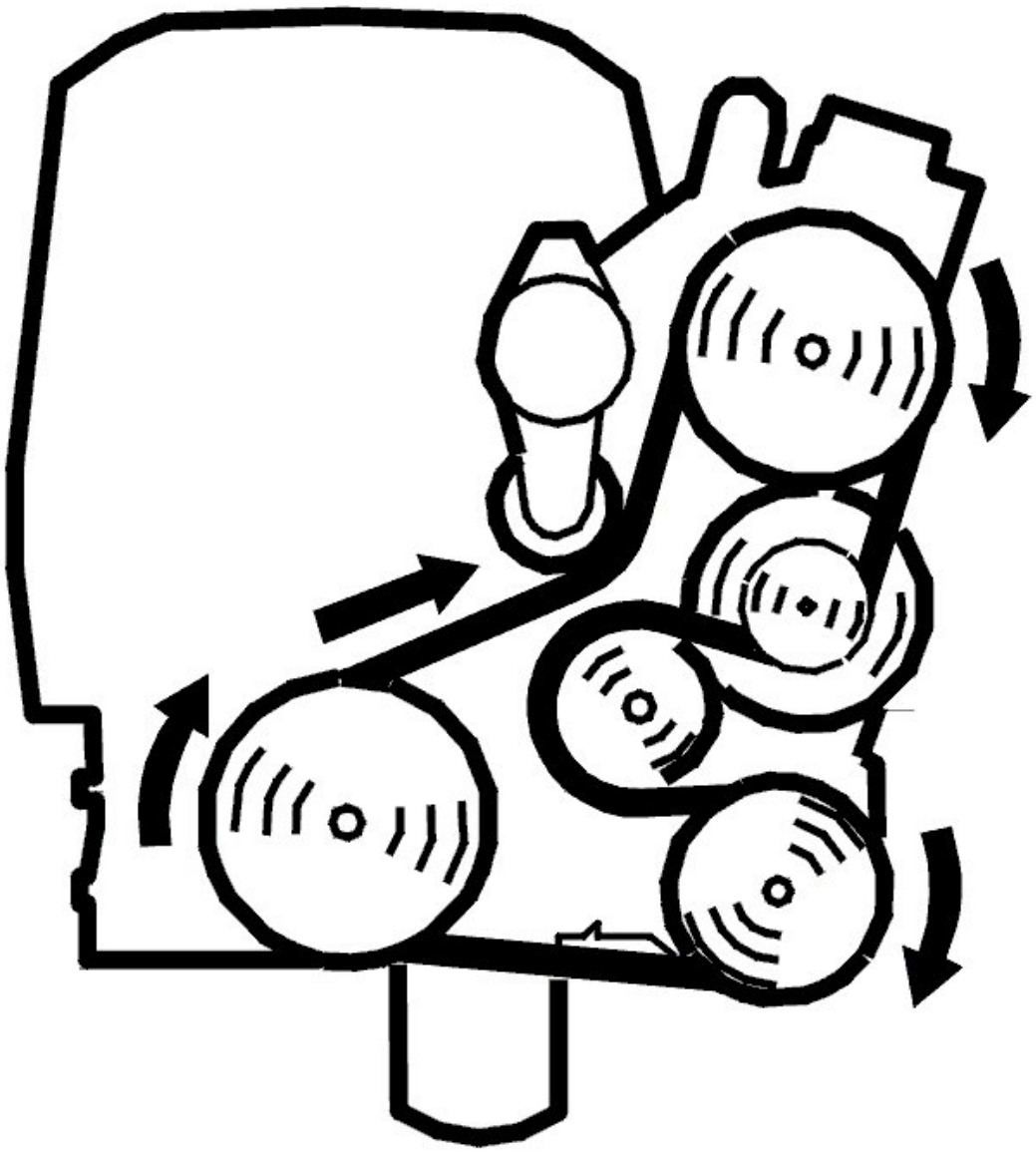
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Slow/Faulty

Slow/Faulty

Checking the status

Hint: Diagnostic trouble code (DTC) may be caused by a damaged fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.

Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the vehicle is delivered to the customer.

Continue - Checking components

Checking components

Check the level and quality of the engine oil. Check for contaminants in particular.
Check the engine oil pressure.
Remove the camshaft reset valve. Check the oil ducts for the cylinder head for the camshaft reset valve (intake) for blockages and dirt.

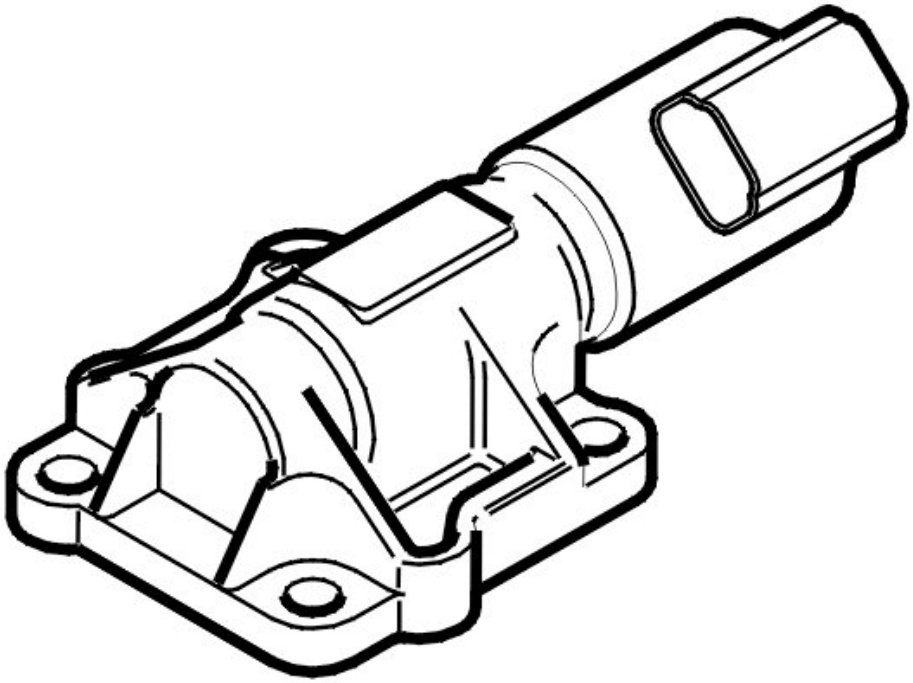
Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Remedy as necessary.
Try a new intake camshaft reset valve if the above remedy does not solve the fault.

Hint: The fault may also have been caused by an internal fault in the variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- Checking oil pressure, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Testing and Inspection/Checking Oil Pressure
- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



Continue - Verification

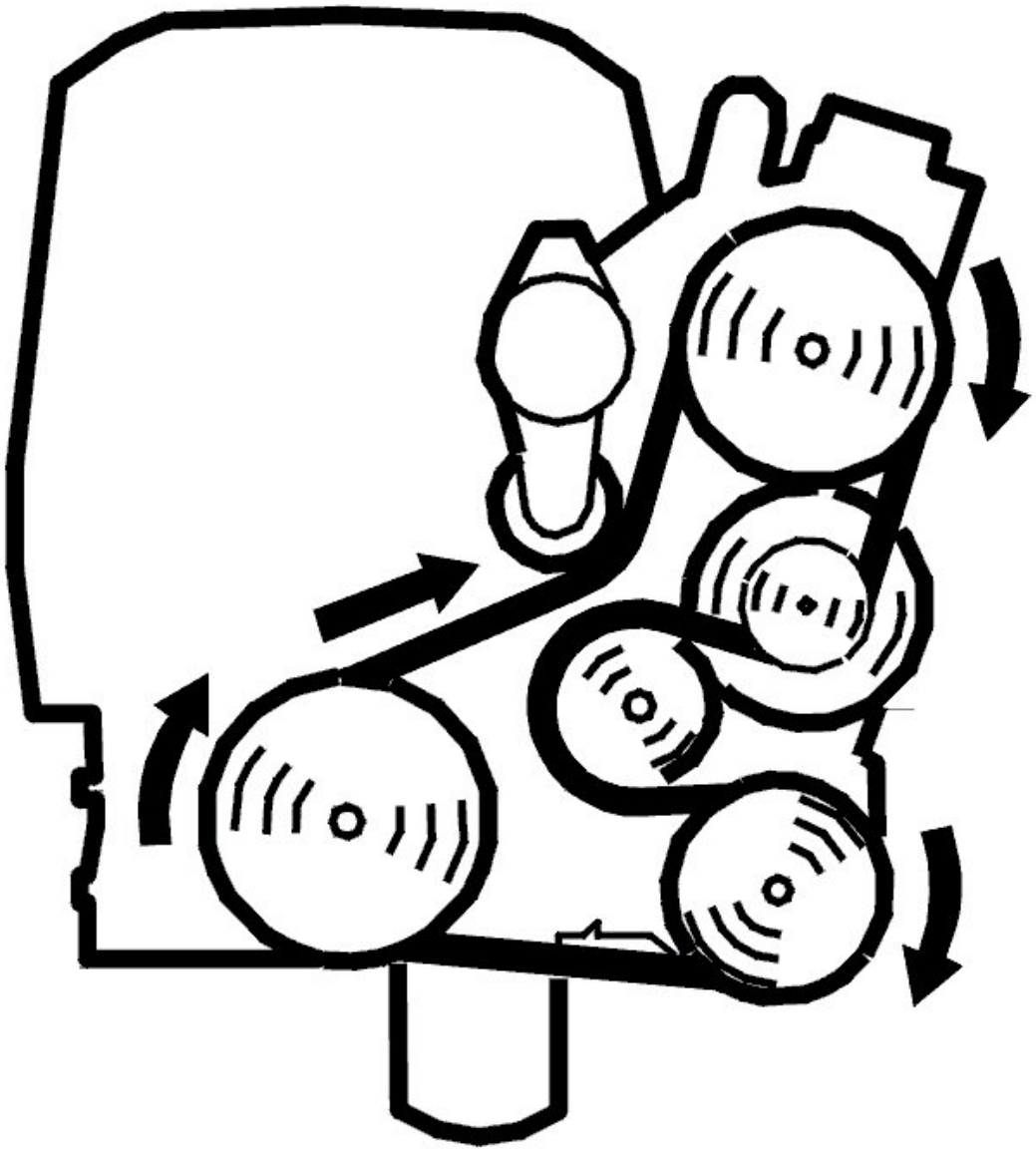
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

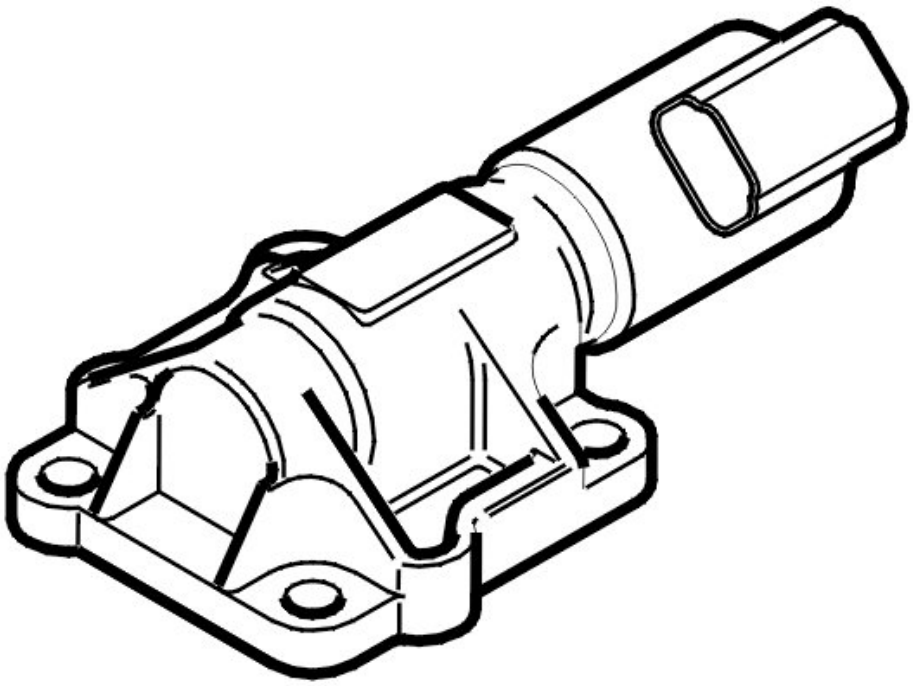
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-612B

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the intake camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an open-circuit in the signal cable for the reset valve.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged camshaft reset valve.

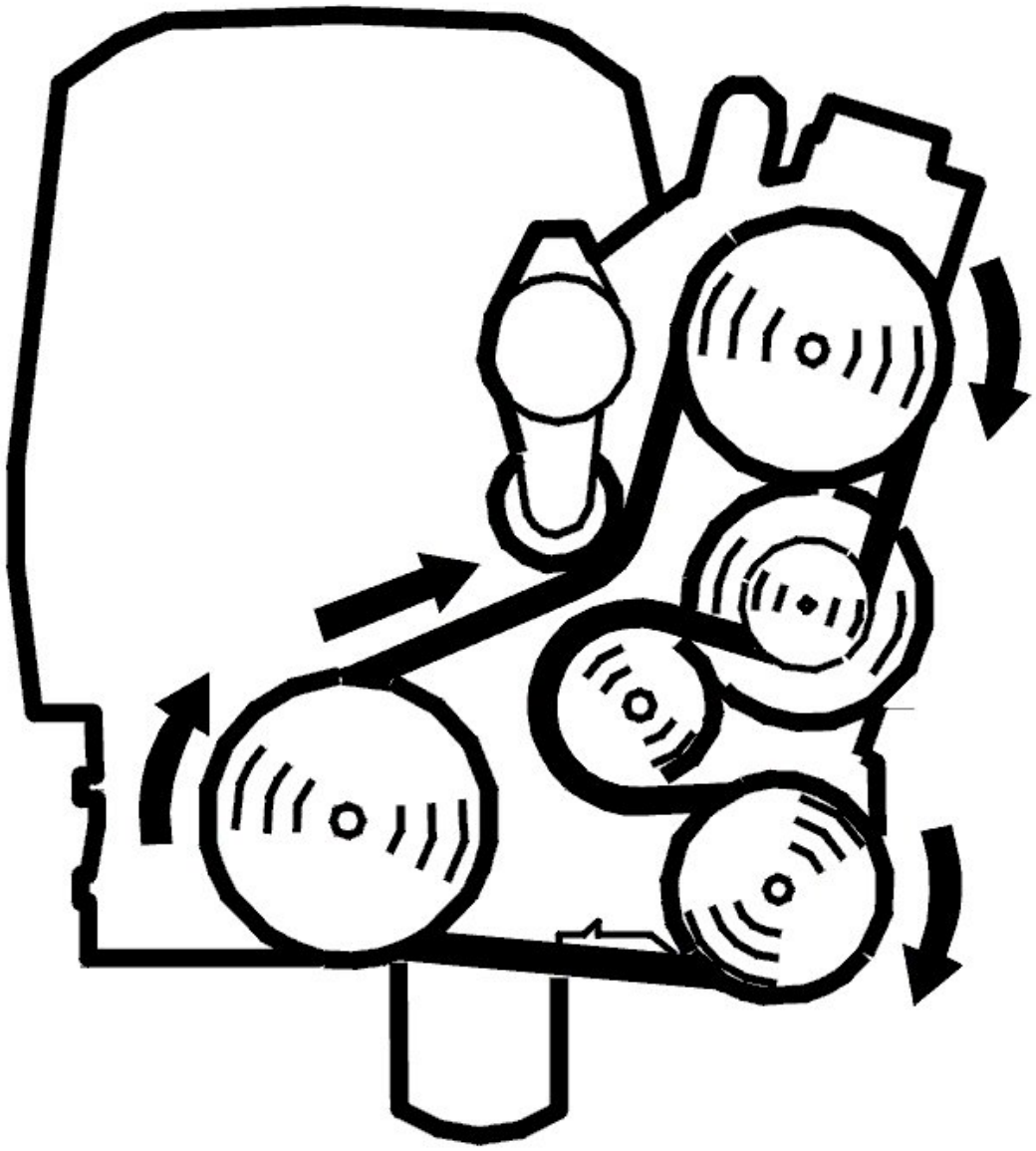
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the status

Hint: The diagnostic trouble code (DTC) may be caused by a defective fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

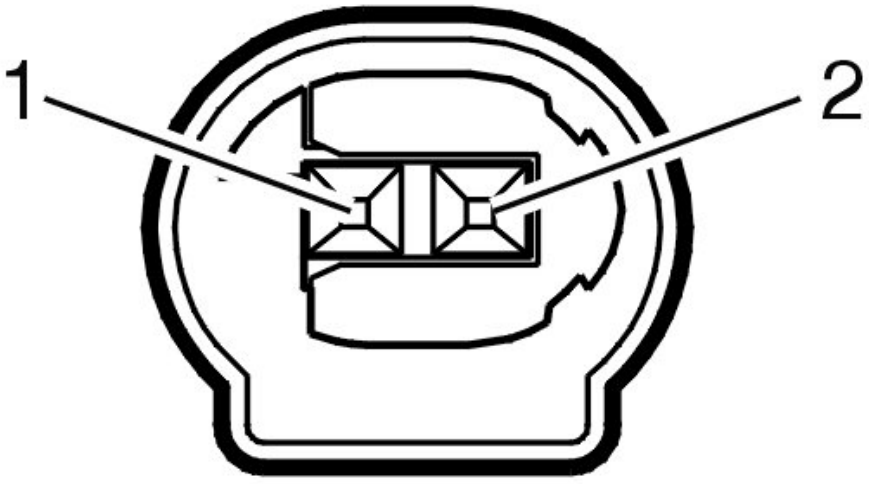
Check the fuse before the circuit. If the fuse is blown, check the circuit for a short-circuit to ground.
Check the resistance of the camshaft reset valve between terminals #1 and #2.
The resistance must be approximately 3.7 ohms.
Check the signal cable between engine control module (ECM) terminal #A13 (#A13) and camshaft reset valve terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Check the power supply cable between system relay terminal #5 and camshaft reset valve terminal #1. Check for an open-circuit.

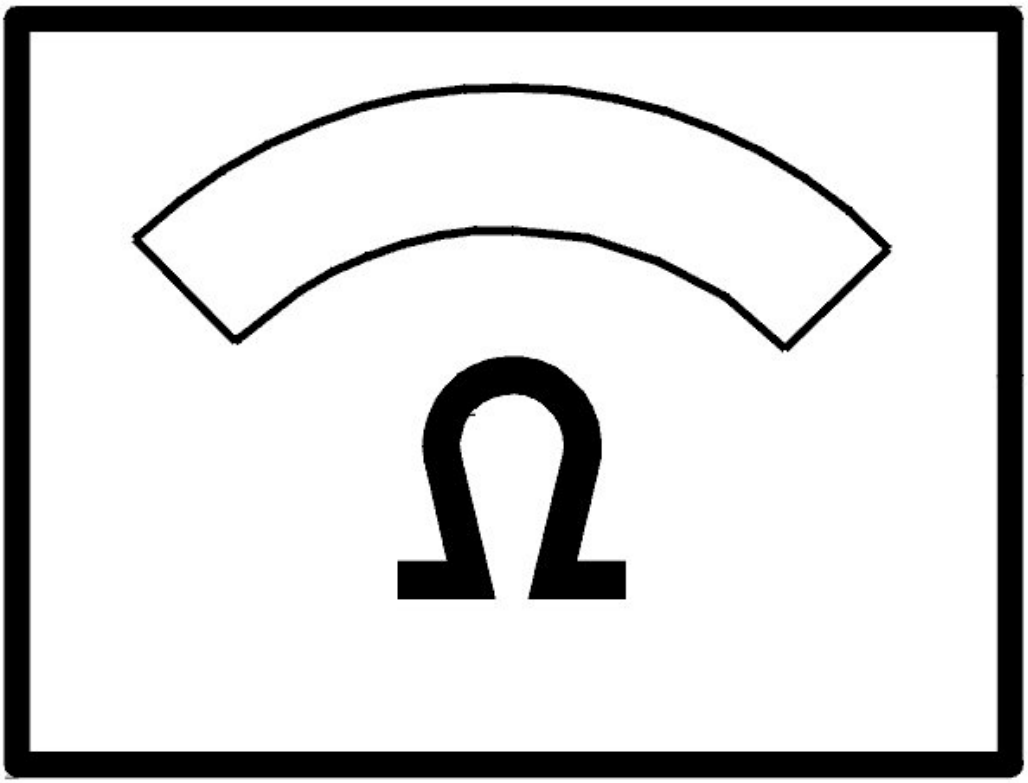
Hint: With the ignition on and the reset valve and camshaft connector disconnected, the voltage at connector terminal #1 must be approximately Ubat.

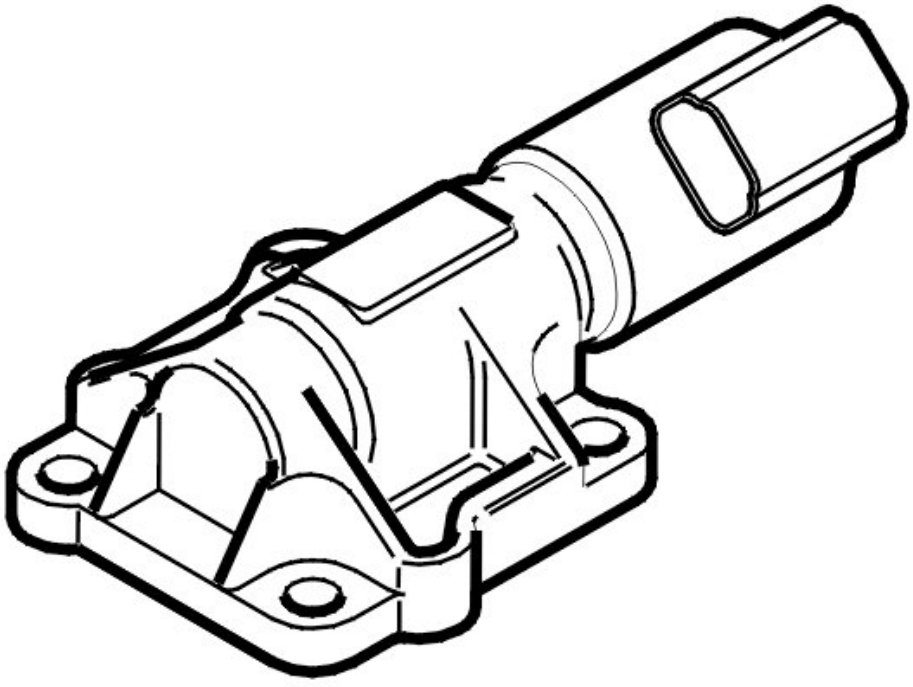
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







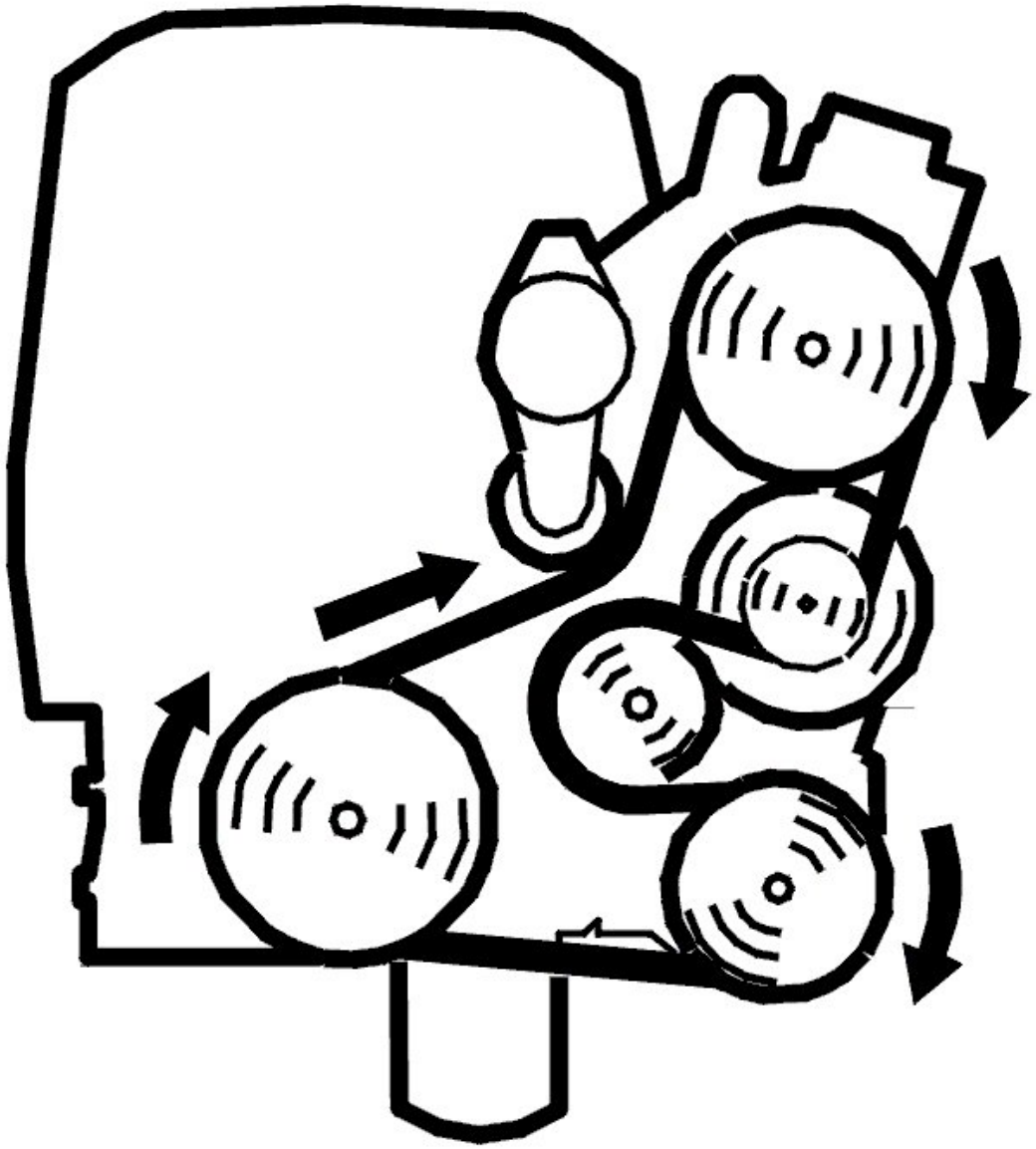
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

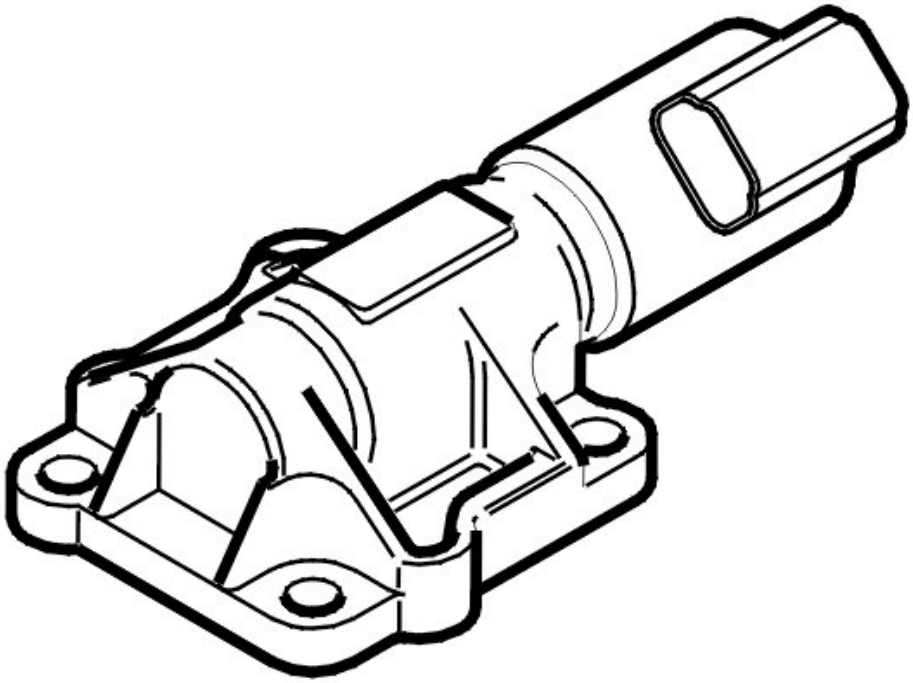
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-612C

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the intake camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the reset valve is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

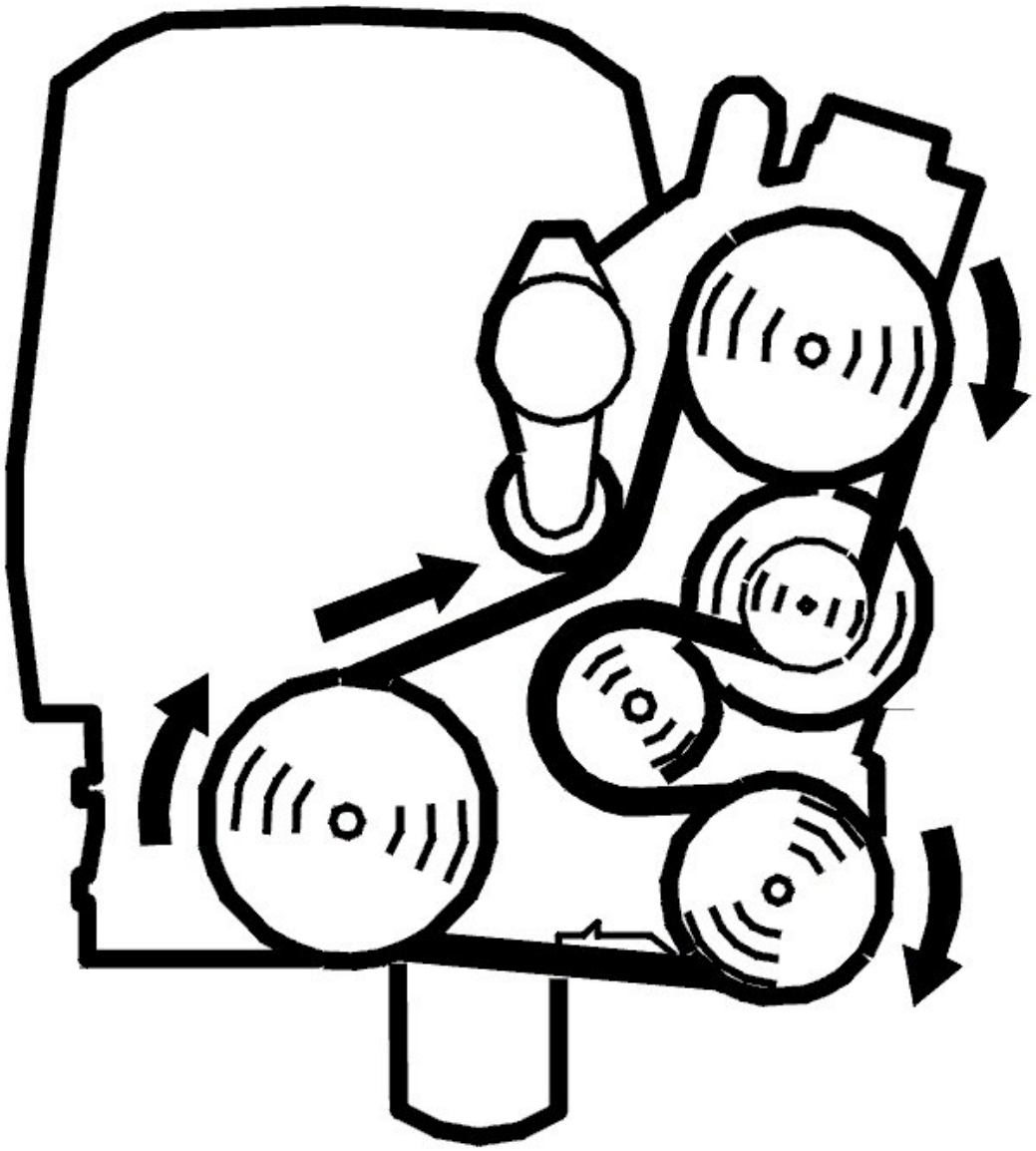
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the power supply
- Damaged camshaft reset valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the status



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

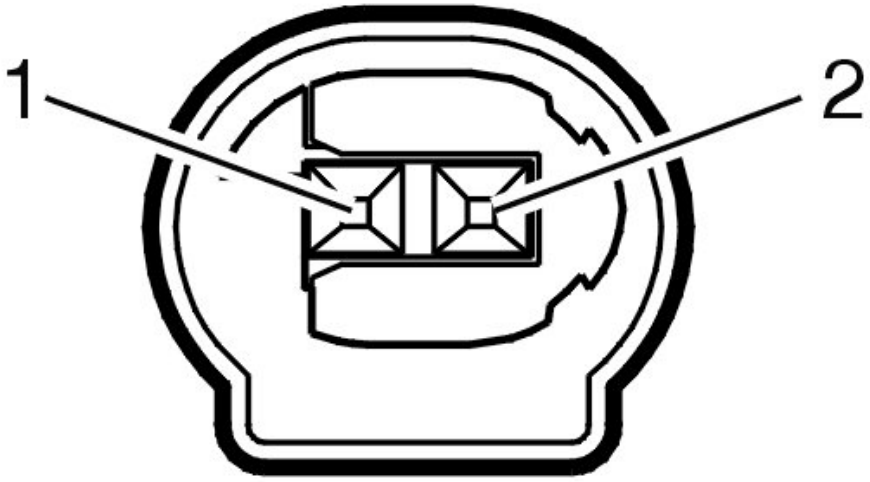
Check the resistance of the camshaft reset valve between terminals #1 and #2.
The resistance must be approximately 3.7 ohms.

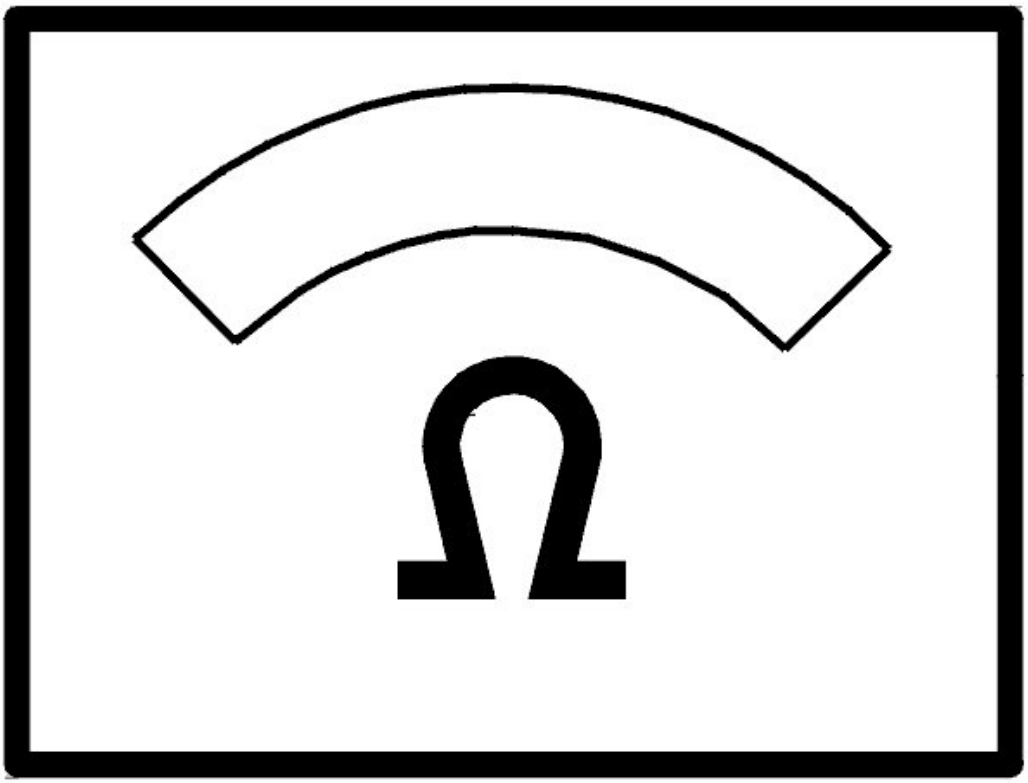
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

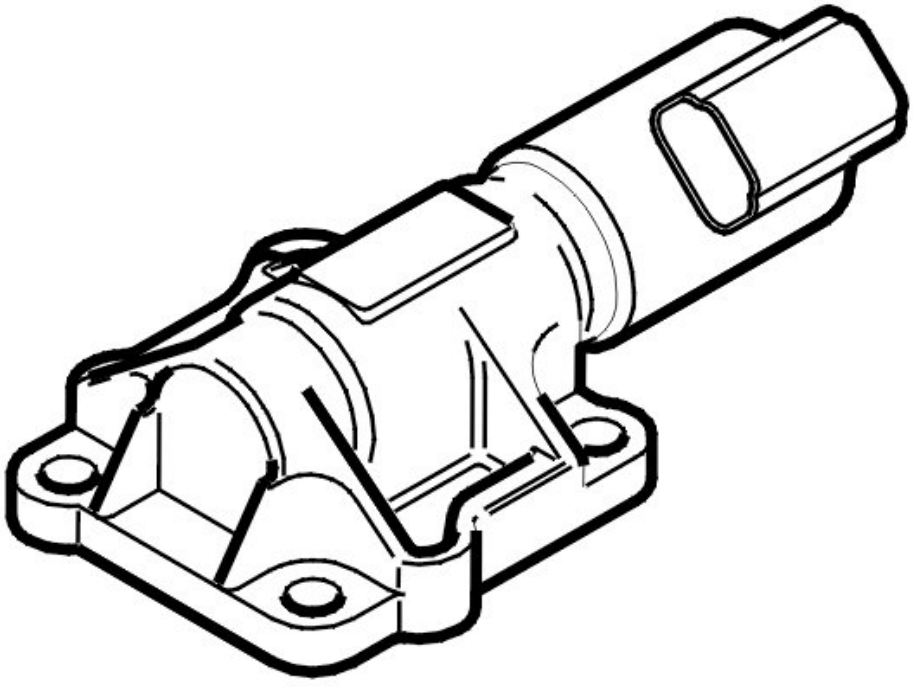
Check the signal cable between engine control module (ECM) terminal #A13 (#A13) and camshaft reset valve terminal #2. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







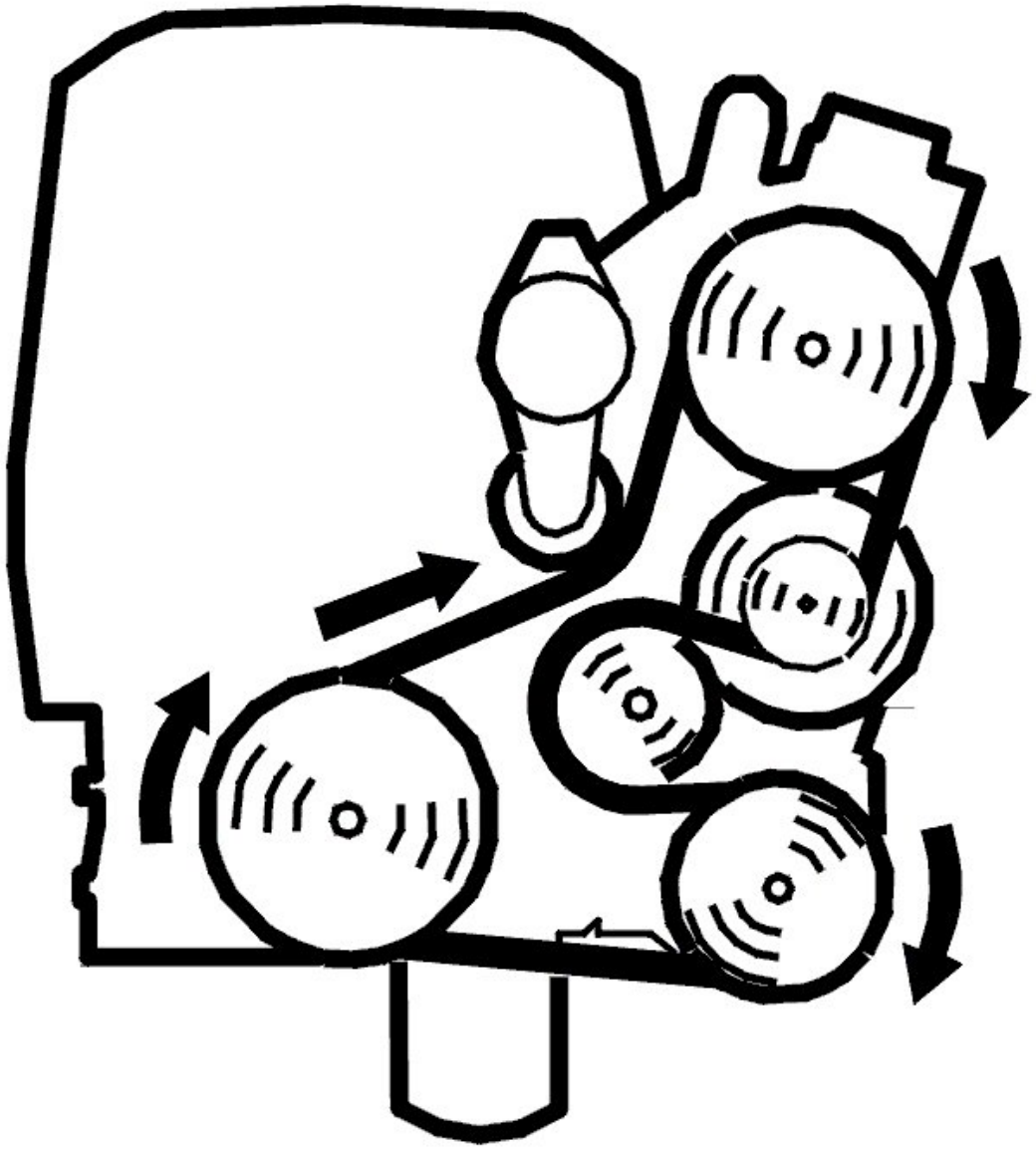
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

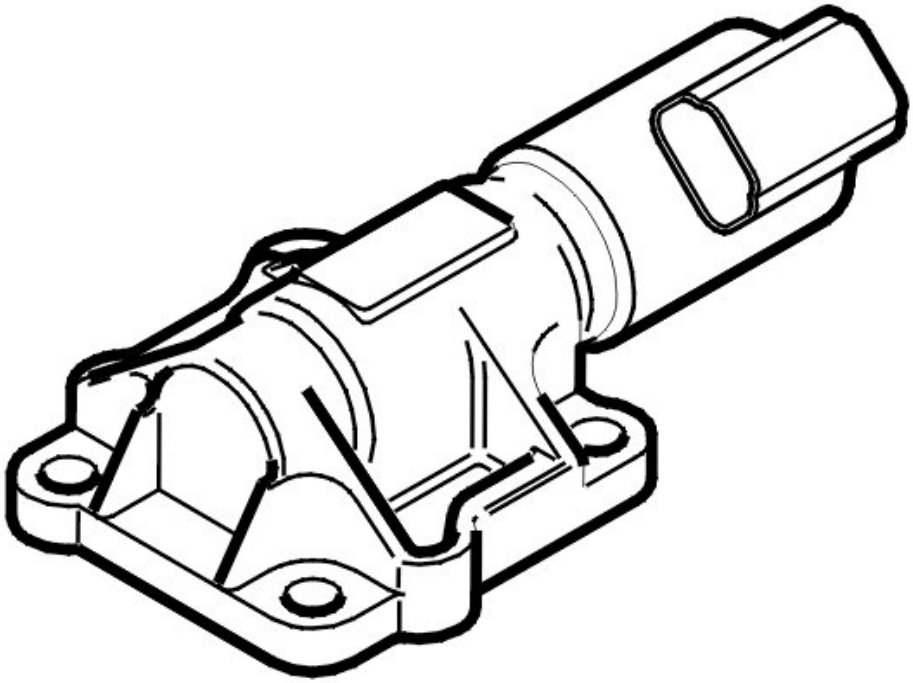
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-612D

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the intake camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the reset valve is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Short-circuit to ground in the signal cable
- Damaged camshaft reset valve.

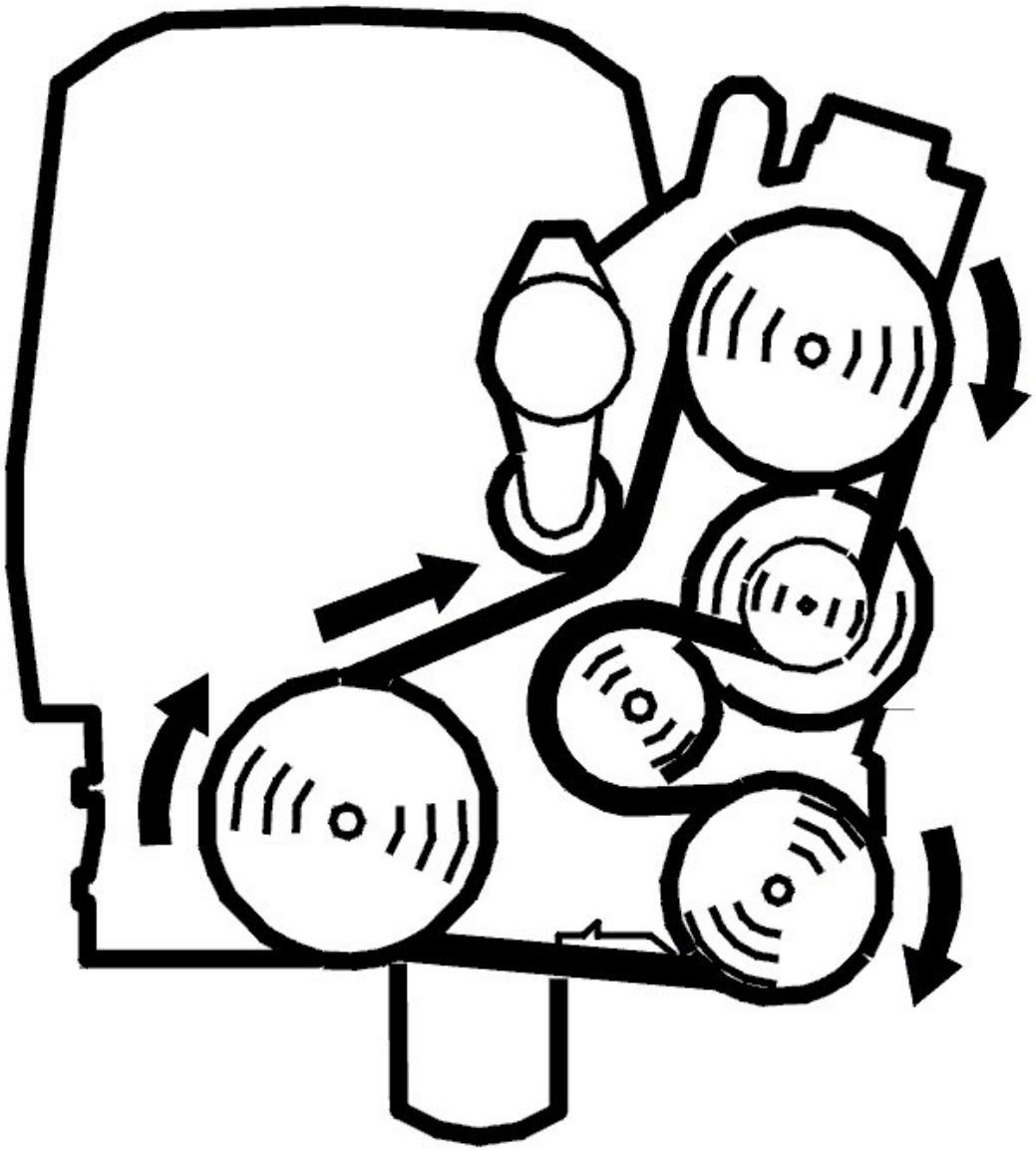
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the status

Hint: The diagnostic trouble code (DTC) may be caused by a defective fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

Check the fuse before the circuit. If the fuse is blown, check the circuit for a short-circuit to ground.
Check the resistance of the camshaft reset valve between terminals #1 and #2.

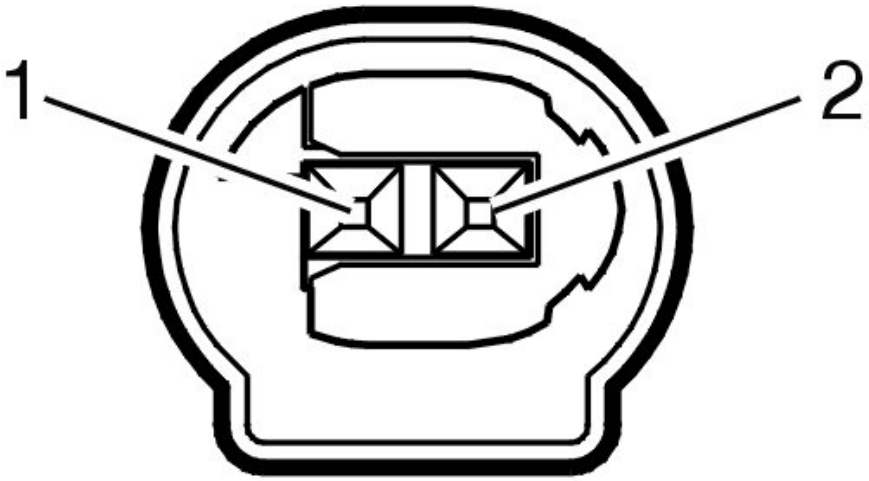
The resistance must be approximately 3.7 ohms.
Check the signal cable between engine control module (ECM) terminal #A13 (#A13) and camshaft reset valve terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Check the power supply cable between system relay terminal #5 and camshaft reset valve terminal #1. Check for an open-circuit.

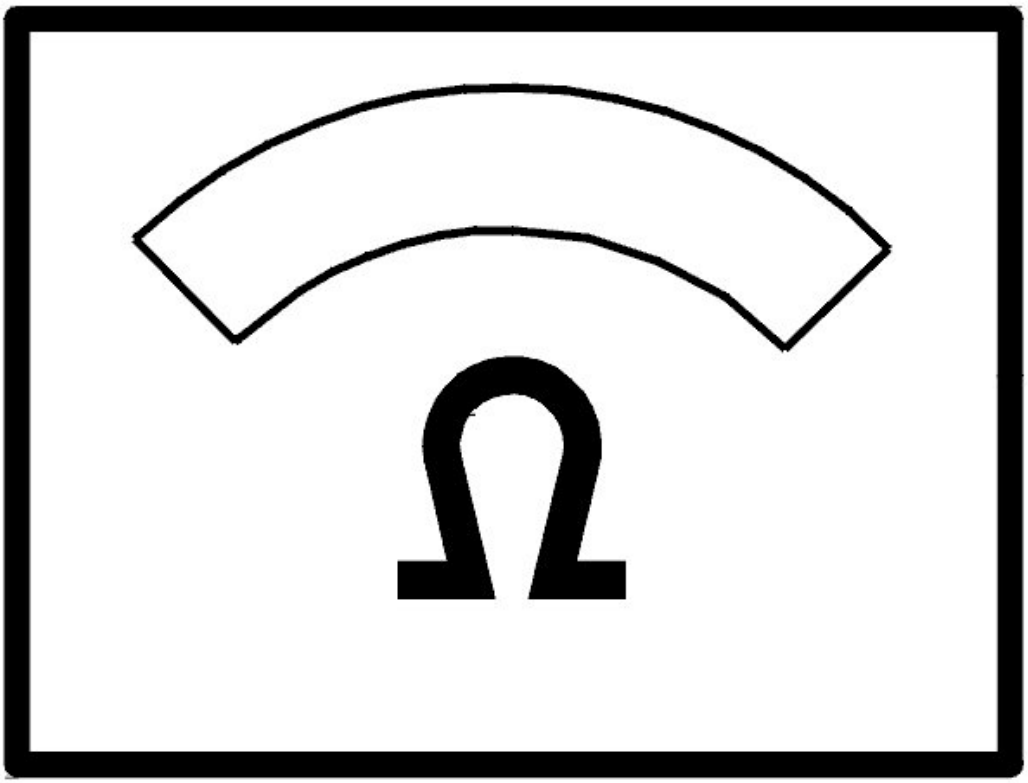
Hint: With the ignition on and the reset valve and camshaft connector disconnected, the voltage at connector terminal #1 must be approximately Ubat.

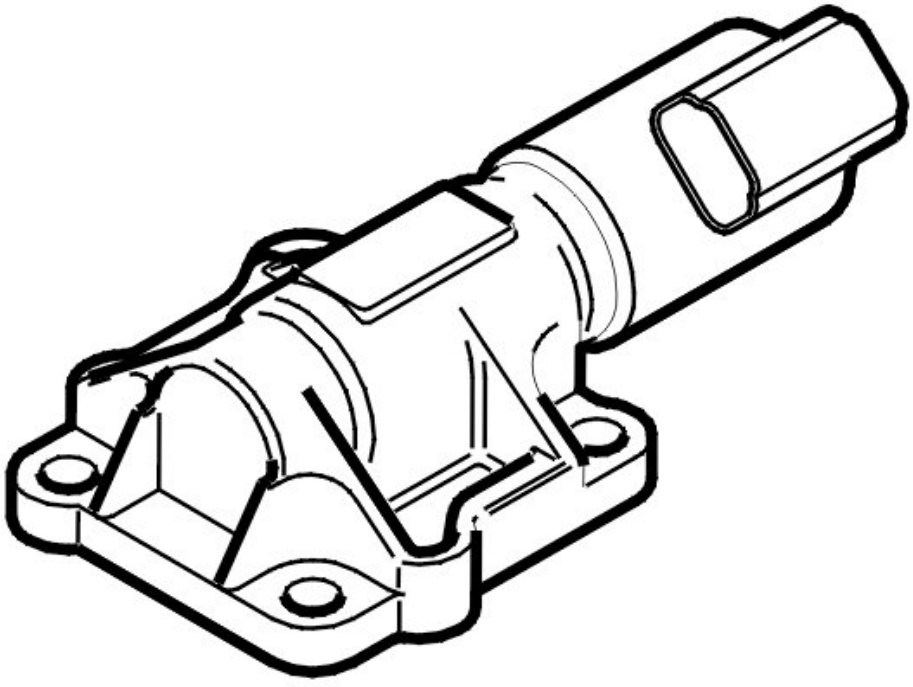
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







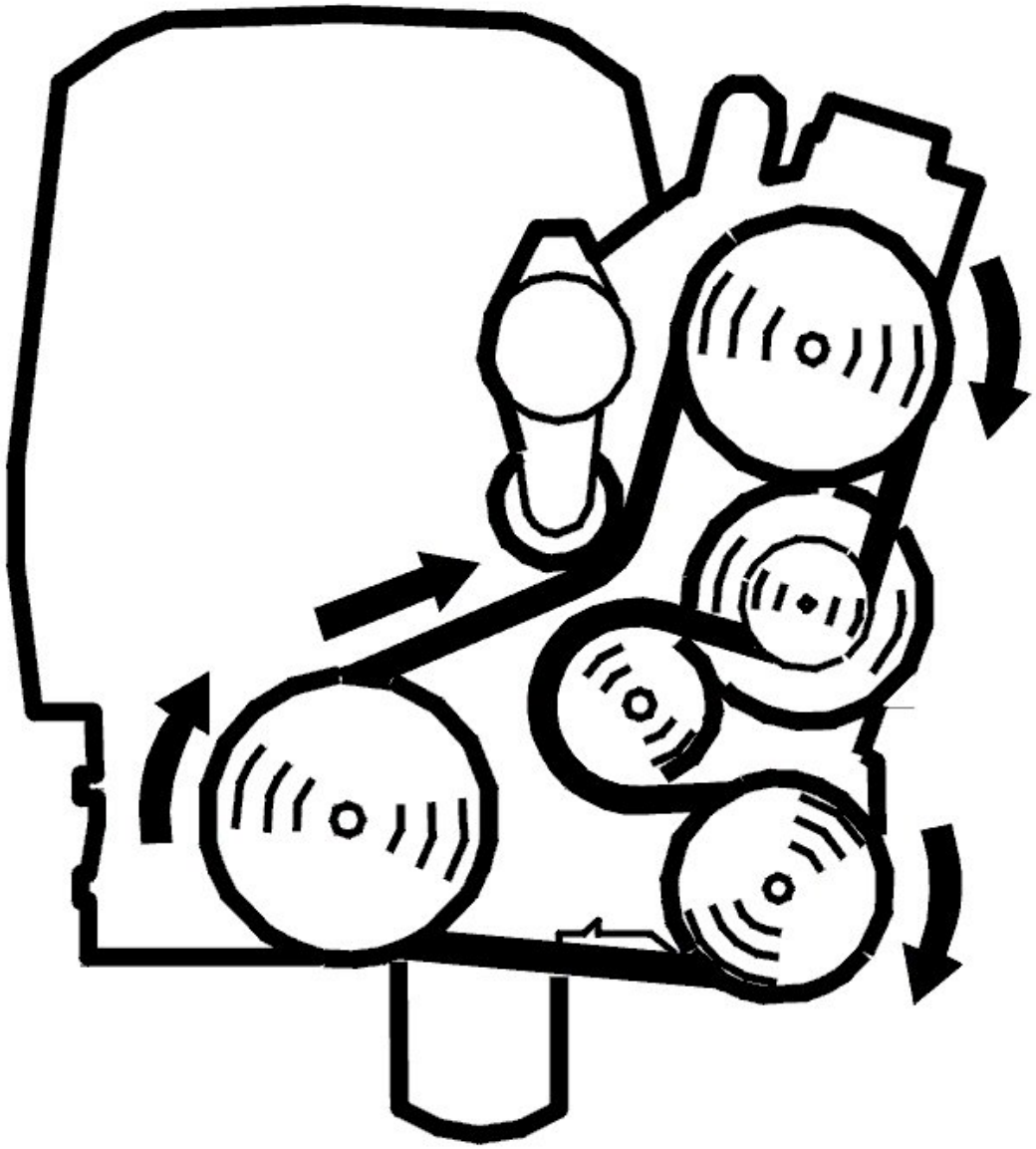
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

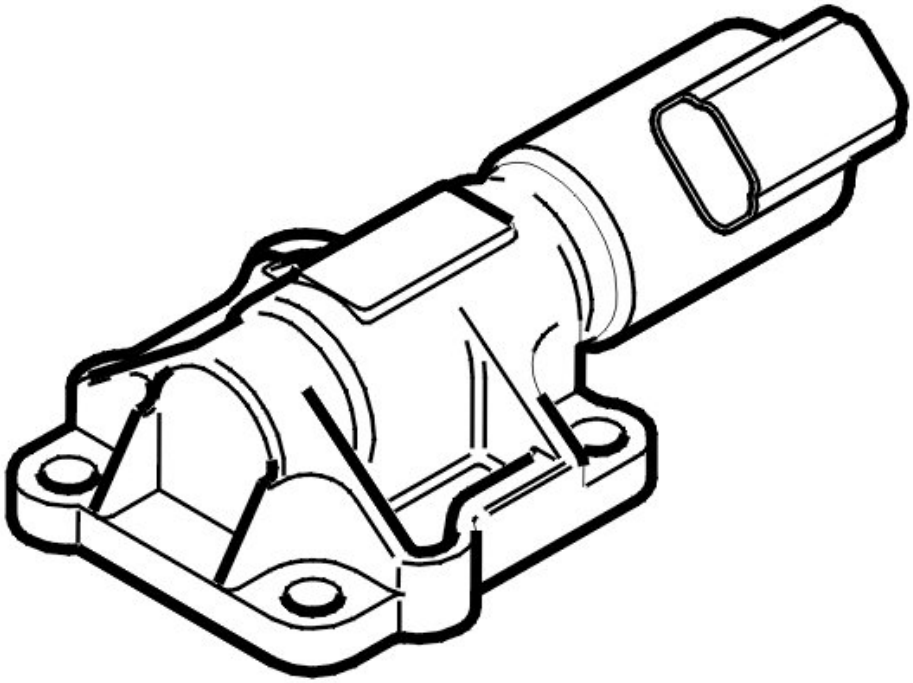
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-6140

Condition



The engine control module (ECM) checks that control of the exhaust camshaft is quick enough. This means that the exhaust camshaft (actual value) reaches the position requested by the engine control module (ECM) quickly enough. The diagnostic trouble code (DTC) is stored if the requested position is not reached within a certain time.
The diagnostic trouble code (DTC) can be diagnosed while the engine is running and while camshaft control is active.

Substitute value
- None.

Possible source
- Low oil pressure
- Poor oil quality
- Damaged reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

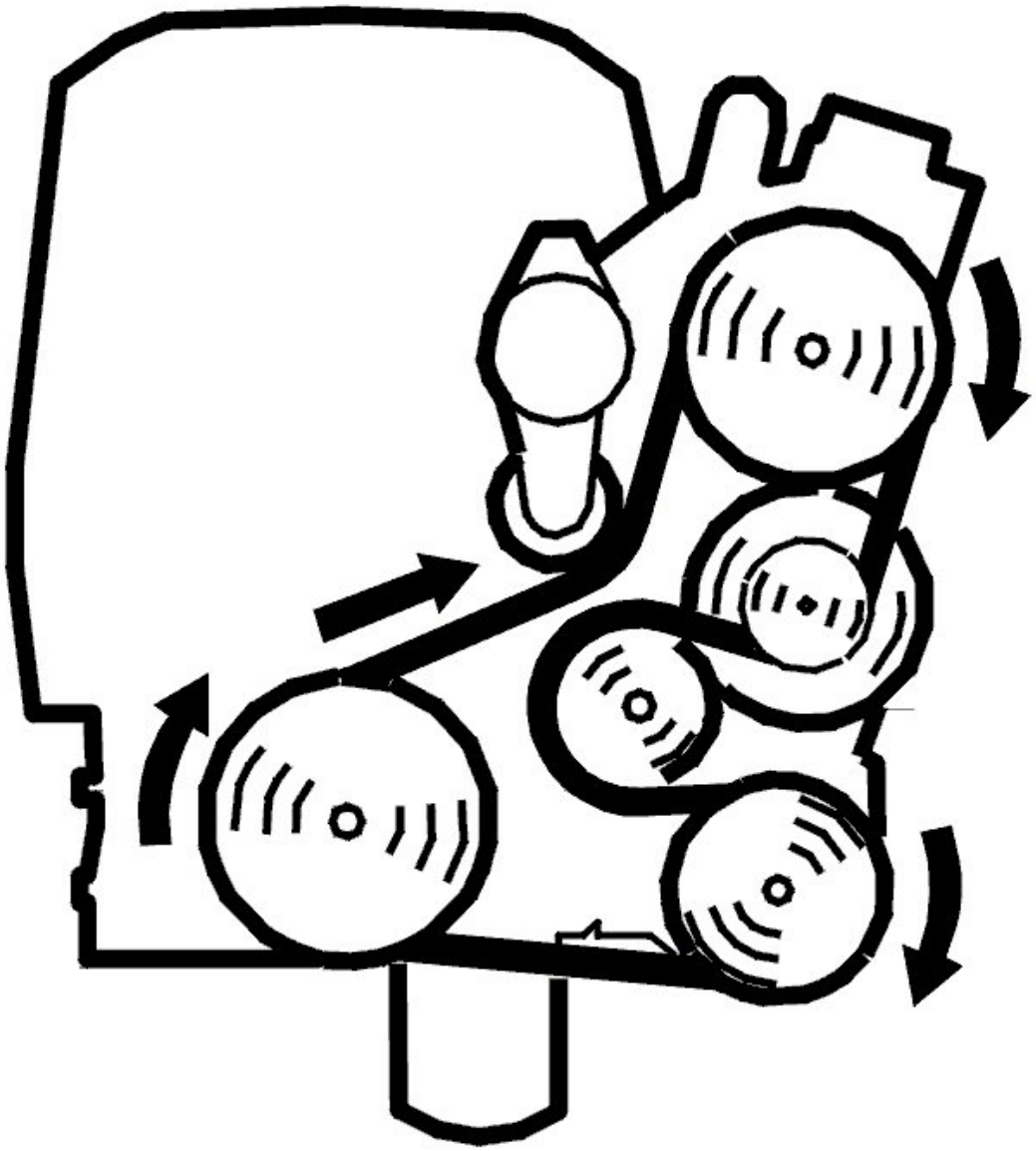
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Slow/Faulty

Slow/Faulty

Checking the status

Hint: Diagnostic trouble code (DTC) may be caused by a damaged fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. Let the engine return to idle speed to start the test again. Then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the vehicle is delivered to the customer.

Continue - Checking components

Checking components

Check the level and quality of the engine oil. Check for contaminants in particular.
Check the engine oil pressure.

Remove the camshaft reset valve. Check the oil ducts for the cylinder head for the camshaft reset valve (exhaust) for blockages and dirt.

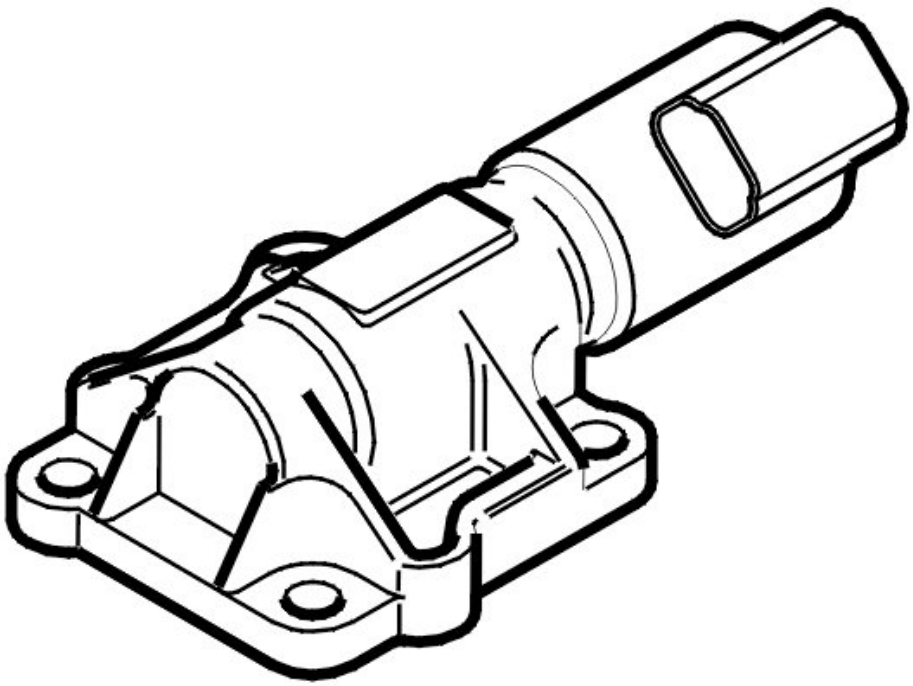
Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Remedy as necessary.
Try a new intake camshaft reset valve if the above remedy does not solve the fault.

Hint: The fault may also have been caused by an internal fault in the variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- Checking oil pressure, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Testing and Inspection/Checking Oil Pressure
- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



Continue - Verification

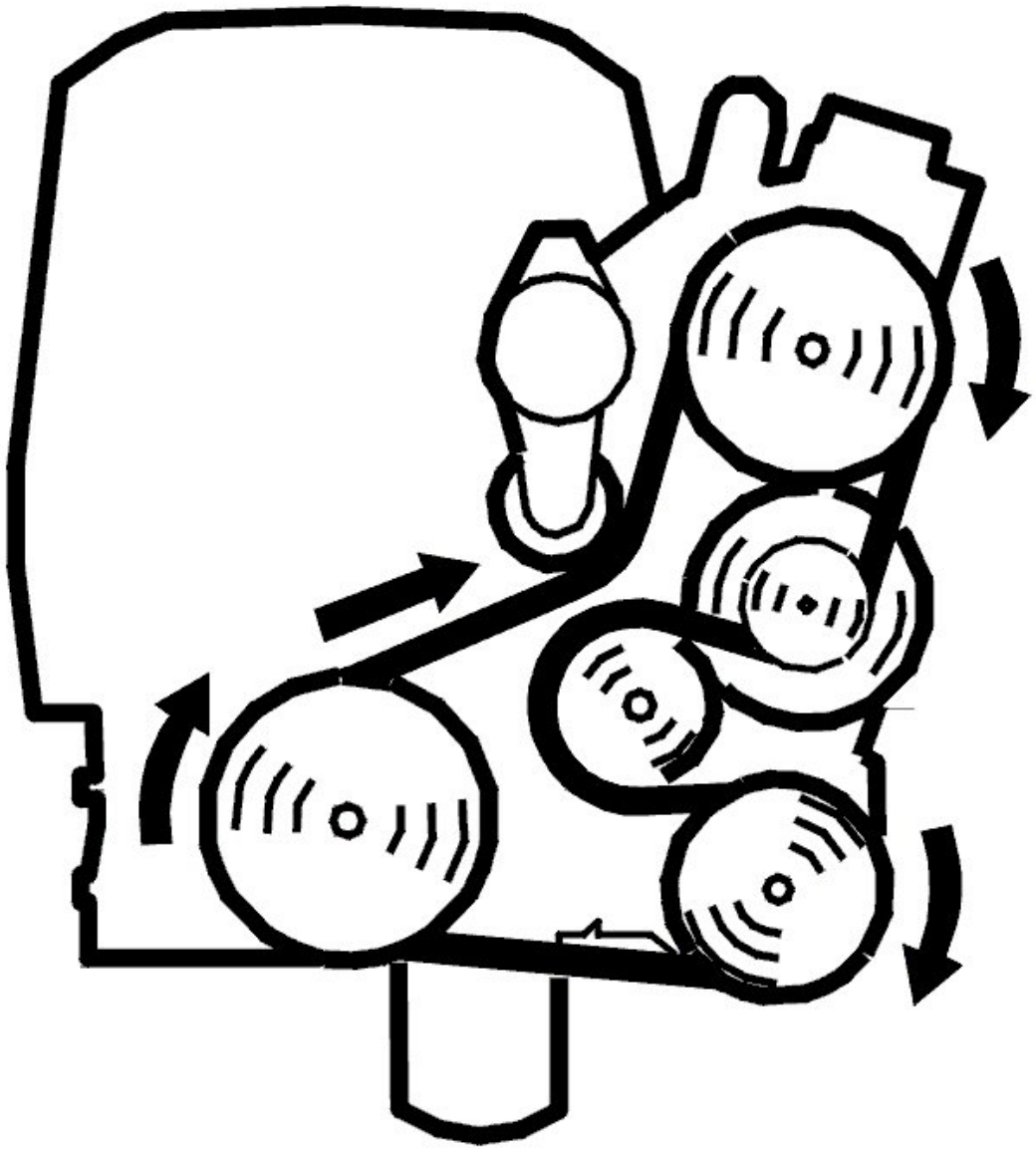
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

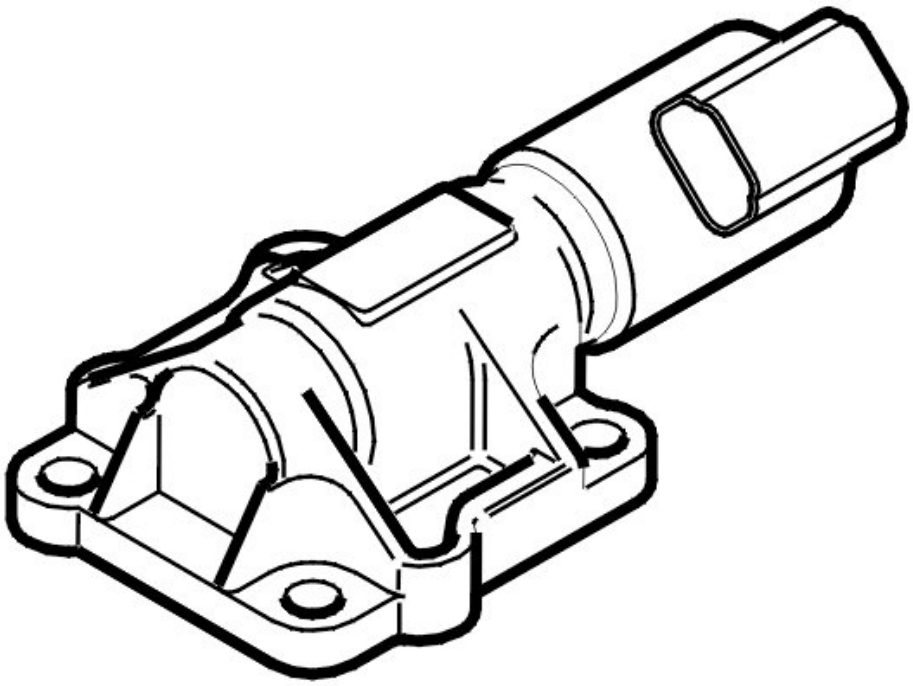
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-614B

Condition



The engine control module (ECM) checks that the position of the exhaust camshaft (actual value) corresponds to the requested position (desired value).
The diagnostic trouble code (DTC) is stored if the requested position is not reached.
The diagnostic trouble code (DTC) is diagnosed by the engine control module (ECM) when the engine is running and the camshaft control is active.

Substitute value
- None.

Possible source
- Low oil pressure
- Poor oil quality
- Damaged reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

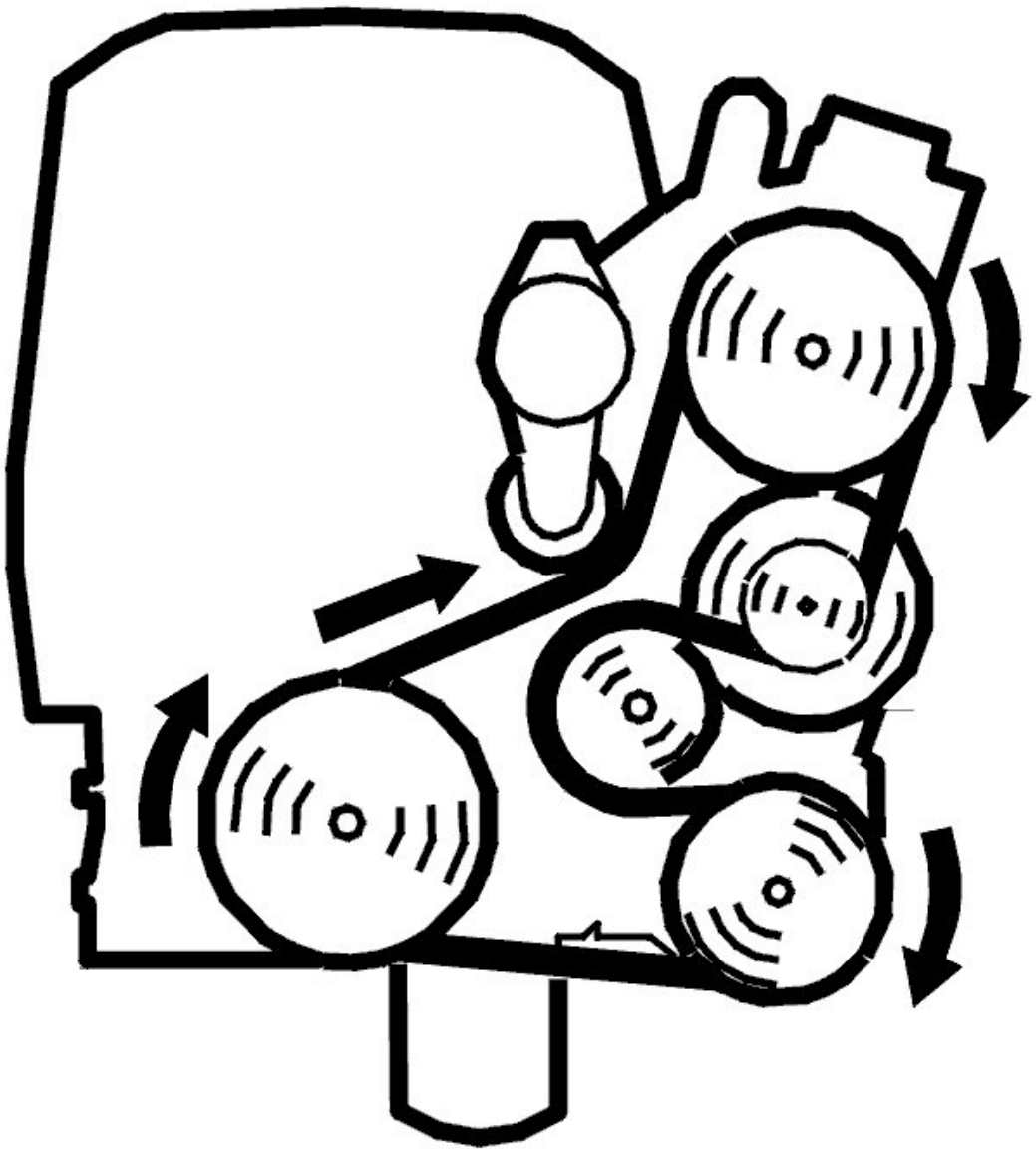
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Slow/Faulty

Slow/Faulty

Checking the status

Hint: Diagnostic trouble code (DTC) may be caused by a damaged fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.

Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. Let the engine return to idle speed to start the test again. Then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the vehicle is delivered to the customer.

Continue - Checking components

Checking components

Check the level and quality of the engine oil. Check for contaminants in particular.
Check the engine oil pressure.
Remove the camshaft reset valve. Check the oil ducts for the cylinder head for the camshaft reset valve (exhaust) for blockages and dirt.

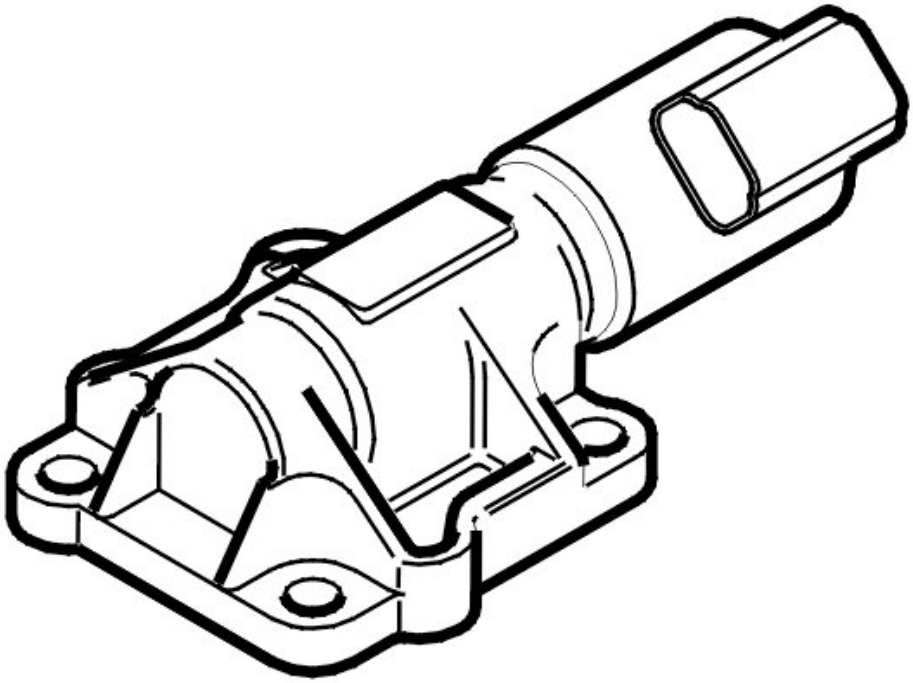
Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Remedy as necessary.
Try a new intake camshaft reset valve if the above remedy does not solve the fault.

Hint: The fault may also have been caused by an internal fault in the variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- Checking oil pressure, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Testing and Inspection/Checking Oil Pressure
- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



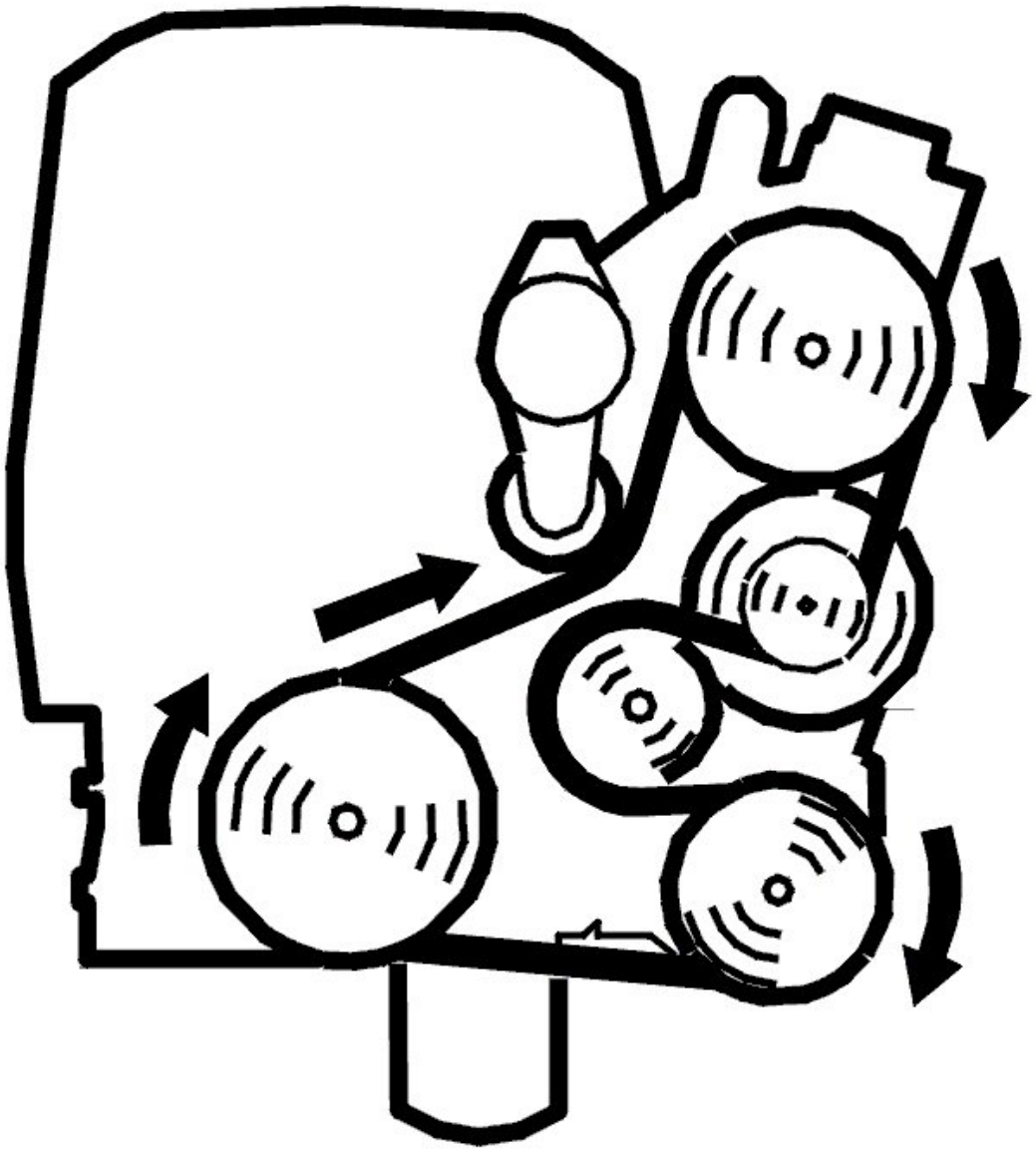
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

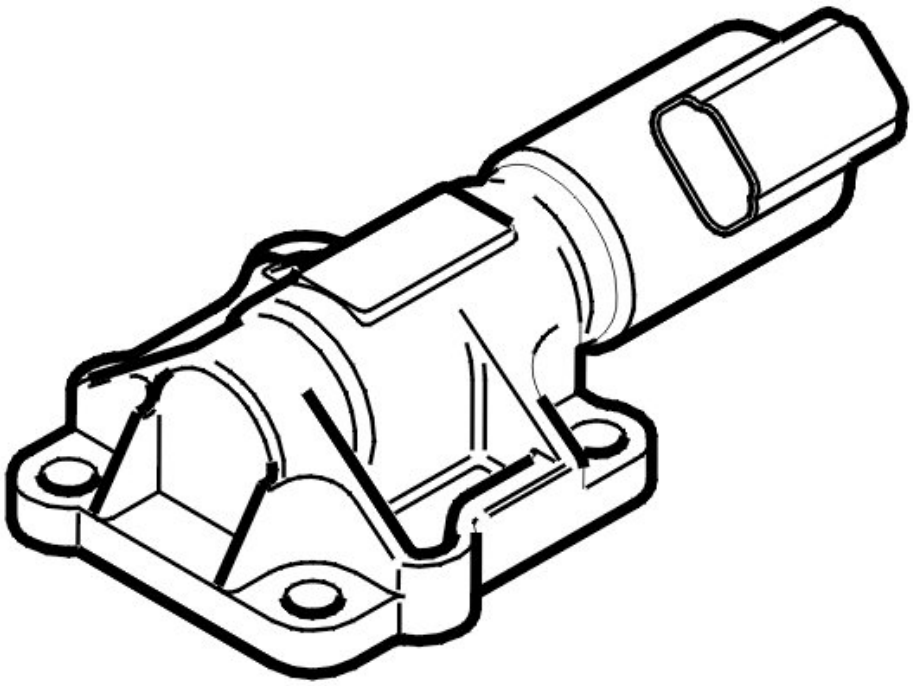
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-616B

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the exhaust camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an open-circuit in the signal cable for the reset valve.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value

- None.

Possible source
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged camshaft reset valve.

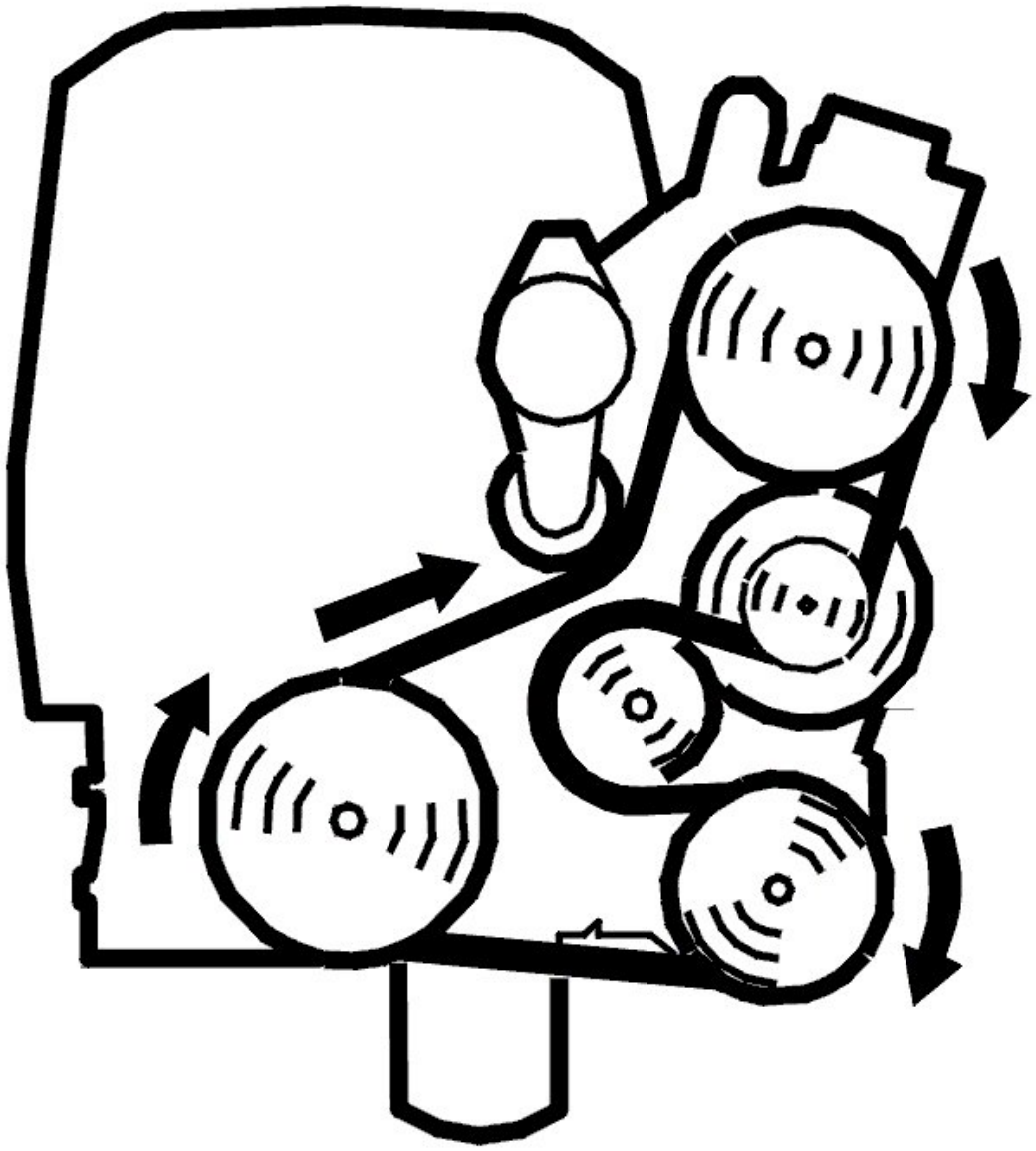
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the status

Hint: The diagnostic trouble code (DTC) may be caused by a defective fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

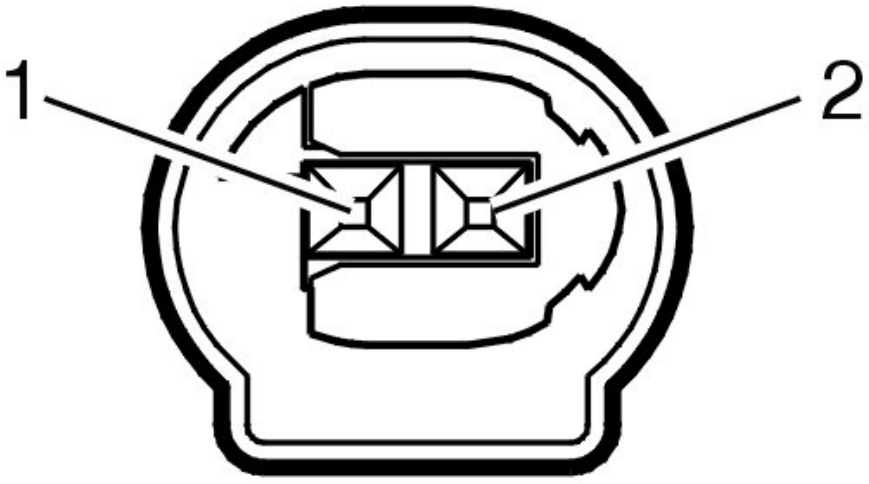
Check the fuse before the circuit. If the fuse is blown, check the circuit for a short-circuit to ground.
Check the resistance of the camshaft reset valve between terminals #1 and #2.
The resistance must be approximately 3.7 ohms.
Check the signal cable between engine control module (ECM) terminal #A21 (#A21) and camshaft reset valve terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Check the power supply cable between system relay terminal #5 and camshaft reset valve terminal #1. Check for an open-circuit.

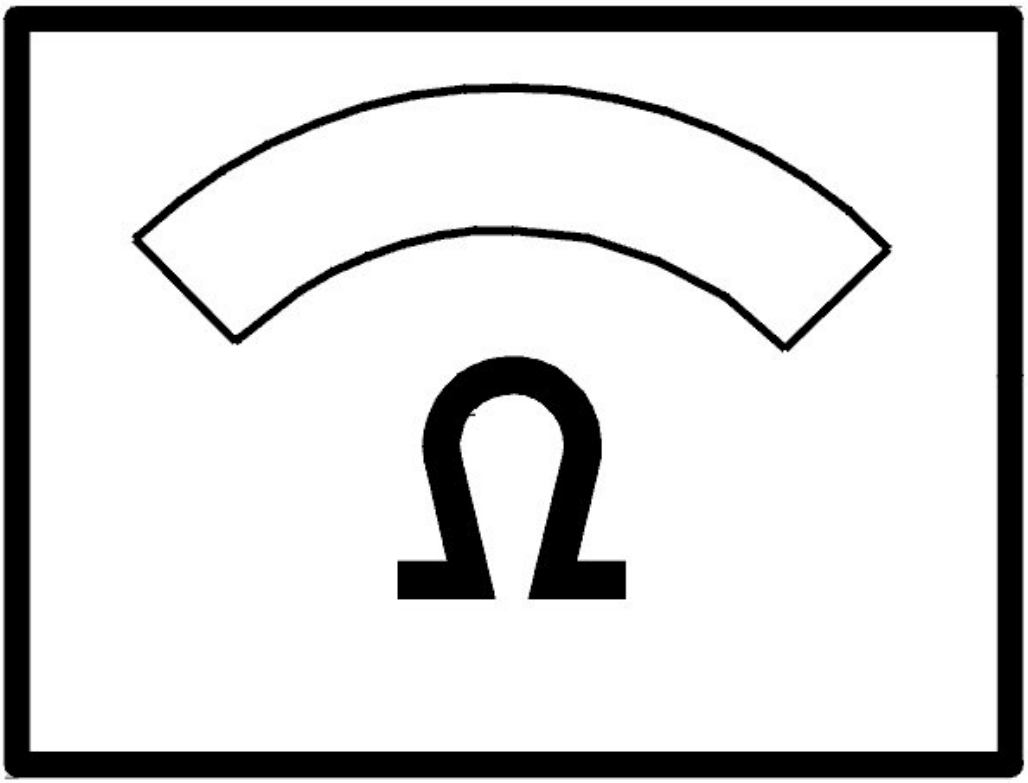
Hint: With the ignition on and the reset valve and camshaft connector disconnected, the voltage at connector terminal #1 must be approximately Ubat.

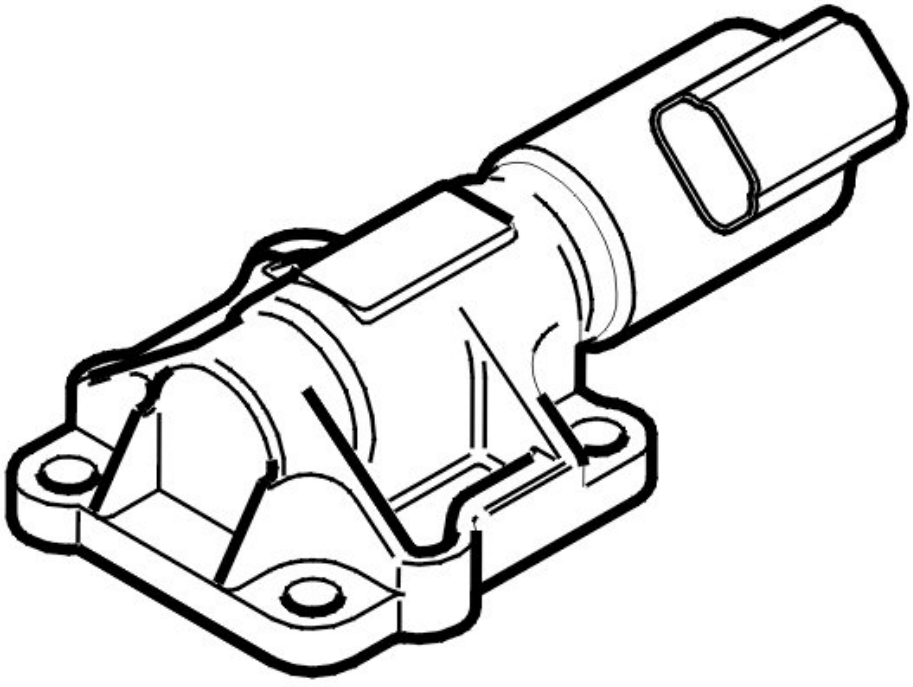
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







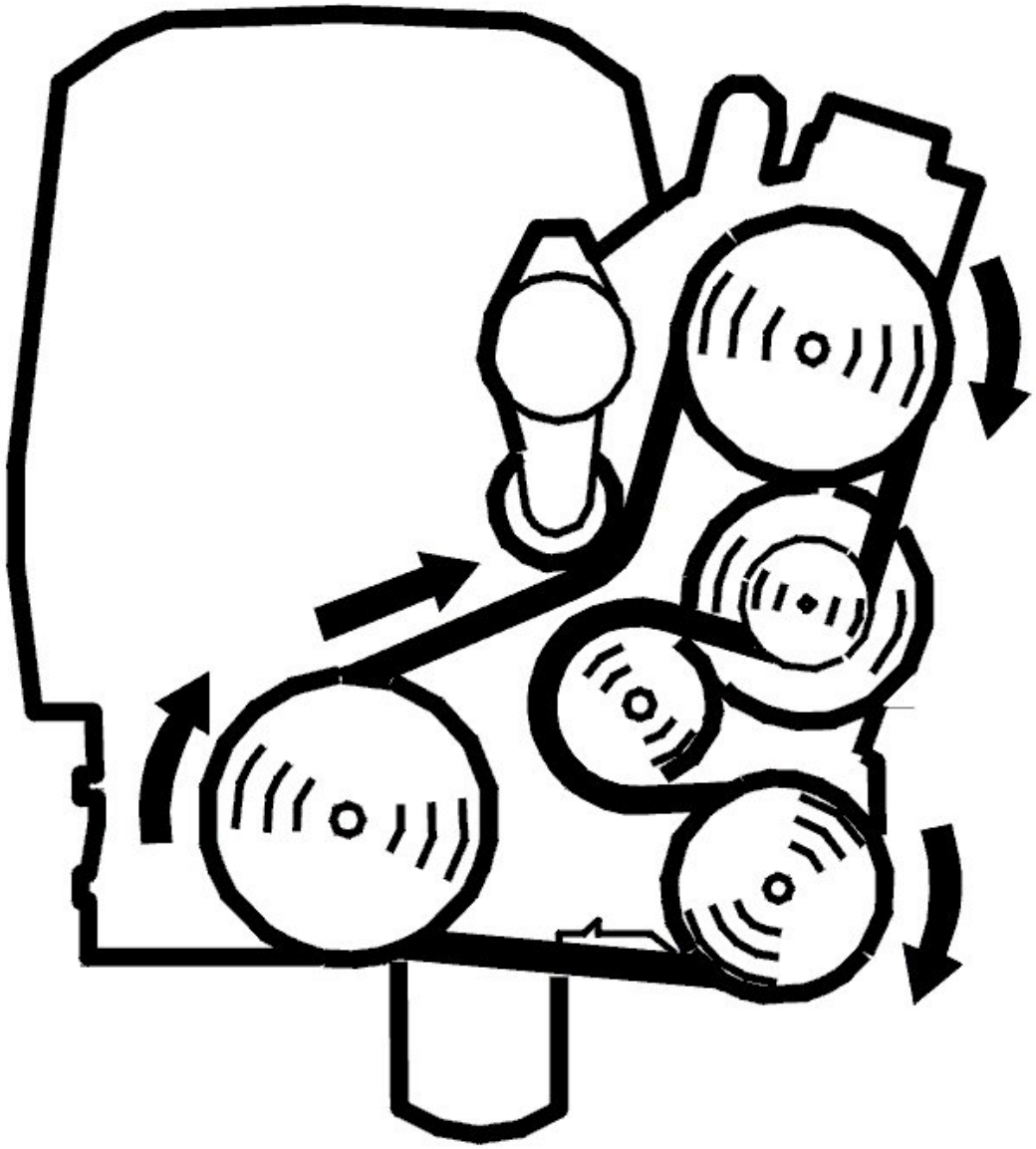
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

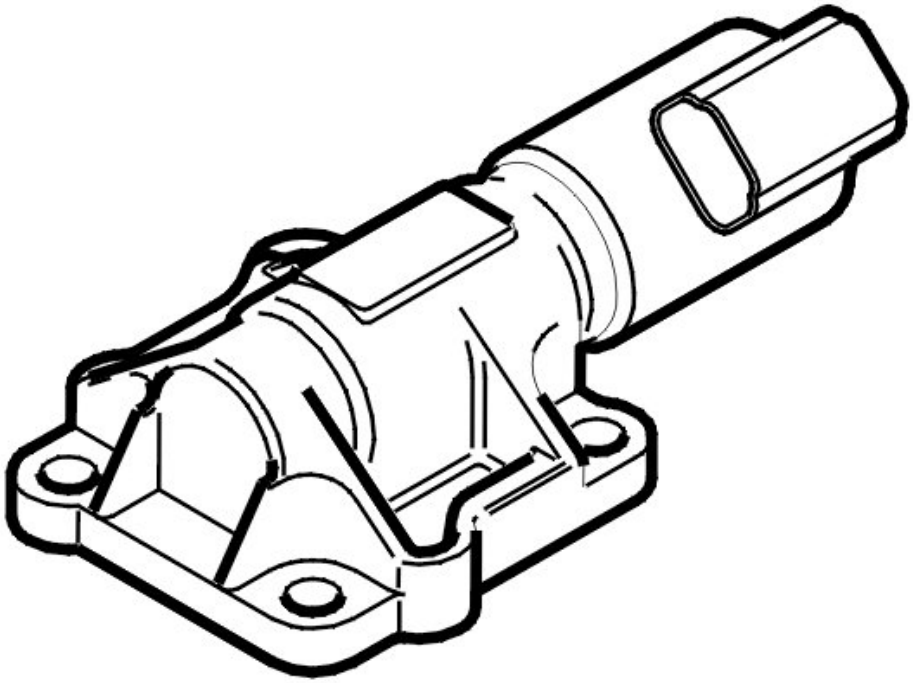
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-616C

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the exhaust camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the reset valve is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

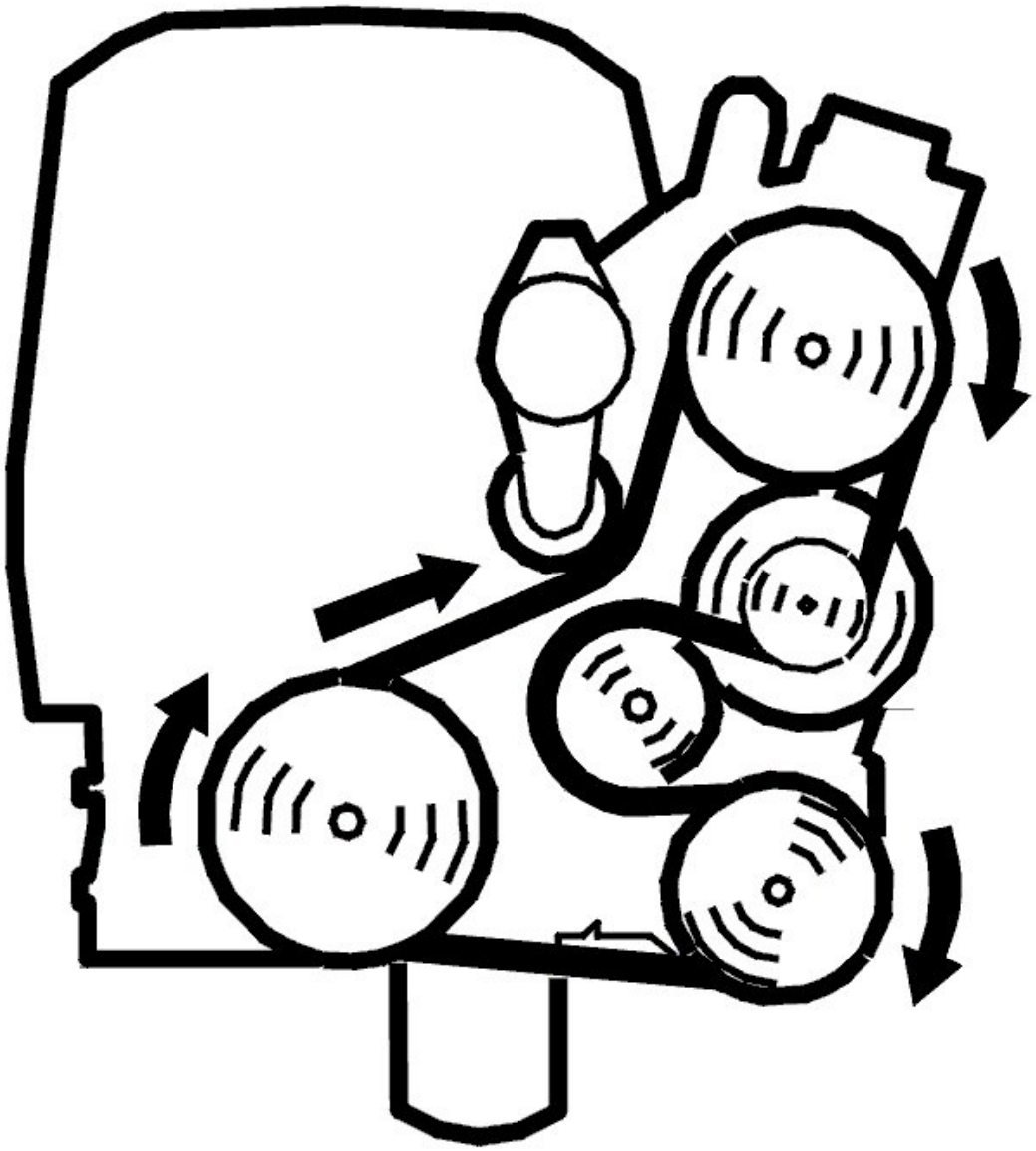
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the power supply
- Damaged camshaft reset valve.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

Signal too high

Checking the status



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

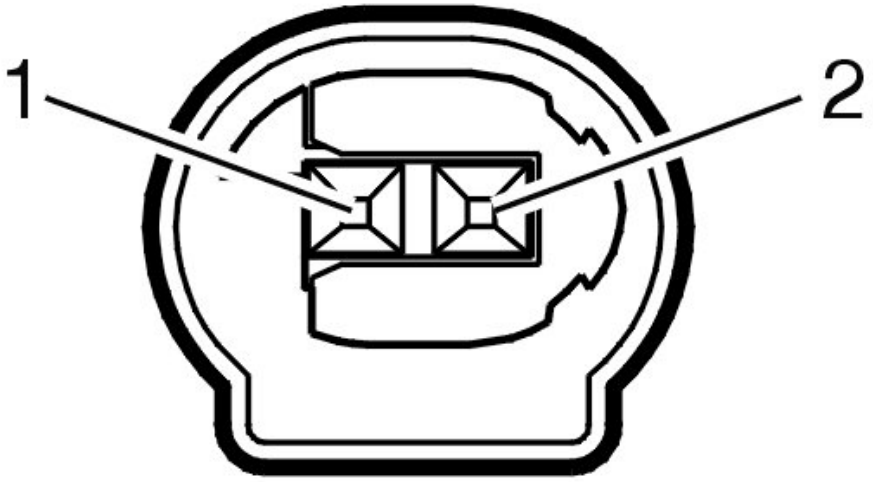
Check the resistance of the camshaft reset valve between terminals #1 and #2.
The resistance must be approximately 3.7 ohms.

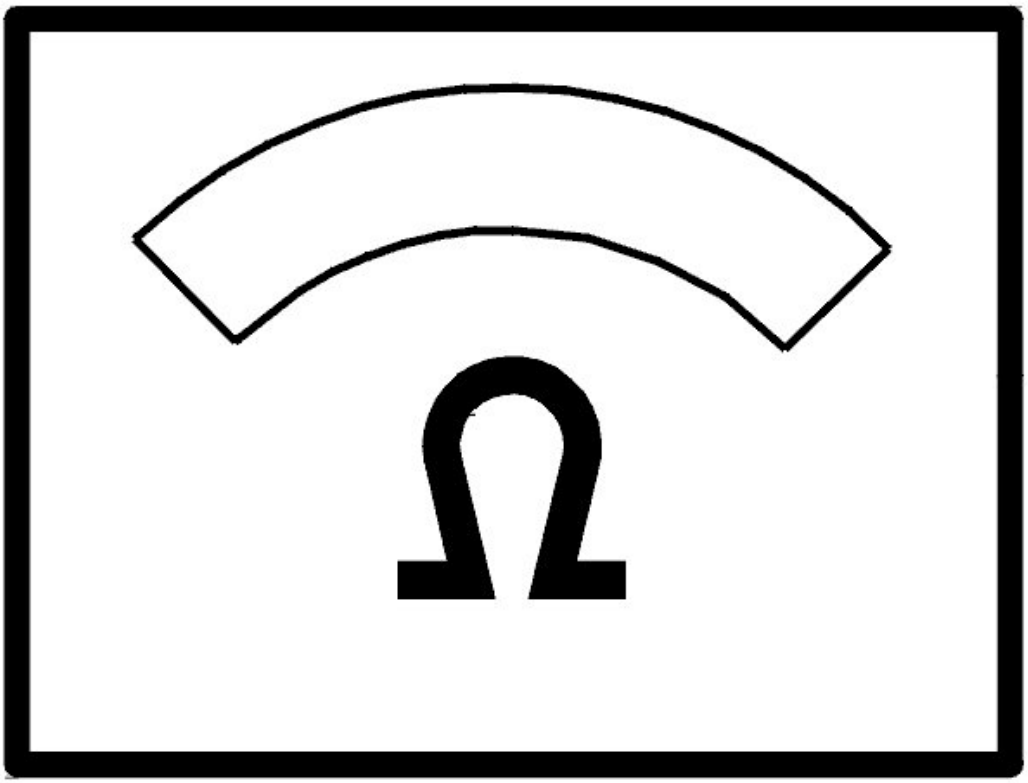
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

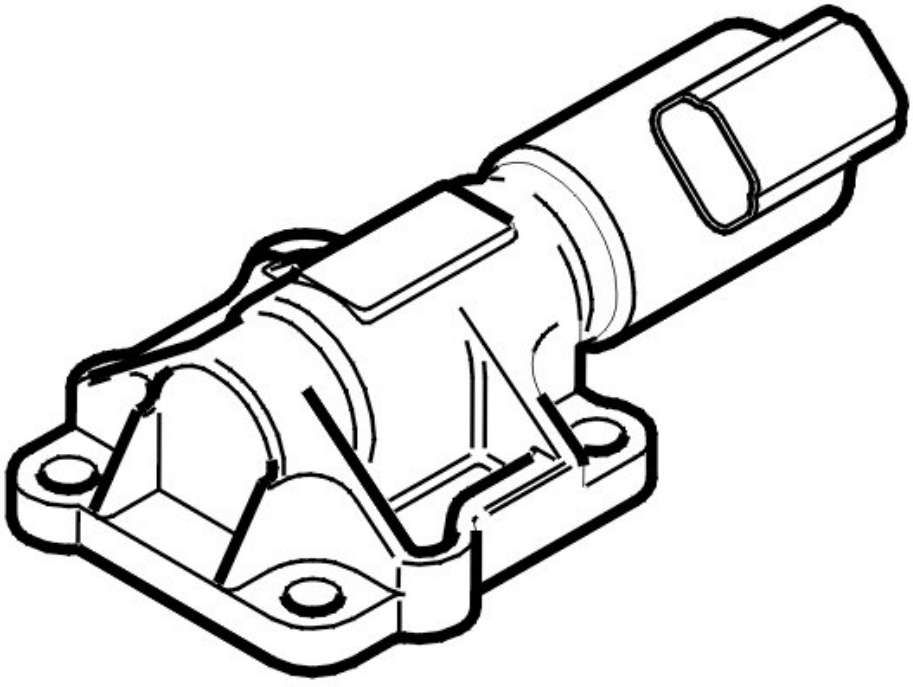
Check the signal cable between engine control module (ECM) terminal #A21 (#A21) and camshaft reset valve terminal #2. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







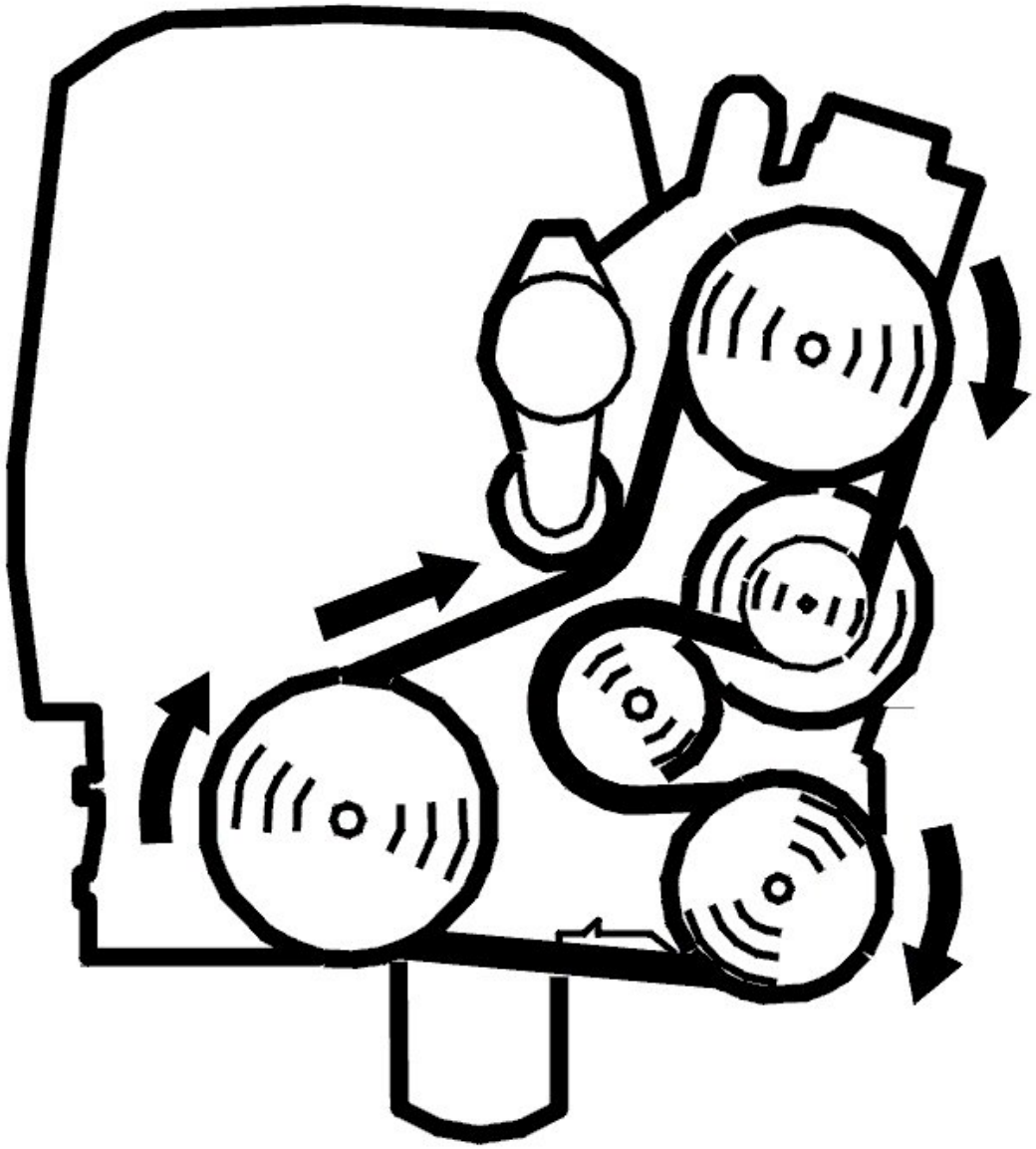
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

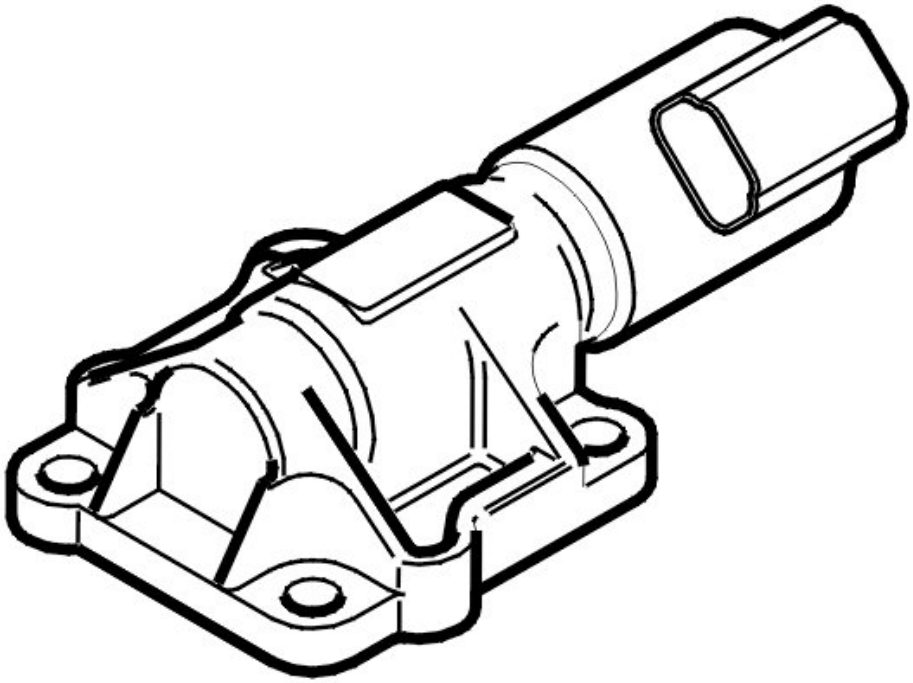
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-616D

Condition



The engine control module (ECM) checks the signal cable for the reset valve for the exhaust camshaft.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the reset valve is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Short-circuit to ground in the signal cable
- Damaged camshaft reset valve.

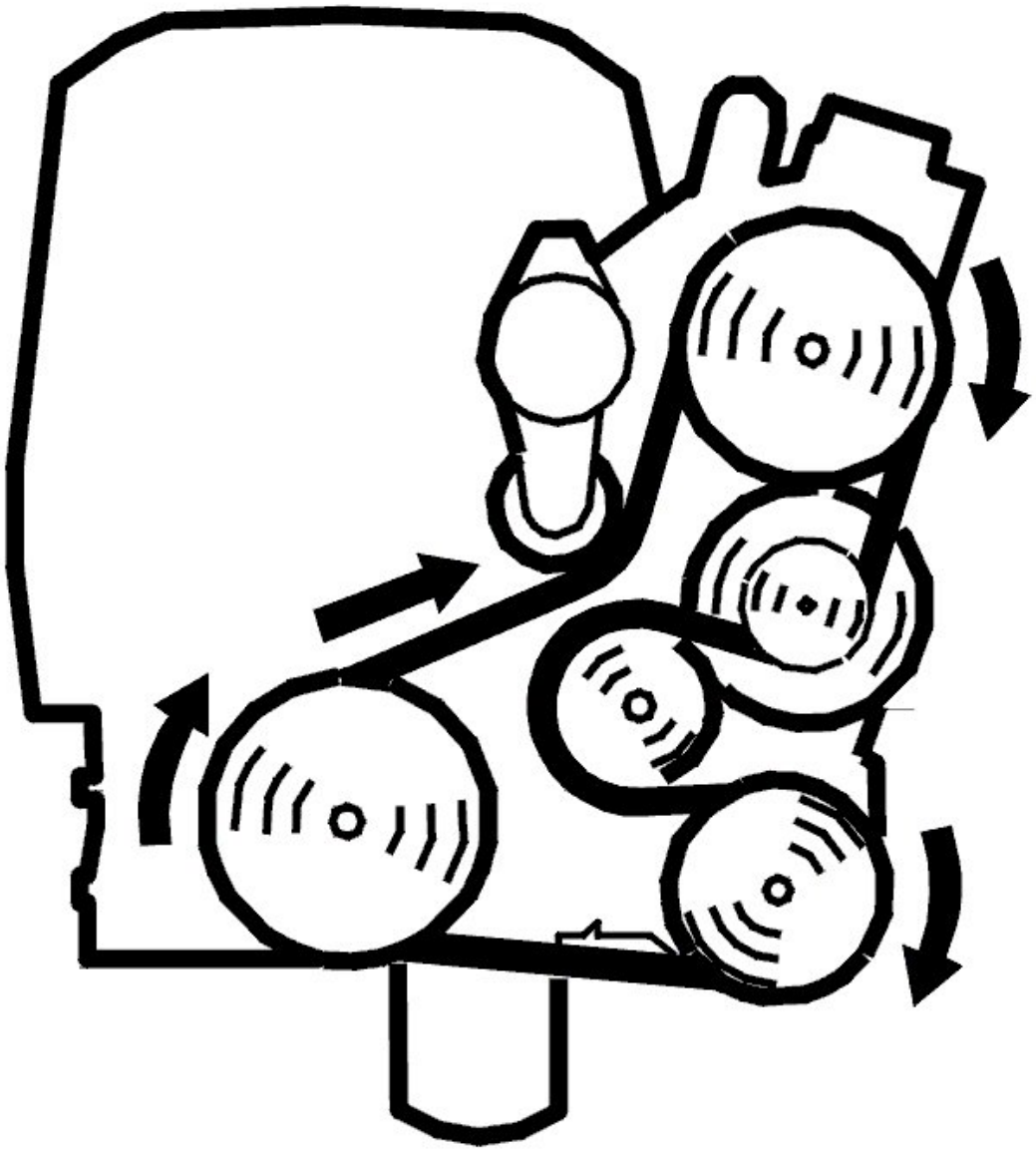
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the status

Hint: The diagnostic trouble code (DTC) may be caused by a defective fuse. If the engine does not start, check the fuse for the power supply to the camshaft reset valve.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.
The fault is intermittent if the function is OK.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Continue - Checking the wiring

Checking the wiring

Check the fuse before the circuit. If the fuse is blown, check the circuit for a short-circuit to ground.
Check the resistance of the camshaft reset valve between terminals #1 and #2.

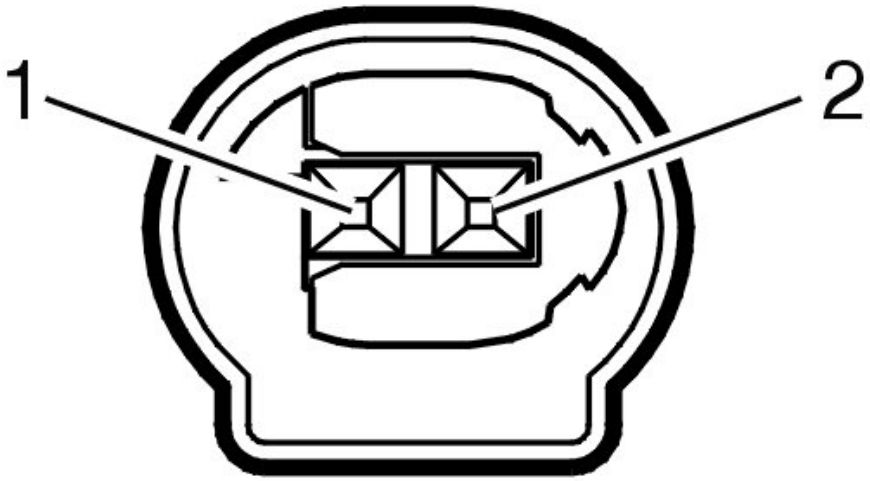
The resistance must be approximately 3.7 ohms.
Check the signal cable between engine control module (ECM) terminal #A21 (#A21) and camshaft reset valve terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Check the power supply cable between system relay terminal #5 and camshaft reset valve terminal #1. Check for an open-circuit.

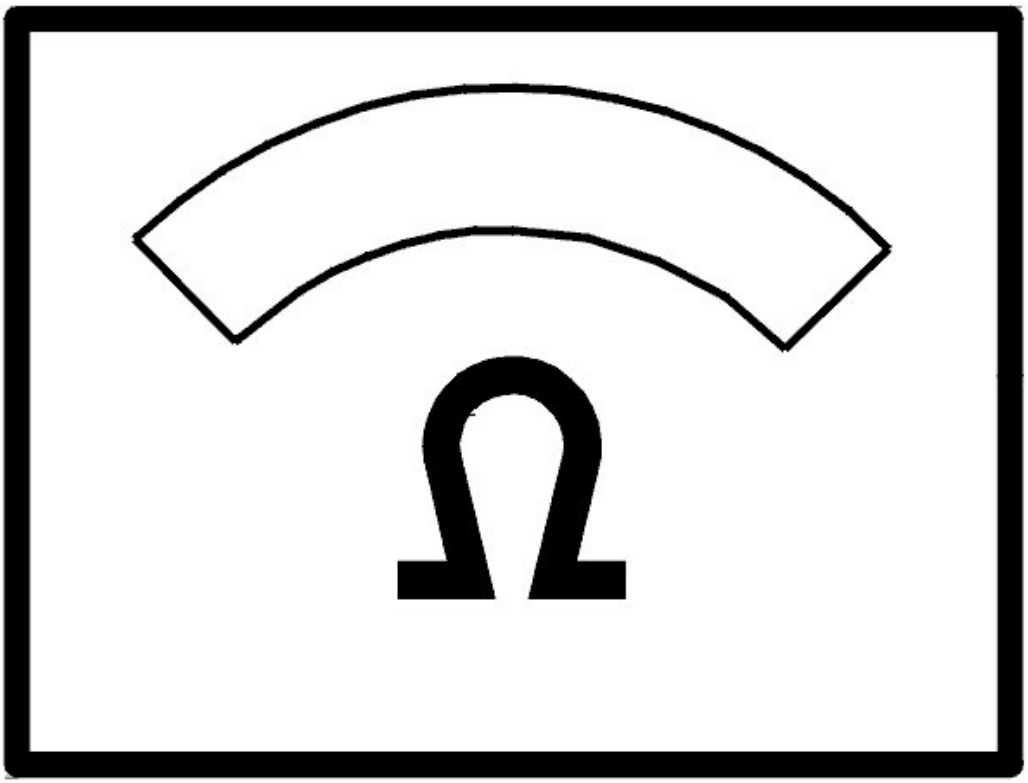
Hint: With the ignition on and the reset valve and camshaft connector disconnected, the voltage at connector terminal #1 must be approximately Ubat.

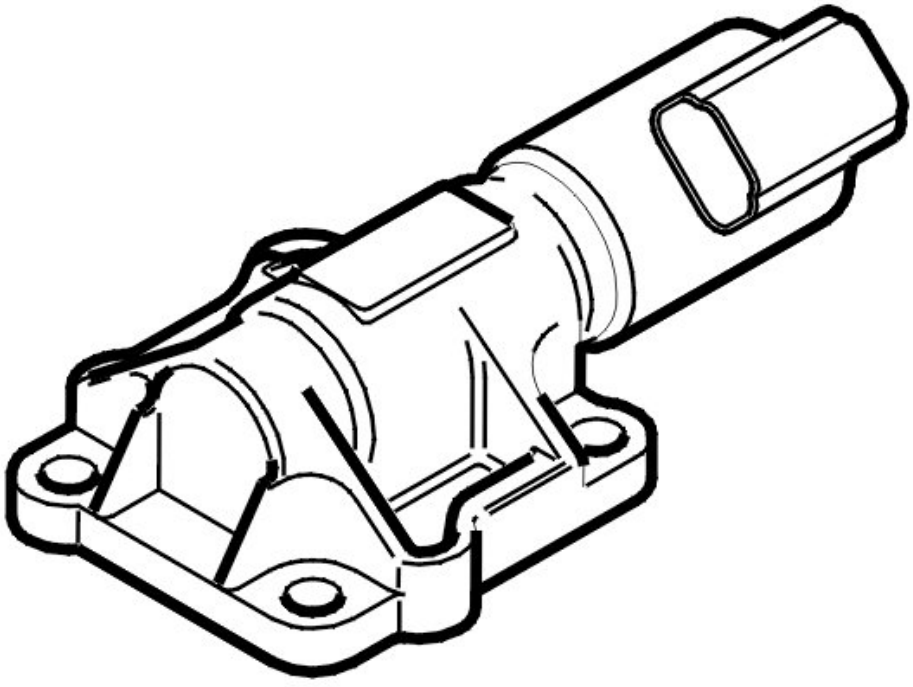
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access and replace the camshaft reset valve, see Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







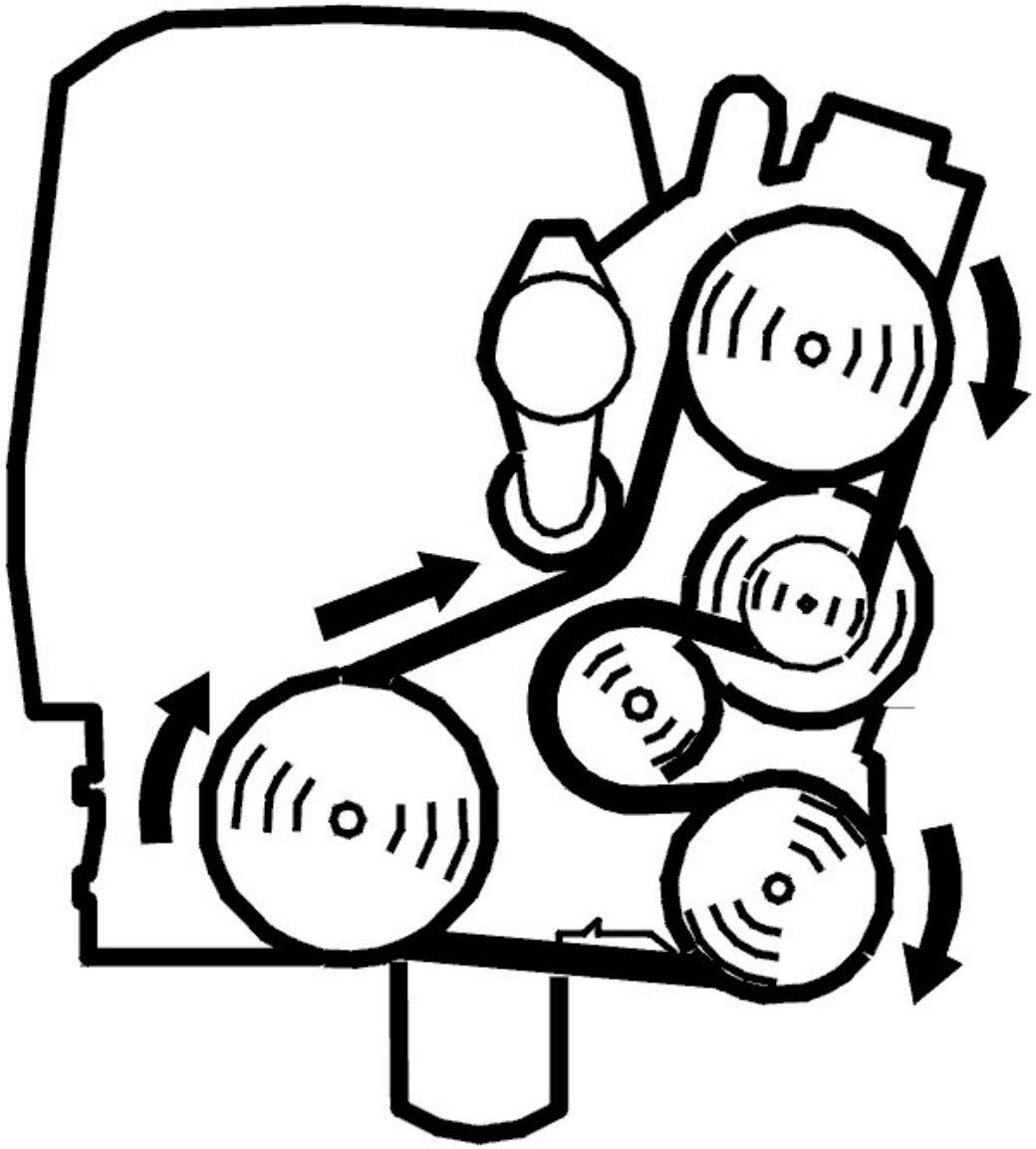
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft to the different target values. There is a fault if the control module does not operate the camshaft shift angle to the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°. If the shift angle of the camshaft (target value) does not change, or if the actual value does not correspond to the target value, the function is faulty.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Note! The test is active until the ignition is switched off. Switch off the ignition before the car is delivered to the customer.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

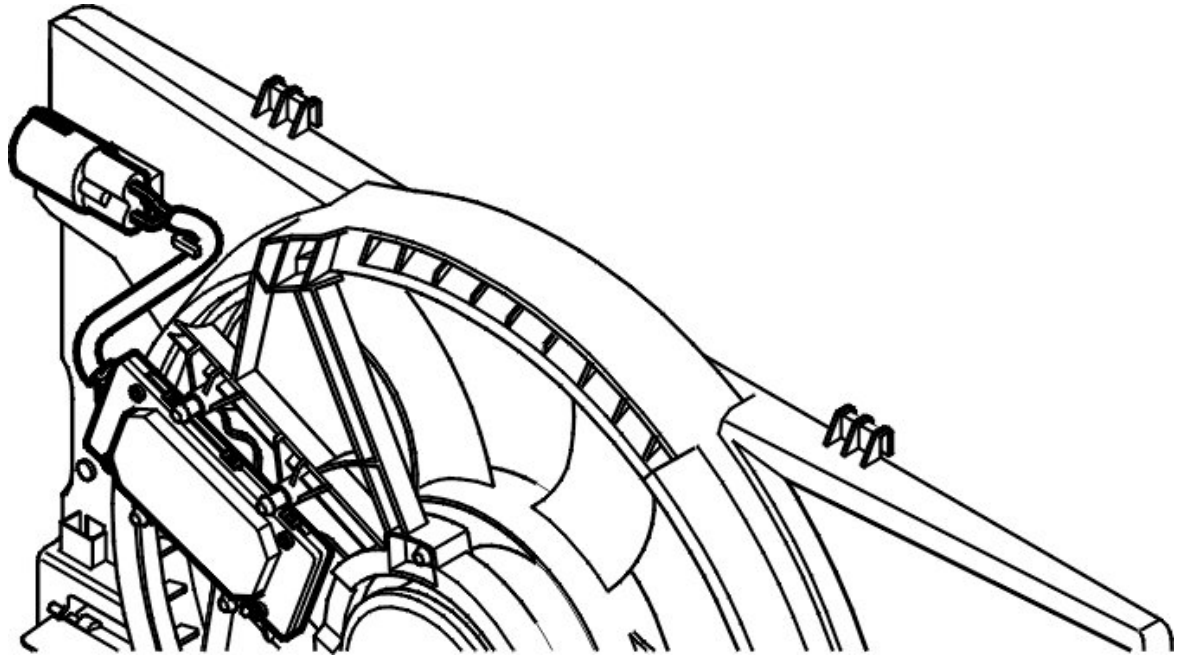
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-6200

Condition



The engine control module (ECM) checks the function of the engine cooling fan (FC). The diagnostic trouble code (DTC) is stored if an internal fault in the engine cooling fan (FC) is registered.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- Engine cooling fan (FC) switched off.

Possible source
- Damaged engine cooling fan (FC).

Fault symptom[s]
- The engine cooling fan (FC) does not function.

Fault-Tracing Information

Fault-tracing information

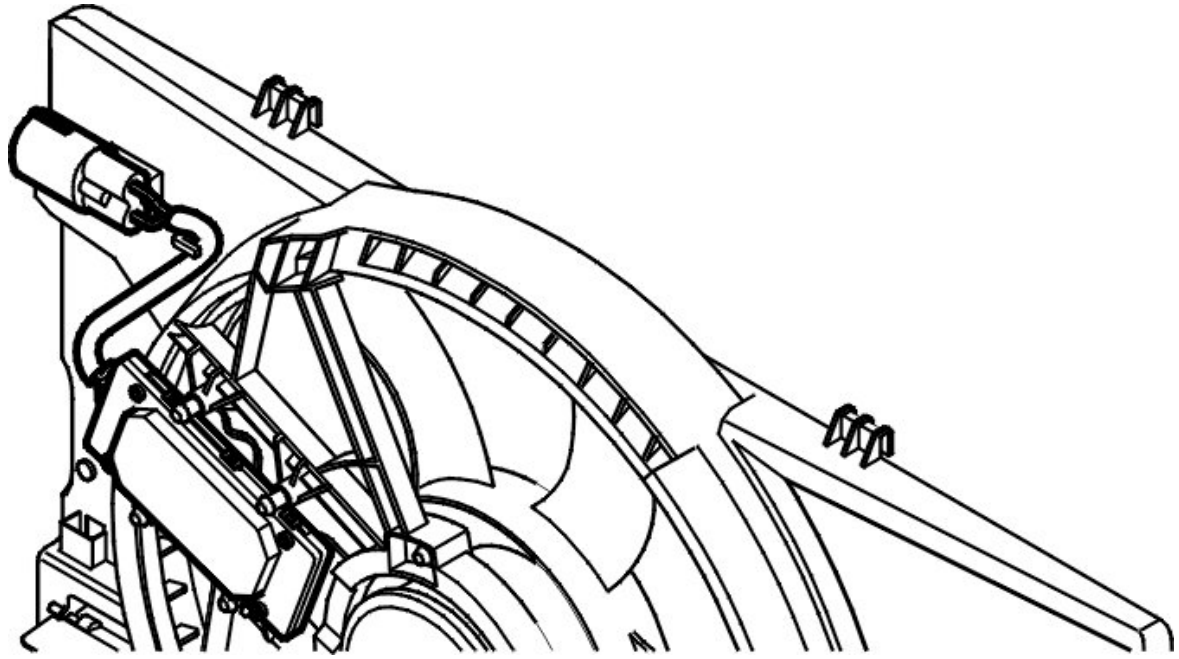
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-620B

Condition



The engine control module (ECM) checks the function of the engine cooling fan (FC). The diagnostic trouble code (DTC) is stored if an internal fault in the engine cooling fan (FC) is registered.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- Engine cooling fan (FC) switched off.

Possible source
- Damaged engine cooling fan (FC).

Fault symptom[s]
- The engine cooling fan (FC) does not function.

Fault-Tracing Information

Fault-tracing information

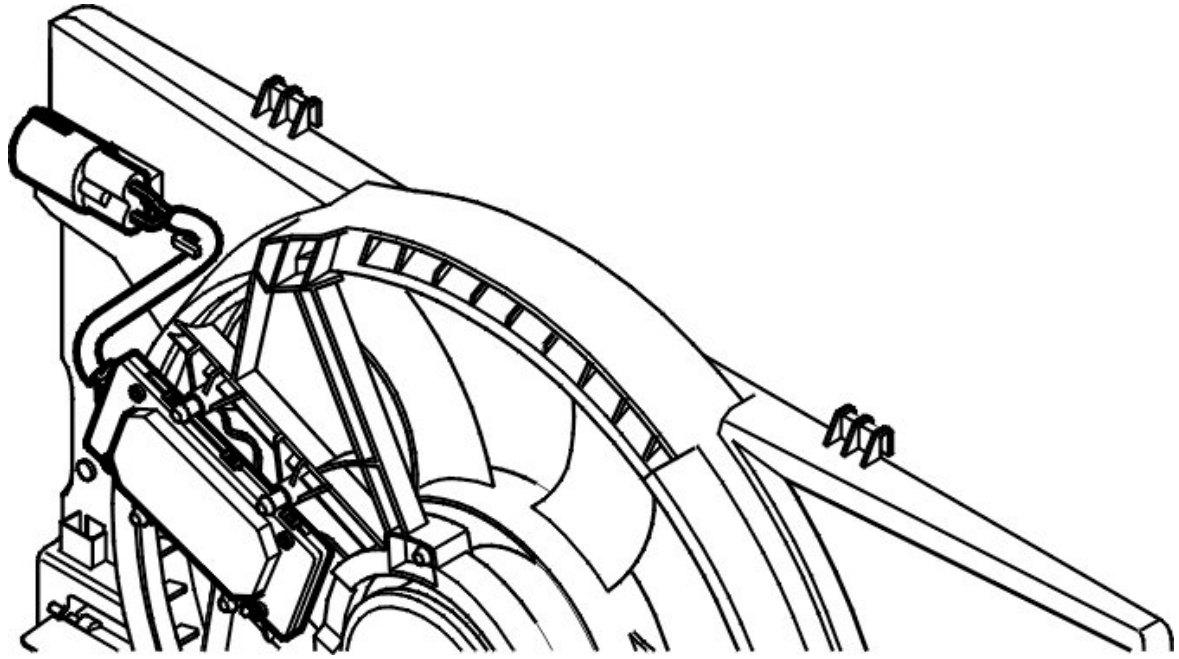
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-620C

Condition



The engine control module (ECM) checks the function of the engine cooling fan (FC). The diagnostic trouble code (DTC) is stored if an internal fault in the engine cooling fan (FC) is registered or if the fan is blocked.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- Engine cooling fan (FC) switched off.

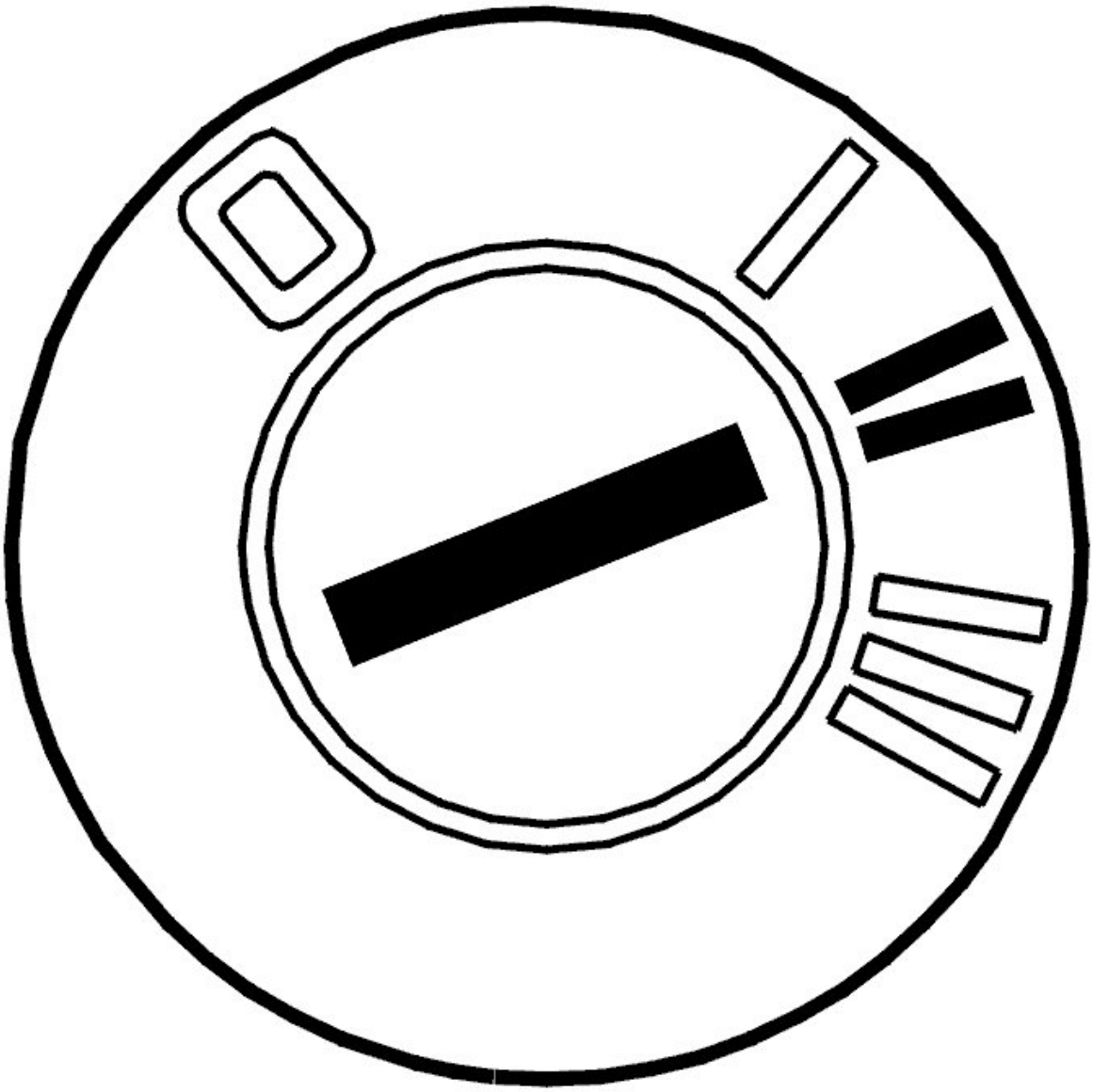
Possible source
- Blocked engine cooling fan (FC)
- Damaged engine cooling fan (FC).

Fault symptom[s]
- The engine cooling fan (FC) does not function.

Signal Too High

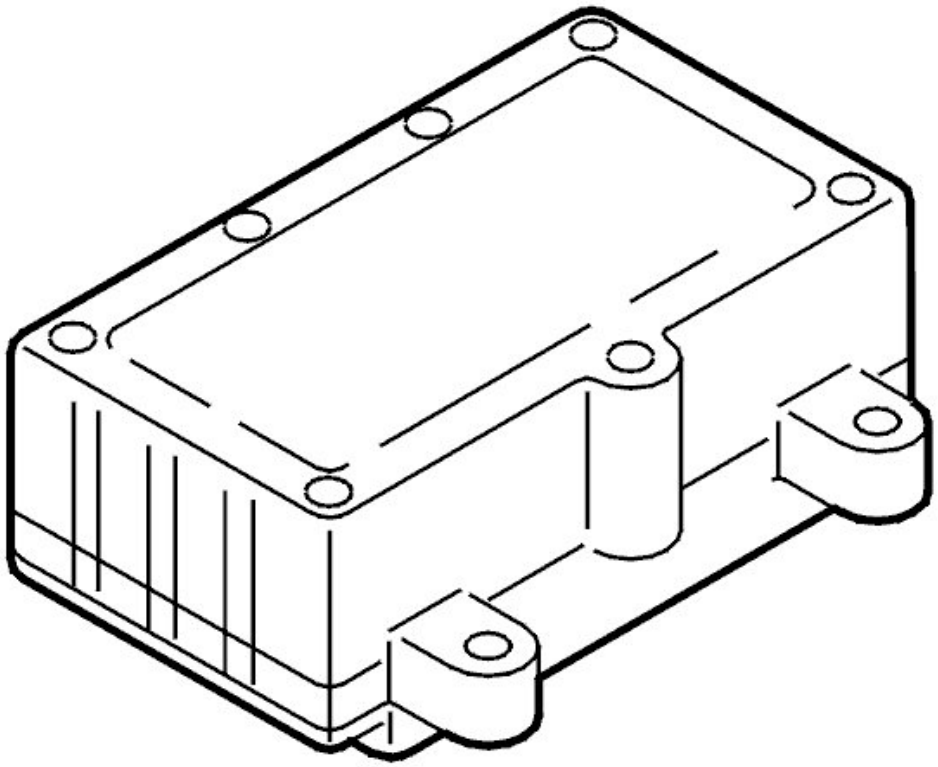
Signal too high

Checking the component



- Ignition off.
- Check that the fan blade rotates easily. Check that nothing is obstructing the fan
- Remedy as necessary
- Ignition on
- Check all speeds of the engine cooling fan (FC).

Activate the engine cooling fan (FC) by clicking the VCT2000 symbol.



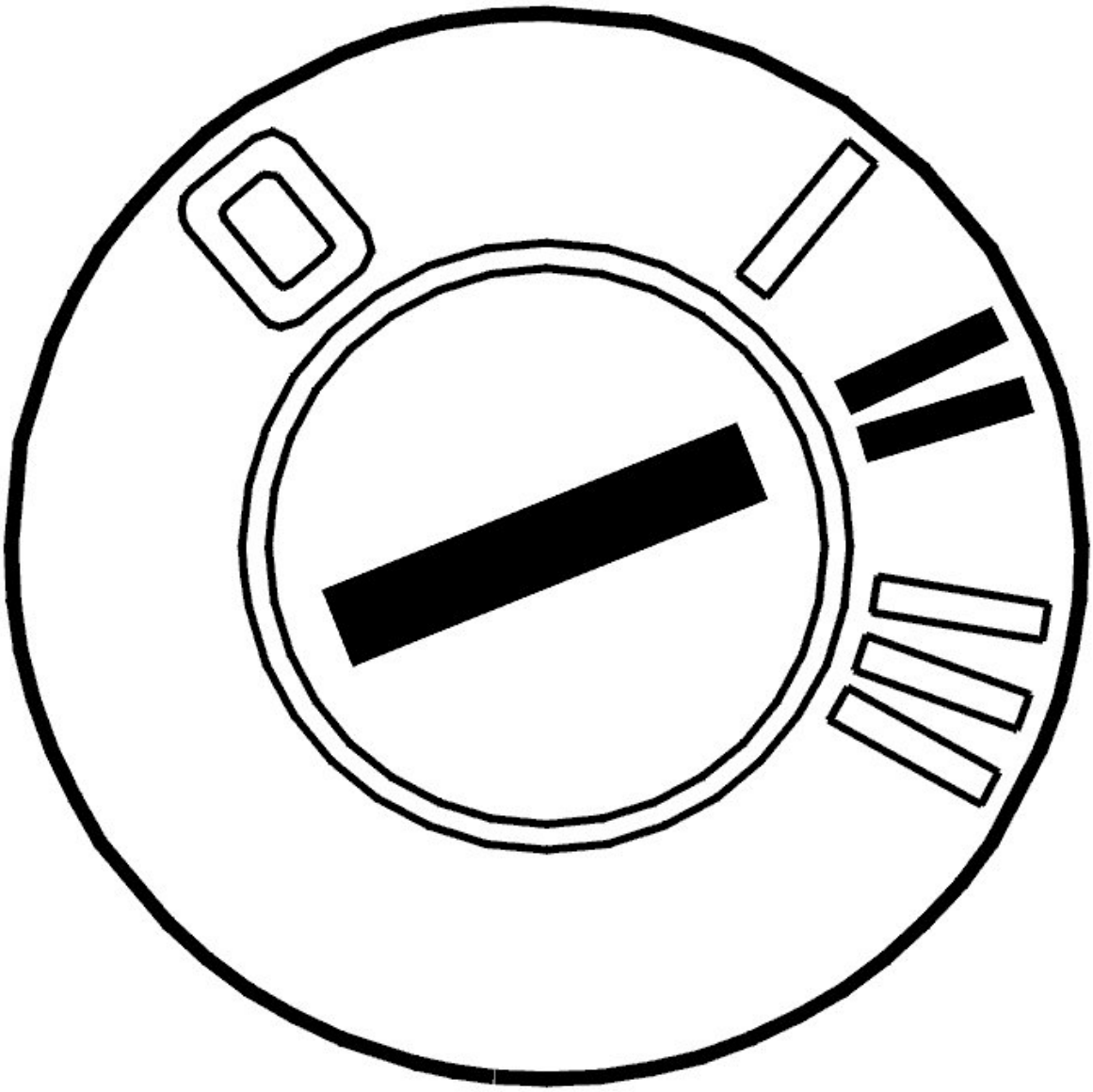
Continue - Checking the component and wiring

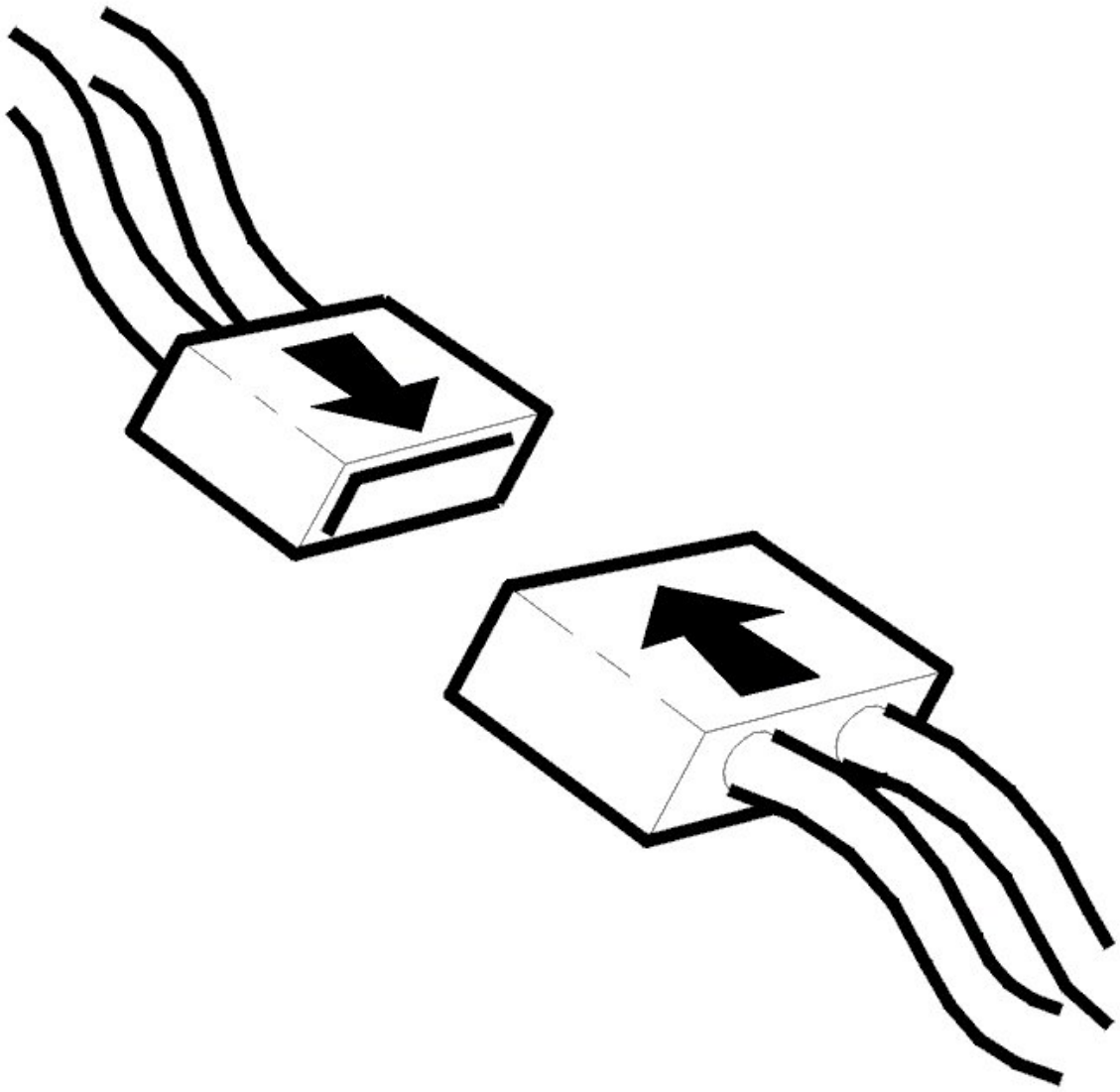
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the engine cooling fan (FC). Check all 6 speeds of the engine cooling fan (FC).

Is the engine cooling fan (FC) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

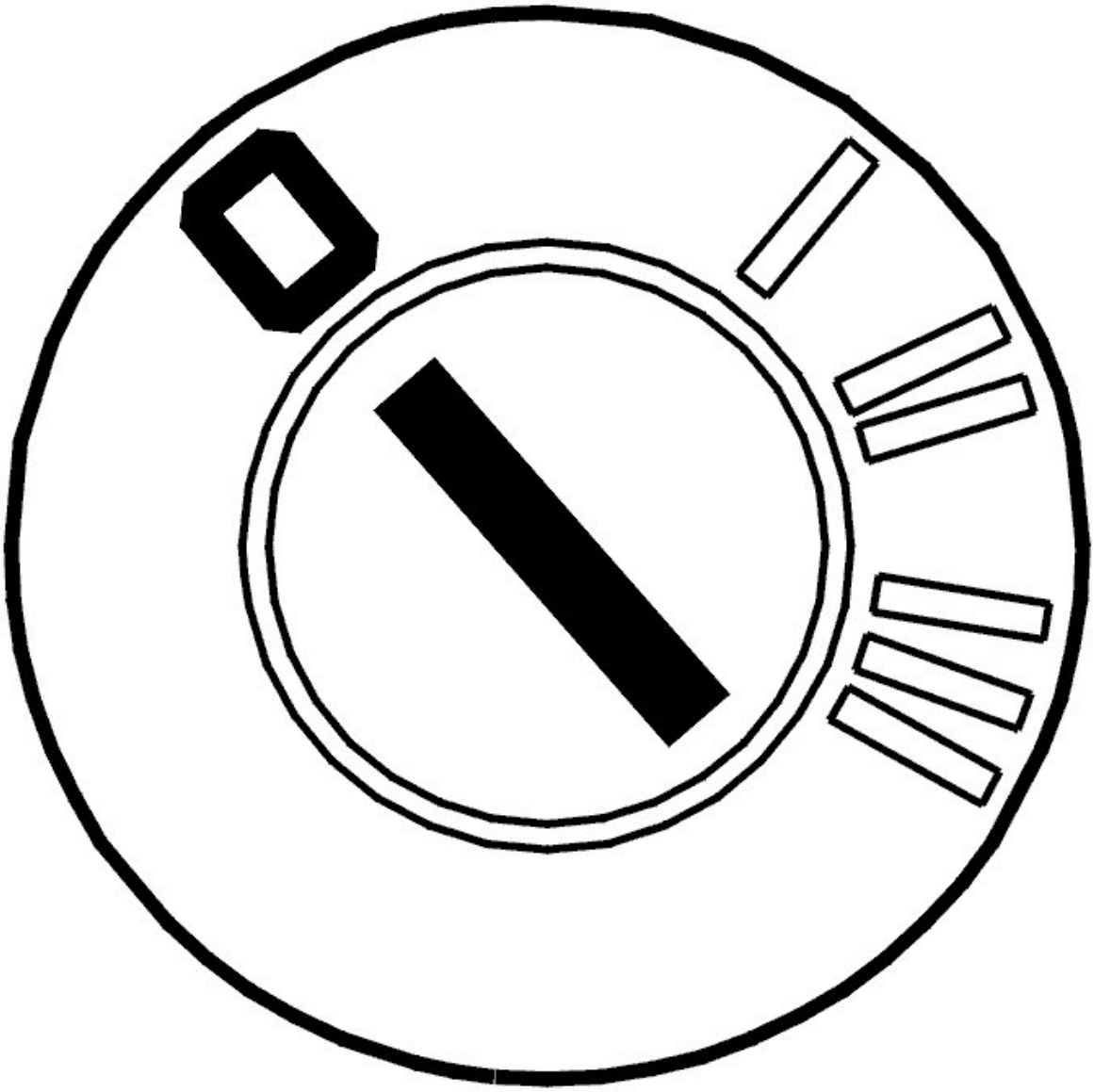
Yes - FAULT-TRACING FAILED

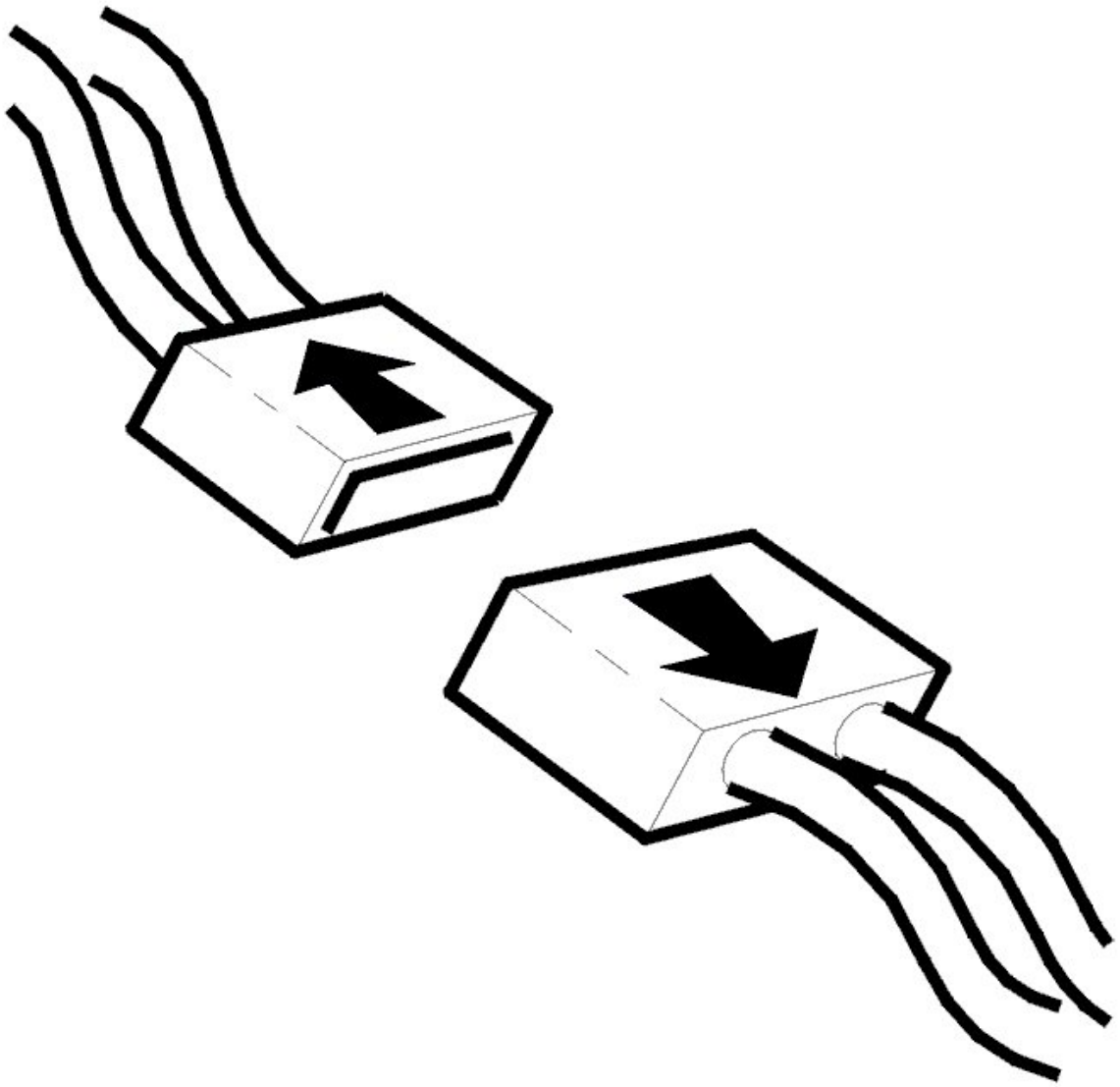
No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Checking the component and wiring





- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

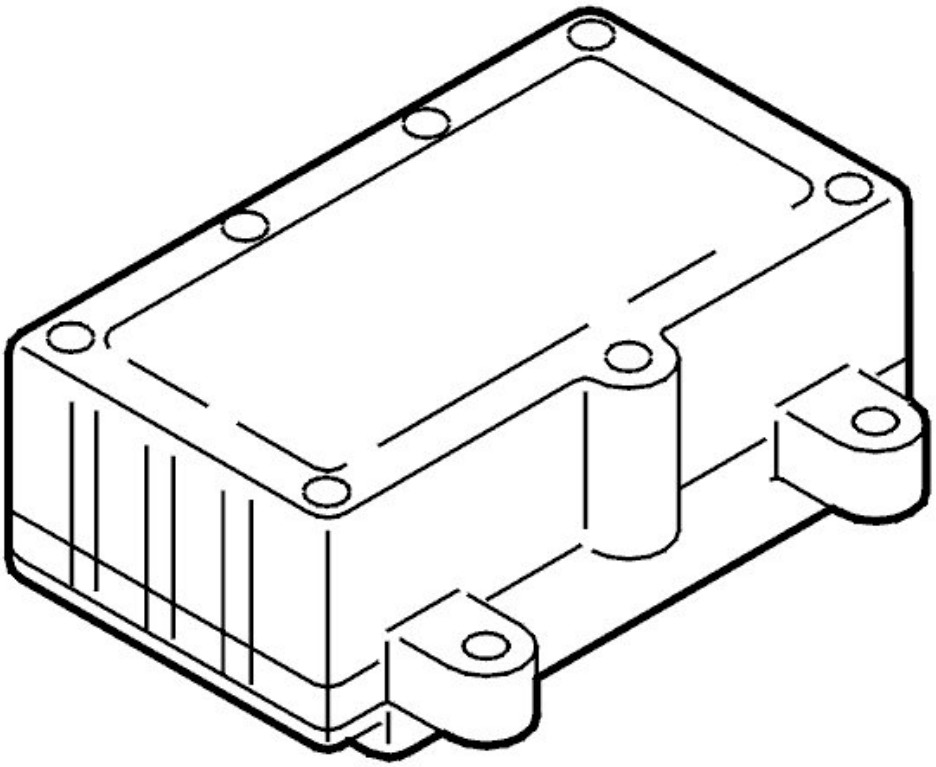
If the engine cooling fan (FC) cannot be activated at any speed:
- Check the fuse, power supply cable and ground lead for the engine cooling fan (FC).
- Check the connector and wiring between the engine control module (ECM) and engine cooling fan (FC) module. Check for damage. Check for an open circuit. Check for a short circuit.

If the engine cooling fan (FC) can be activated at one or more speeds:
- Check the connectors to the engine cooling fan (FC) control module and Engine Control Module (ECM). Check for damage to pins and connections.
- Also check other connectors and connections that connect cables between Engine Control Module (ECM) and the control module for electric cooling fan.
- Check the wiring between the engine control module (ECM) and the engine cooling fan (FC) module. Check for damage.

Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

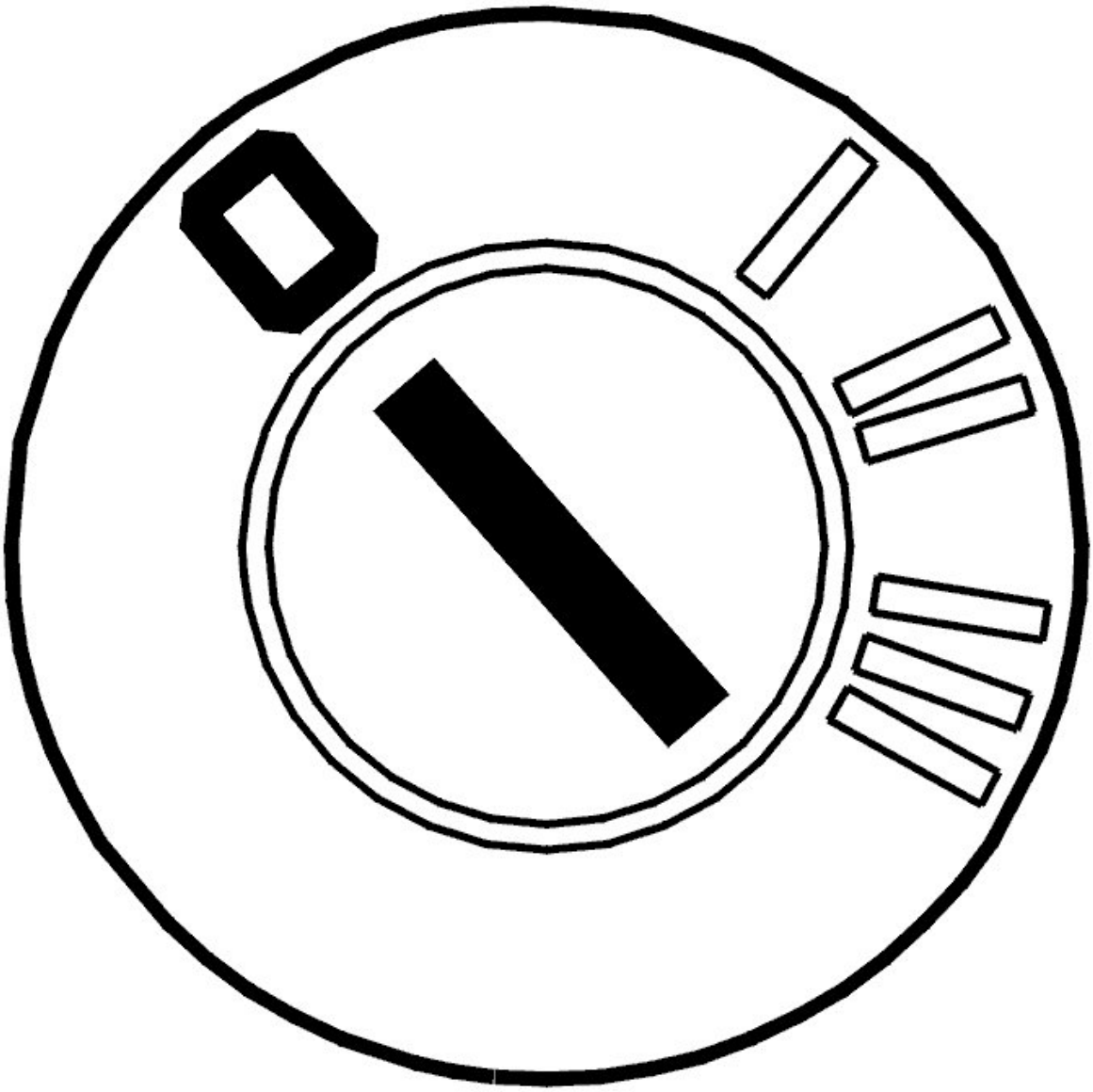


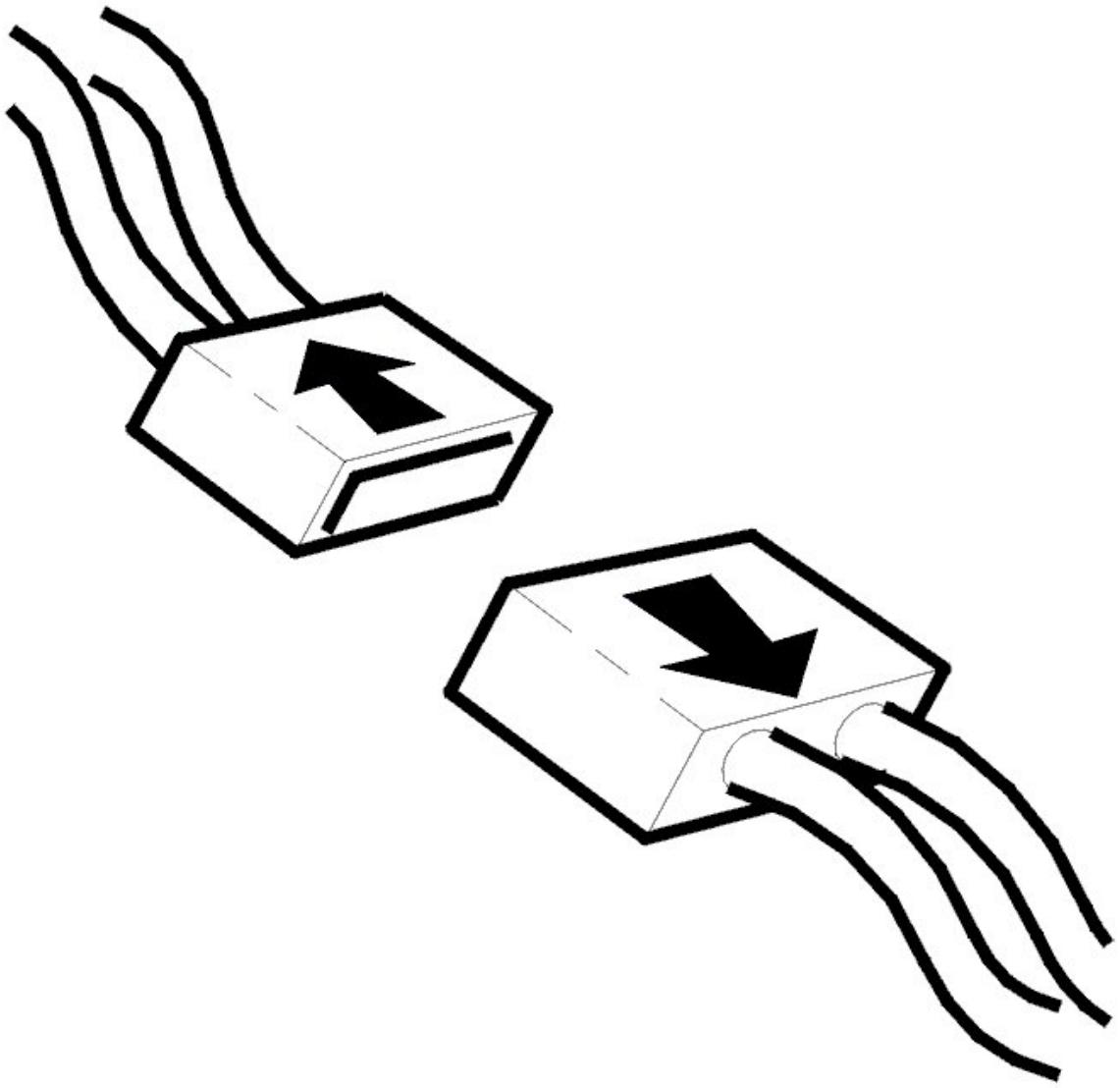
Was a fault detected?

Yes - Verification

No - Replacing a component

Replacing a component





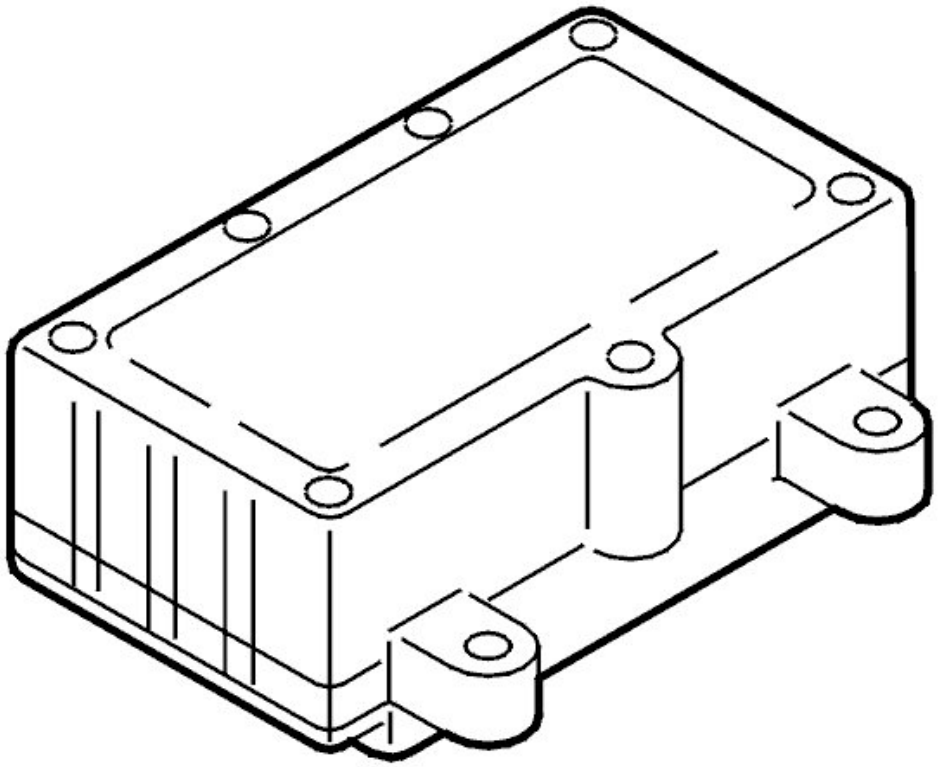
- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

Replace the engine cooling fan (FC) control module if the engine cooling fan (FC) cannot be activated at all speeds and no faults have been found on wiring and connections.
Remedy as necessary.

Other information:

- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair

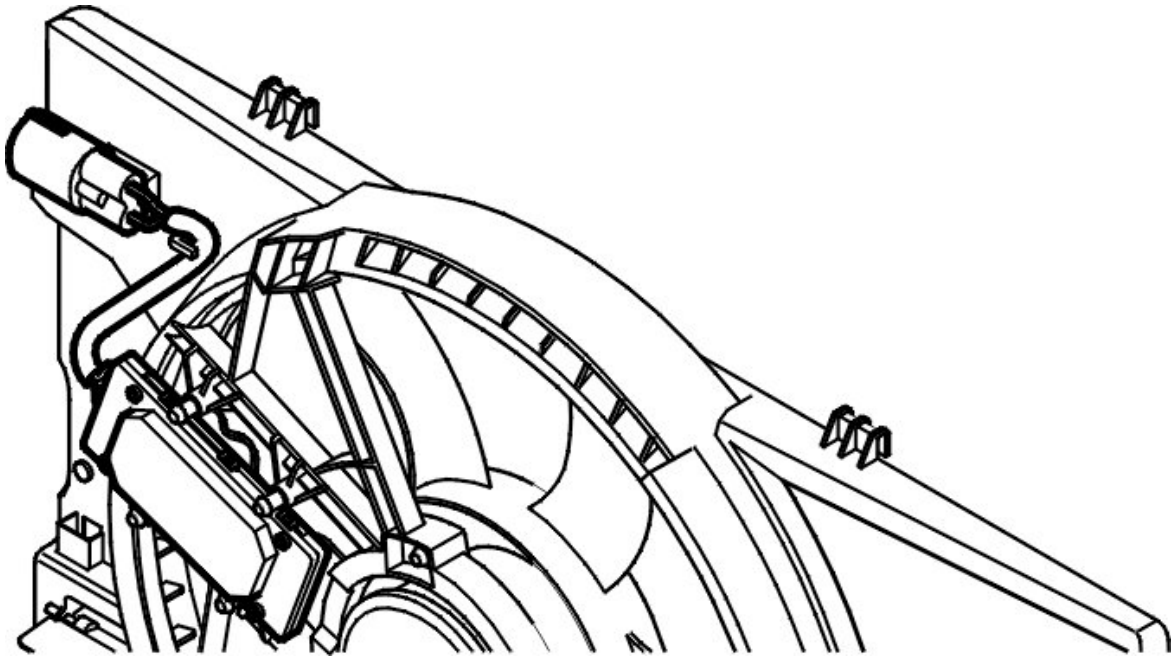


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-620D

Condition



The engine control module (ECM) checks the function of the engine cooling fan (FC). The diagnostic trouble code (DTC) is stored if an internal fault in the engine cooling fan (FC) is registered.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- Engine cooling fan (FC) switched off.

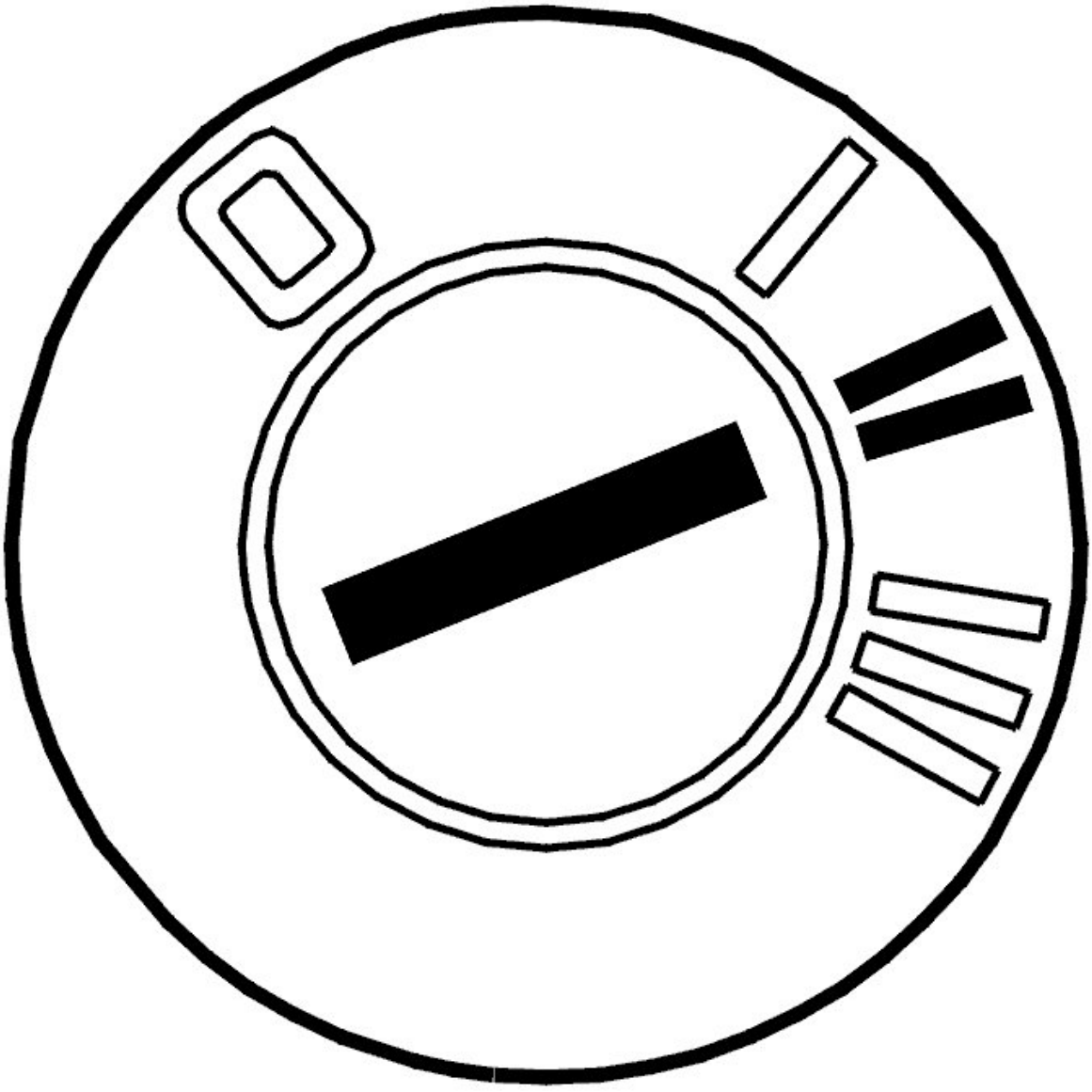
Possible source
- Contact resistance or oxidation in the connectors
- No supply voltage to the engine cooling fan (FC) control module
- Open-circuit or short-circuit to ground in the wiring
- Damaged engine cooling fan (FC).

Fault symptom[s]
- The engine cooling fan (FC) does not function.

Signal Too Low

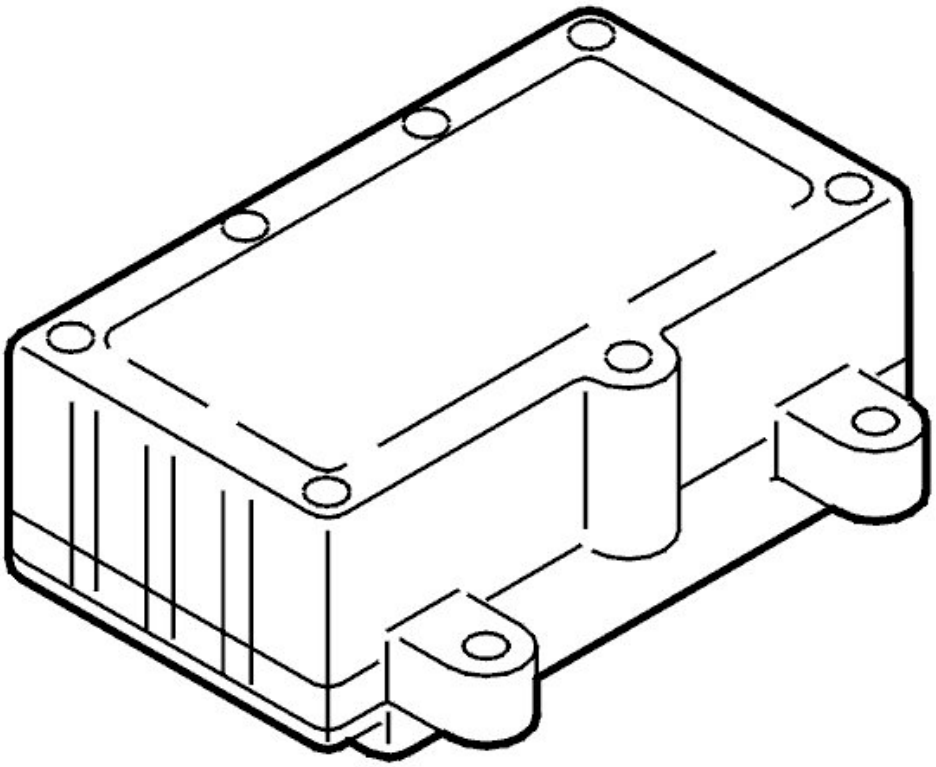
Signal too low

Checking the component



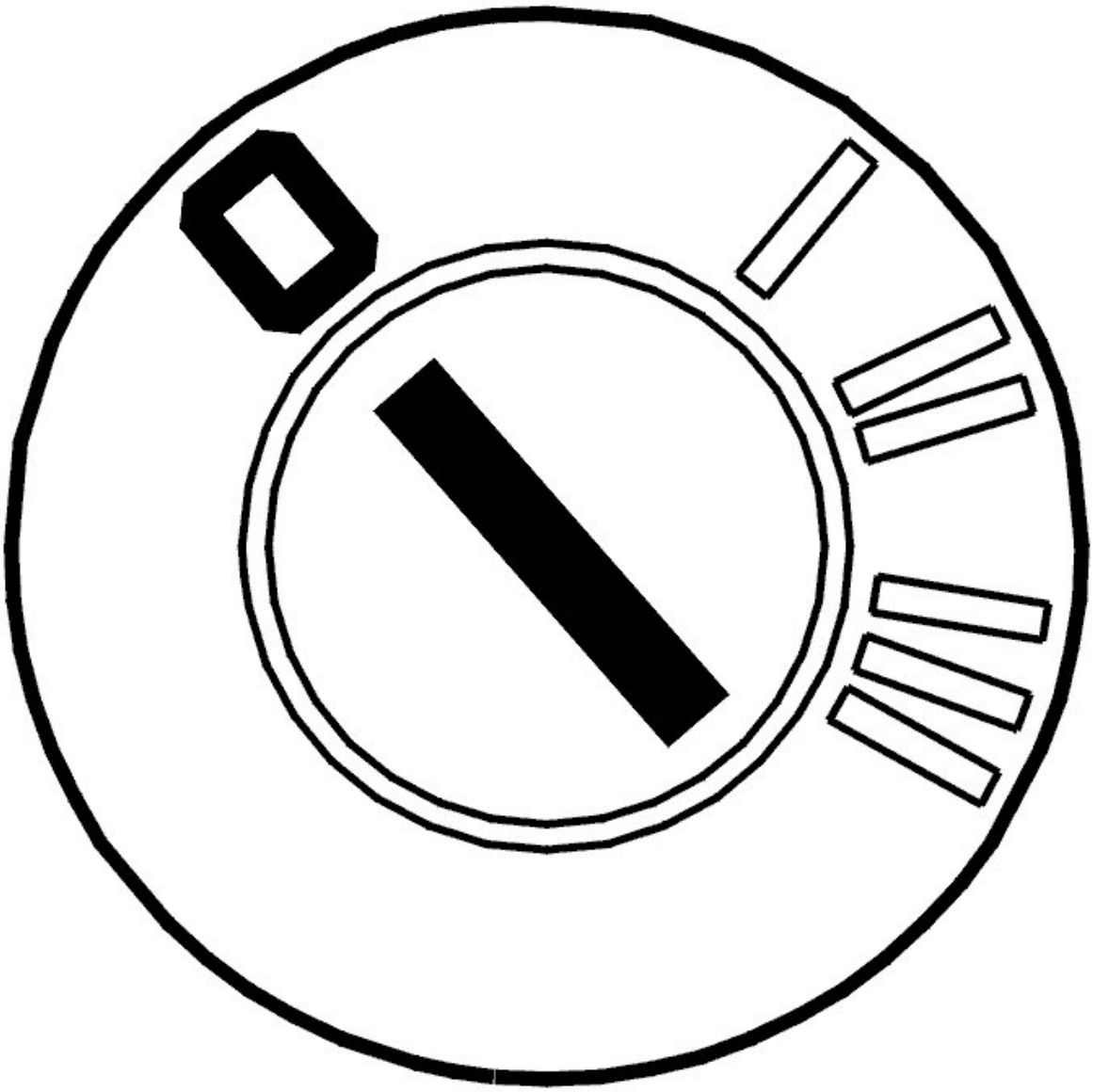
- Ignition off.
- Check that the engine cooling fan (FC) blade rotates easily. Check that nothing is obstructing the engine cooling fan (FC) blade.
- Remedy as necessary.
- Ignition on.
- Check all speeds of the engine cooling fan (FC).

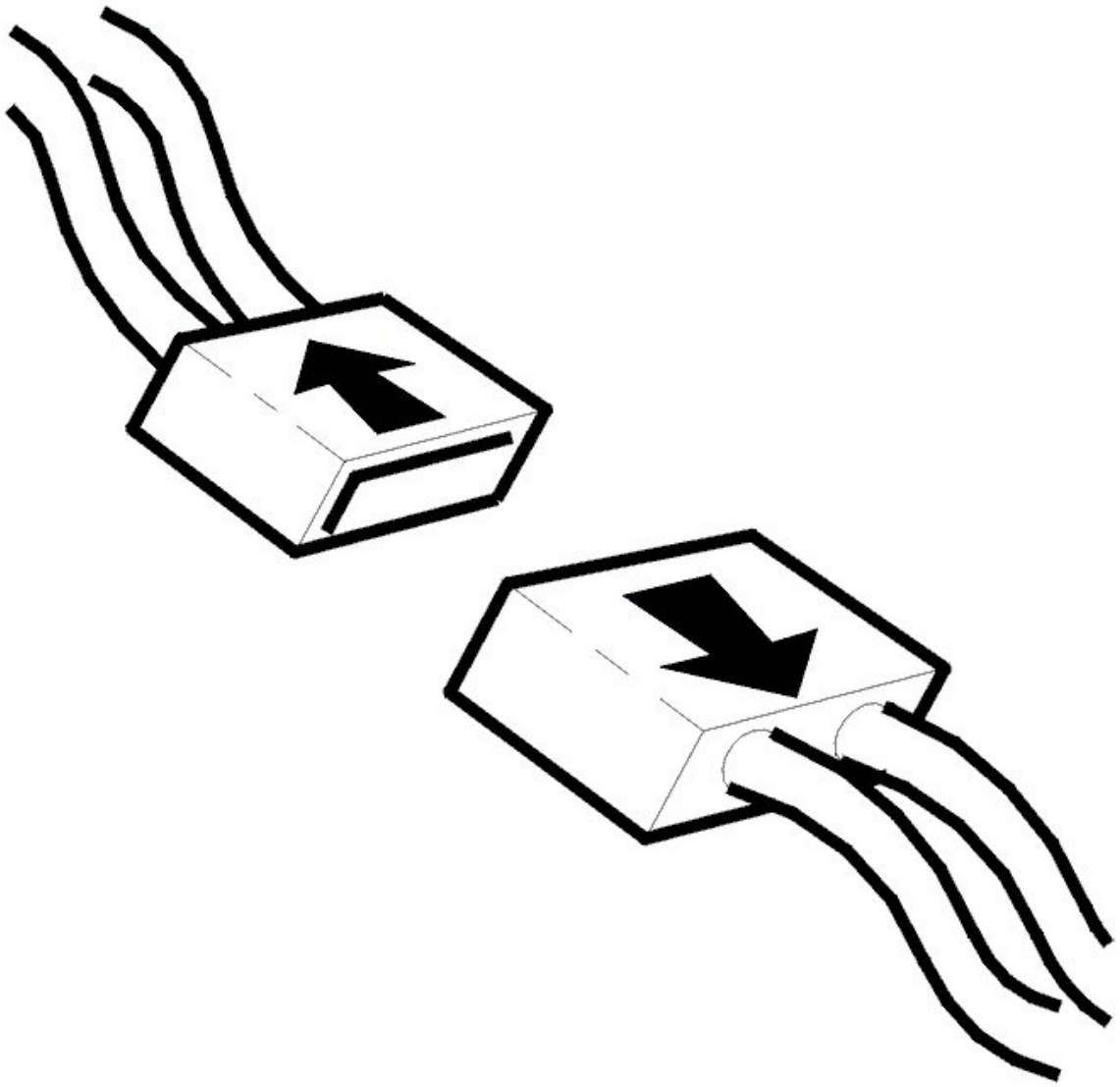
Activate the engine cooling fan (FC) by clicking the VCT2000 symbol.



Continue - Checking components and wiring

Checking components and wiring





- Ignition off

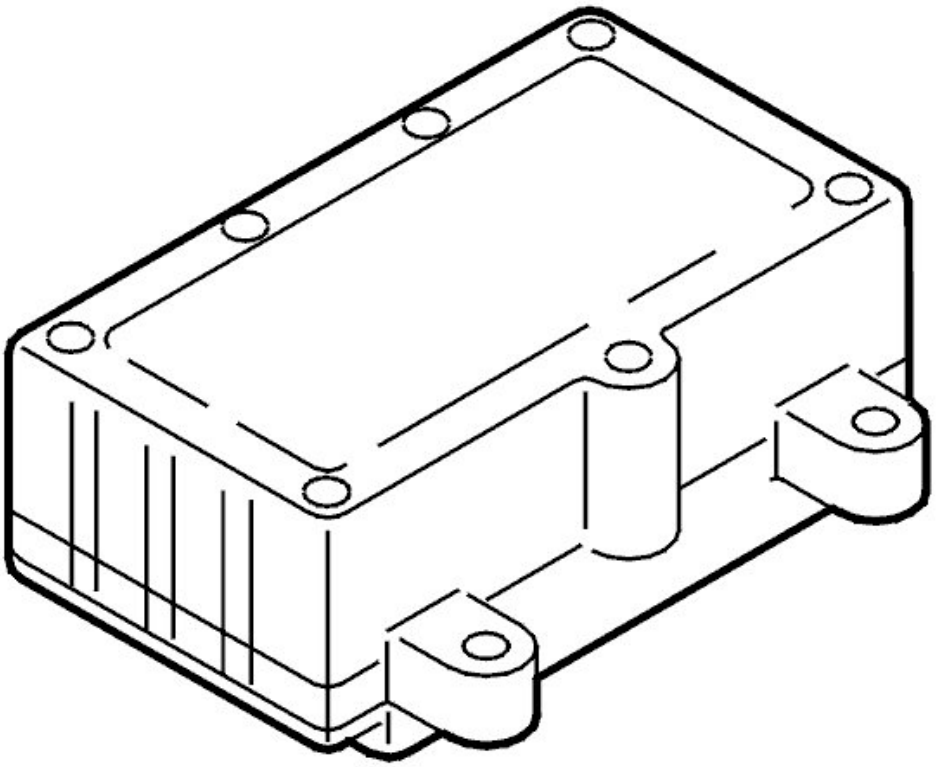
Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

If the engine cooling fan (FC) cannot be activated at any speed:
- Check the fuse, power supply cable and ground lead for the engine cooling fan (FC).
- Check the connector and wiring between the engine control module (ECM) and engine cooling fan (FC) module. Check for damage. Check for an open circuit. Check for a short circuit.

If the engine cooling fan (FC) can be activated at one or more speeds:
- Check the connectors to the engine cooling fan (FC) control module and Engine Control Module (ECM). Check for damage to pins and connections.
- Also check other connectors and connections that connect cables between Engine Control Module (ECM) and the control module for electric cooling fan.
- Check the wiring between the engine control module (ECM) and the engine cooling fan (FC) module. Check for damage.

Remedy as necessary.

Other information:
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

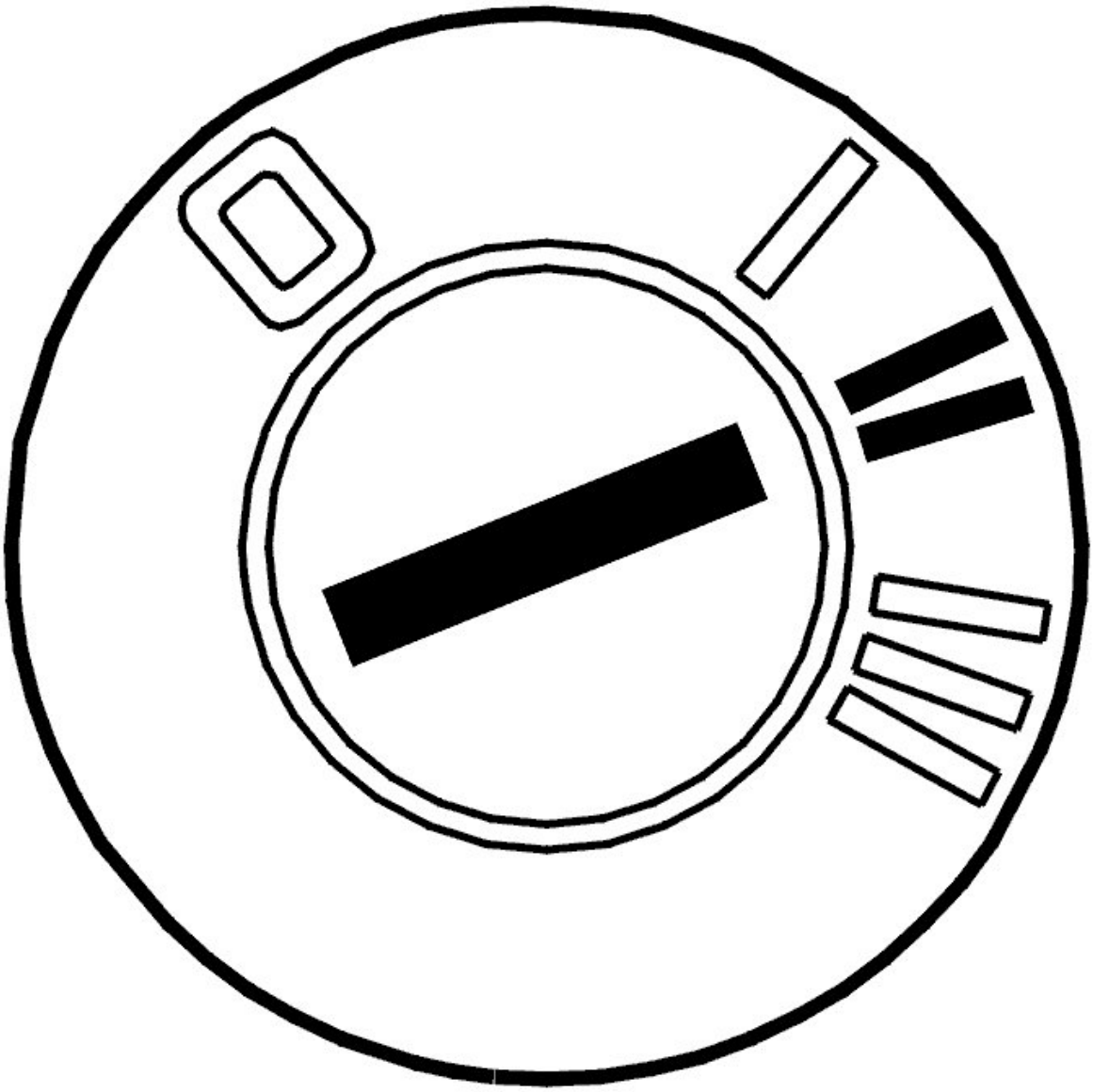
No - Replacing a component

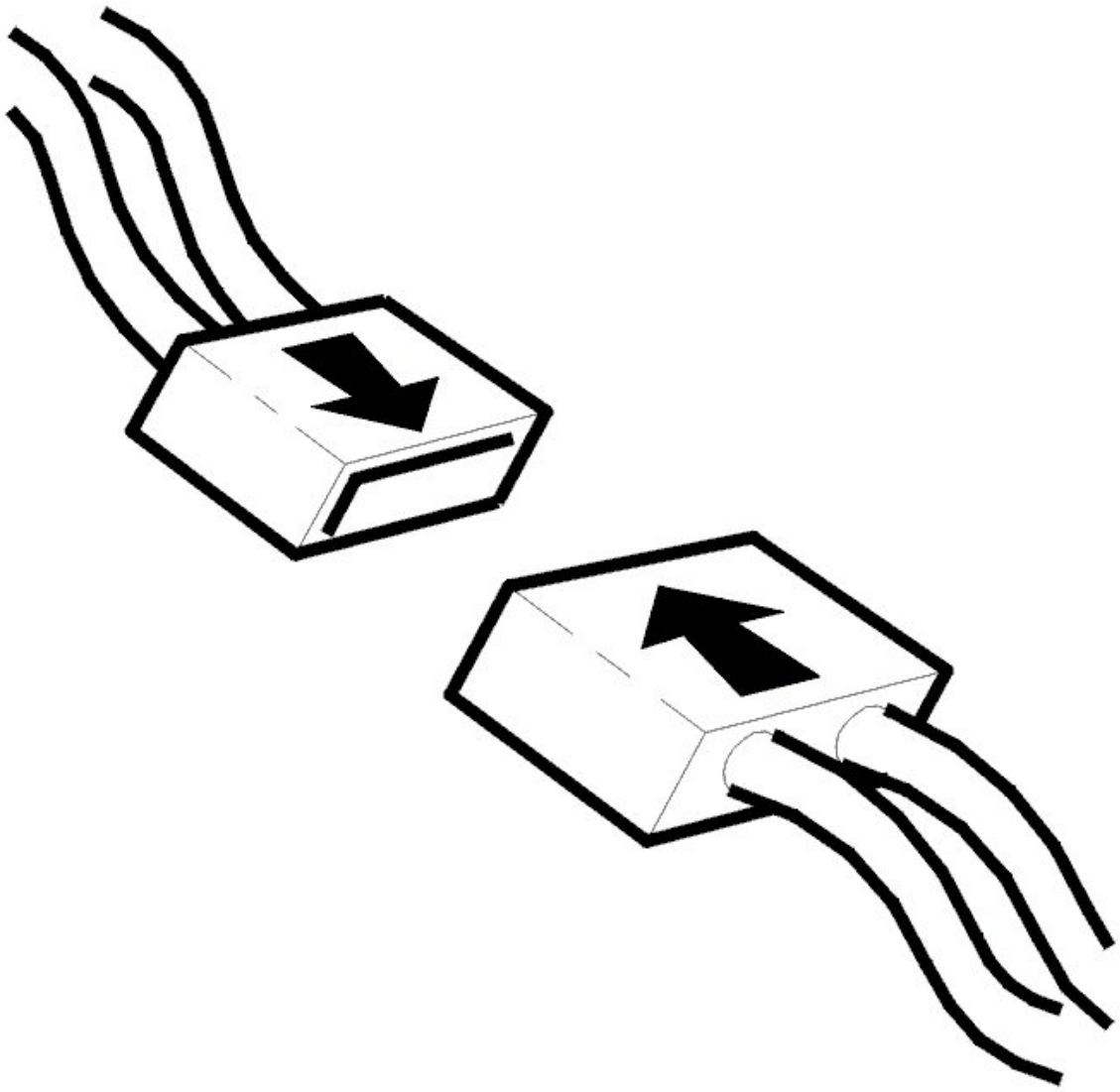
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the engine cooling fan (FC). Check all 6 speeds of the engine cooling fan (FC).

Is the engine cooling fan (FC) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

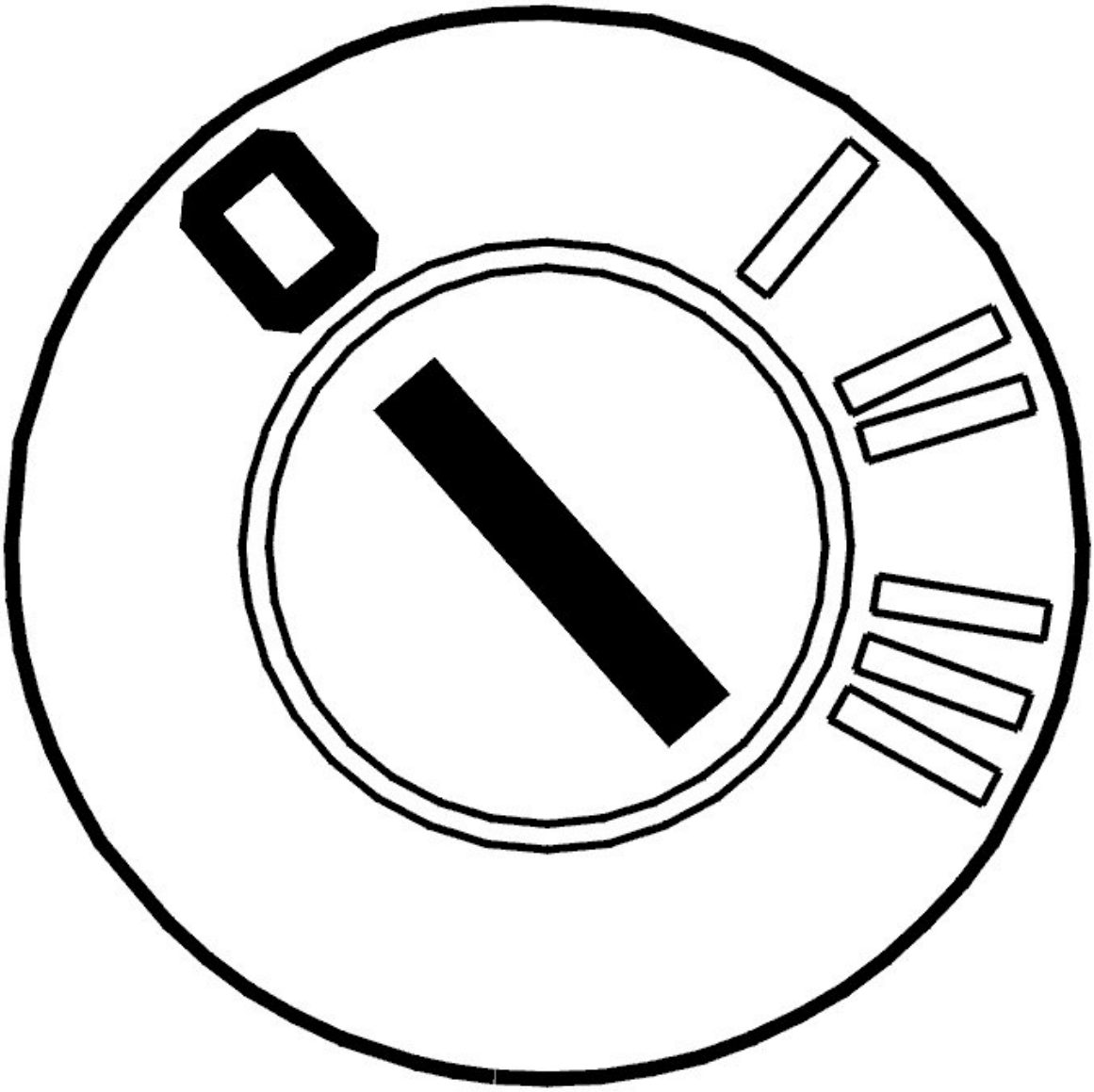
Yes - FAULT-TRACING FAILED

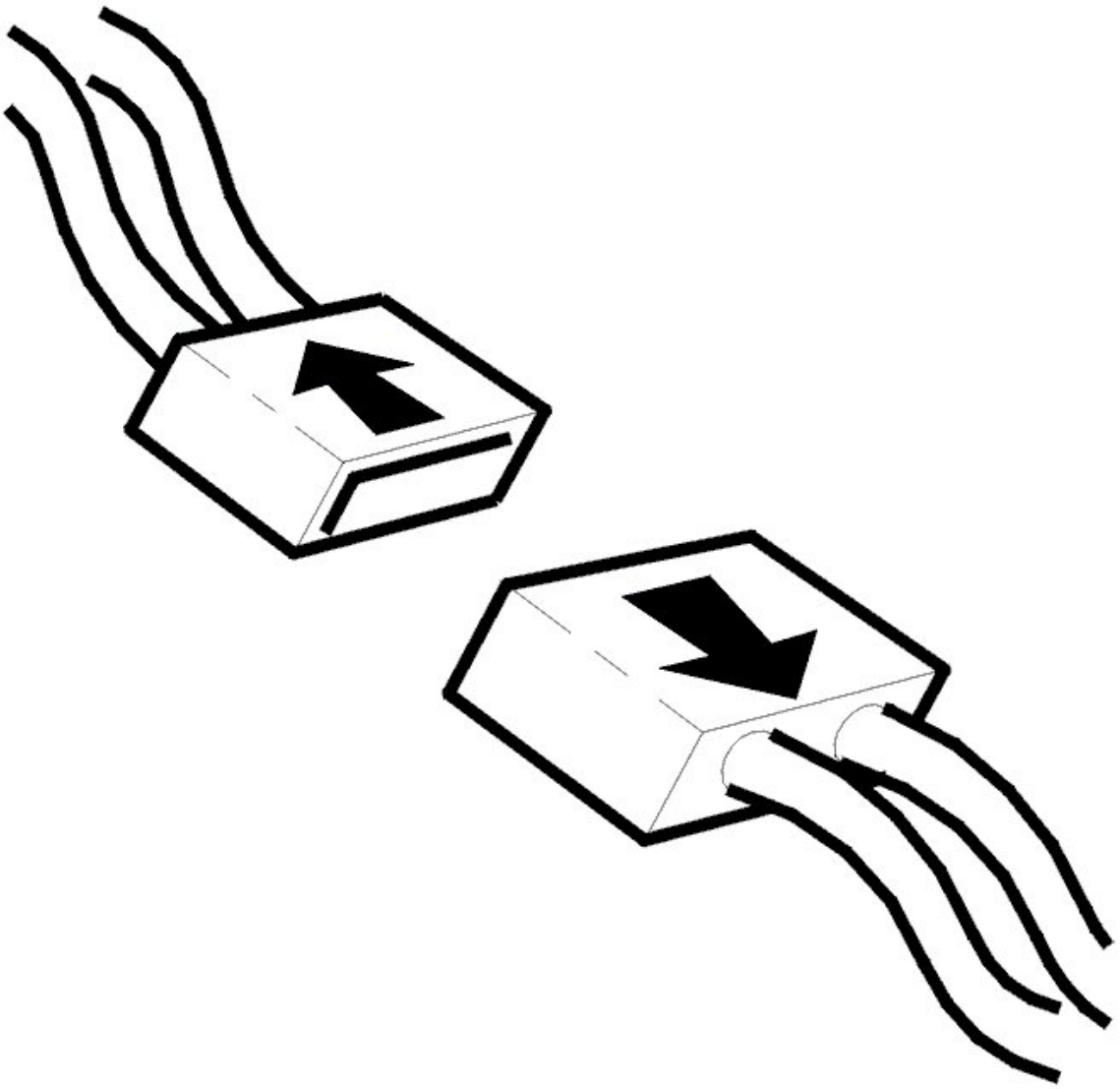
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Replacing a component





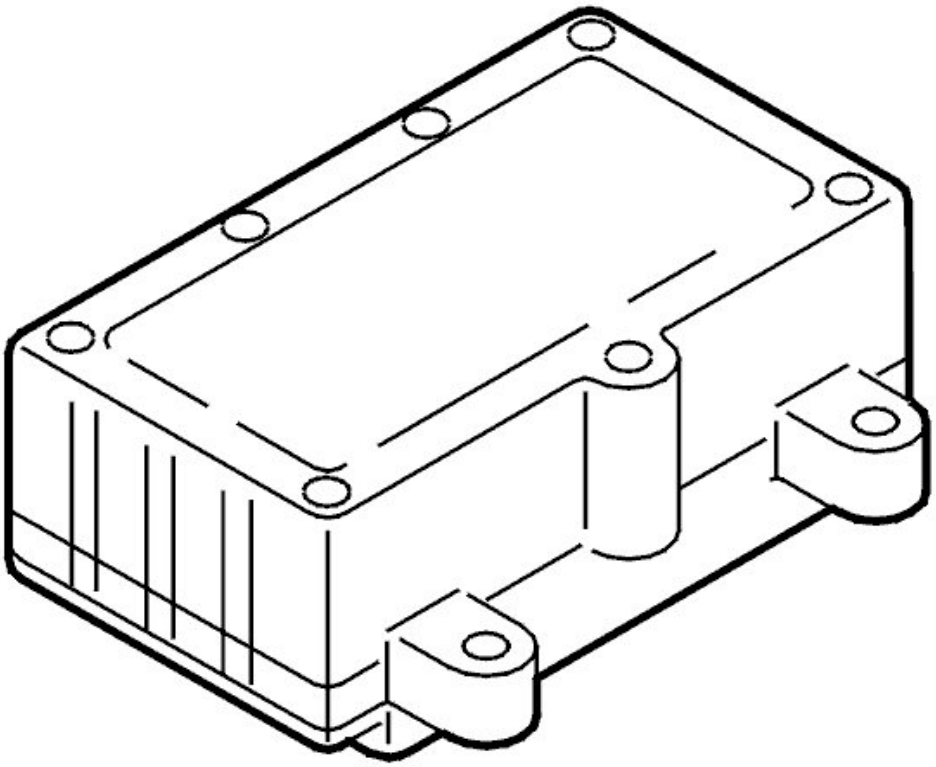
- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

Replace the engine cooling fan (FC) control module if the engine cooling fan (FC) cannot be activated at all speeds and no faults have been found on wiring and connections.
Remedy as necessary.

Other information:

- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair



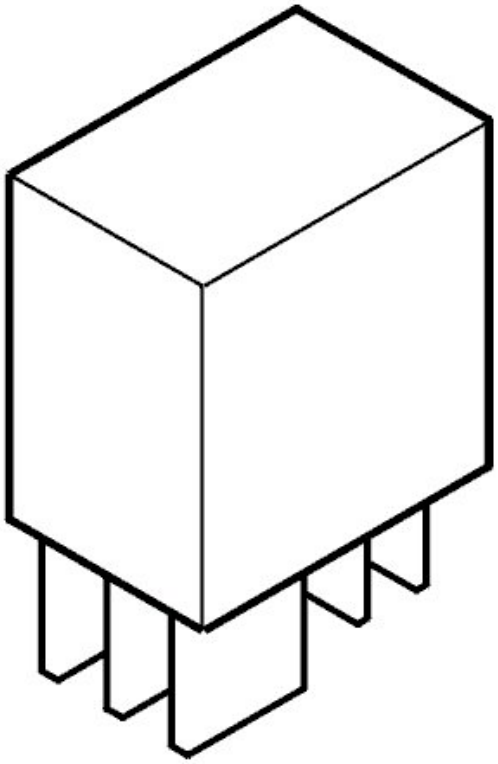
Select continue when the defect has been remedied.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-630B

Condition



The engine control module (ECM) checks the signal cable for controlling the air conditioning (A/C) relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects an open-circuit in the signal cable for the air conditioning (A/C) relay.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

Possible source
- Open-circuit in the signal cable
- Open-circuit in the power cable
- Damaged air conditioning (A/C) relay.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

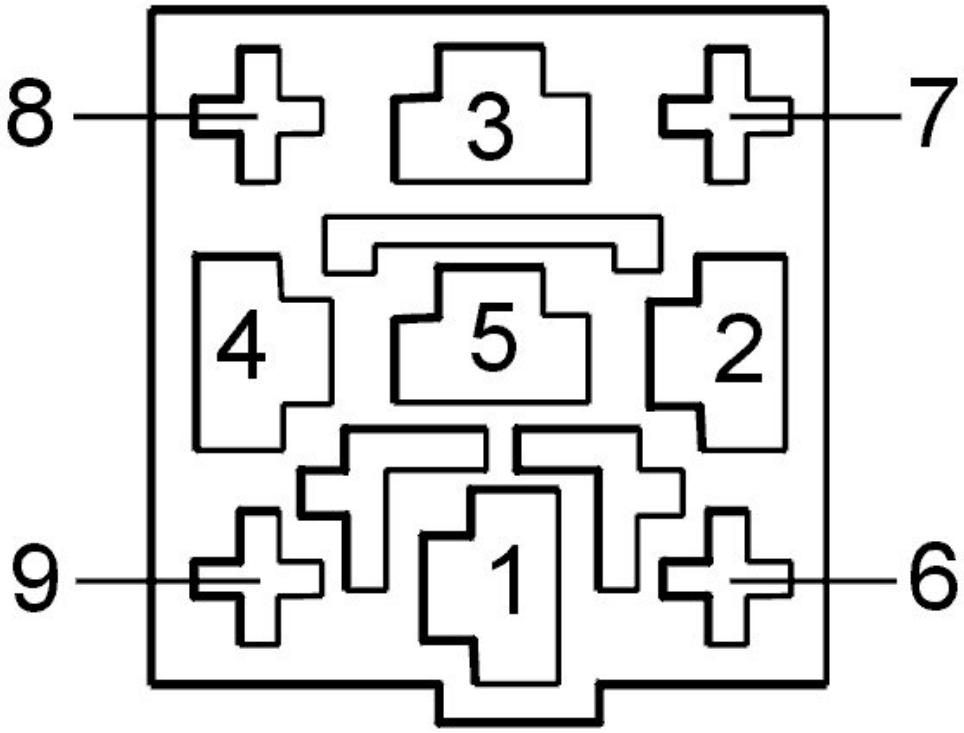
Signal Missing - Intermittent Fault

Signal missing. Intermittent fault

Checking wiring and connectors

Check the connector for the air conditioning (A/C) relay. Check for contact resistance and oxidation. Check for loose connections.
Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check the power supply between system relay terminal #3 and A/C relay terminal #2. Check for an intermittent open-circuit.

Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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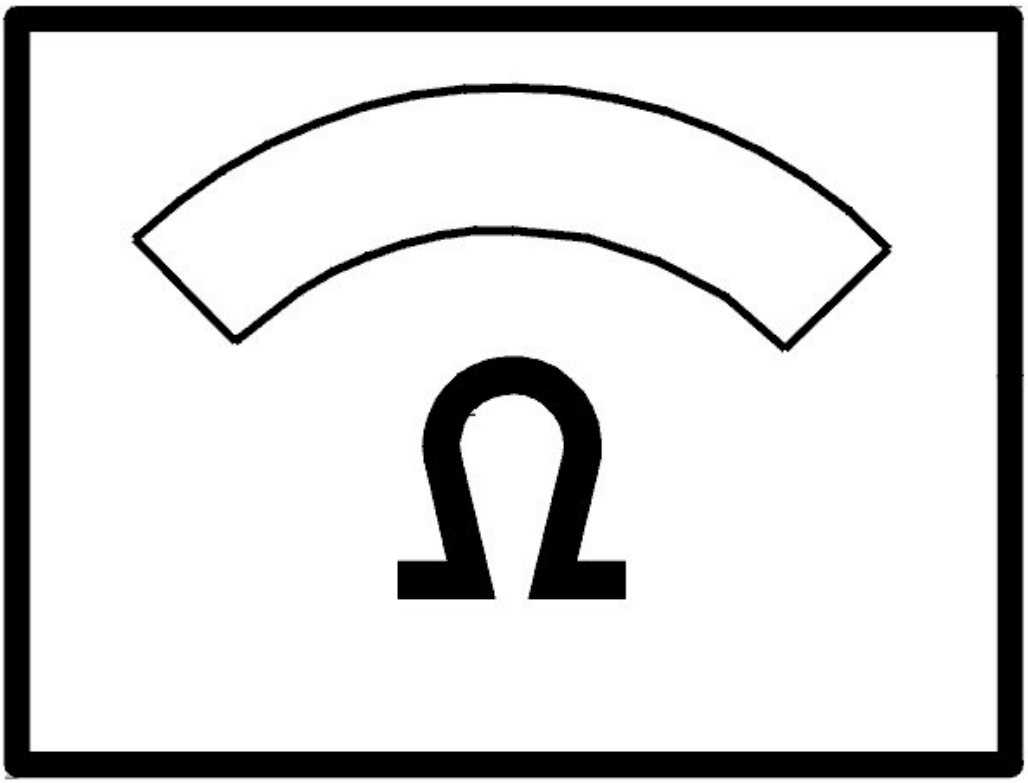
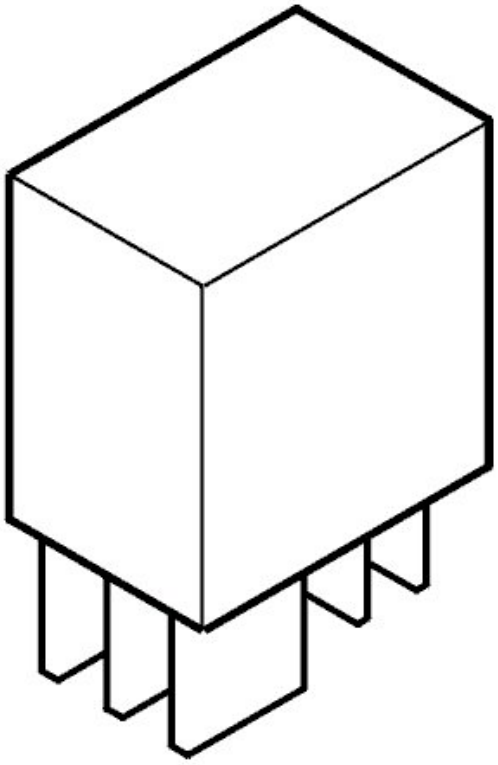




Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

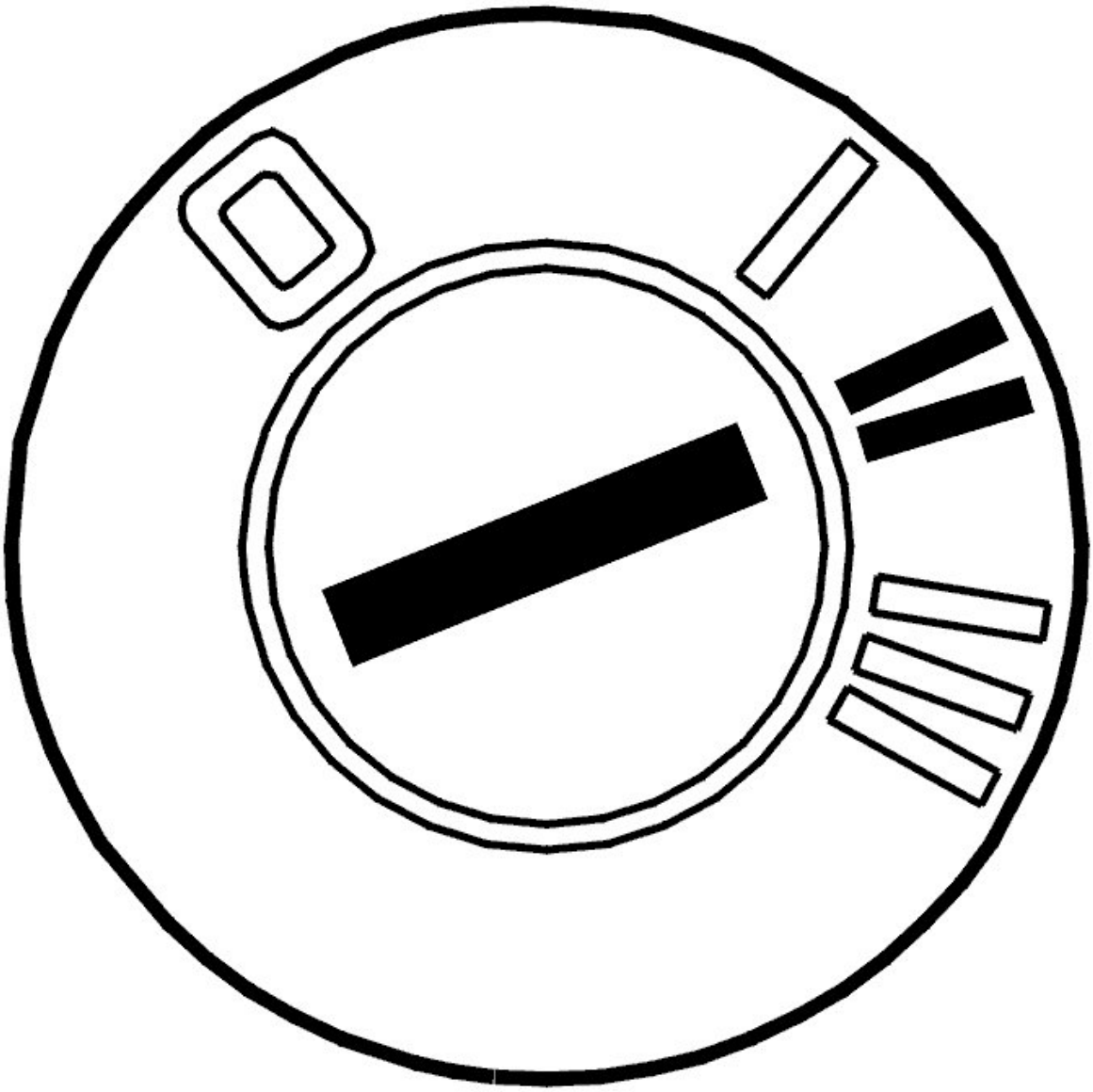
Attempt New Test - Checking wiring and connectors

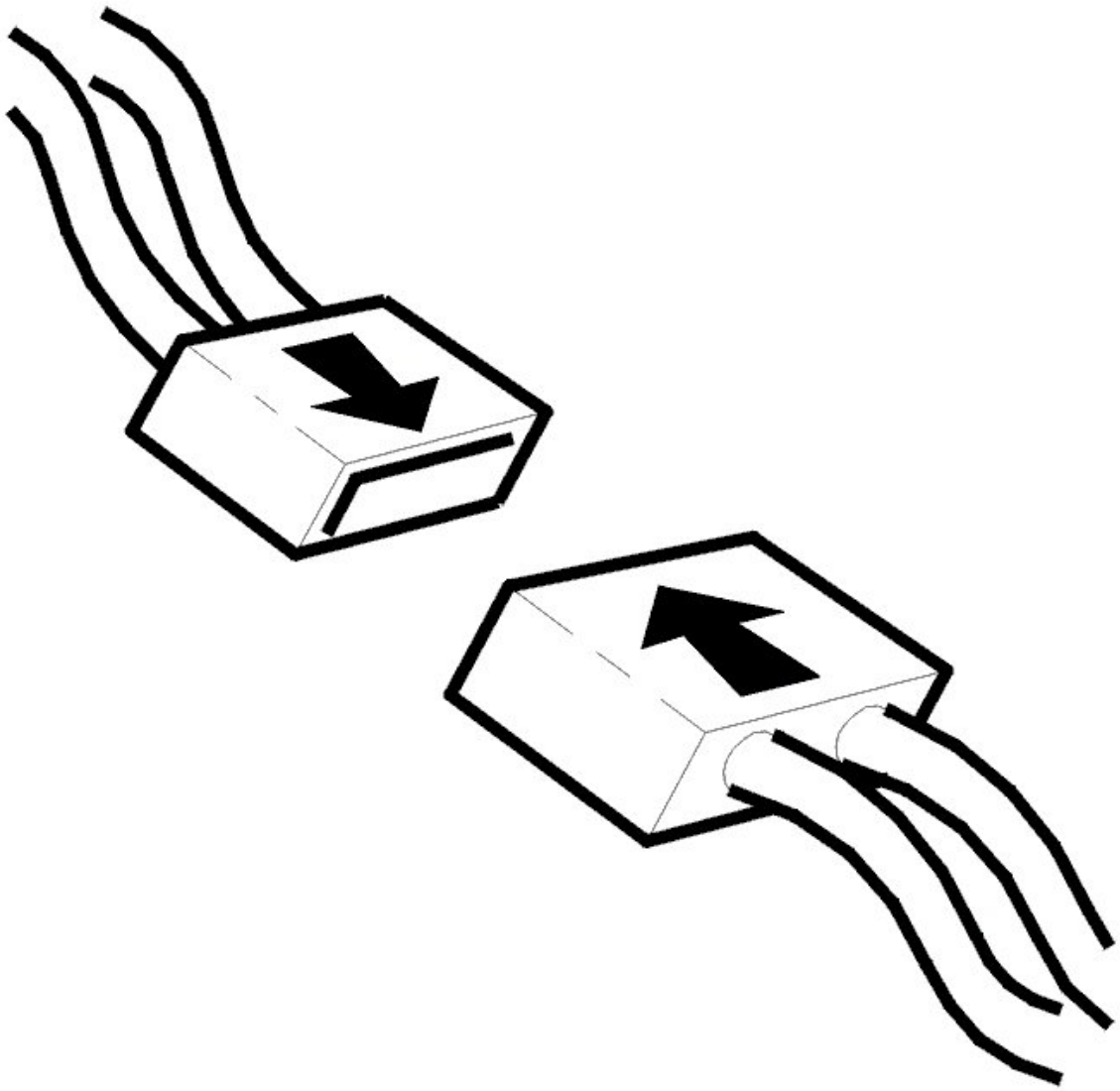
FAULT FOUND - DONE

Signal Missing - Permanent Fault

Signal missing. Permanent fault

Checking the connector



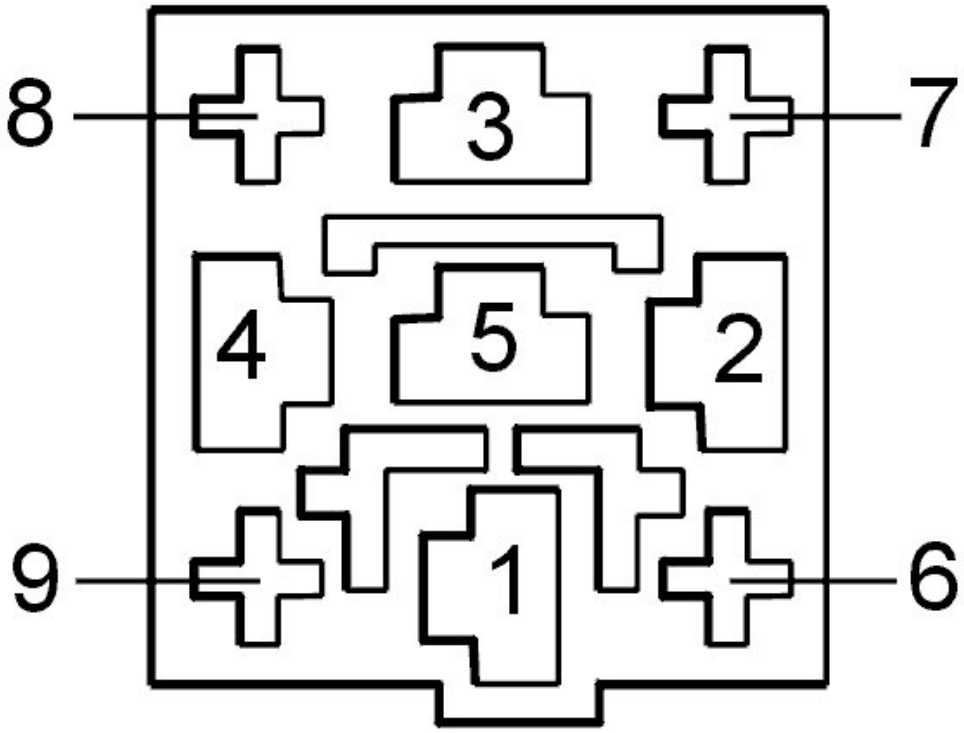


- Ignition off
- Check the air conditioning (A/C) relay connector. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate the air conditioning (A/C) relay.

A " clicking sound" should be heard when the air conditioning (A/C) relay is activated.
If the air conditioning (A/C) relay is now OK, the cause of the fault was loose connections in the connector.

Other information

- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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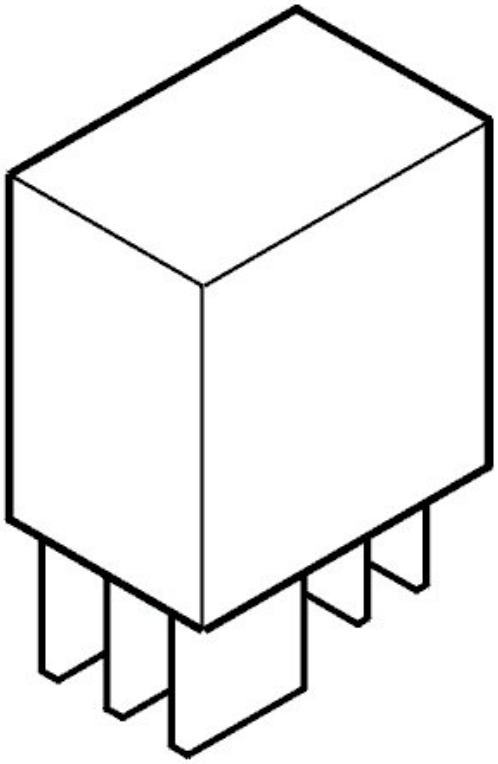
VCT2000



Does the air conditioning (A/C) relay function?

Yes - Fault Found

No - Checking components and wiring

Checking components and wiring

Check the resistance of the air conditioning (A/C) relay. At +20°C the resistance must be approximately 96 ohms between terminals #2 and #4. For the resistance values, see Component specifications See: Engine Control Module/Specifications.
Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check the power supply between system relay terminal #3 and A/C relay terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Remedy as necessary.

Other information

- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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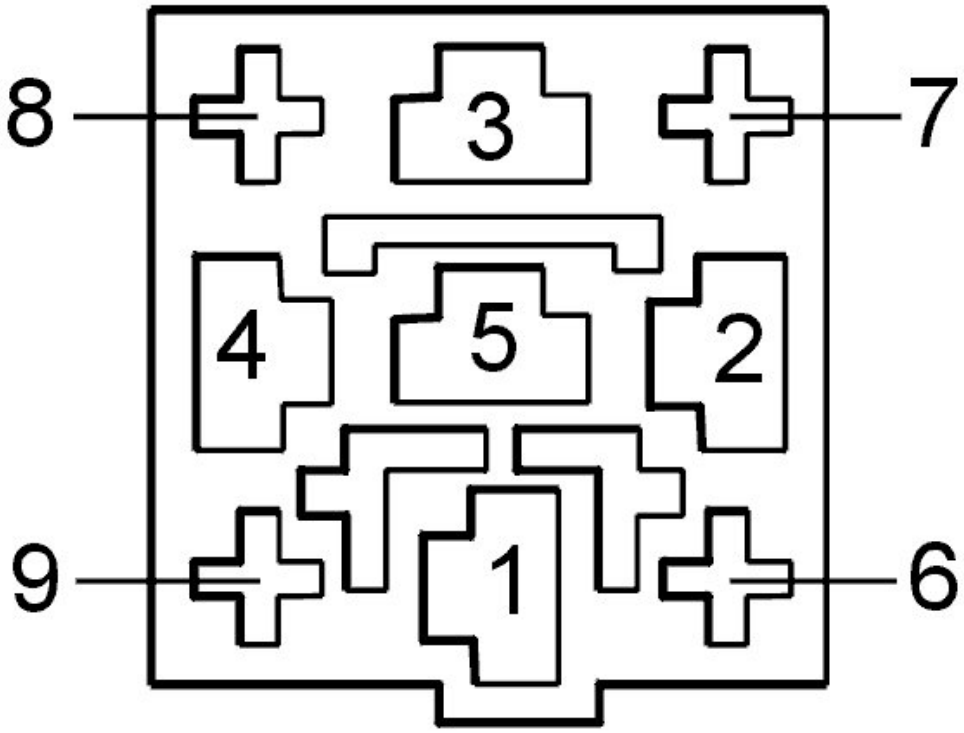
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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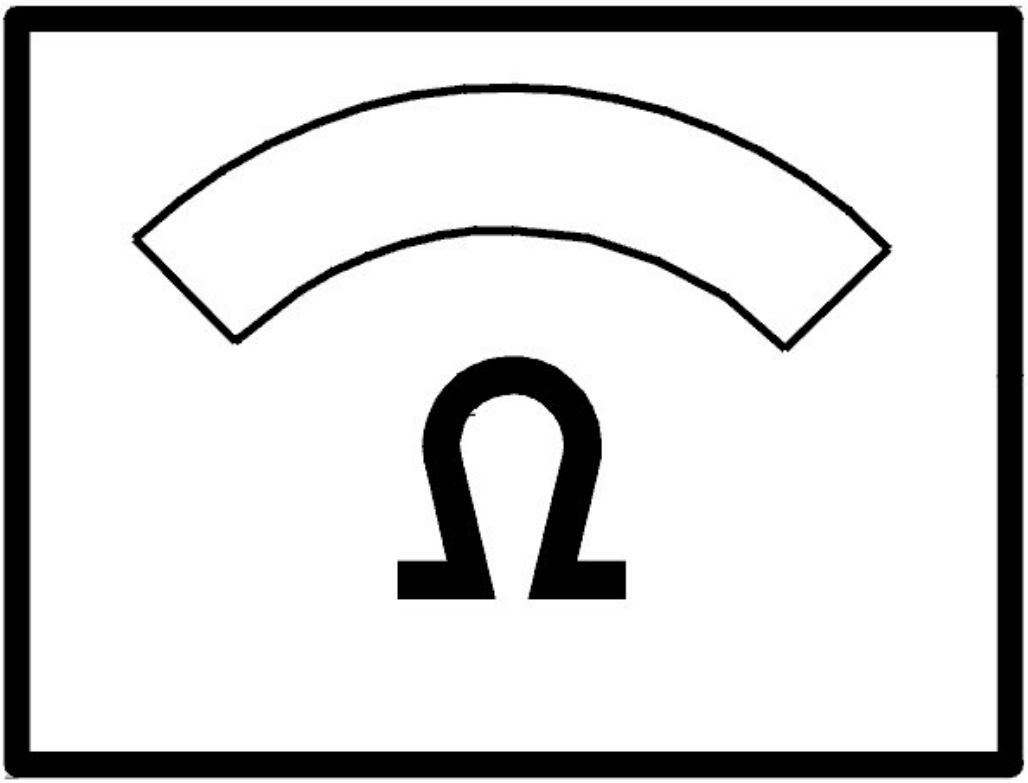
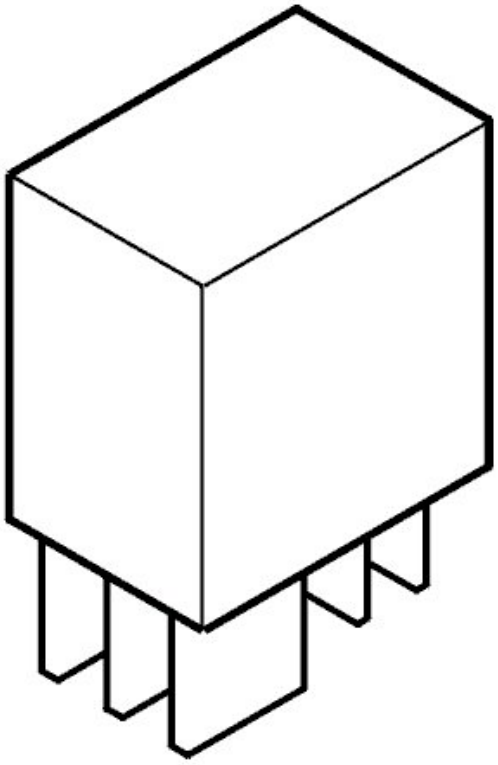


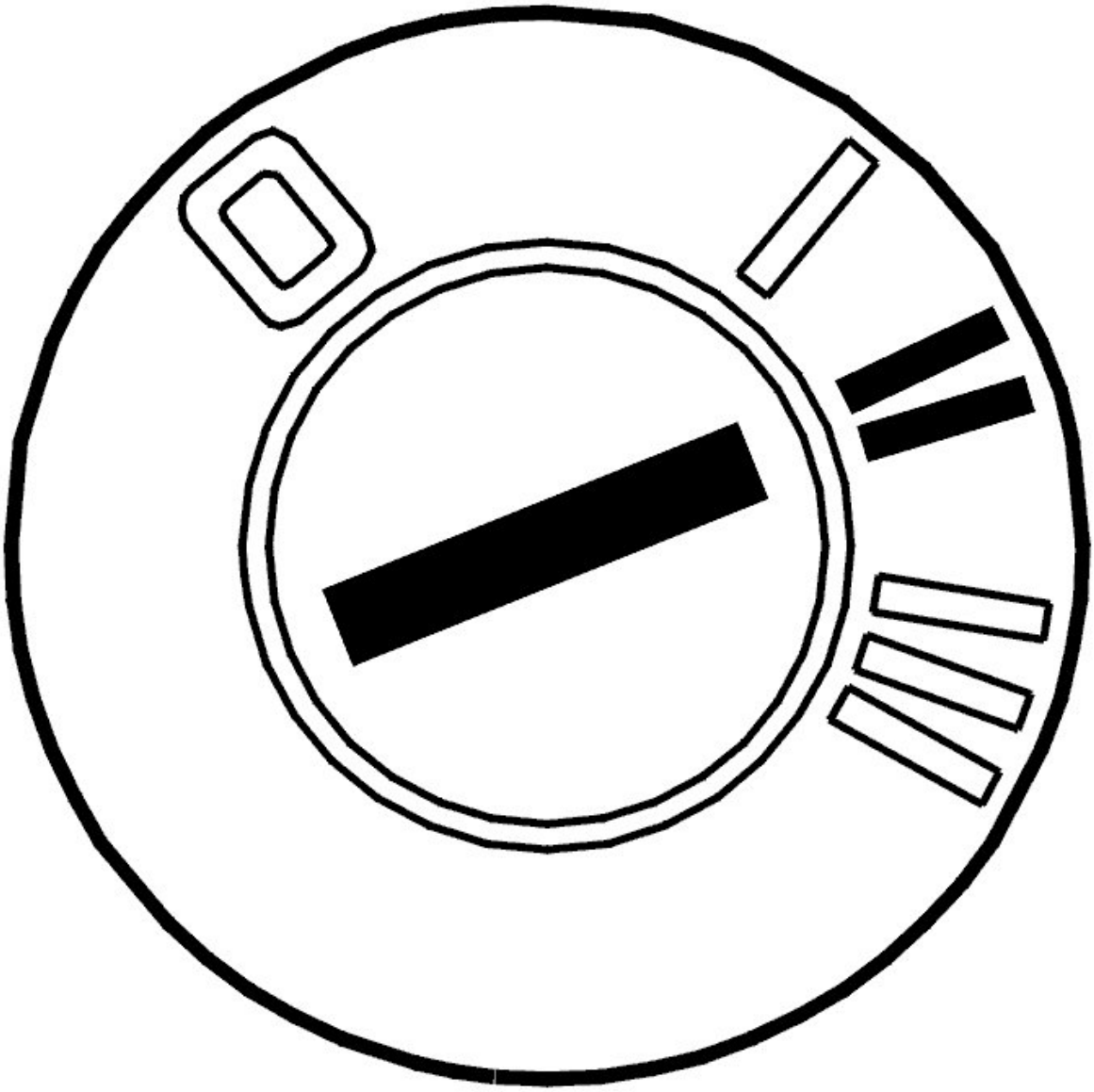


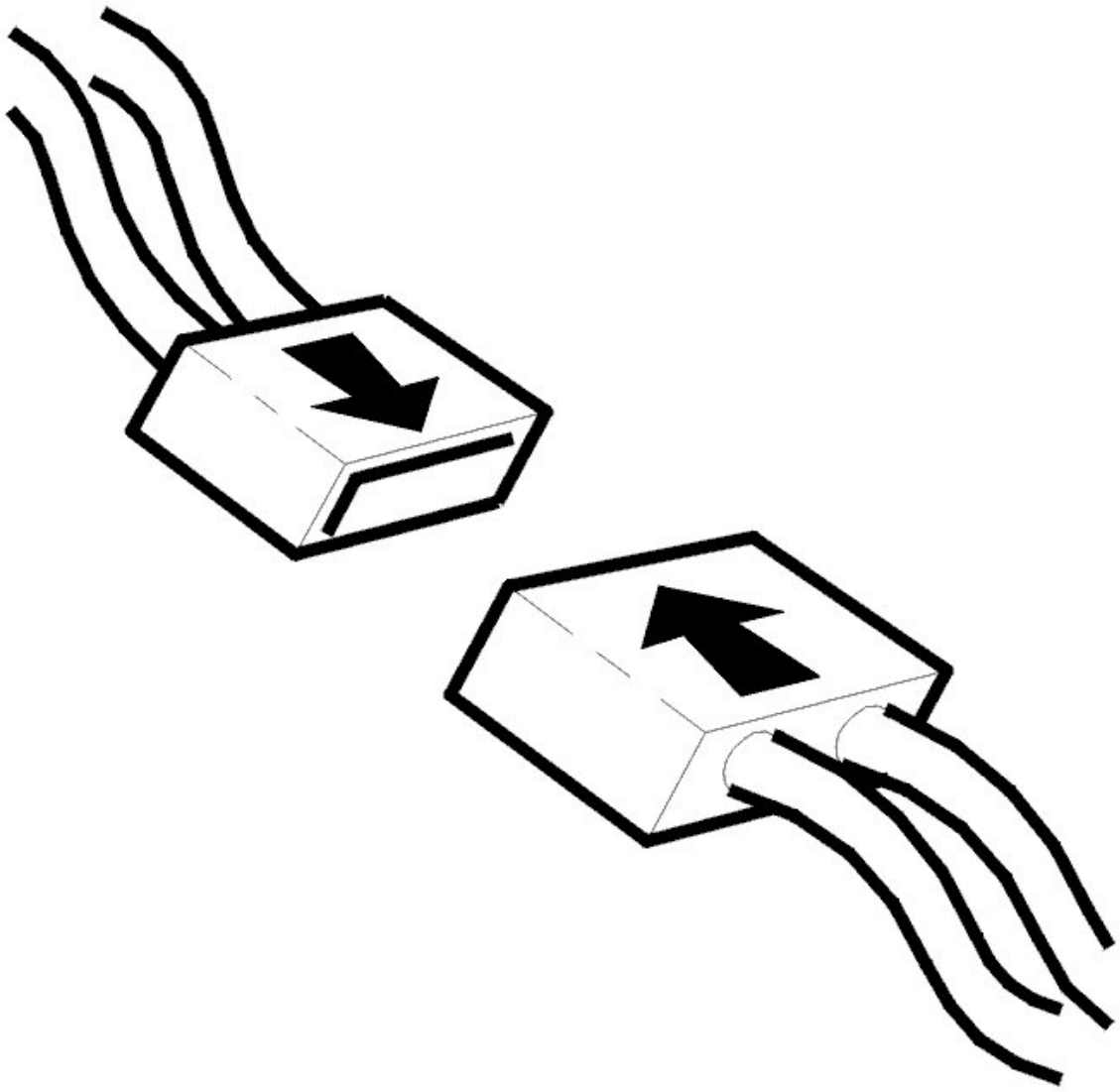
Continue - Verification

Verification

Verification

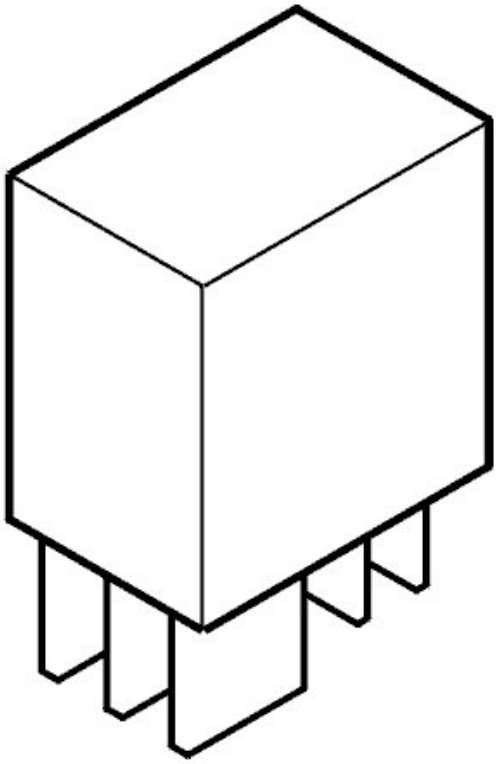
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components
- Ignition on.
- Activate air conditioning (A/C) relay.

An "clicking sound" should be heard from the air conditioning (A/C) relay when it is activated.



Does the air conditioning (A/C) relay function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

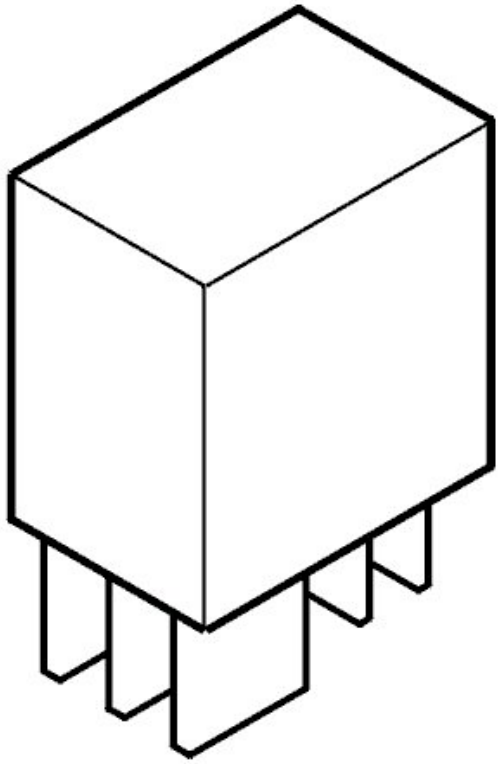
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connector

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-630C

Condition



The engine control module (ECM) checks the signal cable for controlling the air conditioning (A/C) relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the air conditioning (A/C) relay is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the power supply
- Damaged air conditioning (A/C) relay.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Signal Too High - Intermittent Fault

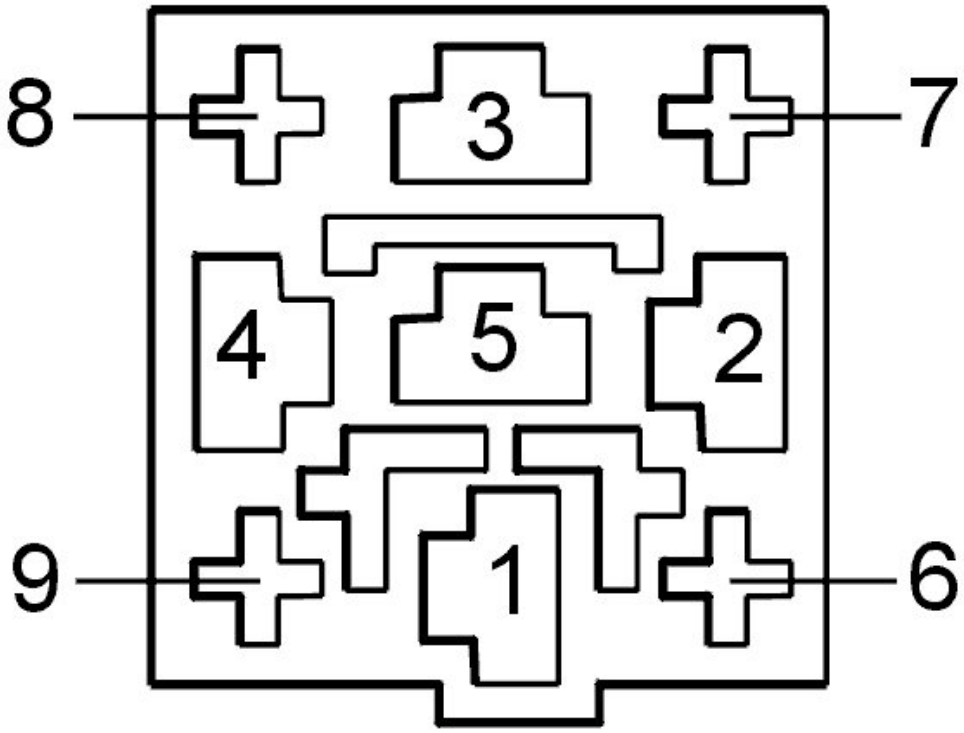
Signal too high. Intermittent fault

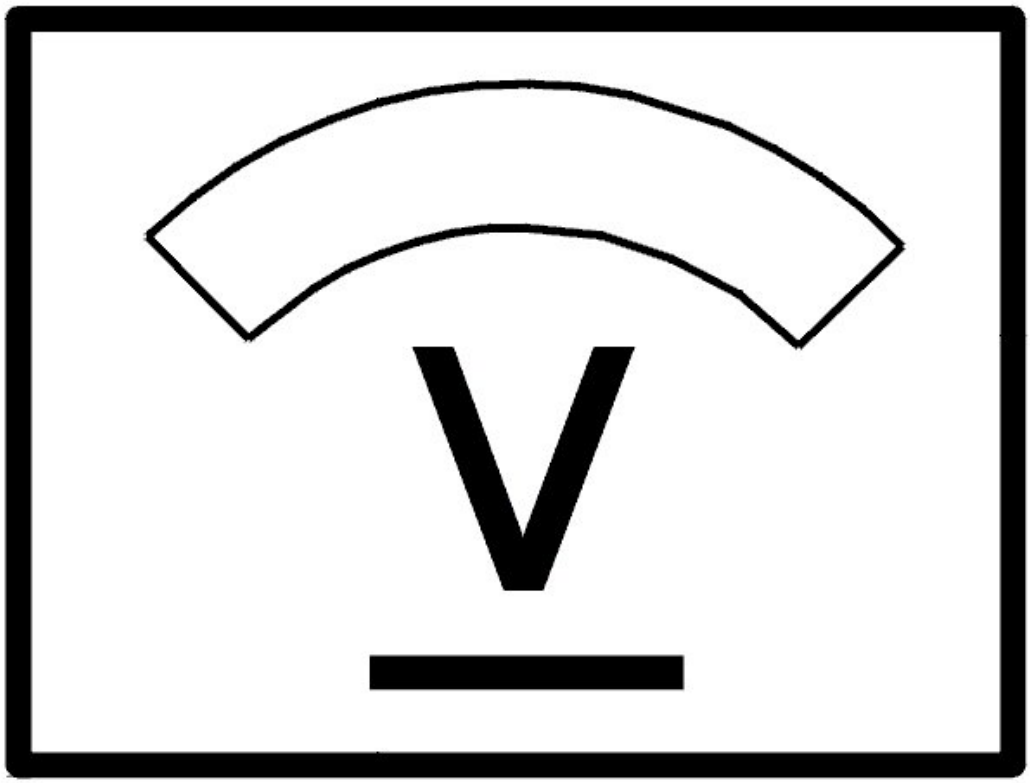
Checking the wiring

Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check for an intermittent short-circuit to supply voltage.

Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.

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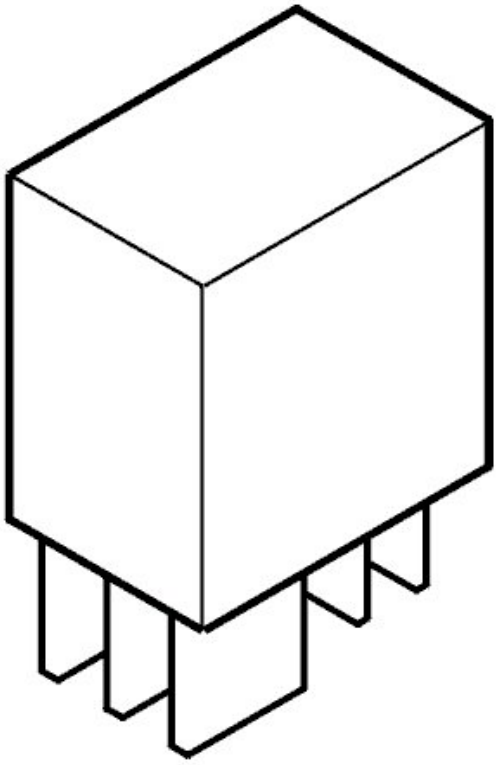

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the wiring

FAULT FOUND - DONE

Signal Too High - Permanent Fault

Signal too high. Permanent fault

Checking components and wiring

Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check for a short-circuit to supply voltage.

Hint: Use a test lamp with at least a 3 W bulb to determine whether the cable is short-circuited to supply voltage.

Remedy as necessary.

Other information

- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
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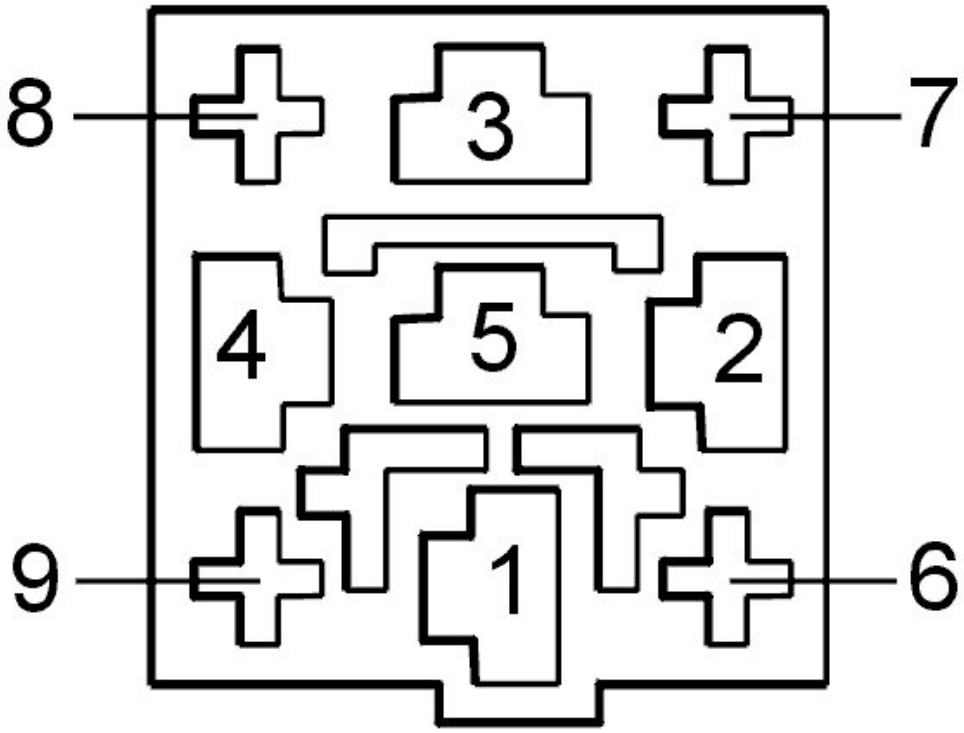
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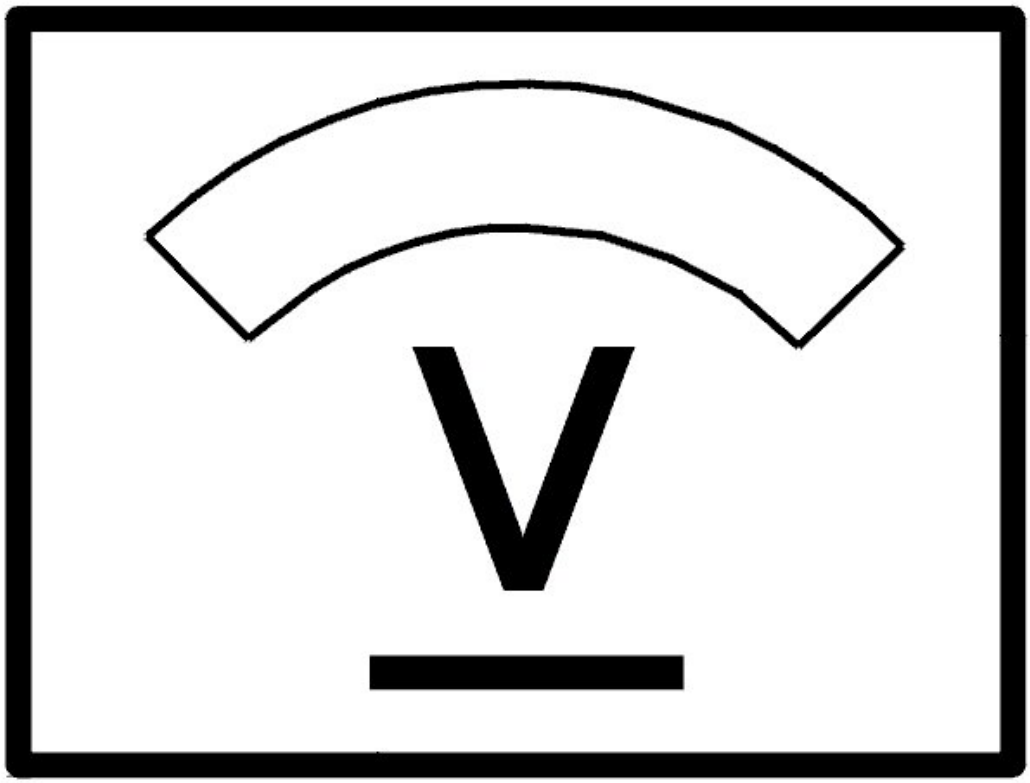
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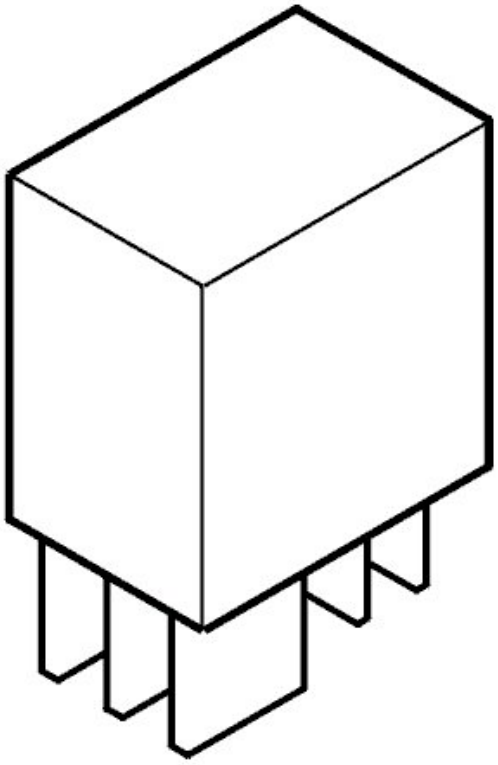
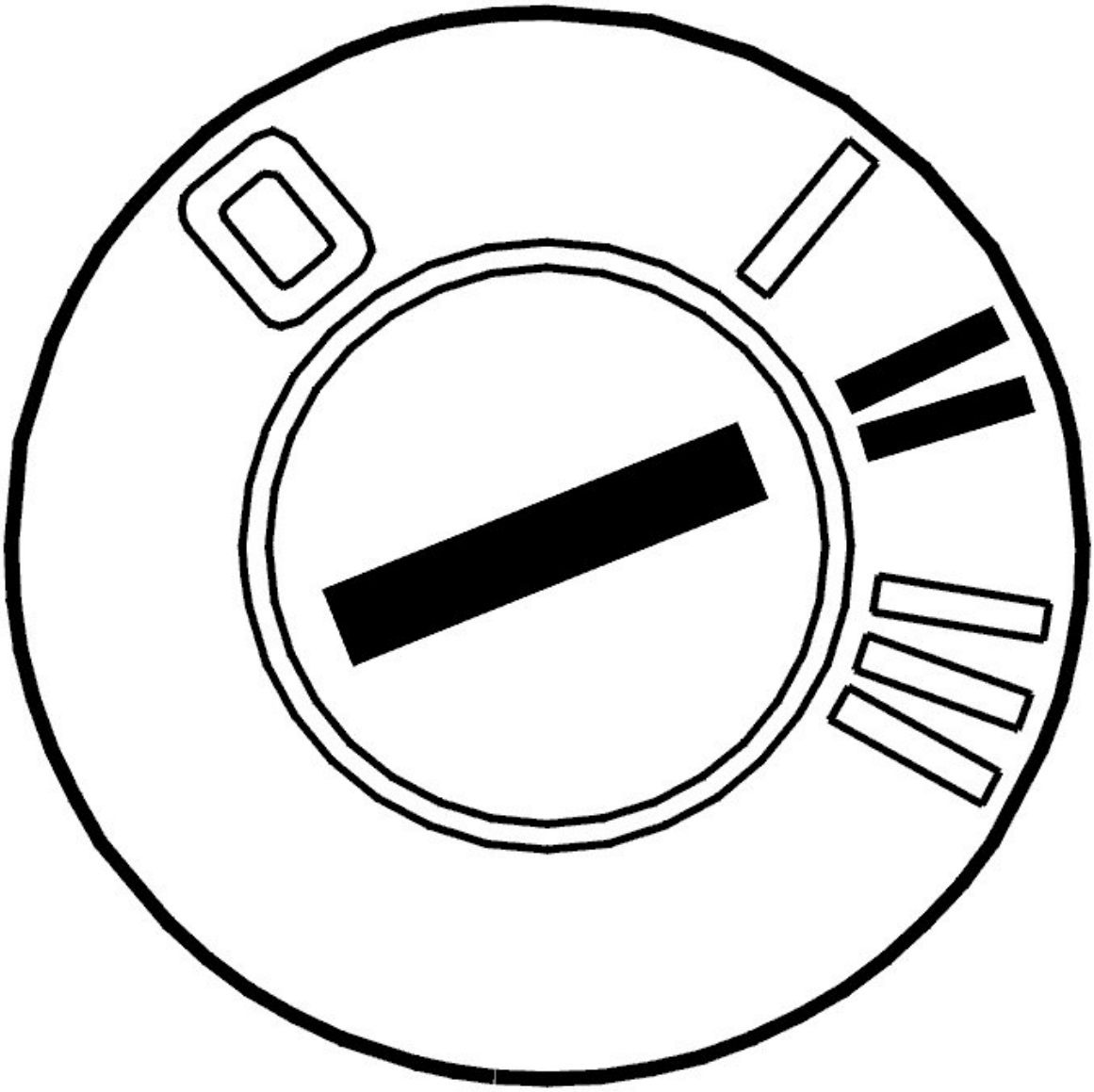


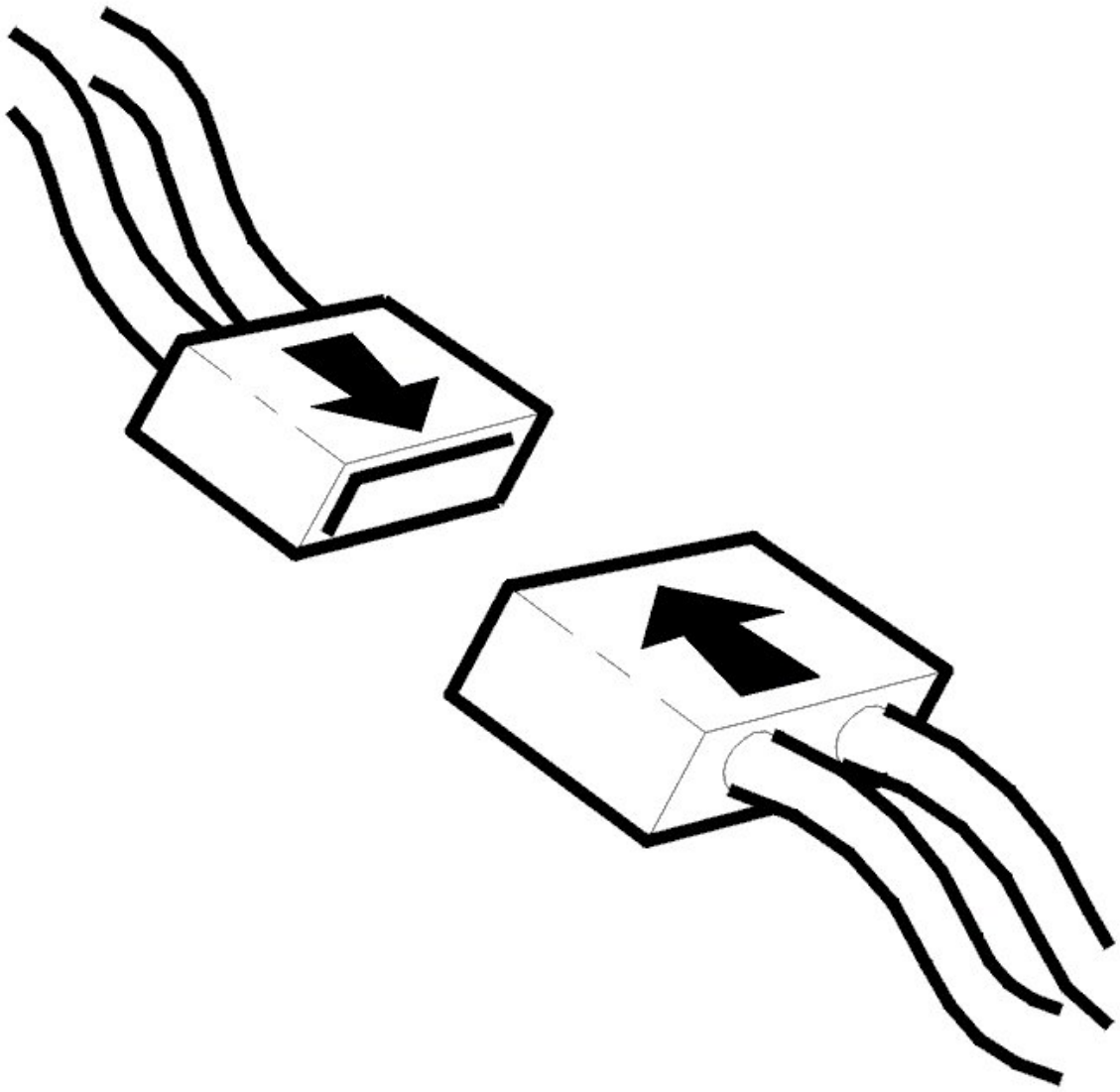
Continue - Verification

Verification

Verification

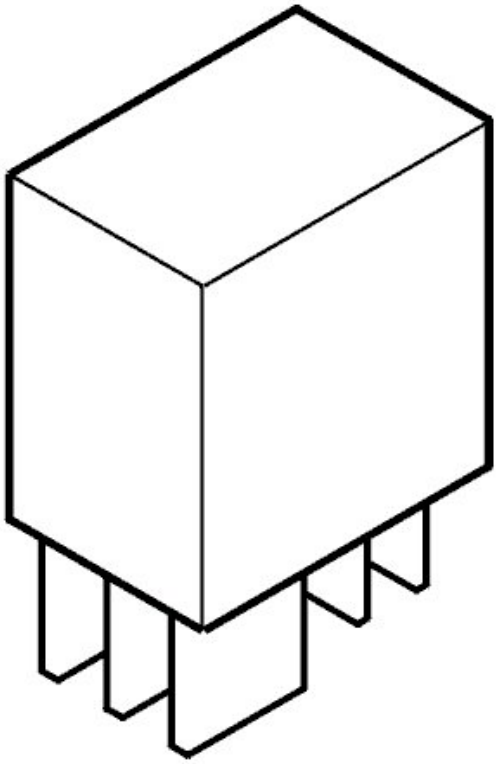
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components
- Ignition on.
- Activate air conditioning (A/C) relay.

An "clicking sound" should be heard from the air conditioning (A/C) relay when it is activated.



Does the air conditioning (A/C) relay function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

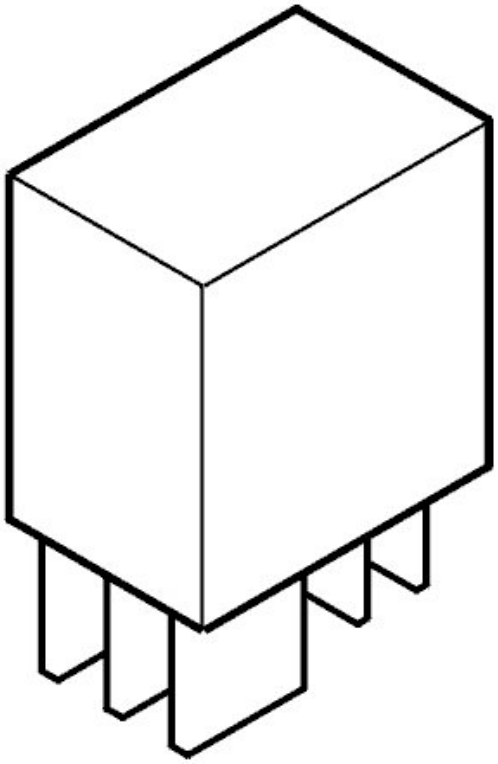
Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-630D

Condition



The engine control module (ECM) checks the signal cable for controlling the air conditioning (A/C) relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal from the signal cable for the air conditioning (A/C) relay is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on and with the engine running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Short-circuit to ground in the signal cable
- Damaged air conditioning (A/C) relay.

Fault symptom[s]
- The air conditioning (A/C) system does not operate.

Signal Too Low - Intermittent Fault

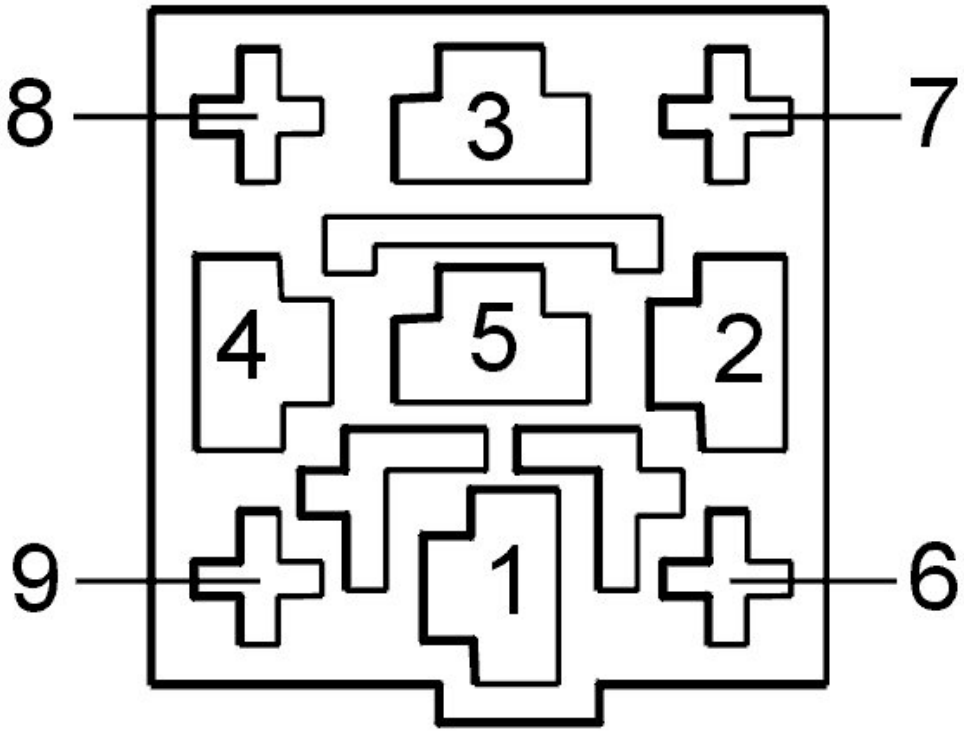
Signal too low. Intermittent fault

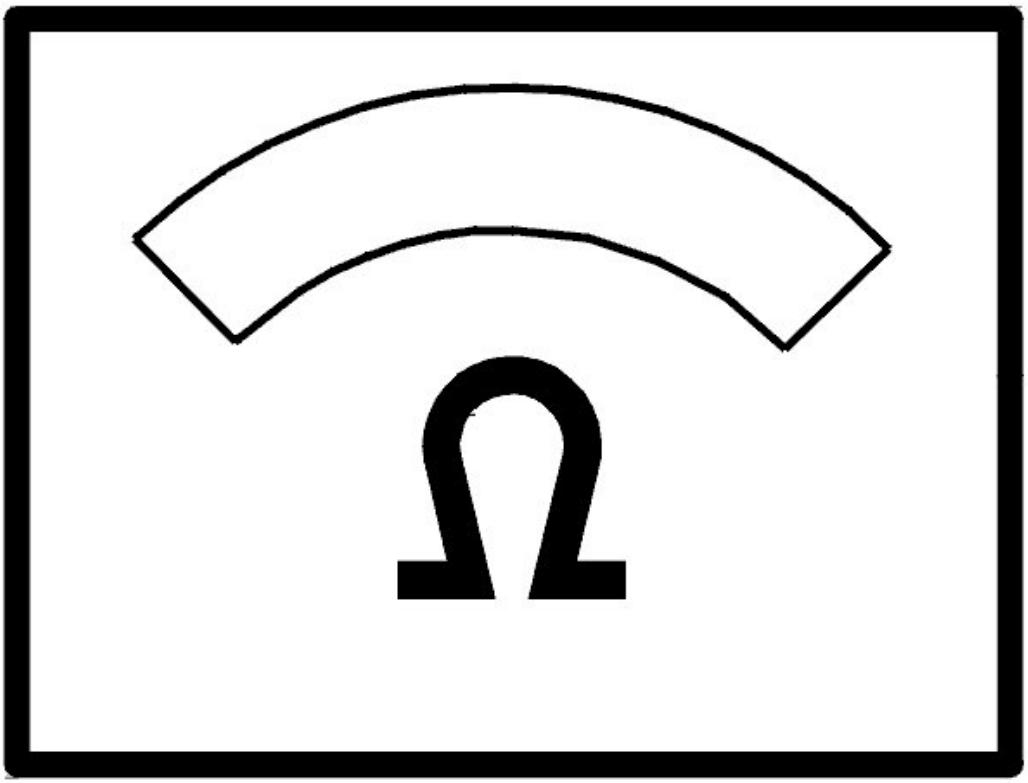
Checking the wiring

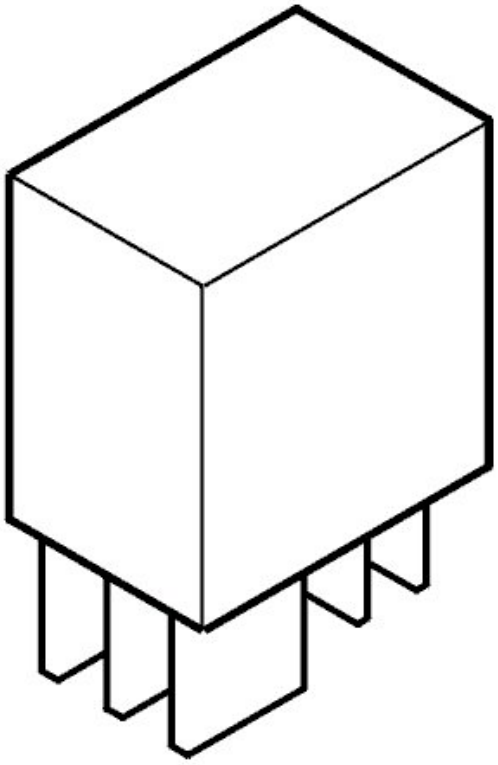
Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check for an intermittent short-circuit to ground.

Other information
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the wiring

FAULT FOUND - DONE

Signal Too Low - Permanent Fault

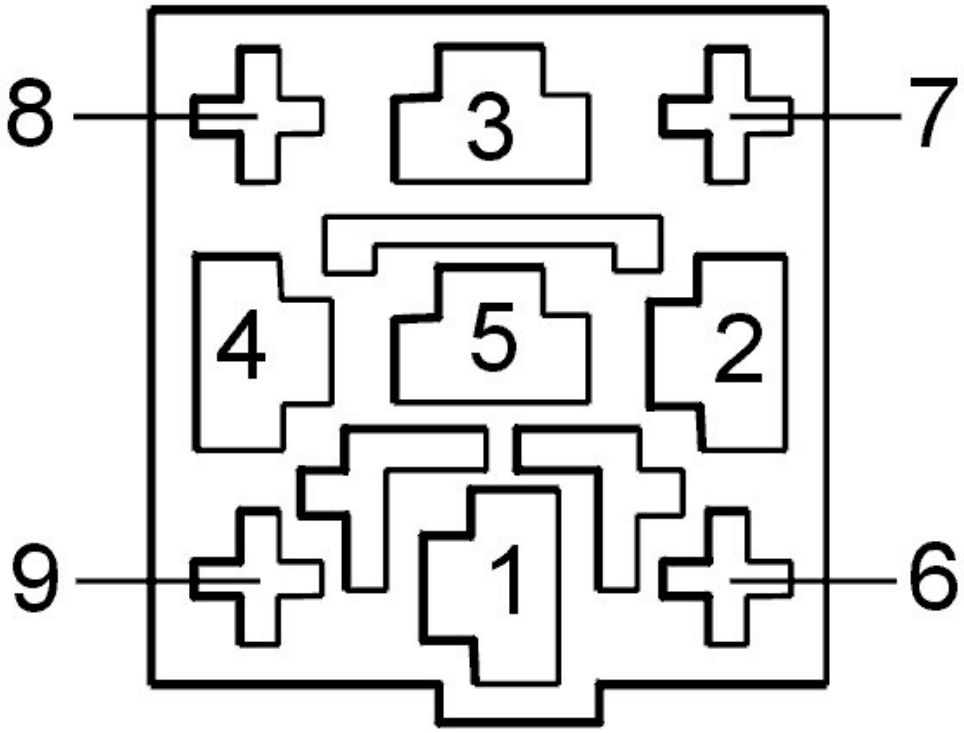
Signal too low. Permanent fault

Checking components and wiring

Check the signal cable between control module terminal #B44 and air conditioning (A/C) relay terminal #4. Check for a short-circuit to ground. Remedy as necessary.

Other information

- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For further information about the fuses and relays, see the Wiring Diagram
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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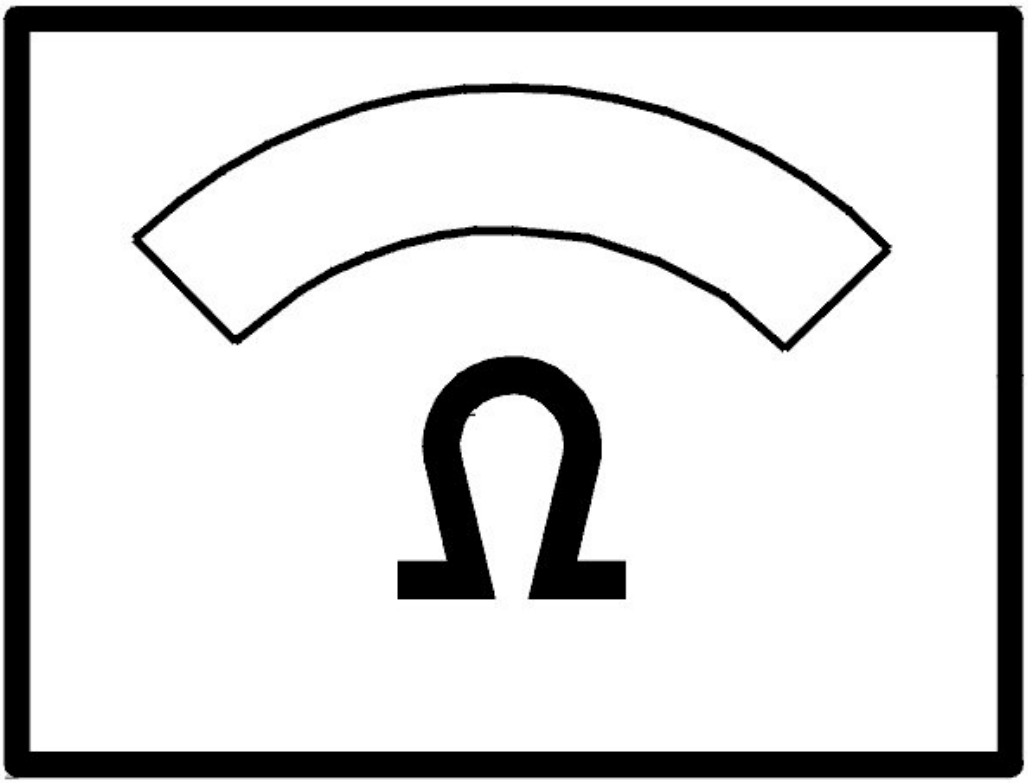
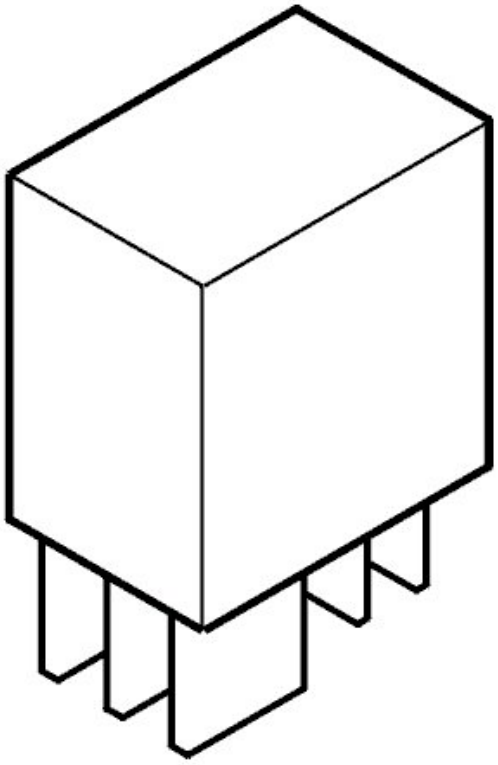


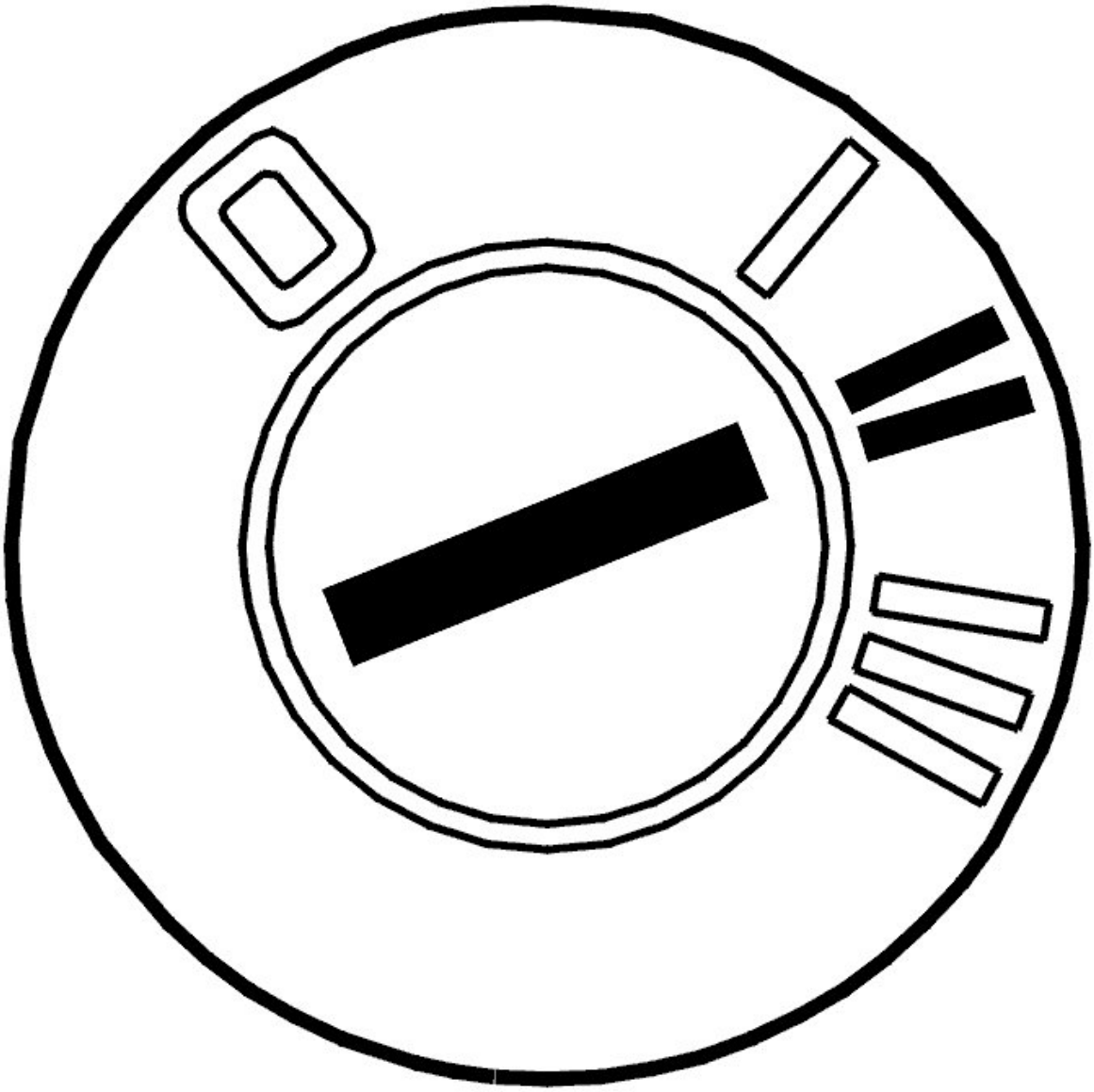


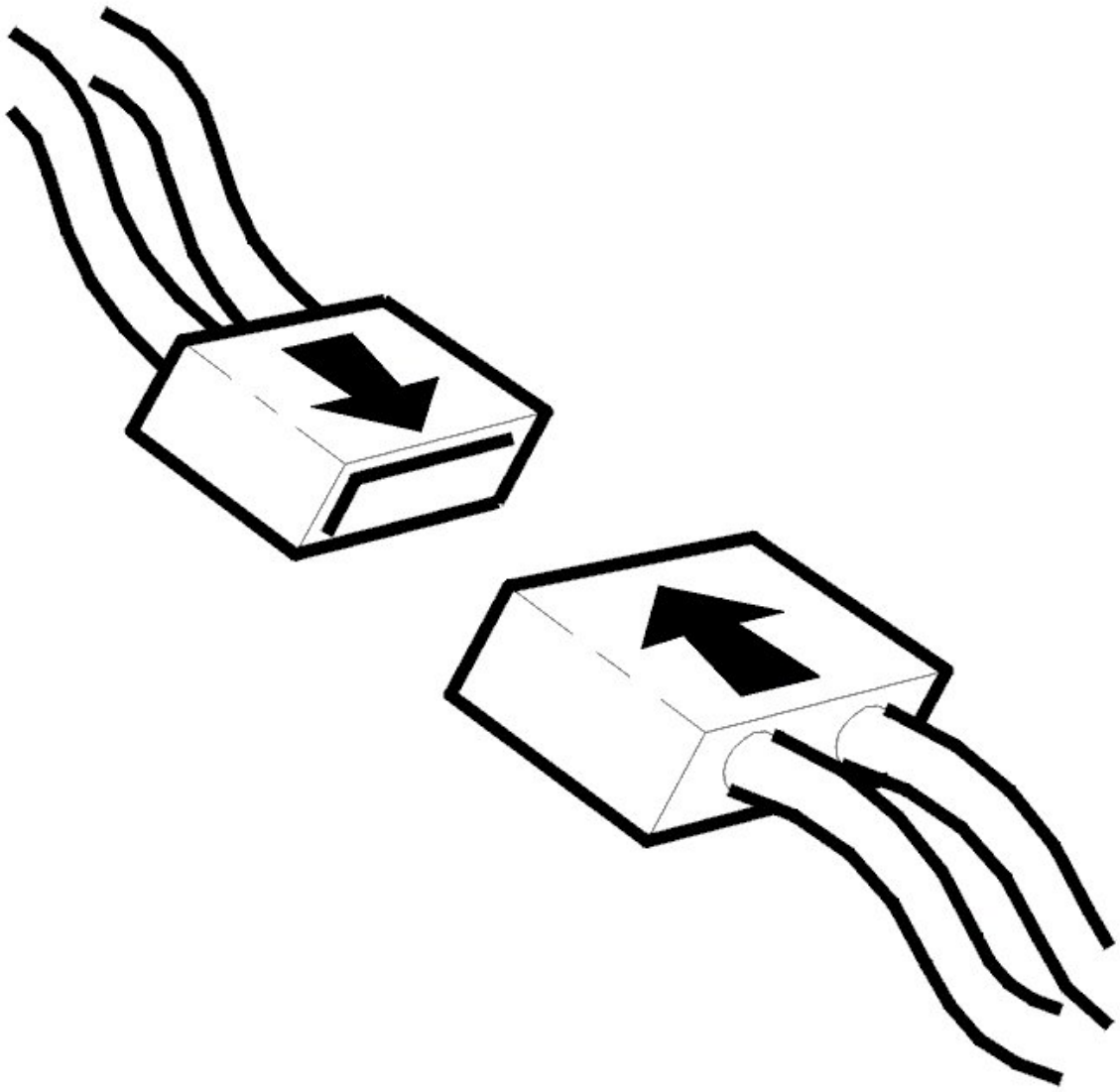
Continue - Verification

Verification

Verification

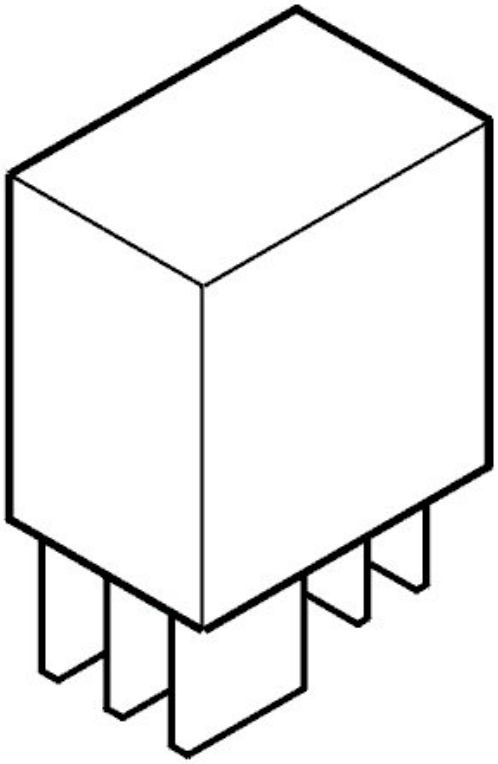
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components
- Ignition on.
- Activate air conditioning (A/C) relay.

An "clicking sound" should be heard from the air conditioning (A/C) relay when it is activated.



Does the air conditioning (A/C) relay function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-640C

Condition

The engine control module (ECM) checks the boost pressure.
The diagnostic trouble code (DTC) is stored if the ratio between the measured boost pressure (measured value from the boost pressure sensor before the throttle) and the calculated boost pressure (calculated value after the throttle) is incorrect.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- Reduced boost pressure.

Possible source
- Damaged boost pressure sensor
- Loose boost pressure sensor (the engine control module (ECM) measures the atmospheric pressure)
- Air leakage downstream of the turbocharger (TC) (between the turbocharger (TC) and the electronic throttle unit)
- Large air leak at the intake manifold (after the electronic throttle unit).

Fault symptom[s]
- Poor performance.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking hoses and the turbocharger (TC) control valve

Check particularly that the boost pressure sensor is correctly installed and has not come loose.
Check the intake system for air leakage. Check in particular the hose between the turbocharger (TC) and the throttle unit.
The boost pressure sensor is damaged if no fault is found in the above fault-tracing.

Other information:
- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair.

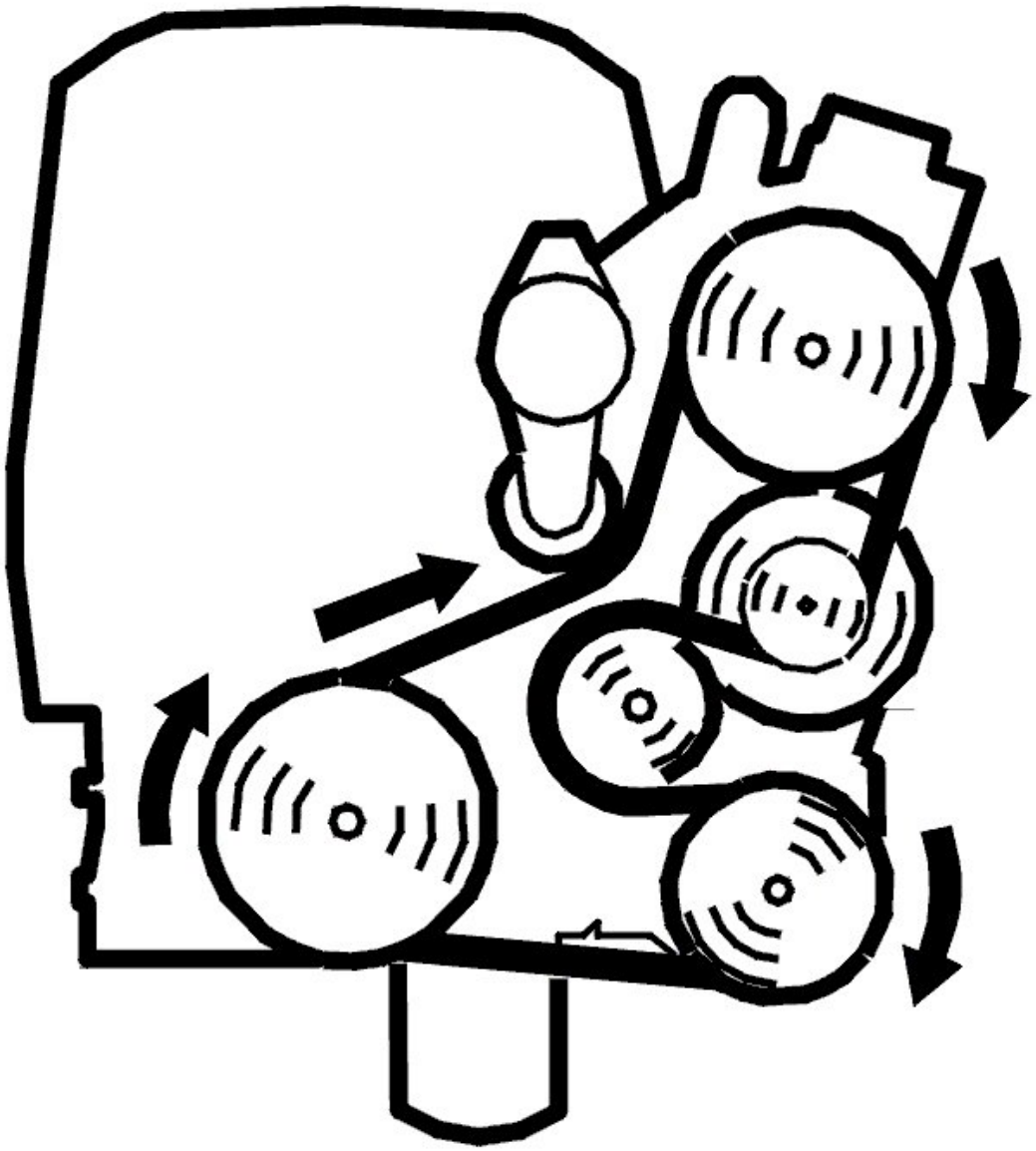
Continue - Verification

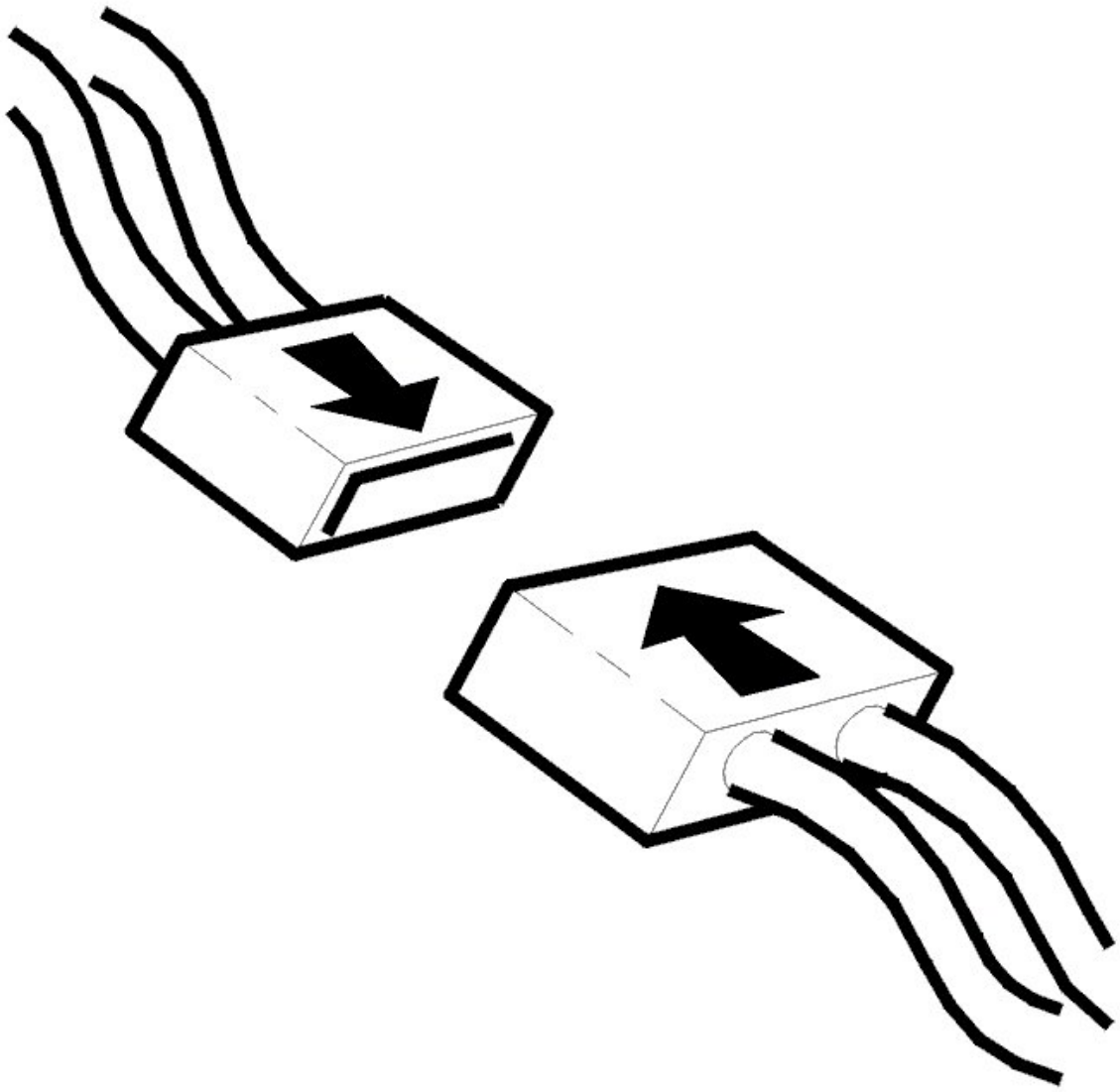
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Ensure that high boost pressure is reached (high load) so that the engine control module (ECM) can run the diagnostic
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking hoses and the turbocharger (TC) control valve

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-640D

Condition

The engine control module (ECM) checks the boost pressure. The diagnostic trouble code (DTC) is stored if the ratio between the measured boost pressure (measured value from the boost pressure sensor before the throttle) and the calculated boost pressure (calculated value after the throttle) is incorrect.
The diagnostic trouble code (DTC) can be diagnosed when the turbocharger (TC) control system is active.

Substitute value
- Reduced boost pressure.

Possible source
- Damaged boost pressure sensor
- Loose boost pressure sensor (the engine control module (ECM) measures the atmospheric pressure)
- Air leakage downstream of the turbocharger (TC) (between the turbocharger (TC) and the electronic throttle unit)
- Large air leak at the intake manifold (after the electronic throttle unit).

Fault symptom[s]
- Poor performance.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking hoses and the turbocharger (TC) control valve

Check particularly that the boost pressure sensor is correctly installed and has not come loose.
Check the intake system for air leakage. Check in particular the hose between the turbocharger (TC) and the throttle unit.
The boost pressure sensor is damaged if no fault is found in the above fault-tracing.

Other information:
- Check for air leaks in the intake system See: Fuel Delivery and Air Induction/Testing and Inspection/Air Leaks in the Intake System, Checking
- Temperature and pressure sensor, replacing See: Coolant Temperature Sensor/Switch (For Computer)/Service and Repair.

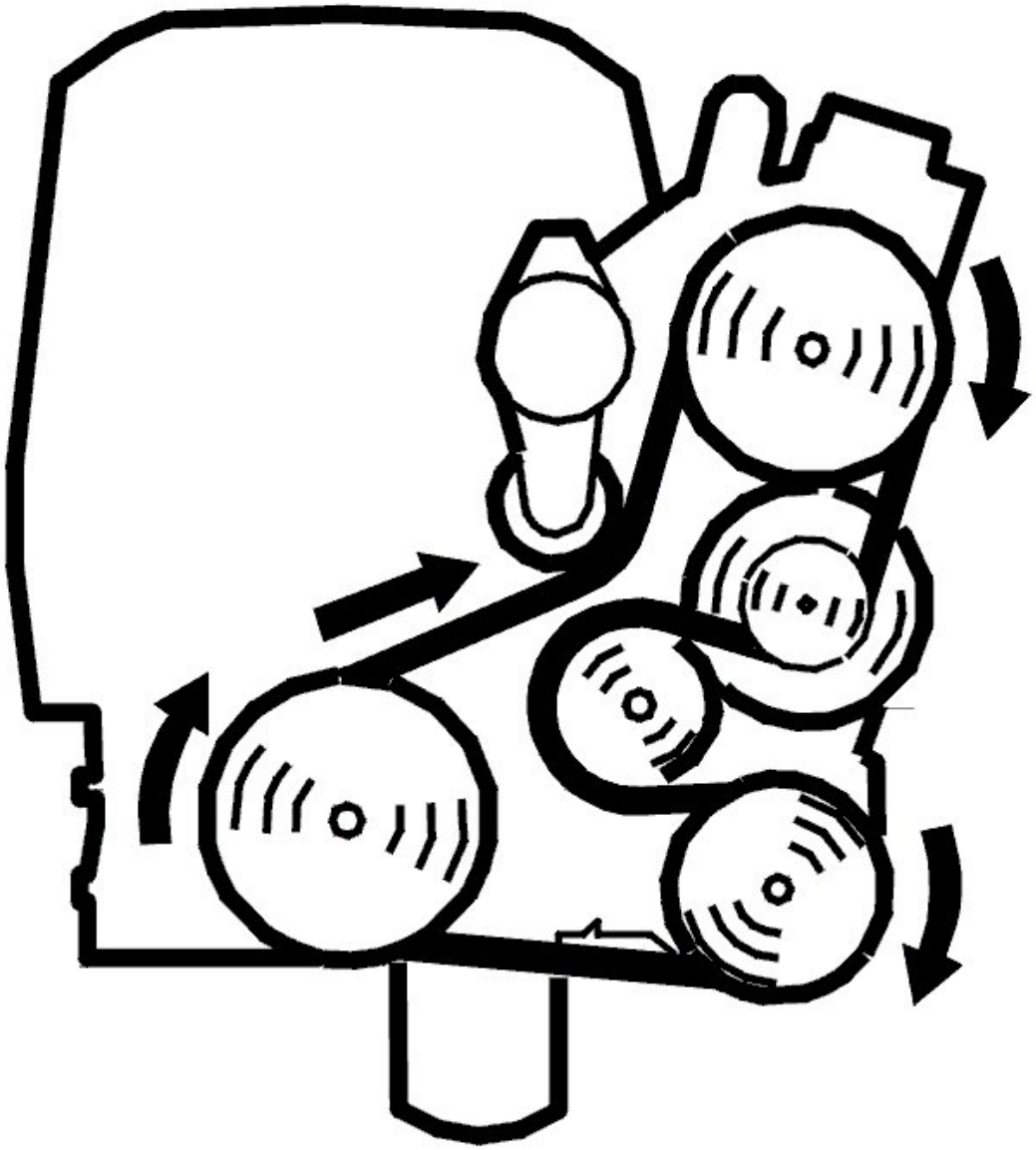
Continue - Verification

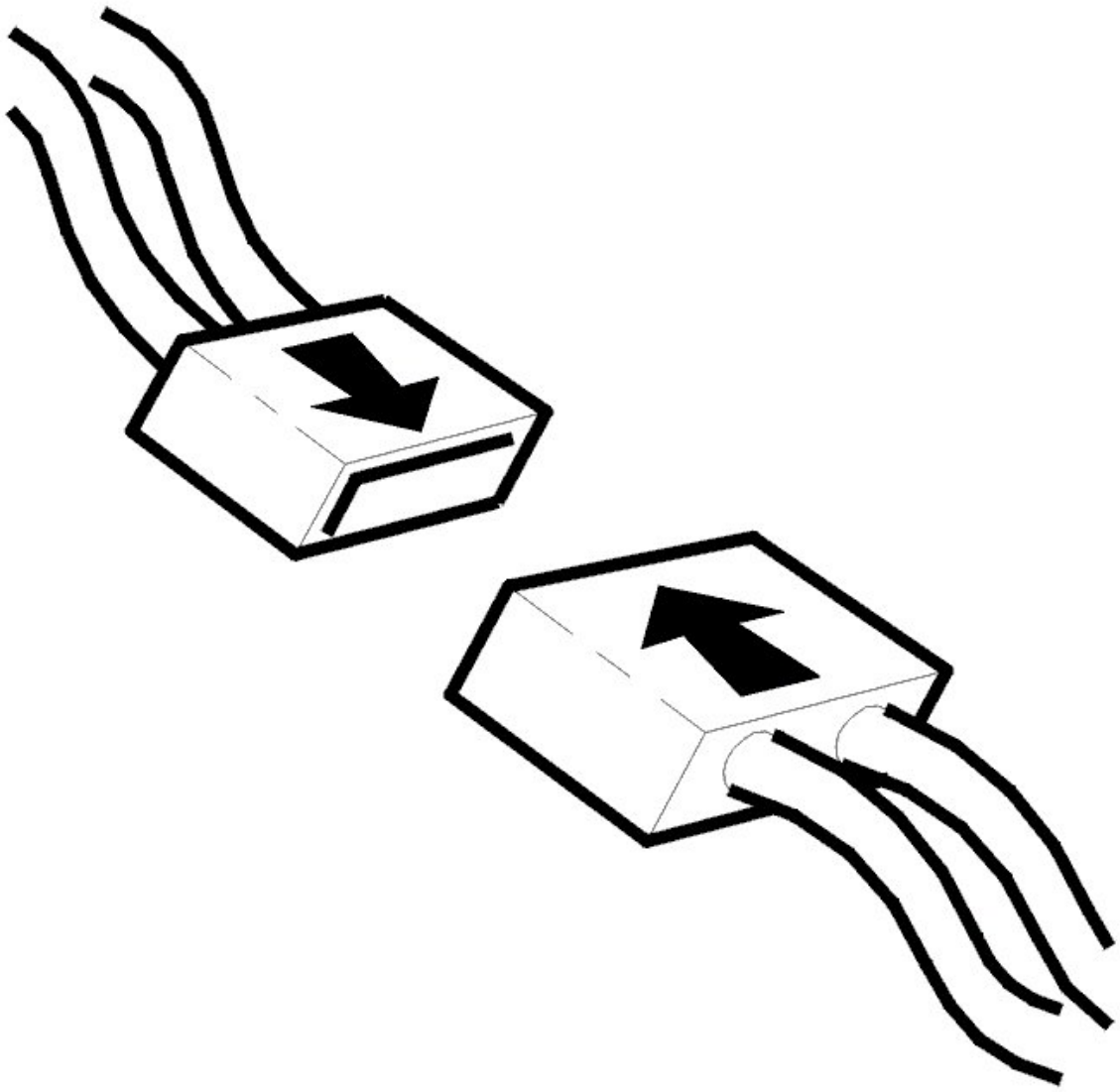
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the vehicle on the road. Ensure that high boost pressure is reached (high load) so that the engine control module (ECM) can run the diagnostic
- Connect VCT2000 to the data link connector (DLC) without switching off the engine.

Note! If the engine is switched off, the stored fault status will be erased and the test drive will have to be repeated.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

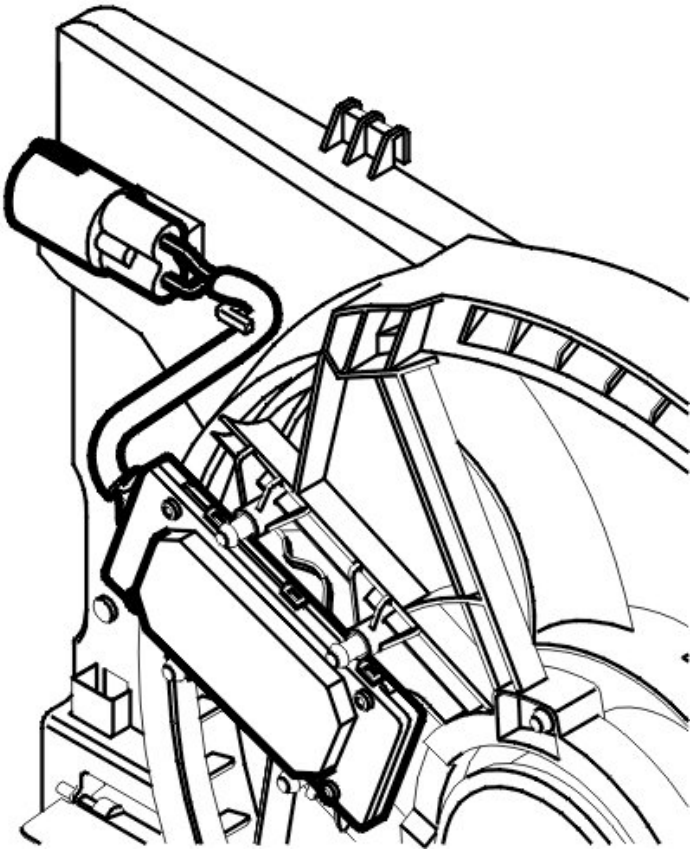
Attempt New Test - Checking hoses and the turbocharger (TC) control valve

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-650B

Condition



The engine control module (ECM) checks the signal cable for the engine cooling fan (FC).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) is missing.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the

electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- None.

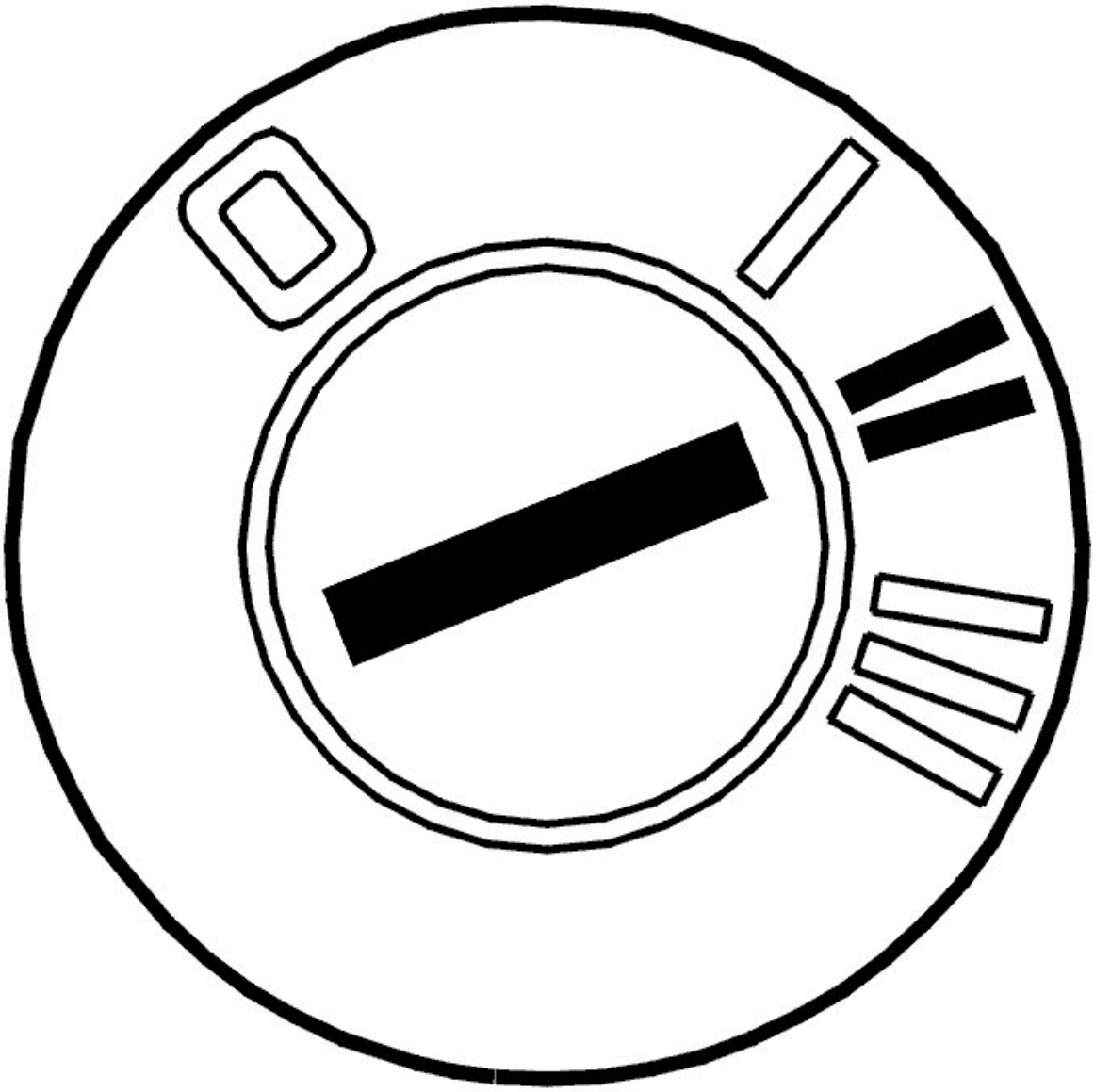
Possible source
- Open-circuit in the signal cable
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Electric cooling fan does not operate
- The engine cooling fan (FC) operates constantly.

Signal Missing

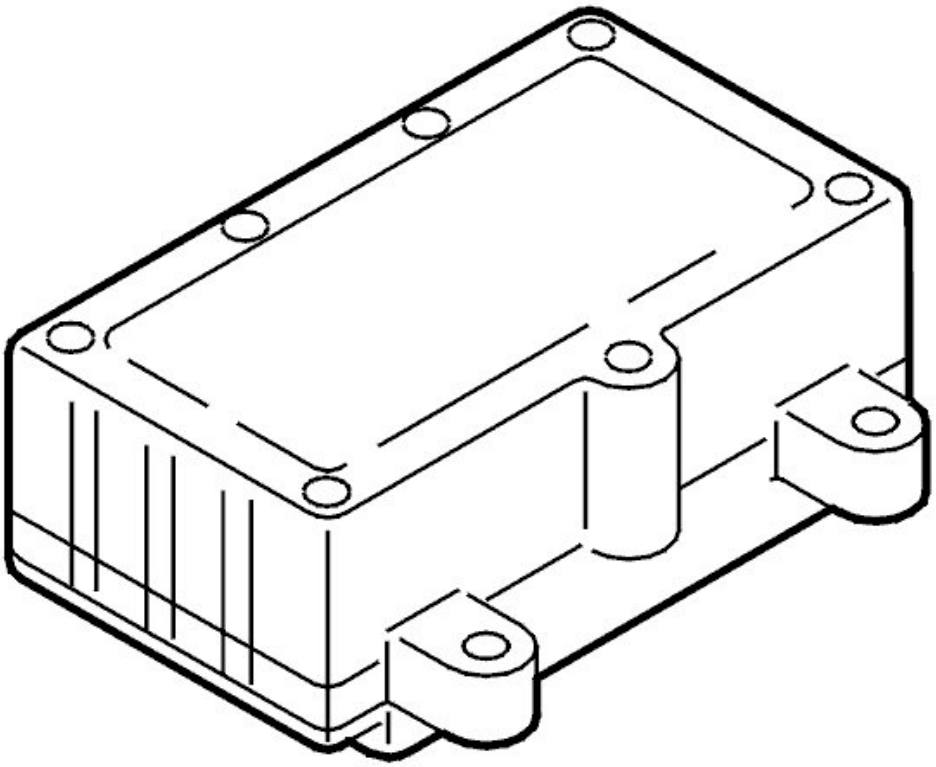
Signal missing

Checking the component



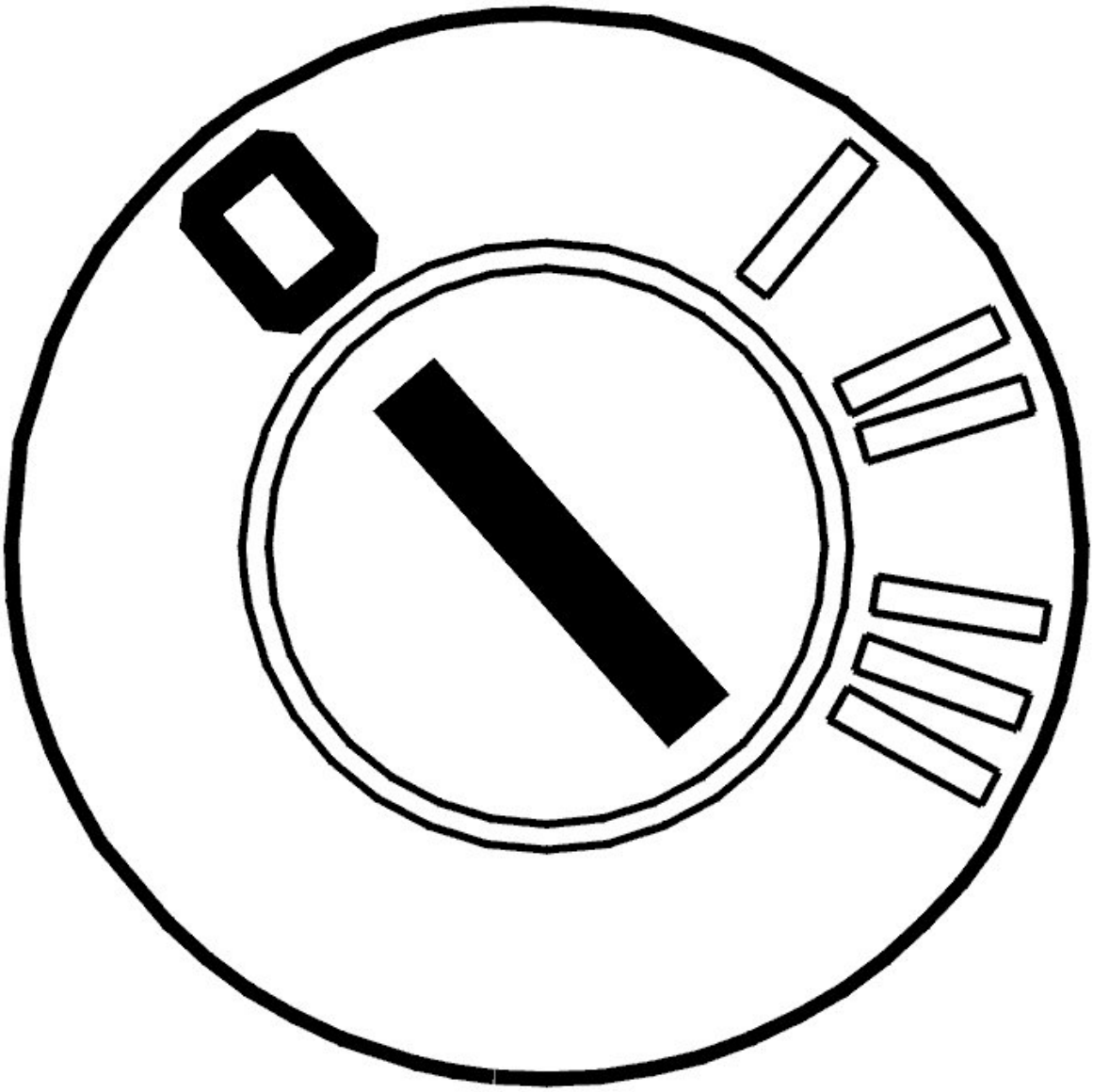
- Ignition off.
- Check that the engine cooling fan (FC) blade rotates easily. Check that nothing is obstructing the engine cooling fan (FC) blade.
- Remedy as necessary.
- Ignition on.
- Check all speeds of the engine cooling fan (FC).

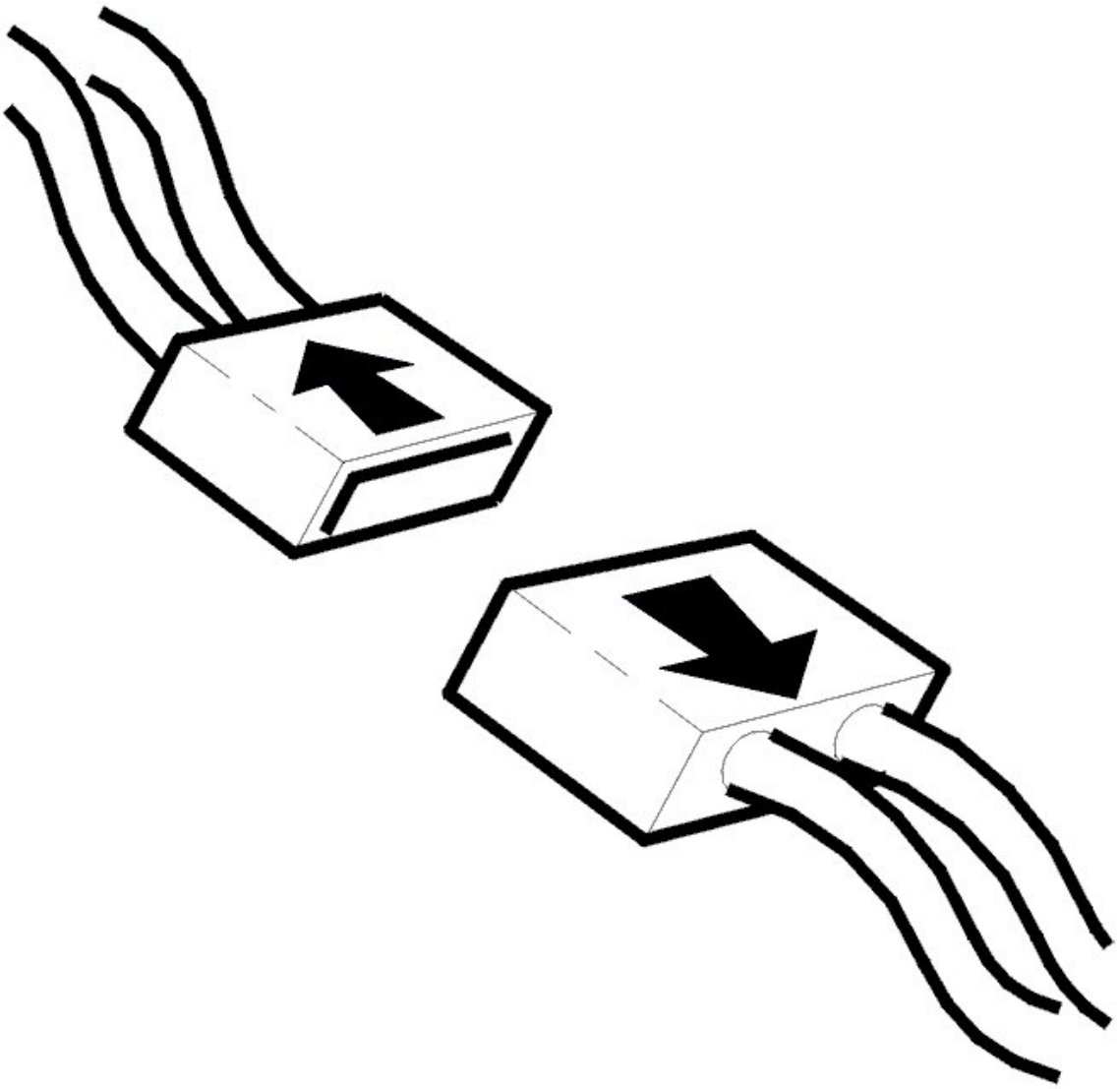
Activate the engine cooling fan (FC) by clicking the VCT2000 symbol.



Continue - Checking the component and wiring

Replacing a component





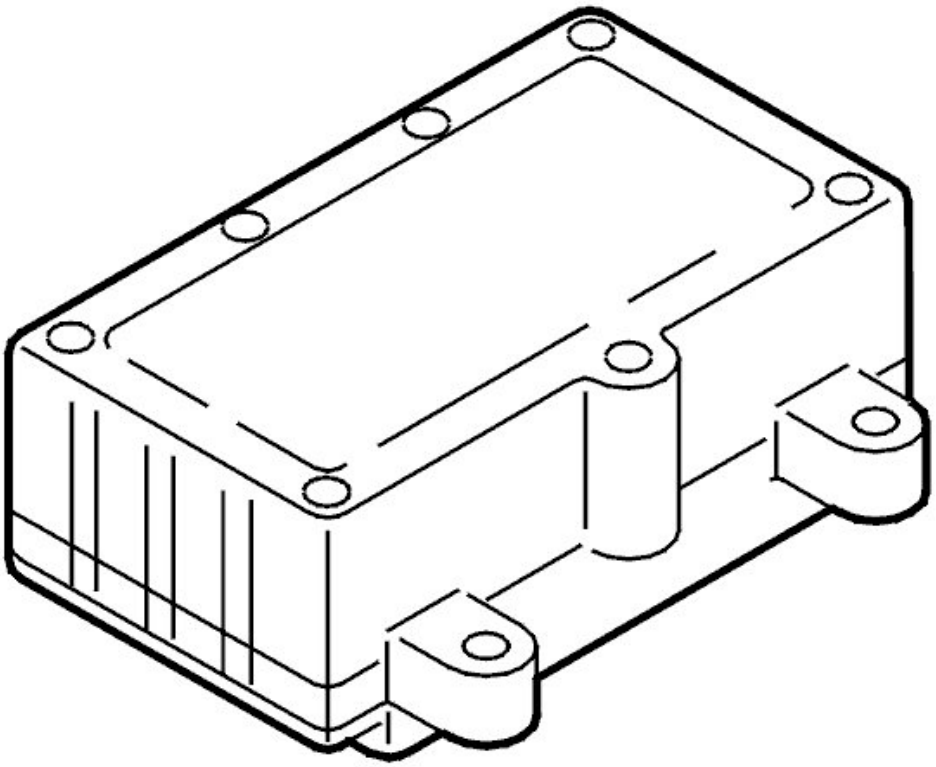
- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

Replace the engine cooling fan (FC) control module if the engine cooling fan (FC) cannot be activated at all speeds and no faults have been found on wiring and connections.
Remedy as necessary.

Other information

- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair



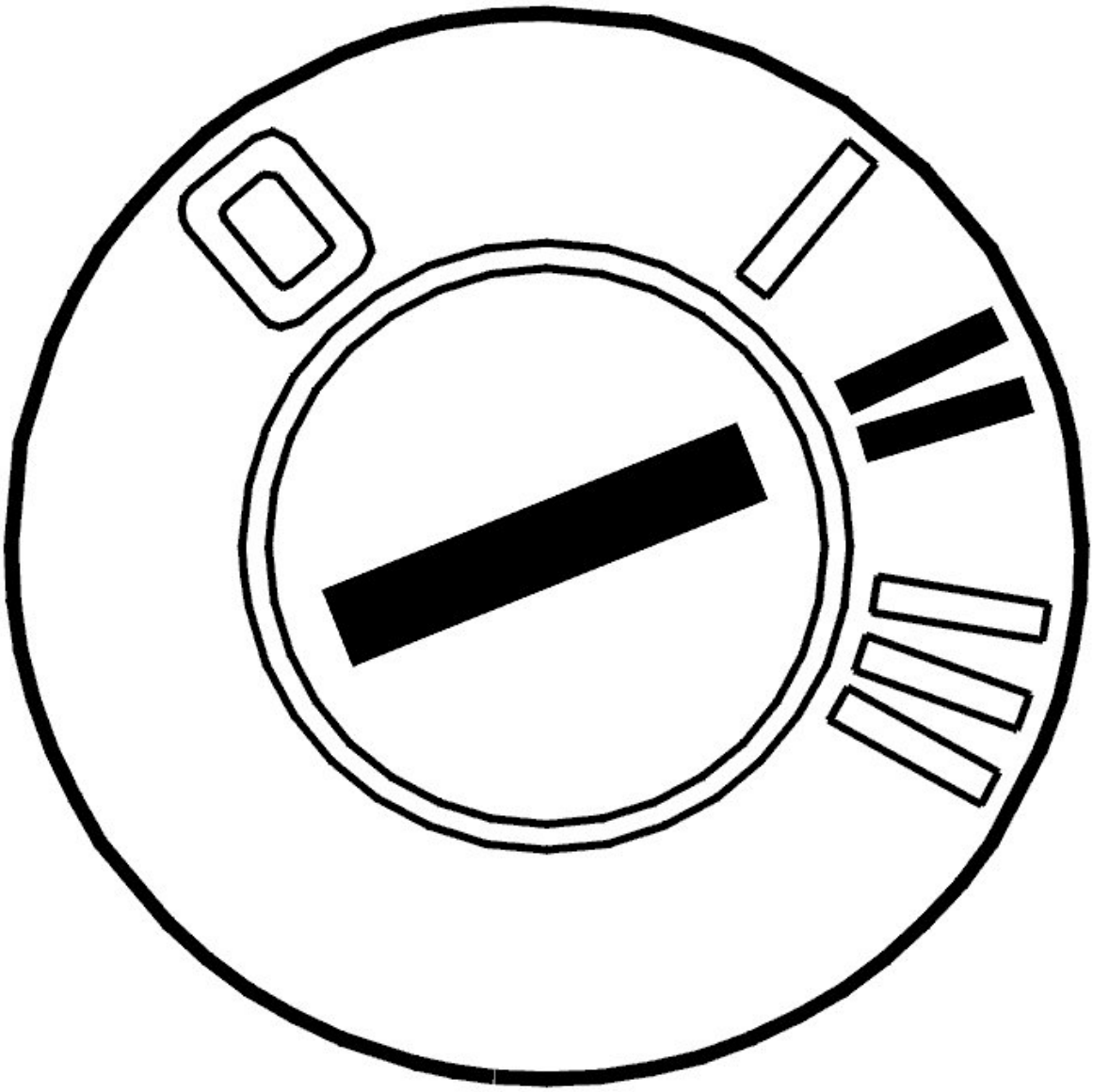
Continue - Verification

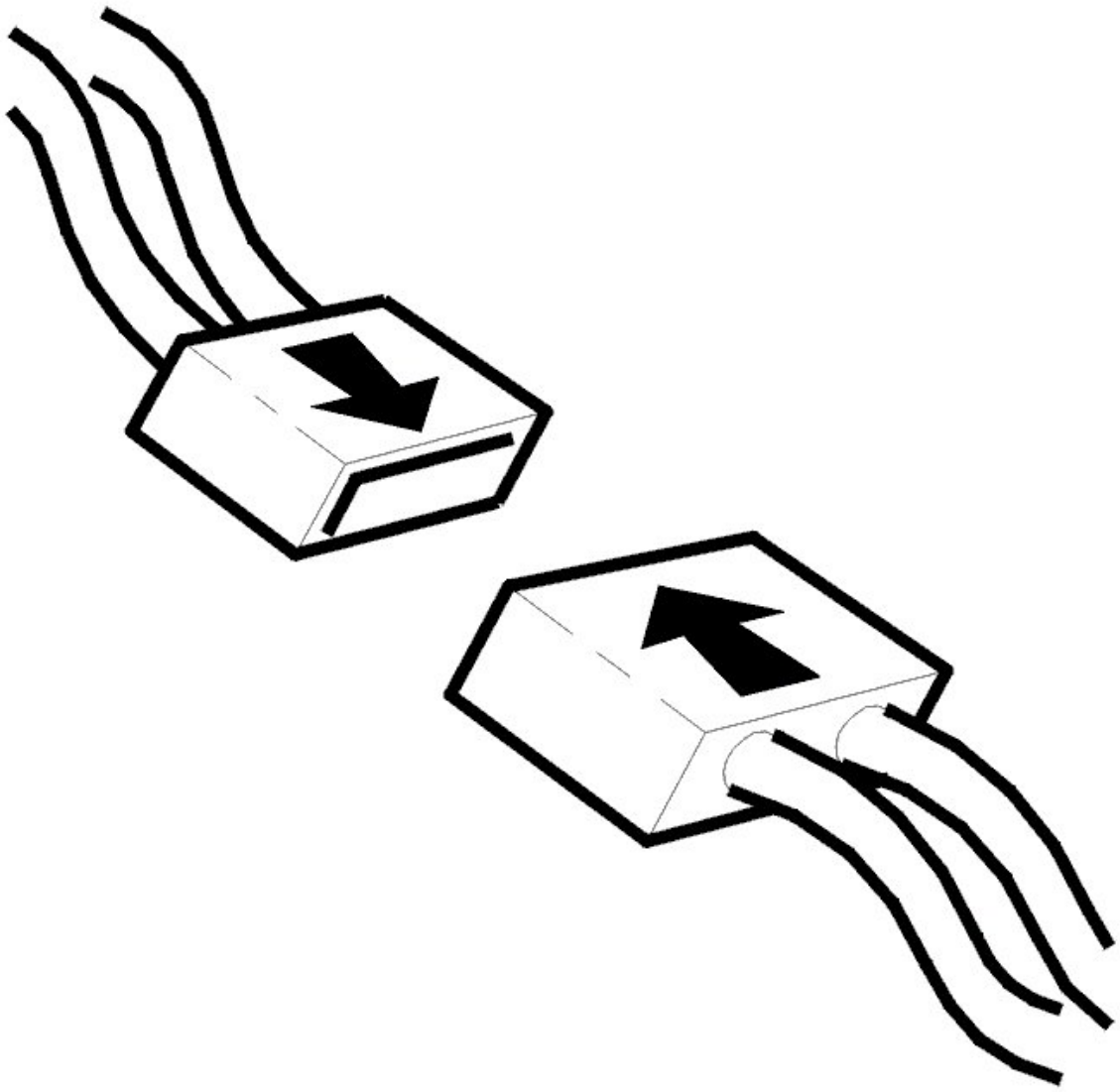
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the engine cooling fan (FC). Check all 6 speeds of the engine cooling fan (FC).

Is the engine cooling fan (FC) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

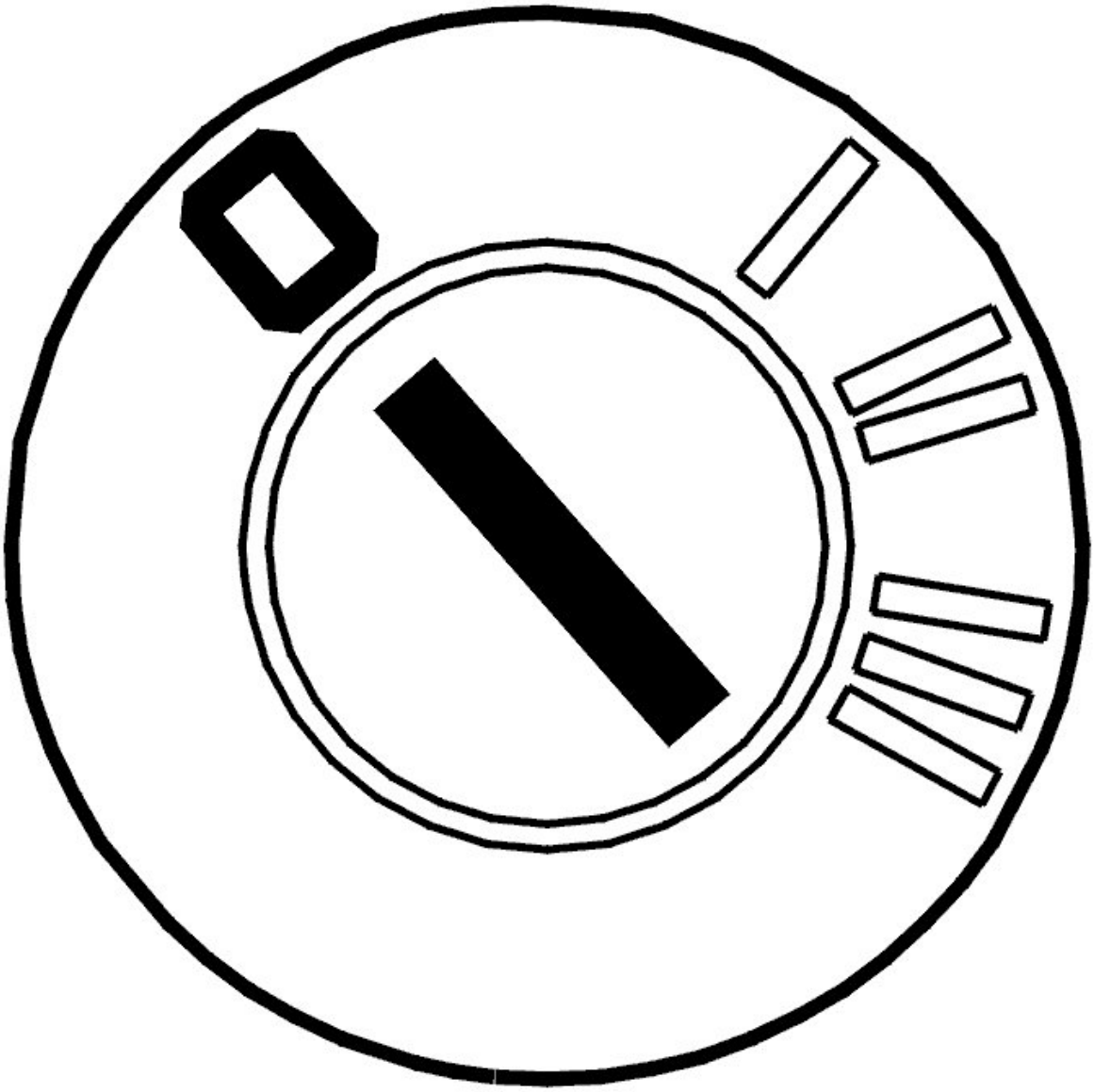
Yes - FAULT-TRACING FAILED

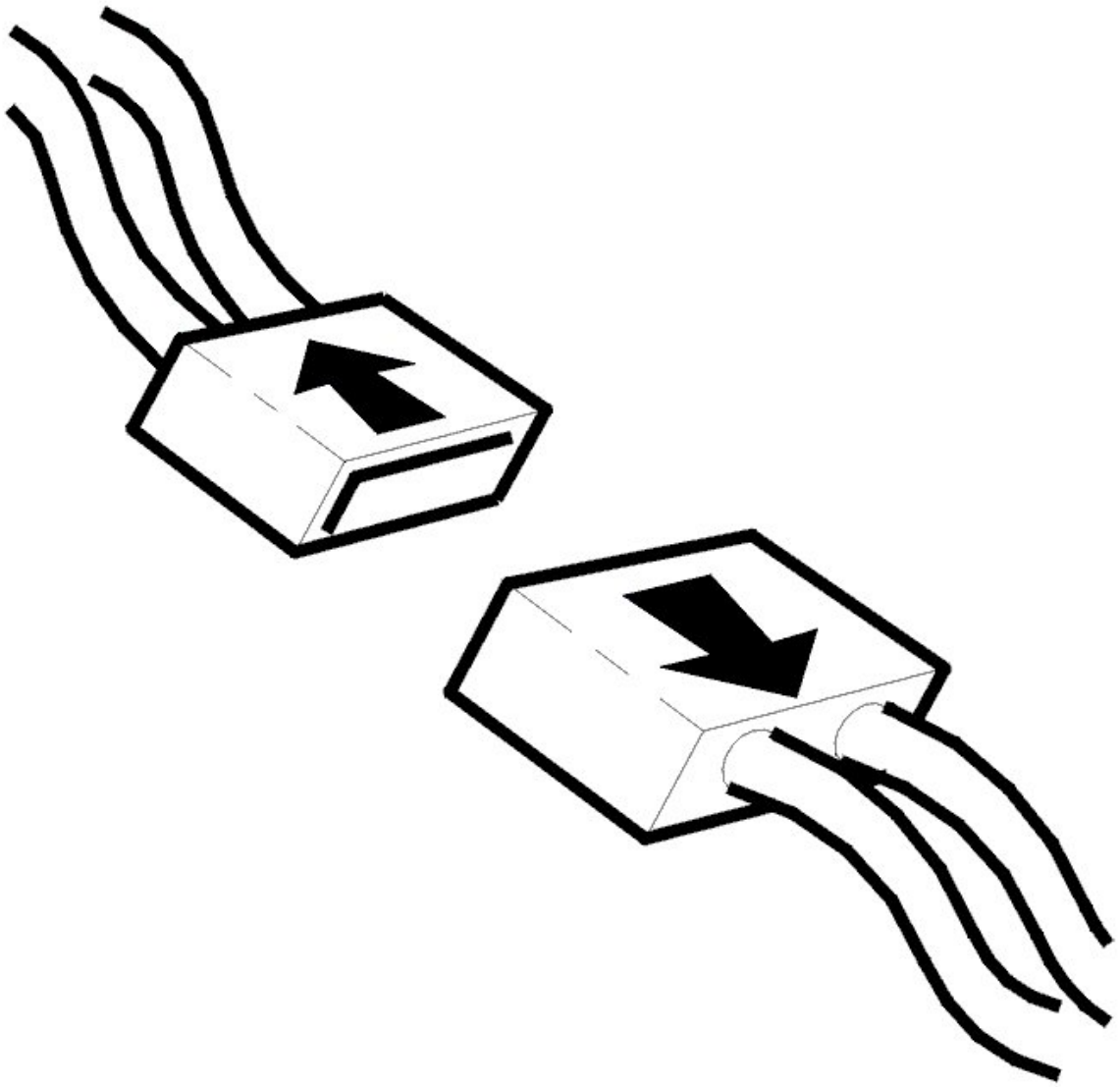
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Checking the component and wiring





- Ignition off.

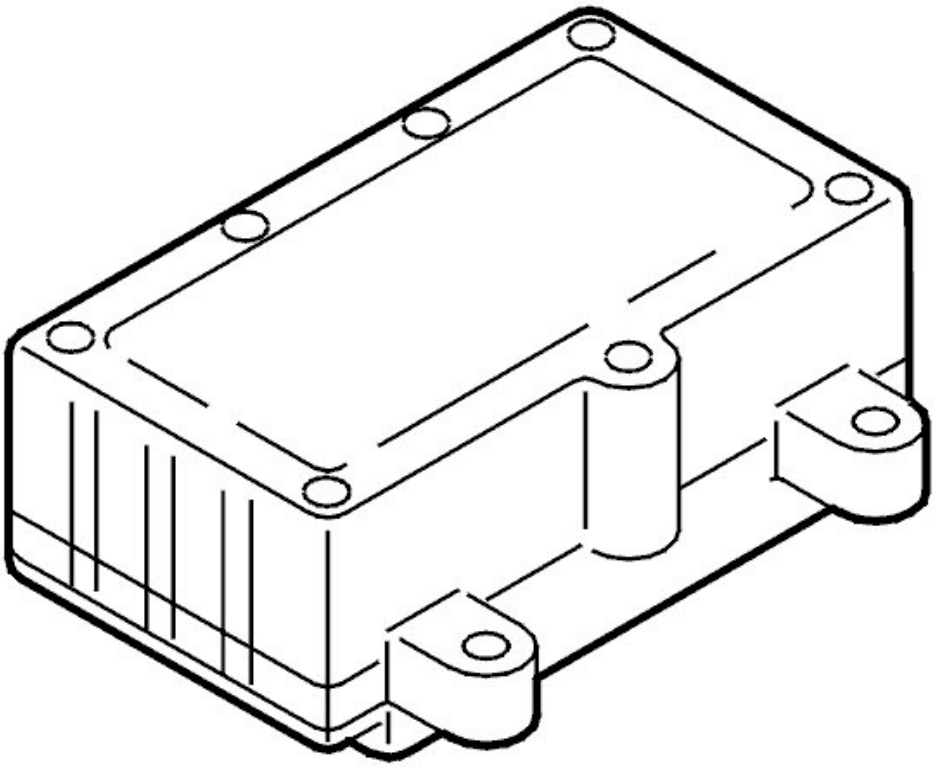
Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

If the engine cooling fan (FC) cannot be activated at any speed:
- Check the fuse, power supply cable and ground lead for the engine cooling fan (FC).
- Check the connector and wiring between the engine control module (ECM) and engine cooling fan (FC) module. Check for damage. Check for an open circuit. Check for a short circuit.

If the engine cooling fan (FC) can be activated at one or more speeds:
- Check the connectors to the engine cooling fan (FC) control module and Engine Control Module (ECM). Check for damage to pins and connections.
- Also check other connectors and connections that connect cables between Engine Control Module (ECM) and the control module for electric cooling fan.
- Check the wiring between the engine control module (ECM) and the engine cooling fan (FC) module. Check for damage.

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

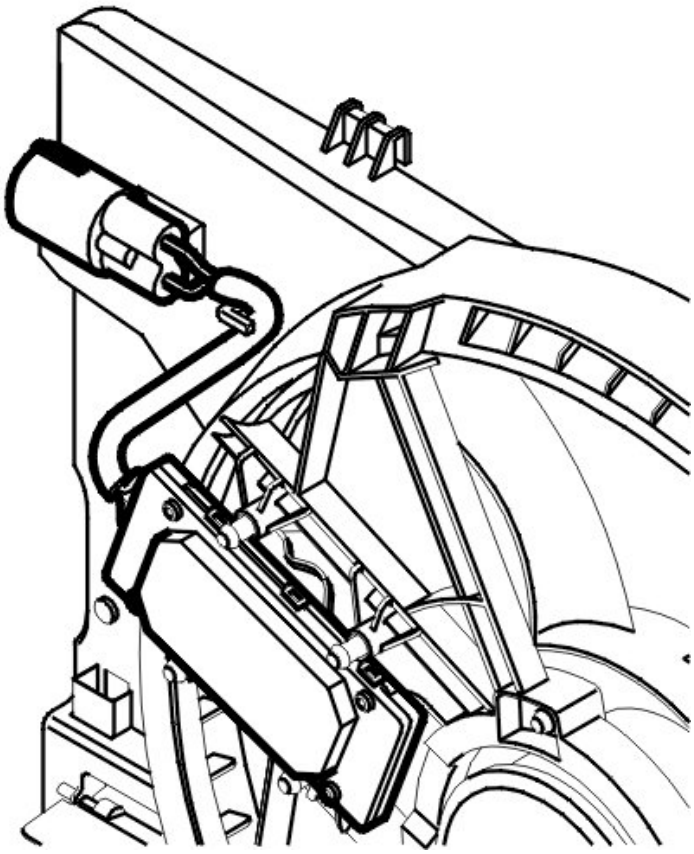
Yes - Verification

No - Replacing a component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-650C

Condition



The engine control module (ECM) checks the signal cable for the engine cooling fan (FC).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- None.

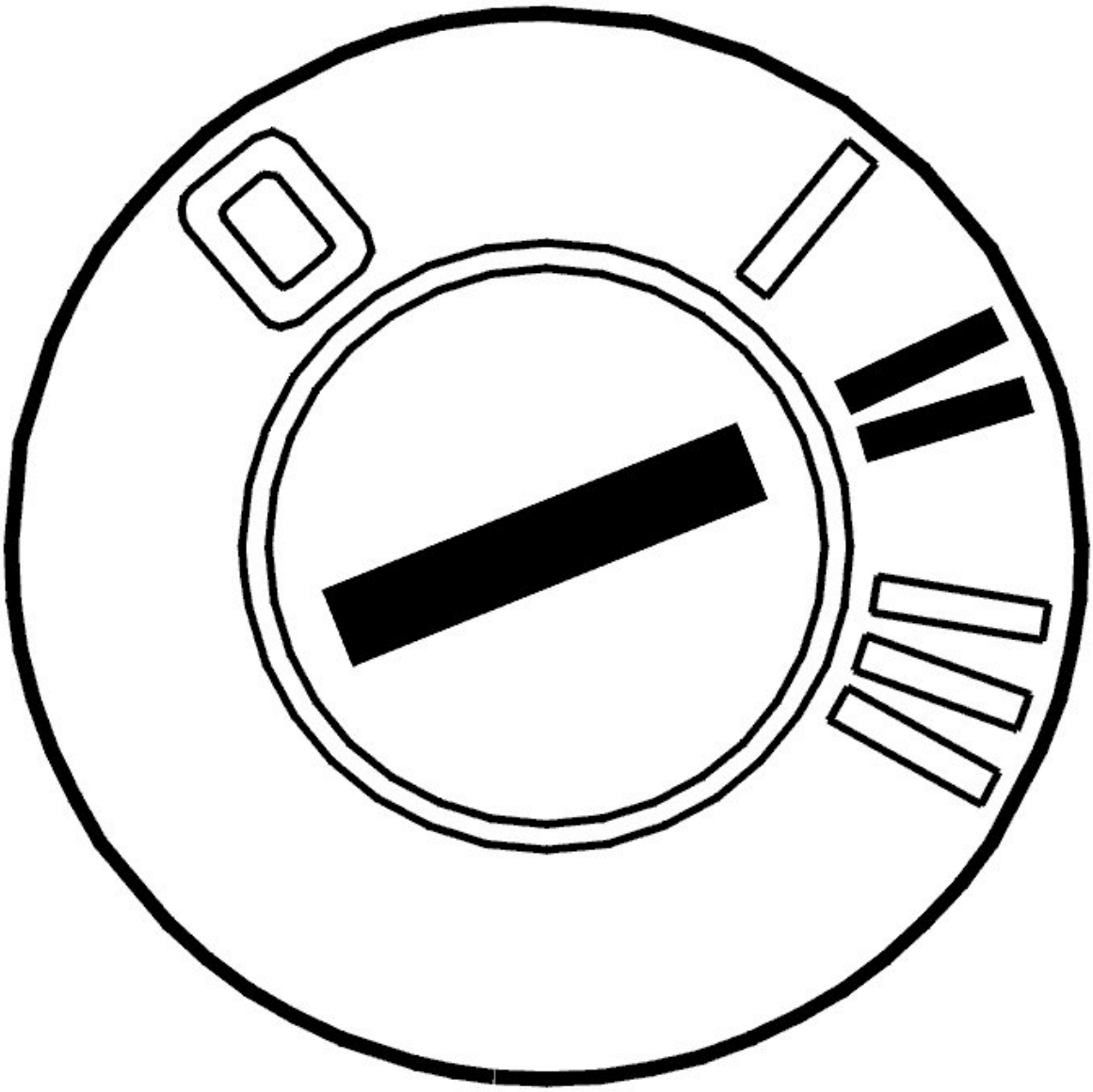
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Electric cooling fan does not operate
- The engine cooling fan (FC) operates constantly.

Signal Too High

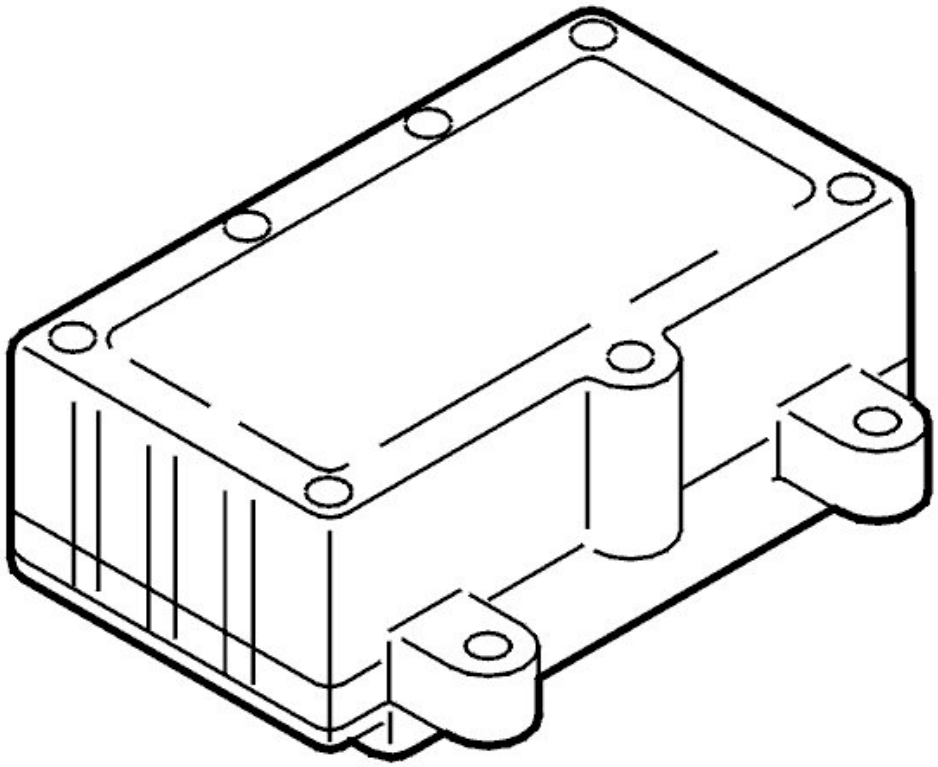
Signal too high

Checking the component



- Ignition off.
- Check that the engine cooling fan (FC) blade rotates easily. Check that nothing is obstructing the engine cooling fan (FC) blade.
- Remedy as necessary.
- Check all speeds of the engine cooling fan (FC).

Activate the engine cooling fan (FC) by clicking the VCT2000 symbol.



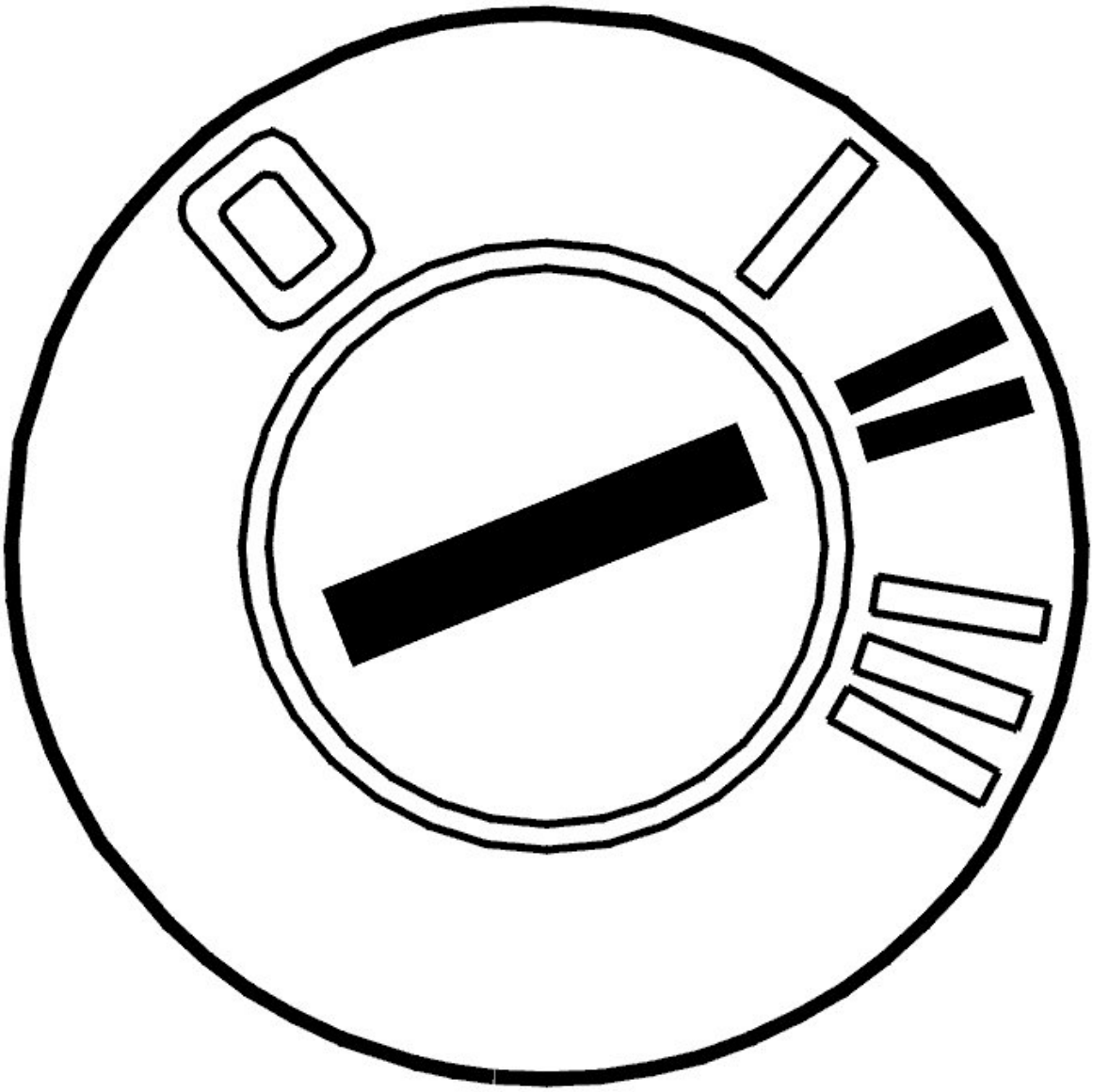
Continue - Checking the component and wiring

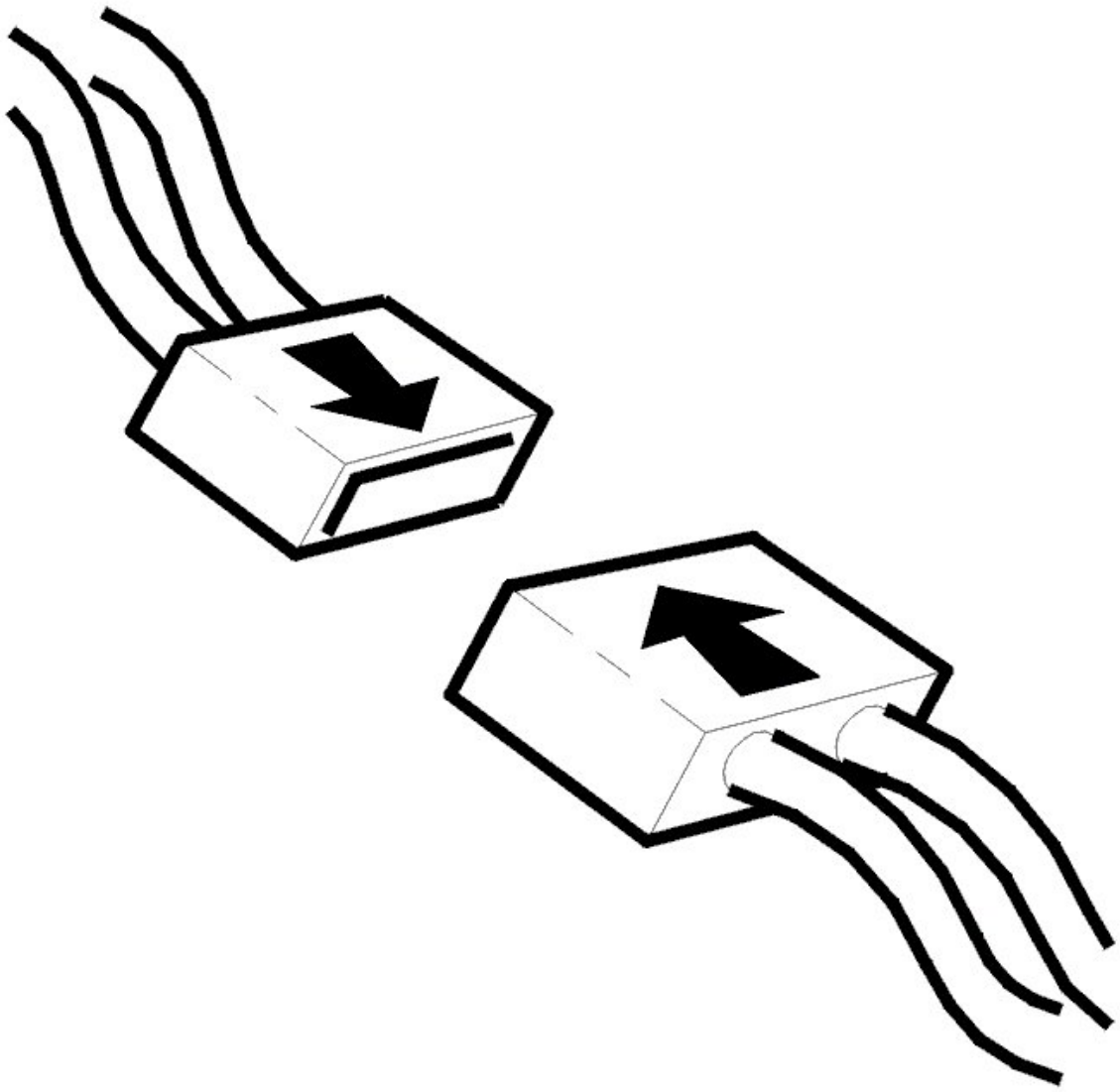
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the engine cooling fan (FC). Check all 6 speeds of the engine cooling fan (FC).

Is the engine cooling fan (FC) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

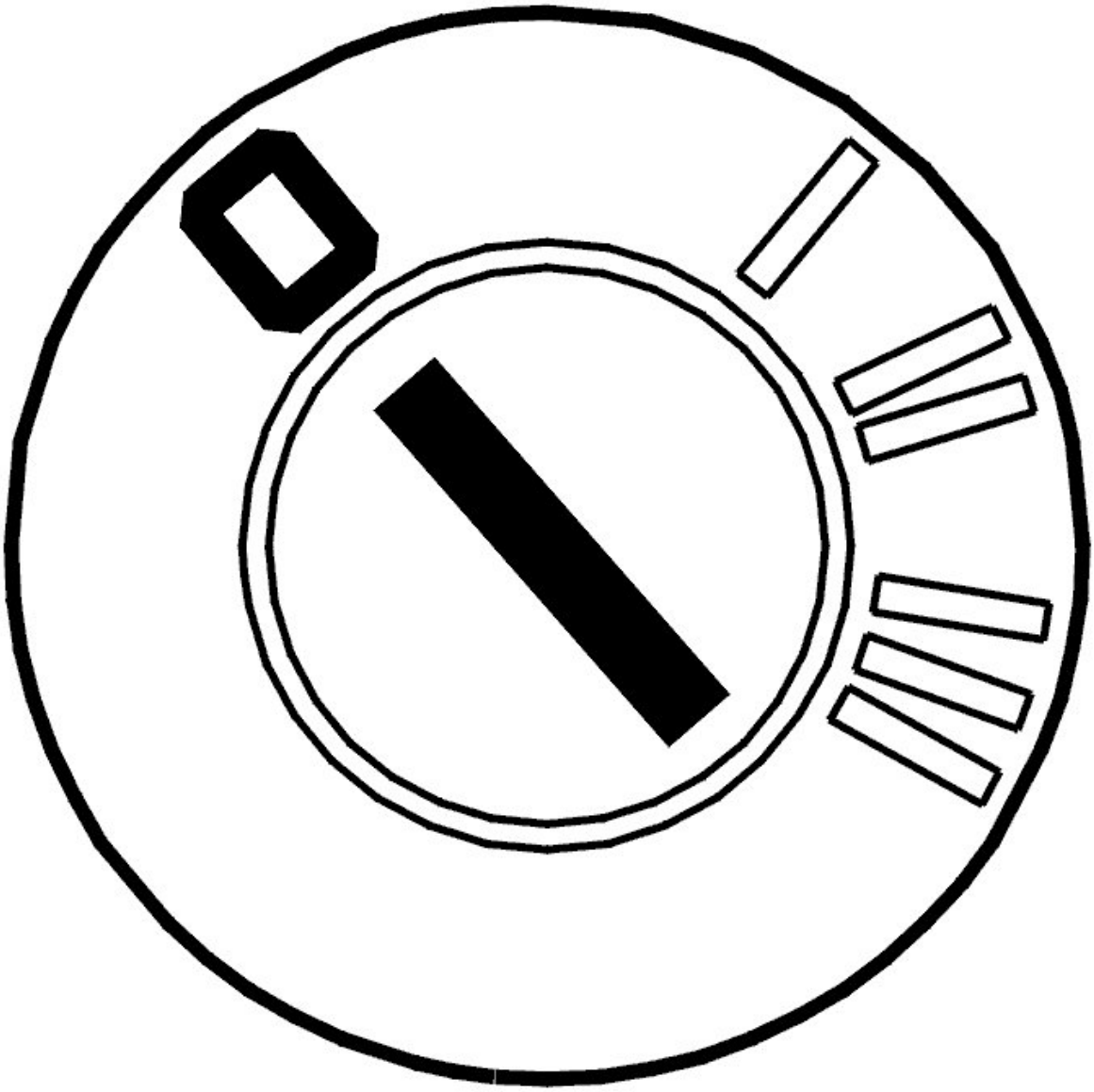
Yes - FAULT-TRACING FAILED

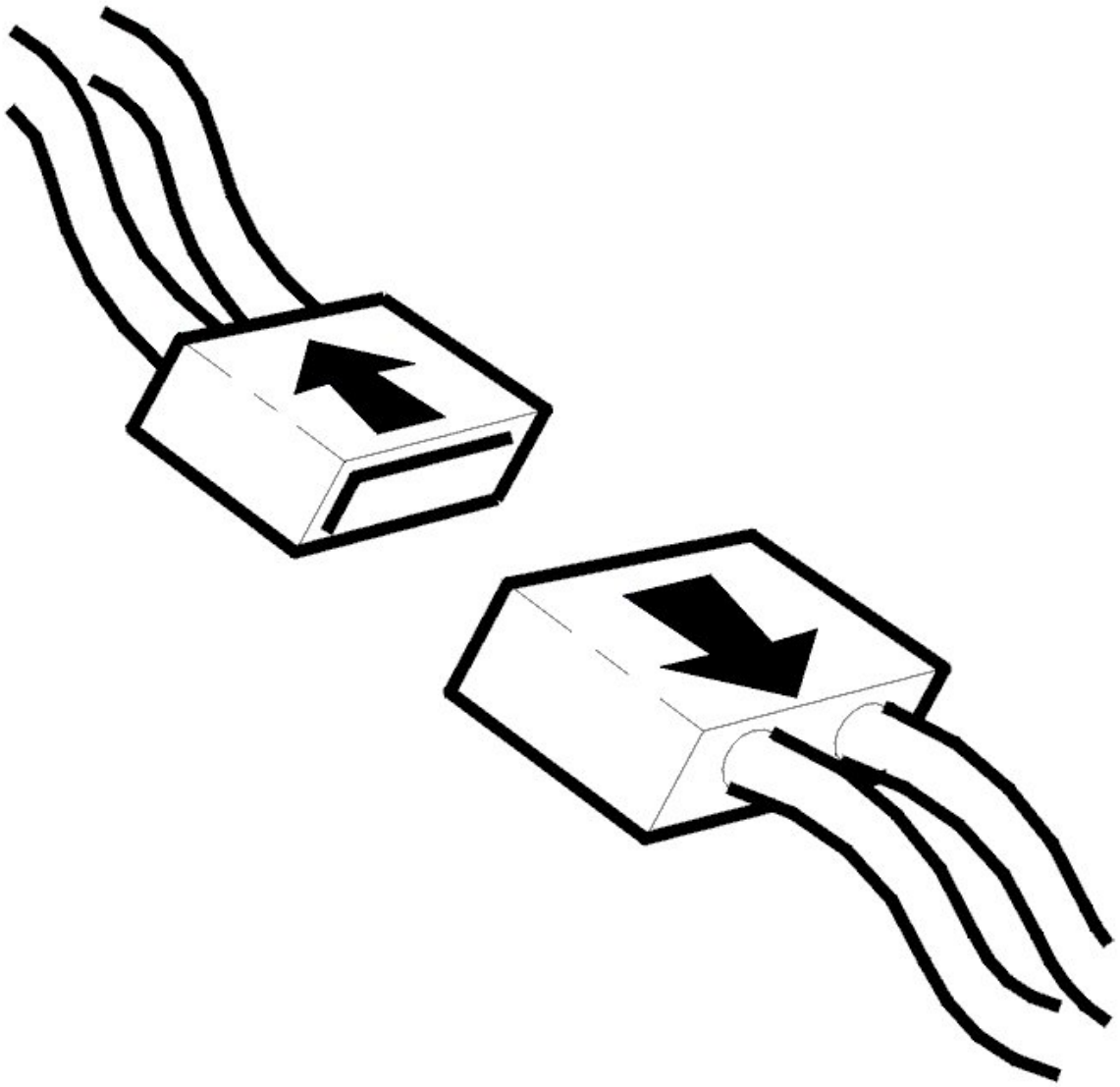
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Checking the component and wiring





- Ignition off.

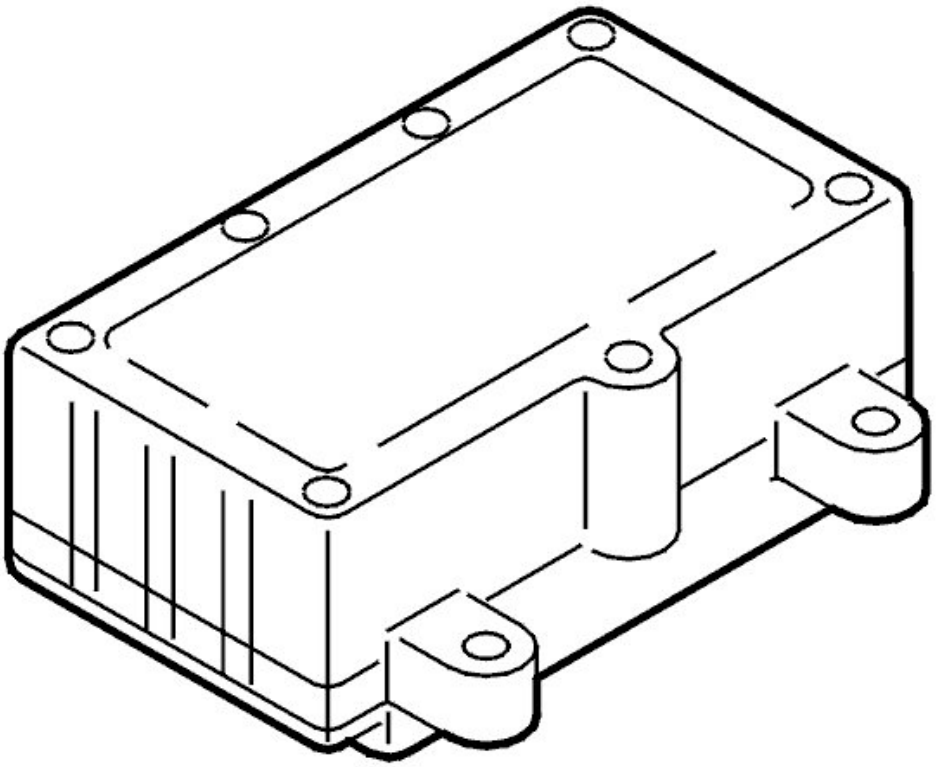
Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

If the engine cooling fan (FC) cannot be activated at any speed:
- Check the fuse, power supply cable and ground lead for the engine cooling fan (FC).
- Check the connector and wiring between the engine control module (ECM) and engine cooling fan (FC) module. Check for damage. Check for an open circuit. Check for a short circuit.

If the engine cooling fan (FC) can be activated at one or more speeds:
- Check the connectors to the engine cooling fan (FC) control module and Engine Control Module (ECM). Check for damage to pins and connections.
- Also check other connectors and connections that connect cables between Engine Control Module (ECM) and the control module for electric cooling fan.
- Check the wiring between the engine control module (ECM) and the engine cooling fan (FC) module. Check for damage.

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

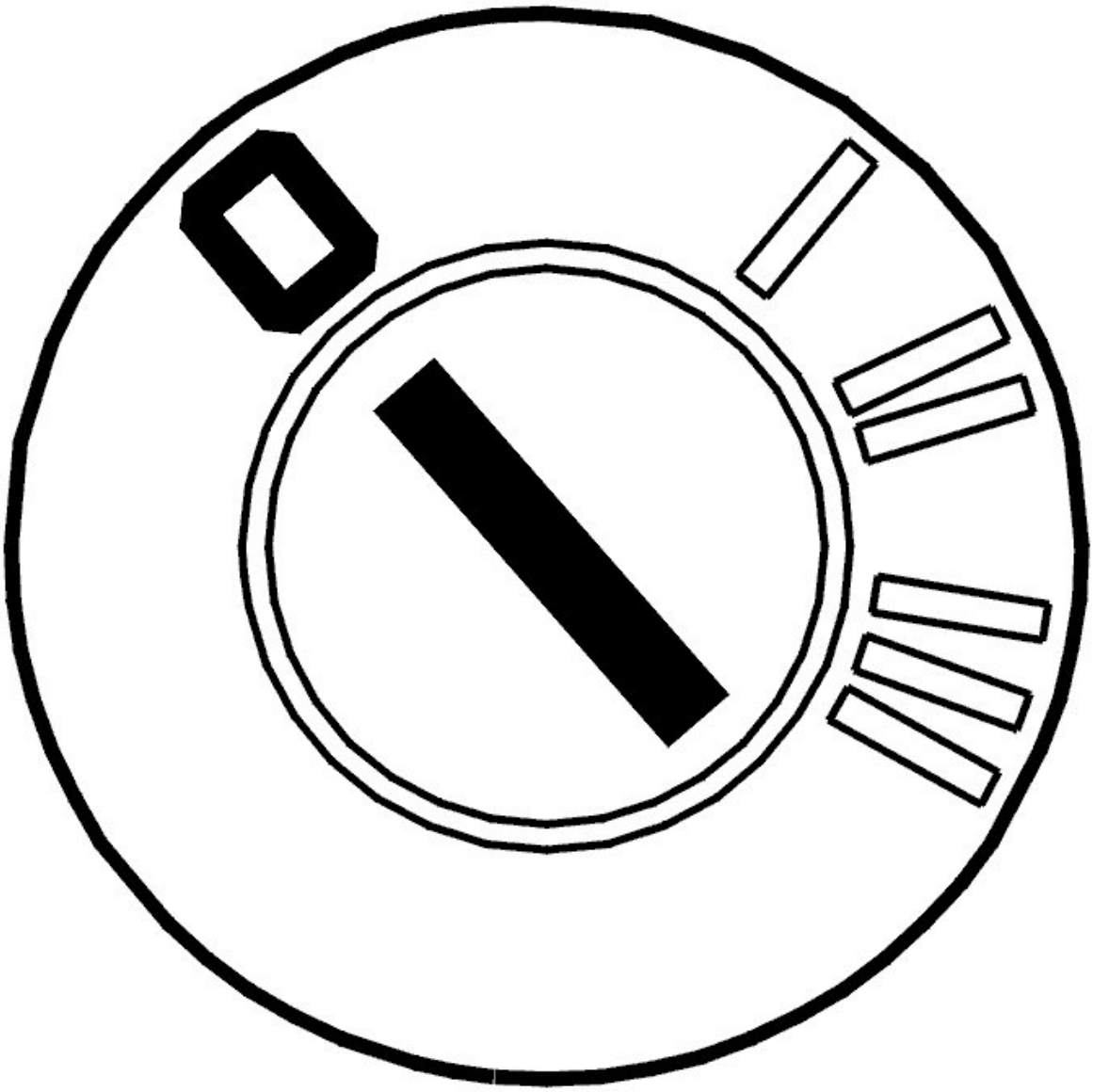


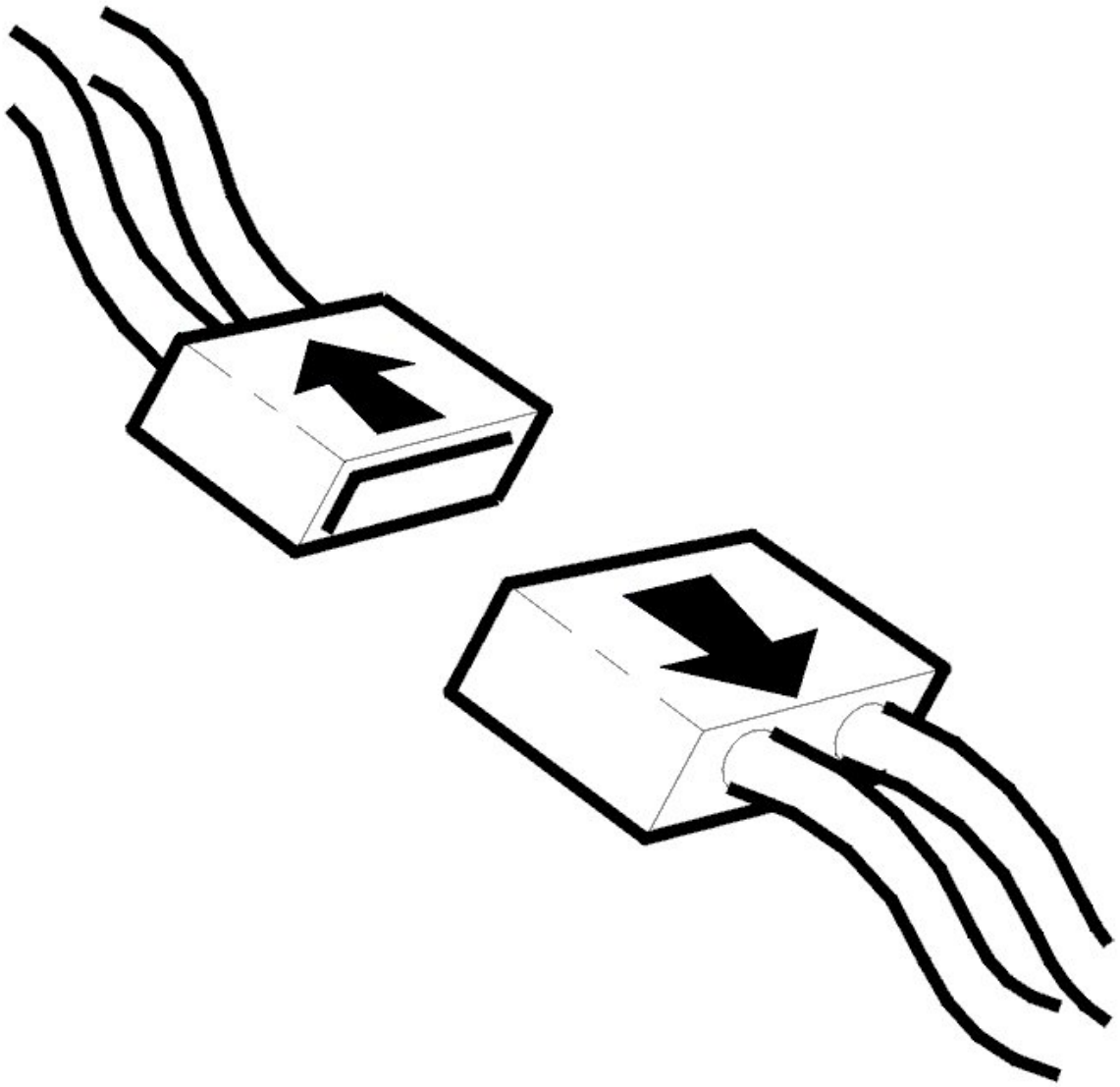
Was a fault detected?

Yes - Verification

No - Replacing a component

Replacing a component





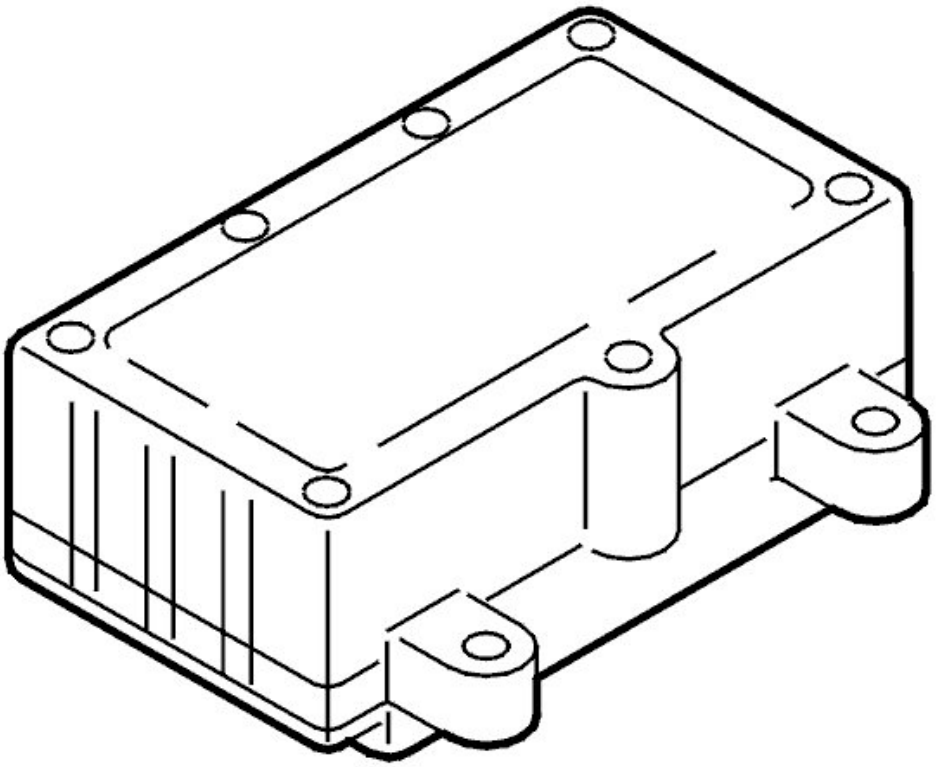
- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

Replace the engine cooling fan (FC) control module if the engine cooling fan (FC) cannot be activated at all speeds and no faults have been found on wiring and connections.
Remedy as necessary.

Other information

- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair

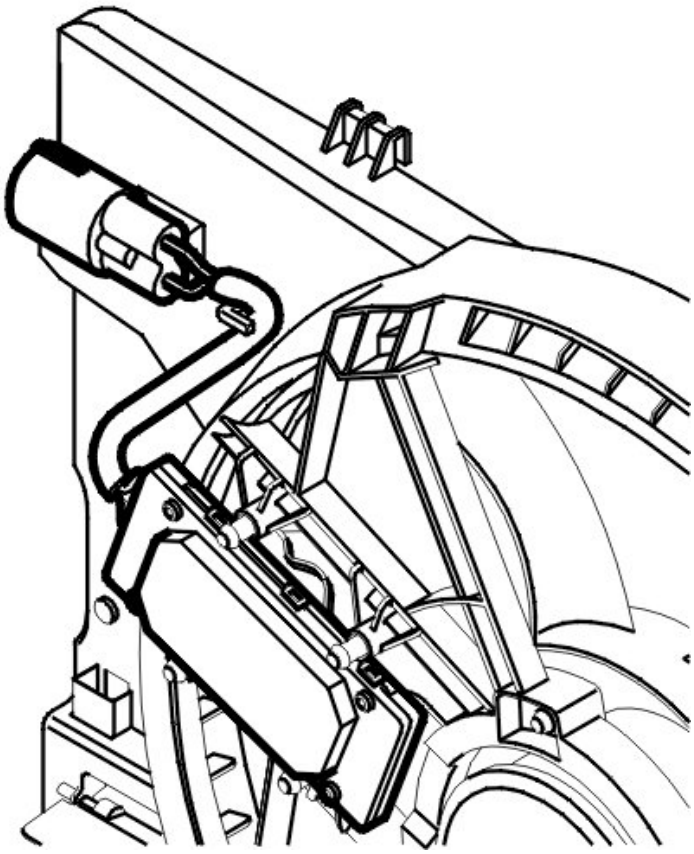


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-650D

Condition



The engine control module (ECM) checks the signal cable for the engine cooling fan (FC).
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Note! The electric cooling fan may have a post-running time of up to approx. 6 minutes after the engine has been shut off. The time for the electric cooling fan's post-running depends on the engine's temperature, temperature in the engine compartment as well as the pressure level in the AC system.

Substitute value
- None.

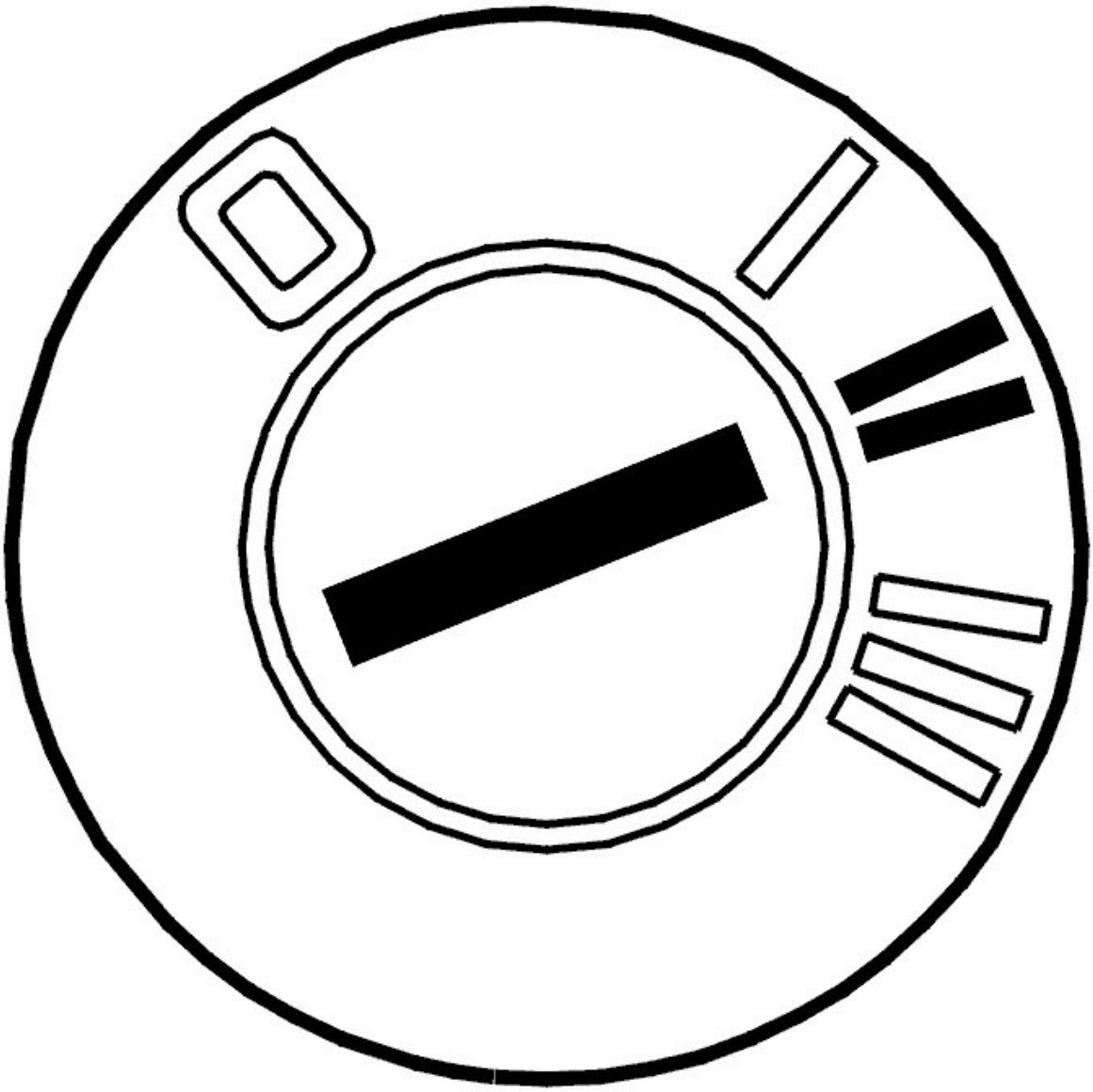
Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Electric cooling fan does not operate
- The engine cooling fan (FC) operates constantly.

Signal Too Low

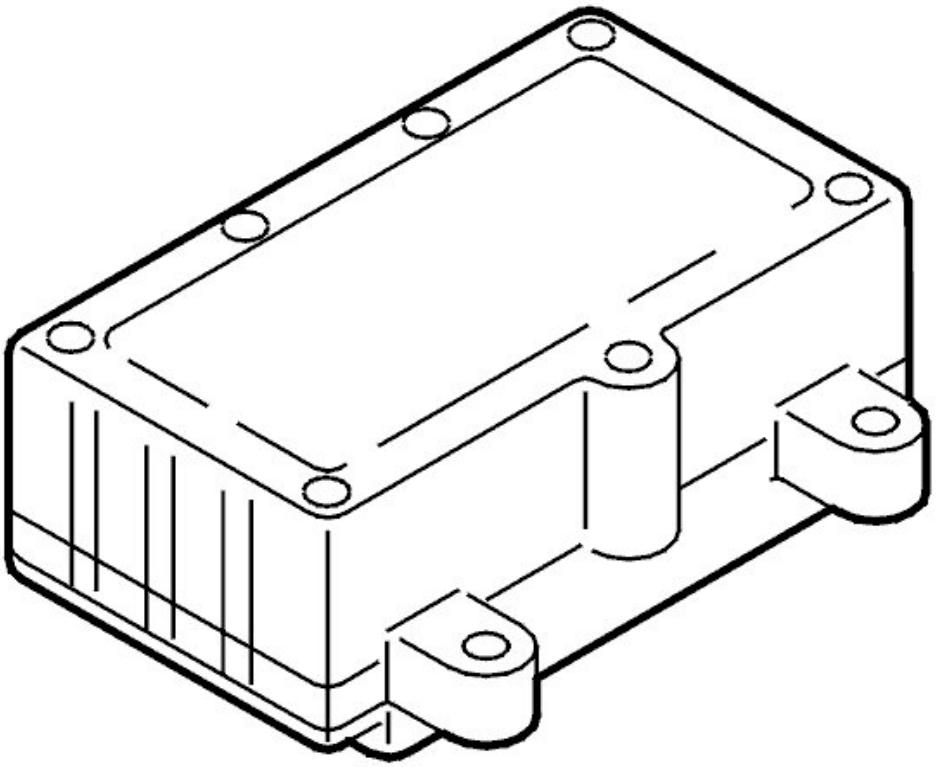
Signal too low

Checking the component



- Ignition off.
- Check that the engine cooling fan (FC) blade rotates easily. Check that nothing is obstructing the engine cooling fan (FC) blade.
- Remedy as necessary.
- Ignition on.
- Check all speeds of the engine cooling fan (FC).

Activate the engine cooling fan (FC) by clicking the VCT2000 symbol.



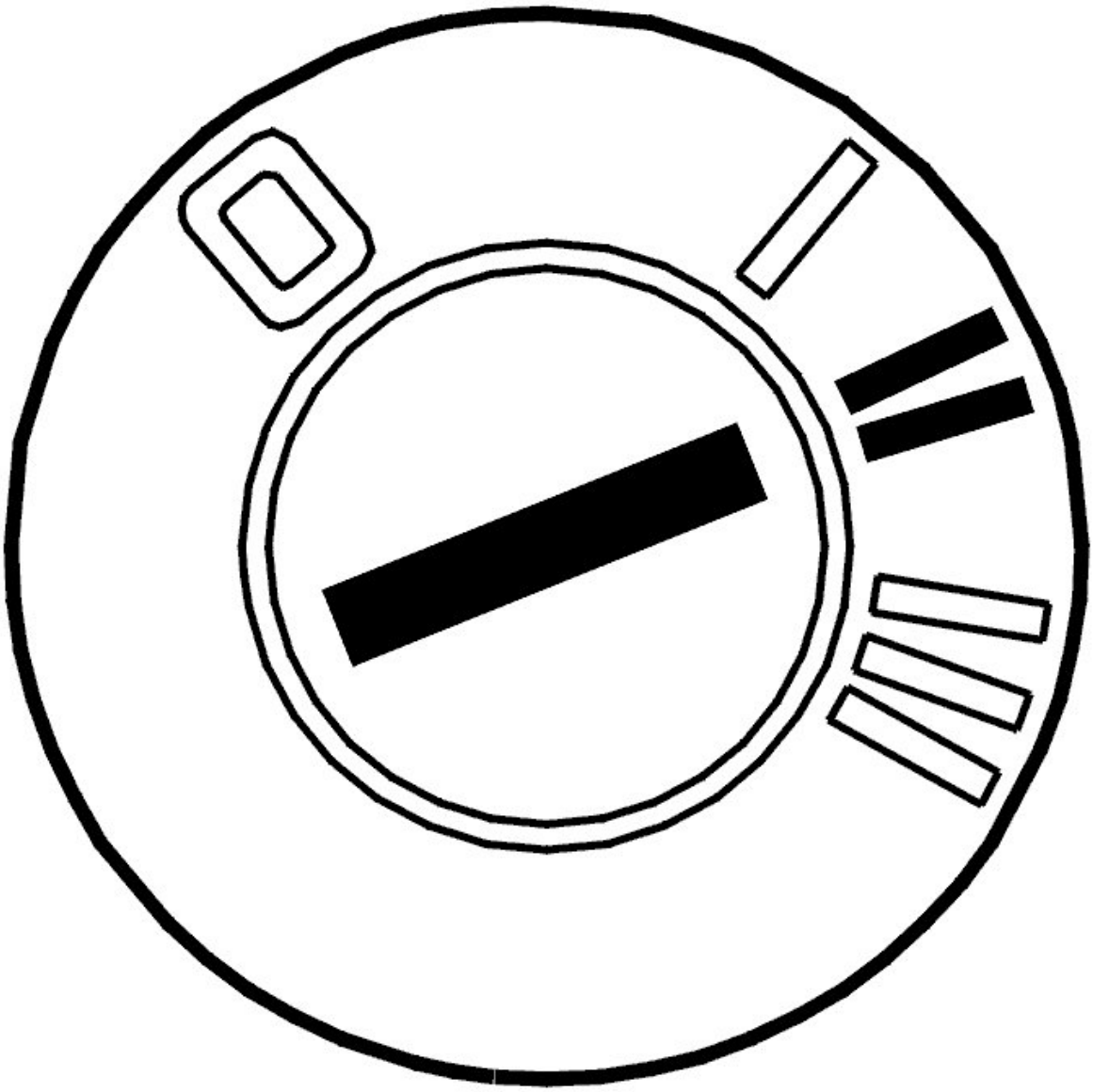
Continue - Checking the component and wiring

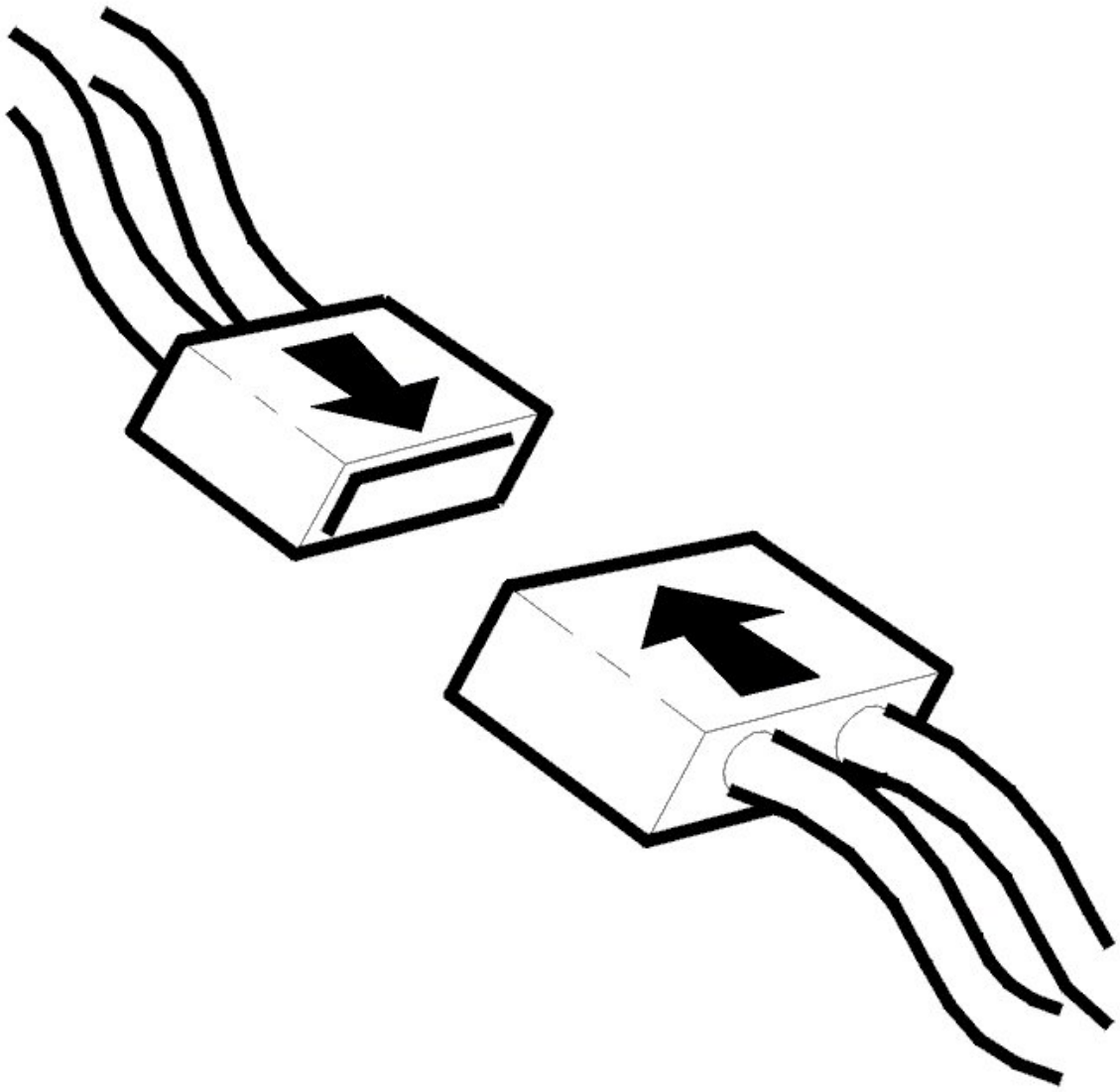
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the engine cooling fan (FC). Check all 6 speeds of the engine cooling fan (FC).

Is the engine cooling fan (FC) working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

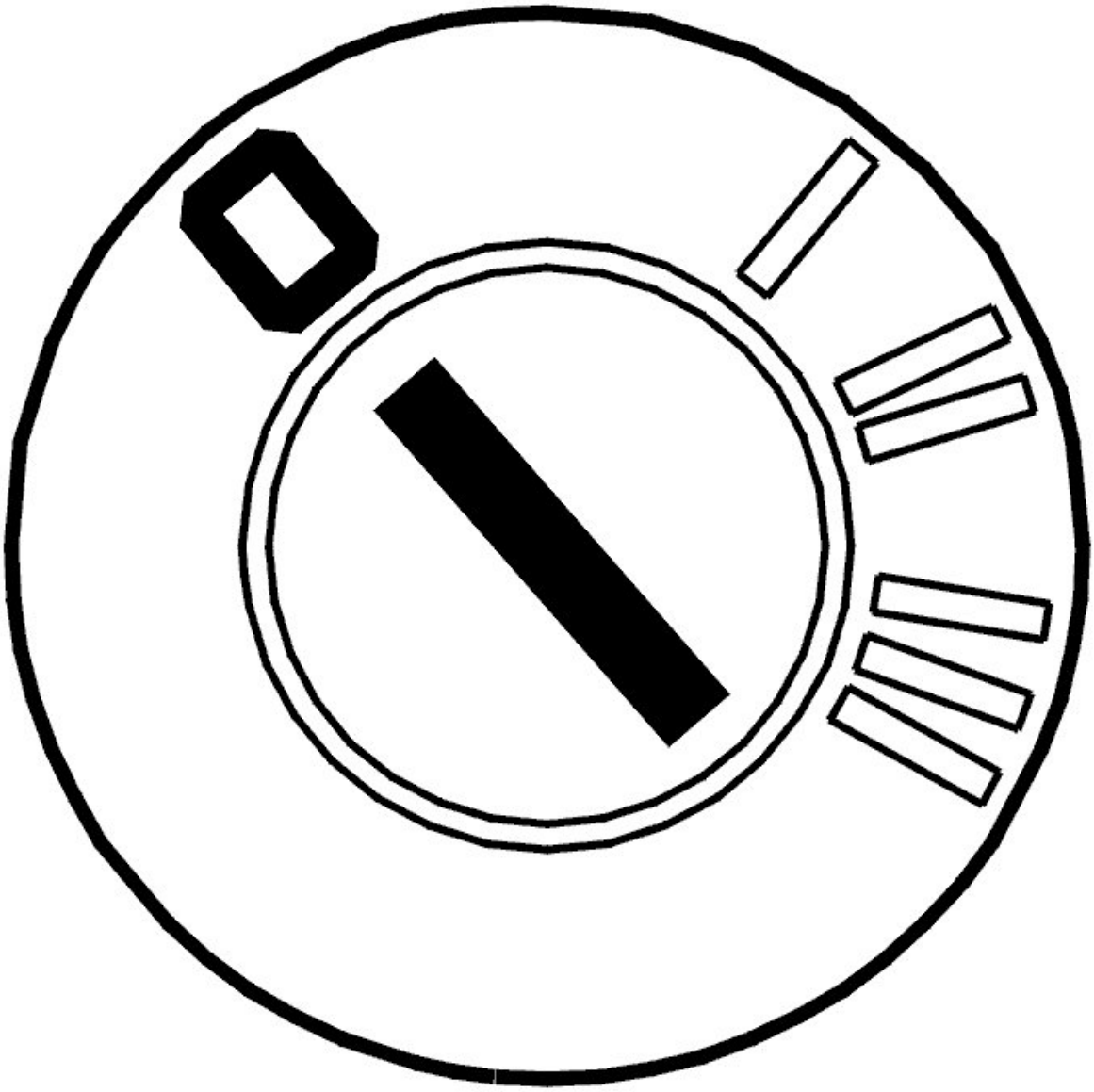
Yes - FAULT-TRACING FAILED

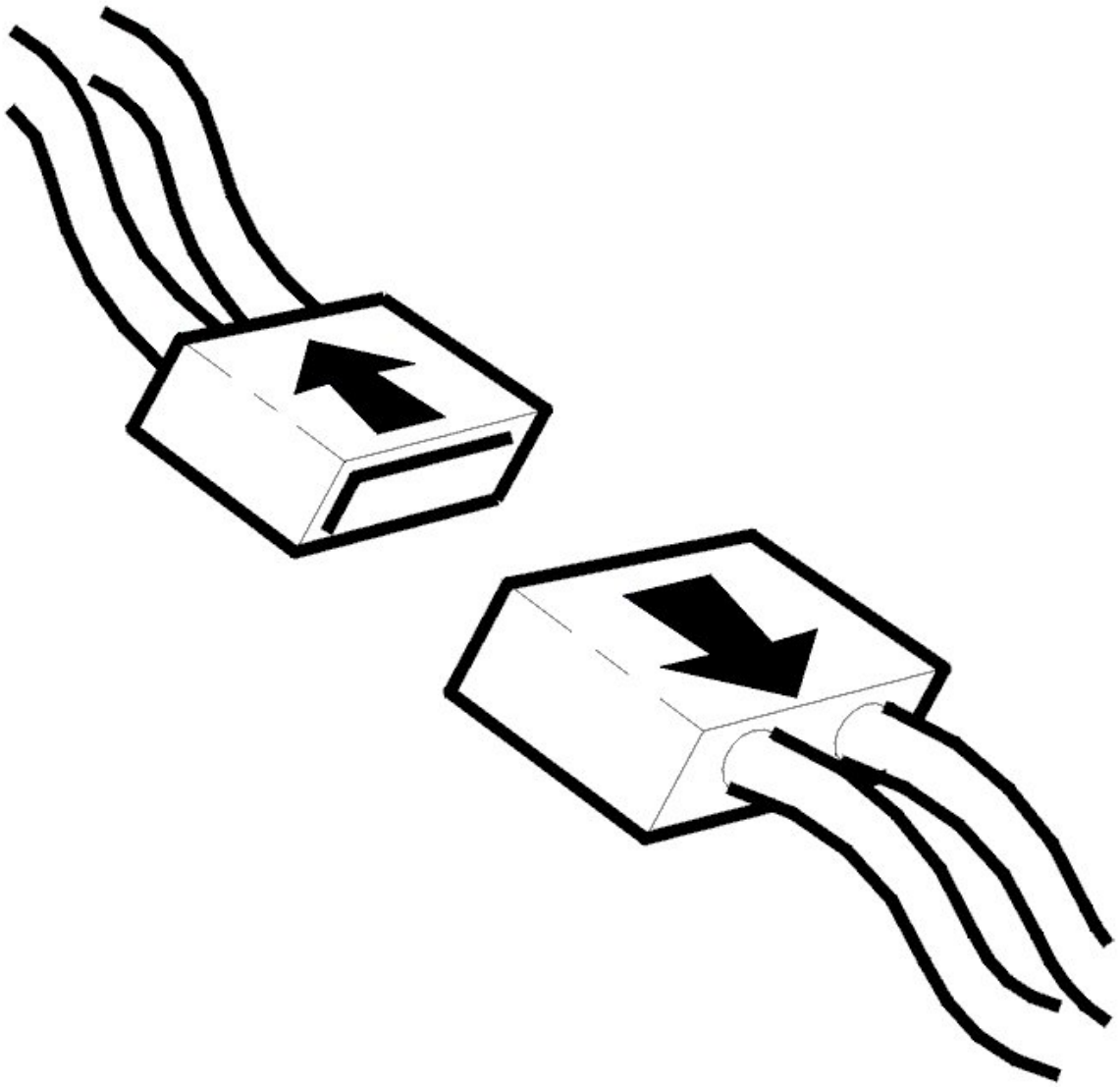
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Checking the component and wiring





- Ignition off.

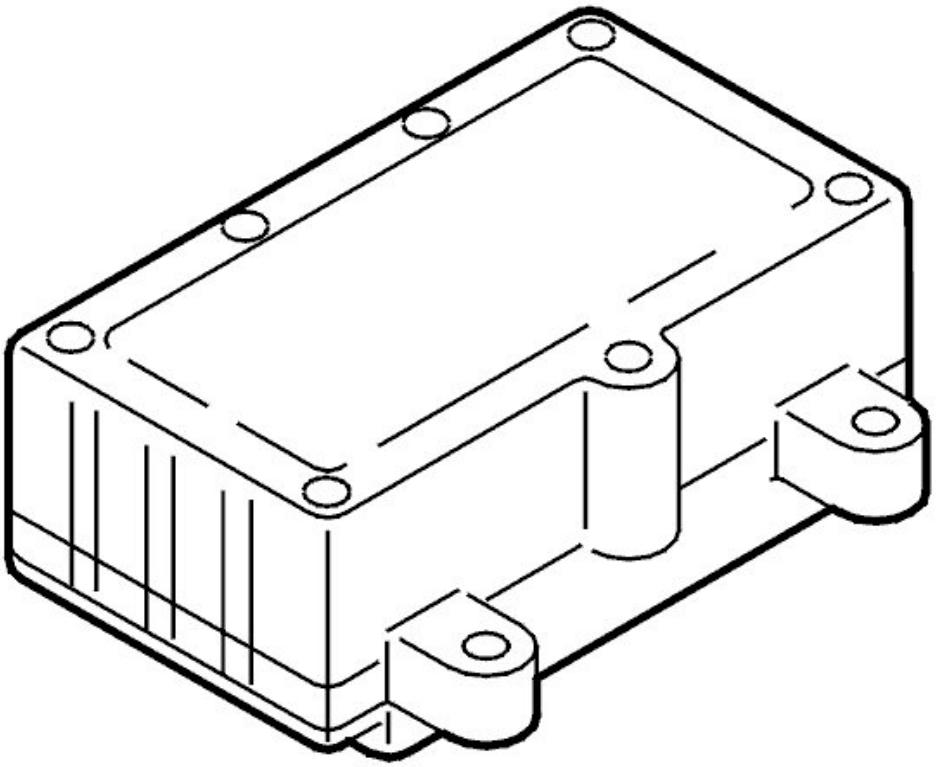
Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

If the engine cooling fan (FC) cannot be activated at any speed:
- Check the fuse, power supply cable and ground lead for the engine cooling fan (FC).
- Check the connector and wiring between the engine control module (ECM) and engine cooling fan (FC) module. Check for damage. Check for an open circuit. Check for a short circuit.

If the engine cooling fan (FC) can be activated at one or more speeds:
- Check the connectors to the engine cooling fan (FC) control module and Engine Control Module (ECM). Check for damage to pins and connections.
- Also check other connectors and connections that connect cables between Engine Control Module (ECM) and the control module for electric cooling fan.
- Check the wiring between the engine control module (ECM) and the engine cooling fan (FC) module. Check for damage.

Remedy as necessary.

Other information
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- 5 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- 6 cylinder: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair
- For information about the cable routing, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

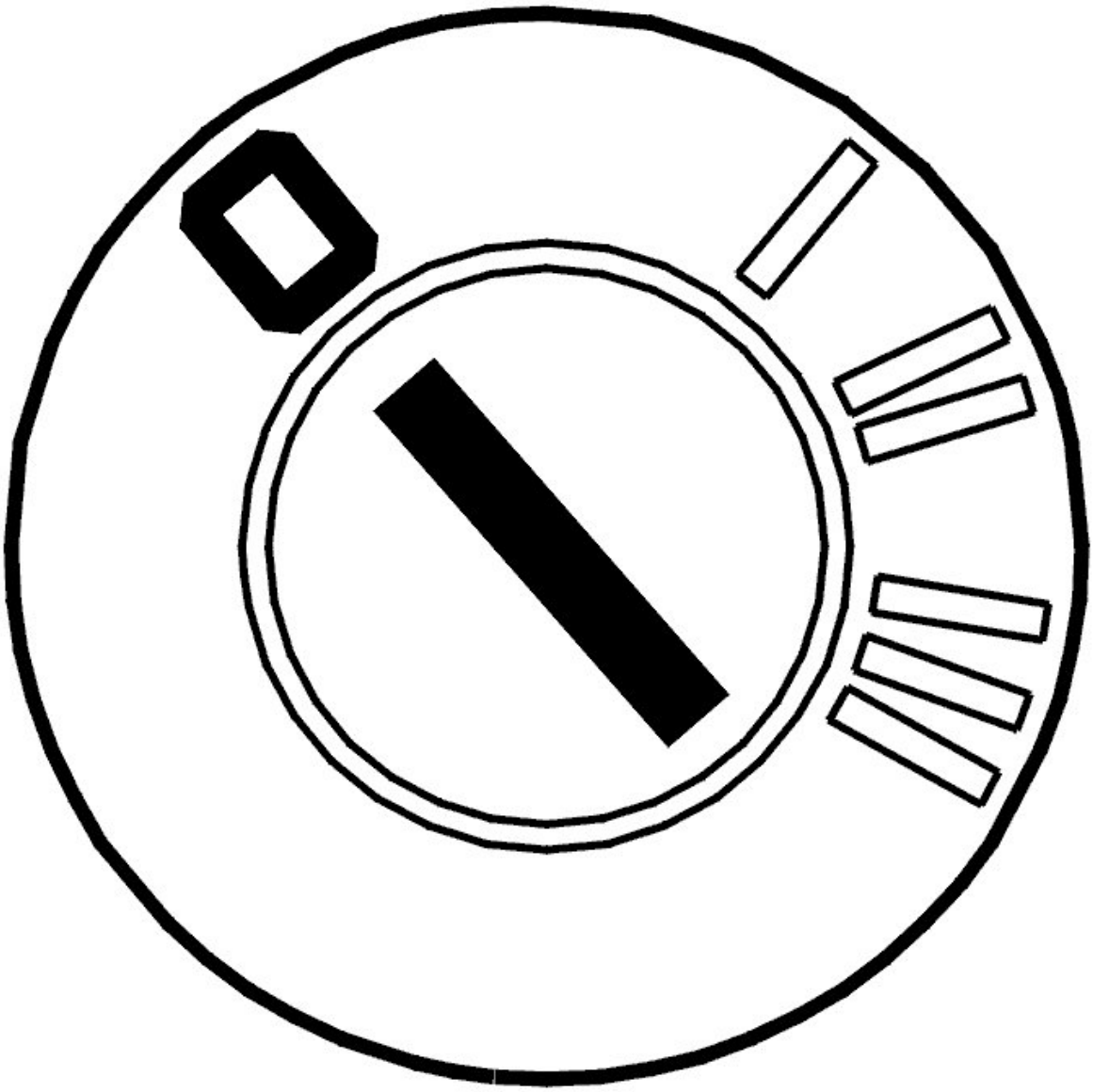


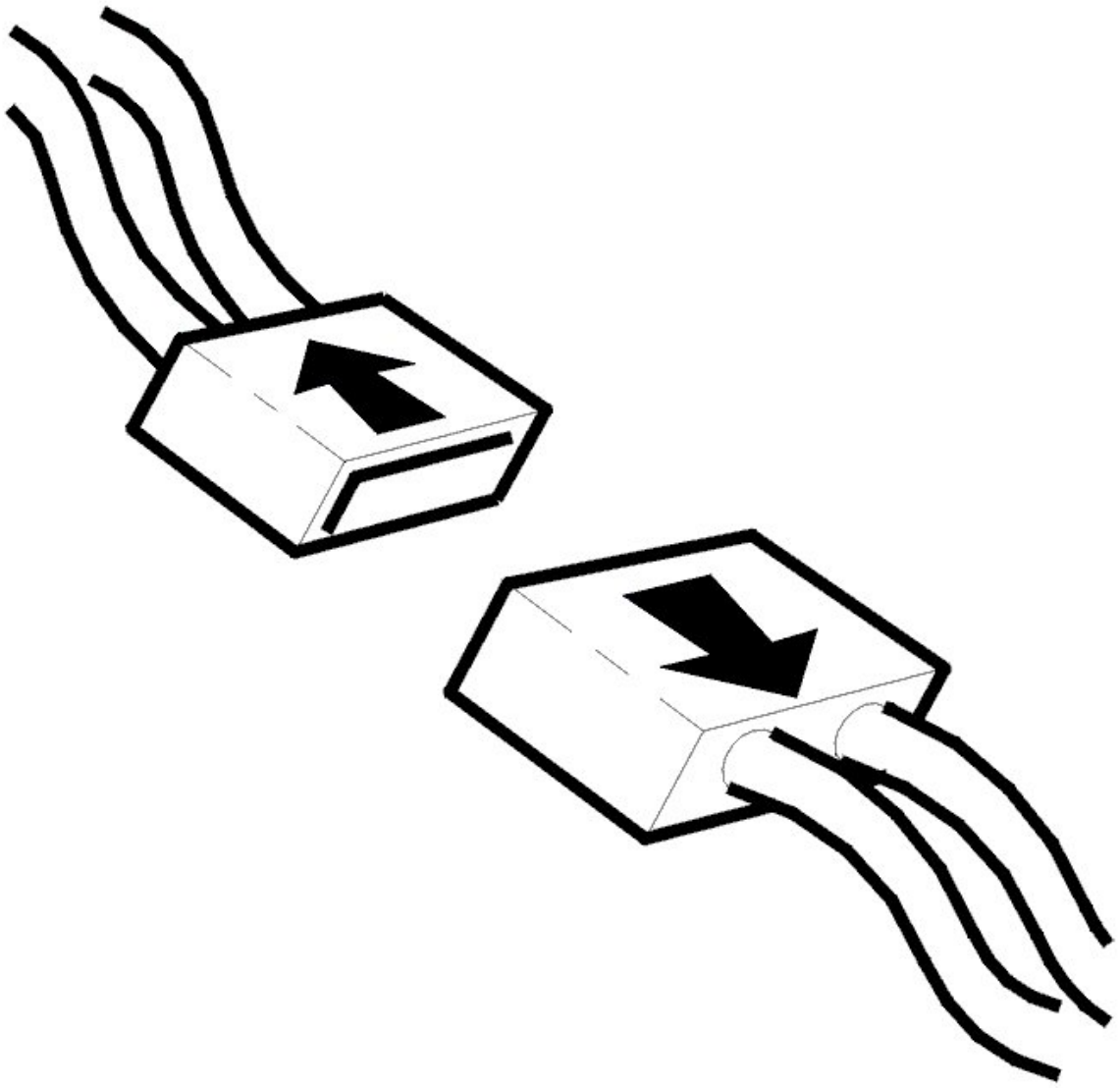
Was a fault detected?

Yes - Verification

No - Replacing a component

Replacing a component





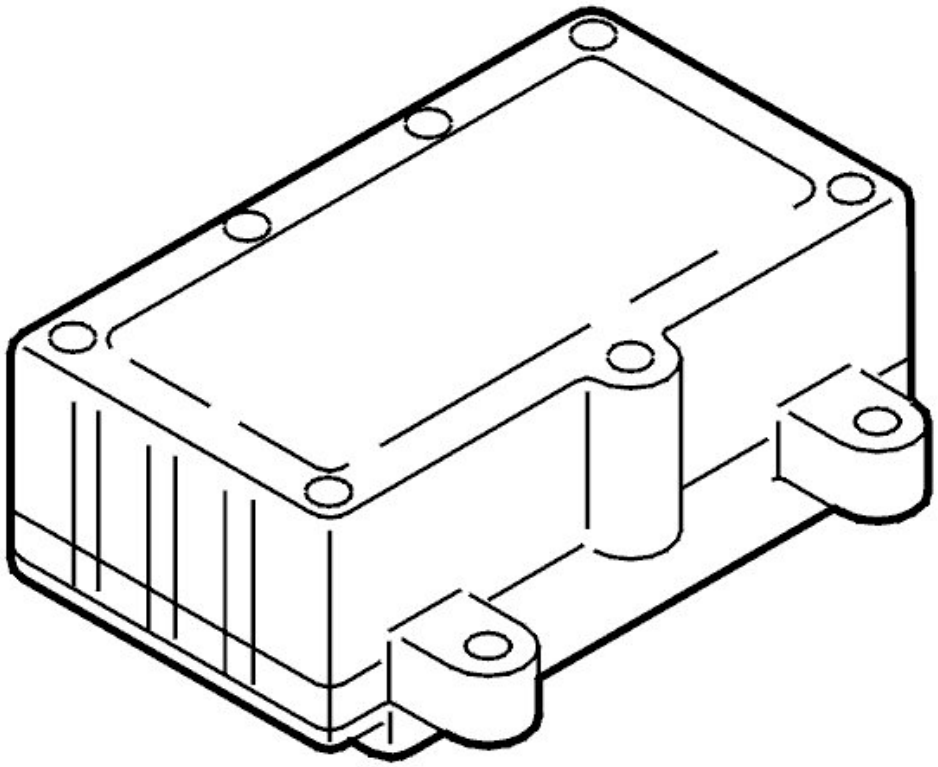
- Ignition off.

Caution! Avoid touching the pins in the control module and the corresponding connector on the cable harness. There is a risk of static discharge which could damage the control module. Discharge yourself and tools to be used by holding the tool's metal part and touching a body part on the car just before starting to work.

Replace the engine cooling fan (FC) control module if the engine cooling fan (FC) cannot be activated at all speeds and no faults have been found on wiring and connections.
Remedy as necessary.

Other information

- Engine cooling fan (FC), replacing See: Engine, Cooling and Exhaust/Cooling System/Radiator Cooling Fan/Service and Repair



Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-660B

Condition

If there is an open-circuit in the circuit controlling the malfunction indicator lamp (MIL) the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored.

Substitute value
- None.

Possible source
- Open-circuit in the signal cable
- Open-circuit in the power cable.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing - Permanent Fault

Signal missing. Permanent fault

Checking the component and wiring

Check the cable between Engine control module (ECM) #B46 and Driver information module (DIM) #2 for open circuit according to: Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
Remedy as necessary.

Other information
- To connect the breakout box to the Engine control module (ECM), see: Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To connect the breakout box to the driver information module (DIM), see: Connecting the breakout box See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout

Box, Driver Information Module (DIM)

- Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing
- Signal description engine control module (ECM): Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Signal description Driver information module (DIM): Signal specification See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Driver Information Module (DIM)

Continue.

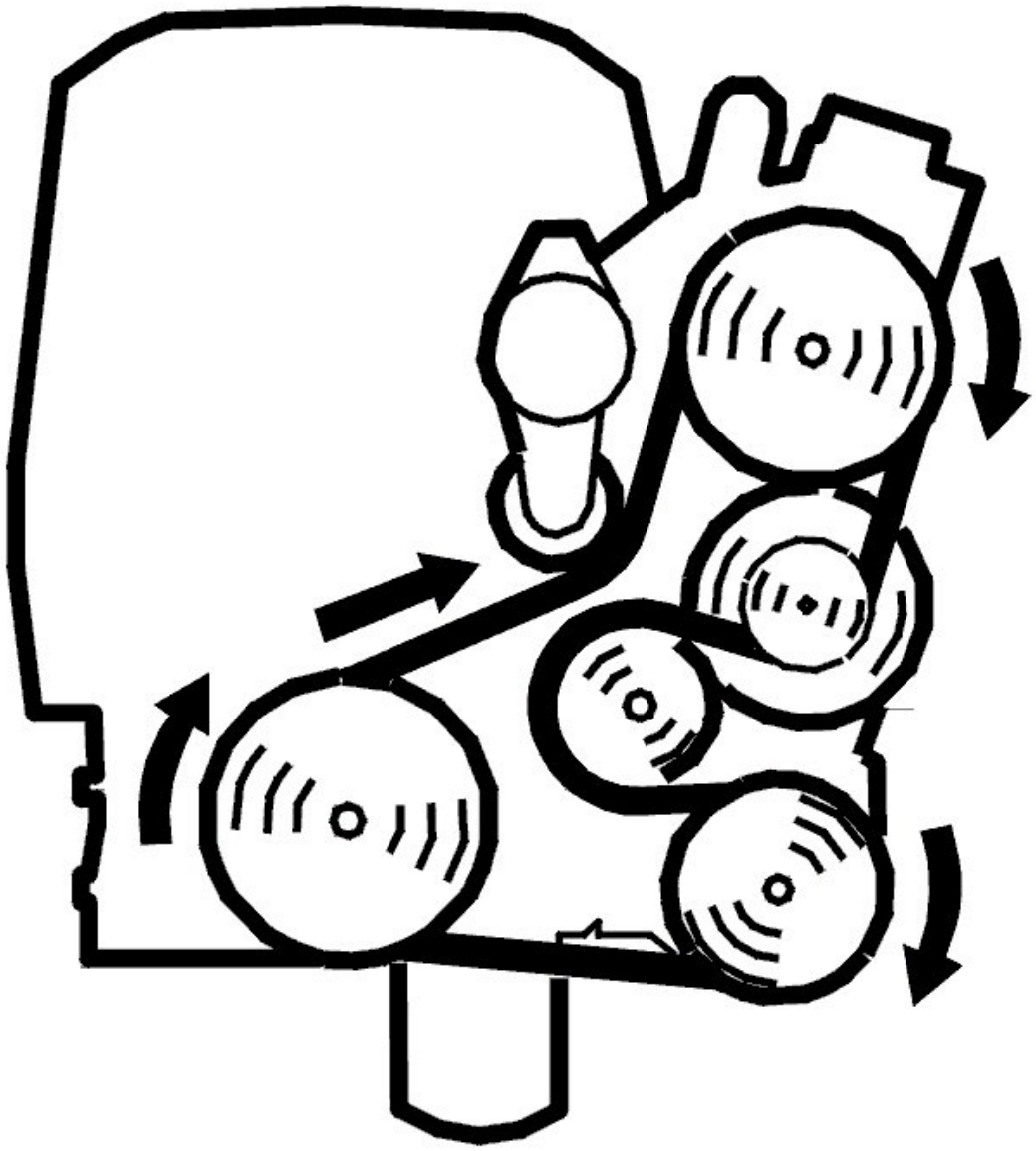
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Start the engine and let it run at idle speed
- Activate the malfunction indicator lamp (MIL)
- Check that the function is OK.

Is function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - VERIFIED

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the component and wiring

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-660C

Condition

If there is a short-circuit to supply voltage in the circuit for the malfunction indicator lamp (MIL) the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored.

Substitute value
- None.

Possible source
- Open-circuit in the ground lead.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High - Permanent Fault

Signal too high. Permanent fault

Checking component and wiring

Check the cable between Engine control module (ECM) #B46 and Driver information module (DIM) #2 for short-circuiting according to: Checking

wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
Remedy as necessary.

Other information:

- For connection of engine control module (ECM) breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To connect the breakout box to the Driver information module (DIM), see: Connecting the breakout box See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Driver Information Module (DIM)
- To access/replace the combined instrument panel, see Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

- Signal description Driver information module (DIM): Signal specification See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Driver Information Module (DIM)

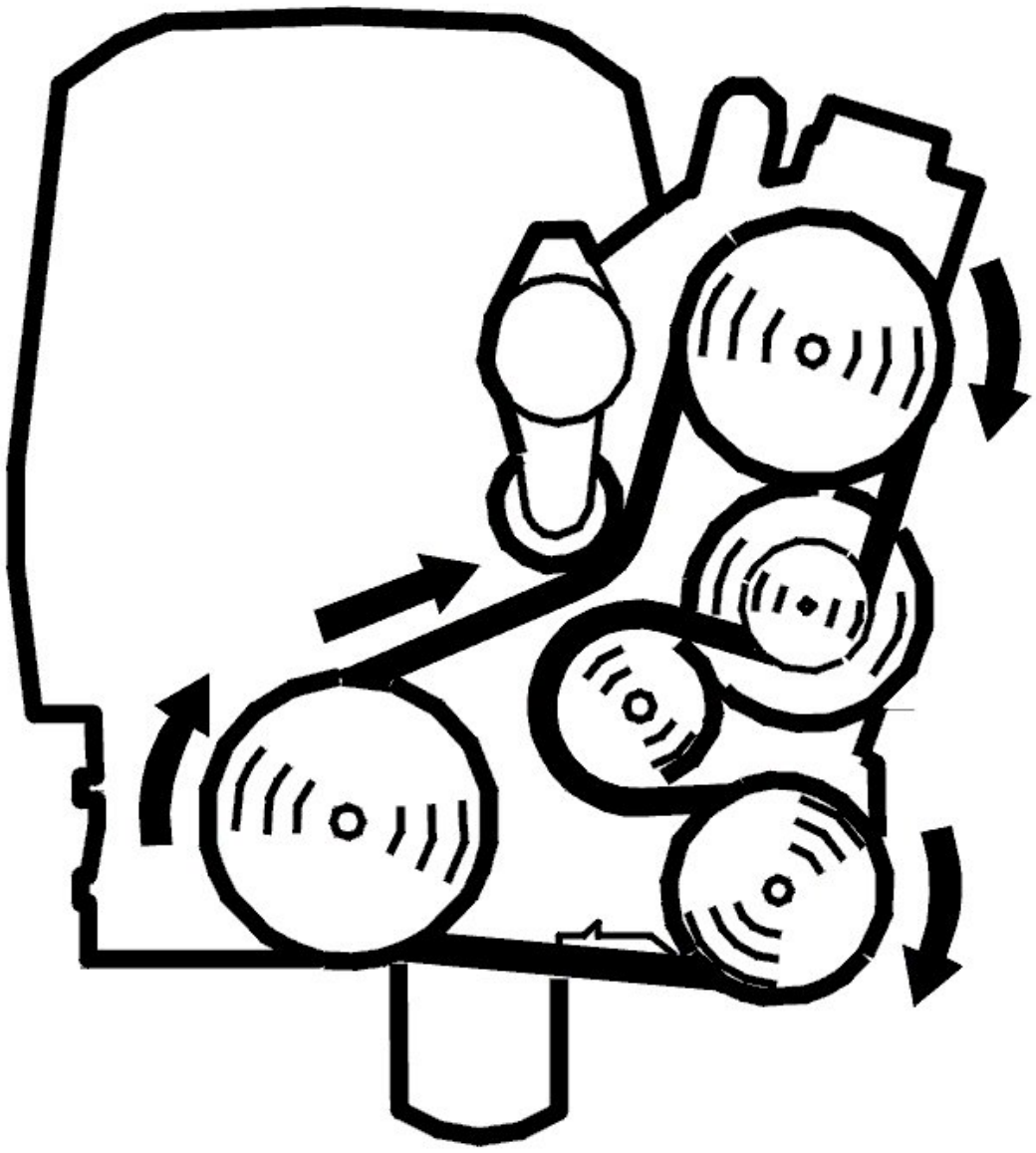
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off

- Reinstall the connectors, components etc.
- Start the engine and let it run at idle speed
- Activate the malfunction indicator lamp (MIL)
- Check that the function is OK.

Is function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-660D

Condition

If there is a short-circuit to ground in the circuit for the malfunction indicator lamp (MIL) the engine control module (ECM) interprets this as a fault and the diagnostic trouble code (DTC) is stored.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low - Permanent Fault

Signal too low. Permanent fault

Checking component and wiring

Check the cable between Engine control module (ECM) #B46 and Driver information module (DIM) #2 for short-circuiting to ground according to: Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
Remedy as necessary.

Other information:

- For connection of engine control module (ECM) breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To connect the breakout box to the Driver information module (DIM), see: Connecting the breakout box See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Driver Information Module (DIM)
- To access/replace the combined instrument panel, see Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification.

- Signal description Driver information module (DIM): Signal specification See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Driver Information Module (DIM)

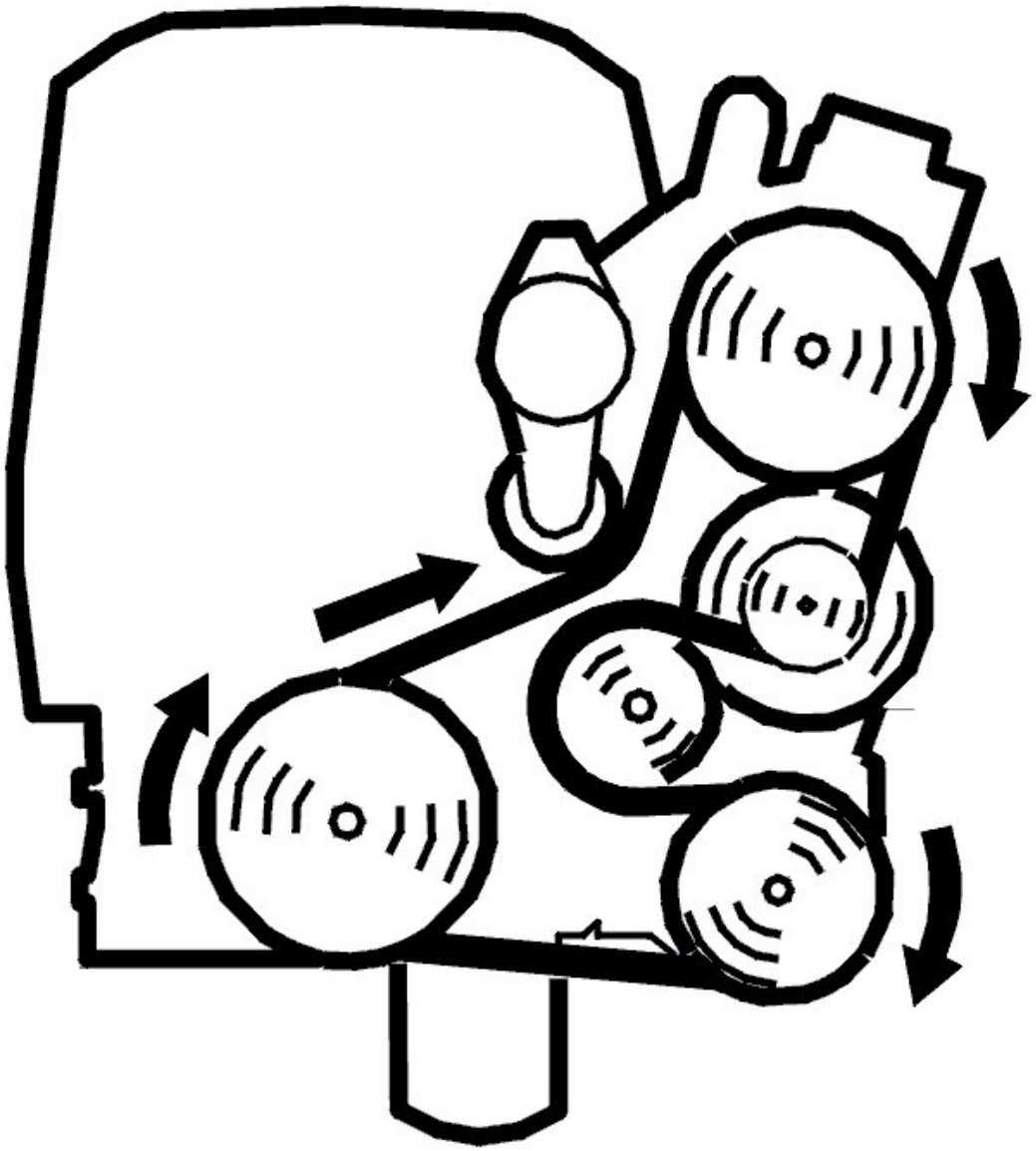
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Start the engine and let it run at idle speed
- Activate the malfunction indicator lamp (MIL)
- Check that the function is OK.

Is function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

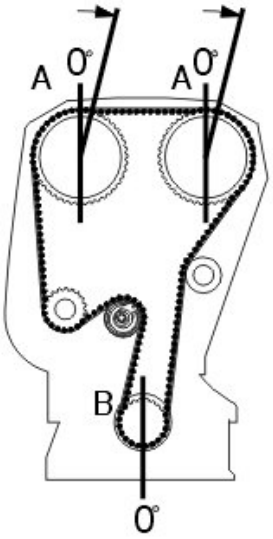
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-6700

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If the Engine control module (ECM) detects that the intake camshaft's angle position changes dramatically when idling, the Engine control module (ECM) interprets this as a fault and stores a DTC.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value
- The Engine control module (ECM) switches off camshaft control.

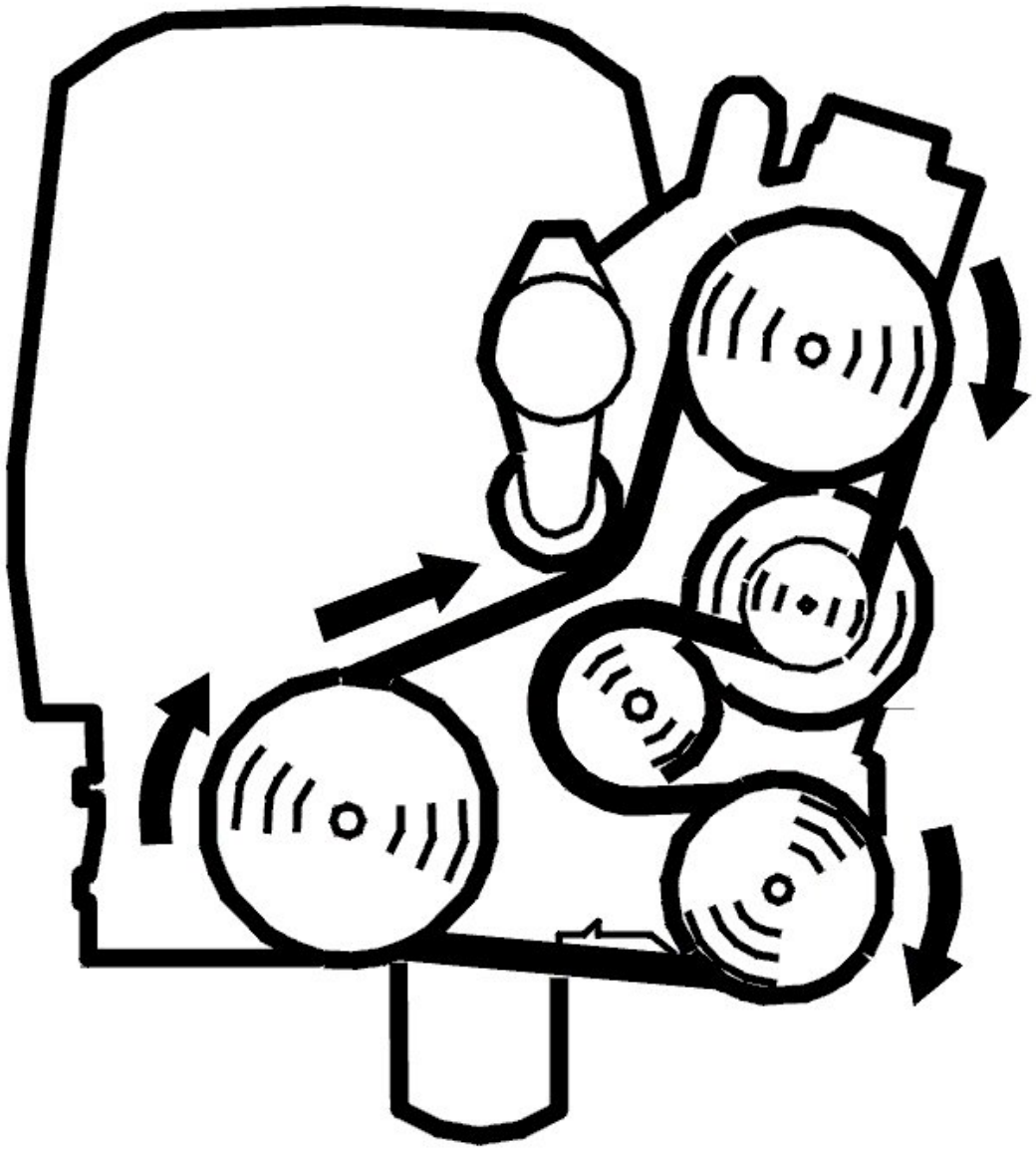
Possible source
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs
- Damaged camshaft reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-tracing

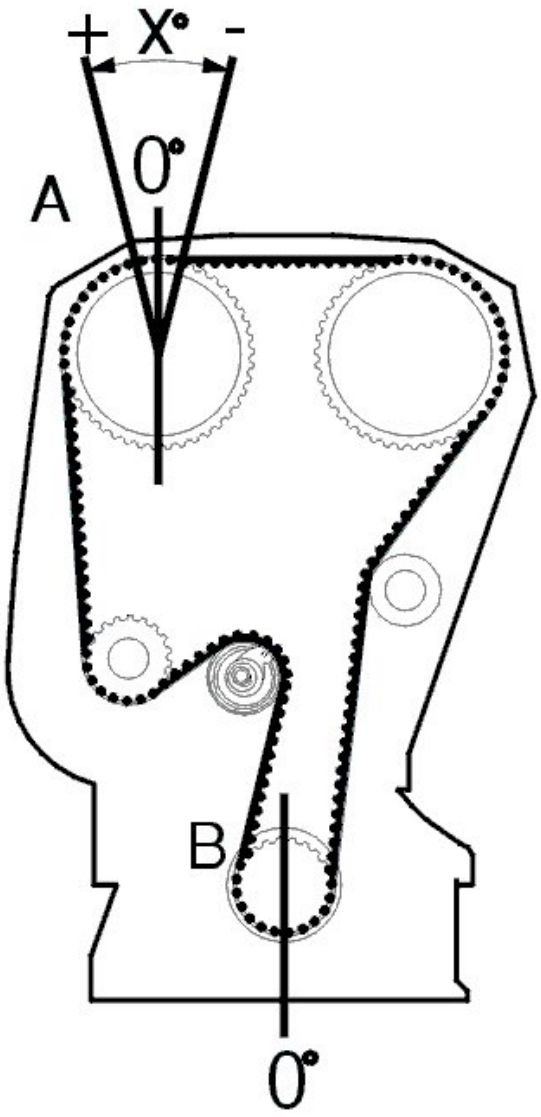
Fault-tracing

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Is the adaptation value correct?

Yes - Intermittent fault

No - Checking components

Checking components

For the variable valve timing control to work, the engine oil must be at the correct level, of the correct grade and free of contaminants. Check the level and quality of the engine oil. Check for contaminants in particular.
If the adaptation value is too high (higher than +8°) when the engine is at operating temperature, the cause of the fault is probably one of the following:

- Camshaft belt incorrectly seated
- Incorrect basic setting of the timing belt
- Faulty camshaft reset valve (the slide in the valve has stuck).

Try to adjust the basic setting of the camshaft. Then read off the adaptation value for the camshaft with the engine idling and at operating temperature. The value must be between -8° and +8°. If the adaptation value is incorrect when the basic setting of the camshaft is correct, try cleaning the camshaft reset valve.

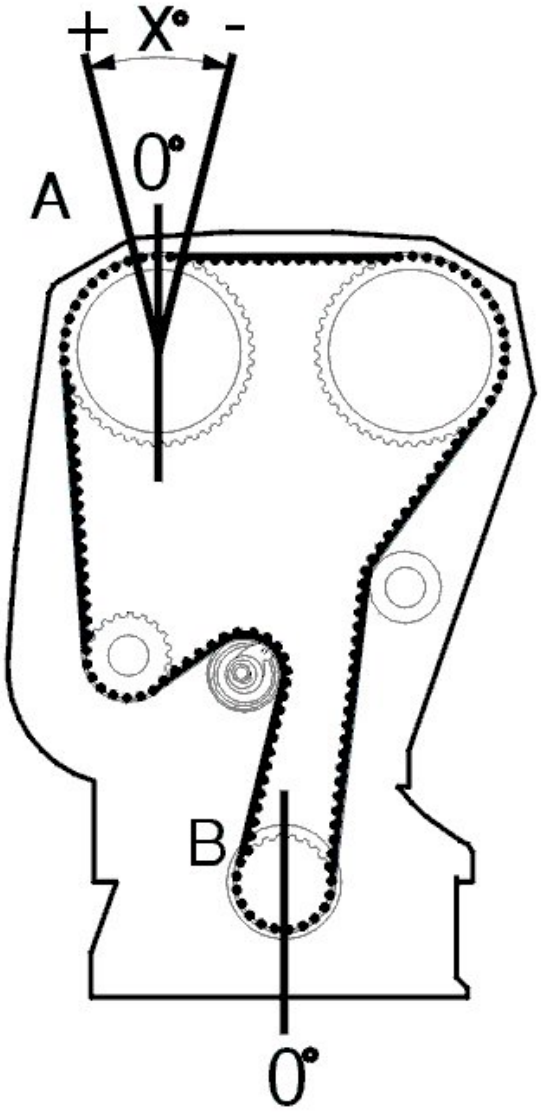
Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Try a new camshaft reset valve if the above fault-tracing does not solve the fault.
Remedy as necessary.

Hint: The fault can also be caused by a damaged variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- To adjust camshaft settings: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing



Continue - Verification

Intermittent fault

If the diagnostic trouble code (DTC) for this fault is stored but the adaptation value is correct, the fault is intermittent. Cause of the intermittent fault is probably a damaged camshaft reset valve.

Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing

- To adjust camshaft settings: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

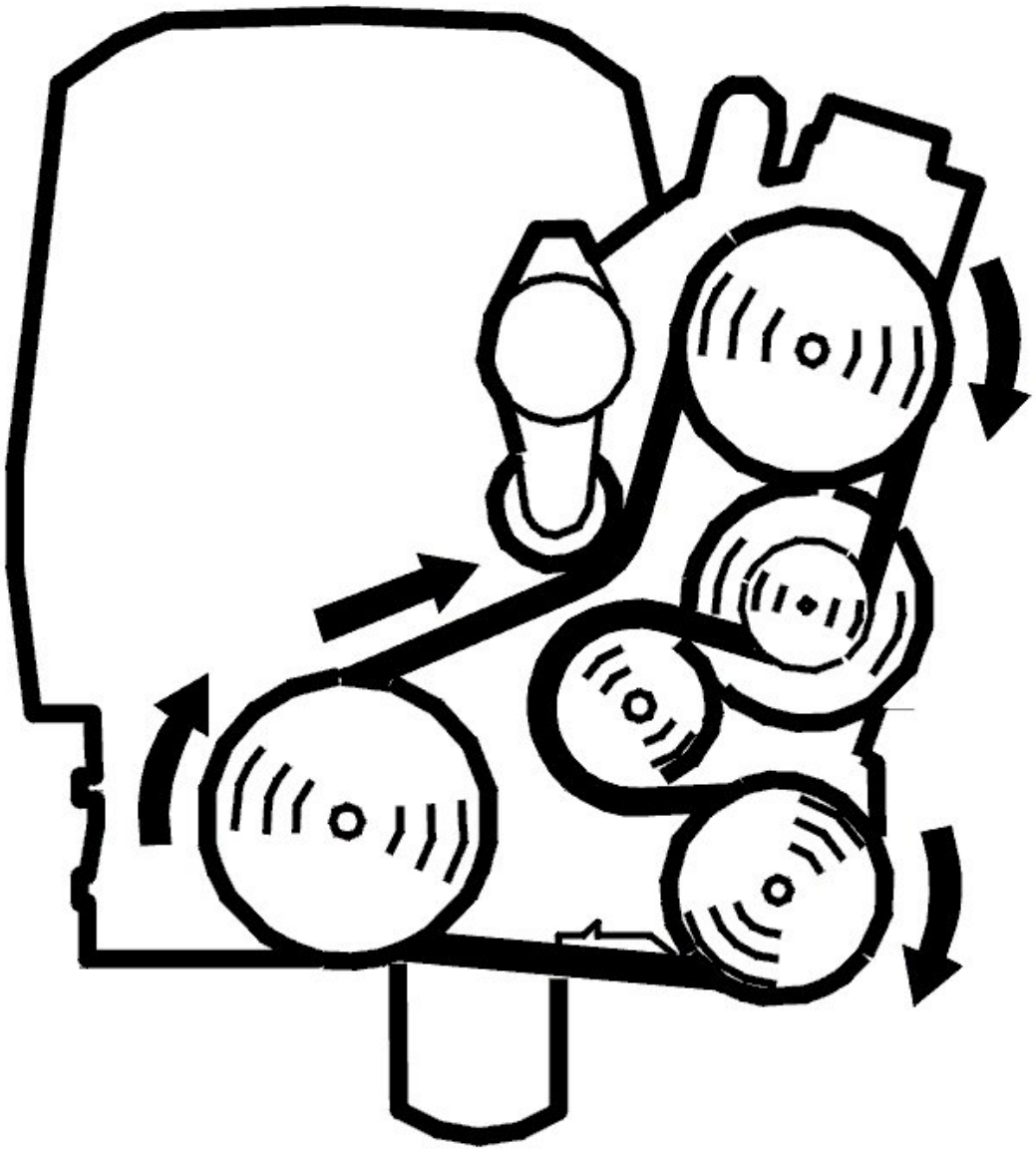
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

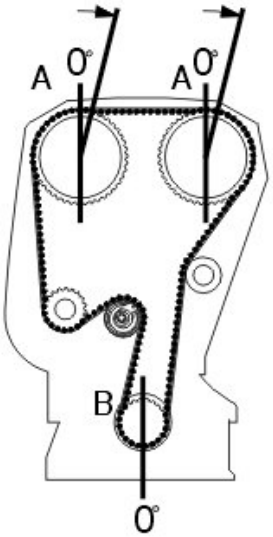
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-670C

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If the inlet camshaft's angle position deviates and is too high during adaption (camshaft is ahead of crankshaft), the Engine control module (ECM) will interpret this as a failure and store a diagnostic trouble code.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value

- The Engine control module (ECM) switches off camshaft control.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Possible source

- Poor engine oil quality
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs
- Damaged camshaft reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

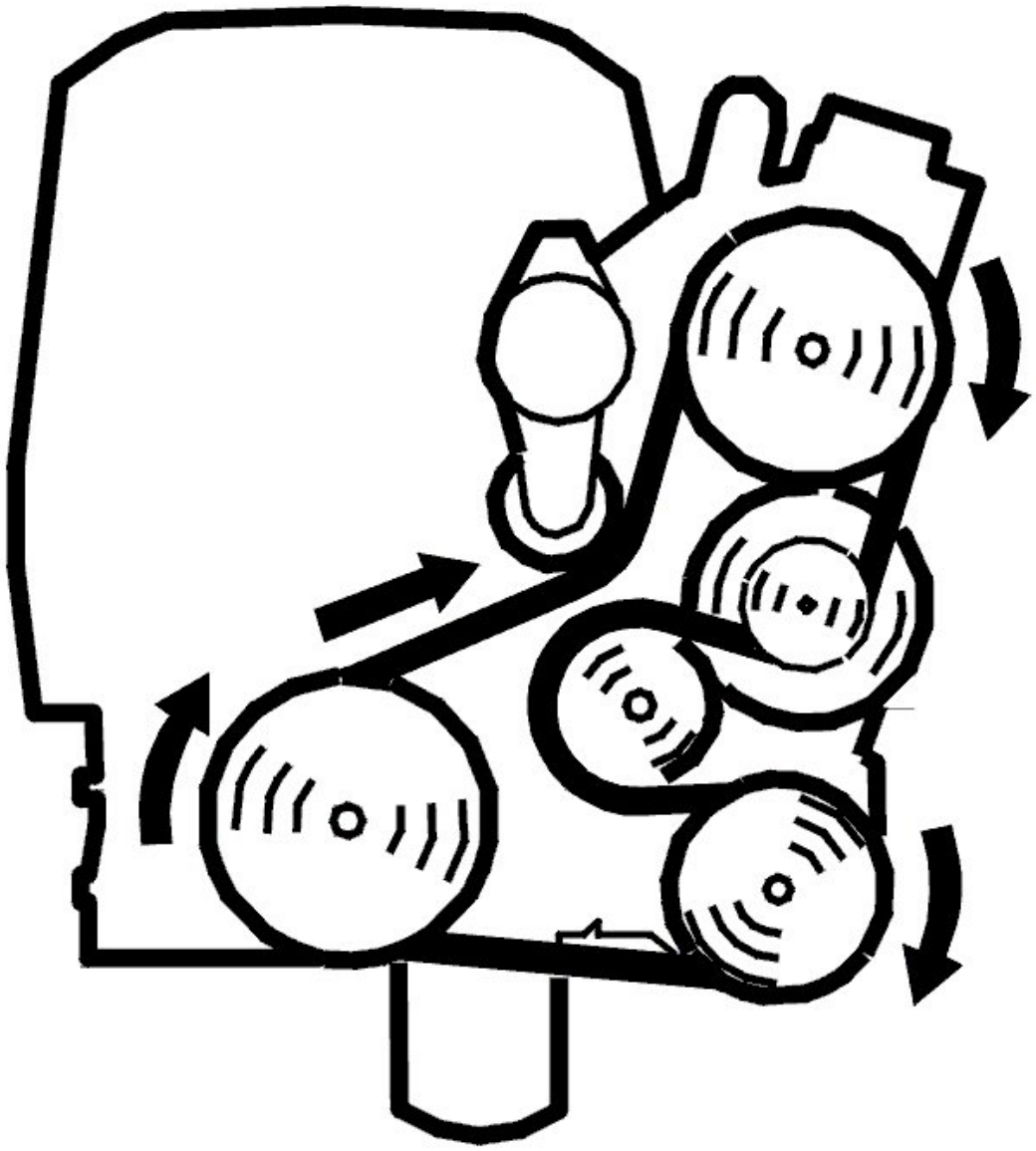
Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

High

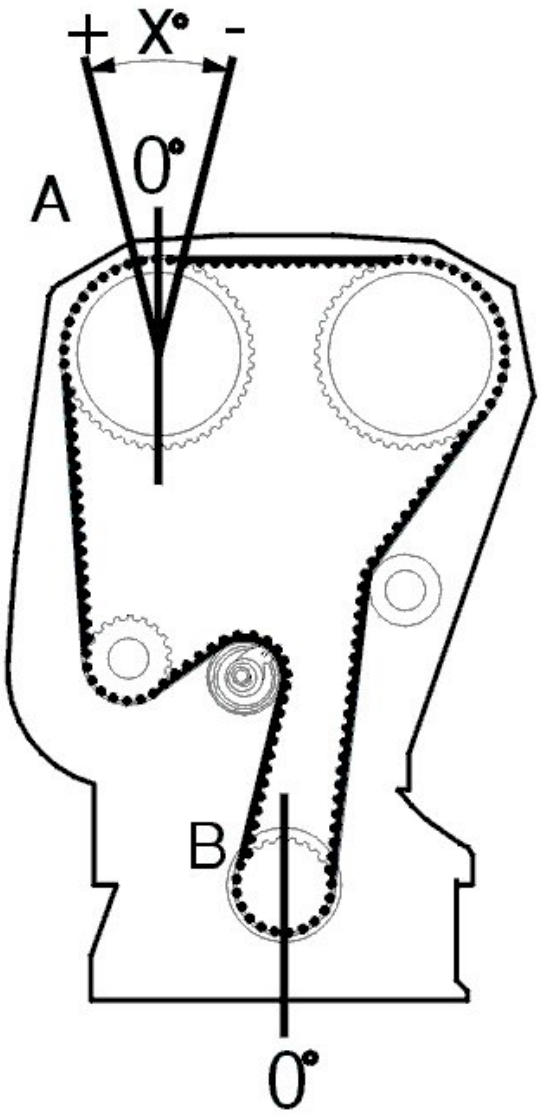
High

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Is the adaptation value correct?

Yes - Intermittent fault

No - Checking components

Checking components

For the variable valve timing control to work, the engine oil must be at the correct level, of the correct grade and free of contaminants. Check the level and quality of the engine oil. Check for contaminants in particular.
If the adaptation value is too high (higher than +8°) when the engine is at operating temperature, the cause of the fault is probably one of the following:

- Camshaft belt incorrectly seated
- Incorrect basic setting of the timing belt
- Faulty camshaft reset valve (the slide in the valve has stuck).

Try to adjust the basic setting of the camshaft. Then read off the adaptation value for the camshaft with the engine idling and at operating temperature. The value must be between -8° and +8°. If the adaptation value is incorrect when the basic setting of the camshaft is correct, try cleaning the camshaft reset valve.

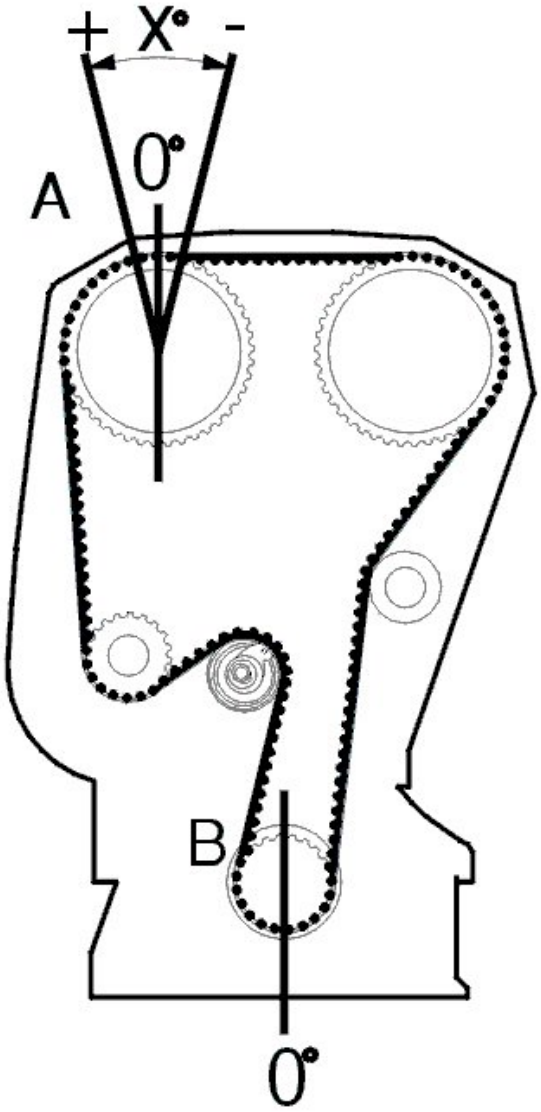
Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Try a new camshaft reset valve if the above fault-tracing does not solve the fault.
Remedy as necessary.

Hint: The fault can also be caused by a damaged variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing



Continue - Verification

Intermittent fault

If the diagnostic trouble code (DTC) for this fault is stored but the adaptation value is correct, the fault is intermittent. Cause of the intermittent fault is probably a damaged camshaft reset valve.

Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing

- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

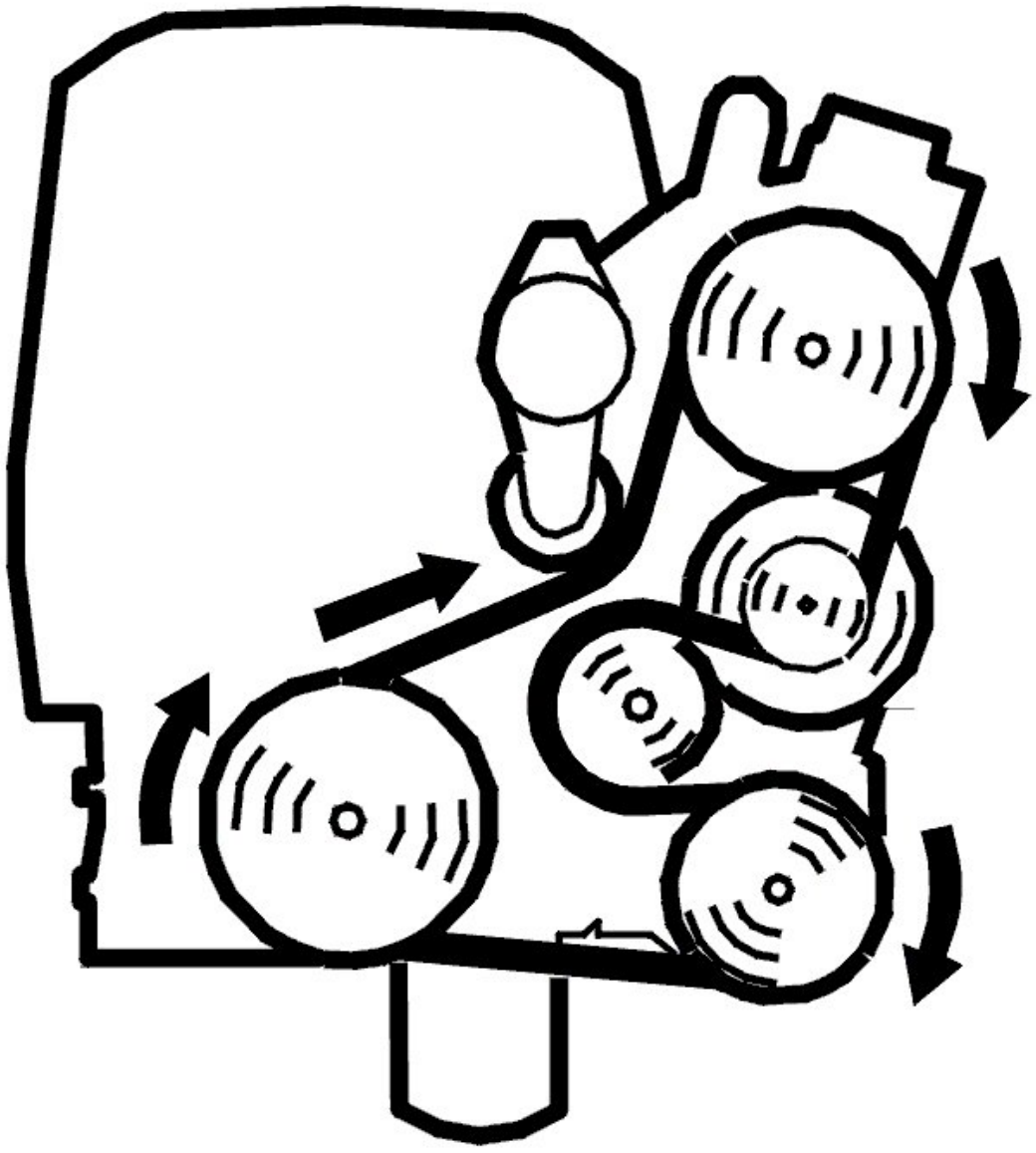
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

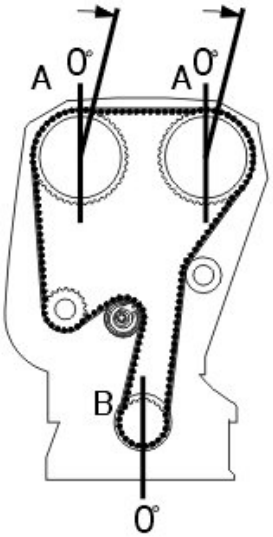
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-670D

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If the intake camshaft's angle position deviates and is too low (the camshaft is "after" the crankshaft) during fuel trim, the Engine control module (ECM) interprets this as a fault and stores a DTC.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value

- None. The Engine control module (ECM) switches off camshaft control.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Possible source

- Poor engine oil quality
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs.
- Air conditioning (A/C) compressor. Damaged camshaft reset valve.
- Mechanical fault in the variable valve timing (VVT) unit.

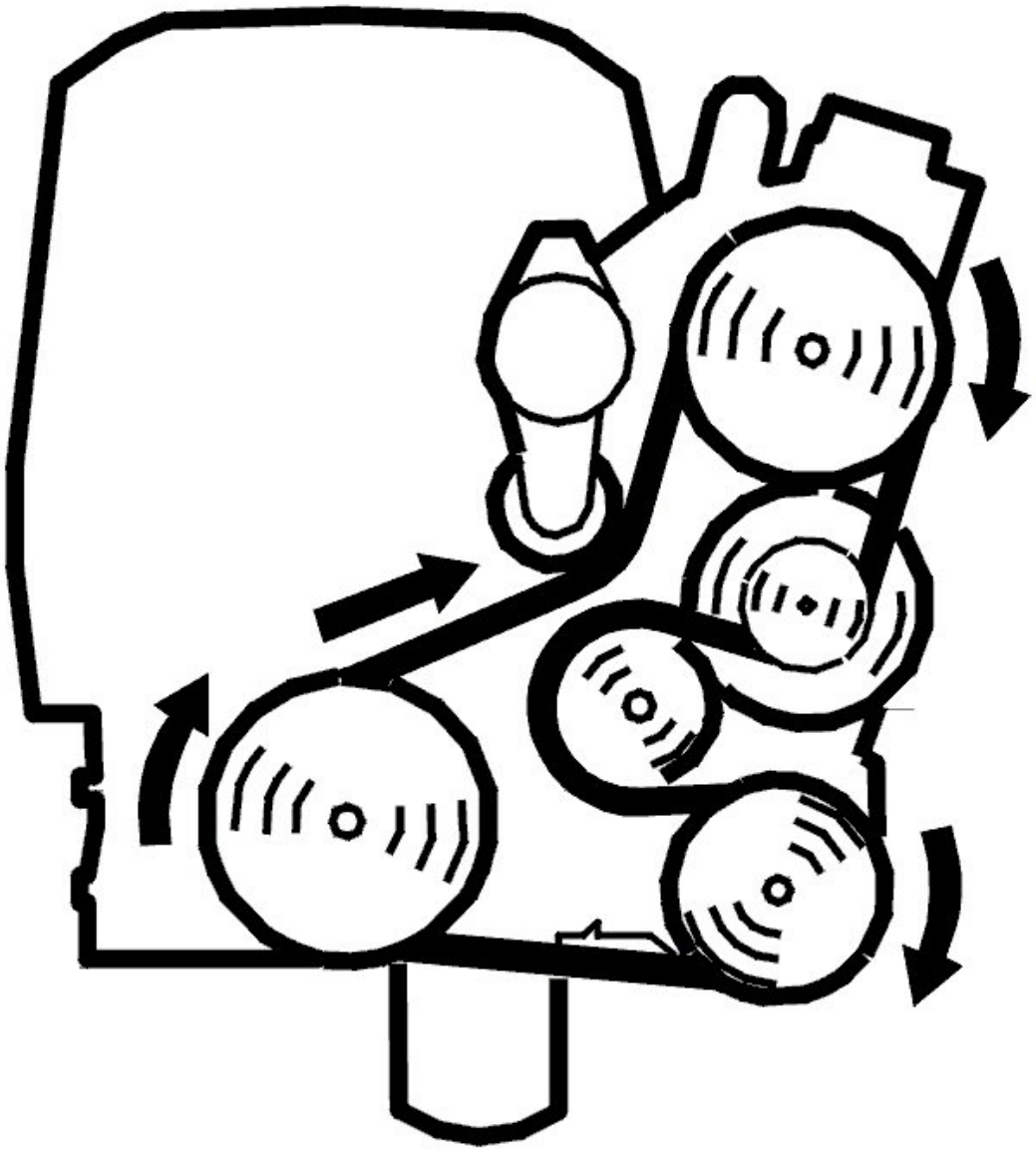
Fault symptom[s]

- Malfunction indicator lamp (MIL) lit.

Low

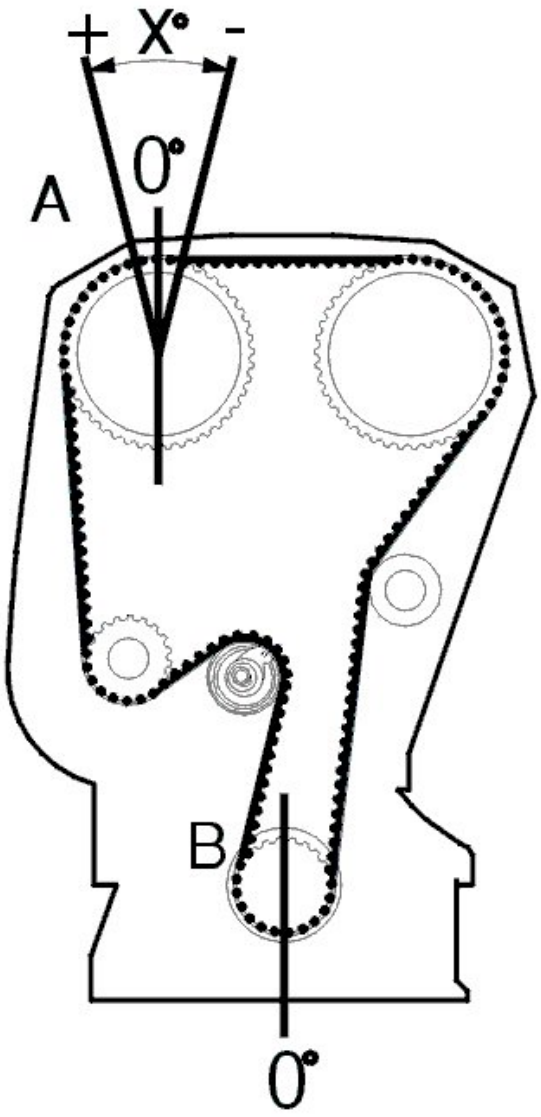
Low

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Continue - Checking components

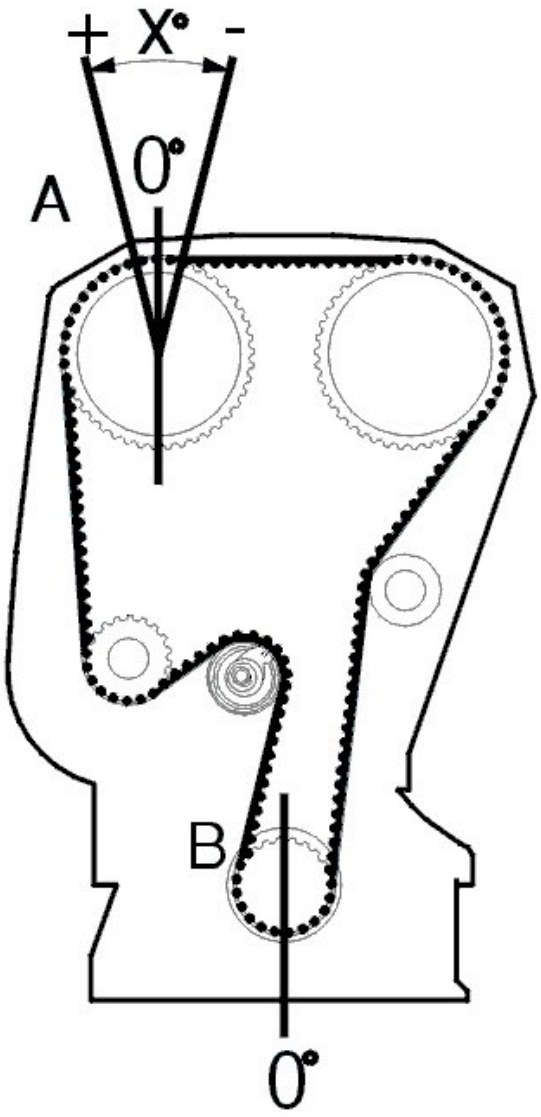
Checking components

For the variable valve timing control to work, the engine oil must be at the correct level, of the correct grade and free of contaminants.
Check the level and quality of the engine oil. Check for contaminants in particular.
Adjust the camshaft settings.

Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Other information:

- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



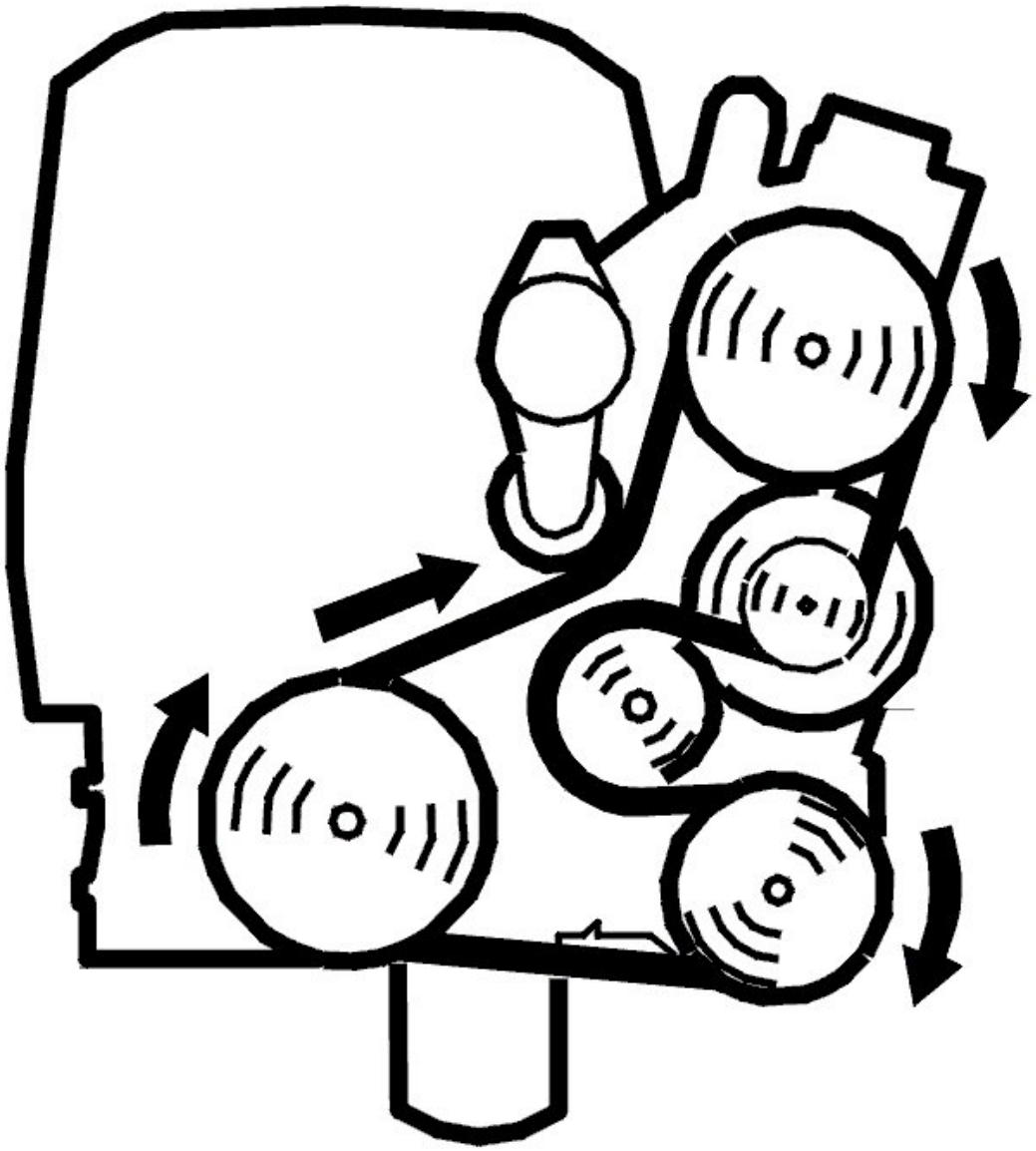
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

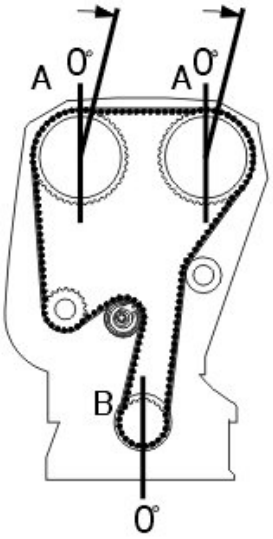
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-6710

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If Engine control module (ECM) detects that the exhaust camshaft's angle position changes dramatically during running, then Engine control module will interpret this as a failure and store a diagnostic trouble code.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value
- The Engine control module (ECM) switches off camshaft control.

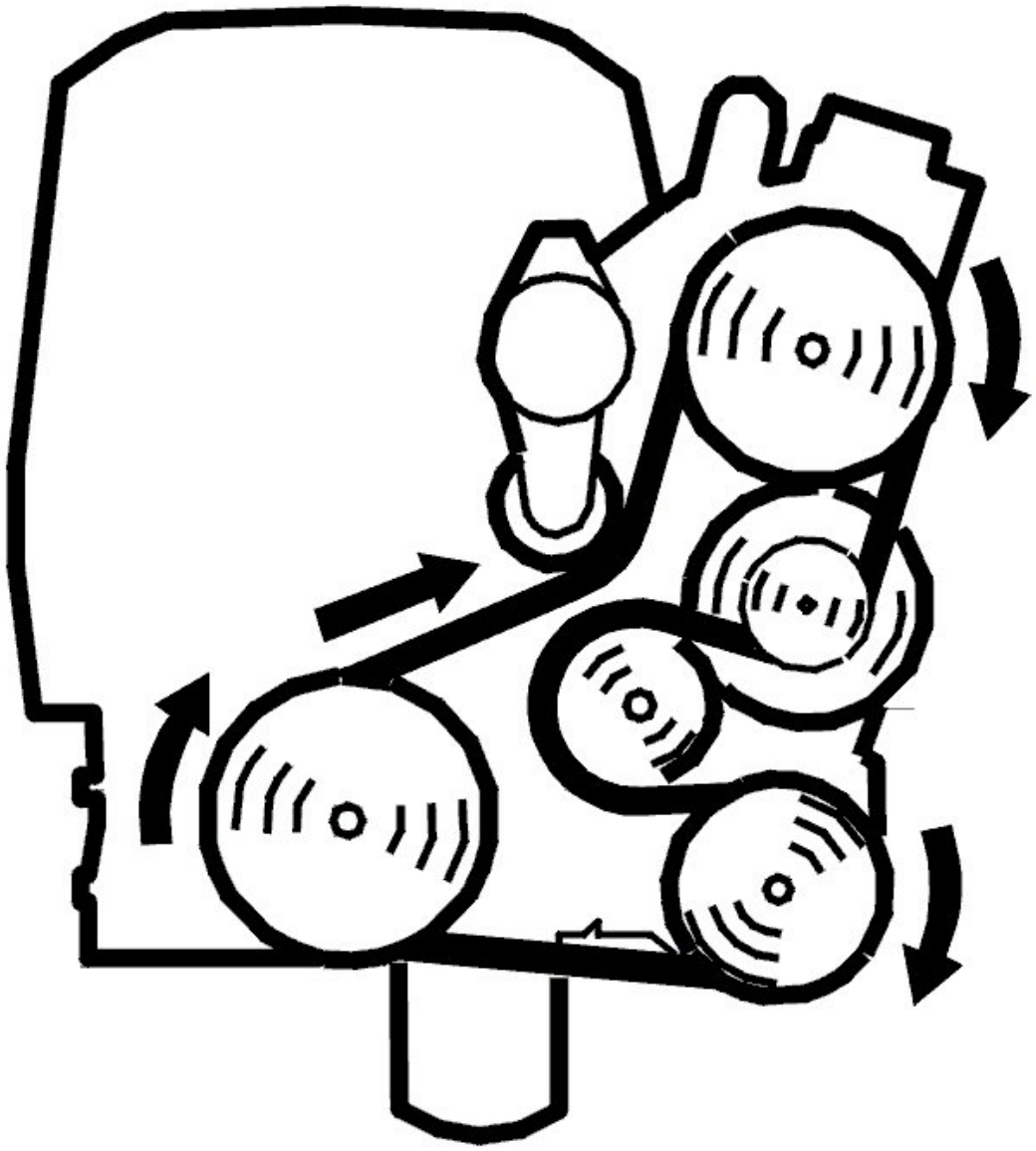
Possible source
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs
- Damaged camshaft reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-tracing

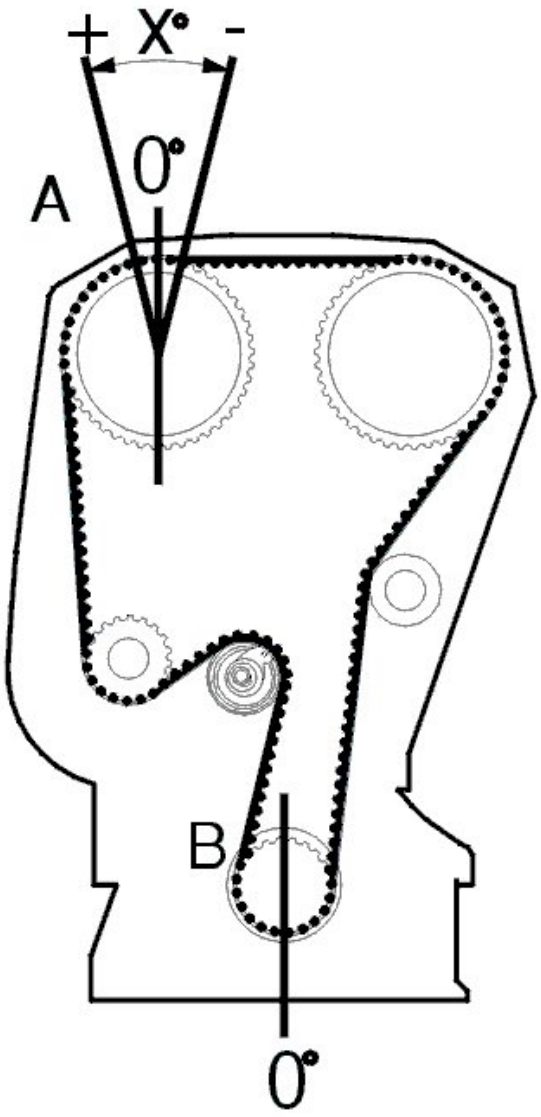
Fault-tracing

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Is the adaptation value correct?

Yes - Intermittent fault

No - Checking components

Checking components

For the variable valve timing control to work, the engine oil must be at the correct level, of the correct grade and free of contaminants.
Check the level and quality of the engine oil. Check for contaminants in particular.
If the adaptation value is too high (higher than +8°) when the engine is at operating temperature, the cause of the fault is probably one of the following:

- Camshaft belt incorrectly seated
- Incorrect basic setting of the timing belt
- Faulty camshaft reset valve (the slide in the valve has stuck).

Hint: Try to adjust the basic setting of the camshaft. Then read off the adaptation value for the camshaft with the engine idling and at operating temperature. The value must be between -8° and +8°. If the adaptation value is incorrect when the basic setting of the camshaft is correct, try cleaning the camshaft reset valve.

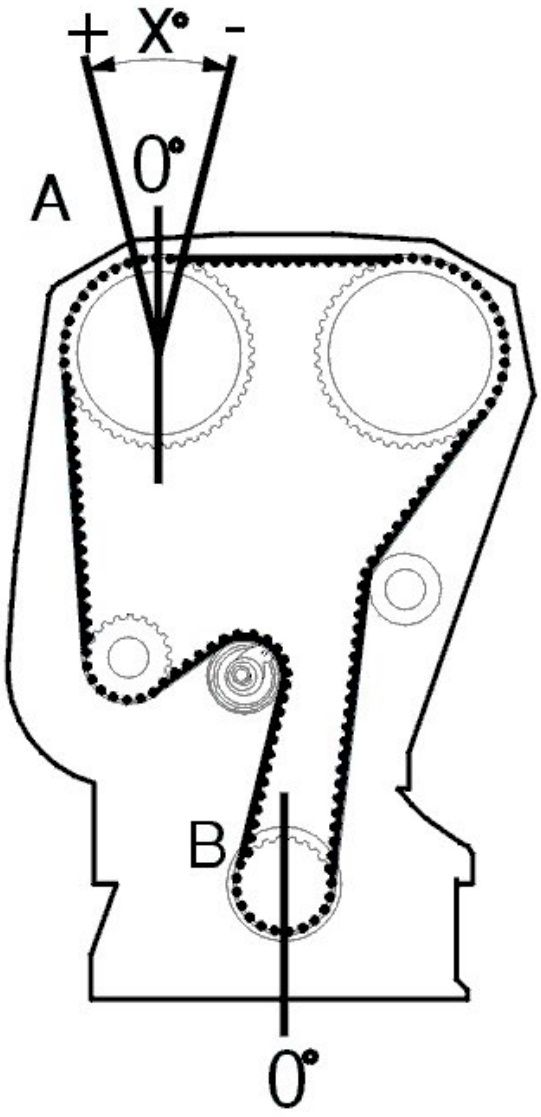
Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Try a new camshaft reset valve if the above fault-tracing does not solve the fault.
Remedy as necessary.

Hint: The fault can also be caused by a damaged variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing



Continue - Verification

Intermittent fault

If the diagnostic trouble code (DTC) for this fault is stored but the adaptation value is correct, the fault is intermittent. Cause of the intermittent fault is probably a damaged camshaft reset valve.

Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning

- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

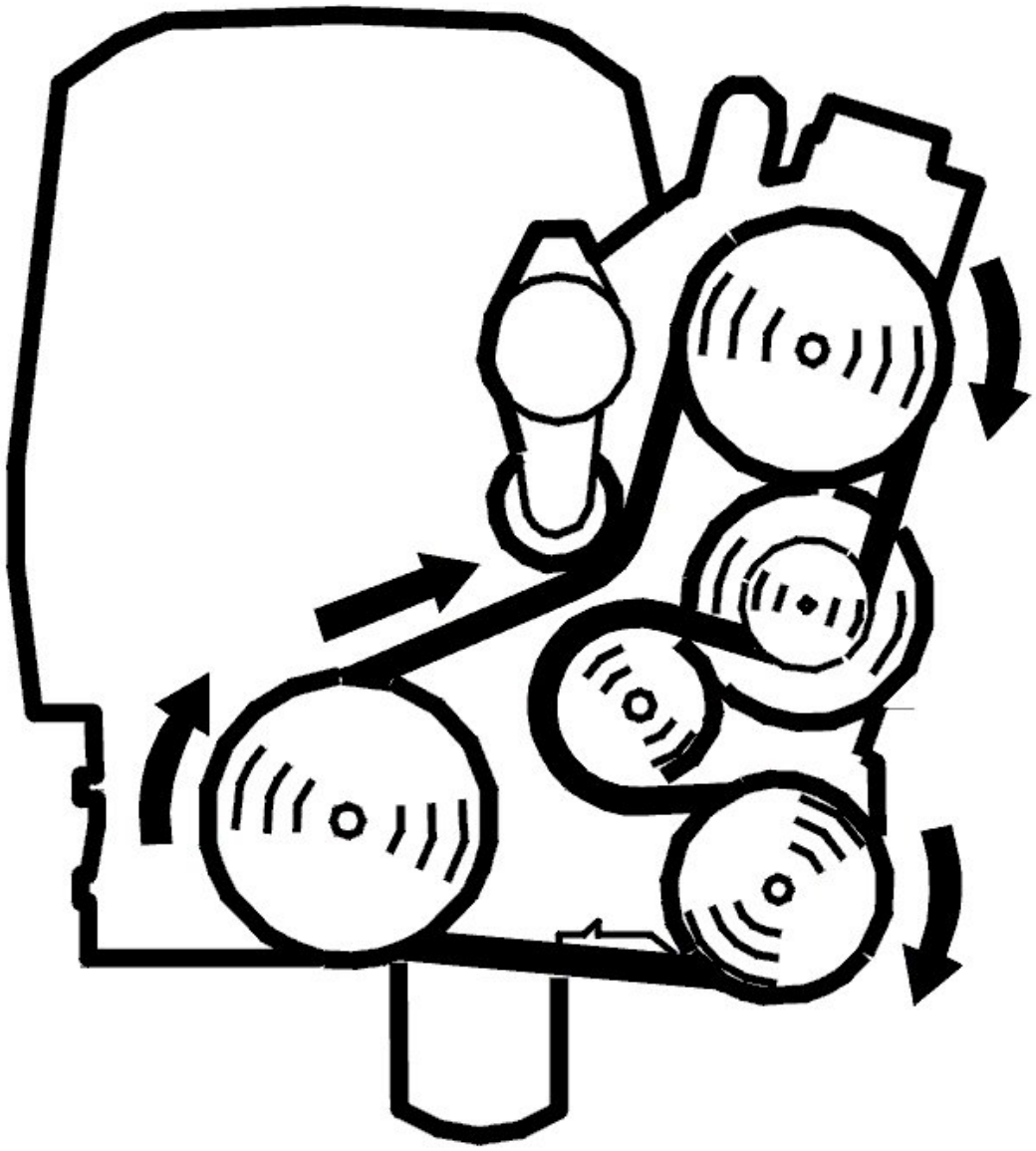
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

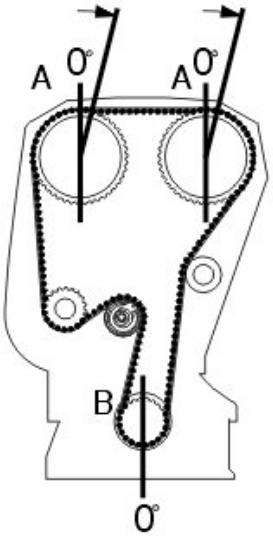
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-671C

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If the exhaust camshaft's angle position deviates and is too high during adaption (camshaft is ahead of crankshaft), the Engine control module (ECM) will interpret this as a failure and store a diagnostic trouble code.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value

- The Engine control module (ECM) switches off camshaft control.

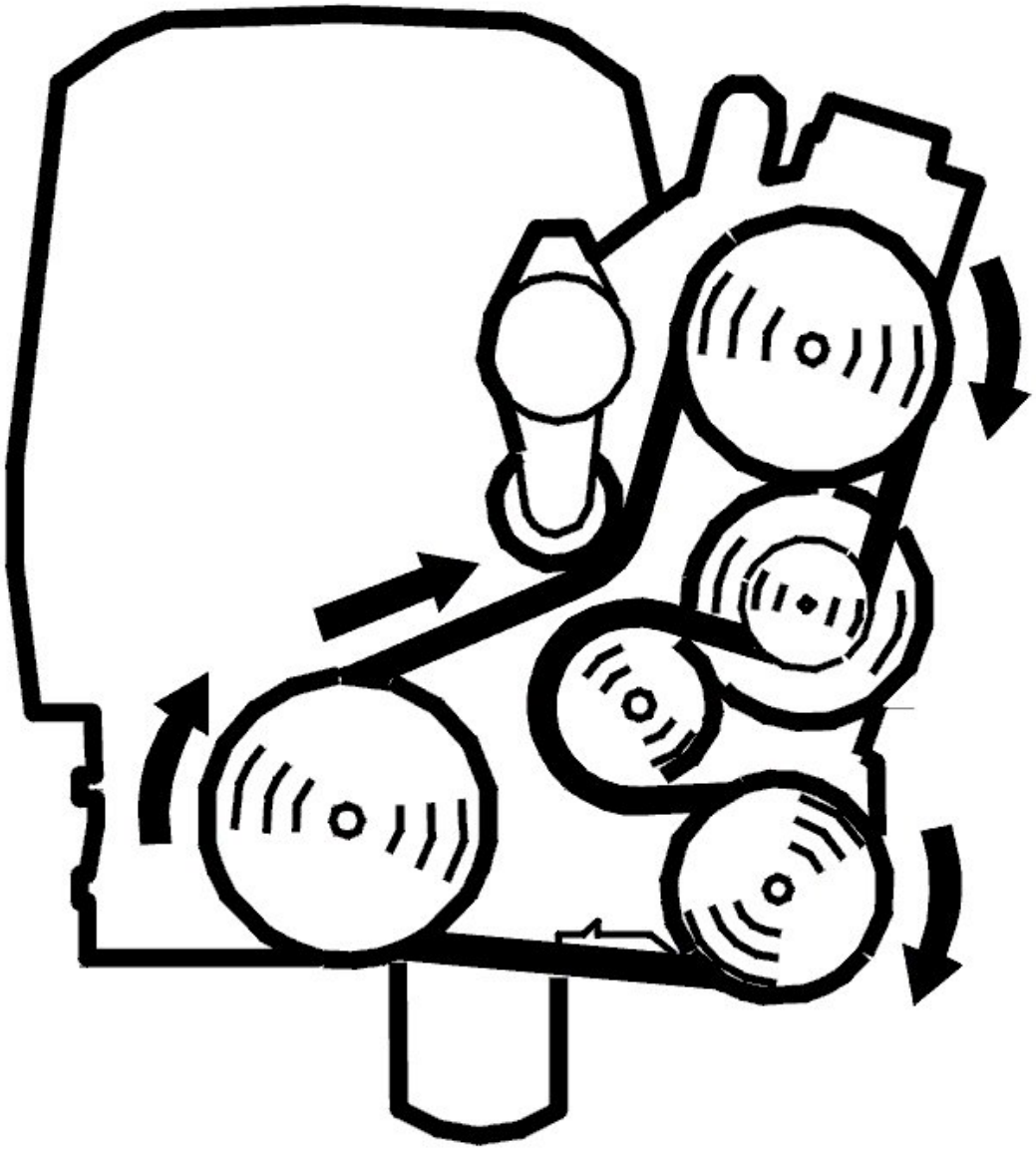
Possible source
- Poor engine oil quality
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs
- Damaged camshaft reset valve
- Mechanical fault in the variable valve timing (VVT) unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

High

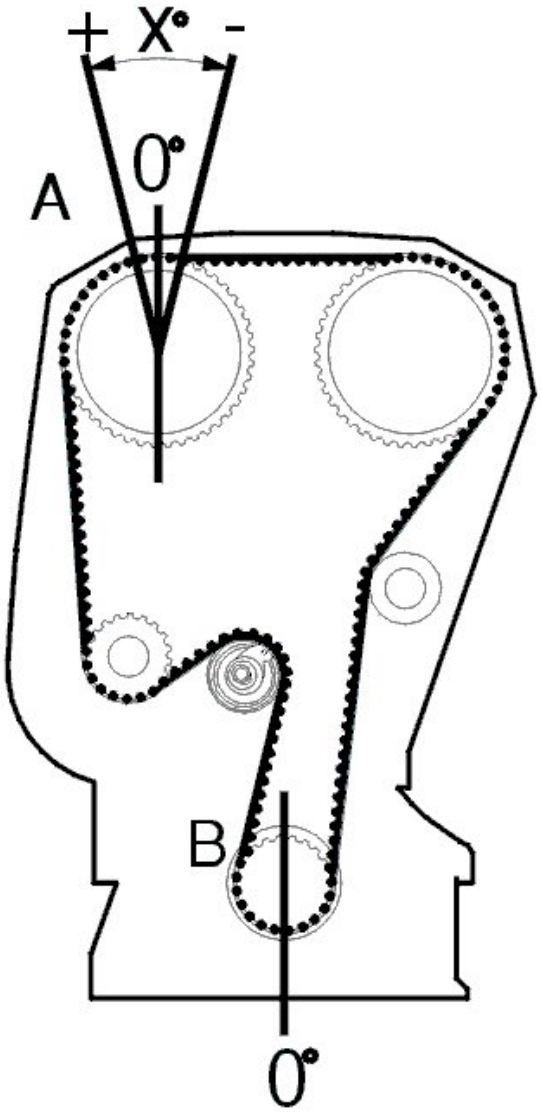
High

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Is the adaptation value correct?

Yes - Intermittent fault

No - Checking components

Checking components

For the variable valve timing control to work, the engine oil must be at the correct level, of the correct grade and free of contaminants.
Check the level and quality of the engine oil. Check for contaminants in particular.
If the adaptation value is too high (higher than +8°) when the engine is at operating temperature, the cause of the fault is probably one of the following:

- Camshaft belt incorrectly seated
- Incorrect basic setting of the timing belt
- Faulty camshaft reset valve (the slide in the valve has stuck).

Hint: Try to adjust the basic setting of the camshaft. Then read off the adaptation value for the camshaft with the engine idling and at operating temperature. The value must be between -8° and +8°. If the adaptation value is incorrect when the basic setting of the camshaft is correct, try cleaning the camshaft reset valve.

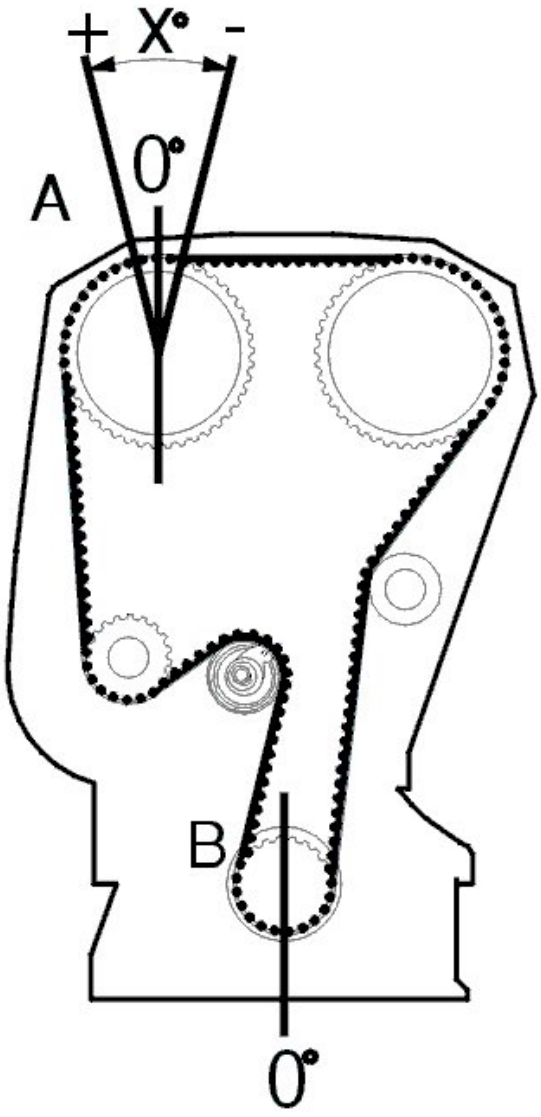
Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Try a new camshaft reset valve if the above fault-tracing does not solve the fault.
Remedy as necessary.

Hint: The fault can also be caused by a damaged variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing



Continue - Verification

Intermittent fault

If the diagnostic trouble code (DTC) for this fault is stored but the adaptation value is correct, the fault is intermittent. Cause of the intermittent fault is probably a damaged camshaft reset valve.

Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning

- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

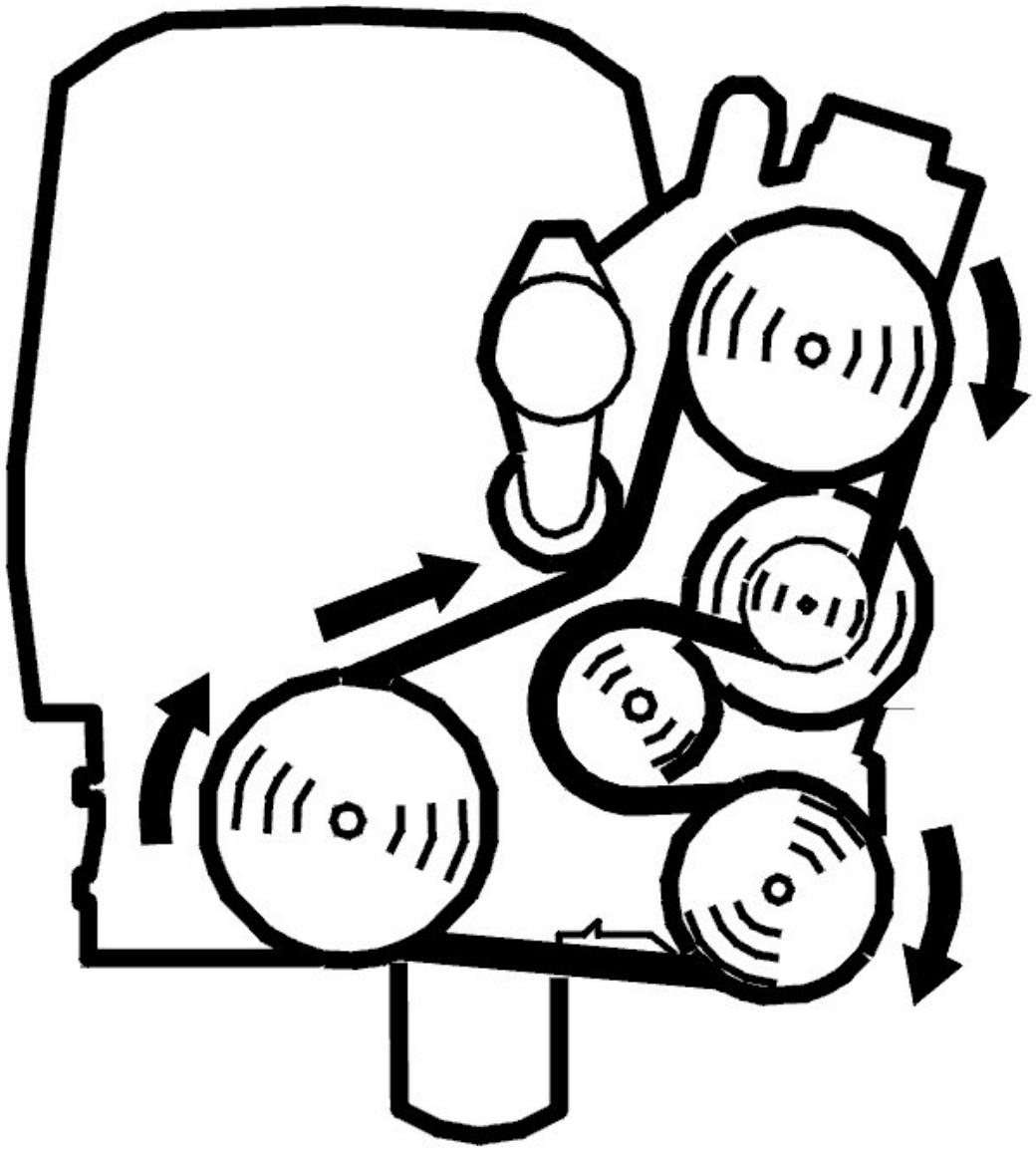
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

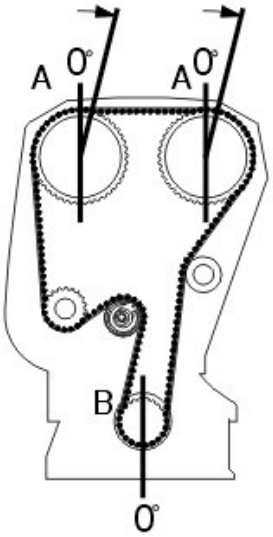
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-671D

Condition



The engine control module (ECM) checks the angle of the camshaft (its position in relation to the crankshaft).
If the exhaust camshaft's angle position deviates and is too low during adaption (camshaft is behind of crankshaft), the Engine control module (ECM) will interpret this as a failure and store a diagnostic trouble code.
The diagnostic trouble code (DTC) can be diagnosed when the engine is hot and the camshaft is in position 0.
For more information, see Design and Function.

Substitute value

- The Engine control module (ECM) switches off camshaft control.

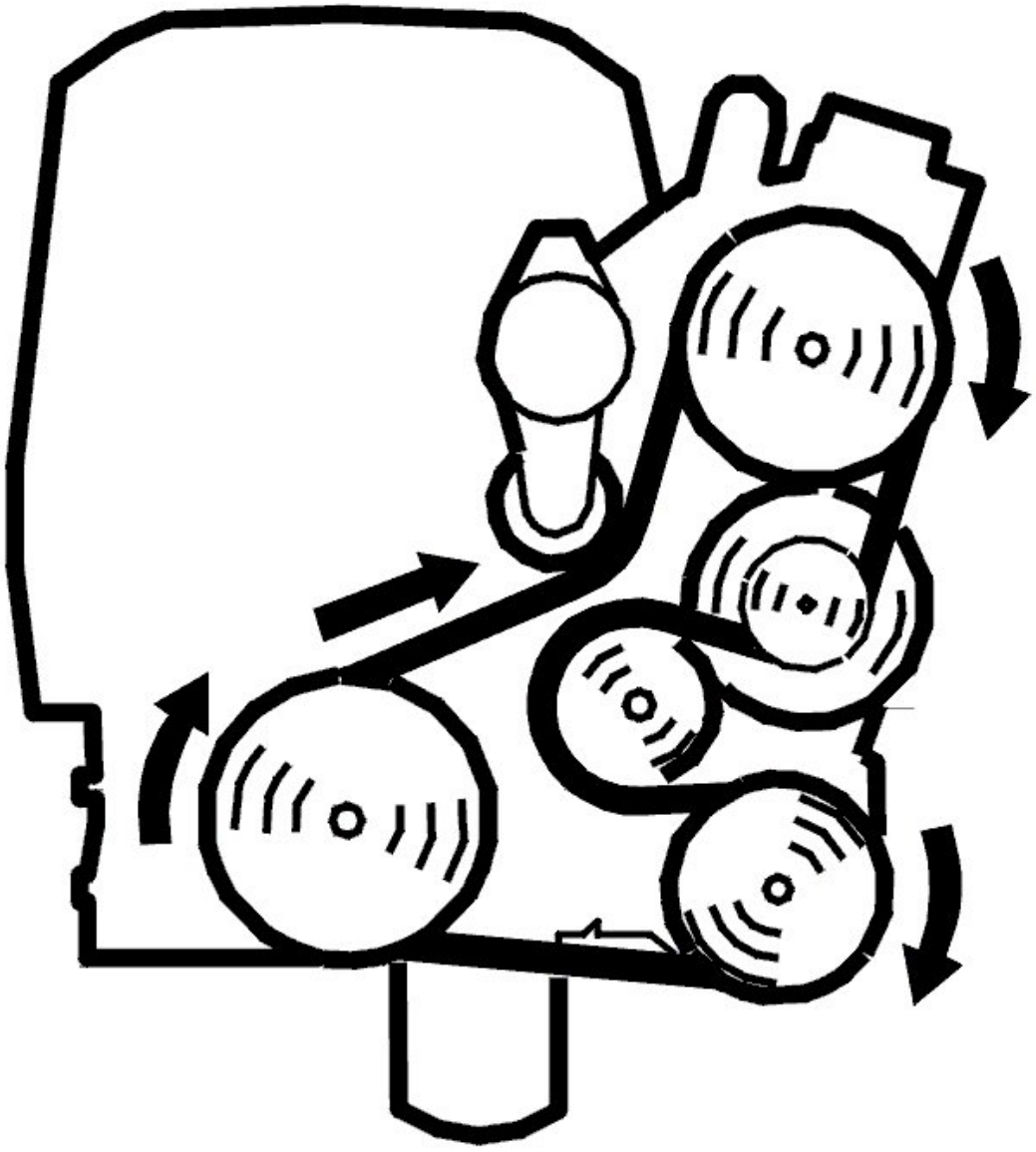
Possible source
- Poor engine oil quality
- Incorrectly adjusted camshafts
- The timing gear belt has jumped off the cogs.
- Damaged camshaft reset valve.
- Mechanical fault in the variable valve timing (VVT) unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Low

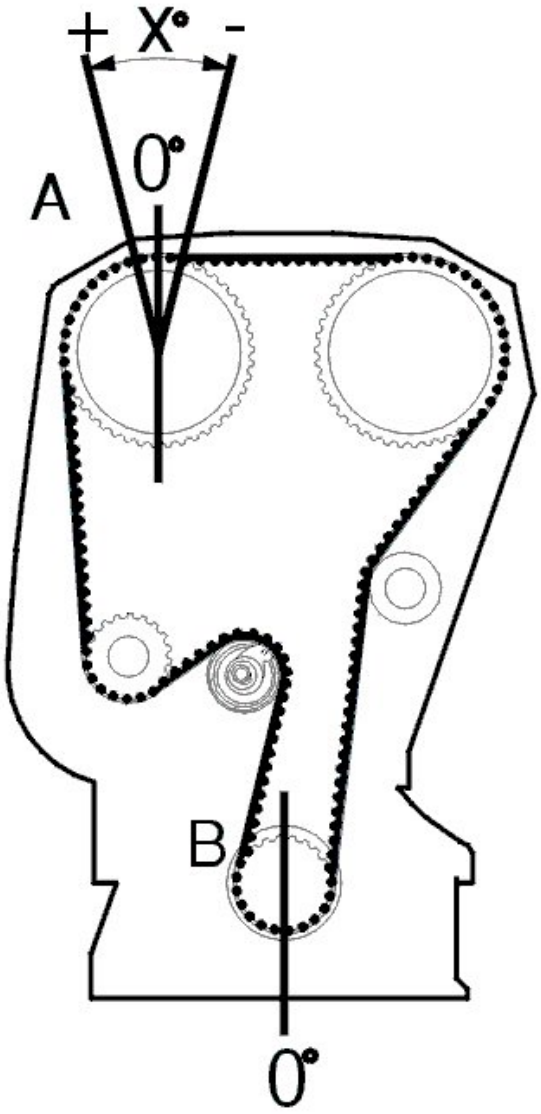
Low

Checking the status



- Start the engine and run it to normal operating temperature
- Read off and note the adaptation value for the camshaft at idle speed. The value must be between -8° and +8°.

The fault is intermittent if the adaptation value is between -8° and +8°. The fault is permanent if the adaptation value is lower than -8° or higher than +8°.



Is the adaptation value correct?

Yes - Intermittent fault

No - Checking components

Checking components

In order for the variable valve timing control to function correctly, the correct grade of engine oil must be used. The oil must be clean and the oil pressure must be correct.
Check the level and quality of the engine oil. Check for contaminants in particular.
Check the engine oil pressure.
Remedy as necessary.
If no fault is found in the above fault tracing and the adaptation value is too low (lower than -8 °) when the engine is at operating temperature, the cause of the fault is probably one of the following:

- Camshaft belt incorrectly seated
- Incorrect basic setting of the timing belt
- Faulty camshaft reset valve (the slide in the valve has stuck).

Hint: Try adjusting the basic setting of the camshaft if no fault is found during the above fault-tracing. Then read off the adaptation value for the camshaft with the engine idling and at operating temperature. The value must be between -8° and +8°. If the adaptation value is incorrect when the basic setting of the camshaft is correct, try cleaning the camshaft reset valve.

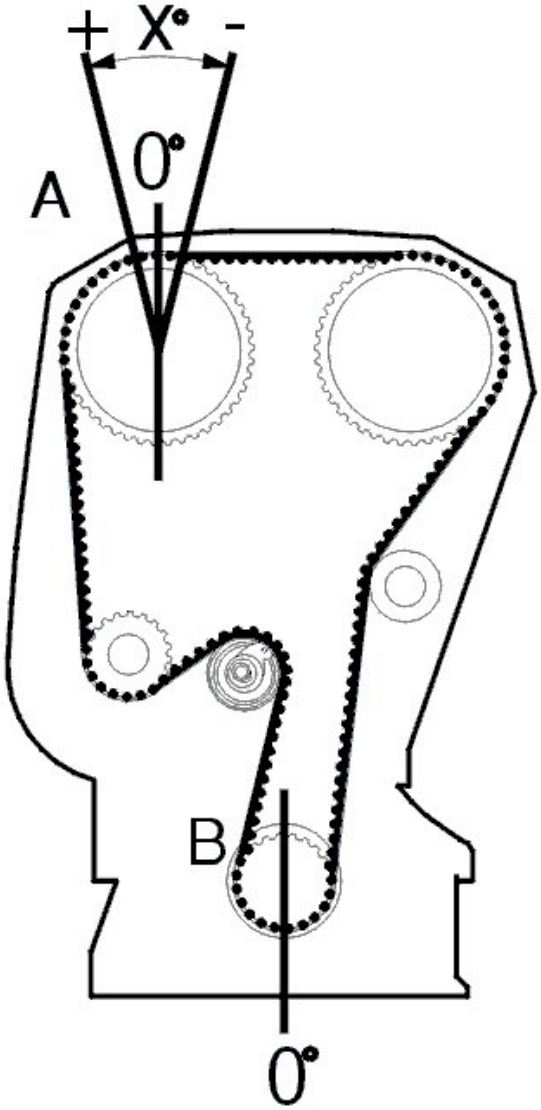
Note! The camshafts must be adjusted using the adjustment tool for the camshafts and crankshaft in the prescribed manner.

Try a new camshaft reset valve if the above fault-tracing does not solve the fault.
Remedy as necessary.

Hint: The fault may also be caused by a defective variable valve timing unit. The variable valve timing unit may be damaged if the above fault-tracing and corrective action do not remedy the fault.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Checking oil pressure, B5244T5, B5254T2 See: Engine, Cooling and Exhaust/Engine/Engine Lubrication/Testing and Inspection/Checking Oil Pressure
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing



Continue - Verification

Intermittent fault

The fault is intermittent if the diagnostic trouble code (DTC) for this fault is stored but the adaptation value is correct. Cause of the intermittent fault is probably a damaged camshaft reset valve.

Hint: The fault can be caused by contaminants in the camshaft reset valve. Try cleaning the valve.

Other information:

- VVT solenoid, inspection and cleaning See: Variable Valve Timing Solenoid/Service and Repair/Procedures/VVT Solenoid, Inspection and Cleaning
- Variable valve timing solenoid, replacing See: Variable Valve Timing Actuator/Service and Repair/Variable Valve Timing Solenoid, Replacing
- To adjust the camshaft position (CMP), see: Camshaft seal/variable valve timing (VVT) unit, replacing See: Variable Valve Timing Actuator/Service and Repair/Camshaft Seal/Variable Valve Timing (VVT) Unit, Replacing

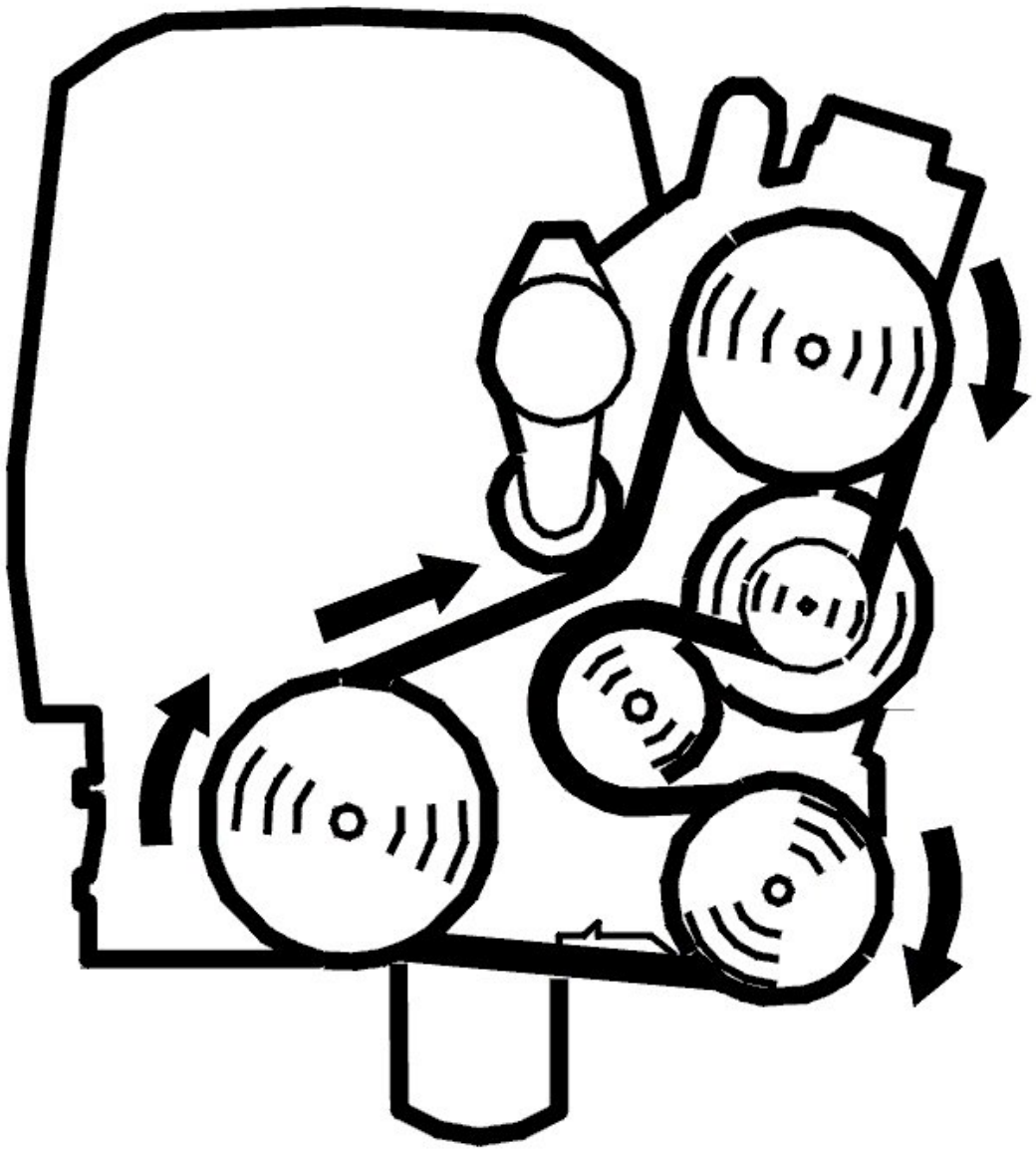
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine and run it to normal operating temperature
- Read off the camshaft adaptation at idle speed.

The adaptation value must be between -8° and +8.
The function is OK if the adaptation value is correct.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

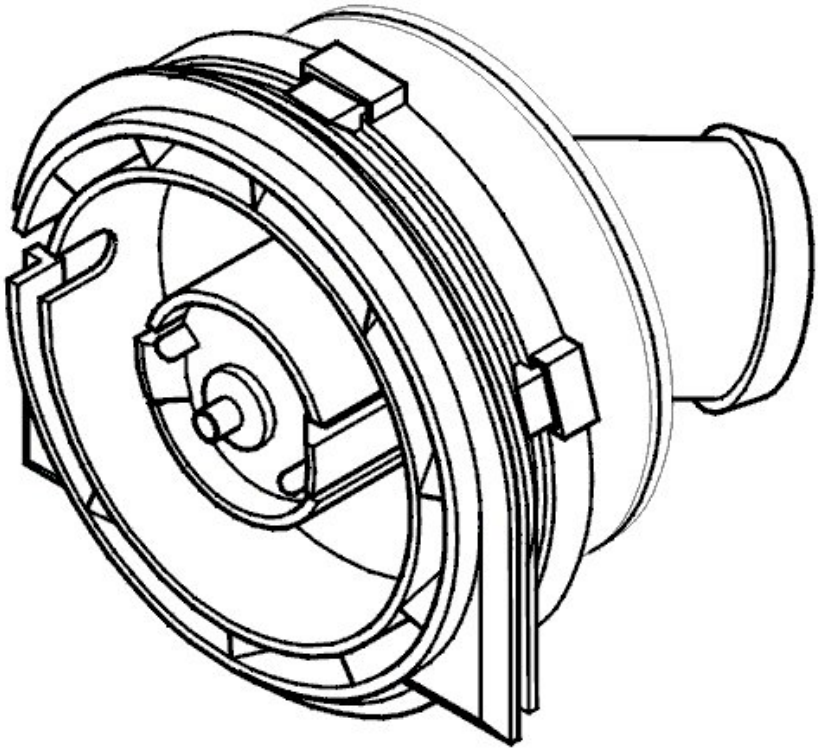
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-680B

Condition



The engine control module (ECM) checks the circuit from the engine cooling fan (FC) to the control module box.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) to the control module box is missing.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable
- Open-circuit in the power supply to the engine cooling fan (FC)
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Missing

Signal missing

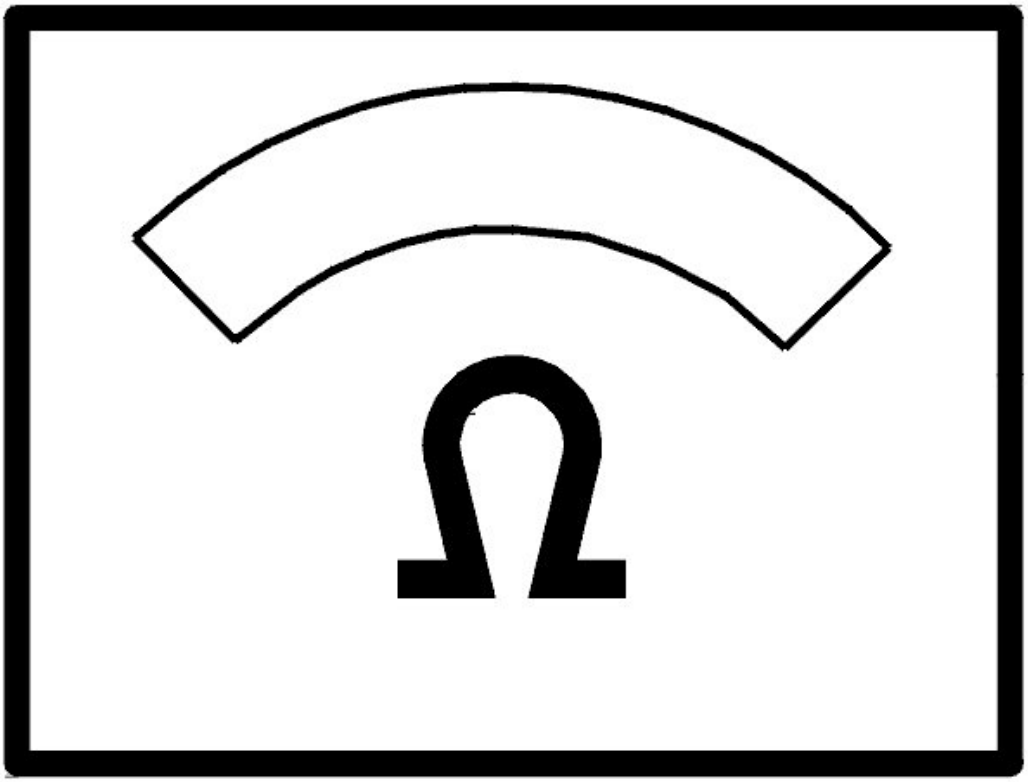
Checking the wiring

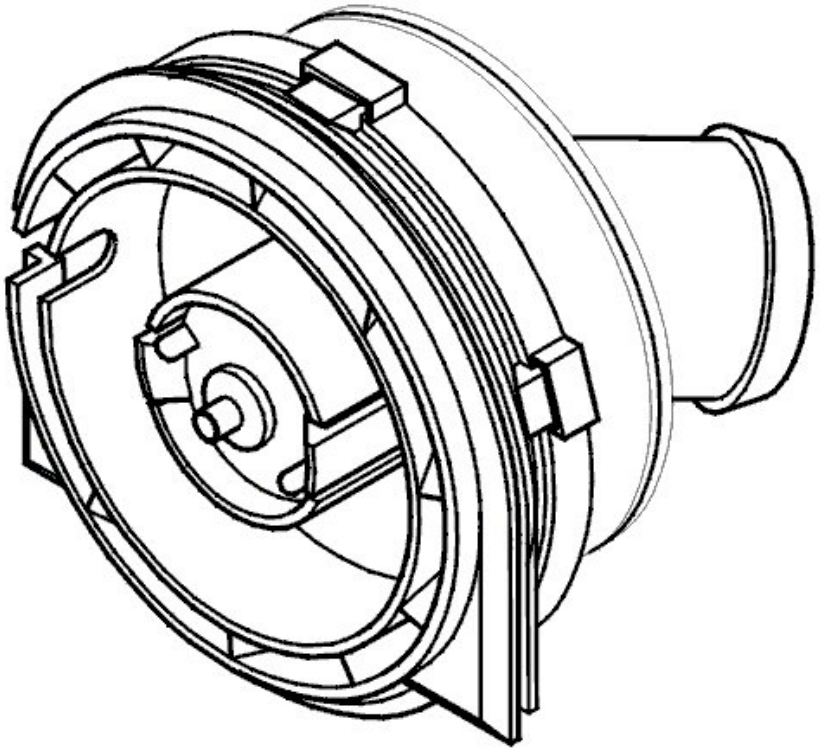
Check the fuse before the circuit. If the fuse is blown, check the circuit for a short-circuit to ground.
Check the power cable between the fuse of the circuit and terminal #1 of the control module cooling fan for open circuit.
Check the signal cable with regard to open circuit.
Take readings between:
- Engine Control Module (ECM) terminal #B48 (#B58) and terminal #2 of control module cooling fan.

If no faults are found via the aforementioned fault tracing, replace the control module cooling fan.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

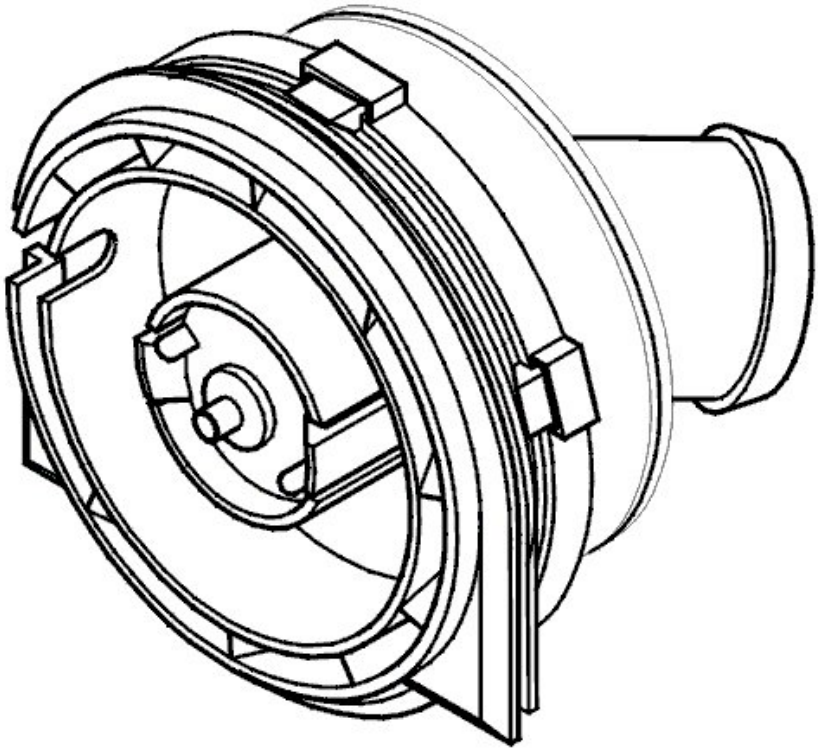
Attempt New Test - Checking the wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-680C

Condition



The engine control module (ECM) checks the circuit from the engine cooling fan (FC) to the control module box.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) to the control module box is too high.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too High

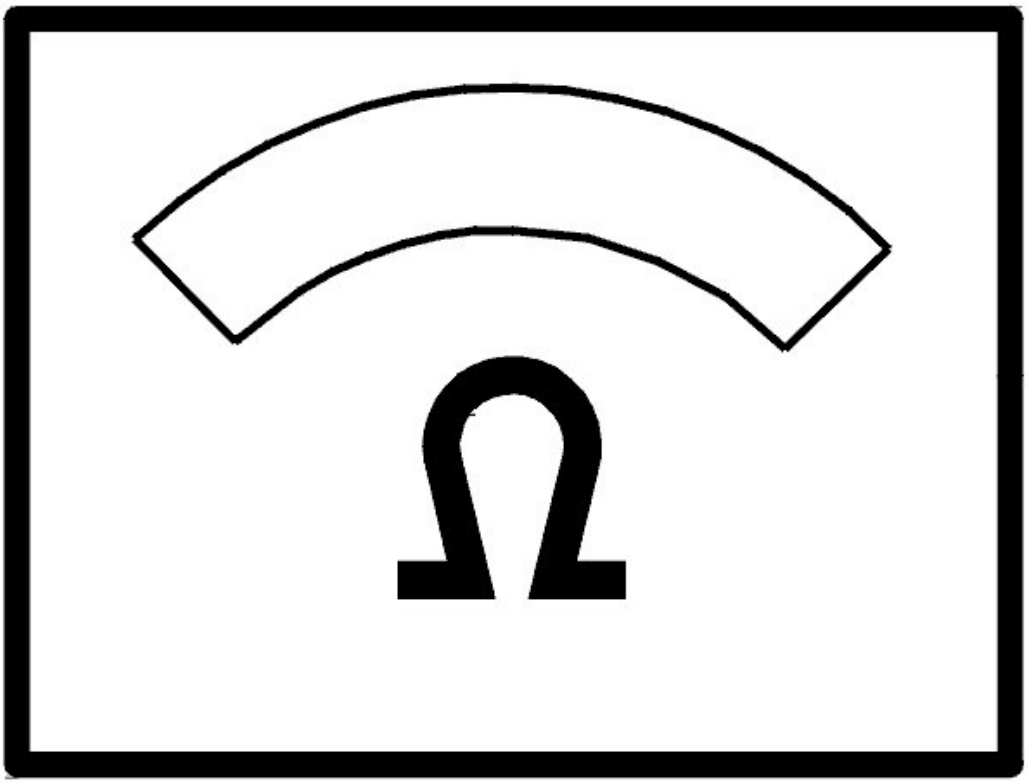
Signal too high

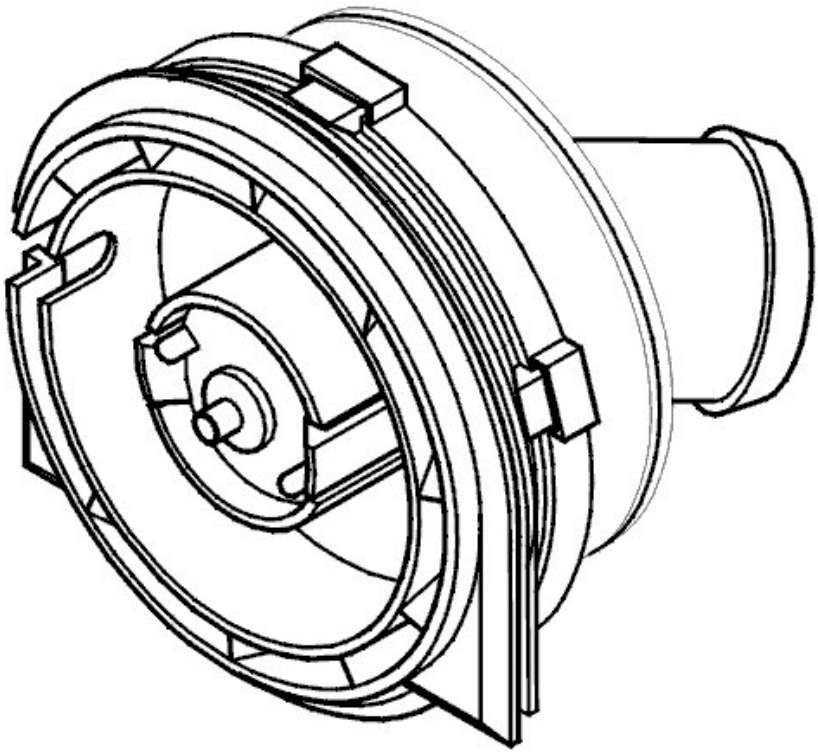
Checking the wiring

Check signal cable for an open-circuit and short-circuit to supply voltage.
Take readings between:
- Engine Control Module (ECM) terminal #B48 (#B58) and terminal #2 of control module cooling fan.

If no faults are found via the aforementioned fault tracing, replace the control module cooling fan.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

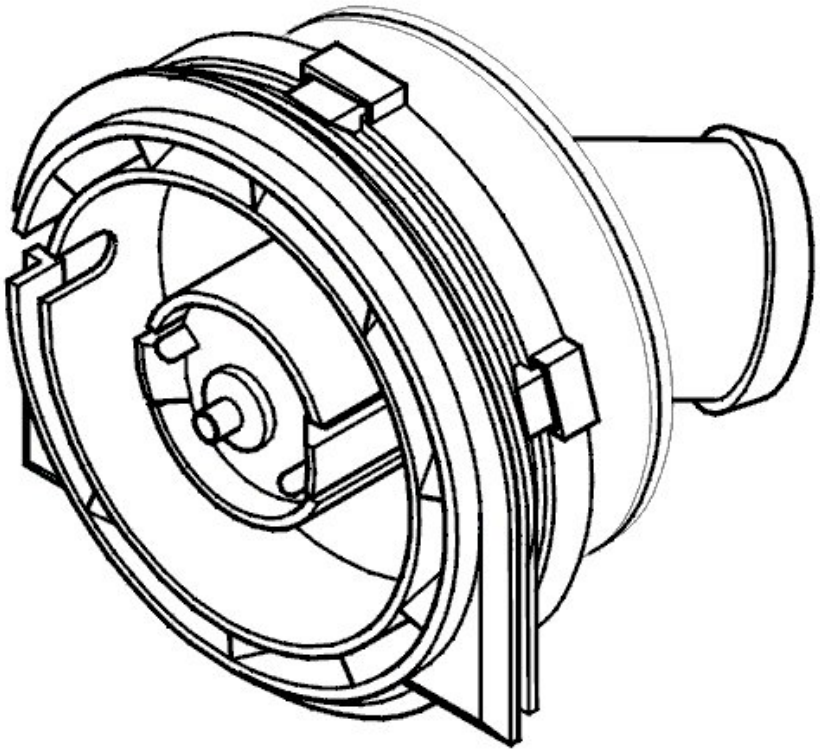
Attempt New Test - Checking the wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-680D

Condition



The engine control module (ECM) checks the circuit from the engine cooling fan (FC) to the control module box.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the signal for the engine cooling fan (FC) to the control module box is too low.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable
- Damaged engine cooling fan (FC).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Signal Too Low

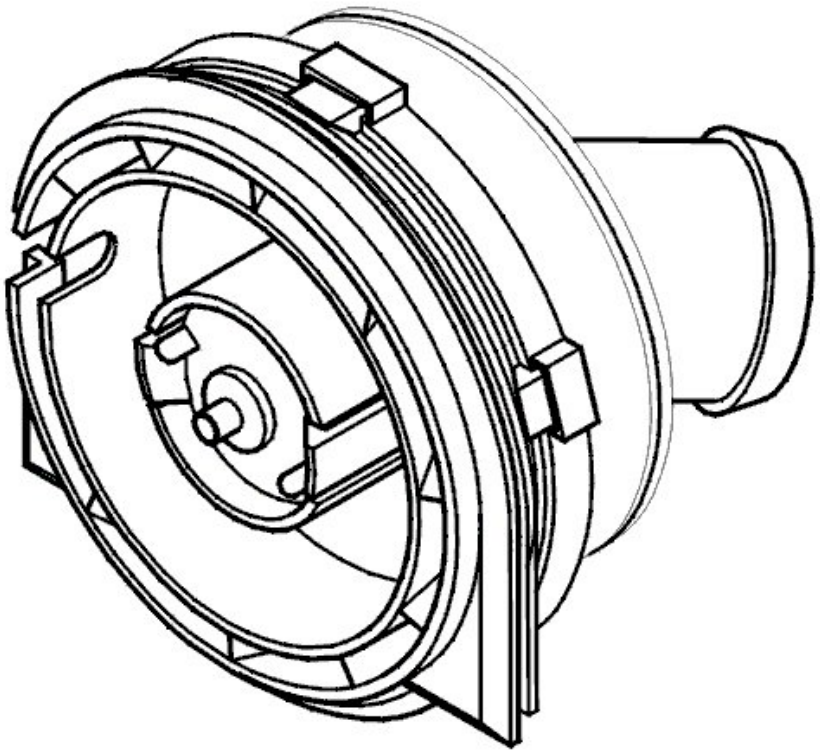
Signal too low

Checking the wiring

Check the signal cable. Check for a short-circuit to ground.
Take readings between:
- Engine Control Module (ECM) terminal #B48 (#B58) and terminal #2 of control module cooling fan.

If no faults are found via the aforementioned fault tracing, replace the control module cooling fan.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

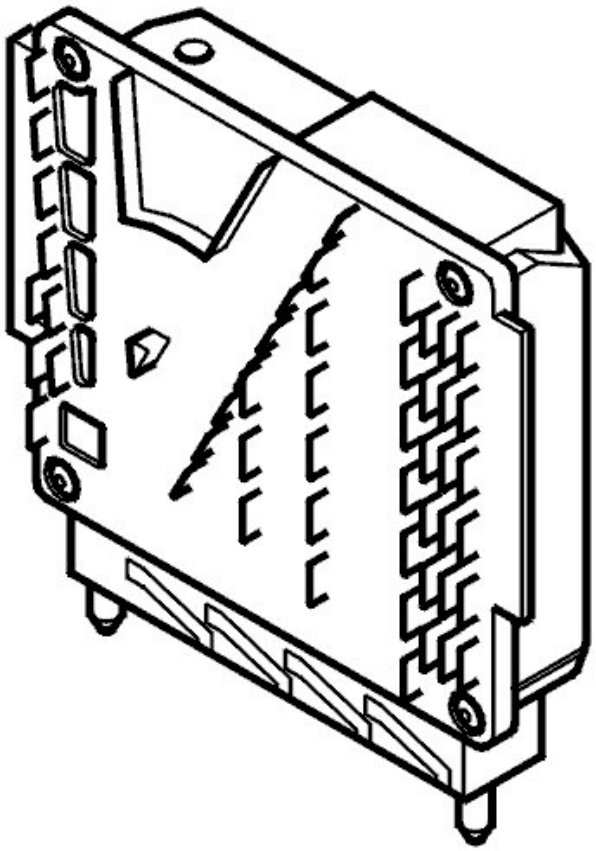
Attempt New Test - Checking the wiring

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a fault in the circuit for the internal temperature sensor in the control module. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

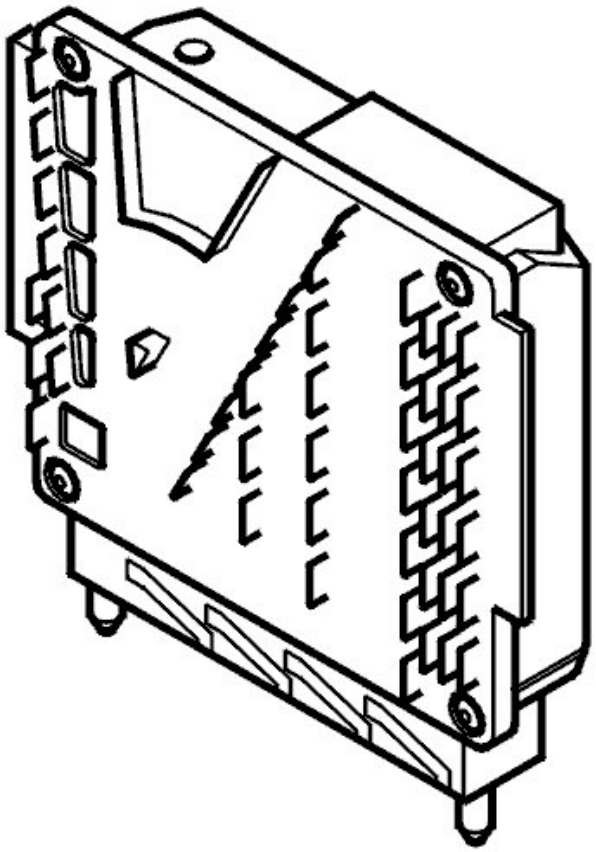
Fault symptom[s]
- None.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

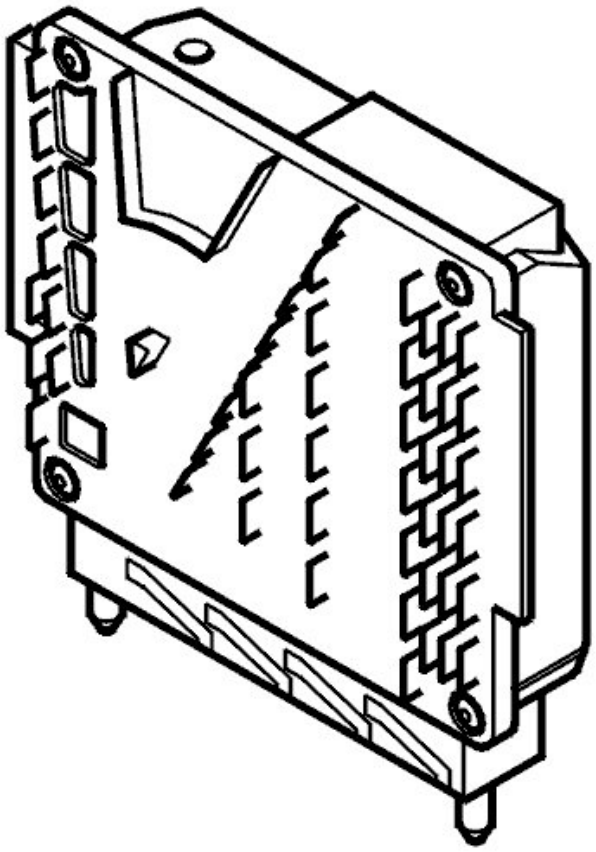
FAULT FOUND - DONE

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects a fault in the circuit for the internal temperature sensor in the control module. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

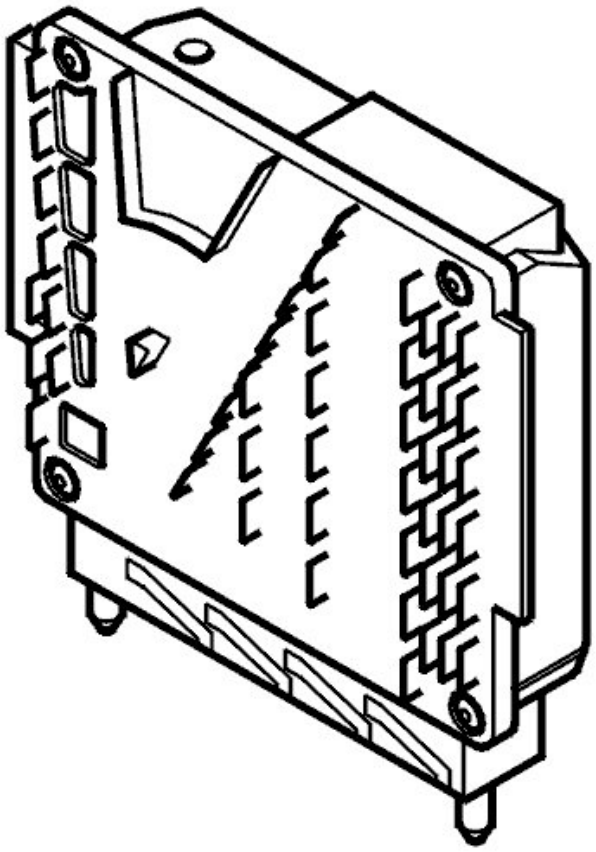
Fault symptom[s]
- None.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

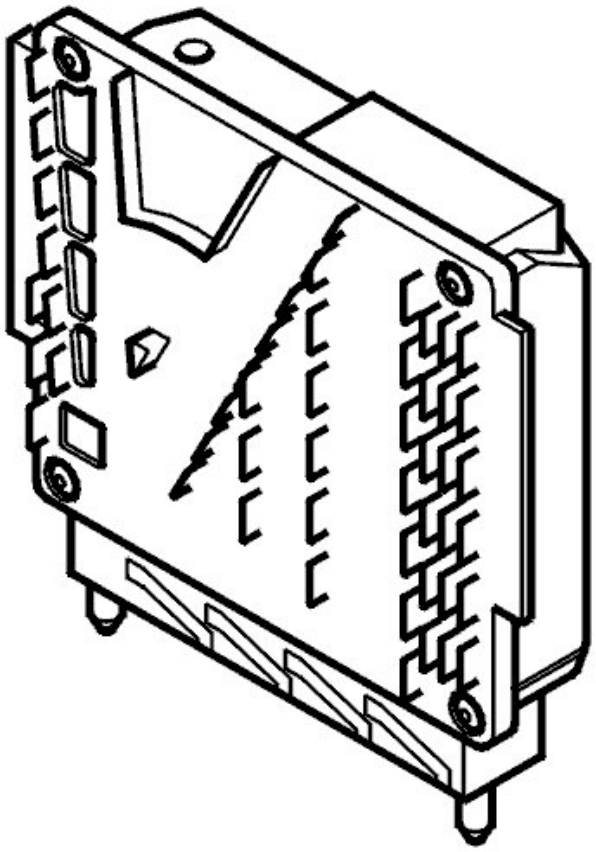
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-7010

Condition



The diagnostic trouble code (DTC) is stored if the temperature in the engine control module (ECM) exceeds 95 °C.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The engine cooling fan (FC) runs at low-speed.

Possible source
- Air supply is blocked.

Fault symptom[s]
- None.

Faulty Signal

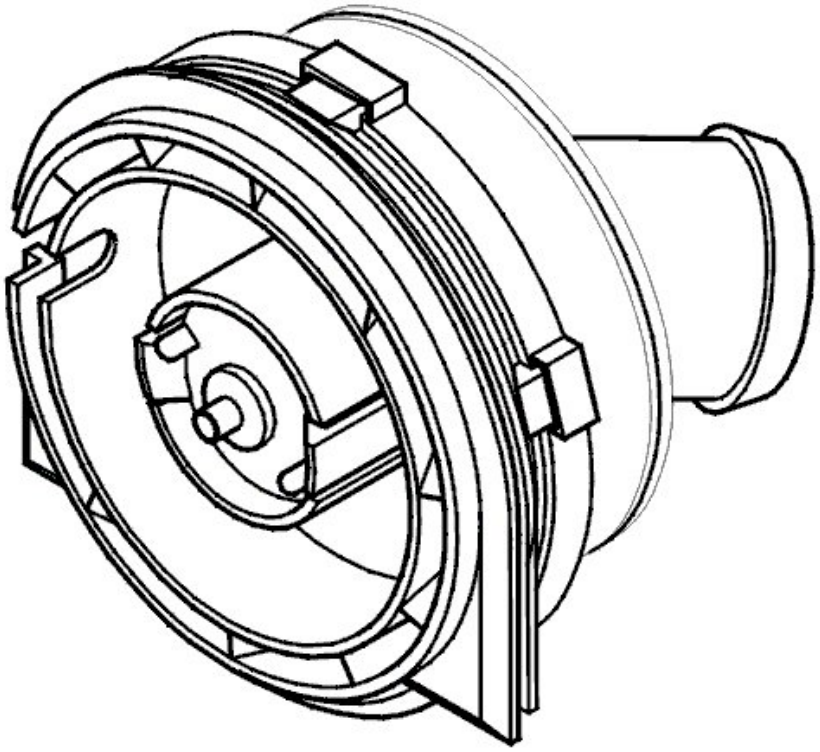
Faulty signal

Checking the component

Hint: The diagnostic trouble code (DTC) may due to a damaged cooling fan for the control module boxes. If diagnostic trouble code (DTC) ECM-680X is stored it must be remedied first.

Activate the cooling fan for the control module box. Check the function. There must be a buzzing noise from the cooling fan when the fan for the control module box is activated.
Check that the air ducts for the control module box are not blocked.
Remedy as necessary.

Other information
- For the location of components on 5 cylinder engines, see Location of components See: Locations
- For the location of components on 6 cylinder normally aspirated engines, see Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see Location of components See: Locations.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

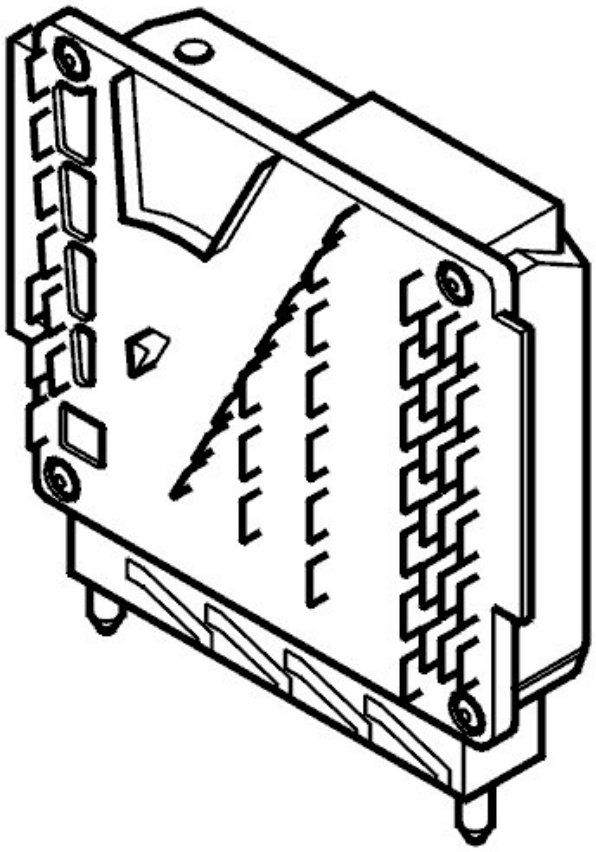
Attempt New Test - Checking the component

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-7020

Condition



The diagnostic trouble code (DTC) is stored if the temperature in the engine control module (ECM) exceeds 105 °C.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The engine cooling fan (FC) runs at low-speed.

Possible source
- Air supply is blocked.

Fault symptom[s]
- None.

Faulty Signal

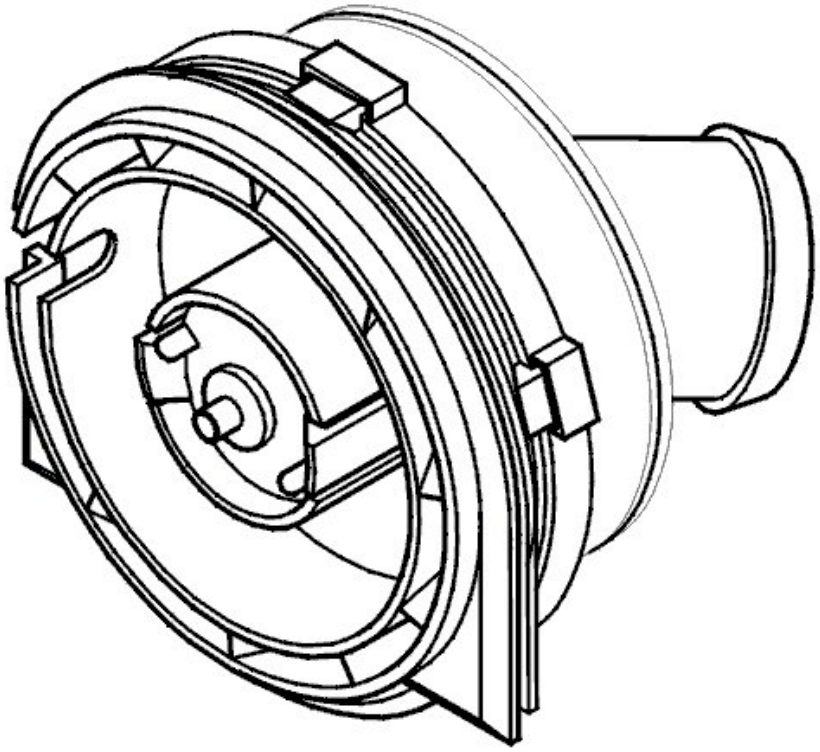
Faulty signal

Checking the component

Hint: The diagnostic trouble code (DTC) may due to a damaged cooling fan for the control module boxes. If diagnostic trouble code (DTC) ECM-680X is stored it must be remedied first.

Activate the cooling fan for the control module box. Check the function. There must be a buzzing noise from the cooling fan when the fan for the control module box is activated.
Check that the air ducts for the control module box are not blocked.
Remedy as necessary.

Other information
- For the location of components on 5 cylinder engines, see Location of components See: Locations
- For the location of components on 6 cylinder normally aspirated engines, see Location of components See: Locations
- For the location of components on 6 cylinder turbocharged engines, see Location of components See: Locations.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the component

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-7100

Condition

The engine control module (ECM) contains a code for the immobilizer which is unique to each car. Before the engine can be started, the immobilizer code is checked to ensure that it corresponds to both the central electronic module (CEM) and the engine control module (ECM). The diagnostic trouble code (DTC) is stored if the immobilizer code does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

None

Possible source
- The engine control module (ECM) is not programmed and has no immobilizer code
- The immobilizer code in the engine control module (ECM) is incorrect
- The immobilizer code in the central electronic module (CEM) is incorrect
- The central electronic module (CEM) is not programmed and has no immobilizer code
- Damaged central electronic module (CEM)
- Damaged engine control module (ECM).

Fault symptom[s]
- The engine does not start.

Faulty Signal - Permanent Fault

Faulty signal. Permanent fault

Information

This diagnostic trouble code (DTC) indicates that the immobilizer code does not match between the engine control module (ECM) and the central electronic module (CEM). This may be because:
- the immobilizer code in the engine control module (ECM) is incorrect i.e. the code does not correspond to the code stored in the central electronic module (CEM)
- the engine control module (ECM) is not programmed and has no immobilizer code
- the immobilizer code in the central electronic module (CEM) is incorrect
- the central electronic module (CEM) is not programmed and has no immobilizer code
- the engine control module (ECM) is damaged
- the central electronic module (CEM) is damaged.

Note! A programmed engine control module (ECM) or central electronic module (CEM) cannot be moved from one vehicle to another.

Hint: Read off the diagnostic trouble codes (DTCs) for the central electronic module (CEM).

For further information about this diagnostic trouble code (DTC), see Diagnostic Trouble Code (DTC) Information.

Other information:
- To access and replace the engine control module (ECM), see Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- To access or replace the central electronic module (CEM), see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

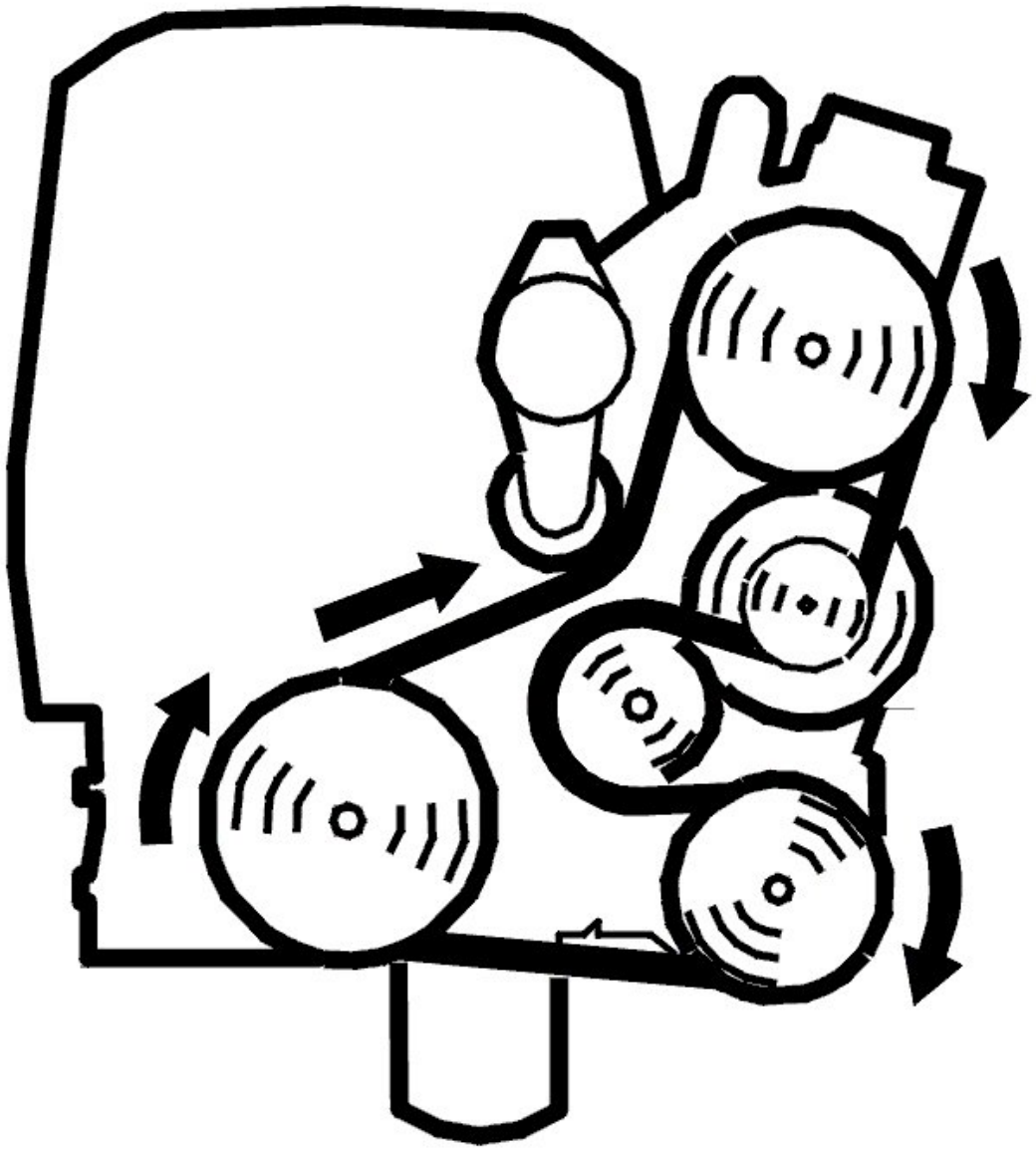
No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall connectors, components etc.
- Start the engine.

Did the engine start?

Yes - Fault Found

No - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-710B

Condition

The engine control module (ECM) contains a code for the immobilizer which is unique to each car. Before the engine can be started, the immobilizer code is checked to ensure that it corresponds to both the central electronic module (CEM) and the engine control module (ECM).
The diagnostic trouble code (DTC) will be stored if there is no communication between the central electronic module (CEM) and the engine control module (ECM) so that the immobilizer code cannot be checked.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

None

Possible source
- Open-circuit in the communication between the central electronic module (CEM) and the engine control module (ECM).

Fault symptom[s]
- The engine does not start.

Signal Missing, Permanent Fault

Signal missing. Permanent fault

Checking the component

The immobilizer function is integrated in the central electronic module (CEM).
This diagnostic trouble code (DTC) can be caused by missing CAN communication. If there is a diagnostic trouble code (DTC) stored in the central electronic module (CEM) fault trace accordingly.
If no diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM), try a new central electronic module (CEM).

Other information:
- To access or replace the central electronic module (CEM), see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To access and replace the engine control module (ECM), see Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- For signal specifications for the central electronic module (CEM), see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For information about signals, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

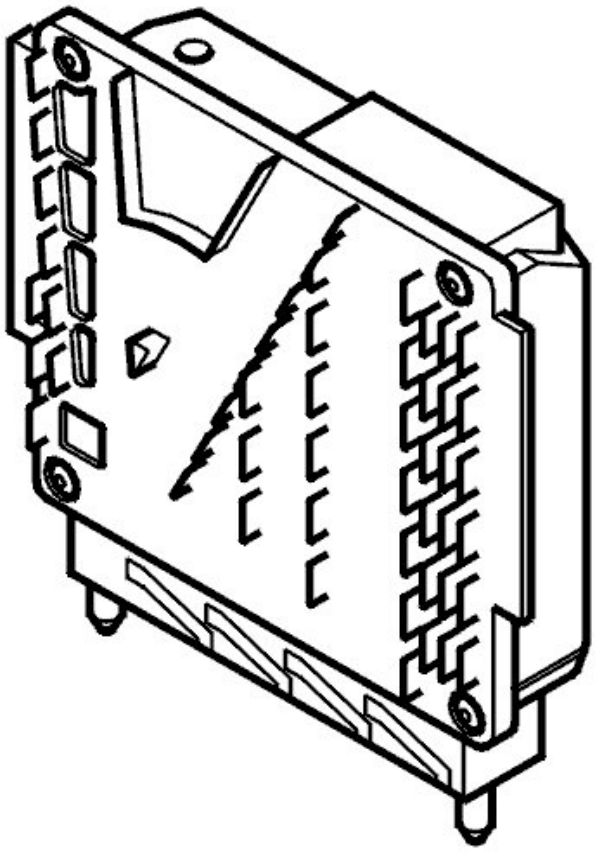
FAULT FOUND - Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-720B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the circuit for the timer functions.

Substitute value
- None.

Possible source
- Damaged engine control module (ECM).

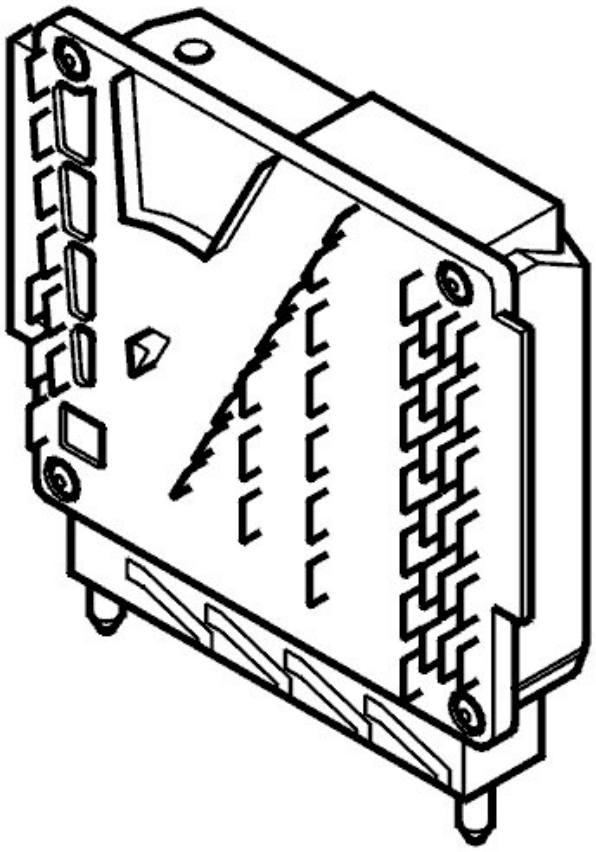
Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-7300

Condition

The engine control module (ECM) checks the signal from the gear-shift position sensor via CAN communication.
Diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the information about the selected gear position from the transmission control module (TCM) is outside its permitted range compared with the speed of the vehicle.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

- None.

Possible source
- Fault-trace the transmission control module (TCM)
- Fault-trace the brake control module (BCM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

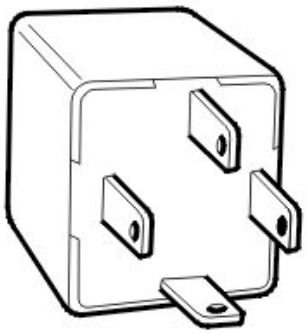
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-800B

Condition



The engine control module (ECM) checks the function of the system relay. The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the voltage from the system relay is too low when the relay is activated.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Contact resistance in the terminals
- Open-circuit in the signal cable for the system relay
- Damaged system relay.

Fault symptom[s]
- The engine does not start.

Signal Too Low

Signal too low

Checking connectors and components

Check the engine control module (ECM) and the system relay connectors. Check for contact resistance. Check for oxidation.
Check the cable between system relay terminal #5 and the engine control module (ECM). Check for an open-circuit.
Remedy as necessary.
Try a new system relay if no fault is found during the above fault-tracing.

Hint: Read off the voltage from the system relay to the engine control module (ECM) by clicking on the VCT2000 symbol.

Other information

- For information about signals for 5 cylinder engines: Signal specification, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines:
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

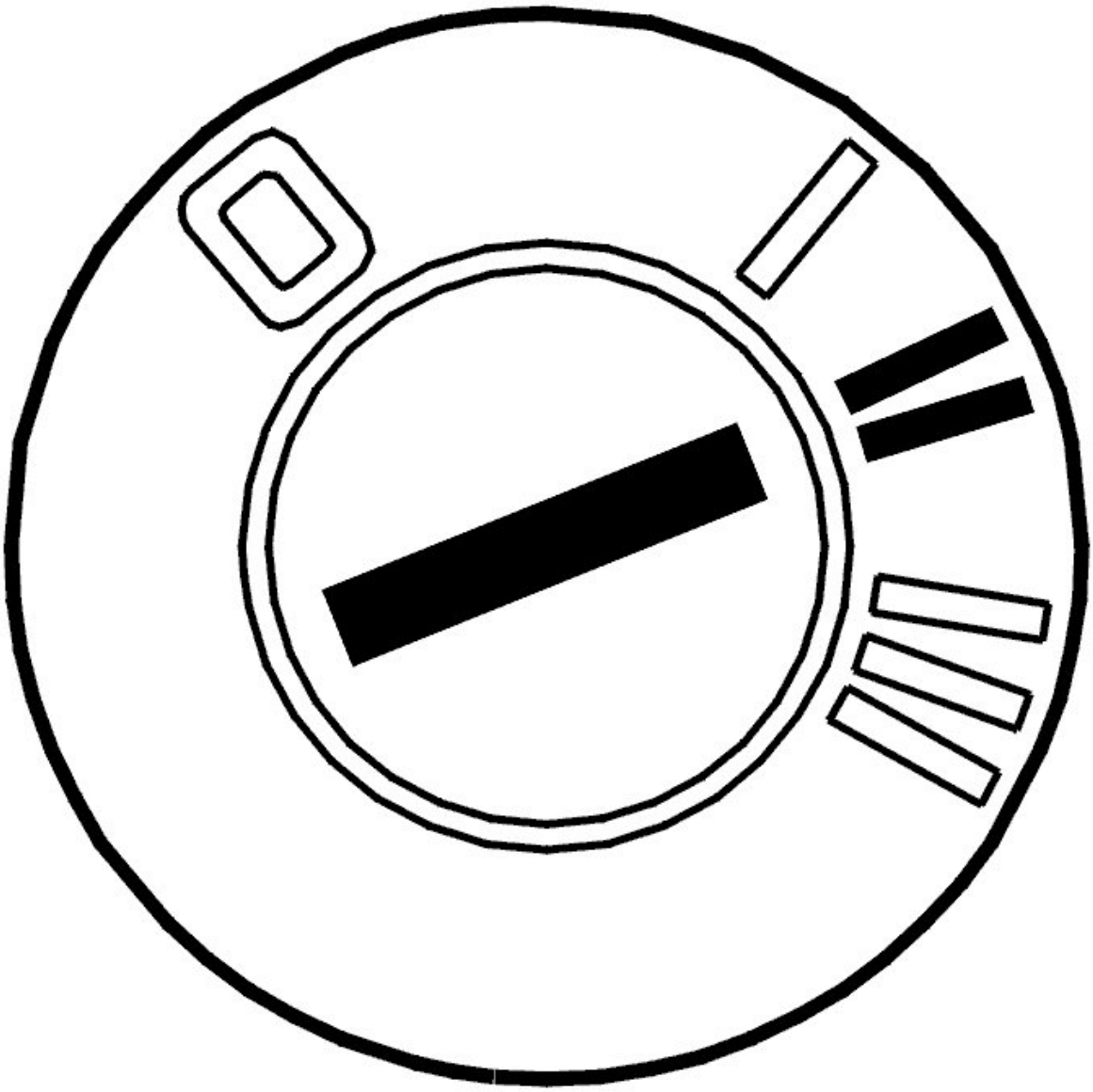
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Read off the voltage from the system relay to the engine control module (ECM).

Check that the voltage is correct. The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-810C

Condition

The engine control module (ECM) checks the 5 volt cable which supplies components with power. The diagnostic trouble code (DTC) is stored if the voltage at the 5 volt cable is higher than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- short-circuit to battery voltage in the 5 volt supply cable
- Damaged sensor connected to the 5 volt supply cable.

Fault symptom[s]
- Poor performance.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-810D

Condition

The engine control module (ECM) checks the 5 volt cable which supplies components with power. If the voltage at the 5 volt cable is lower than a certain value, the engine control module (ECM) interprets this as a fault and a diagnostic trouble code (DTC) is stored.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Short-circuit to ground in 5-volt supply cable
- Damaged sensor connected to the 5 volt supply cable.

Fault symptom[s]
- Poor performance.

Fault-Tracing Information

Signal too low

Checking the connectors and components

Check the battery voltage.
Check the charging function of the generator (GEN).
Check the engine control module (ECM) and system relay connectors. Check for contact resistance and oxidation.
Check the cable between system relay terminal #5 and control module terminal #A17 (#A17). Check for contact resistance and oxidation. Remedy as necessary.
Try a new system relay if no fault is found during the above fault-tracing.

Hint: Read off the voltage from the system relay to the engine control module (ECM) by clicking on the VCT2000 symbol.

Other information
- To fault-trace the charging system, see Fault-tracing and testing the voltage supply system See: Starting and Charging/Charging System/Testing and Inspection/Component Tests and General Diagnostics/Fault-Tracing And Testing the Electrical Generating
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

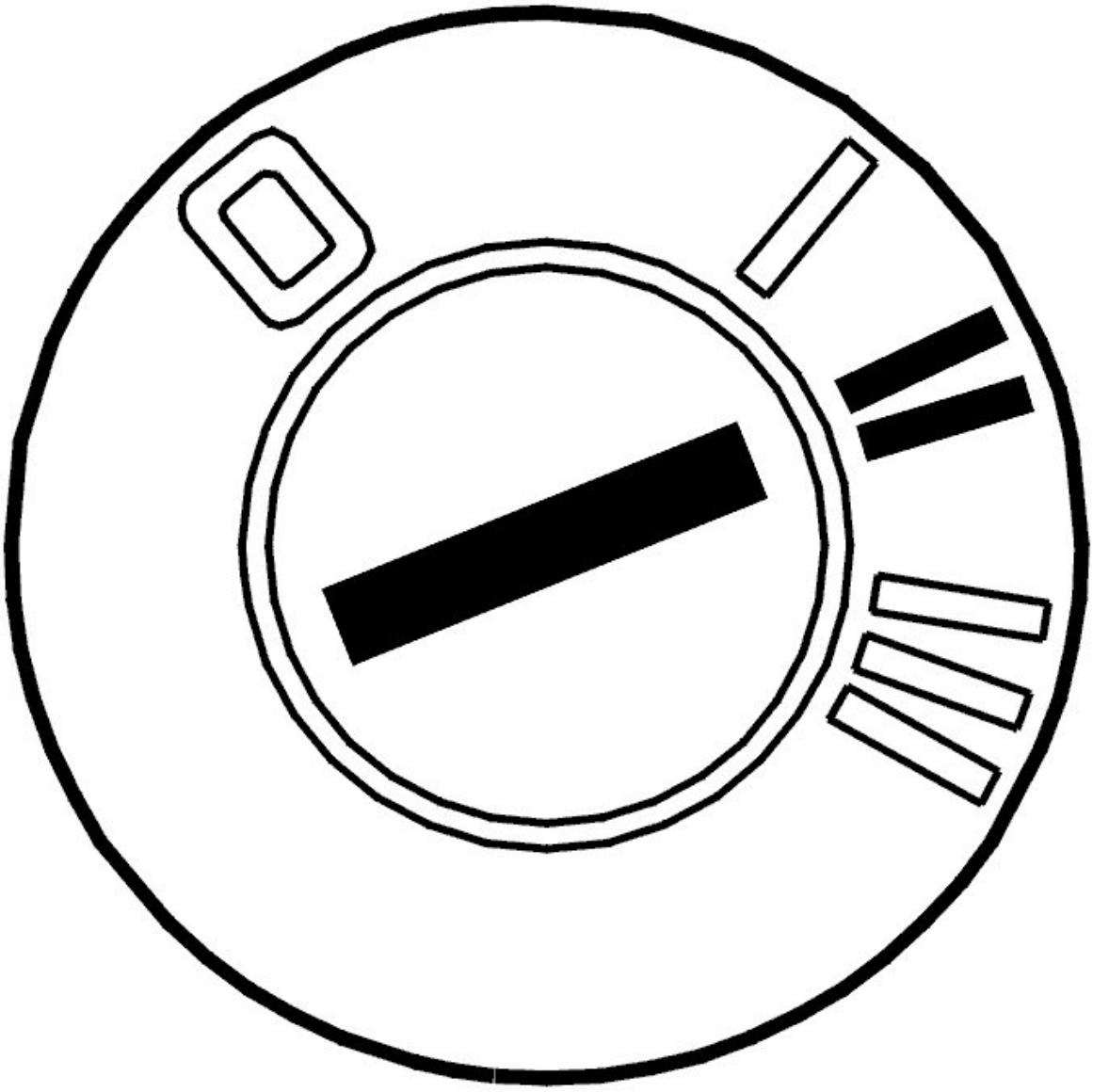
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Read off the voltage from the system relay to the engine control module (ECM).

Check that the voltage is correct. The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-8200

Condition

The engine control module (ECM) checks the power supply from the system relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the voltage from the system relay is below 2.5 V.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- The engine control module (ECM) assumes a voltage of 13.4 V.

Possible source
- Damaged engine control module (ECM).

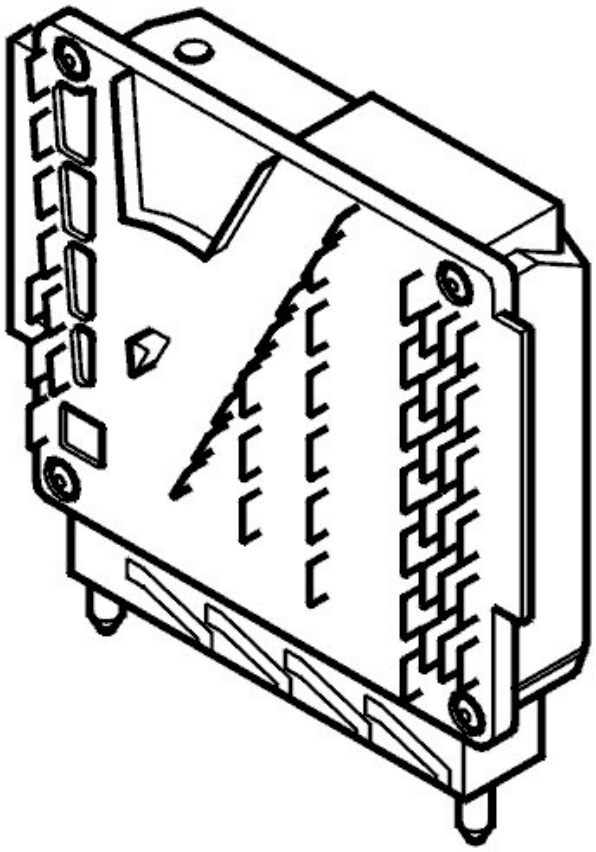
Fault symptom[s]
- The engine cuts out
- The engine does not start.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-820C

Condition

The engine control module (ECM) checks the power supply from the system relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the voltage from the system relay is higher than a certain value.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- None.

Possible source
- Defective charging system.

Fault symptom[s]
- Starting/Engine does not start/Unsure when/at all times

Signal Too High

Signal too high

Checking the connectors and components

Check the charging function of the generator (GEN). Check for high charging voltage.
Remedy as necessary.

Other information
- To fault-trace the charging system, see Fault-tracing and testing the voltage supply system See: Starting and Charging/Charging System/Testing and Inspection/Component Tests and General Diagnostics/Fault-Tracing And Testing the Electrical Generating.

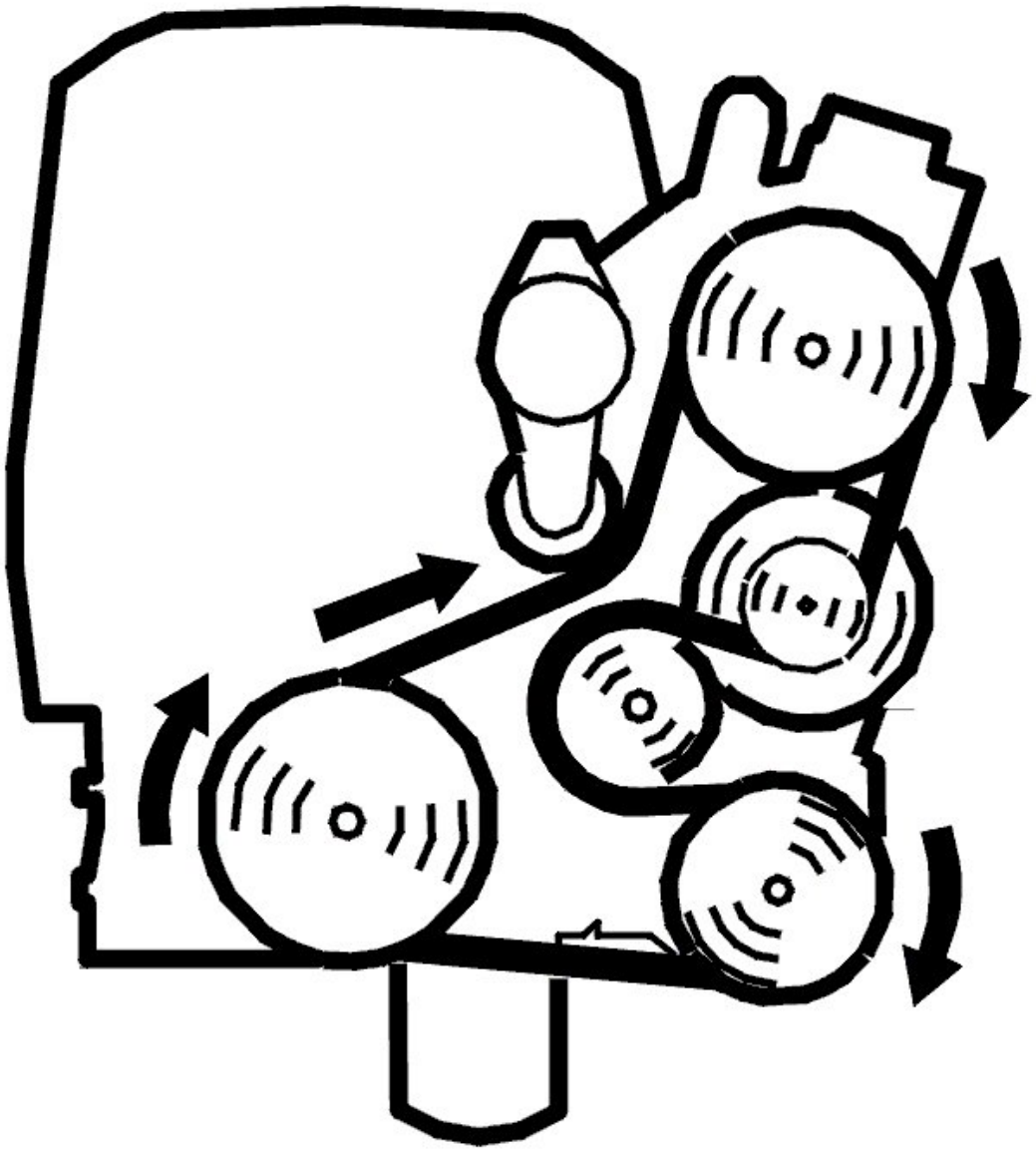
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Start the engine
- Read off the voltage from the system relay to the engine control module (ECM).

Check that the voltage is correct. The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-820D

Condition

The engine control module (ECM) checks the power supply from the system relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the voltage from the system relay is lower than a certain value.
The diagnostic trouble code (DTC) can be diagnosed at ignition on or when the engine is running.

Substitute value
- None.

Possible source
- Faulty charging system
- Damaged battery.

Fault symptom[s]
- Starting/Engine does not start/Unsure when/at all times

Signal Too Low

Signal too low

Checking the connectors and components

Check the battery voltage.
Check the charging function of the generator (GEN).
Check the engine control module (ECM) and system relay connectors. Check for contact resistance and oxidation.
Check the cable between system relay terminal #5 and control module terminal #A17 (#A17). Check for contact resistance and oxidation. Remedy as necessary.
Try a new system relay if no fault is found during the above fault-tracing.

Hint: Read off the voltage from the system relay to the engine control module (ECM) by clicking on the VCT2000 symbol.

Other information

- To fault-trace the charging system, see Fault-tracing and testing the voltage supply system See: Starting and Charging/Charging System/Testing and Inspection/Component Tests and General Diagnostics/Fault-Tracing And Testing the Electrical Generating
- To connect the breakout box / access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

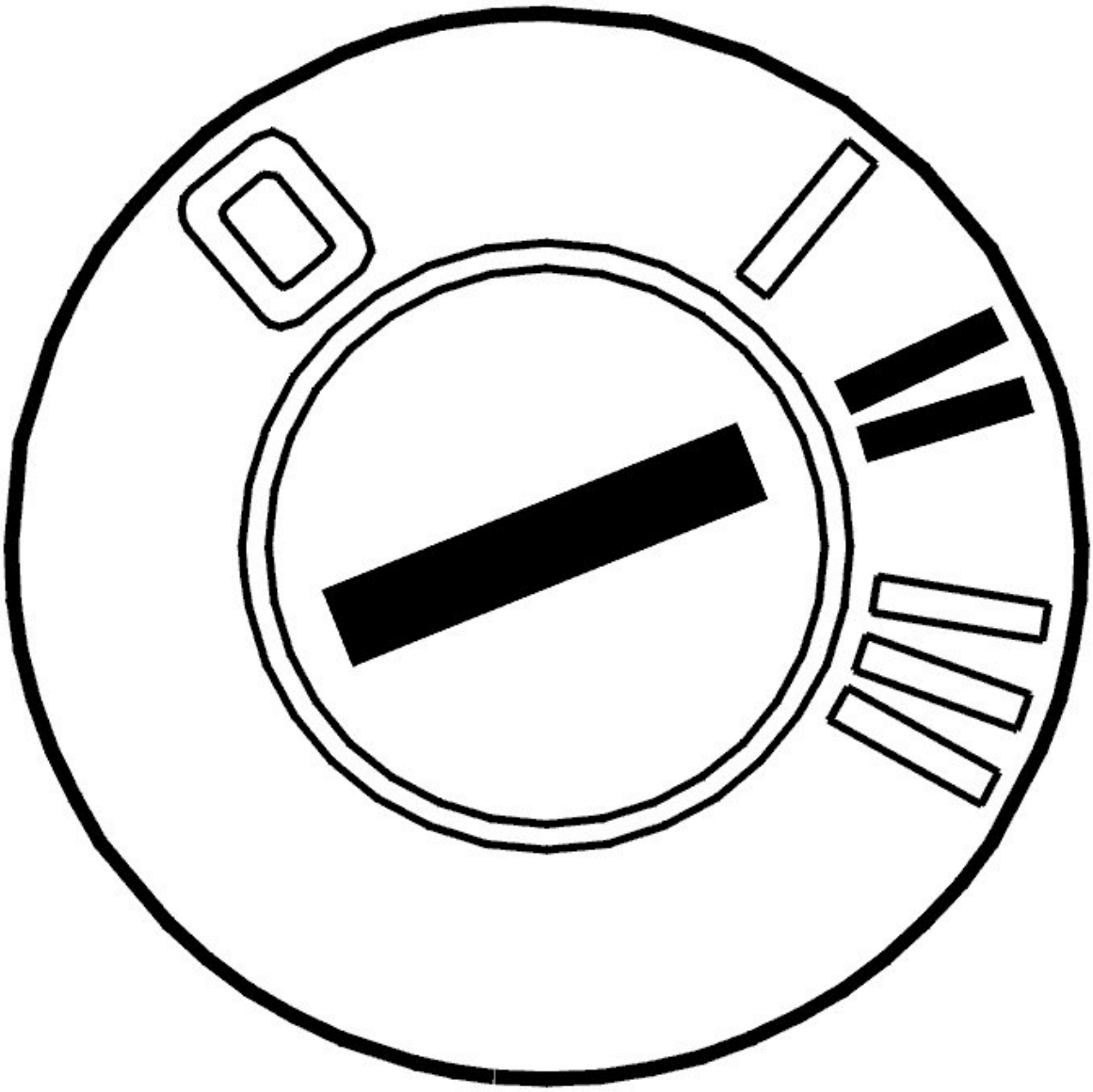
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Read off the voltage from the system relay to the engine control module (ECM).

Check that the voltage is correct. The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

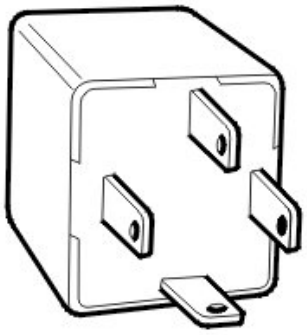
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-8210

Condition



The engine control module (ECM) checks the power supply from the system relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the power supply from the engine control module (ECM) to the throttle unit is lower than 8 V.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The injectors are shut off.

Possible source
- Faulty charging system
- Contact resistance in the terminals
- Damaged system relay.

Fault symptom[s]

- The starter motor turns but the engine does not start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the connectors and components

Check the battery voltage.
Check the charging function of the generator (GEN).
Check the fuse before the circuit. If the fuse is blown, check the circuit. Check for a short-circuit to ground.
Check the cable between system relay terminal #5 and control module terminal #A17 (#A17). Check for an open-circuit.
Check the engine control module (ECM) and system relay connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new system relay if no fault is found during the above fault-tracing.

Hint: Read off the voltage from the system relay to the engine control module (ECM).

Other information

- To fault-trace the charging system, see Fault-tracing and testing the voltage supply system See: Starting and Charging/Charging System/Testing and Inspection/Component Tests and General Diagnostics/Fault-Tracing And Testing the Electrical Generating
- For further information about the fuses and relays, see the Wiring Diagram
- To connect the breakout box and access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

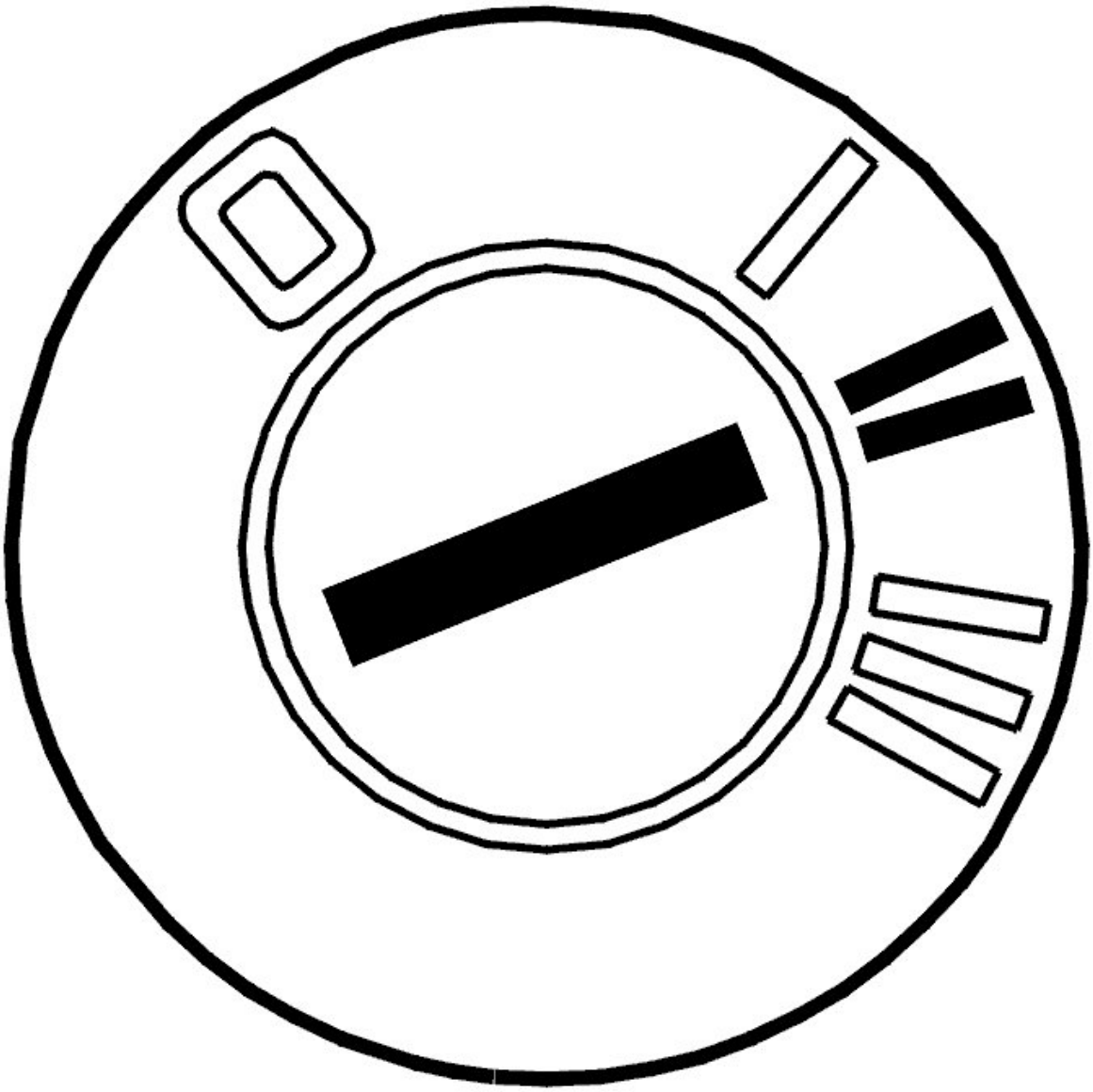
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Read off the voltage from the system relay to the engine control module (ECM).

The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

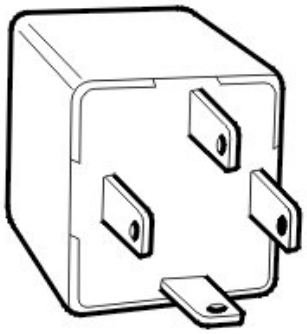
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-821B

Condition



The engine control module (ECM) checks the power supply from the system relay.
The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the power supply from the system relay is lower than a certain value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Faulty charging system
- Contact resistance in the terminals
- Open-circuit in the signal cable for the system relay
- Damaged system relay.

Fault symptom[s]
- The starter motor turns but the engine does not start.

Faulty Signal or Signal Missing

Faulty signal or signal missing

Checking the connectors and components

Check the battery voltage.
Check the charging function of the generator (GEN).
Check the fuse before the circuit. If the fuse is blown, check the circuit. Check for a short-circuit to ground.
Check the cable between system relay terminal #5 and control module terminal #A17 (#A17). Check for an open-circuit.
Check the engine control module (ECM) and system relay connectors. Check for contact resistance and oxidation.
Remedy as necessary.
Try a new system relay if no fault is found during the above fault-tracing.

Hint: Read off the voltage from the system relay to the engine control module (ECM).

Other information
- To fault-trace the charging system, see Fault-tracing and testing the voltage supply system See: Starting and Charging/Charging System/Testing and Inspection/Component Tests and General Diagnostics/Fault-Tracing And Testing the Electrical Generating
- For further information about the fuses and relays, see the Wiring Diagram
- To connect the breakout box and access the control module, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

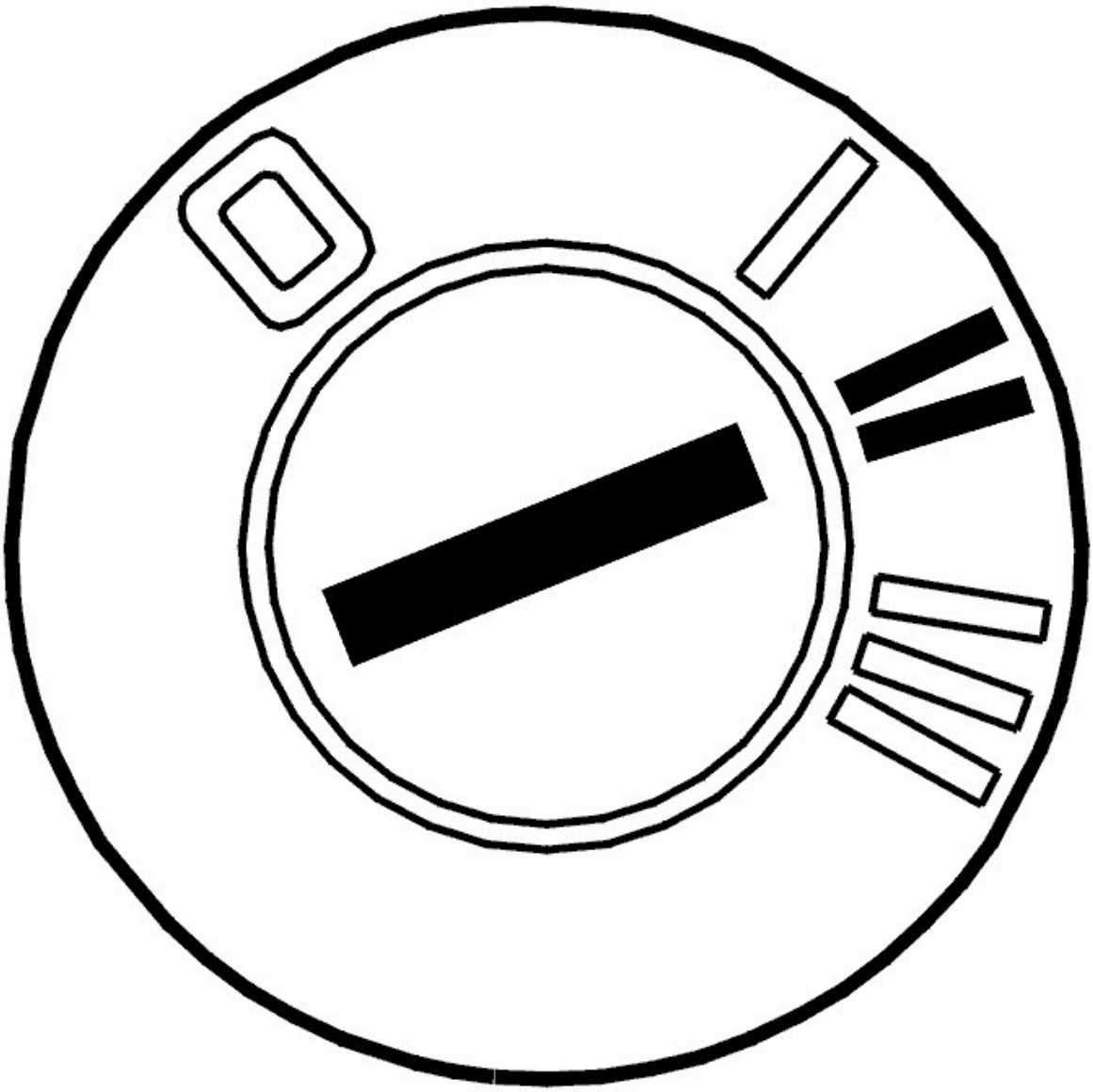
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Read off the voltage from the system relay to the engine control module (ECM).

The voltage must be approximately 12 V.

Is the voltage correct?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

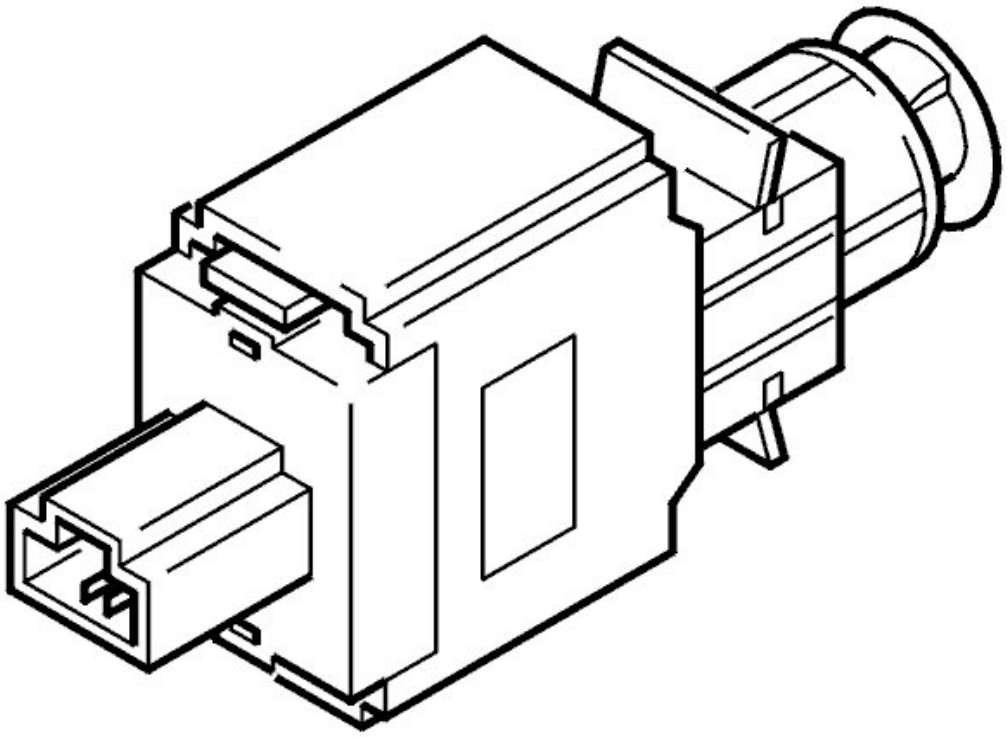
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and components

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9000

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the circuit for the brake pedal position sensor, the circuit for the stop lamp switch or in the CAN communication between the brake control module (BCM) and the engine control module (ECM). The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

Cruise control switched off.

Possible source
- Fault in the brake control module (BCM) or the central electronic module (CEM)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the stop lamp switch
- Open-circuit in the power supply to the stop lamp switch
- Open-circuit or short-circuit to ground or supply voltage in the cable for the stop lamp switch
- Incorrectly installed stop lamp switch
- Damaged stop lamp switch.

Fault symptom[s]
- Cruise control/Does not engage
- Text window and warning symbol/Text message

Signal Missing or Faulty Signal

Signal missing or faulty signal

Checking the diagnostic trouble codes (DTCs)

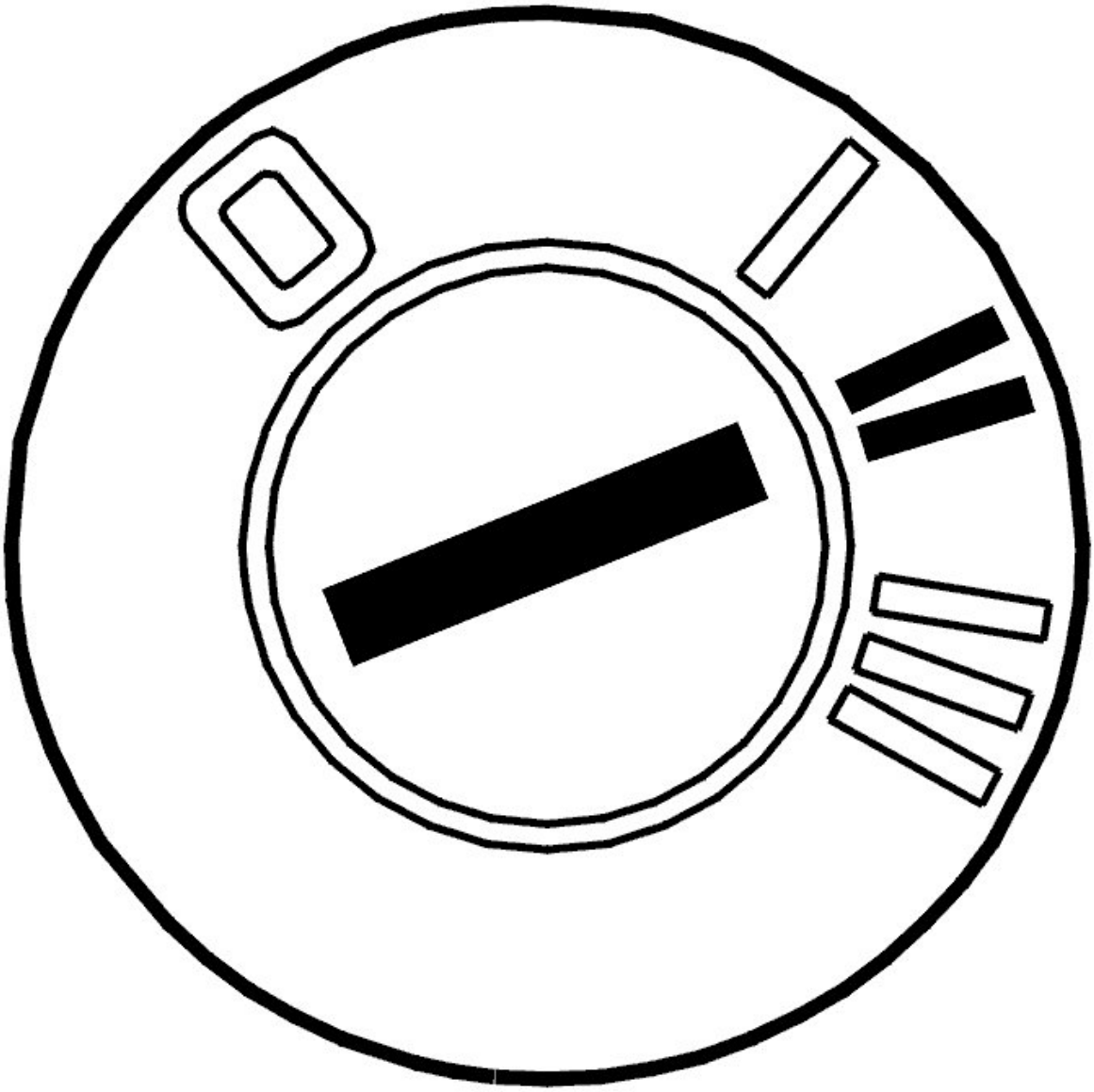
Check whether any diagnostic trouble codes (DTCs) are stored in the brake control module (BCM) or in the central electronic module (CEM). Any diagnostic trouble codes (DTCs) stored in the brake control module (BCM) or central electronic module (CEM) must be remedied first.

Have fault causes been traced or remedied in the brake control module (BCM) and the central electronic module (CEM)?

Yes - Checking the status

No - DONE

Checking the status

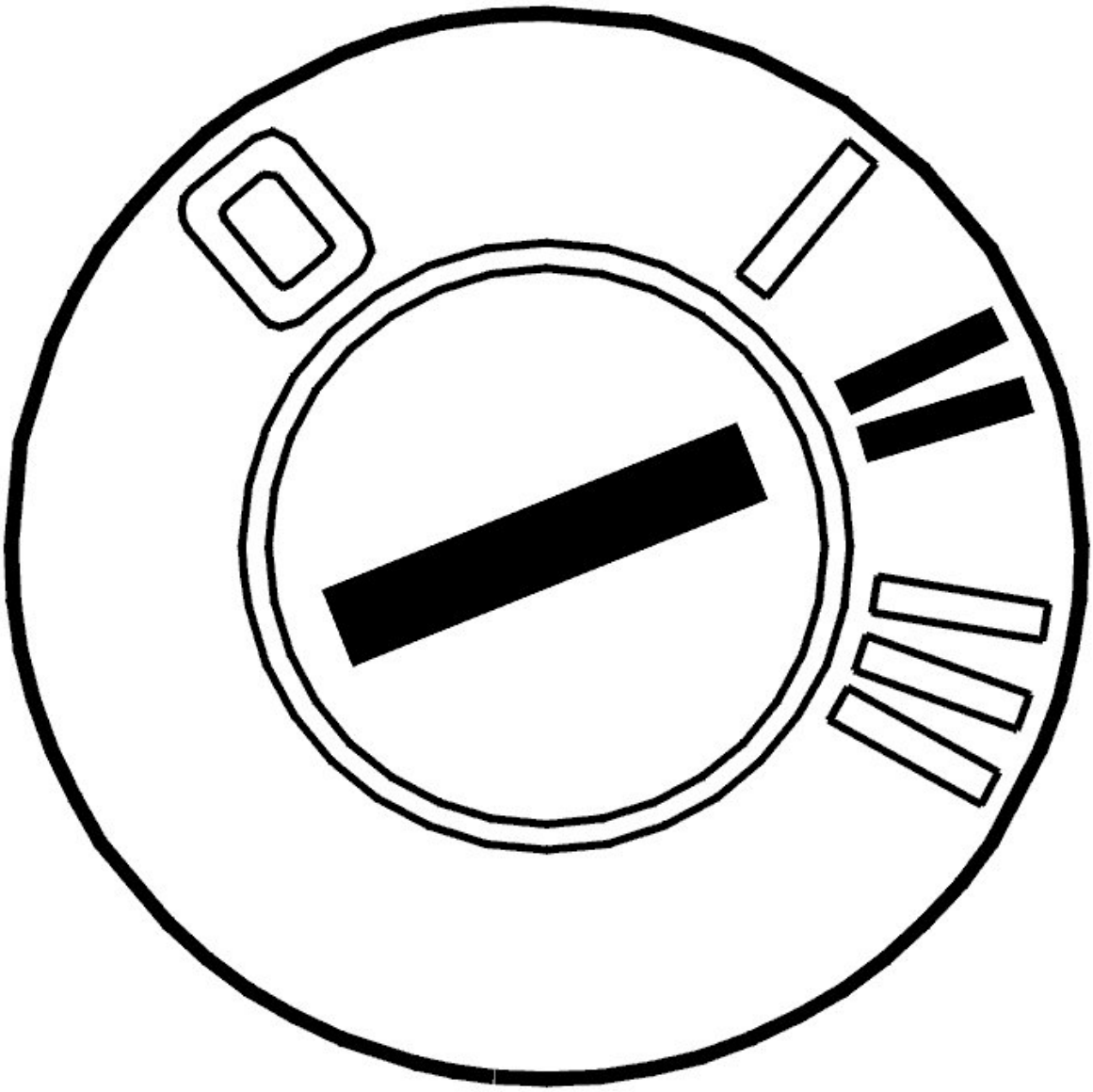


- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault is intermittent at the moment.

Continue - Checking the power supply

Checking the power supply



- Ignition on.

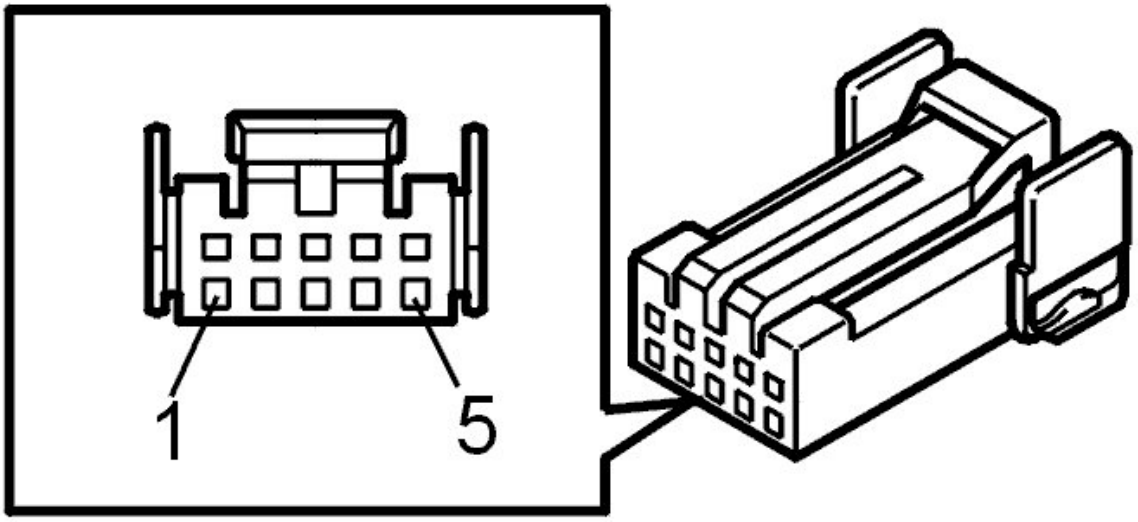
Check the power supply to the stop lamp switch. Take readings between stop lamp switch terminal #1 (cable harness side) and the ground terminal. The power supply must be approximately 12 V.

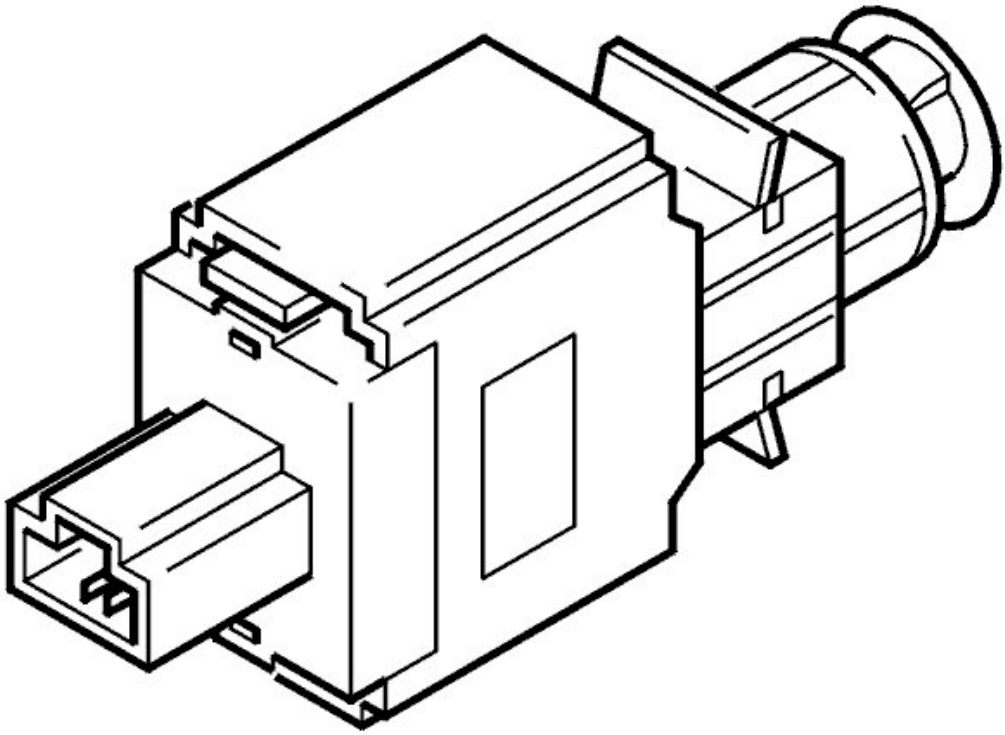
If there is no power supply:

Check the power supply circuit for stop lamp switch terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a blown fuse in the circuit.
Remedy as necessary.

Other information:

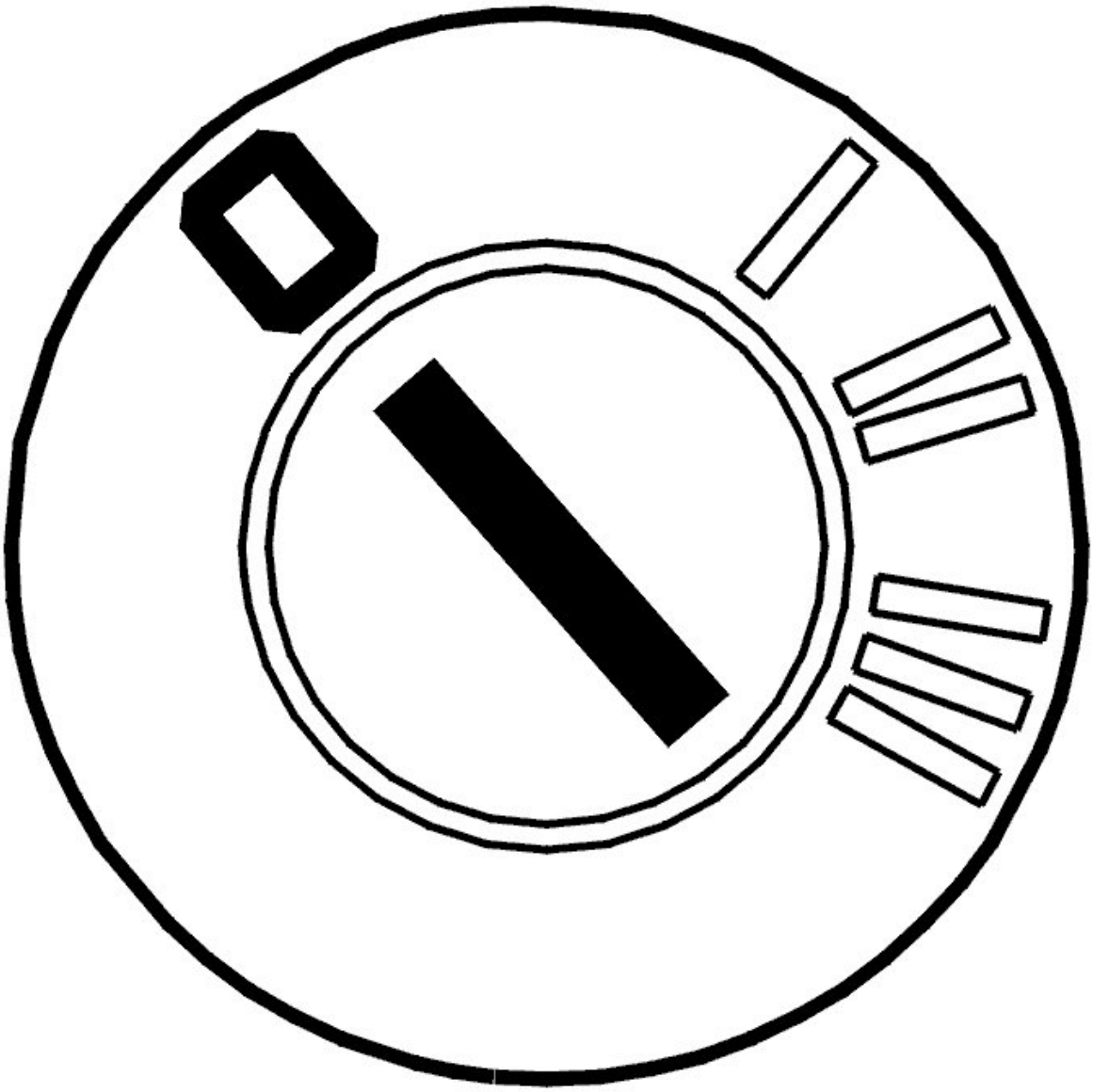
- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check that the stop lamp switch is correctly installed.

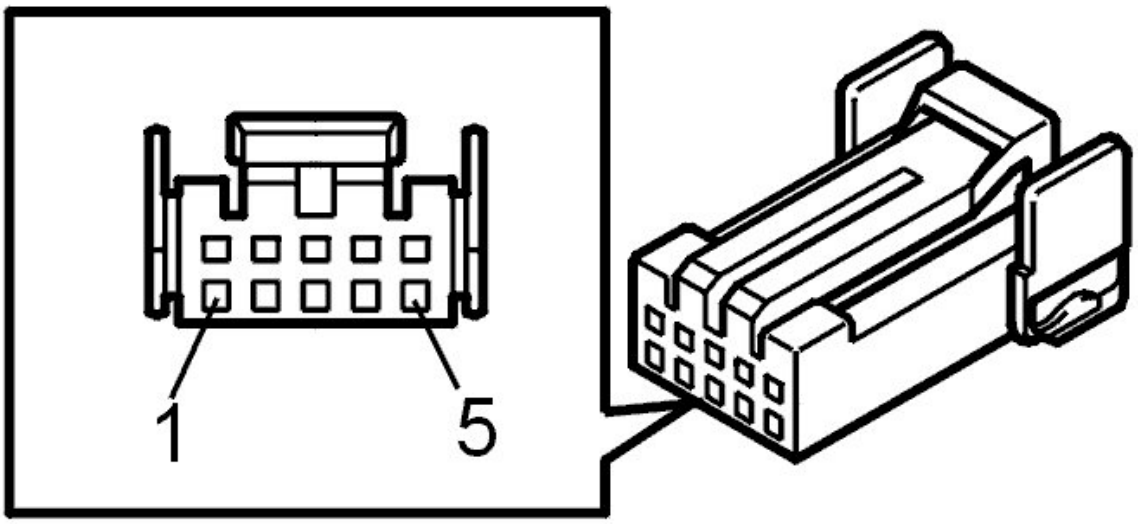
Check the resistance of the stop lamp switch with the switch pressed in and with the switch released. Take readings between terminals #1 and #5 (component side) on the stop lamp switch.

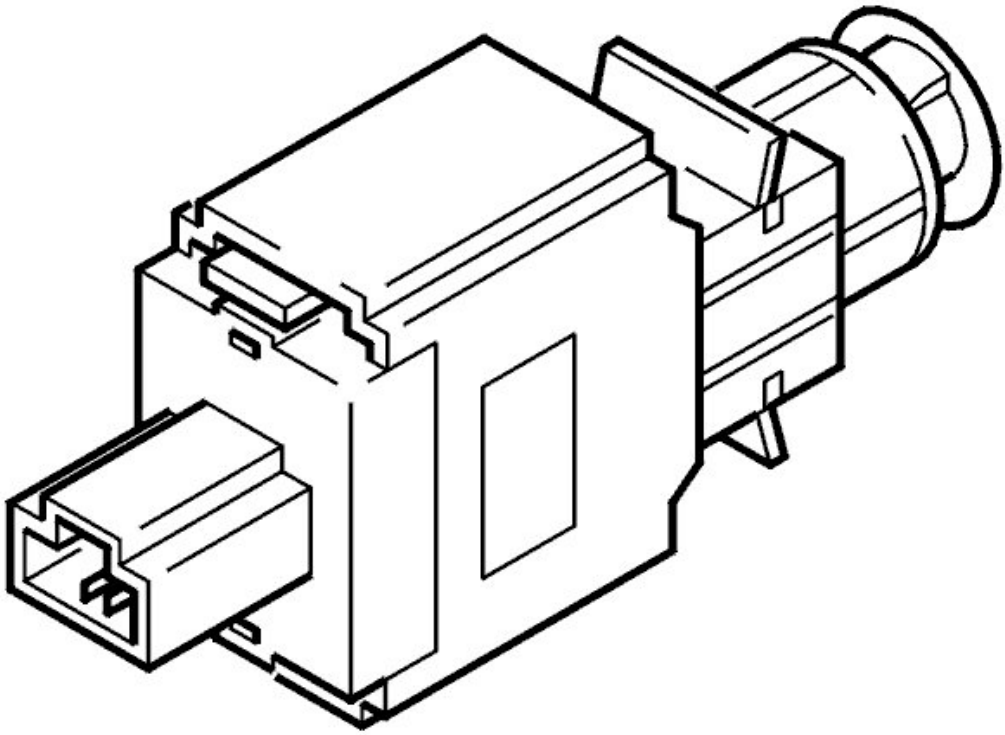
Hint: The stop lamp switch must be closed when the brake pedal is depressed. The resistance of the stop lamp switch must be infinite when the brake pedal is unaffected.

Check the stop lamp switch and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and engine control module (ECM) terminal #B26 (#B36). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check central electronic module (CEM) connector B. Check for contact resistance and oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and central electronic module (CEM) terminal #4B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





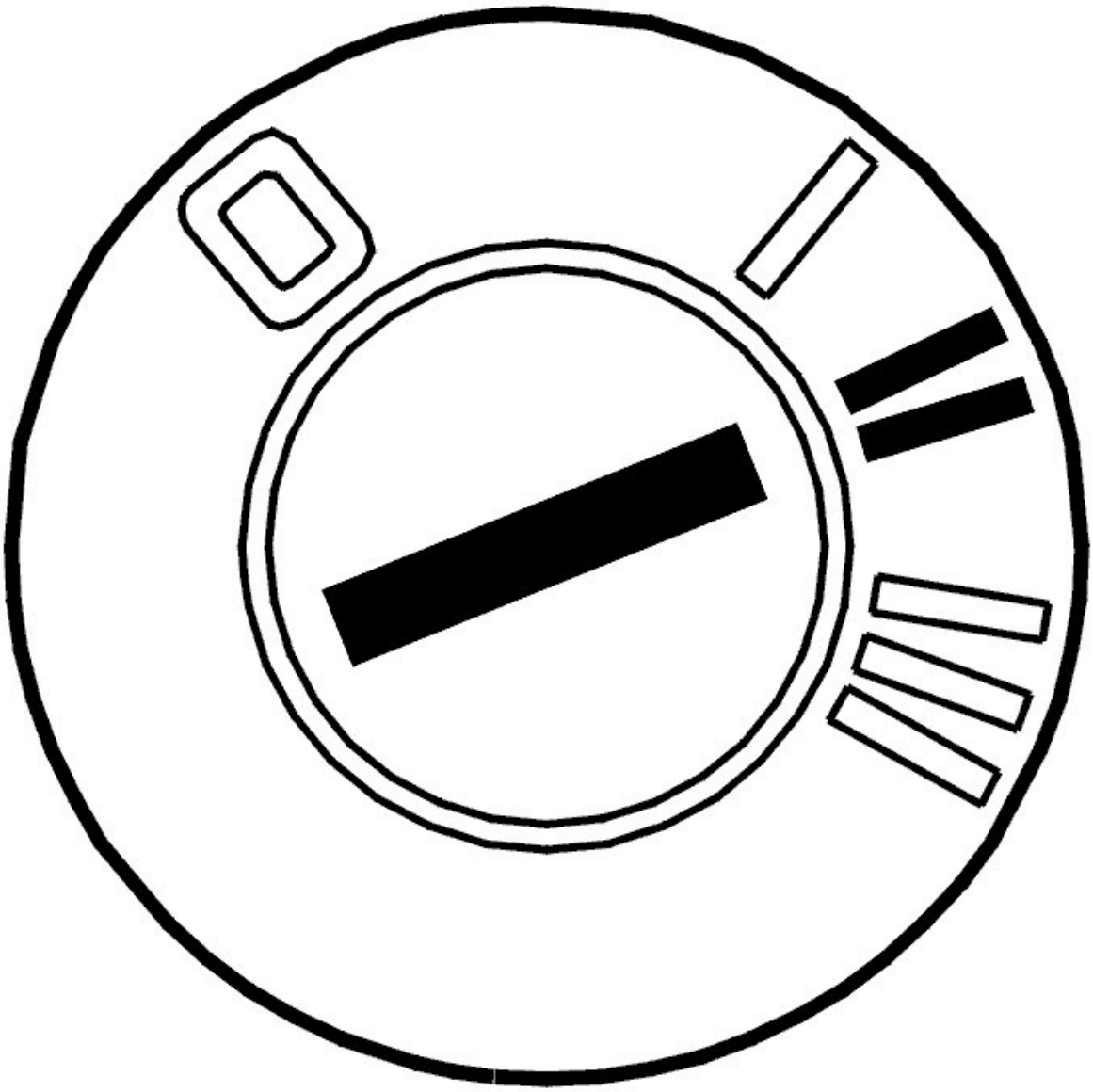
Continue - Verification

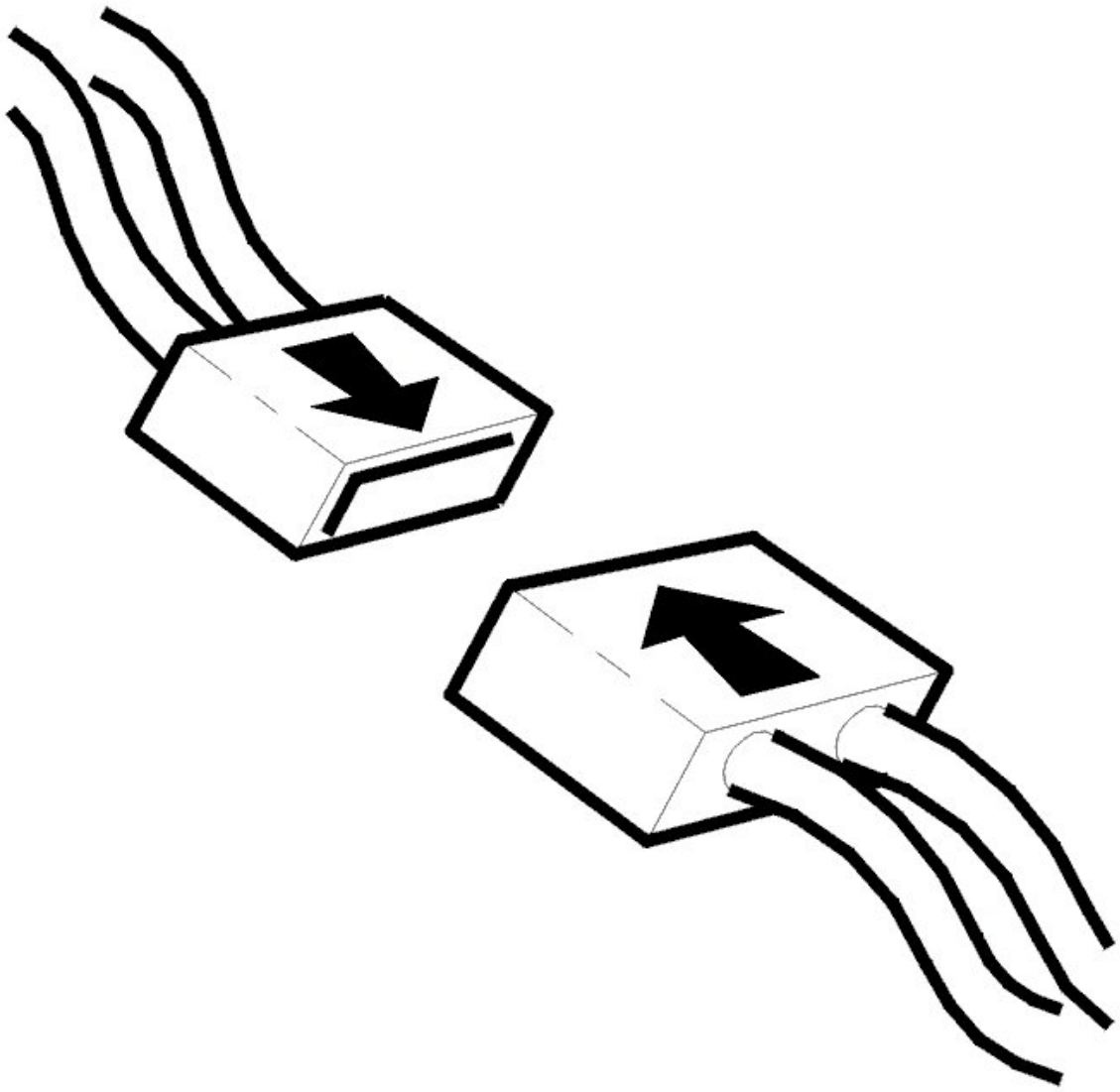
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault has been remedied.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

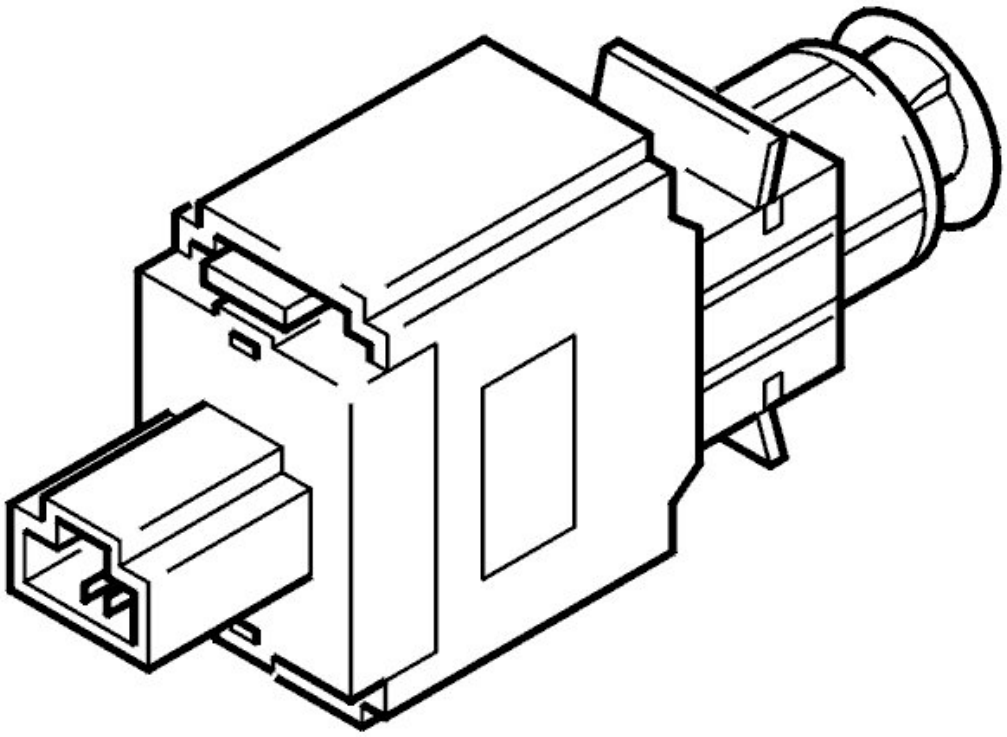
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-900B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the circuit for the brake pedal position sensor, the circuit for the stop lamp switch or in the CAN communication between the brake control module (BCM) and the engine control module (ECM). The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

Cruise control switched off.

Possible source

- Fault trace the brake control module (BCM) and the central electronic module (CEM).

Fault symptom[s]

- Cruise control does not function at all.

Signal Missing or Faulty Signal

Signal missing or faulty signal

Checking the diagnostic trouble codes (DTCs)

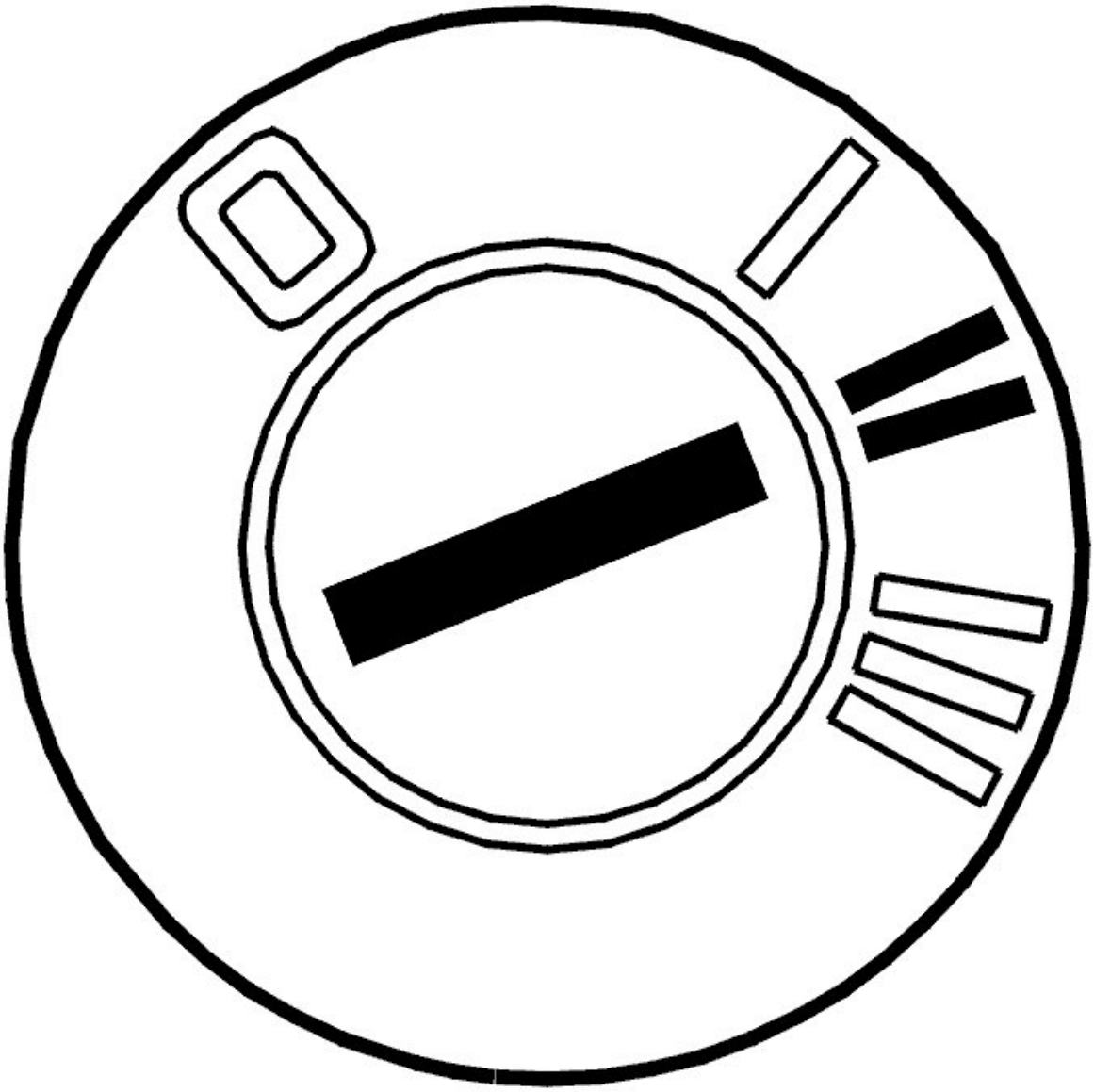
Check whether any diagnostic trouble codes (DTCs) are stored in the brake control module (BCM) or in the central electronic module (CEM).
Any diagnostic trouble codes (DTCs) stored in the brake control module (BCM) or central electronic module (CEM) must be remedied first.

Have fault causes been traced or remedied in the brake control module (BCM) and the central electronic module (CEM)?

Yes - Checking the status

No - DONE

Checking the status

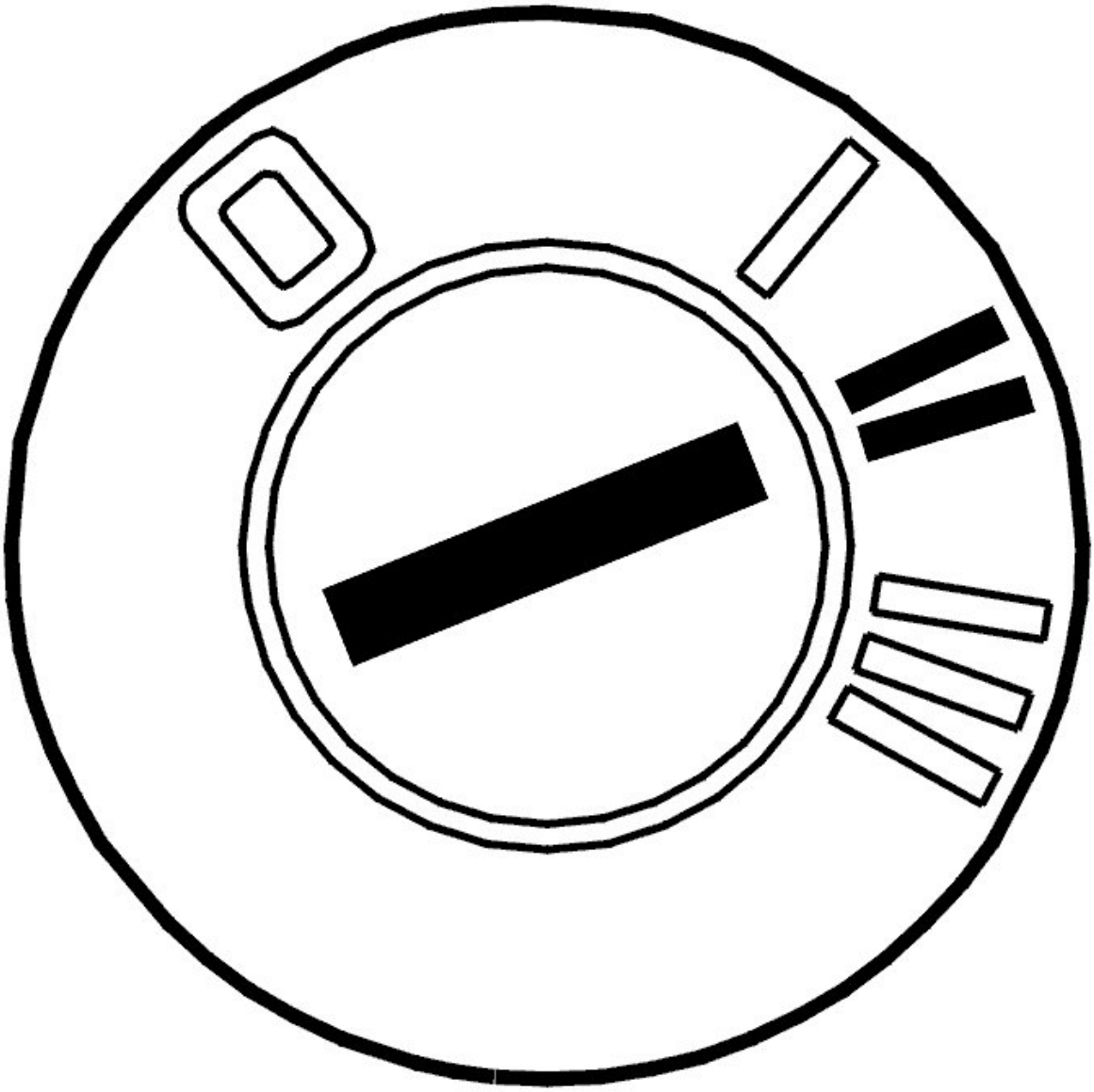


- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault is intermittent at the moment.

Continue - Checking the power supply

Checking the power supply



- Ignition on.

Check the power supply to the stop lamp switch. Take readings between stop lamp switch terminal #1 (cable harness side) and the ground terminal. The power supply must be approximately 12 V.

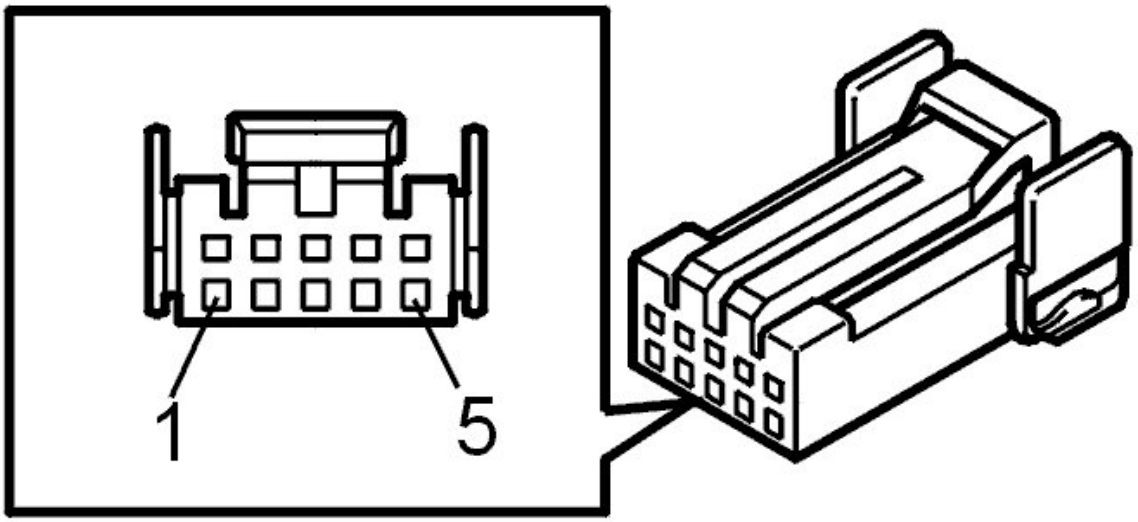
If there is no power supply:

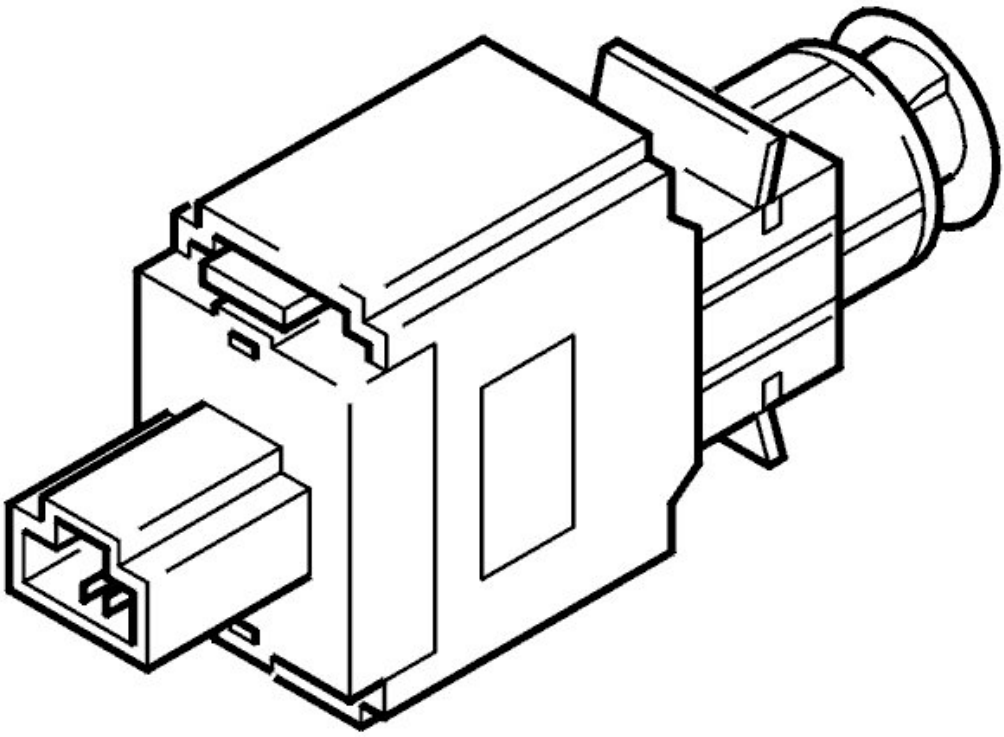
Check the power supply circuit for stop lamp switch terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a blown fuse in the circuit.
Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification

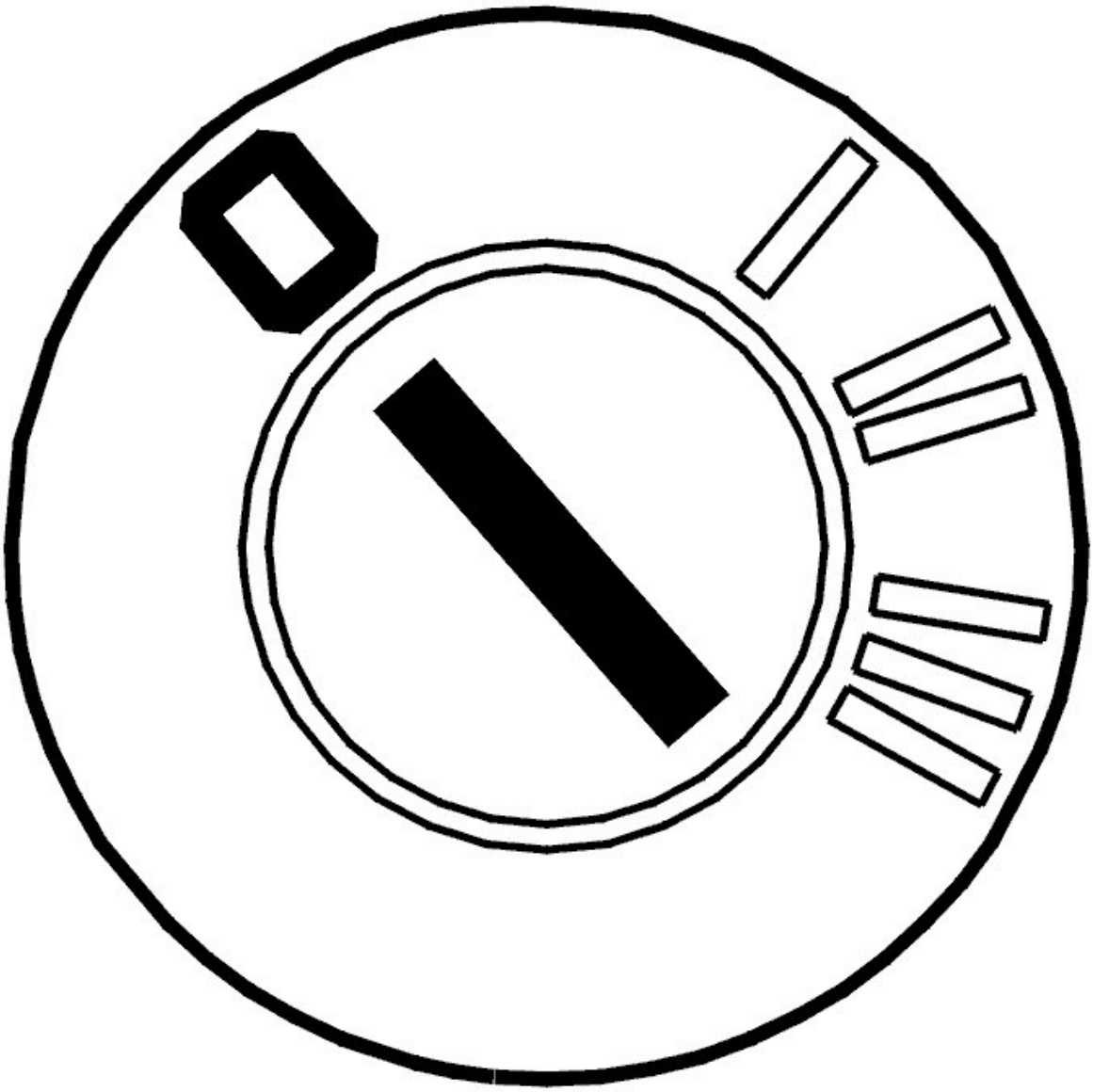
- Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check that the stop lamp switch is correctly installed.

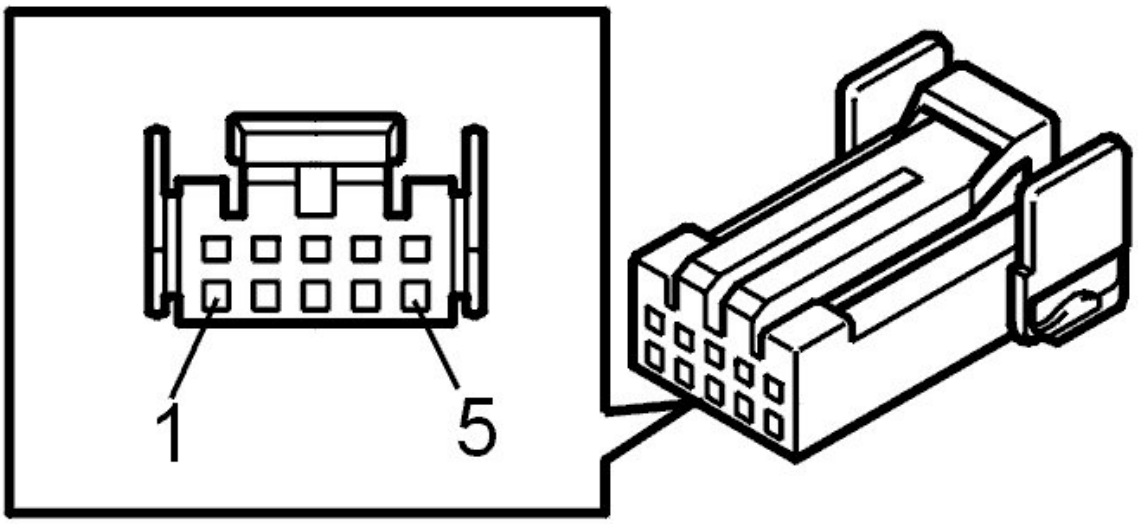
Check the resistance of the stop lamp switch with the switch pressed in and with the switch released. Take readings between terminals #1 and #5 (component side) on the stop lamp switch.

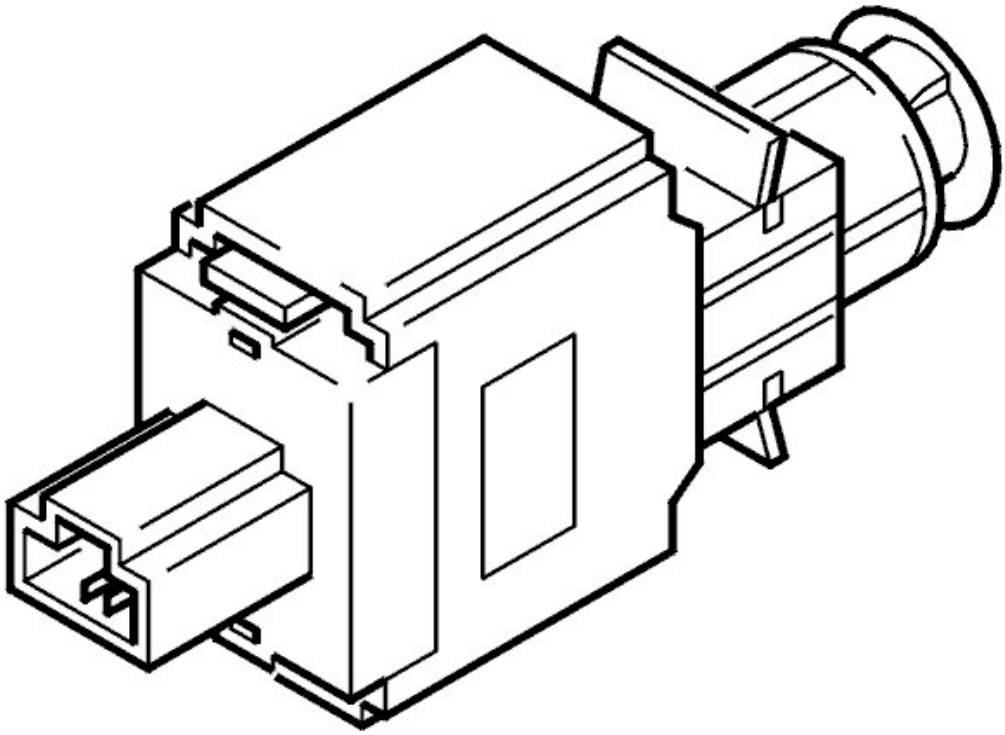
Hint: The stop lamp switch must be closed when the brake pedal is depressed. The resistance of the stop lamp switch must be infinite when the brake pedal is unaffected.

Check the stop lamp switch and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and engine control module (ECM) terminal #B26 (#B36). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check central electronic module (CEM) connector B. Check for contact resistance and oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and central electronic module (CEM) terminal #4B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





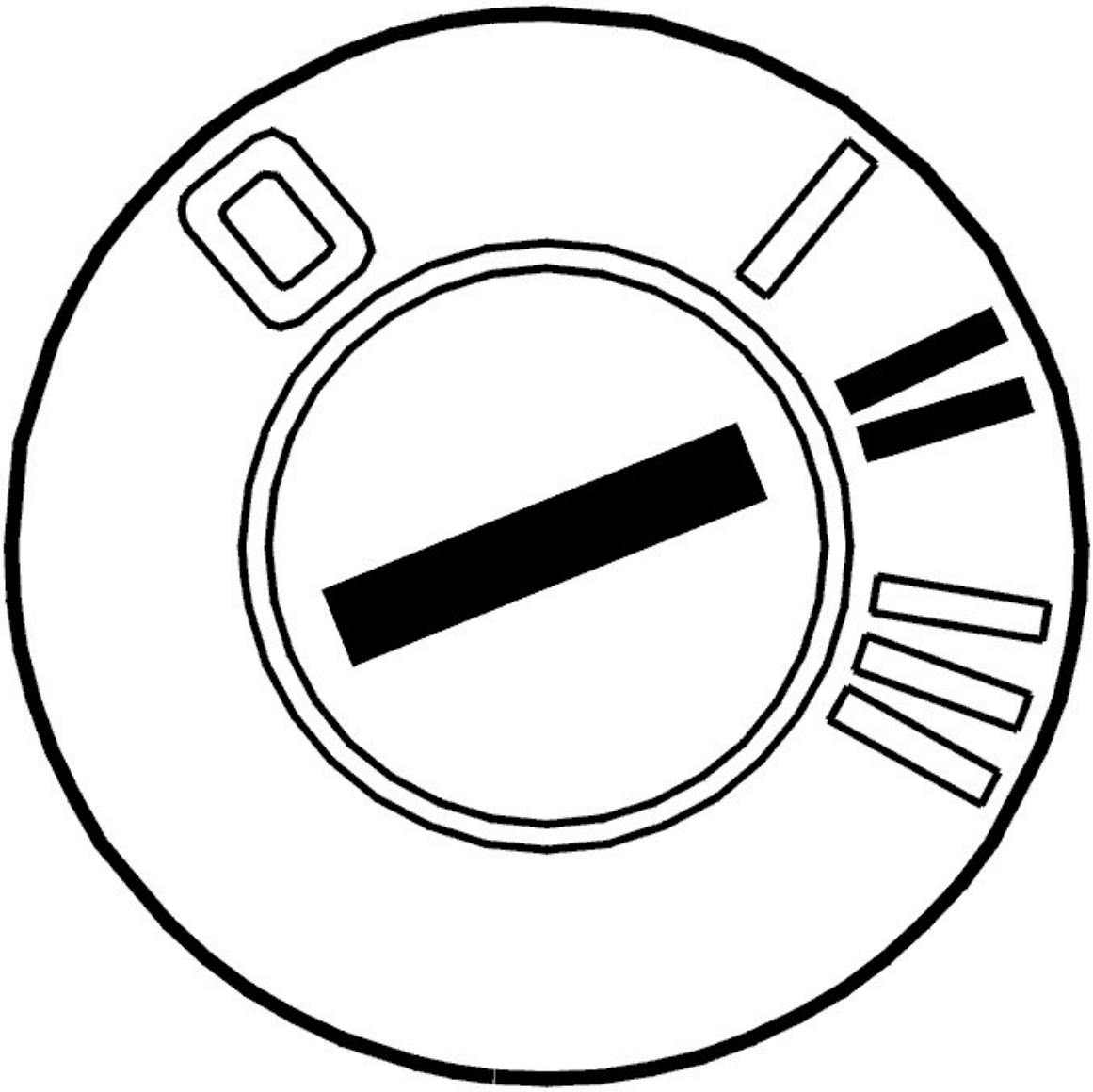
Continue - Verification

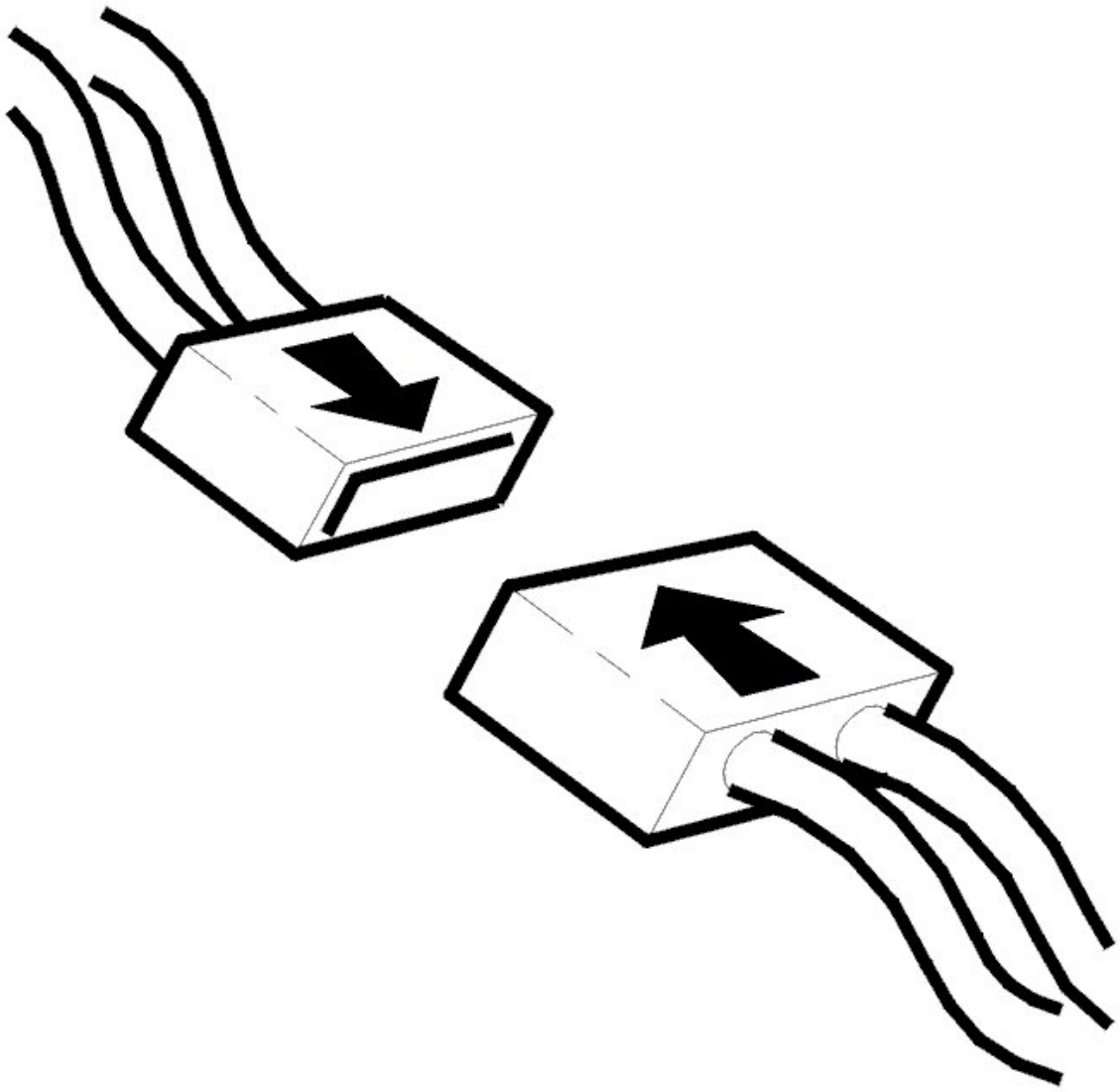
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault has been remedied.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

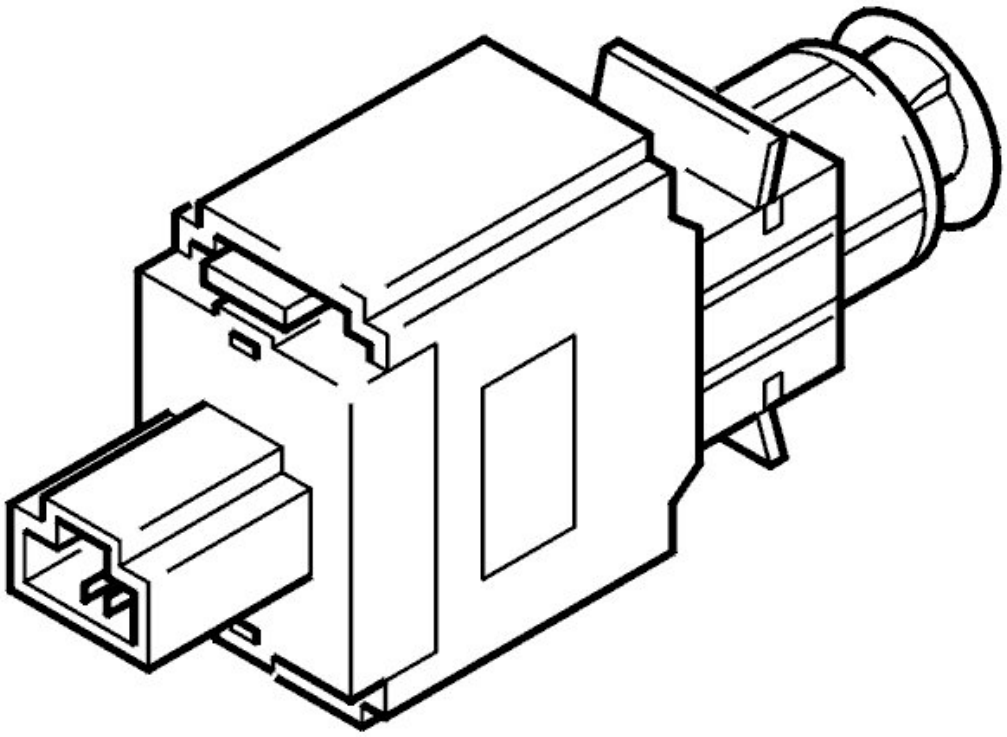
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-900C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the circuit for the brake pedal position sensor, the circuit for the stop lamp switch or in the CAN communication between the brake control module (BCM) and the engine control module (ECM). The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

Cruise control switched off.

Possible source

- Fault trace the brake control module (BCM) and the central electronic module (CEM).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]
- Cruise control/Does not engage
- Text window and warning symbol/Text message

Signal Too High

Signal too high

Checking the diagnostic trouble codes (DTCs)

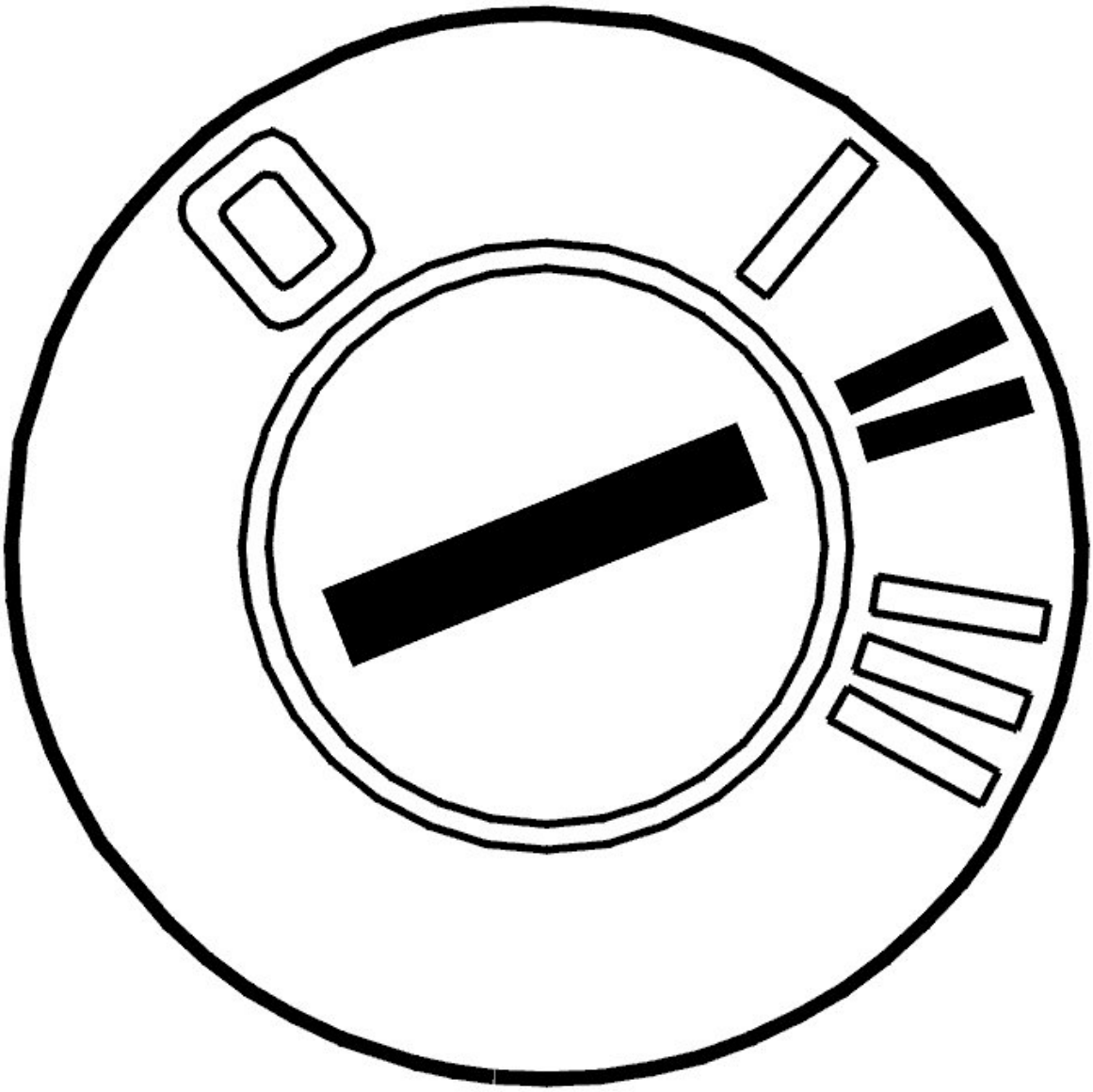
Check whether any diagnostic trouble codes (DTCs) are stored in the brake control module (BCM) in the central electronic module (CEM).
Any diagnostic trouble codes (DTCs) stored in the brake control module (BCM) or central electronic module (CEM) must be remedied first.

Have fault causes been traced or remedied in the brake control module (BCM) and central electronic module (CEM)?

Yes - Checking the status

No - DONE

Checking the status

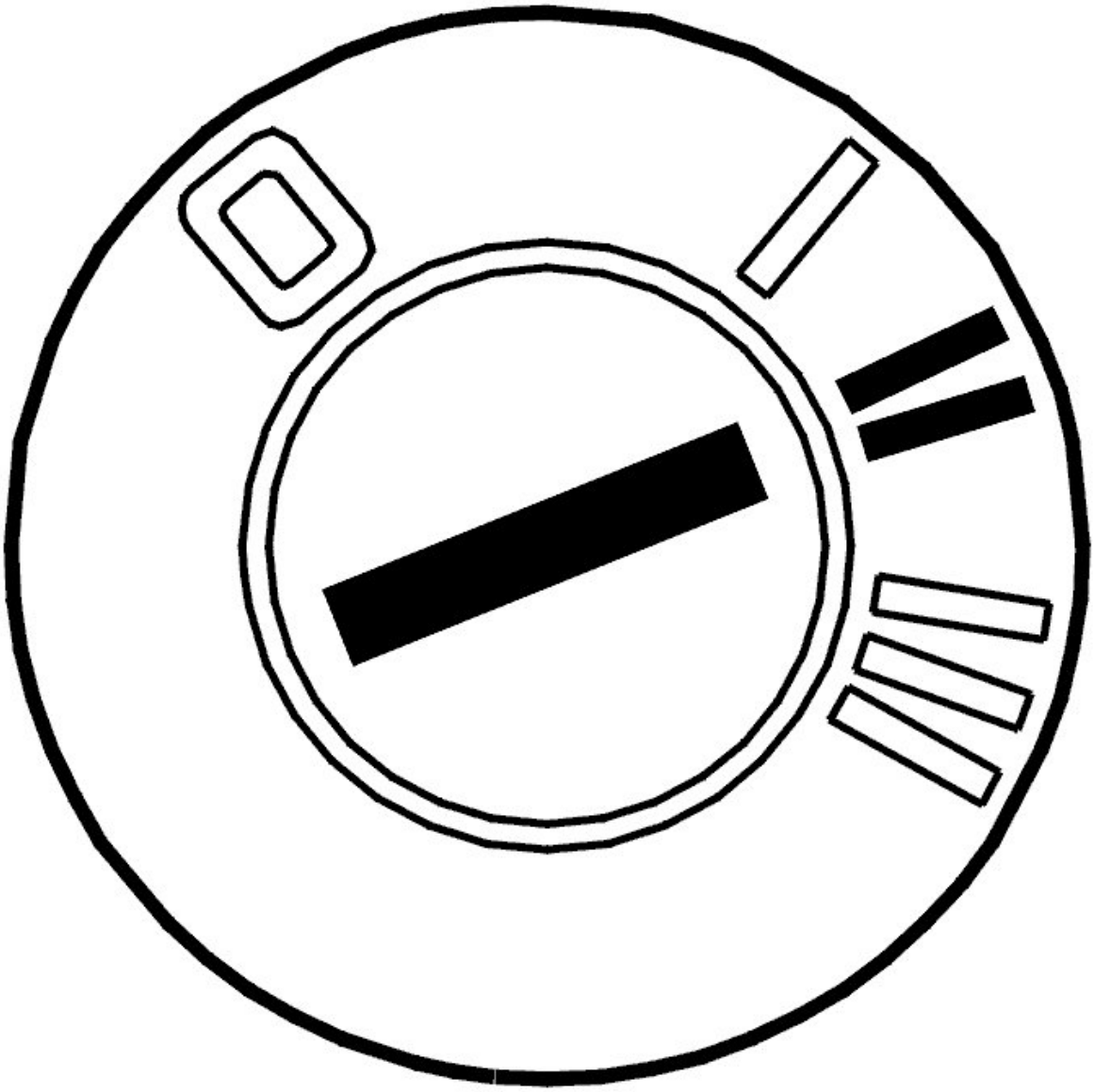


- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault is intermittent at the moment.

Continue - Checking the power supply

Checking the power supply



- Ignition on.

Check the power supply to the stop lamp switch. Take readings between stop lamp switch terminal #1 (cable harness side) and the ground terminal. The power supply must be approximately 12 V.

If there is no power supply:

Check the power supply circuit for stop lamp switch terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a blown fuse in the circuit.
Remedy as necessary.

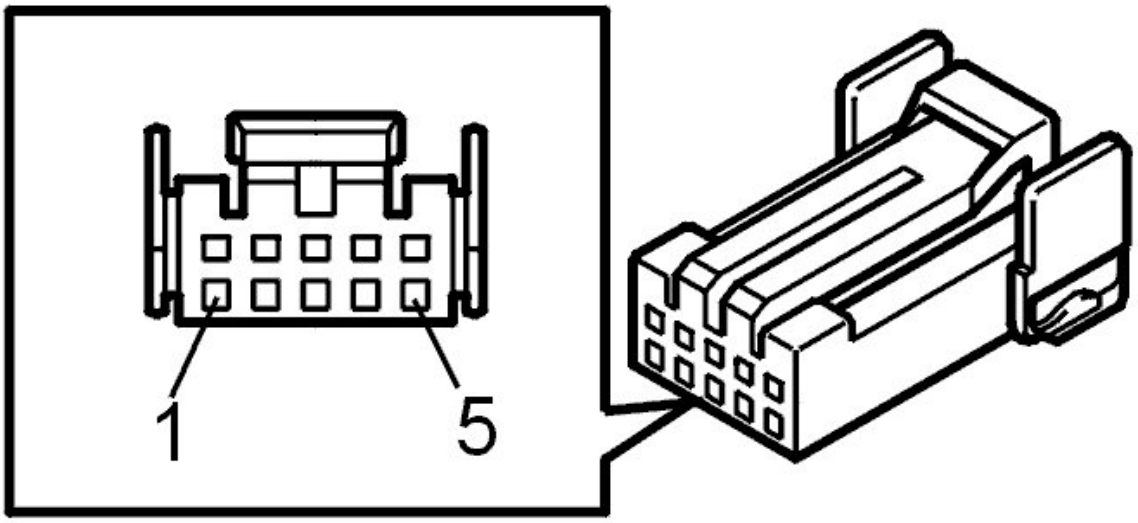
Other information:

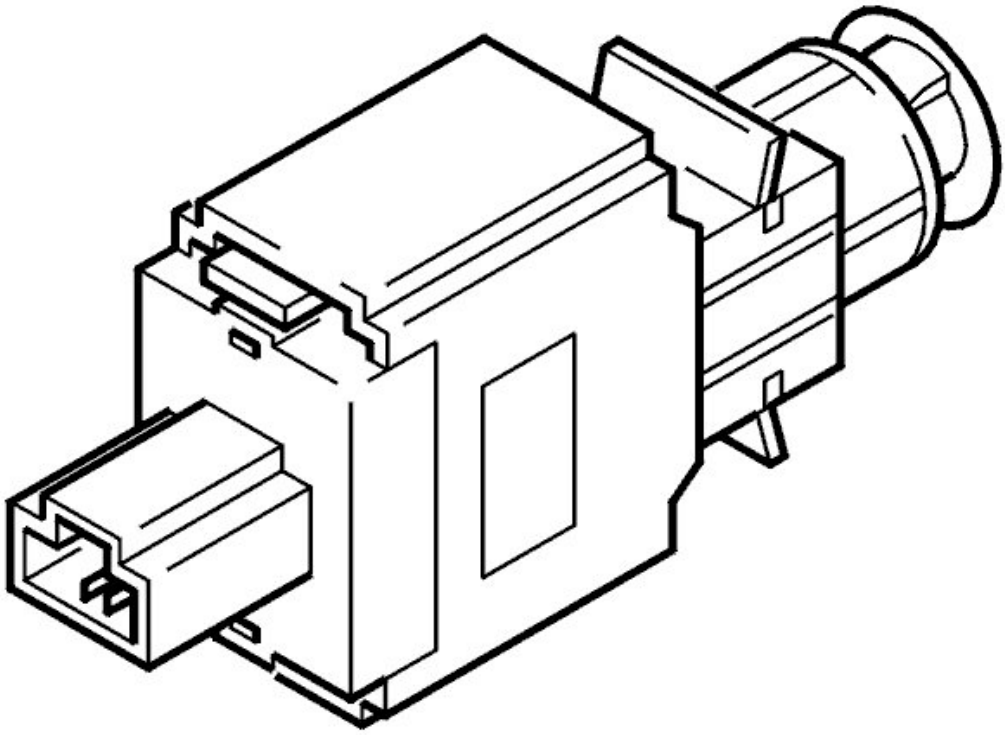
- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Description / Specification

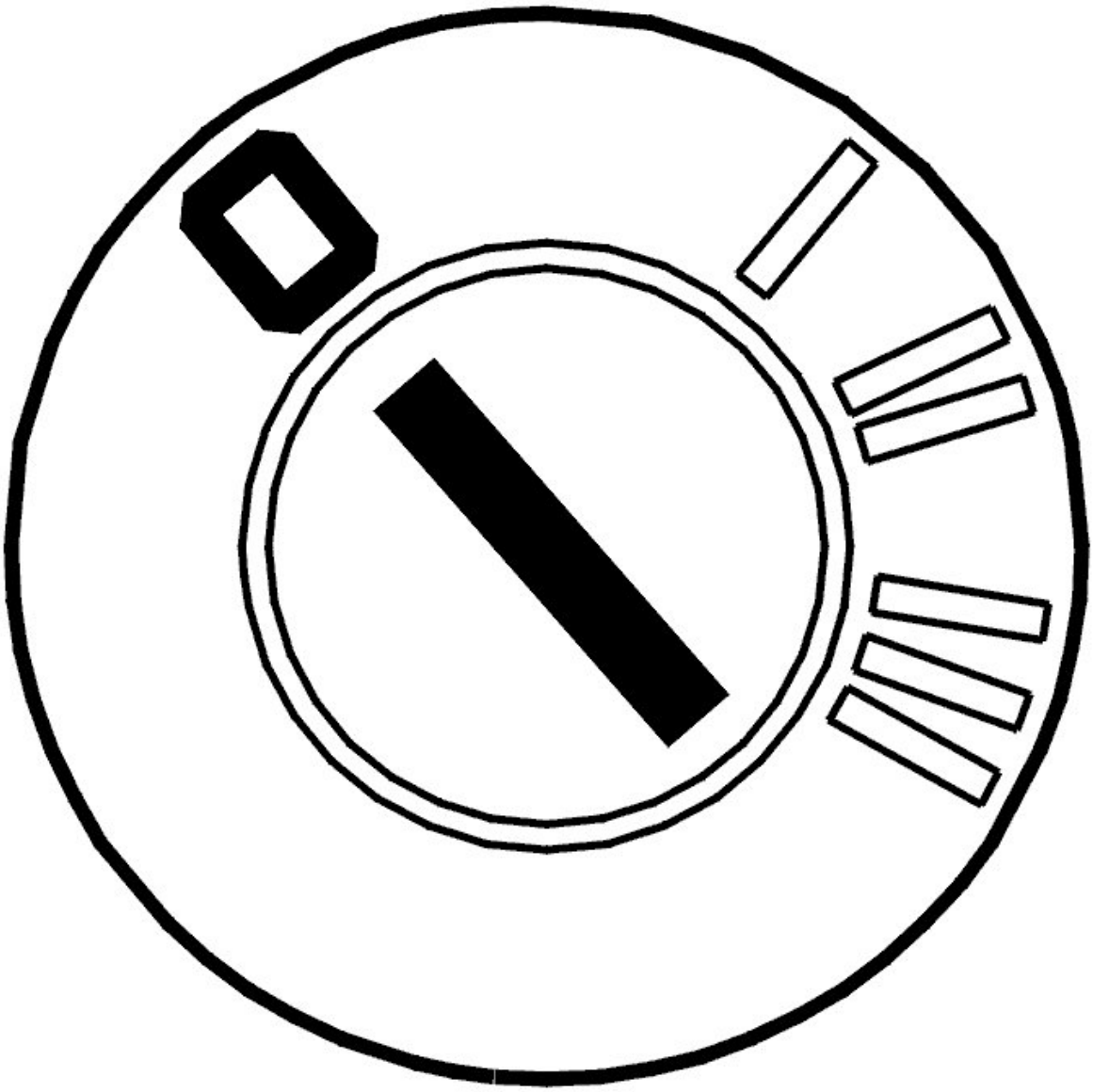
- Stop lamp switch, replacing See: Lighting and Horns/Brake Light Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check that the stop lamp switch is correctly installed.

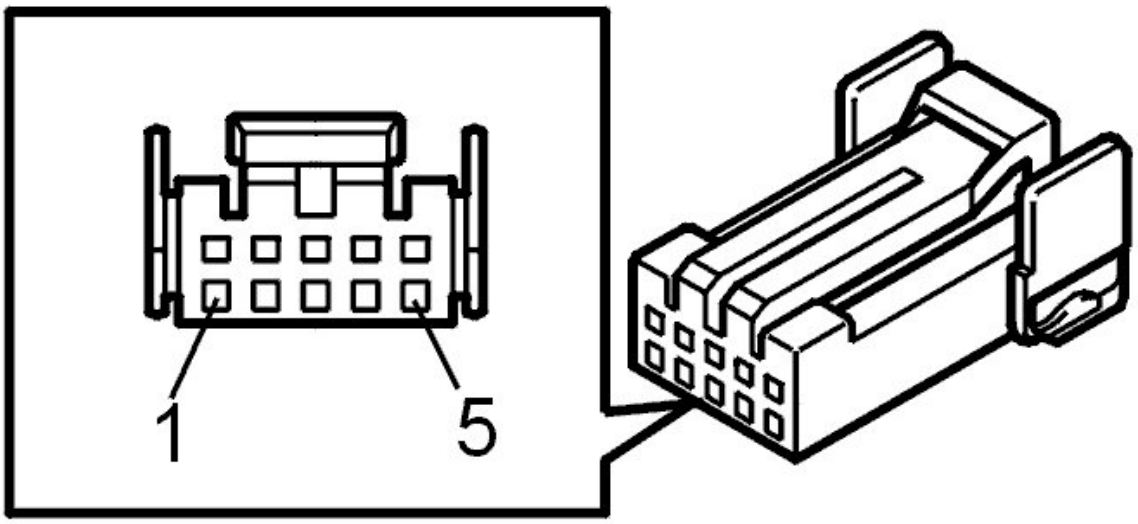
Check the resistance of the stop lamp switch with the switch pressed in and with the switch released. Take readings between terminals #1 and #5 (component side) on the stop lamp switch.

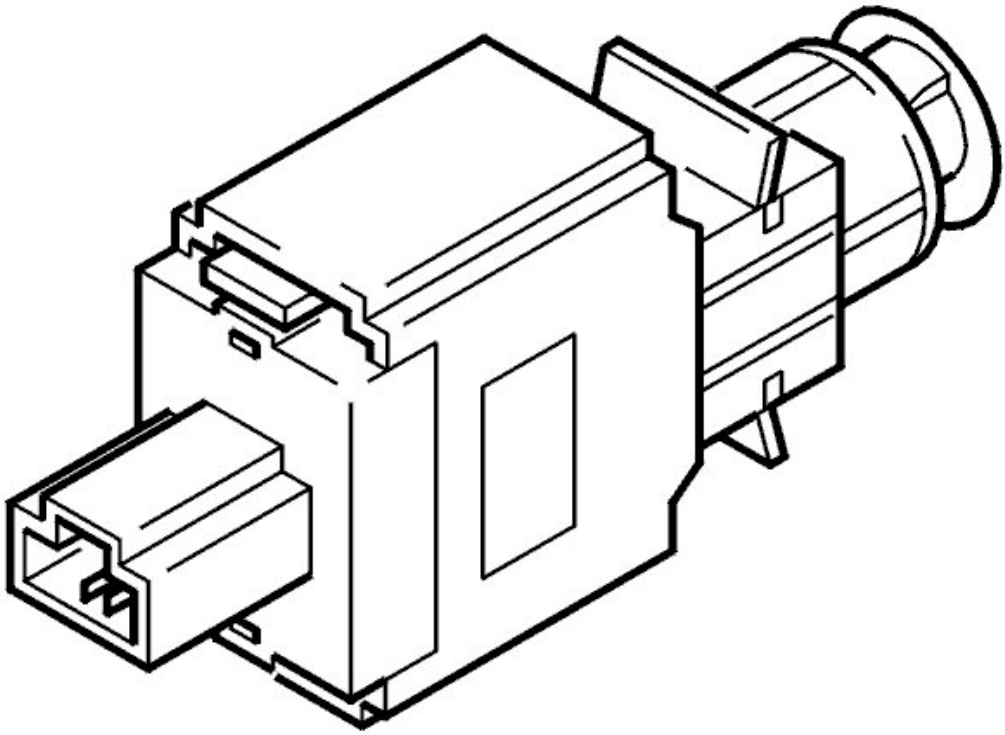
Hint: The stop lamp switch must be closed when the brake pedal is depressed. The resistance of the stop lamp switch must be infinite when the brake pedal is unaffected.

Check the stop lamp switch and engine control module (ECM) connectors. Check for contact resistance. Check for oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and engine control module (ECM) terminal #B26 (#B36). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check central electronic module (CEM) connector B. Check for contact resistance and oxidation.
Check the cable between stop lamp switch terminal #5 (cable harness side) and central electronic module (CEM) terminal #4B. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





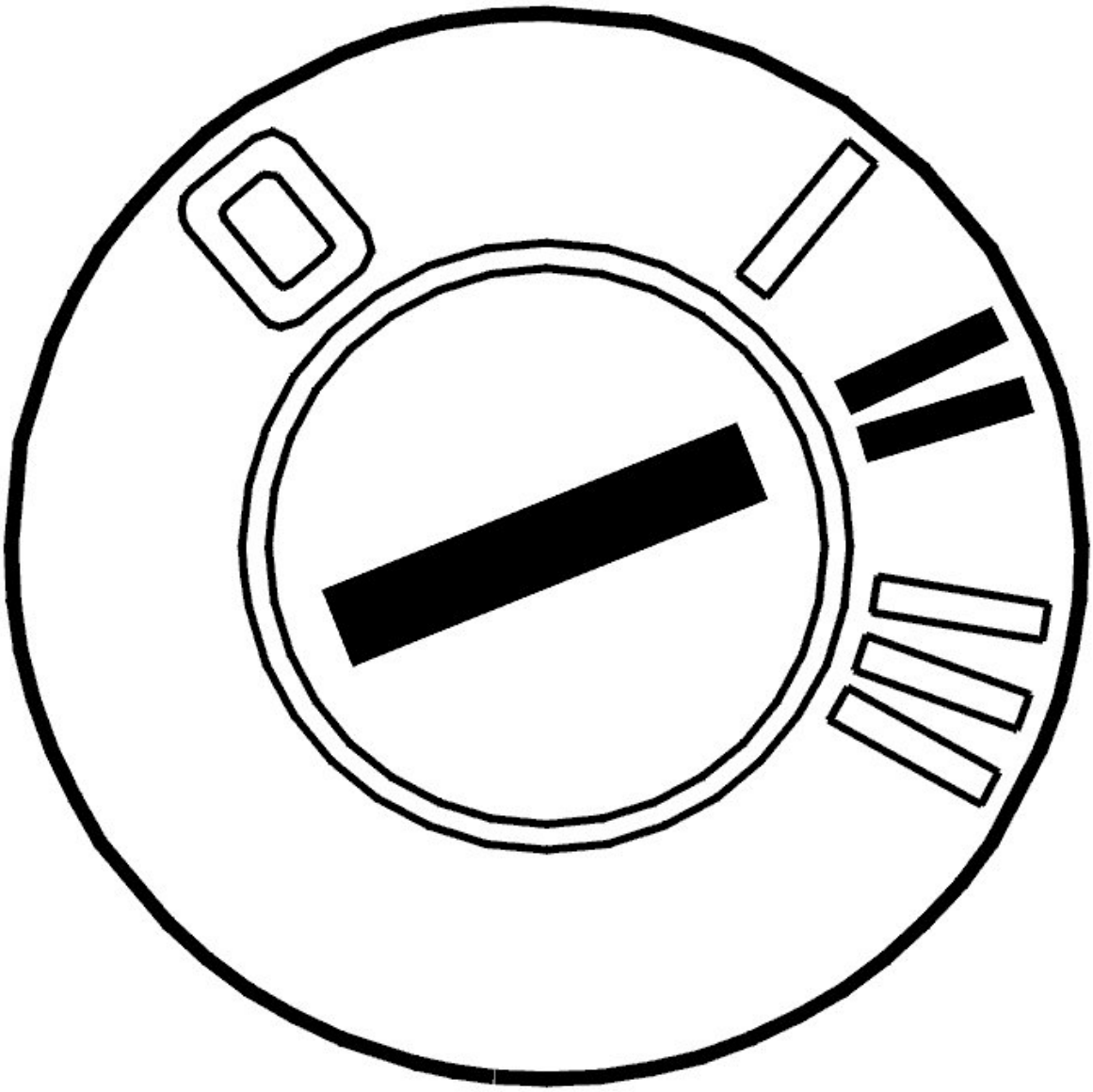
Continue - Verification

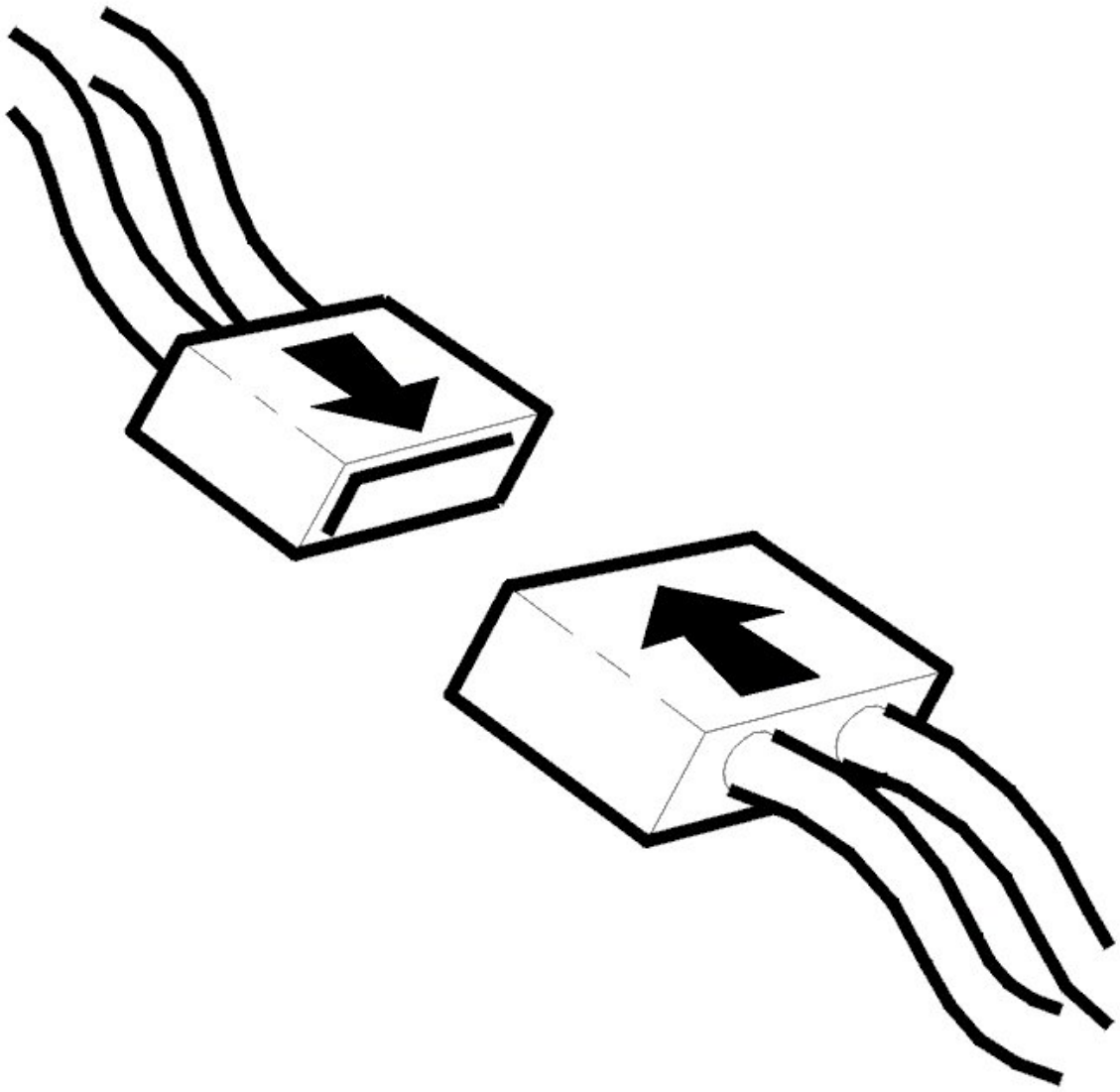
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the status from the stop lamp switch.

Check the function of the stop lamp switch by carefully pressing and releasing the brake pedal.
Check that the status changes between "OFF" when the brake pedal is unaffected and "ON" when the brake pedal is depressed.
If the status of the stop lamp switch changes as described above when the brake pedal is depressed, the fault has been remedied.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

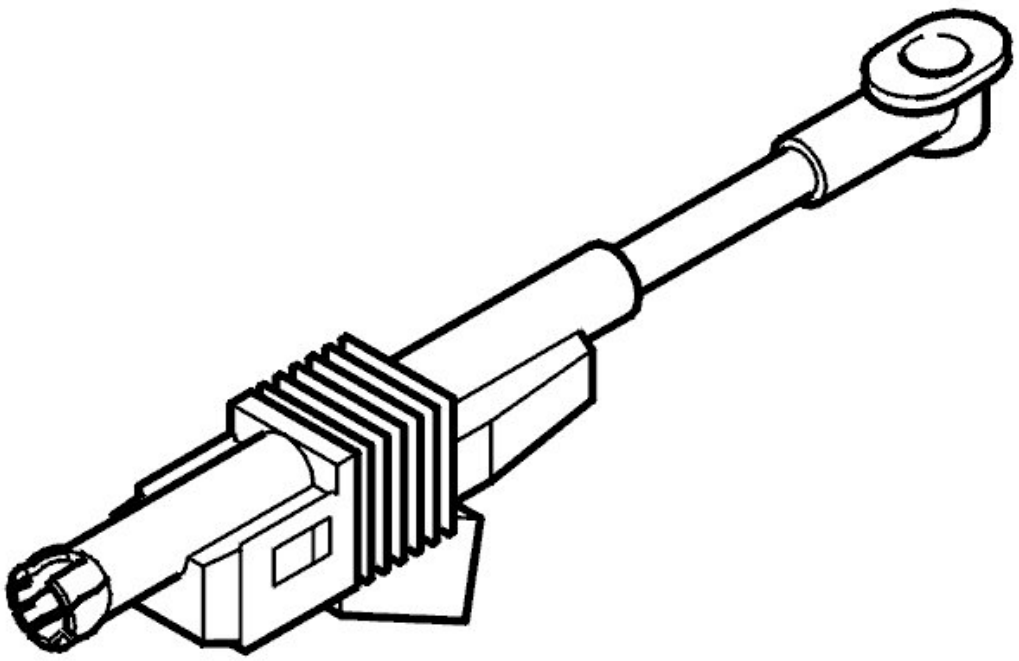
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9100

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the clutch pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

Cruise control switched off.

Possible source

- Open-circuit in the signal cable
- Incorrectly installed clutch pedal sensor
- Damaged clutch pedal sensor.

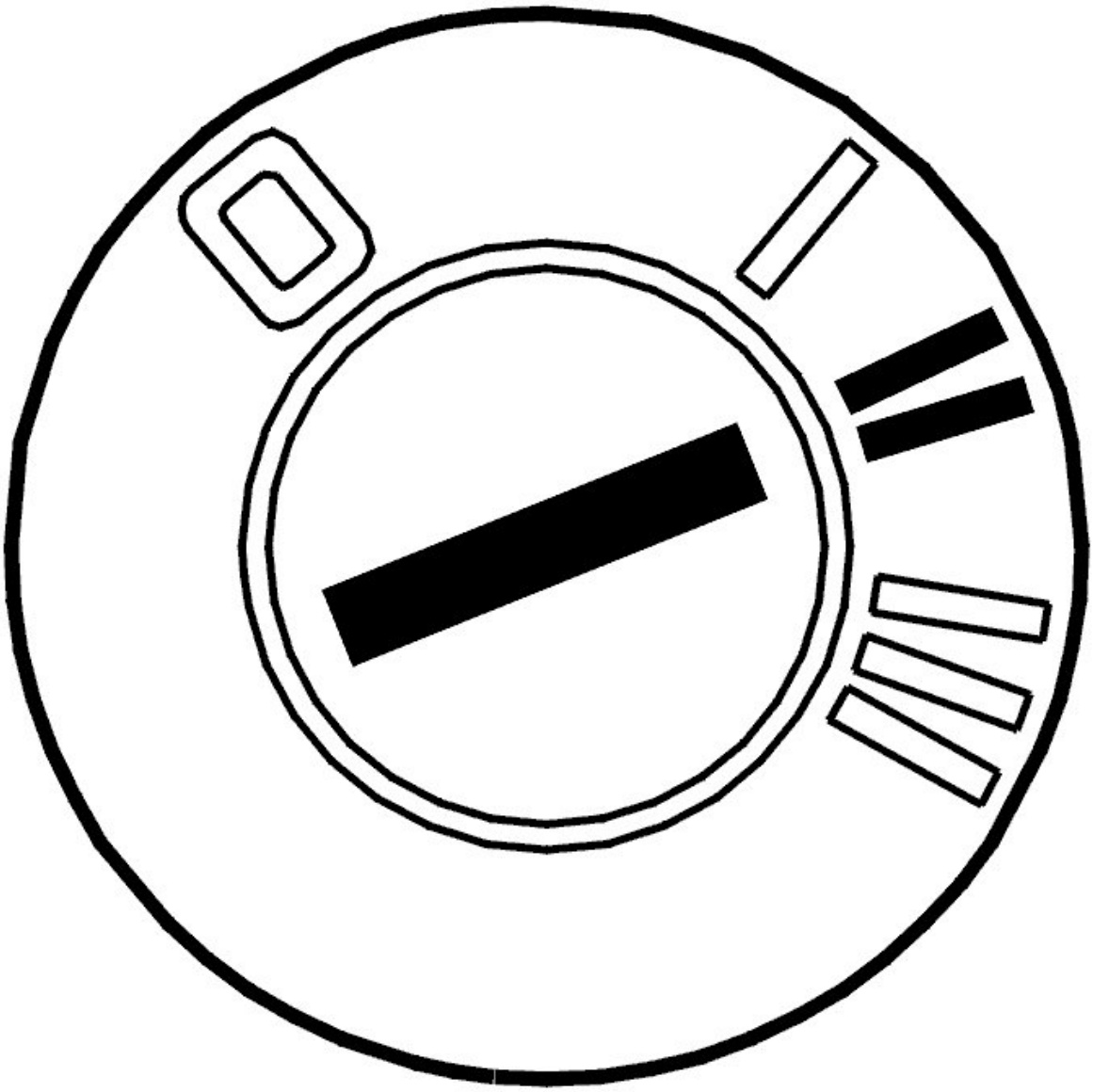
Fault symptom[s]

- Cruise control does not function at all.

Faulty Signal or Signal Missing

Signal missing or faulty signal

Checking the status

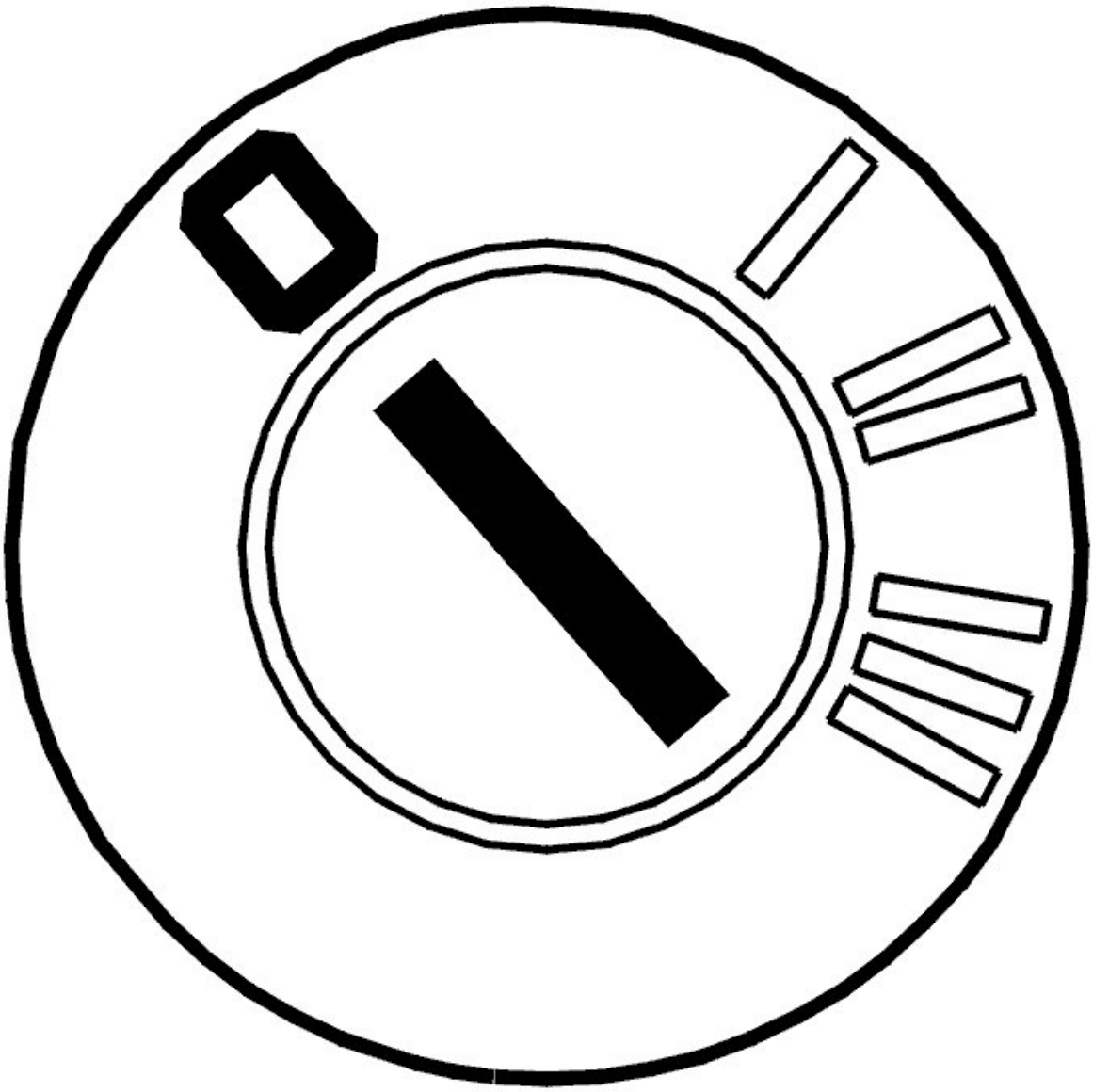


- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20 % when the pedal is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

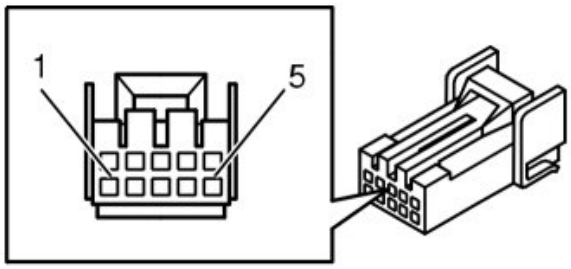
Check the resistance of the clutch pedal sensor between terminals #2 and #4 (component side).
Check the clutch pedal and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #B15 (#B25) and clutch pedal sensor terminal #2 (component side). Check for an open-circuit.
Check the signal ground cable between engine control module (ECM) terminal #B4 (#B14) and clutch pedal sensor terminal #4 (cable harness side). Check for an open-circuit.
Check the clutch pedal sensor installation. Search for damage and check the connections visually.

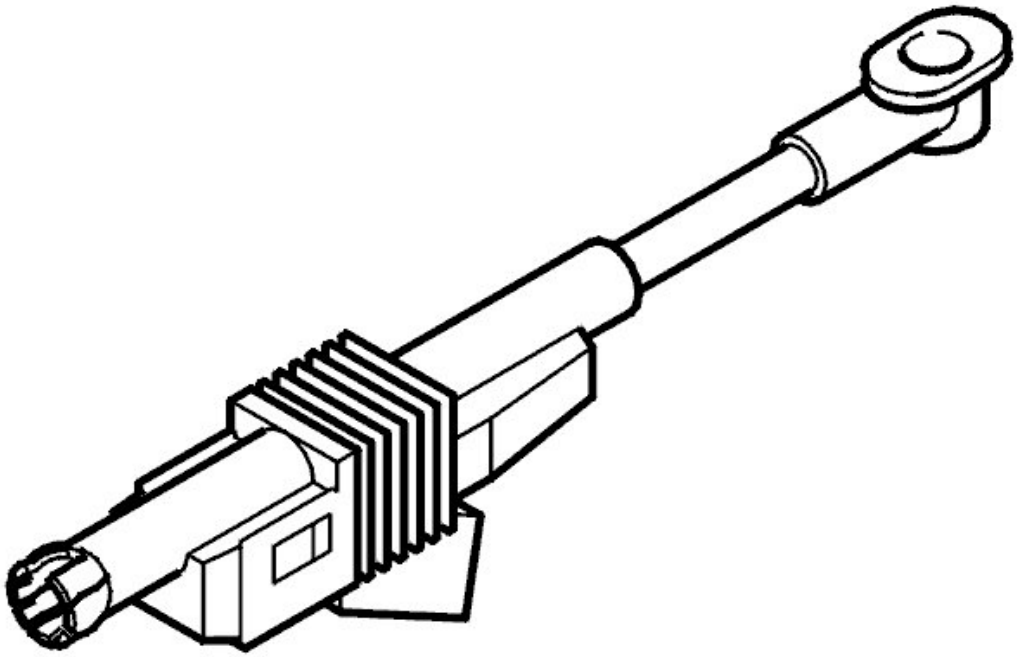
Hint: With the ignition on, the power supply to the clutch pedal sensor must be approximately 5 V (measured with the clutch pedal sensor disconnected), measured between terminals #2 and #4 (cable harness side).

Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Pedal position sensor clutch, replacing See: Clutch Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





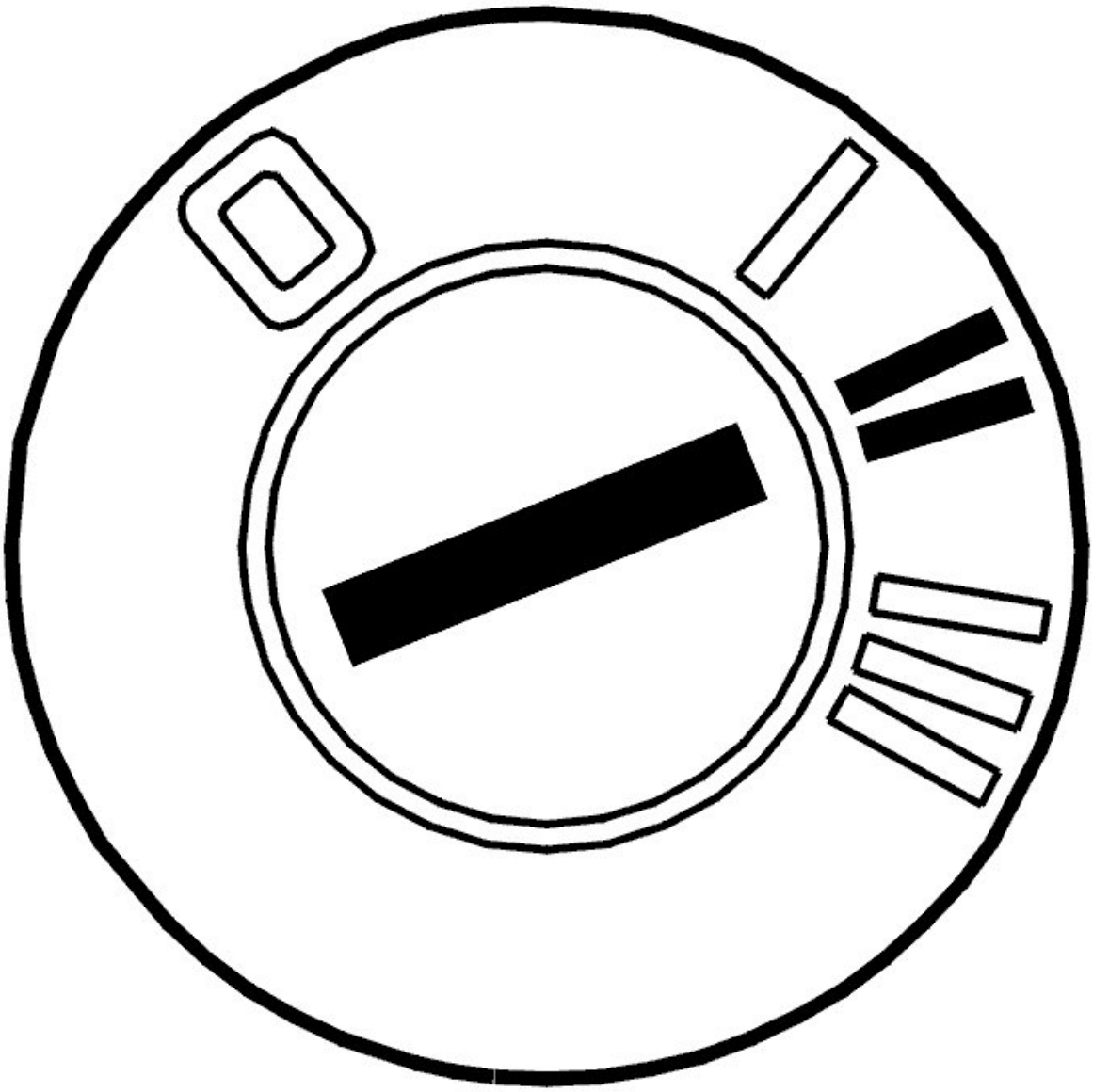
Continue - Verification

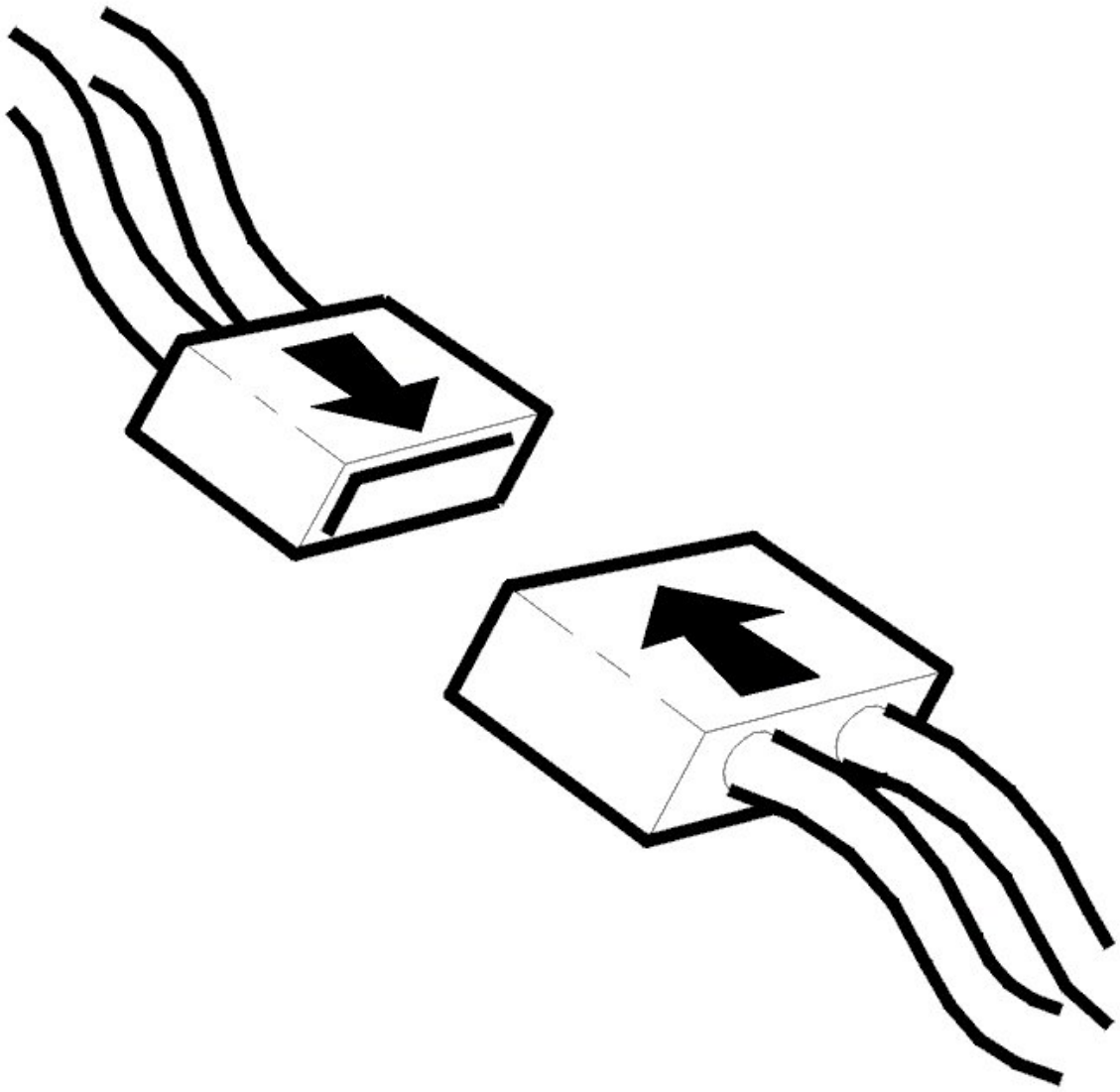
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20% when the pedal is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

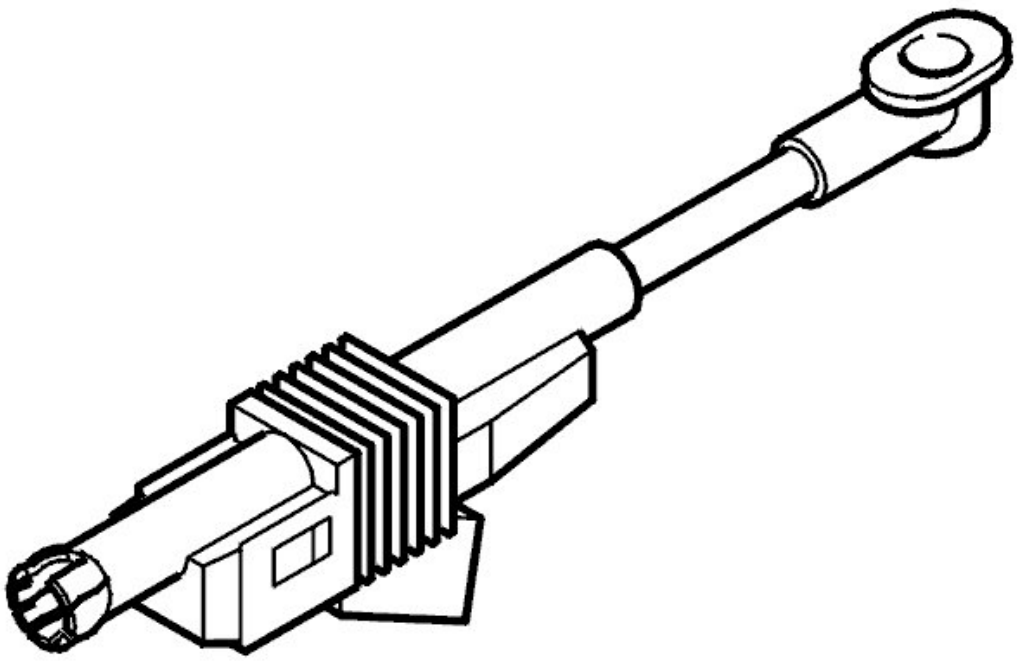
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-910B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the clutch pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

Cruise control switched off.

Possible source

- Open-circuit in the signal cable
- Incorrectly installed clutch pedal sensor
- Damaged clutch pedal sensor.

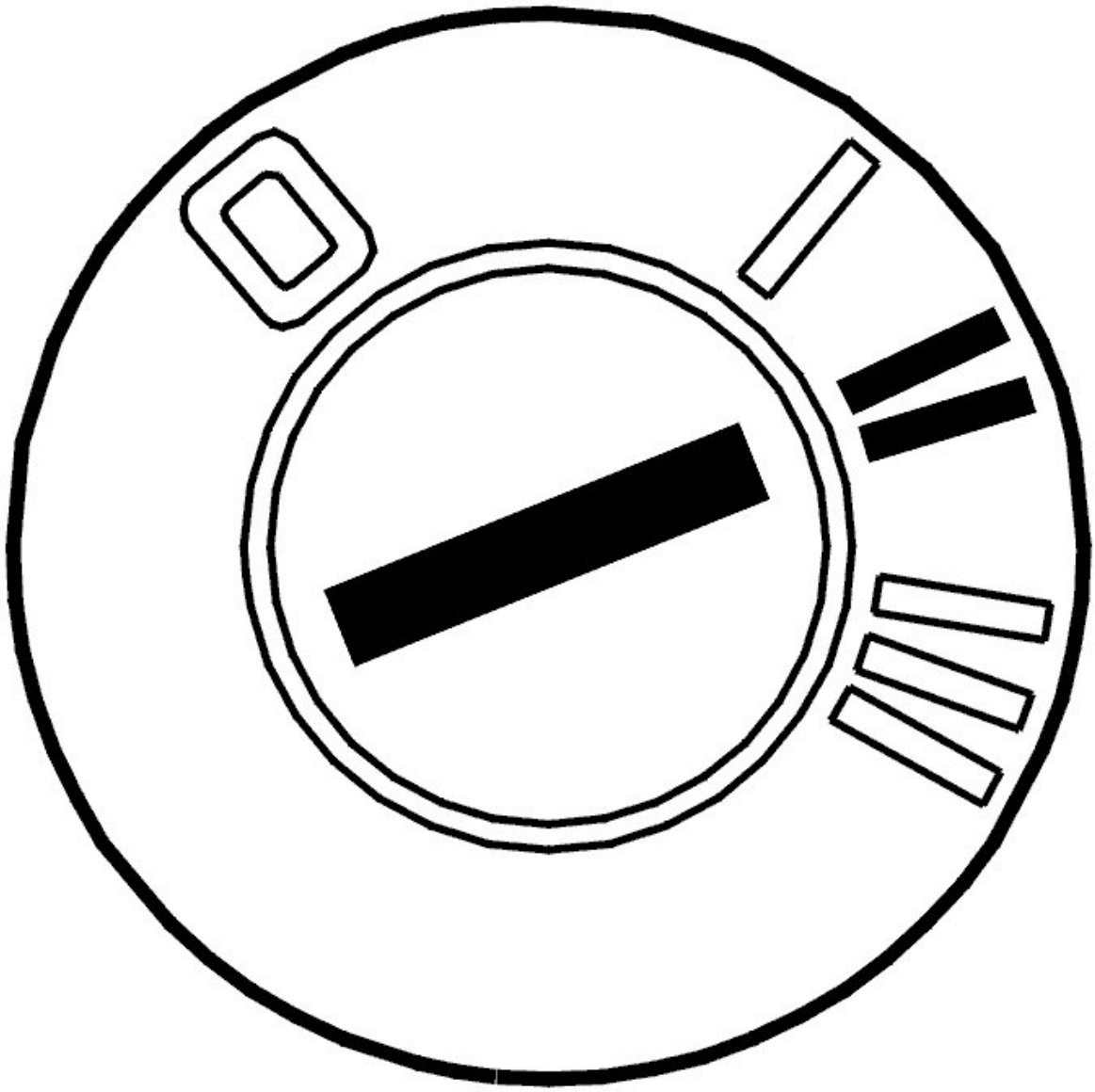
Fault symptom[s]

- Cruise control does not function at all.

Signal Missing or Faulty Signal

Signal missing or faulty signal

Checking the status

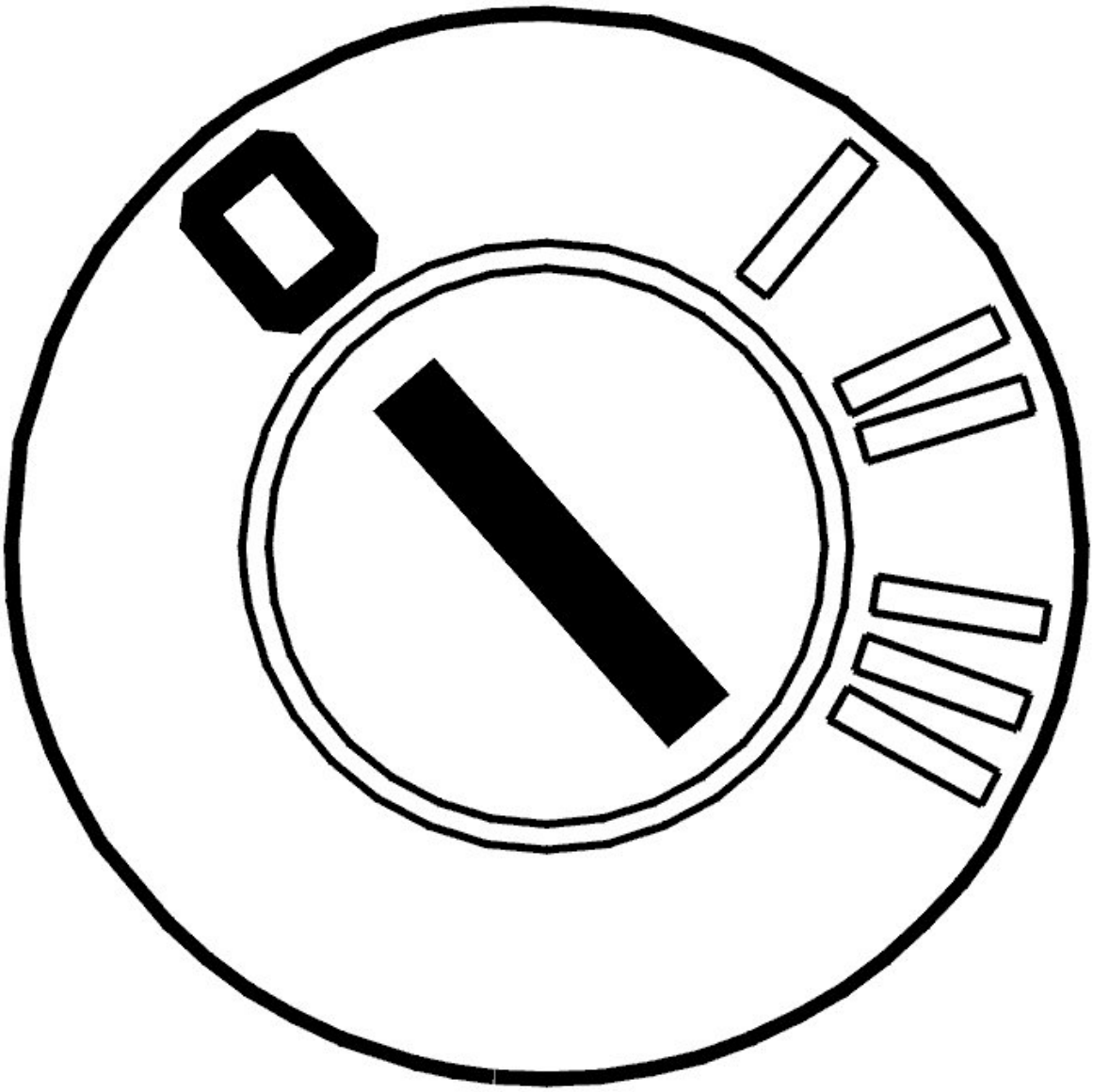


- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20 % when the pedal is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

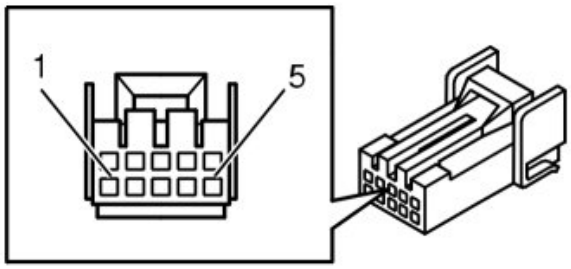
Check the resistance of the clutch pedal sensor between terminals #2 and #4 (component side).
Check the clutch pedal and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #B15 (#B25) and clutch pedal sensor terminal #2 (component side). Check for an open-circuit.
Check the signal ground cable between engine control module (ECM) terminal #B4 (#B14) and clutch pedal sensor terminal #4 (cable harness side). Check for an open-circuit.
Check the clutch pedal sensor installation. Search for damage and check the connections visually.

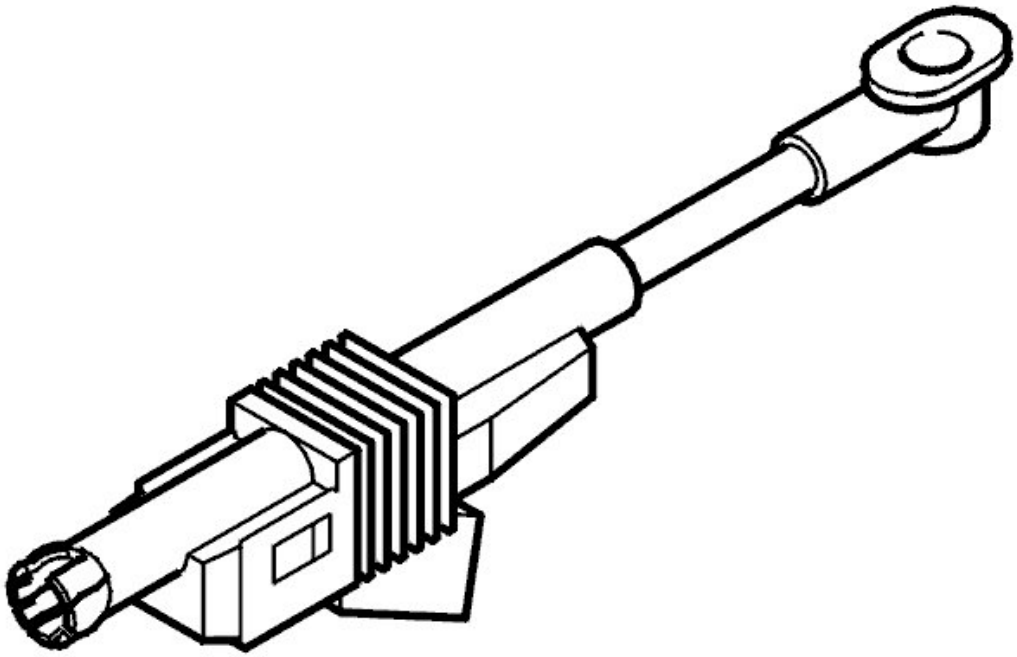
Hint: With the ignition on, the power supply to the clutch pedal sensor must be approximately 5 V (measured with the clutch pedal sensor disconnected), measured between terminals #2 and #4 (cable harness side).

Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Pedal position sensor clutch, replacing See: Clutch Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





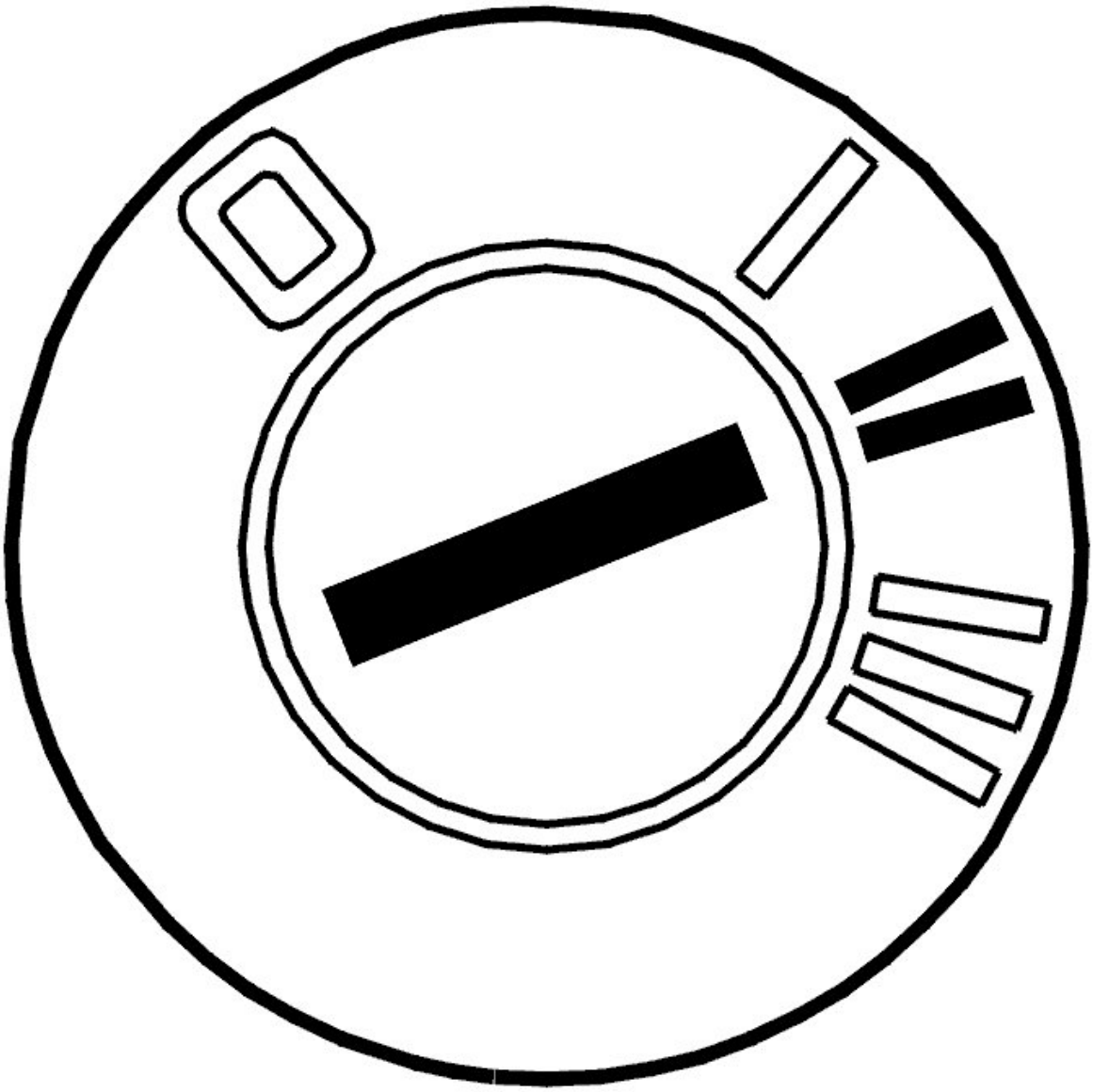
Continue - Verification

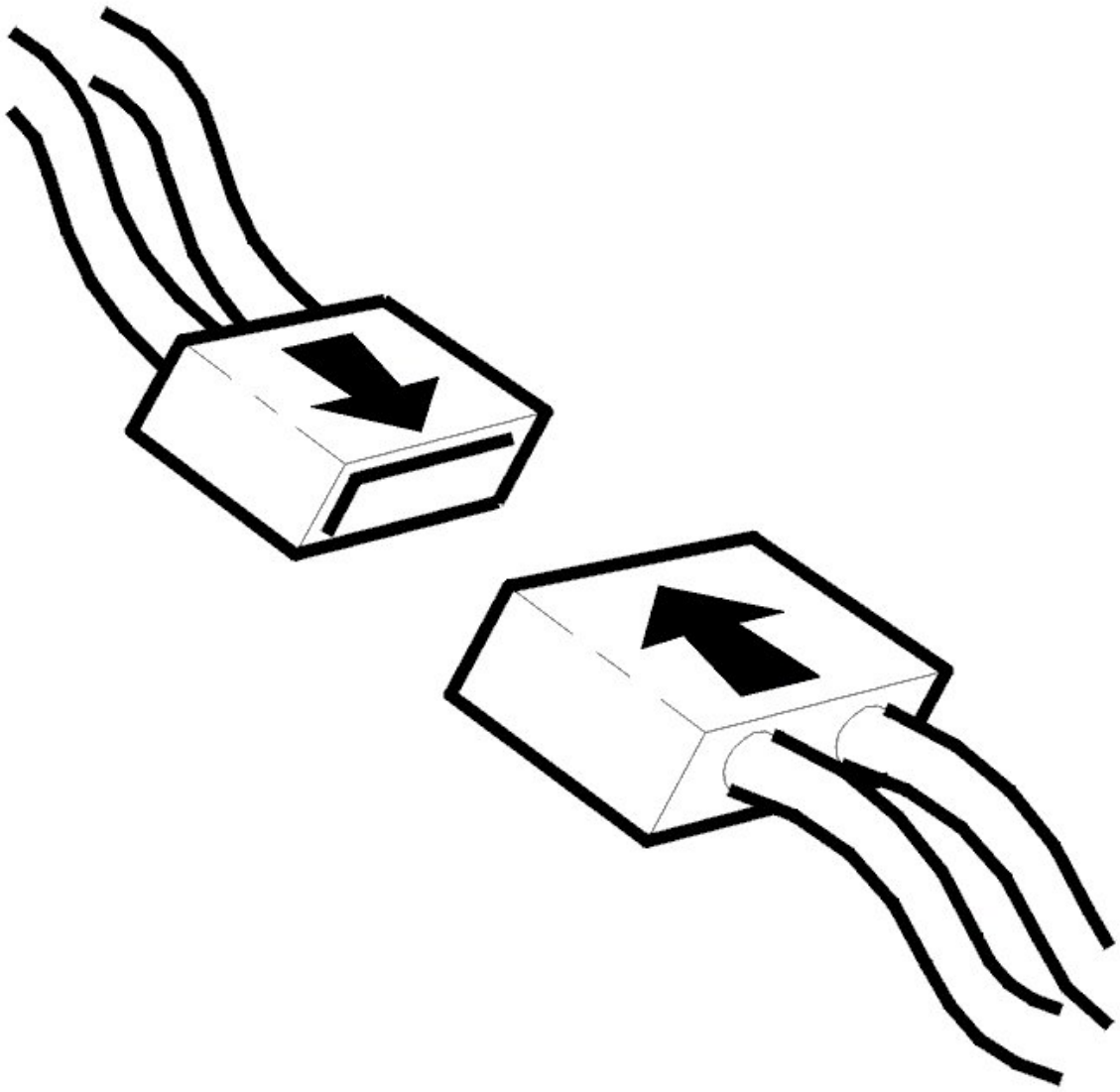
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20% when the pedal is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

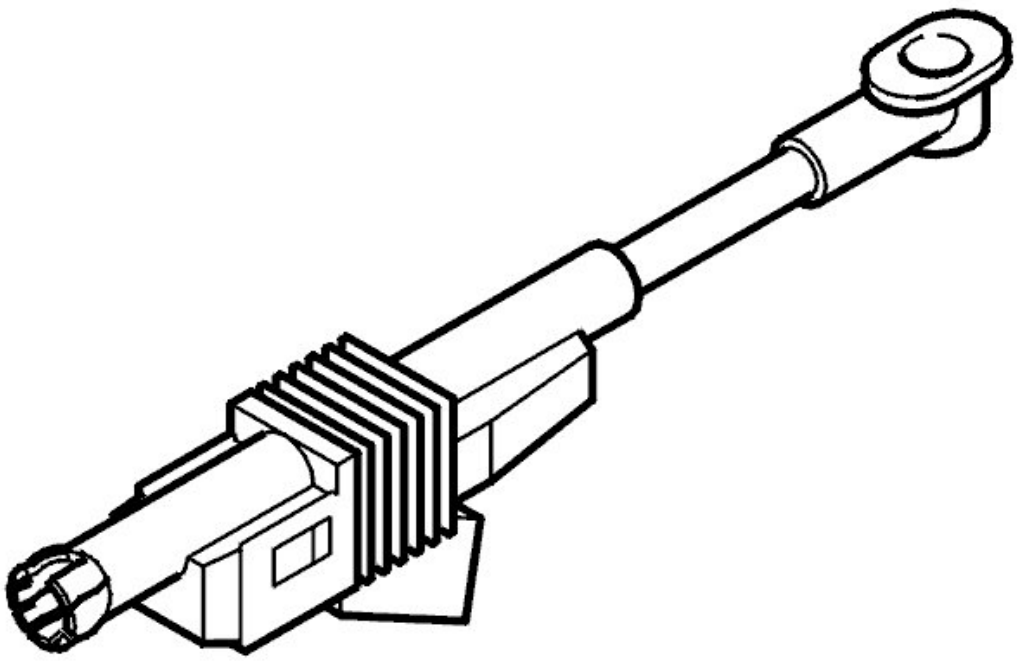
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-910C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the clutch pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

Cruise control switched off.

Possible source

- Short-circuit to supply voltage in the signal cable
- Damaged clutch pedal sensor.

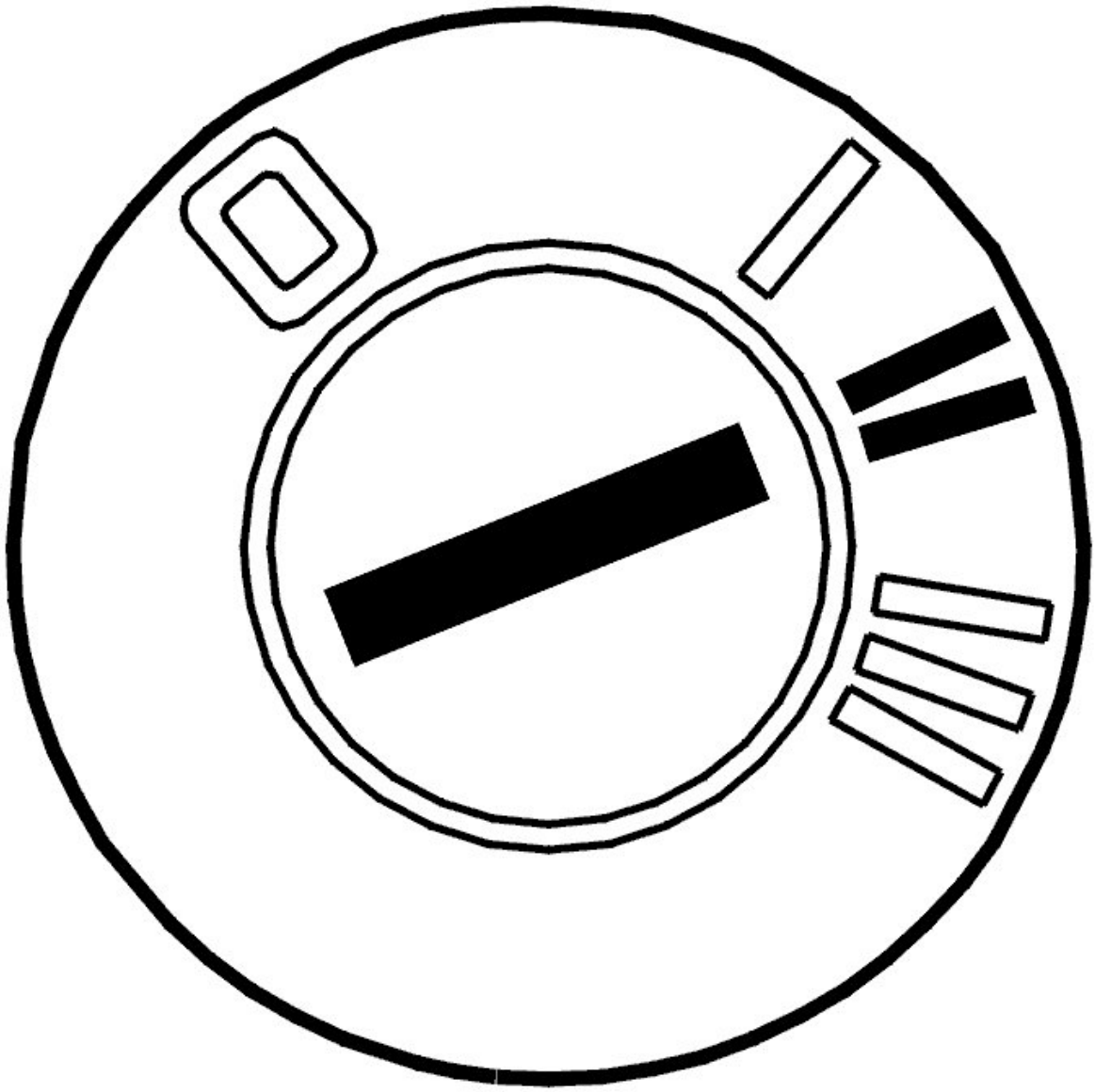
Fault symptom[s]

- Cruise control does not function at all.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking the status

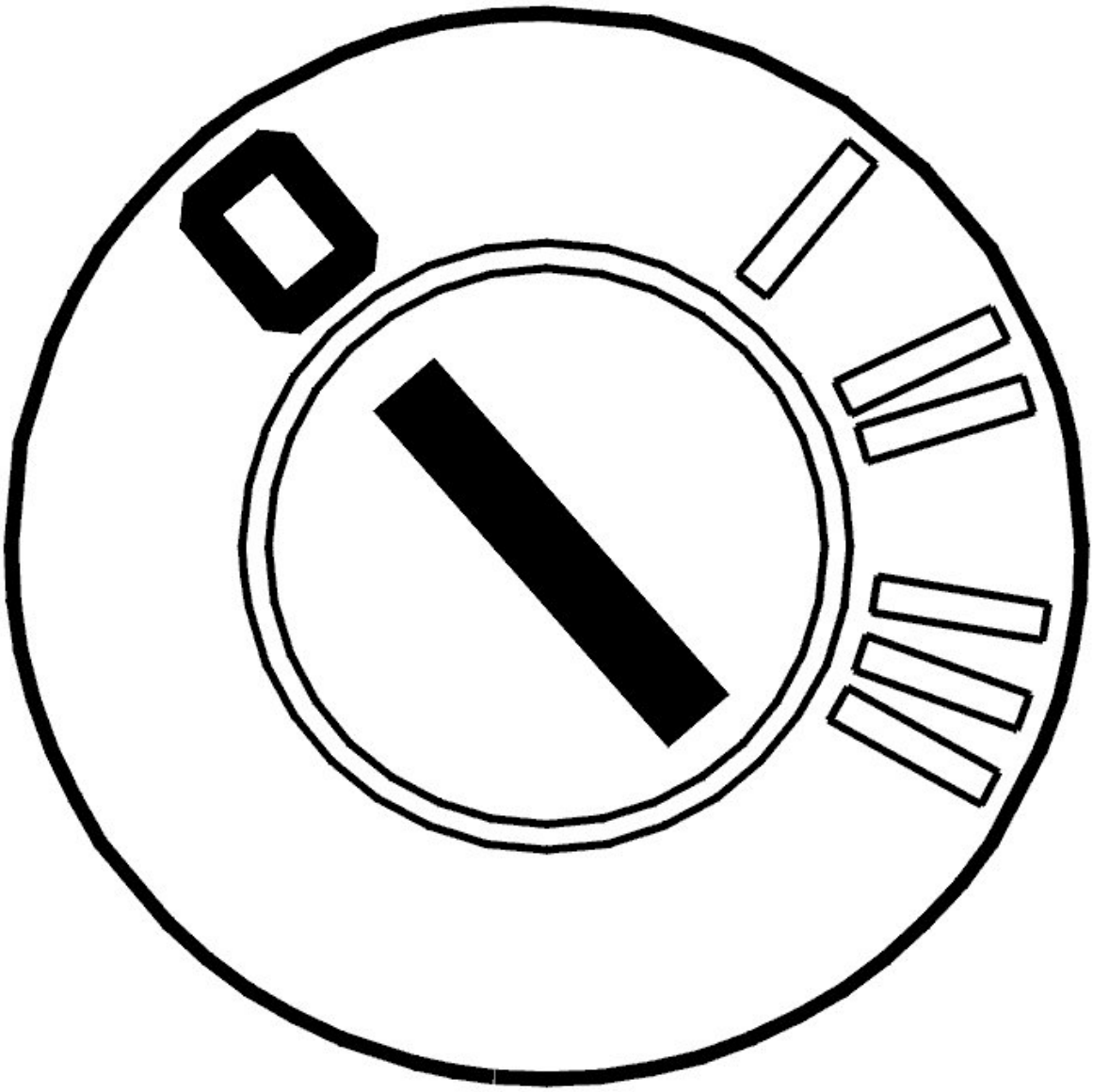


- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20 % when the pedal is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

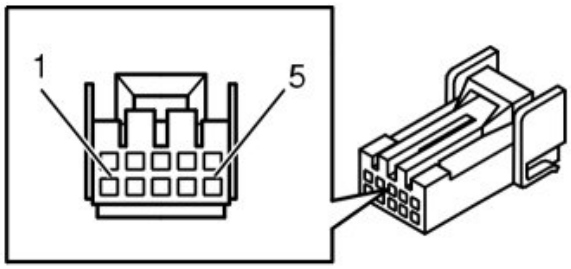
Check the resistance of the clutch pedal sensor between terminals #2 and #4 (component side).
Check the clutch pedal and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #B15 (#B25) and clutch pedal sensor terminal #2 (component side). Check for an open-circuit.
Check the signal ground cable between engine control module (ECM) terminal #B4 (#B14) and clutch pedal sensor terminal #4 (cable harness side). Check for an open-circuit.
Check the clutch pedal sensor installation. Search for damage and check the connections visually.

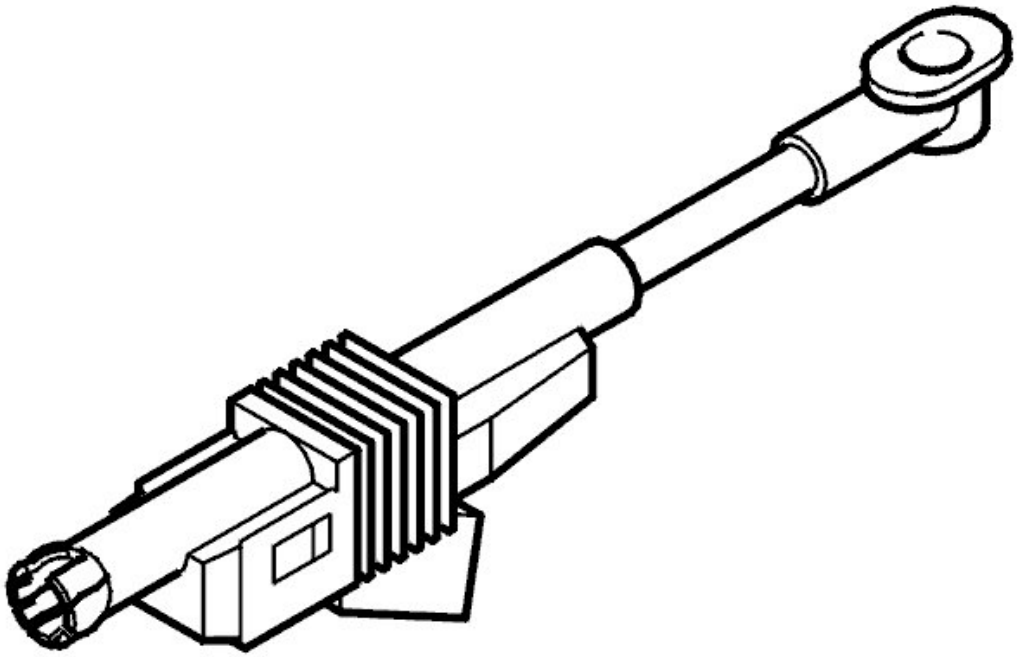
Hint: With the ignition on, the power supply to the clutch pedal sensor must be approximately 5 V (measured with the clutch pedal sensor disconnected), measured between terminals #2 and #4 (cable harness side).

Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Pedal position sensor clutch, replacing See: Clutch Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





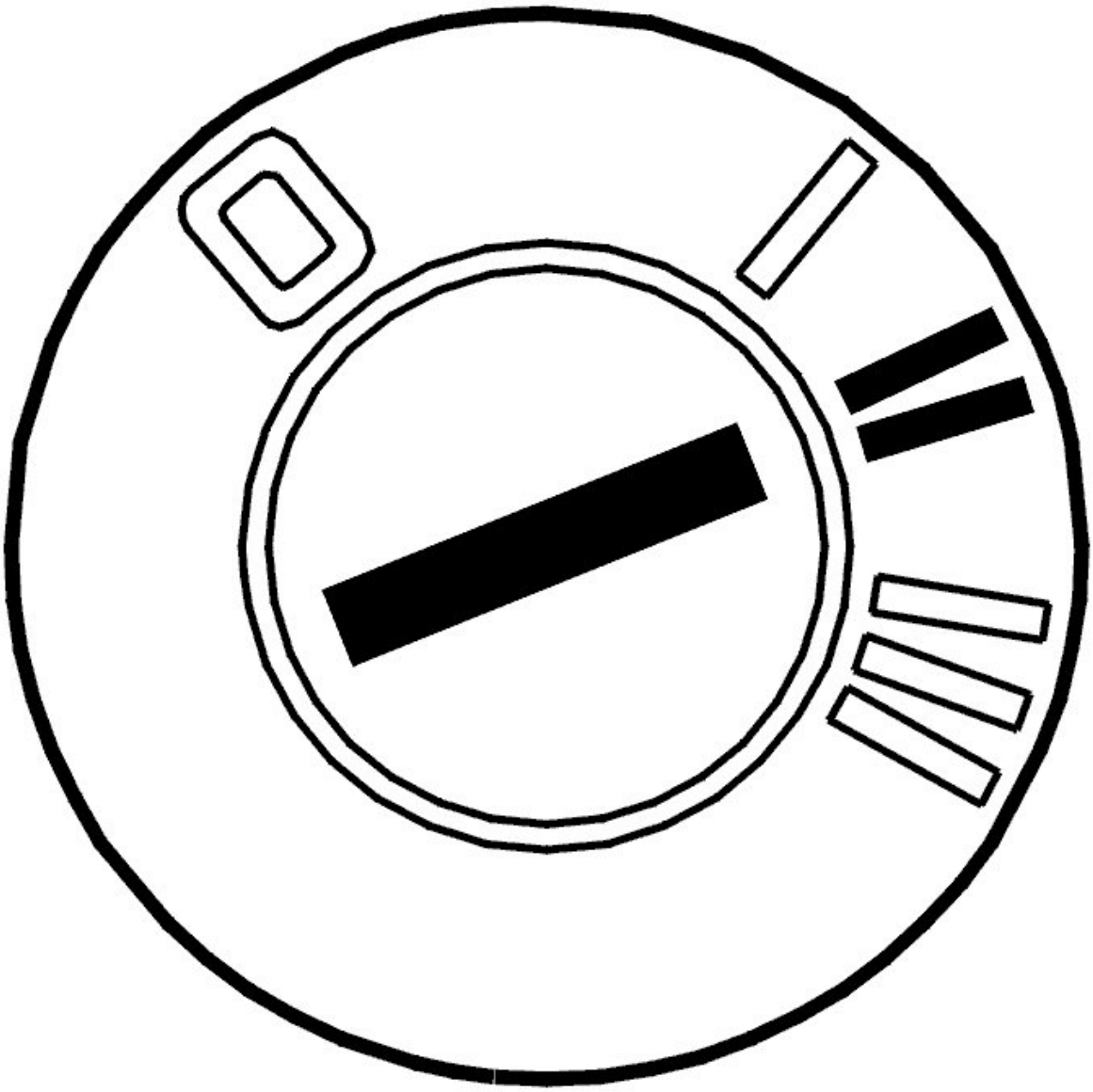
Continue - Verification

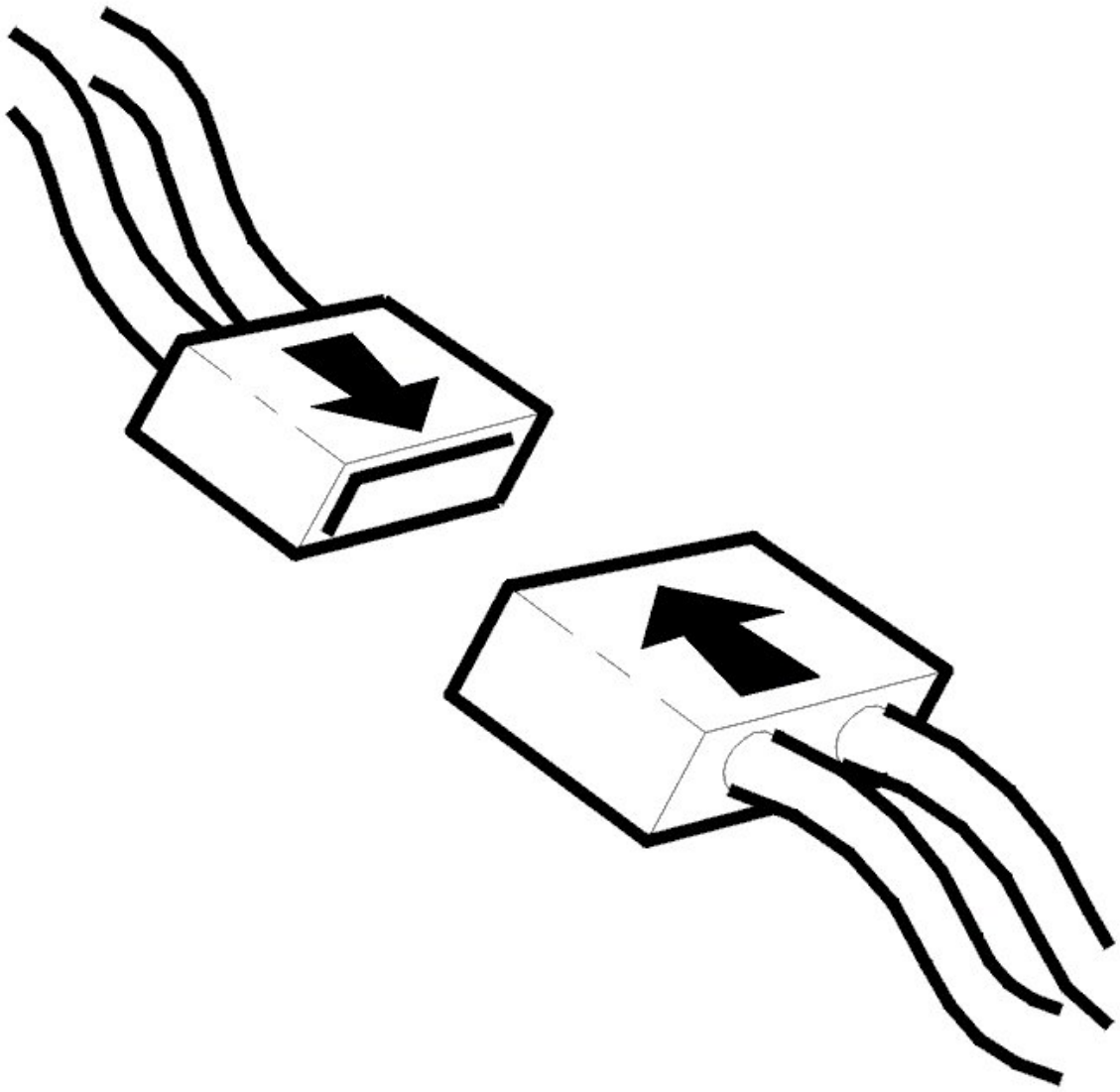
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20% when the pedal is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

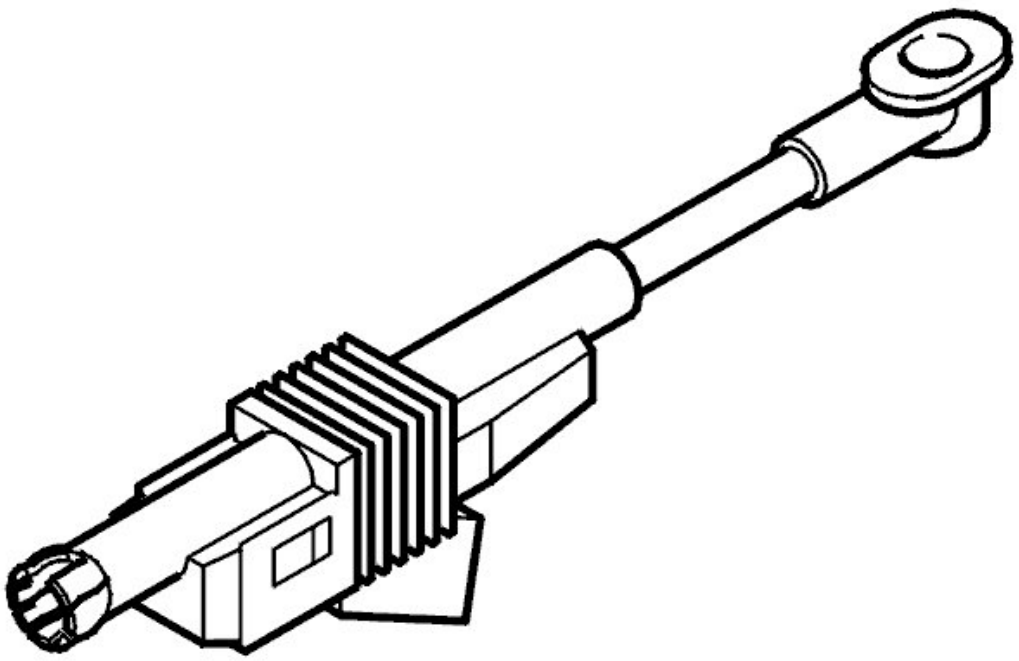
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-910D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the clutch pedal position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

Cruise control switched off.

Possible source

- Short-circuit to ground in the signal cable
- Damaged clutch pedal sensor.

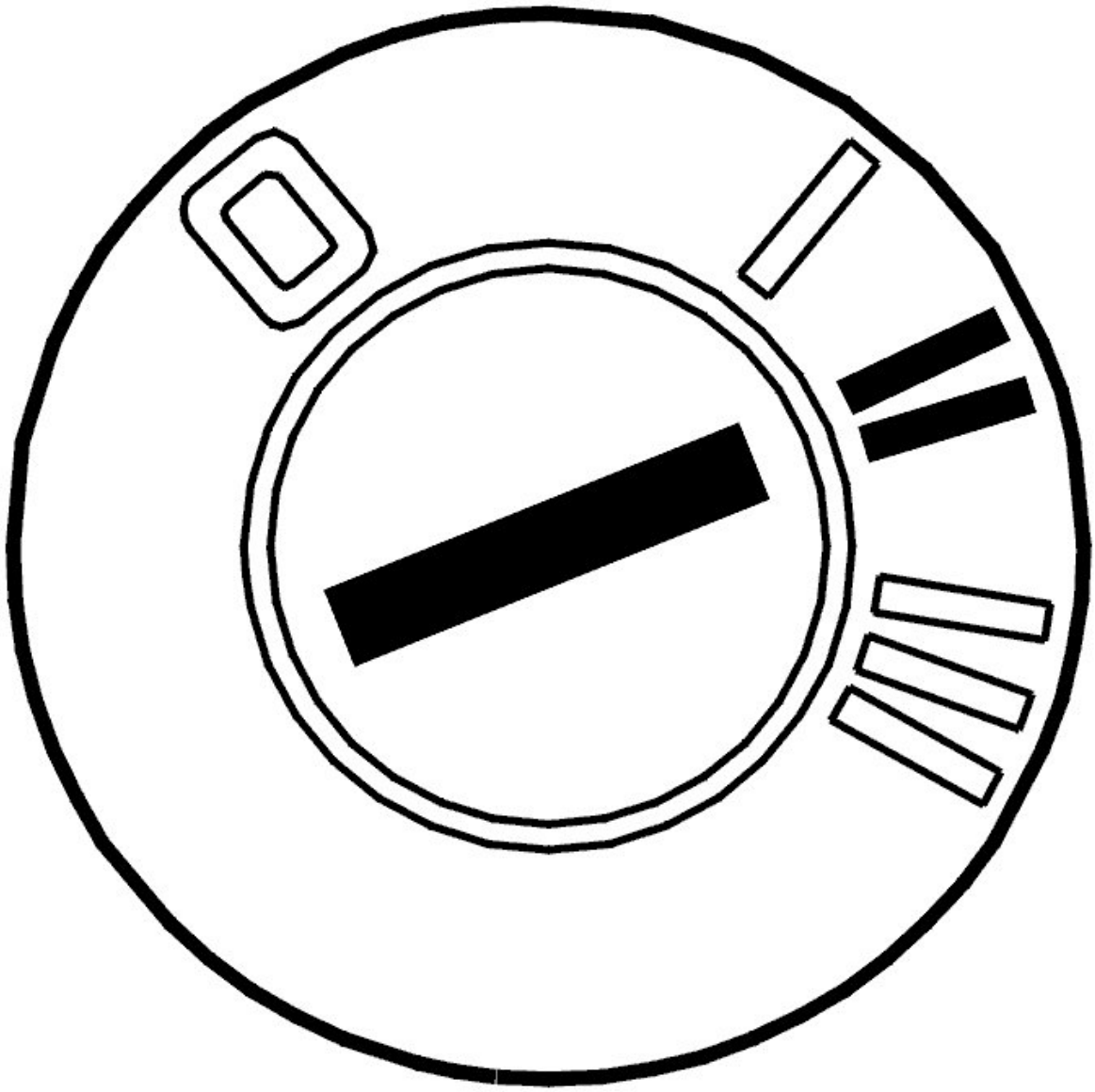
Fault symptom[s]

- Cruise control does not function at all.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking the status

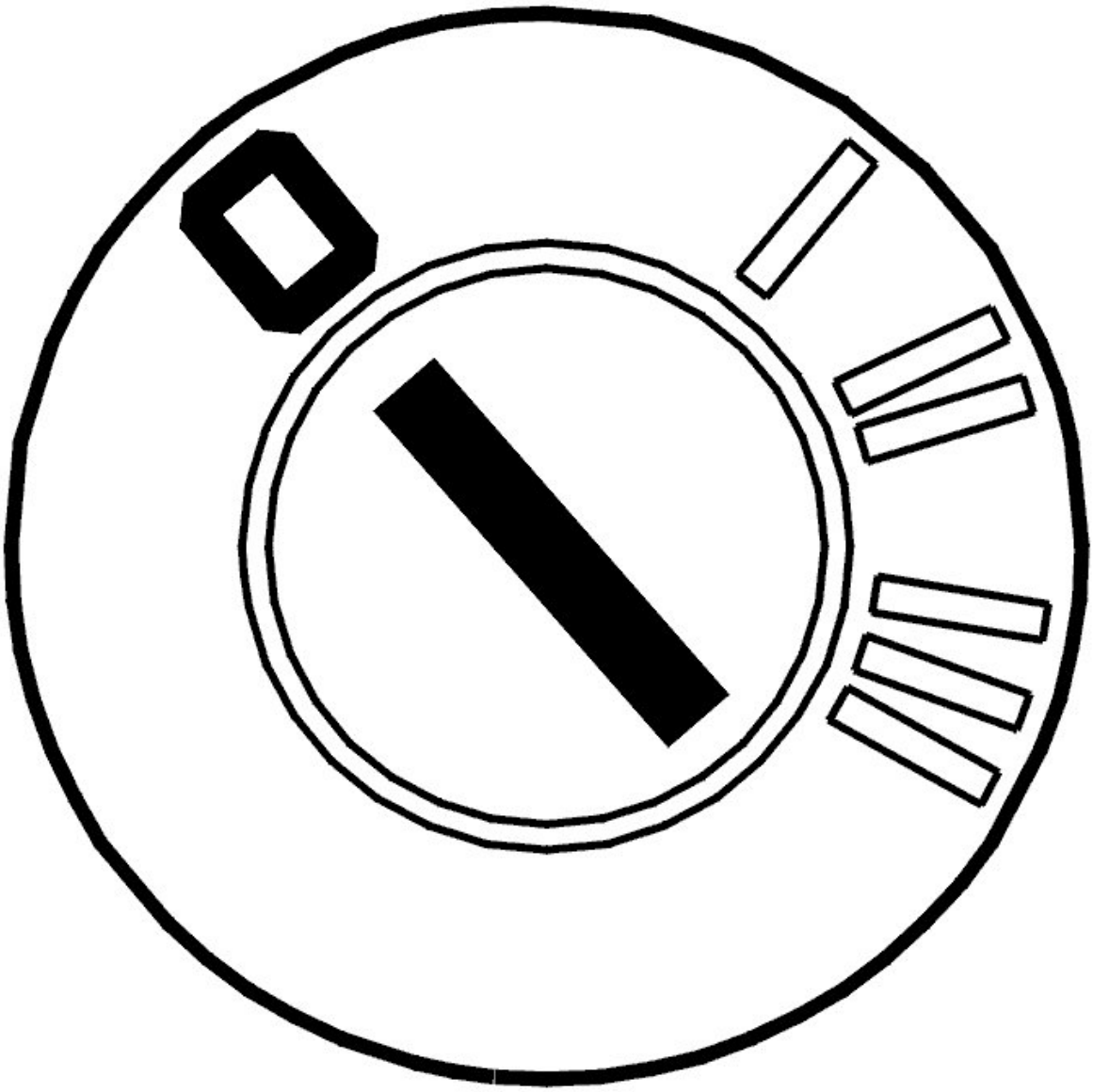


- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20 % when the pedal is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the resistance of the clutch pedal sensor between terminals #2 and #4 (component side).
Check the clutch pedal and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the signal cable between engine control module (ECM) terminal #B15 (#B25) and clutch pedal sensor terminal #2 (component side). Check for an open-circuit.
Check the signal ground cable between engine control module (ECM) terminal #B4 (#B14) and clutch pedal sensor terminal #4 (cable harness side). Check for an open-circuit.
Check the clutch pedal sensor installation. Search for damage and check the connections visually.

Hint: With the ignition on, the power supply to the clutch pedal sensor must be approximately 5 V (measured with the clutch pedal sensor disconnected), measured between terminals #2 and #4 (cable harness side).

Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
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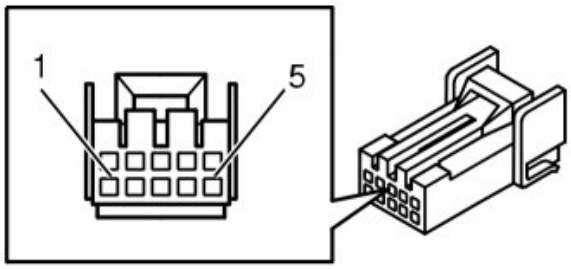
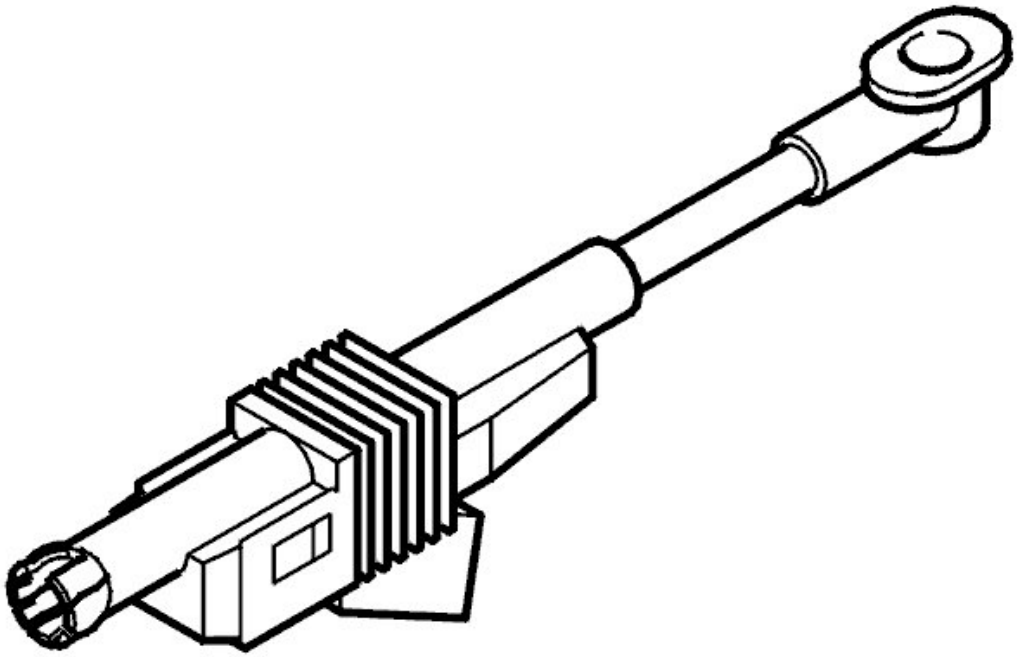
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





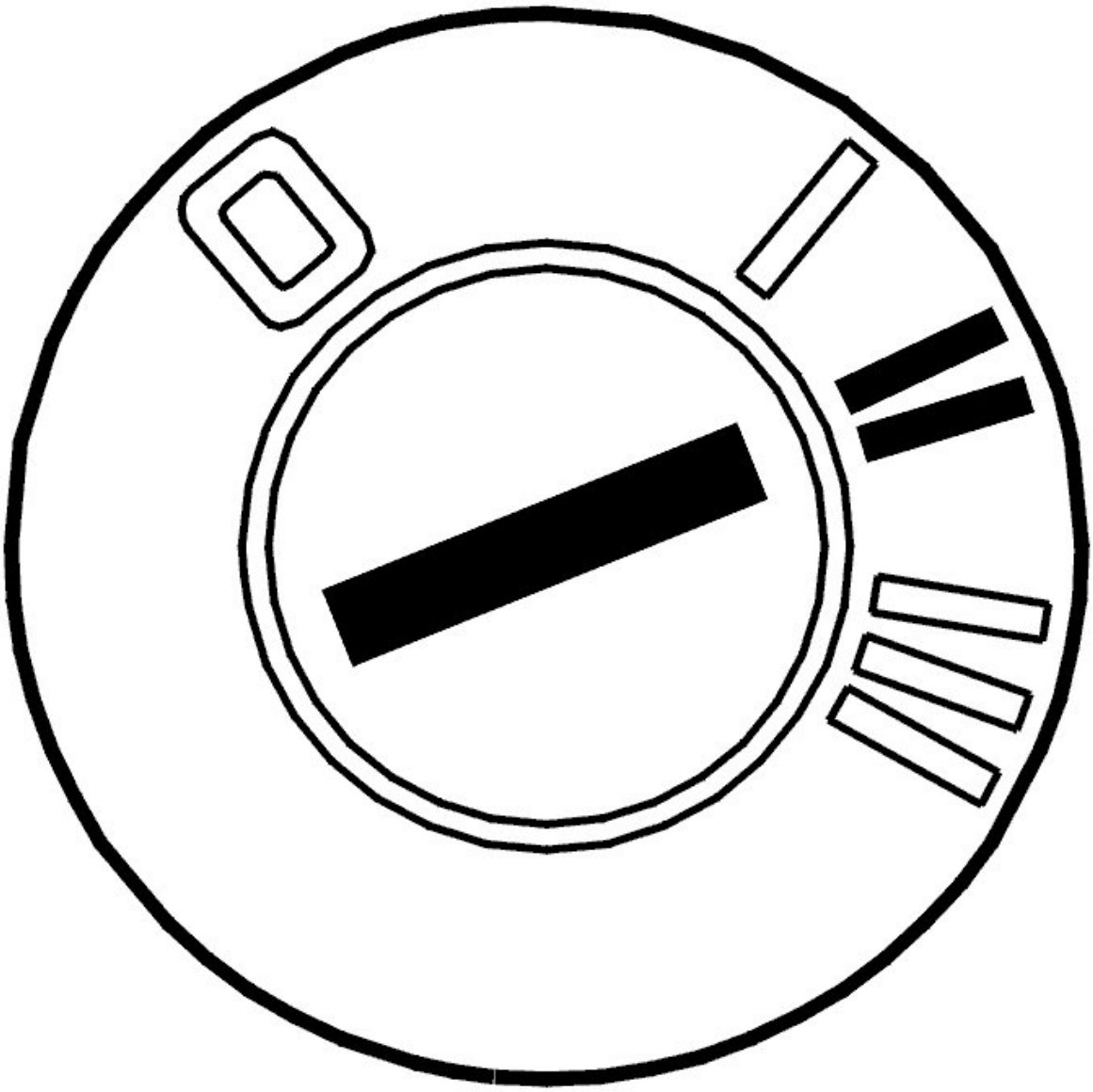
Continue - Verification

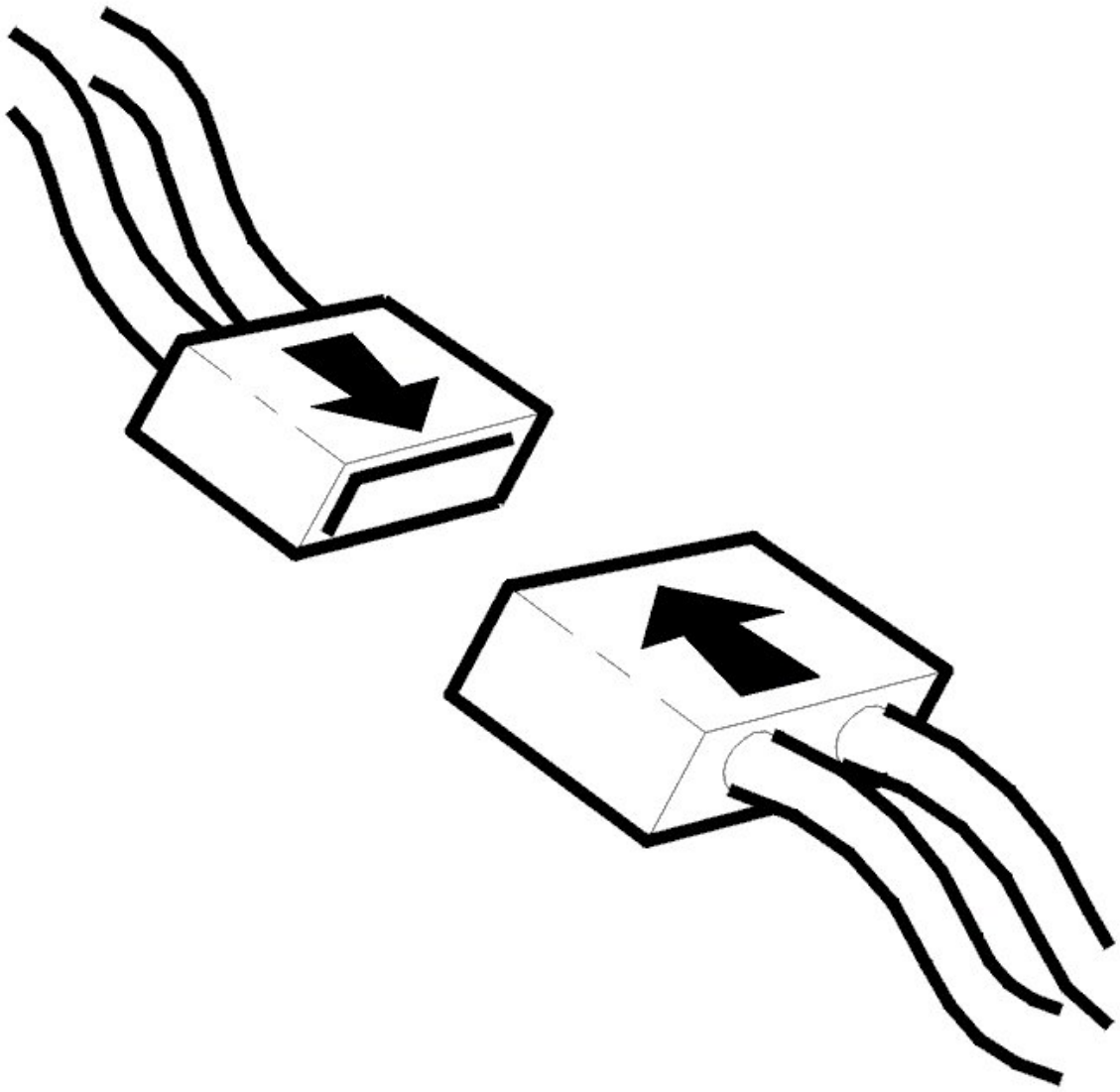
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the clutch pedal movement by carefully pressing and releasing the clutch pedal.

Check that the value changes with clutch pedal movement. The value must be between 60-70 % when the clutch pedal is unaffected and 10-20% when the pedal is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

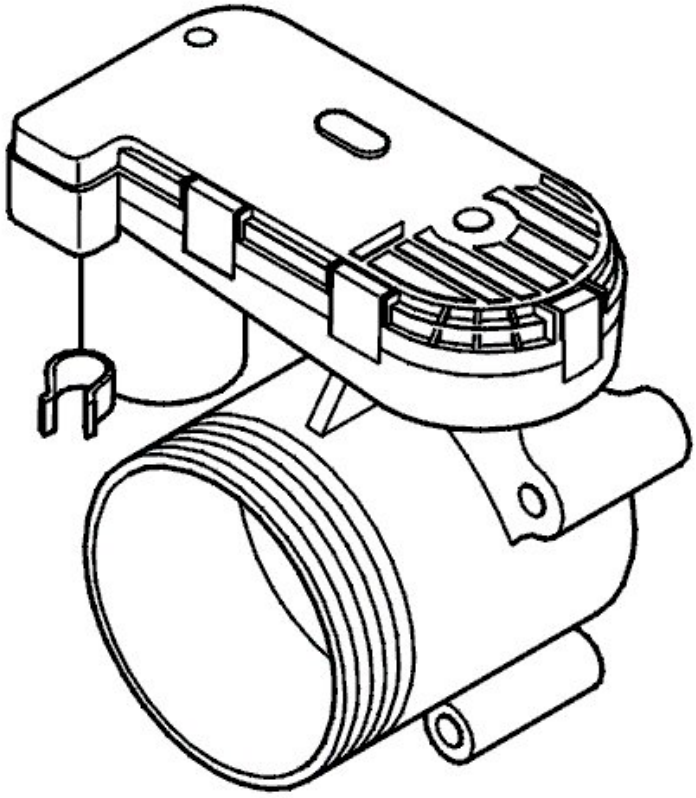
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9200

Condition



This diagnostic trouble code (DTC) is never stored on its own. This diagnostic trouble code (DTC) will also be stored if the engine control module (ECM) registers that one of the diagnostic trouble codes (DTCs) for the throttle position sensor circuit is stored.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

None.

Possible source

- Fault in the throttle position (TP) sensor circuit for the electronic throttle unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

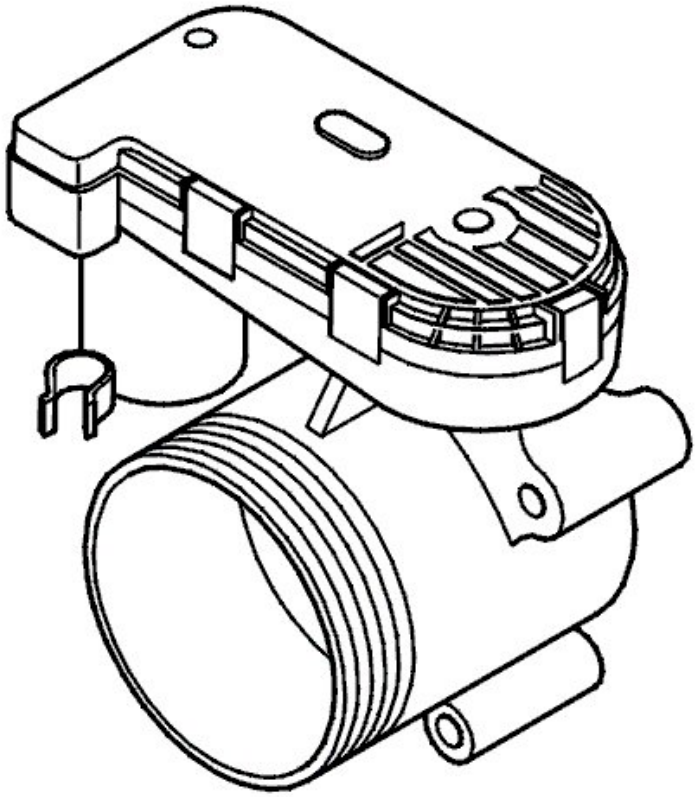
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9210

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 1 (circuit 1) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 2 (circuit 2) in the throttle position (TP) sensor for the throttle unit. If the diagnostic trouble codes (DTCs) for both potentiometers 1 and 2 are stored at the same time, the supply to the damper motor in the throttle unit will be disabled. The throttle will set itself to the return position.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- The signal cables are short-circuited to each other
- Damaged throttle unit.

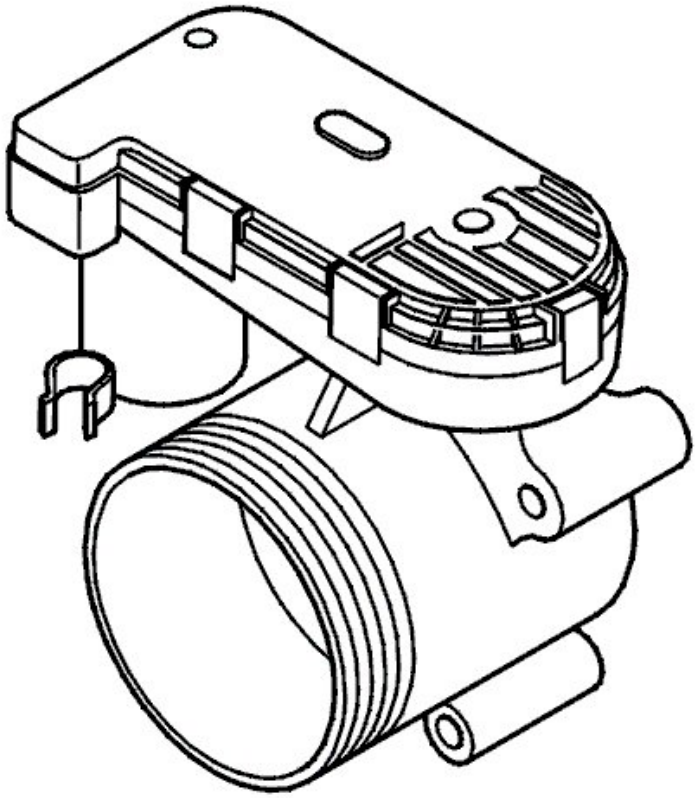
Fault symptom[s]
- Poor performance.

Faulty Signal

Faulty signal

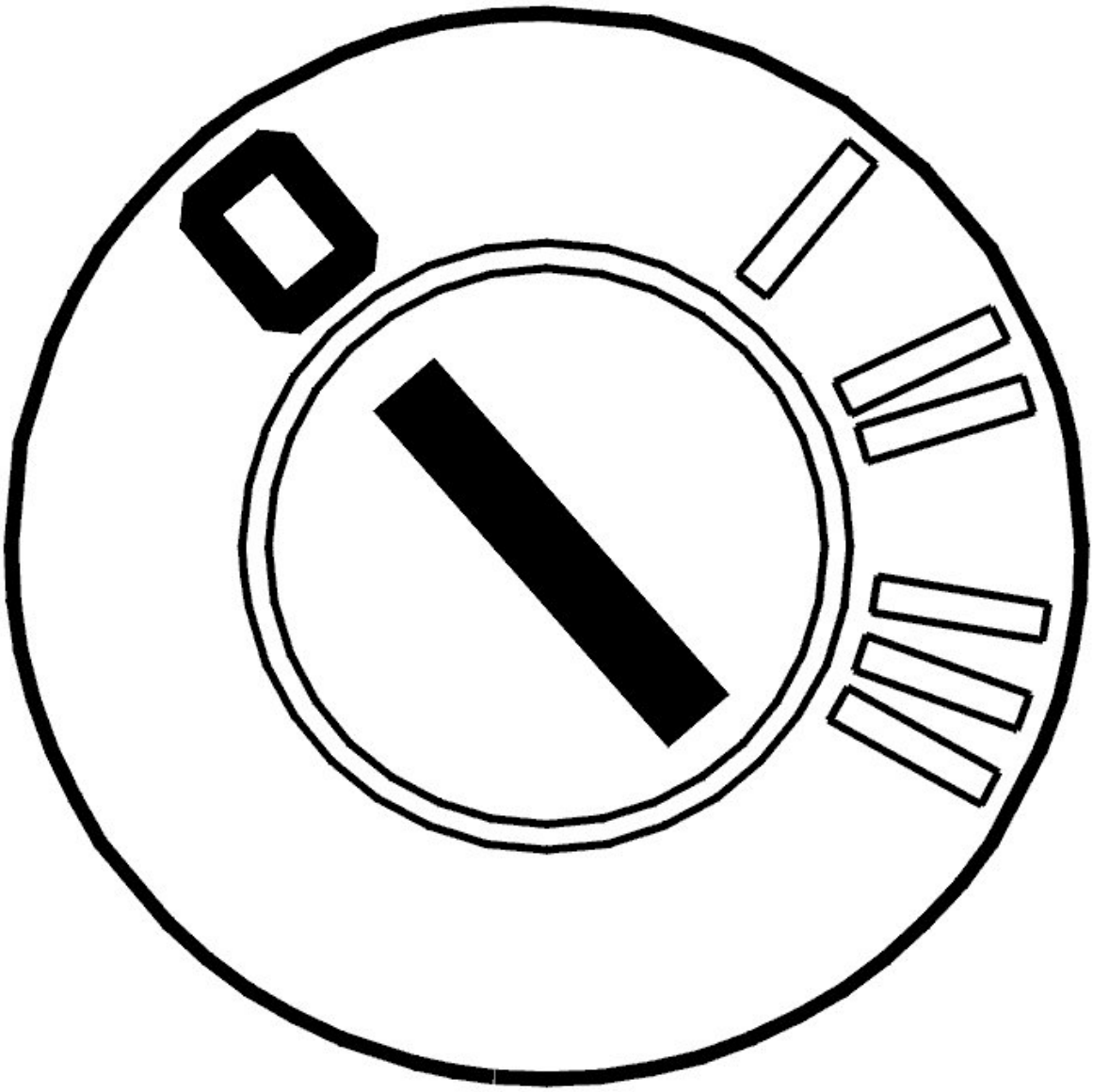
Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the signal cable (potentiometer 1) between engine control module (ECM) terminal #A1 (#A1) and throttle unit terminal #6 (wiring side). Check for an open-circuit.
Check the signal cable (potentiometer 2) between engine control module (ECM) terminal #A20 (#A20) and throttle unit terminal #5 (wiring side). Check for an open-circuit.
Check the signal cables (potentiometer 1) terminal #A1 (#A1) and (potentiometer 2) terminal #A20 (#A20). Check for a short-circuit to each other.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

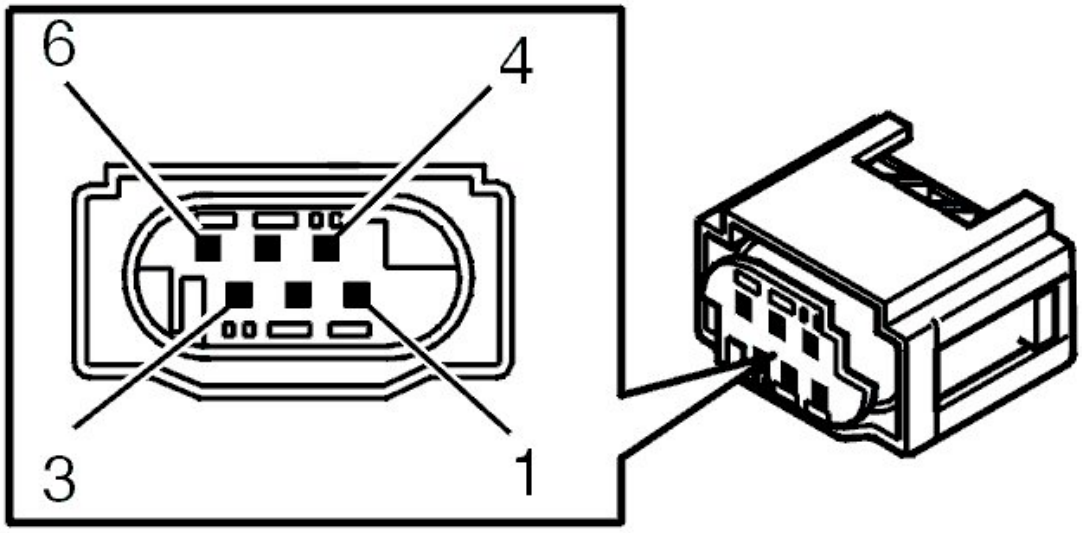
Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

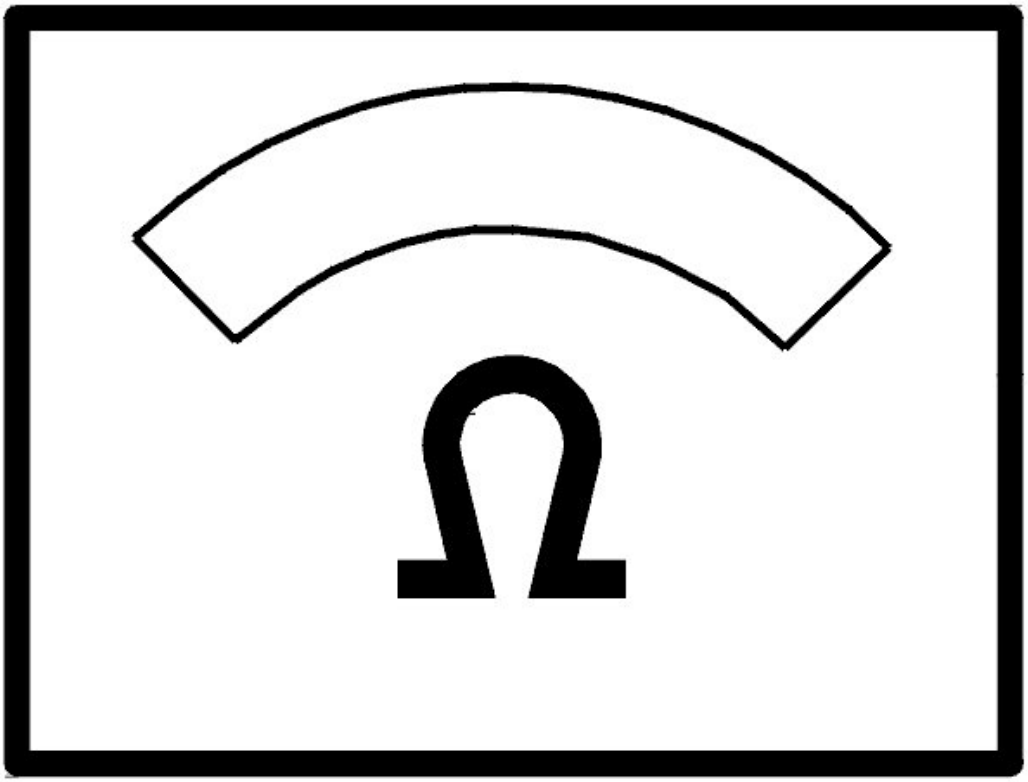
Remedy as necessary.

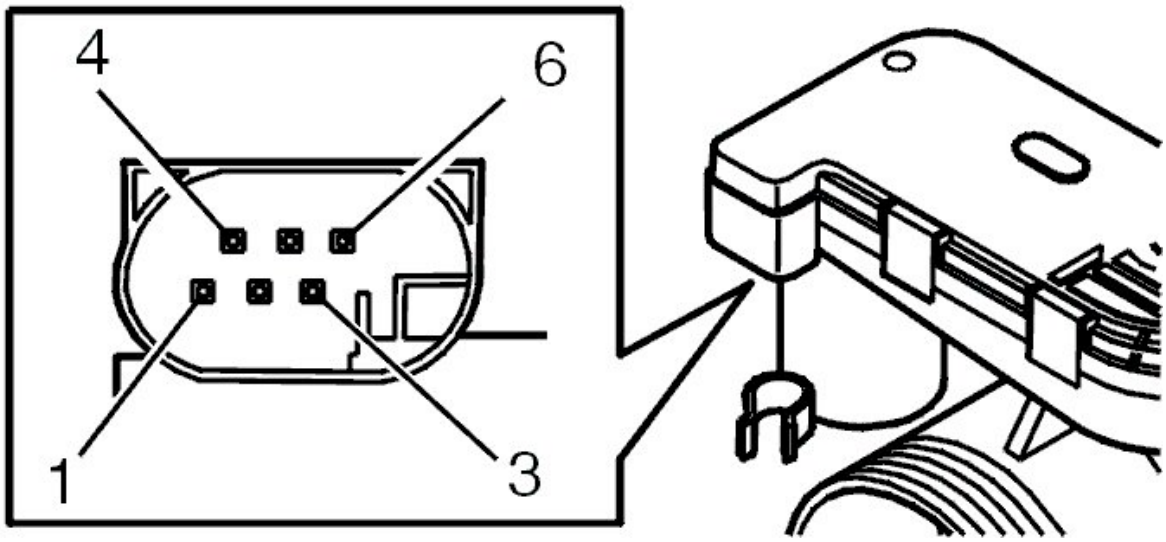
Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air

Induction/Throttle Body/Service and Repair/Removal and Replacement.



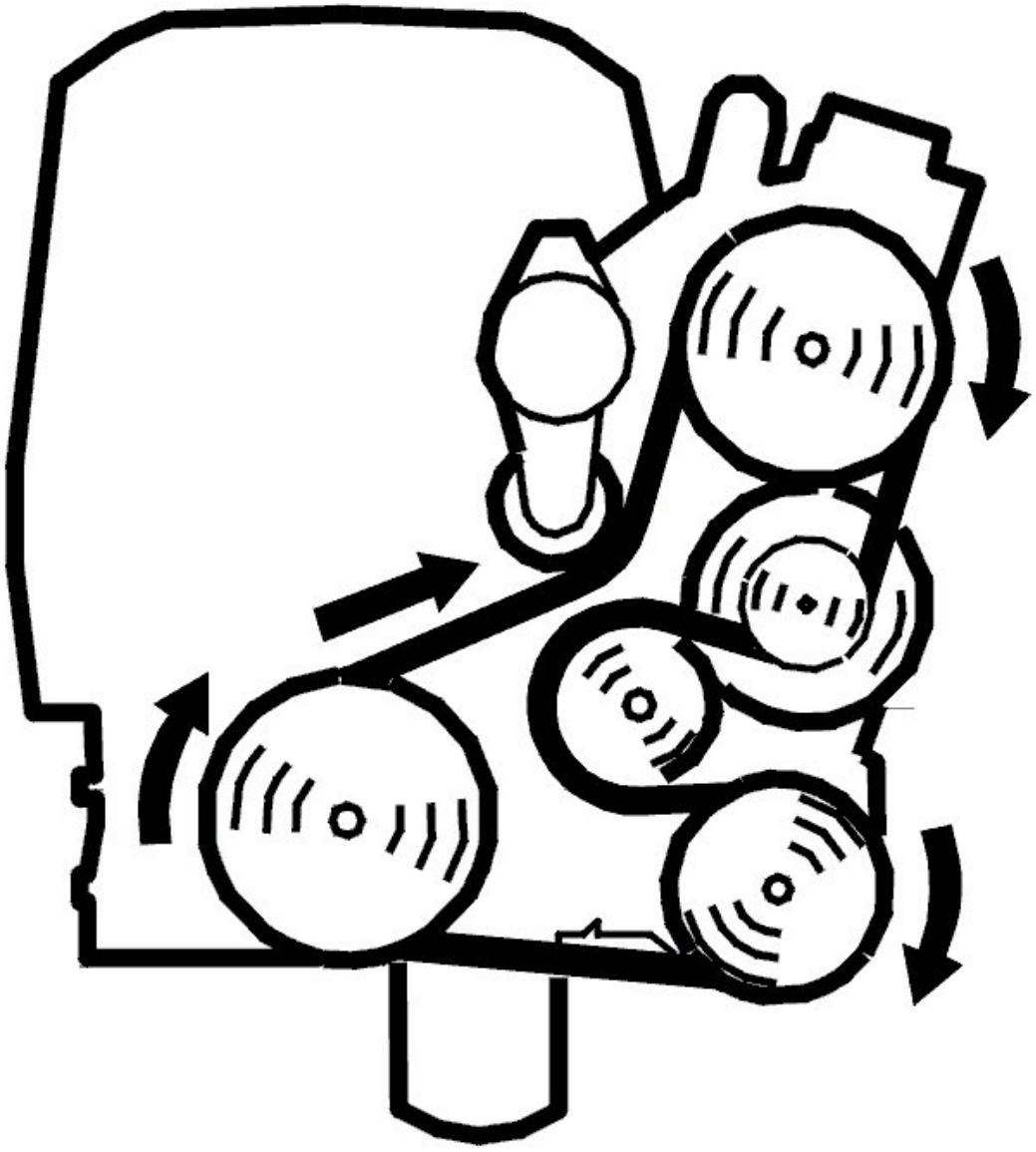


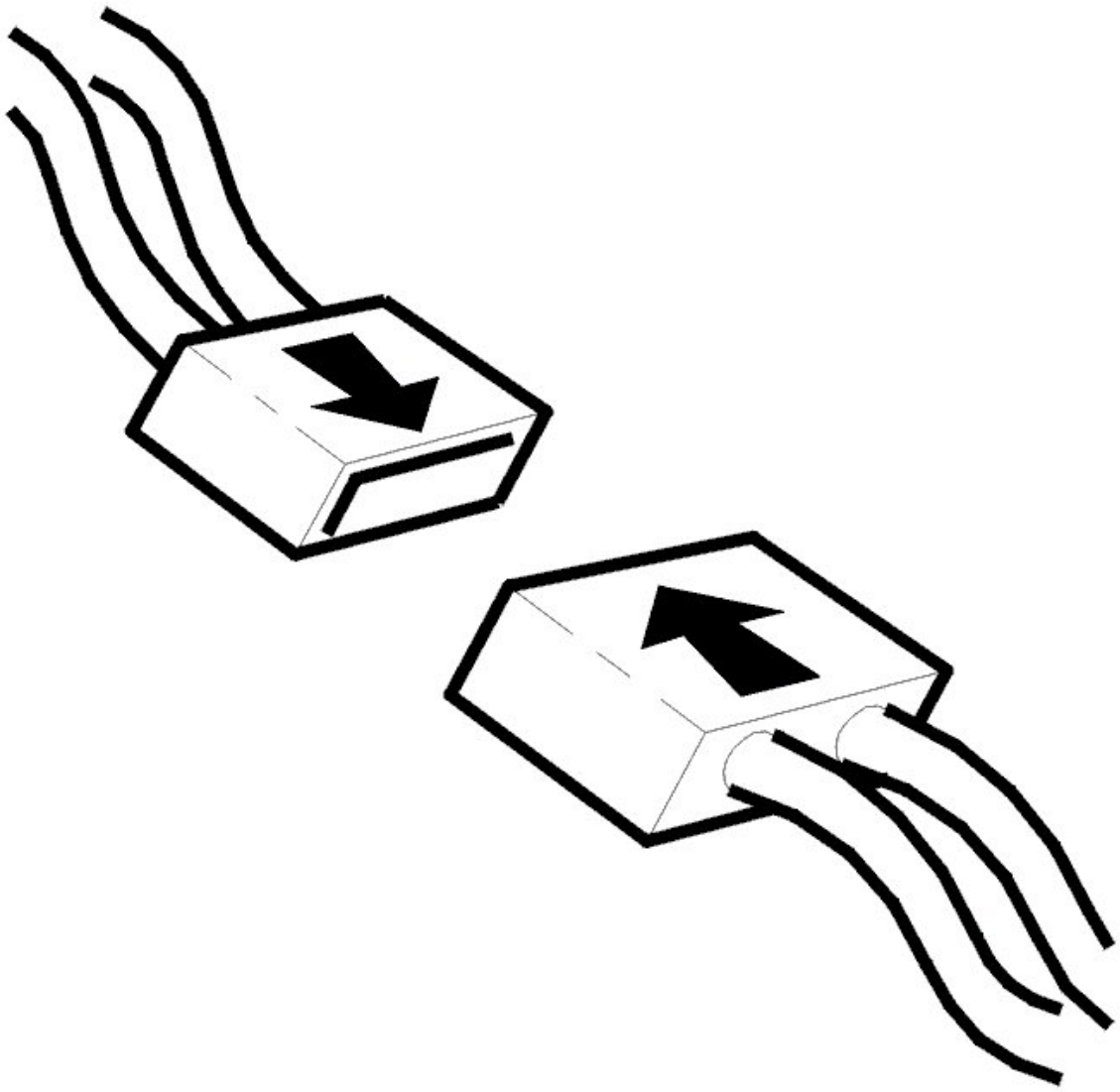


Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

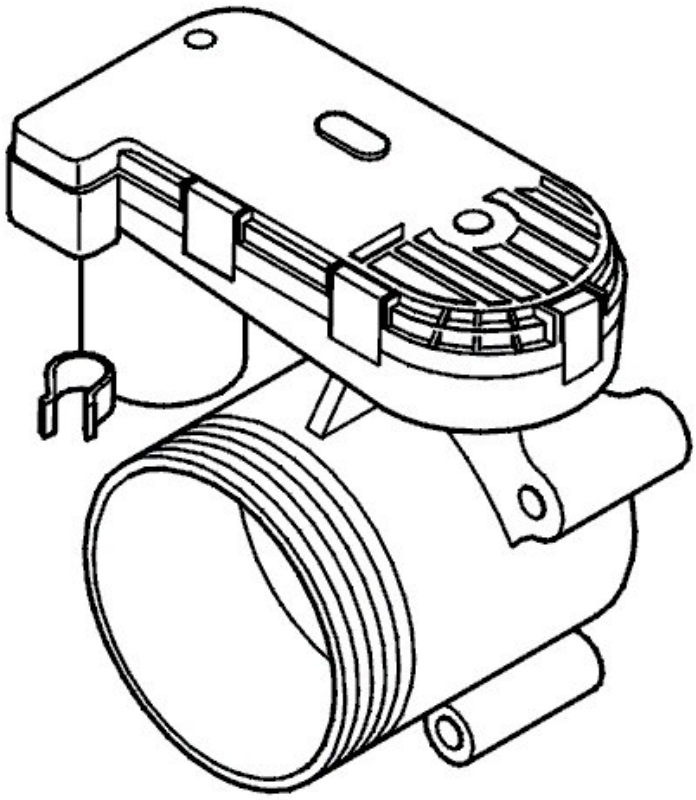
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-921C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 1 (circuit 1) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 2 (circuit 2) in the throttle position (TP) sensor for the throttle unit. If the diagnostic trouble codes (DTCs) for both potentiometers 1 and 2 are stored at the same time, the supply to the damper motor in the throttle unit will be disabled. The throttle will set itself to the return position.

Possible source

- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit or short-circuit to supply voltage in the signal cable

- Open-circuit in the signal ground cable for potentiometers 1 and 2
- Damaged throttle unit.

Fault symptom[s]
- Poor performance.

Signal Too High

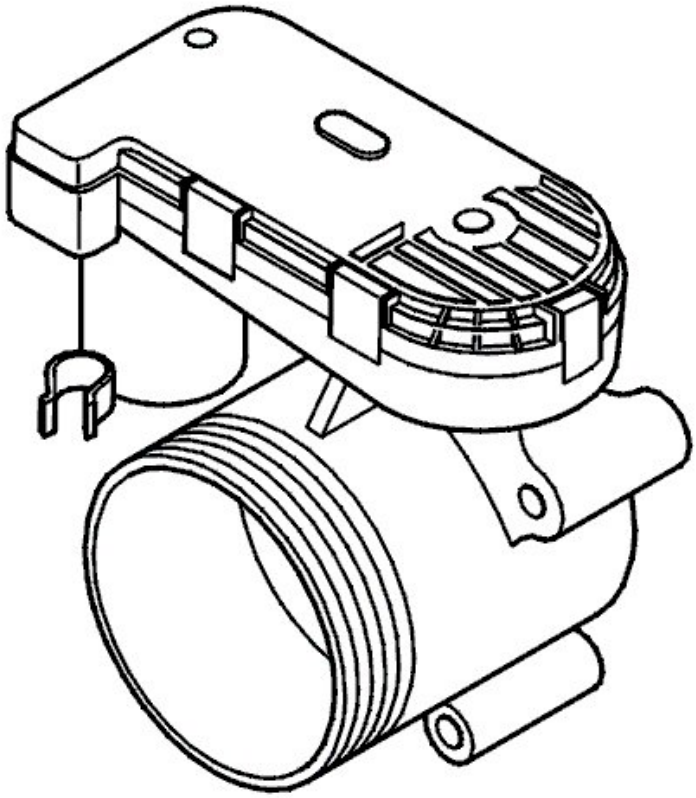
Signal too high

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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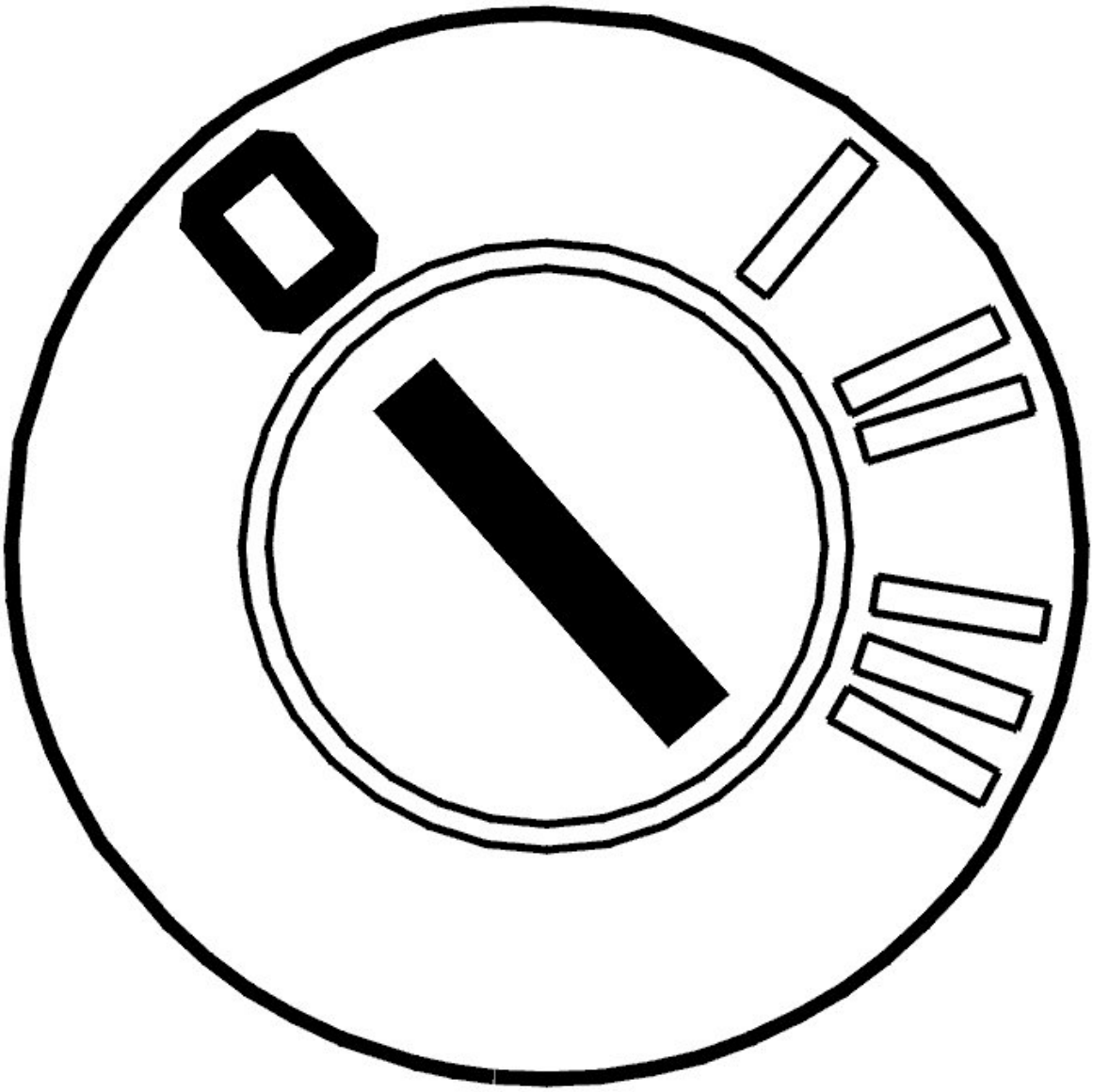
cont - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the signal ground cable between engine control module (ECM) terminal #A19 (#A19) and throttle unit terminal #2 (wiring side). Check for an open-circuit.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

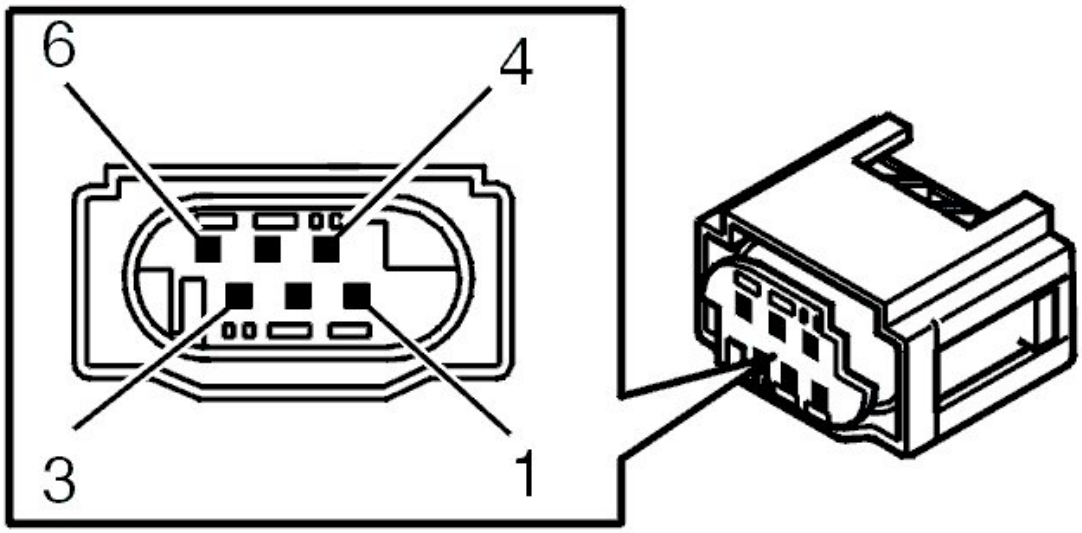
Check the signal cable (potentiometer 1) between engine control module (ECM) terminal #A1 (#A1) and throttle unit terminal #6 (wiring side). Check for an open-circuit. Check for a short-circuit to supply voltage.
If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement.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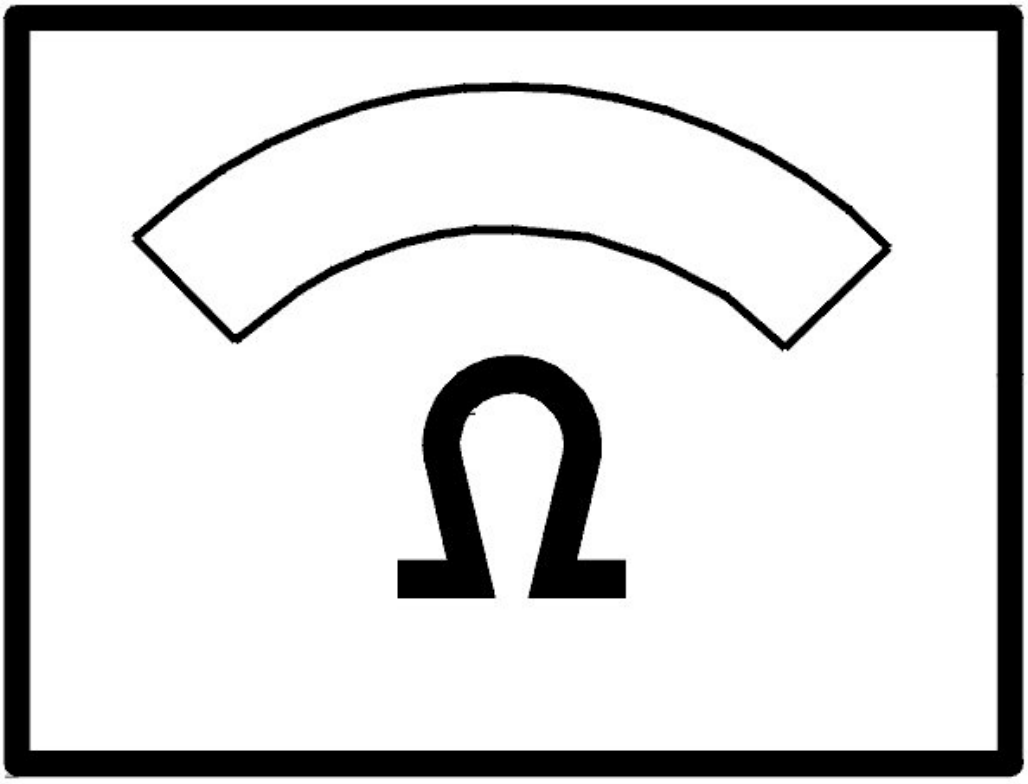
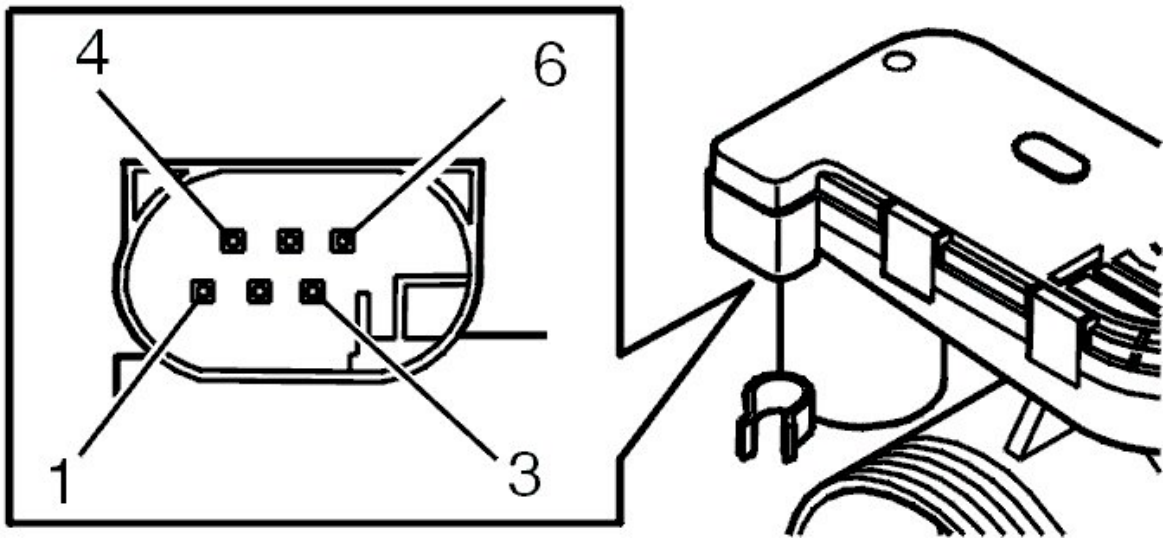




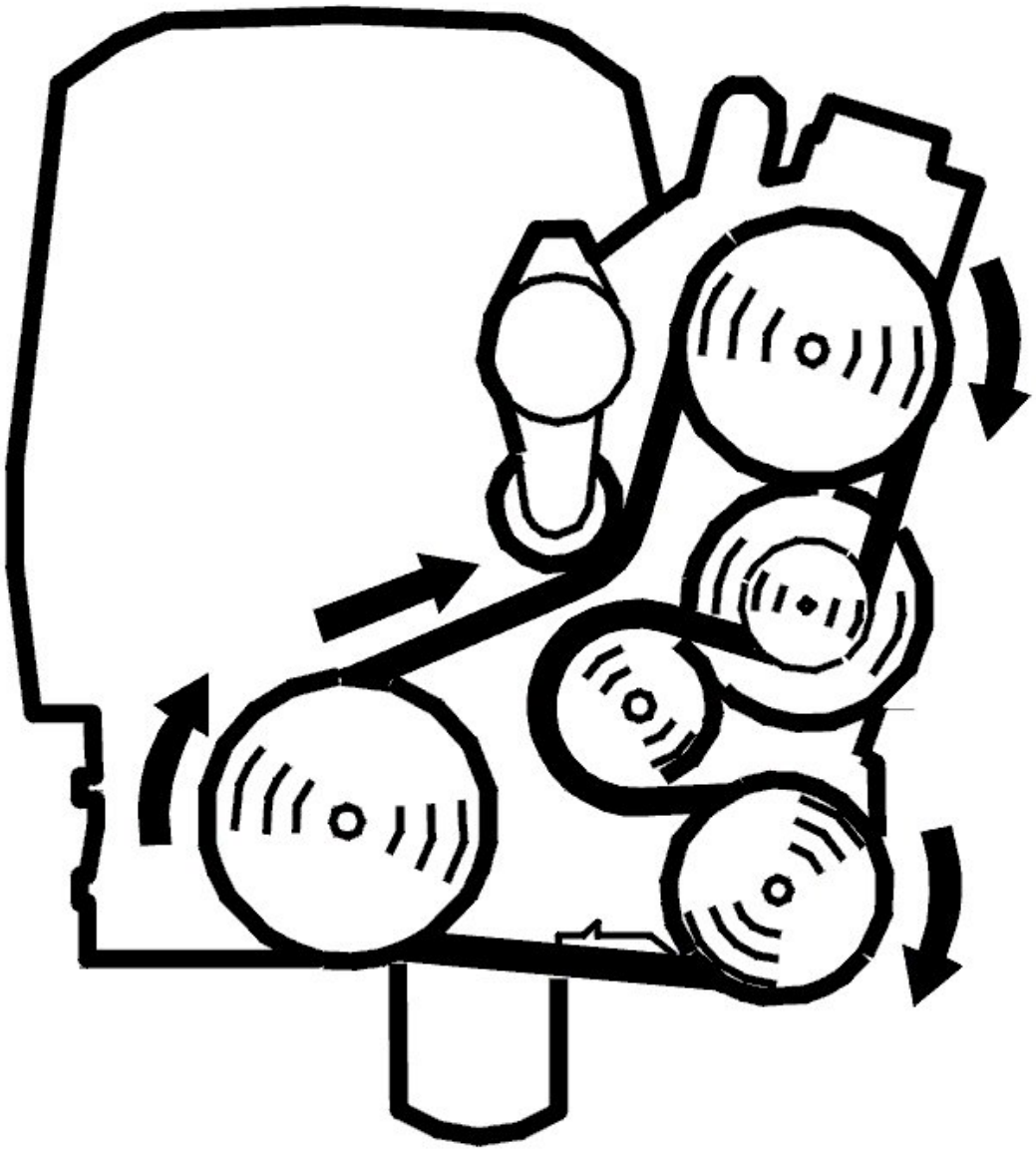
Continue - Verification

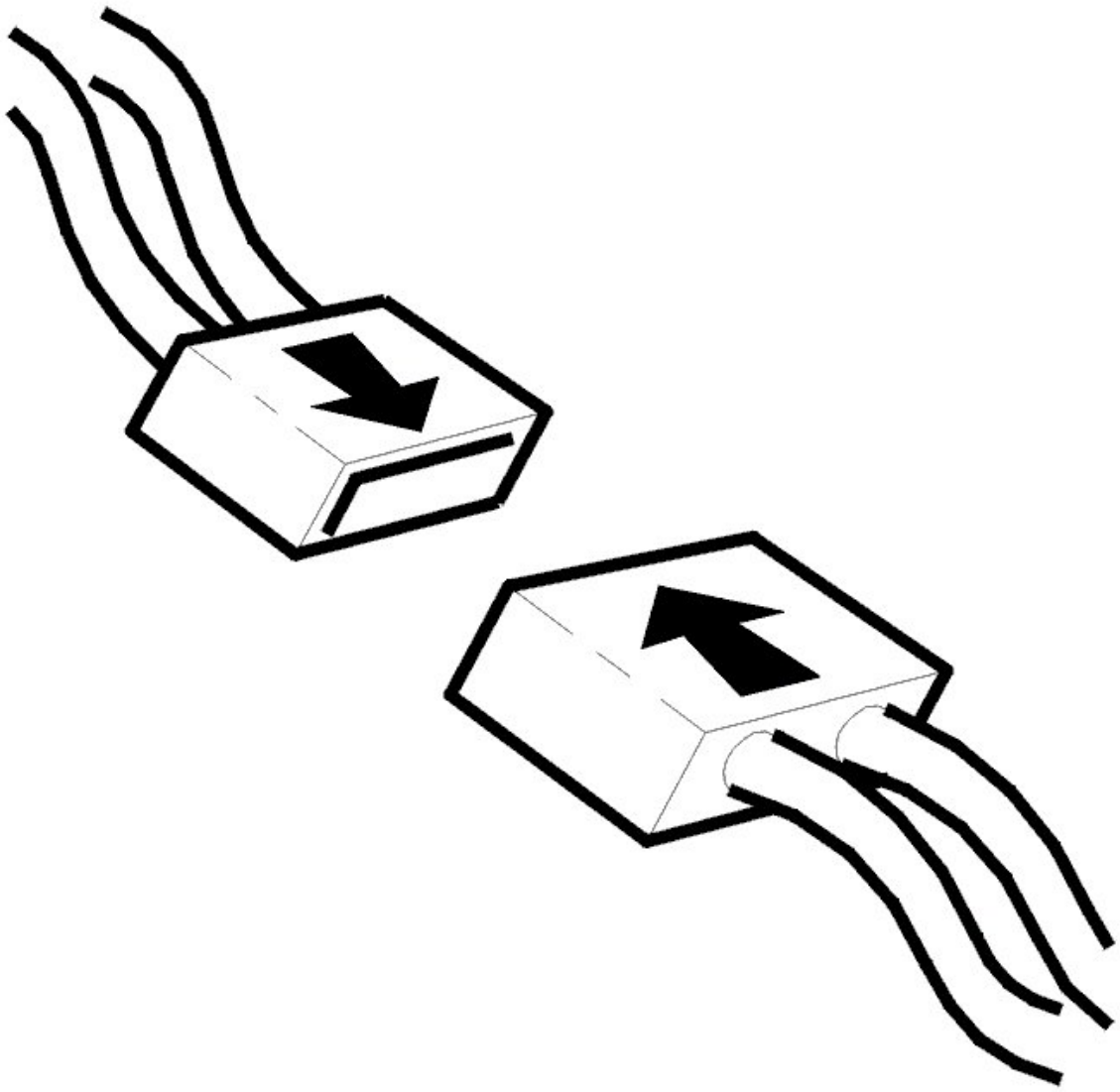
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

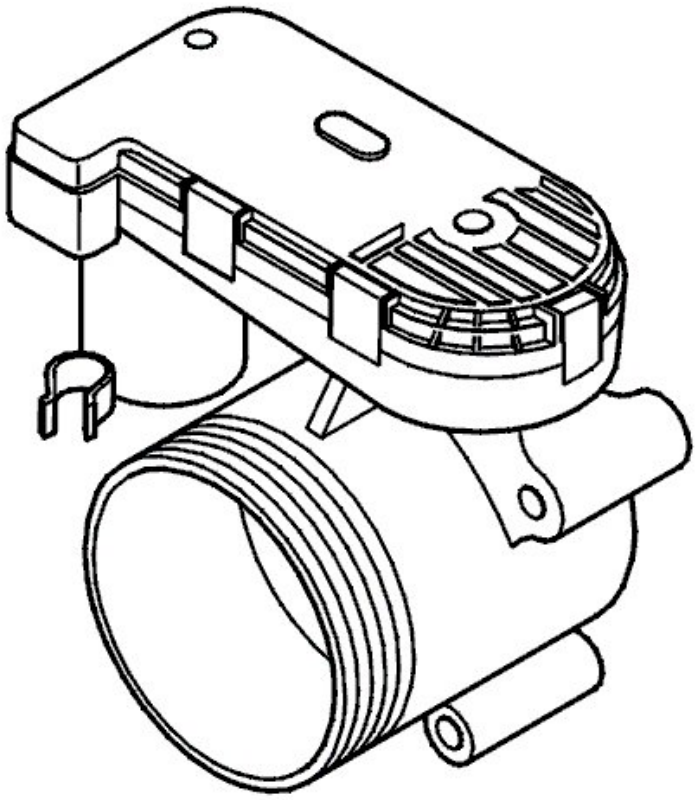
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-921D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 1 (circuit 1) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 2 (circuit 2) in the throttle position (TP) sensor for the throttle unit. If the diagnostic trouble codes (DTCs) for both potentiometers 1 and 2 are stored at the same time, the supply to the damper motor in the throttle unit will be disabled. The throttle will set itself to the return position.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Short-circuit to ground in the signal cable

- Open-circuit or short-circuit to ground in the power supply to potentiometers 1 and 2
- Damaged throttle unit.

Fault symptom[s]
- Poor performance.

Signal Too Low

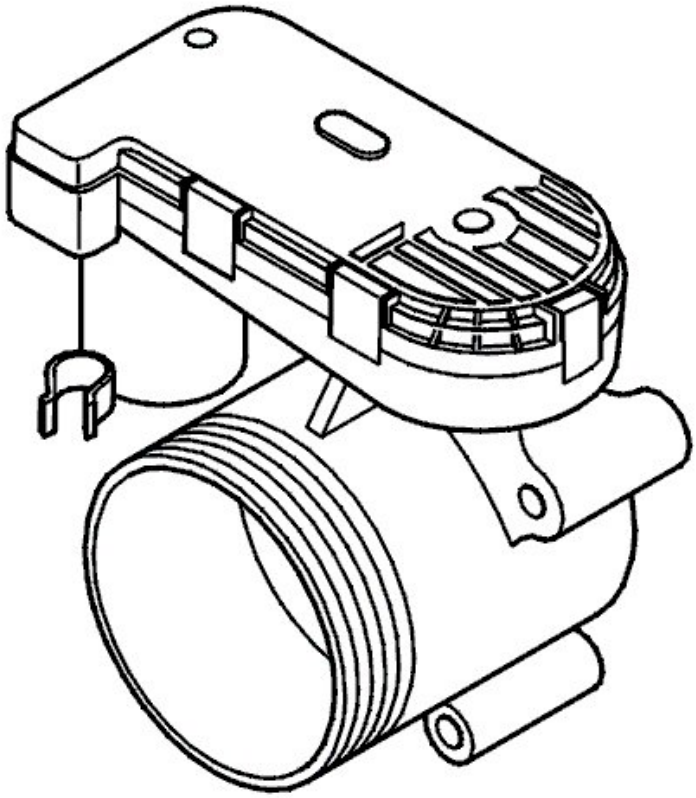
Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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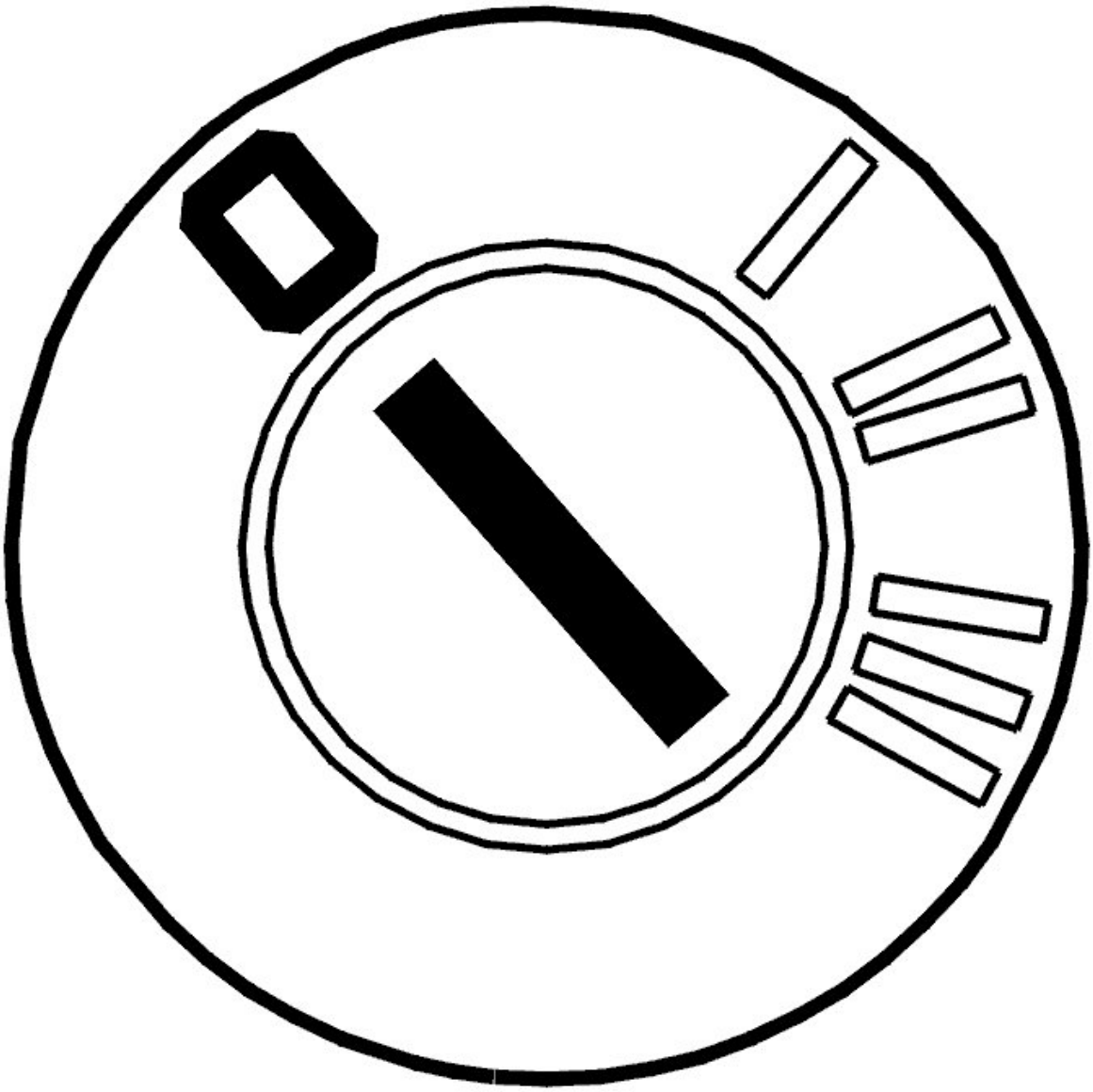
cont - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the power supply cable (5 volts) between engine control module (ECM) terminal #A59 (#A59) and throttle unit terminal #3 (wiring side).
Check for an open-circuit. Check for a short-circuit to ground.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

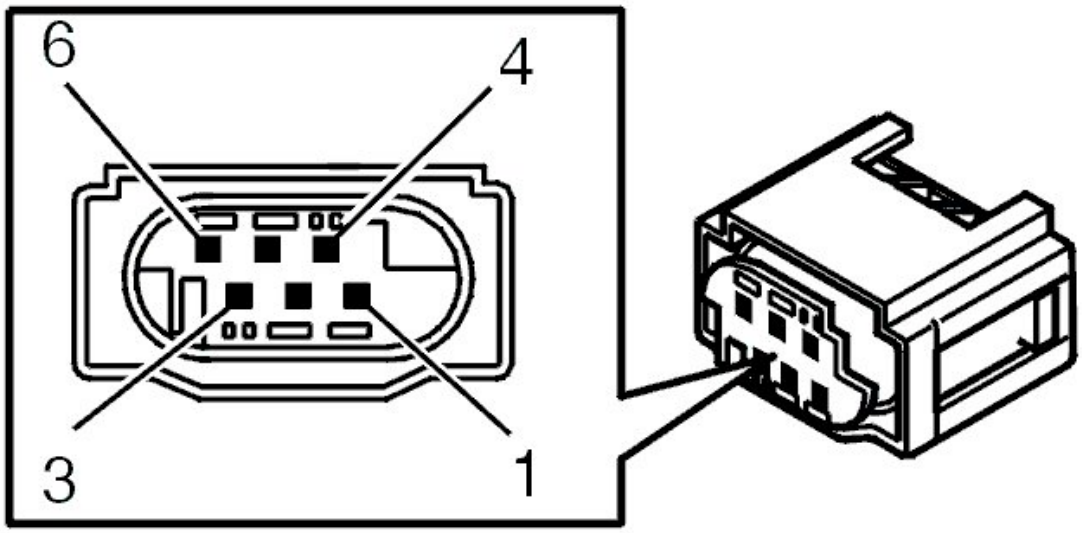
Check the signal cable (potentiometer 1) between engine control module (ECM) terminal #A1 (#A1) and throttle unit terminal #6 (wiring side).
Check for a short-circuit to ground.
If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement.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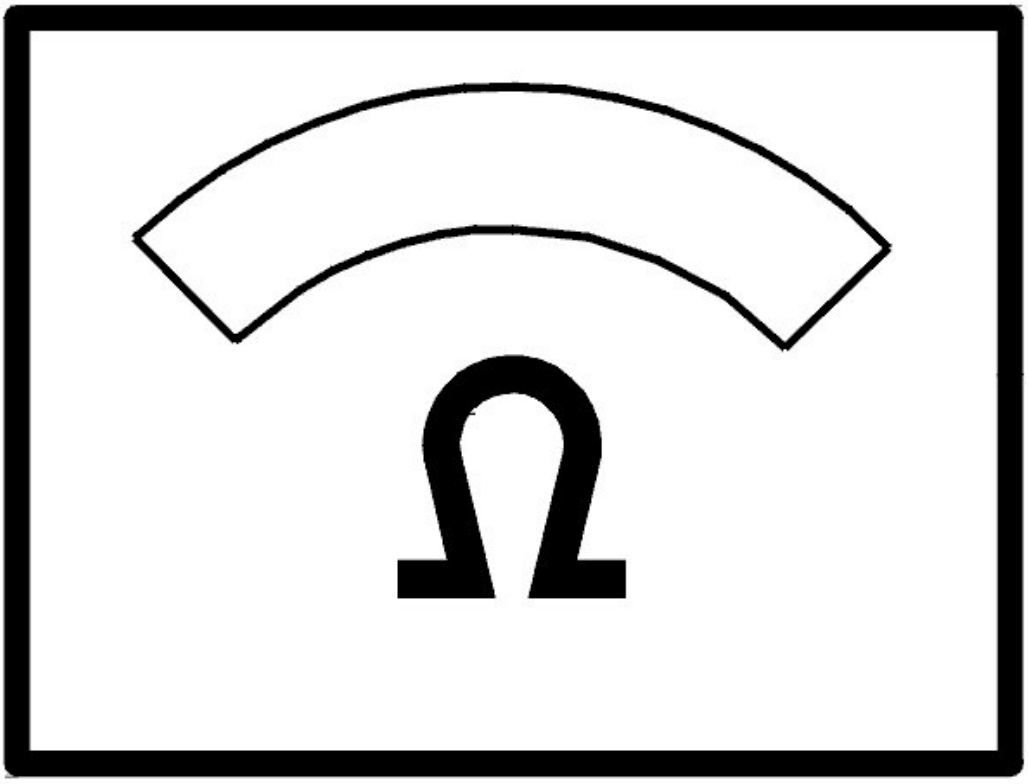
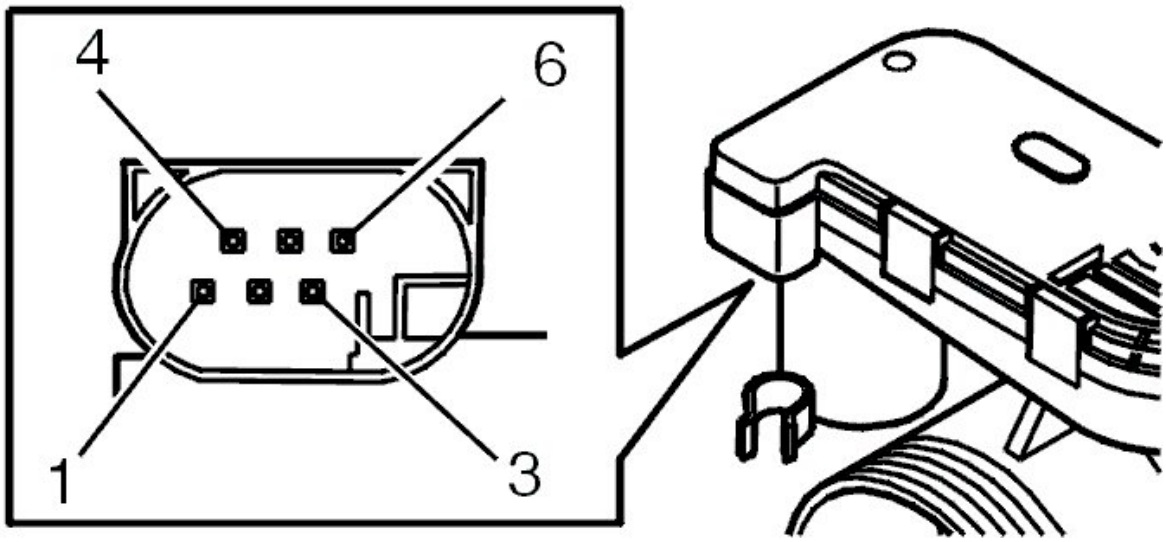




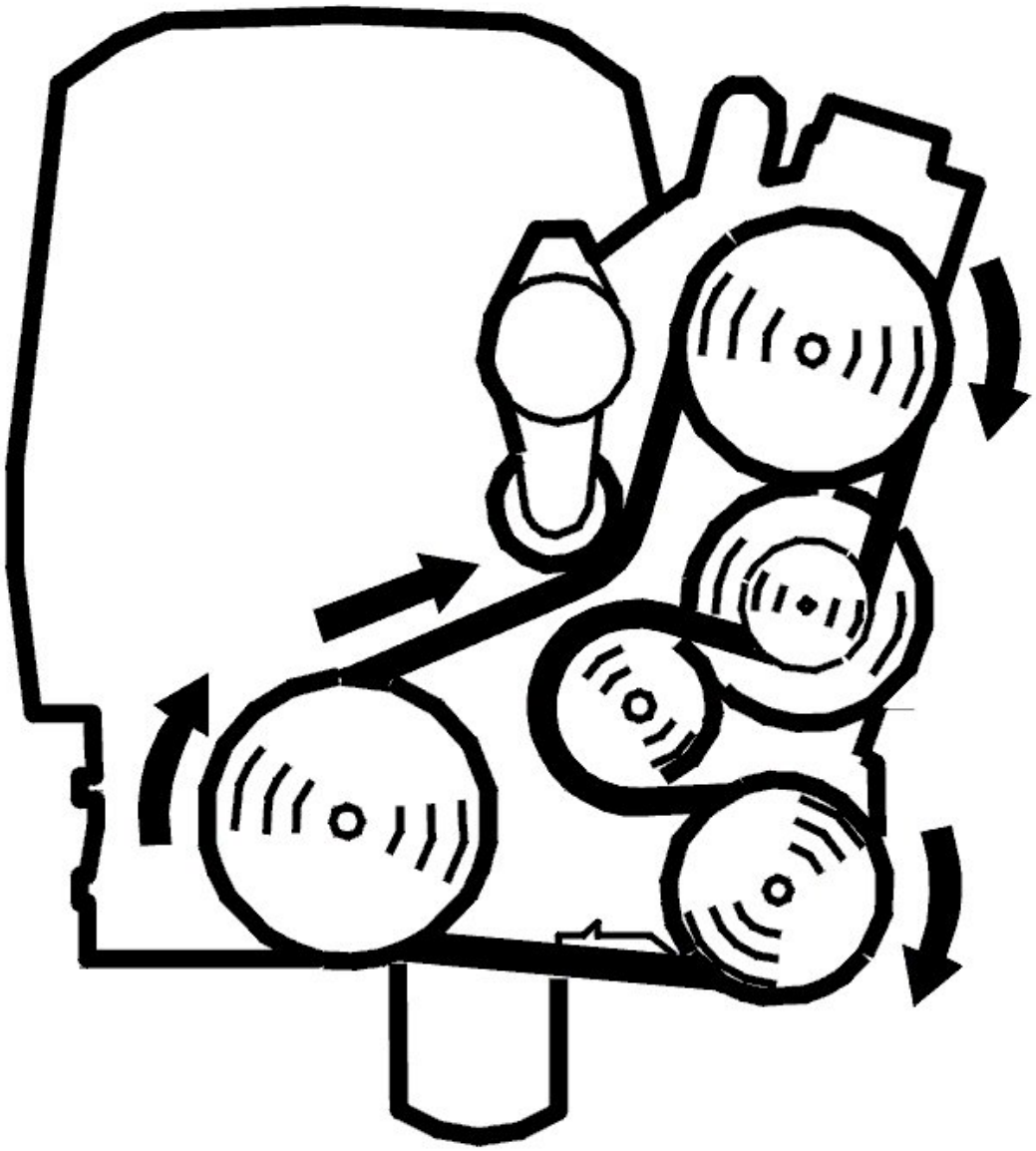
Continue - Verification

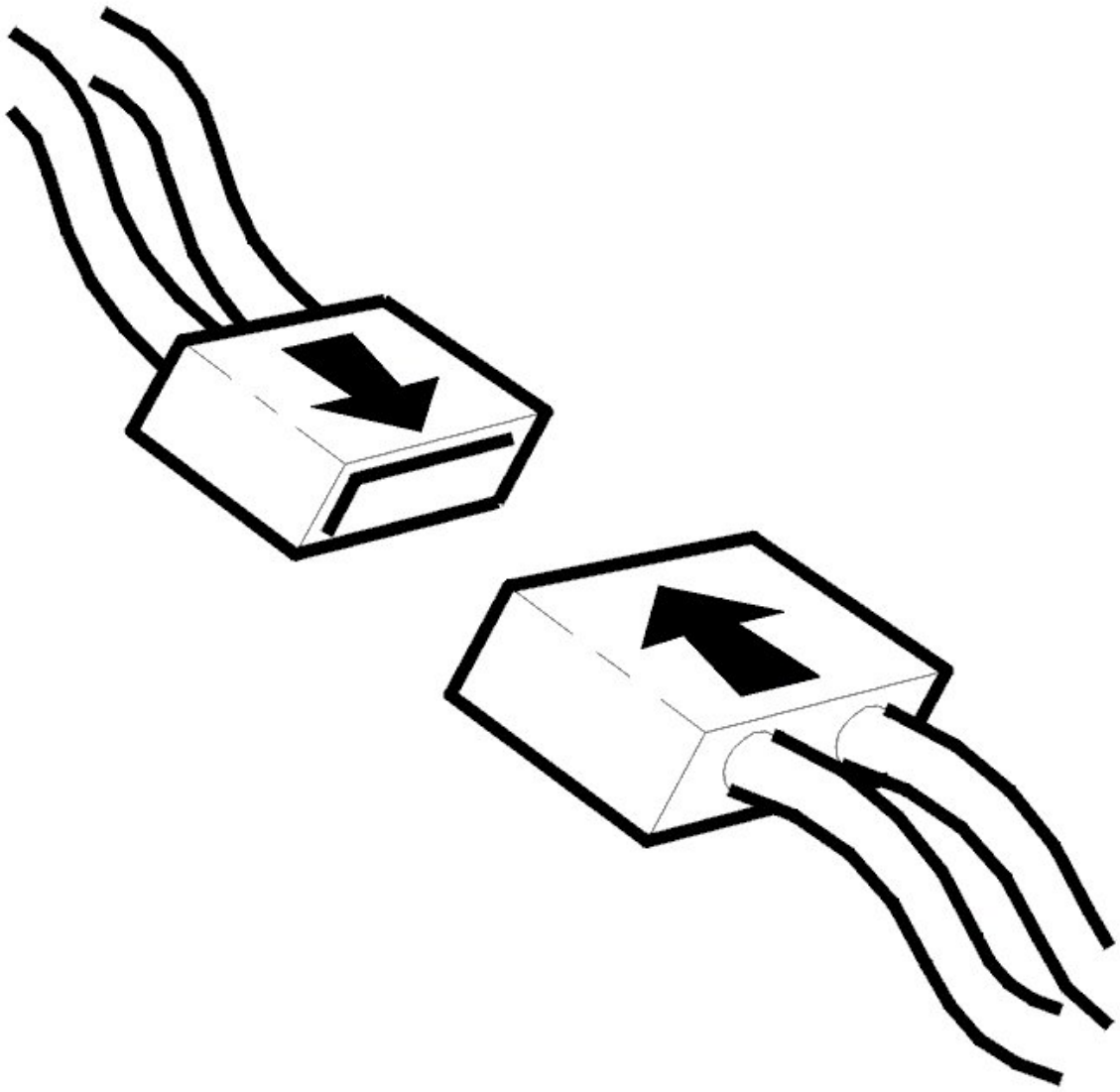
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

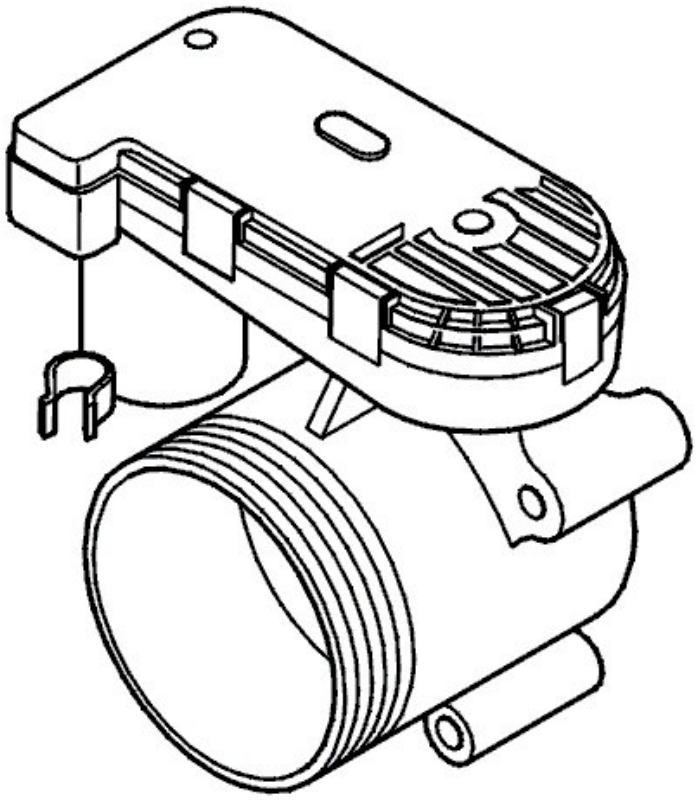
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9220

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 2 (circuit 2) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 1 (circuit 1) in the throttle position (TP) sensor for the throttle unit. If the diagnostic trouble codes (DTCs) for both potentiometers 1 and 2 are stored at the same time, the supply to the damper motor in the throttle unit will be disabled. The throttle will set itself to the return position.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- The signal cables are short-circuited to each other

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- Damaged throttle unit.

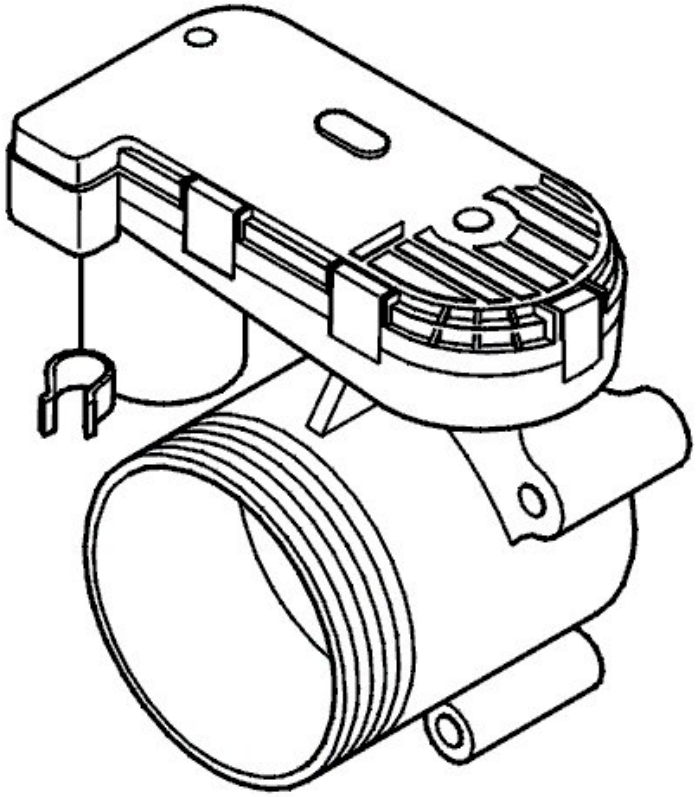
Fault symptom[s]
- Poor performance.

Faulty Signal

Faulty signal

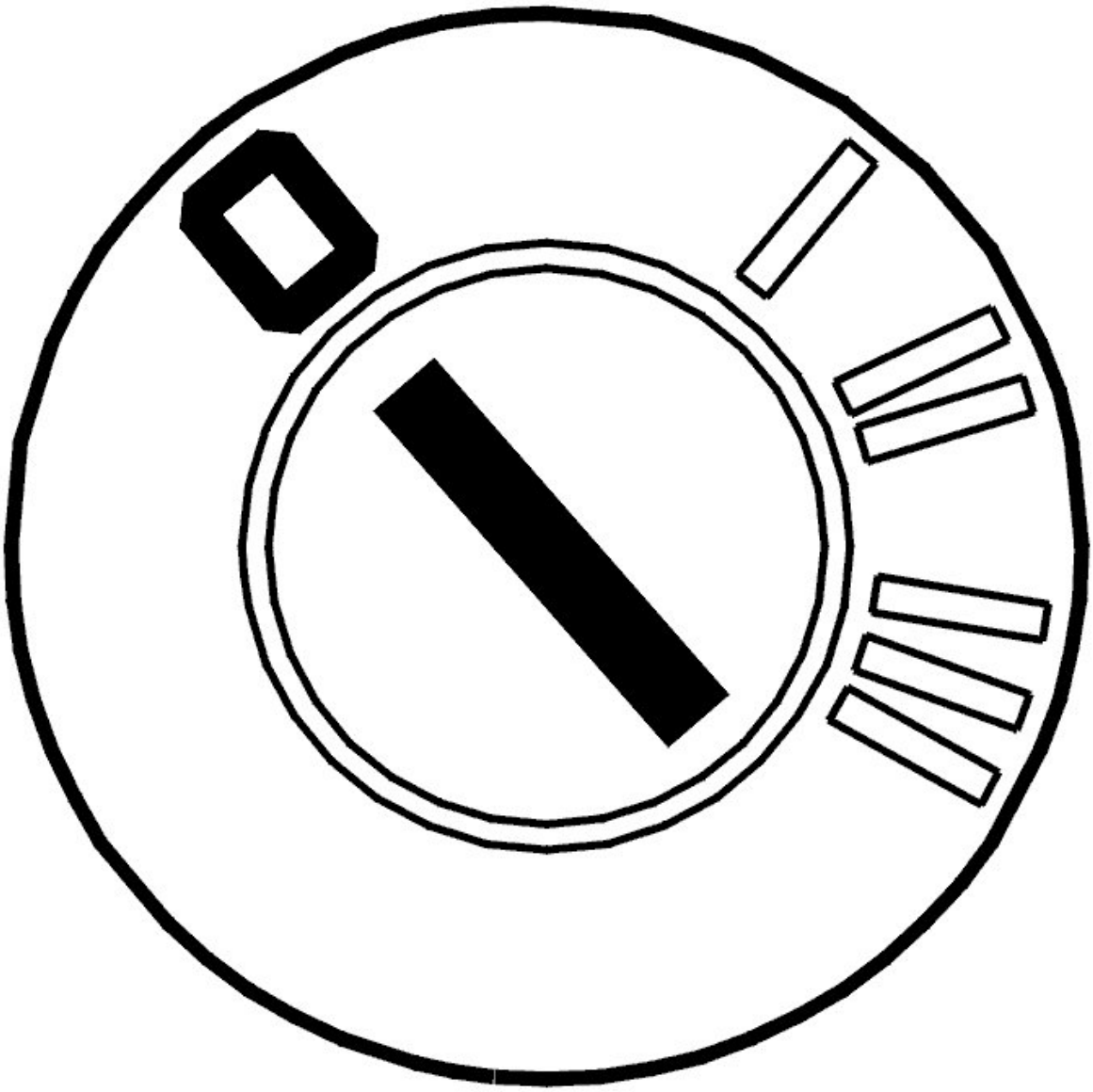
Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the signal cable (potentiometer 1) between engine control module (ECM) terminal #A1 (#A1) and throttle unit terminal #6 (wiring side). Check for an open-circuit.
Check the signal cable (potentiometer 2) between engine control module (ECM) terminal #A20 (#A20) and throttle unit terminal #5 (wiring side). Check for an open-circuit.
Check the signal cables (potentiometer 1) terminal #A1 (#A1) and (potentiometer 2) terminal #A20 (#A20). Check for a short-circuit to each other.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

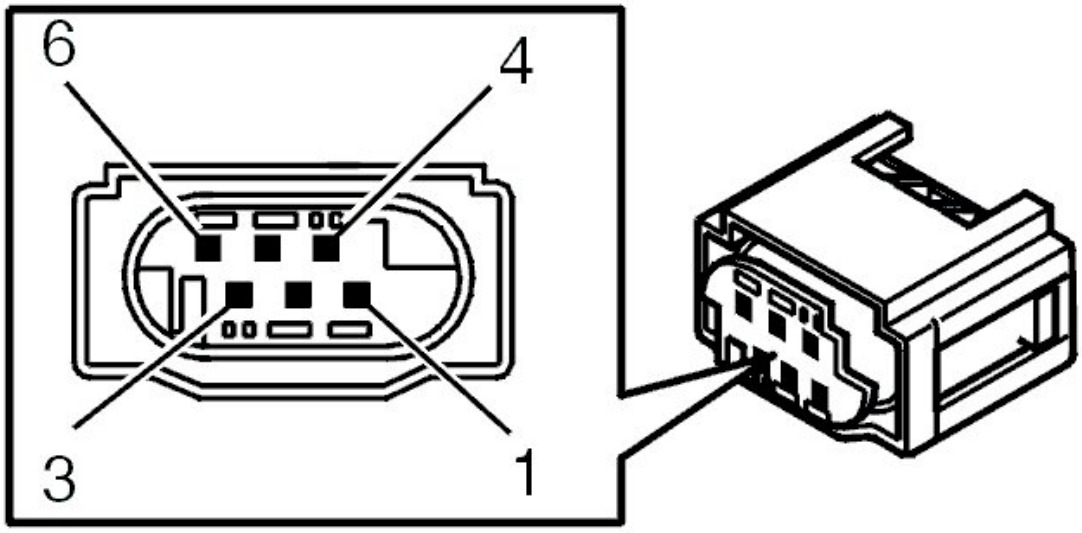
Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

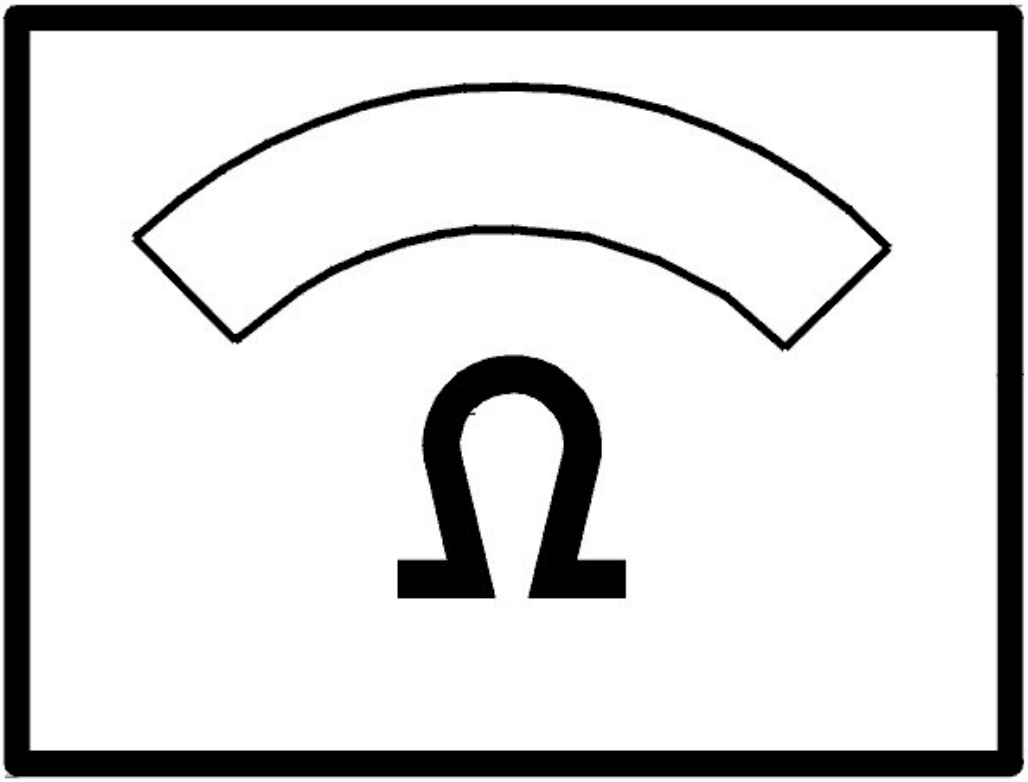
Remedy as necessary.

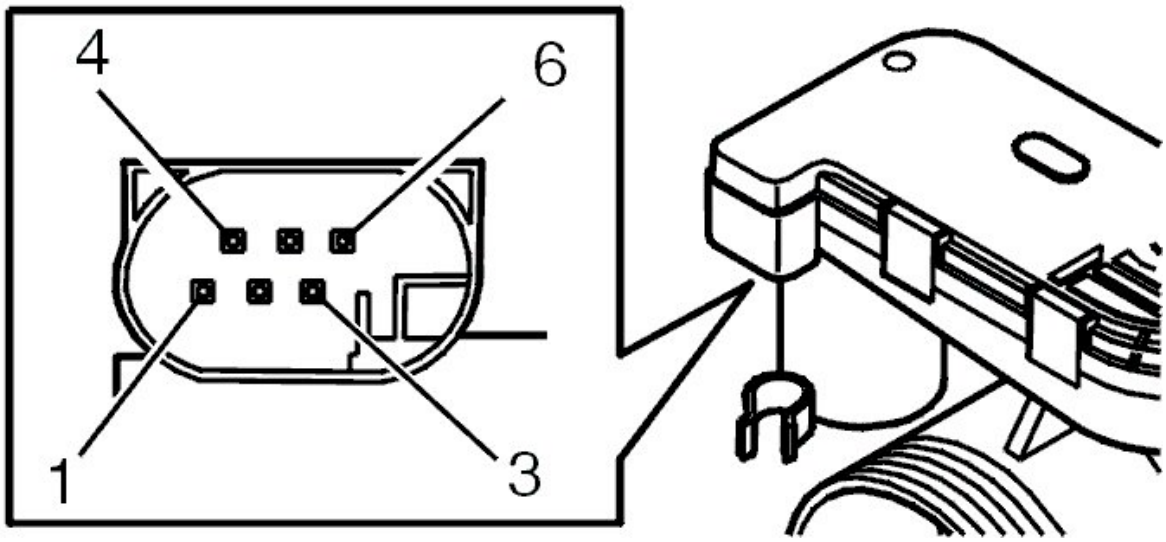
Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air

Induction/Throttle Body/Service and Repair/Removal and Replacement.



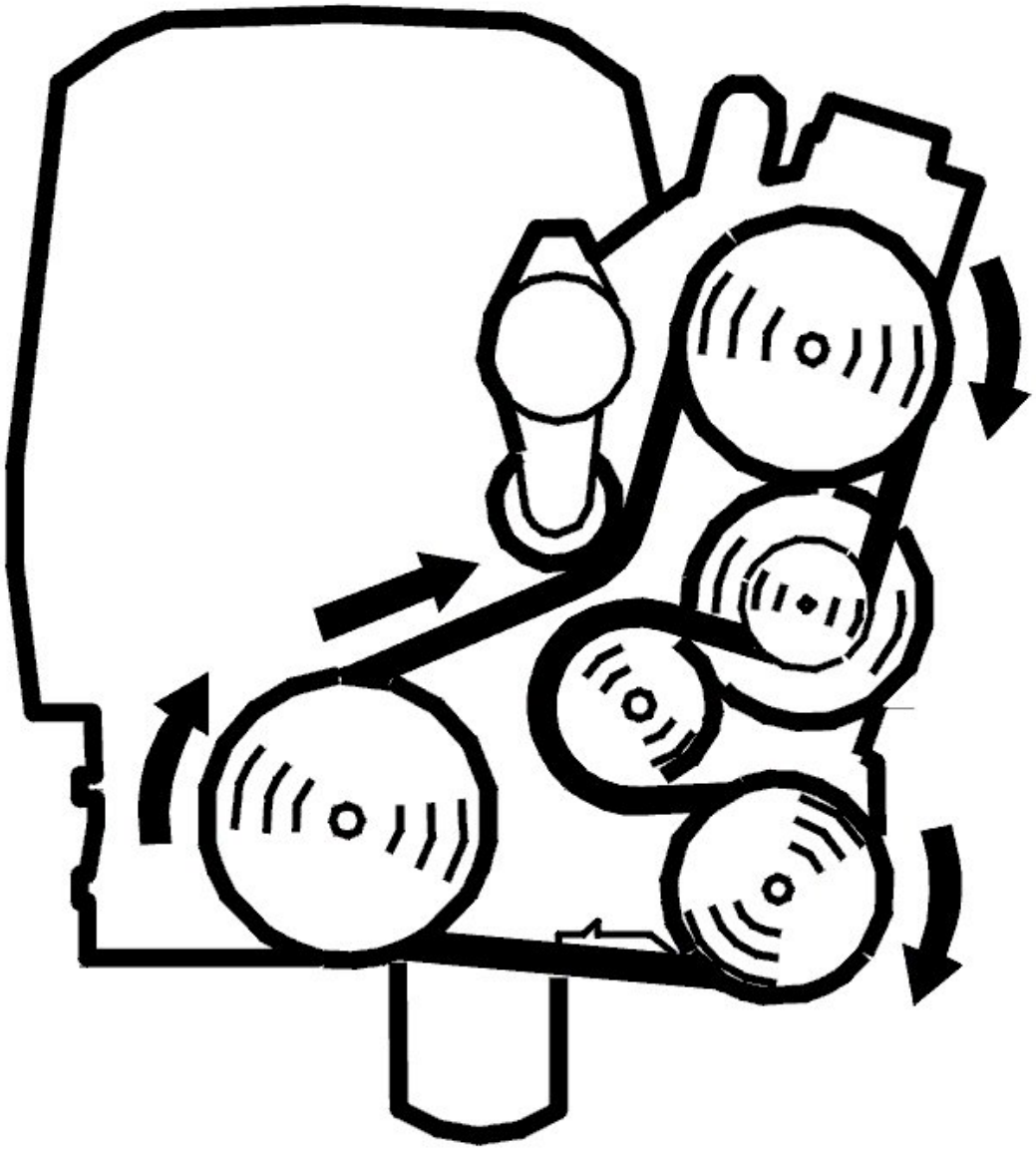


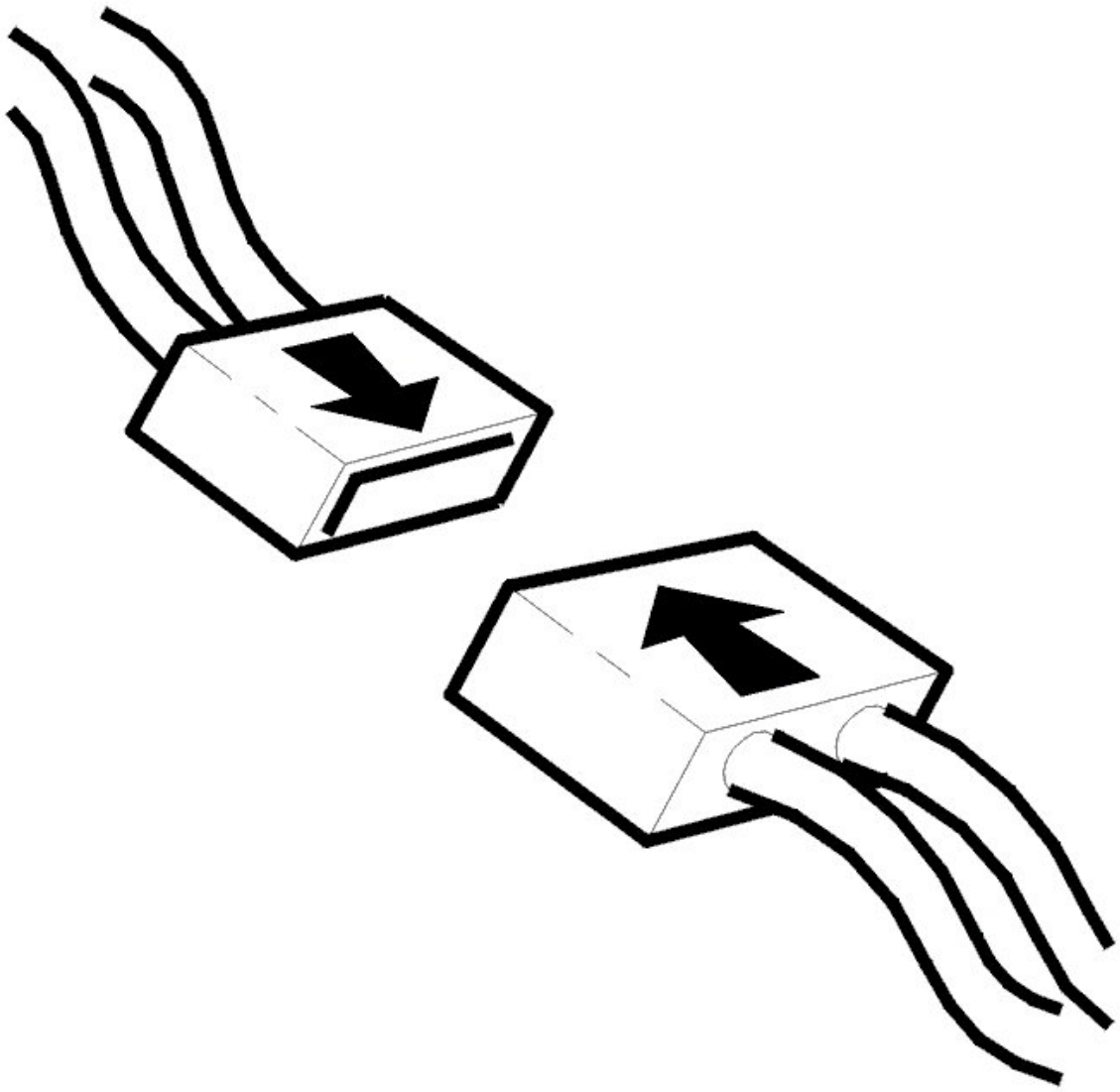


Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

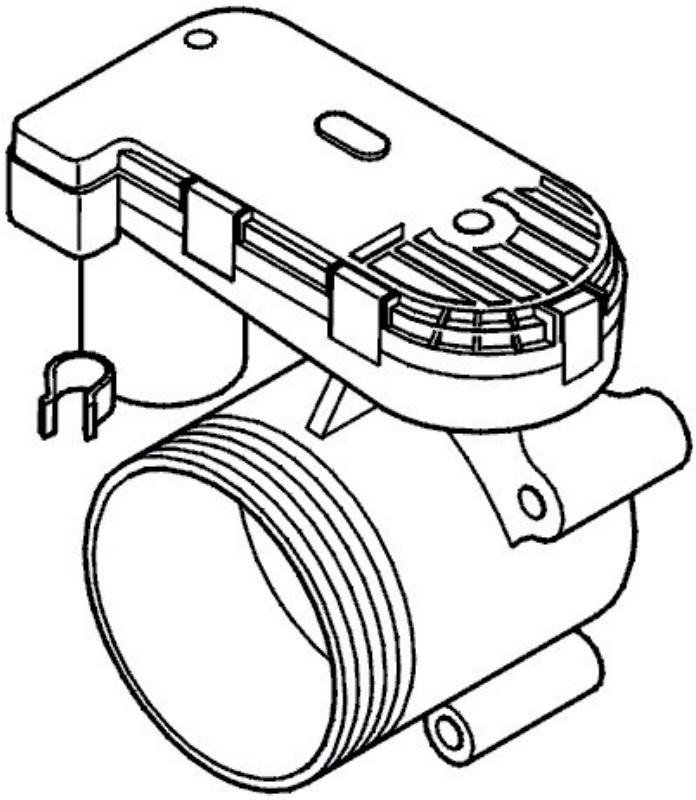
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-922C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 2 (circuit 2) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 1 (circuit 1) in the throttle position (TP) sensor for the throttle unit. If the diagnostic trouble codes (DTCs) for both potentiometers 1 and 2 are stored at the same time, the supply to the damper motor in the throttle unit will be disabled. The throttle will set itself to the return position.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Short-circuit to supply voltage in the signal cable

- Open-circuit in the signal ground cable for potentiometers 1 and 2
- Damaged throttle unit.

Fault symptom[s]
- Poor performance.

Signal Too High

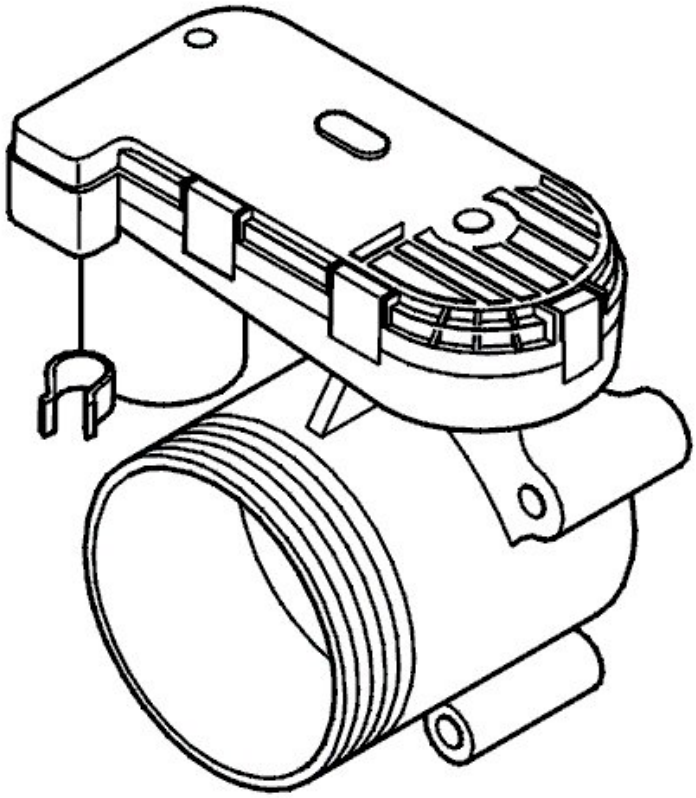
Signal too high

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



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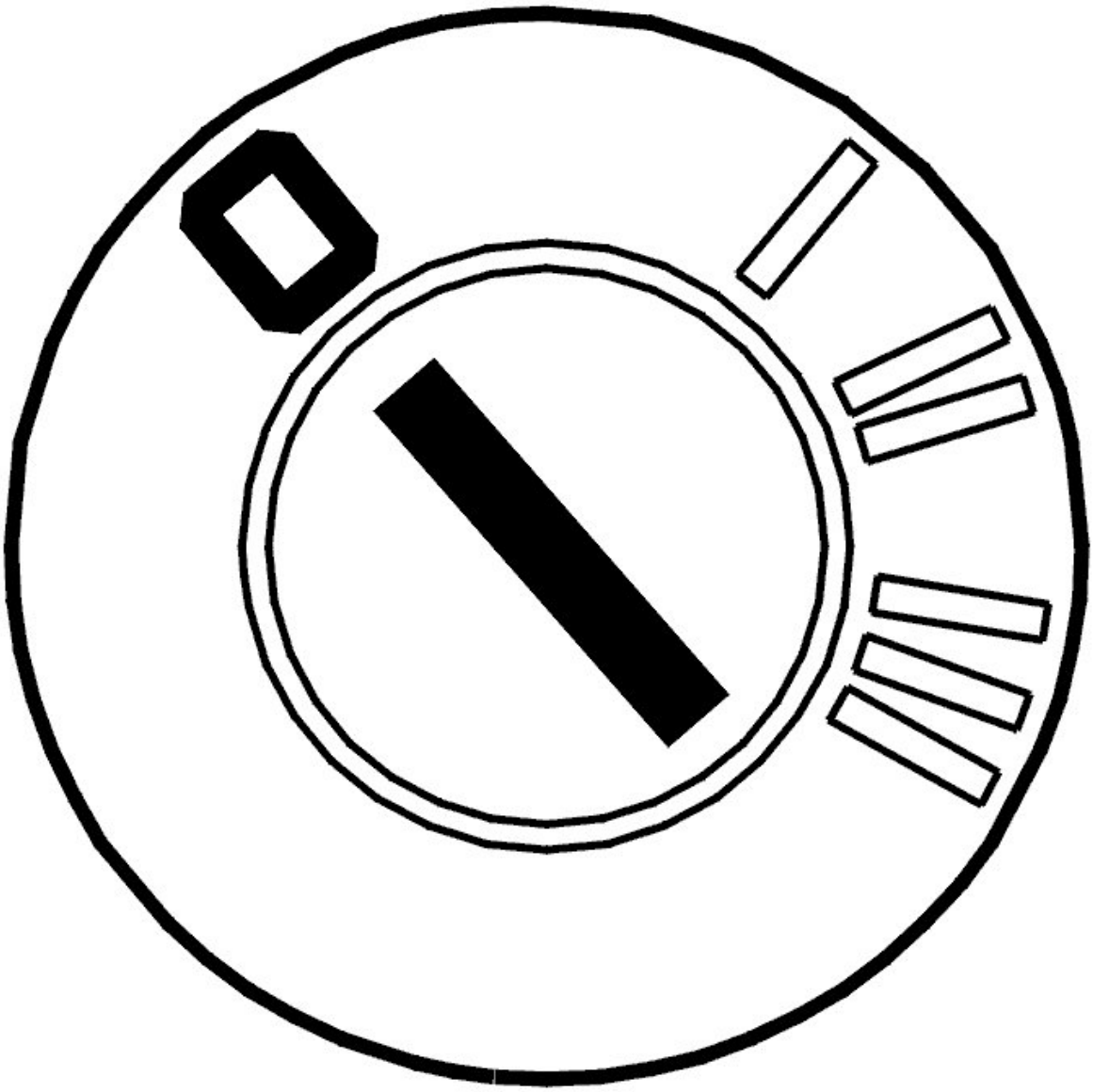
cont - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the signal ground cable between engine control module (ECM) terminal #A19 (#A19) and throttle unit terminal #2 (wiring side). Check for an open-circuit.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

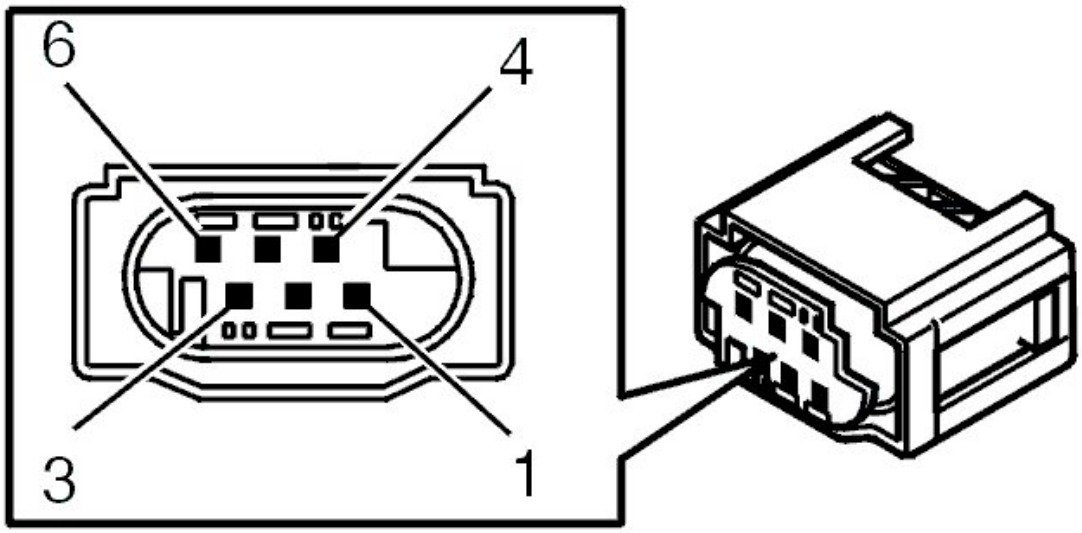
Check the signal cable (potentiometer 2) between engine control module (ECM) terminal #A20 (#A20) and throttle unit terminal #5 (wiring side). Check for a short-circuit to supply voltage.
If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement.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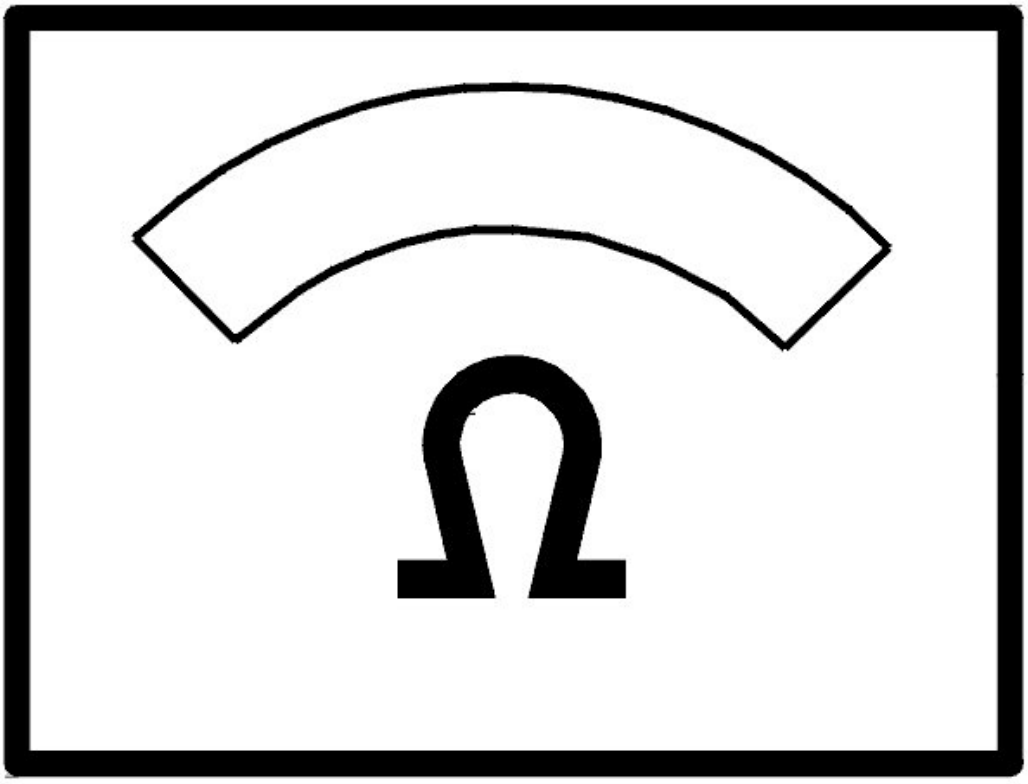
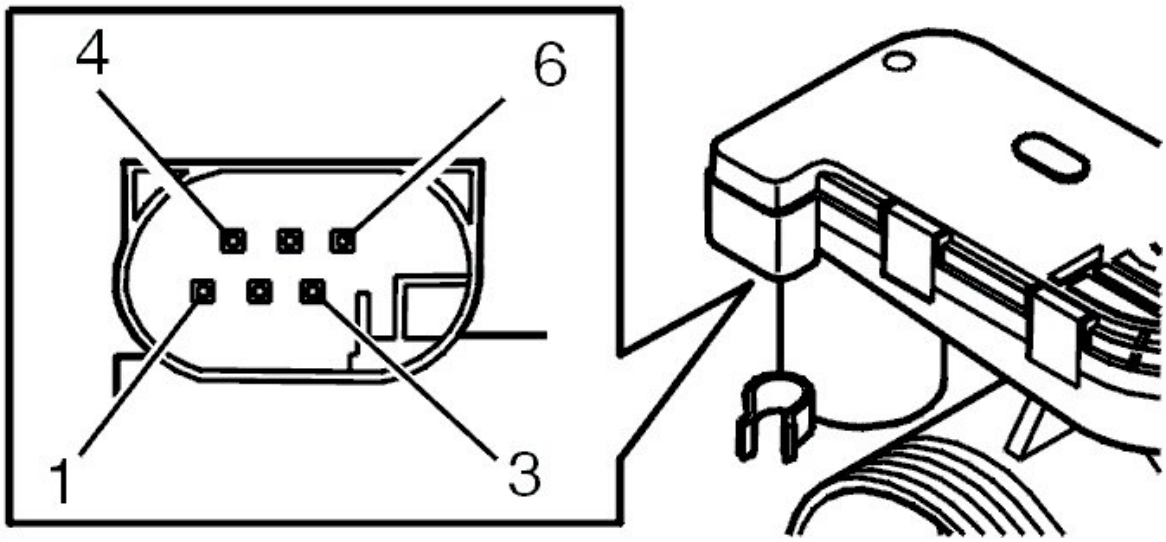




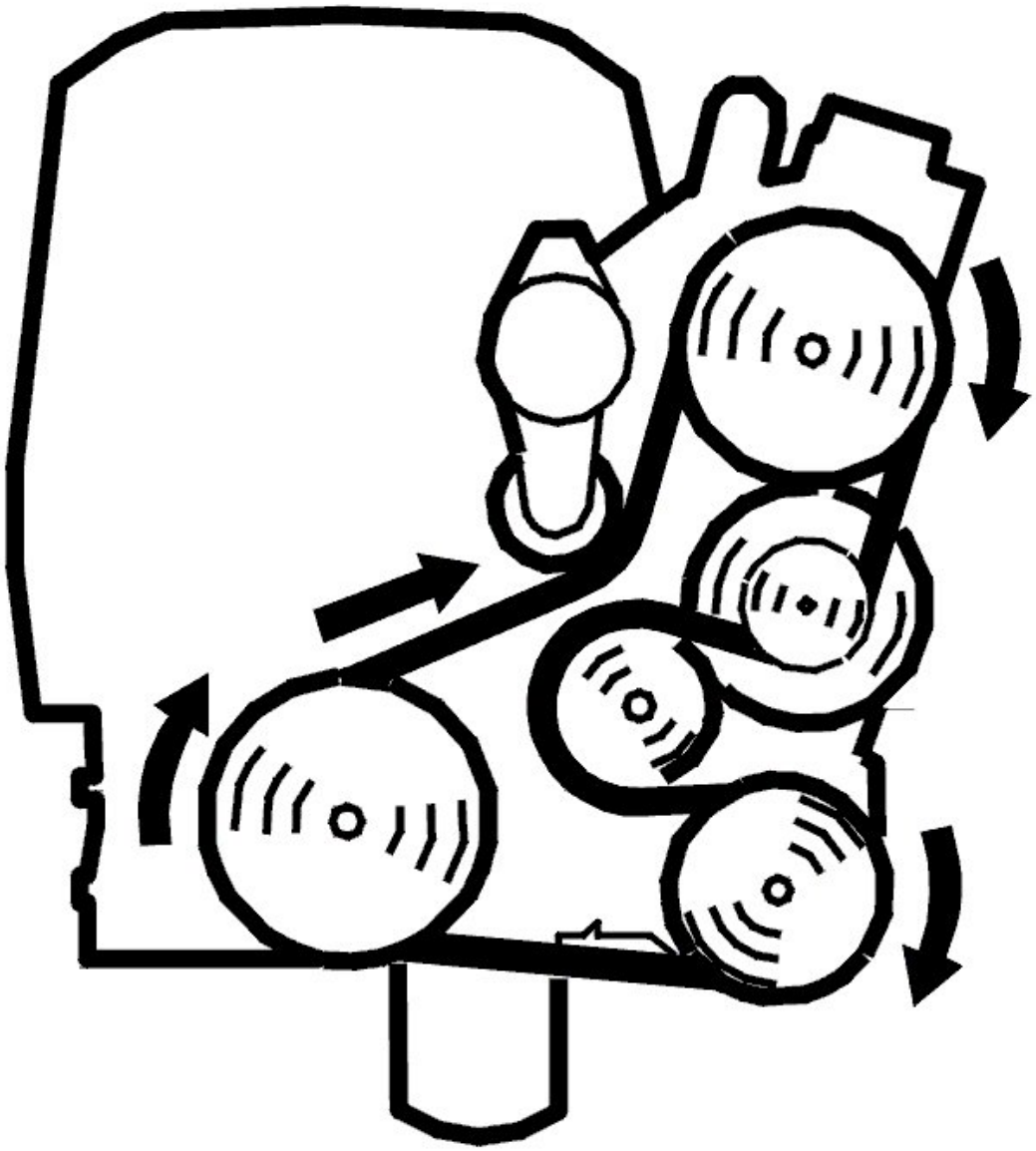
Continue - Verification

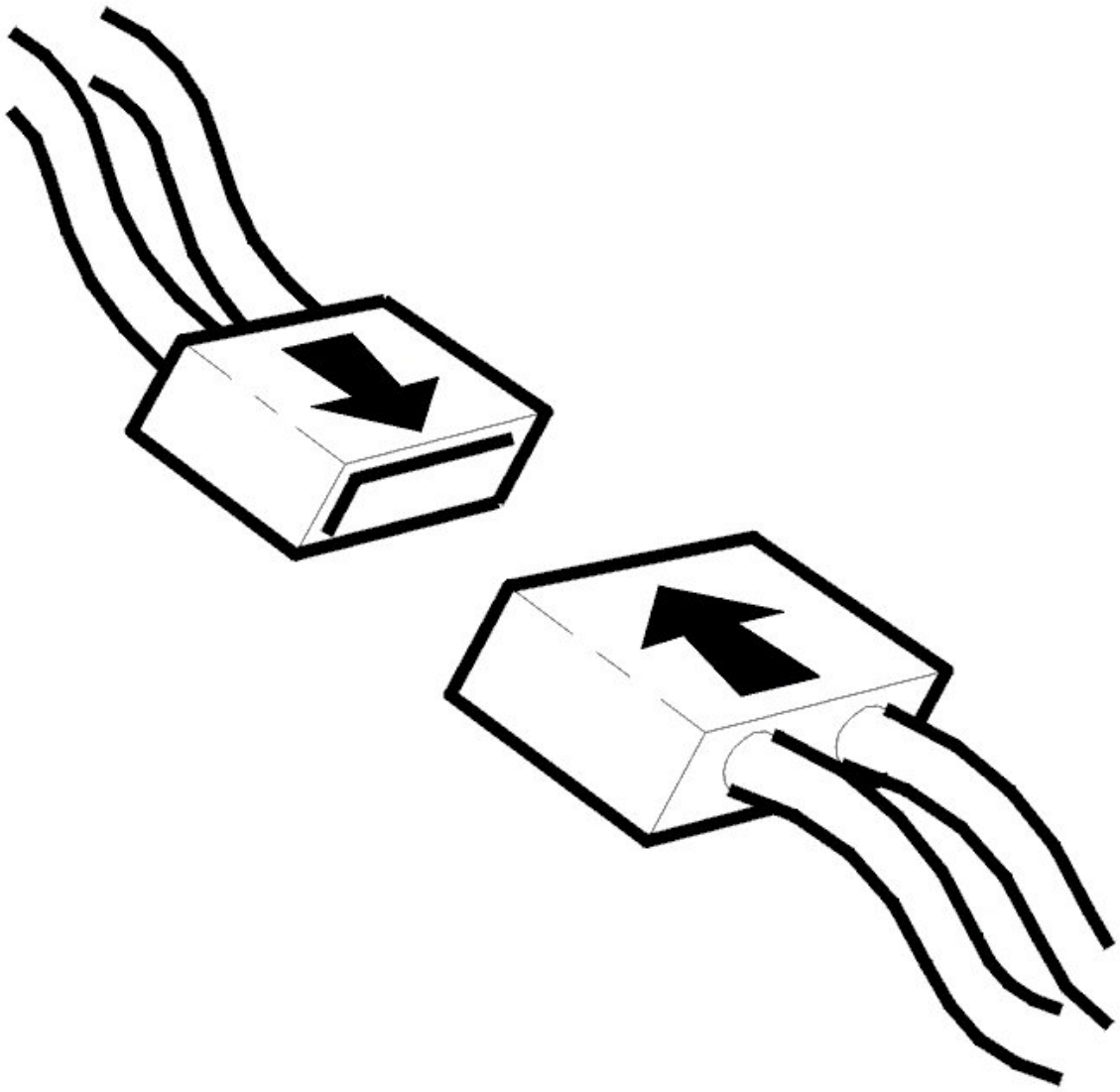
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

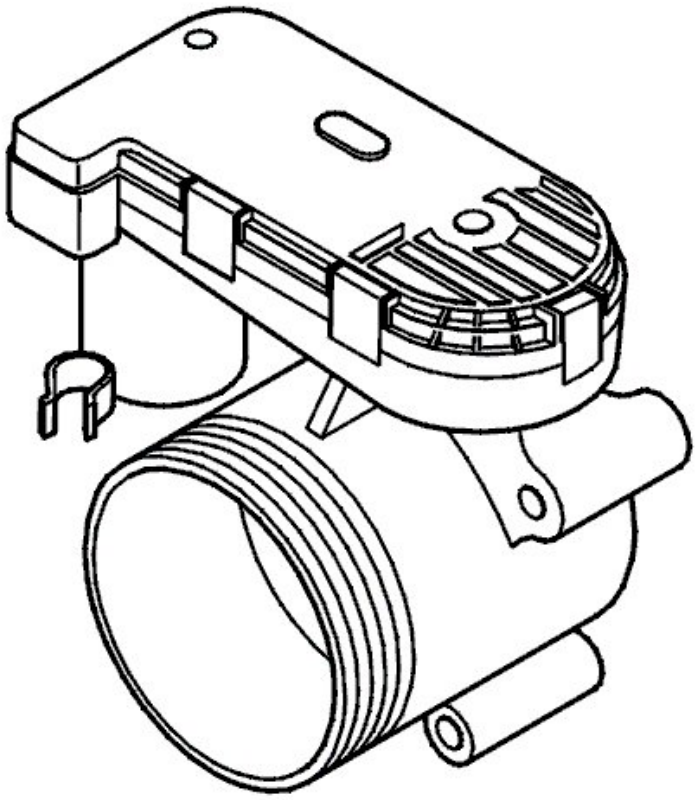
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-922D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the signal from the throttle position (TP) sensor, potentiometer 2 (circuit 2) in the electronic throttle unit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The throttle angle is calculated using potentiometer 1 (circuit 1) in the throttle position (TP) sensor for the throttle unit. If a fault is also detected in potentiometer 1 (circuit 1) a diagnostic trouble code (DTC) will also be stored for this. If diagnostic trouble codes (DTCs) have been stored for both potentiometers, the supply to the damper motor for the electronic throttle unit will be disabled. The throttle will set itself to the return position.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit or short-circuit to ground in the signal cable

- Open-circuit or short-circuit to ground in the power supply to potentiometers 1 and 2
- Damaged throttle unit.

Fault symptom[s]
- Poor performance.

Signal Too Low

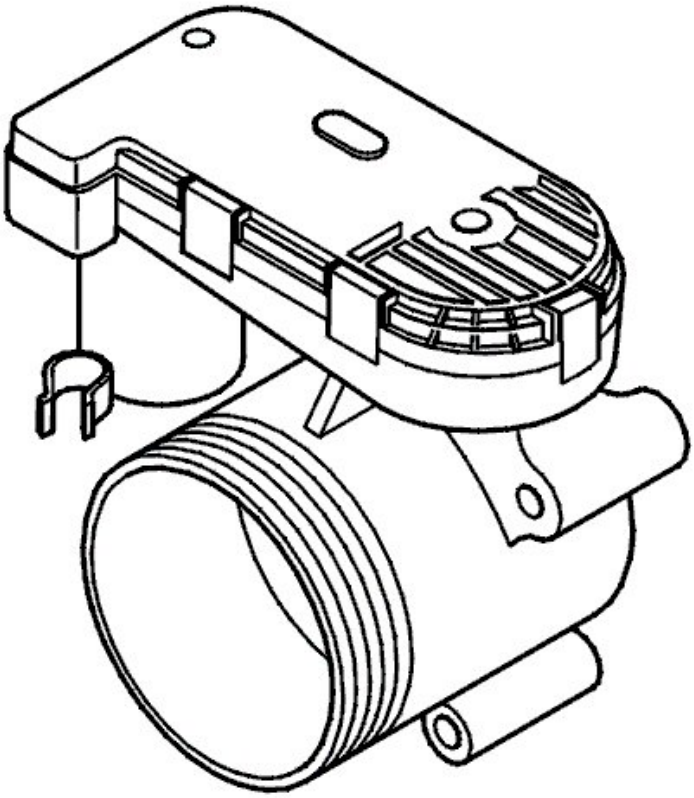
Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



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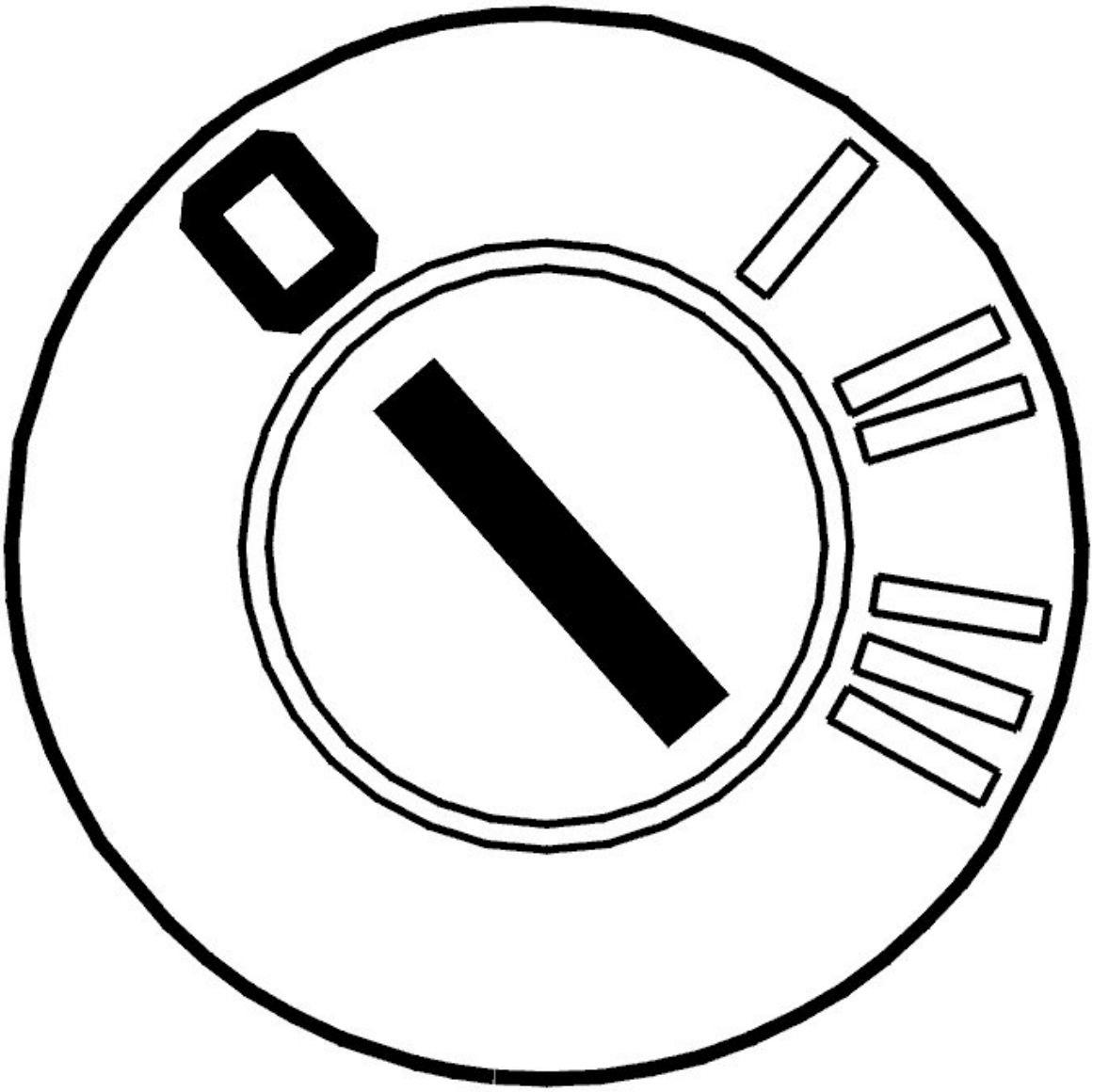
cont - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check the power supply cable (5 volts) between engine control module (ECM) terminal #A59 (#A59) and throttle unit terminal #3 (wiring side).
Check for an open-circuit. Check for a short-circuit to ground.

Hint: With the ignition on, the power supply to the throttle unit potentiometers must be approximately 5 V measured between throttle unit connector terminals #2 and #3 (wiring side).

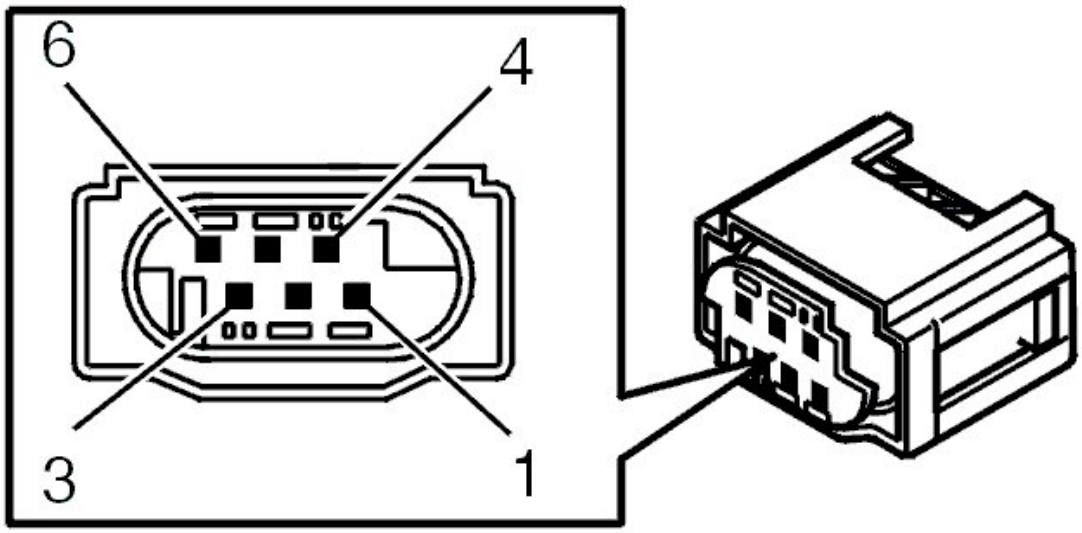
Check the signal cable (potentiometer 2) between engine control module (ECM) terminal #A20 (#A20) and throttle unit terminal #5 (wiring side).
Check for an open-circuit. Check for a short-circuit to ground.
If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

Note! When replacing the throttle unit, the throttle unit must be adapted. See Throttle unit adaptation in the vehicle communication socket.

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement.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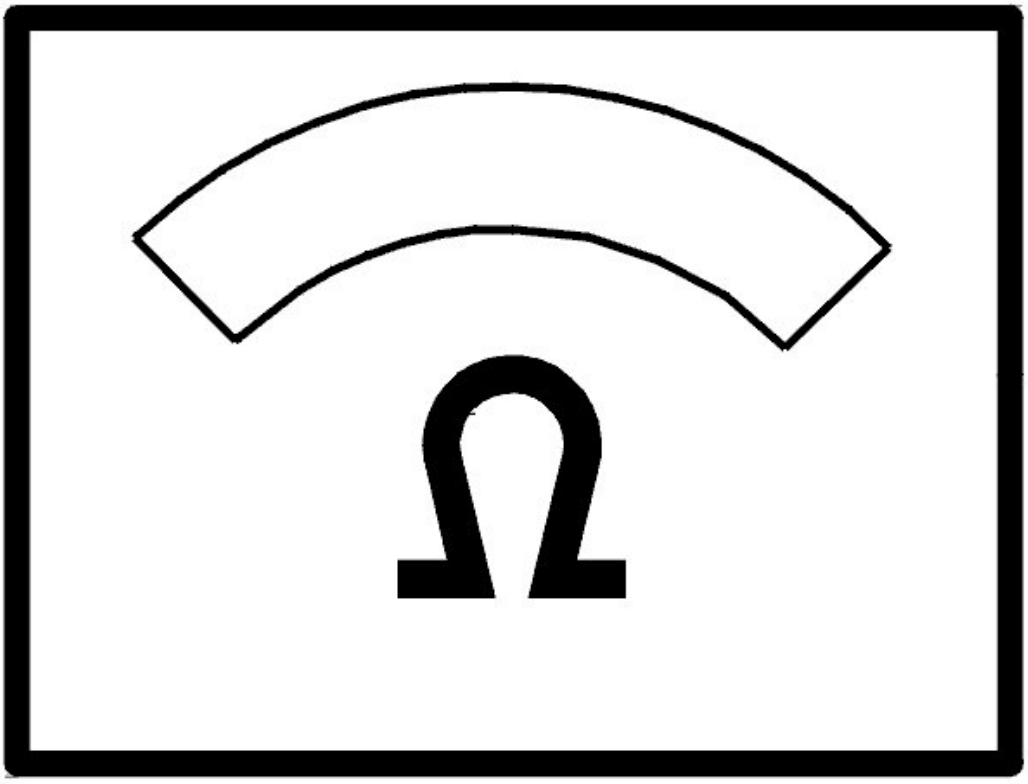
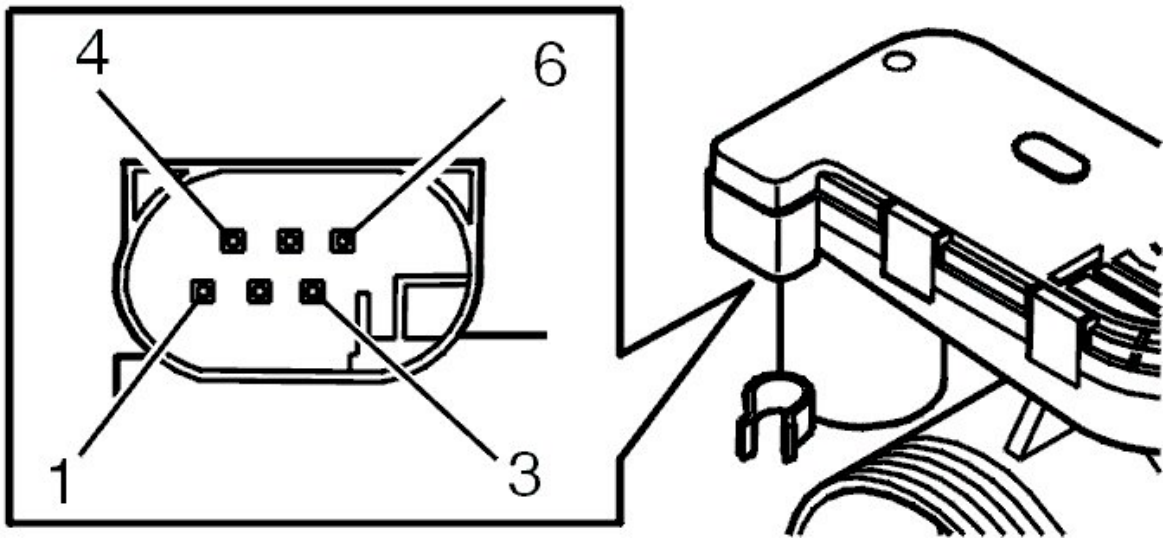




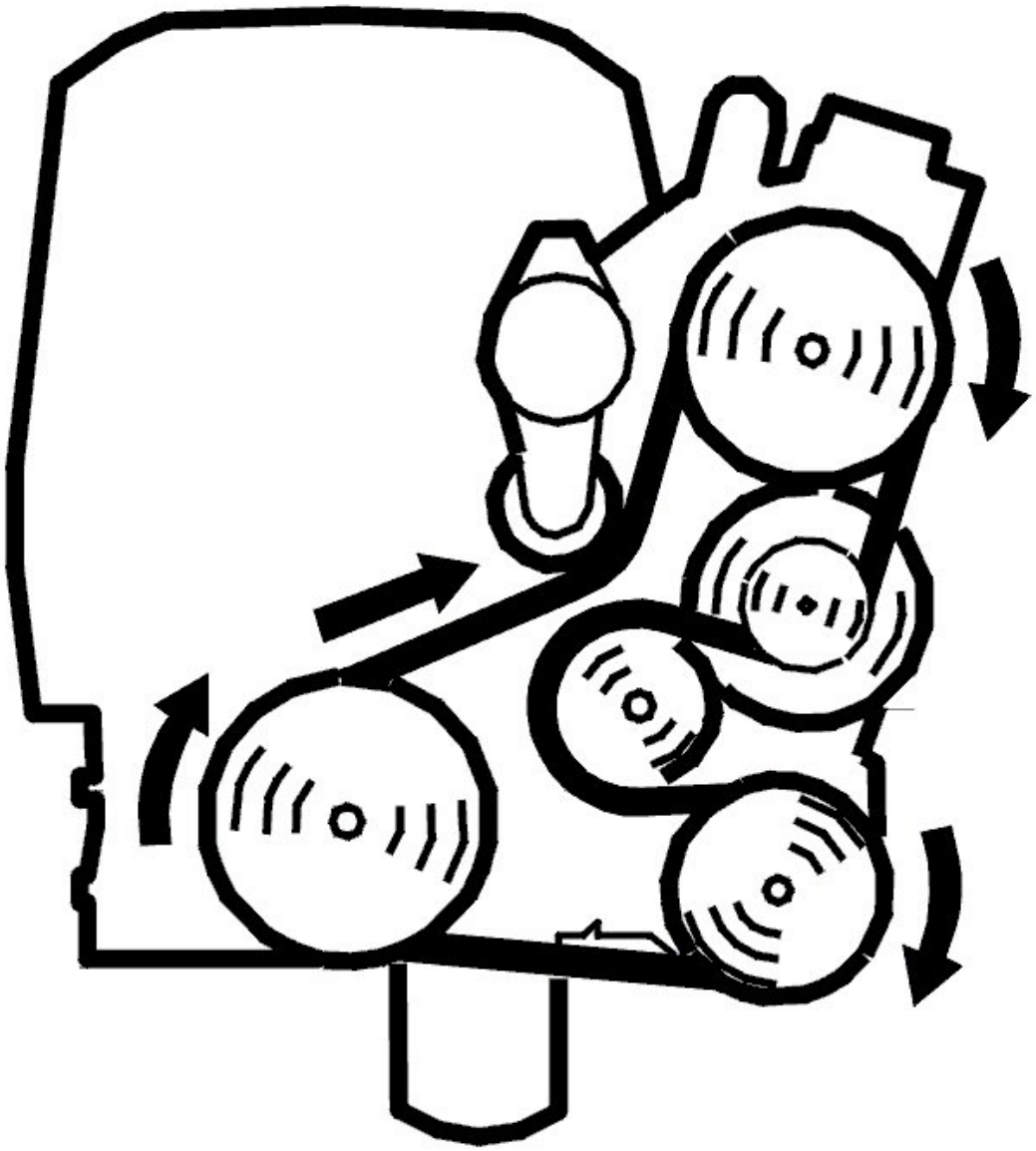
Continue - Verification

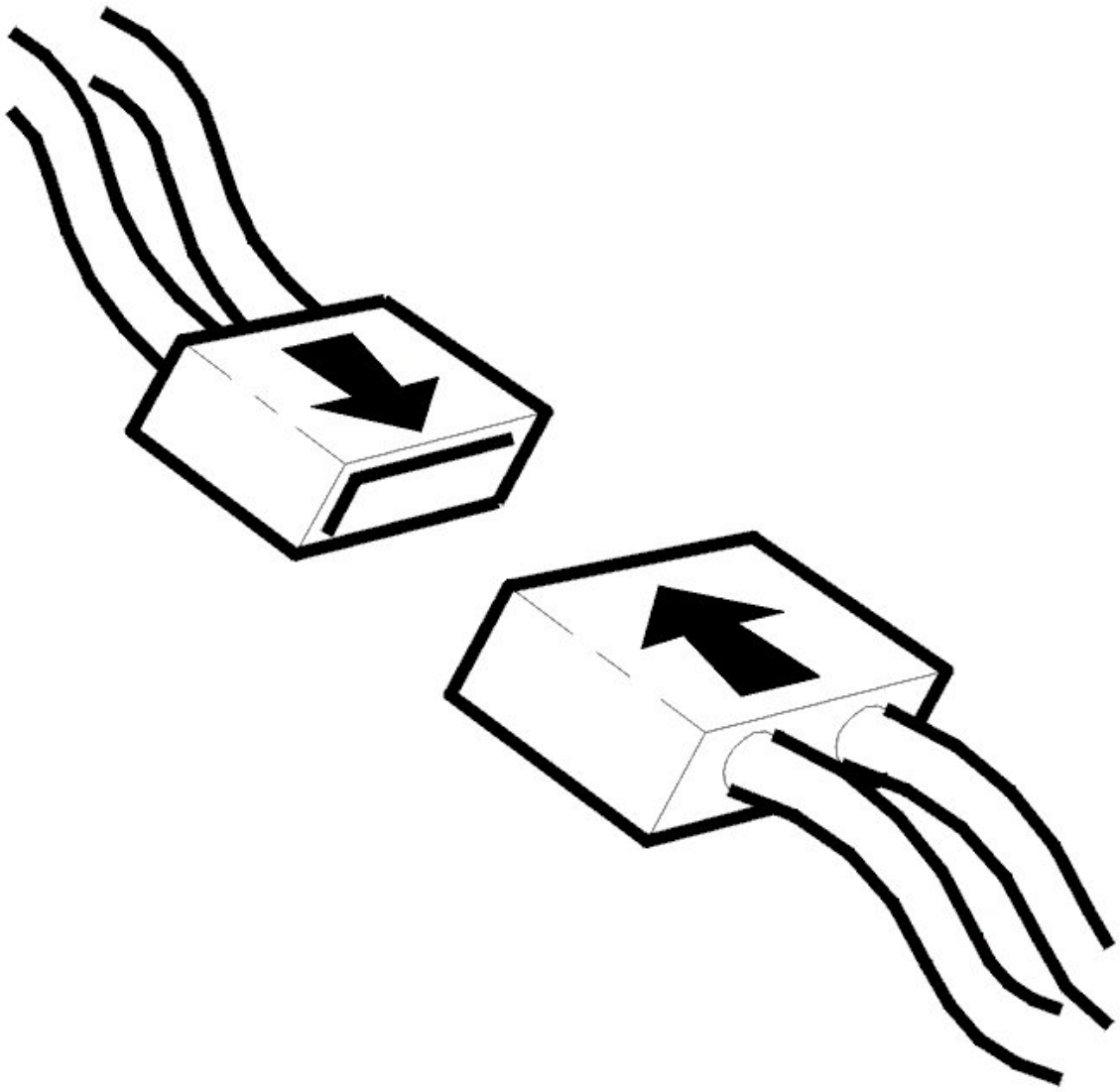
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

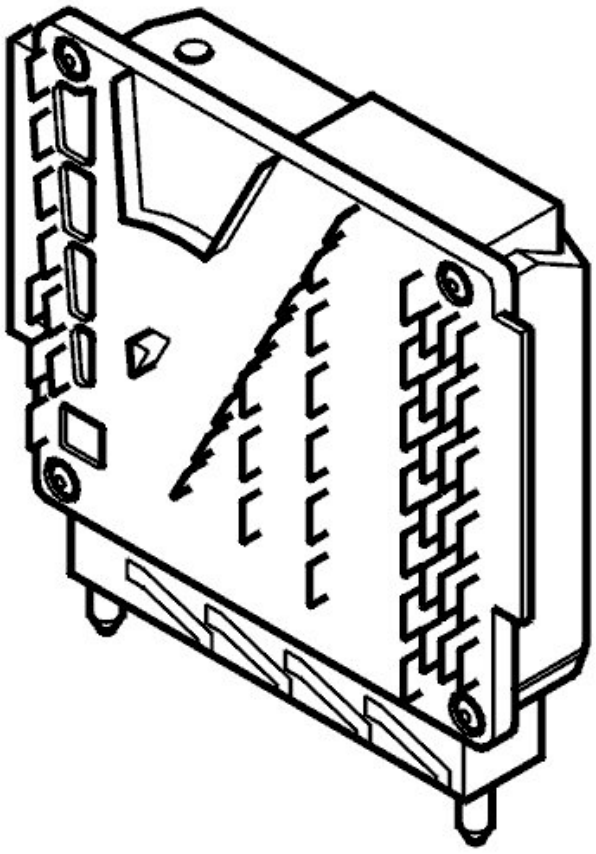
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9240

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault or a fault in the circuit for the throttle unit damper motor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit

- Damaged throttle unit
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

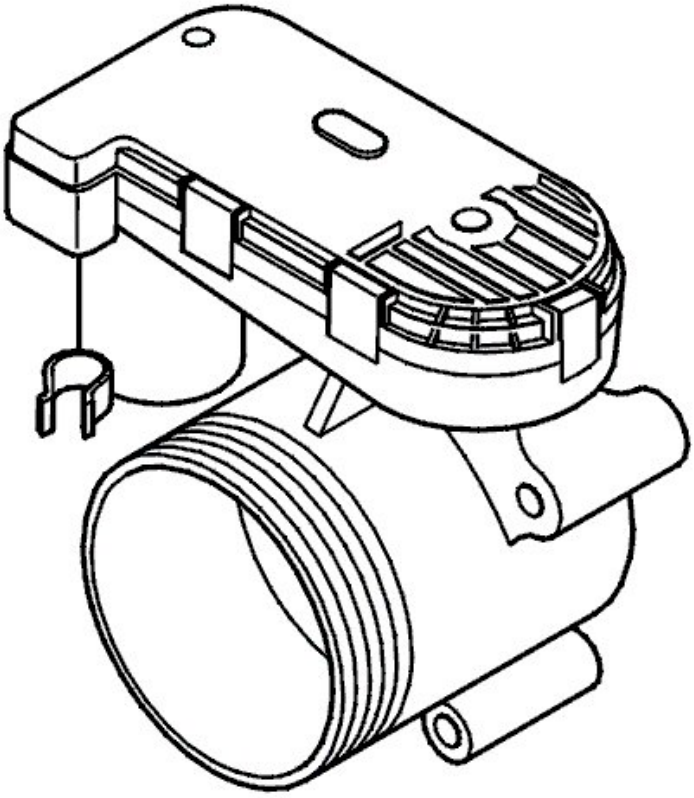
Faulty signal

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



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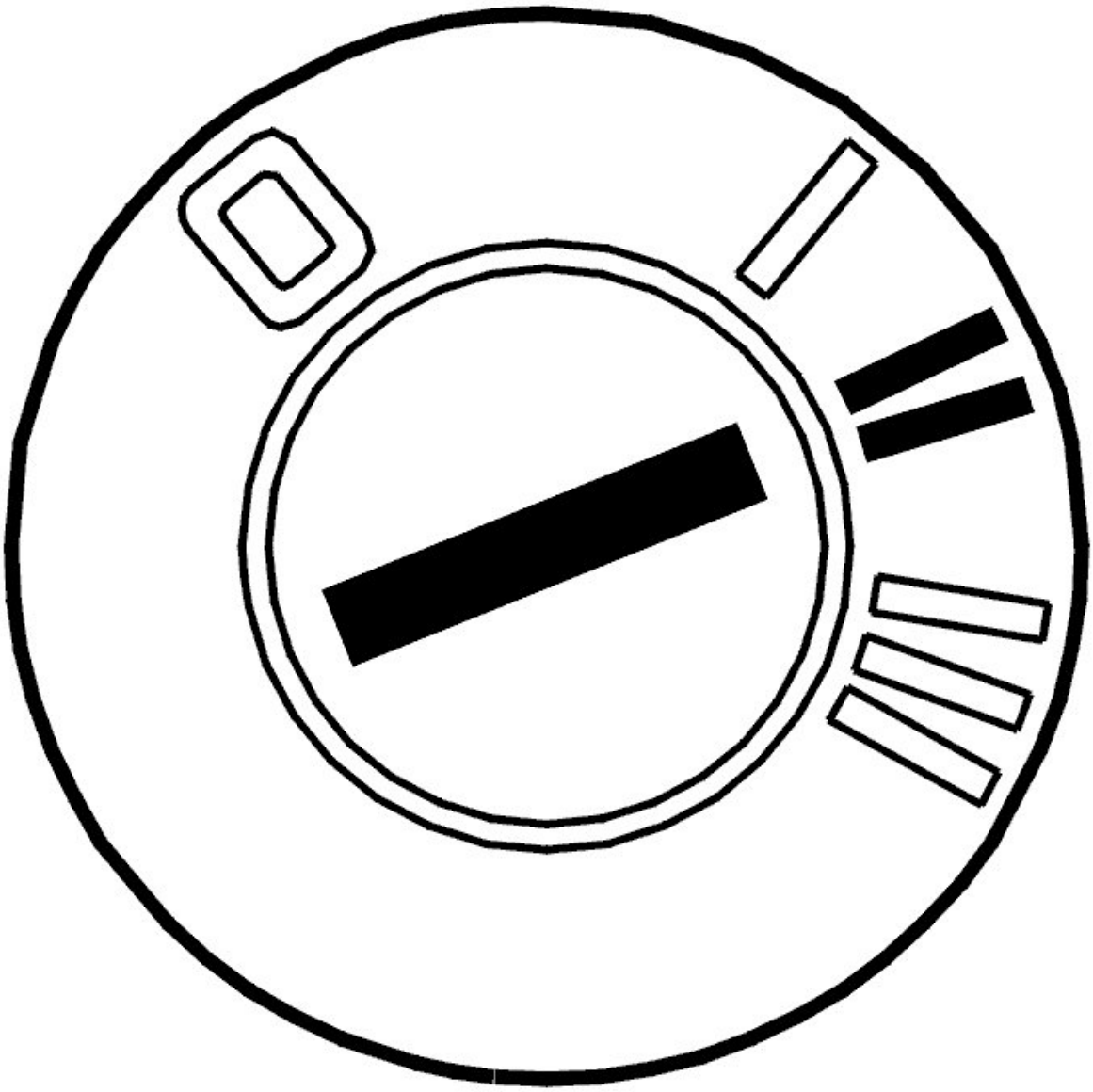
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit or the throttle position (TP) sensor.
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

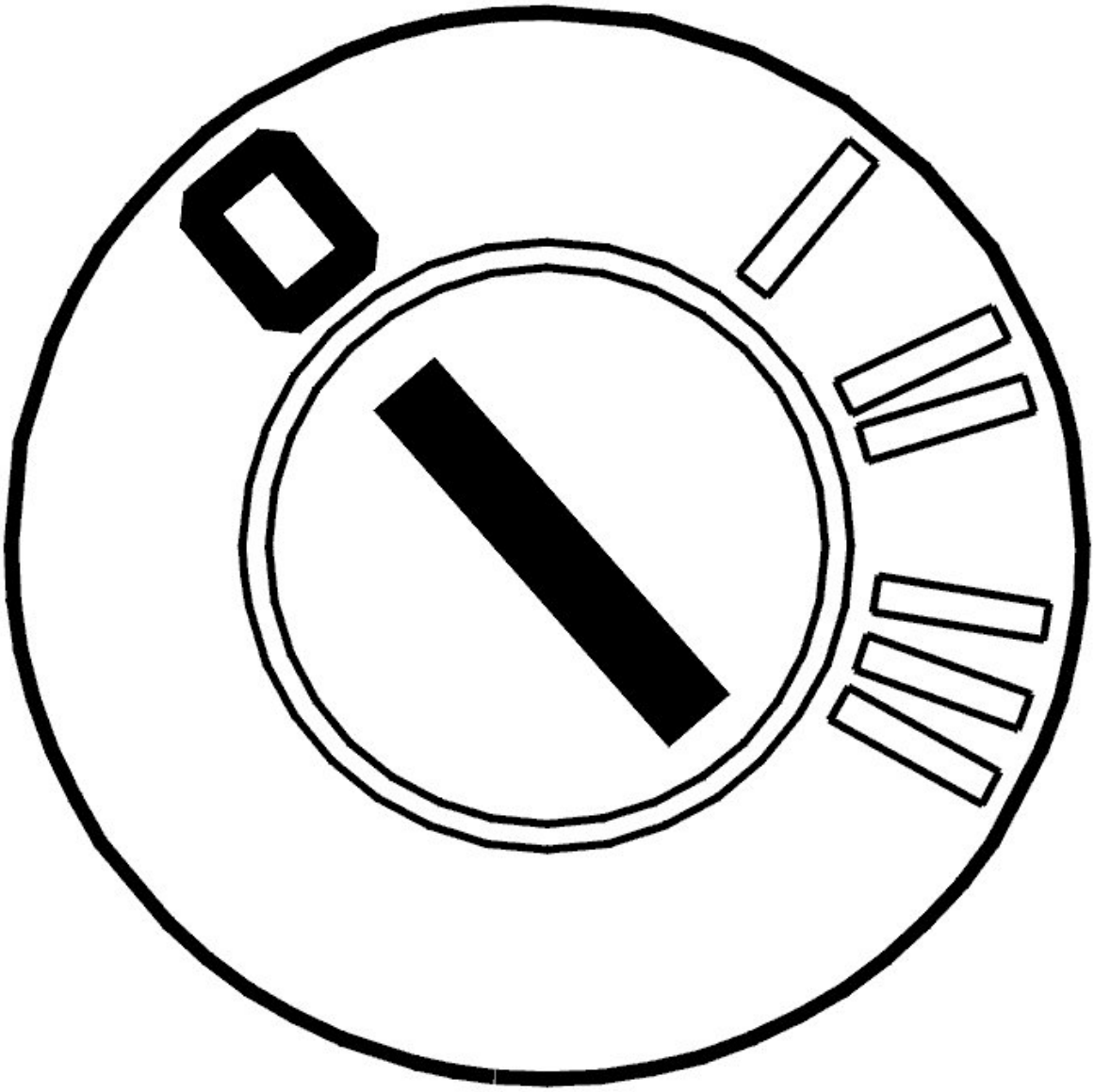
No - Checking components and wiring

Fault-tracing information

Remedy any diagnostic trouble codes (DTCs) that are stored.
Remedy as necessary.

Continue - DONE

Checking components and wiring



- Ignition off
- Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.

Check the resistance value of the damper motor winding in the throttle unit. Take readings between throttle unit terminals #1 and #4 (component side). Check for an open-circuit. Check for a short-circuit.

Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
If no faults are found during the checks and the diagnostic trouble code (DTC) recurs, try replacing the throttle unit.

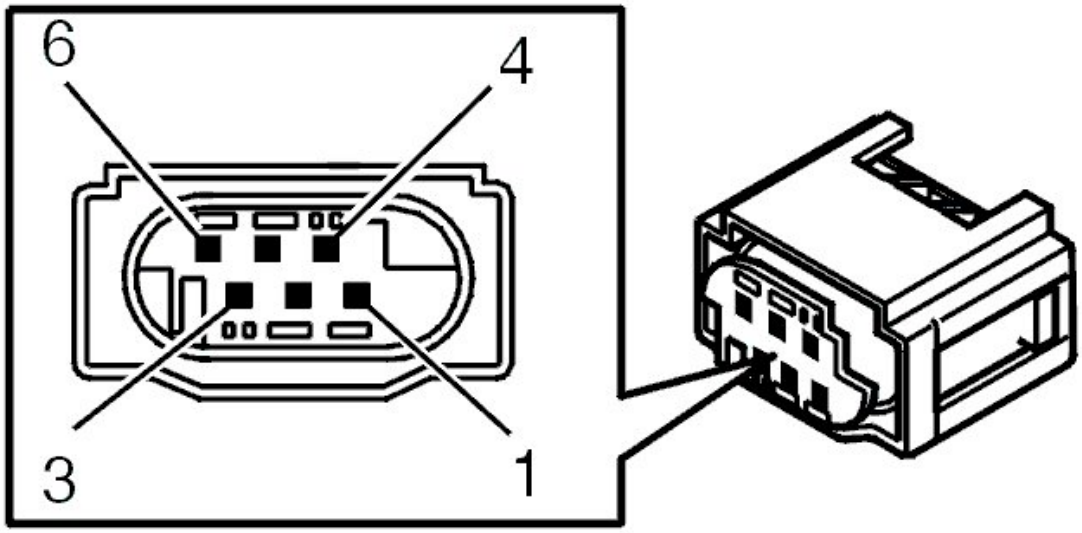
Note! When replacing the throttle unit or the engine control module (ECM) the throttle unit must be adapted. See "Throttle unit adaptation" in the vehicle communication socket.

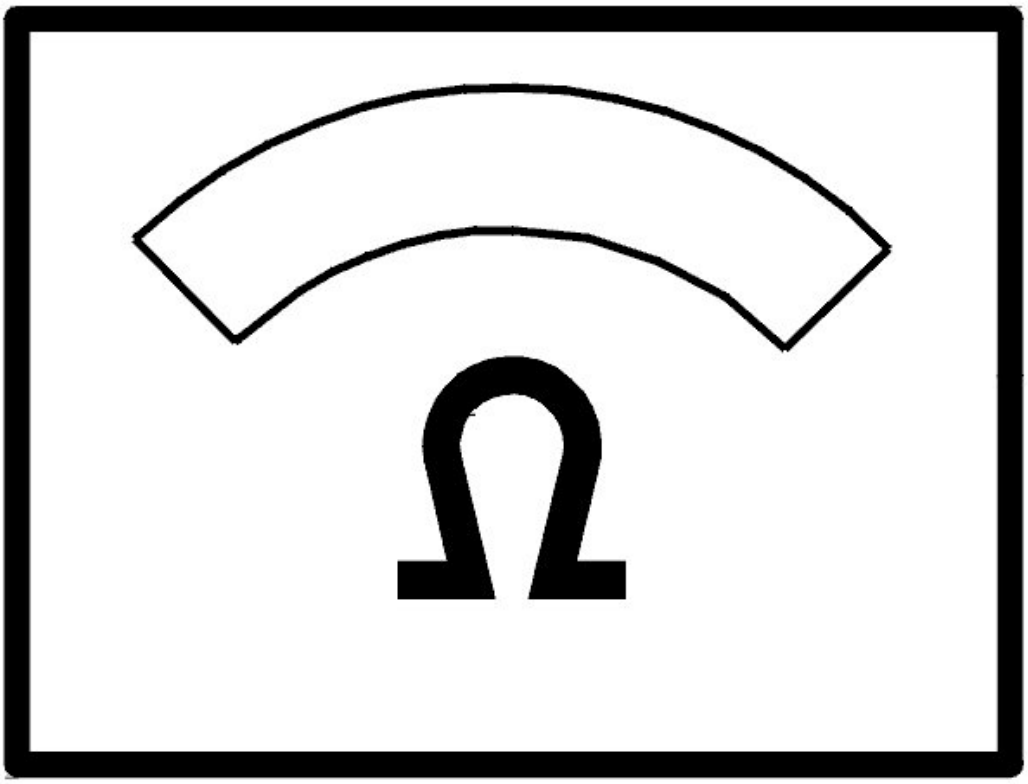
Remedy as necessary.

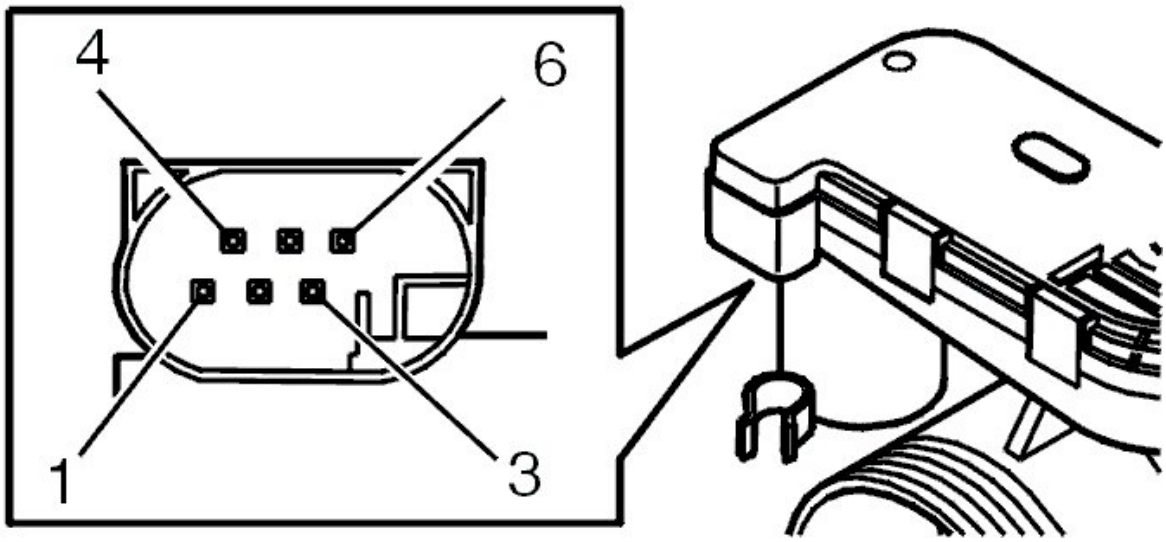
Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement

- Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







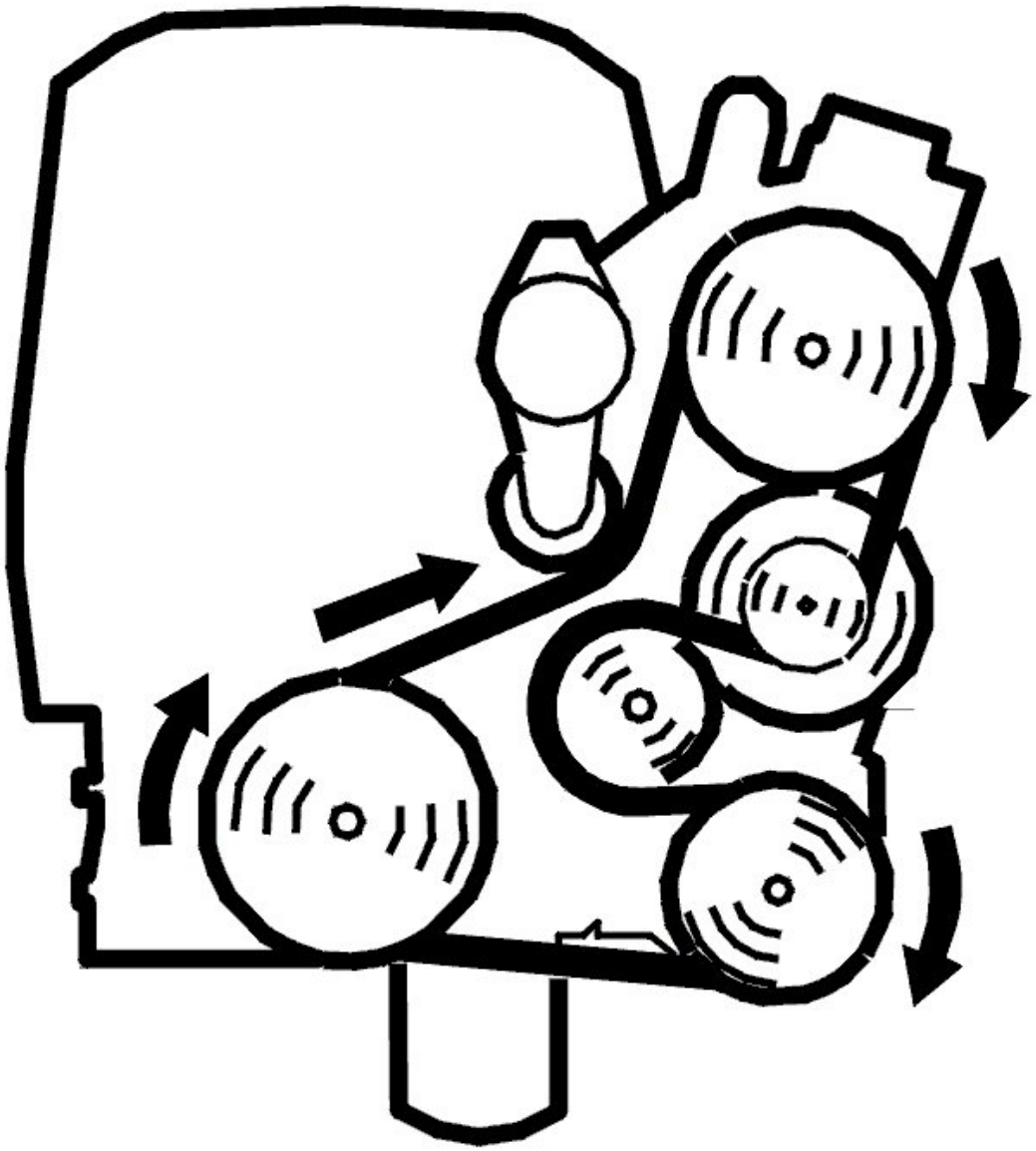
Continue - Verification

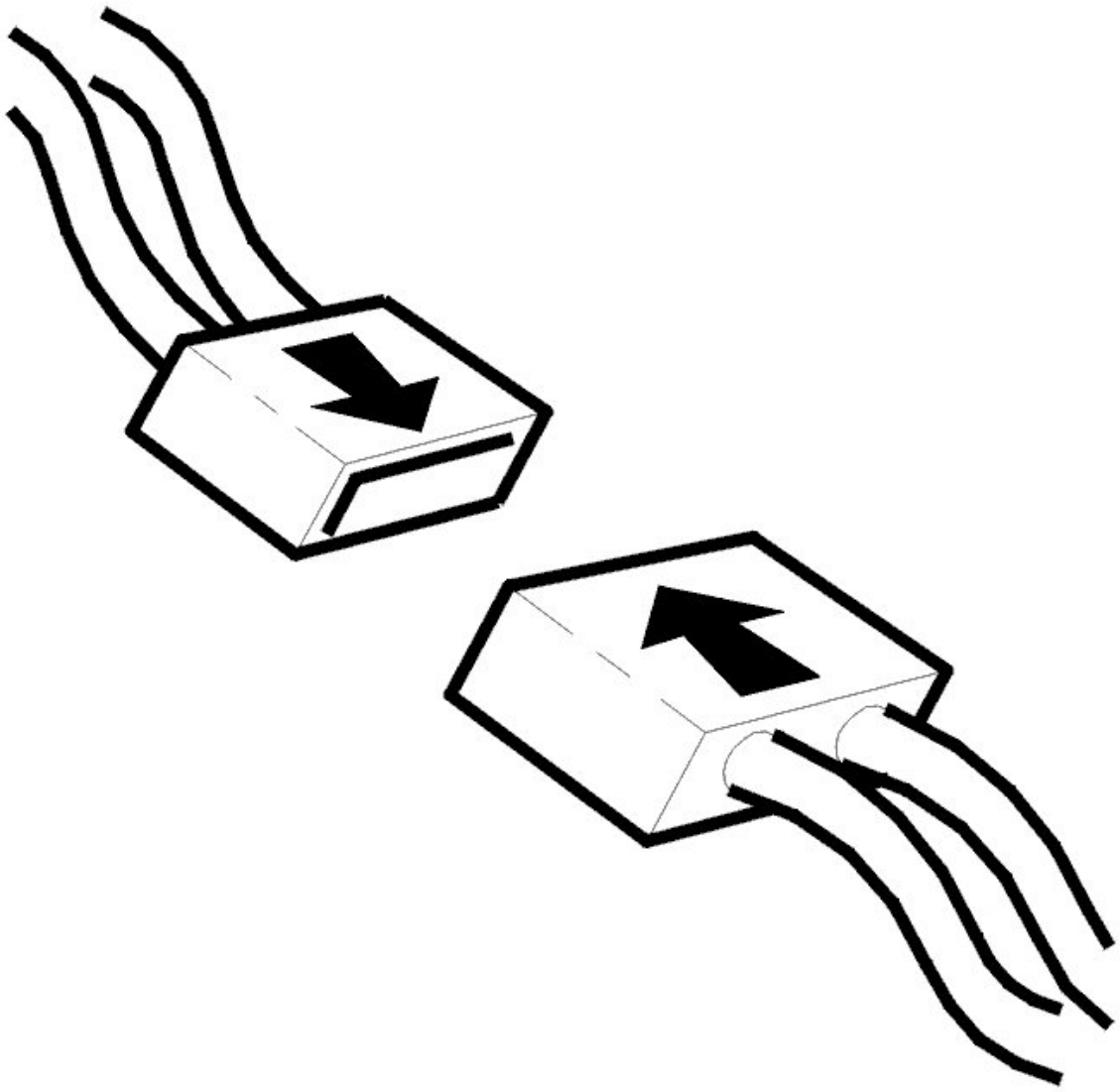
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

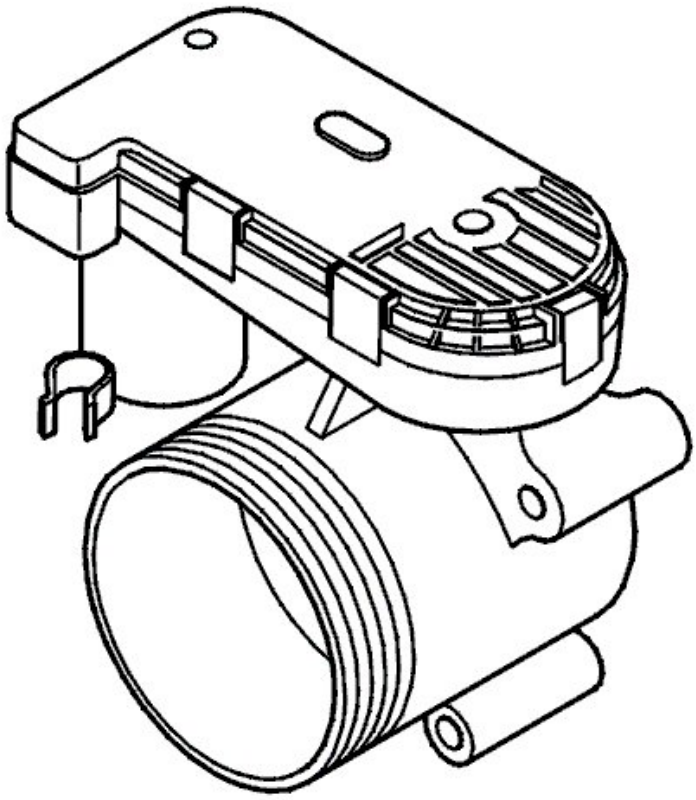
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-925C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the movement of the throttle is impeded, or that the return spring in the throttle unit is not functioning correctly, when attempting to adapt the electronic throttle unit.

Substitute value

Depending on the fault, the engine control module (ECM) can cut off the supply to the damper motor in the electronic throttle unit. The throttle will then attempt to set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the electronic throttle unit

- Damaged throttle unit.

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

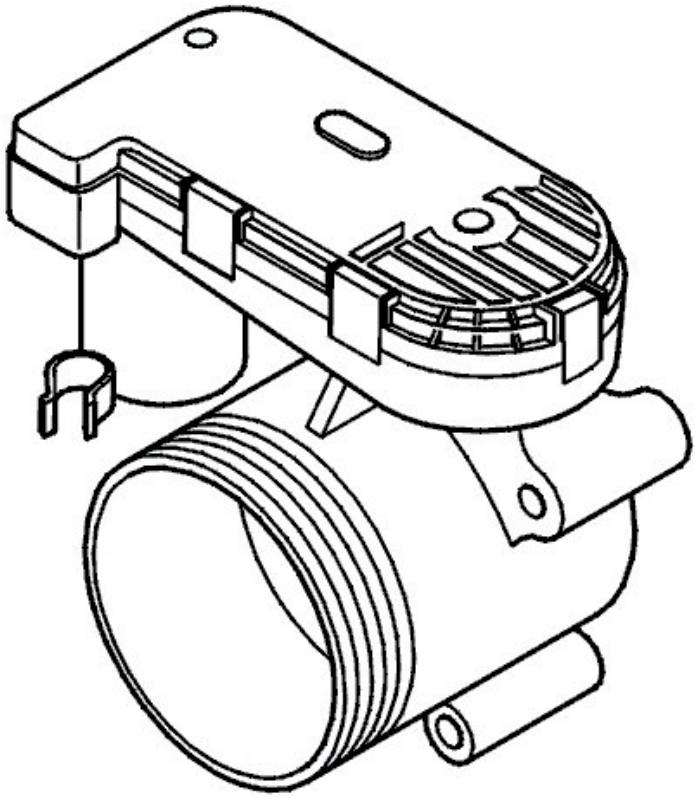
Signal too high

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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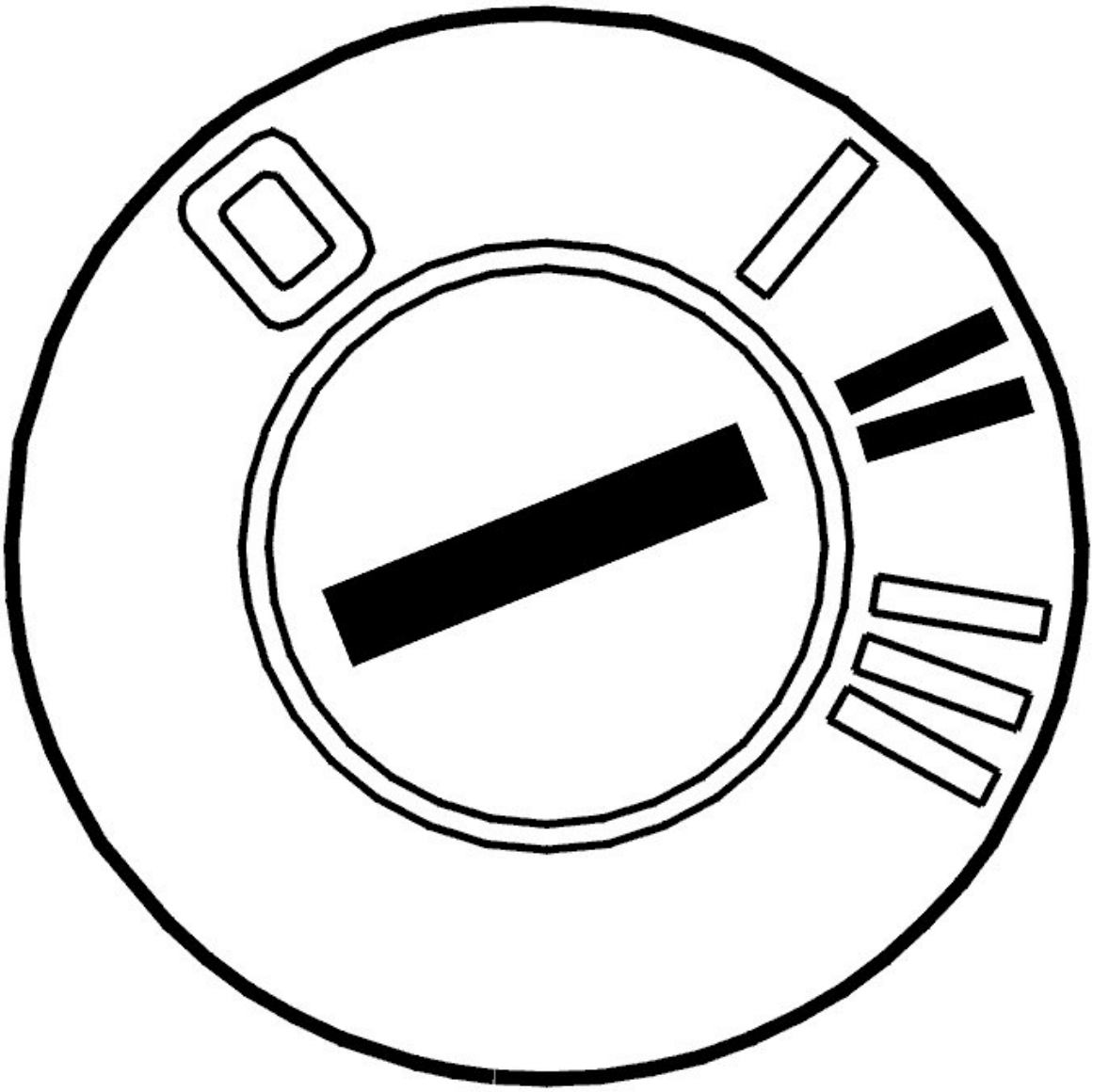
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

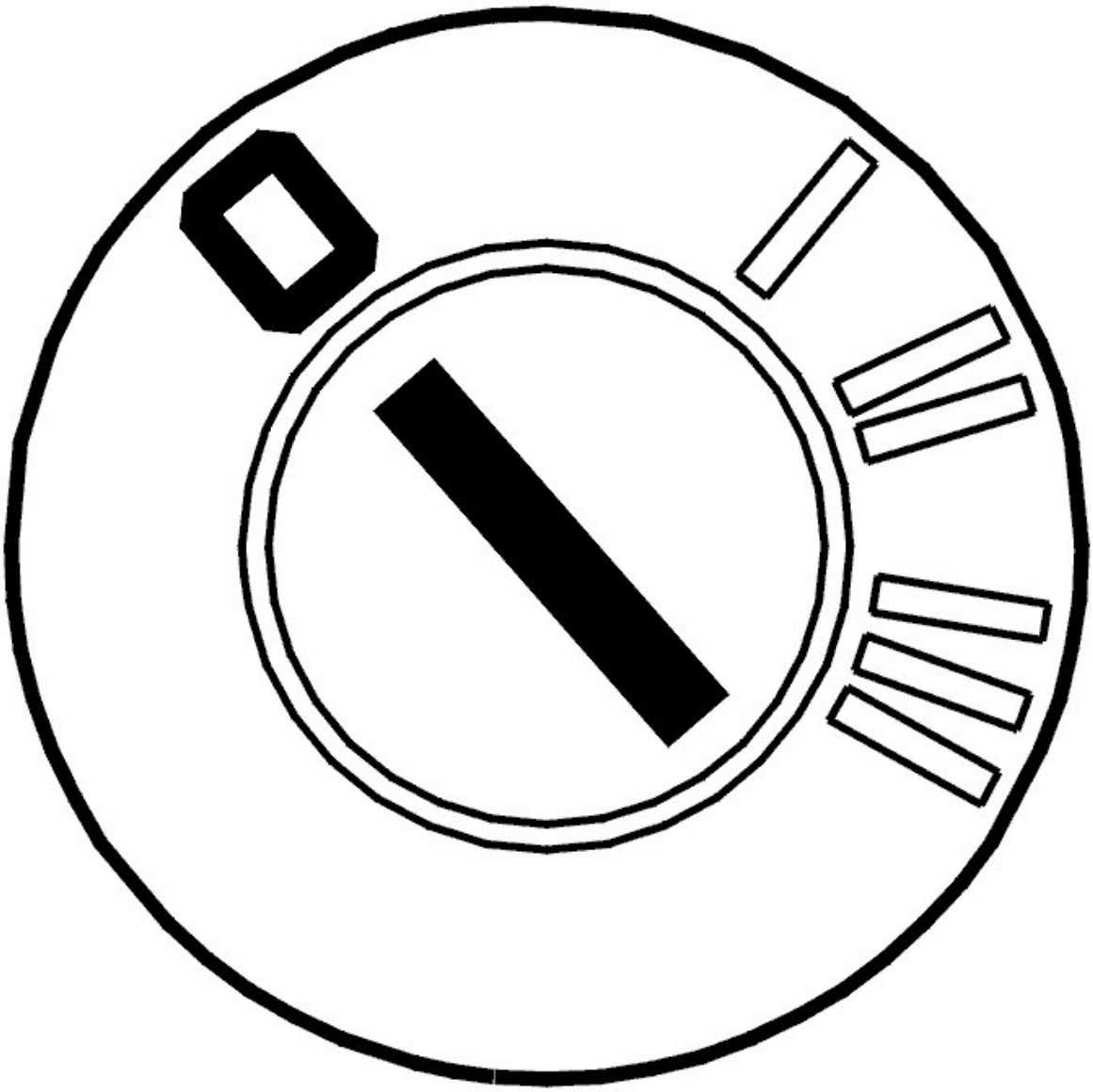
Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit, throttle position (TP) sensor or engine control module (ECM).
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit and damper motor winding.

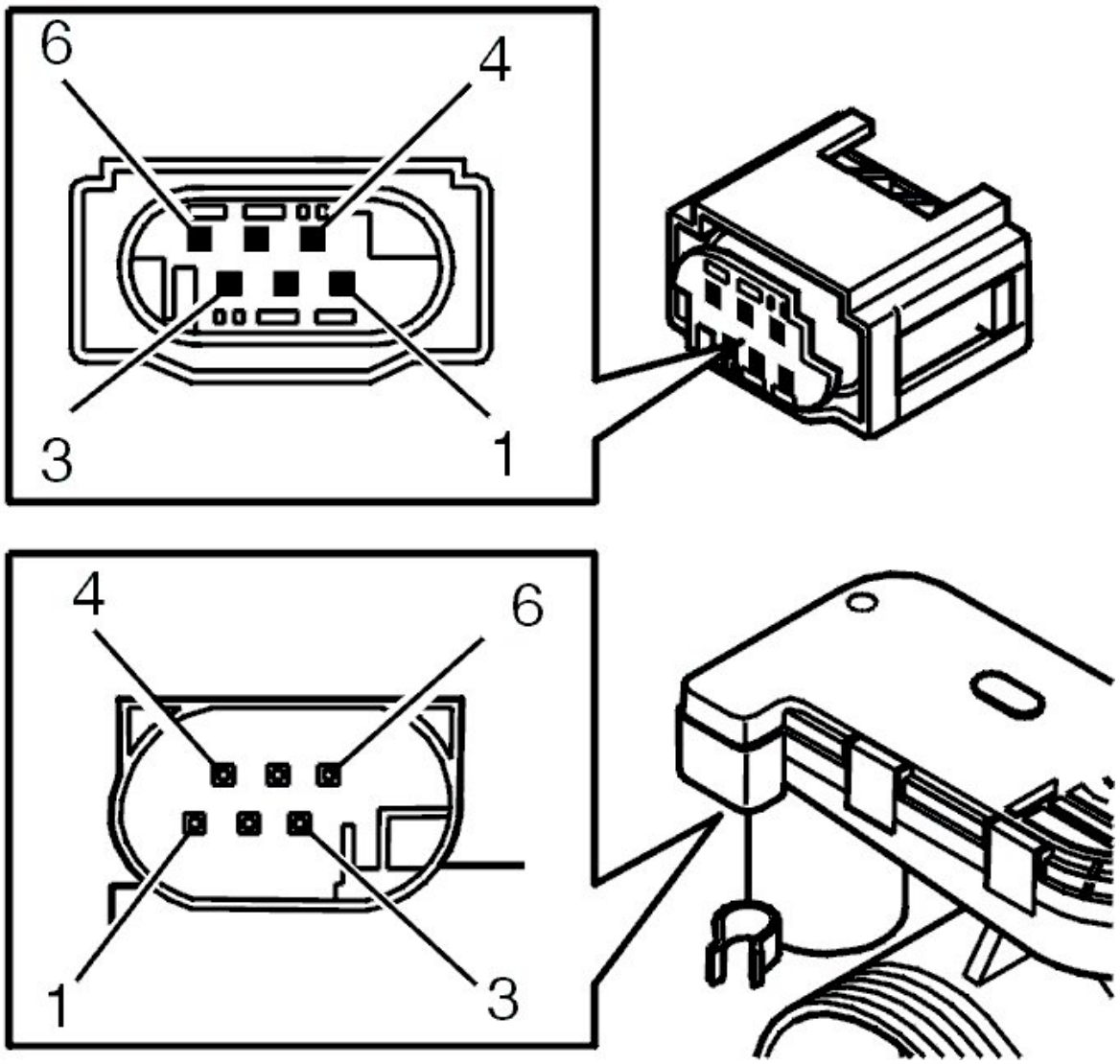
Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
The throttle unit is damaged if the diagnostic trouble code (DTC) recurs.

Note! If the throttle unit is replaced it must be adapted. See: "Throttle unit adaptation" in the vehicle communication socket.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

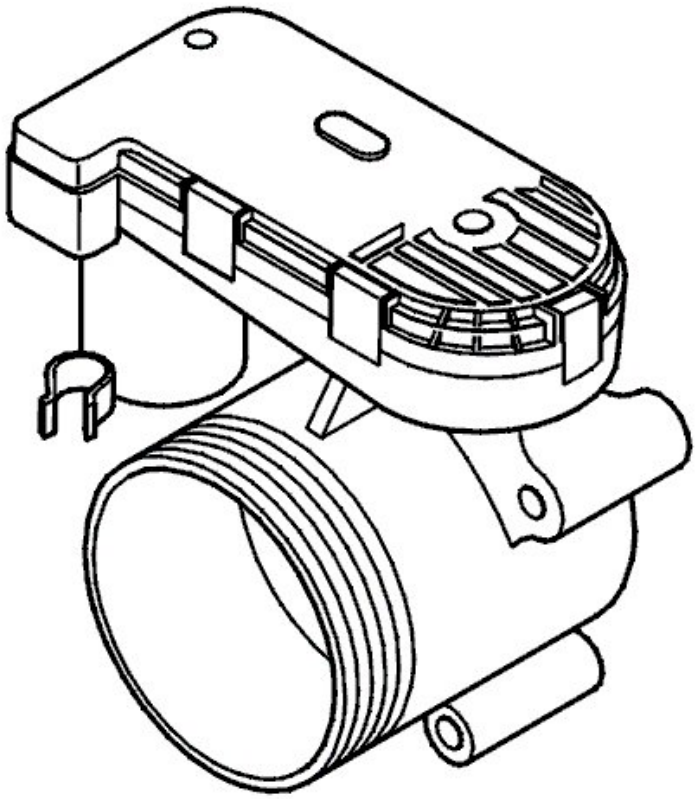
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-925D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the movement of the throttle is impeded, or that the return spring in the throttle unit is not functioning correctly, when attempting to adapt the electronic throttle unit.

Substitute value

Depending on the fault, the engine control module (ECM) can cut off the supply to the damper motor in the electronic throttle unit. The throttle will then attempt to set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too Low

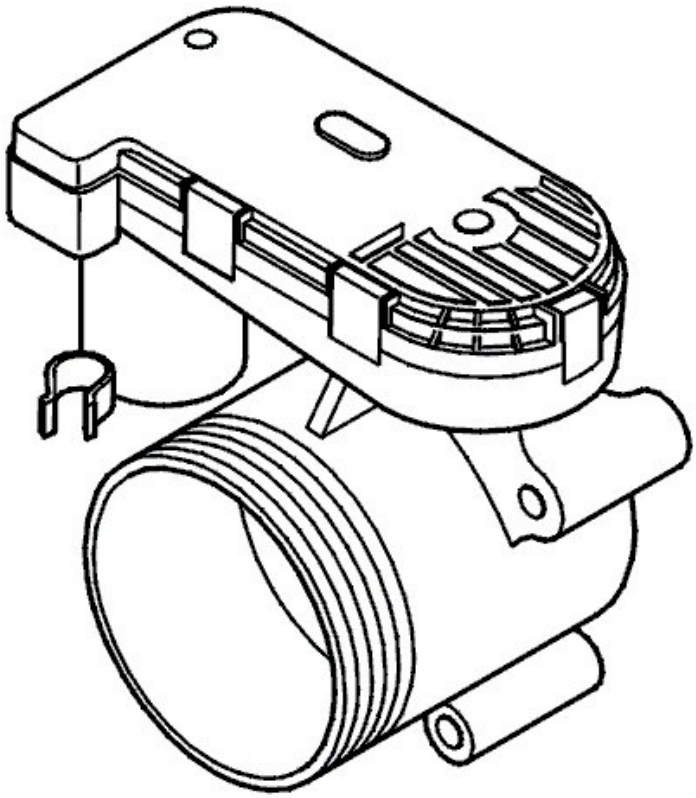
Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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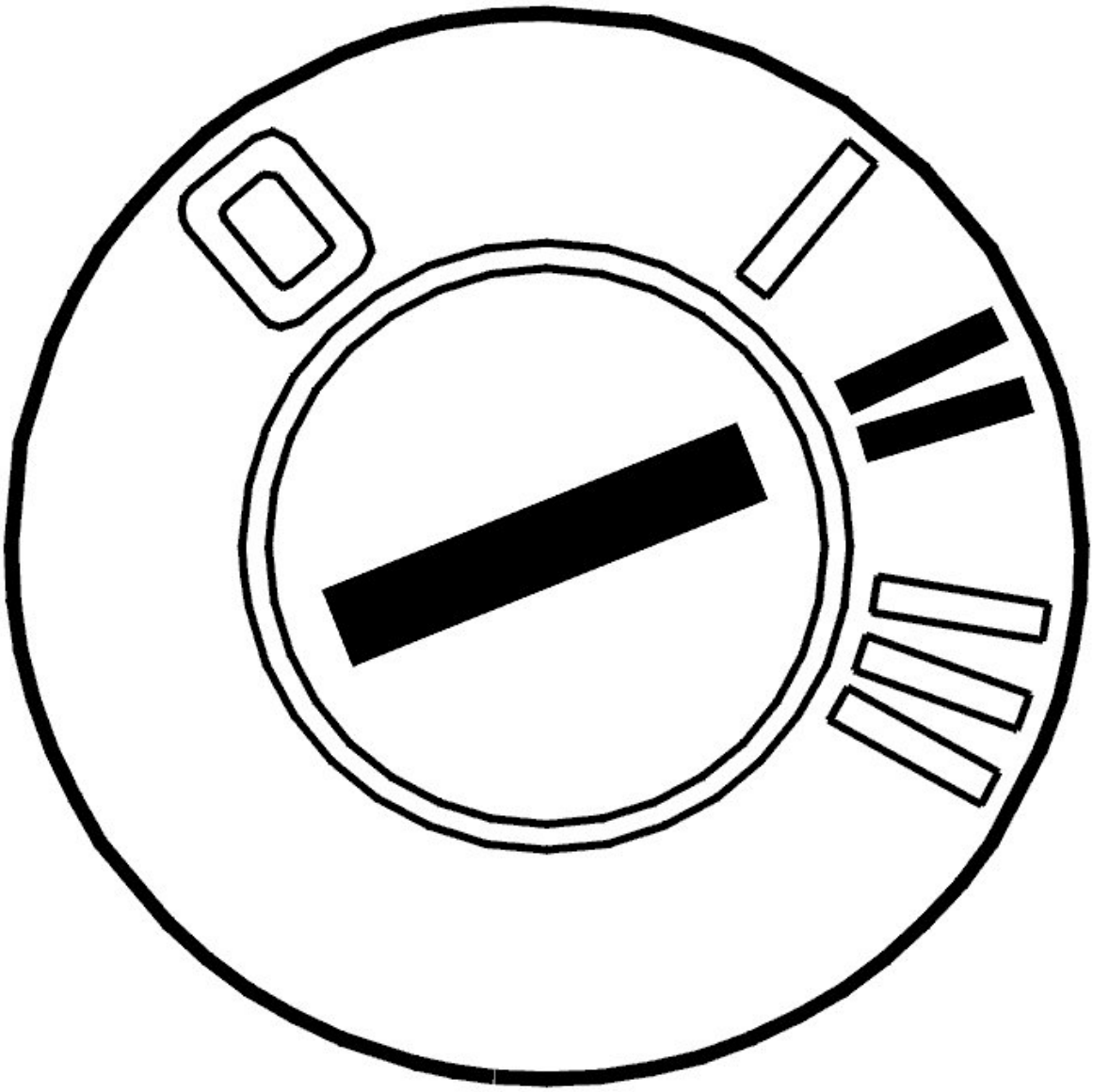
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

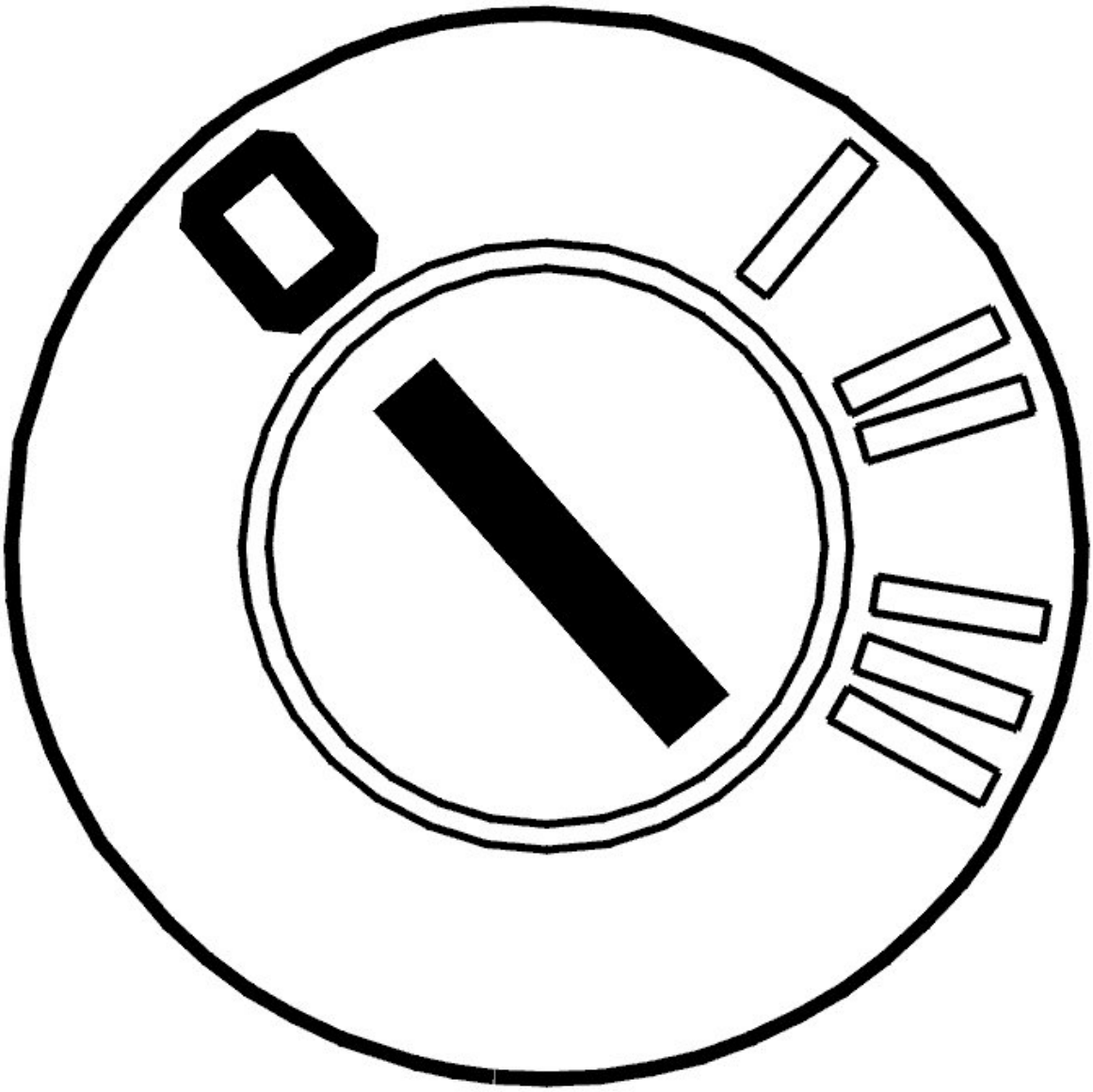
Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit, throttle position (TP) sensor or engine control module (ECM).
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit and damper motor winding.

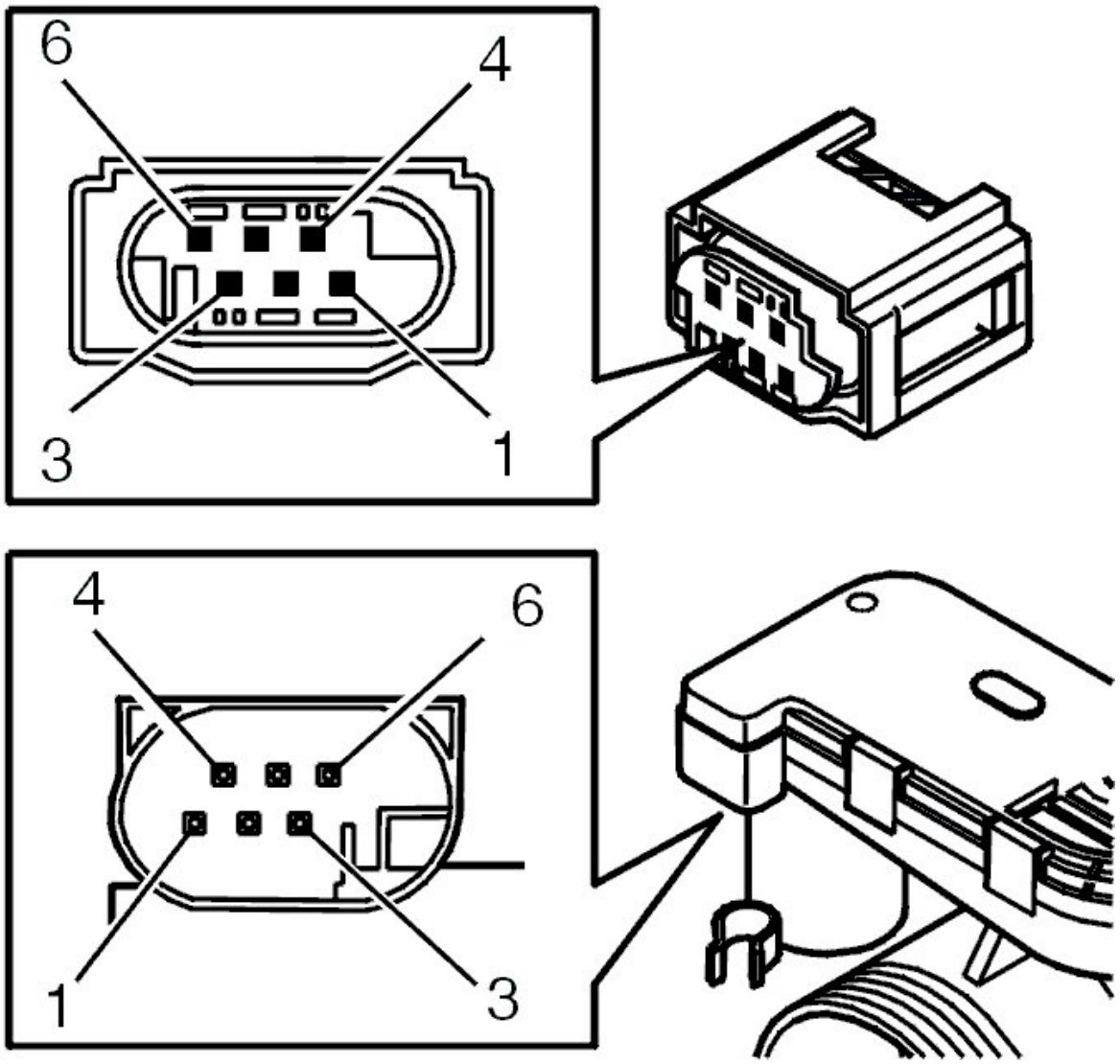
Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
The throttle unit is damaged if the diagnostic trouble code (DTC) recurs.

Note! If the throttle unit is replaced it must be adapted. See: "Throttle unit adaptation" in the vehicle communication socket.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

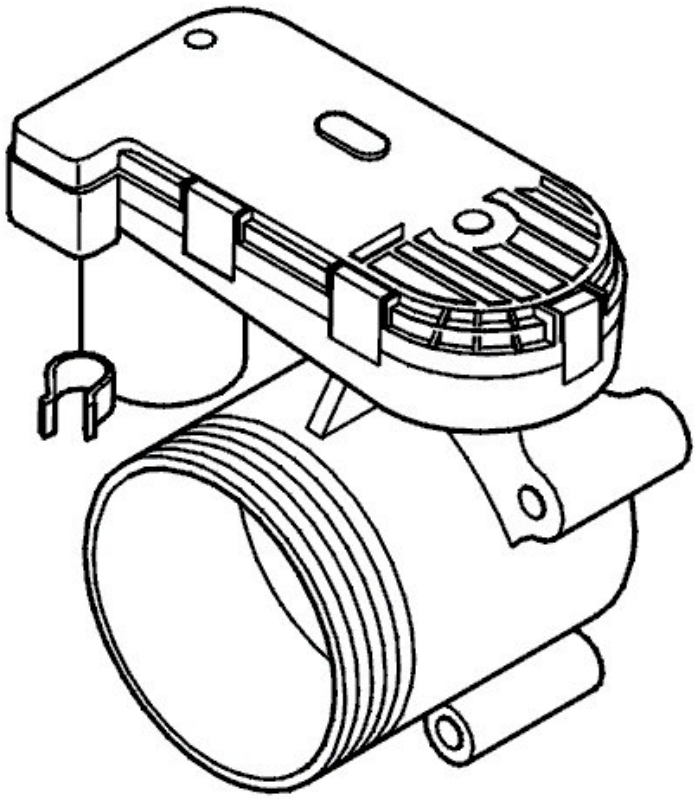
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-926C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM), when attempting to adapt the throttle unit, registers that the movements of the throttle is impeded or that the opening spring in the electronic throttle unit is not functioning correctly.

Substitute value

Depending on the fault, the engine control module (ECM) can cut off the supply to the damper motor in the electronic throttle unit. The throttle will then attempt to set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the electronic throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

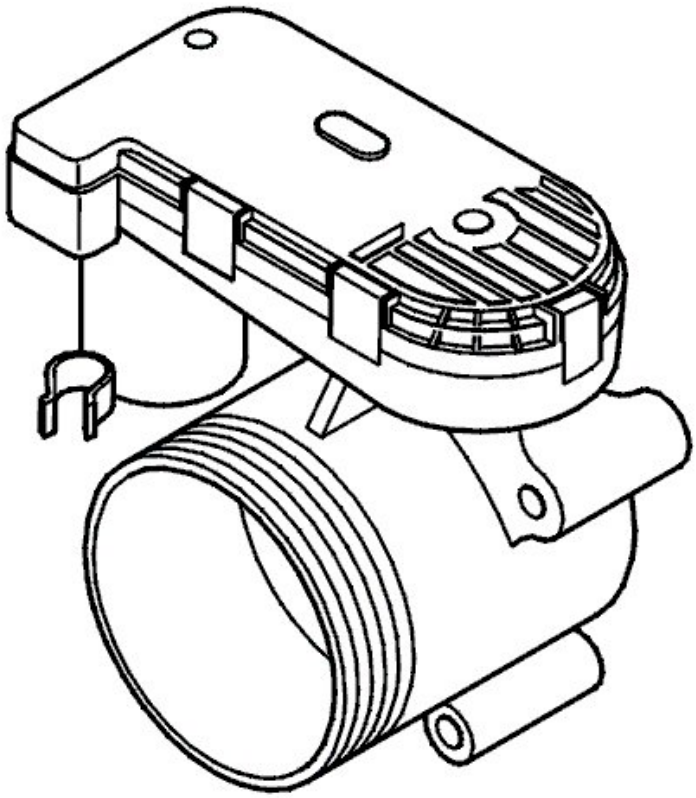
Signal too high

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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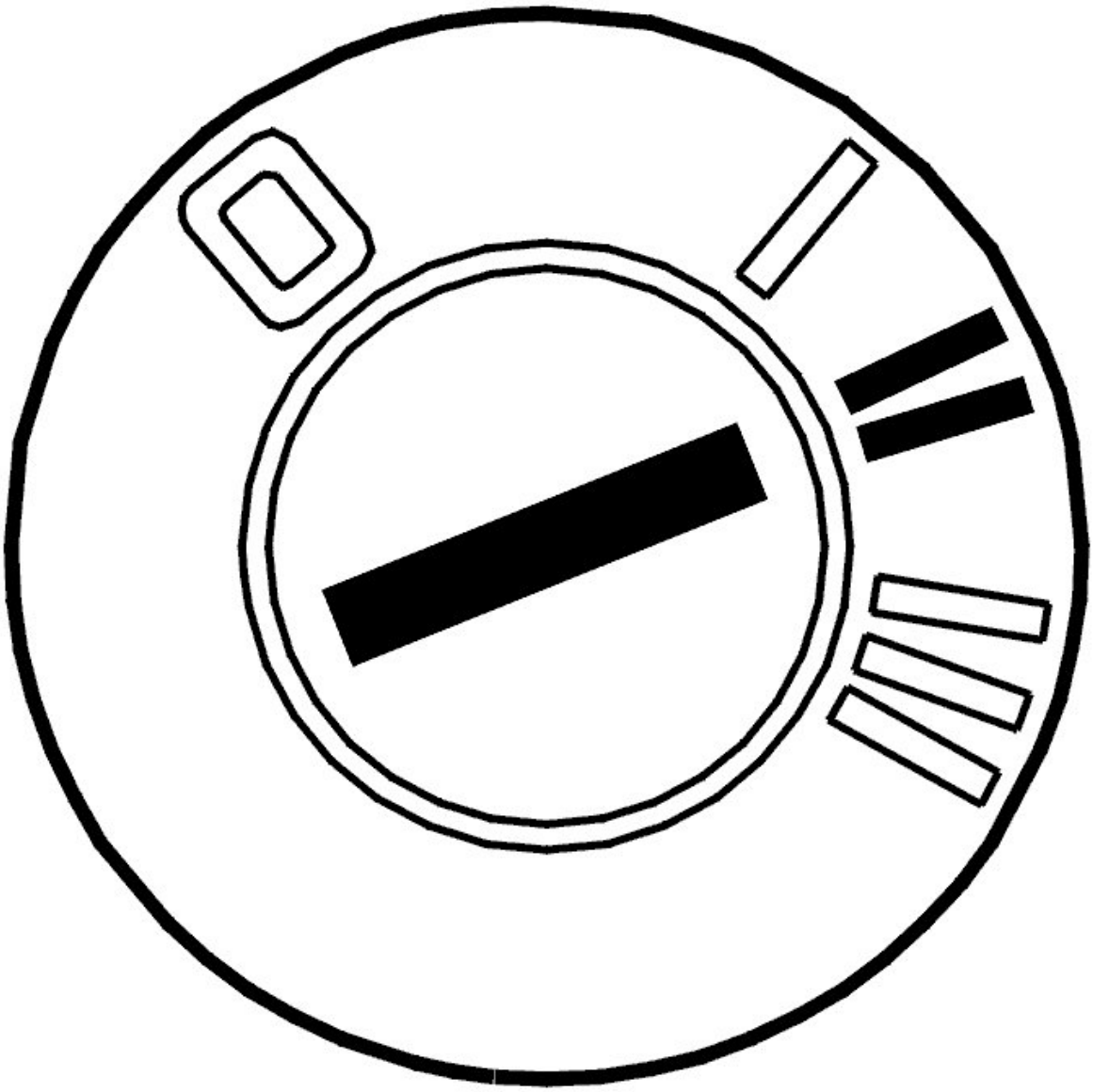
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

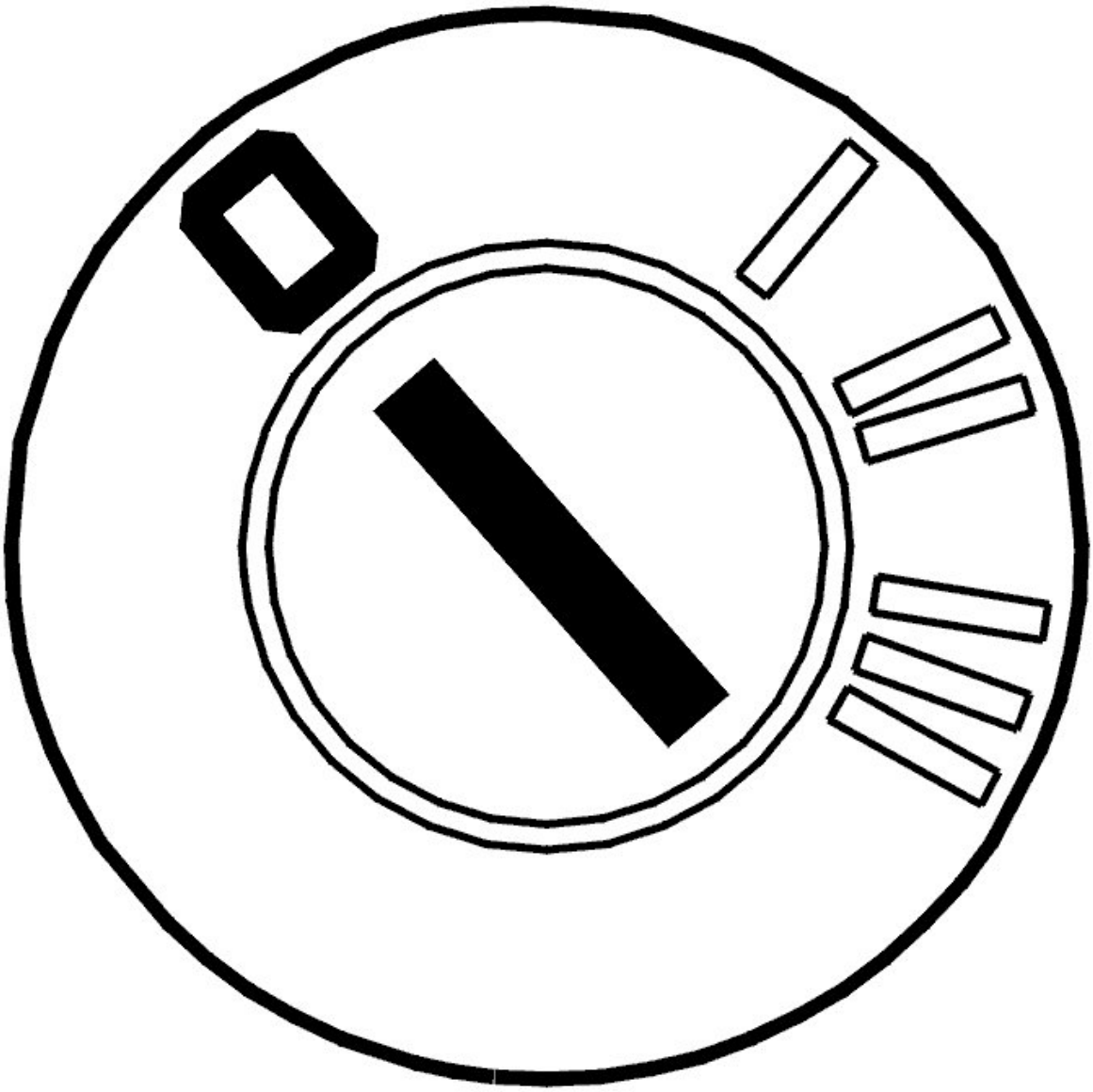
Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit, throttle position (TP) sensor or engine control module (ECM).
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit and damper motor winding.

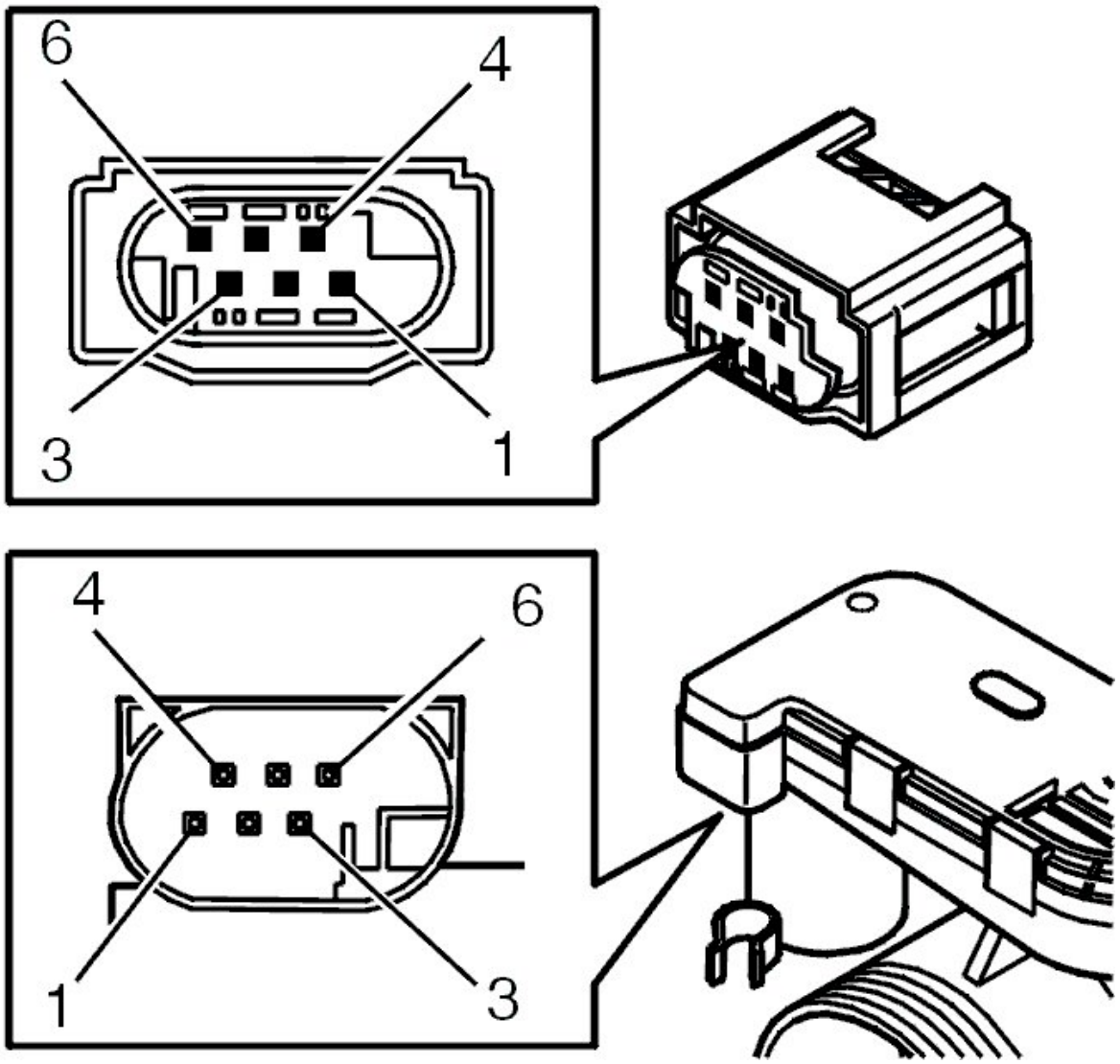
Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
The throttle unit is damaged if the diagnostic trouble code (DTC) recurs.

Note! If the throttle unit is replaced it must be adapted. See: "Throttle unit adaptation" in the vehicle communication socket.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

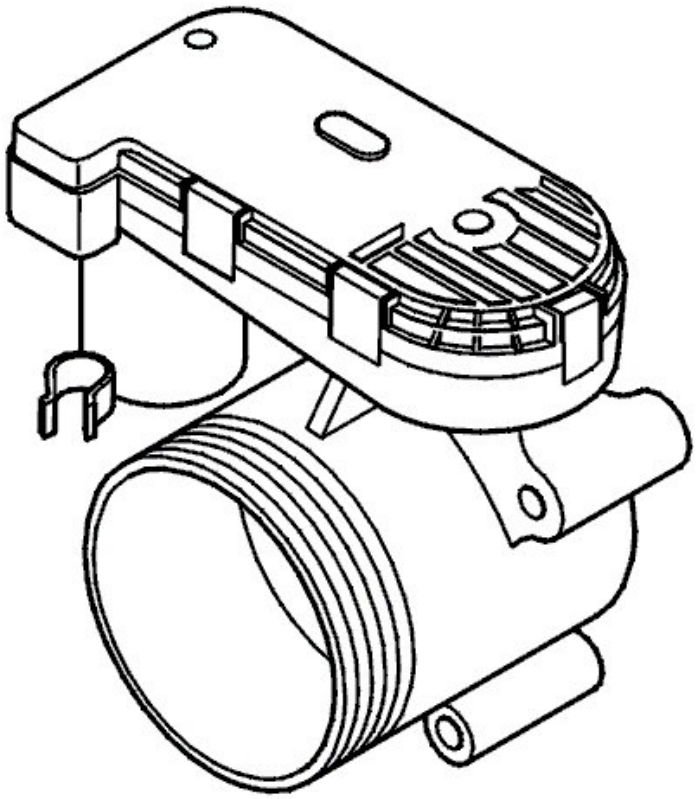
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-926D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM), when attempting to adapt the throttle unit, registers that the movements of the throttle is impeded or that the opening spring in the electronic throttle unit is not functioning correctly.

Substitute value

Depending on the fault, the engine control module (ECM) can cut off the supply to the damper motor in the electronic throttle unit. The throttle will then attempt to set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too Low

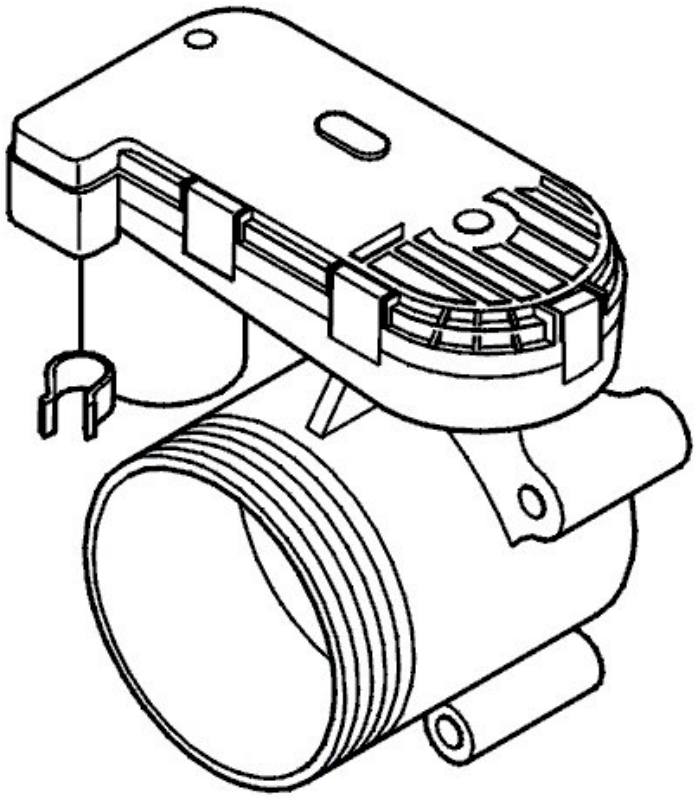
Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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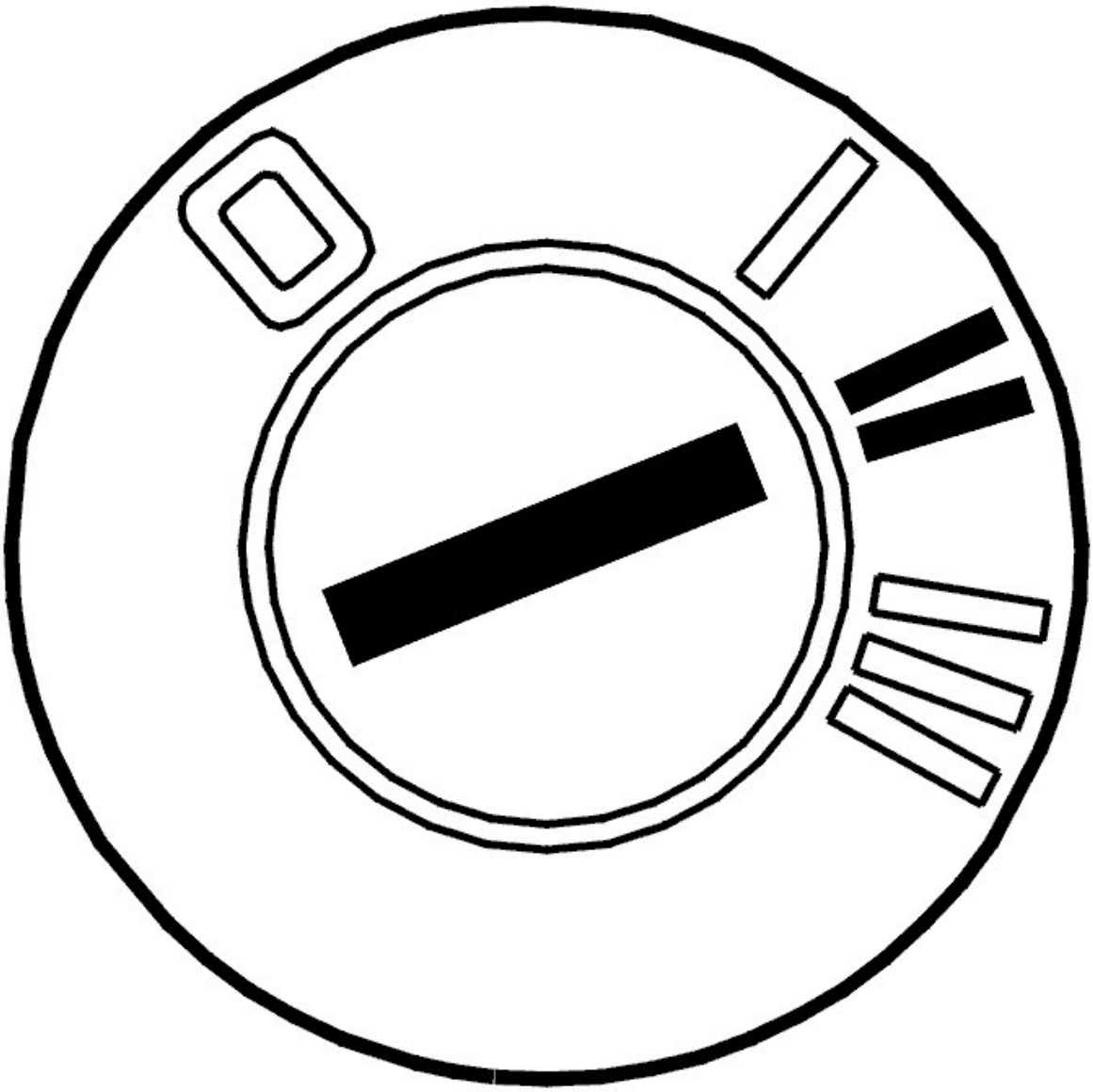
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

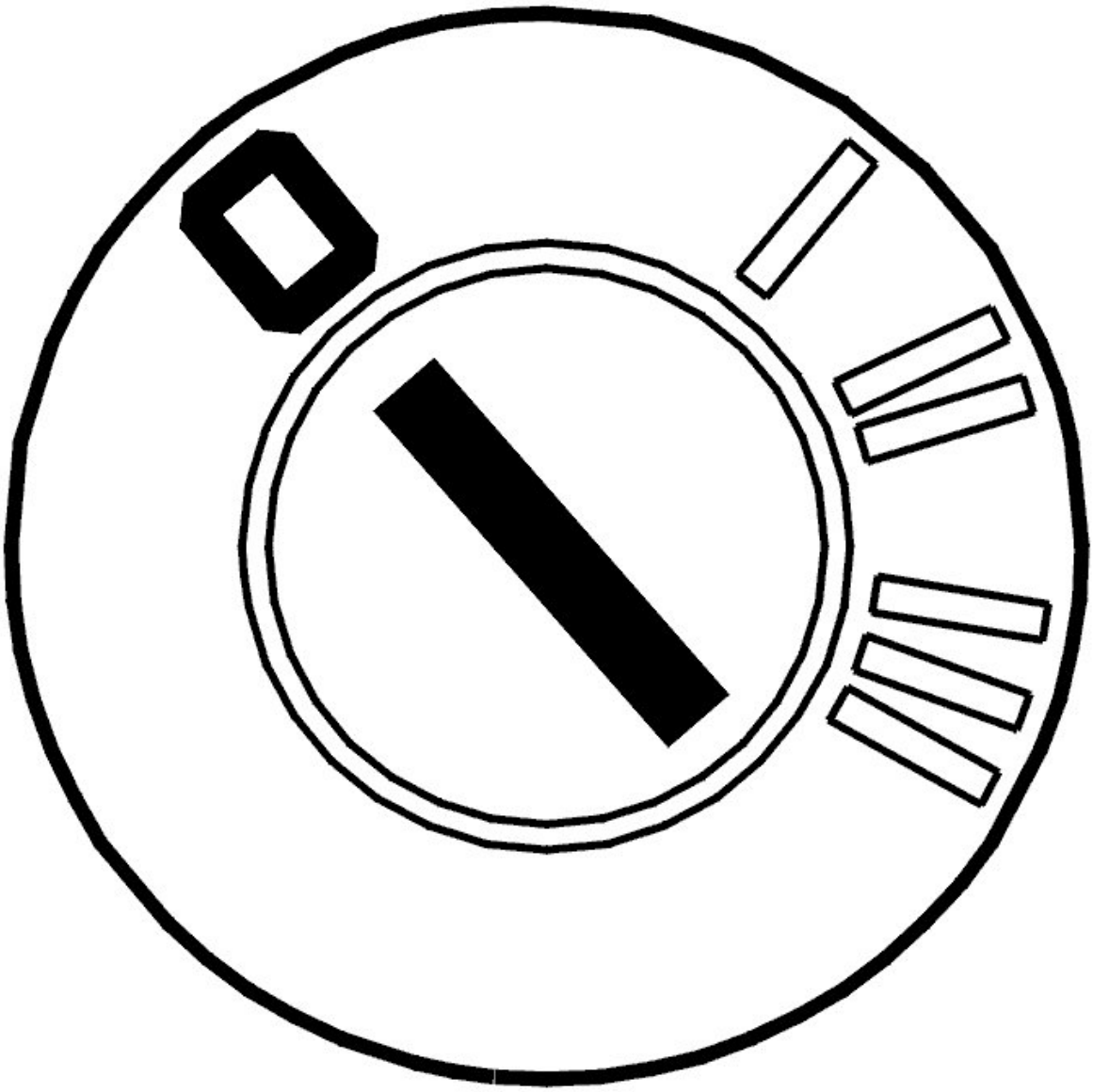
Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit, throttle position (TP) sensor or engine control module (ECM).
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit and damper motor winding.

Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
The throttle unit is damaged if the diagnostic trouble code (DTC) recurs.

Note! If the throttle unit is replaced it must be adapted. See: "Throttle unit adaptation" in the vehicle communication socket.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
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- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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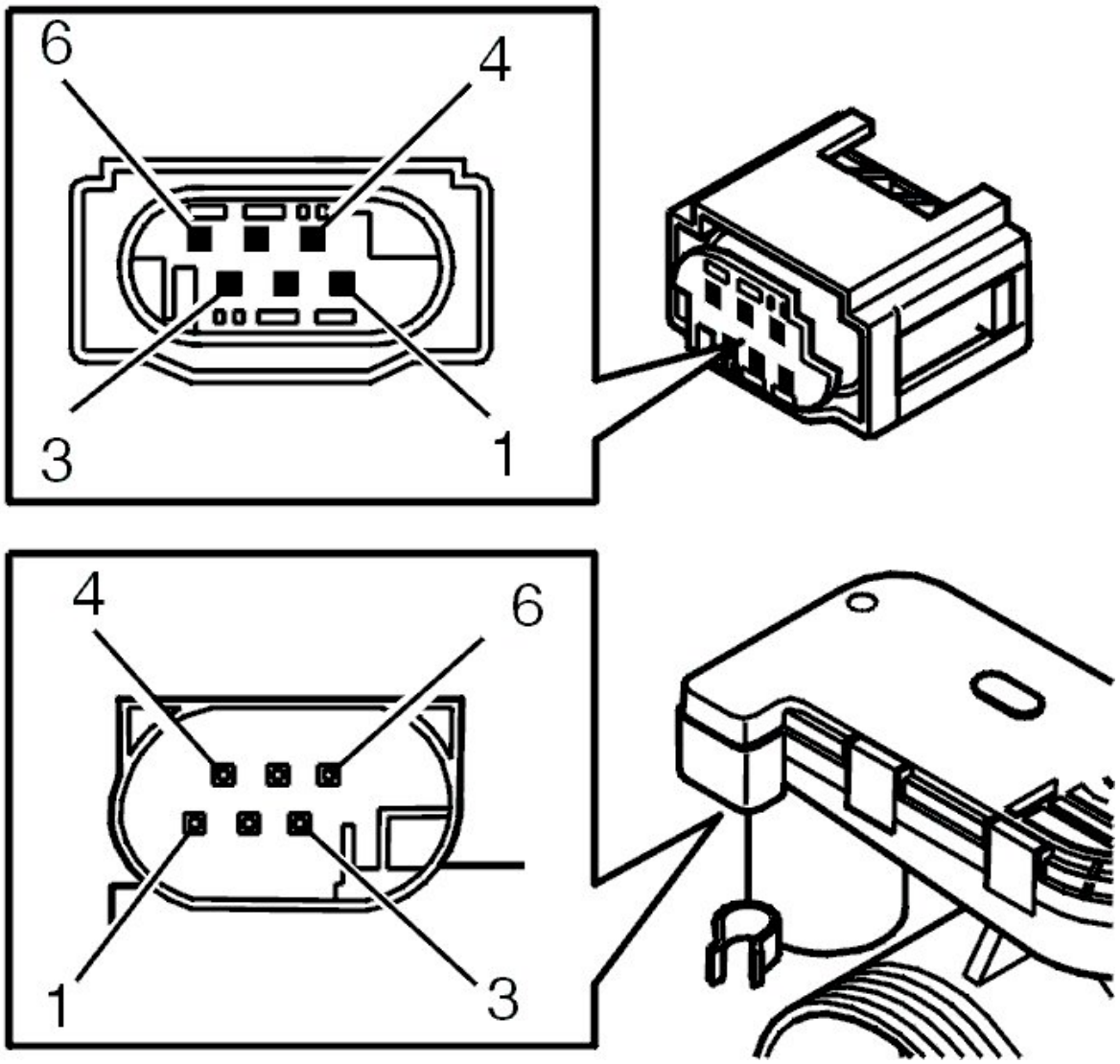
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

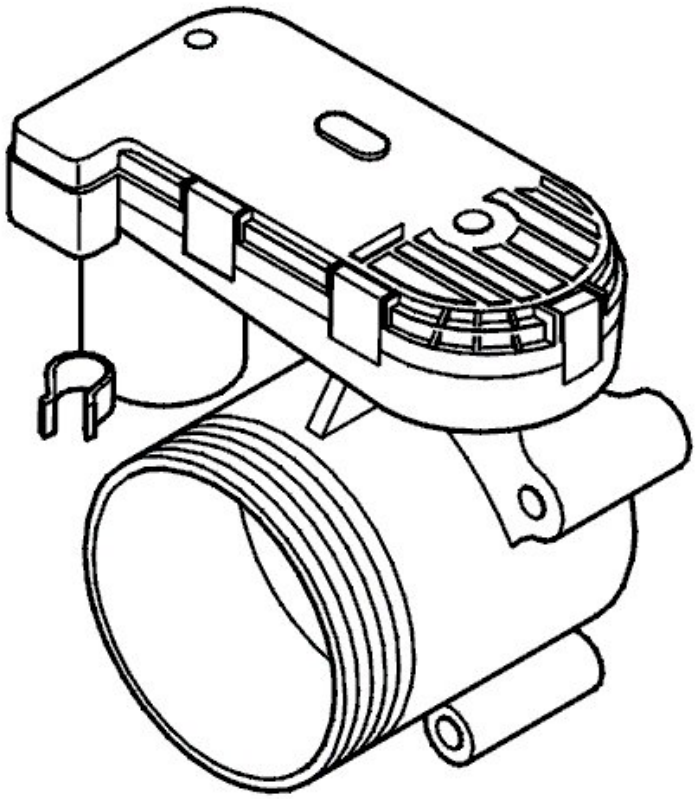
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9270

Condition



The diagnostic trouble code (DTC) is stored if, when the engine is running, the engine control module (ECM) registers that the desired throttle angle (desired value) does not correspond to the actual throttle angle (actual value) in the electronic throttle unit.

Substitute value

The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

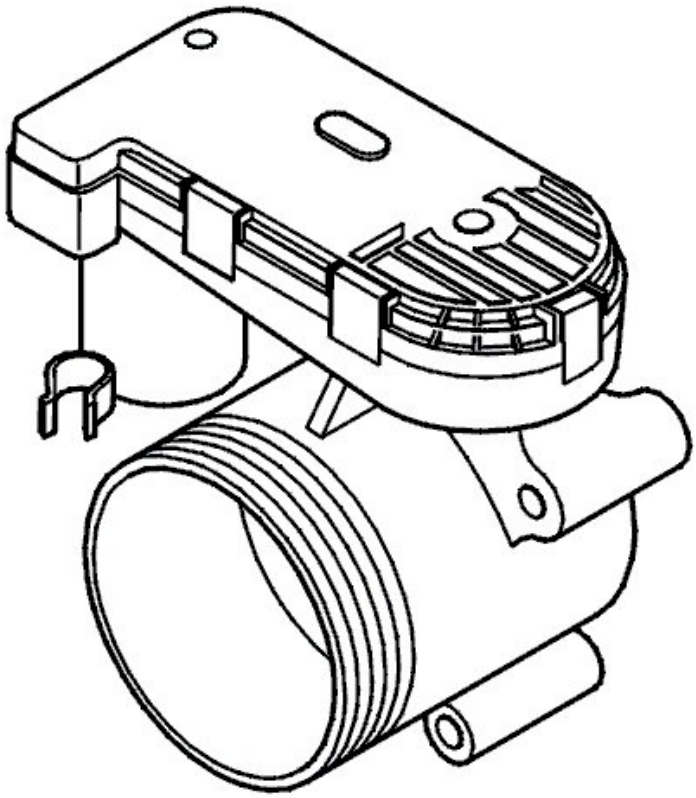
Faulty signal

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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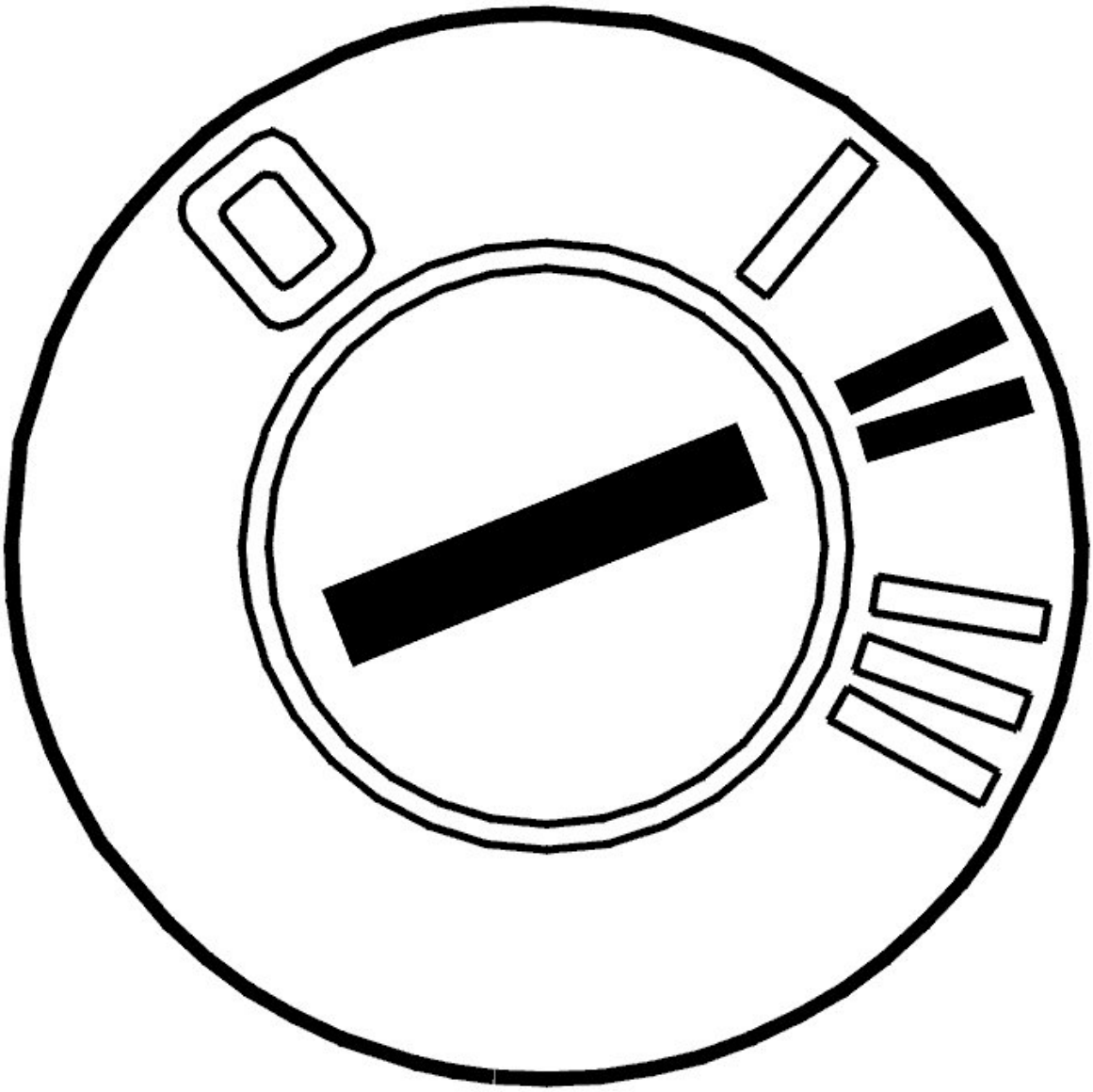
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

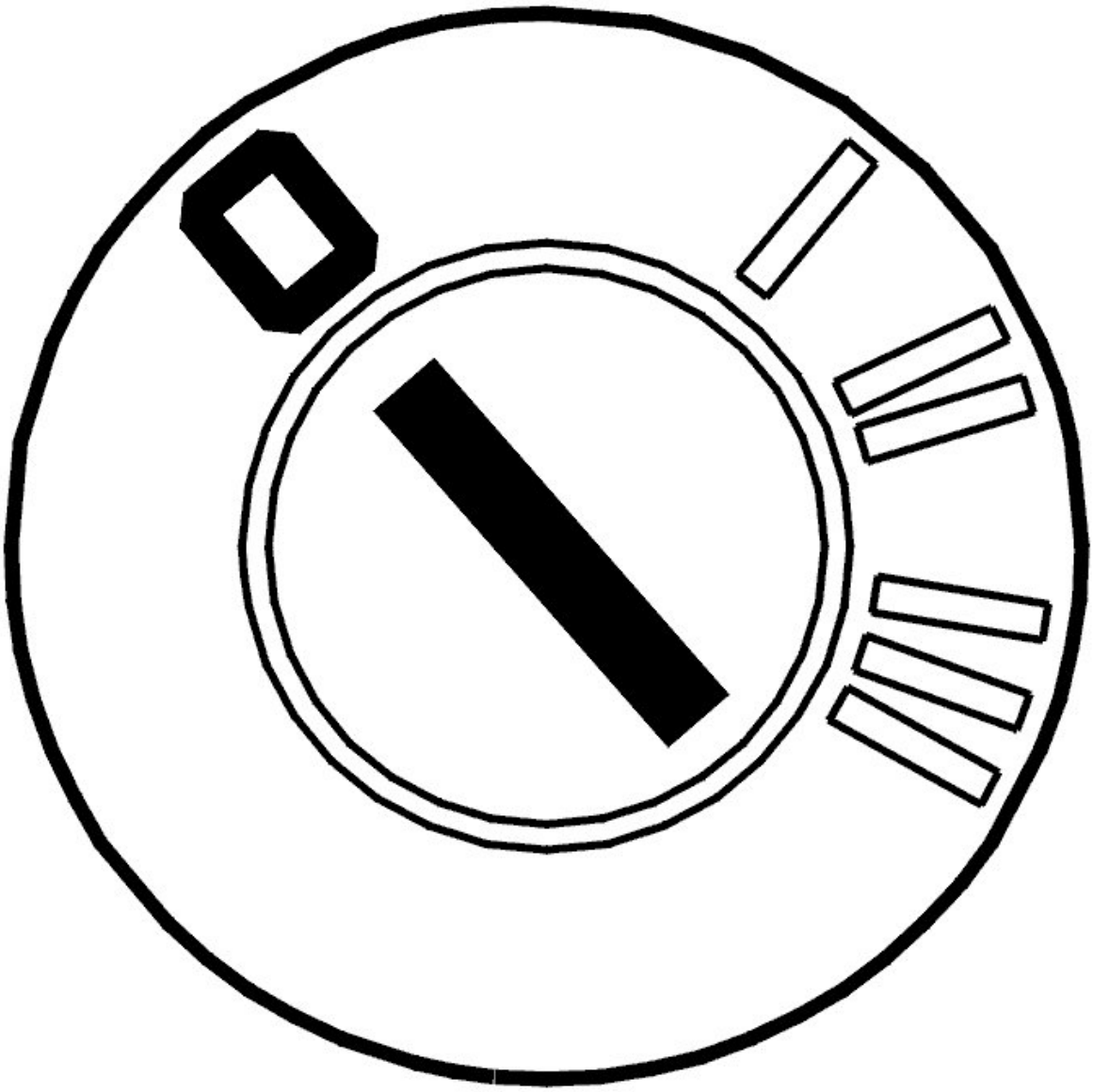
Check if any diagnostic trouble codes (DTCs) are stored for the electronic throttle unit, throttle position (TP) sensor or engine control module (ECM).
If any of these diagnostic trouble codes (DTCs) are stored, these must be remedied first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit and damper motor winding.

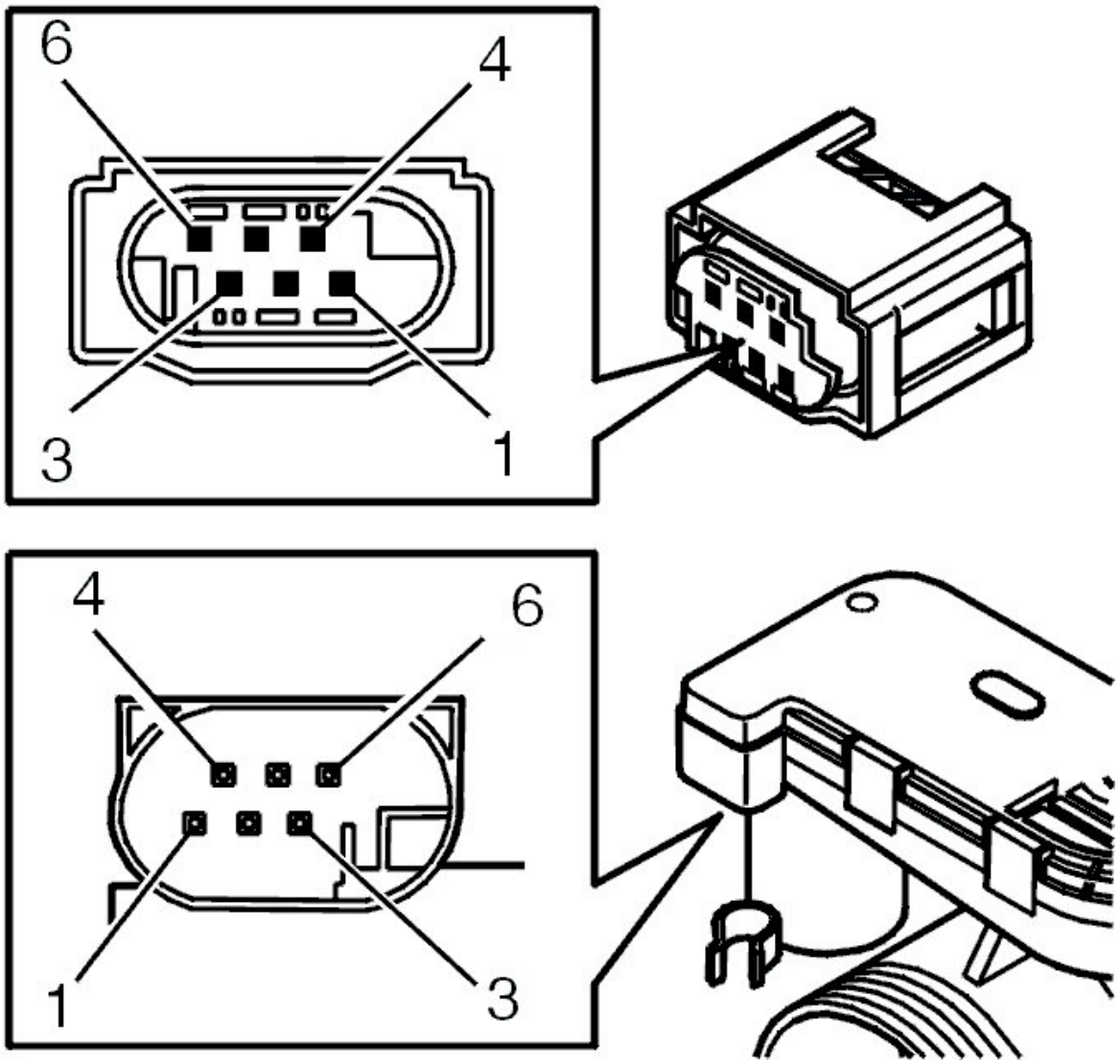
Note! The resistance of the motor winding in the damper motor is very low.

Replace the throttle unit if necessary.
Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
The throttle unit is damaged if the diagnostic trouble code (DTC) recurs.

Note! If the throttle unit is replaced it must be adapted. See: "Throttle unit adaptation" in the vehicle communication socket.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

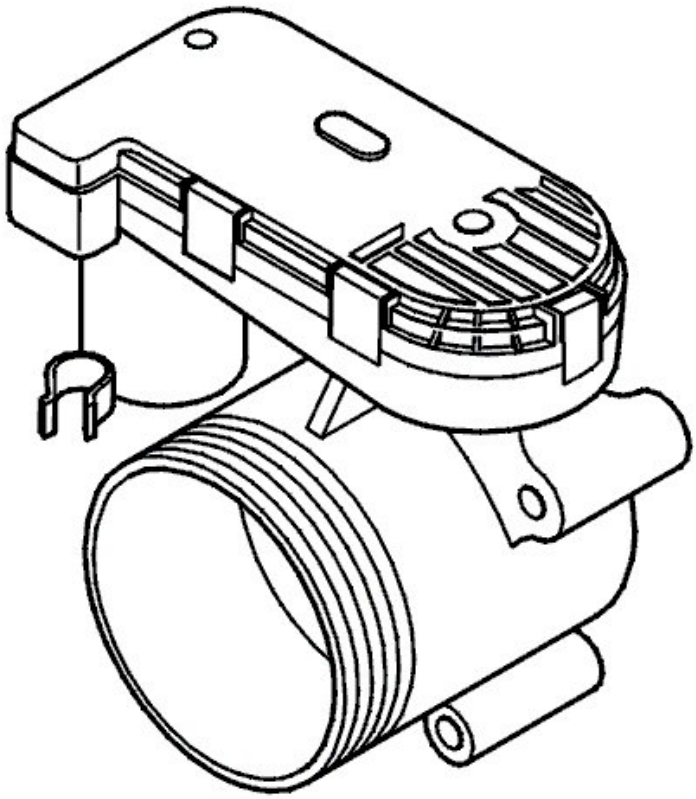
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9280

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the throttle angle at the return limit position is outside the programmed parameter when trying to adapt the throttle unit.

Substitute value

None.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Driving/Poor performance/lacks power
- Idling/Uneven idle

Faulty Signal

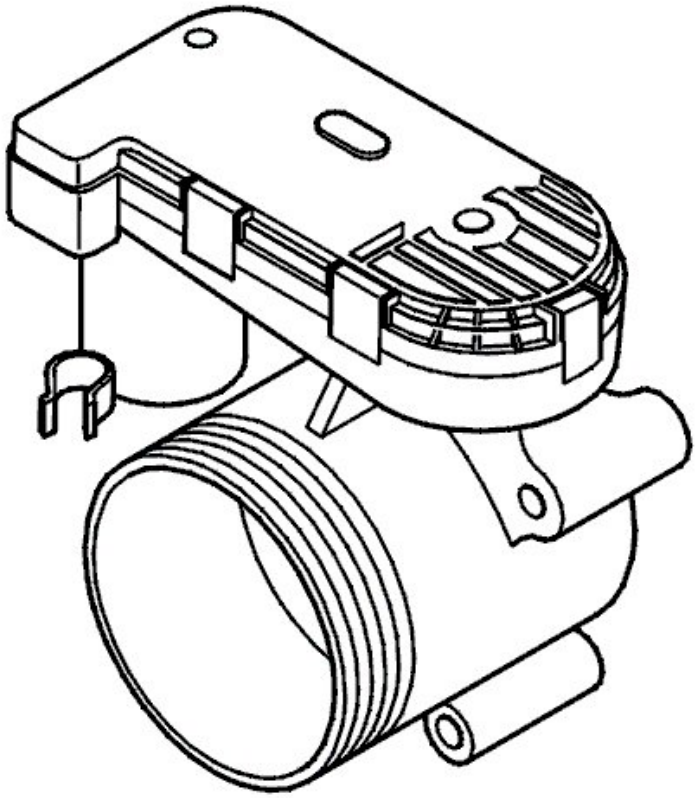
Faulty signal

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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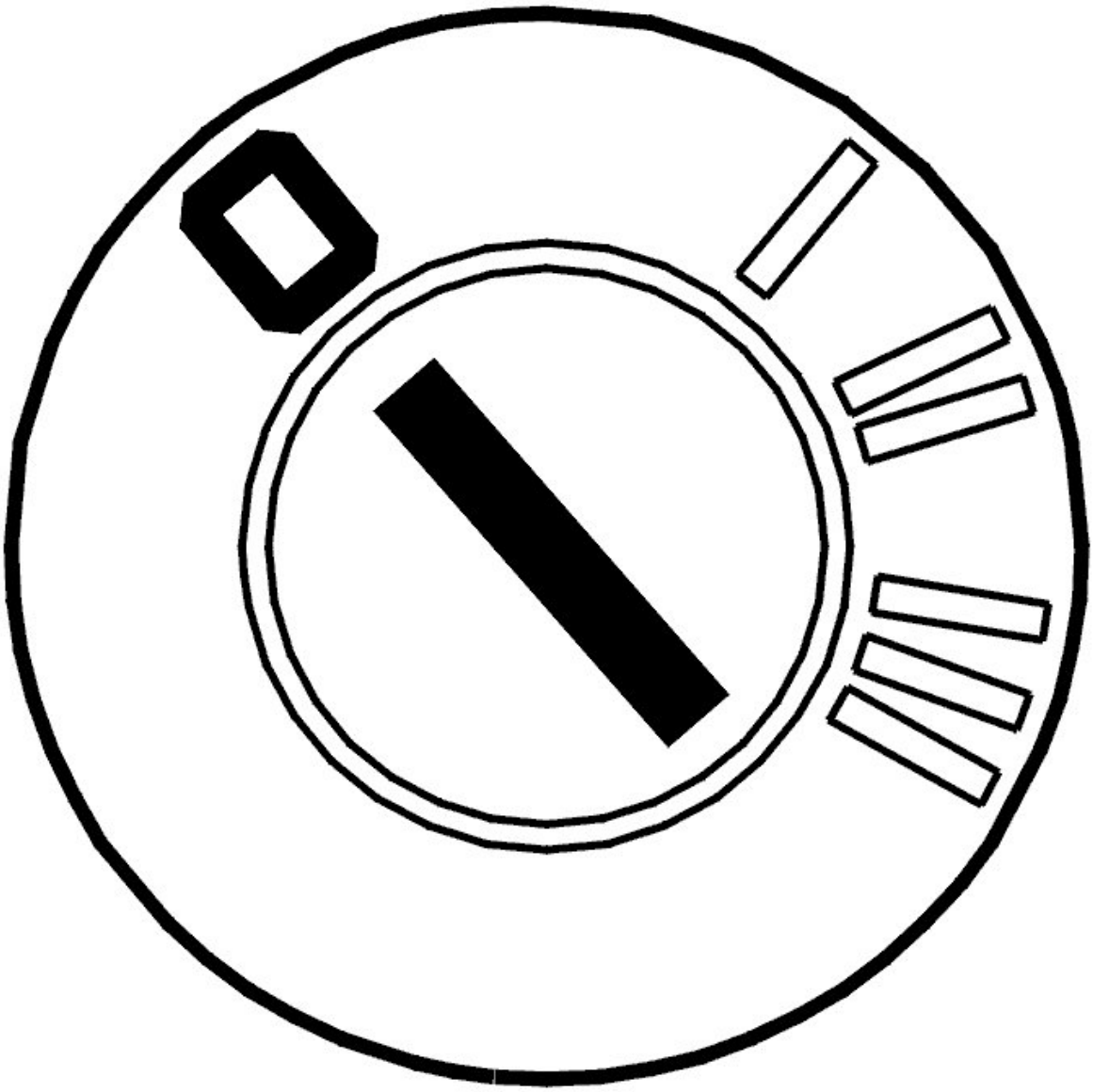
cont - Checking components and wiring

Checking components and wiring

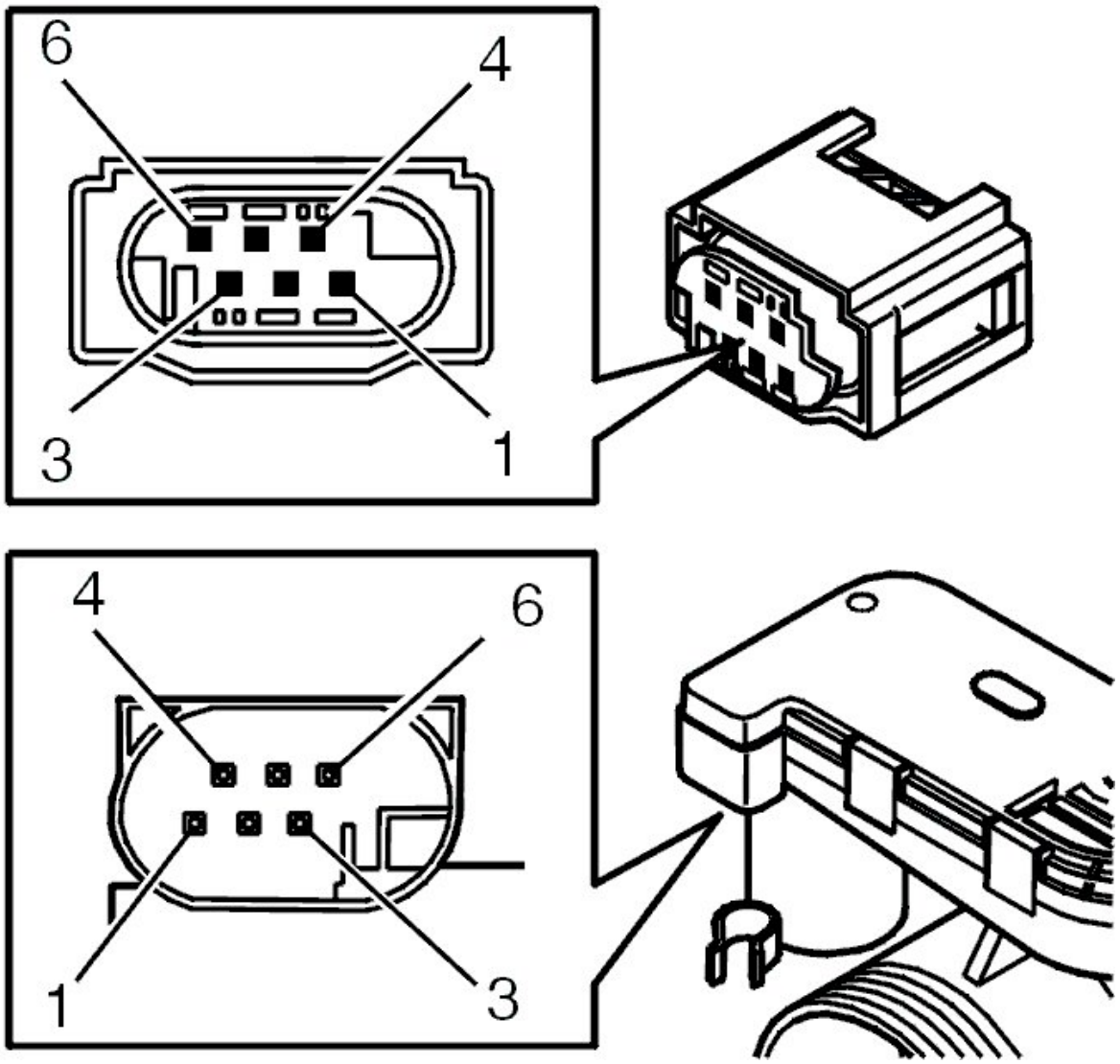


- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Check the function of the integrated return spring in the throttle unit by carefully manually turning the throttle to wide open position and then carefully releasing the throttle. Check that the return spring returns the shutter to its resting position.
If the return spring does not return the shutter, the throttle unit is damaged.
Remedy as necessary.

Other information:

- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

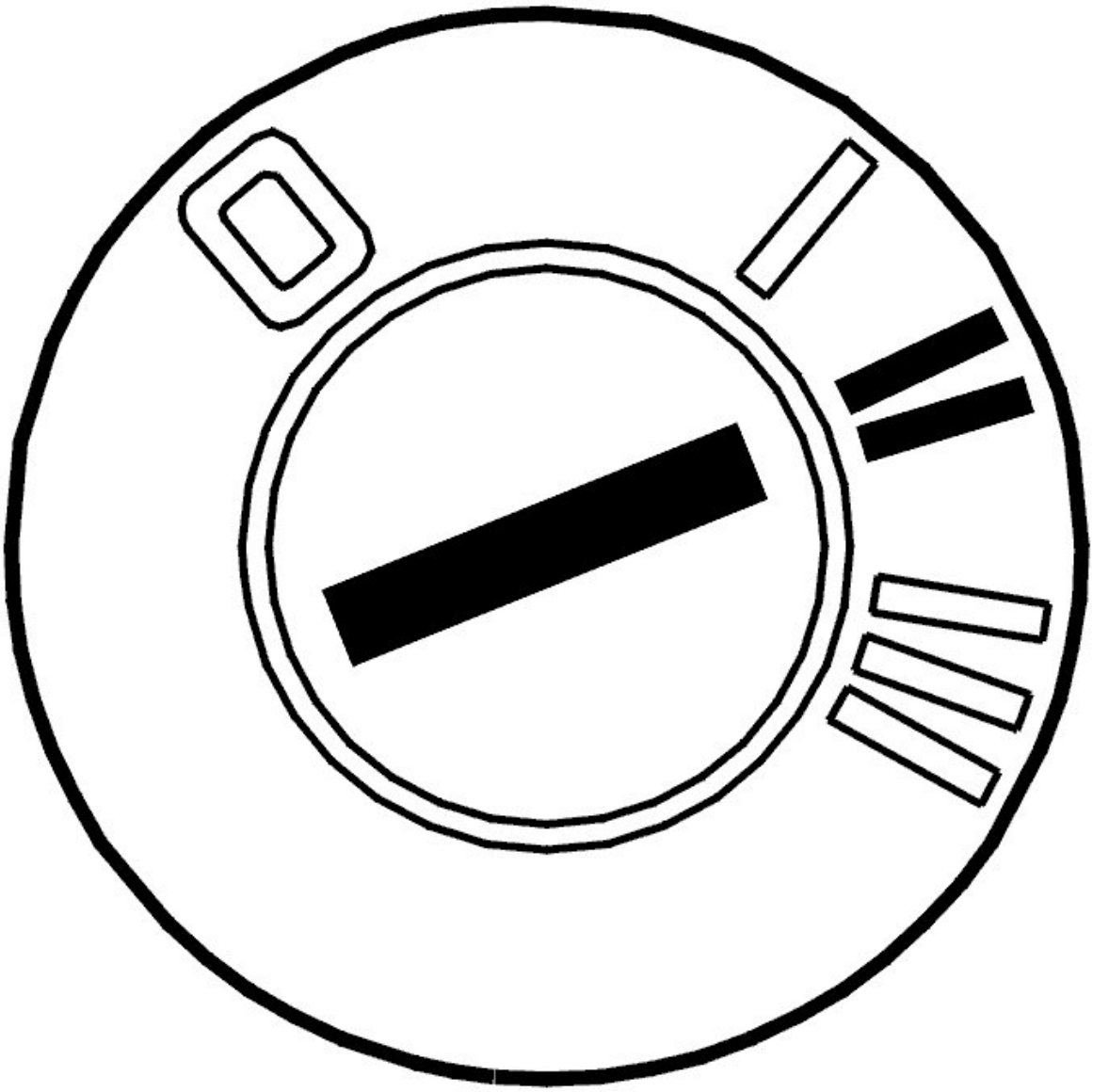


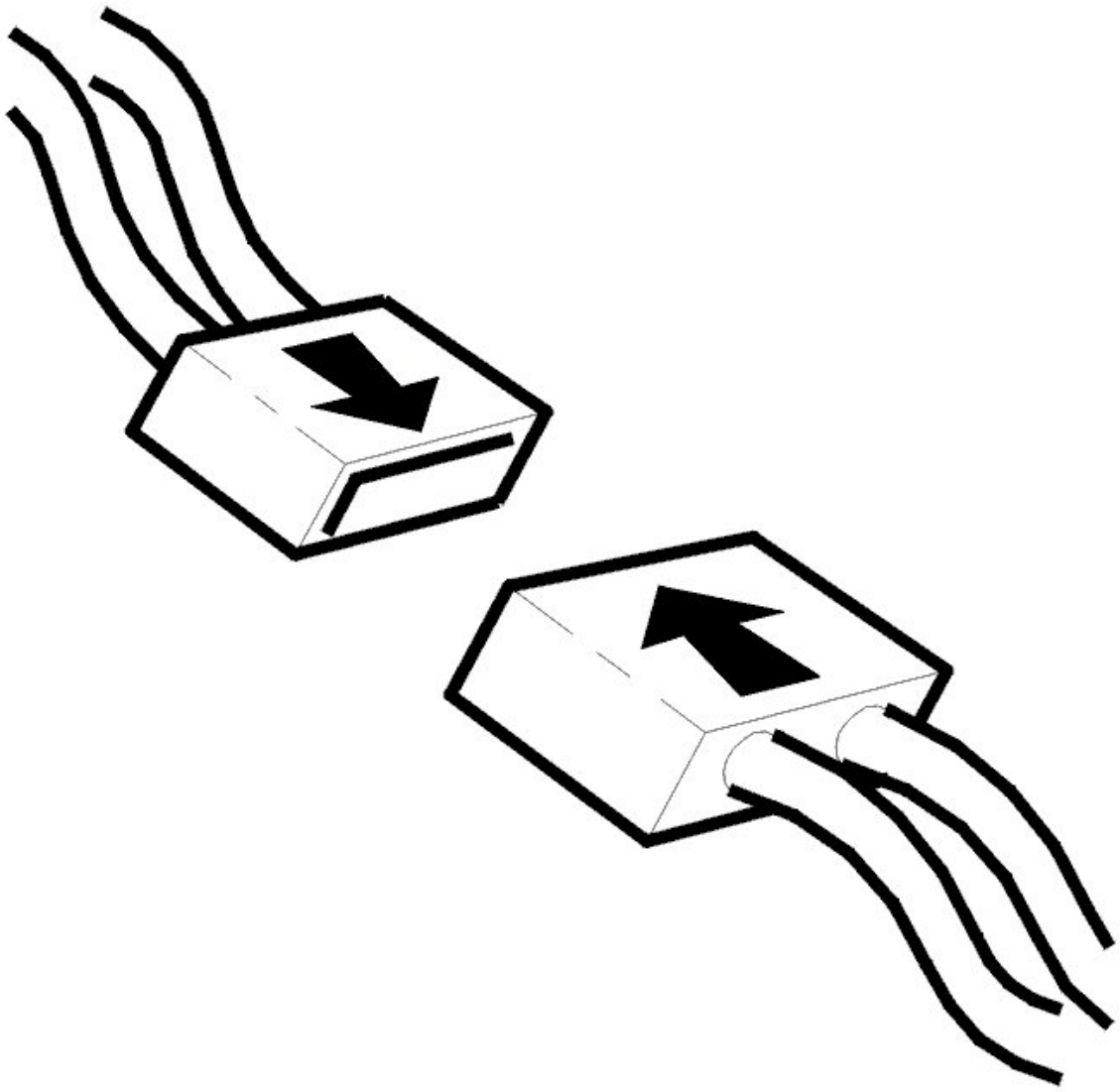
Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Hint: Faults which caused this diagnostic trouble code (DTC) may affect the adaptation values for the throttle unit. Carry out adaptation of the throttle unit to update the adaptation values.

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the components and connectors etc.
- Ignition on
- Read off the parameters.

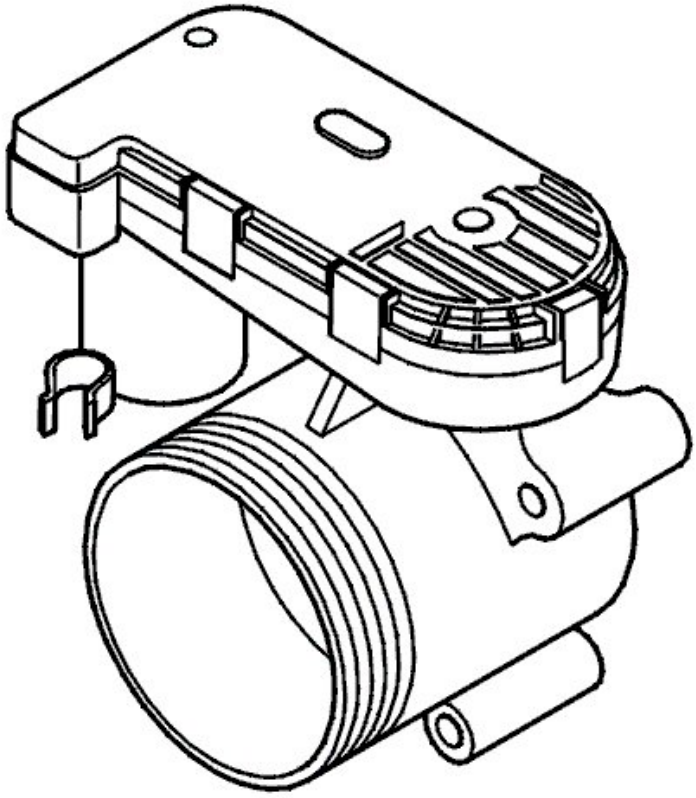
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

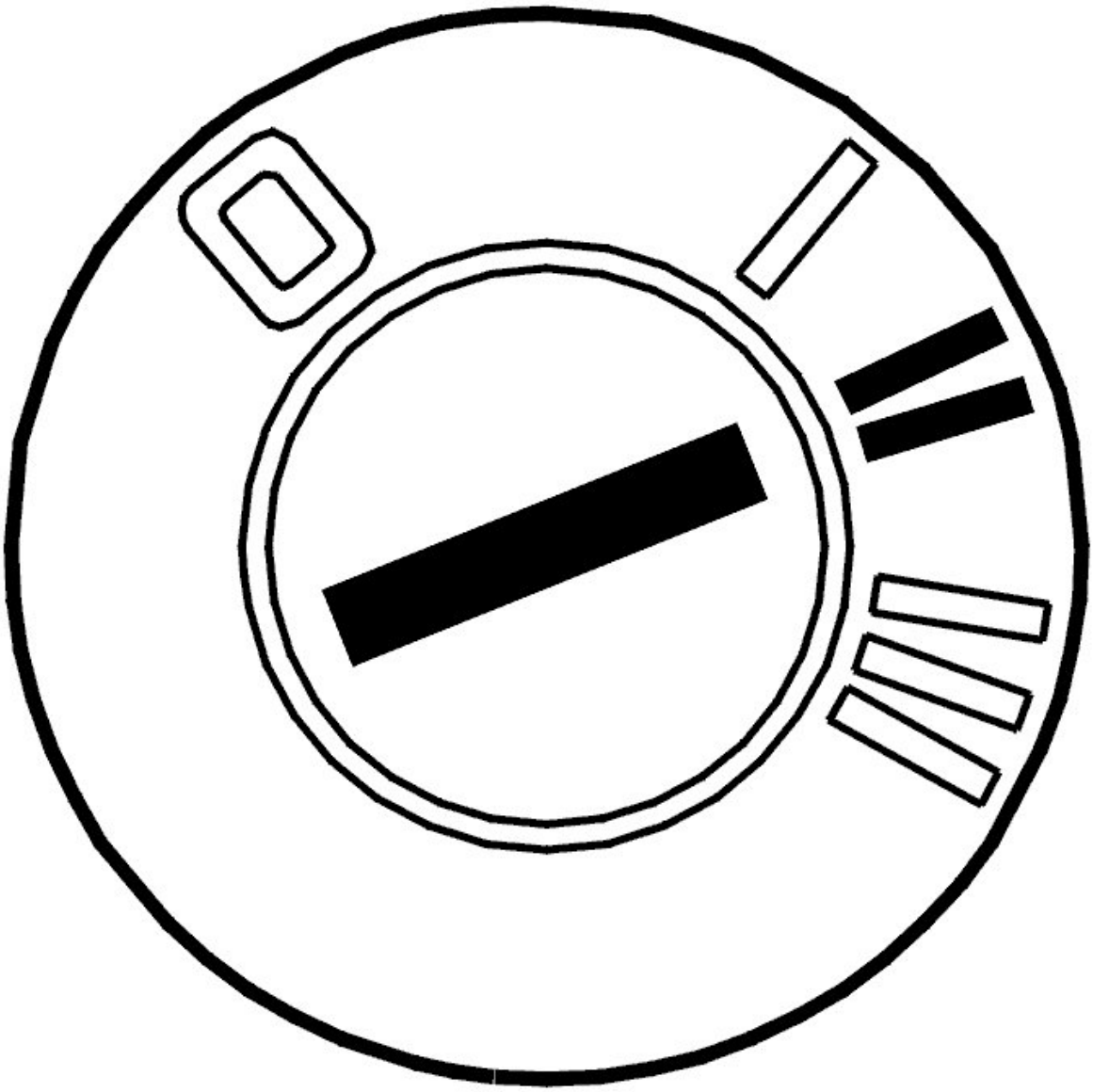
- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.



Select Continue without switching off the ignition when the adaptation is OK.

Continue - Checking the function

Checking the function



- Ignition on.

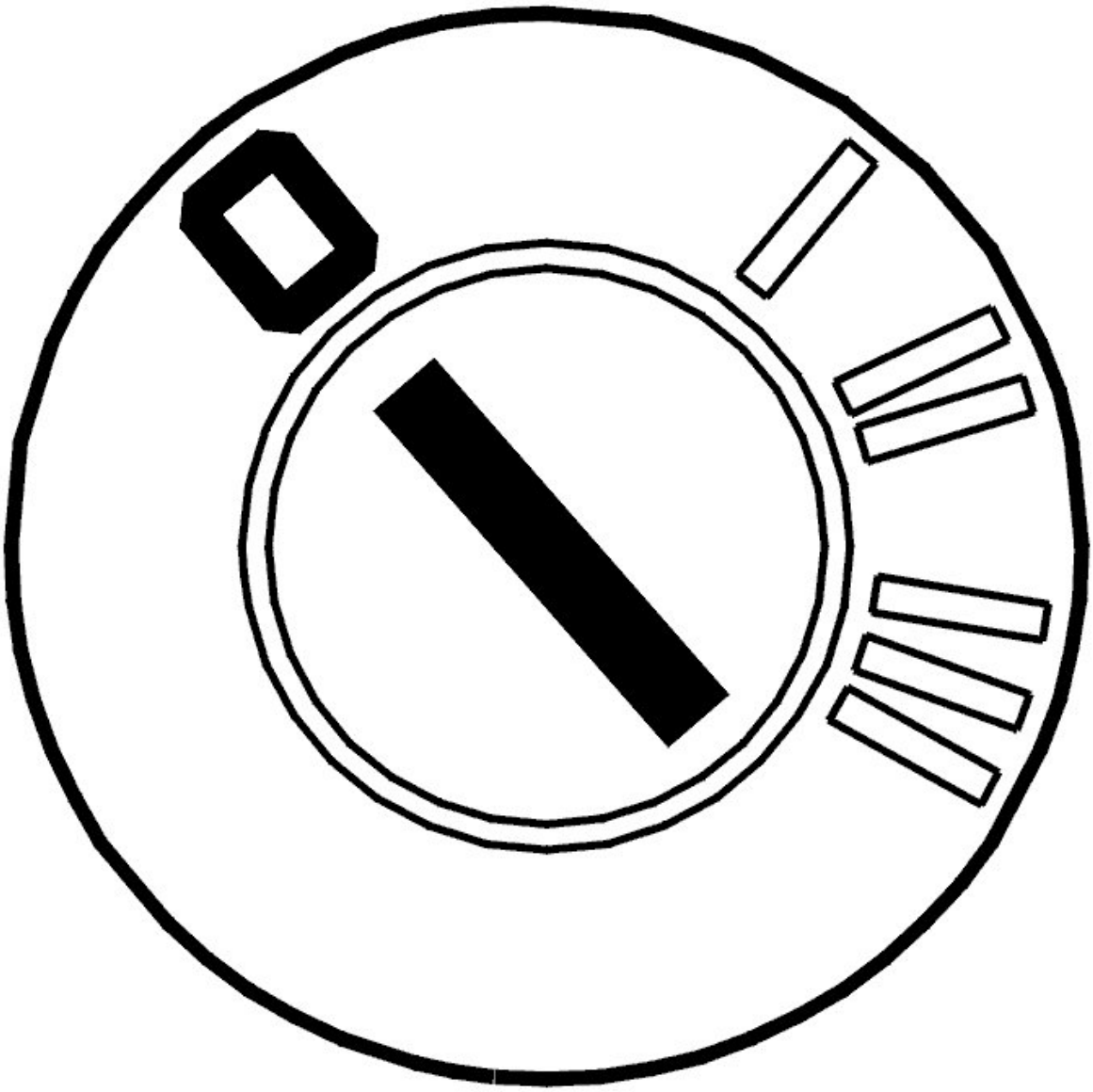
Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.

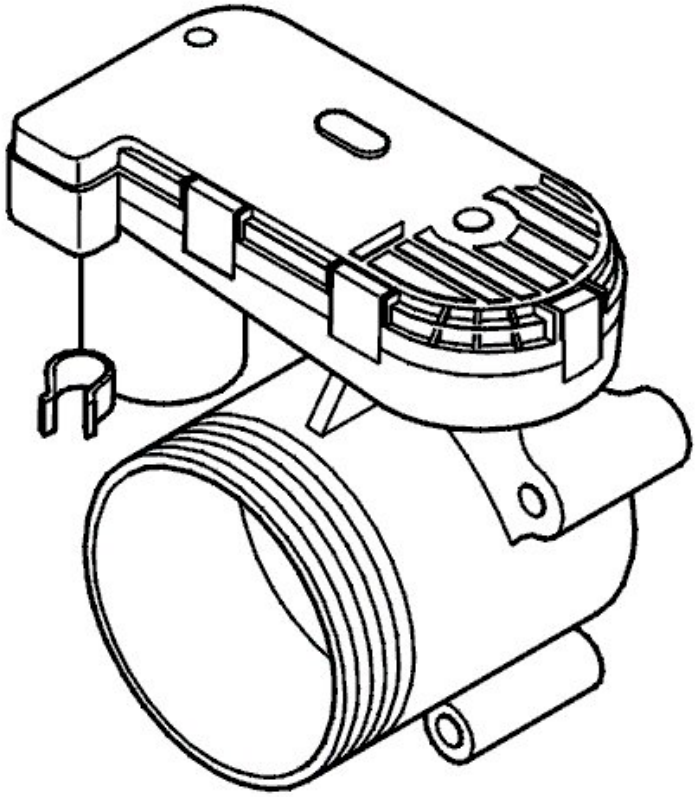
Continue - Replacing the component

Replacing the component



- Ignition off.

Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement



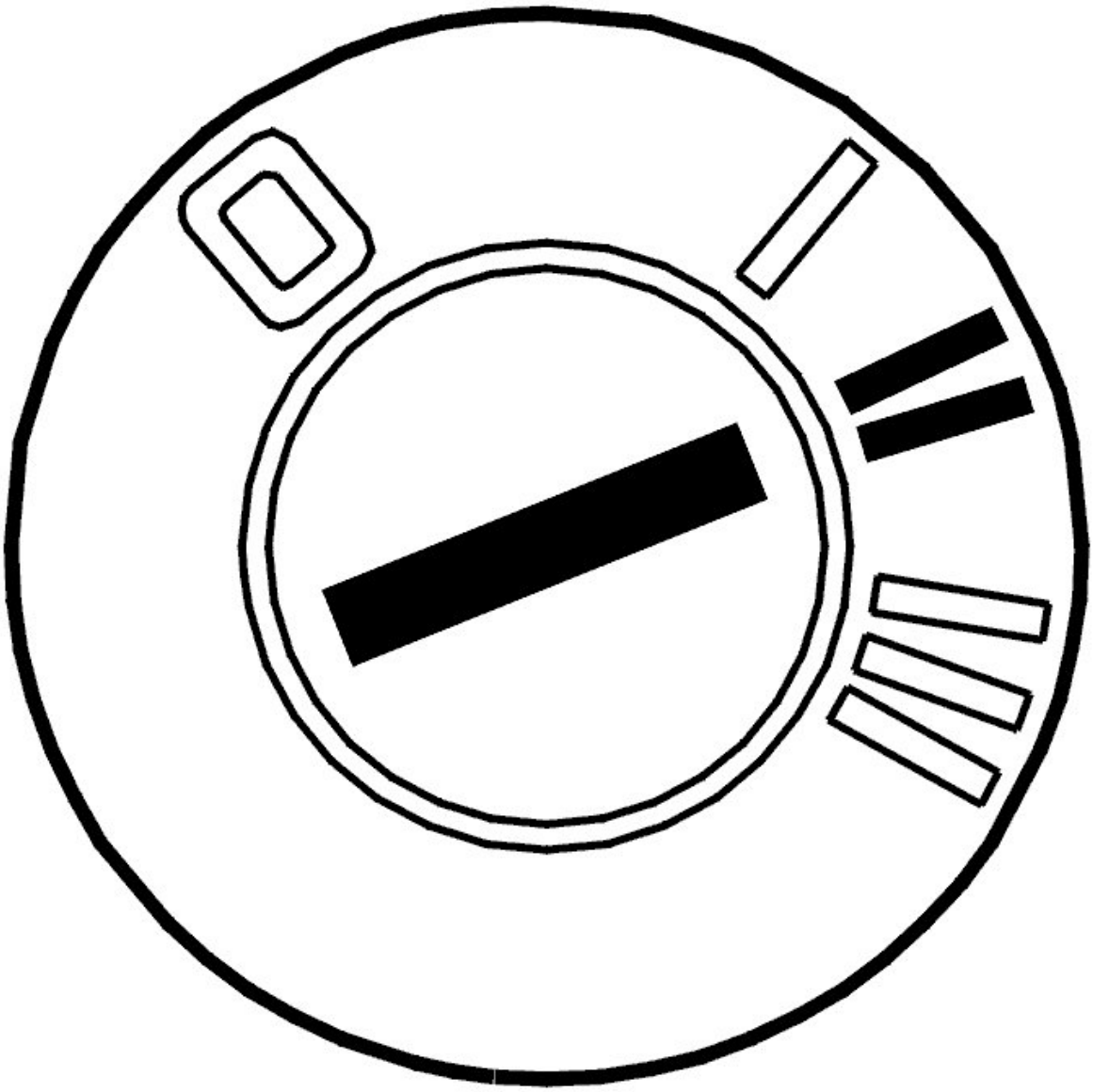
Continue - Verification

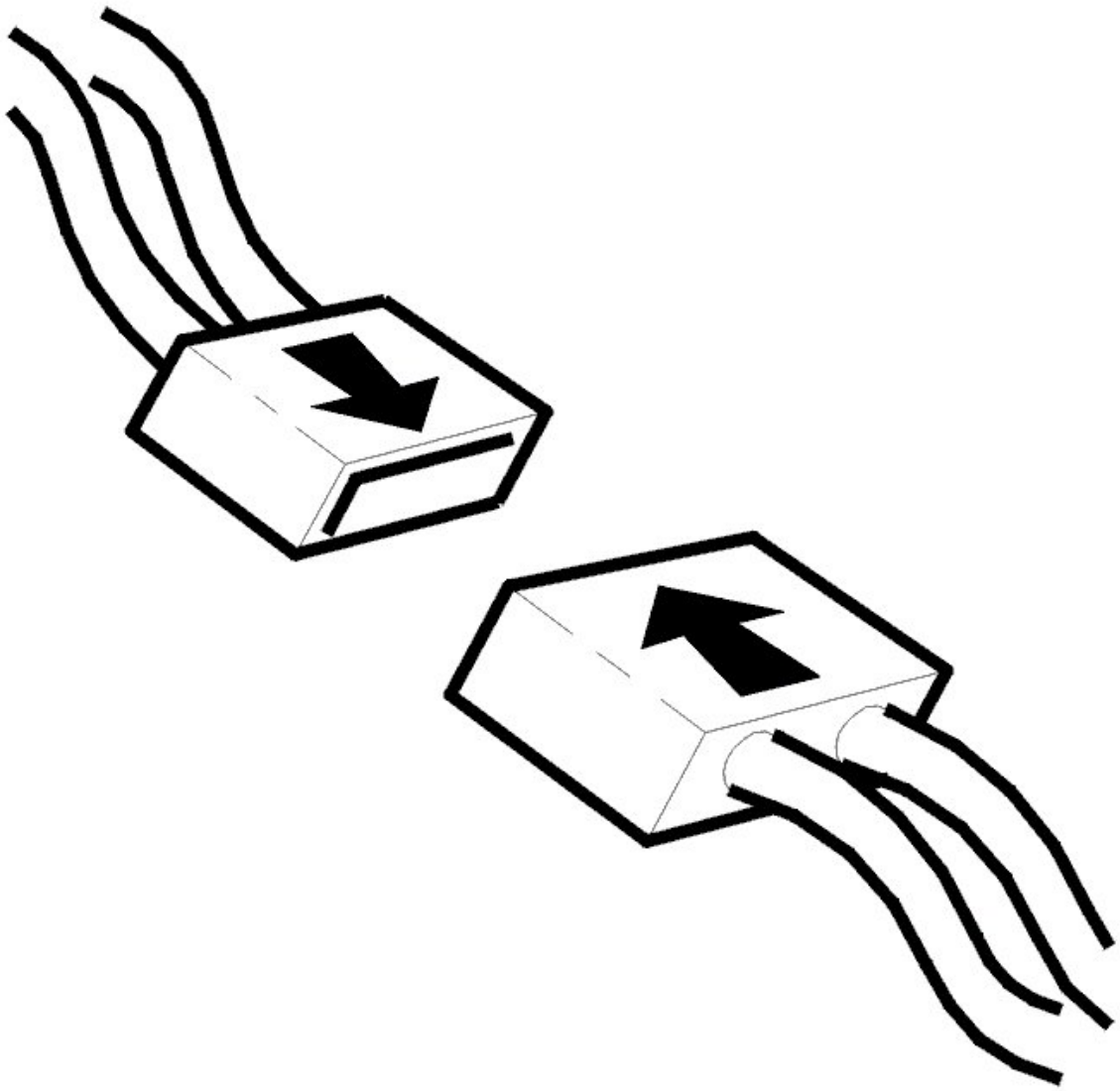
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

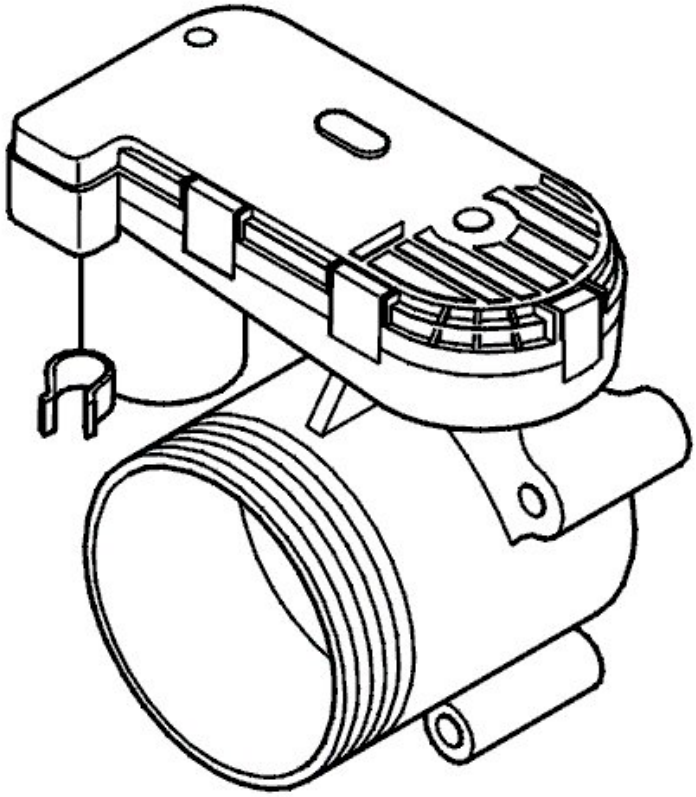
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

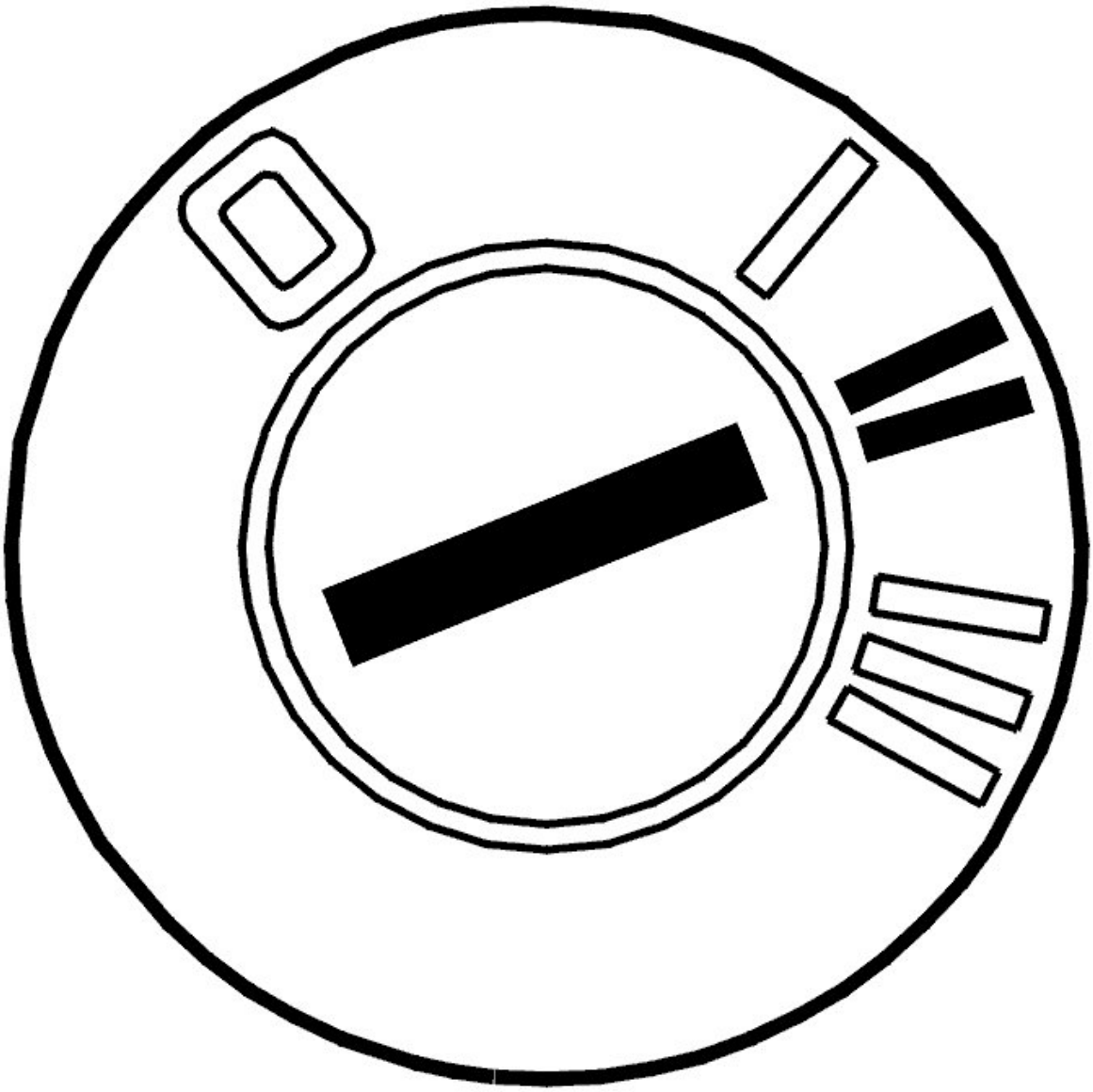


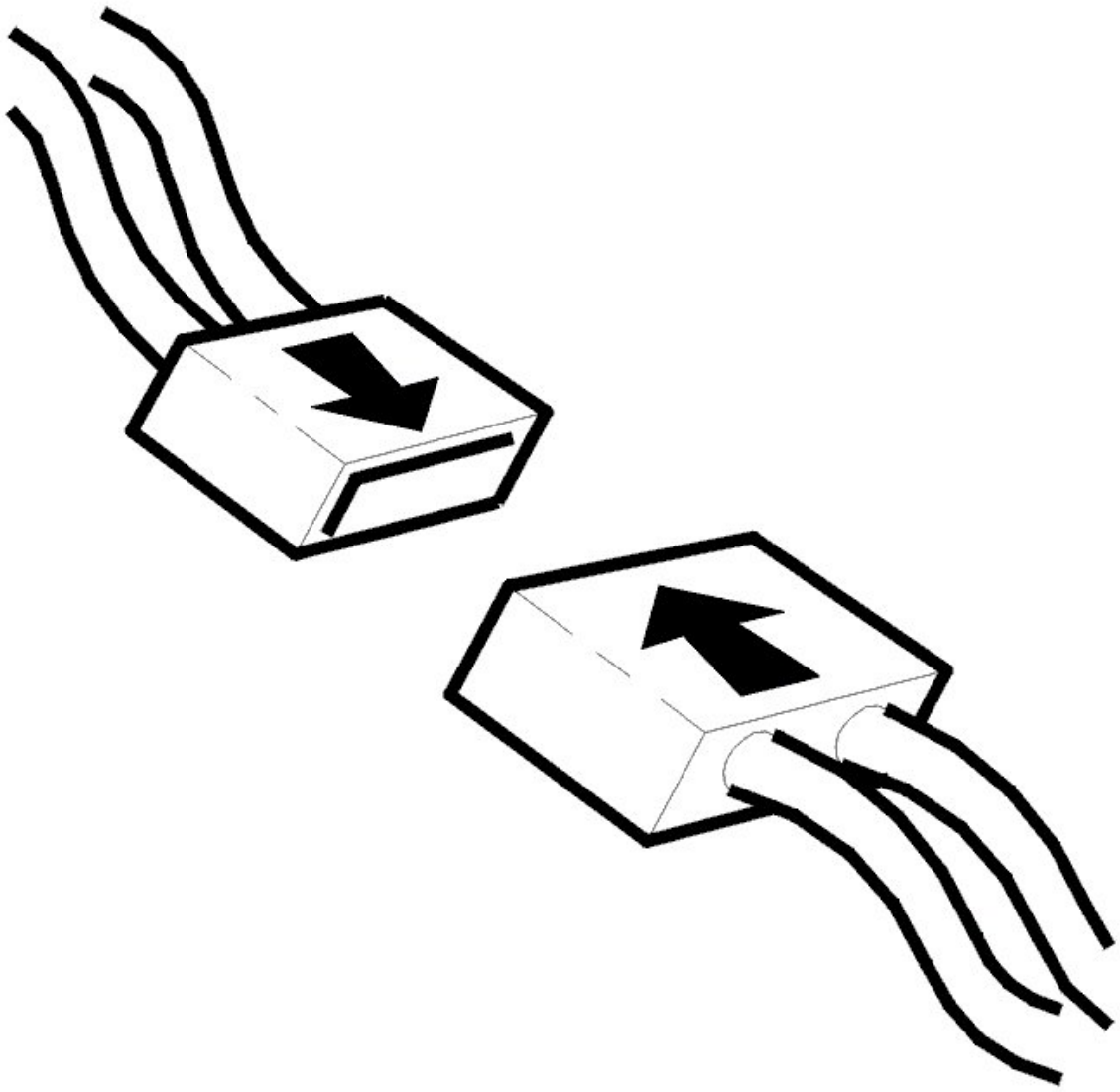
Select Continue without switching off the ignition when the adaptation is OK.

Continue - continued

Verification, continued

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition on.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.

Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

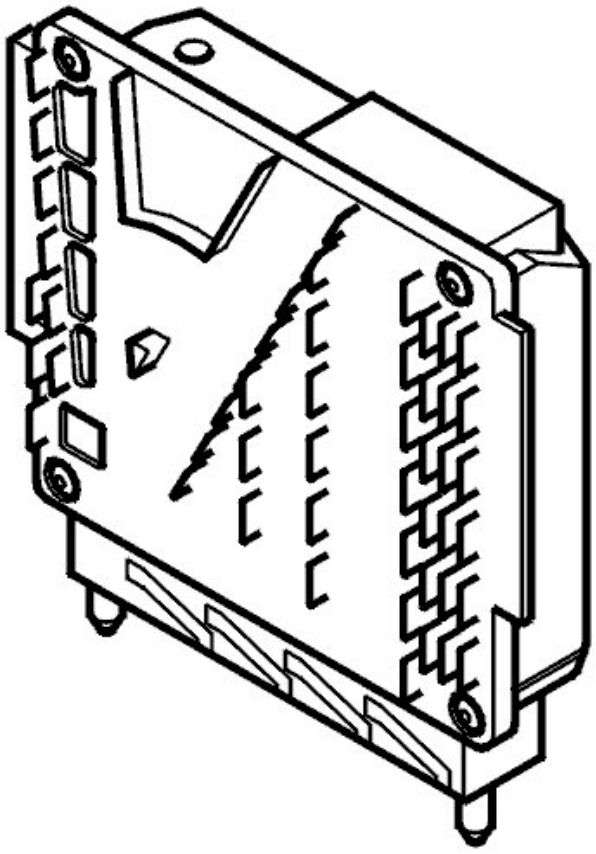
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9290

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the internal governor for control of the throttle angle in the throttle unit is damaged or that the control signal for the governor is too low when controlling the throttle.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit

- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit
- Faulty software in the engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

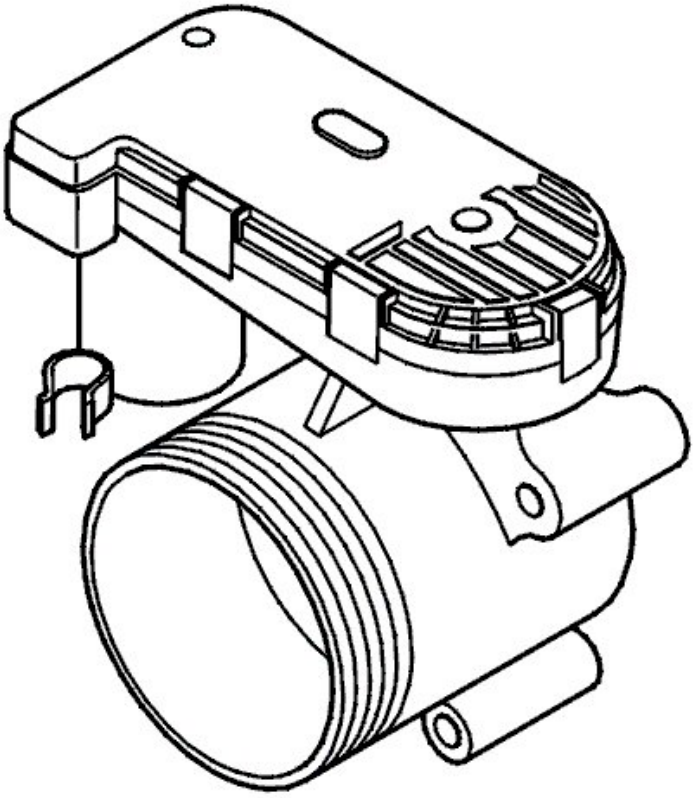
Faulty signal

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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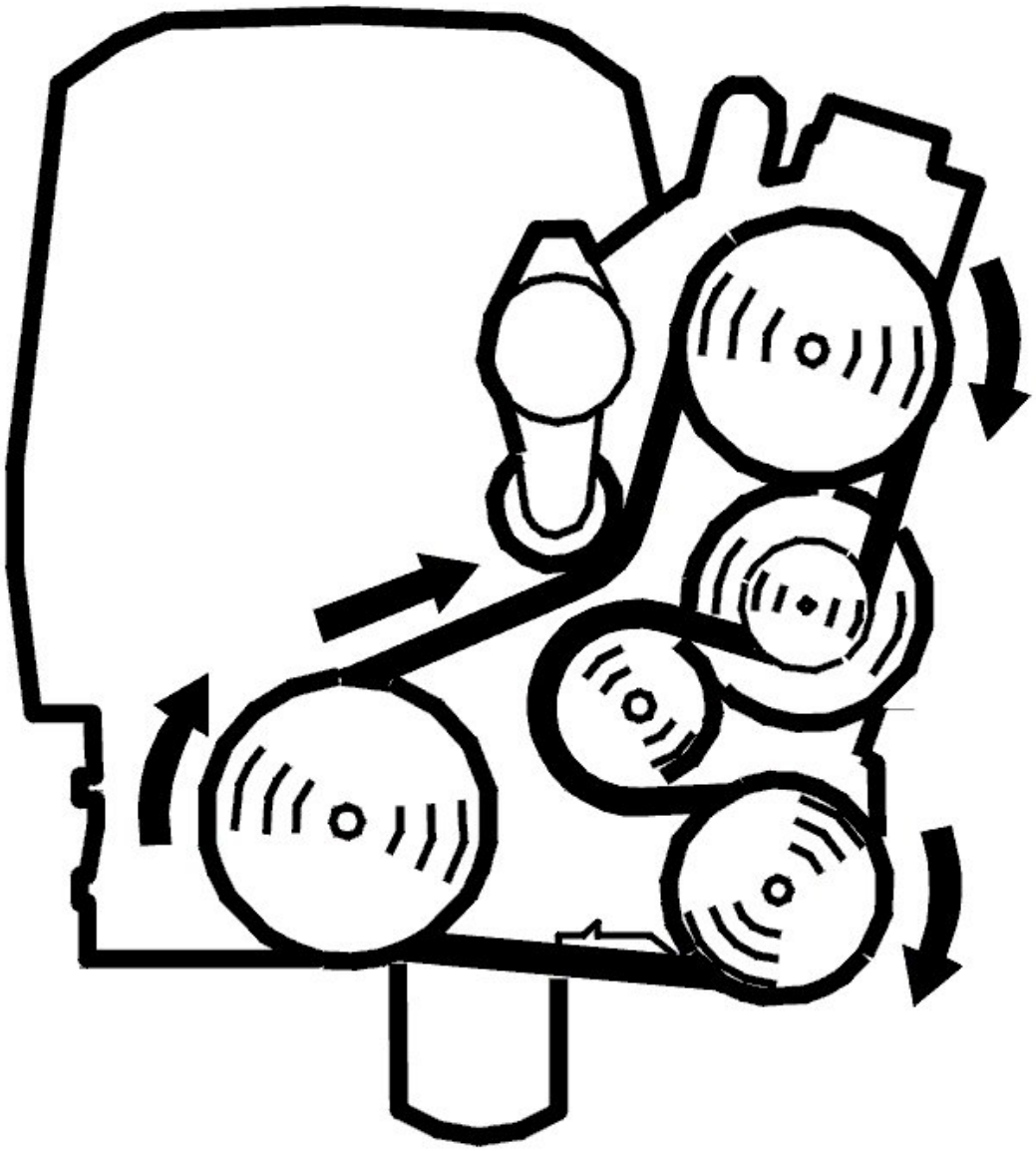
cont - Checking the fault status

Checking the fault status



- Start the engine.

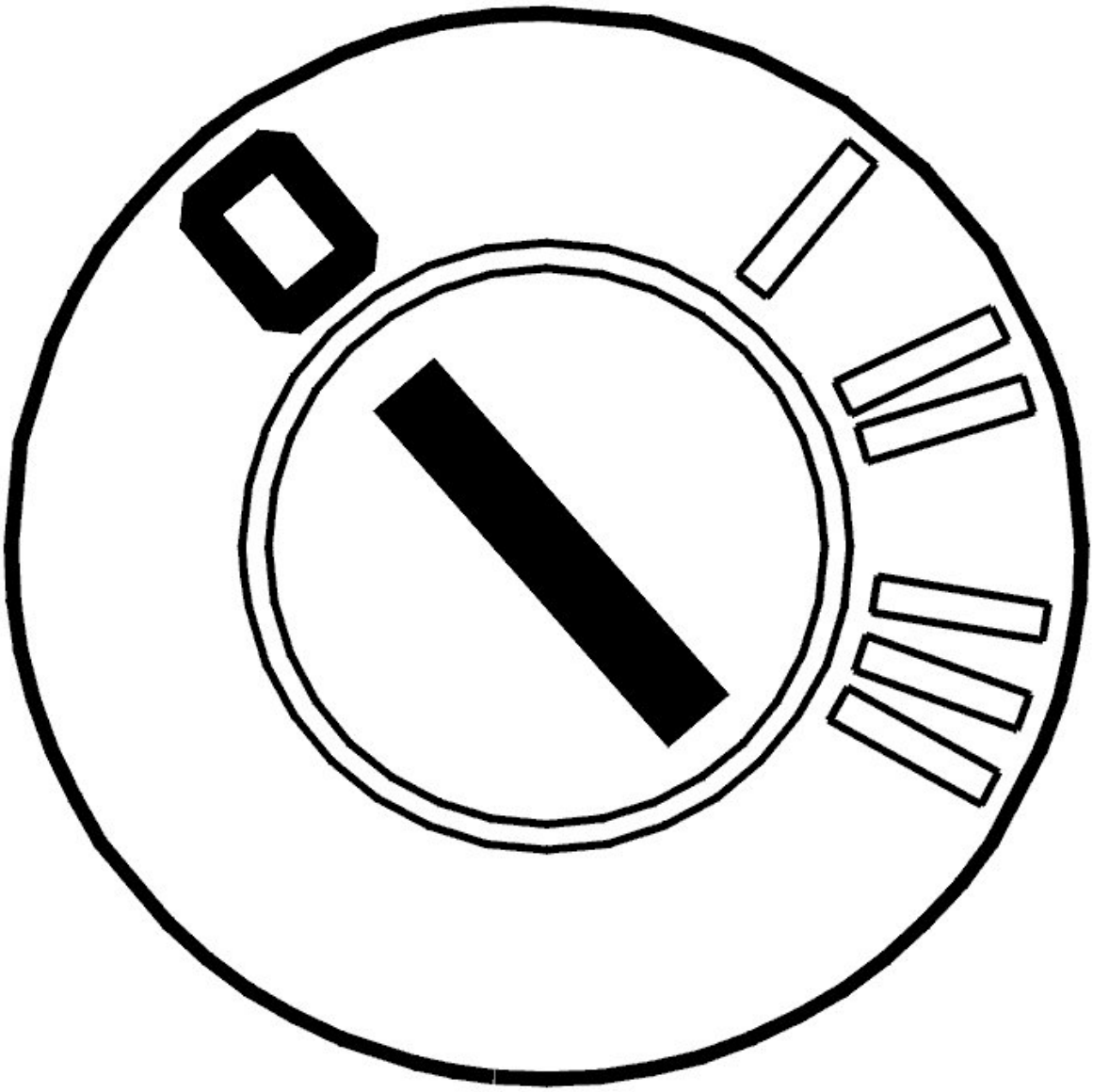
Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.

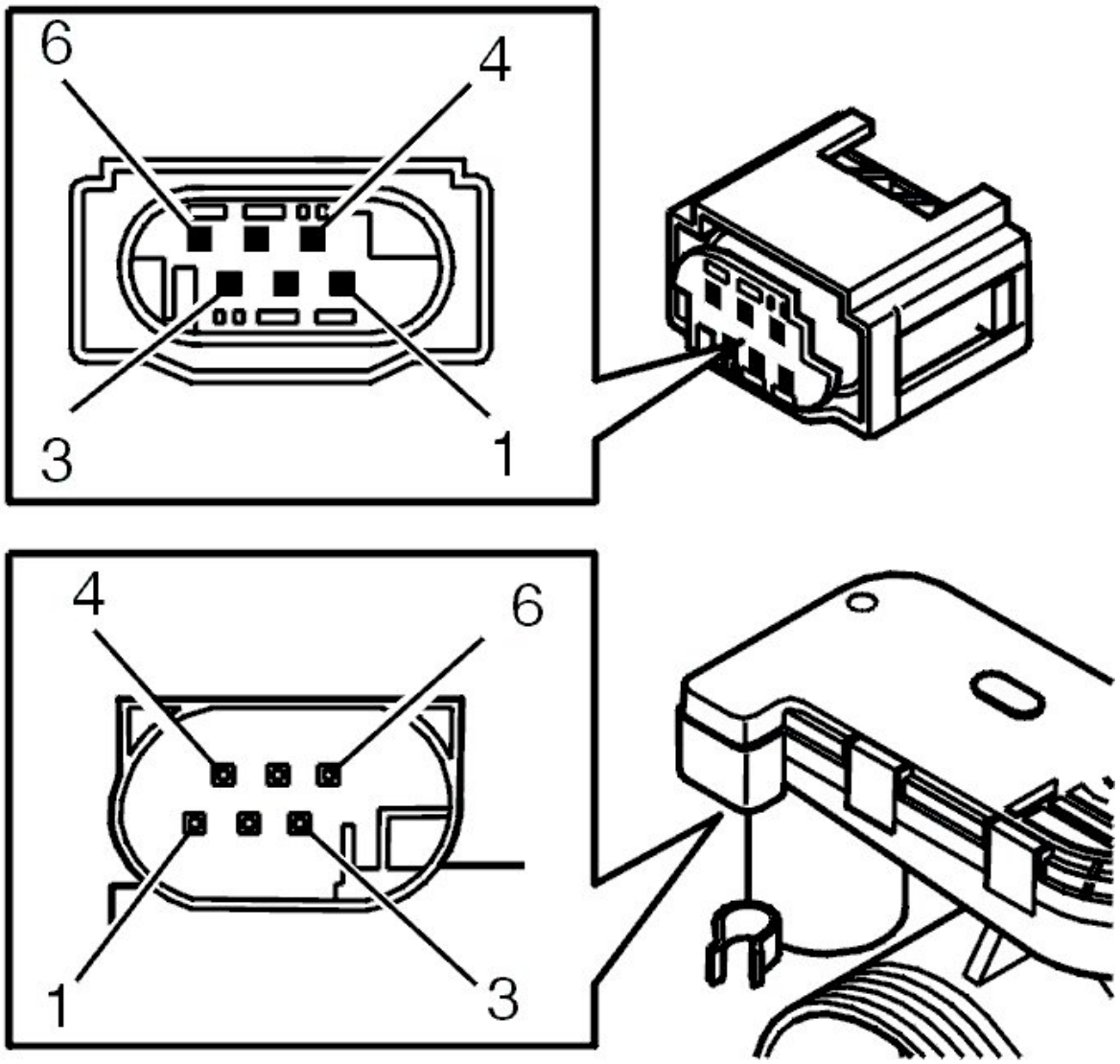
Check the resistance value of the damper motor winding in the throttle unit. Take readings between throttle unit terminals #1 and #4 (component side). Check for an open-circuit. Check for a short-circuit.

Note! The resistance of the motor winding in the damper motor is very low.

Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

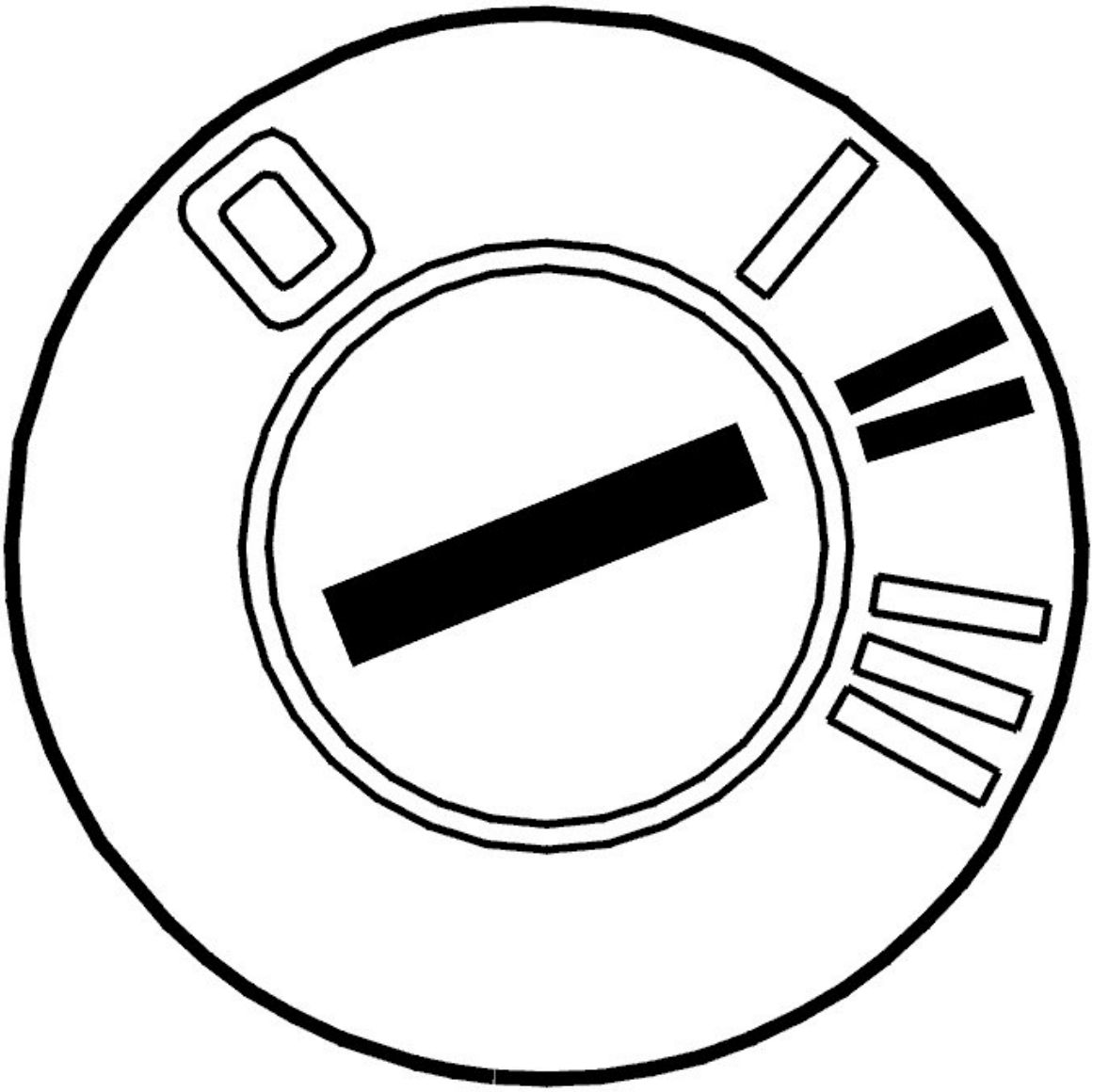
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

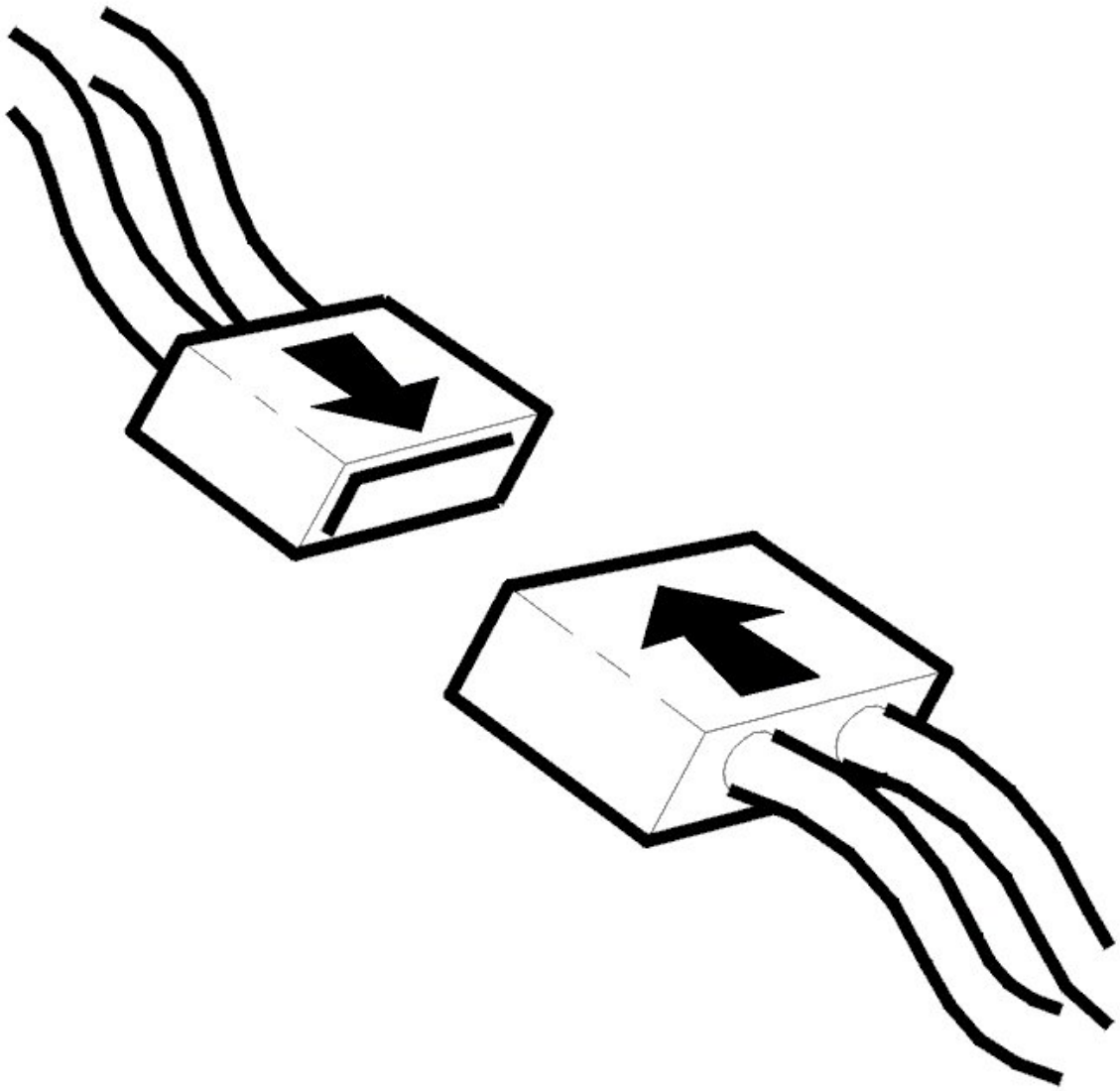


Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

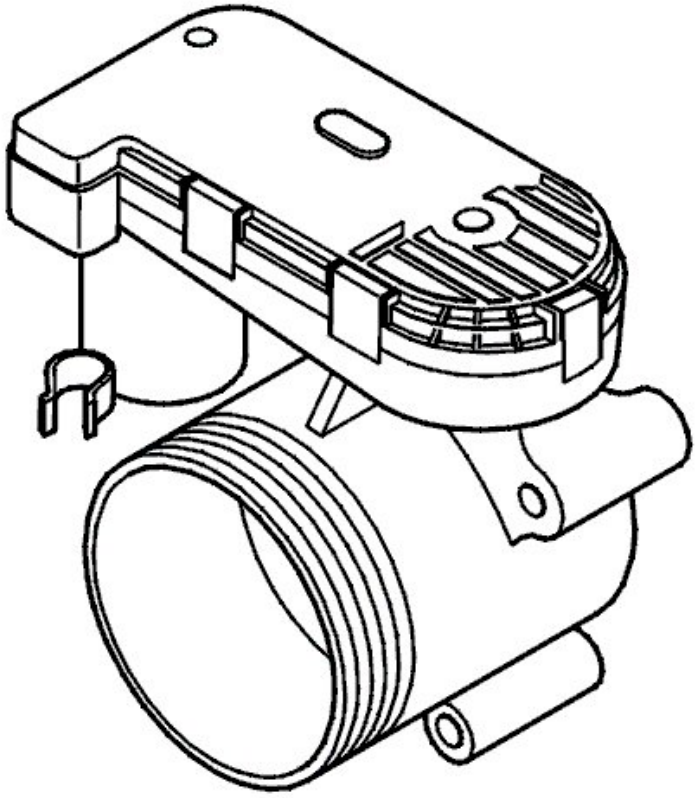
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

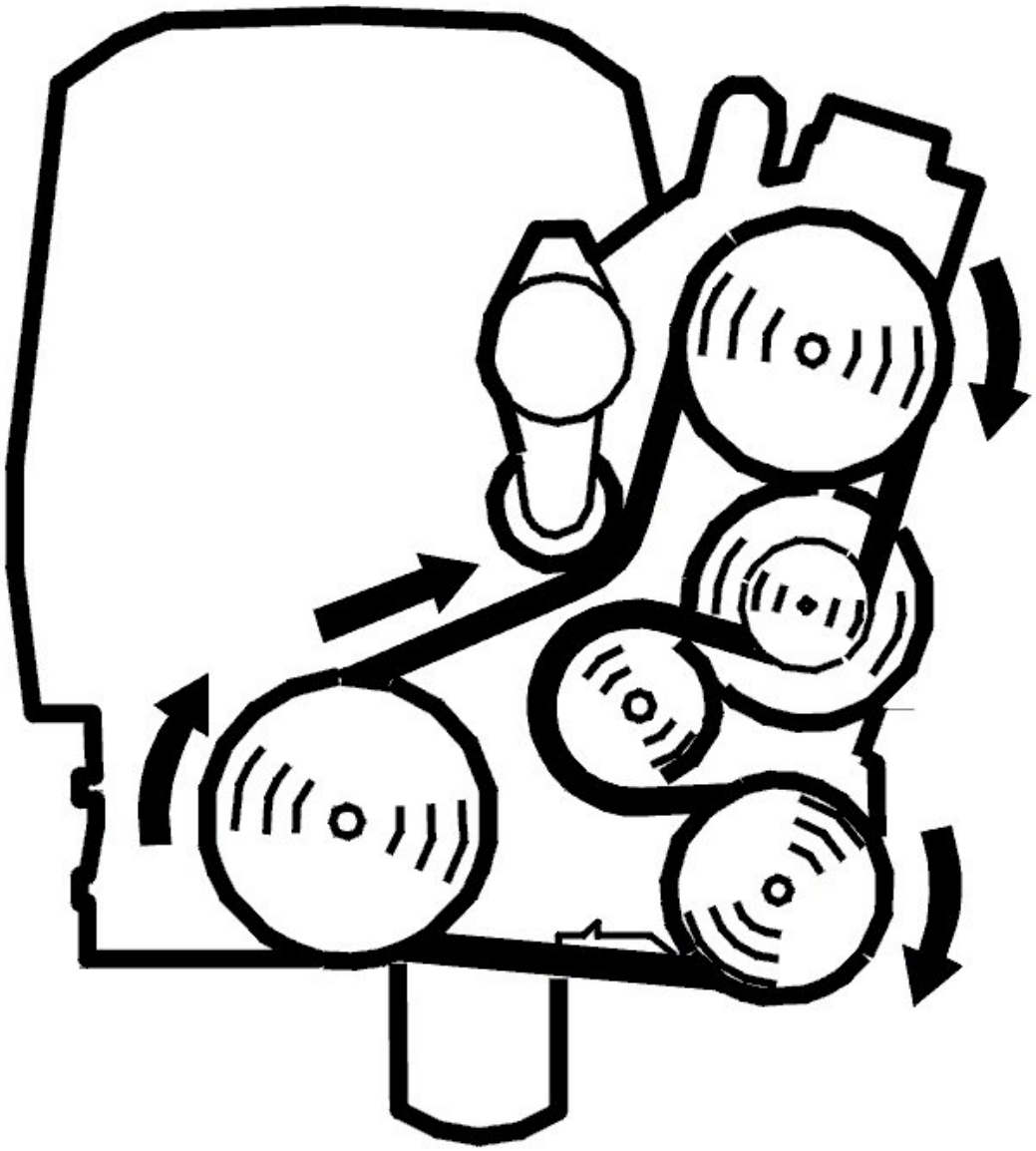


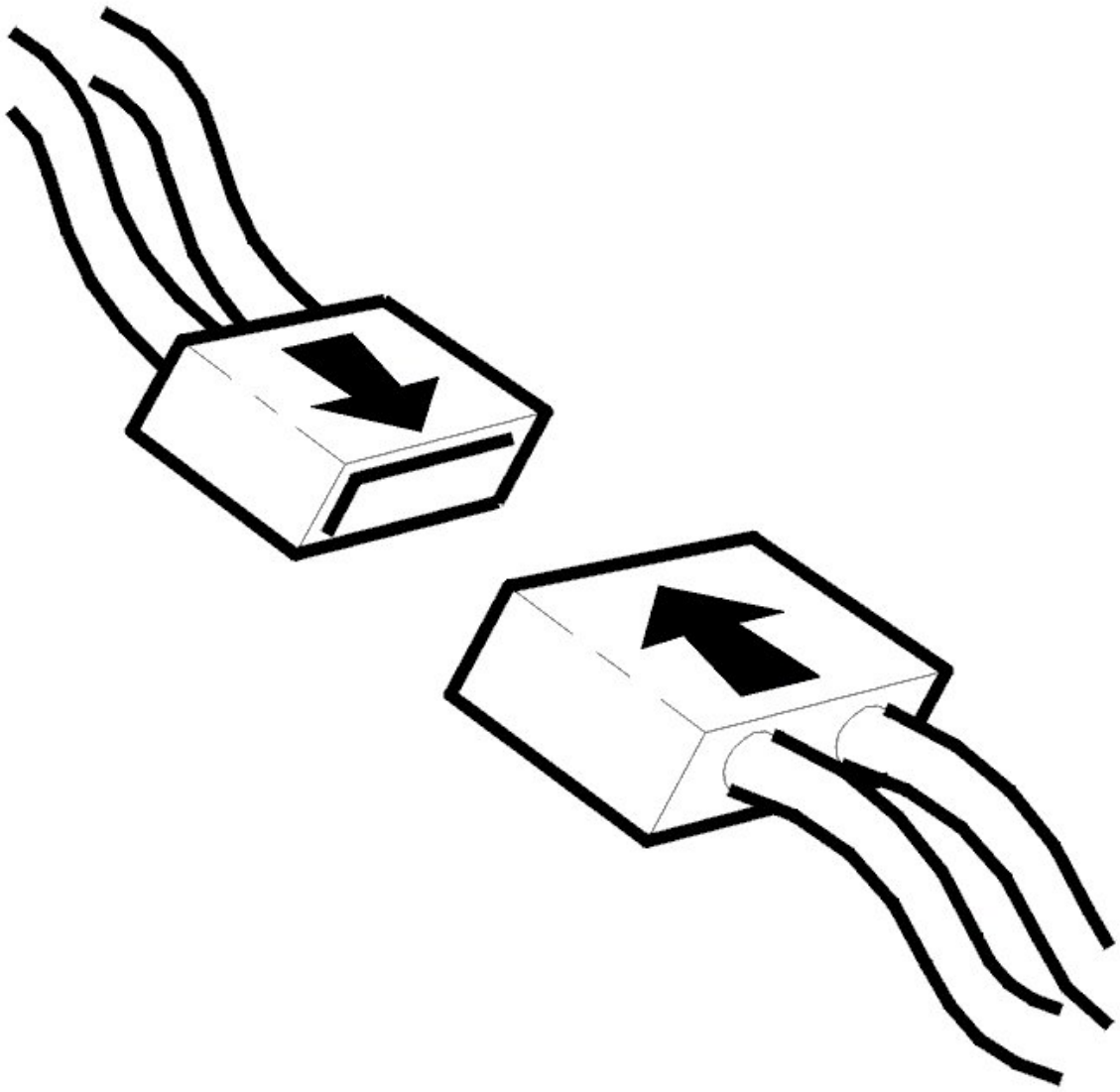
Then select Continue when the adaptation has been completed correctly.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

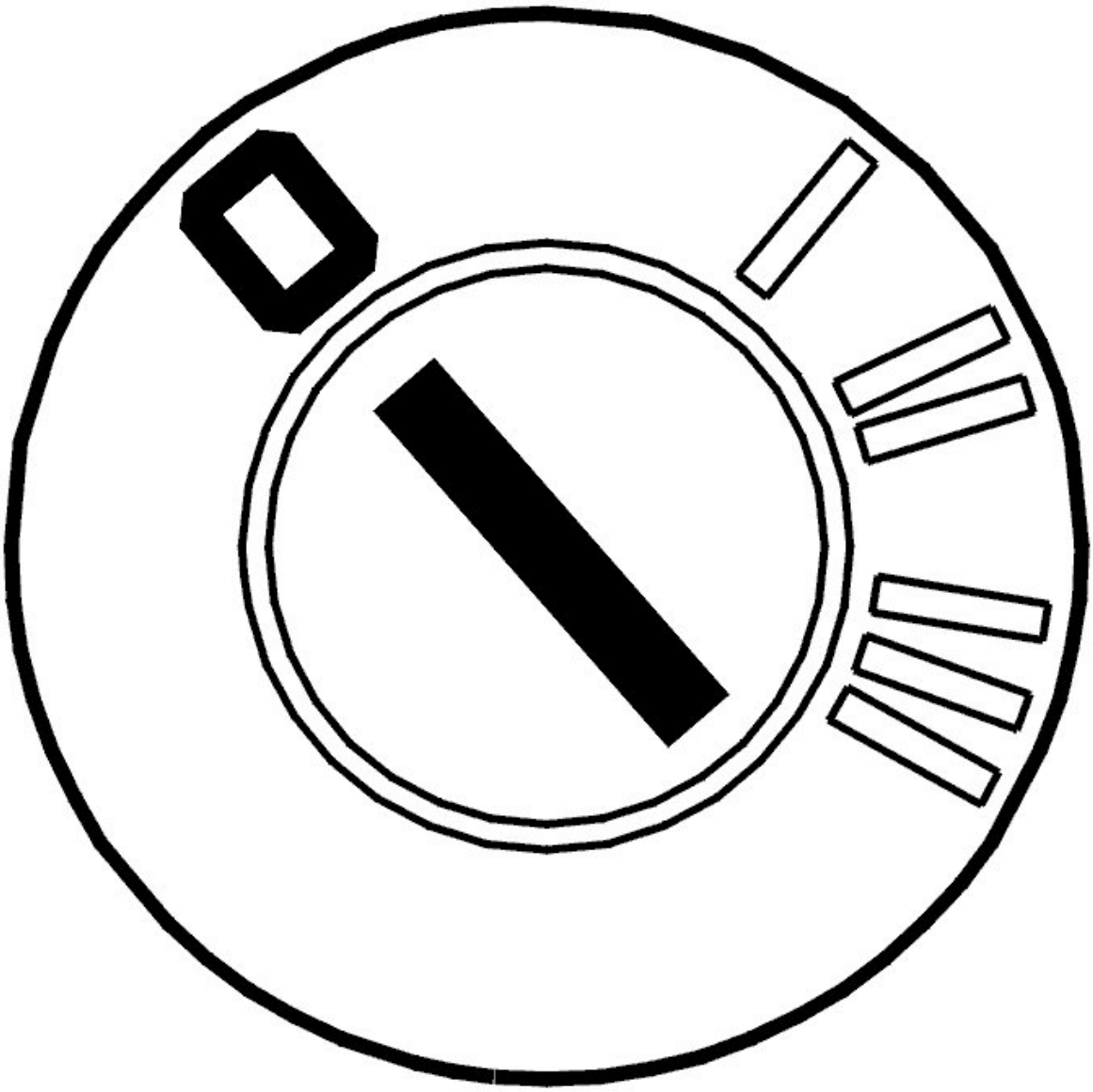
Is the function OK?

Yes - Fault Found

No - Programming the engine control module (ECM)

Programming the engine control module (ECM)

Hint: This diagnostic trouble code (DTC) may be caused by faulty software.



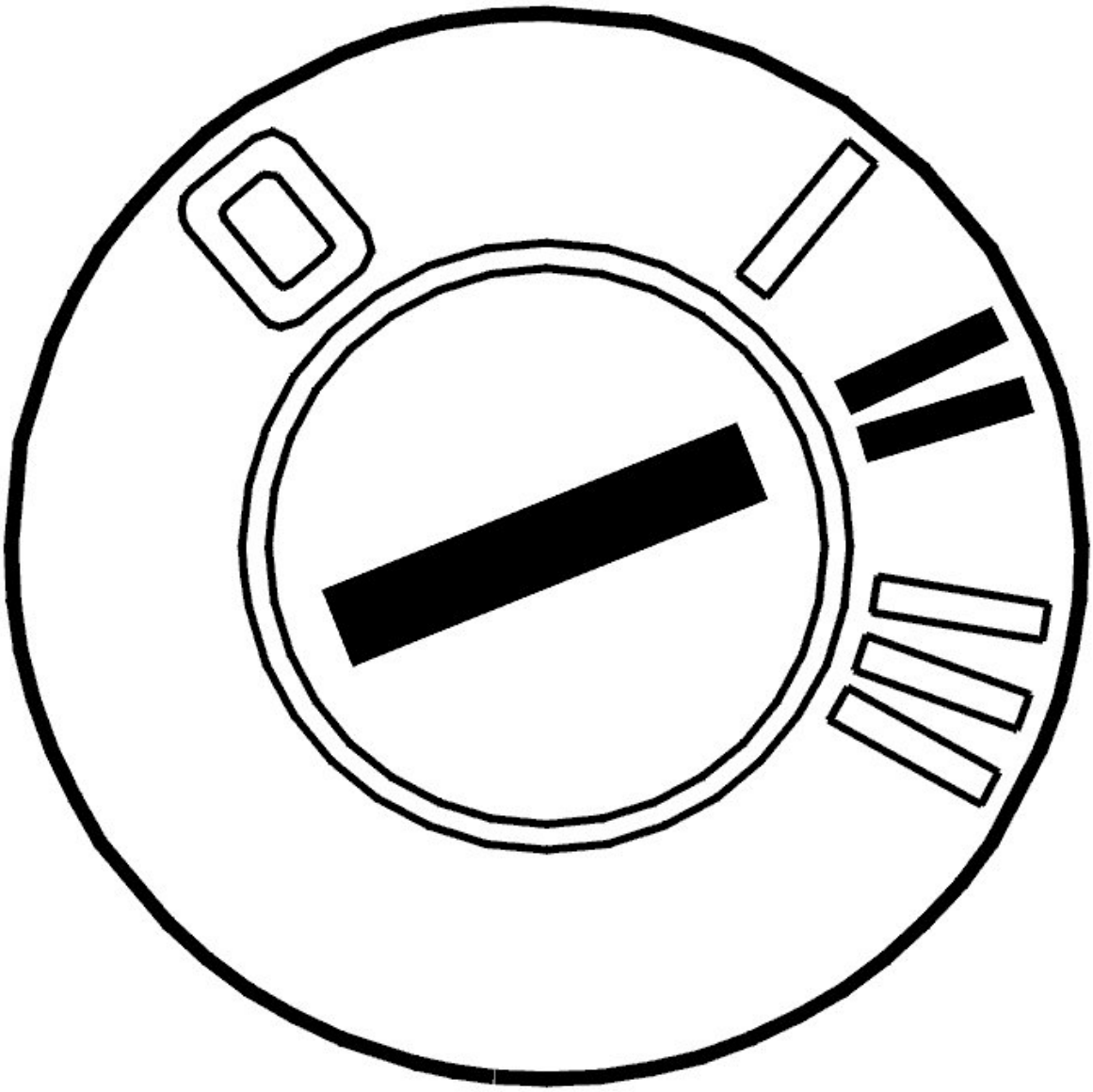
- Ignition off.

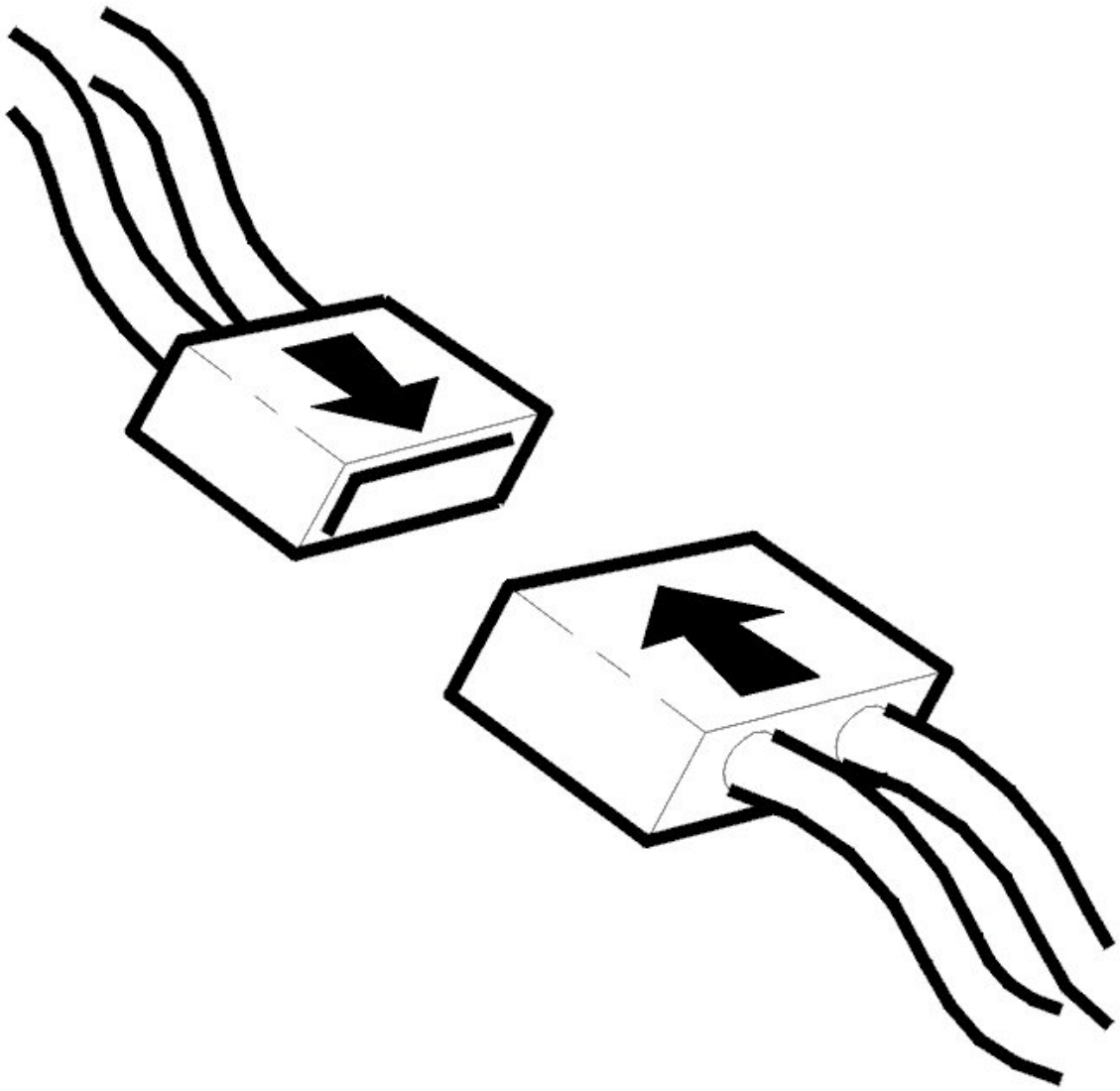
Try downloading new software to the engine control module (ECM). To download new software, see: Engine control module (ECM), replacing
See: Engine Control Module/Service and Repair
Remedy as necessary.

Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

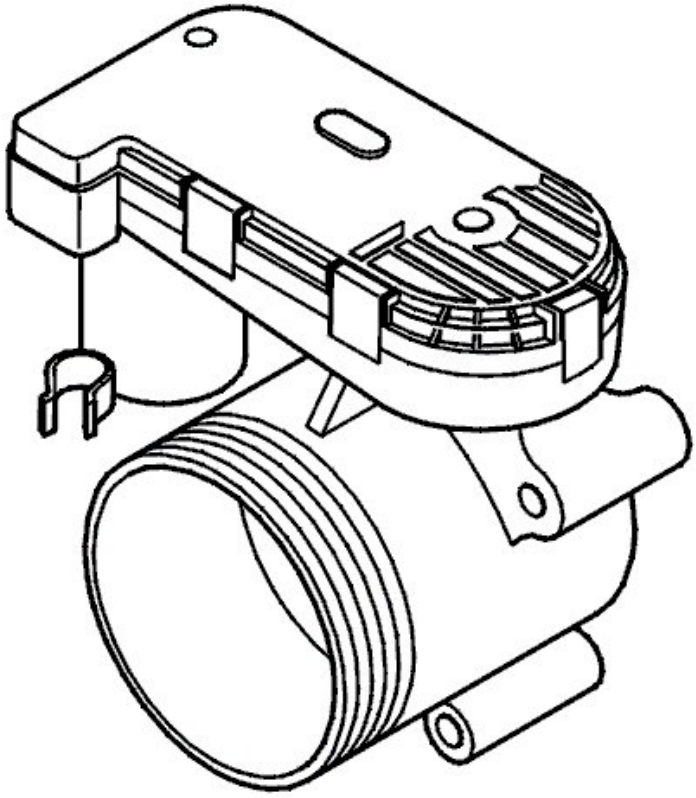
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.



Then select Continue when the adaptation has been completed correctly.

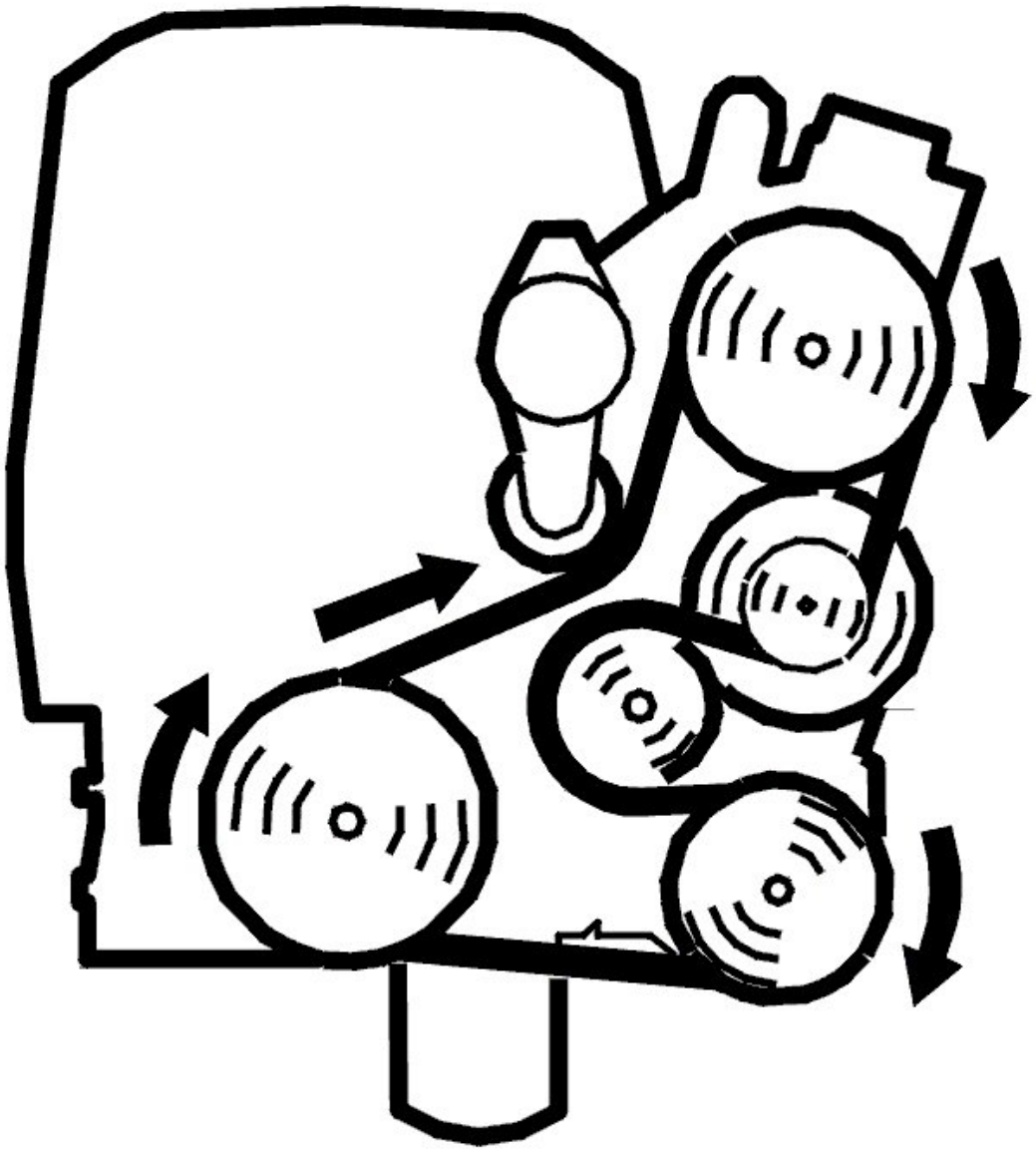
Continue - Verification

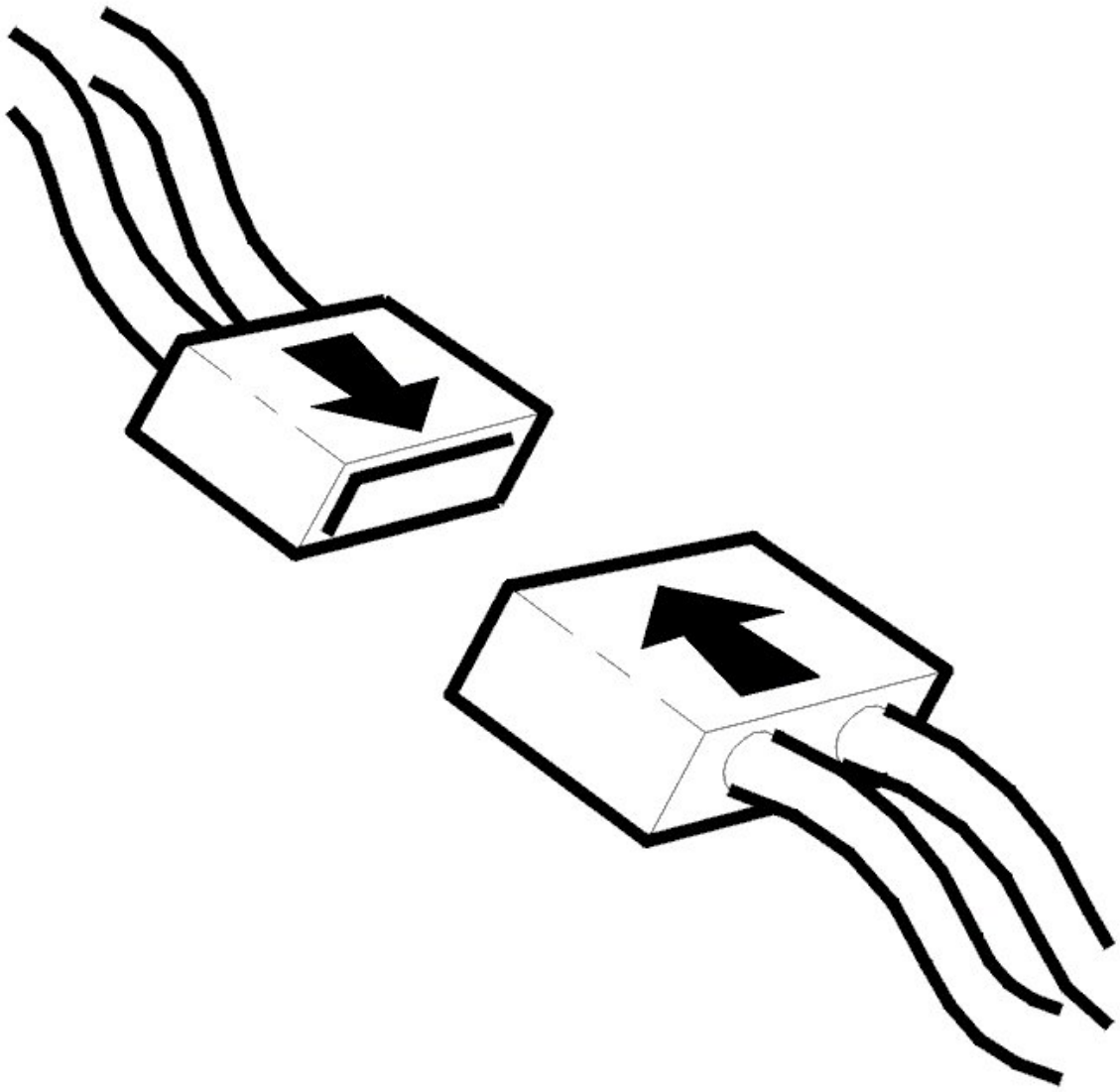
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

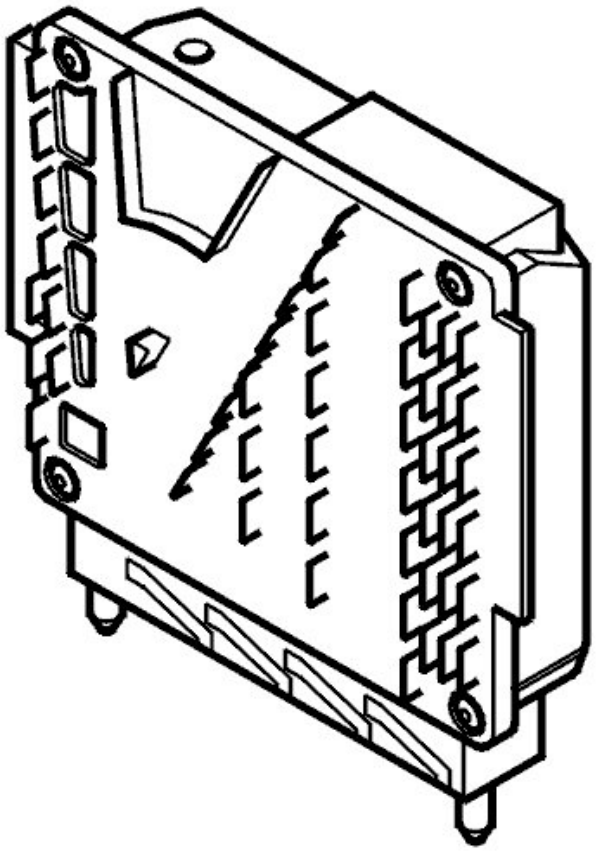
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-929C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the internal governor for control of the throttle angle in the throttle unit is damaged or that the control signal for the governor is too low when controlling the throttle.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)

- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit
- Faulty software in the engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too High

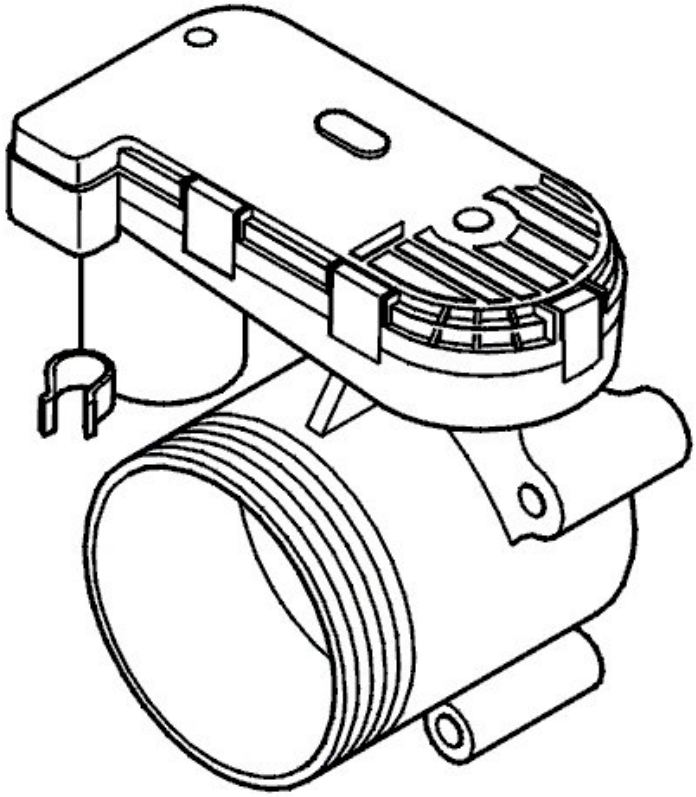
Signal too high

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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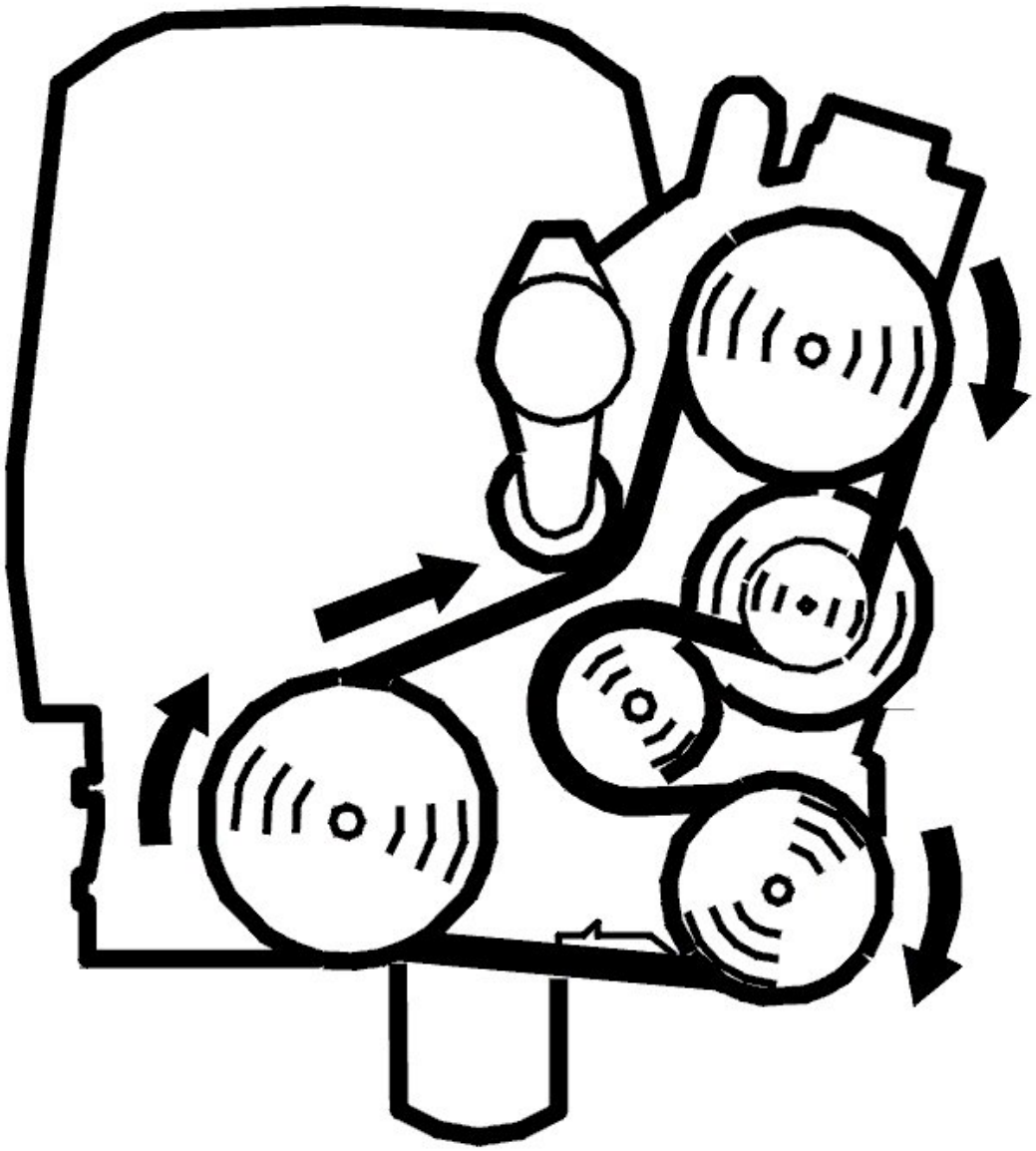
cont - Checking the fault status

Checking the fault status



- Start the engine.

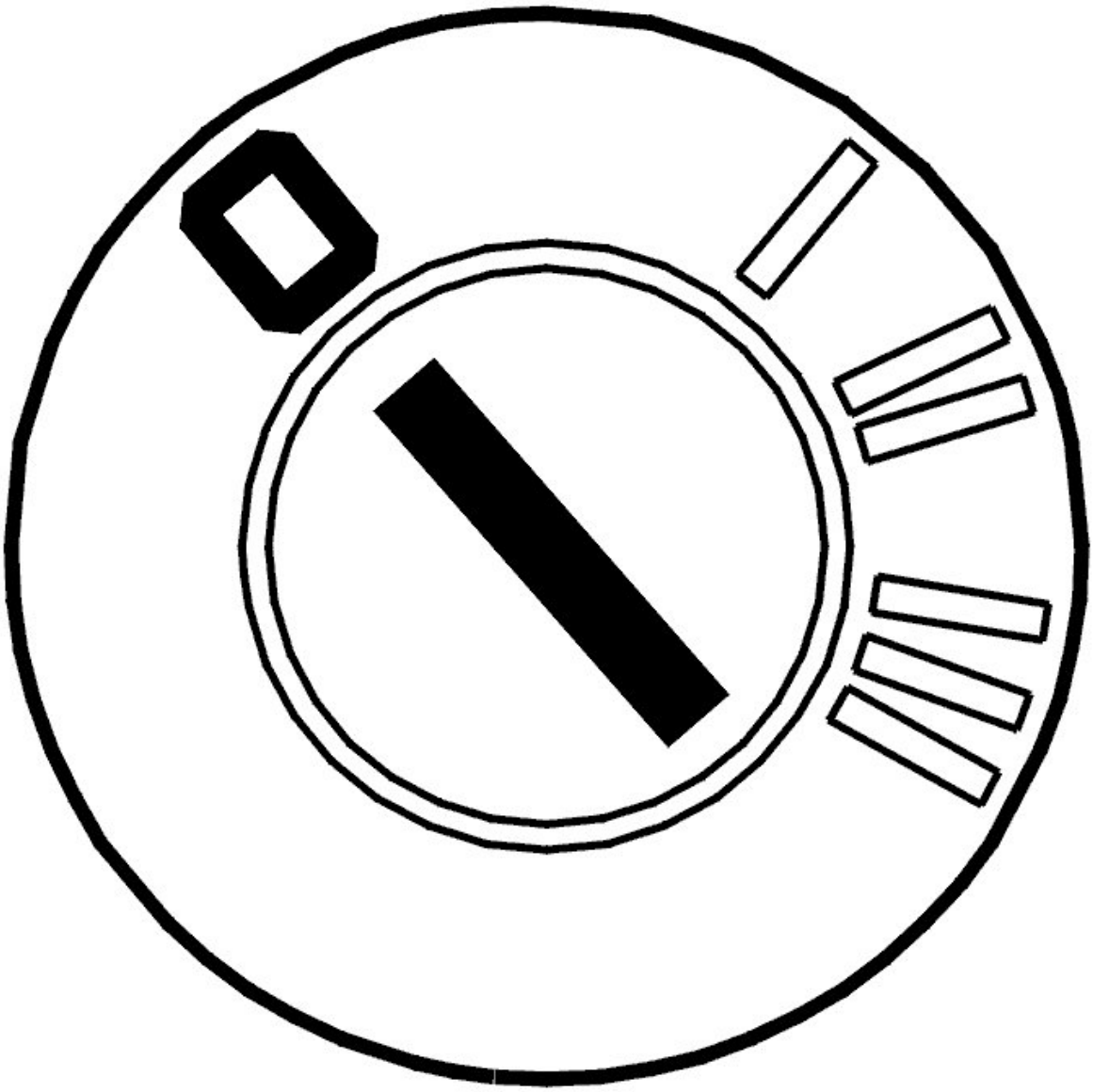
Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.

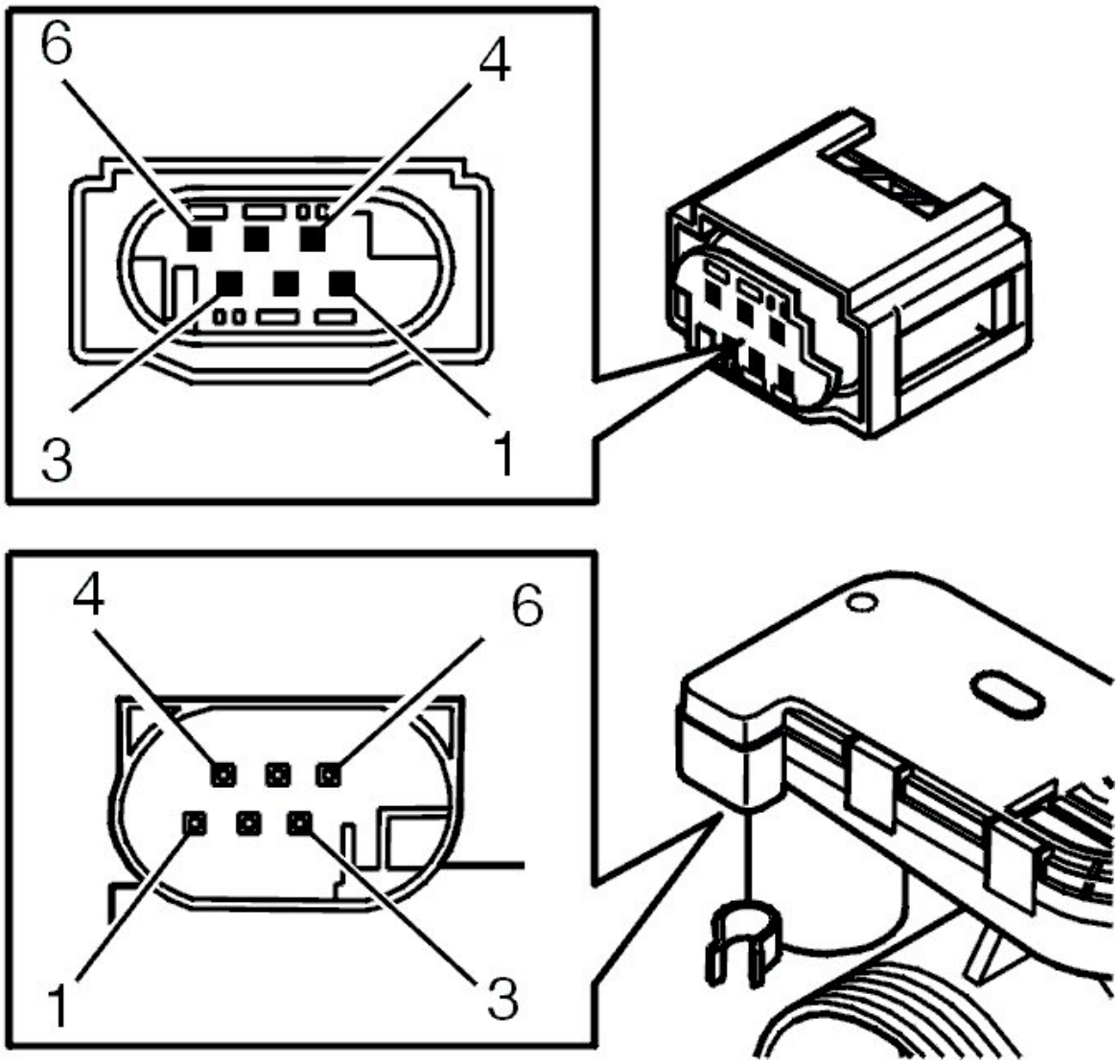
Check the resistance value of the damper motor winding in the throttle unit. Take readings between throttle unit terminals #1 and #4 (component side). Check for an open-circuit. Check for a short-circuit.

Note! The resistance of the motor winding in the damper motor is very low.

Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

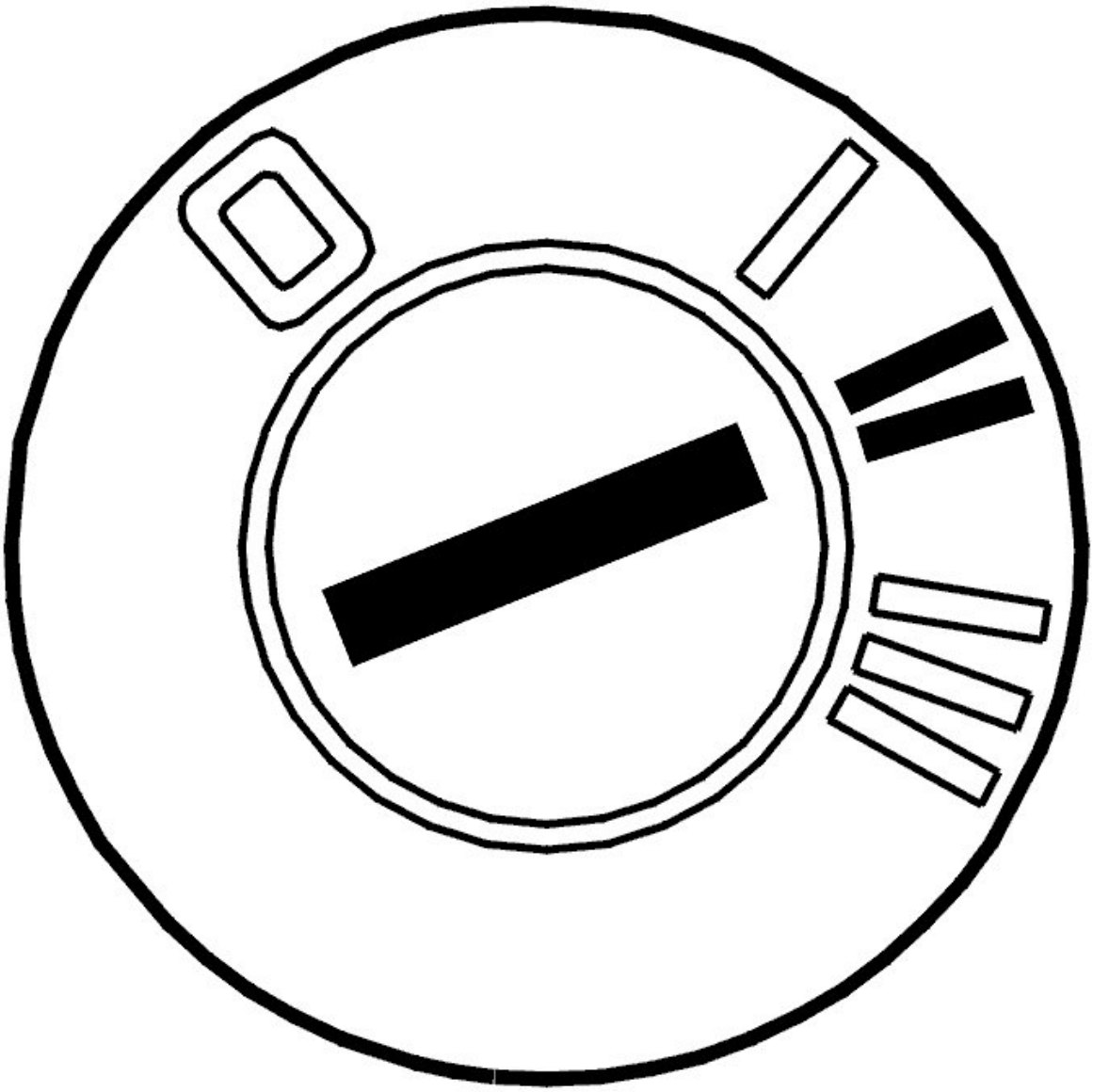
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

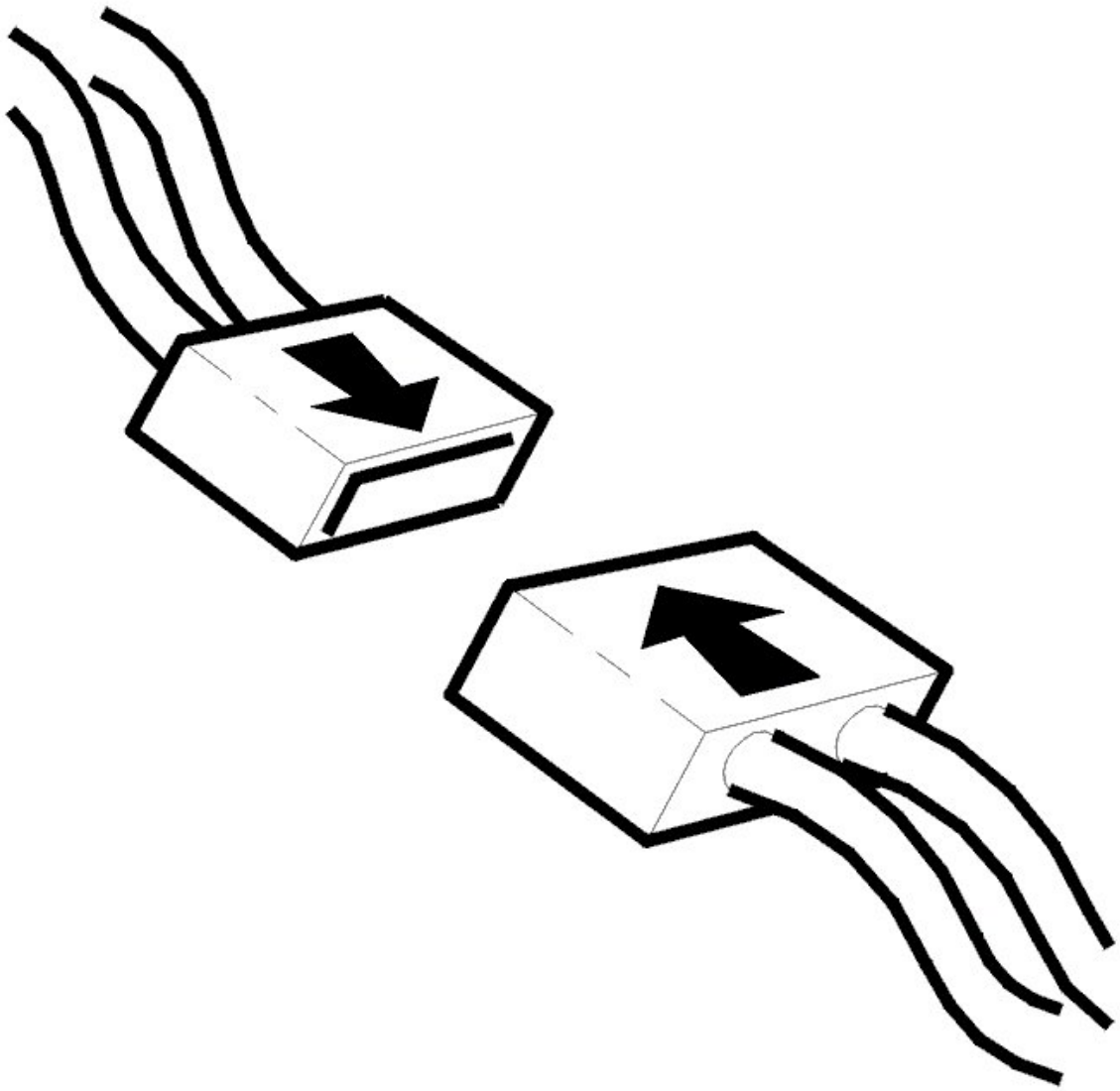


Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

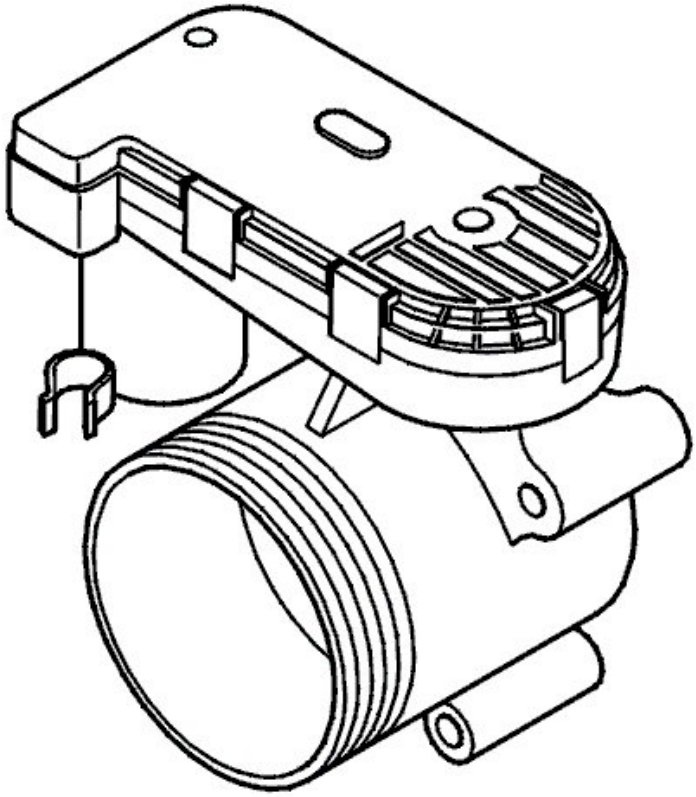
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

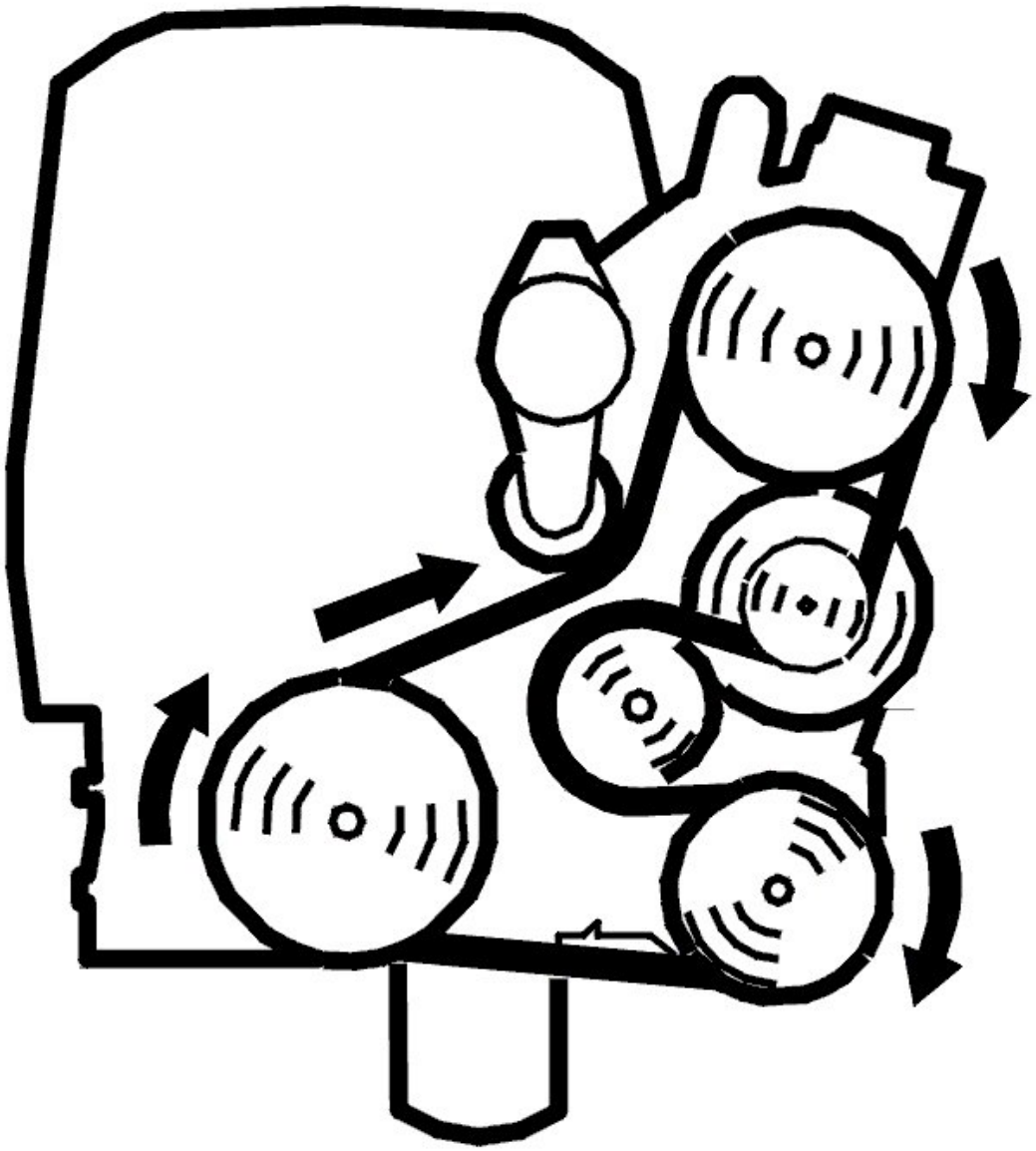


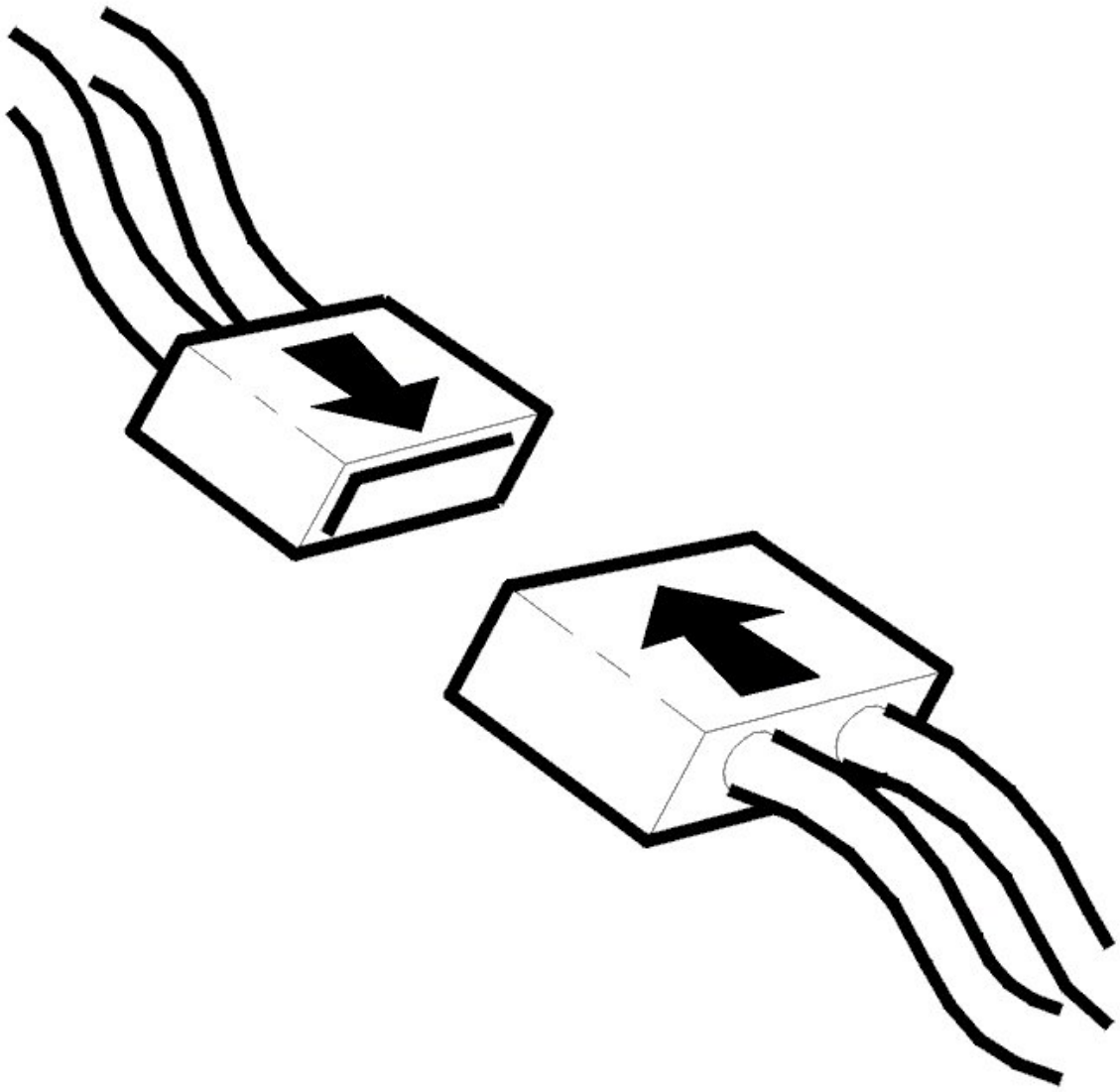
Then select Continue when the adaptation has been completed correctly.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

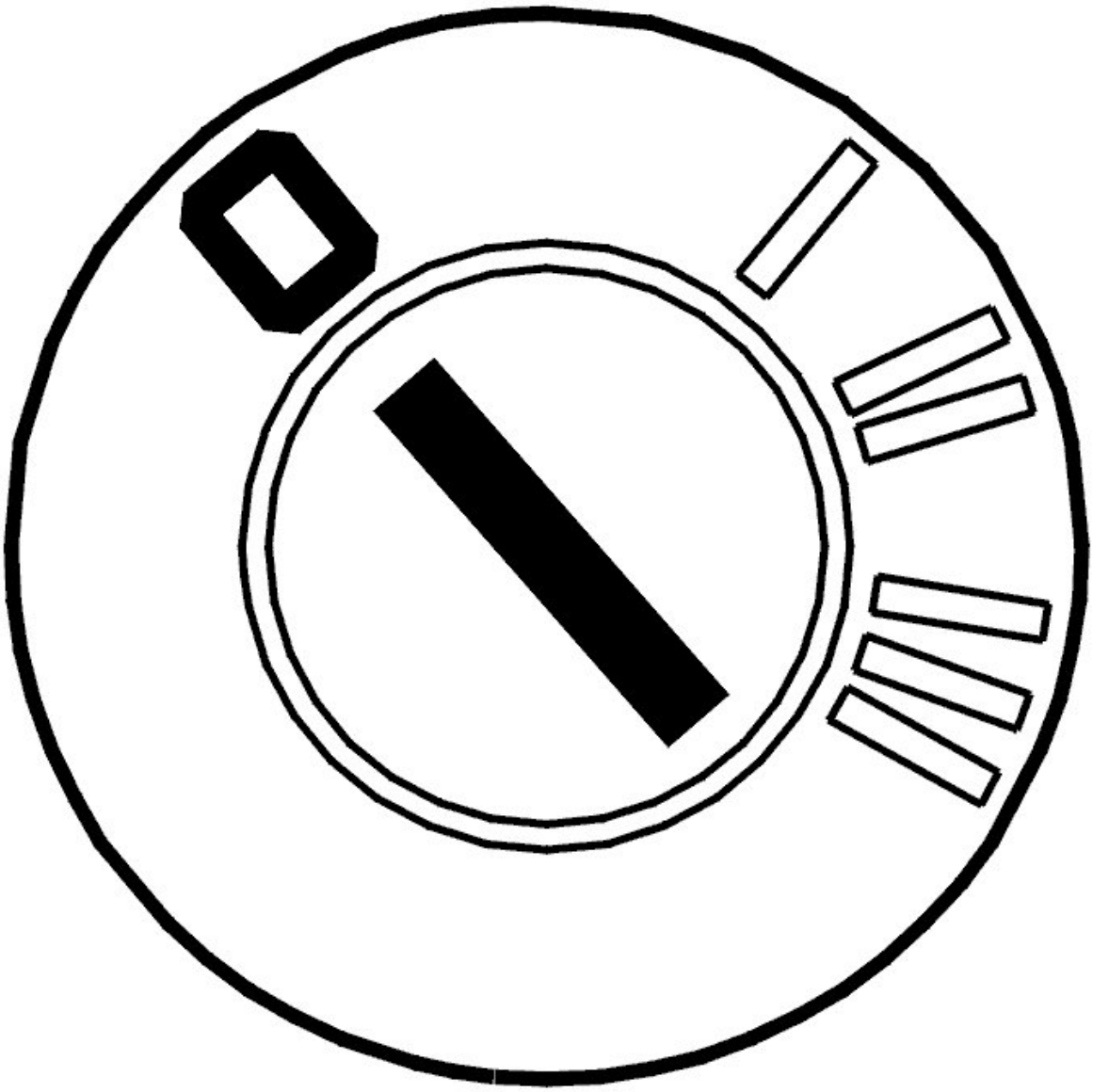
Is the function OK?

Yes - Fault Found

No - Programming the engine control module (ECM)

Programming the engine control module (ECM)

Hint: This diagnostic trouble code (DTC) may be caused by faulty software.



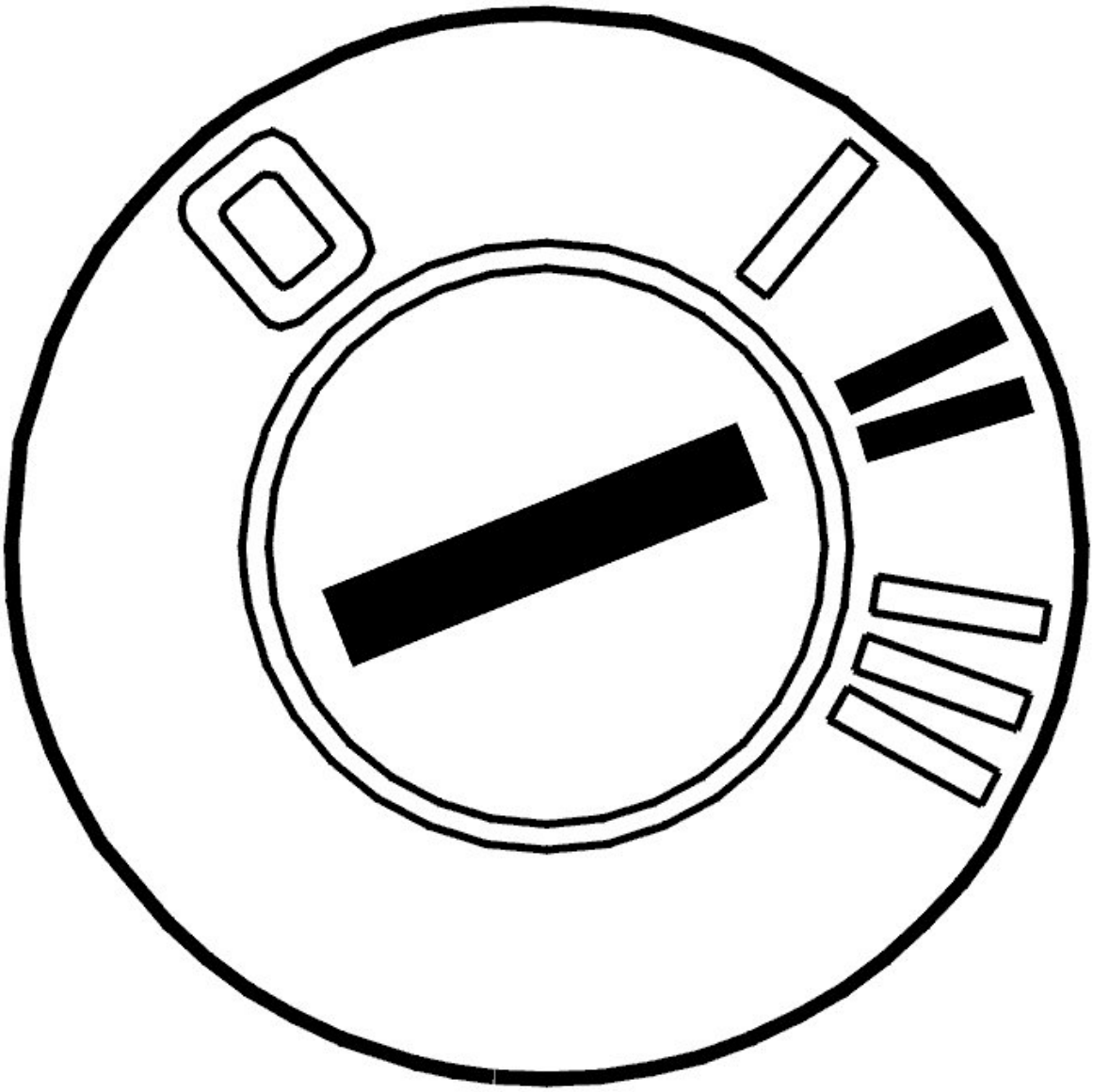
- Ignition off.

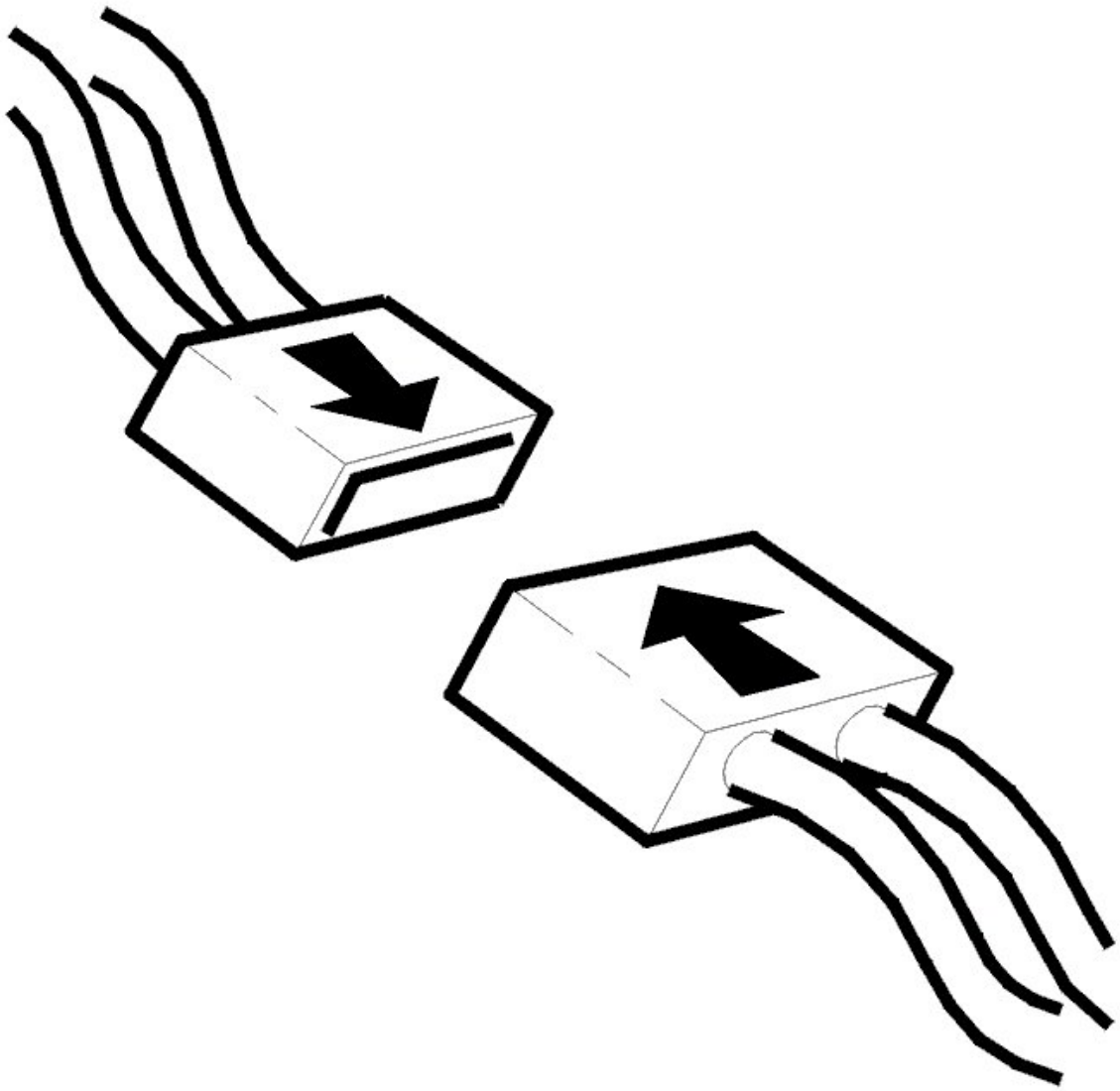
Try downloading new software to the engine control module (ECM). To download new software, see: Engine control module (ECM), replacing
See: Engine Control Module/Service and Repair
Remedy as necessary.

Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

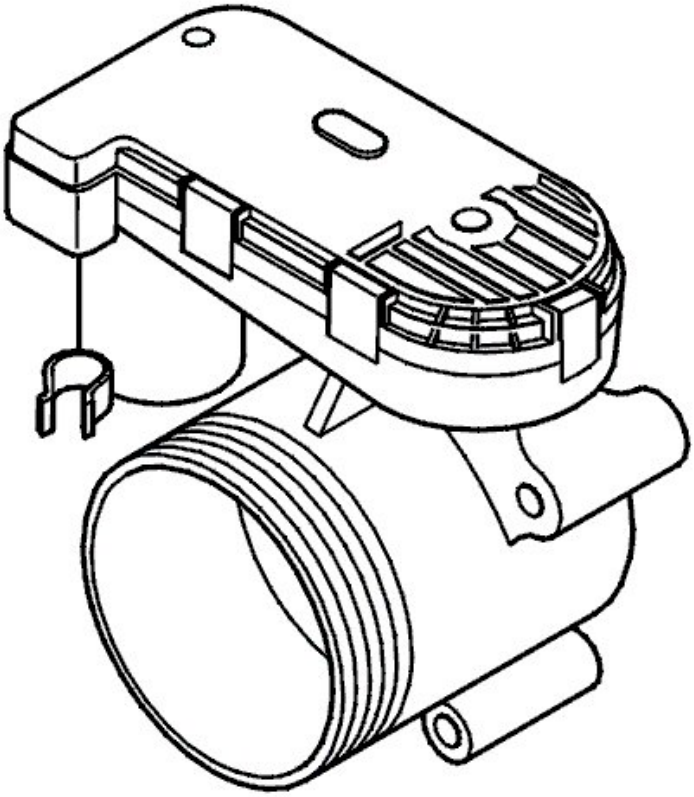
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.



Then select Continue when the adaptation has been completed correctly.

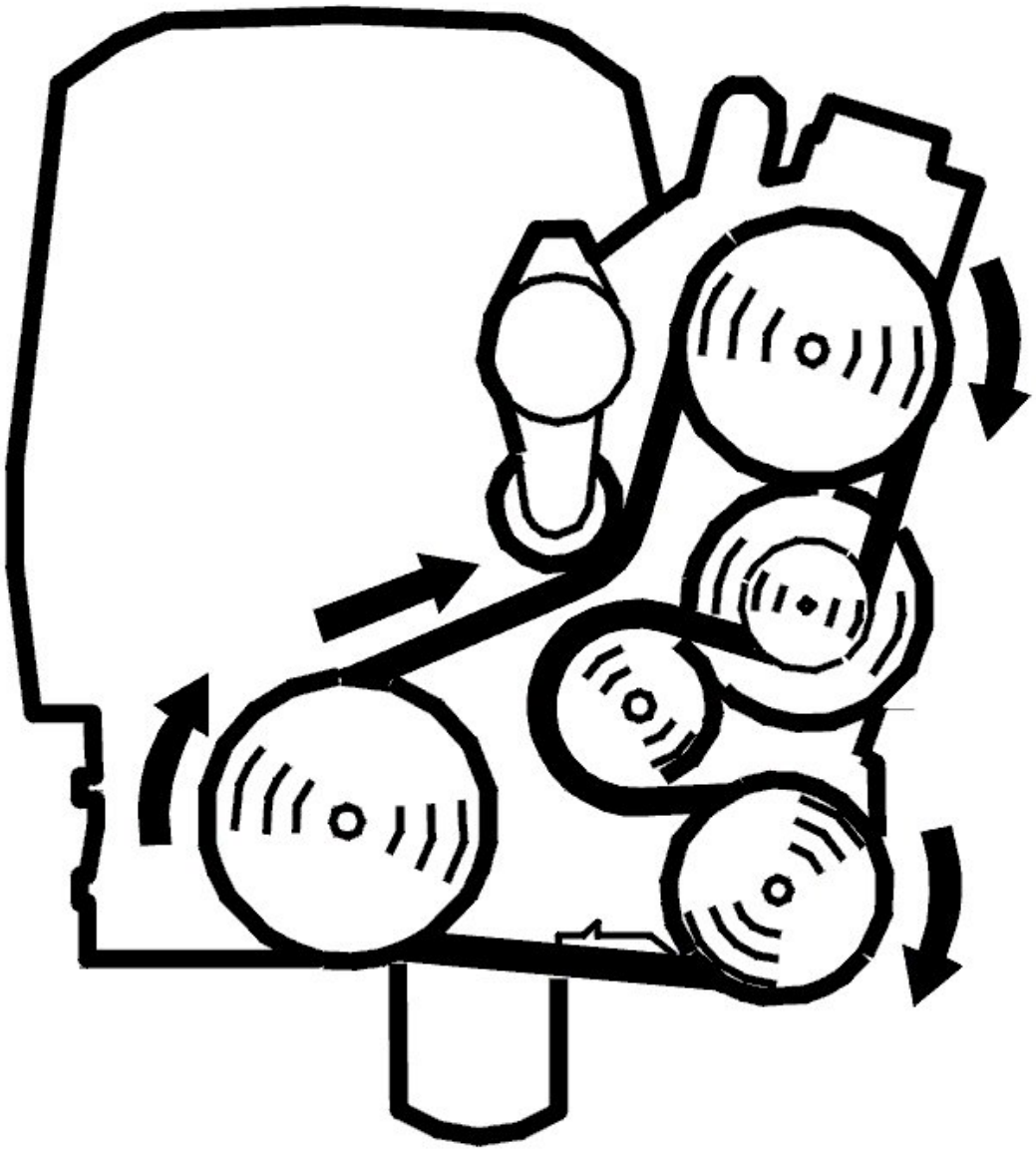
Continue - Verification

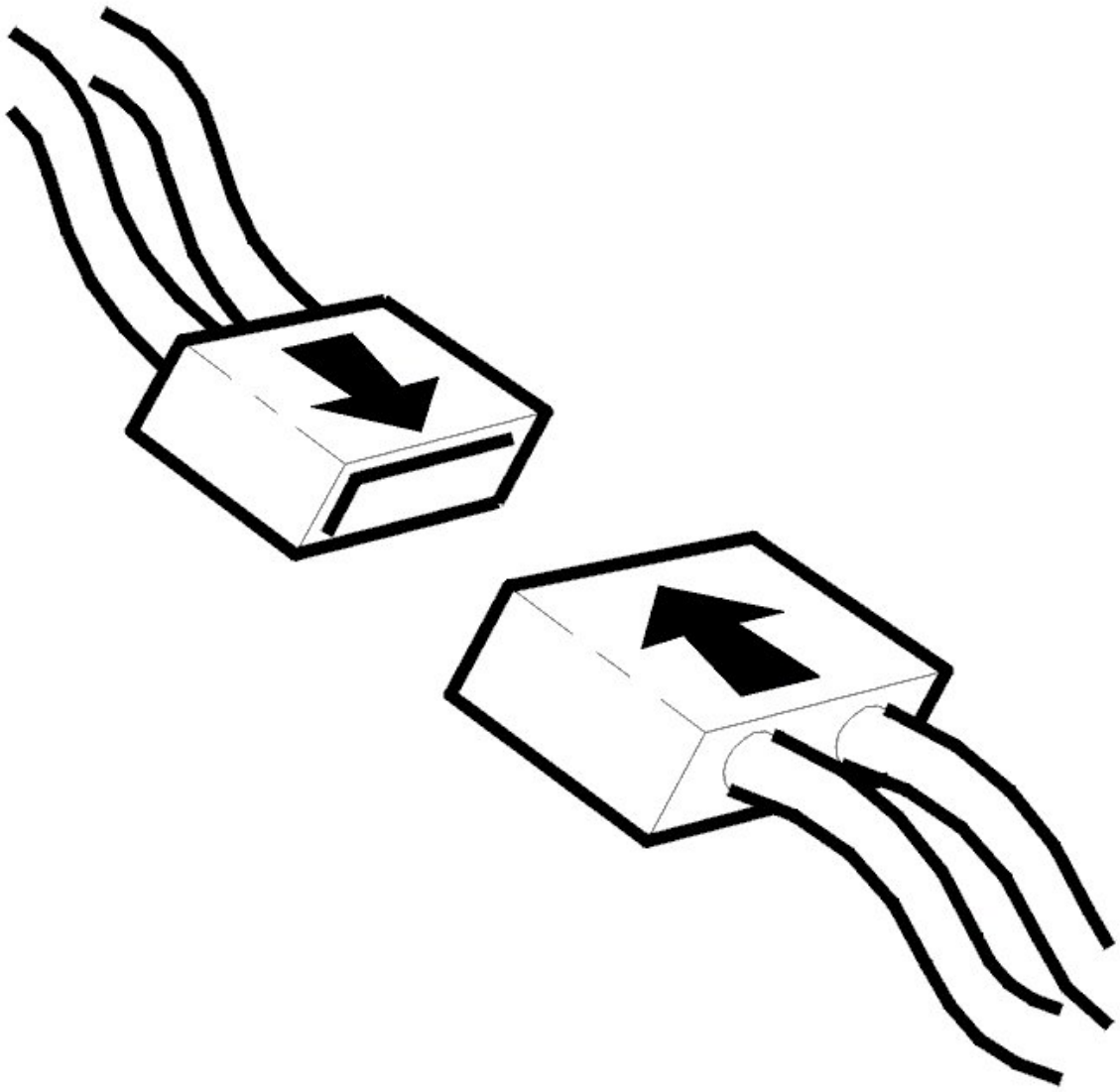
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

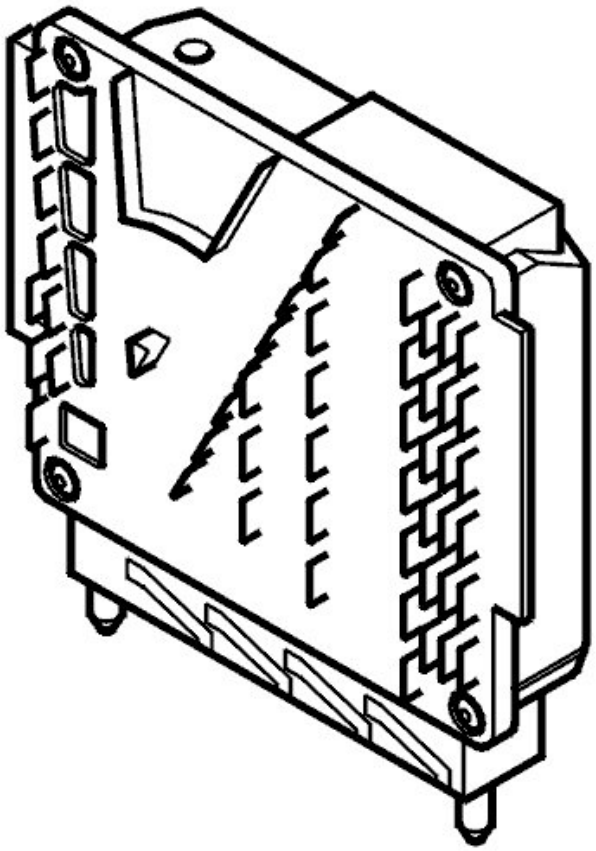
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-929D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the internal governor for control of the throttle angle in the throttle unit is damaged or that the control signal for the governor is too low when controlling the throttle.
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value

The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)

- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the wiring for the damper motor in the throttle unit
- Short-circuit to each other in the wiring for the damper motor in the throttle unit
- Damaged throttle unit
- Faulty software in the engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Signal Too Low

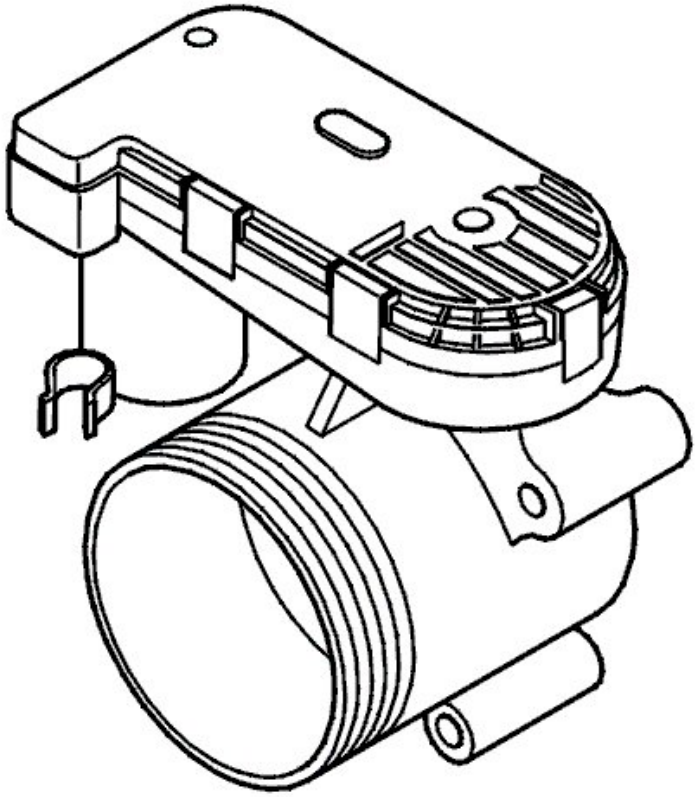
Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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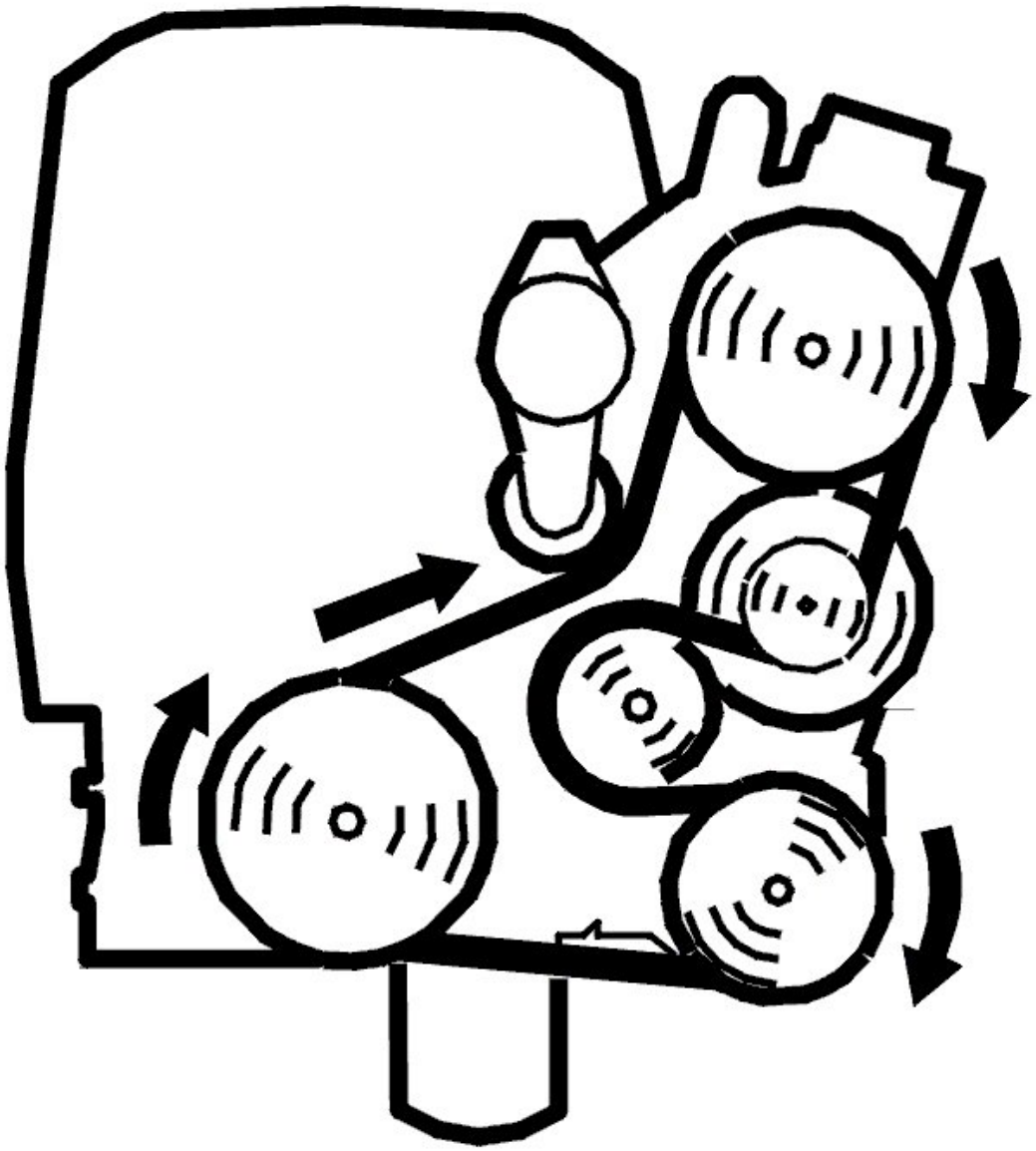
cont - Checking the fault status

Checking the fault status



- Start the engine.

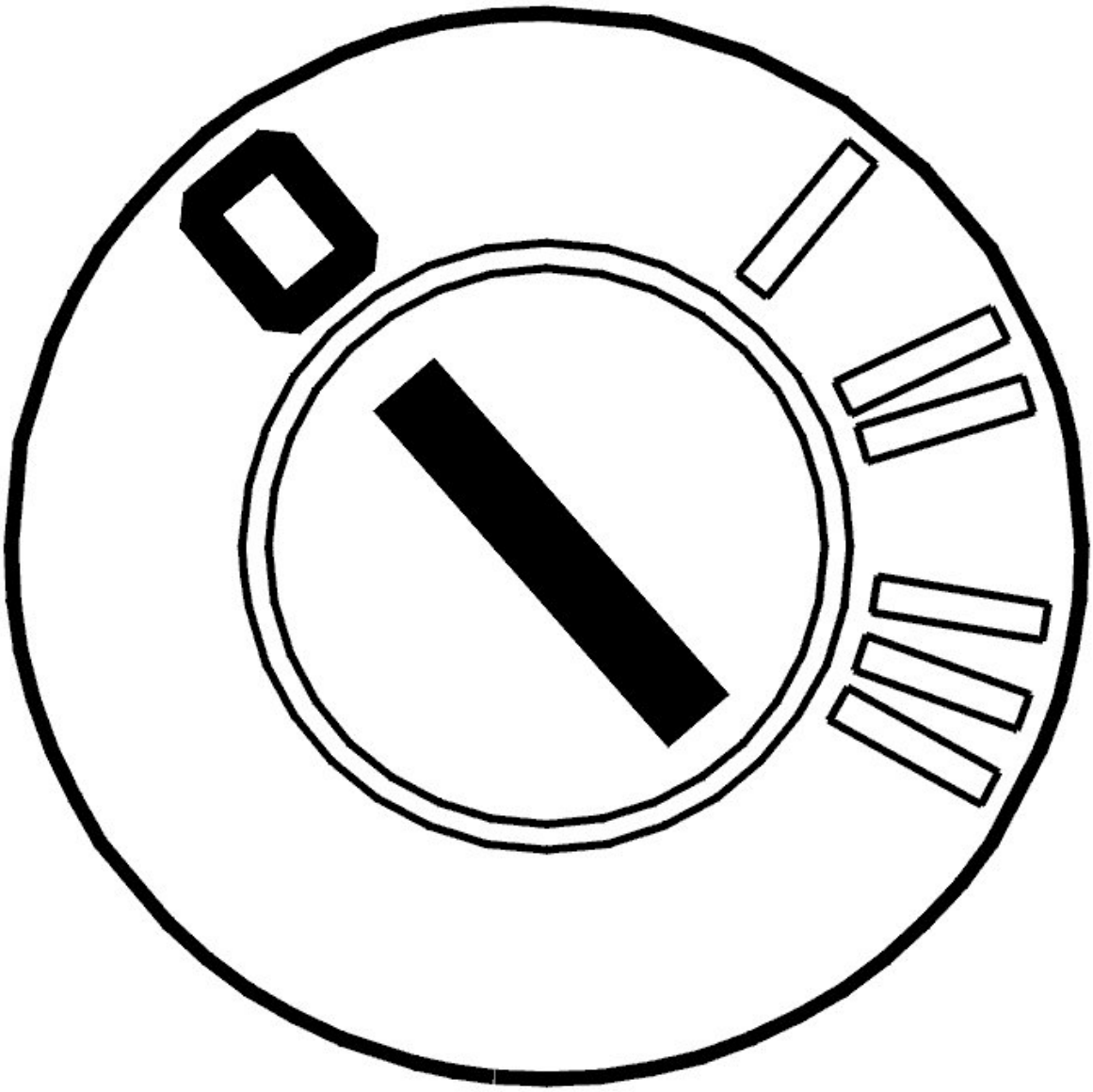
Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check whether the fault is permanent or intermittent. Read off the diagnostic trouble code (DTC) fault status when the diagnostic status is "Completed".

Hint: In some cases several functions of the component will be diagnosed. The affects the amount of time taken to run the diagnostic.

The fault is permanent if the fault status is "Fault found". If the fault status is "No fault found" the fault is intermittent and not presently active.

Continue - Checking components and wiring

Checking components and wiring



- Ignition off
- Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.

Check the resistance value of the damper motor winding in the throttle unit. Take readings between throttle unit terminals #1 and #4 (component side). Check for an open-circuit. Check for a short-circuit.

Note! The resistance of the motor winding in the damper motor is very low.

Check the cable (+) for the damper motor between engine control module (ECM) terminal #A35 (#A35) and throttle unit terminal #4 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable (-) for the damper motor between engine control module (ECM) terminal #A36 (#A36) and throttle unit terminal #1 (cable harness side). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Also check the damper motor cables (+) and (-). Check for a short-circuit to each other.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
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- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
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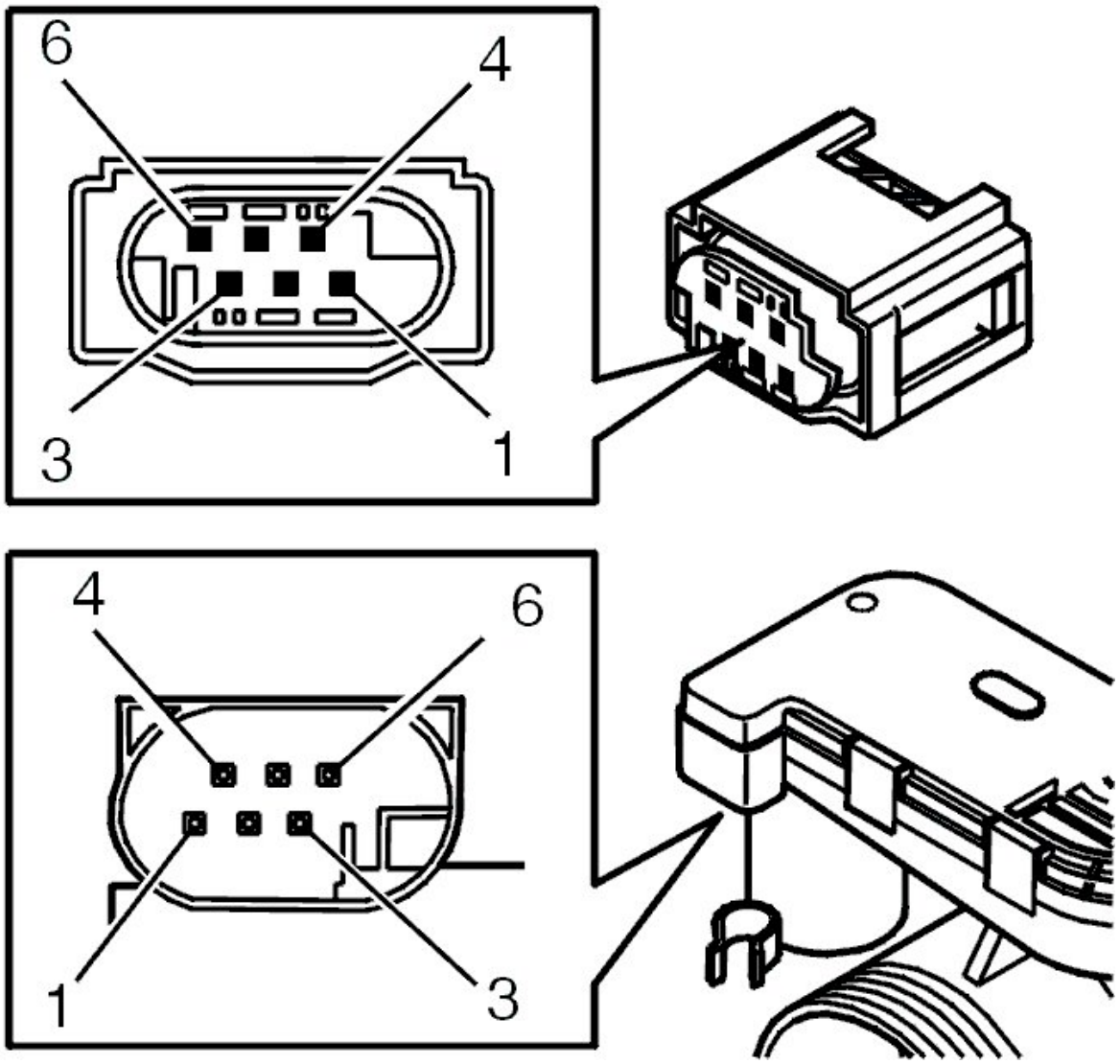
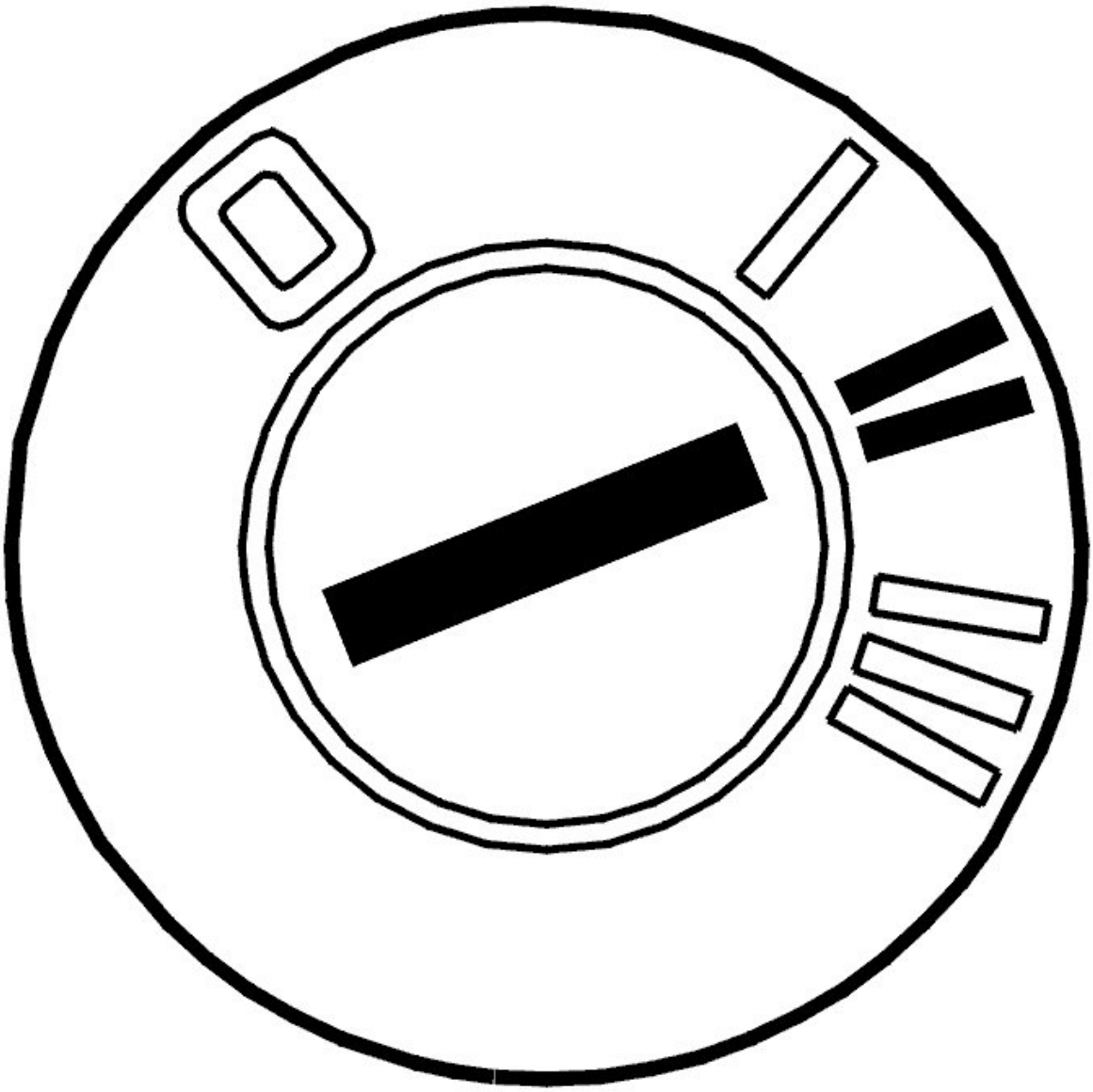
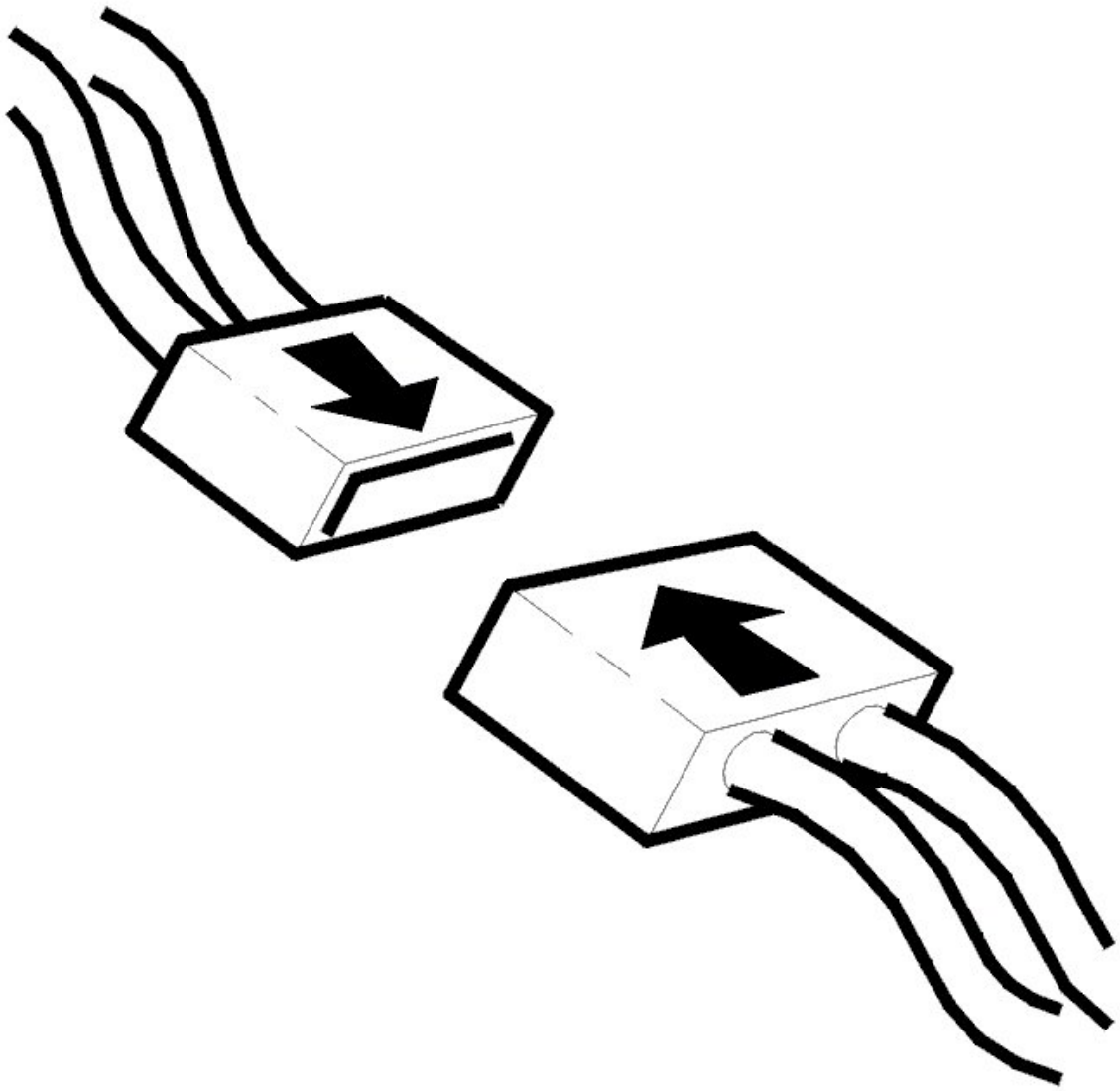


Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

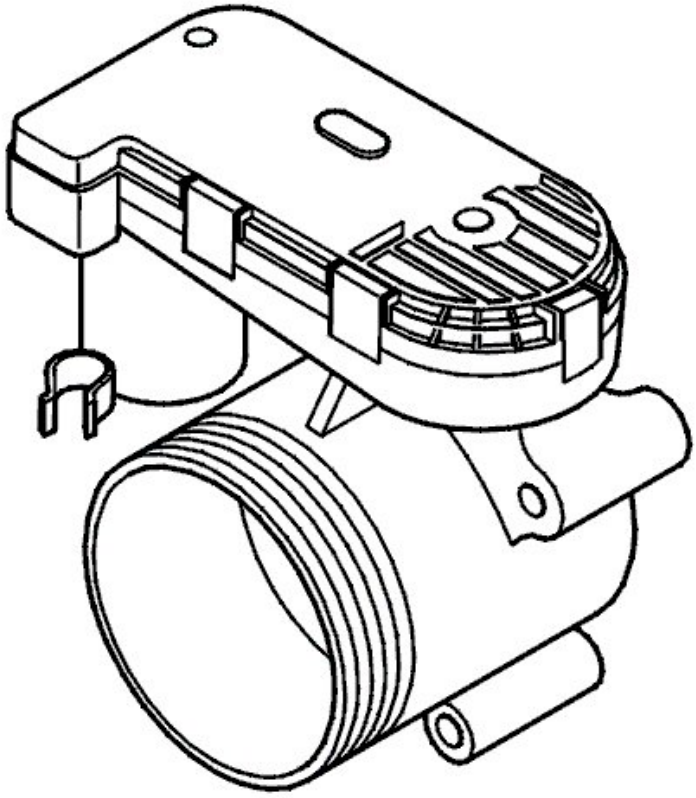
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

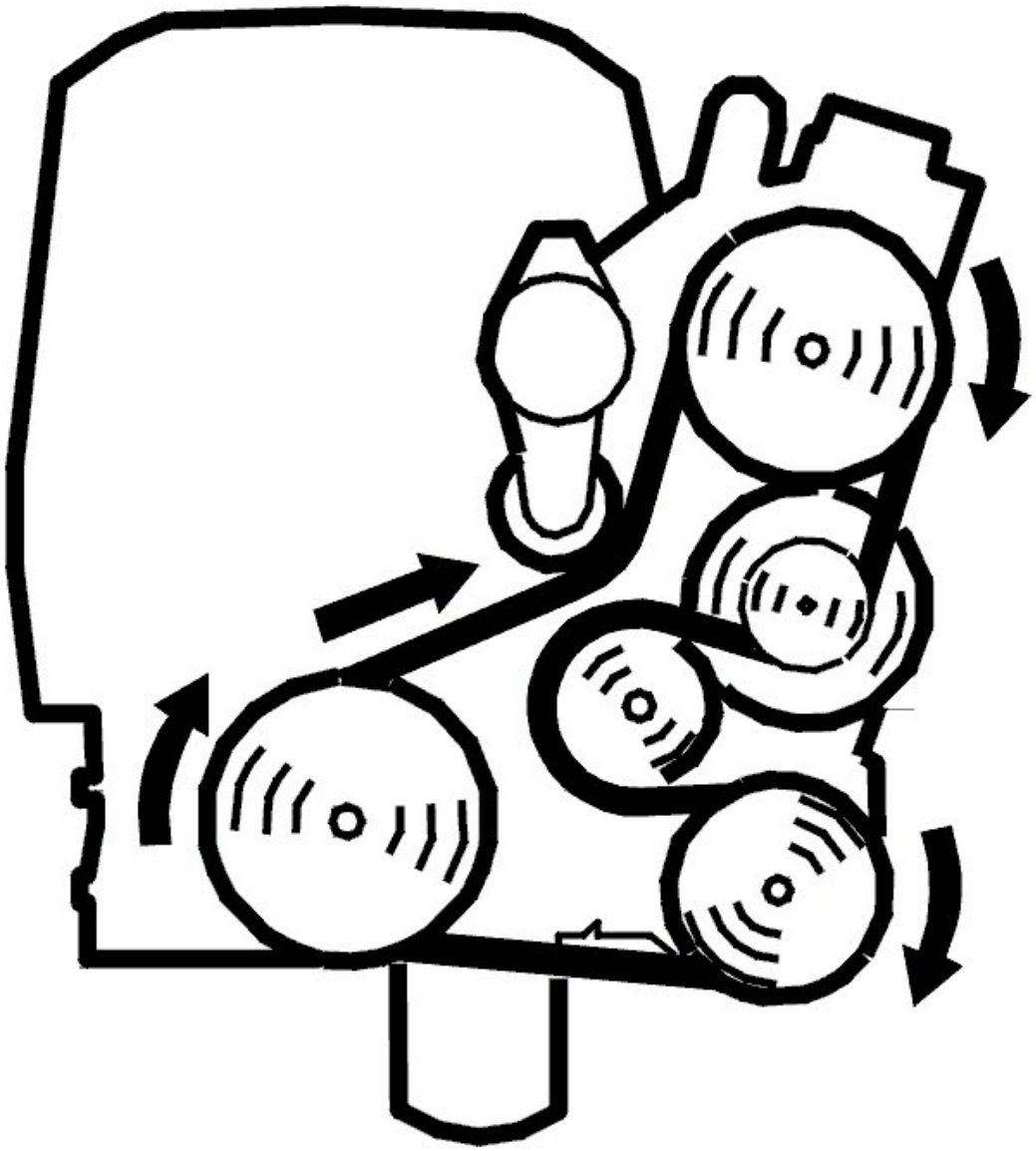


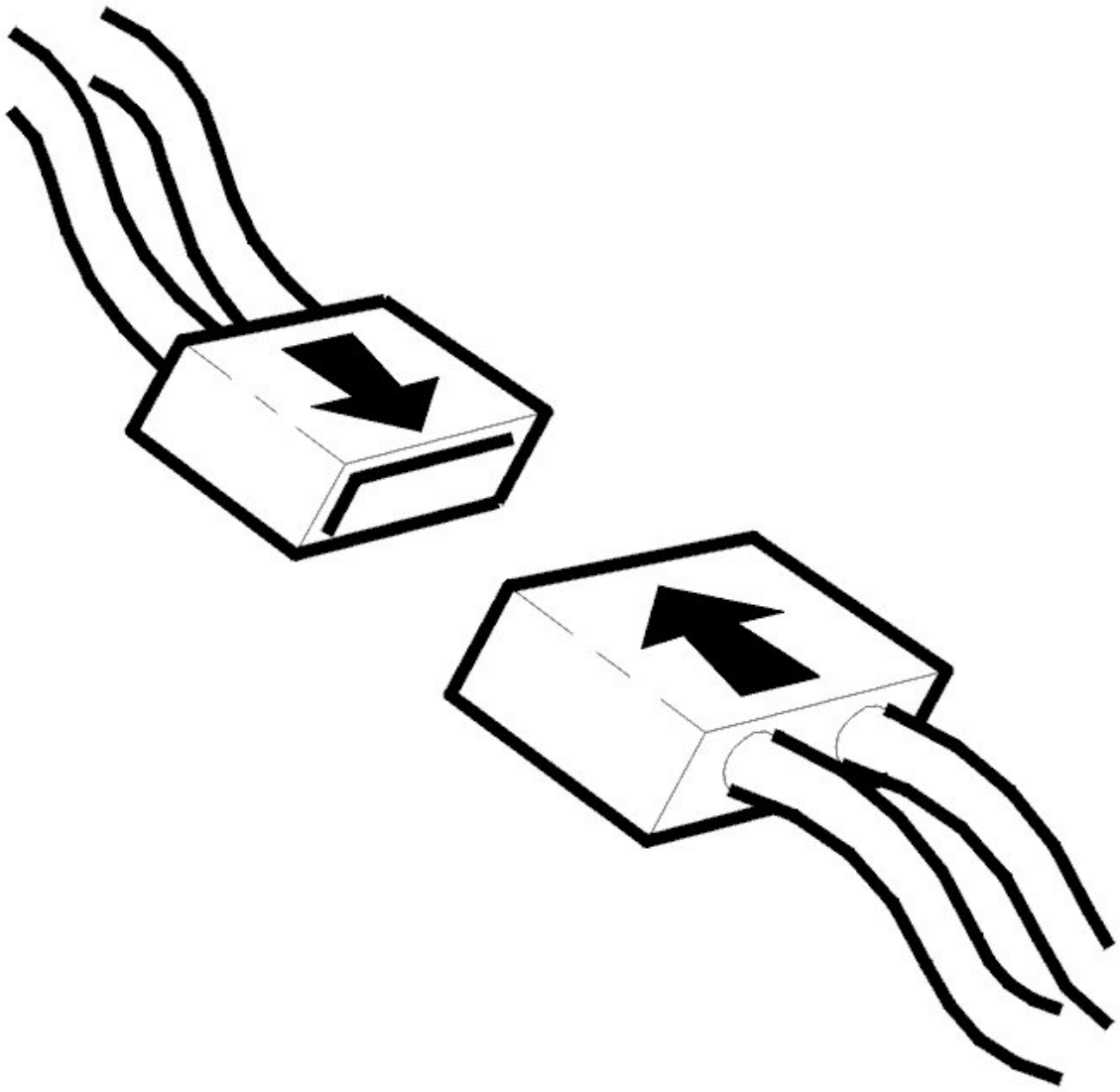
Then select Continue when the adaptation has been completed correctly.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

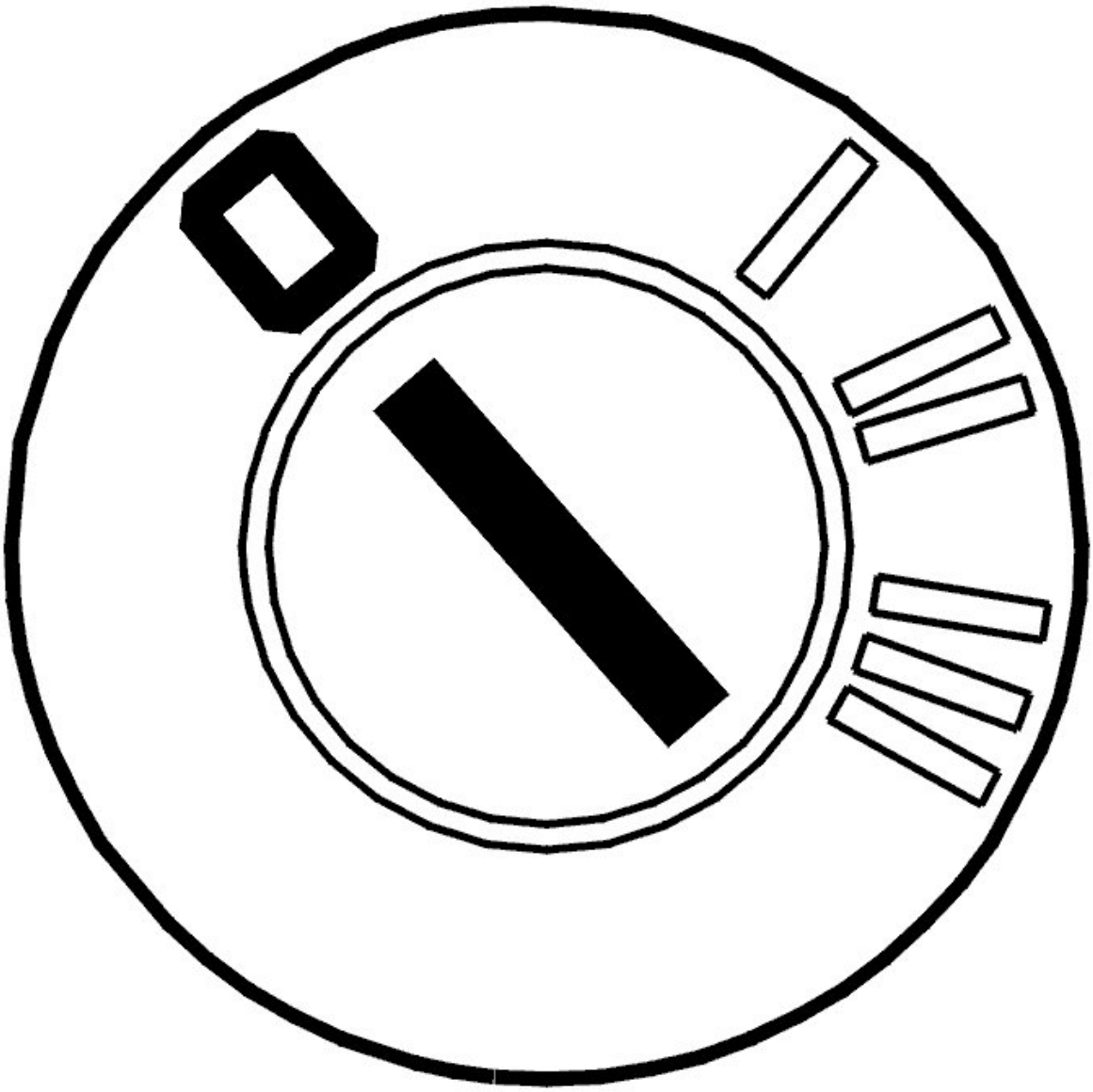
Is the function OK?

Yes - Fault Found

No - Programming the engine control module (ECM)

Programming the engine control module (ECM)

Hint: This diagnostic trouble code (DTC) may be caused by faulty software.



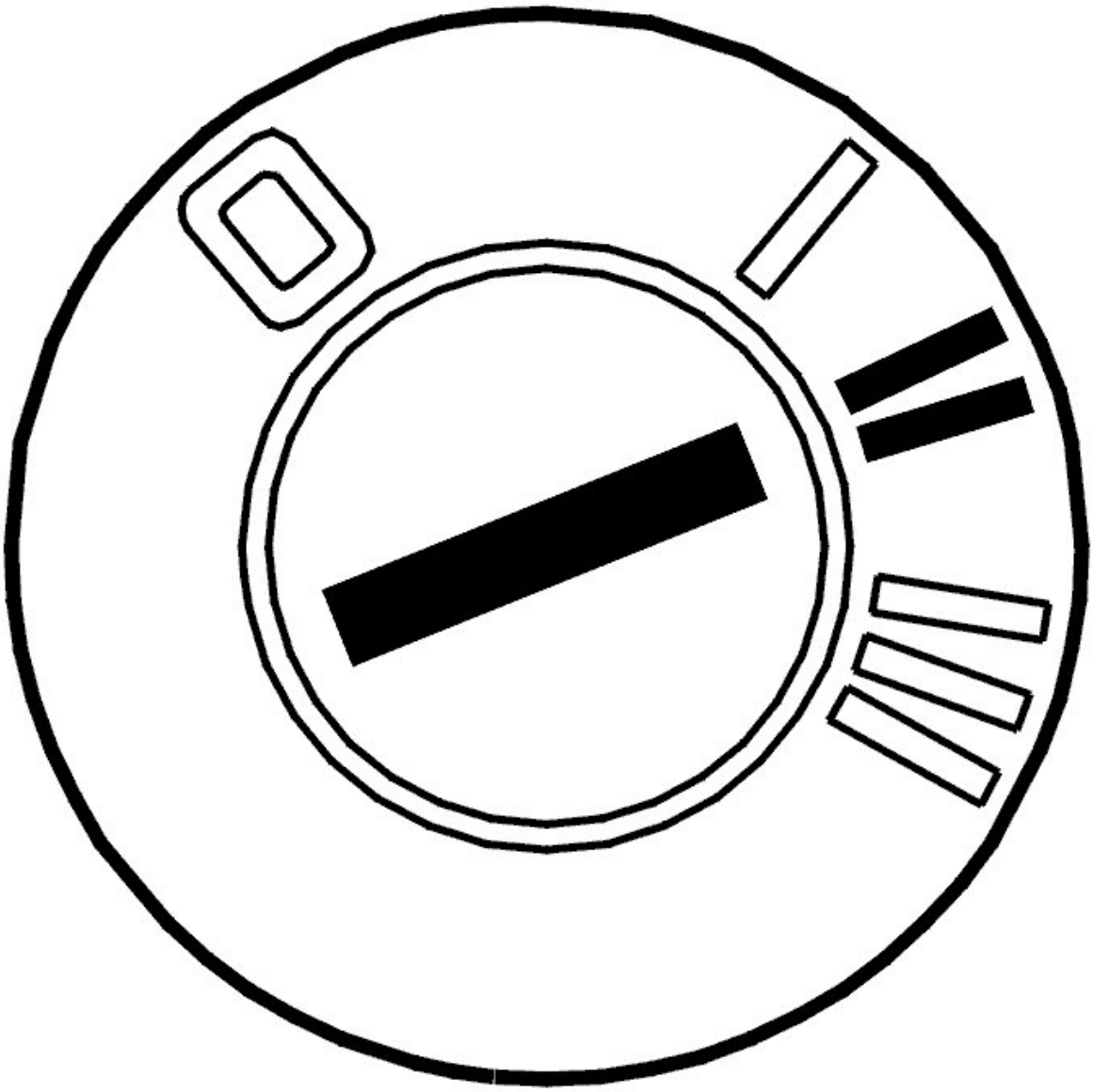
- Ignition off.

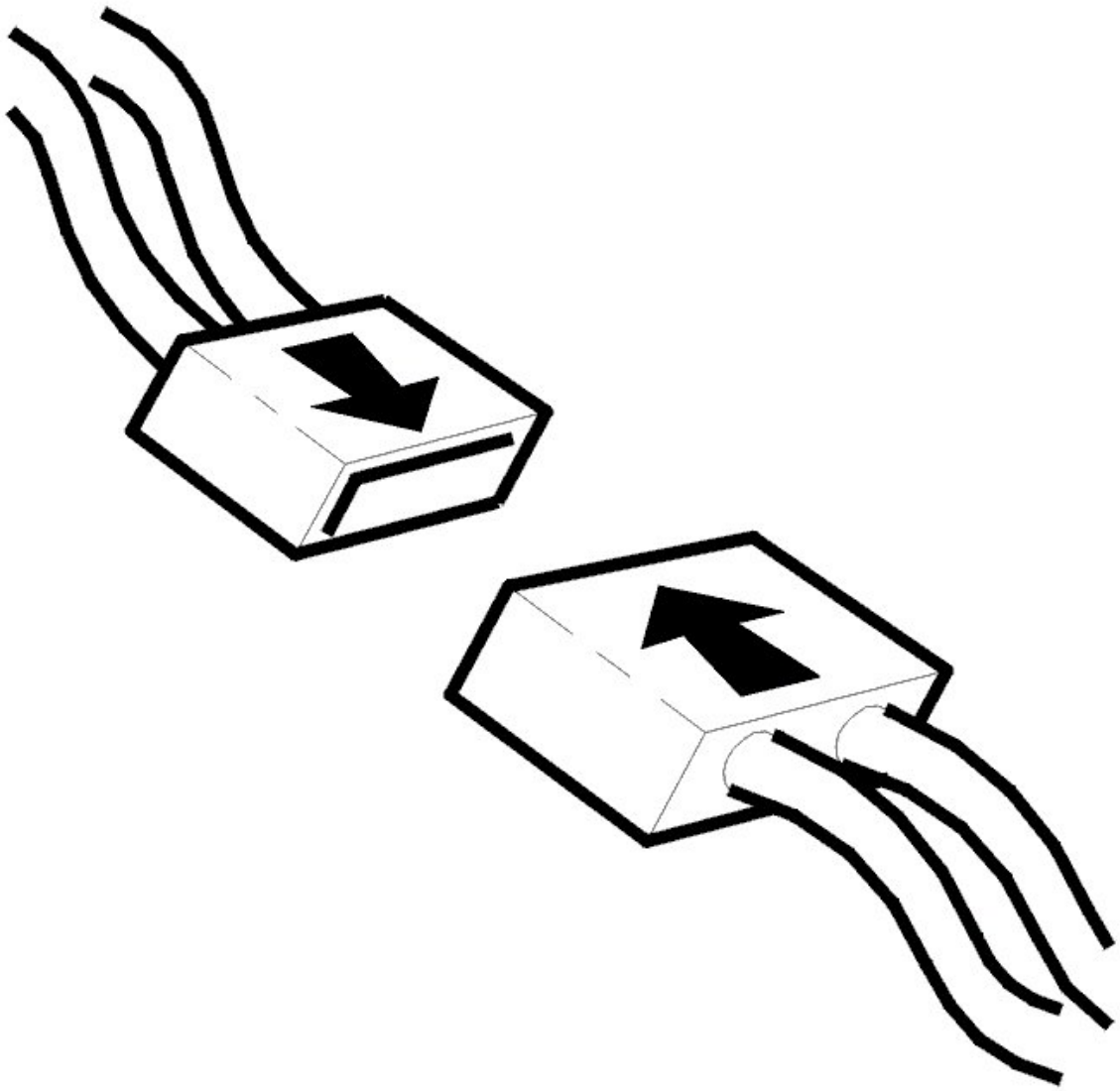
Try downloading new software to the engine control module (ECM). To download new software, see: Engine control module (ECM), replacing
See: Engine Control Module/Service and Repair
Remedy as necessary.

Continue - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

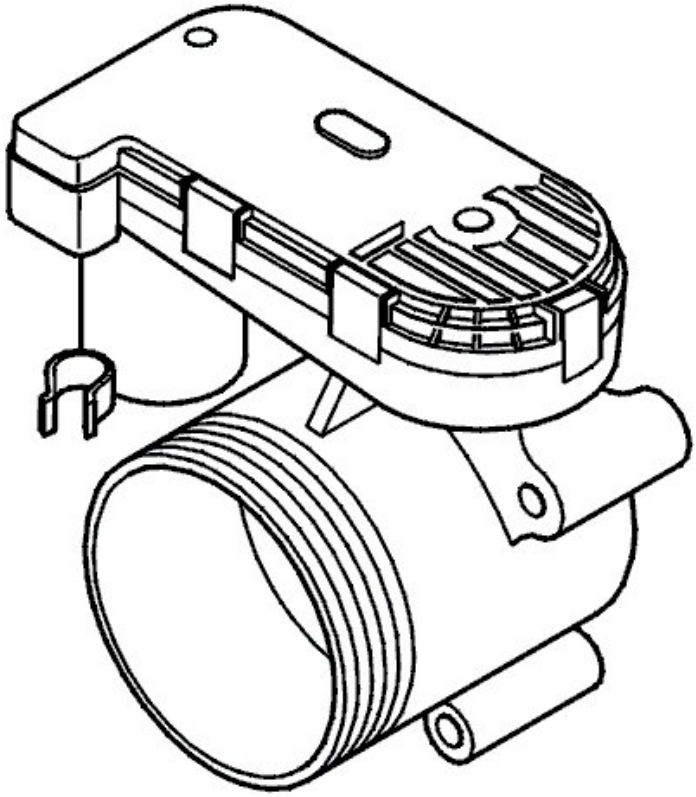
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.



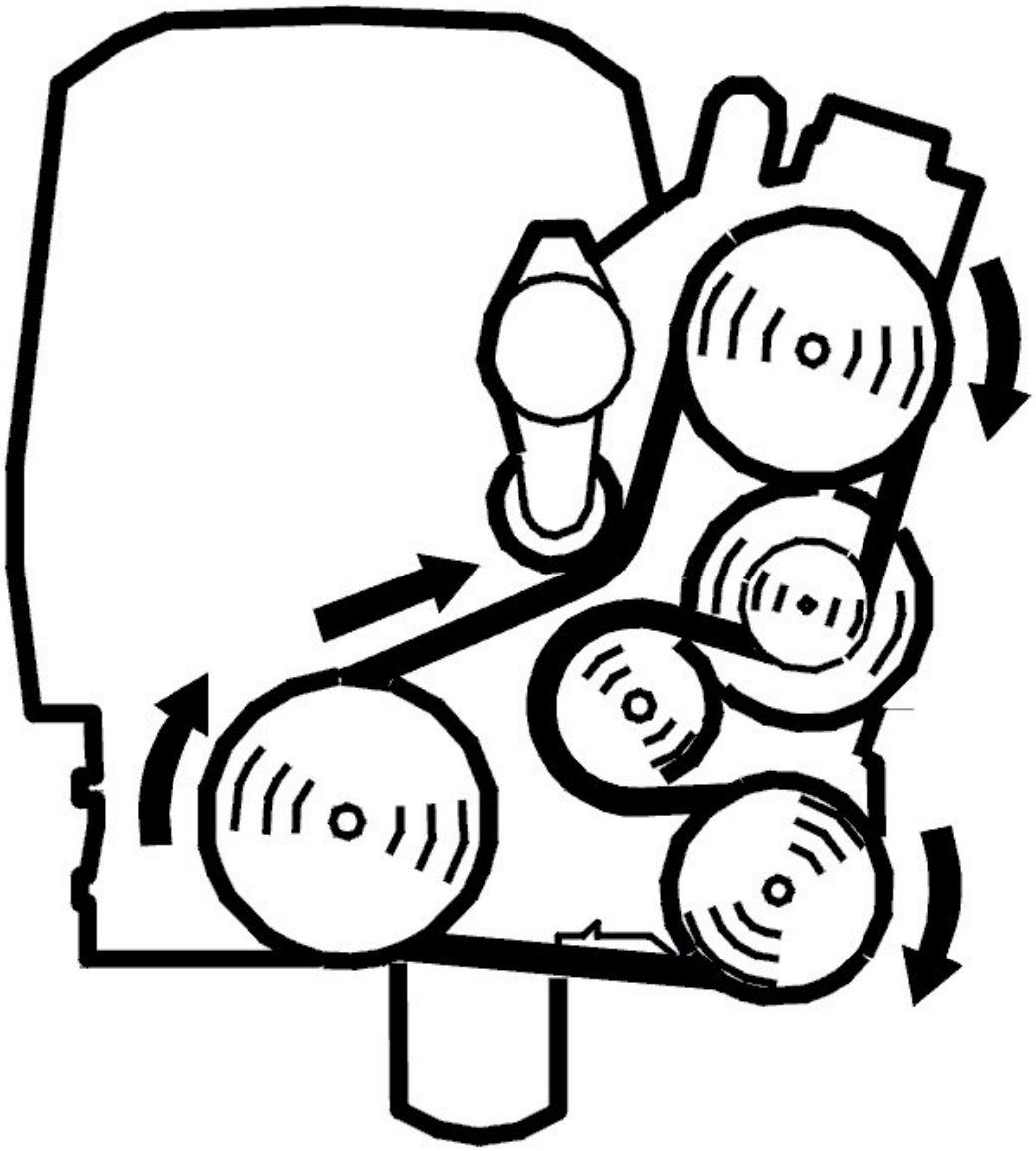
Continue - Verification

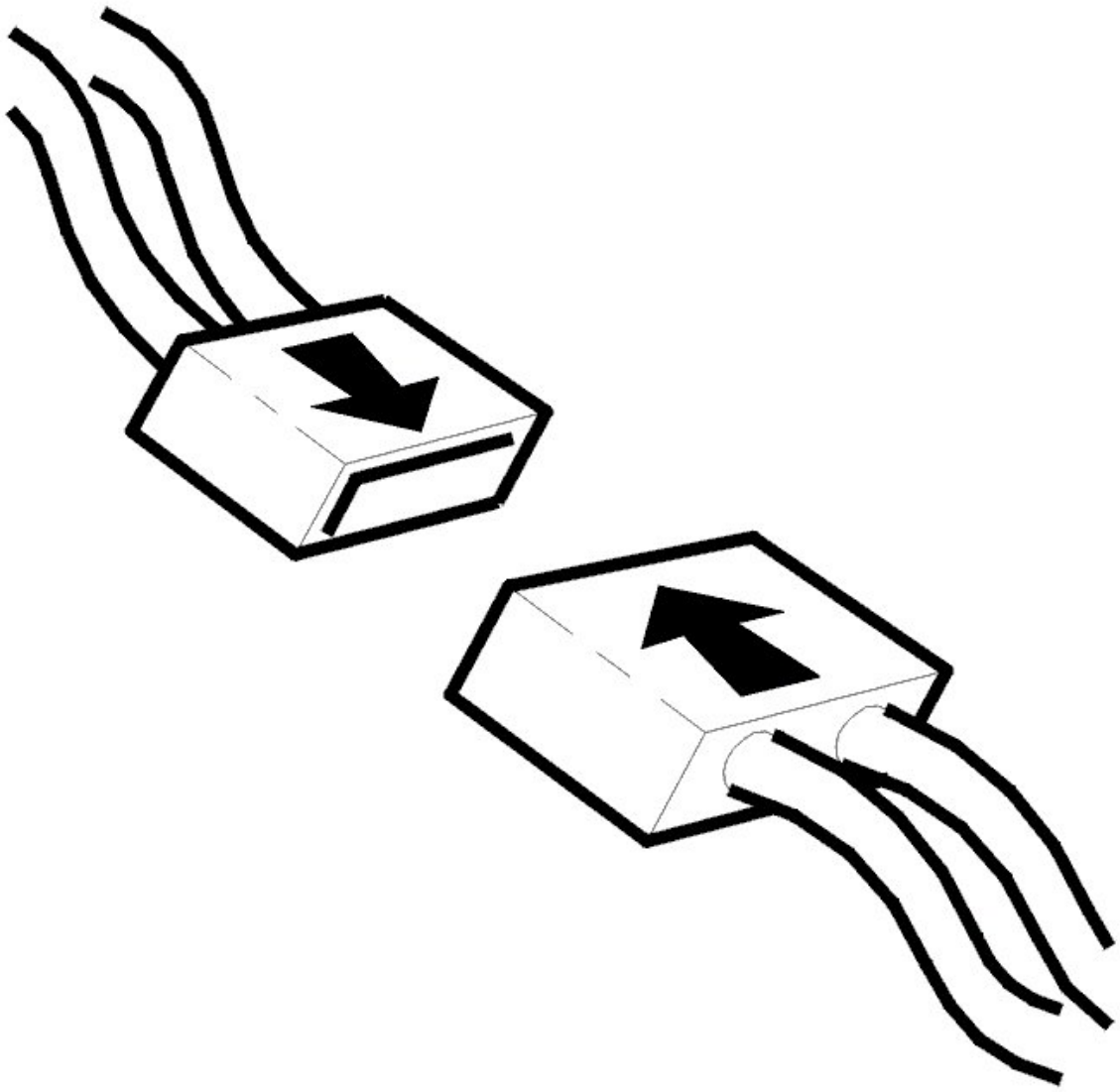
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine.

Read off the diagnostic status and fault status for the diagnostic trouble code (DTC) by selecting the relevant diagnostic trouble code (DTC) from the list.
Check the fault status for the diagnostic trouble code (DTC) when the diagnostic is "Complete". If the function is correct, the fault status must be "No fault found" when the diagnostic is complete.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

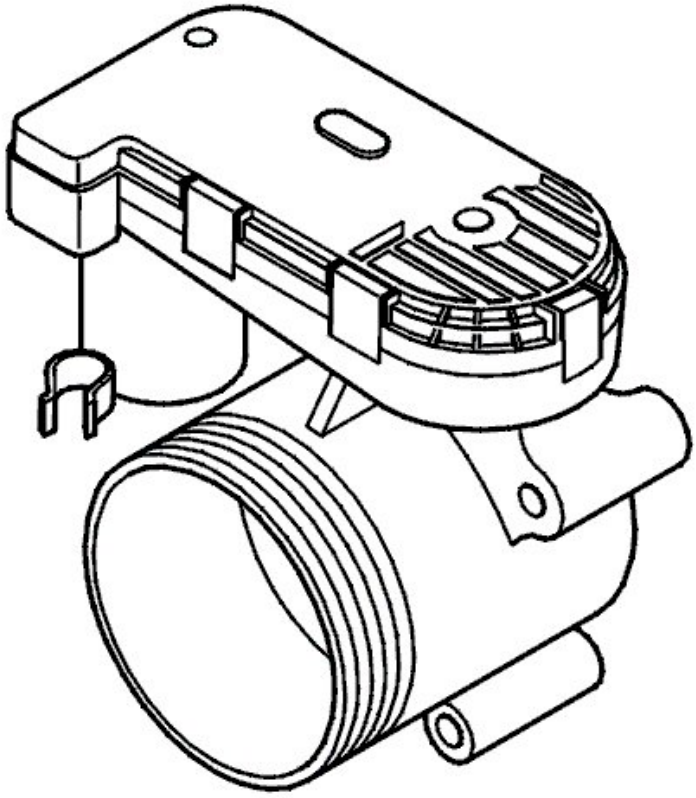
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-92B0

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) fails to carry out its first adaptation of the electronic throttle unit. This is because the programmed parameter for the stop position in the throttle position (TP) sensor has been exceeded. This adaptation is normally run during manufacture of the vehicle. However the electronic throttle unit must be adapted again if the software, the engine control module (ECM) or the throttle unit is replaced. If other diagnostic trouble codes (DTCs) are stored, these must be remedied first. These may have caused the adaptation to fail.

Substitute value

- The engine control module (ECM) uses nominal values for the throttle unit parameters
- The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Damaged throttle unit.

Fault symptom[s]

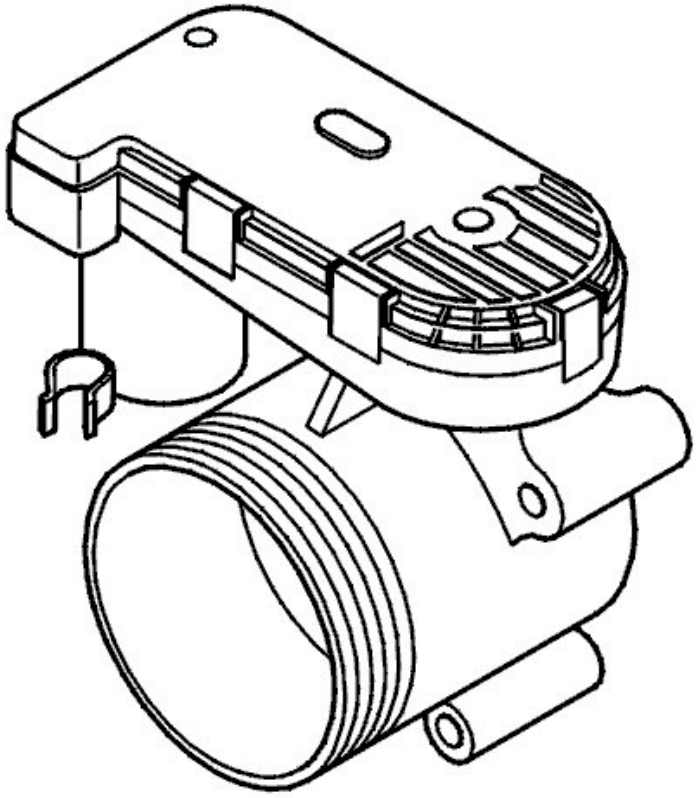
- Malfunction indicator lamp (MIL) lit
- Poor performance.

Faulty Signal

Faulty signal

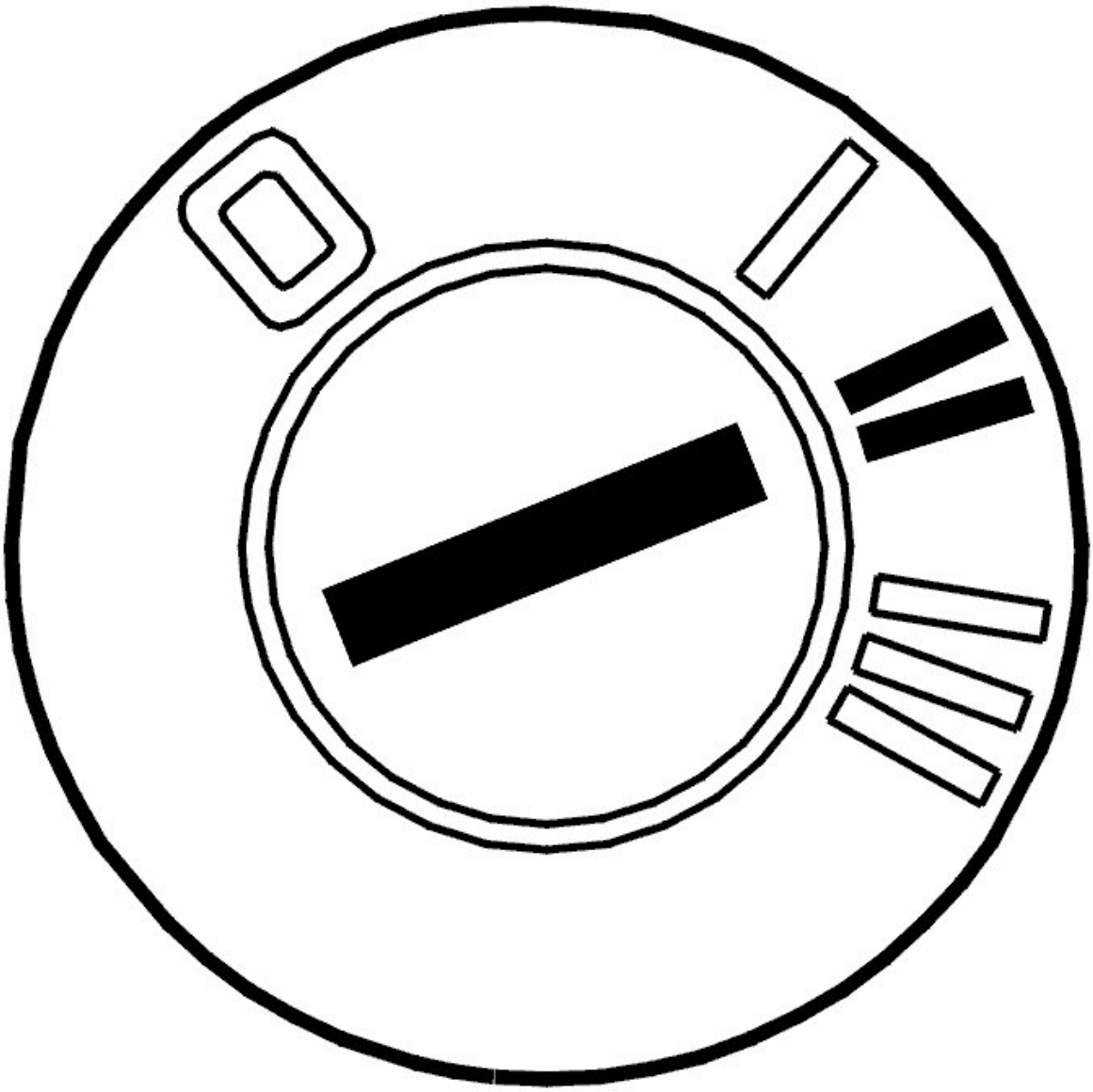
Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check to see if any other diagnostic trouble codes (DTCs) are stored. If other diagnostic trouble codes (DTCs) are stored, they may mean that it is not possible to run the adaptation of the engine control module (ECM).

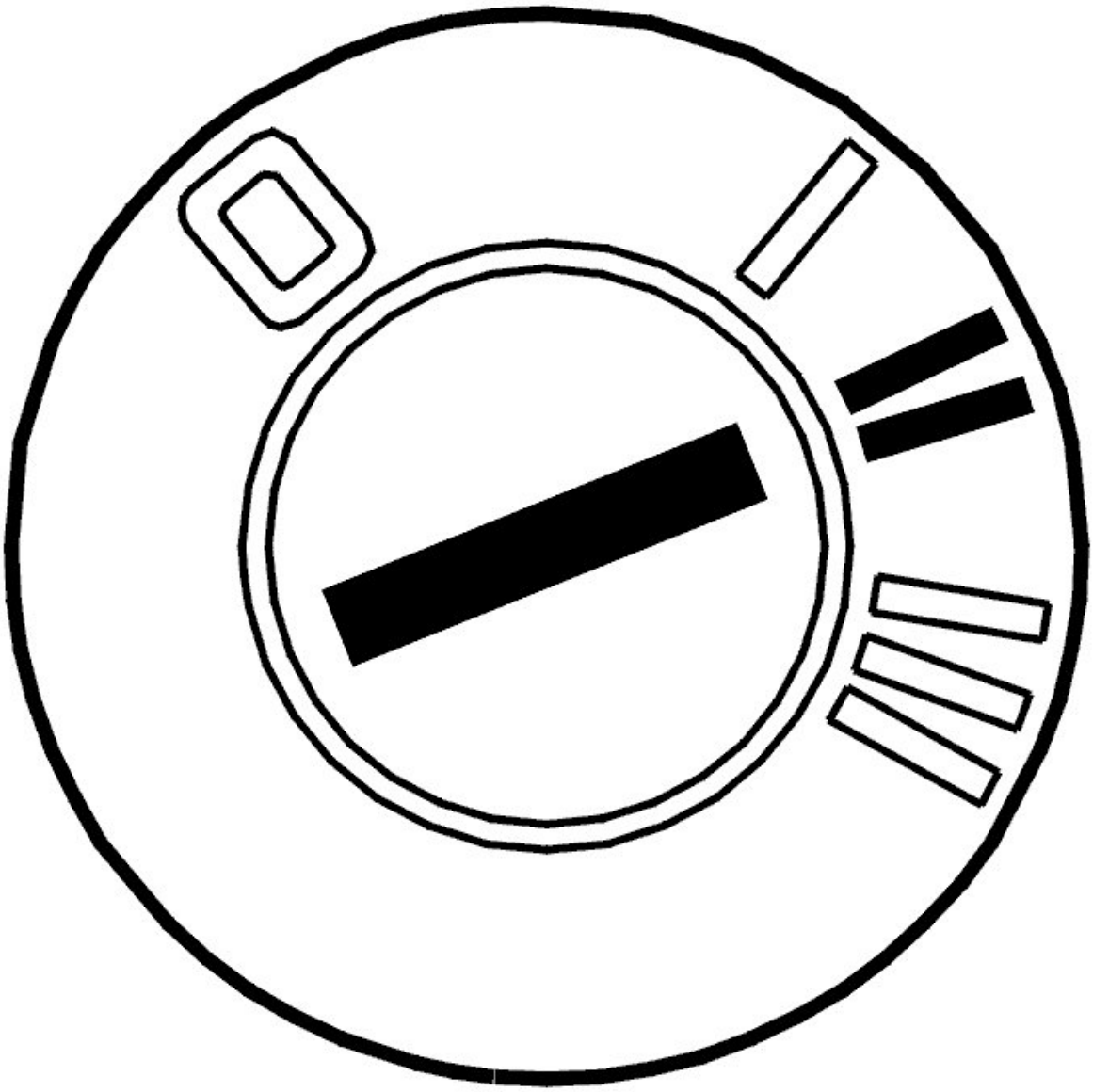
Are any other diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking the status

Checking the status

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.



- Ignition off
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

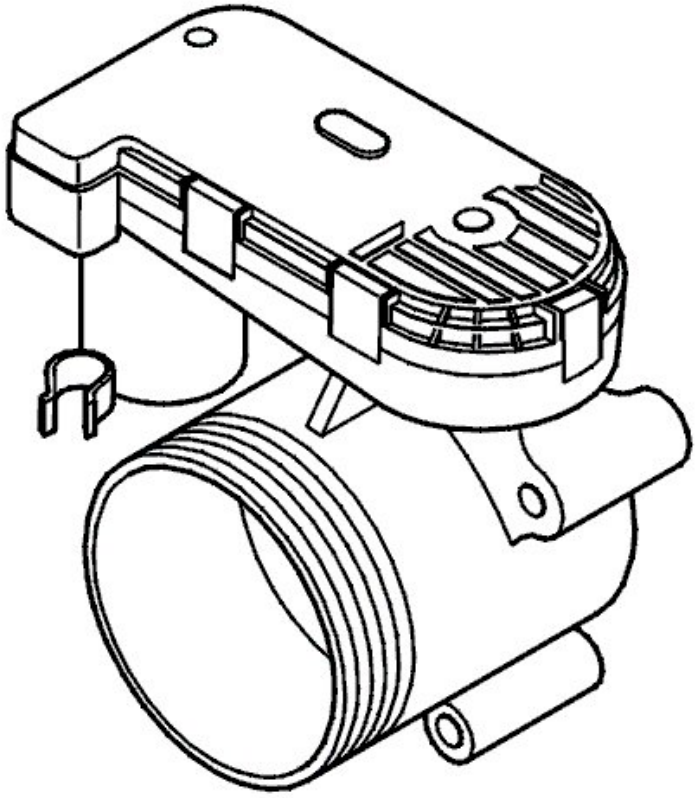
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

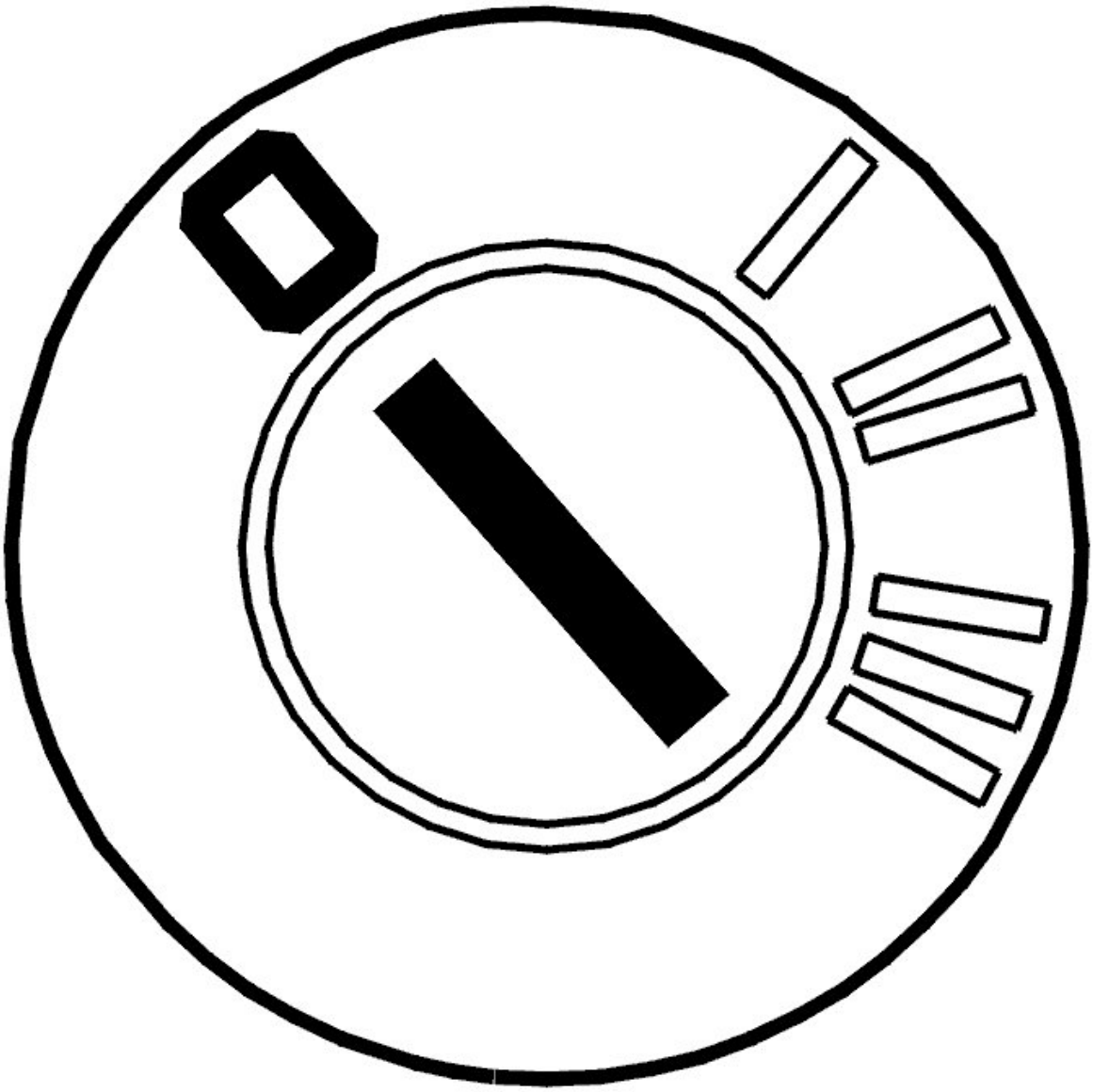
- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault is intermittent at the moment if the adaptation has been completed correctly.



Continue - Checking the connectors and components

Checking the connectors and components

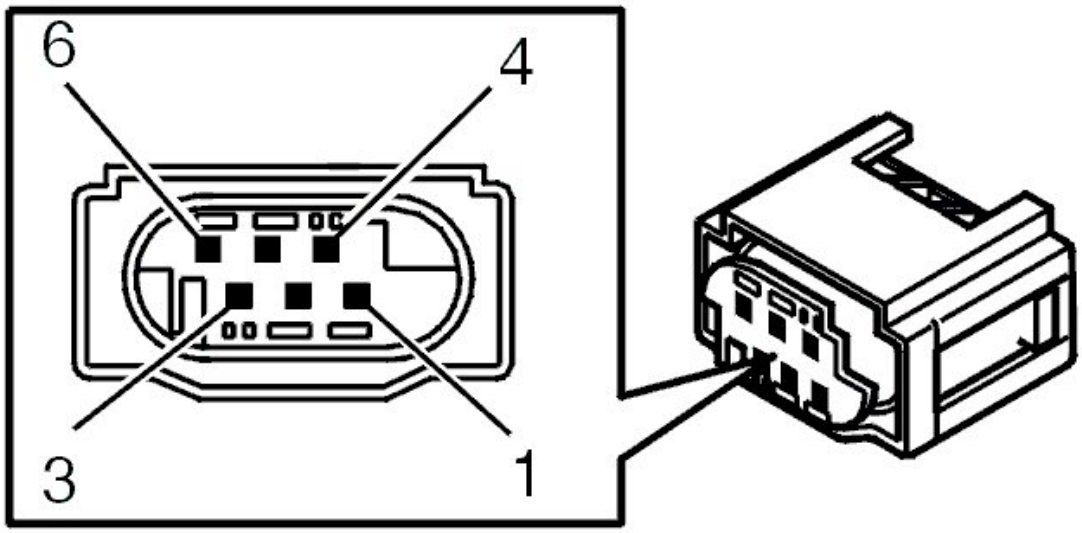


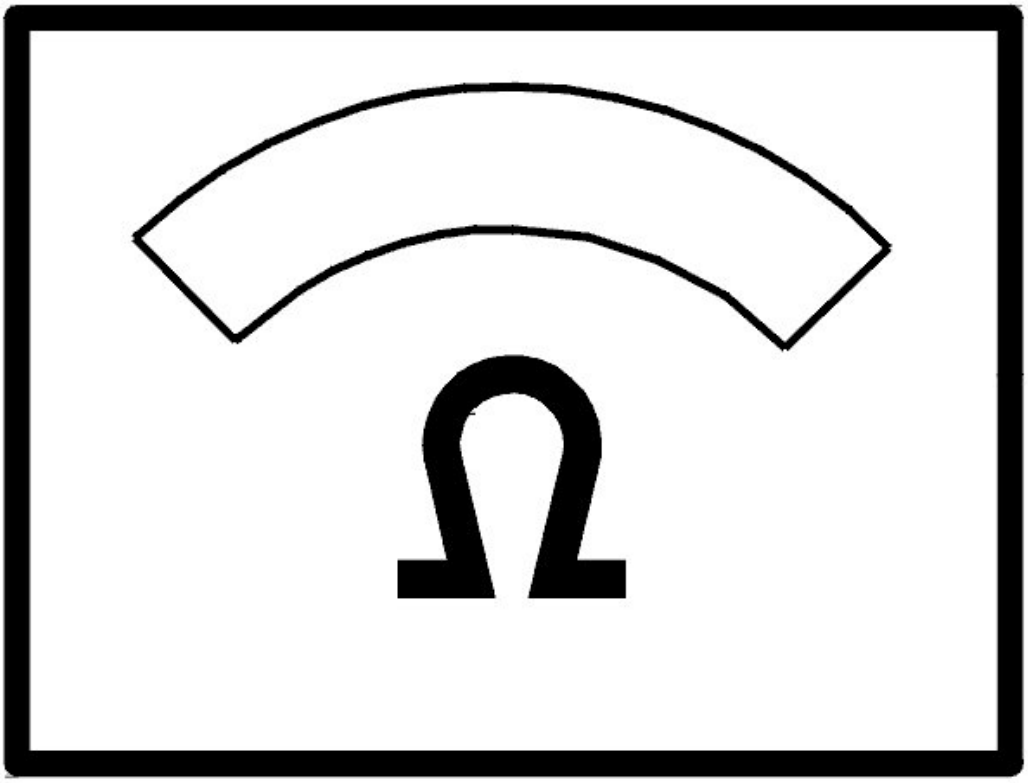
- Ignition off.

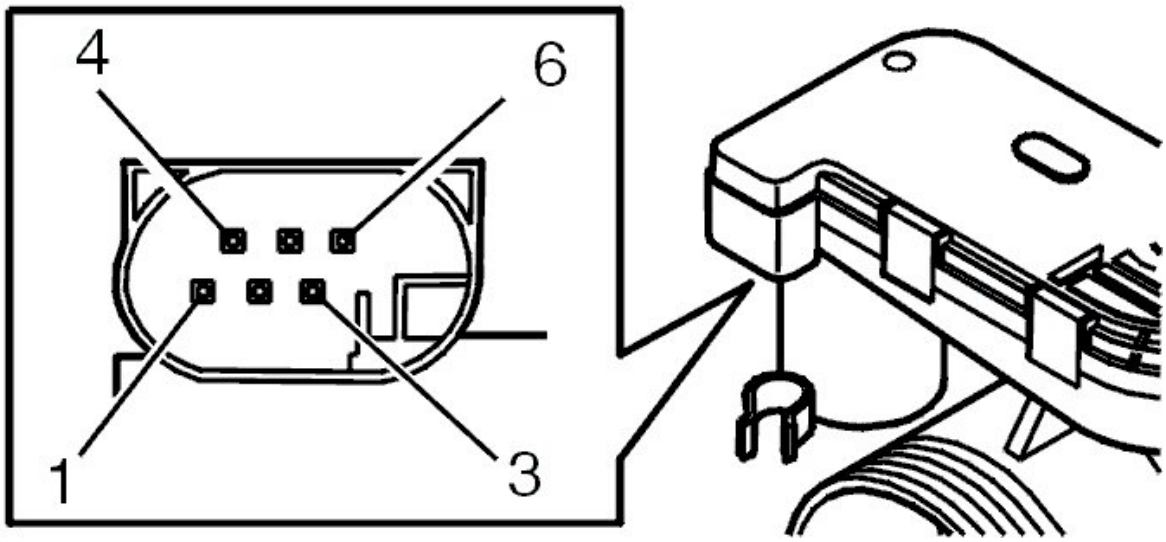
Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- To clean the throttle unit, see Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures.


6
4
3
1





Continue - Verification

Fault-tracing information

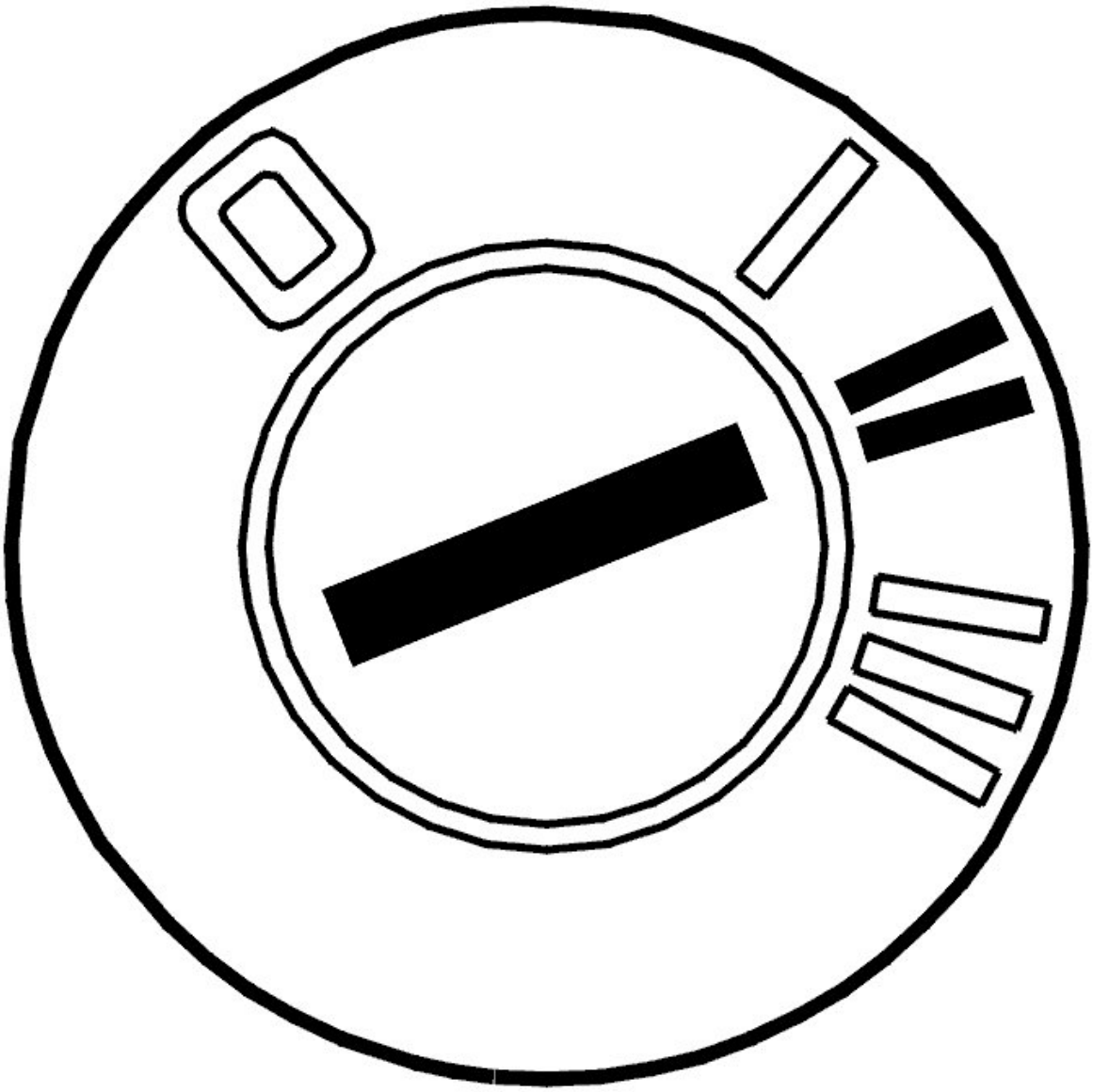
Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

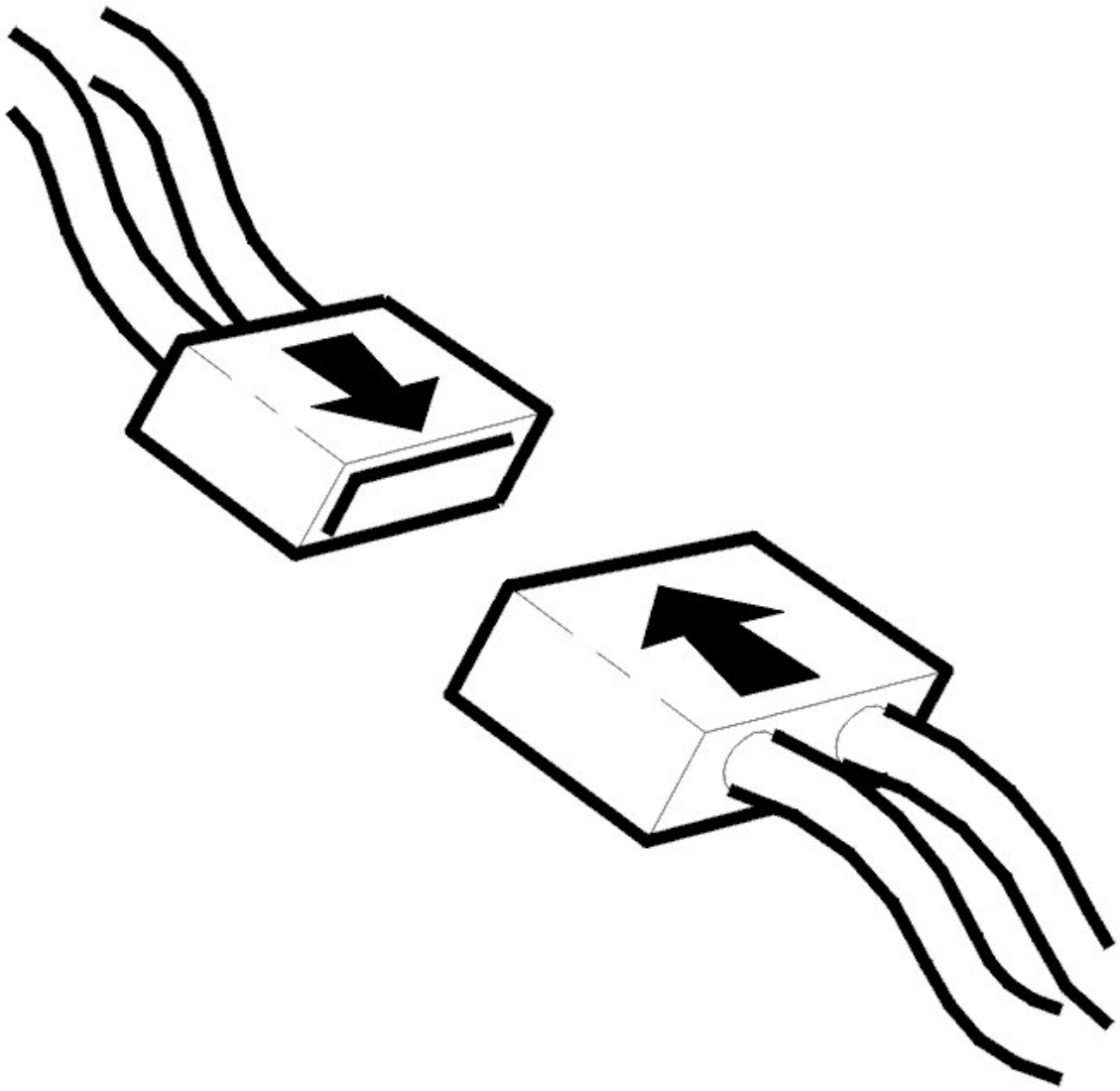
Continue - **DONE**

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

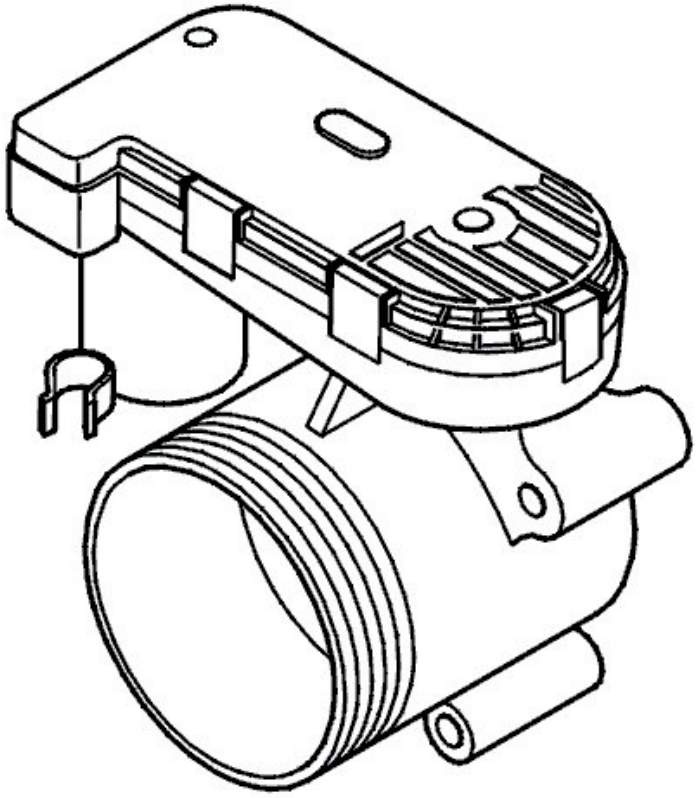
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault has been remedied if the adaptation has been completed correctly.



Is the adaptation OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

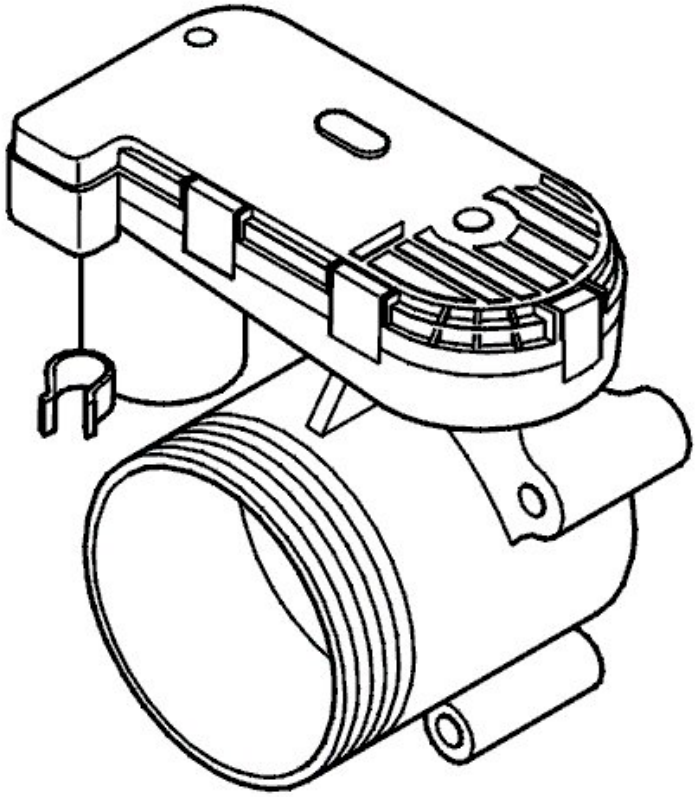
Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-92CC

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the basic conditions for adaptation are not met when trying to adapt the electronic throttle unit. If other diagnostic trouble codes (DTCs) are stored, these must be remedied first. These may have caused the adaptation to fail.

Substitute value

- The adaptation is cancelled
- The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

Adaptation of the throttle unit is cancelled because one of the following basic requirements has not been met:

1. Ignition on / engine off
2. The battery voltage must be over 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Poor performance.

Signal Too High/Signal Too Low

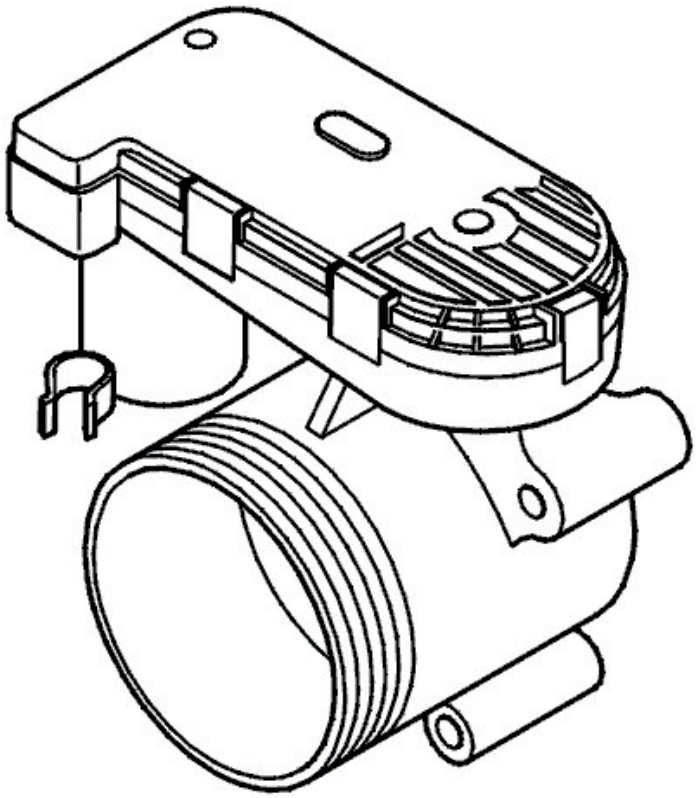
Signal too high / Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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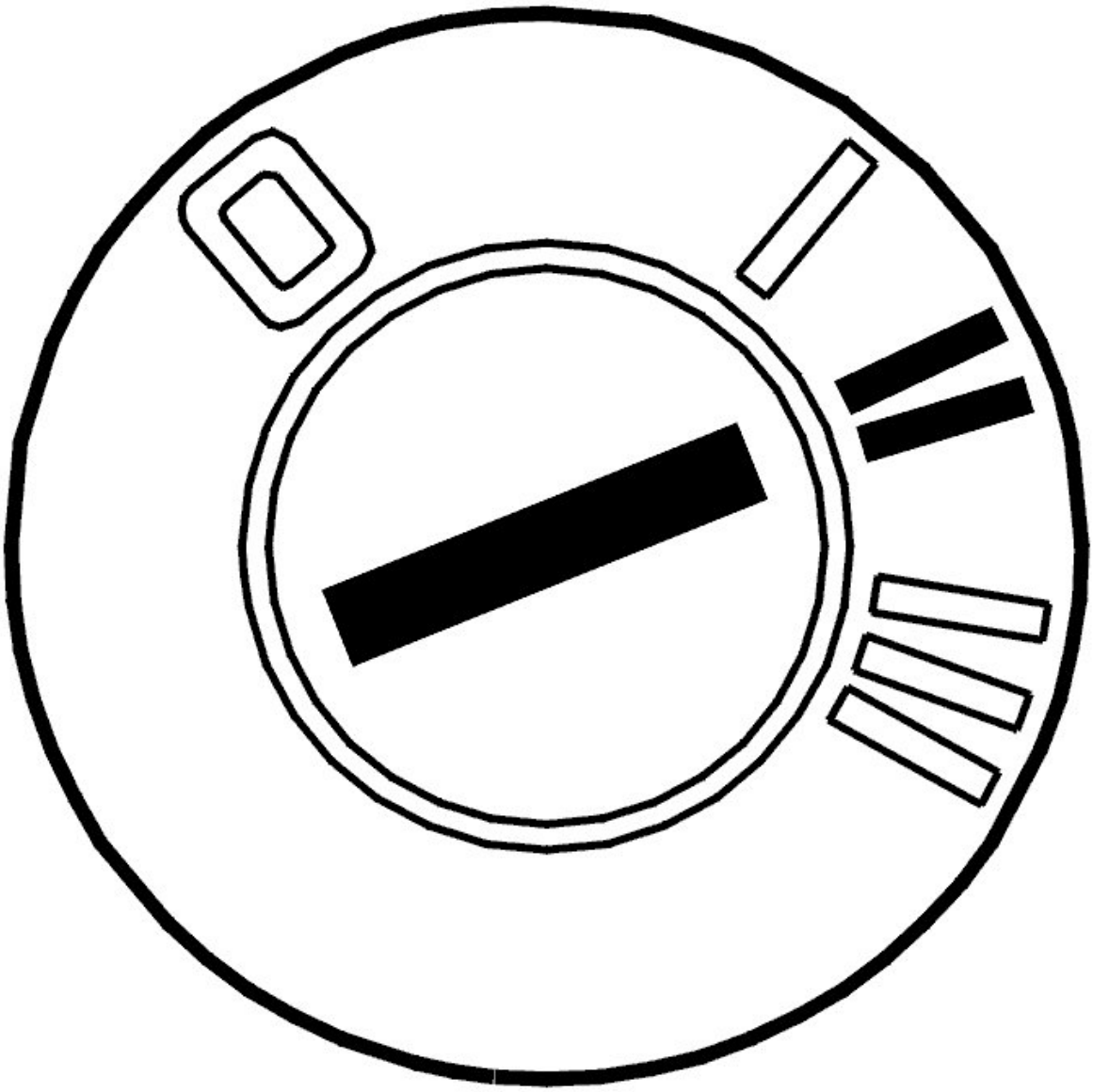
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check to see if any other diagnostic trouble codes (DTCs) are stored. If other diagnostic trouble codes (DTCs) are stored, the engine control module (ECM) may not be able to run the adaptation.

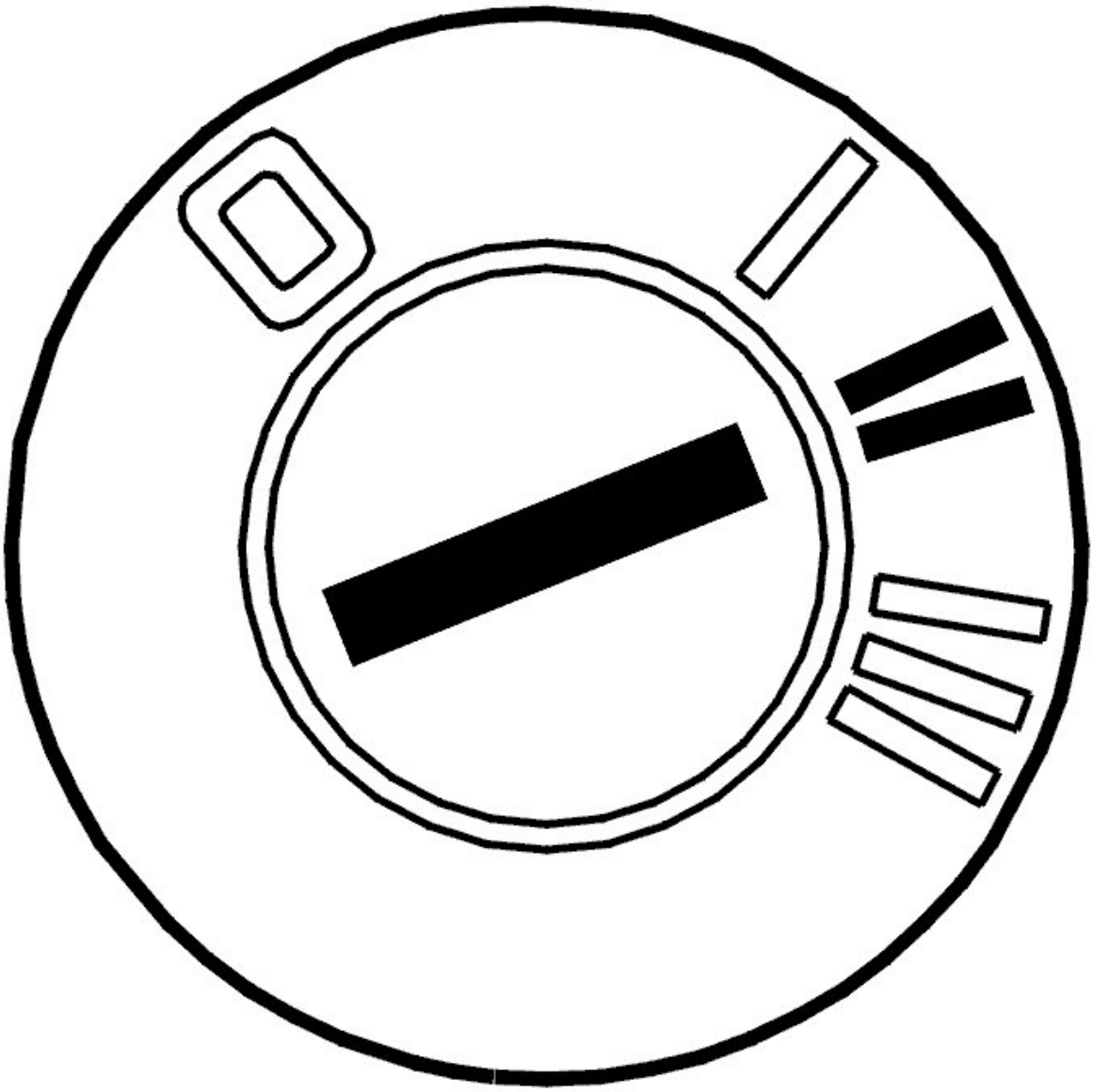
Are any other diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking the status

Checking the status

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.



- Ignition off
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

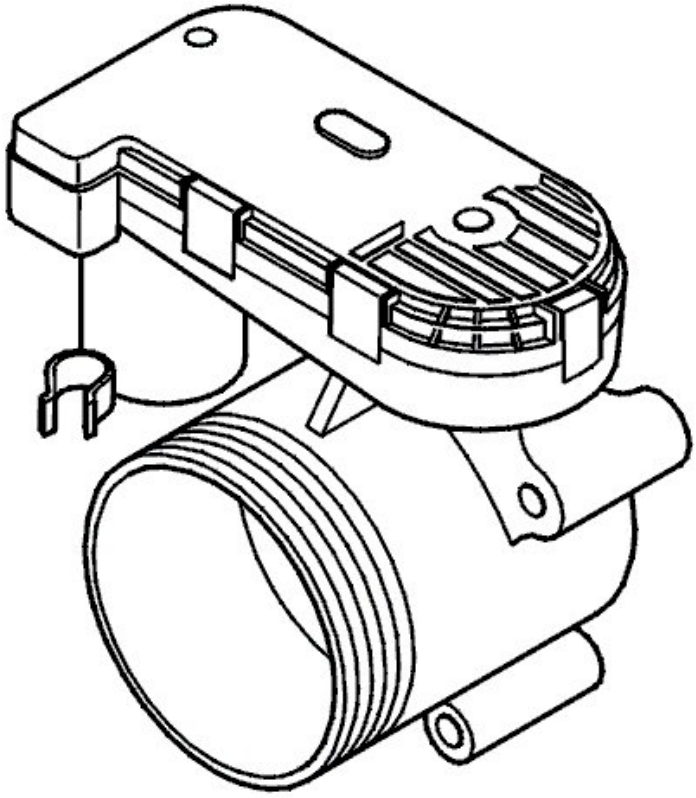
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

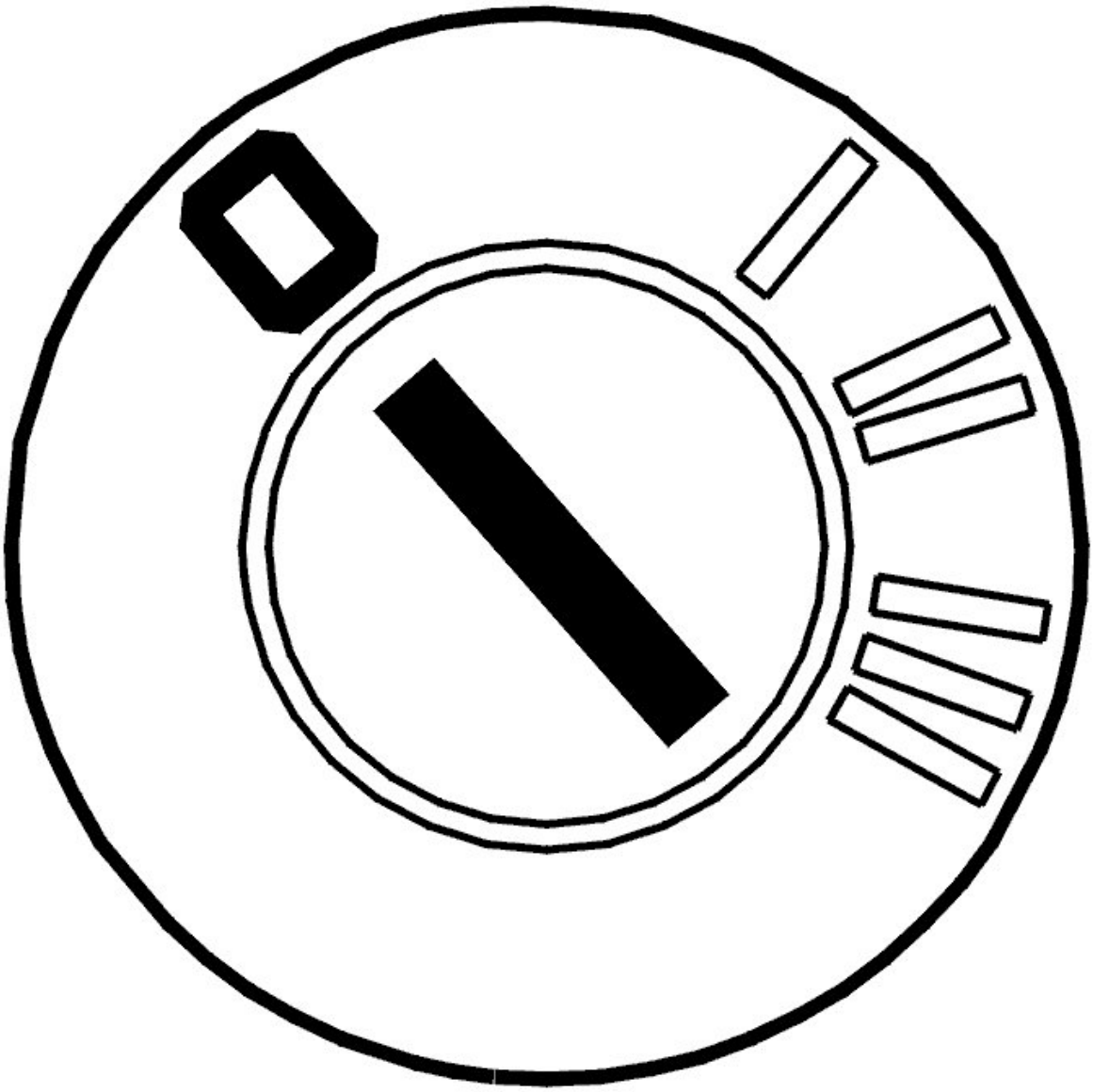
- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault is intermittent at the moment if the adaptation has been completed correctly.



Continue - Checking connectors and components

Checking connectors and components

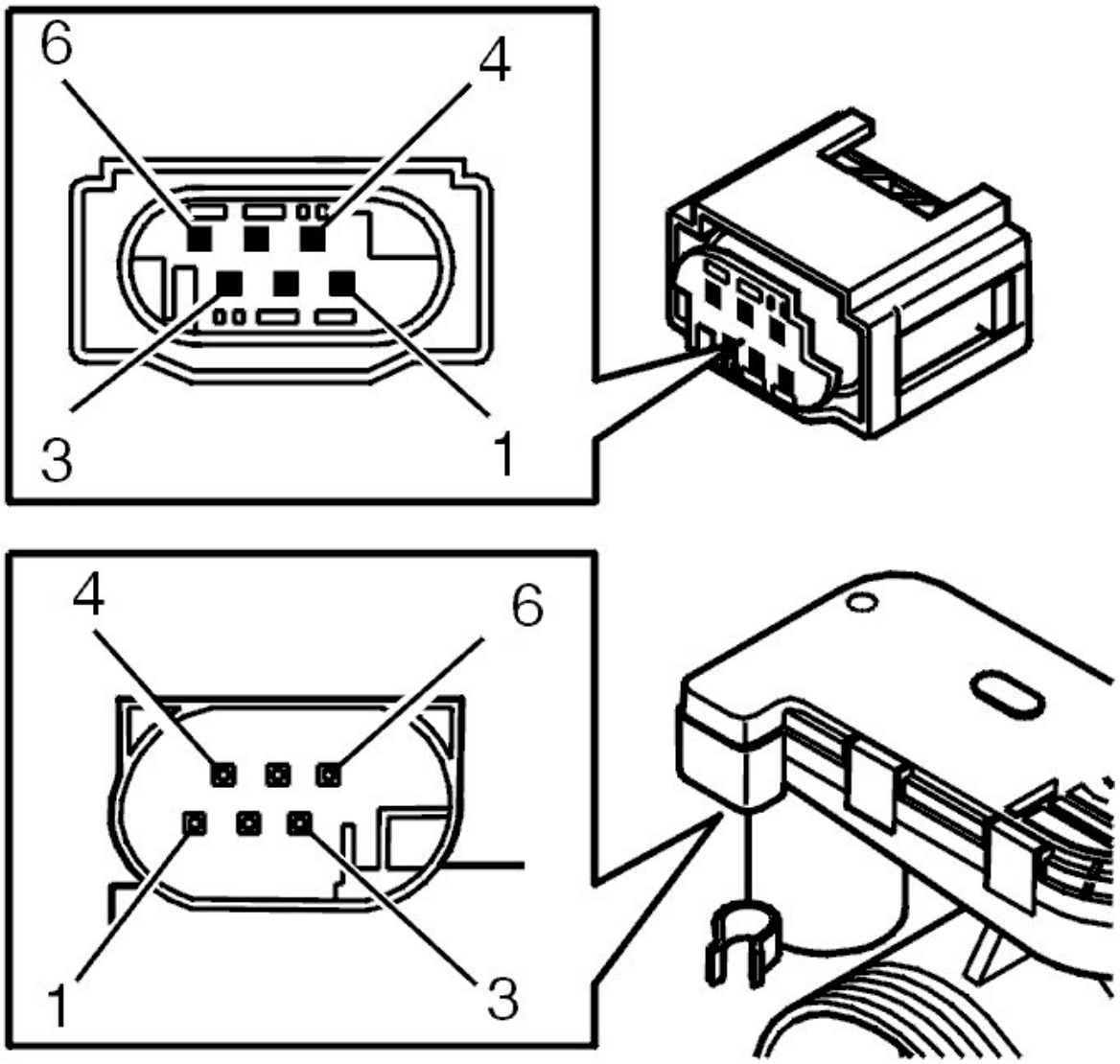


- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

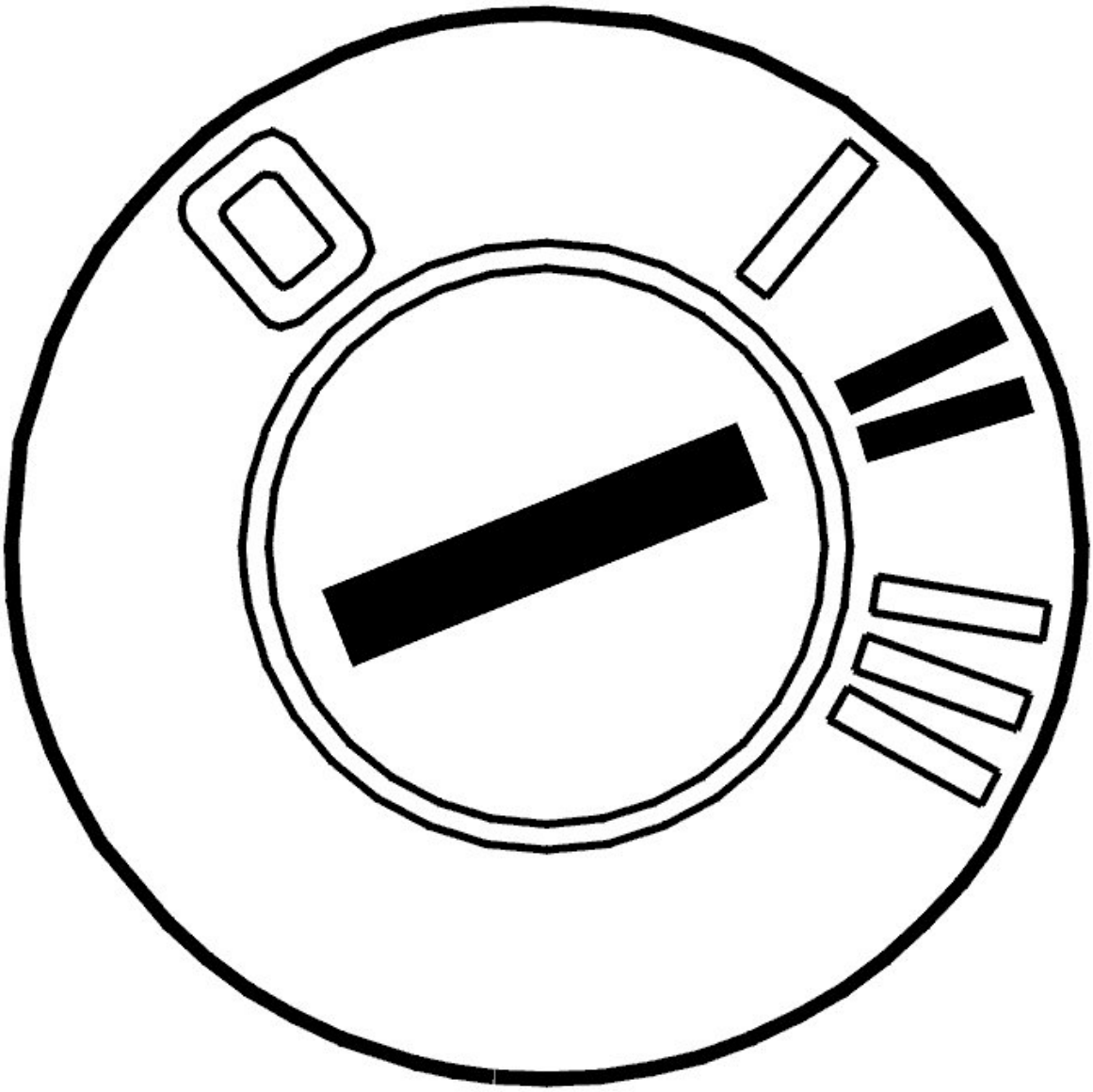
Verification

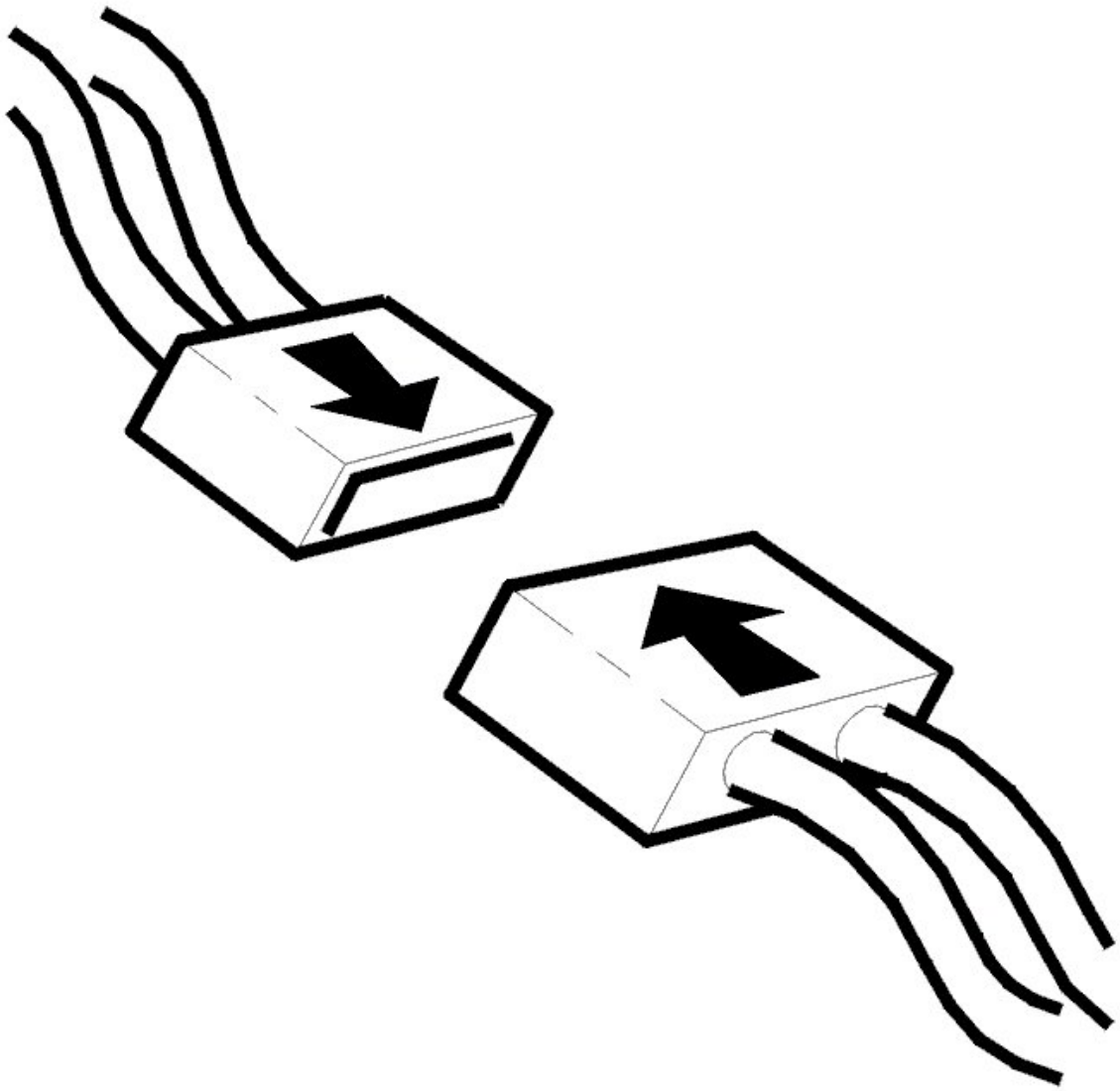
Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

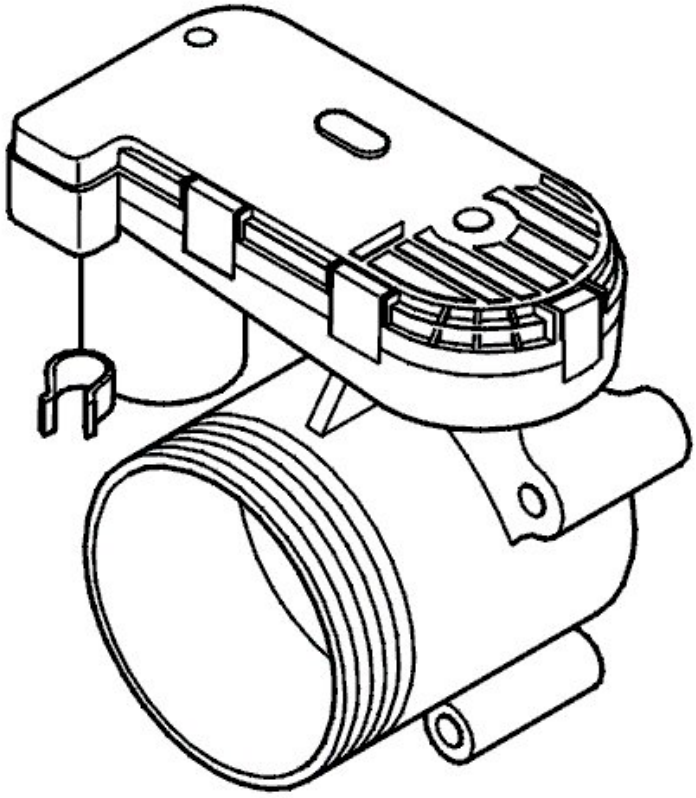
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault has been remedied if the adaptation has been completed correctly.



Is the adaptation OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

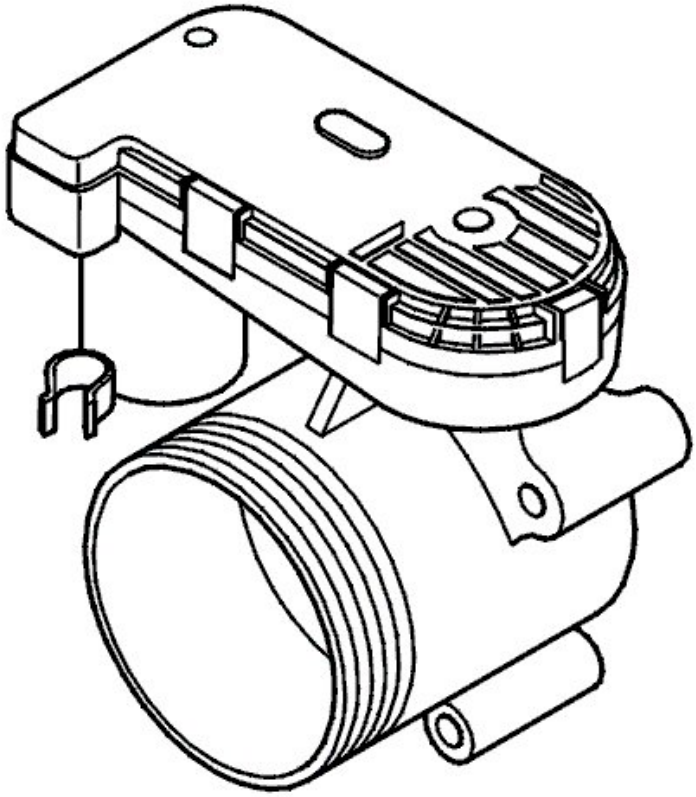
Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information ECM-92CD

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) detects that the basic conditions for adaptation are not met when trying to adapt the electronic throttle unit. If other diagnostic trouble codes (DTCs) are stored, these must be remedied first. These may have caused the adaptation to fail.

Substitute value

- The adaptation is cancelled
- The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source

Adaptation of the throttle unit is cancelled because one of the following basic requirements has not been met:

1. Ignition on / engine off
2. The battery voltage must be over 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Damaged throttle unit.

Fault symptom[s]

- Poor performance.

Signal Too High/Signal Too Low

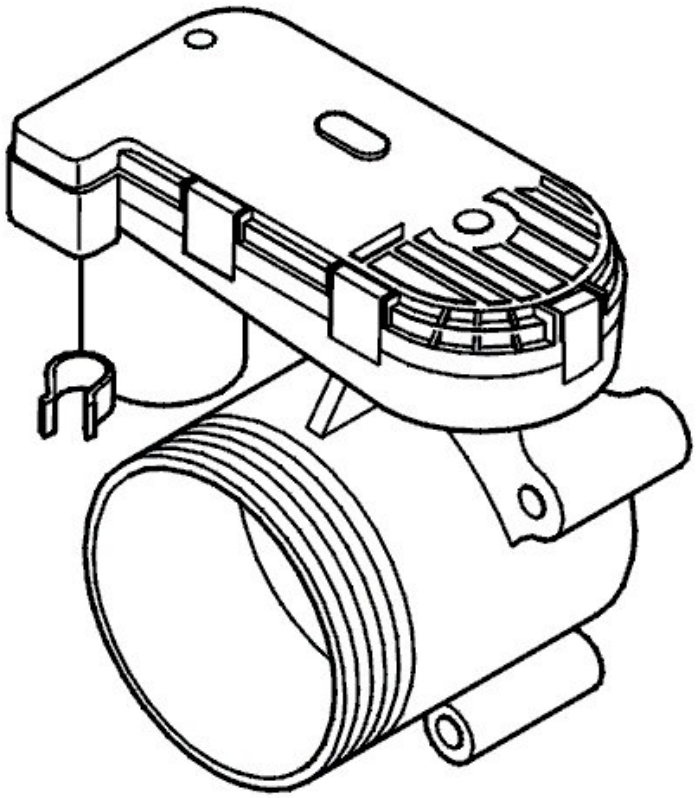
Signal too high / Signal too low

Fault-tracing information

Fault-tracing information

Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - cont

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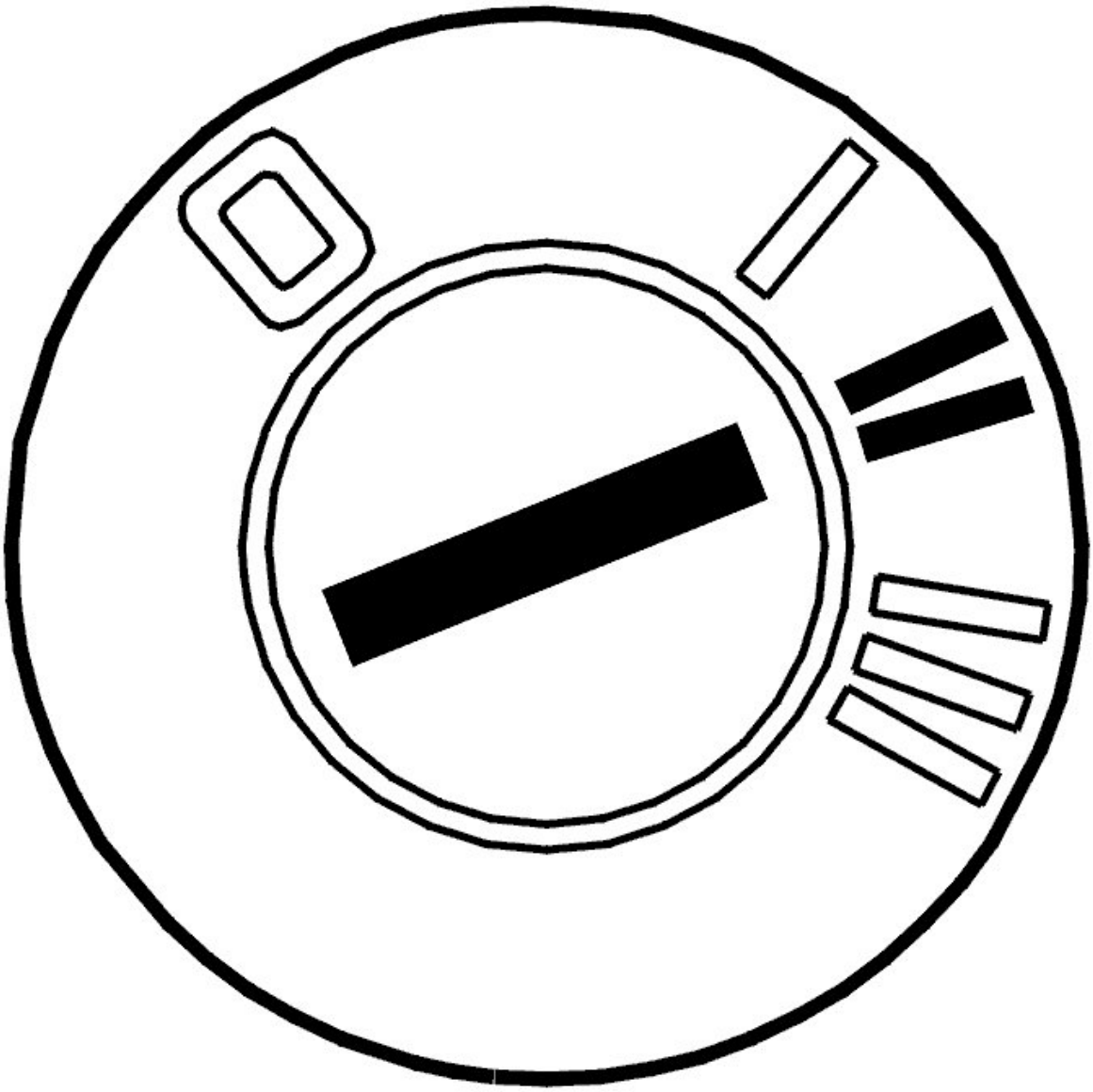
cont - Checking the diagnostic trouble codes (DTCs)

Checking the diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check to see if any other diagnostic trouble codes (DTCs) are stored. If other diagnostic trouble codes (DTCs) are stored, the engine control module (ECM) may not be able to run the adaptation.

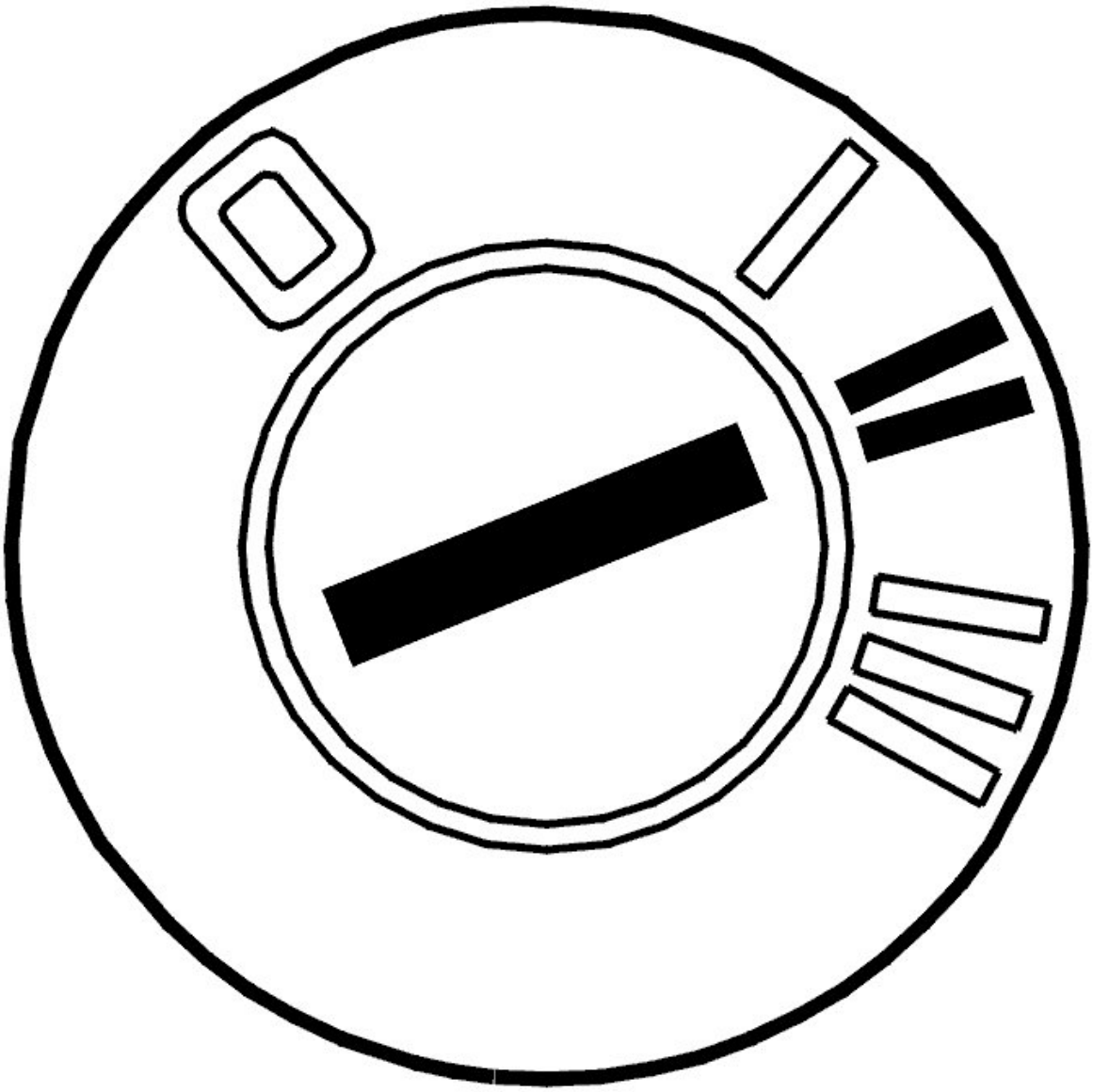
Are any other diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking the status

Checking the status

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.



- Ignition off
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The vehicle must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100°C
6. Intake air temperature (IAT) above 5 °C.

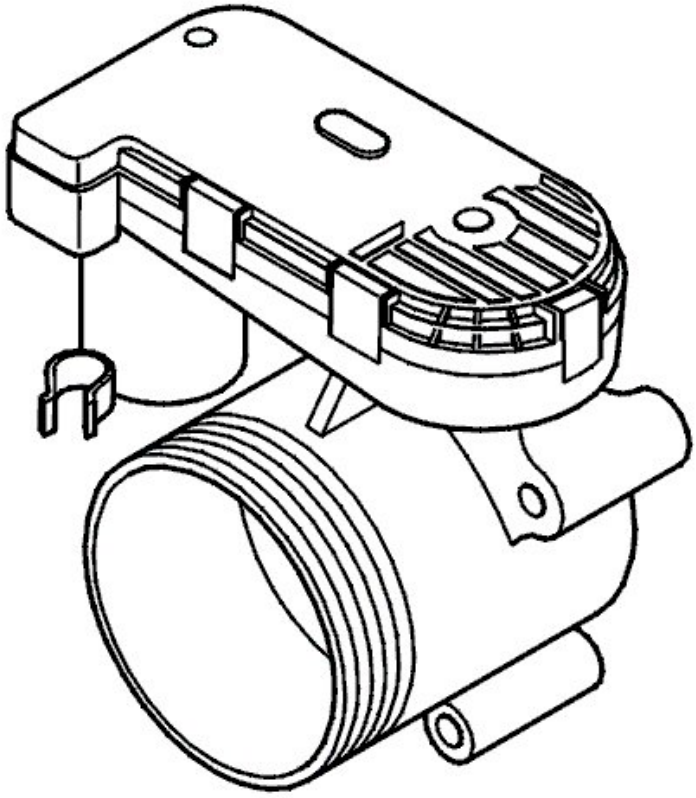
Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation has been run correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

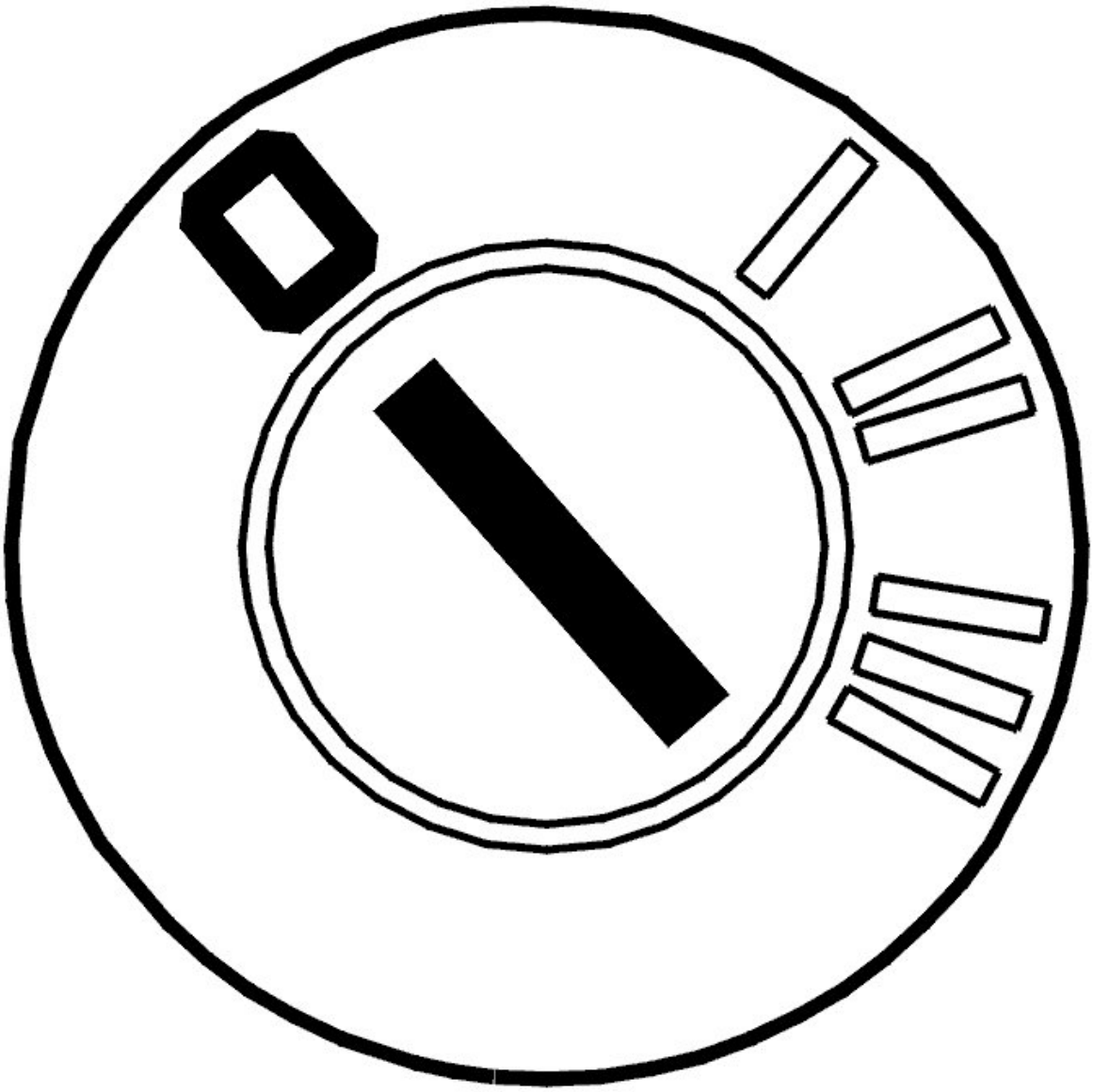
The fault is intermittent at the moment if the adaptation has been completed correctly.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Checking connectors and components

Checking connectors and components

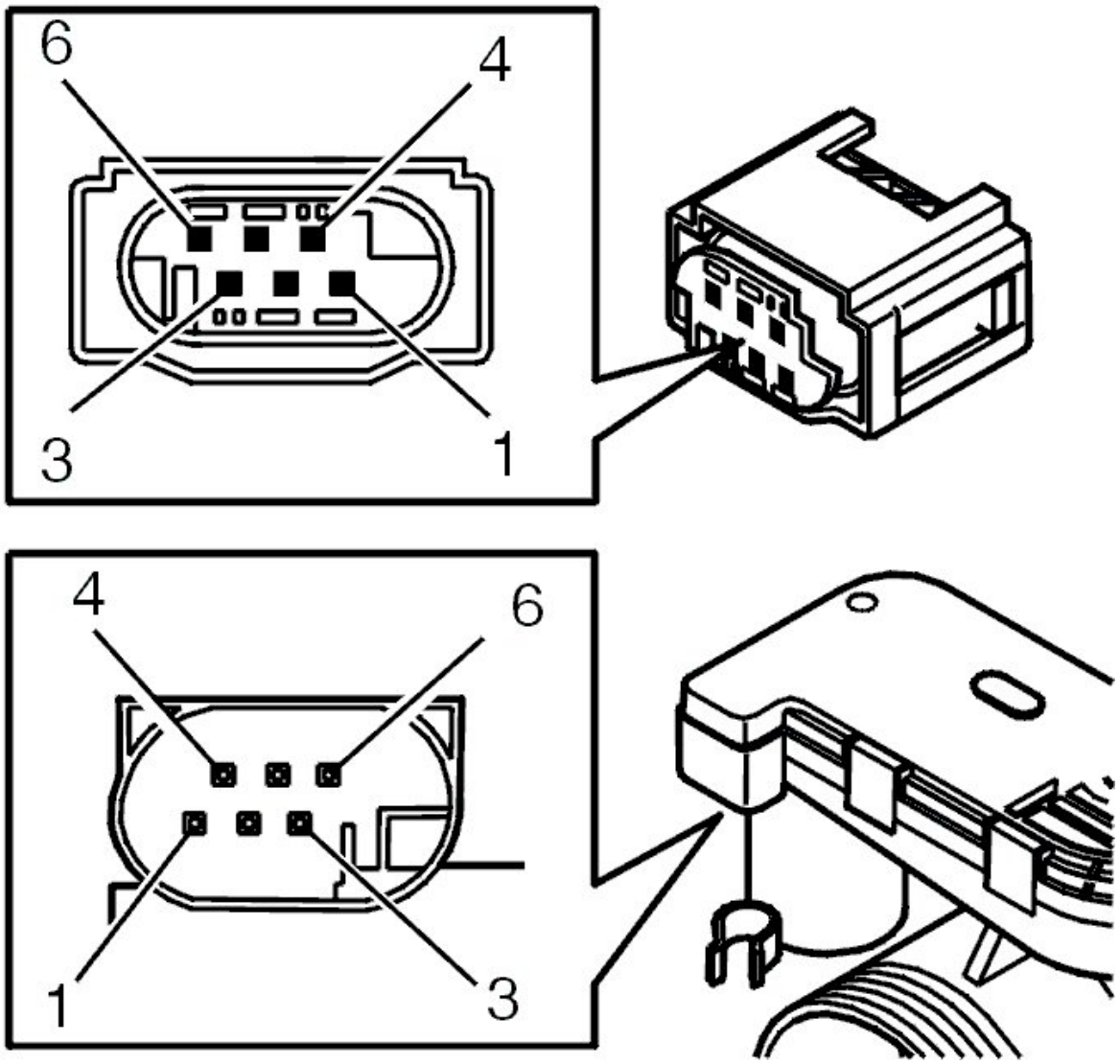


- Ignition off.

Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For resistance values: Component specifications See: Engine Control Module/Specifications
- Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Verification

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

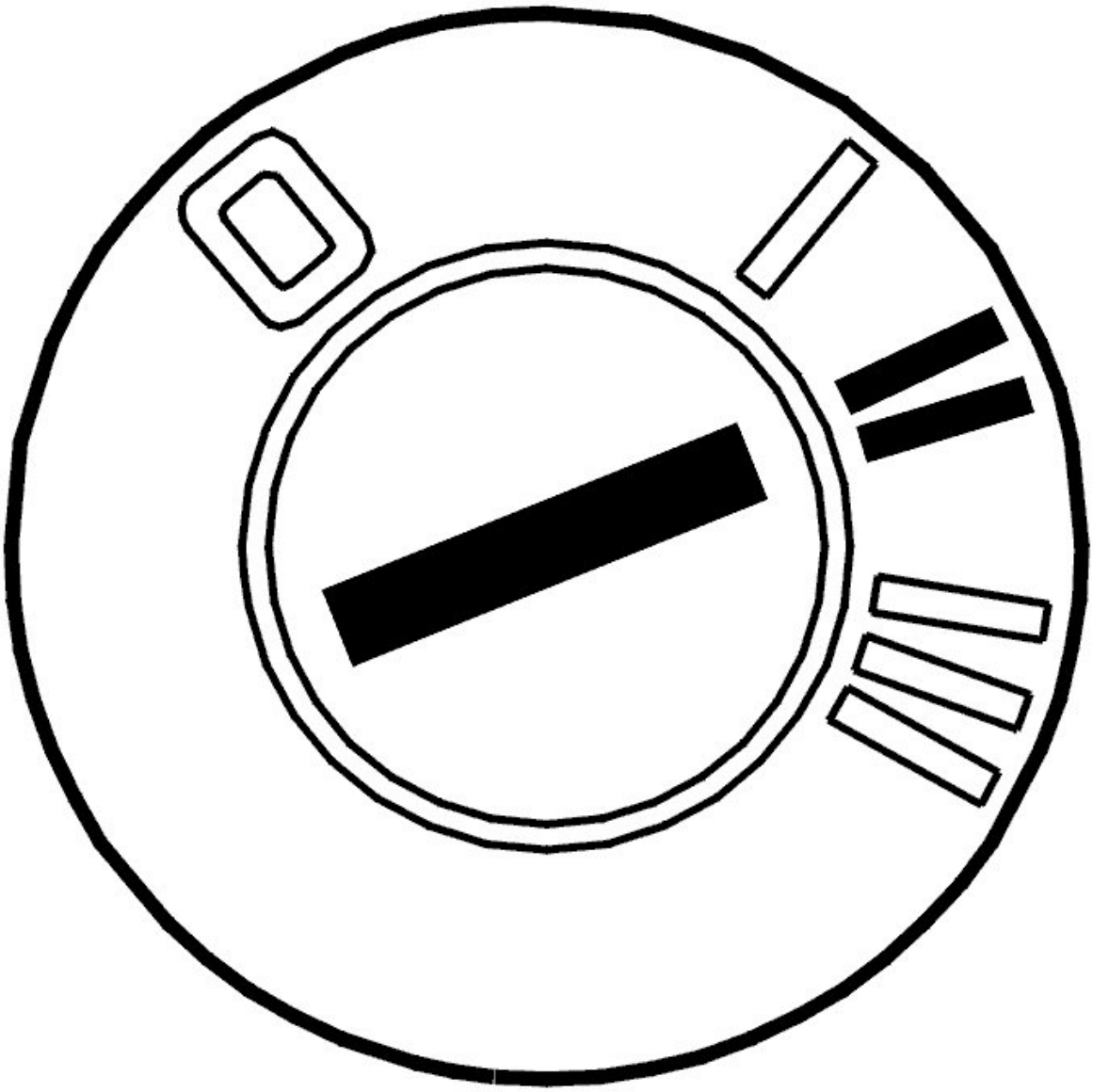
Verification

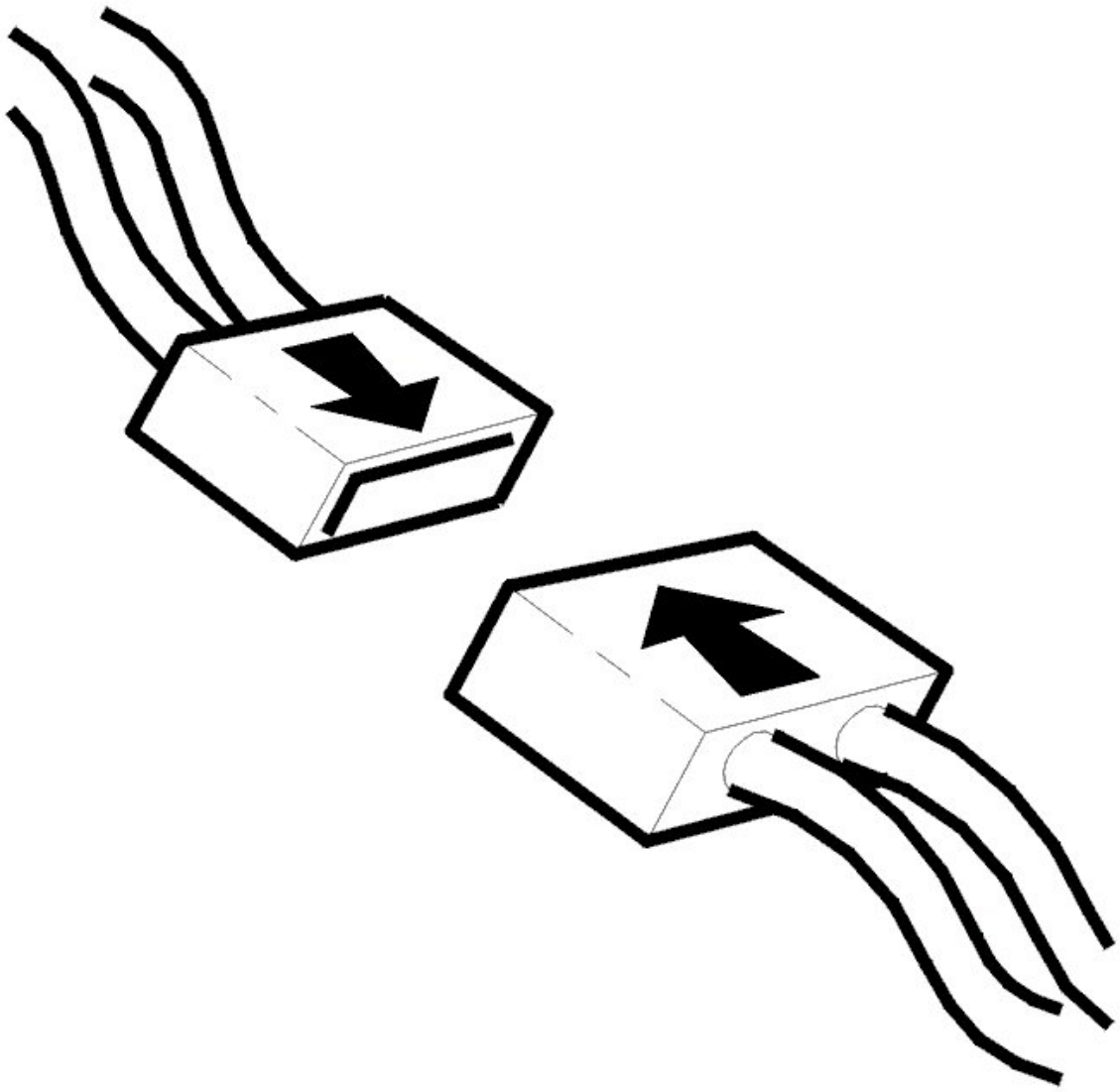
Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

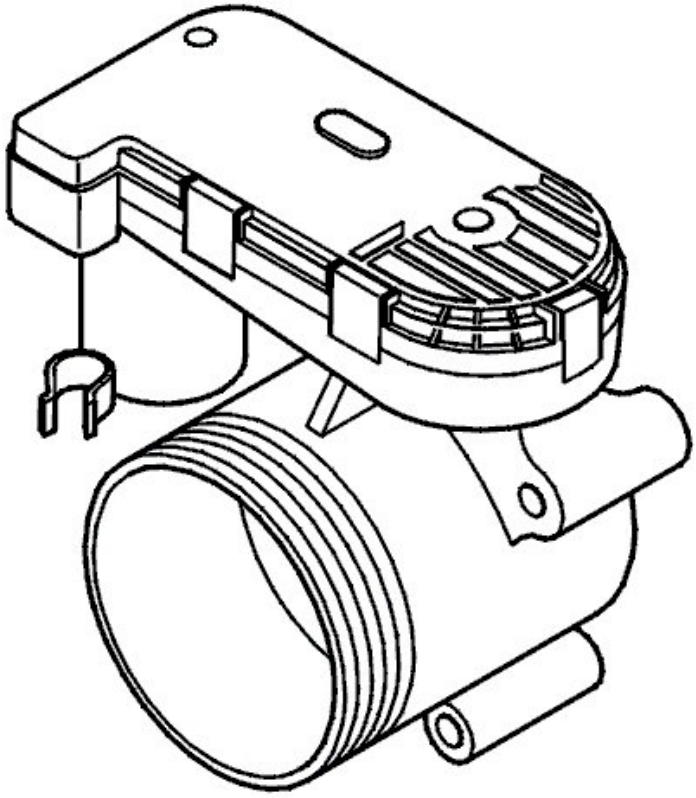
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault has been remedied if the adaptation has been completed correctly.



Is the adaptation OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

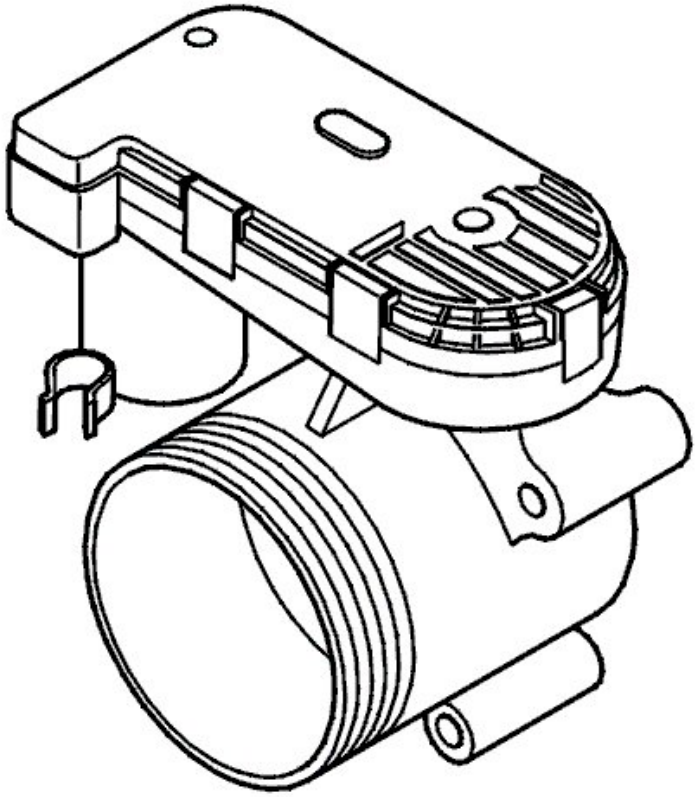
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-92D0

Condition



The diagnostic trouble code (DTC) is stored if the ignition has been left on for 30 seconds and the engine control module (ECM) has been unable to adapt the electronic throttle unit. This is because the programmed parameter for the stop position in the throttle position (TP) sensor has been exceeded. Adaptation is usually carried out to ensure that the throttle unit parameters are within the programmed values that are stored in the engine control module (ECM). If other diagnostic trouble codes (DTCs) are stored, these must be remedied first. These may have caused the adaptation to fail.

Substitute value
- The engine control module (ECM) uses parameters from previous successful adaptations
- The engine control module (ECM) shuts down the supply to the damper motor for the electronic throttle unit. The throttle will set itself to the return position.

Possible source
- The throttle is sticking or is blocked (e.g. oil film, dust)
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the electronic throttle unit
- Damaged throttle unit.

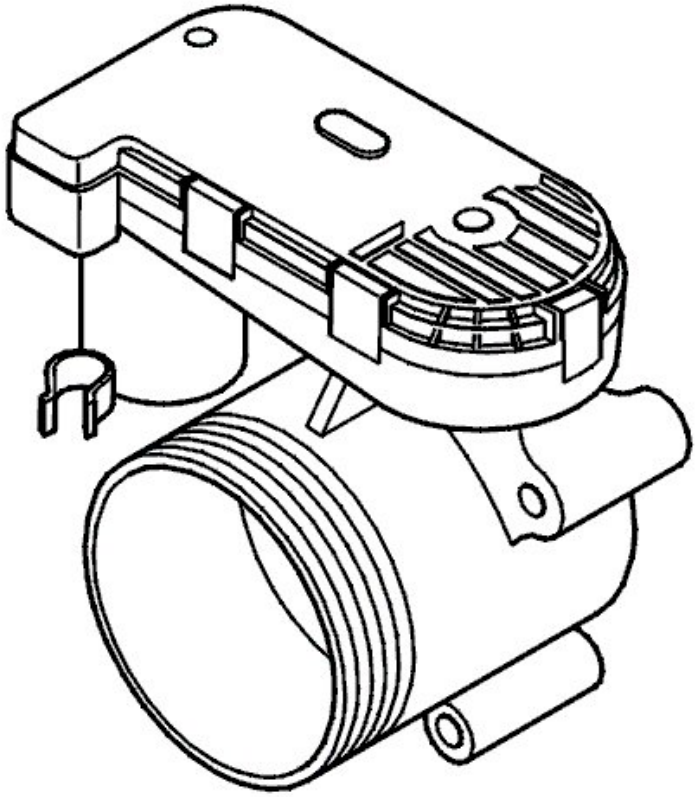
Fault symptom[s]
- Poor performance.

Faulty Signal

Faulty signal

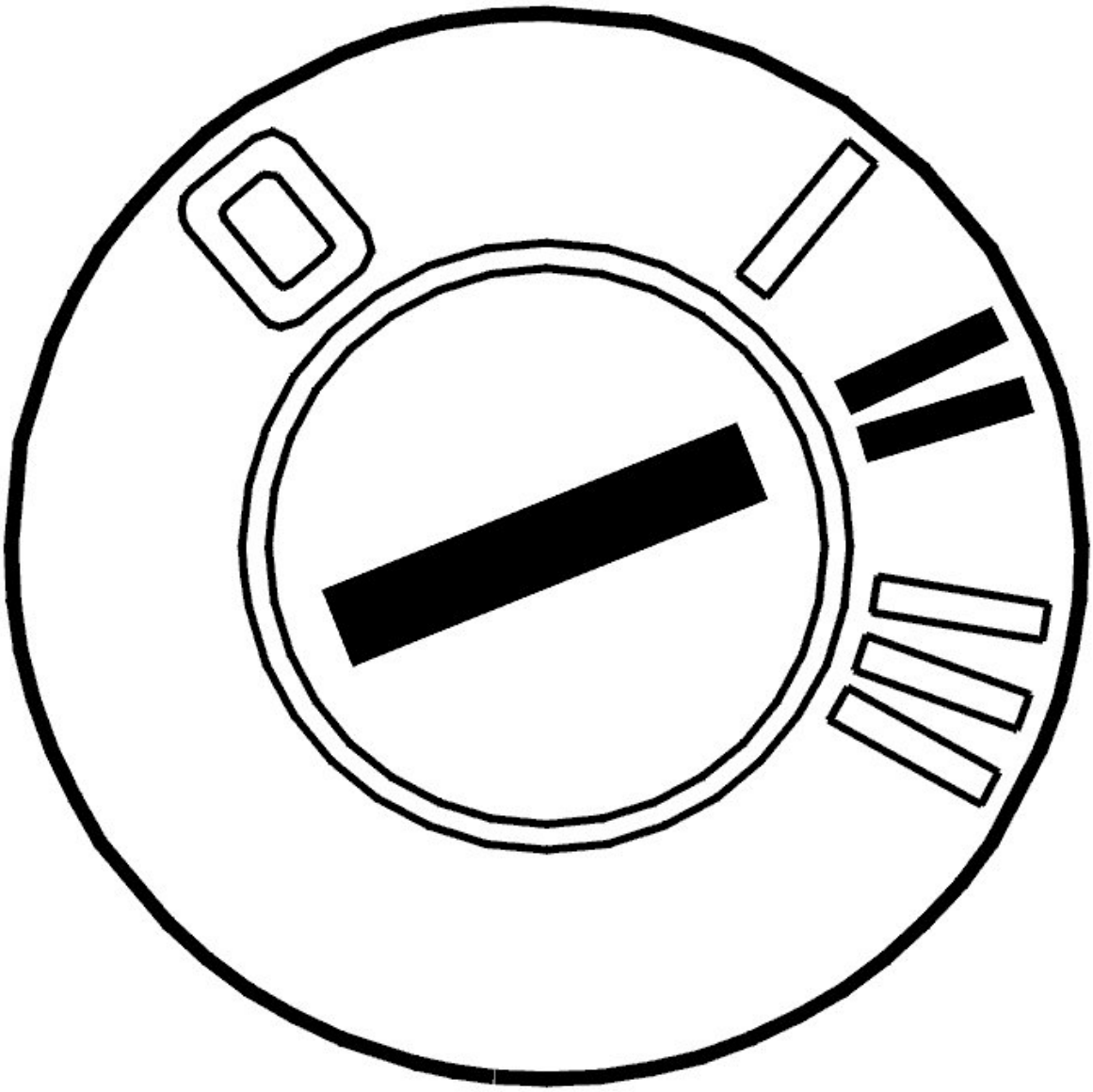
Fault-tracing information

Caution! The male and female pins on the electronic throttle unit connectors are gold plated. Great care must be taken when measuring. Damage to the gold plating can result in operating difficulties.



Continue - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check to see if any other diagnostic trouble codes (DTCs) are stored. If other diagnostic trouble codes (DTCs) are stored, they may mean that it is not possible to run the adaptation of the engine control module (ECM).

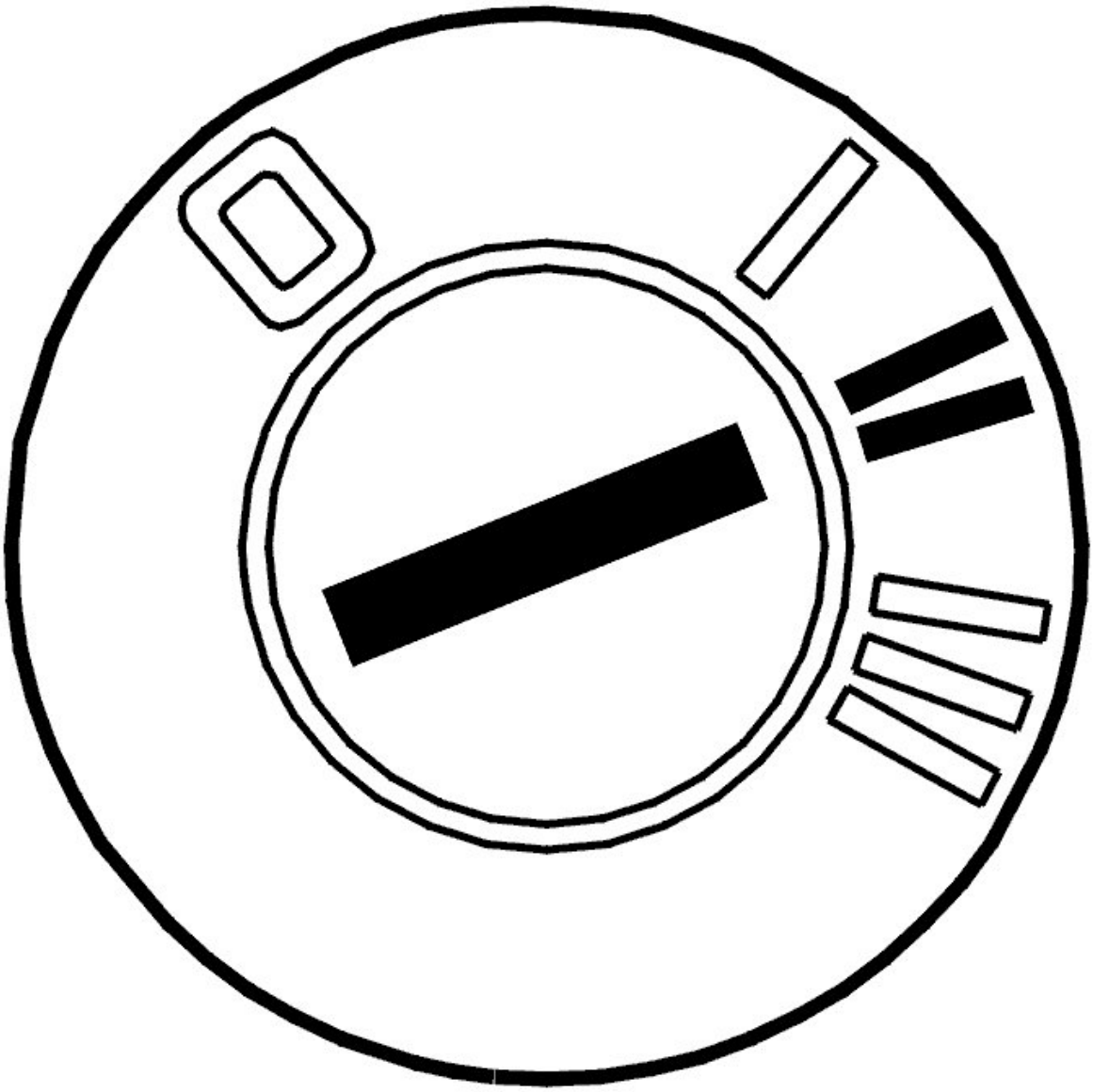
Are any other diagnostic trouble codes (DTCs) stored?

Yes - Fault-tracing information

No - Checking the status

Checking the status

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.



- Ignition off
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

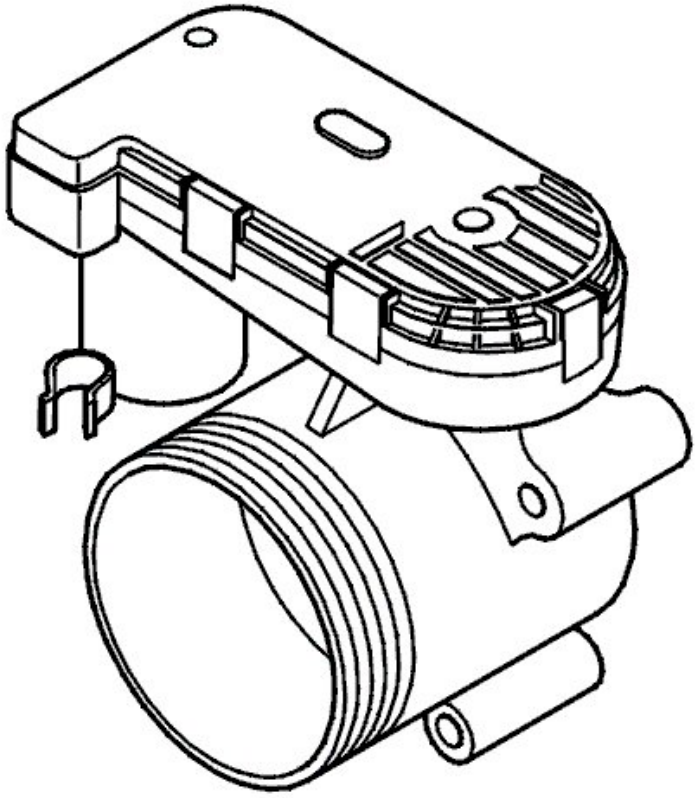
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

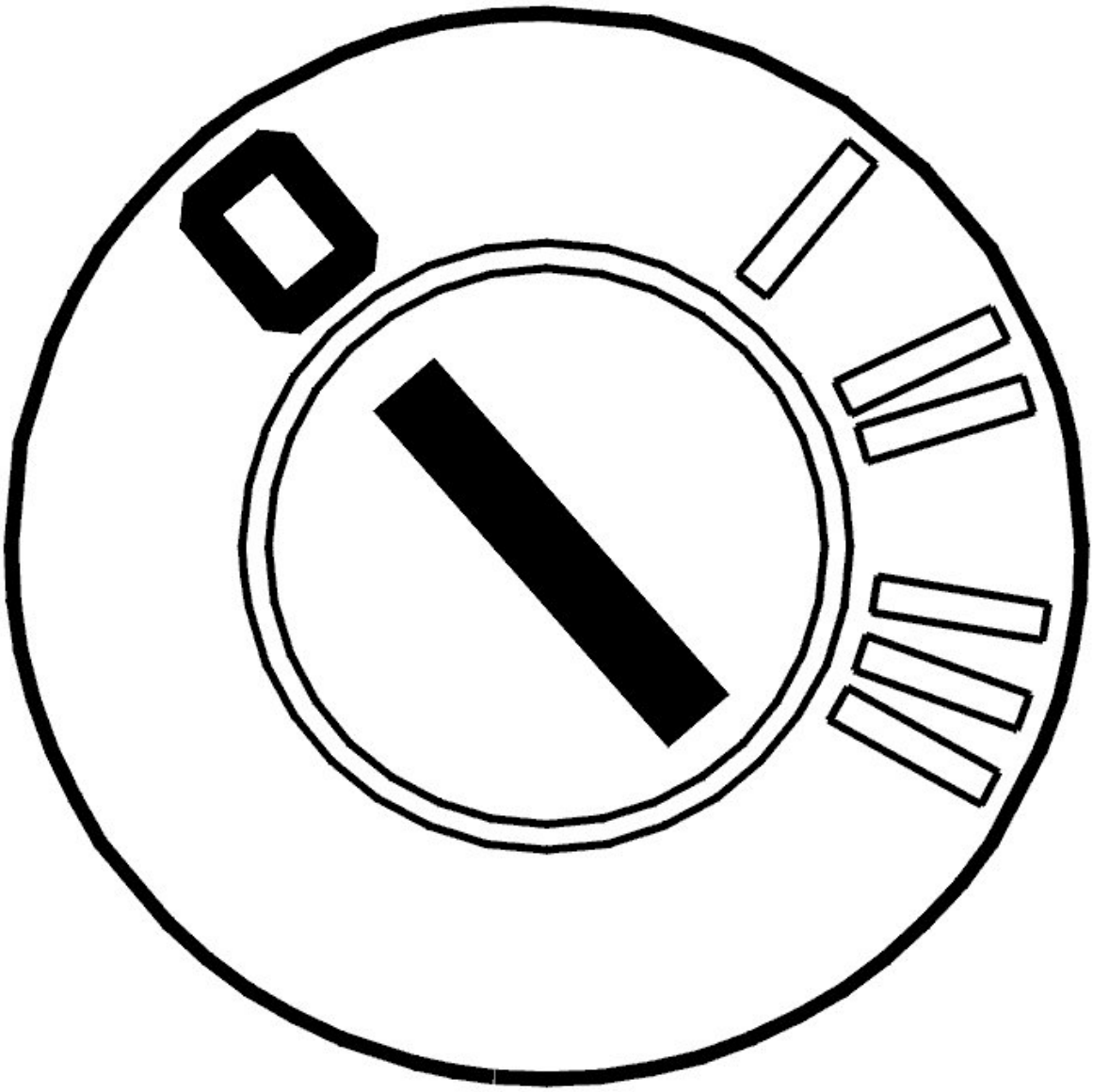
- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault is intermittent at the moment if the adaptation has been completed correctly.



Continue - Checking the connectors and components

Checking the connectors and components

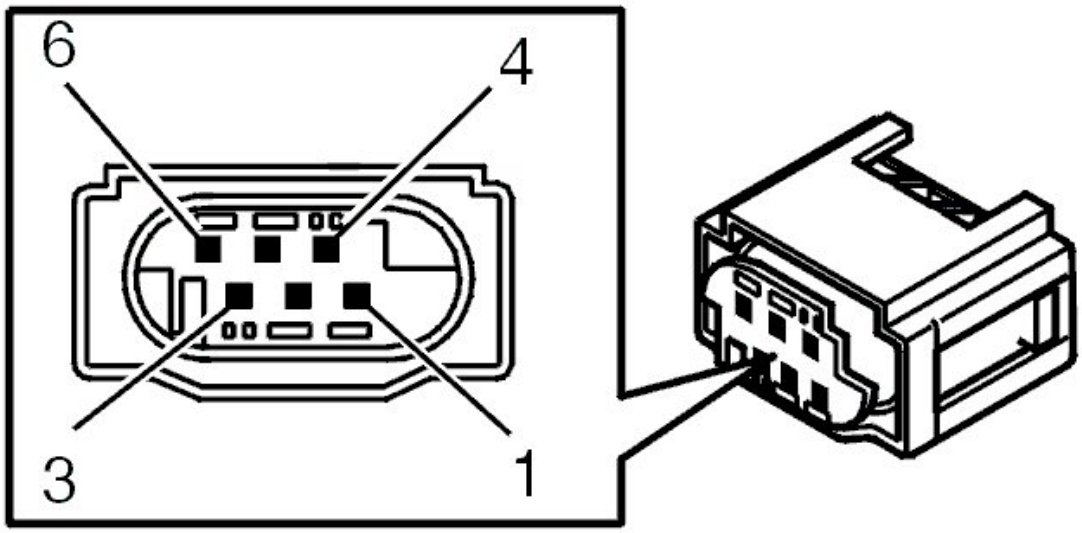


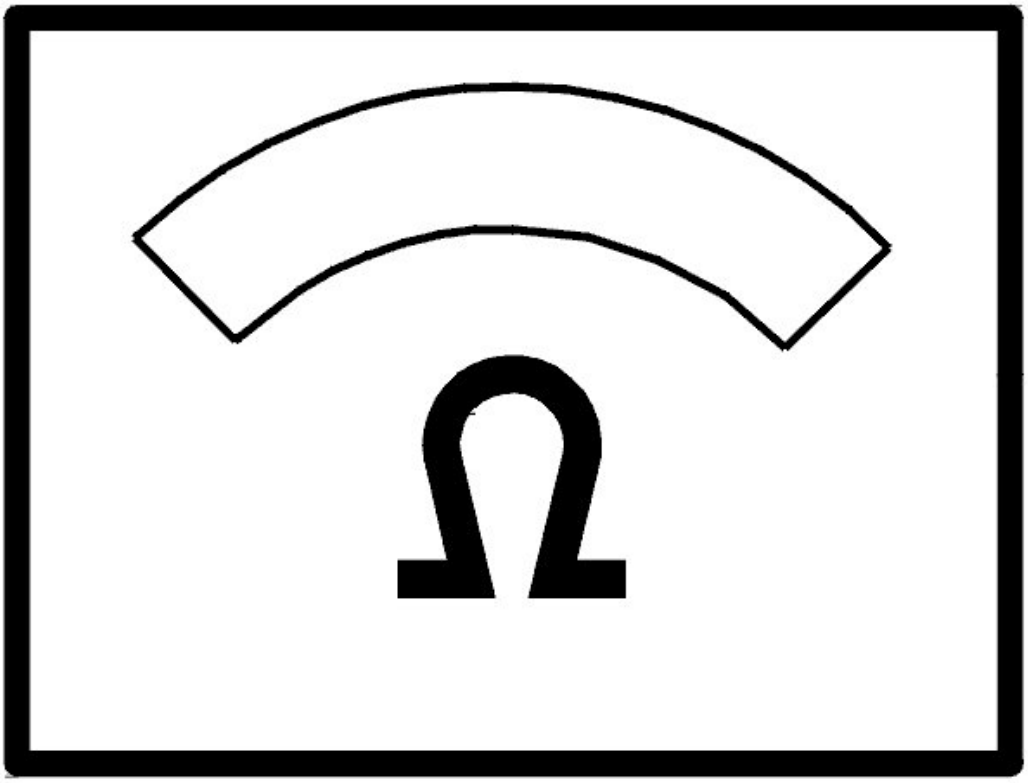
- Ignition off.

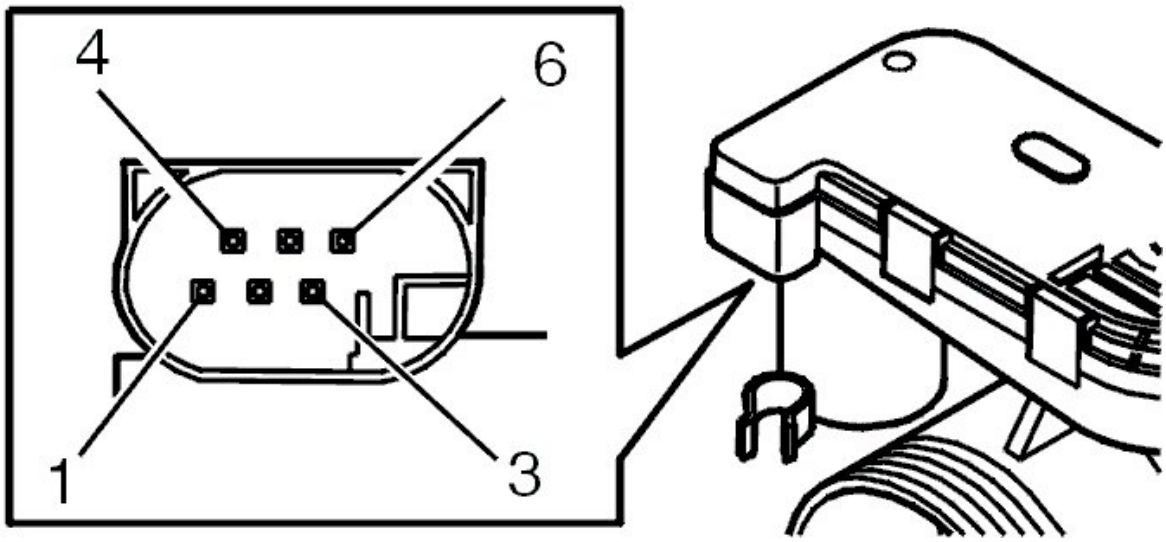
Check the throttle unit and engine control module (ECM) connectors. Check for contact resistance and oxidation.
Check the resistance values of the potentiometers in the throttle unit.
Check that the shutter in the throttle unit is not blocked or sticking. Clean as necessary.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For resistance values, see Component specifications See: Engine Control Module/Specifications
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access or replace the throttle unit, see Throttle body (electronic throttle module (ETM)), replacing See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Removal and Replacement
- To clean the throttle unit, see Throttle body (TB), cleaning See: Fuel Delivery and Air Induction/Throttle Body/Service and Repair/Procedures.


6
4
3
1





Continue - Verification

Fault-tracing information

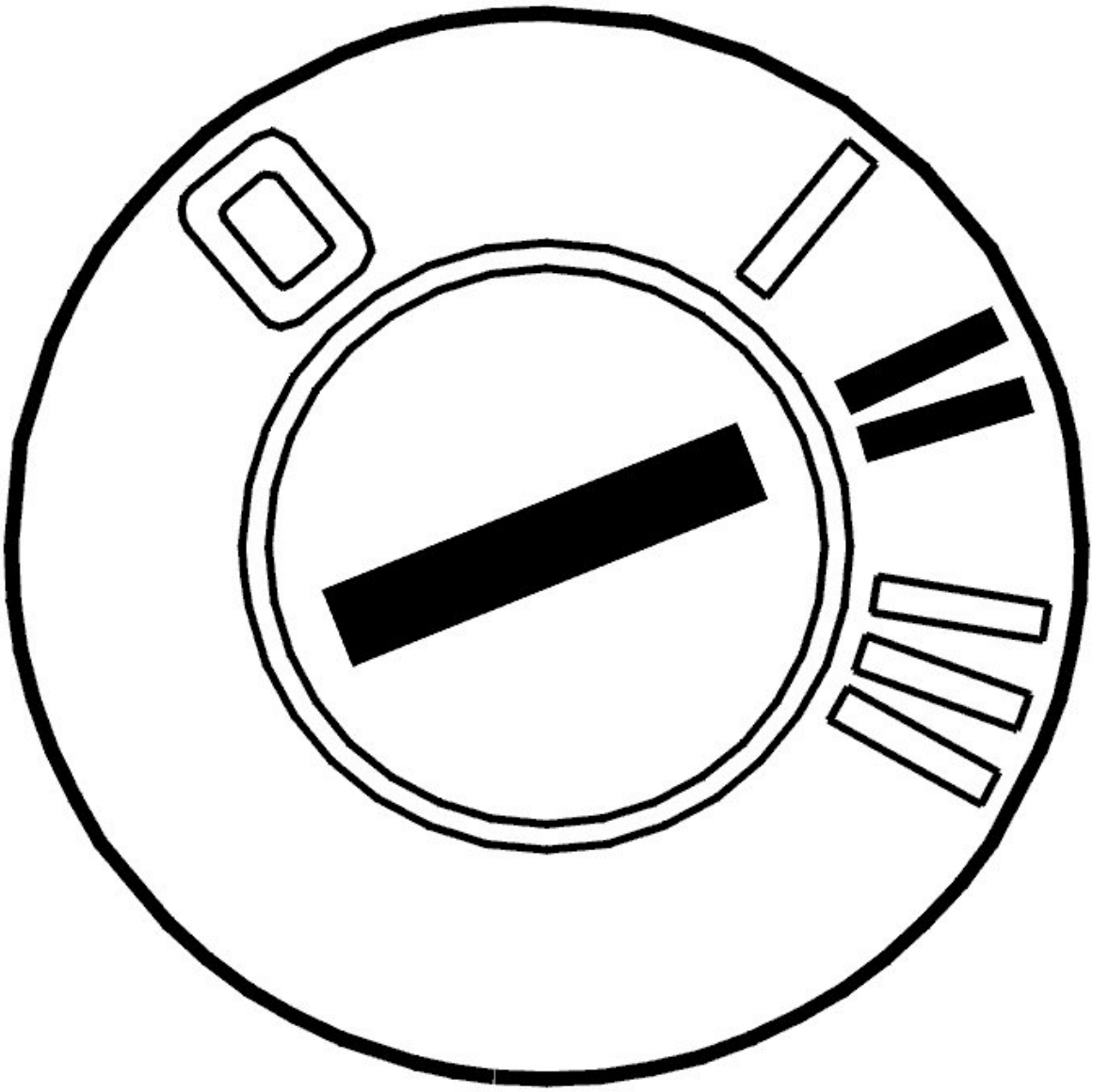
Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

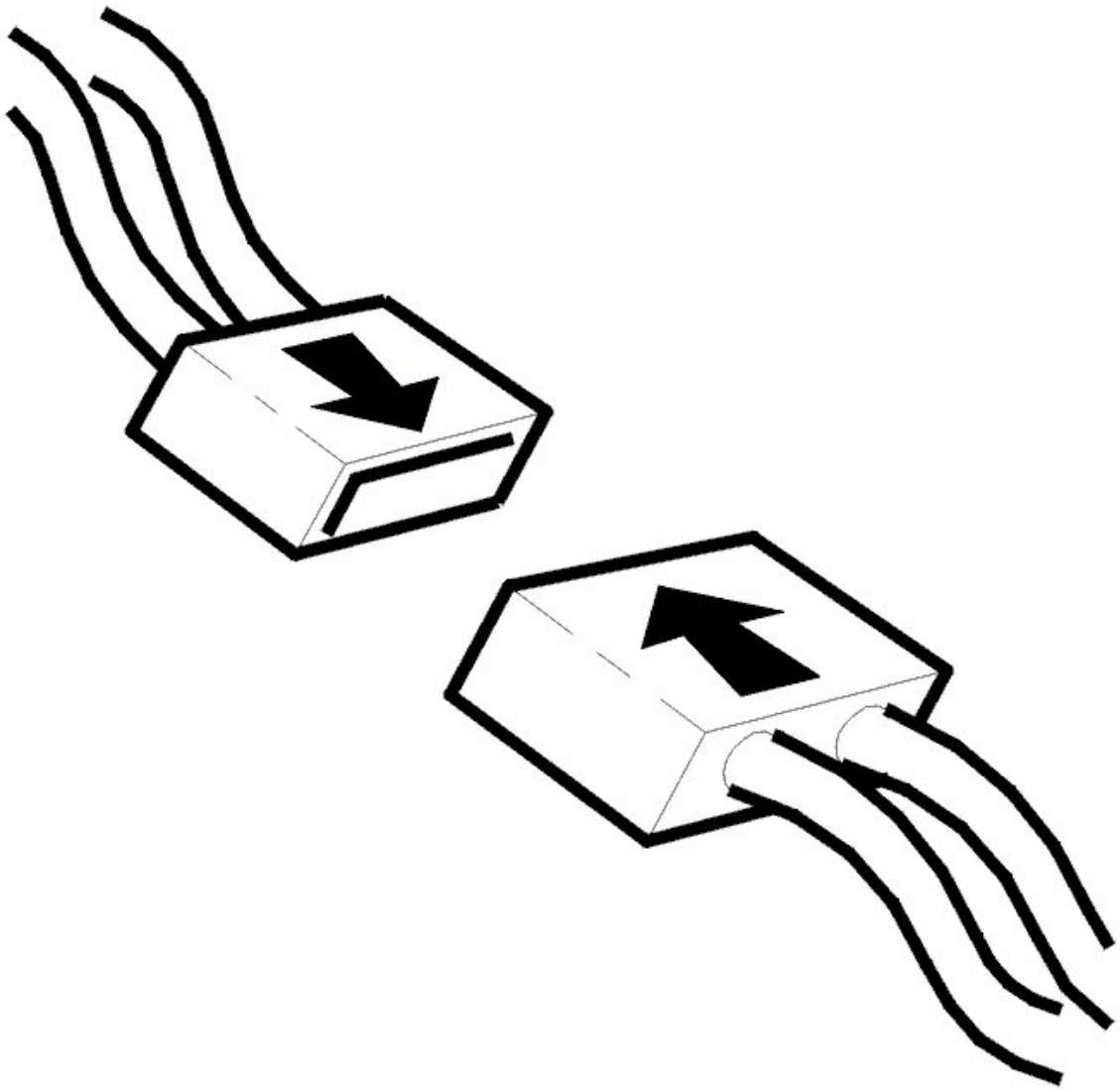
Continue - **DONE**

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the parameters.

Check that the following basic conditions for adaptation of the throttle unit are met.

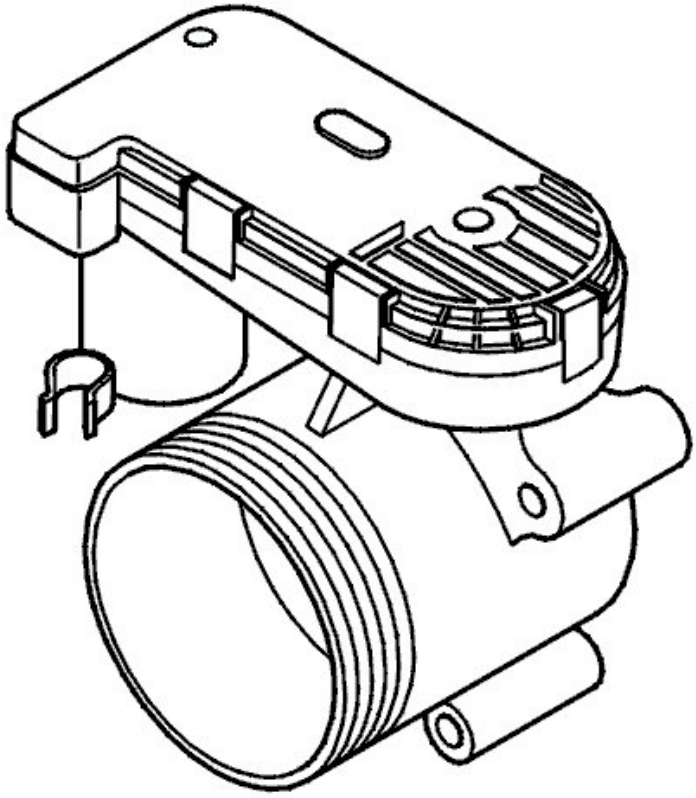
1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.

The fault has been remedied if the adaptation has been completed correctly.



Is the adaptation OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

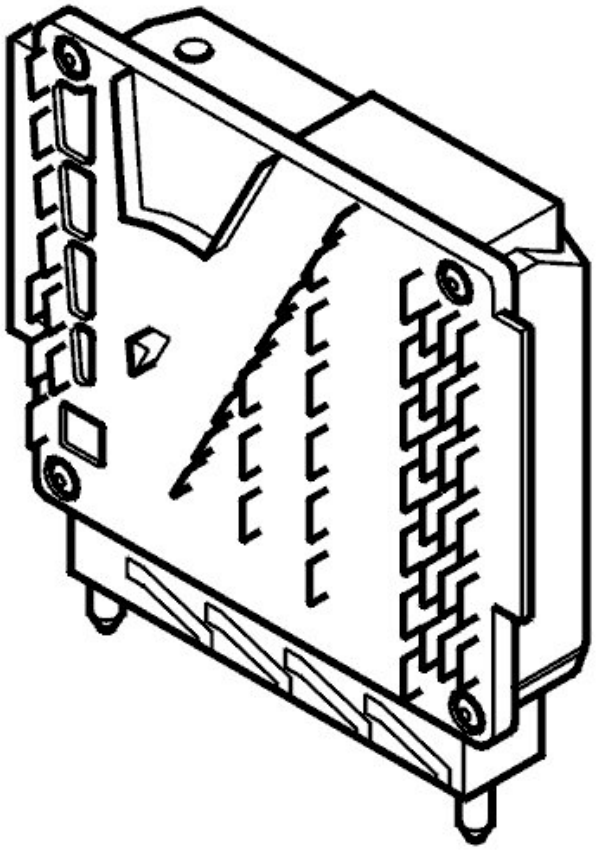
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-92E0

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM), when attempting to adapt the electronic throttle unit, registers an internal fault in the integrated amplifier for the signal from potentiometer 1 in throttle position sensor (circuit 1) in the electronic throttle unit.

Substitute value

The engine control module (ECM) does not use the signal from potentiometer 1 for the throttle position (TP) sensor (circuit 1) in the electronic throttle unit.

Possible source
- Damaged engine control module (ECM).

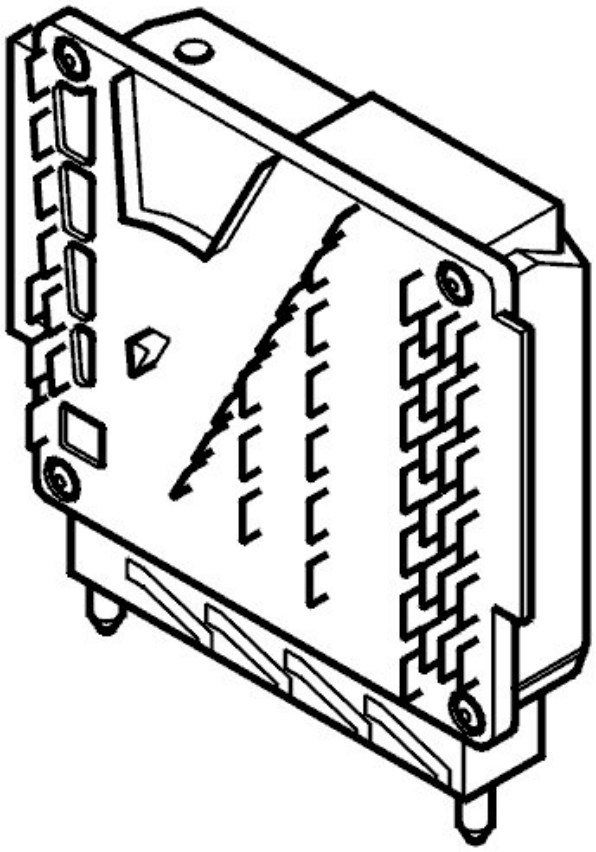
Fault symptom[s]
- None.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

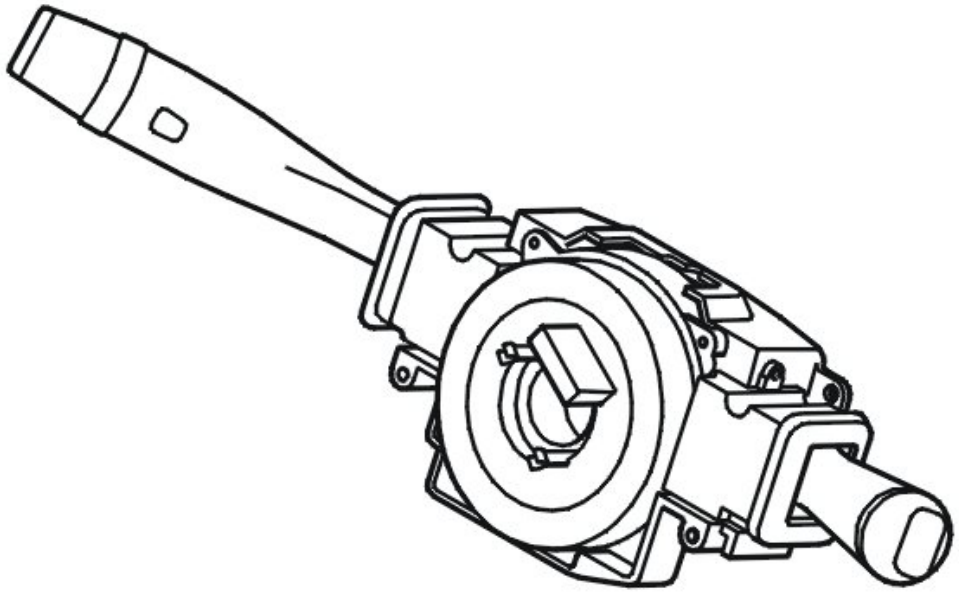
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9300

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the steering wheel module (SWM) or in its CAN communication.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Cruise control switched off.

Possible source
- Fault trace the steering wheel module (SWM)
- Fault trace the central electronic module (CEM).

Fault symptom[s]
- Cruise control does not function at all.

Fault-Tracing Information

Fault-tracing information

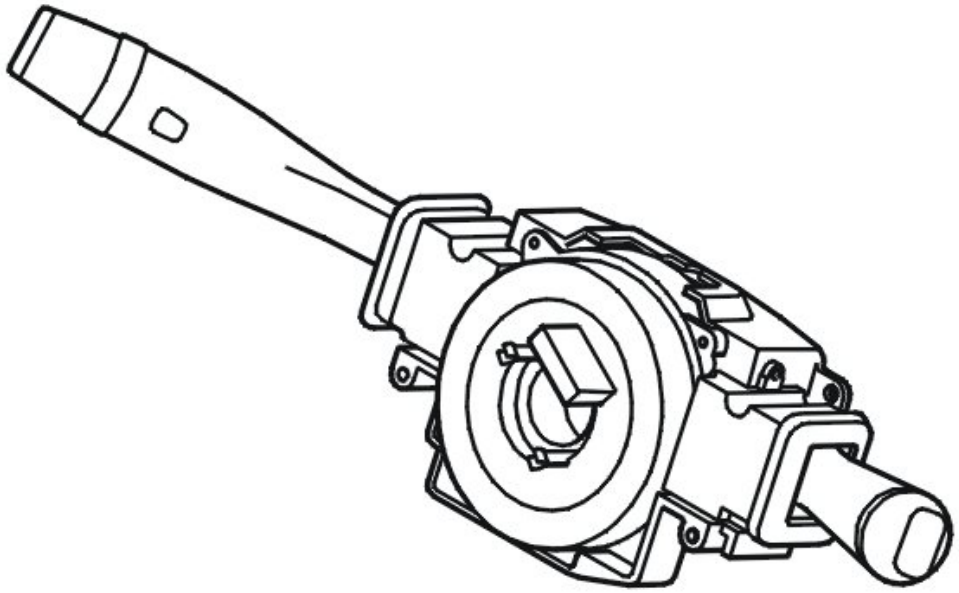
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-930B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the steering wheel module (SWM) or in its CAN communication.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Cruise control switched off.

Possible source
- Fault trace the steering wheel module (SWM)
- Fault trace the central electronic module (CEM).

Fault symptom[s]
- Cruise control does not function at all.

Fault-Tracing Information

Fault-tracing information

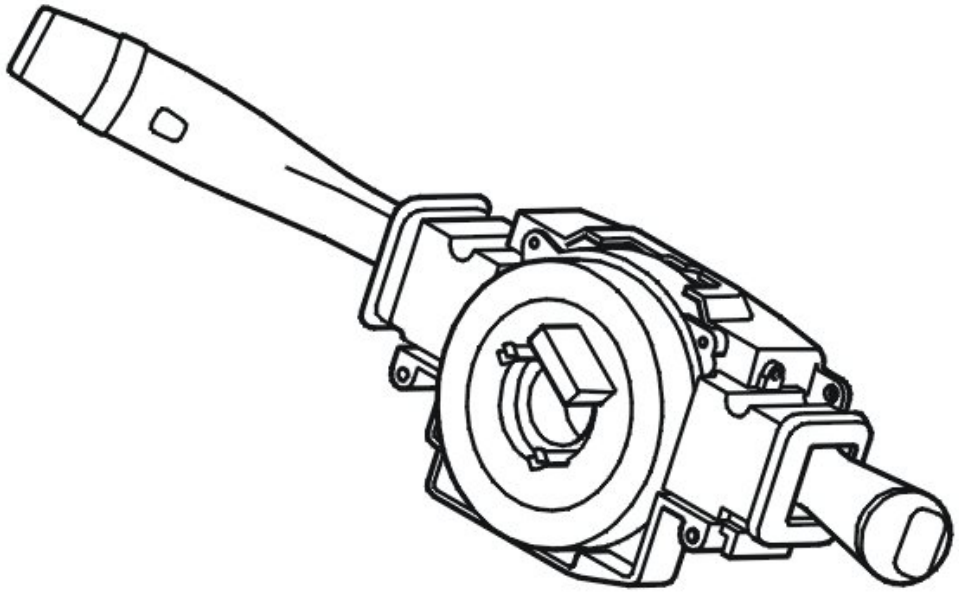
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-930C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the steering wheel module (SWM) or in its CAN communication.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Cruise control switched off.

Possible source
- Fault trace the steering wheel module (SWM)
- Fault trace the central electronic module (CEM).

Fault symptom[s]
- Cruise control does not function at all.

Fault-Tracing Information

Fault-tracing information

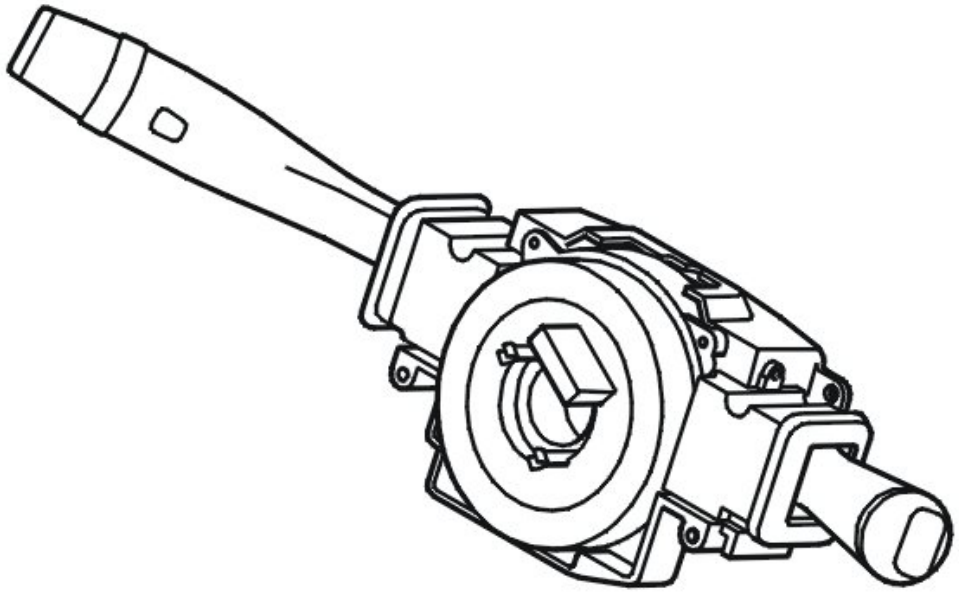
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-930D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the steering wheel module (SWM) or in its CAN communication.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- Cruise control switched off.

Possible source
- Fault trace the steering wheel module (SWM)
- Fault trace the central electronic module (CEM).

Fault symptom[s]
- Cruise control does not function at all.

Fault-Tracing Information

Fault-tracing information

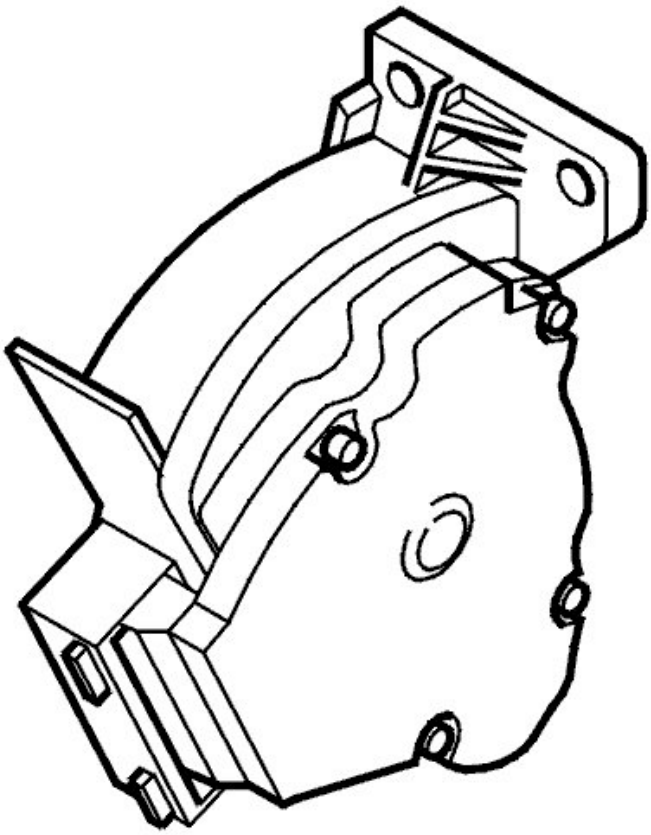
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9400

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the analog signal from the accelerator pedal (AP) position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The accelerator pedal (AP) is disabled at the same time as the brake pedal is pressed.

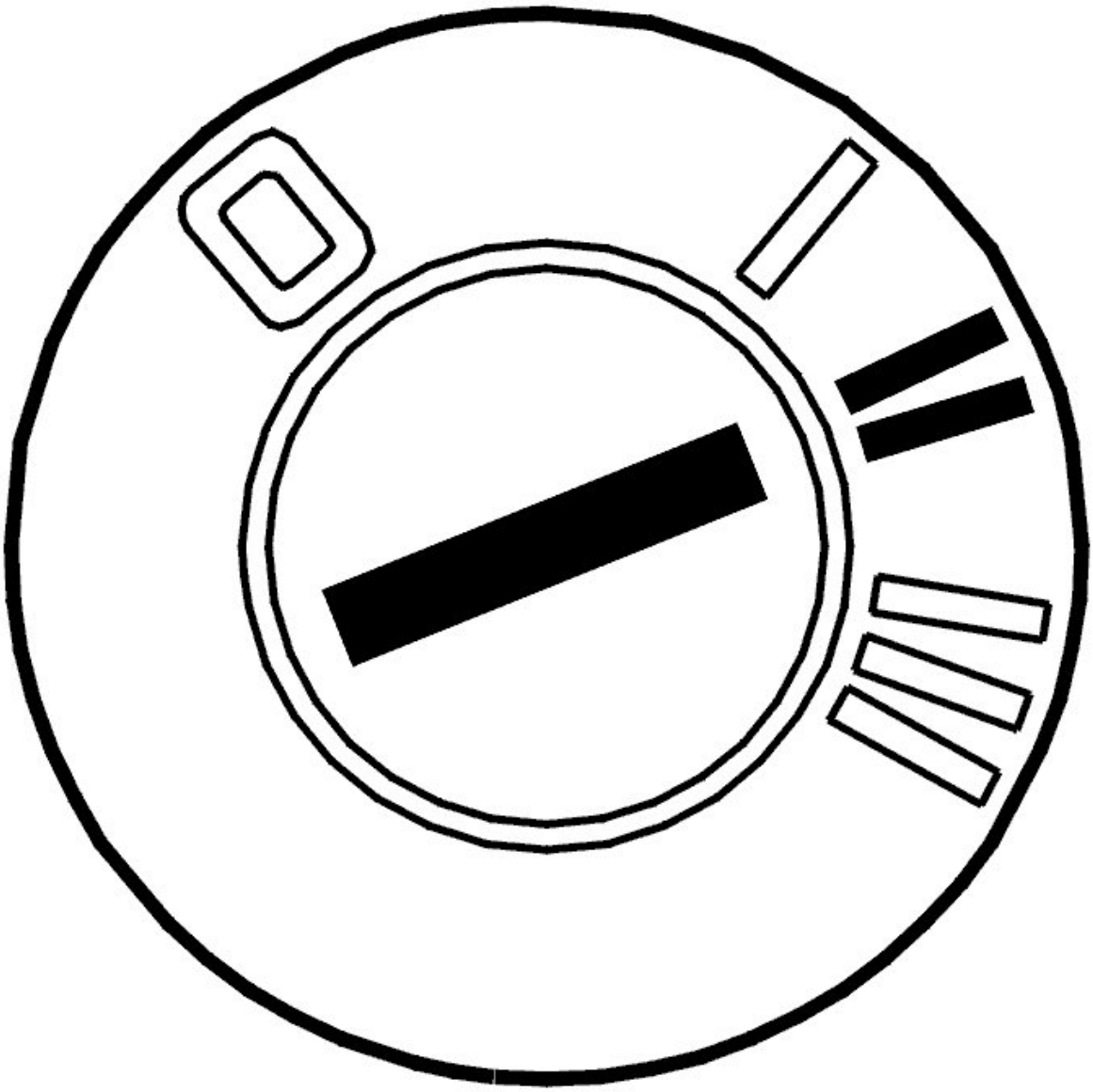
Possible source
- Open-circuit in the power supply (12 V) for the accelerator pedal (AP) position sensor
- Water in the connectors.
- Damaged accelerator pedal (AP) position sensor.

Fault symptom[s]
- Poor accelerator pedal (AP) response.
- Message in information display

Faulty Signal

Faulty signal

Checking the status

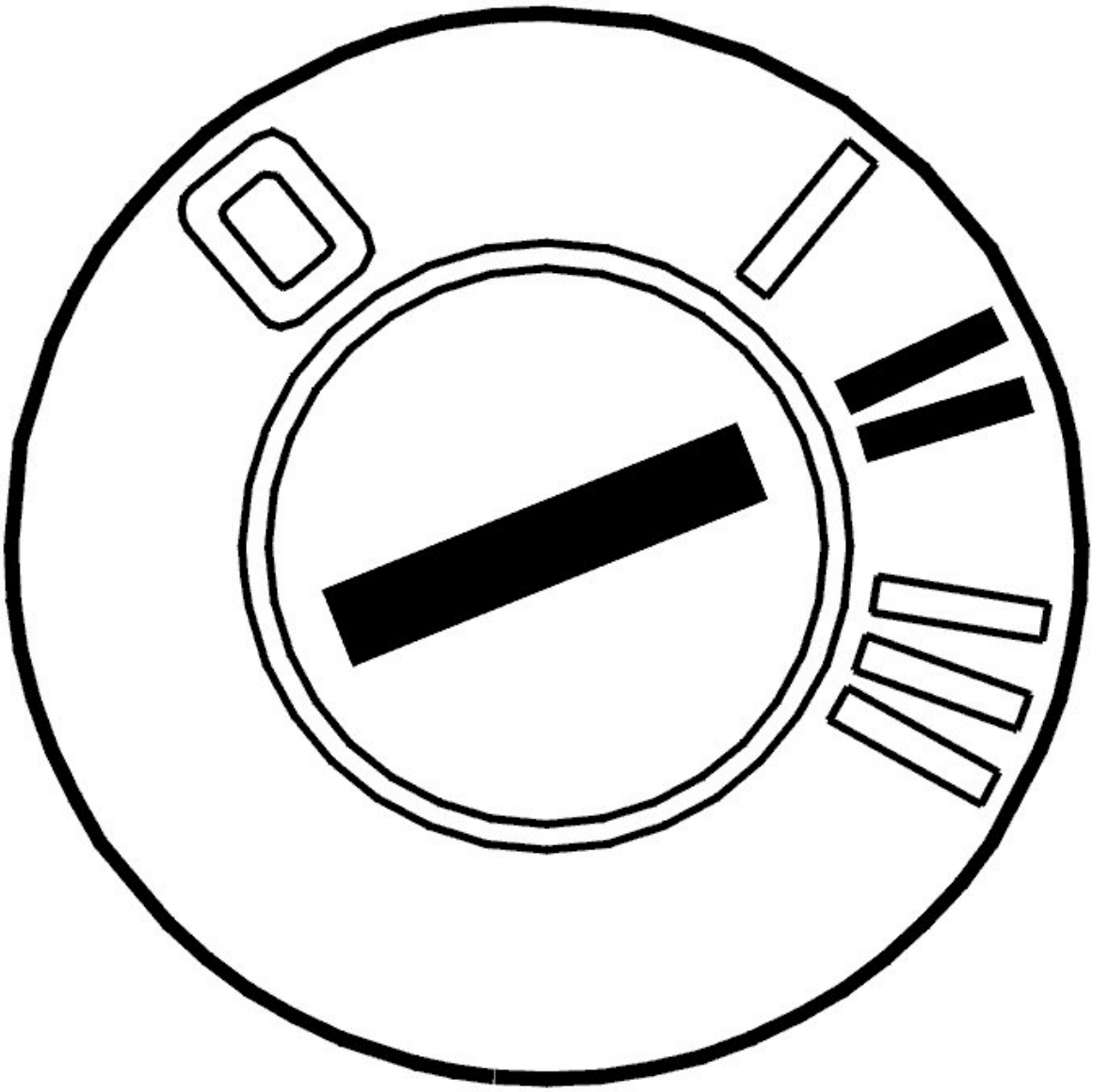


- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking the power supply

Checking the power supply

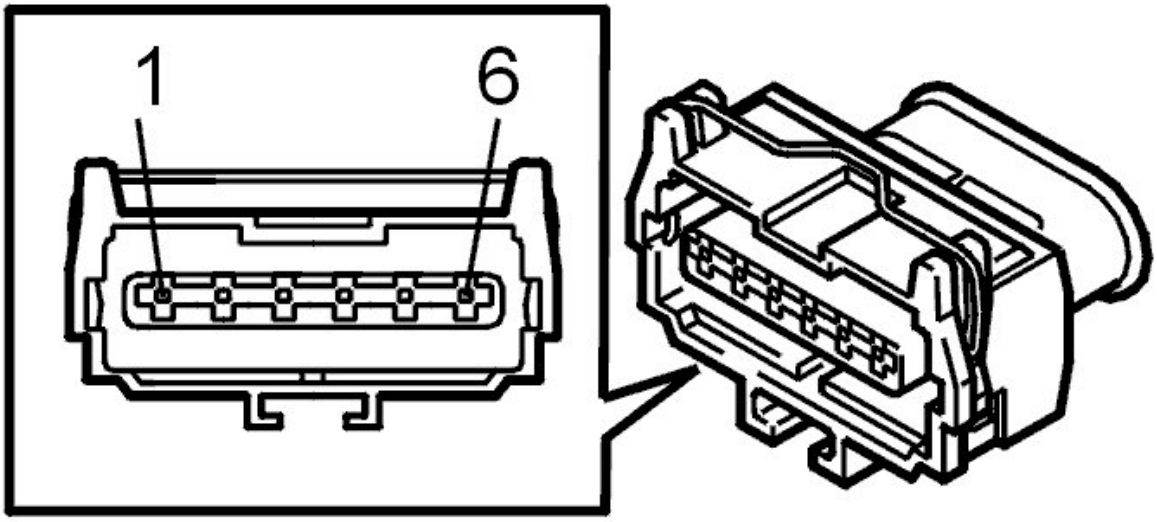


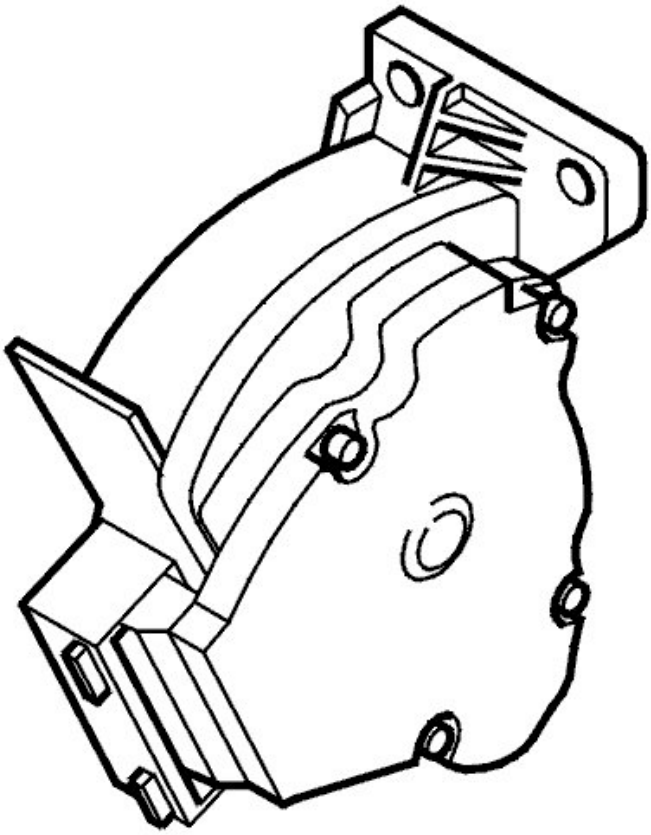
- Ignition on.

Check the connectors and terminals for water penetration.
Check the power supply (12 V) to the accelerator pedal (AP) position sensor between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).
Check that the power supply is approximately 12 V with the ignition on.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.



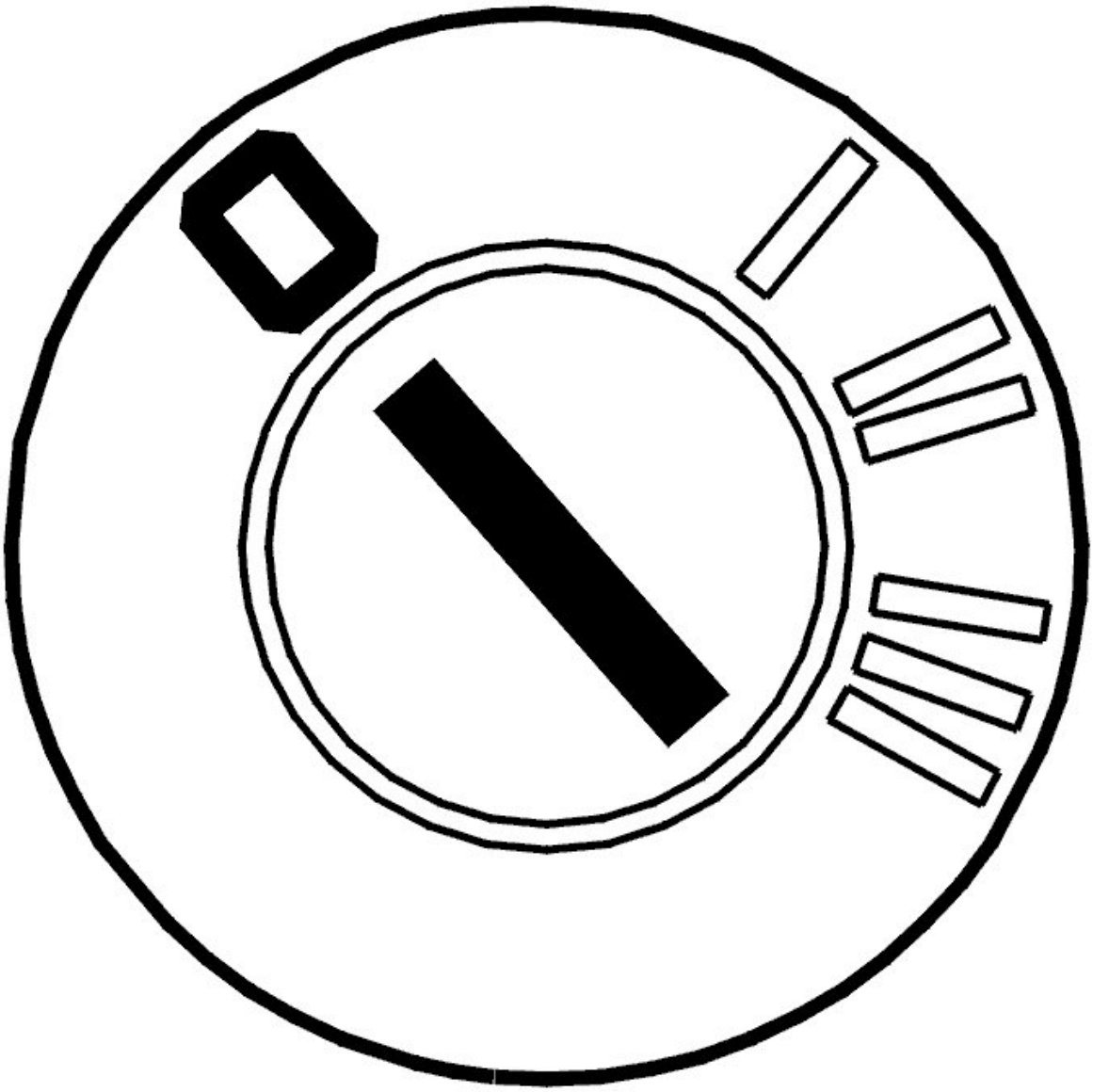


Is the power supply OK?

Yes - Replacing the component

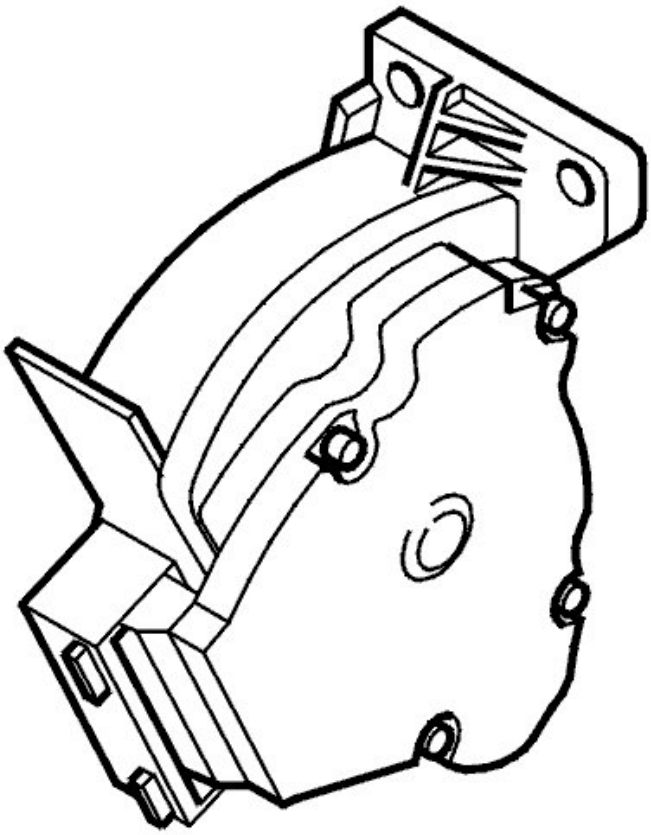
No - Checking the connectors and cables

Replacing the component



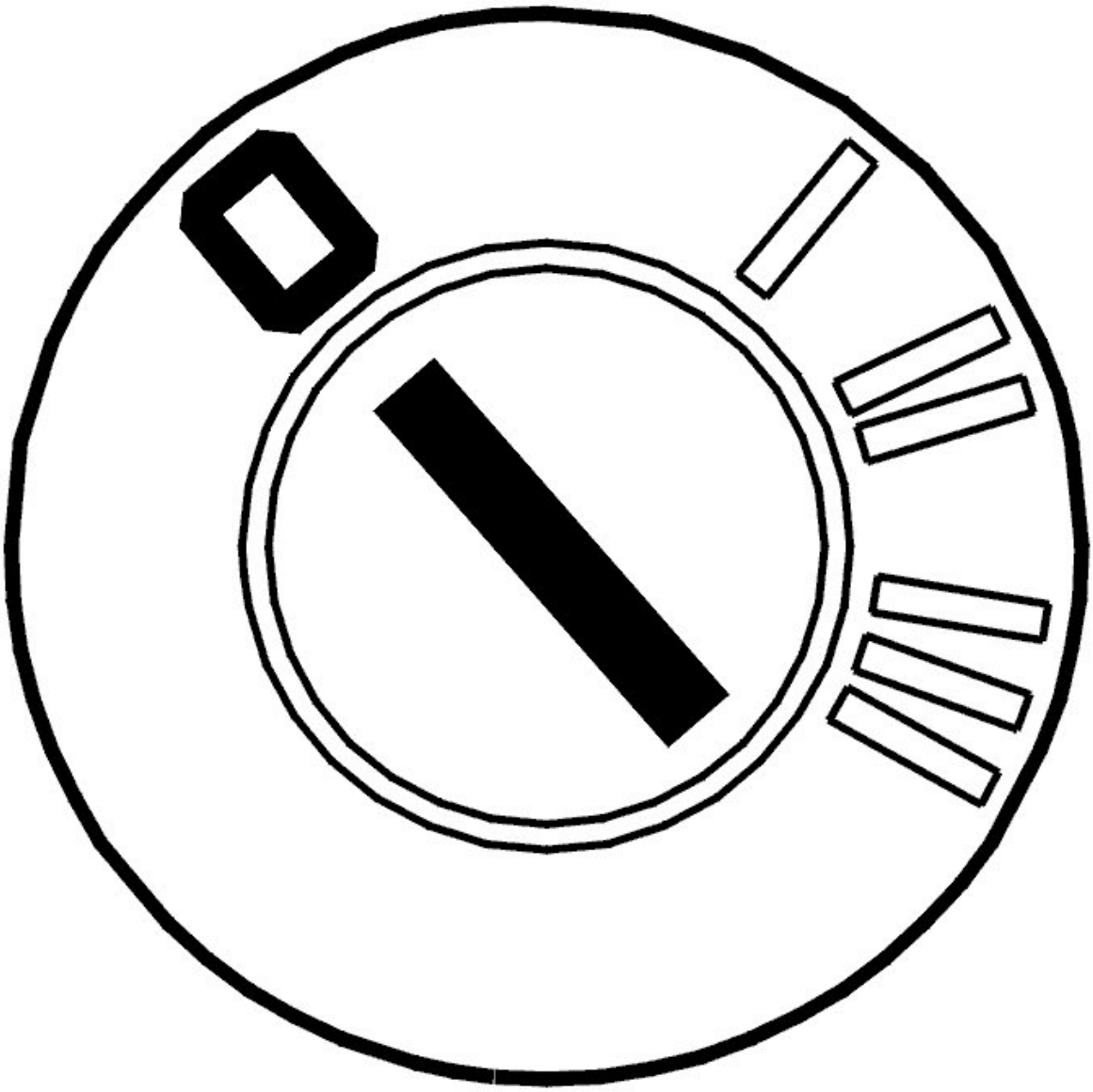
- Ignition off.

Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent. See Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.



Continue - Verification

Checking the connectors and cables



- Ignition off
- Check the accelerator pedal (AP) position sensor connector. Check for contact resistance and oxidation.

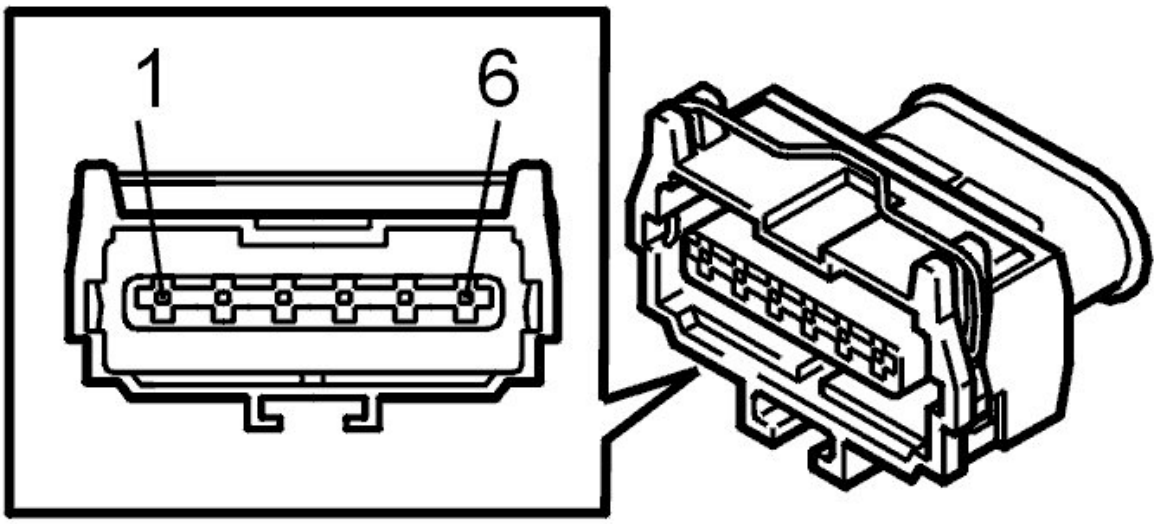
Check the power supply cable (12 V) between accelerator pedal (AP) position sensor terminal #1 (wiring side) and the relevant fuse for the circuit. Check for a short-circuit to ground. Check for an open-circuit. Check that the fuse for the circuit has not blown.
Check the ground lead for power supply (12 V) between accelerator pedal (AP) position sensor terminal #3 (wiring side) and the relevant ground terminal. Check for contact resistance and oxidation. Check for an open-circuit.

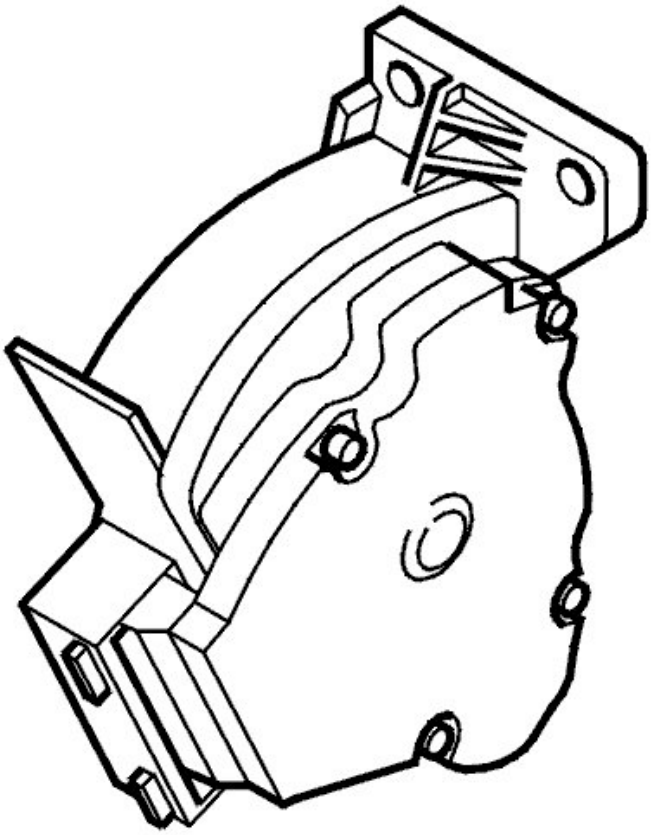
Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor must be approximately 12 V measured between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).
With the ignition on, the power supply from the engine control module (ECM) must be approximately 5 V measured between accelerator pedal (AP) position sensor terminals #6 (wiring side) and #4 (wiring side).

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.





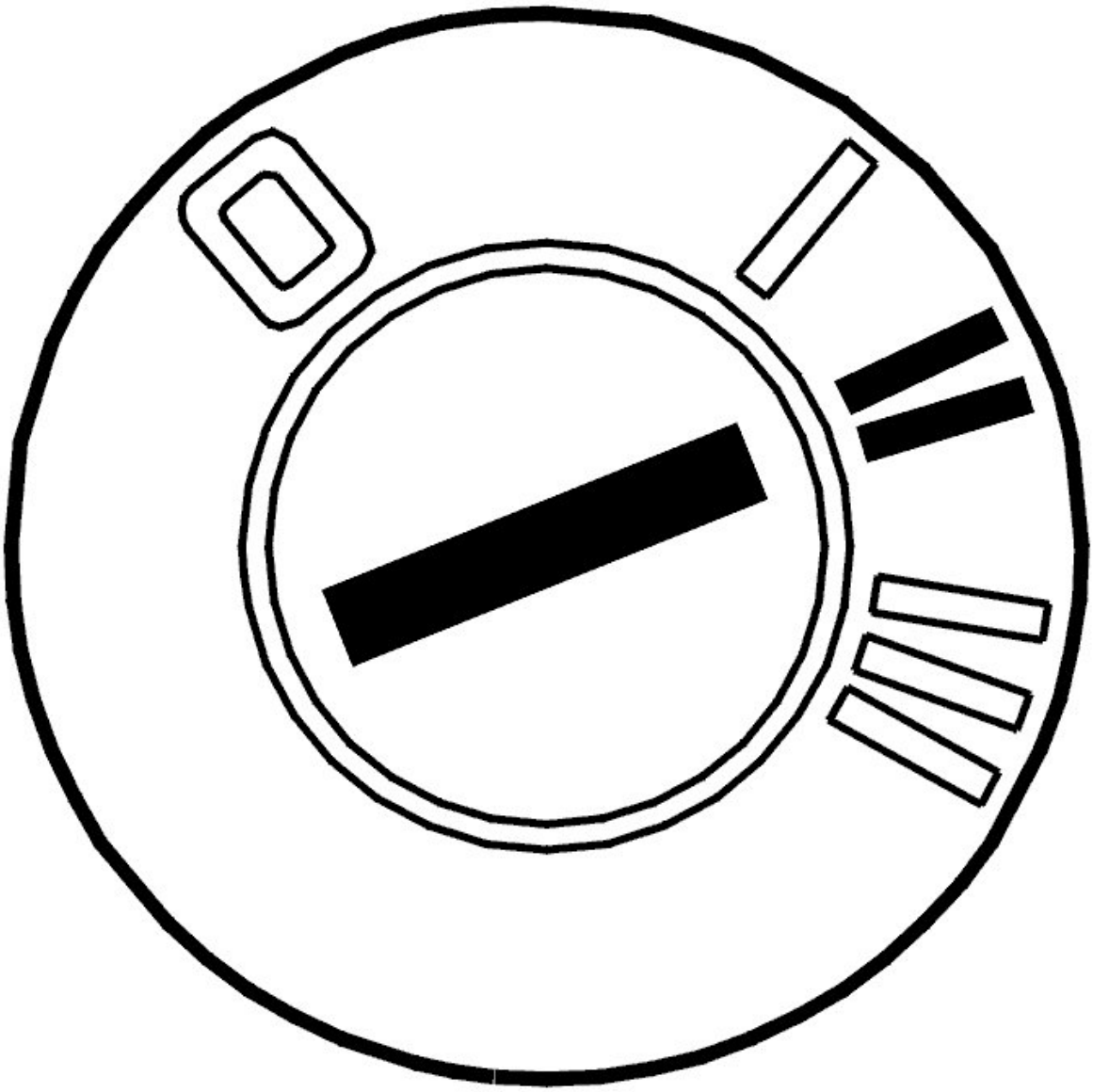
Continue - Replacing the component

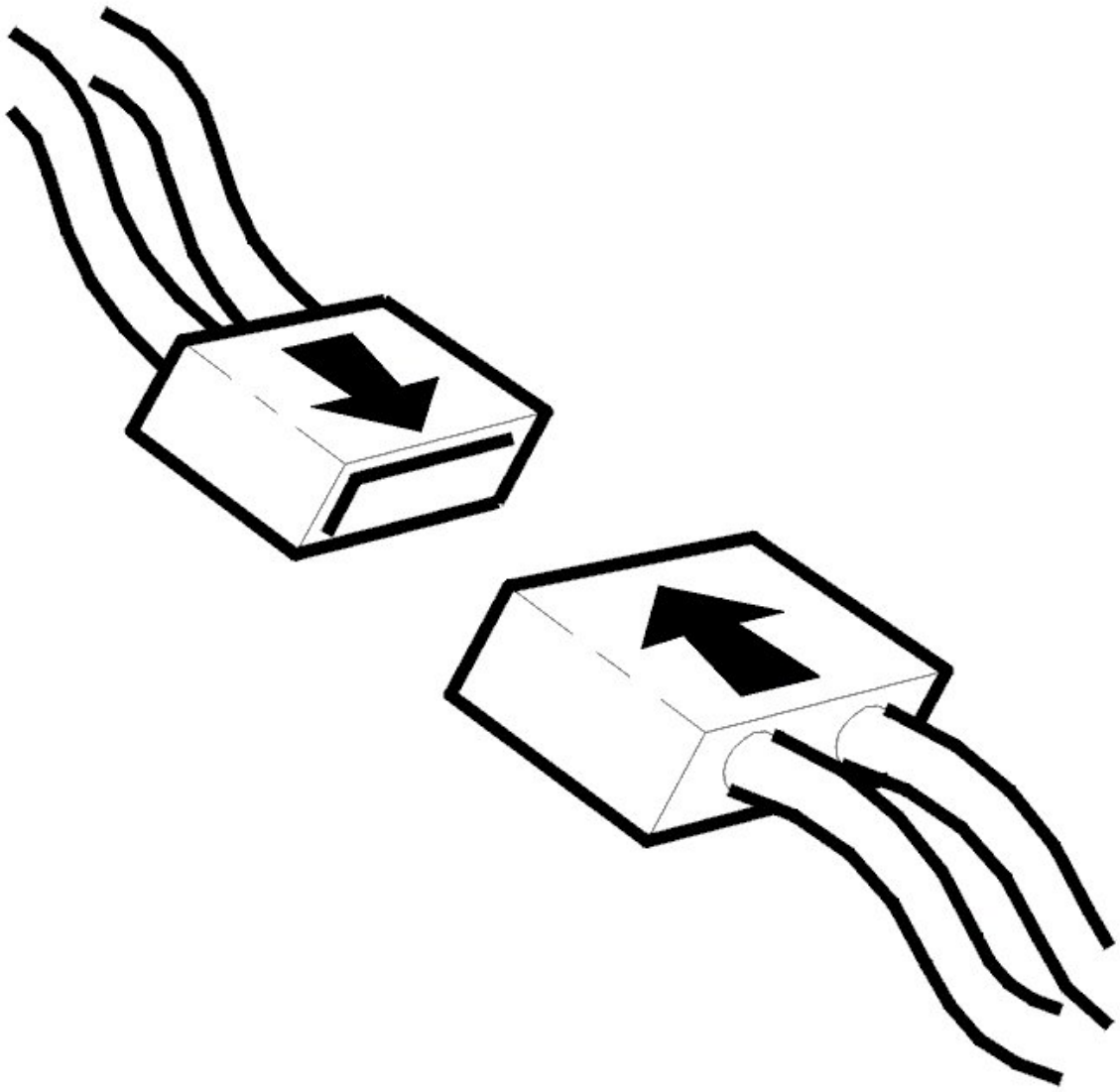
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

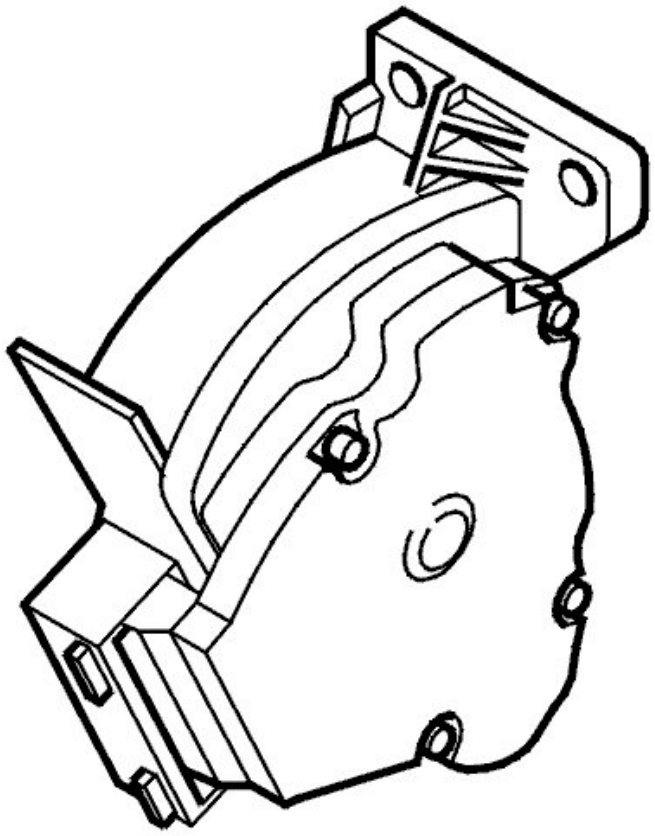
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-940C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the analog signal from the accelerator pedal (AP) position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The accelerator pedal (AP) is disabled at the same time as the brake pedal is pressed.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged accelerator pedal (AP) position sensor.

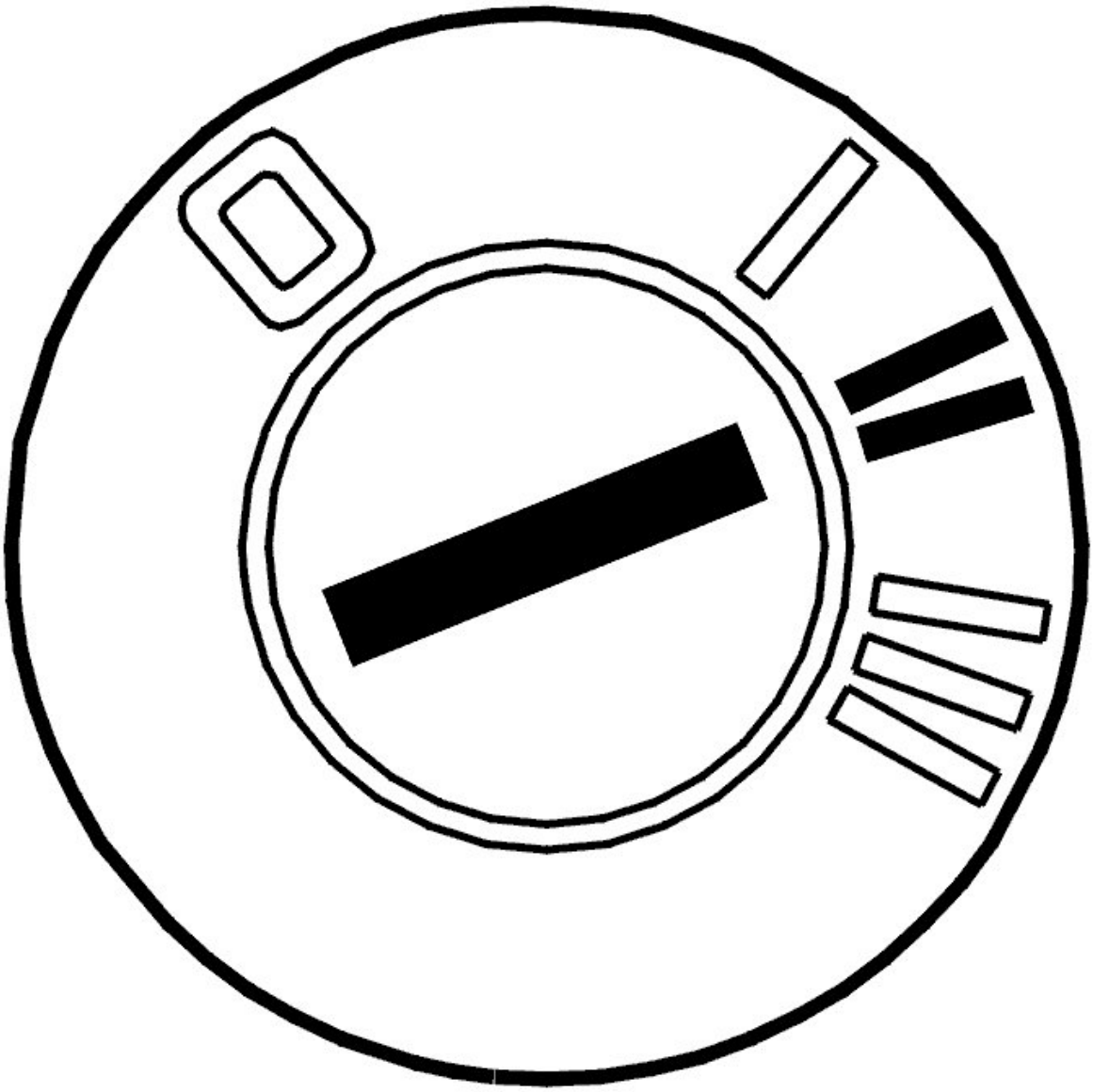
Fault symptom[s]

- Poor accelerator pedal (AP) response.

Fault-Tracing Information

Signal too high / Signal too low

Checking the status

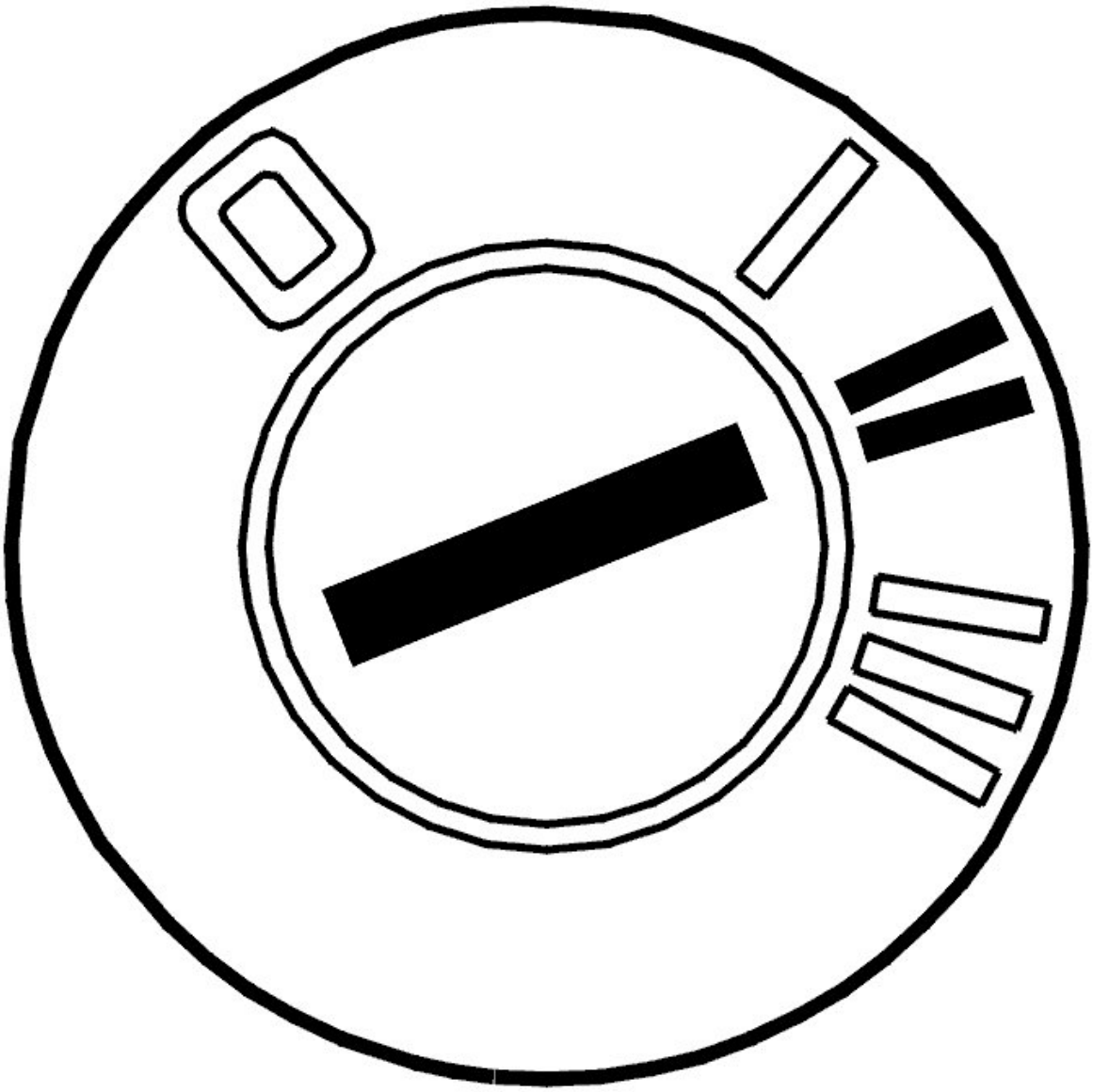


- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking the power supply

Checking the power supply

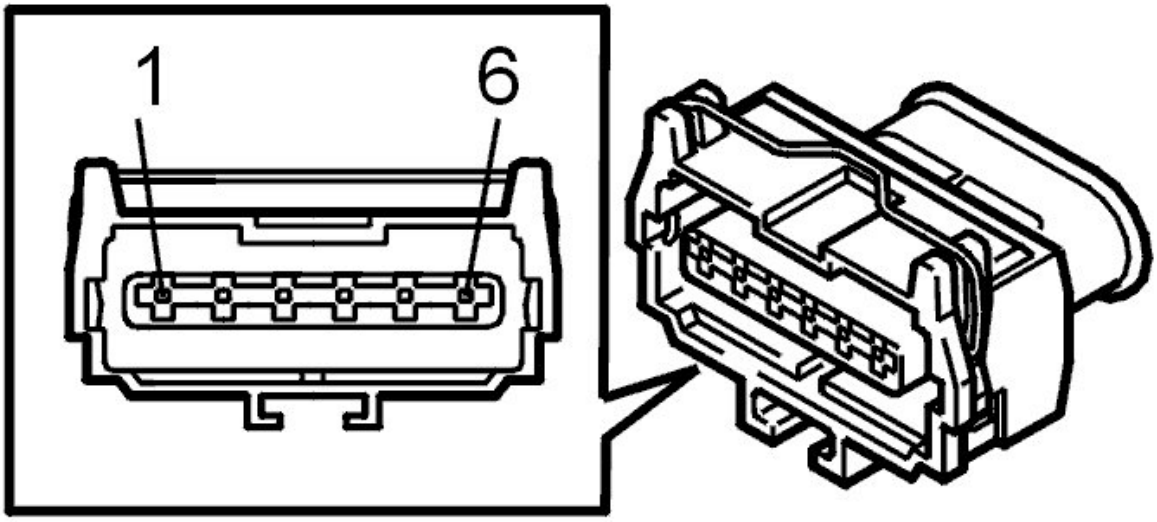


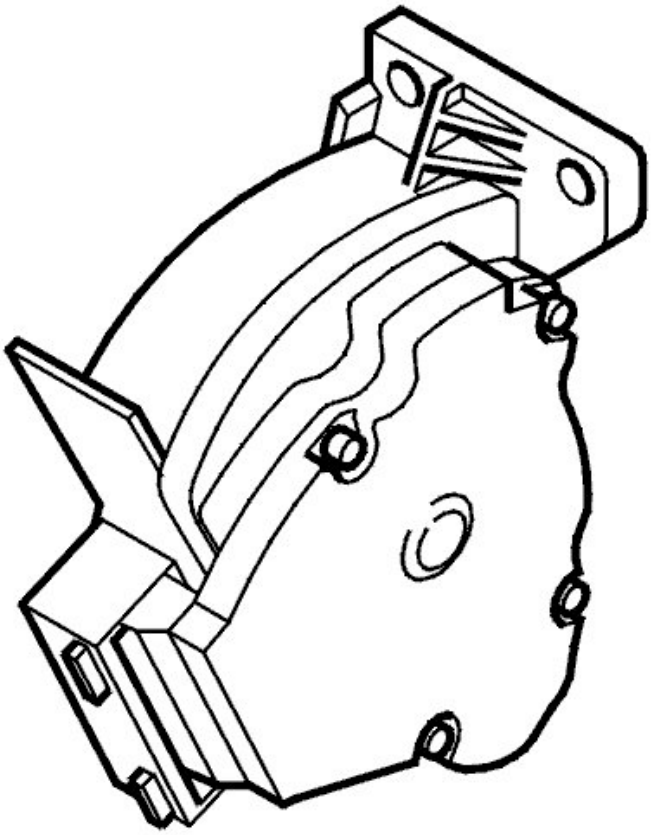
- Ignition on.

Check the power supply (12 V) to the accelerator pedal (AP) position sensor between accelerator pedal (AP) position sensor terminals #1 (cable harness side) and #3 (cable harness side).
Check that the power supply is approximately 12 V with the ignition on.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



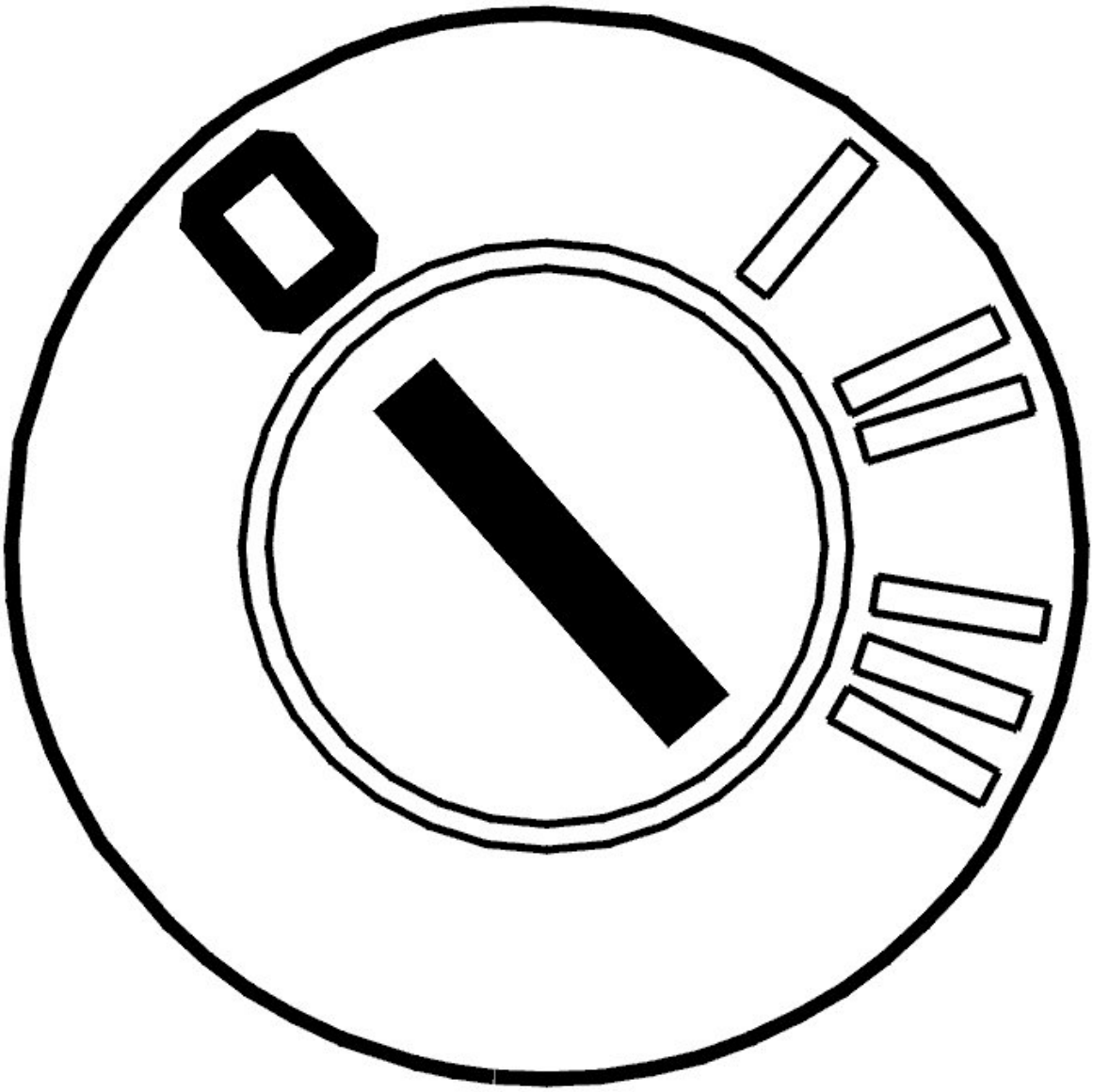


Is the power supply OK?

Yes - Replacing the component

No - Checking the connectors and cables

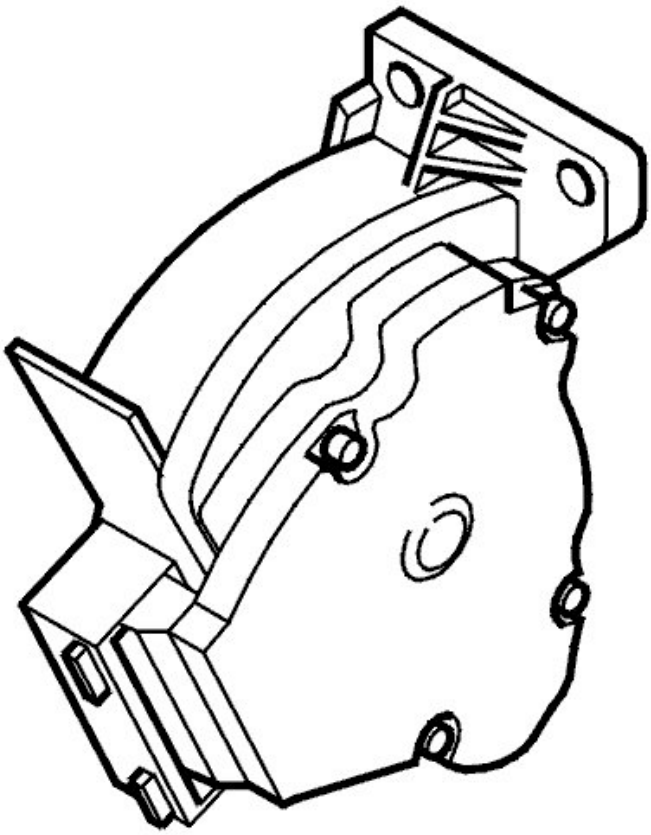
Replacing the component



- Ignition off.

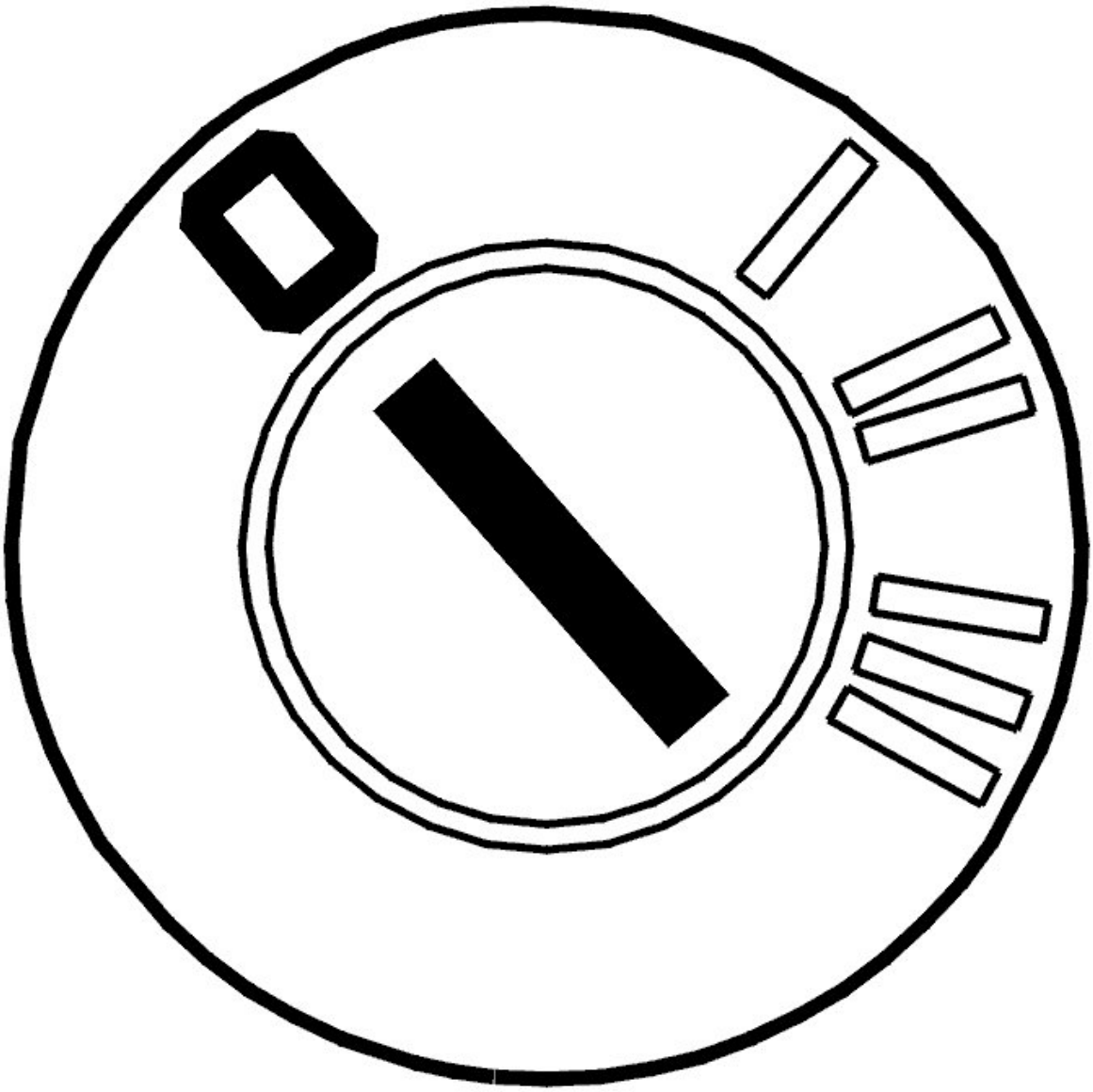
Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent. See: Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Verification

Checking the connectors and cables



- Ignition off
- Check the accelerator pedal (AP) position sensor connector. Check for contact resistance and oxidation.

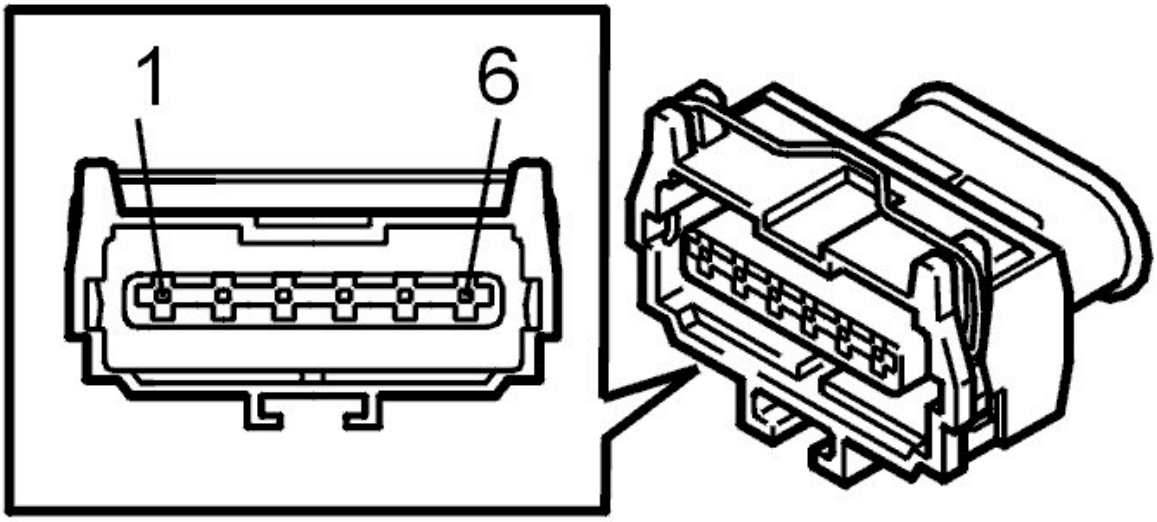
Check the power supply cable (12 V) between accelerator pedal (AP) position sensor terminal #1 (cable harness side) and the relevant fuse for the circuit. Check for a short-circuit to ground. Check for an open-circuit. Check that the fuse for the circuit is not damaged.
Check the ground lead for power supply (12 V) between accelerator pedal (AP) position sensor terminal #3 (cable harness side) and the relevant ground terminal. Check for contact resistance and oxidation. Check for an open-circuit.

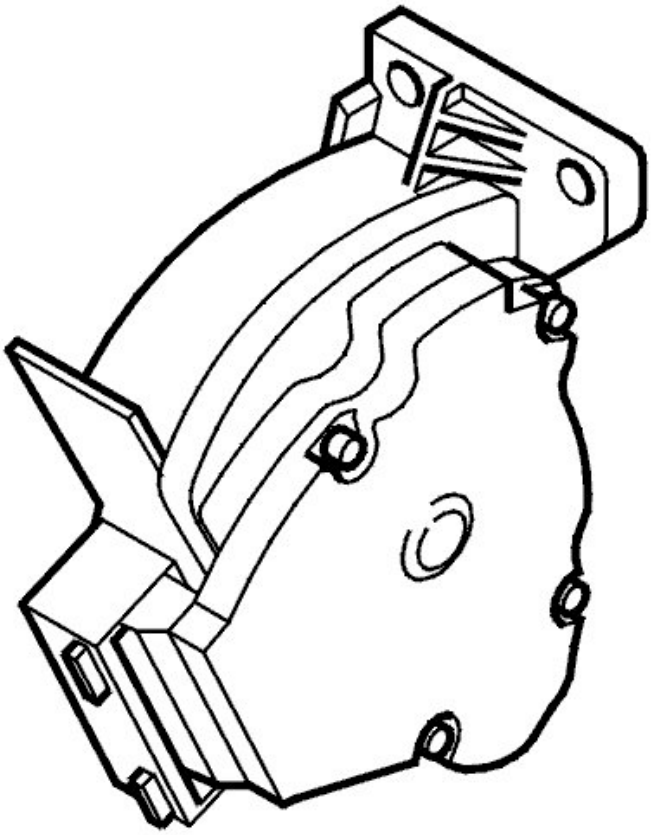
Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor measured between accelerator pedal (AP) position sensor terminals #1 (cable harness side) and #3 (cable harness side) must be approximately 12 V.
With the ignition on, the power supply from the engine control module (ECM) must be approximately 5 V measured between accelerator pedal (AP) position sensor terminals #6 (cable harness side) and #4 (cable harness side).

Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





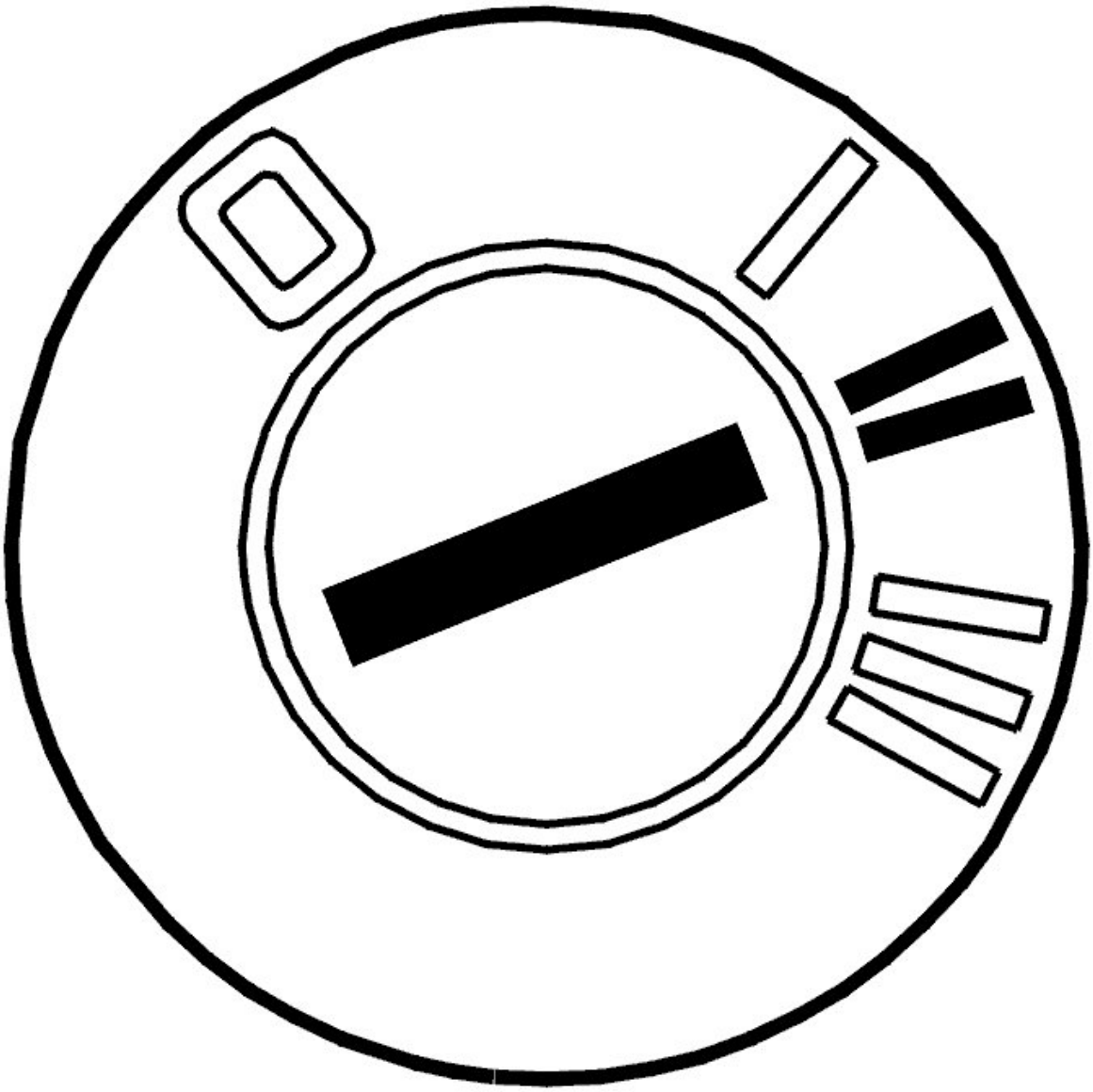
Continue - Replacing the component

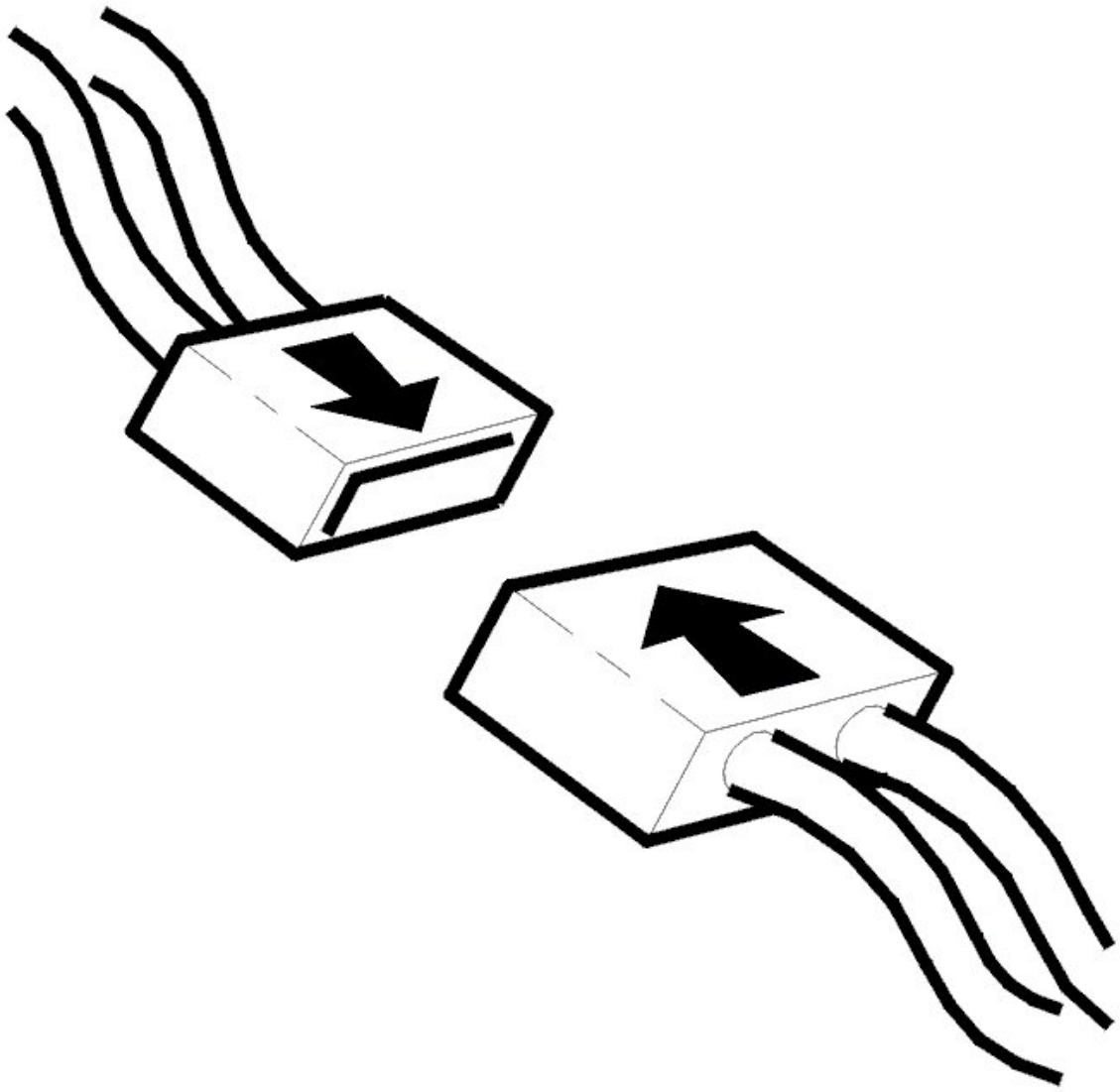
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

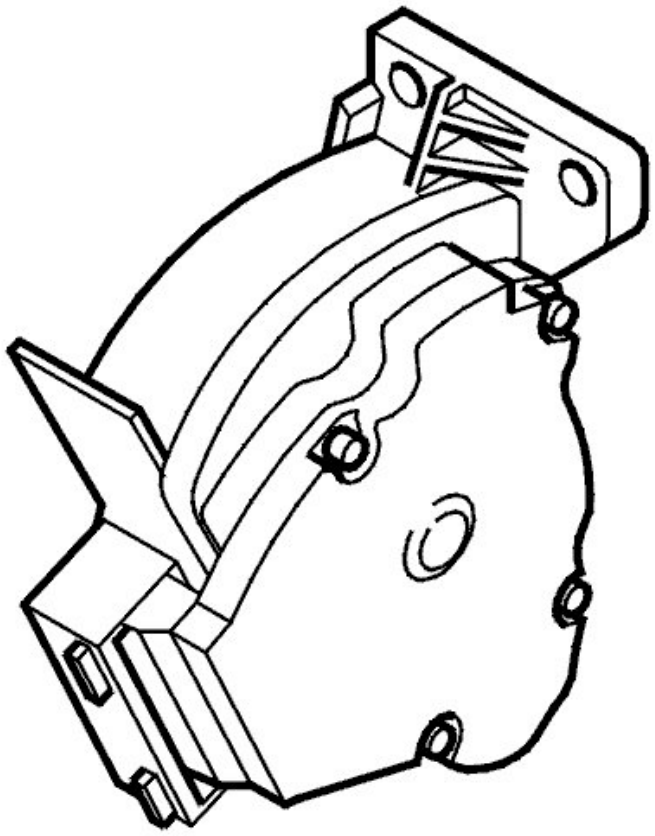
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-940D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the analog signal from the accelerator pedal (AP) position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The accelerator pedal (AP) is disabled at the same time as the brake pedal is pressed.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the accelerator pedal (AP) position sensor
- Open-circuit in the power supply (12 V) for the accelerator pedal (AP) position sensor
- Open-circuit in the power supply (5 V) for the analog signal

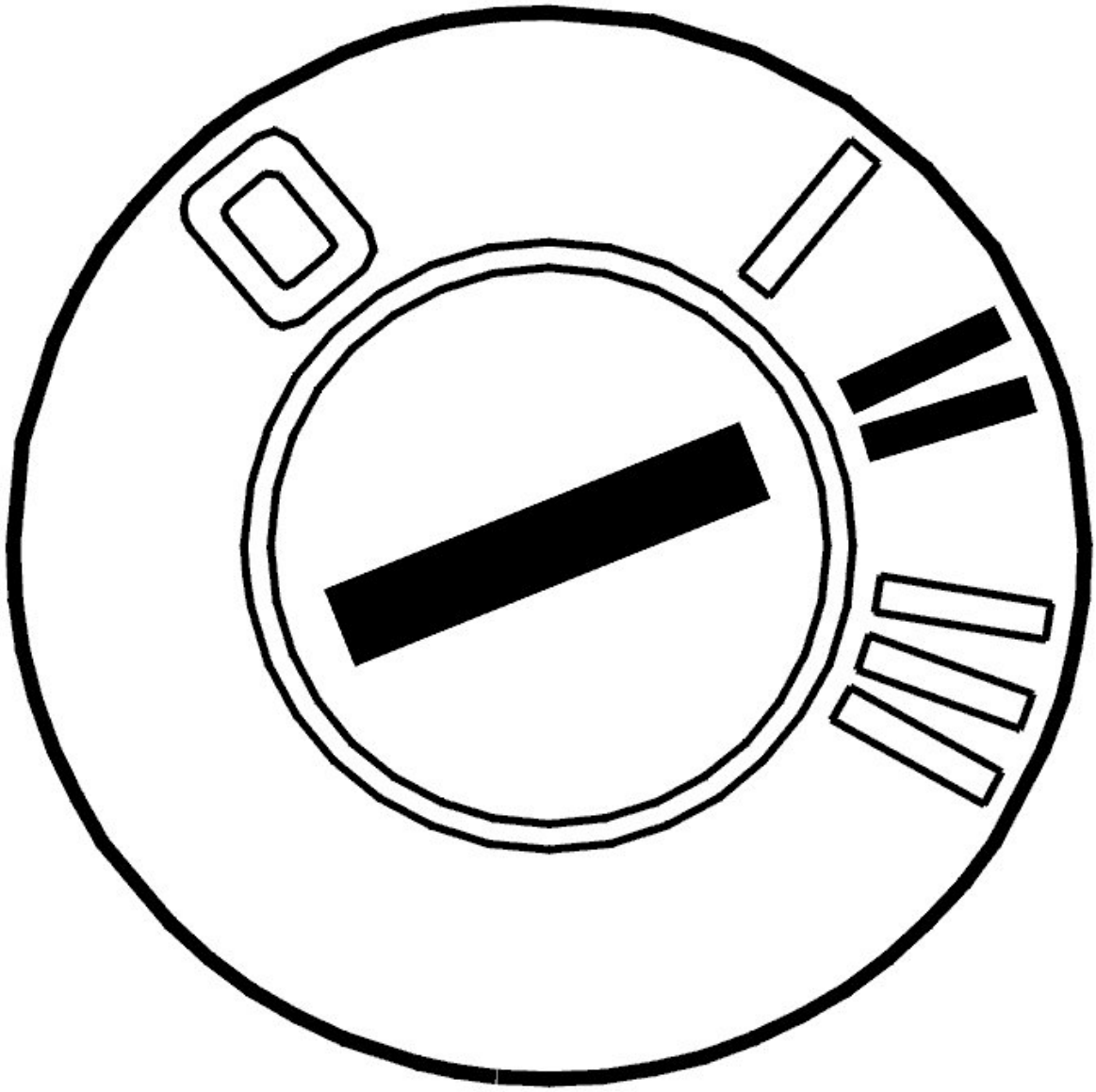
- Open-circuit in the signal ground cable for the analog signal
- Open-circuit or short-circuit to ground in the signal cable
- Damaged accelerator pedal (AP) position sensor.

Fault symptom[s]
- Poor accelerator pedal (AP) response.

Signal Too High/Signal Too Low

Signal too high / Signal too low

Checking the status

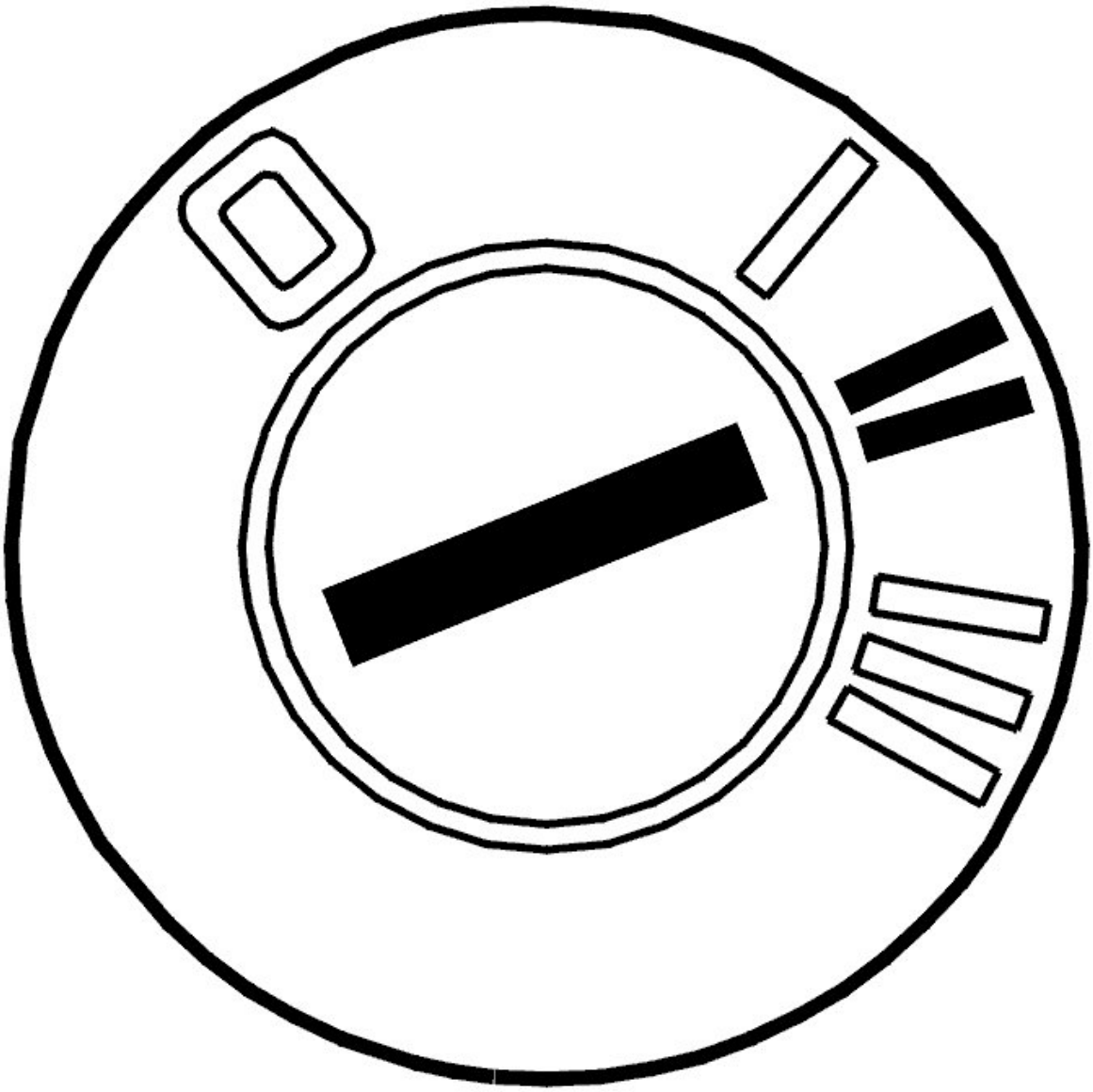


- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking the power supply

Checking the power supply

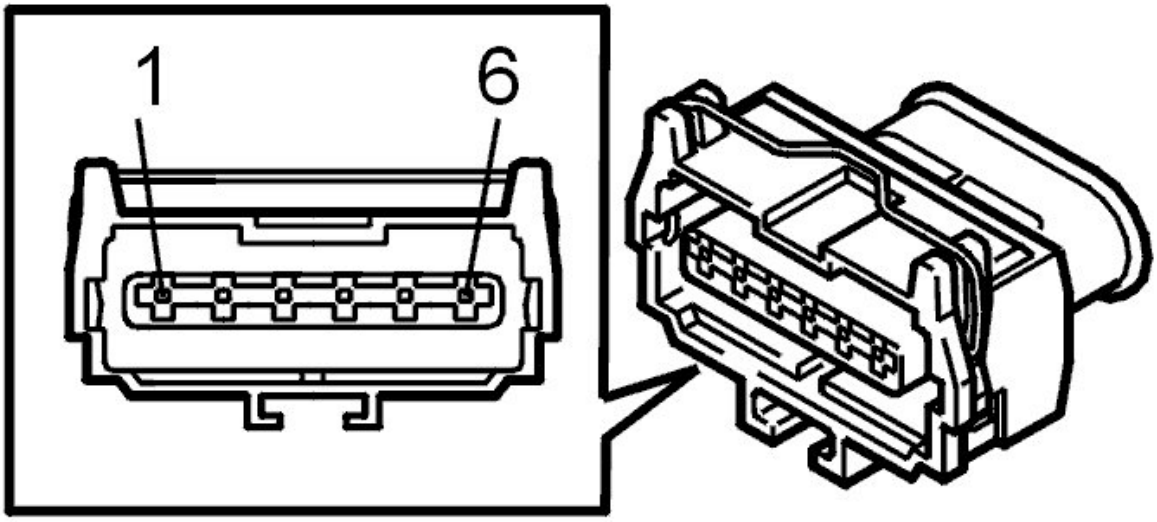


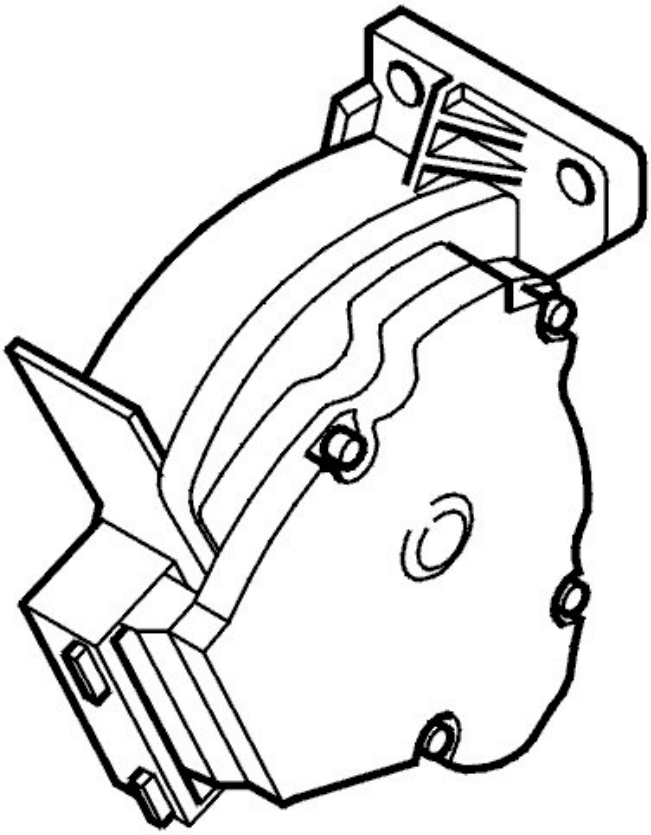
- Ignition on.

Check the power supply (12 V) to the accelerator pedal (AP) position sensor between accelerator pedal (AP) position sensor terminals #1 (cable harness side) and #3 (cable harness side).
Check that the power supply is approximately 12 V with the ignition on.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



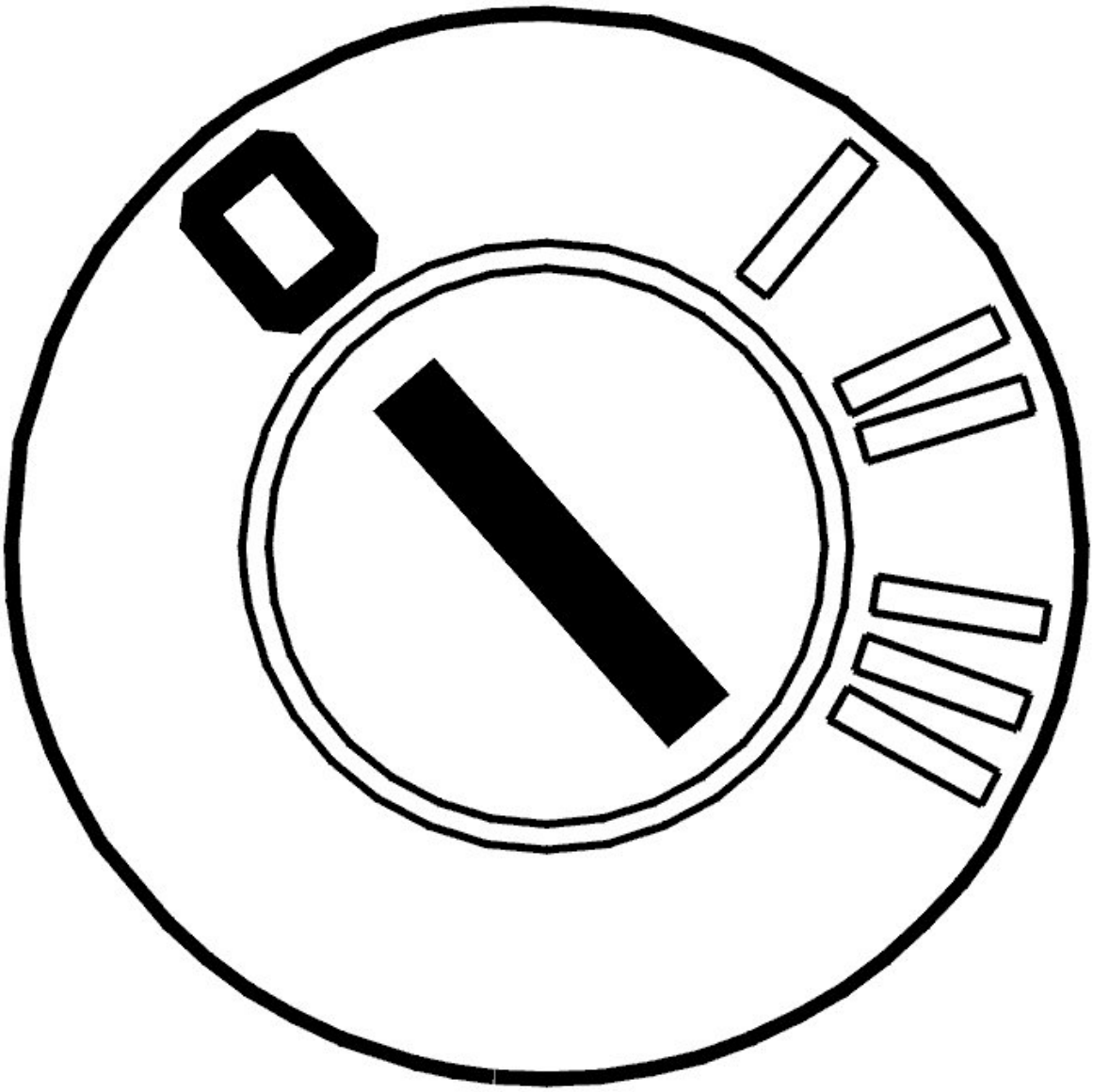


Is the power supply OK?

Yes - Replacing the component

No - Checking the connectors and cables

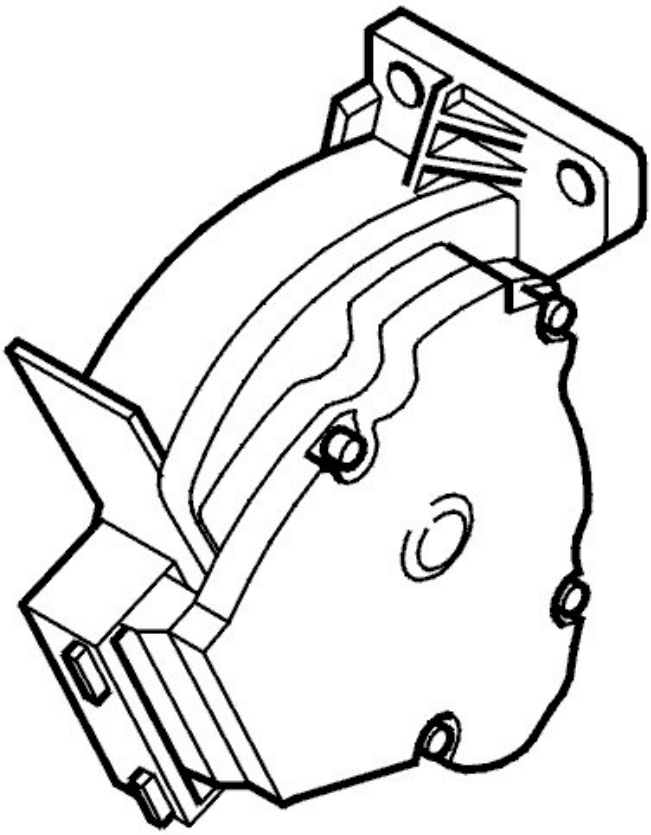
Replacing the component



- Ignition off.

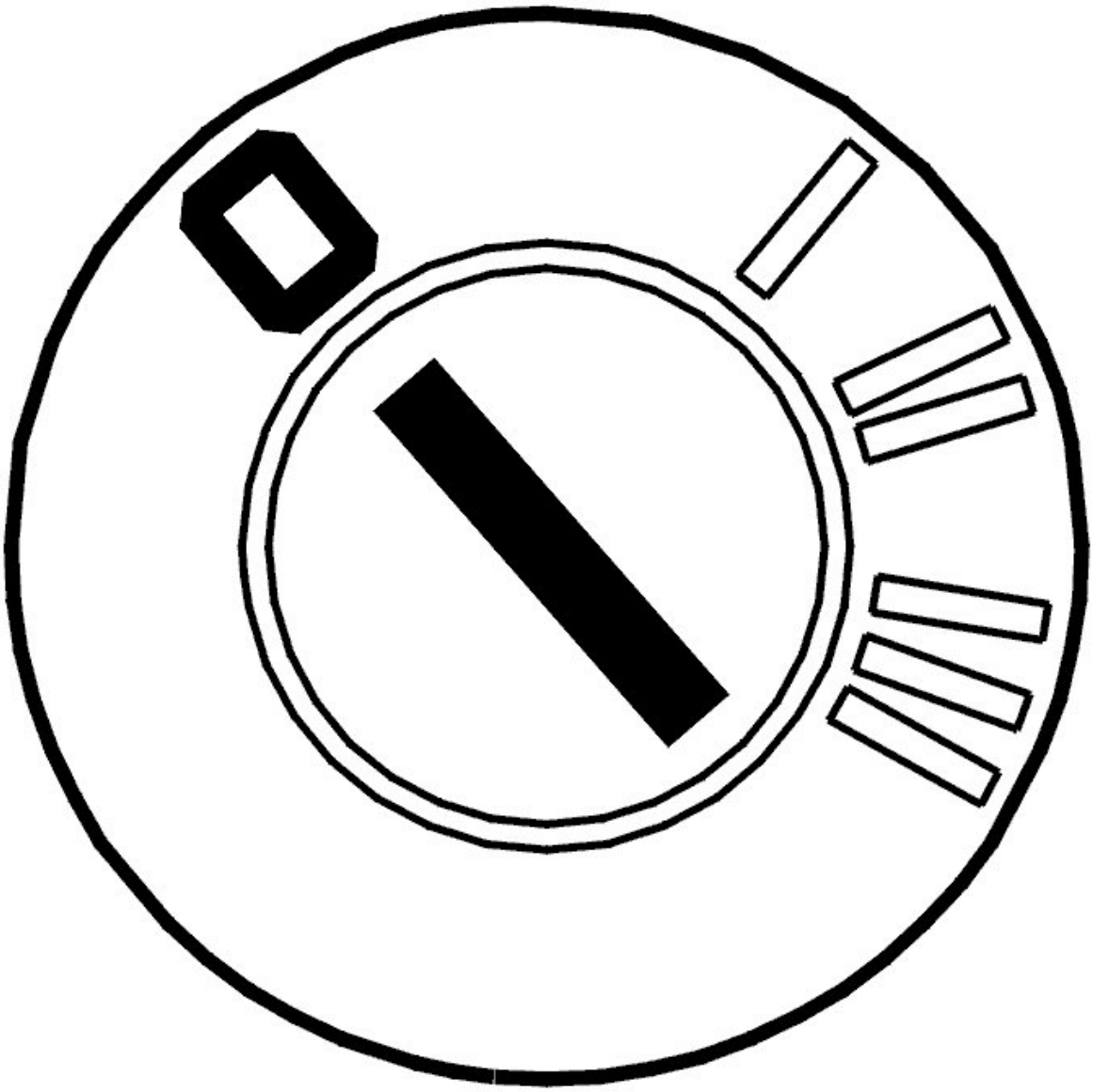
Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent. See: Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Verification

Checking the connectors and cables



- Ignition off
- Check the accelerator pedal (AP) position sensor connector. Check for contact resistance and oxidation.

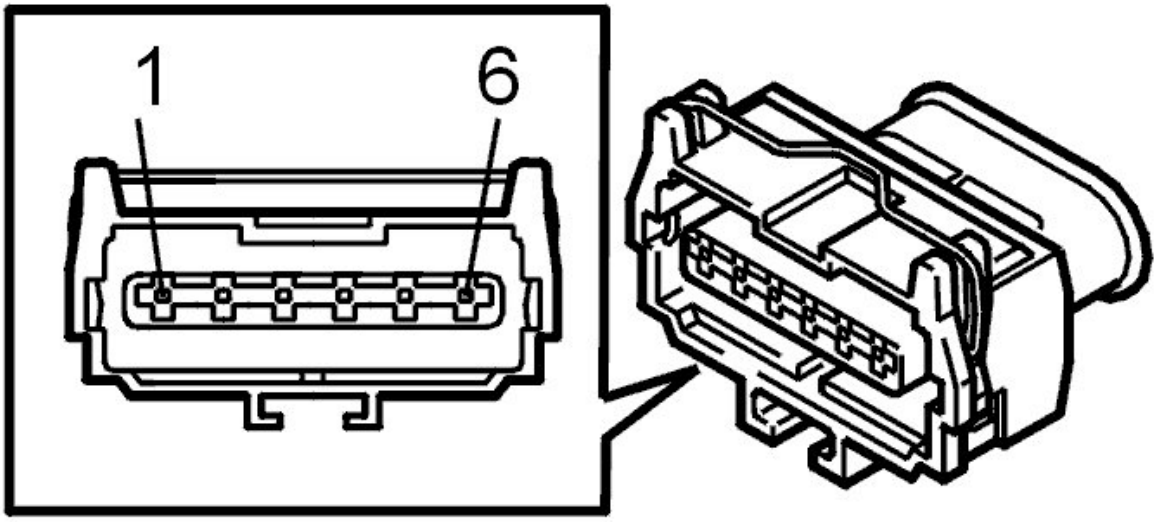
Check the power supply cable (12 V) between accelerator pedal (AP) position sensor terminal #1 (cable harness side) and the relevant fuse for the circuit. Check for a short-circuit to ground. Check for an open-circuit. Check that the fuse for the circuit is not damaged.
Check the ground lead for power supply (12 V) between accelerator pedal (AP) position sensor terminal #3 (cable harness side) and the relevant ground terminal. Check for contact resistance and oxidation. Check for an open-circuit.

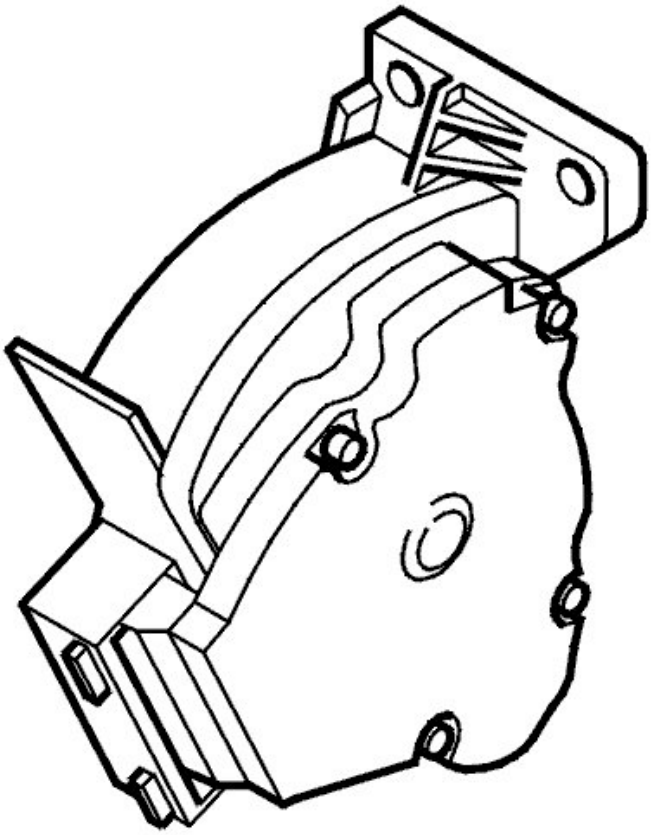
Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor measured between accelerator pedal (AP) position sensor terminals #1 (cable harness side) and #3 (cable harness side) must be approximately 12 V.
With the ignition on, the power supply from the engine control module (ECM) must be approximately 5 V measured between accelerator pedal (AP) position sensor terminals #6 (cable harness side) and #4 (cable harness side).

Remedy as necessary.

Other information:

- For further information about the fuses and relays, see the Wiring Diagram
- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





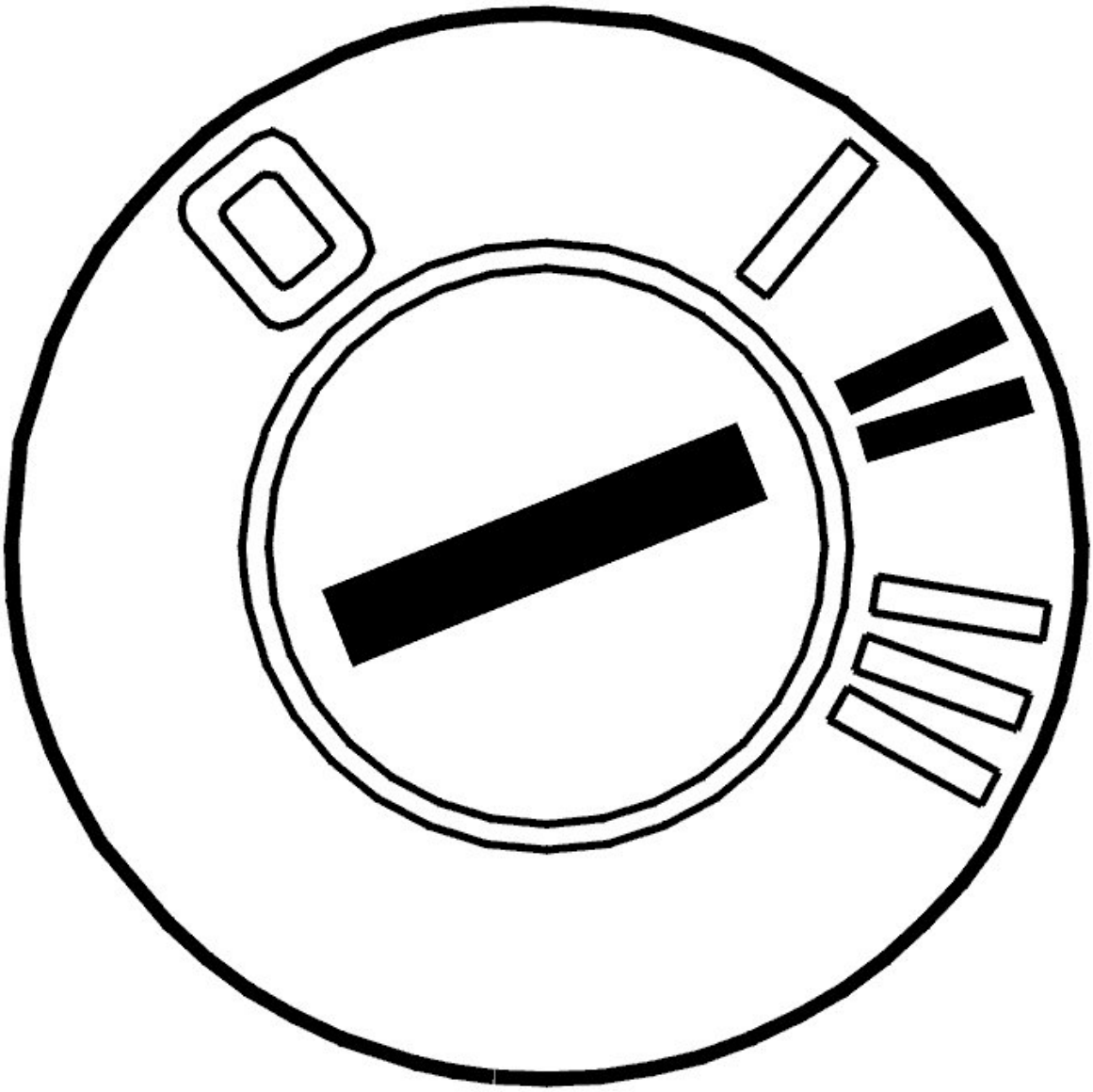
Continue - Replacing the component

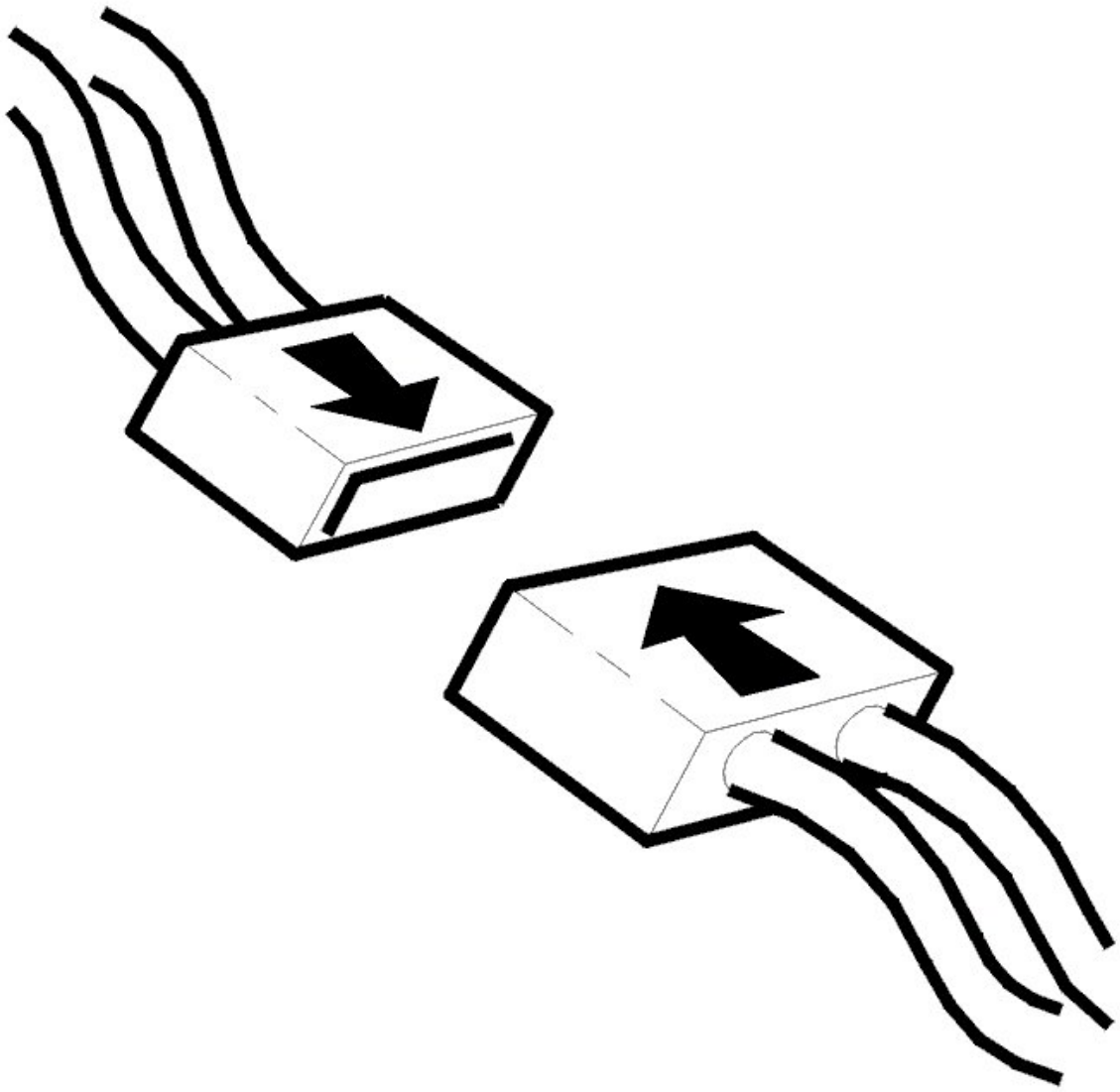
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

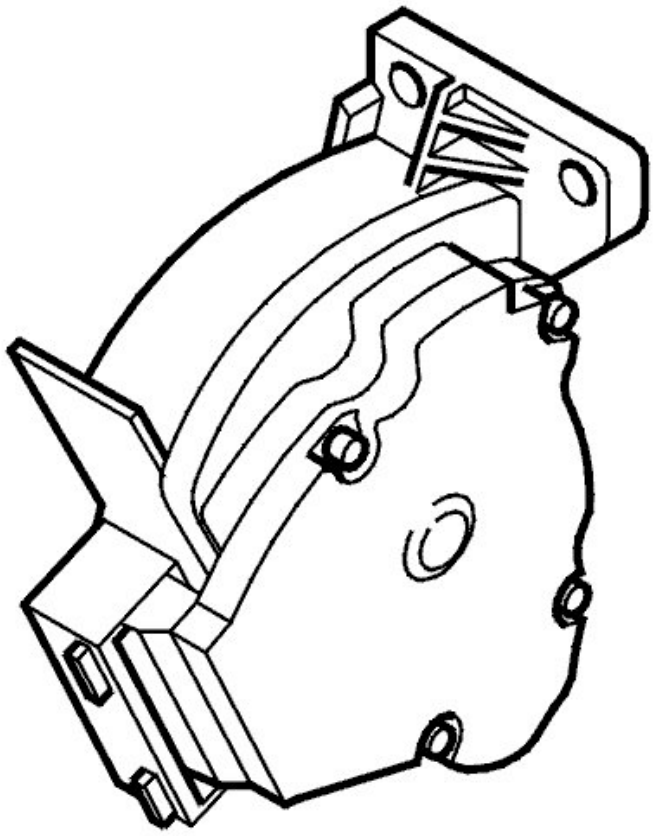
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-941C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the PWM-signal from the accelerator pedal (AP) position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The accelerator pedal (AP) is disabled at the same time as the brake pedal is pressed.

Possible source
- Short-circuit to supply voltage in the signal cable
- Damaged accelerator pedal (AP) position sensor.

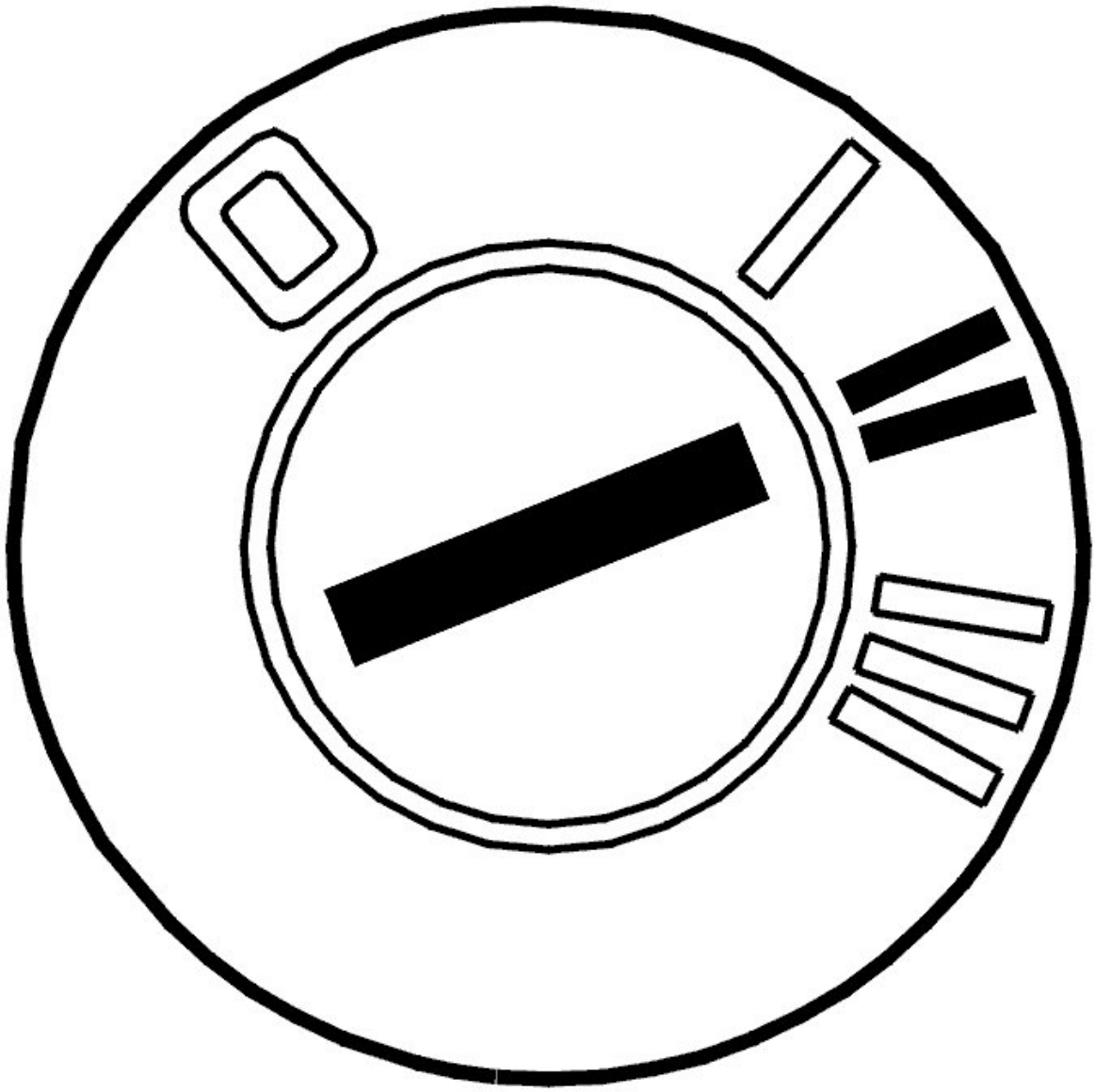
Fault symptom[s]

- Poor accelerator pedal (AP) response.

Signal Too High

Signal too high

Checking the status

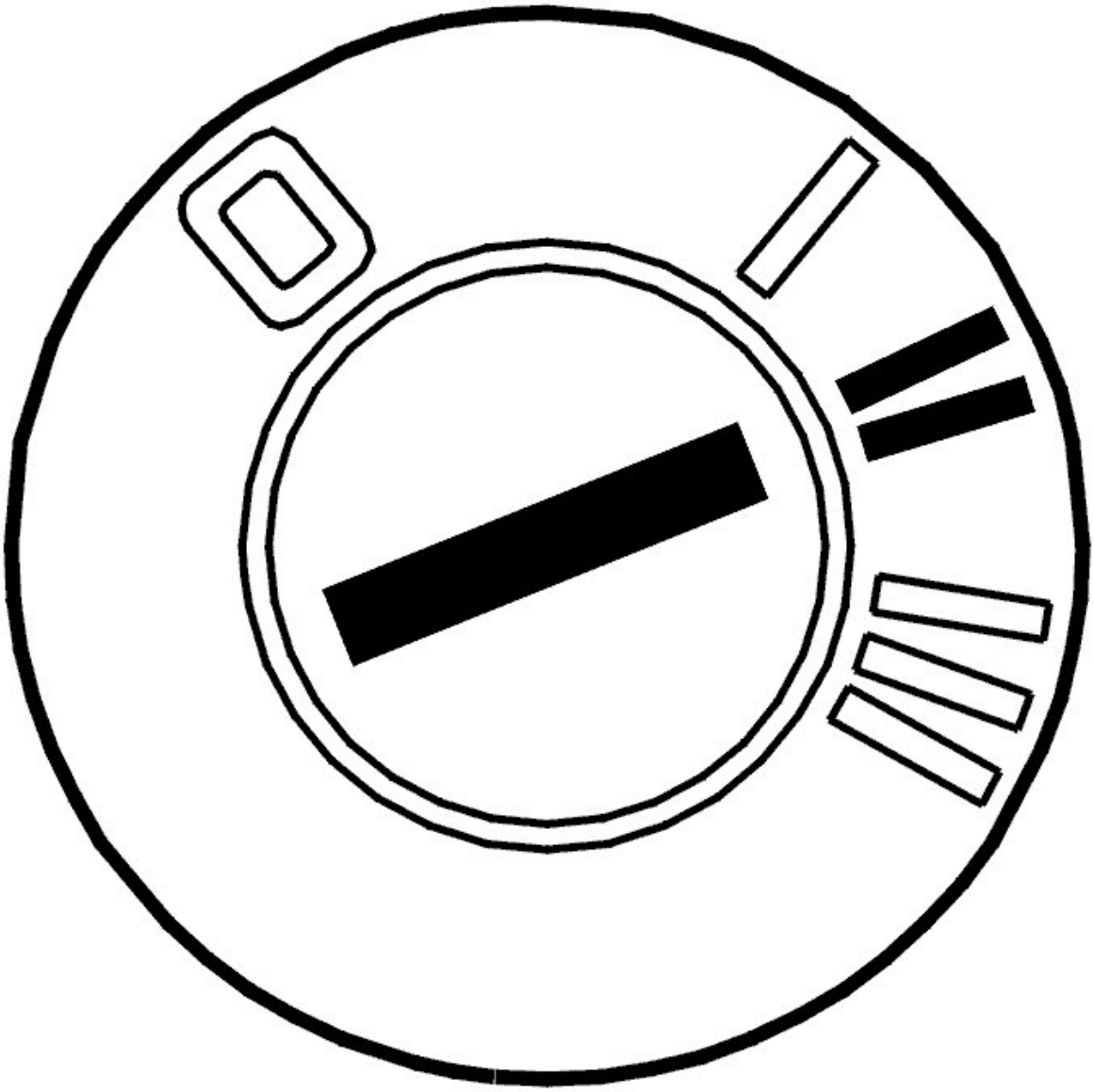


- Start the engine
- Ignition off
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be between approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking the power supply

Checking the power supply

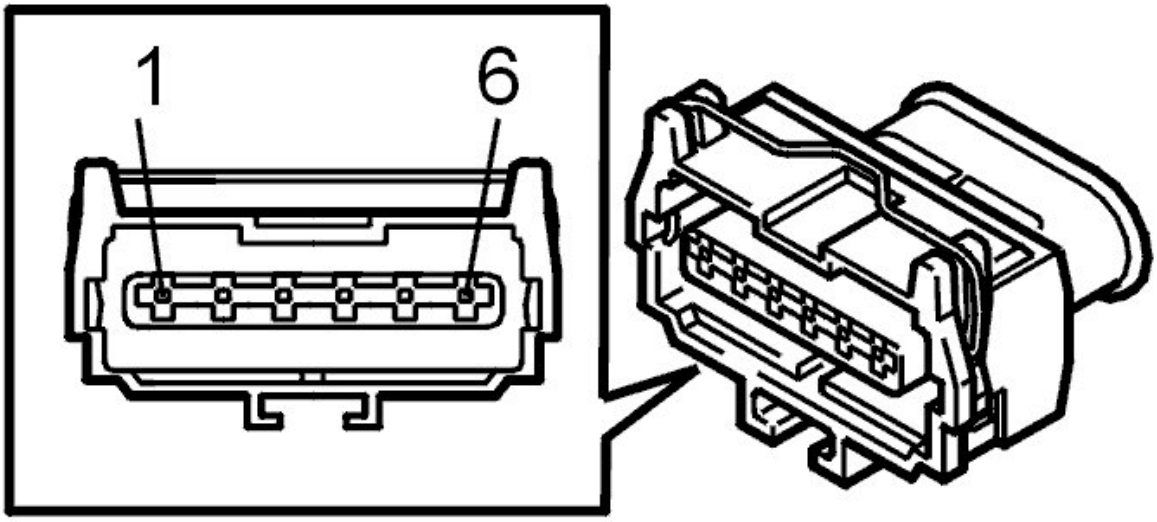


- Ignition on.

Check the power supply (12 V) to the accelerator pedal (AP) position sensor between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).
Check that the power supply is approximately 12 V with the ignition on

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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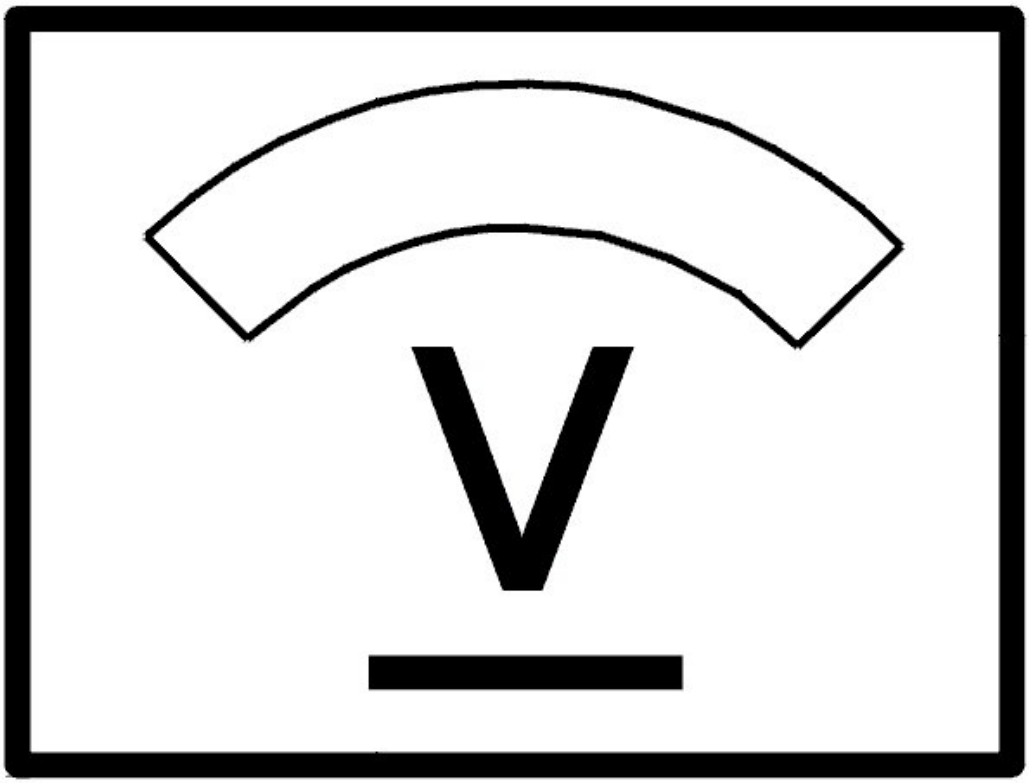
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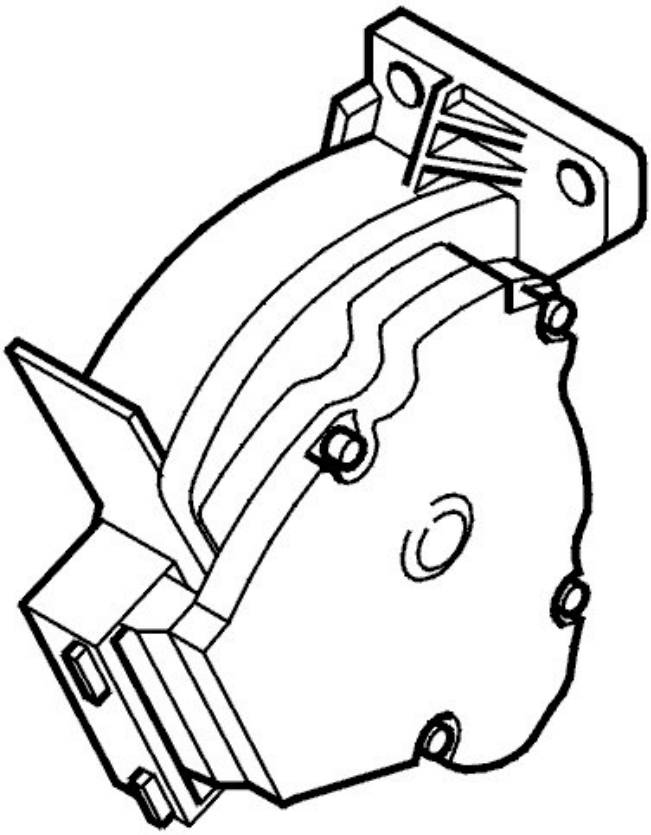
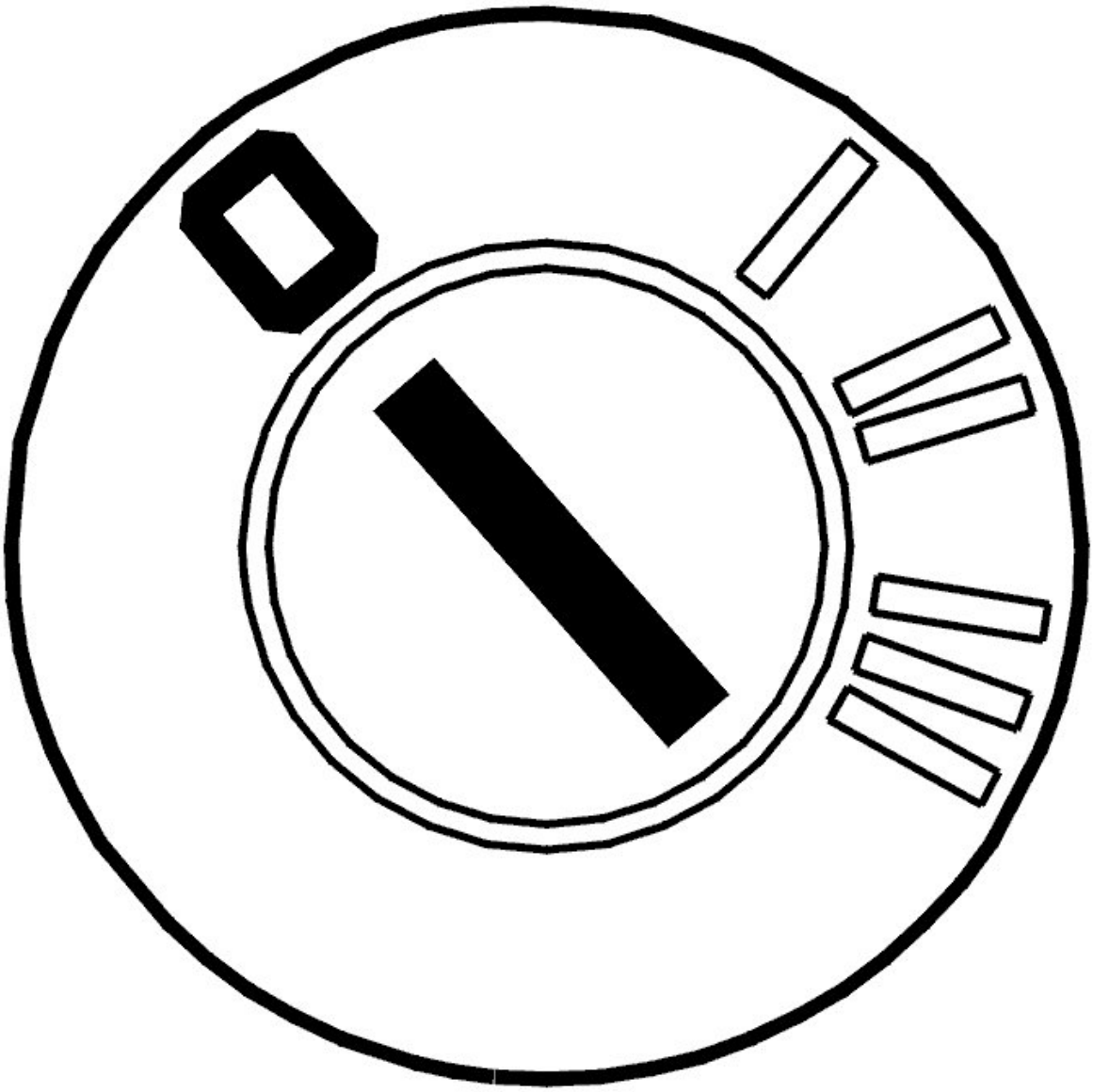


Is the power supply OK?

Yes - Checking the connectors and cables

No - Checking components and wiring

Checking the connectors and cables

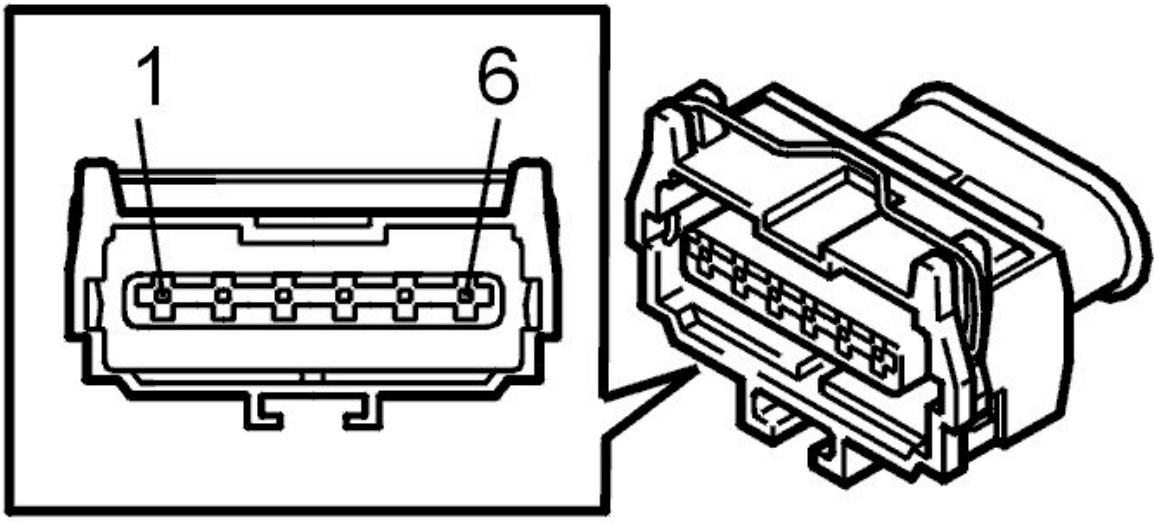


- Ignition off.

Check the signal cable between engine control module (ECM) terminal #B25 (#B35) and accelerator pedal (AP) position sensor terminal #2. Check for a short-circuit to supply voltage.
Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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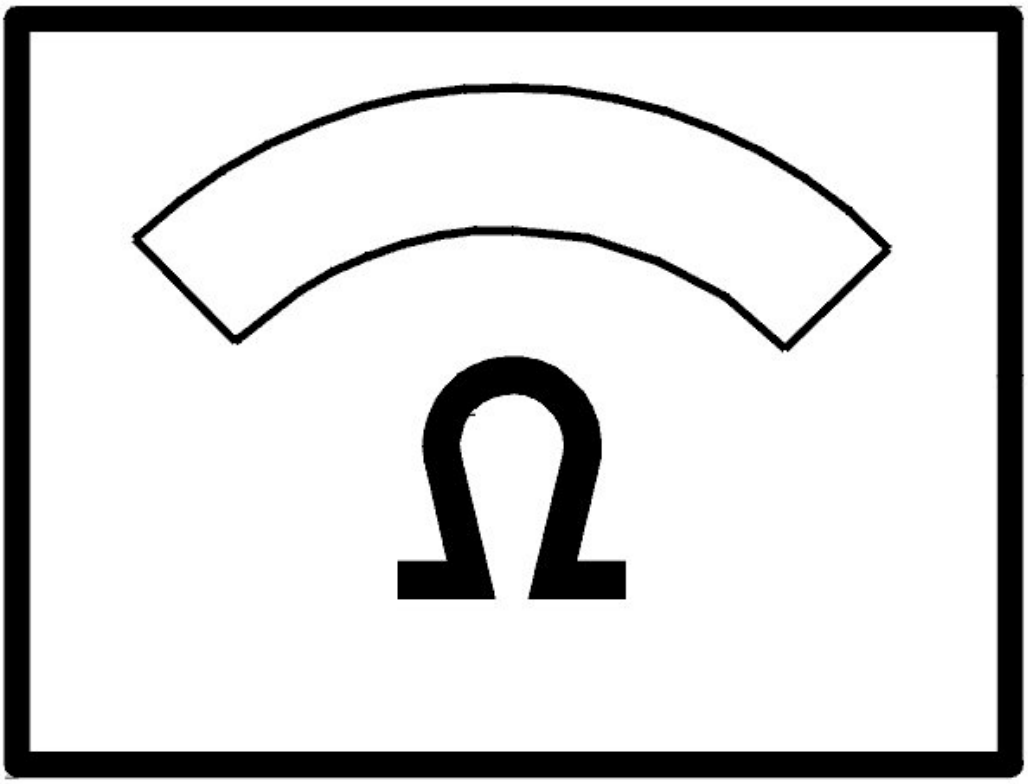
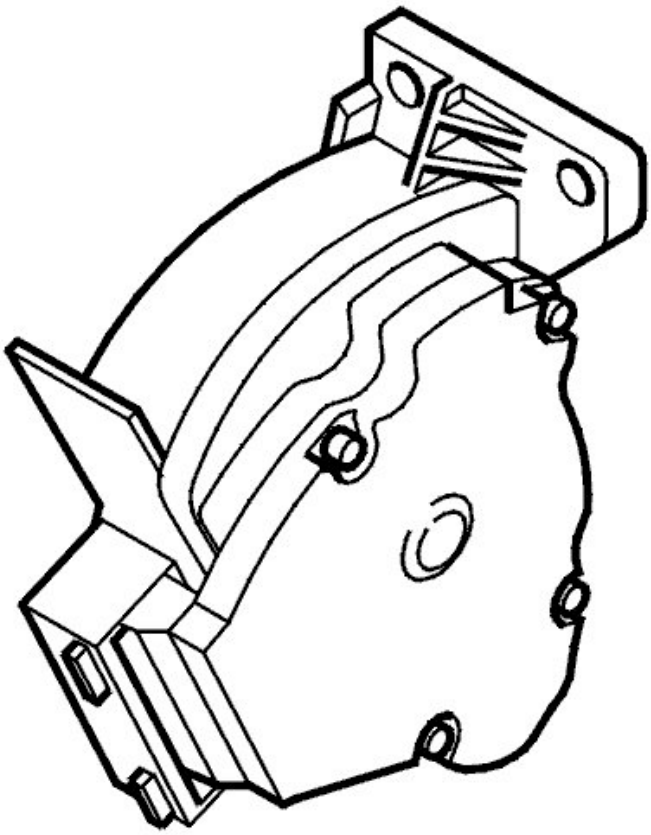
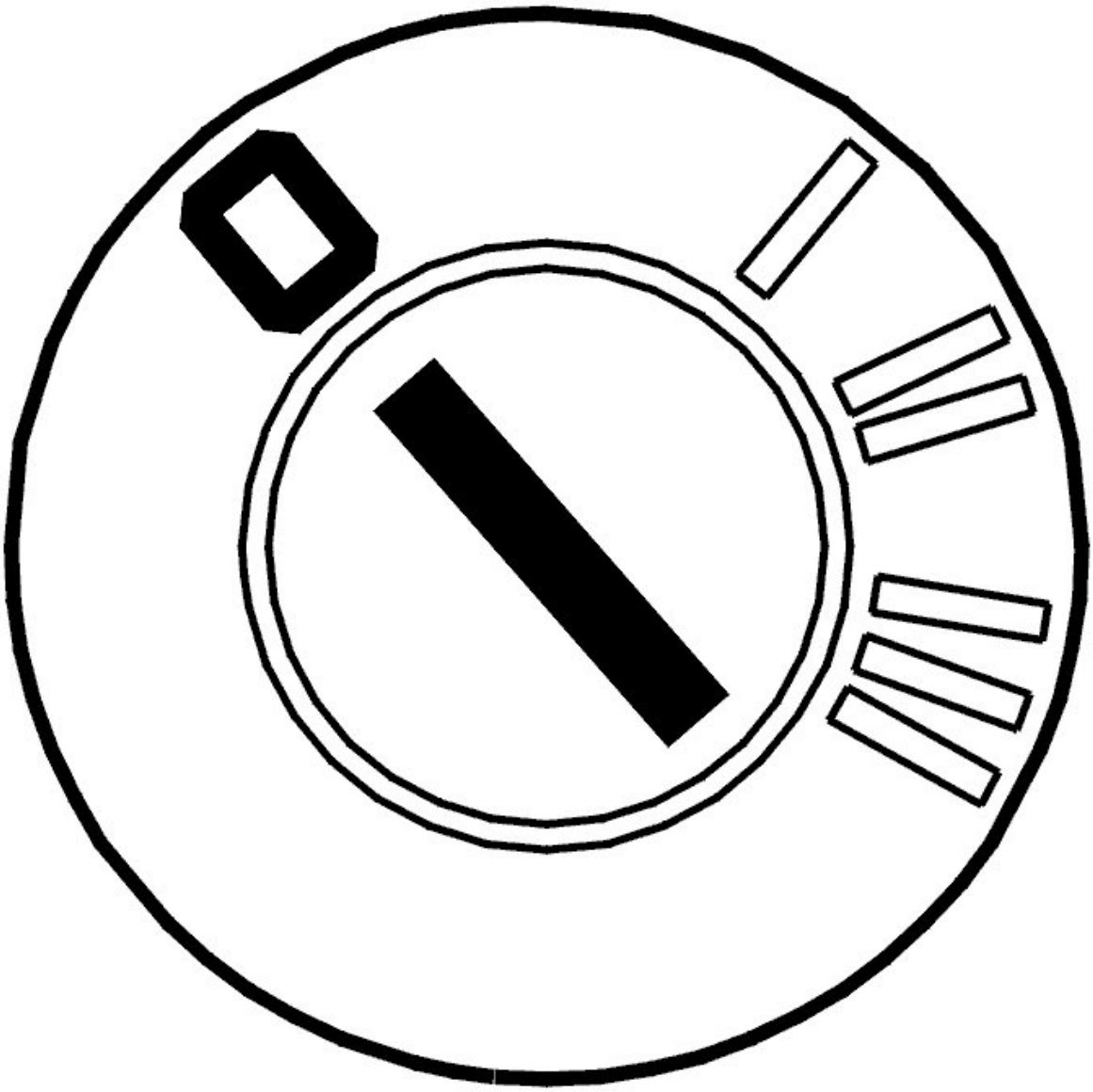


Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Verification

Checking components and wiring



- Ignition off
- Check the accelerator pedal (AP) position sensor connector. Check for contact resistance and oxidation.

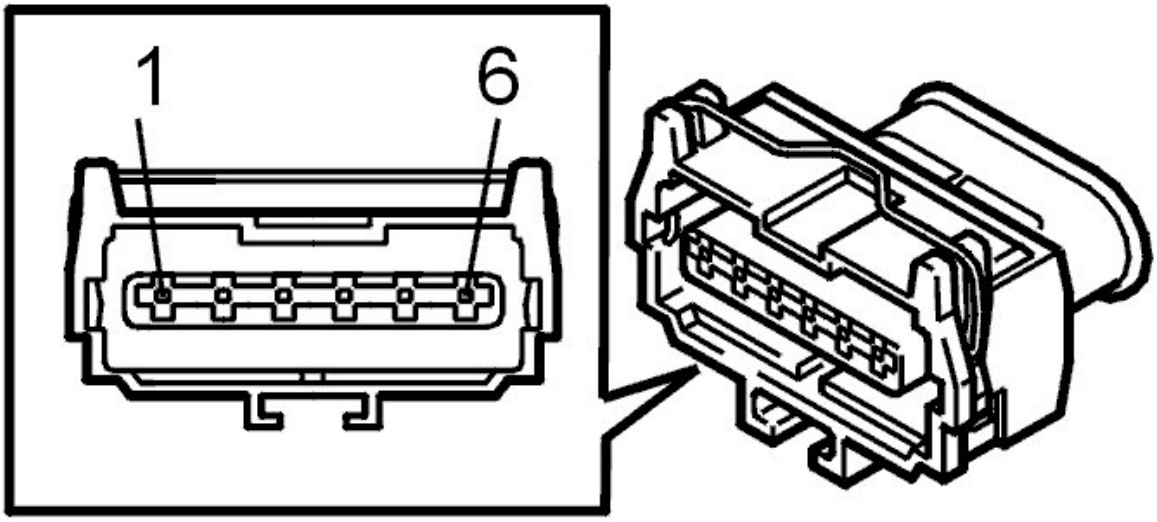
Check the power supply cable (12 V) between accelerator pedal (AP) position sensor terminal #1 (wiring side) and the relevant fuse for the circuit. Check for a short-circuit to ground. Check for an open-circuit. Check that the fuse for the circuit has not blown.
Check the ground lead for power supply (12 V) between accelerator pedal (AP) position sensor terminal #3 (wiring side) and the relevant ground terminal. Check for contact resistance and oxidation. Check for an open-circuit.

Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor must be approximately 12 V measured between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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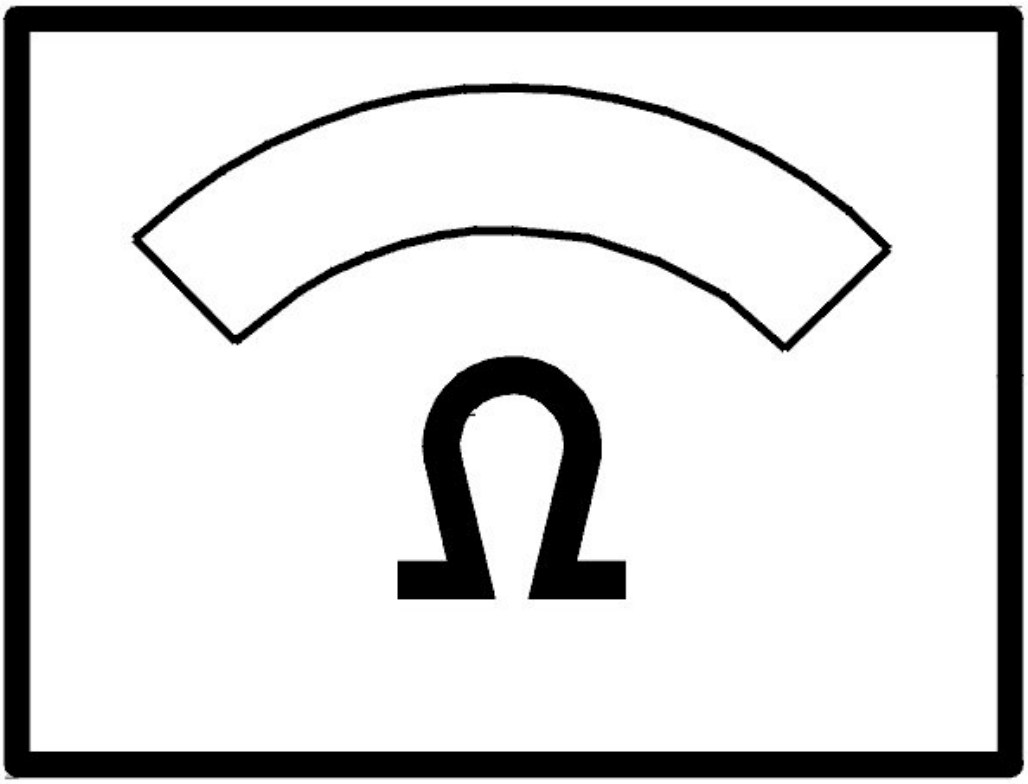
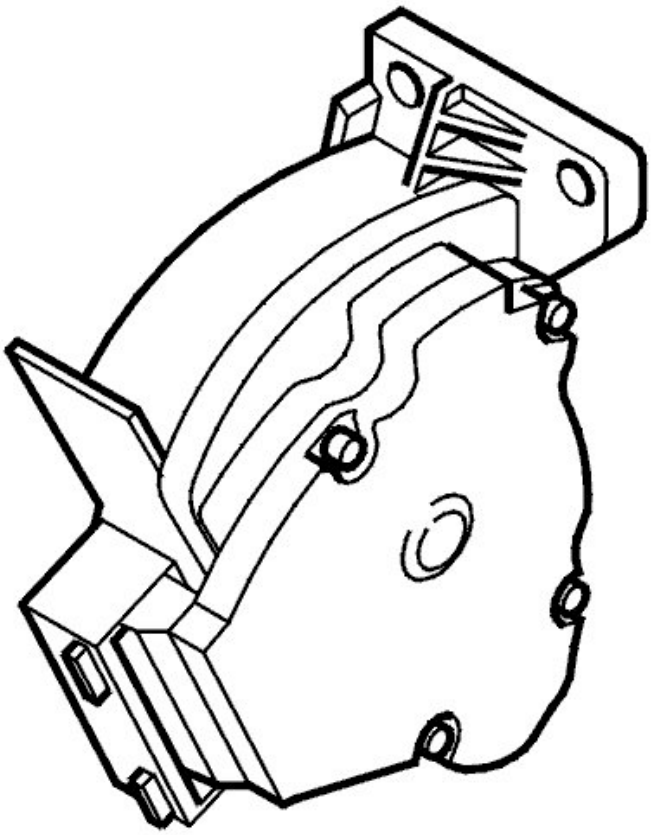




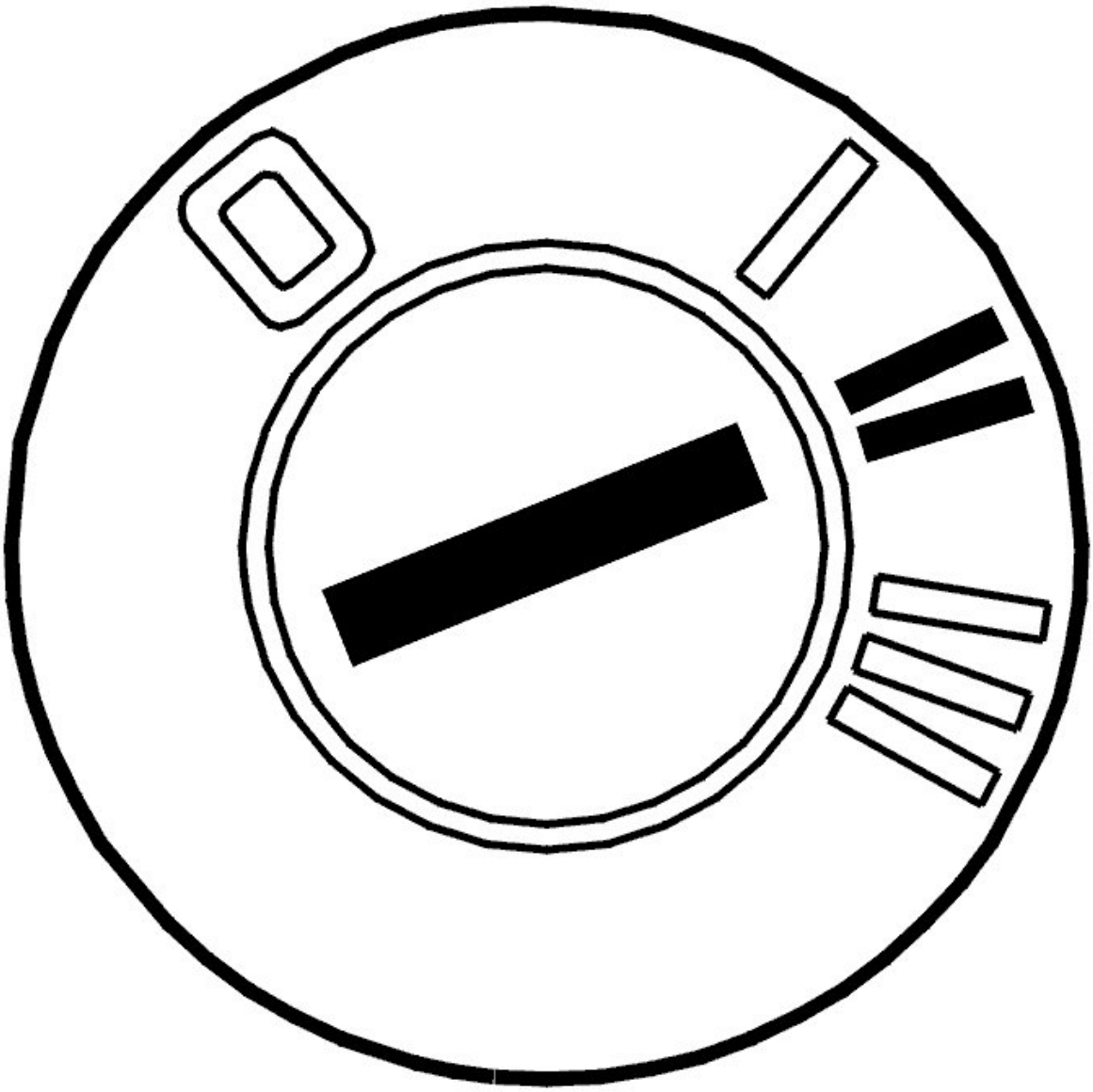
Continue - Checking the connectors and cables

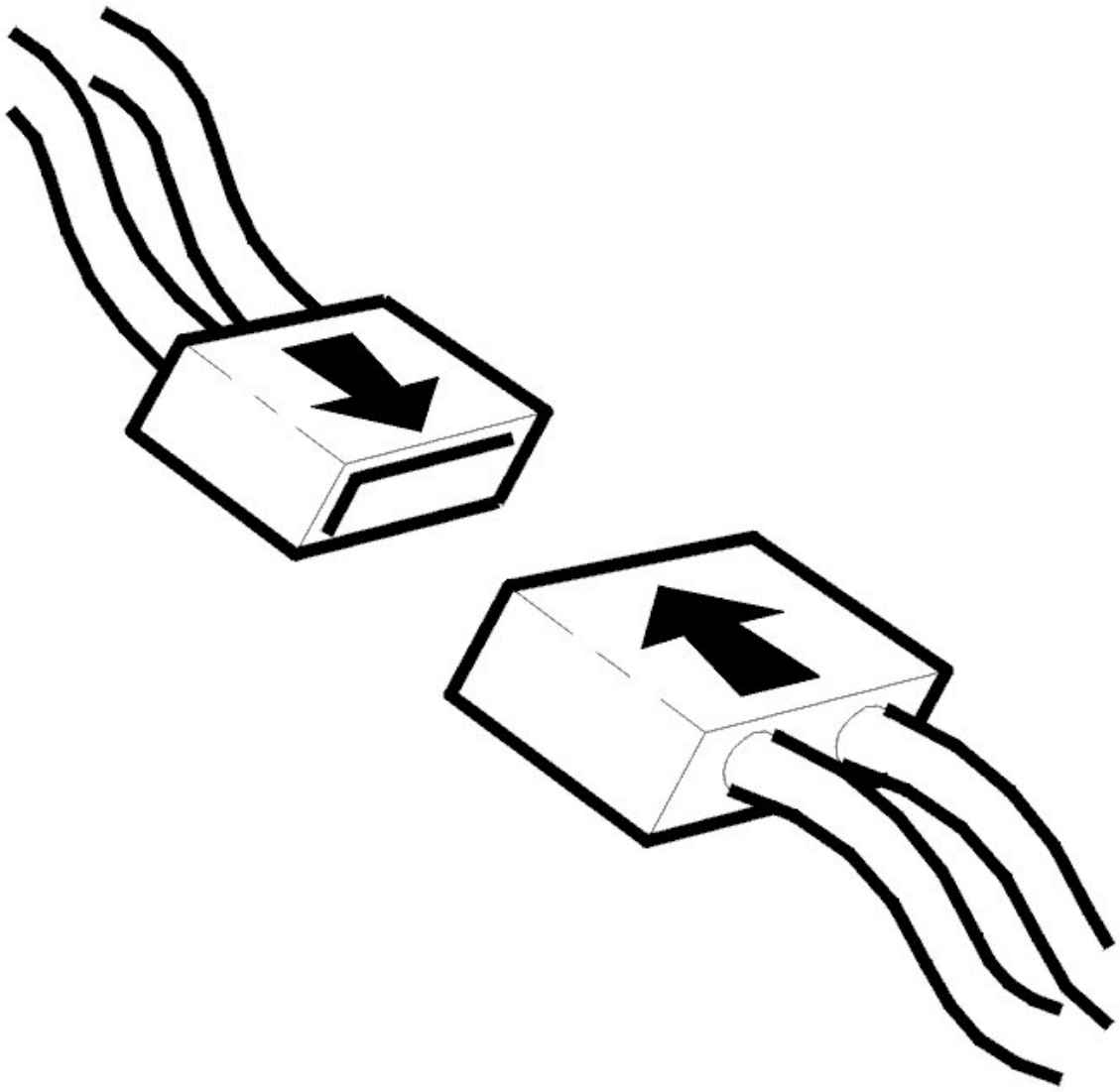
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Ignition off
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be between approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

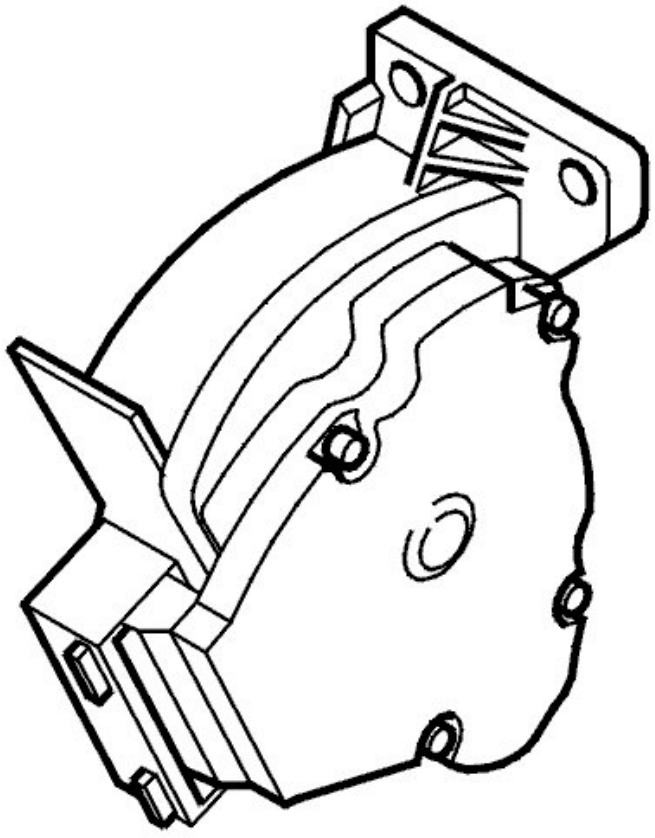
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-941D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault in the PWM-signal from the accelerator pedal (AP) position sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value

- The accelerator pedal (AP) is disabled at the same time as the brake pedal is pressed.

Possible source

- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the accelerator pedal (AP) position sensor

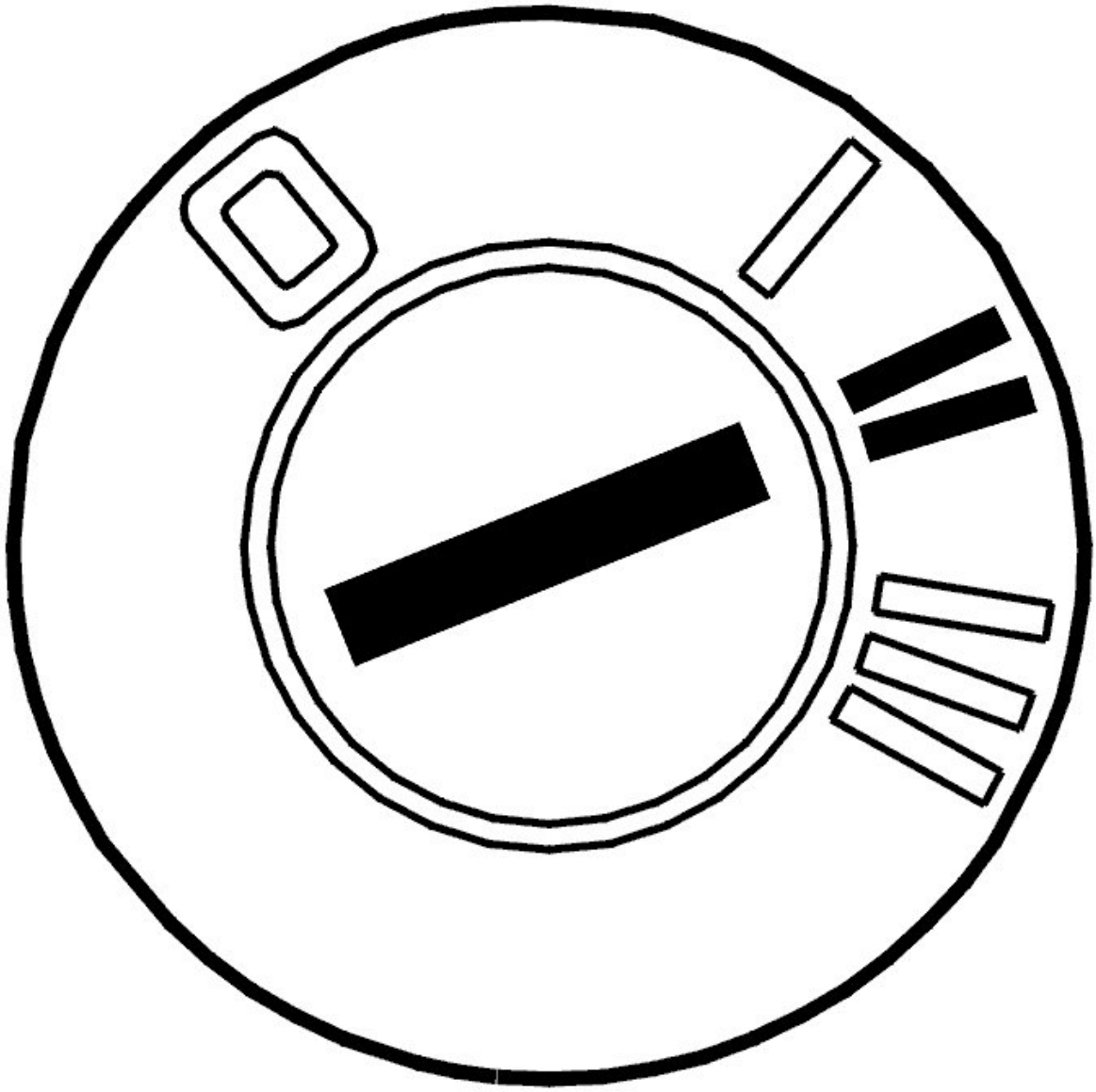
- Open-circuit or short-circuit to ground in the signal cable
- Open-circuit in the power supply (12 V) for the accelerator pedal (AP) position sensor
- Damaged accelerator pedal (AP) position sensor.

Fault symptom[s]
- Poor accelerator pedal (AP) response.

Signal Too Low

Signal too low

Checking the status



- Start the engine
- Ignition off
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be between approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault is intermittent at the moment if the values are OK.

Continue - Checking the power supply

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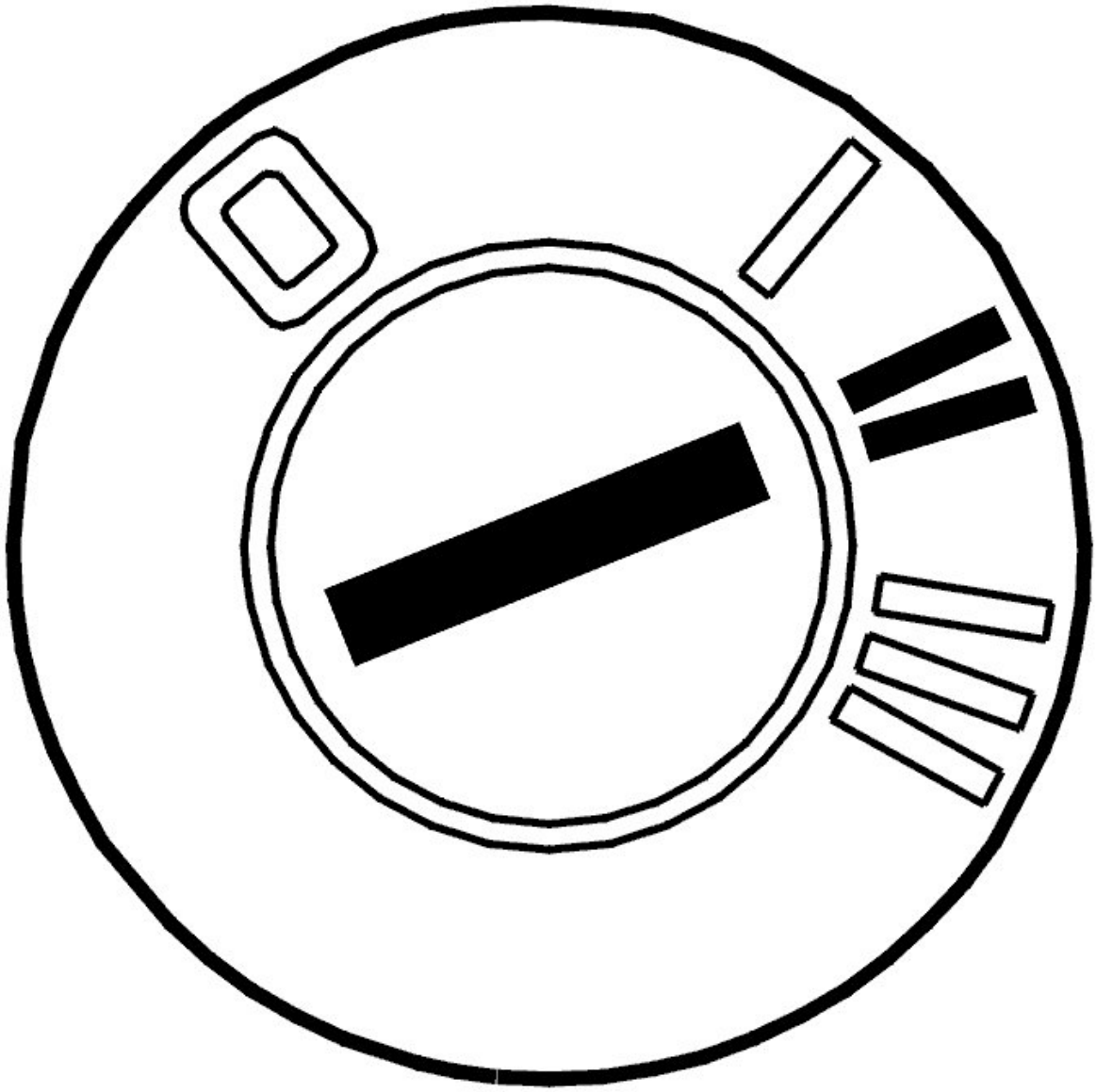
Checking the power supply

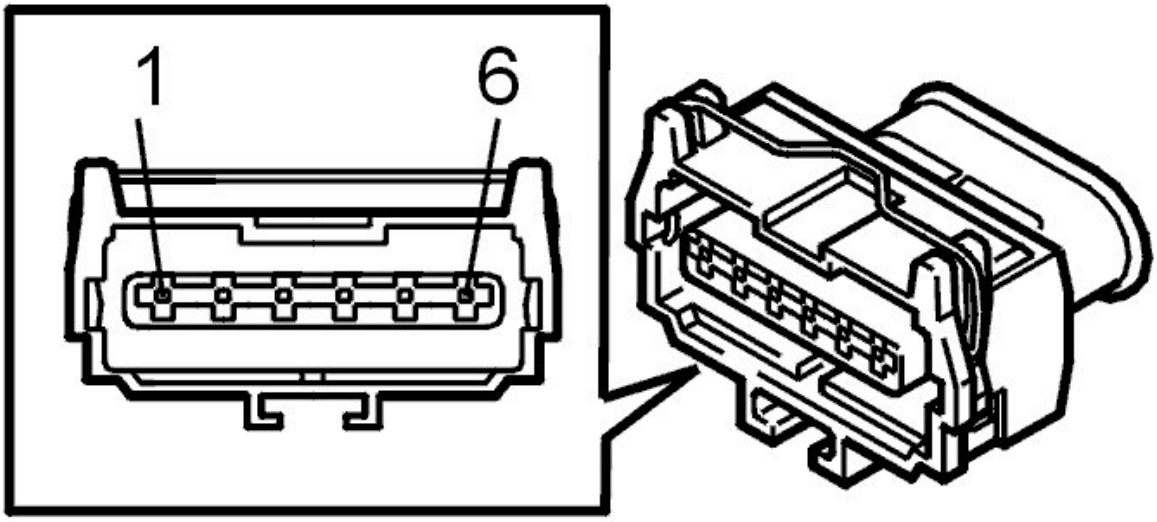


- Ignition on.

Check the power supply (12 V) to the accelerator pedal (AP) position sensor between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).
Check that the power supply is approximately 12 V with the ignition on.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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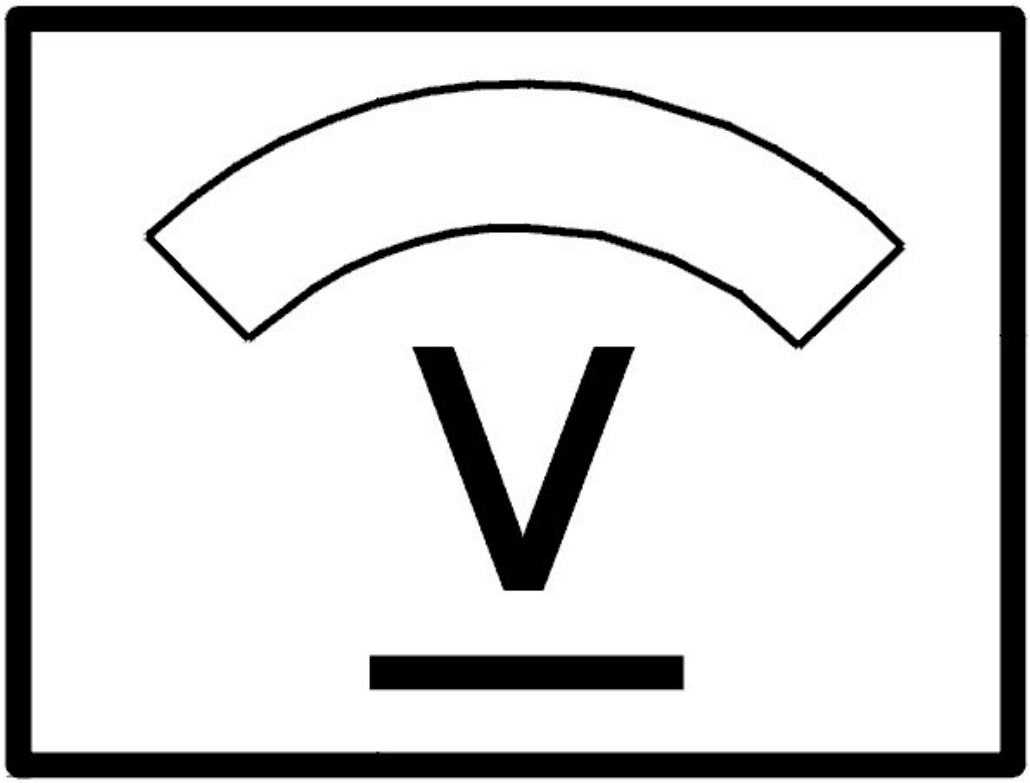
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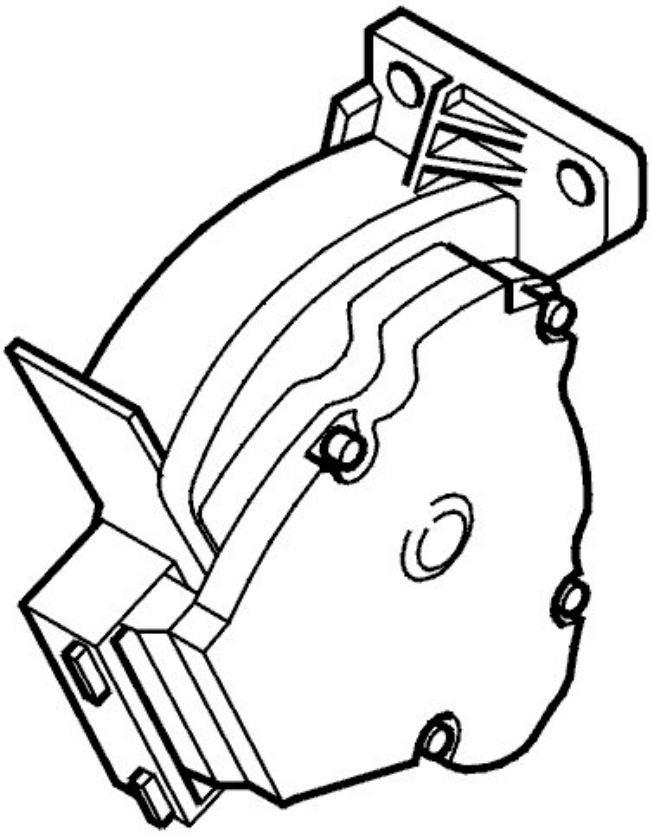
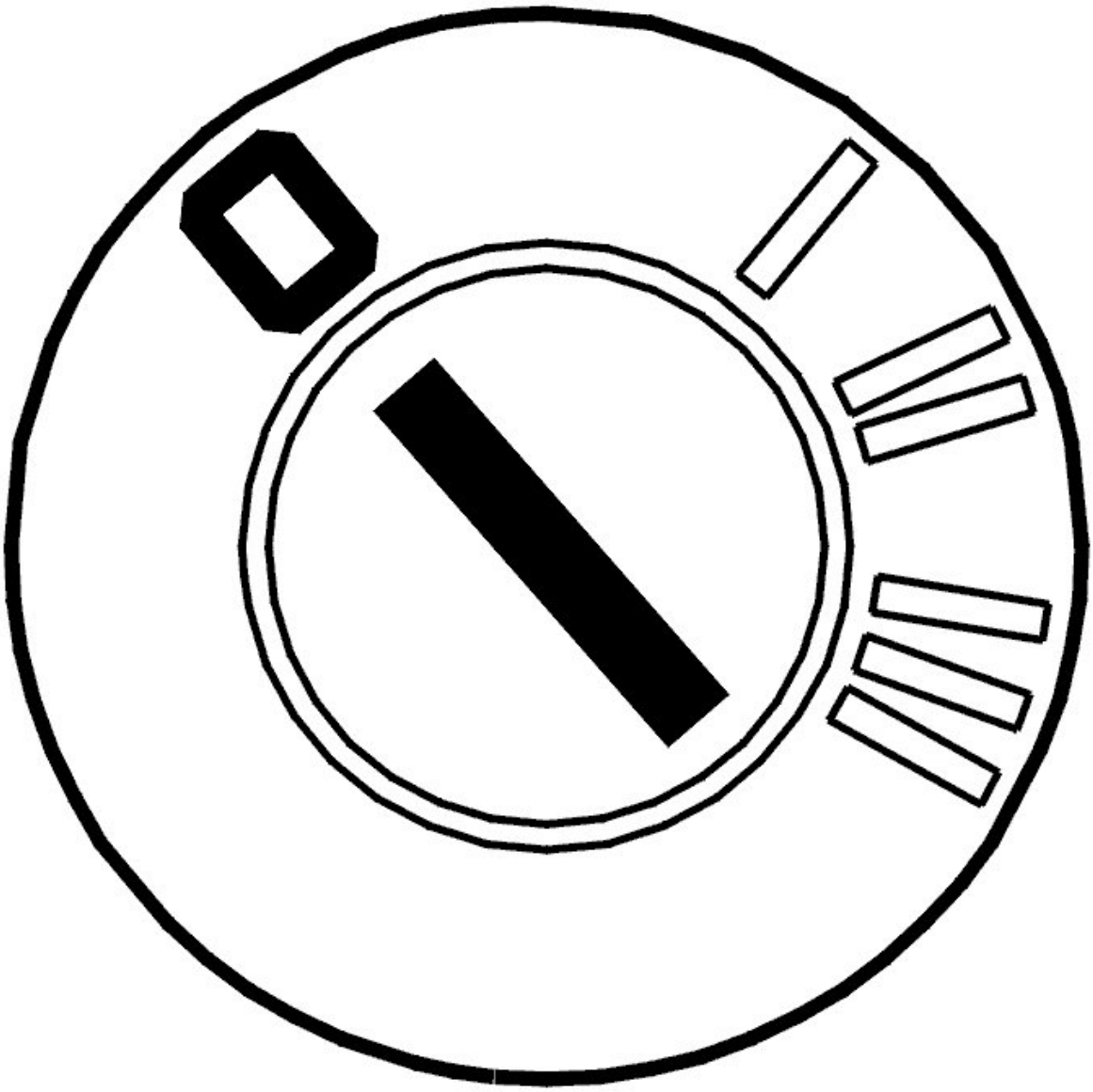


Is the power supply OK?

Yes - Checking the connectors and cables

No - Checking components and wiring

Checking the connectors and cables

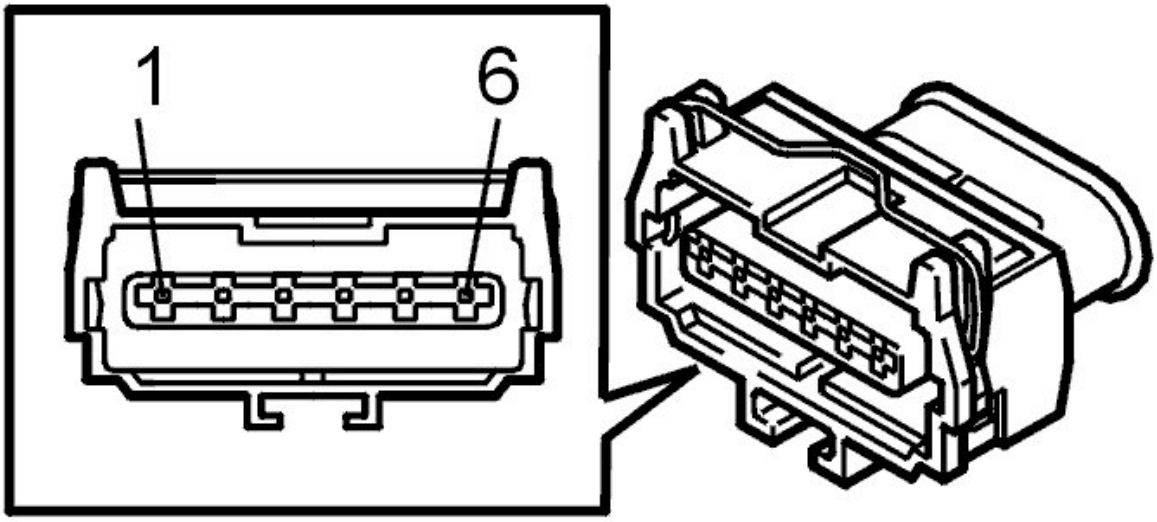


- Ignition off
- Check the accelerator pedal position sensor and engine control module (ECM) connectors. Check for contact resistance and oxidation.

Check the signal cable between engine control module (ECM) terminal #B25 (#B35) and accelerator pedal (AP) position sensor terminal #2. Check for an open-circuit. Check for a short-circuit to ground.
Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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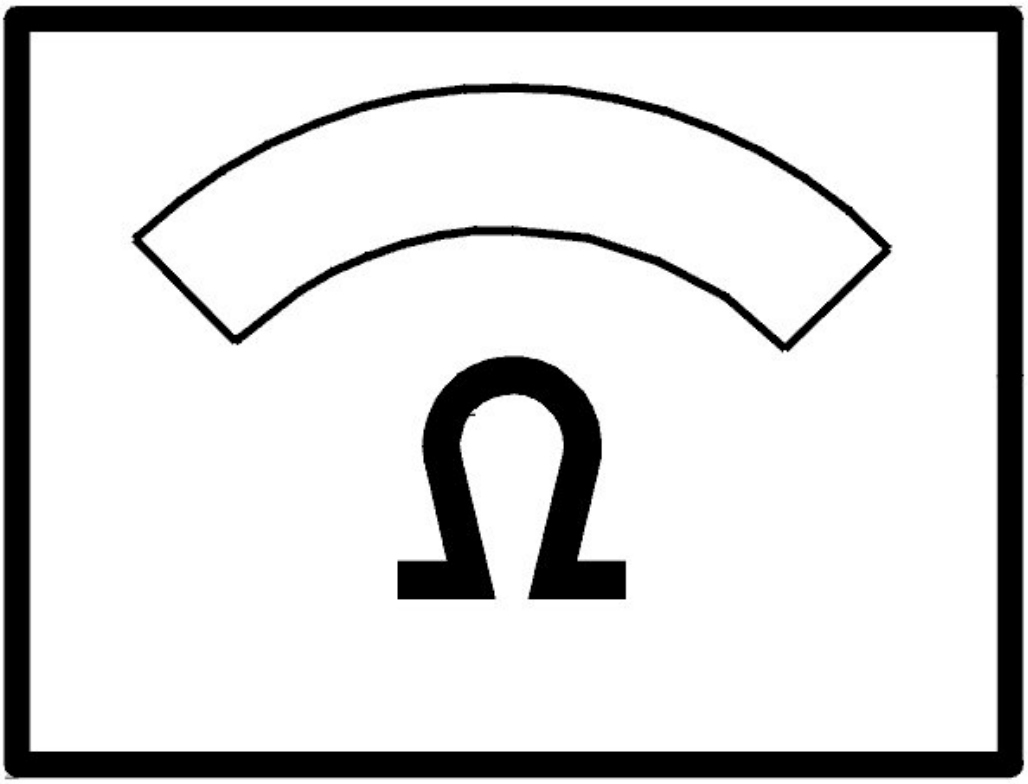
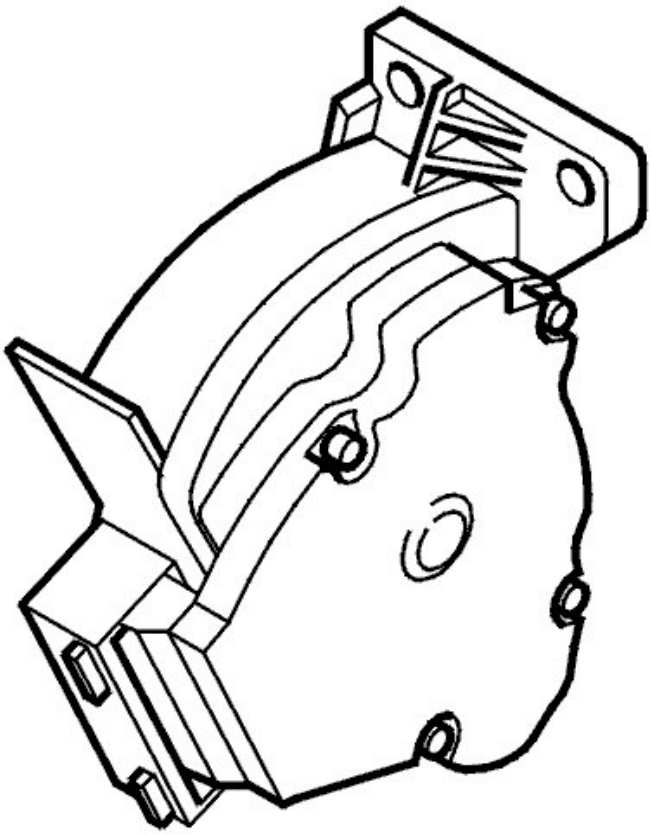
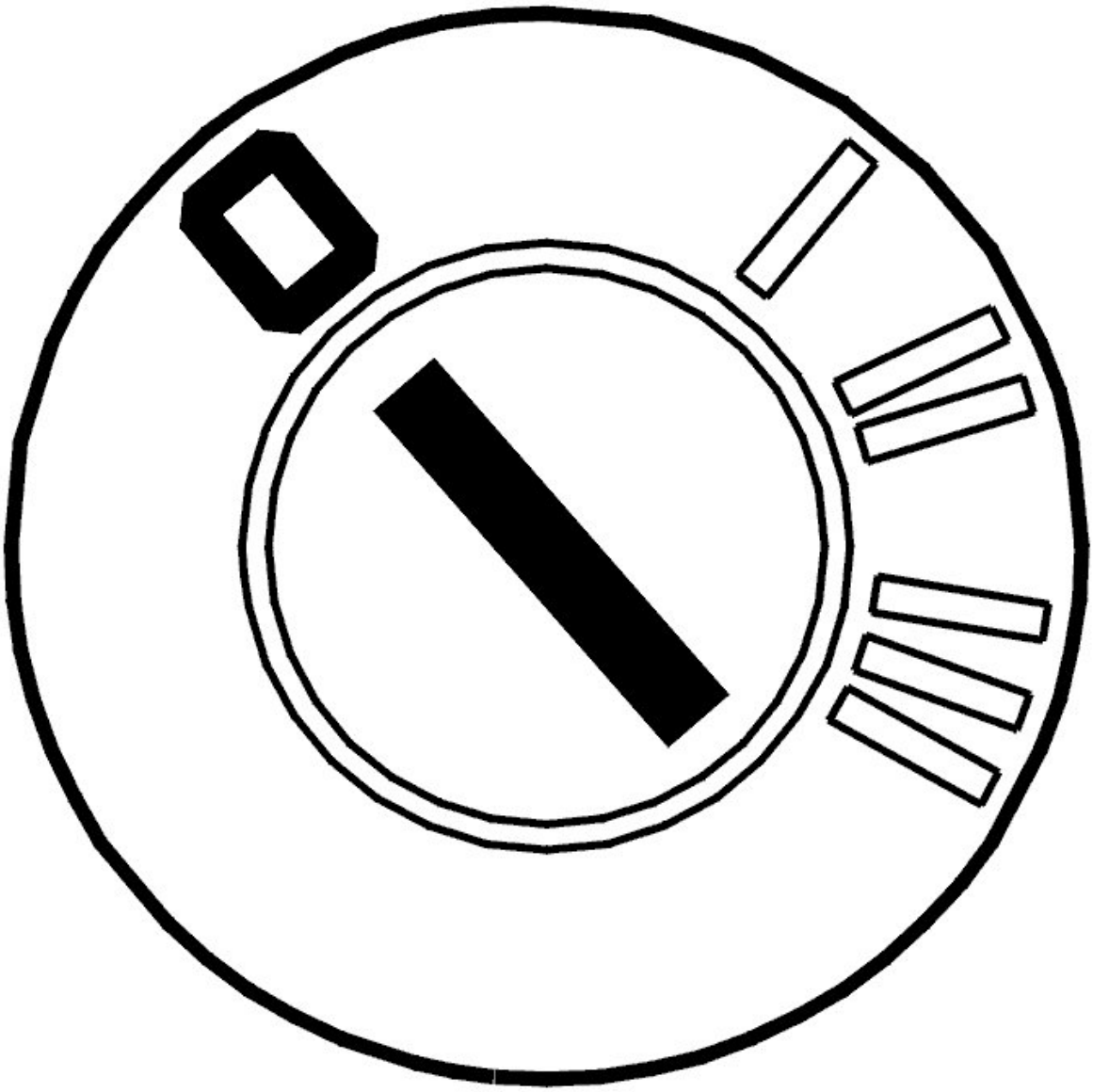


Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Verification

Checking components and wiring



- Ignition off
- Check the accelerator pedal (AP) position sensor connector. Check for contact resistance and oxidation.

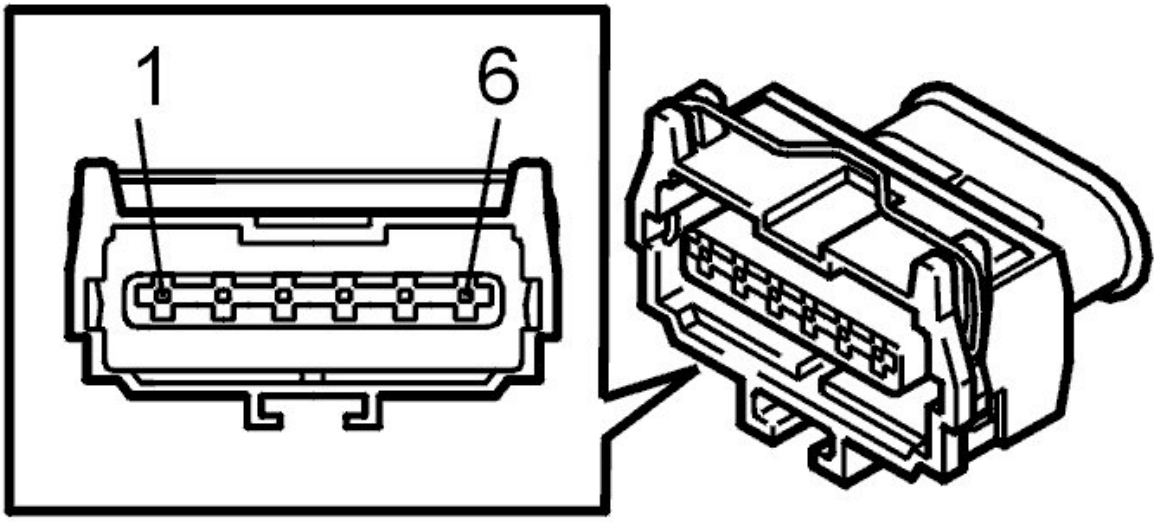
Check the power supply cable (12 V) between accelerator pedal (AP) position sensor terminal #1 (wiring side) and the relevant fuse for the circuit. Check for a short-circuit to ground. Check for an open-circuit. Check that the fuse for the circuit has not blown.
Check the ground lead for power supply (12 V) between accelerator pedal (AP) position sensor terminal #3 (wiring side) and the relevant ground terminal. Check for contact resistance and oxidation. Check for an open-circuit.

Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor must be approximately 12 V measured between accelerator pedal (AP) position sensor terminals #1 (wiring side) and #3 (wiring side).

Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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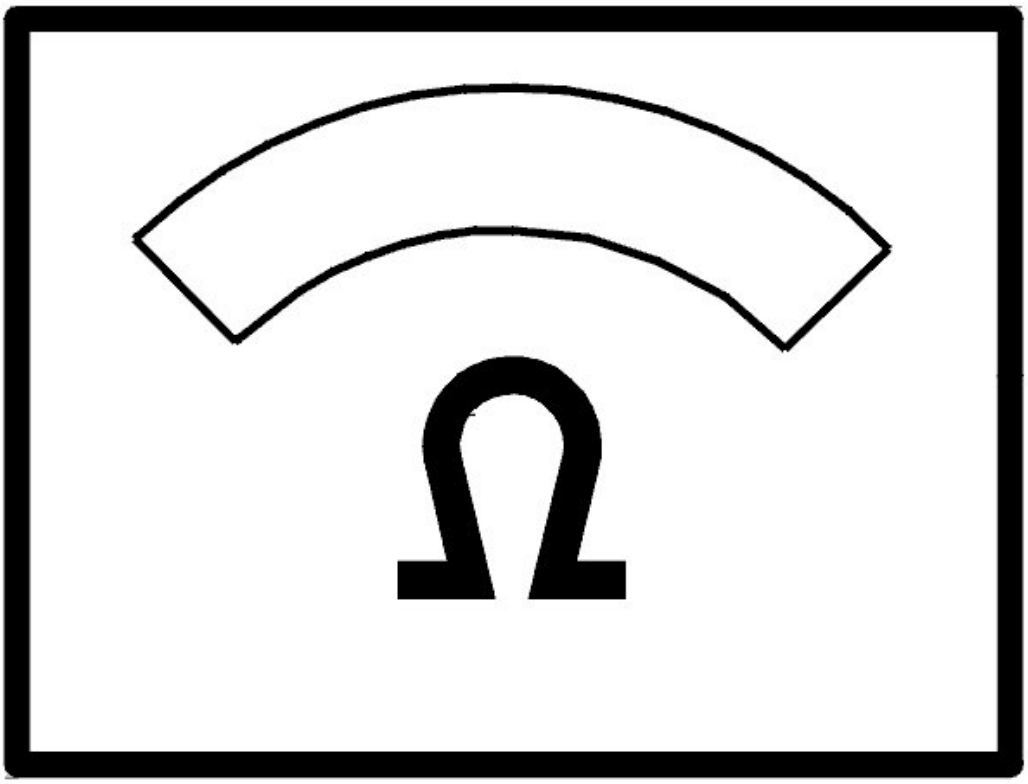
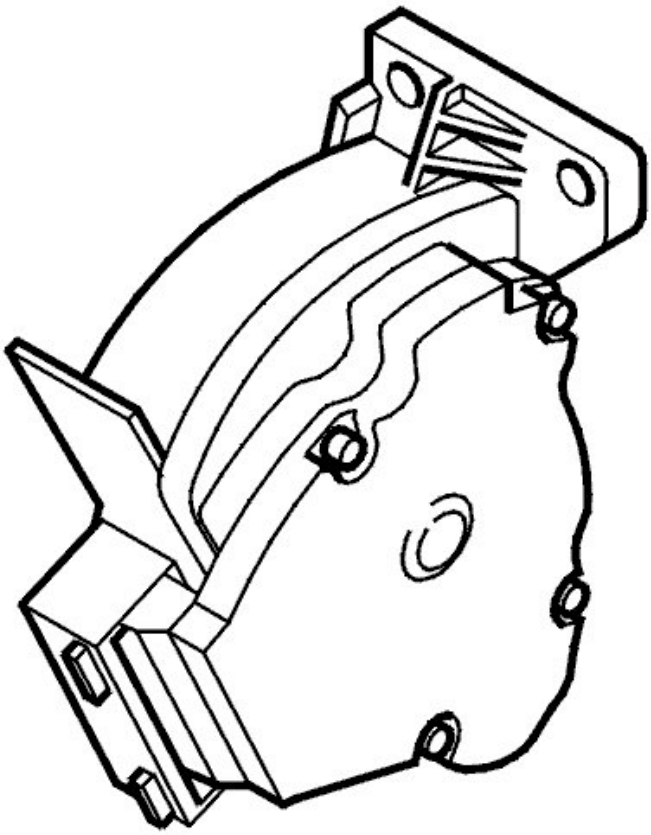




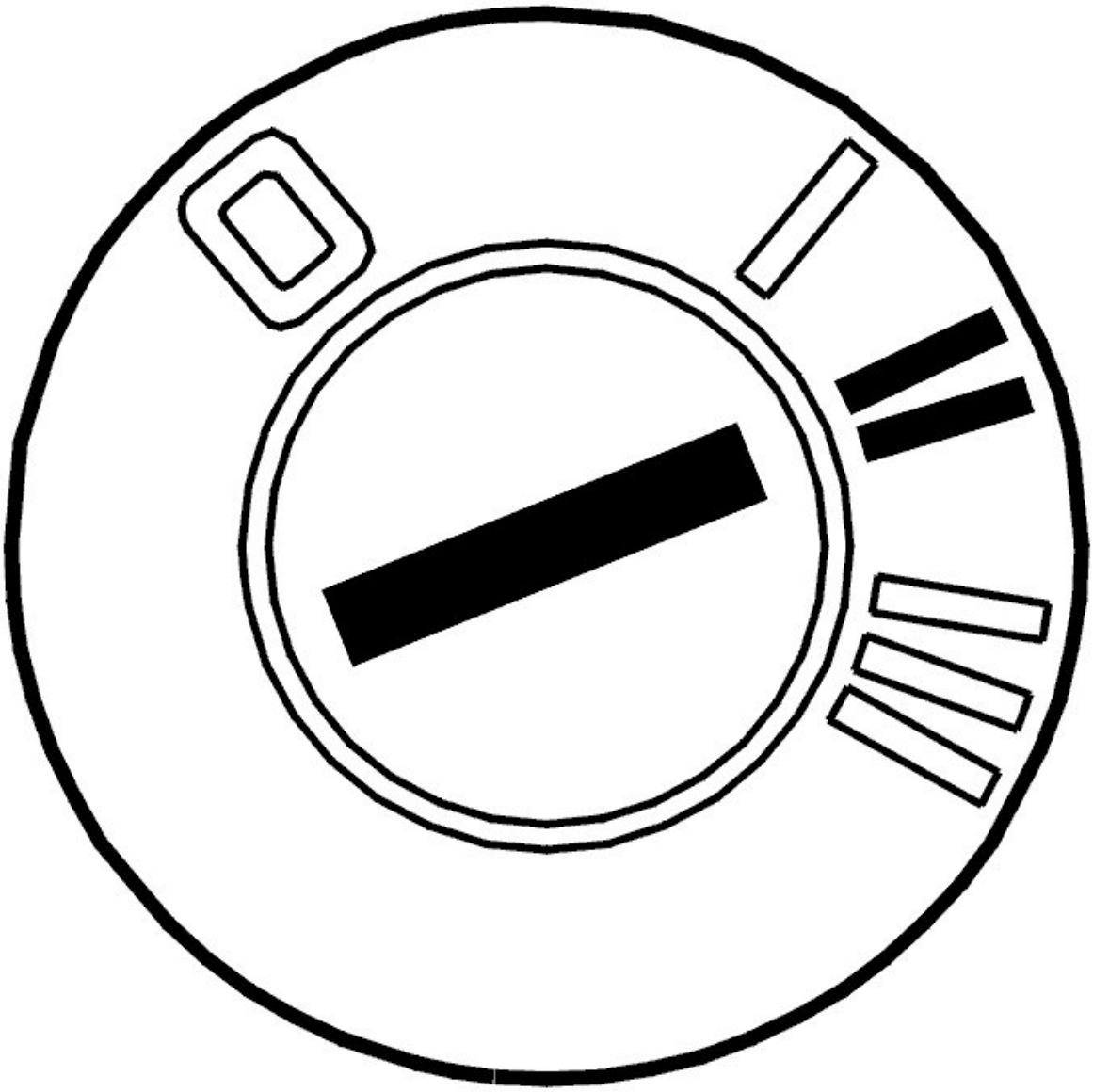
Continue - Checking the connectors and cables

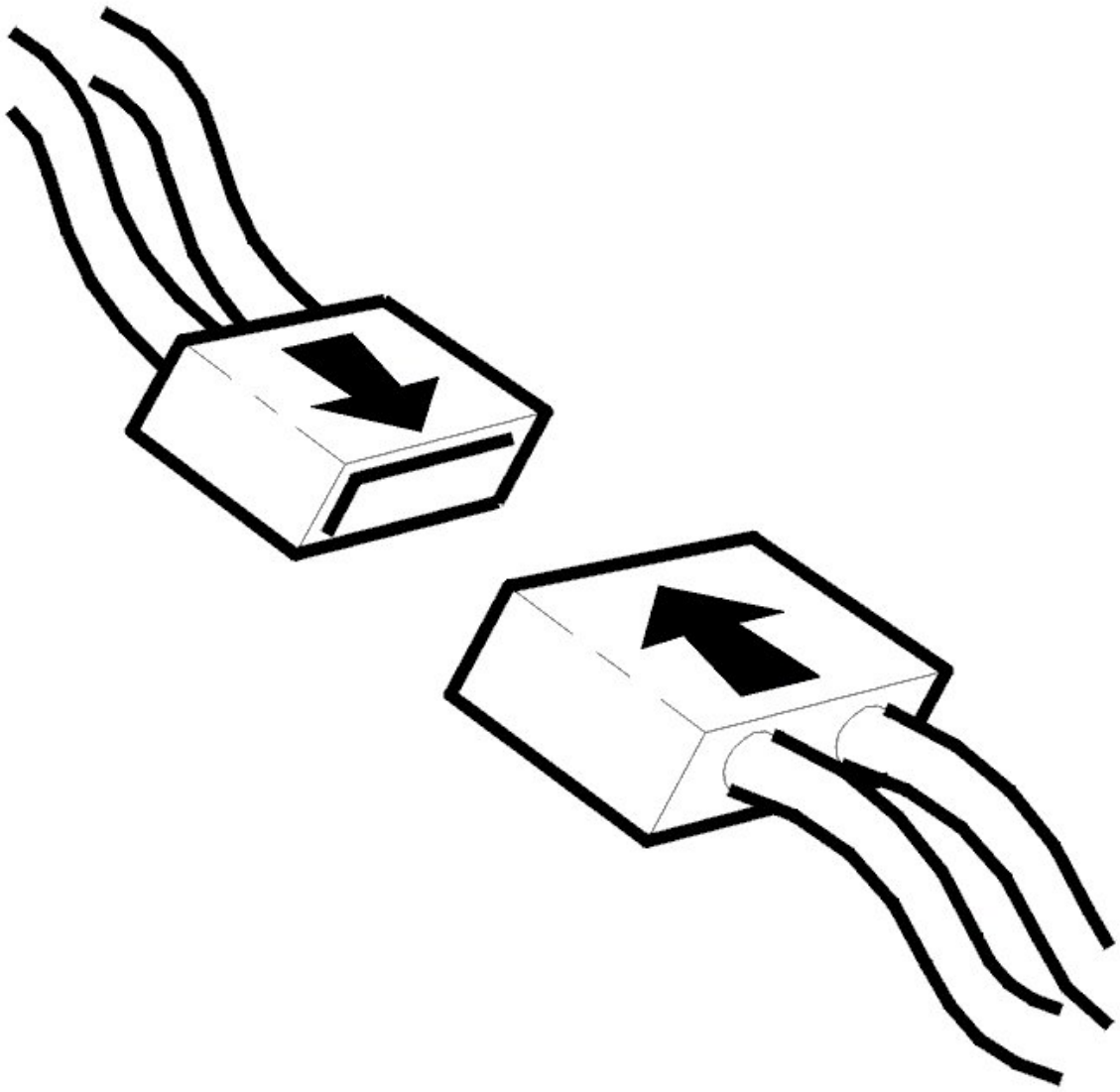
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Start the engine
- Ignition off
- Ignition on
- Read off the movement of the accelerator pedal by carefully depressing and releasing the accelerator pedal (AP).

Check that the value changes with accelerator pedal movement. The value must be between approximately 0.4 V when the accelerator pedal (AP) is unaffected and approximately 4 V when the accelerator pedal (AP) is fully depressed.
The fault has been remedied if the values are OK.

Are these values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

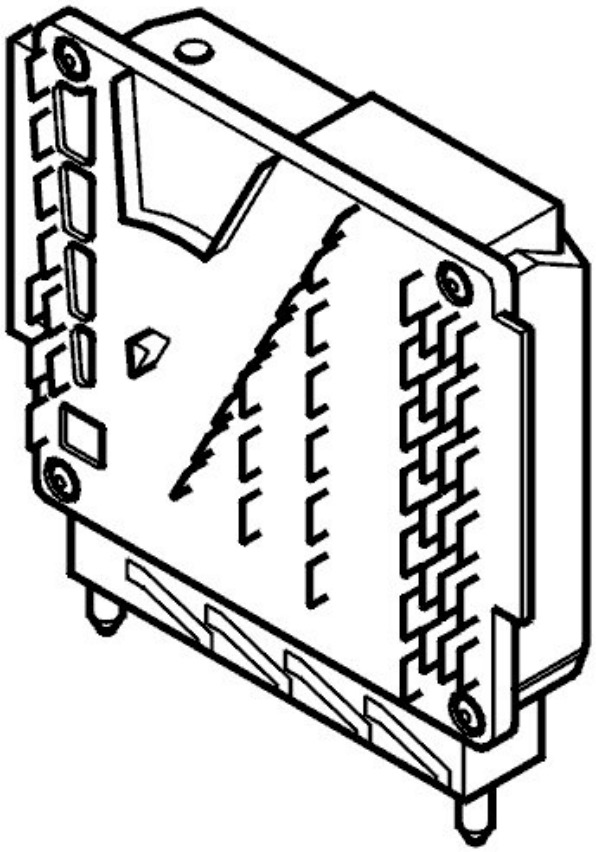
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the actual idle speed deviates from the predefined parameters.

Substitute value
- None.

Possible source
- Search the fault cause in the air supply and fuel system (air leakage, blockages, etc.).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- High idling speed.

Fault-Tracing Information

Fault-tracing information

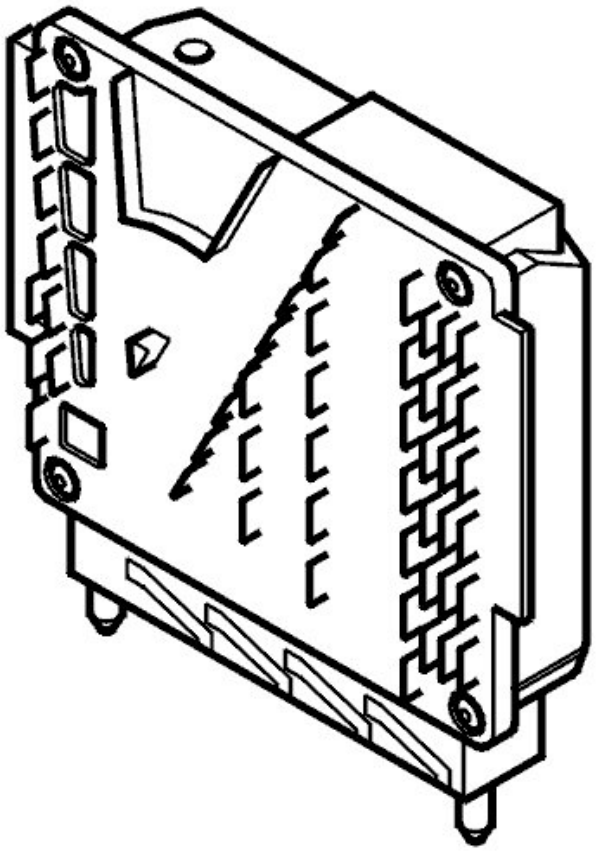
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the actual idle speed deviates from the predefined parameters.

Substitute value
- None.

Possible source
- Search the fault cause in the air supply and fuel system (air leakage, blockages, etc.).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- Low idling speed.

Fault-Tracing Information

Fault-tracing information

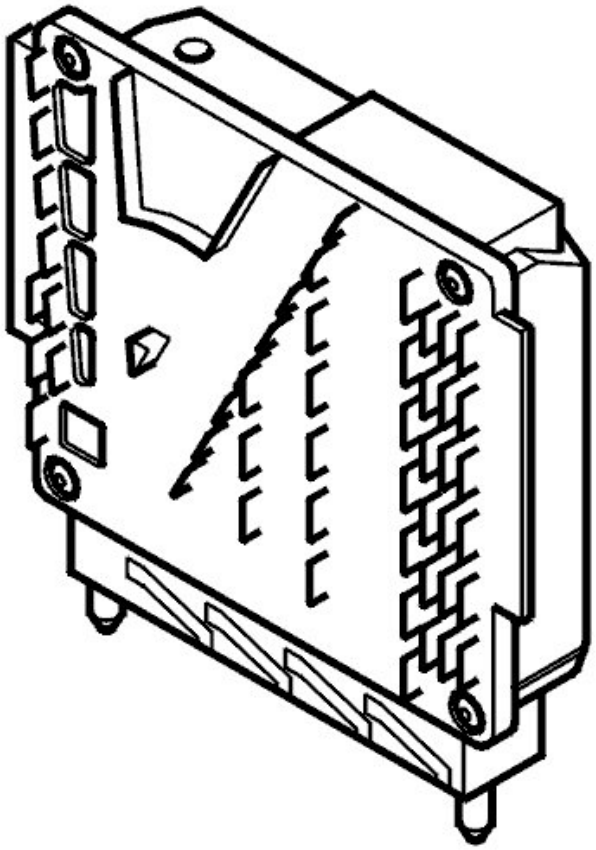
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-960C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault which indicates that the normal engine control functions are requesting more torque than is within the maximum permitted range.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Requested torque is limited to a calculated operating range.

Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Poor performance.

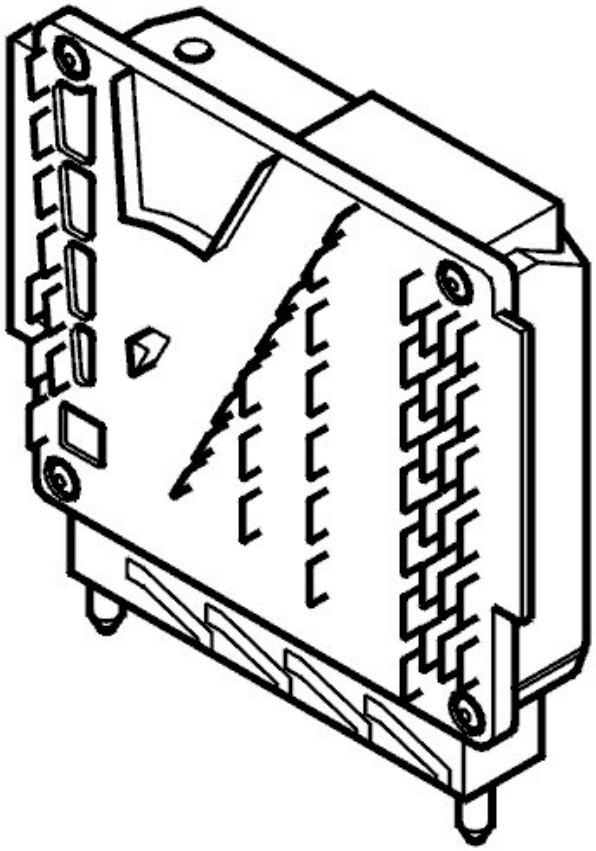
Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

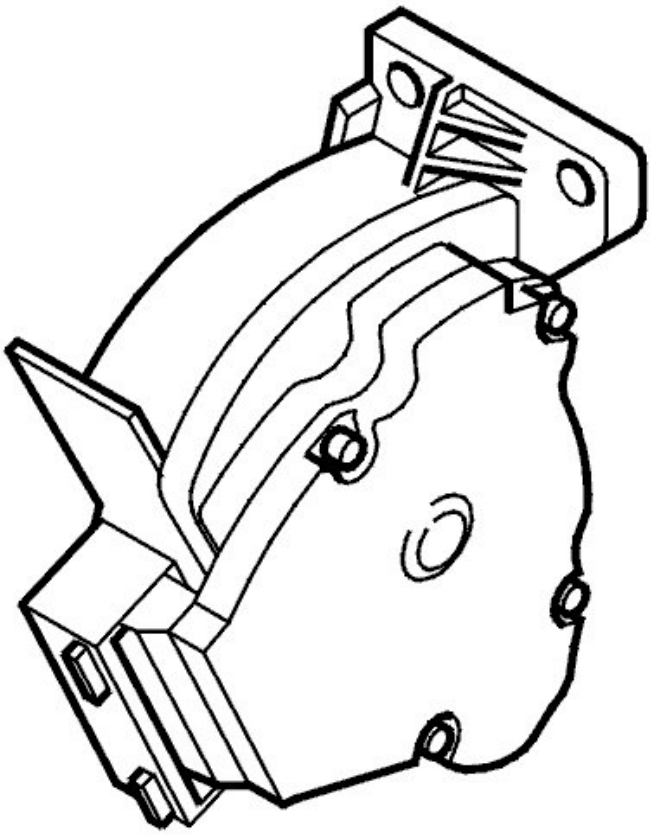
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9700

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the basic frequency of the PWM signal from the accelerator pedal (AP) position sensor deviates from the predefined values.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

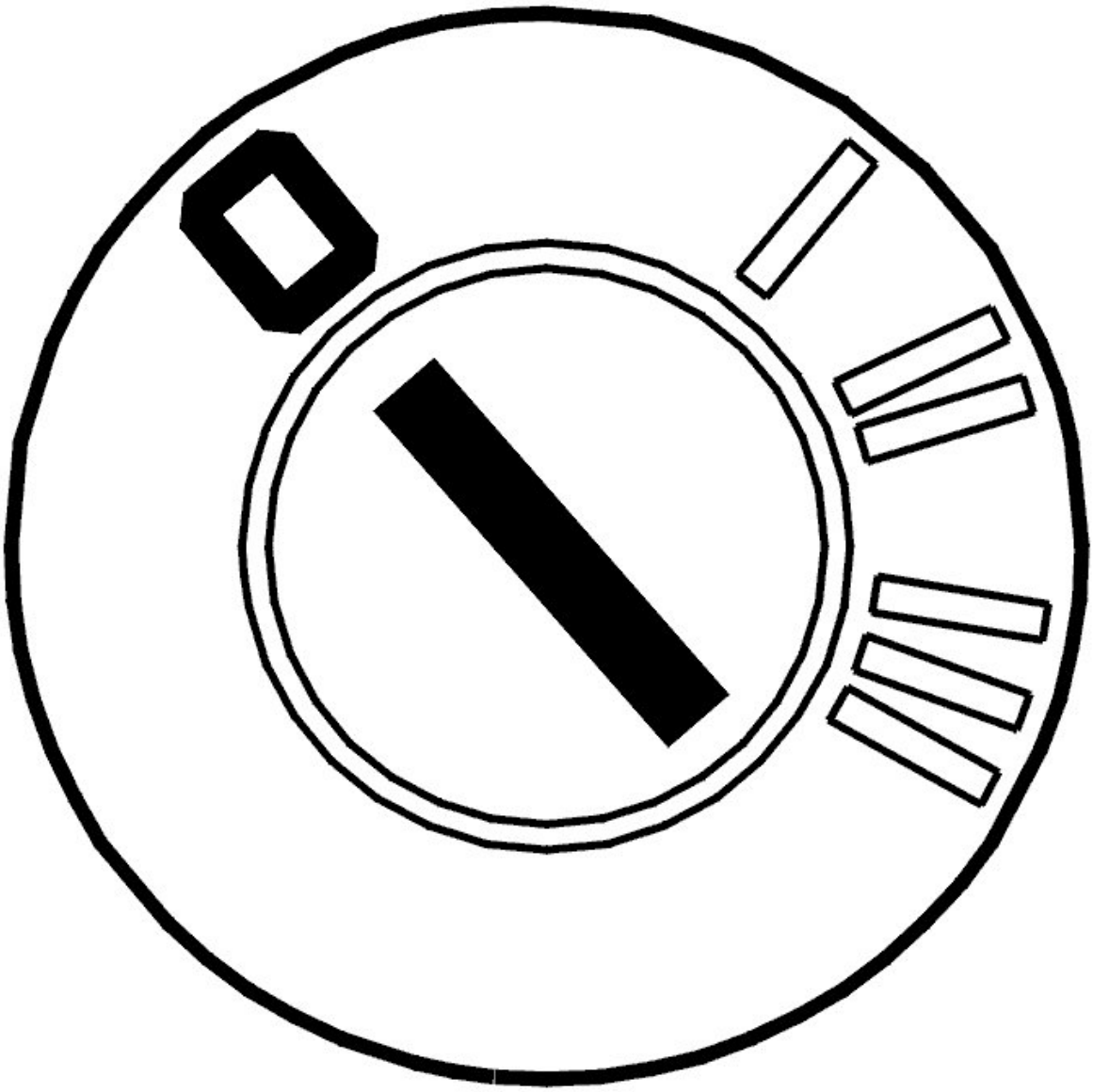
Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the accelerator pedal (AP) position sensor
- Open-circuit or short-circuit to ground or supply voltage in the signal cable
- Damaged accelerator pedal (AP) position sensor.

Fault symptom[s]
- None.

Faulty Signal

Faulty signal

Checking the connectors and cables



- Ignition off
- Check the accelerator pedal position sensor and engine control module (ECM) connectors. Check for contact resistance and oxidation.

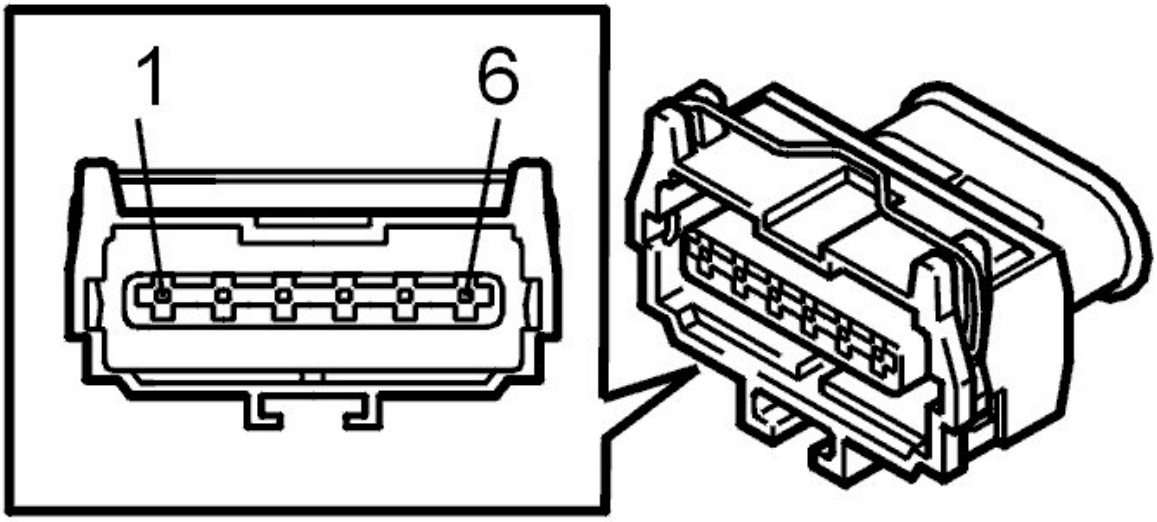
Check the signal cable between engine control module (ECM) terminal #B25 (#B35) and accelerator pedal (AP) position sensor terminal #2 (wiring side). Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor must be approximately 12 V measured between accelerator pedal (AP) position sensor terminals #1 and #3 (wiring side).

Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- To access and replace the accelerator pedal (AP) position sensor, see Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair.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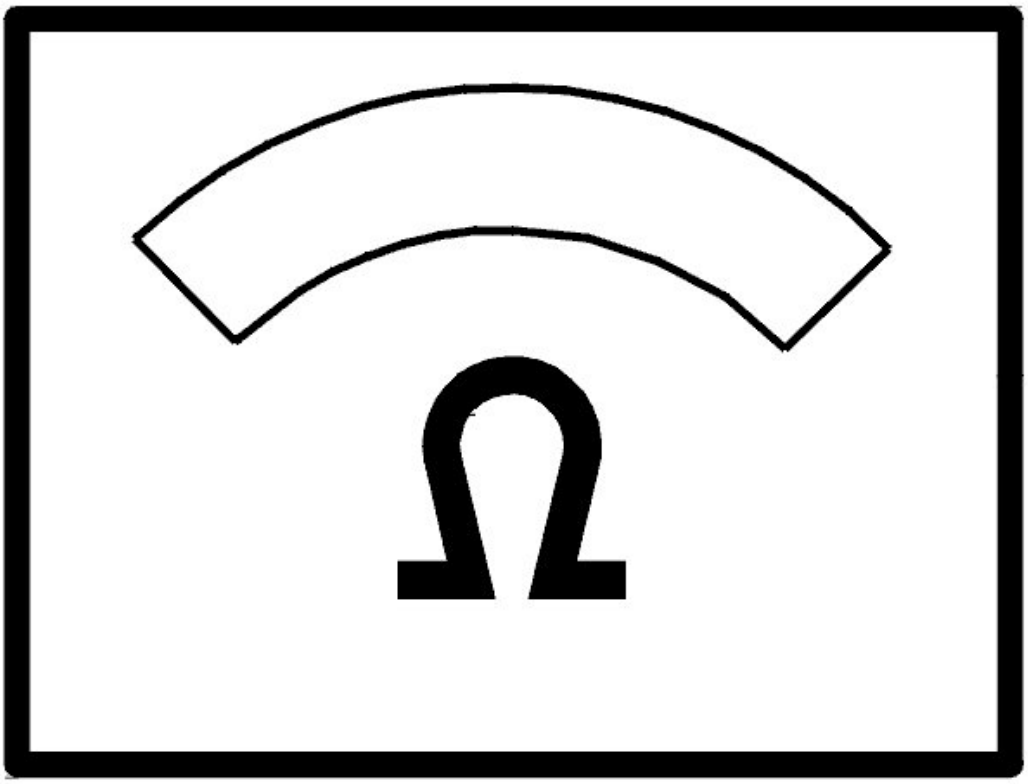
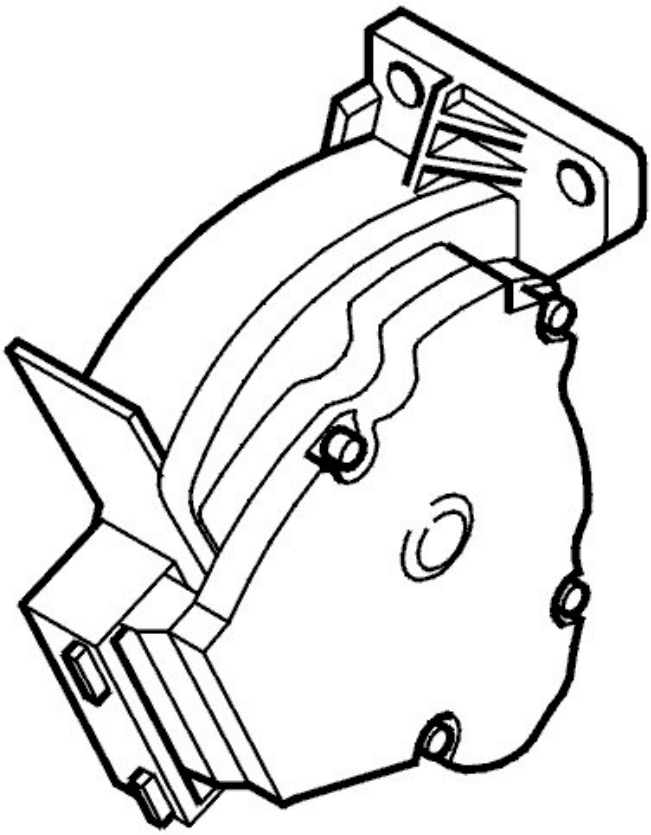




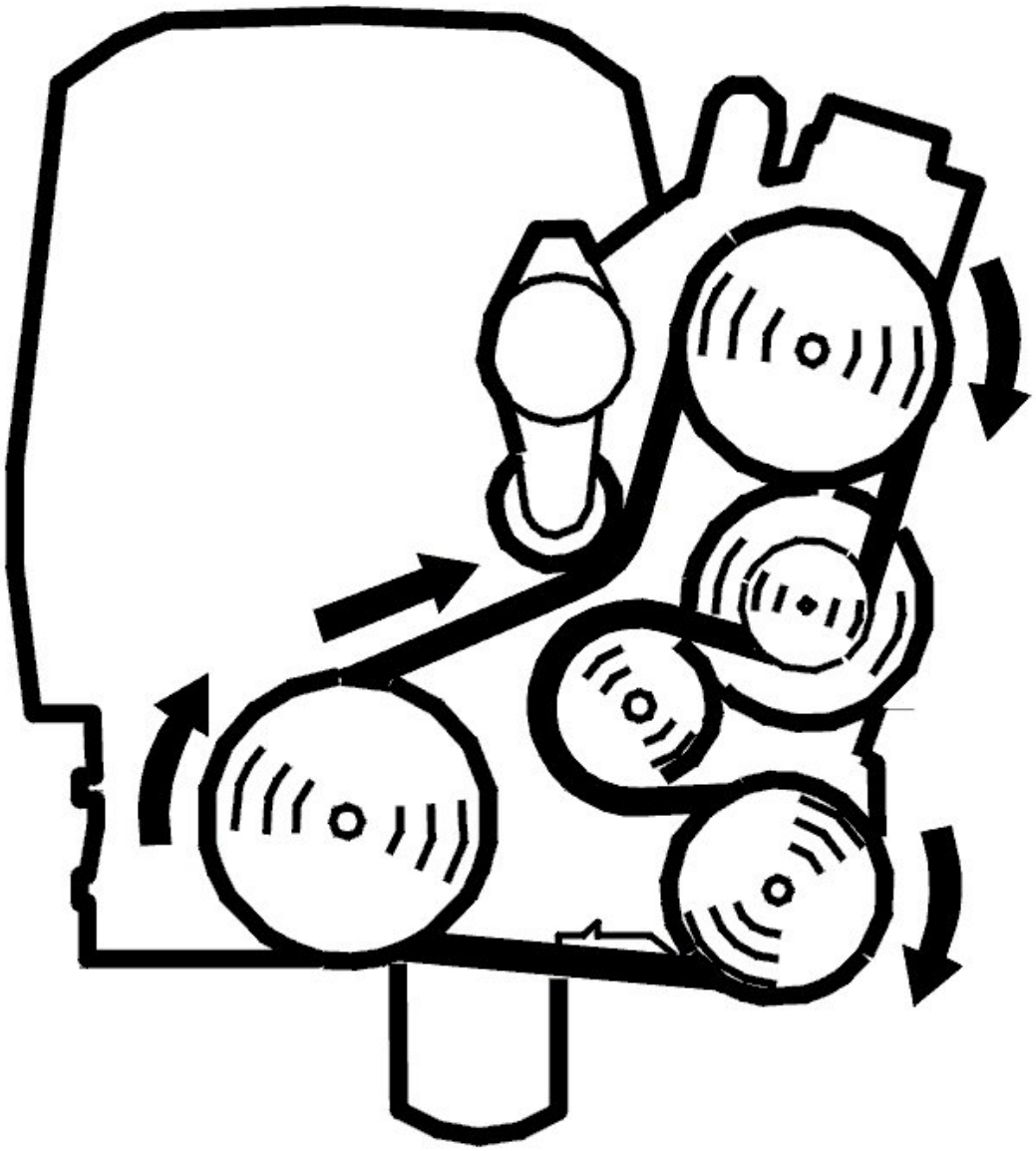
Continue - Verification

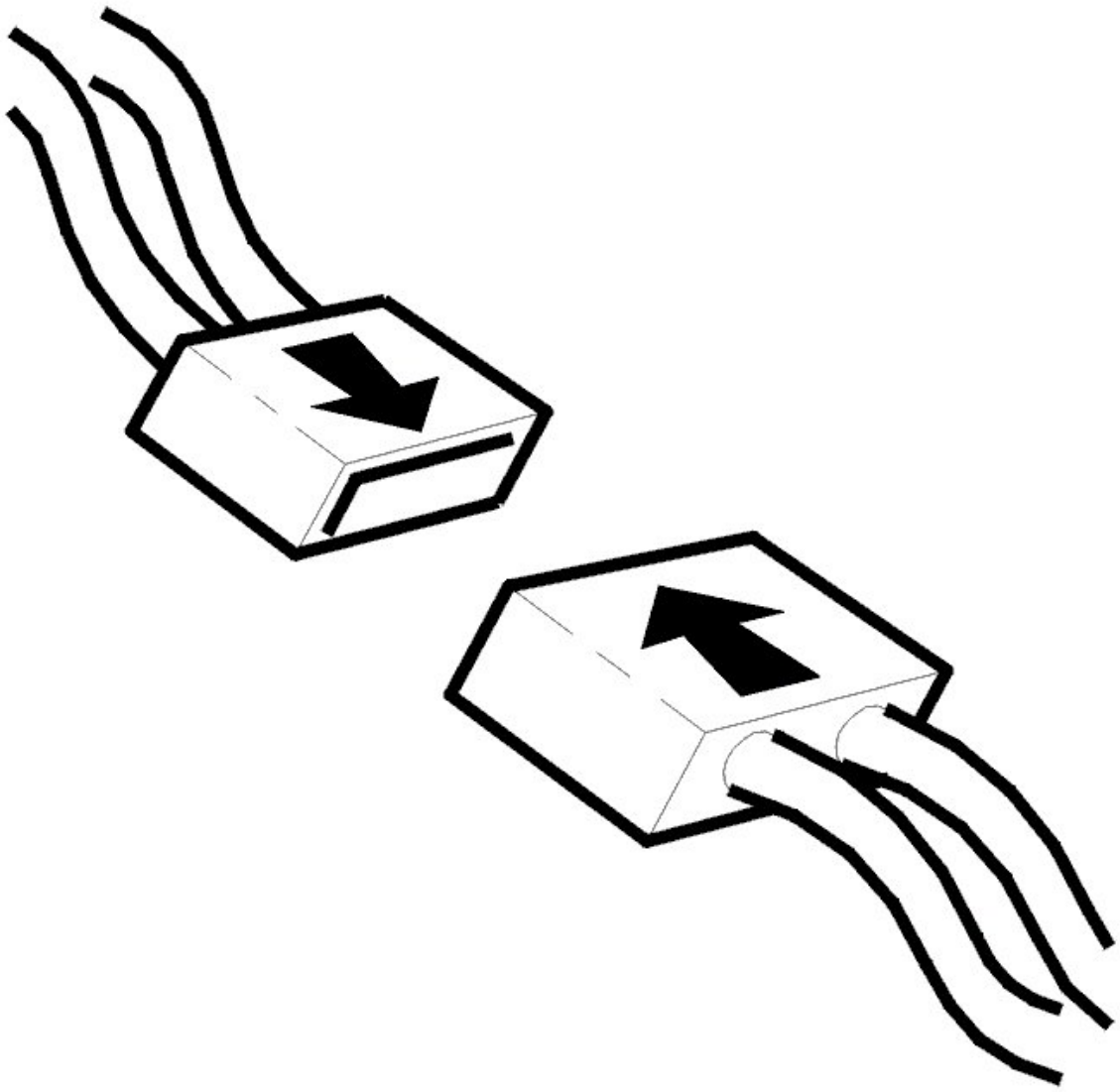
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

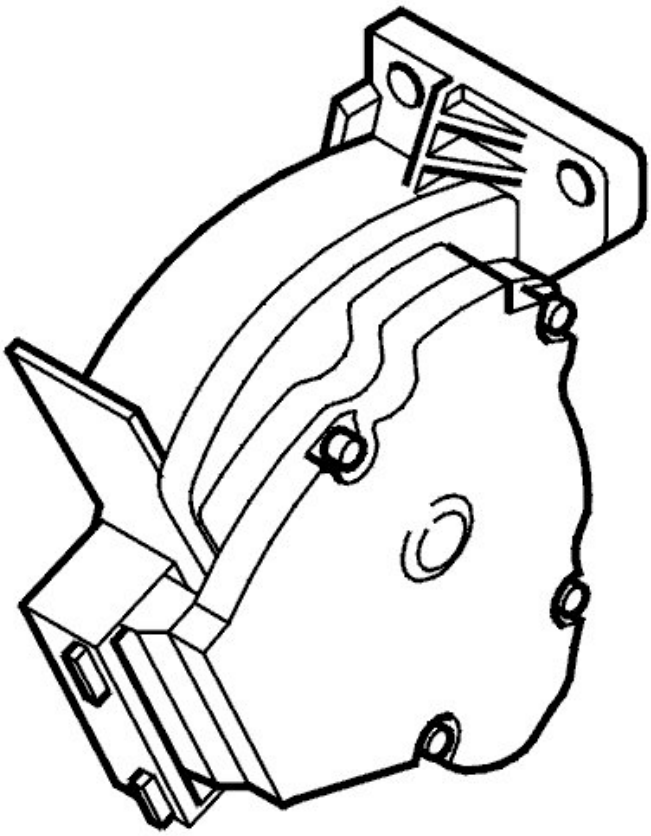
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and cables

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-970B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers that the basic frequency of the PWM signal from the accelerator pedal (AP) position sensor deviates from the predefined values.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the terminals between the engine control module (ECM) and the accelerator pedal (AP) position sensor
- Open-circuit or short-circuit to ground or supply voltage in the signal cable
- Damaged accelerator pedal (AP) position sensor.

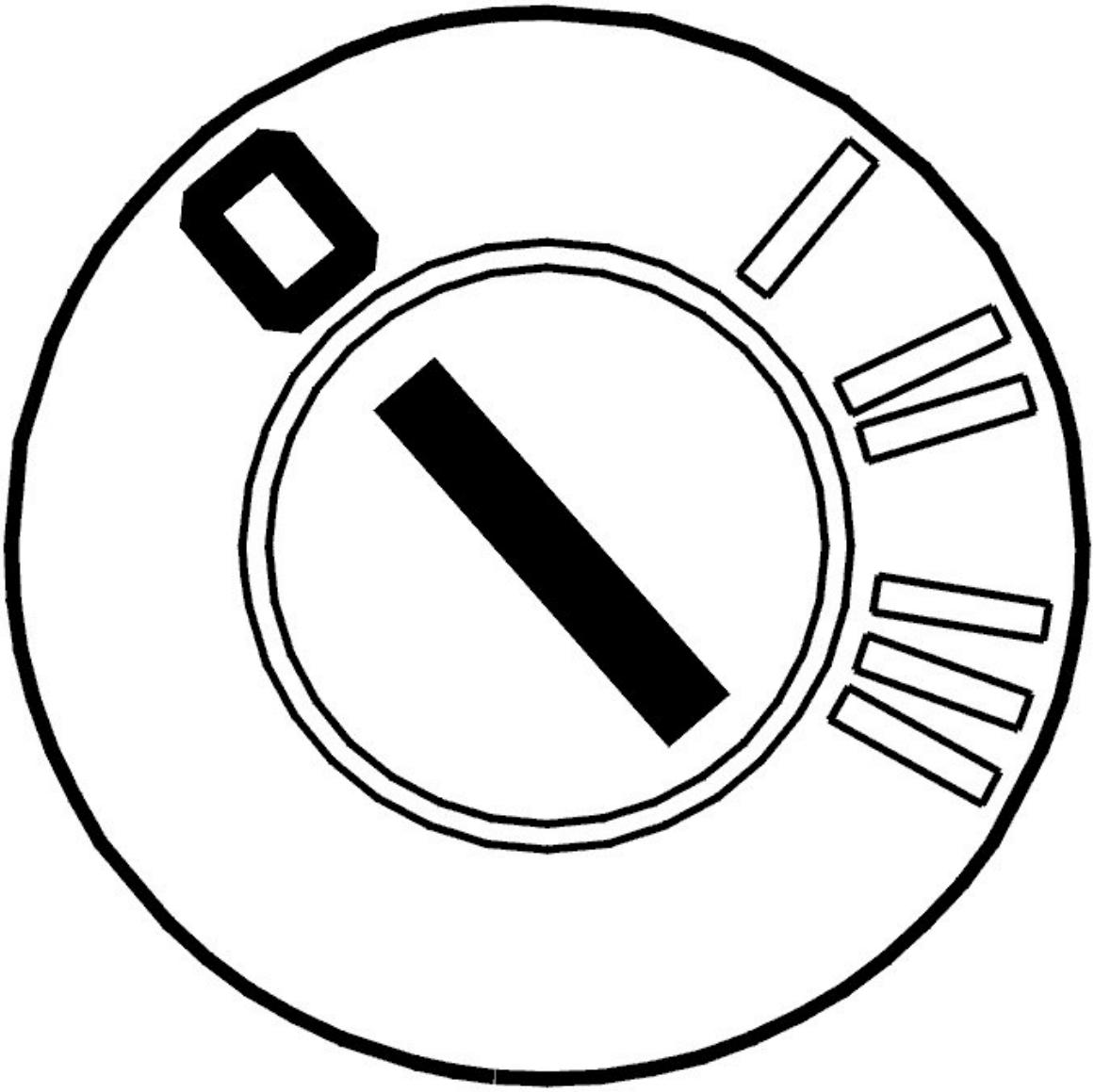
Fault symptom[s]

- None.

Faulty Signal or Signal Missing

Signal missing

Checking the connectors and cables



- Ignition off
- Check the accelerator pedal position sensor and engine control module (ECM) connectors. Check for contact resistance and oxidation.

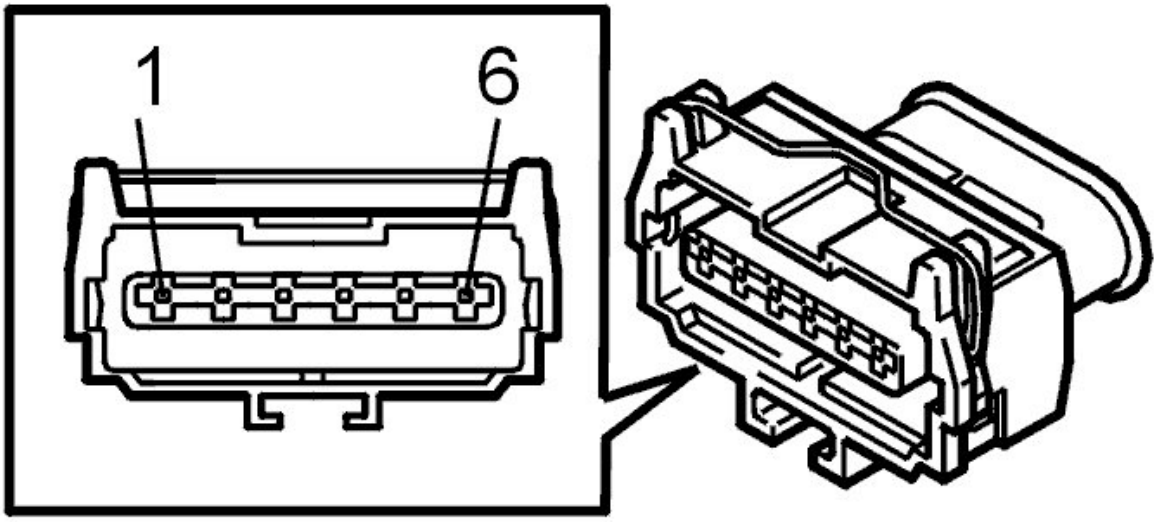
Check the signal cable between engine control module (ECM) terminal #B25 (#B35) and accelerator pedal (AP) position sensor terminal #2 (cable harness side). Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.

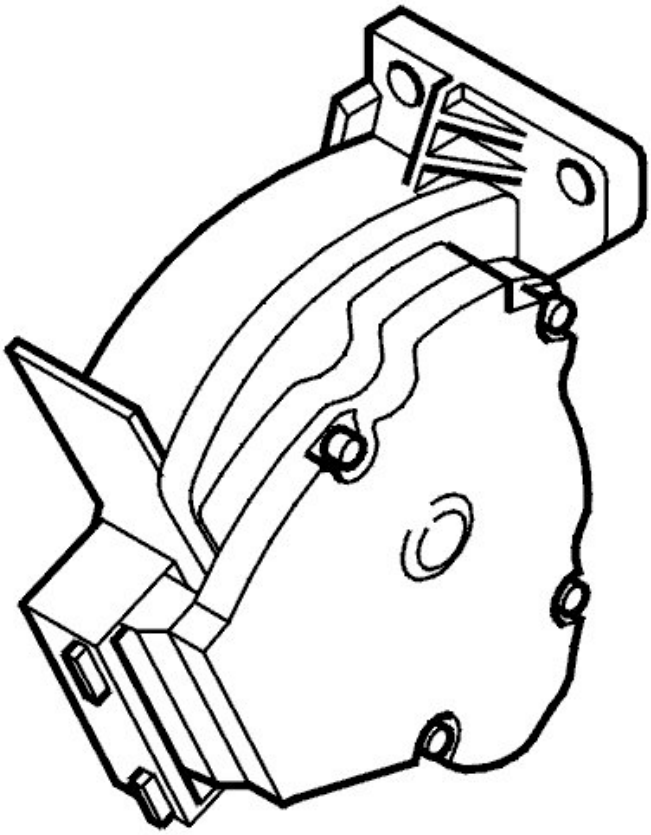
Hint: With the ignition on, the power supply to the accelerator pedal (AP) position sensor must be approximately 12 V measured between accelerator pedal (AP) position sensor terminals #1 and #3 (cable harness side).

Try a new accelerator pedal (AP) position sensor if no fault is found and the fault is permanent.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals for 5 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals for 6 cylinder engines: Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- Accelerator pedal (AP), replacing See: Fuel Delivery and Air Induction/Accelerator Pedal/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





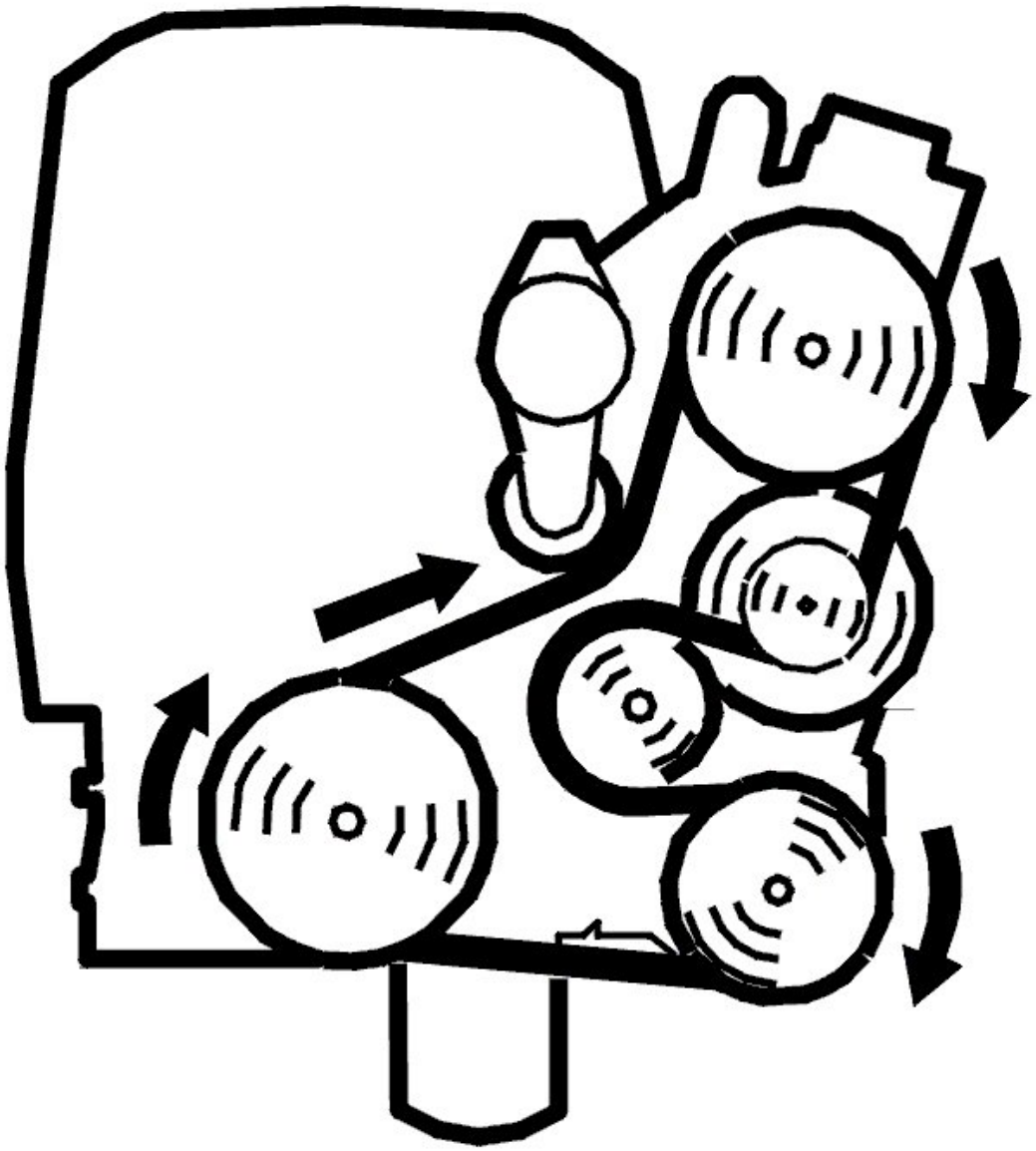
Continue - Verification

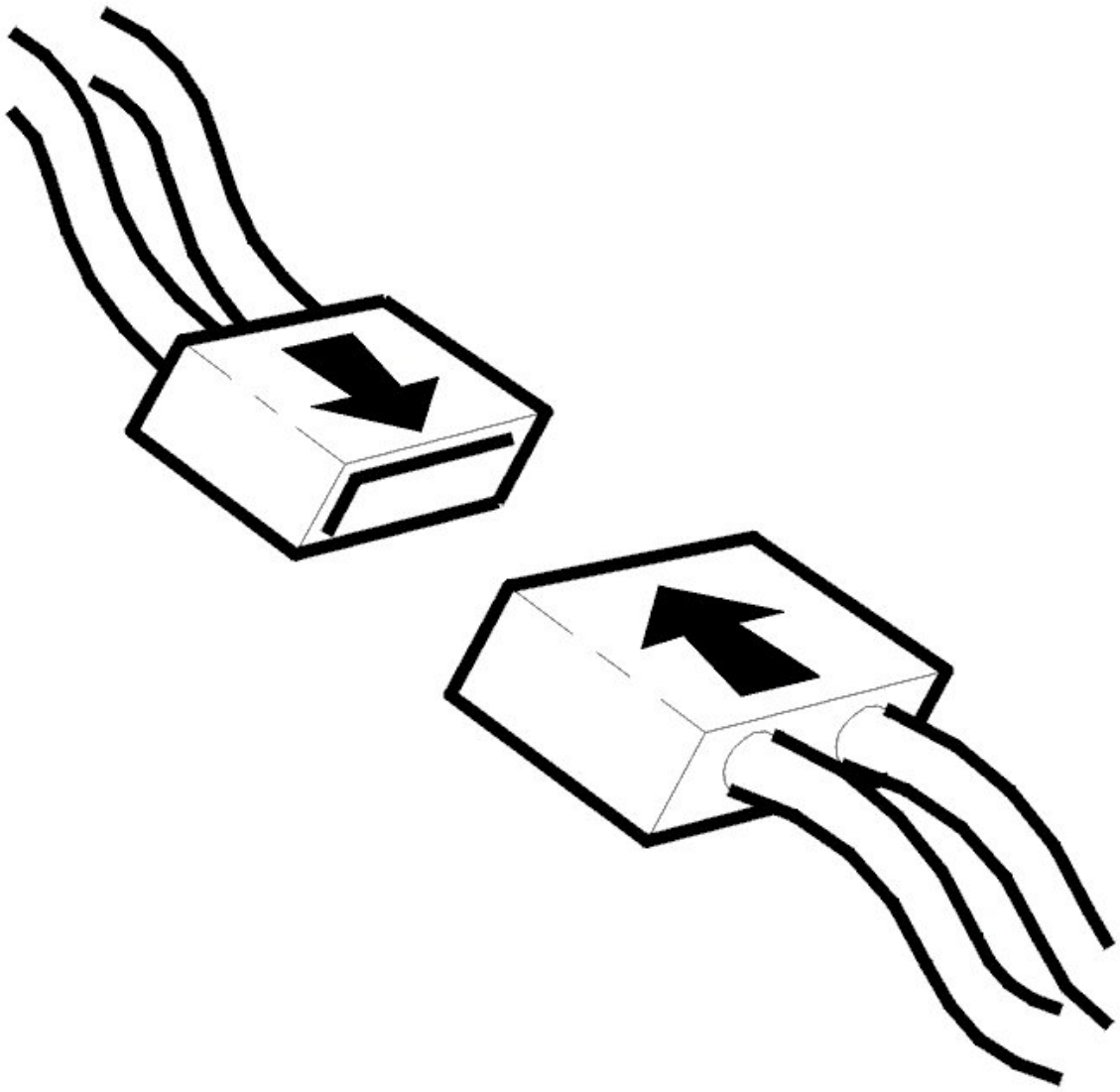
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Start the engine
- Read off diagnostic trouble codes (DTCs).

The fault has been remedied if status of the diagnostic trouble code (DTC) is intermittent.

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

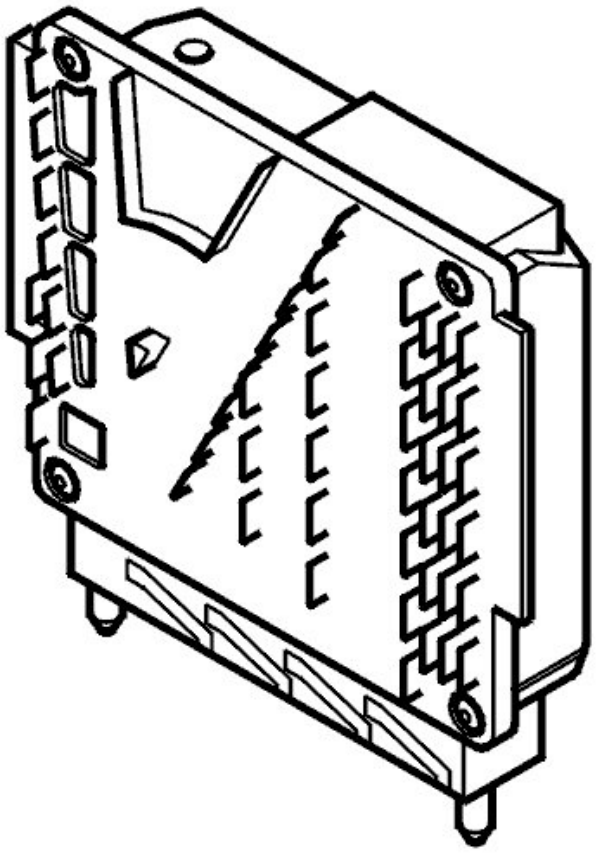
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the connectors and cables

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9800

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault which indicates that the normal engine control functions are producing a higher torque than is within the maximum permitted range.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- The engine speed (RPM) is restricted to approximately 2200 rpm by the fuel shut-off system
- Requested torque is limited to a calculated operating range.

Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Maximum engine speed (RPM) too low

- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

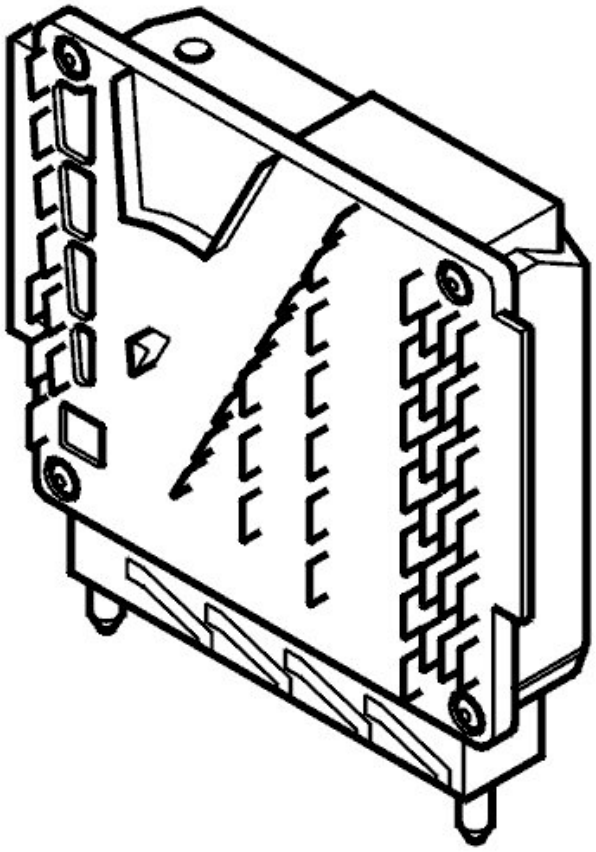
Internal Fault

Internal fault

Replacing the component

Note! The diagnostic trouble code (DTC) may be stored as a consequence of other faults. Check therefore if any other diagnostic trouble codes (DTCs) are stored for the engine control module (ECM). Remedy these first.

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

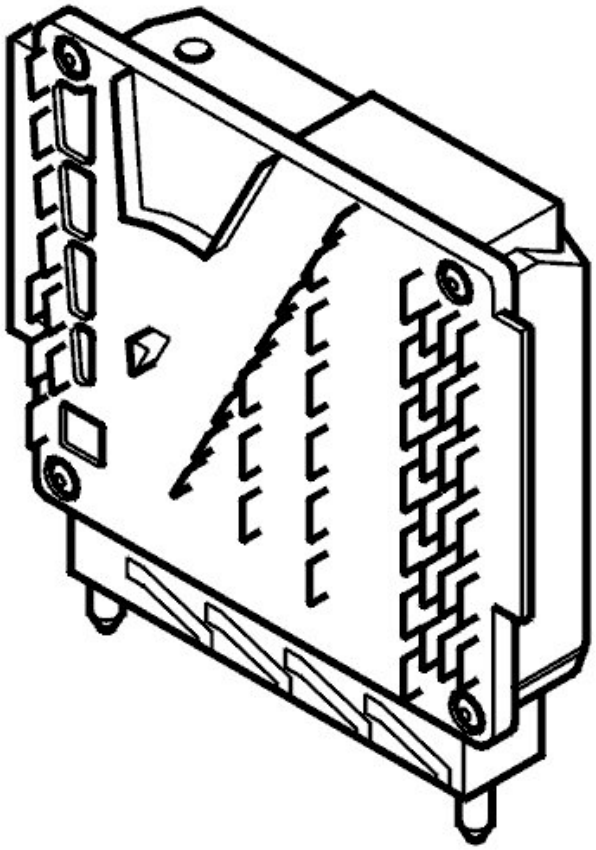
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9810

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault indicating that the calculated engine speed (RPM) in the internal monitoring functions differs from the normal calculated engine speed (RPM) in the engine control functions.
The diagnostic trouble code (DTC) is diagnosed with the engine running and at an engine speed (RPM) above 520 rpm.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

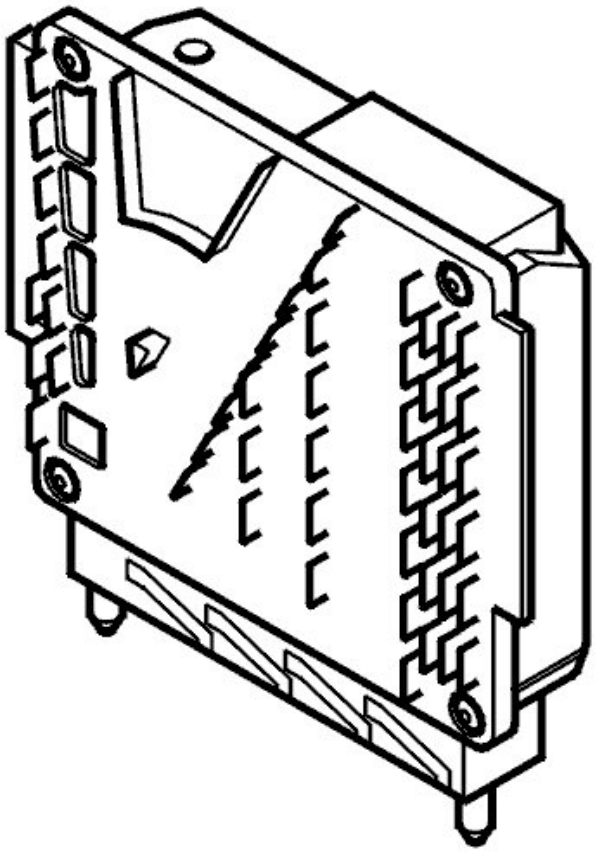
Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of

the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

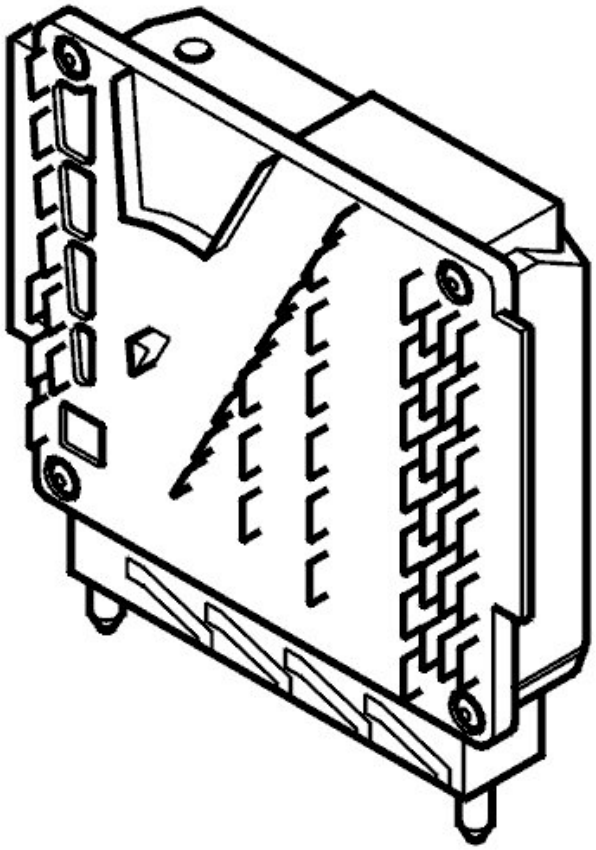
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9820

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault indicating that the calculated load signals for the normal engine control functions are lower than calculated by the internal monitoring functions.
The diagnostic trouble code (DTC) is diagnosed with the engine running and at an engine speed (RPM) of more than 1000 rpm.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Dirt or contaminants in the electronic throttle unit
- Foreign objects in the intake passages
- Damaged engine control module (ECM).

Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

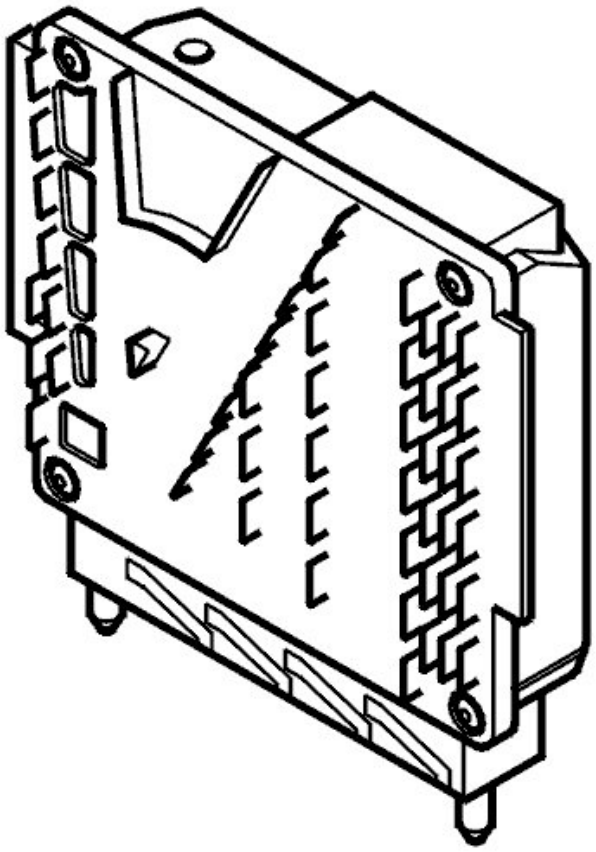
Internal Fault

Internal fault

Replacing the component

Note! The diagnostic trouble code (DTC) may be stored as a result of foreign objects in the intake passages or contaminants in the electronic throttle unit. Check and remedy these first.

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

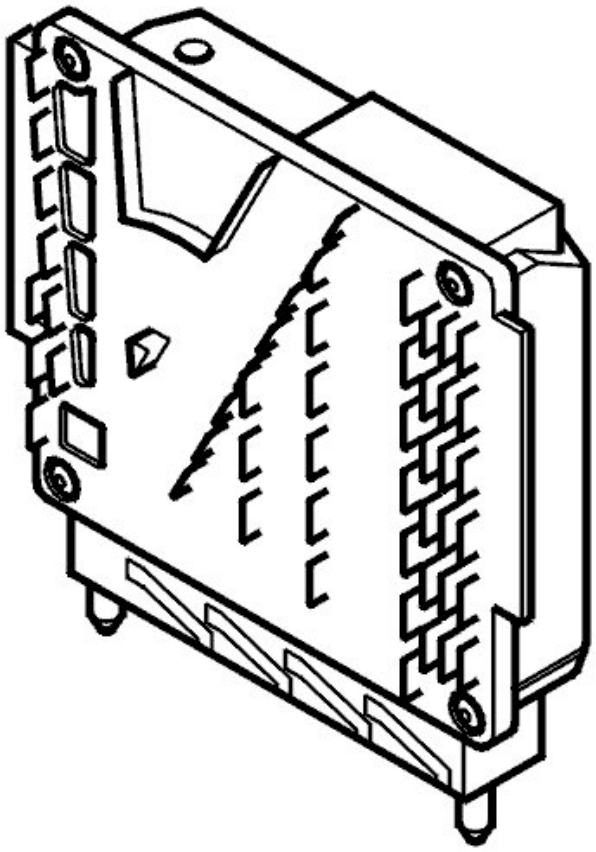
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-983B

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault indicating that the internal monitoring functions have registered one or more present values that do not correspond with the complement value.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

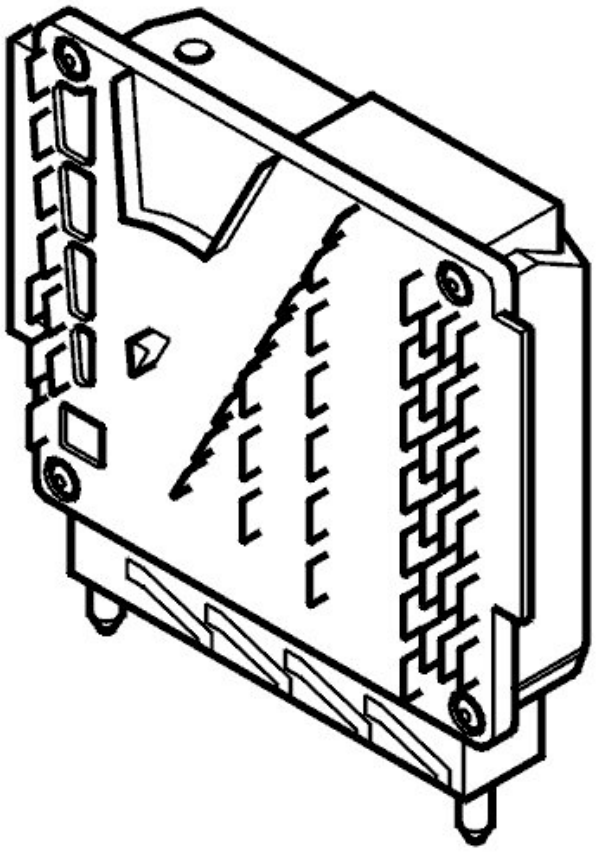
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

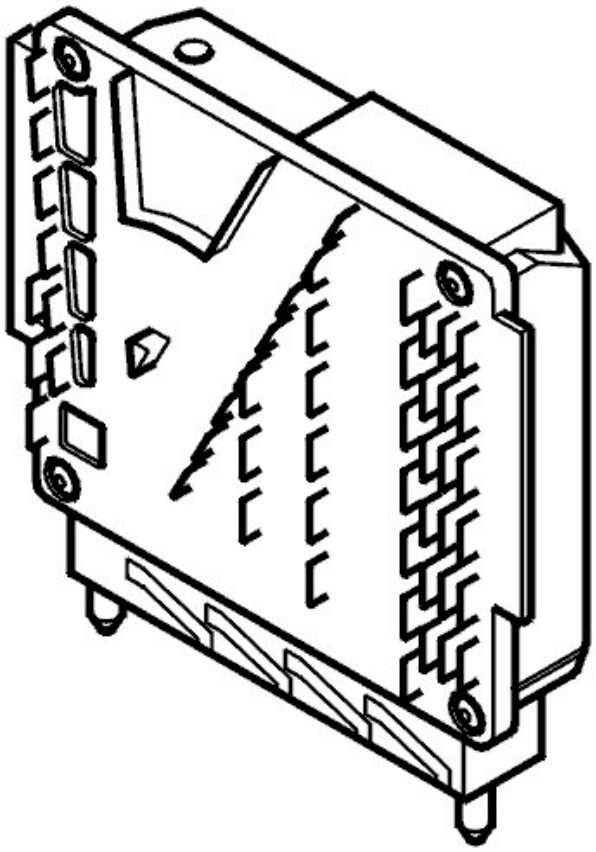
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-983C

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault indicating that the internal monitoring functions have registered one or more present values that do not correspond with the complement value.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

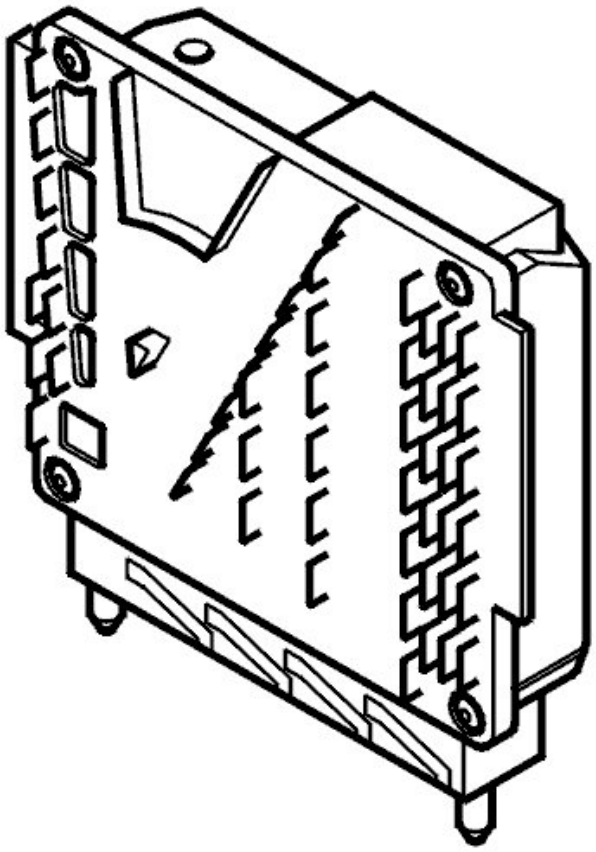
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

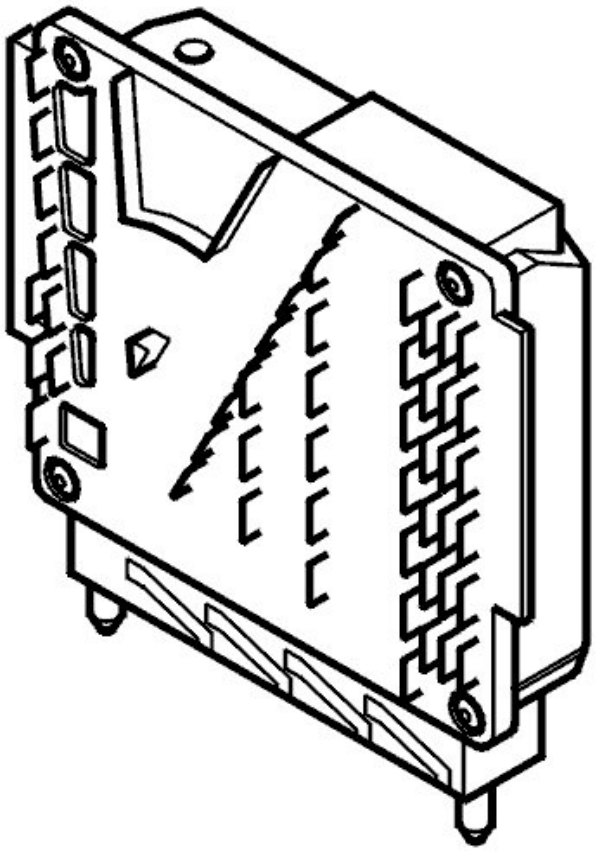
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-983D

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault indicating that the internal monitoring functions have registered one or more present values that do not correspond with the complement value.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

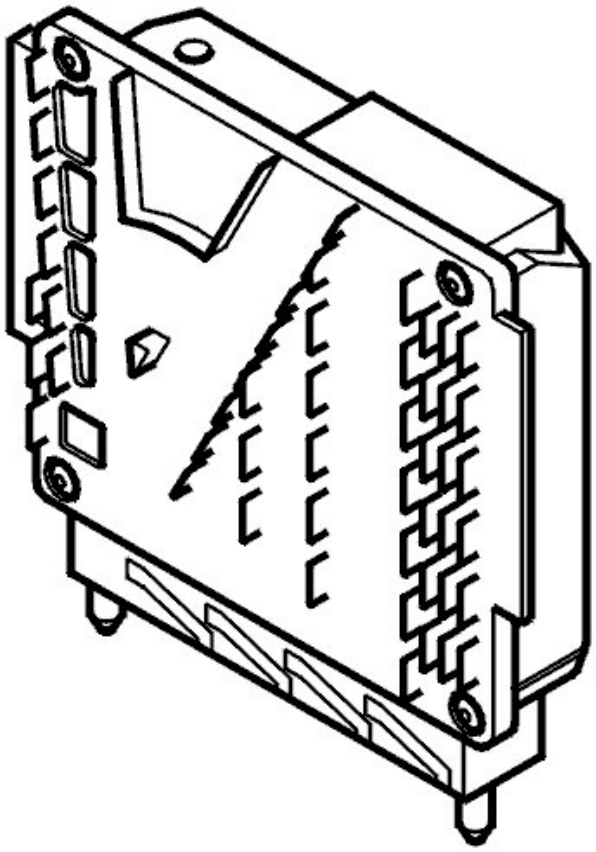
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

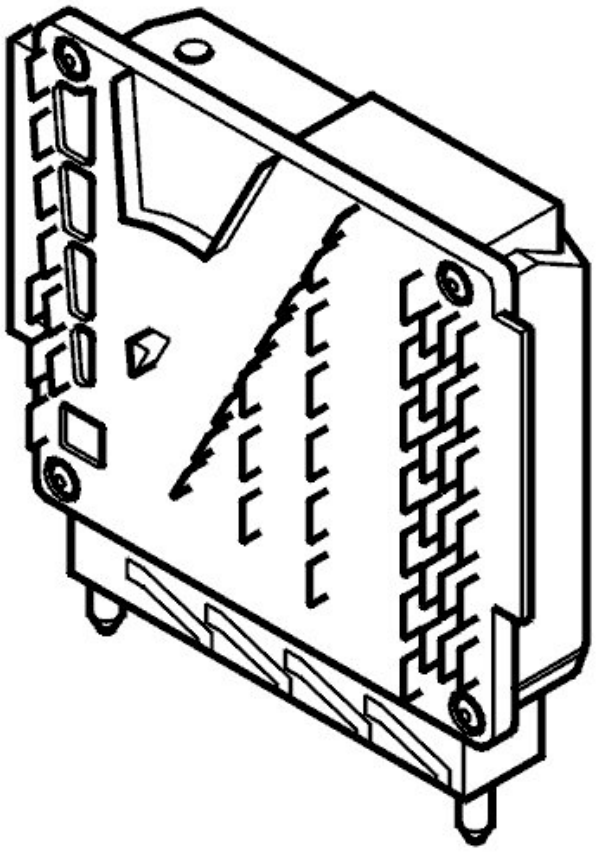
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9840

Condition



The diagnostic trouble code (DTC) stored if the engine control module (ECM) registers a fault where the input signals from the throttle unit position sensor are interpreted by the normal engine control functions as having exceeded their minimum or maximum limits, while the internal monitoring function interprets the input signals from the electronic throttle unit position sensor differently.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

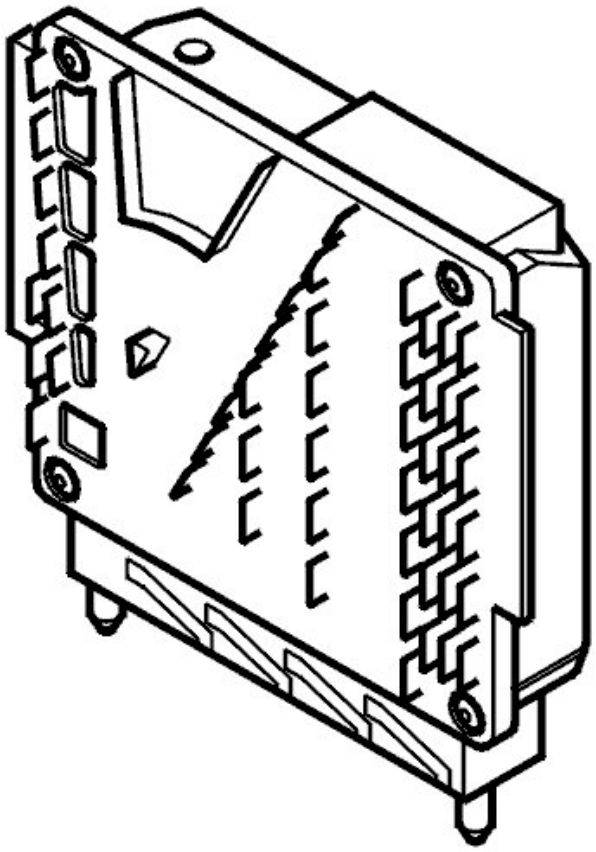
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

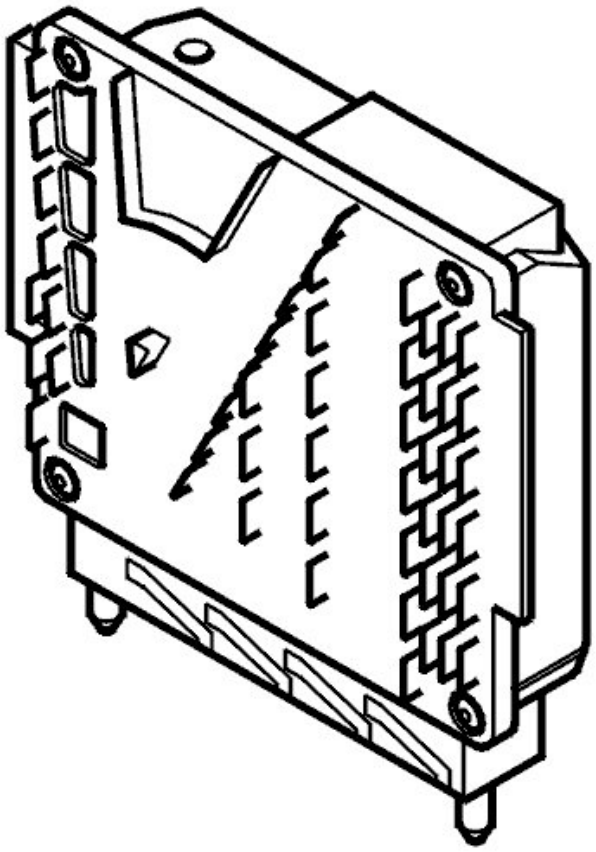
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-984B

Condition



The diagnostic trouble code (DTC) stored if the engine control module (ECM) registers a fault where the input signals from the throttle unit position sensor are interpreted by the normal engine control functions as having exceeded their minimum or maximum limits, while the internal monitoring function interprets the input signals from the electronic throttle unit position sensor differently.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

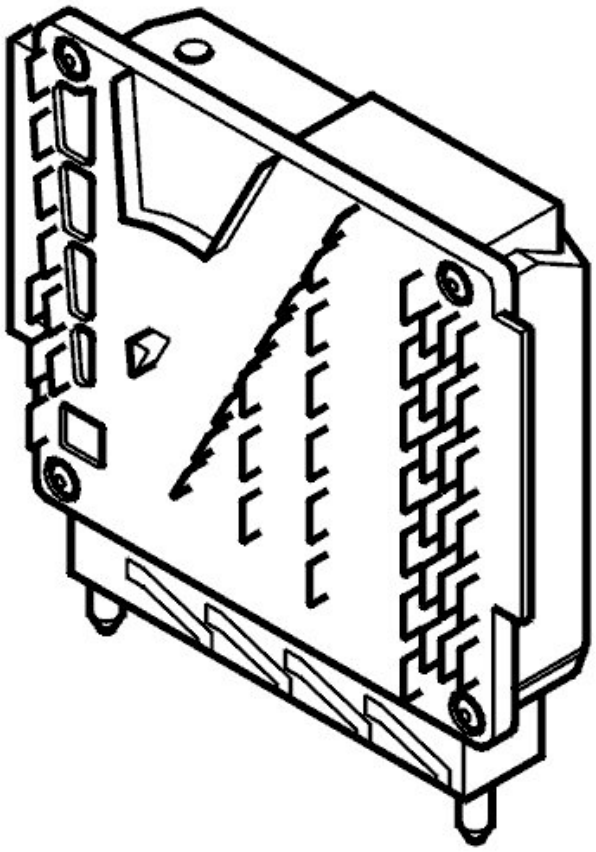
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

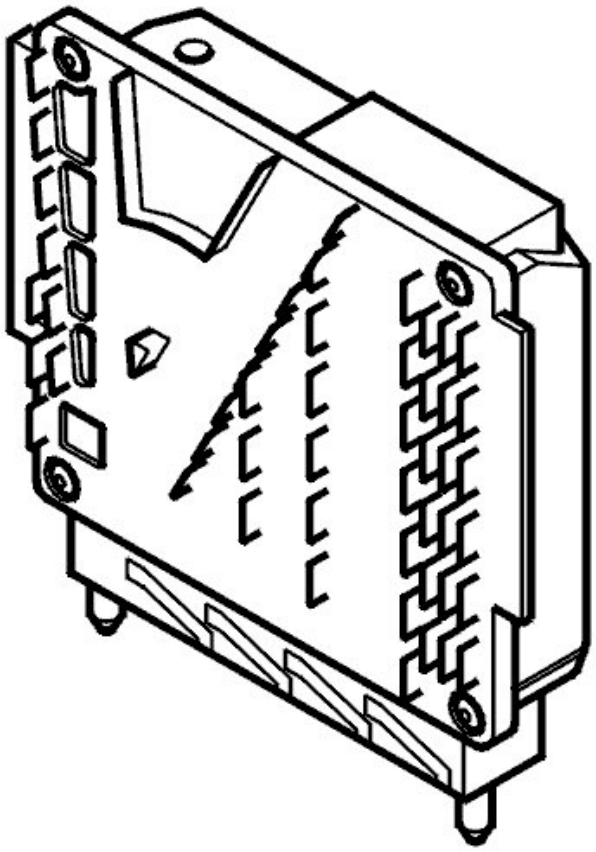
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9850

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers an internal fault in one of the internal monitoring functions in the engine control module (ECM). This diagnostic trouble code (DTC) is normally always stored with one of the other diagnostic trouble codes (DTCs) which affect the internal monitoring functions.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value

None.

Possible source
- One of the diagnostic trouble codes (DTCs) which affect the internal monitoring functions is stored in the engine control module (ECM)
- Damaged engine control module (ECM).

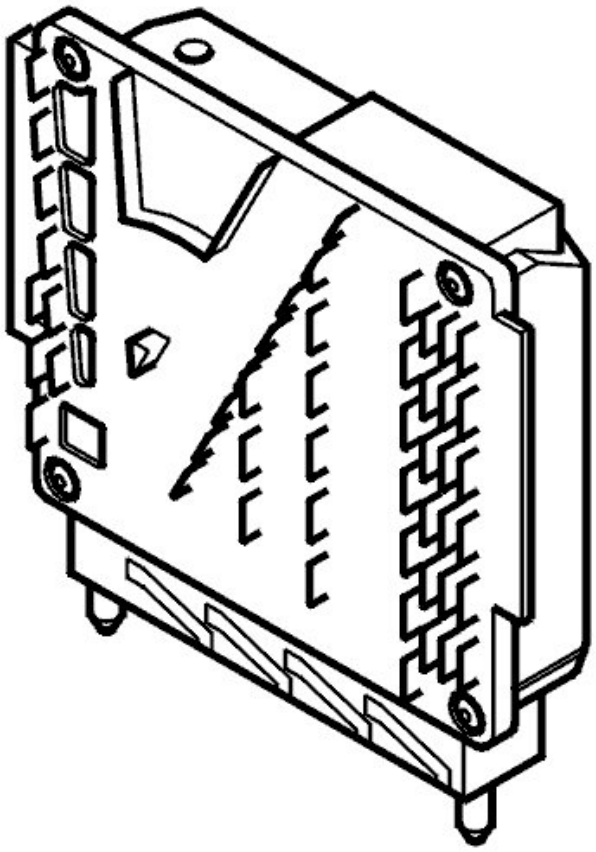
Fault symptom[s]
- Driving/Poor performance/lacks power
- Idling/Uneven idle

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

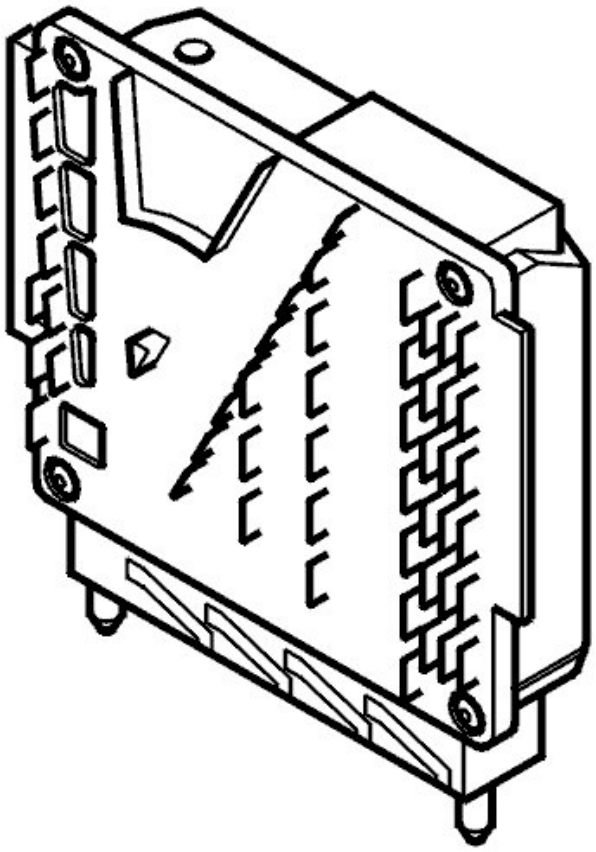
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9860

Condition



The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers a fault indicating that the normal engine control functions have not discovered a fault in the signals from the accelerator pedal (AP) position sensor, but that the internal monitoring function has detected a difference between the two signals.
The diagnostic trouble code (DTC) is diagnosed at ignition on or with the engine running.

Substitute value
- Engine speed (RPM) and torque are limited to a calculated normal operating range.

Possible source
- Damaged engine control module (ECM).

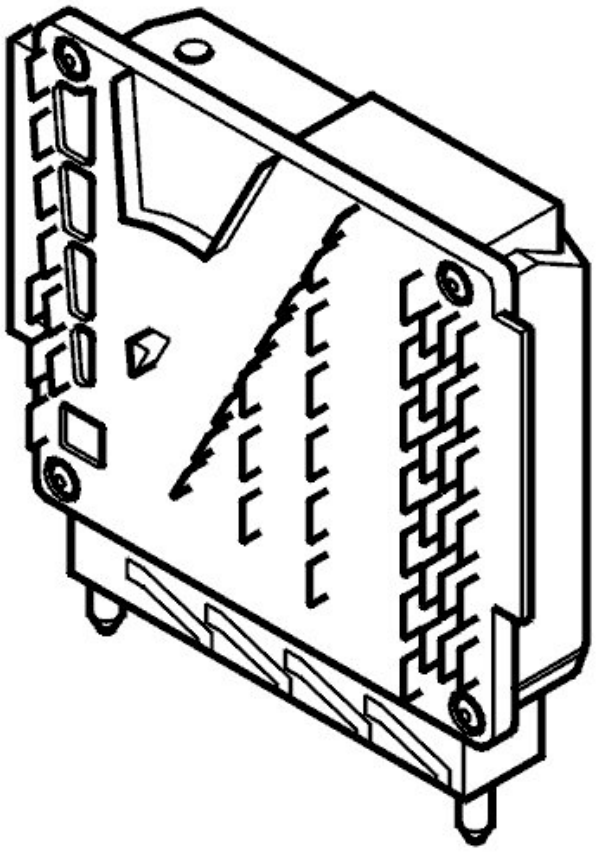
Fault symptom[s]
- Maximum engine speed (RPM) too low
- Cruise control does not work at all
- Uneven idle
- Malfunction indicator lamp (MIL) lit.

Internal Fault

Internal fault

Replacing the component

The engine control module (ECM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the engine control module (ECM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the engine control module (ECM) if the fault recurs.
Replace the engine control module (ECM) in the event of a permanent fault.
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair
Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

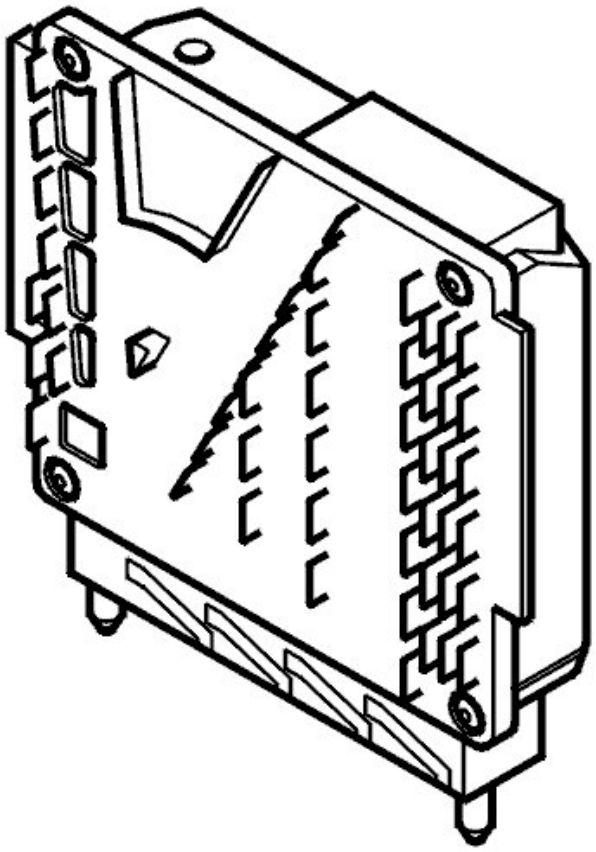
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9970

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The engine control module (ECM) continuously checks the internal RAM (random access memory) functionality. The diagnostic trouble code (DTC) is stored if there is a fault in the RAM.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The engine control module (ECM) attempts to reset itself.

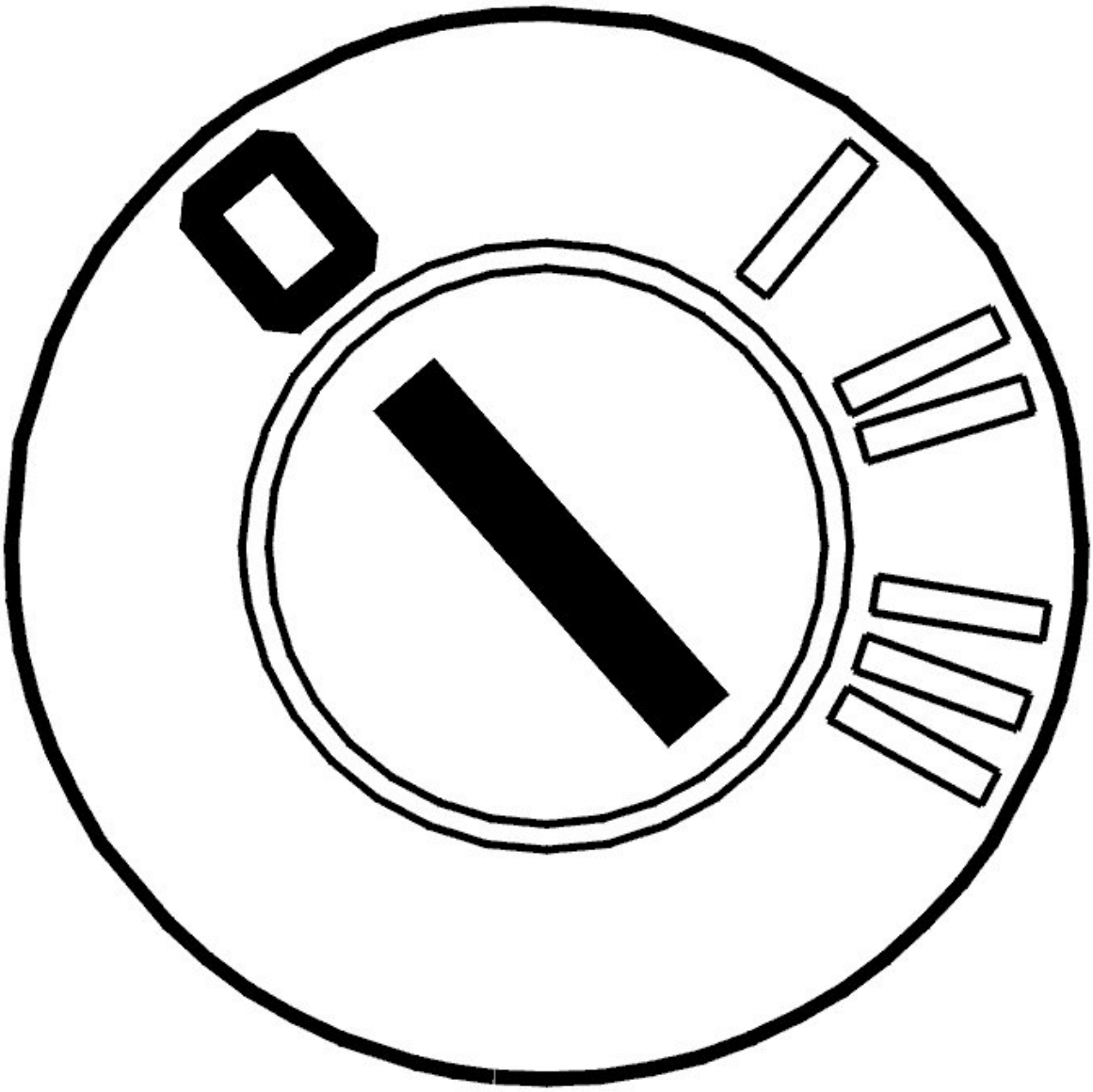
Possible source
- Faulty software in the engine control module (ECM)
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The malfunction indicator lamp (MIL) flashes
- The engine cuts out
- The starter motor turns but the engine does not start.

Faulty Signal

Faulty signal

Programming/replacing the engine control module (ECM)

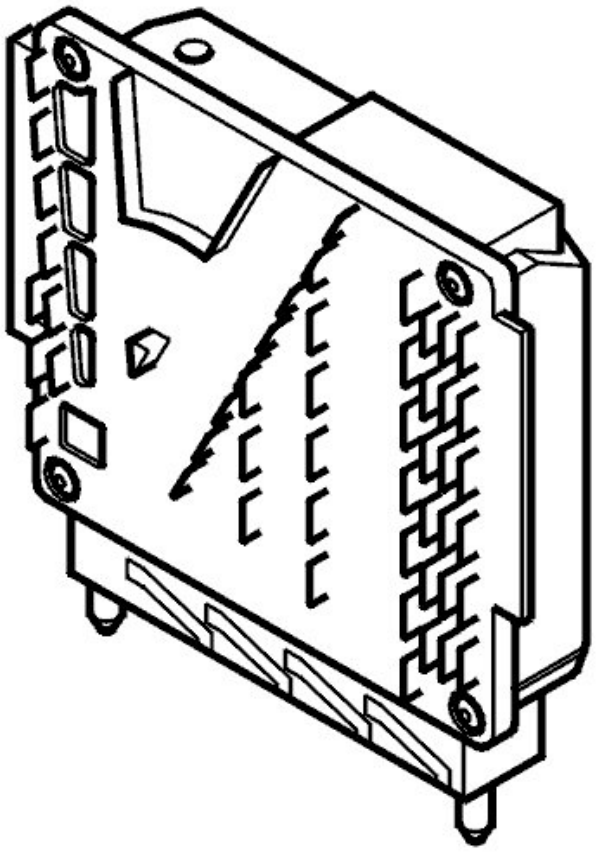


- Ignition off.

The engine control module (ECM) has registered an internal fault or a fault in the software. Try downloading new software into the control module.
To download new software or replace the engine control module (ECM), see:
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair.
If software cannot be downloaded or new software does not solve the problem, replace the engine control module (ECM) and download the relevant software to the new control module.

Note! After downloading new software or replacing the engine control module (ECM), the throttle unit must be adapted according to VIDA Vehicle communication: "Throttle unit adaptation".

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Programming/replacing the engine control module (ECM)

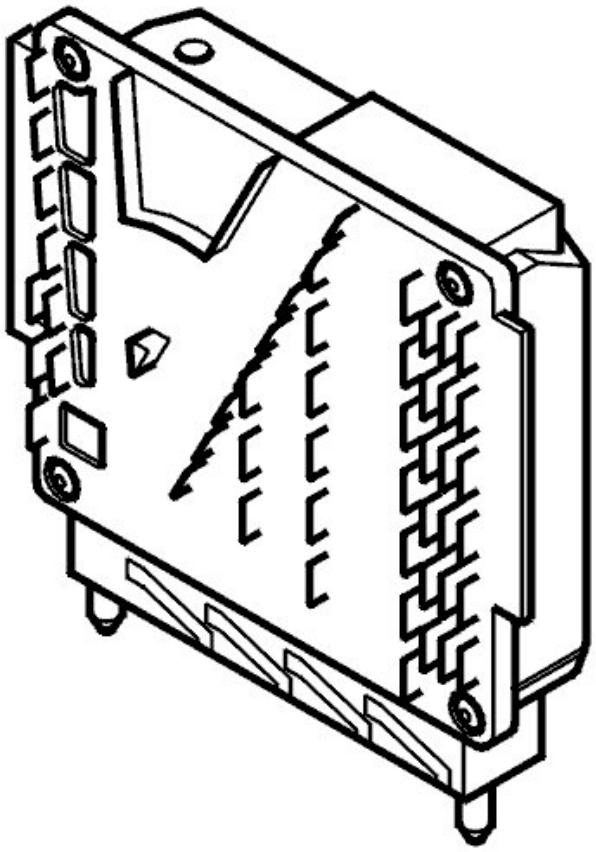
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9980

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The engine control module (ECM) continuously checks the internal ROM (read only memory) functionality. The diagnostic trouble code (DTC) is stored if there is a fault in the ROM.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The engine control module (ECM) attempts to reset itself.

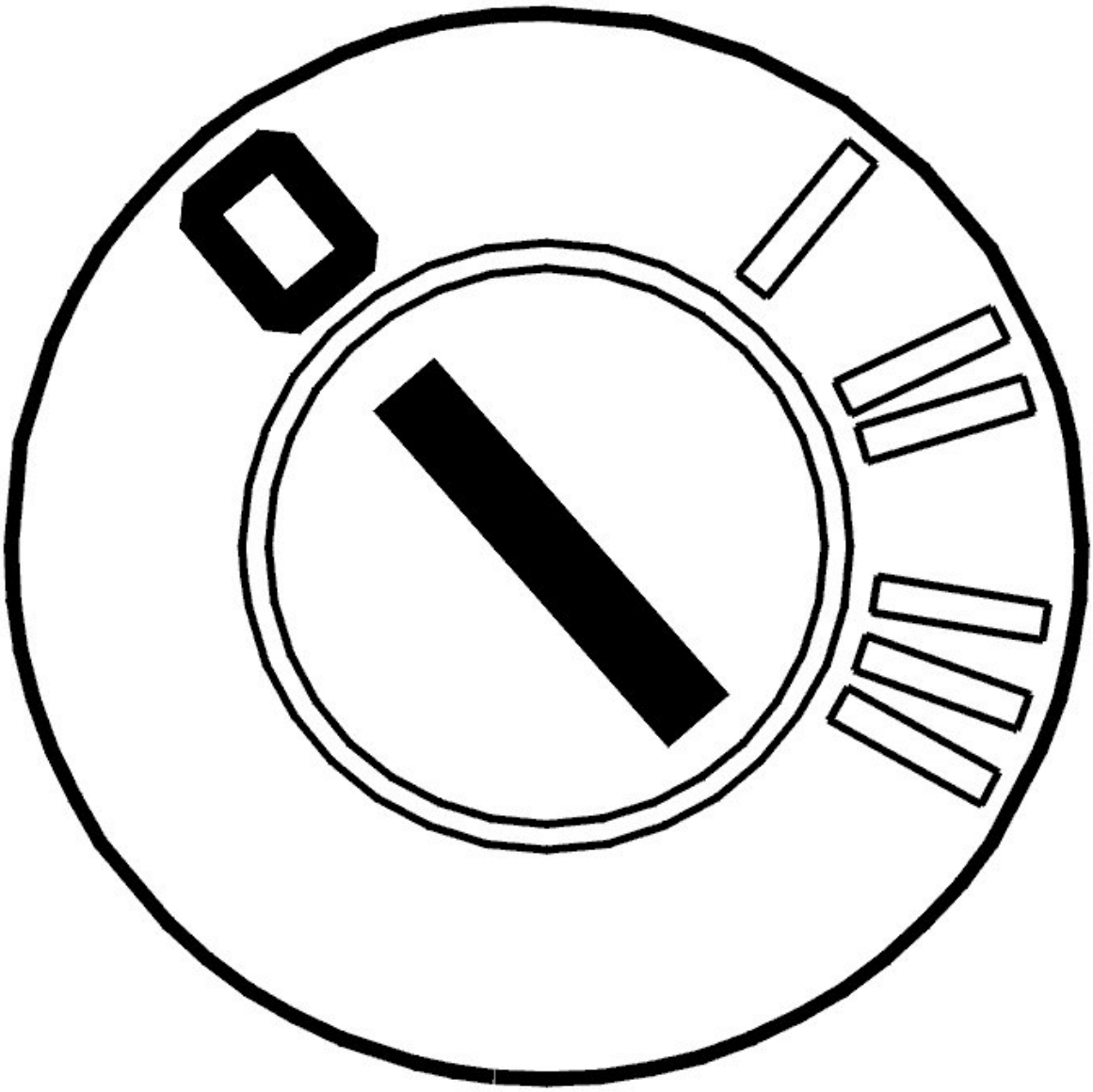
Possible source
- Faulty software in the engine control module (ECM)
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The malfunction indicator lamp (MIL) flashes
- The engine cuts out
- The starter motor turns but the engine does not start.

Faulty Signal

Faulty signal

Programming/replacing the engine control module (ECM)

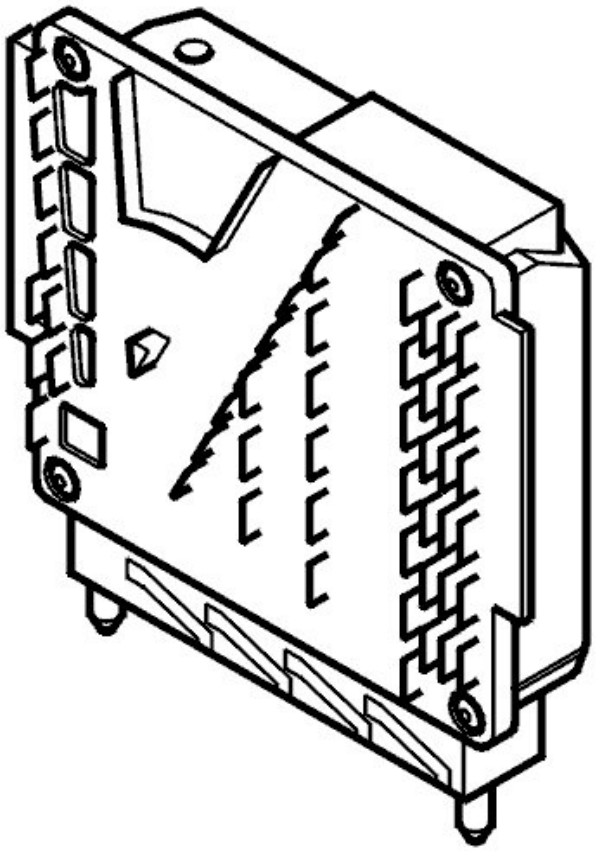


- Ignition off.

The engine control module (ECM) has registered an internal fault or a fault in the software. Try downloading new software into the control module.
To download new software or replace the engine control module (ECM), see:
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair.
If software cannot be downloaded or new software does not solve the problem, replace the engine control module (ECM) and download the relevant software to the new control module.

Note! After downloading new software or replacing the engine control module (ECM), the throttle unit must be adapted according to VIDA Vehicle communication: "Throttle unit adaptation".

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Programming/replacing the engine control module (ECM)

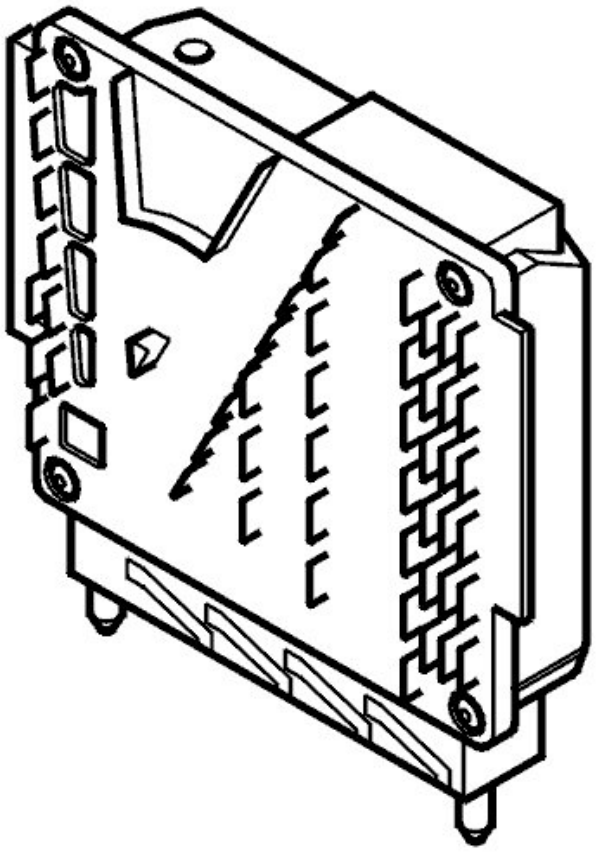
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-9990

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The engine control module (ECM) continuously checks its own internal reset functionality. The diagnostic trouble code (DTC) is stored if there is a fault in the reset function.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- The engine control module (ECM) attempts to reset itself.

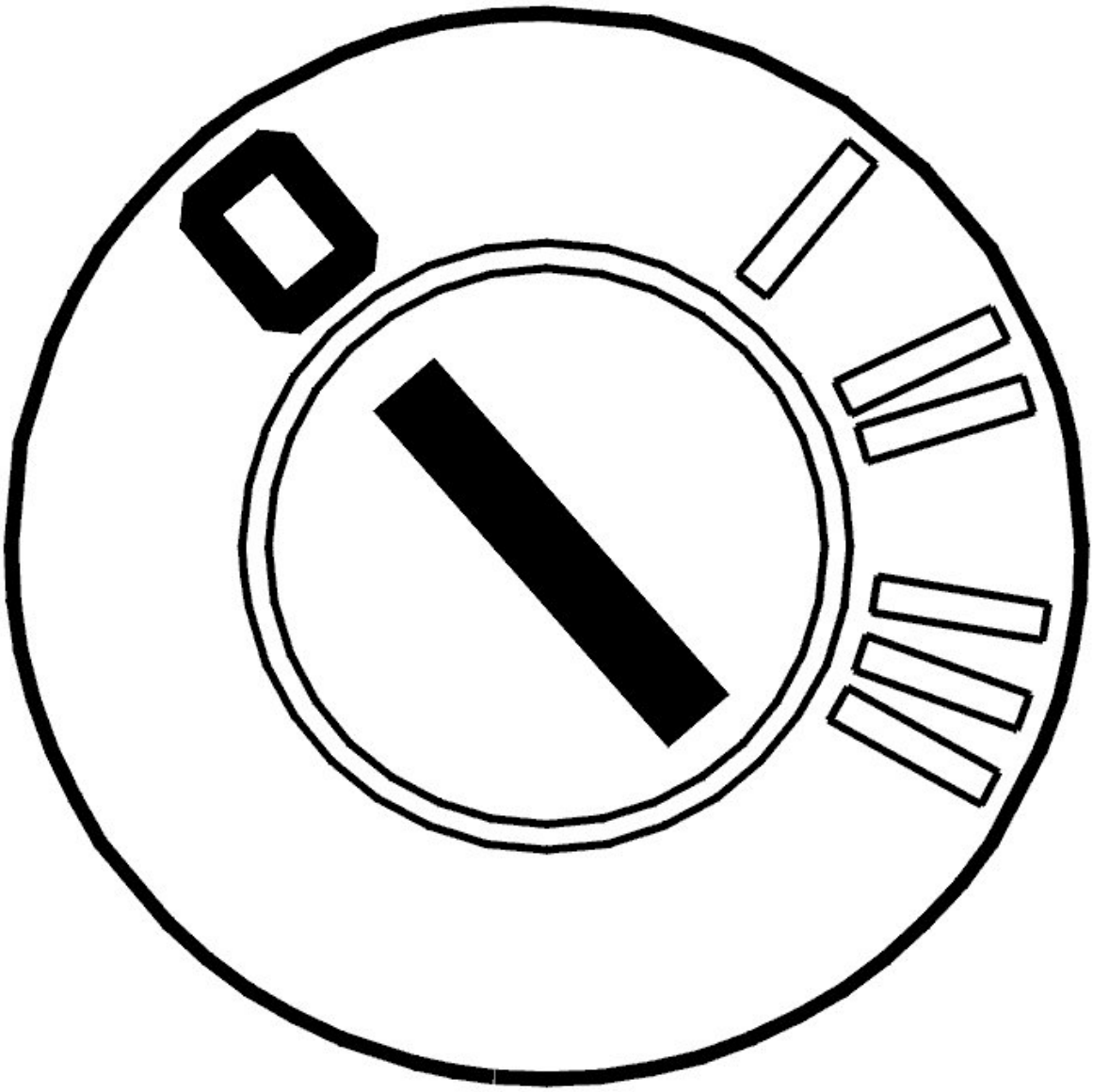
Possible source
- Faulty software in the engine control module (ECM)
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit
- The malfunction indicator lamp (MIL) flashes
- The engine cuts out
- The starter motor turns but the engine does not start.

Faulty Signal

Faulty signal

Programming/replacing the engine control module (ECM)

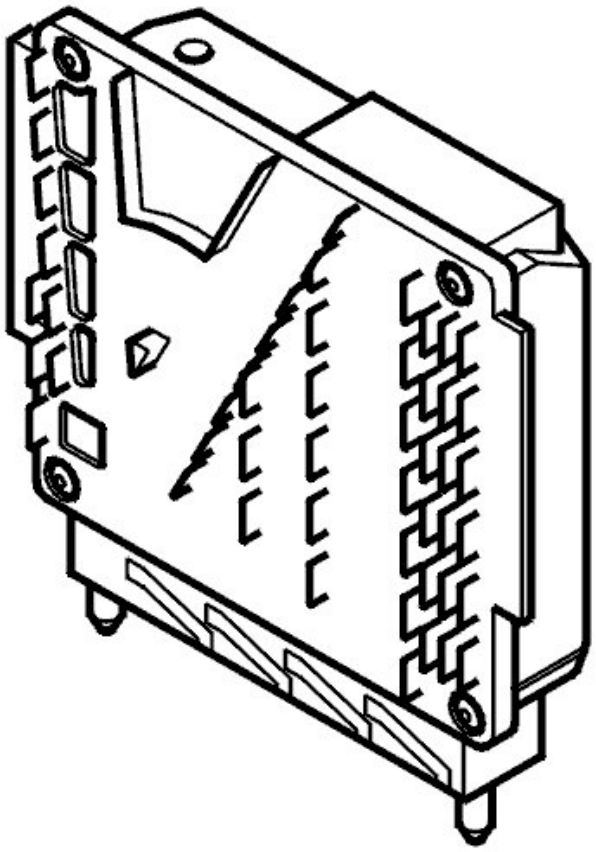


- Ignition off.

The engine control module (ECM) has registered an internal fault or a fault in the software. Try downloading new software into the control module.
To download new software or replace the engine control module (ECM), see:
Engine control module (ECM), replacing See: Engine Control Module/Service and Repair.
If software cannot be downloaded or new software does not solve the problem, replace the engine control module (ECM) and download the relevant software to the new control module.

Note! After downloading new software or replacing the engine control module (ECM), the throttle unit must be adapted according to VIDA Vehicle communication: "Throttle unit adaptation".

Remedy as necessary.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Programming/replacing the engine control module (ECM)

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-A12B

Condition

A fault message is transmitted to the engine control module (ECM) and the diagnostic trouble code (DTC) is stored if a fault is detected in the brake control module (BCM). Diagnostic trouble codes (DTCs) for the vehicle speed sensor (VSS) signal are also stored in the brake control module (BCM).

Substitute value

- The speed signal from the brake control module (BCM) is set at 0 km/h.

Possible source
- Contact resistance in the control area network (CAN) terminals
- Open-circuit in one or both CAN cables
- Short-circuit to ground, voltage or each other in one or both signal cables
- Damaged brake control module (BCM)
- Damaged engine control module (ECM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-A12C

Condition

A fault message is transmitted to the engine control module (ECM) and the diagnostic trouble code (DTC) is stored if a fault is detected in the brake control module (BCM). Diagnostic trouble codes (DTCs) for the vehicle speed sensor (VSS) signal are also stored in the brake control module (BCM).

Substitute value
- The speed signal from the brake control module (BCM) is set at 0 km/h.

Possible source
- Faulty speed signal to the brake control module (BCM).

Fault symptom[s]
- Malfunction indicator lamp (MIL) lit.

Fault-Tracing Information

Fault-tracing information

Information

The diagnostic trouble code (DTC) indicates that the primary fault is in another unit. The fault-tracing is carried out from the primary diagnostic trouble code.
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-A130

Condition

The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the engine control module (ECM). Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The engine control module (ECM) shuts itself off "bus-off".

Hint: The engine control module (ECM) will then be shut off until the supply voltage is interrupted (15-, 30-, X supply). When the power supply is switched on, the engine control module (ECM) will make a new attempt to communicate.

Possible source
- Contact resistance or oxidation in the terminals
- Open-circuit in the control area network (CAN) wiring
- Short-circuit between the control area network (CAN) wiring
- Internal fault in the engine control module (ECM)
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- General warning lamp lit
- The cruise control does not function at all
- The engine judders under acceleration
- The engine judders heavily after engine braking
- Uneven idle.

Faulty Communication

Faulty communication

General information

In order to check the control area network (CAN) cables, the resistance in the network must be measured. The resistance between the two controller area network (CAN) wiring, with the network connected 60 ohms. The resistance can differ depending on the configuration of the car. Permitted values are 55-65 ohms. This applies to both the high speed side network and the low speed side network.

Hint: Use the applicable wiring diagram to provide support when taking readings. Take a copy of the data communication side for each model. Note which diagnostic trouble codes (DTCs) are stored in each control module. This facilitates fault-tracing considerably.

Check if the diagnostic trouble codes (DTCs) for failed communication are stored in the central electronic module (CEM). If this is the case, first fault-trace according to these diagnostic trouble codes (DTCs).

Other information
- For general information about fault-tracing the control area network (CAN), see

Continue - Checking the resistance of the control area network (CAN) cables

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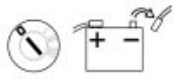
Checking the resistance of the control area network (CAN) cables



- Disconnect the battery negative lead. The power to the network must be cut when taking resistance readings. The reading may otherwise be incorrect.

Note! Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Connect the adapter wiring to the central electronic module (CEM).

Hint: Where a breakout box cannot be used, take readings from the rear of the affected connectors if possible. This prevents terminal pins and socket housings being damaged.

When taking readings on the low speed network
- When taking readings on the low speed network, the adapter wiring should be connected to the central electronic module (CEM) and the readings taken from there. The readings can also be taken in the connector for the power seat module (PSM). The advantage of using the adapter wiring connected to the central electronic module (CEM) is that all control modules can be connected to the network when taking readings and there is access to both the high speed and the low speed networks.

This resistance reading only measures main arteries in the low speed network, not the junctions for the road traffic information module (RTI), accessory electronic module (AEM), power seat module (PSM), phone module (PHM), audio module (AUM), driver's door module (DDM) and passenger door module (PDM). See the applicable wiring diagram, Data communication.

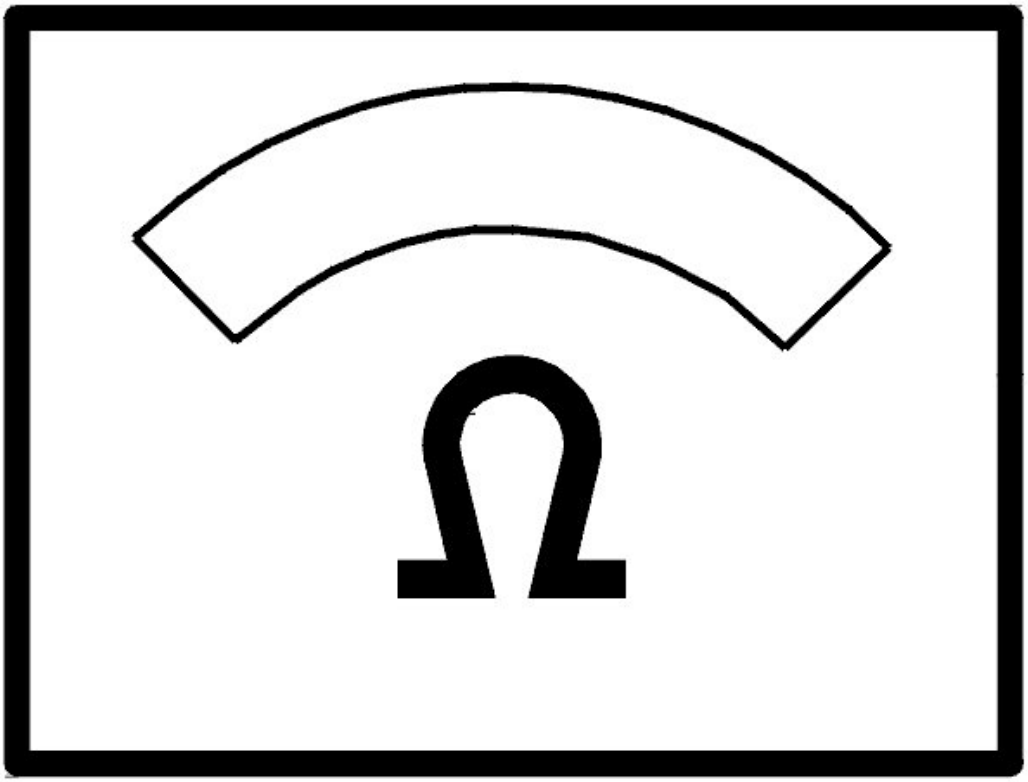
When taking readings on the high speed network

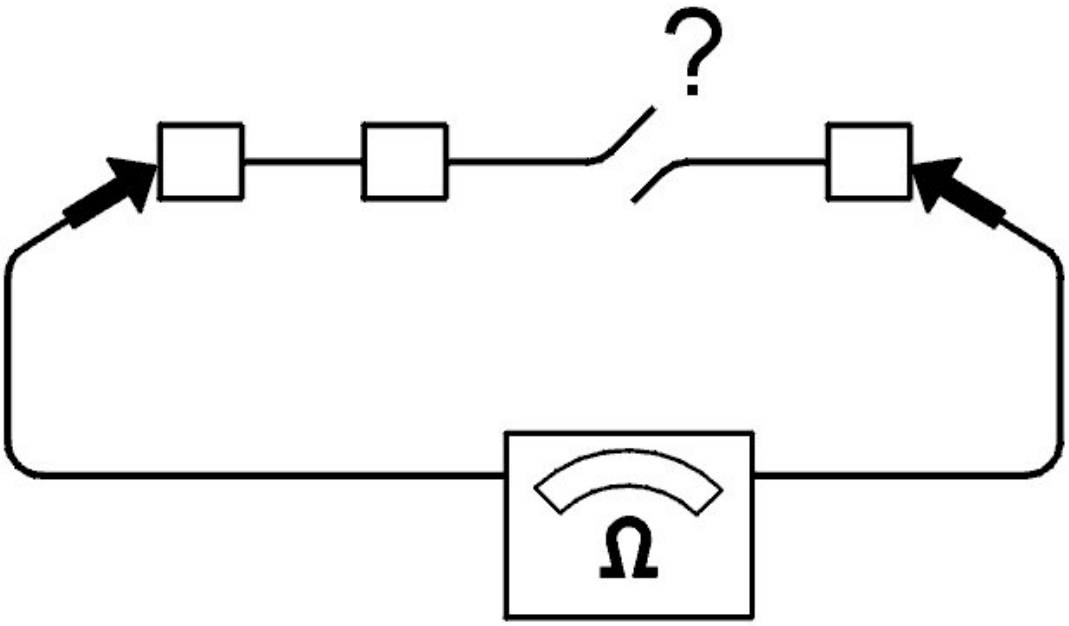
- When taking readings on the high speed network, the readings should be taken at the engine control module (ECM) using adapter wiring. The engine control module (ECM) must be connected. This resistance reading only takes readings from the main arteries in the high speed network. See the applicable wiring diagram, Data communication.

Connect the ohmmeter to the terminals for CAN-L and CAN-H on the relevant network. Work the connectors and twist the cable harness. The resistance must be approximately 60 ohms. Permitted values are 55-65 ohms.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Is the value OK?

Yes - Checking a short-circuit in CAN cables

No - Identifying fault causes in the CAN network

Checking a short-circuit in CAN cables

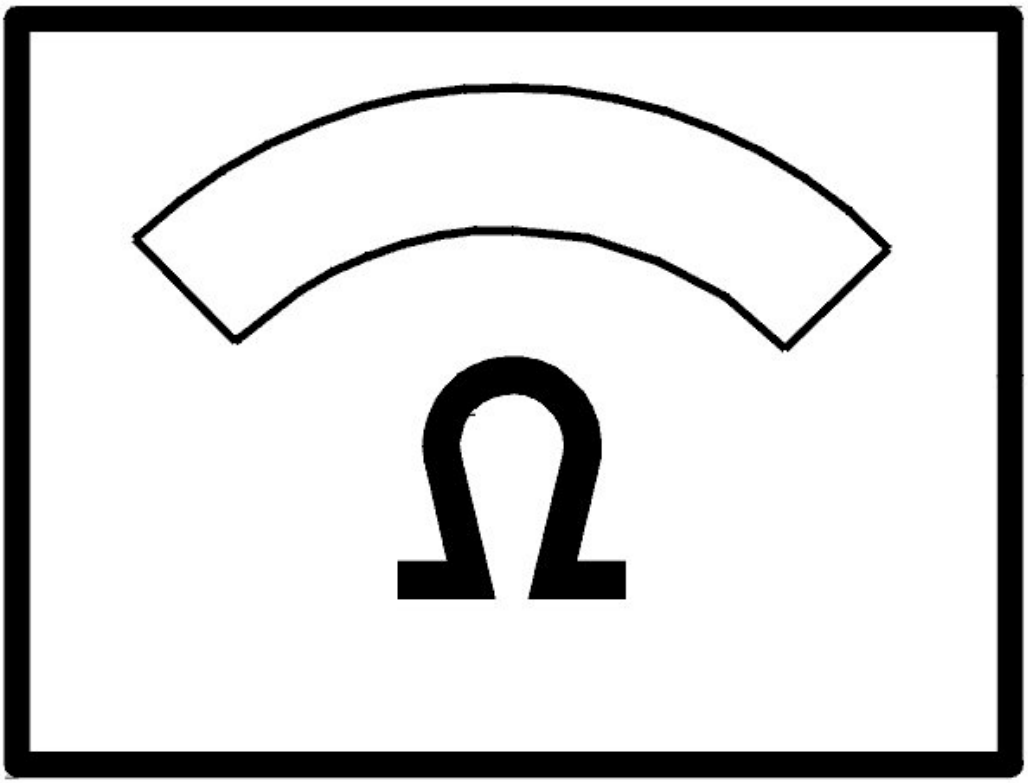
Connect an ohmmeter between the relevant CAN cable (CAN-L and CAN-H) and the power supply, and between the CAN cable and ground. Twist the connectors and turn the cable harness to different positions at each reading to determine any intermittent short-circuits.

Take the following readings:

- The resistance between CAN-L and ground
- The resistance between CAN-L and voltage
- The resistance between CAN-H and ground
- The resistance between CAN-H and voltage.

The resistance must be infinite or very high in all cases (greater than 1 M Ohms).

Hint: The reading can be taken from the same connector if the CAN cables, power supply and ground are exposed. If possible, take readings on the rear of the connector to prevent damage to the terminals in the connector. If this is not possible, use the adapter wiring or loose terminal pins to obtain a good contact.

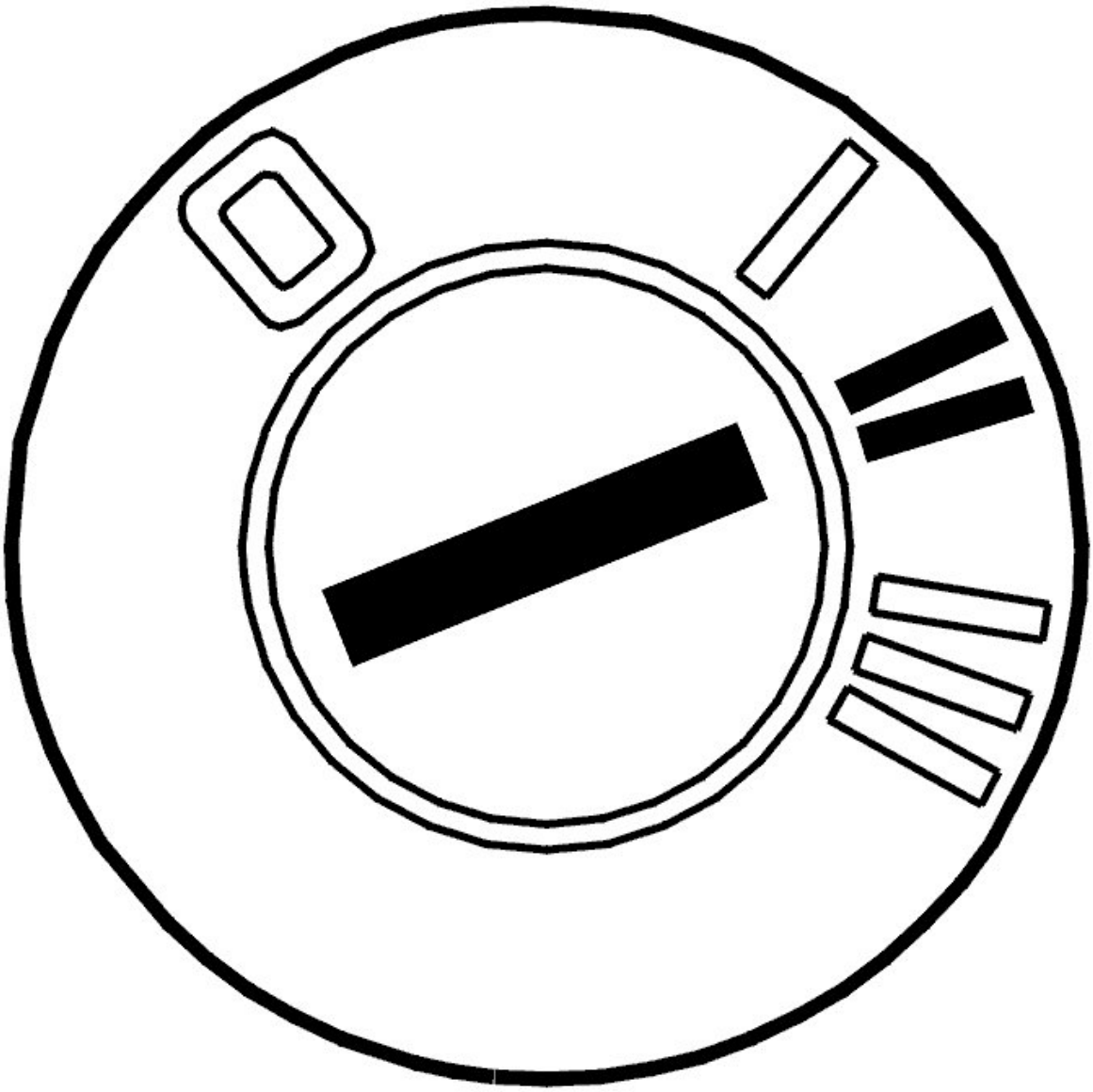


Was a fault detected?

Yes - Identifying fault causes in the CAN network

No - Checking the traffic load on the CAN cables

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on

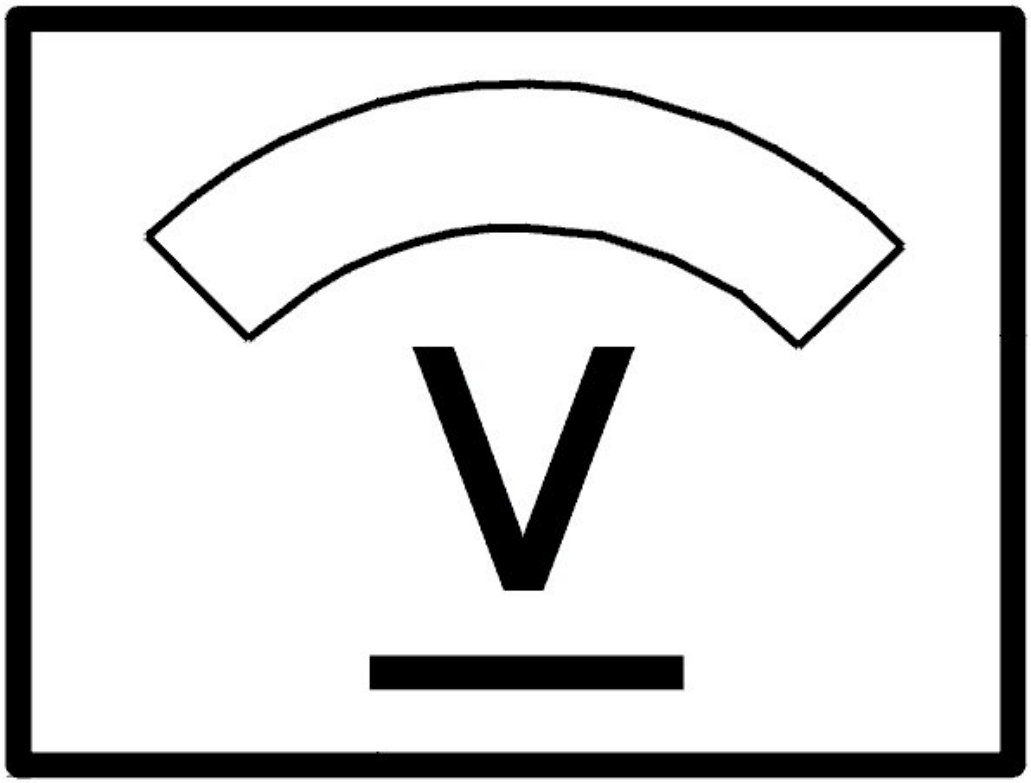
Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

Faults in the CAN network may be due to a control module sending faulty messages that disrupt "normal" communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.

Connect a voltmeter between CAN-L and ground. The voltage must be approximately 2.3 V.

Then connect a voltmeter between CAN-H and ground. The voltage must be approximately 2.8 V.

Hint: If possible measure from the rear of the affected connectors so that they are not damaged.



Is the value OK?

Yes - Fault-tracing without result

No - Identifying a control module in the CAN network

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

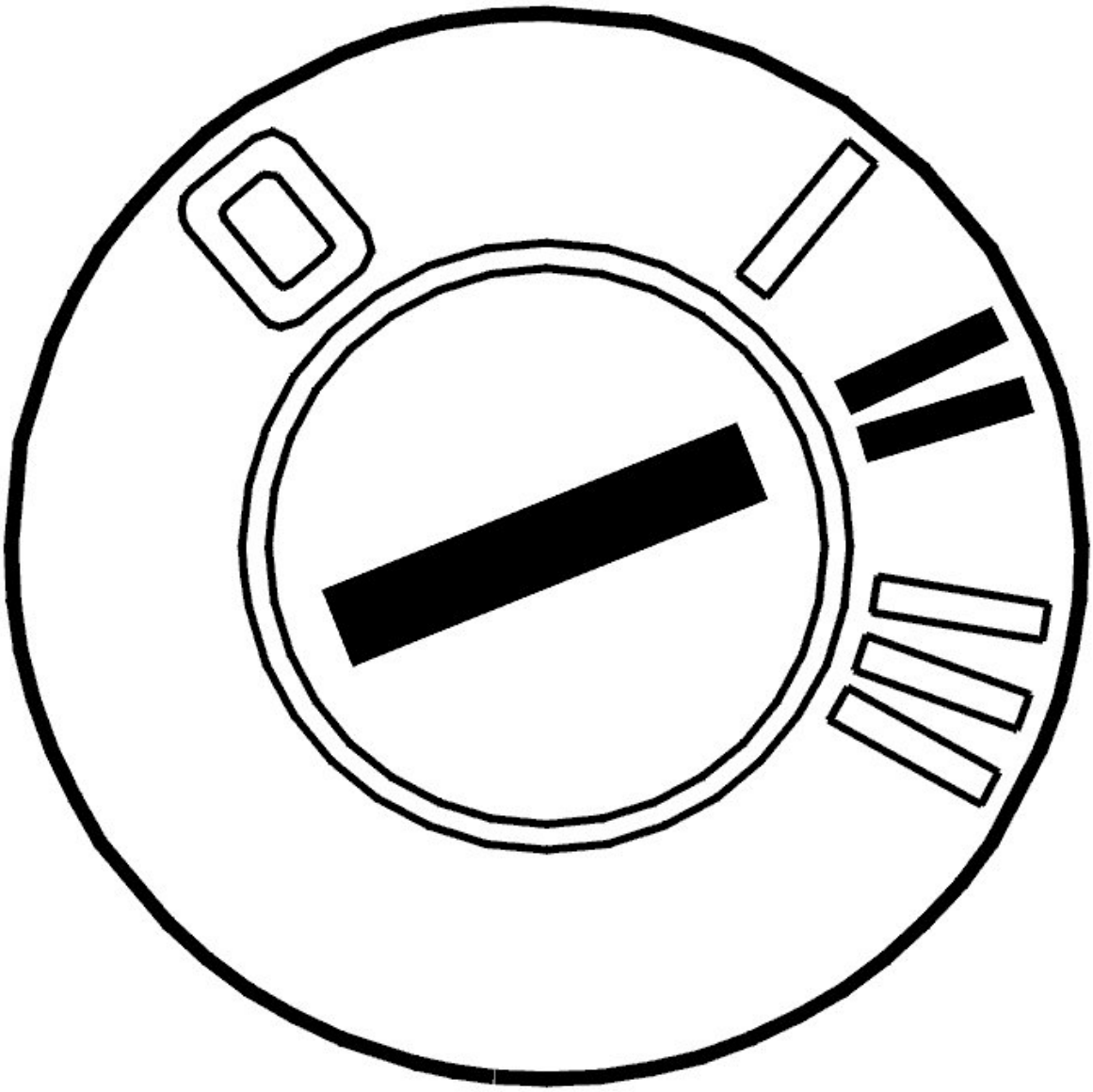
In the event of a short-circuit between one of the CAN cables and voltage or ground, the fault can be located by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located. Connect an ohmmeter between the CAN cable and supply voltage or ground. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be infinite or very high (greater than 1Mohms).
If a fault can be localized in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.

Hint: A short-circuit between the CAN cables and supply voltage or ground may be in either the wiring or in a control module.

Rectify the wiring as necessary. Replace the control module if the fault has been localized to a control module.

Continue - Verification

Identifying a control module in the CAN network



- Connect the battery

Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Ignition on

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network. Connect a voltmeter between the CAN cables. If the communication on the network is correct, the average voltage value should be approximately 0.5 V (0.4 V to 0.6 V). If there is a fault in the communication, the voltage reading will be approximately 0.7 V or higher.
In order to identify from which control module the faulty communication is being transmitted, cut the supply voltage to one control module at a time and check the voltage in the CAN cables again. The easiest way to cut the supply voltage is to remove a fuse. Repeat until the voltage between the CAN cables drops to approximately 0.5 V.

Hint: When the probable faulty control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the fault appears and disappears.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

The control module that is communicating incorrectly must be replaced. Remedy as necessary.

Note! Following a fault involving "disruptive" control modules, other modules may remain in "Limp-Home mode" even after switching the ignition off and on a number of times. To remedy this, disconnect and reconnect the battery negative terminal to restore the control modules to normal function.

Continue - Verification

Fault-tracing without result

Information

Fault-tracing information

Verification shows that the fault is no longer present. The diagnostic trouble code (DTC) was probably caused by an intermittent fault.
Fault-tracing for this diagnostic trouble code (DTC) is not followed by a verification.
You can view the information again or exit fault-tracing for this diagnostic trouble code (DTC).

Do you want to view information again?

Yes - Attempt New Test

No - No Fault Found

Attempt New Test - Checking the resistance of the control area network (CAN) cables

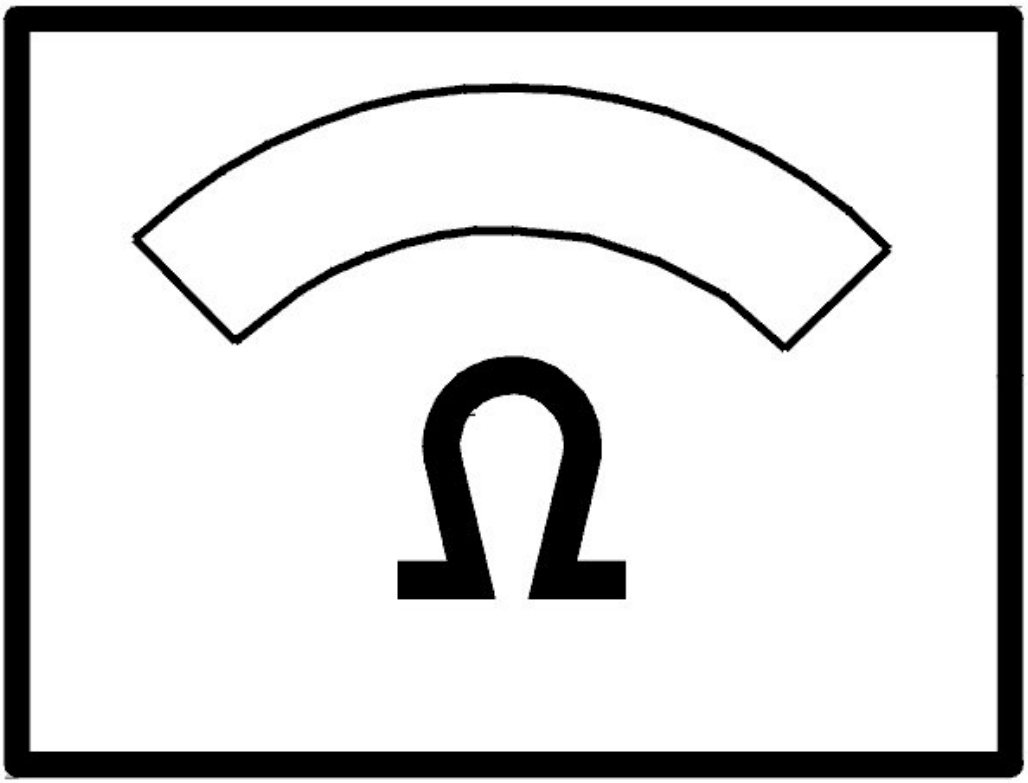
No Fault Found - No Fault Found

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

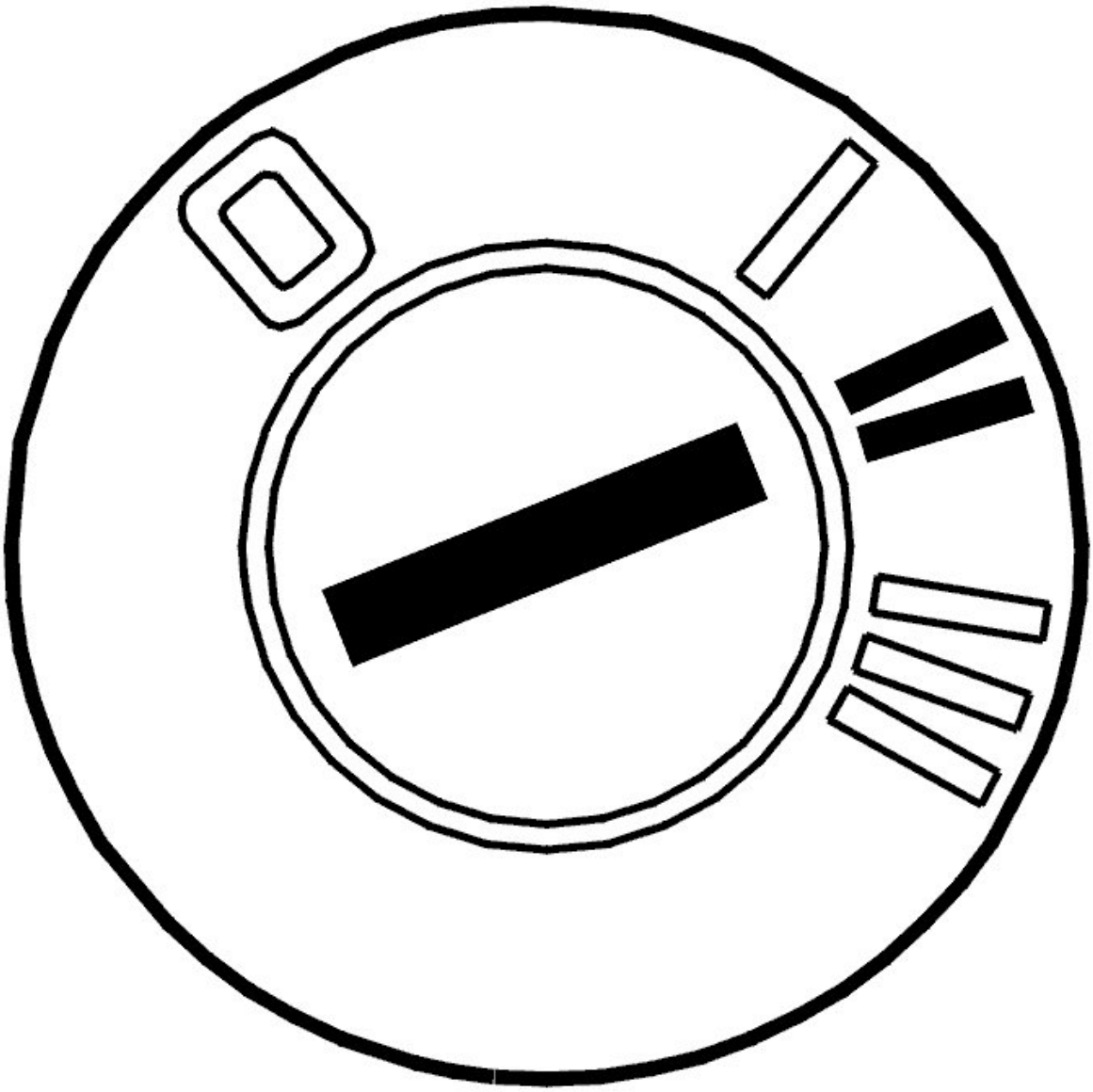
In the event of an open-circuit or a short-circuit between the CAN cables, the fault can be localized by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located.
Connect an ohmmeter between the CAN cables. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be 120 ohm.
If a fault can be localized in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.
Remedy the cables as necessary.



Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components, etc.
- Ignition on
- Erase diagnostic trouble codes by clicking the VCT2000 symbol
- Start the car. Allow the car to run for 10 minutes.
- Read off diagnostic trouble codes (DTCs).

Check if a diagnostic trouble codes (DTCs) for communication fault recurs in the central electronic module (CEM).

Does the diagnostic trouble code (DTC) recur?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the resistance of the control area network (CAN) cables

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-E000

Condition

The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the engine control module (ECM) registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the engine control module (ECM). Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The engine control module (ECM) shuts itself off "bus-off".

Hint: The engine control module (ECM) will then be shut off until the supply voltage is interrupted (15-, 30-, X supply). When the power supply is switched on, the engine control module (ECM) will make a new attempt to communicate.

Possible source
- Contact resistance or oxidation in the terminals
- Open-circuit in the control area network (CAN) wiring
- Short-circuit between the control area network (CAN) wiring
- Internal fault in the engine control module (ECM)
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- General warning lamp lit
- The cruise control does not function at all
- The engine judders under acceleration
- The engine judders heavily after engine braking
- Uneven idle.

General Information

General Information

HINT: For general information about fault-tracing the control area network (CAN), see the linked document below.

NOTE: When selecting the vehicle profile, the correct vehicle must be identified. Use the "Retrieve VIN" button. The fault-tracing may fail if this is not done.

In order to check the control area network (CAN) cables, the resistance in the network must be measured. When the network is connected, the resistance between the two CAN cables must be **60 ohms** in the high speed network. Generally the permitted values **55-65 ohms**.

NOTE: Resistance will only be **60 ohms** if the main artery of the CAN network is whole and the network is connected. If the main artery of the CAN network is split somewhere and a reading is taken between the CAN cables, resistance will be **120 ohms**.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.

Intermittent fault in the voltage supply to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

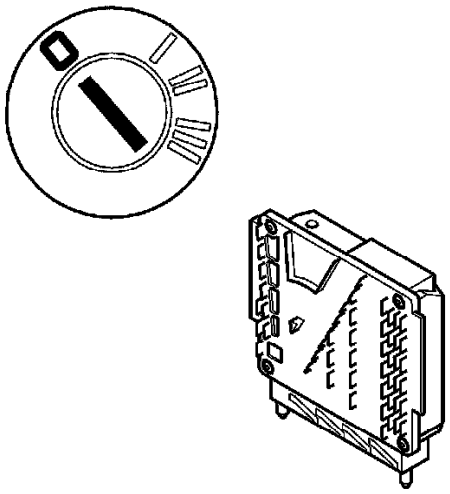
CAUTION: During this fault-tracing use the wiring diagram to provide support when taking readings.

Other Information
- **General information about fault-tracing in the CAN network**

Continue: Refer to Taking Reading on Cables In the CAN Network (HS-CAN). See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Taking Reading on Cables In the CAN Network (HS-CAN)

Taking Reading on Cables In the CAN Network (HS-CAN)

Taking Reading On Cables In The CAN Network (HS-CAN)



- Ignition off
- Disconnect the battery negative lead
- Connect the breakout box to the engine control module (ECM).

HINT: Use the Wiring diagrams to provide support when taking readings.

Take resistance readings across the following terminals. Various readings must be taken due to the structure of the network. Twist the cable harness and work the connectors at accessible points along the cable harness in order to check whether the resistance changes during each measurement. This method can be used to detect intermittent short-circuits or open-circuits.

NOTE: The following resistance readings only measure the main arteries in the high speed network, not the junctions that exist for some control modules. See the Wiring diagrams for the relevant car model. An open-circuit in one artery cannot be detected by this reading. However a short-circuit in an artery can be detected.

Measure the resistance between control module terminals #B1(#1) and #B13 (#13). The resistance must be approximately **60 ohms**. The permitted values are **55-65 ohms**.

HINT: Resistance will only be **60 ohms** if the main artery of the CAN network is whole and the network is connected. If the main artery of the CAN network is split somewhere and a reading is taken between the CAN cables, resistance will be **120 ohms**.

Also measure the resistance between each terminal and supply voltage and ground. The resistance must be infinite or very high (higher than **1 M ohm**).

HINT: If a fault is found, try to disconnect the junction with the fault at a point further forward. Disconnect any connector/control module immediately before the measurement point and take the reading again. Try to locate the fault in this way.

Remedy the cables as necessary.

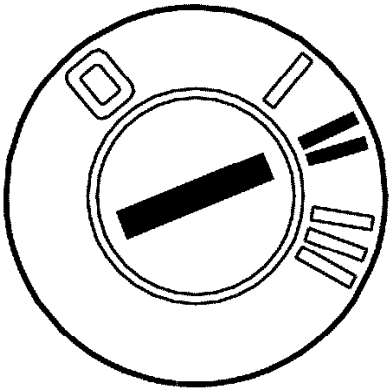
Other Information
- **Battery, disconnecting**
- See Checking Wiring and Terminals under Related Tests, Information and Procedures

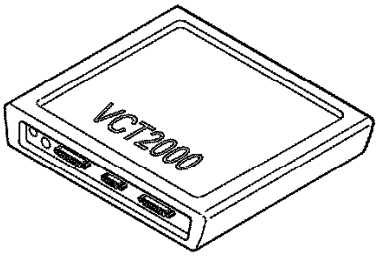
Was a fault detected?

YES: Refer to Reading Off DTCs From All Systems Before Erasing. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Reading Off DTCs From All Systems Before Erasing
NO: Refer to Checking the Traffic Load on the CAN Cables. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Checking the Traffic Load on the CAN Cables

Reading Off DTCs From All Systems Before Erasing

Reading Off Diagnostic Trouble Codes (DTCs) From All Systems Before Erasing





CAUTION: This function erases all diagnostic trouble codes (DTCs) in all the systems in the car. The procedure begins with the reading off and display of diagnostic trouble codes (DTCs). The diagnostic trouble codes (DTCs) can then be erased.

NOTE: When erasing diagnostic trouble codes (DTCs) in all systems, alarm causes are also erased.

- Check that the transmission and engine type have been selected
- Ignition on.

NOTE: The engine must not be running.

Click on the VCT2000 symbol to read off the diagnostic trouble codes (DTCs).

After the read off, it will be possible to access the function for erasing diagnostic trouble codes (DTCs).

HINT: The read off may take up to **1 minute**.

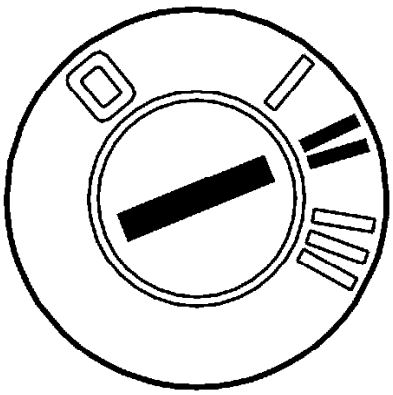
NOTE: Always fault-trace any stored diagnostic trouble codes (DTCs) via the VIDA symptom input before diagnostic trouble codes (DTCs) are erased.

Select "Continue" from the tool on the left to continue erasing diagnostic trouble codes (DTCs).

To cancel the function, select Cancel in the tool on the left.

Checking the Traffic Load on the CAN Cables

Checking The Traffic Load On The CAN Cables



- Connect the battery
- Ignition on.

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent

incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.

For further information, see the wiring diagram.

Check as follows:
- Connect a voltmeter between CAN-L and ground. The voltage should be approx: **1,8-2,2V**
- Connect a voltmeter between CAN-H and ground. The voltage should be approx: **2,8-3,2V**

Other Information
- **Battery, disconnecting**

Is the value OK?

YES: Refer to Fault-Tracing Information. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Fault-Tracing Information
NO: Refer to Identifying A Control Module In the CAN Network. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Identifying A Control Module In the CAN Network

Fault-Tracing Information

Fault-tracing Information
Verification shows that the fault is no longer present. The diagnostic trouble code (DTC) was probably caused by an intermittent fault.

Fault-tracing for this diagnostic trouble code (DTC) is not followed by a verification.

You can view the information again or exit fault-tracing for this diagnostic trouble code (DTC).

Do you want to view information again?

YES: Refer to General Information. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/General Information
NO: Refer to Diagnostic Trouble Code Descriptions. See: Diagnostic Trouble Code Descriptions

Identifying A Control Module In the CAN Network

Identifying A Control Module In The CAN Network
If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

NOTE: It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

Check communication/load on CAN-net by measuring voltage between #B1 (#1) and # B13 (#13). The average value of the voltage must be approximately **0.6-1.4 V**. In the event of a communication fault the voltage is significantly higher than the above specified values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

NOTE: When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

HINT: When the suspected control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the fault appears and disappears. Switch off the ignition between each check.

NOTE: Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

NOTE: Following a fault involving control modules that disrupt communication, other control modules may remain in Limp-Home mode (i.e. they work but with limited functionality) even after switching the ignition off and on a number of times. To remedy this, disconnect and reconnect the battery negative terminal to restore the control modules to normal function.

Continue: Refer to Reading Off DTCs From All Systems Before Erasing. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Reading Off DTCs From All Systems Before Erasing

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information ECM-E003

Condition

The engine control module (ECM) compares its configuration ID with the signal configuration transmitted by the central electronic module (CEM) on the control area network (CAN). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the engine control module (ECM) and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the engine control module (ECM). Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the engine control module (ECM) responds to the diagnostic commands. However normal control area network (CAN) communication "Expulsion mode" does not work.

Substitute value
- None.

Possible source
- Incorrect CAN configuration ID (present engine control module (ECM) is not intended for the vehicle, for example a used control module with other software/hardware)
- Open-circuit in the control area network (CAN) wiring between the engine control module (ECM) and the central electrical module (CEM).

Fault symptom[s]
- General warning lamp lit
- The cruise control does not function at all
- The engine judders under acceleration
- The engine judders heavily after engine braking
- Uneven idle.

General Information

General Information

HINT: For general information about fault-tracing the control area network (CAN), see the linked document below.

NOTE: When selecting the vehicle profile, the correct vehicle must be identified. Use the "Retrieve VIN" button. The fault-tracing may fail if this is not done.

In order to check the control area network (CAN) cables, the resistance in the network must be measured. When the network is connected, the resistance between the two CAN cables must be **60 ohms** in the high speed network. Generally the permitted values **55-65 ohms**.

NOTE: Resistance will only be **60 ohms** if the main artery of the CAN network is whole and the network is connected. If the main artery of the CAN network is split somewhere and a reading is taken between the CAN cables, resistance will be **120 ohms**.

If diagnostic trouble codes (DTCs) for communication faults can be read off from a control module, the fault is probably intermittent.

Intermittent fault in the voltage supply to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

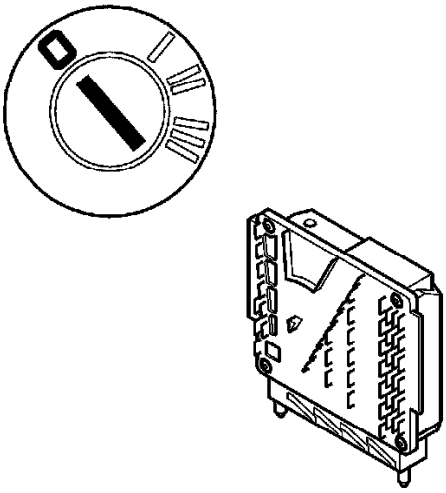
CAUTION: During this fault-tracing use the wiring diagram to provide support when taking readings.

Other Information
- **General information about fault-tracing in the CAN network**

Continue: Refer to Taking Reading on Cables In the Can Network (HS-CAN). See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E003/Signal Missing/Taking Reading on Cables In the CAN Network (HS-CAN)

Taking Reading on Cables In the CAN Network (HS-CAN)

Taking Reading On Cables In The CAN Network (HS-CAN)



- Ignition off
- Disconnect the battery negative lead
- Connect the breakout box to the engine control module (ECM).

HINT: Use the Wiring diagrams to provide support when taking readings.

Take resistance readings across the following terminals. Various readings must be taken due to the structure of the network. Twist the cable harness and work the connectors at accessible points along the cable harness in order to check whether the resistance changes during each measurement. This method can be used to detect intermittent short-circuits or open-circuits.

NOTE: The following resistance readings only measure the main arteries in the high speed network, not the junctions that exist for some control modules. See the Wiring diagrams for the relevant car model. An open-circuit in one artery cannot be detected by this reading. However a short-circuit in an artery can be detected.

Measure the resistance between control module terminals #B1(#1) and #B13 (#13). The resistance must be approximately **60 ohms**. The permitted values are **55-65 ohms**.

HINT: Resistance will only be **60 ohms** if the main artery of the CAN network is whole and the network is connected. If the main artery of the CAN network is split somewhere and a reading is taken between the CAN cables, resistance will be **120 ohms**.

Also measure the resistance between each terminal and supply voltage and ground. The resistance must be infinite or very high (higher than **1 MOhm**).

HINT: If a fault is found, try to disconnect the junction with the fault at a point further forward. Disconnect any connector/control module immediately before the measurement point and take the reading again. Try to locate the fault in this way.

Remedy the cables as necessary.

Other Information

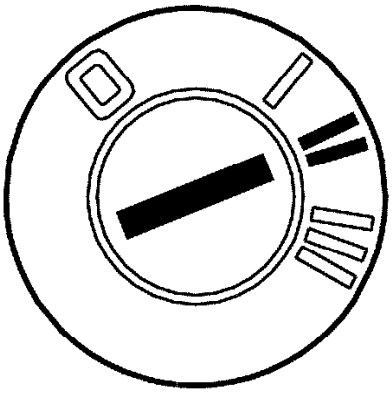
- **Battery, disconnecting**
- See Checking Wiring and Terminals under Related Tests, Information and Procedures

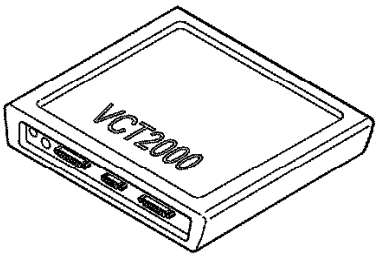
Was a fault detected?

YES: Refer to Reading Off DTCs From All Systems Before Erasing. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E003/Signal Missing/Reading Off DTCs From All Systems Before Erasing
NO: Refer to Checking the Traffic Load on the CAN Cables. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E003/Signal Missing/Checking the Traffic Load on the CAN Cables

Reading Off DTCs From All Systems Before Erasing

Reading Off Diagnostic Trouble Codes (DTCs) From All Systems Before Erasing





CAUTION: This function erases all diagnostic trouble codes (DTCs) in all the systems in the car. The procedure begins with the reading off and display of diagnostic trouble codes (DTCs). The diagnostic trouble codes (DTCs) can then be erased.

NOTE: When erasing diagnostic trouble codes (DTCs) in all systems, alarm causes are also erased.

- Check that the transmission and engine type have been selected
- Ignition on.

NOTE: The engine must not be running.

Click on the VCT2000 symbol to read off the diagnostic trouble codes (DTCs).

After the read off, it will be possible to access the function for erasing diagnostic trouble codes (DTCs).

HINT: The read off may take up to **1 minute**.

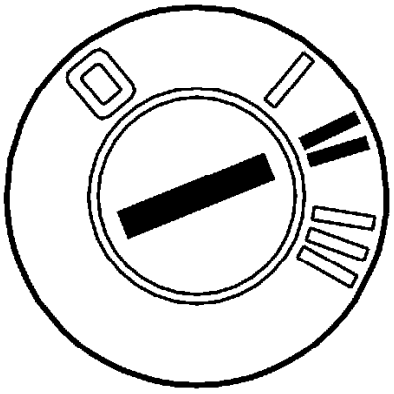
NOTE: Always fault-trace any stored diagnostic trouble codes (DTCs) via the VIDA symptom input before diagnostic trouble codes (DTCs) are erased.

Select "Continue" from the tool on the left to continue erasing diagnostic trouble codes (DTCs).

To cancel the function, select Cancel in the tool on the left.

Checking the Traffic Load on the CAN Cables

Checking The Traffic Load On The CAN Cables



- Connect the battery
- Ignition on.

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.

For further information, see the wiring diagram.

Check as follows:
- Connect a voltmeter between CAN-L and ground. The voltage should be approx: **1,8-2,2V**
- Connect a voltmeter between CAN-H and ground. The voltage should be approx: **2,8-3,2V**

Other Information
- **Battery, disconnecting**

Is the value OK?

YES: Refer to Fault-Tracing Information. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Fault-Tracing Information
NO: Refer to Identifying A Control Module In the CAN Network. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Identifying A Control Module In the CAN Network

Fault-Tracing Information

Fault-tracing Information
Verification shows that the fault is no longer present. The diagnostic trouble code (DTC) was probably caused by an intermittent fault.

Fault-tracing for this diagnostic trouble code (DTC) is not followed by a verification.

You can view the information again or exit fault-tracing for this diagnostic trouble code (DTC).

Do you want to view information again?

YES: Refer to General Information. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/General Information
NO: Refer to Diagnostic Trouble Code Descriptions. See: Diagnostic Trouble Code Descriptions

Identifying A Control Module In the CAN Network

Identifying A Control Module In The CAN Network
If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

NOTE: It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

Check communication/load on CAN-net by measuring voltage between #B1 (#1) and # B13 (#13). The average value of the voltage must be approximately **0.6-1.4 V**. In the event of a communication fault the voltage is significantly higher than the above specified values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

NOTE: When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

HINT: When the suspected control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the fault appears and disappears. Switch off the ignition between each check.

NOTE: Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

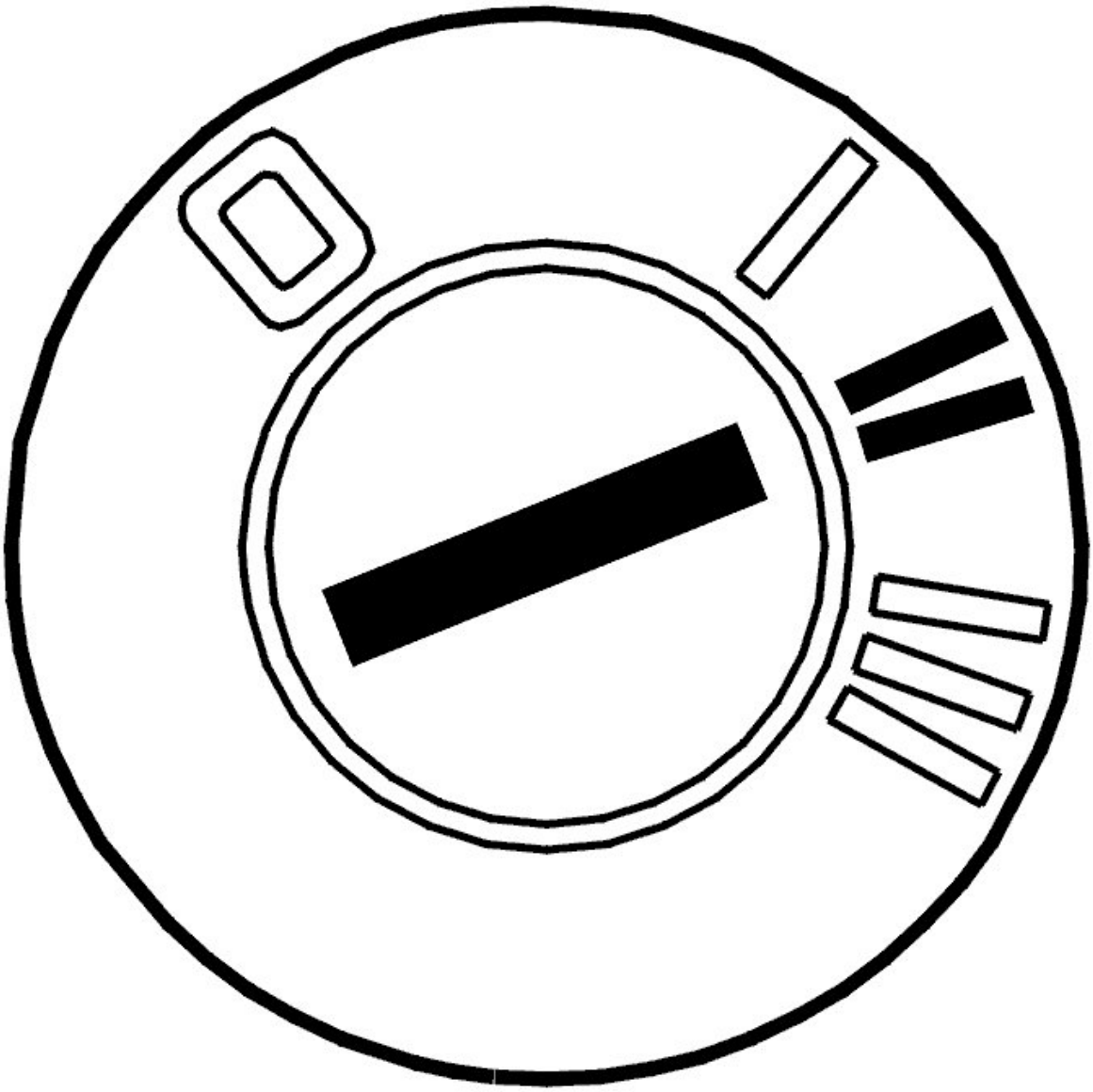
NOTE: Following a fault involving control modules that disrupt communication, other control modules may remain in Limp-Home mode (i.e. they work but with limited functionality) even after switching the ignition off and on a number of times. To remedy this, disconnect and reconnect the battery negative terminal to restore the control modules to normal function.

Continue: Refer to Reading Off DTCs From All Systems Before Erasing. See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/ECM Codes (Engine Control Module)/ECM-E000/Signal Missing/Reading Off DTCs From All Systems Before Erasing

ECM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

PDM-E001

Diagnostic trouble code (DTC) information PDM-E001

Condition

The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

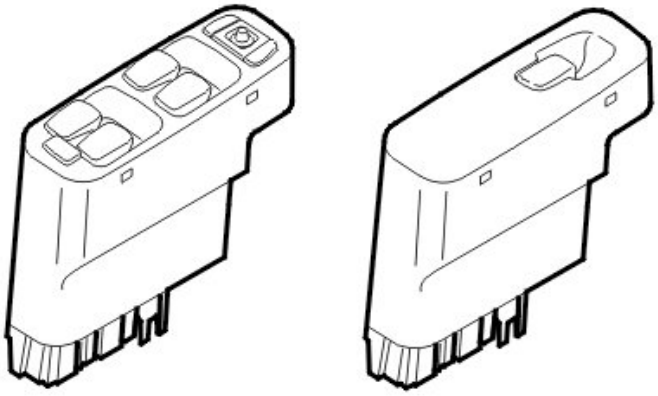
Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- The switch panel for the driver's door does not work
- Automatic window closure does not function
- Cannot be controlled with the remote control.

PDM-E003

Diagnostic trouble code (DTC) information PDM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The switch panel for the passenger door does not work
- Automatic window closure does not function
- Cannot be controlled with the remote control.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the passenger door module (PDM) registers that the central locking button is depressed for more than 60 seconds, error code PDM-001D is set.

Substitute value
- Nothing.

Possible source
- Button depressed for more than 60 seconds.
- Defective central locking button.

Fault symptom[s]
- Cannot be operated from central-locking switch.

Signal Faulty

Signal faulty

Trouble-shooting information

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PDM-003A is stored if the control module registers that there is a short-circuit to ground in the signal supply to the mirror lamp, connected to the passenger door module, at the same time as the control module has requested the door mirror lamp to light.

Substitute value
- None.

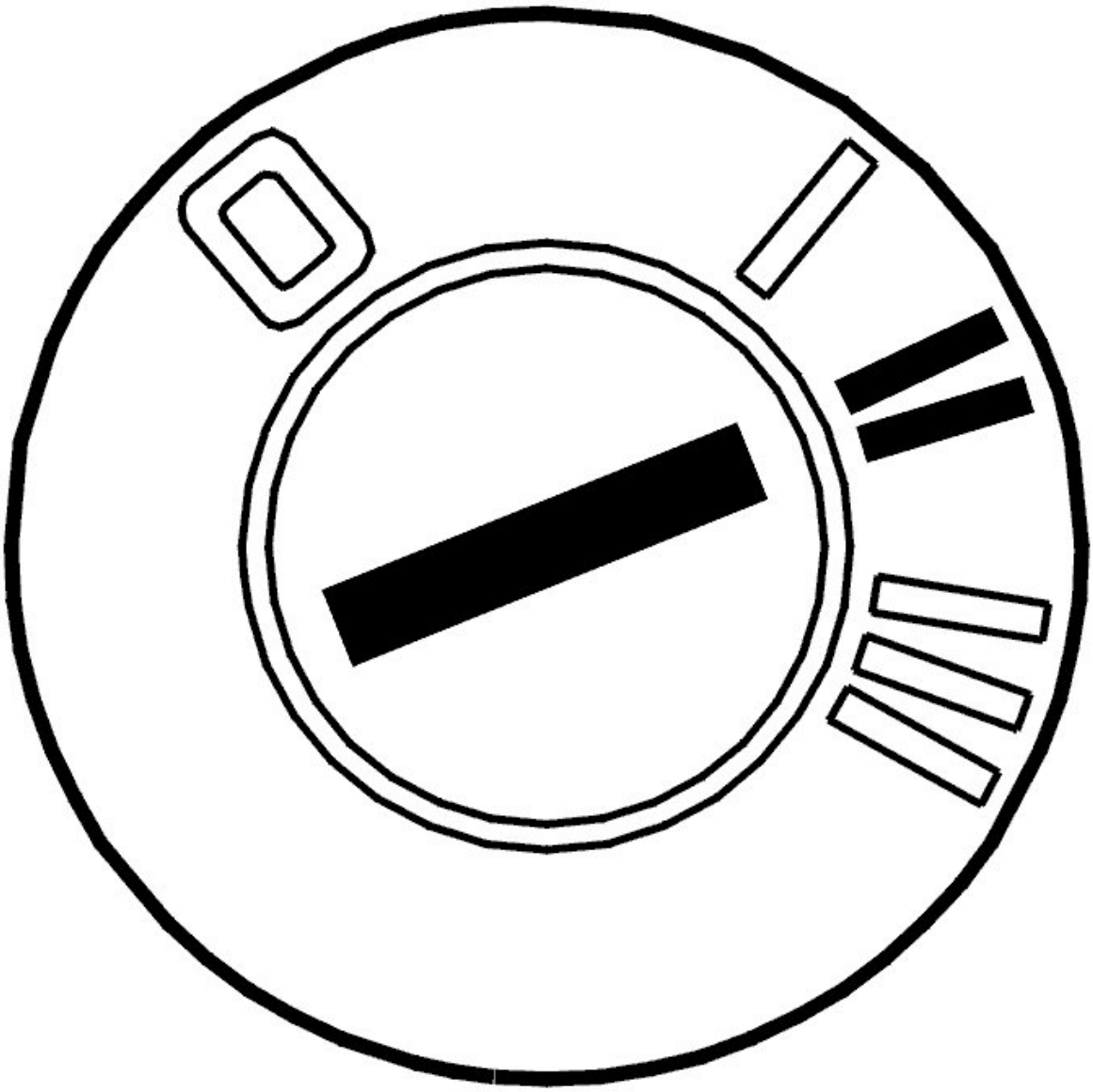
Possible source
- Signal cable to the door mirror lamp, connected to passenger door module, short circuited to ground.

Fault symptom[s]
- Local lighting is not operating.

Signal Too Low

Signal too low

Checking faults



- Ignition on.

Check if the lamp in the power door mirror lights up and goes out.

Is the lamp in the power door mirror working?

Yes - Intermittent fault

No - Checking for a short-circuit

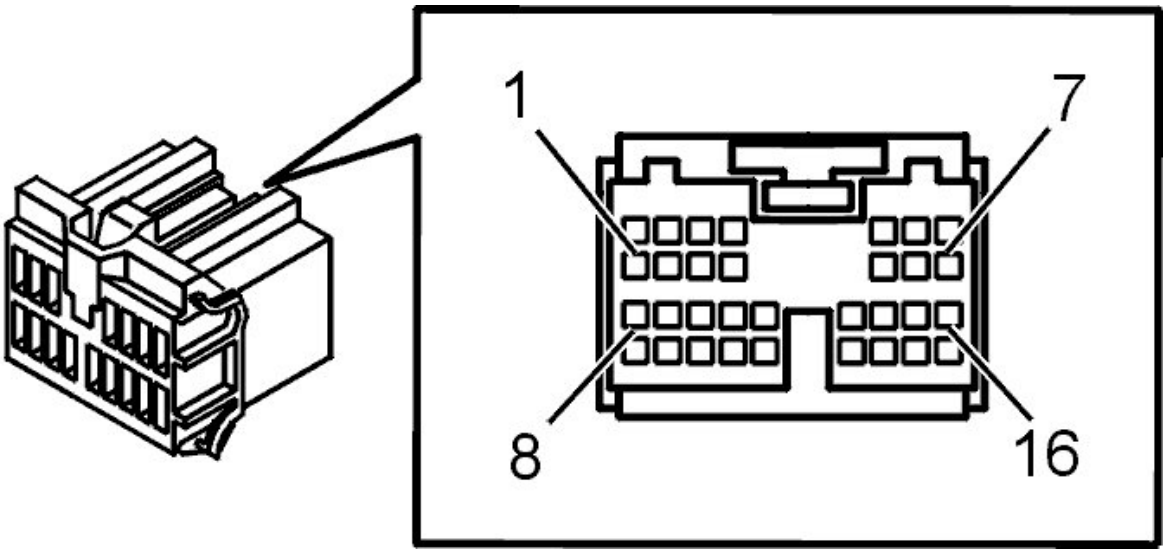
Checking for a short-circuit

Check the cable between control module terminal #8B and power door mirror terminal #13. Check for a short-circuit to ground.
Check the ground lead between the control module terminal #10B and the power door mirror terminal #6.
Replace the cable if a fault is found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Were any faults found in the cable?

Yes - Verification

No - Replacing the component

Replacing the component

Check the bulb holder. Check for a short-circuit.
Remedy as necessary.
If no malfunction is found: Replace the bulb.

Other information

- Bulb, ground lighting, door mirror, replacing See: Lighting and Horns/Courtesy Lamp/Courtesy Lamp Bulb/Service and Repair/Bulb, Ground Lighting, Door Mirror, Replacing

Select Continue.

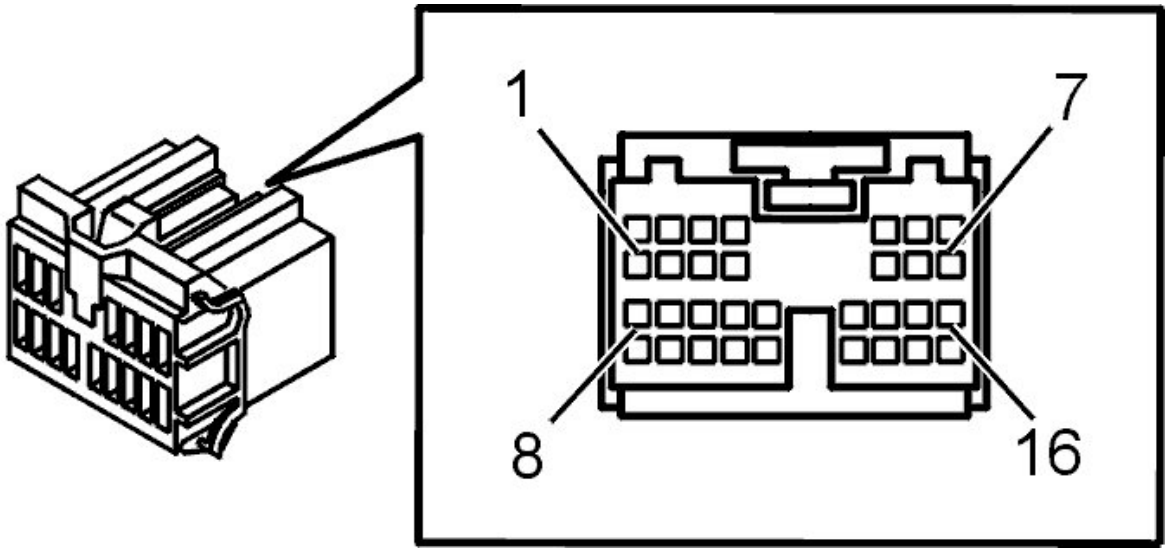
Continue - Verification

Intermittent fault

Check the control module and power door mirror connectors. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between control module terminal #8B and power door mirror terminal #13. Check for an intermittent short-circuit to ground.
Check the ground lead between the control module terminal #10B and the power door mirror terminal #6.
Check the bulb holder and bulb if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Bulb, ground lighting, door mirror, replacing See: Lighting and Horns/Courtesy Lamp/Courtesy Lamp Bulb/Service and Repair/Bulb, Ground Lighting, Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



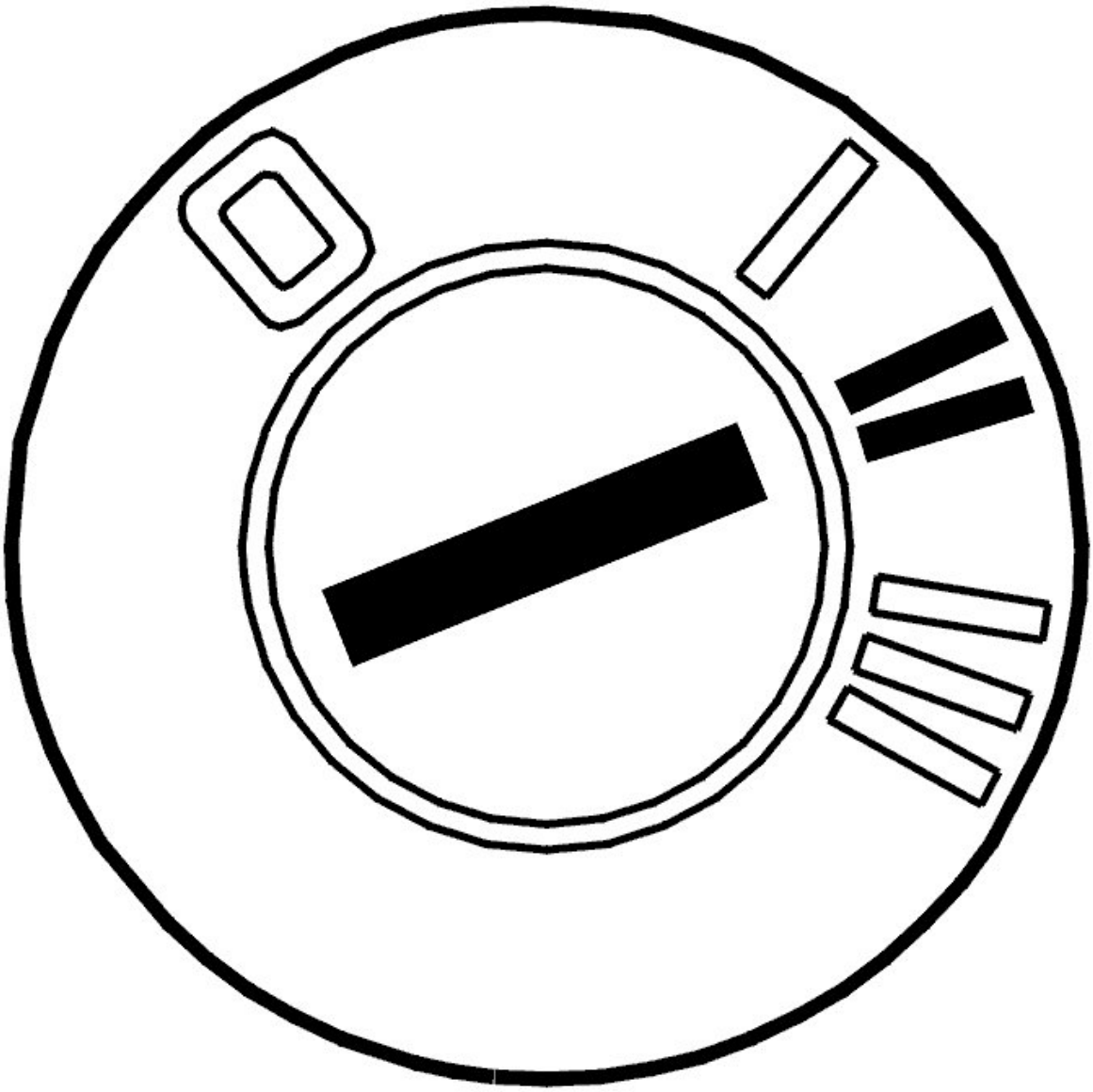
Continue - Fault-tracing information

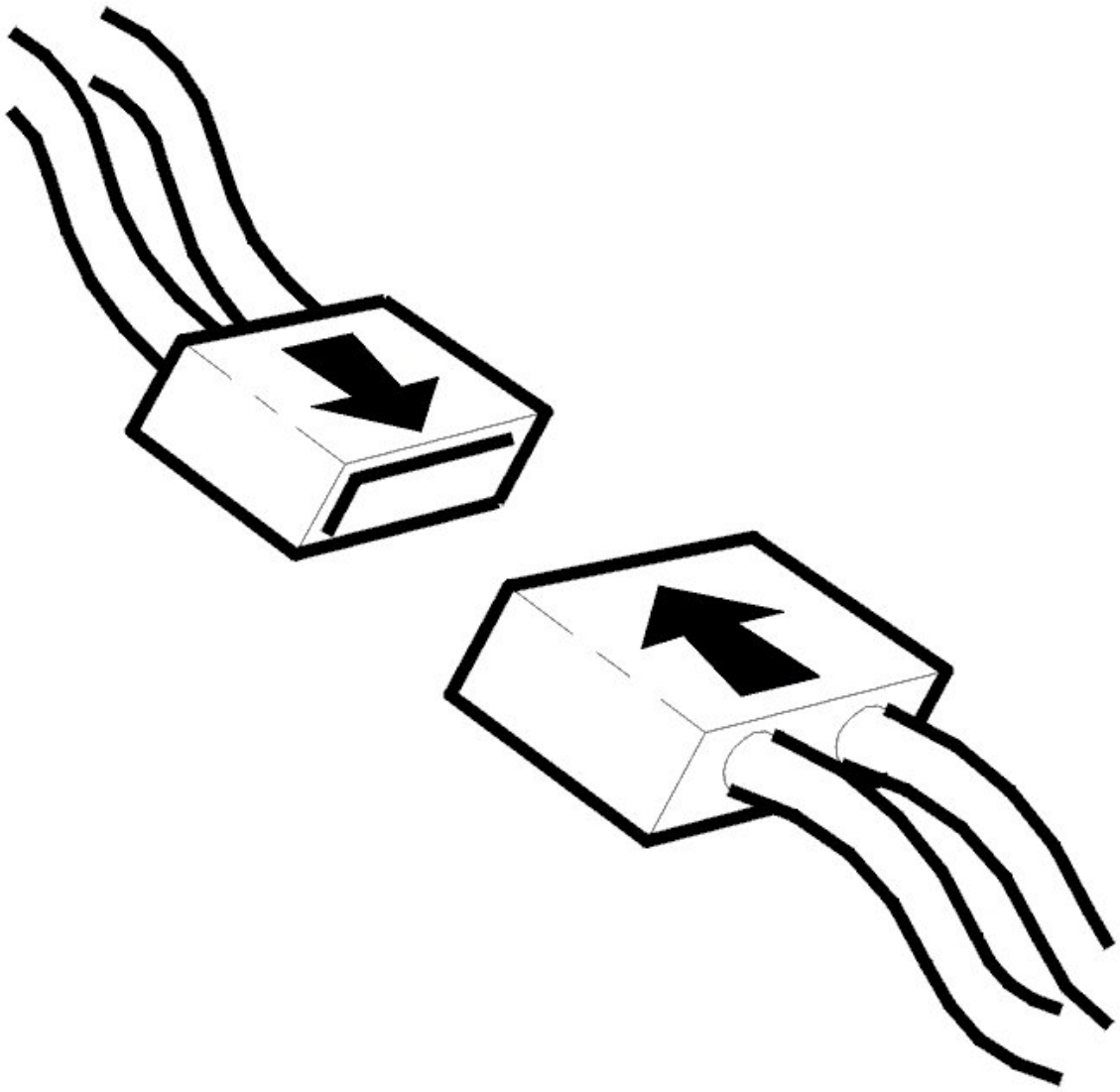
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check if the lamp in the power door mirror lights.

Does the lamp in the power door mirror light?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking faults

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking faults

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that a signal has not been updated within the specified time, diagnostic trouble code PDM-003E is displayed.

Substitute value
- Nothing.

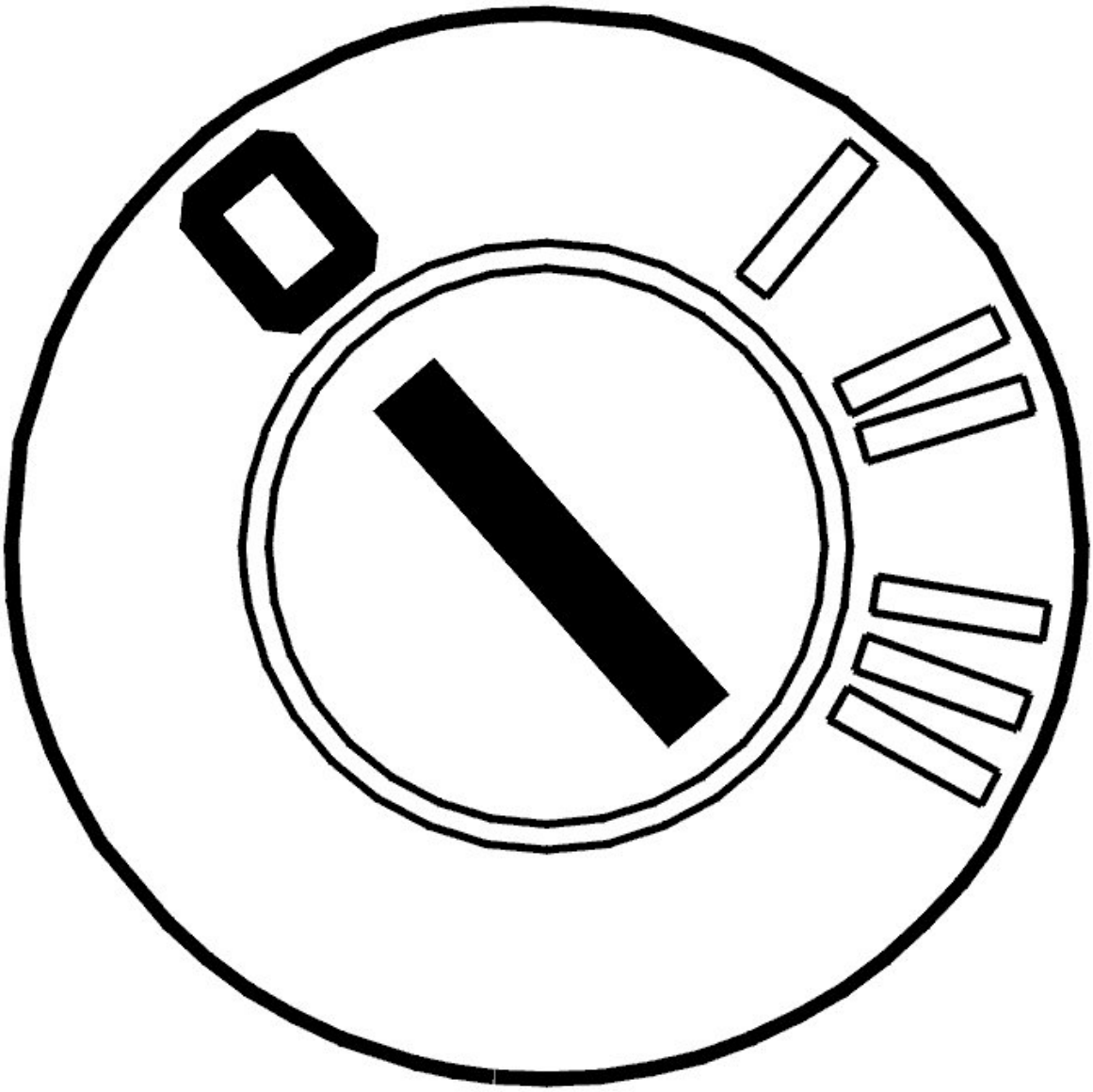
Possible source
- Internal fault in software.

Fault symptom[s]
- Electric window lift does not work
- External rear-view mirror operation does not work
- Mist on windows and/or external rear-view mirrors.

Signal Too High

Signal too high

Replacing the component



- Ignition off.

The passenger door module (PDM) has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

After replacing the control module the window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Other information:

- Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that UP and DOWN signals to electric window lift on passenger door are active at the same time, diagnostic trouble code PDM-0034 is displayed.

Substitute value
- Nothing.

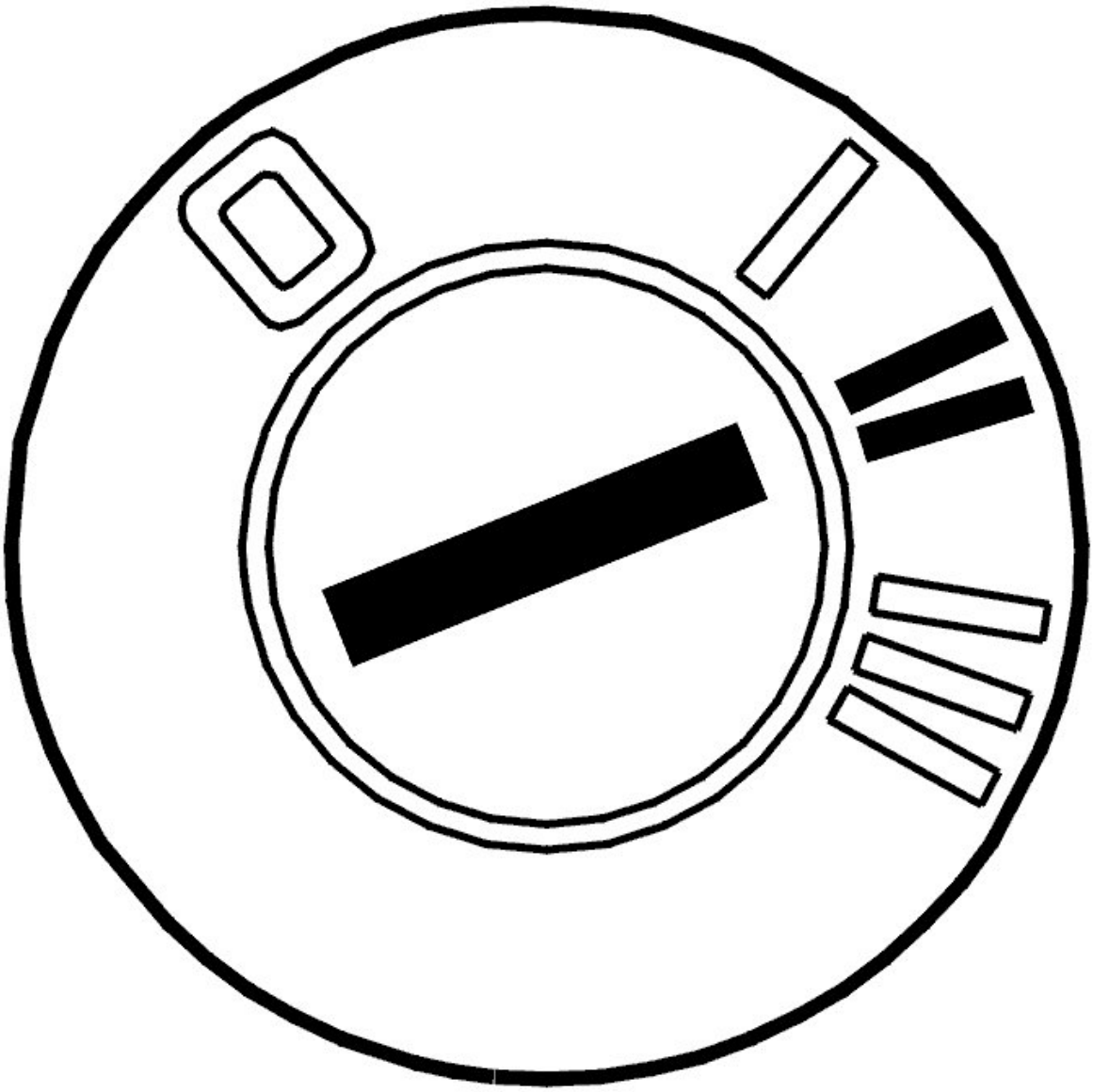
Possible source
- Electric window lift switch on passenger door is stuck in two positions.

Fault symptom[s]
- Electric window lift on passenger side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

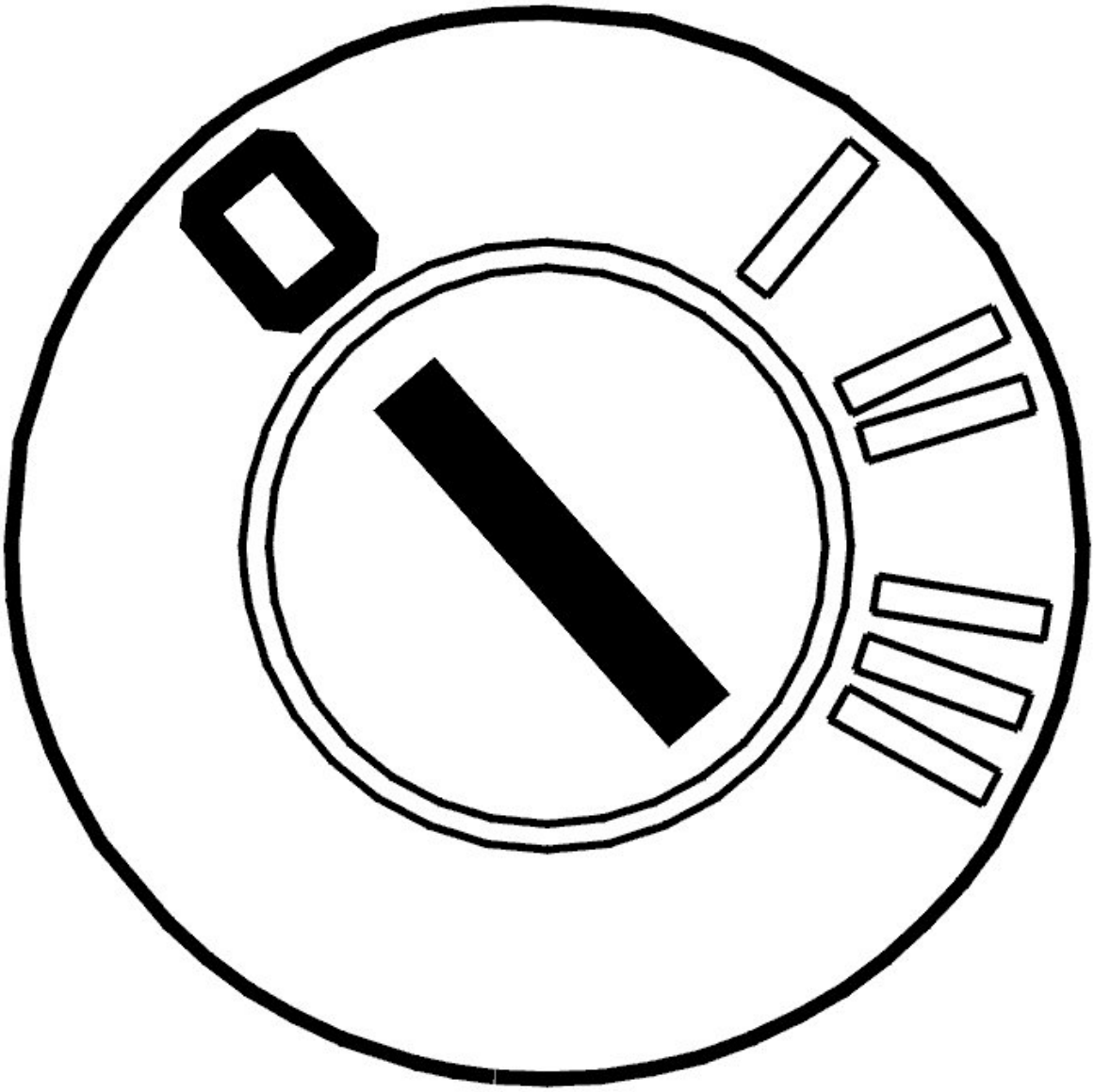
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that electric window-lift switch on passenger door is activated for more than 60 seconds diagnostic trouble code PDM-0035 is displayed.

Substitute value
- Nothing.

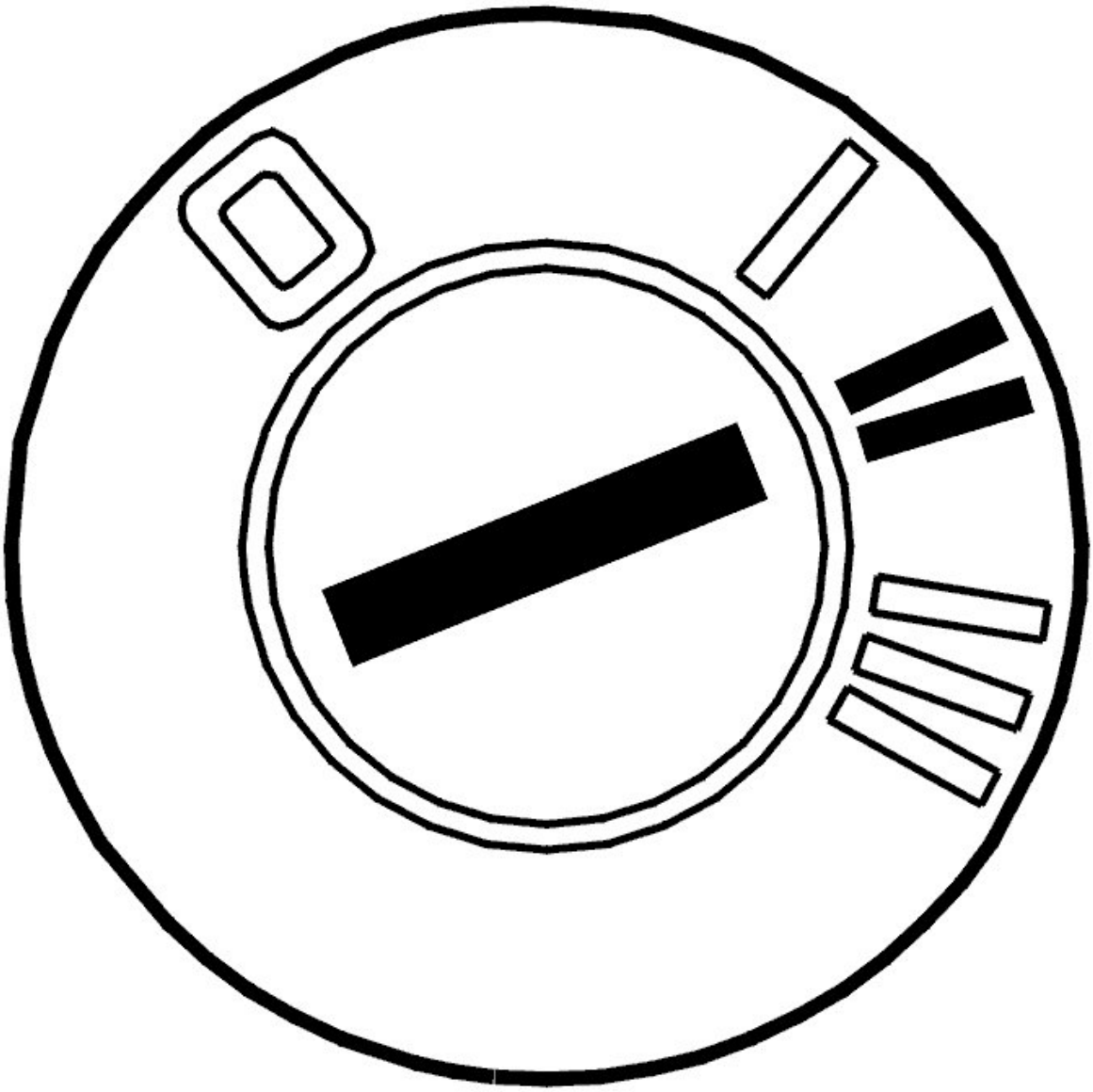
Possible source
- Electric window lift switch on driver door has stuck in an activated position.

Fault symptom[s]
- Electric window lift on passenger side does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

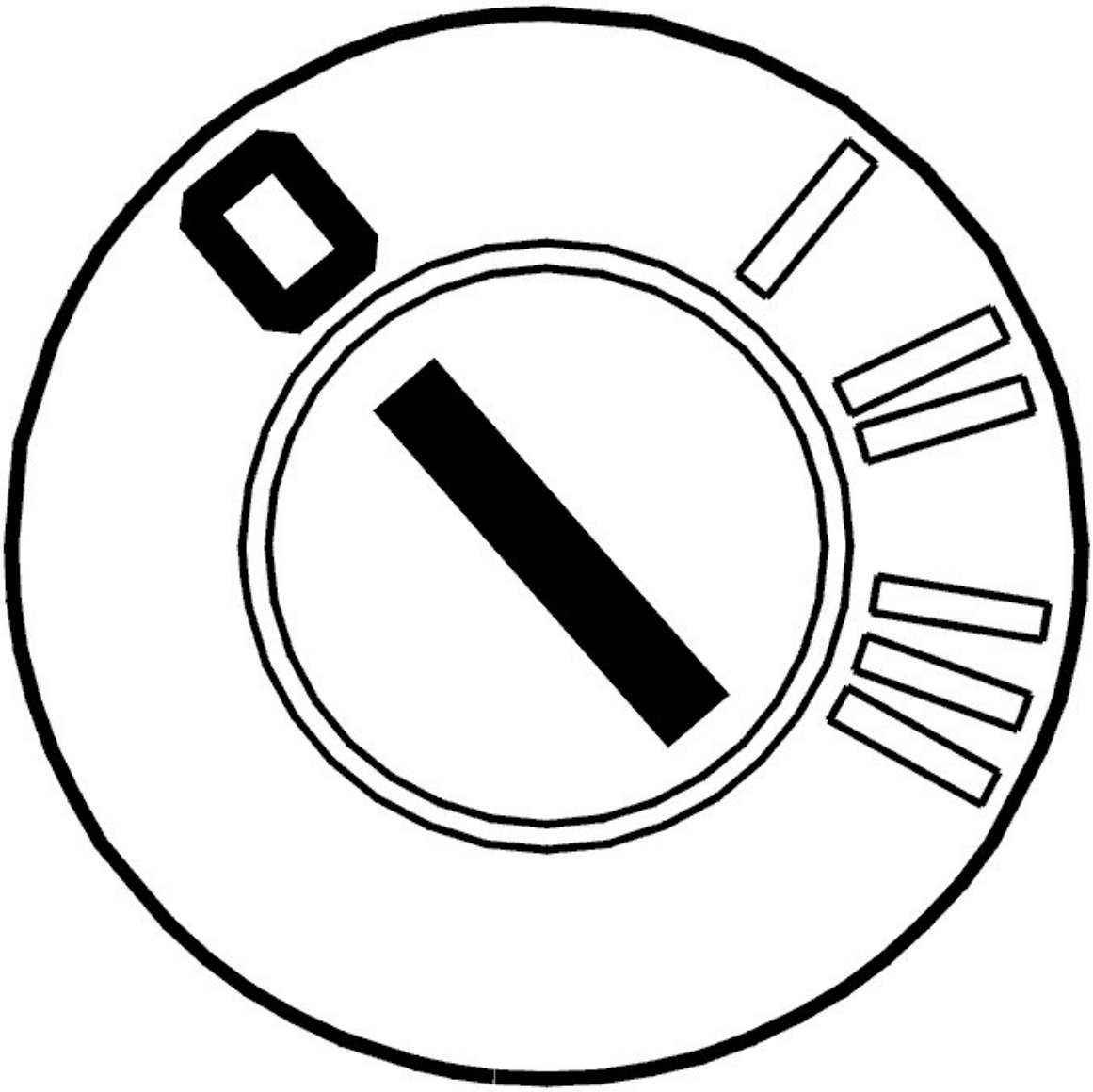
Operate each function and check the function.

Are the controls working?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

The control module has registered an internal fault.

Note! A new control module is delivered without software. The control module must be programmed when it has been replaced.

Other information:

- For further information about programming and replacing the control module, see Driver's door module / passenger door module (DDM/PDM), replacing See: Body Control Module/Service and Repair/Driver's Door Module / Passenger Door Module (DDM/PDM), Replacing.

After replacing the control module the window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal from temperature sensor is too high, diagnostic trouble code PDM-0040 is displayed.

Substitute value
- Nothing.

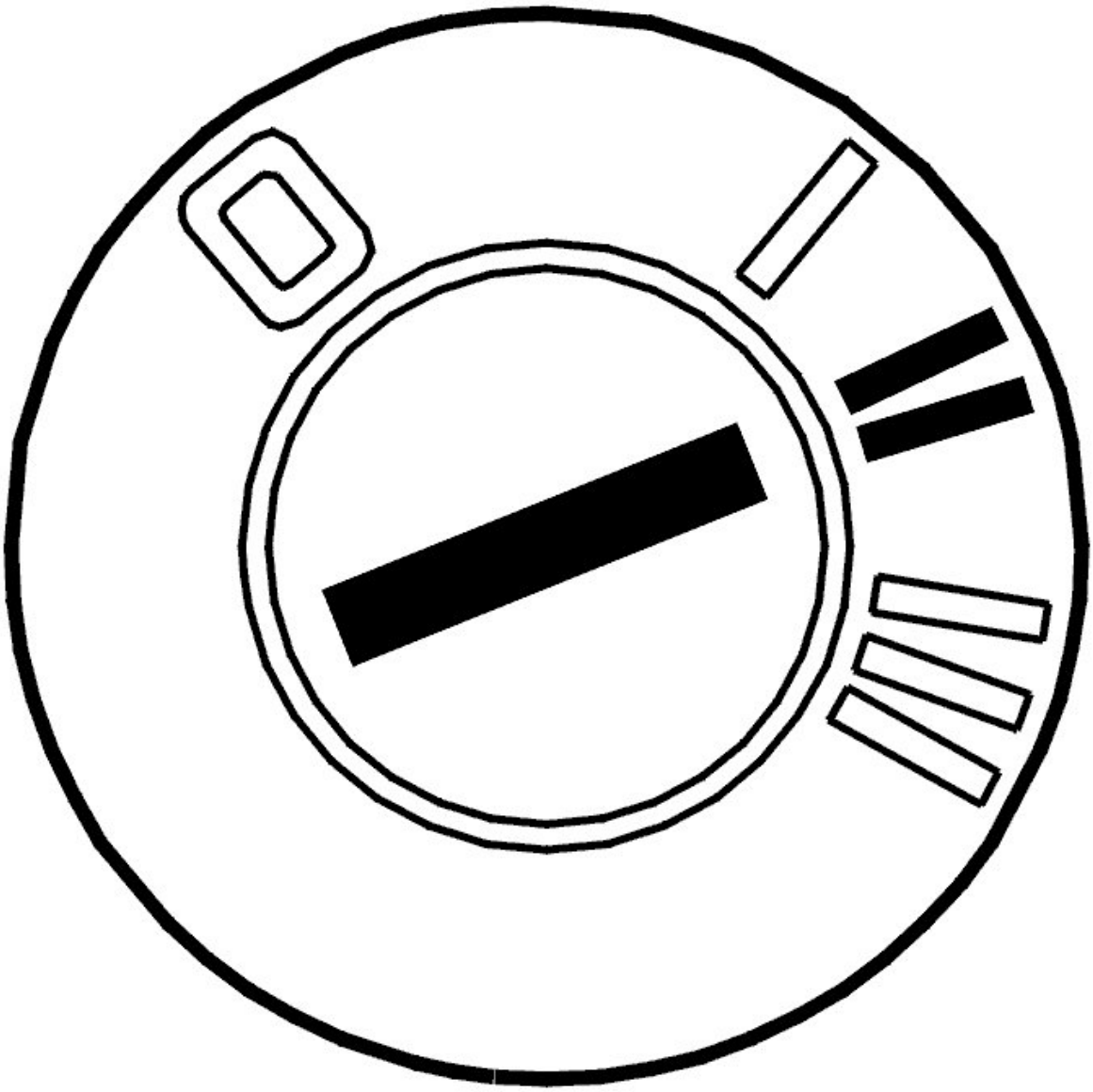
Possible source
- Signal wire short circuited to voltage supply.

Fault symptom[s]
- Outside temperature sensor does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Check the outside temperature.

Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

Is the temperature within its permitted range?

Yes - Intermittent fault

No - Checking for a short-circuit

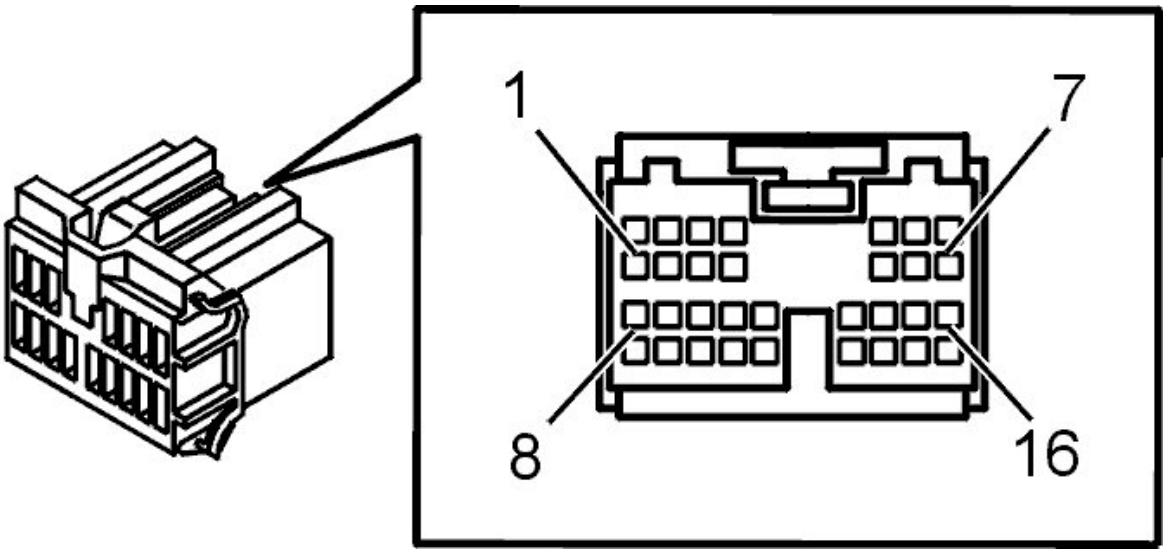
Checking for a short-circuit

If the car is equipped with a 16-pin connector

Check the cable between driver door module (DDM) terminal #18A and power door mirror connector terminal #3. Check for an open-circuit.
Check the cable between driver door module (DDM) terminal #14A and power door mirror connector terminal #2. Check for a short-circuit to supply voltage. Check for an open-circuit.
Replace the cable if a fault is found.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

Intermittent fault

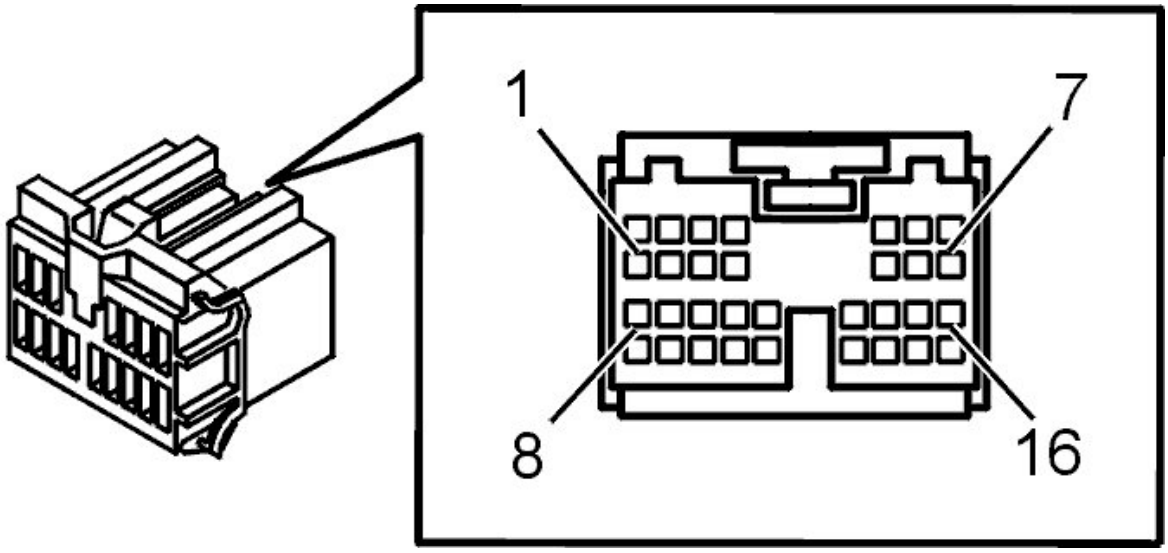
Check the control module and power door mirror connectors. Check for contact resistance, oxidation and loose connections.

If the car is equipped with a 16-pin connector

Check the cable between driver door module (DDM) terminal #14A and power door mirror terminal #2. Check the cable between control module terminal #18A and power door mirror terminal #3. Check these cables for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

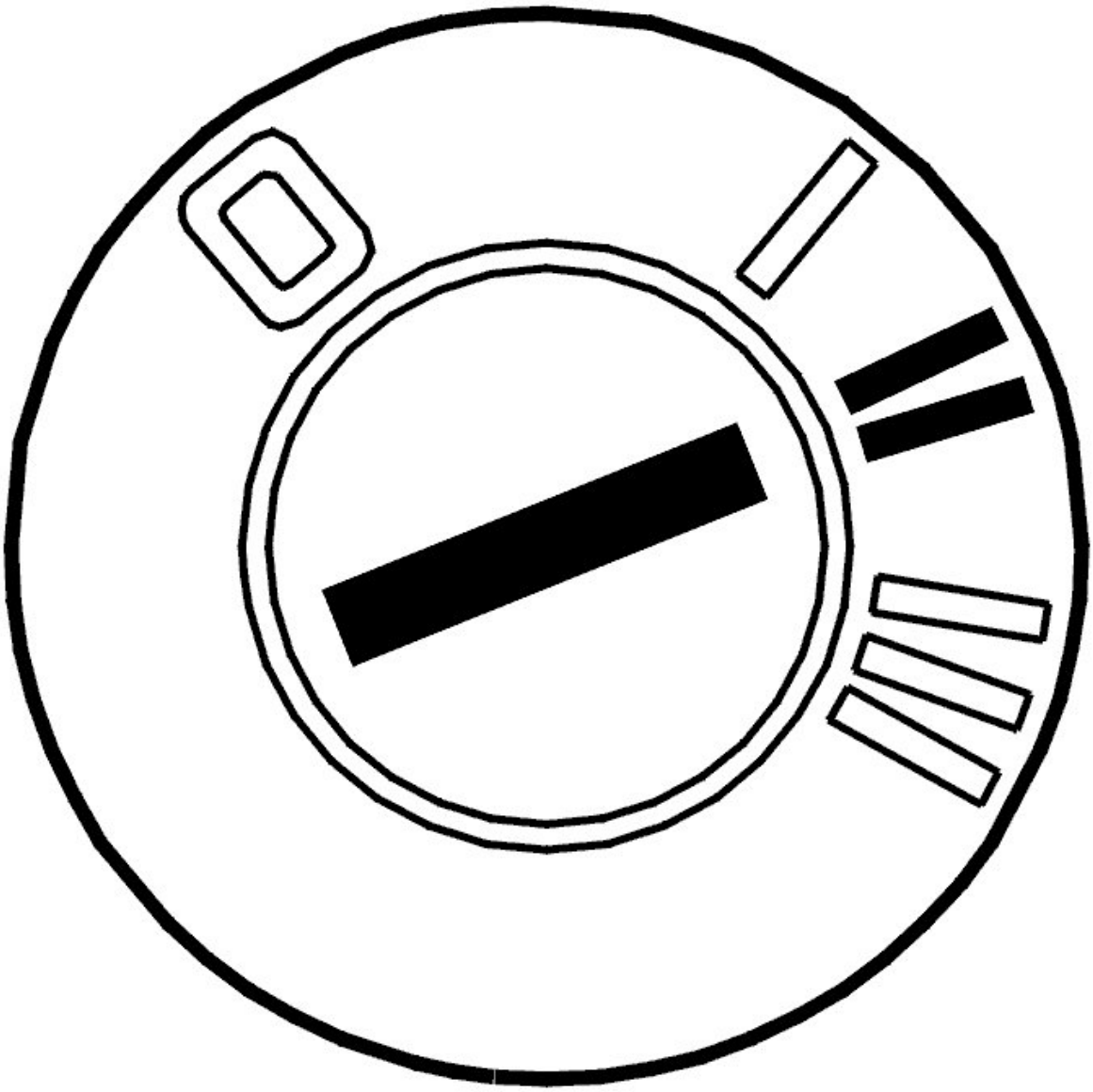
Continue - Fault-tracing information

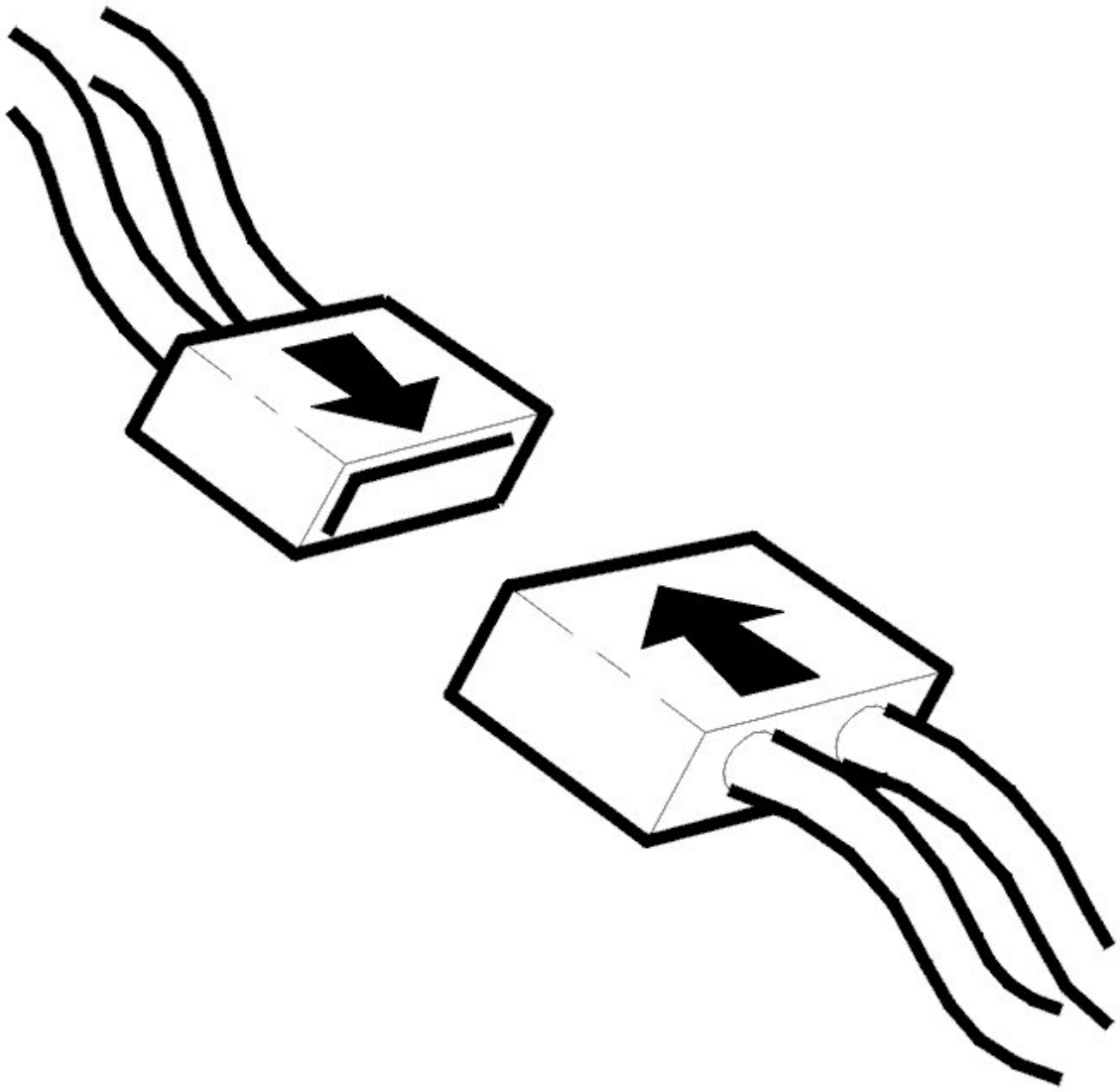
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If control unit registers that signal from temperature sensor is too low, diagnostic trouble code PDM-0041 is displayed.

Substitute value
- Nothing.

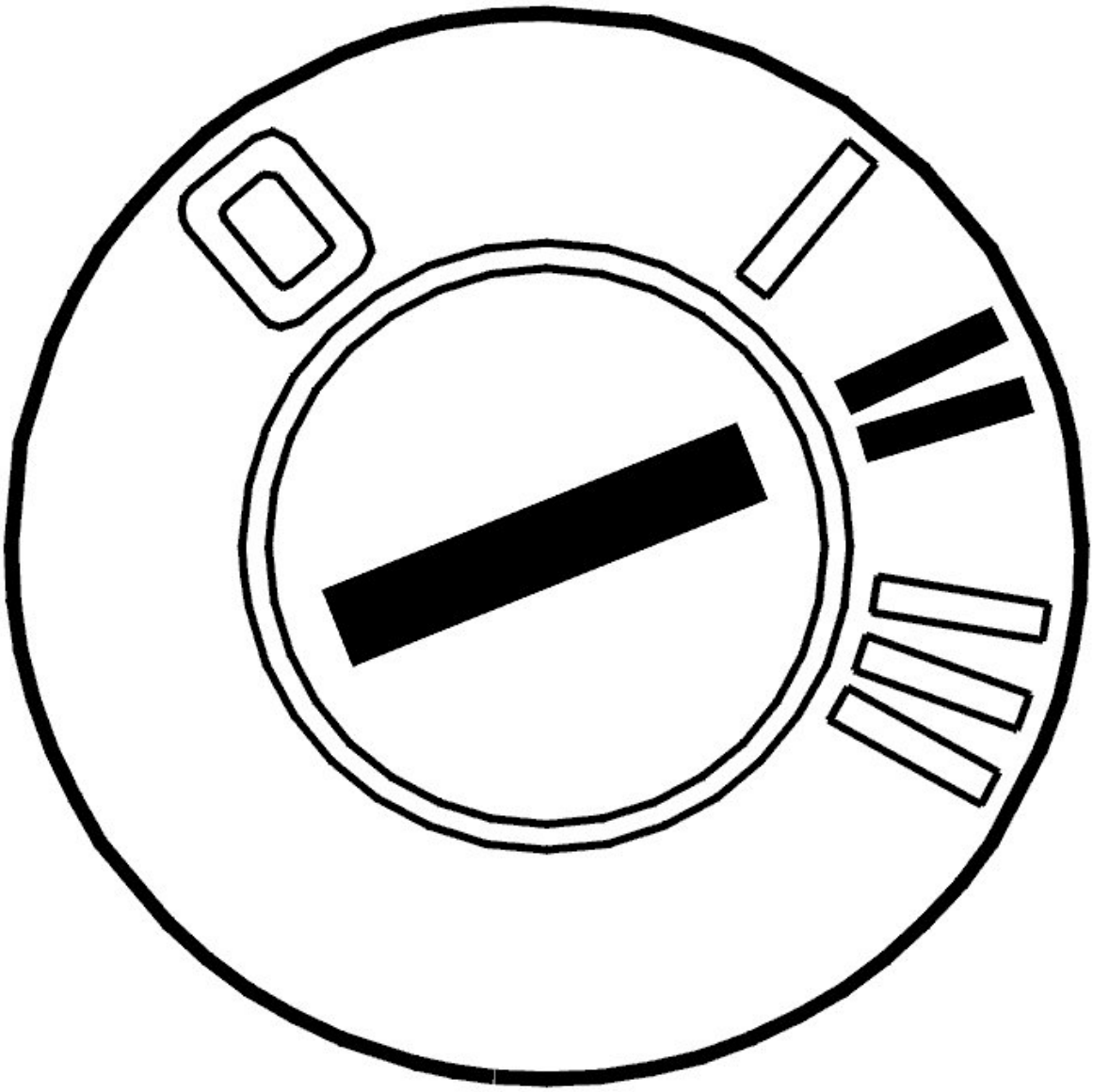
Possible source
- Signal wire open circuit or short circuited to ground.

Fault symptom[s]
- Outside temperature sensor does not work.

Signal Missing

Signal missing

Checking faults



- Ignition on.

Check the outside temperature.

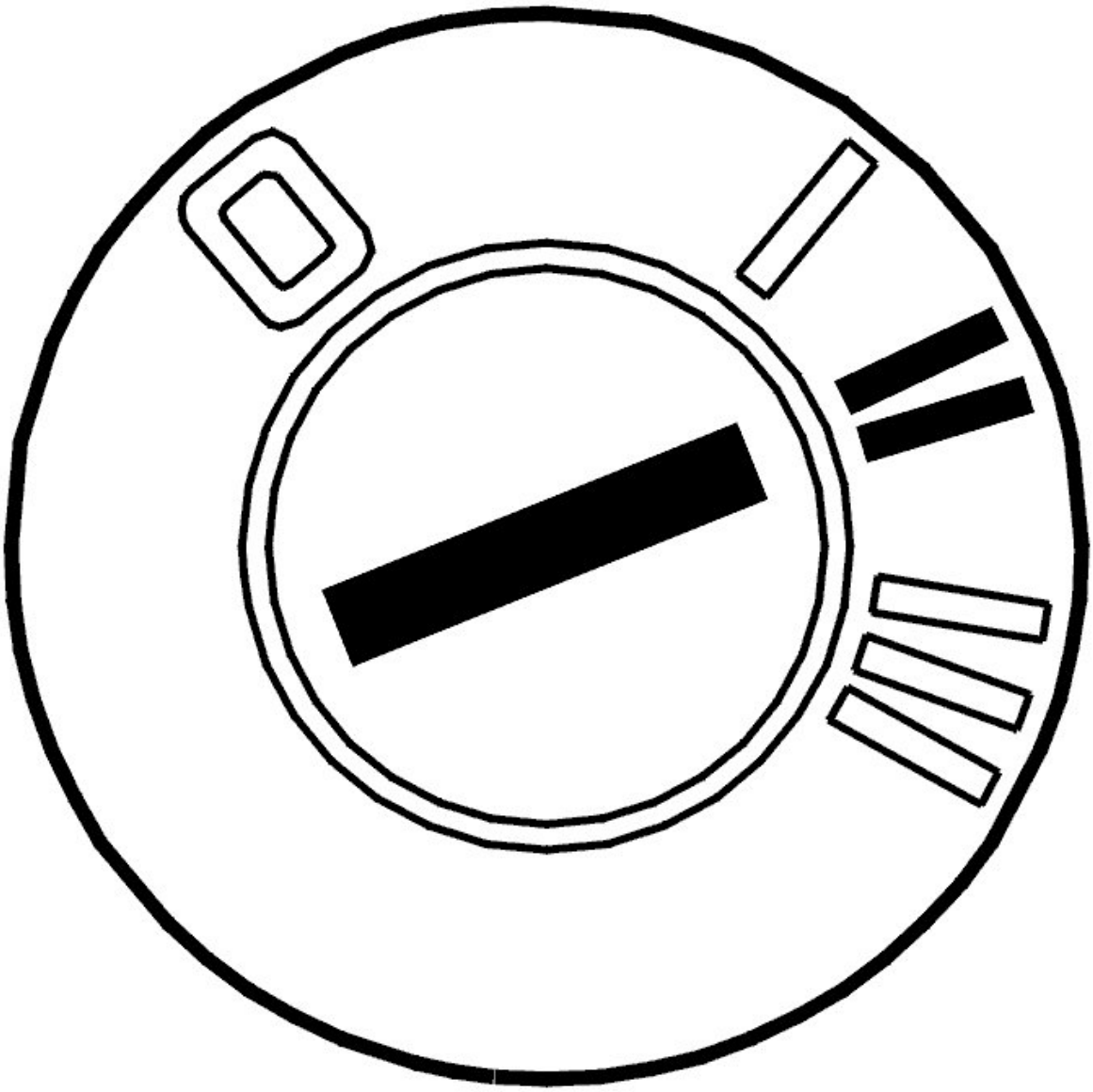
Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

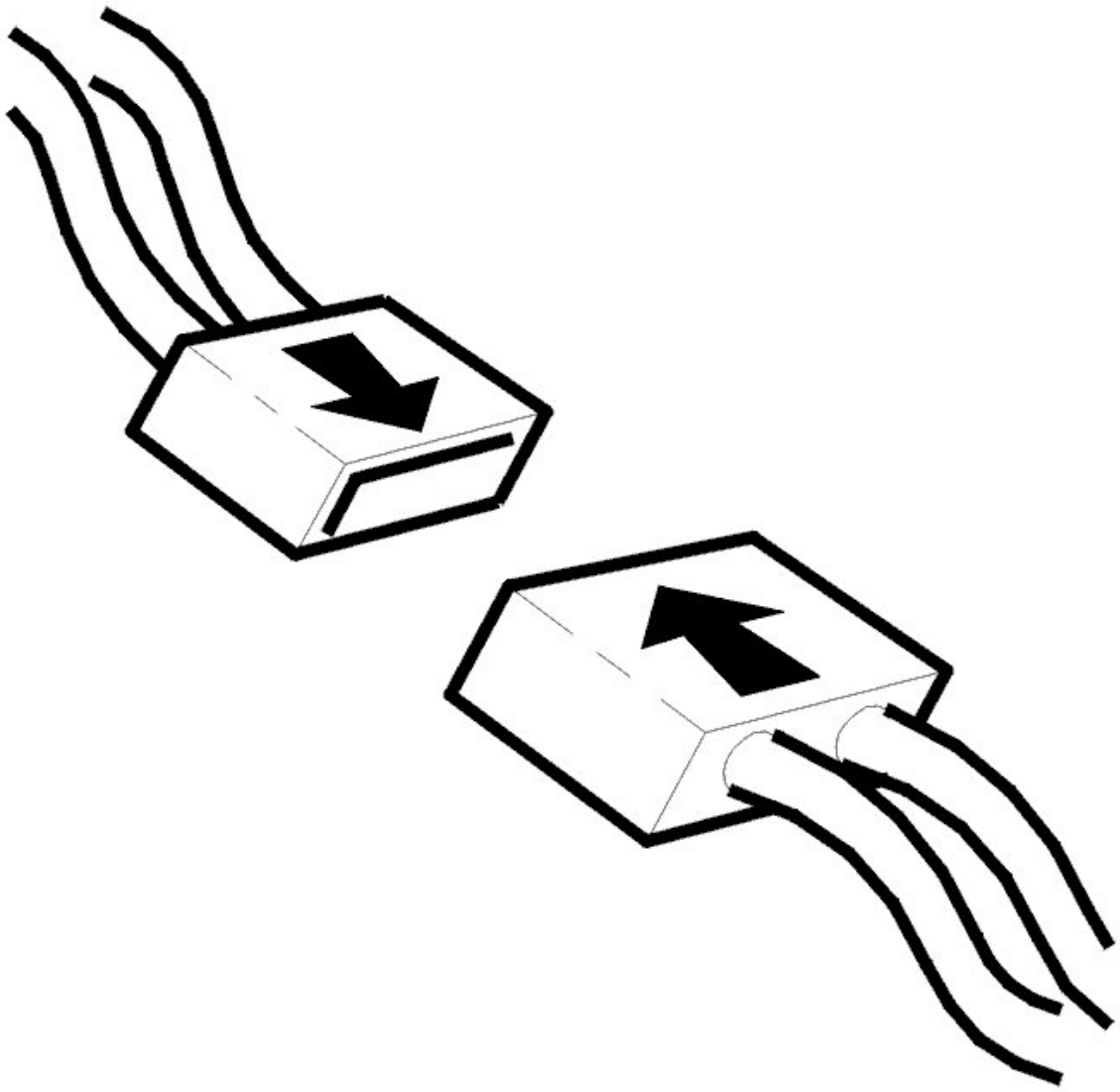
Is the temperature within its permitted range?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors





- Ignition off
- Check the power door mirror connector. Check for contact resistance and oxidation. Remedy if necessary. Check for damage carefully
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check the outside temperature.

Note! The outside temperature sensor is always located in the right door mirror, irrespective of whether the car is left or right-hand drive.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Is the temperature within its permitted range?

Yes - Verification

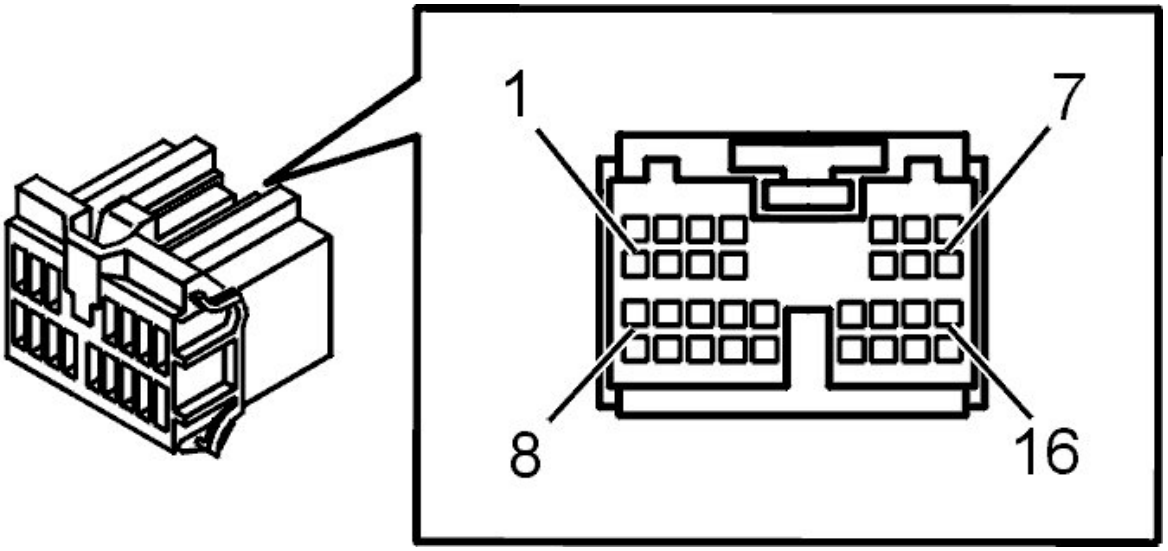
No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between door control module terminal #14A and power door mirror connector terminal #2. Check for a short-circuit to ground. Replace the cable if a fault is found.
Try a new outside temperature sensor if no fault was found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

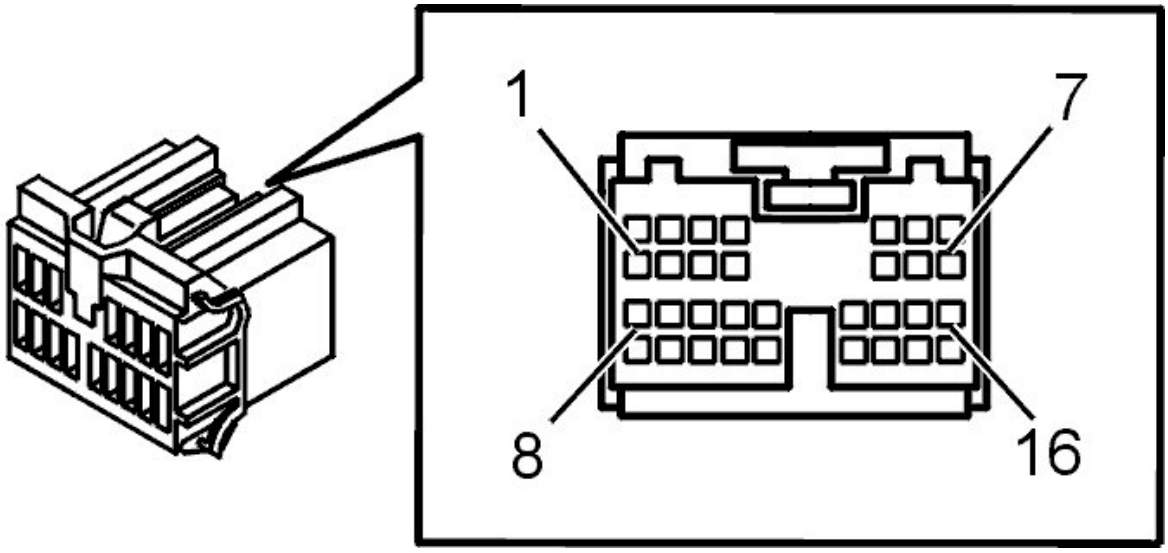
Continue - Verification

Intermittent fault

Check the cable between control module terminal #14A and power door mirror terminal #2. Check for an intermittent short-circuit to ground. Replace the outside temperature sensor if no fault is found.

Other information:

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- Door mirror, replacing See: Body and Frame/Mirrors/Service and Repair
- Outside temperature sensor door mirror, replacing See: Instrument Panel, Gauges and Warning Indicators/Outside Temperature Display/Outside Temperature Display Sensor/Service and Repair/Outside Temperature Sensor Door Mirror, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Select Continue.

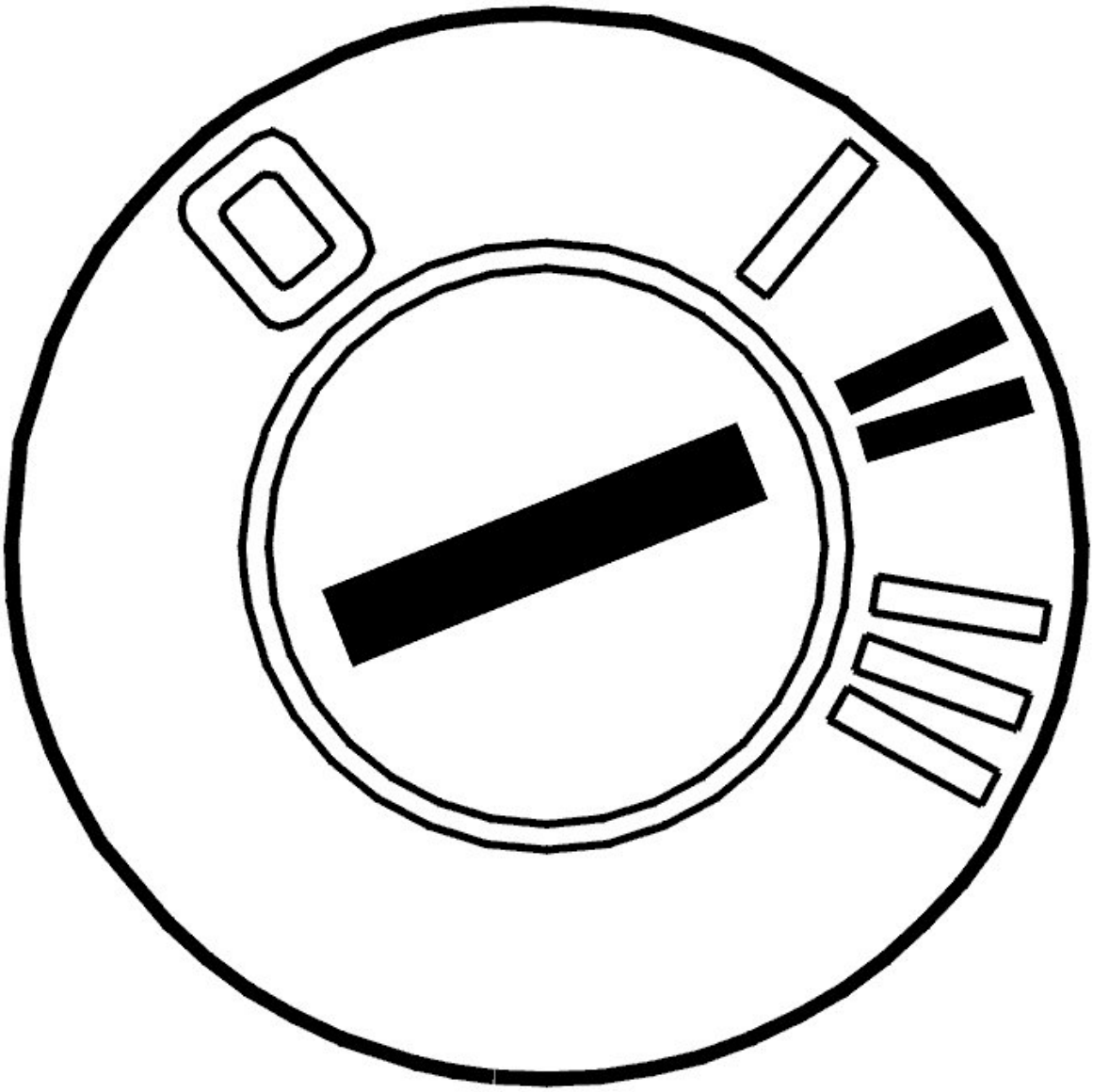
Continue - Fault-tracing information

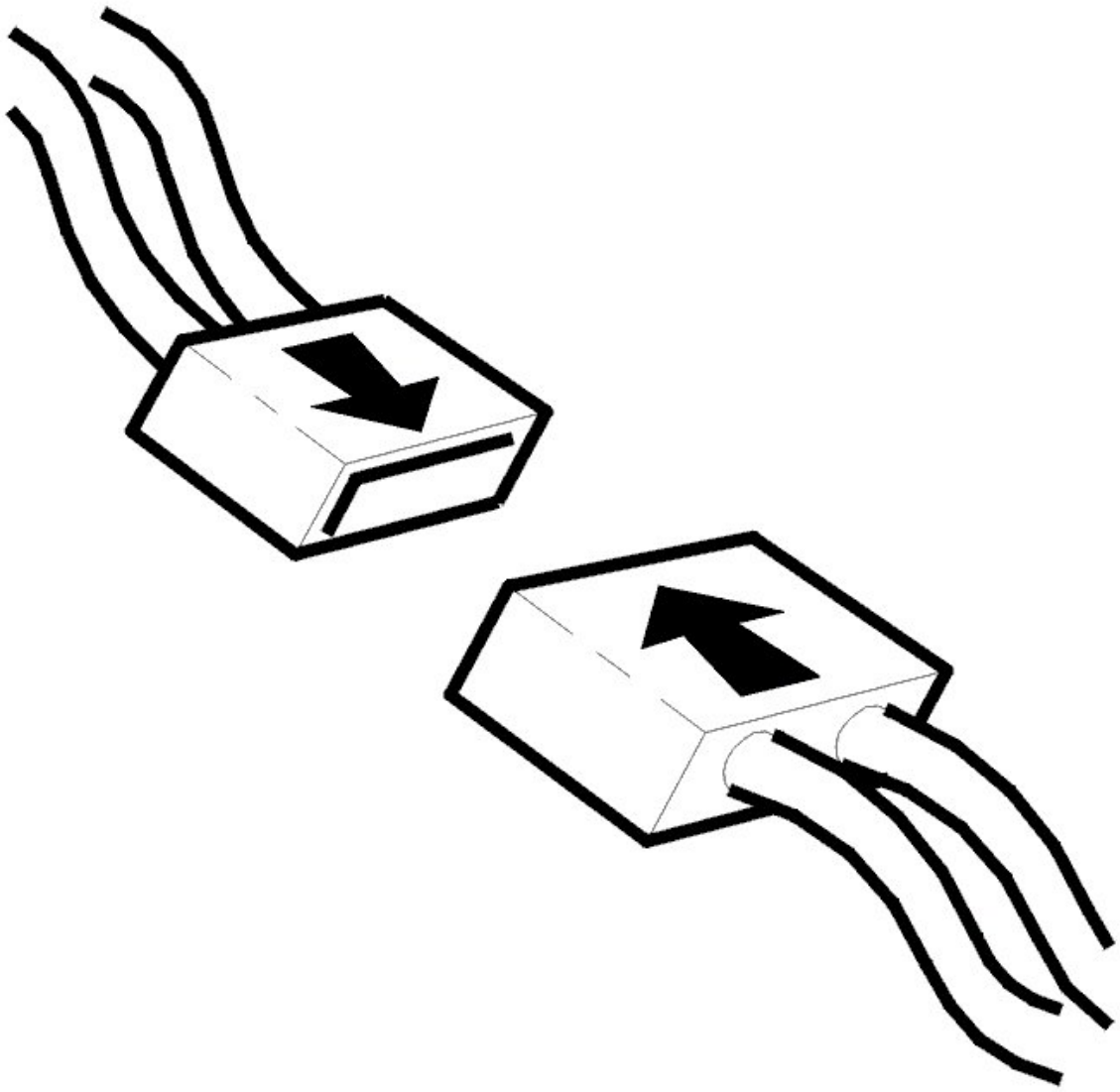
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the components, connectors etc.
- Ignition on.

Check the outside temperature.

Is the temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

The initial set up of the window position is not done at the workshop.

Substitute value
- Nothing.

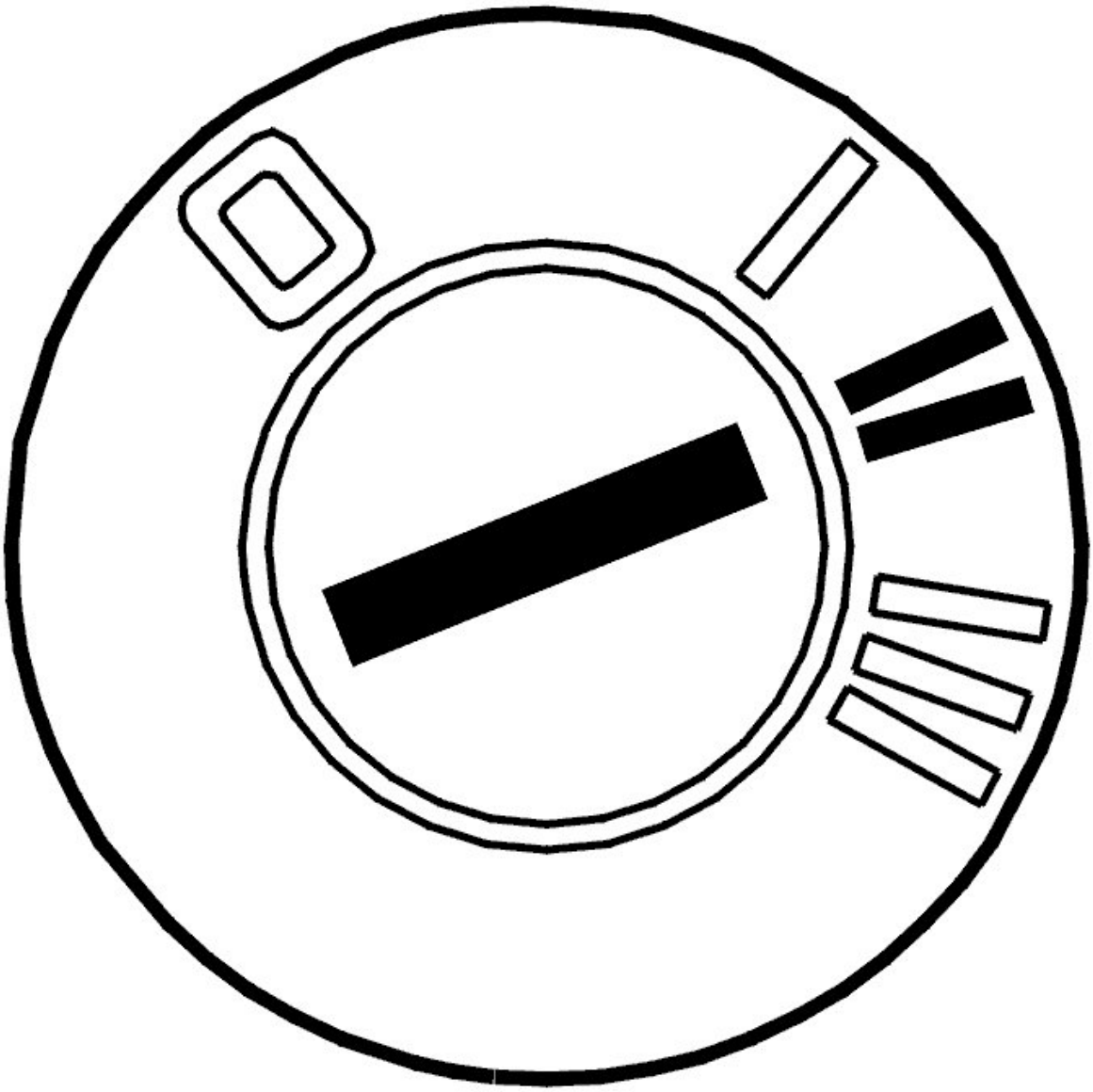
Possible source
- Set up is not done.

Fault symptom[s]
- The automatic window operation does not work.

Internal Fault

Internal fault

Checking faults



- Ignition on.

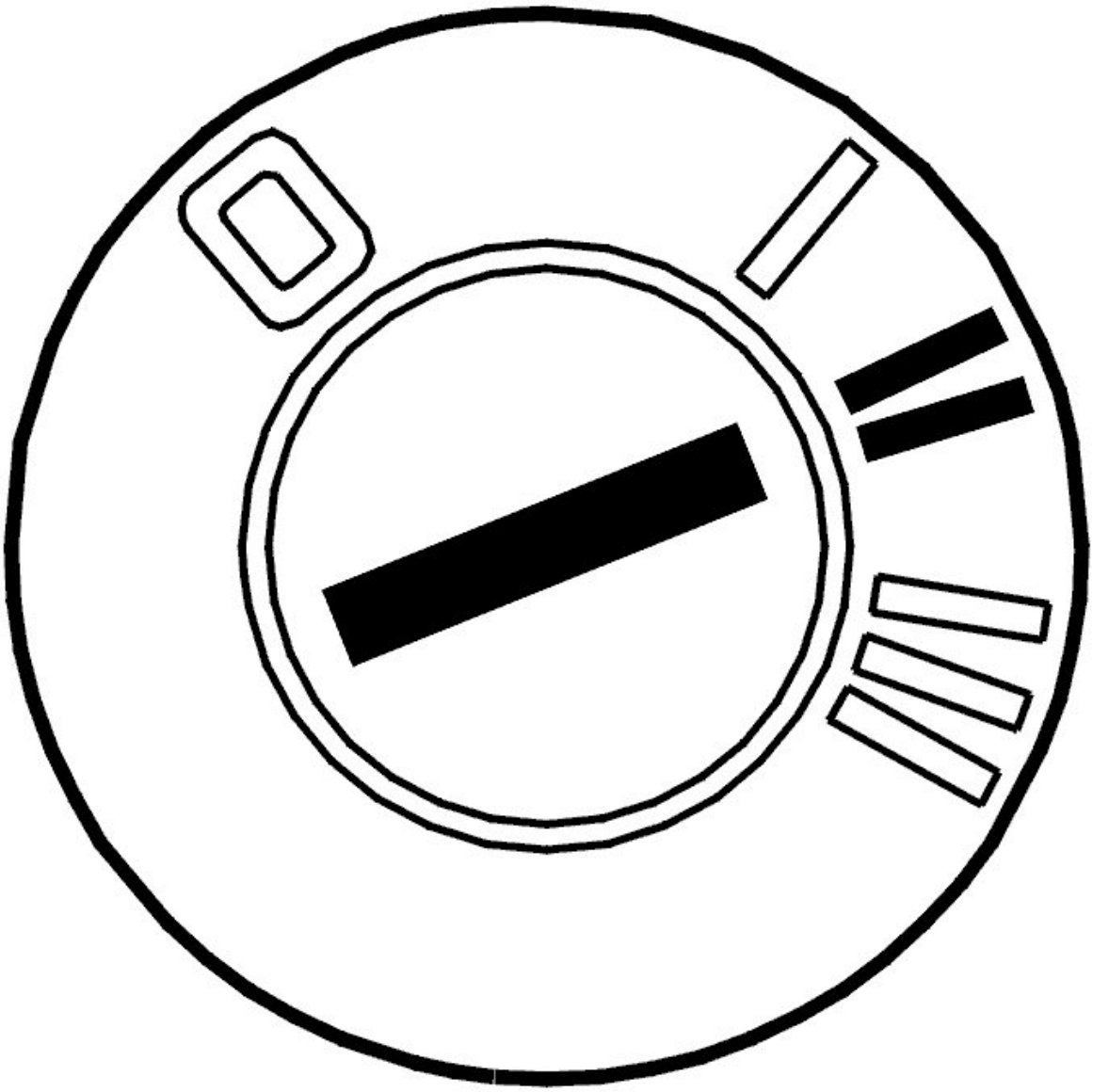
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Initiation

Initiation



The control module has registered an internal fault.
The window position must be initialized.

- Ignition on.

Move the window to its upper limit position using manual control.
Initialize the window.
During initialization, the window will automatically go down to its lowest position and then go back up again.

Continue - **Fault Found**

Intermittent fault

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The window position settings have been lost by the control module. This is due to a voltage drop when the window lift mechanism was activated.

Substitute value
- None.

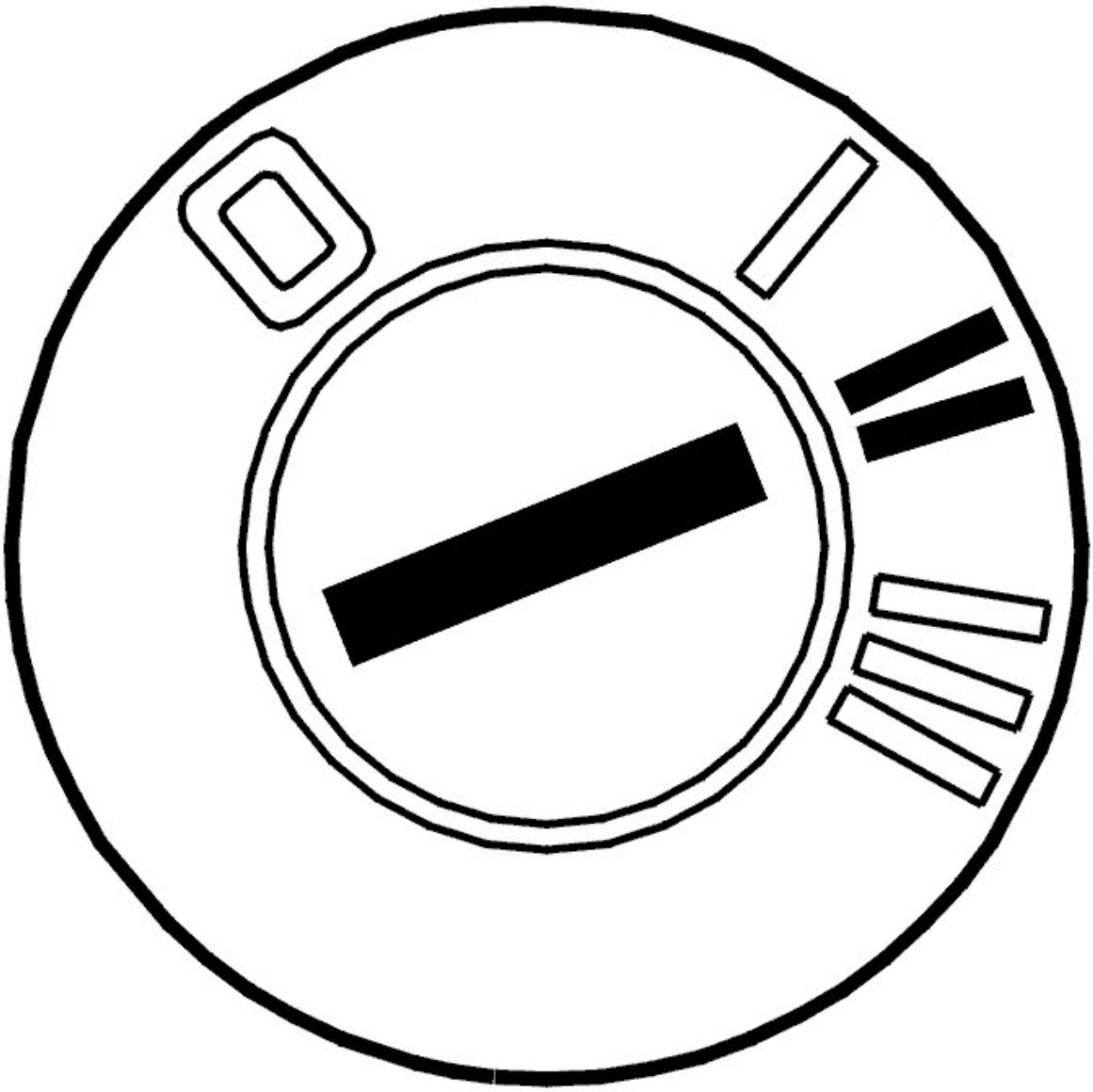
Possible source
- The initialization of the window position is lost.

Fault symptom[s]
- Automatic window operation does not function.

Internal Fault

Internal fault

Checking for permanent or intermittent faults



- Ignition on.

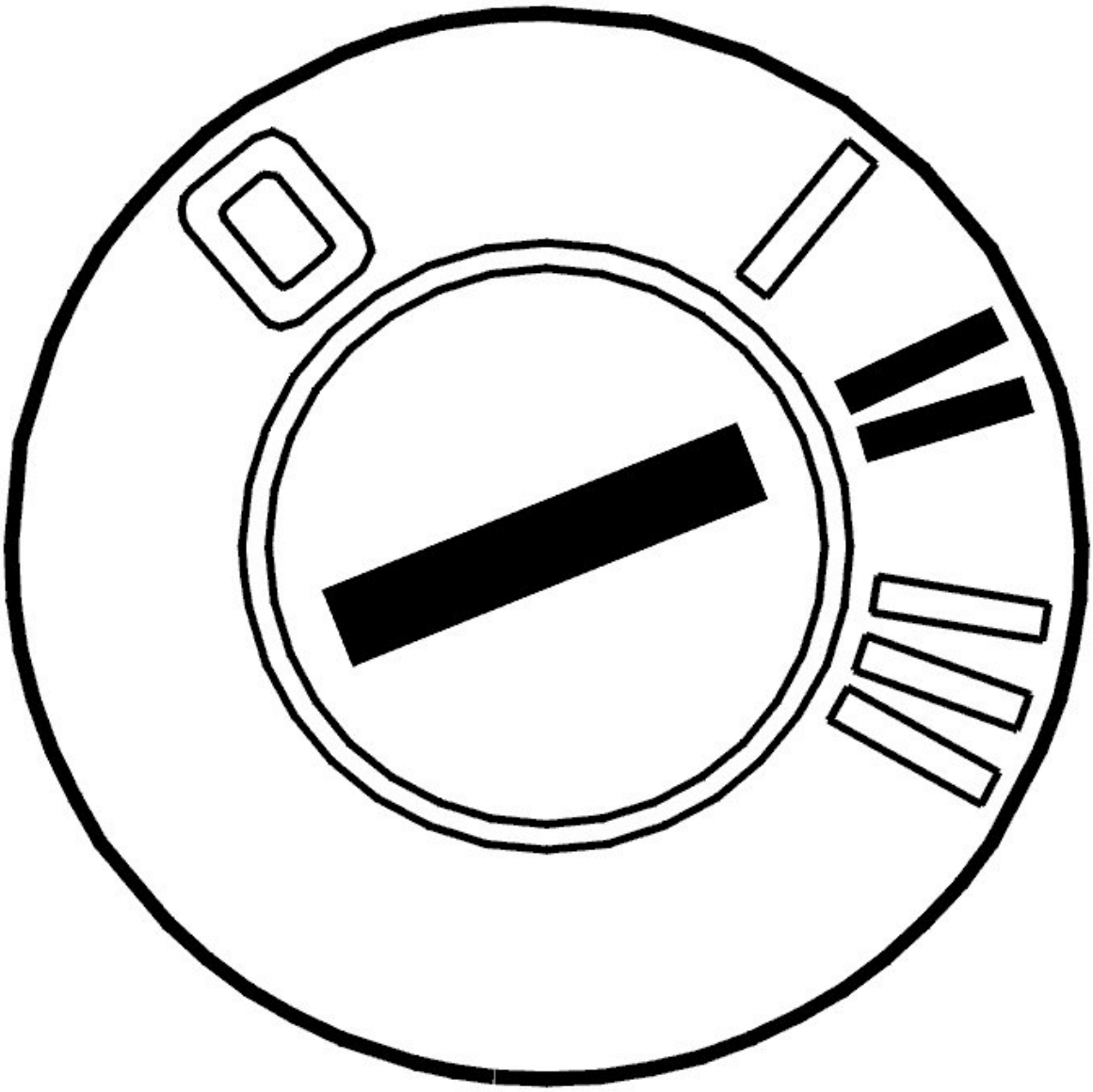
Press the power window switch 2 steps up to check the function of the automatic power window mechanism.

Is the automatic power window mechanism functioning?

Yes - Intermittent fault

No - Initiation

Initiation



The control module has registered an internal fault.
The window position must be initialized.
Ignition on.
Move the window to its upper limit position using manual control.
Initialize the window.
From model year 2003 inclusive, the window will lower approximately 10 centimeters and then close again during initialization.

Continue - **Fault Found**

Intermittent fault

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

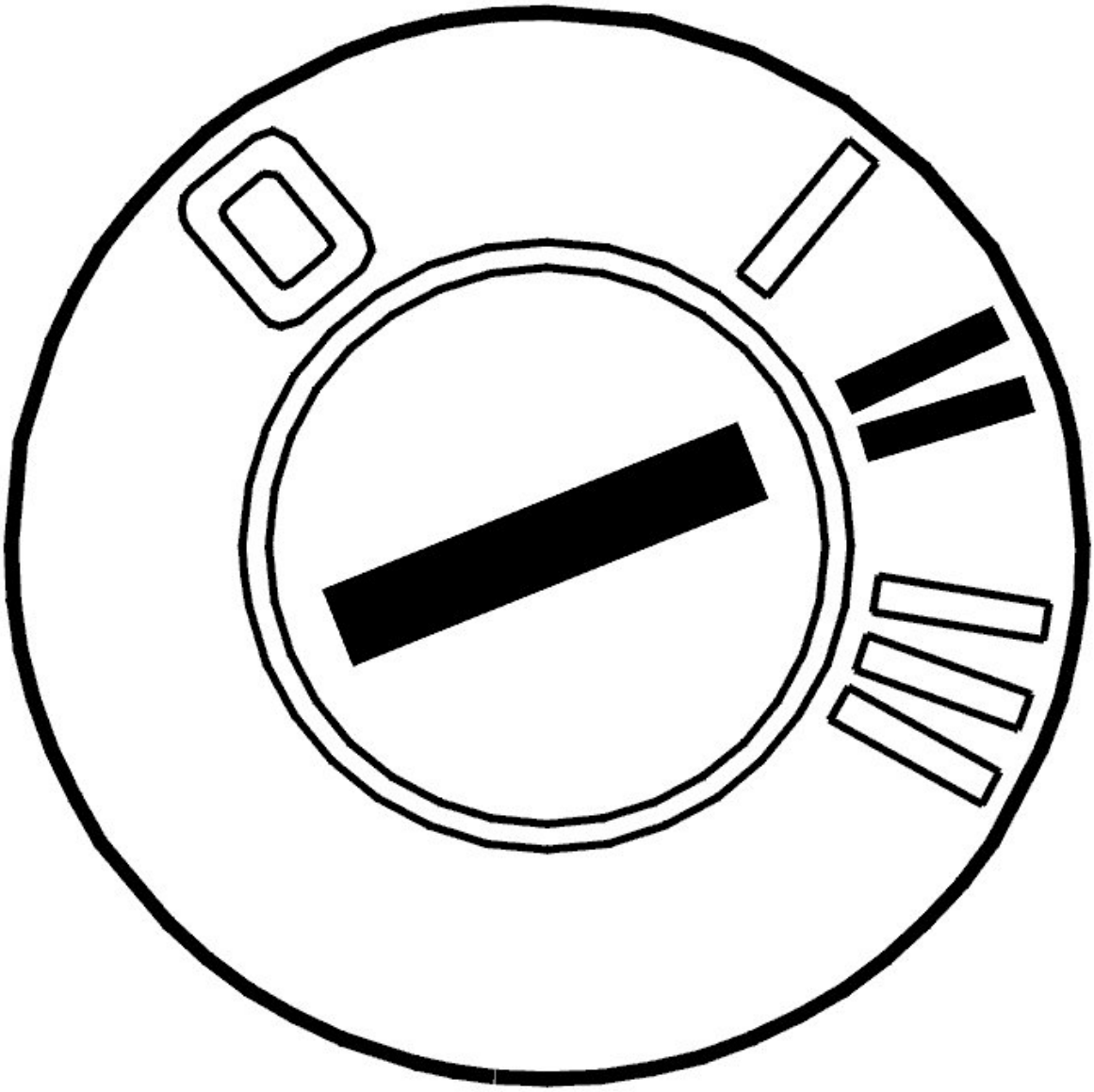
Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

PDM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

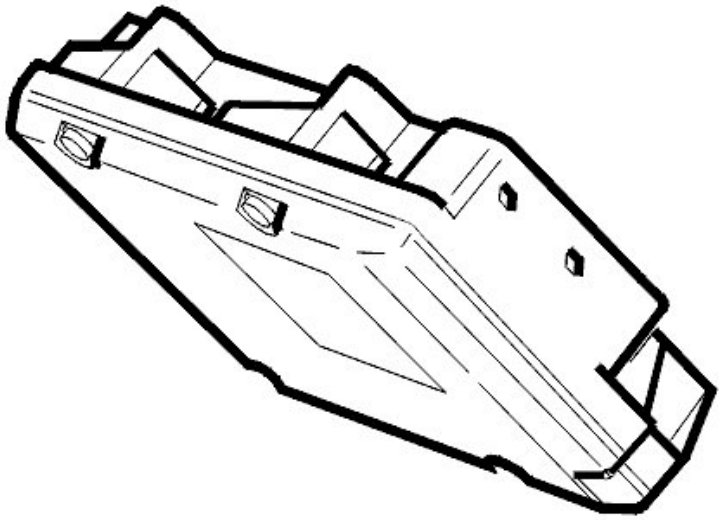
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information PSM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value

- The control module shuts itself off ("bus-off")

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source

- Short-circuit between Control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the Control area network (CAN).

Fault symptom[s]

- Power seat with memory function does not operate at all
- Automatic seat/door mirror operation does not function.

Faulty Communication

Faulty communication

General information

In order to check the control area network (CAN) cables, the resistance in the network must be measured. The resistance between the two controller area network (CAN) wiring, with the network connected 60 ohms. The resistance can differ depending on the configuration of the car. Permitted values are 55-65 ohms. This applies to both the high speed side network and the low speed side network.

Hint: Use the applicable wiring diagram to provide support when taking readings. Take a copy of the data communication side for each model. Note which diagnostic trouble codes (DTCs) are stored in each control module. This facilitates fault-tracing considerably.

Check if the diagnostic trouble codes (DTCs) for failed communication are stored in the central electronic module (CEM). If this is the case, first fault-trace according to these diagnostic trouble codes (DTCs).

Other information

- For general information about fault-tracing the control area network (CAN), see

Continue - Checking the resistance of the control area network (CAN) cables

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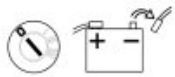
Checking the resistance of the control area network (CAN) cables



- Disconnect the battery negative lead. The power to the network must be cut when taking resistance readings. The reading may otherwise be incorrect.

Note! Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Connect the adapter wiring to the central electronic module (CEM).

Hint: Where a breakout box cannot be used, take readings from the rear of the affected connectors if possible. This prevents terminal pins and socket housings being damaged.

When taking readings on the low speed network

- When taking readings on the low speed network, the adapter wiring should be connected to the central electronic module (CEM) and the readings taken from there. The readings can also be taken in the connector for the power seat module (PSM). The advantage of using the adapter wiring connected to the central electronic module (CEM) is that all control modules can be connected to the network when taking readings and there is access to both the high speed and the low speed networks.

This resistance reading only measures main arteries in the low speed network, not the junctions for the road traffic information module (RTI), accessory electronic module (AEM), power seat module (PSM), phone module (PHM), audio module (AUM), driver's door module (DDM) and passenger door module (PDM). See the applicable wiring diagram, Data communication.

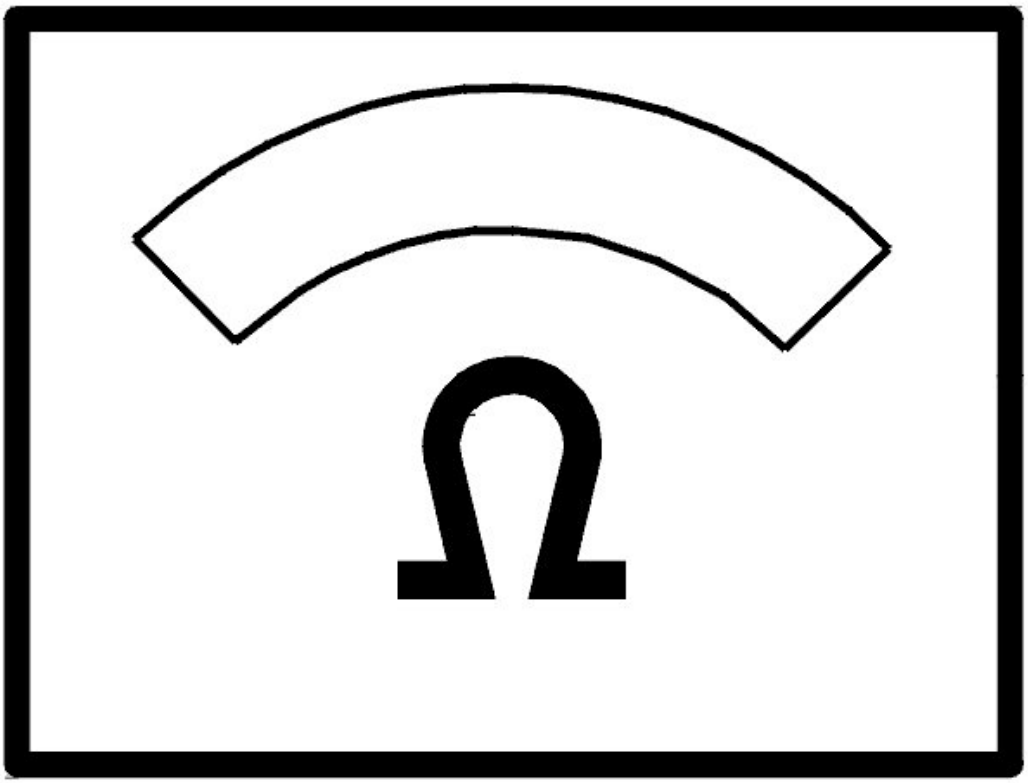
When taking readings on the high speed network

- When taking readings on the high speed network, the readings should be taken at the engine control module (ECM) using adapter wiring. The engine control module (ECM) must be connected. This resistance reading only takes readings from the main arteries in the high speed network. See the applicable wiring diagram, Data communication.

Connect the ohmmeter to the terminals for CAN-L and CAN-H on the relevant network. Work the connectors and twist the cable harness. The resistance must be approximately 60 ohms. Permitted values are 55-65 ohms.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals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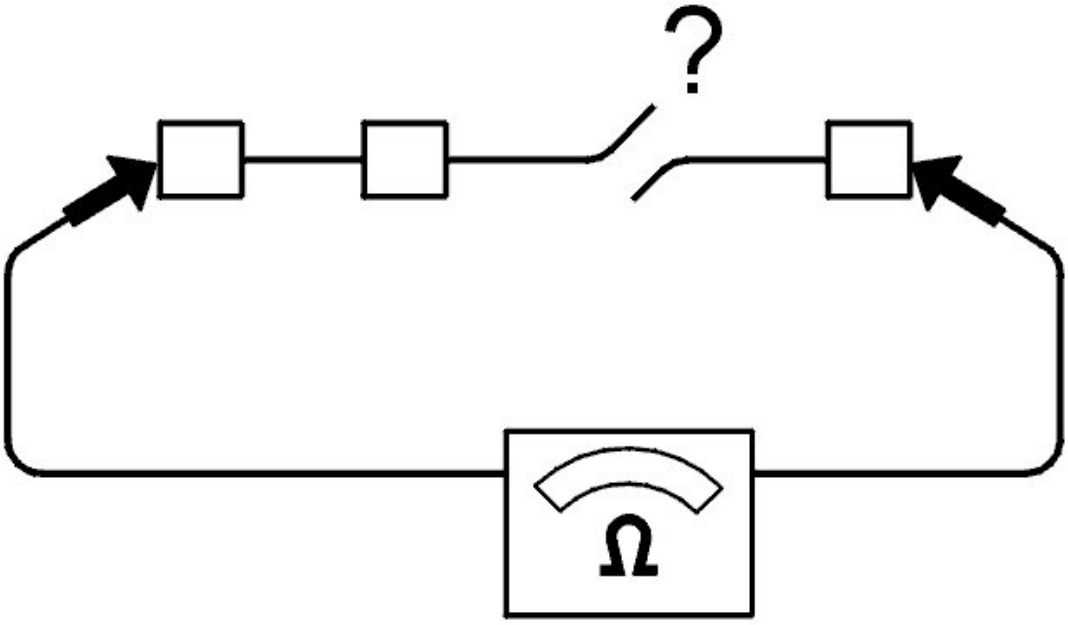
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Ω

Is the value OK?

Yes - Checking a short-circuit in CAN cables

No - Identifying fault causes in the CAN network

Checking a short-circuit in CAN cables

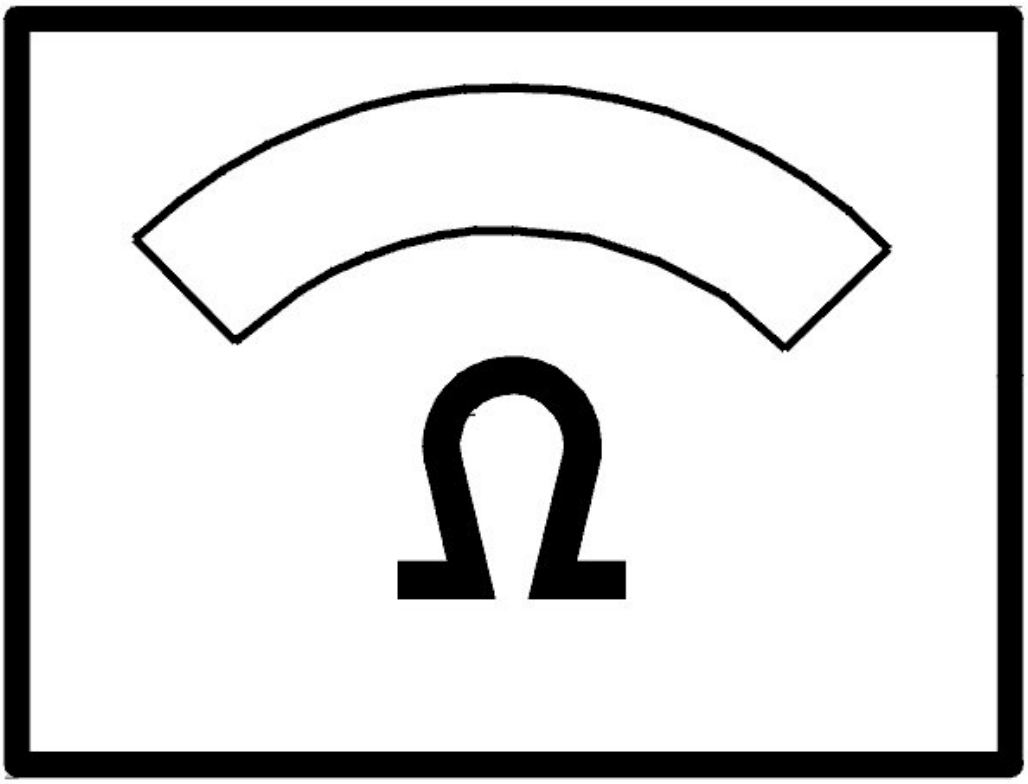
Connect an ohmmeter between the relevant CAN cable (CAN-L and CAN-H) and the power supply, and between the CAN cable and ground. Twist the connectors and turn the cable harness to different positions at each reading to determine any intermittent short-circuits.

Take the following readings:

- The resistance between CAN-L and ground
- The resistance between CAN-L and voltage
- The resistance between CAN-H and ground
- The resistance between CAN-H and voltage.

The resistance must be infinite or very high in all cases (greater than 1 M Ohms).

Hint: The reading can be taken from the same connector if the CAN cables, power supply and ground are exposed. If possible, take readings on the rear of the connector to prevent damage to the terminals in the connector. If this is not possible, use the adapter wiring or loose terminal pins to obtain a good contact.

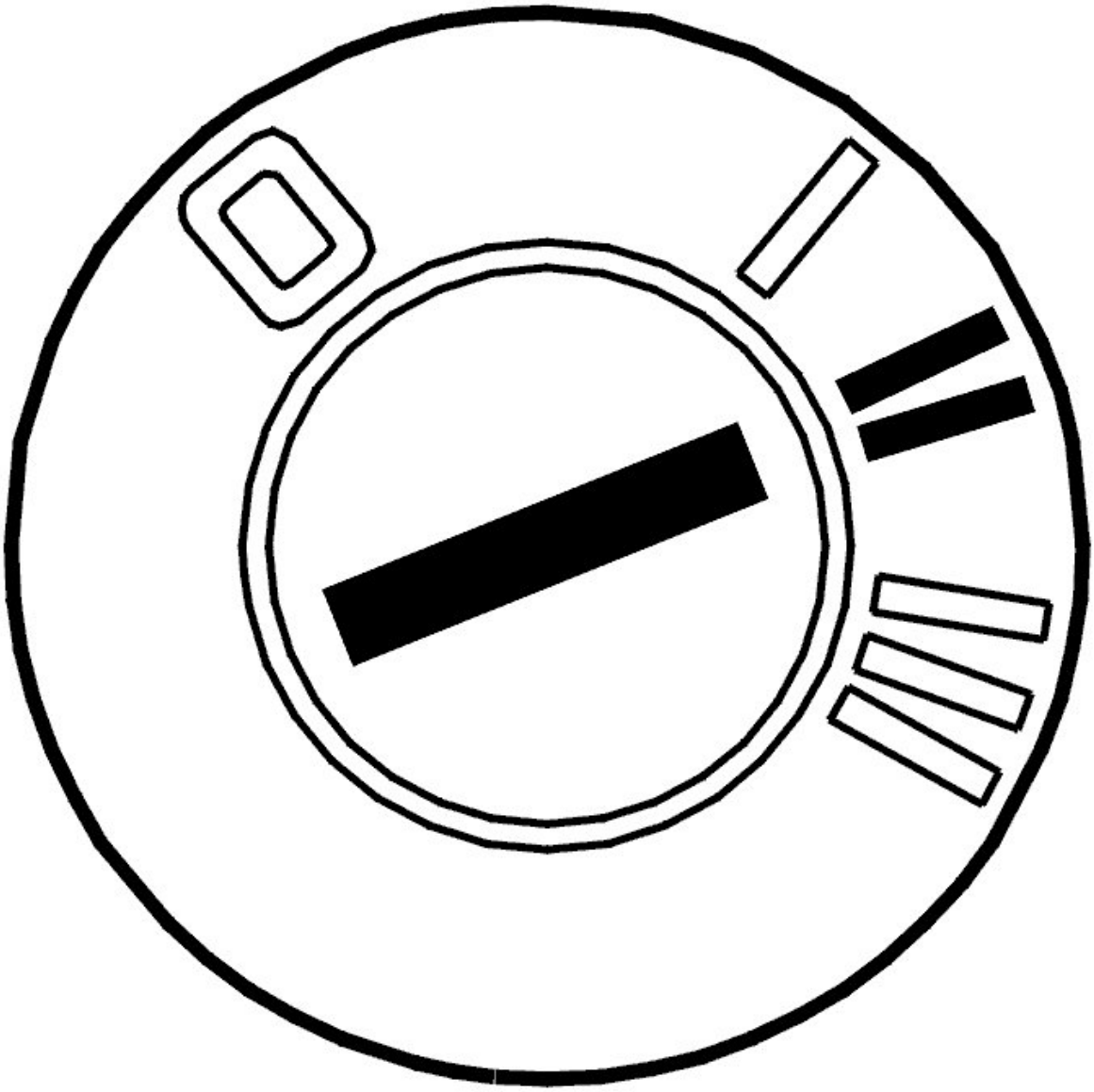


Was a fault detected?

Yes - Identifying fault causes in the CAN network

No - Checking the traffic load on the CAN cables

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on

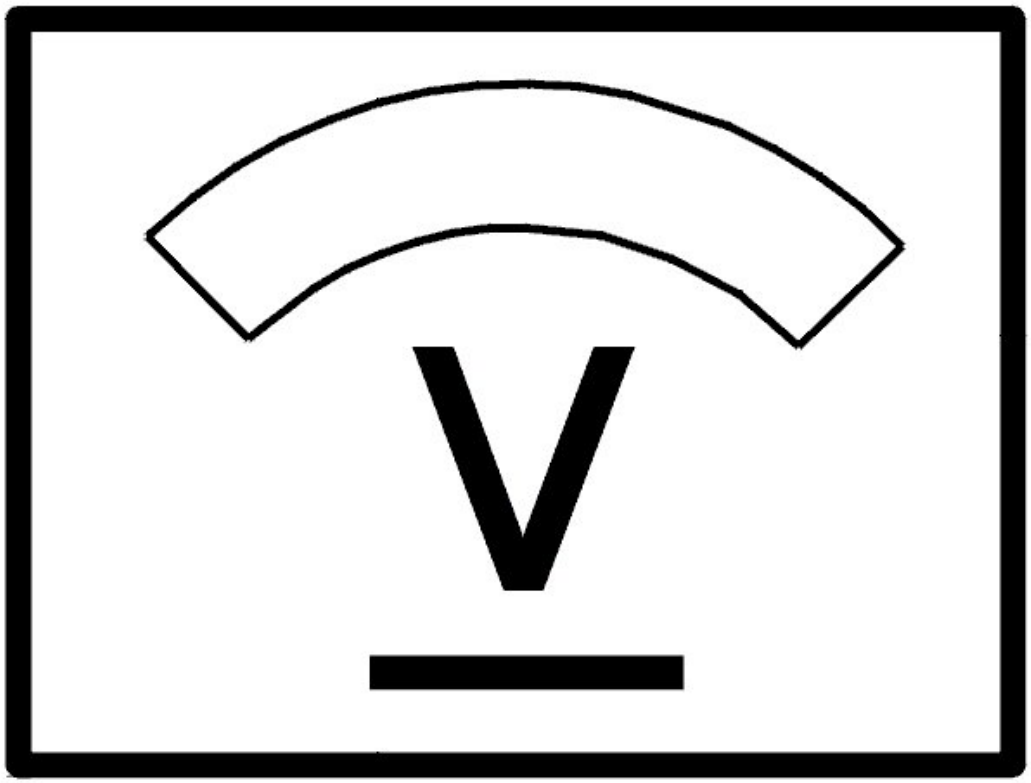
Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

Faults in the CAN network may be due to a control module sending faulty messages that disrupt "normal" communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.

Connect a voltmeter between CAN-L and ground. The voltage must be approximately 2.3 V.

Then connect a voltmeter between CAN-H and ground. The voltage must be approximately 2.8 V.

Hint: If possible measure from the rear of the affected connectors so that they are not damaged.



Is the value OK?

Yes - Fault-tracing without result

No - Identifying a control module in the CAN network

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

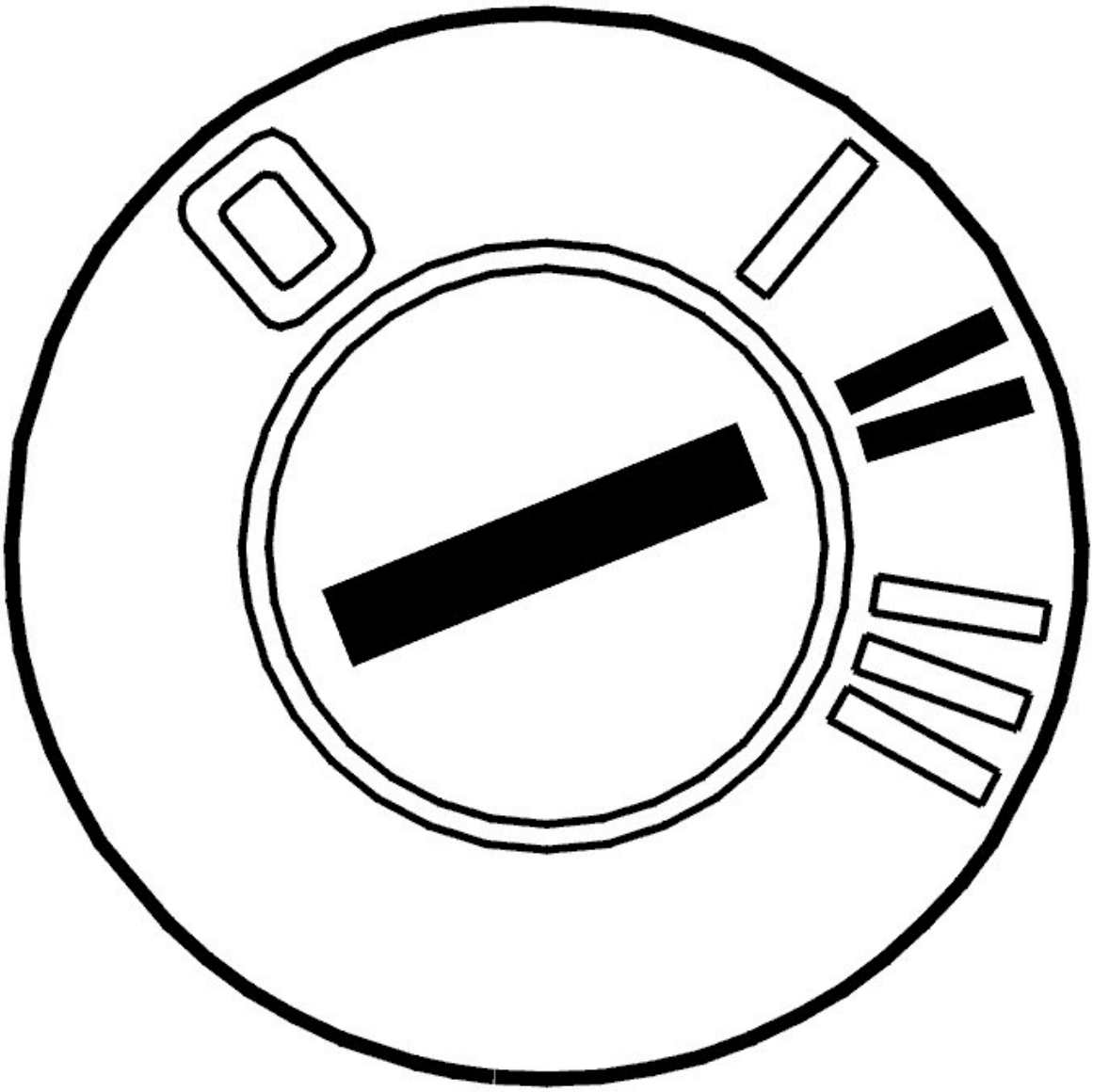
In the event of a short-circuit between one of the CAN cables and voltage or ground, the fault can be located by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located. Connect an ohmmeter between the CAN cable and supply voltage or ground. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be infinite or very high (greater than 1Mohms).
If a fault can be localized in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.

Hint: A short-circuit between the CAN cables and supply voltage or ground may be in either the wiring or in a control module.

Rectify the wiring as necessary. Replace the control module if the fault has been localized to a control module.

Continue - Verification

Identifying a control module in the CAN network



- Connect the battery

Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Ignition on

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network. Connect a voltmeter between the CAN cables. If the communication on the network is correct, the average voltage value should be approximately 0.5 V (0.4 V to 0.6 V). If there is a fault in the communication, the voltage reading will be approximately 0.7 V or higher.
In order to identify from which control module the faulty communication is being transmitted, cut the supply voltage to one control module at a time and check the voltage in the CAN cables again. The easiest way to cut the supply voltage is to remove a fuse. Repeat until the voltage between the CAN cables drops to approximately 0.5 V.

Hint: When the probable faulty control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the fault appears and disappears.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

The control module that is communicating incorrectly must be replaced. Remedy as necessary.

Note! Following a fault involving "disruptive" control modules, other modules may remain in "Limp-Home mode" even after switching the ignition off and on a number of times. To remedy this, disconnect and reconnect the battery negative terminal to restore the control modules to normal function.

Continue - Verification

Fault-tracing without result

Information

Fault-tracing information

Verification shows that the fault is no longer present. The diagnostic trouble code (DTC) was probably caused by an intermittent fault.
Fault-tracing for this diagnostic trouble code (DTC) is not followed by a verification.
You can view the information again or exit fault-tracing for this diagnostic trouble code (DTC).

Do you want to view information again?

Yes - Attempt New Test

No - No Fault Found

Attempt New Test - Checking the resistance of the control area network (CAN) cables

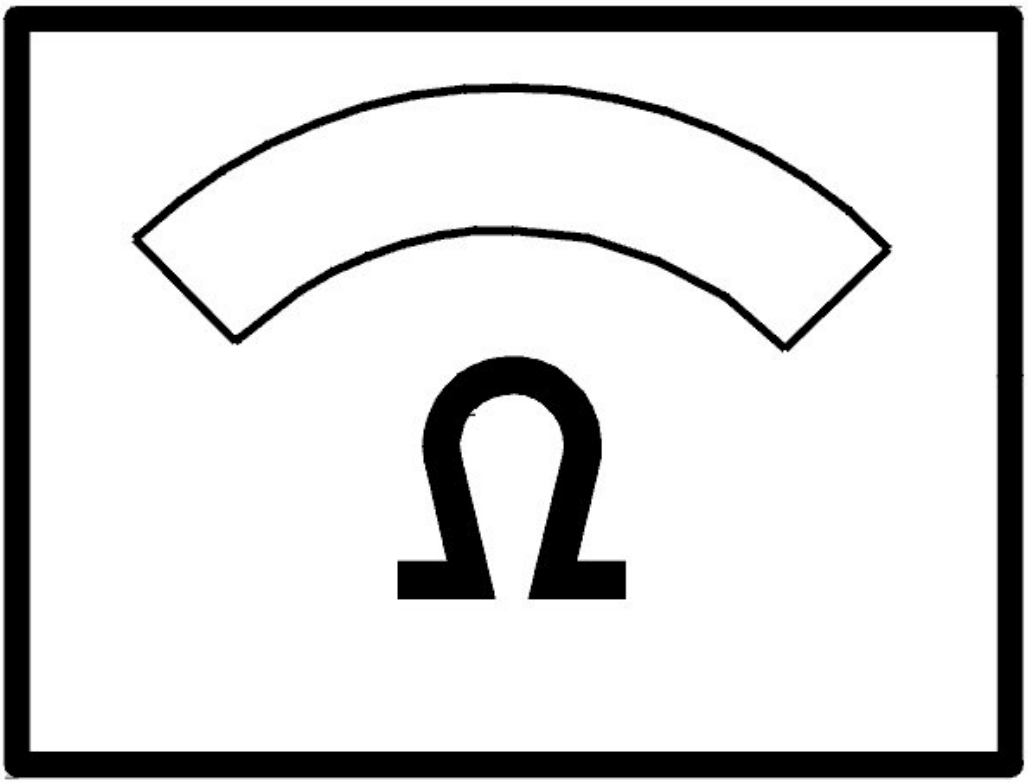
No Fault Found - No Fault Found

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

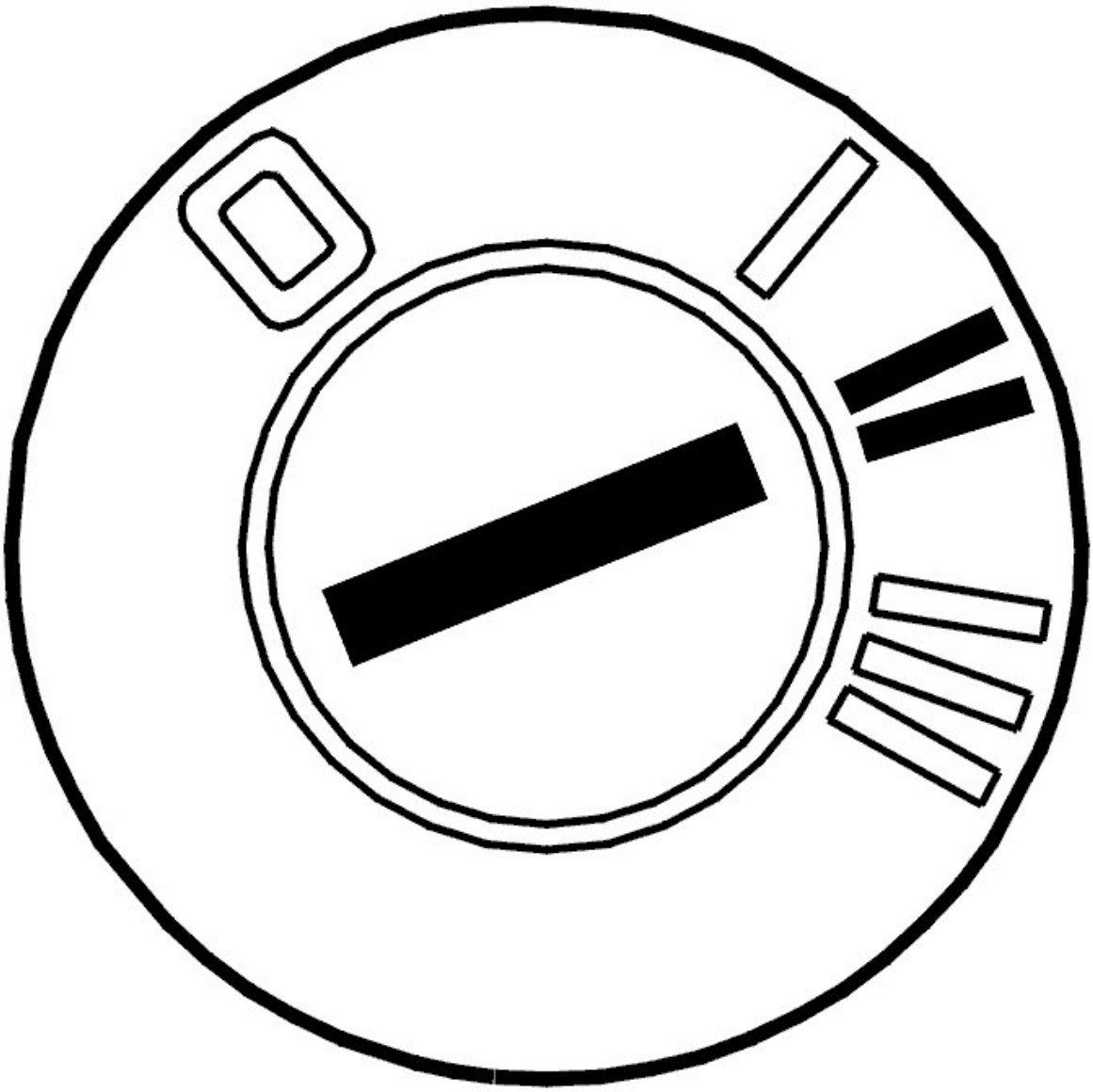
In the event of an open-circuit or a short-circuit between the CAN cables, the fault can be localized by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located. Connect an ohmmeter between the CAN cables. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be 120 ohm.
If a fault can be localized in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.
Remedy the cables as necessary.



Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components, etc.
- Ignition on
- Erase diagnostic trouble codes by clicking the VCT2000 symbol
- Start the car. Allow the car to run for 10 minutes.
- Read off diagnostic trouble codes (DTCs).

Check if a diagnostic trouble codes (DTCs) for communication fault recurs in the central electronic module (CEM).

Does the diagnostic trouble code (DTC) recur?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

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Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the resistance of the control area network (CAN) cables

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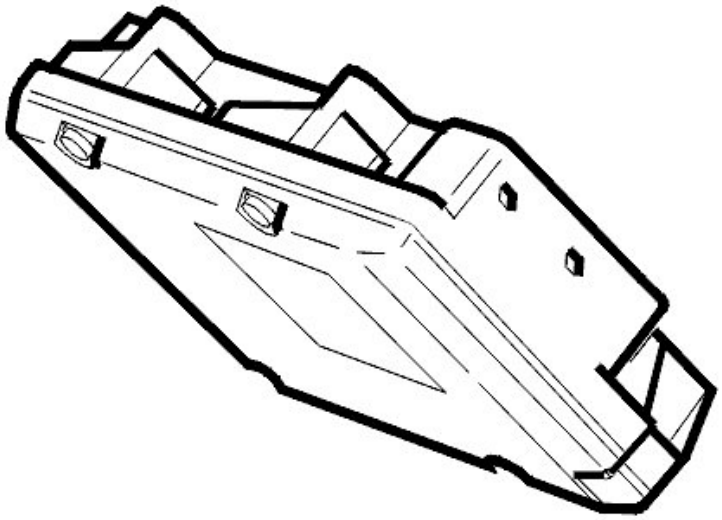
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information PSM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]

- Power seat with memory function does not operate at all
- Automatic seat/door mirror operation does not function.

Faulty Configuration

Faulty configuration

General information

In order to check the control area network (CAN) cables, the resistance in the network must be measured. The resistance between the two controller area network (CAN) wiring, with the network connected 60 ohms. The resistance can differ depending on the configuration of the car. Permitted values are 55-65 ohms. This applies to both the high speed side network and the low speed side network.

Hint: Use the applicable wiring diagram to provide support when taking readings. Take a copy of the data communication side for each model. Note which diagnostic trouble codes (DTCs) are stored in each control module. This facilitates fault-tracing considerably.

Also check if the diagnostic trouble codes (DTCs) for failed communication are stored in the central electronic module (CEM). If this is the case: first fault-trace according to these diagnostic trouble codes (DTCs).

Other information

- General information about fault-tracing in the CAN network See: Body and Frame/Body Control Systems/Testing and Inspection/Initial Inspection and Diagnostic Overview

Continue - Checking the resistance of the control area network (CAN) cables

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Checking the resistance of the control area network (CAN) cables

- Disconnect the battery negative lead. The power to the network must be cut when taking resistance readings. The reading may otherwise be incorrect.

Note! Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Connect the adapter wiring to the central electronic module (CEM).

Hint: Where a breakout box cannot be used, take readings from the rear of the affected connectors if possible. This prevents terminal pins and socket housings being damaged.

When taking readings on the low speed network

- When taking readings on the low speed network, the adapter wiring should be connected to the central electronic module (CEM) and the readings taken from there. The readings can also be taken in the connector for the power seat module (PSM). The advantage of using the adapter wiring connected to the central electronic module (CEM) is that all control modules can be connected to the network when taking readings and there is access to both the high speed and the low speed networks.

This resistance reading only measures main arteries in the low speed network, not the junctions for the road traffic information module (RTI), accessory electronic module (AEM), power seat module (PSM), phone module (PHM), audio module (AUM), driver's door module (DDM) and passenger door module (PDM). See the applicable wiring diagram, Data communication.

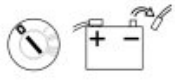
When taking readings on the high speed network

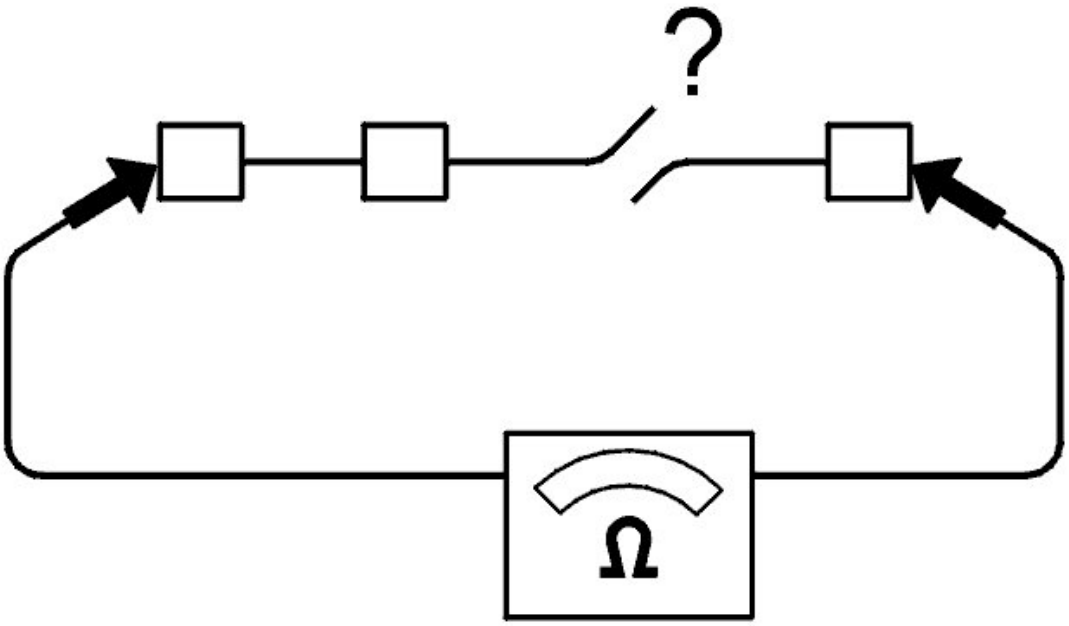
- When taking readings on the high speed network, the readings should be taken at the engine control module (ECM) using adapter wiring. The engine control module (ECM) must be connected. This resistance reading only takes readings from the main arteries in the high speed network. See the applicable wiring diagram, Data communication.

Connect the ohmmeter to the terminals for CAN-L and CAN-H on the relevant network. Work the connectors and twist the cable harness. The resistance must be approximately 60 ohms. Permitted values are 55-65 ohms.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Is the value OK?

Yes - Checking a short-circuit in CAN cables

No - Identifying fault causes in the CAN network

Checking a short-circuit in CAN cables

Connect an ohmmeter between the relevant CAN cable (CAN-L and CAN-H) and the power supply, and between the CAN cable and ground. Twist the connectors and turn the cable harness to different positions at each reading to determine any intermittent short-circuits.

Take the following readings:

- The resistance between CAN-L and ground
- The resistance between CAN-L and voltage
- The resistance between CAN-H and ground
- The resistance between CAN-H and voltage.

The resistance must be infinite or very high in all cases (greater than 1 Mohms).

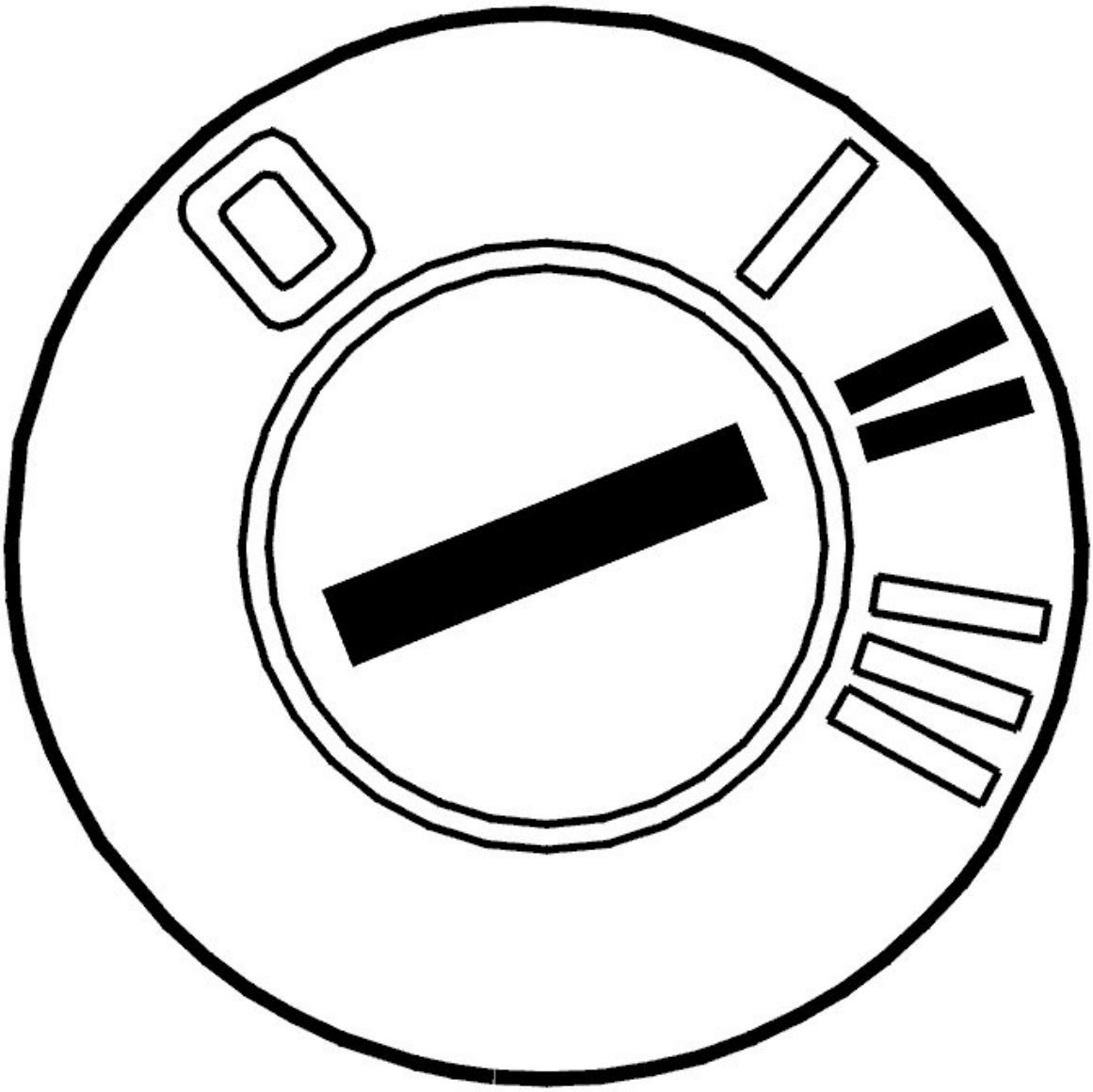
Hint: The reading can be taken from the same connector if the CAN cables, power supply and ground are exposed. If possible, take readings on the rear of the connector to prevent damage to the terminals in the connector. If this is not possible, use the adapter wiring or loose terminal pins to obtain a good contact.

Was a fault detected?

Yes - Identifying fault causes in the CAN network

No - Checking the traffic load on the CAN cables

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on

Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

Faults in the CAN network may be due to a control module sending faulty messages that disrupt "normal" communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.

Connect a voltmeter between CAN-L and ground. The voltage must be approximately 2.3 V.

Then connect a voltmeter between CAN-H and ground. The voltage must be approximately 2.8 V.

Hint: If possible measure from the rear of the affected connectors so that they are not damaged.

Is the value OK?

Yes - Downloading new software

No - Identifying a control module in the CAN network

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

In the event of a short-circuit between one of the CAN cables and voltage or ground, the fault can be located by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located.

Connect an ohmmeter between the CAN cable and supply voltage or ground. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be infinite or very high (greater than 1Mohms).

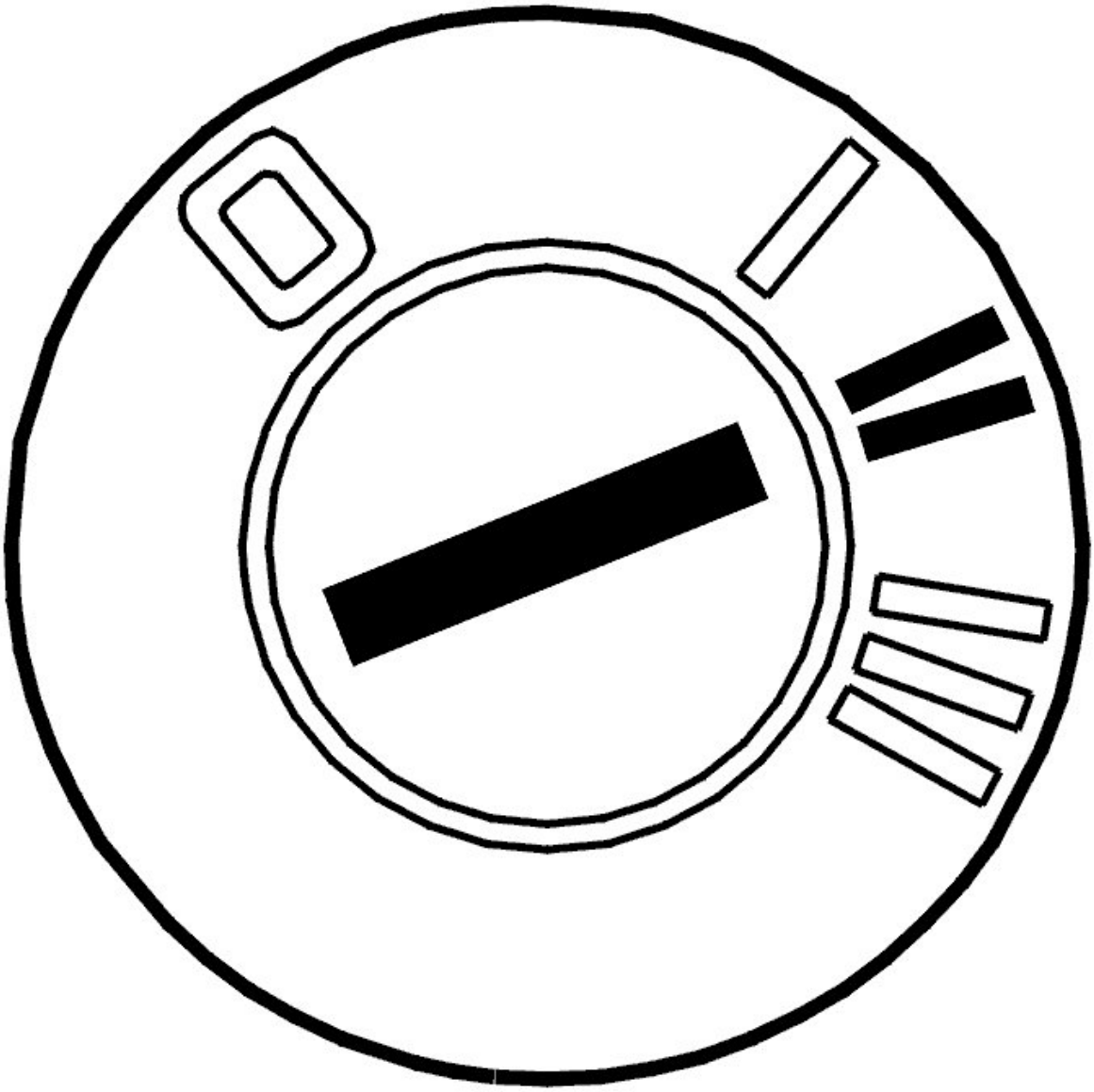
If a fault can be localised in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.

Hint: A short-circuit between the CAN cables and supply voltage or ground may be in either the wiring or in a control module.

Rectify the wiring as necessary. Replace the control module if the fault has been localised to a control module.

Continue - Verification

Identifying a control module in the CAN network



- Connect the battery

Also read: Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting

- Ignition on

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.
Connect a voltmeter between the CAN cables. If the communication on the network is correct, the average voltage value should be approximately 0.5 V (0.4 V to 0.6 V). If there is a fault in the communication, the voltage reading will be approximately 0.7 V or higher.
In order to identify from which control module the faulty communication is being transmitted, cut the supply voltage to one control module at a time and check the voltage in the CAN cables again. The easiest way to cut the supply voltage is to remove a fuse. Repeat until the voltage between the CAN cables drops to approximately 0.5 V.

Hint: When the probable faulty control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the fault appears and disappears.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

The control module that is communicating incorrectly must be replaced. Remedy as necessary.

Note! Following a fault involving "disruptive" control modules, other modules may remain in "Limp-Home mode" even after switching the ignition off and on a number of times. To remedy this, disconnect and reconnect the battery negative terminal to restore the control modules to normal function.

Was a fault detected?

Yes - Verification

No - Downloading new software

Identifying fault causes in the CAN network

- Disconnect a control module that disconnects the CAN network (a control module that has four terminals to the CAN network).

Hint: For the low speed network, suitable places for disconnecting the network are at the steering wheel module (SWM), the driver information module (DIM) or the climate control module (CCM).

In the event of an open-circuit or a short-circuit between the CAN cables, the fault can be localised by disconnecting a control module that disconnects the CAN network. Readings can then be taken to determine on which side of the disconnected control module the fault is located. Connect an ohmmeter between the CAN cables. Take readings at both ends of the CAN network where the network is disconnected. Twist and bend the cable harness to locate any intermittent short-circuits. The resistance must be 120 ohm.
If a fault can be localised in one direction, disconnect the network at a point further down on the CAN network in the direction in which the fault was discovered and repeat the reading. In this way, try to identify where in the network the fault might be located.
Remedy the cables as necessary.

Was a fault detected?

Yes - Verification

No - Downloading new software

Downloading new software

Hint: If no other faults are found, new software can be downloaded to remedy the fault in the control module which stored the diagnostic trouble code (DTC). Downloading of software must occur after agreement with the customer.

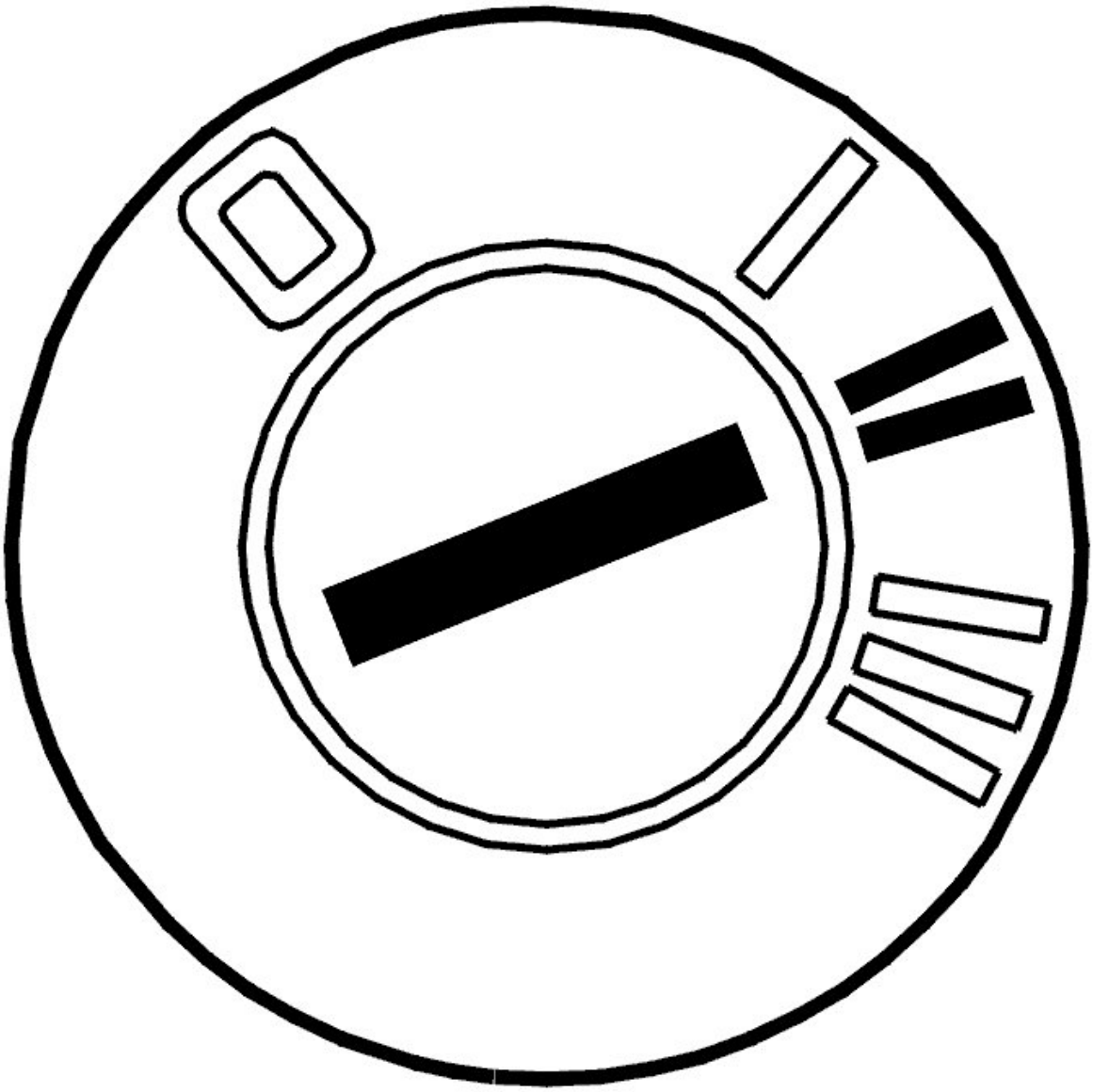
Downloading of software occurs according to the replacement parts catalogue/Index Software components.

Hint: Install a bookmark on this side to continue fault-tracing after downloading new software.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Reinstall the connectors, components, etc.
- Ignition on
- Erase diagnostic trouble codes by clicking the VCT2000 symbol
- Start the car. Allow the car to run for 10 minutes.
- Read off diagnostic trouble codes (DTCs).

Does the diagnostic trouble code (DTC) for a communication fault recur (CEM-1A5X or CEM-1A6X)?

Does the diagnostic trouble code (DTC) recur?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

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Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the resistance of the control area network (CAN) cables

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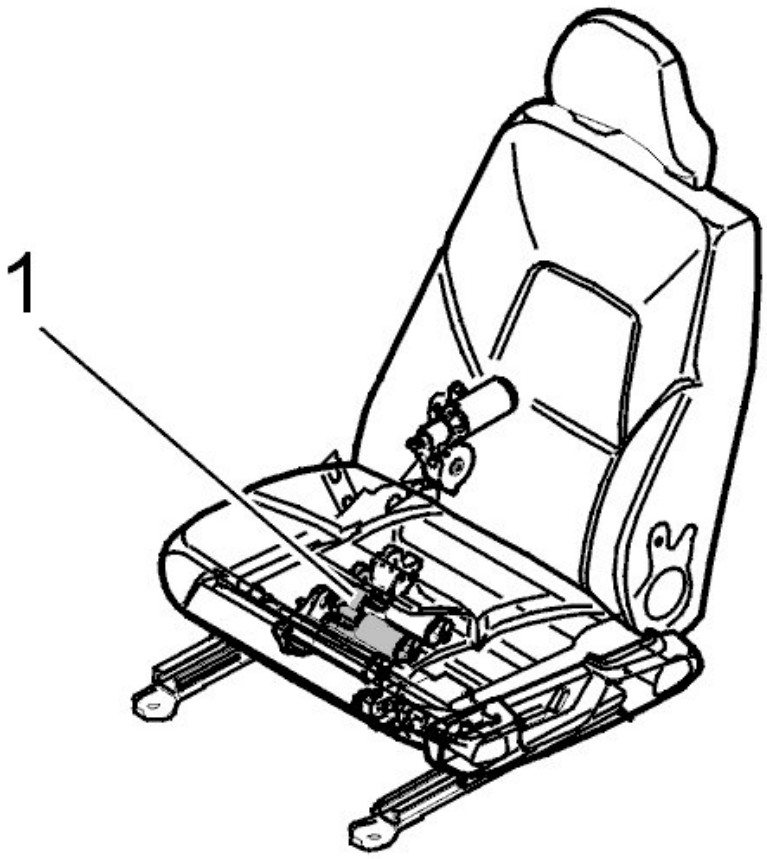
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0001 is stored if no Hall sensor pulse is detected when motor 1 is activated and in operation.

Possible source

- Defective Hall sensor in motor 1.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

- Automatic seat control does not function (automatic control of other motors functioning as normal).

Faulty Signal

Faulty signal. Intermittent fault

Checking cable

Check the power seat module (PSM) and motor connector for contact resistance and oxidation according to Checking wiring and terminals.

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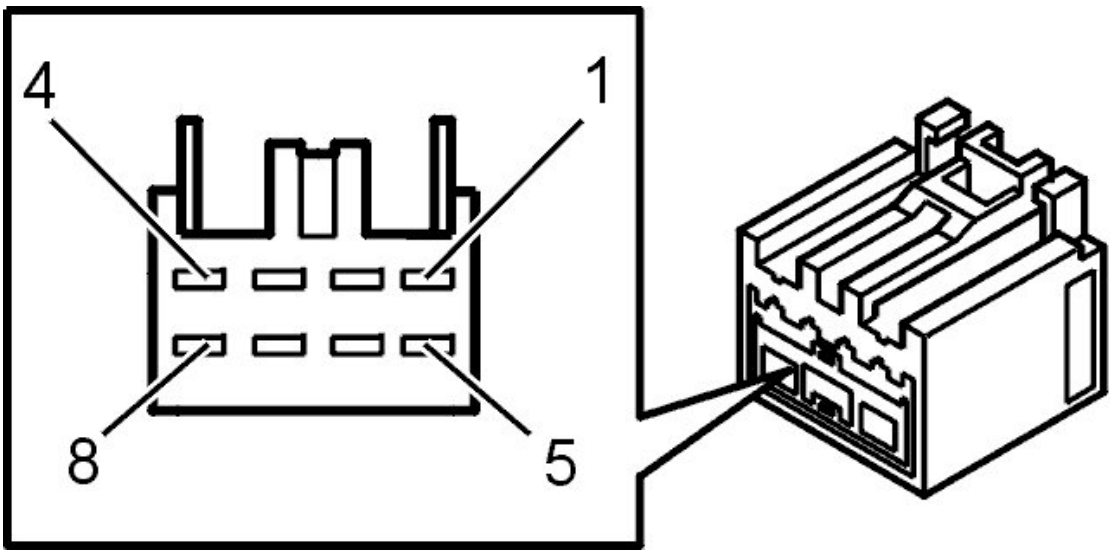
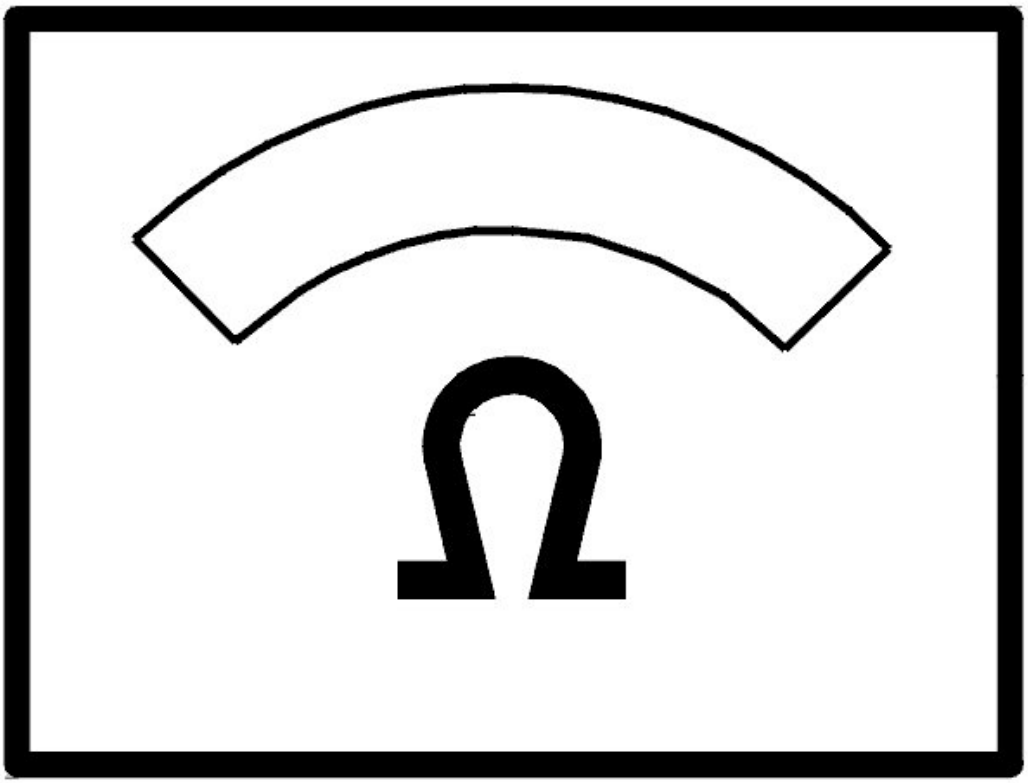
Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
The Hall sensor is integrated in the motor.
Check the wiring between the power seat module (PSM) and the sensor according to the table below for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

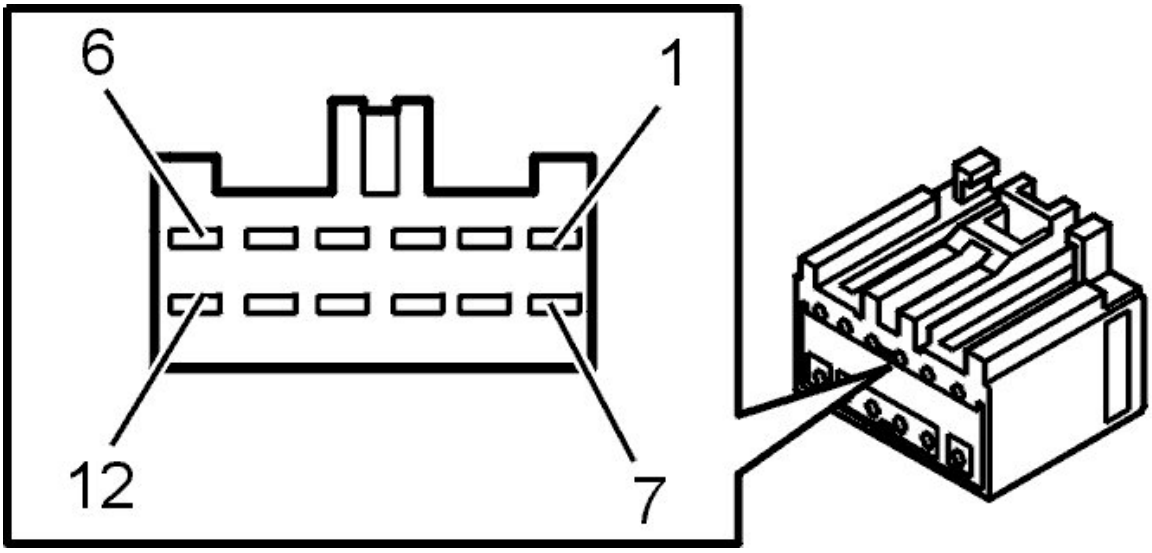
DTC	Covers motor	Terminal	Terminal
PSM-0001	M1	#3E	#4E
PSM-0002	M2	#3D	#4D
PSM-0003	M3	#7E	#8E
PSM-0004	M4	#11E	#12E

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





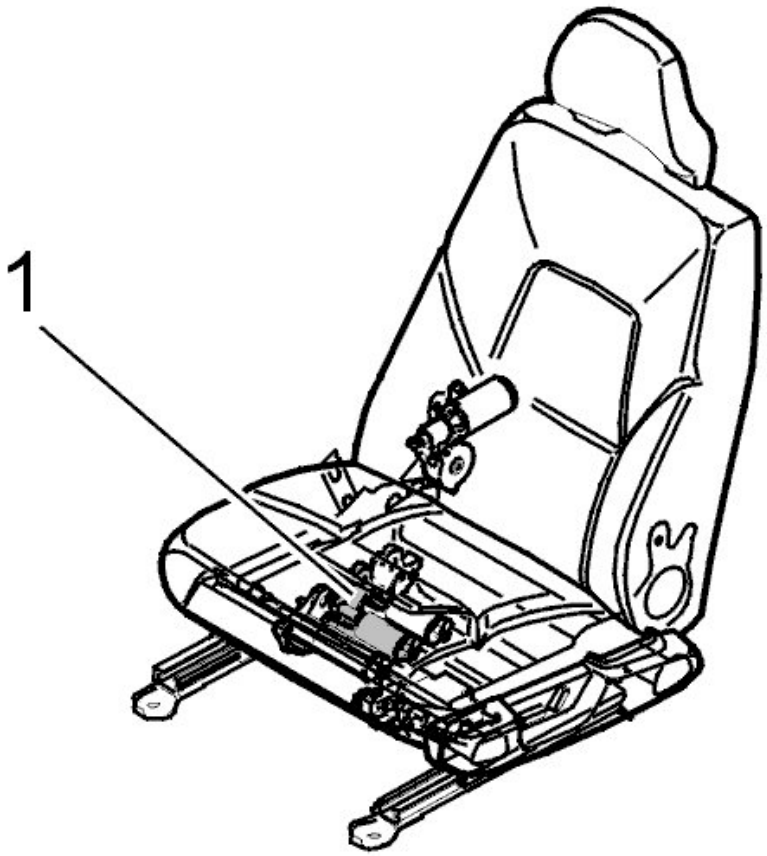


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0001 is stored if no Hall sensor pulse is detected when motor 1 is activated and in operation.

Possible source

- Defective Hall sensor in motor 1.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

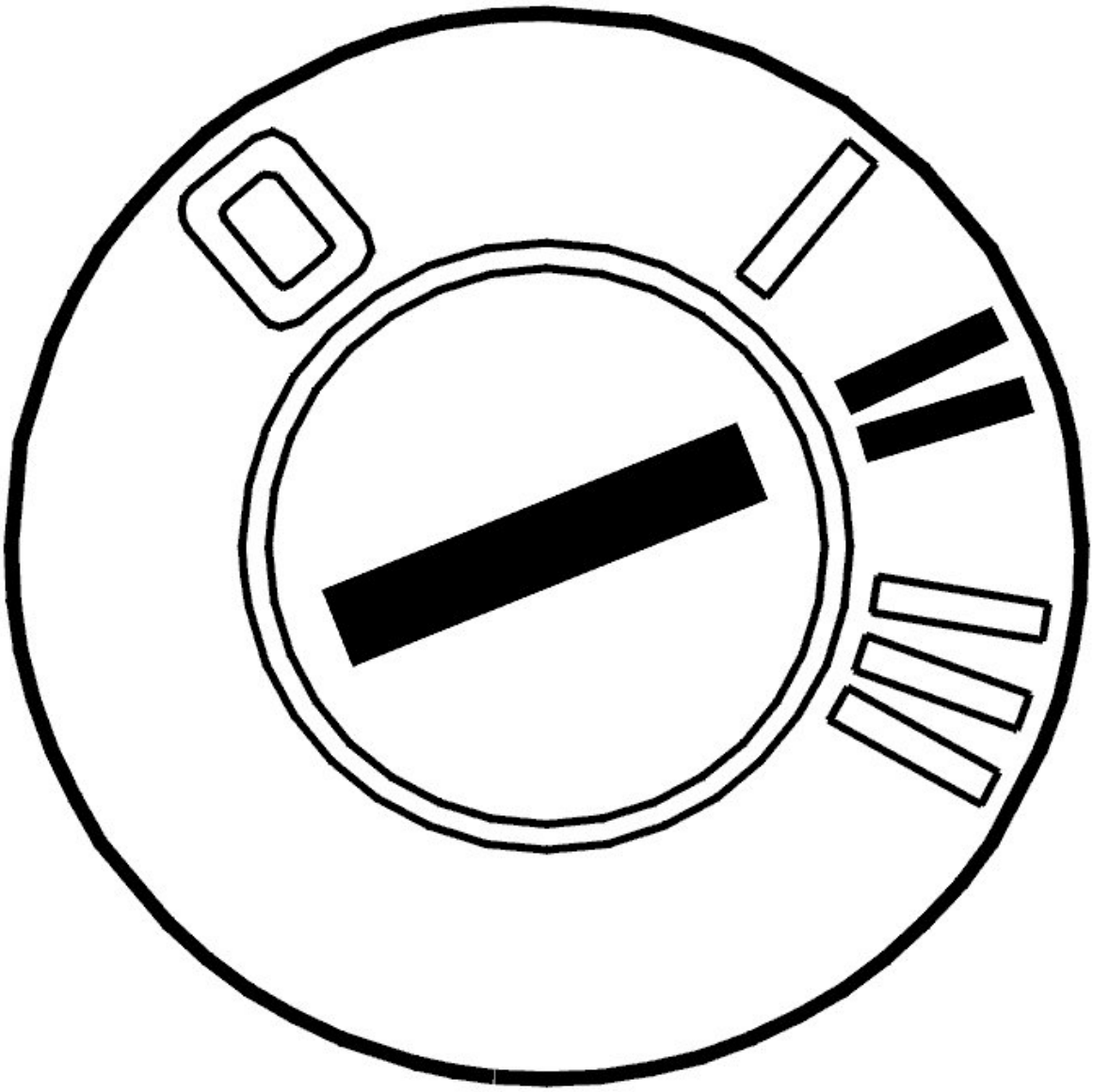
- Automatic seat control does not function (automatic control of other motors functioning as normal).

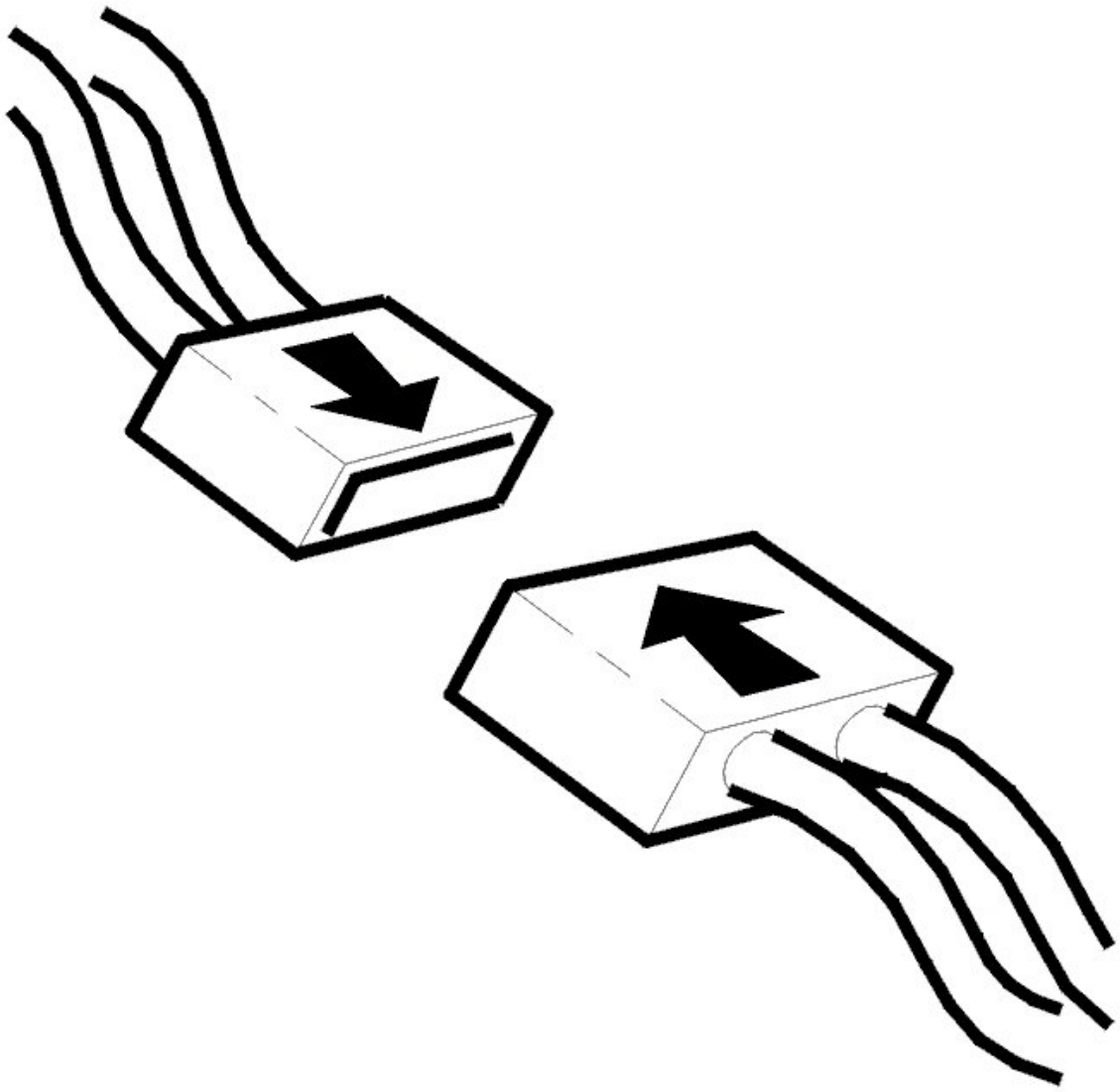
Faulty Signal

Faulty signal. Permanent fault

Checking the Hall sensor signal

Hint: The motor should be activated when the check is carried out.





- Reconnect components, connectors etc.
- Ignition on.

Read off value.
Check whether the power seat module (PSM) receives the signal from the Hall sensor. Operate the relevant seat motor and check whether the value counts upwards and downwards as the seat is moved in each direction.
The value should count up or down depending on seat operation.

Is the function OK?

Yes - Fault Found

No - Checking wiring and components

Checking wiring and components

Check the cable between the power seat module (PSM) #3E and the Hall sensor, and the cable between the power seat module (PSM) #4E and the Hall sensor for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault and a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and

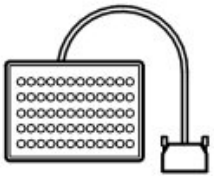
Terminals. Permanent Fault.
Check hall sensor and replace if necessary.

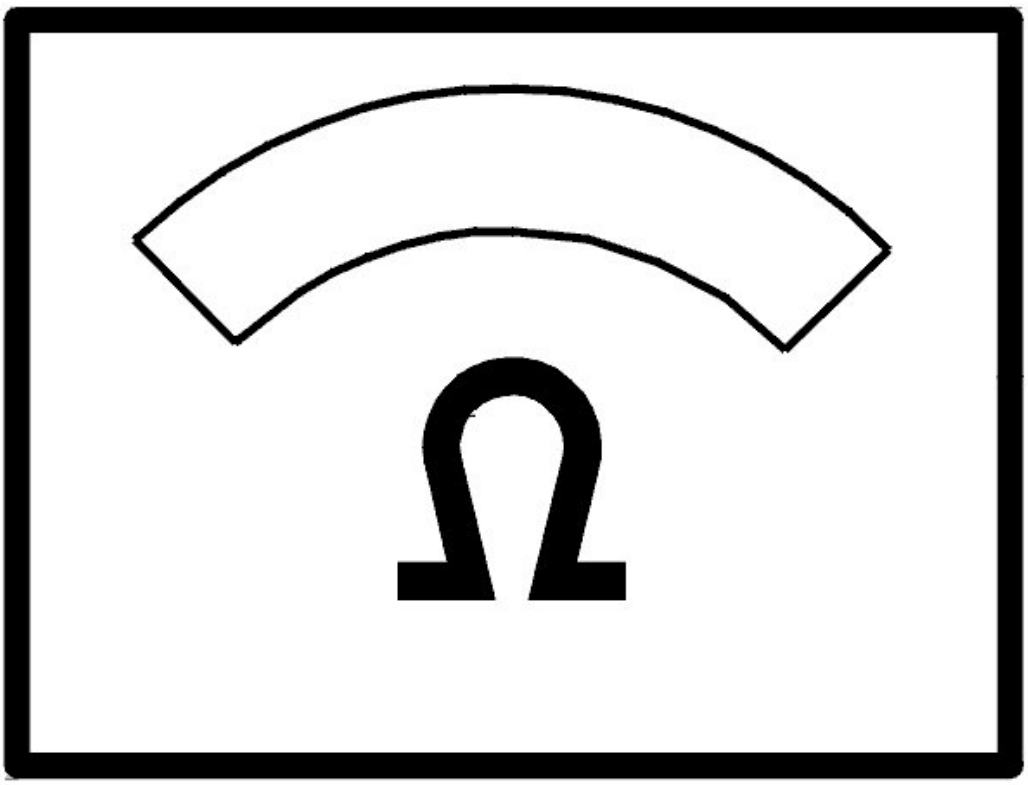
Hint: The sensor should generate a pulsed signal.

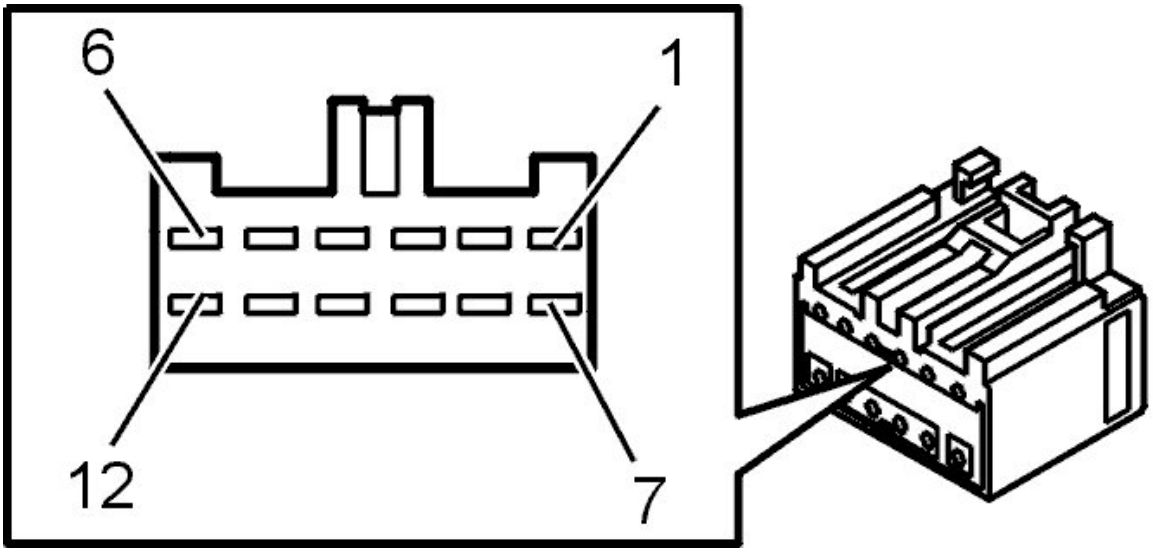
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





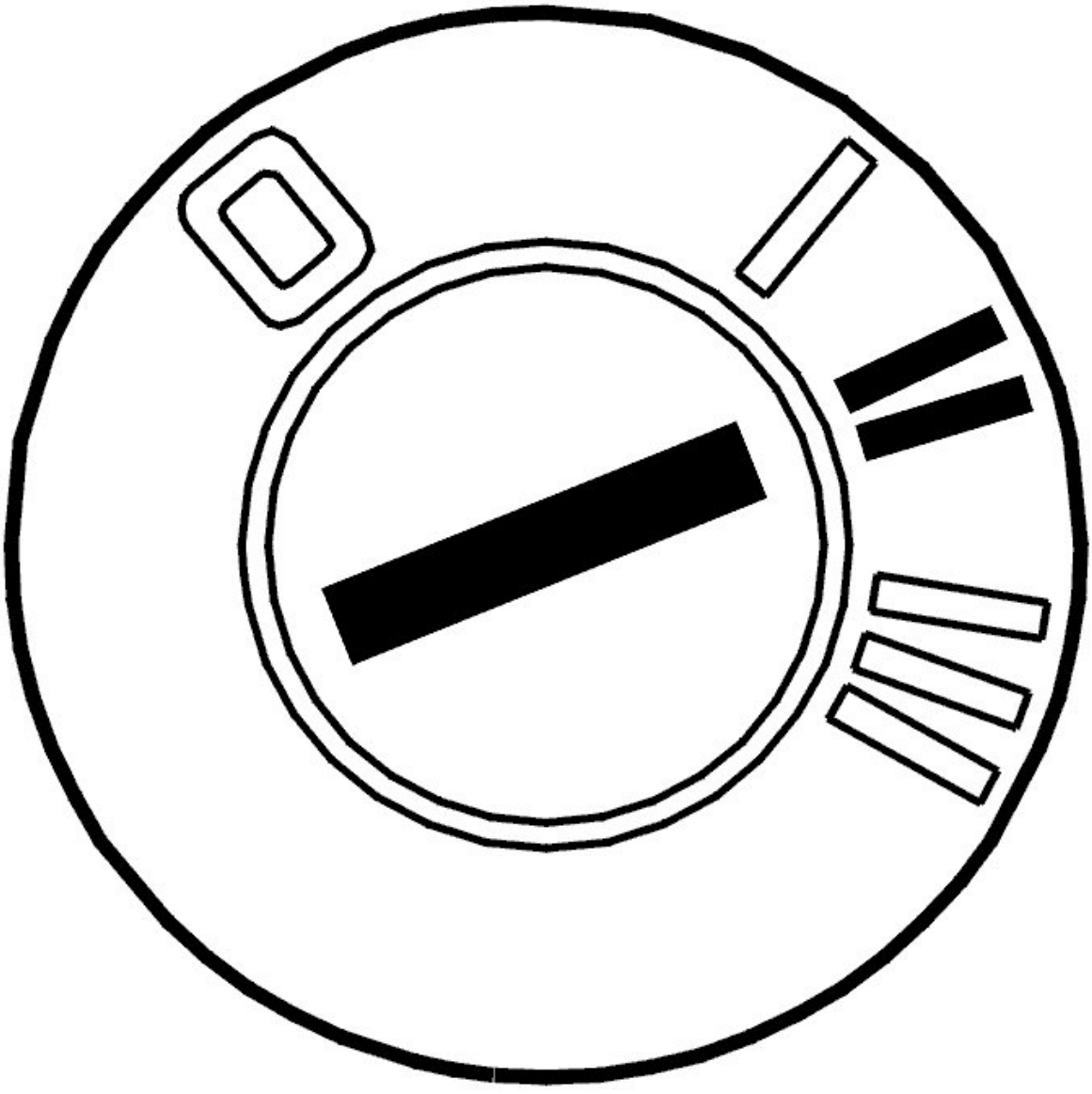


Select Continue

Continue - Verification

Verification

Hint: The motor should be activated when the check is carried out.



- Ignition on.

Read off value.
The Hall sensor must generate a pulsed signal and the power seat module (PSM) should count up or down depending on the movement of the seat.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the Hall sensor signal

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 2. Memory button 2 must be activated for the diagnostic trouble code (DTC) to be detected. Diagnostic trouble code (DTC) PSM-001A is stored if the power seat module (PSM) detects that the setting in memory position 2 does not correspond with a calculated check sum.

Possible source
- Memory position 2 not stored.
- Memory position incorrectly stored.

Fault symptom[s]
- Memory function 2 does not function.

Internal Fault

Internal fault. Intermittent fault

Fault-tracing information

Internal fault in the power seat module (PSM). Replace the power seat module (PSM). See Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 2. Memory button 2 must be activated for the diagnostic trouble code (DTC) to be detected. Diagnostic trouble code (DTC) PSM-001A is stored if the power seat module (PSM) detects that the setting in memory position 2 does not correspond with a calculated check sum.

Possible source
- Memory position 2 not stored.
- Memory position incorrectly stored.

Fault symptom[s]
- Memory function 2 does not function.

Internal Fault

Internal fault. Permanent fault

Checking seat function

Program in seat position 2.
Move seat to another position.
Attempt to move the seat to memory position 2.

Does the memory function correctly?

Yes - Fault Found

No - Checking the control panel

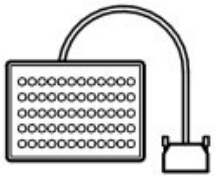
Checking the control panel

Check whether the signal from the control panel is received by the power seat module (PSM).
To read off the input signal to the power seat module (PSM) for memory button 2, select Mem 2 from the menu.
Read off the value.

Hint: When checking the control panel, check if the resistance between terminal #6C and the terminal pin is 0 ohms.

Button	Measure at:
Memory button 2	#1C

Other information
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - Checking the memory in the power seat module (PSM)

No - Replacing the component

Replacing the component

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Checking the memory in the power seat module (PSM)

The power seat module (PSM) has detected a fault in the memory. Try programming in a new seat position. If this does not work, the actual seat position can be compared with the programmed seat position.
As soon as the memory has been programmed the actual value should be the same as the programmed value.

Does the memory function correctly?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the power seat module (PSM) according to Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Select Continue

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

The check is performed by checking the diagnostic trouble code (DTC) status.
Activate button

Is the diagnostic trouble code (DTC) now intermittent?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking seat function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 3. Memory button 3 must be activated for the diagnostic trouble code (DTC) to be detected. Diagnostic trouble code (DTC) PSM-001B is stored if the power seat module (PSM) detects that the setting in memory position 3 does not correspond with a calculated check sum.

Possible source
- Memory position 3 not stored.
- Memory position incorrectly stored.

Fault symptom[s]
- Memory function 3 does not function.

Internal Fault

Internal fault. Intermittent fault

Fault-tracing information

Internal fault in the power seat module (PSM). Replace the power seat module (PSM). See Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 3. Memory button 3 must be activated for the diagnostic trouble code

(DTC) to be detected. Diagnostic trouble code (DTC) PSM-001B is stored if the power seat module (PSM) detects that the setting in memory position 3 does not correspond with a calculated check sum.

Possible source

- Memory position 3 not stored.
- Memory position incorrectly stored.

Fault symptom[s]

- Memory function 3 does not function.

Internal Fault

Internal fault. Permanent fault

Checking seat function

Program in seat position 3.
Move seat to another position.
Attempt to move the seat to memory position 3.

Does the memory function correctly?

Yes - Fault Found

No - Checking the control panel

Checking the control panel

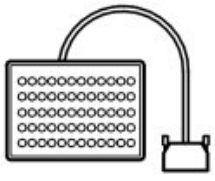
Check whether the signal from the control panel is received by the power seat module (PSM).
To read off the input signal to the power seat module (PSM) for memory button 3, select Mem 3 from the menu.
Read off the value.

Hint: When checking the control panel, check if the resistance between terminal #6C and the terminal pin is 0 ohms.

Button	Measure at:
Memory button 3	#16C

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - Checking the memory in the power seat module (PSM)

No - Replacing the component

Replacing the component

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Checking the memory in the power seat module (PSM)

The power seat module (PSM) has detected a fault in the memory. Try programming in a new seat position. If this does not work, the actual seat position can be compared with the programmed seat position.
As soon as the memory has been programmed the actual value should be the same as the programmed value.

Does the memory function correctly?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the power seat module (PSM) according to Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

The check is performed by checking the diagnostic trouble code (DTC) status.
Activate button

Is the diagnostic trouble code (DTC) now intermittent?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

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No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking seat function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-001C is stored if the power seat module (PSM) registers an open-circuit in the LH/RH detection.

Possible source
- Control panel not connected.
- Defective control panel.
- Open-circuit in the control circuit (LH/RH).

Fault symptom[s]
- The seat does not function at all via the control panel.

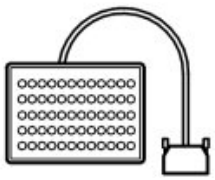
Signal Missing

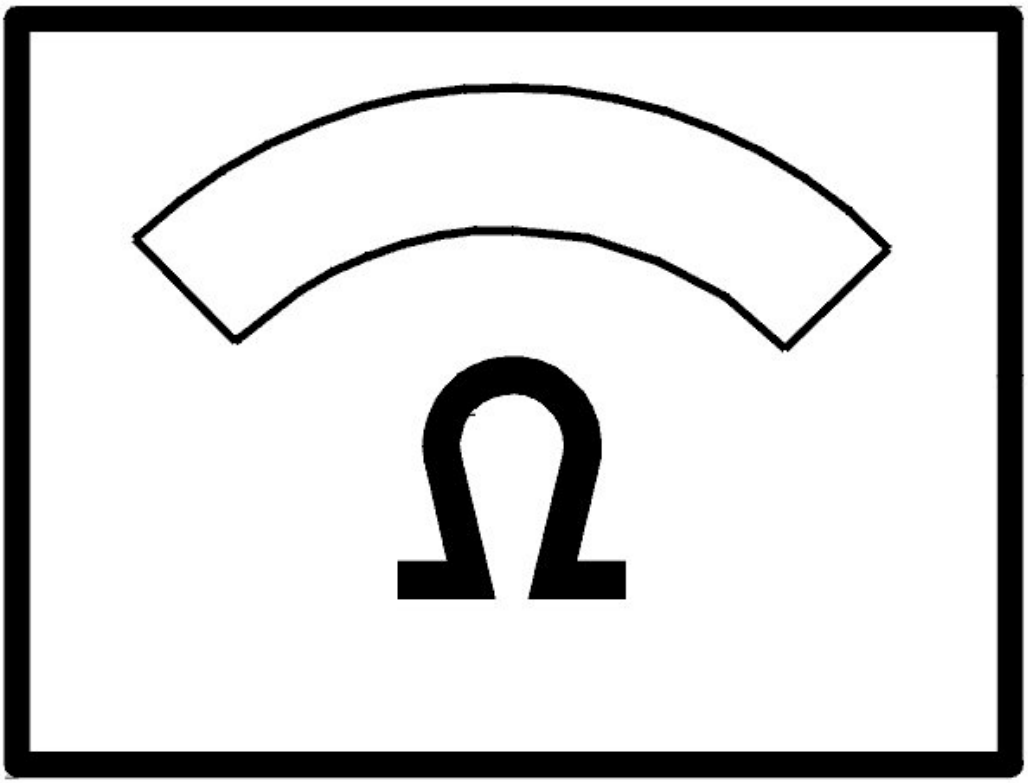
Signal missing. Intermittent fault

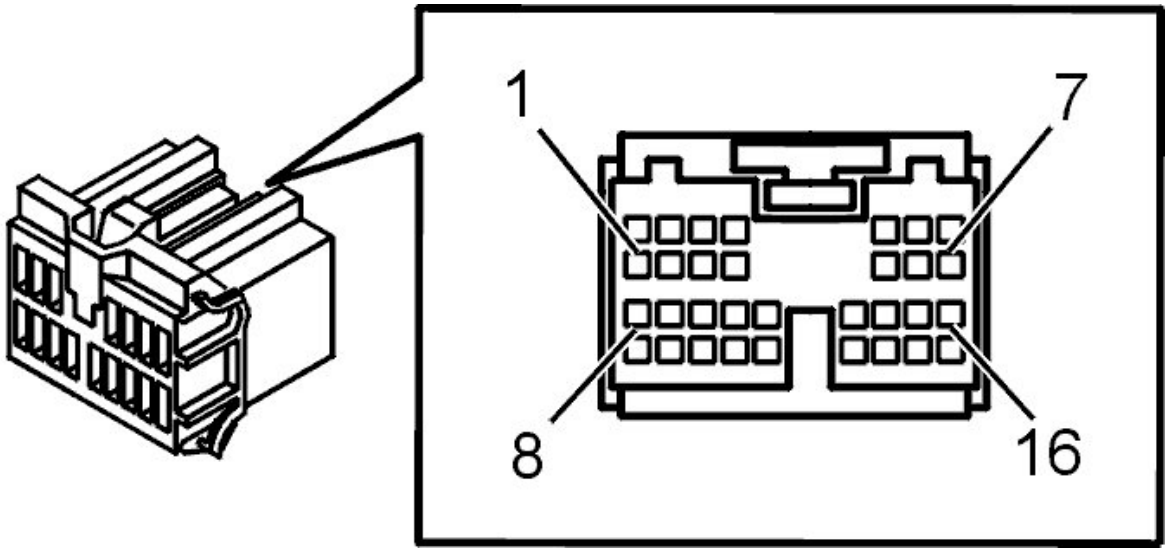
Checking control panel terminals

Check that the control panel is correctly connected to the seat.
Check the control circuit between the power seat module (PSM) #4C and #5C. Check for an open-circuit. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Was a fault detected?

Yes - DONE

No - Replacing component

Replacing component

Try a new control panel.

Other information:

- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM)
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-001C is stored if the power seat module (PSM) registers an open-circuit in the LH/RH detection.

Possible source

- Control panel not connected.
- Defective control panel.
- Open-circuit in the control circuit (LH/RH).

Fault symptom[s]

- The seat does not function at all via the control panel.

Signal Missing

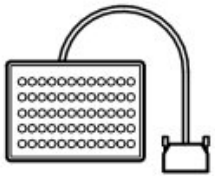
Signal missing. Permanent fault

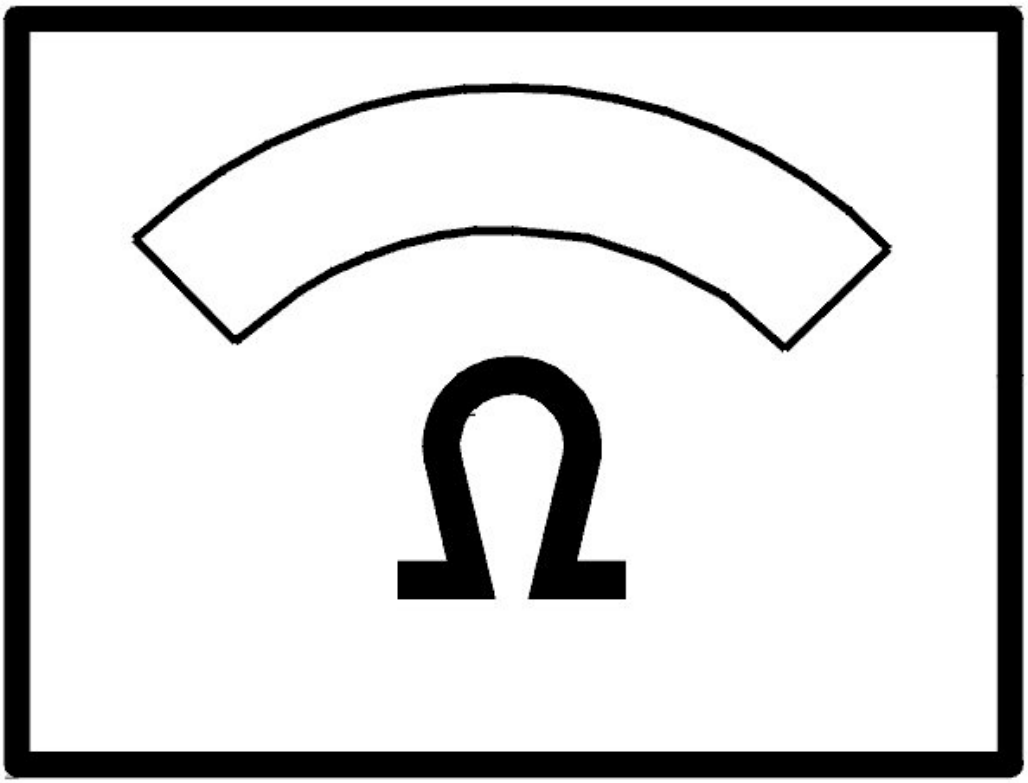
Checking control panel terminals

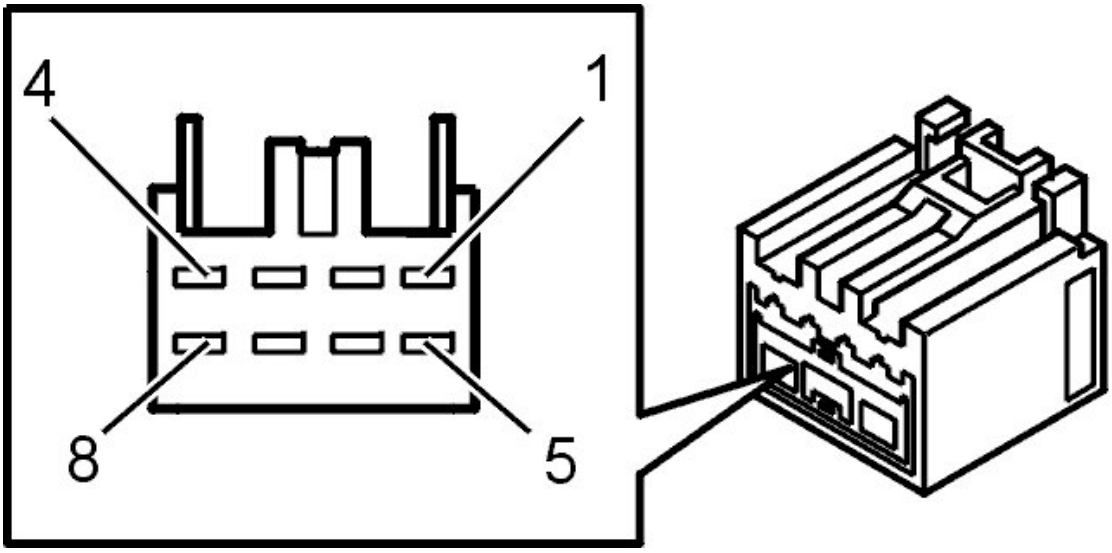
Check that the control panel is correctly connected to the seat.
Check the control circuit between #C4 and #C5. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Was a fault detected?

Yes - Fault Found

No - Replacing the component

Replacing the component

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-001D is stored if the power seat module (PSM) registers a fault in the main relay or in the power supply.

Possible source
- Defective power seat module (PSM).
- No power supply to the motors.

Fault symptom[s]
- The seat does not function at all.

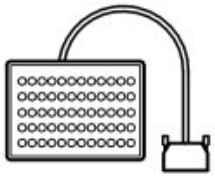
Intermittent Fault

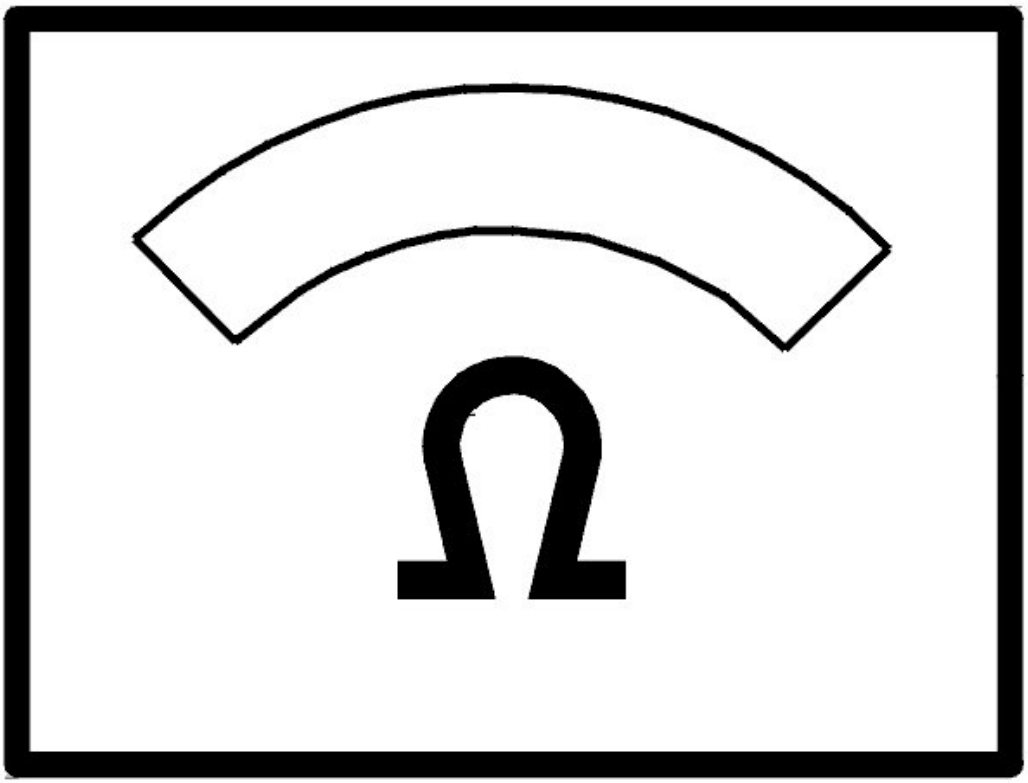
Internal fault. Intermittent fault

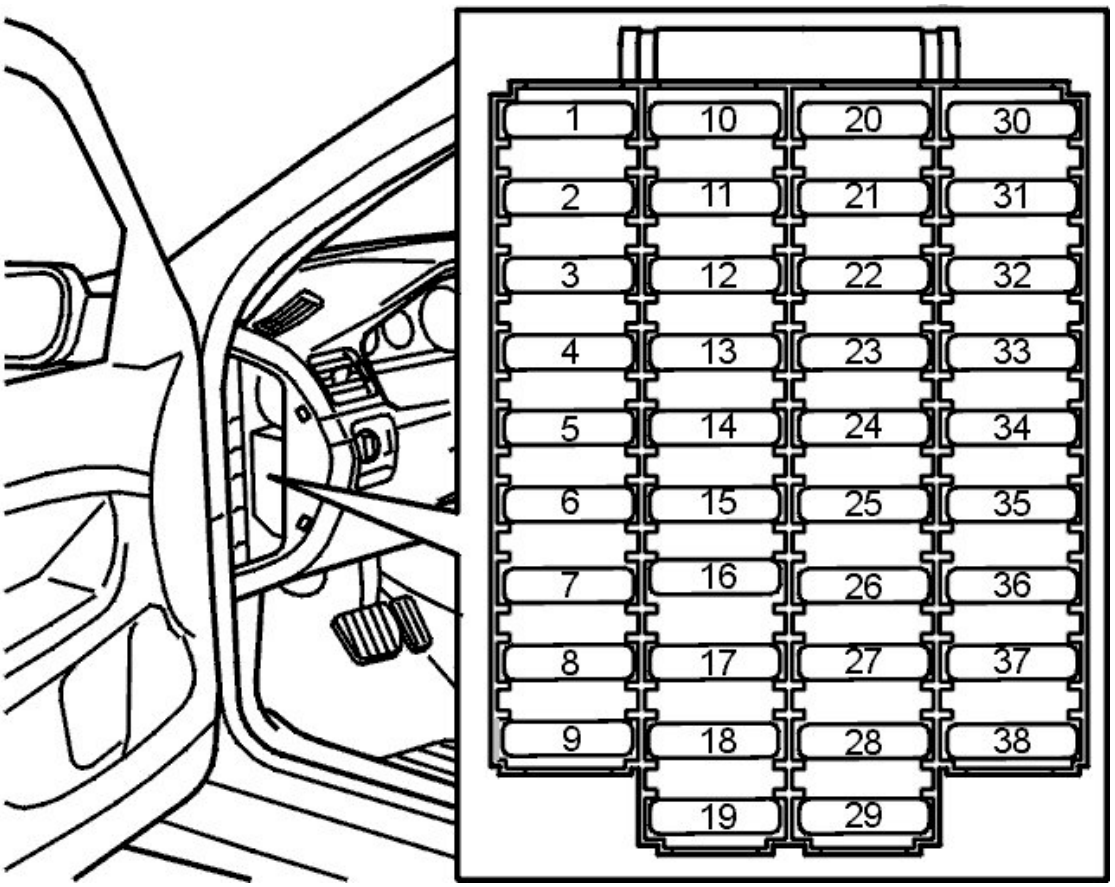
Checking supply

Check passenger compartment fuse 4 (11C/4:2)
Check the cable between the power seat module (PSM) terminal #A1 and passenger compartment fuse 4 (11C/4:2). Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
If the fuse has blown fault-trace for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults
Check the connector
Check passenger compartment fuse 24 (11C/24:2)
Check the cable between power seat supply relay (2/29) #3 and passenger compartment fuse 24 (11C/24:2). Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check that the relay is not is defective.
Check the cable between the power seat module (PSM) #B1 and power seat supply relay (2/29) #1. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



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Was a fault detected?

Yes - Fault-tracing information

No - Replacing the component

Replacing the component

An internal relay in the power seat module (PSM) has stuck in active position.
Try to activate the motor.
Check the supply to the control modules.
If no faults were found, try a new power seat module (PSM).

Other information:

- For information about replacing the control module, see Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Continue - DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking supply

Permanent Fault

Internal fault. Permanent fault

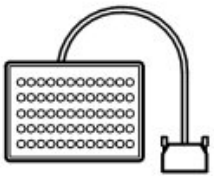
Checking supply

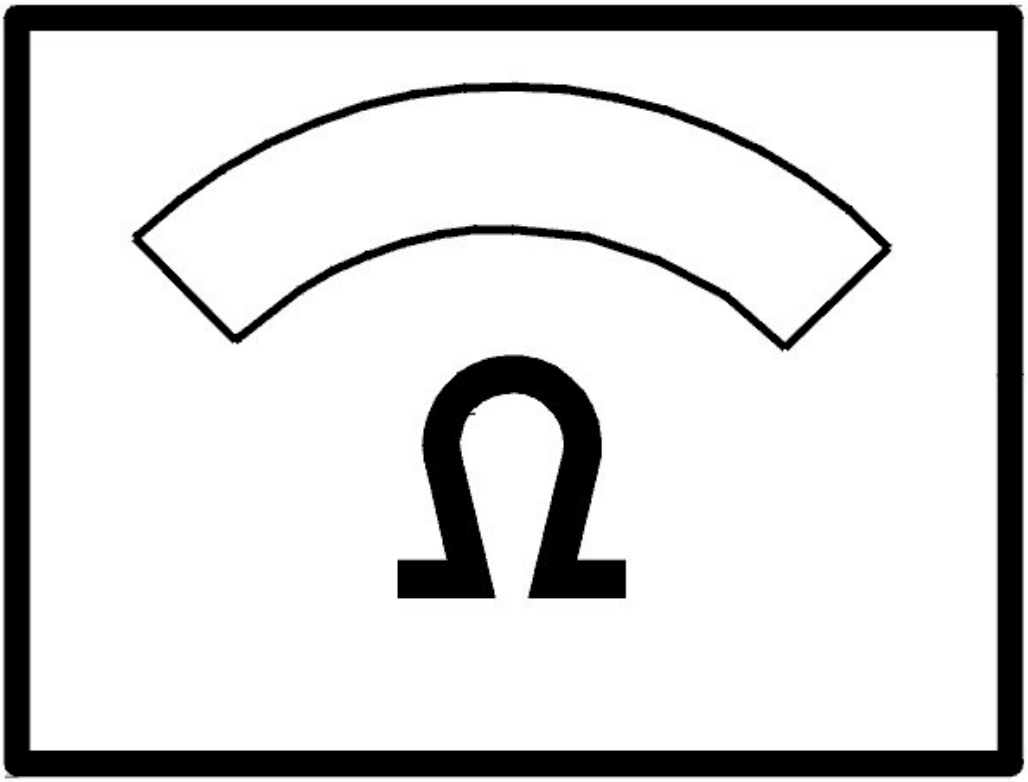
Check passenger compartment fuse 4 (11C/4:2).
Check the cable between the power seat module (PSM) connector #A1 and passenger compartment fuse 4 (11C/4:2). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
If the fuse has blown, fault-trace for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check connector (54/24:1)
Check passenger compartment fuse 24 (11C/24:2)
Check the cable between power seat module (PSM) supply relay (2/29) #3 and passenger compartment fuse 24 (11C/24:2). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check that the relay is not defective.
Check the cable between the power seat module (PSM) connector terminal #B1 and power seat supply relay (2/29) #1. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking

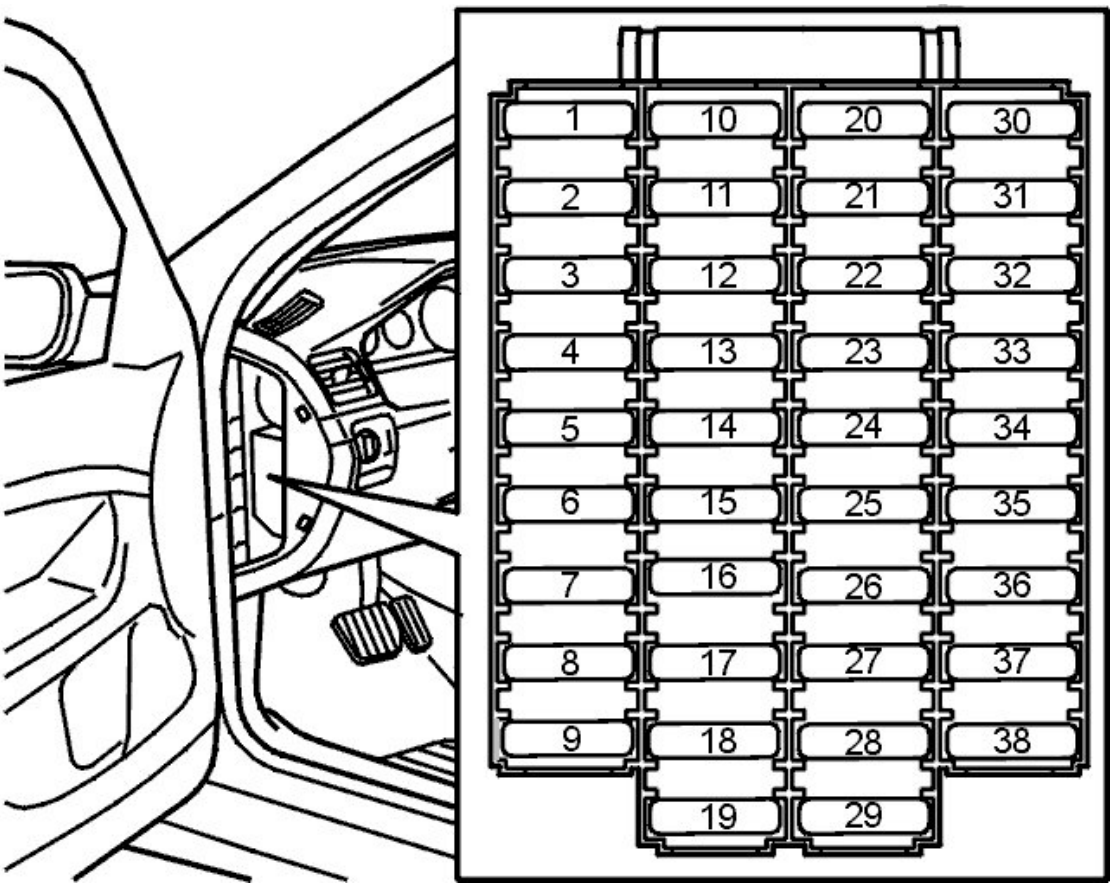
Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Were any faults found?

Yes - Fault Found

No - Replace / program component

Replace / program component

An internal relay in the power seat module (PSM) is defective.
Reprogram the power seat module (PSM).

Other information

- For further information about programming and replacing the power seat module (PSM), see Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

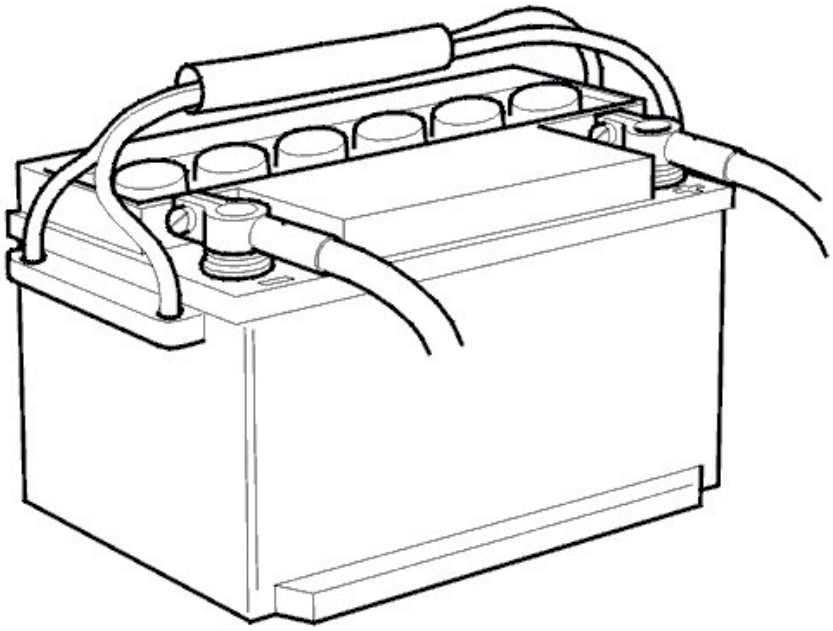
Select Continue

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The voltage to the power seat module (PSM) is too low in relation to the voltage in the central electronic module (CEM). Diagnostic trouble code (DTC) PSM-001E is stored if the voltage is more than 2.5 V under the CEM voltage.

Possible source
- Supply voltage too low.

Fault symptom[s]
- The seat does not function at all.

Signal Too Low

Signal too low. Permanent fault

Checking voltage level

Read of the voltage level in the control modules.

Note! None of the motors should be operating when reading off.

The levels between the central electronic module (CEM) and the power seat module (PSM) should not deviate by more than a maximum of one volt. A small difference as a result of contact resistance is acceptable.

Are the voltage levels OK?

Yes - Fault-tracing information

No - Checking supply

Fault-tracing information

The fault is not currently present but has been previously.

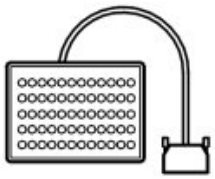
Continue - No Fault Found

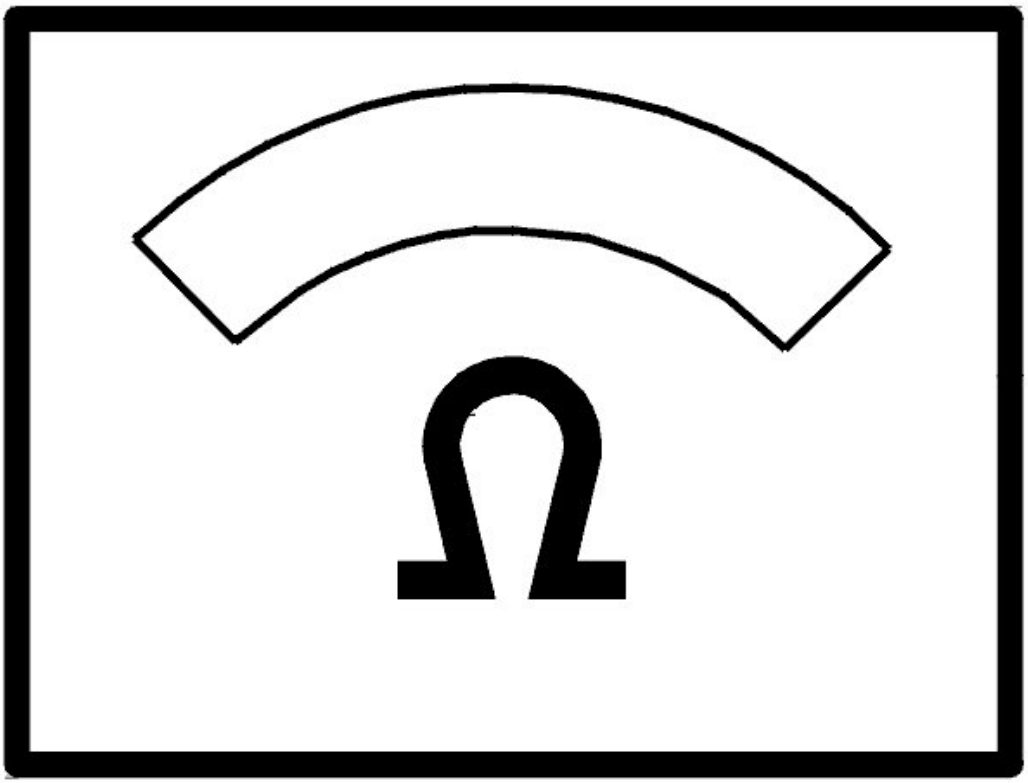
Checking supply

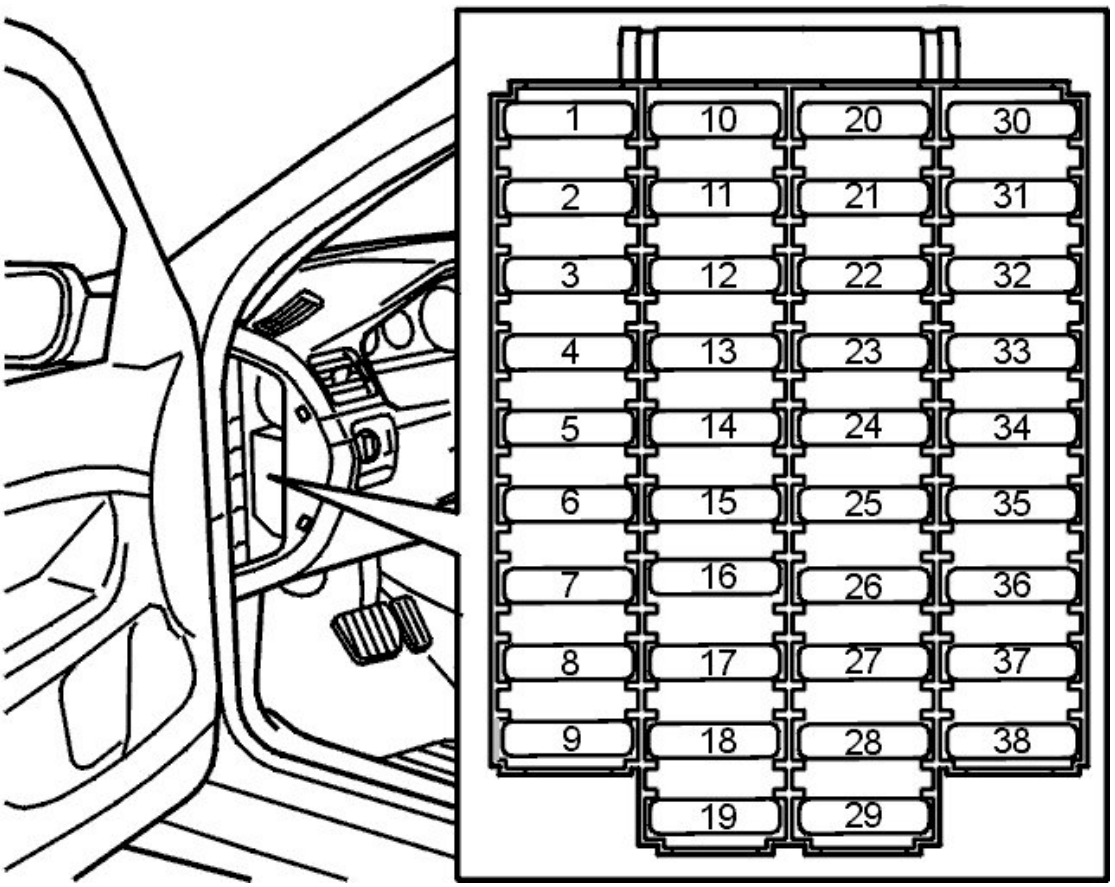
Check passenger compartment fuse 4 (11C/4:2)
Check the cable between the power seat module (PSM) connector #A1 and passenger compartment fuse 4 (11C/4:2) for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
If the fuse has blown fault-trace for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the connector.
Check passenger compartment fuse 24 (11C/24:2)
Check the cable between power seat module (PSM) supply relay (2/29) #3 and passenger compartment fuse 24 (11C/24:2) for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault or open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check that the relay is not is defective.
Check cable between power seat module (PSM) connector #B1 and power seat module (PSM) supply relay (2/29) #1 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault or open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals and connectors, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



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Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Does the problem persist?

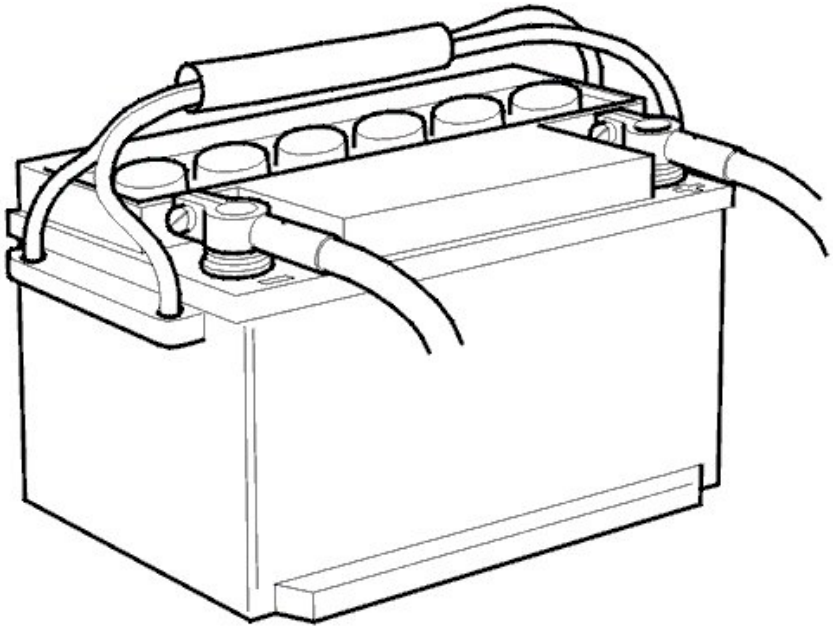
Yes - No Fault Found

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The voltage to the power seat module (PSM) is too low in relation to the voltage in the central electronic module (CEM). Diagnostic trouble code (DTC) PSM-001E is stored if the voltage is more than 2.5 V under the CEM voltage.

Possible source

- Supply voltage too low.

Fault symptom[s]

- The seat does not function at all.

Signal Too Low

Signal too low. Intermittent fault

Checking supply

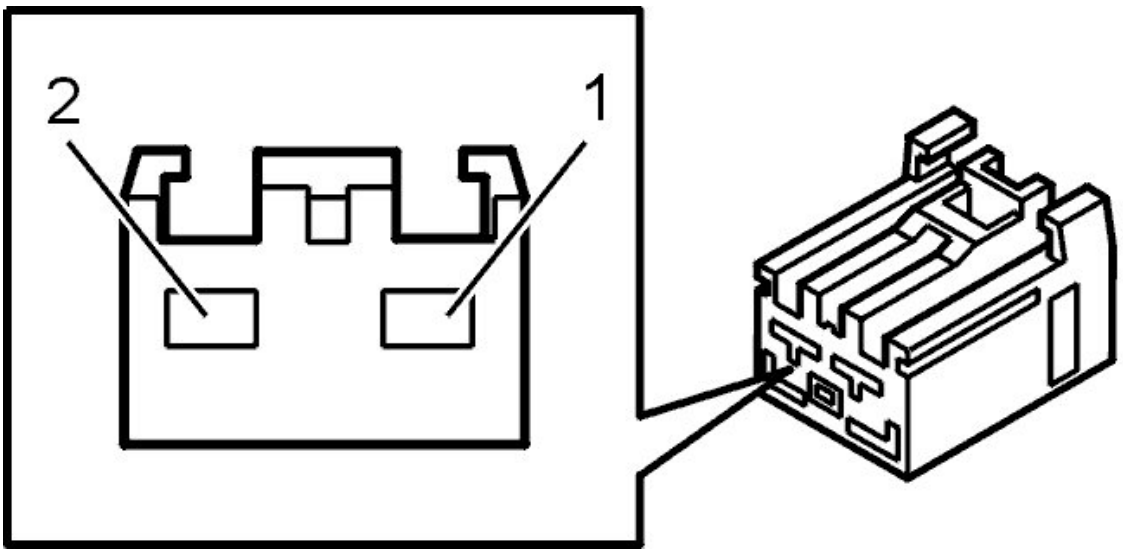
Check the cable between power seat module (PSM) #A1 and the fusebox in passenger compartment 4 (11C/4:2) for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check connector (54/24:1) for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

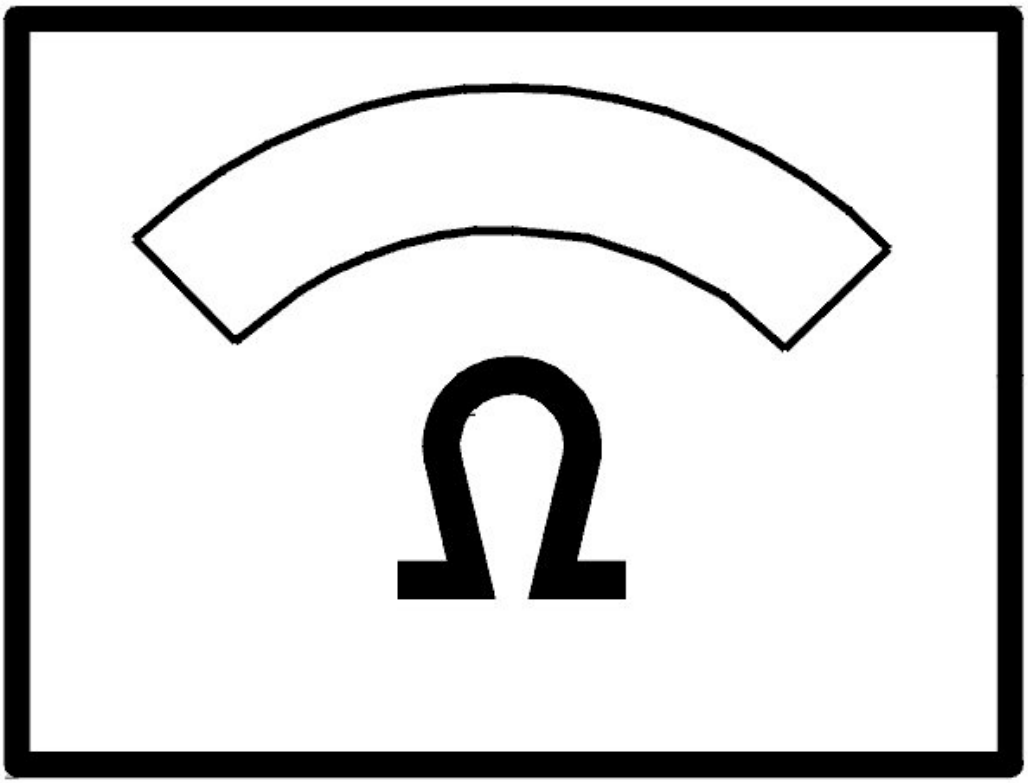
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

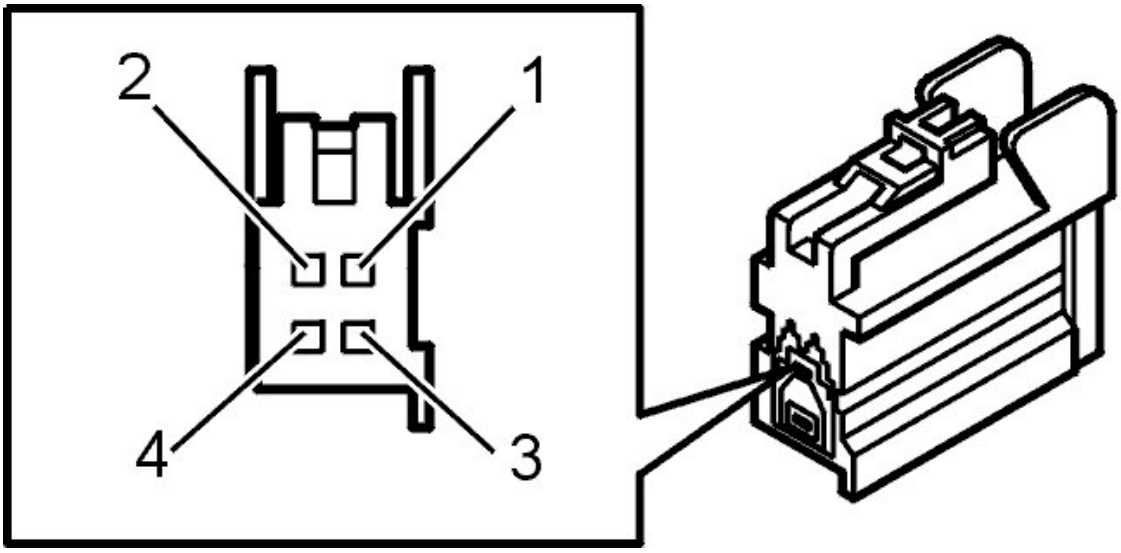
Check fuse no. 24 (11C/24:2) in passenger compartment fusebox for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between power seat supply relay (2/29) #3 and fuse no. 24 (11C/24:2) in the passenger compartment fusebox for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , or for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check that the relay is not defective; check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the power seat module (PSM) #B1 and power seat supply relay (2/29) #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , or for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





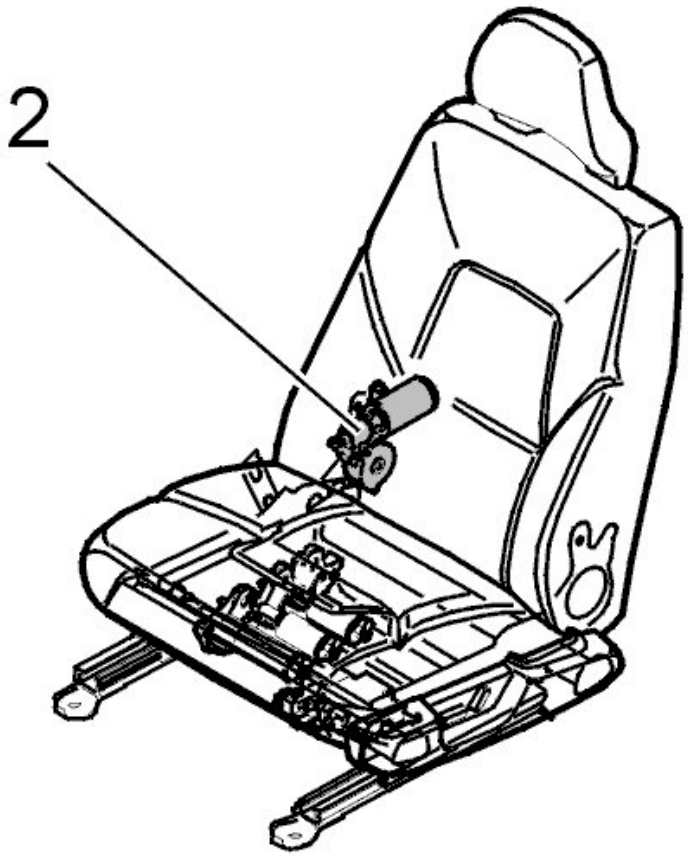


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0002 is stored if no Hall sensor pulse is detected when motor 2 is activated and in operation.

Possible source

- Defective Hall sensor in motor 2.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

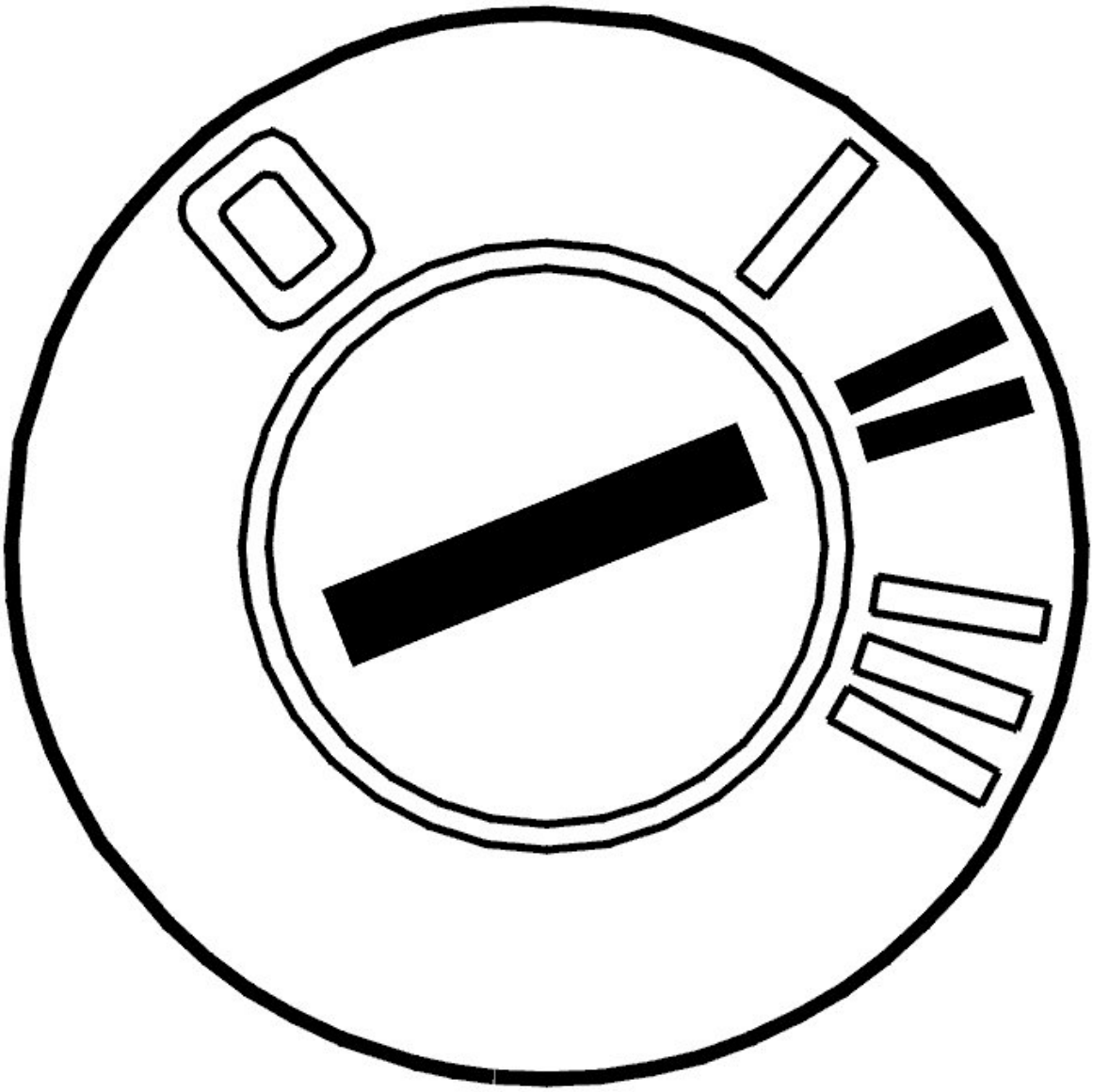
- Automatic seat control does not function (automatic control of other motors functioning as normal).

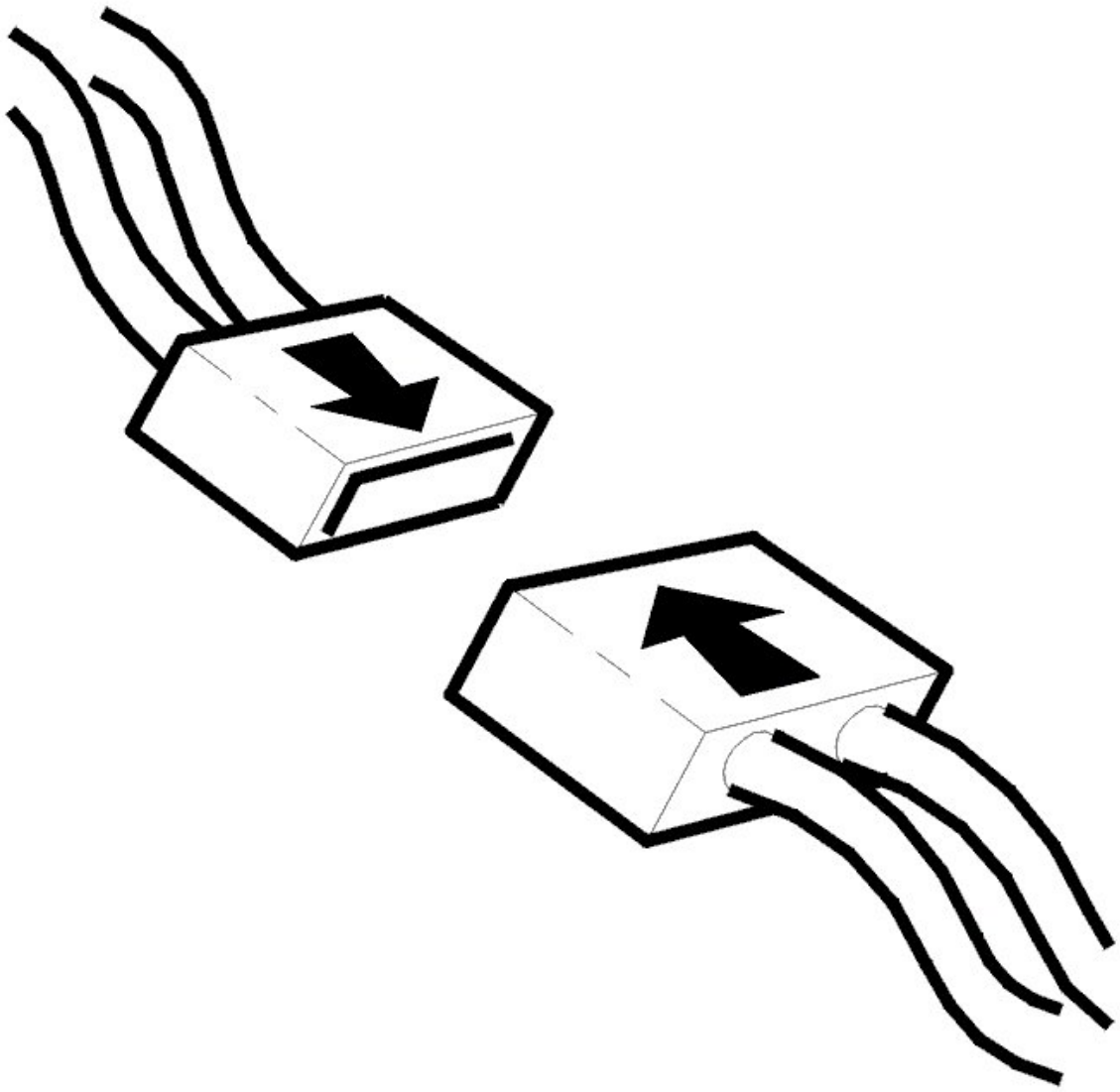
Faulty Signal

Faulty signal. Permanent fault

Checking Hall sensor signal

Hint: The motor should be activated when the check is carried out.





- Reconnect components, connectors etc.
- Ignition on.

Read off value.
Check whether the power seat module (PSM) receives the signal from the Hall sensor. Operate the relevant seat motor and check whether the value counts upwards and downwards as the seat is moved in each direction.
The value should count up or down depending on seat operation.

Is the function OK?

Yes - Fault Found

No - Checking cables and components

Checking cables and components

Check the cable between the power seat module (PSM) #3D and the Hall sensor, and the cable between the power seat module (PSM) #4D and the Hall sensor for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault and a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and

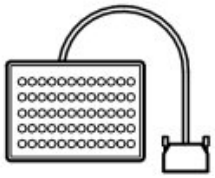
Terminals. Permanent Fault.
Check hall sensor and replace if necessary.

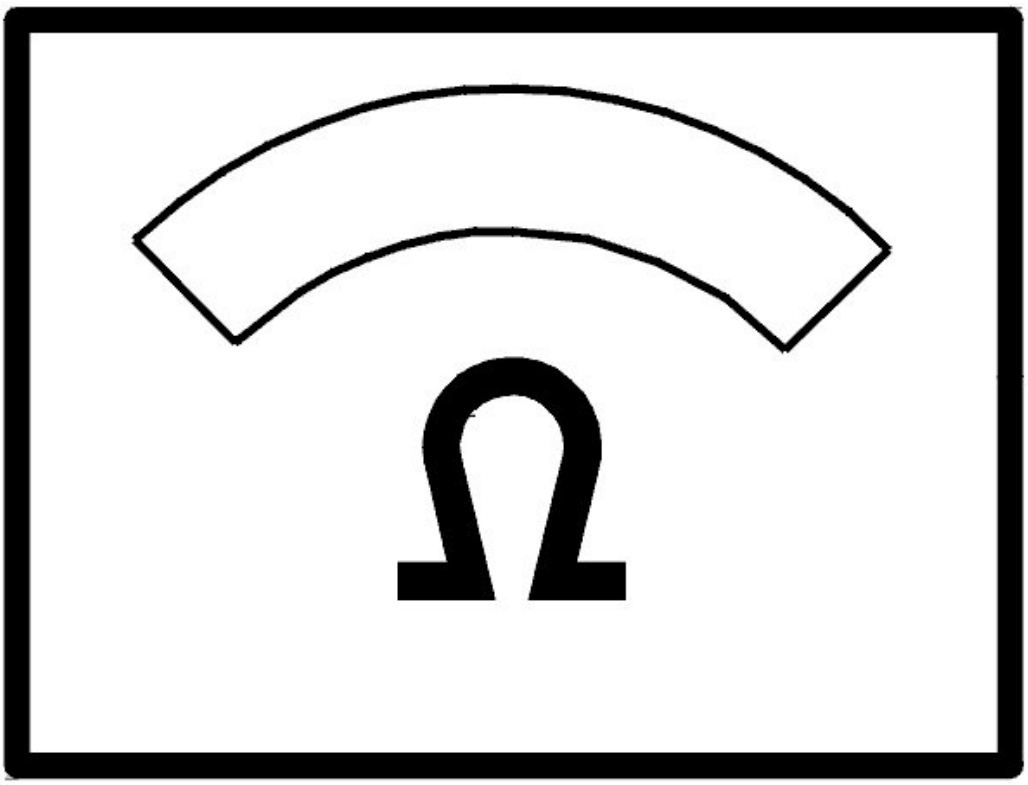
Hint: The sensor should generate a pulsed signal.

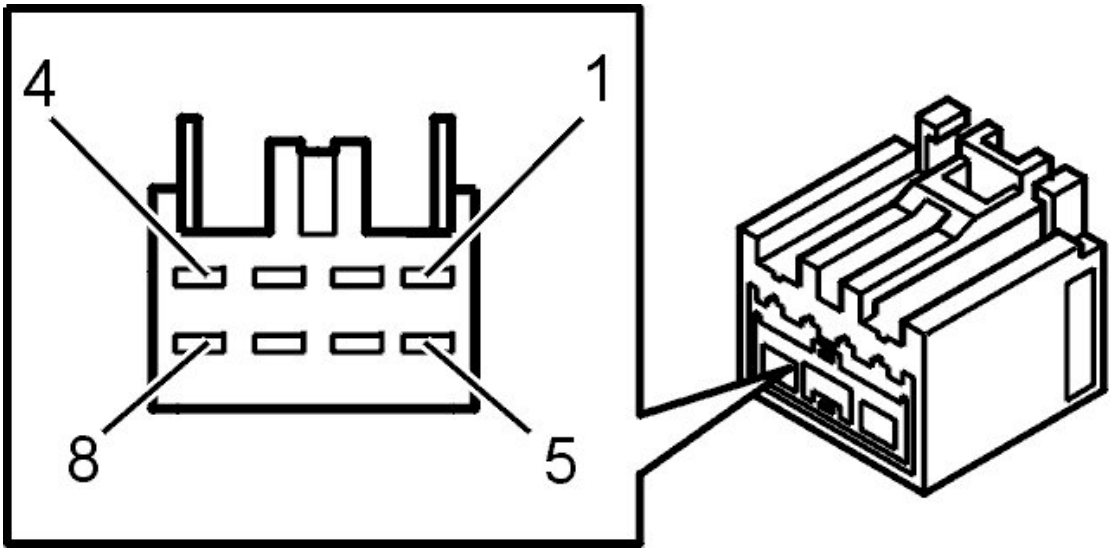
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





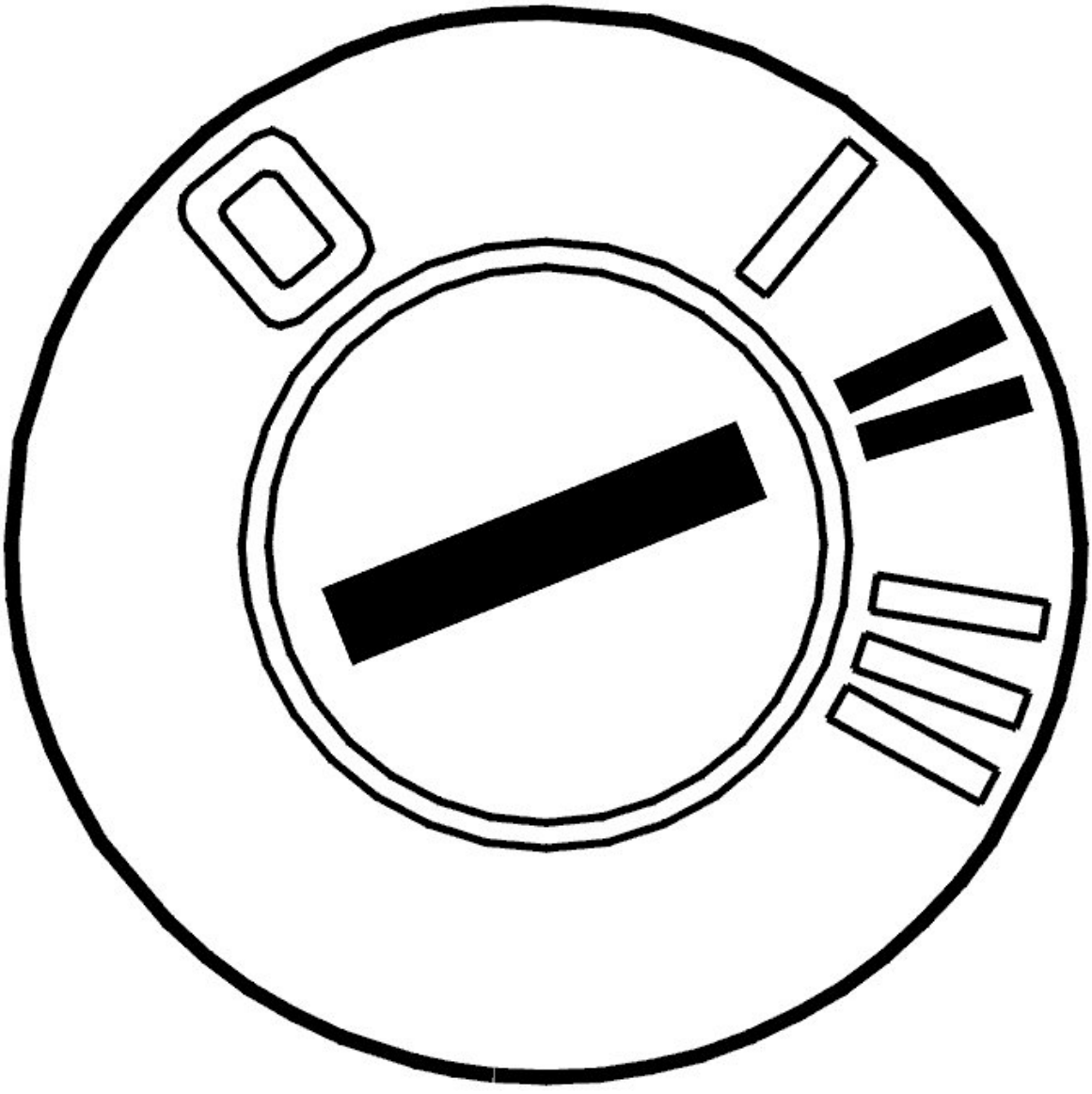


Select Continue

Continue - Verification

Verification

Hint: The motor should be activated when the check is carried out.



- Ignition on.

Read off value.
The Hall sensor must generate a pulsed signal and the power seat module (PSM) should count up or down depending on the movement of the seat.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

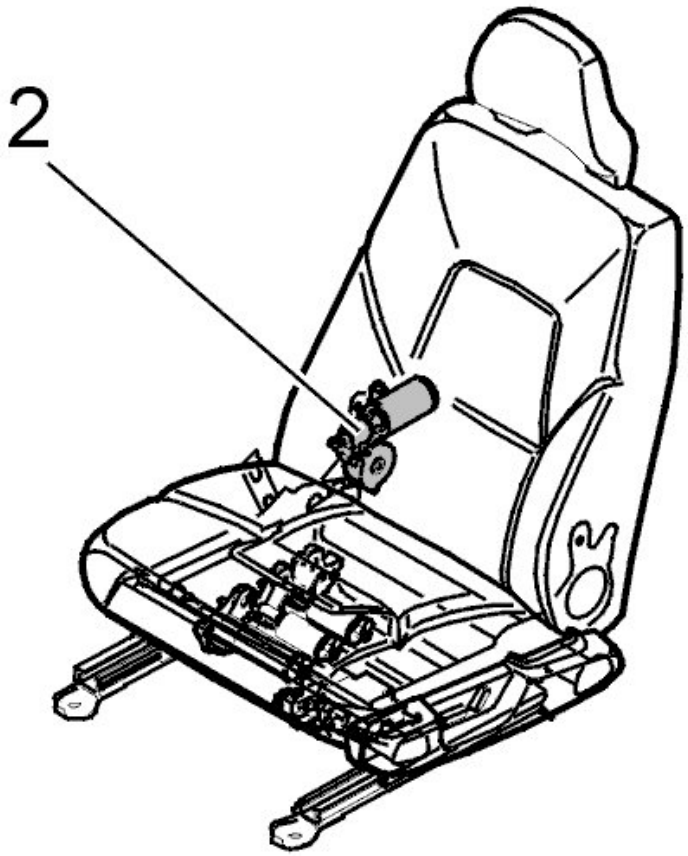
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking Hall sensor signal

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0002 is stored if no Hall sensor pulse is detected when motor 2 is activated and in operation.

Possible source

- Defective Hall sensor in motor 2.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

- Automatic seat control does not function (automatic control of other motors functioning as normal).

Faulty Signal

Faulty signal. Intermittent fault

Checking cable

Check the power seat module (PSM) and motor connector for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
The Hall sensor is integrated in the motor.
Check the wiring between the power seat module (PSM) and the sensor according to the table below for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

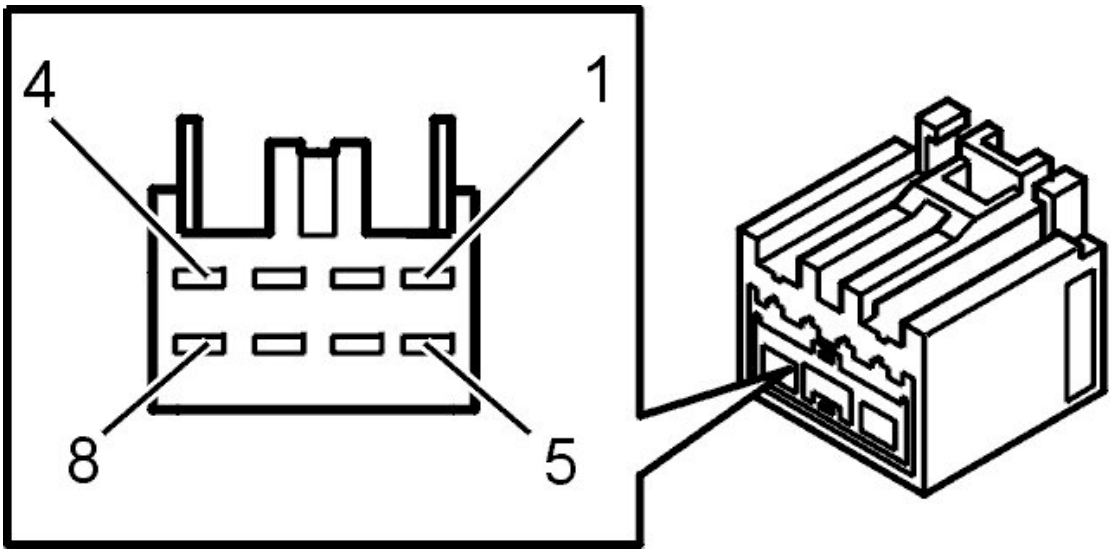
DTC	Covers motor	Terminal	Terminal
PSM-0001	M1	#3E	#4E
PSM-0002	M2	#3D	#4D
PSM-0003	M3	#7E	#8E
PSM-0004	M4	#11E	#12E

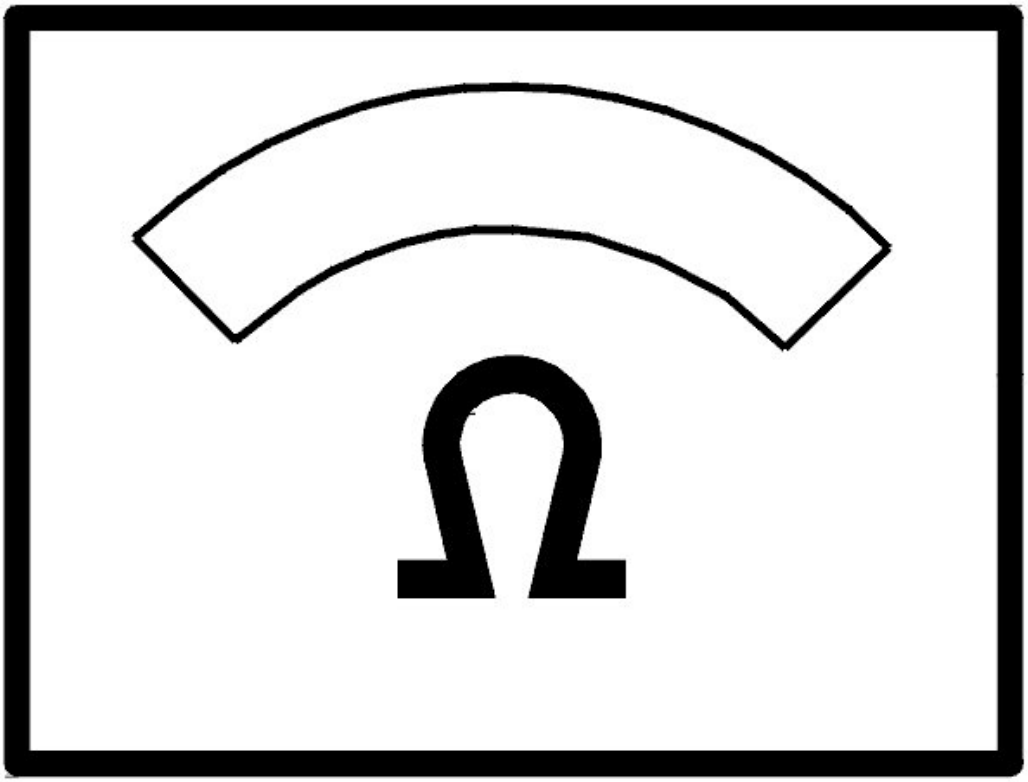
Other information:

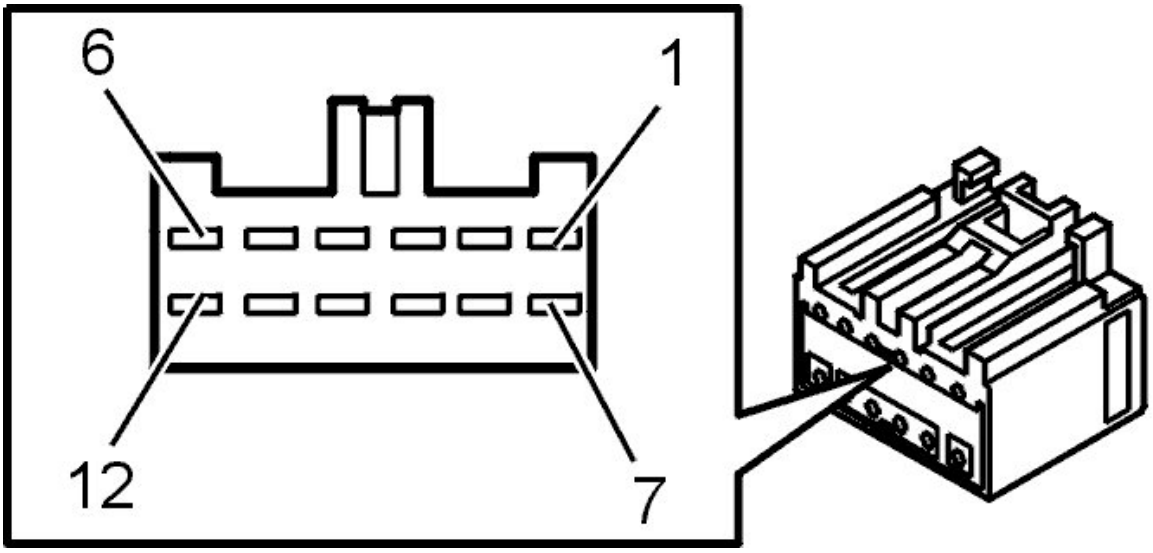
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).

- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-002A is stored if button 3 has been activated for longer than 60 seconds.

Possible source
- Memory button 3 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- Button 3 does not function.

Too Long Time

Too long time. Permanent fault

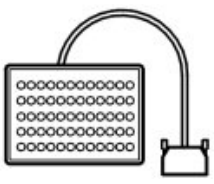
Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-002A is stored if button 3 has been activated for longer than 60 seconds.

Possible source
- Memory button 3 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- Button 3 does not function.

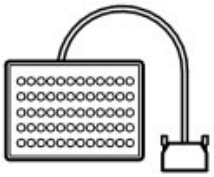
Too Long Time

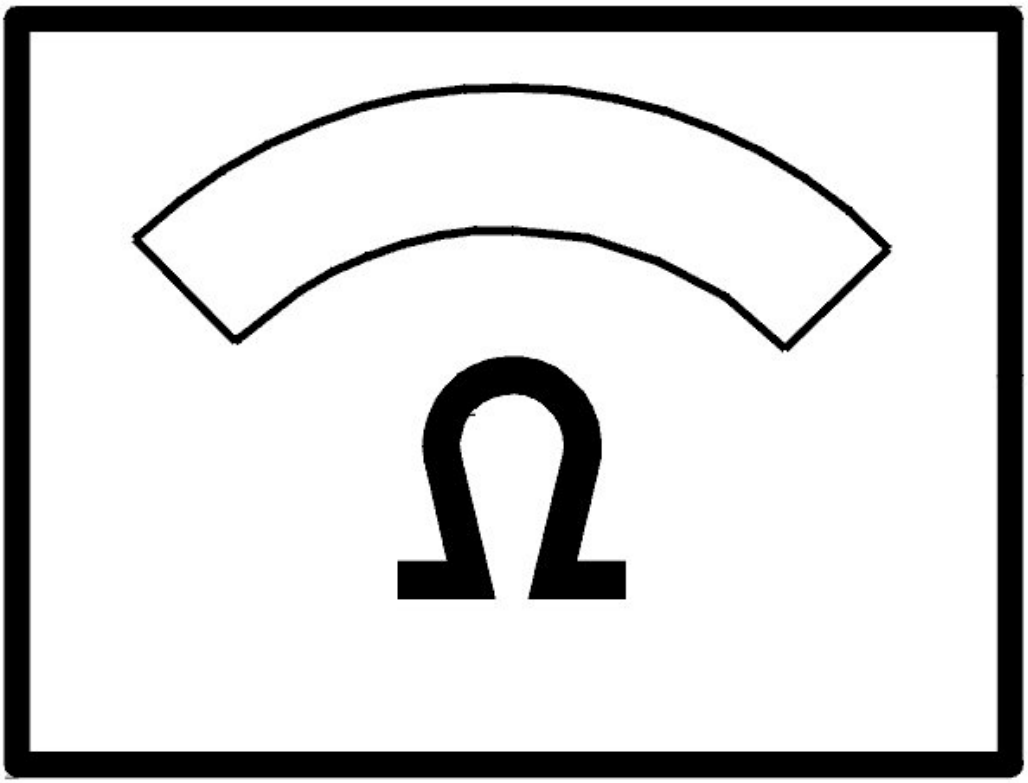
Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The MEM memory button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-002B is stored if a memory button has been activated for longer than 60 seconds.

Possible source
- A memory button has jammed in the pressed in position.
- Defective control panel.

Fault symptom[s]
- The memory button does not function.

Too Long Time

Too long time. Permanent fault

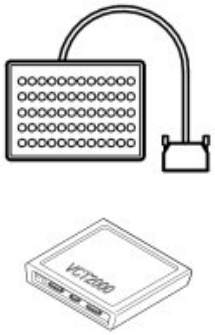
Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The MEM memory button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-002B is stored if a memory button has been activated for longer than 60 seconds.

Possible source
- A memory button has jammed in the pressed in position.
- Defective control panel.

Fault symptom[s]
- The memory button does not function.

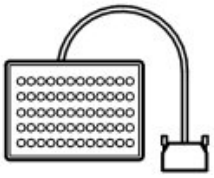
Too Long Time

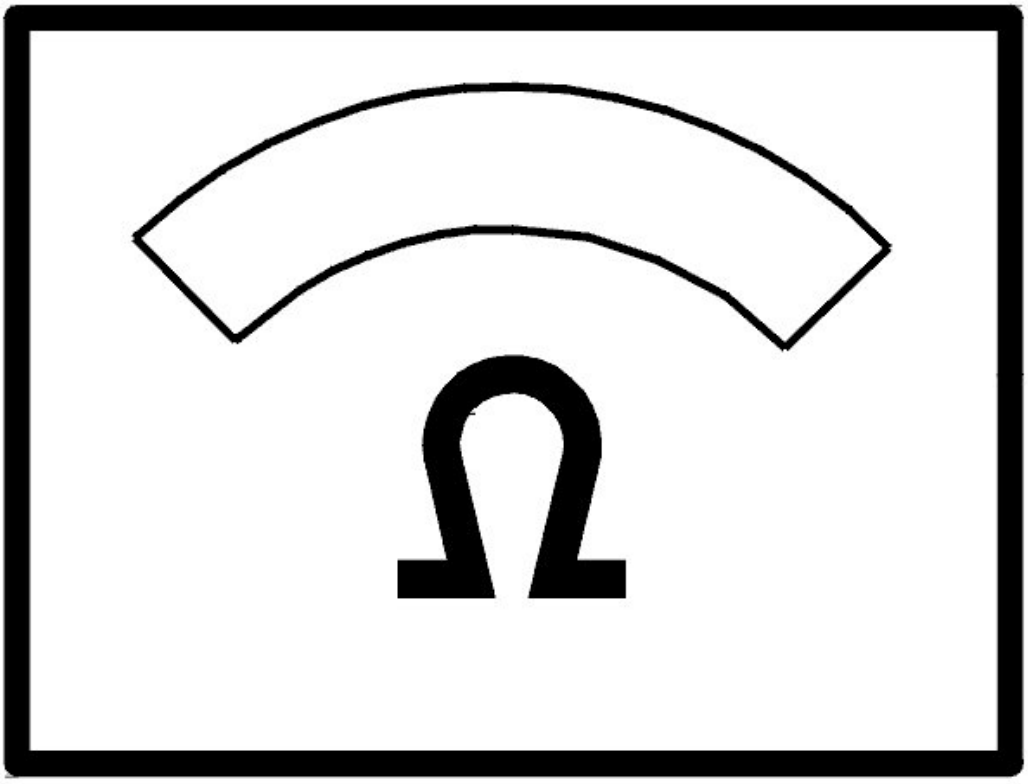
Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002C is stored if M1+ and M1- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Faulty Signal

Faulty signal. Permanent fault

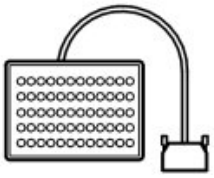
Checking the control panel

Check if the signal from the control panel is received by the power seat module (PSM).
Read off the value.

Hint: When checking the control panel, check if the resistance between #6C and the terminal pin is 0 ohms.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - Fault Found

No - Replacing the control panel

Replacing the control panel

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Verification

Hint: After carrying out the repair it is important to check that the fault is no longer present.
Read off the value.

Does the motor now operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control panel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002C is stored if M1+ and M1- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002D is stored if M2+ and M2- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Faulty Signal

Faulty signal. Permanent fault

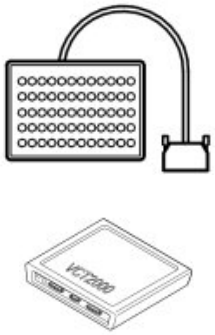
Checking the control panel

Check if the signal from the control panel is received by the power seat module (PSM).
Read off the value.

Hint: When checking the control panel, check if the resistance between #6C and the terminal pin is 0 ohms.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - **Fault Found**

No - Replacing the control panel

Replacing the control panel

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Verification

Hint: After carrying out the repair it is important to check that the fault is no longer present.
Read off the value.

Does the motor now operate as it should?

Yes - **Fault Found**

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control panel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002D is stored if M2+ and M2- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002E is stored if M3+ and M3- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002E is stored if M3+ and M3- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Faulty Signal

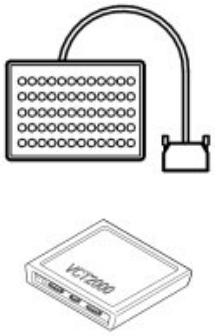
Faulty signal. Permanent fault

Checking the control panel

Check if the signal from the control panel is received by the power seat module (PSM).
Read off the value.

Hint: When checking the control panel, check if the resistance between #6C and the terminal pin is 0 ohms.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - Fault Found

No - Replacing the control panel

Replacing the control panel

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Verification

Hint: After carrying out the repair it is important to check that the fault is no longer present.
Read off the value.

Does the motor now operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control panel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002F is stored if M4+ and M4- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) PSM-002F is stored if M4+ and M4- are activated at the same time.

Possible source
- Faulty control panel operation.
- Defective control panel.
- Defective power seat module (PSM).

Fault symptom[s]
- Power seat does not function at all.

Faulty Signal

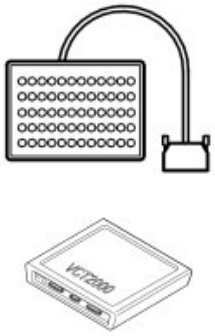
Faulty signal. Permanent fault

Checking the control panel

Check if the signal from the control panel is received by the power seat module (PSM).
Read off the value.

Hint: When checking the control panel, check if the resistance between #6C and the terminal pin is 0 ohms.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - **Fault Found**

No - Replacing the control panel

Replacing the control panel

Replace the control panel. See Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Verification

Hint: After carrying out the repair it is important to check that the fault is no longer present.
Read off the value.

Does the motor now operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

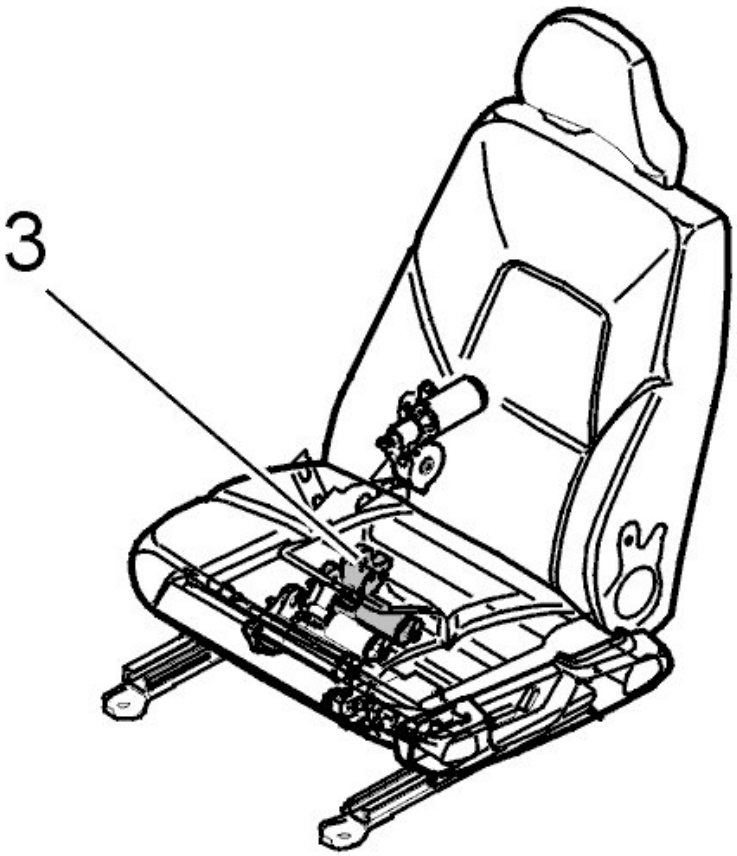
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control panel

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the rear edge seat height. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0003 is stored if no Hall sensor pulse is detected when motor 3 is activated and in operation.

Possible source

- Defective Hall sensor in motor 3.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

- Automatic seat control does not function (automatic control of other motors functioning as normal).

Faulty Signal

Faulty signal. Intermittent fault

Checking cable

Check the power seat module (PSM) and motor connector for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
The Hall sensor is integrated in the motor.
Check the wiring between the power seat module (PSM) and the sensor according to the table below for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

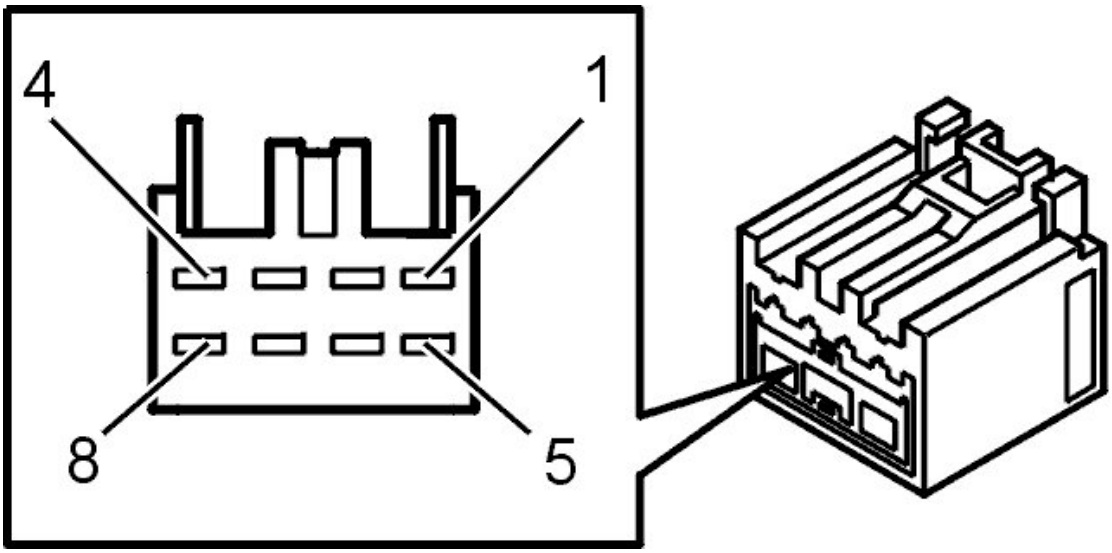
DTC	Covers motor	Terminal	Terminal
PSM-0001	M1	#3E	#4E
PSM-0002	M2	#3D	#4D
PSM-0003	M3	#7E	#8E
PSM-0004	M4	#11E	#12E

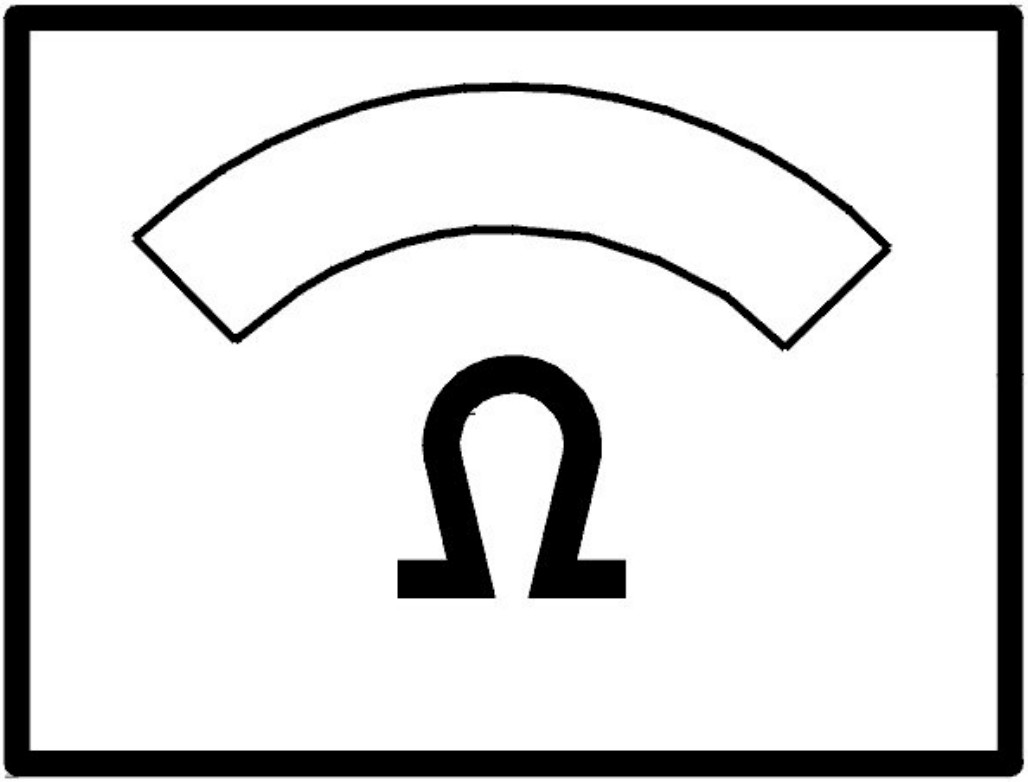
Other information:

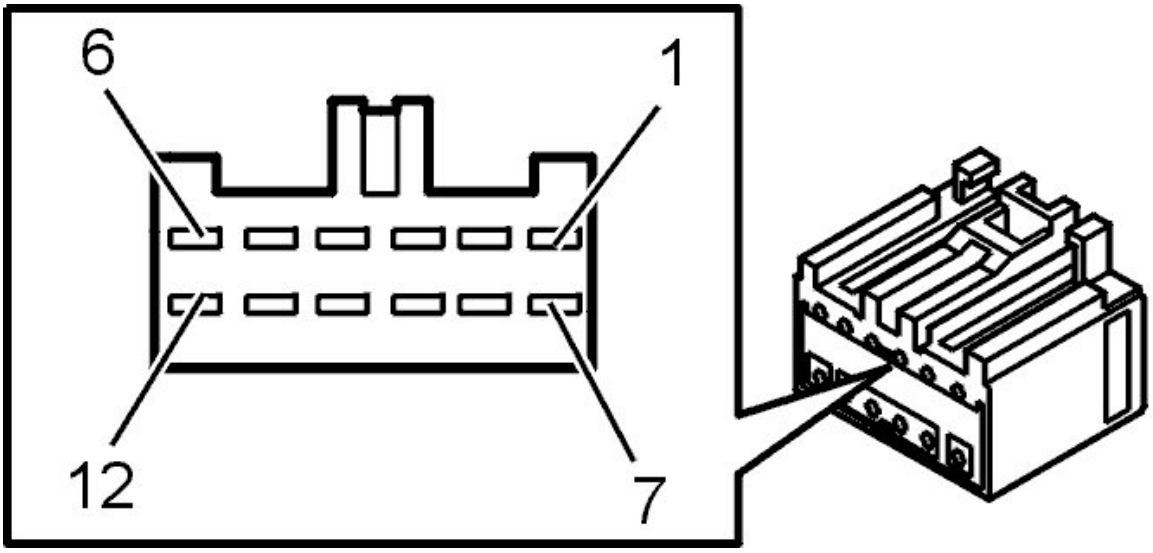
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).

- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





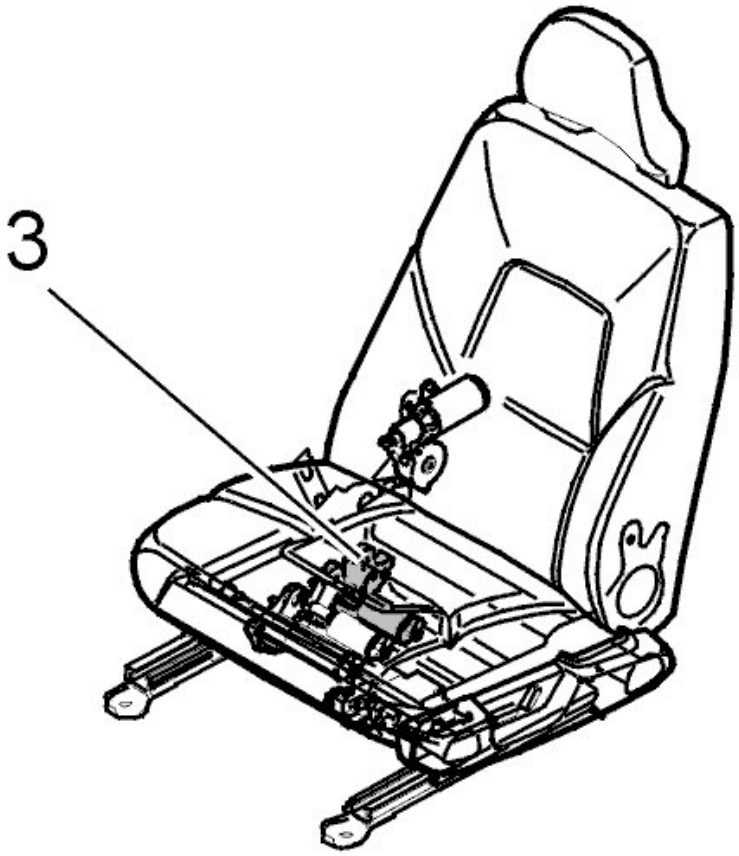


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the rear edge seat height. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0003 is stored if no Hall sensor pulse is detected when motor 3 is activated and in operation.

Possible source

- Defective Hall sensor in motor 3.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

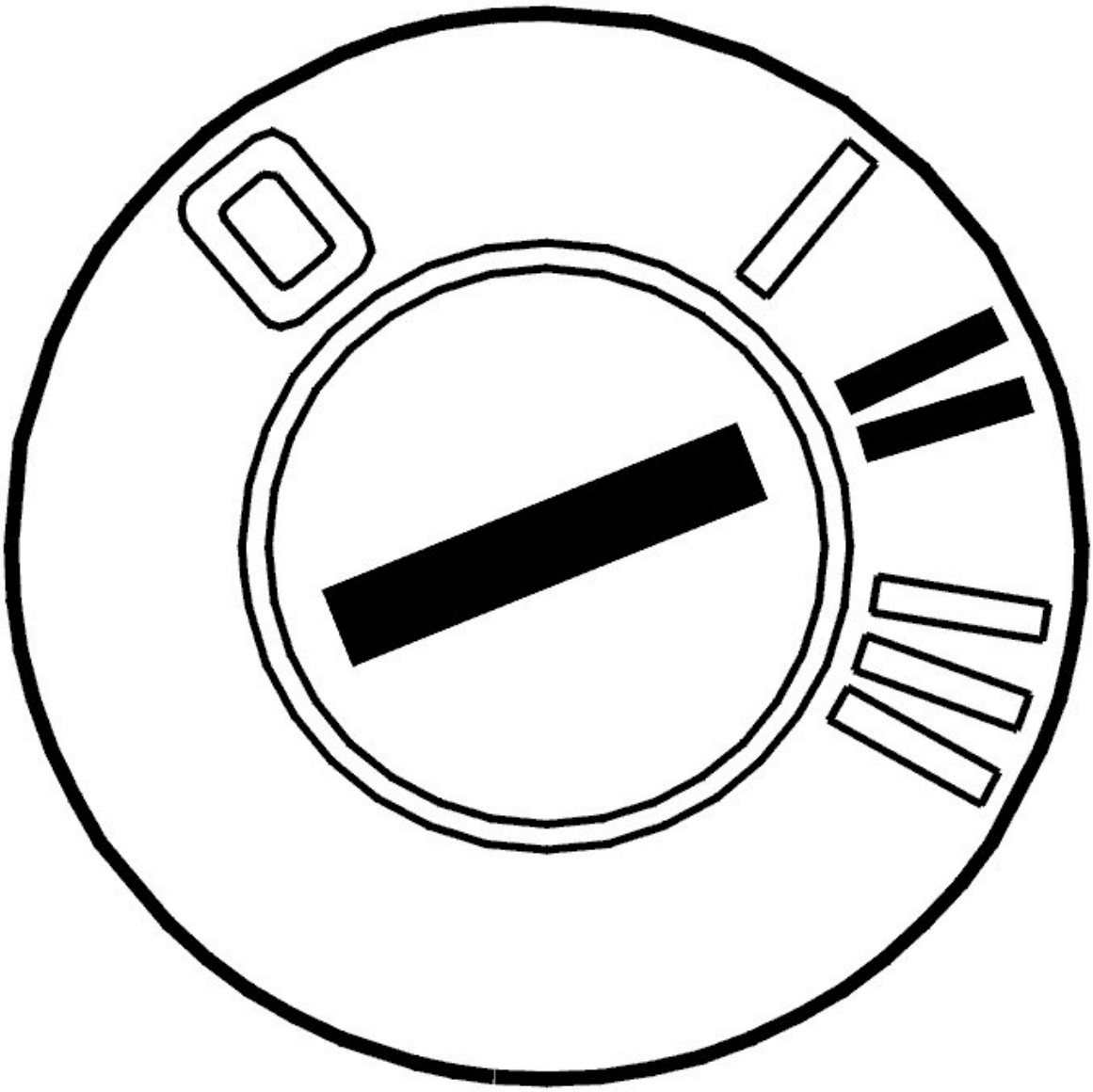
- Automatic seat control does not function (automatic control of other motors functioning as normal).

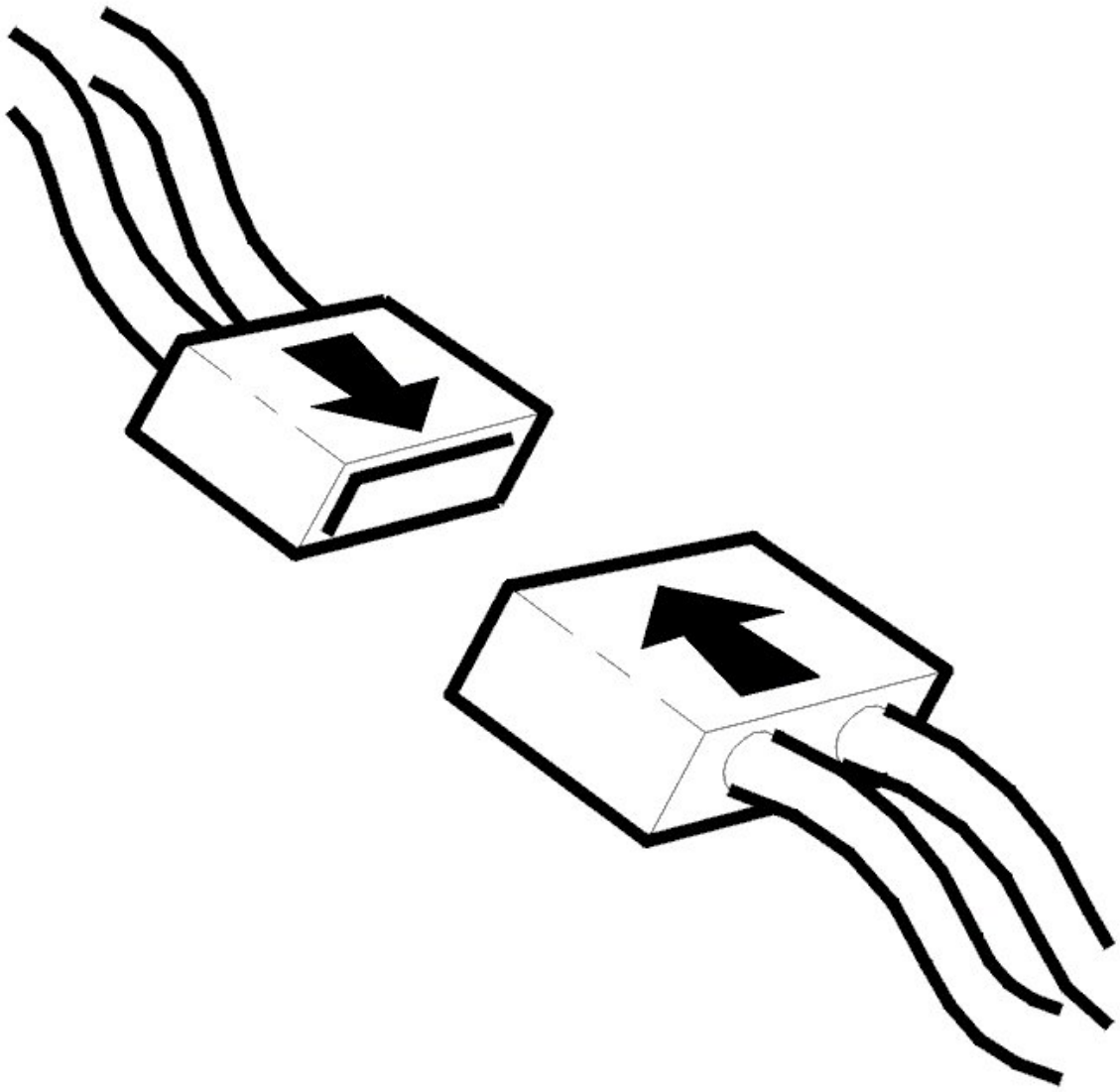
Faulty Signal

Faulty signal. Permanent fault

Checking the Hall sensor signal

Hint: The motor should be activated when the check is carried out.





- Reconnect components, connectors etc.
- Ignition on.

Read off value.

Check whether the power seat module (PSM) receives the signal from the Hall sensor. Operate the relevant seat motor and check whether the value counts upwards and downwards as the seat is moved in each direction. The value should count up or down depending on seat operation.

Is the function OK?

Yes - Fault Found

No - Checking wiring and components

Checking wiring and components

Check the cable between the power seat module (PSM) #7E and the Hall sensor, and the cable between the power seat module (PSM) #8E and the Hall sensor for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault and a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

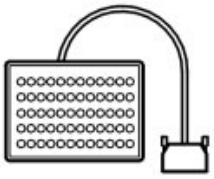
Check hall sensor and replace if necessary.

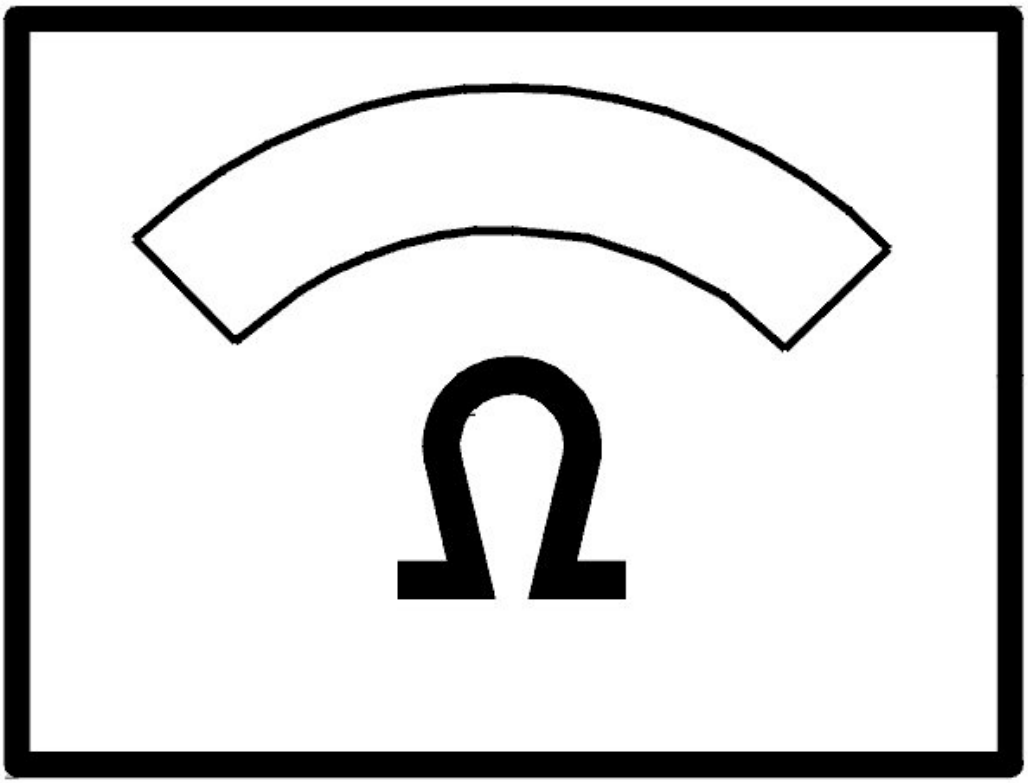
Hint: The sensor should generate a pulsed signal.

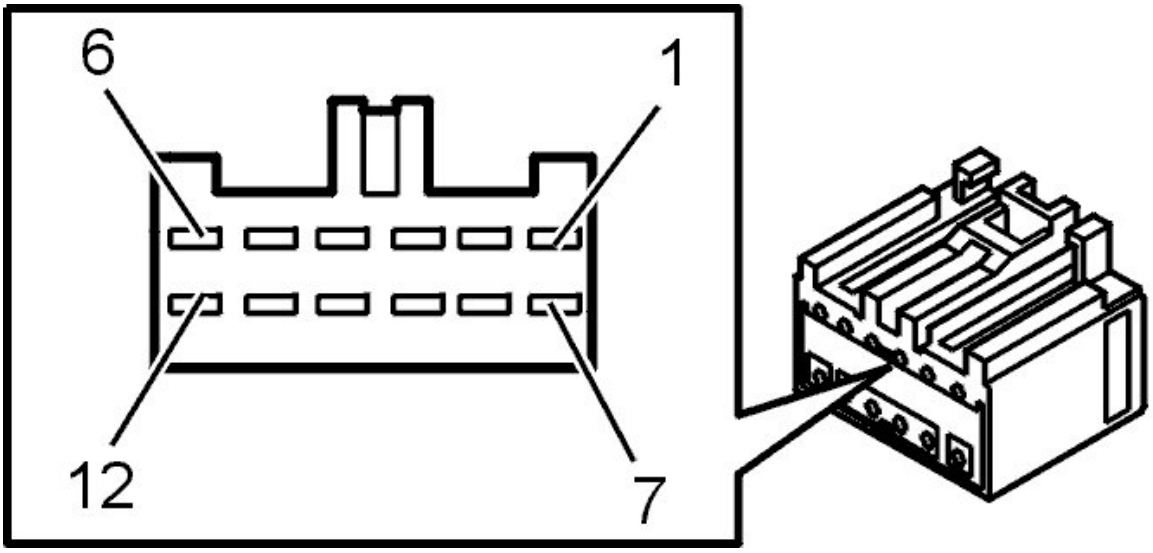
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





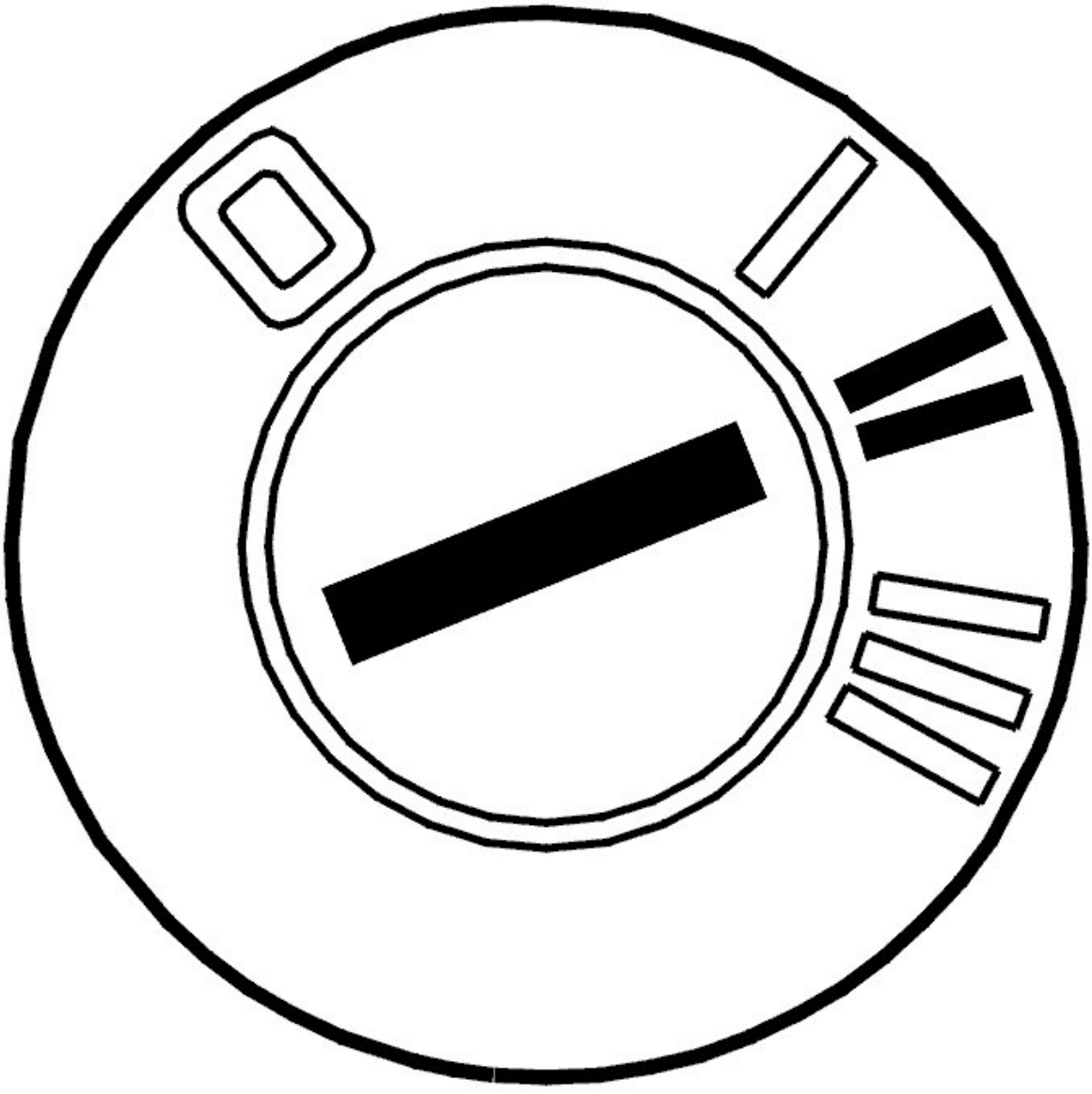


Select Continue

Continue - Verification

Verification

Hint: The motor should be activated when the check is carried out.



- Ignition on.

Read off value.
The Hall sensor must generate a pulsed signal and the power seat module (PSM) should count up or down depending on the movement of the seat.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the Hall sensor signal

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 1 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003A is stored if the power seat module (PSM) detects Hall sensor pulses when M1 is switched off.

Possible source
- Defective Hall sensor 1.
- Internal fault in the power seat module (PSM).

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Permanent fault

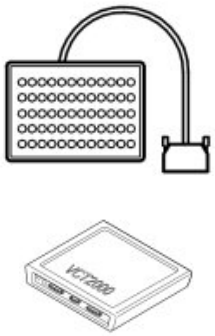
Checking input signal

Read off the value for Hall sensor 1.
The value should not change when the seat is not affected.

Hint: If the value counts up or down there may be a fault in the sensor, an intermittent short-circuit to supply voltage or an internal fault in the power seat module (PSM).

Remedy as necessary.

Other information:
- To access Hall sensor 1, see Front-rear adjustment motor See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement/Front Seat, Driver's Seat/Front-Rear Adjustment Motor.
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 1 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003A is stored if the power seat module (PSM) detects Hall sensor pulses when M1 is switched off.

Possible source
- Defective Hall sensor 1.
- Internal fault in the power seat module (PSM).

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

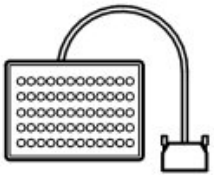
Faulty signal. Intermittent fault

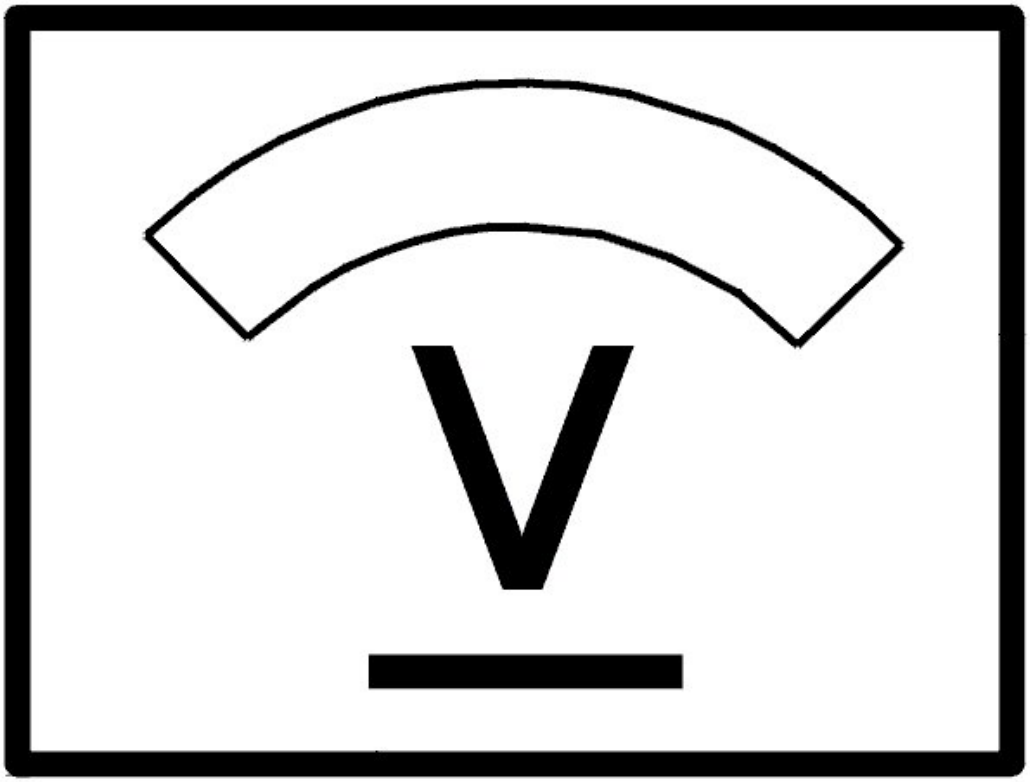
Checking input signal

When the seat is operated there should be a pulsed signal between pins according to the table.

DTC	Component	Terminal	Connector
PSM-003A	Hall sensor 1	#3, #4	E
PSM-003B	Hall sensor 2	#3, #4	D
PSM-003C	Hall sensor 3	#7, #8	E
PSM-003D	Hall sensor 4	#11, #12	E

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 2 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003B is stored if the power seat module (PSM) detects Hall sensor pulses when M2 is switched off.

Possible source

- Defective Hall sensor 2.

Fault symptom[s]

- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Intermittent fault

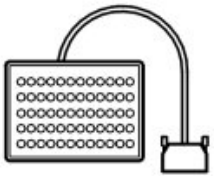
Checking input signal

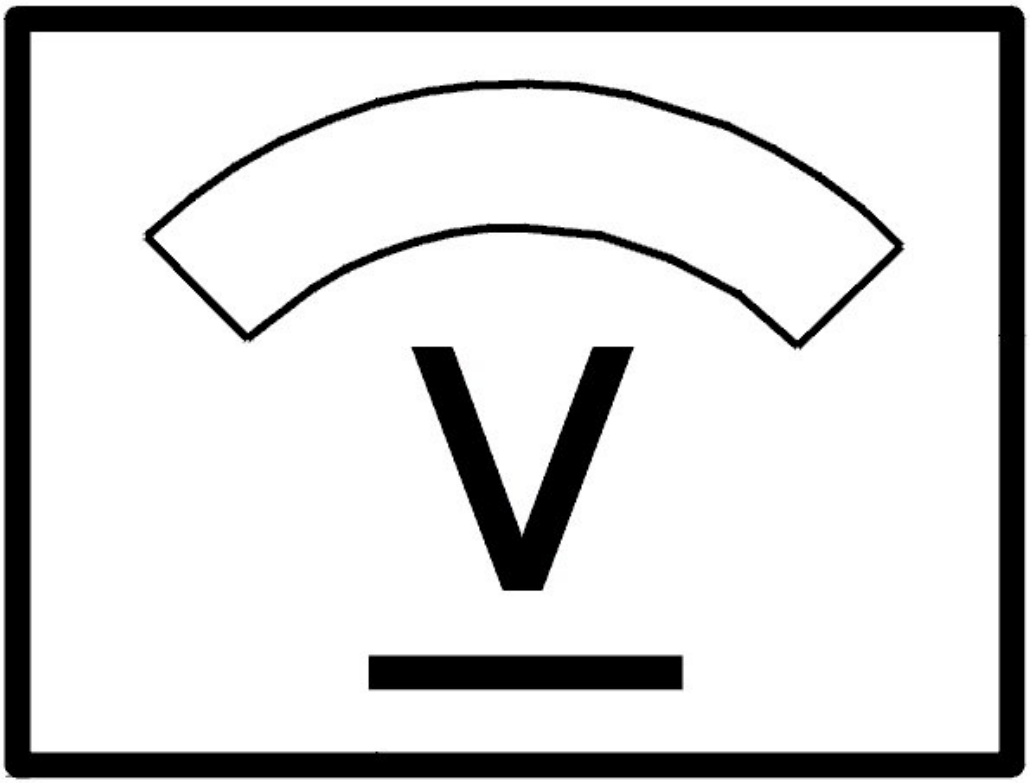
When the seat is operated there should be a pulsed signal between pins according to the table.

DTC	Component	Terminal	Connector
PSM-003A	Hall sensor 1	#3, #4	E
PSM-003B	Hall sensor 2	#3, #4	D
PSM-003C	Hall sensor 3	#7, #8	E
PSM-003D	Hall sensor 4	#11, #12	E

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 2 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003B is stored if the power seat module (PSM) detects Hall sensor pulses when M2 is switched off.

Possible source
- Defective Hall sensor 2.

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Permanent fault

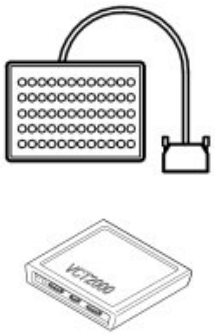
Checking input signal

Read off the value for Hall sensor 2.
The value should not change when the seat is not affected.

Hint: If the value counts up or down there may be a fault in the sensor, an intermittent short-circuit to supply voltage or an internal fault in the power seat module (PSM).

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 3 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003C is stored if the power seat module (PSM) detects Hall sensor pulses when M3 is switched off.

Possible source
- Defective Hall sensor 3.

Fault symptom[s]

- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Permanent fault

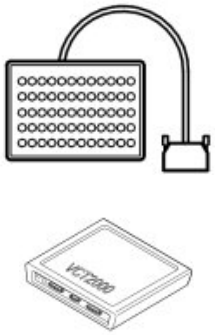
Checking input signal

Read off the value for Hall sensor 3.
The value should not change when the seat is not affected.

Hint: If the value counts up or down there may be a fault in the sensor, an intermittent short-circuit to supply voltage or an internal fault in the power seat module (PSM).

Remedy as necessary.

Other information:
- To access Hall sensor 2, see Height adjustment motor, rear See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement/Front Seat, Driver's Seat/Electric Motor Cushion, Replacing.
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 3 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003C is stored if the power seat module (PSM) detects Hall sensor pulses when M3 is switched off.

Possible source
- Defective Hall sensor 3.

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Intermittent fault

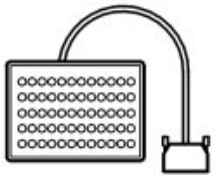
Checking input signal

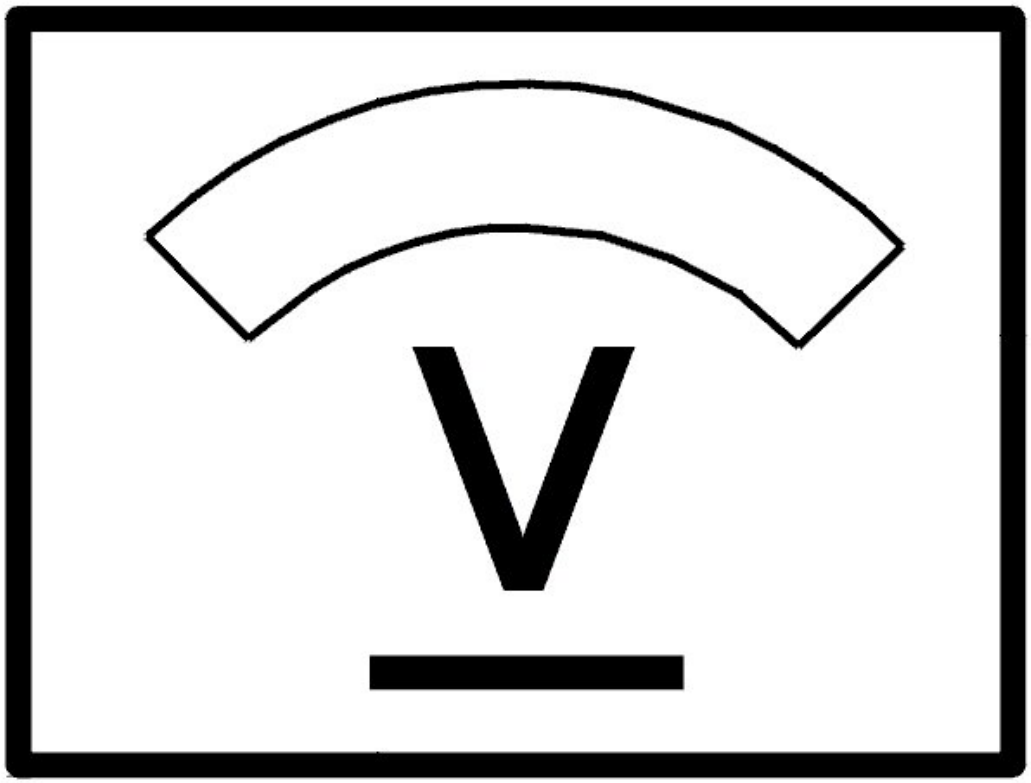
When the seat is operated there should be a pulsed signal between pins according to the table.

DTC	Component	Terminal	Connector
PSM-003A	Hall sensor 1	#3, #4	E
PSM-003B	Hall sensor 2	#3, #4	D
PSM-003C	Hall sensor 3	#7, #8	E
PSM-003D	Hall sensor 4	#11, #12	E

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 4 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003D is stored if the power seat module (PSM) detects Hall sensor pulses when M4 is switched off.

Possible source
- Defective Hall sensor 4.

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Permanent fault

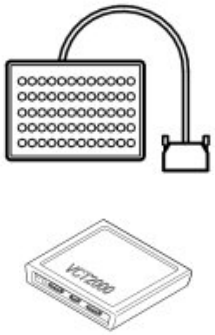
Checking input signal

Read off the value for Hall sensor 4.
The value should not change when the seat is not affected.

Hint: If the value counts up or down there may be a fault in the sensor, an intermittent short-circuit to supply voltage or an internal fault in the power seat module (PSM).

Remedy as necessary.

Other information:
- To access Hall sensor 4, see Height adjustment motor, front See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement/Front Seat, Driver's Seat/Front Height Adjustment Motor.
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Motor 4 must be switched off before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-003D is stored if the power seat module (PSM) detects Hall sensor pulses when M4 is switched off.

Possible source
- Defective Hall sensor 4.

Fault symptom[s]
- Automatic seat operation does not function.

Faulty Signal

Faulty signal. Intermittent fault

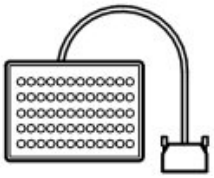
Checking input signal

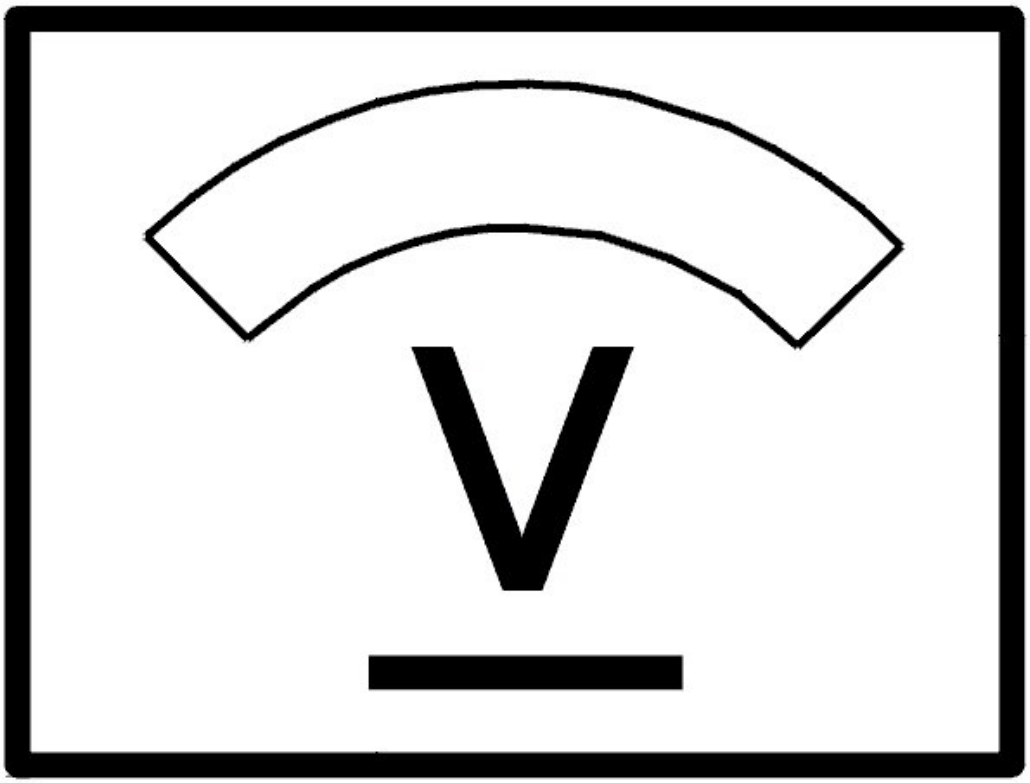
When the seat is operated there should be a pulsed signal between pins according to the table.

DTC	Component	Terminal	Connector
PSM-003A	Hall sensor 1	#3, #4	E
PSM-003B	Hall sensor 2	#3, #4	D
PSM-003C	Hall sensor 3	#7, #8	E
PSM-003D	Hall sensor 4	#11, #12	E

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





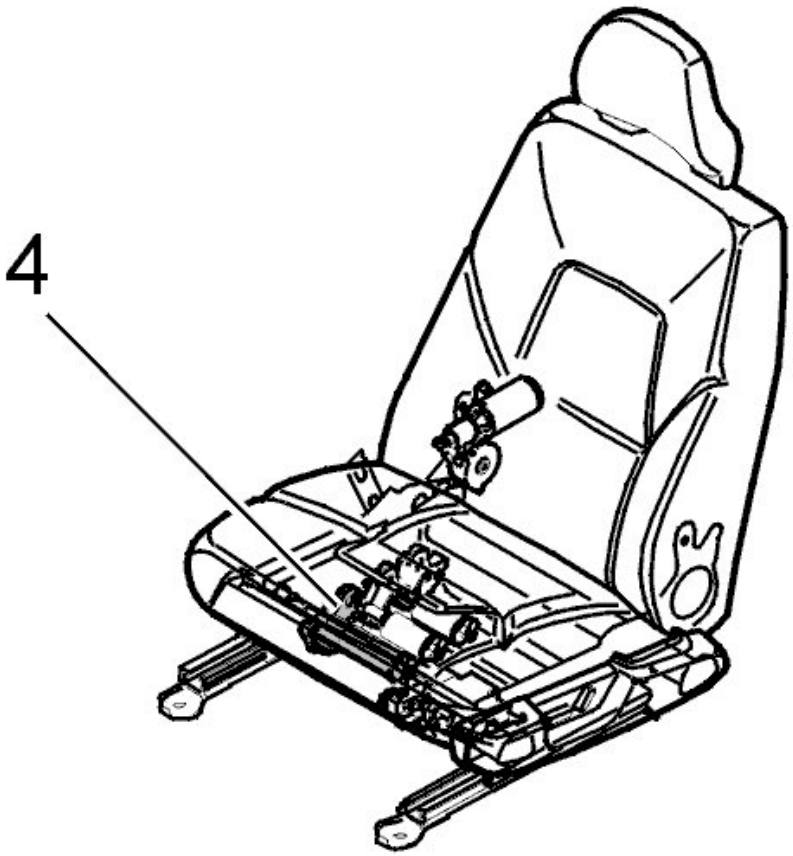
Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls seat front edge height. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0004 is stored if no Hall sensor pulse is detected when motor 4 is activated and in operation.

Possible source

- Defective Hall sensor in motor 4.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

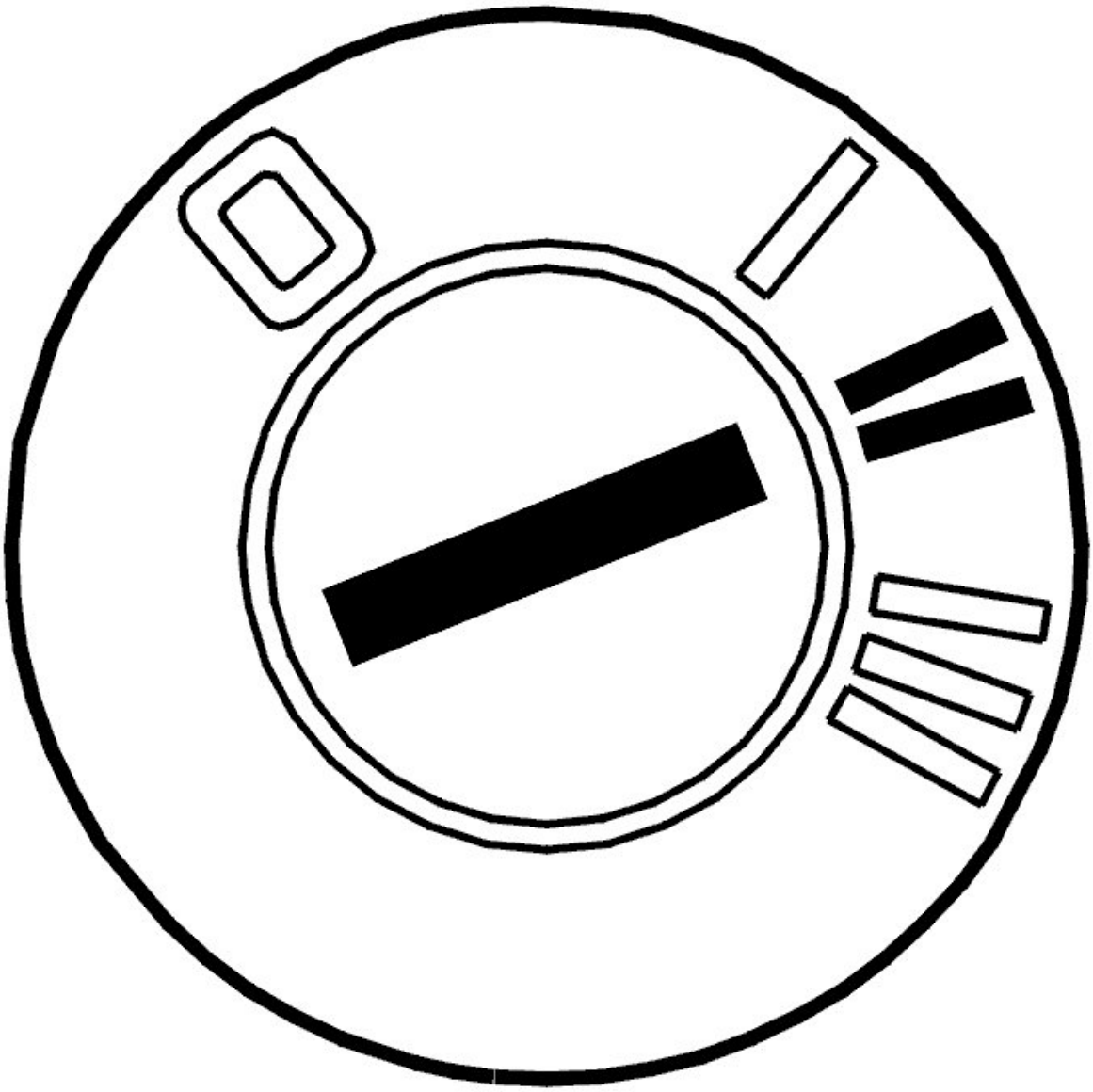
- Automatic seat control does not function (automatic control of other motors functioning as normal).

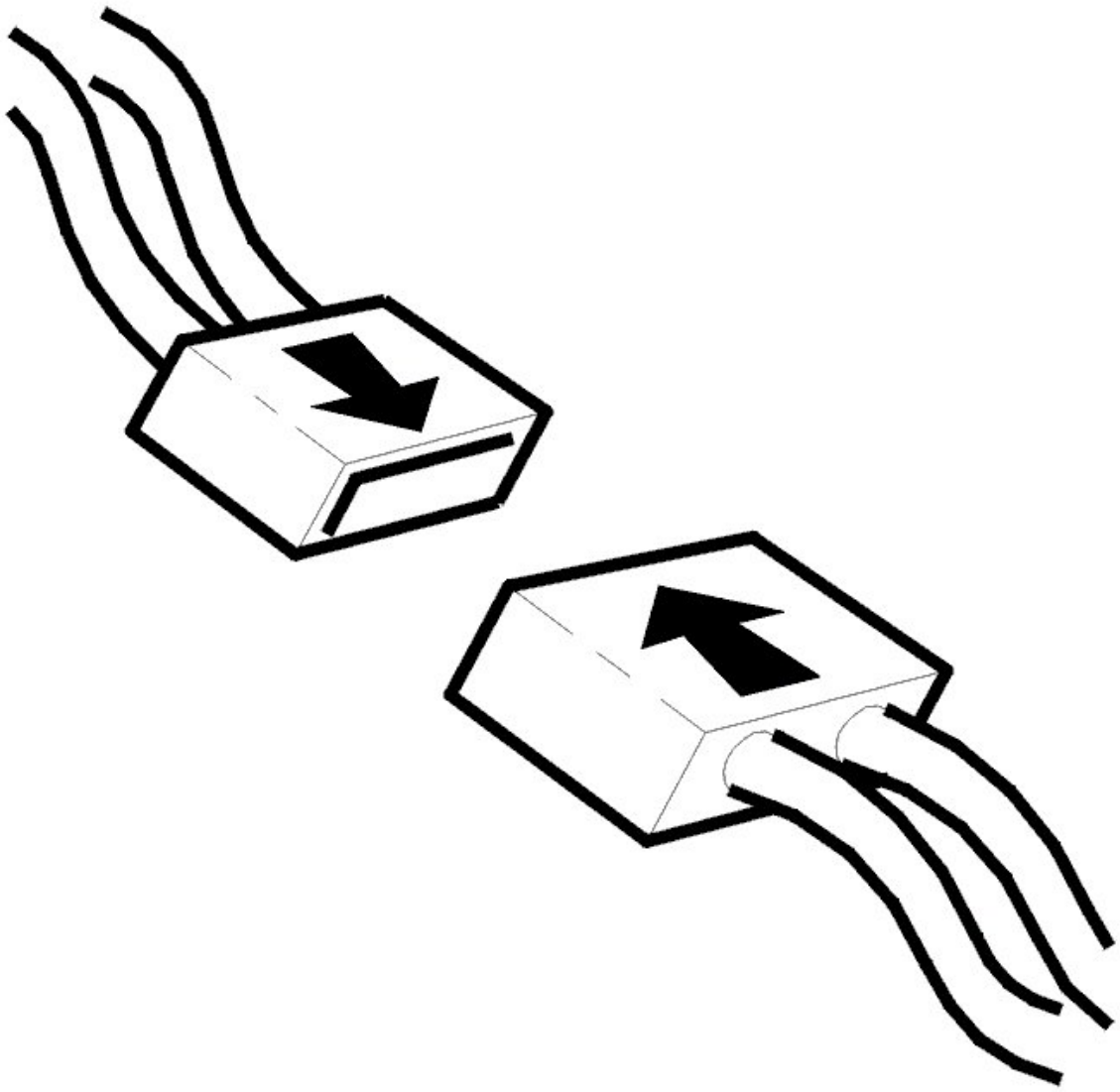
Faulty Signal

Faulty signal. Permanent fault

Checking Hall sensor signal

Hint: The motor should be activated when the check is carried out.





- Reconnect components, connectors etc.
- Ignition on.

Read off value.
Check whether the power seat module (PSM) receives the signal from the Hall sensor. Operate the relevant seat motor and check whether the value counts upwards and downwards as the seat is moved in each direction.
The value should count up or down depending on seat operation.

Is the function OK?

Yes - Fault Found

No - Checking wiring and components

Checking wiring and components

Check the cable between the power seat module (PSM) #3D and the Hall sensor, and the cable between the power seat module (PSM) #4D and the Hall sensor for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault and a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and

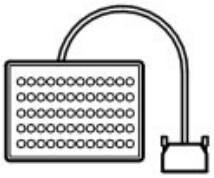
Terminals. Permanent Fault.
Check hall sensor and replace if necessary.

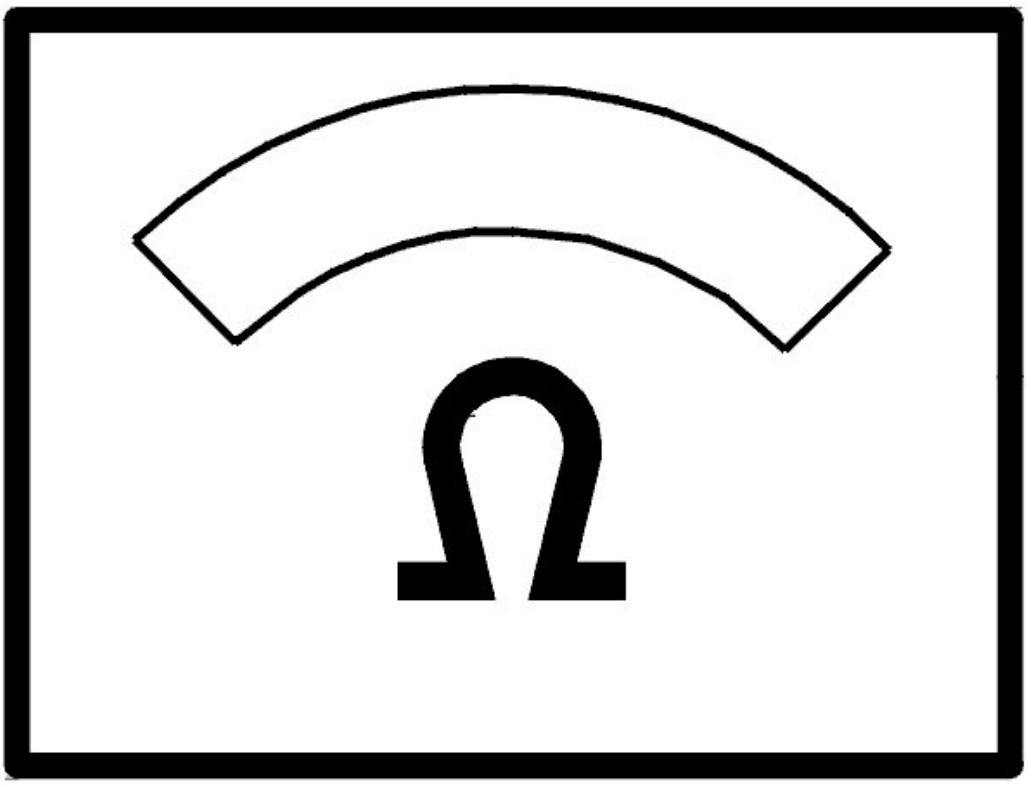
Hint: The sensor should generate a pulsed signal.

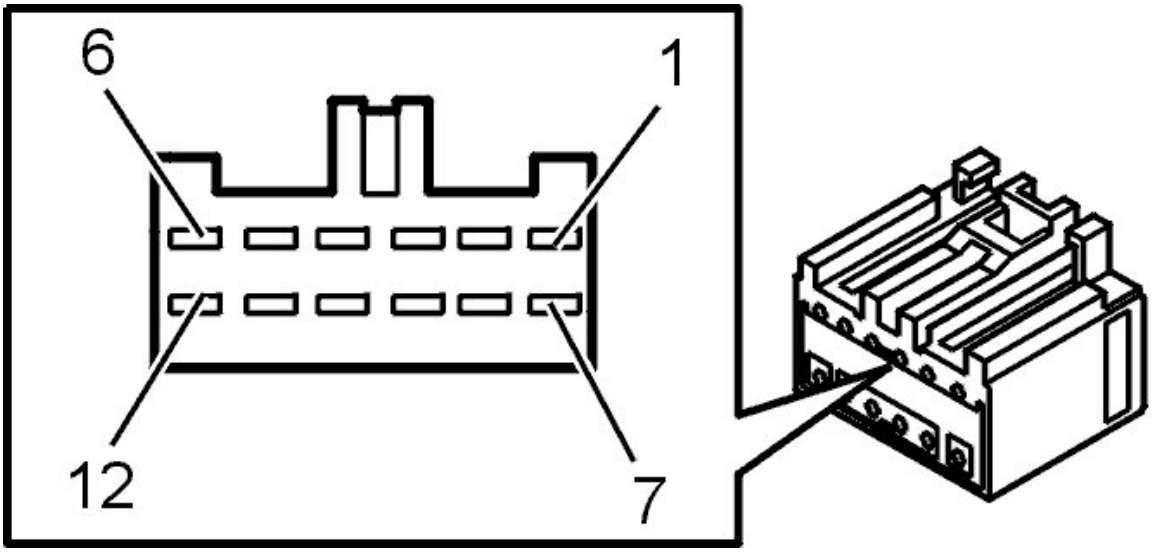
Remedy as necessary.

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





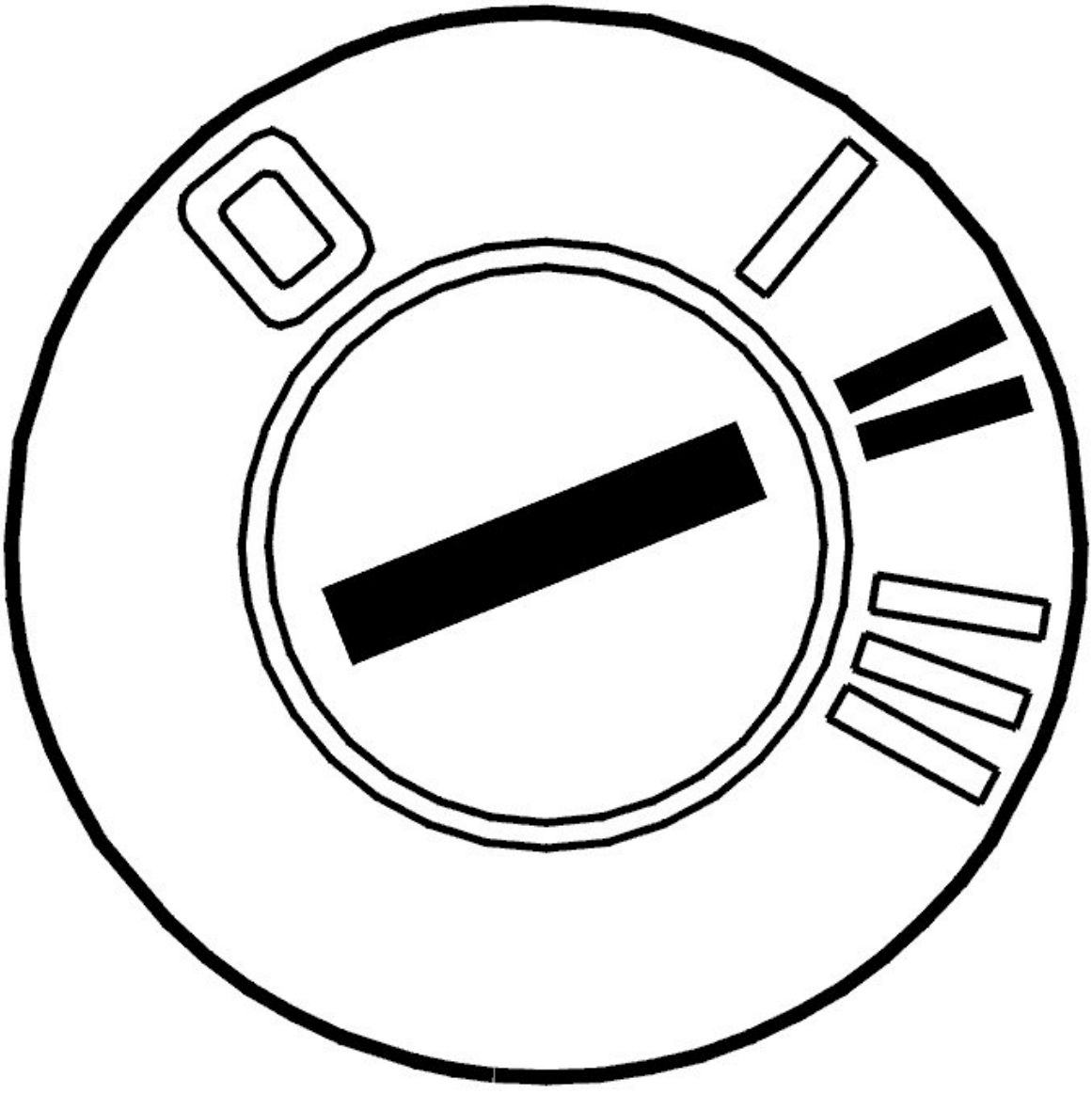


Select Continue

Continue - Verification

Verification

Hint: The motor should be activated when the check is carried out.



- Ignition on.

Read off value.
The Hall sensor must generate a pulsed signal and the power seat module (PSM) should count up or down depending on the movement of the seat.

Is the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

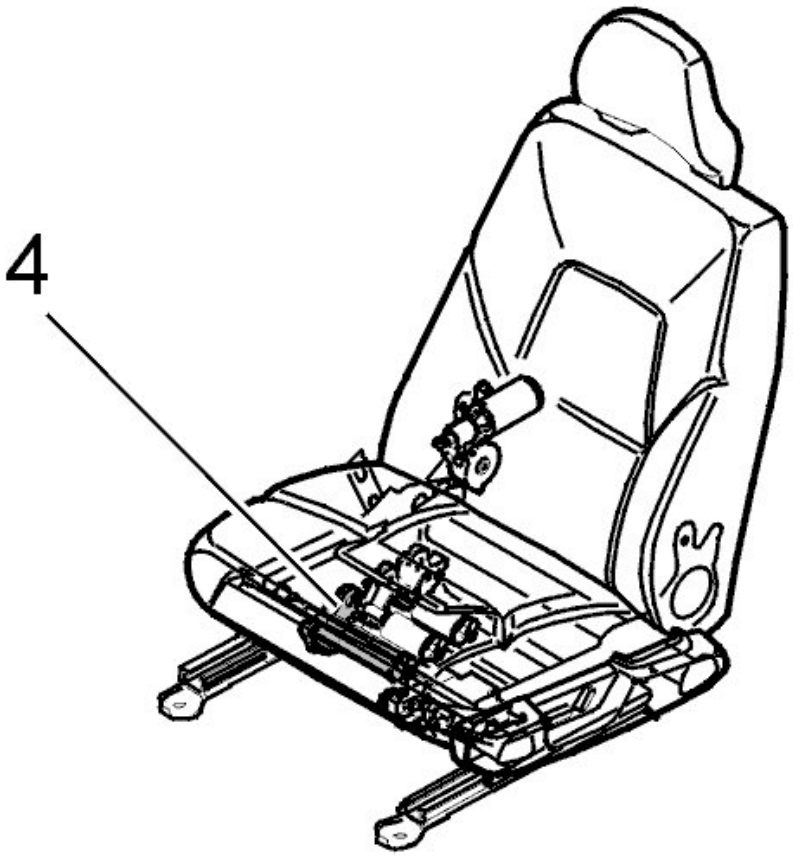
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking Hall sensor signal

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls seat front edge height. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0004 is stored if no Hall sensor pulse is detected when motor 4 is activated and in operation.

Possible source

- Defective Hall sensor in motor 4.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable to the Hall sensor.

Fault symptom[s]

- Automatic seat control does not function (automatic control of other motors functioning as normal).

Faulty Signal

Faulty signal. Intermittent fault

Checking cable

Check the power seat module (PSM) and motor connector for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
The Hall sensor is integrated in the motor.
Check the wiring between the power seat module (PSM) and the sensor according to the table below for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults , an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults and an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

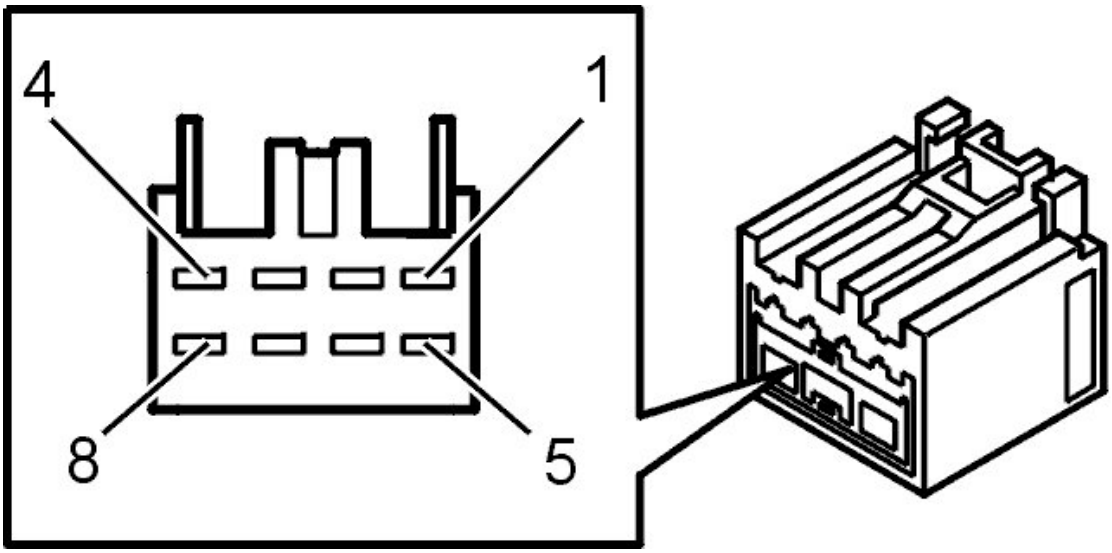
DTC	Covers motor	Terminal	Terminal
PSM-0001	M1	#3E	#4E
PSM-0002	M2	#3D	#4D
PSM-0003	M3	#7E	#8E
PSM-0004	M4	#11E	#12E

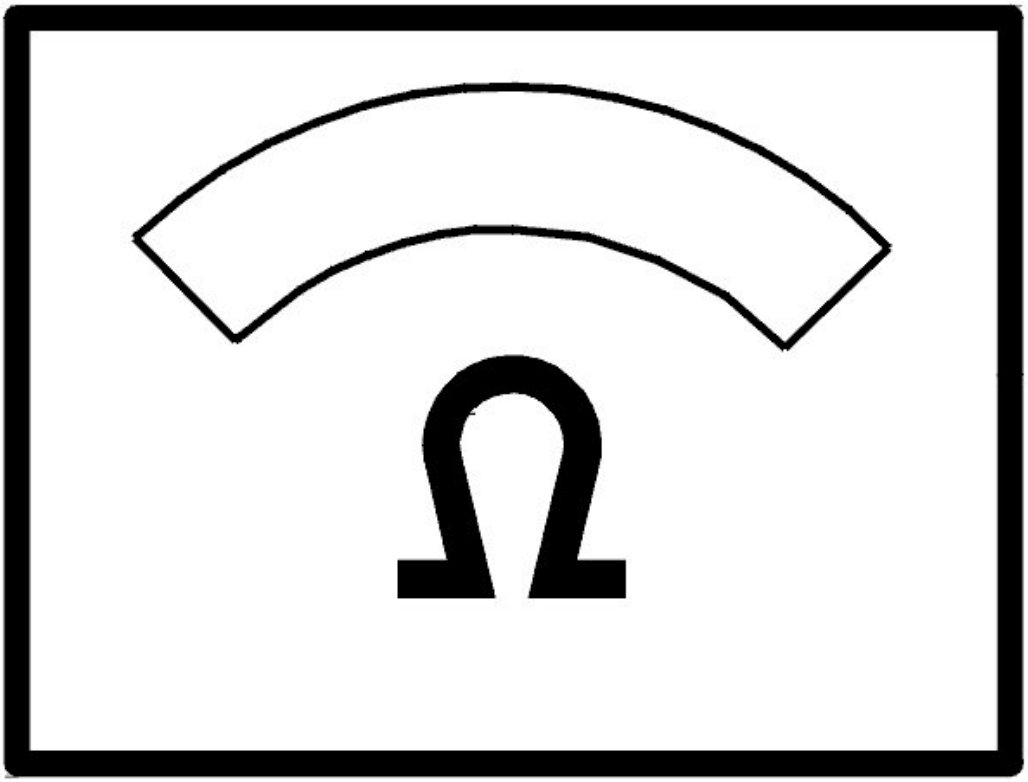
Other information:

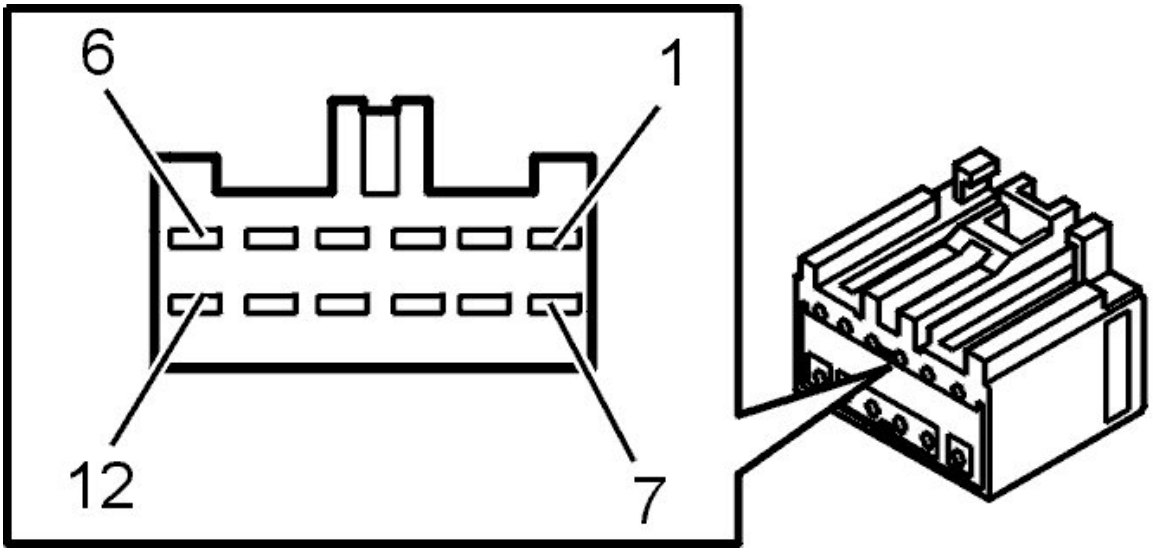
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).

- For information on signals, refer to Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 1. Memory button 1 must be activated for the diagnostic trouble code (DTC) to be detected. Diagnostic trouble code (DTC) PSM-0019 is stored if the power seat module (PSM) detects that the setting in memory position 1 does not correspond with a calculated check sum.

Possible source
- Memory position 1 not stored.
- Memory position incorrectly stored.

Fault symptom[s]
- Memory button does not function.

Internal Fault

Internal fault. Intermittent fault

Fault-tracing information

Internal fault in the power seat module (PSM). Replace the power seat module (PSM). See Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The power seat module (PSM) can store a seat setting in memory position 1. Memory button 1 must be activated for the diagnostic trouble code (DTC) to be detected. Diagnostic trouble code (DTC) PSM-0019 is stored if the power seat module (PSM) detects that the setting in memory position 1 does not correspond with a calculated check sum.

Possible source
- Memory position 1 not stored.
- Memory position incorrectly stored.

Fault symptom[s]

- Memory button does not function.

Internal Fault

Internal fault. Permanent fault

Checking seat function

Program in seat position 1.
Move seat to another position.
Attempt to move the seat to memory position 1.

Does the memory function correctly?

Yes - Fault Found

No - Checking the control panel

Checking the control panel

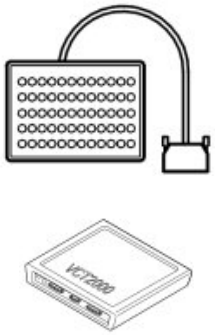
Check whether the signal from the control panel is received by the power seat module (PSM).
To read off the input signal to the power seat module (PSM) for memory button 1, select Mem 1 from the menu.
Read off the value.

Hint: When checking the control panel, check if the resistance between terminal #6C and the terminal pin is 0 ohms.

Button	Measure at:
Memory button 1	#2C

Other information

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Does the value change?

Yes - Checking the memory in the power seat module (PSM)

No - Replacing the component

Replacing the component

Replace the control panel according to Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement.

Continue - Verification

Checking the memory in the power seat module (PSM)

The power seat module (PSM) has detected a fault in the memory. Try programming in a new seat position. If this does not work, the actual seat position can be compared with the programmed seat position.
As soon as the memory has been programmed the actual value should be the same as the programmed value.

Does the memory function correctly?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the power seat module (PSM) according to Power seat module (PSM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Power Seat Control Module/Service and Repair.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

The check is performed by checking the diagnostic trouble code (DTC) status.

Is the diagnostic trouble code (DTC) now intermittent?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Attempt New Test - Checking seat function

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M1+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0020 is stored if button M1+ has been activated for longer than 60 seconds.

Possible source
- Button M1+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

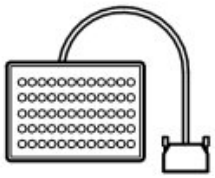
Too Long Time

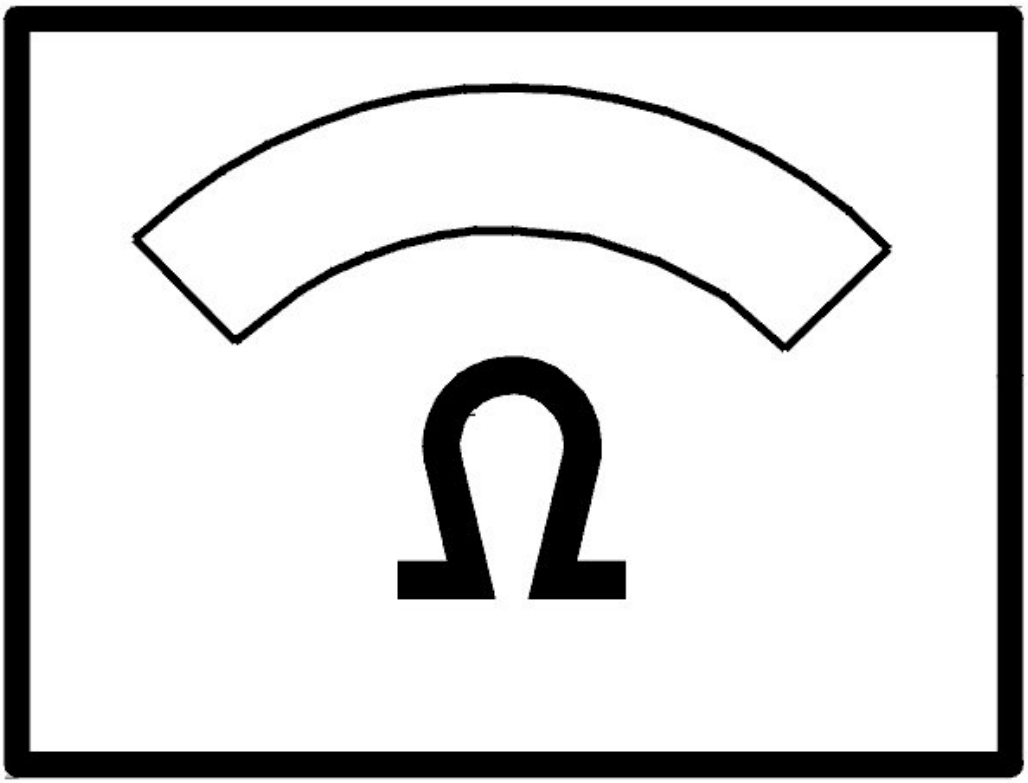
Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M1+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0020 is stored if button M1+ has been activated for longer than 60 seconds.

Possible source
- Button M1+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
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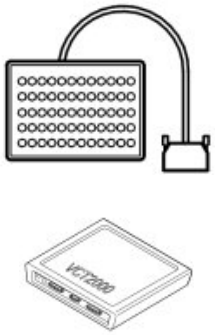

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M1- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0021 is stored if button M1- has been activated for longer than 60 seconds.

Possible source
- Button M1- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
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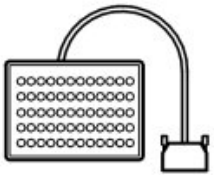

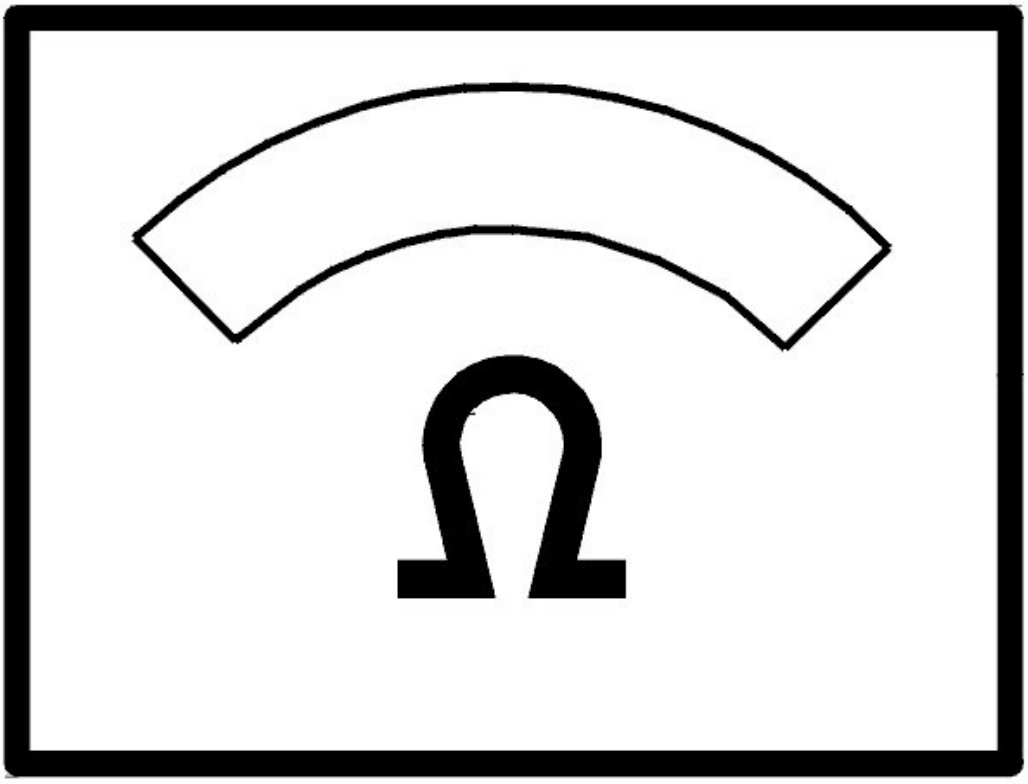

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M1- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0021 is stored if button M1- has been activated for longer than 60 seconds.

Possible source
- Button M1- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:

- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
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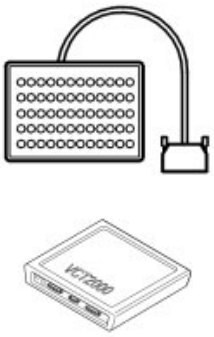

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M2+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0022 is stored if button M2+ has been activated for longer than 60 seconds.

Possible source

- Button M2+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
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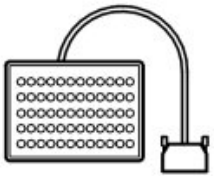

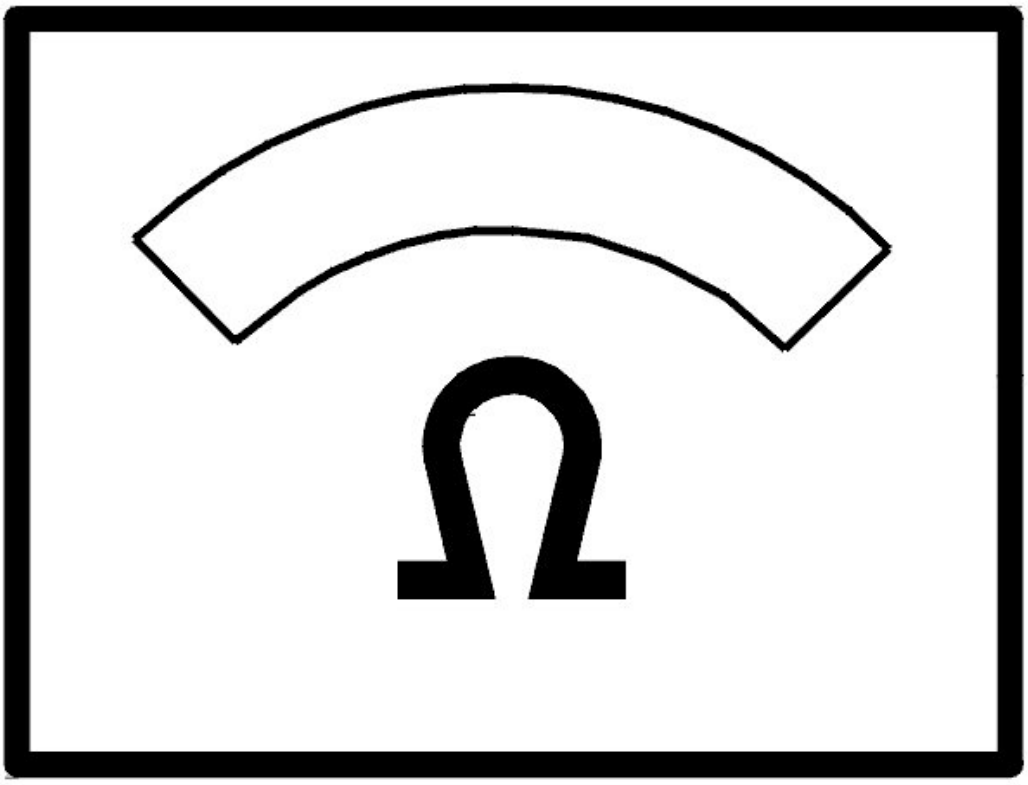

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M2+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0022 is stored if button M2+ has been activated for longer than 60 seconds.

Possible source

- Button M2+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
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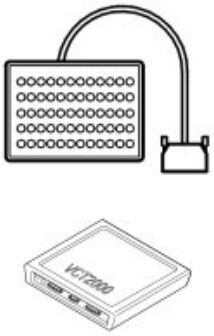

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M2- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0023 is stored if button M2- has been activated for longer than 60 seconds.

Possible source
- Button M2- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

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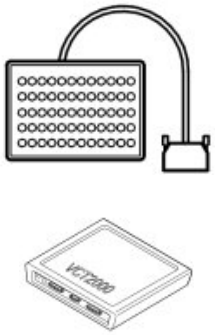

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M2- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0023 is stored if button M2- has been activated for longer than 60 seconds.

Possible source
- Button M2- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
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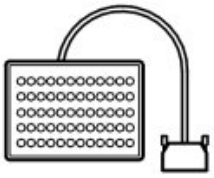

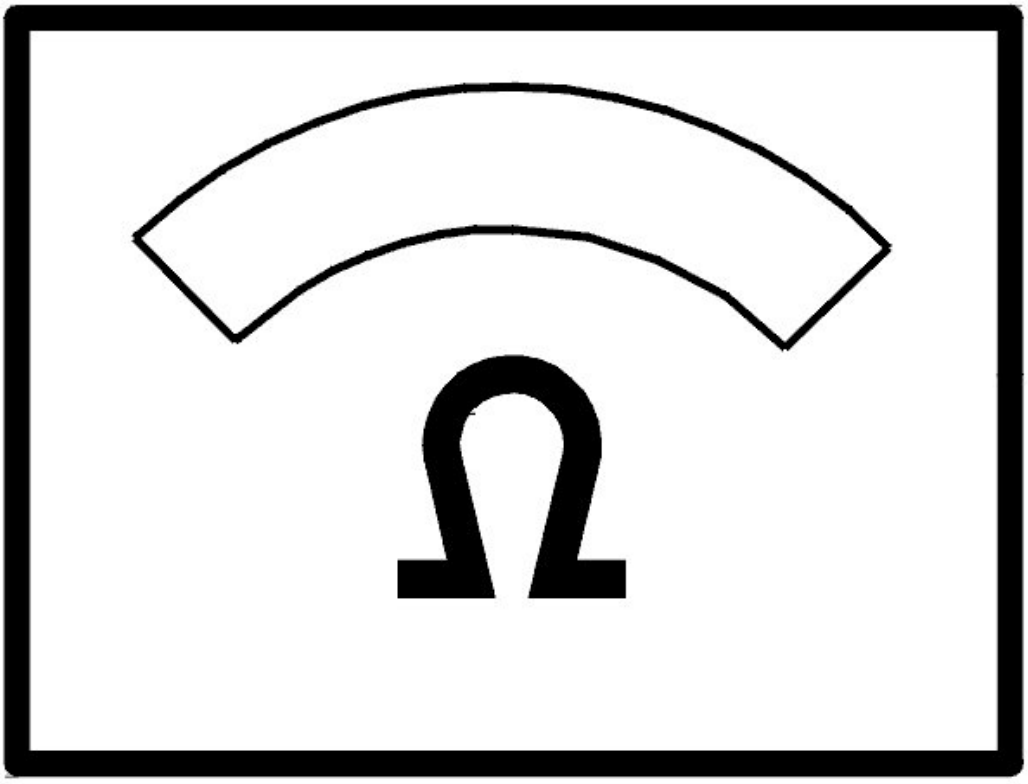

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M3+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0024 is stored if button M3+ has been activated for longer than 60 seconds.

Possible source
- Button M3+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:

- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
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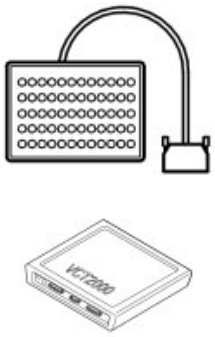

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M3+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0024 is stored if button M3+ has been activated for longer than 60 seconds.

Possible source

- Button M3+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

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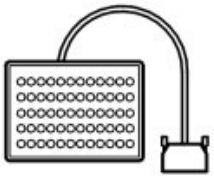

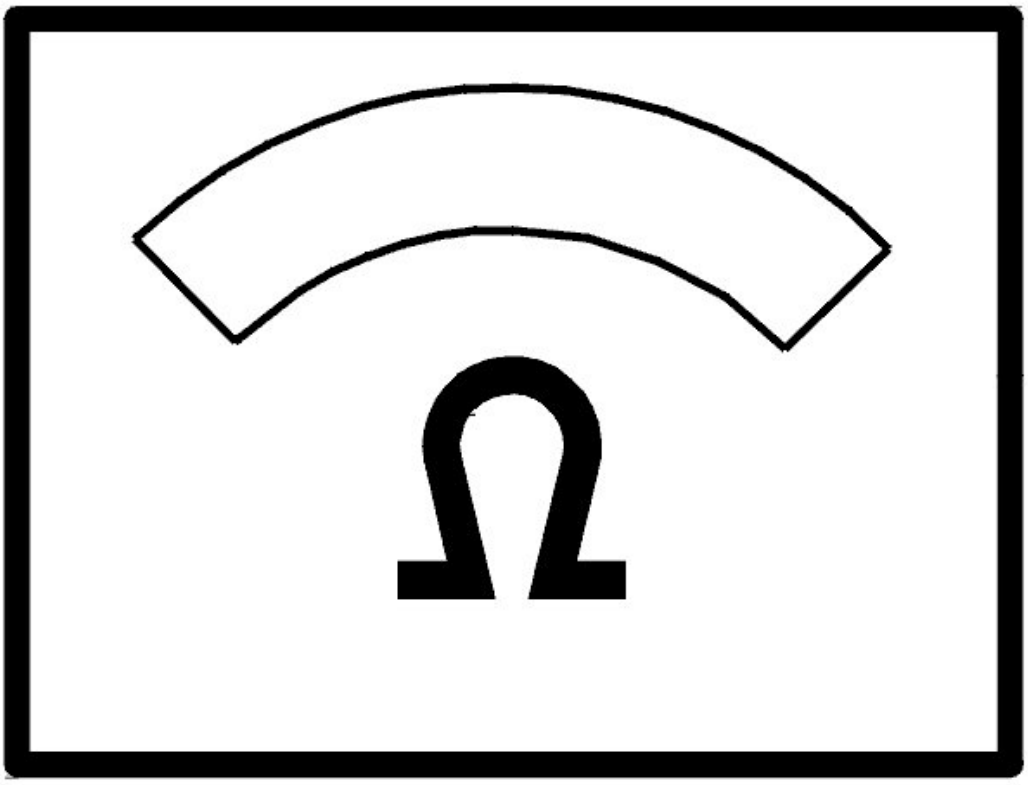

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M3- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0025 is stored if button M3- has been activated for longer than 60 seconds.

Possible source

- Button M3- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- The operation button does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
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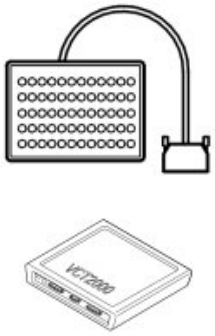

Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M3- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0025 is stored if button M3- has been activated for longer than 60 seconds.

Possible source
- Button M3- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent

Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

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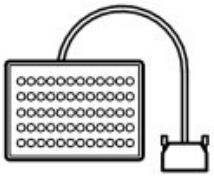
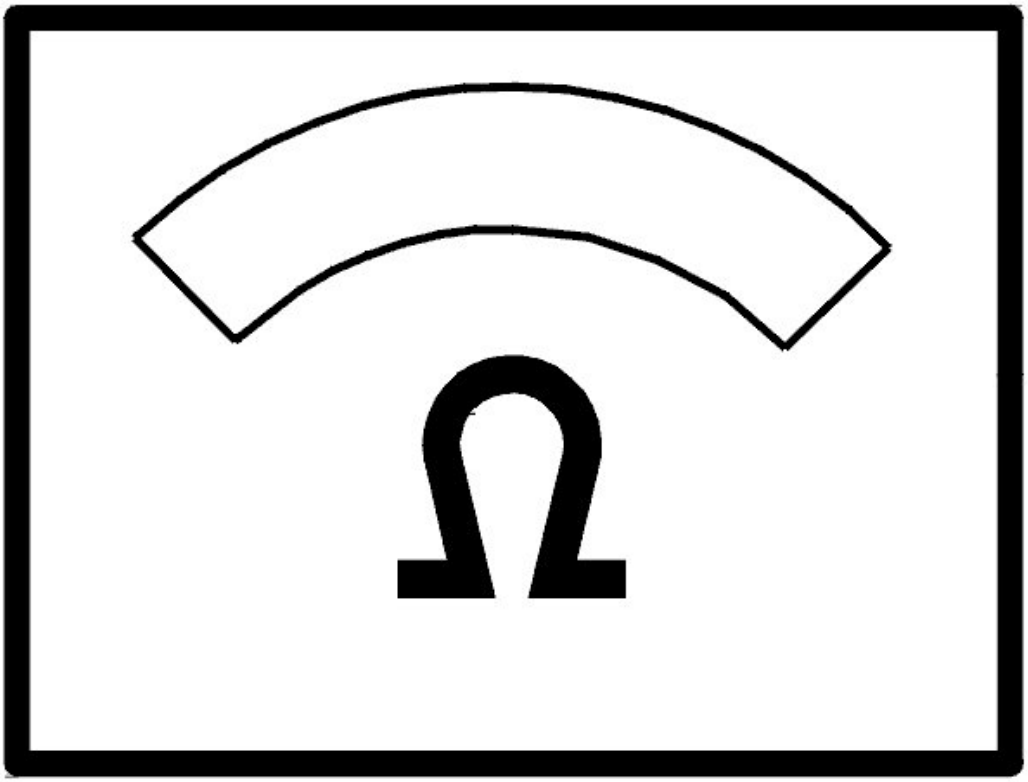




Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M4+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0026 is stored if button M4+ has been activated for longer than 60 seconds.

Possible source
- Button M4+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

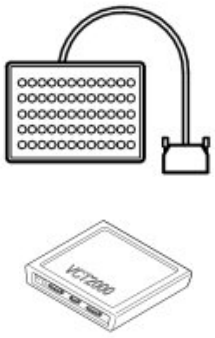
Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M4+ button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0026 is stored if button M4+ has been activated for longer than 60 seconds.

Possible source
- Button M4+ has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

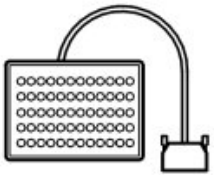
Too long time. Intermittent fault

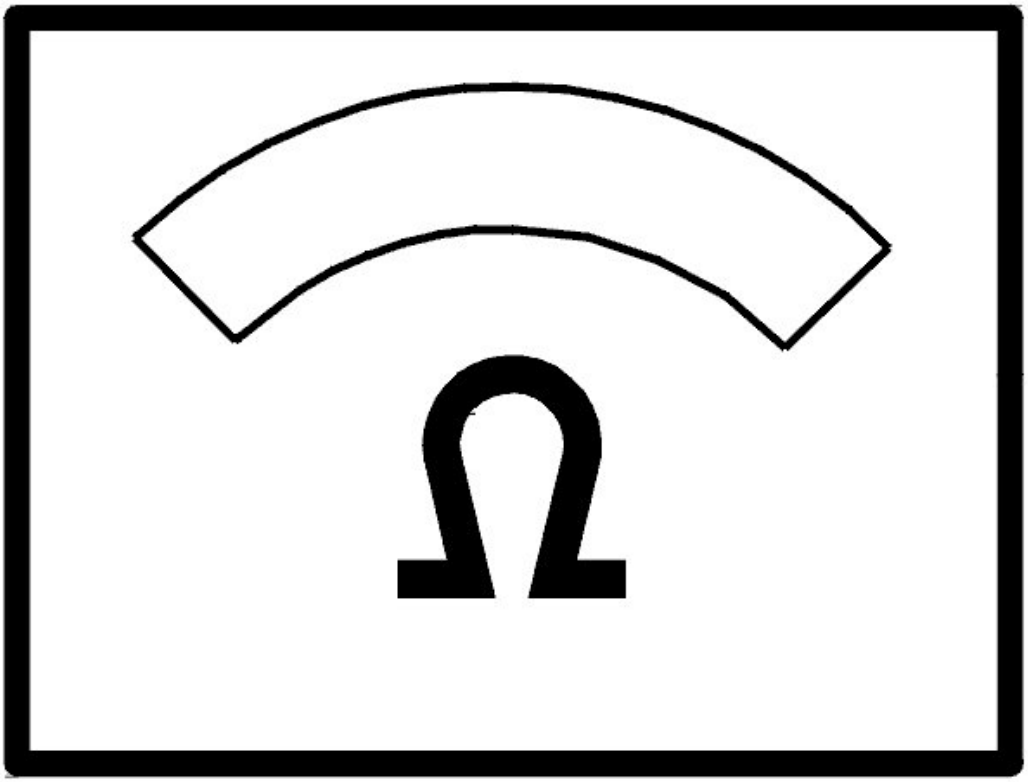
Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M4- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0027 is stored if button M4- has been activated for longer than 60 seconds.

Possible source
- Button M4- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- The operation button does not function.

Too Long Time

Too long time. Permanent fault

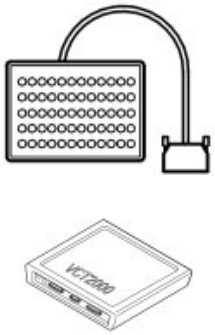
Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The M4- button must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0027 is stored if button M4- has been activated for longer than 60 seconds.

Possible source
- Button M4- has jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- The operation button does not function.

Too Long Time

Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
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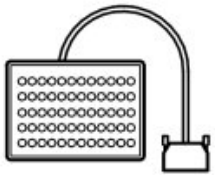
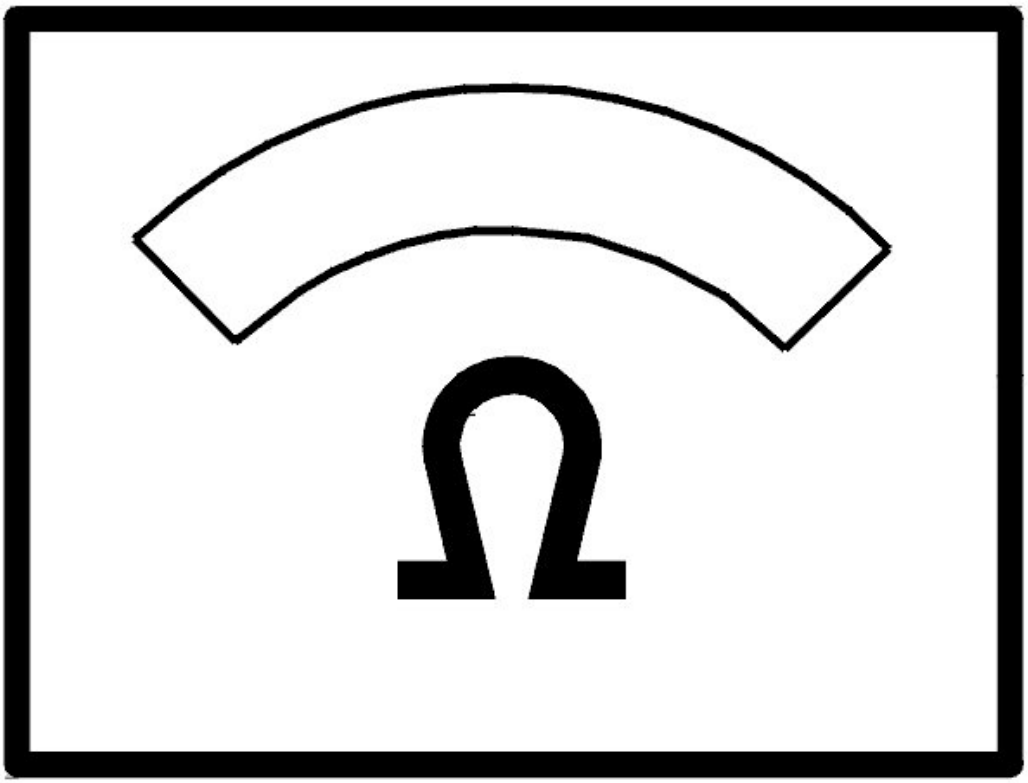




Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0028 is stored if memory button 1 has been activated for longer than 60 seconds.

Possible source
- Memory button 1 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- Button 1 does not function.

Too Long Time

Too long time. Permanent fault

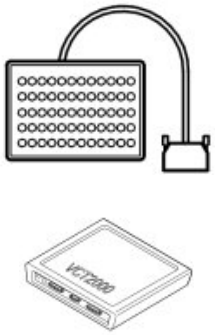
Checking inputs

Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:
- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0028 is stored if memory button 1 has been activated for longer than 60 seconds.

Possible source
- Memory button 1 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- Button 1 does not function.

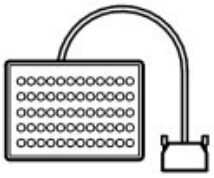
Too Long Time

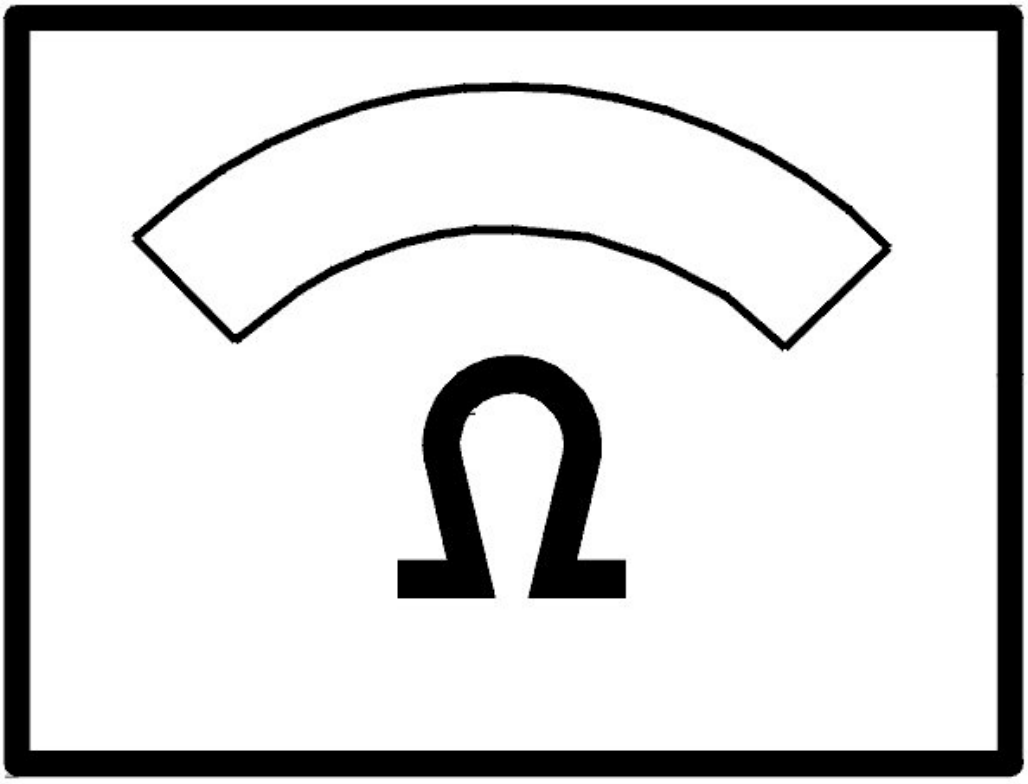
Too long time. Intermittent fault

Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).





Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0029 is stored if memory button 2 has been activated for longer than 60 seconds.

Possible source
- Memory button 2 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]
- Button 2 does not function.

Too Long Time

Too long time. Permanent fault

Checking inputs

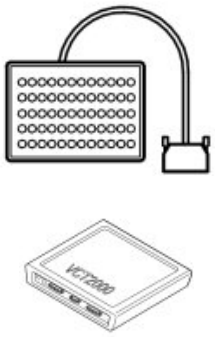
Check the function of the control panel buttons.

Hint: The value should change when the button is activated.

Replace the control panel if the power seat control module (PSM) does not receive any signal.

Other information:

- To access or replace the control panel, see Side panel, replacing See: Body and Frame/Seats/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



Is the function OK?

Yes - Fault Found

No - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Memory button 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0029 is stored if memory button 2 has been activated for longer than 60 seconds.

Possible source

- Memory button 2 is jammed in the depressed position.
- Defective control panel.

Fault symptom[s]

- Button 2 does not function.

Too Long Time

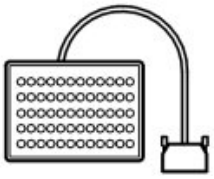
Too long time. Intermittent fault

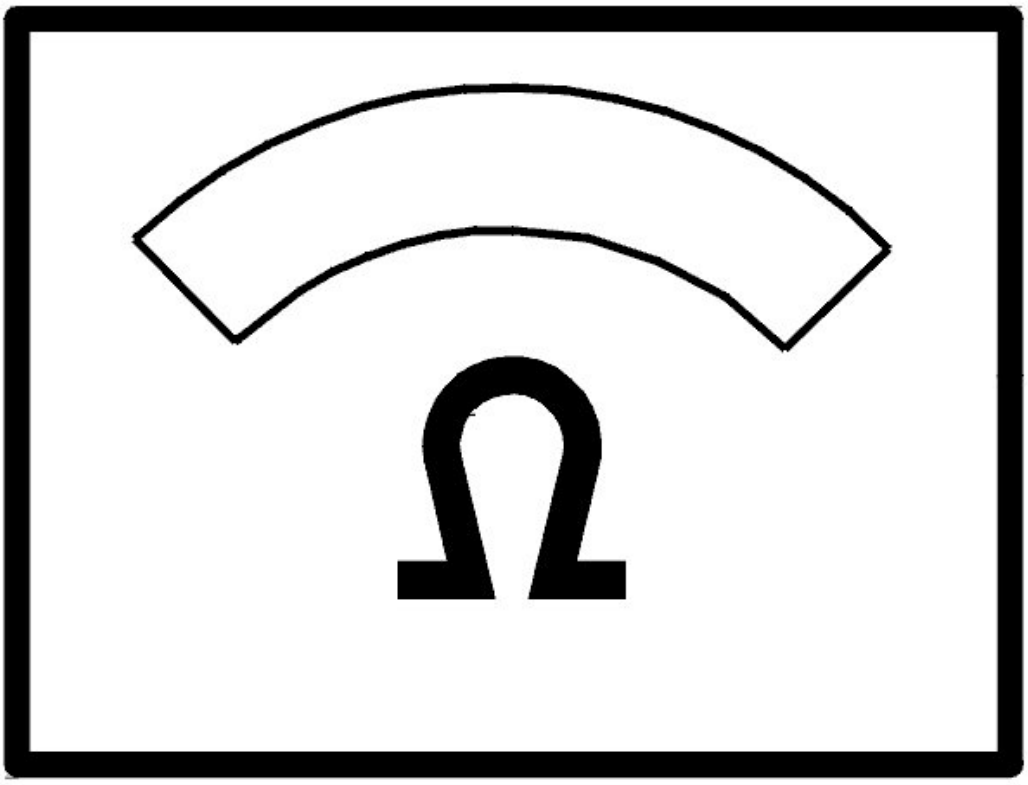
Checking control panel

Check the power seat module (PSM) and the control panel connectors. Check for intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



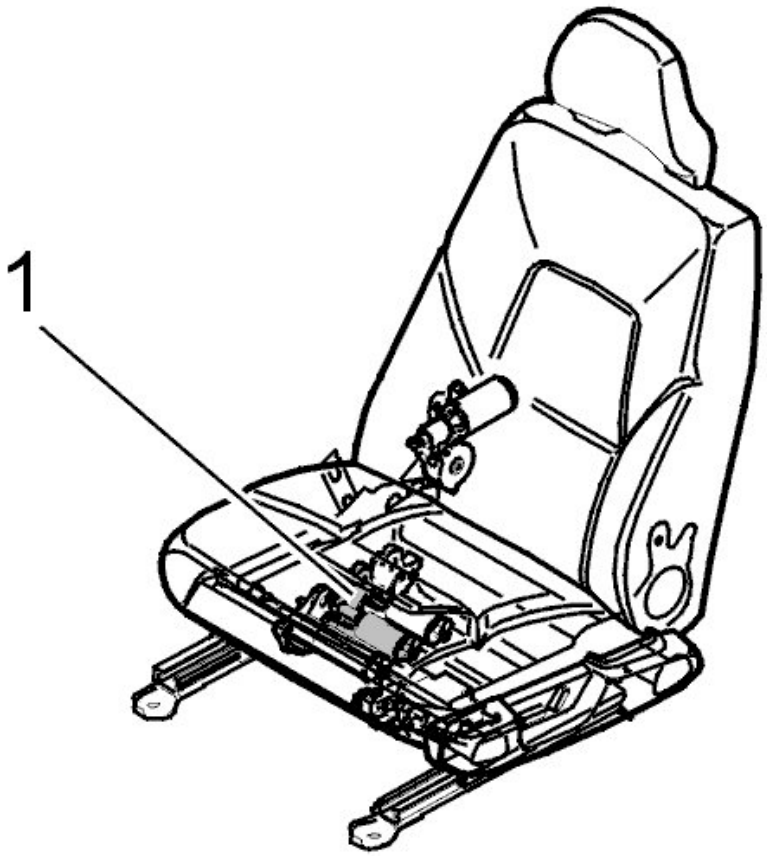


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0030 is stored if the motor 1 does not run despite M1+ being activated and the power seat module registering +12 V on the M1+ signal cable.

Possible source

- Open-circuit in signal cable M1+.
- Blown fuse (11C/4).

Fault symptom[s]

- Seat front-rear adjustment does not operate.

Signal Missing. Intermittent Fault

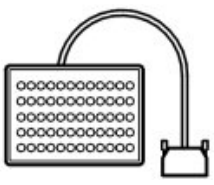
Signal missing. Intermittent fault

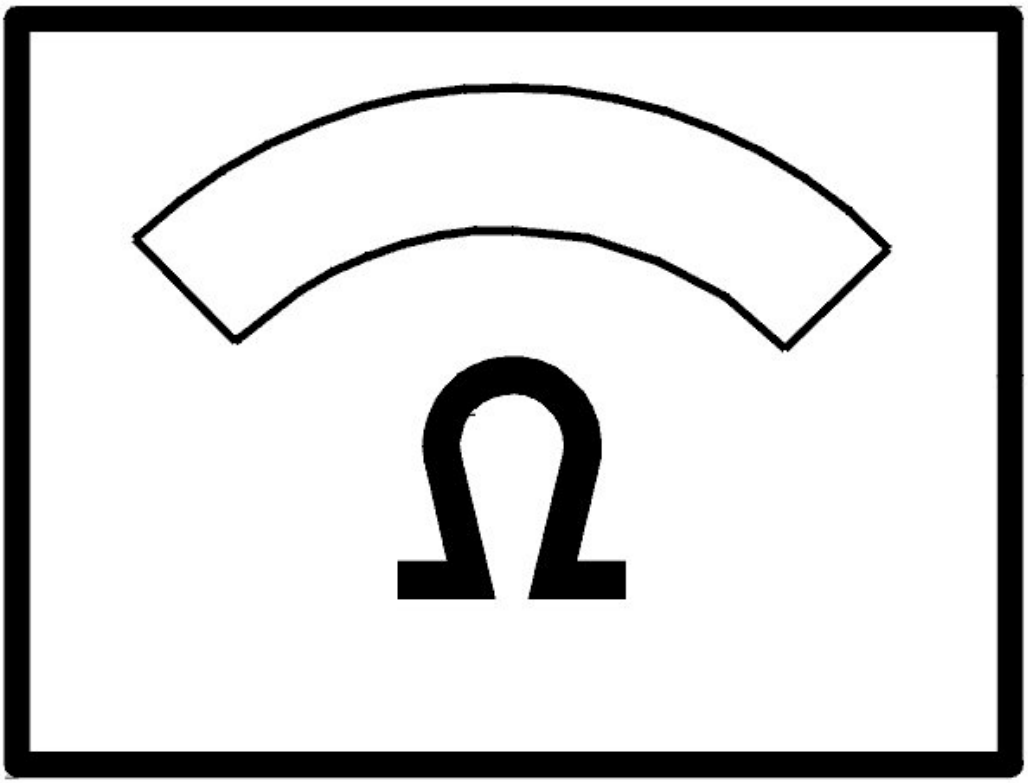
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



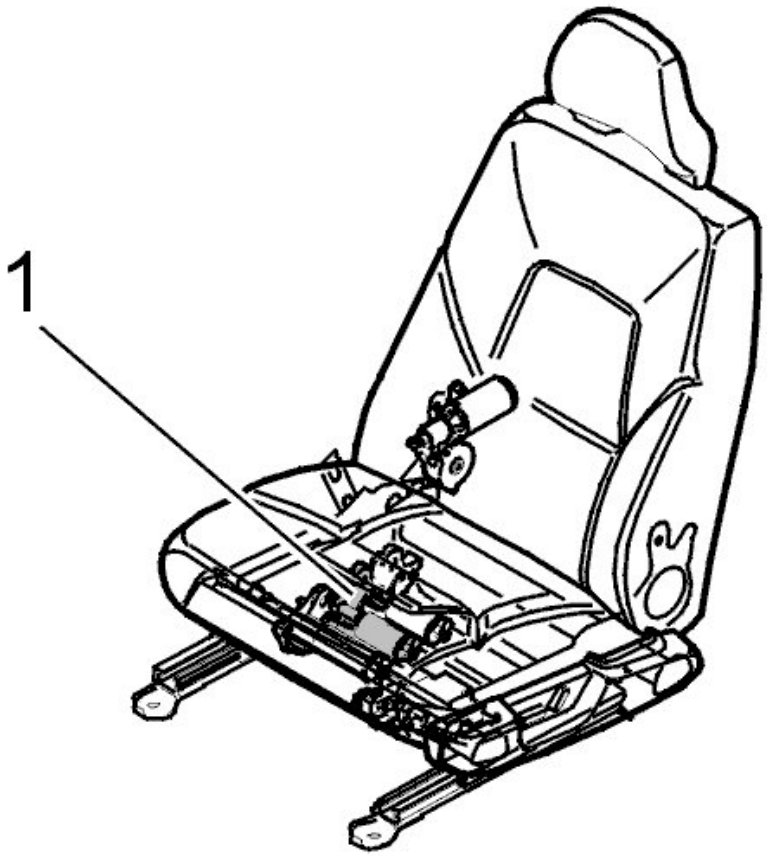


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0030 is stored if the motor 1 does not run despite M1+ being activated and the power seat module registering +12 V on the M1+ signal cable.

Possible source

- Open-circuit in signal cable M1+.
- Blown fuse (11C/4).

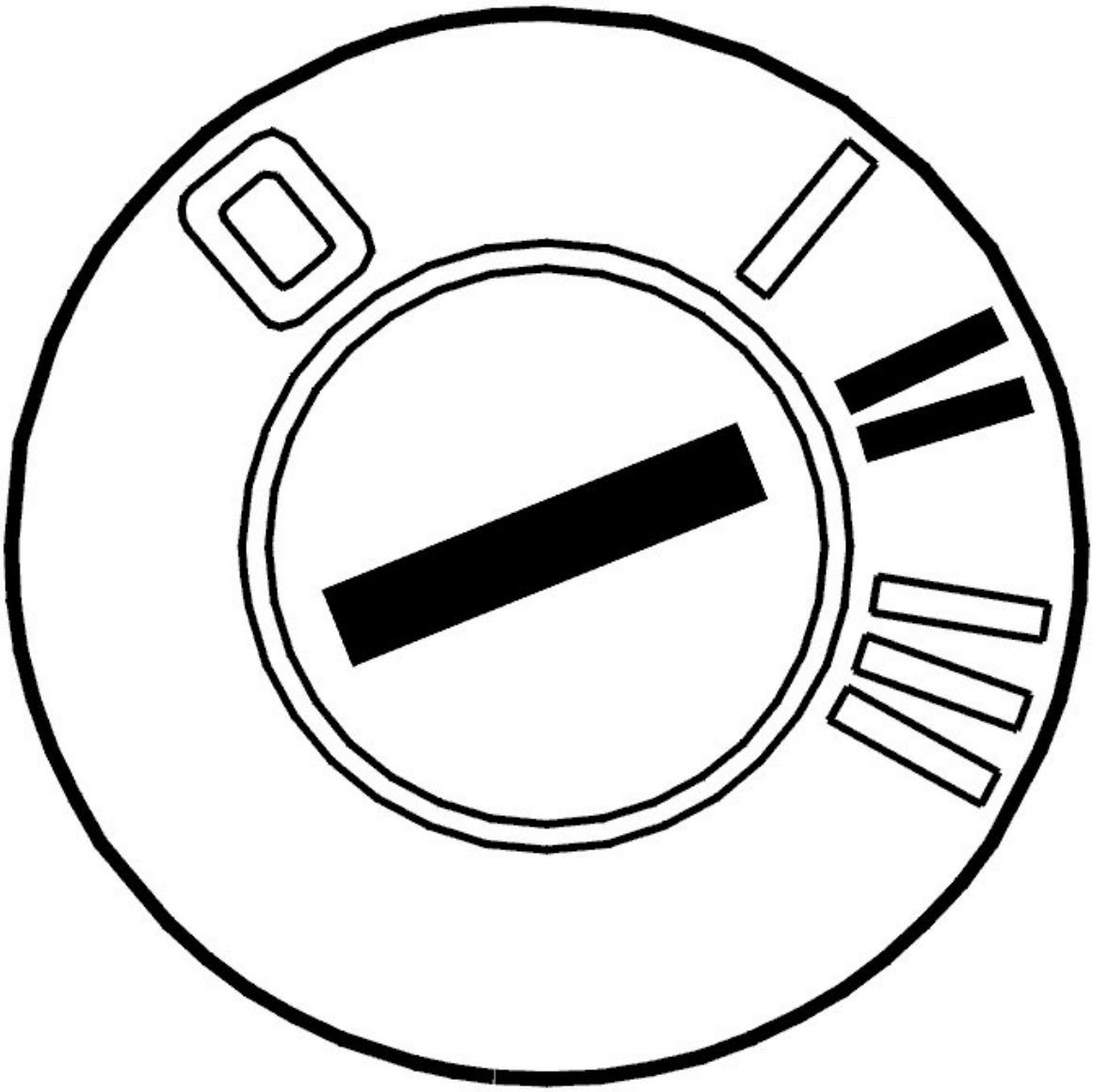
Fault symptom[s]

- Seat front-rear adjustment does not operate.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking wiring



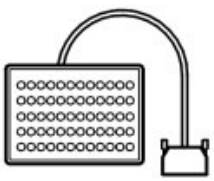
- Ignition on
- Try to activate the motor.

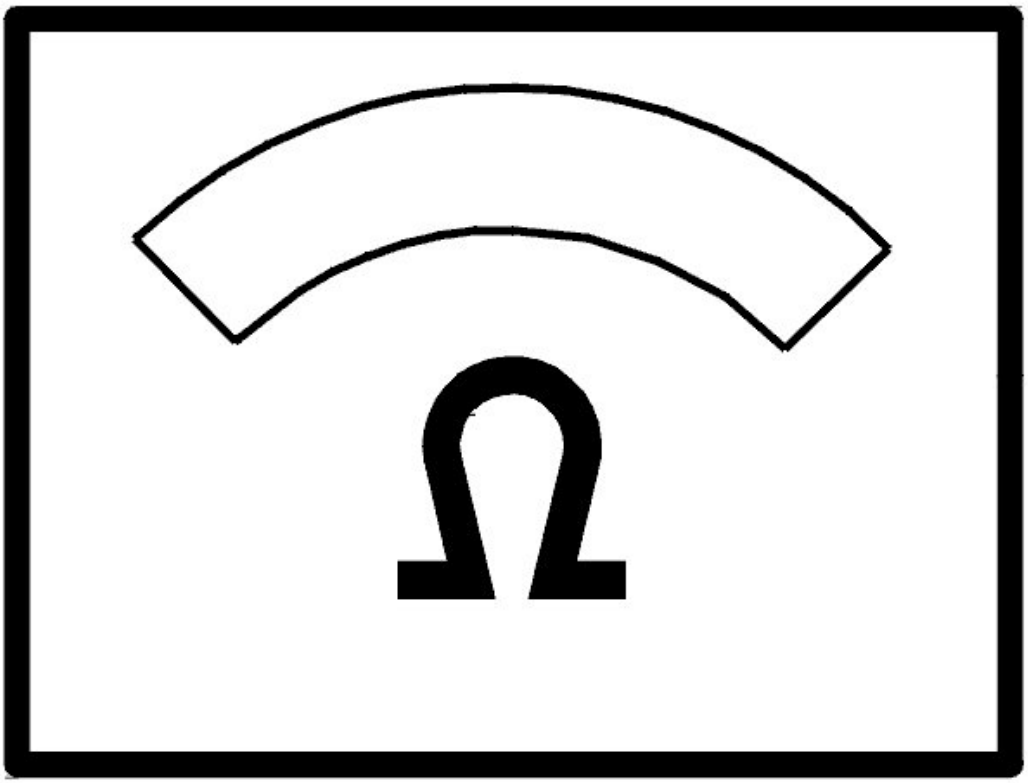
Hint: The resistance between #1E and #2E must be approximately 0 ohms.

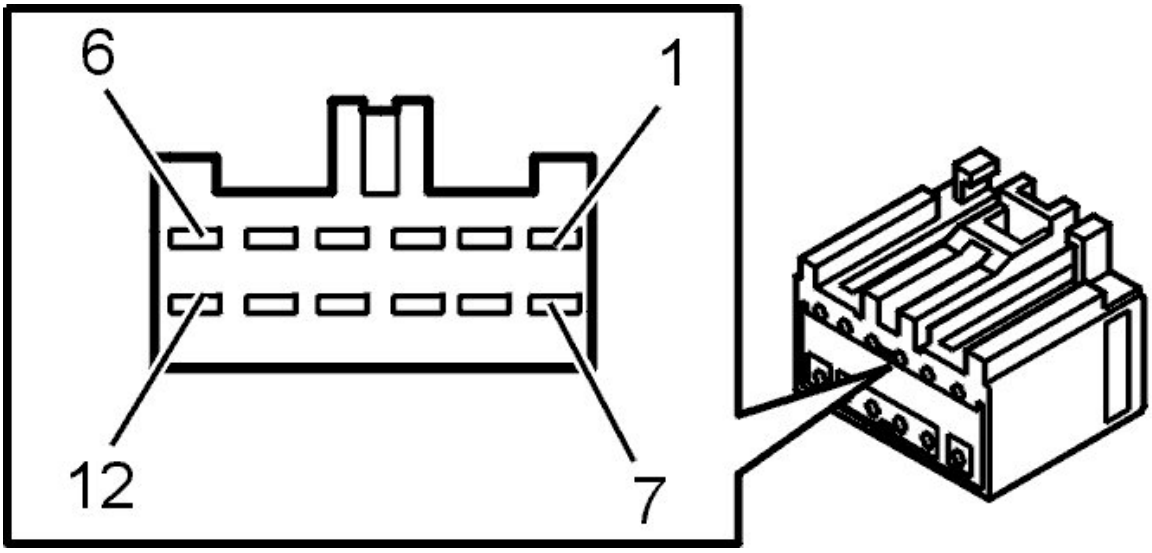
Check the cable between the power seat module (PSM) #1E and the motor. Check for an open-circuit. See Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found, try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

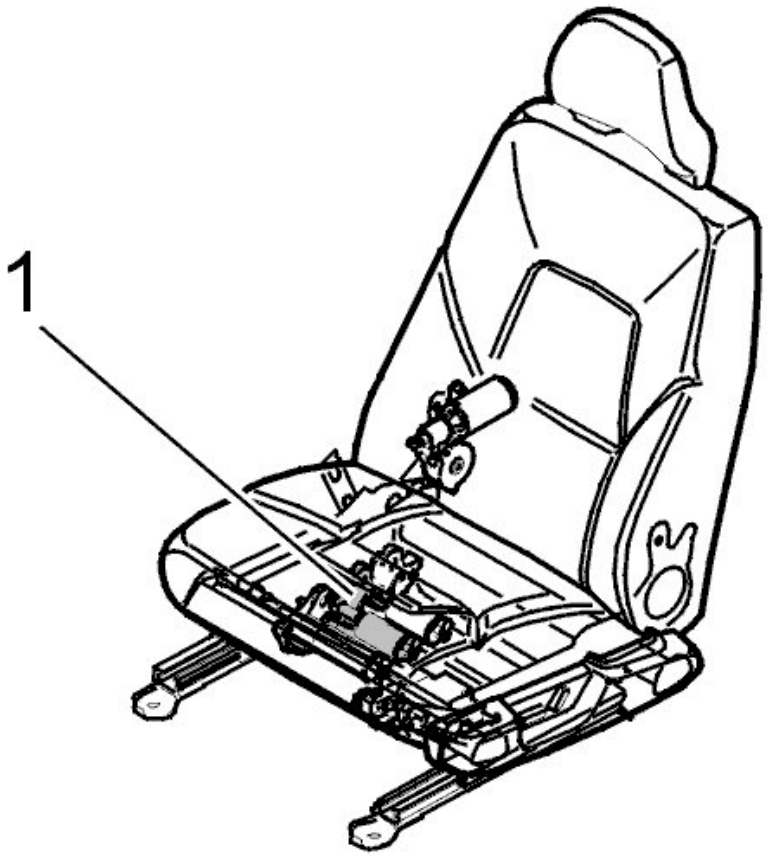
Attempt New Test - Checking wiring

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0031 is stored if the motor 1 does not run despite M1- being activated and the power seat module registering +12 V on the M1- signal cable.

Possible source

- Open-circuit in signal cable M1-.
- Blown fuse (11C/4).

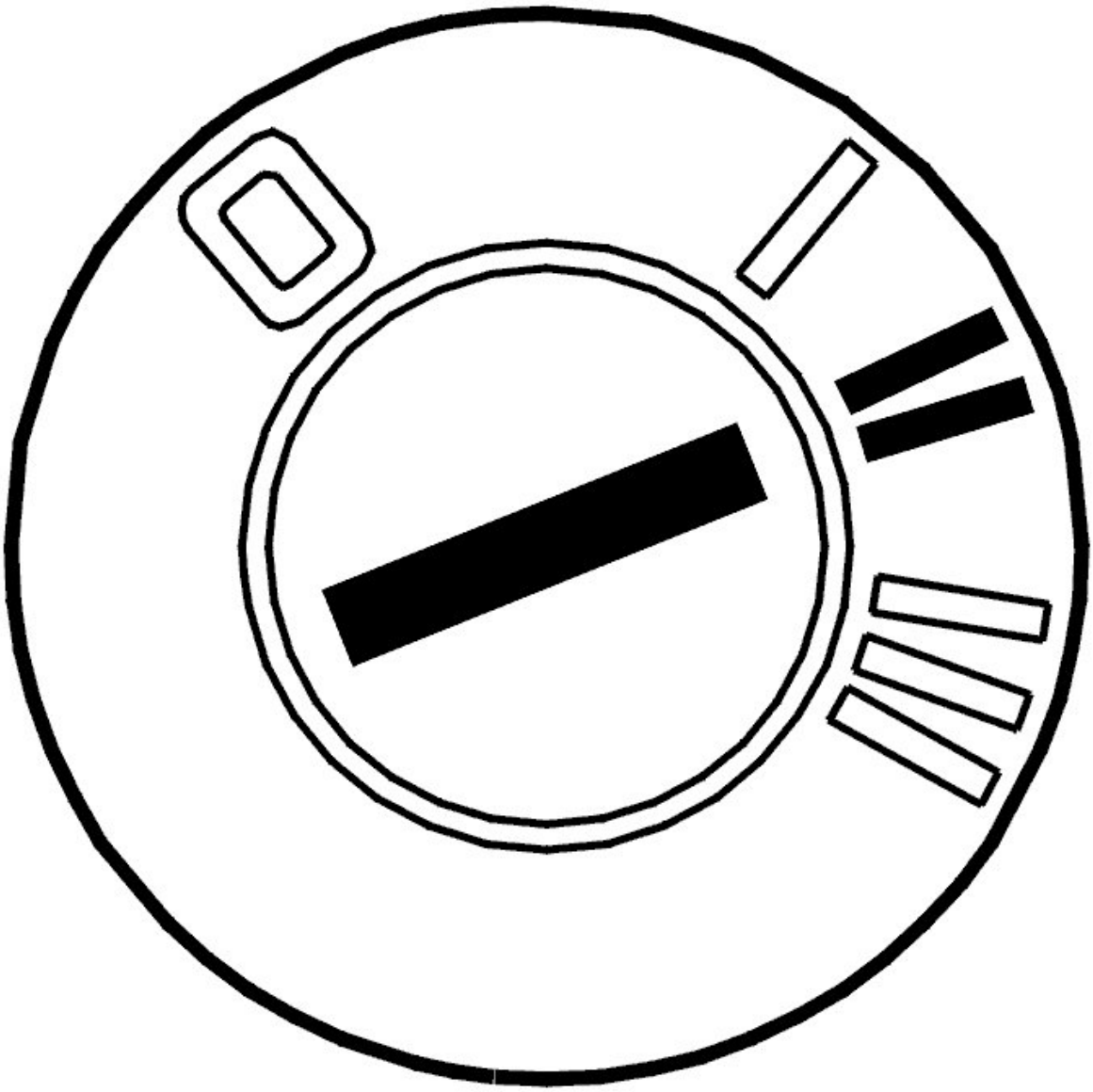
Fault symptom[s]

- Seat front-rear adjustment does not operate.

Signal Missing

Signal missing. Permanent fault

Checking the cable



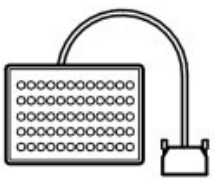
- Ignition on
- Try to activate the motor.

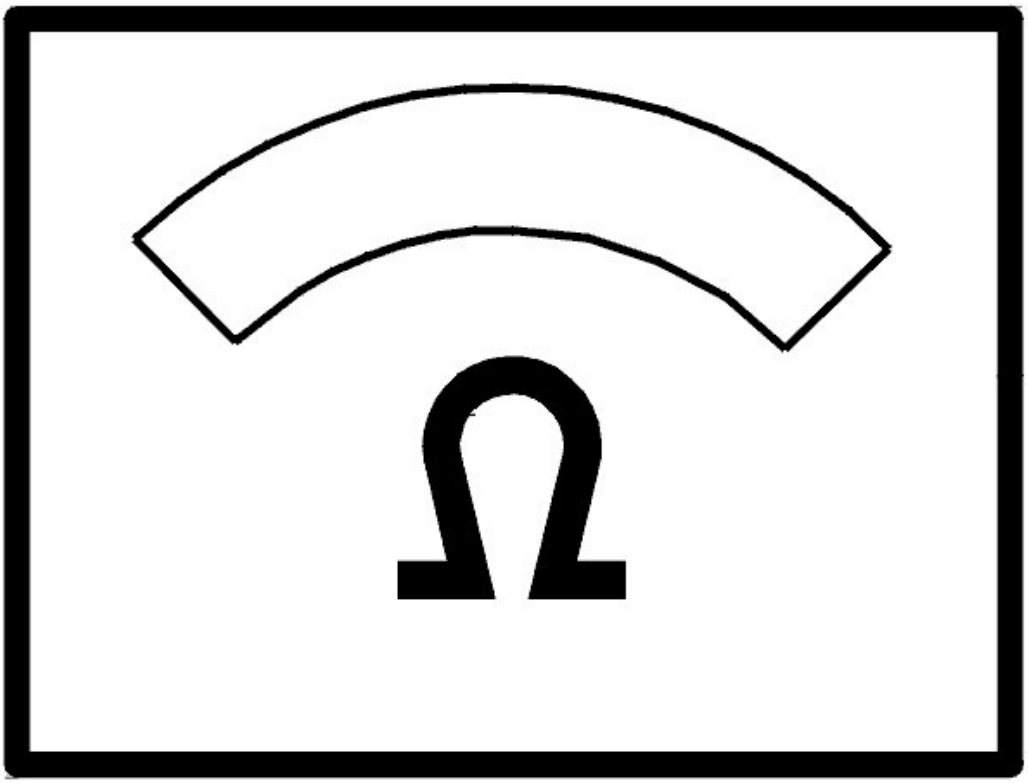
Hint: The resistance between #1E and #2E must be approximately 0 ohms.

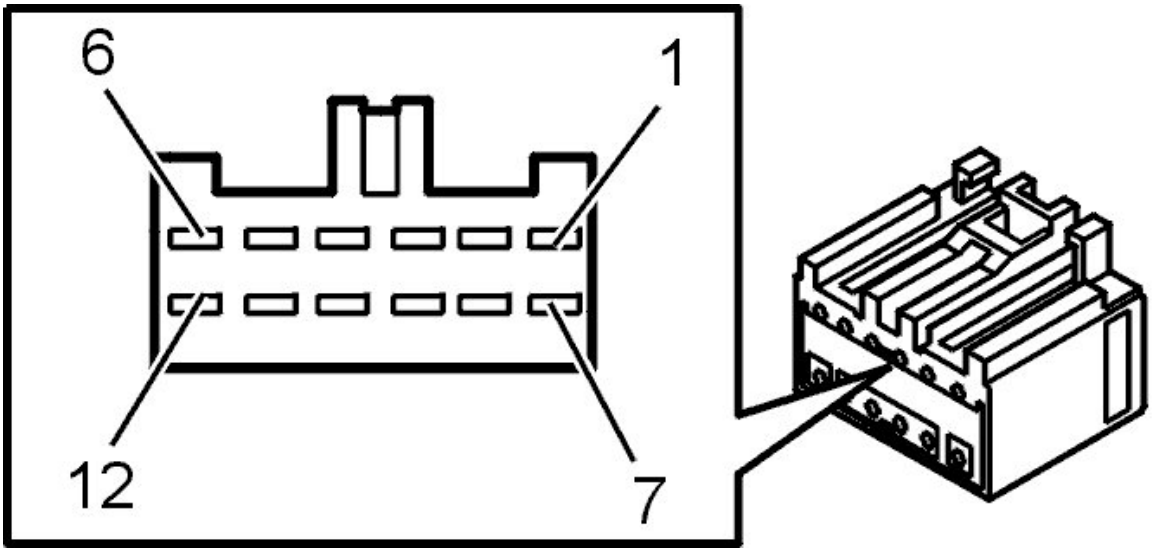
Check the cable between the power seat module (PSM) #2E and the motor. Check for an open-circuit. See Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found, try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

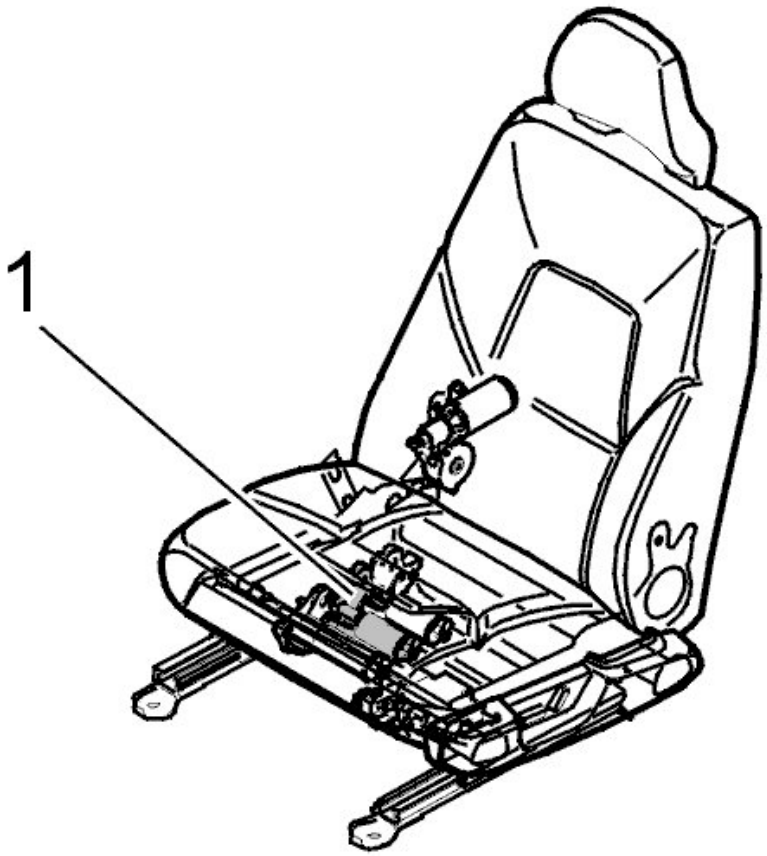
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 1 controls the seat front-rear adjustment. Motor 1 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0031 is stored if the motor 1 does not run despite M1- being activated and the power seat module registering +12 V on the M1- signal cable.

Possible source

- Open-circuit in signal cable M1-.
- Blown fuse (11C/4).

Fault symptom[s]

- Seat front-rear adjustment does not operate.

Signal Missing

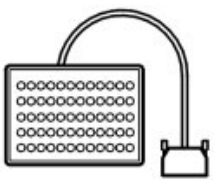
Signal missing. Intermittent fault

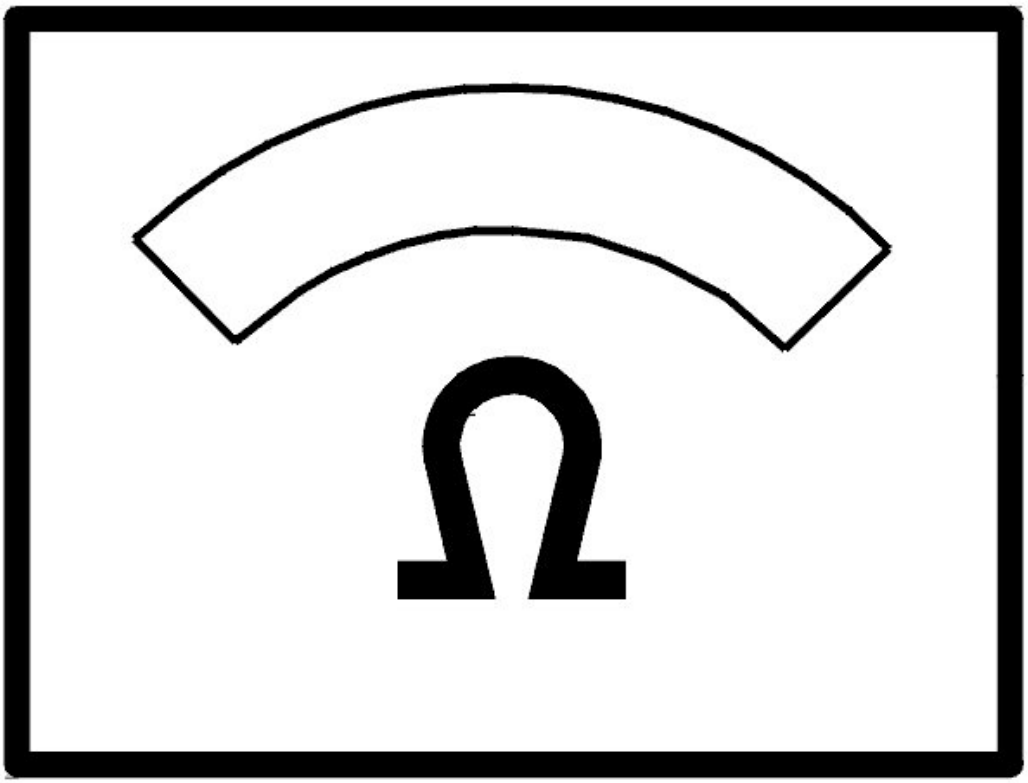
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



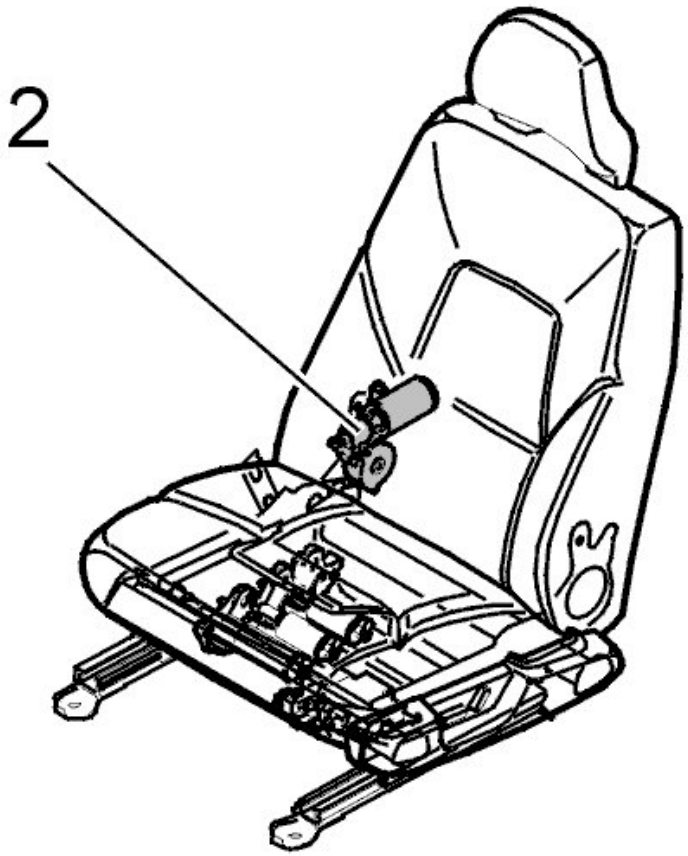


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls the backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0032 is stored if motor 2 does not run despite M2+ being activated and the power seat module registering +12 V on the M2+ signal cable.

Possible source

- Open-circuit in signal cable M2+.
- Blown fuse (11C/4).

Fault symptom[s]

- The angle of the backrest cannot be adjusted.

Signal Missing

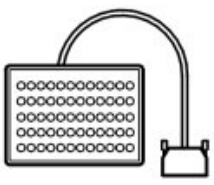
Signal missing. Intermittent fault

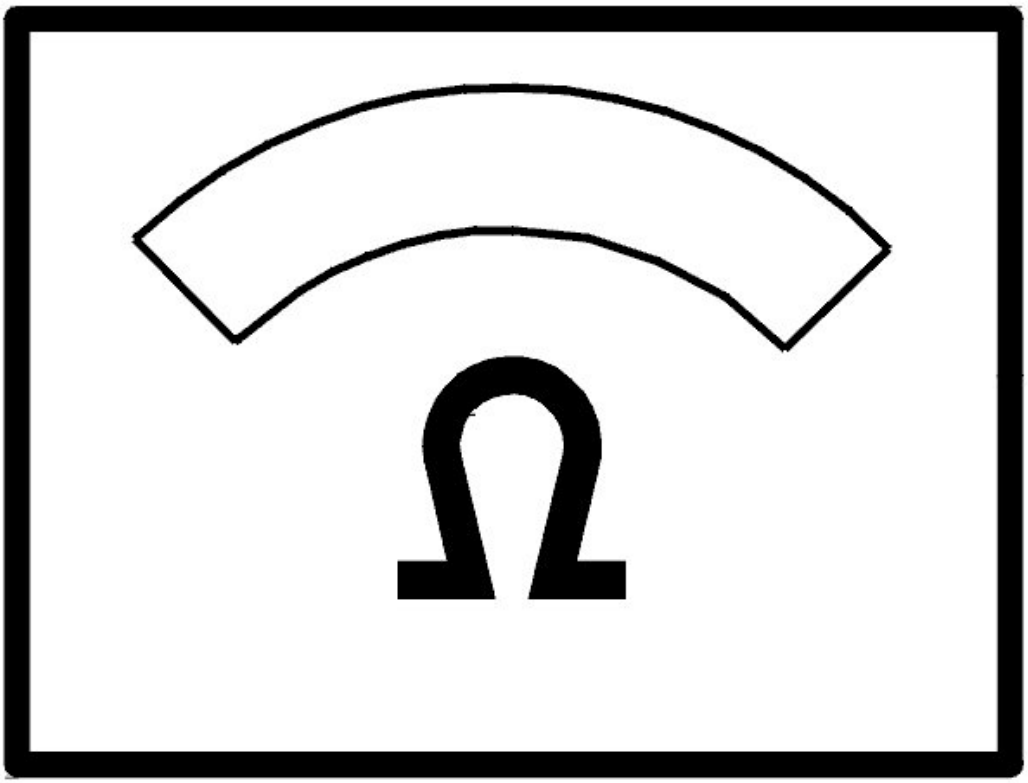
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



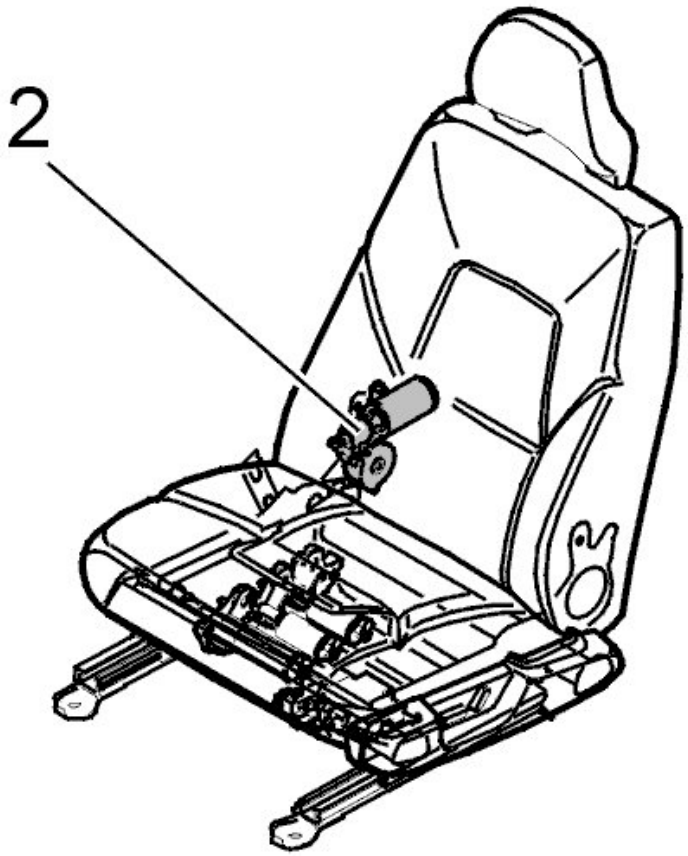


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls the backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0032 is stored if motor 2 does not run despite M2+ being activated and the power seat module registering +12 V on the M2+ signal cable.

Possible source

- Open-circuit in signal cable M2+.
- Blown fuse (11C/4).

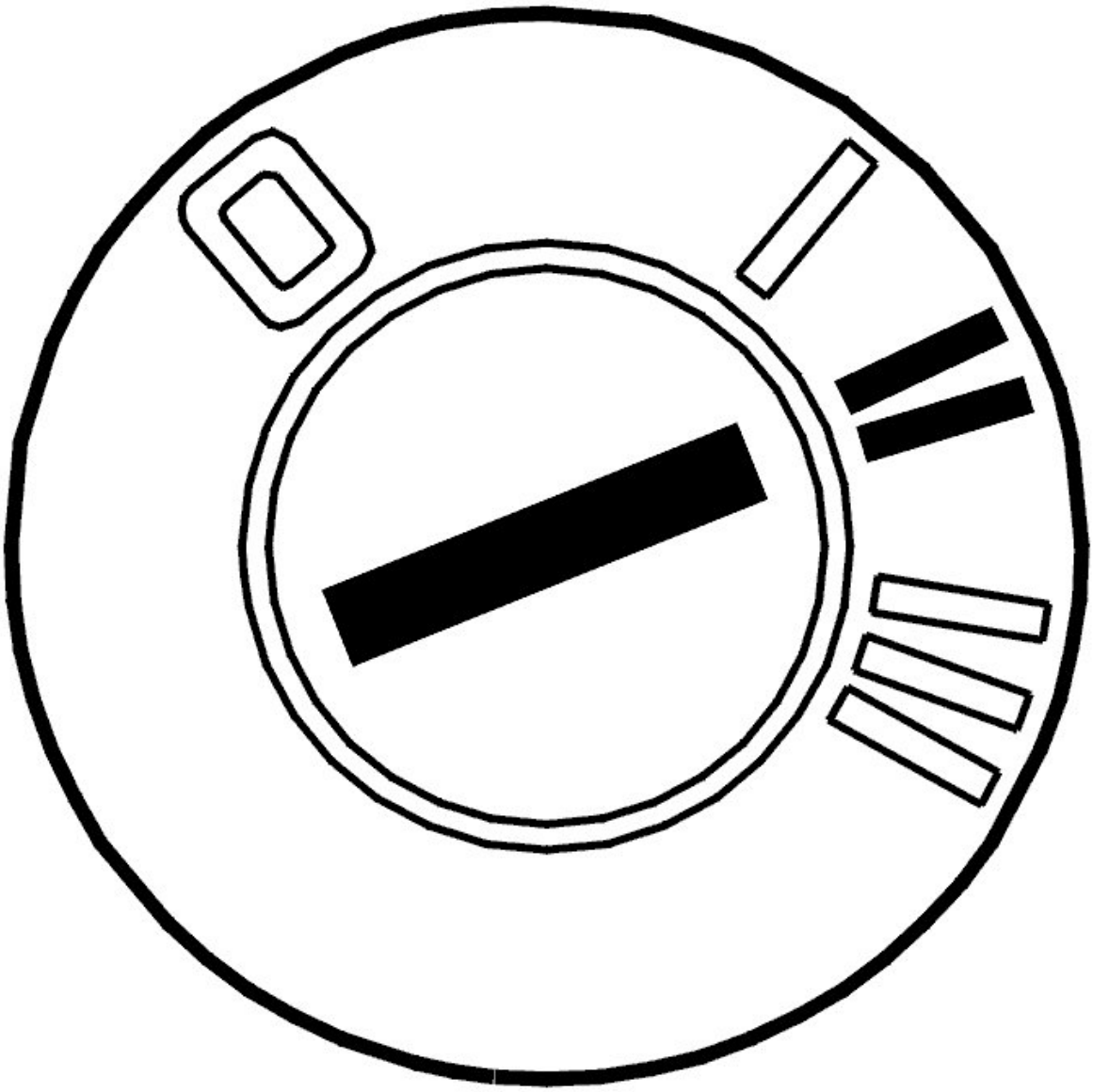
Fault symptom[s]

- The angle of the backrest cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



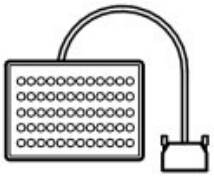
- Ignition on.
- Try to activate the motor.

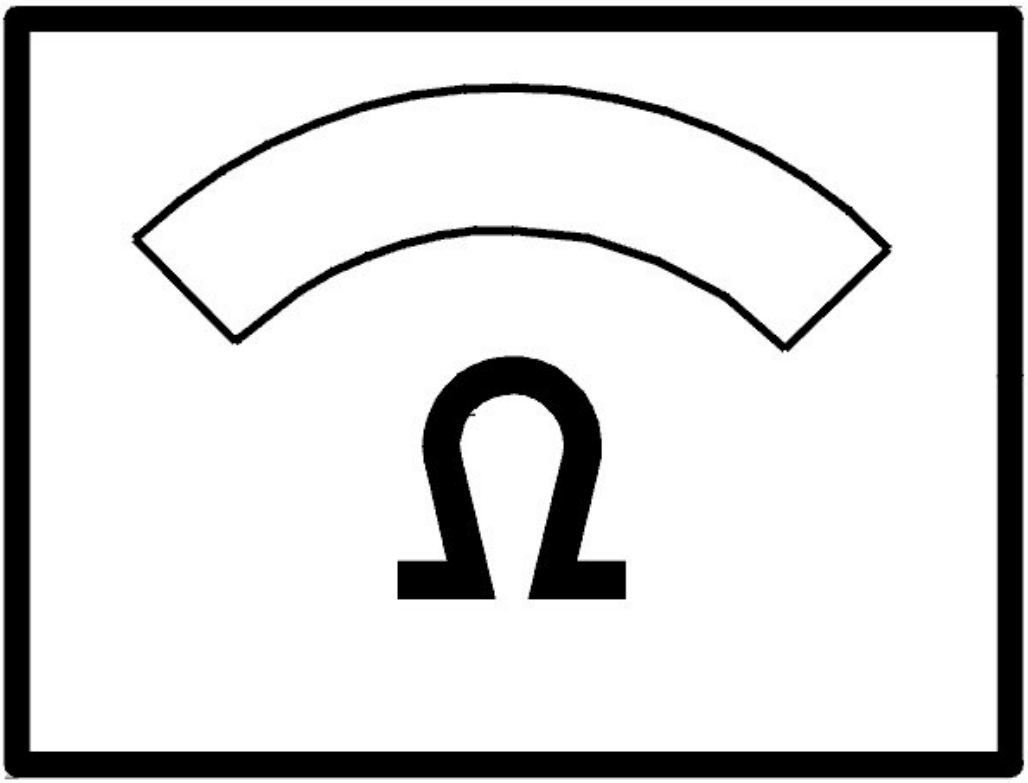
Hint: The resistance between #1D and #2D must be approximately 0 ohms.

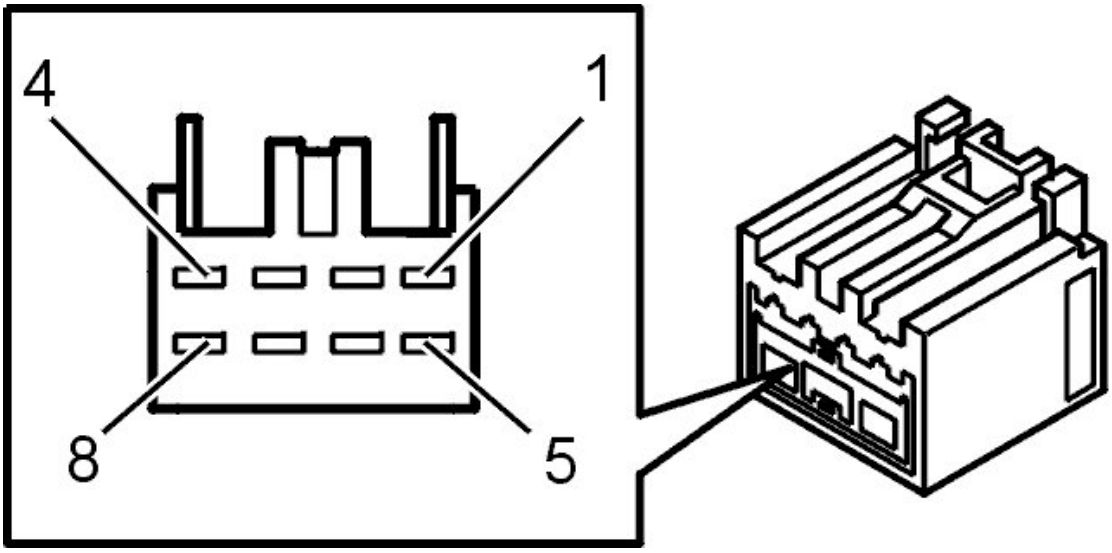
Check the cable between the power seat module (PSM) #1D and the motor for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found, try replacing the motor.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

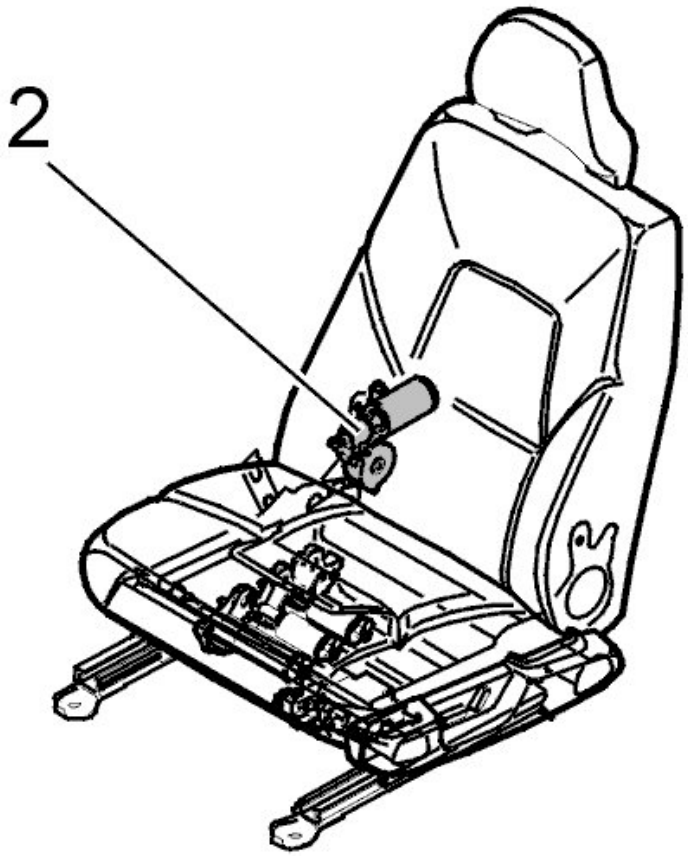
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls the backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0033 is stored if motor 2 does not run despite M2- being activated and the power seat module registering +12 V on the M2- signal cable.

Possible source

- Open-circuit in signal cable M2-.
- Blown fuse (11C/4).

Fault symptom[s]

- The angle of the backrest cannot be adjusted.

Signal Missing

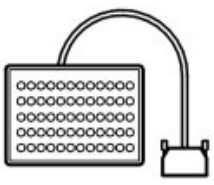
Signal missing. Intermittent fault

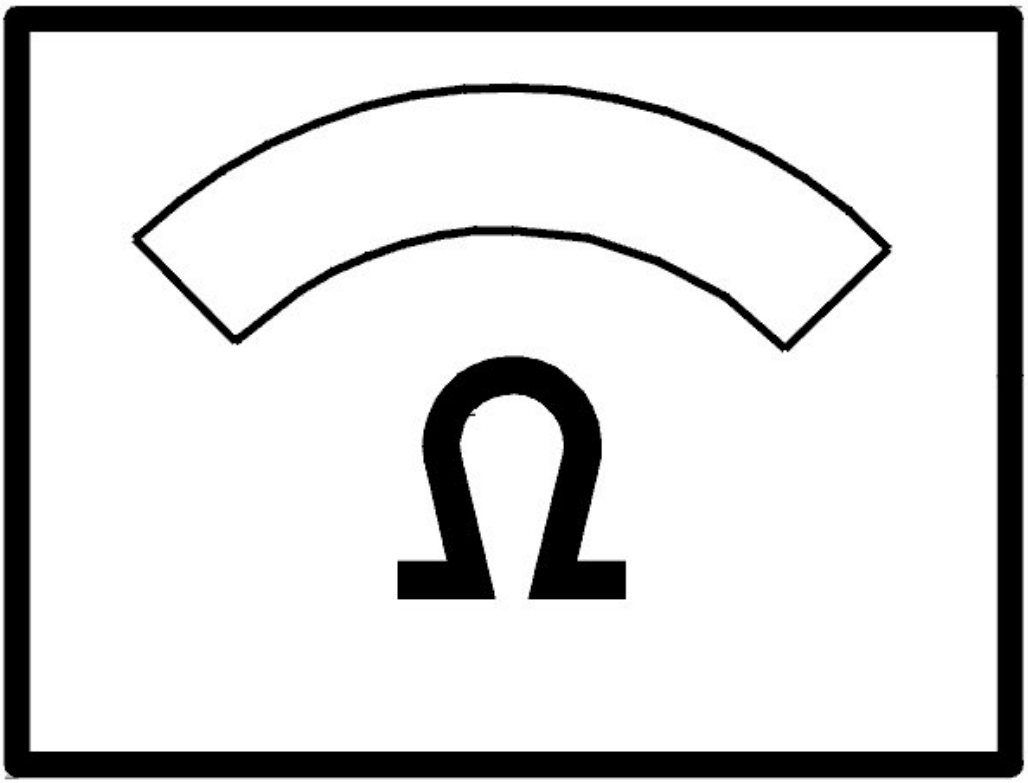
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



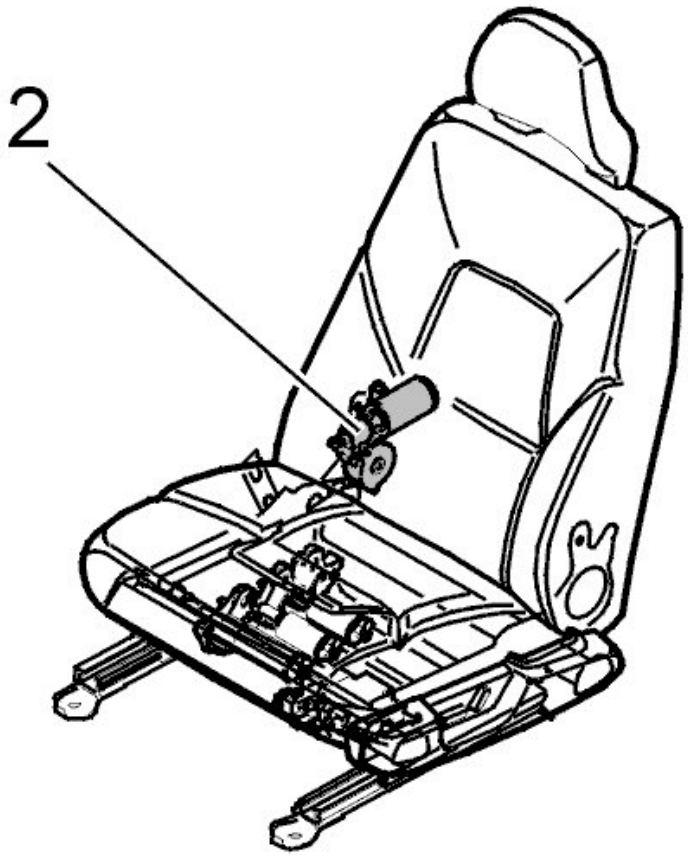


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 2 controls the backrest rake. Motor 2 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0033 is stored if motor 2 does not run despite M2- being activated and the power seat module registering +12 V on the M2- signal cable.

Possible source

- Open-circuit in signal cable M2-.
- Blown fuse (11C/4).

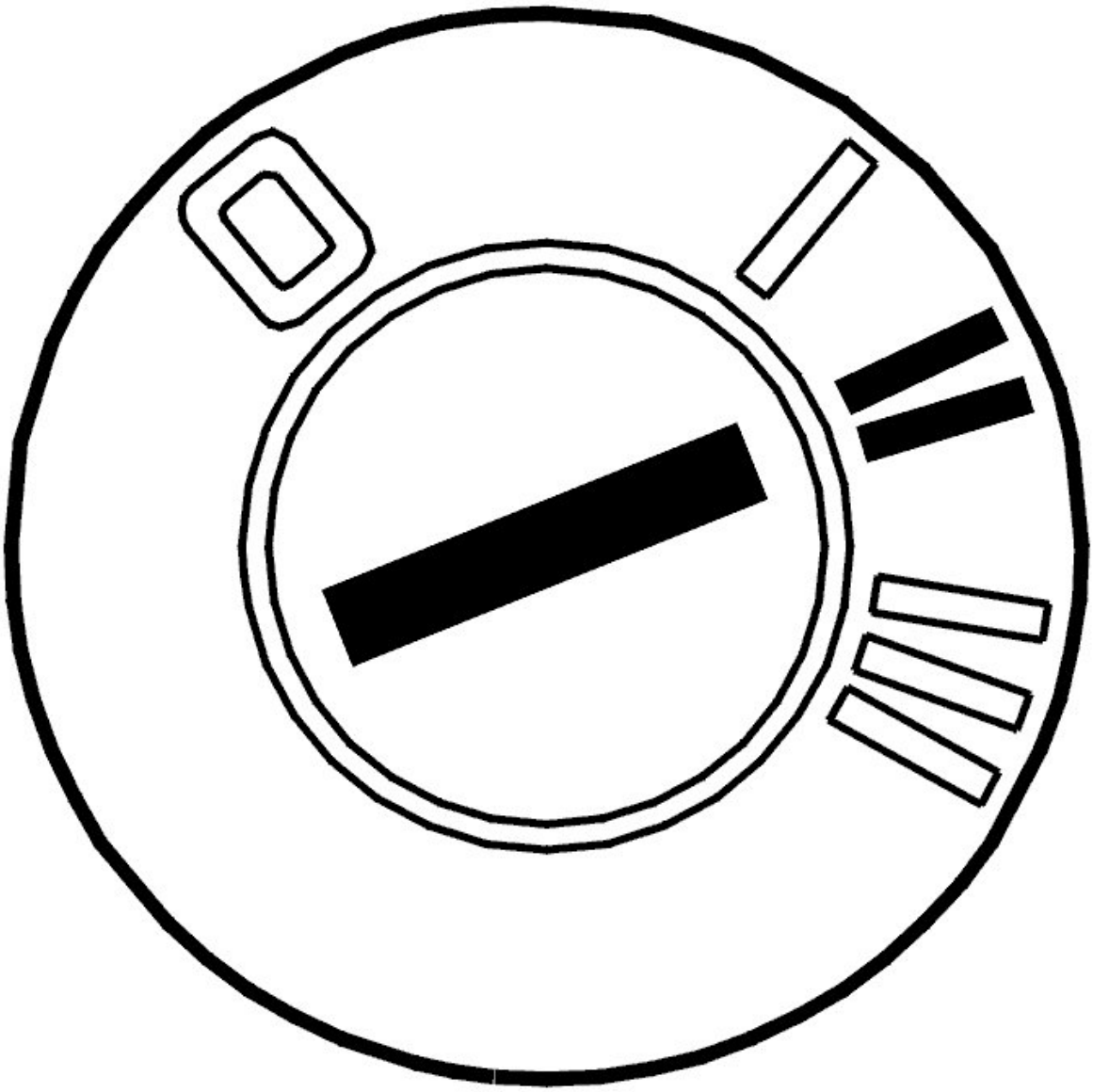
Fault symptom[s]

- The angle of the backrest cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



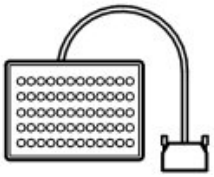
- Ignition on.
- Try to activate the motor.

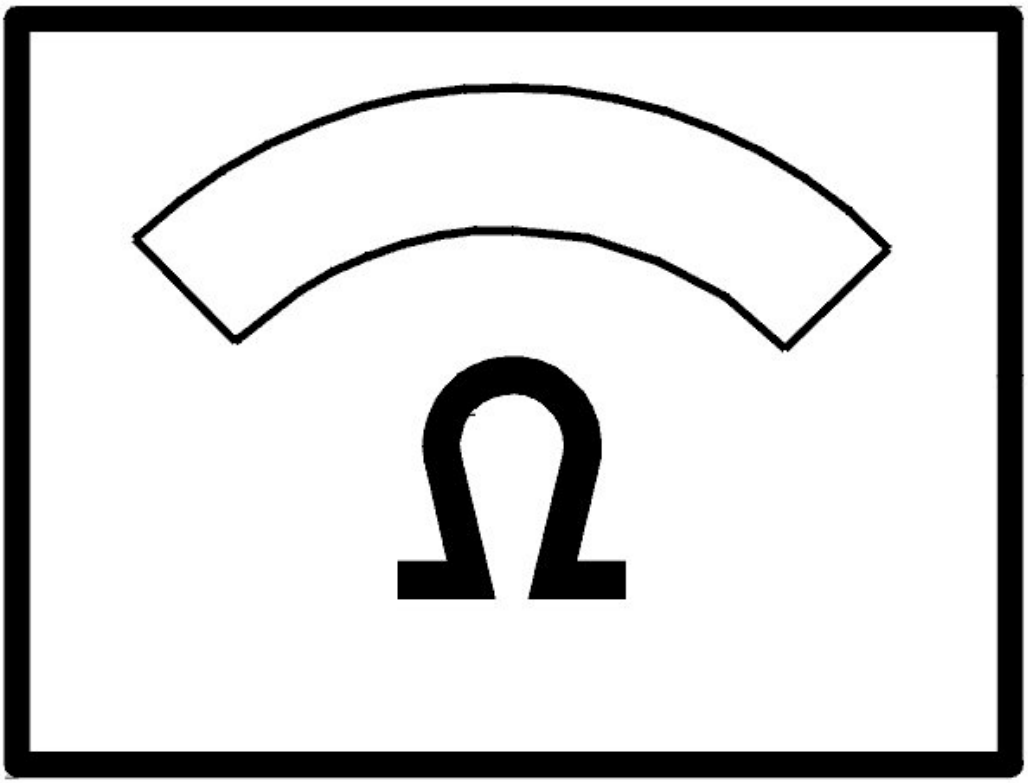
Hint: The resistance between #1D and #2D must be approximately 0 ohms.

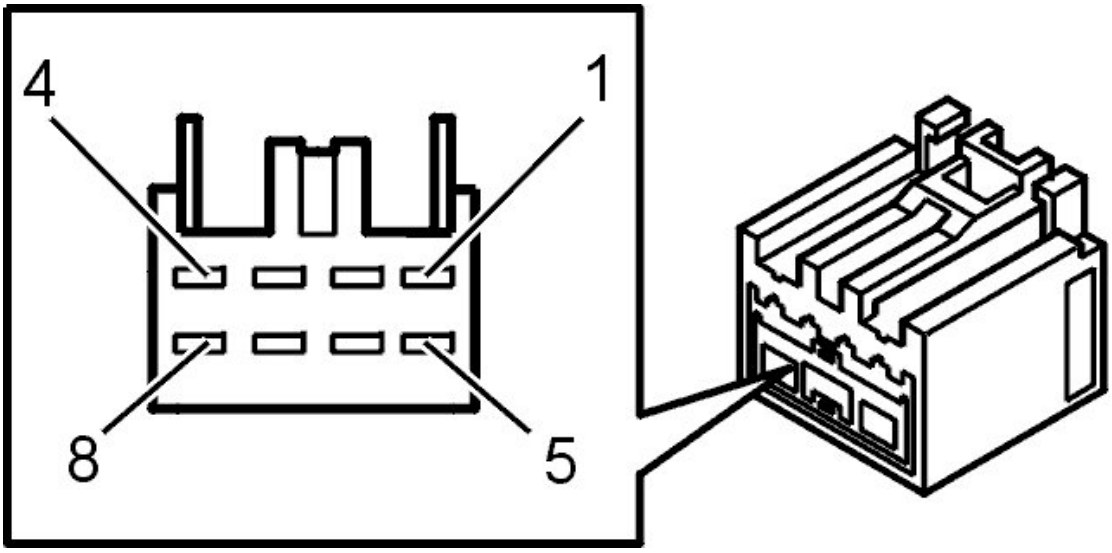
Check the cable between the power seat module (PSM) #2D and the motor for an open-circuit according to Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found try replacing the motor.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

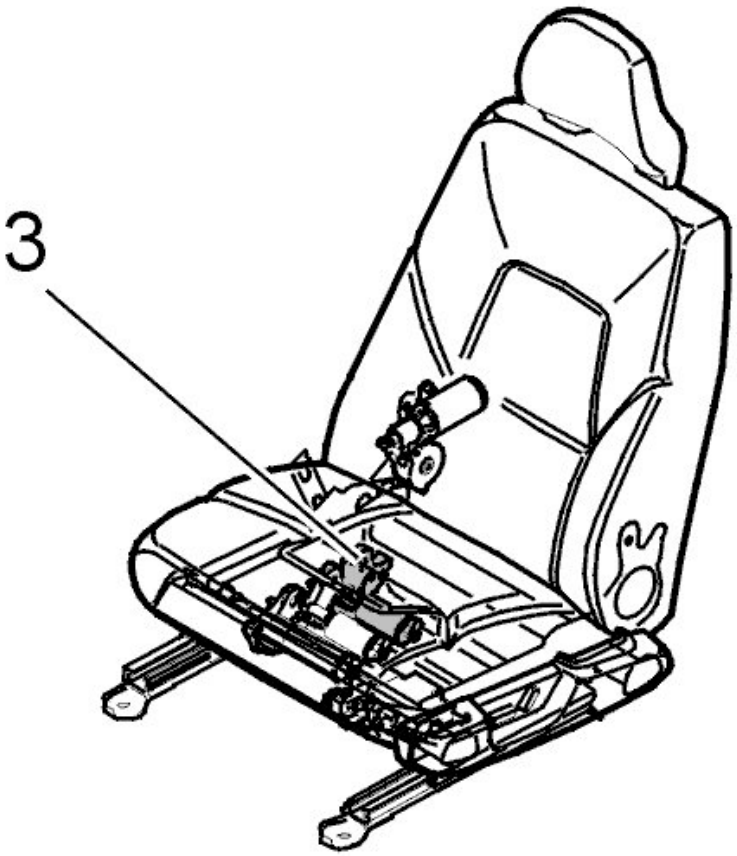
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the height of the rear edge of the seat. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0034 is stored if motor 3 does not run despite M3+ being activated and the power seat module registering +12 V on the M3+ signal cable.

Possible source

- Open-circuit in signal cable M3+.
- Blown fuse (11C/4).

Fault symptom[s]

- The height of the rear edge of the seat cannot be adjusted.

Signal Missing

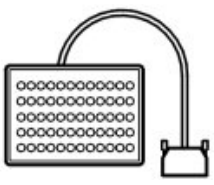
Signal missing. Intermittent fault

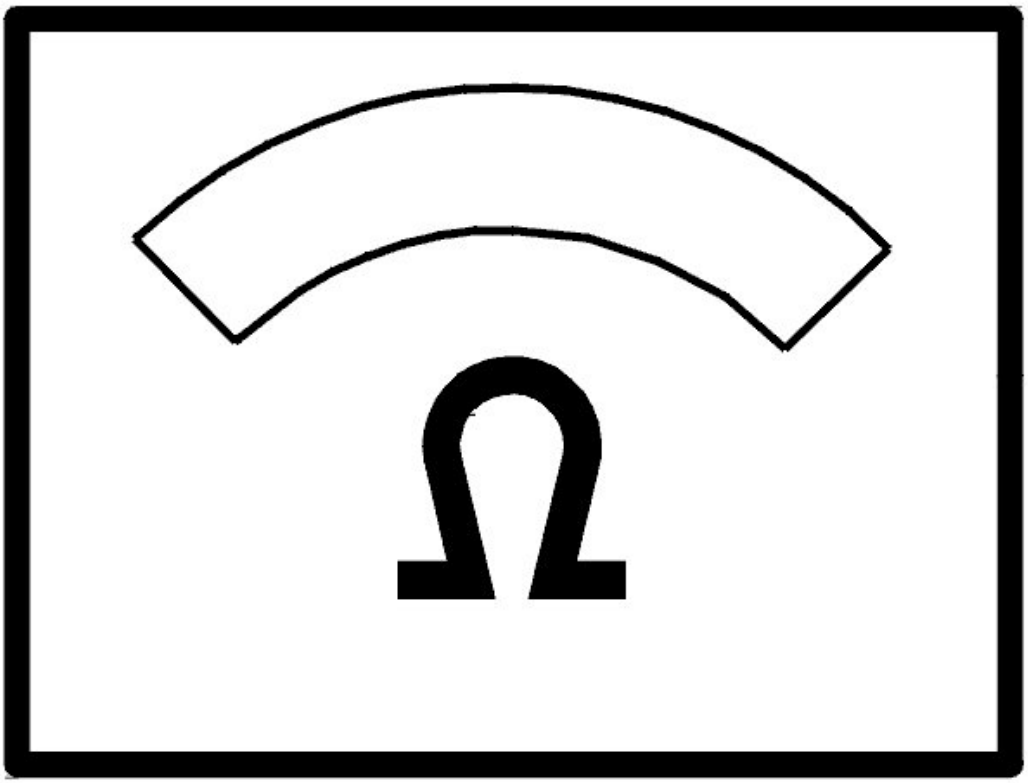
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



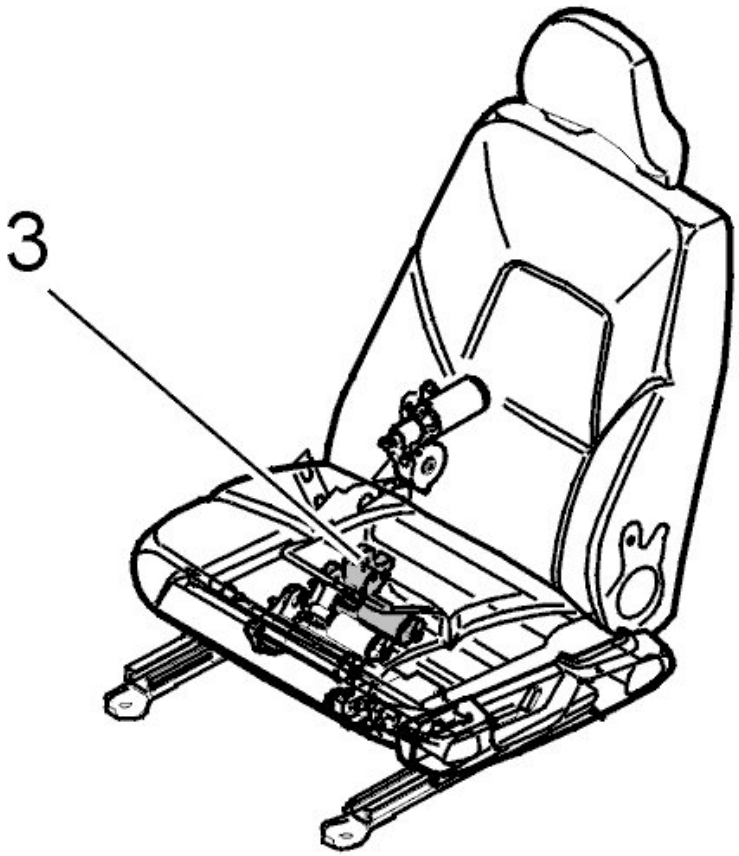


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the height of the rear edge of the seat. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0034 is stored if motor 3 does not run despite M3+ being activated and the power seat module registering +12 V on the M3+ signal cable.

Possible source

- Open-circuit in signal cable M3+.
- Blown fuse (11C/4).

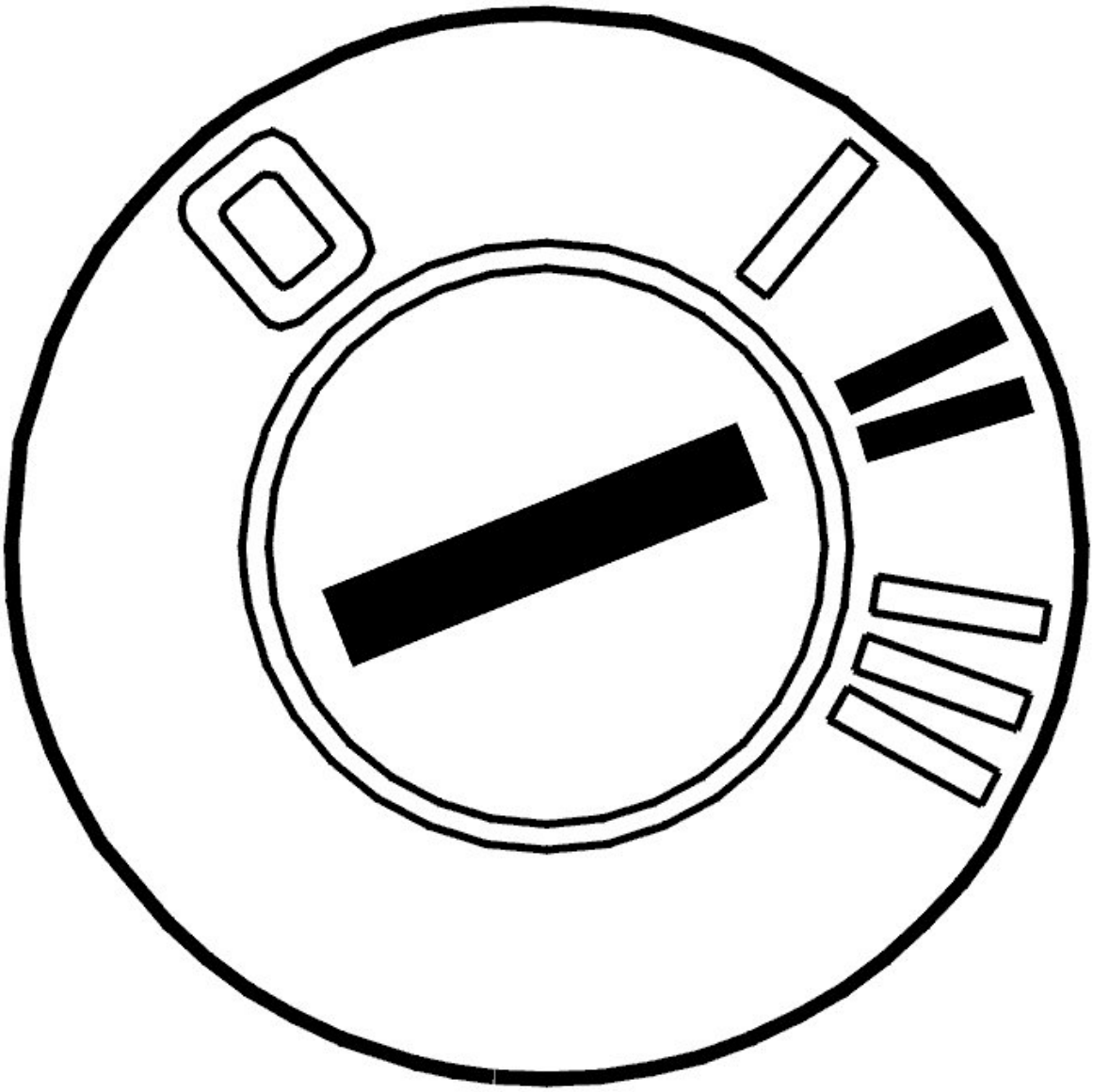
Fault symptom[s]

- The height of the rear edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



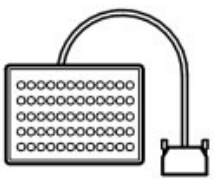
- Ignition on
- Try to activate the motor.

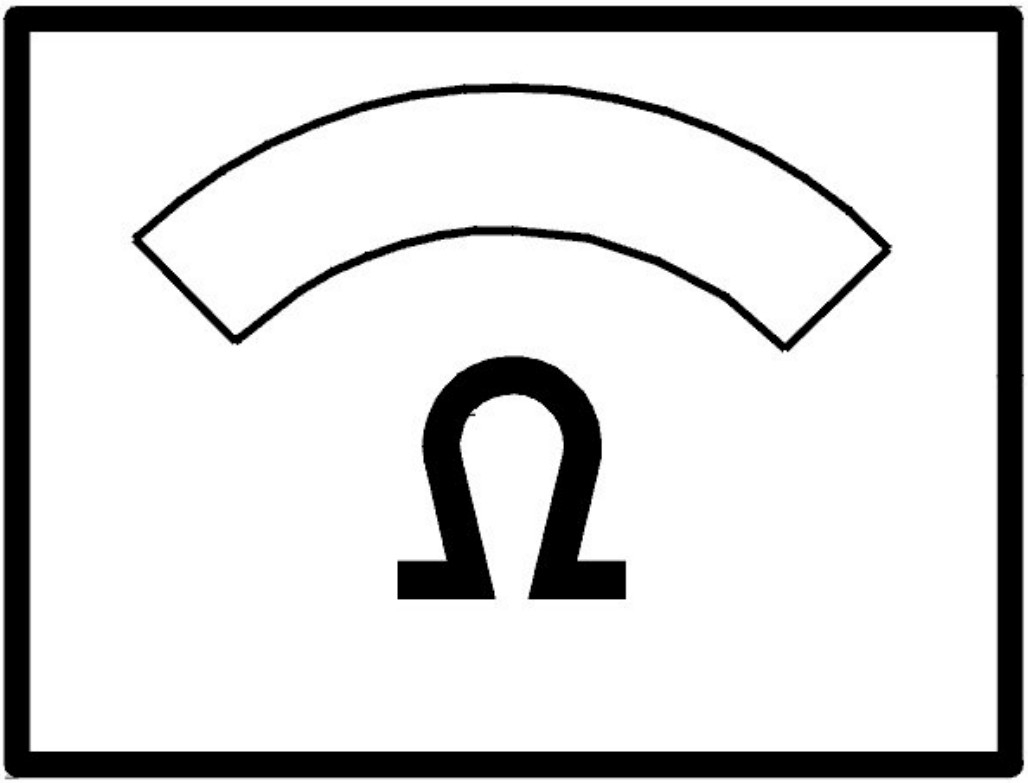
Hint: The resistance between terminals #5E and #6E must be approximately 0 ohms.

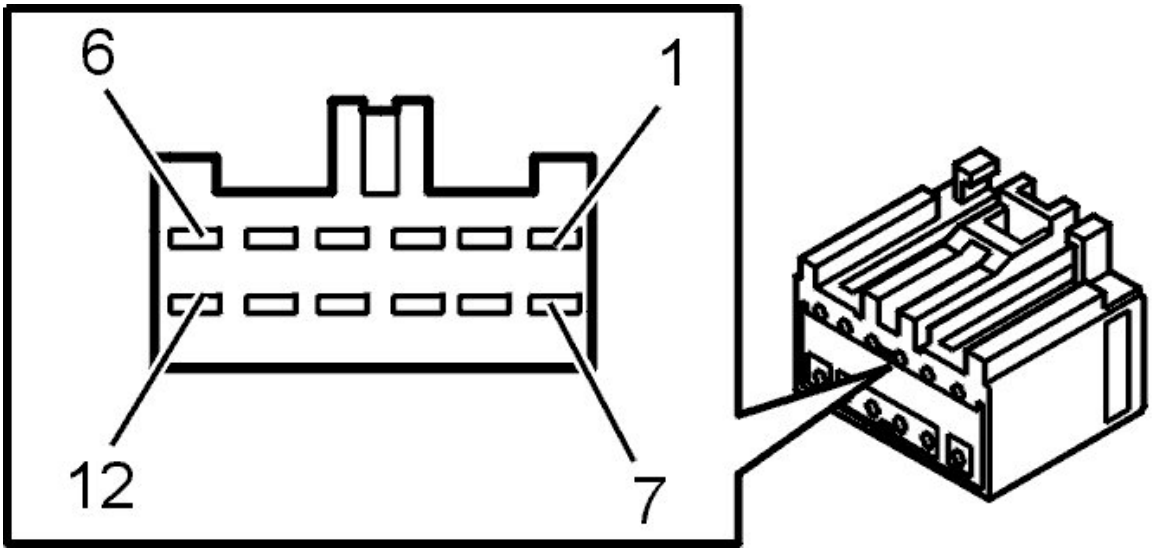
Check the cable between the power seat module (PSM) terminal #5E and the motor. Check for an open-circuit. See Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

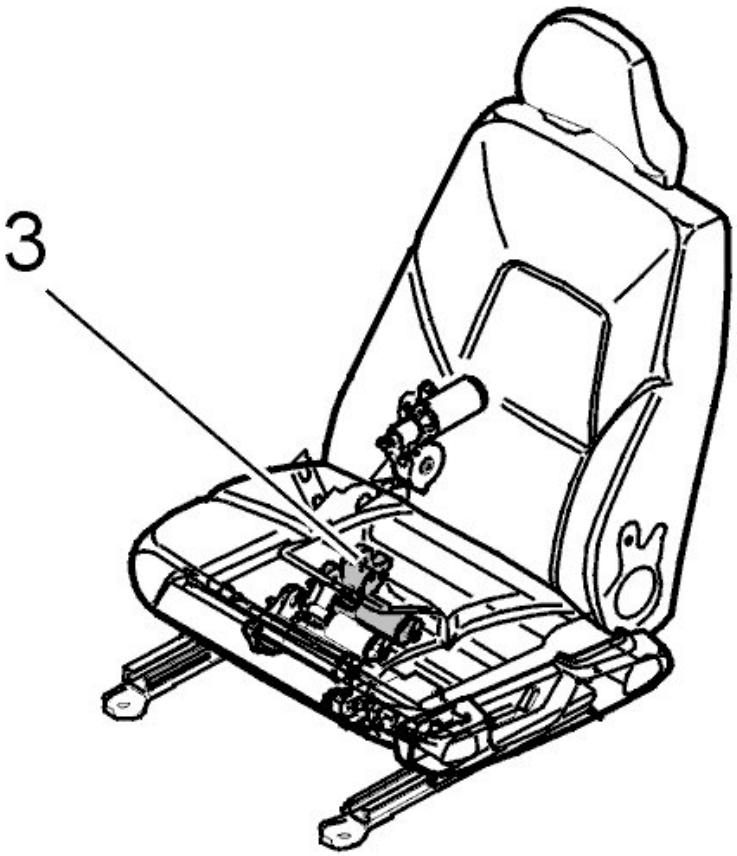
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the height of the rear edge of the seat. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0035 is stored if motor 3 does not run despite M3- being activated and the power seat module registering +12 V on the M3- signal cable.

Possible source

- Open-circuit on signal cable M3-.
- Blown fuse (11C/4).

Fault symptom[s]

- The height of the rear edge of the seat cannot be adjusted.

Signal Missing

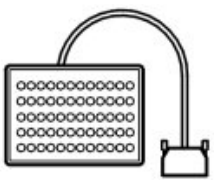
Signal missing. Intermittent fault

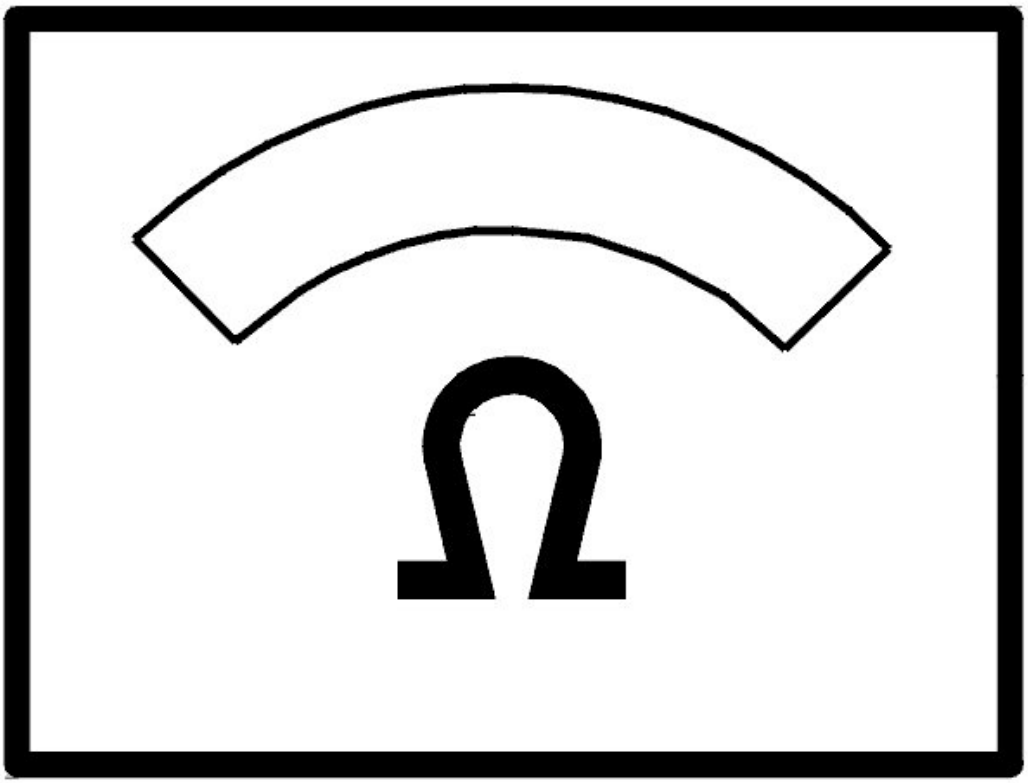
Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).



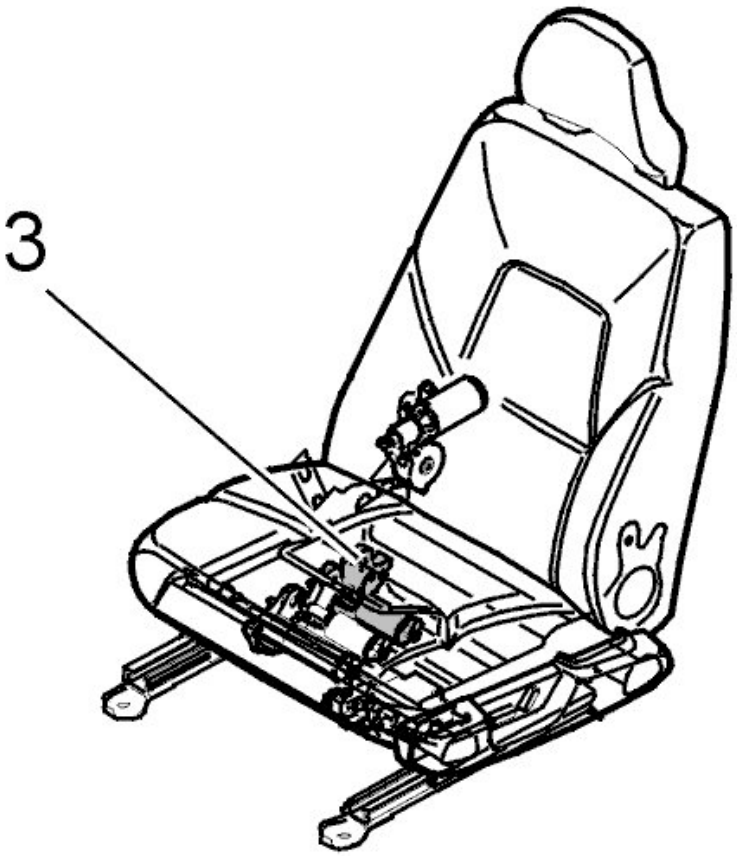


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 3 controls the height of the rear edge of the seat. Motor 3 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0035 is stored if motor 3 does not run despite M3- being activated and the power seat module registering +12 V on the M3- signal cable.

Possible source

- Open-circuit on signal cable M3-.
- Blown fuse (11C/4).

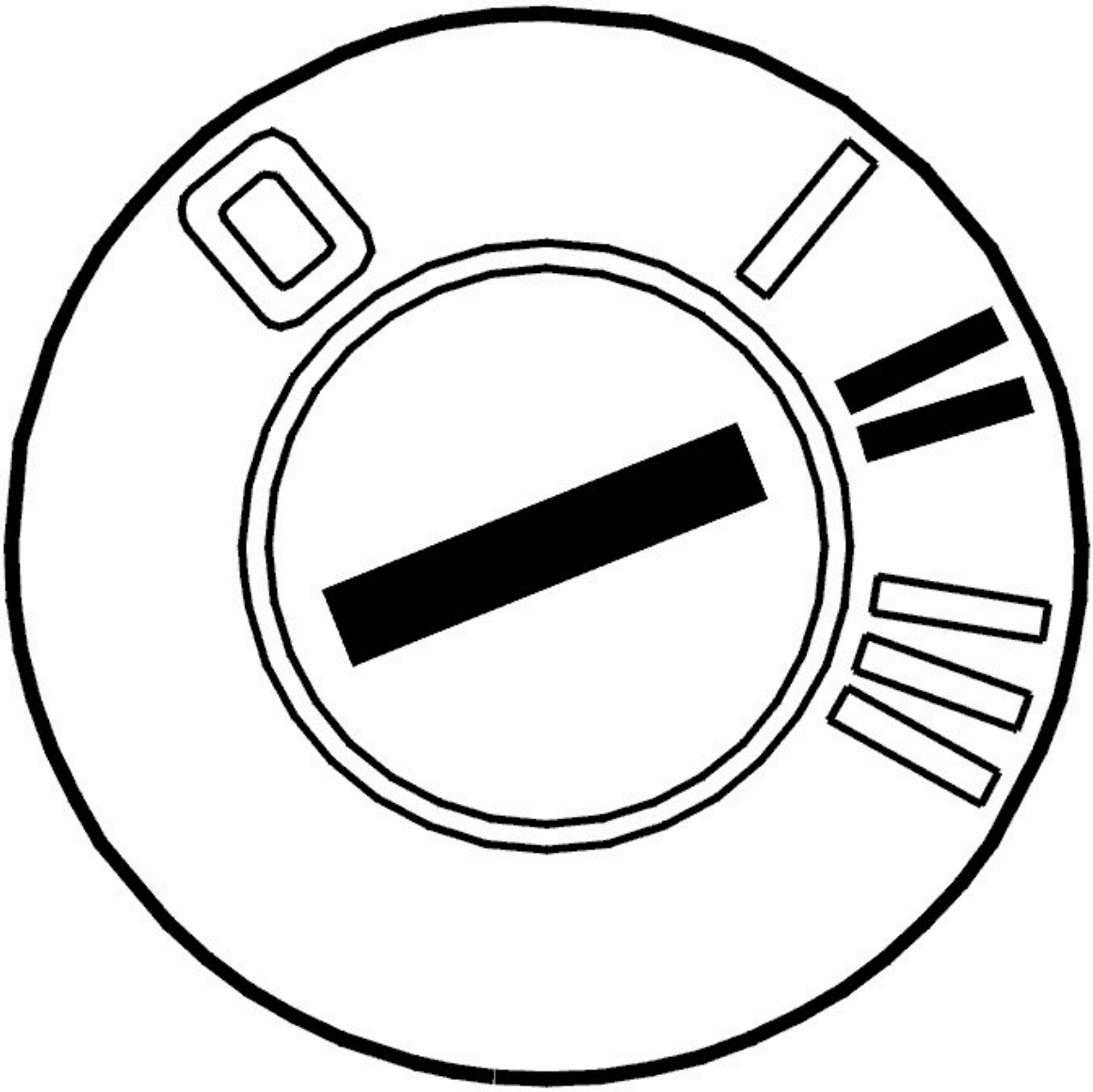
Fault symptom[s]

- The height of the rear edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



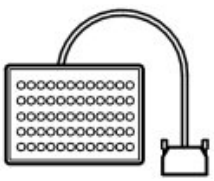
- Ignition on
- Try to activate the motor.

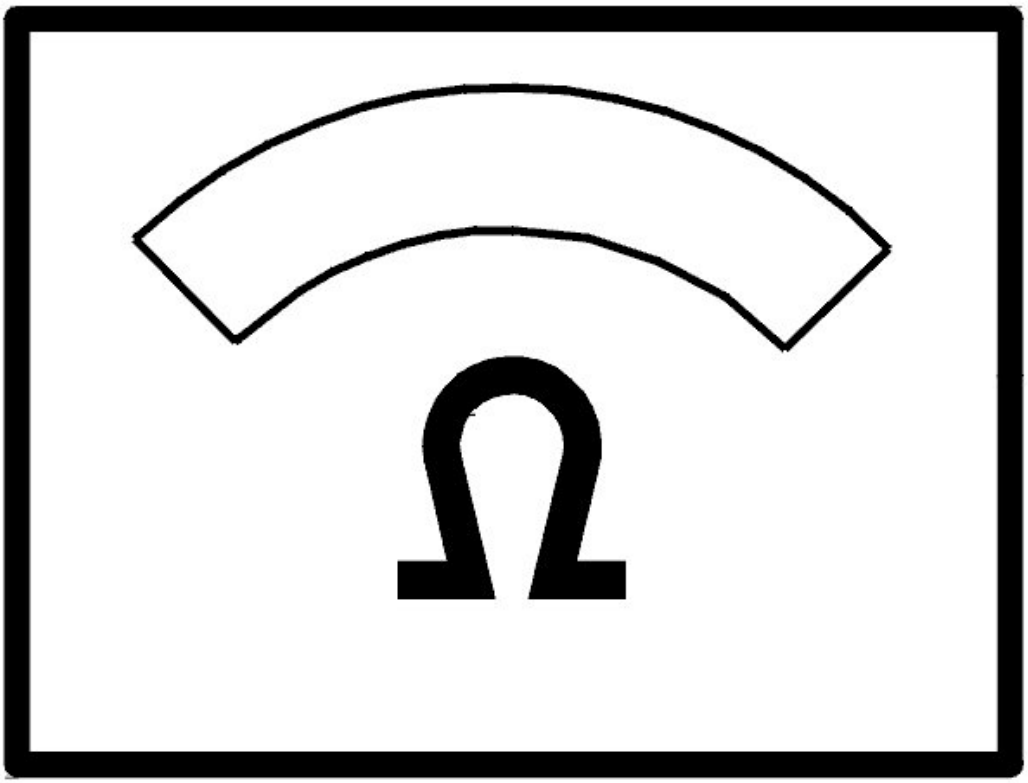
Hint: The resistance between terminals #5E and #6E must be approximately 0 ohms.

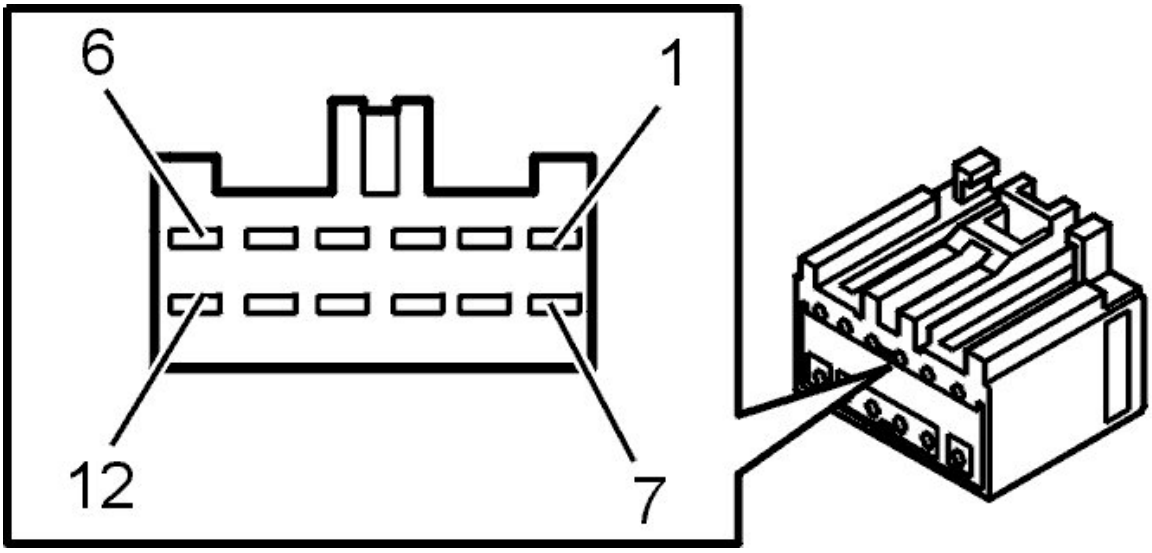
Check the cable between the power seat module (PSM) terminal #6E and the motor. Check for an open-circuit. See Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

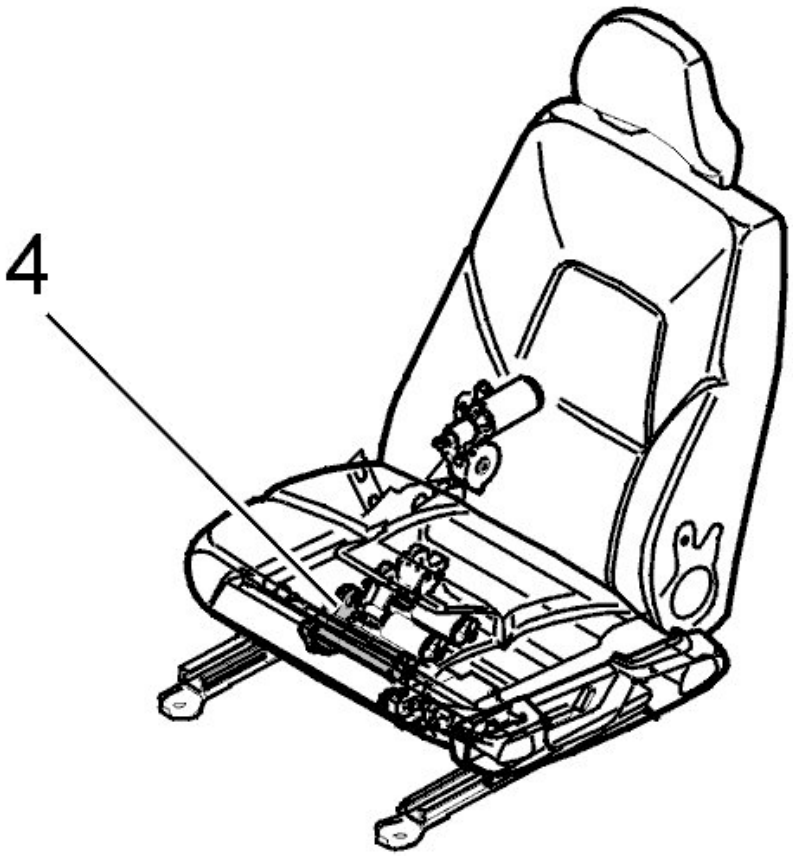
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls the height of the front edge of the seat. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0036 is stored if motor 4 does not run despite M4+ being activated and the power seat module registering +12 V on the M4+ signal cable.

Possible source

- Open-circuit in signal cable M4+.
- Blown fuse (11C/4).

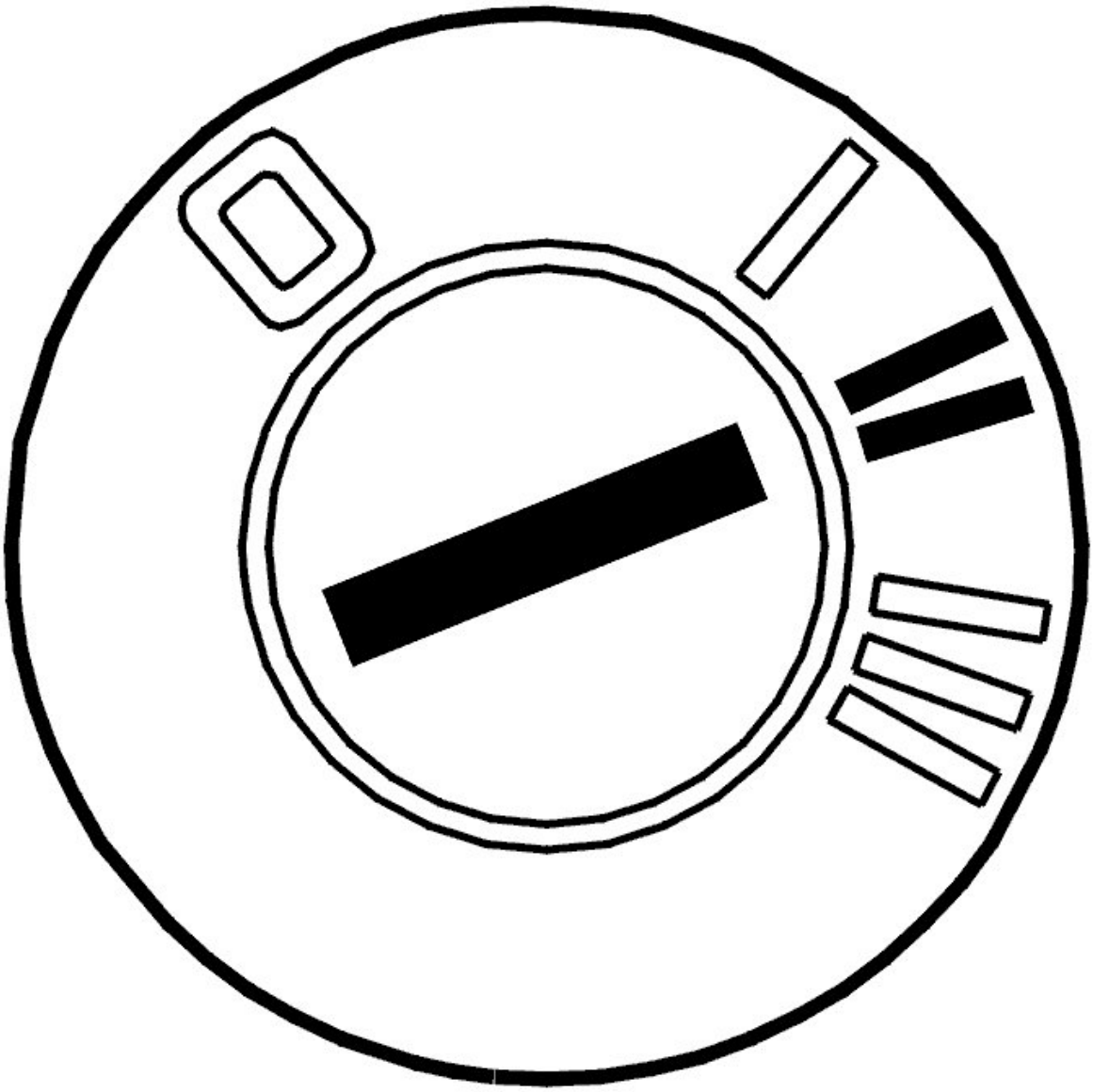
Fault symptom[s]

- The height of the front edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



- Ignition on
- Try to activate the motor.

Hint: The resistance between terminals #9E and #10E must be approximately 0 ohms.

Check the cable between the power seat module (PSM) #9E and the motor. Check for an open-circuit. See Checking wiring and terminals.
Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
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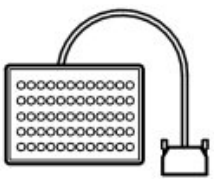
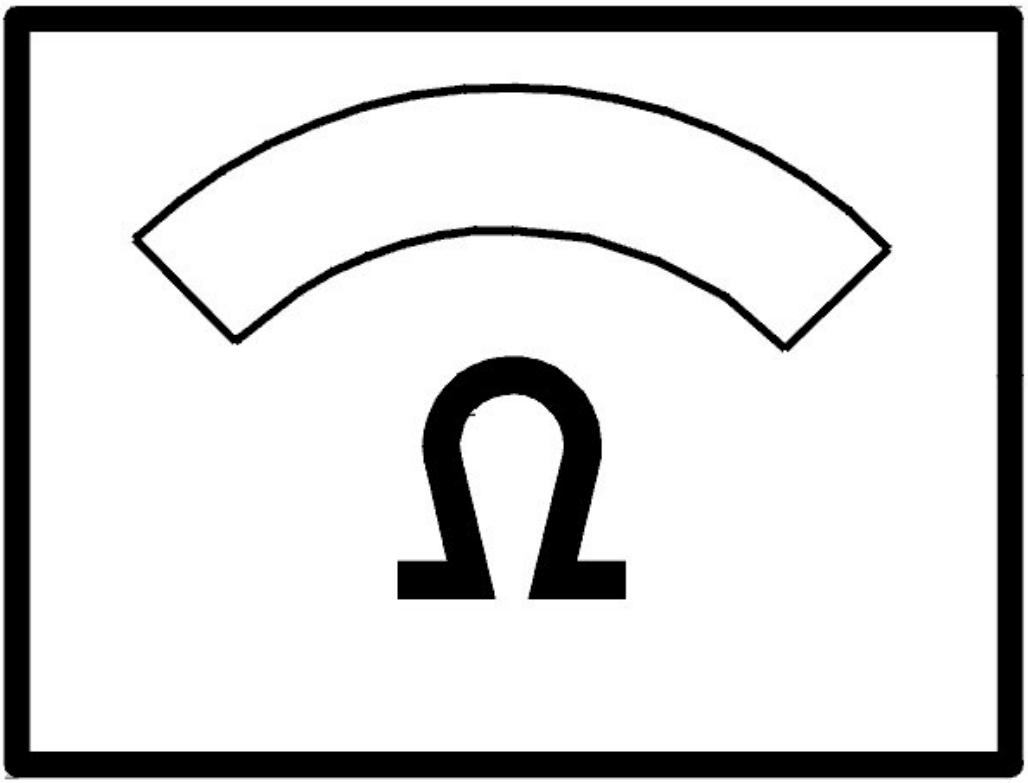
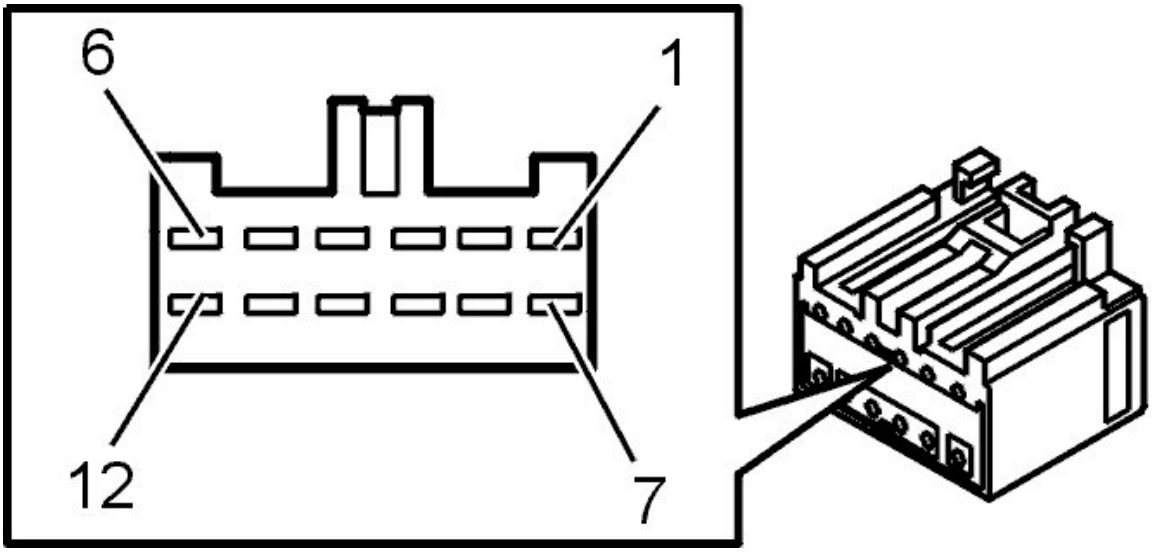






Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

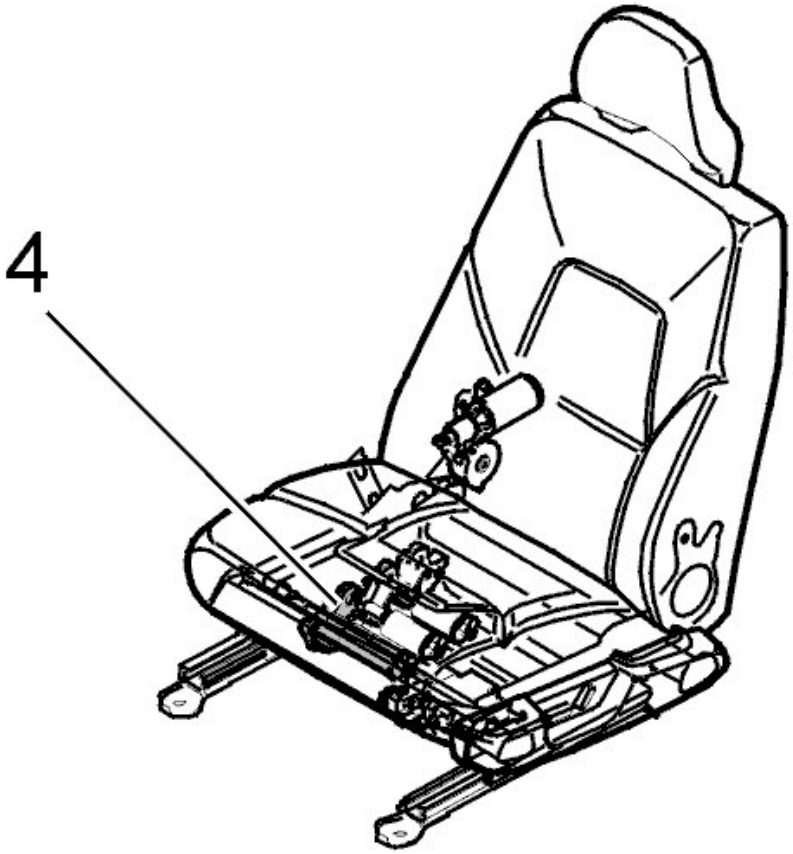
Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls the height of the front edge of the seat. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0036 is stored if motor 4 does not run despite M4+ being activated and the power seat module registering +12 V on the M4+ signal cable.

Possible source

- Open-circuit in signal cable M4+.
- Blown fuse (11C/4).

Fault symptom[s]

- The height of the front edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Intermittent fault

Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
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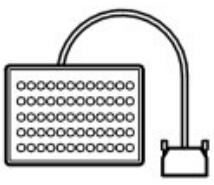
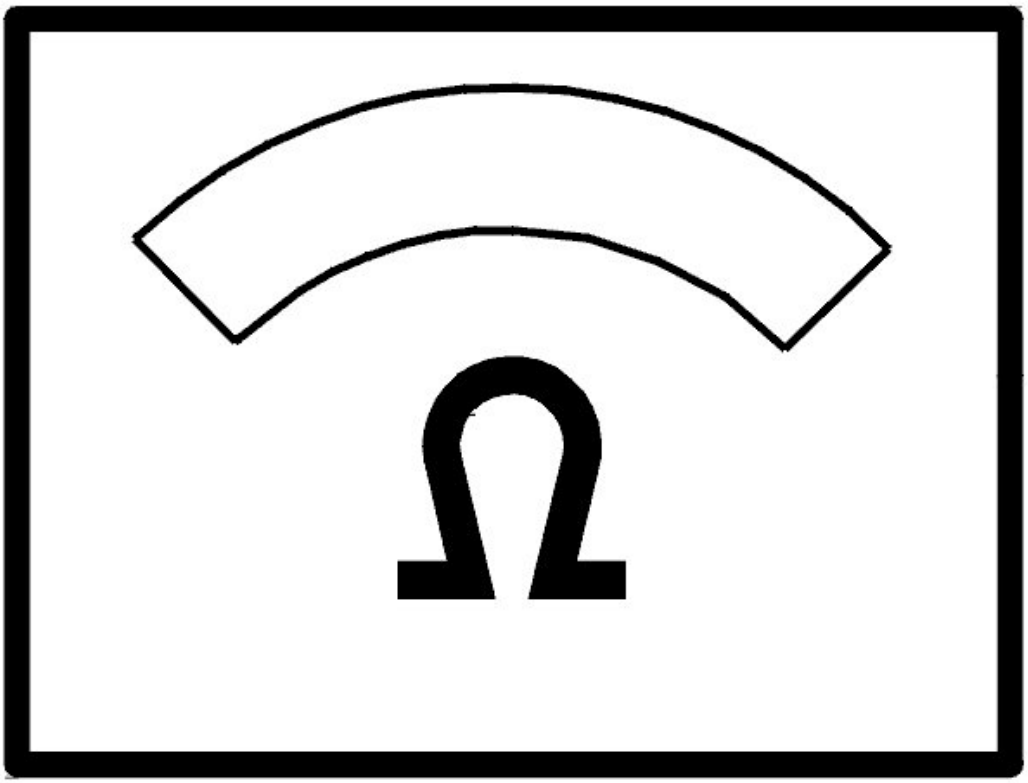


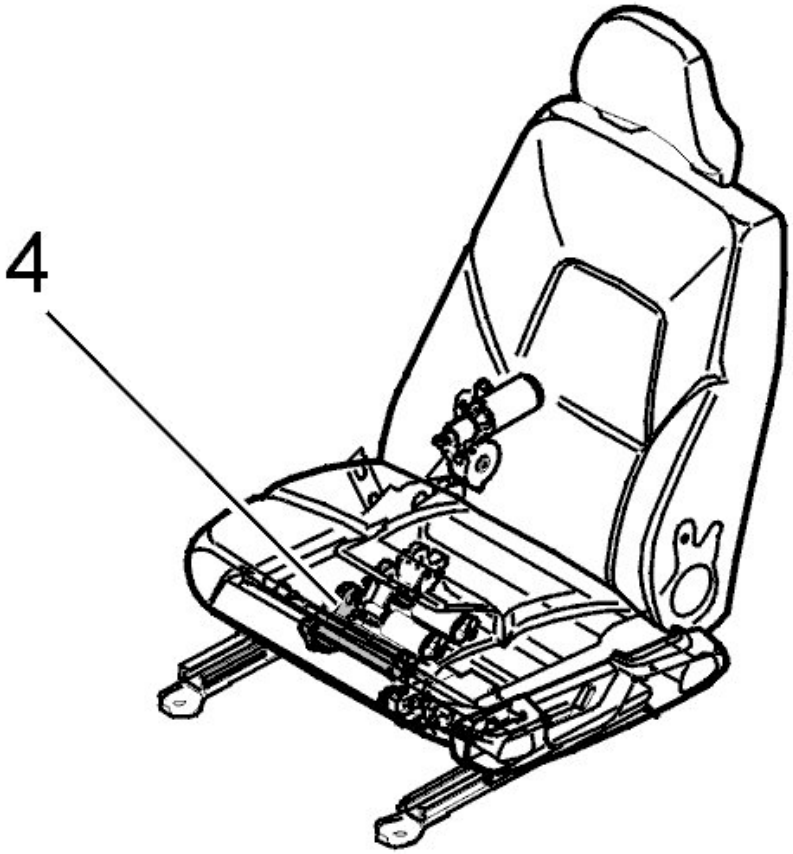


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls the height of the front edge of the seat. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0036 is stored if motor 4 does not run despite M4+ being activated and the power seat module registering +12 V on the M4+ signal cable.

Possible source

- Open-circuit in signal cable M4+.
- Blown fuse (11C/4).

Fault symptom[s]

- The height of the front edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Intermittent fault

Checking cable

Check the cable between the power seat module (PSM) and the motor for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM).
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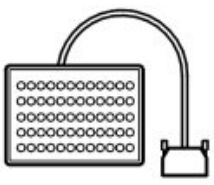
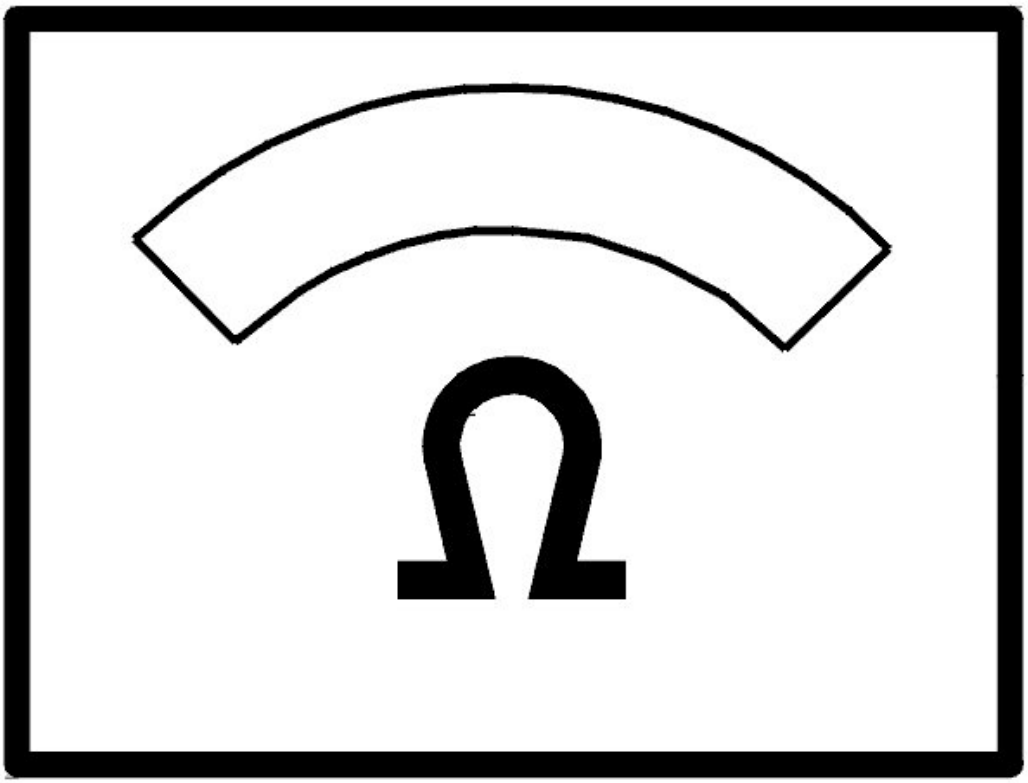


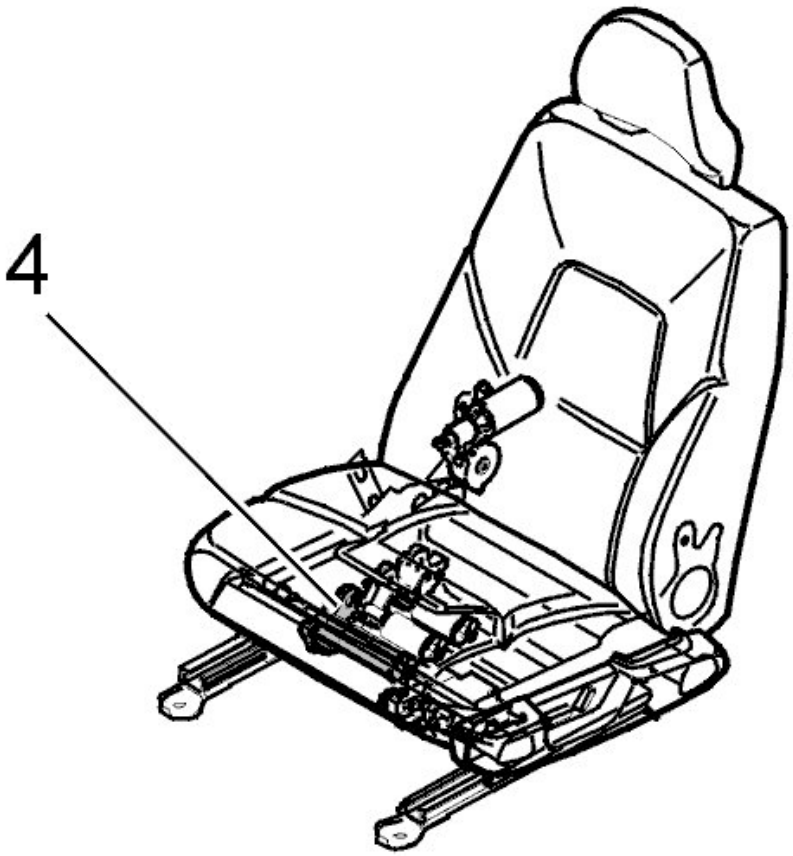


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Motor 4 controls the height of the front edge of the seat. Motor 4 must be activated before the diagnostic trouble code (DTC) can be detected. Diagnostic trouble code (DTC) PSM-0036 is stored if motor 4 does not run despite M4+ being activated and the power seat module registering +12 V on the M4+ signal cable.

Possible source

- Open-circuit in signal cable M4+.
- Blown fuse (11C/4).

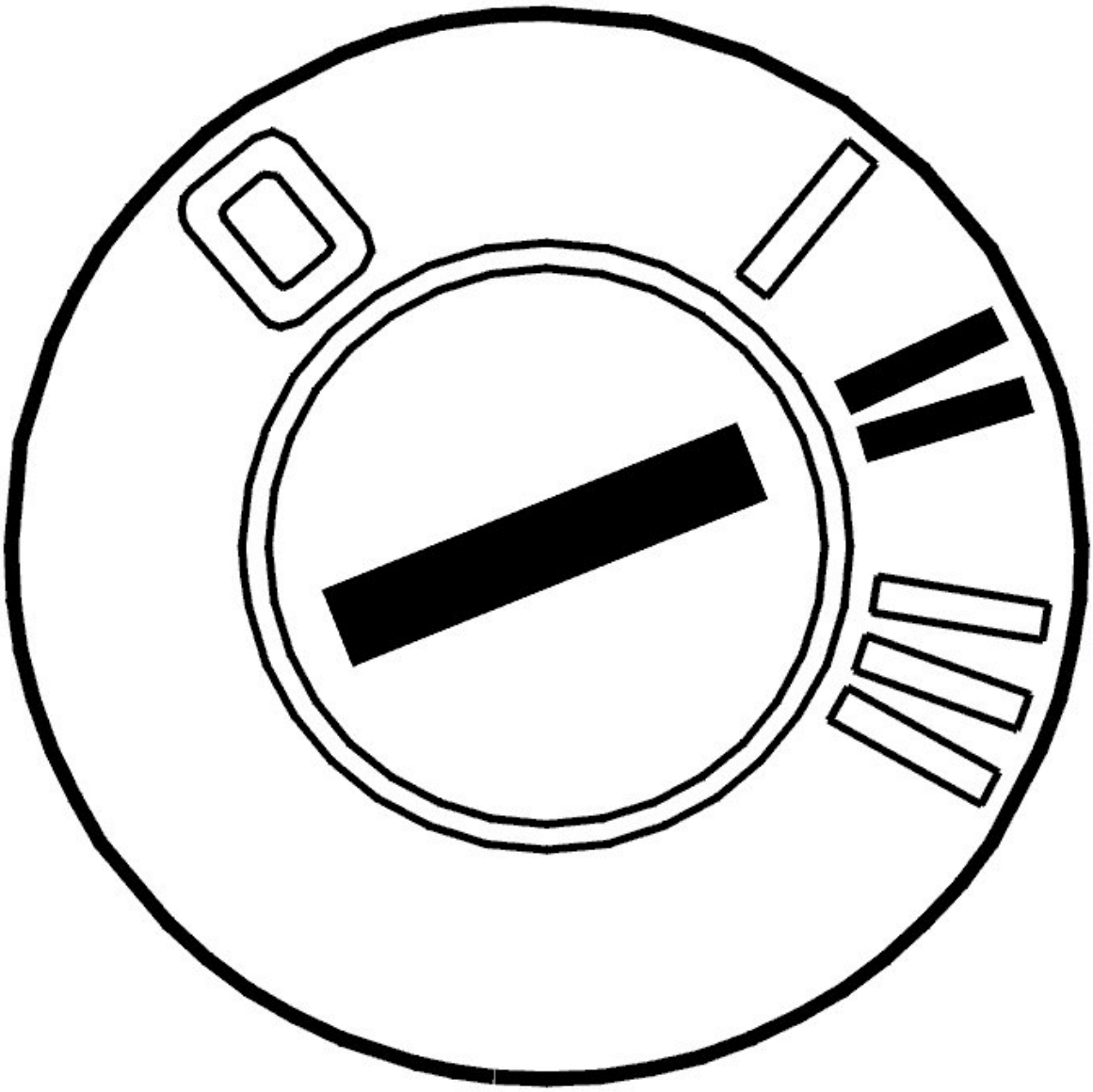
Fault symptom[s]

- The height of the front edge of the seat cannot be adjusted.

Signal Missing

Signal missing. Permanent fault

Checking the cable



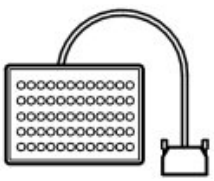
- Ignition on
- Try to activate the motor.

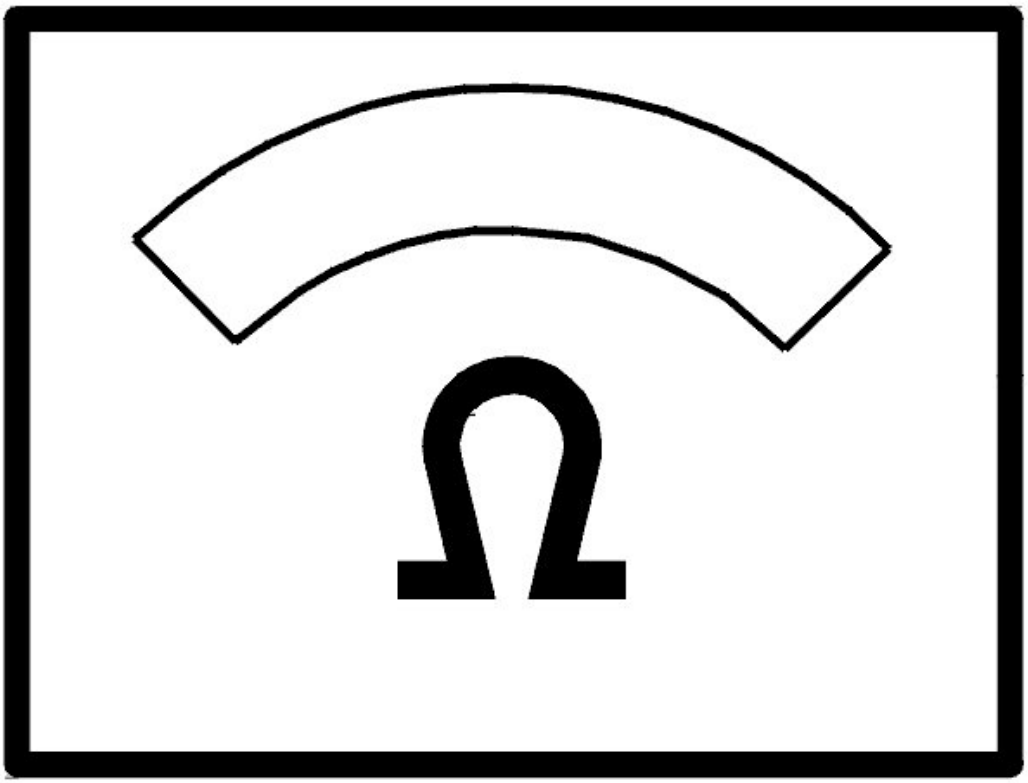
Hint: The resistance between terminals #9E and #10E must be approximately 0 ohms.

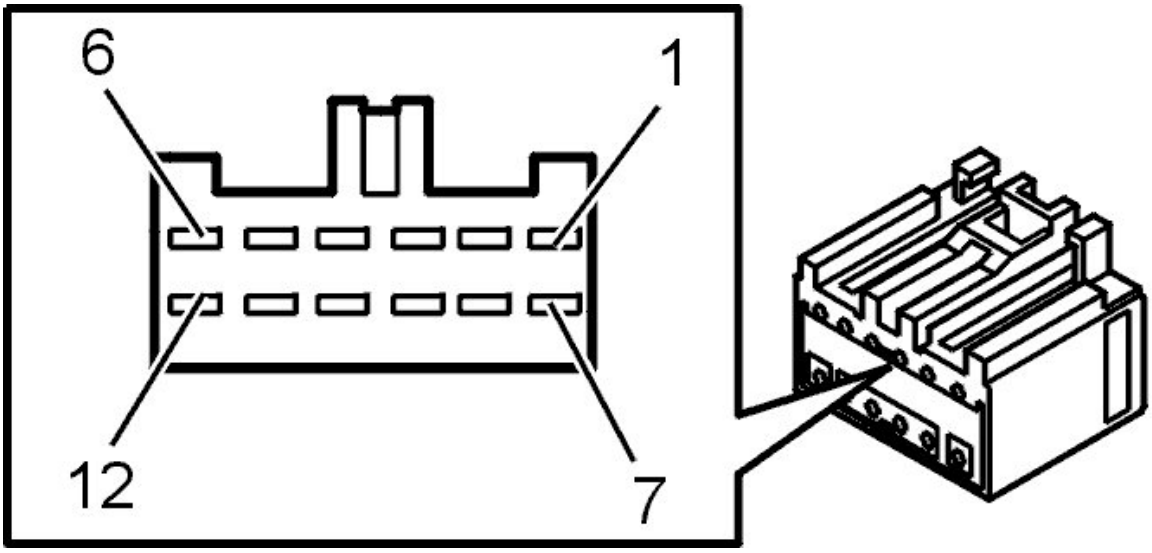
Check the cable between the power seat module (PSM) terminal #10E and the motor. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.
If no fault is found try replacing the motor.

Other information:

- To access or replace the motor, see Electric motor cushion, replacing See: Body and Frame/Seats/Power Seat Motor/Service and Repair/Removal and Replacement
- To connect the breakout box, see Connecting the breakout box, power seat module (PSM) See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Power Seat Module (PSM)
- For information about signals, see Signal specification, Power seat module See: Body and Frame/Seats/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Power Seat Module (PSM).







Continue - Verification

Verification

Activate the motor.

Does the motor operate as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the cable

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

No conditions.

Possible source
- Software fault in the control module
- Defective control module.

Fault symptom[s]
- Seat operation does not function
- Symptoms may be missing.

Fault-tracing Information

Fault-tracing information

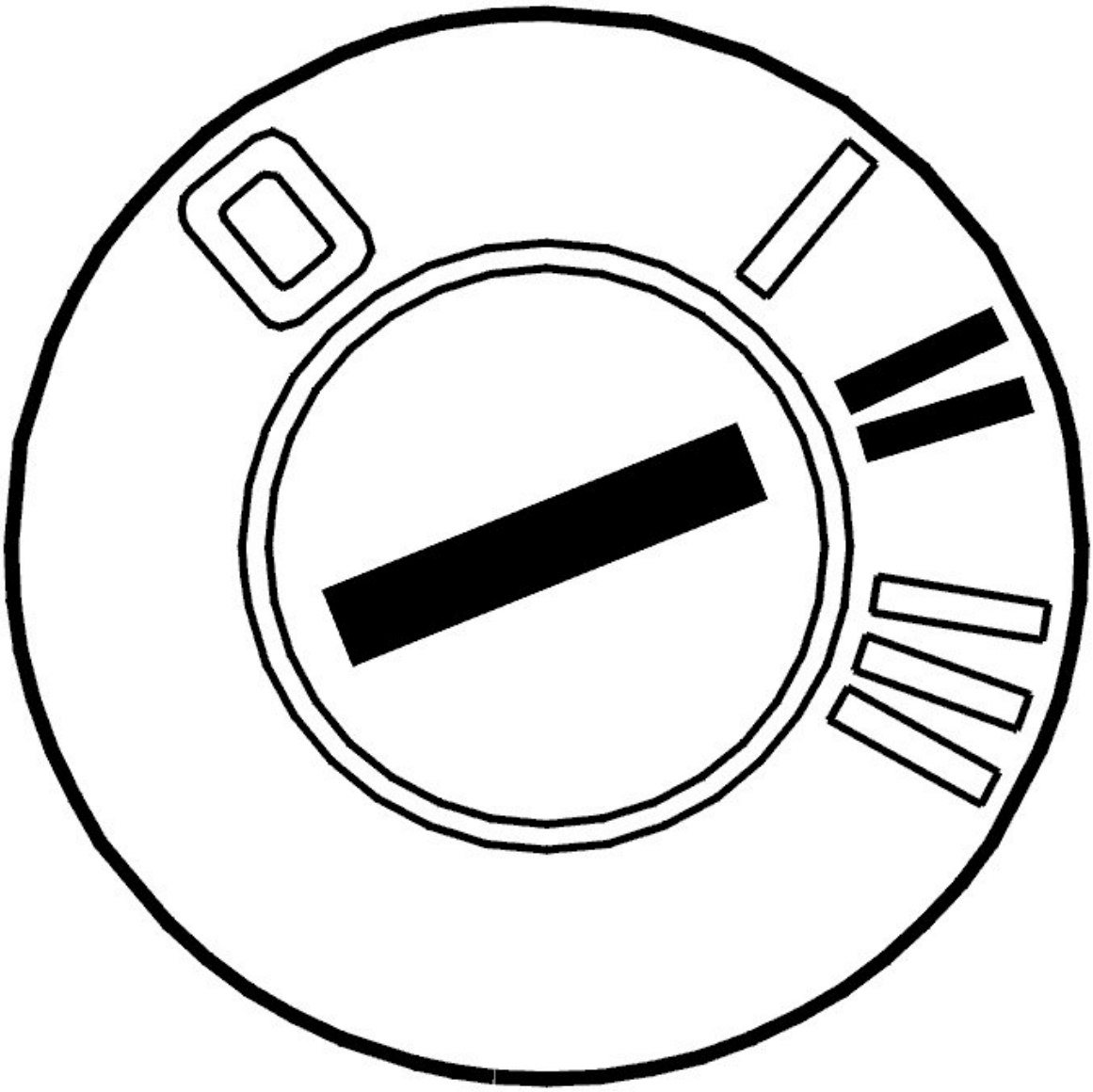
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

PSM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

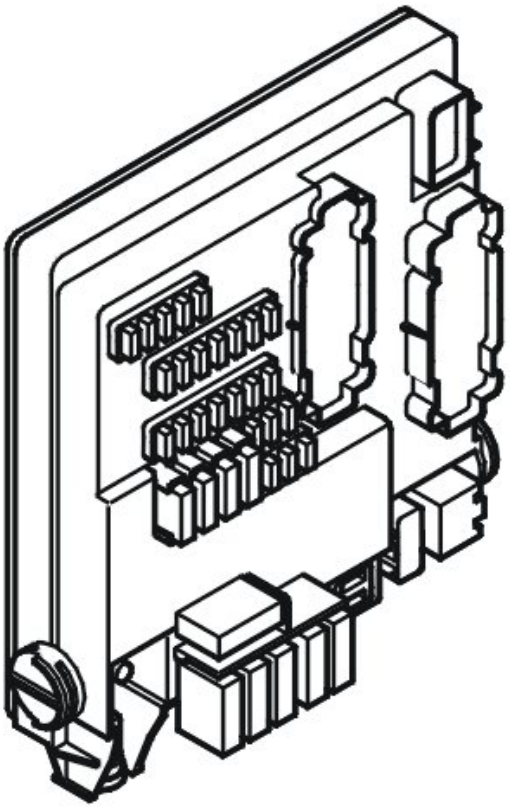
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD00

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (LIN communication blocked) with the parking assistance module (PAM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of REM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network! The rear electronic module (REM) is the only control module that monitors the voltage level in the LIN wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

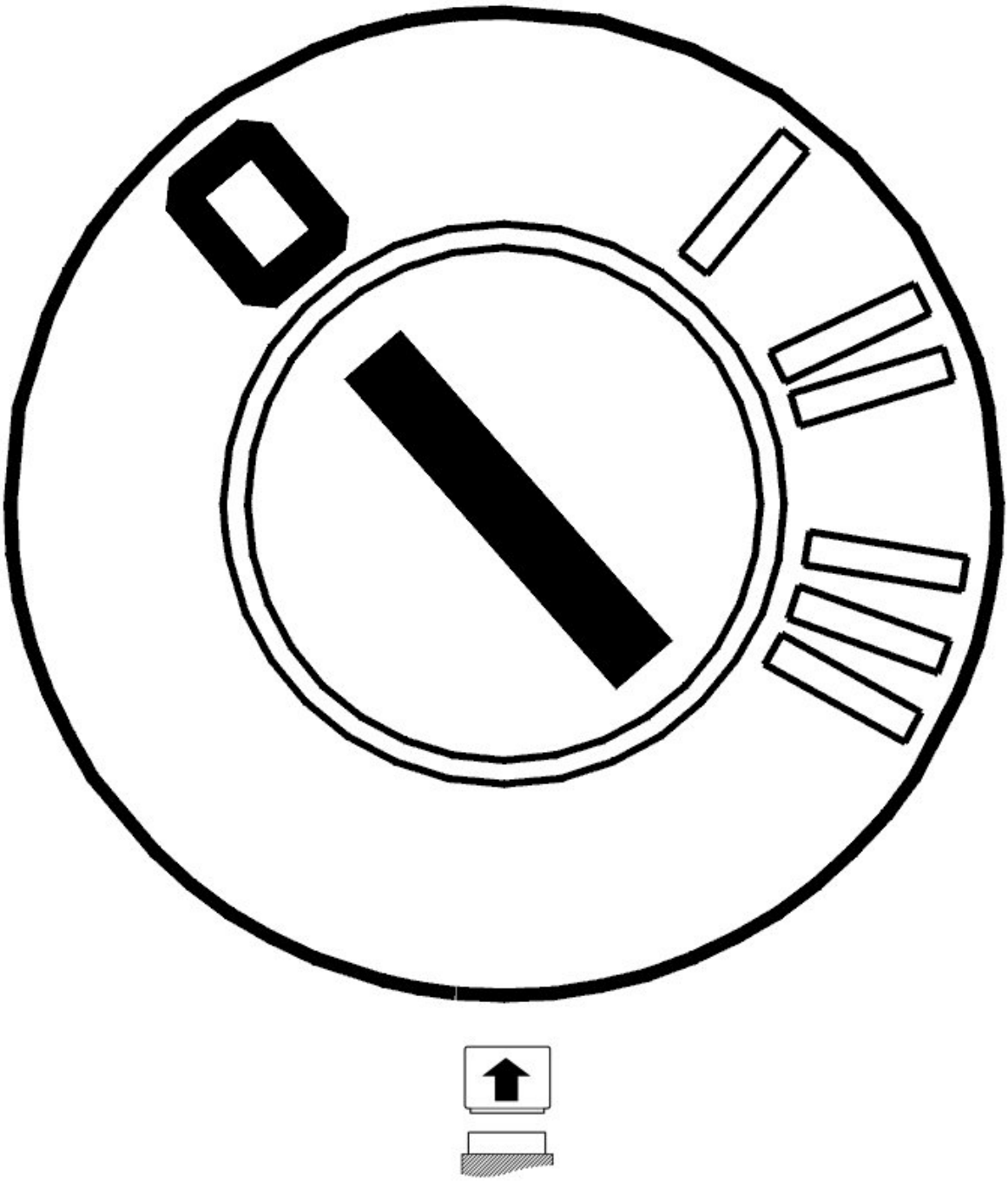
Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- The parking assistance system does not operate.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the parking assistance module (PAM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #D32 (#32) and parking assistance module (PAM) terminal #A12.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new parking assistance module (PAM).
Remedy as necessary.

Other information

- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair

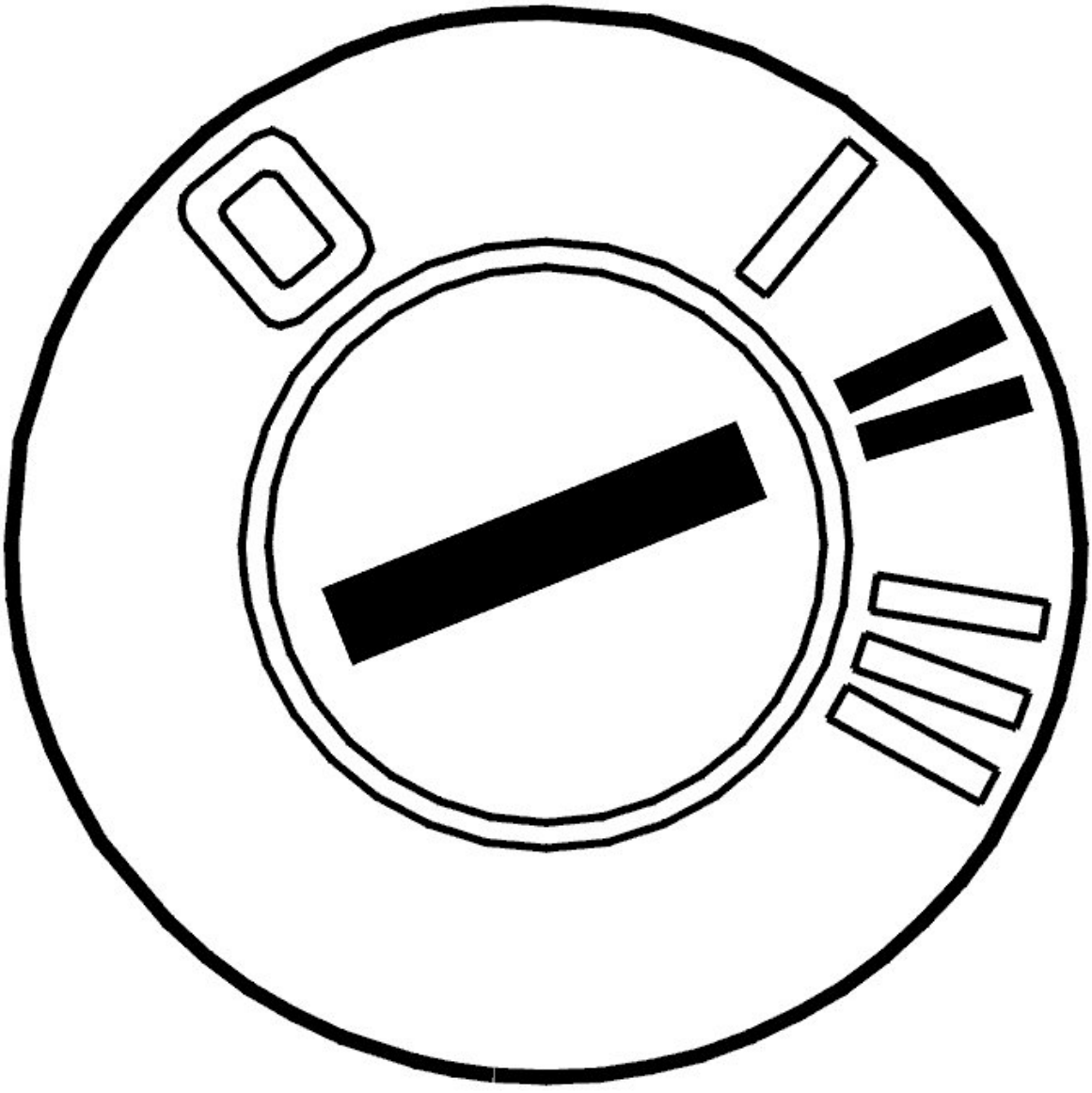
Continue - Verification

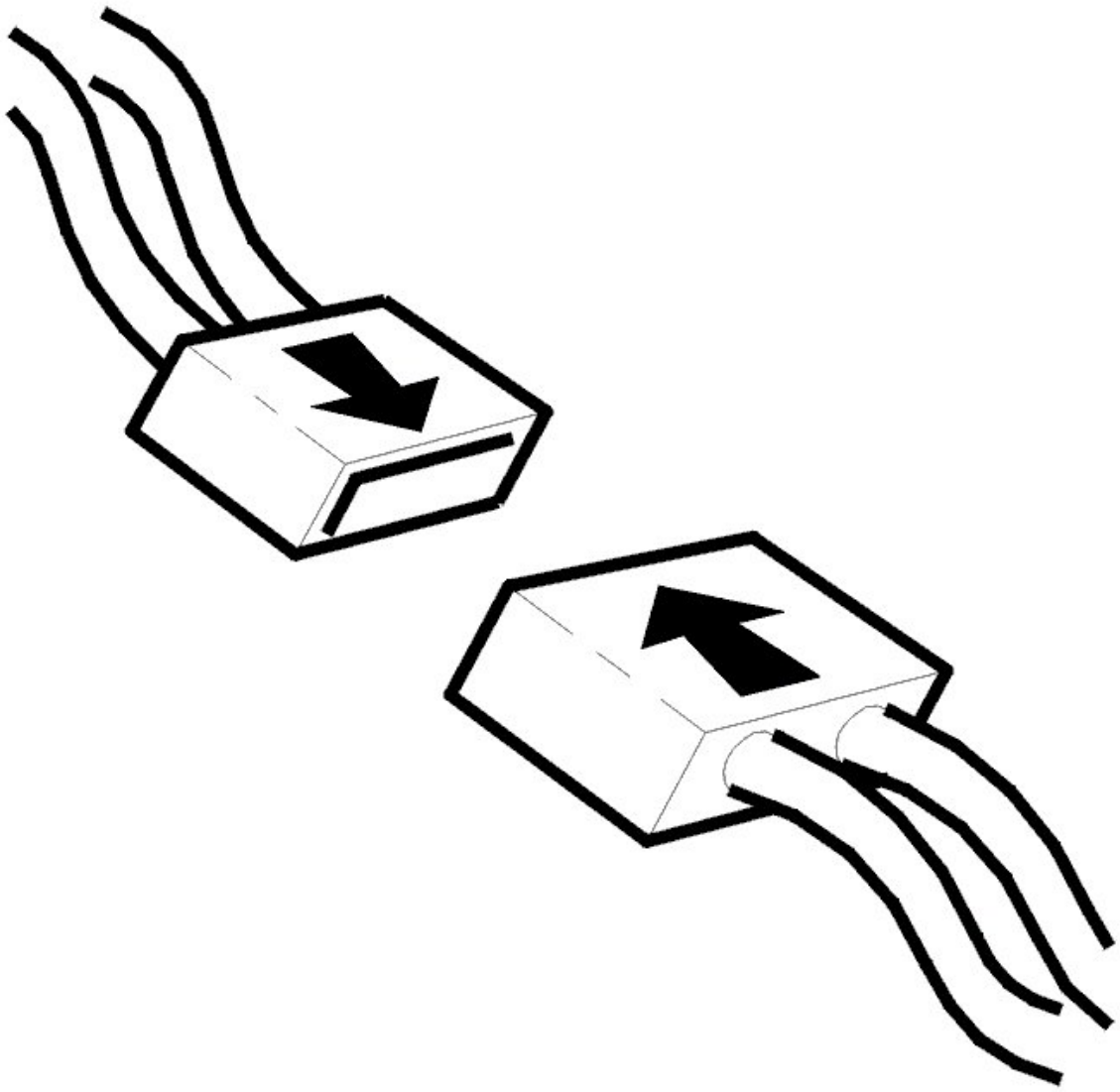
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

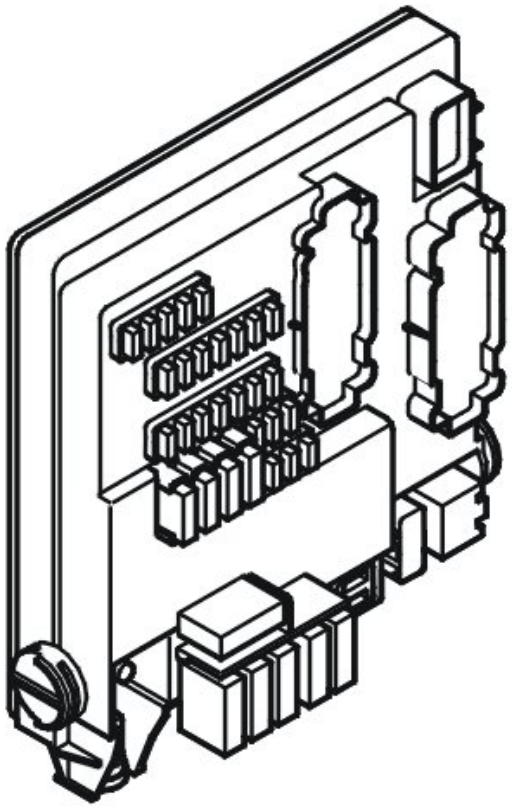
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD01

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (LIN communication blocked) with the parking assistance module (PAM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of REM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network! The rear electronic module (REM) is the only control module that monitors the voltage level in the LIN wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

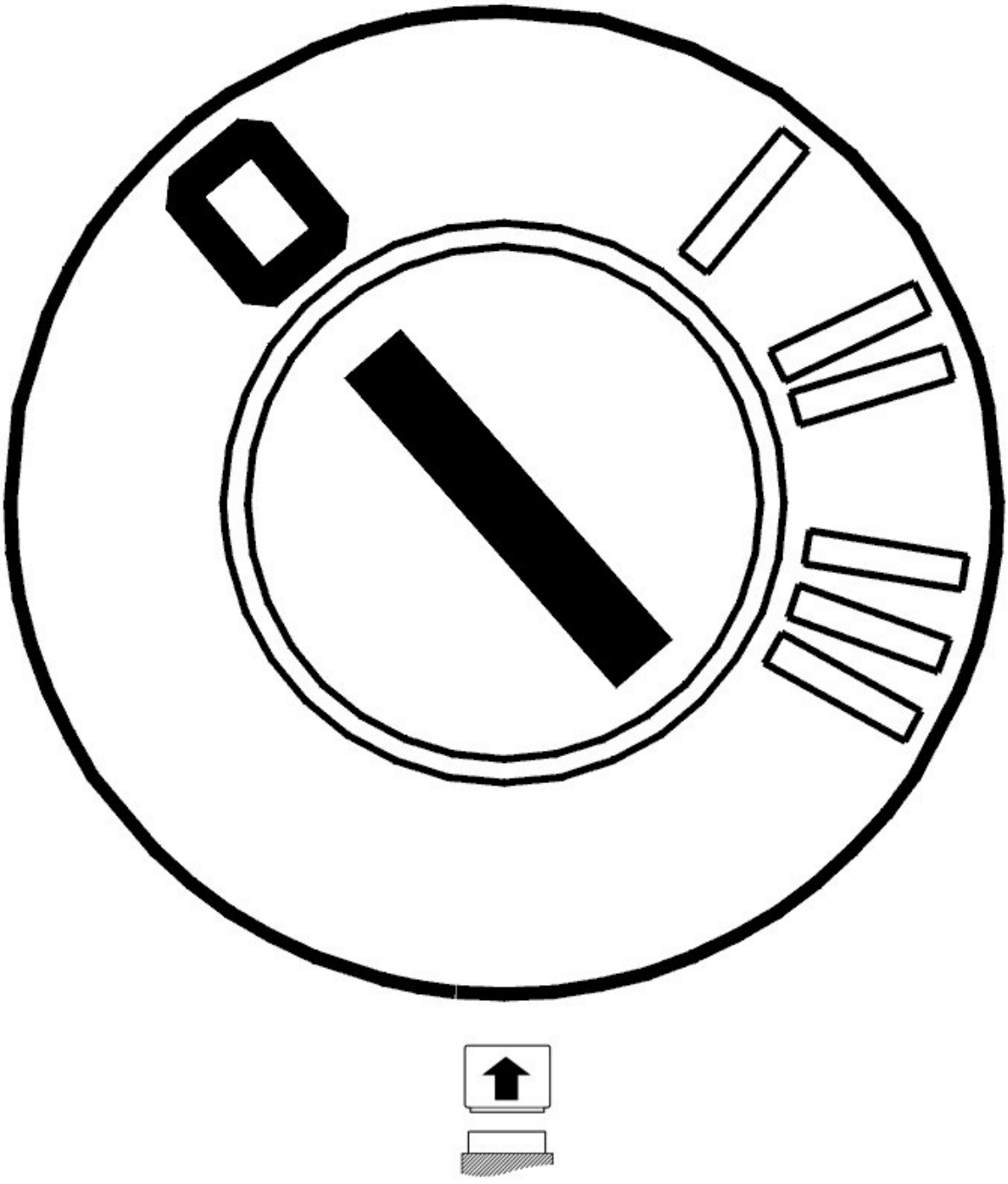
Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- The parking assistance system does not operate.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the parking assistance module (PAM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the control modules.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #D32 (#32) and parking assistance module (PAM) terminal #A12.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new parking assistance module (PAM).
Remedy as necessary.

Other information

- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair

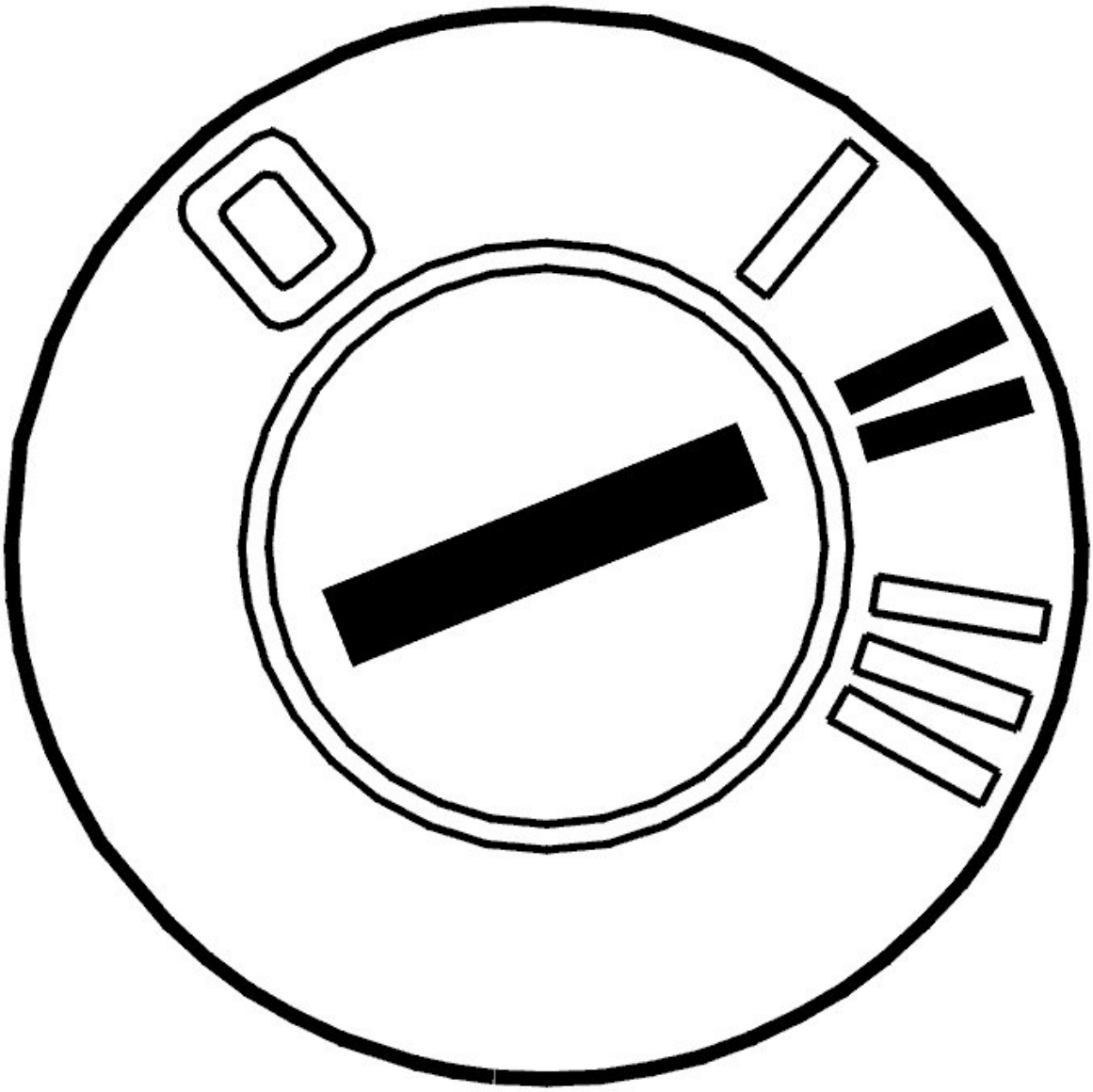
Continue - Verification

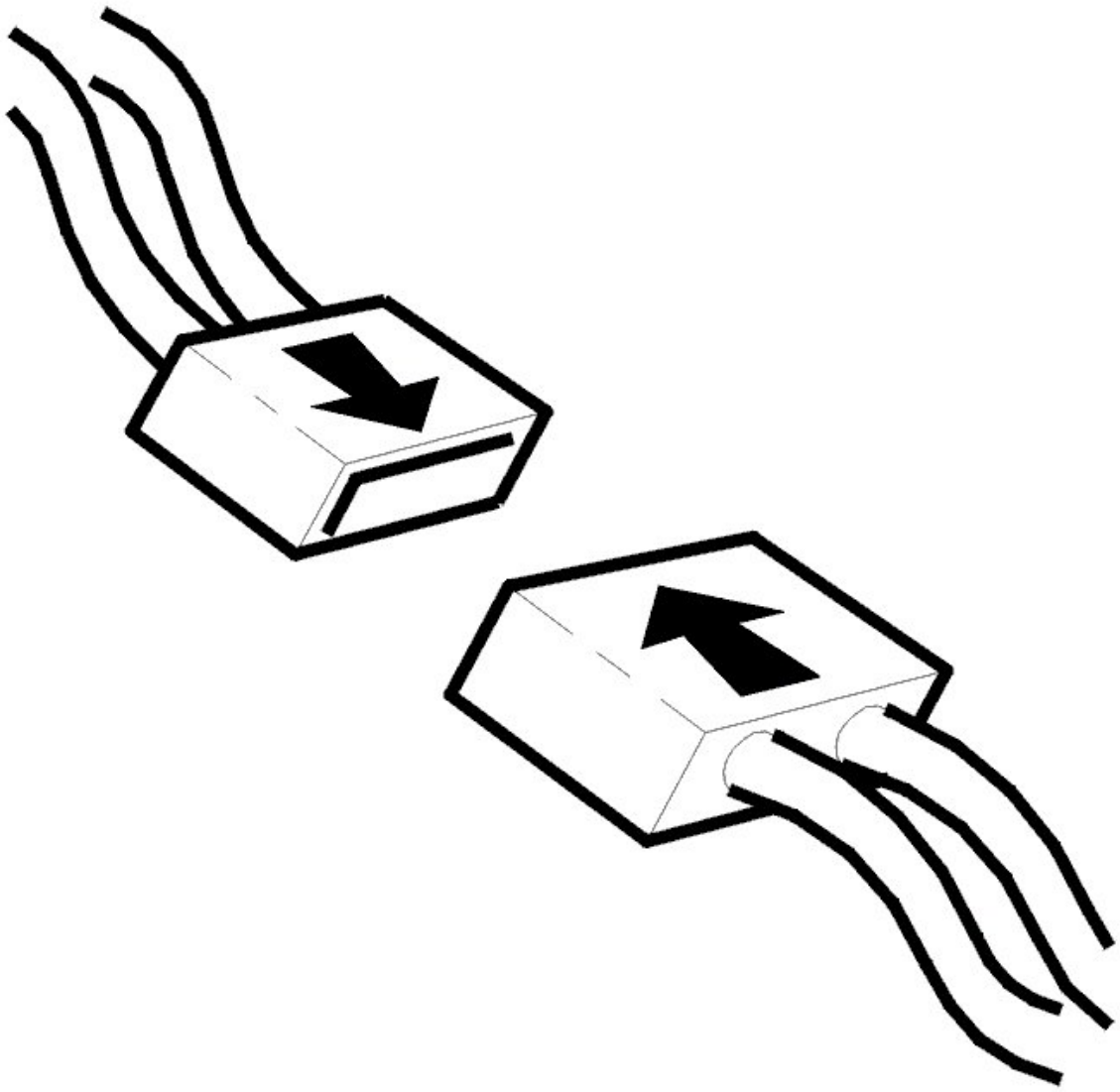
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

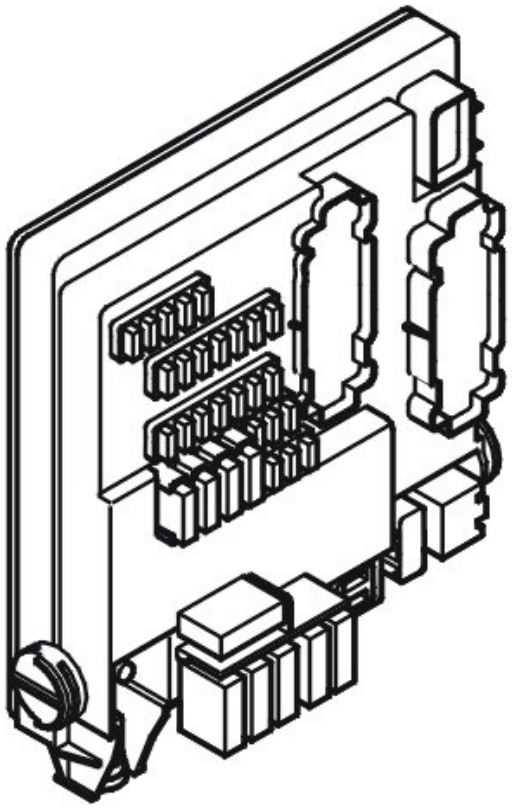
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD02

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (LIN communication blocked) with the parking assistance module (PAM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of REM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network! The rear electronic module (REM) is the only control module that monitors the voltage level in the LIN wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

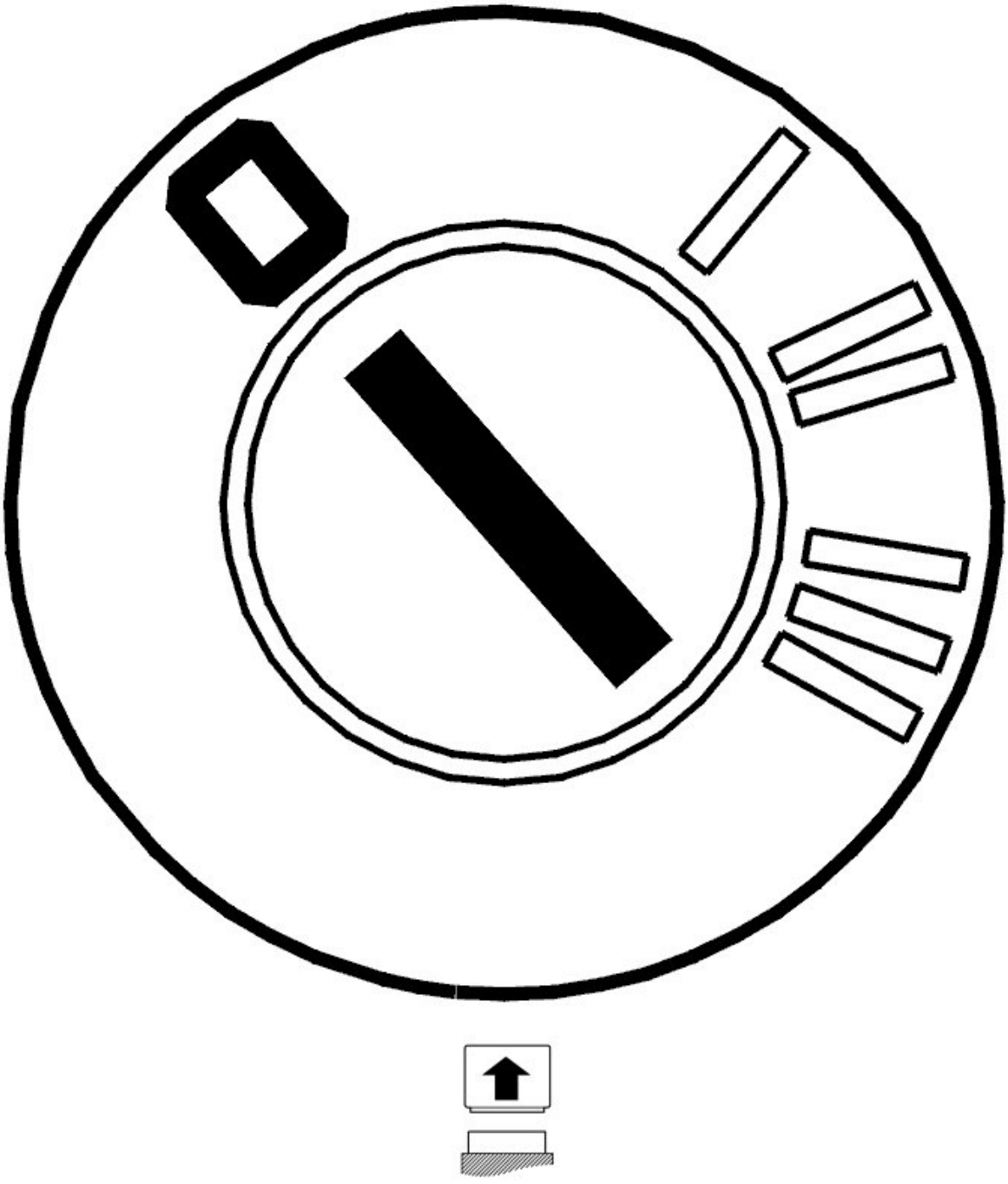
Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- The parking assistance system does not operate.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the parking assistance module (PAM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the control modules.

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #D32 (#32) and parking assistance module (PAM) terminal #A12.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new parking assistance module (PAM).
Remedy as necessary.

Other information

- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair

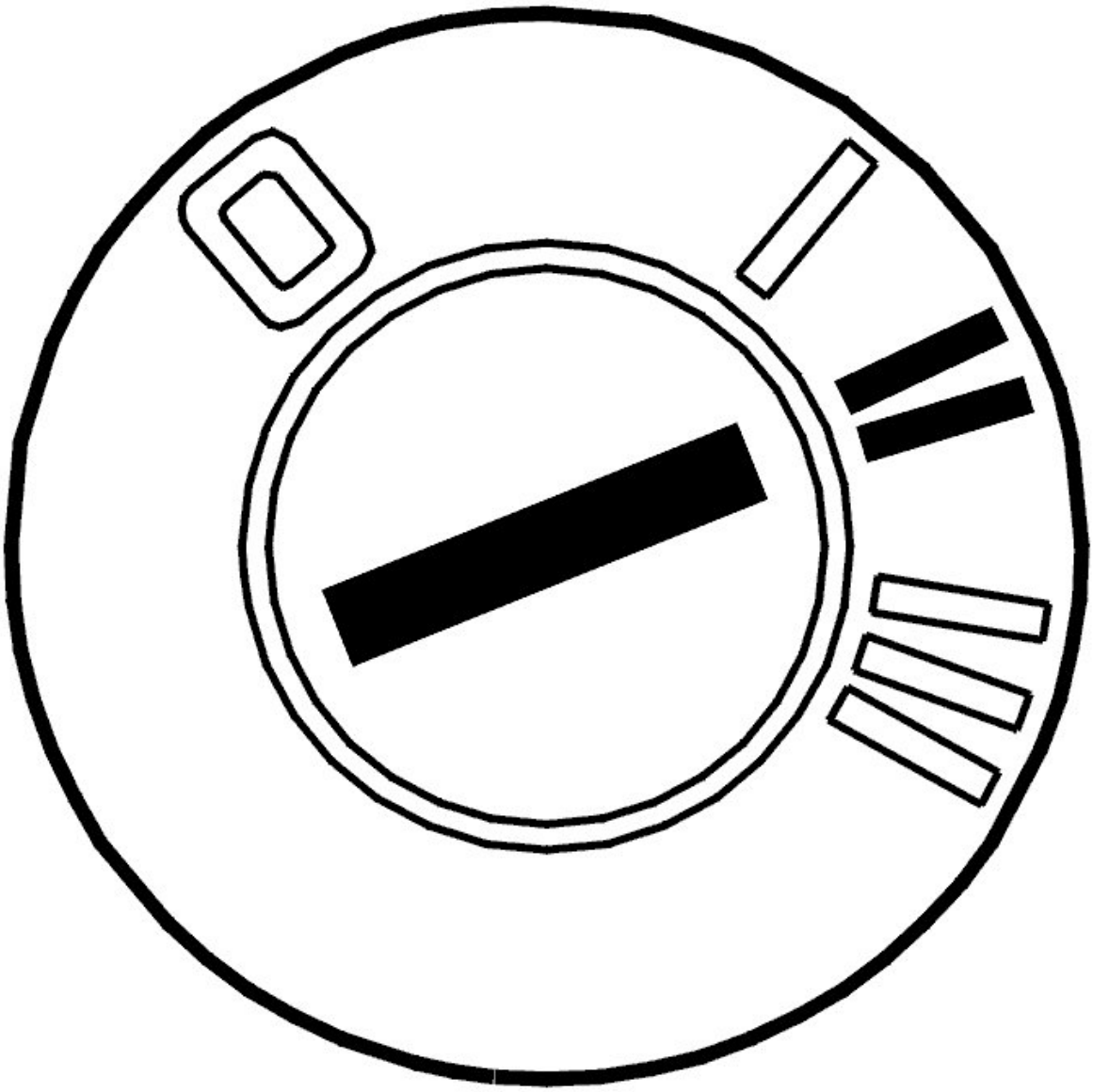
Continue - Verification

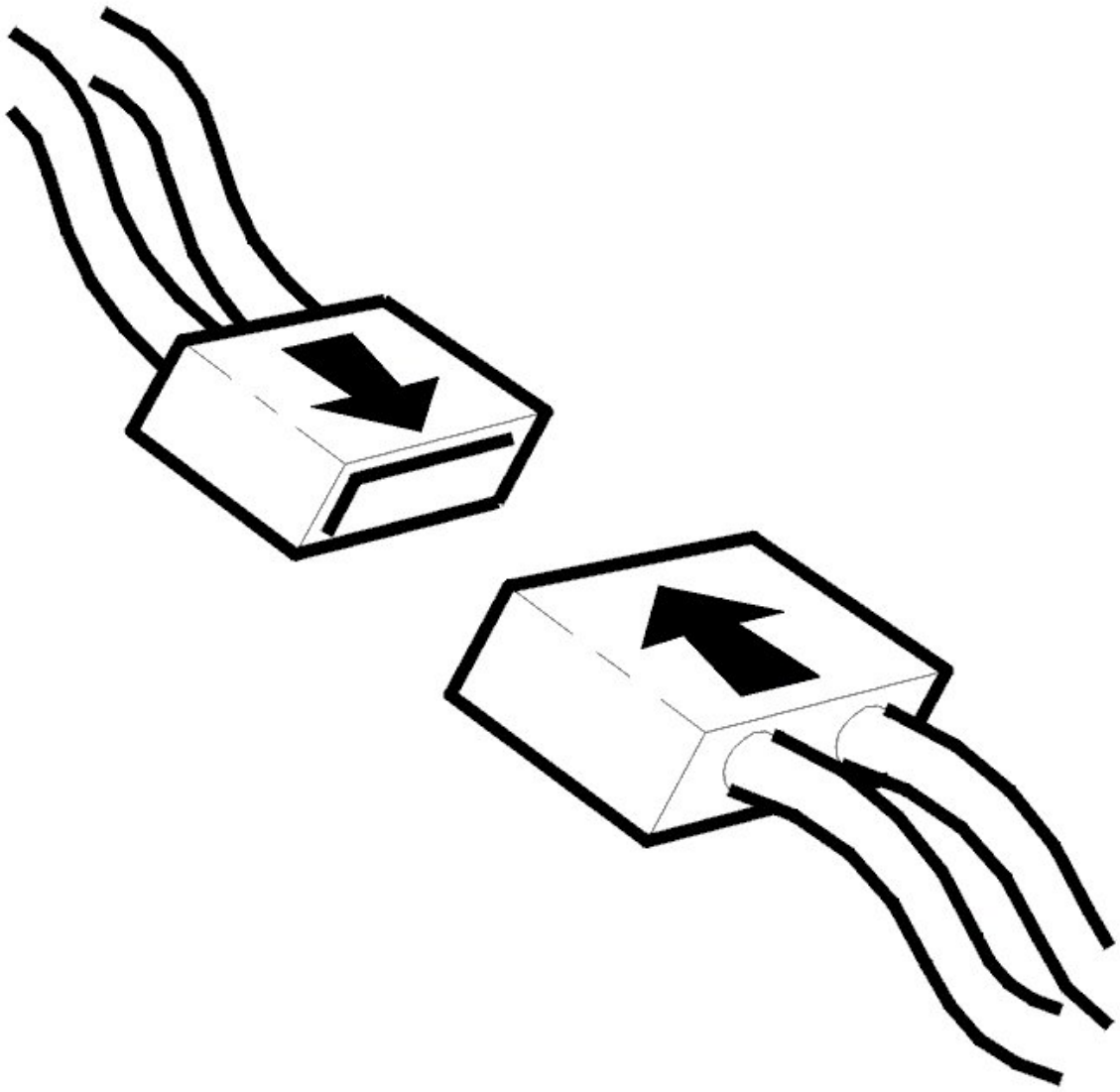
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

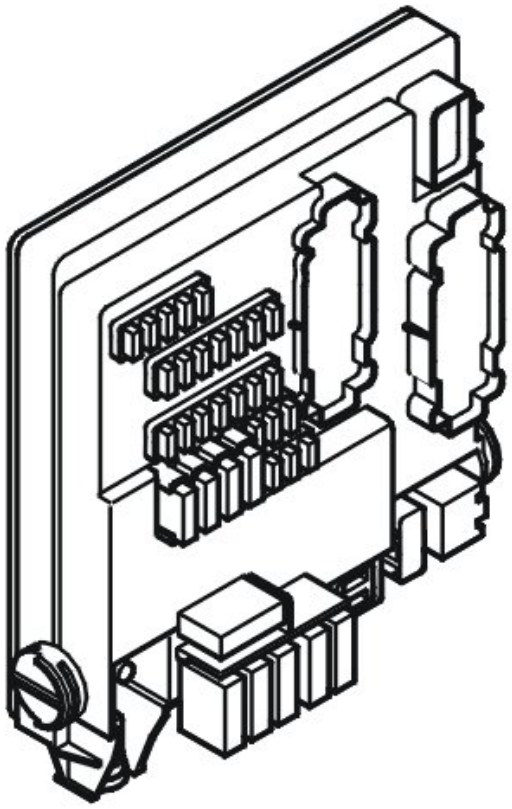
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD10

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - LIN (Local Interconnect Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (LIN communication blocked) with the parking assistance module (PAM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of REM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors in the LIN network! The rear electronic module (REM) is the only control module that monitors the voltage level in the LIN wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of a LIN fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

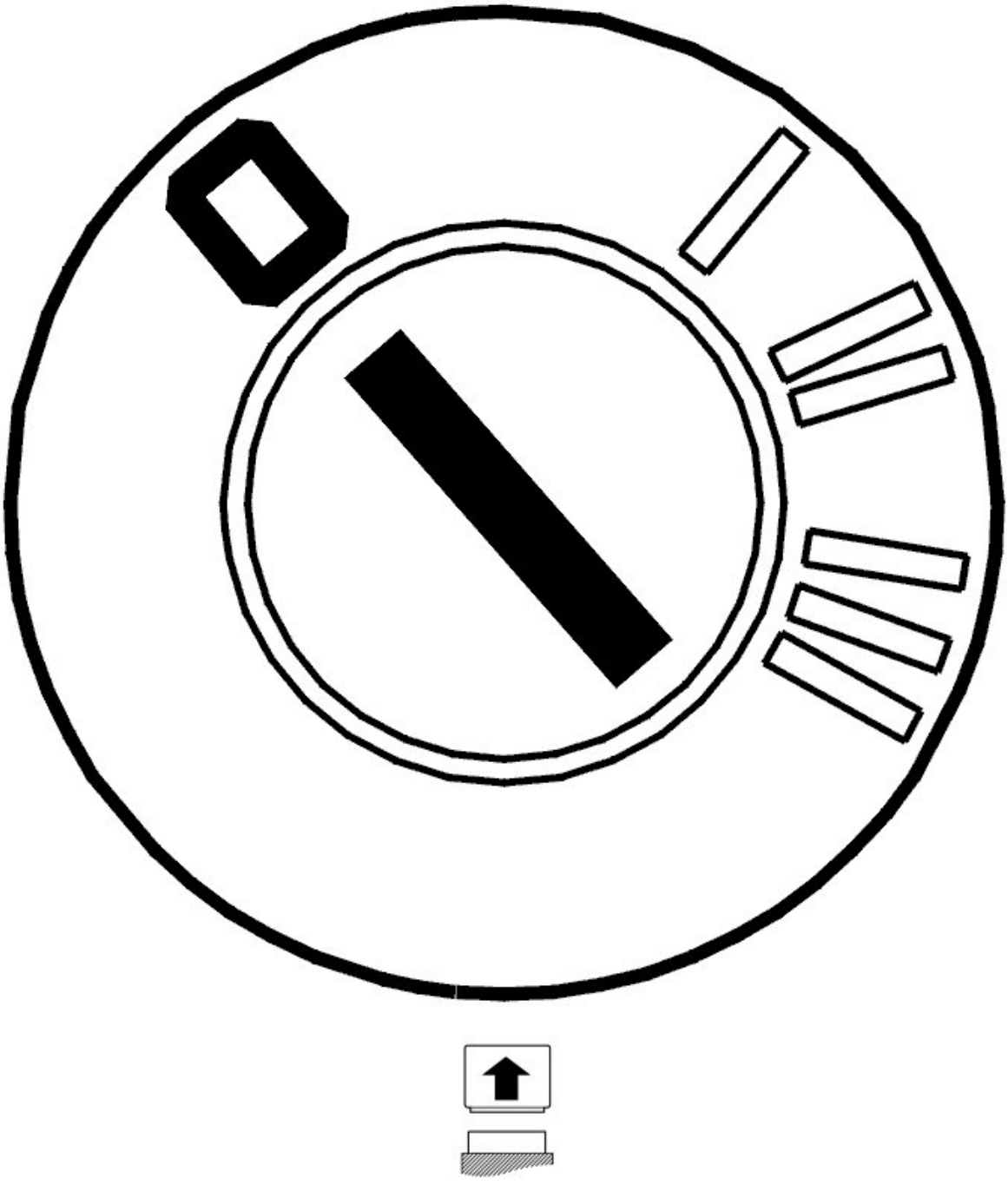
Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- The parking assistance system does not operate.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check that the fuse for the control module is intact.
The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the parking assistance module (PAM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the

control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:
- Rear electronic module (REM) terminal #D32 (#32) and parking assistance module (PAM) terminal #A12.

Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new parking assistance module (PAM).
Remedy as necessary.

Other information
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair

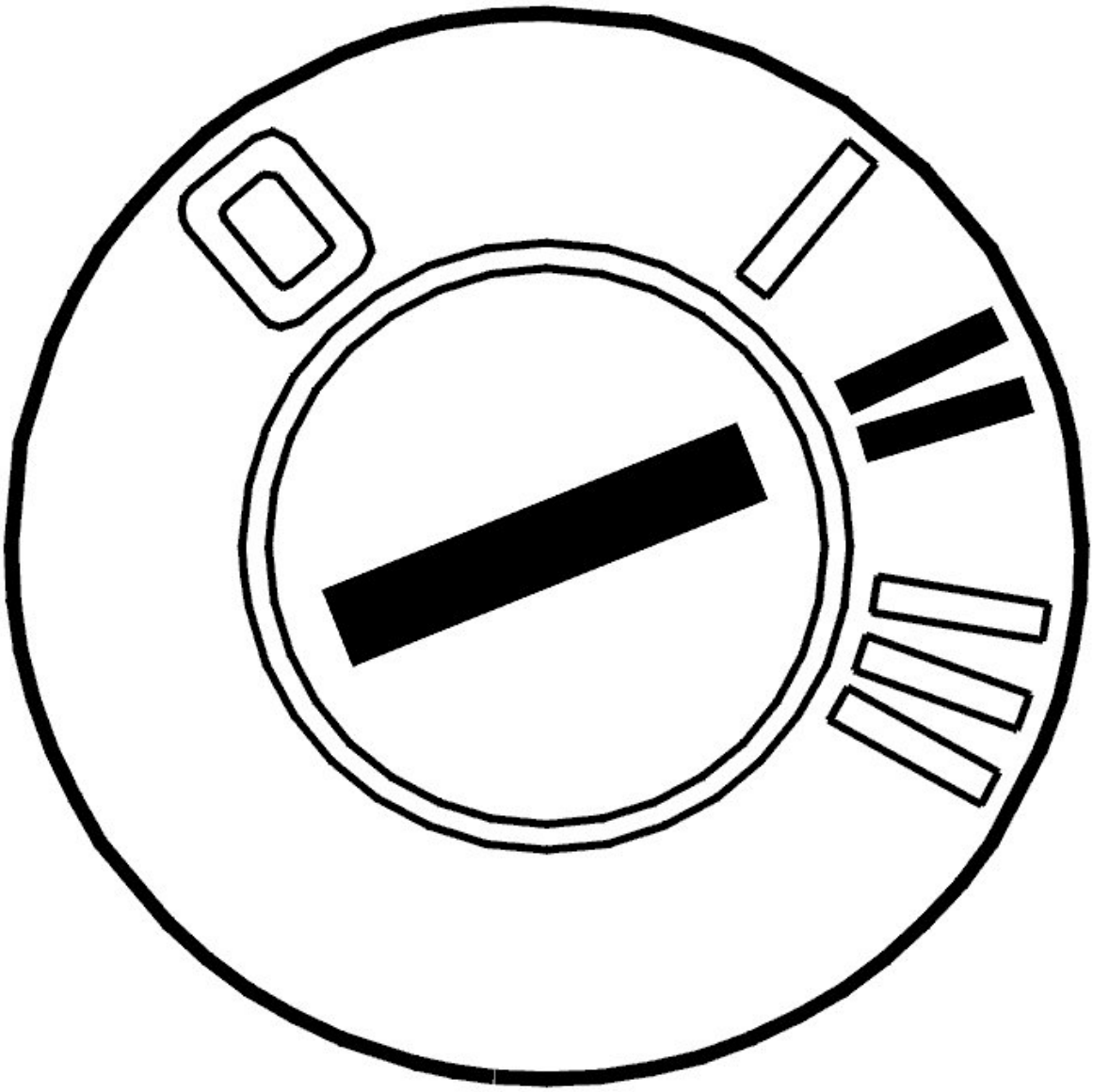
Continue - Verification

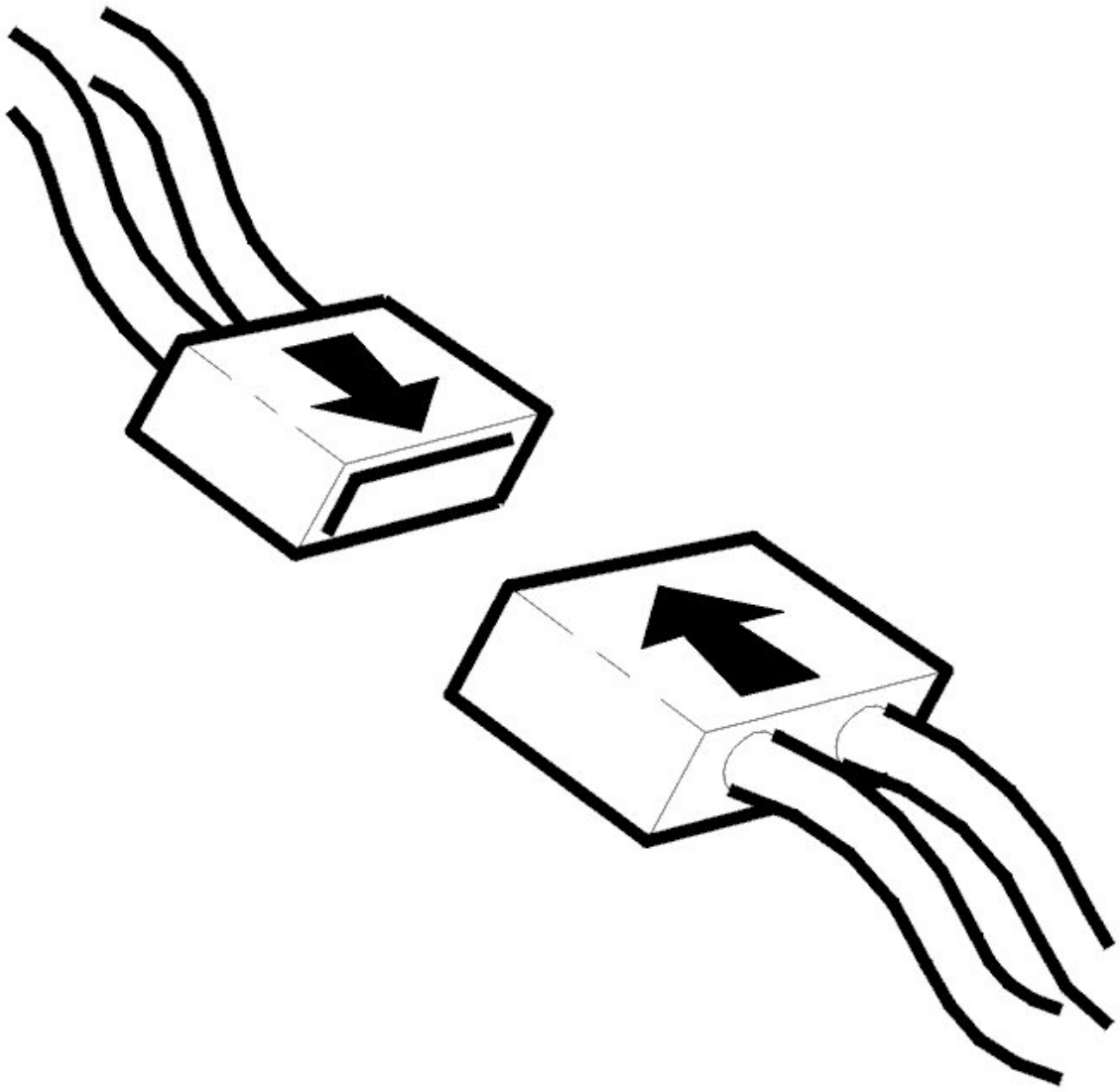
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

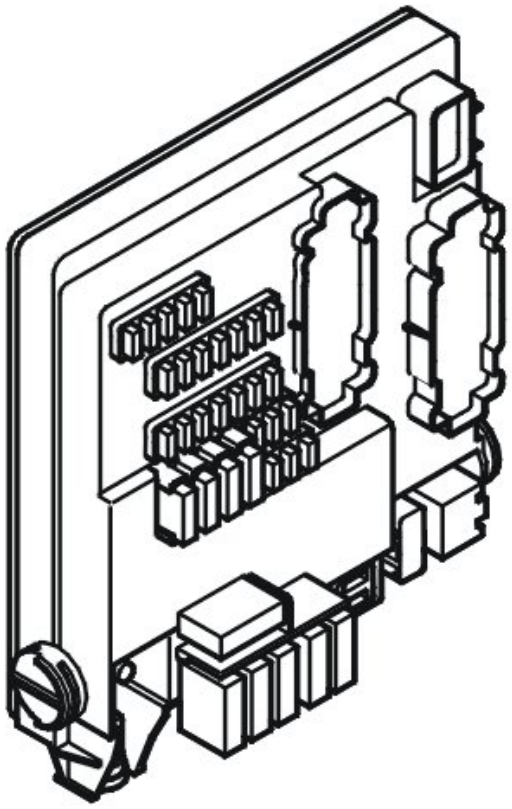
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD20

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (communication blocked) with the inclination sensor module (ISM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors! The rear electronic module (REM) is the only control module that monitors the voltage level in the signal wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of this type of fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

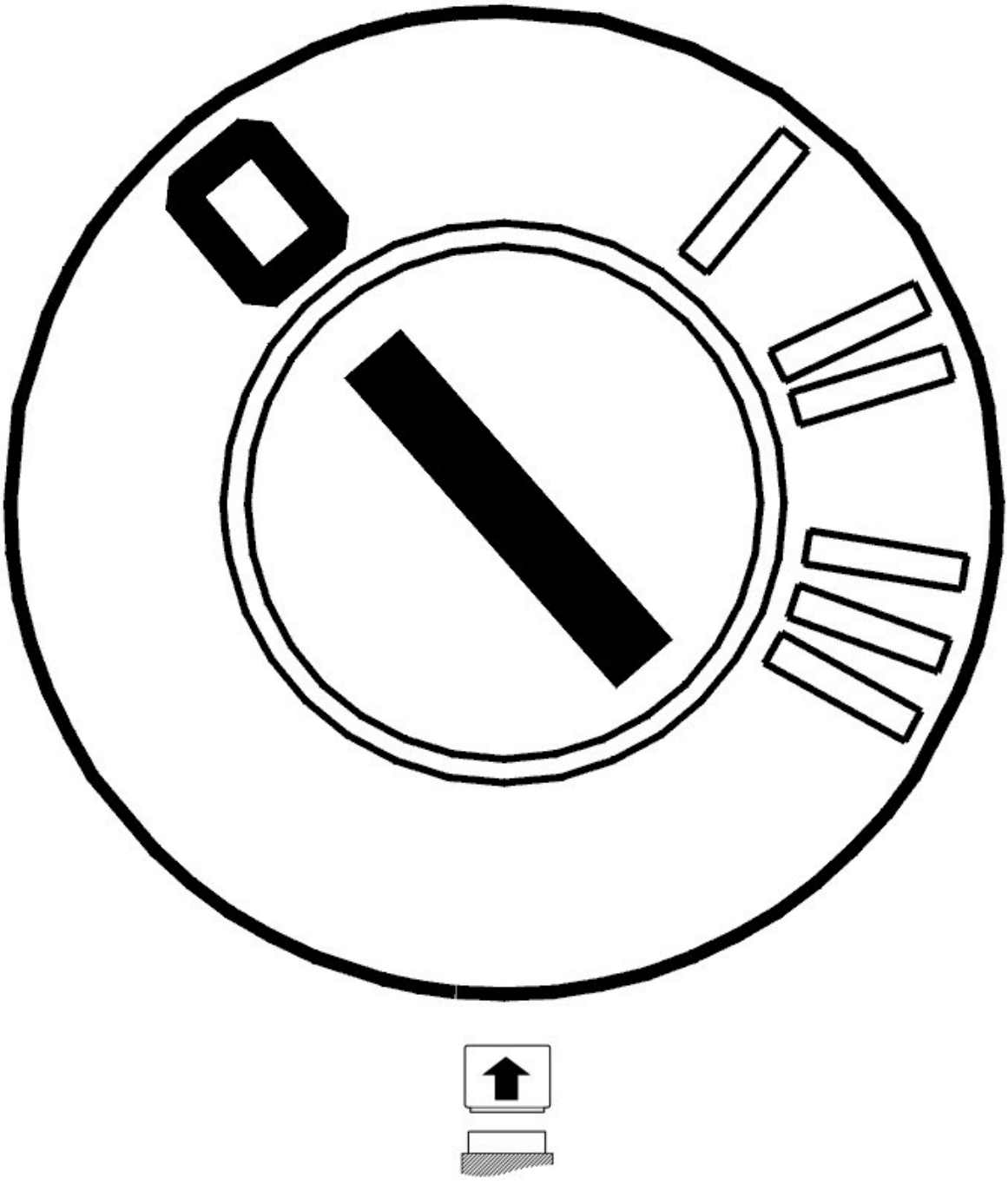
Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

Fault symptom[s]
- False alarm.

Communication Fault

Communication fault

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the inclination sensor module (ISM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the control modules.

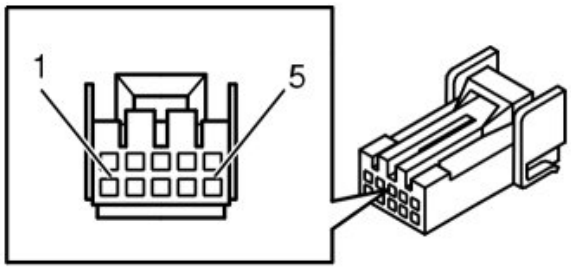
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #D26 (#26) and the inclination sensor module (ISM) terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Tilt sensor alarm, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Tow Sensor/Service and Repair/Tilt Sensor Alarm, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new inclination sensor module (ISM).
Remedy as necessary.

Other information

- Tilt sensor alarm, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Tow Sensor/Service and Repair/Tilt Sensor Alarm, Replacing

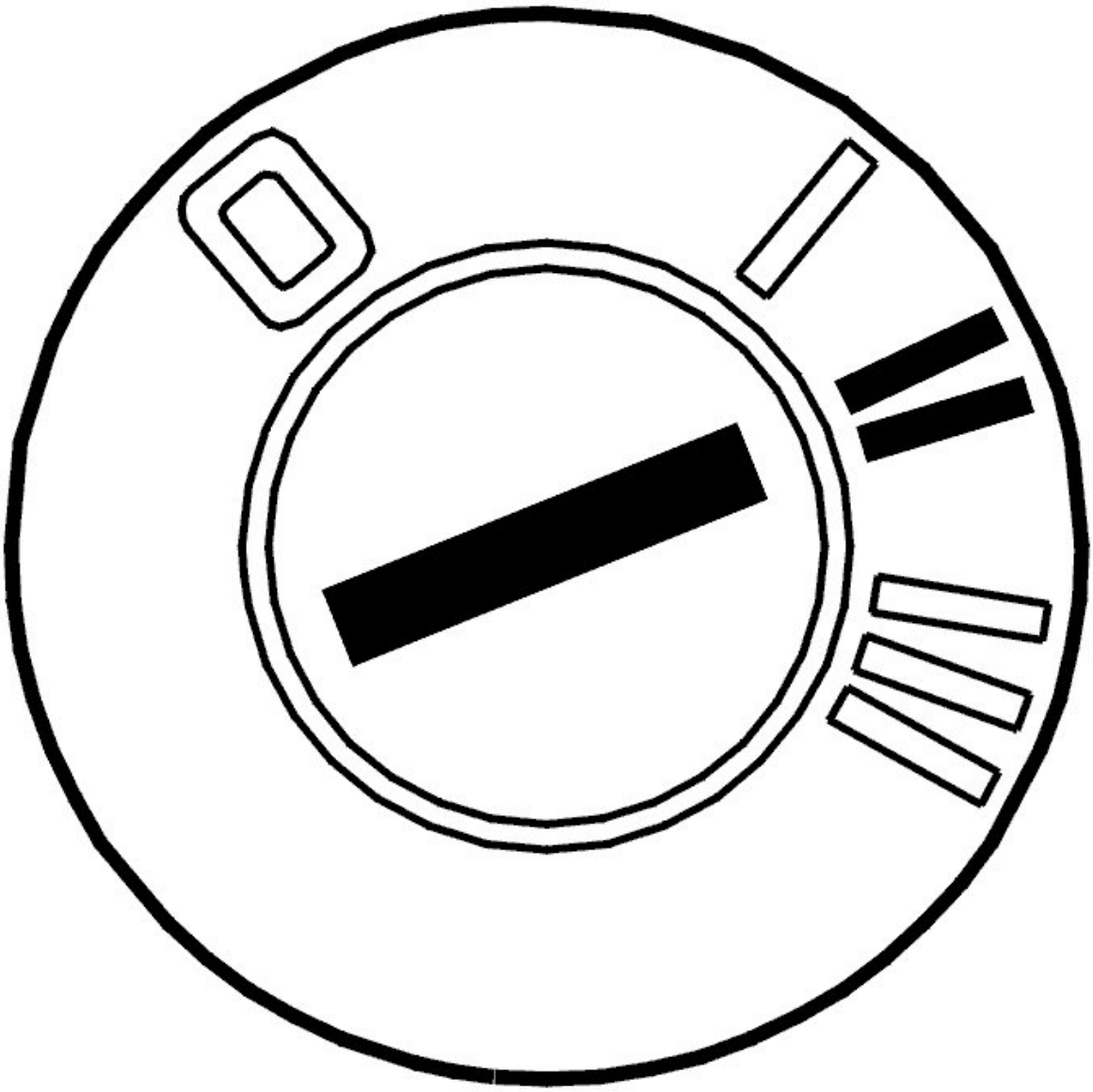
Continue - Verification

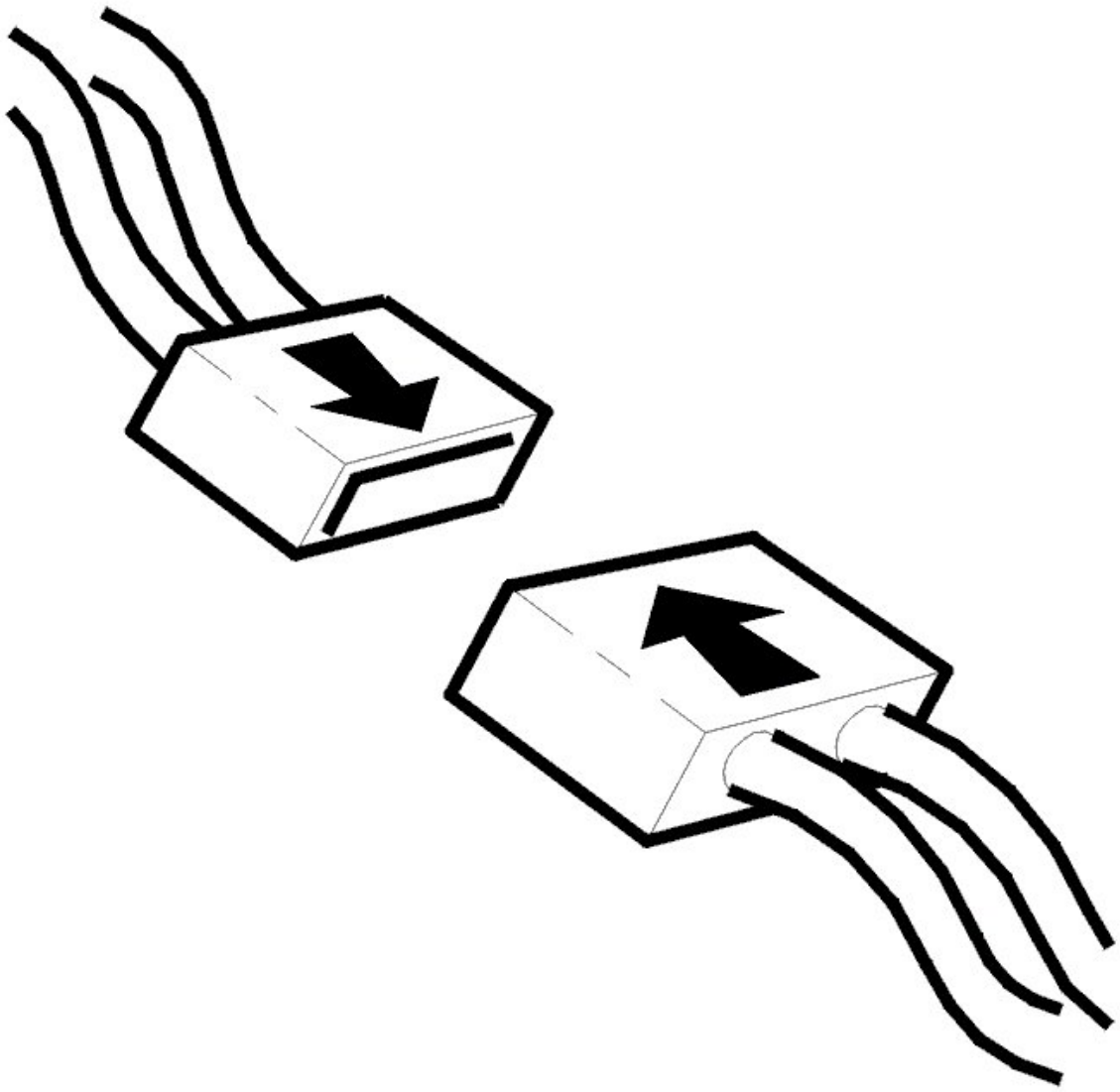
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the alarm.
Check that the functions are OK.

Are the functions OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

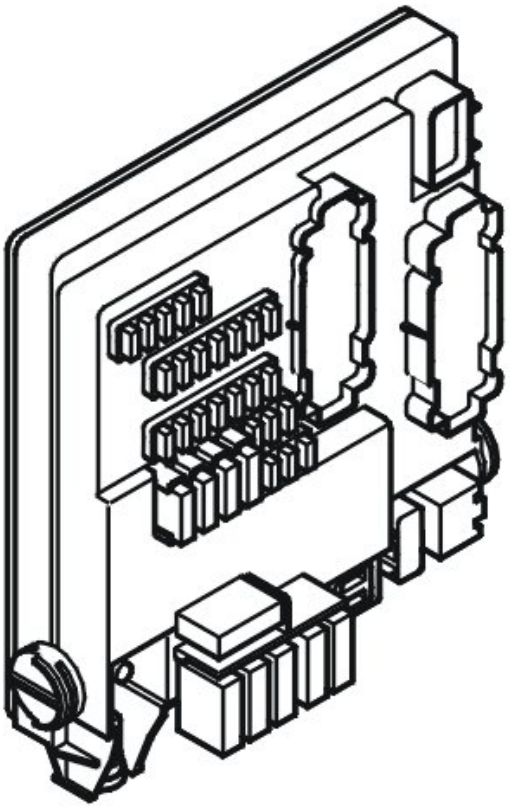
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-DD21

Condition



The rear electronic module (REM) transmits and receives information via a standardized serial communication method - Volcano Lite (VOLvo CAN based distributed real time Operative environment). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (communication blocked) with the inclination sensor module (ISM).
The diagnostic trouble code (DTC) can be detected when the ignition is in position II for at least 10 seconds and the battery voltage is > 10.5 volts.
Note! In the event of CEM-DDxx diagnostic trouble codes (DTCs), the rear electronic module (REM) must not be replaced as the diagnostic trouble code (DTC) indicates a short-circuit in one or more conductors! The rear electronic module (REM) is the only control module that monitors the voltage level in the signal wiring. The rear electronic module (REM) is therefore the only control module that can store a diagnostic trouble code (DTC) for a short-circuit to ground or supply voltage in one of the cables. Do not replace the rear electronic module (REM) in the event of this type of fault unless VIDA fault-tracing has indicated that the rear electronic module (REM) has an internal fault.

Substitute value
- None.

Possible source
- Short-circuit between signal cables
- Open-circuit in one of the signal cables
- Internal fault in another control module in the same part of the network.

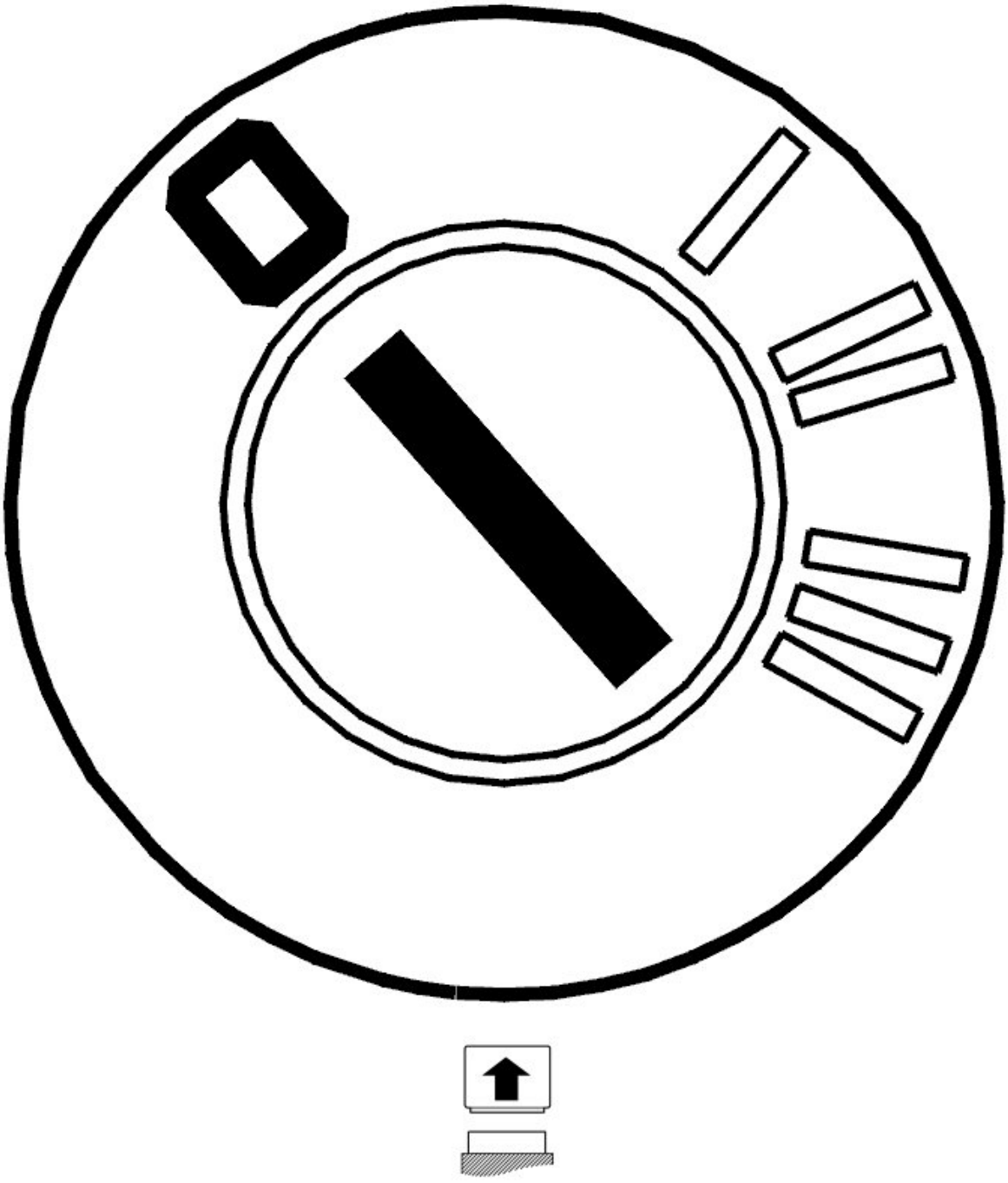
Fault symptom[s]

- False alarm.

Faulty Signal

Faulty signal

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

The diagnostic trouble code (DTC) is stored if there is no communication between the rear electronic module (REM) and the inclination sensor module (ISM). This may be due to a fault in the signal cable between the control modules or a defective communication device in one or all of the control modules.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

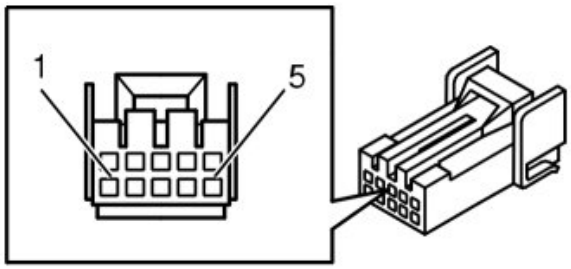
- Rear electronic module (REM) terminal #D26 (#26) and the inclination sensor module (ISM) terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)

- Tilt sensor alarm, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Tow Sensor/Service and Repair/Tilt Sensor Alarm, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Verification

No - Replacing the control module

Replacing the control module

Try a new inclination sensor module (ISM).
Remedy as necessary.

Other information

- Tilt sensor alarm, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Tow Sensor/Service and Repair/Tilt Sensor Alarm, Replacing

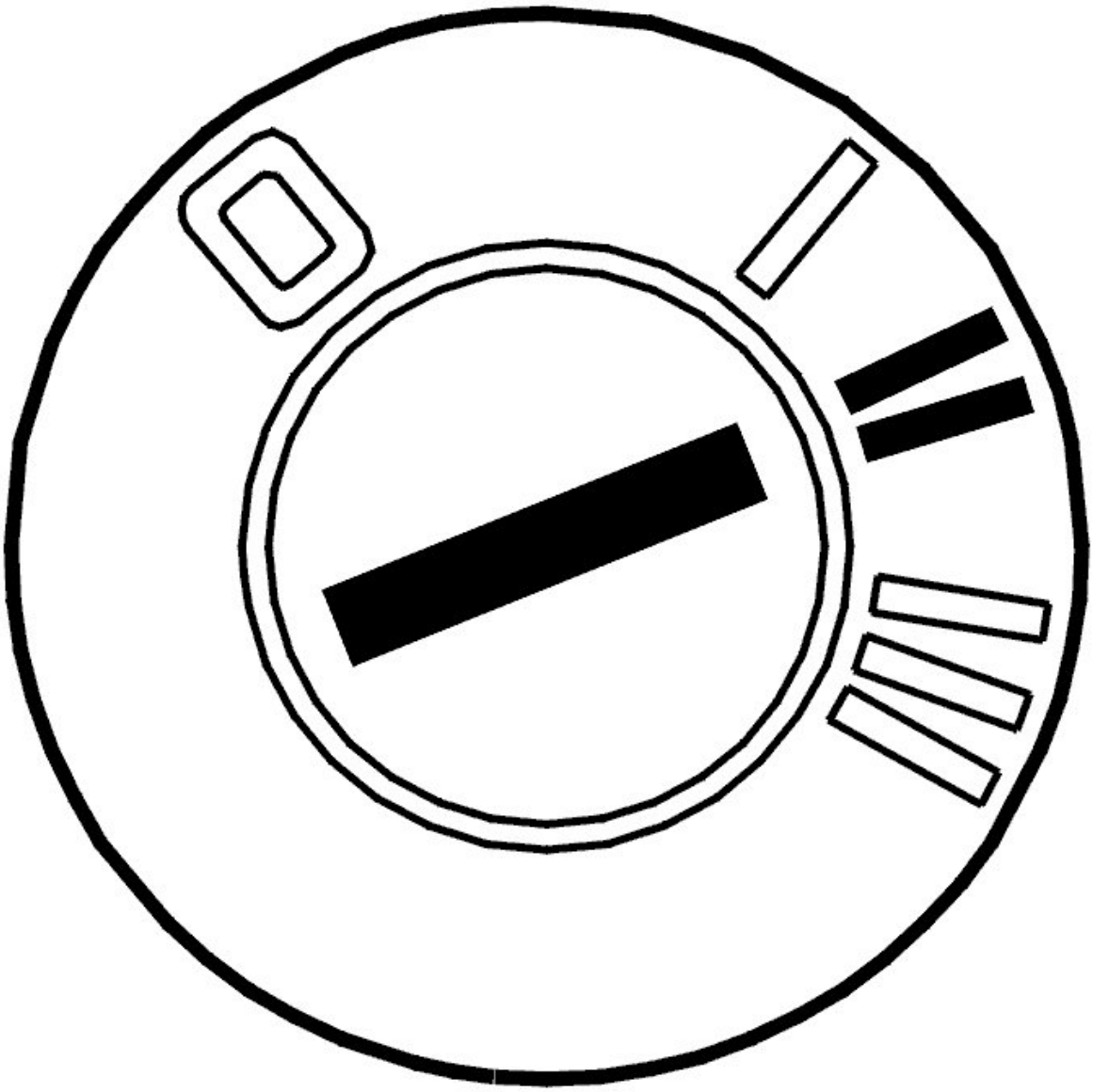
Continue - Verification

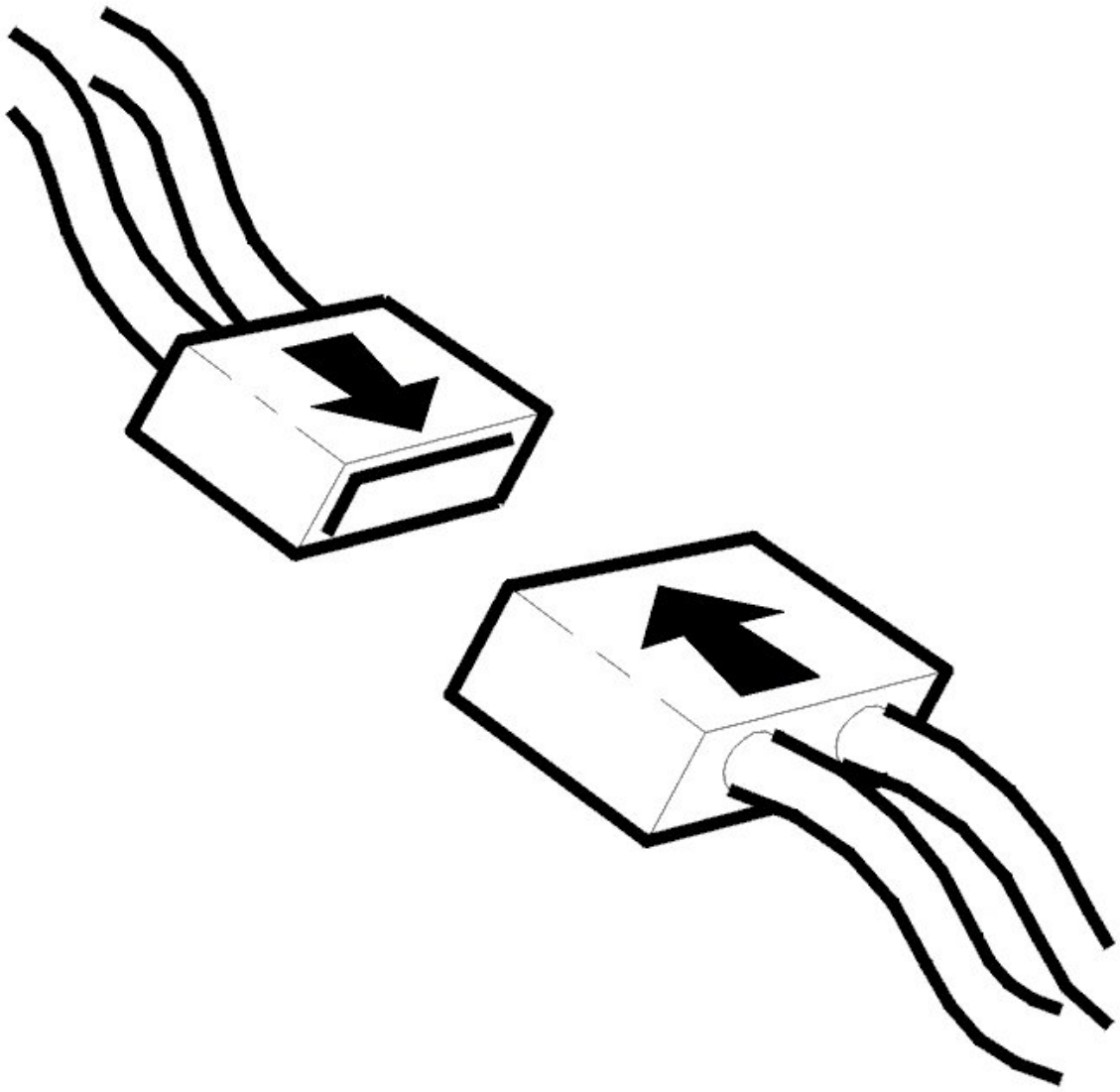
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the alarm.
Check that the functions are OK.

Are the functions OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

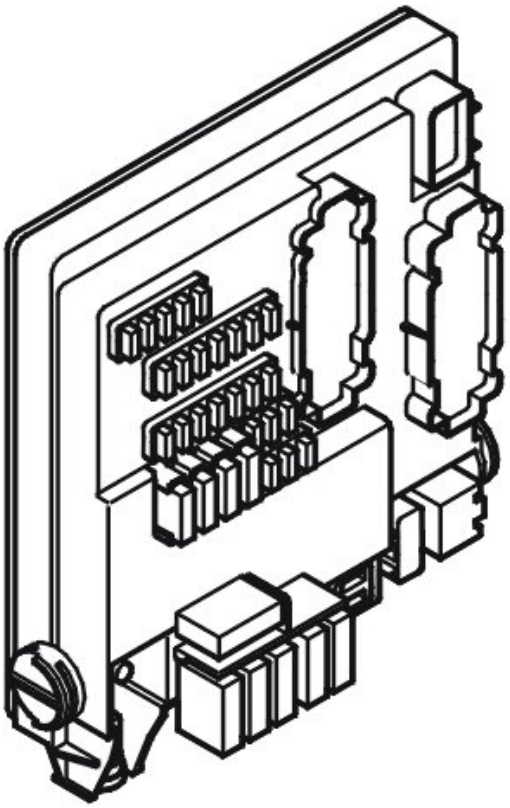
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

REM-E001

Diagnostic trouble code (DTC) information REM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value

- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source

- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]

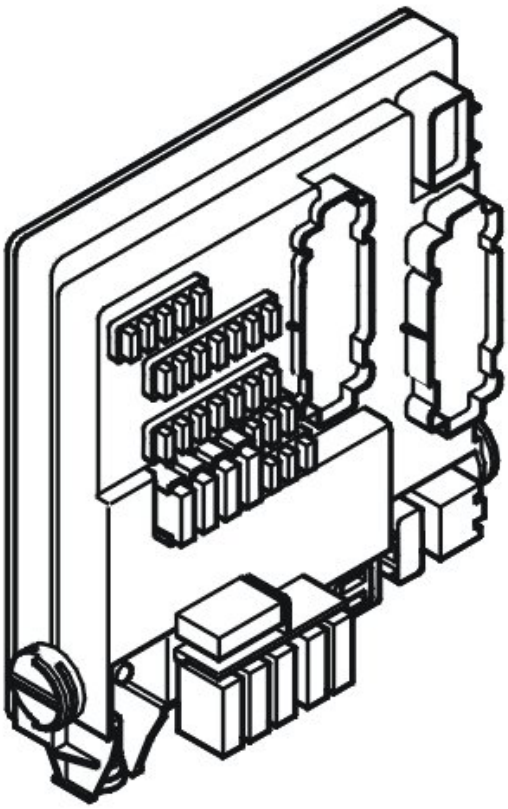
- The central locking system does not function at all

- The fuel gauge indicates zero even though there is fuel in the tank.
- Rear demist does not operate.
- Retractable headrest not operating.
- Does not lock / unlock the fuel tank filler cap.
- The power window mechanism in the rear door does not operate.
- The tail lamps are not working.

REM-E003

Diagnostic trouble code (DTC) information REM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is or has been interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

Possible source
- Incorrect control area network (CAN) configuration ID (the node is not intended for this car - for example a used control module with different software/hardware)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The central locking system does not function at all.
- The fuel gauge indicates zero even though there is fuel in the tank.
- Rear demist does not operate.
- Retractable headrest not operating.
- Does not lock / unlock the fuel tank filler cap.
- The power window mechanism in the rear door does not operate.
- The tail lamps are not working.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-E010

Condition

The rear electronic module (REM) compares its supply voltage with the information about the supply voltage to the central electronic module (CEM) transmitted on the CAN network.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that its own power supply is more than 3V below the power supply to the central electronic module (CEM).
The diagnostic trouble code (DTC) can be diagnosed when the engine is running.

Substitute value
- None.

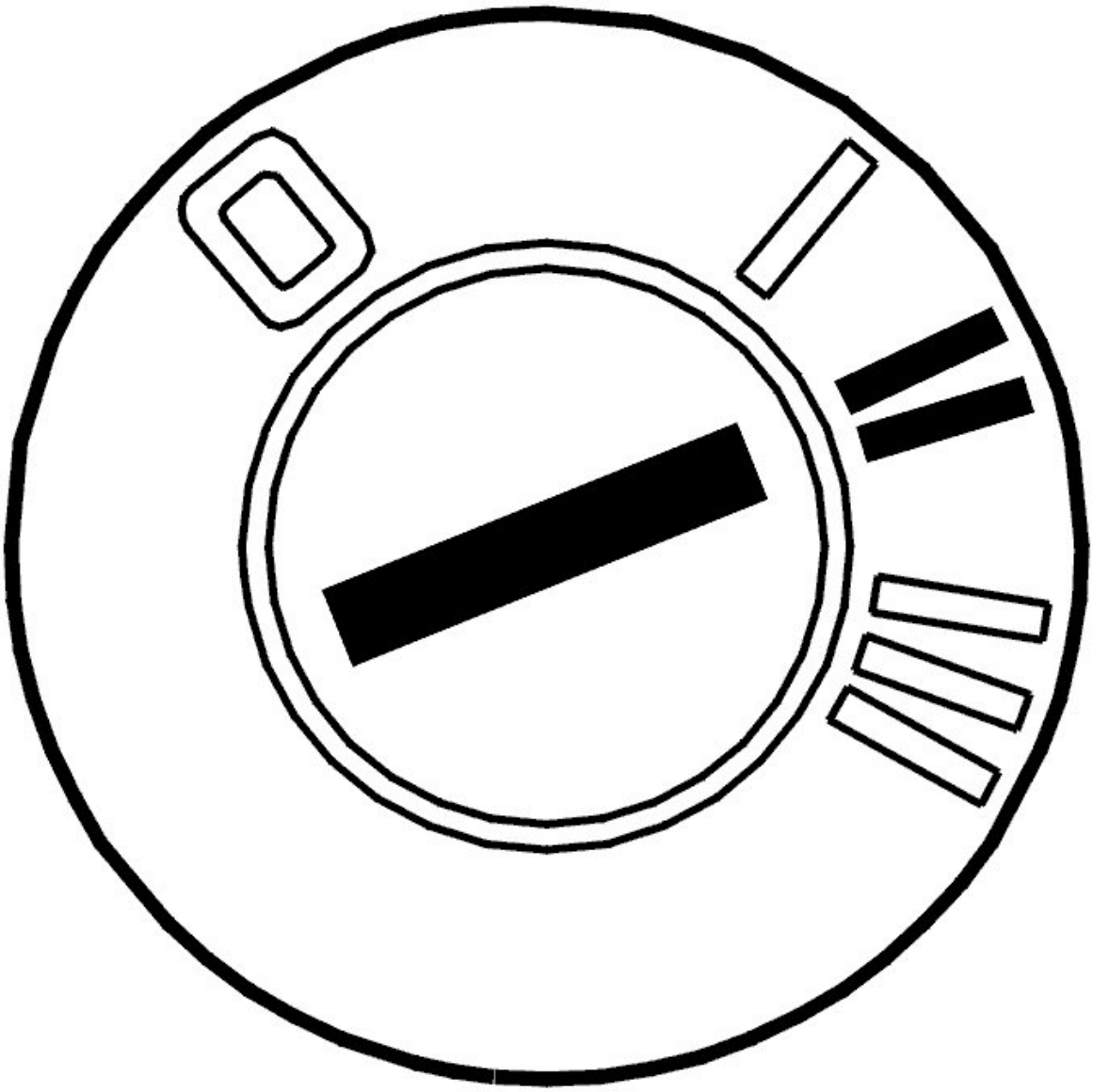
Possible source
- Half-burned fuse for the rear electronic module (REM)
- Damaged power supply cable to the rear electronic module (REM)
- Loose connections in the ground lead for the rear electronic module (REM)
- Contact resistance or oxidation in the terminals.

Fault symptom[s]
- The central locking system does not function at all.
- The fuel gauge indicates zero even though there is fuel in the tank.
- Rear demist does not operate.
- Retractable headrest not operating.
- Does not lock / unlock the fuel tank filler cap.
- The power window mechanism in the rear door does not operate.
- The tail lamps are not working.

Signal Too Low

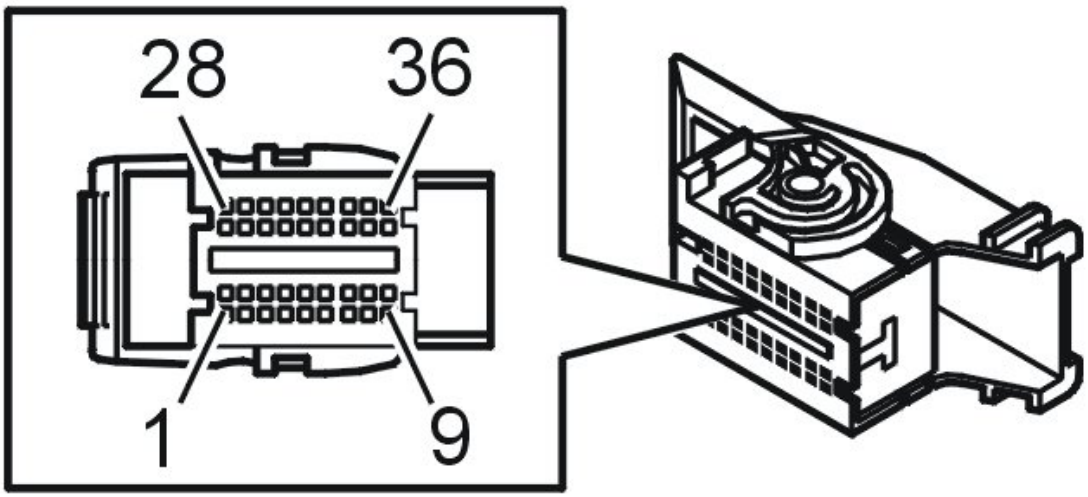
Signal too low

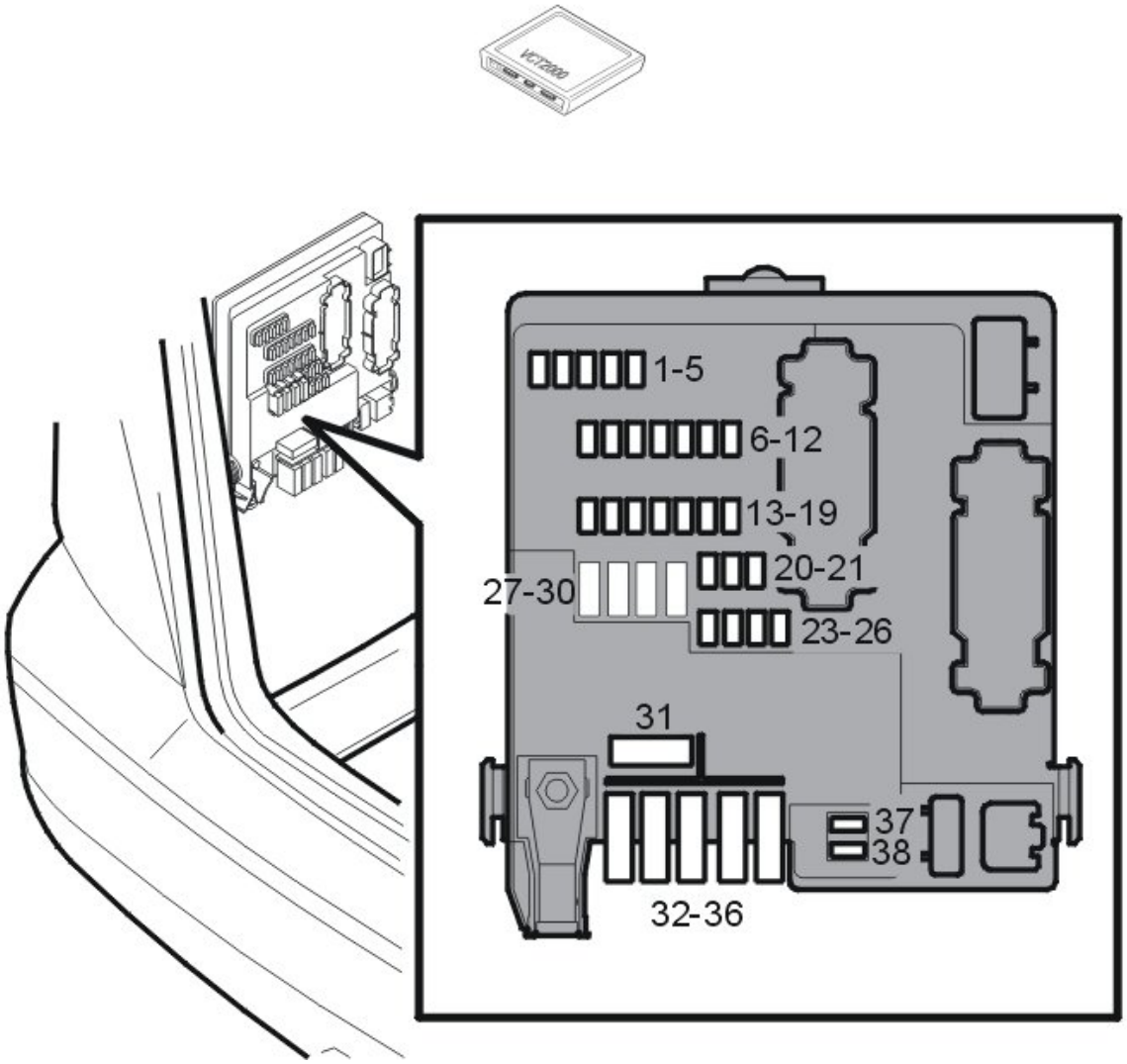
Checking the power supply



- Ignition on
- Read off the power supply for the rear electronic module (REM) and the central electronic module (CEM).

The voltage for the rear electronic module (REM) and the central electronic module (CEM) must be approximately the same.
The fault is permanent if the voltage for the rear electronic module (REM) deviates by more than 3 V from the central electronic module (CEM).
If the voltage is approximately the same, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.





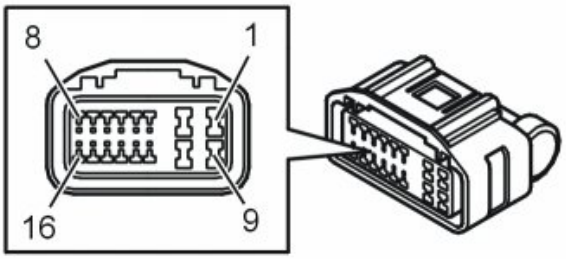
Continue - Checking cable and component

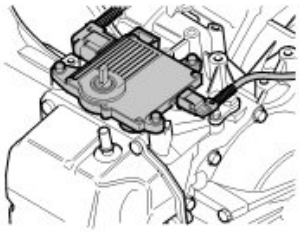
Checking cable and component

Check the connectors for the rear electronic module (REM). Check for contact resistance and oxidation.
Check the terminals for the power supply (30-supply) from the battery to the rear electronic module (REM) (screw terminal). Check for contact resistance and oxidation. Also check the terminals for the fuse to the actual rear electronic module (REM). For information about fuses, see the relevant Wiring Diagram.
Check the ground terminal from the rear electronic module (REM) terminal #12 (#D12) and ground terminal. Check for contact resistance and oxidation.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





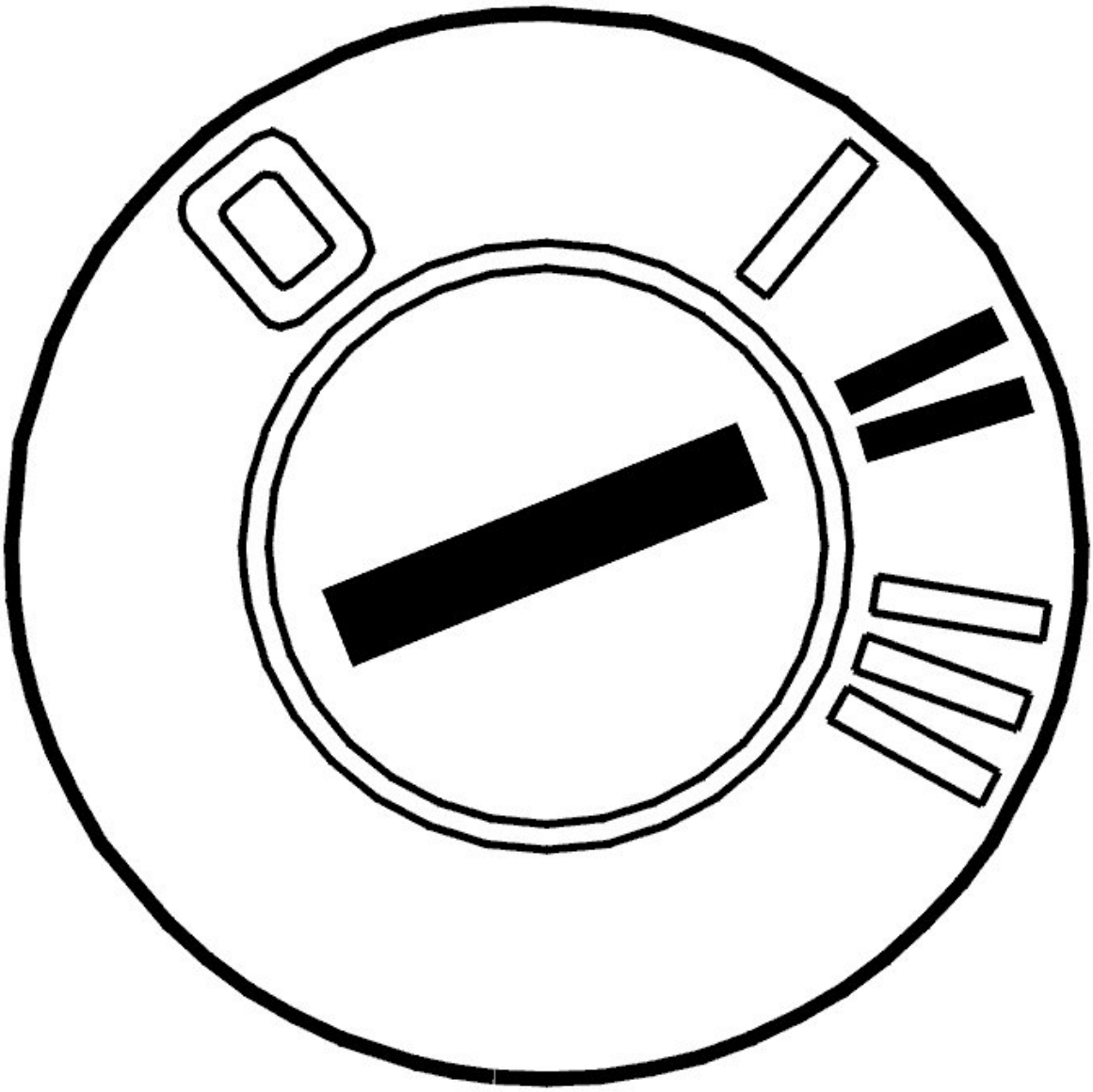
Continue - Verification

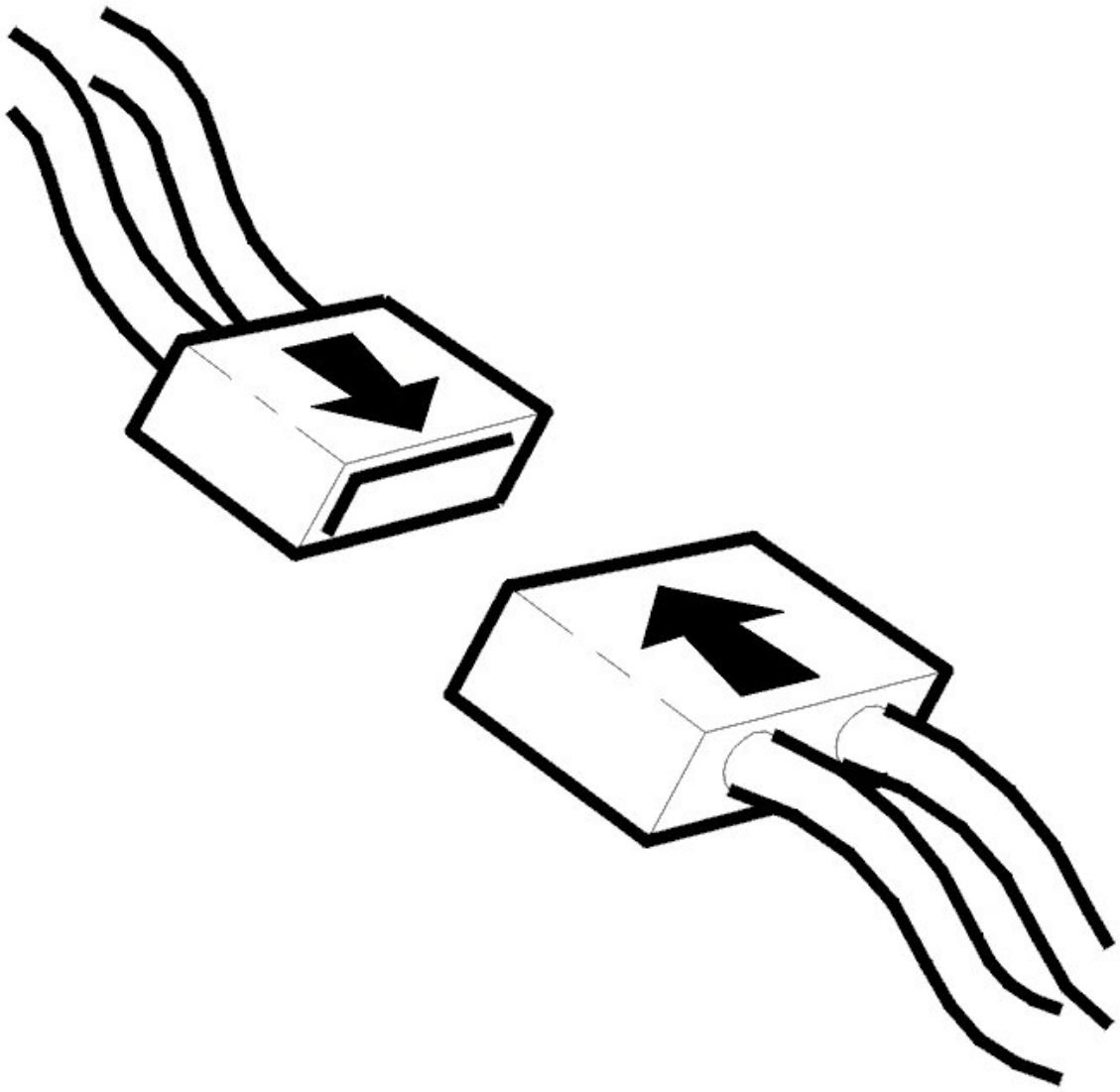
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply for the rear electronic module (REM) and the central electronic module (CEM).

The voltage for the rear electronic module (REM) and the central electronic module (CEM) must be approximately the same (a maximum difference of 3 V).

Is the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

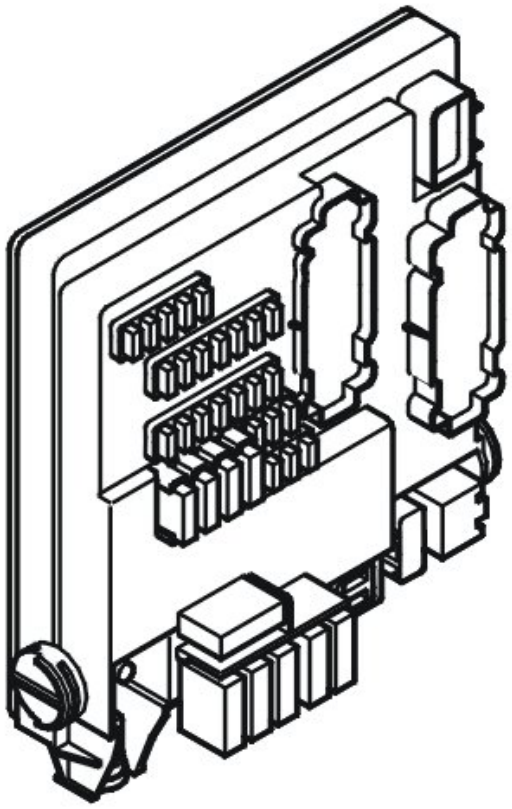
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D0A

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work

- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

Internal Fault

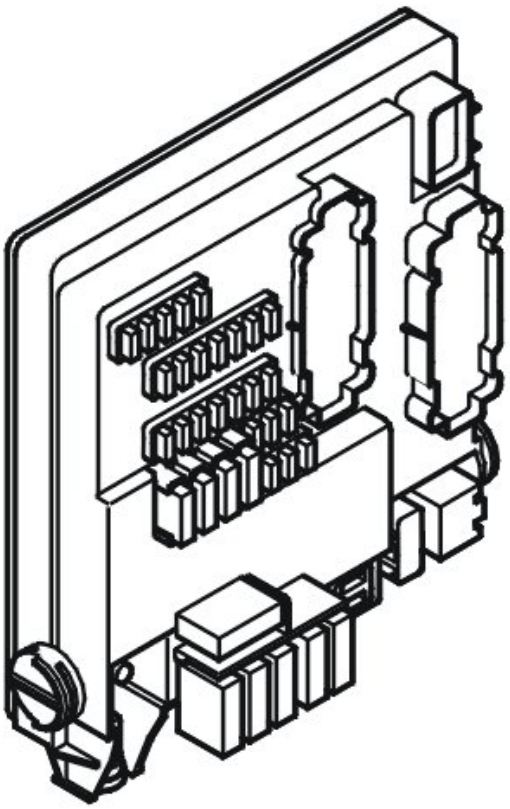
Internal fault

Replacing the component

The rear electronic module (REM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the rear electronic module (REM) if the fault recurs.
Replace the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information

- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

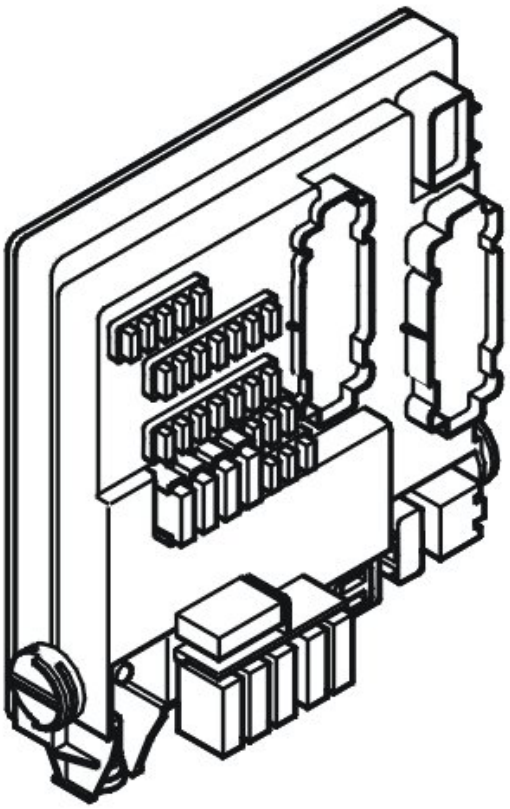
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D01

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work
- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

Internal Fault

Internal fault

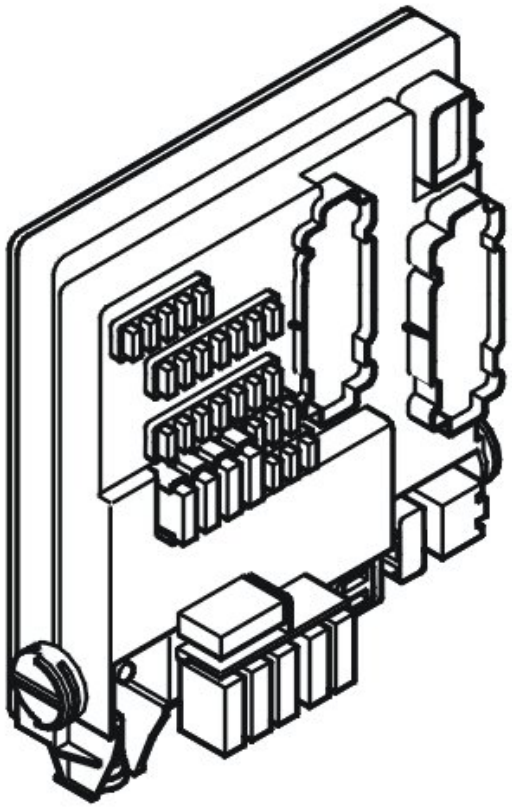
Replacing the component

The rear electronic module (REM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the rear electronic module (REM) if the fault recurs.

Replace the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information

- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

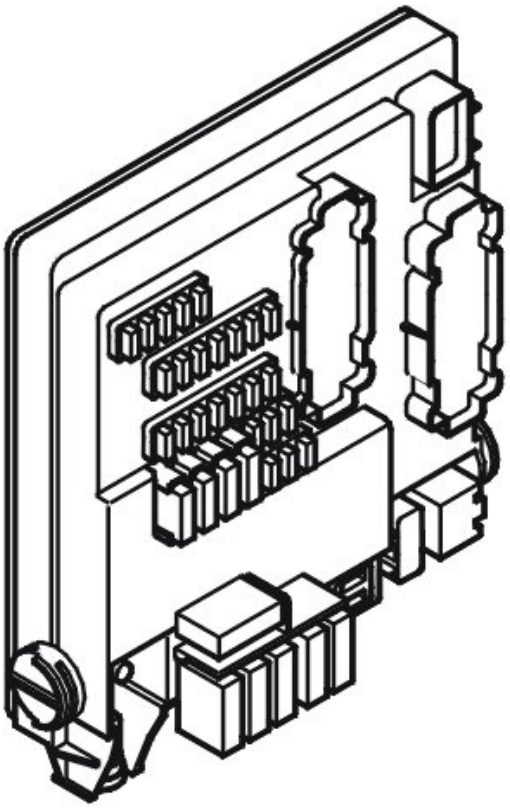
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D02

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work.
- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

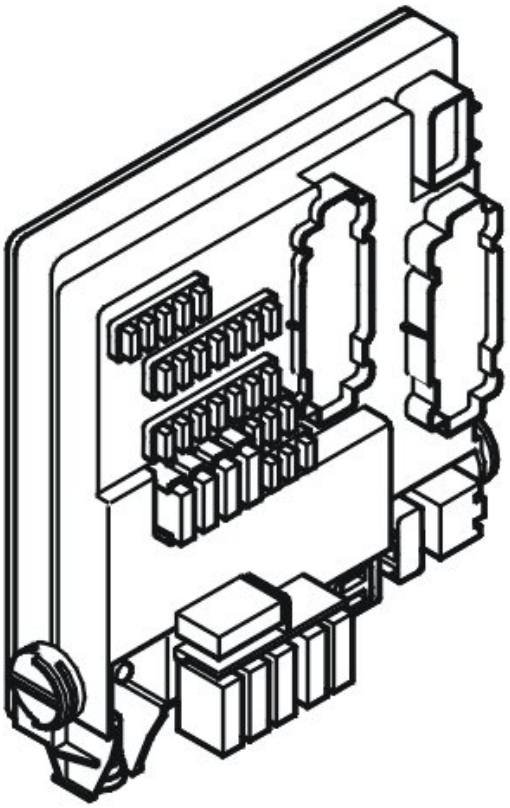
Internal Fault

Internal fault

Replacing the component

The rear electronic module (REM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the rear electronic module (REM) if the fault recurs.
Replace the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

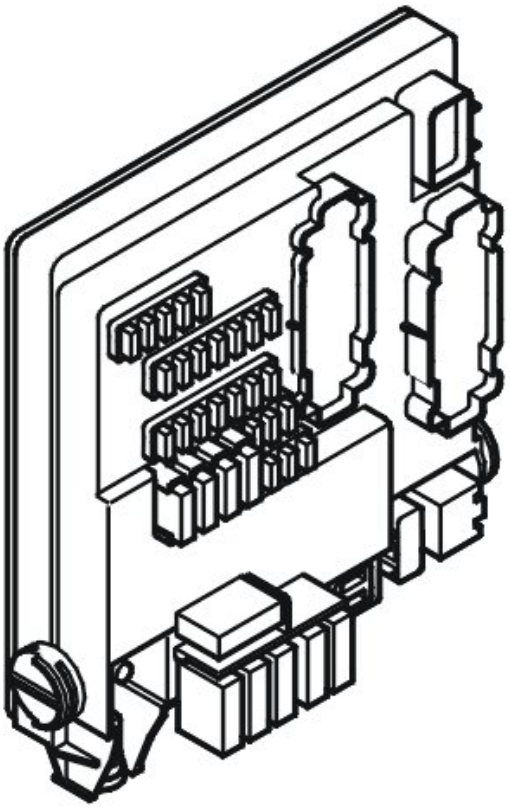
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D03

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the programming is faulty or incomplete.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work
- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

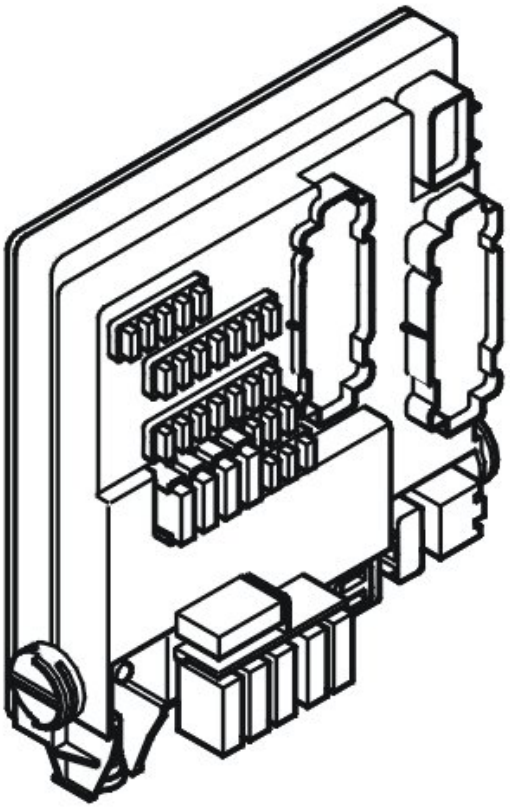
Internal Fault

Internal fault

Replacing software

The rear electronic module (REM) has registered an internal fault in the software.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the software for the rear electronic module (REM) if the fault recurs.
Replace the software for the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

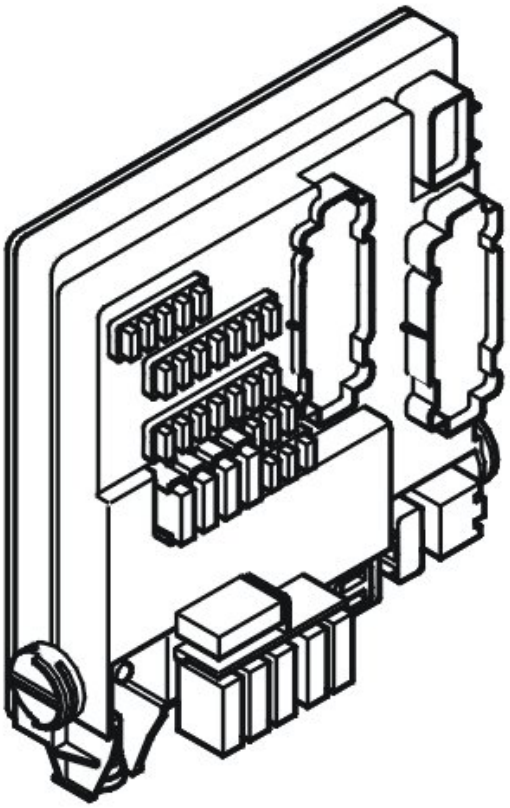
Attempt New Test - Replacing software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D07

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work
- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

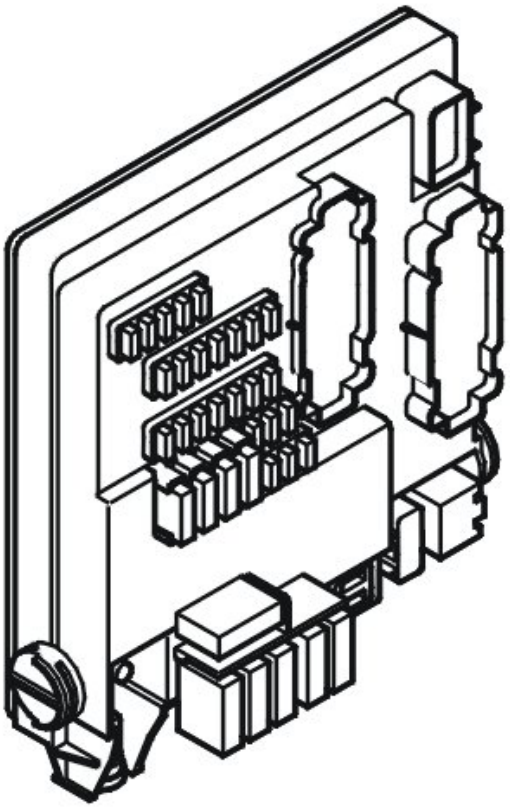
Internal Fault

Internal fault

Replacing the component

The rear electronic module (REM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the rear electronic module (REM) if the fault recurs.
Replace the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

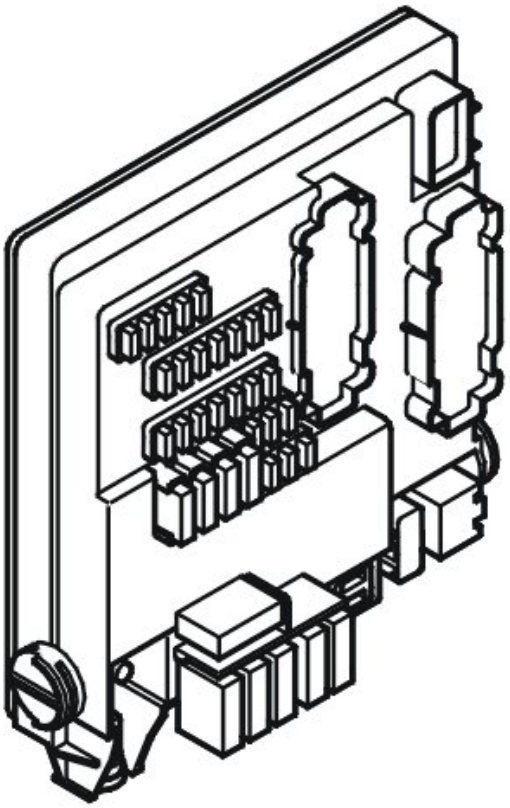
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-1D08

Condition



The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- The fuel gauge does not work
- No locking/unlocking of the tailgate
- Does not lock / unlock the fuel tank filler cap.

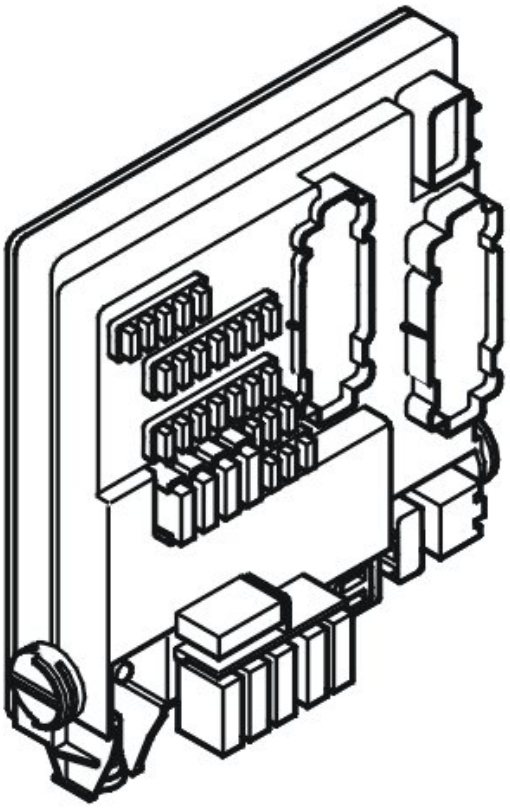
Internal Fault

Internal fault

Replacing the component

The rear electronic module (REM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the rear electronic module (REM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the rear electronic module (REM) if the fault recurs.
Replace the rear electronic module (REM) in the event of a permanent fault.
Remedy as necessary.

Other information
- Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A40

Condition

The rear electronic module (REM) checks the signal from the gas temperature sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too high.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value

- The fuel level is set to zero.

Possible source

- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable.

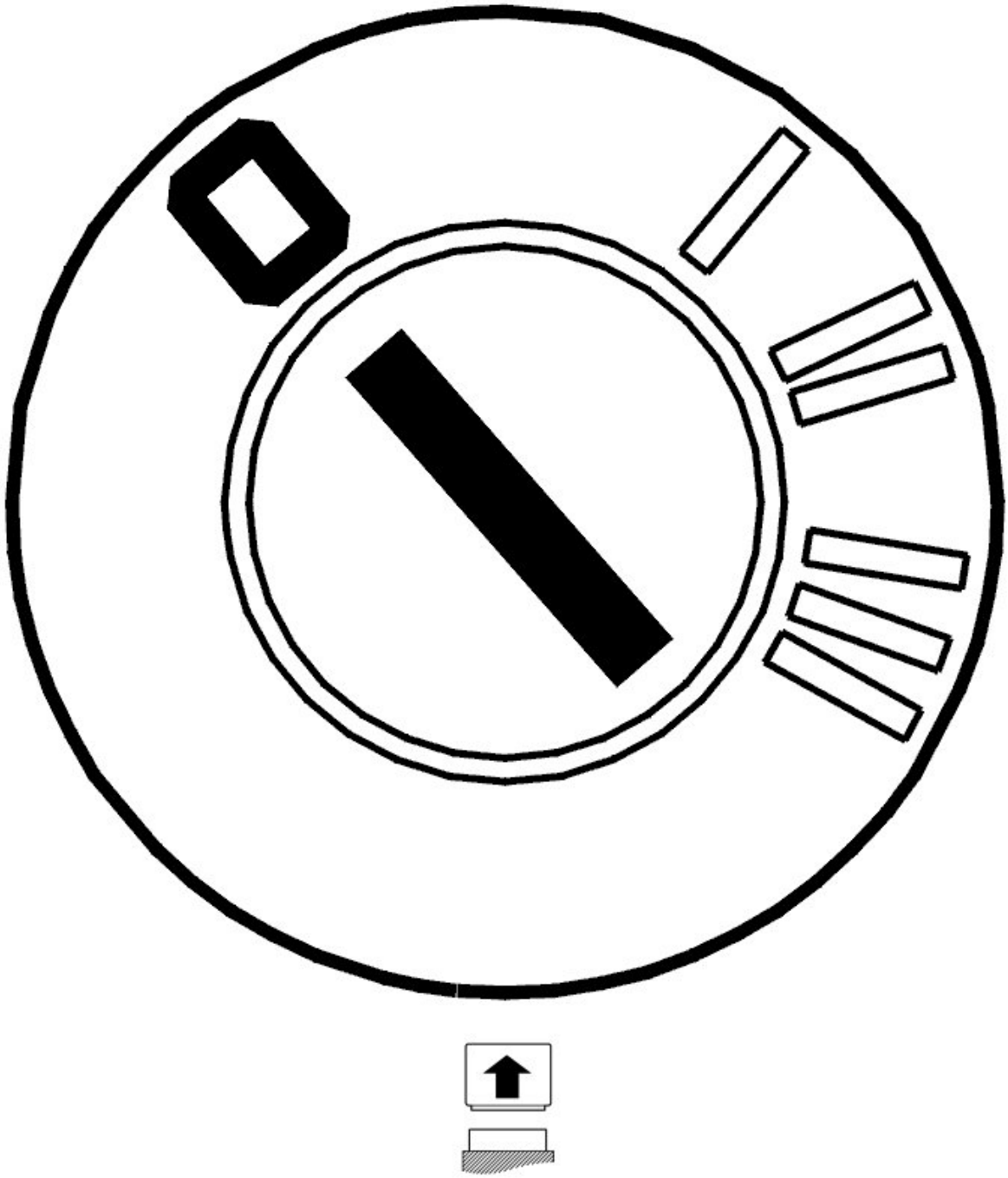
Fault symptom[s]

- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #D27 (#27) and gas temperature sensor terminal #3
- Rear electronic module (REM) terminal #D8 (#8) and gas temperature sensor terminal #4.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

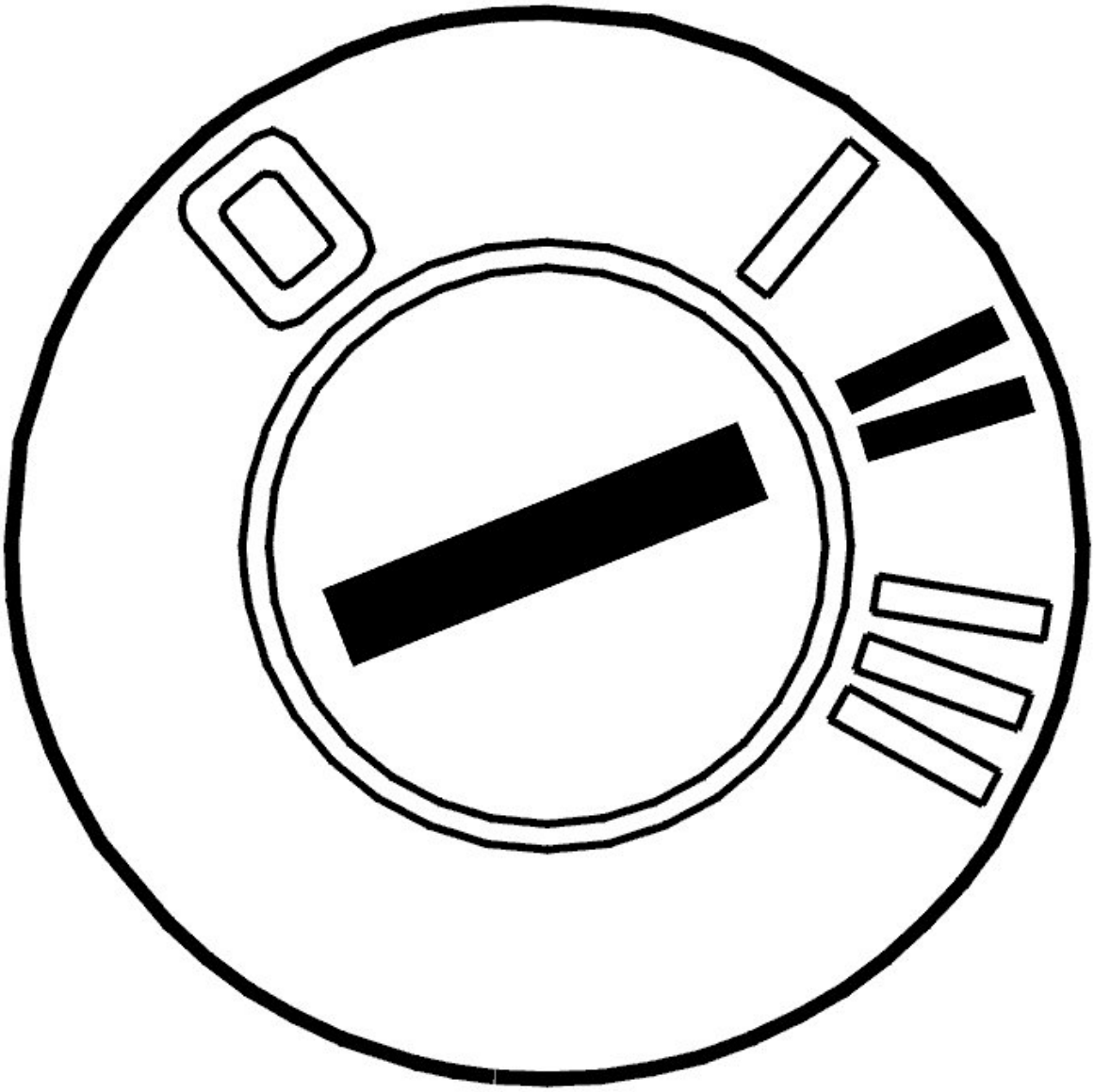
Continue - Verification

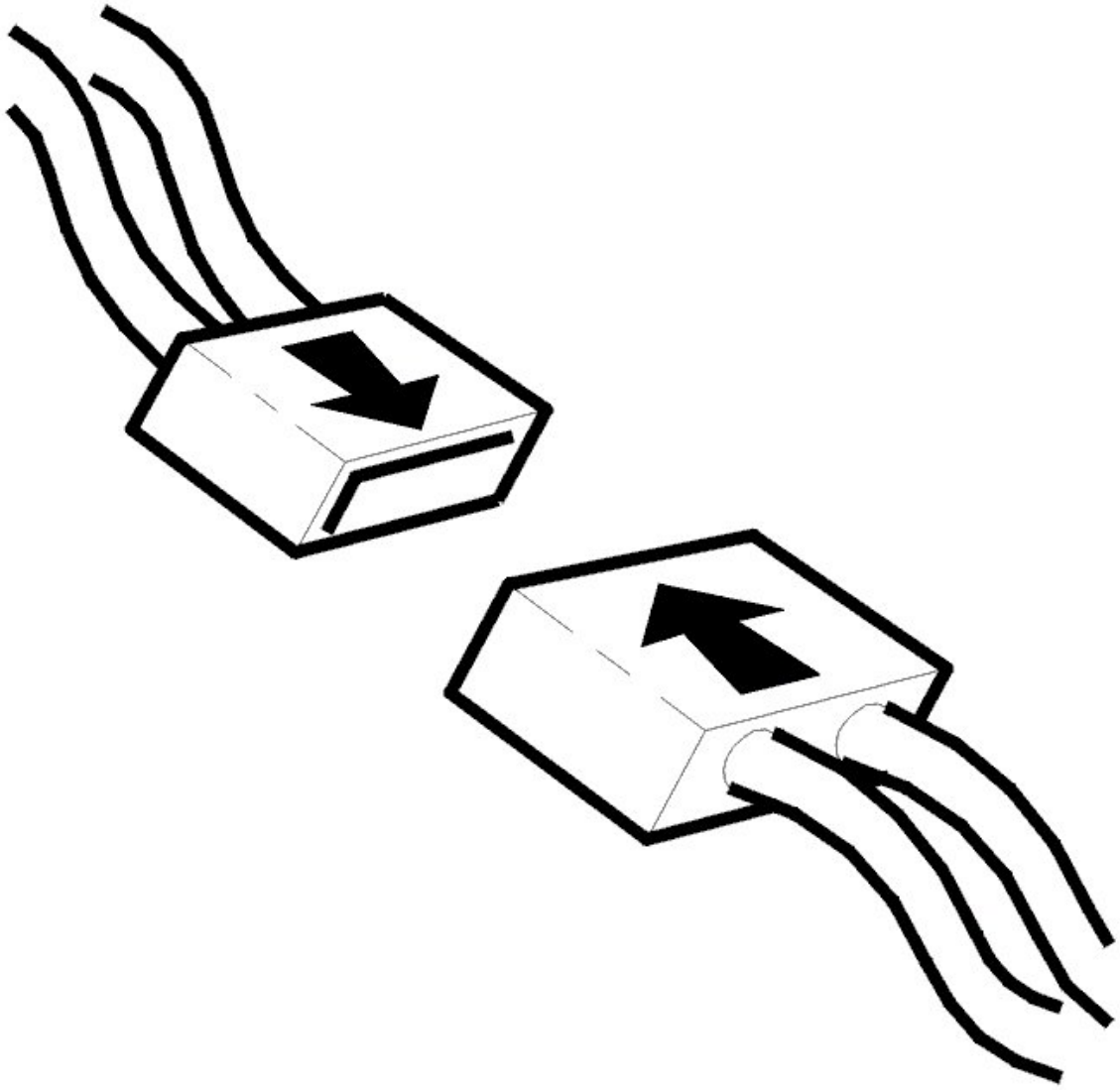
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A41

Condition

The rear electronic module (REM) checks the signal from the gas temperature sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

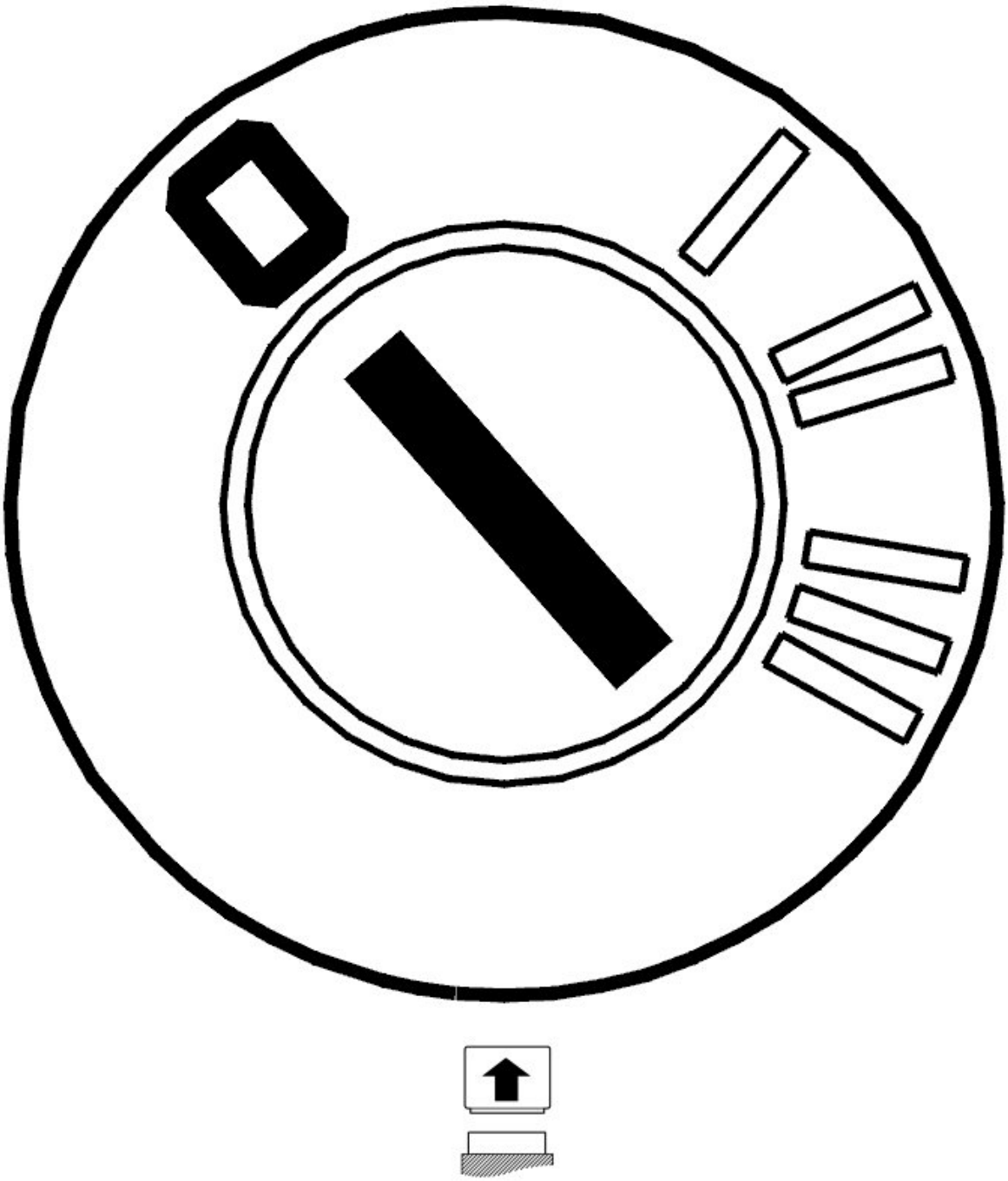
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in the signal cable.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #D27 (#27) and gas temperature sensor terminal #3.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

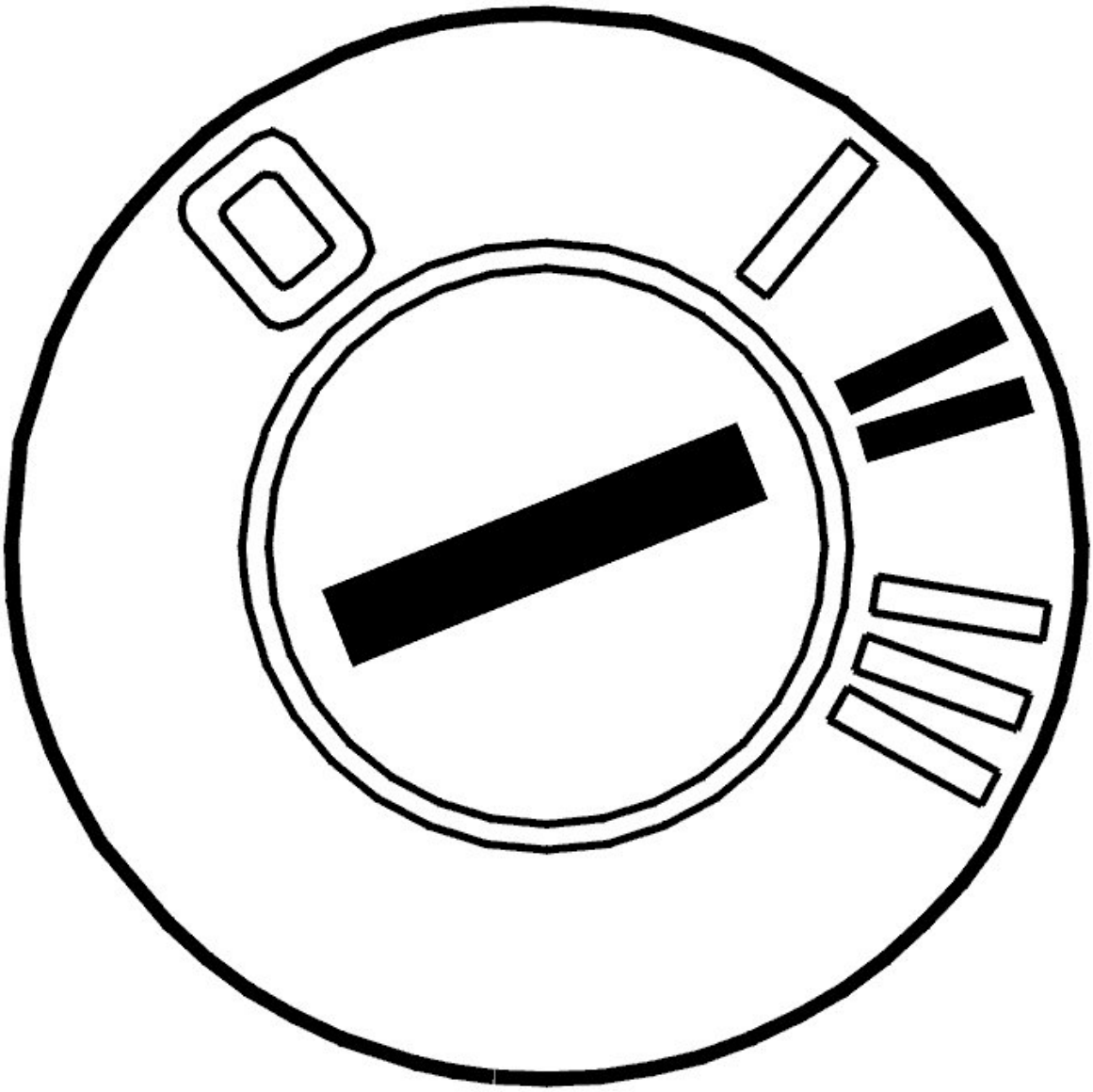
Continue - Verification

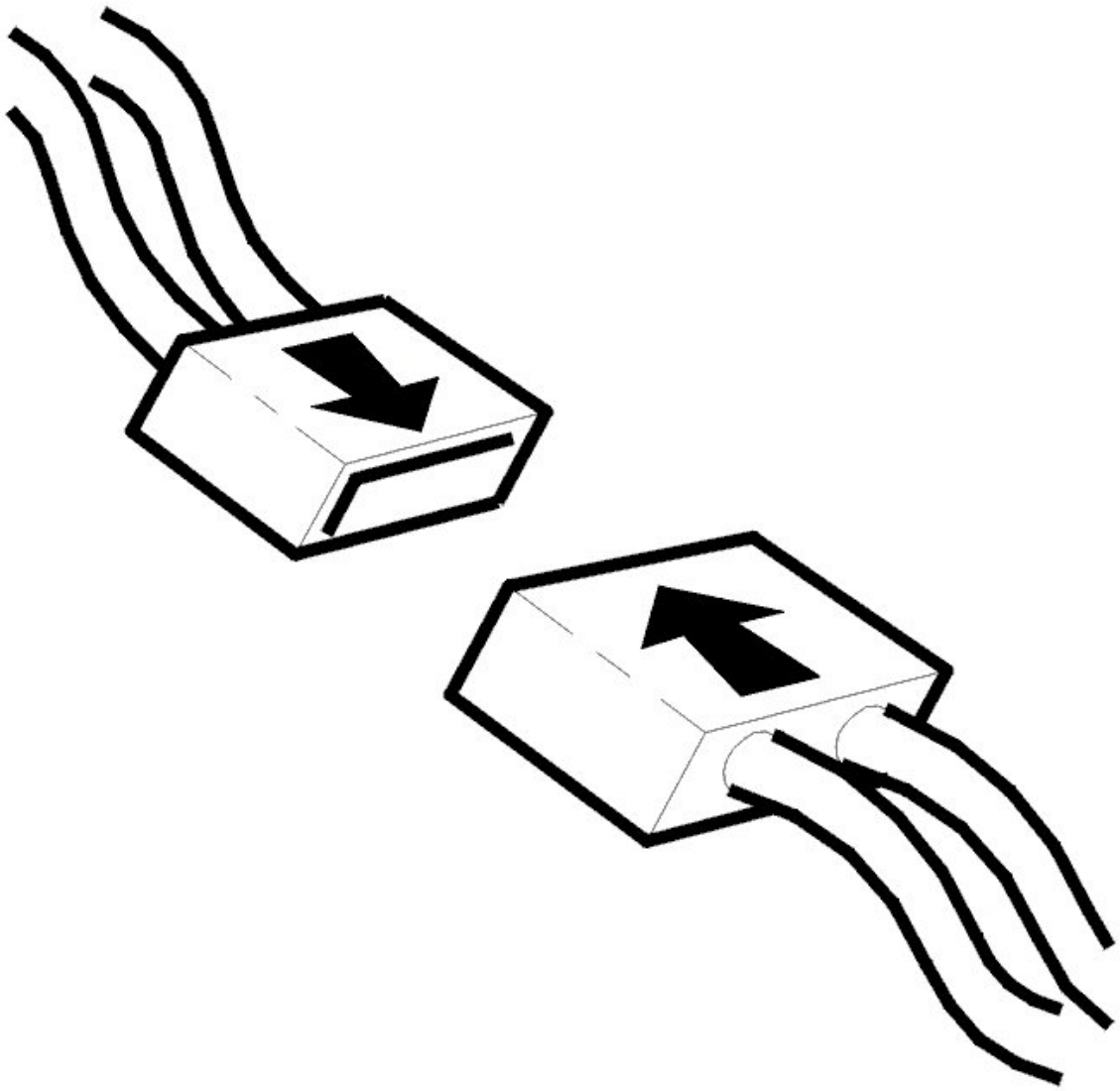
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A42

Condition

The rear electronic module (REM) checks the signal from the gas pressure sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too high.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

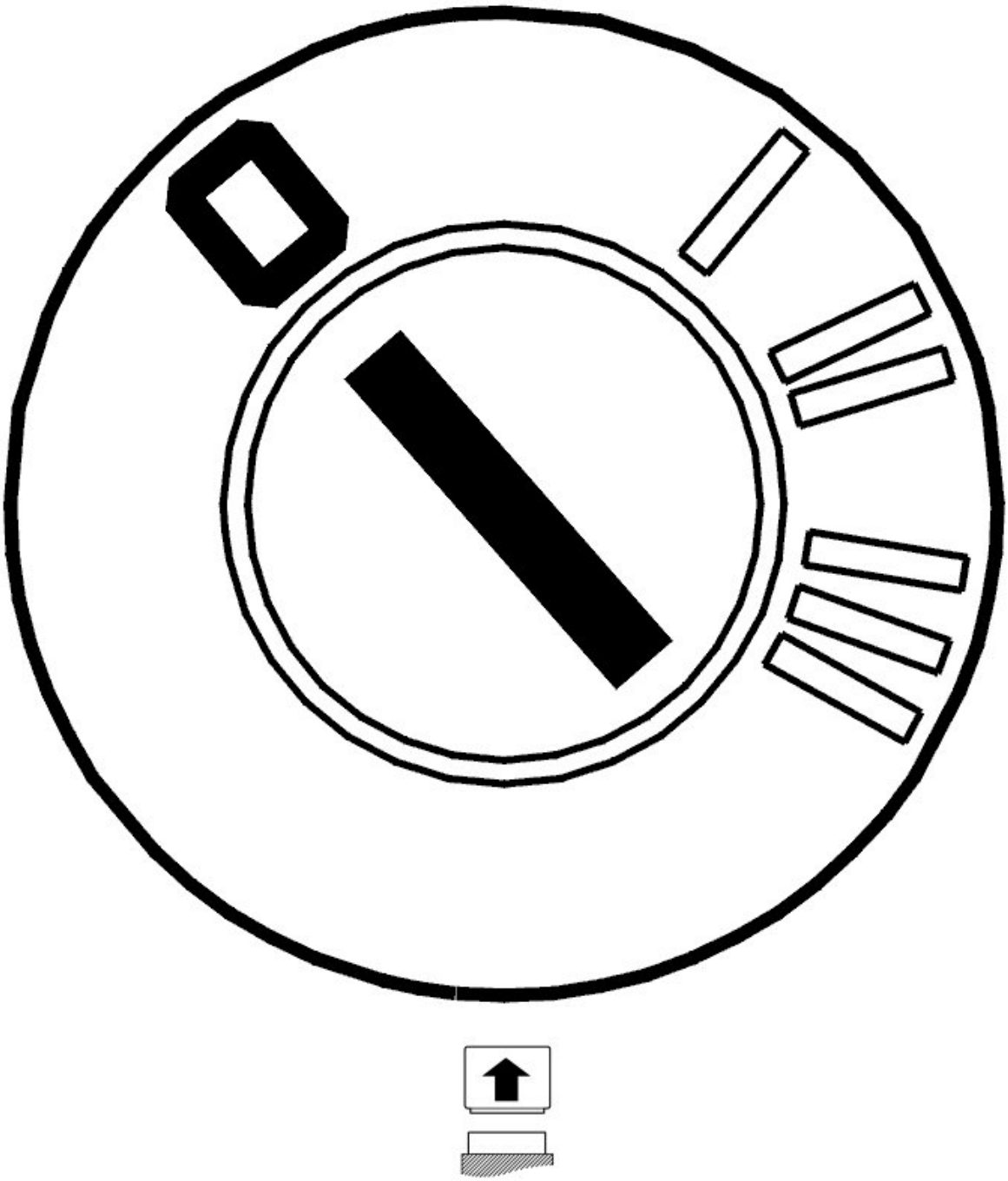
Possible source
- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the power supply cable. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #D15 (#15) and gas pressure sensor #2.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

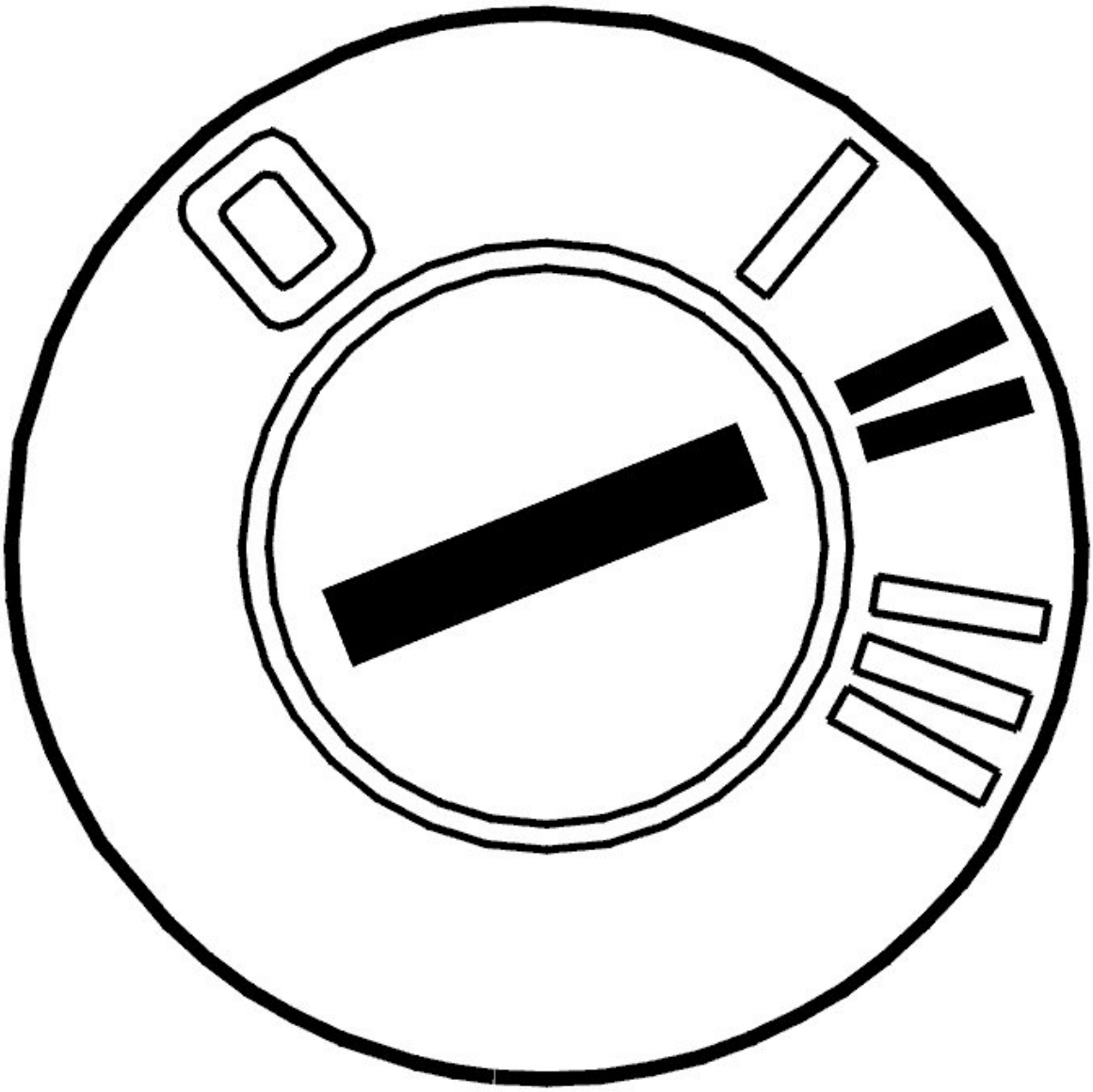
Continue - Verification

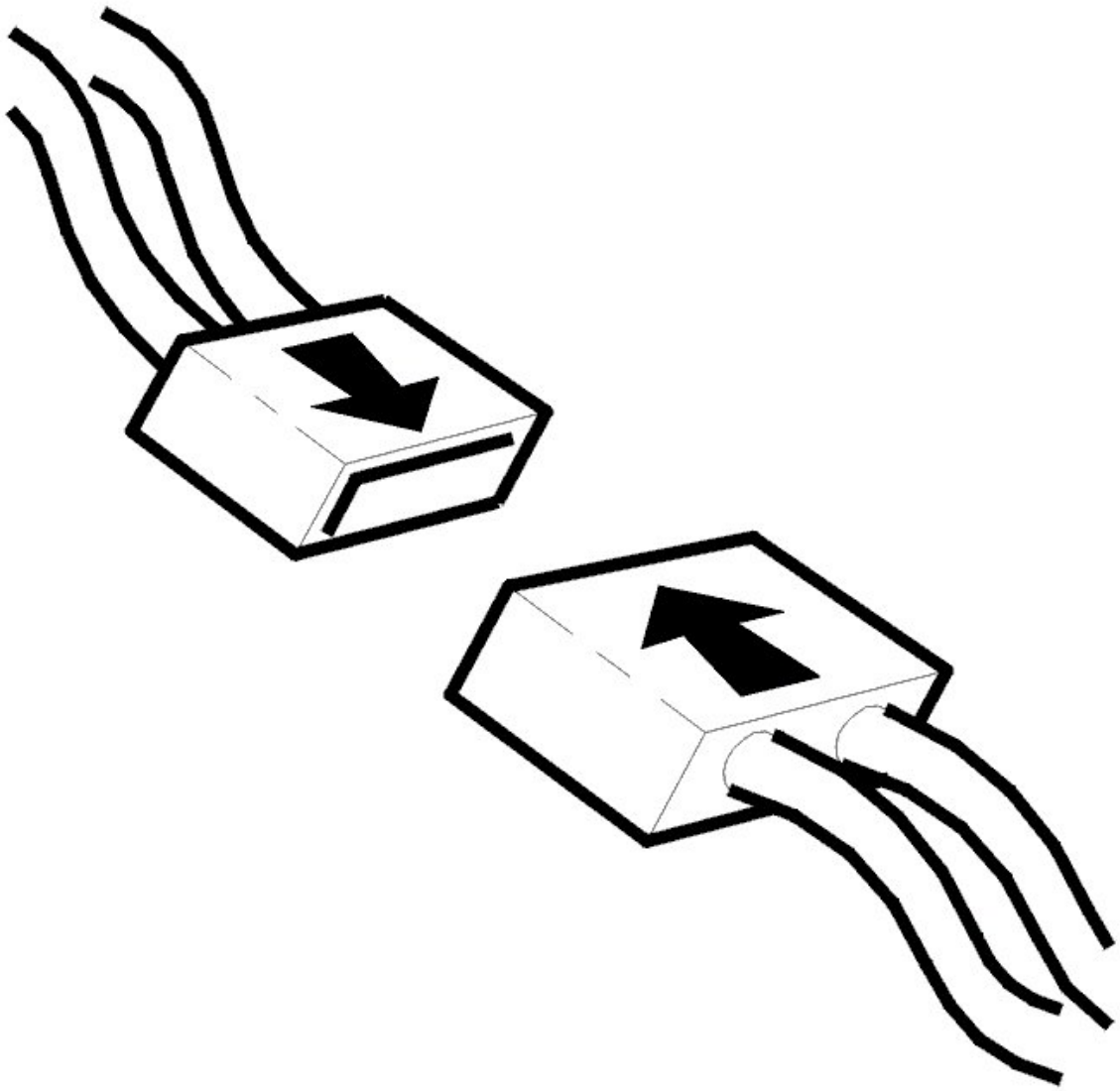
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A43

Condition

The rear electronic module (REM) checks the signal from the gas pressure sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

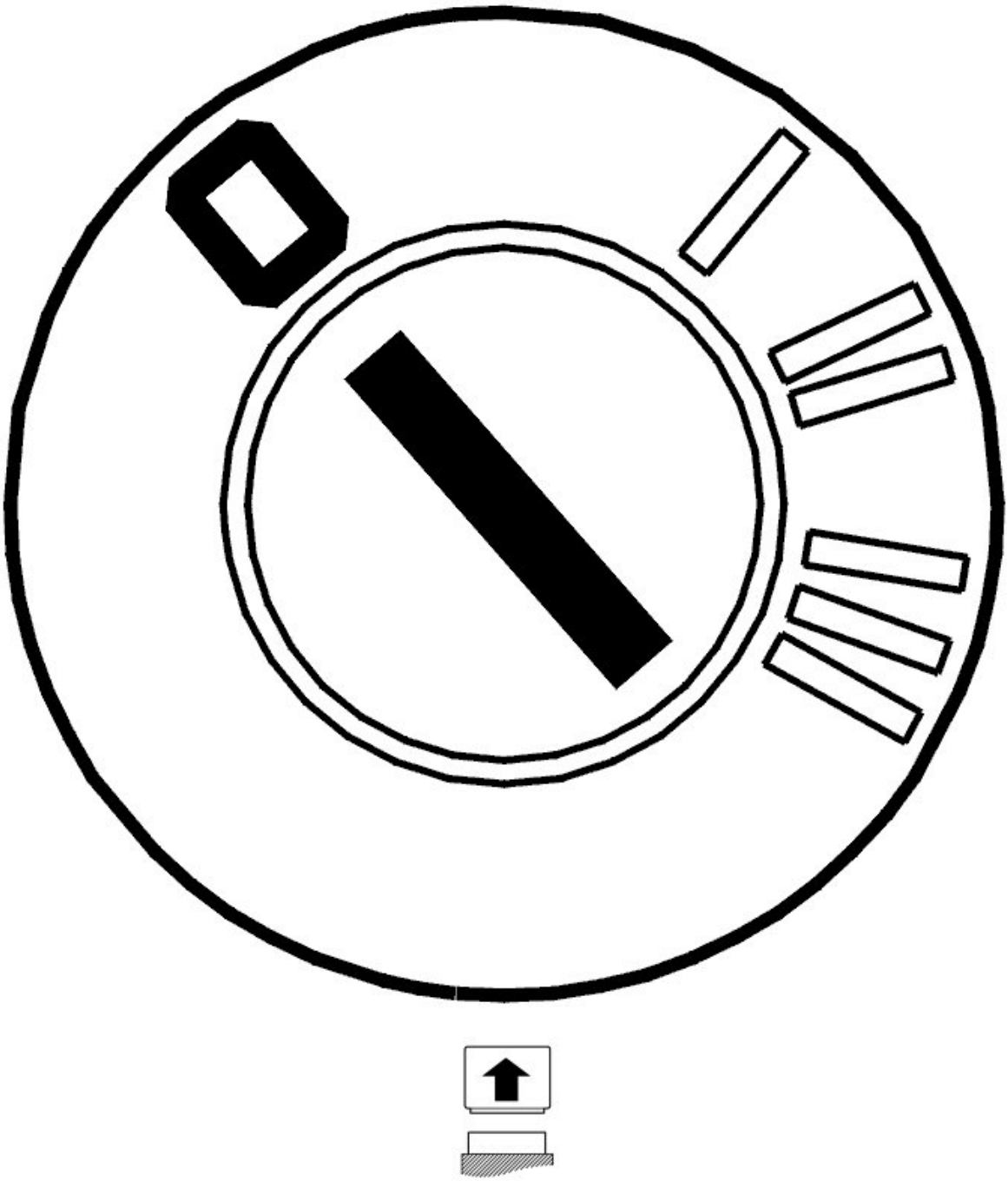
Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in signal cable to the sensor.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #D15 (#15) and gas pressure sensor #2.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

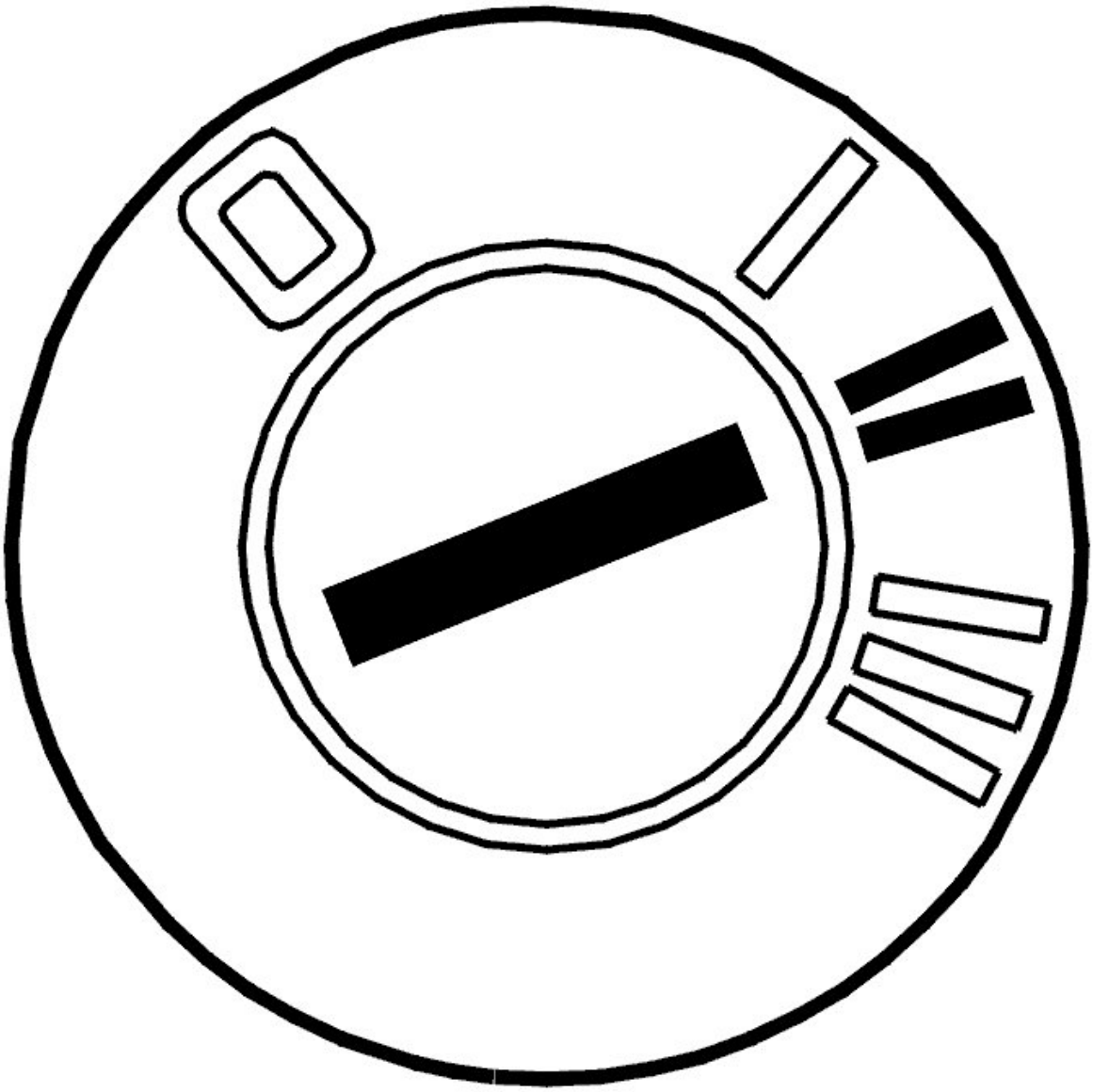
Continue - Verification

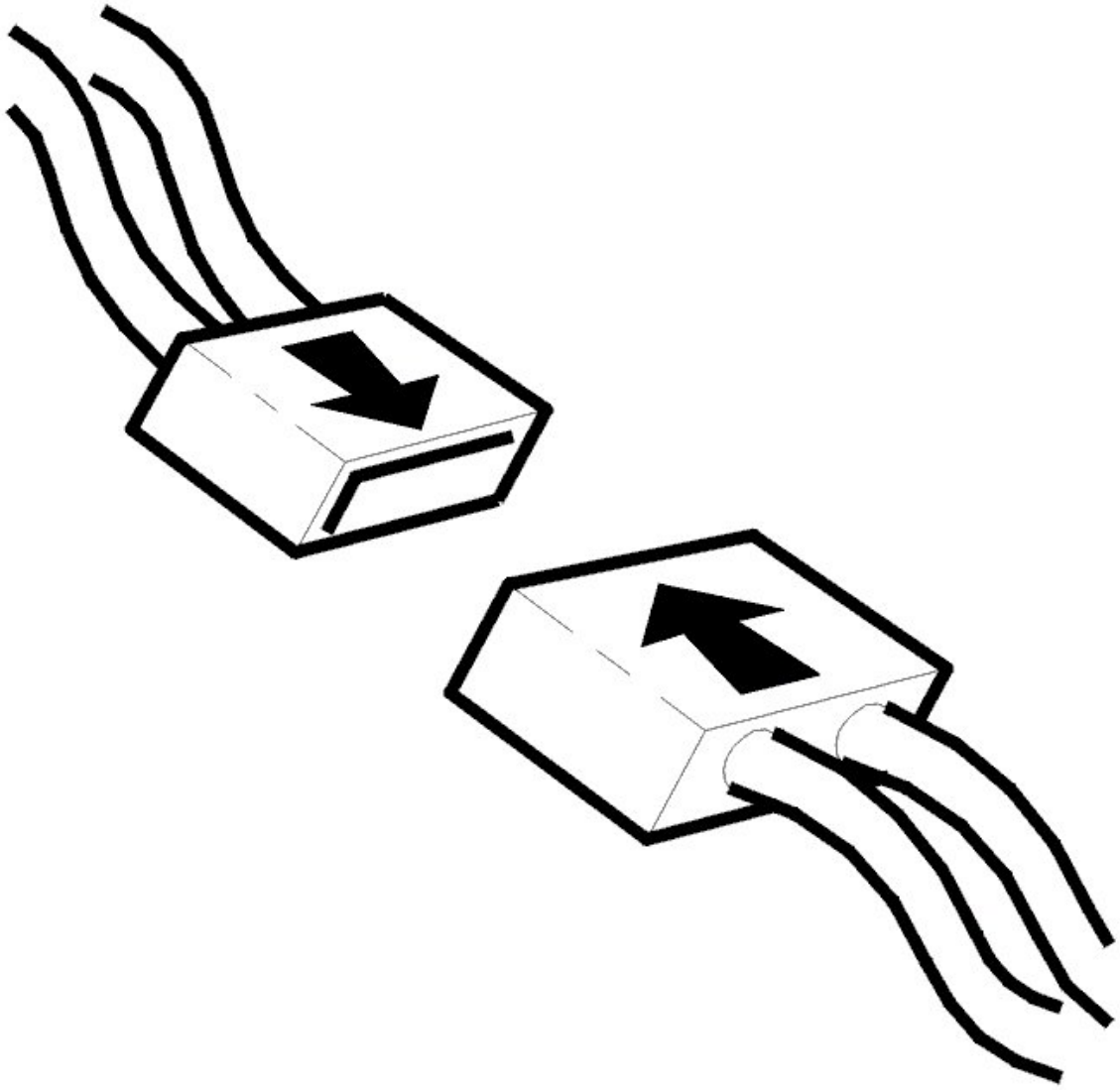
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill with gas. Check the gas lines and terminals for leakage. Check that the gas fuel gauge displays a reasonable value.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

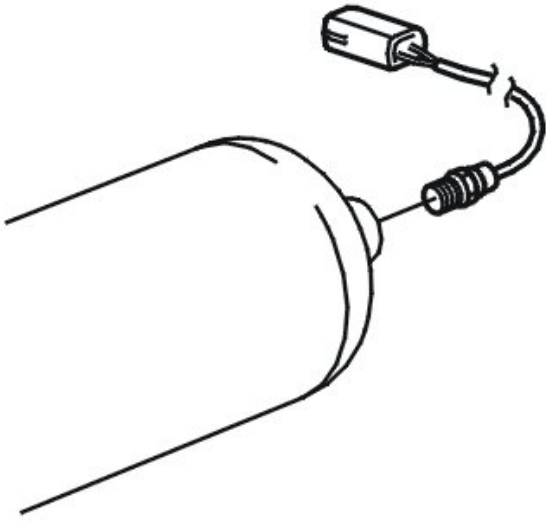
FAULT-TRACING FAILED - FAULT-TRACING FAILED

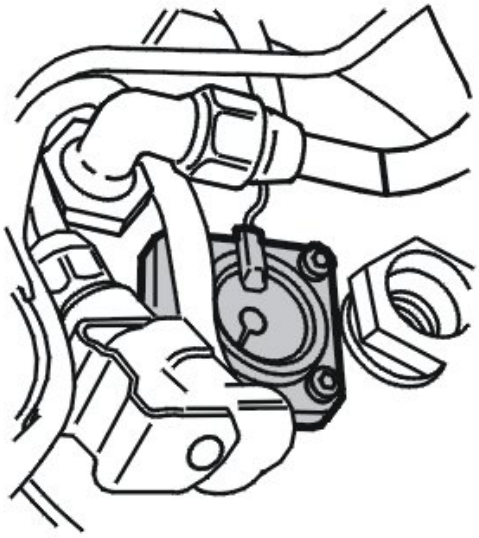
Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A44

Condition





The rear electronic module (REM) checks the signal from the fuel level sensor for gas.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the level has not changed in 100 km.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

Possible source
- Faulty sensor.

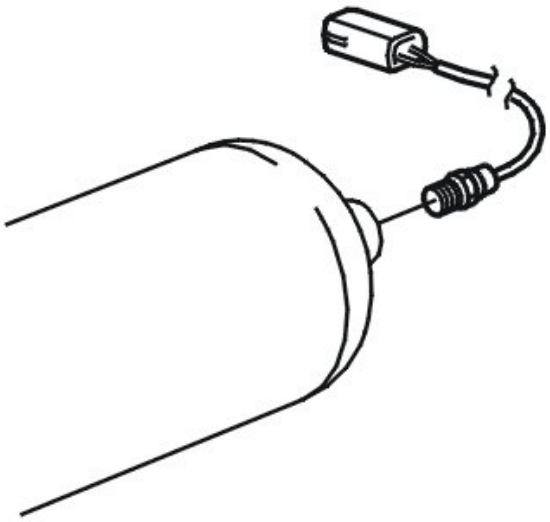
Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

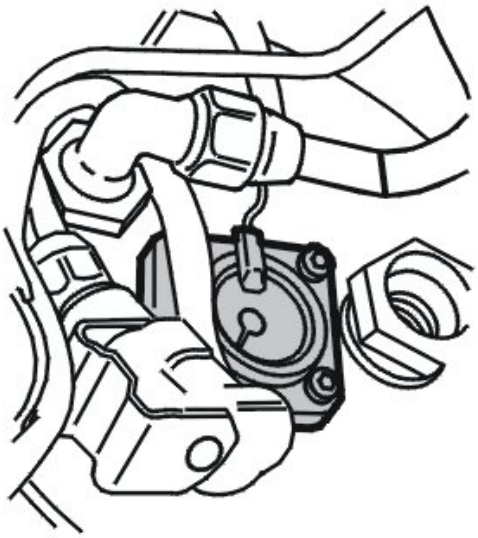
Faulty Signal

Faulty signal

Checking the status

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be due to interference at start up of the control module or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Replace the fuel level sensor if the fault is permanent.



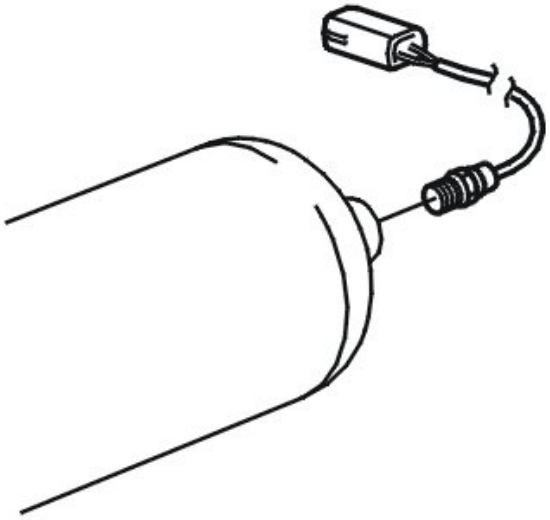


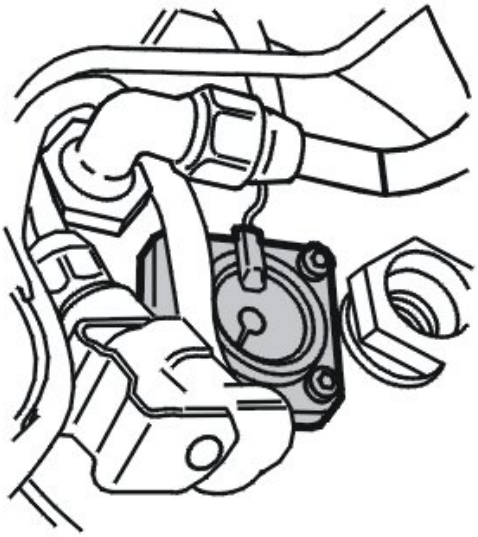
Continue - Replacing the component

Replacing the component

Replace the fuel level sensor.

Other information:





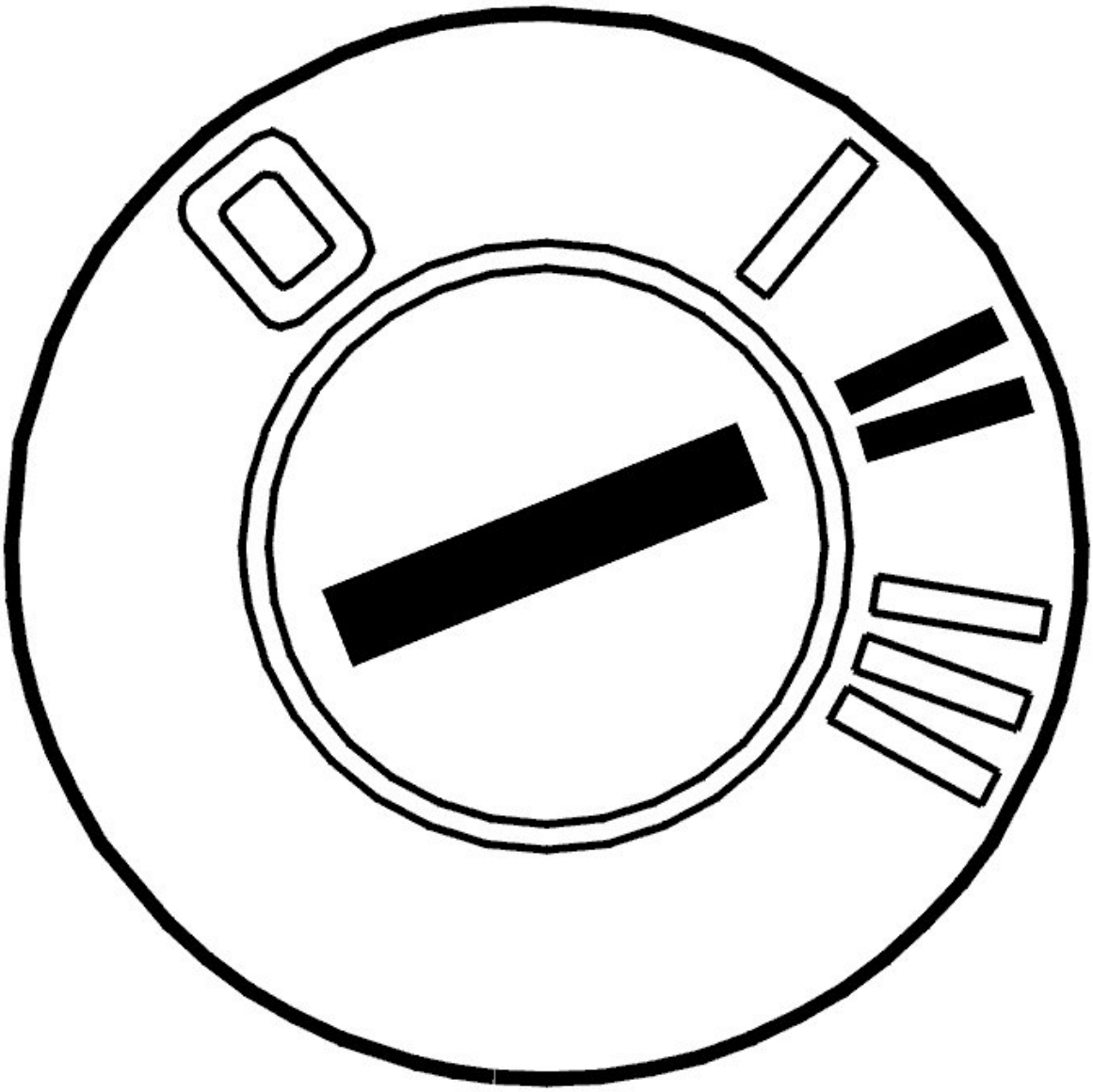
Continue - Verification

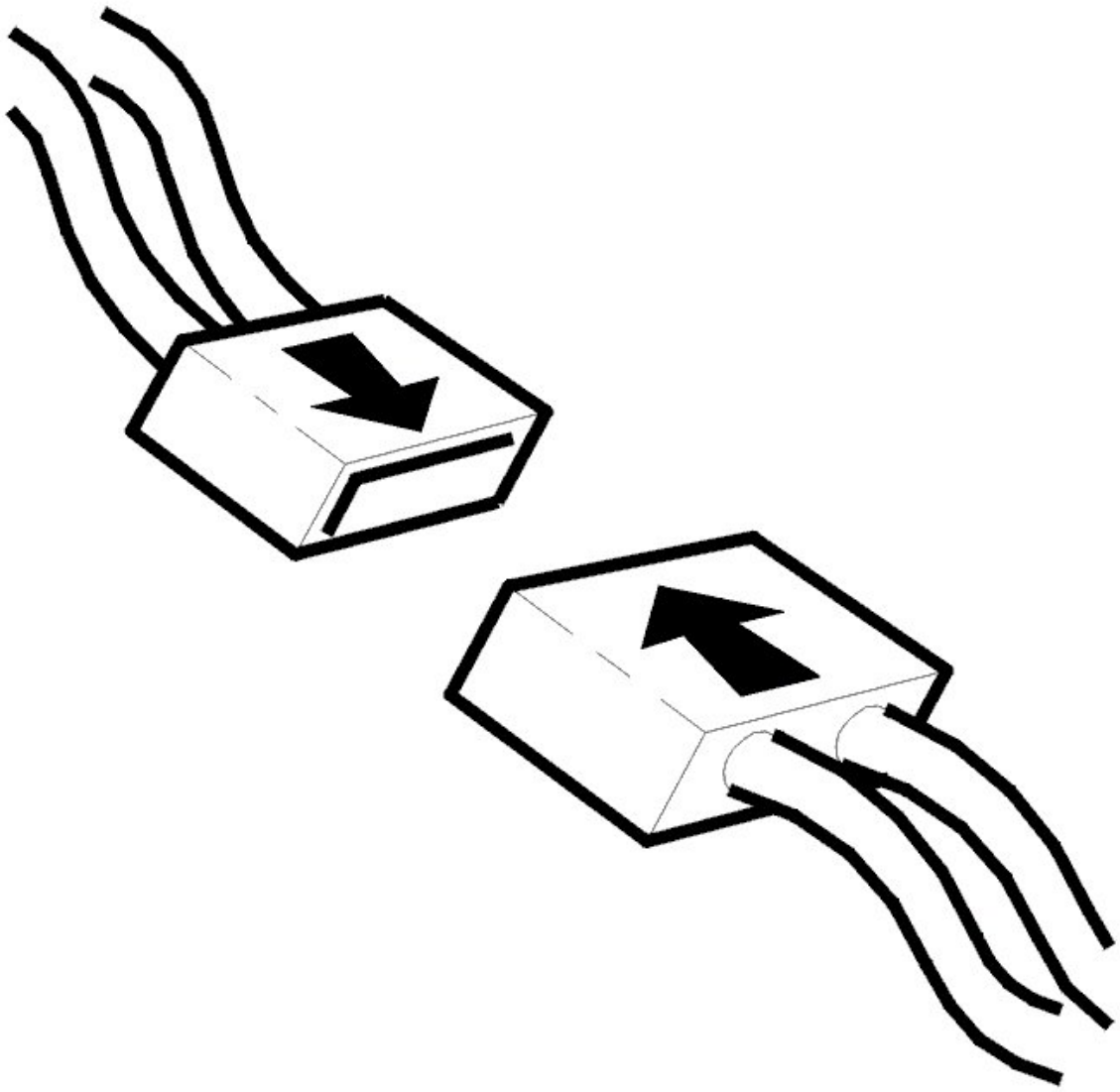
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

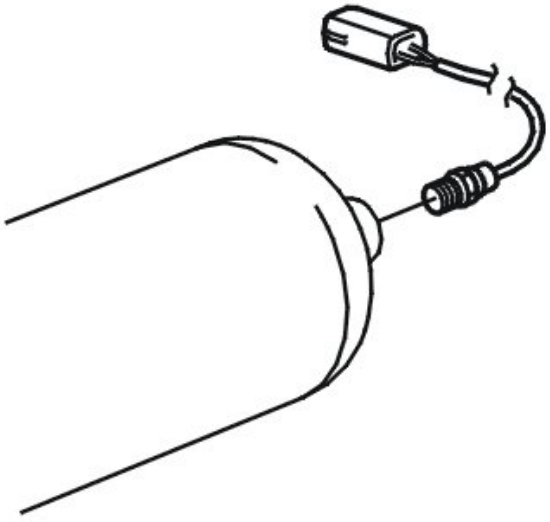
FAULT-TRACING FAILED - FAULT-TRACING FAILED

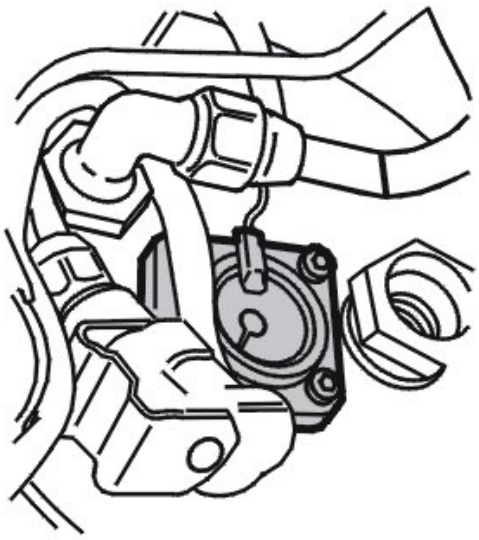
Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A45

Condition





The rear electronic module (REM) checks the signal from the fuel level sensor for gas.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too high.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

Possible source
- Short-circuit to supply voltage in the signal cable
- Open-circuit in signal cable to the sensor.

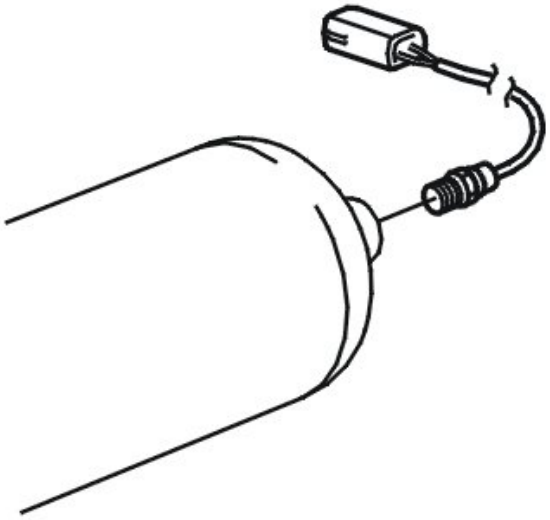
Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

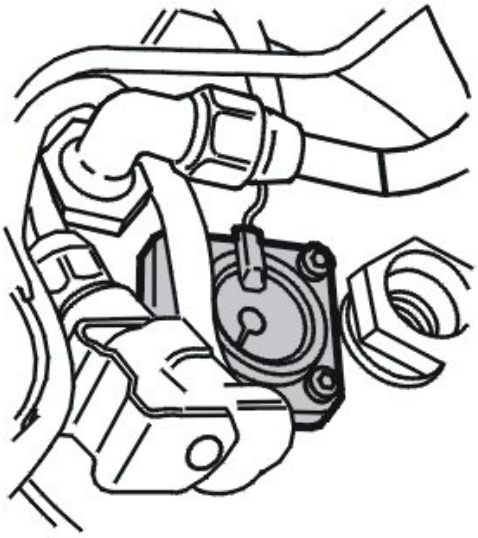
Faulty Signal

Faulty signal

Checking the status

If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults may be due to interference at start up of the control module or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs.
Replace the fuel level sensor if the fault is permanent.



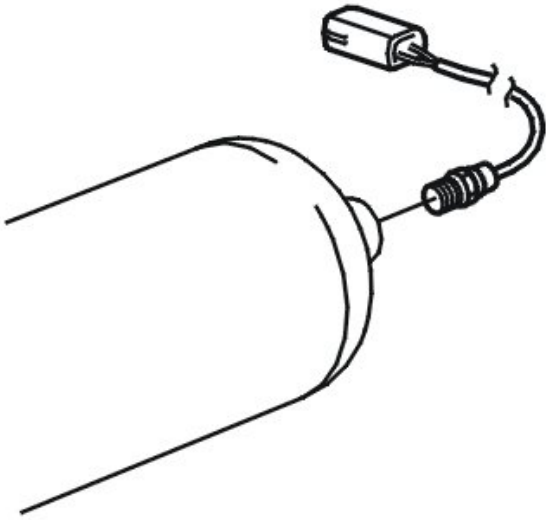


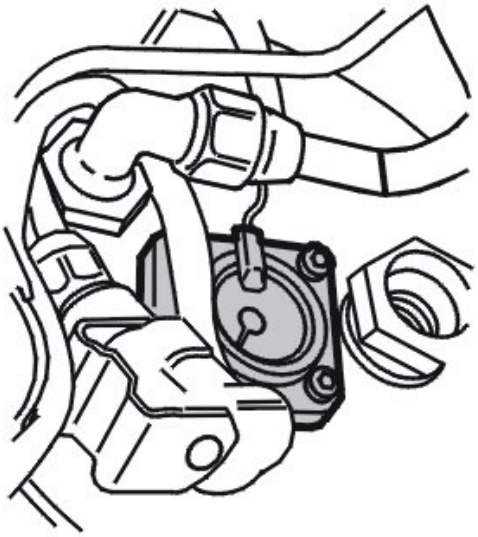
Continue - Replacing the component

Replacing the component

Replace the fuel level sensor.

Other information:





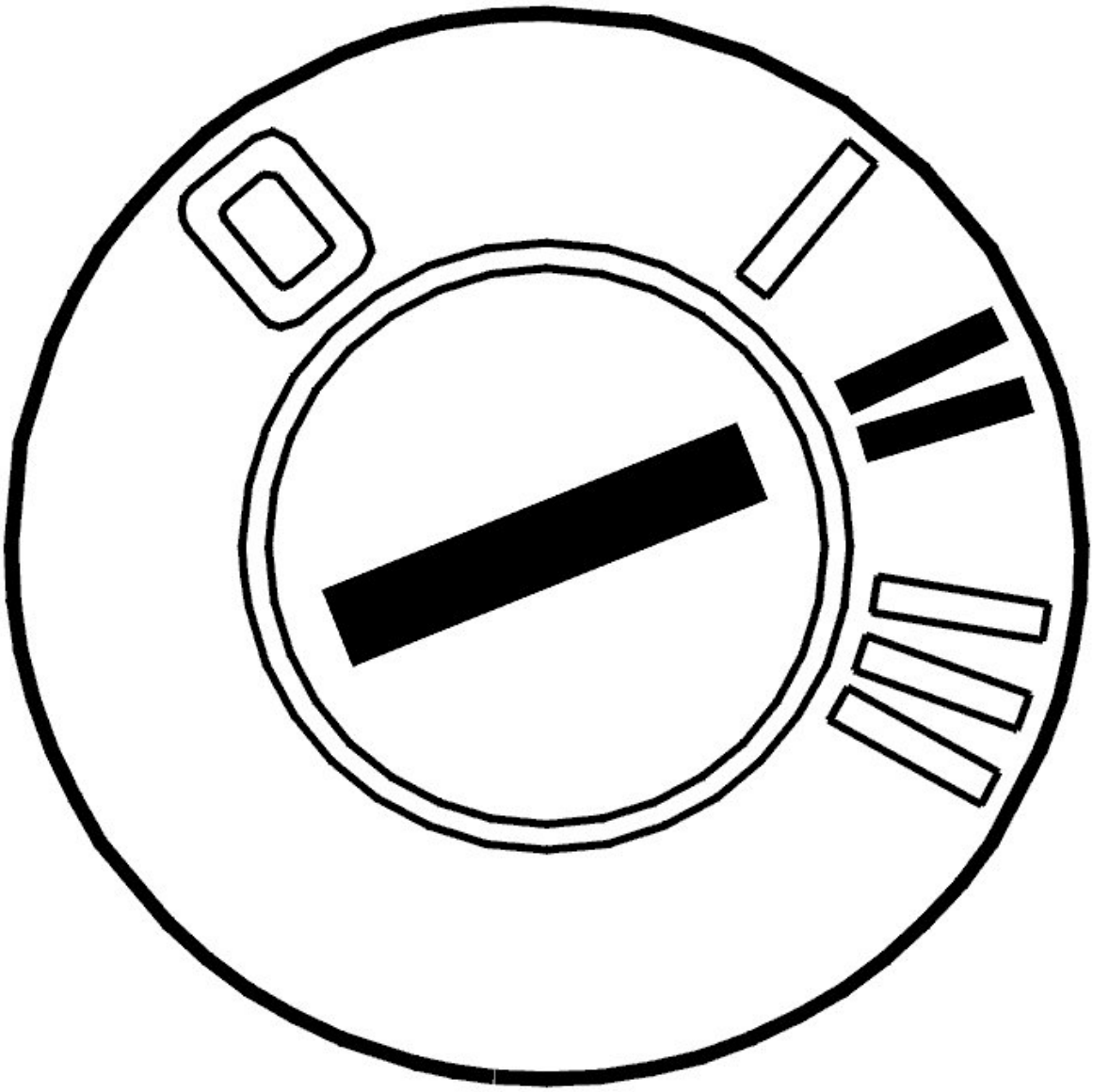
Continue - Verification

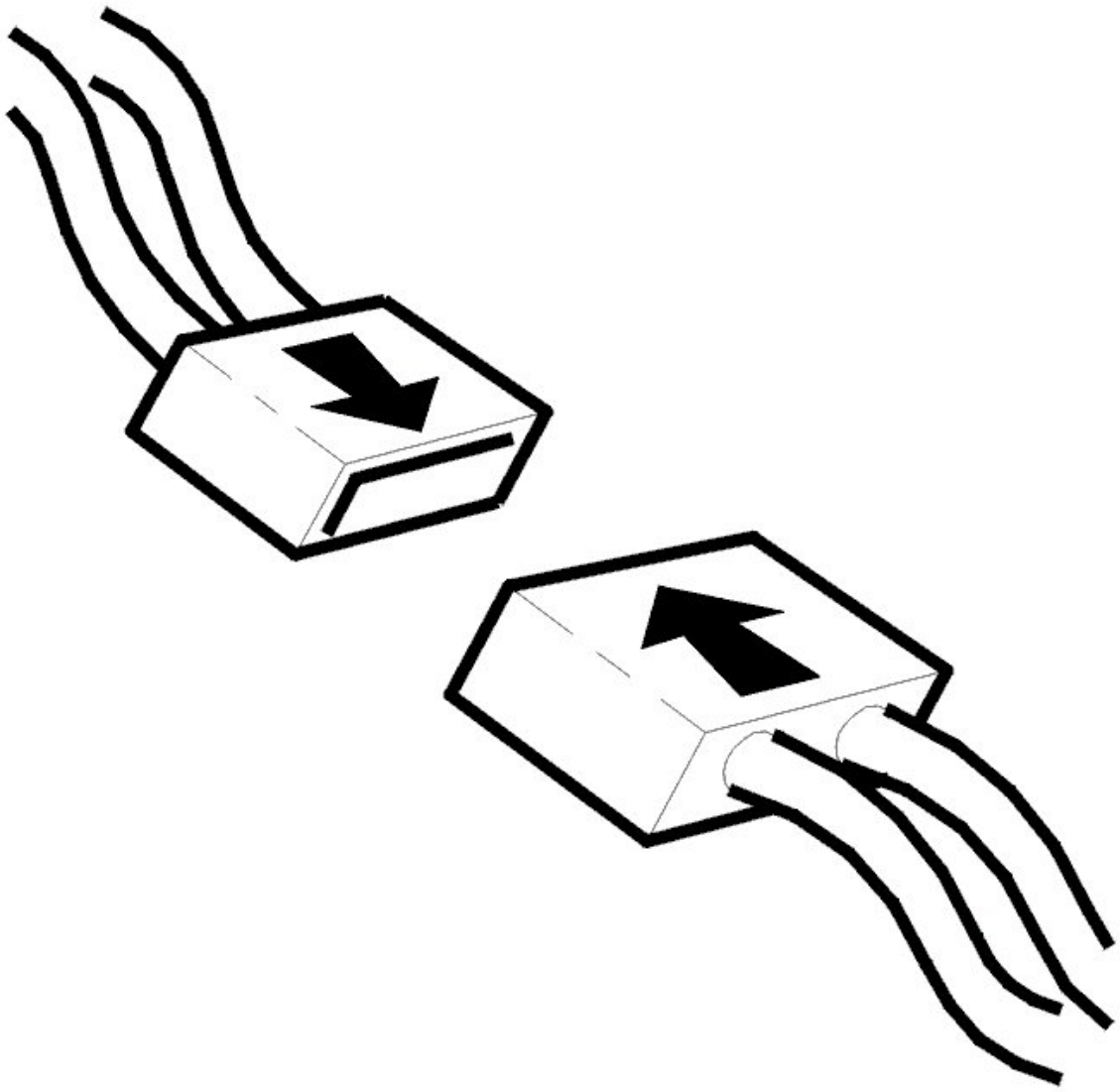
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

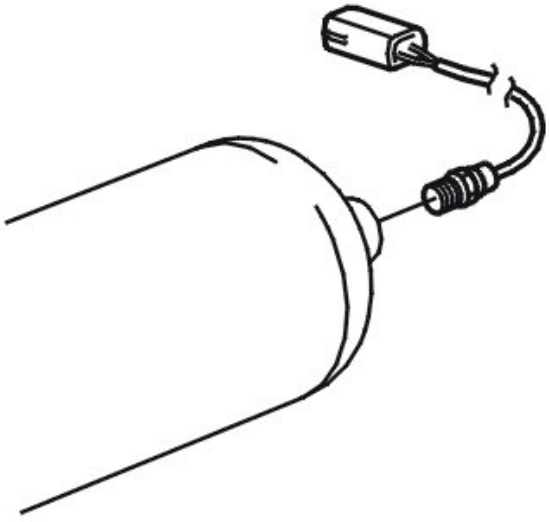
FAULT-TRACING FAILED - FAULT-TRACING FAILED

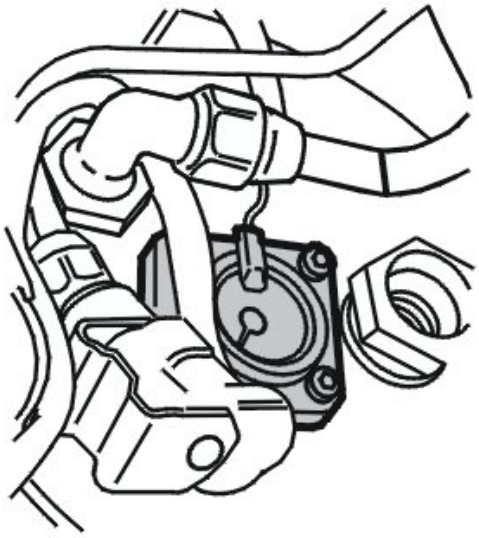
Attempt New Test - Checking the status

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A46

Condition





The rear electronic module (REM) checks the signal from the fuel level sensor for gas.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

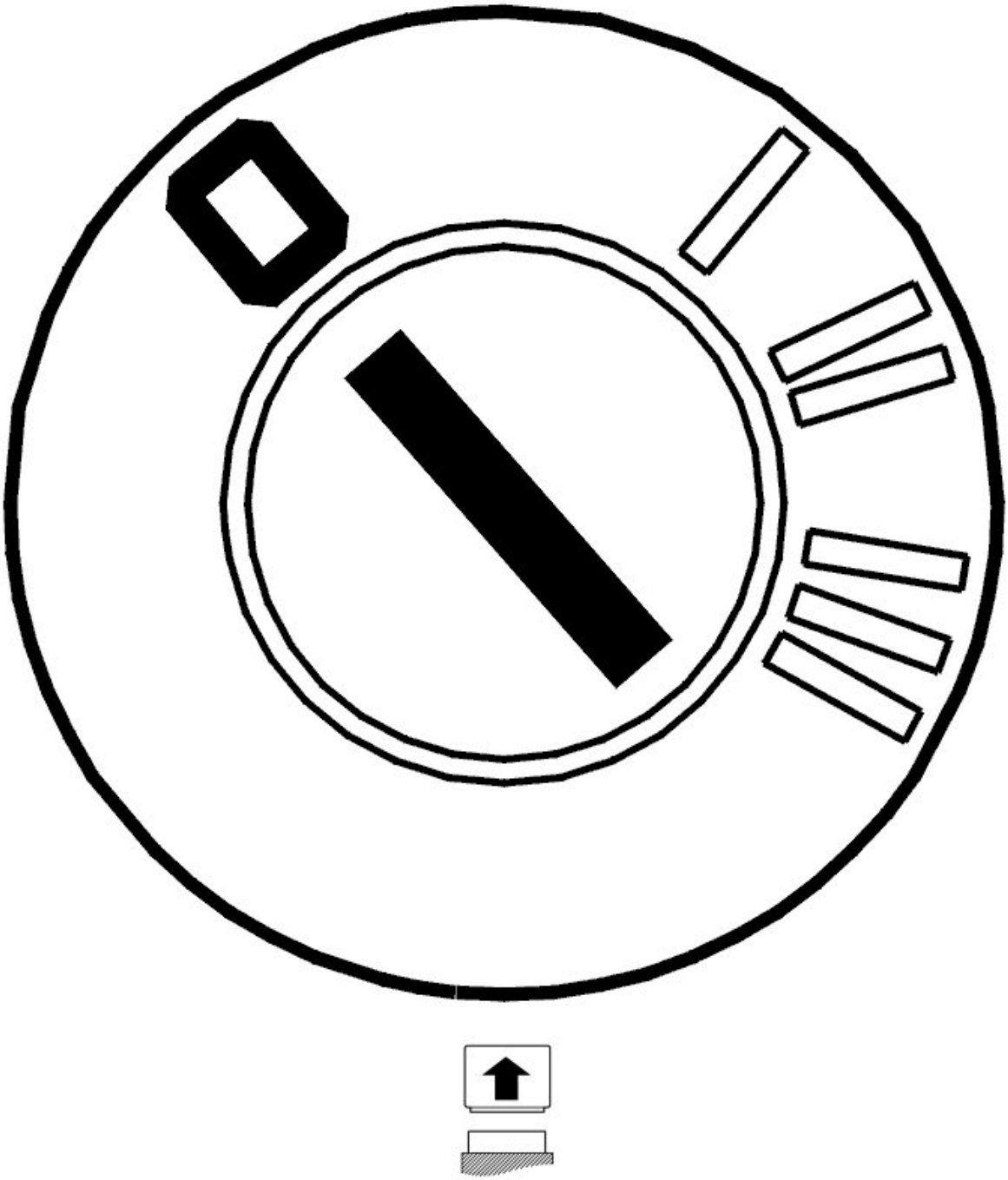
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

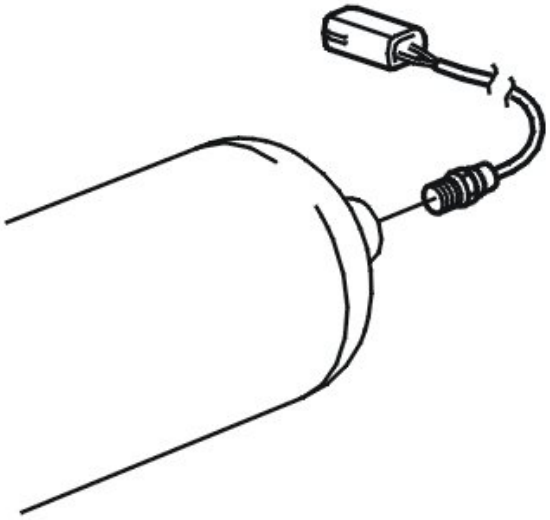
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.

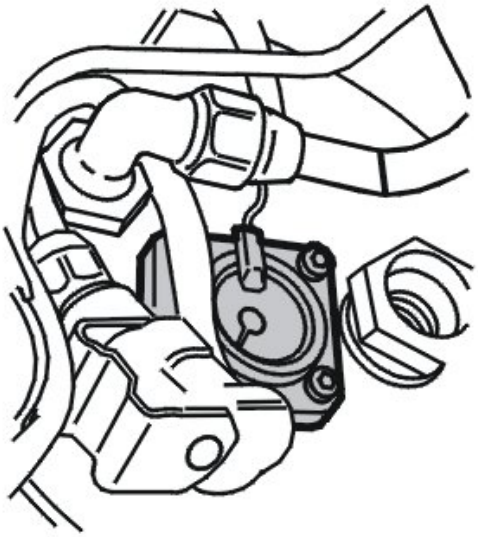
Take readings between:

- Rear electronic module (REM) terminal #D36 (#36) and gas level sensor terminal #1.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





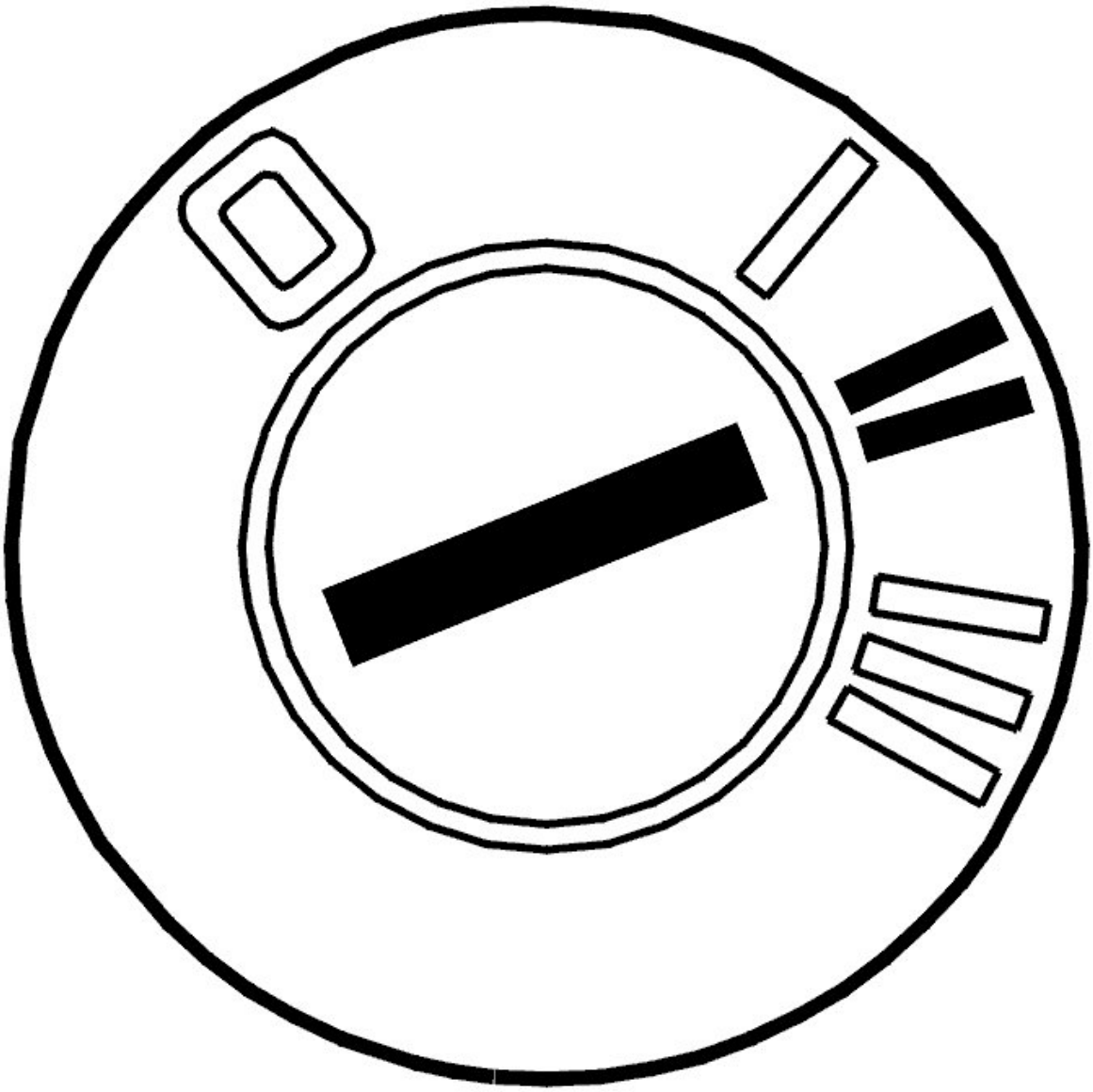
Continue - Verification

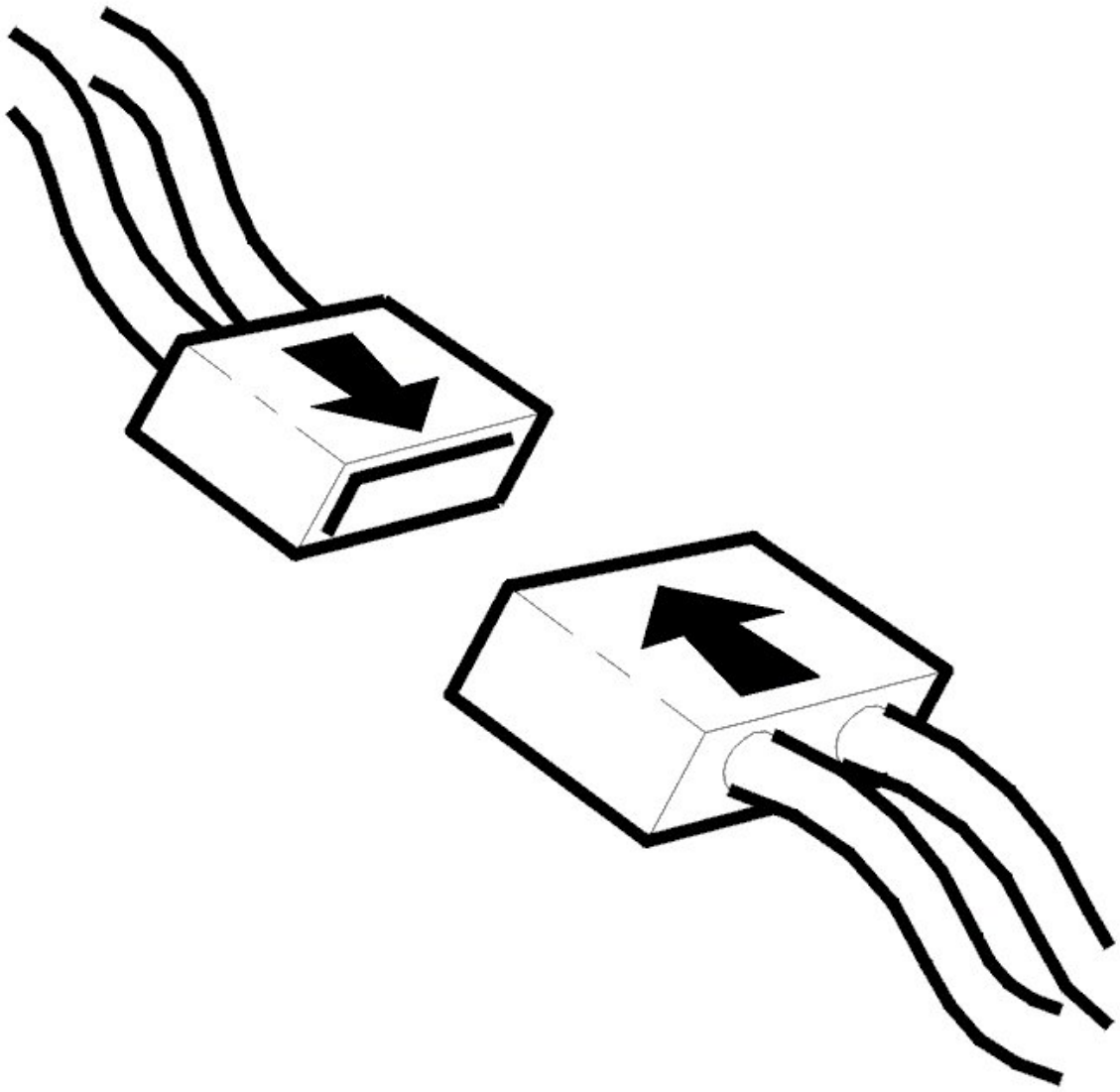
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

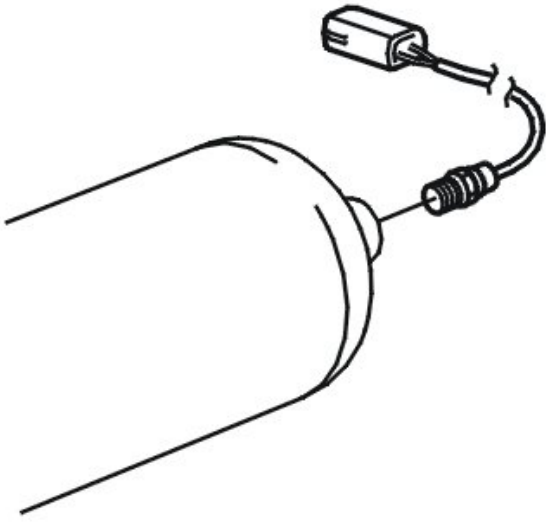
FAULT-TRACING FAILED - FAULT-TRACING FAILED

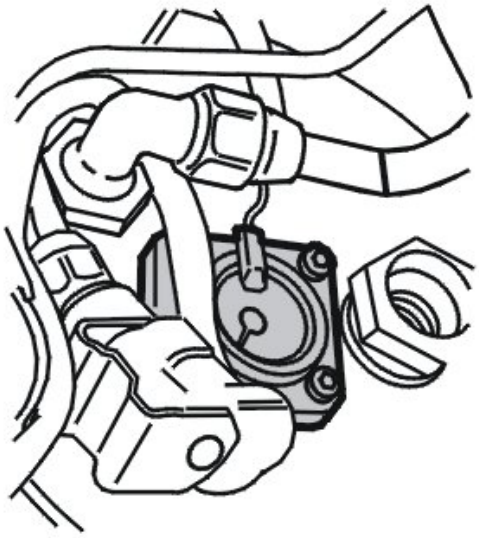
Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A47

Condition





The rear electronic module (REM) checks the signal from the fuel level sensor for gas.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

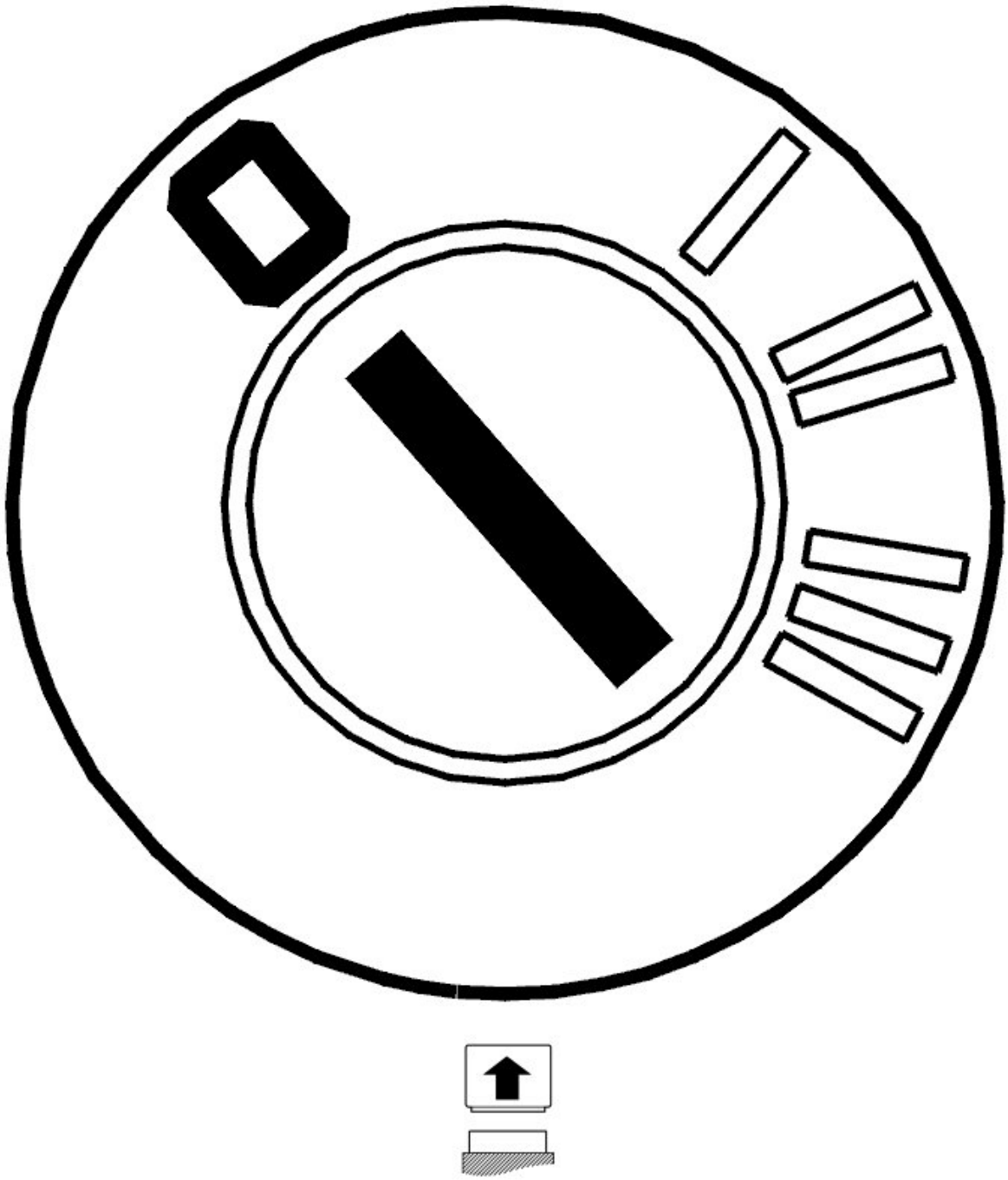
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not function
- Automatic headlamp range control is not functioning.

Signal Too Low

Signal too low

Checking the wiring



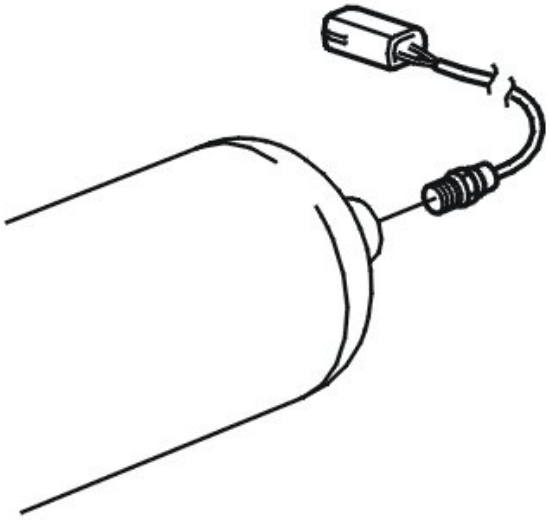
- Ignition off
- Disconnect connector C on the rear electronic module (REM)
- Disconnect connector D on the rear electronic module (REM).

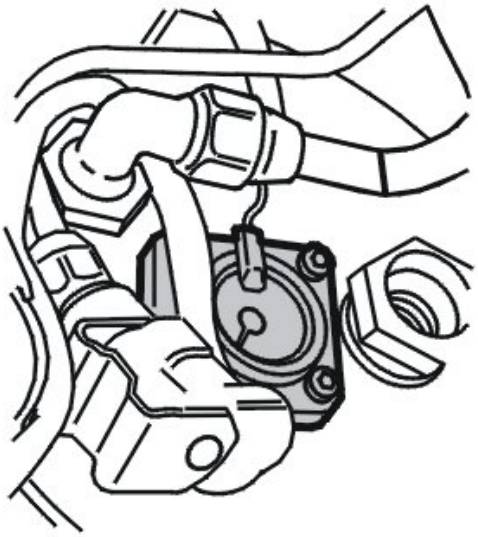
Check the signal cable. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #C11 (#51) and terminal #5 on the position sensor for the Xenon lamp
- Rear electronic module (REM) terminal #D14 (#14) and gas temperature sensor terminal #1.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





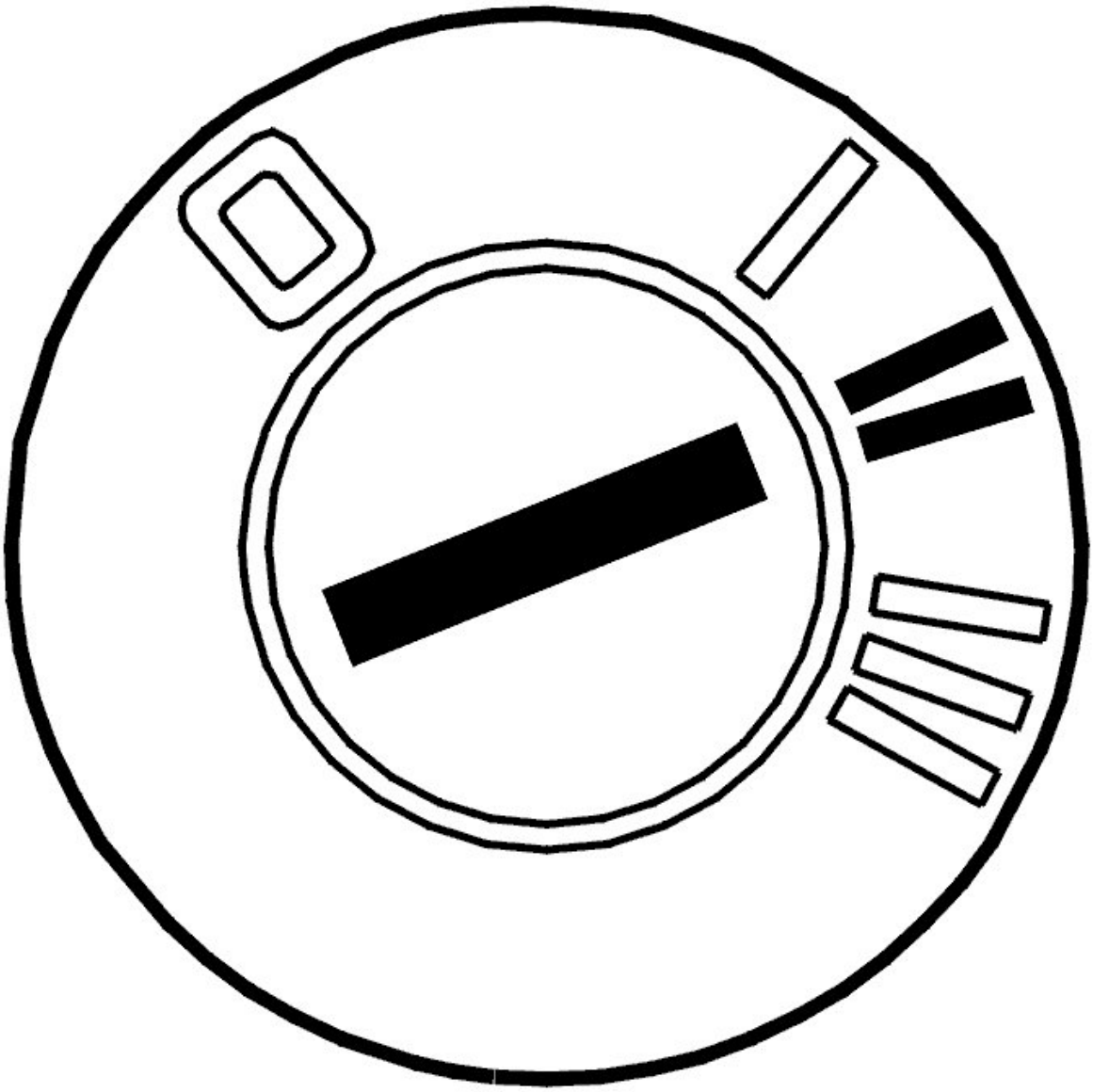
Continue - Verification

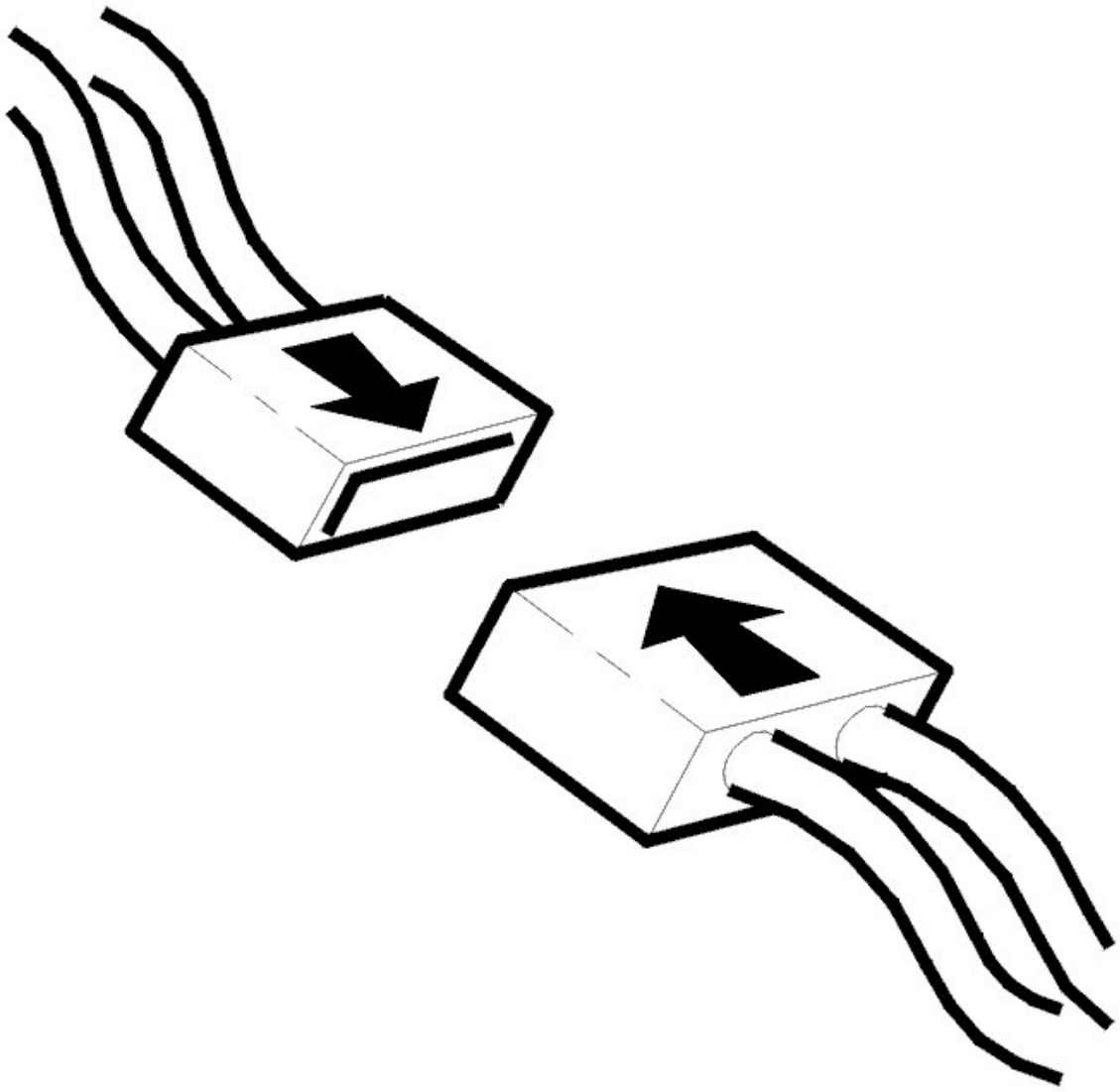
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

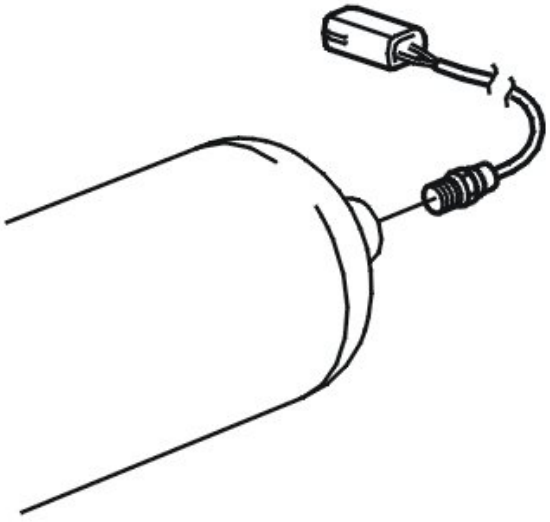
FAULT-TRACING FAILED - FAULT-TRACING FAILED

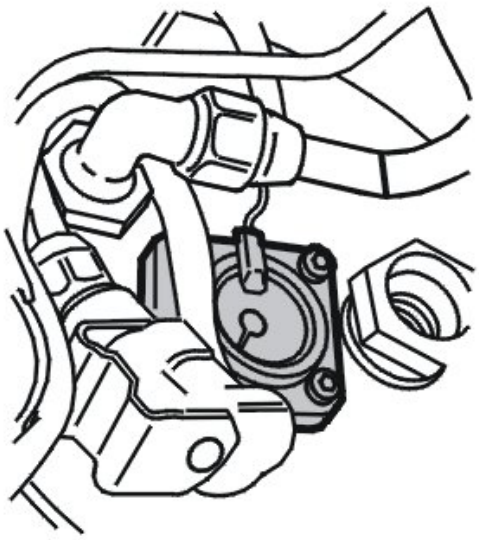
Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4A48

Condition





The rear electronic module (REM) checks the signal from the fuel level sensor for gas.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal is too high.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The fuel level is set to zero.

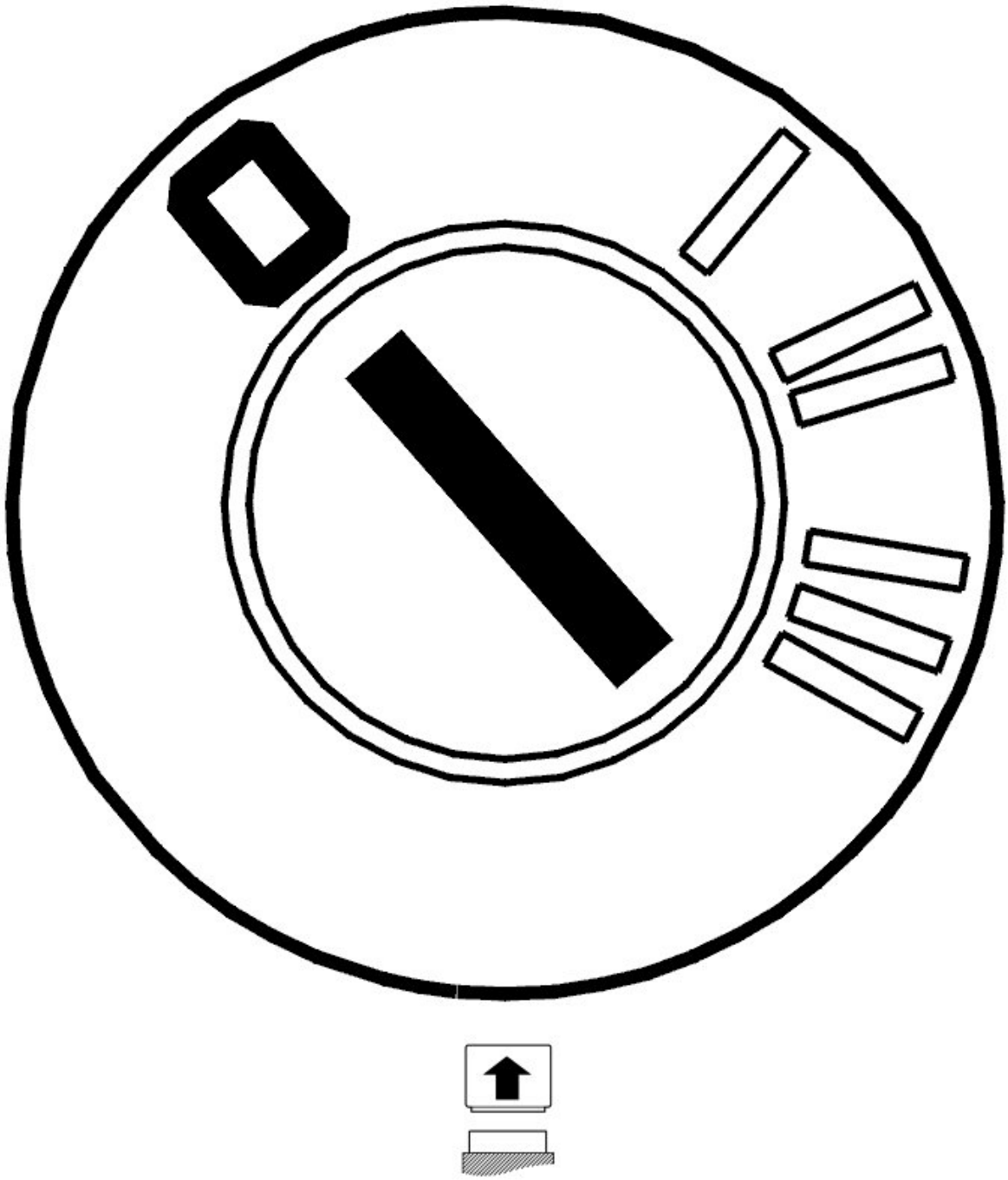
Possible source
- Short-circuit to supply voltage in the signal cable.

Fault symptom[s]
- The trip computer displays an empty fuel tank too early
- The fuel gauge indicates zero even though there is fuel in the tank
- The gas level gauge does not function
- Automatic headlamp range control is not functioning.

Signal Too High

Signal too high

Checking the wiring



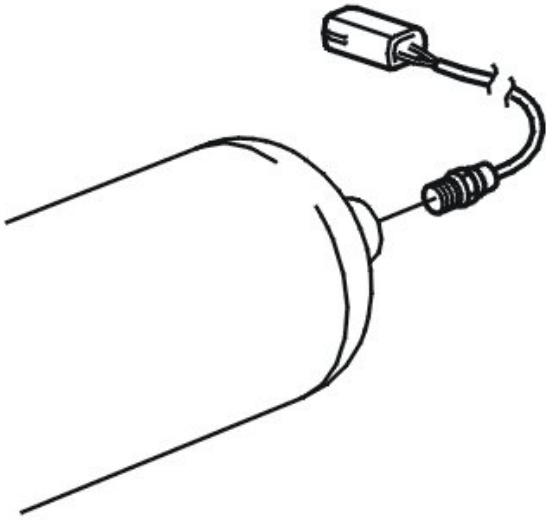
- Ignition off
- Disconnect connector C on the rear electronic module (REM)
- Disconnect connector D on the rear electronic module (REM).

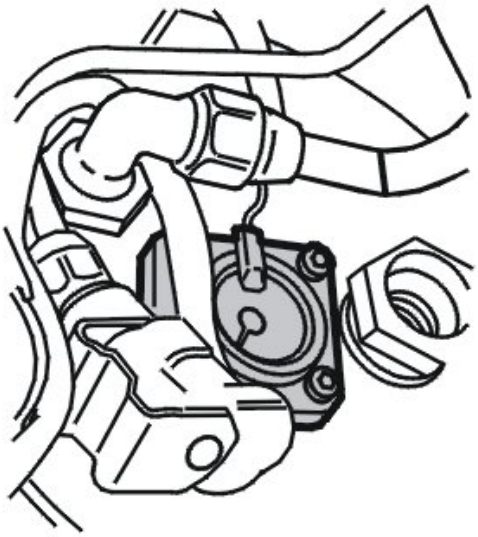
Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #C11 (#51) and terminal #5 on the position sensor for the Xenon lamp
- Rear electronic module (REM) terminal #D14 (#14) and gas temperature sensor terminal #1.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





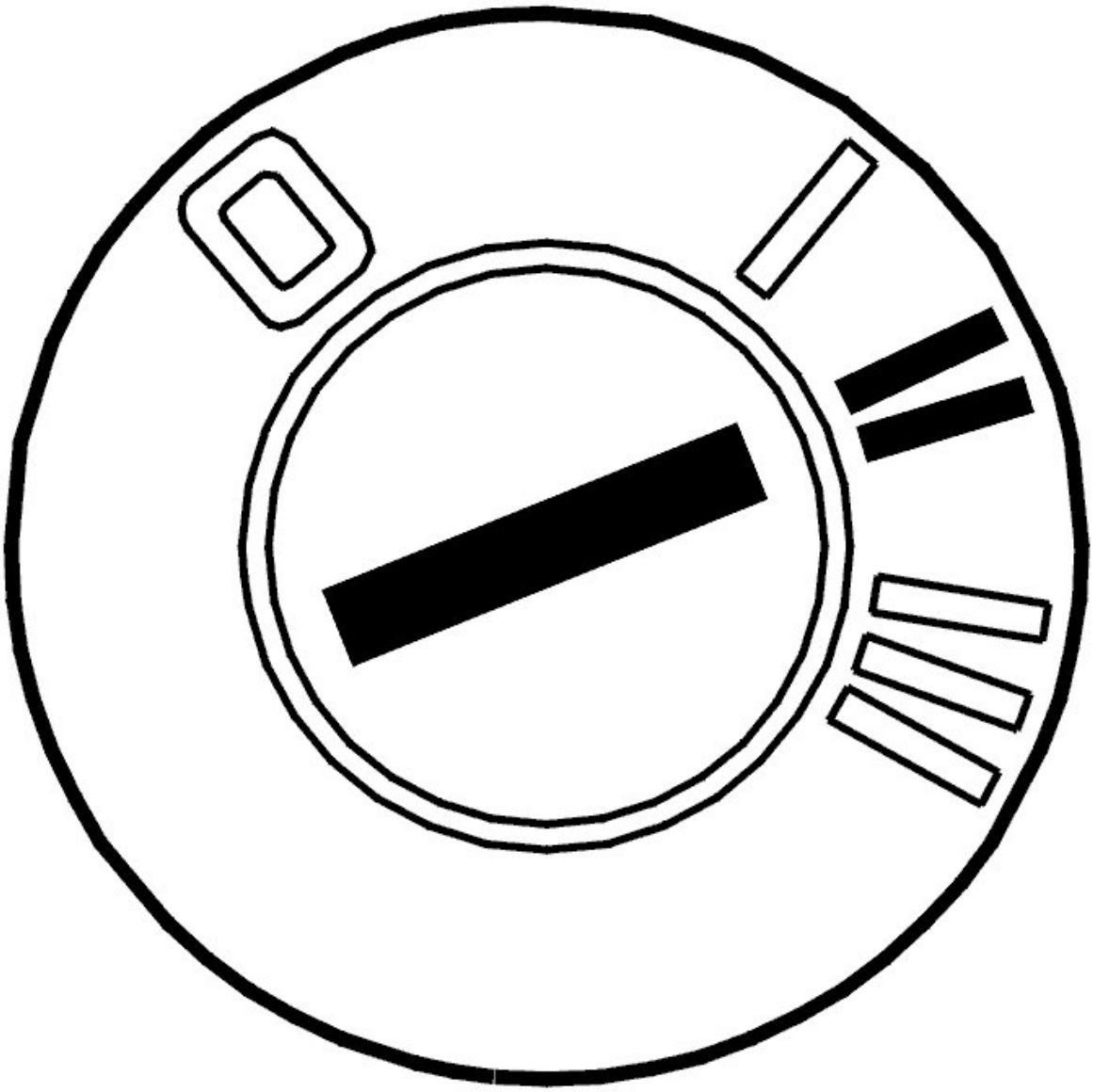
Continue - Verification

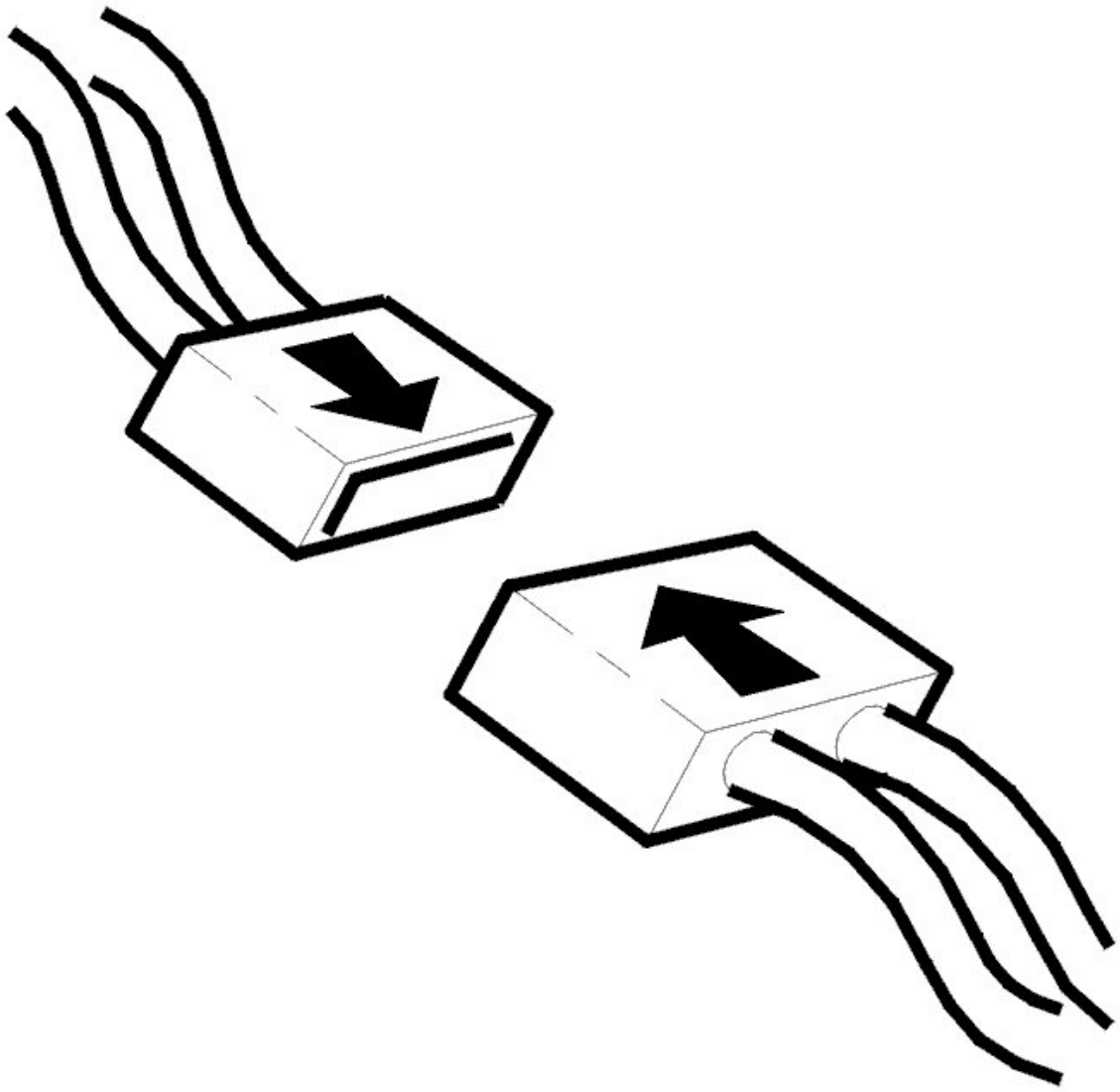
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Fill up with gas. Check that the level of the fuel gauge changes.

Is the value within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

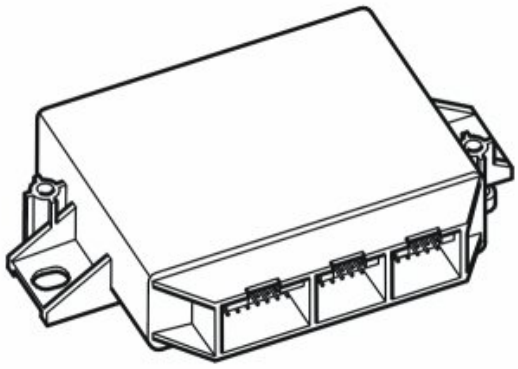
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F4A

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM).
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives information from the parking assistance module (PAM) indicating an internal fault.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Internal fault in the parking assistance module (PAM).

Fault symptom[s]
- The parking assistance system does not operate
- Message in the display.

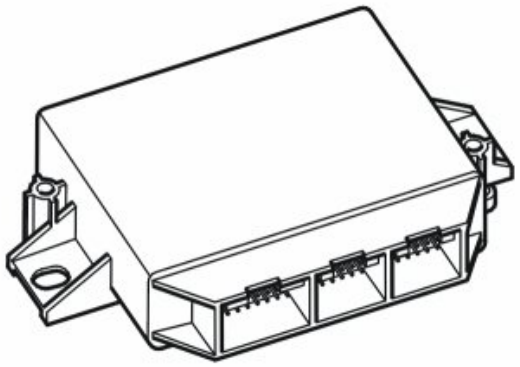
Faulty Signal

Faulty signal

Replacing the component

The parking assistance module (PAM) has registered an internal fault.
If the fault is intermittent, it has been registered previously but is no longer present. Intermittent faults can be caused by interference at start up of the parking assistance module (PAM) or may be a different type of fault which occurs on different occasions. The fault is evaluated depending on how it occurs. Replace the parking assistance module (PAM) if the fault recurs.
Replace the parking assistance module (PAM) in the event of a permanent fault.
Remedy as necessary.

Other information
- Parking assistance module (PAM), replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Control Module/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

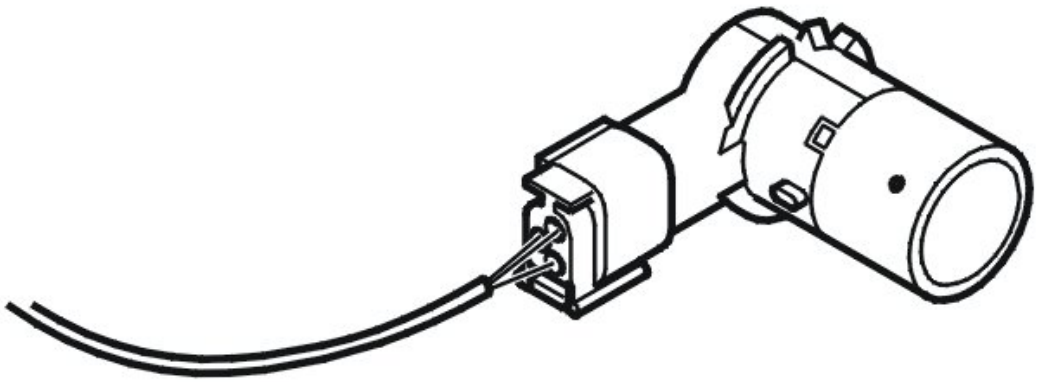
Attempt New Test - Replacing the component

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F42

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 1.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (1).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value

- None.

Possible source

- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 1
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 1
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 1.

Fault symptom[s]

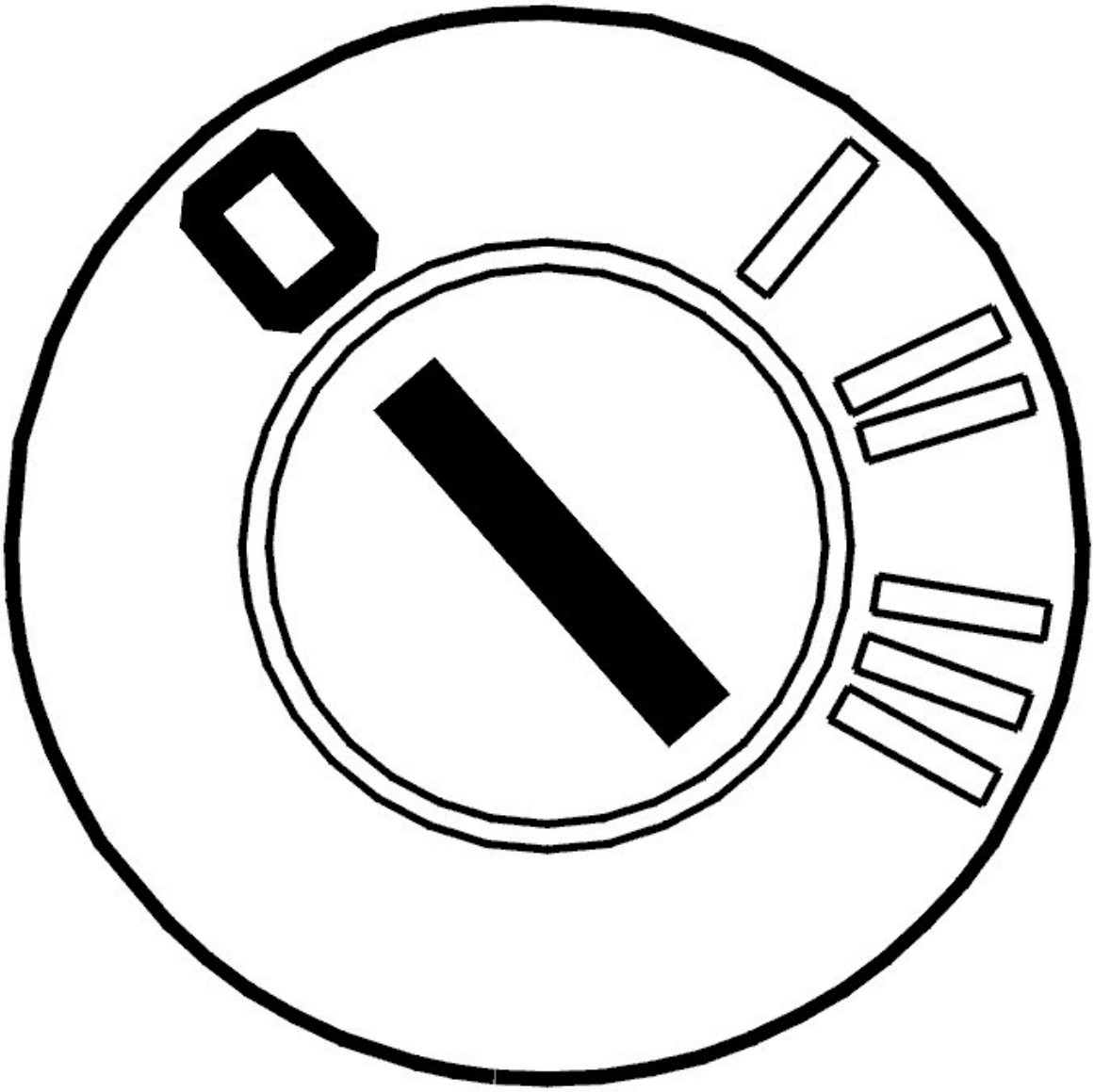
- The parking assistance system does not operate
- Message in the display.

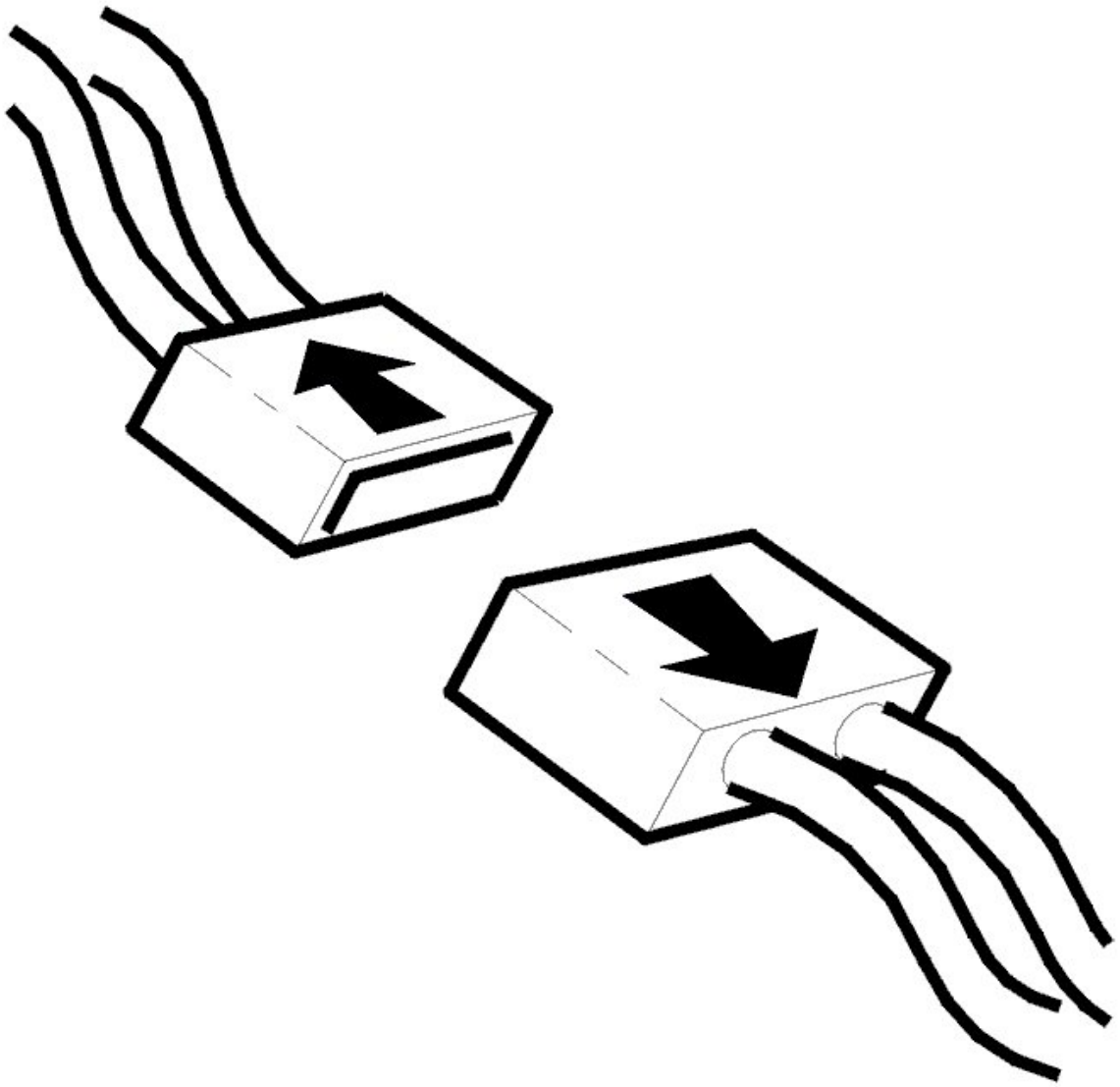
Faulty Signal

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 1 (outer left rear) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C5 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C6 and parking sensor connector terminal #1.

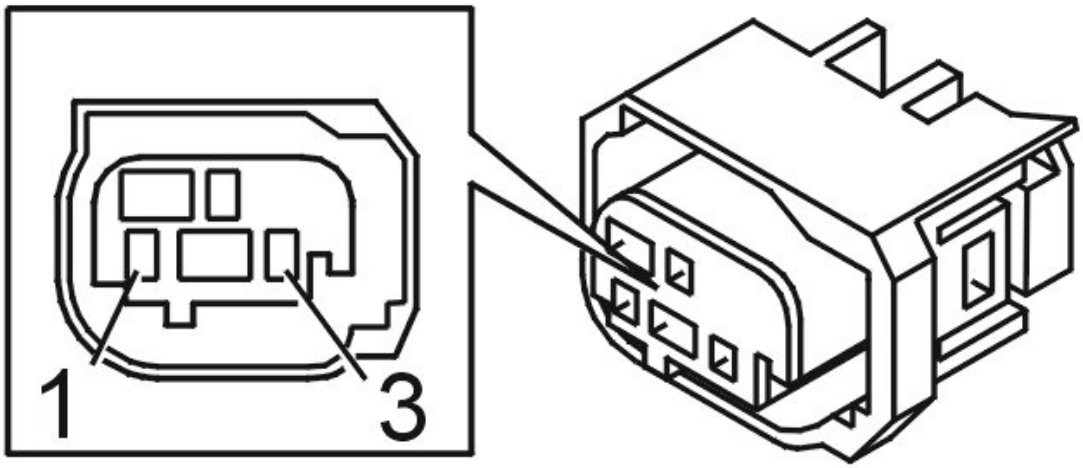
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #C1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Back-up warning sensor, replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Distance Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

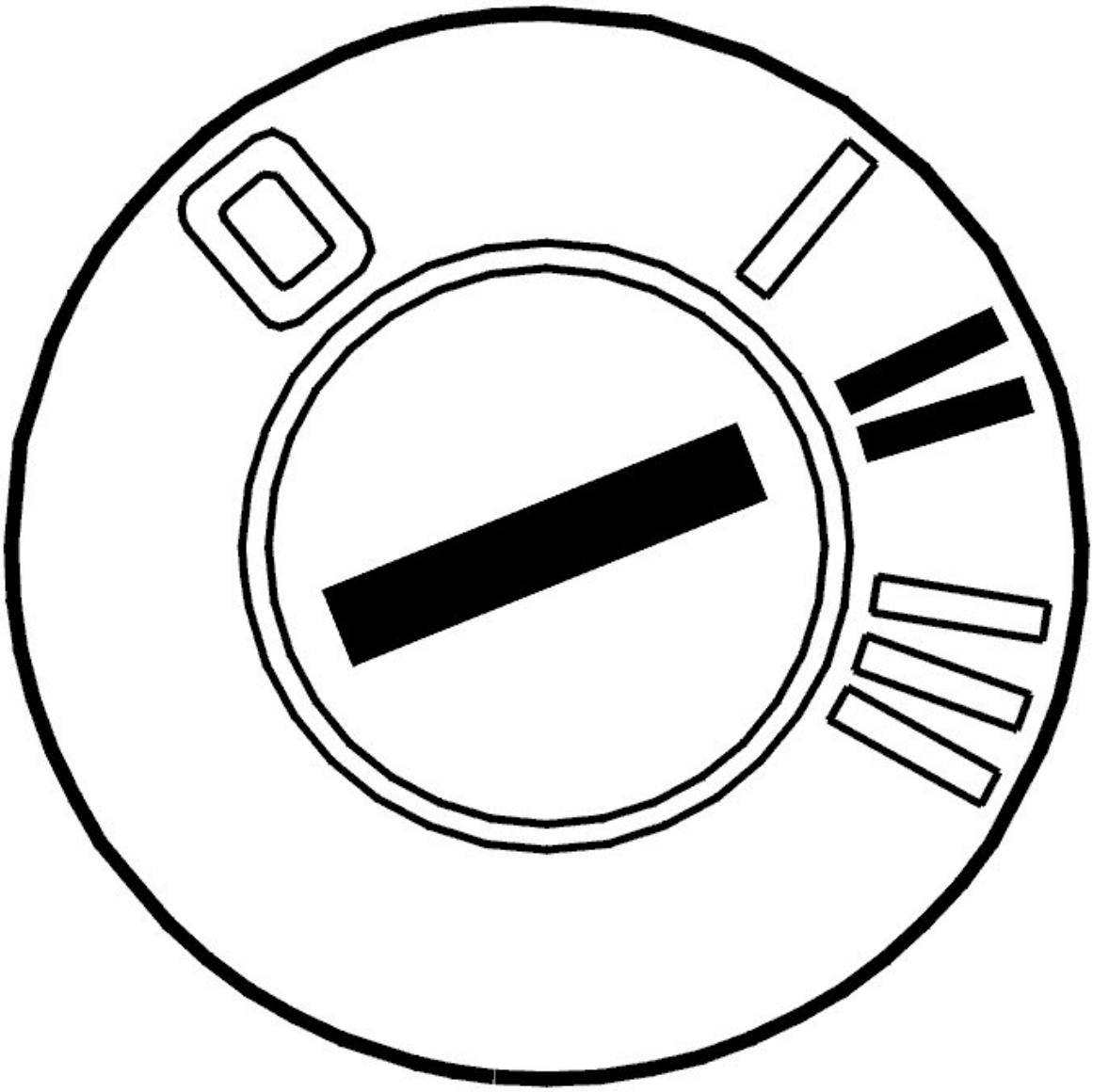
Continue - Verification

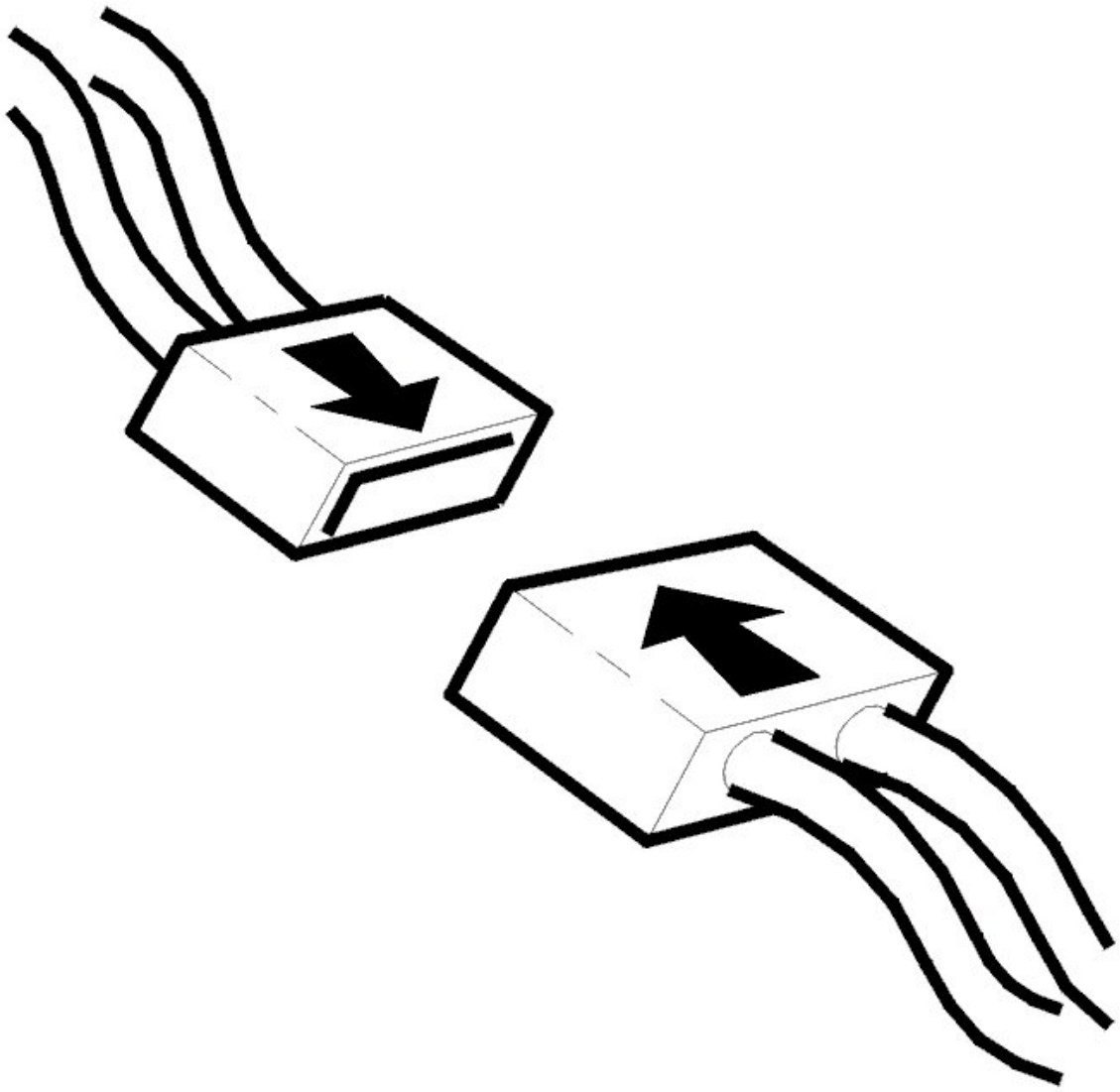
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

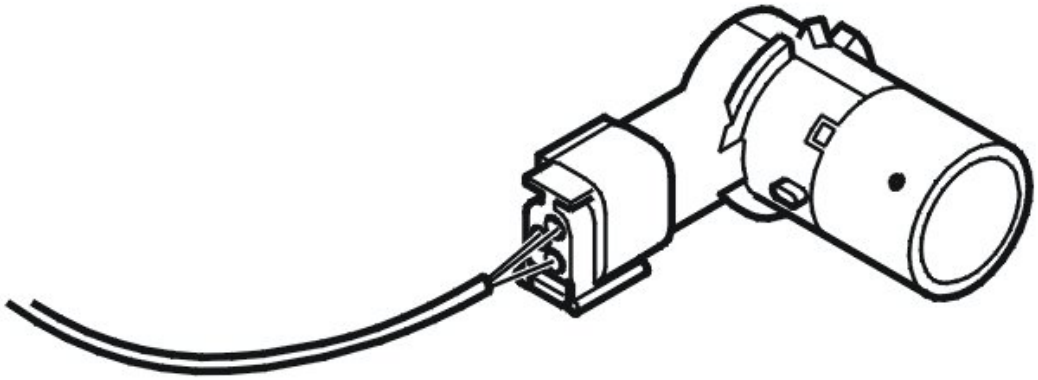
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F43

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 2.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (2).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 2
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 2
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 2.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]

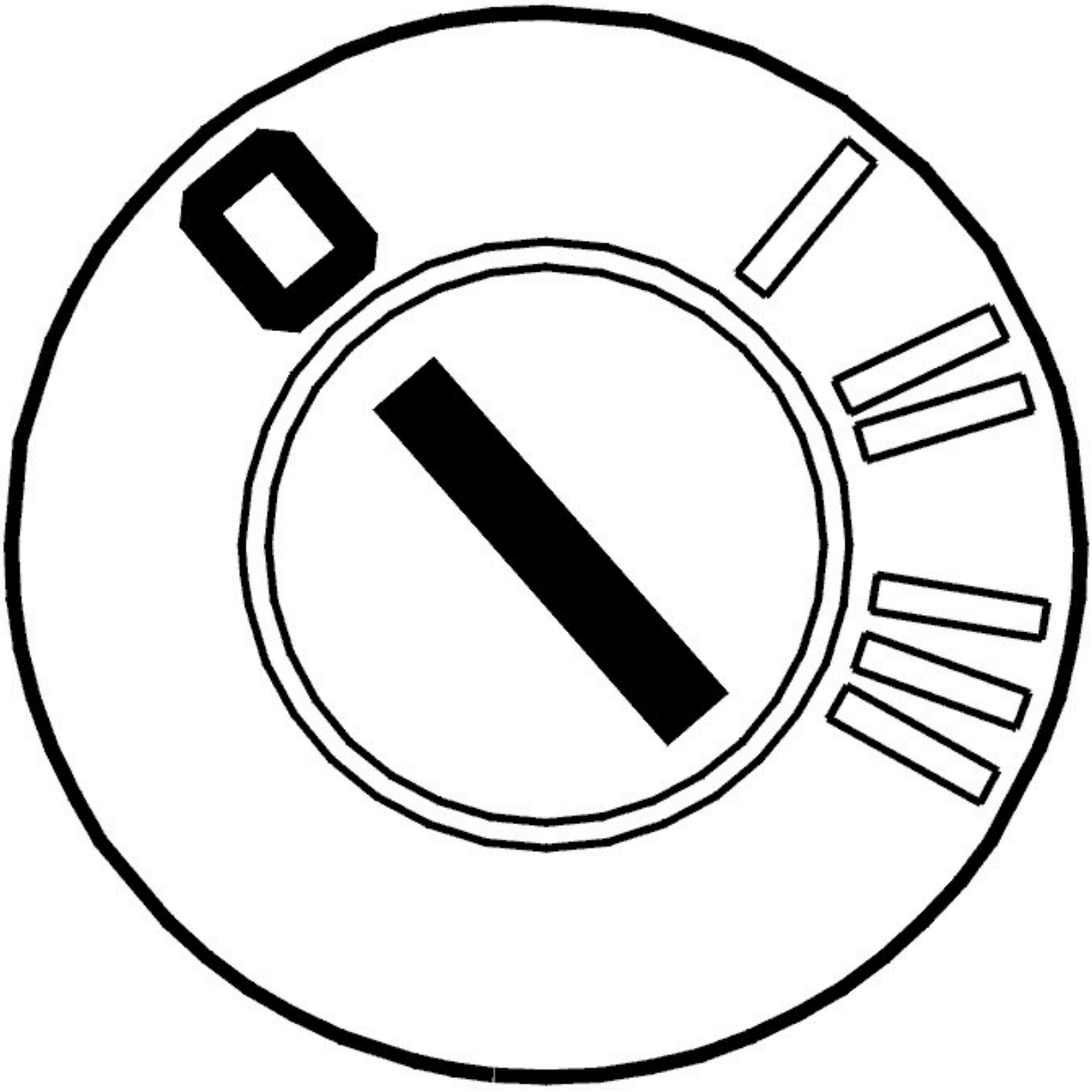
- The parking assistance system does not operate
- Message in the display.

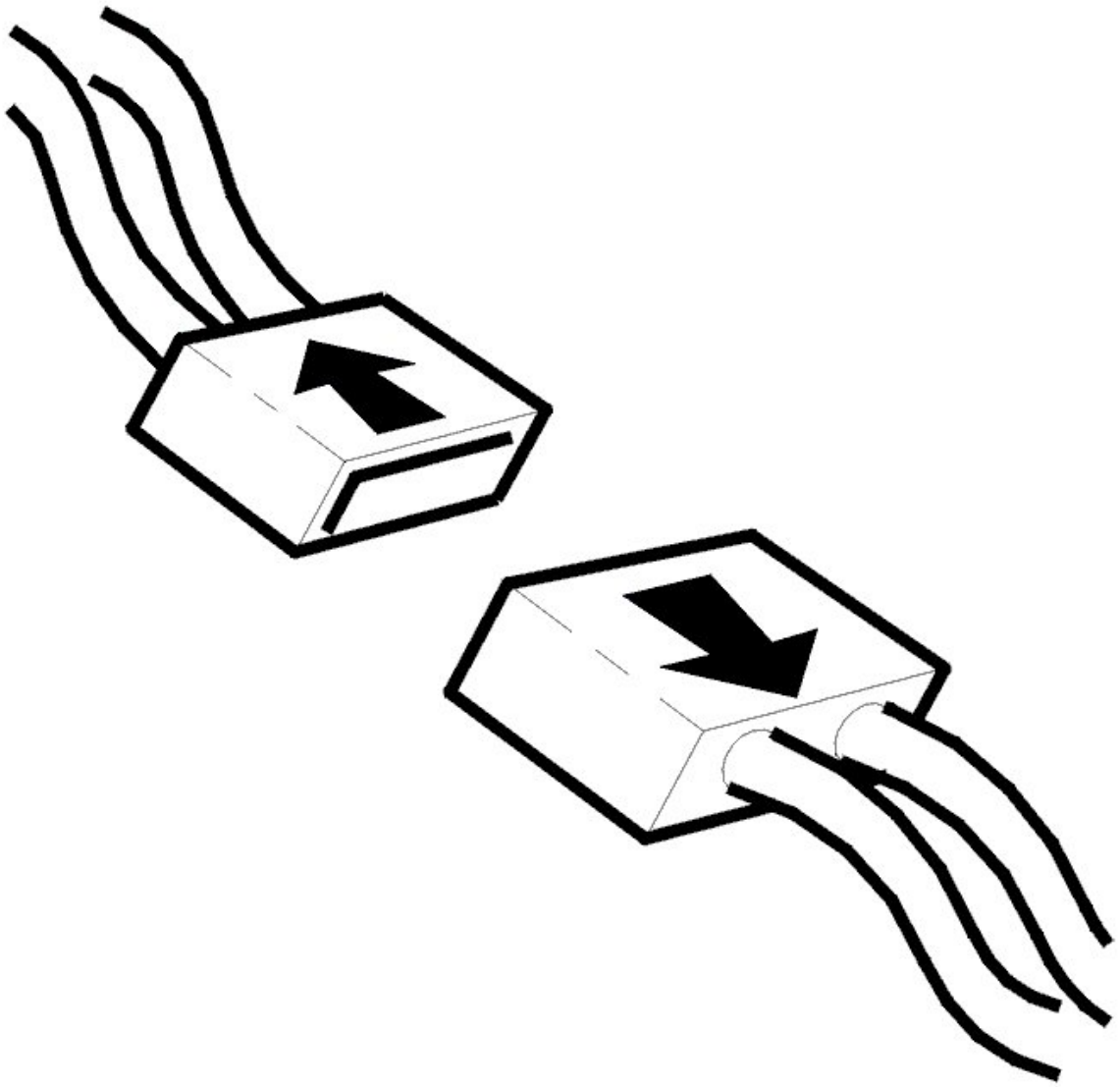
Faulty Signal

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 2 (inner left rear) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C3 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C10 and parking sensor connector terminal #1.

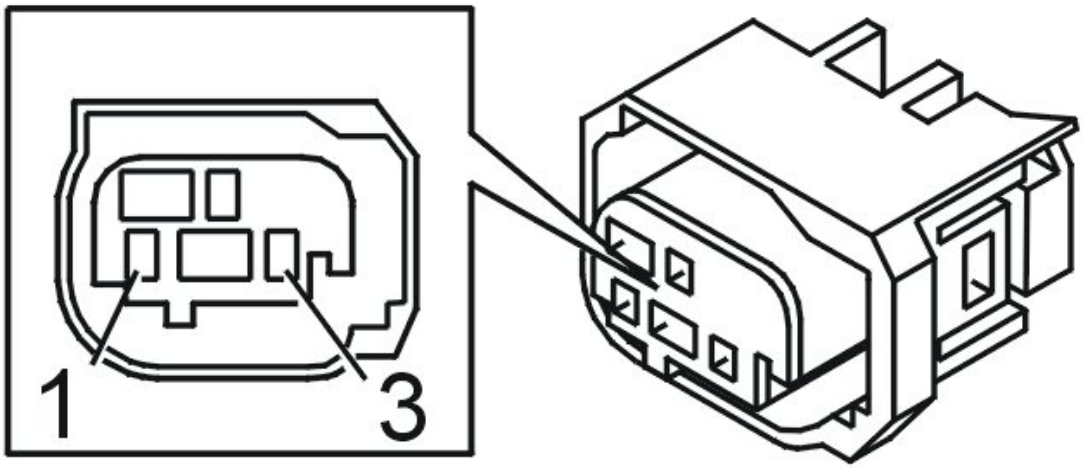
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #C7 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Back-up warning sensor, replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Distance Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

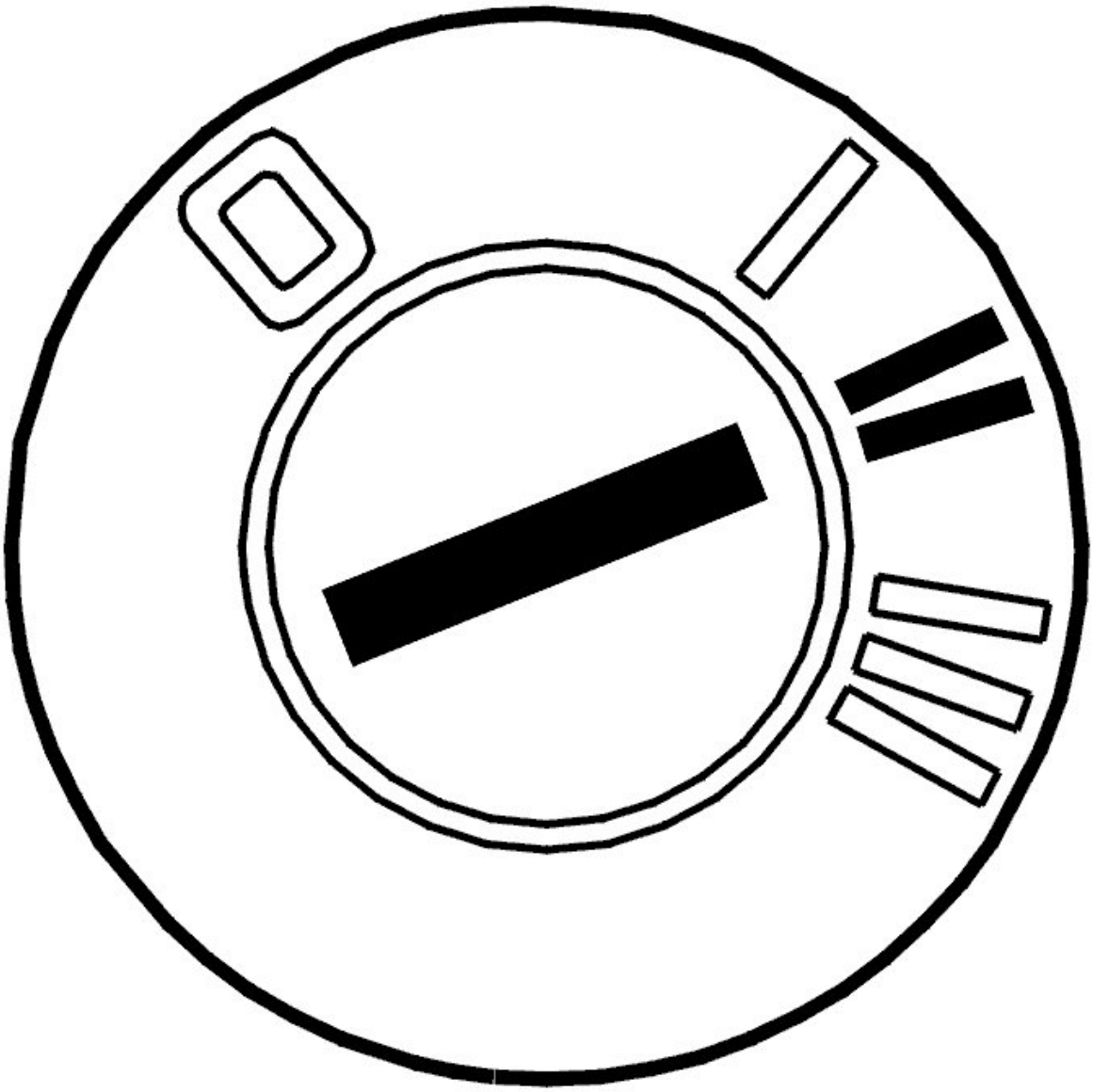
Continue - Verification

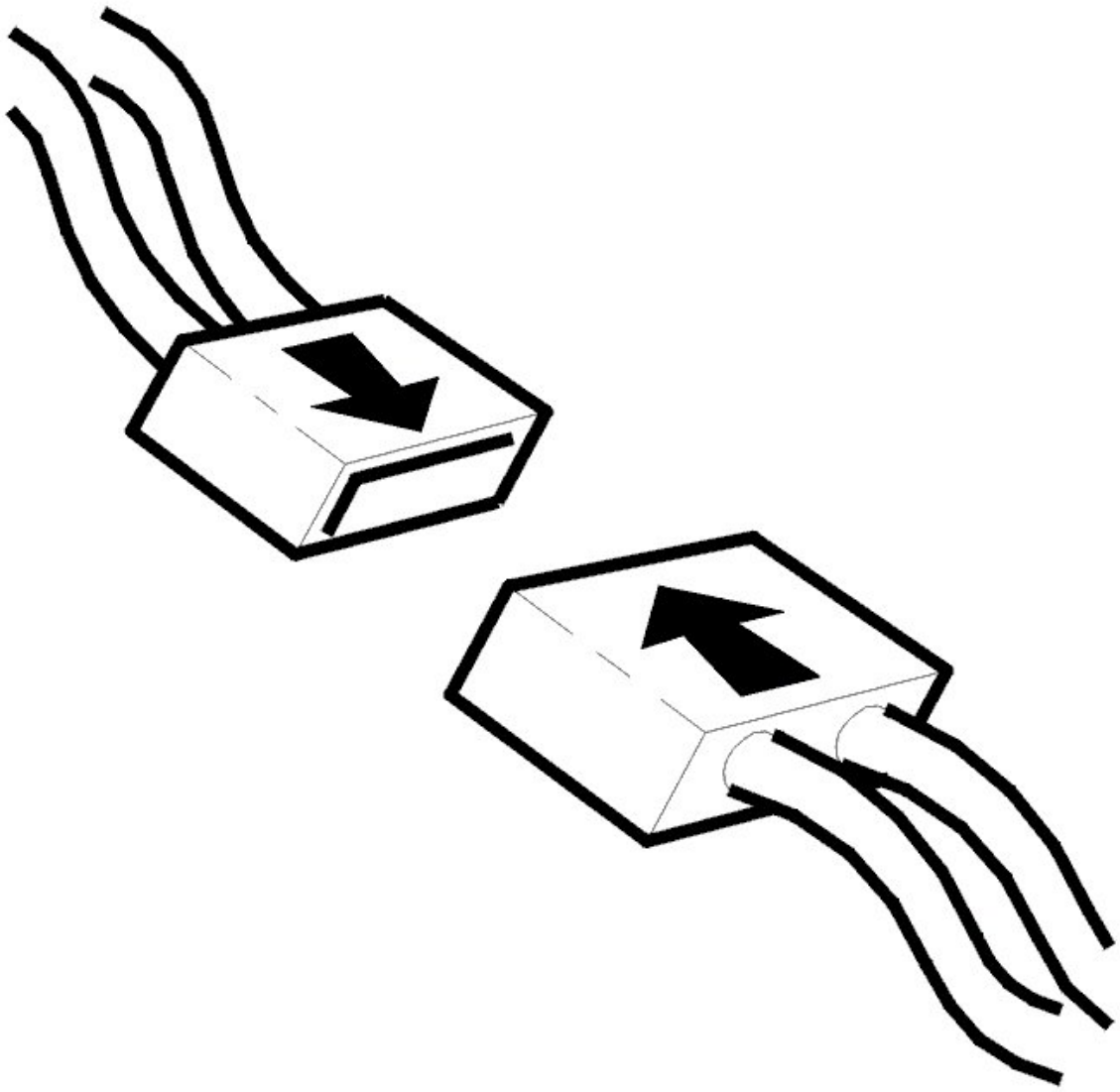
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

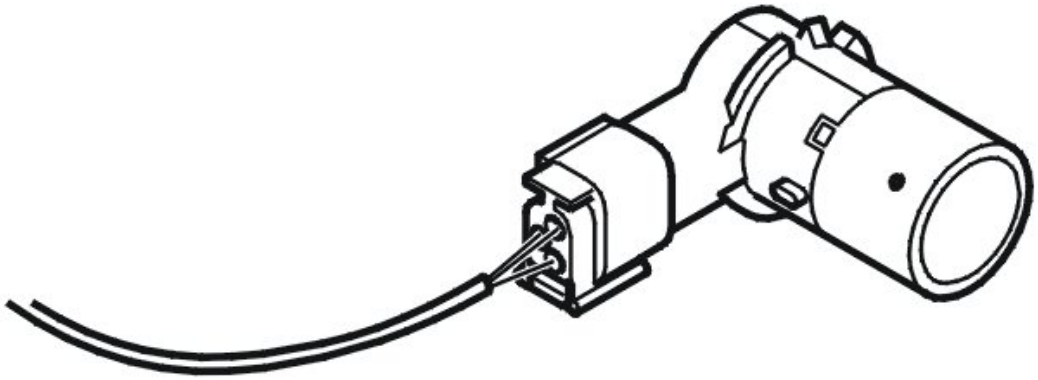
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F44

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 3.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (3).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 3
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 3
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 3.

Fault symptom[s]

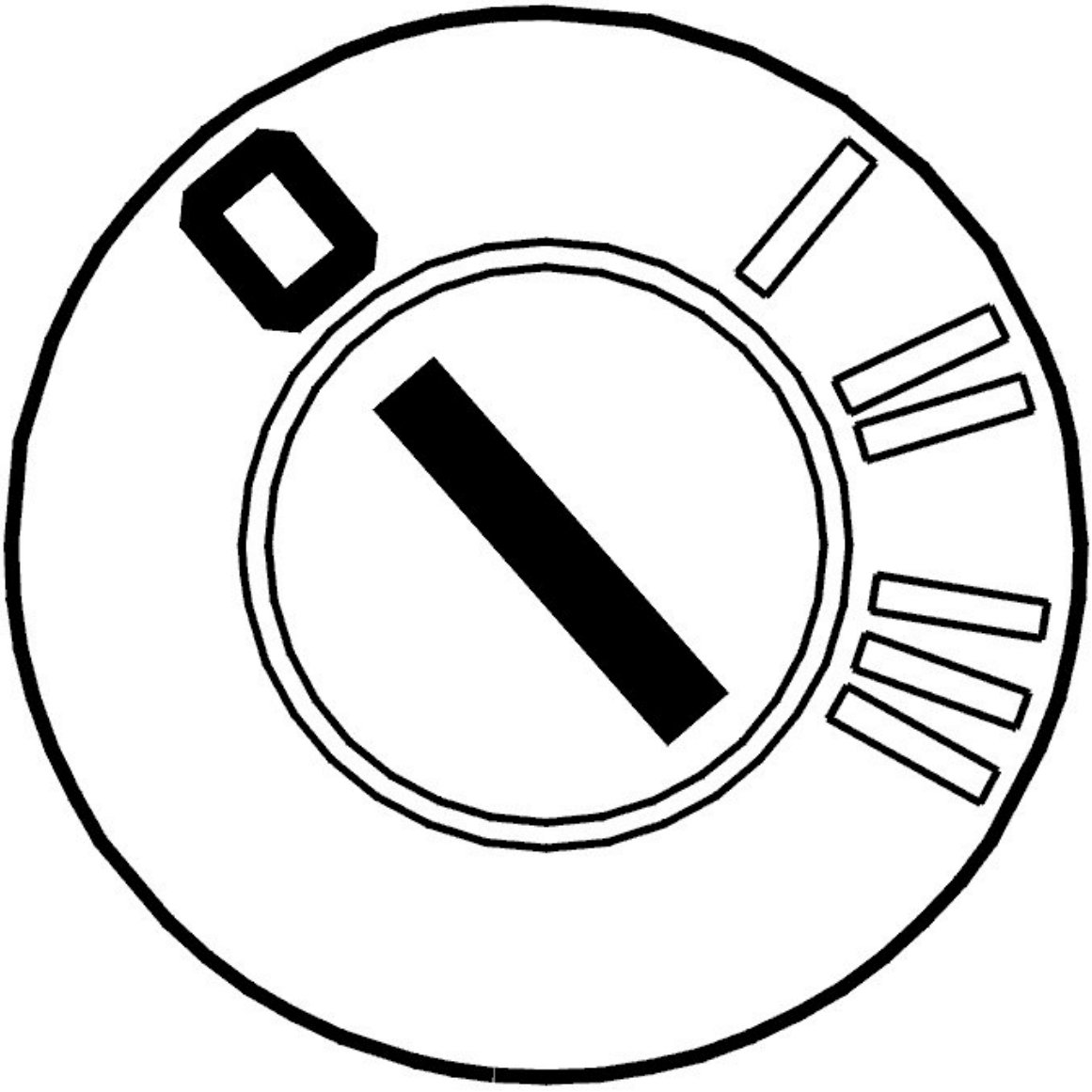
- The parking assistance system does not operate
- Message in the display.

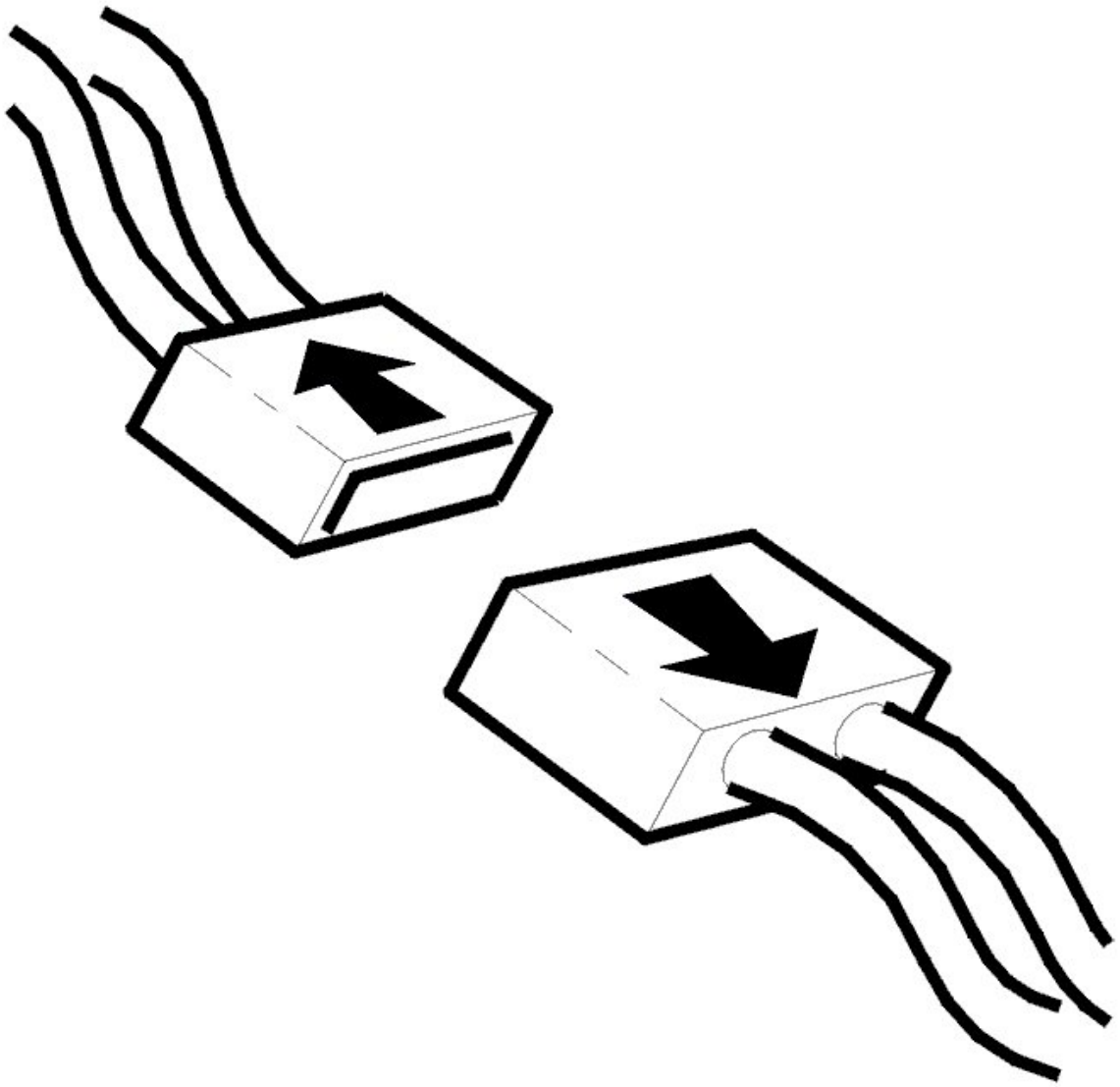
Faulty Signal

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 3 (inner right rear) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C2 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C11 and parking sensor connector terminal #1.

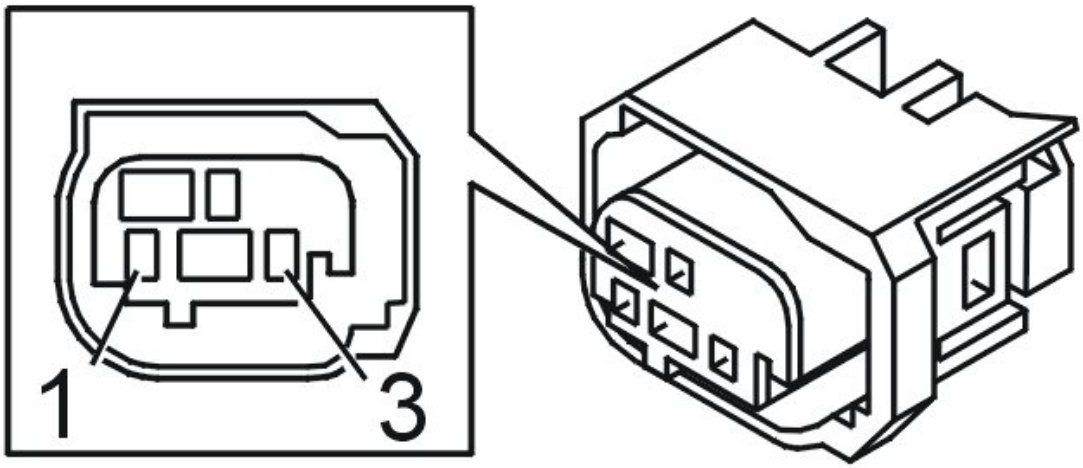
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #C8 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Back-up warning sensor, replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Distance Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

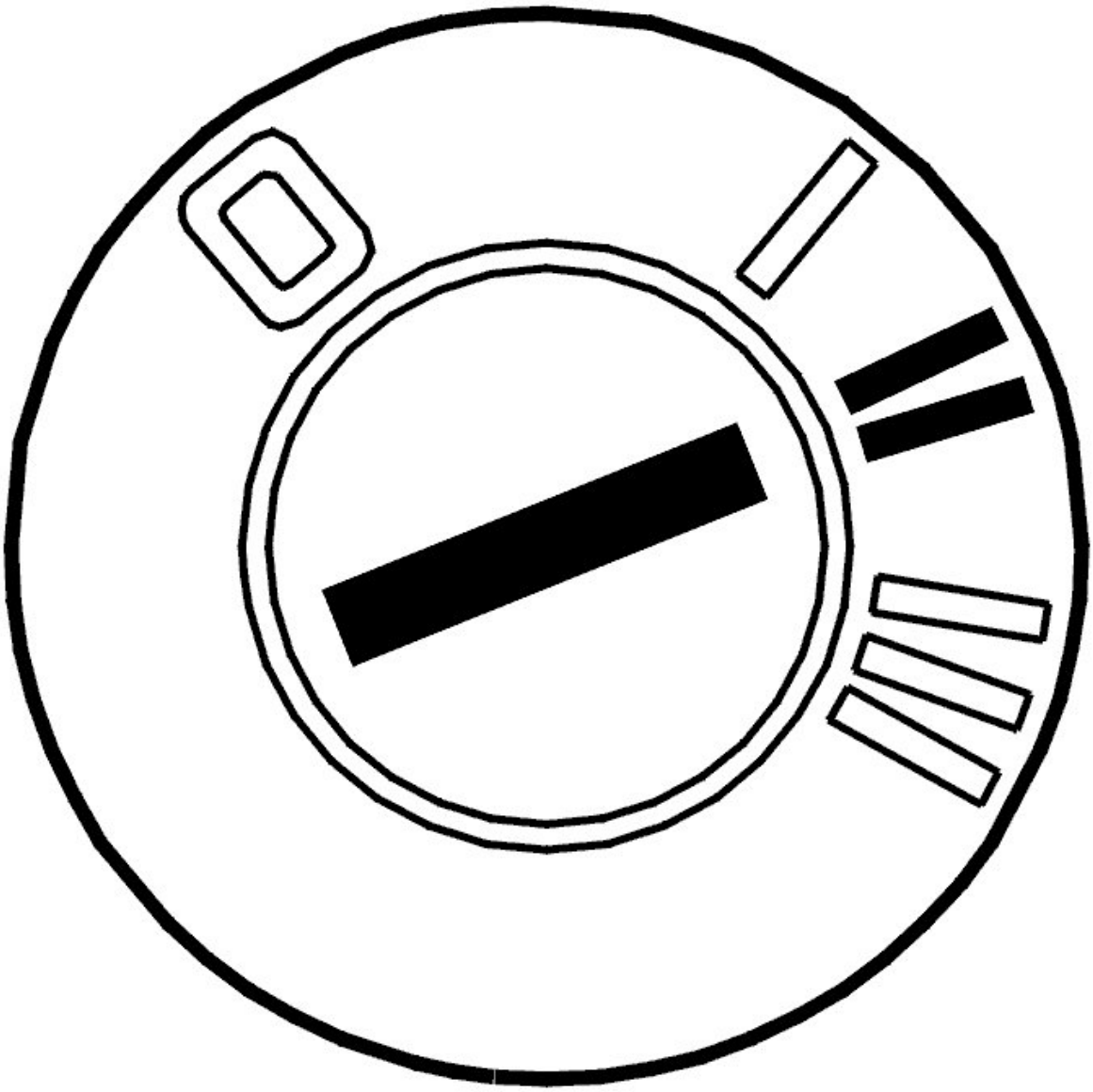
Continue - Verification

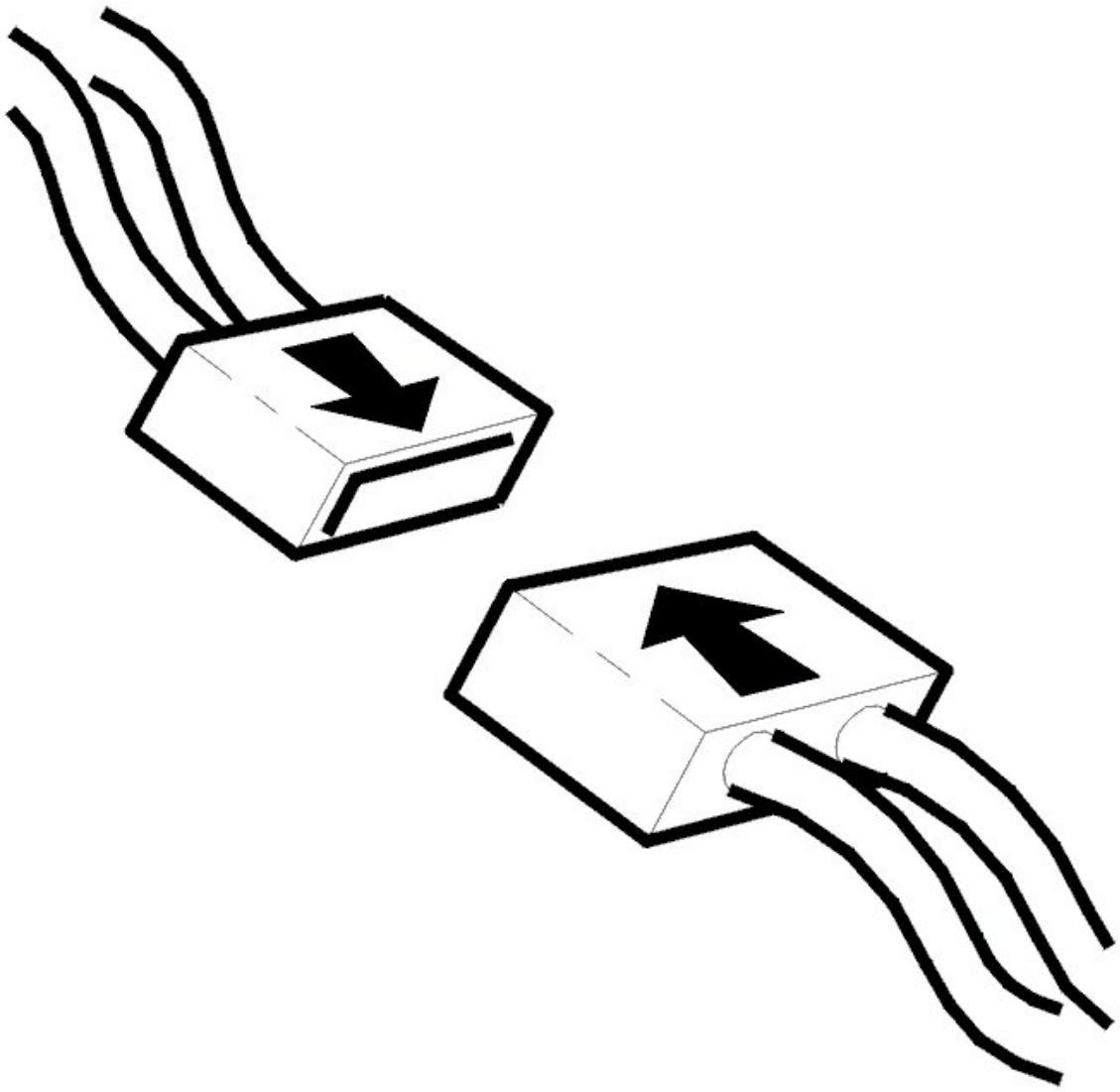
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

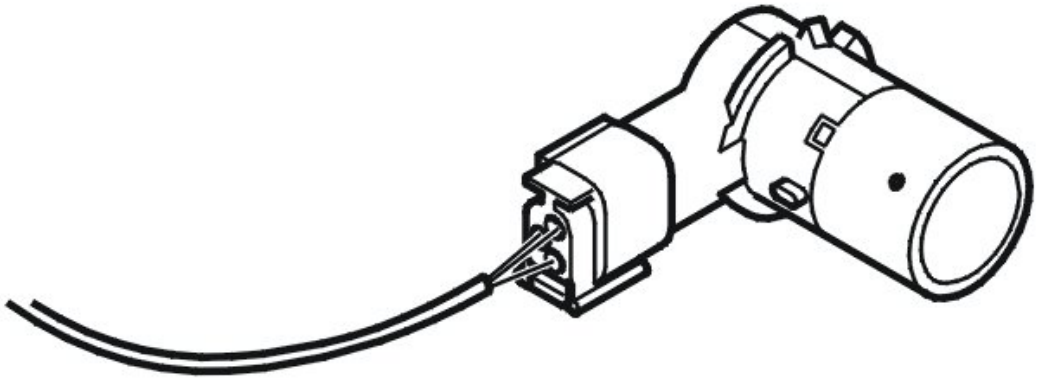
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F45

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 4.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (4).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 4
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 4
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 4.

Fault symptom[s]

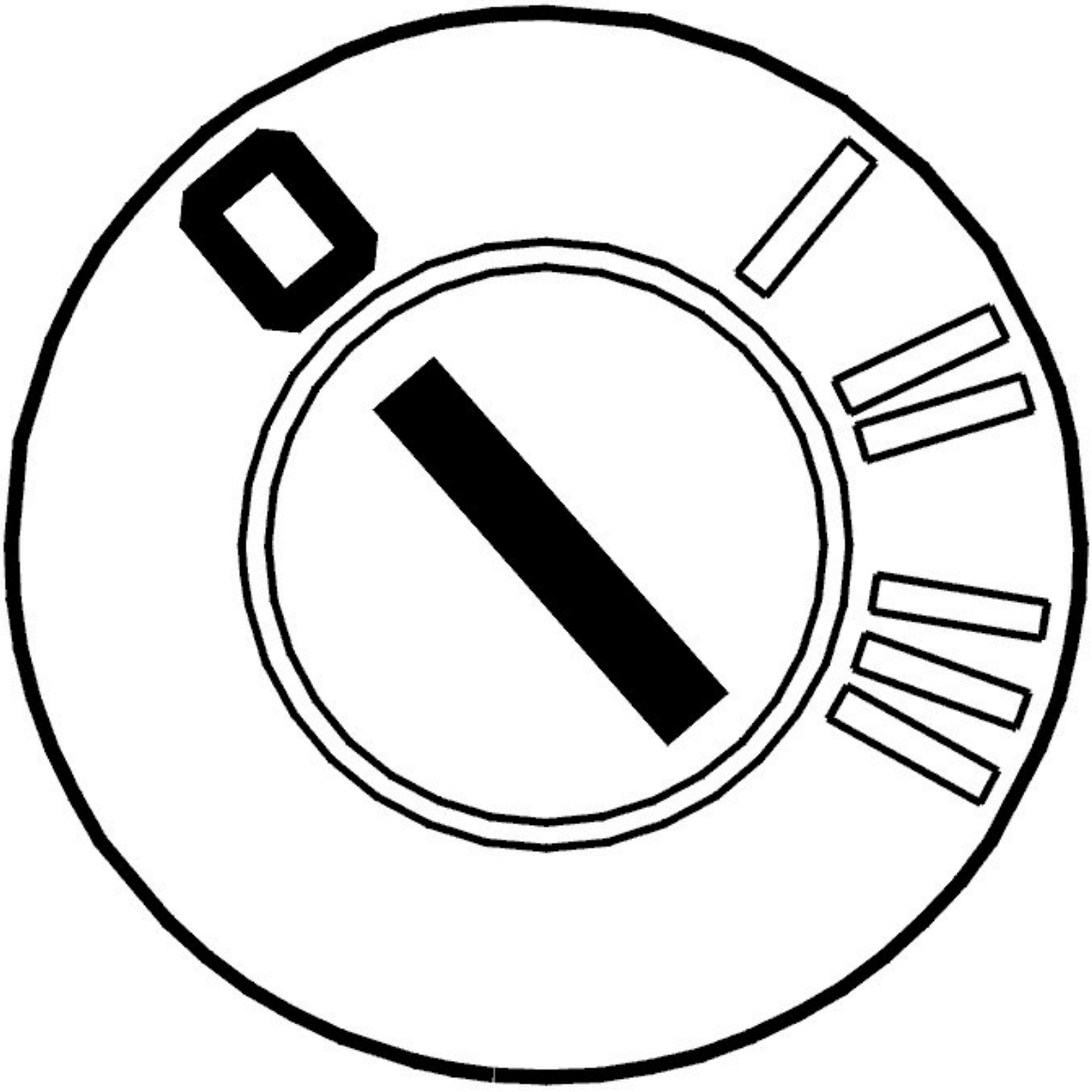
- The parking assistance system does not operate
- Message in the display.

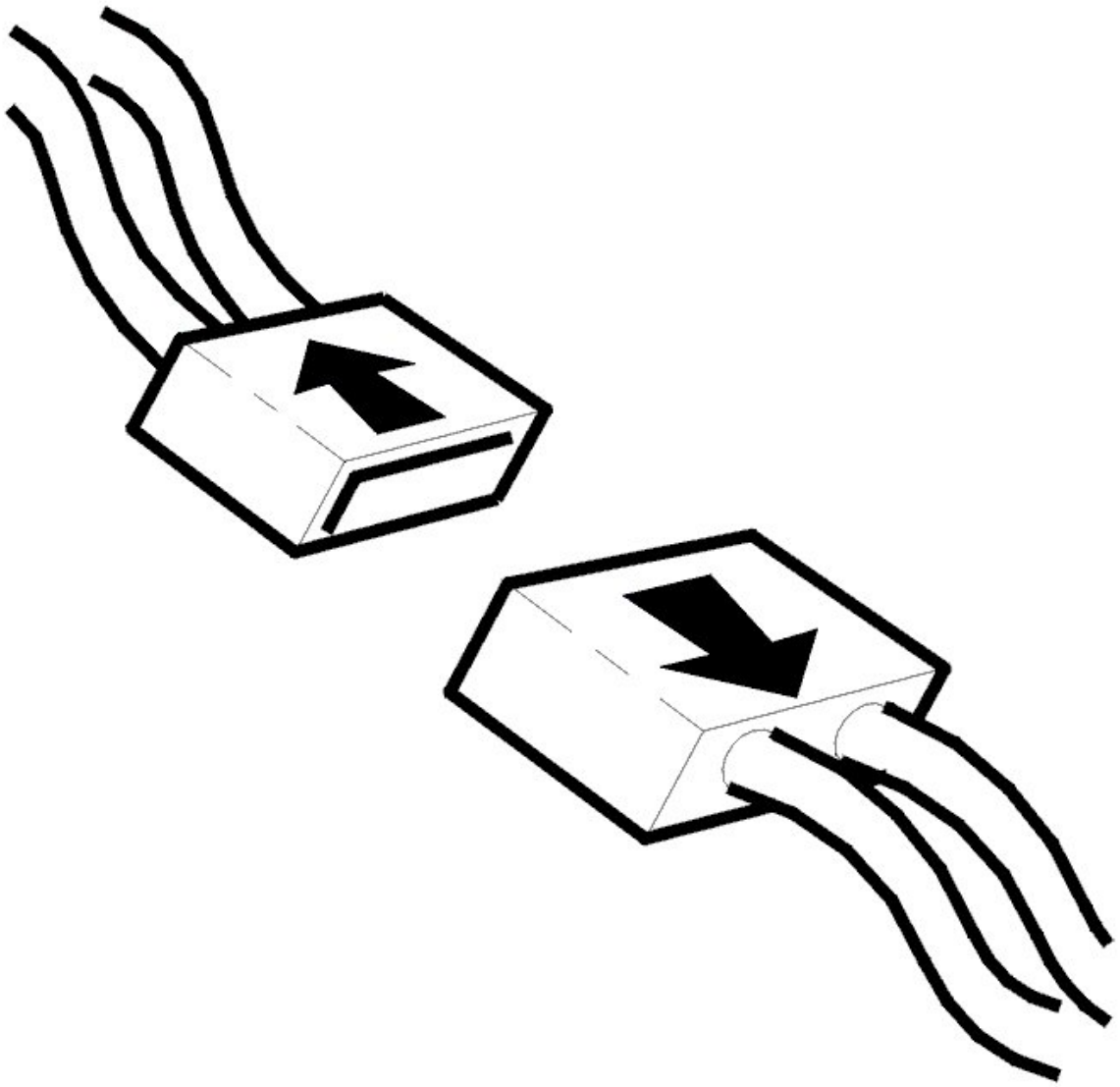
Faulty Signal

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 4 (outer right rear) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C4 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #C12 and parking sensor connector terminal #1.

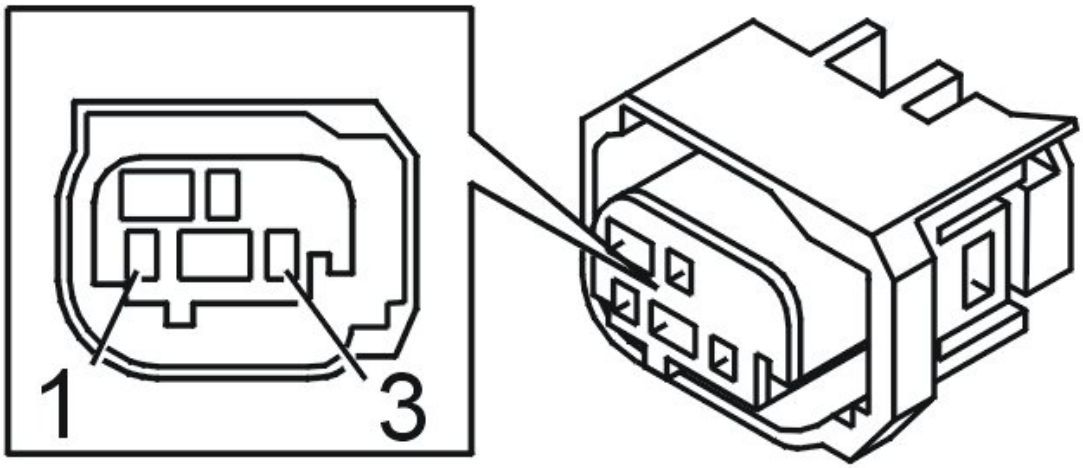
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #C9 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Back-up warning sensor, replacing See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Parking Assist Distance Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

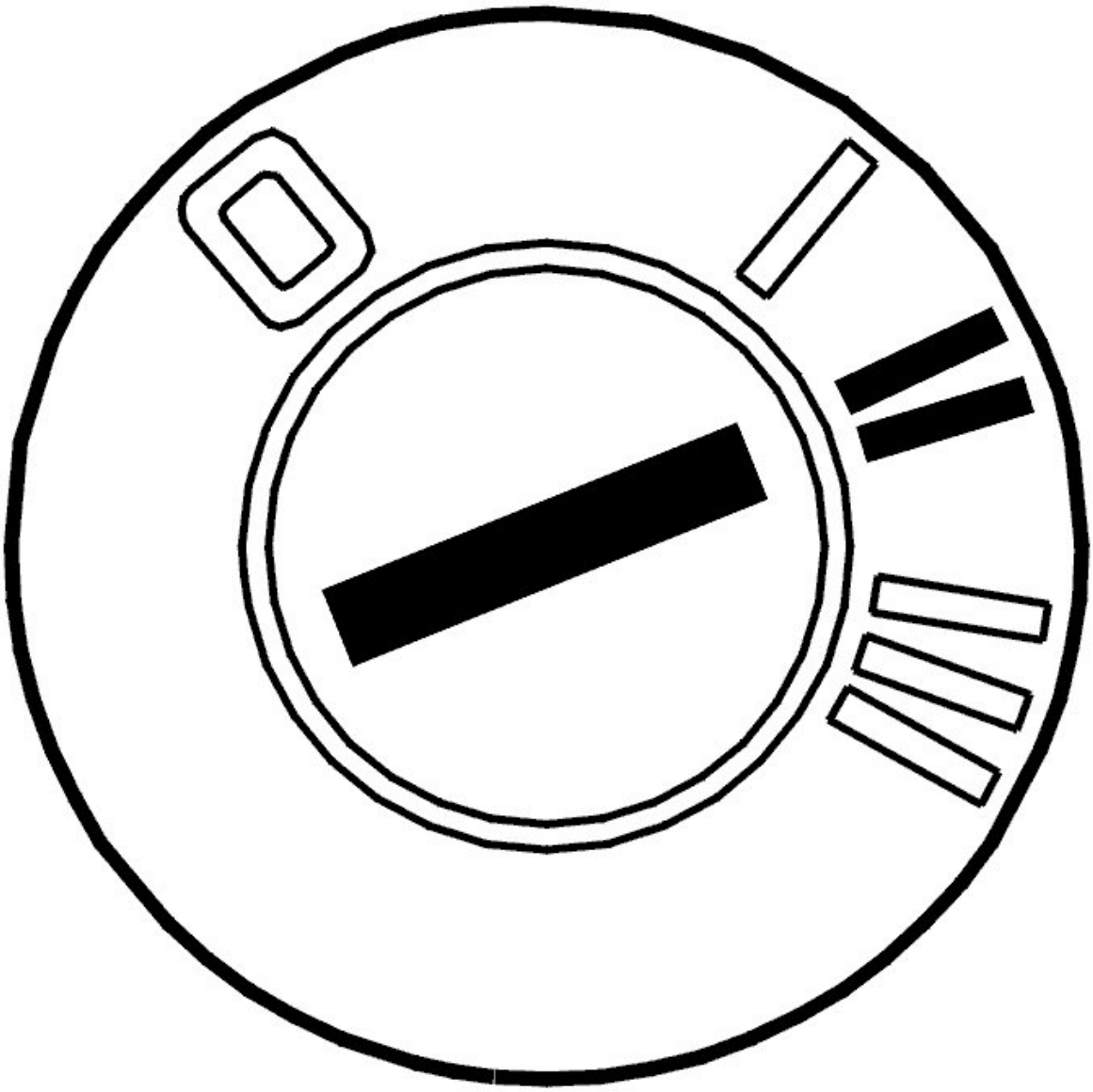
Continue - Verification

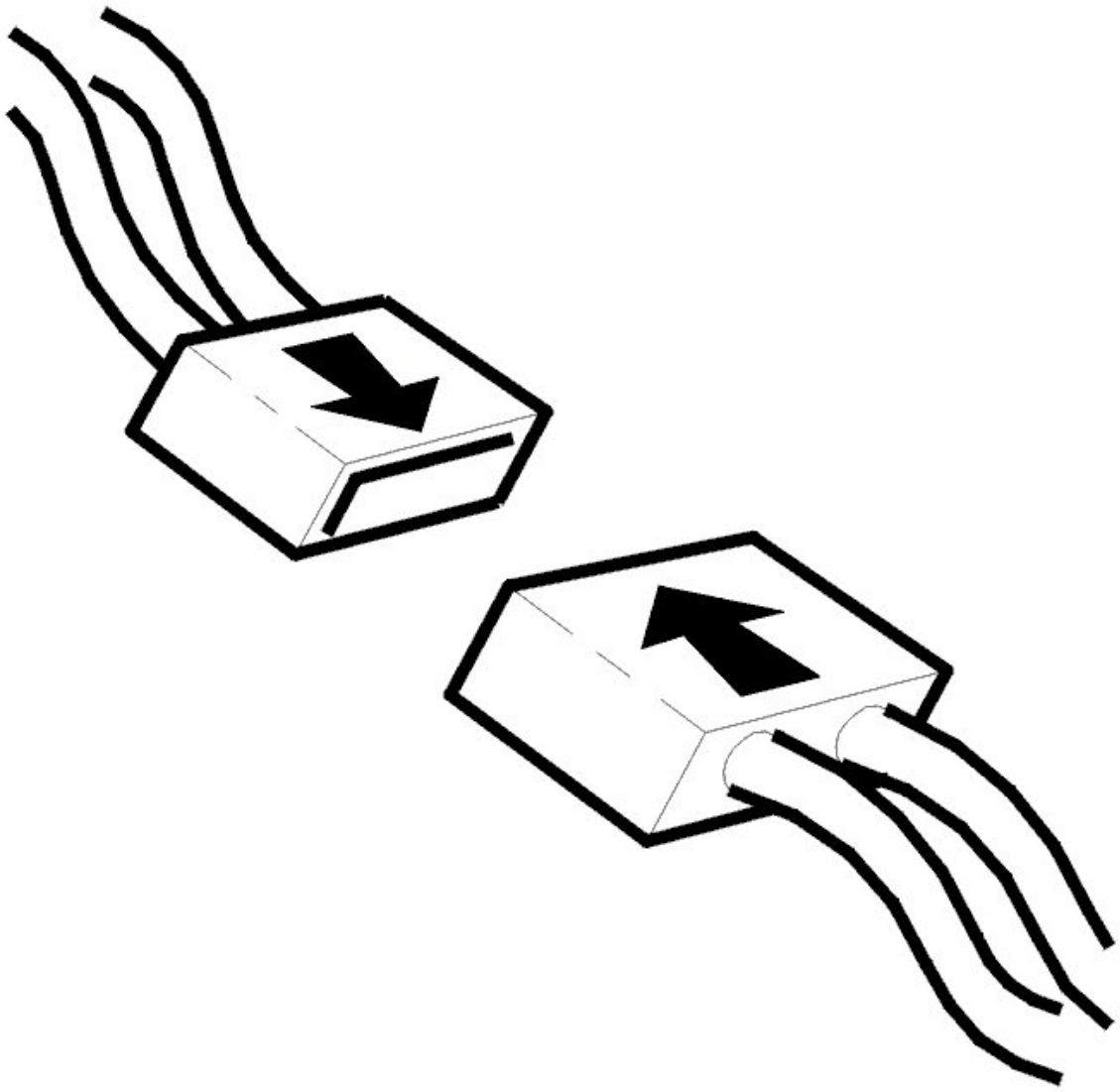
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

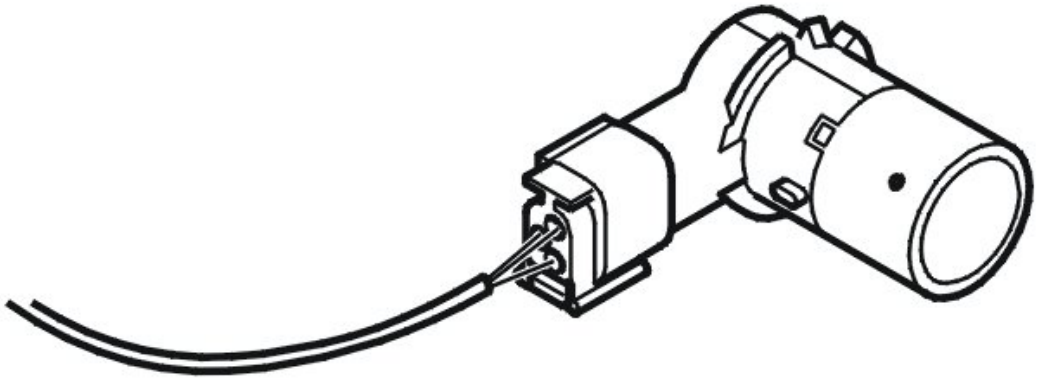
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F46

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 5.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (5).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 5
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 5
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 5.

Fault symptom[s]

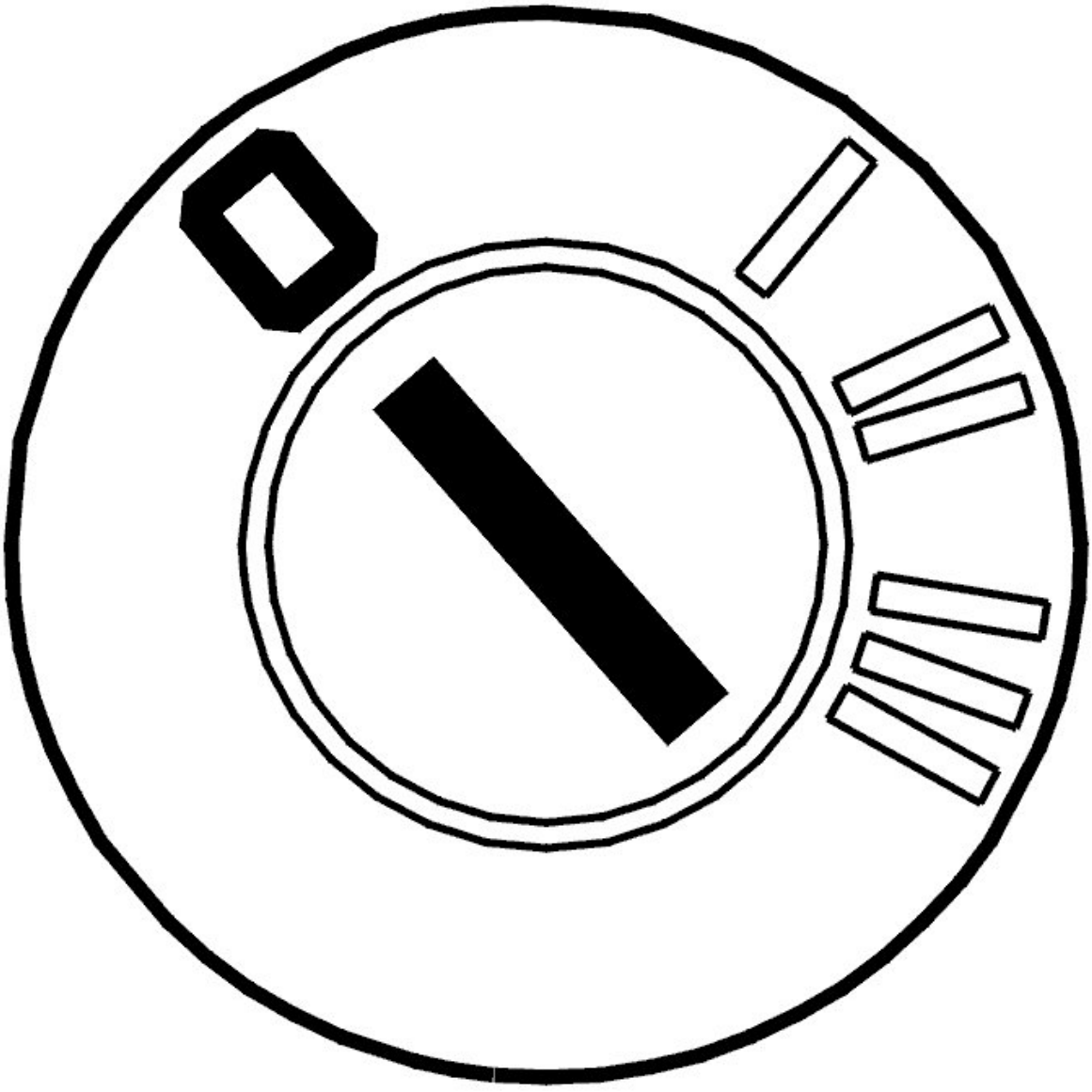
- The parking assistance system does not operate
- Message in the display.

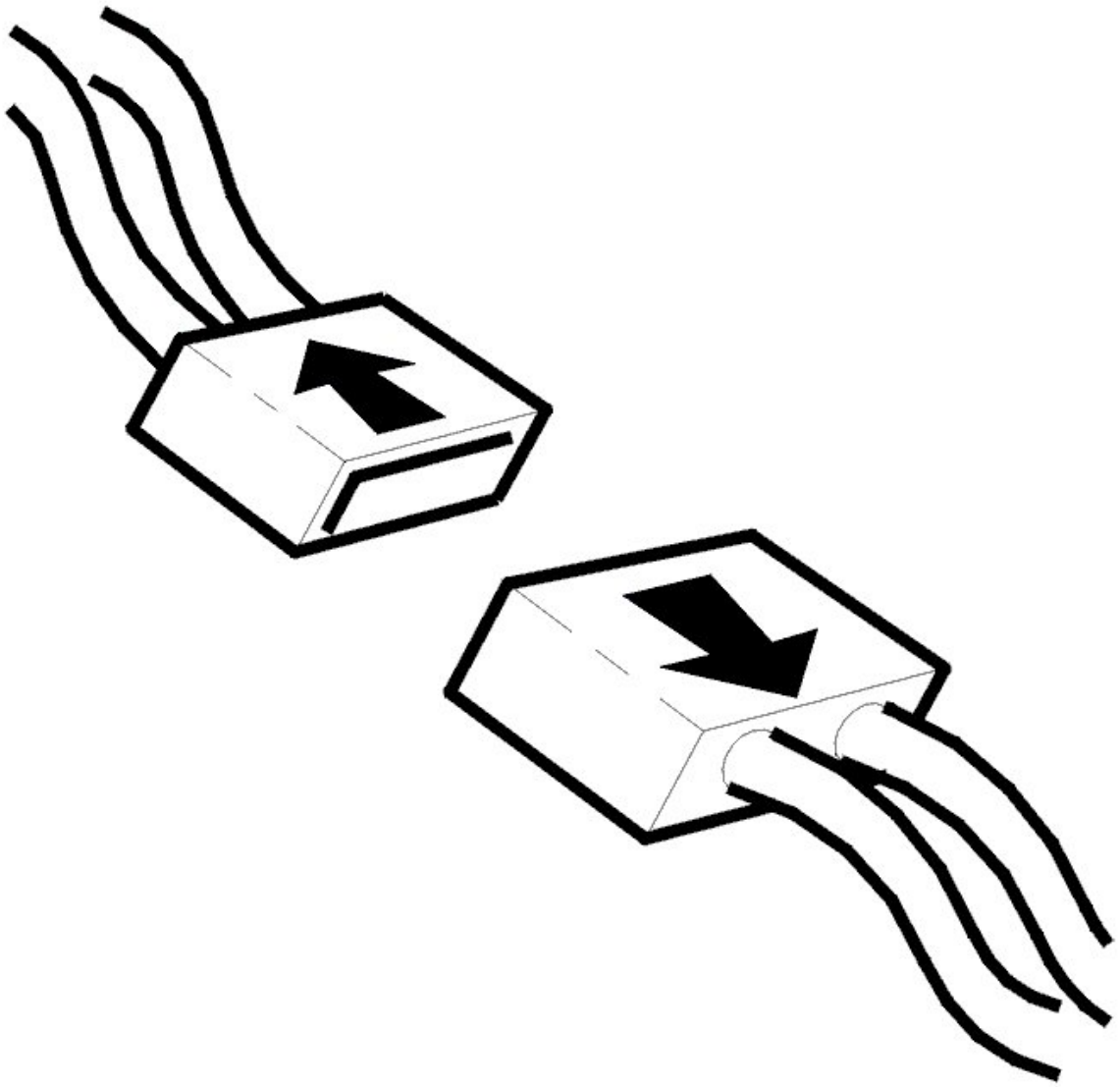
L.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 5 (outer left front) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B5 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

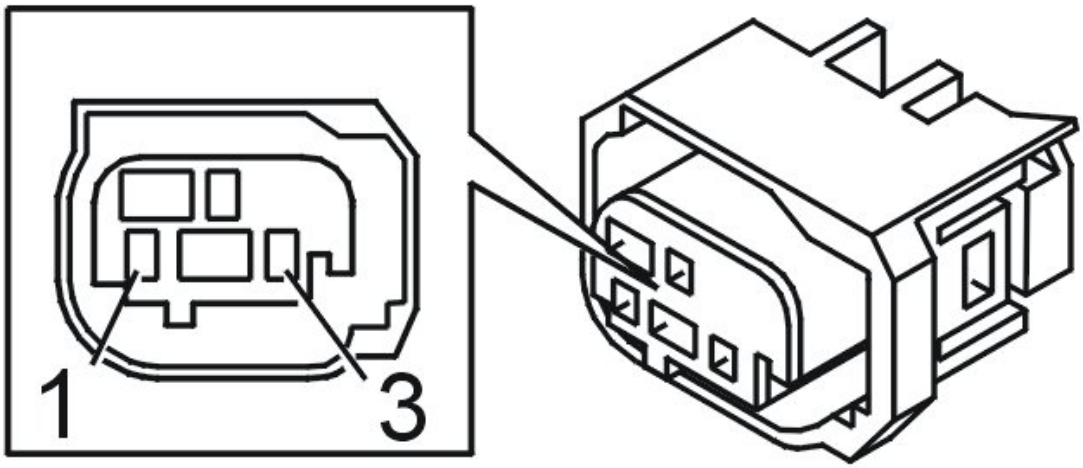
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, L.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



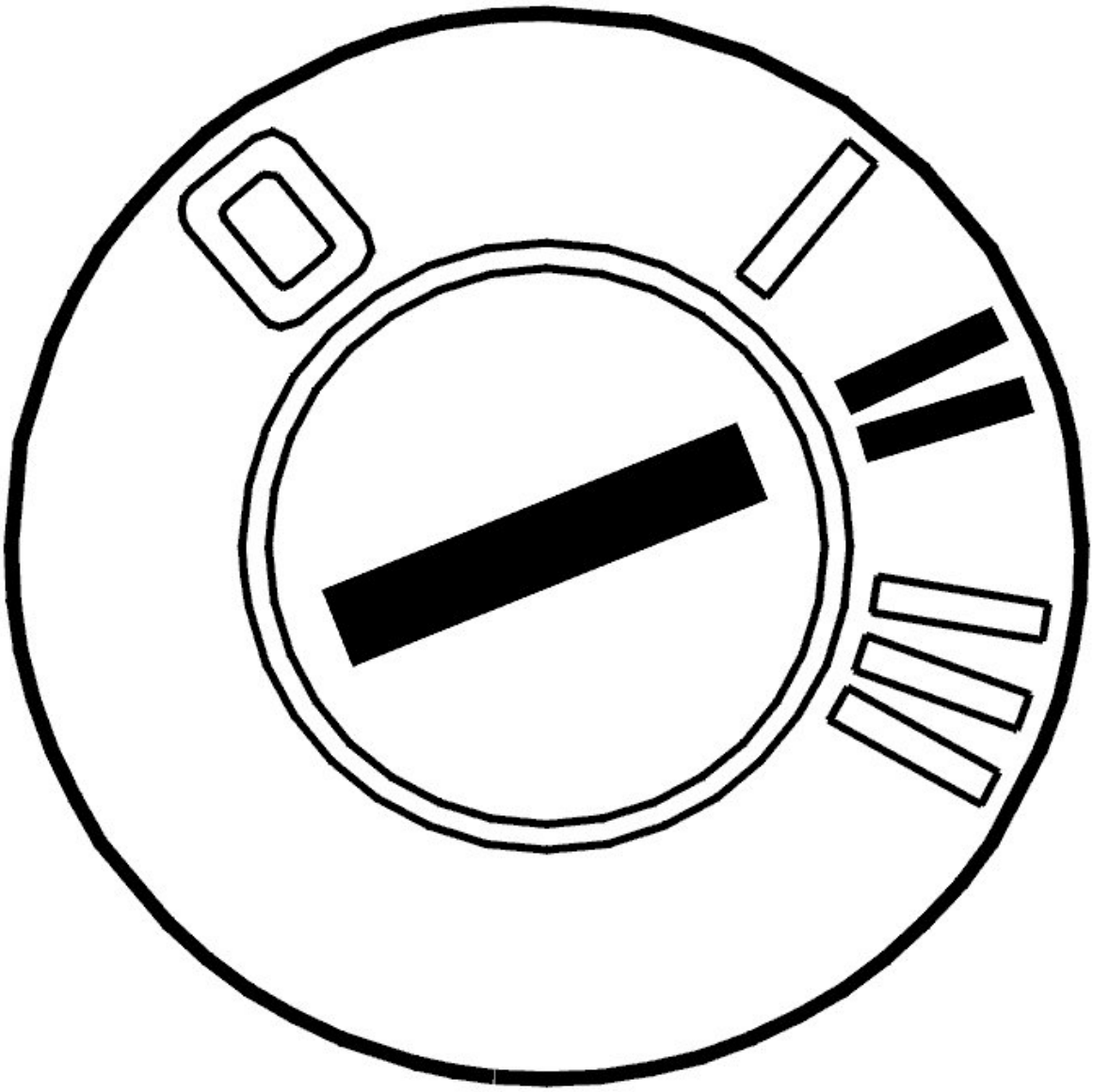
Continue - Verification

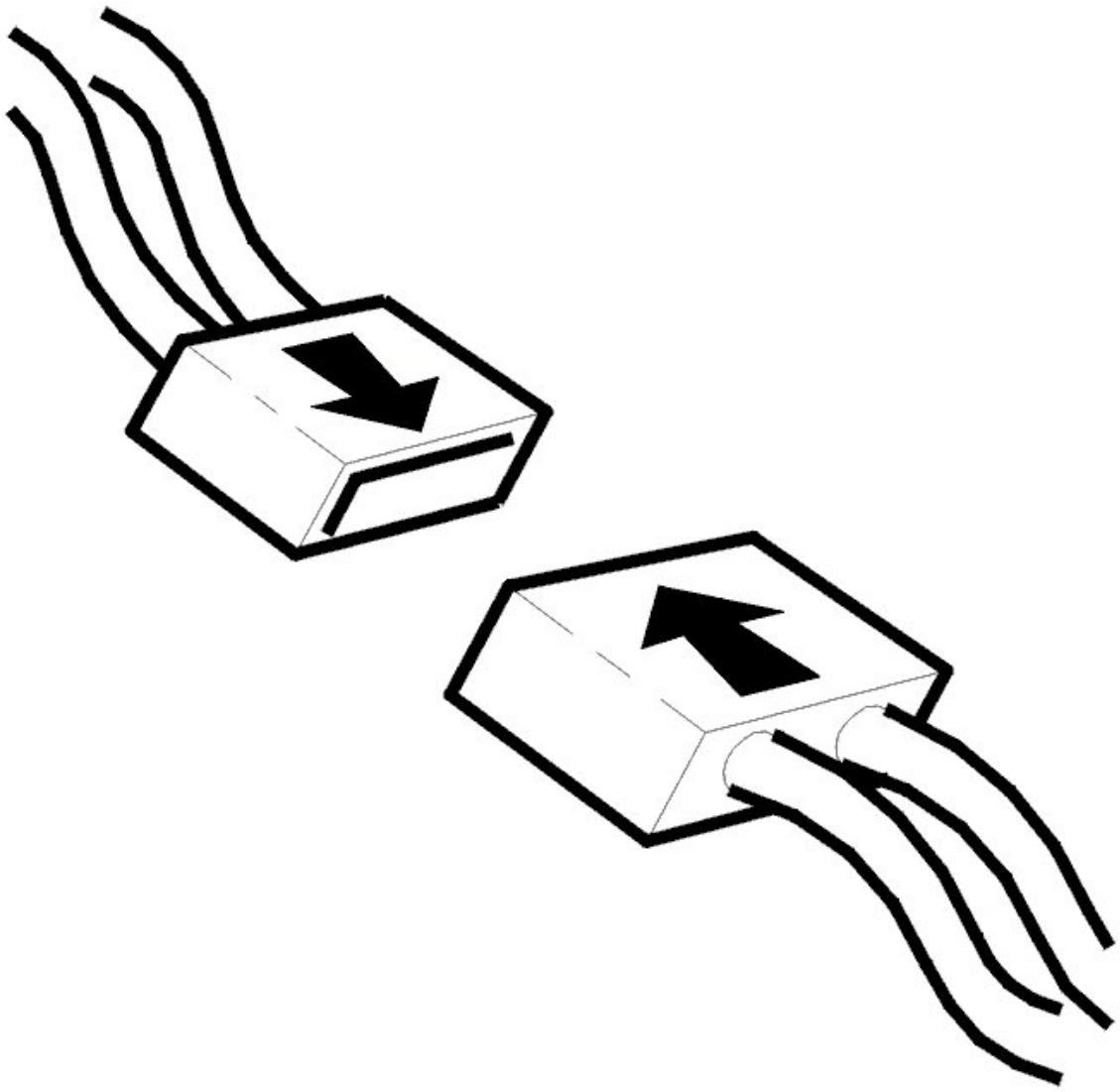
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

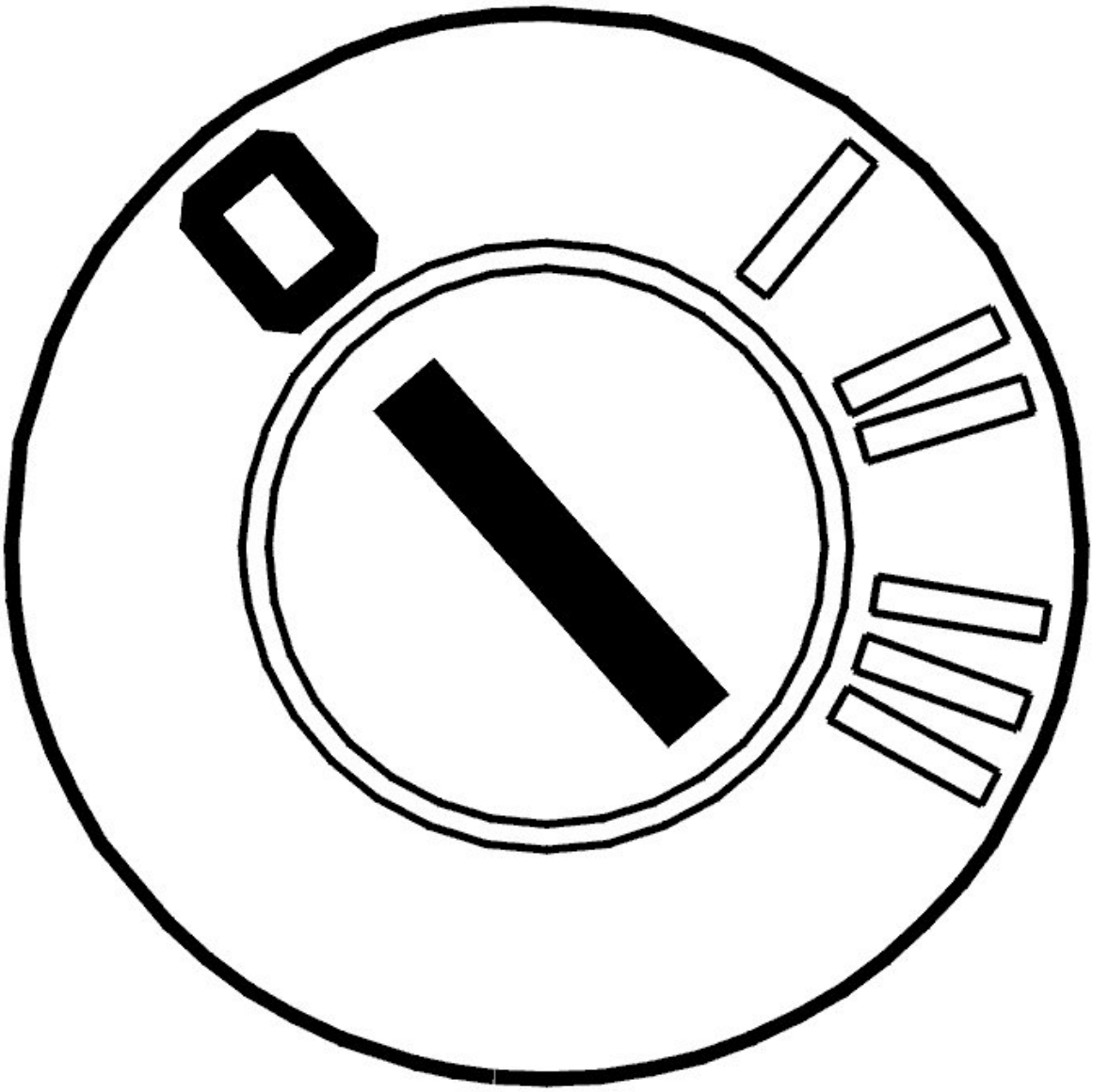
Attempt New Test - Checking components and wiring

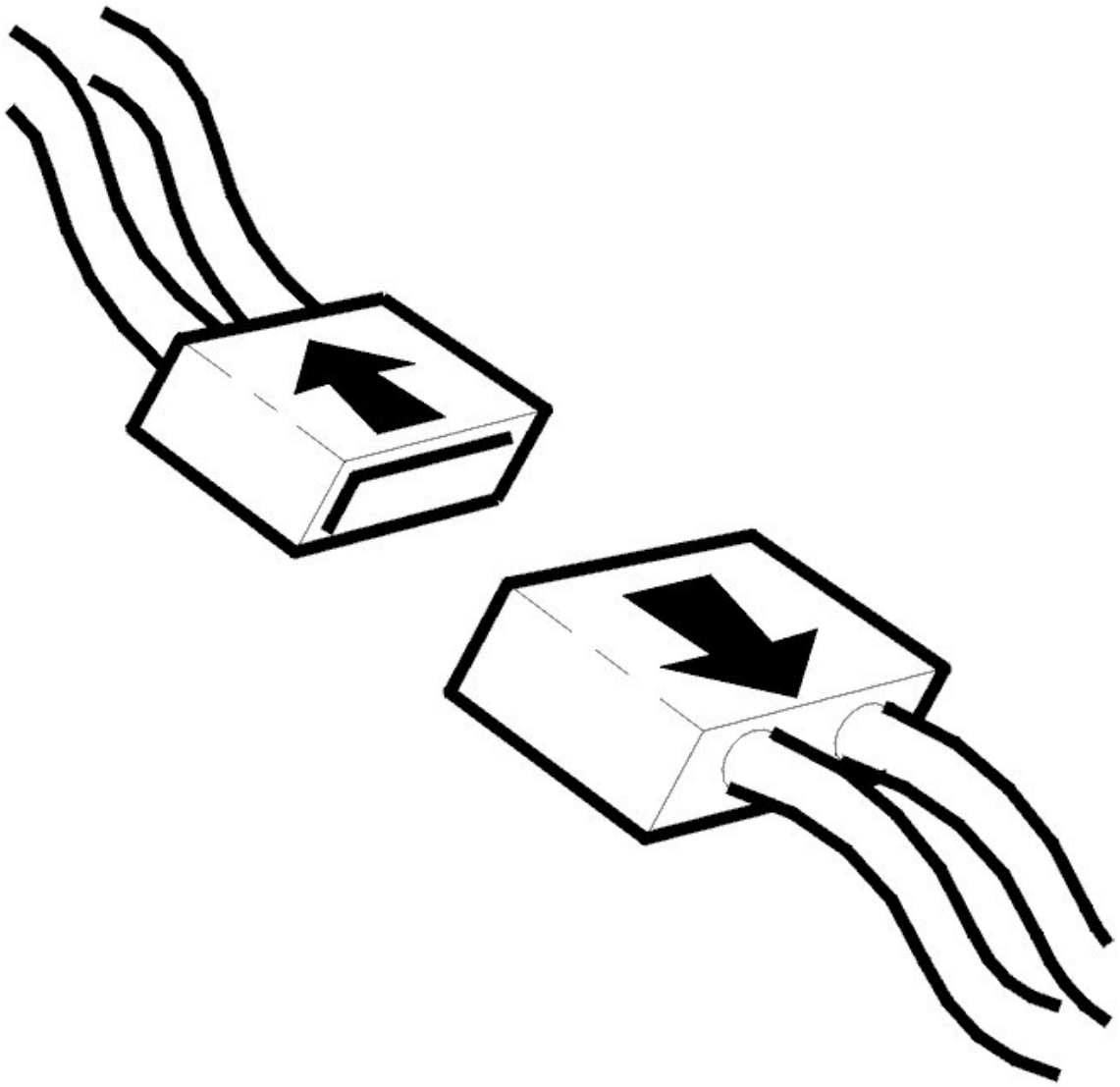
R.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 5 (outer right front) and the parking assistance module (PAM). Check for damage to pins and terminals. Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B5 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

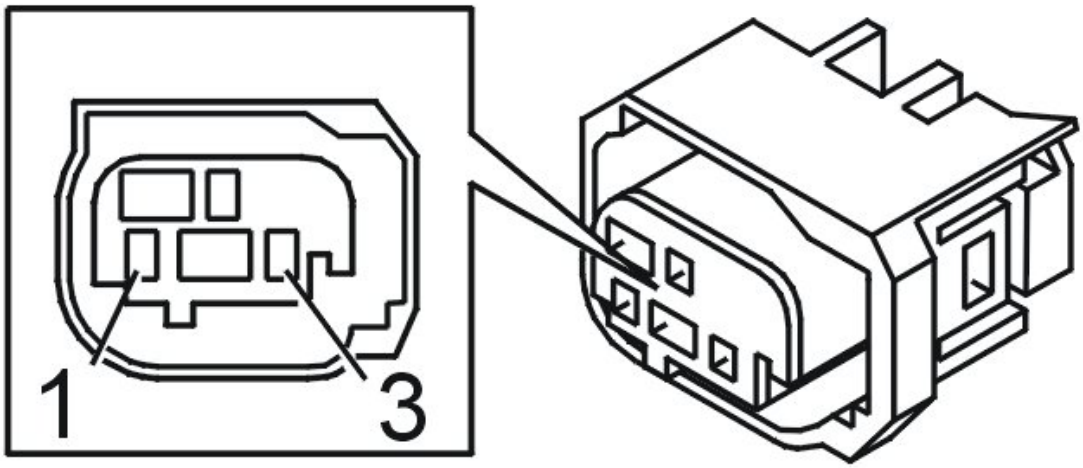
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, R.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



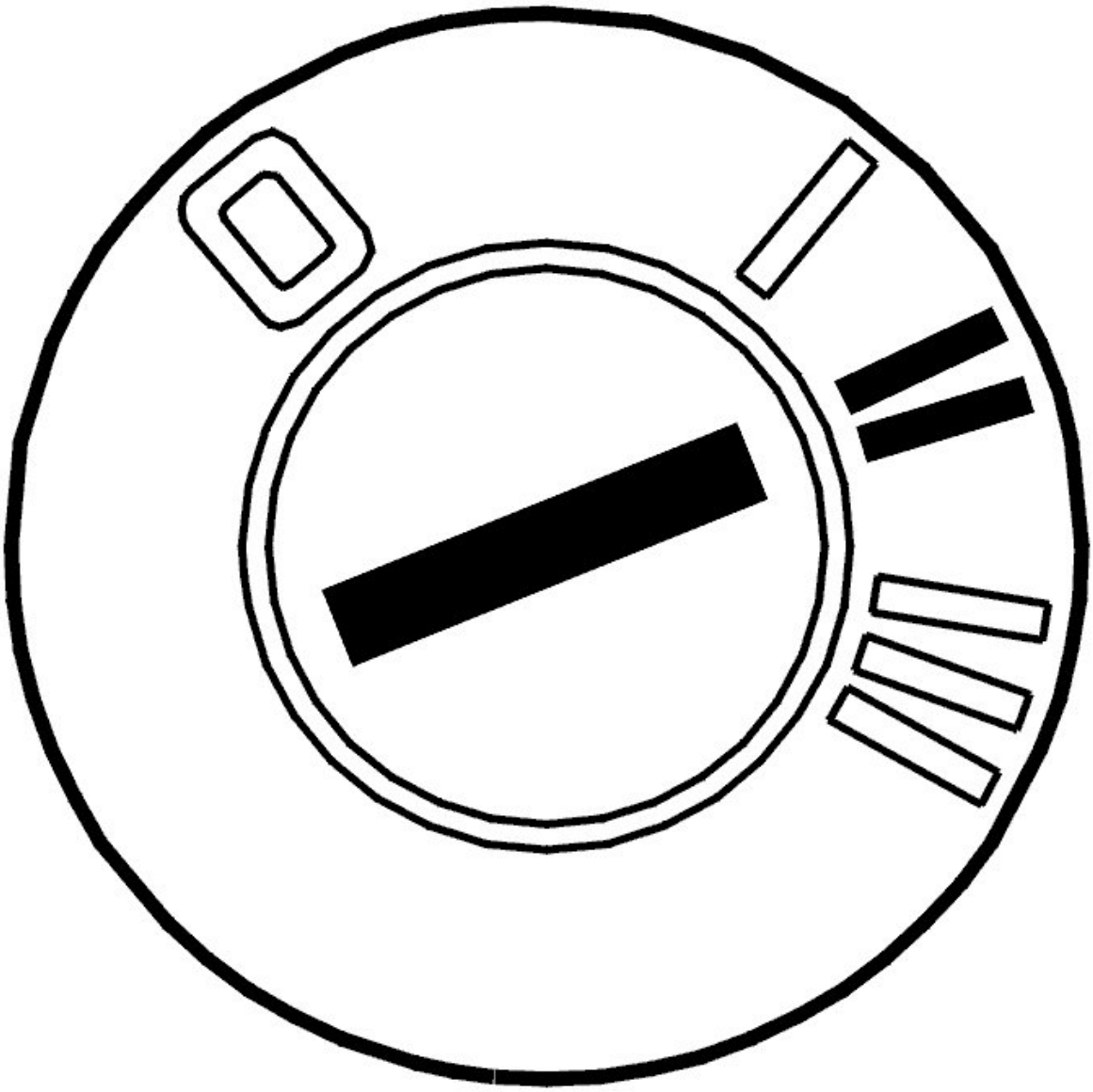
Continue - Verification

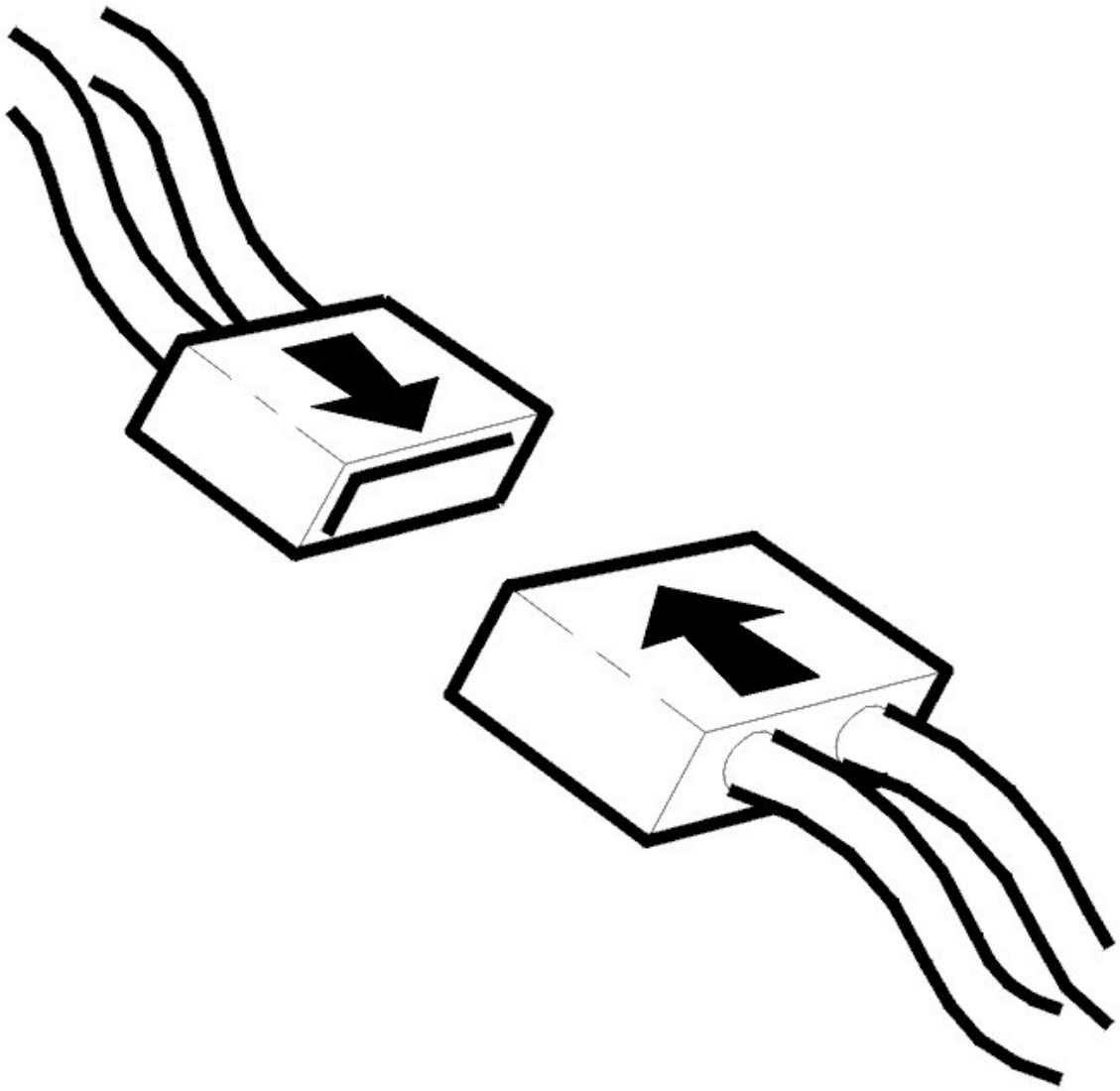
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

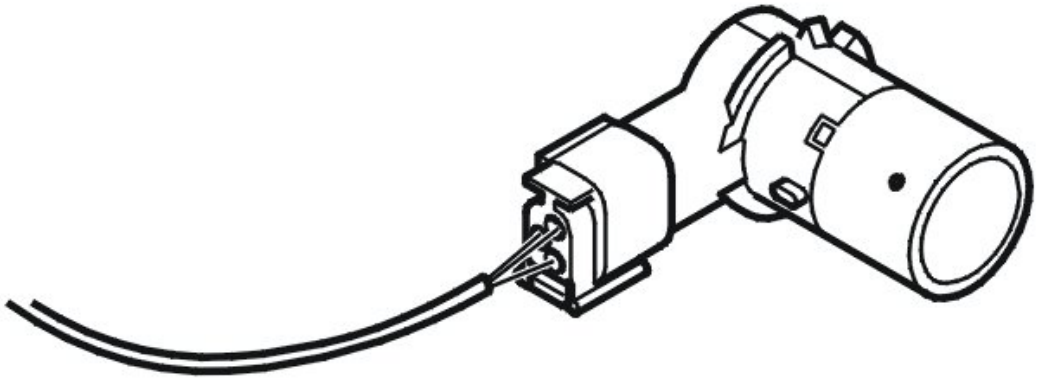
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F47

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 6.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (6).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 6
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 6
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 6.

Fault symptom[s]

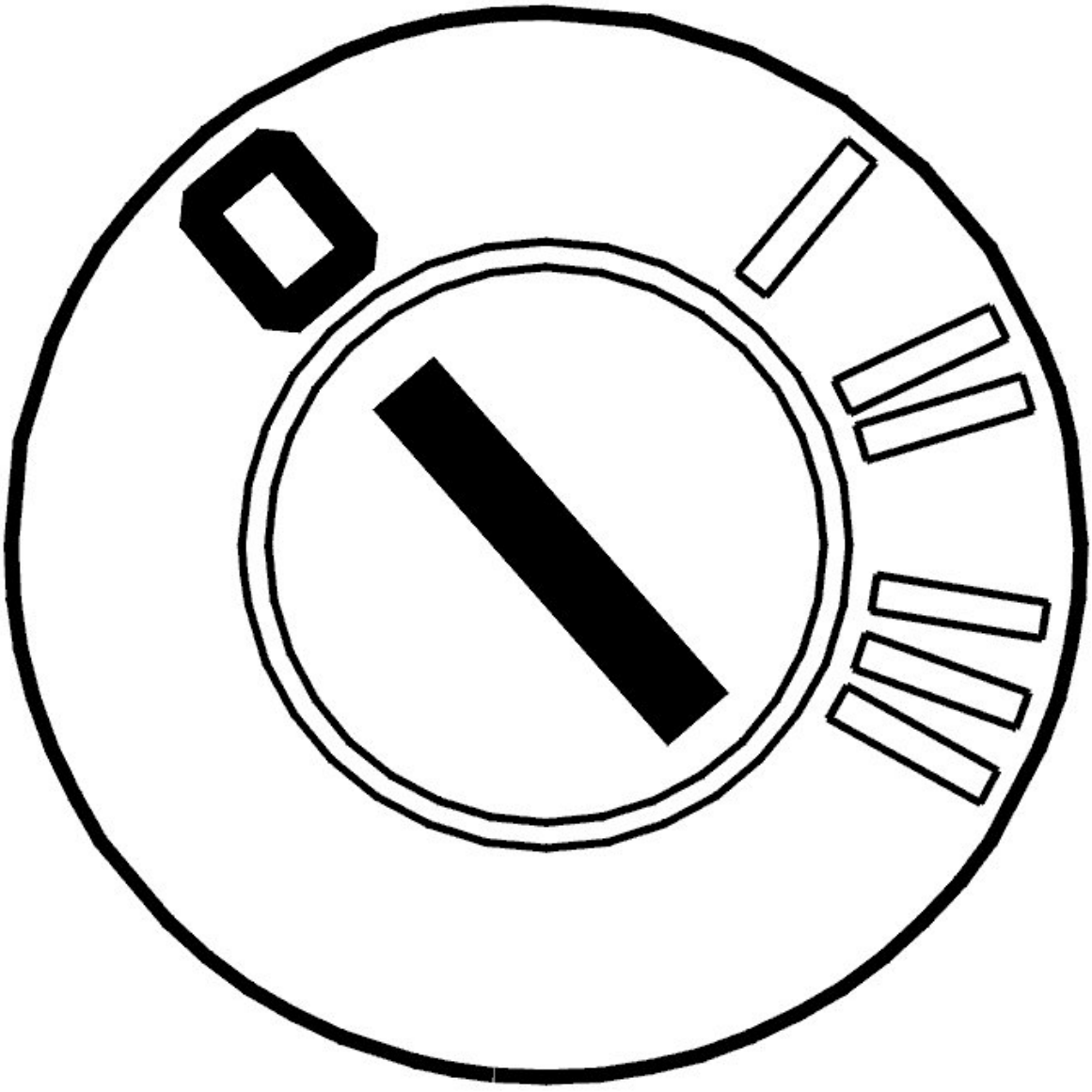
- The parking assistance system does not operate
- Message in the display.

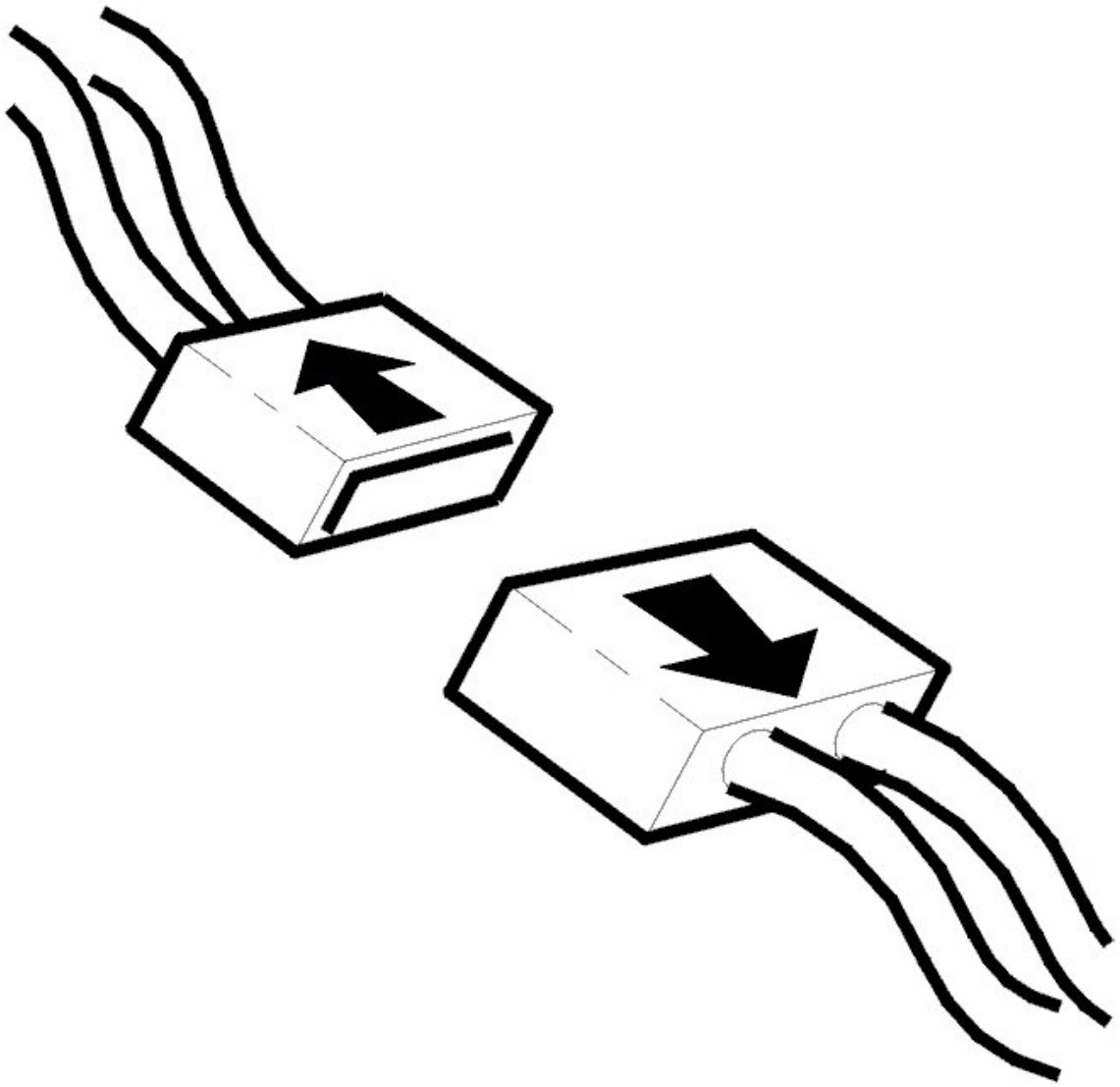
L.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 6 (inner left front) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B6 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

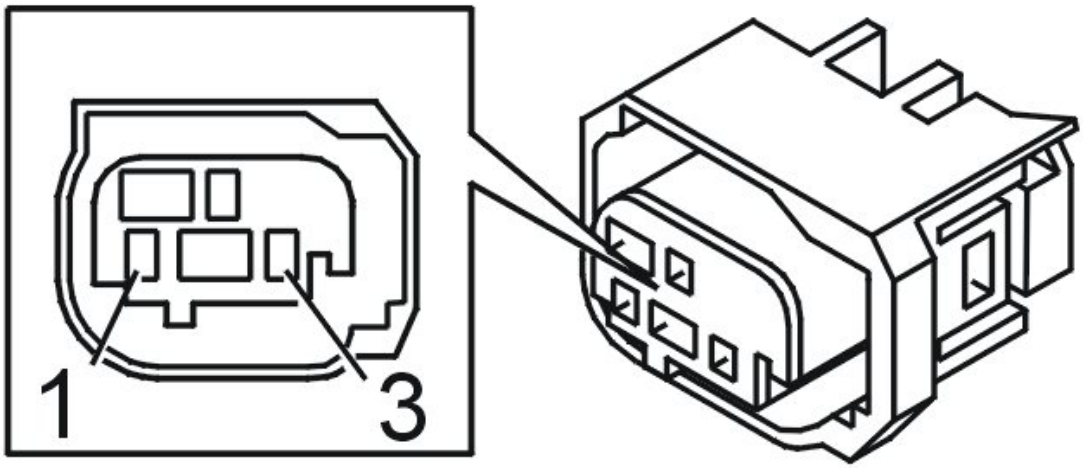
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, L.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



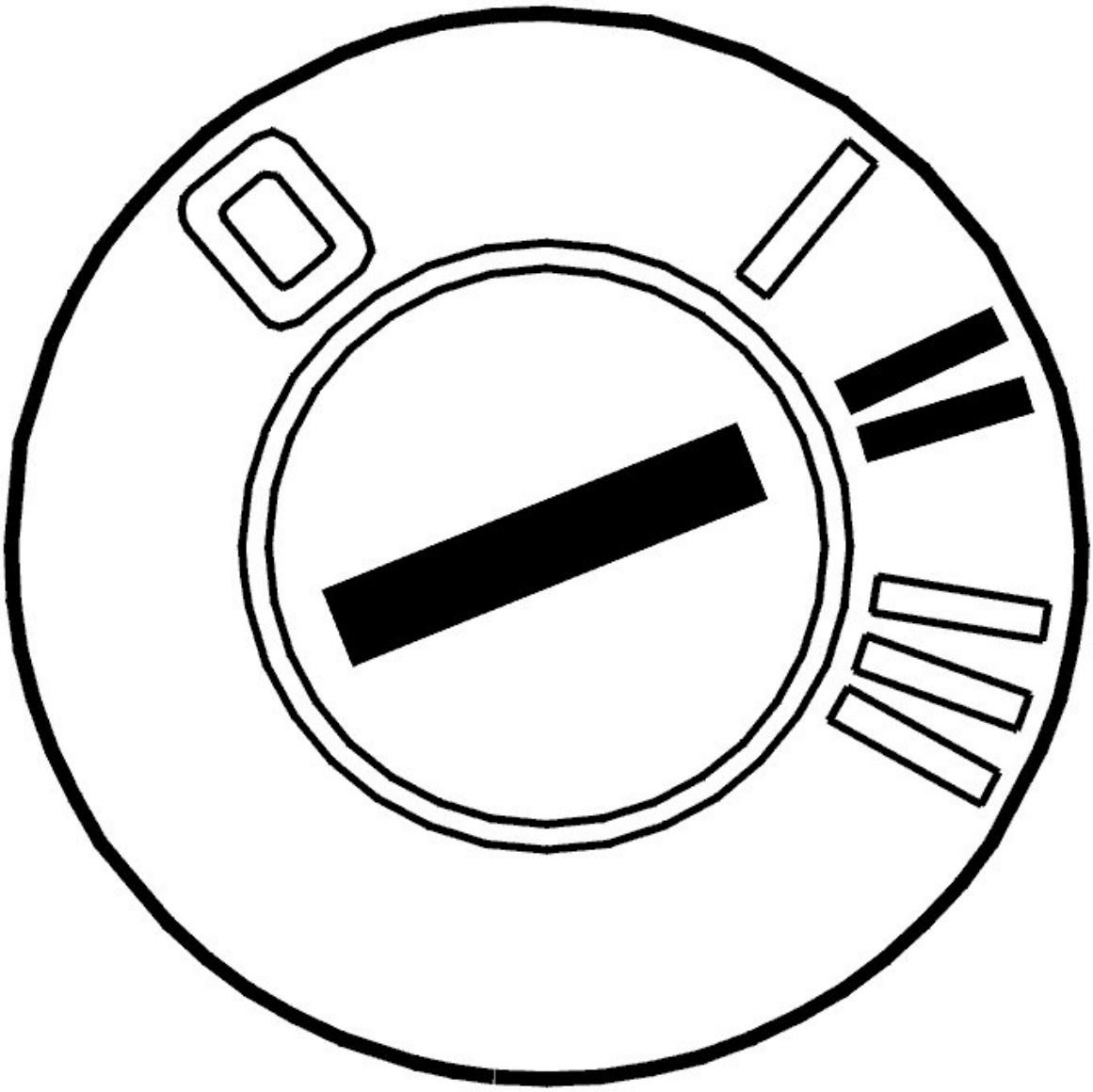
Continue - Verification

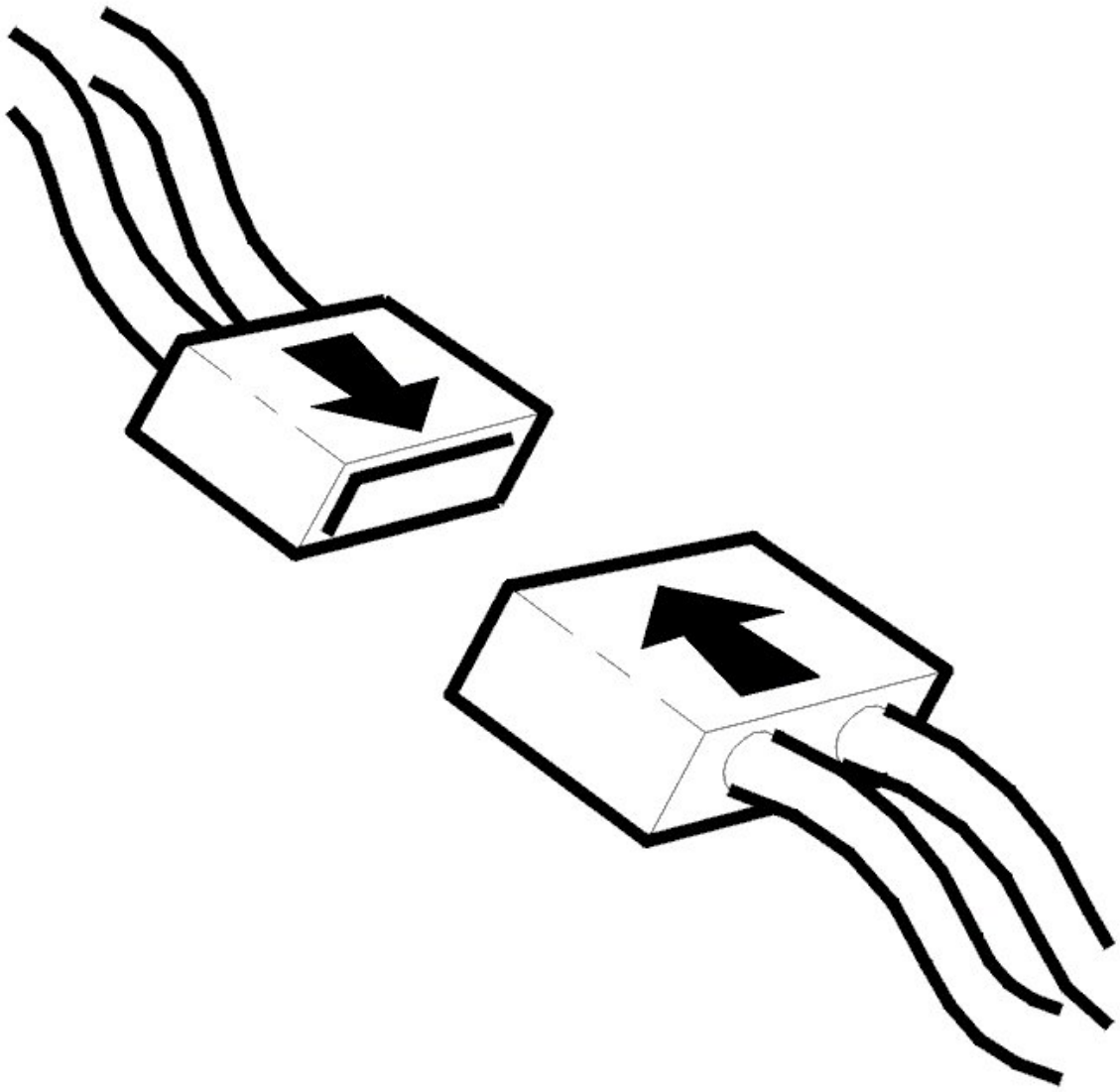
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

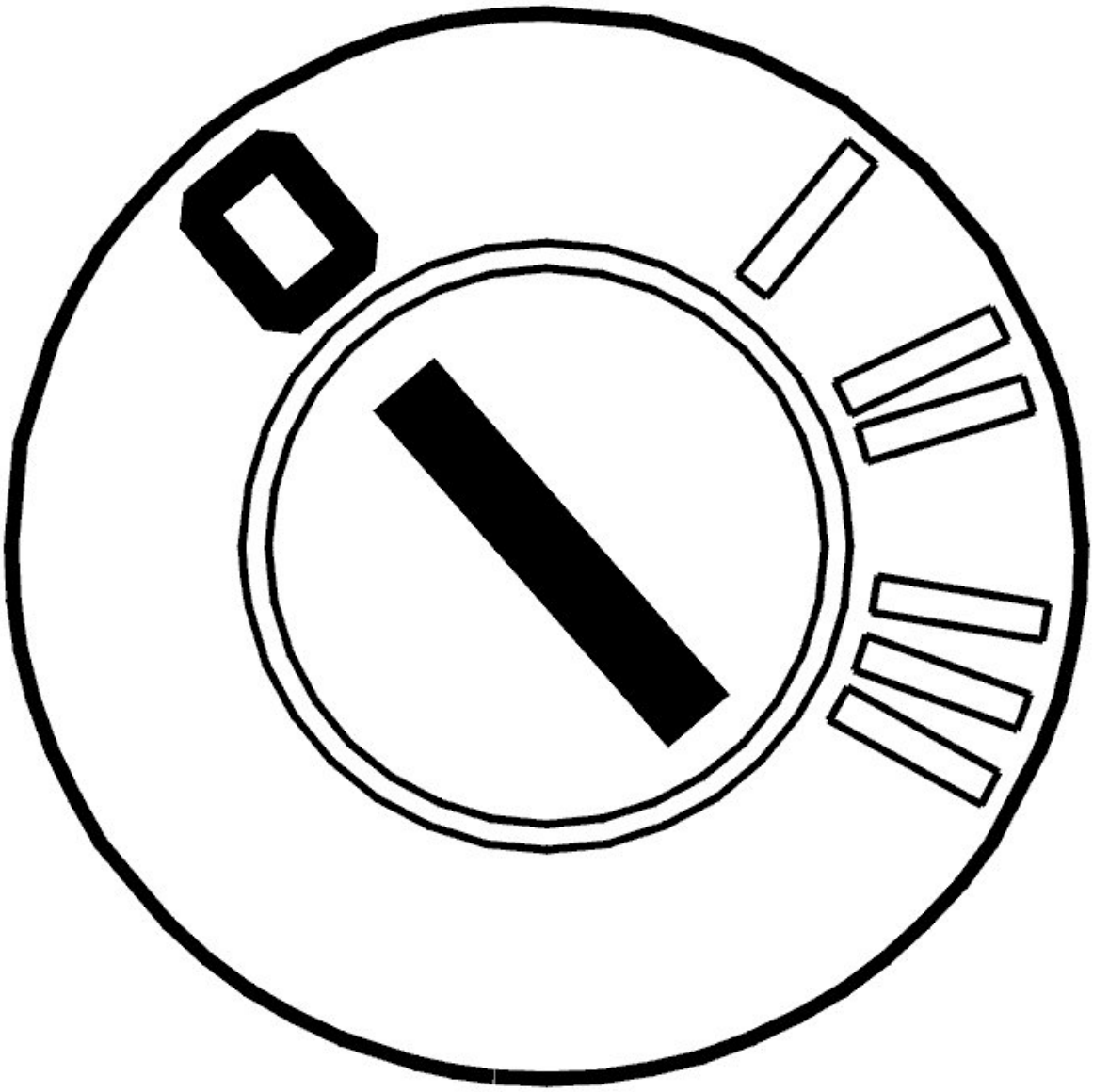
Attempt New Test - Checking components and wiring

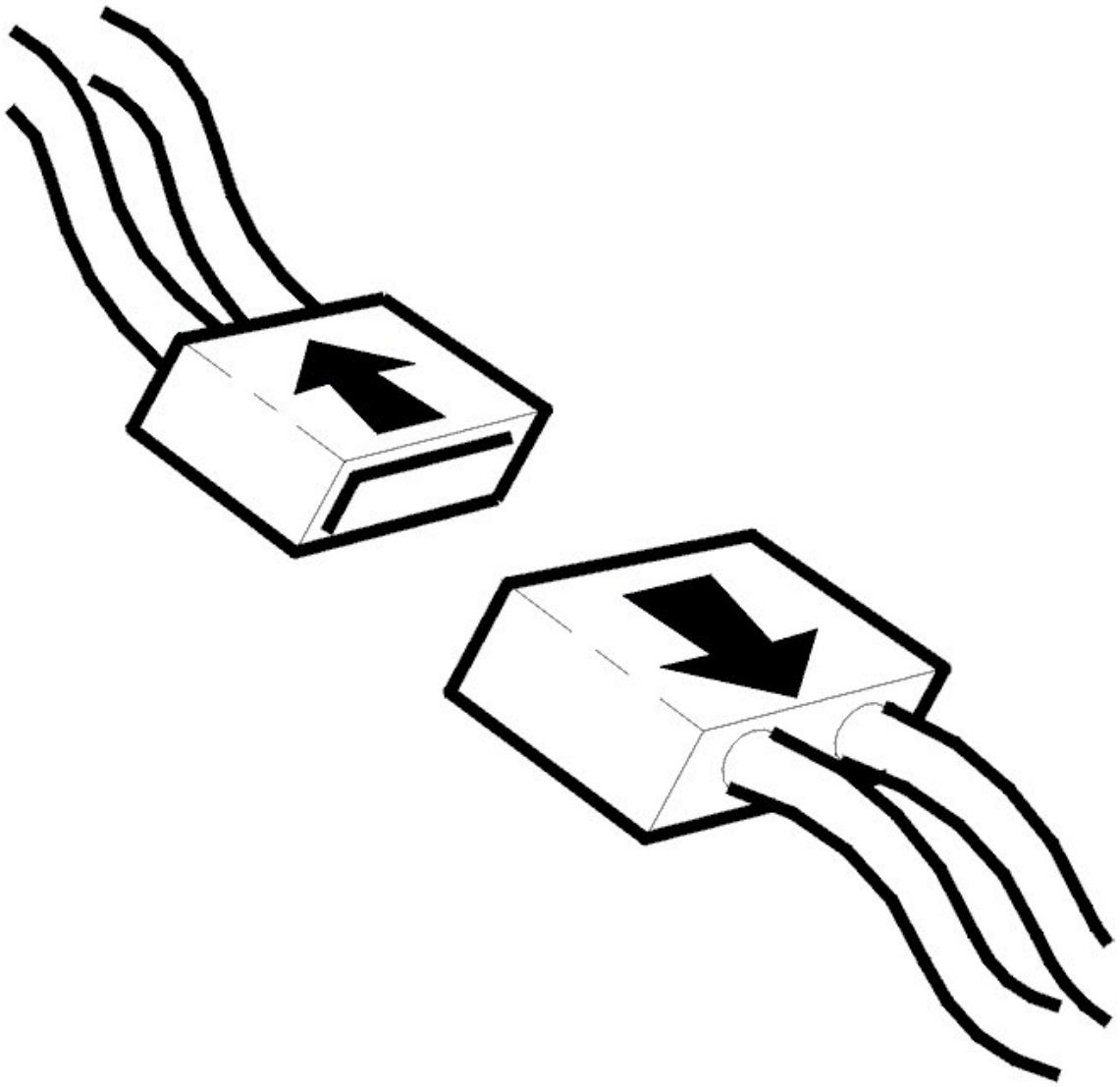
R.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 6 (inner right front) and the parking assistance module (PAM). Check for damage to pins and terminals. Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B6 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

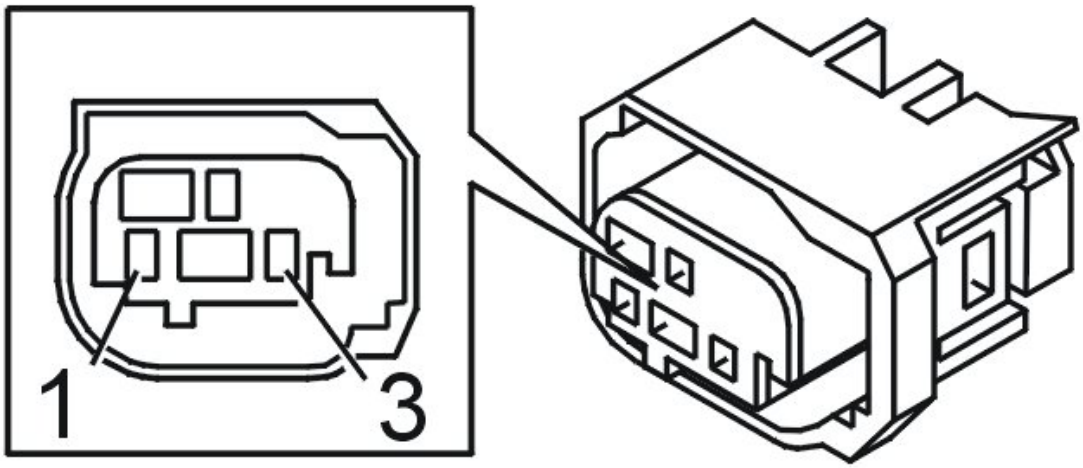
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, R.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



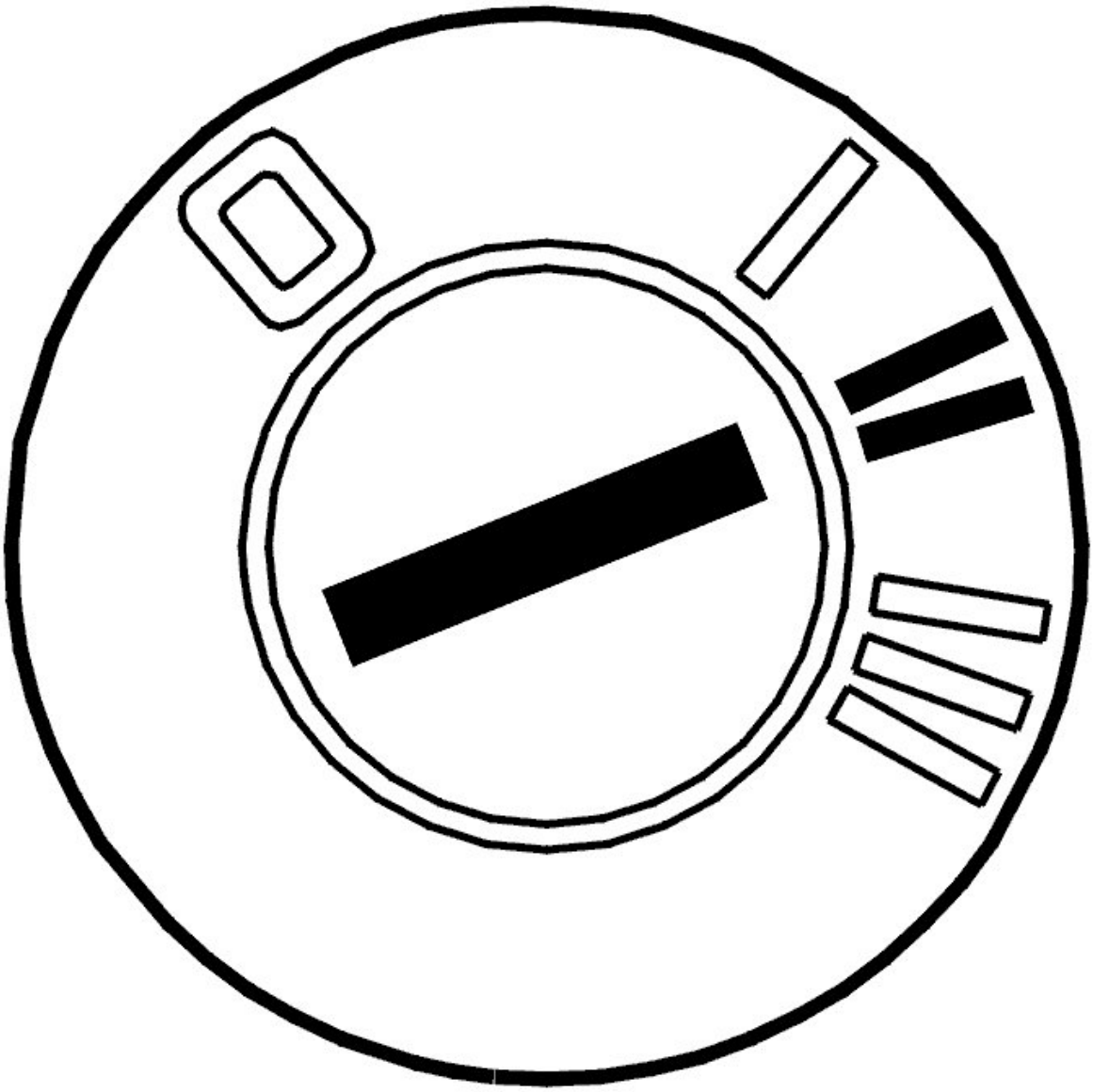
Continue - Verification

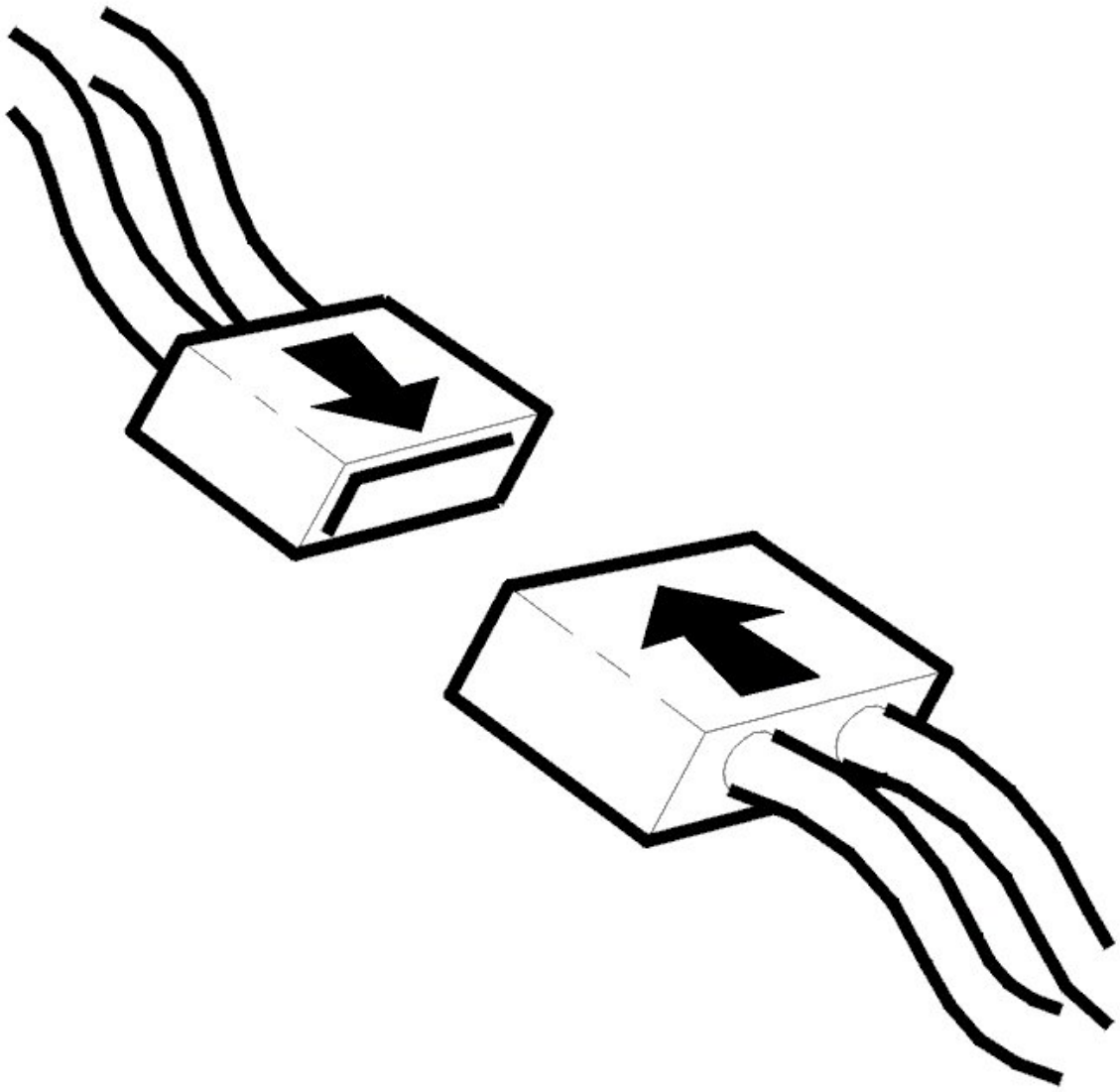
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

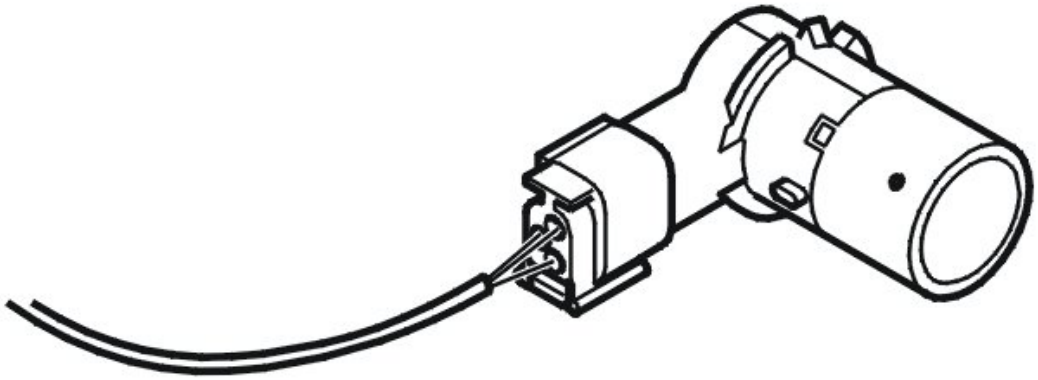
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F48

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 7.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (7).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 7
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 7
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 7.

Fault symptom[s]

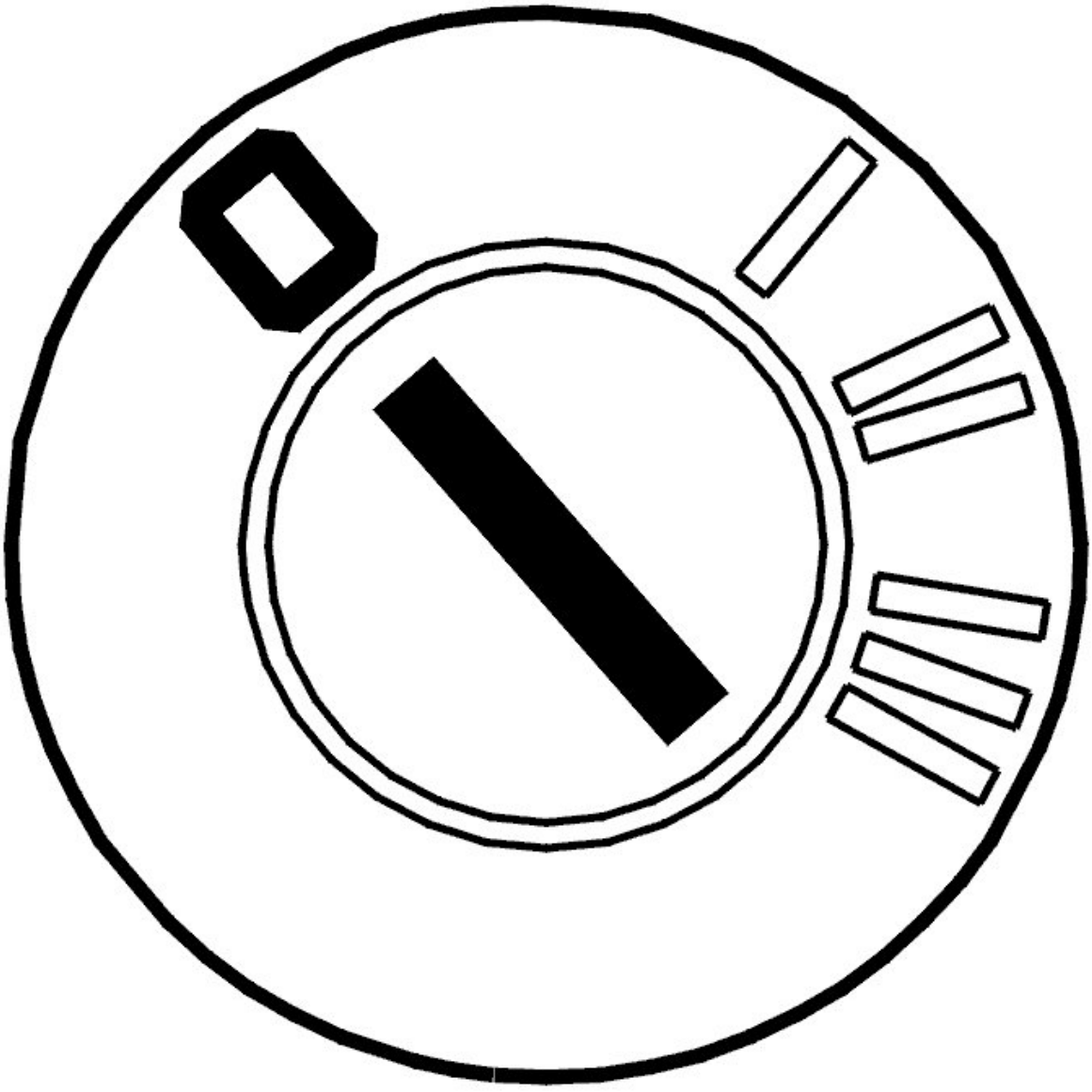
- The parking assistance system does not operate
- Message in the display.

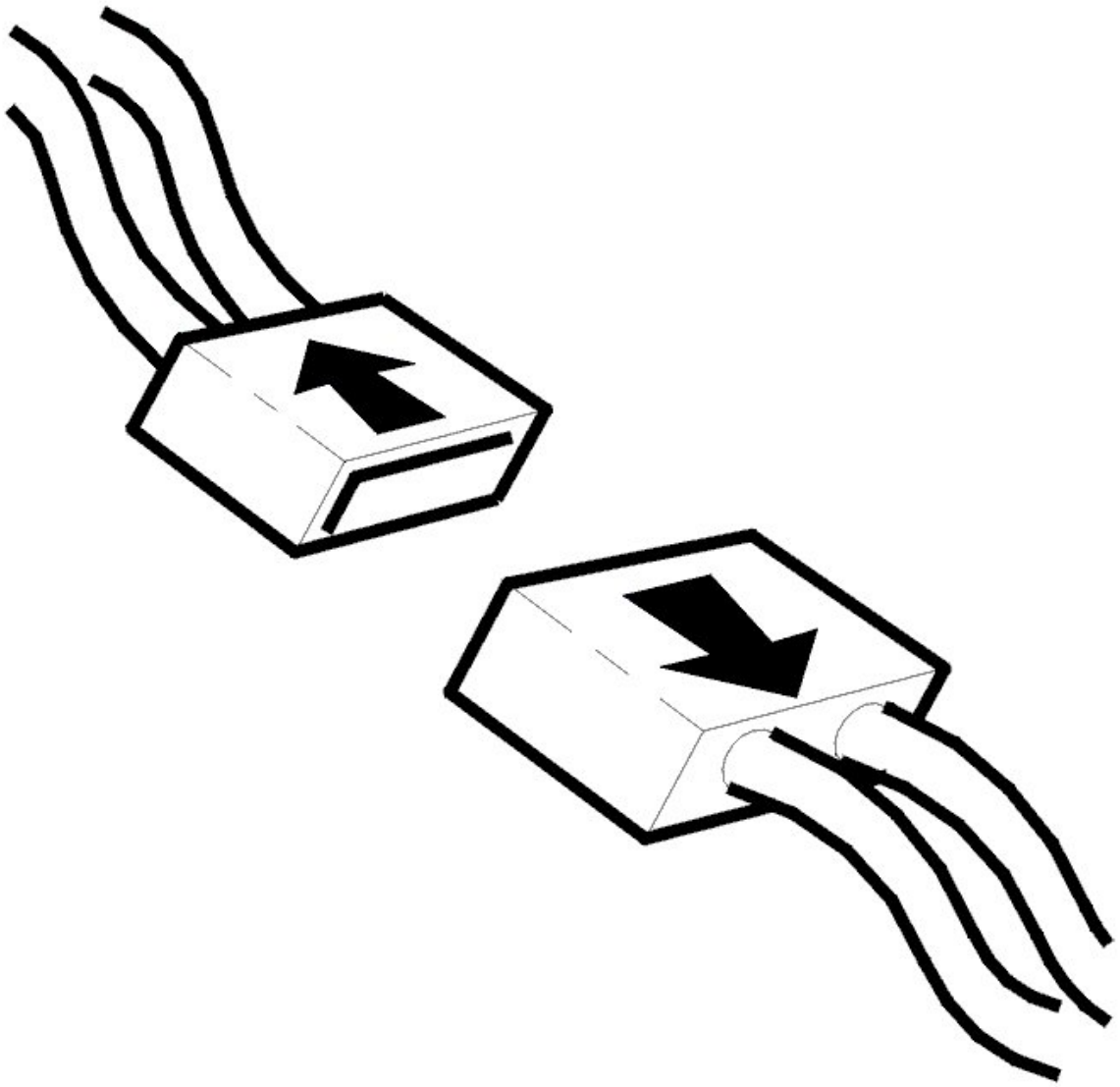
L.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 7 (inner right front) and the parking assistance module (PAM). Check for damage to pins and terminals. Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B7 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

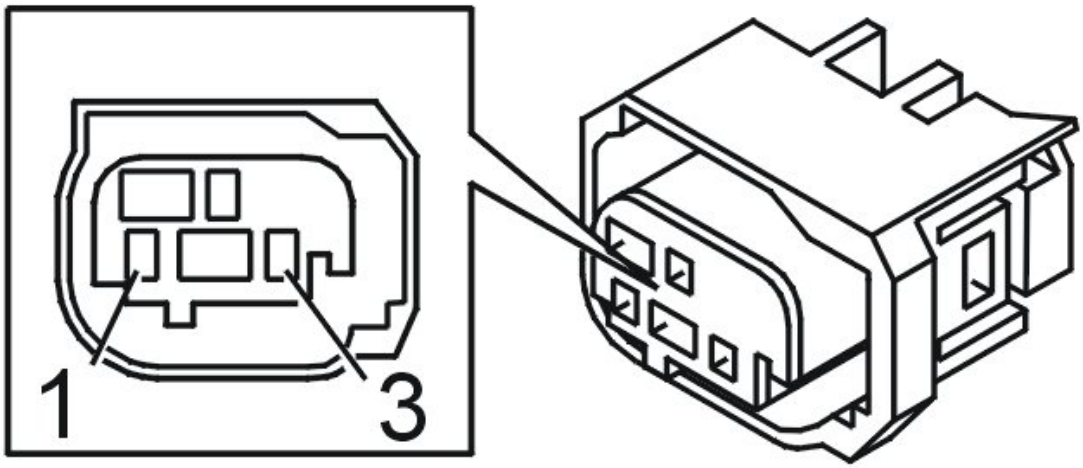
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, L.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



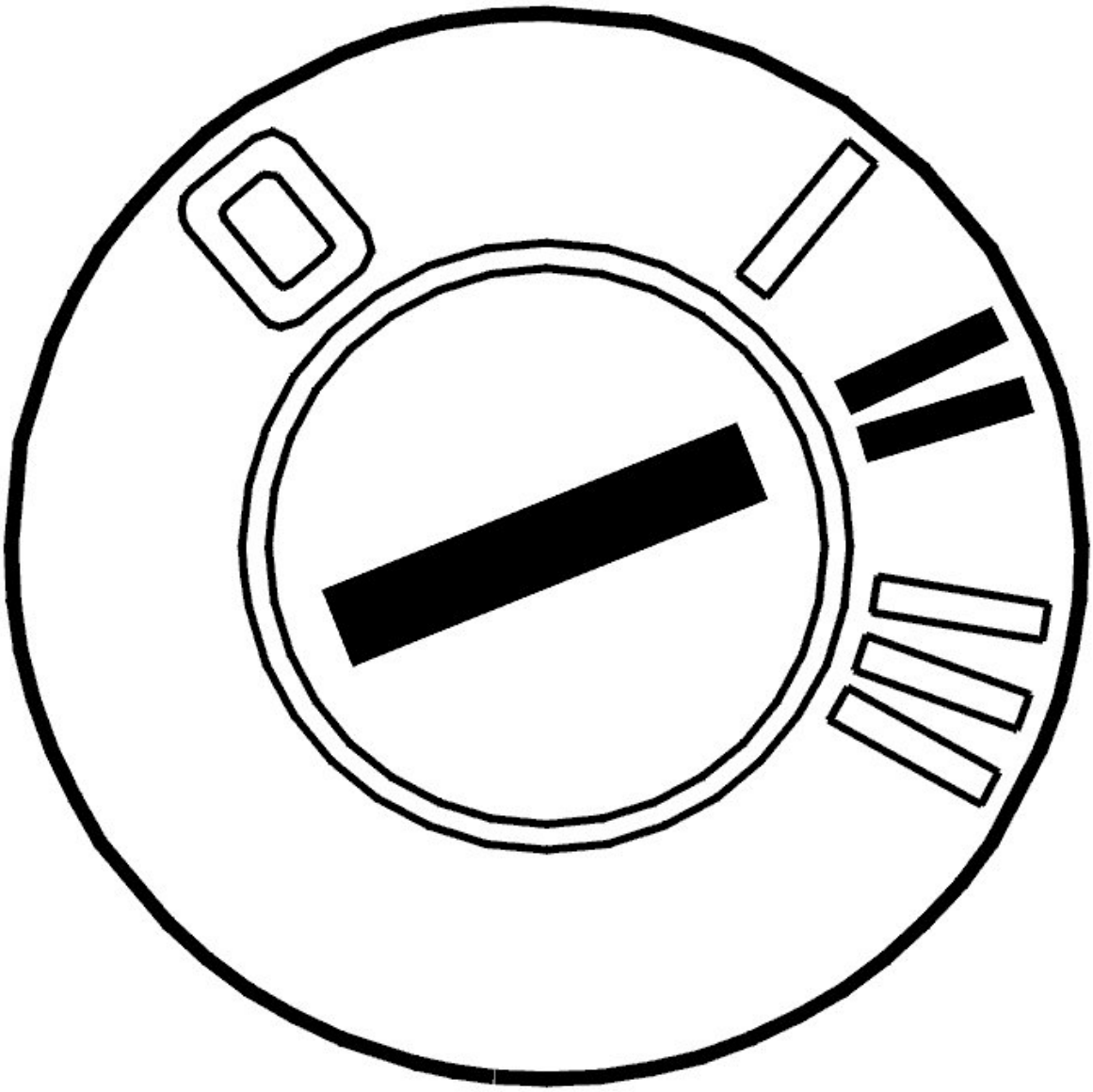
Continue - Verification

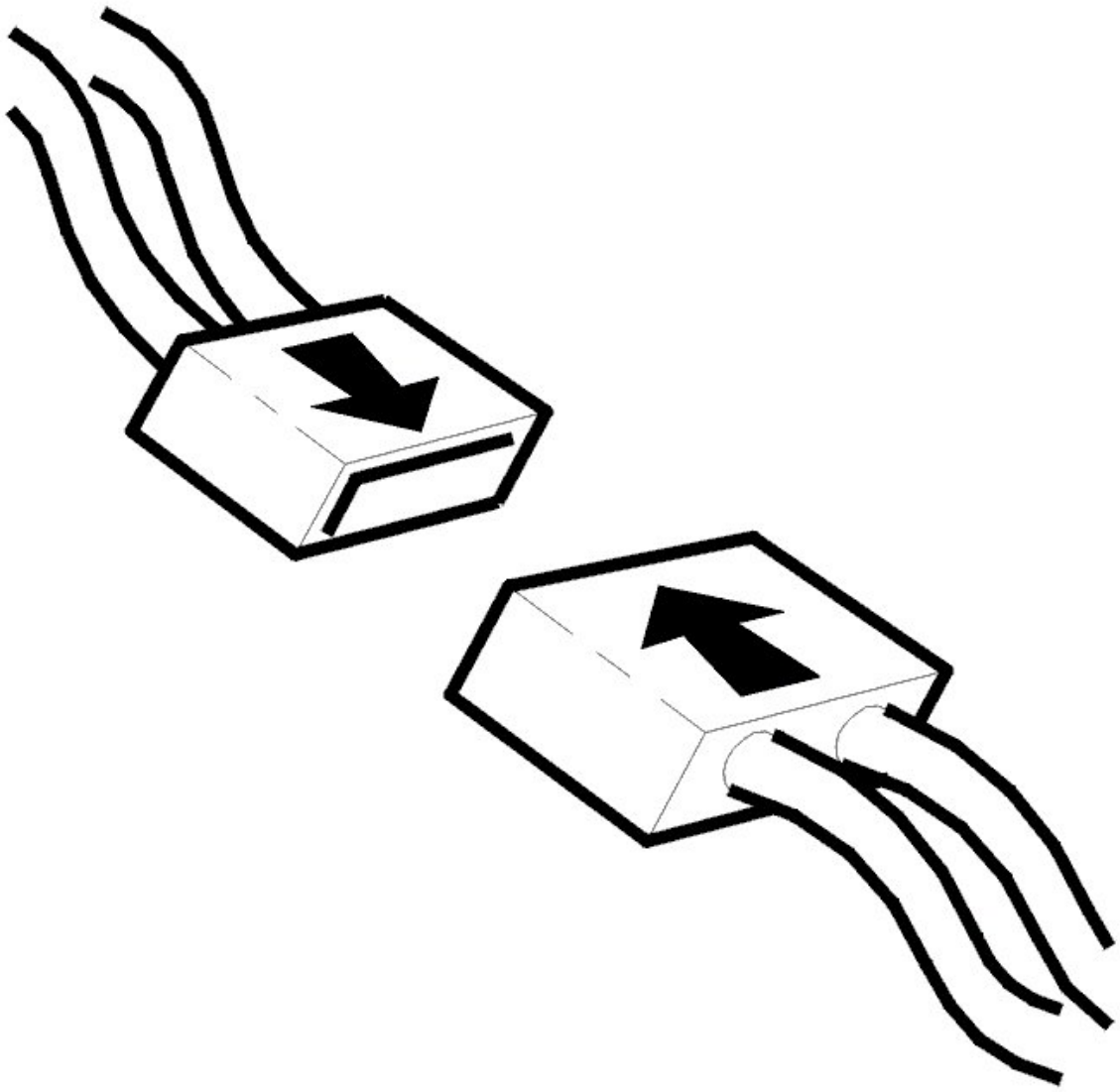
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

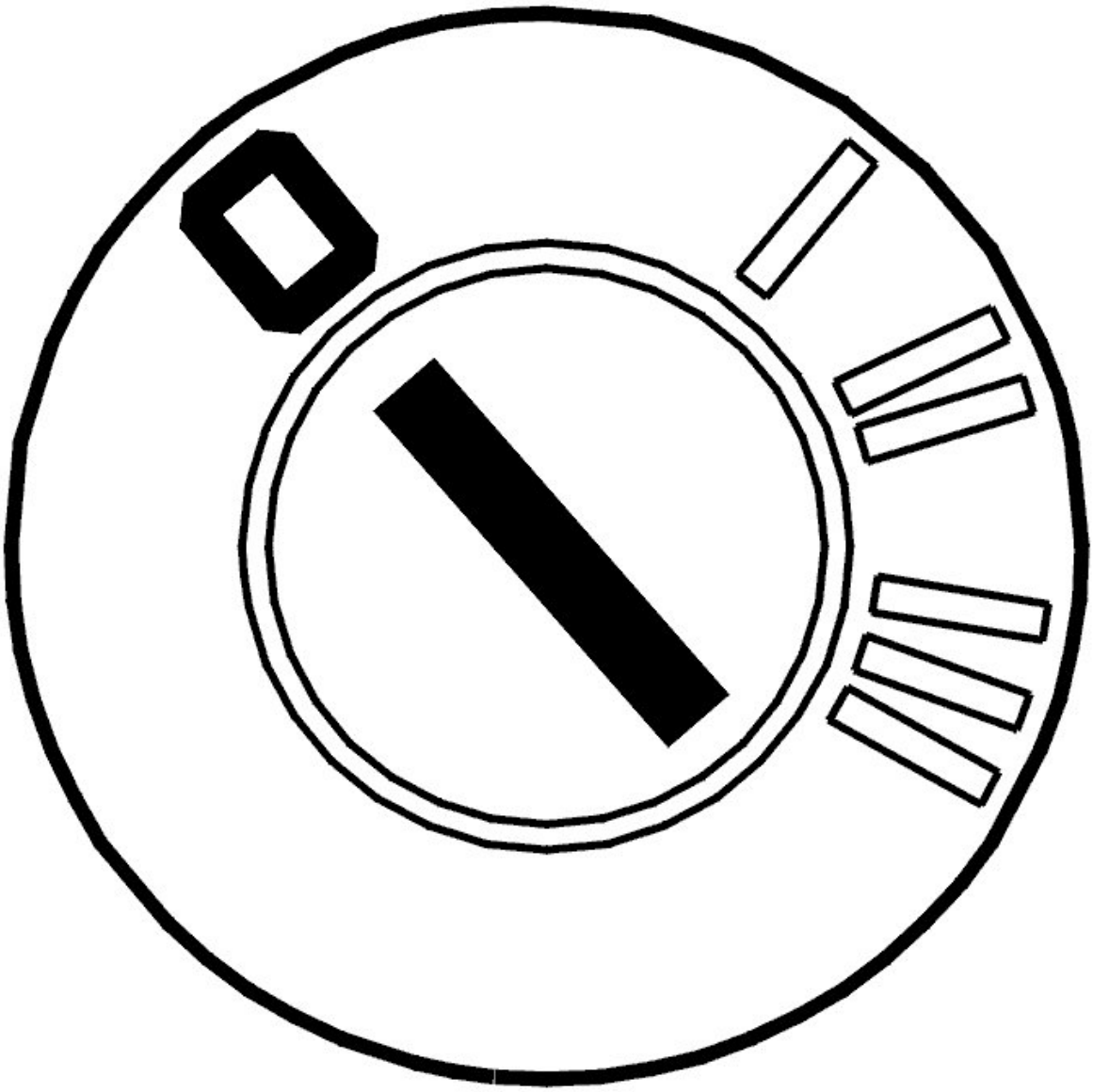
Attempt New Test - Checking components and wiring

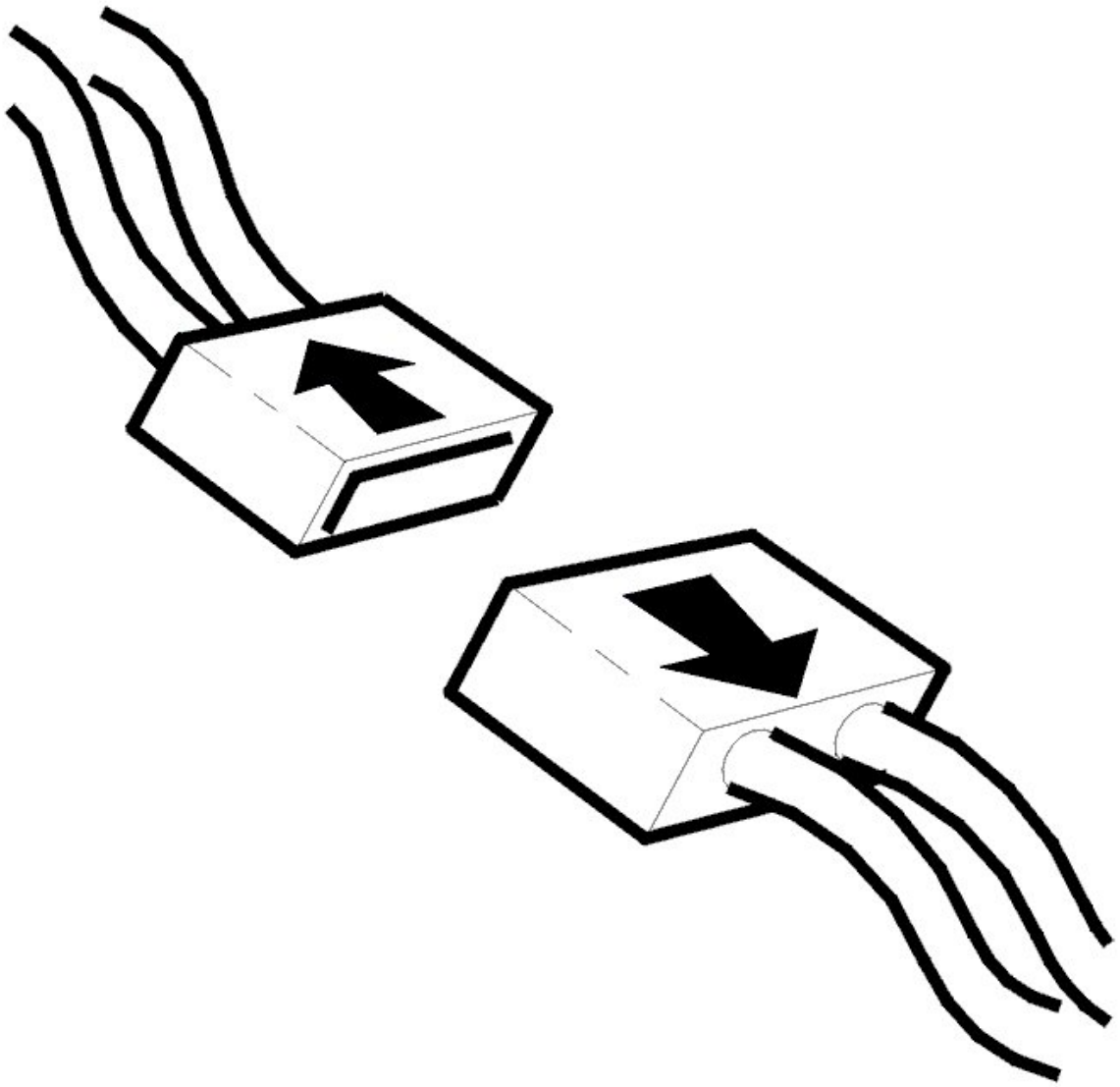
R.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 7 (inner left front) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B7 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

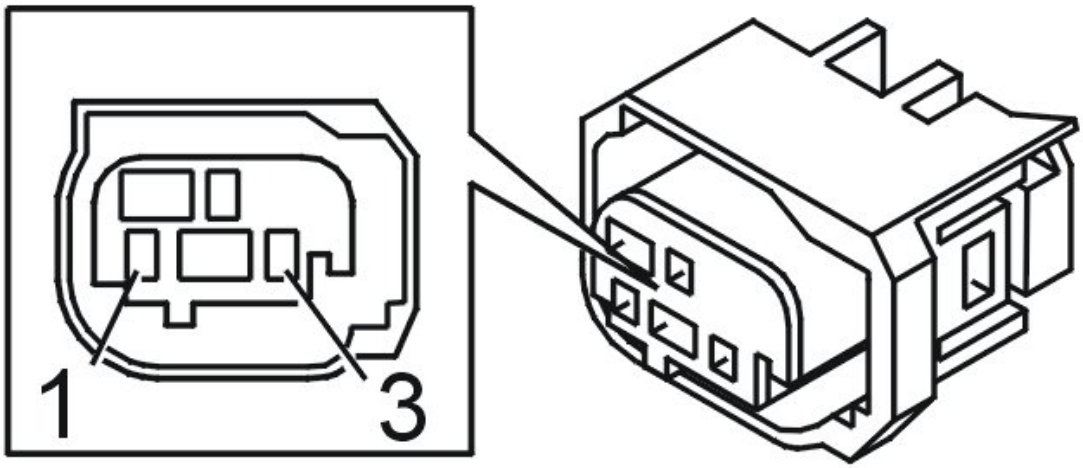
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, R.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



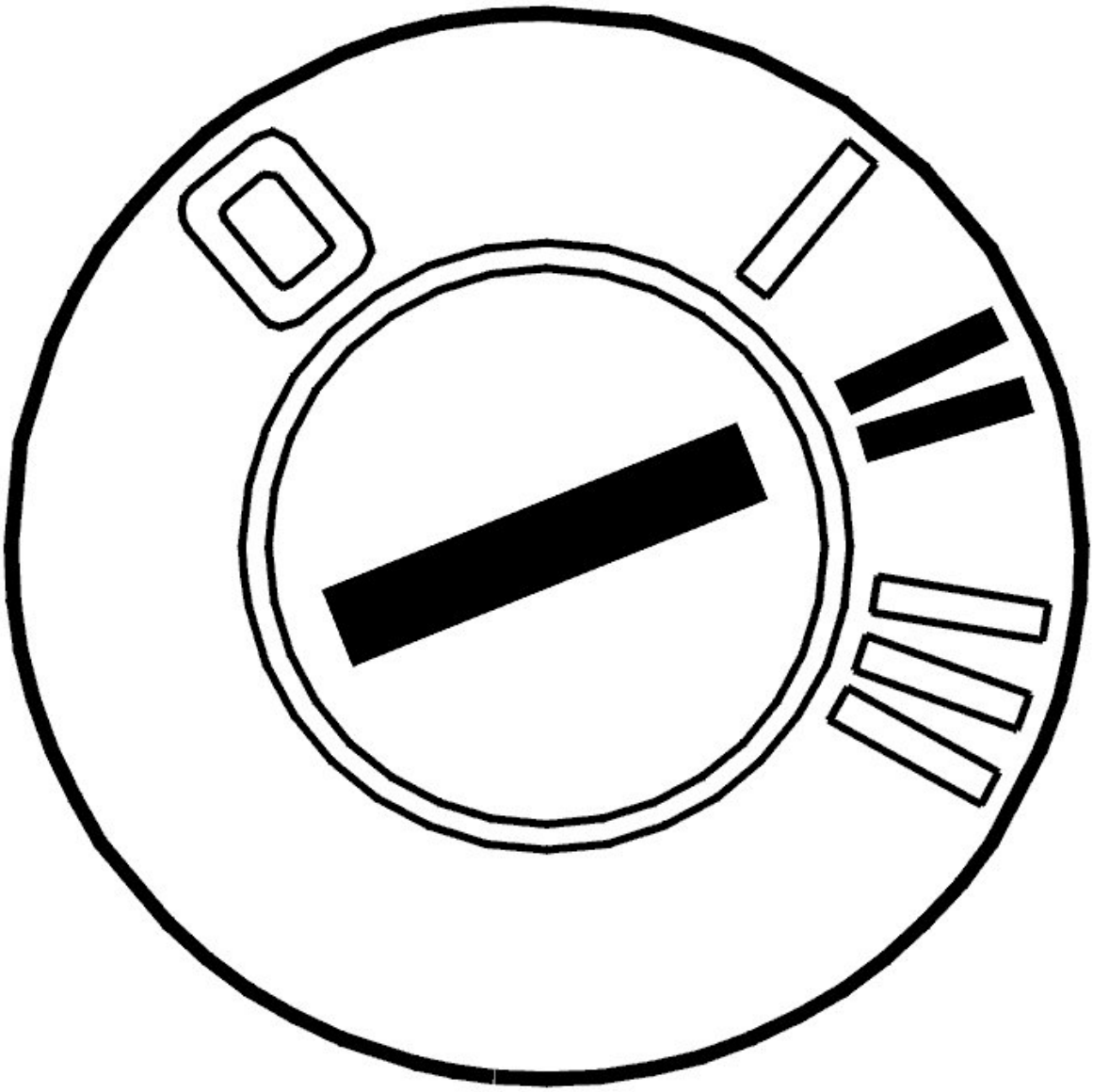
Continue - Verification

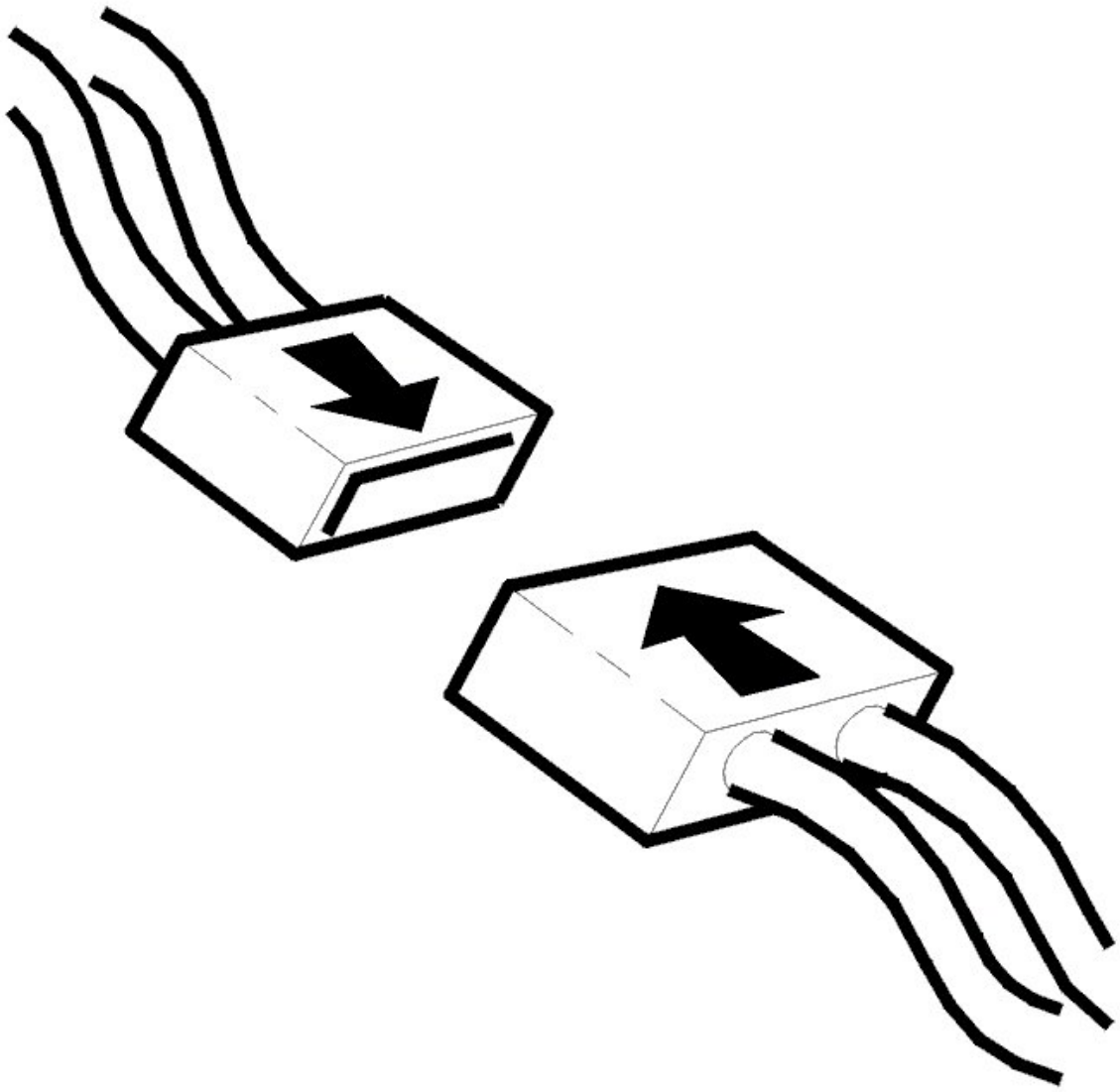
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

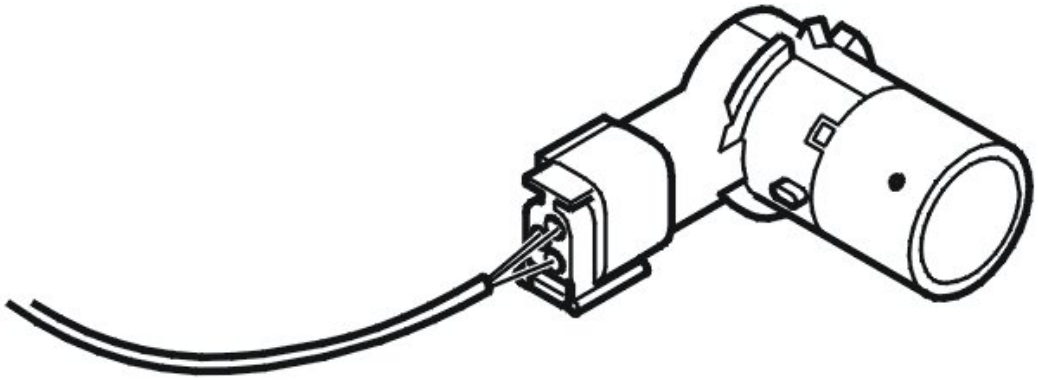
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-4F49

Condition



The rear electronic module (REM) communicates with the parking assistance module (PAM) which checks the signal from parking sensor 8.
The diagnostic trouble code (DTC) is stored if the parking assistance module (PAM) registers a faulty signal from the parking sensor (8).
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to ground or supply voltage in the signal cable between the parking assistance module (PAM) and parking sensor 8
- Short-circuit to ground in the power supply cable between the parking assistance module (PAM) and parking sensor 8
- Short-circuit to supply voltage in the ground lead between the parking assistance module (PAM) and parking sensor 8.

Fault symptom[s]

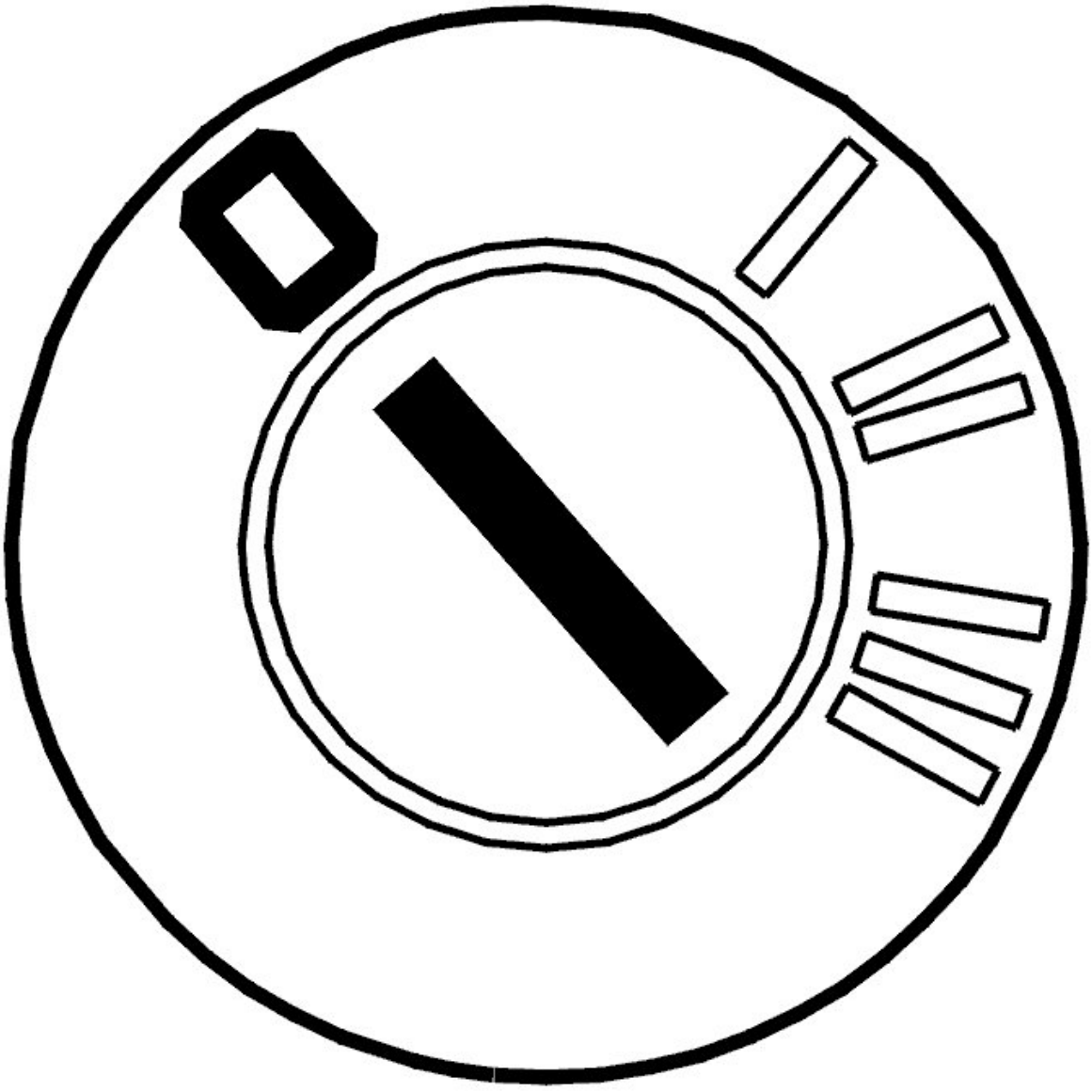
- The parking assistance system does not operate
- Message in the display.

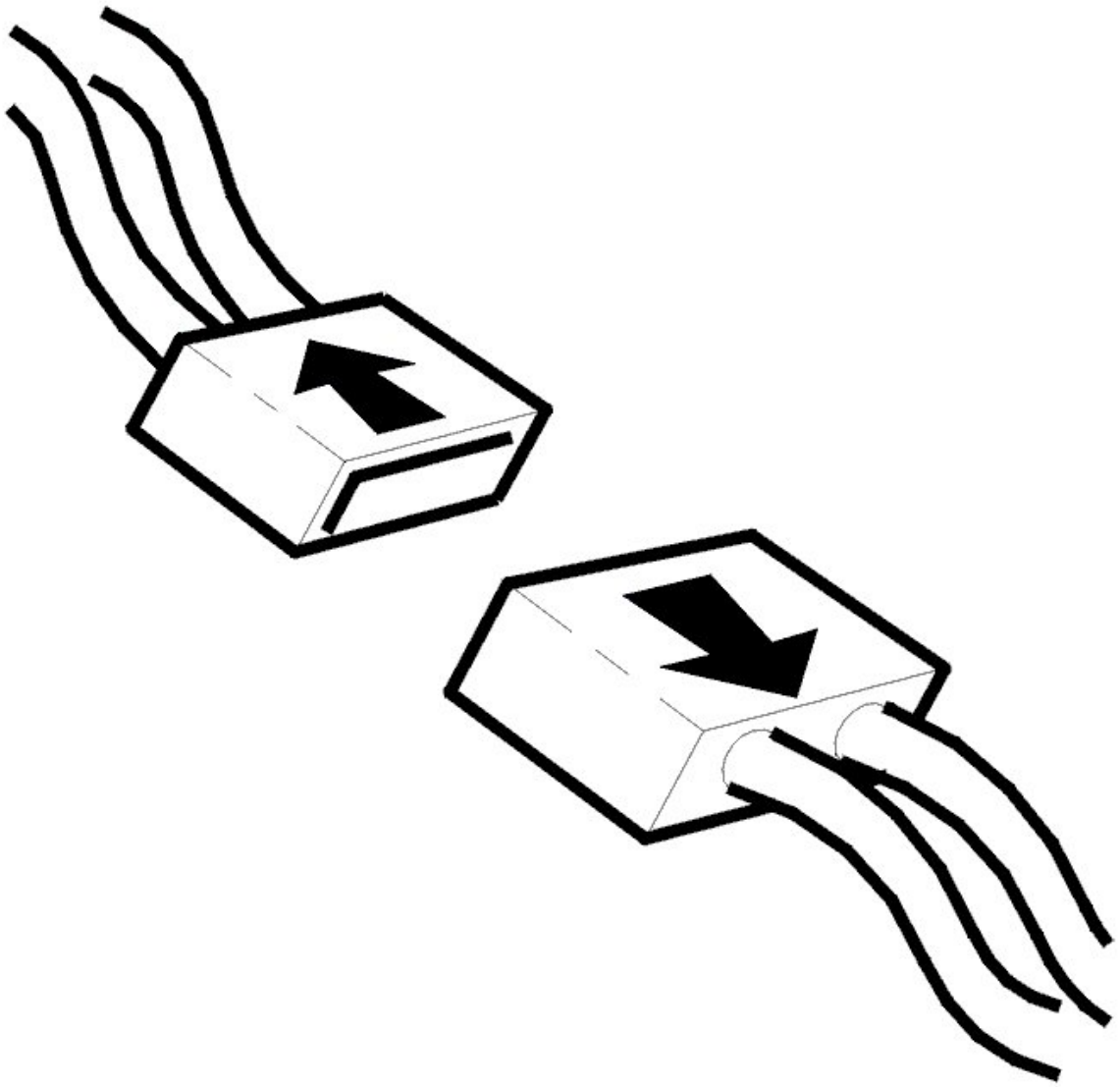
L.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 8 (outer right front) and the parking assistance module (PAM). Check for damage to pins and terminals. Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B8 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

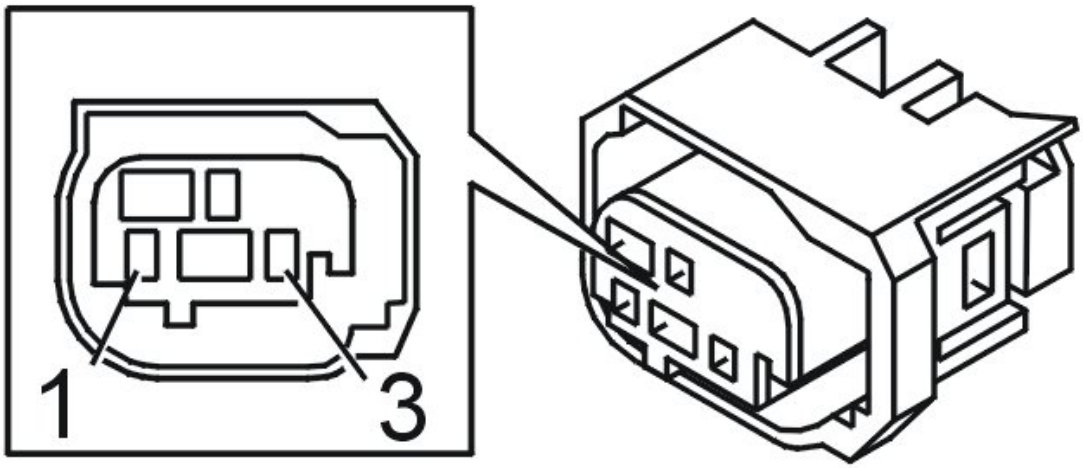
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, L.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



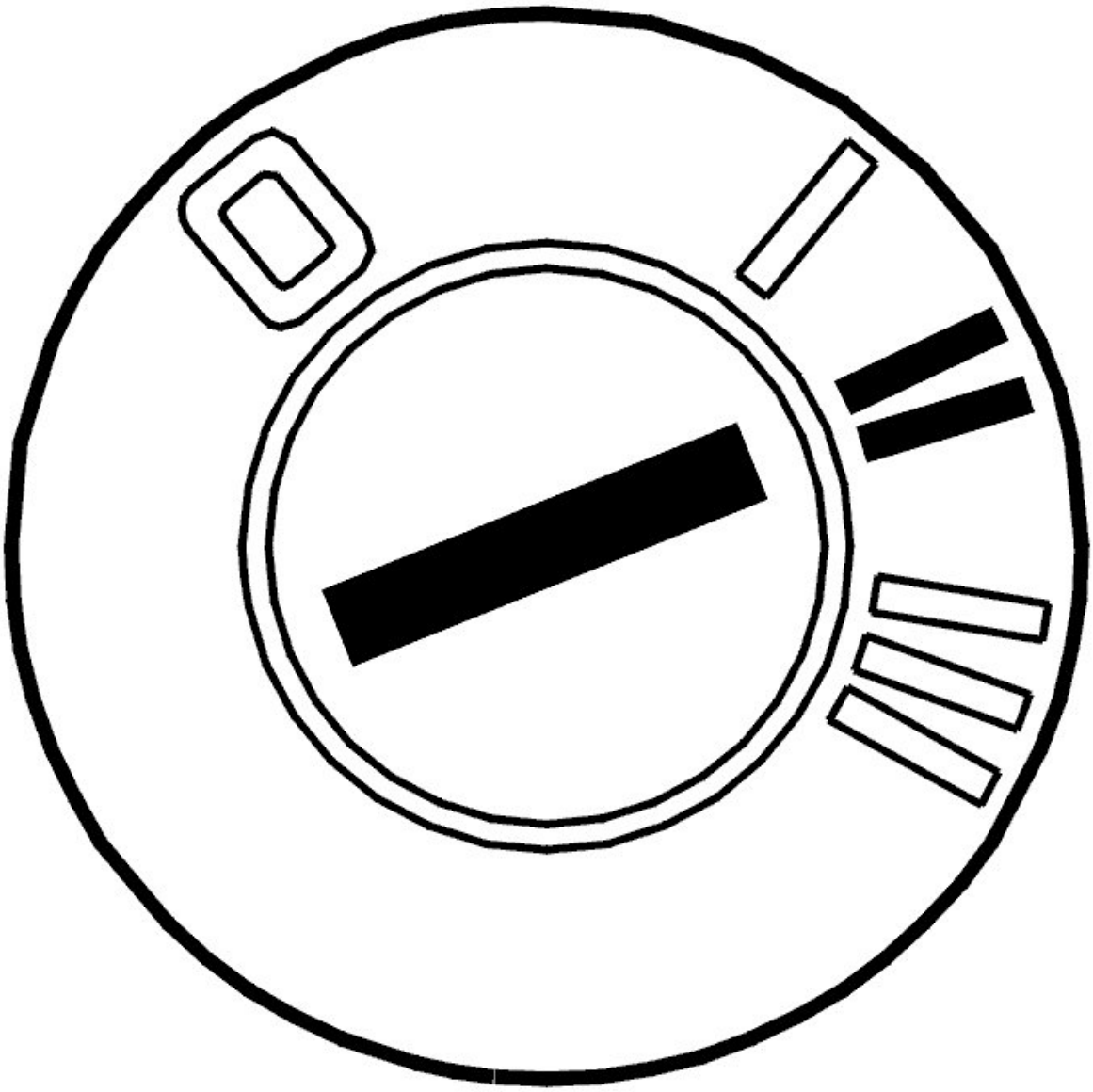
Continue - Verification

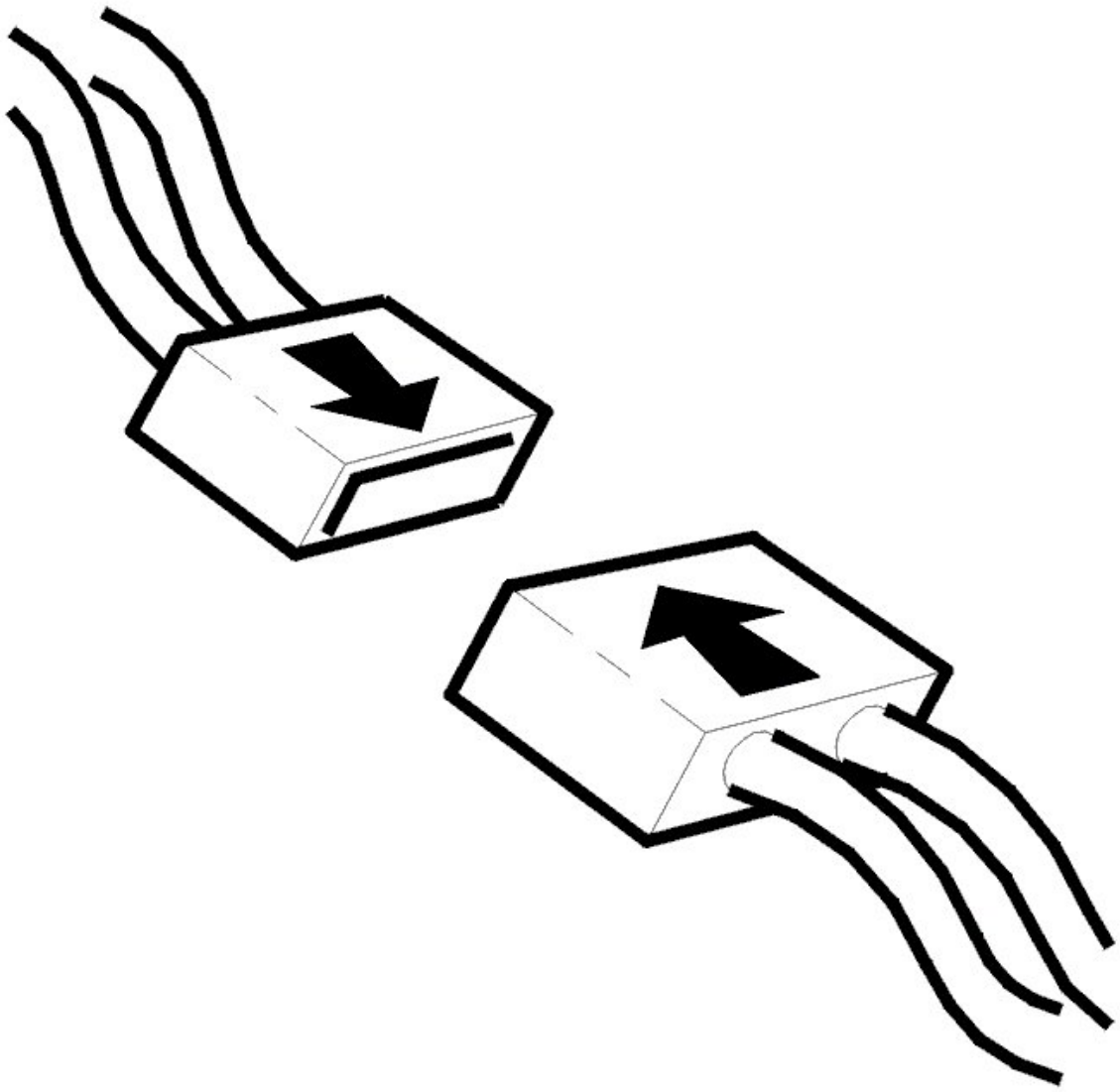
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

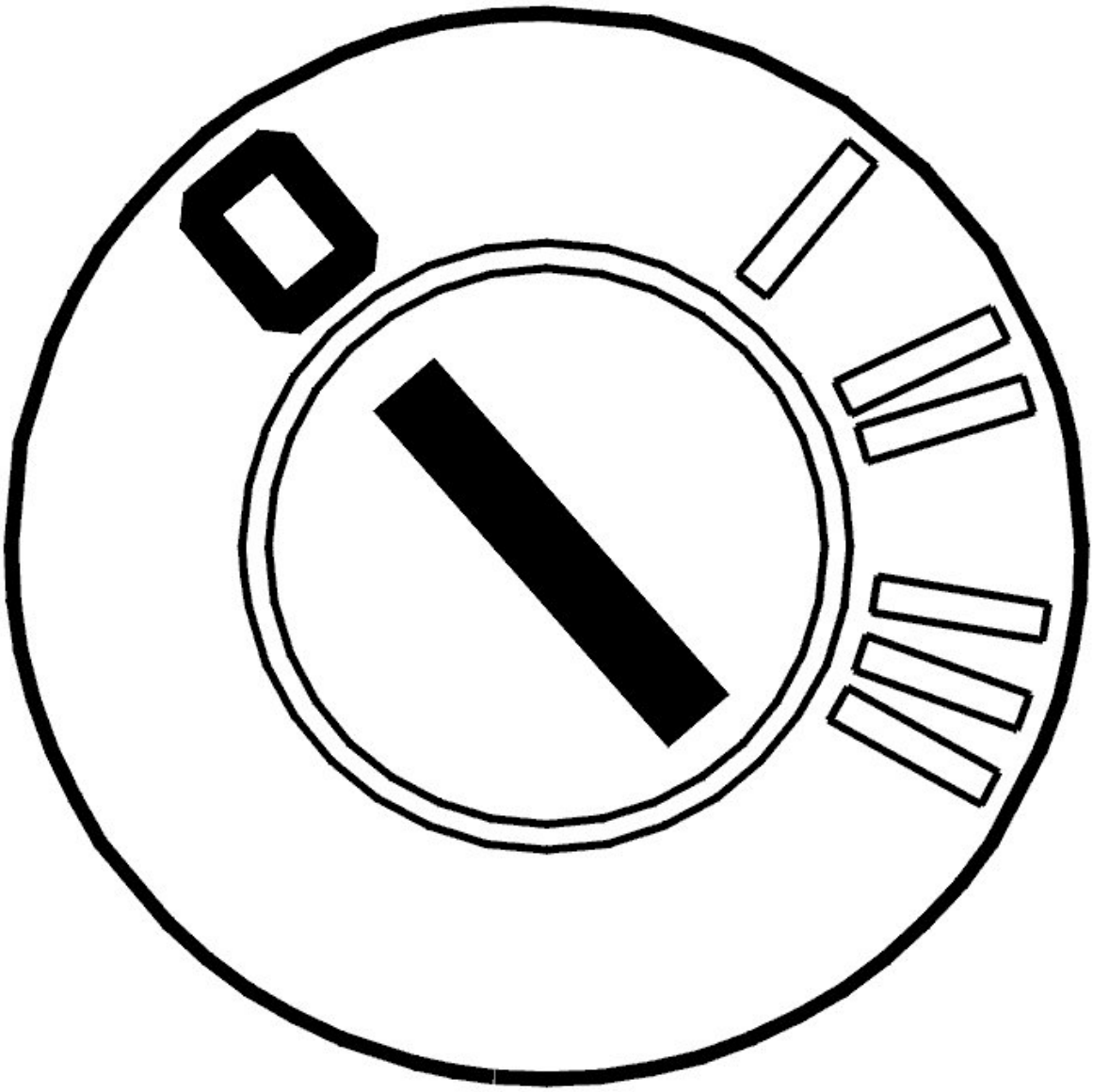
Attempt New Test - Checking components and wiring

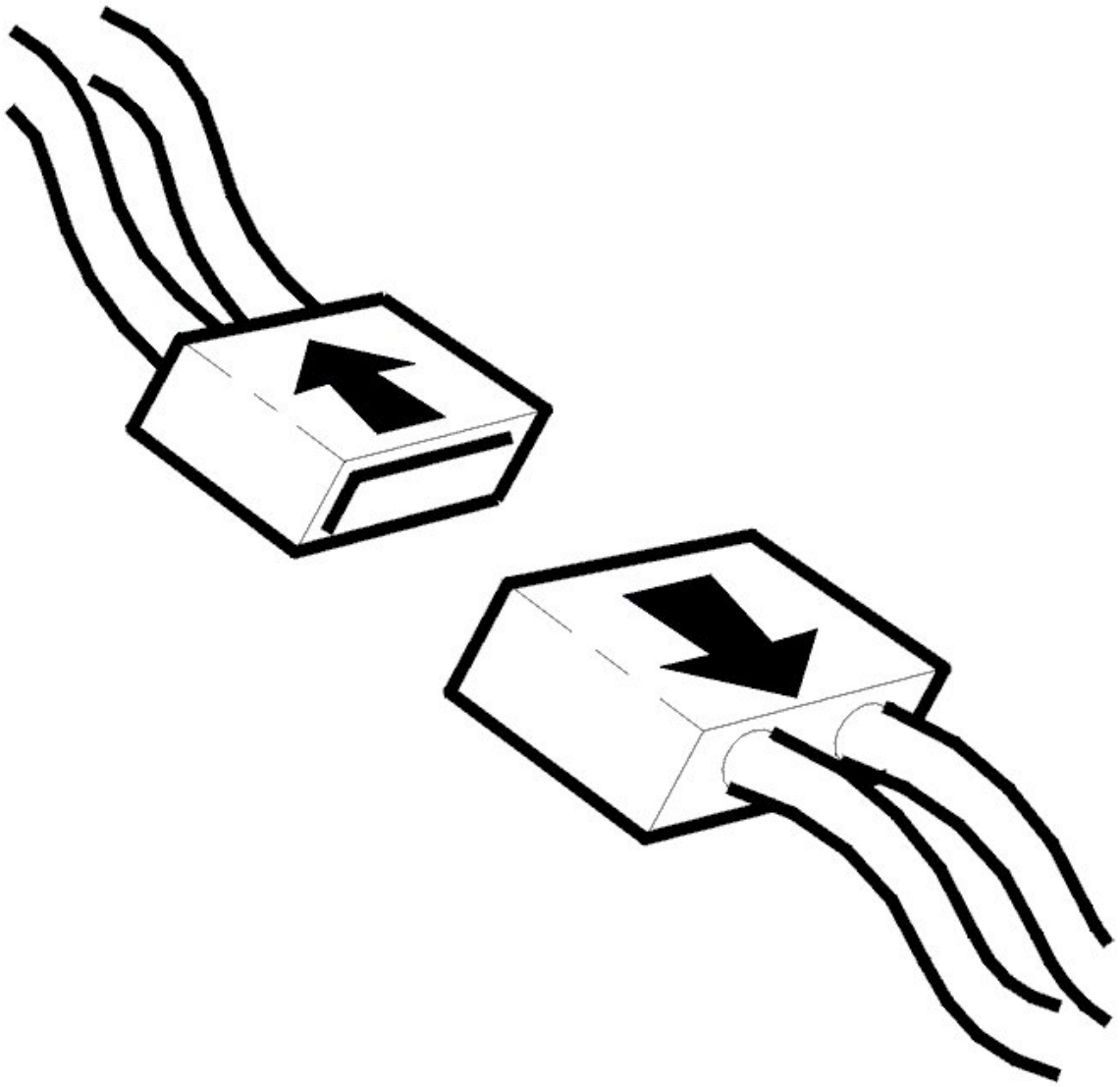
R.H.D.

Faulty signal

Checking components and wiring

Caution! Do not touch the terminal pins in the parking assistance module (PAM). There is a risk of static discharge. This could damage the parking assistance module (PAM).





- Ignition off.

Check the connectors for the parking sensor 8 (outer left front) and the parking assistance module (PAM). Check for damage to pins and terminals.
Also check the other connectors that connect the wiring between the parking assistance module (PAM) and the parking sensor.
Check the signal cable between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B8 and parking sensor connector terminal #2.

Check the power supply lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to ground.
Check the cable between:

- Parking assistance module (PAM) terminal #B2 and parking sensor connector terminal #1.

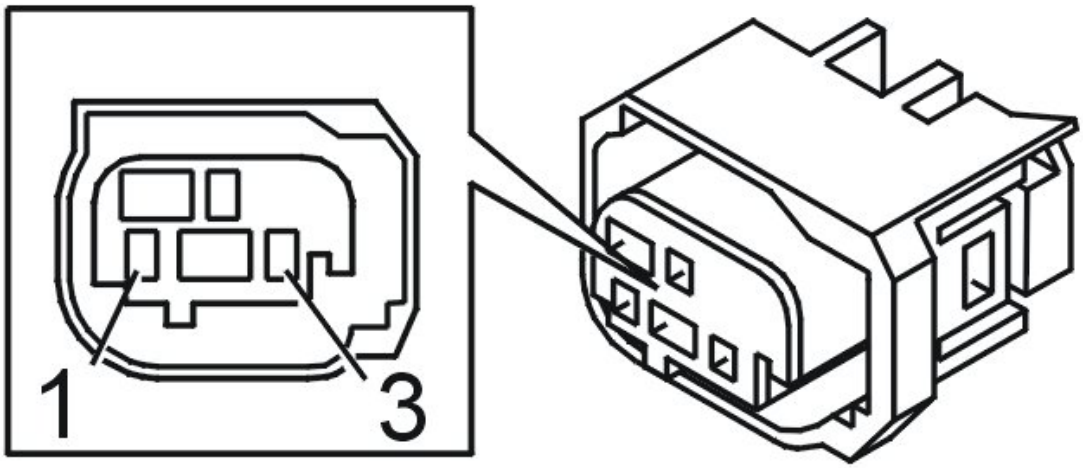
Check the ground lead between the parking assistance module (PAM) and the parking sensor connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Parking assistance module (PAM) terminal #B1 and parking sensor connector terminal #3.

Remedy as necessary.
If no fault is found, replace the parking sensor.

Other information

- Signal specification, R.H.D See: Accessories and Optional Equipment/Collision Avoidance and Parking Assist Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters
- For accessing/replacing the front parking assistance sensors, see Installation instructions, Accessories.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



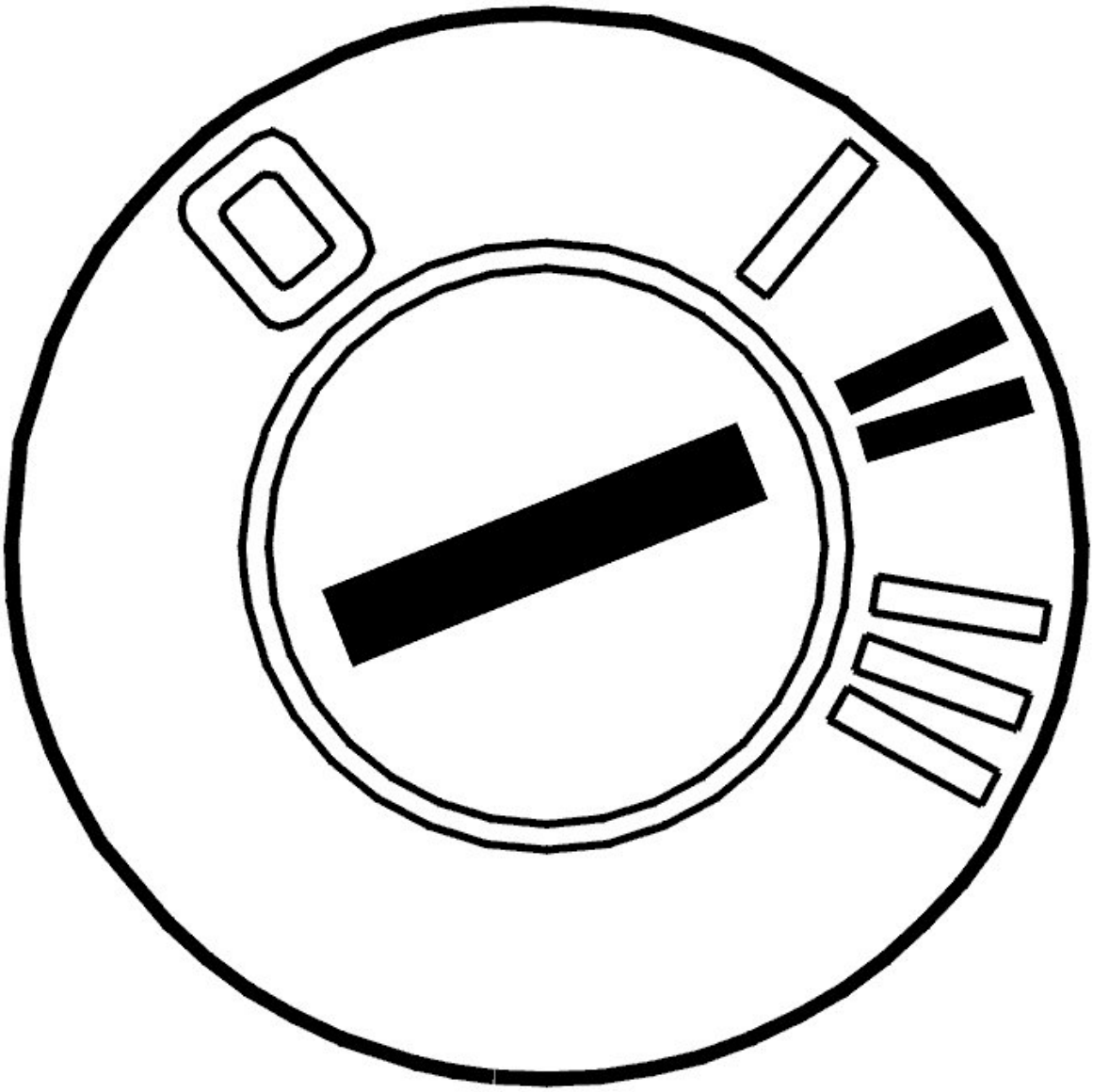
Continue - Verification

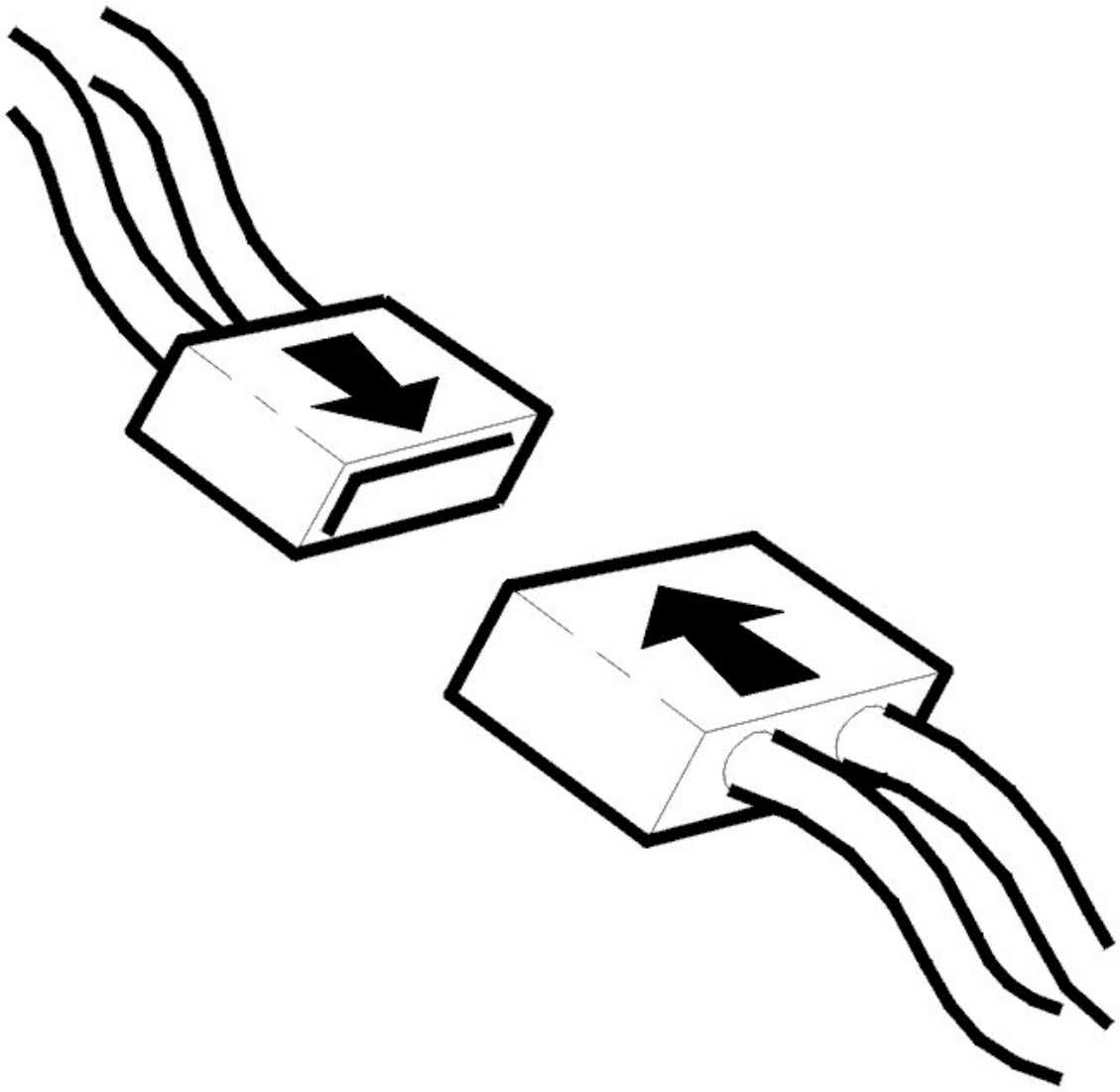
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Switch off the ignition. Wait at least 15 seconds
- Reinstall the connectors, components etc.
- Ignition on for at least 5 seconds
- Move the gear selector lever to back-up (reversing) (R).

The parking assistance module (PAM) is activated by pressing the switch on the lower section of the climate control module (CCM). Click on the VCT2000 symbol to read off the diagnostic status from the parking assistance module (PAM).
Check that the parking assistance module (PAM) is active. Check that the sensors are OK.

Is the parking assistance module (PAM) active? Are the sensors OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

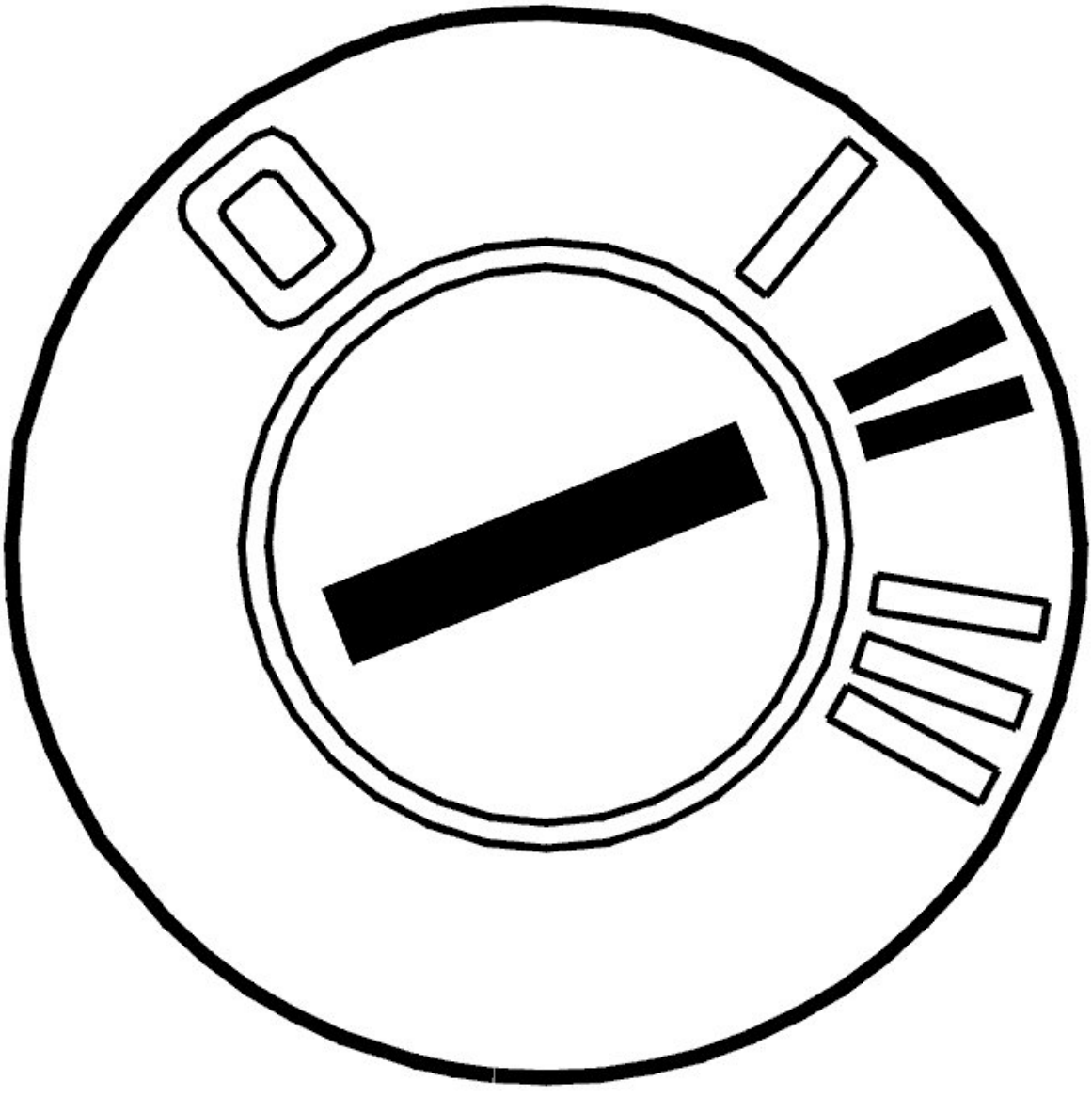
Attempt New Test - Checking components and wiring

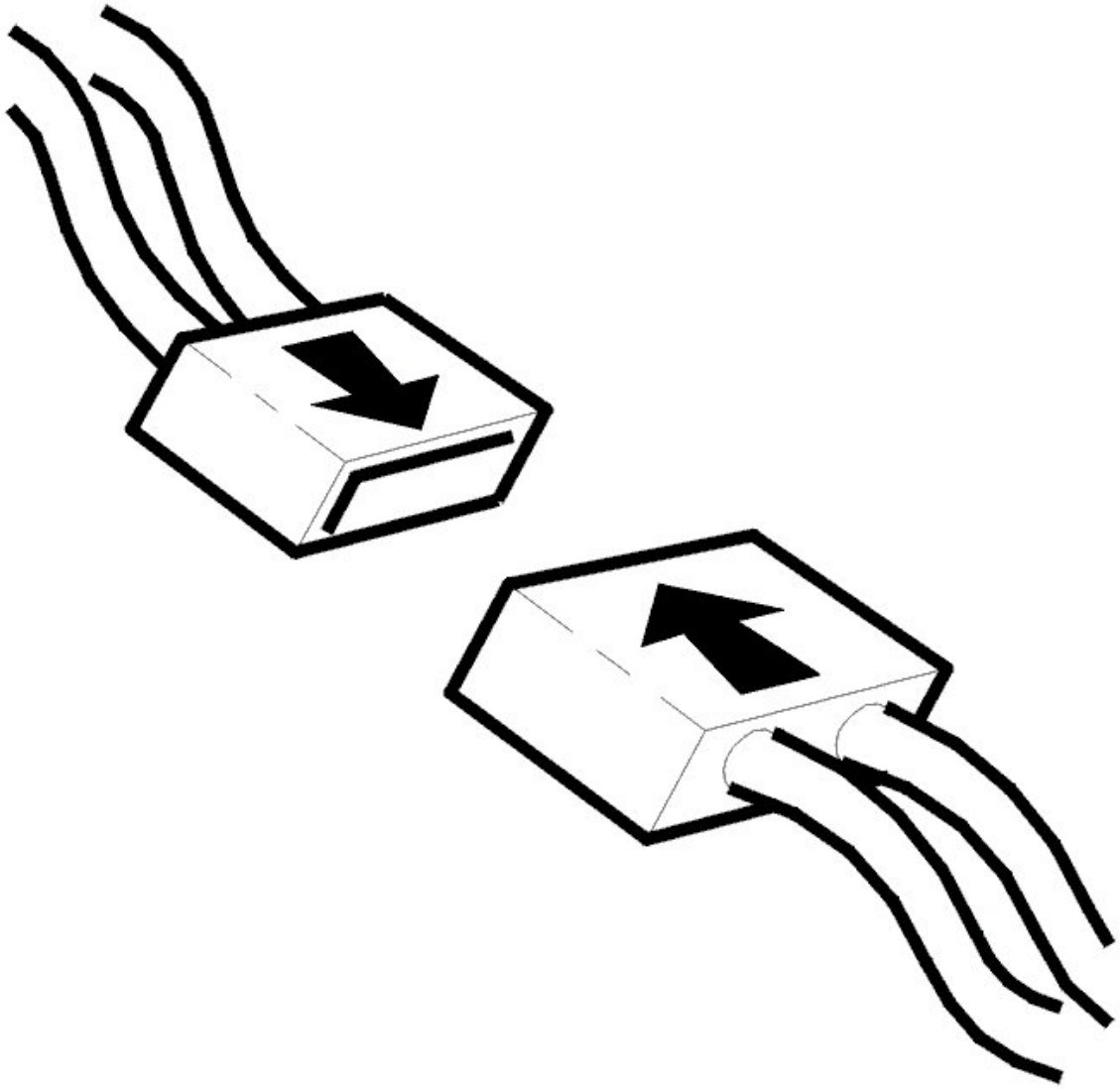
REM-4F90

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the outside temperature in Volts. Check that it matches the value in the table. See Outer temperature sensor See: Intake Air Temperature Sensor/Specifications.

Is the value within its permitted range?

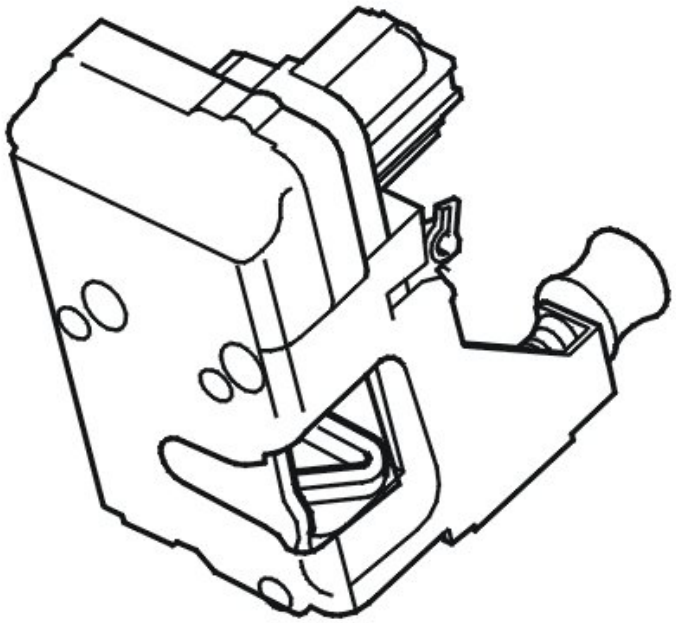
Yes - VERIFIED

No - VERIFICATION FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A01

Condition



The rear electronic module (REM) controls the lock units in the rear doors via a number of relays.
The rear electronic module (REM) receives an indication from the lock units about whether the central locking motor is in the locked or unlocked position. This information is provided by a switch in each lock unit. The switch must be closed when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch in the **left rear door** is still high 15 seconds after the unlock command was given.
The diagnostic trouble code (DTC) can be diagnosed when locking the central locking.

Substitute value
- None.

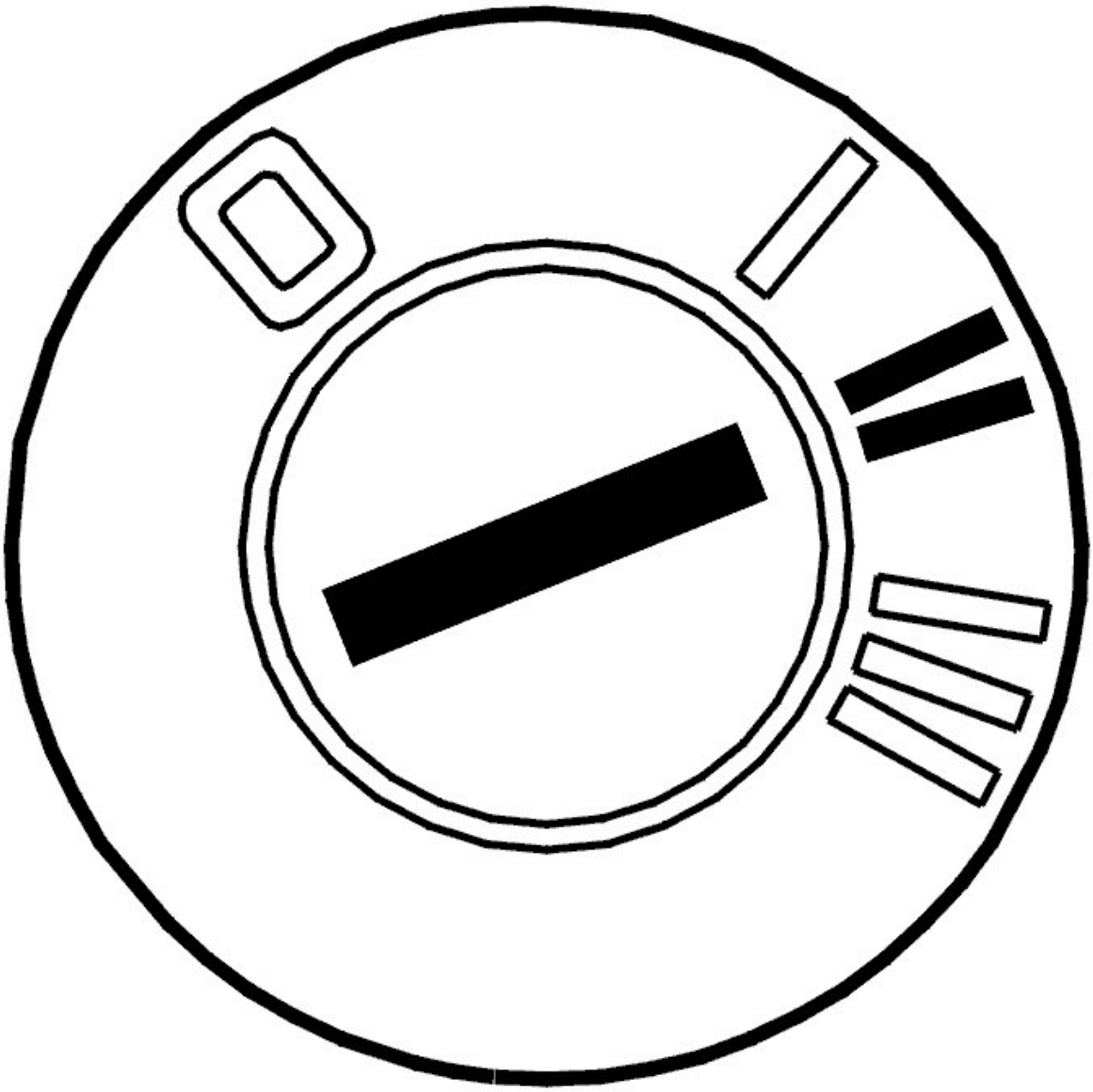
Possible source
- Contact resistance and oxidation in the terminals
- Fault or short-circuit to supply voltage in the switch for indication of the lock motor position
- Open-circuit in the cable from the switch for indication of the lock motor position
- The lock motor is stuck in one position
- Open-circuit in the ground lead/ground terminal for the lock mechanism
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- Does not lock / unlock a door.

Signal Too High

Signal too high

Checking the signal from the switches in the rear doors

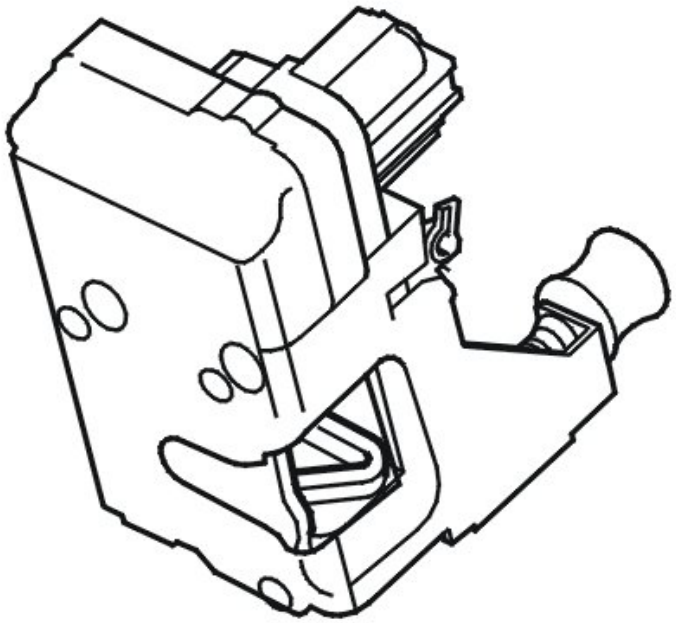


- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.

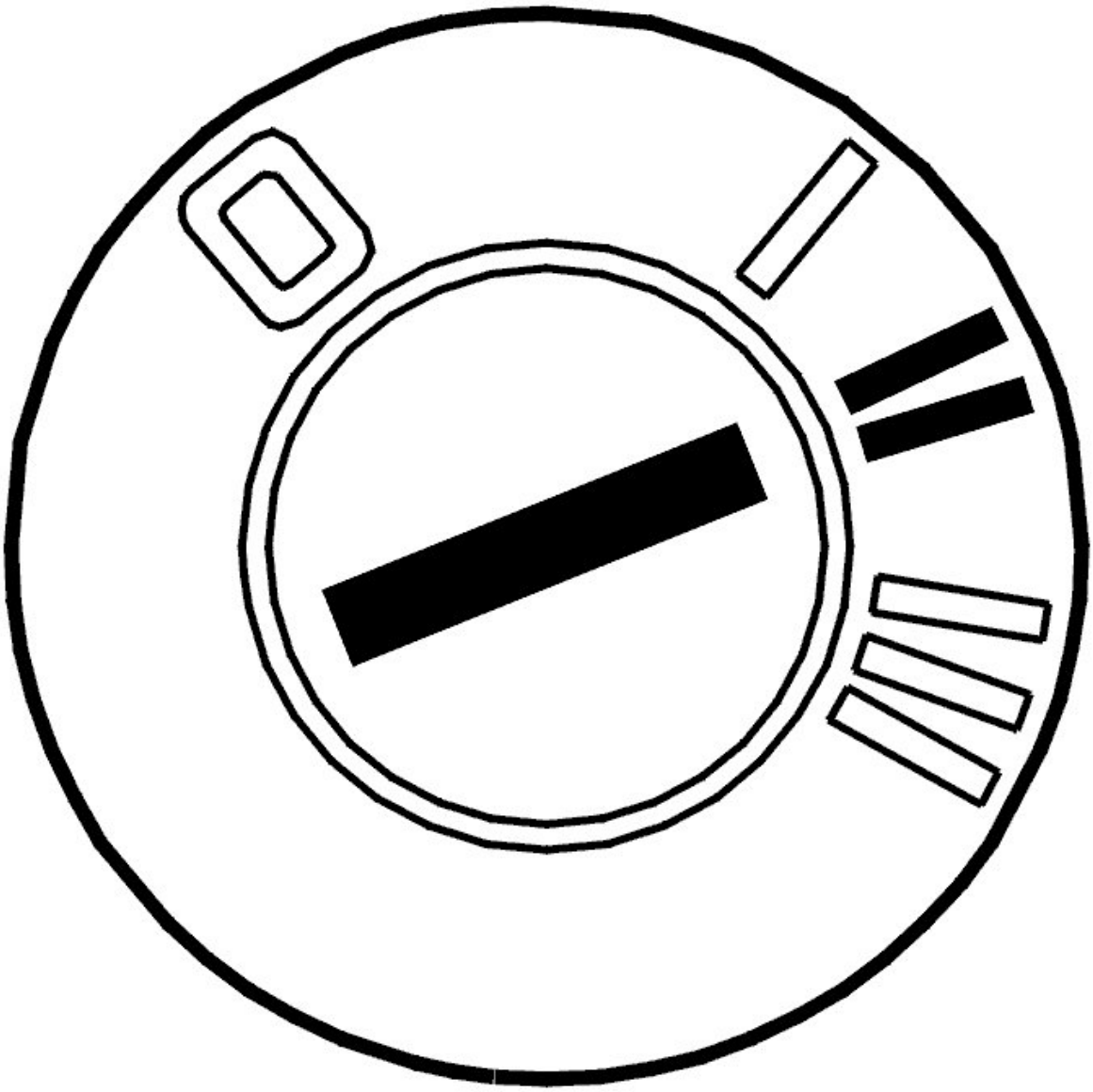
Hint: The doors can also be locked/unlocked using the remote control.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



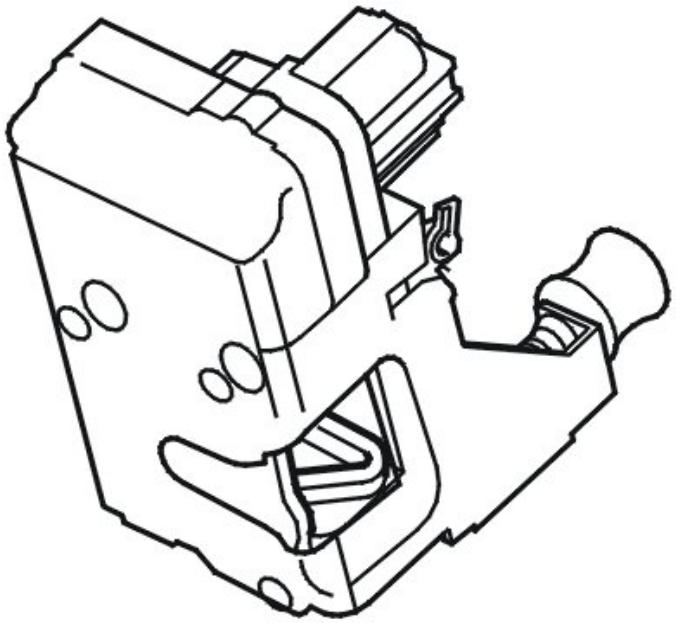
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Lock and unlock the left and right-hand rear doors. Check that the door can be opened when it is unlocked and cannot be opened when it is locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the switch in the lock mechanism. Check for a short-circuit. Check for an open-circuit. Check by measuring the resistance between terminals #1 and #5 on the connector for the lock mechanism and ground.
Check the resistance between terminals #1 and #5 on the lock mechanism side. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

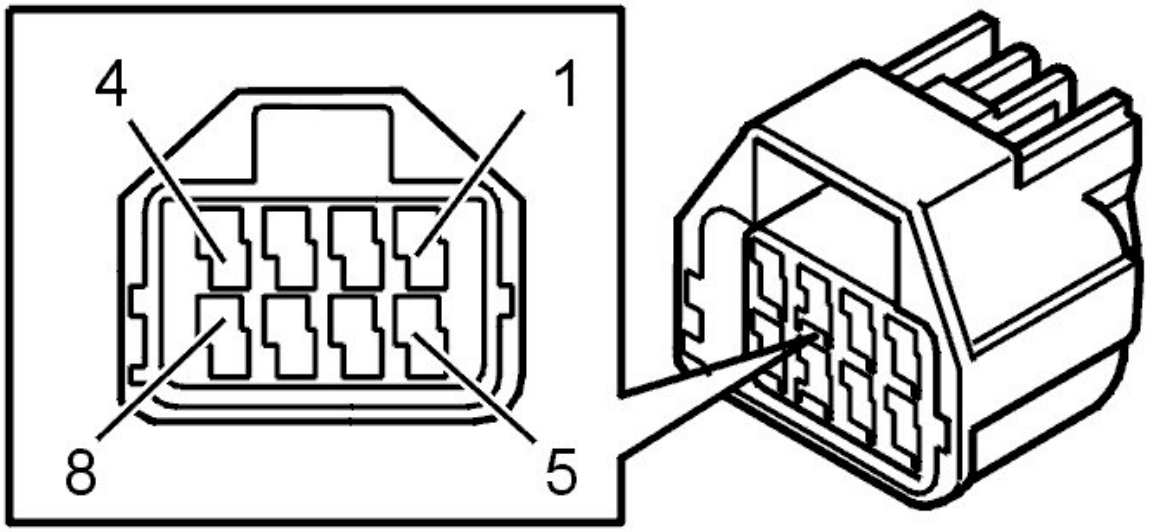
Check the signal cable between rear electronic module (REM) connector terminal #45 (#C5) and terminal #5 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch.

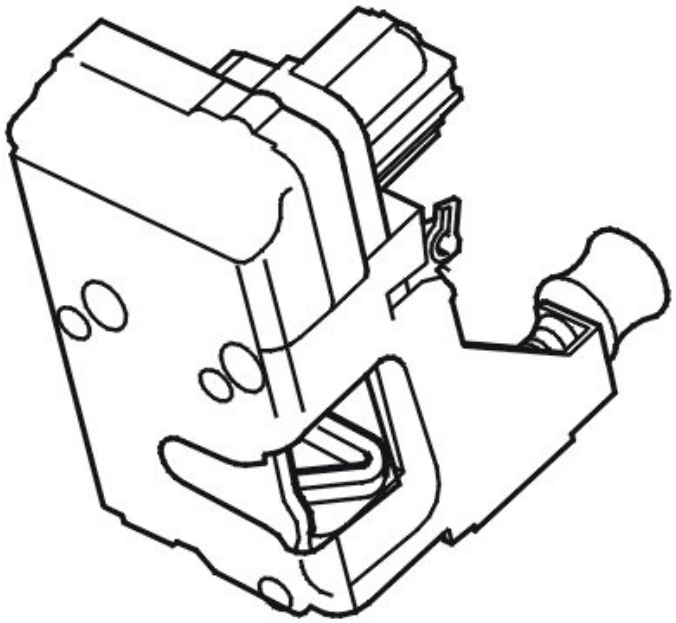
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #28 (#D28) and terminal #5 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch. Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the ground lead/ground terminal for the lock mechanism. Check for an open-circuit.

Left rear door

Check the control signal cable between rear electronic module (REM) connector terminal #23 (#A23) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the control signal cable between rear electronic module (REM) connector terminal #27 (#A27) and terminal #8 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

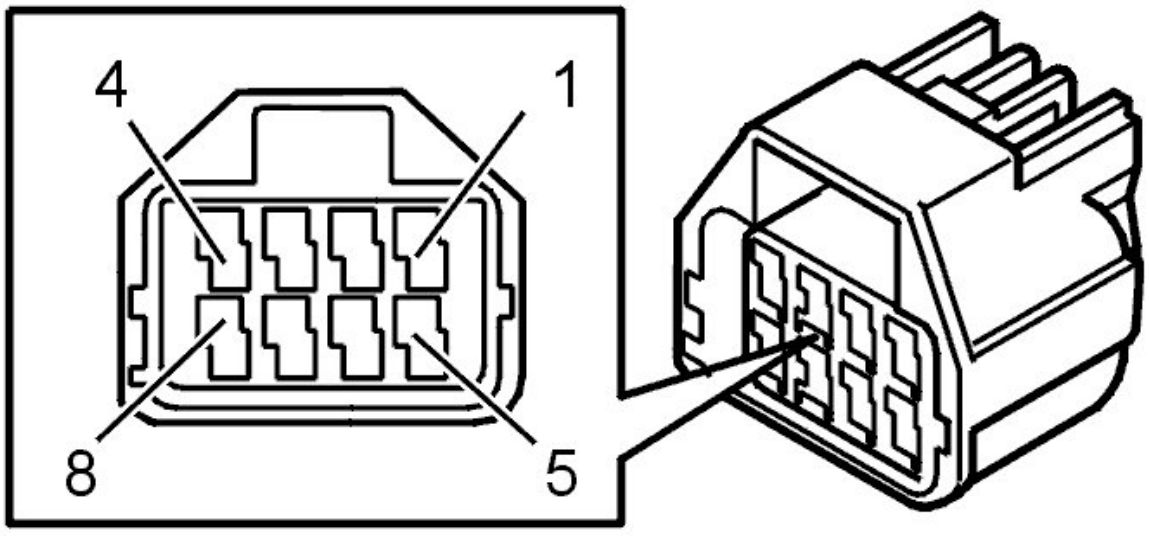
Check the control signal cable between rear electronic module (REM) connector terminal #26 (#B26) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground. The circuit runs via the lock motor for the fuel tank filler cap.
Check the control signal cable between rear electronic module (REM) connector terminal #24 (#B24) and terminal #8 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

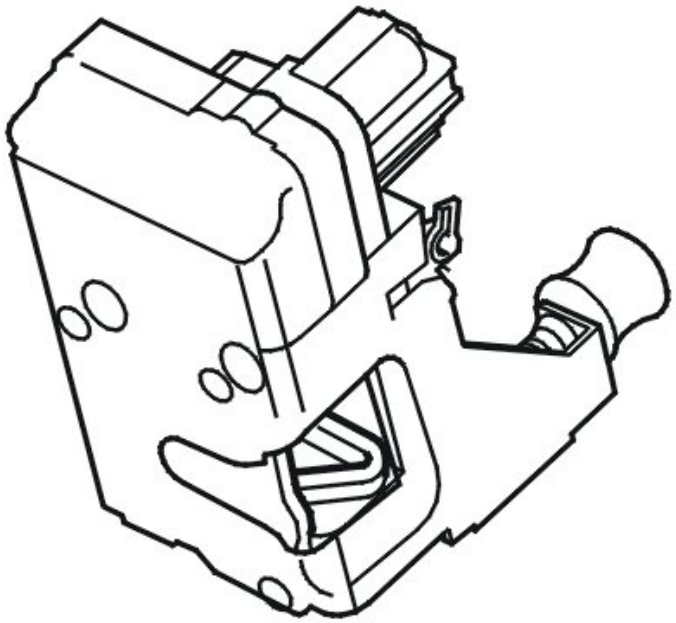
Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





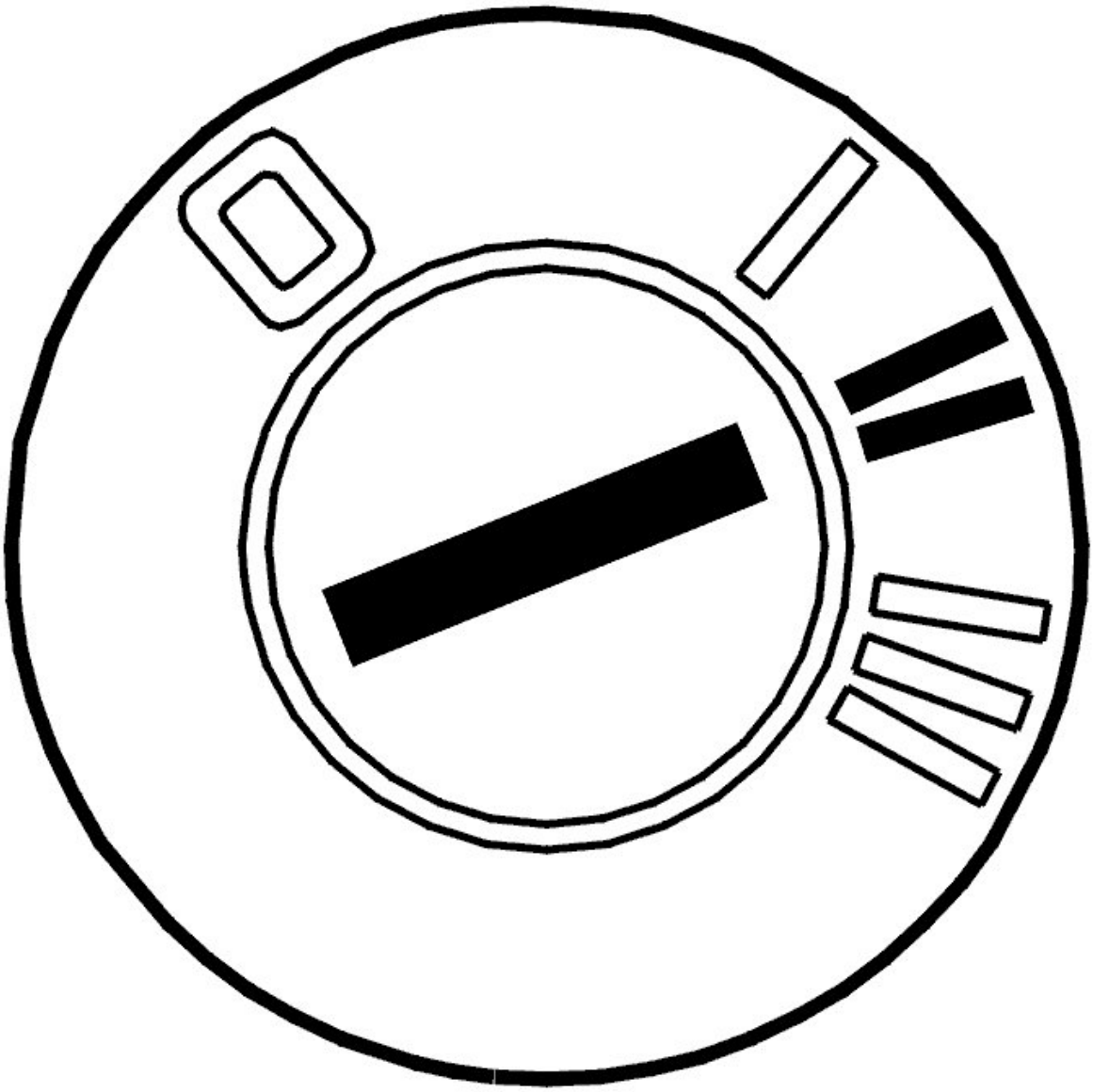
Continue - Verification

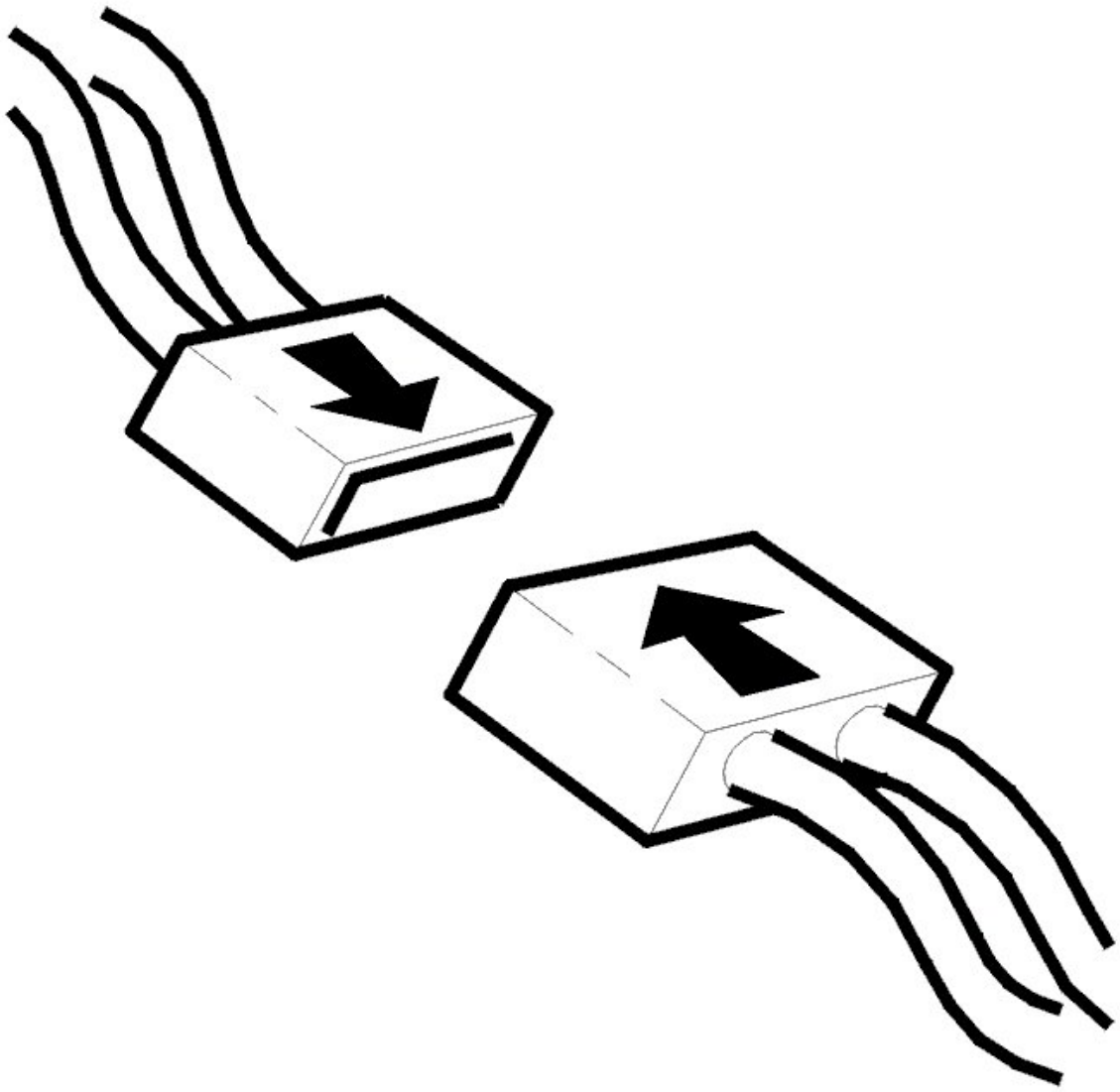
Verification

Verification

Verification

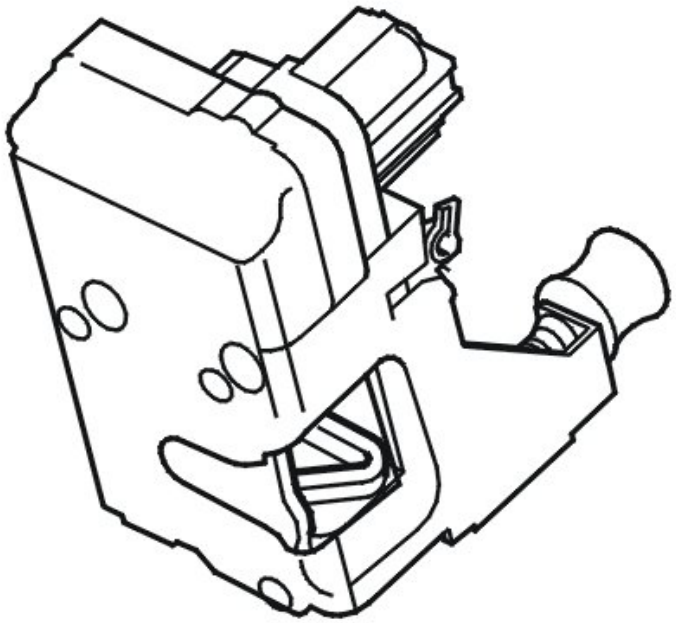
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the switches in the rear doors

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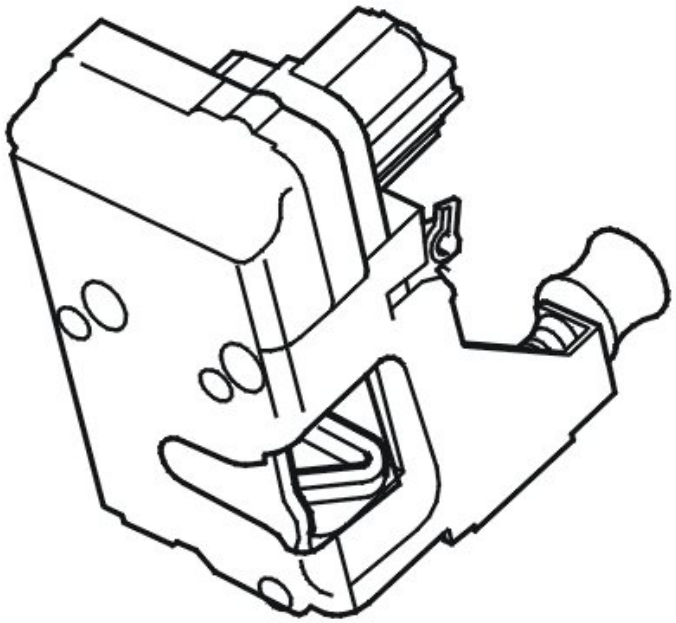
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A02

Condition



The rear electronic module (REM) controls the lock units in the rear doors via a number of relays.
The rear electronic module (REM) receives an indication from the lock units about whether the central locking motor is in the locked or unlocked position. This information is provided by a switch in each lock unit. The switch must be closed when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch in the **right rear door** is still high 15 seconds after the unlock command was given.
The diagnostic trouble code (DTC) can be diagnosed during central locking and when no further lock command has been received within 15 seconds.

Substitute value
- None.

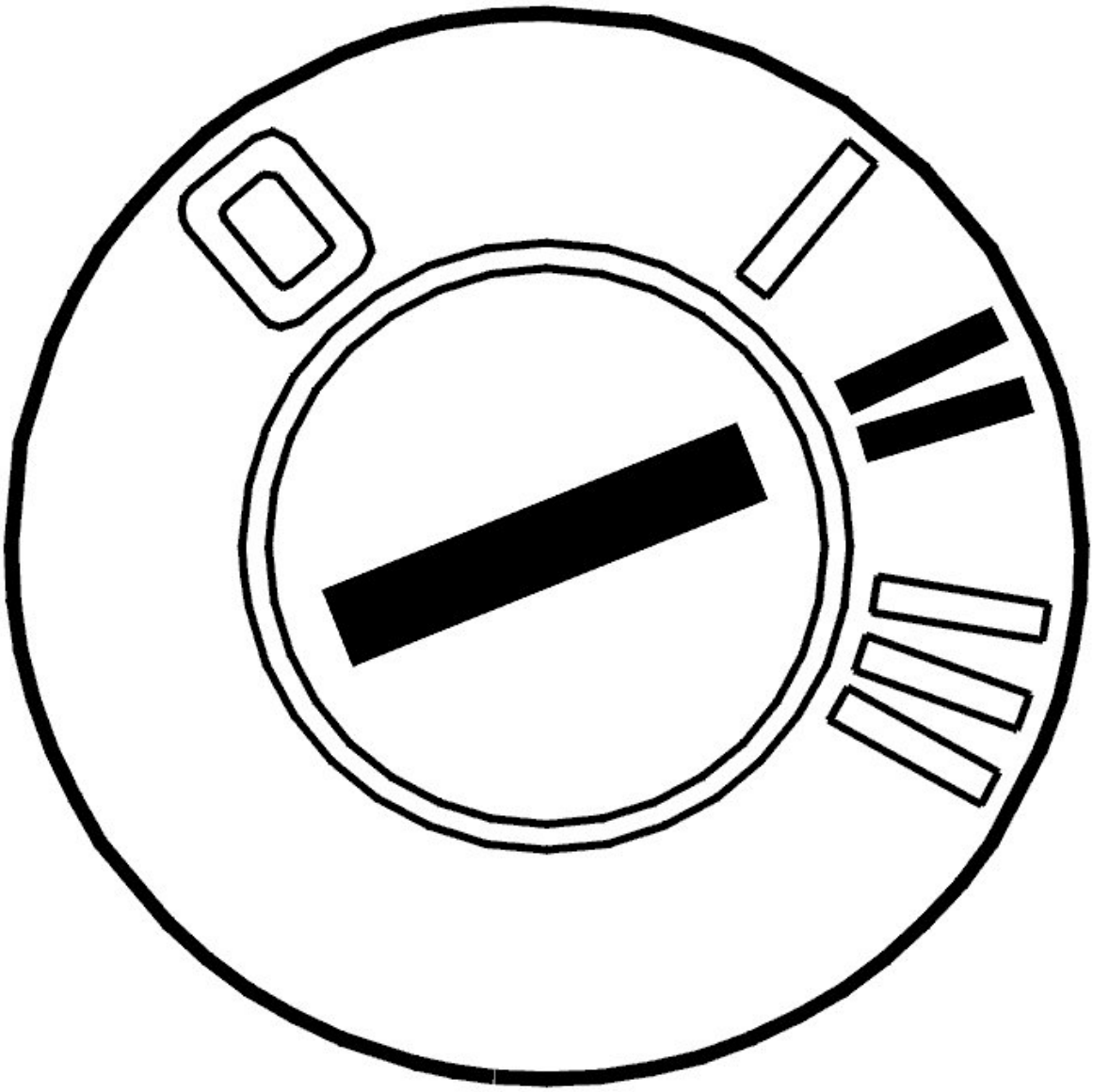
Possible source
- Contact resistance and oxidation in the terminals
- Fault or short-circuit to supply voltage in the switch for indication of the lock motor position
- Open-circuit in the cable from the switch for indication of the lock motor position
- The lock motor is stuck in one position
- Open-circuit in the ground lead/ground terminal for the lock mechanism
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- Does not lock / unlock a door.

Signal Too High

Signal too high

Checking the signal from the switches in the rear doors

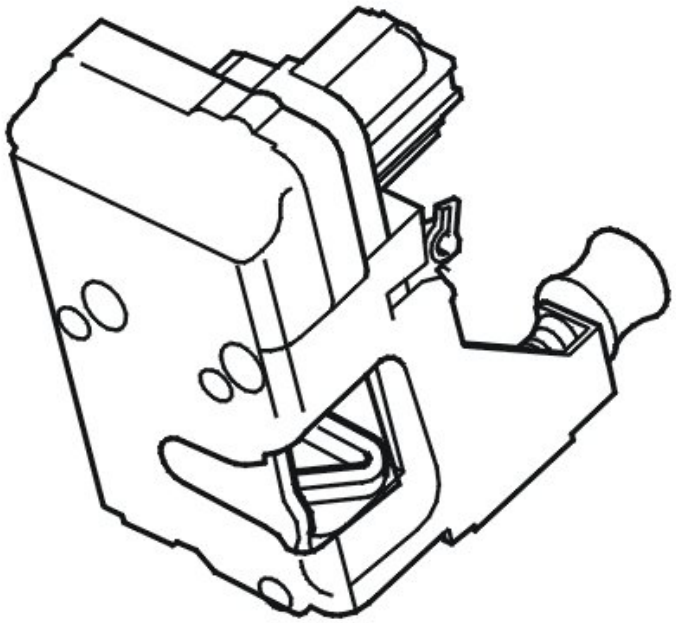


- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.

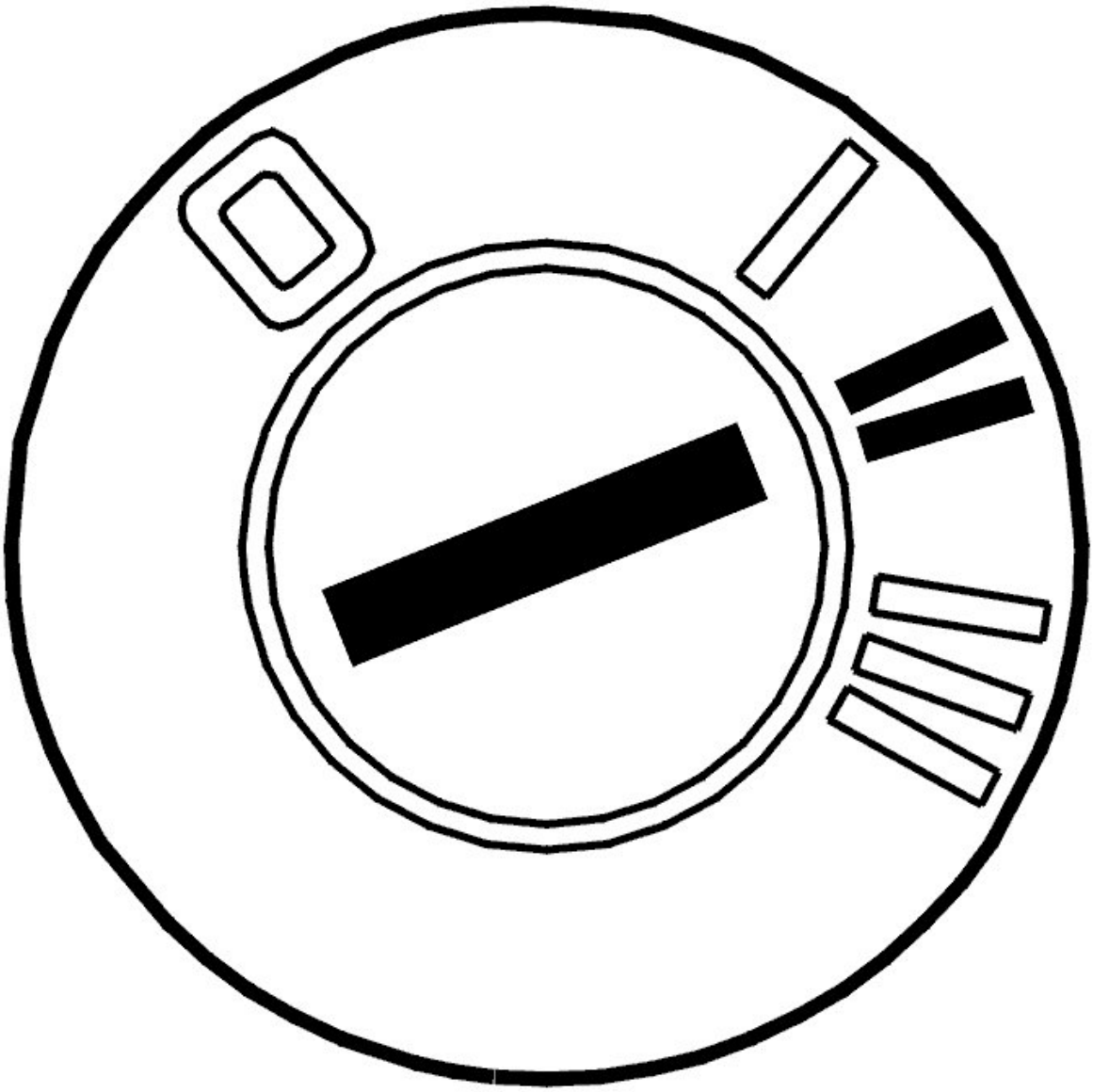
Hint: The doors can also be locked/unlocked using the remote control.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



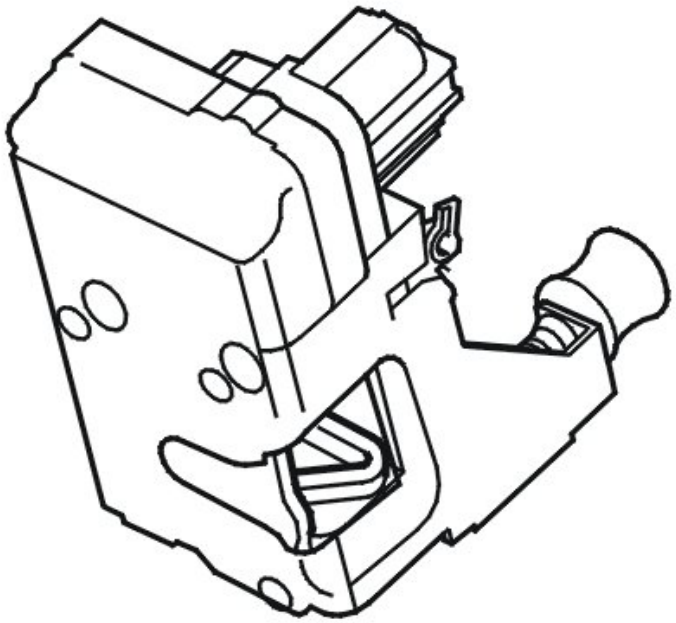
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Lock and unlock the left and right-hand rear doors. Check that the door can be opened when it is unlocked and cannot be opened when it is locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the switch in the lock mechanism. Check for a short-circuit. Check for an open-circuit. Check by measuring the resistance between terminals #1 and #5 on the connector for the lock mechanism and ground.
Check the resistance between terminals #1 and #5 on the lock mechanism side. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

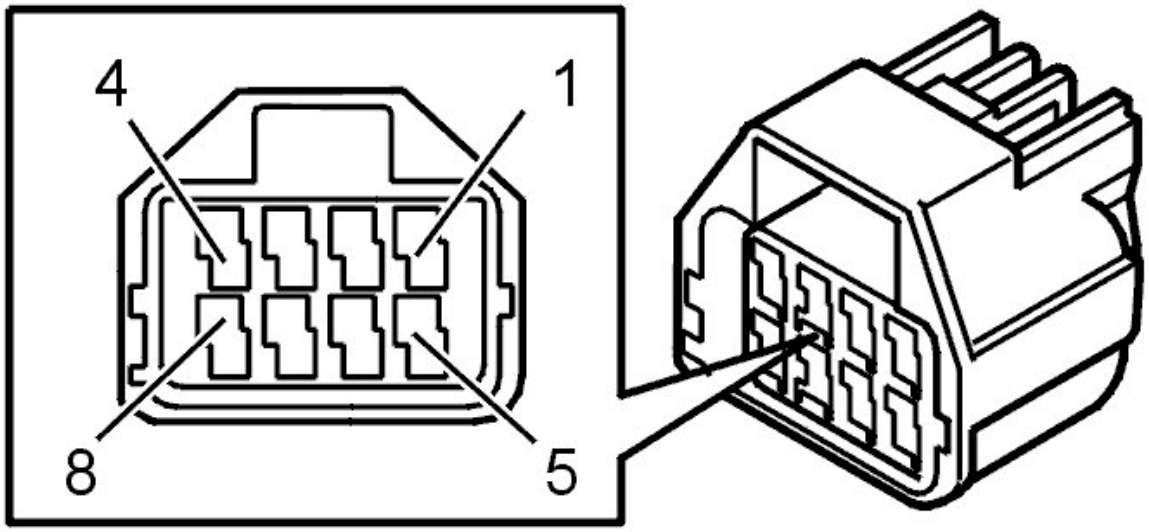
Check the signal cable between rear electronic module (REM) connector terminal #45 (#C5) and terminal #5 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch.

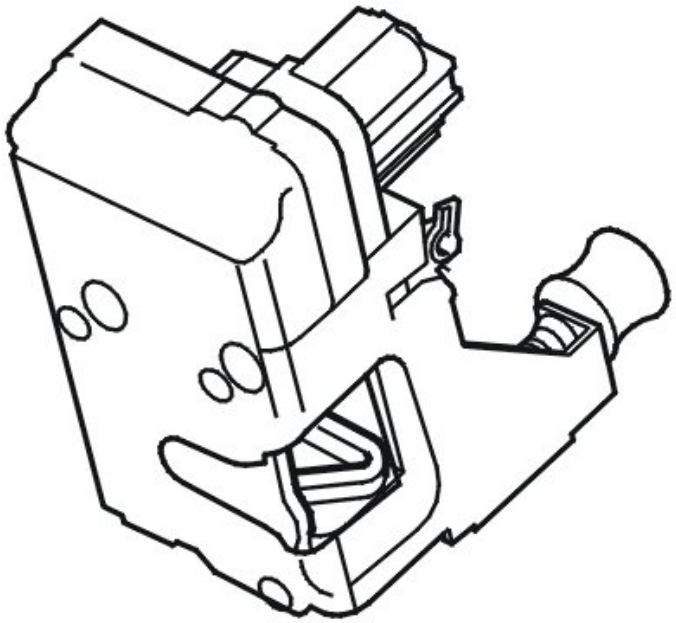
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #28 (#D28) and terminal #5 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch. Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the ground lead/ground terminal for the lock mechanism. Check for an open-circuit.

Left rear door

Check the control signal cable between rear electronic module (REM) connector terminal #23 (#A23) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the control signal cable between rear electronic module (REM) connector terminal #27 (#A27) and terminal #8 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

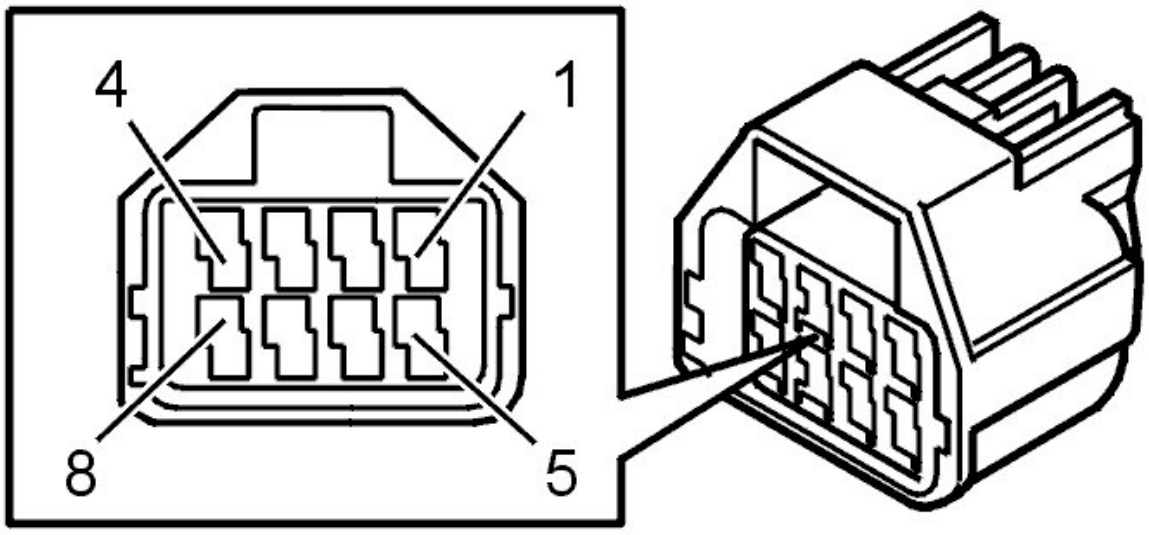
Check the control signal cable between rear electronic module (REM) connector terminal #26 (#B26) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground. The circuit runs via the lock motor for the fuel tank filler cap.
Check the control signal cable between rear electronic module (REM) connector terminal #24 (#B24) and terminal #8 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

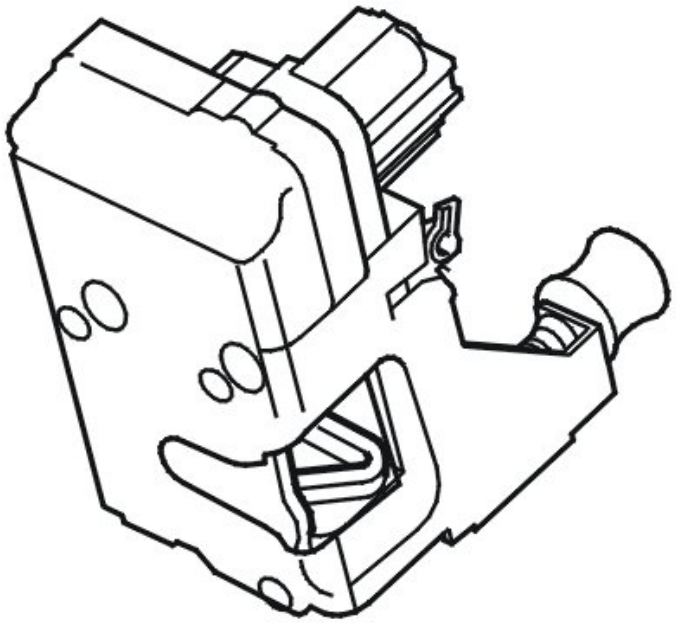
Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





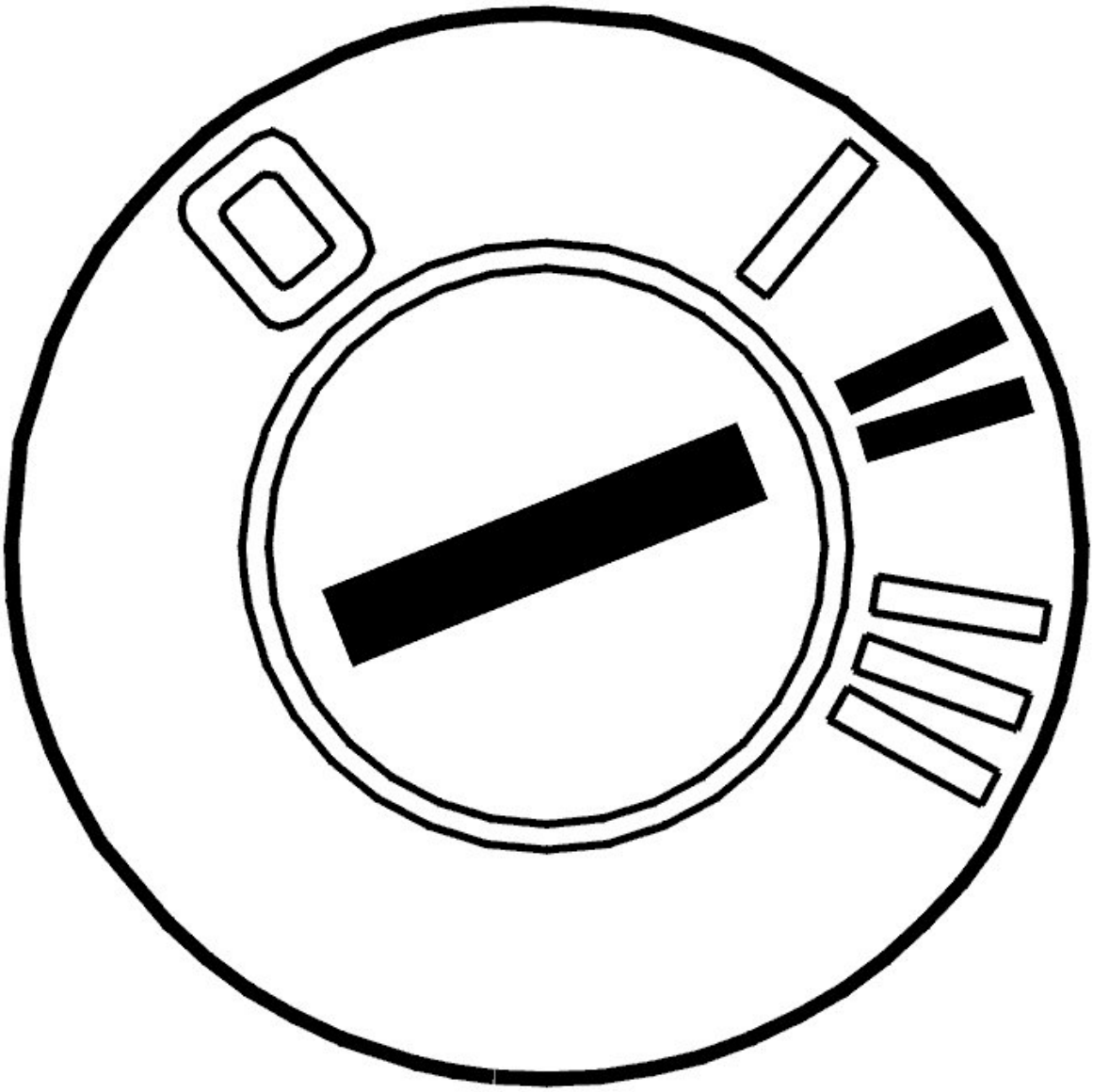
Continue - Verification

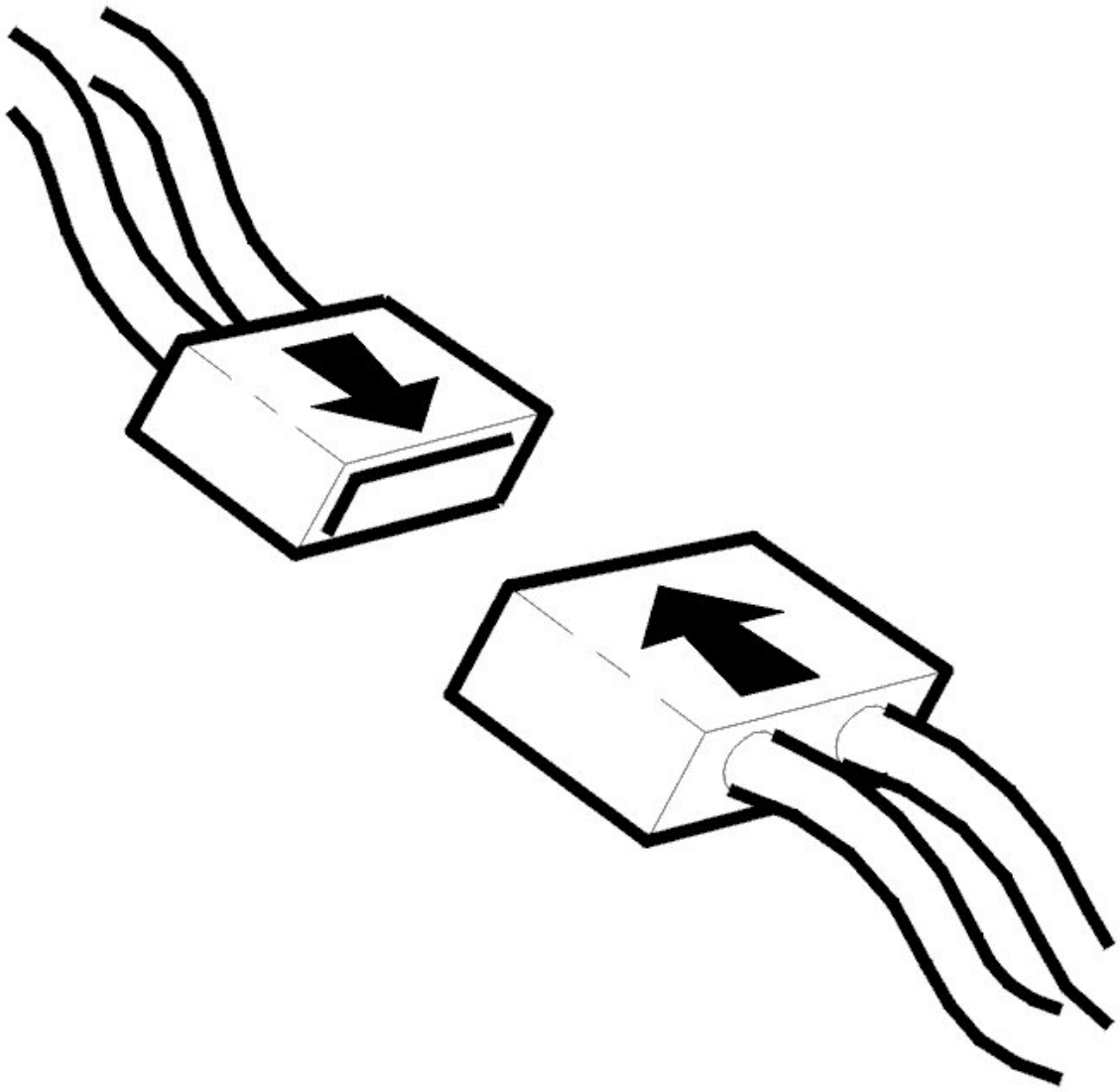
Verification

Verification

Verification

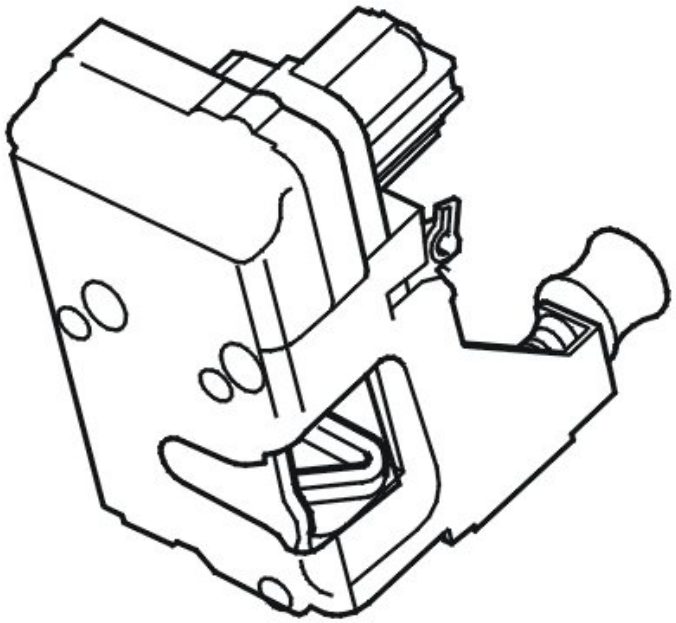
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the switches in the rear doors

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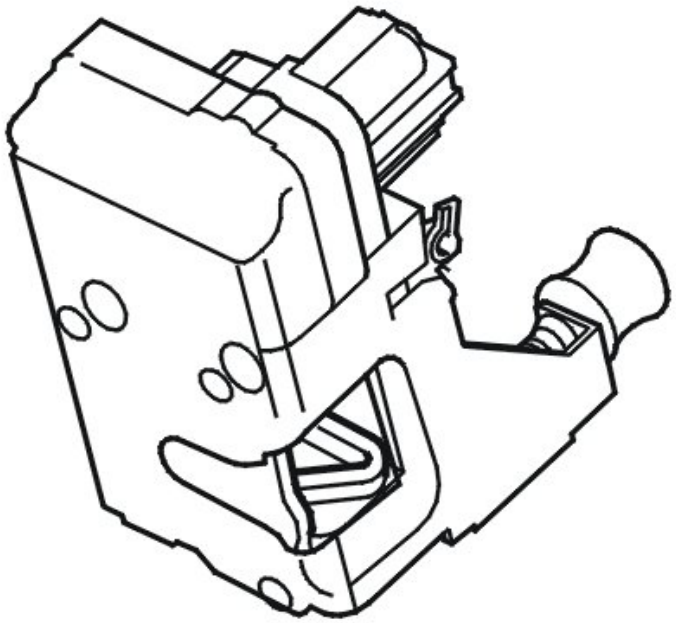
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A03

Condition



The rear electronic module (REM) uses a number of relays to control the lock units in the rear doors for locking and unlocking.
The rear electronic module (REM) receives an indication from the lock units when the central locking motor is in the locked or unlocked position. This information is supplied by a switch in each lock unit. The switch provides a ground when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch in the **left rear door** is still low 15 seconds after the unlock command was given.
The diagnostic trouble code (DTC) can be diagnosed during unlocking by the central locking and when no further lock command has been received within 15 seconds.

Substitute value
- None.

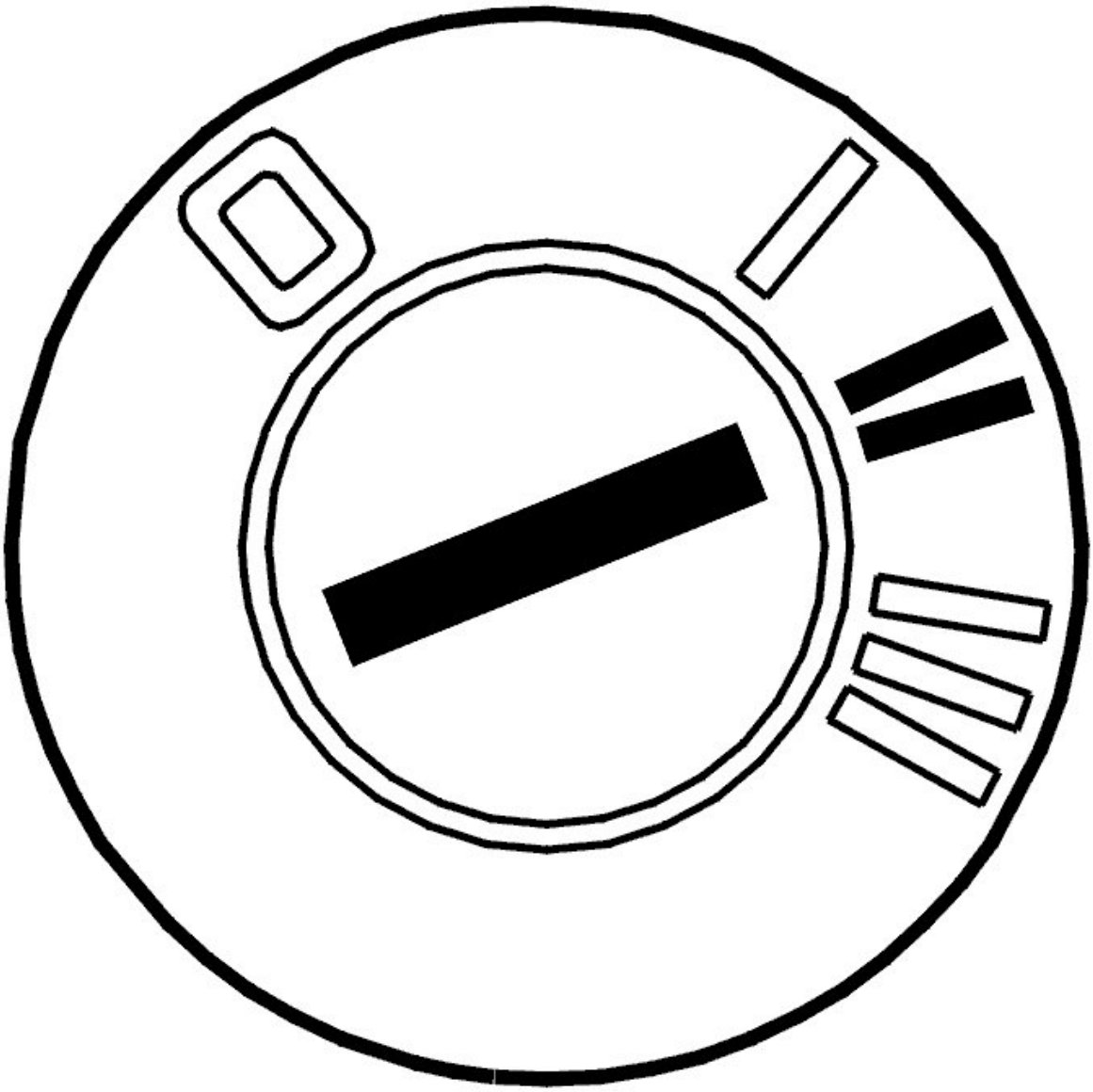
Possible source
- Contact resistance and oxidation in the terminals
- Fault or short-circuit to ground in the switch for indication of the lock motor position
- Short-circuit to ground in the cable from the switch for indication of the lock motor position
- The lock motor is stuck in one position
- Open-circuit in the ground lead/ground terminal for the lock mechanism
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- Does not lock / unlock a door.

Signal Too Low

Signal too low

Checking the signal from the switches in the rear doors

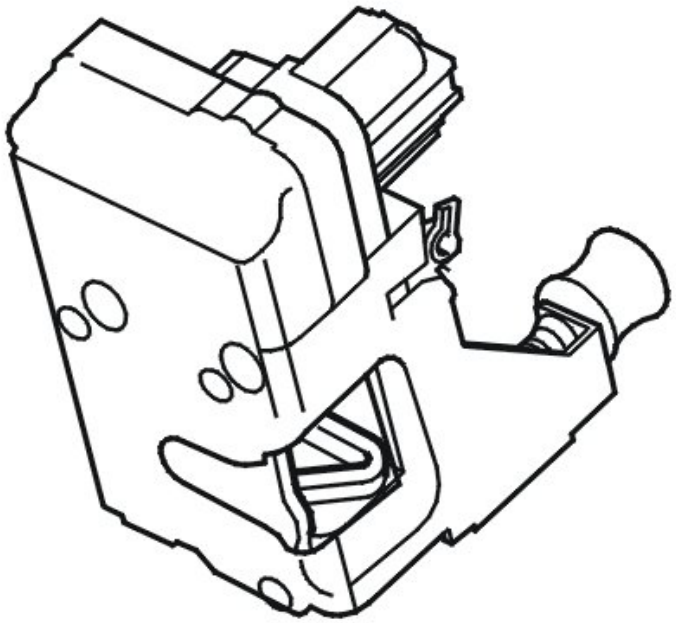


- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.

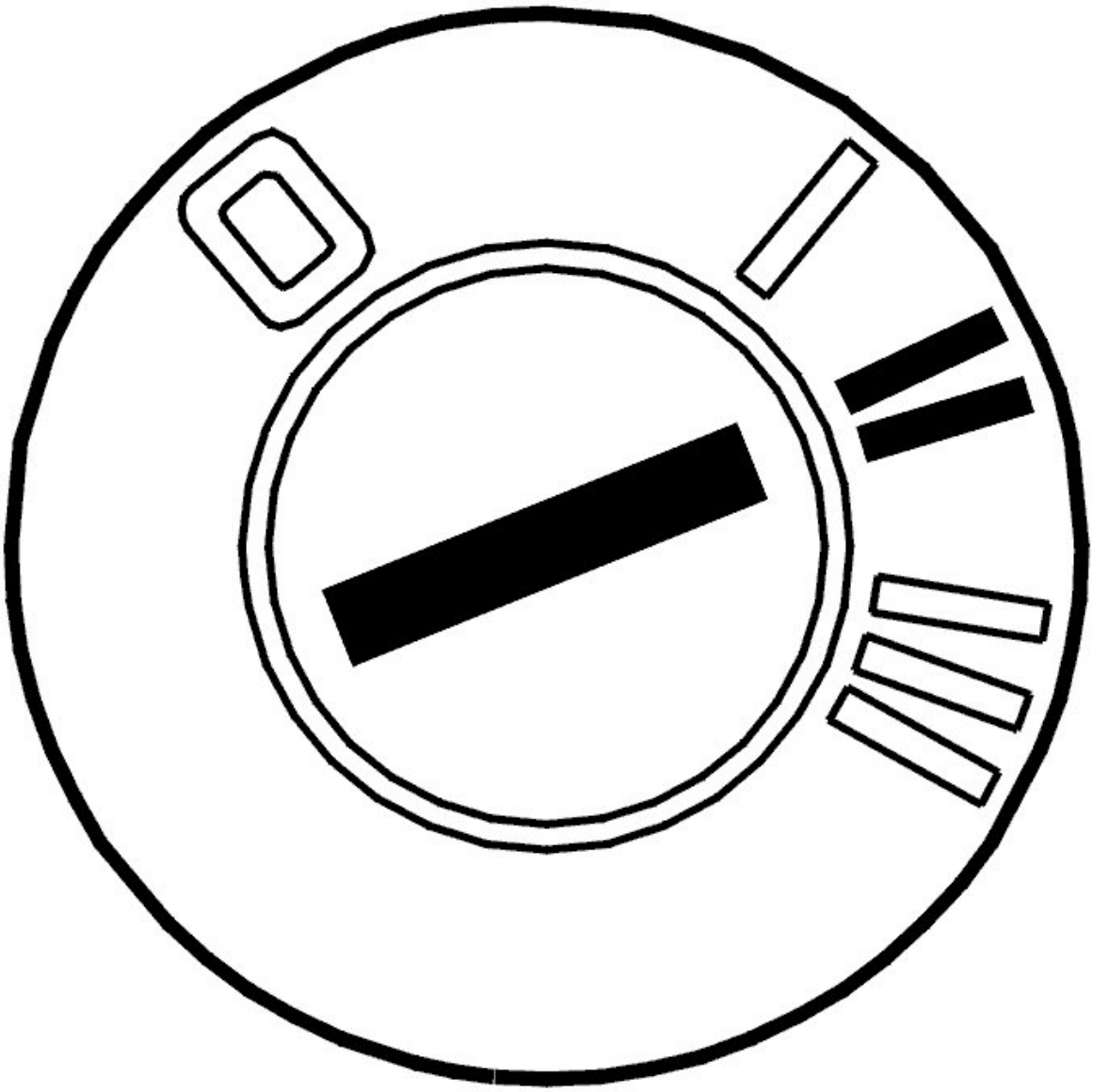
Hint: The doors can also be locked/unlocked using the remote control.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



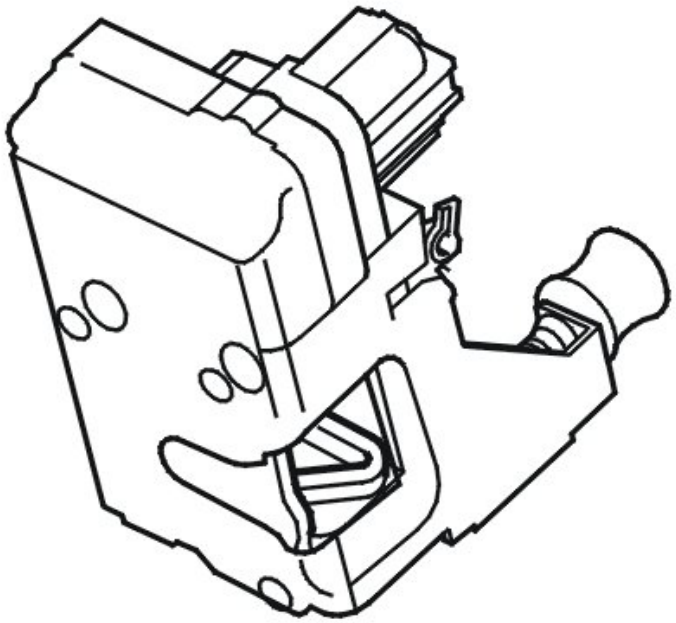
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Lock and unlock the left and right-hand rear doors. Check that the door can be opened when it is unlocked and cannot be opened when it is locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the switch in the lock mechanism. Check for a short-circuit. Check for an open-circuit. Check by measuring the resistance between terminals #1 and #5 on the connector for the lock mechanism and ground.
Check the resistance between terminals #1 and #5 on the lock mechanism side. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

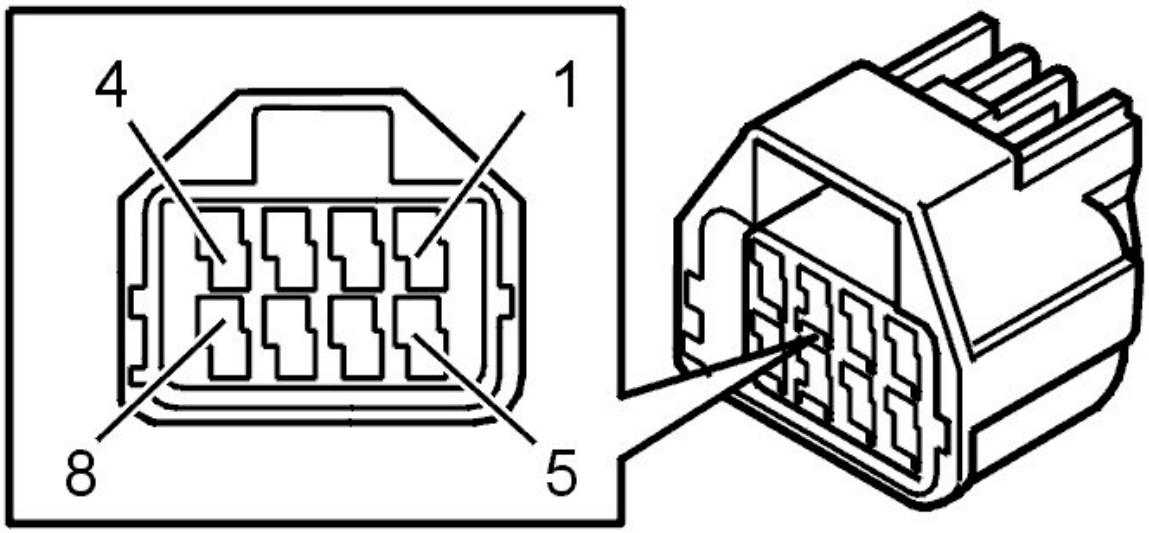
Check the signal cable between rear electronic module (REM) connector terminal #45 (#C5) and terminal #5 on the lock mechanism. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.

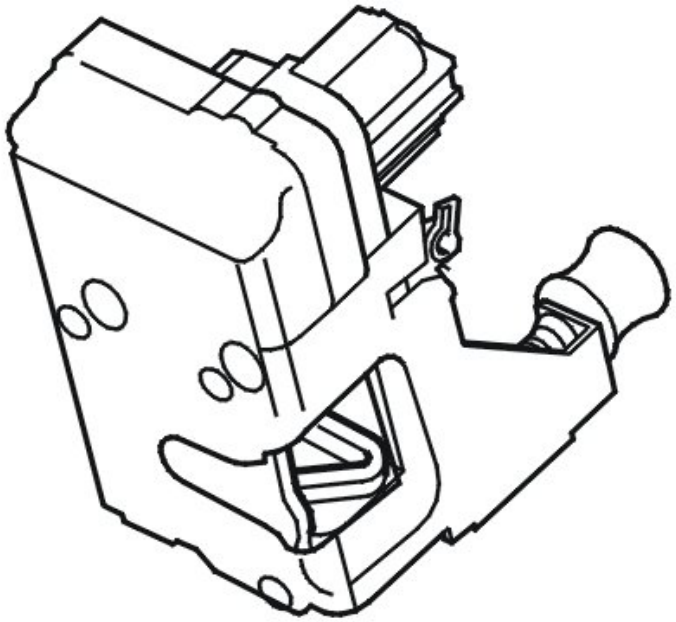
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #28 (#D28) and lock mechanism terminal #5. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the ground lead/ground terminal for the lock mechanism. Check for an open-circuit.

Left rear door

Check the control signal cable between rear electronic module (REM) connector terminal #23 (#A23) and terminal #4 on the lock mechanism

connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the control signal cable between rear electronic module (REM) connector terminal #27 (#A27) and terminal #8 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

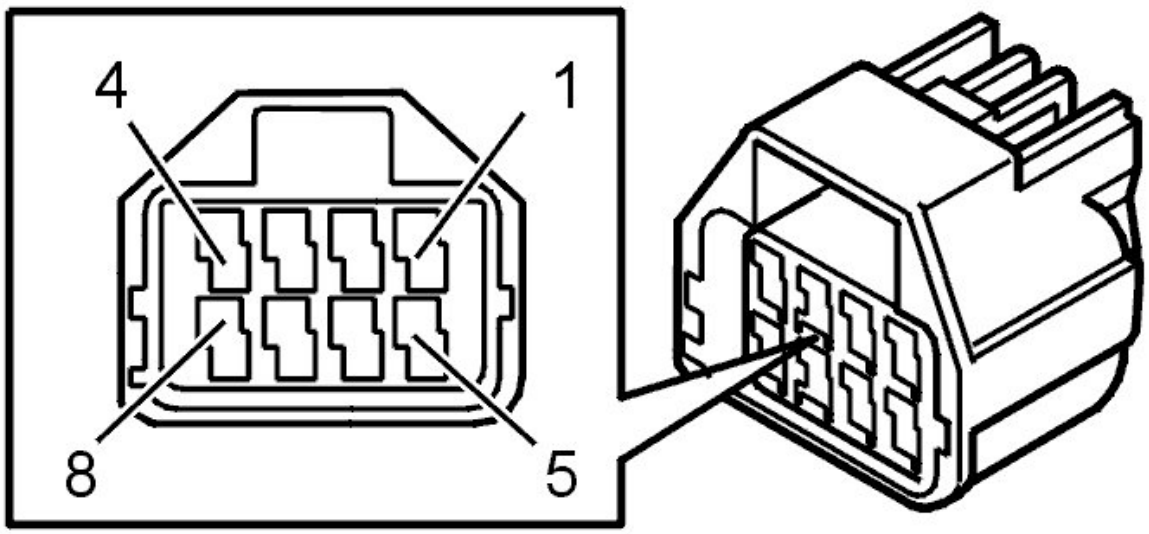
Check the control signal cable between rear electronic module (REM) connector terminal #26 (#B26) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground. The circuit runs via the lock motor for the fuel tank filler cap.
Check the control signal cable between rear electronic module (REM) connector terminal #24 (#B24) and terminal #8 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

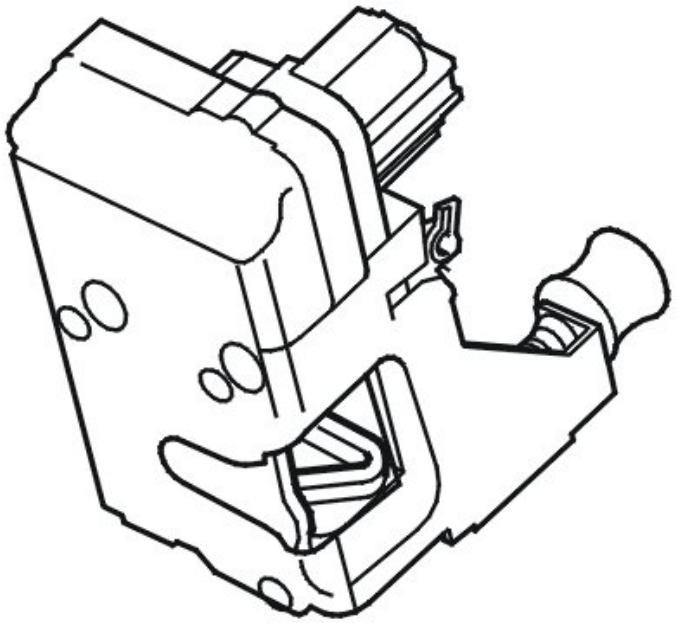
Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





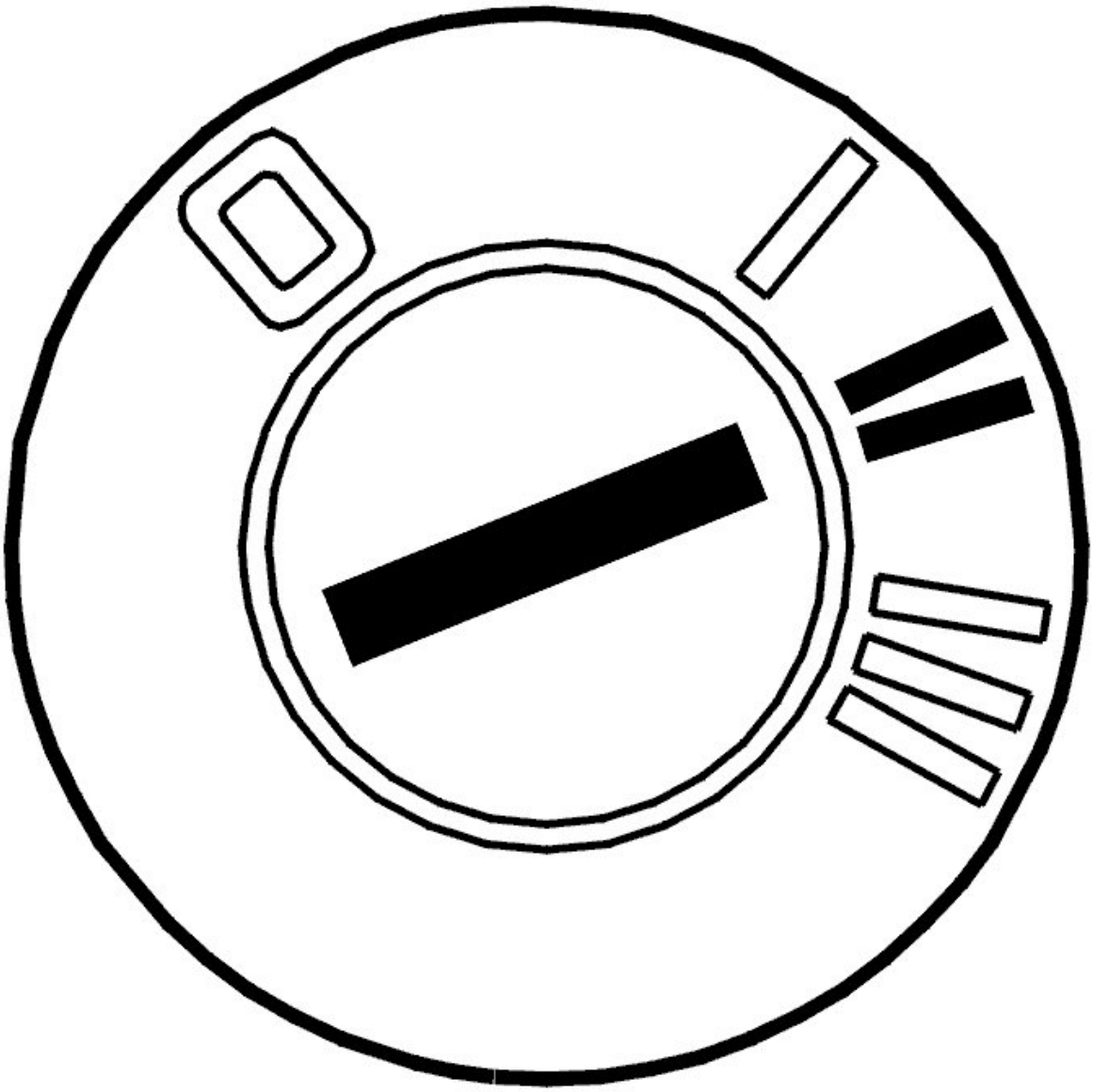
Continue - Verification

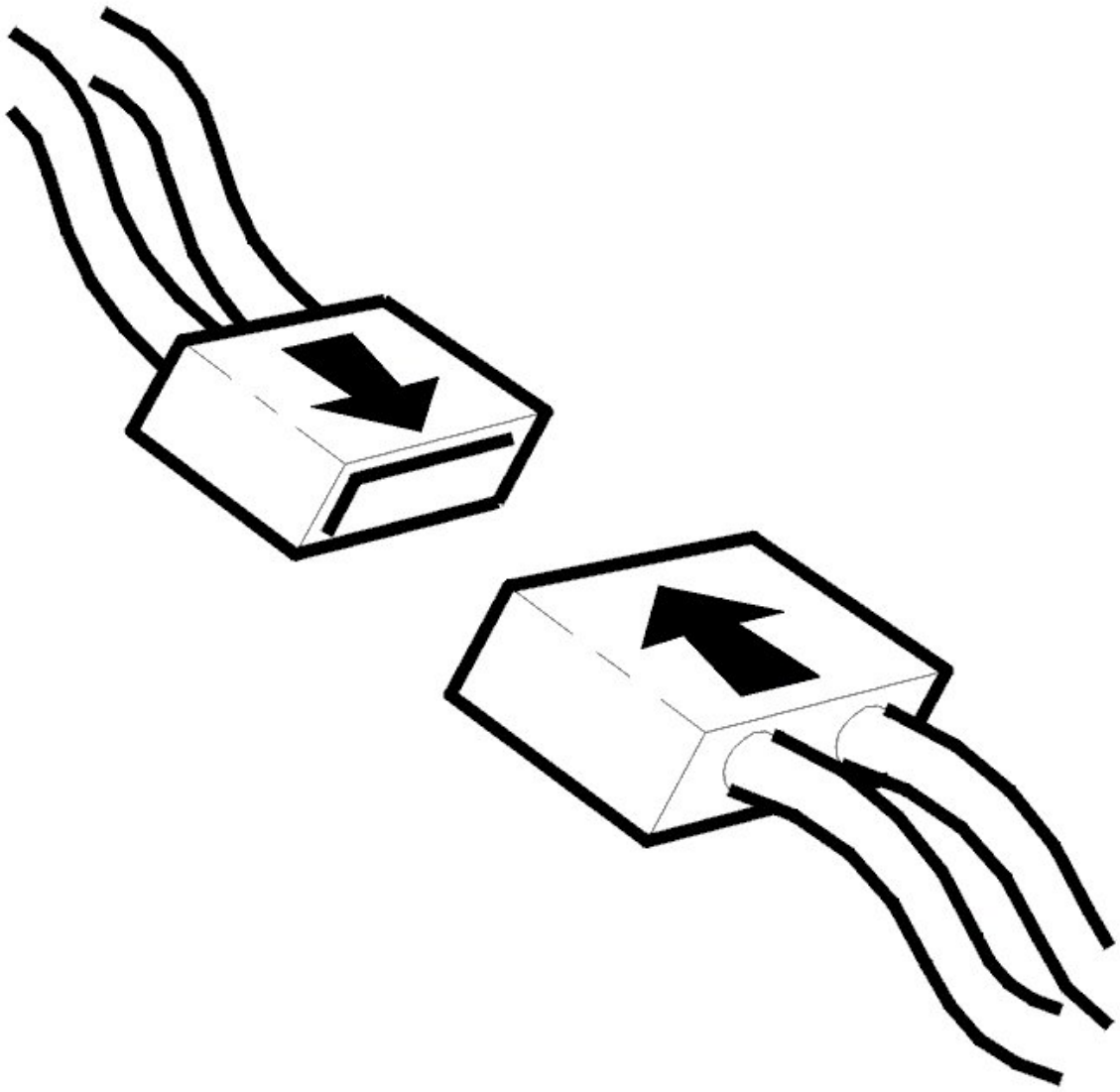
Verification

Verification

Verification

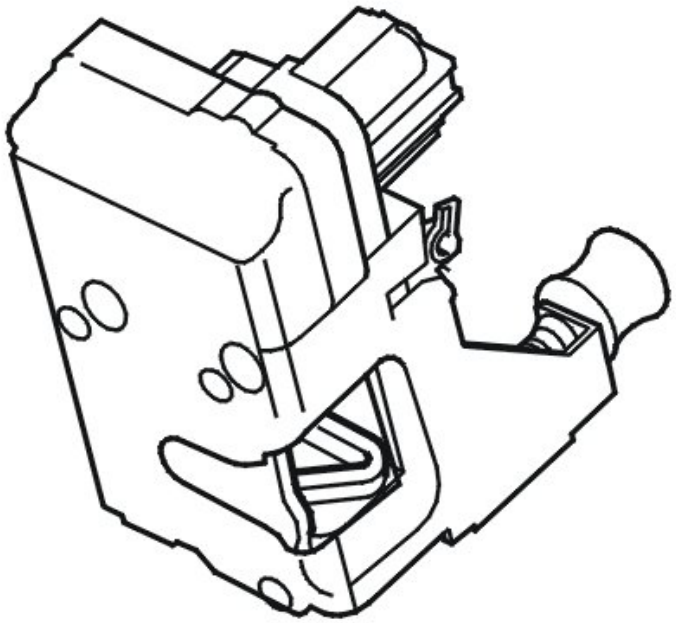
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the switches in the rear doors

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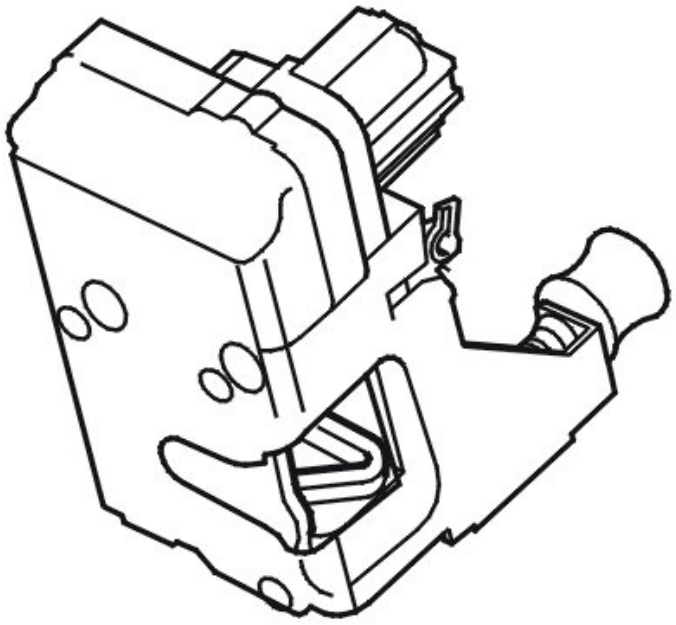
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A04

Condition



The rear electronic module (REM) uses a number of relays to control the lock units in the rear doors for locking and unlocking.
The rear electronic module (REM) receives an indication from the lock units when the central locking motor is in the locked or unlocked position. This information is supplied by a switch in each lock unit. The switch provides a ground when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch in the **right rear door** is still low 15 seconds after the unlock command was given.
The diagnostic trouble code (DTC) can be diagnosed during unlocking by the central locking and when no further lock command has been received within 15 seconds.

Substitute value
- None.

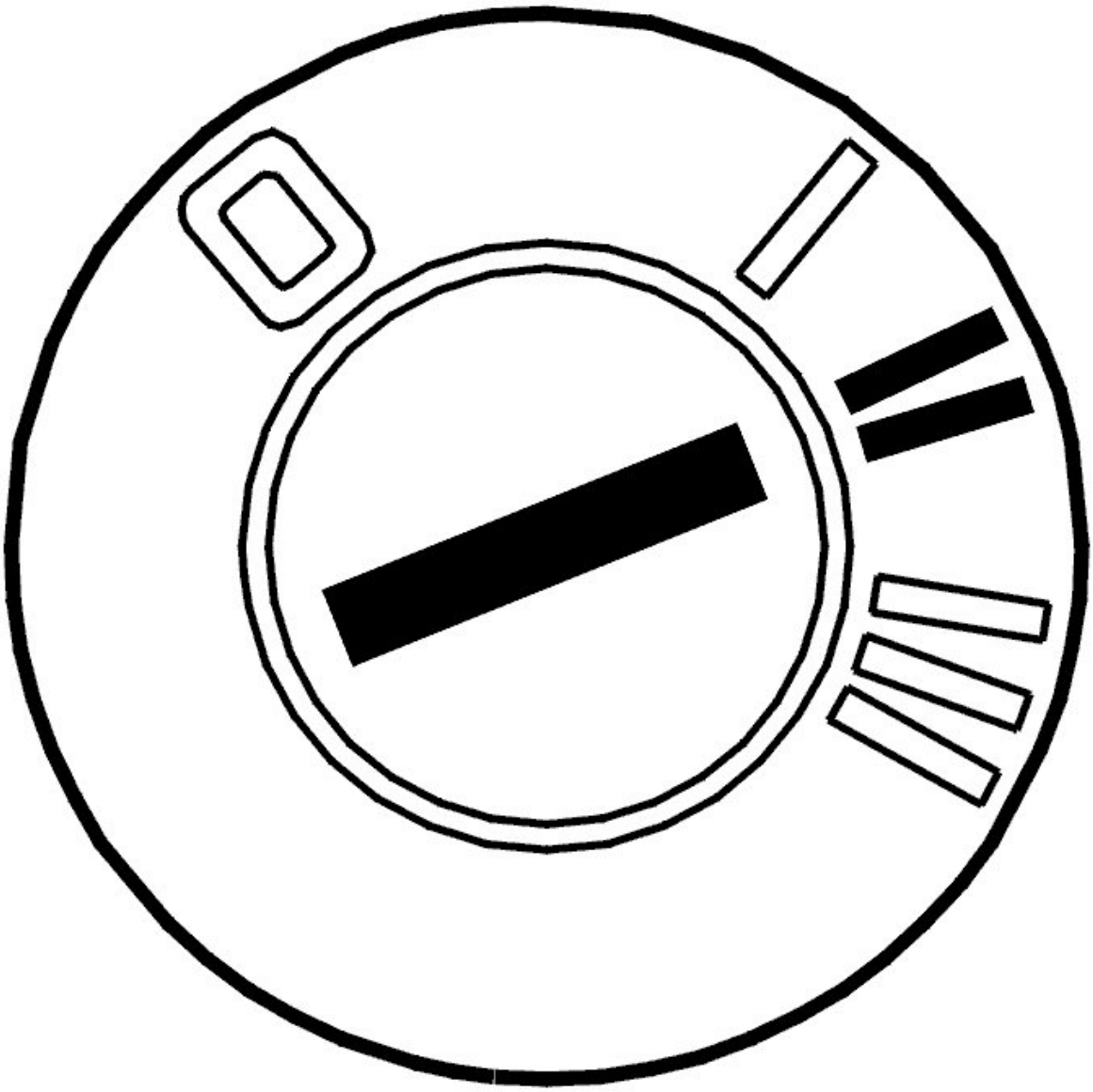
Possible source
- Contact resistance and oxidation in the terminals
- Fault or short-circuit to ground in the switch for indication of the lock motor position
- Short-circuit to ground in the cable from the switch for indication of the lock motor position
- The lock motor is stuck in one position
- Open-circuit in the ground lead/ground terminal for the lock mechanism
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motors from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- Does not lock / unlock a door.

Signal Too Low

Signal too low

Checking the signal from the switches in the rear doors

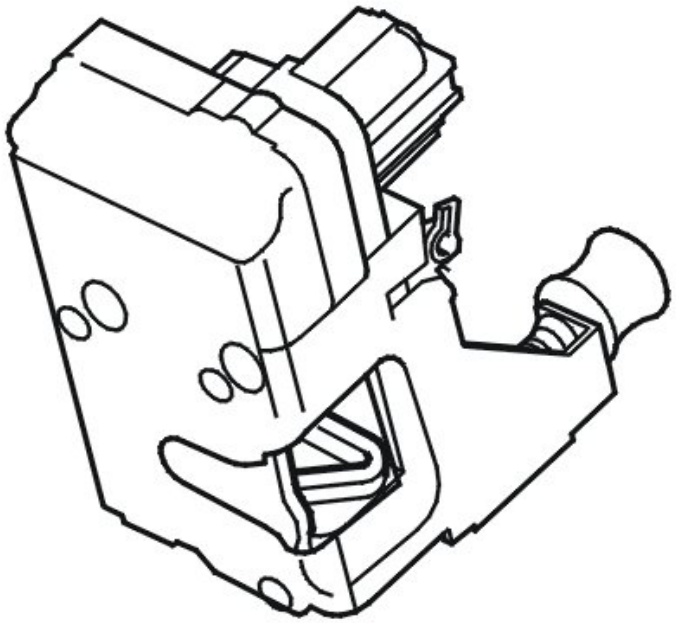


- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.

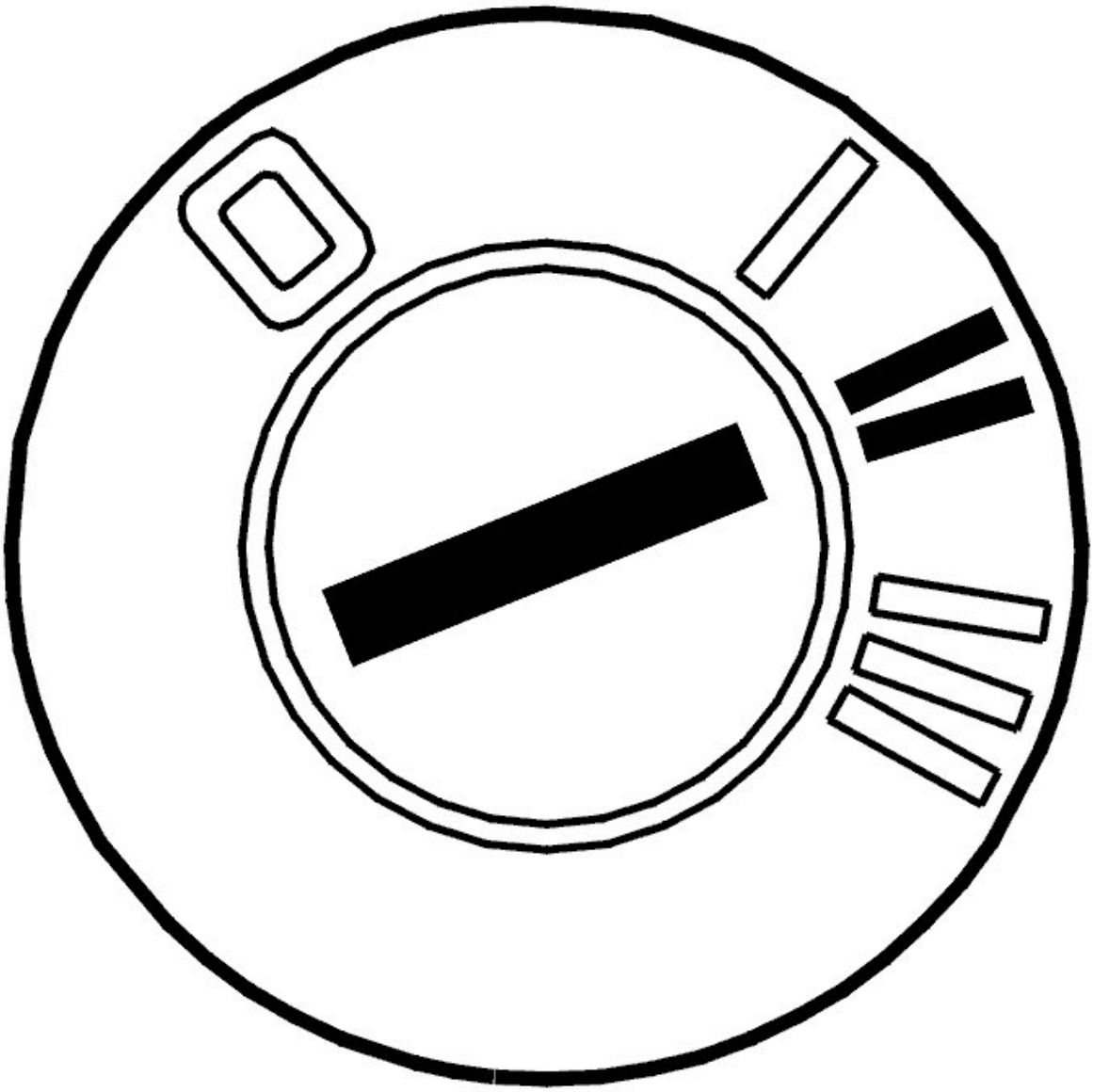
Hint: The doors can also be locked/unlocked using the remote control.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



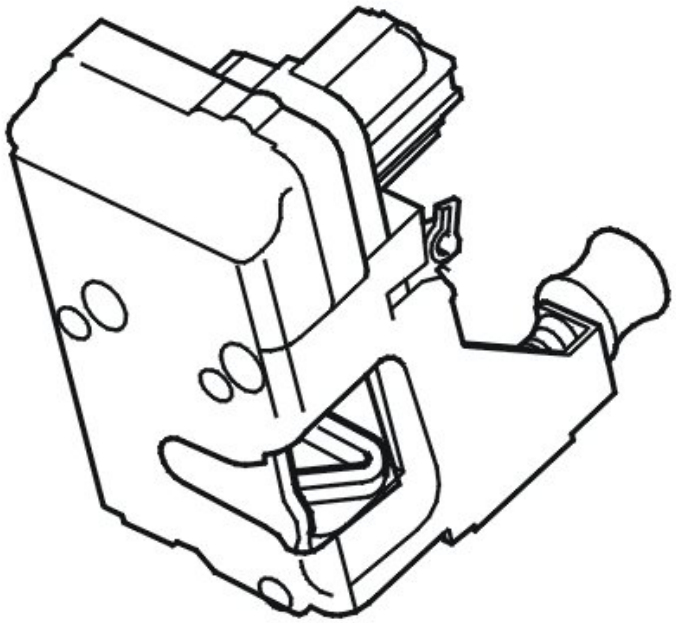
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Lock and unlock the left and right-hand rear doors. Check that the door can be opened when it is unlocked and cannot be opened when it is locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the switch in the lock mechanism. Check for a short-circuit. Check for an open-circuit. Check by measuring the resistance between terminals #1 and #5 on the connector for the lock mechanism and ground.
Check the resistance between terminals #1 and #5 on the lock mechanism side. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

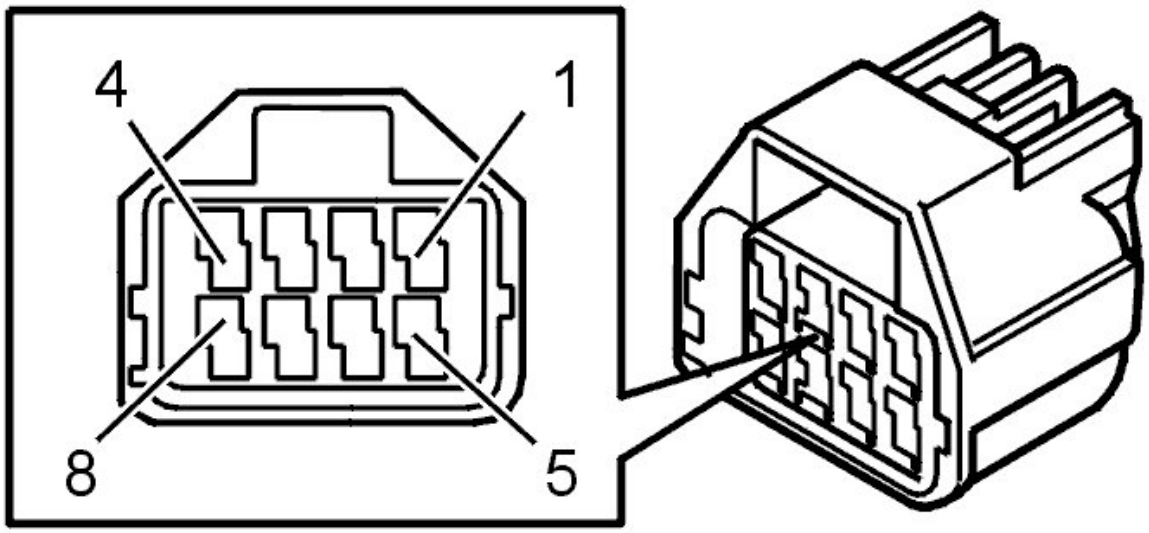
Check the signal cable between rear electronic module (REM) connector terminal #45 (#C5) and terminal #5 on the lock mechanism. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.

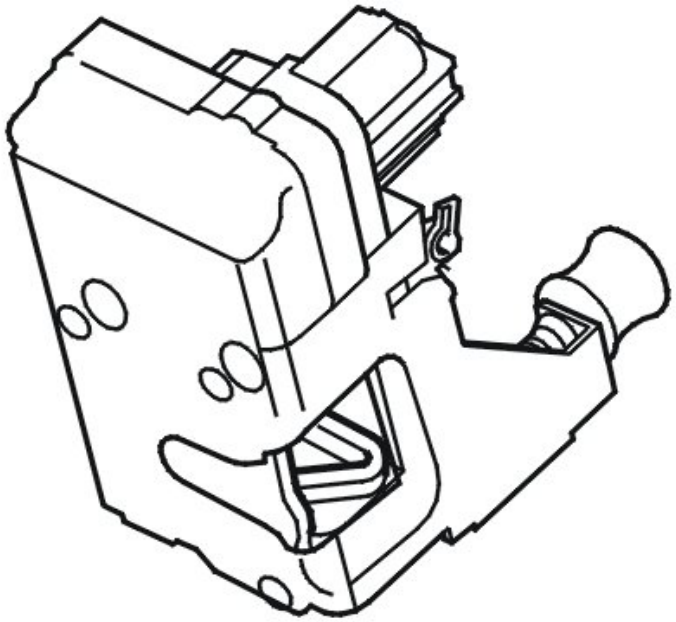
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #28 (#D28) and lock mechanism terminal #5. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the ground lead/ground terminal for the lock mechanism. Check for an open-circuit.

Left rear door

Check the control signal cable between rear electronic module (REM) connector terminal #23 (#A23) and terminal #4 on the lock mechanism

connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the control signal cable between rear electronic module (REM) connector terminal #27 (#A27) and terminal #8 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

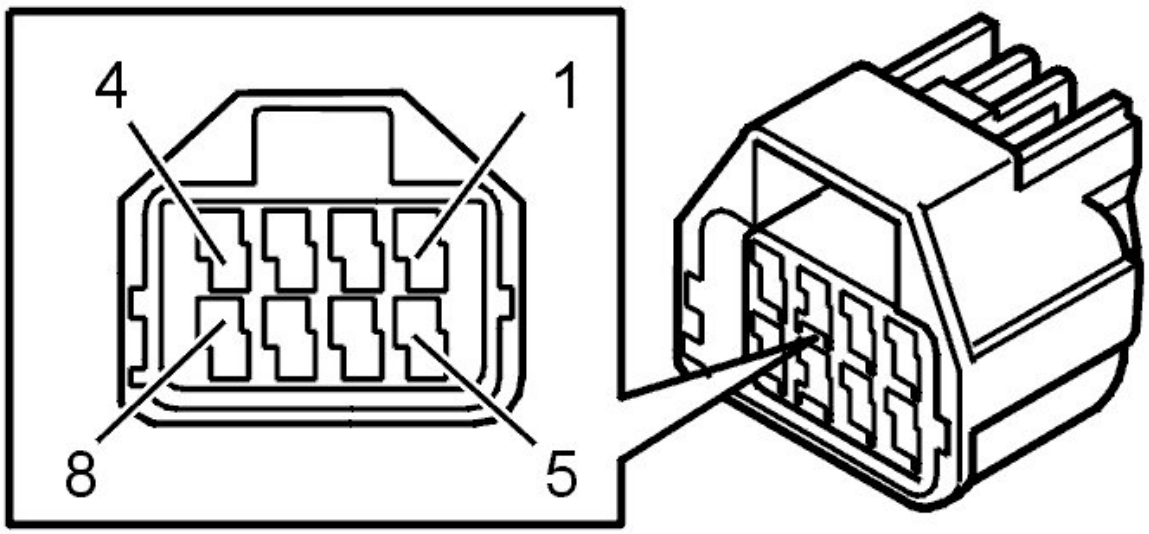
Check the control signal cable between rear electronic module (REM) connector terminal #26 (#B26) and terminal #4 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground. The circuit runs via the lock motor for the fuel tank filler cap.
Check the control signal cable between rear electronic module (REM) connector terminal #24 (#B24) and terminal #8 on the lock mechanism connector. Check for an open-circuit. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

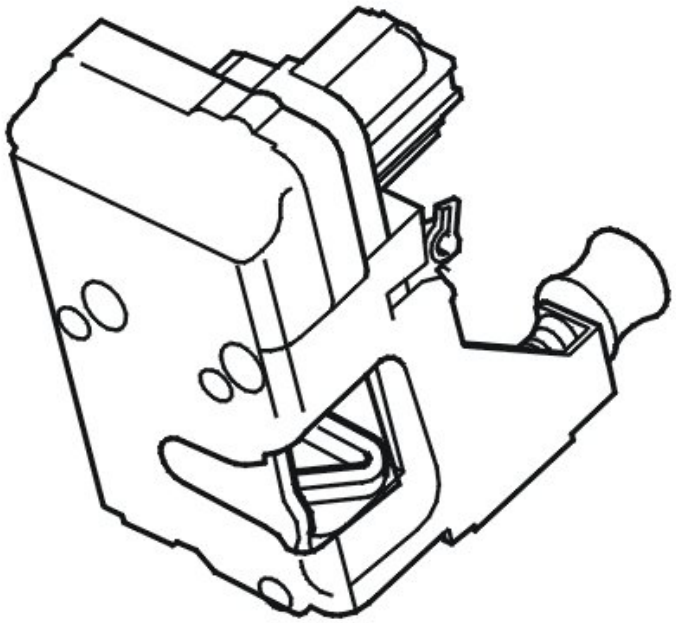
Hint: Remove the relay for the child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





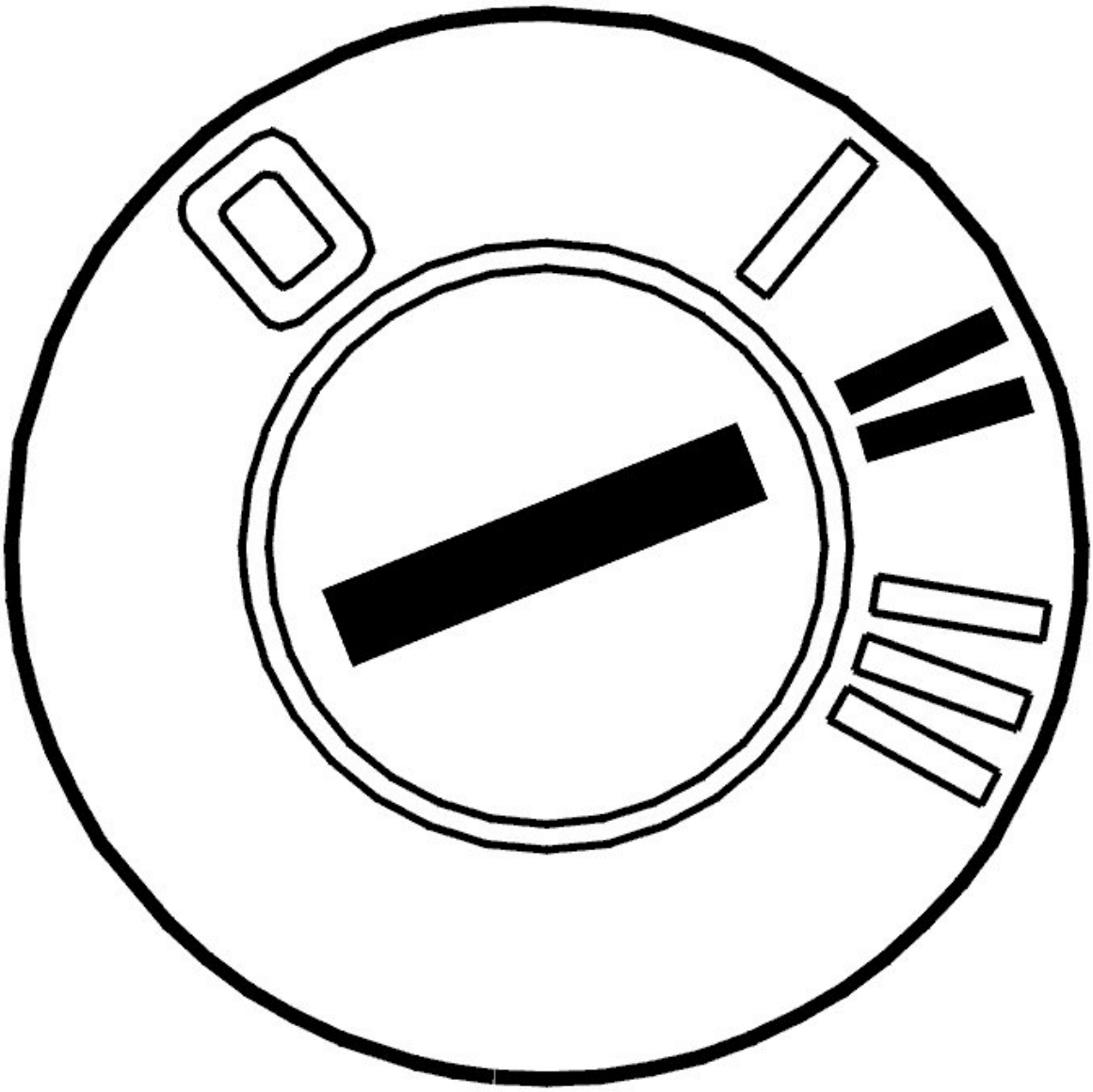
Continue - Verification

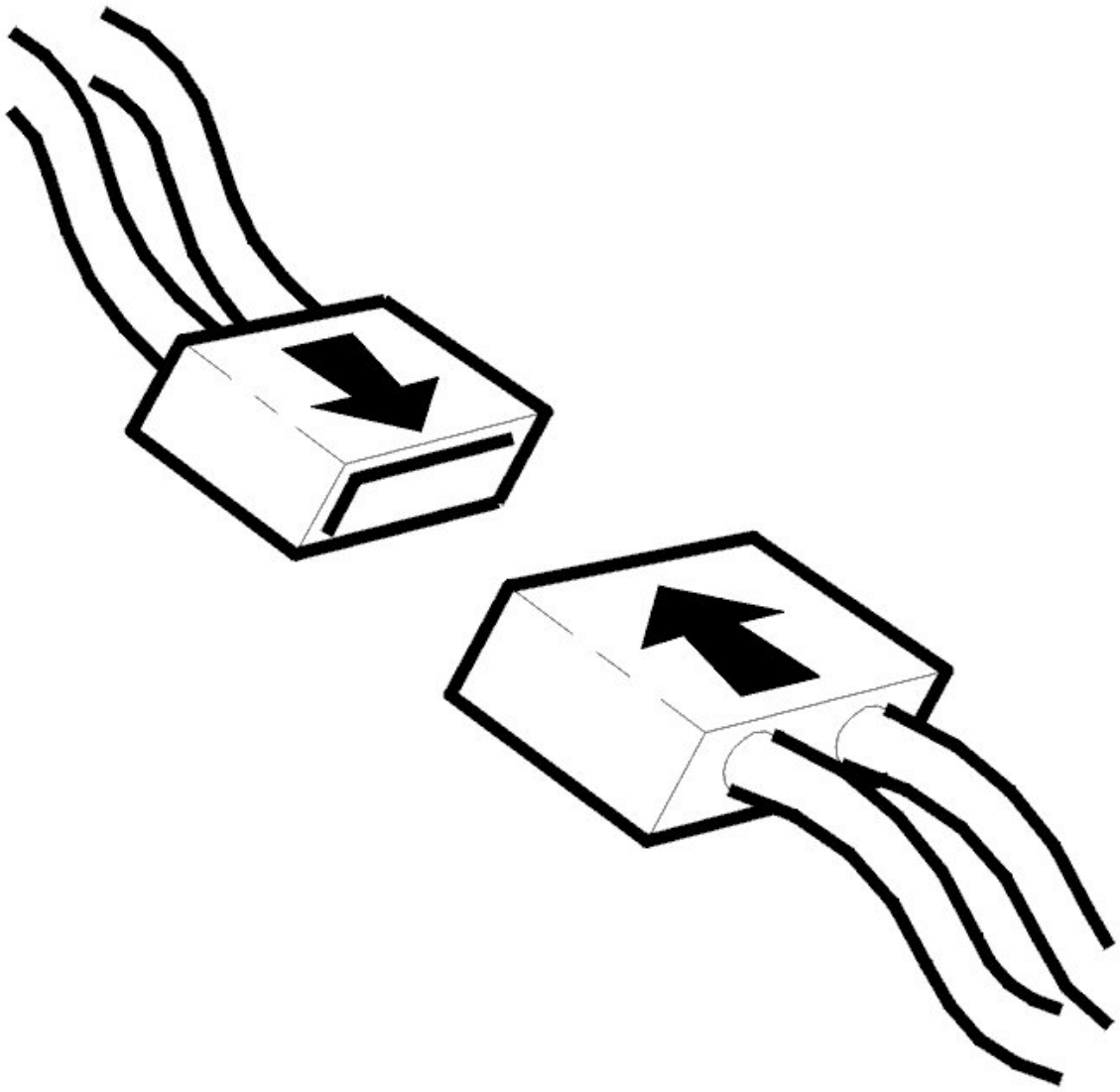
Verification

Verification

Verification

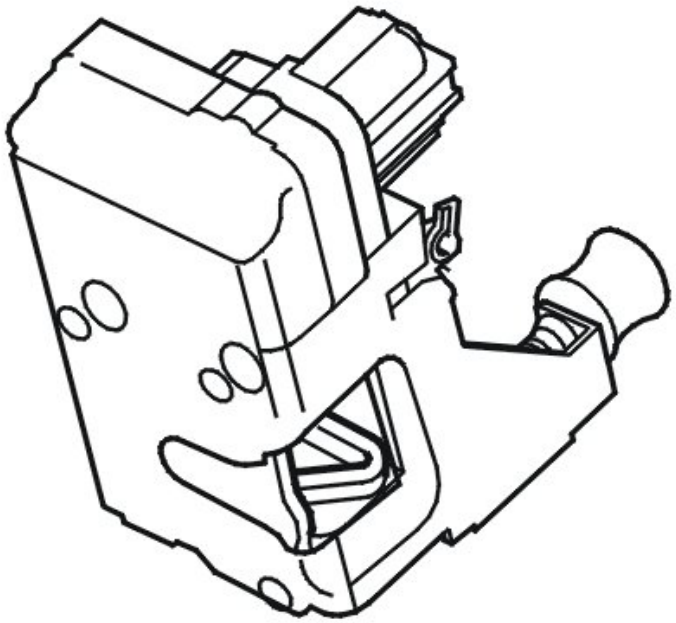
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both rear doors (indicates whether the doors are locked or not).

Lock and unlock the left and right-hand rear doors. The status of each door should change when the door is locked or unlocked.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the switches in the rear doors

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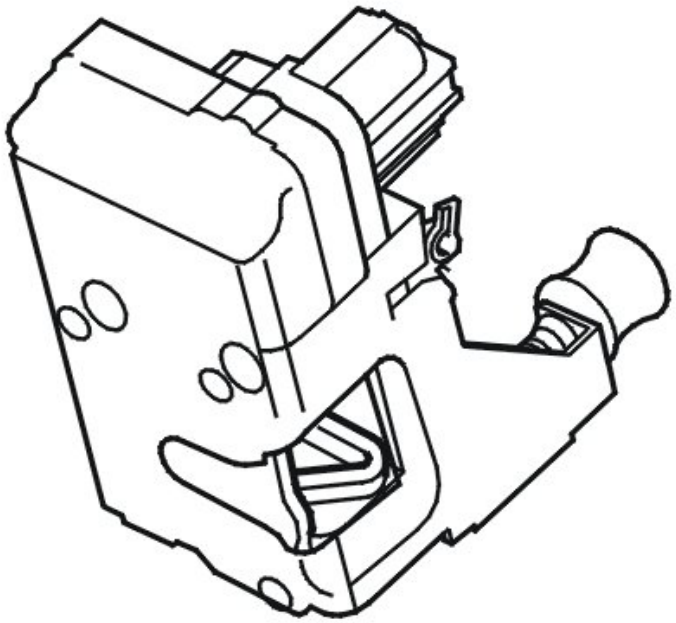
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A05

Condition



The rear electronic module (REM) uses a number of relays to control the lock units in the rear doors for locking and unlocking.
The rear electronic module (REM) also activates the child-proof lock. A switch in the lock unit indicates that the child-proof lock is activated. The switch provides a ground when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch for the child-proof lock in **one of the rear doors**is still high 1 second after an activation command has been given.
The diagnostic trouble code (DTC) can be diagnosed when the child-proof lock is activated.

Substitute value
- None.

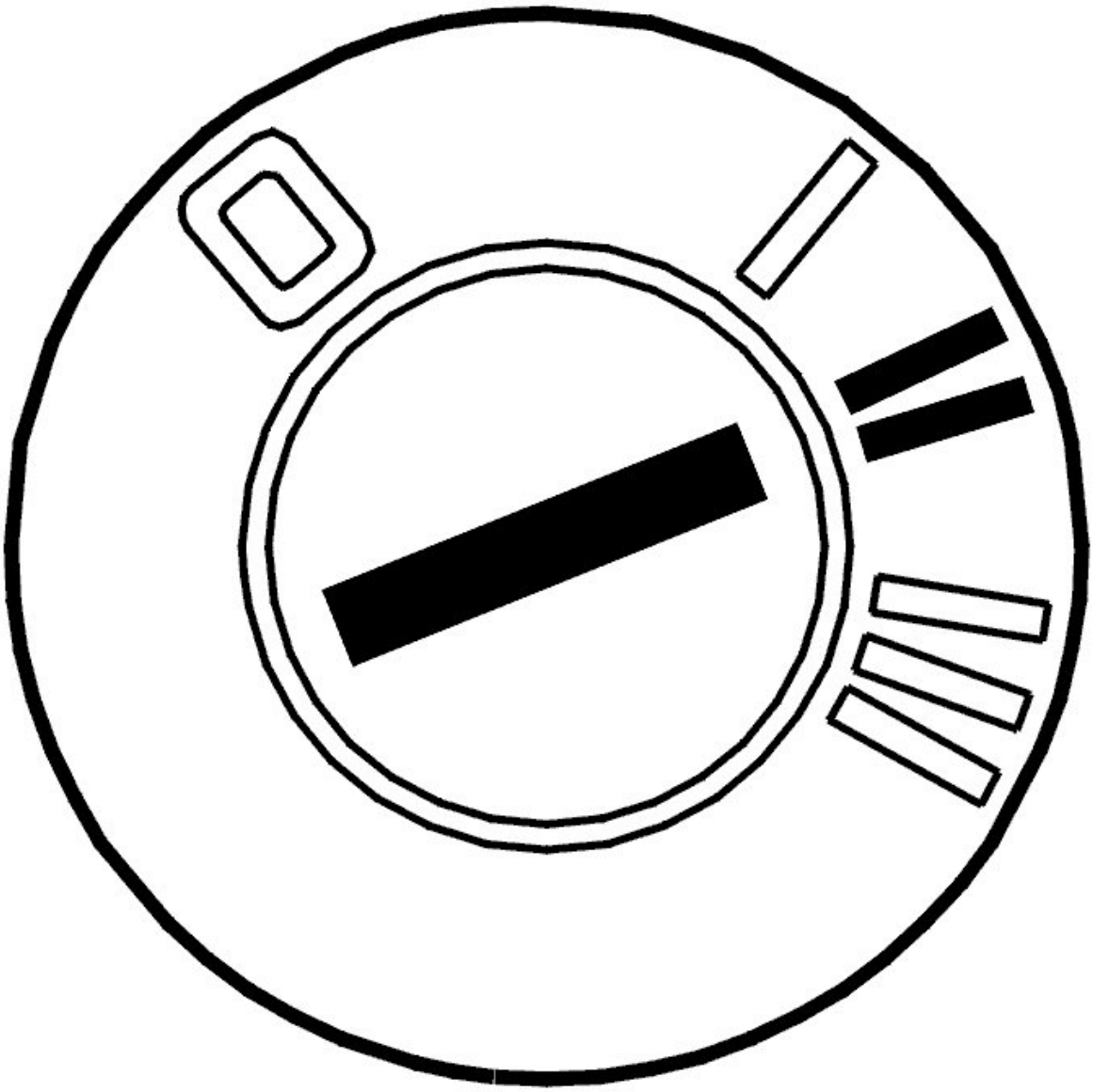
Possible source
- Contact resistance and oxidation in the terminals
- The lock motor in one of the rear doors is stuck in one position
- Fault or short-circuit to supply voltage in the switch for indication of the lock motor position in one of the rear doors
- Short-circuit to supply voltage in the cable from the switch for indication of the lock motor position in one of the rear doors
- Open-circuit in the cable from the switch for indication of the lock motor status in one of the rear doors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motor
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motor from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- The child-proof lock does not function.

Faulty Signal

Faulty signal

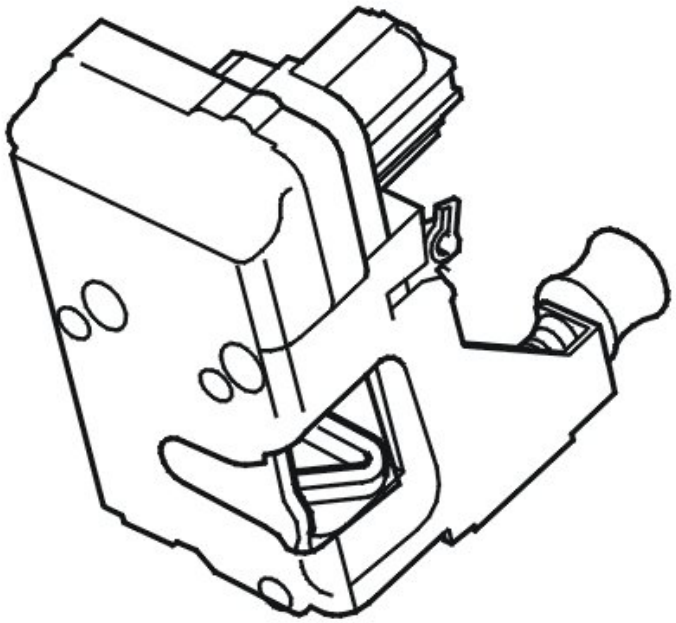
Checking the signal from the control switch for the child lock switch



- Ignition on
- Read the status of the control switch for the child lock from both rear doors.

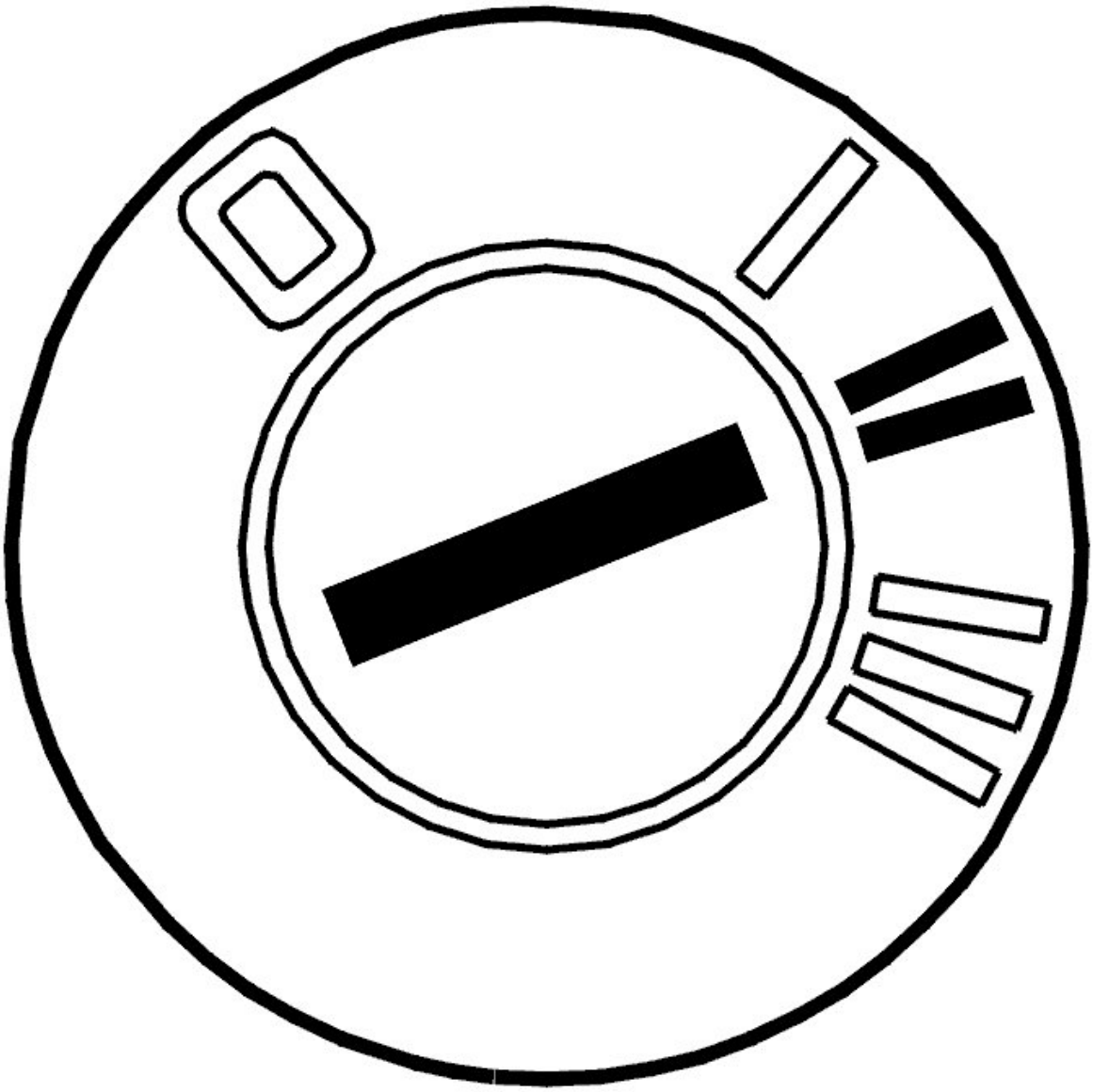
Activate and deactivate the power child locks.
The status of both doors should change at the same time as the function is engaged / disengaged.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



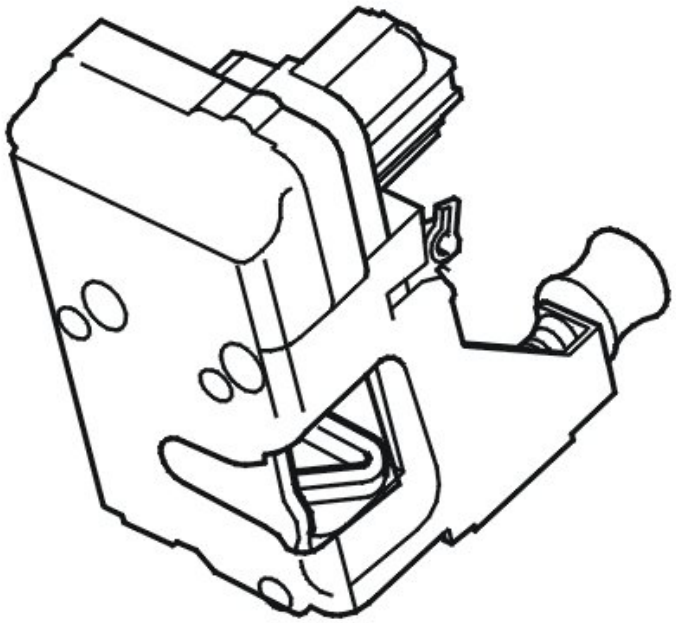
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Activate and deactivate the power child locks. Check that the door can be opened from the inside when unlocked and that it cannot be opened when locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.
Check the switch in the lock mechanism. Check for a short-circuit. Check by measuring the resistance between terminals #6 and #7 on the connector for the lock mechanism.
Check the resistance between terminals #6 and #7 on the lock mechanism. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

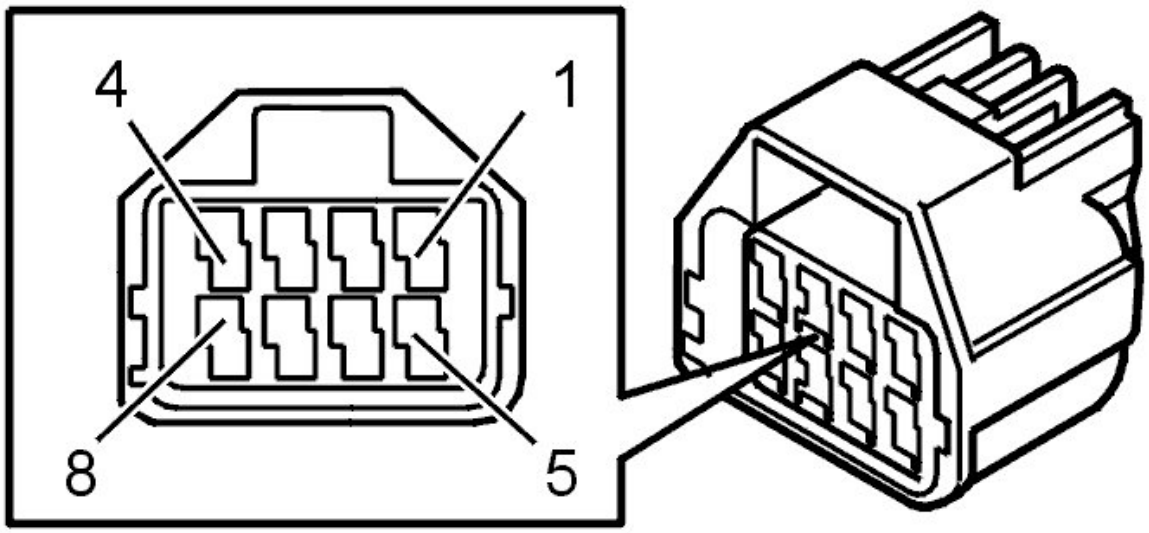
Check the signal cable between rear electronic module (REM) connector terminal #50 (#C10) and terminal #7 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch.

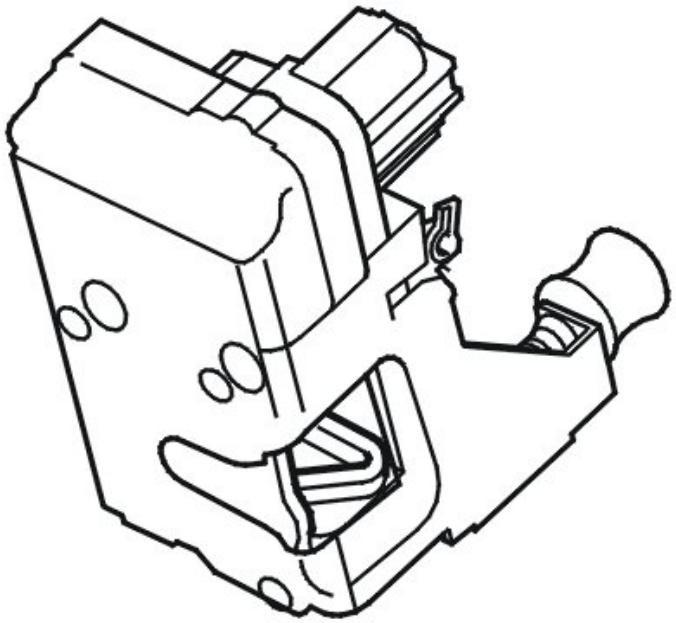
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #4 (#D4) and terminal #7 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit. The lock mechanism is jammed if no fault is found in the cable or the switch. Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.

Left rear door

Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an

open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between relay terminal #1 for the child lock and rear electronic module (REM) terminal #27 (#A27). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for power child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

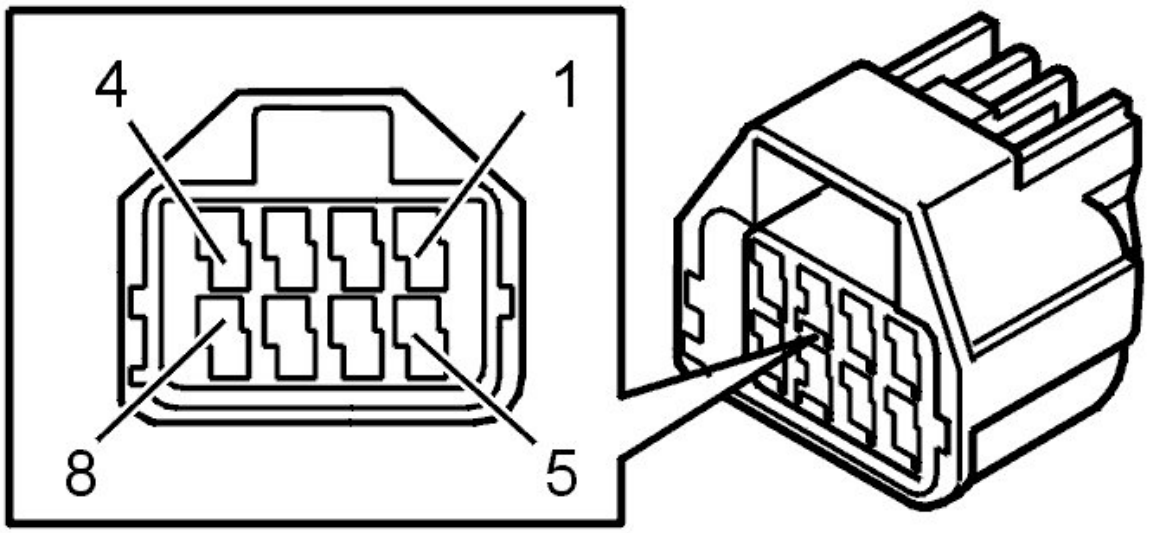
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between relay terminal #1 for the child lock and rear electronic module (REM) terminal #24 (#B24). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

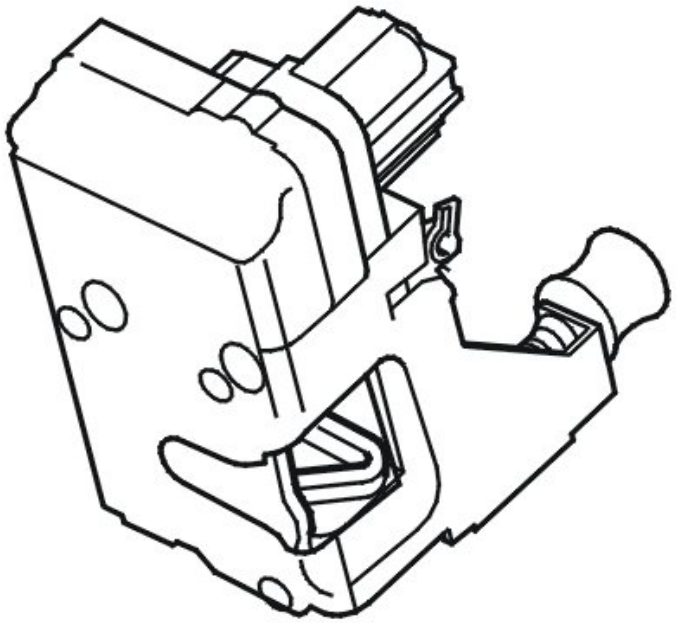
Hint: Remove the relay for power child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

The lock mechanism is jammed if no fault is found in the wiring.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





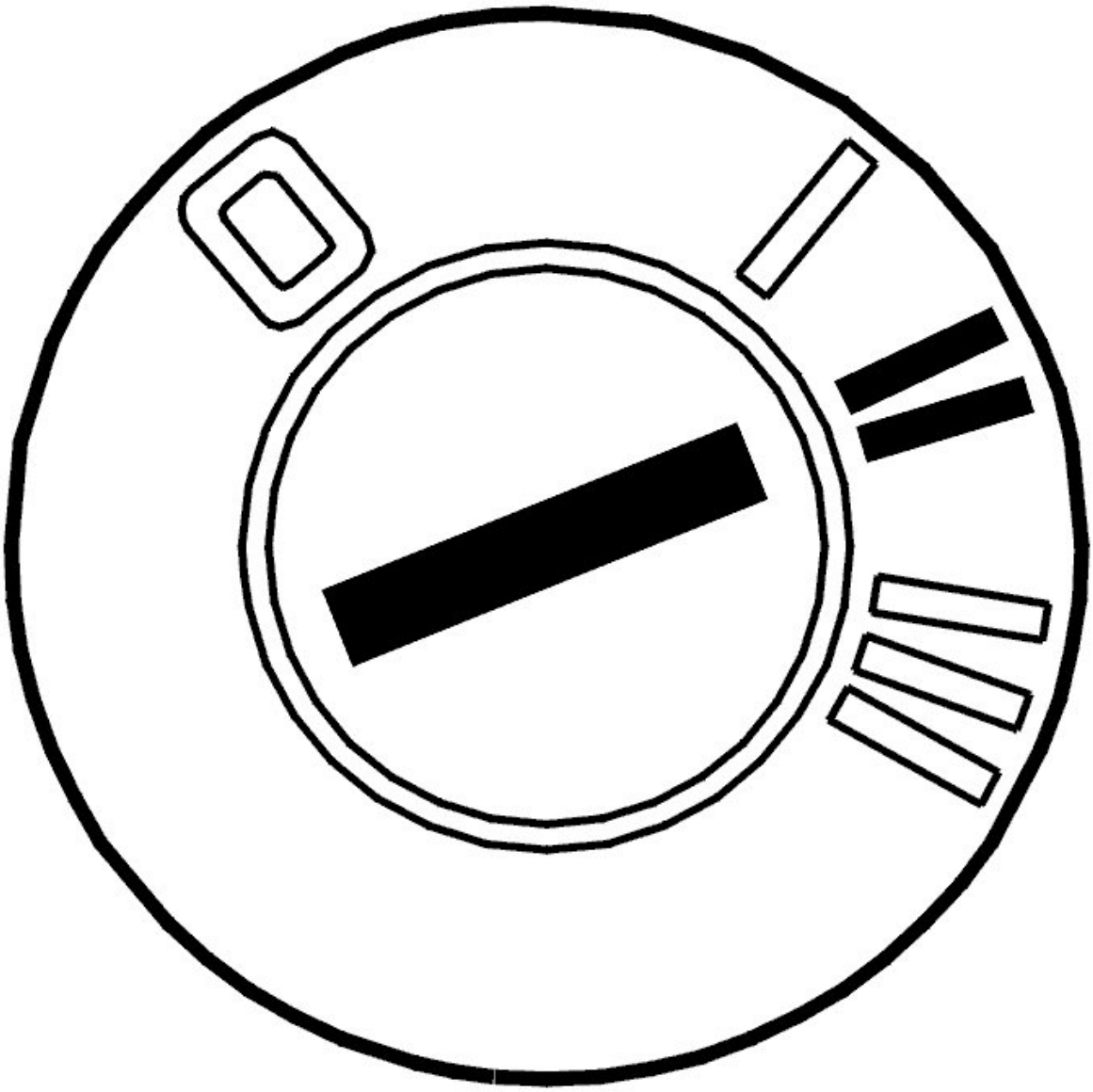
Continue - Verification

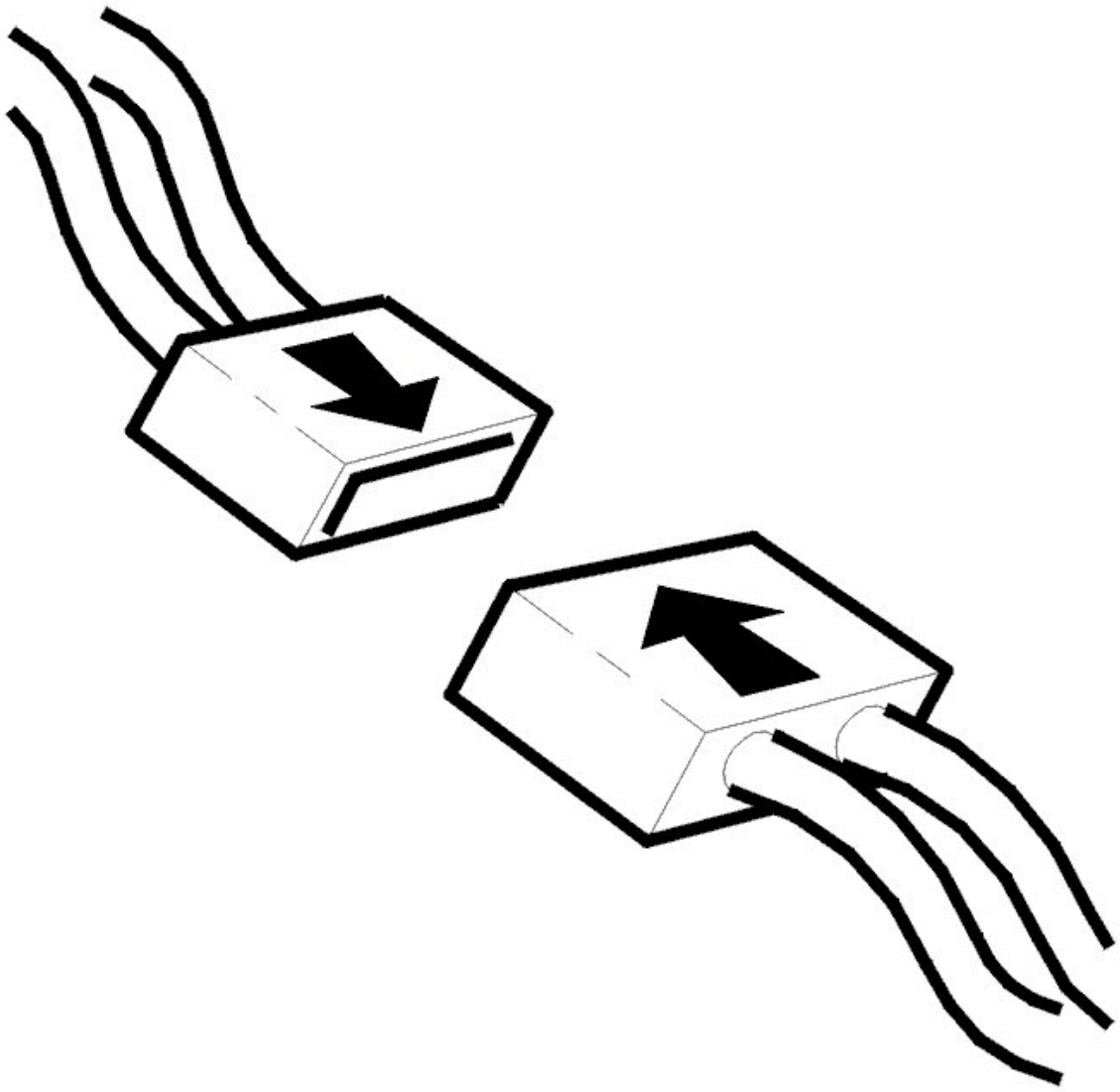
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

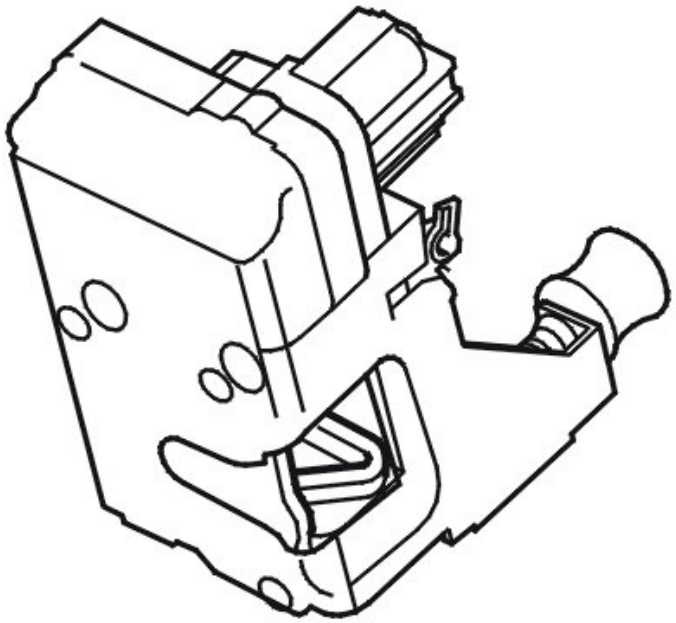




- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read the status of the control switch for the child lock from both rear doors.

Activate and deactivate the power child locks.

The status of both doors should change at the same time as the function is engaged / disengaged.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the control switch for the child lock switch

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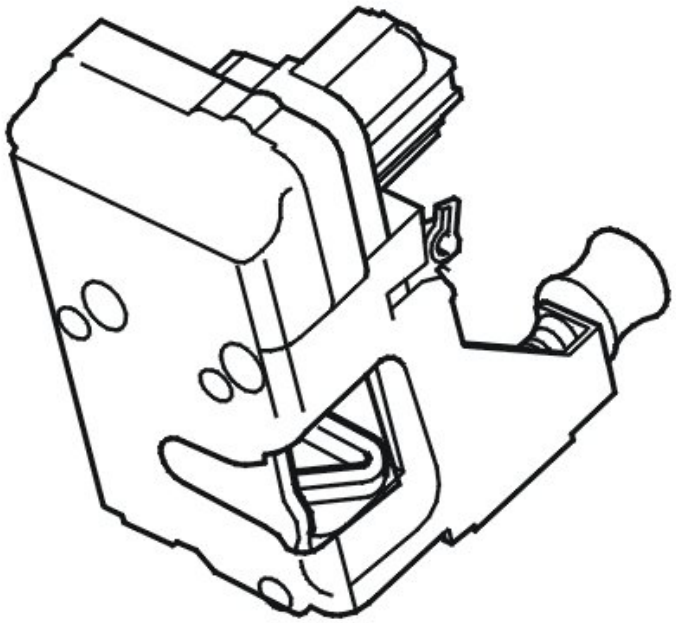
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A06

Condition



The rear electronic module (REM) uses a number of relays to control the lock units in the rear doors for locking and unlocking.
The rear electronic module (REM) also activates the child-proof lock. A switch in the lock unit indicates that the child-proof lock is activated. The switch provides a ground when the lock motor is in the locked position.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects that the input from the switch for the child-proof lock in **one of the rear doors**is still high 1 second after an activation command has been given.
The diagnostic trouble code (DTC) can be diagnosed when the child-proof lock is activated.

Substitute value
- None.

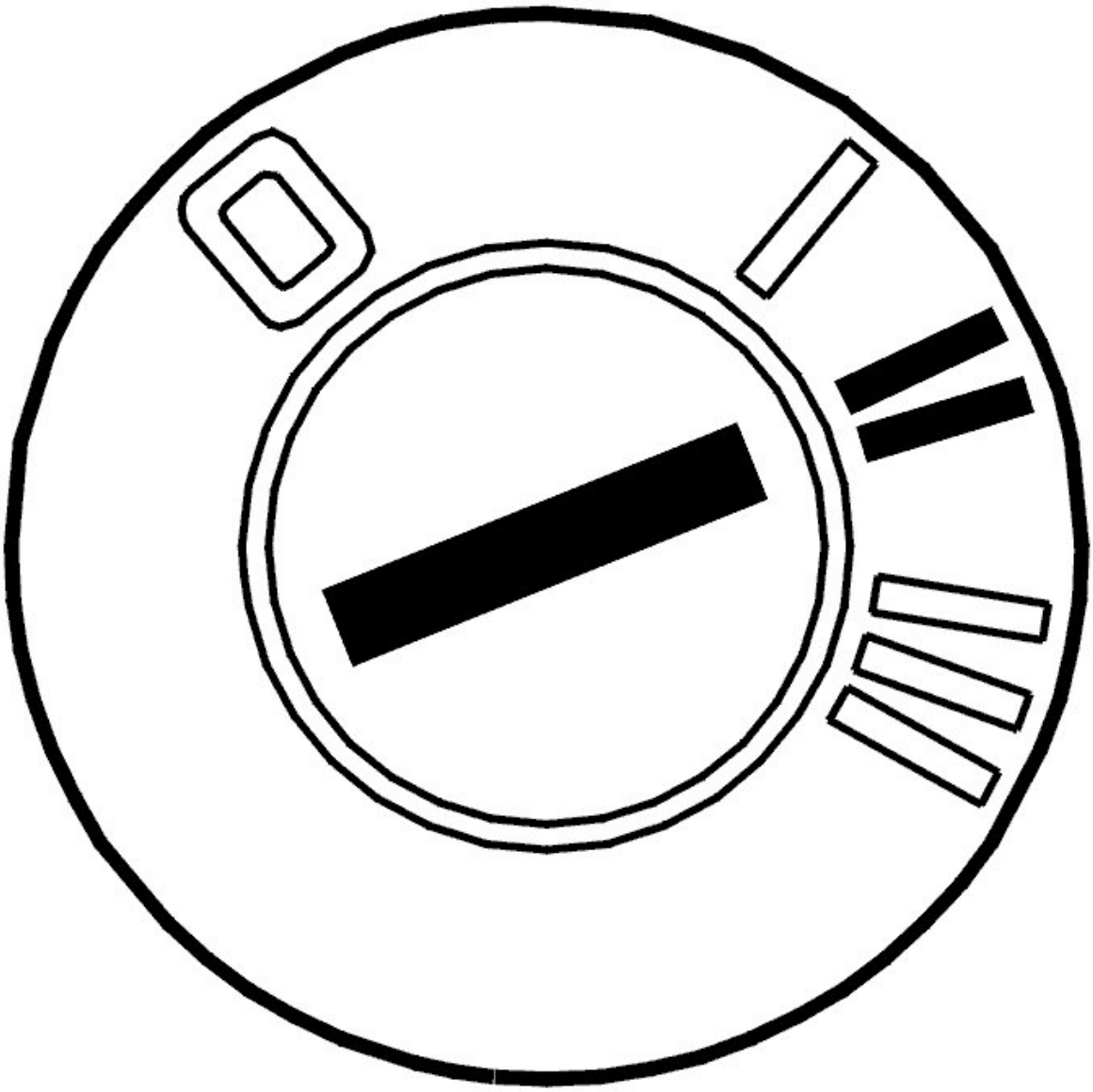
Possible source
- Contact resistance and oxidation in the terminals
- The lock motor in one of the rear doors is stuck in one position
- Short-circuit to ground in the switch for indication of the lock motor position in one of the rear doors
- Short-circuit to ground in the cable from the switch for indication of the lock motor position in one of the rear doors
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motor
- Open-circuit, short-circuit to ground or supply voltage in the control cable to the lock motor from/to the relay for the child-proof lock
- Open-circuit, short-circuit to ground or supply voltage in the wiring to the relay for the child-proof lock from the power window switch
- Damaged relay for the child-proof lock.

Fault symptom[s]
- The child-proof lock does not function.

Faulty Signal

Faulty signal

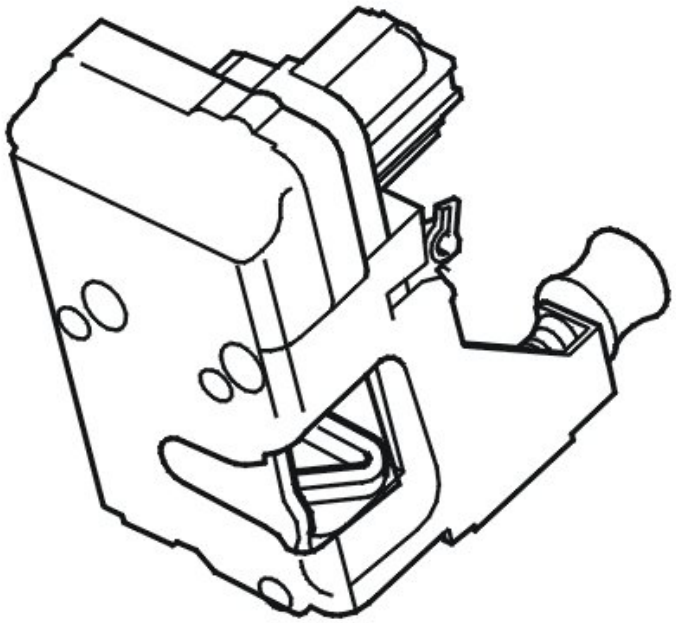
Checking the signal from the control switch for the child lock switch



- Ignition on
- Read the status of the control switch for the child lock from both rear doors.

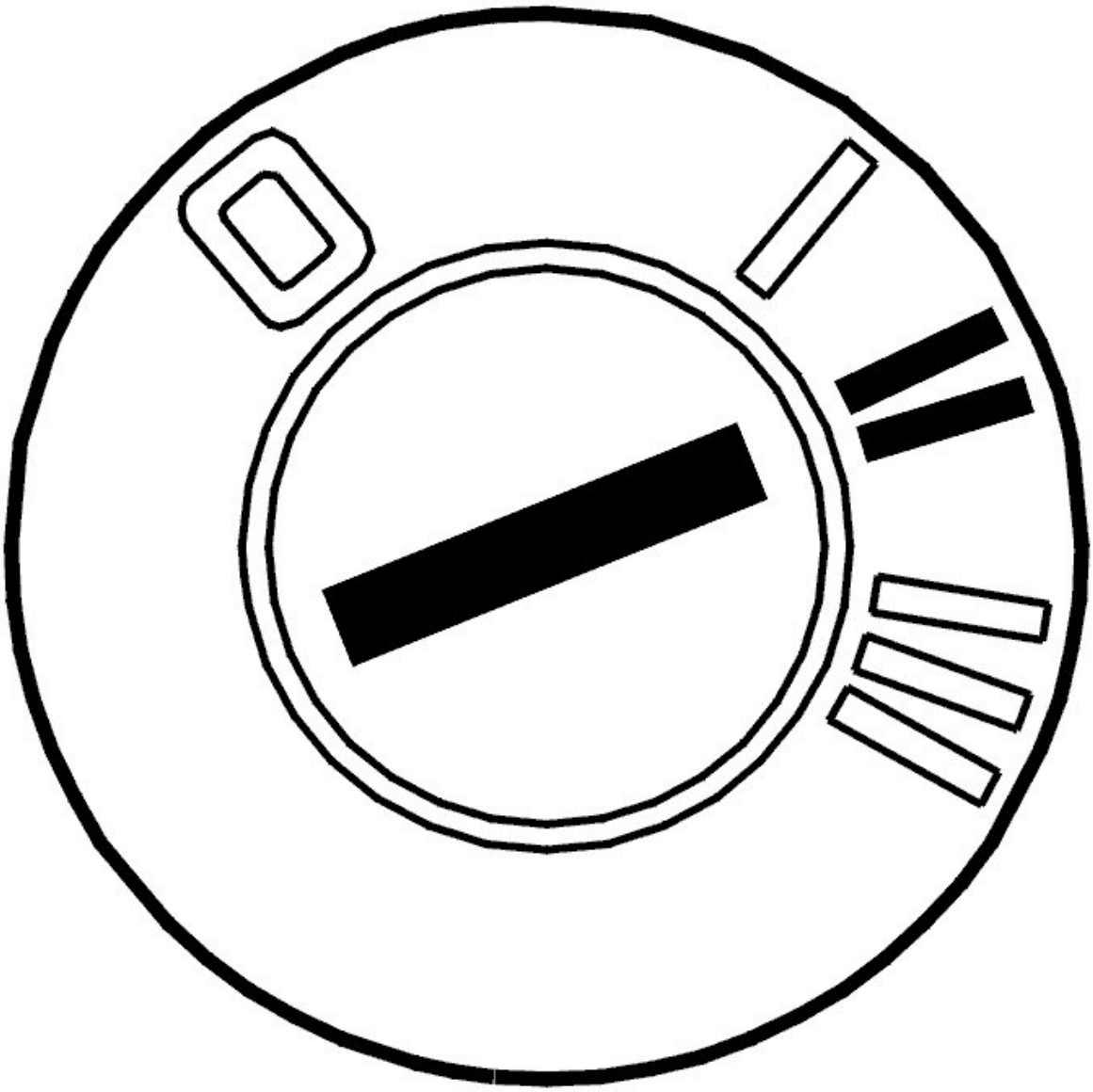
Activate and deactivate the power child locks.
The status of both doors should change at the same time as the function is engaged / disengaged.

The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



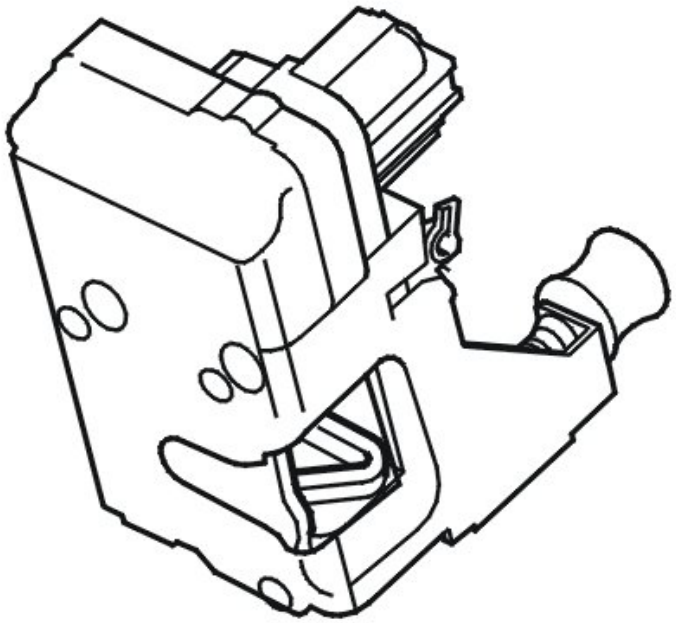
Continue - Checking the function of the lock mechanism

Checking the function of the lock mechanism



- Ignition on

Activate and deactivate the power child locks. Check that the door can be opened from the inside when unlocked and that it cannot be opened when locked.



Is the function OK?

Yes - Checking the signal from the switches in the rear doors

No - Checking cable and component

Checking the signal from the switches in the rear doors

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the switch in the lock mechanism. Check for a short-circuit. Check by measuring the resistance between terminals #6 and #7 on the connector for the lock mechanism.
Check the resistance between terminals #6 and #7 on the lock mechanism. The resistance must be infinite or near 0 ohm depending on the position of the switch.

Left rear door

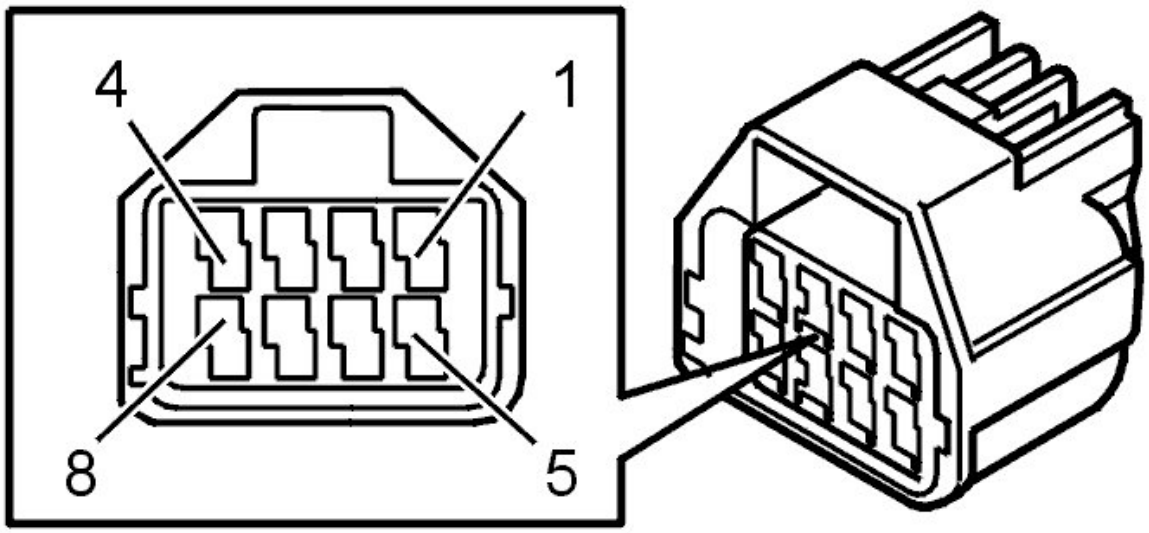
Check the signal cable between rear electronic module (REM) connector terminal #50 (#C10) and terminal #7 on the lock mechanism. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.

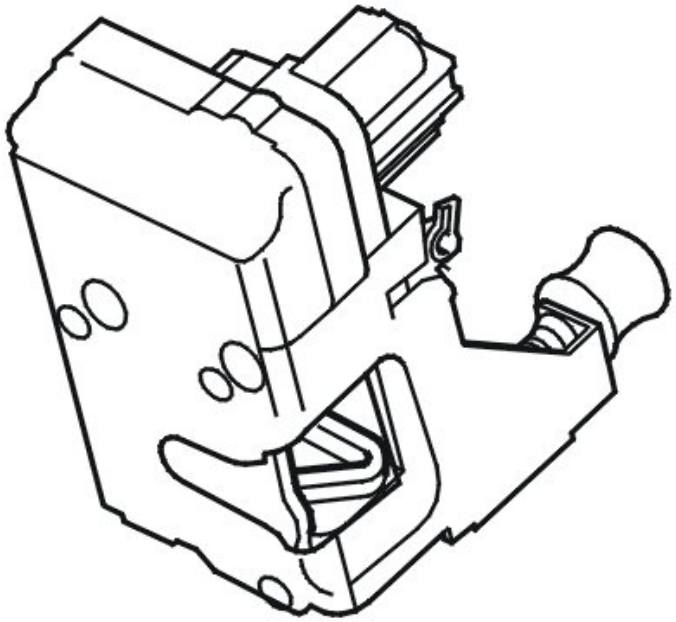
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #4 (#D4) and lock mechanism terminal #7. Check for a short-circuit to ground. The lock mechanism is jammed if no fault is found in the cable or the switch.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Verification

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Check the connectors for the lock mechanism and the rear electronic module (REM). Check for contact resistance and oxidation.

Left rear door

Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between relay terminal #1 for the child lock and rear electronic module (REM) terminal #27 (#A27). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

Hint: Remove the relay for power child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

Right rear door

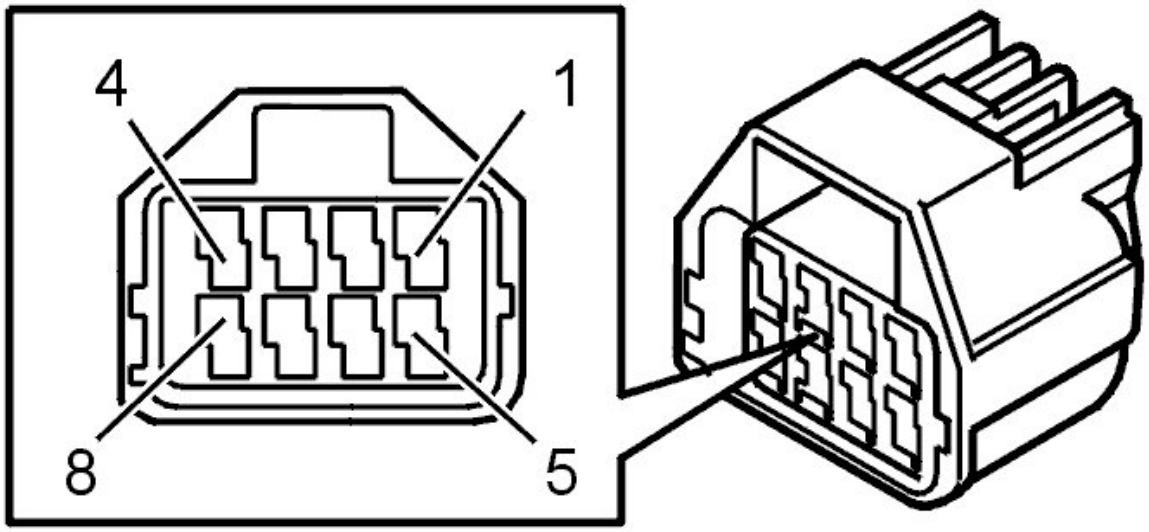
Check the wiring between the lock mechanism connector terminals #3 and #8 and the relay terminals #2 and #4 for the child lock. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the wiring between the lock mechanism connector terminals #3 and #5 and the power window switch. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between relay terminal #1 for the child lock and rear electronic module (REM) terminal #24 (#B24). Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.

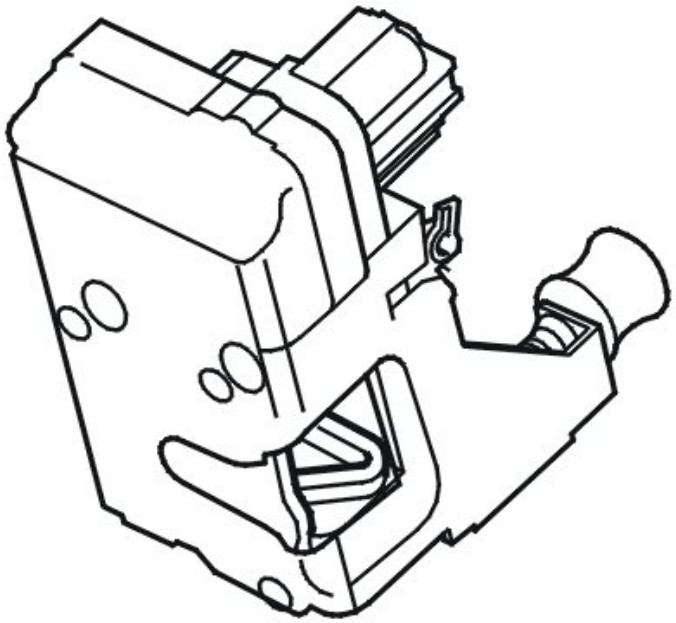
Hint: Remove the relay for power child locks while checking the lock motors. If the function is OK when the relay is removed it means that there is a fault in the relay or in the circuit for controlling the relay.

The lock mechanism is jammed if no fault is found in the wiring.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





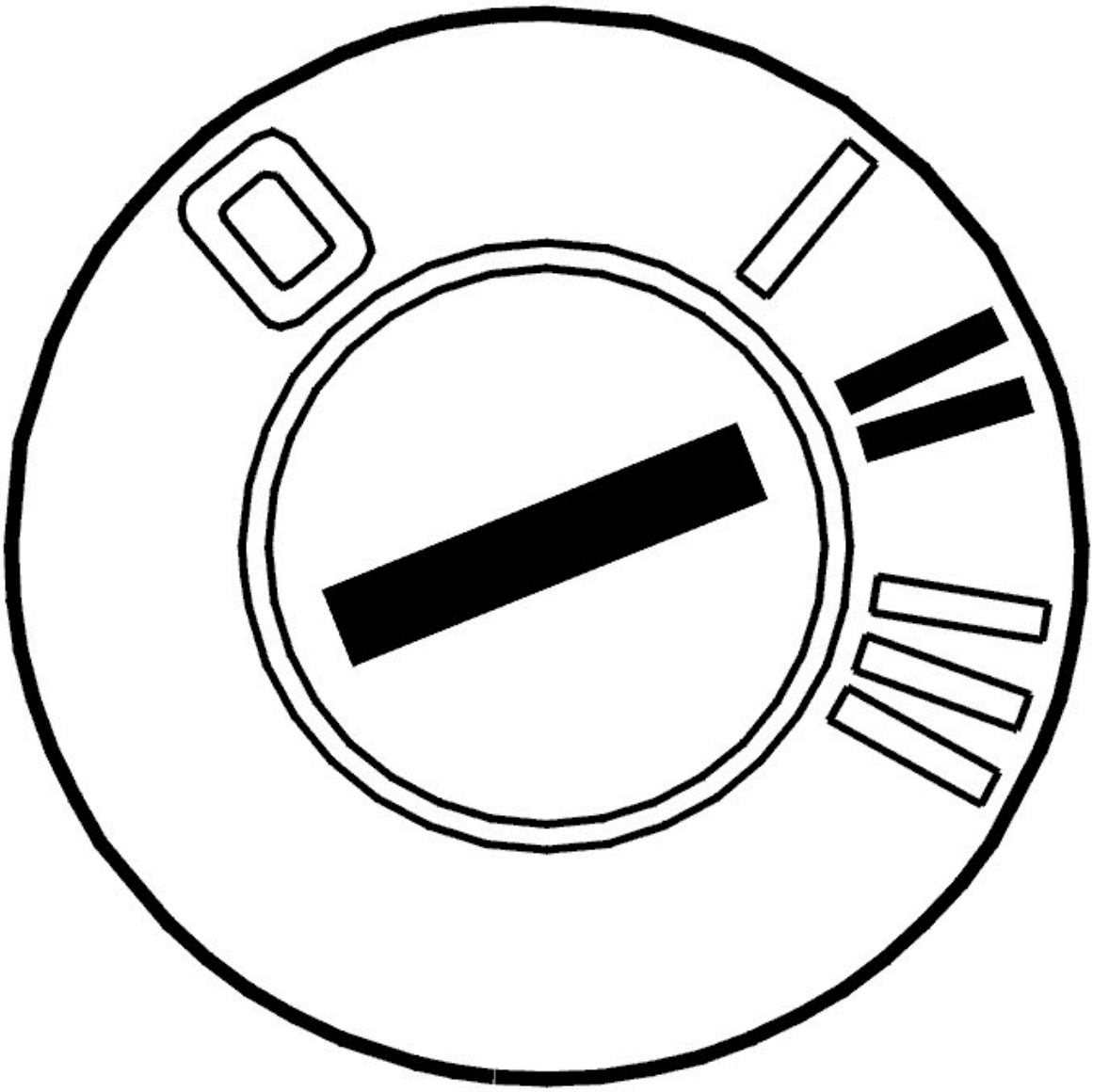
Continue - Verification

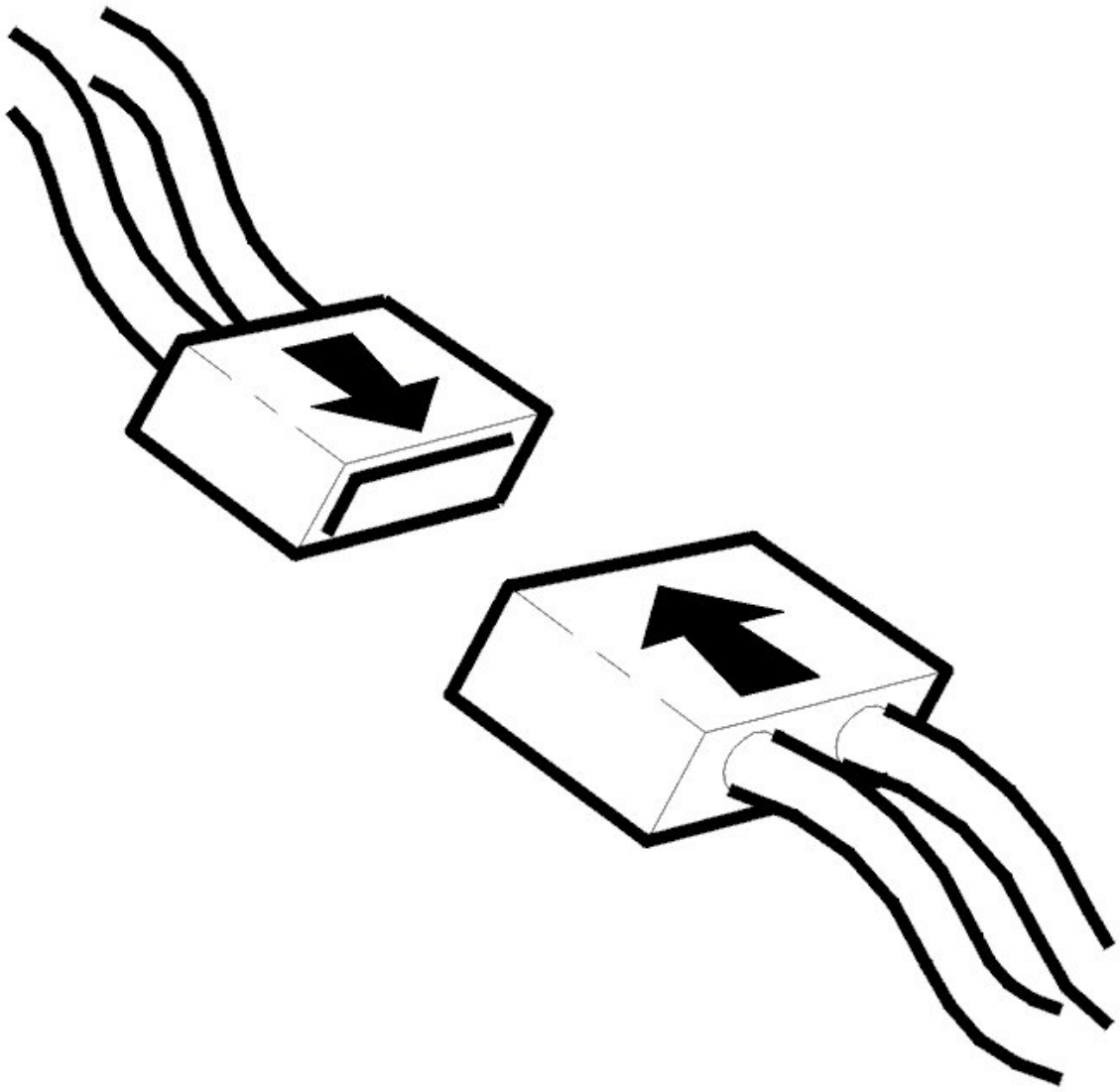
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.

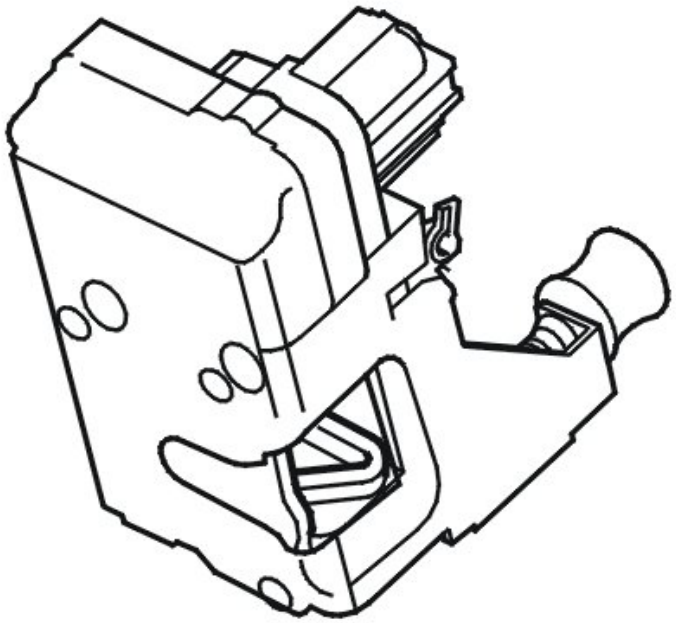




- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read the status of the control switch for the child lock from both rear doors.

Activate and deactivate the power child locks.

The status of both doors should change at the same time as the function is engaged / disengaged.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the control switch for the child lock switch

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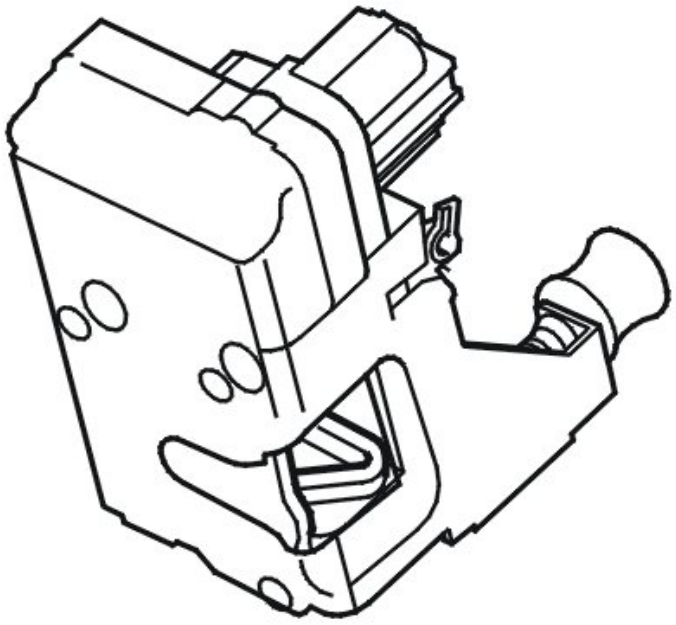
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A10

Condition



The rear electrical module (REM) checks if the doors are open or closed using the switches in the lock units. The switches provide a ground to the rear electronic module (REM) when the doors are shut.
The rear electronic module (REM) checks the status of the switches by powering them for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**driver's door**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Substitute value
- None.

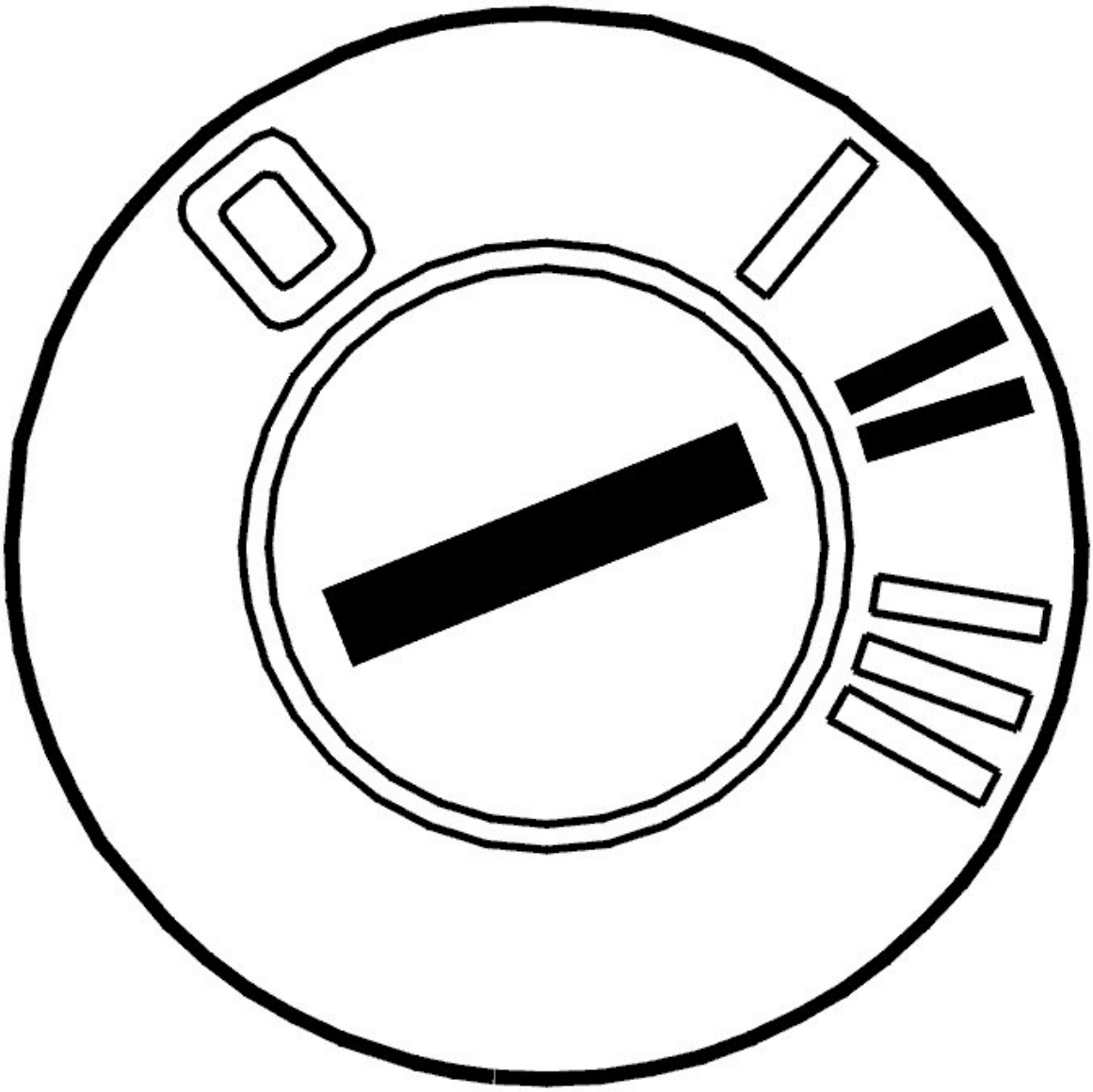
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed door.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the door.

Signal Too High

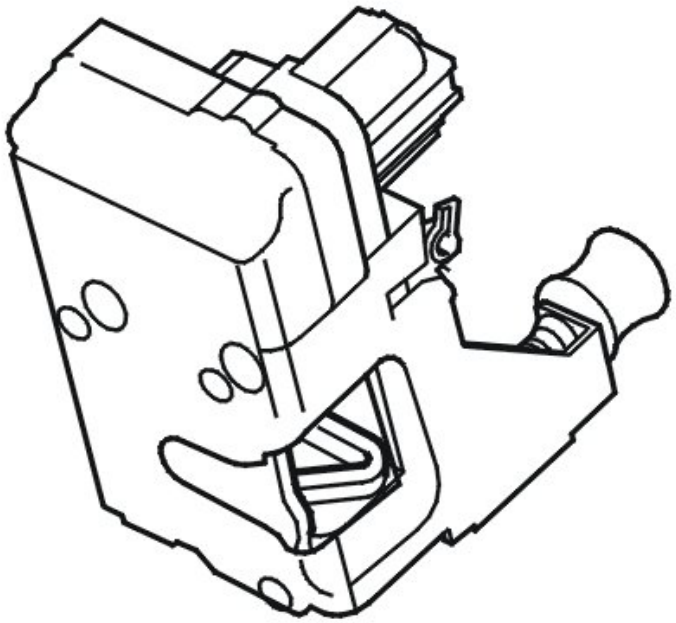
Signal too high

Checking the signal from the switch in the front door



- Ignition on
- Read off the status from the control switch in both front doors (indicates whether the doors are open or closed).

Open and close the left and right-hand front door. The status for each door must change when the door is opened/closed.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



Continue - Checking cable and component

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Left front door

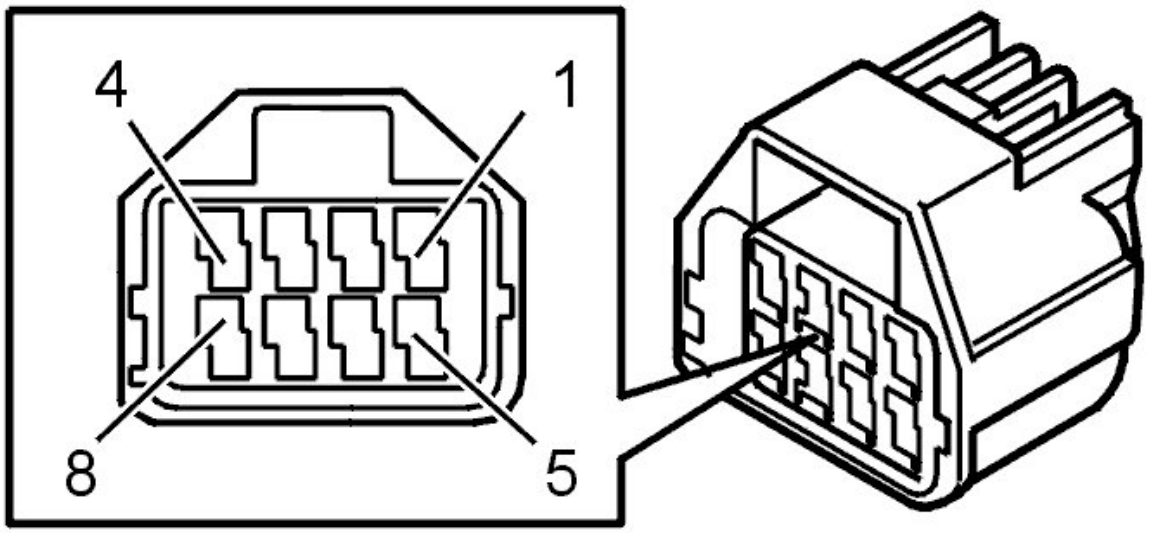
Check the signal cable between rear electronic module (REM) connector terminal #52 (#C12) and terminal #3 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.

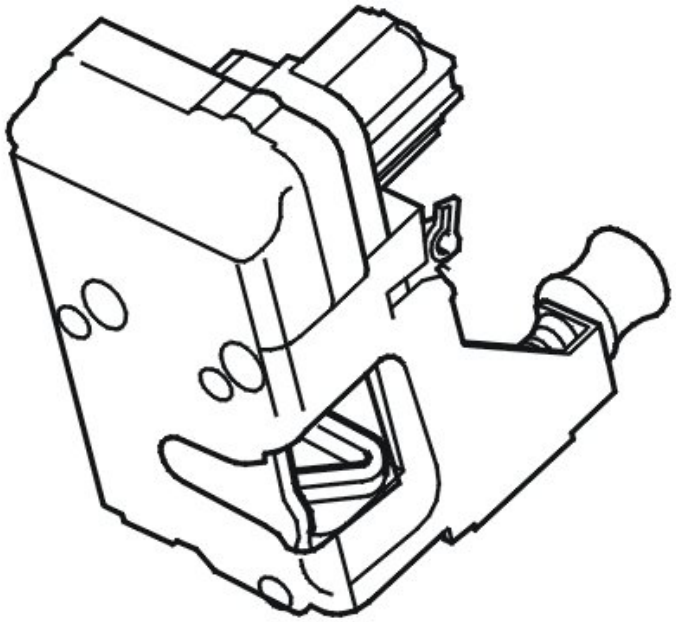
Right front door

Check the signal cable between rear electronic module (REM) connector terminal #29 (#D29) and terminal #3 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





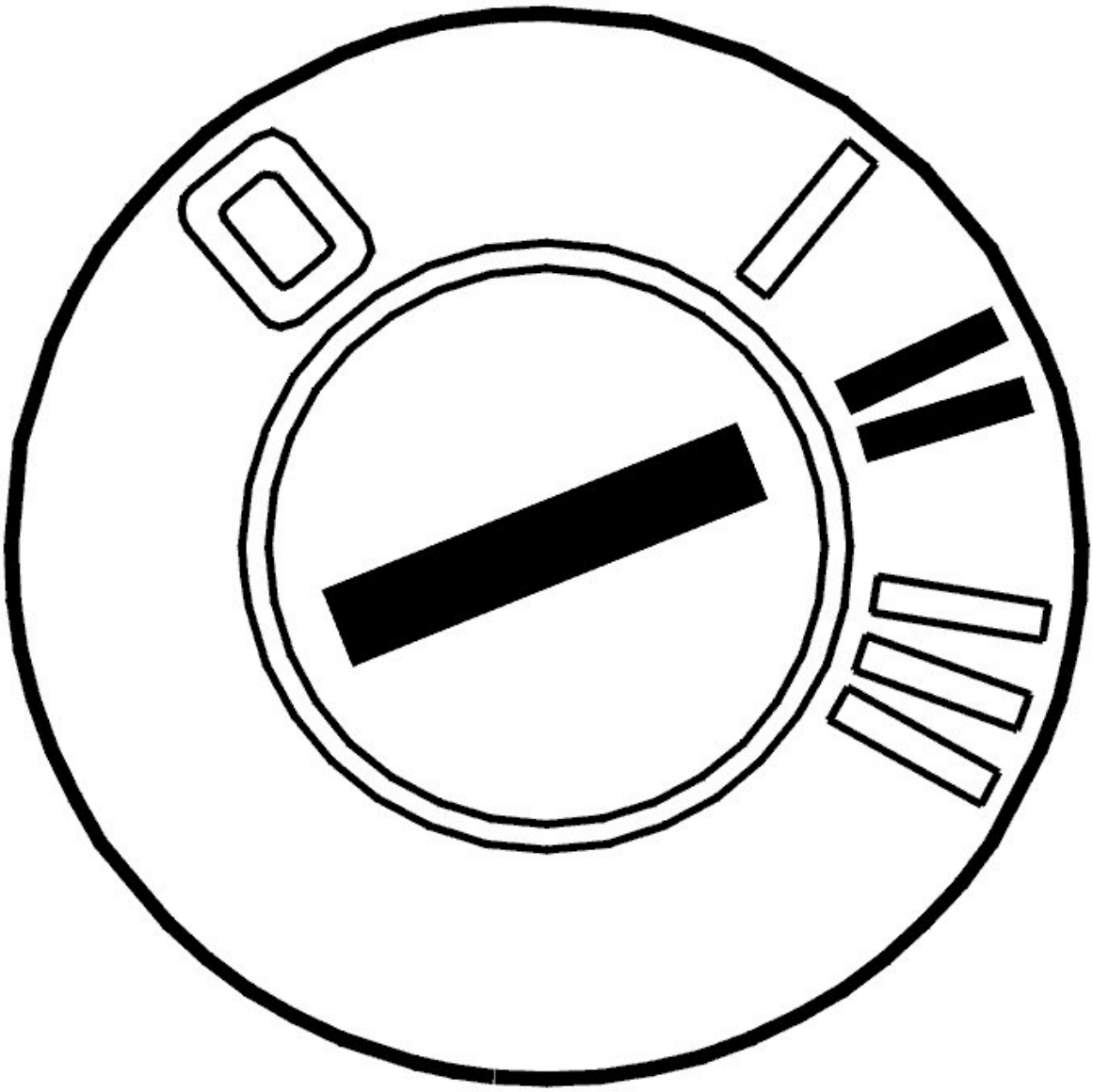
Continue - Verification

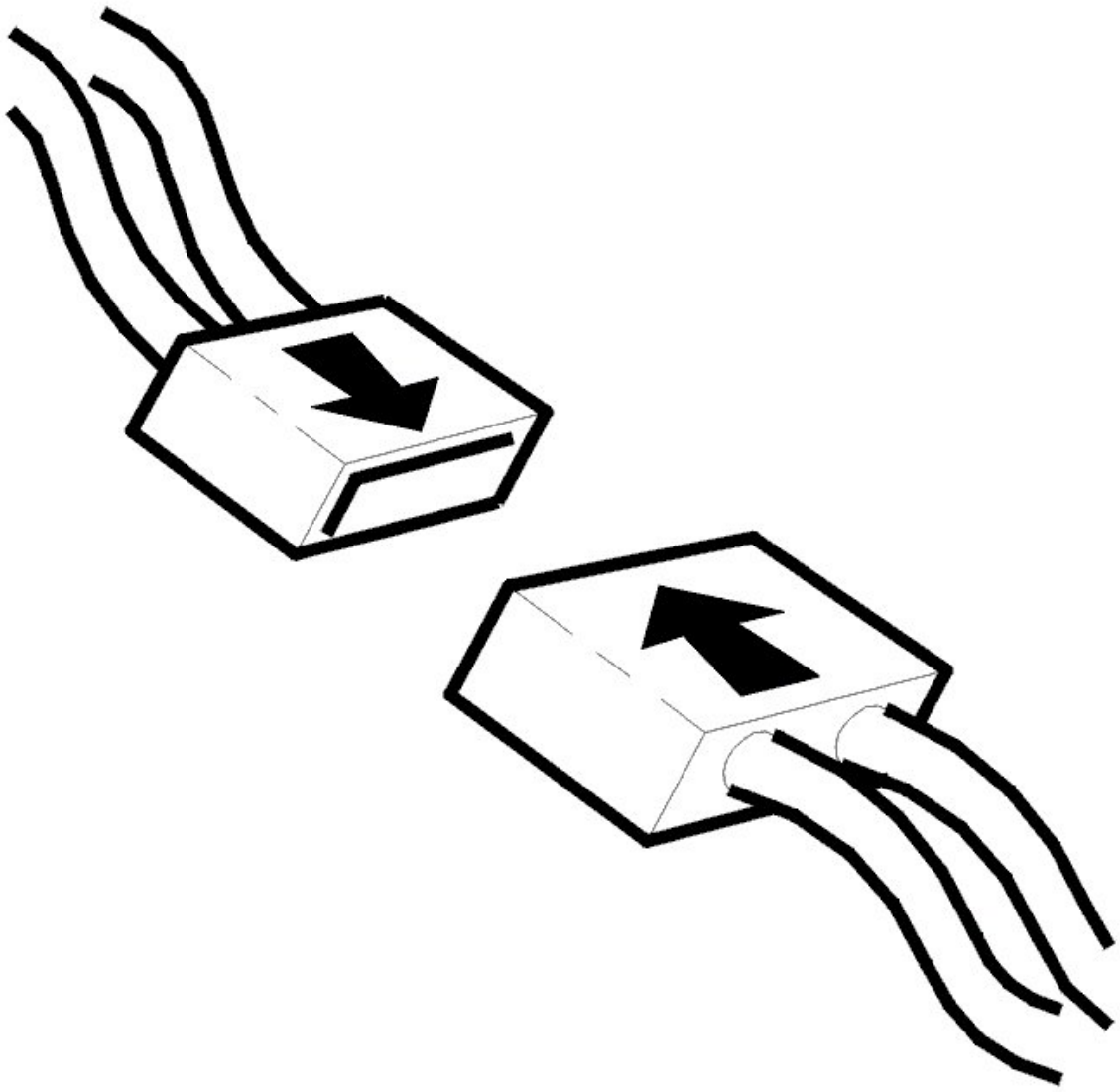
Verification

Verification

Verification

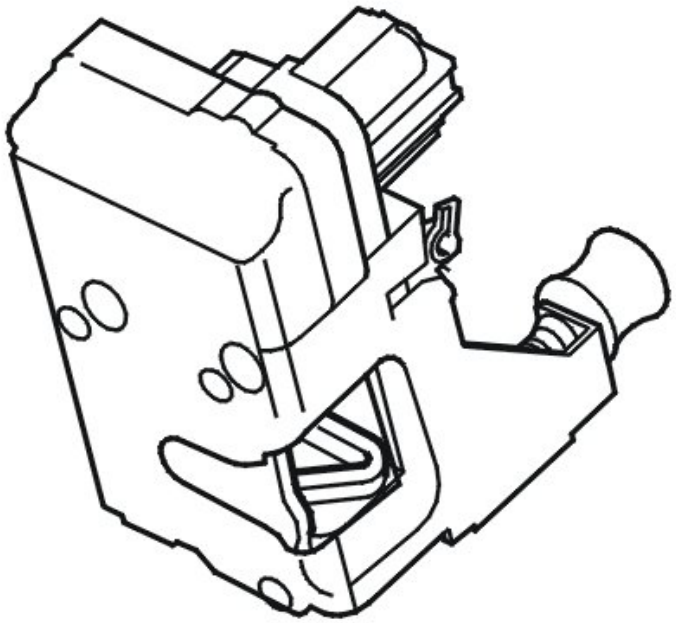
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both front doors (indicates whether the doors are open or closed).

Open and close the left and right-hand front door. The status for each door must change when the door is opened/closed.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

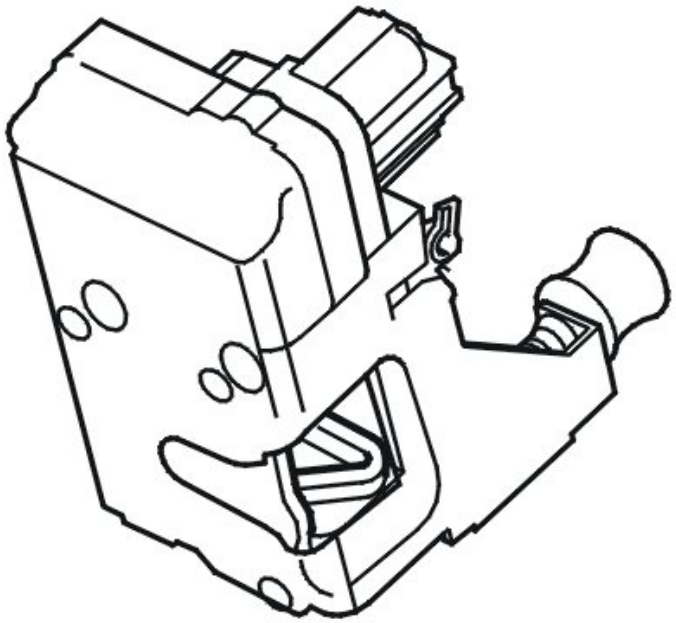
Attempt New Test - Checking the signal from the switch in the front door

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A11

Condition



The rear electrical module (REM) checks if the doors are open or closed using the switches in the lock units. The switches provide a ground to the rear electronic module (REM) when the doors are shut.
The rear electronic module (REM) checks the status of the switches by powering them for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**passenger door**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Substitute value
- None.

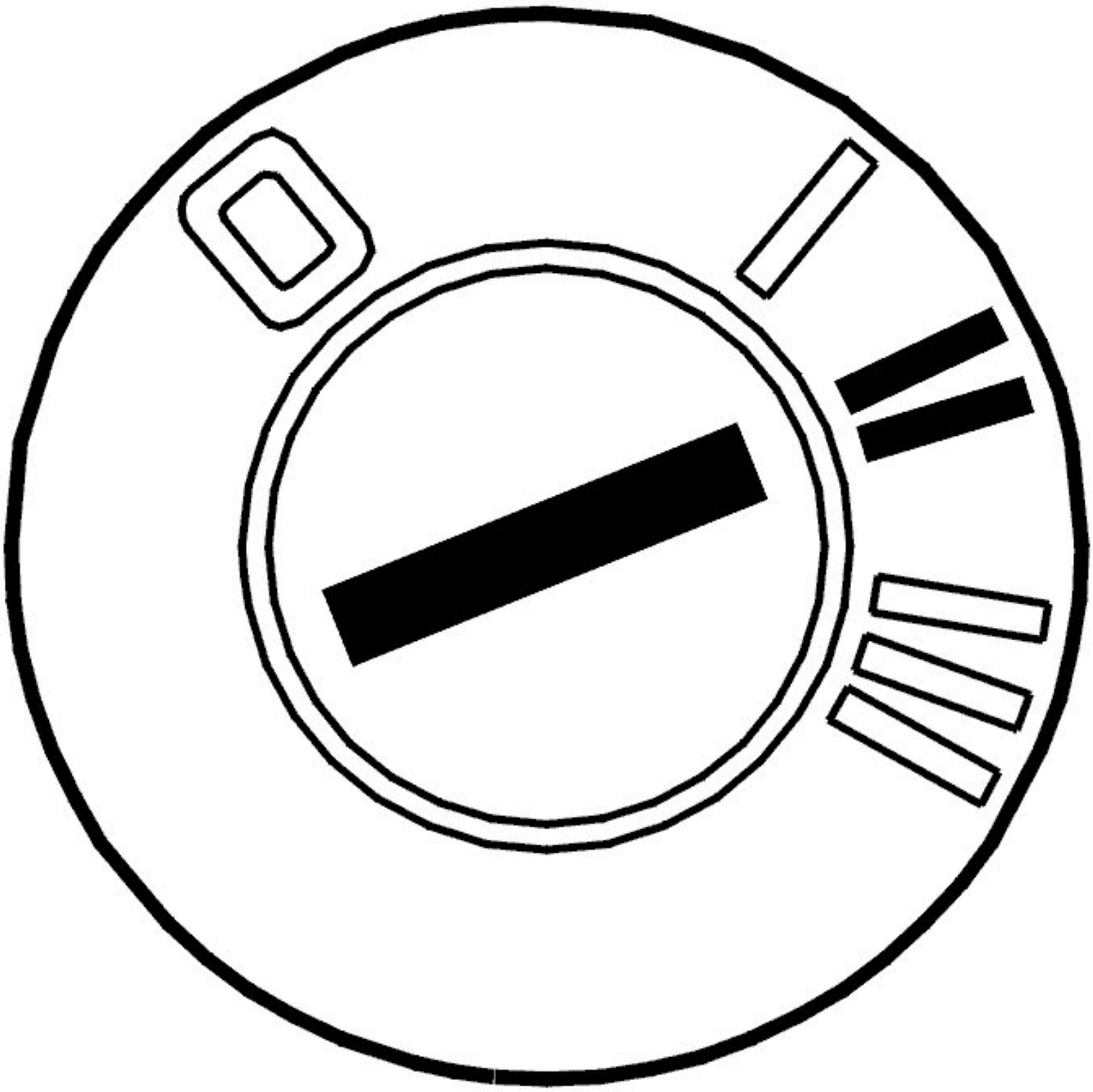
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed door.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the door.

Signal Too High

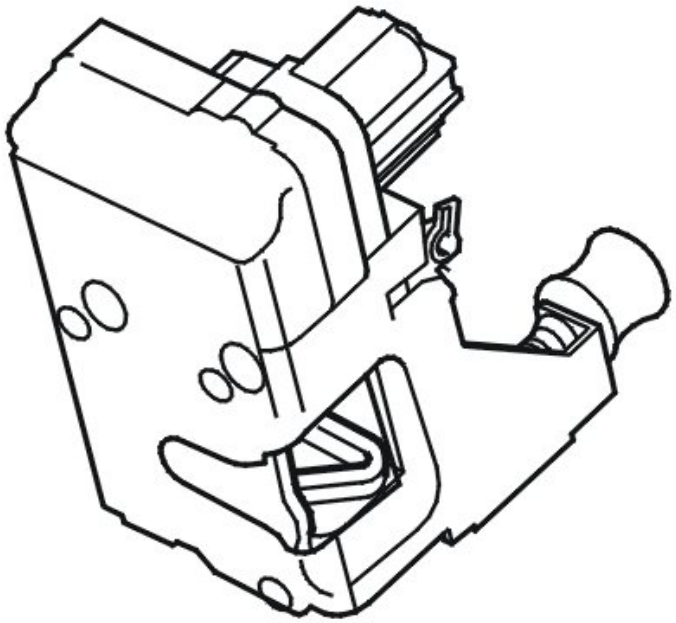
Signal too high

Checking the signal from the switch in the front door



- Ignition on
- Read off the status from the control switch in both front doors (indicates whether the doors are open or closed).

Open and close the left and right-hand front door. The status for each door must change when the door is opened/closed.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



Continue - Checking cable and component

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Left front door

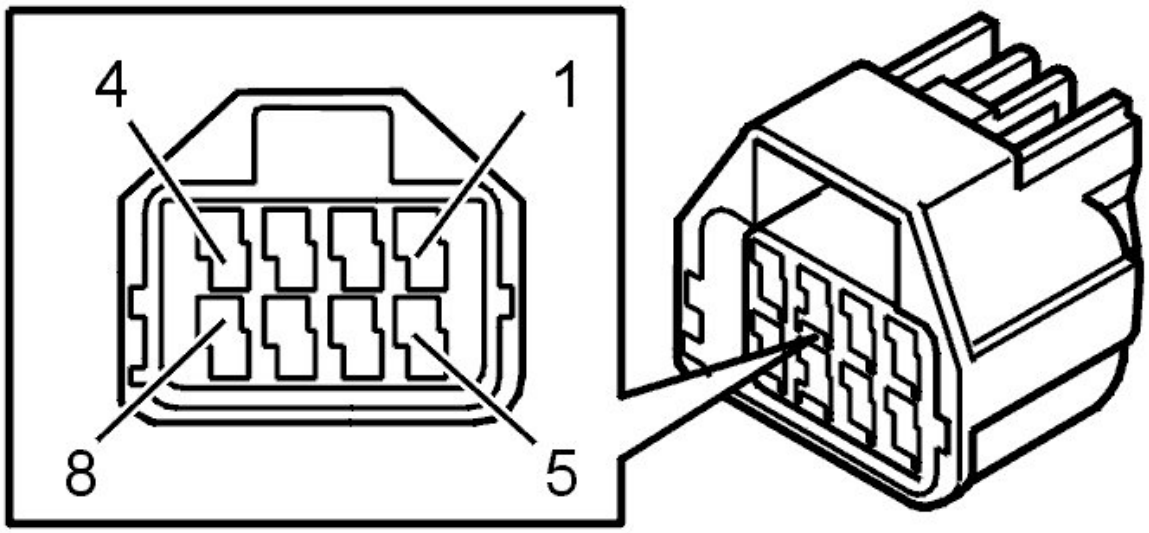
Check the signal cable between rear electronic module (REM) connector terminal #52 (#C12) and terminal #3 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.

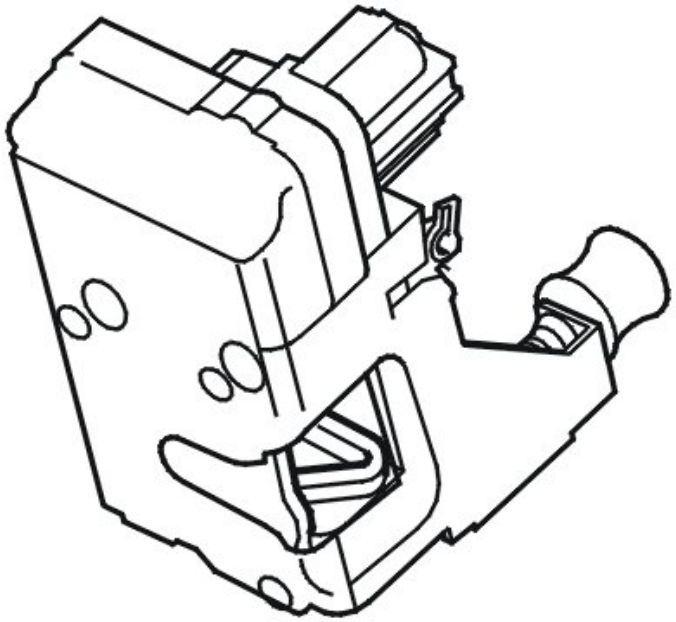
Right front door

Check the signal cable between rear electronic module (REM) connector terminal #29 (#D29) and terminal #3 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism front side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Front Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





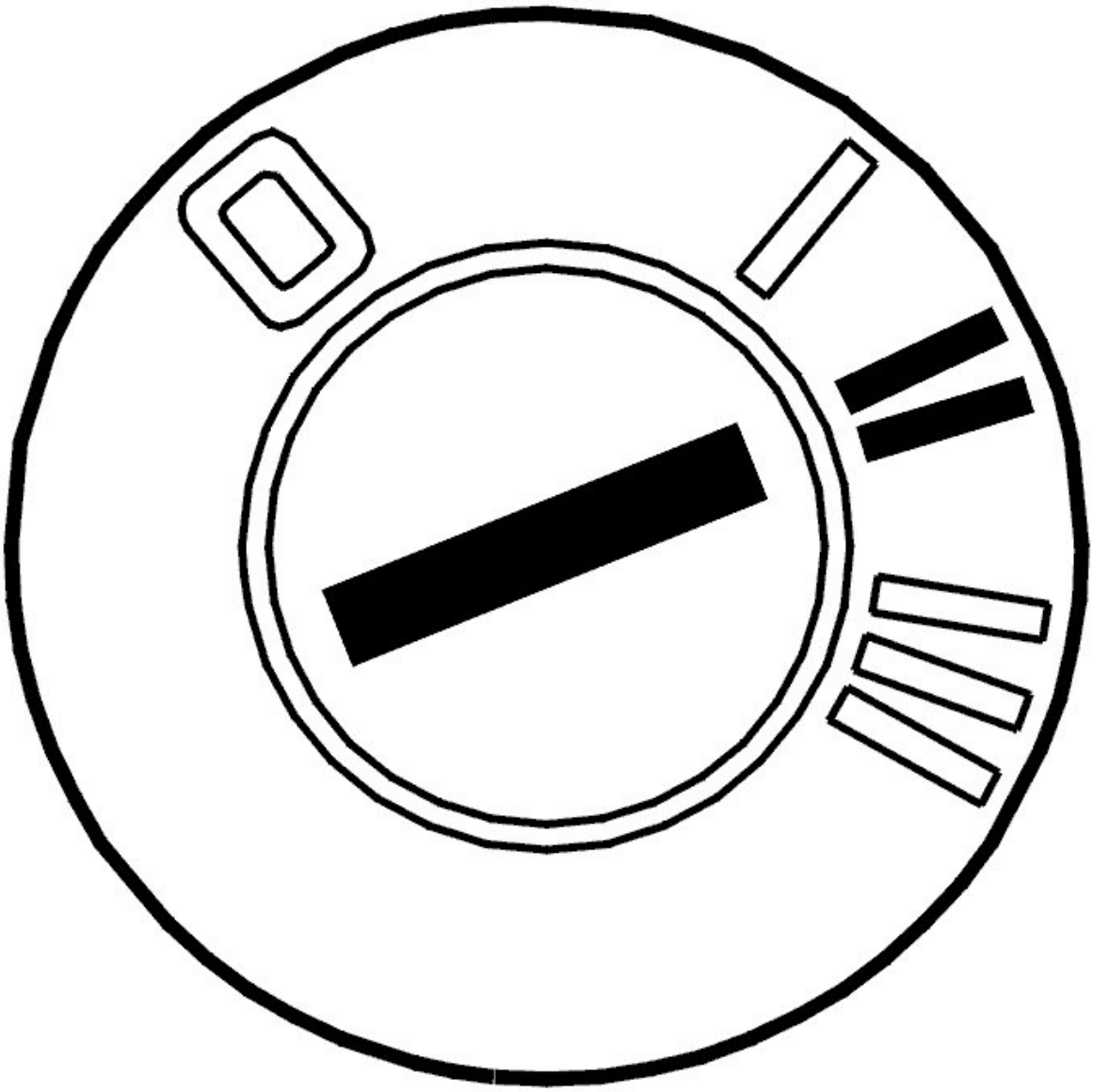
Continue - Verification

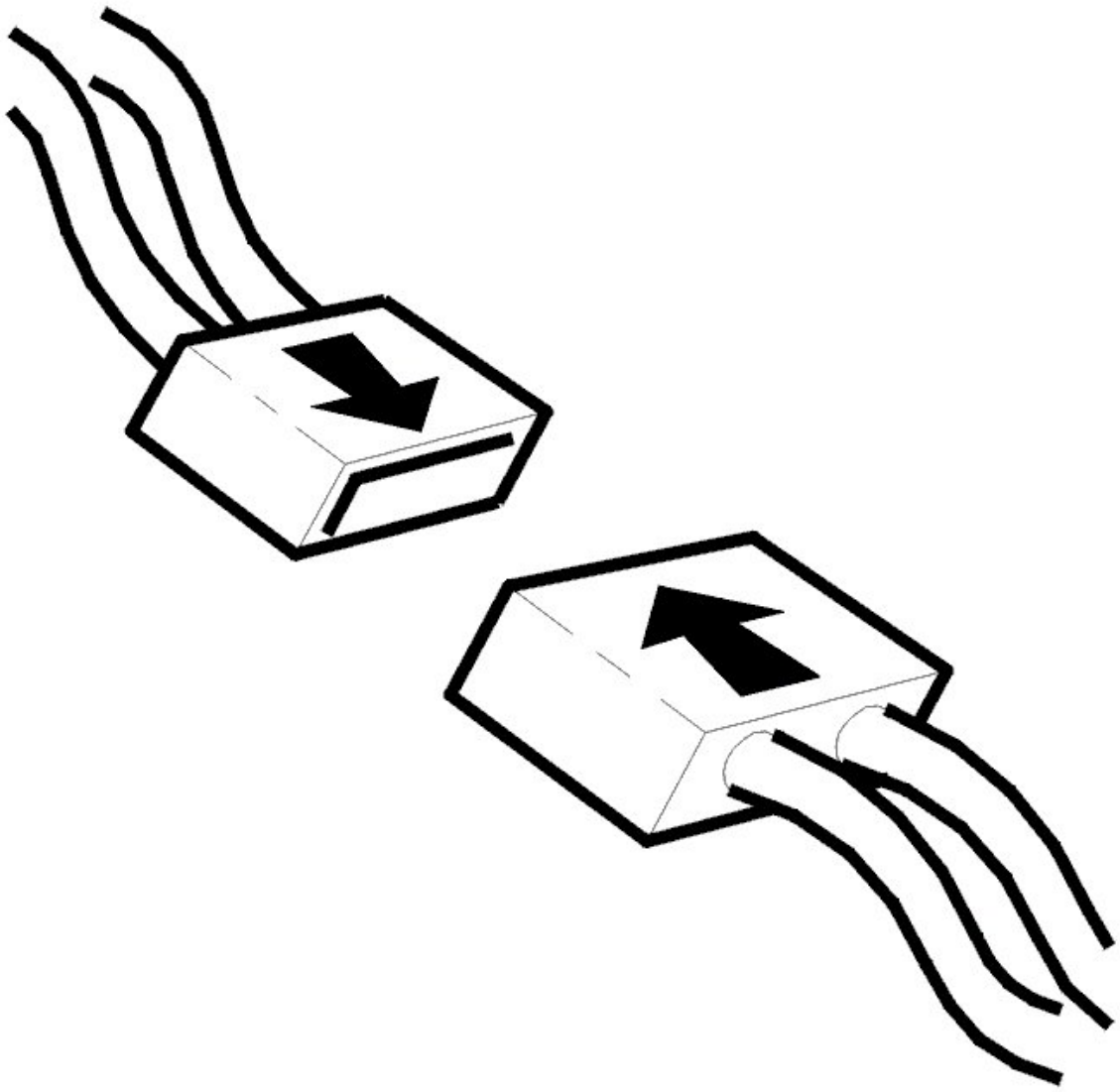
Verification

Verification

Verification

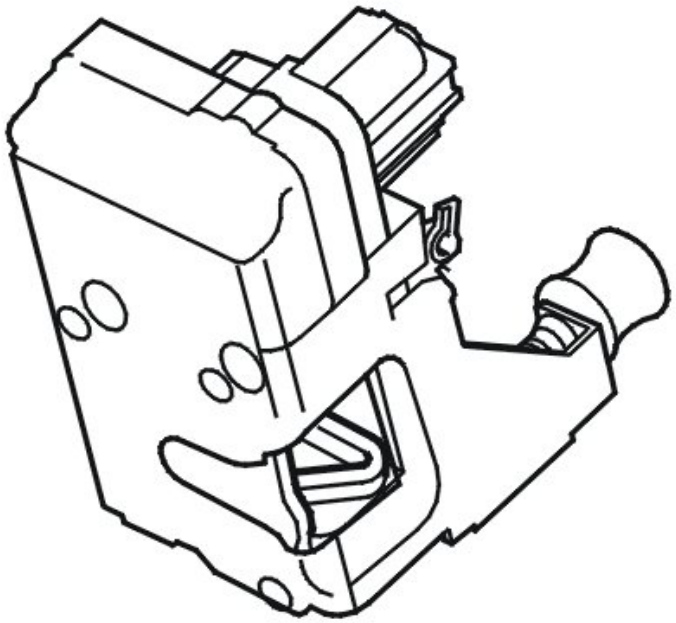
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the control switch in both front doors (indicates whether the doors are open or closed).

Open and close the left and right-hand front door. The status for each door must change when the door is opened/closed.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

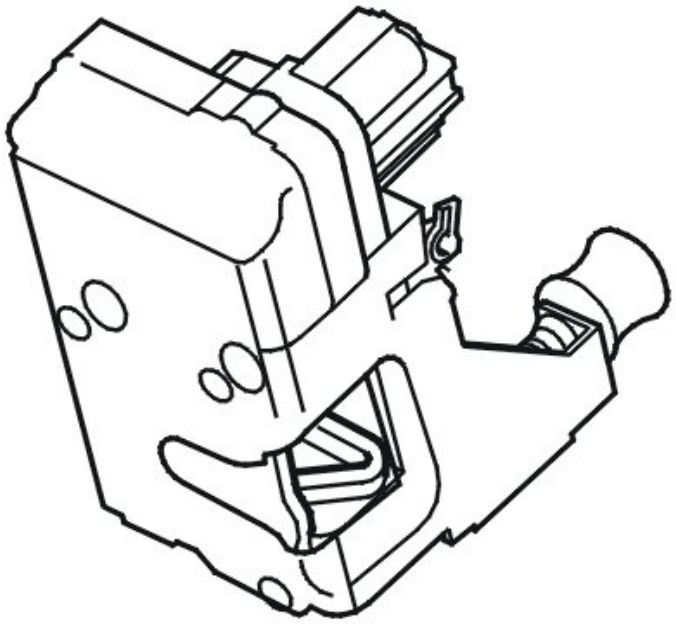
Attempt New Test - Checking the signal from the switch in the front door

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A12

Condition



The rear electrical module (REM) checks if the doors are open or closed using the switches in the lock units. The switches provide a ground to the rear electronic module (REM) when the doors are shut.
The rear electronic module (REM) checks the status of the switches by powering them for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**rear left door**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Substitute value
- None.

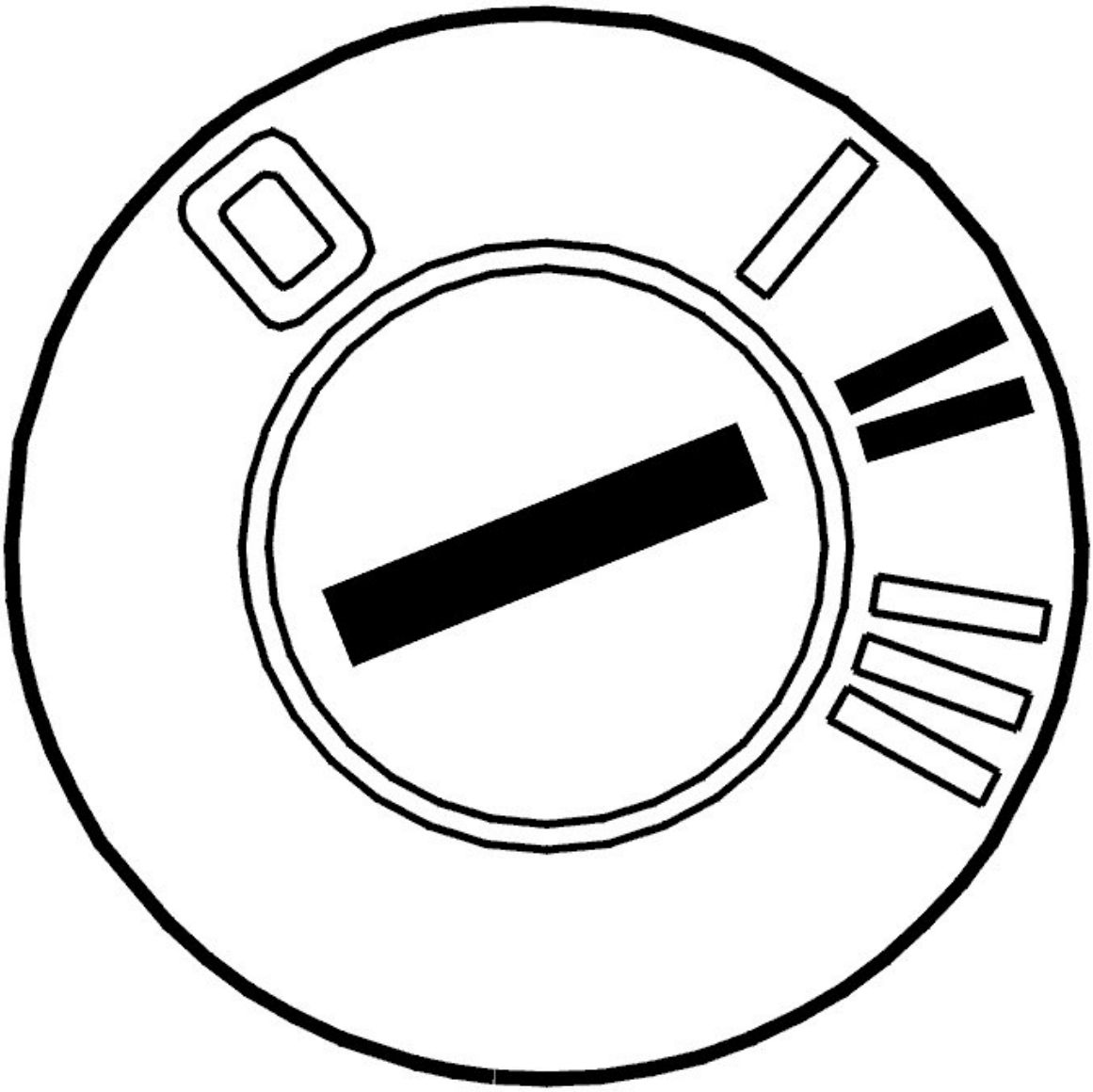
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed door.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the door.

Signal Too High

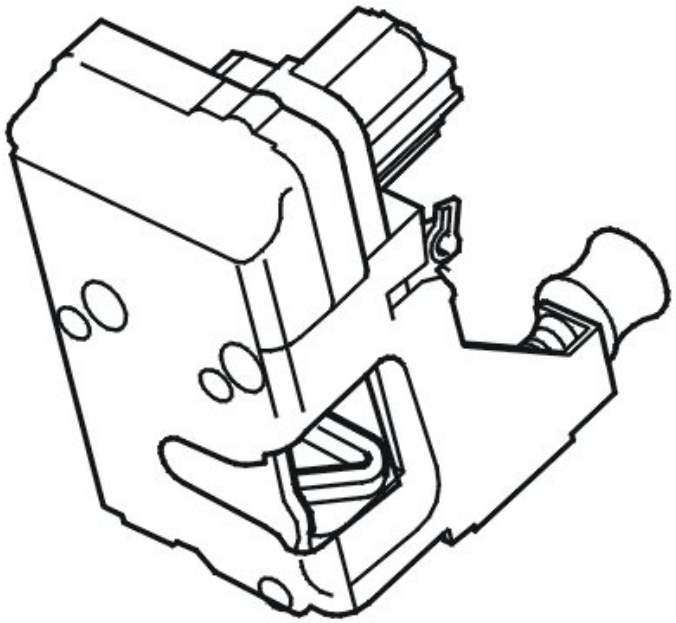
Signal too high

Checking the signal from the switch in the rear door



- Ignition on
- Read off the status of the switch in both rear doors (indicates whether the doors are open or closed).

Open and close the left and right-hand rear doors. The status for each door must change when the door is opened/closed.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



Continue - Checking cable and component

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Left rear door

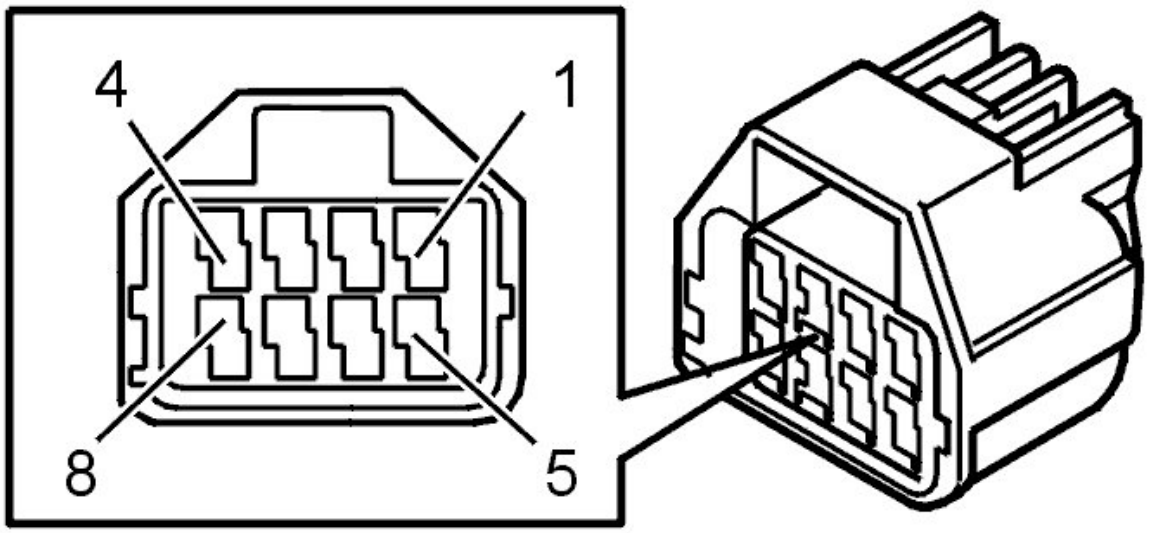
Check the signal cable between rear electronic module (REM) connector terminal #43 (#C3) and terminal #2 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.

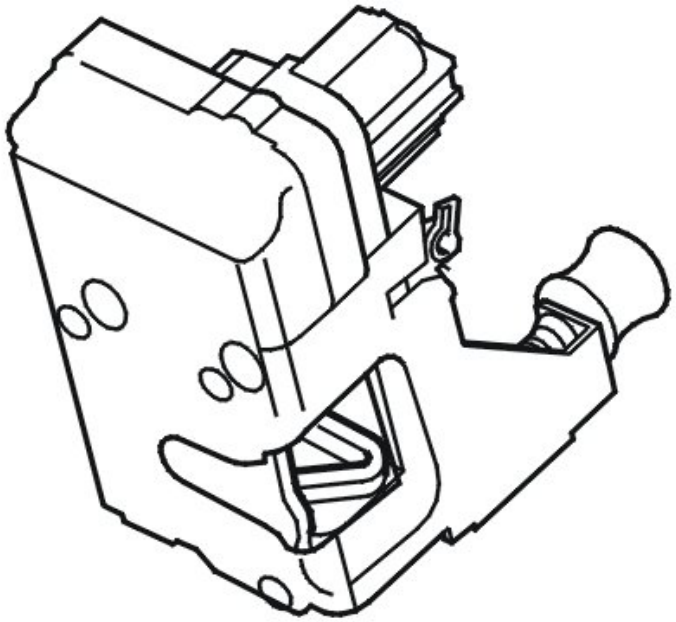
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #33 (#D33) and terminal #2 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism rear side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Rear Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





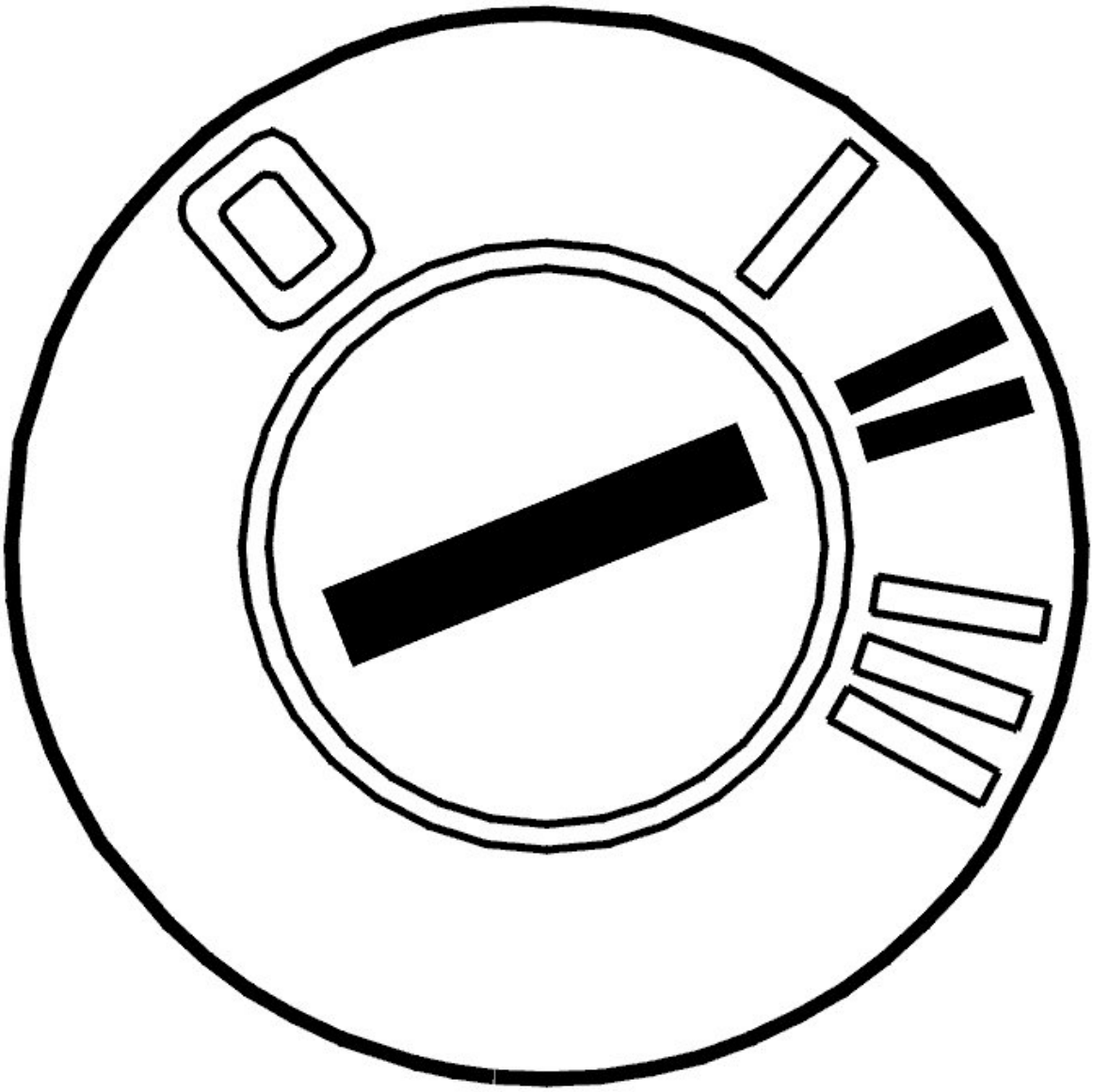
Continue - Verification

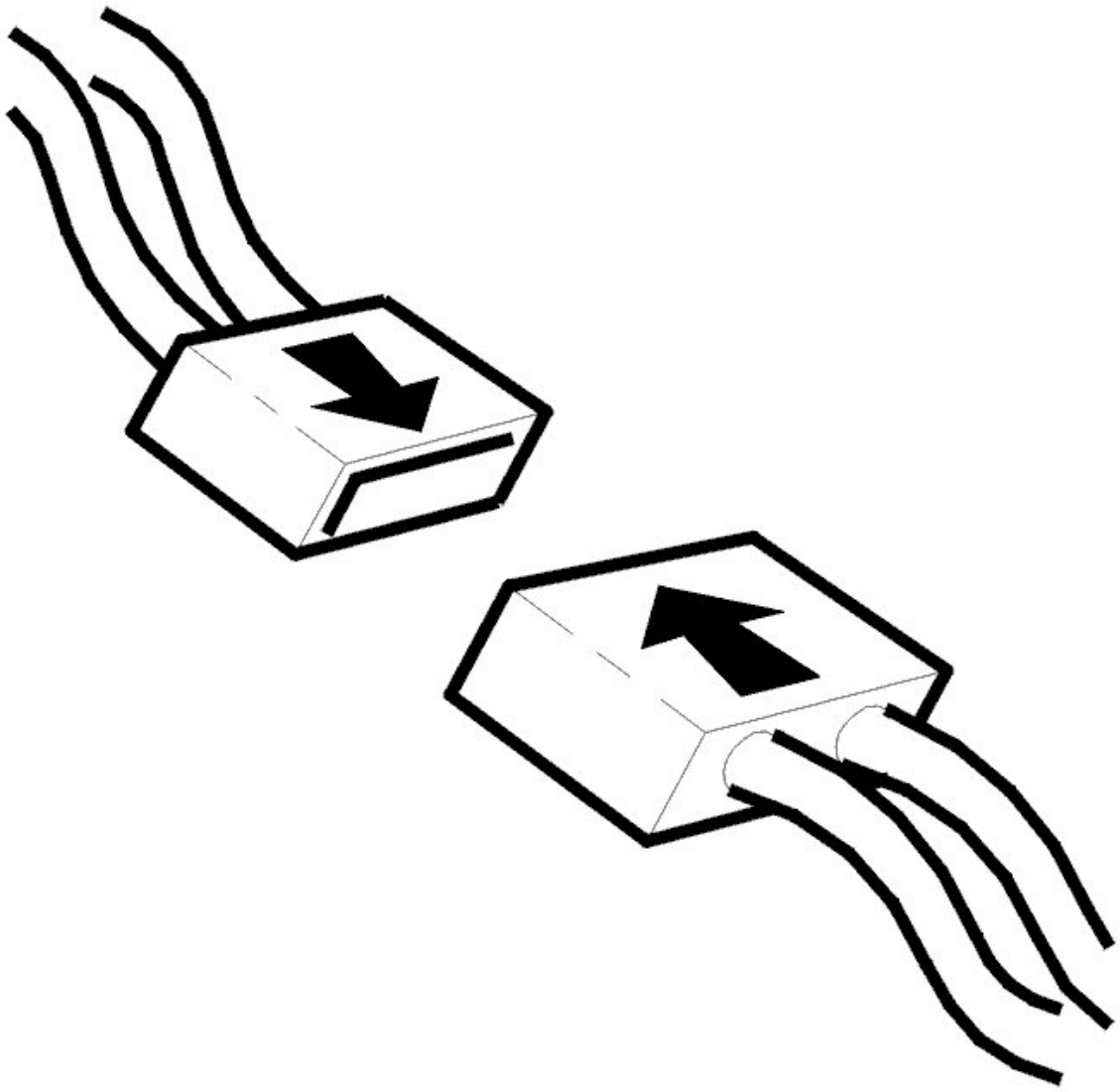
Verification

Verification

Verification

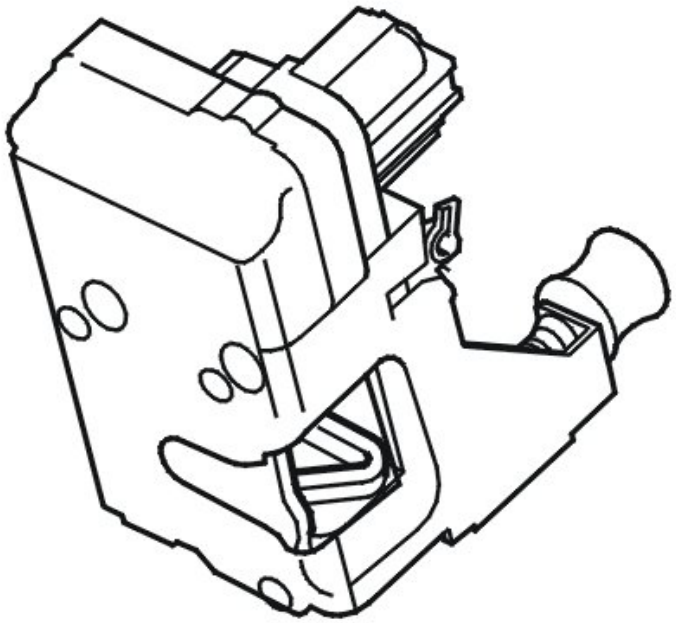
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status of the switch in both rear doors (indicates whether the doors are open or closed).

Open and close the left and right-hand rear doors. The status for each door must change when the door is opened/closed.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

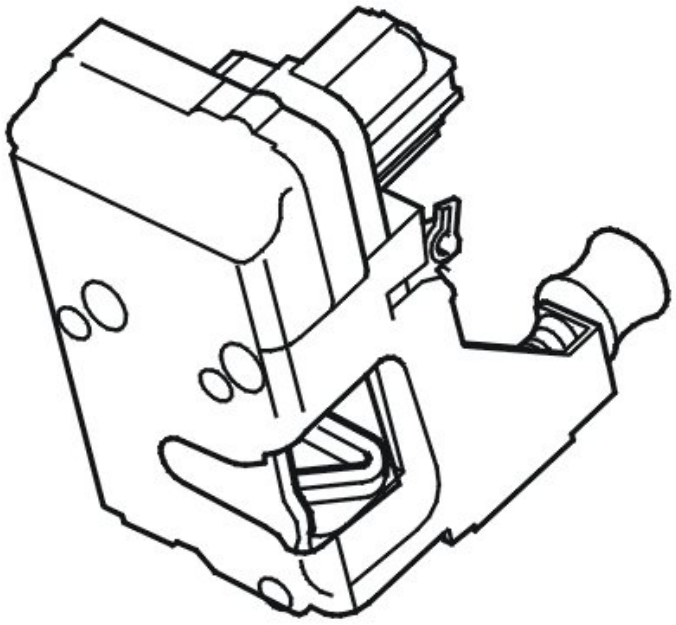
Attempt New Test - Checking the signal from the switch in the rear door

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A13

Condition



The rear electrical module (REM) checks if the doors are open or closed using the switches in the lock units. The switches provide a ground to the rear electronic module (REM) when the doors are shut.
The rear electronic module (REM) checks the status of the switches by powering them for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**rear right door**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Substitute value
- None.

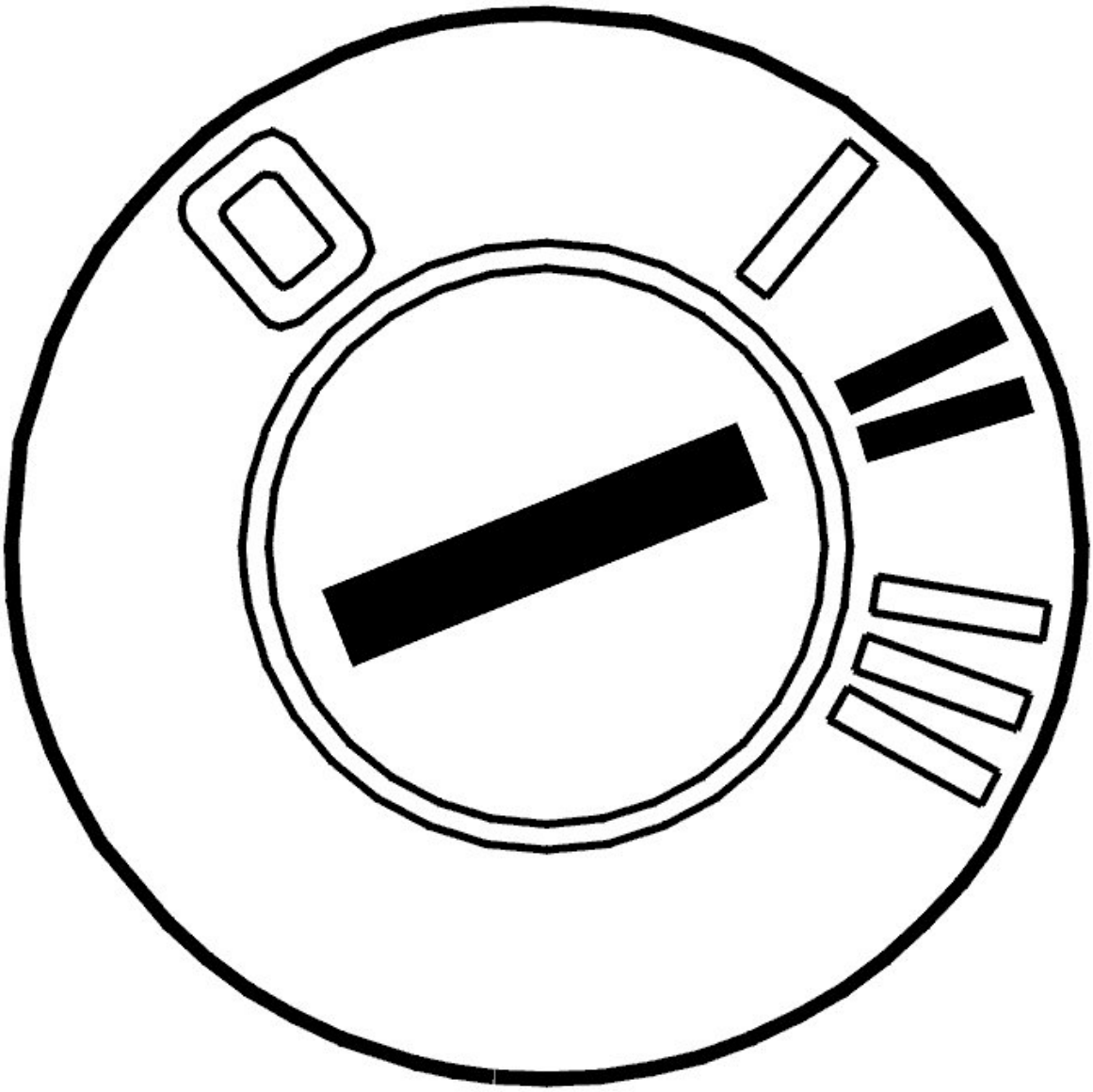
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed door.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the door.

Signal Too High

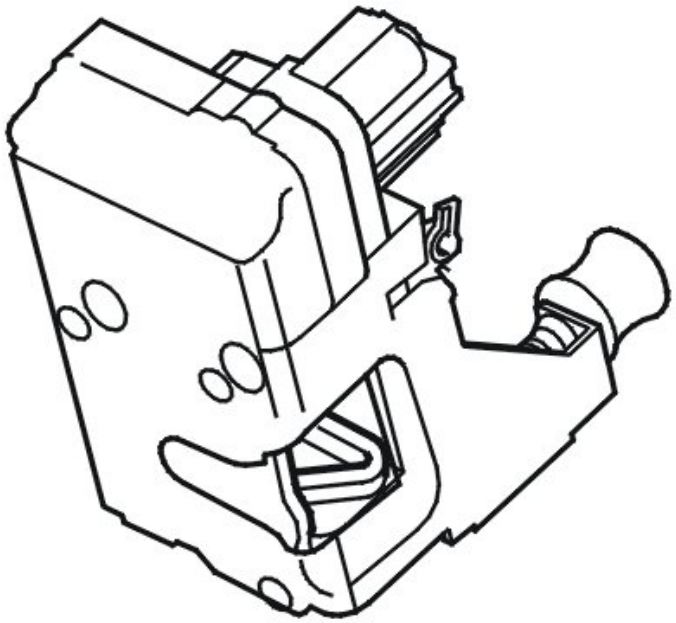
Signal too high

Checking the signal from the switch in the rear door



- Ignition on
- Read off the status of the switch in both rear doors (indicates whether the doors are open or closed).

Open and close the left and right-hand rear doors. The status for each door must change when the door is opened/closed.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



Continue - Checking cable and component

Checking cable and component

Note! Only fault-trace the circuit of the door displaying the faulty value.

Left rear door

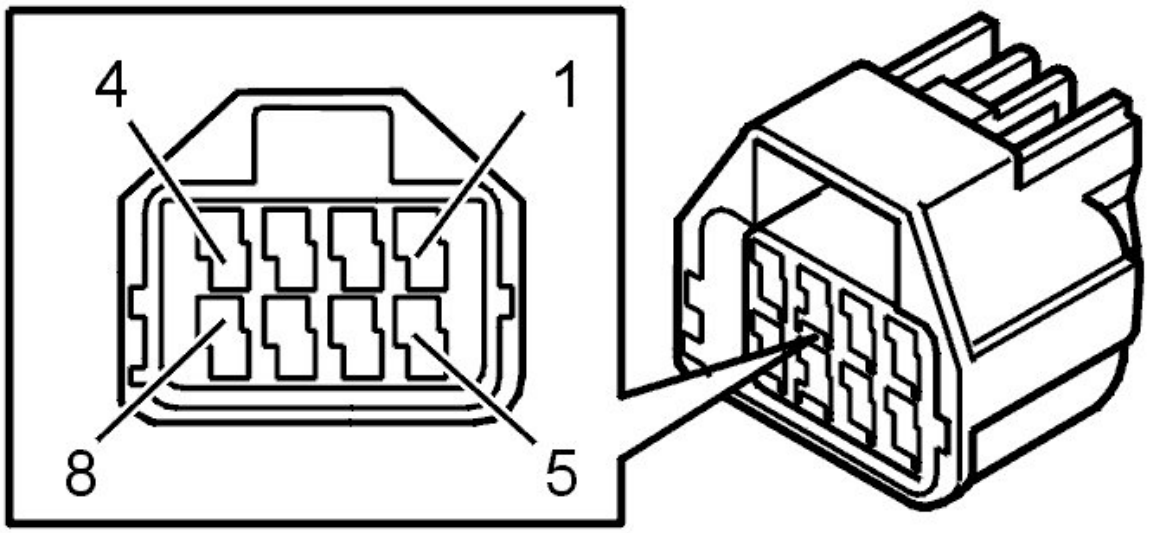
Check the signal cable between rear electronic module (REM) connector terminal #43 (#C3) and terminal #2 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.

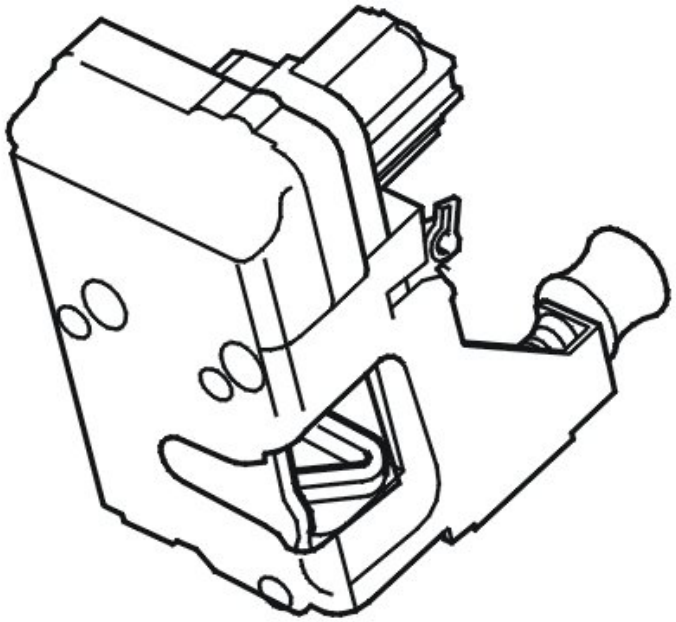
Right rear door

Check the signal cable between rear electronic module (REM) connector terminal #33 (#D33) and terminal #2 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Lock mechanism rear side door, replacing See: Body and Frame/Locks/Door Locks/Service and Repair/Lock Mechanism Rear Side Door, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





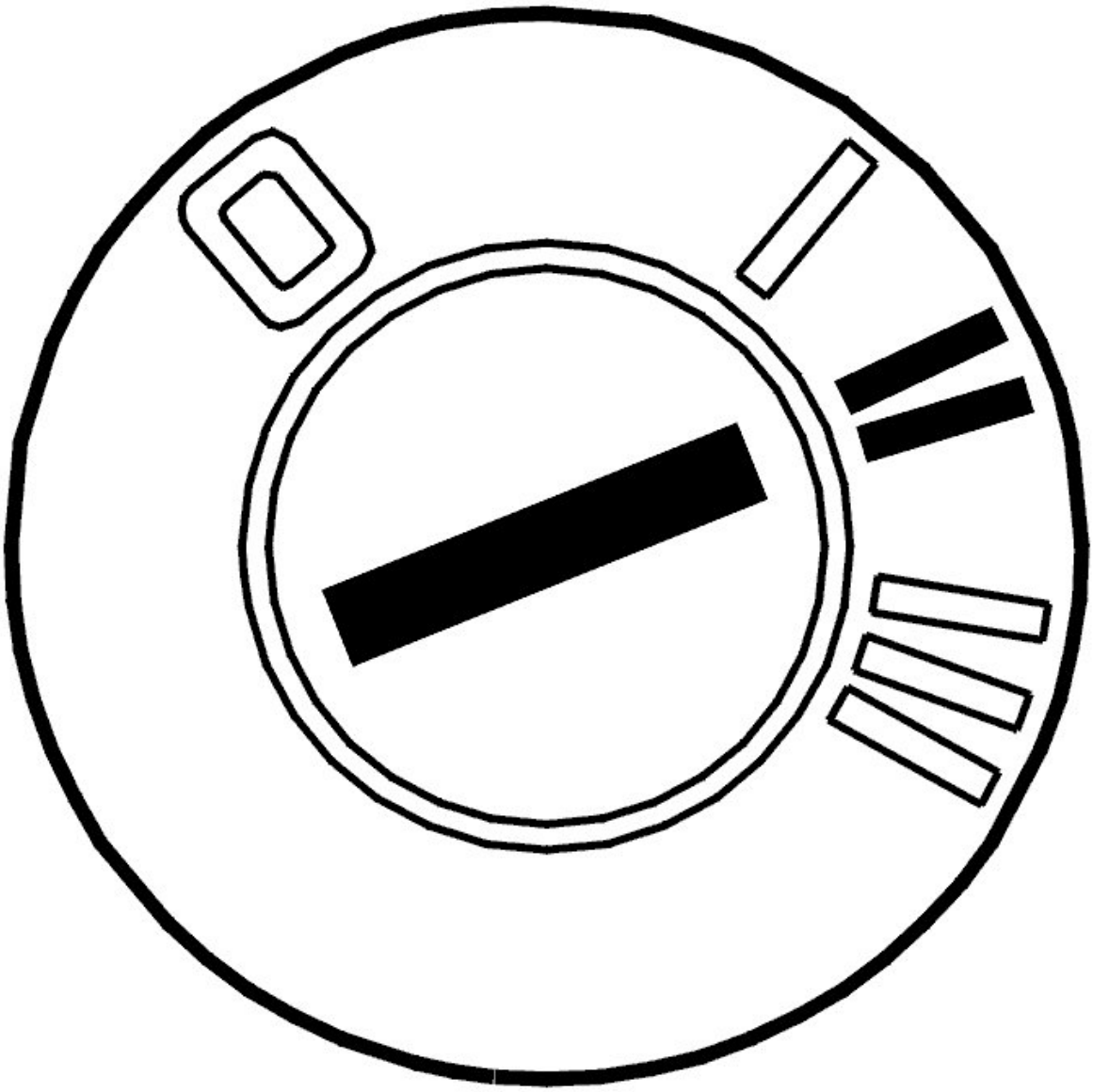
Continue - Verification

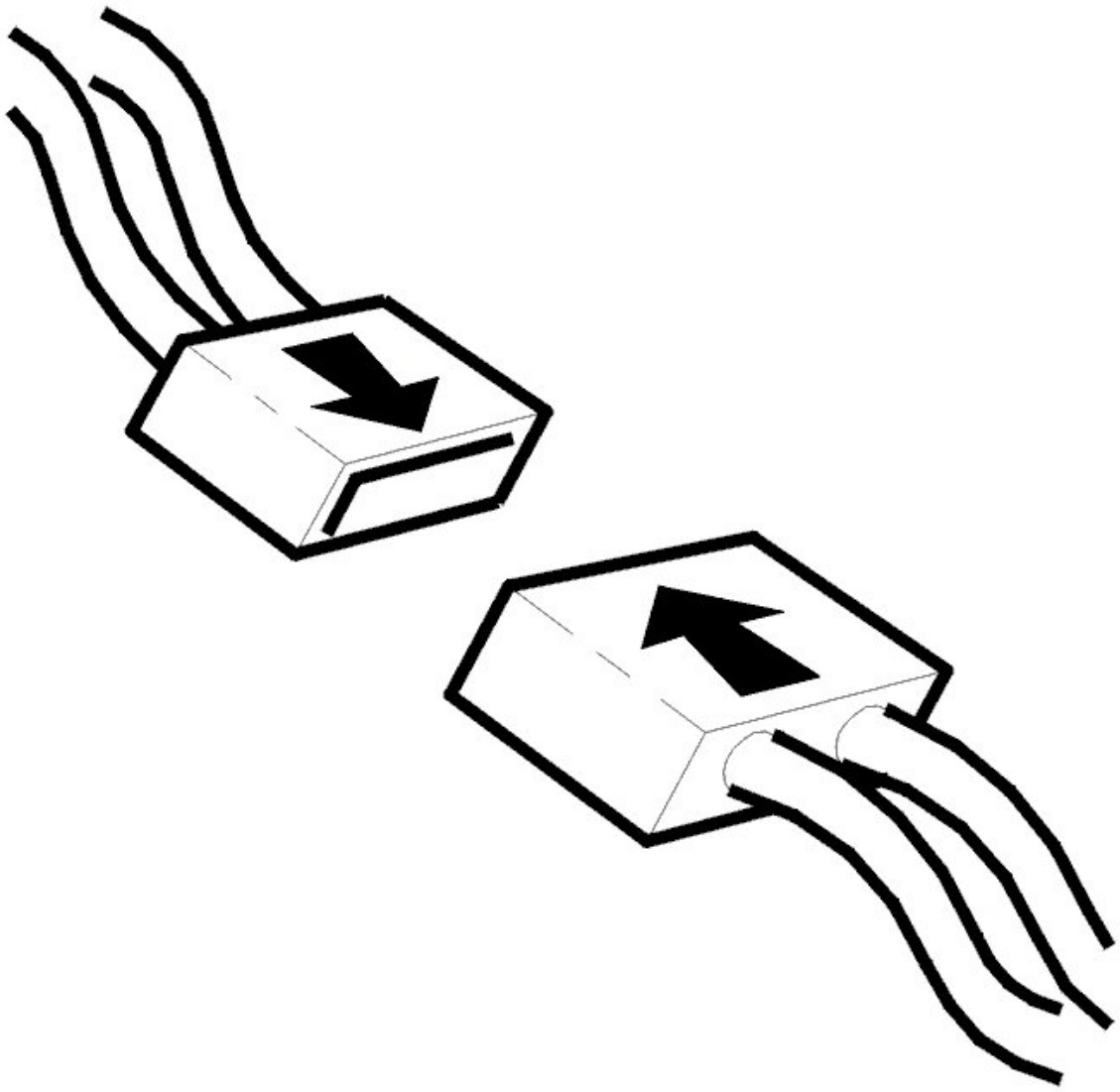
Verification

Verification

Verification

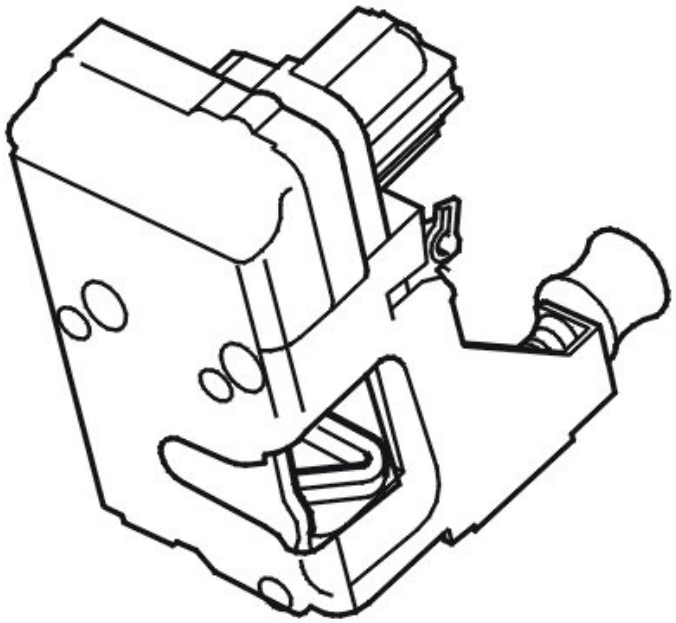
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status of the switch in both rear doors (indicates whether the doors are open or closed).

Open and close the left and right-hand rear doors. The status for each door must change when the door is opened/closed.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

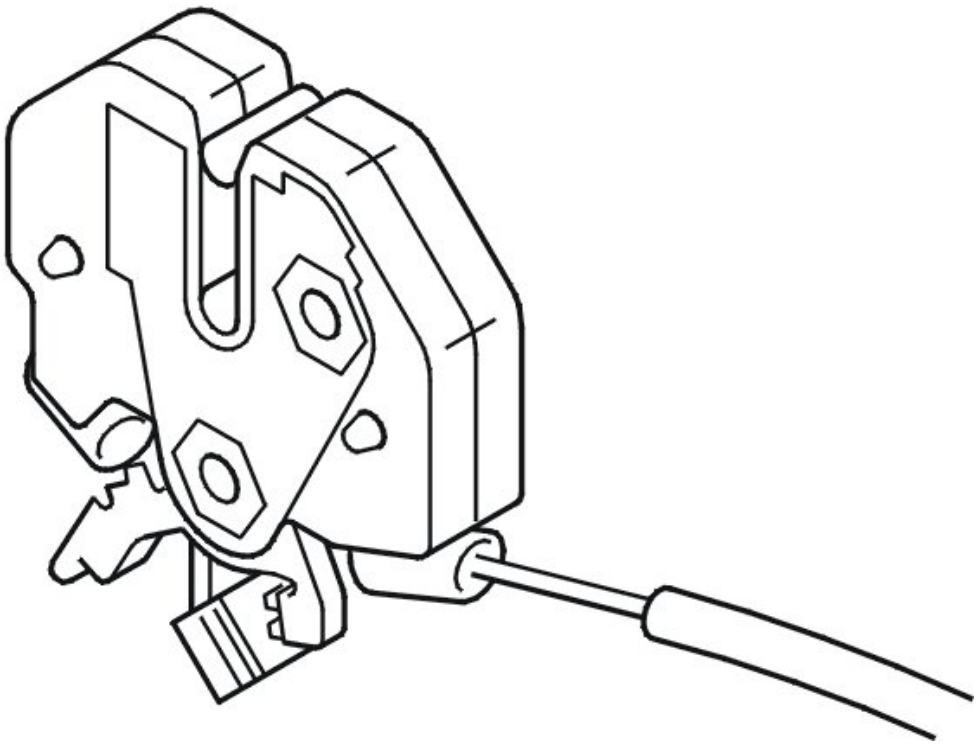
Attempt New Test - Checking the signal from the switch in the rear door

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A14

Condition



The rear electrical module (REM) uses a switch to check whether the hood is open or closed. The switch provides a ground to the rear electronic module (REM) when the hood is shut.
The rear electronic module (REM) checks the status of the switch by powering it for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**hood**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Note! This switch is only installed on cars equipped with an alarm.

Substitute value
- None.

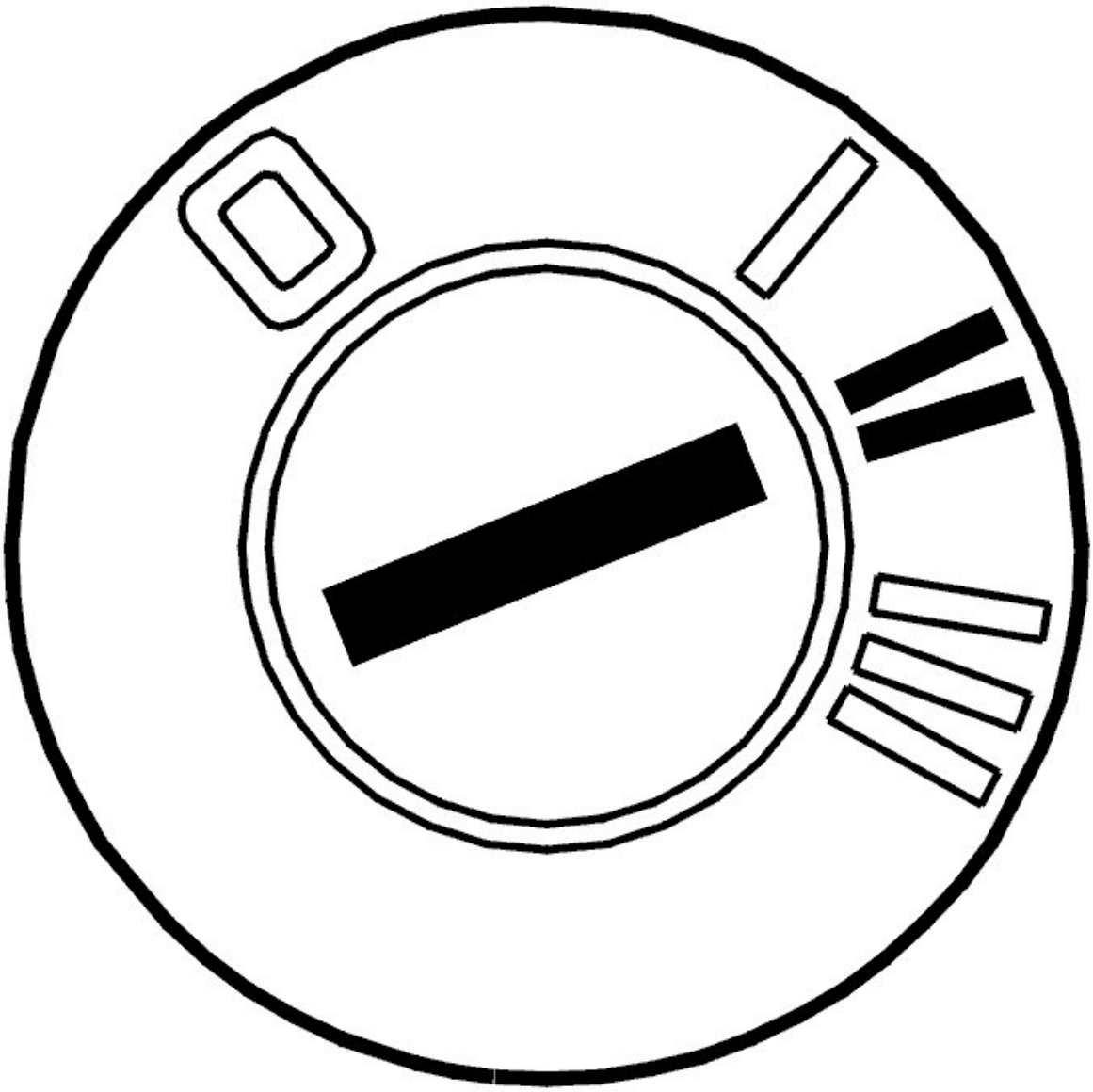
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed hood.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the hood.

Signal Too High

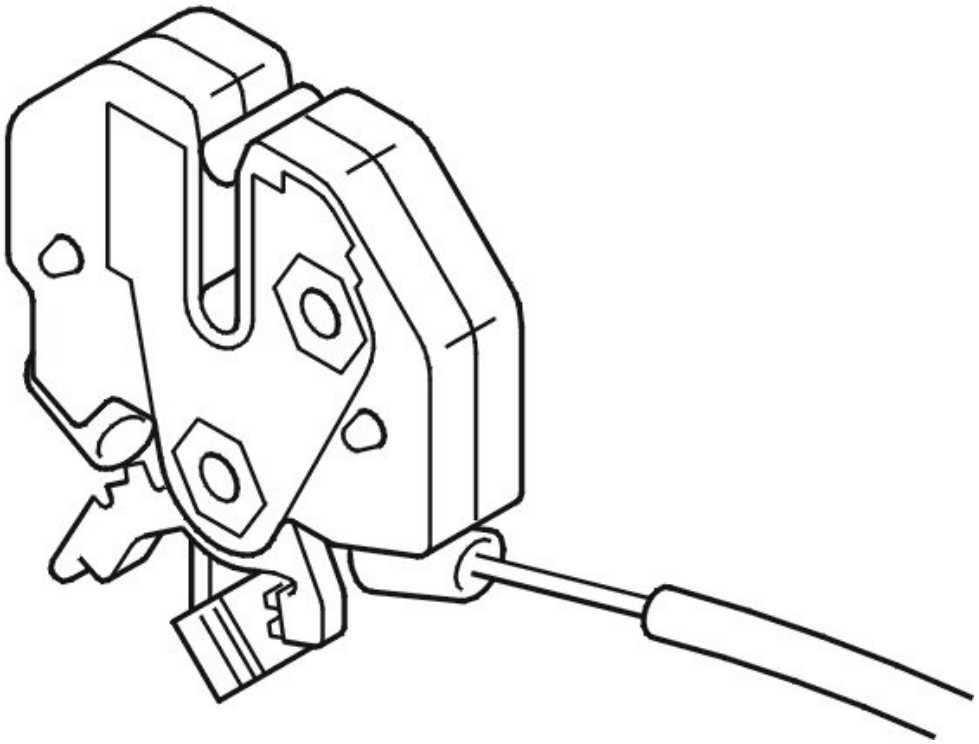
Signal too high

Checking the signal from the hood switch



- Ignition on
- Read off the signal from the hood switch.

Open and close the hood so that the hood switch is affected. The signal should change status.
The fault is permanent if the signal does not change status.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



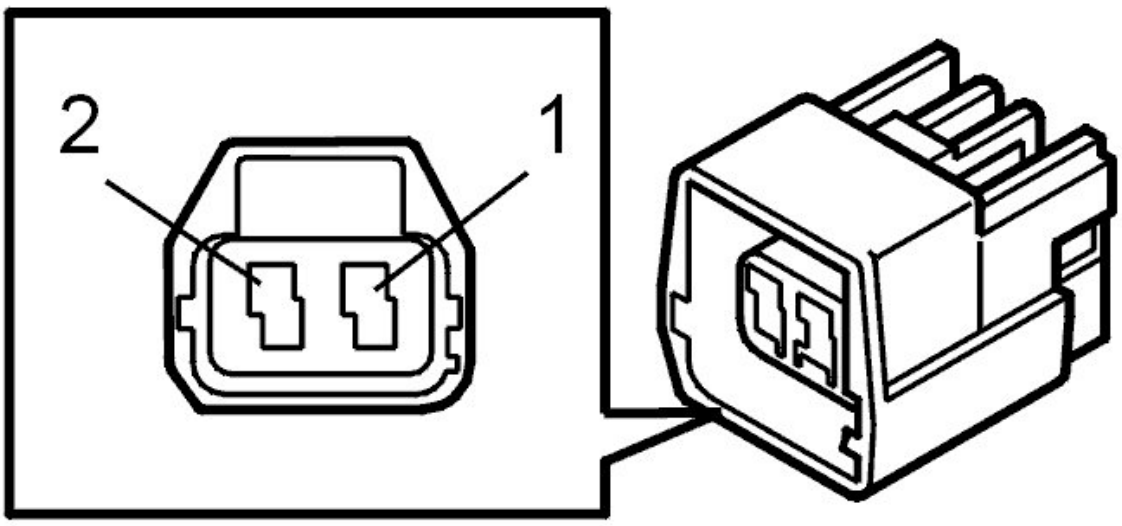
Continue - Checking cable and component

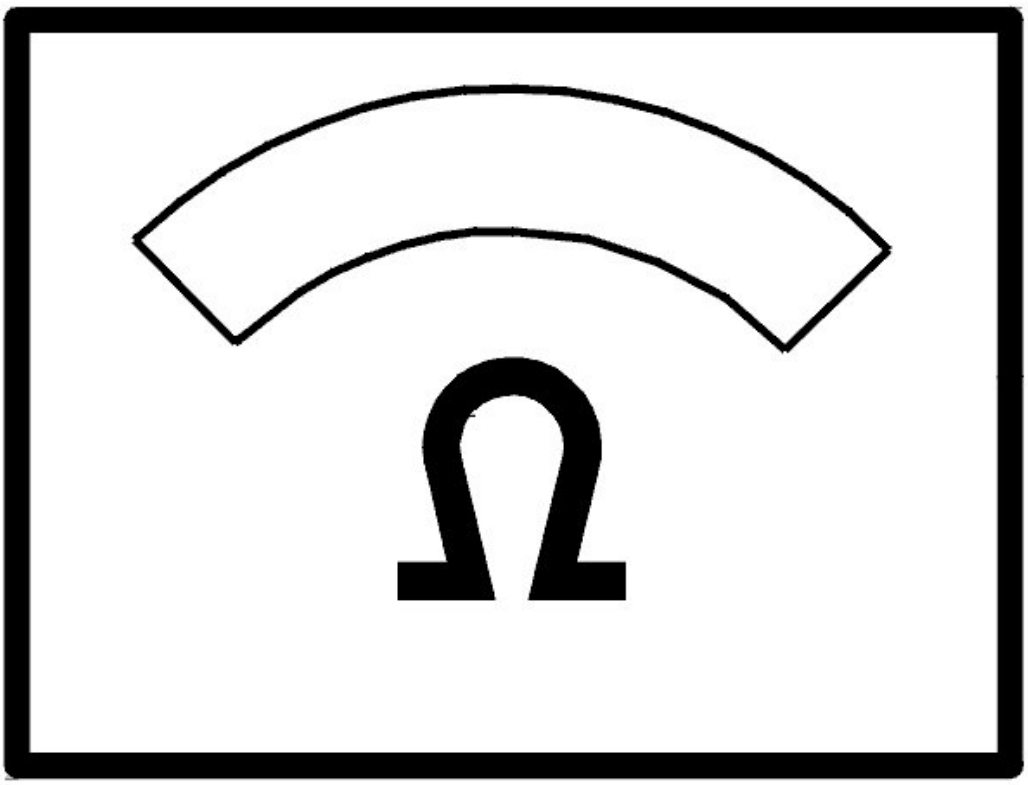
Checking cable and component

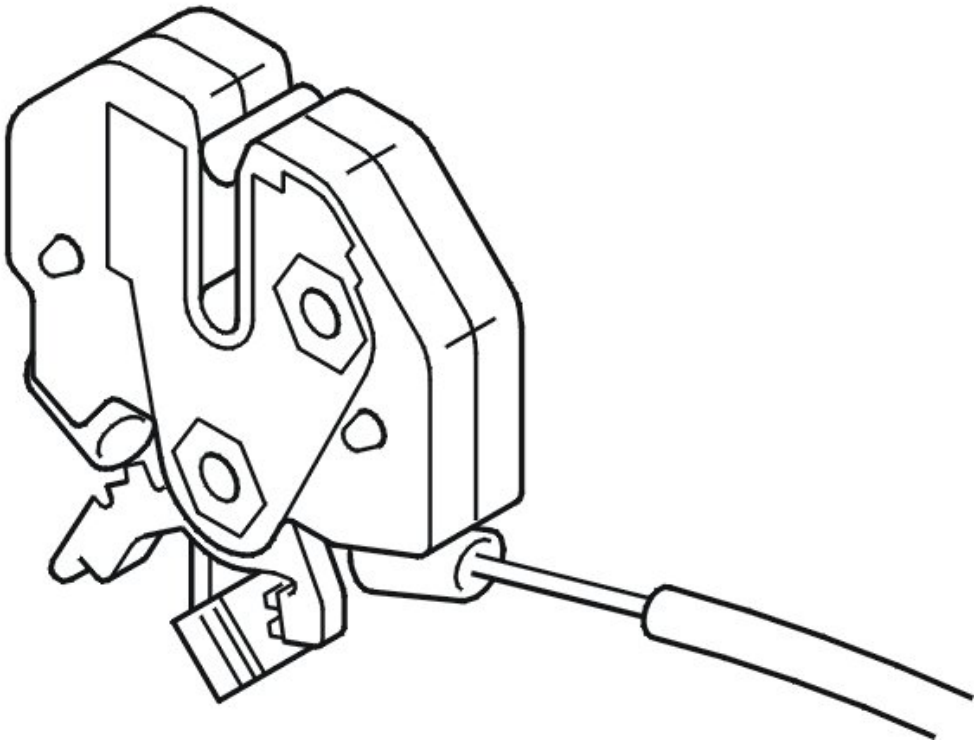
Check the signal cable between rear electronic module (REM) connector terminal #44 (#C4) and hood switch terminal #1. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- To disconnect the rear electronic module (REM), see Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals







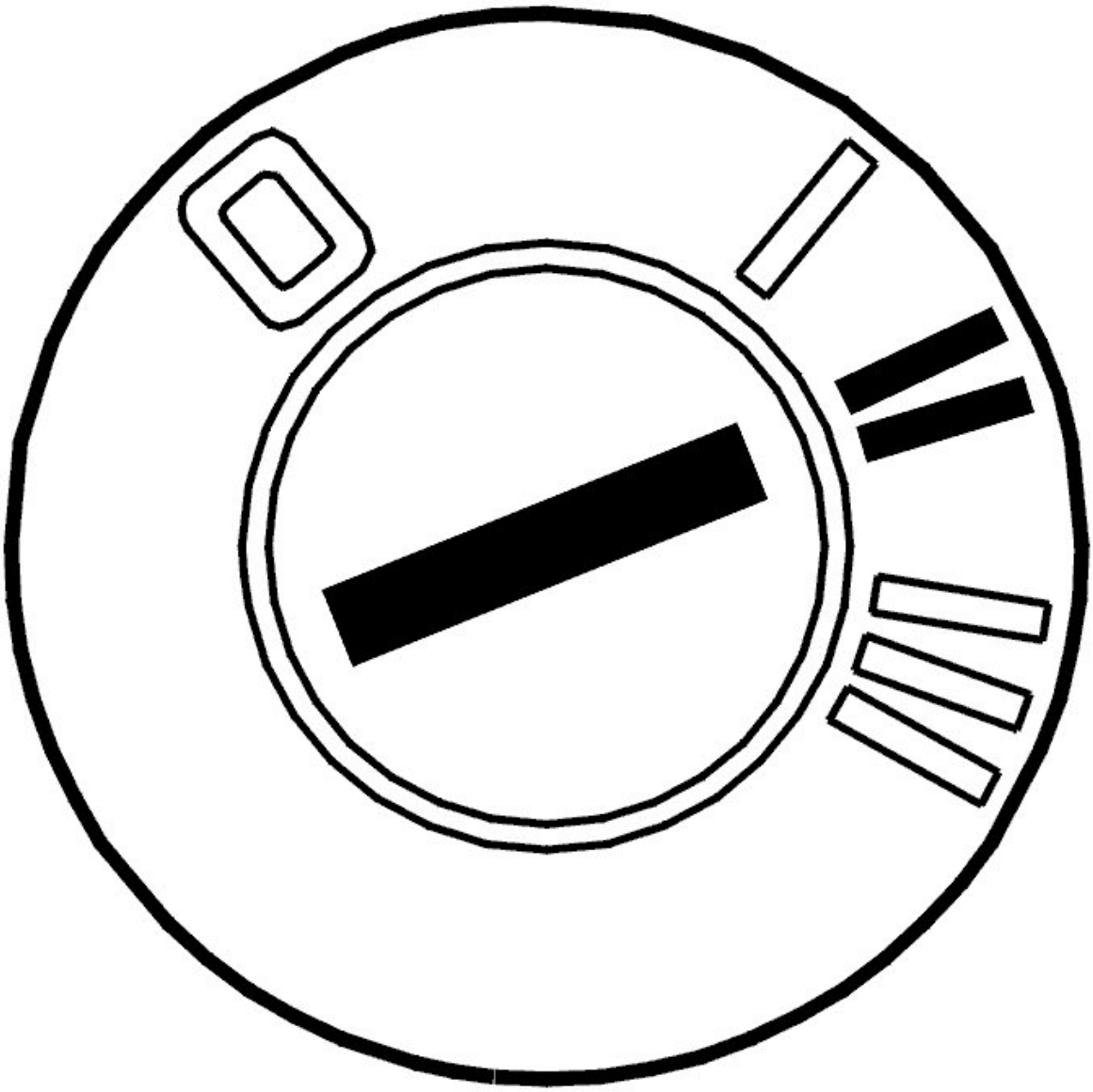
Continue - Verification

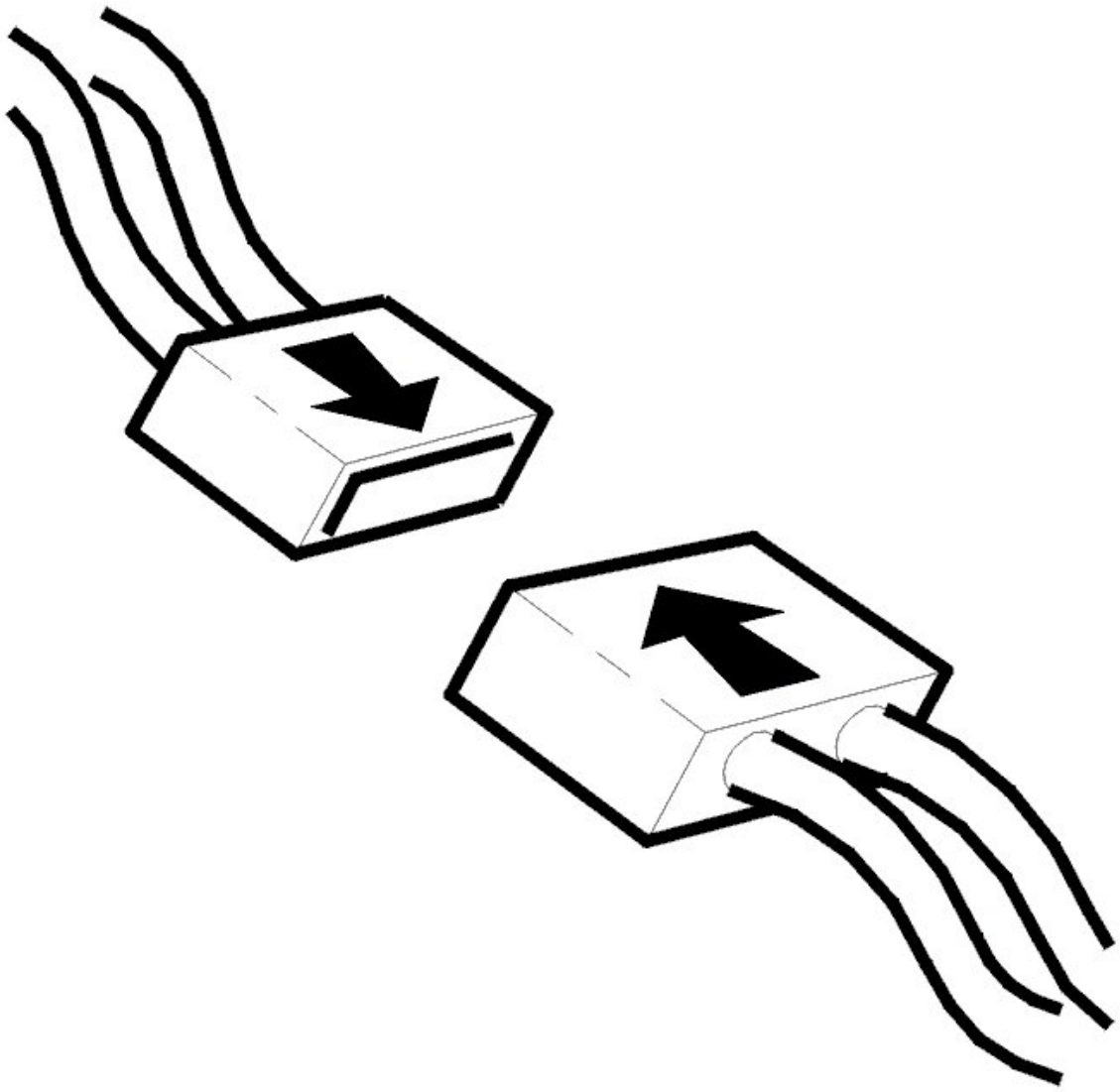
Verification

Verification

Verification

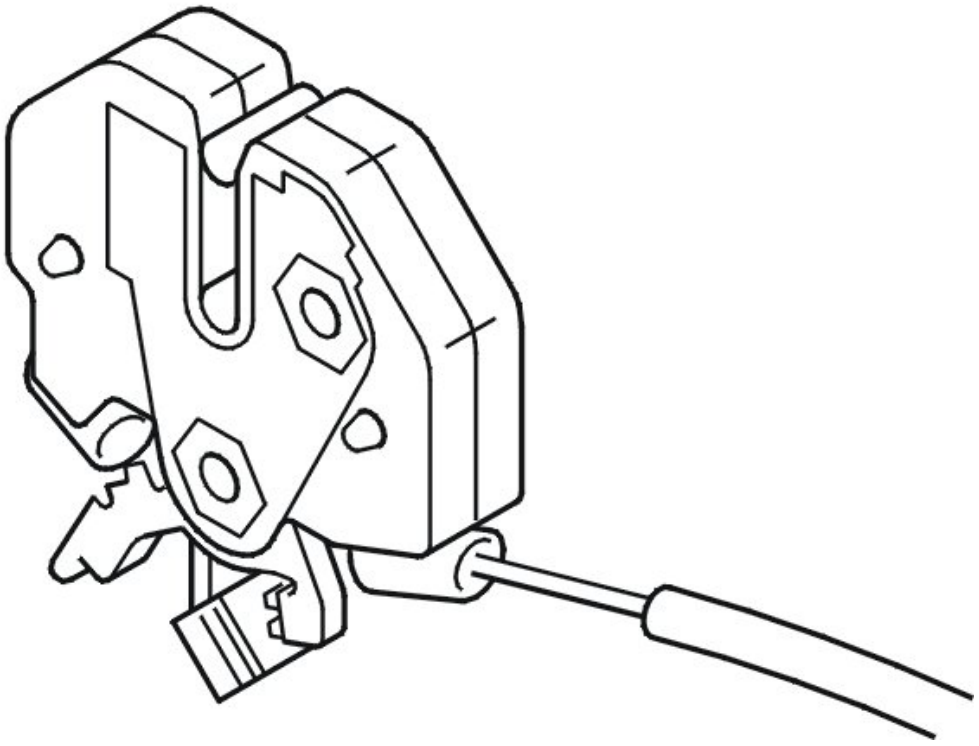
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the signal from the hood switch.

Open and close the hood so that the hood switch is affected. The signal should change status.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

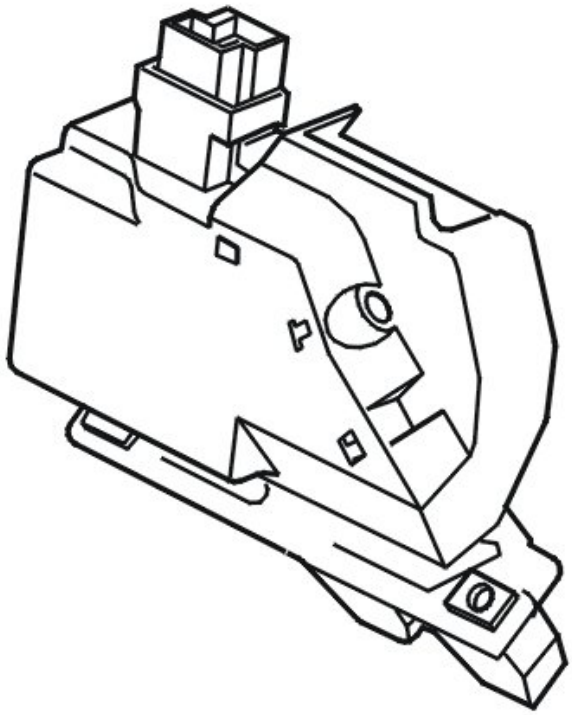
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the hood switch

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6A15

Condition



The rear electrical module (REM) checks if the tailgate is open or closed using a switch in the lock unit of the tailgate. The switch provides a ground to the rear electronic module (REM) when the tailgate is shut.
The rear electronic module (REM) checks the status of the switch by powering it for a short period ("polling").
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives a high signal from the**tailgate**switch when the control module has not polled that switch. This is seen as a short-circuit to supply voltage in the switch or the cable to the switch.

Substitute value
- None.

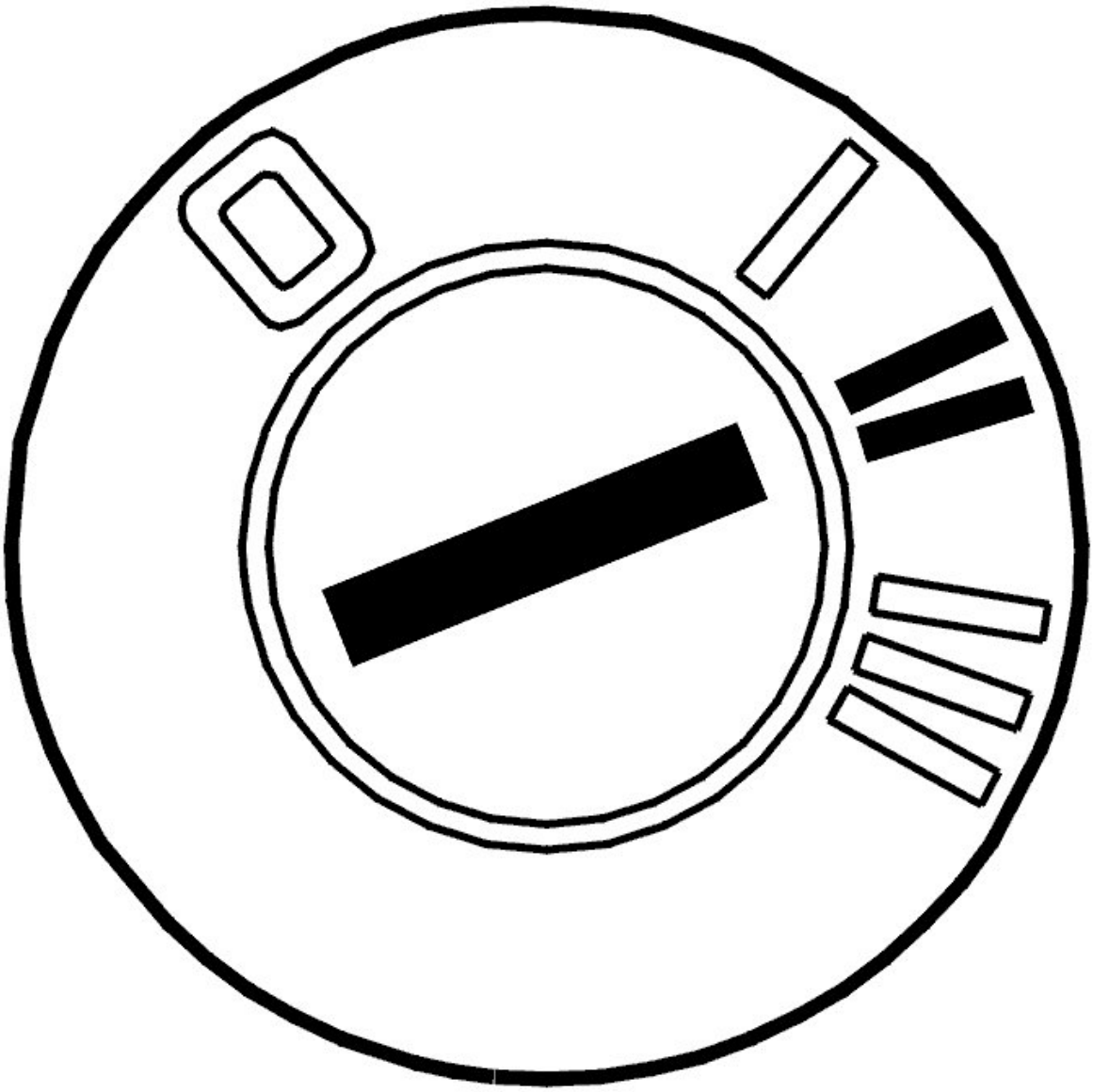
Possible source
- Short-circuit to supply voltage in the switch for indicating a closed tailgate.

Fault symptom[s]
- General warning lamp lit.
- Message in the display.
- Does not alarm the tailgate.

Signal Too High

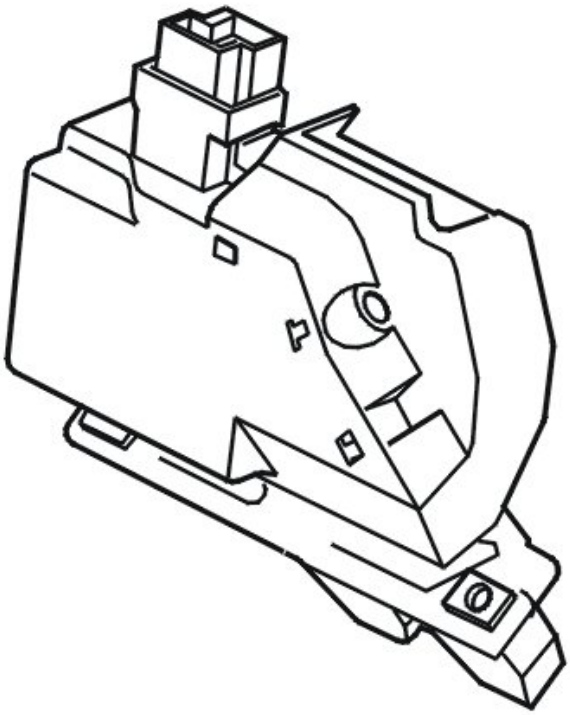
Signal too high

Checking the signal from the switch in the tailgate/trunk lid



- Ignition on
- Read off the status from the switch in tailgate/trunk lid (indicates whether the tailgate/trunk lid is open or closed).

Open and close the trunk lid / tailgate. The status should change when the tailgate/trunk lid is opened/closed.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



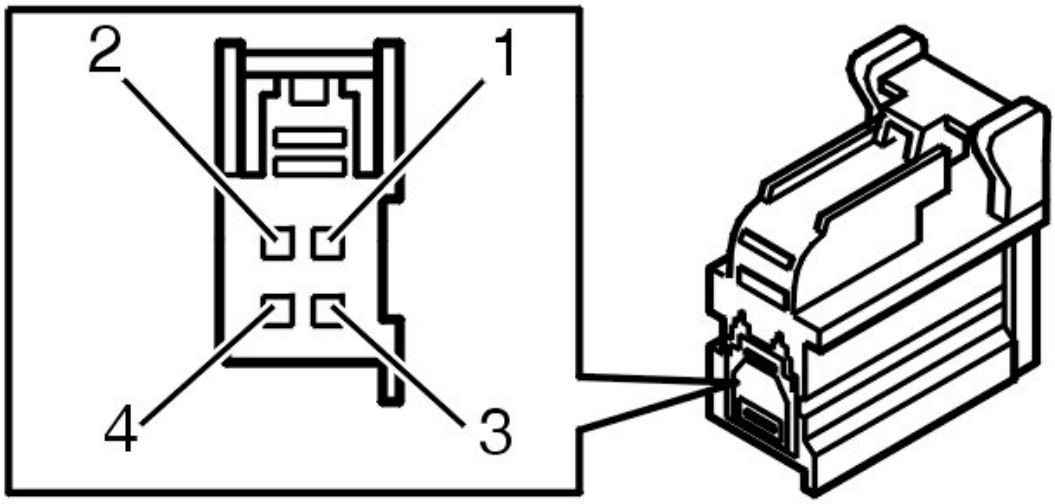
Continue - Checking cable and component

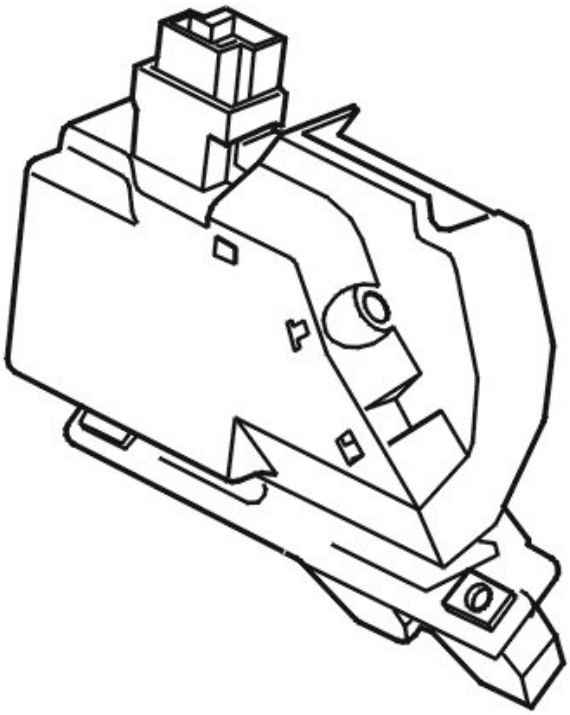
Checking cable and component

Check the signal cable between rear electronic module (REM) connector terminal #42 (#F2) and terminal #1 on the lock mechanism connector. Check for a short-circuit to supply voltage. Check for an open-circuit.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





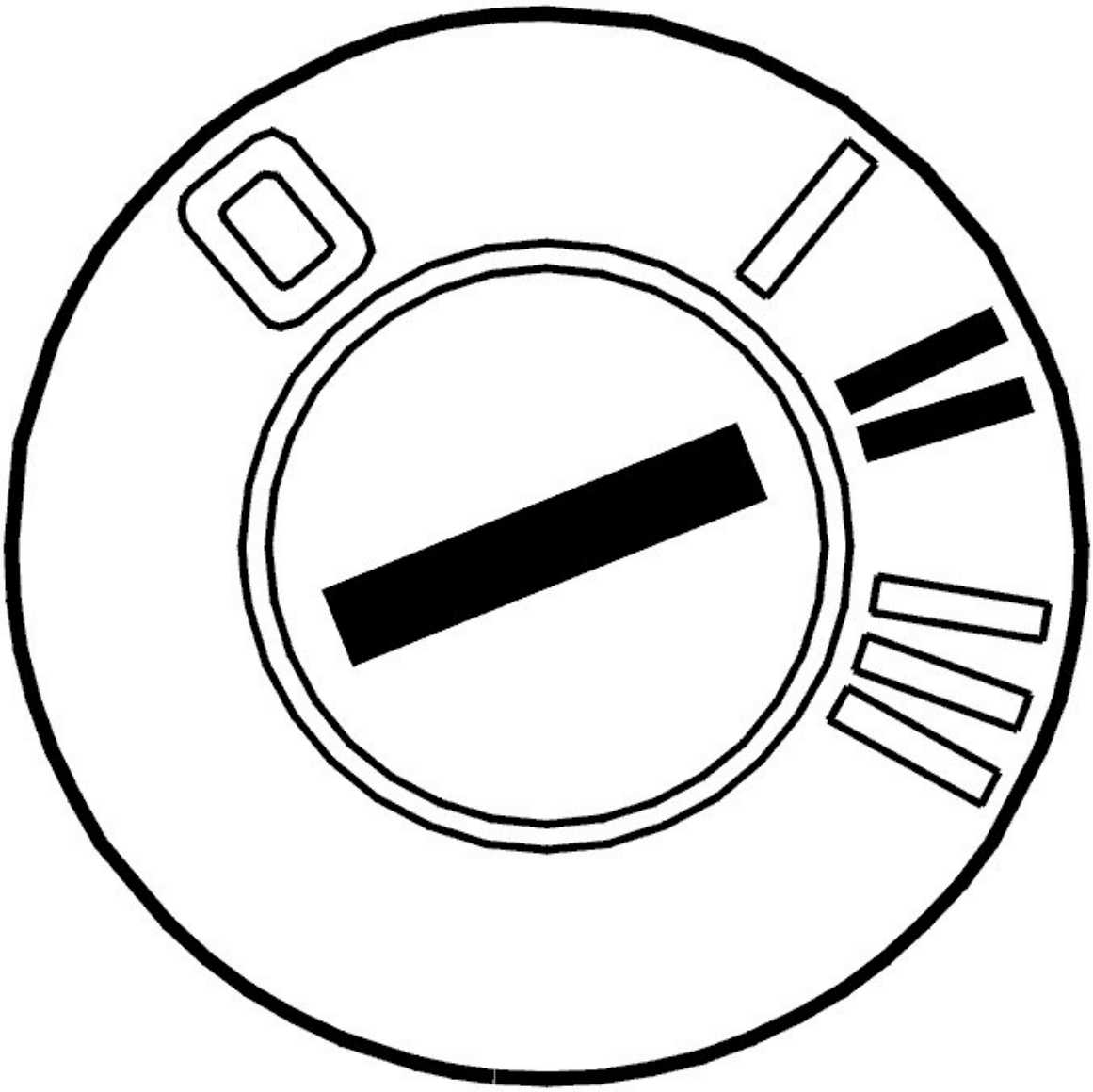
Continue - Verification

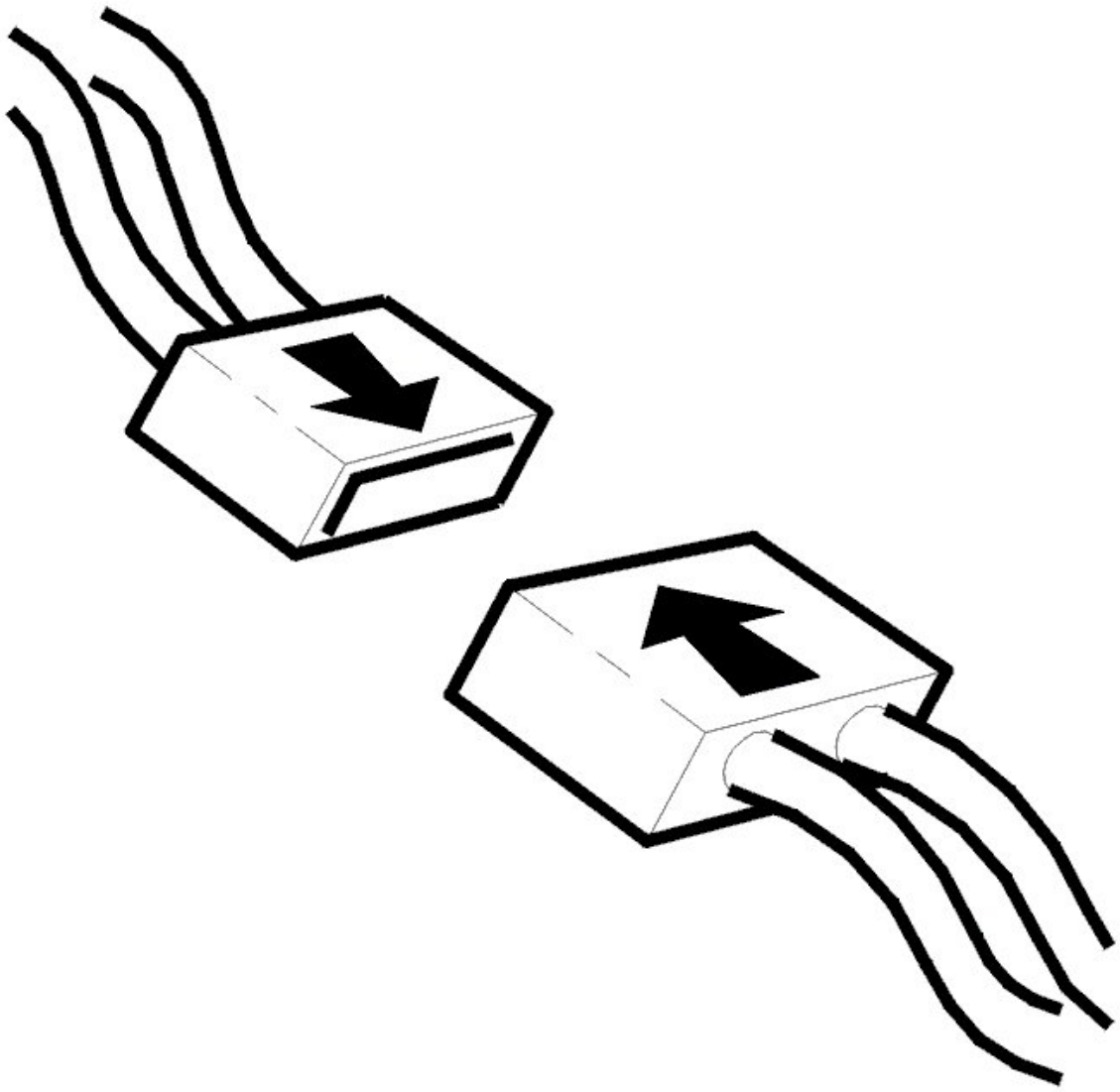
Verification

Verification

Verification

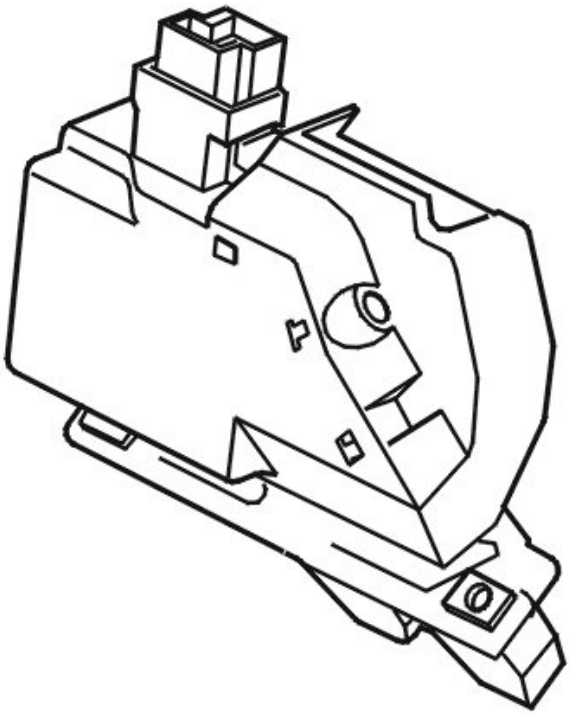
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the switch in tailgate/trunk lid (indicates whether the tailgate/trunk lid is open or closed).

Open and close the trunk lid / tailgate. The status should change when the tailgate/trunk lid is opened/closed.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the switch in the tailgate/trunk lid

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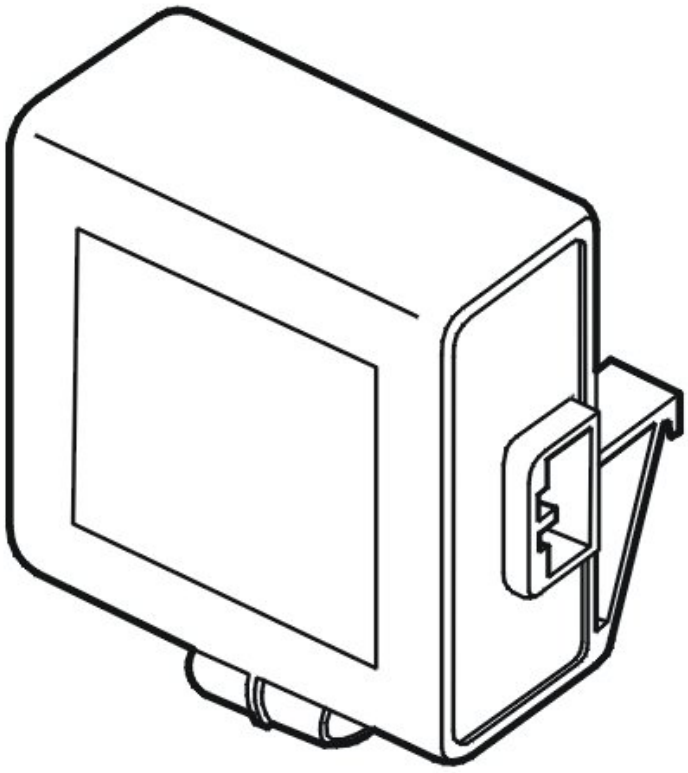
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C11

Condition



The rear electronic module (REM) controls the power supply to the inclination sensor module (ISM). The power supply is active when the alarm is activated if the function for reduced alarm is not activated.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers a high level in the power supply to the inclination sensor module (ISM) even though the power supply is not activated.
The diagnostic trouble code (DTC) can be diagnosed when the rear electronic module (REM) is in alert mode and the alarm is not activated.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the power supply for the inclination sensor module (ISM).

Fault symptom[s]
- Does not alarm the sensor.

Signal Too High

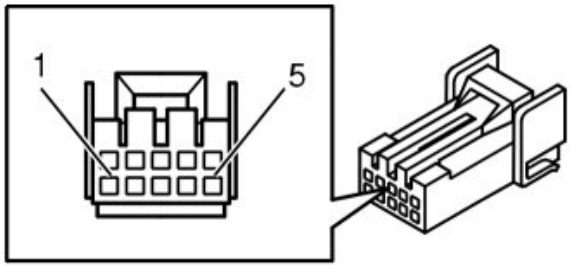
Signal too high

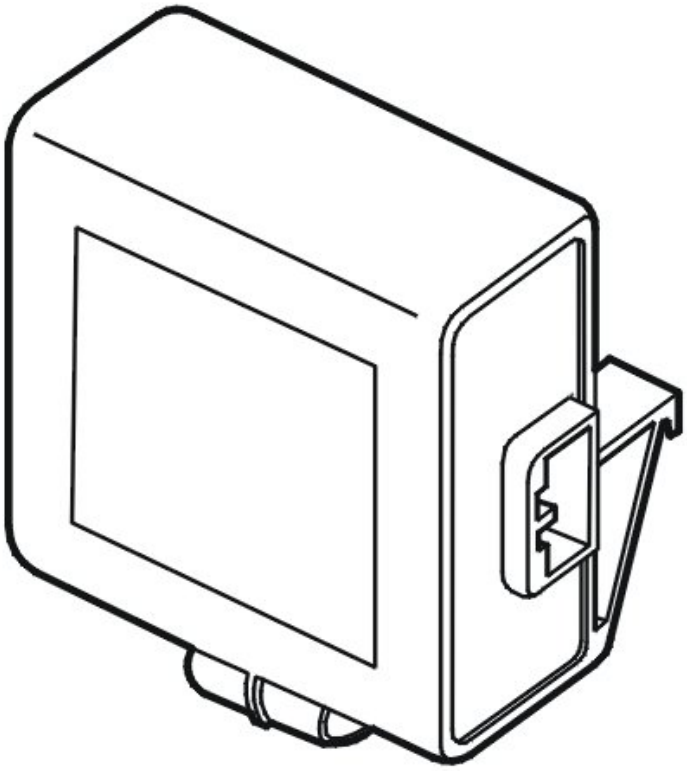
Checking cable and component

Check the power supply cable between rear electronic module (REM) connector terminal #31 (#D31) and tilt sensor connector terminal #1. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals





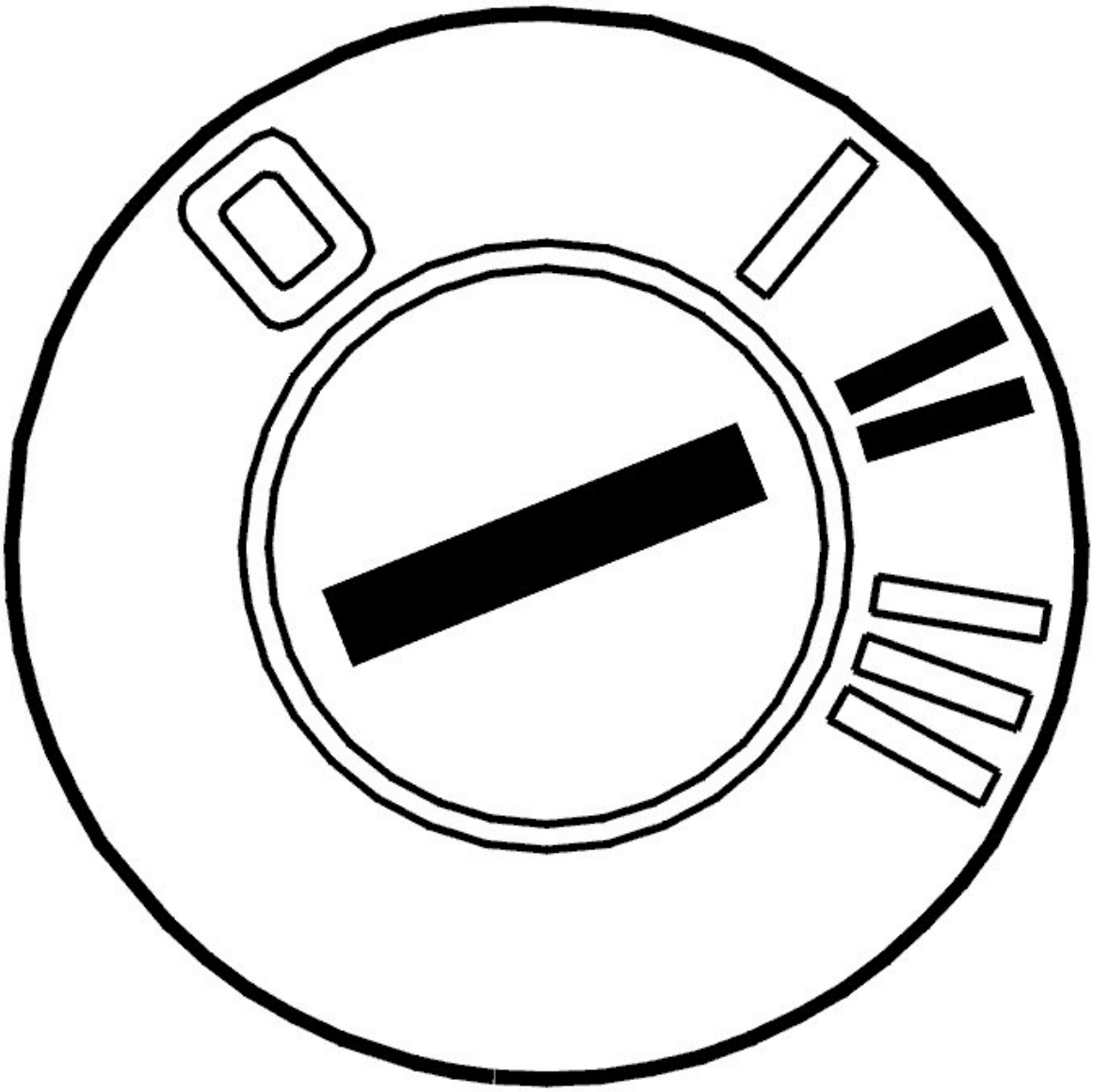
Continue - Verification

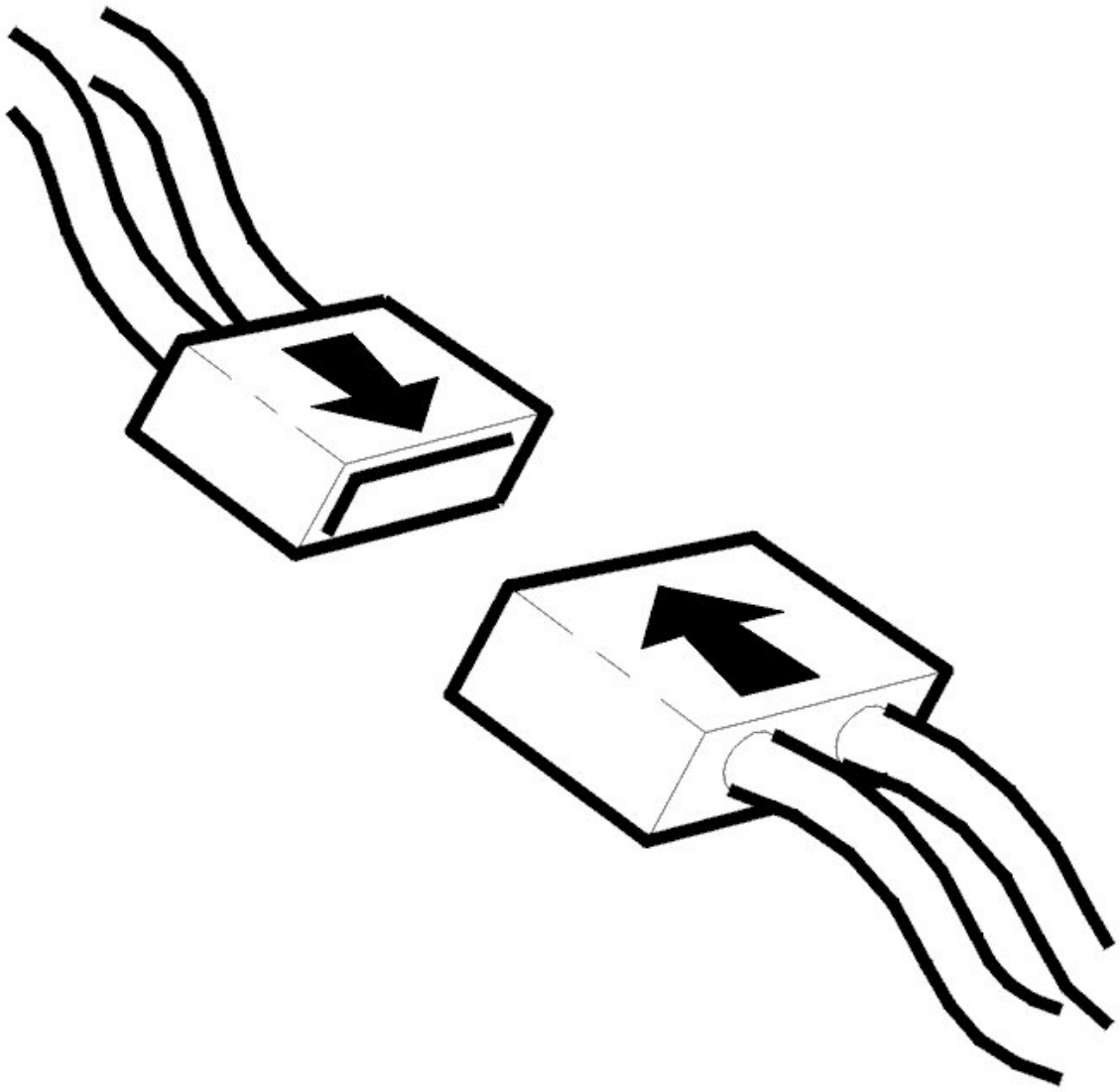
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

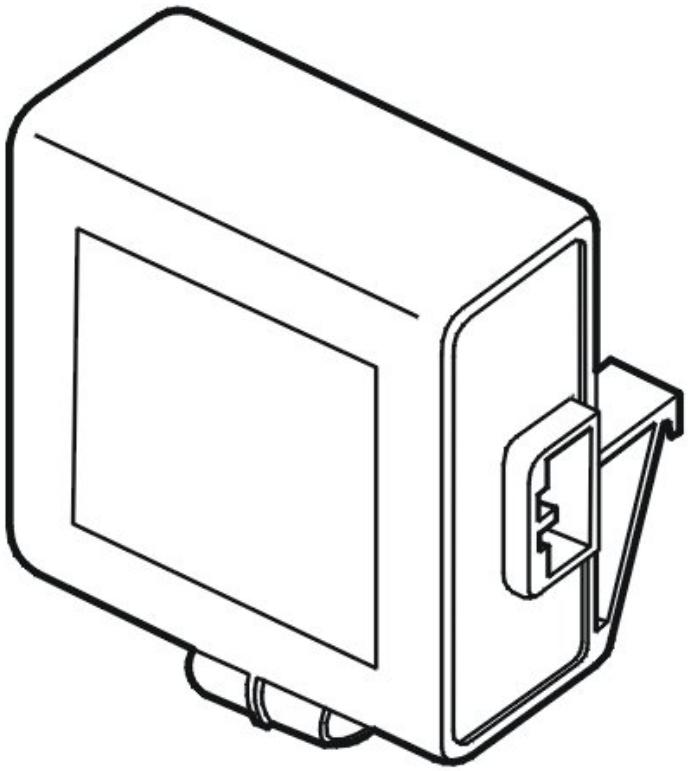
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C12

Condition



The rear electronic module (REM) controls the power supply to the inclination sensor module (ISM). The power supply is active when the alarm is activated if the function for reduced alarm is not activated.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers a short-circuit to ground in the power supply cable for the inclination sensor module (ISM).
The diagnostic trouble code (DTC) can be diagnosed when the rear electronic module (REM) is in alert mode and the alarm is not activated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the power supply for the inclination sensor module (ISM).

Fault symptom[s]
- Does not alarm the sensor.

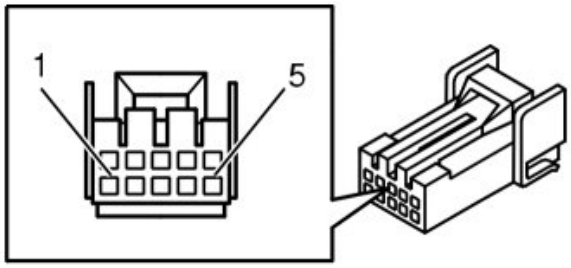
Signal Too Low

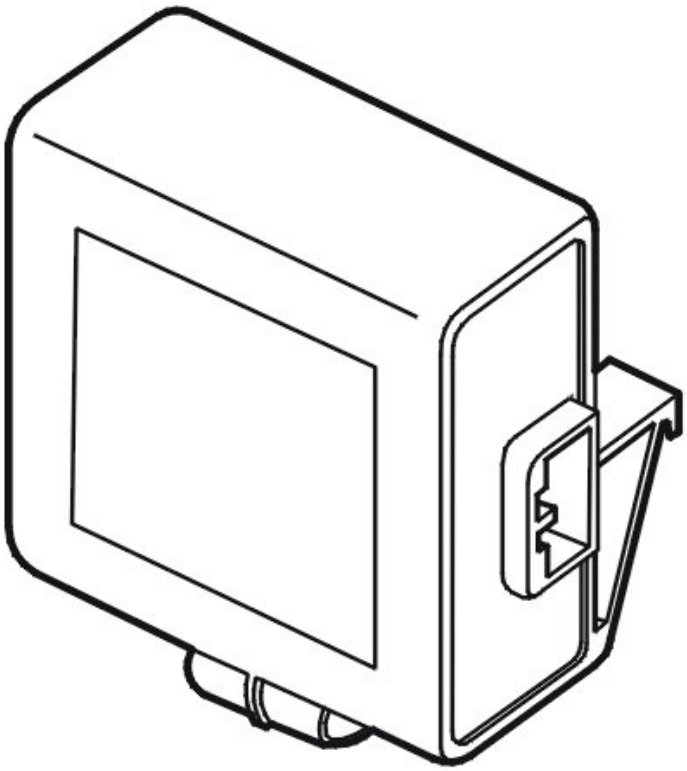
Signal too low

Checking cable and component

Check the power supply cable between rear electronic module (REM) connector terminal #31 (#D31) and inclination sensor module (ISM) connector terminal #1. Check for a short-circuit to ground.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





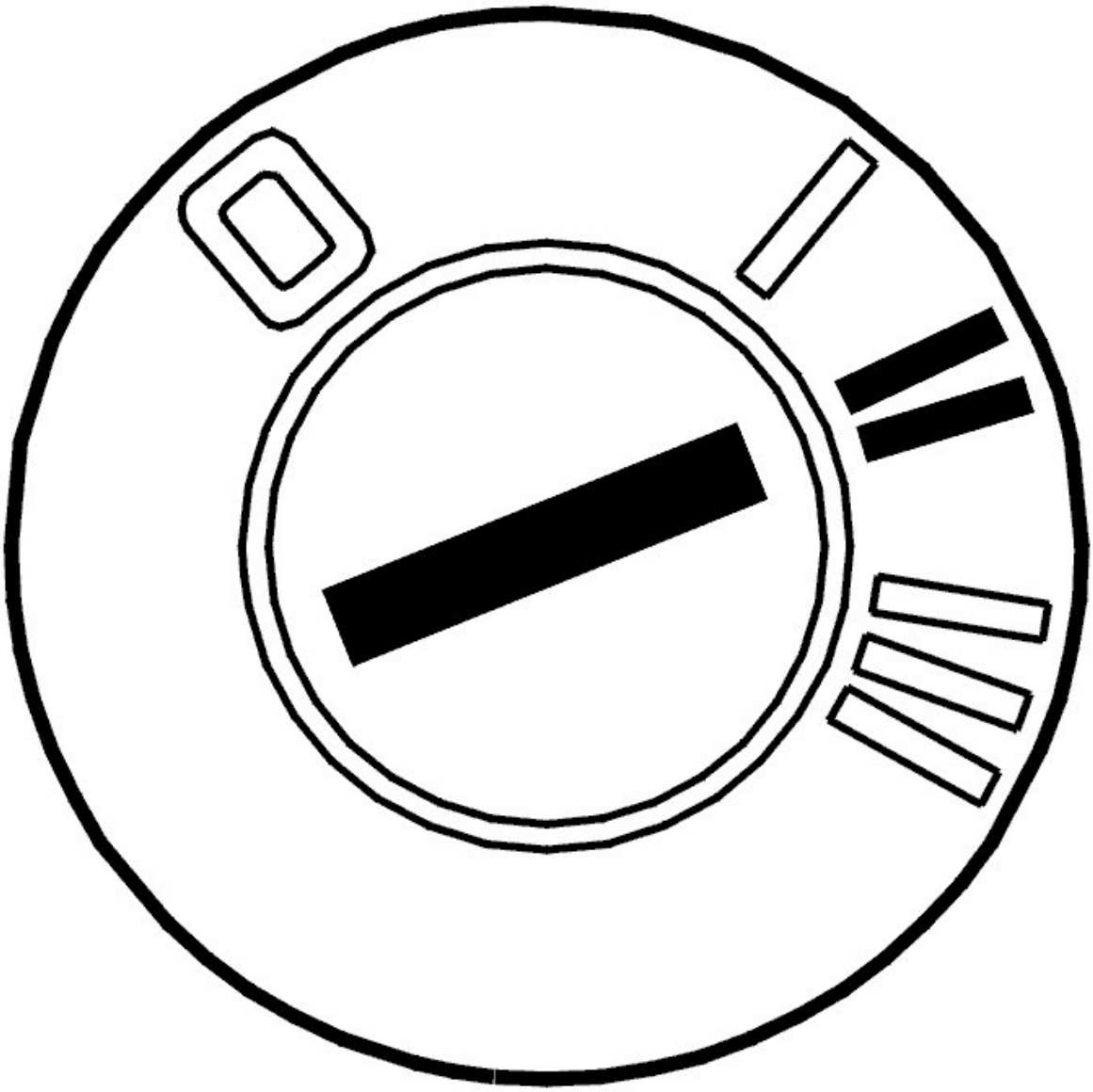
Continue - Verification

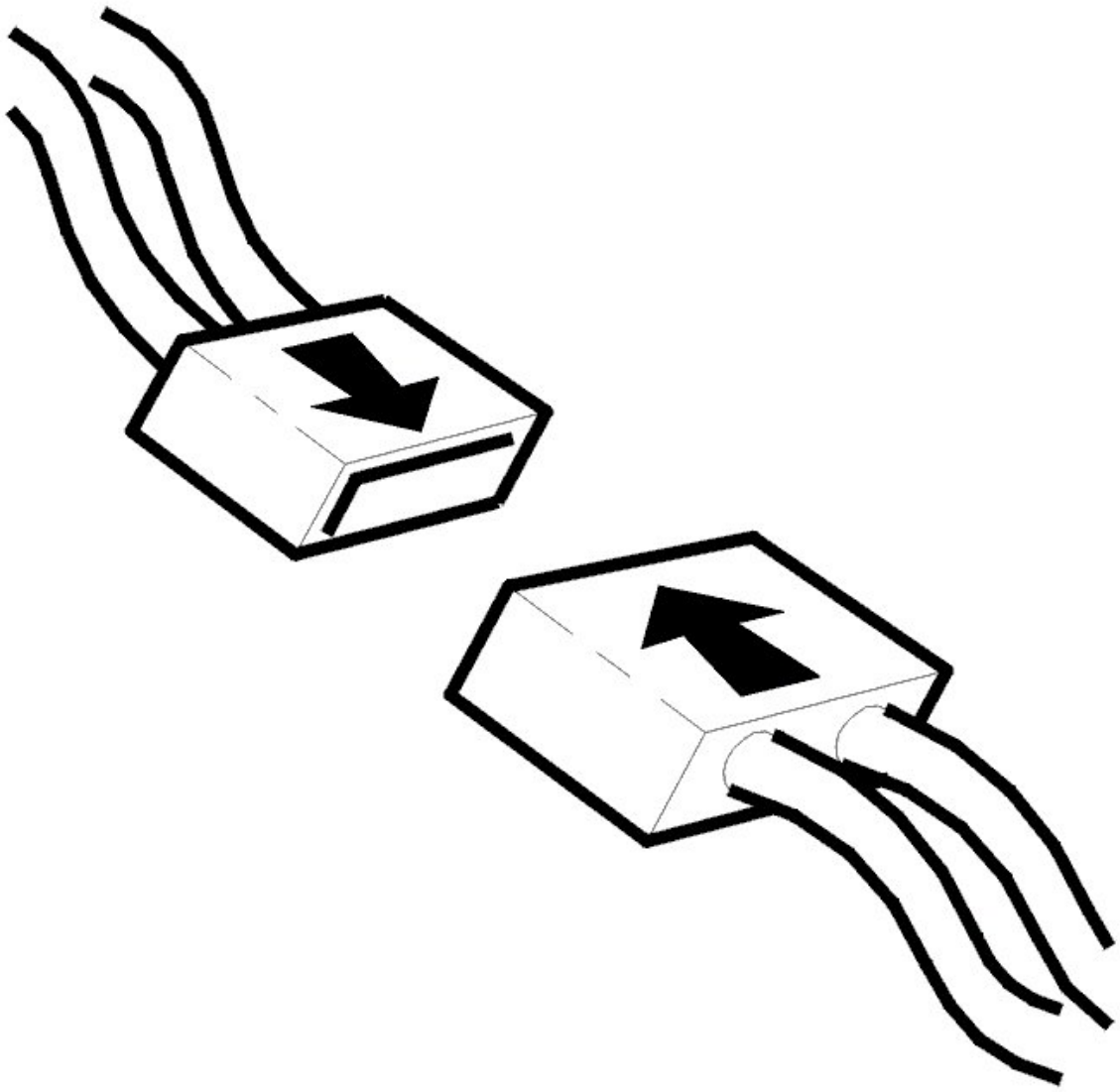
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

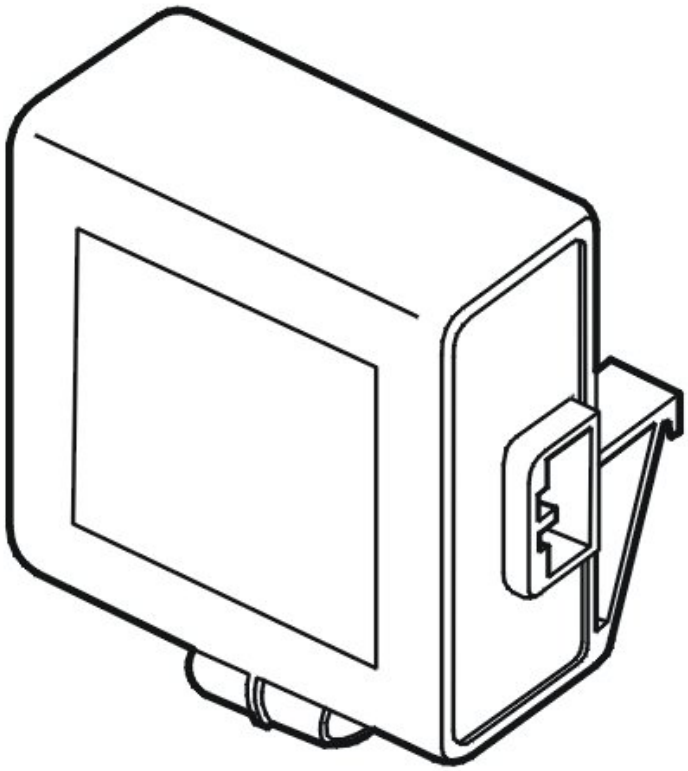
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C15

Condition



The rear electronic module (REM) receives signals from the inclination sensor module (ISM) when the alarm is activated. Before the rear electronic module (REM) accepts signals from the inclination sensor module (ISM) a communication test is carried out after the alarm is activated.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that communication with the inclination sensor module (ISM) is not working.
The diagnostic trouble code (DTC) can be diagnosed when the rear electronic module (REM) is in alert mode.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the connectors

- Open-circuit in the communication cable to the inclination sensor module (ISM)
- Open-circuit in the power supply to the inclination sensor module (ISM)
- Open-circuit in the ground cable to the inclination sensor module (ISM).

Fault symptom[s]
- Does not alarm the sensor.

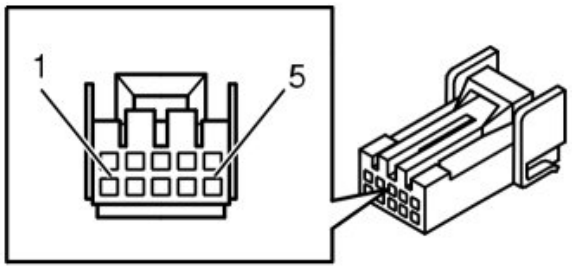
Communication Fault

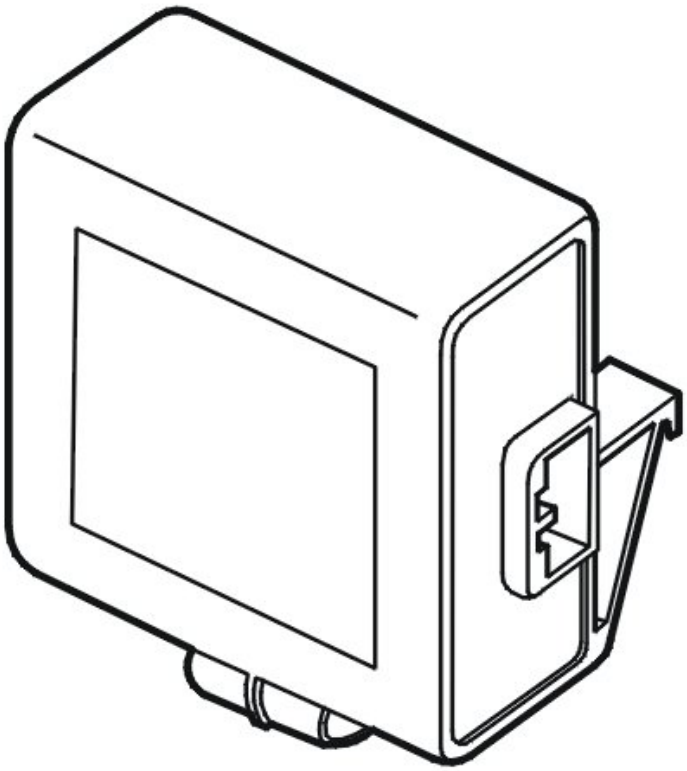
Communication fault

Checking cable and component

Check connector D for the rear electronic module (REM) and the connector for the inclination sensor module (ISM). Check for contact resistance and oxidation.
Check the communication cable between rear electronic module (REM) connector terminal #26 (#D26) and inclination sensor module (ISM) connector terminal #2. Check for an open-circuit.
Check the cable between inclination sensor module (ISM) connector terminal #5 and the ground terminal. Check for open-circuit.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





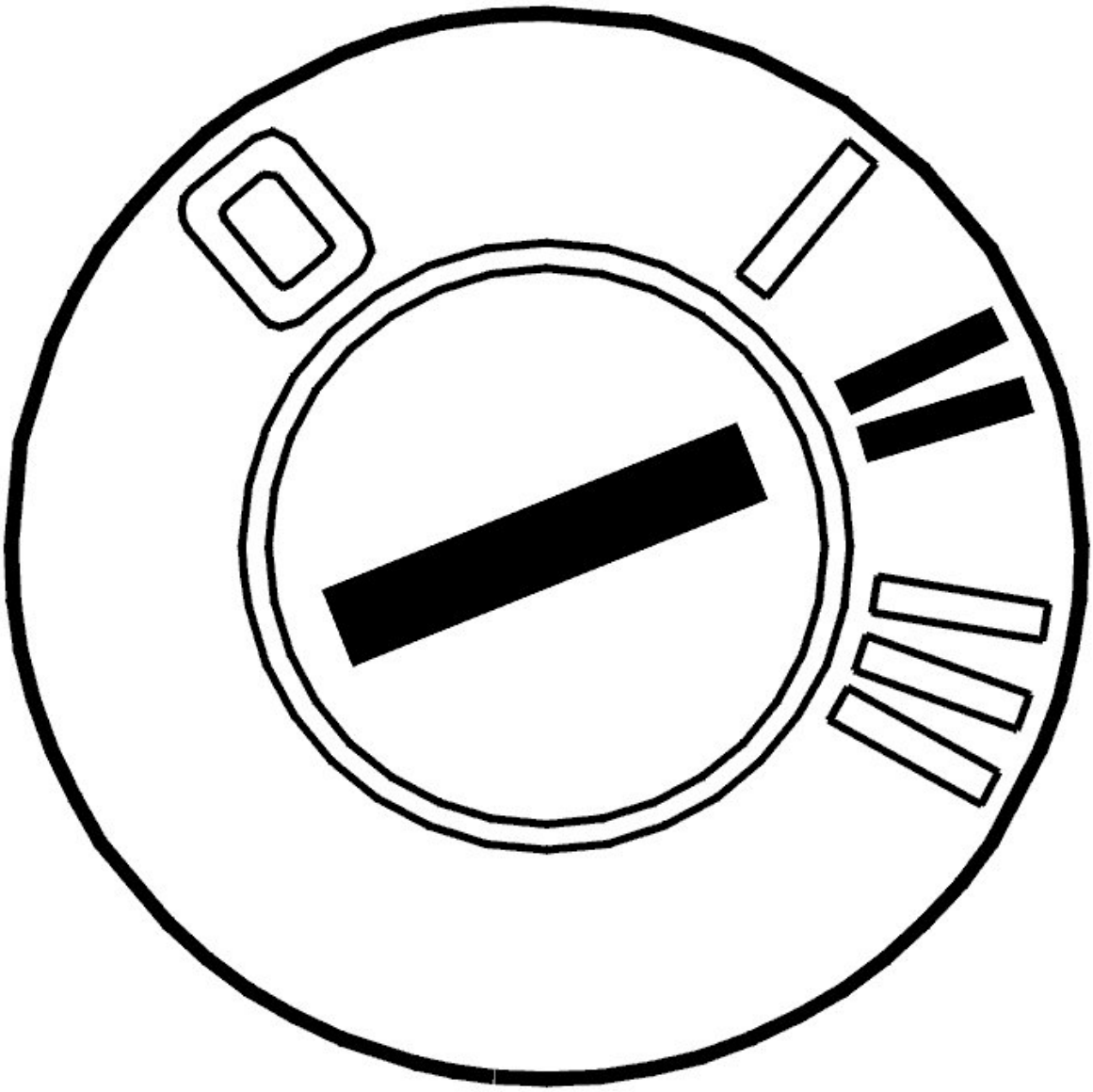
Continue - Verification

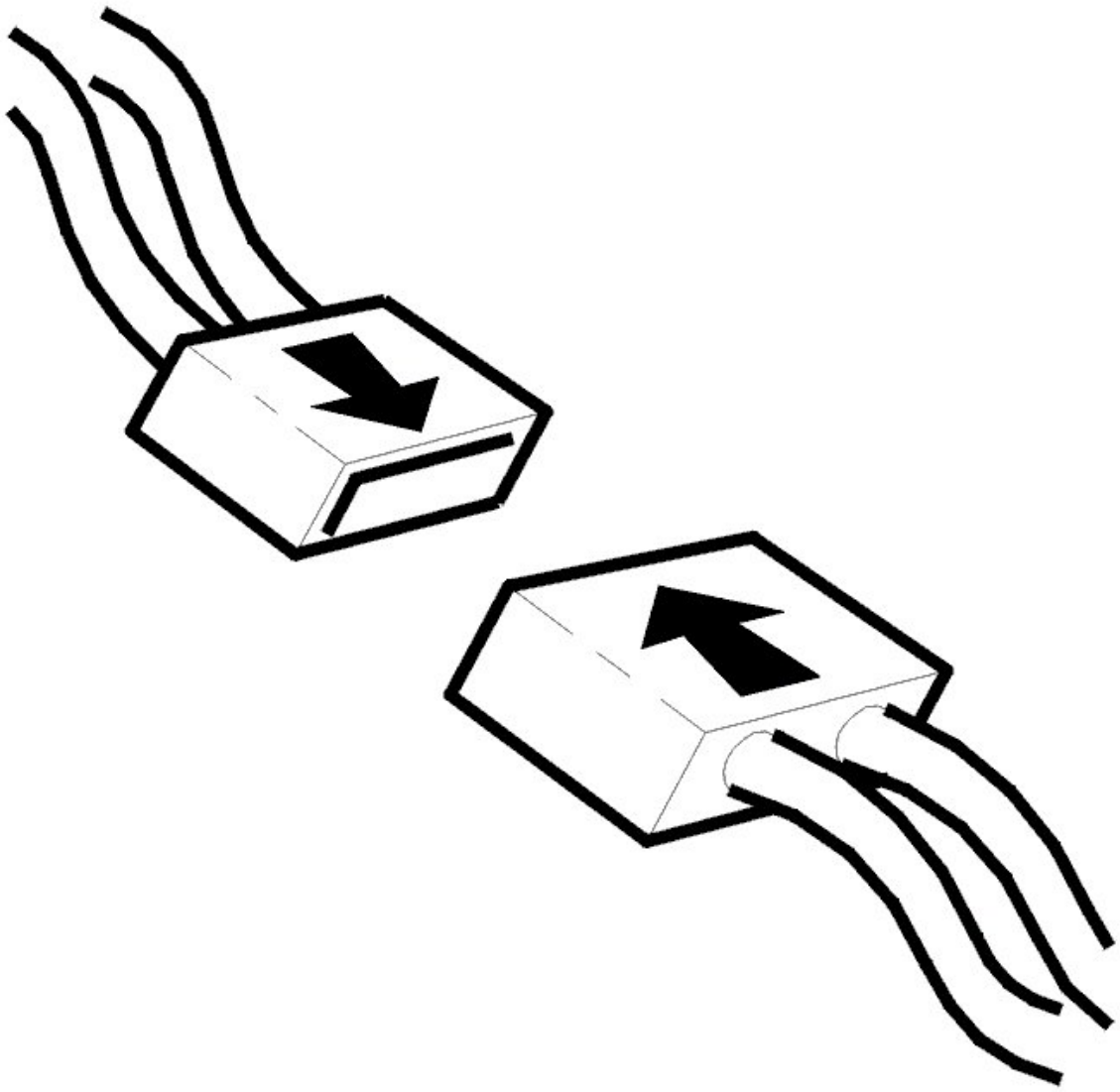
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

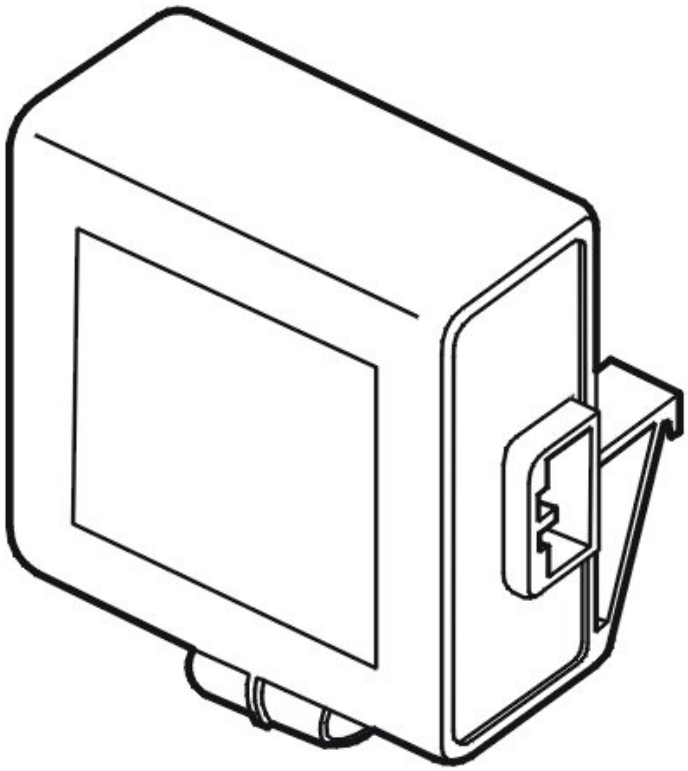
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C16

Condition



The rear electronic module (REM) receives signals from the inclination sensor module (ISM) when the alarm is activated. Before the rear electronic module (REM) accepts signals from the inclination sensor module (ISM) a communication test is carried out after the alarm is activated.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) receives information from the inclination sensor module (ISM) indicating an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the rear electronic module (REM) is in alert mode.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the connectors

- Open-circuit in the communication cable to the inclination sensor module (ISM)
- Open-circuit in the power supply to the inclination sensor module (ISM)
- Open-circuit in the ground cable to the inclination sensor module (ISM)
- Internal fault in the inclination sensor module (ISM).

Fault symptom[s]
- Does not alarm the sensor.

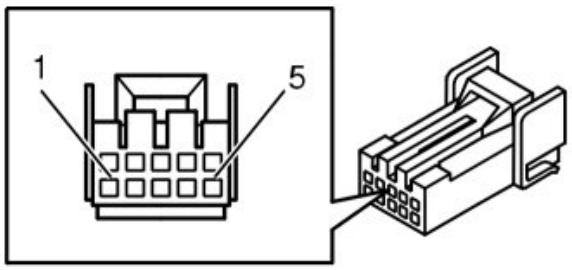
Internal Fault

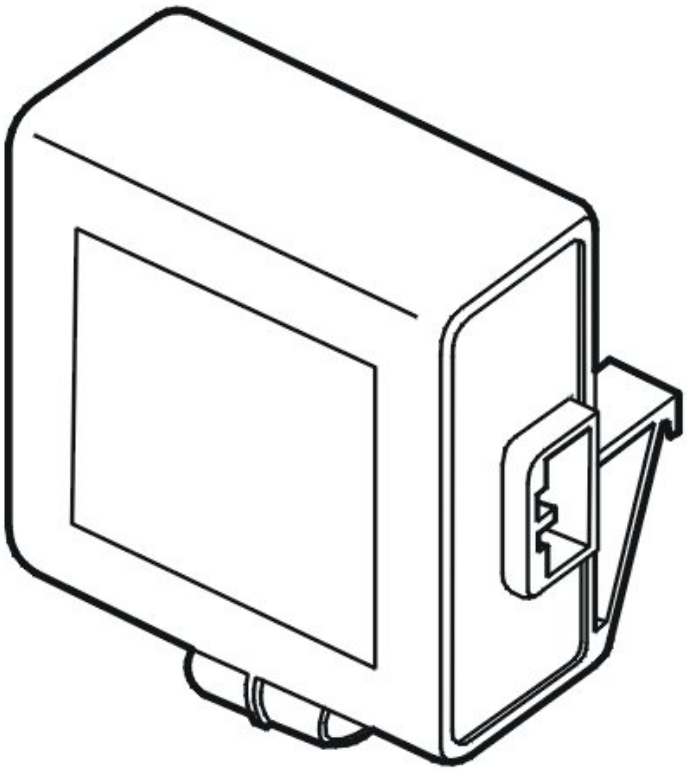
Internal fault

Checking cable and component

Check connector D for the rear electronic module (REM) and the connector for the inclination sensor module (ISM). Check for contact resistance and oxidation.
Check the power cable between rear electronic module (REM) connector terminal #31 (#D31) and inclination sensor module (ISM) connector terminal #1. Check for an open-circuit.
Check the communication cable between rear electronic module (REM) connector terminal #26 (#D26) and inclination sensor module (ISM) connector terminal #2. Check for an open-circuit.
Check the cable between inclination sensor module (ISM) connector terminal #5 and the ground terminal. Check for open-circuit.
Try a new inclination sensor module (ISM) if no fault is found.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Tilt sensor alarm, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Tow Sensor/Service and Repair/Tilt Sensor Alarm, Replacing
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





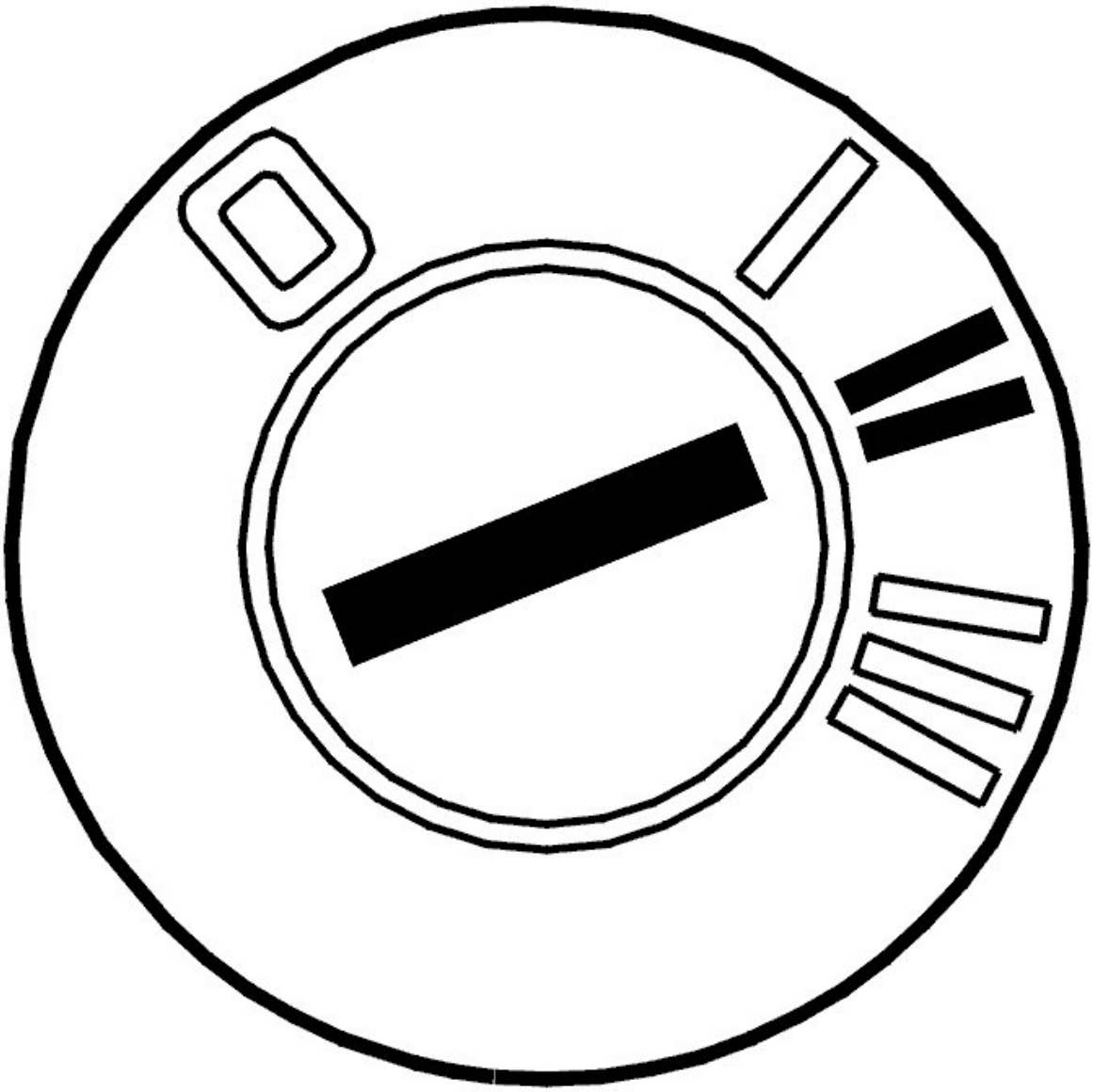
Continue - Verification

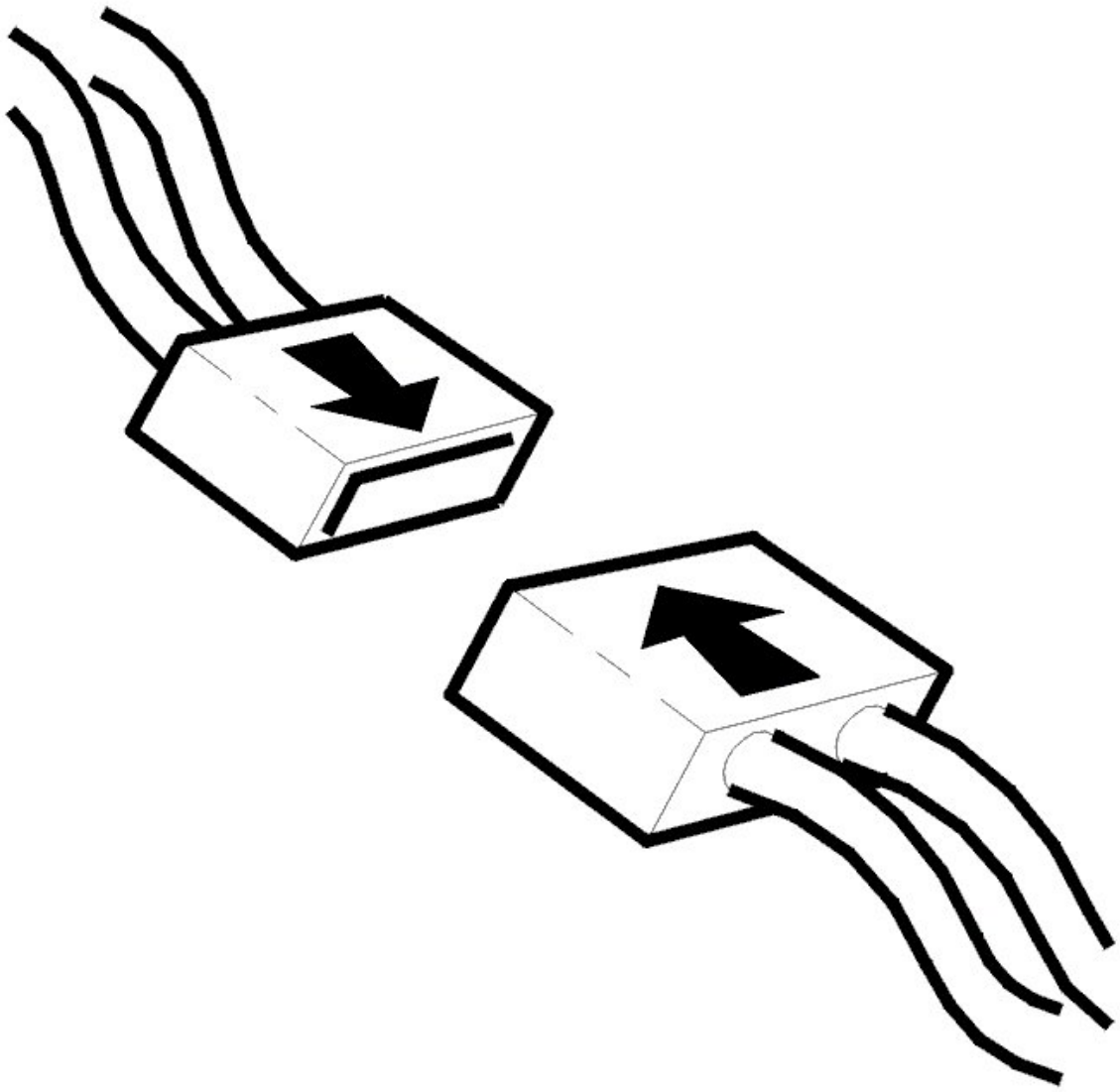
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C17

Condition

When the alarm is activated, the central electronic module (CEM) checks the glass breakage loops in the rear side windows at regular intervals. A diagnostic trouble code (DTC) is stored if the control module detects an open-circuit in any of the glass breakage loops.
The diagnostic trouble code (DTC) can be diagnosed when the alarm is activated.

Substitute value
- The alarm sounds.

Possible source
- Open-circuit in one of the glass breakage loops in the rear side windows
- Contact resistance in the terminals.

Fault symptom[s]
- Text window and warning symbol/Text message
- Alarm/False alarm
- Alarm/Other alarm problems

Signal Missing

Signal missing

Checking cable and component
- Disconnect connector C from the rear electronic module (REM).

Hint: The signal loop runs from rear electronic module (REM) terminal #48 (#C8) to the glass breakage loop in the right-hand rear window, to the glass breakage loop in the left-hand rear window and then to the ground terminal.

Check connector C for the rear electronic module (REM) and the terminals for the glass breakage loop. Check for contact resistance and oxidation.
Check the glass breakage loop and the intermediate cable between rear electronic module (REM) terminal #48 (#C8) and the ground terminal. Check for an open-circuit.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

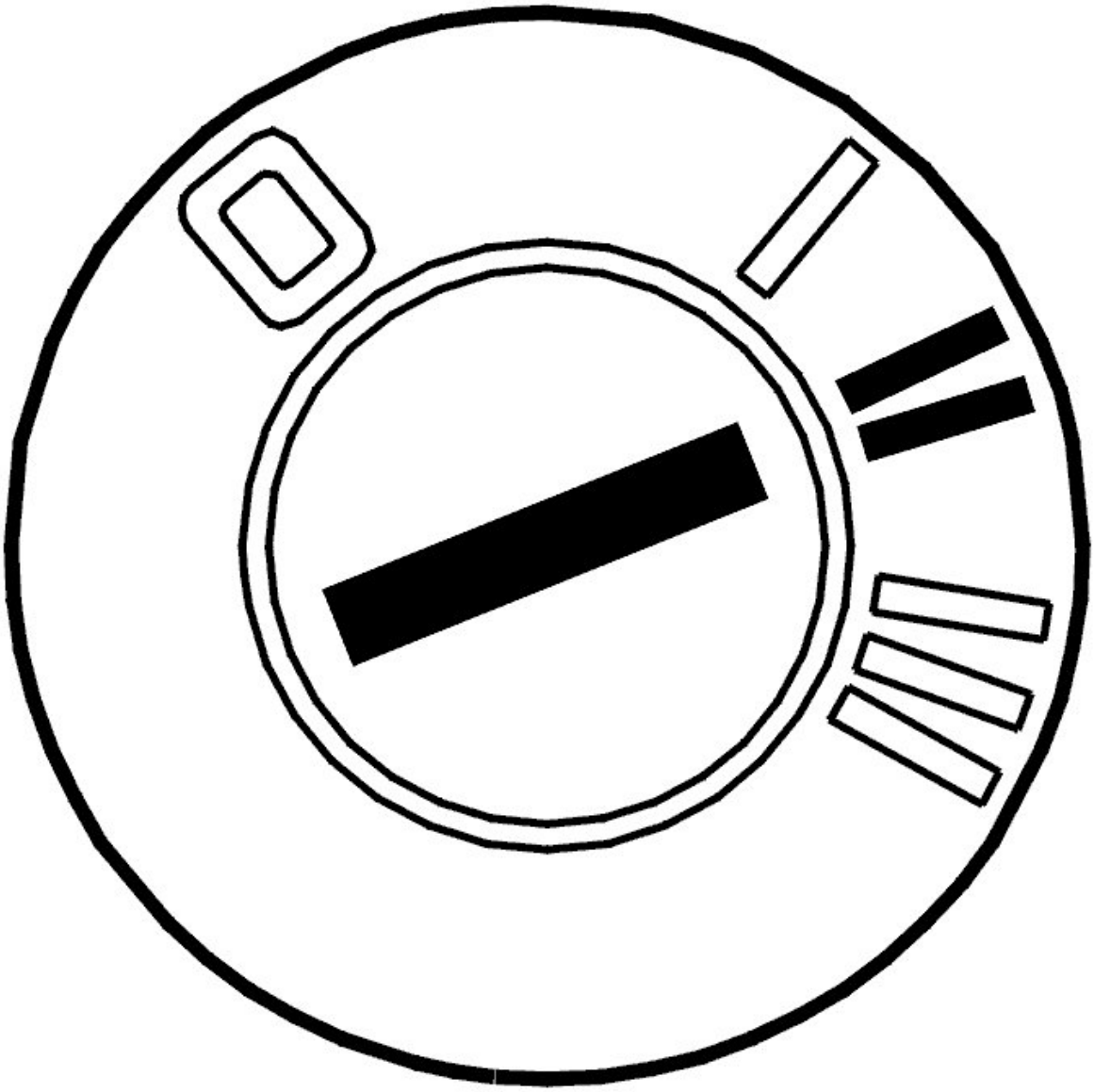
Continue - Verification

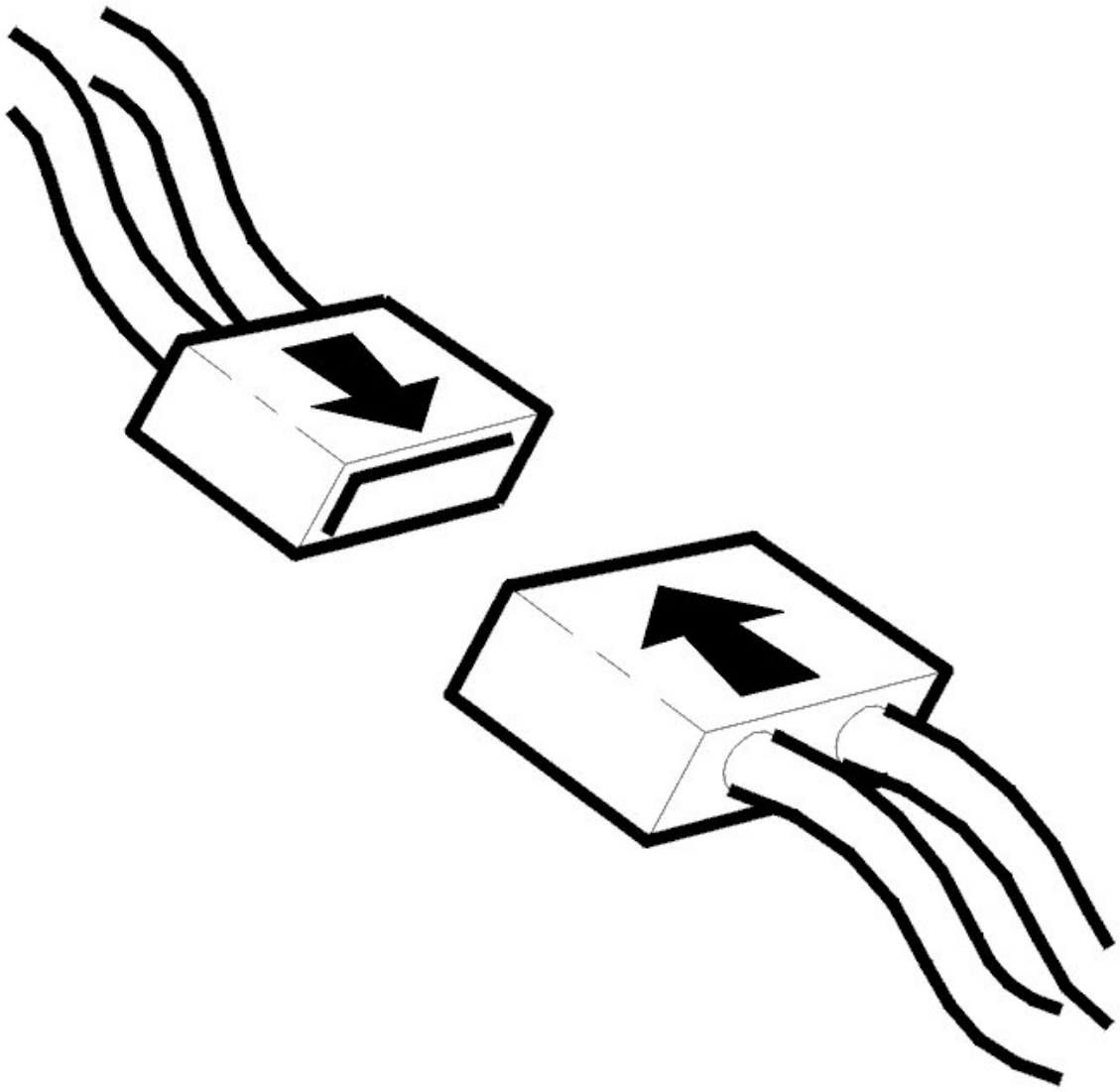
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6C18

Condition

When the alarm is activated, the central electronic module (CEM) checks the glass breakage loops in the rear side windows at regular intervals. The diagnostic trouble code (DTC) is stored if the control module registers a short-circuit to supply voltage in any of the glass breakage loops.
The diagnostic trouble code (DTC) can be diagnosed when the alarm is activated.

Substitute value
- The alarm sounds.

Possible source
- Short-circuit to supply voltage in one of the glass breakage loops in the rear side windows.

Fault symptom[s]
- False alarm.

Signal Too High

Signal too high

Checking cable and component
- Disconnect connector C from the rear electronic module (REM).

Hint: The signal loop runs from rear electronic module (REM) terminal #48 (#C8) to the glass breakage loop in the right-hand rear window, to the glass breakage loop in the left-hand rear window and then to the ground terminal.

Check the glass breakage loop and the intermediate cable between rear electronic module (REM) terminal #48 (#C8) and the ground terminal.
Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

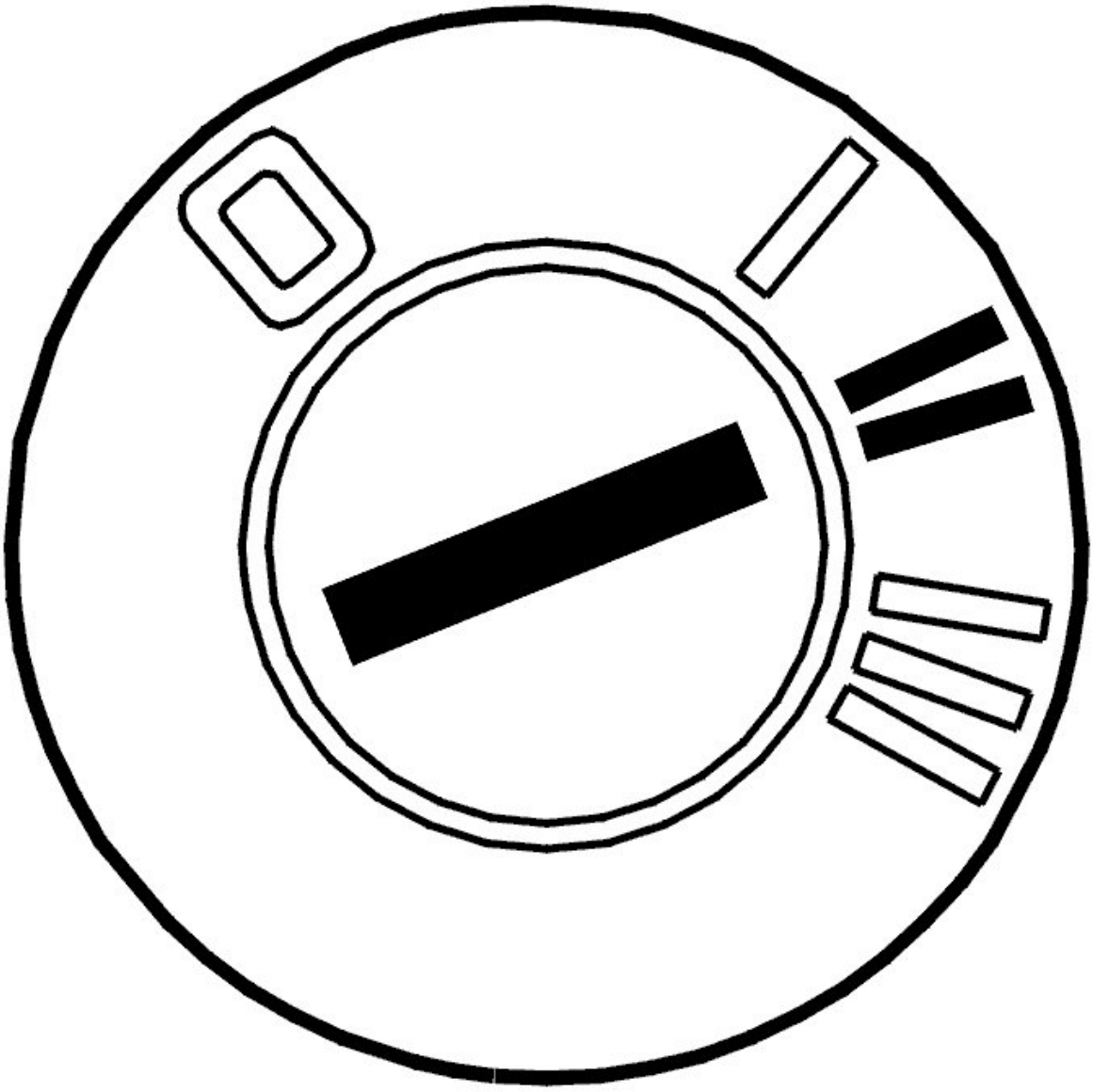
Continue - Verification

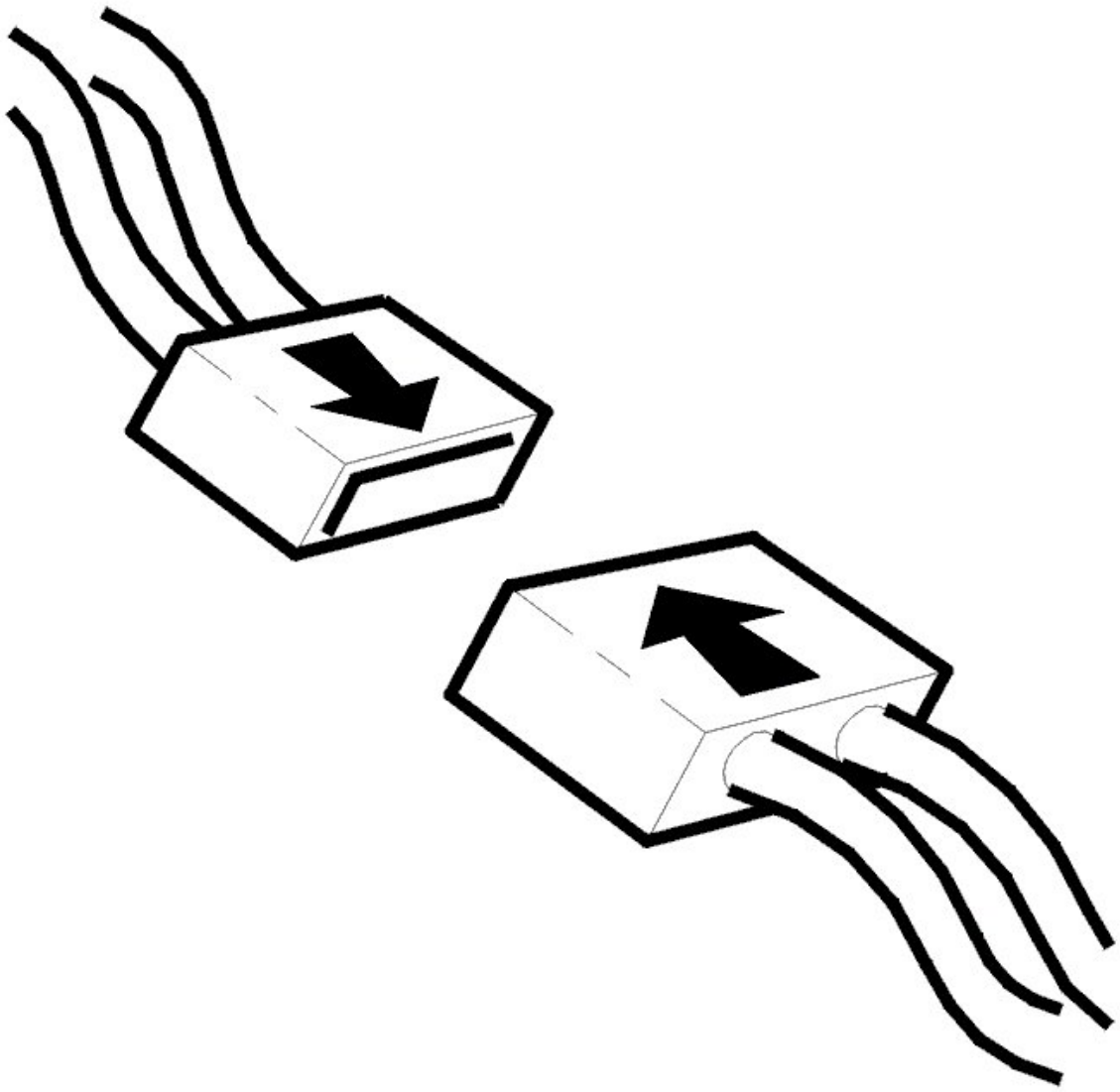
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Shut all the doors. Activate the alarm. Wait 25 seconds until the car is alarmed
- Then deactivate the alarm
- Read off diagnostic trouble codes (DTCs).

Check if the status of the diagnostic trouble code (DTC) is intermittent.

Is the status intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

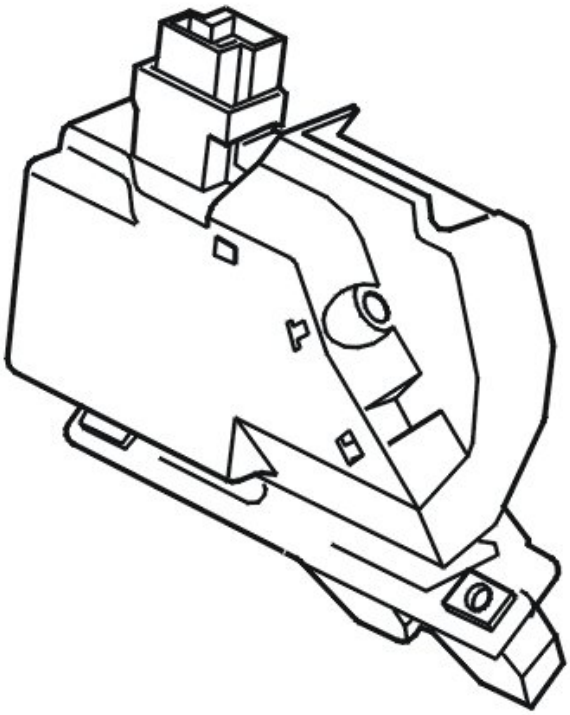
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking cable and component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-6F51

Condition



The rear electronic module (REM) is grounded when a switch on the tailgate is pushed in.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the switch on the tailgate has been activated for more than 20 seconds.

Substitute value
- None.

Possible source
- The switch for the tailgate has stuck in the activated position
- Short-circuit to ground in the cable for the tailgate switch.

Fault symptom[s]

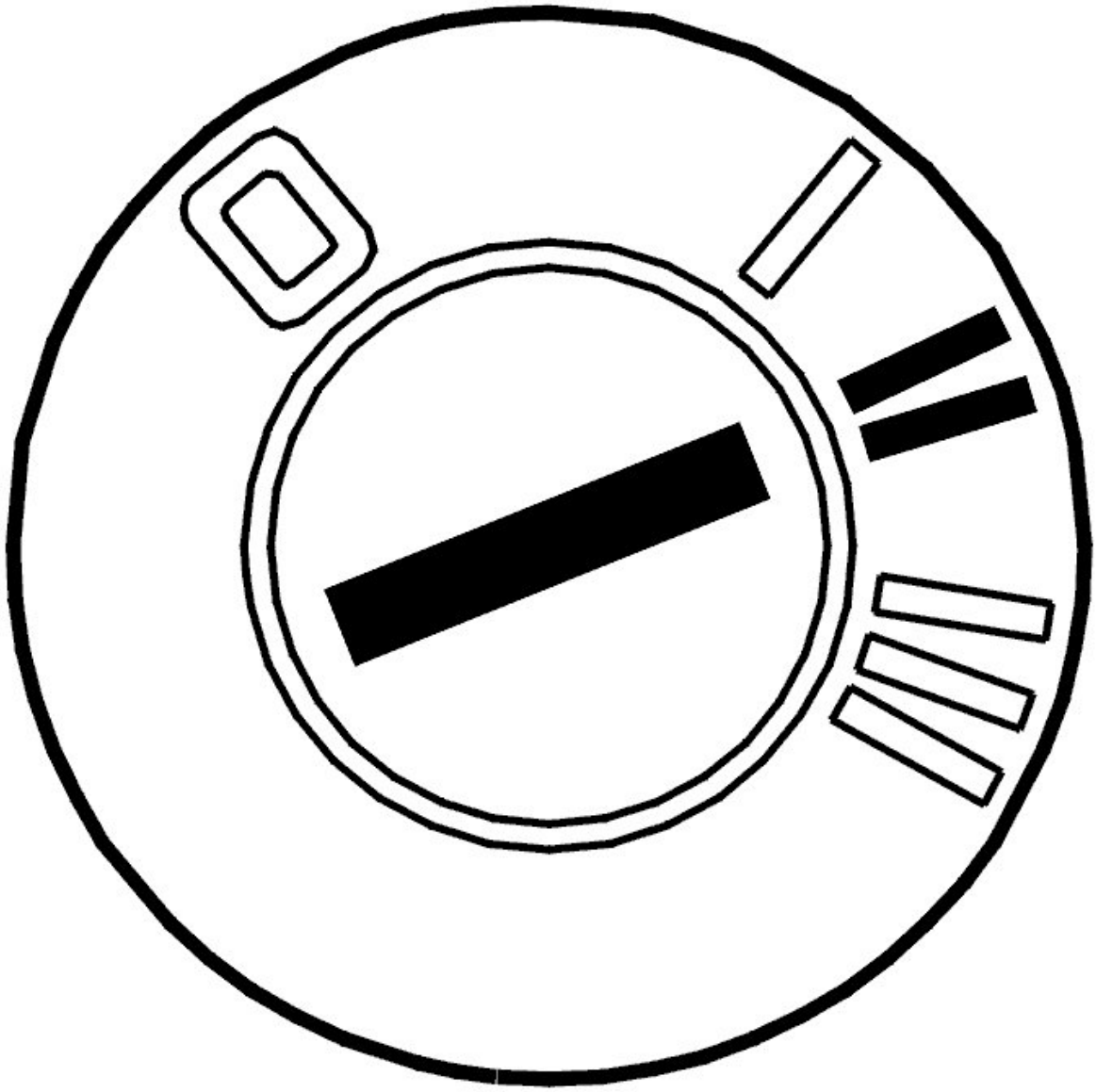
- No locking/unlocking of the tailgate.

Signal Too Low

Signal too low

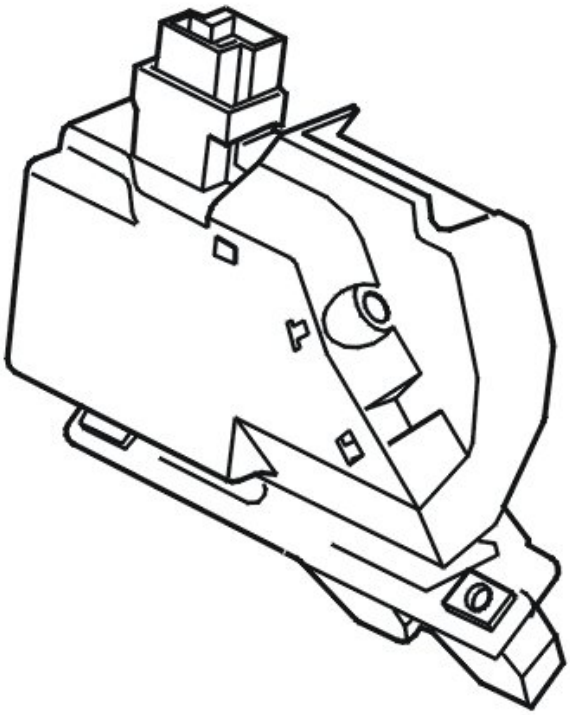
Checking the signal from the trunk lid handle

Note! Only applies to 4-door cars.



- Ignition on
- Read off the status from the trunk lid handle. Open and close the trunk lid using the handle.

The status should alternate as the handle is affected.
The fault is permanent if the status does not change.
If the status changes, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.



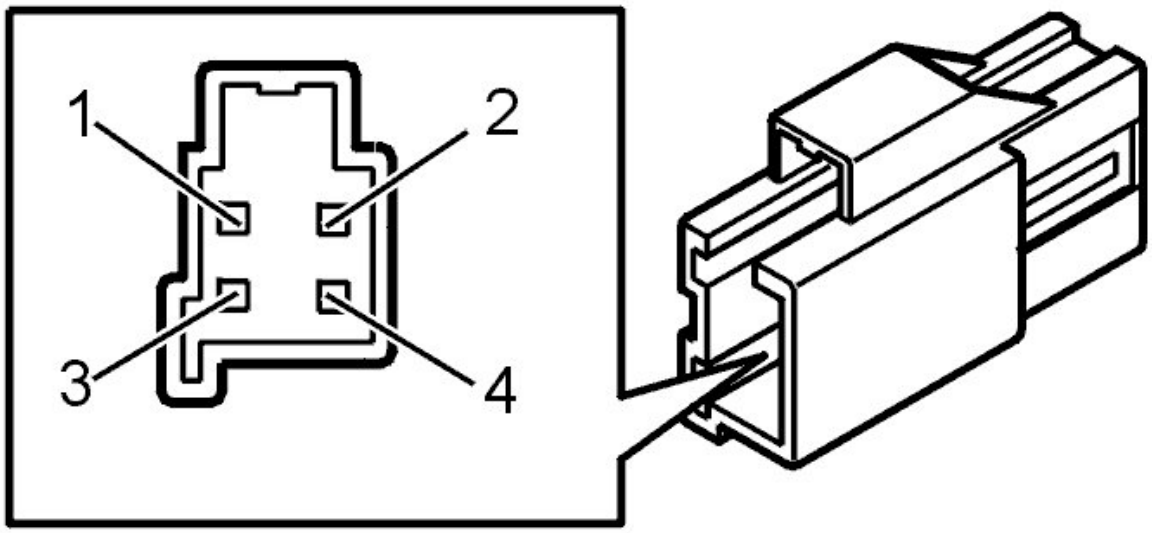
Continue - Checking cable and component

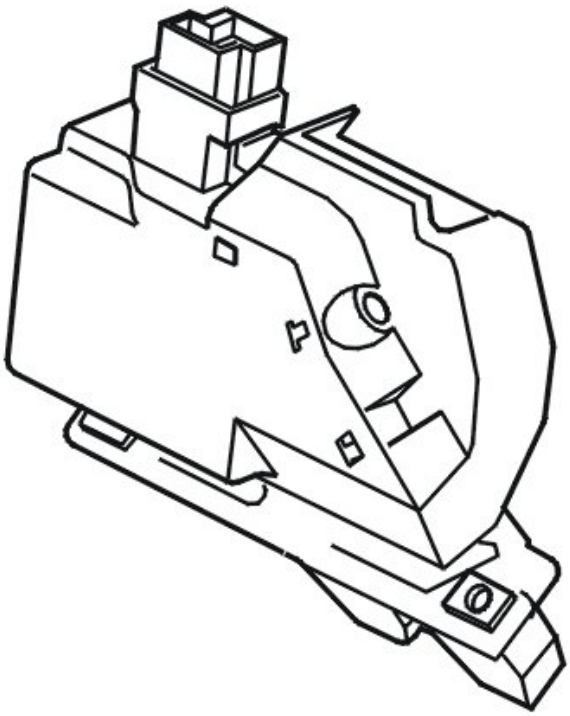
Checking cable and component

Disconnect the connector from the lamp housing for the license plate lighting. Check that the button has not stuck in the pressed in position. Check that there is not a short-circuit in the contact breaker for the switch by taking a reading between terminal #1 and ground.
Check the resistance between terminals #1 and #3 on the switch. The resistance must be infinite or near 0 ohm depending on the position of the switch.
Check the signal cable between terminal #43 (#F3) on the connector for the rear electronic module (REM) and terminal #1 on the connector for the lamp housing for the license plate lighting. Check for a short-circuit to ground.
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Disconnecting the rear electronic module (REM): Integrated relay / fusebox cargo compartment / rear electronic module, replacing See: Maintenance/Fuses and Circuit Breakers/Fuse Block/Service and Repair/Integrated Relay/Fusebox Cargo Compartment/Rear Electronic Module (REM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





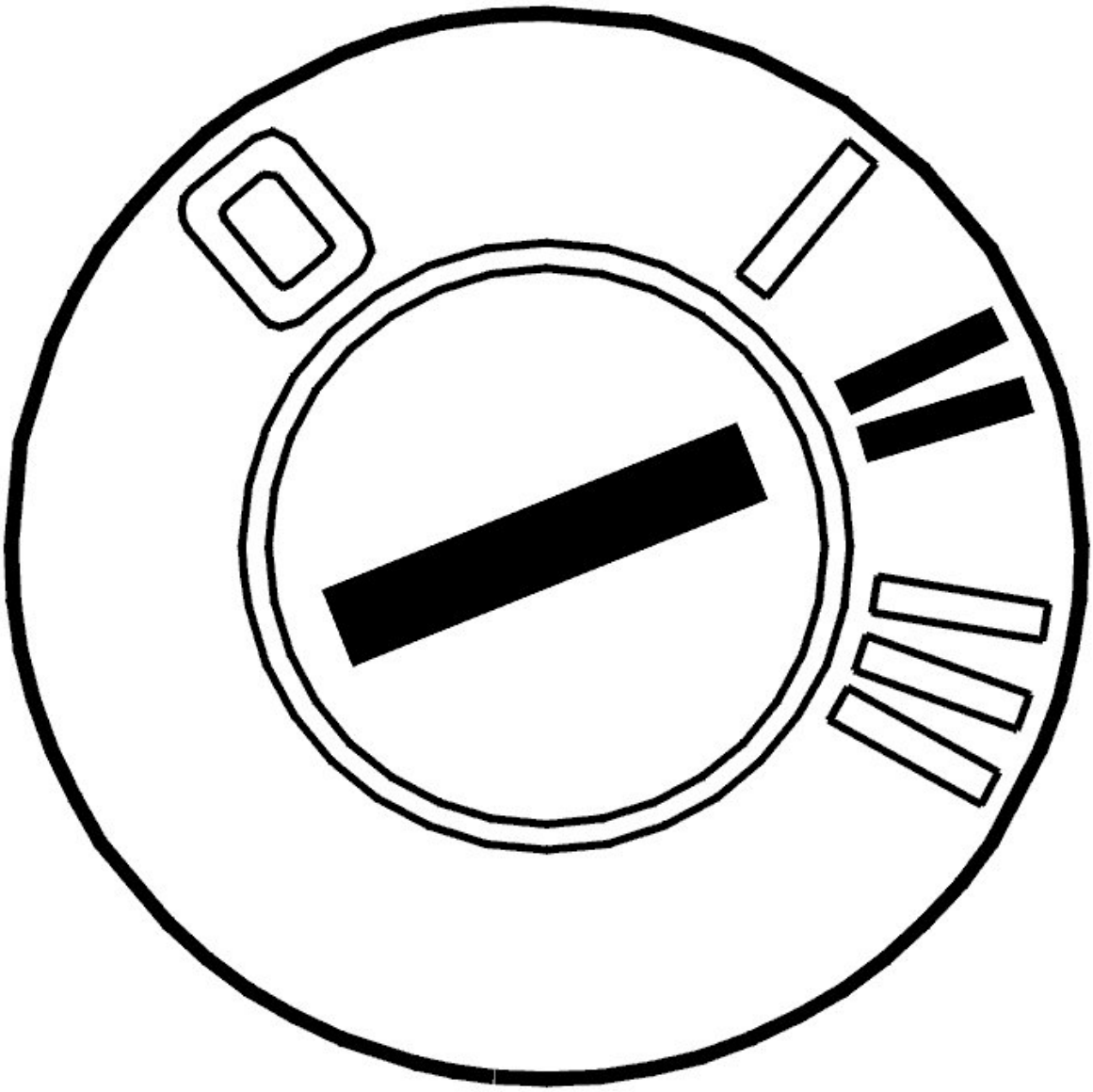
Continue - Verification

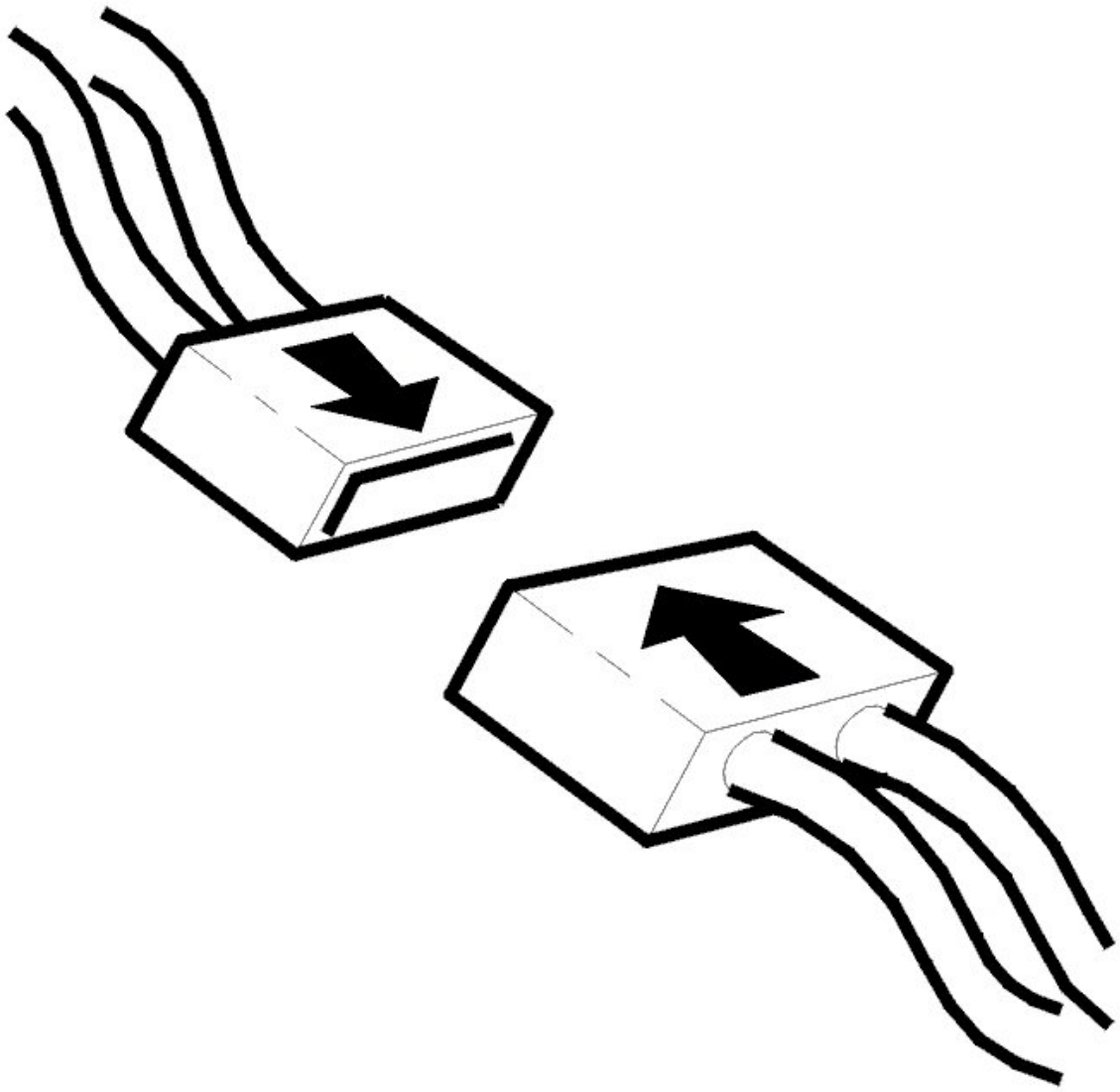
Verification

Verification

Verification

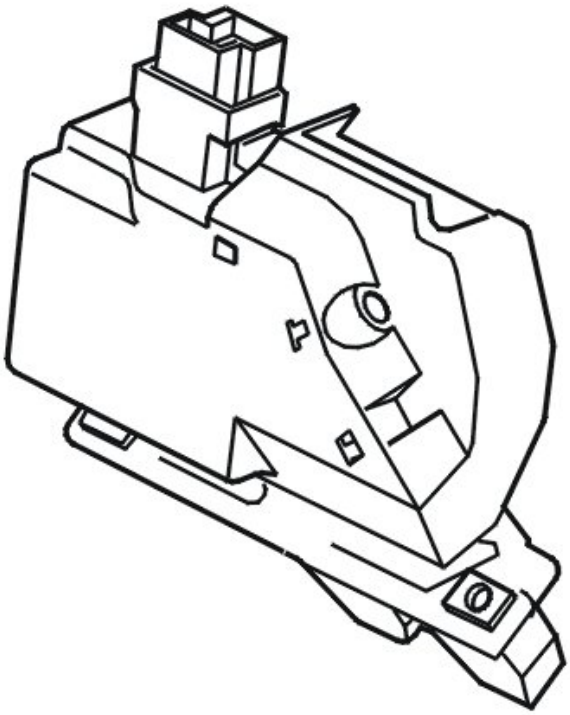
Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the status from the trunk lid handle. Open and close the trunk lid using the handle.

The status should alternate as the handle is affected.



Is the status OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the signal from the trunk lid handle

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8B01

Condition

The rear electronic module (REM) powers the right-hand parking lamp directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

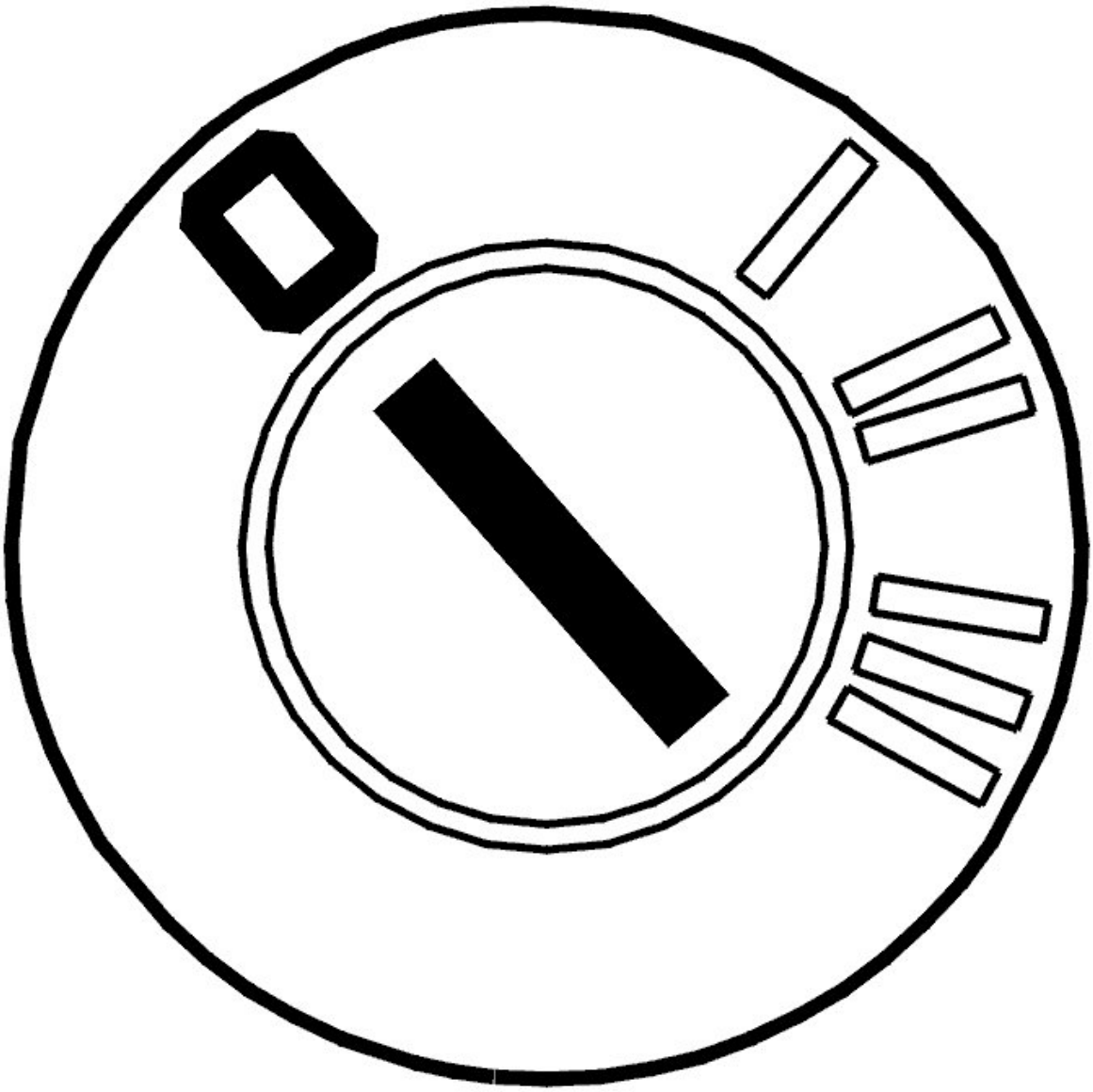
Possible source
- Short-circuit to ground in the signal cable.

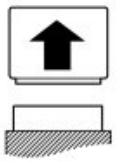
Fault symptom[s]
- The parking lamps do not operate.

Signal Too Low

Signal too low

Checking the wiring





- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For the S60

Take readings between:

- Rear electronic module (REM) terminal #D5 (#5) and terminal #B1 on the connector for the rear left-hand lamp housing
- Terminal #B1 on the connector for the rear left-hand lamp housing and terminal #B3 on the connector for the rear right-hand lamp housing.

For S80

Take readings between:

- Rear electronic module (REM) terminal #D5 (#5) and terminal #4 on the connector for the rear right-hand lamp housing.

For the V70

Take readings between:

- Rear electronic module (REM) terminal #D5 (#5) and terminal #A1 on the connector for the rear left-hand lamp housing
- Terminal #A1 on the connector for the rear left-hand lamp housing and terminal #A5 on the connector for the rear right-hand lamp housing.

For the XC90

Take readings between:

- Rear electronic module (REM) terminal #D5 (#5) and terminal #A1 on the connector for the rear right-hand lamp housing.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

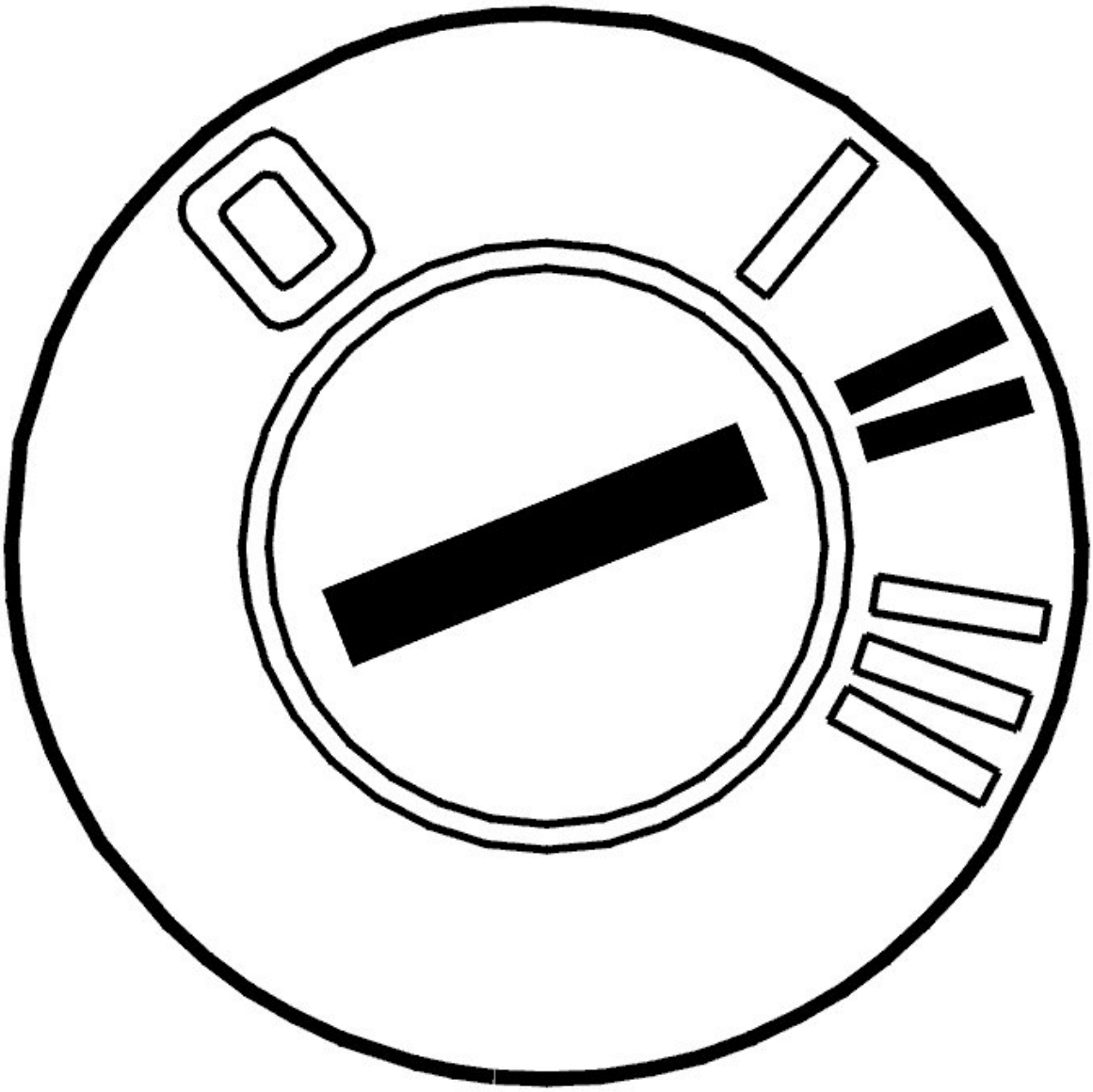
Continue - Verification

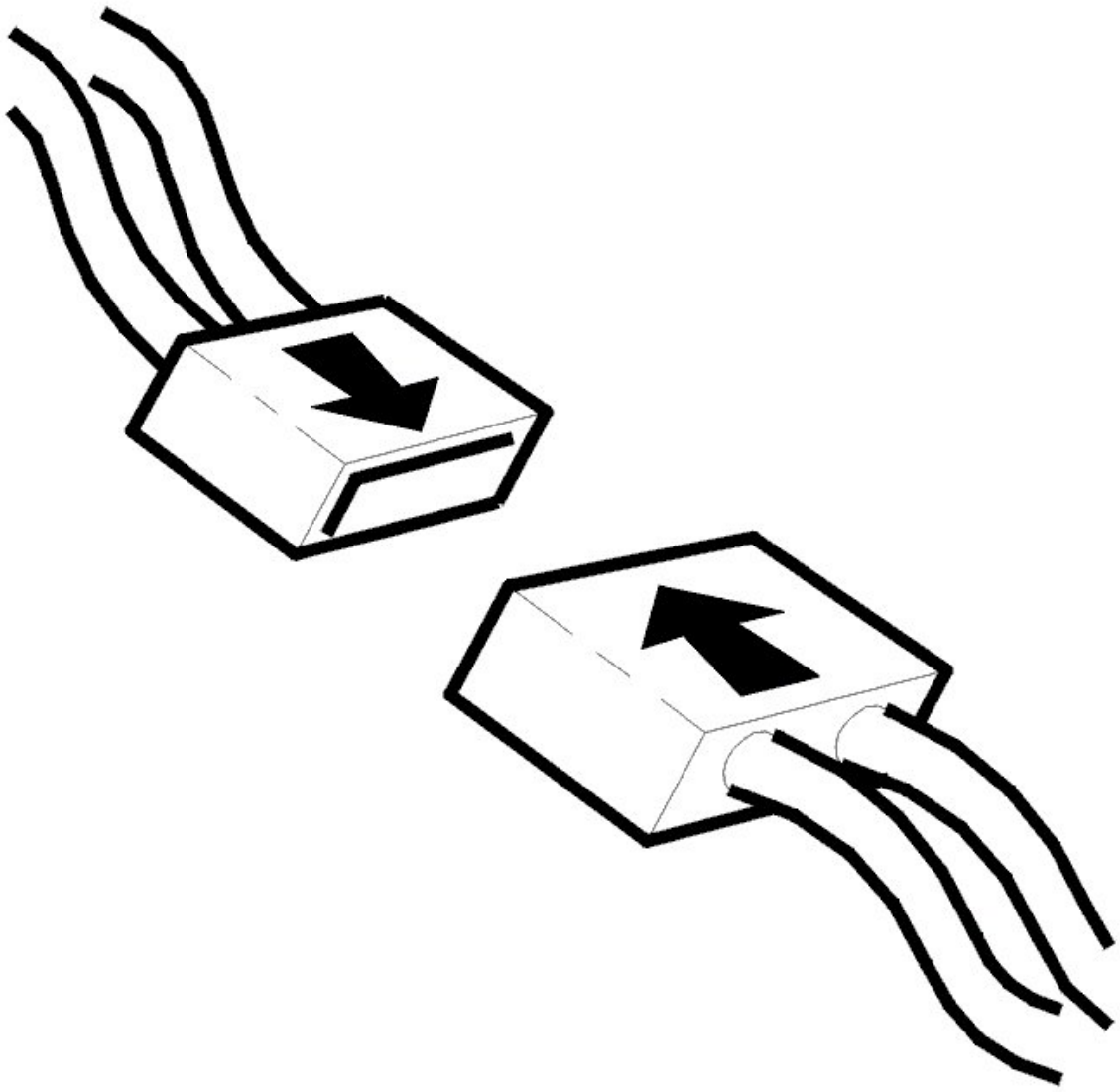
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the parking lamp.
Check that the parking lamp is activated.

Is the parking lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8B11

Condition

The rear electronic module (REM) powers the left-hand parking lamp directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

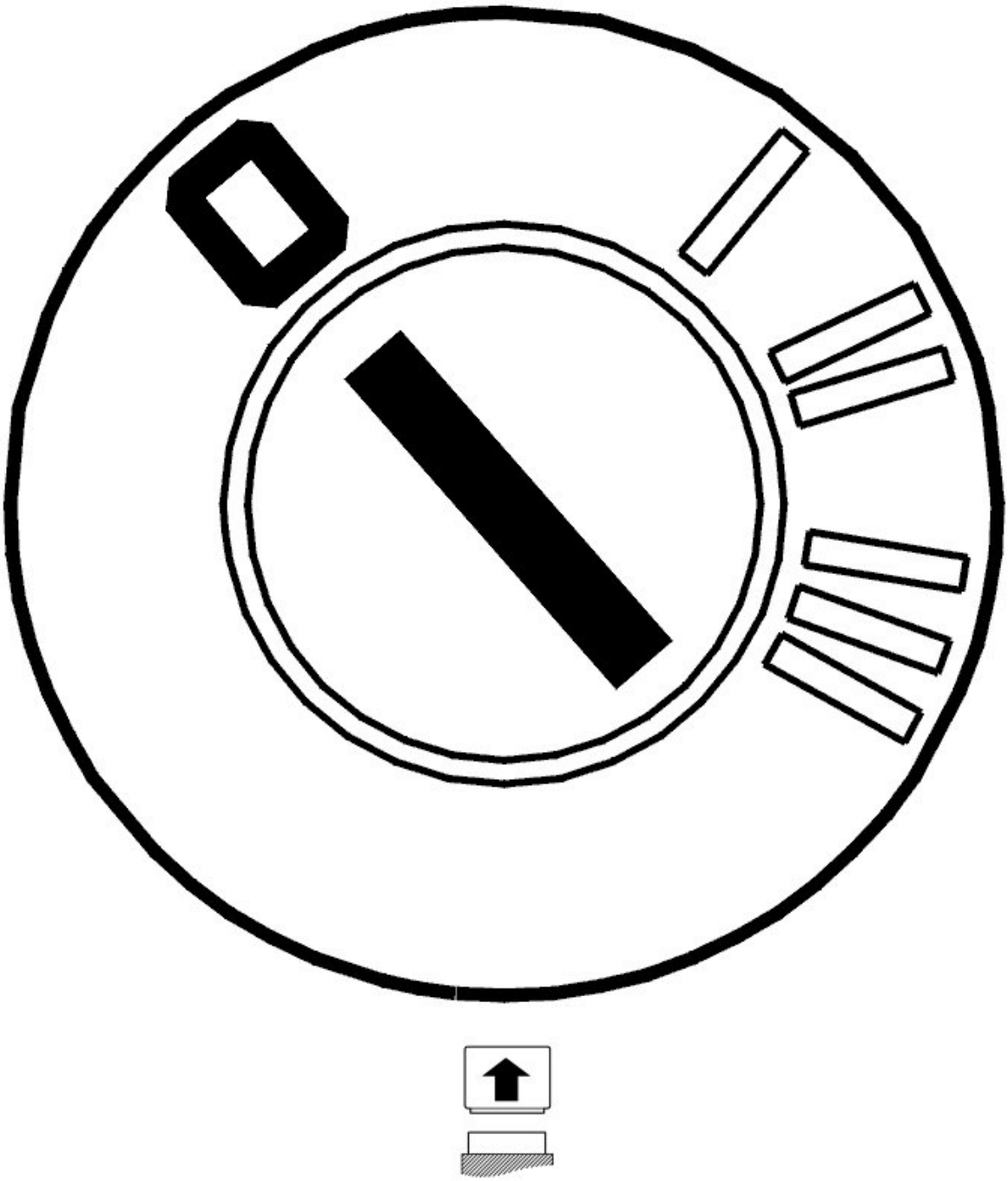
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The parking lamps do not operate.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For the S60

Take readings between:

- Rear electronic module (REM) terminal #D6 (#6) and terminal #B1 on the connector for the rear left-hand lamp housing
- Terminal #B1 on the connector for the rear left-hand lamp housing and terminal #B3 on the connector for the rear right-hand lamp housing.

For S80

Take readings between:

- Rear electronic module (REM) terminal #D6 (#6) and terminal #4 on the connector for the rear left-hand lamp housing.

For the V70

Take readings between:

- Rear electronic module (REM) terminal #D6 (#6) and terminal #A1 on the connector for the rear left-hand lamp housing
- Terminal #A1 on the connector for the rear left-hand lamp housing and terminal #A5 on the connector for the rear right-hand lamp housing.

For the XC90

Take readings between:

- Rear electronic module (REM) terminal #D6 (#6) and terminal #A1 on the connector for the rear left-hand lamp housing.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

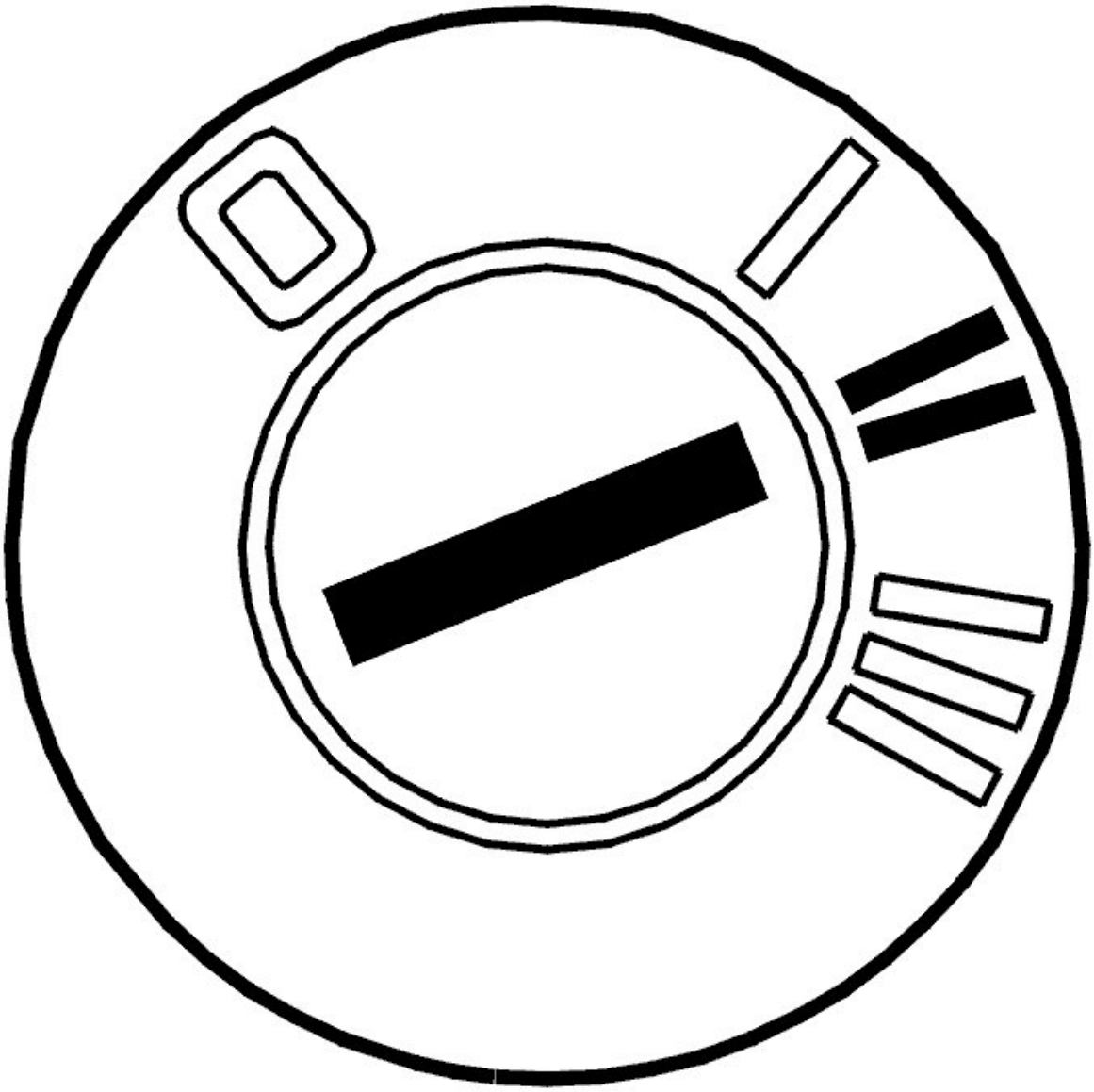
Continue - Verification

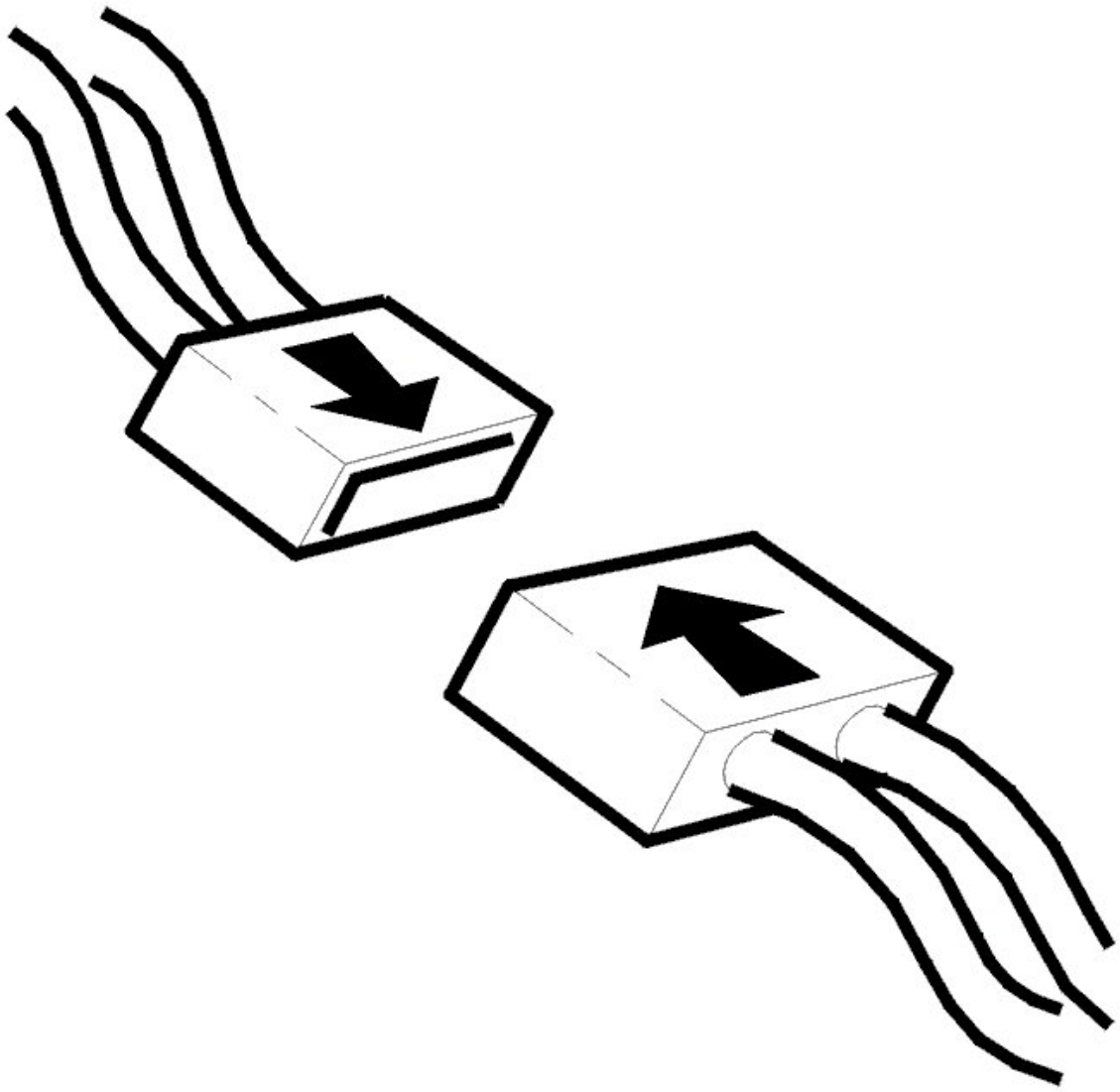
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the parking lamp.
Check that the parking lamp is activated.

Is the parking lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

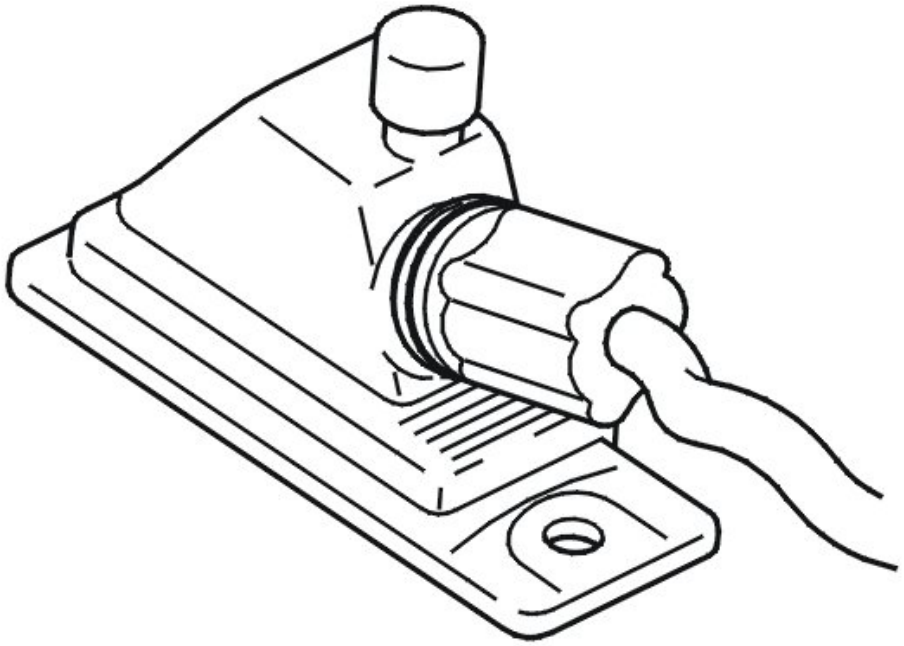
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8B21

Condition



The rear electronic module (REM) powers the license plate lighting directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects a faulty signal.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

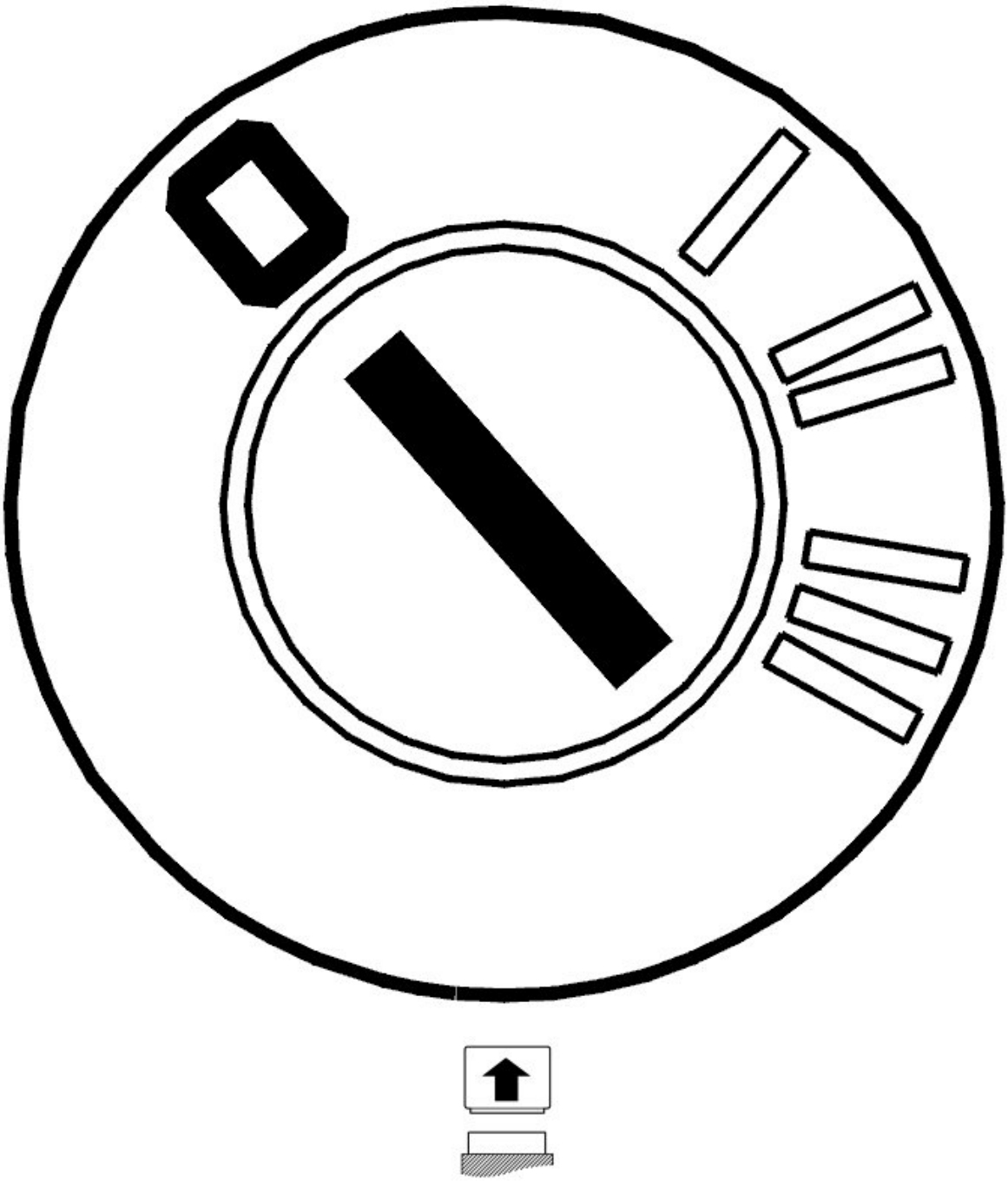
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The license plate lighting does not operate.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector F on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For the S80 and S60

Take readings between:

- Rear electronic module (REM) terminal #F10 (#50) and terminal #2 on the connector for the license plate lighting.

For the V70 and XC90

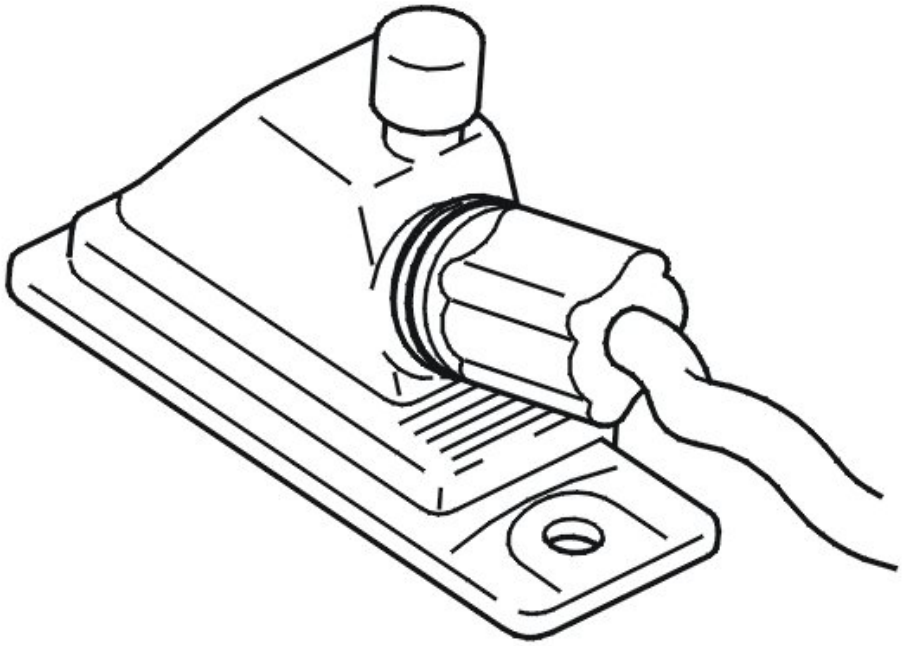
Take readings between:

- Rear electronic module (REM) terminal #F10 (#50) and terminal #1 on the connector for the license plate lighting.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



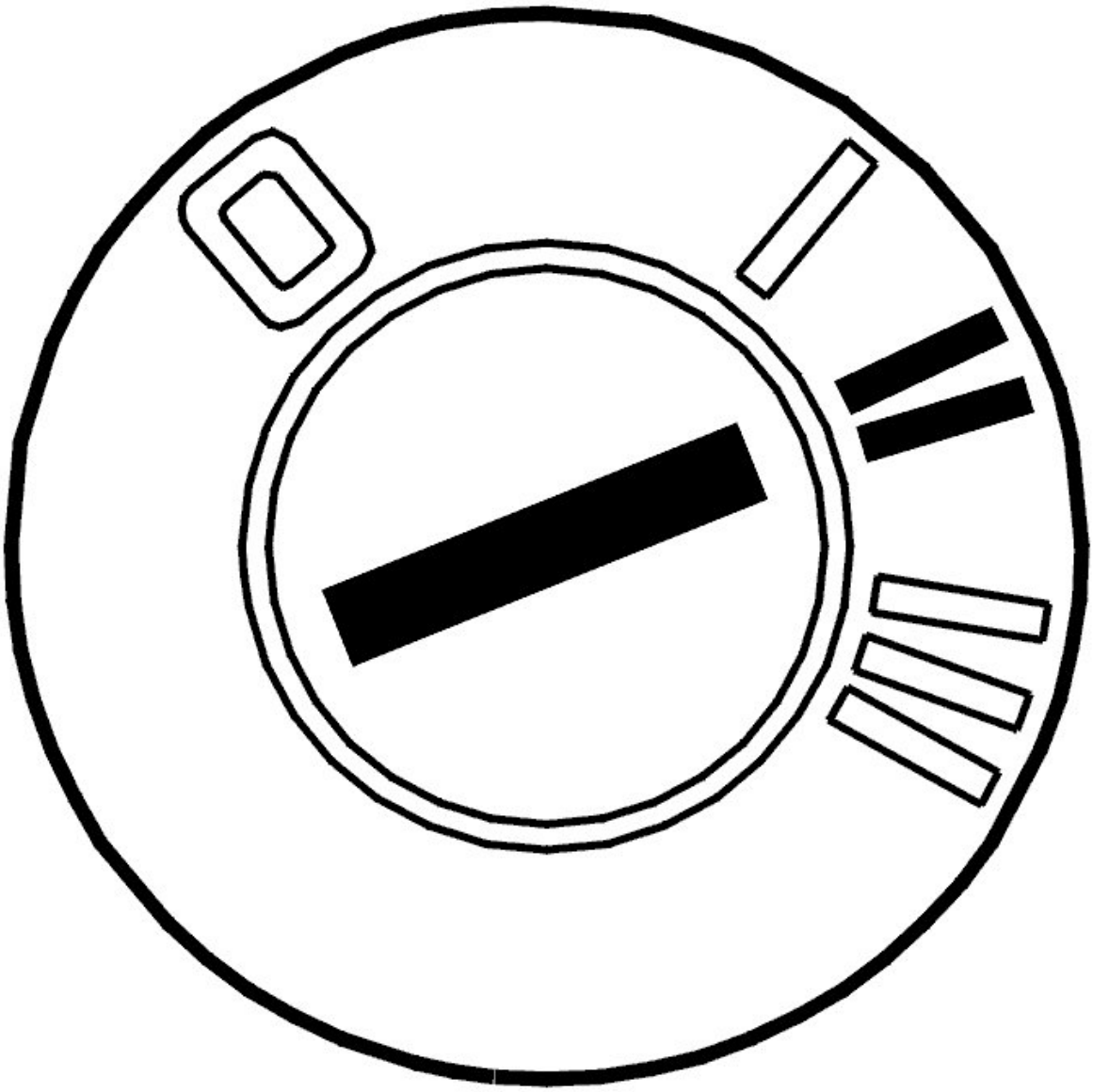
Continue - Verification

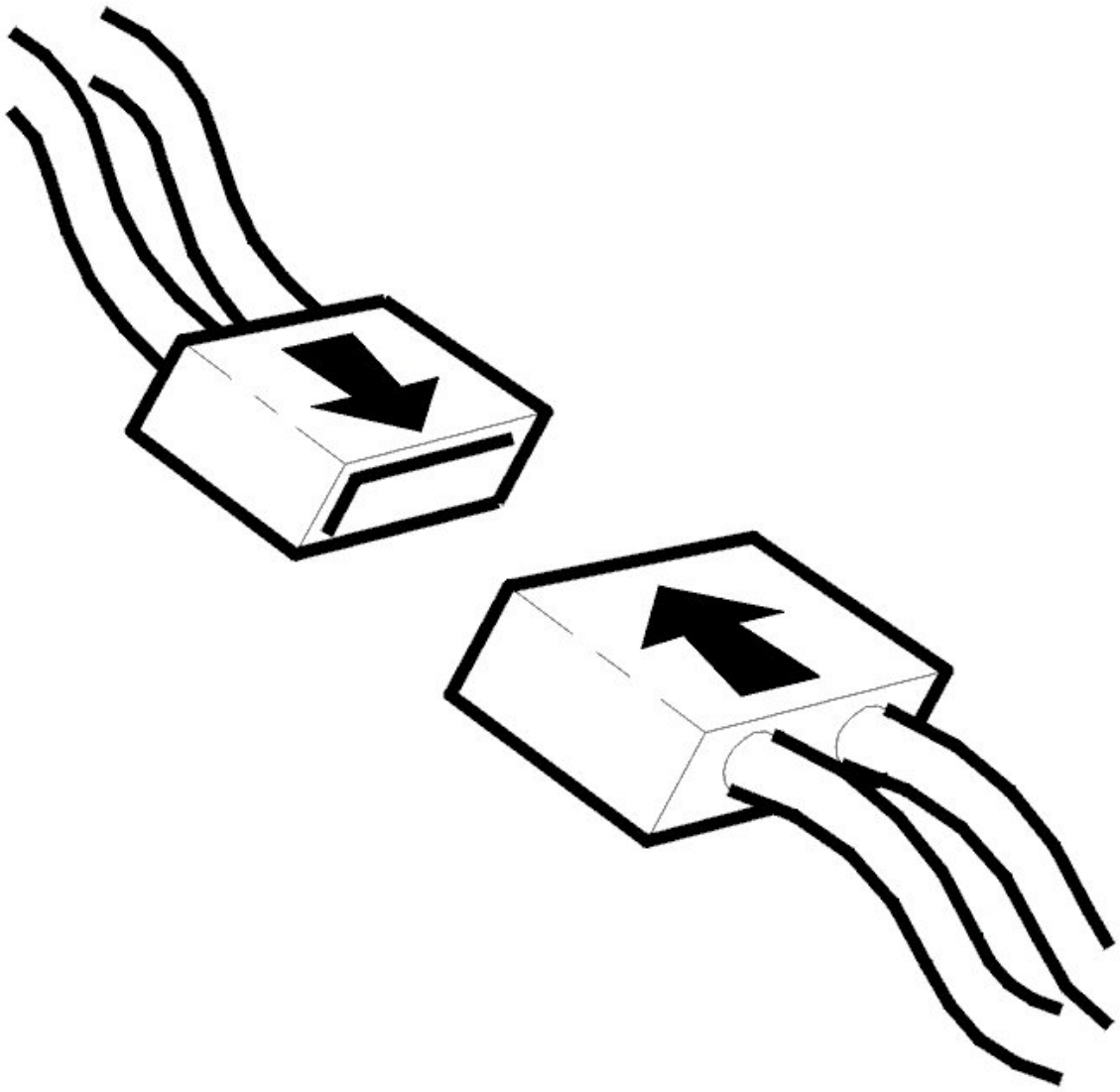
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the parking lamp.
Check that the license plate lighting is activated.

Is the license plate lighting activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8B22

Condition

The rear electronic module (REM) powers the rear parking lamps directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

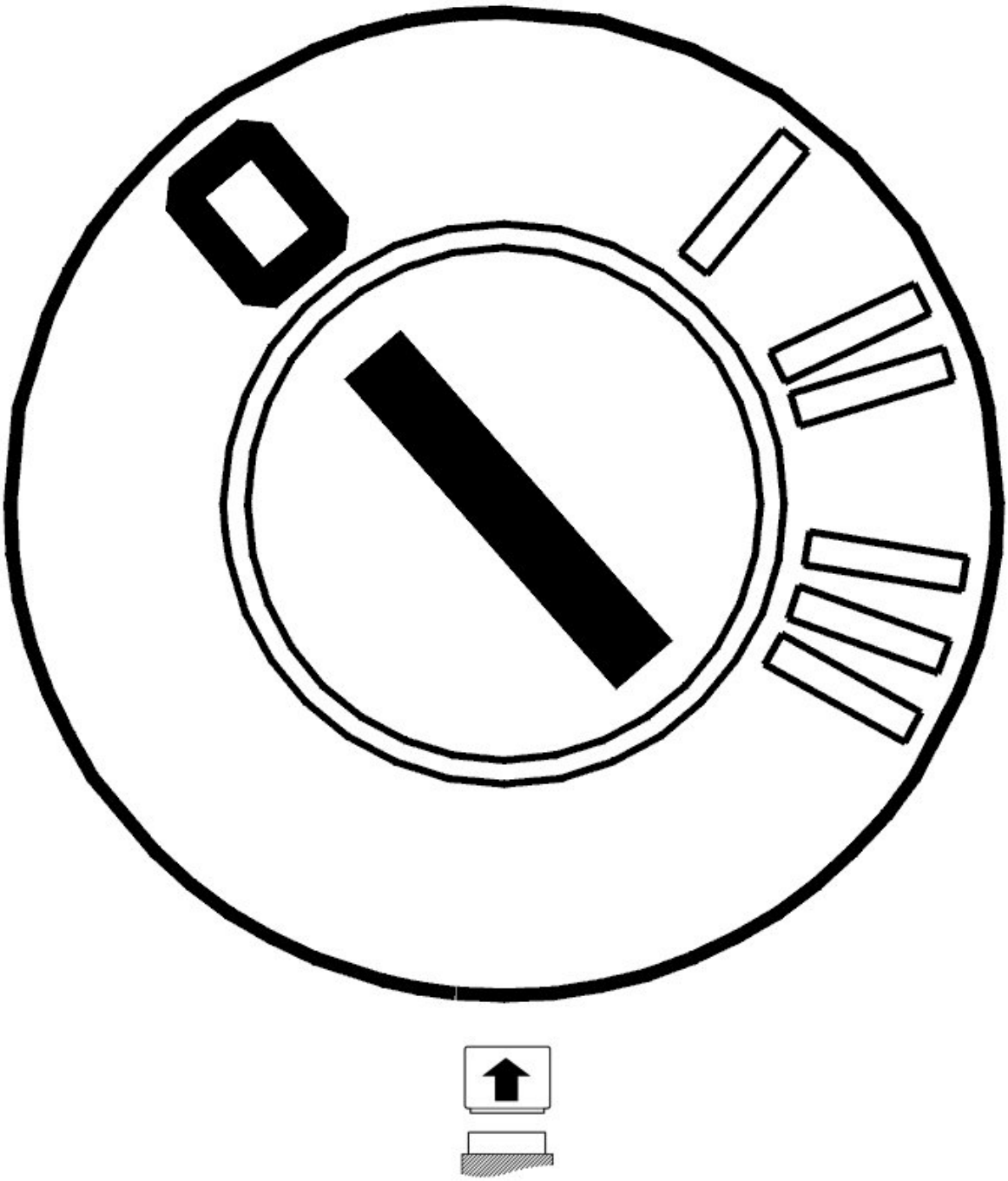
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The parking lamps do not operate.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector D on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For S80

Take readings between:

- Rear electronic module (REM) terminal #D1 (#1) and terminal #1 on the connector for the rear left-hand lamp housing
- Terminal #1 on the connector for the rear left-hand lamp housing and terminal #1 on the connector for the rear right-hand lamp housing.

For the S60

Take readings between:

- Rear electronic module (REM) terminal #D1 (#1) and terminal #A1 on the connector for the rear left-hand lamp housing
- Terminal #A1 on the connector for the rear left-hand lamp housing and terminal #A1 on the connector for the rear right-hand lamp housing.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

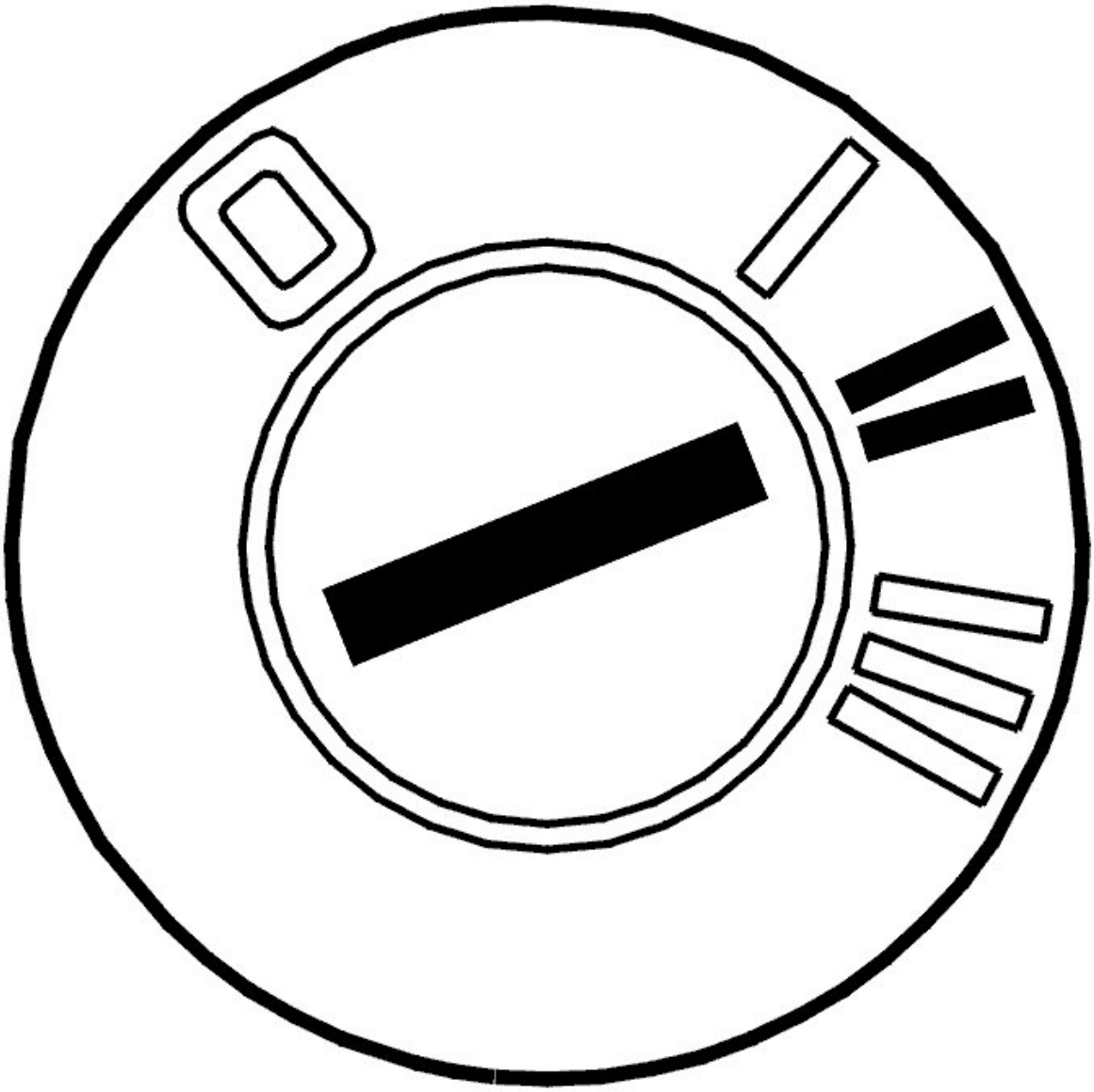
Continue - Verification

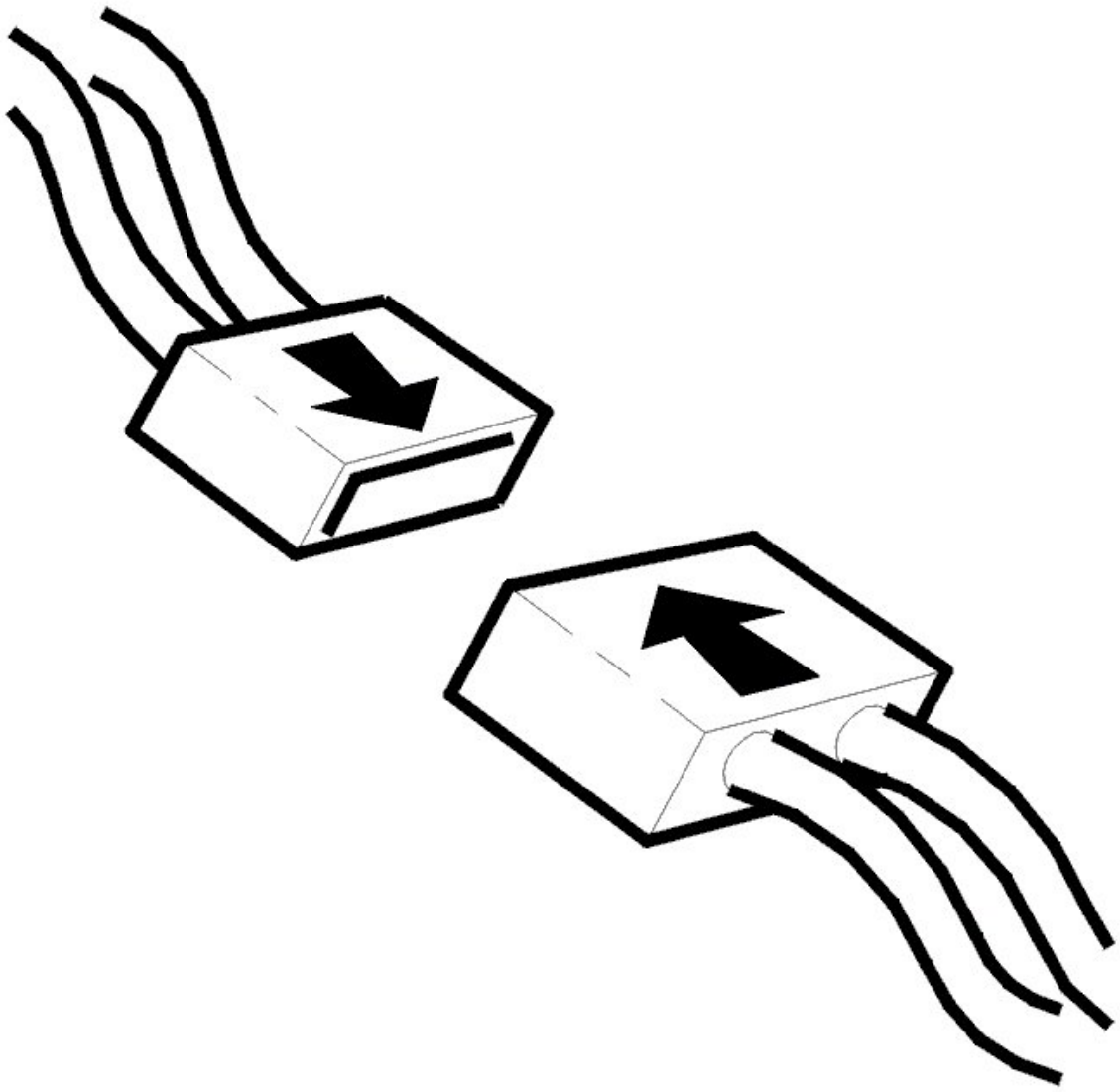
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the parking lamp.
Check that the parking lamp is activated.

Is the parking lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

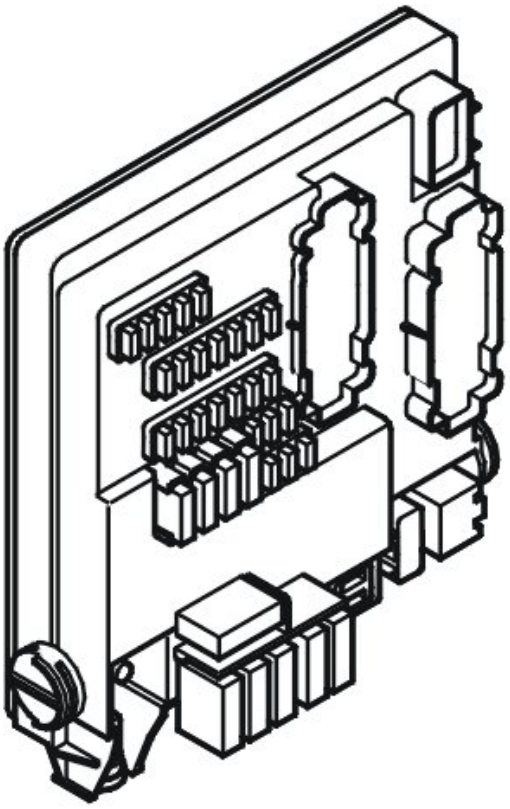
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8C21

Condition



The rear electronic module (REM) powers the rear fog lamps directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) detects a faulty signal.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

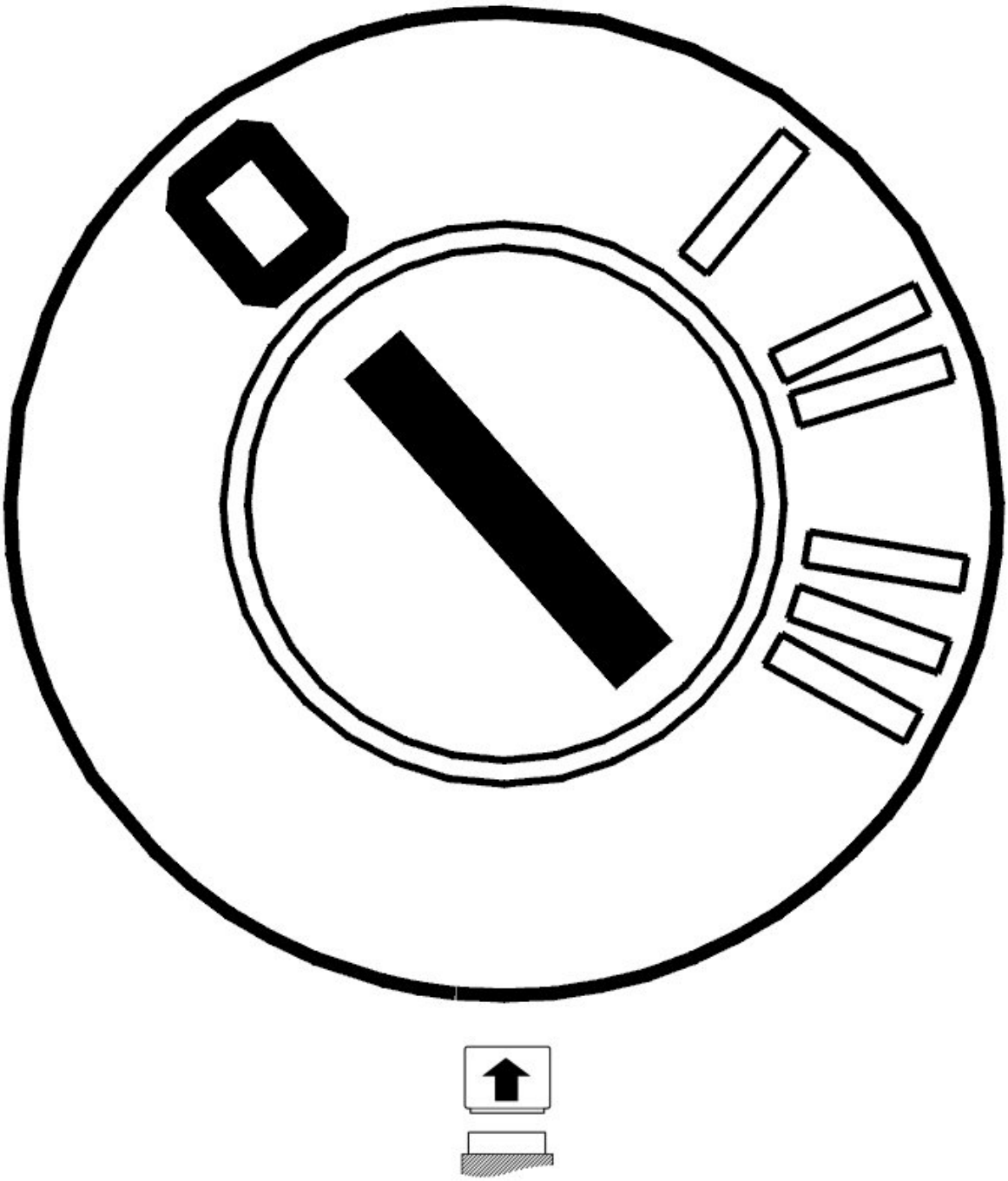
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The rear fog lamp does not work.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connector B on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For S80

Take readings between:

- Rear electronic module (REM) terminal #B4 (#4) and terminal #2 on the connector for the rear left-hand lamp housing
- Terminal #2 on the connector for the rear left-hand lamp housing and terminal #2 on the connector for the rear right-hand lamp housing.

For the S60

Take readings between:

- Rear electronic module (REM) terminal #B4 (#4) and terminal #B2 on the connector for the rear left-hand lamp housing
- Terminal #B2 on the connector for the rear left-hand lamp housing and terminal #B2 on the connector for the rear right-hand lamp housing.

For the V70, XC70 and XC90

Take readings between:

- Rear electronic module (REM) terminal #B4 (#4) and terminal #A3 on the connector for the rear left-hand lamp housing
- Terminal #A3 on the connector for the rear left-hand lamp housing and terminal #A3 on the connector for the rear right-hand lamp housing.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

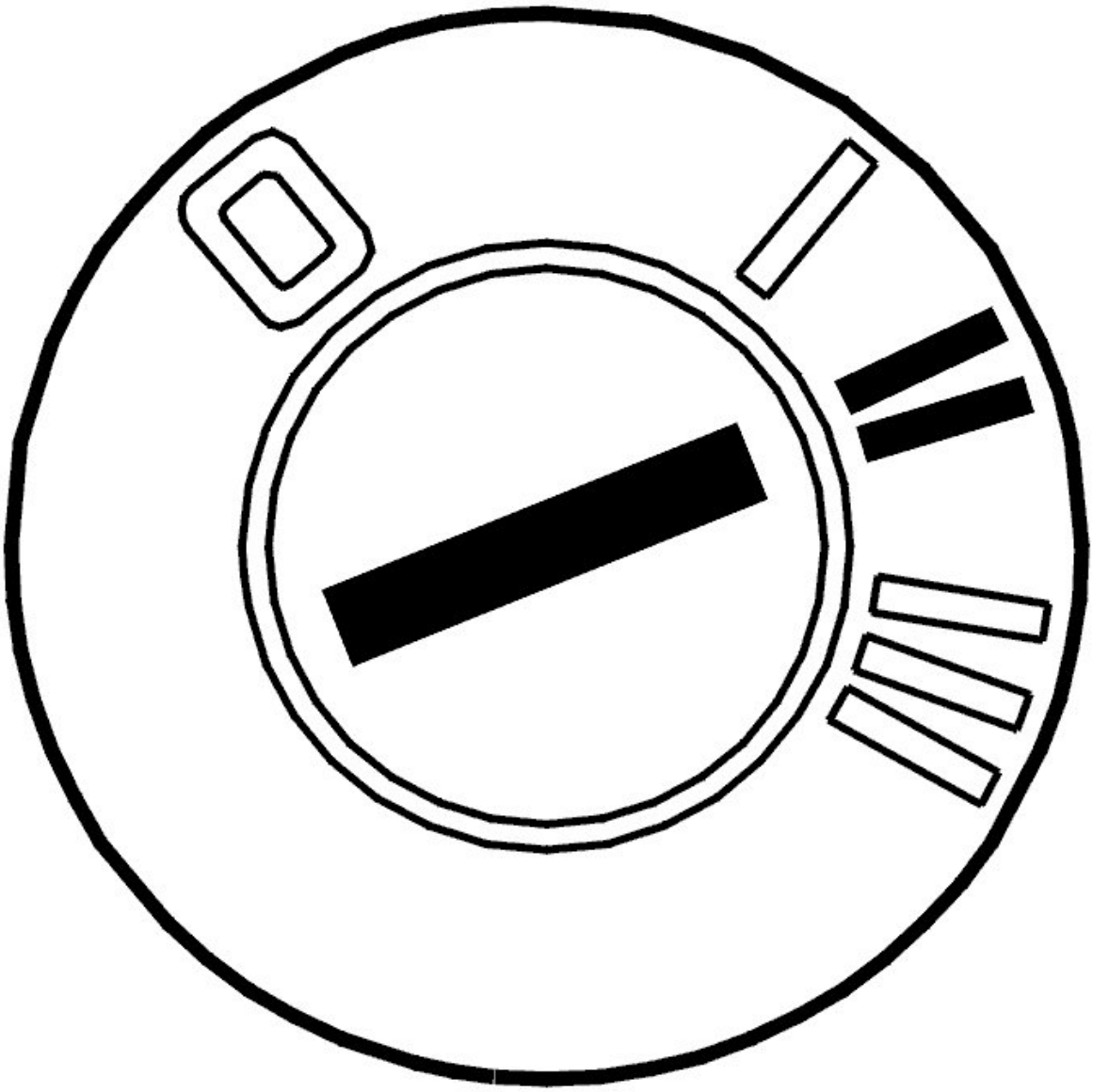
Continue - Verification

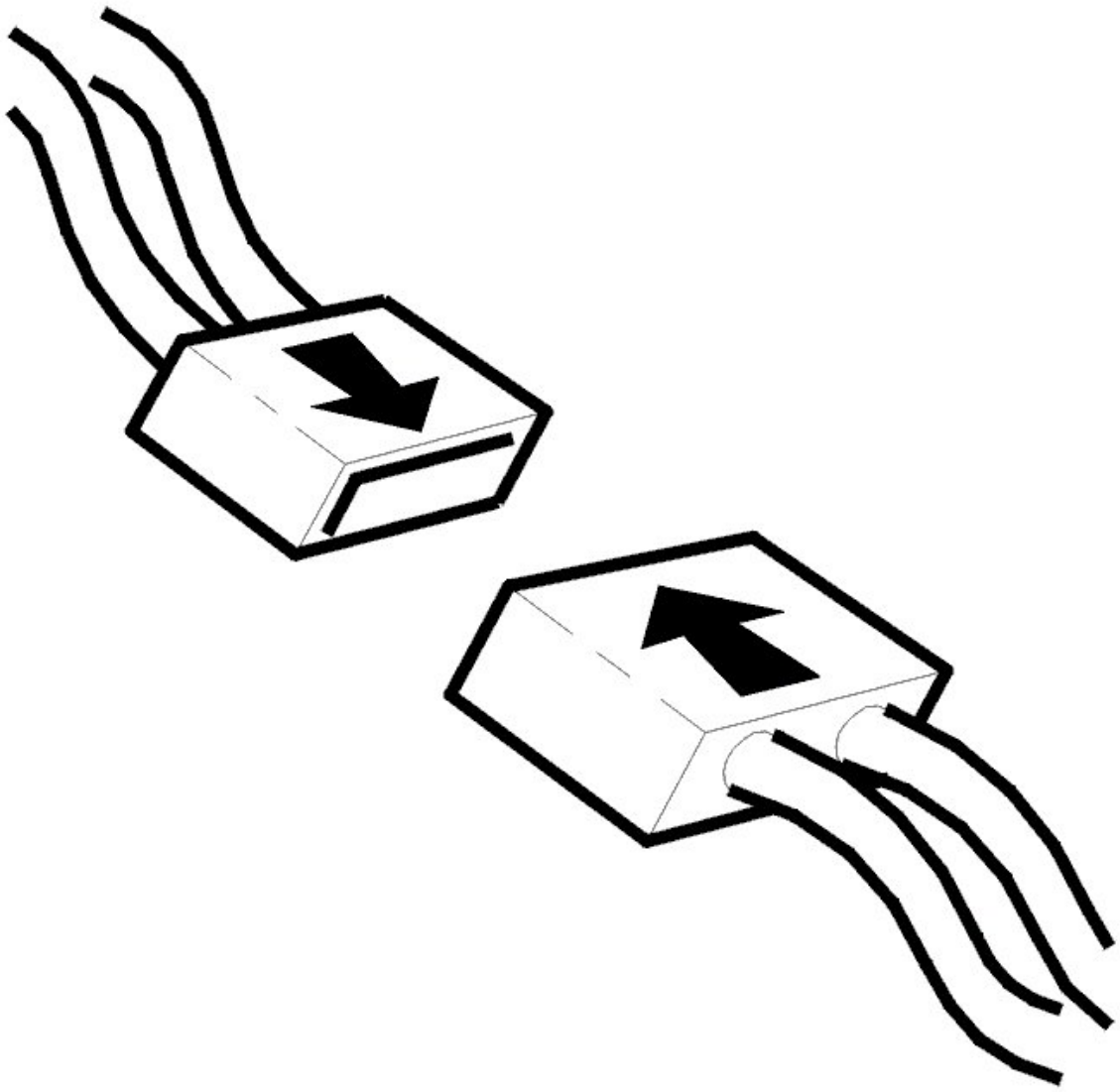
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the rear fog lamp.
Check that the rear fog lamp is activated.

Is the rear fog lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

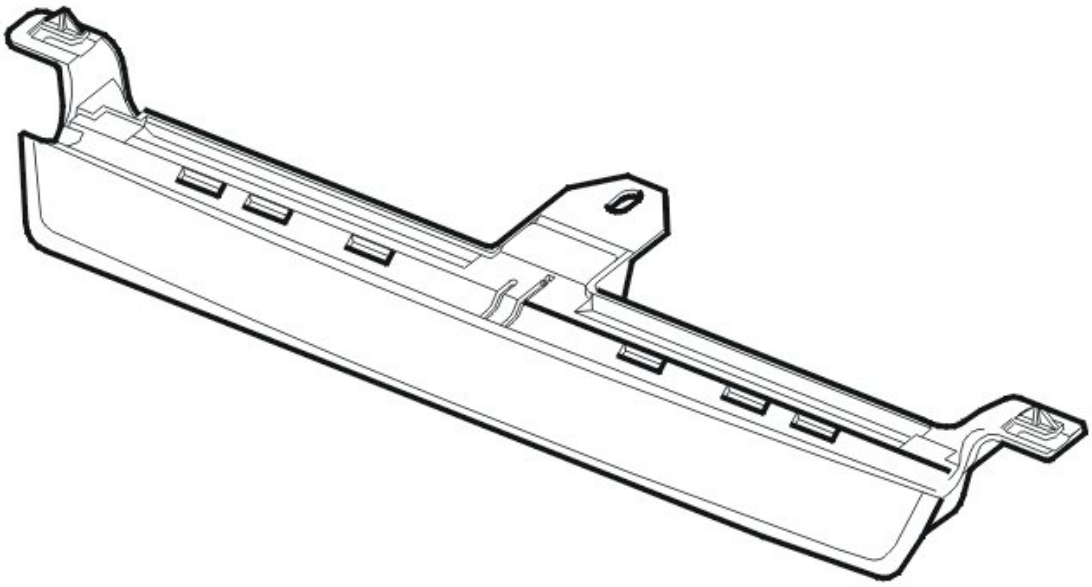
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8D11

Condition



The rear electronic module (REM) powers the high level stop lamps directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

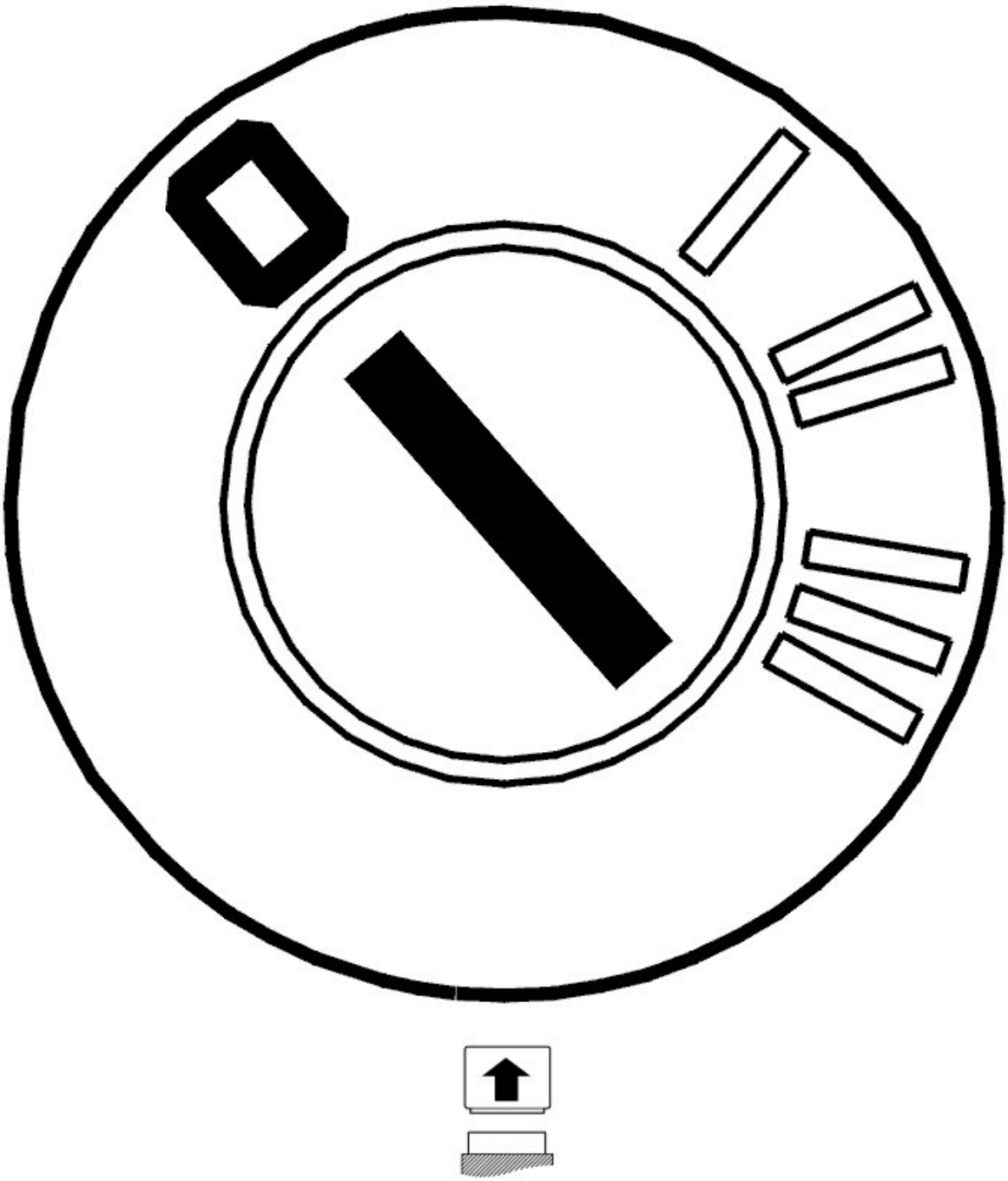
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The stop lamp does not light when the brake pedal is depressed.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connectors A and F on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For the S80 and S60

Take readings between:

- Rear electronic module (REM) terminal #A6 (#6) and terminal #1 on the connector for the high level stop lamp.

For the V70, XC70 and XC90

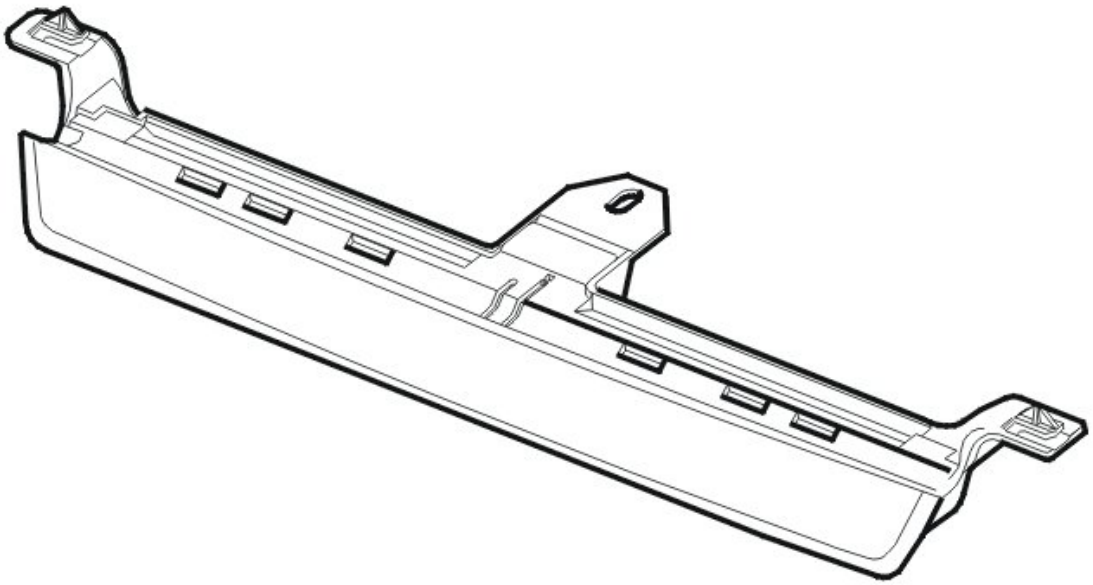
Take readings between:

- Rear electronic module (REM) terminal #F4 (#44) and terminal #1 on the connector for the high level stop lamp.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



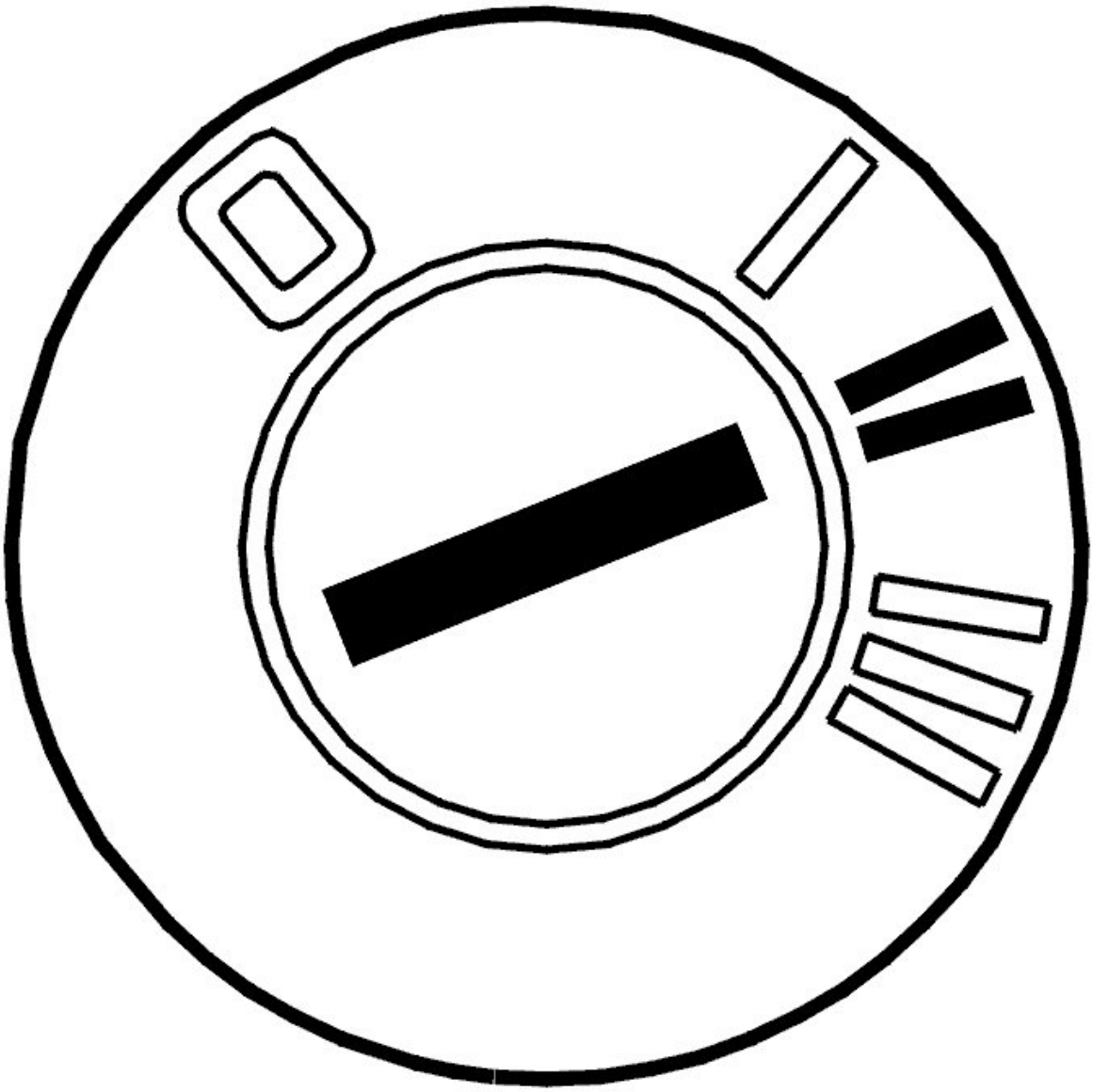
Continue - Verification

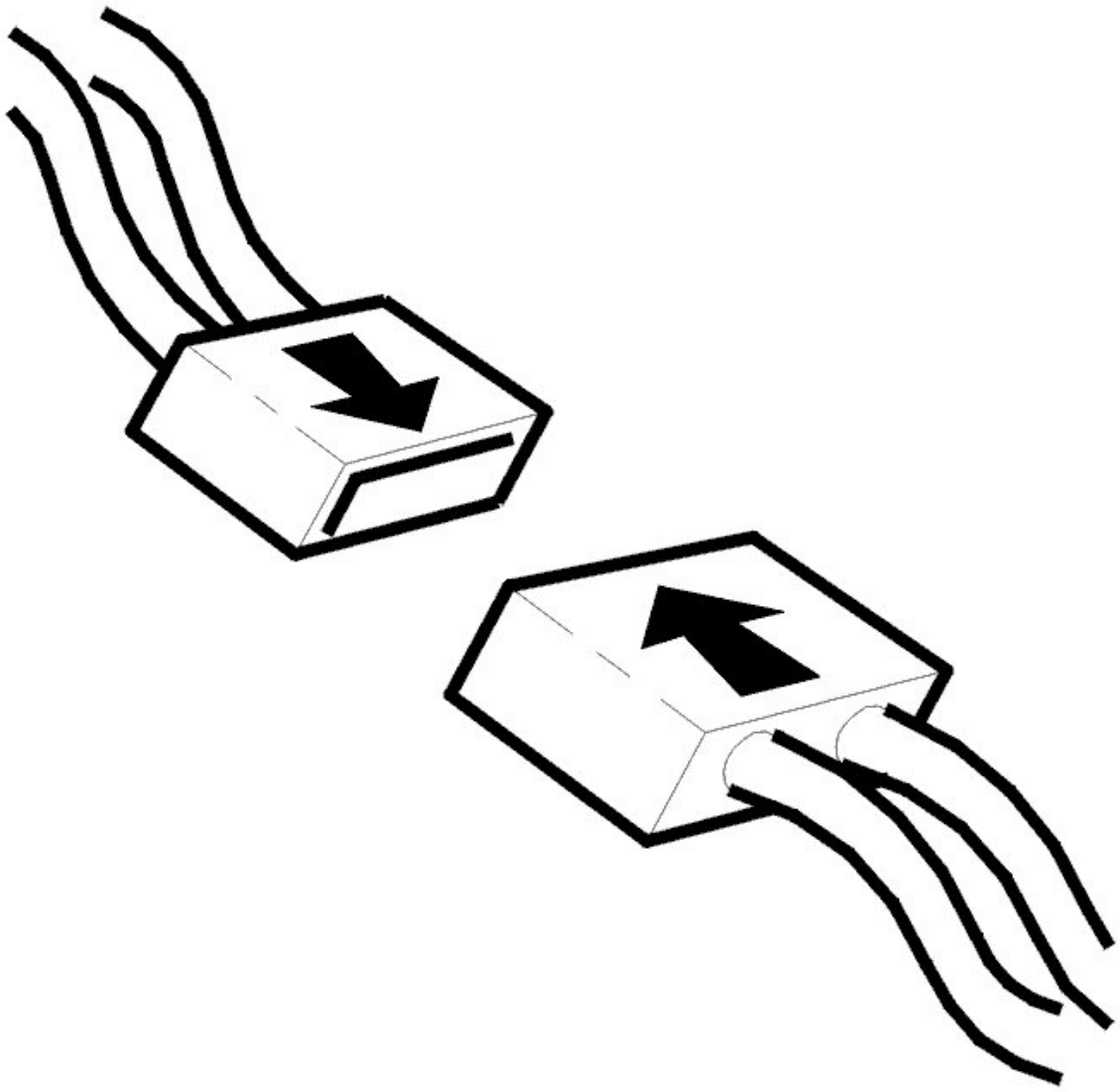
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the stop lamps.

Check that the stop lamps are working.

Are the stop lamps working?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

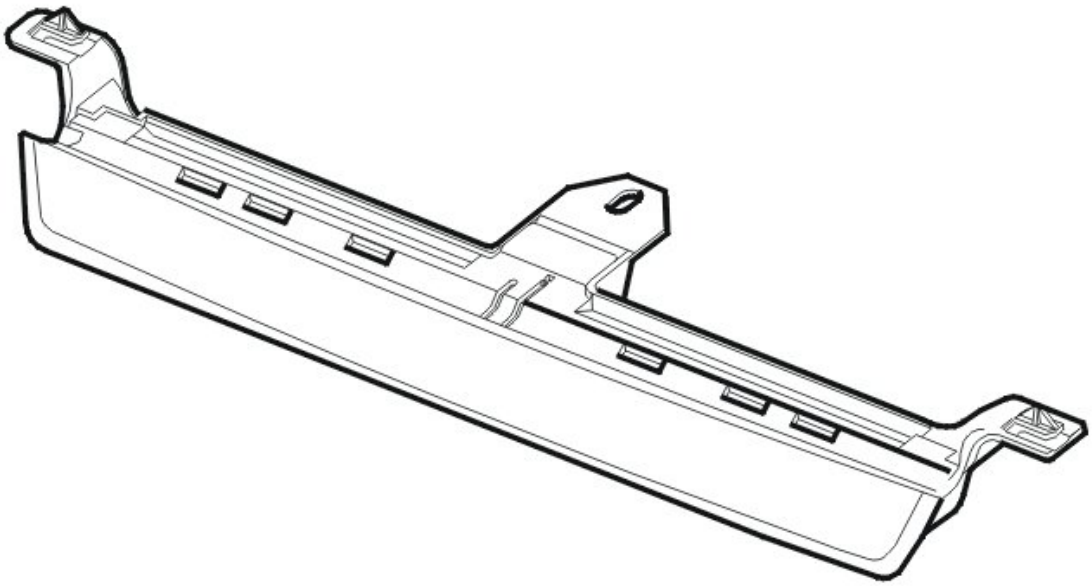
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8D12

Condition



The rear electronic module (REM) powers the high level stop lamps directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too high.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable
- High brake light not installed/damaged.

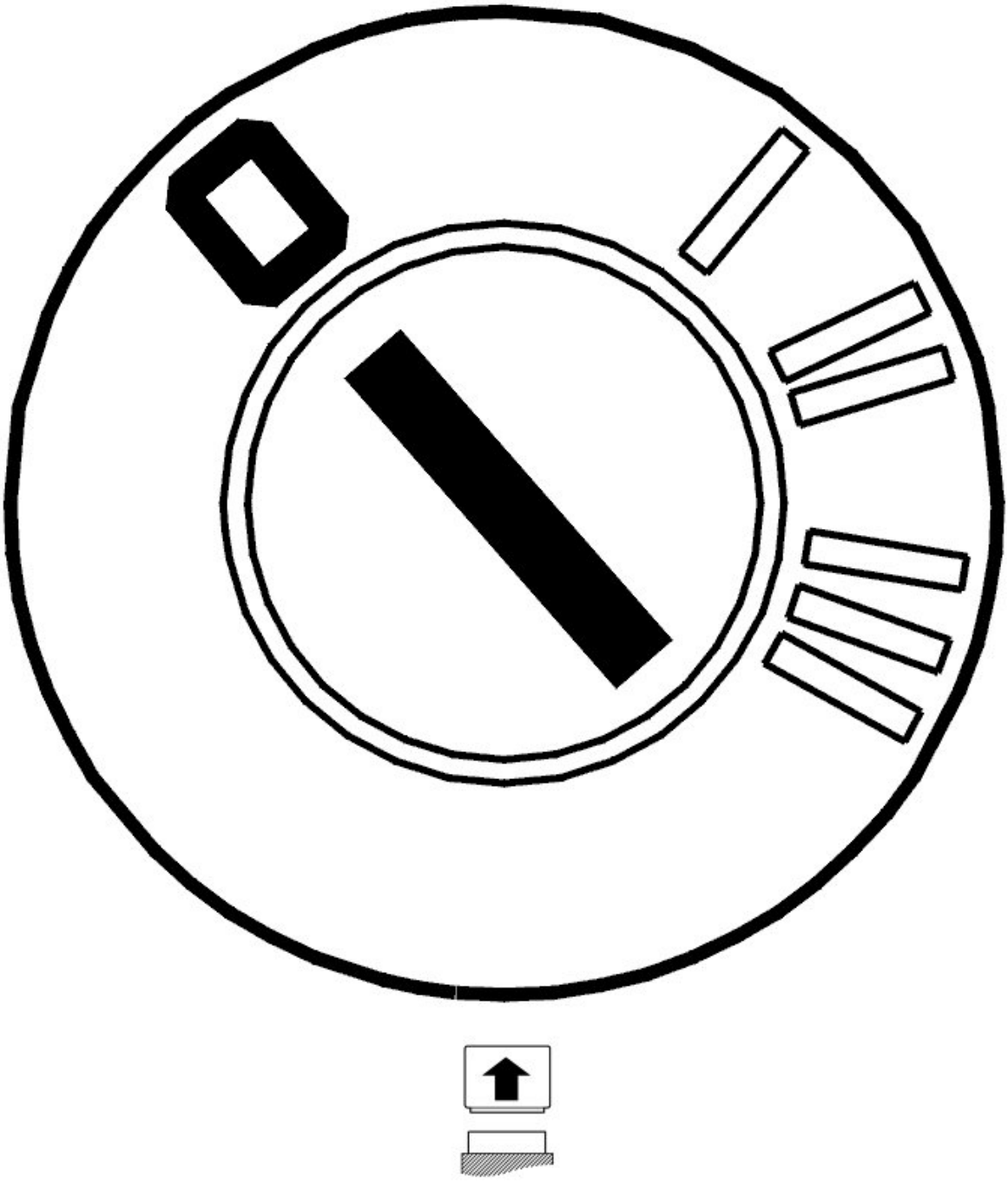
Fault symptom[s]
- The stop lamp lights constantly.

- Message in display

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect connectors A and F on the rear electronic module (REM).

Check the signal cable. Check for an open-circuit. Check for a short-circuit to supply voltage.

For the S80 and S60

Take readings between:

- Rear electronic module (REM) terminal #A6 (#6) and terminal #1 on the connector for the high level stop lamp.

For the V70, XC70 and XC90

Take readings between:

- Rear electronic module (REM) terminal #F4 (#44) and terminal #1 on the connector for the high level stop lamp.

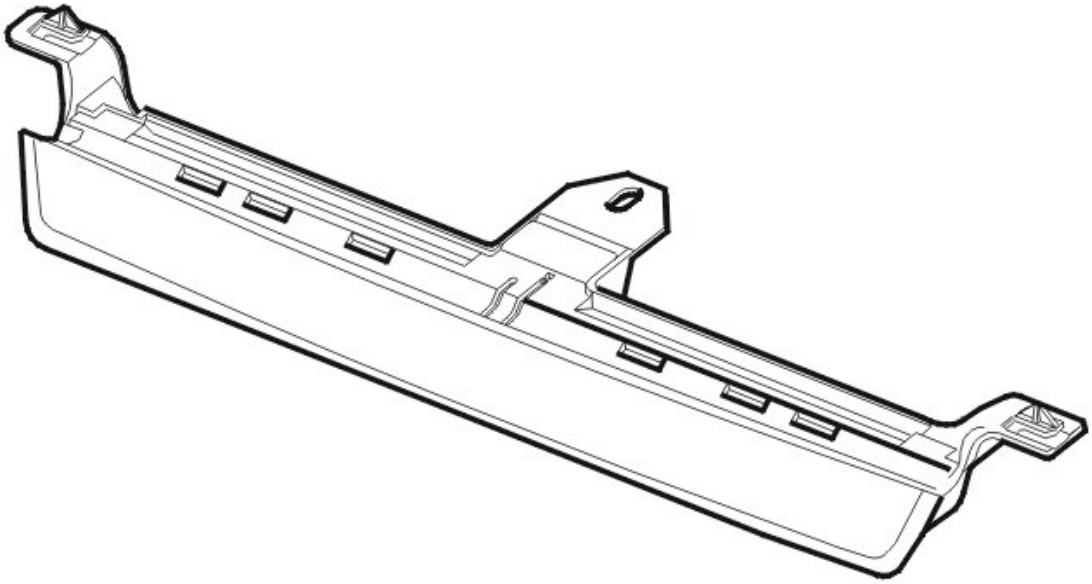
Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic

Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



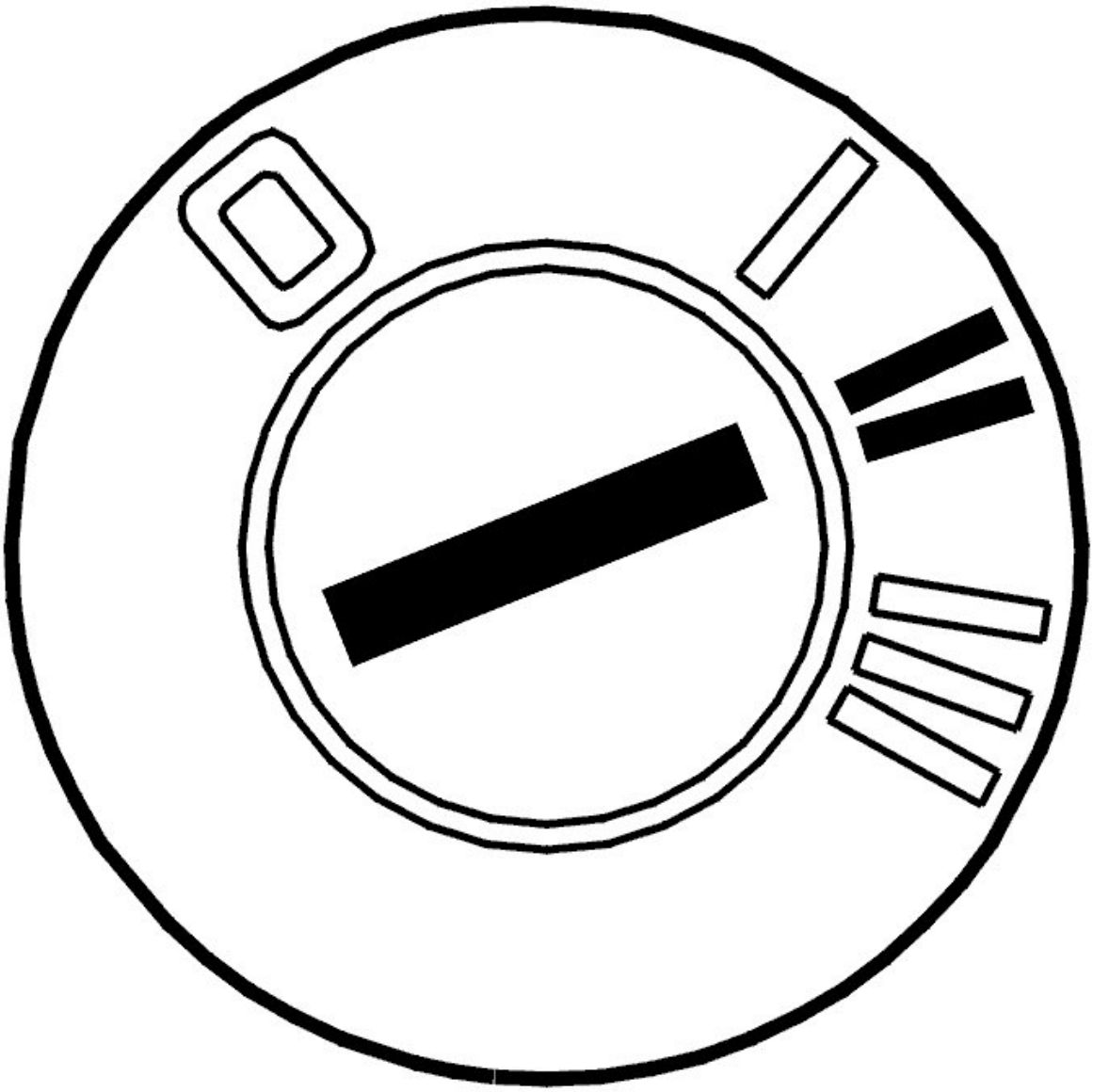
Continue - Verification

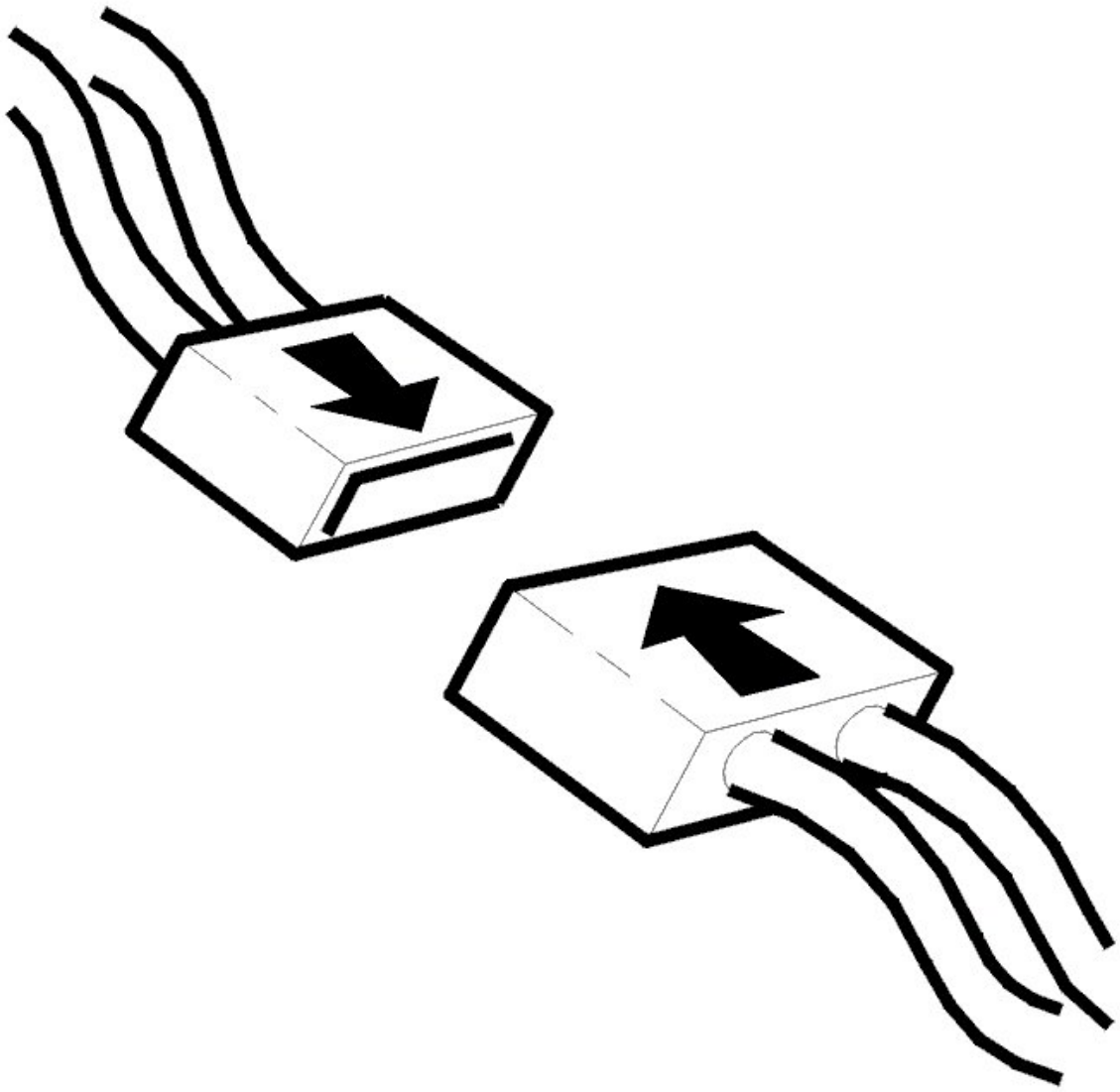
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the stop lamp.
Check that the stop lamp is activated.

Is the stop lamp activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

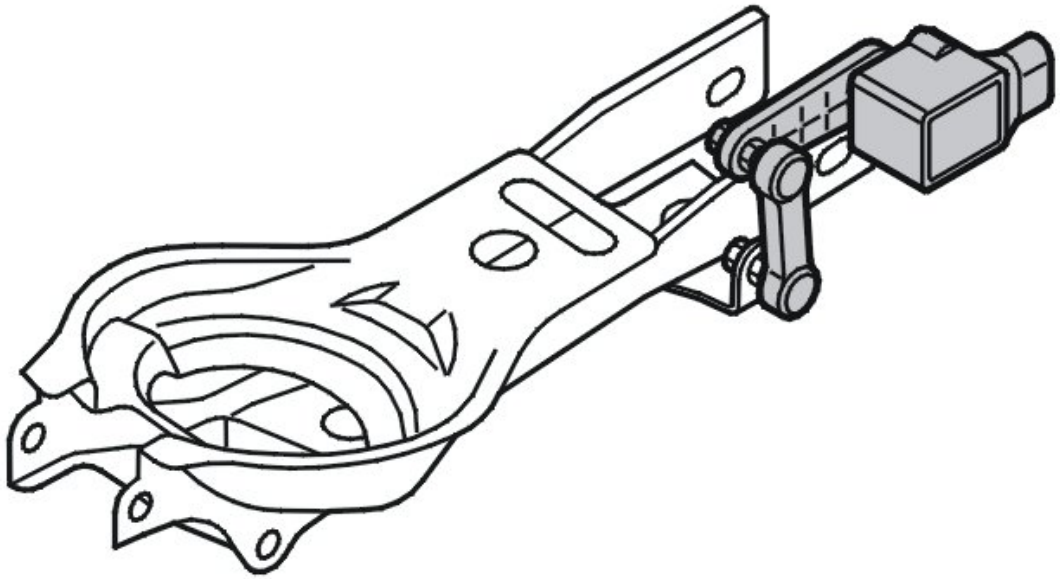
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8F10

Condition



The rear electronic module (REM) checks the signal from the rear position sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers a faulty signal from the position sensor.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The shortest headlamp range will be used.

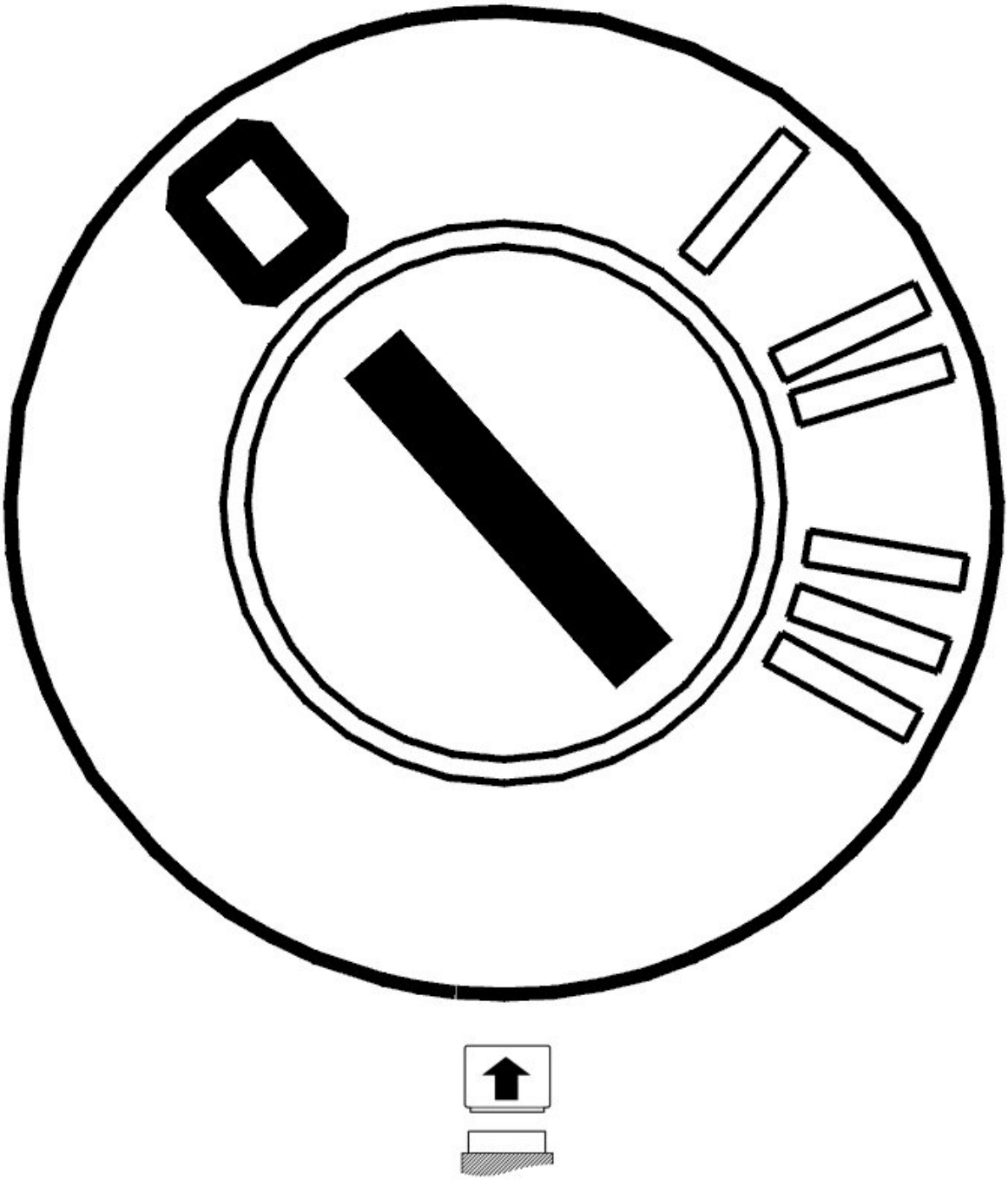
Possible source
- Short-circuit to supply voltage in the signal cable
- Defective position sensor.

Fault symptom[s]
- Automatic headlamp range control is not functioning.

Signal Too High

Signal too high

Checking the wiring



- Ignition off
- Disconnect the connector on the rear electronic module (REM).

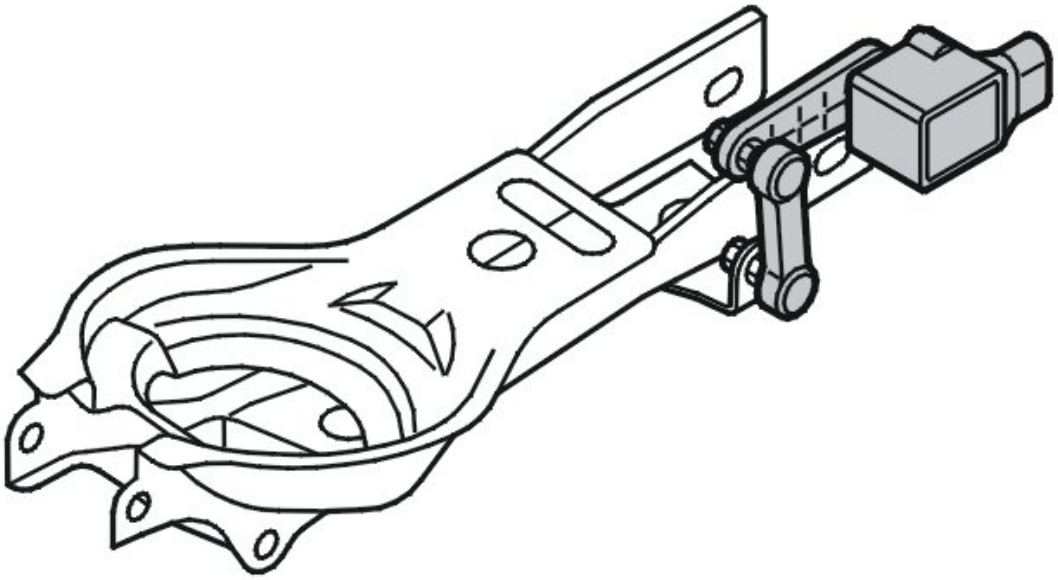
Check that the position sensor for the Xenon lamp is correctly installed.
Check the signal cable. Check for a short-circuit to supply voltage.
Take readings between:

- Rear electronic module (REM) terminal #C6 (#46) and terminal #4 on the position sensor for the Xenon lamp.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Position sensor Bi-Xenon lamps, replacing See: Lighting and Horns/Headlamp/Headlamp Alignment Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



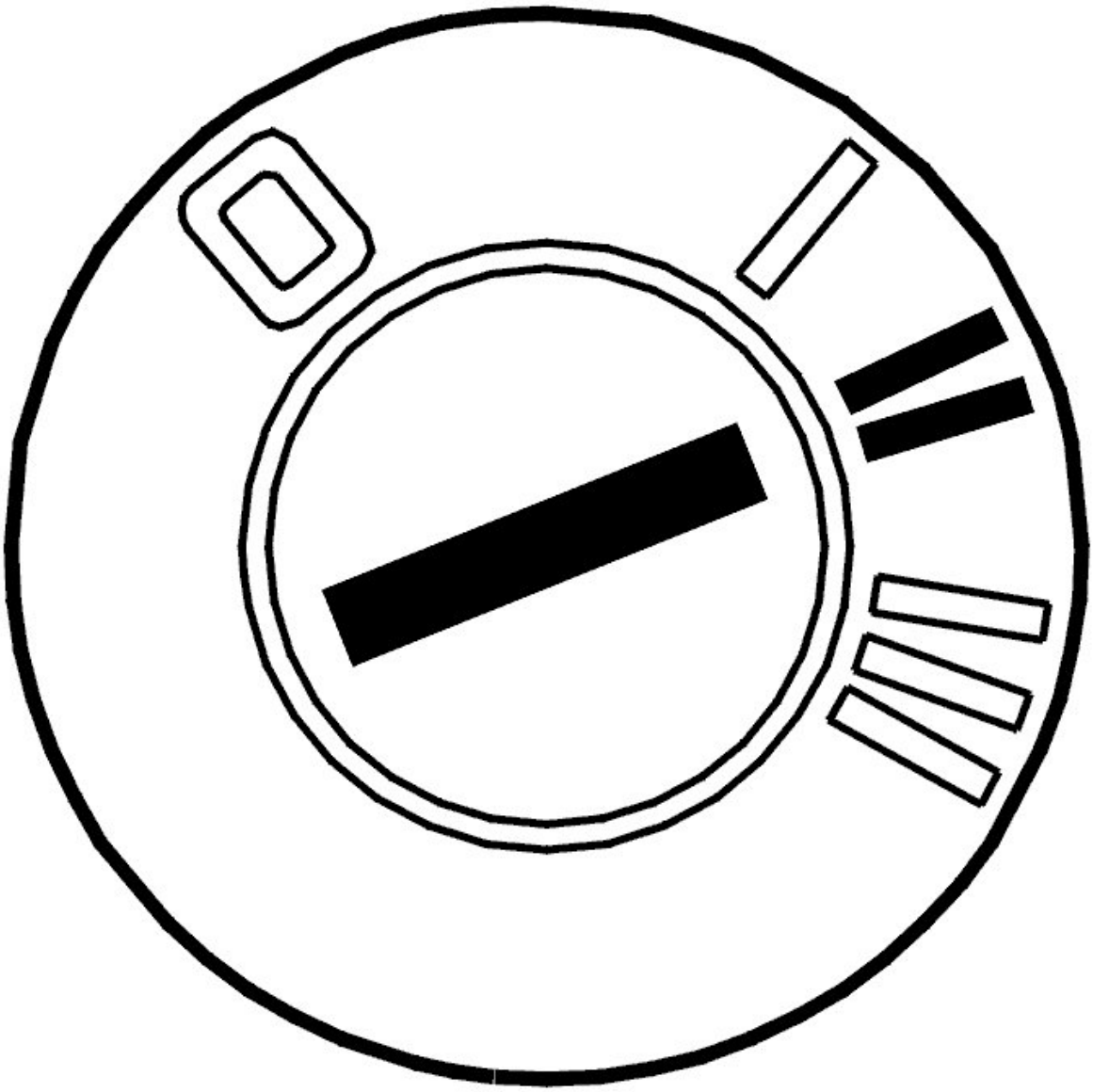
Continue - Verification

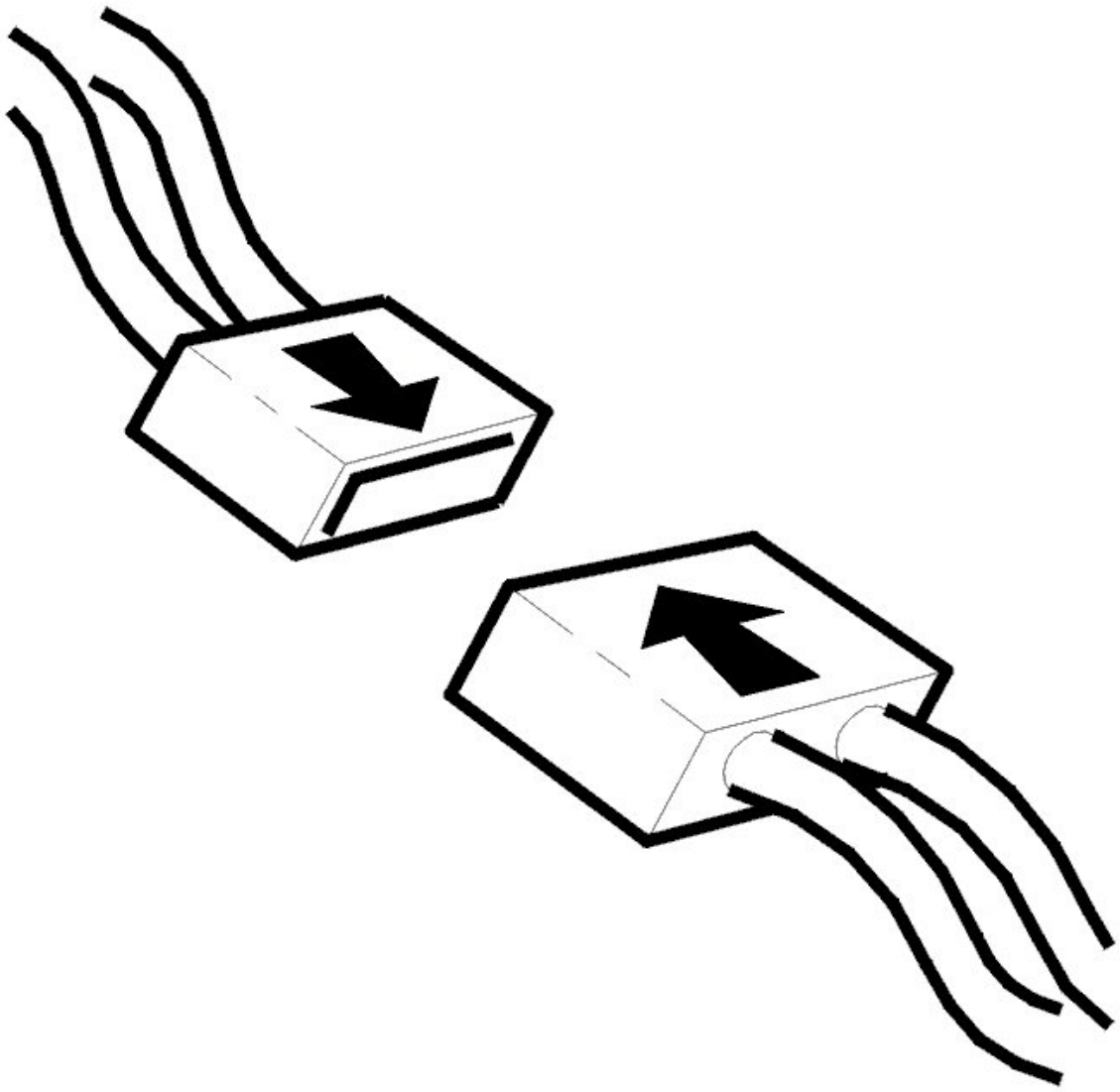
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor for Xenon lamps by clicking the VCT2000 symbol. The voltage must be between 1.7-3.2 V depending on the load and inclination.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

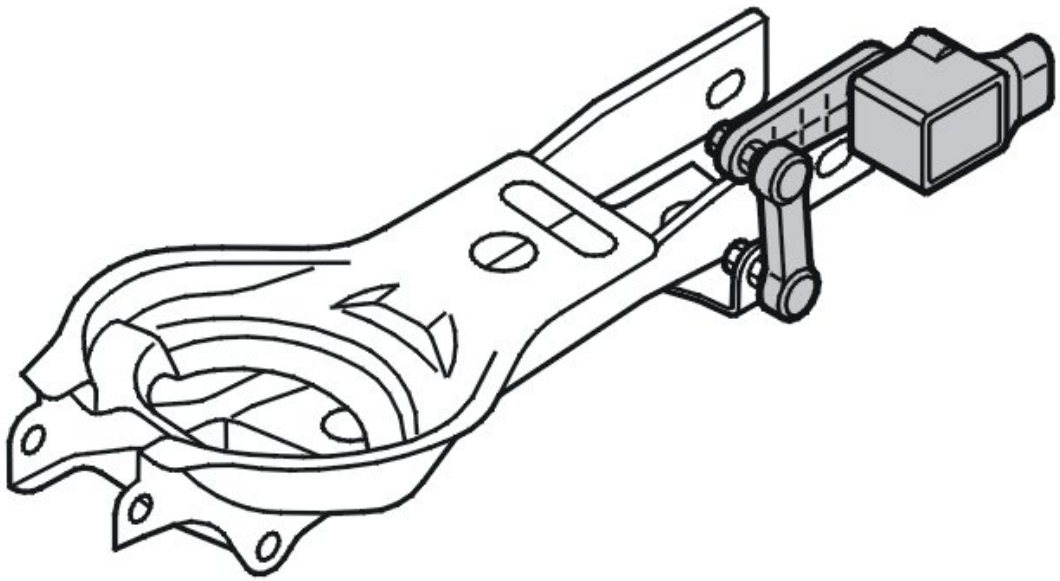
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8F11

Condition



The rear electronic module (REM) checks the signal from the rear position sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal from the position sensor is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The shortest headlamp range will be used.

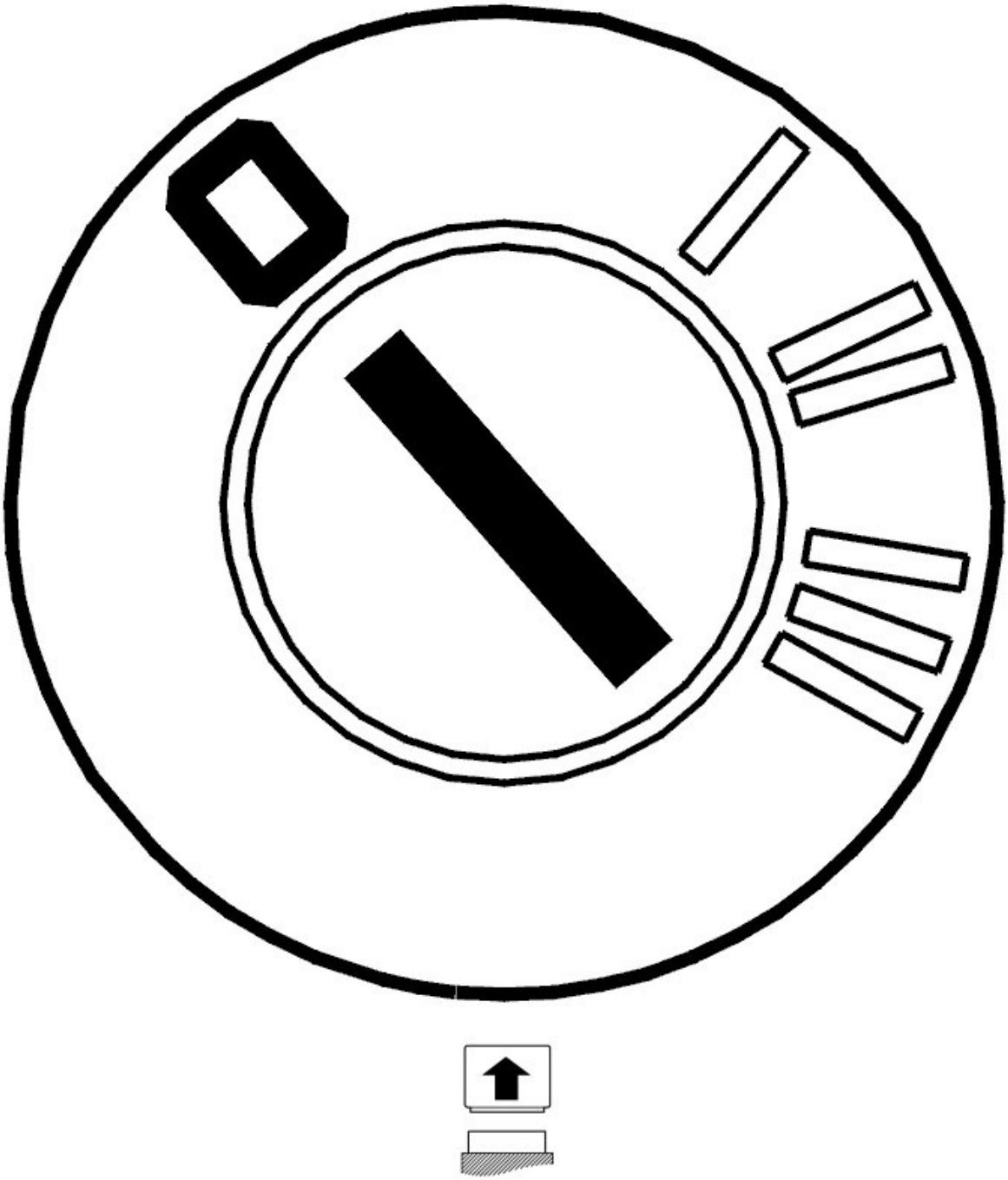
Possible source
- Short-circuit to ground in the signal cable
- The position sensor is not installed.

Fault symptom[s]
- Automatic headlamp range control is not functioning.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect the connector on the rear electronic module (REM).

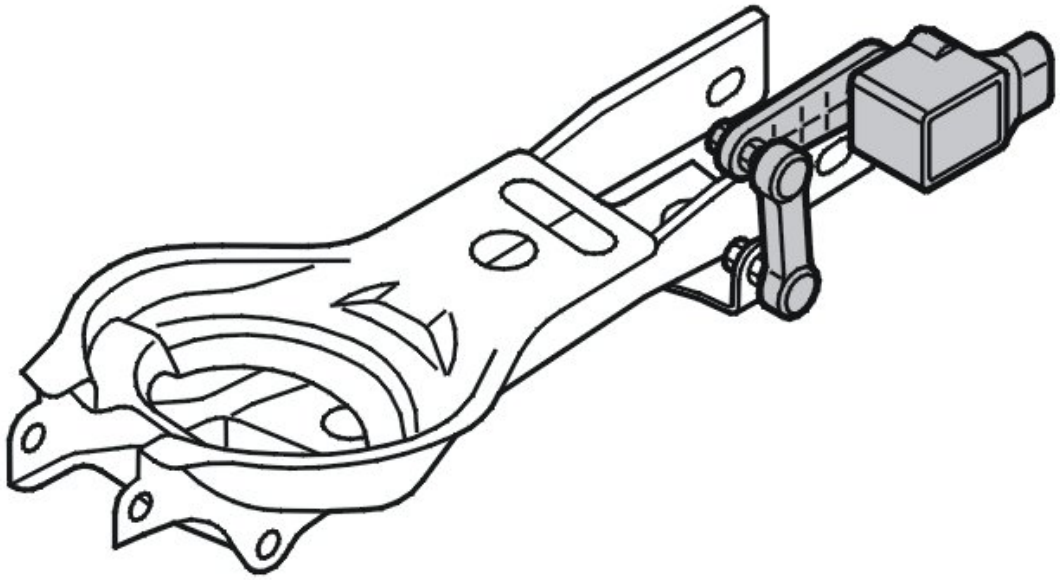
Check that the position sensor for the Xenon lamp is correctly installed.
Check the signal cable. Check for an open-circuit. Check for a short-circuit to ground.
Take readings between:

- Rear electronic module (REM) terminal #C6 (#46) and terminal #4 on the position sensor for the Xenon lamp.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Position sensor Bi-Xenon lamps, replacing See: Lighting and Horns/Headlamp/Headlamp Alignment Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



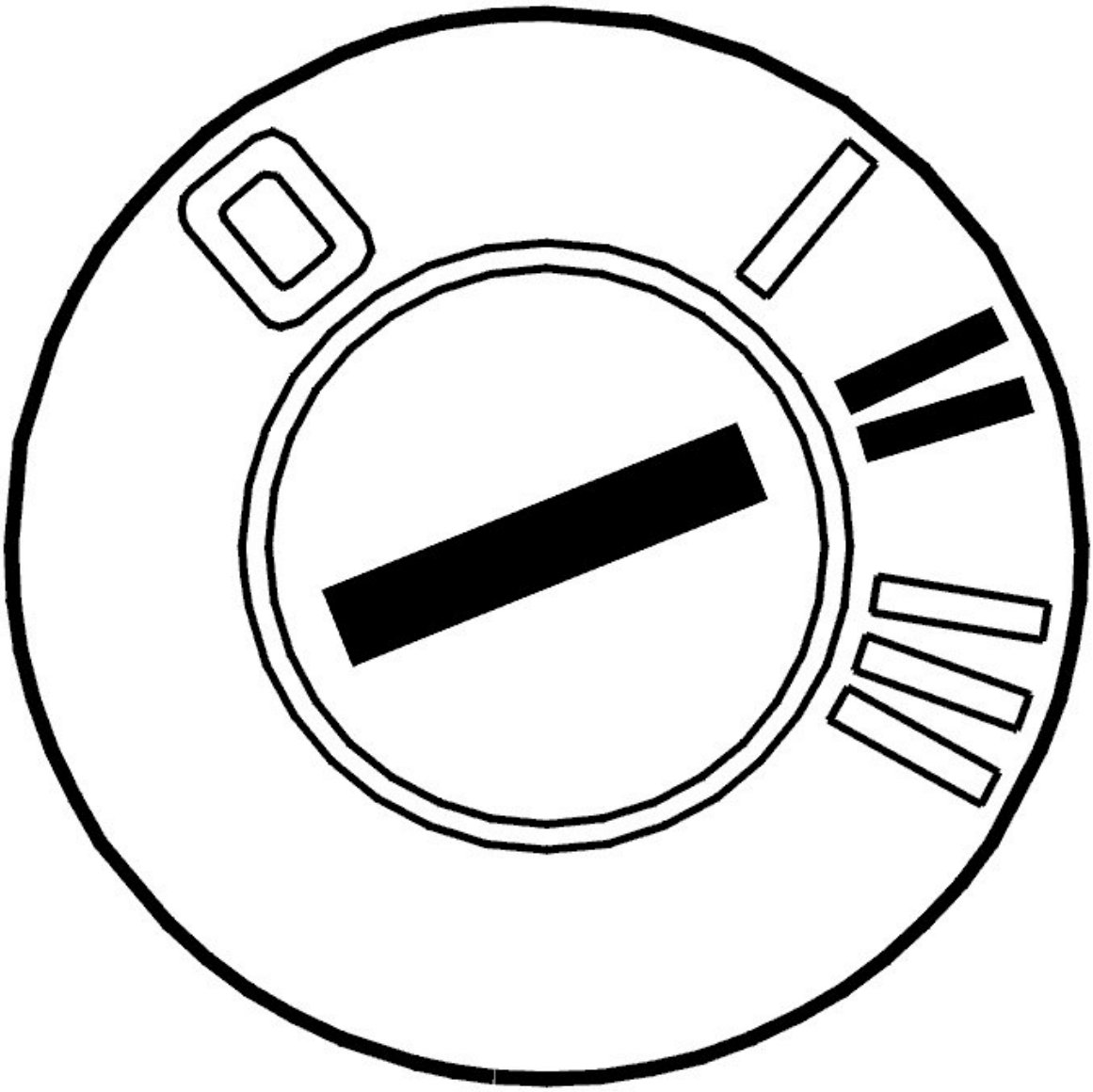
Continue - Verification

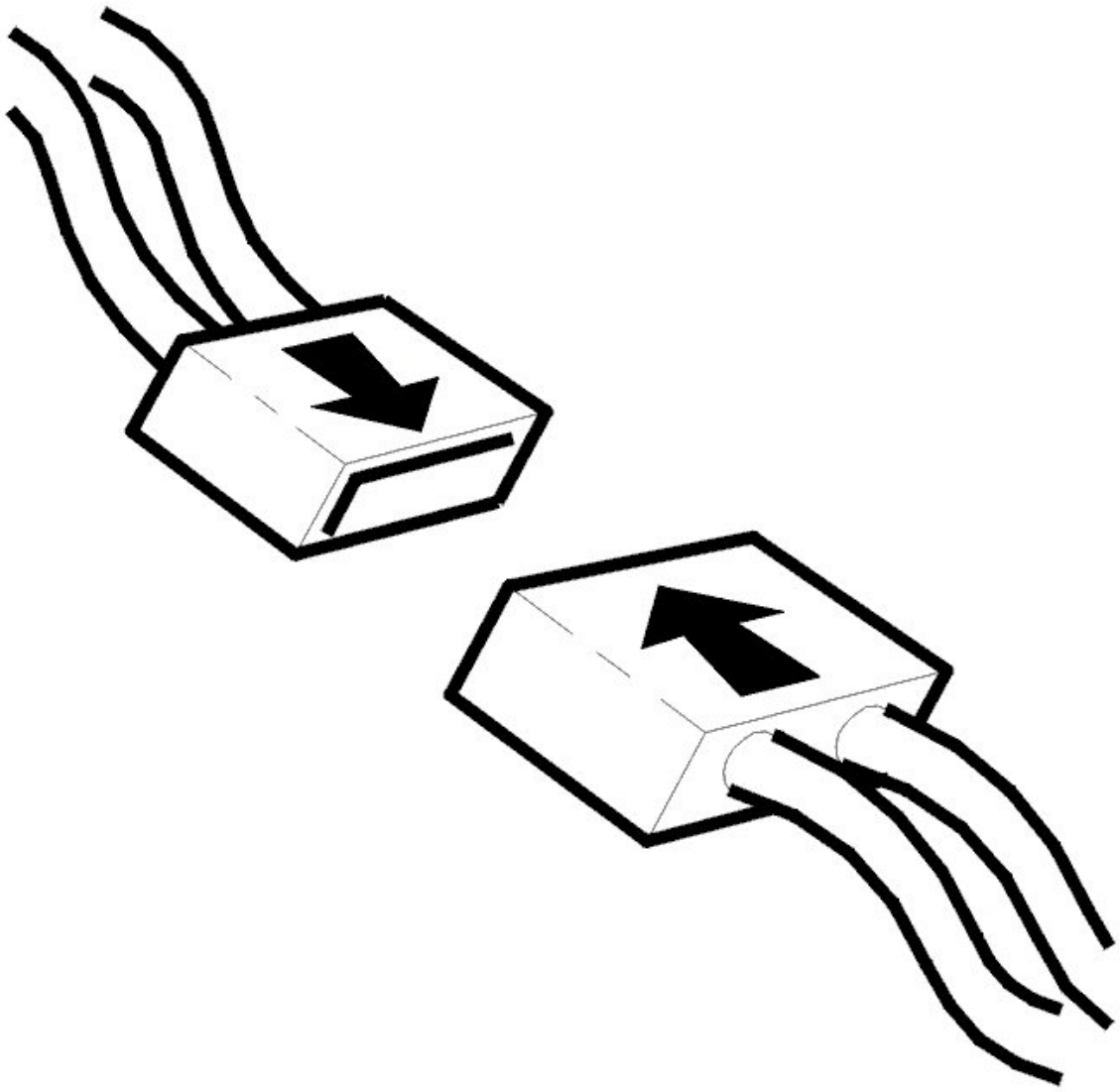
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor for Xenon lamps by clicking the VCT2000 symbol. The voltage must be between 1.7-3.2 V depending on the load and inclination.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

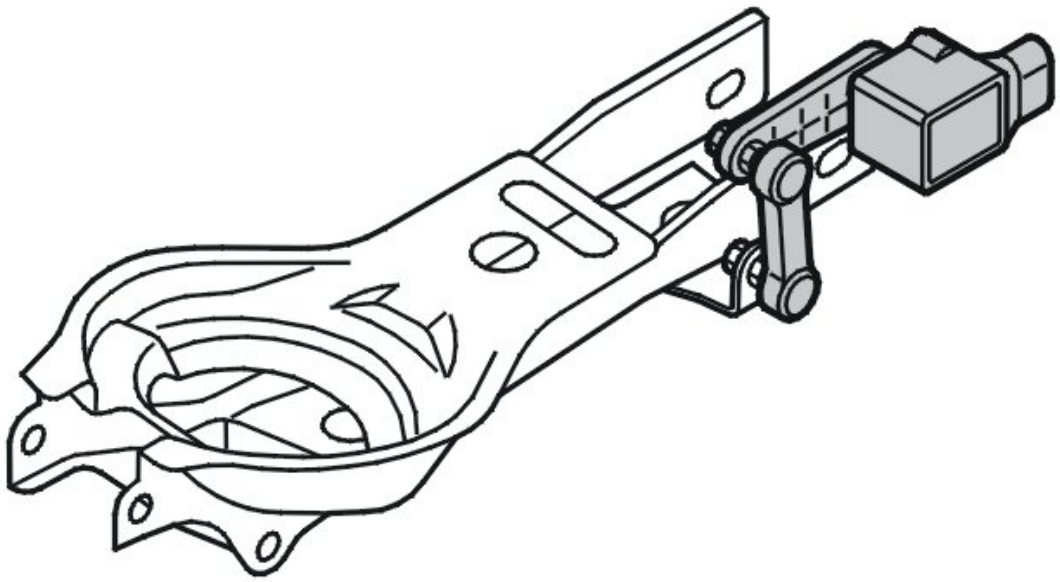
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8F12

Condition



The rear electronic module (REM) checks the signal from the rear position sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the position sensor is not calibrated.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The shortest headlamp range will be used.

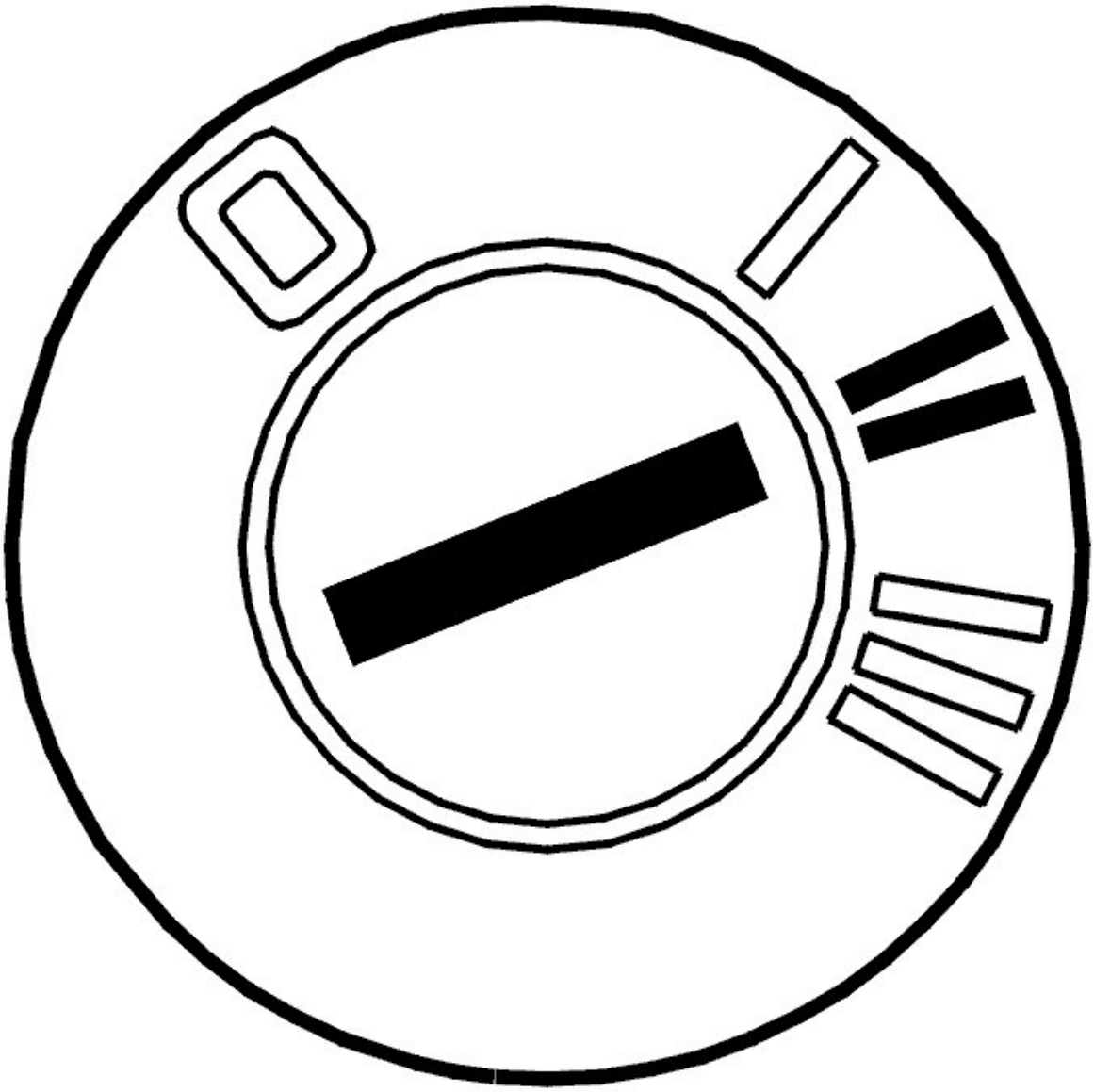
Possible source
- The position sensor is not calibrated.

Fault symptom[s]
- Automatic headlamp range control is not functioning.

Not calibrated

Not calibrated

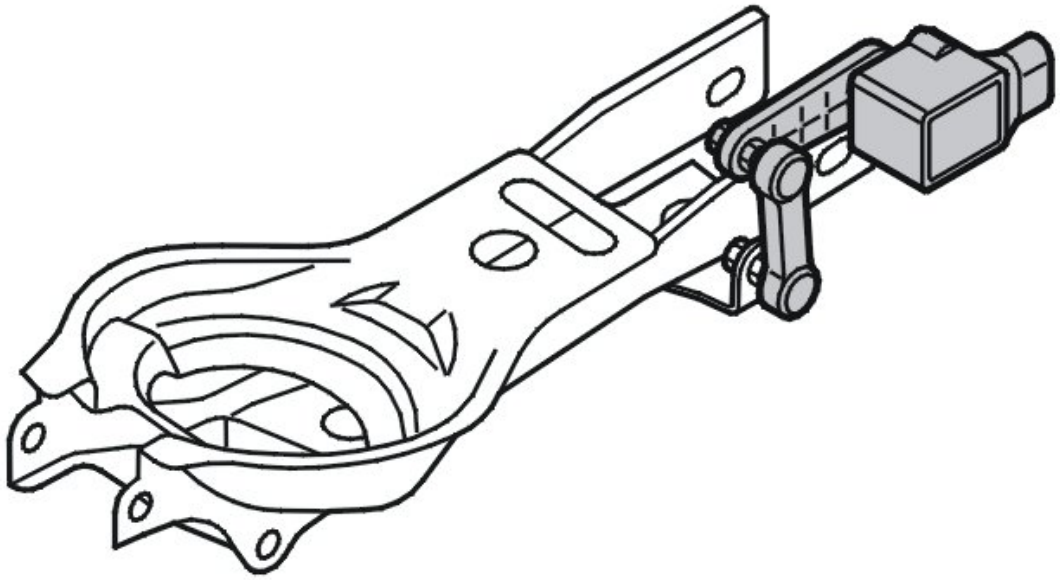
Calibrating the component



Note! If the vehicle is equipped with Four-C, calibration must be carried out via suspension module (SUM).

Calibrate the position sensor for the Bi-Xenon lamps.

- Someone must sit in the driver's seat during calibration. The person must weigh at least 75 kg. Ensure that the car is unladen and is on a flat surface
- Ignition on
- Click on the VCT2000 symbol
- Calibrate the position sensor.



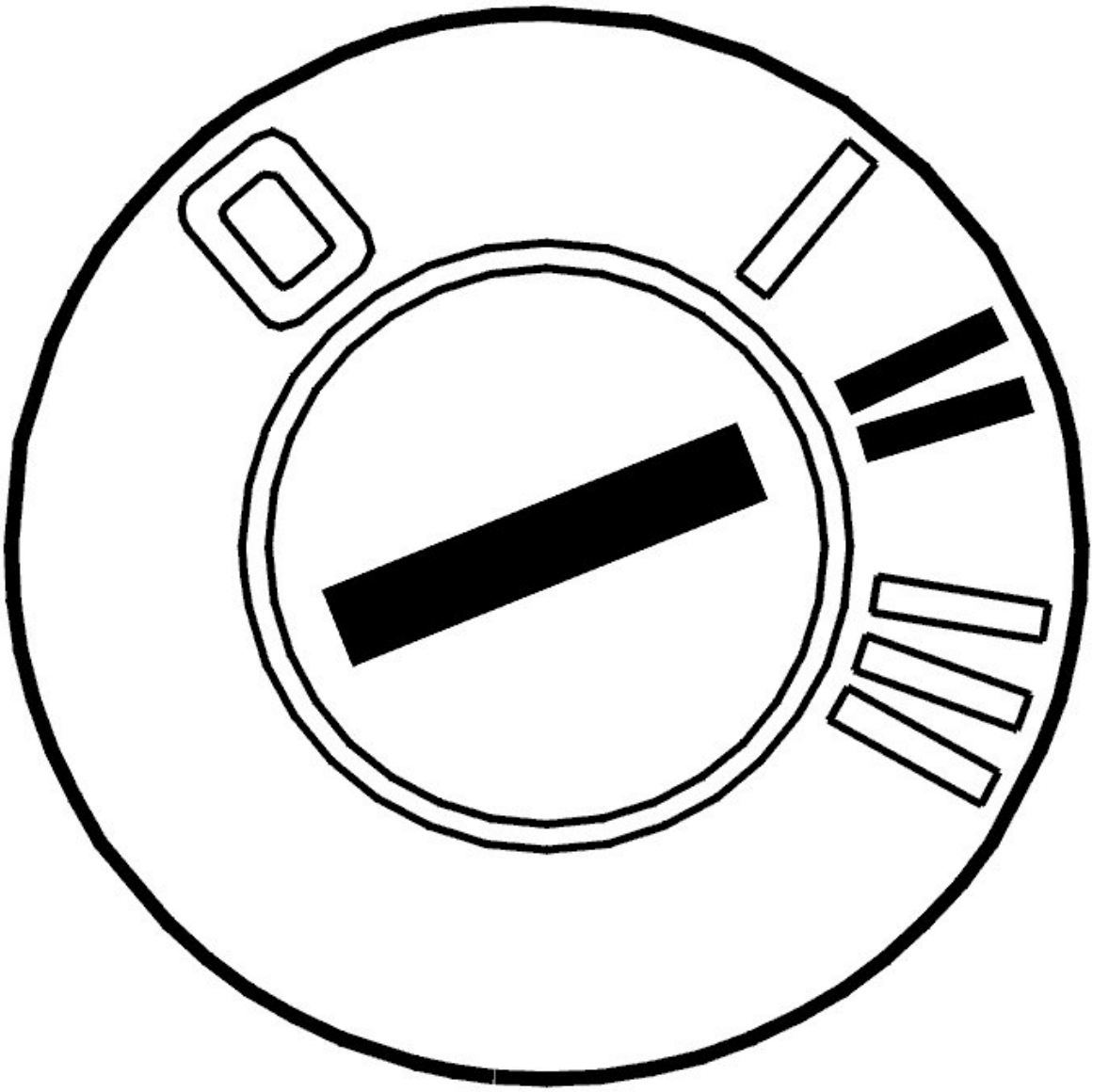
Continue - Verification

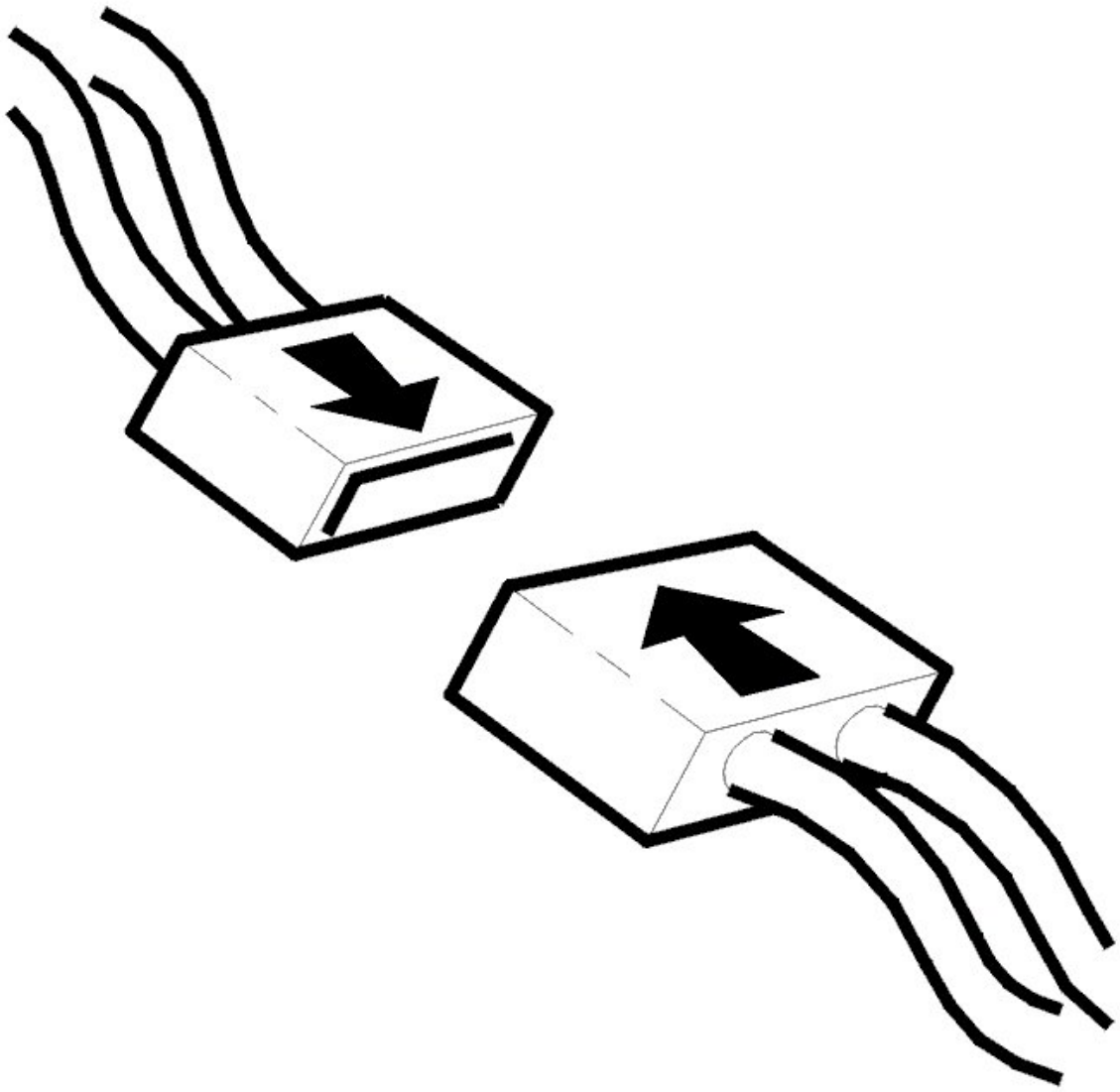
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the position sensor for the Xenon lamp is calibrated by clicking on the symbol for VCT2000.

Is the position sensor calibrated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

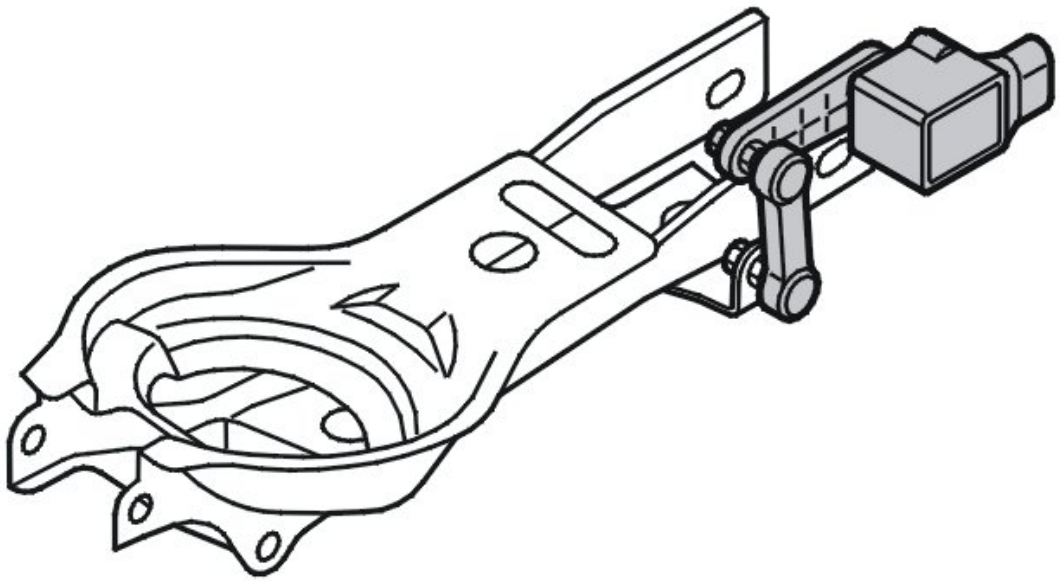
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Calibrating the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-8F13

Condition



The rear electronic module (REM) checks the signal from the rear position sensor.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the calibration of the position sensor failed.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- The shortest headlamp range will be used.

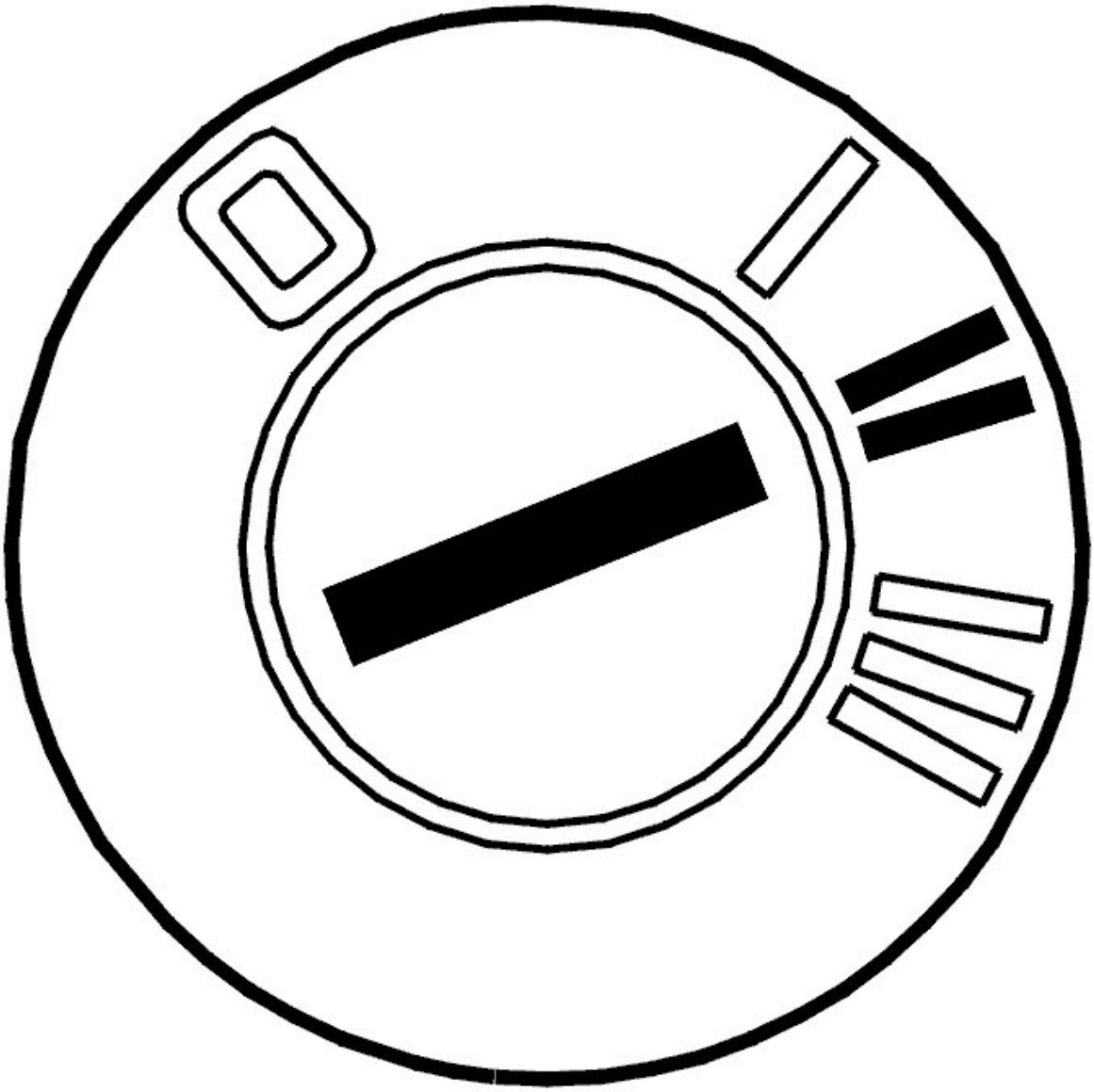
Possible source
- The calibration of the position sensor failed.

Fault symptom[s]
- Automatic headlamp range control is not functioning.

Calibration Fault

Calibration fault

Calibrating the component

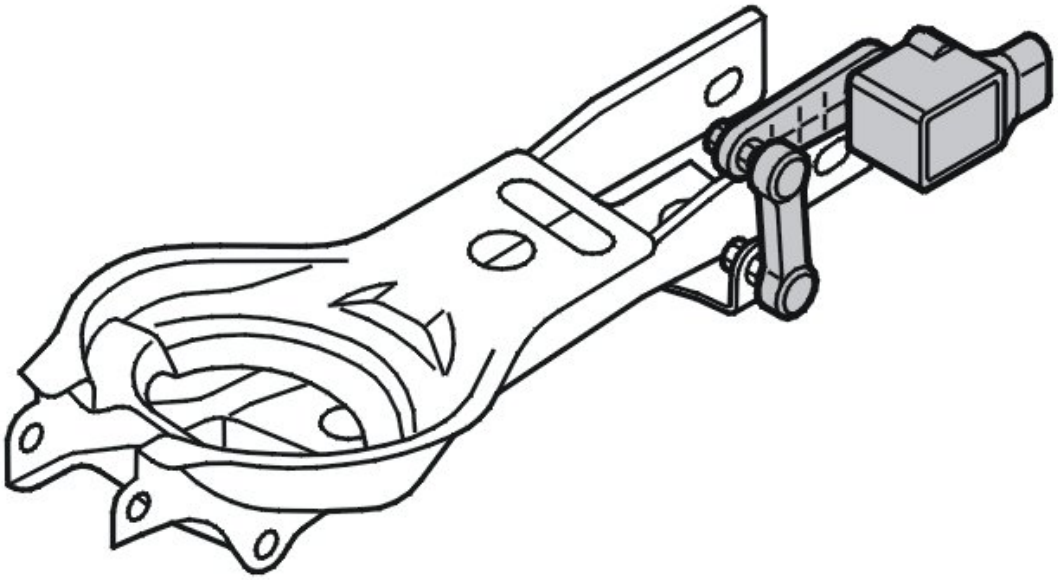


Note! If the vehicle is equipped with Four-C, calibration must be carried out via suspension module (SUM).

Check that the position sensor for the Bi-Xenon lamps is correctly installed.
Someone must sit in the driver's seat during calibration. The person must weigh at least 75 kg. Ensure that the vehicle is unladen and is on a flat surface.
Calibrate the position sensor for the Bi-Xenon lamps again.

- Ignition on
- Click on the VCT2000 symbol
- Calibrate the position sensor.

Other information



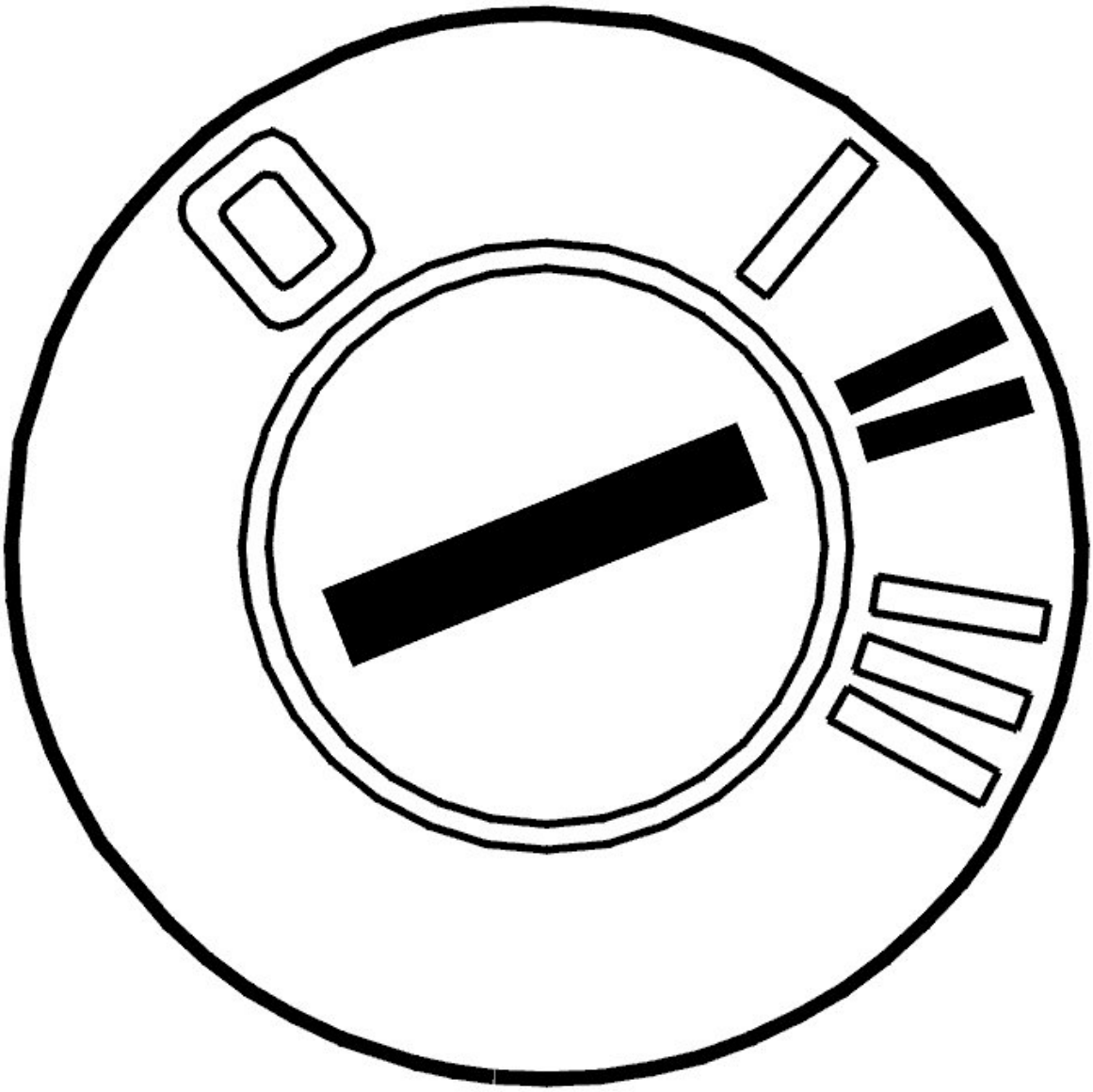
Continue - Verification

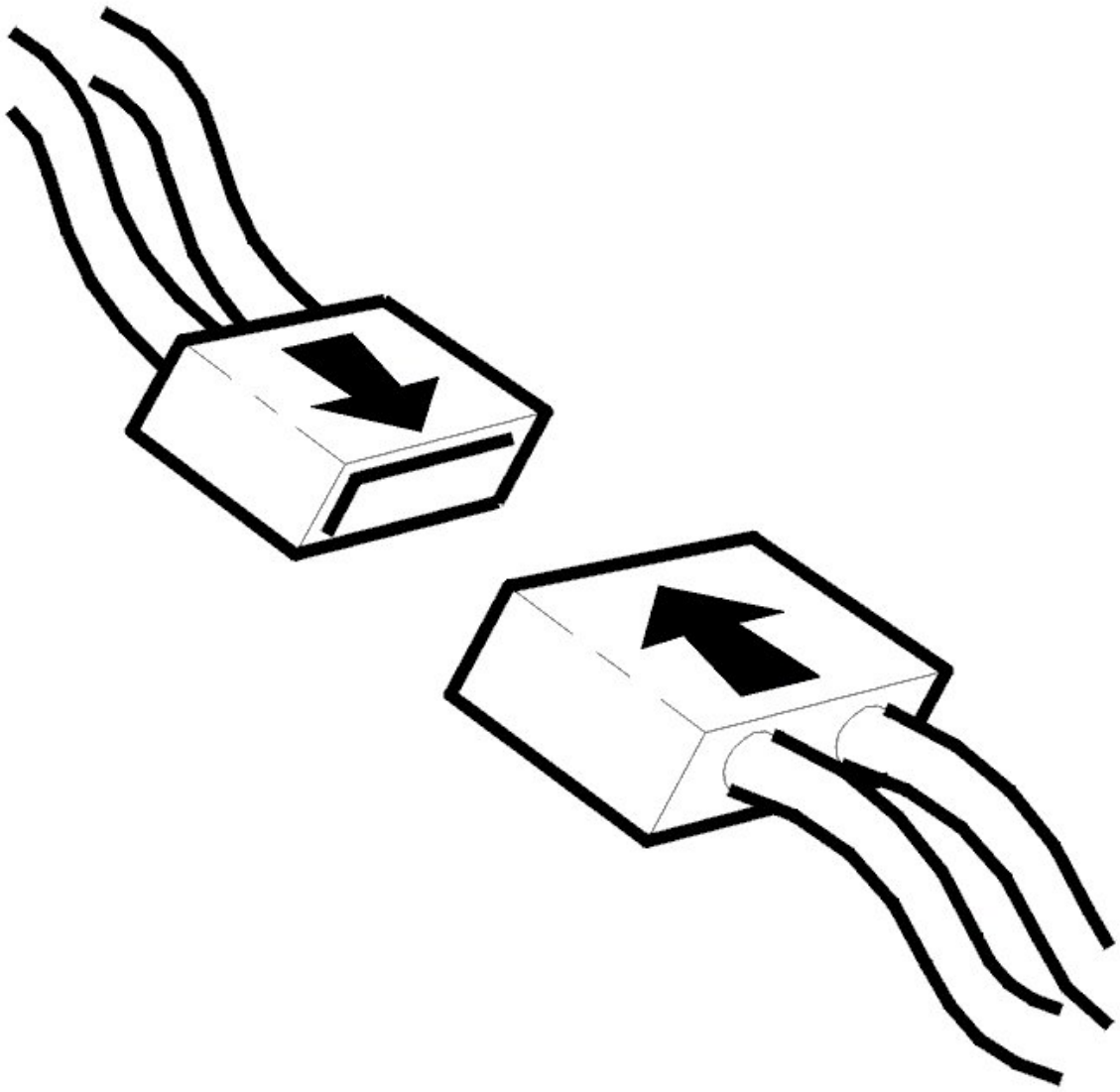
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the position sensor for the Xenon lamp is calibrated by clicking on the symbol for VCT2000.

Is the calibration OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

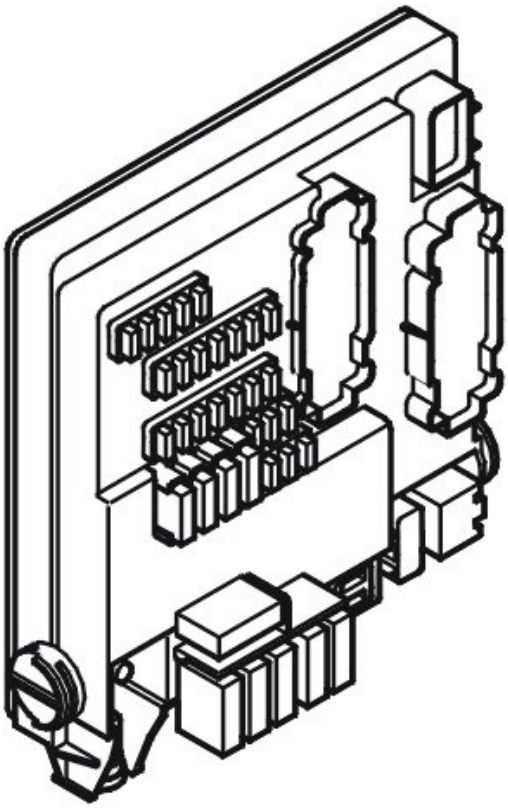
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Calibrating the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information REM-9F21

Condition



The rear electronic module (REM) powers the cargo compartment lighting directly via an output.
The diagnostic trouble code (DTC) is stored if the rear electronic module (REM) registers that the signal at the output is too low.
The diagnostic trouble code (DTC) can be diagnosed at key position II.

Substitute value
- None.

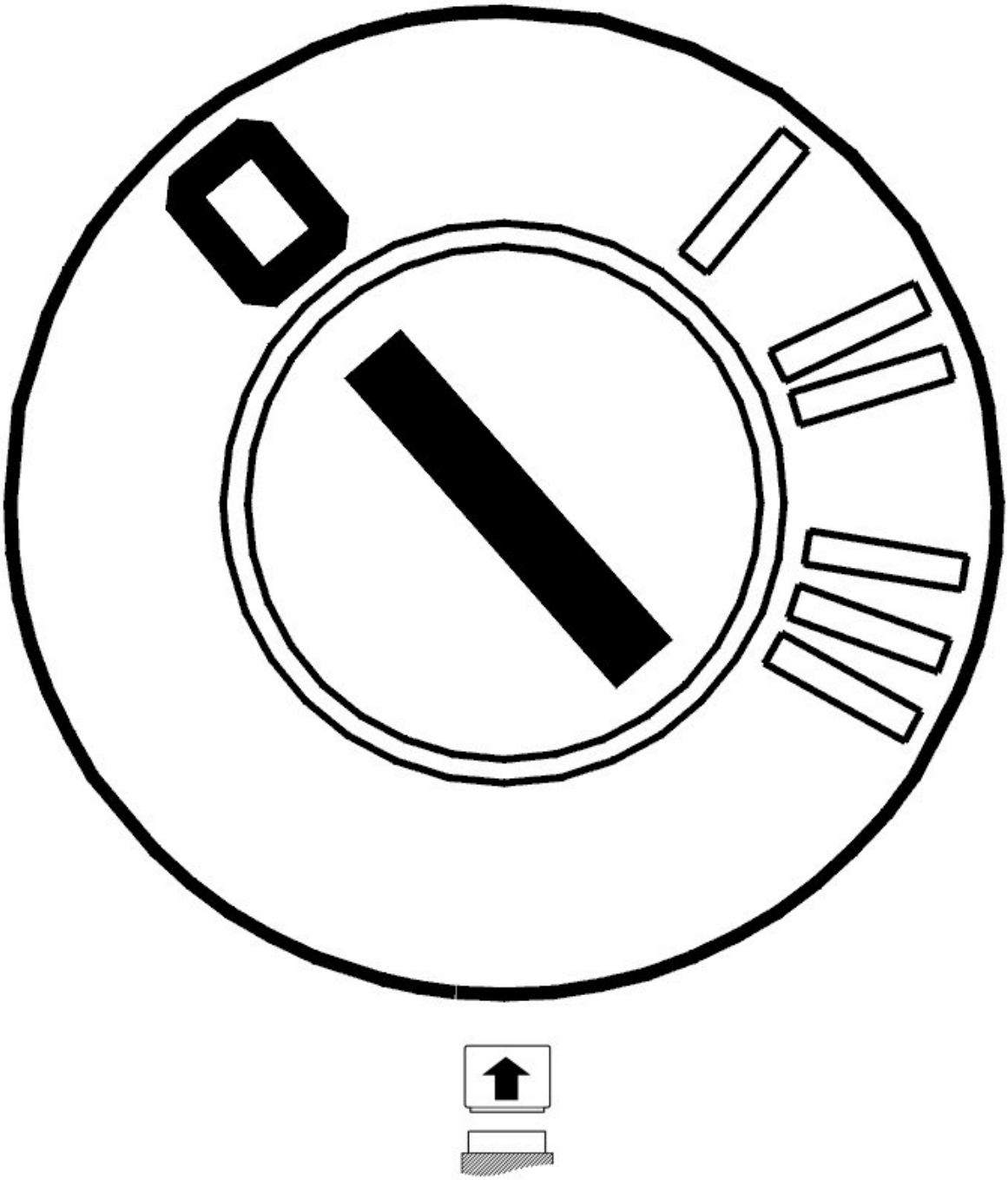
Possible source
- Short-circuit to ground in the signal cable.

Fault symptom[s]
- The cargo compartment lighting does not function.

Signal Too Low

Signal too low

Checking the wiring



- Ignition off
- Disconnect connectors D and F on the rear electronic module (REM).

Check the signal cable. Check for a short-circuit to ground.

For the S80 and S60

Take readings between:

- Rear electronic module (REM) terminal #D2 (#2) and terminal #2 on the connector for the left-hand cargo compartment lamp
- Rear electronic module (REM) terminal #D11 (#11) and terminal #2 on the connector for the right-hand cargo compartment lamp.

For the XC90

Take readings between:

- Rear electronic module (REM) terminal #F7 (#47) and terminal #2 on the connector for the cargo compartment lamp.

Remedy as necessary.

Other information

- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic

Parameters/Connecting the Breakout Box/Connecting Breakout Box, Rear Electronic Module (REM)

- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Rear Electronic Module (REM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

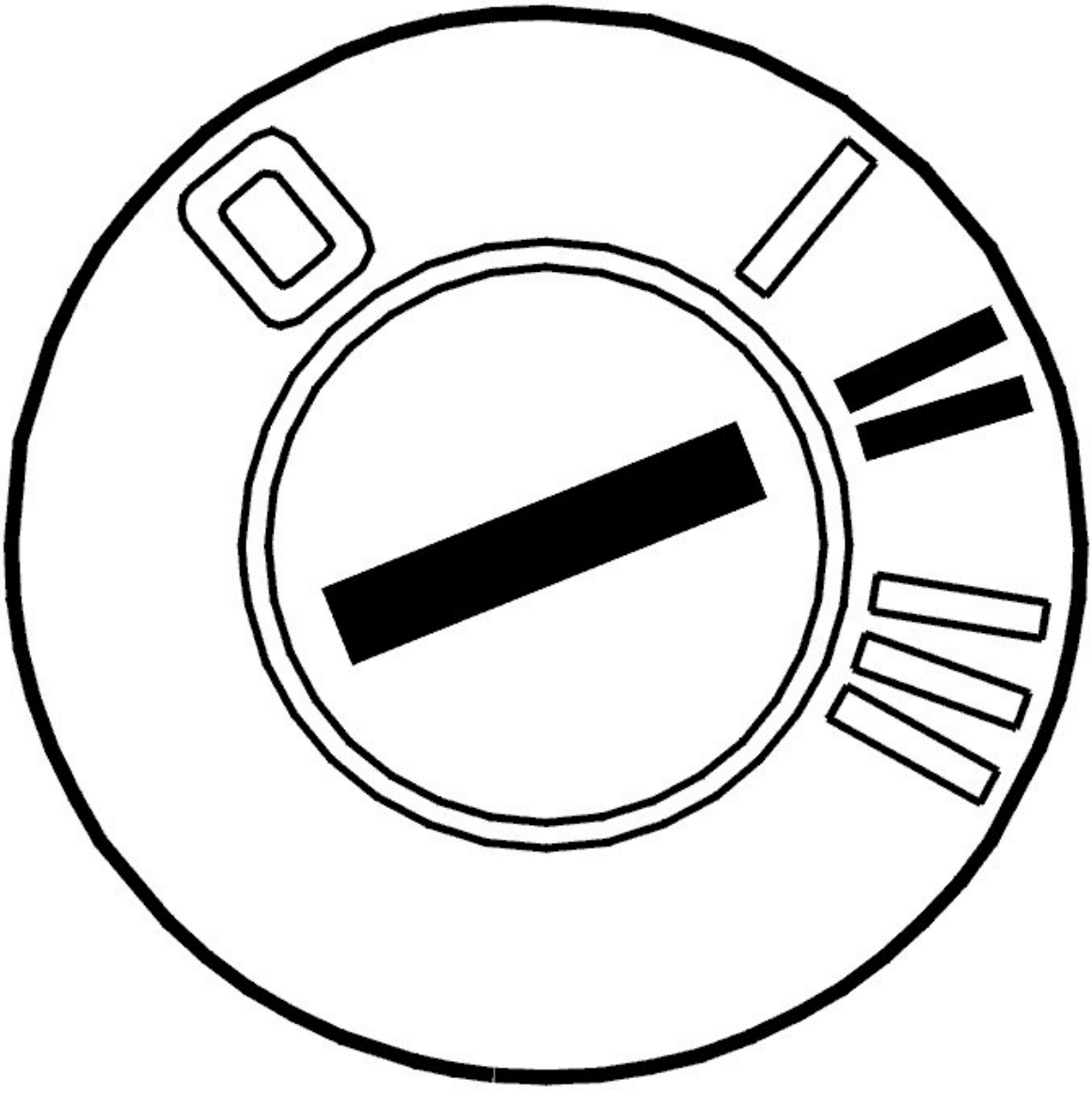
Continue - Verification

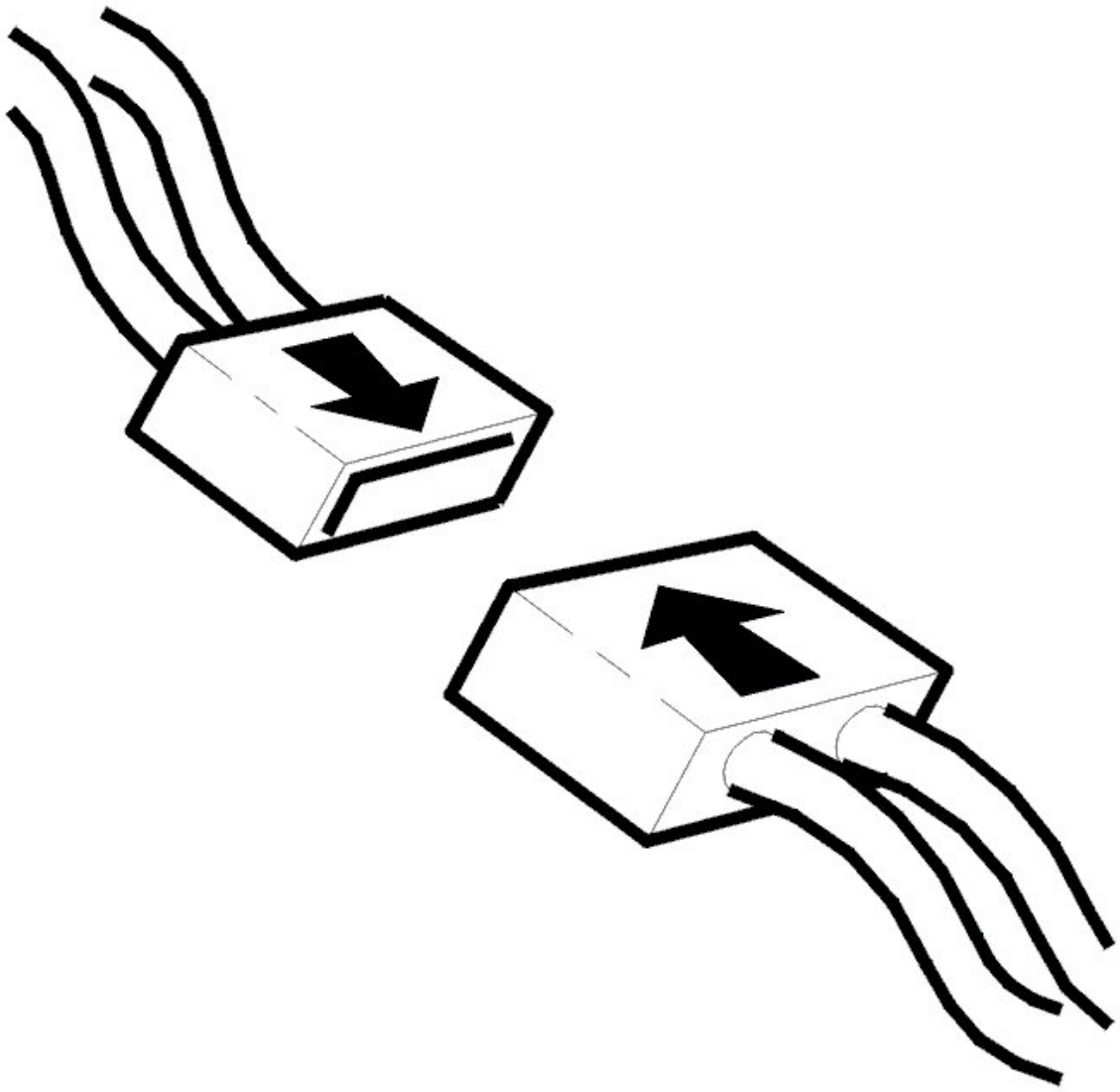
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the cargo compartment lighting.
Check that the cargo compartment lighting is activated

Is the cargo compartment lighting activated?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

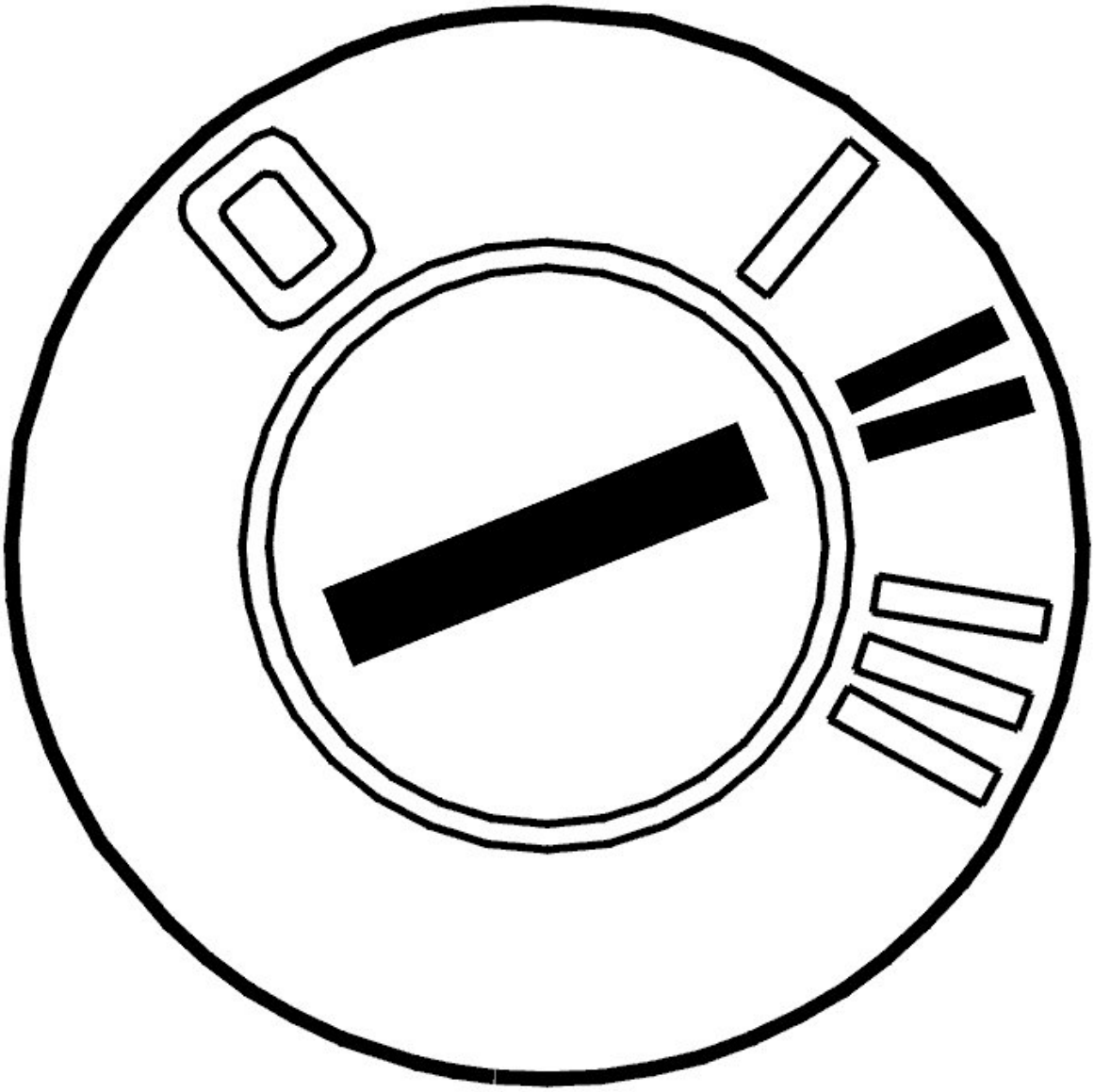
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the wiring

REM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) RTI-1000 is stored if the road traffic information (RTI) control module registers that that there is a difference between the written and read data.

Possible source
- Difference between the written and read data in the road traffic information (RTI) control module.

Fault symptom[s]
- RTI system is down.

Internal Fault. Intermittent Fault

Internal fault. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored in the event of an internal fault in the RTI control module. No further corrective action is required if the diagnostic trouble code (DTC) does not recur.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) RTI-1000 is stored if the road traffic information (RTI) control module registers that that there is a difference between the written and read data.

Possible source
- Difference between the written and read data in the road traffic information (RTI) control module.

Fault symptom[s]
- RTI system is down.

Internal Fault. Permanent Fault

Internal fault. Permanent fault

Replacing the component

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:
- For information about programming and replacing the RTI control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

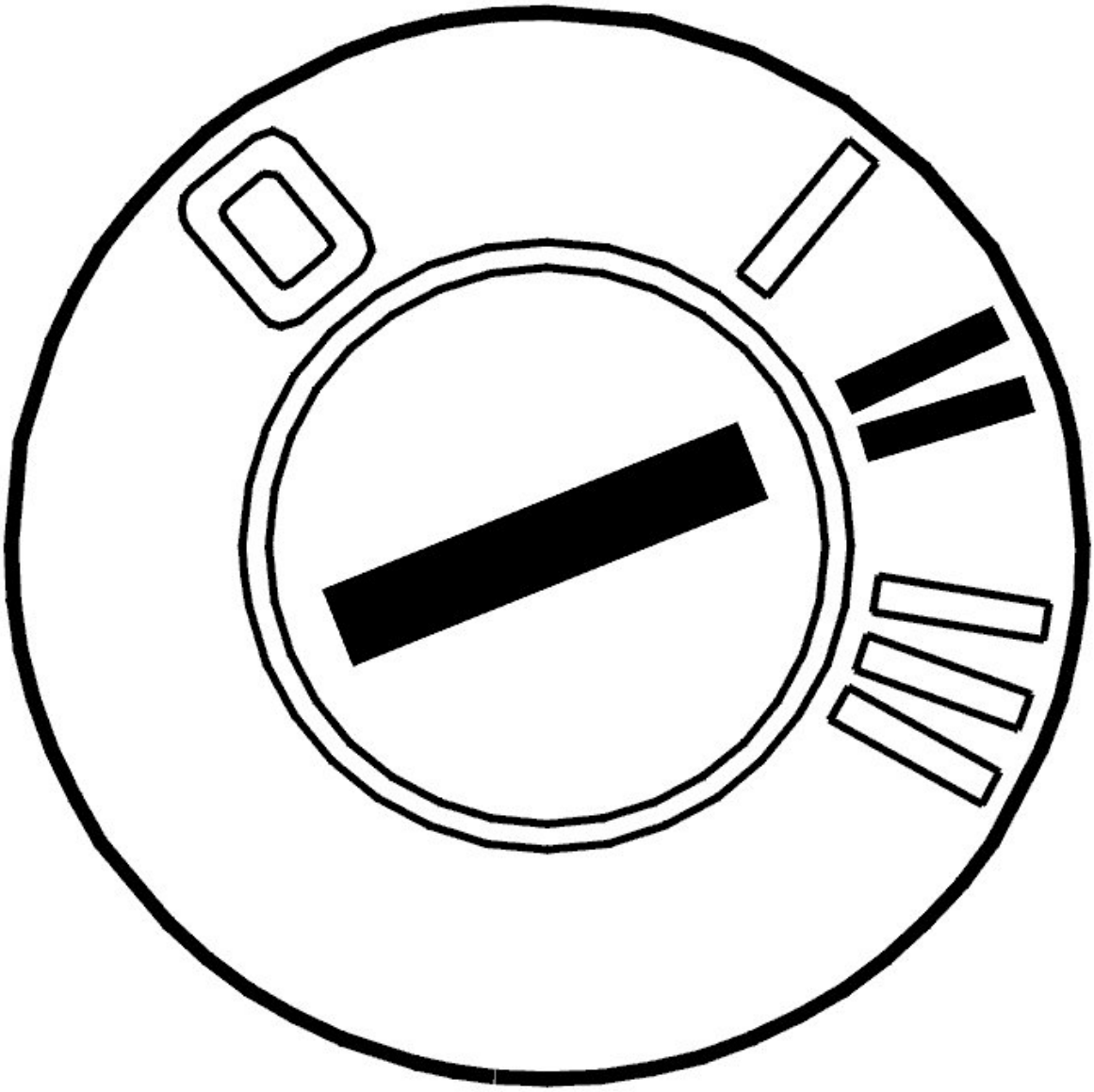
Continue - Verification

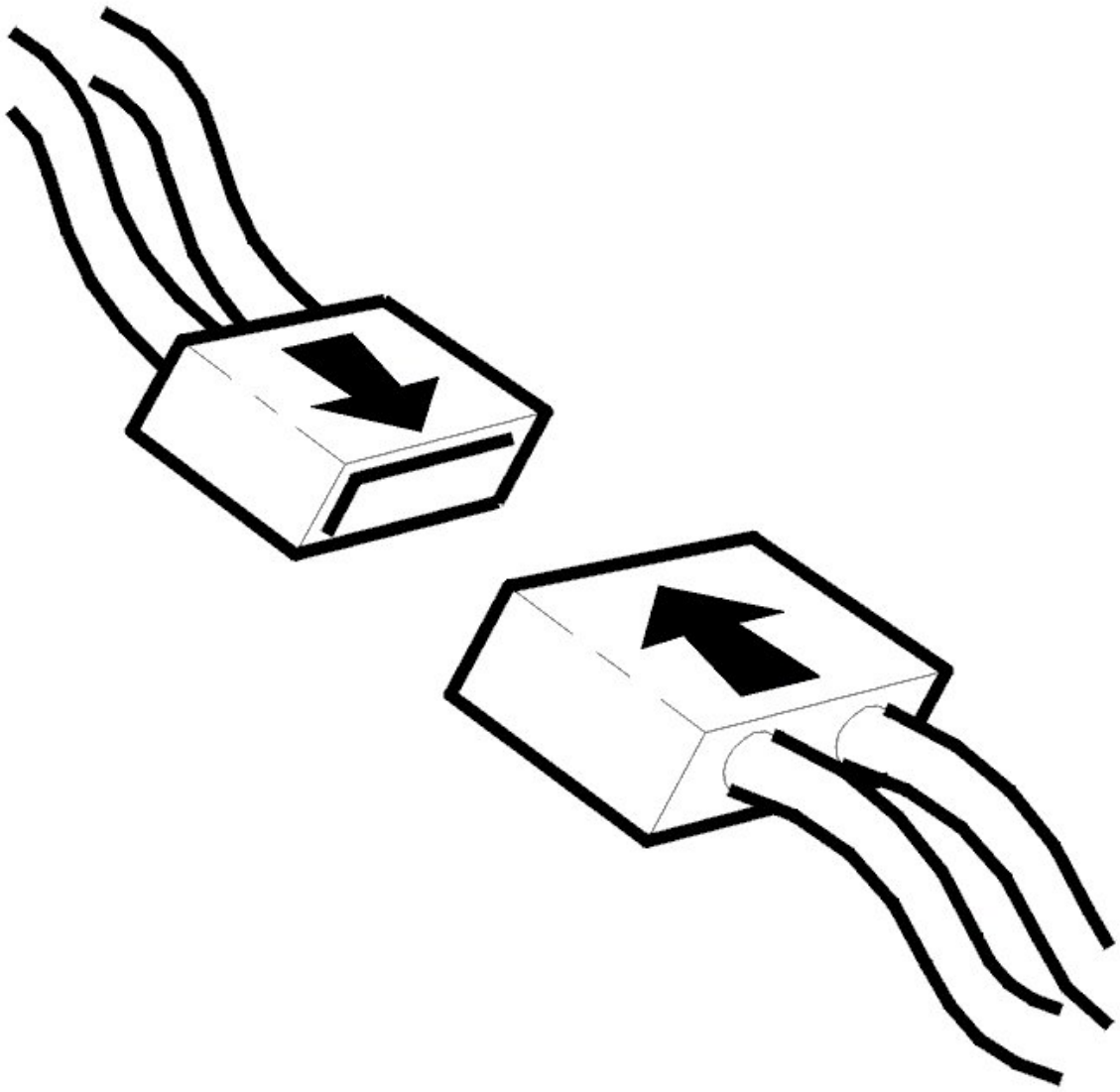
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the System test to test the memory of the RTI control module. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.

Check if the RTI control module memory is OK or not. OK is displayed if the memory functions.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the road traffic information (RTI) system functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) RTI-2000 is stored if the RTI control module registers that the output signal quality from the DVD player is too low.

Possible source
- The output signal quality is poor or disc rotation is unstable after 10 attempts
- Dirty, scratched disc.

Fault symptom[s]
- Information on the display is not updated.

Internal Fault

Internal fault

Checking the component

Check that the DVD disc is not damaged or scratched. Check that there is no damp on the disc.
Replace the disc if it is damaged or scratched. Let the disc dry out if it is damp.

Other information:
- For information about programming and replacing the road traffic information (RTI) control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair
- For information about signals and connectors, see Signal specification, RTI See: Accessories and Optional Equipment/Navigation System/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specifications, Road Traffic Information (RTI).

Is the DVD player OK?

Yes - No Fault Found

No - Replacing the component

Replacing the component

Hint: The DVD player is integrated in the road traffic information (RTI) control module.

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The RTI control module must be programmed in order to function after replacement.

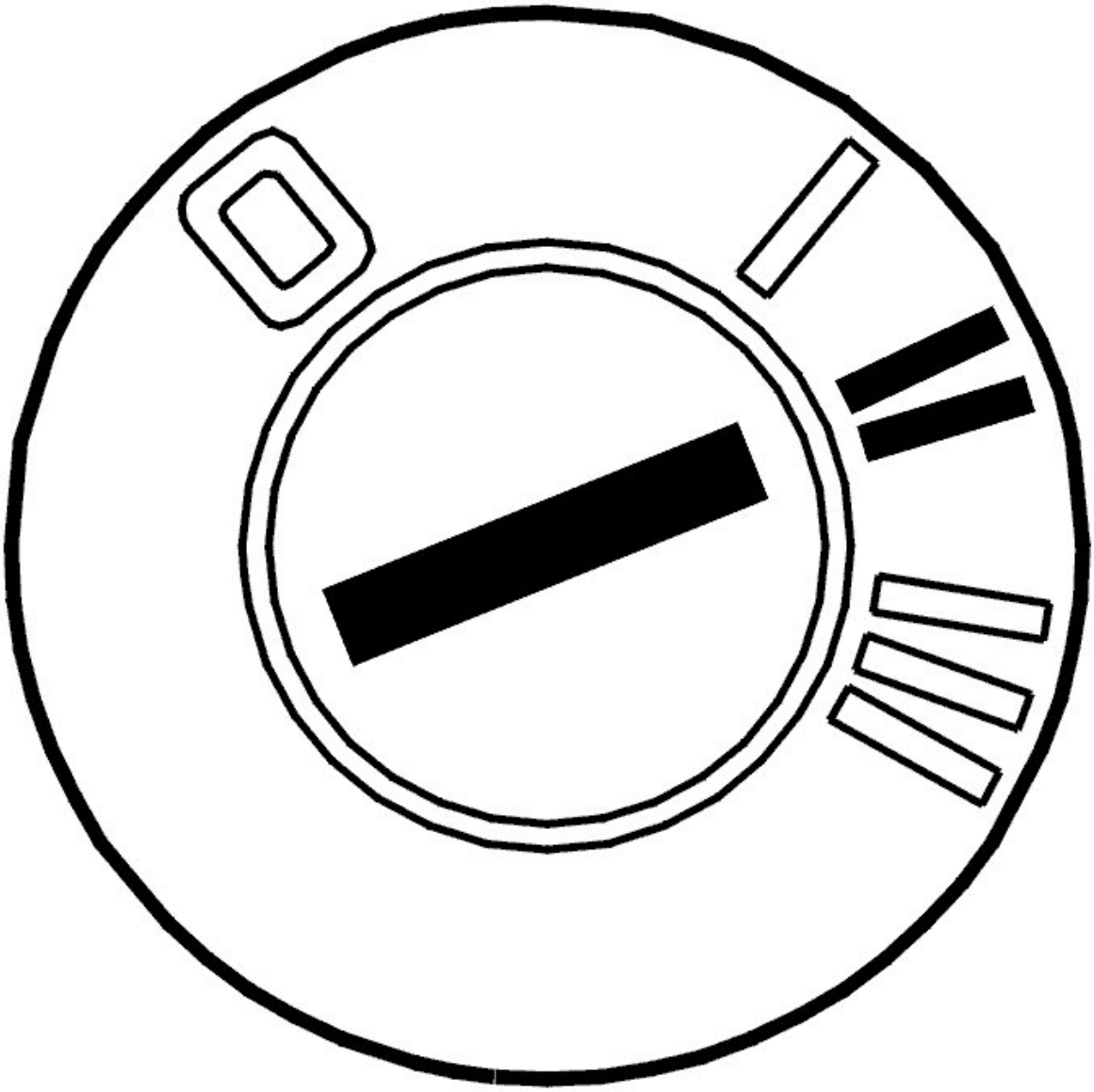
Other information:

- For information about programming and replacing the RTI control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Activate the System test to test the DVD player. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.
Check if the DVD player is OK or not. If the DVD player is functioning, OK is displayed.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the DVD player OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) RTI-2100 is stored if the road traffic information (RTI) control module registers that communication with the DVD player is broken.

Possible source
- The DVD player does not reply to communication from the road traffic information (RTI) control module after 10 attempts.

Fault symptom[s]
- Information on the display is not updated.

Signal Missing

Signal missing

Checking the component

Check that the DVD disc is not damaged or scratched. Check that there is no damp on the disc.
Replace the disc if it is damaged or scratched. Let the disc dry out if it is damp.

Other information:
- For information about programming and replacing the road traffic information (RTI) control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair
- For information about signals and connectors, see Signal specification, RTI See: Accessories and Optional Equipment/Navigation System/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specifications, Road Traffic Information (RTI).

Is the DVD player OK?

Yes - **No Fault Found**

No - Replacing the component

Replacing the component

Hint: The DVD player is integrated in the road traffic information (RTI) control module.

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The RTI control module must be programmed in order to function after replacement.

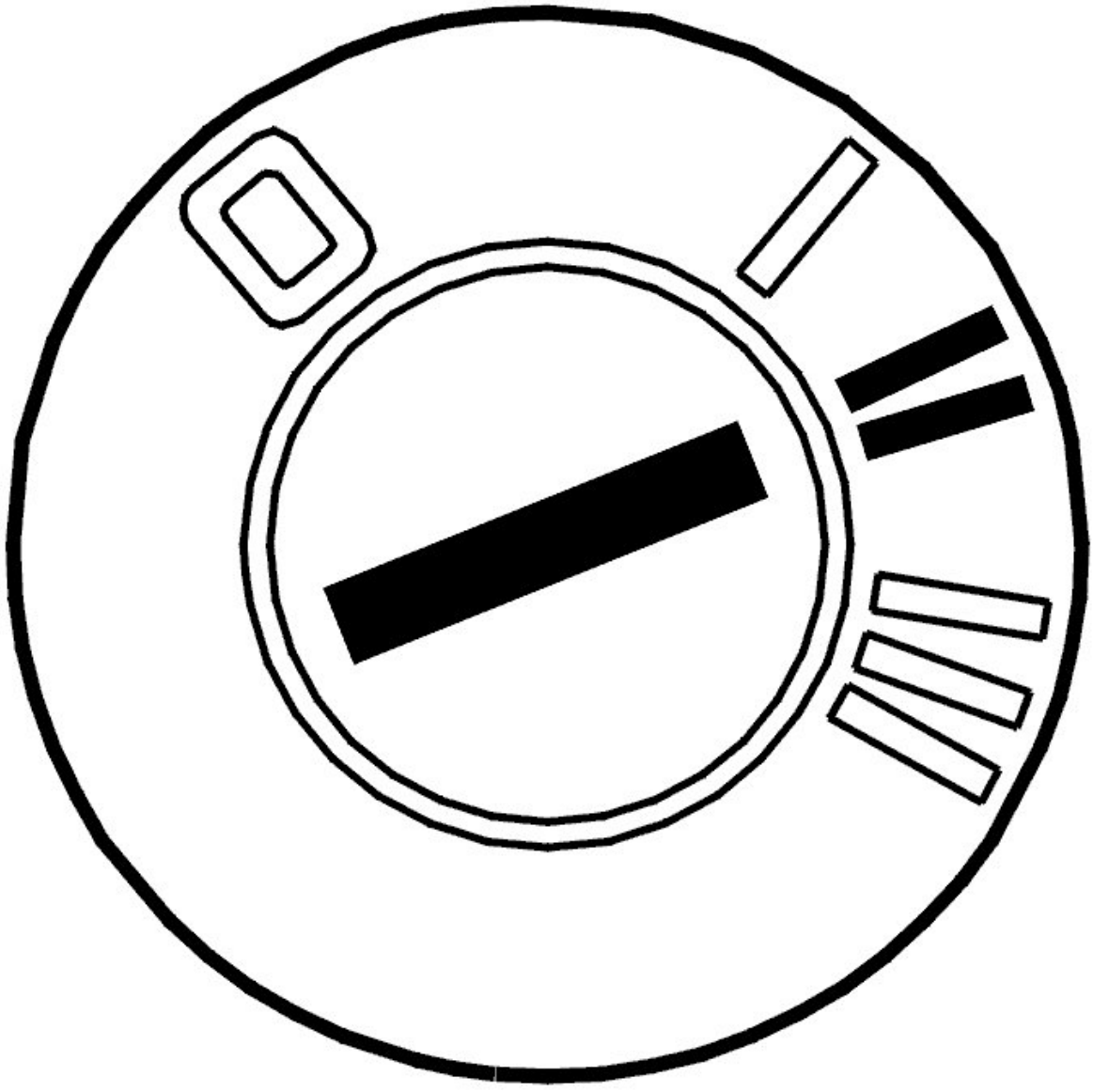
Other information:

- For information about programming and replacing the road traffic information (RTI) control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Reinstall the connectors, components etc.

- Ignition on.

Activate the System test to test the DVD player. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.
Check if the DVD player is OK or not. If the DVD player is functioning, OK is displayed.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the DVD player OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated GPS receiver.

Possible source

- The GPS receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]

- The position of the car on the road map is incorrect

Internal Fault. Permanent Fault

Internal fault. Permanent fault

Replacing the component

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The RTI control module must be programmed in order to function

after replacement.

Other information:

- For information about programming and replacing the RTI control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

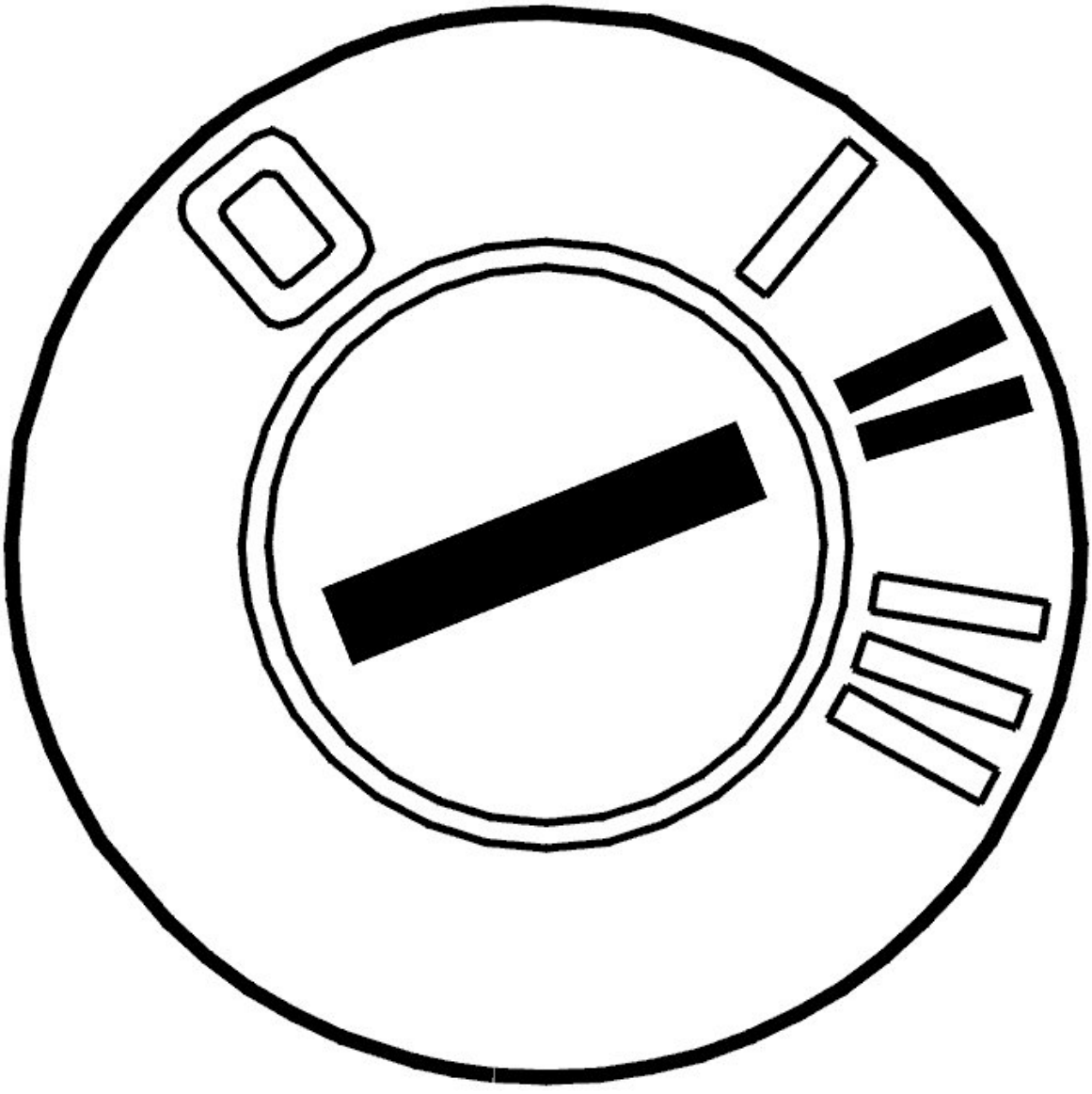
Continue - Verification

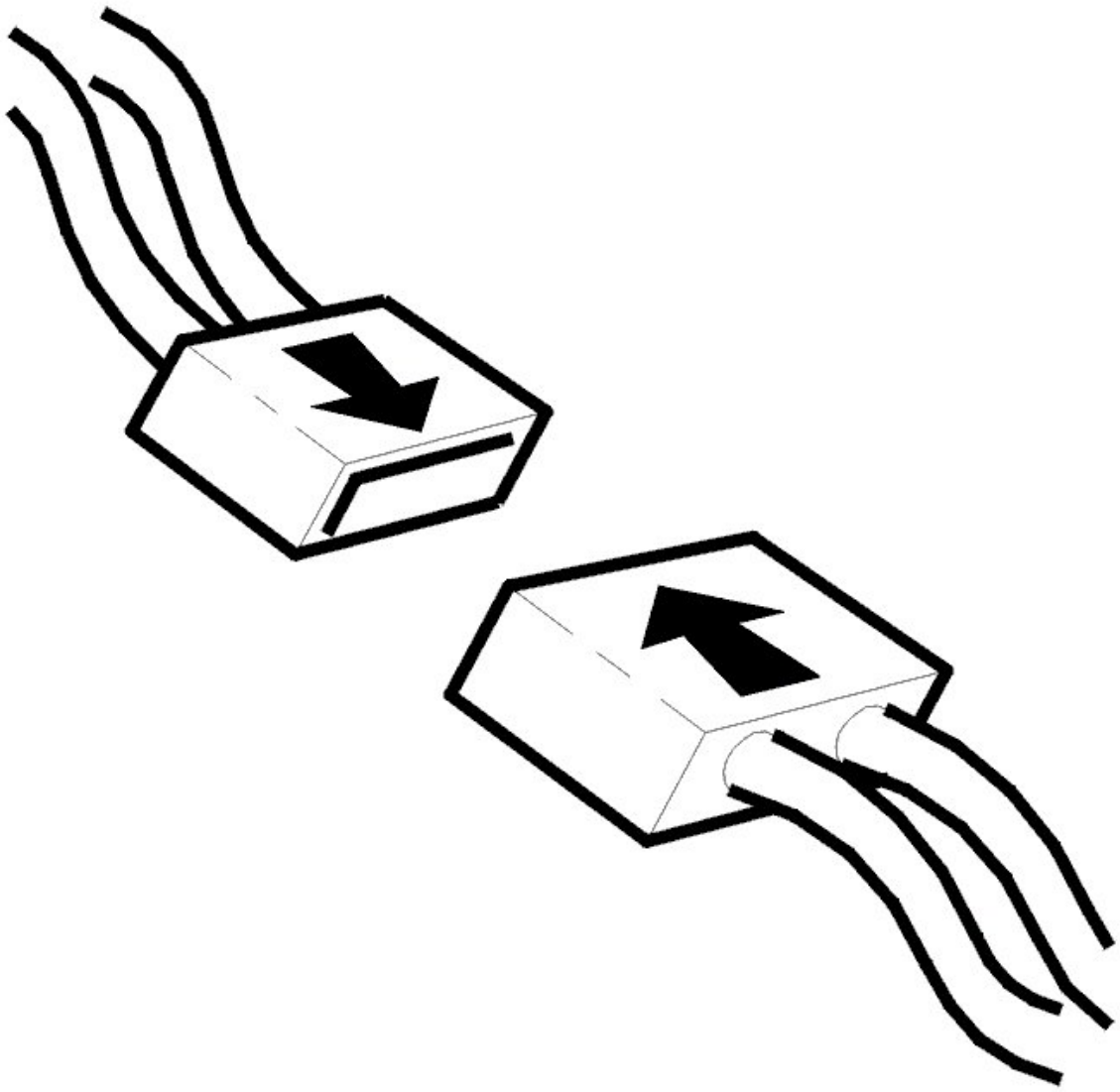
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate System test to test the GPS receiver functions. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.

Check that the GPS receiver functions.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the GPS receiver OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated GPS receiver.

Possible source
- The GPS receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]
- The position of the car on the road map is incorrect

Internal Fault. Intermittent Fault

Internal fault. Intermittent fault

Fault-tracing information

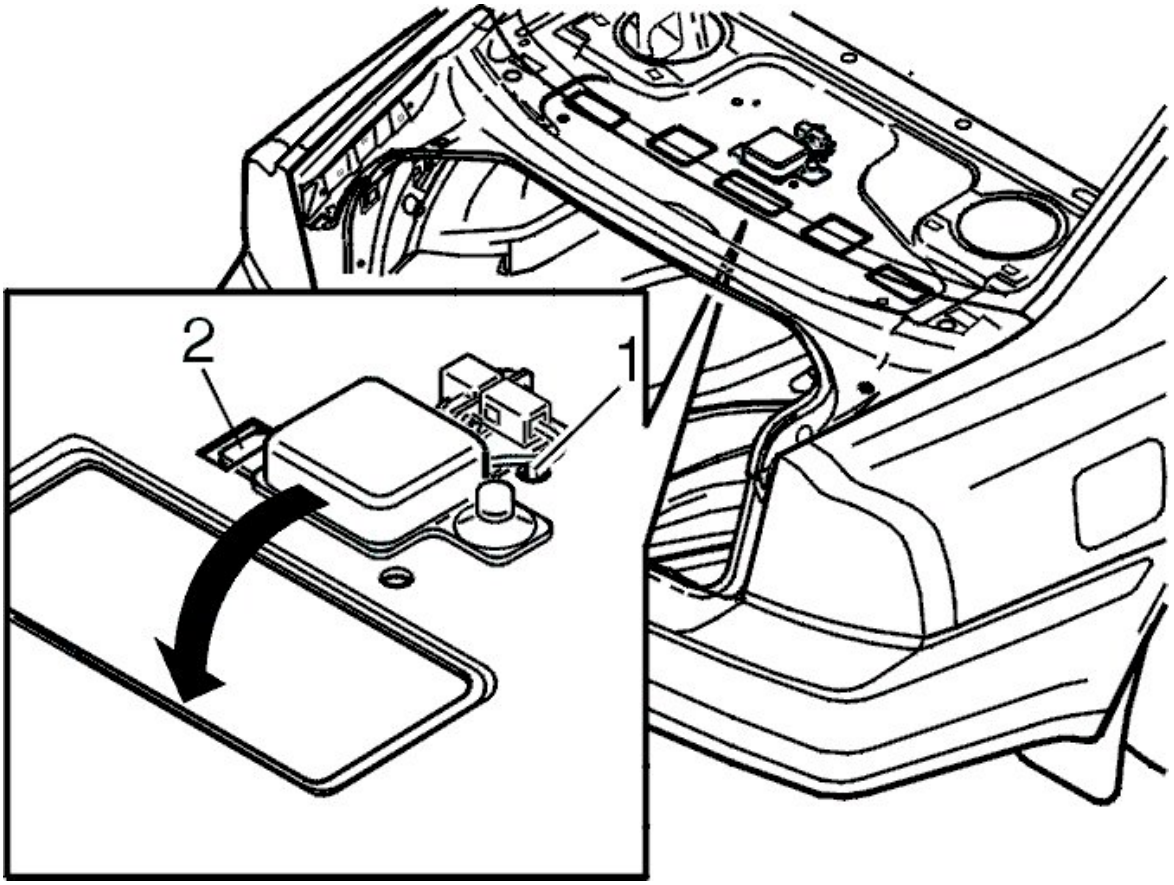
The diagnostic trouble code (DTC) is stored if there is a fault in the GPS receiver. No further corrective action is required if the diagnostic trouble code (DTC) does not recur.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code is generated if the road traffic information module (RTI) registers that there is no signal from the GPS antenna or that the GPS antenna consumes more or less current than 20-25 mA.

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the terminals
- Open-circuit or short-circuit to ground on the cable between the GPS antenna and the GPS receiver, which is integrated with the road traffic information module (RTI).
- Defective GPS antenna
- GPS antenna not connected.

Fault symptom[s]
- The car's position on the map is incorrect.

Signal Missing

Signal missing

Checking wiring and terminals

Check the connector between the road traffic information (RTI) control module and the GPS antenna. Check for contact resistance and oxidation. Check the wiring between the GPS antenna and road traffic information (RTI) control module terminals #G1 and #G2. Check for a short-circuit to ground. Check for an open-circuit.

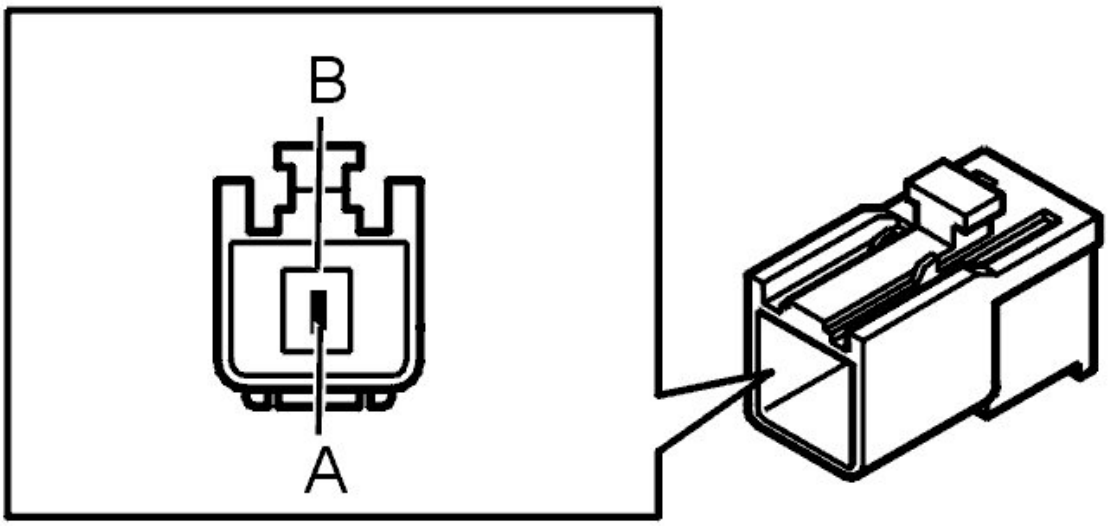
Hint: If the GPS antenna is using more than 100 mA, the current is "shut off" in the control module and drops to 0 mA.

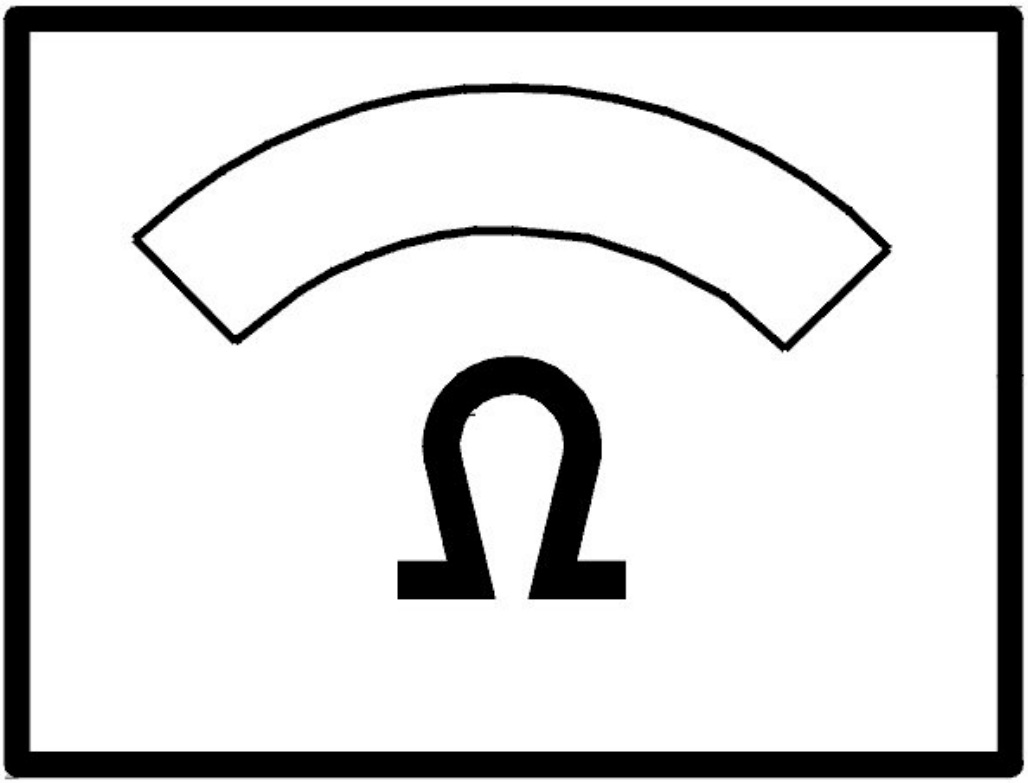
Remedy as necessary.

Other information
- To connect the breakout box, see Connecting the breakout box to the Road Traffic Information (RTI) control module See: Accessories and Optional Equipment/Navigation System/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box to the Road Traffic Information (RTI) Control Module
- To access the GPS antenna, see Antenna, GPS, replacing See: Accessories and Optional Equipment/Antenna/Global Positioning System Antenna/Service and Repair
- For information about programming and replacing the road traffic information (RTI) control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair
- For information about signals and connectors, see Signal specification, RTI See: Accessories and Optional Equipment/Navigation

System/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specifications, Road Traffic Information (RTI)

- To fault-trace the wiring and connections, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

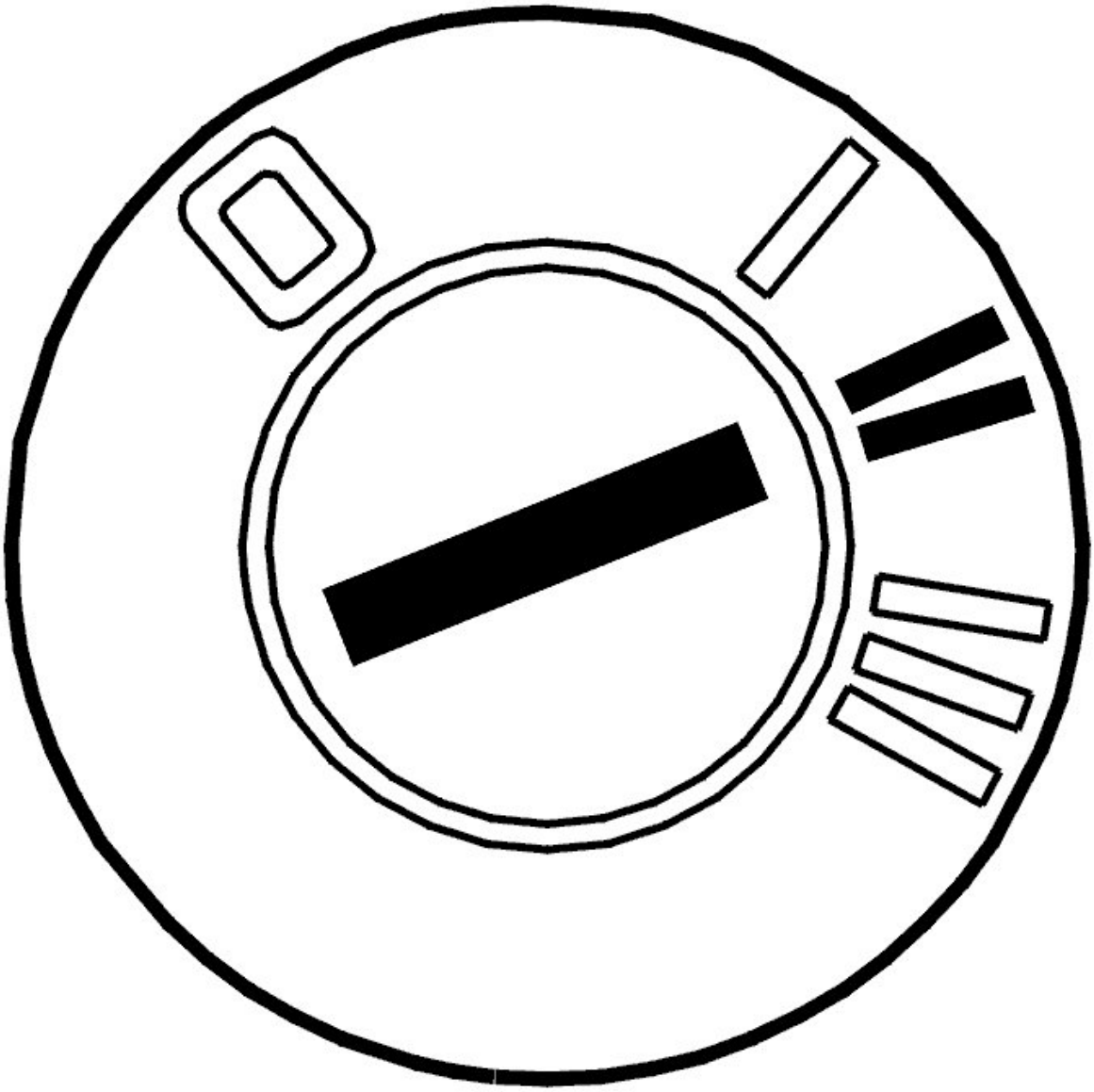
Fault-tracing indicates an internal fault in the GPS antenna. Replace according to Antenna, GPS, replacing See: Accessories and Optional Equipment/Antenna/Global Positioning System Antenna/Service and Repair.

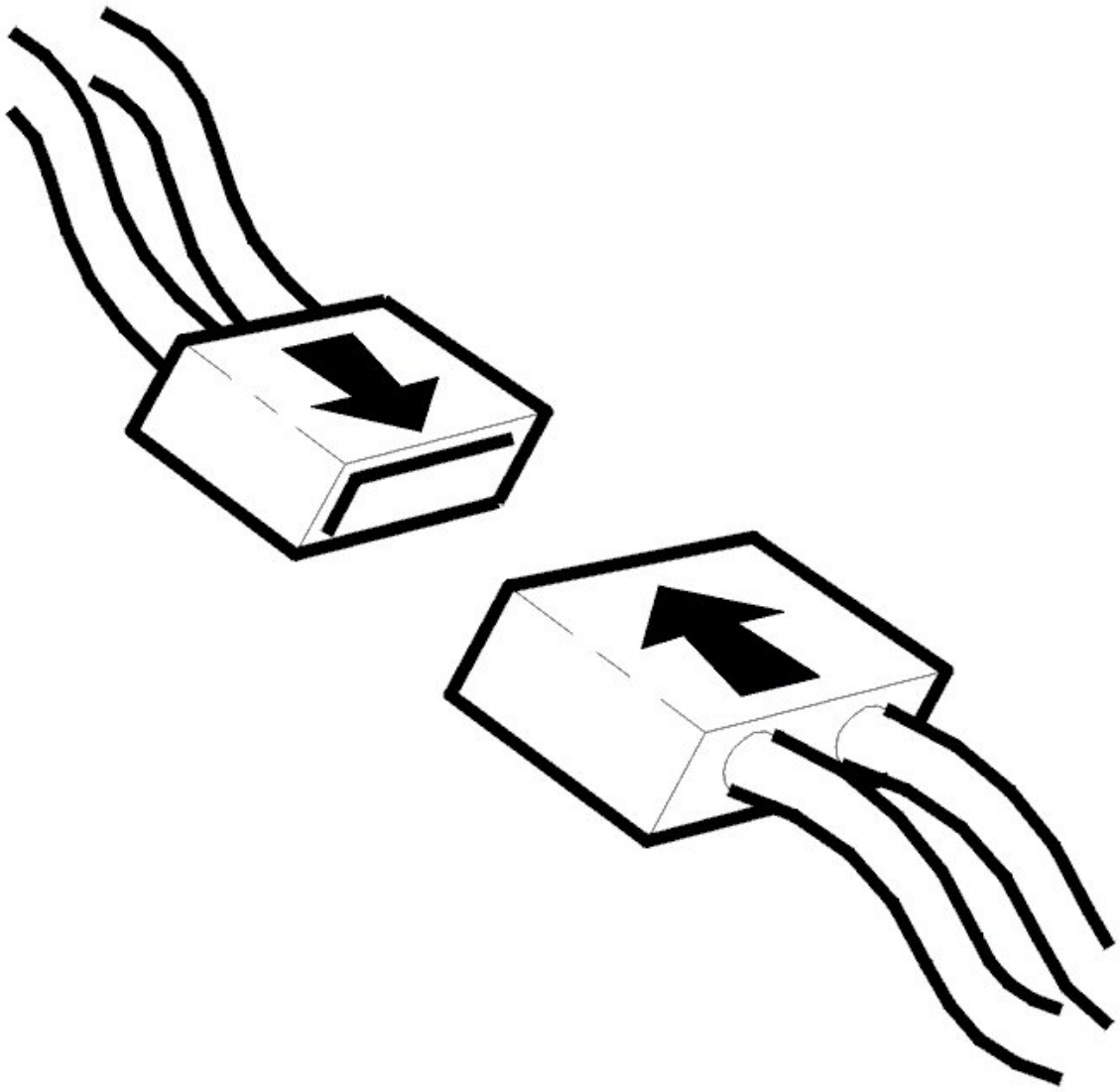
Select "Continue" when corrective action has been carried out.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Hint: Leave the car outside in an open place until the road traffic information (RTI) control module has found at least 3 satellites. This can take up to 15 minutes.

Is the system in contact with enough satellites?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Attempt New Test - Checking wiring and terminals

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated TMC receiver.

Possible source

- The TMC receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]

- Road map is not shown or not updated.

Internal Fault. Permanent Fault

Internal fault. Permanent fault

Replacing the component

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- For information about programming and replacing the RTI control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

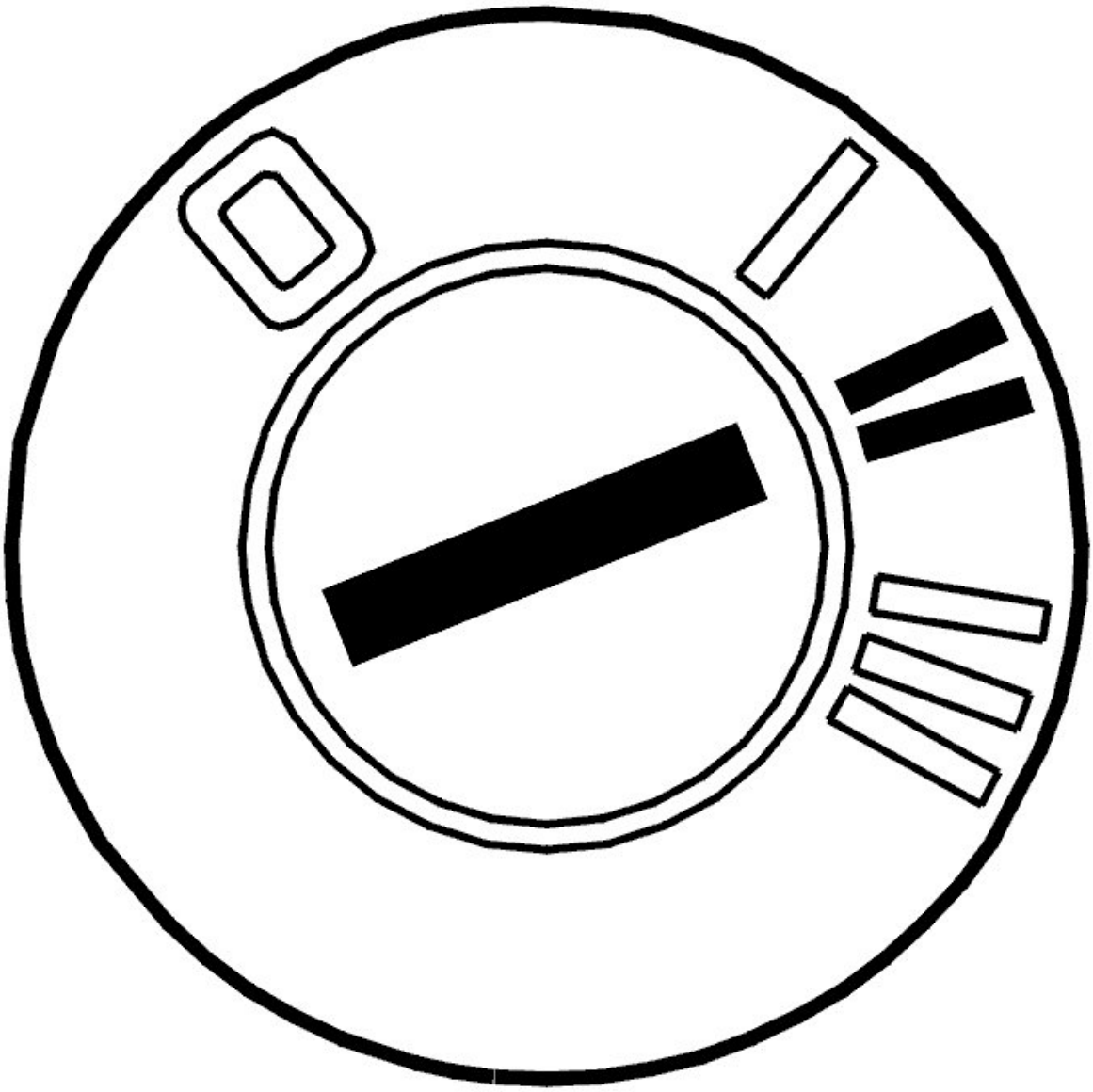
Continue - Verification

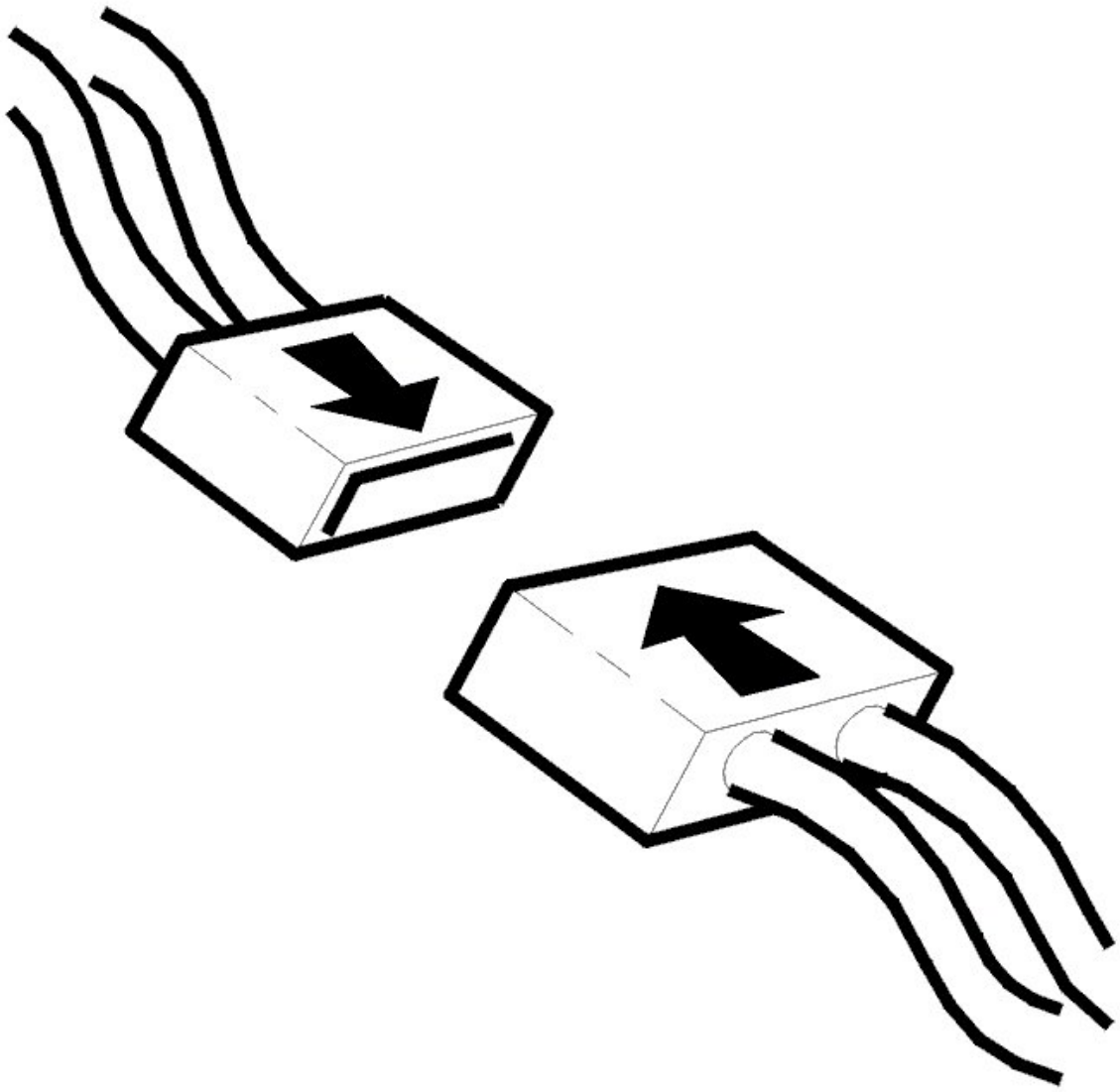
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate System test to test the functions of the traffic message channel (TMC) receiver. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.

Check that the TMC receiver functions.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the TMC receiver OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated TMC receiver.

Possible source
- The TMC receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]
- Road map is not shown or not updated.

Internal Fault. Intermittent Fault

Internal fault. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is a fault in the TMC receiver. No further corrective action is required if the diagnostic trouble code (DTC) does not recur.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated FM multiplex receiver.

Possible source
- The FM multiplex receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]
- Road map is not shown or not updated.

Internal Fault. Intermittent Fault

Internal fault. Intermittent fault

Fault-tracing information

The diagnostic trouble code (DTC) is stored if there is a fault in the FM multiplex receiver. No further corrective action is required if the diagnostic trouble code (DTC) does not recur.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The diagnostic trouble code is generated if the road traffic information module (RTI) registers a loss of communication with the integrated FM multiplex receiver.

Possible source
- The FM multiplex receiver does not respond to communication from the road traffic information module (RTI) within 30 seconds.

Fault symptom[s]
- Road map is not shown or not updated.

Internal Fault. Permanent Fault

Internal fault. Permanent fault

Replacing the component

Replace the RTI control module because an internal fault has been found.

Caution! A new RTI control module is delivered without software. The head unit of the RTI control module must be programmed in order to function after replacement.

Other information:
- For information about programming and replacing the RTI control module, see Road traffic information module (RTI), replacing See: Accessories and Optional Equipment/Navigation System/Navigation Module/Service and Repair.

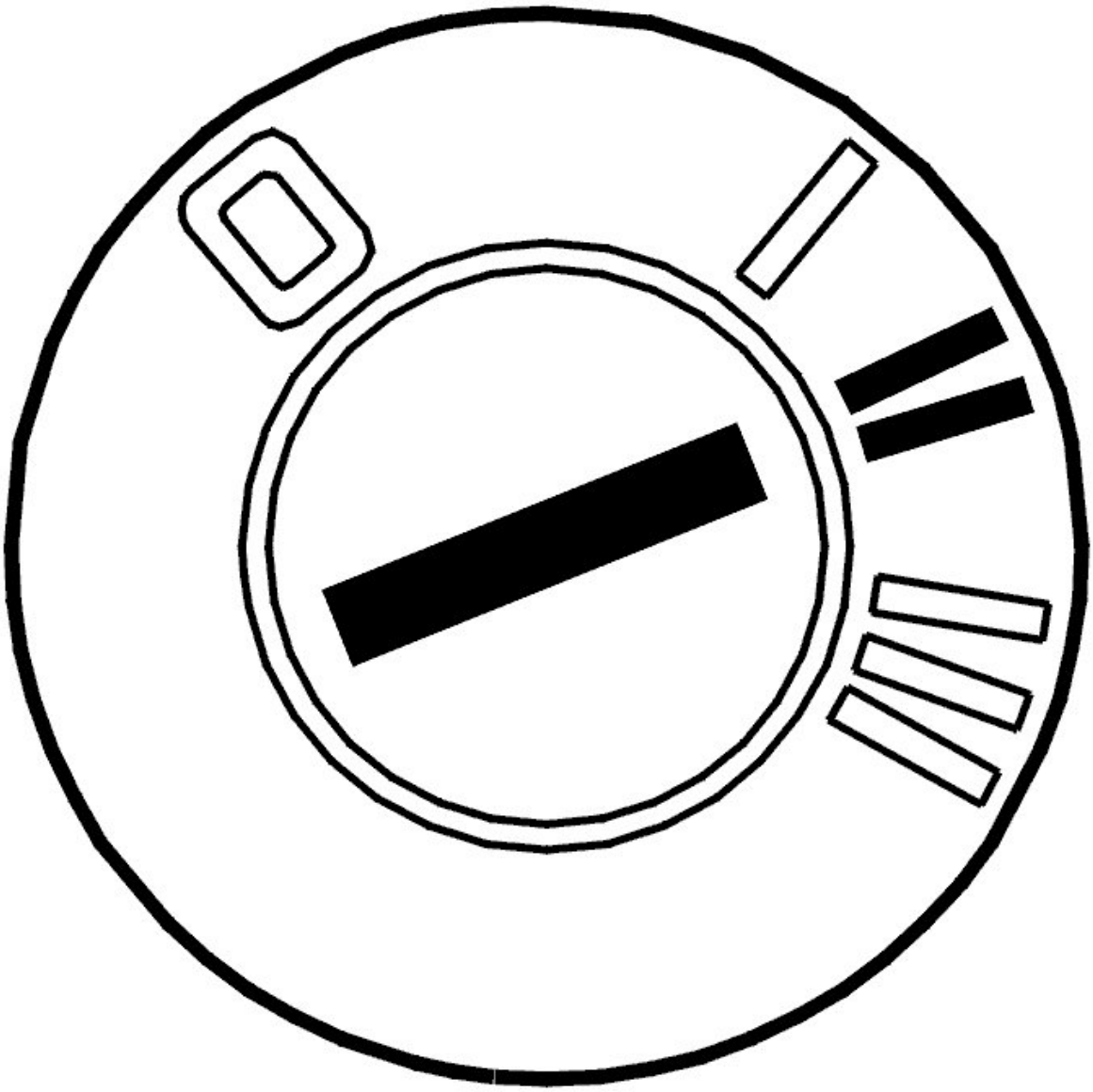
Continue - Verification

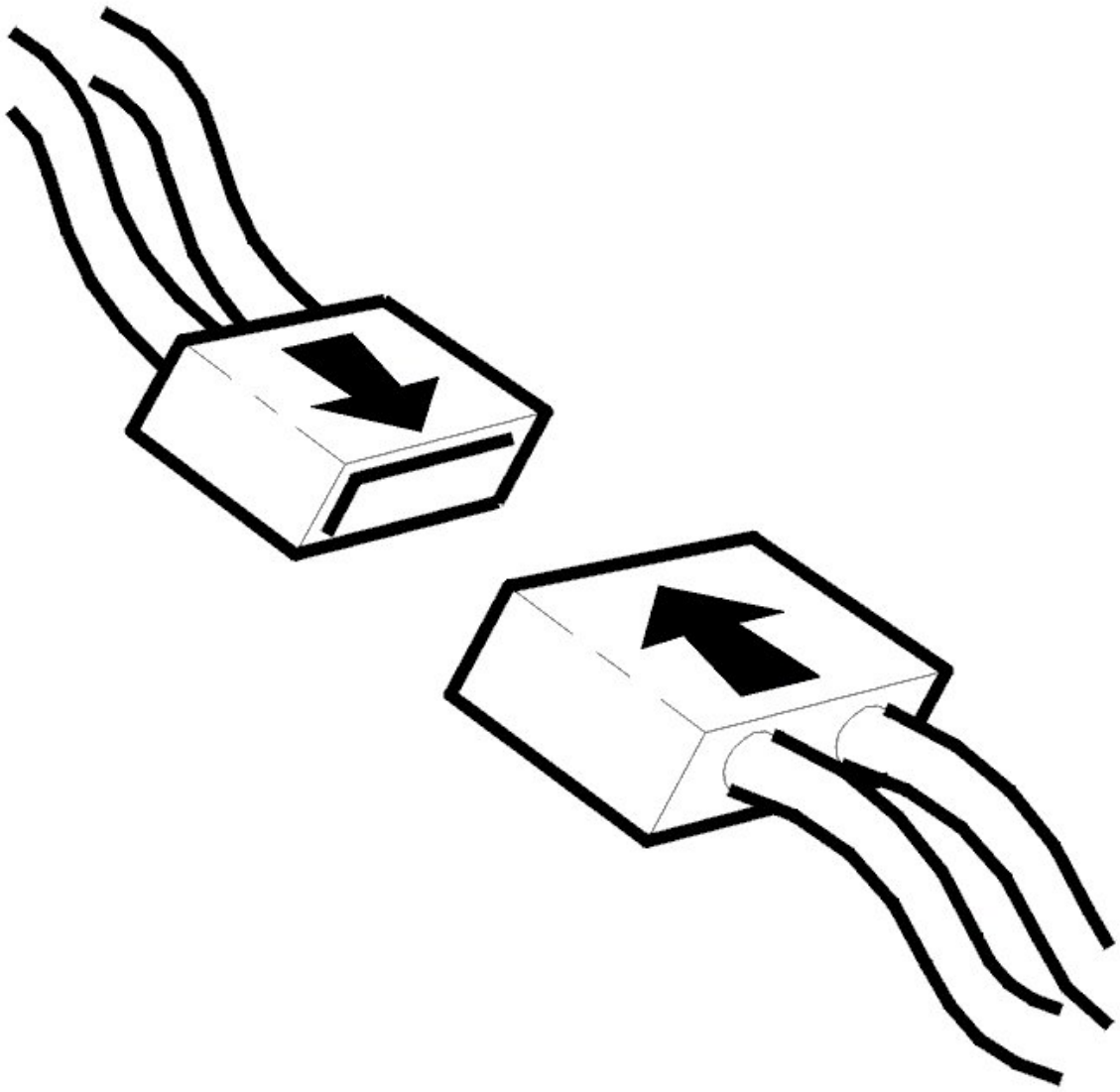
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate System test to test the functions of the FM multiplex receiver. See System Test See: Body and Frame/Body Control Systems/Testing and Inspection/Component Tests and General Diagnostics/System Test.

Check if the FM multiplex receiver functions.

Hint: Tell the customer that it may take 15 minutes of driving before the system is calibrated and functioning satisfactorily.

Is the FM multiplex receiver OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

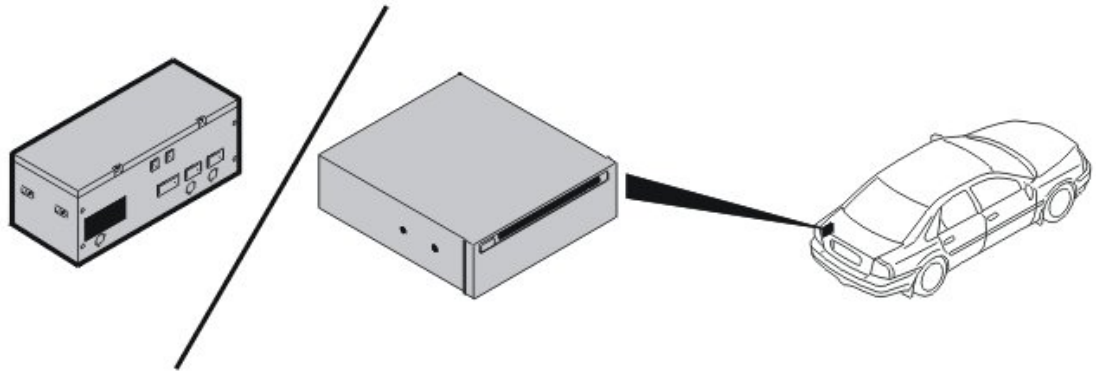
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the component

RTI-E001

Diagnostic trouble code (DTC) information RTI-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source
- Short-circuit between Control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the Control area network (CAN).

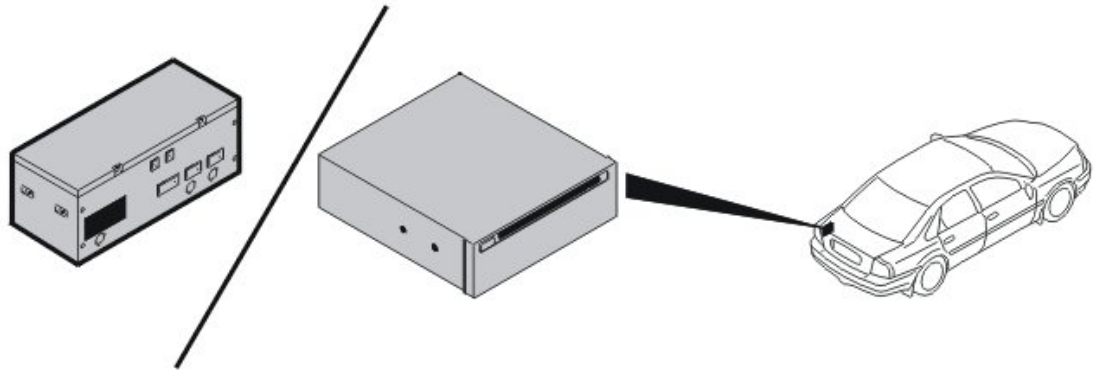
Fault symptom[s]
- The display for the road traffic information module (RTI) does not function
- The display does not deploy
- The car's position on the map is incorrect
- The RTI rheostat function does not function
- The buttons on the steering wheel are not working

- Traffic information is not displayed or updated.

RTI-E003

Diagnostic trouble code (DTC) information RTI-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

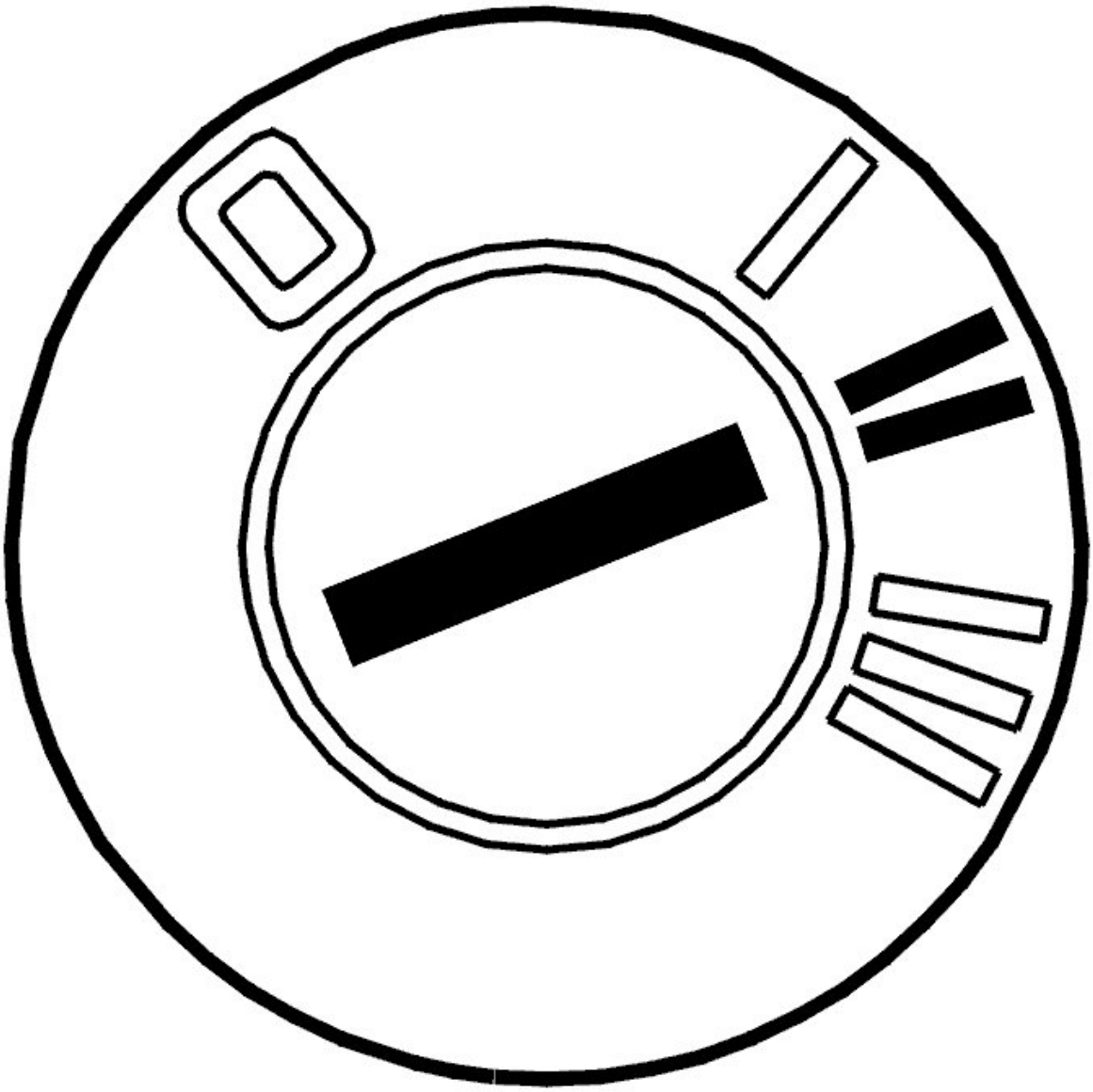
Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The display for the road traffic information module (RTI) does not function
- The display does not deploy
- The car's position on the map is incorrect
- The RTI rheostat function does not function
- The buttons on the steering wheel are not working
- Traffic information is not displayed or updated.

RTI-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

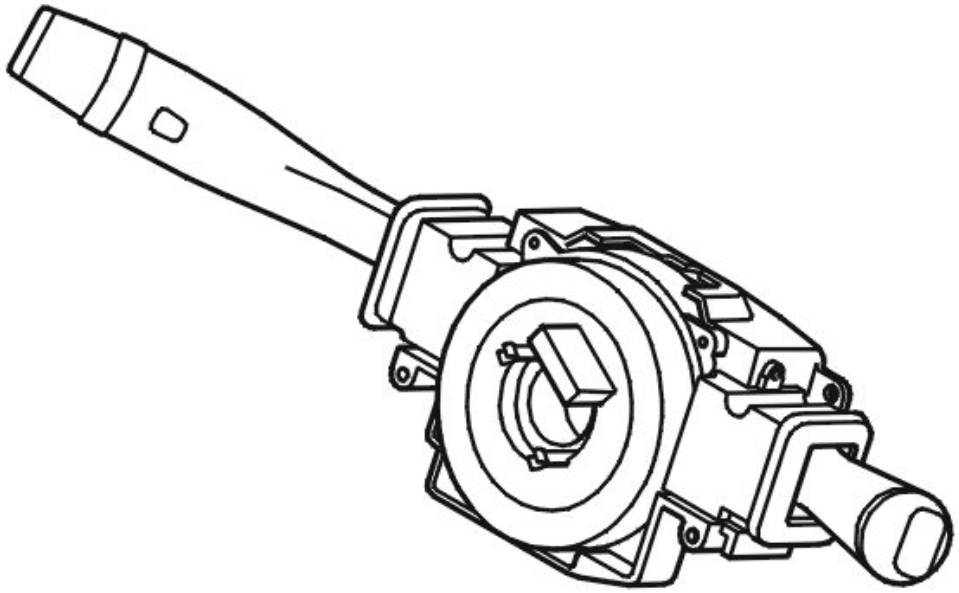
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-000A

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

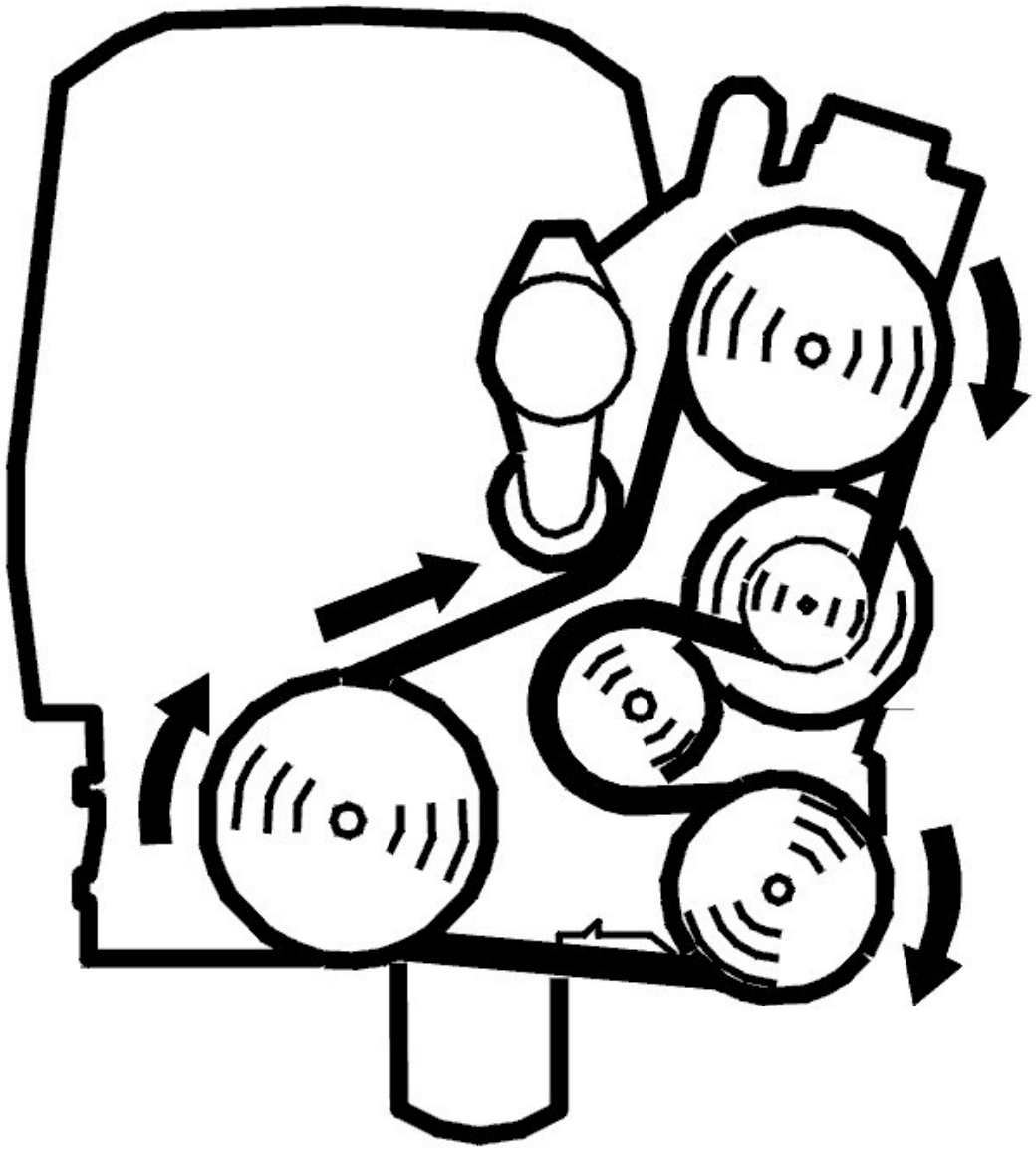
Possible source
- Internal fault in the steering wheel angle sensor.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering

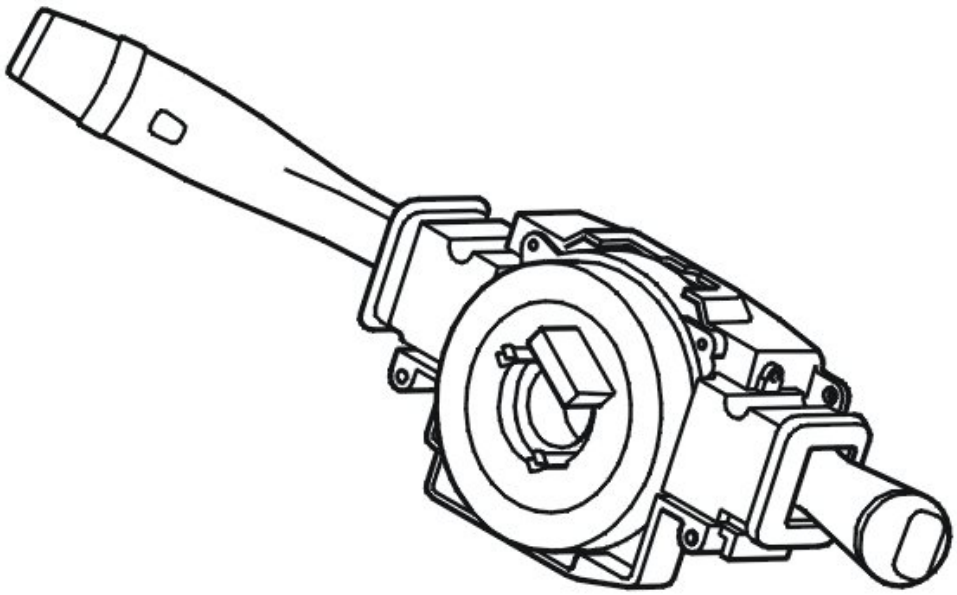
wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-000B

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

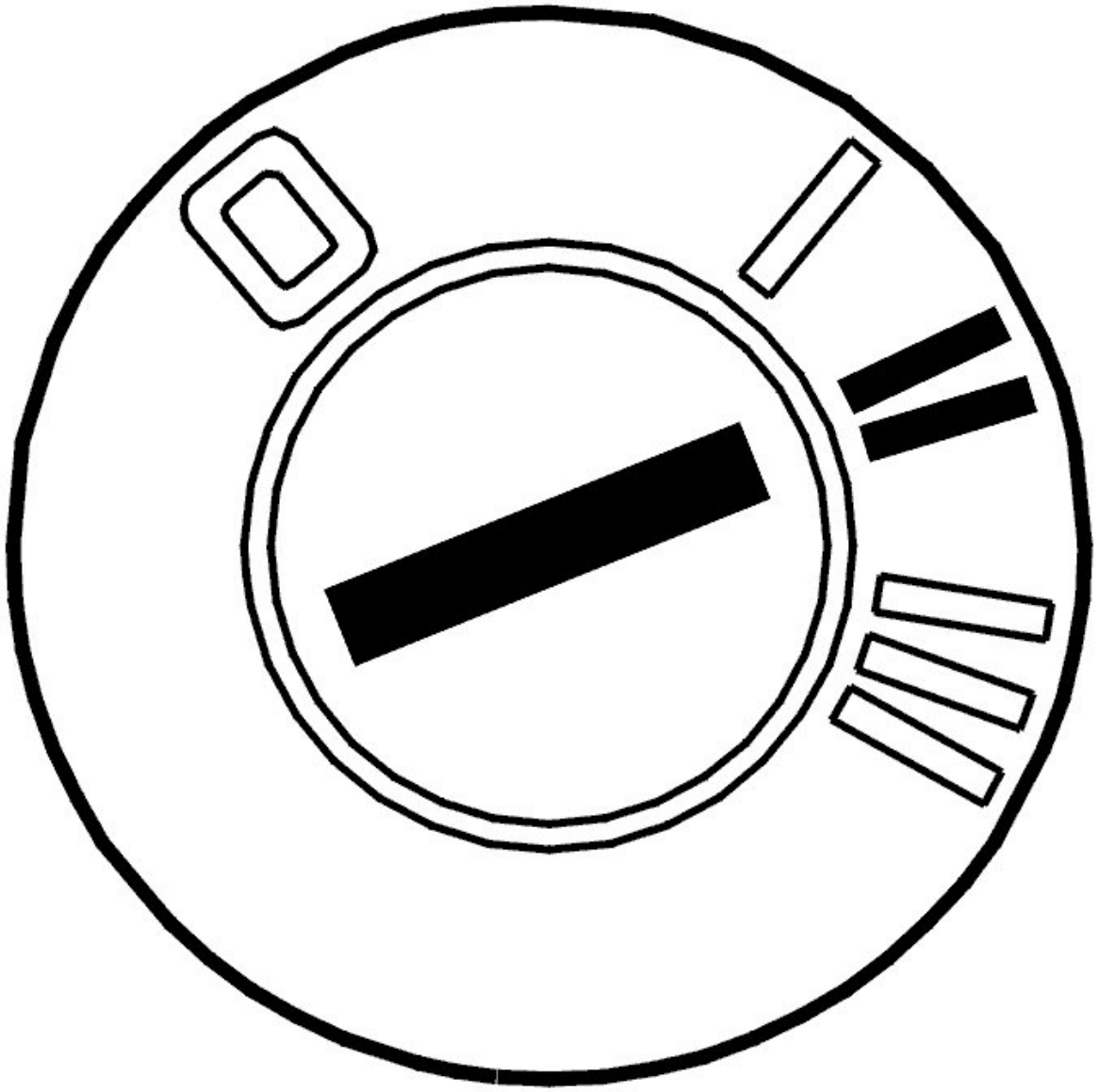
Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

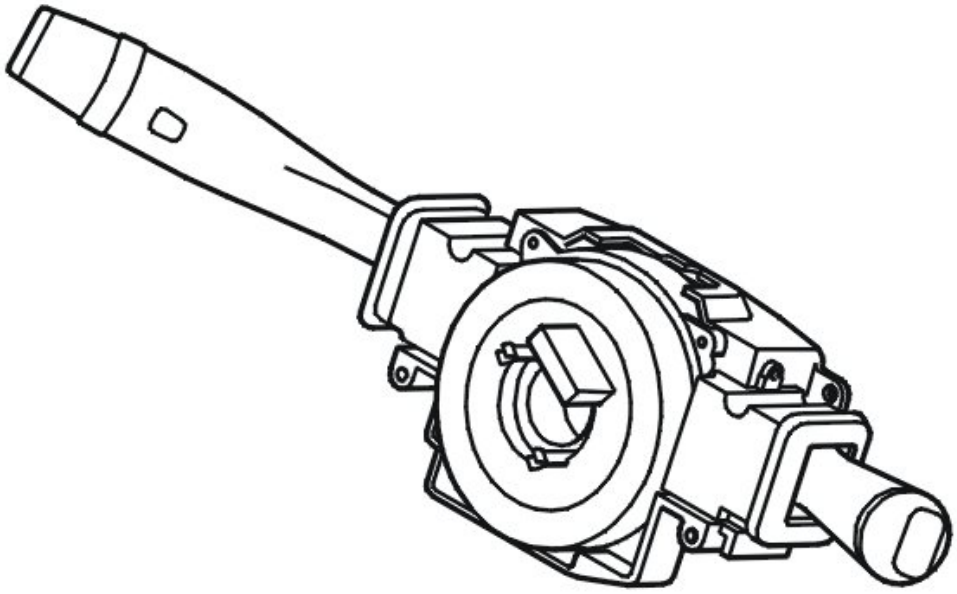
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-000C

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value

- The stability function is blocked.

Possible source

- Internal fault in the steering wheel angle sensor module (SAS).

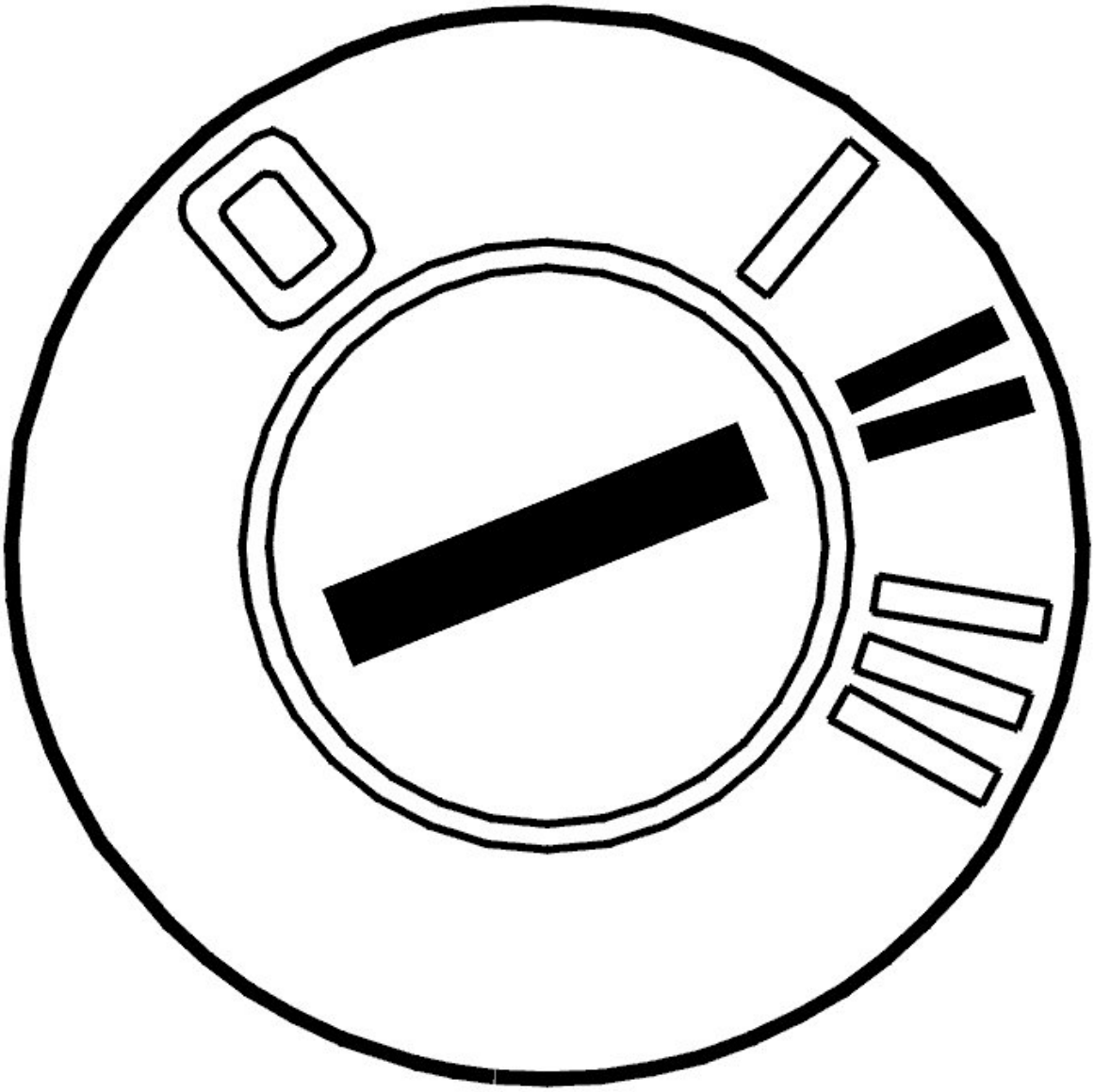
Fault symptom[s]

- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

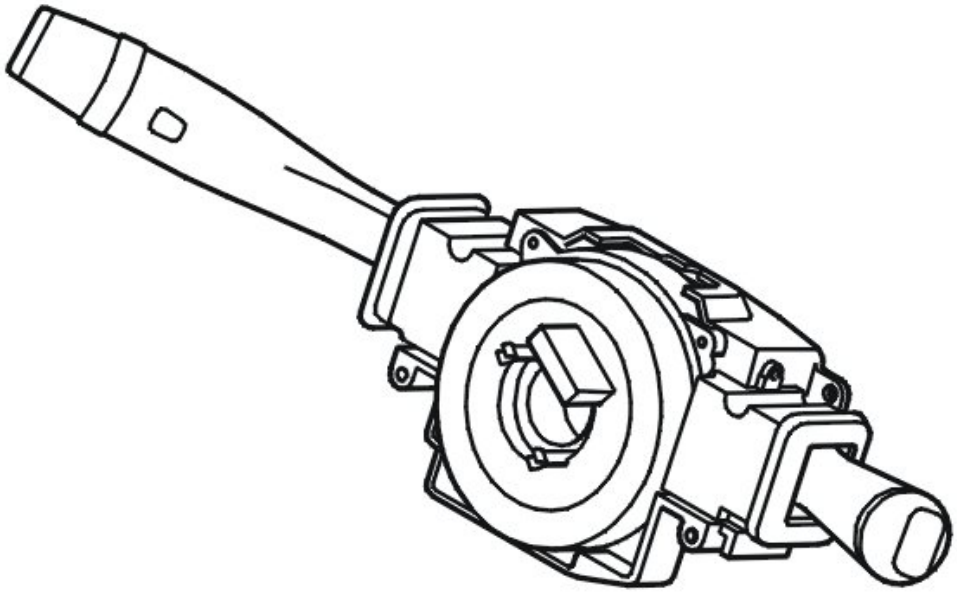
Other information
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-000E

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

Possible source
- Internal fault in the steering wheel angle sensor.

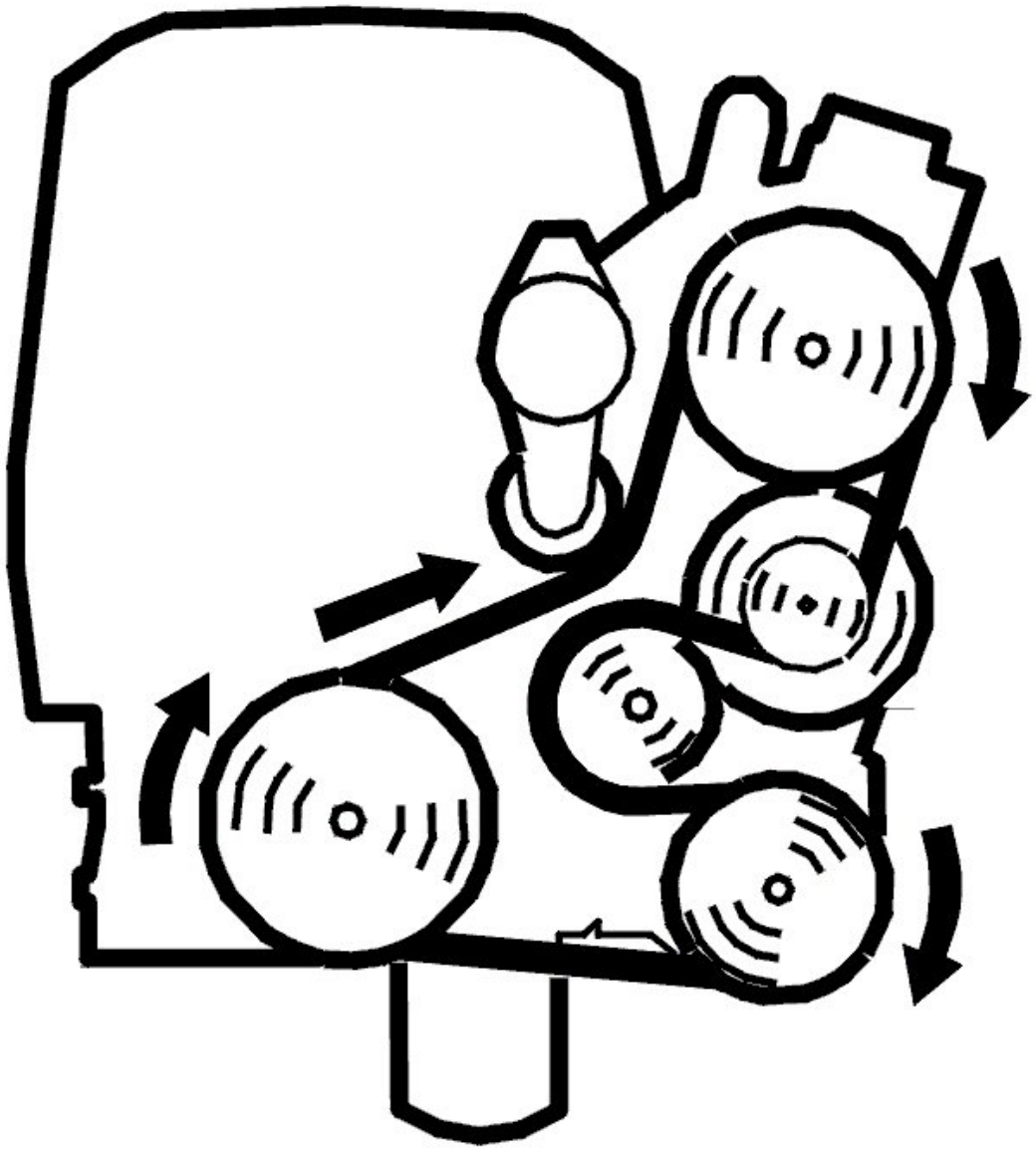
Fault symptom[s]

- Anti-spin warning lamp lit.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates

that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

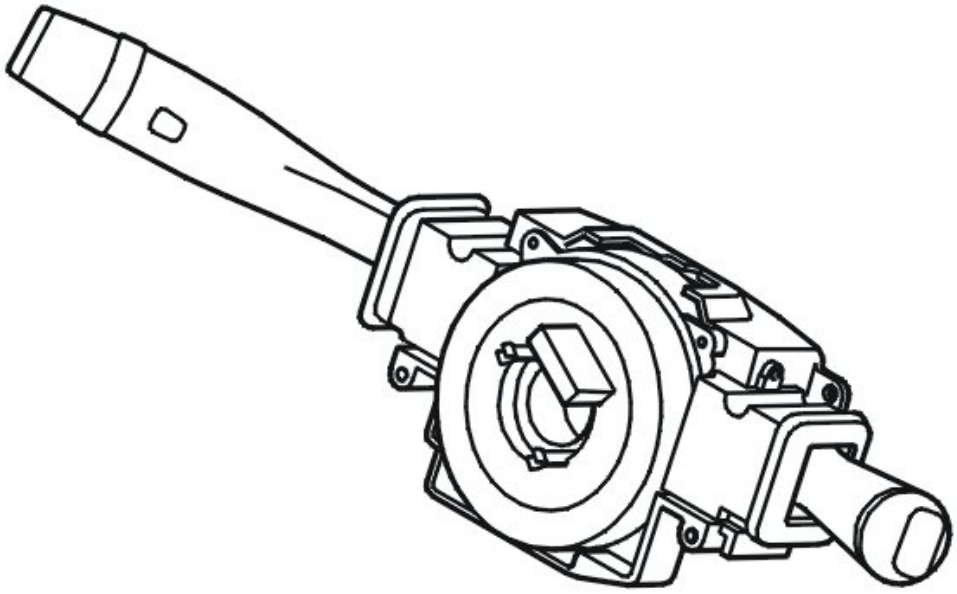
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-000F

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value

- The stability function is blocked.

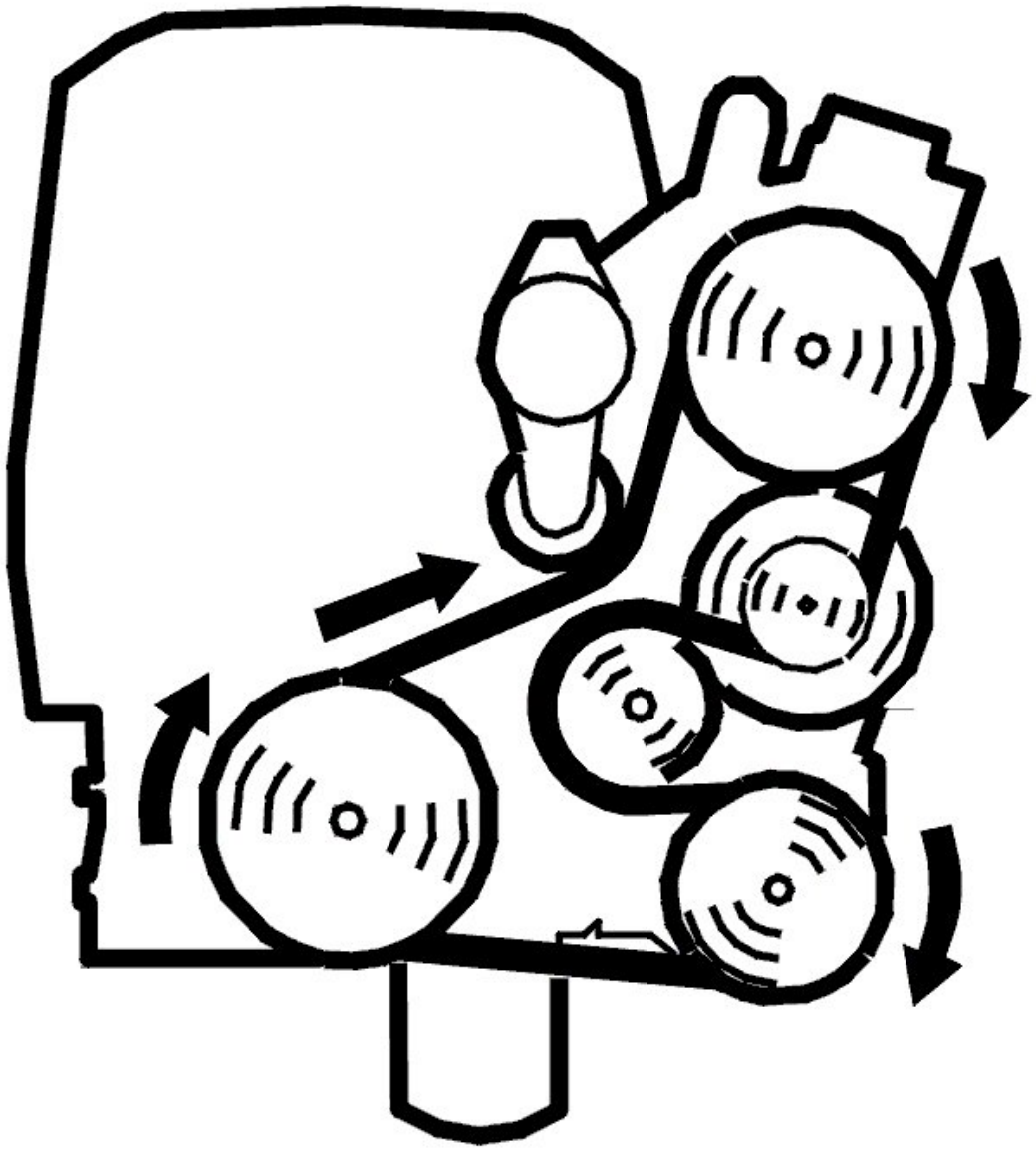
Possible source
- Internal fault in the steering wheel angle sensor.

Fault symptom[s]
- Anti-spin warning lamp lit.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.

- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

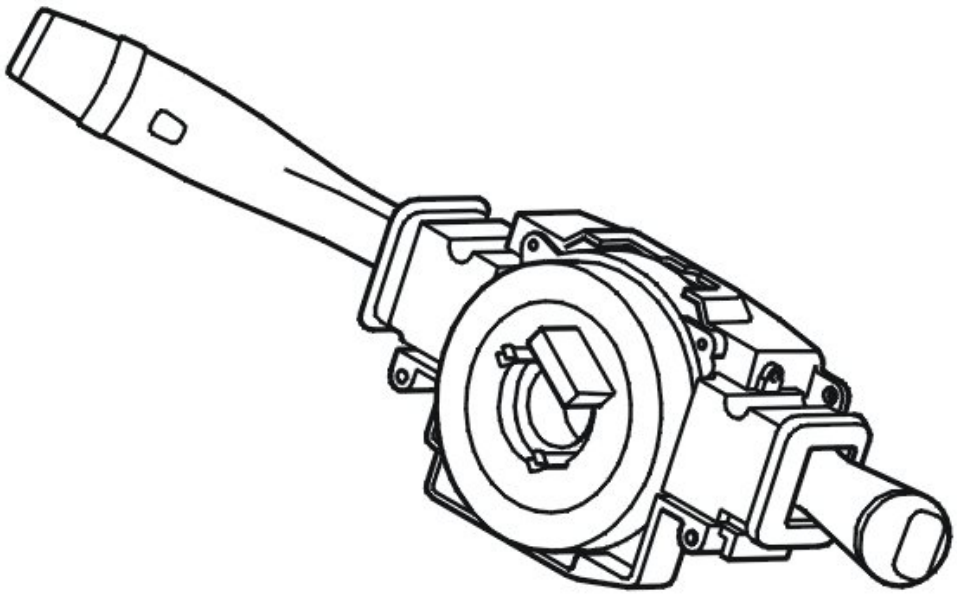
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0001

Condition



Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The steering wheel angle sensor module (SAS) compares the voltage with a known value from the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that the voltage differs from the known value.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is

carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

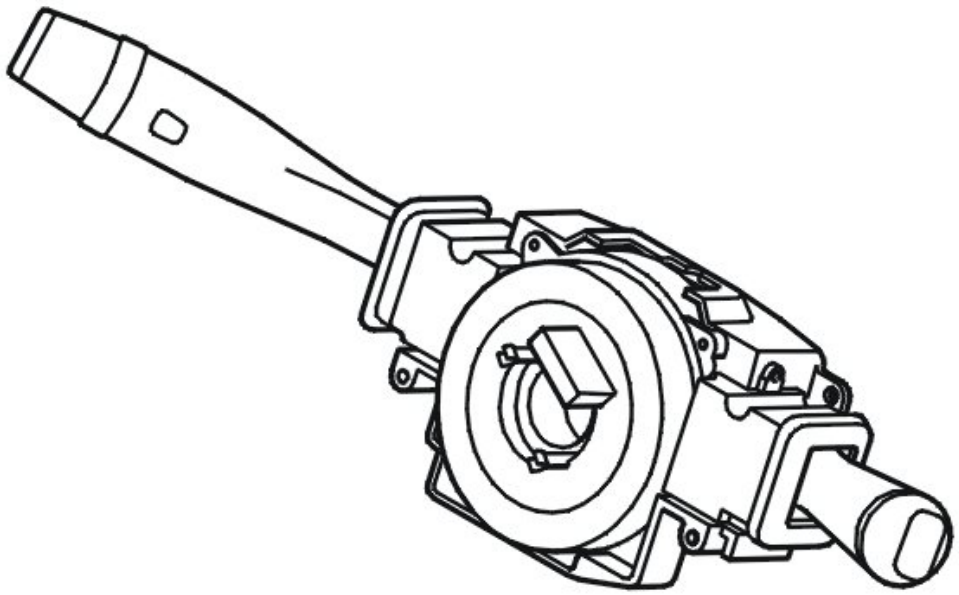
Faulty Voltage

Faulty voltage

Replacing the control module

The steering wheel angle sensor module (SAS) has registered an internal fault. Replace the control module

Other information
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair.

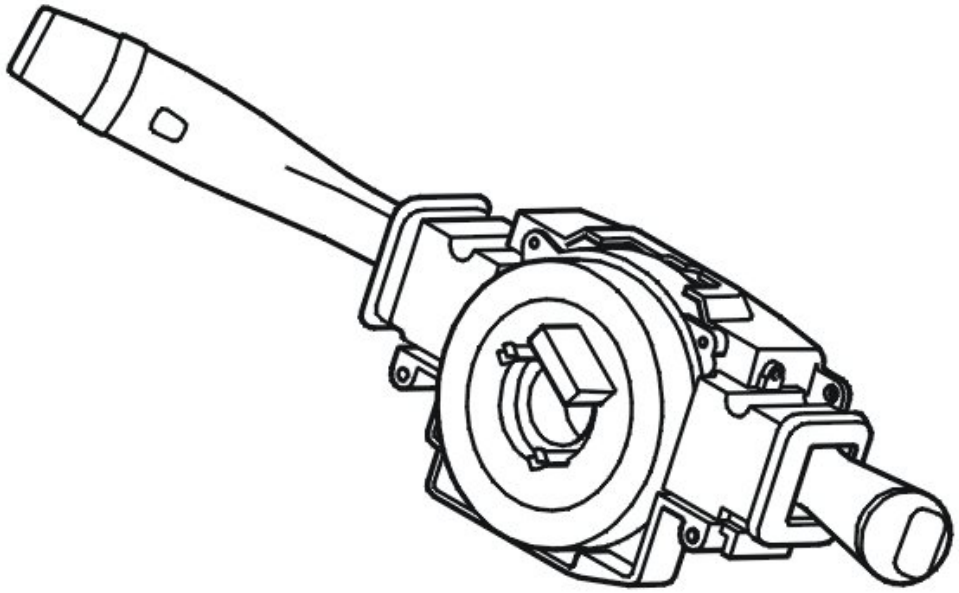


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0002

Condition



Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
Steering wheel angle sensor module (SAS) contains two processors which work together. The processors continuously check the communication between them. The diagnostic trouble code (DTC) is stored if the main processor in the steering wheel angle sensor module (SAS) registers that the information is incorrect in any way.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

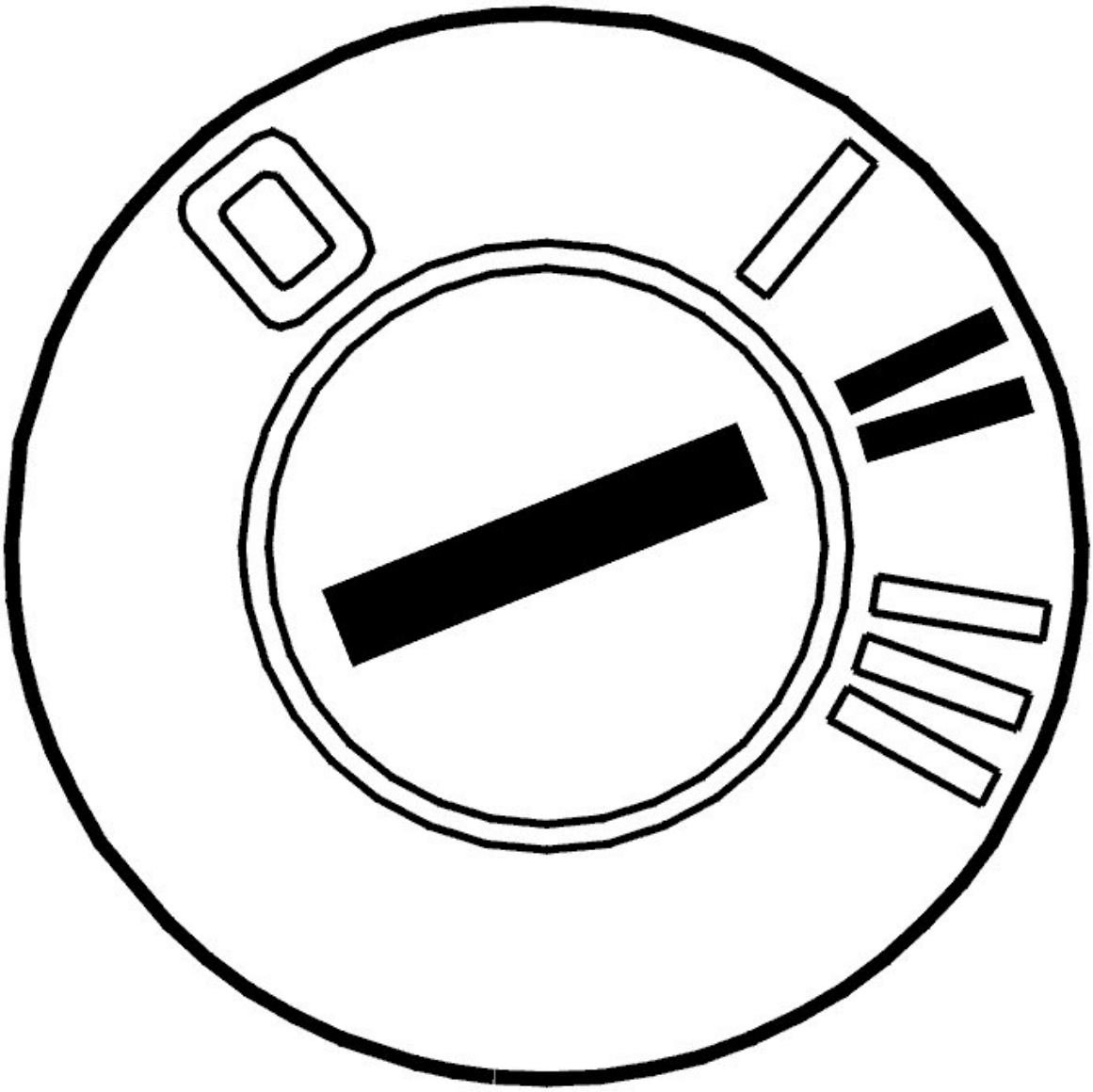
Possible source
- Internal fault in the control module.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

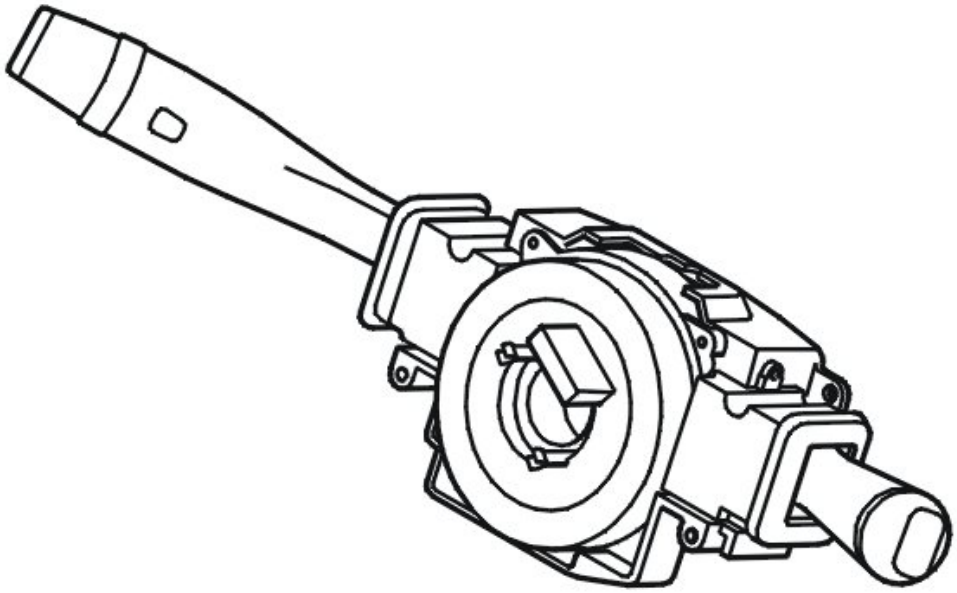
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0003

Condition



Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that the steering wheel angle exceeds 720°in any direction.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

Possible source
- Incorrectly installed steering wheel angle sensor.

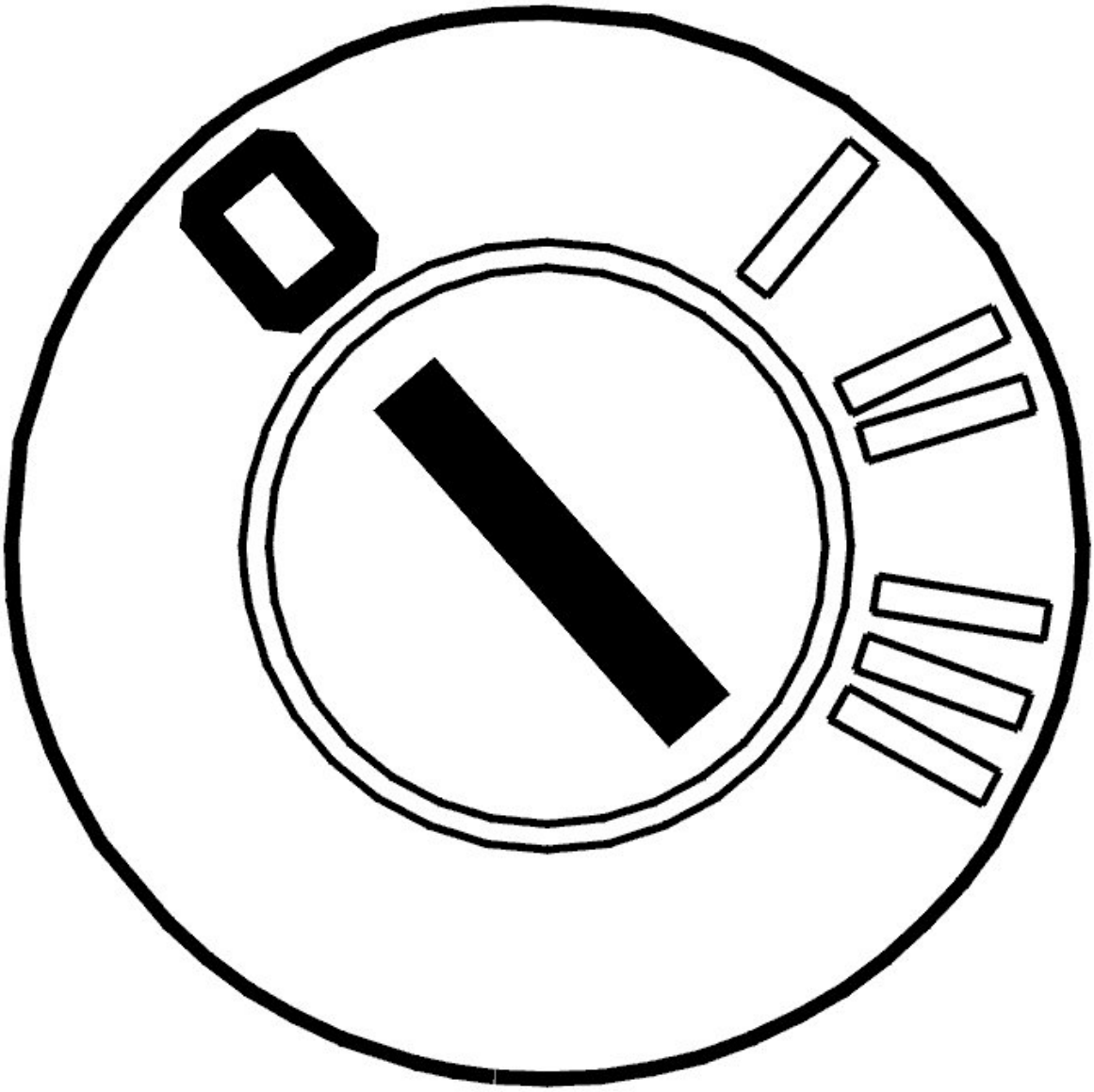
Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Checking the installation of the steering wheel angle sensor

Note! The diagnostic trouble code (DTC) indicates that the steering wheel angle sensor is incorrectly installed. When installing contact reel/steering wheel angle sensor it is important that the unit is installed correctly. If the unit is installed with the revolving center section one revolution out, internal components may be twisted and broken at full lock. If this is suspected, replace the contact reel.



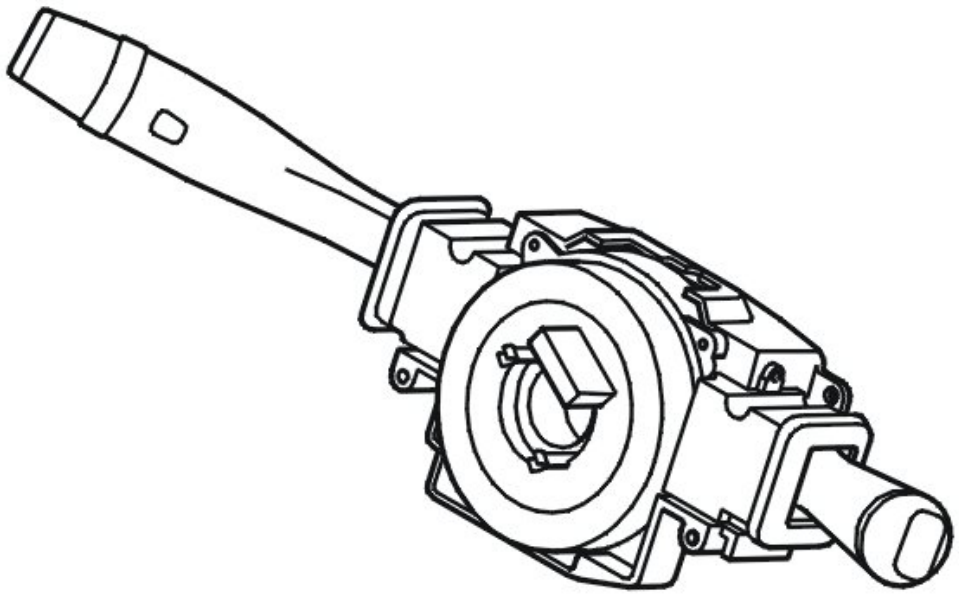
- Ignition off
- Set the front wheels to the straight ahead position
- Remove the steering wheel
- Ignition on
- Turn the steering wheel more than 5° in any direction to initialize the steering wheel angle sensor module (SAS)
- Click on the VCT2000 symbol to read off the steering wheel angle.

Check that the steering wheel angle is 0° when the front wheels are pointing straight ahead. Set the wheels to the straight ahead position. Lock the steering wheel lock. Then adjust the contact reel so that the yellow marking can be seen in the window of the contact reel when the locking screw for the contact reel is in the correct position.

Note! The diagnostic trouble code (DTC) for the steering wheel buttons is stored in the central electronic module (CEM) if the ignition key is turned to position II when the steering wheel is removed.

Other information

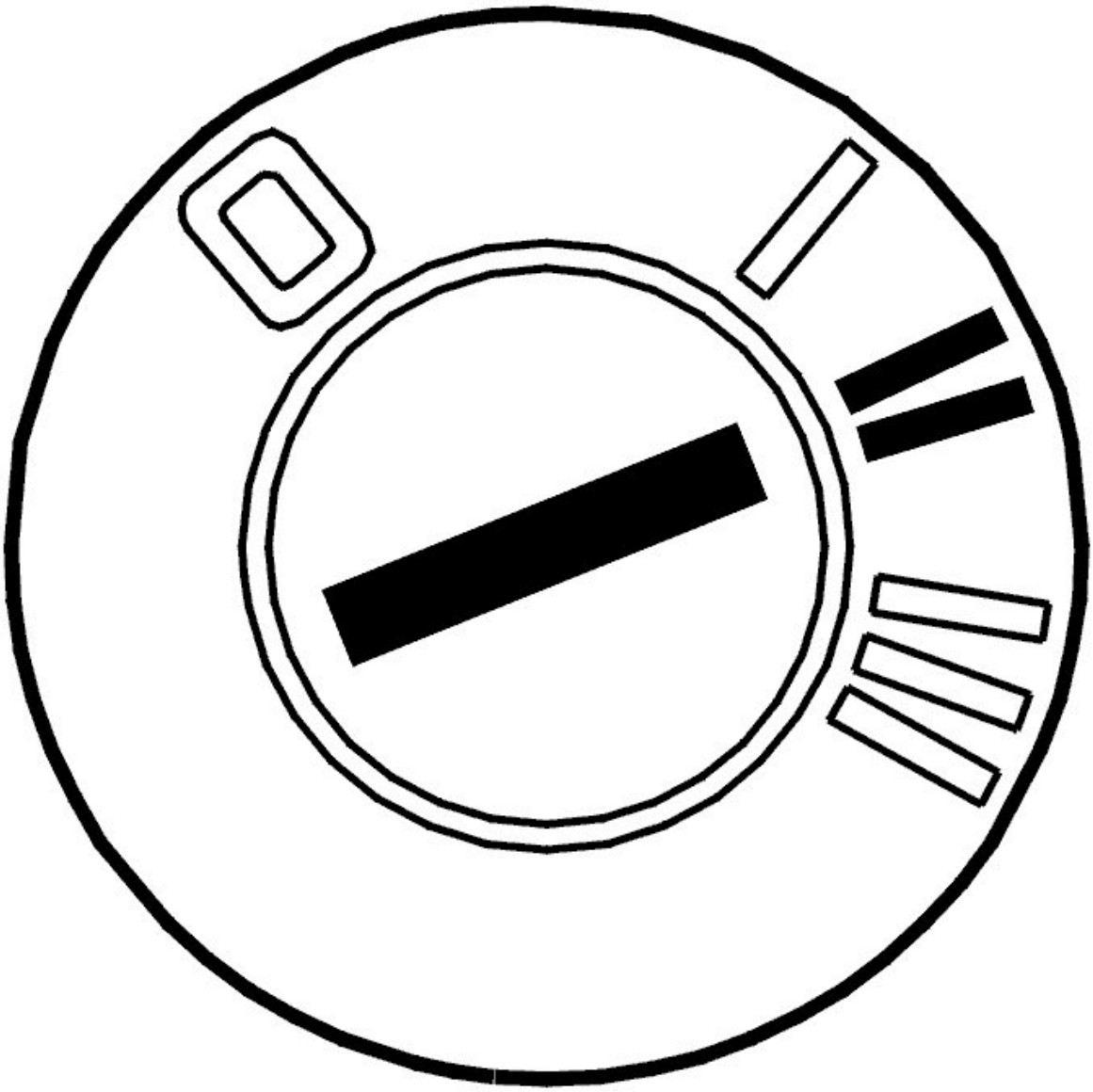
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing

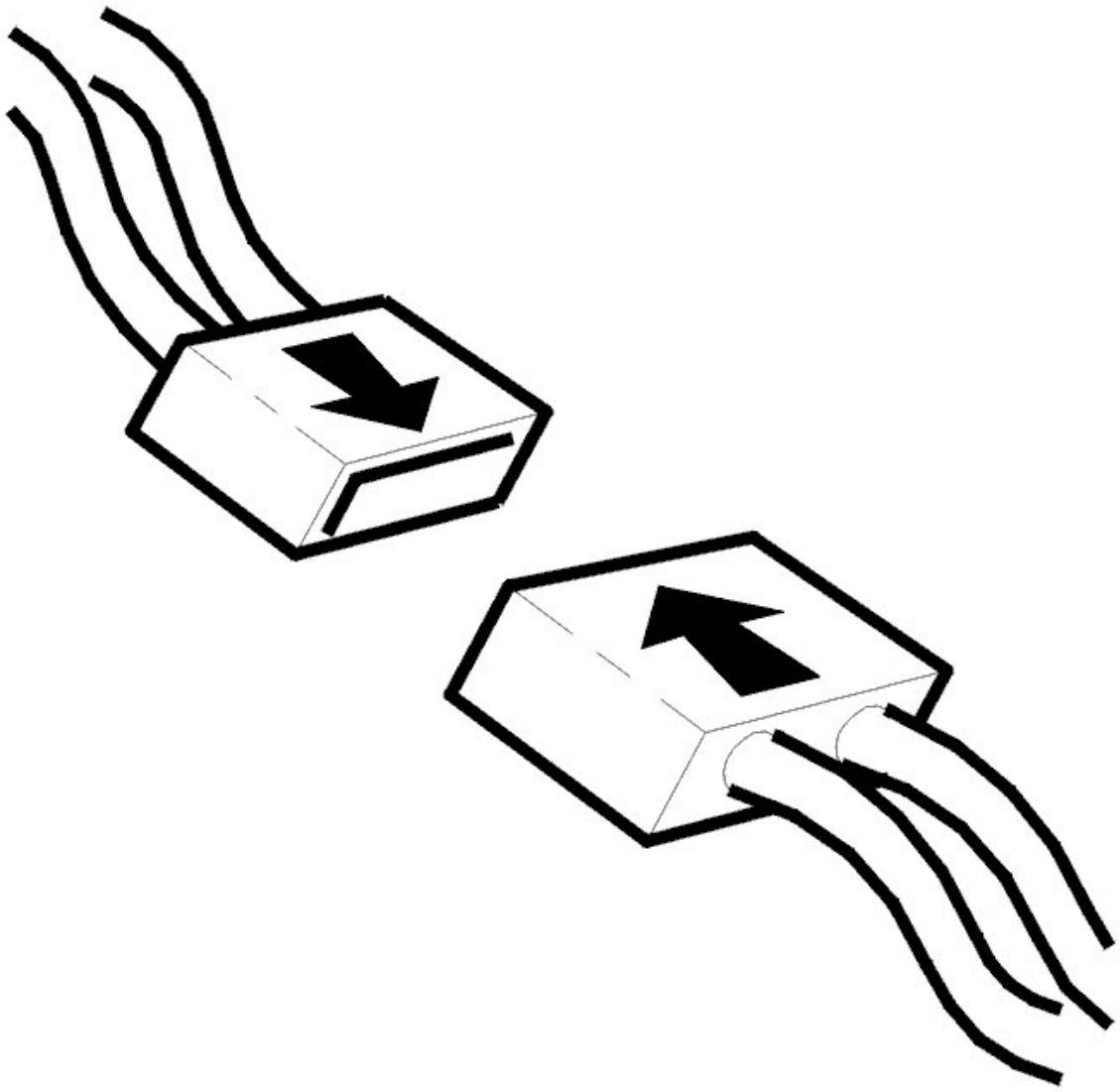


Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Turn the steering wheel more than 5° in any direction to initialize the steering wheel angle sensor module (SAS)
- Click on the VCT2000 symbol to read off the steering wheel angle.

Read off the steering wheel angle. Check that the steering wheel angle is 0° when the front wheels are pointing straight ahead.

°

Is the steering wheel angle 0 when the front wheels are pointing straight ahead?

Yes - VERIFIED

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

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Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - VERIFICATION FAILED

Attempt New Test - Checking the installation of the steering wheel angle sensor

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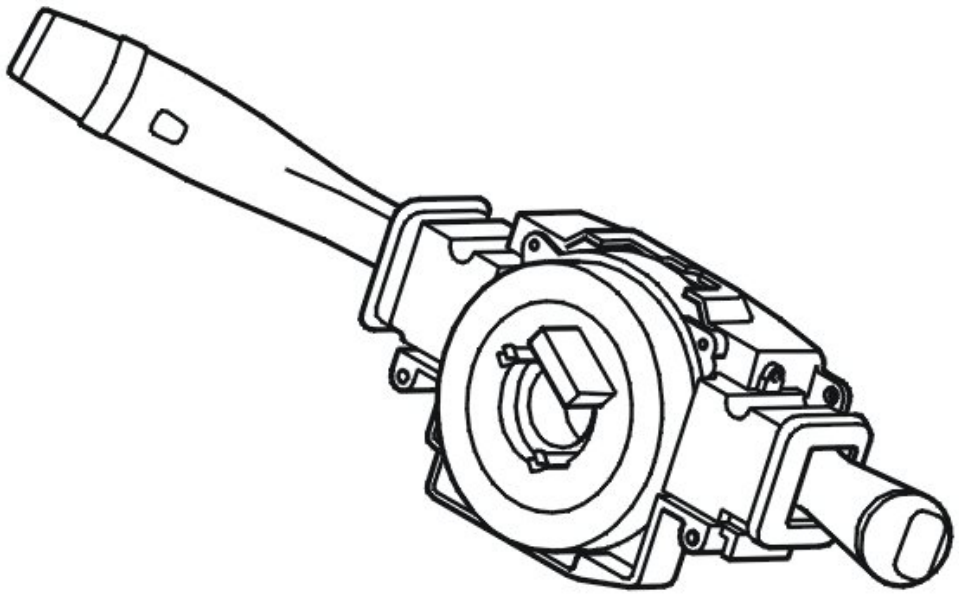
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0004

Condition



Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that the steering wheel angle speed exceeds 1433 °/second.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

Possible source
- The wheel has been pressed against something (the edge of a sidewalk for example)
- Internal fault in the control module.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.

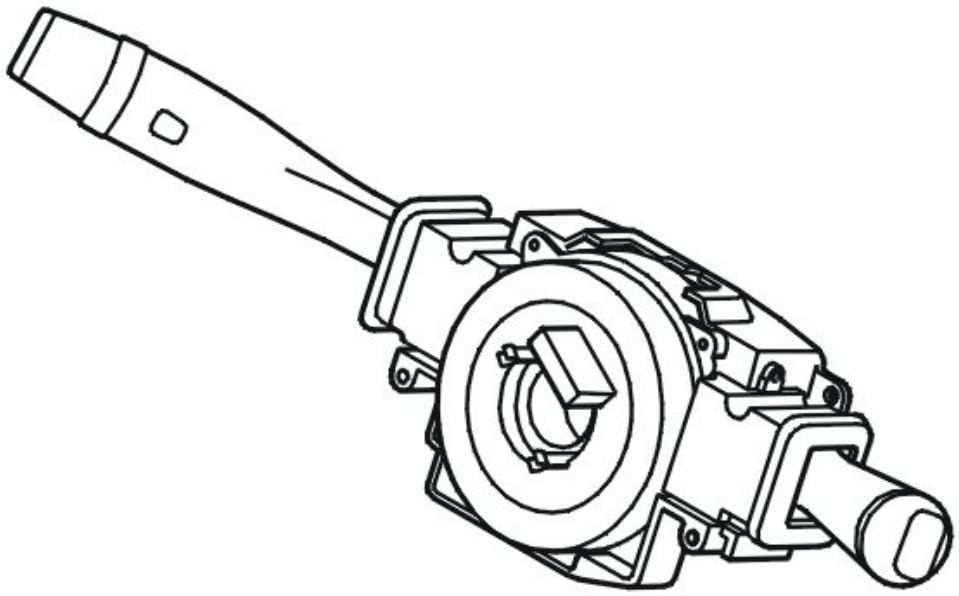
- The stability control system does not function.

Signal Outside Its Permitted Range

Signal outside its permitted range

Information

The diagnostic trouble code (DTC) indicates that the steering wheel has been turned at a speed in excess of 1400°/s. The probable cause of the diagnostic trouble code (DTC) is that the driver has driven into the edge of a sidewalk or hit a stone, causing the angle speed of the steering wheel and the wheels to change drastically.
Check that front suspension alignment has not changed and that the wheels are not damaged.
Remedy as necessary.

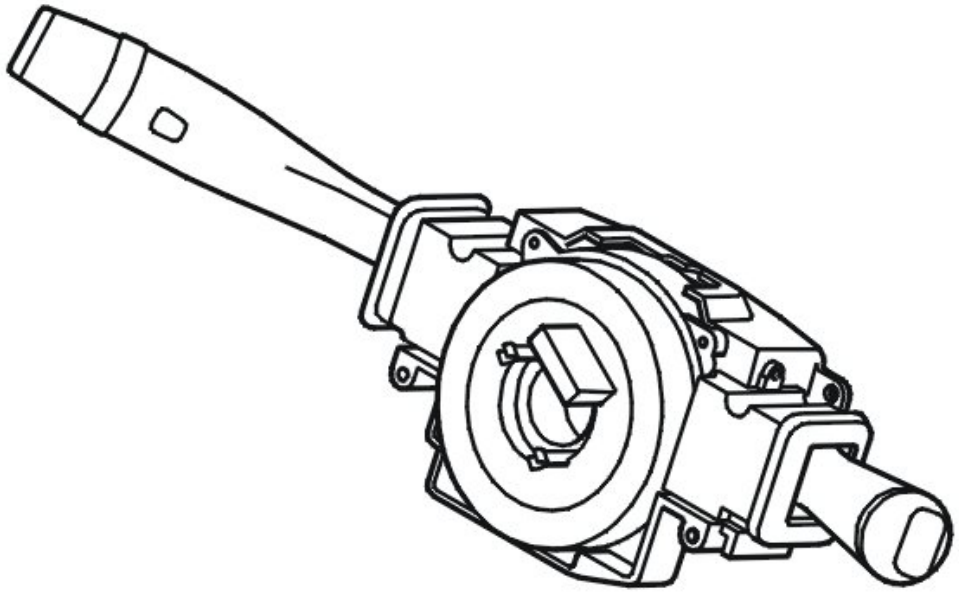


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
Diagnostic trouble code (DTC) SAS-0005 or SAS-0006 is stored (depending on the fault) if the steering wheel angle sensor module (SAS) registers an internal fault in the software.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

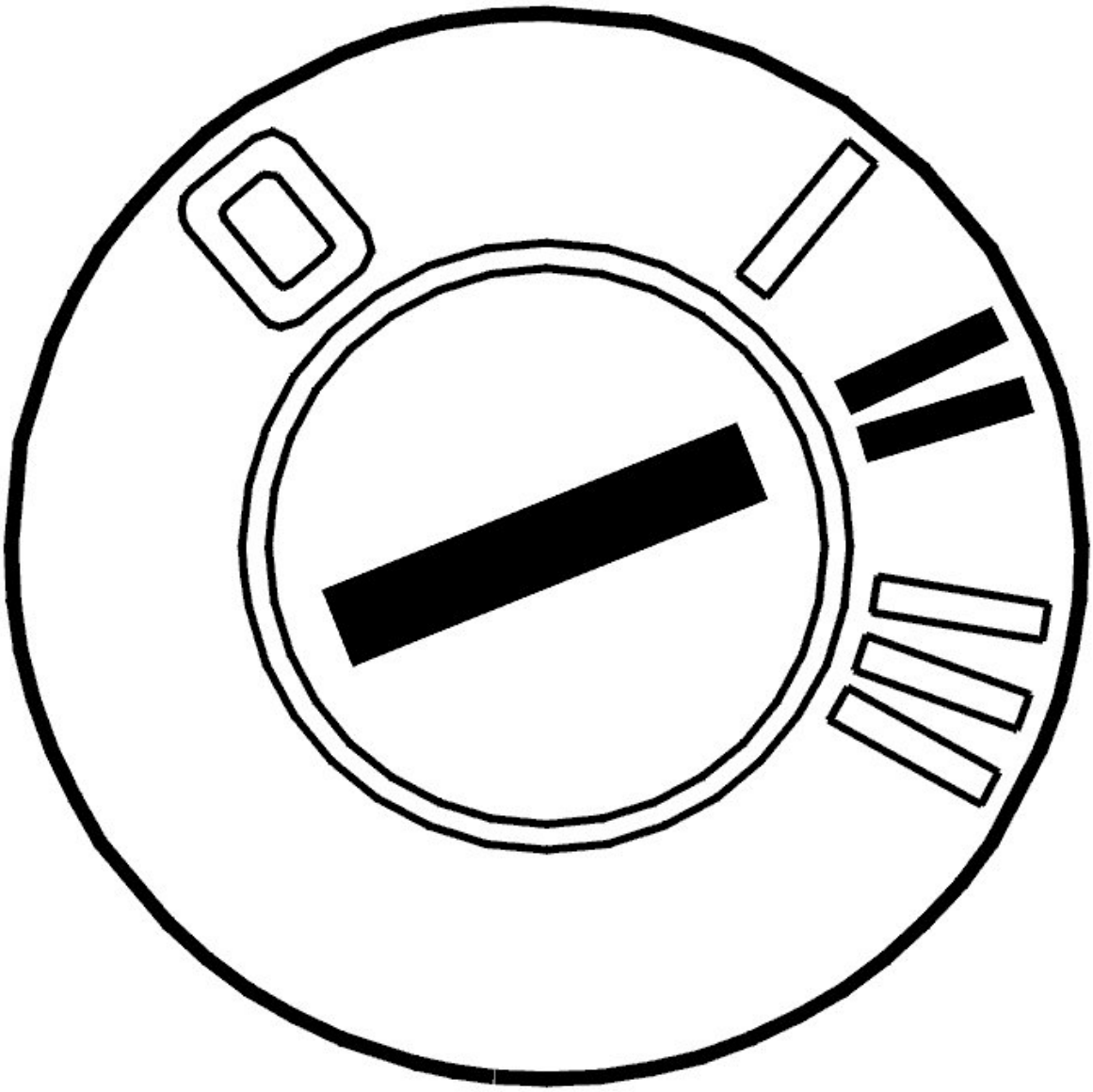
Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

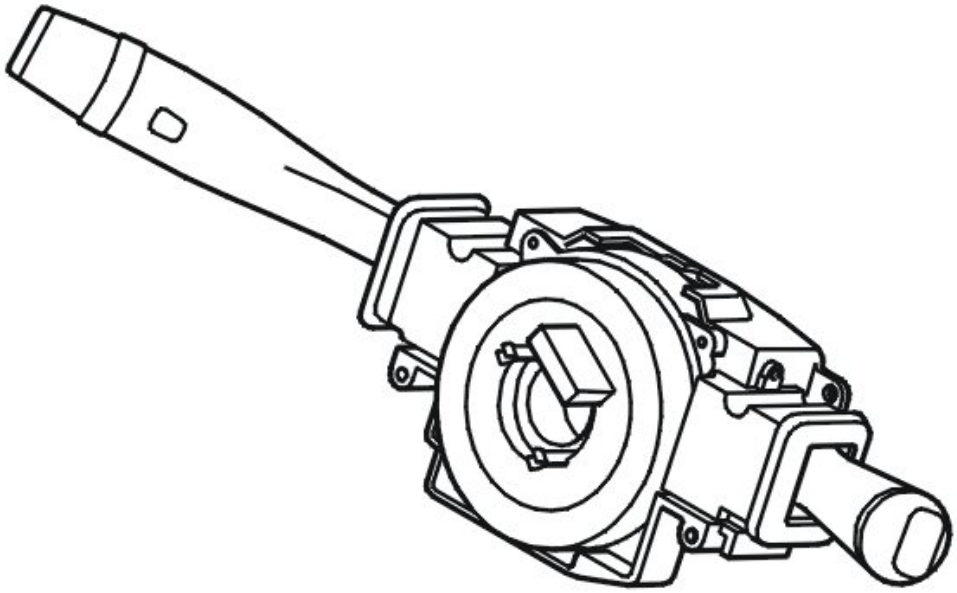
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
Diagnostic trouble code (DTC) SAS-0005 or SAS-0006 is stored (depending on the fault) if the steering wheel angle sensor module (SAS) registers an internal fault in the software.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

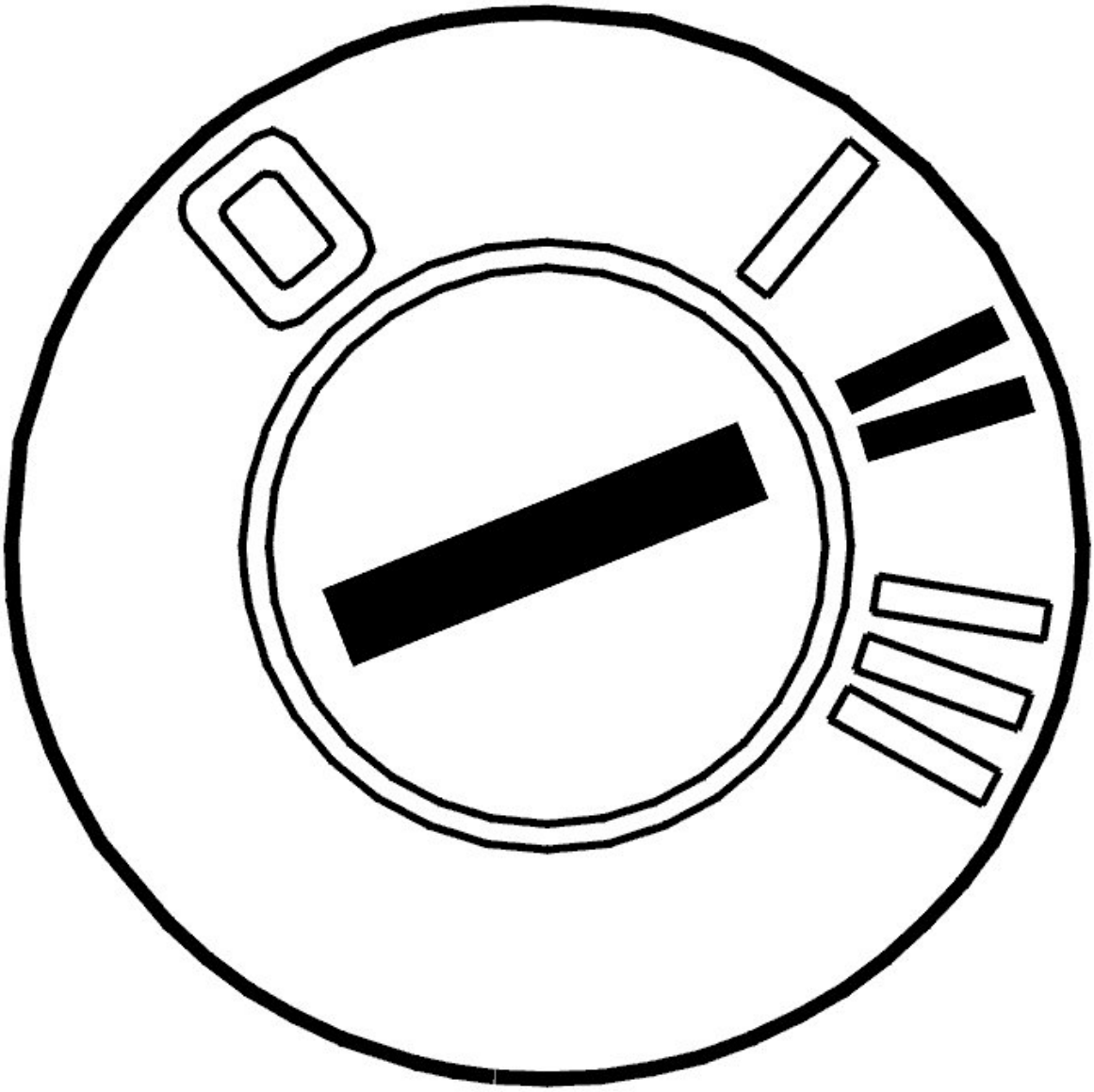
Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

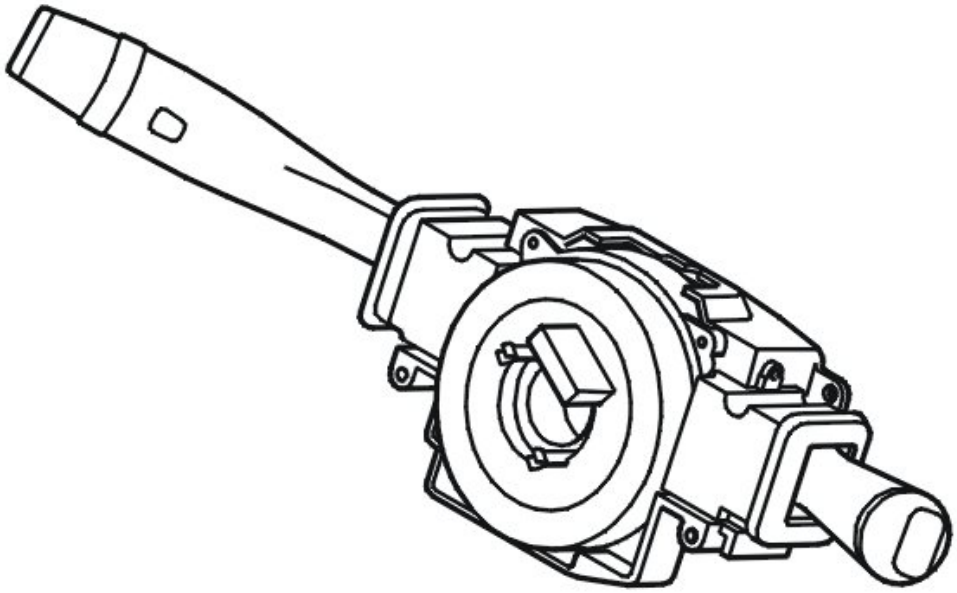
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0007

Condition



Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The Steering wheel angle sensor module (SAS) contains 2 x processors that operate together. The processors receive information about steering wheel angle, steering direction and steering angle speed from the steering wheel angle sensor module (SAS) and compare the information with each other. The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that the information is incorrect in any way.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value

- The stability function is blocked.

Possible source

- Internal fault in the control module.

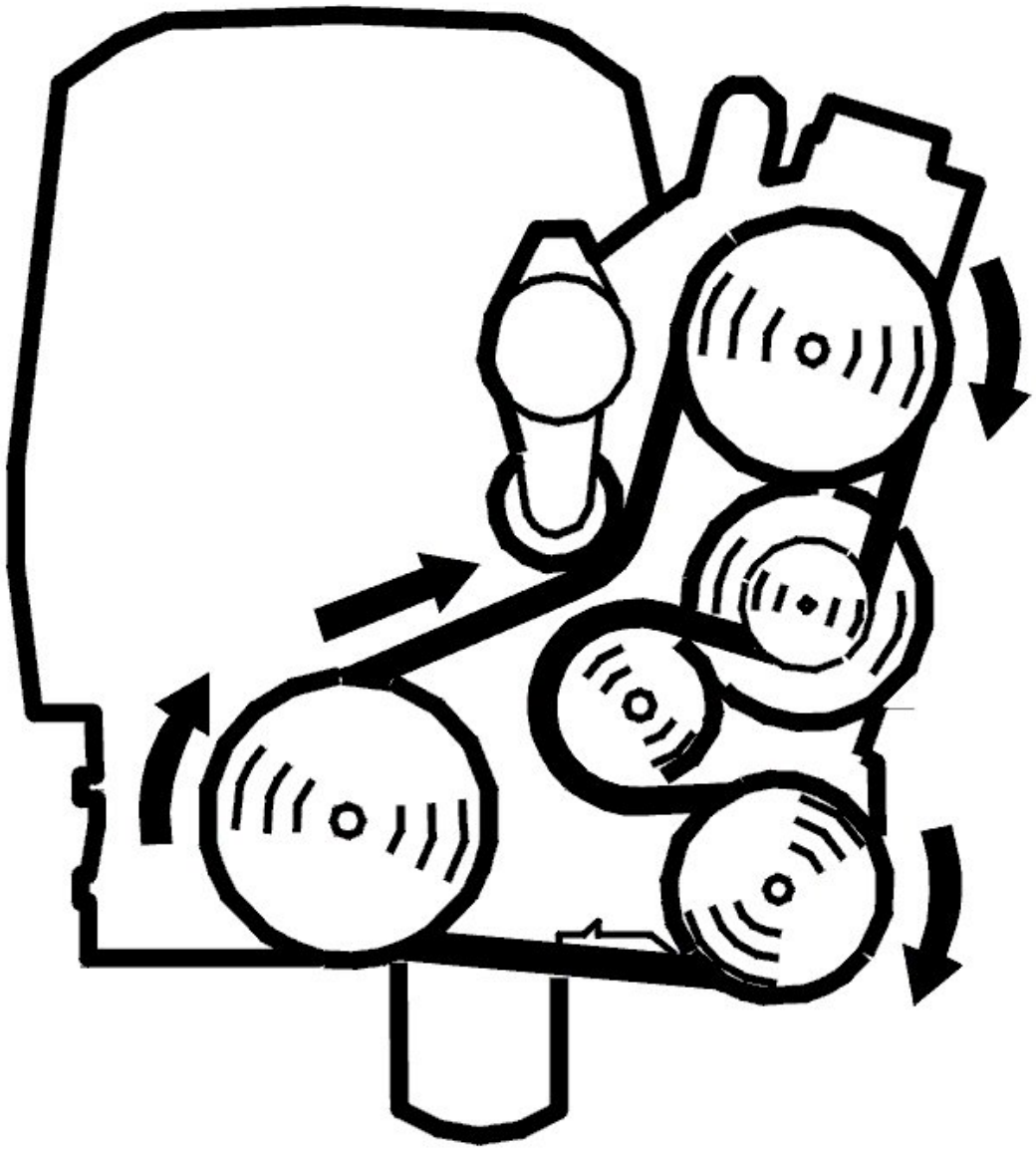
Fault symptom[s]

- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

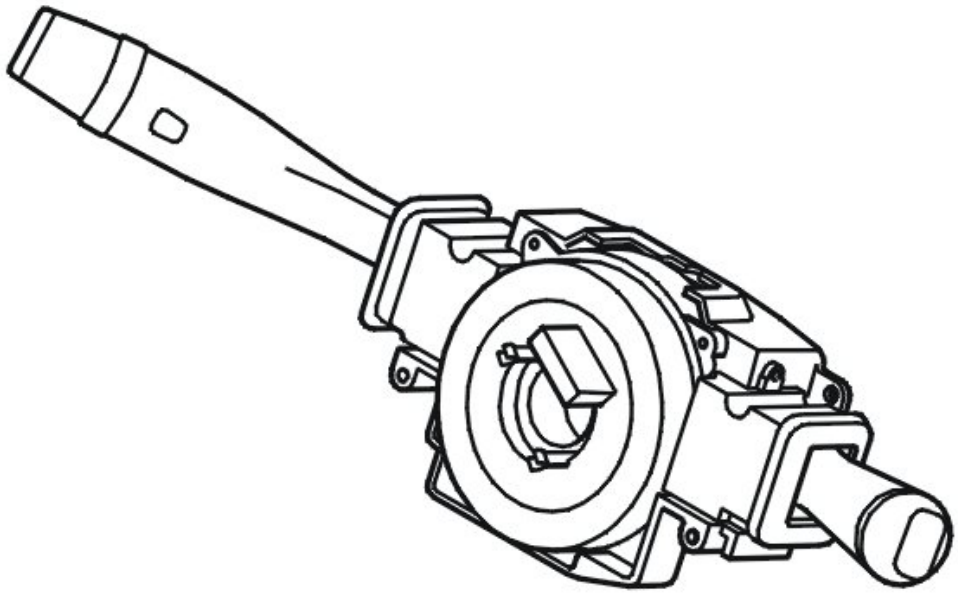
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0008

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is

carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

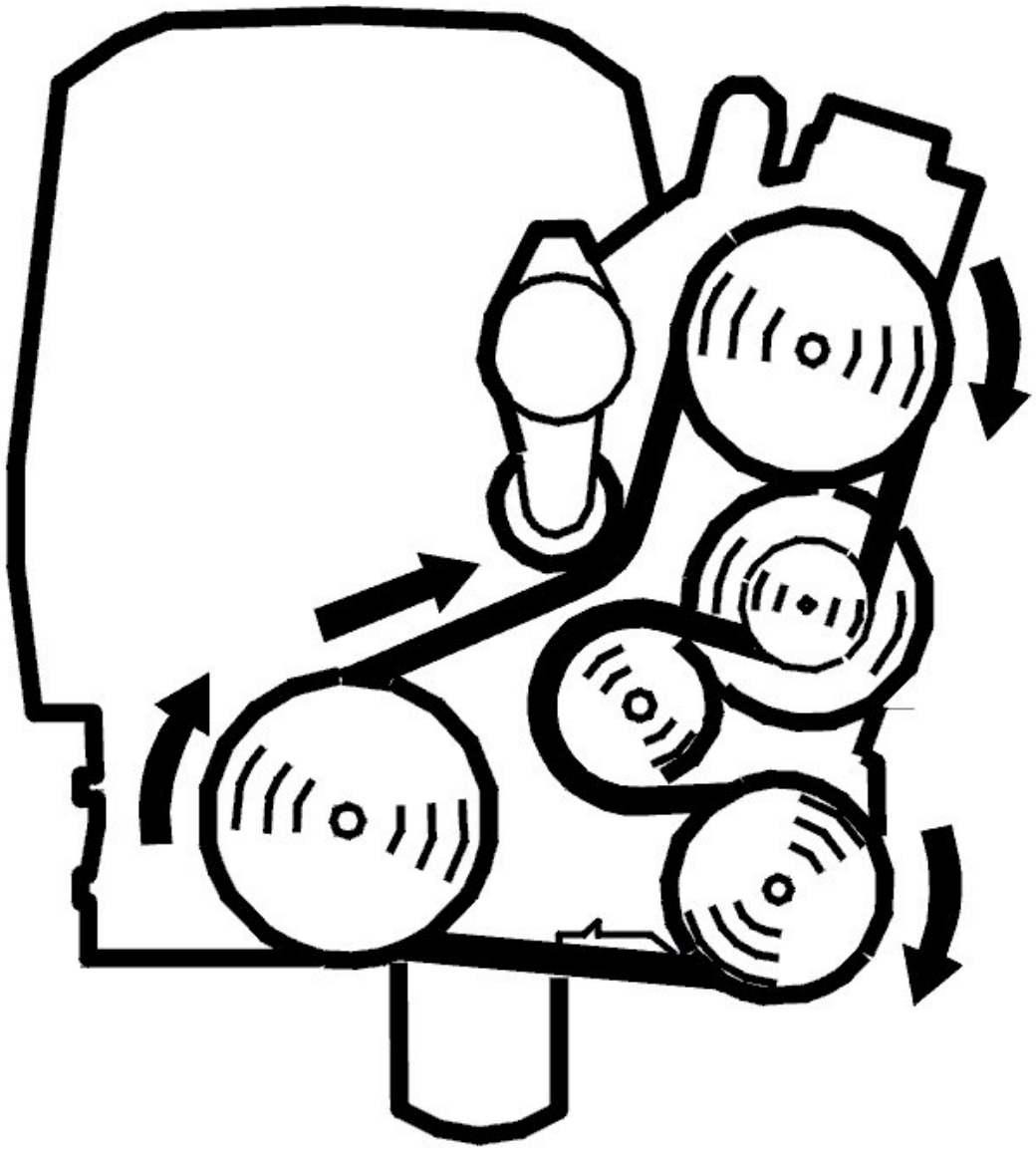
Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

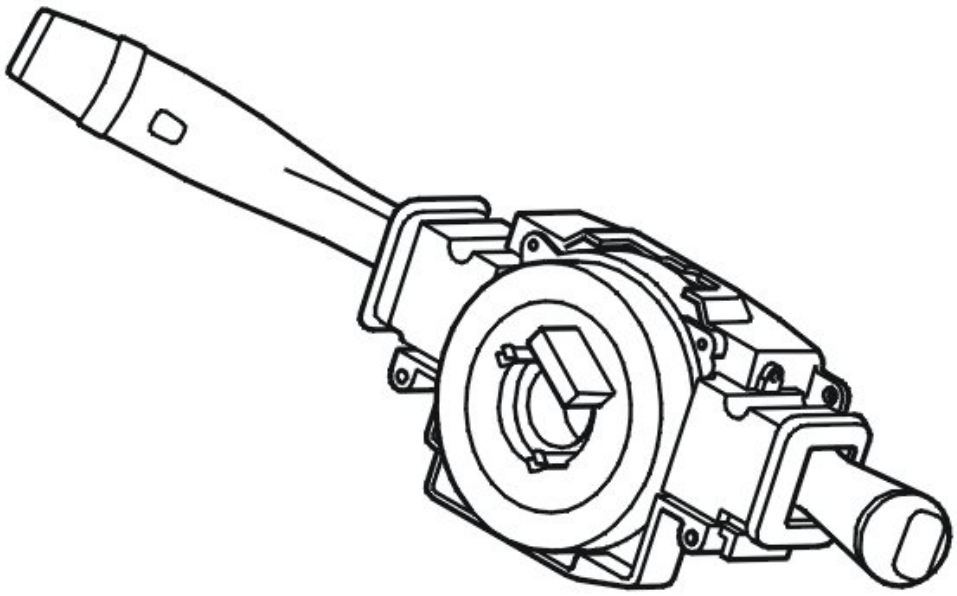
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0009

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with

power by it.
The diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers an internal fault.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

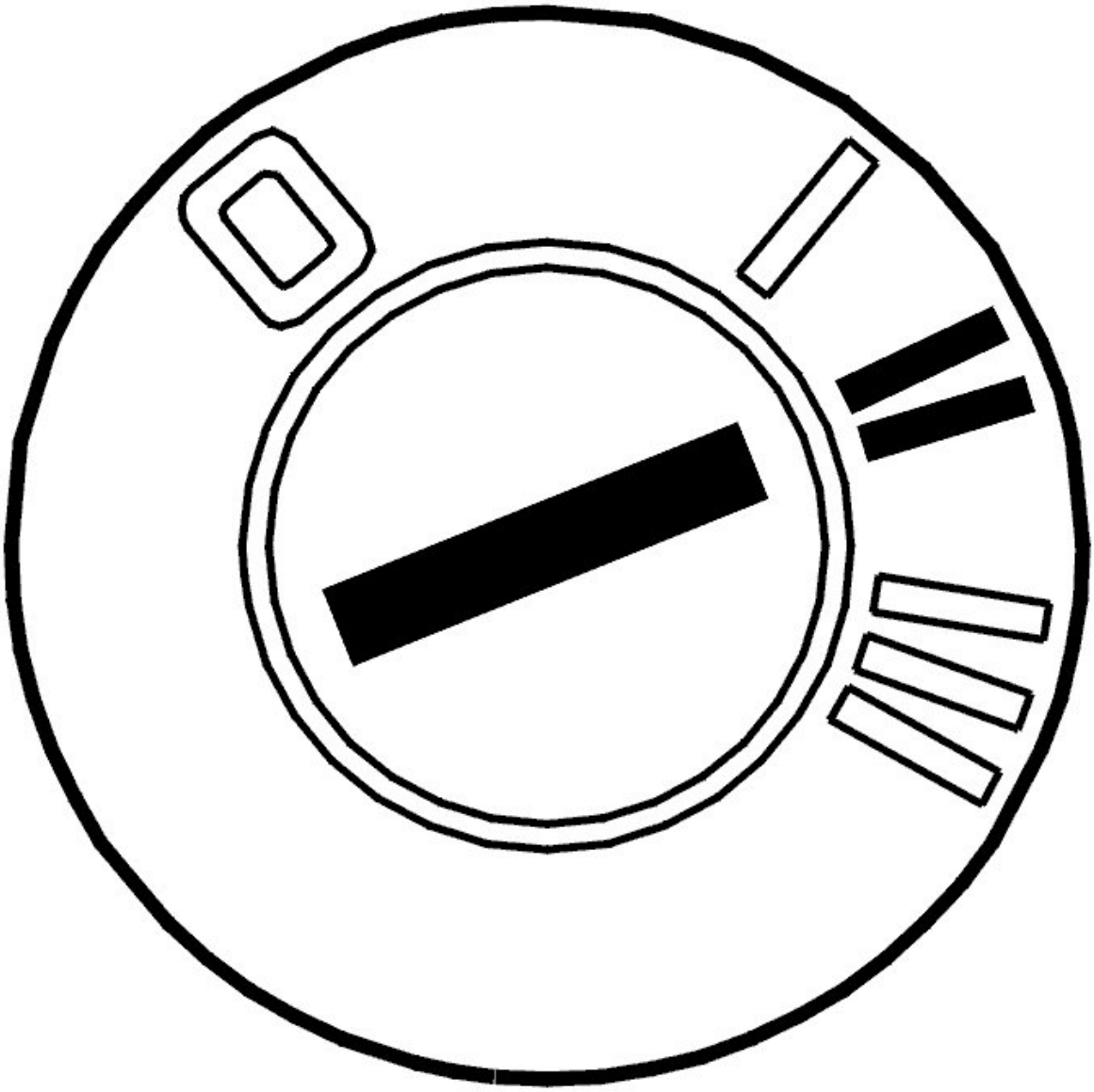
Possible source
- Internal fault in the steering wheel angle sensor module (SAS).

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

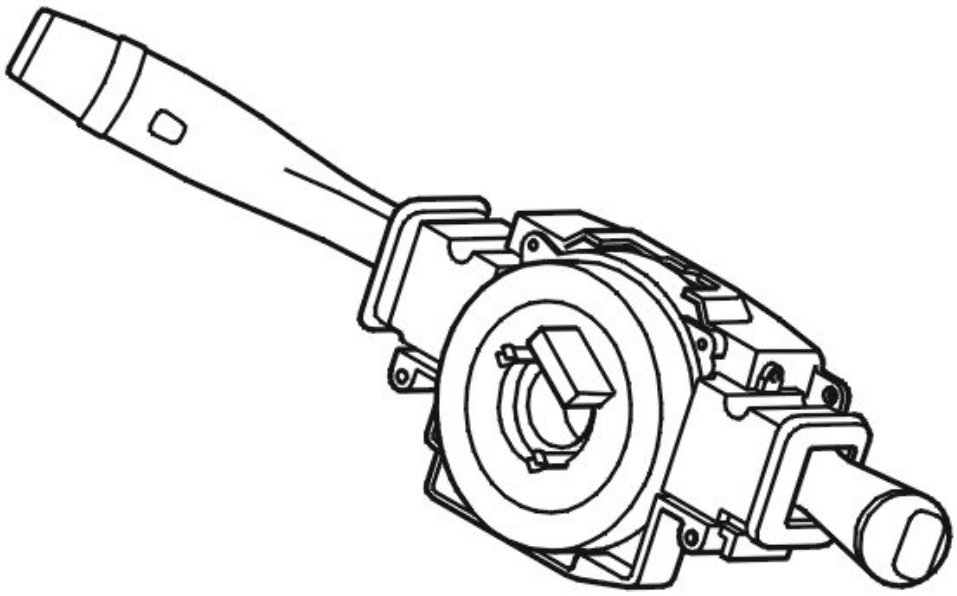
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0010

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with

power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

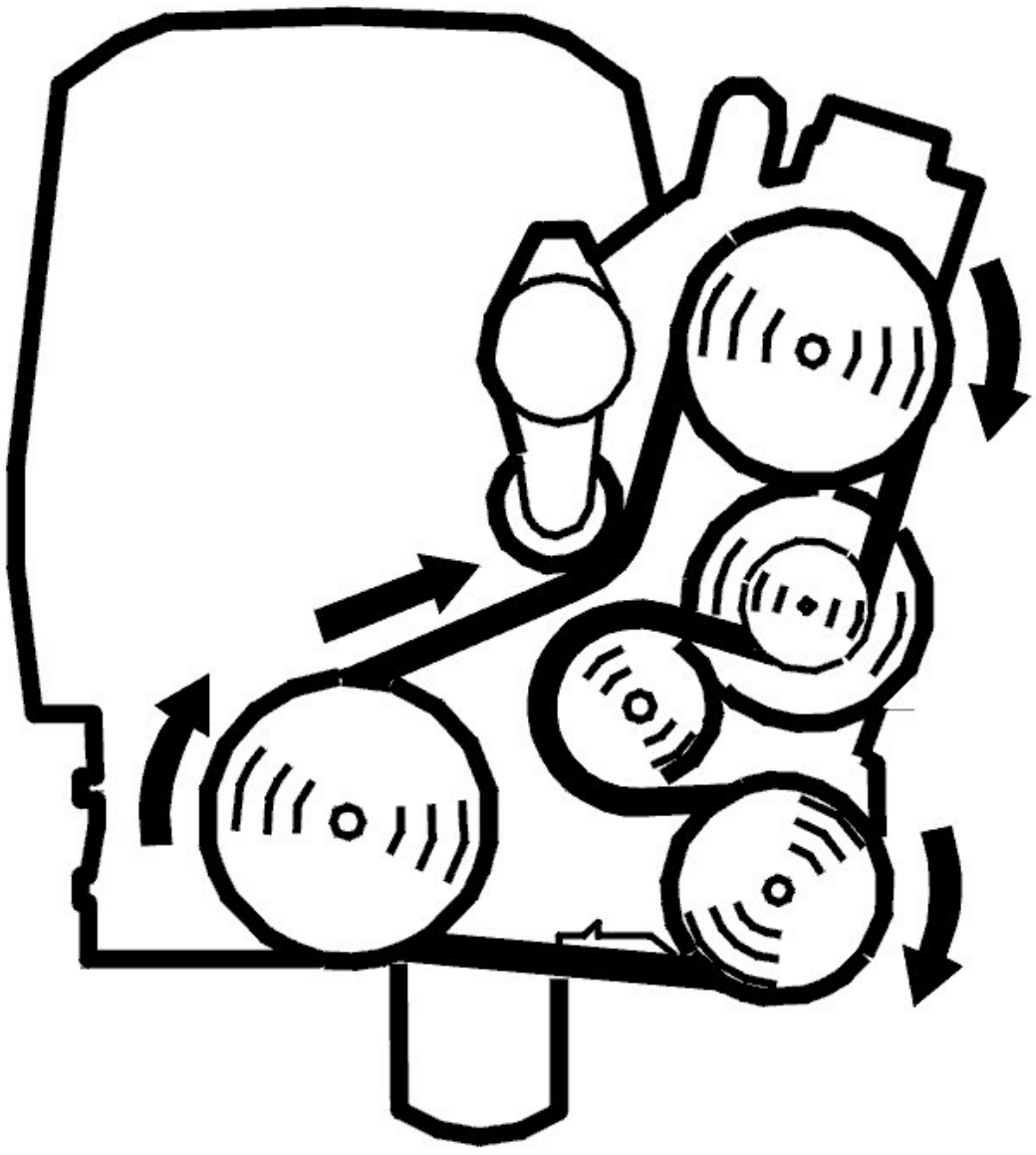
Possible source
- Internal fault in the steering wheel angle sensor.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

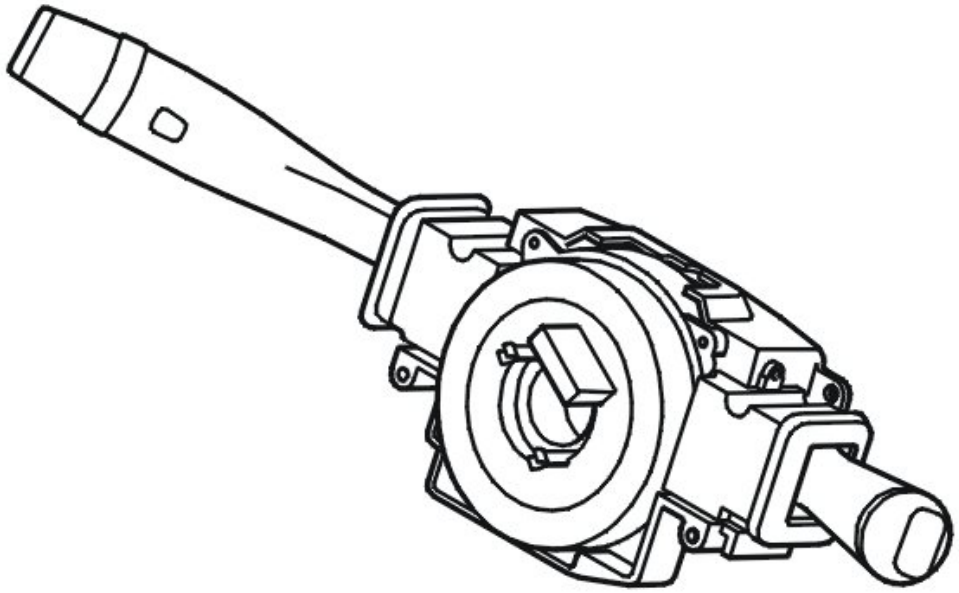
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0011

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor is installed on the underside of the contact reel and together they create a replaceable unit. A code wheel is mounted inside the steering wheel angle sensor which follows the movements of the steering wheel. 9 x optical digital sensors and 2 x analog photo diodes read off the code wheel. These signals are compared and must create a specific pattern. The diagnostic trouble code (DTC) is stored if the signal pattern created does not correspond.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

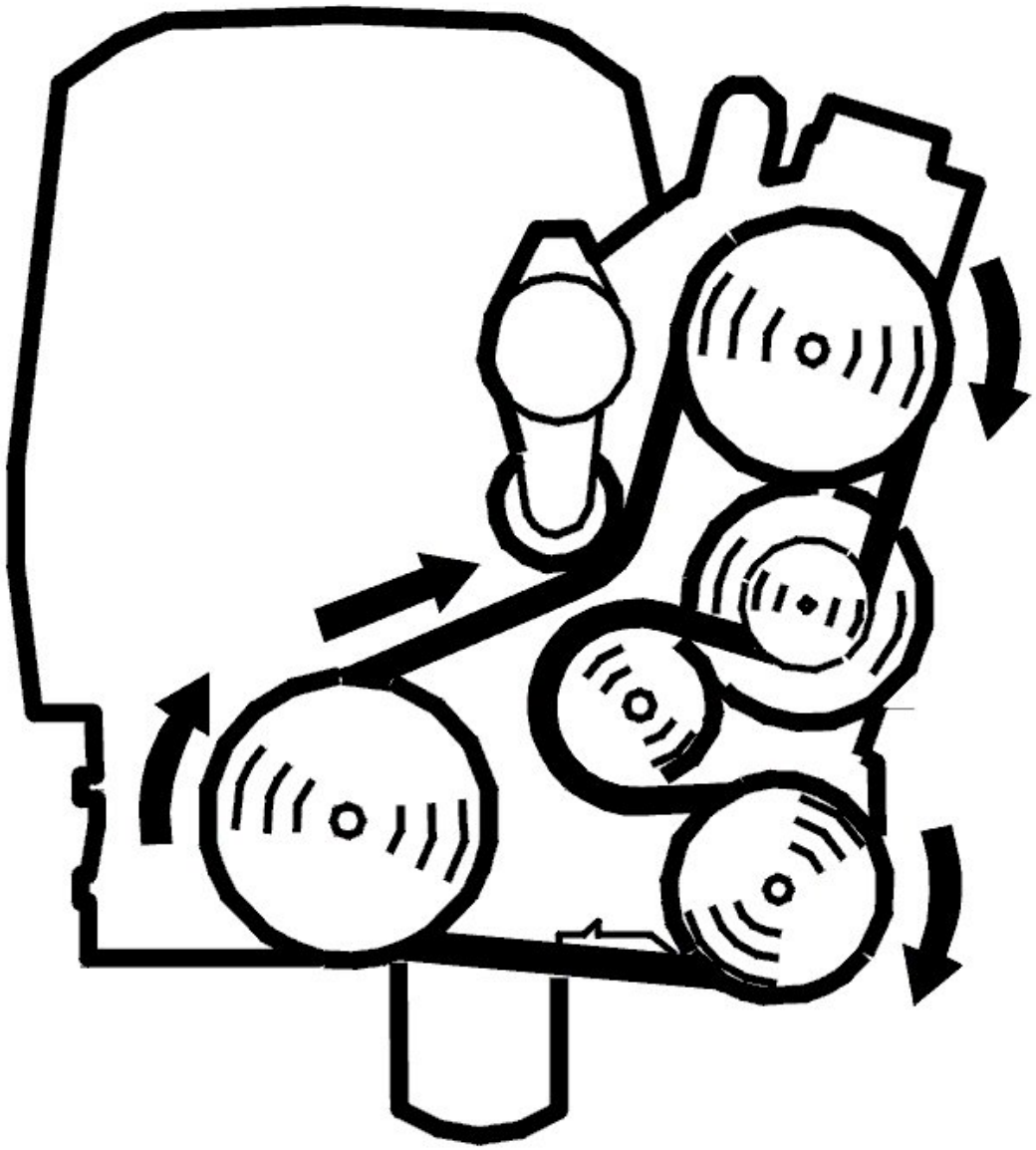
Possible source
- Internal fault in the steering wheel angle sensor.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering

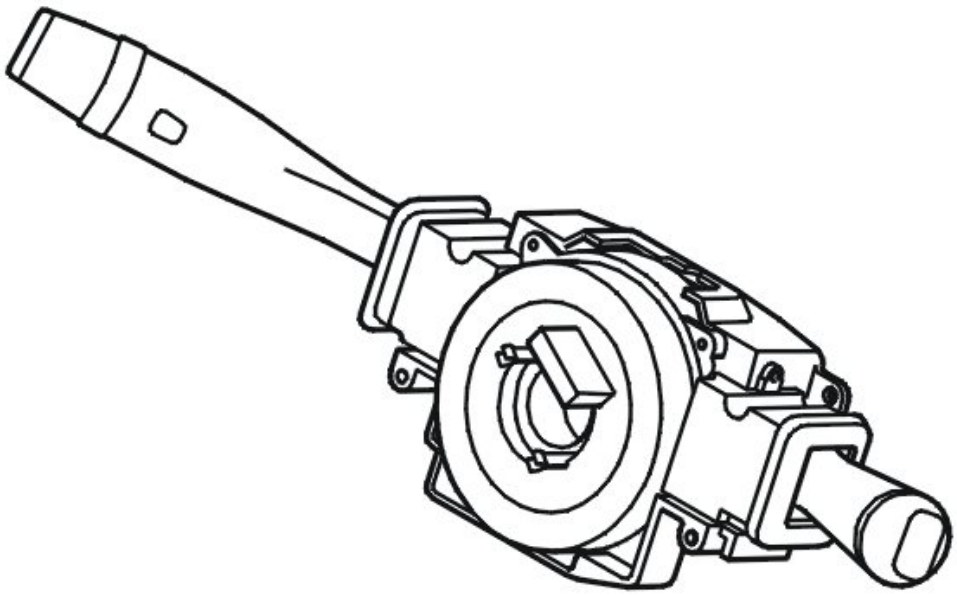
wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0014

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The diagnostic trouble code (DTC) is stored if there is no voltage supply (12 V) or ground to the steering wheel angle sensor.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

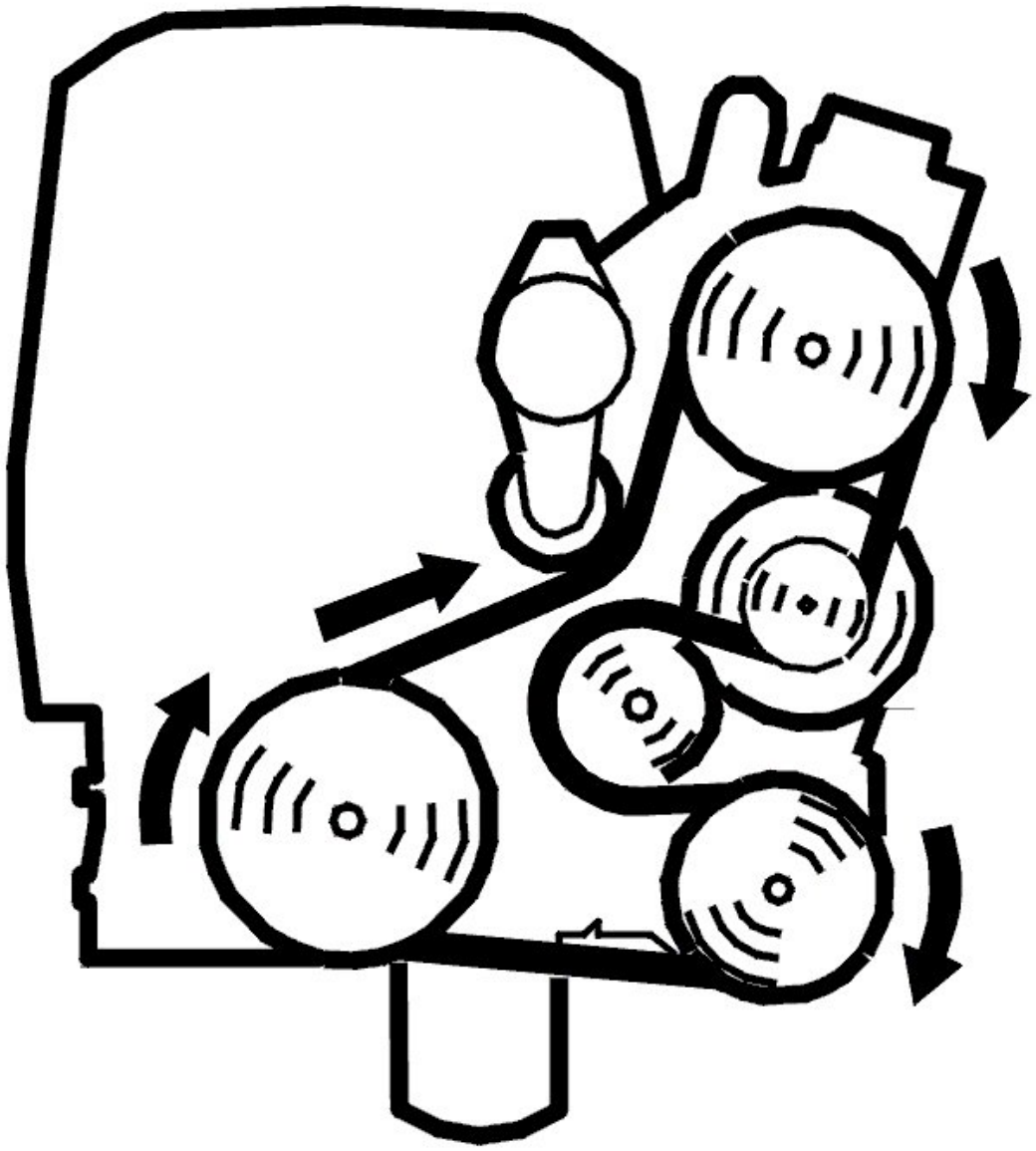
Possible source
- Open-circuit in the circuit for internal power supply cable to the steering wheel angle sensor
- Open-circuit in the circuit for ground terminal to the steering wheel angle sensor.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

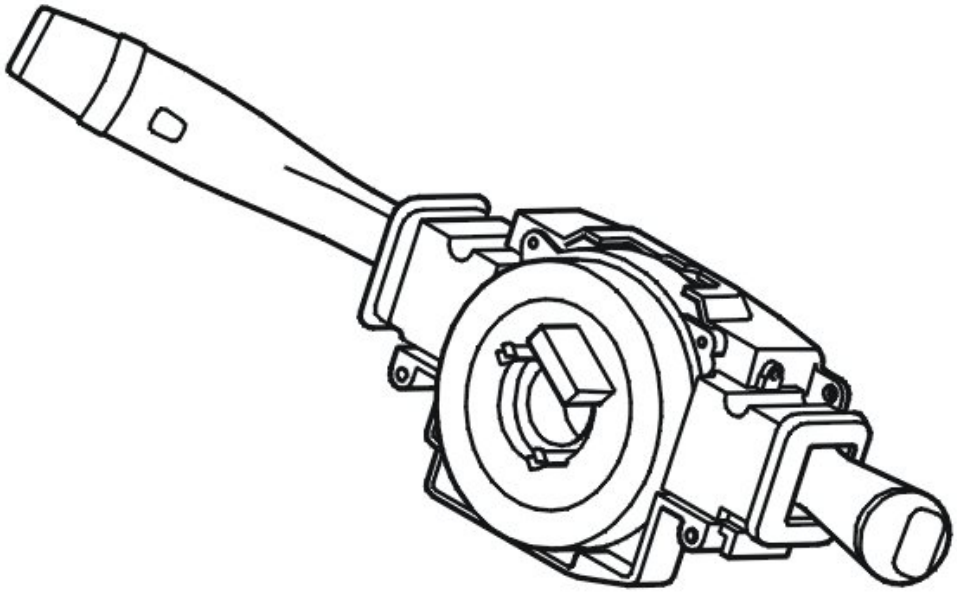
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0015

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The diagnostic trouble code (DTC) is stored if the voltage supply (5 V) for the steering wheel angle sensor is missing.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value

- The stability function is blocked.

Possible source

- Open-circuit in the circuit for internal power supply cable to the steering wheel angle sensor.

Fault symptom[s]

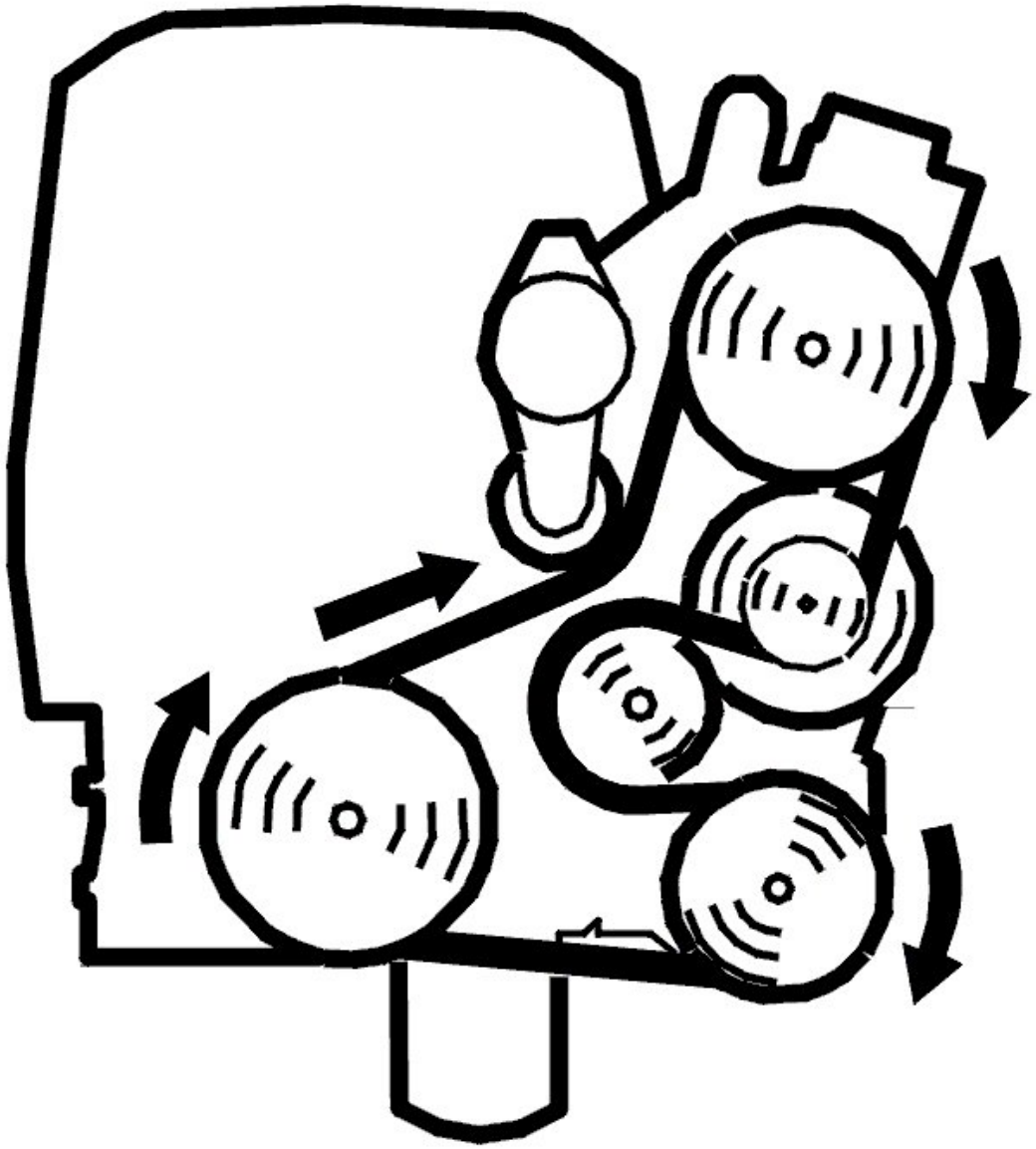
- Anti-spin warning lamp lit.
- General warning lamp lit.

- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Counter 1 counts the number of operating cycles without a fault since the fault was last validated.

If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace contact reel/steering wheel angle sensor.

If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace contact reel/steering wheel angle sensor.
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Hint: Counter 3 indicates number of driving cycles since **first time** that the problem occurred. If the value for **counter 3** is divided by the value for **counter 4**, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs after replacing the contact reel/steering wheel angle sensor.

Remedy as necessary.

Other information

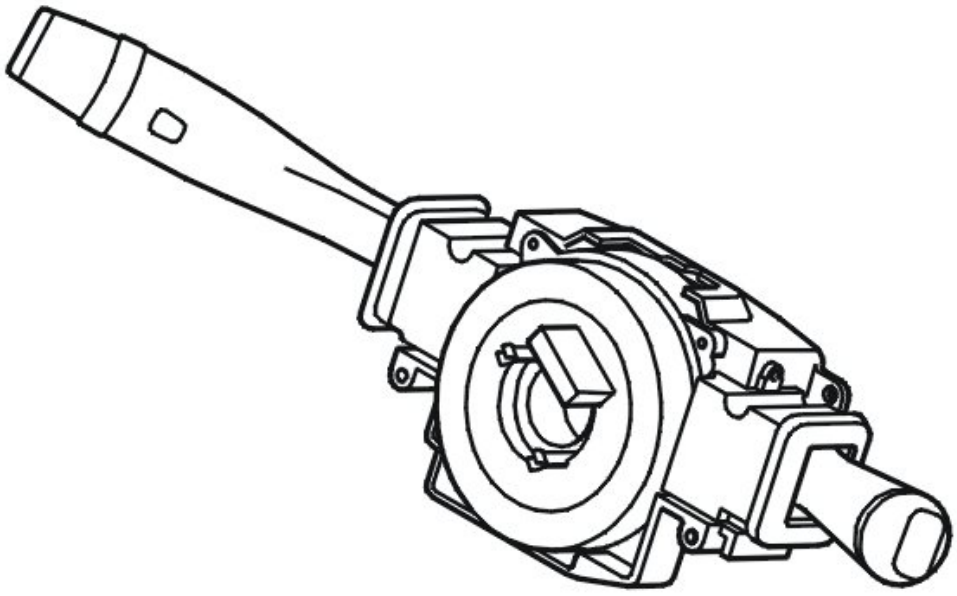
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0016

Condition



The control modules transmit and receive information via a standardized serial communication method, CAN (Control Area Network). Diagnostic trouble codes (DTCs) are stored if the steering wheel angle sensor module (SAS) registers that information from the central electronic module (CEM) is missing.
Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).

Substitute value

- The stability function is blocked.

Possible source

- Incorrect information from the central electronic module (CEM).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]

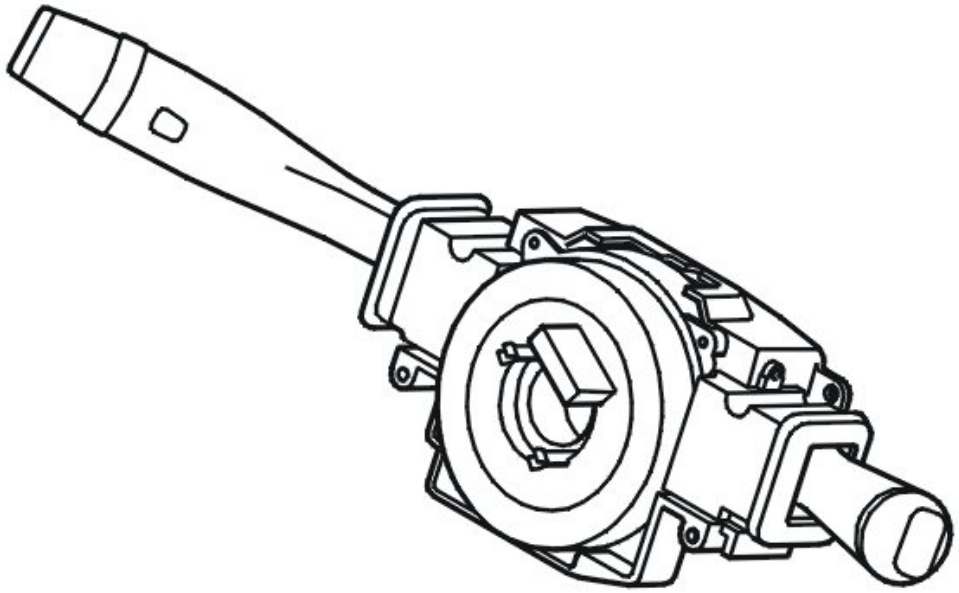
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Communication Fault

Communication fault

Information

The steering wheel angle sensor module (SAS) has registered that information about the car configuration from the central electronic module (CEM) is missing.
Exit fault-tracing and fault-trace the central electronic module (CEM) system.

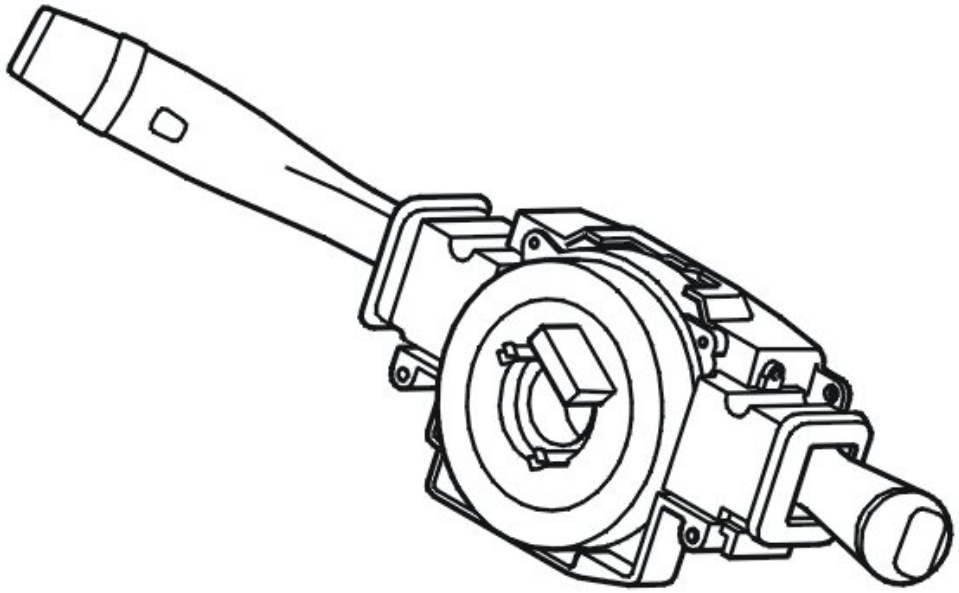


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0017

Condition



The control modules transmit and receive information via a standardized serial communication method, CAN (Control Area Network). Diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that information about global values from the central electronic module (CEM) is incorrect.
Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).

Substitute value
- The stability function is blocked.

Possible source
- Incorrect information from the central electronic module (CEM).

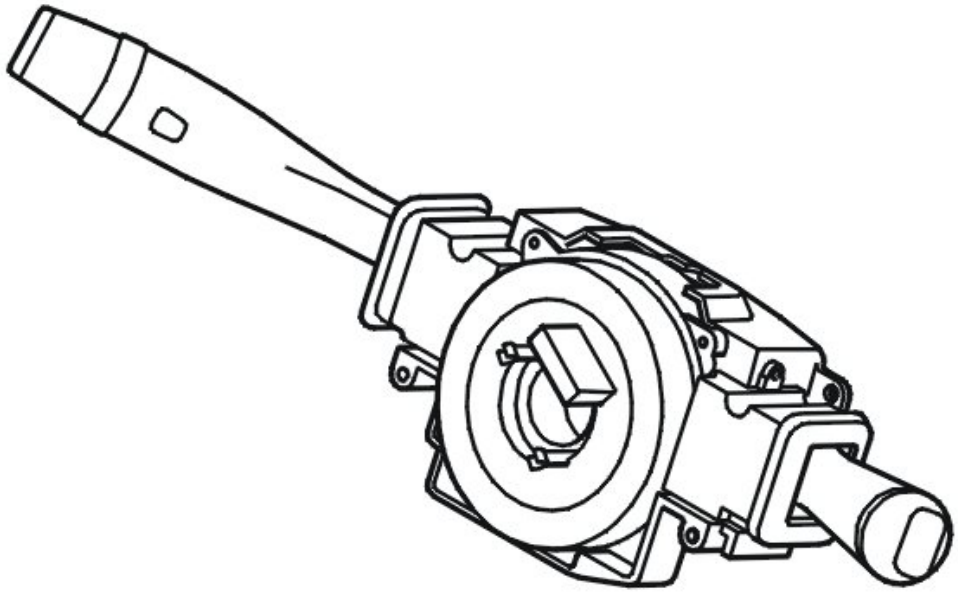
Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Faulty Signal

Faulty signal

Information

The steering wheel angle sensor module (SAS) has registered that information about the car configuration from the central electronic module (CEM) is missing or incorrect.
Exit fault-tracing and fault-trace the central electronic module (CEM) system.

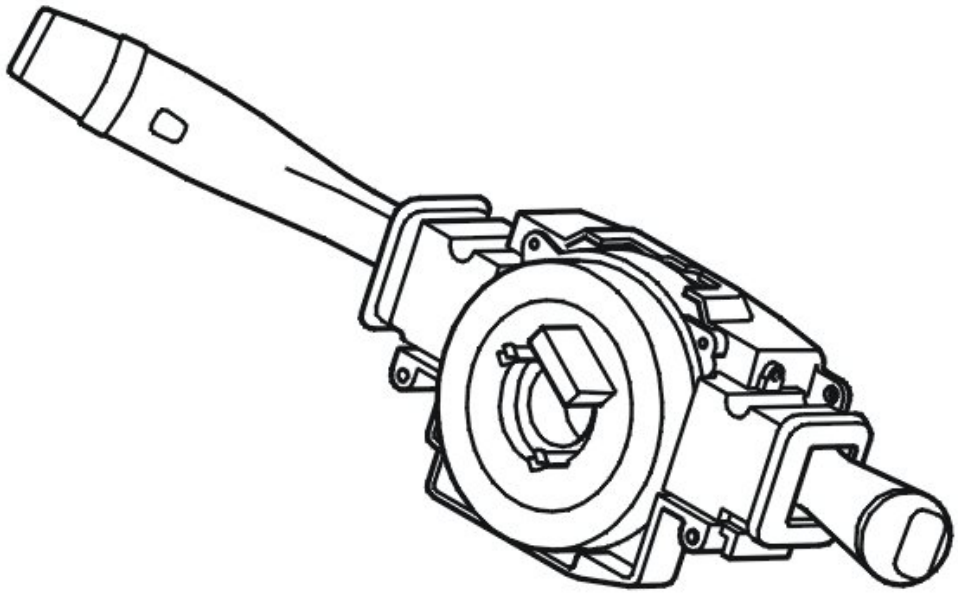


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0018

Condition



The control modules transmit and receive information via a standardized serial communication method, CAN (Control Area Network). Diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that information about the ignition key position from the central electronic module (CEM) is missing or incorrect for more than 2.5 seconds.
Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).

Substitute value
- The stability function is blocked.

Possible source
- Information from central electronic module (CEM) is missing or incorrect.

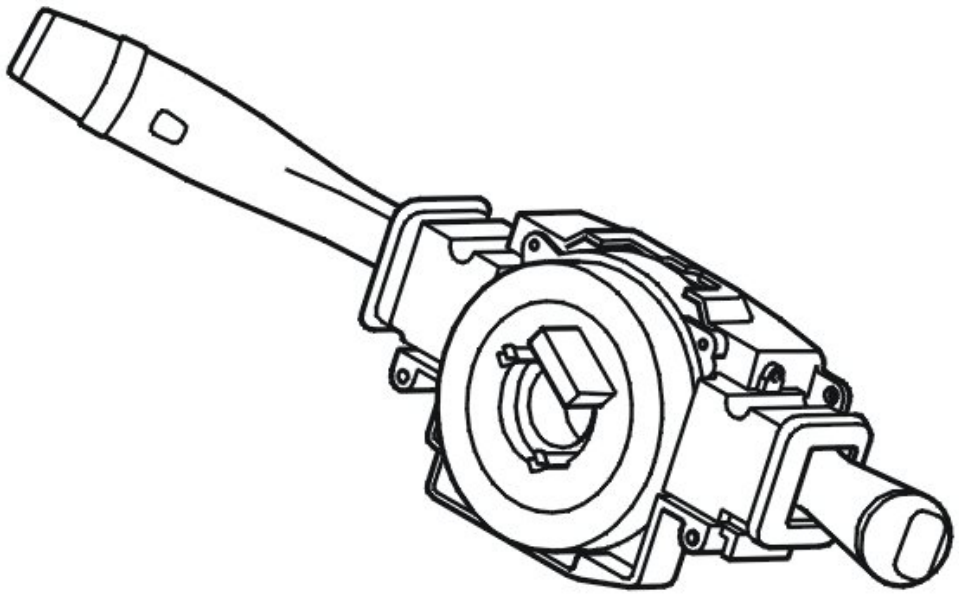
Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Signal Missing

Signal missing

Information

The steering wheel angle sensor module (SAS) has registered that information about the ignition key position from the central electronic module (CEM) is missing or incorrect.
Exit fault-tracing and fault-trace the central electronic module (CEM) system.

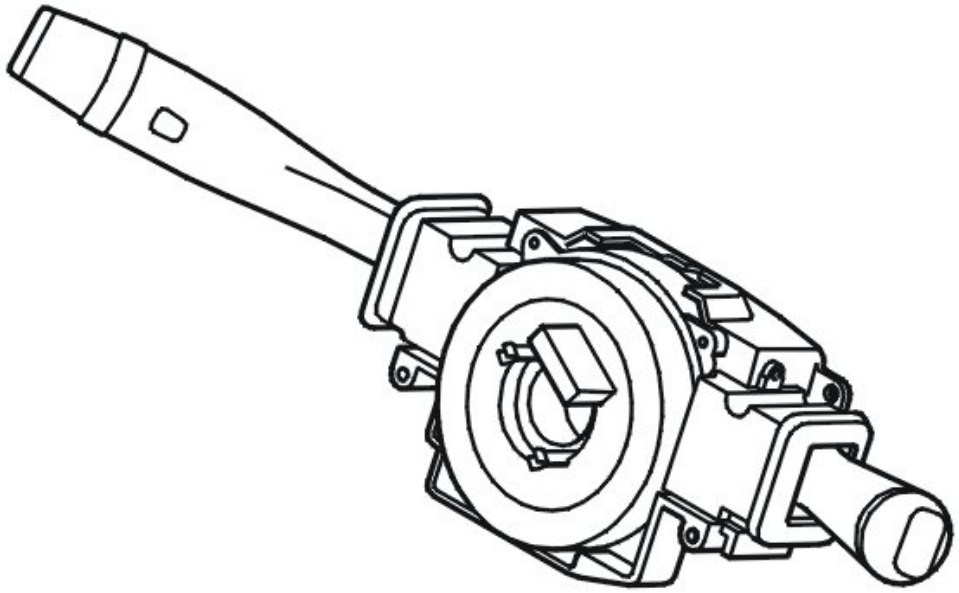


Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-0019

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
Steering wheel angle sensor module (SAS) contains two processors which work together. The processors receive information about steering wheel angle, steering direction and steering angle speed from the steering wheel sensor and compare the information with each other. The diagnostic trouble code (DTC) is stored if one processor registers that other processor requests information more often than expected.

Substitute value
- The stability function is blocked.

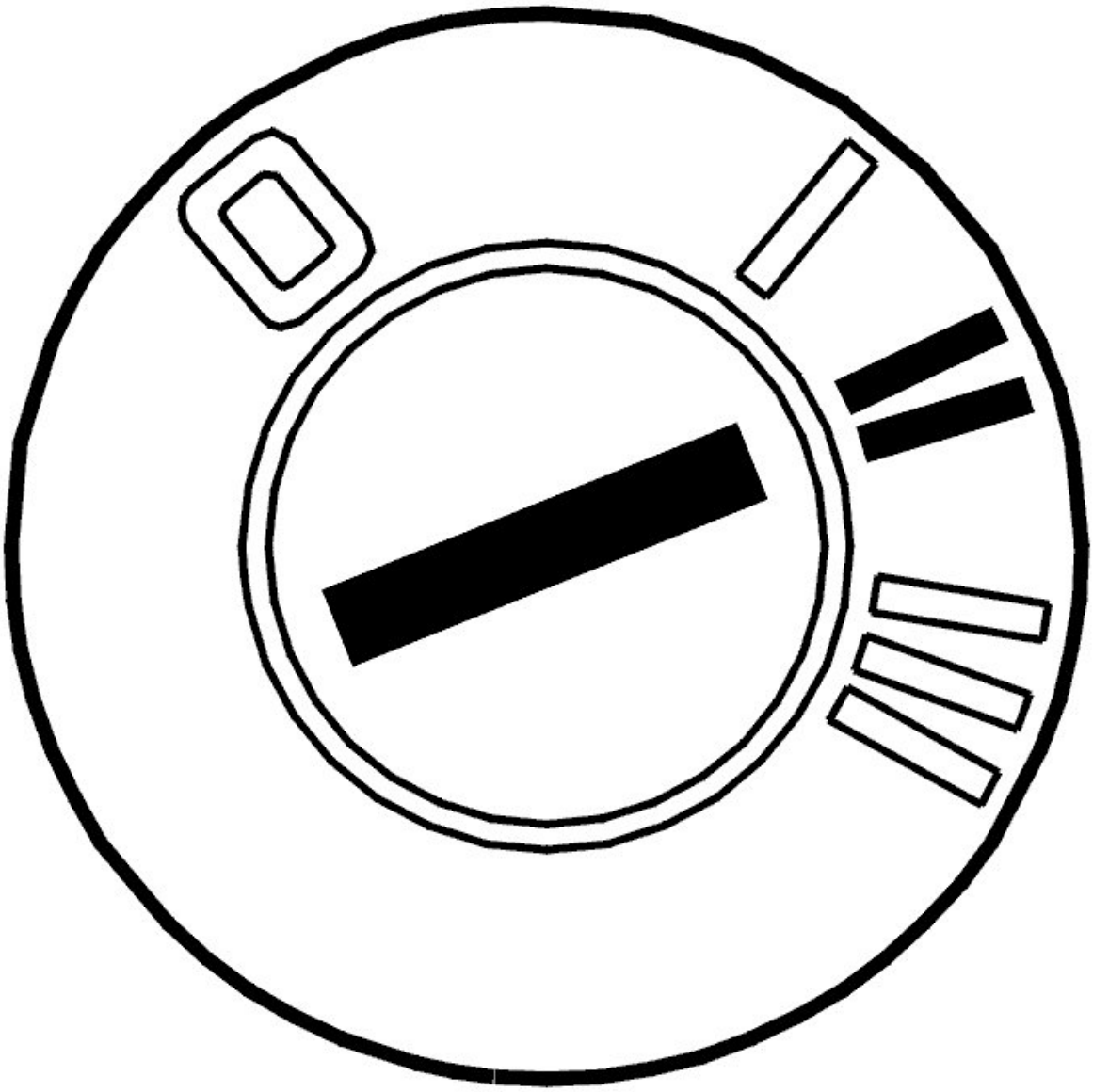
Possible source
- Internal fault.

Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Internal Fault

Internal fault

Checking the status



- Ignition off
- Wait approximately 10 seconds
- Engine running.
- First turn the steering wheel max. to the right, then max. to the left. Then set the steering wheel to the straight-ahead position.
- Click on the VCT2000 symbol to read off the diagnostic trouble code (DTC) counter.

The counters are used to determine the problem's status. For general information about the counters, see: Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description Counters 5, 6 and 7 are not used during this check.
Counter 1 counts the number of operating cycles without a fault since the fault was last validated.
If **counter 1** is the same as 0, this means that the fault has been detected in this operating cycle (permanent fault). Replace the Steering wheel module (SWM).
If **counter 1** is over 0, this indicates that the problem has not been detected in this driving cycle (intermittent problem). The problem has existed earlier but is not active right now. The digit indicates number of driving cycles since the diagnostic trouble code was generated. Then check **counter 4**. **Counter 4**indicates number of driving cycles **with problem** since the problem was validated for the first time.

- If the number of incorrect driving cycles is high, this indicates an intermittent recurring problem. Replace the Steering wheel module (SWM).
- If the number of incorrect driving cycles is low, this indicates an intermittent temporary problem. No action.

Note! Counter 3 indicates number of driving cycles since first time that the problem occurred. If the value for counter 3 is divided by the value for counter 4, the intensity of the problem is obtained. The higher the value, the higher the problem intensity. A high problem intensity indicates that the malfunction recurs often.

Note! Replace the steering wheel module (SWM) if the fault recurs.

Remedy as necessary.

Other information

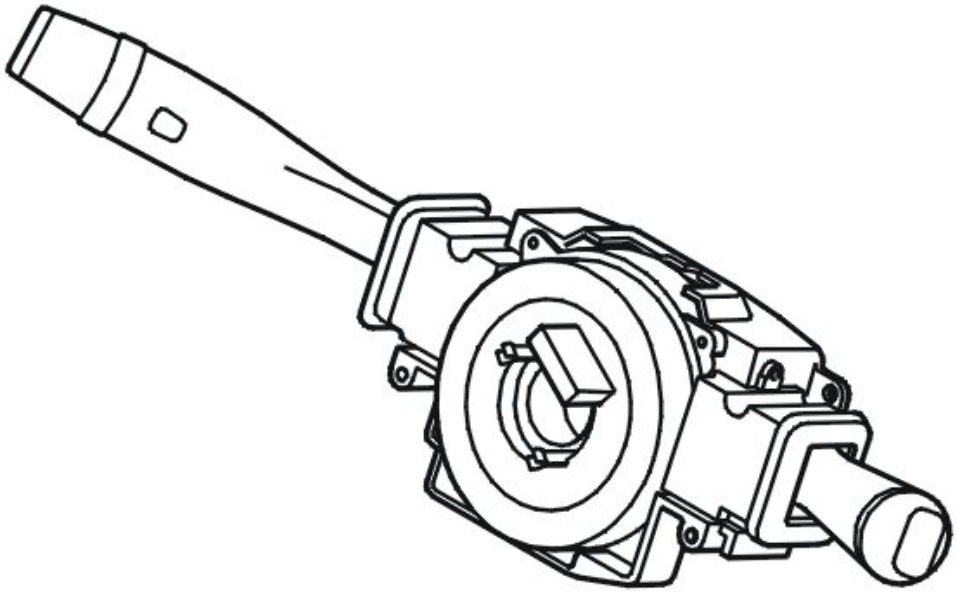
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair

Continue - DONE

SAS-E000

Diagnostic trouble code (DTC) information SAS-E000

Condition



The control modules transmit and receive information via a standardized serial communication method, CAN (Control Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference on the high speed network (CAN communication blocked).
Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if the fault is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- None.

SAS-E003

Diagnostic trouble code (DTC) information SAS-E003

Condition

Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM). Only the steering wheel angle sensor module (SAS) communicates on the controller area network (CAN).
The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the steering wheel angle sensor module (SAS) and the central electronic module (CEM) is interrupted.

Note! In the event of an open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic commands. However, normal control area network (CAN) communication does not work ("Expulsion mode").

Substitute value
- None.

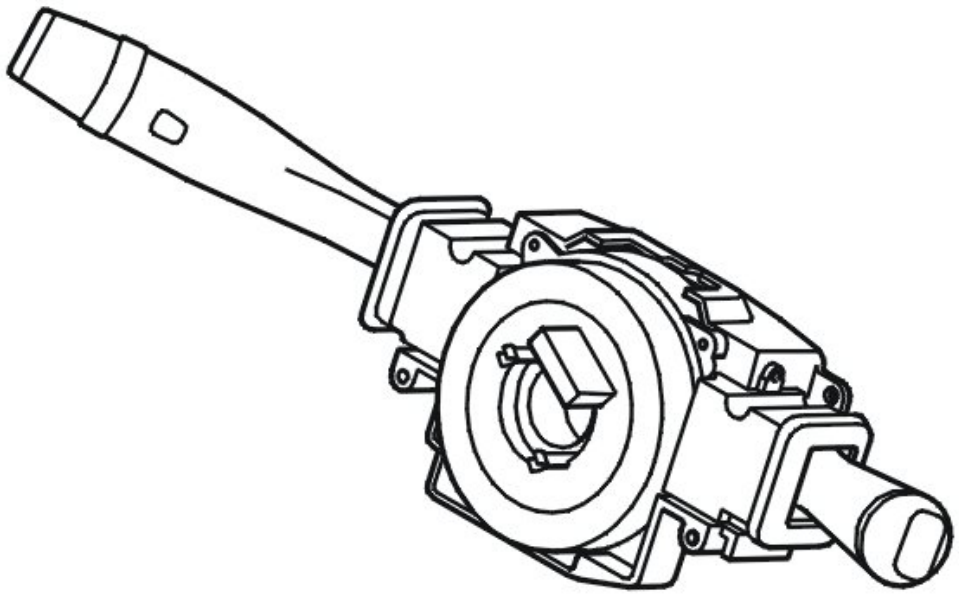
Possible source
- Incorrect CAN configuration ID (the control module is not intended for this vehicle, for example it is a used control module with different software/hardware)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM)
- Incorrect version of software.

Fault symptom[s]
- None.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SAS-E010

Condition



The Steering wheel angle sensor module (SAS) is located in the lever module together with the steering wheel module (SWM) and is supplied with power by it.
The steering wheel angle sensor module (SAS) compares the voltage with the central electronic module (CEM).
Diagnostic trouble code (DTC) is stored if the steering wheel angle sensor module (SAS) registers that the voltage when compared to the voltage signal from the central electronic module (CEM) is lower than 2 V for 10 seconds.

The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on and the steering wheel angle sensor is initiated. Initiation is carried out when the steering wheel is turned more than 4.5° in any direction.

Substitute value
- The stability function is blocked.

Possible source
- Contact resistance or oxidation in the connectors of the steering wheel module (SWM)
- Internal fault in the steering wheel angle sensor module (SAS).

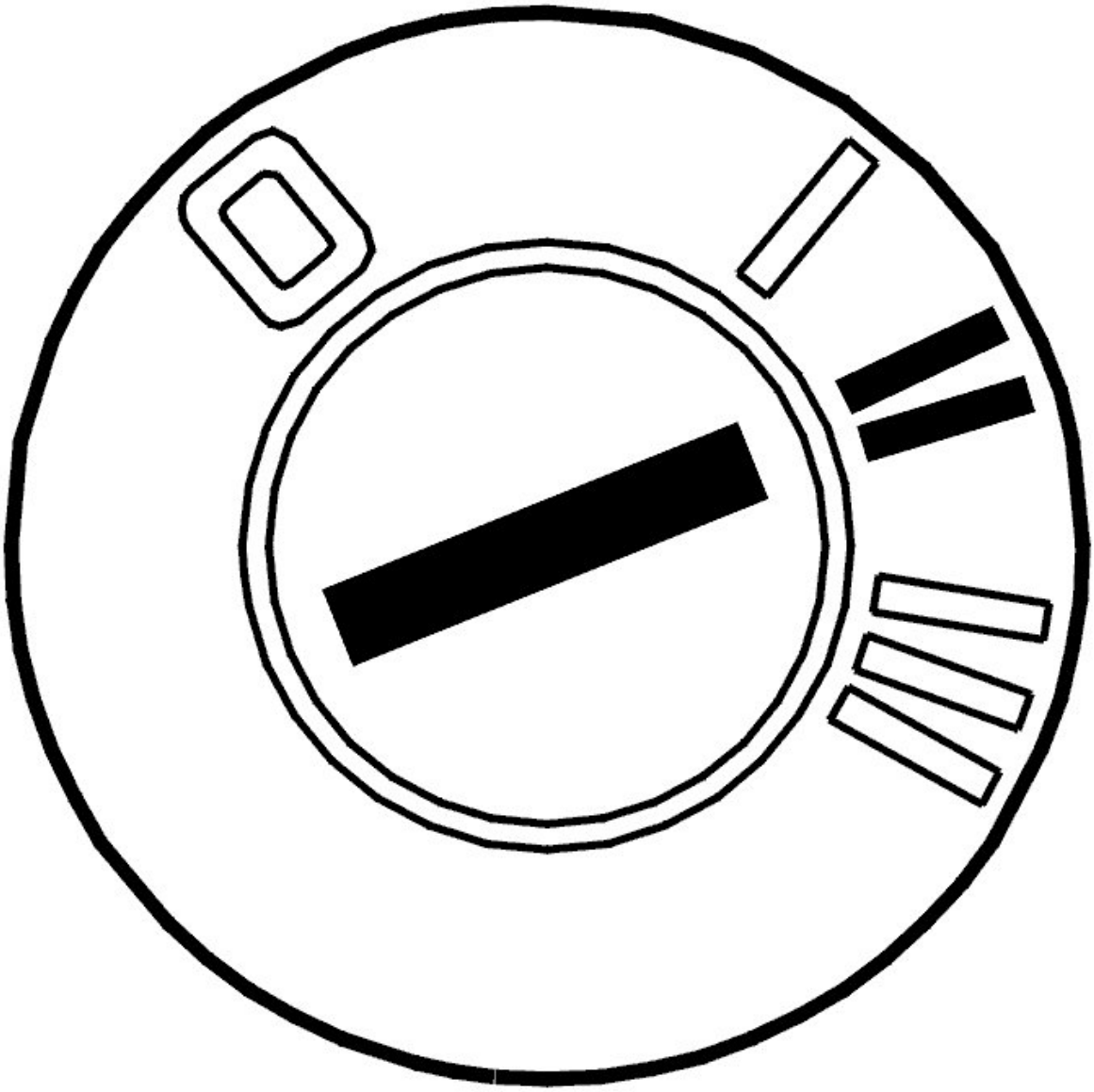
Fault symptom[s]
- Anti-spin warning lamp lit.
- General warning lamp lit.
- The stability control system does not function.

Voltage Too Low

Voltage too low

Checking the power supply

Note! Steering wheel angle sensor module (SAS) is located inside, and is supplied with power by, the steering wheel module (SWM).



- Ignition on
- Read off the power supply for the steering wheel angle sensor module (SAS) and the central electronic module (CEM).

The voltage for the steering wheel angle sensor module (SAS) and the central electronic module (CEM) must be approximately the same.
The fault is permanent if the voltage for the steering wheel angle sensor module (SAS) deviates by more than 2.0 V from the central electronic module (CEM).
If the voltage is approximately the same, this indicates an intermittent fault, i.e. the fault was present previously but is not active at the moment.

Continue - Checking wiring and terminals

Checking wiring and terminals

Check the connector for the steering wheel module (SWM). Check for contact resistance and oxidation.
Check the power supply cable (15i-supply) between the fuse in the integrated relay/fusebox in the cargo compartment and steering wheel module (SWM) terminal #A8 (#8). Check for contact resistance. Check for oxidation. For information about the circuit, see the relevant Wiring Diagram.

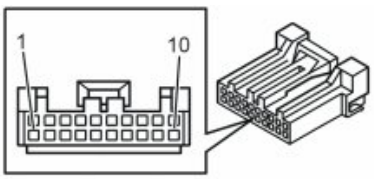
Hint: With the ignition on the voltmeter should indicate battery voltage.

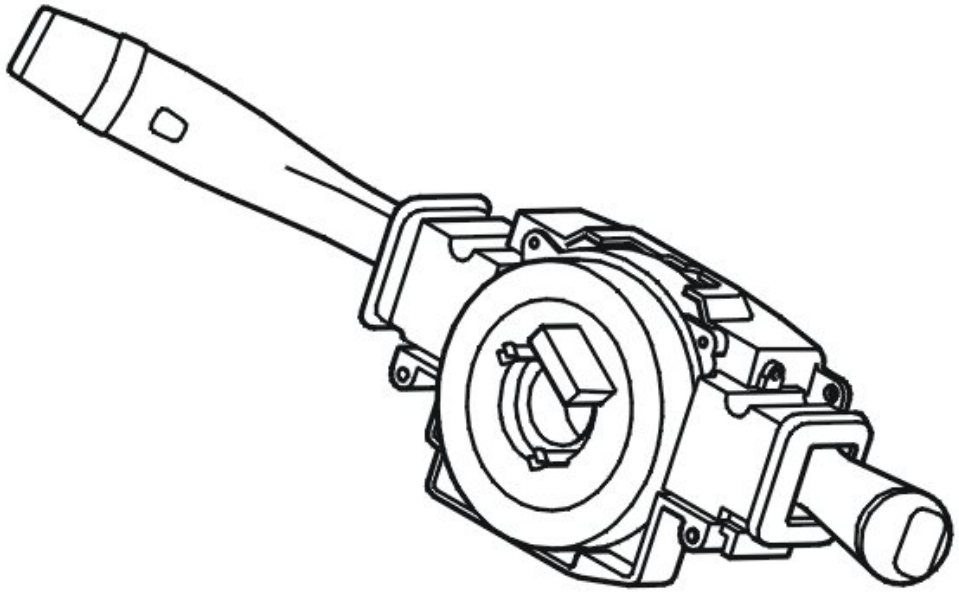
Check the ground lead between steering wheel module (SWM) terminal #A2 (#2) and the ground terminal. Check for contact resistance. Check for oxidation. For information about the circuit, see the relevant Wiring Diagram.
Remedy as necessary.

Other information

- Connecting the breakout box See: Brakes and Traction Control/Antilock Brakes / Traction Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Steering Wheel Angle Sensor Module (SAS)

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Steering wheel angle sensor module (SAS) is integrated in the steering wheel module (SWM). To replace the control module, see Steering wheel module (SWM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Steering/Steering Column Control Module/Service and Repair.

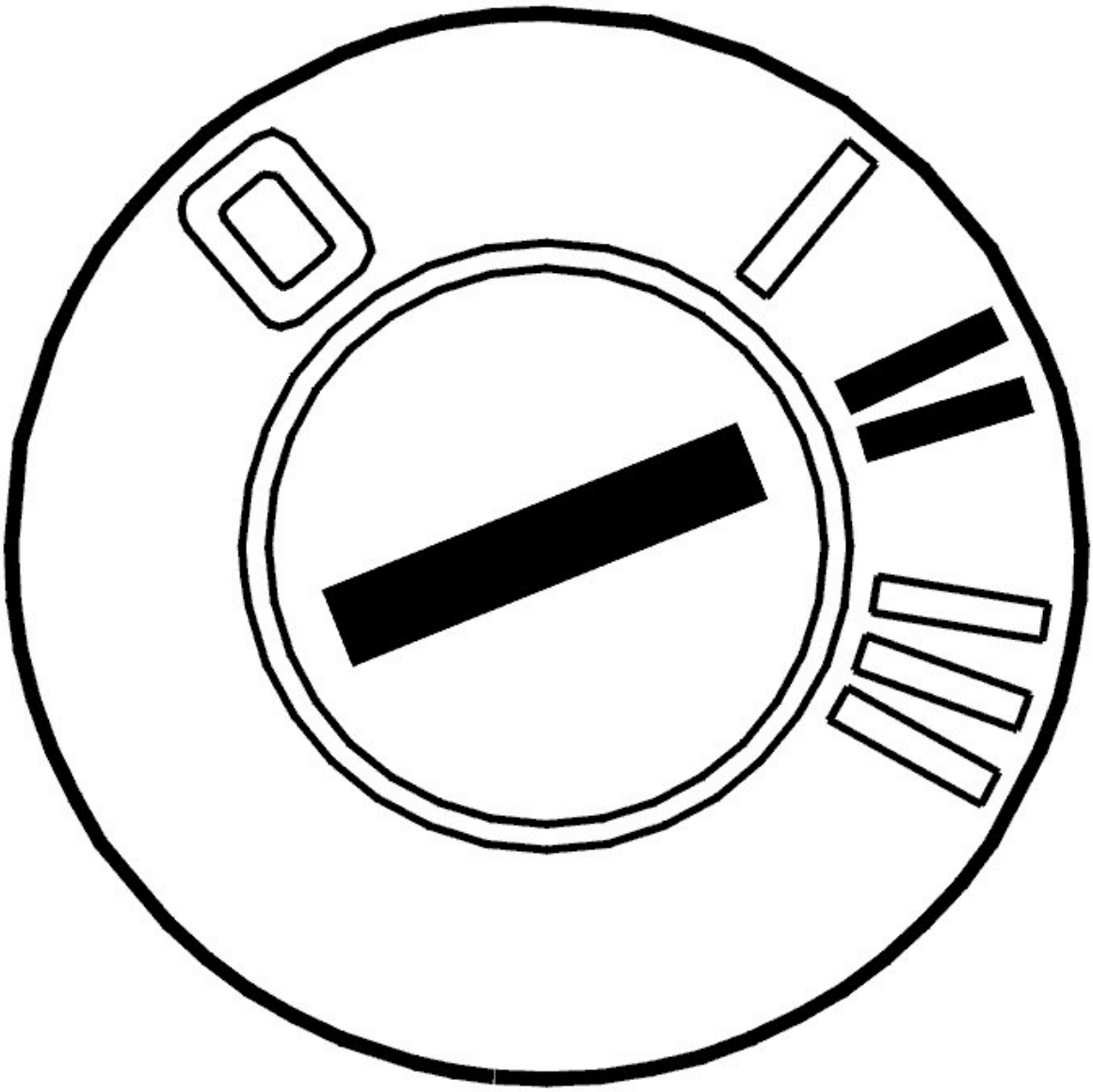


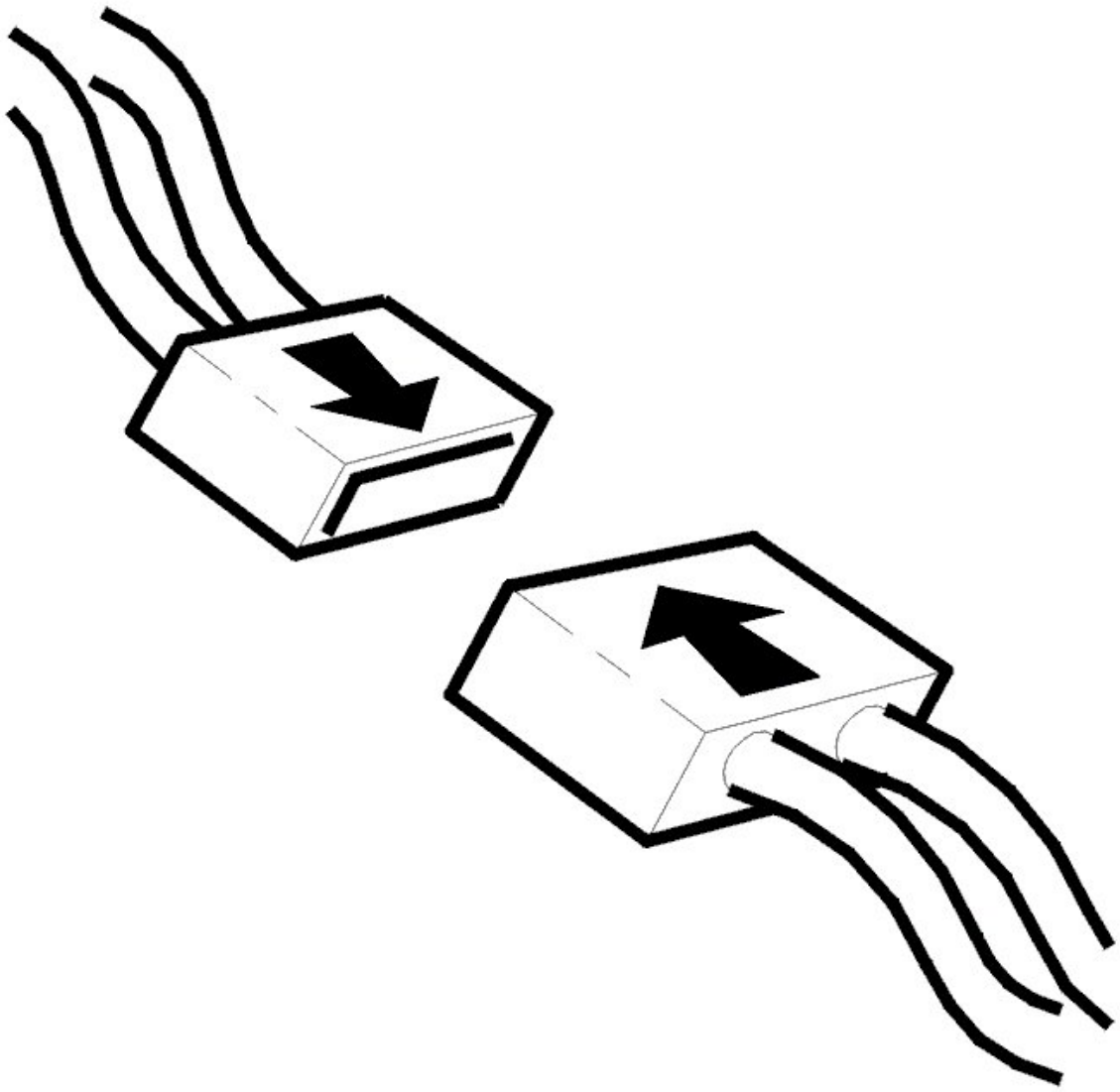


Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, reinstall components etc.
- Ignition on
- Read off the power supply for the steering wheel angle sensor module (SAS) and the central electronic module (CEM).

Check that the voltage is approximately battery voltage.

Is the voltage OK?

Yes - VERIFIED

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

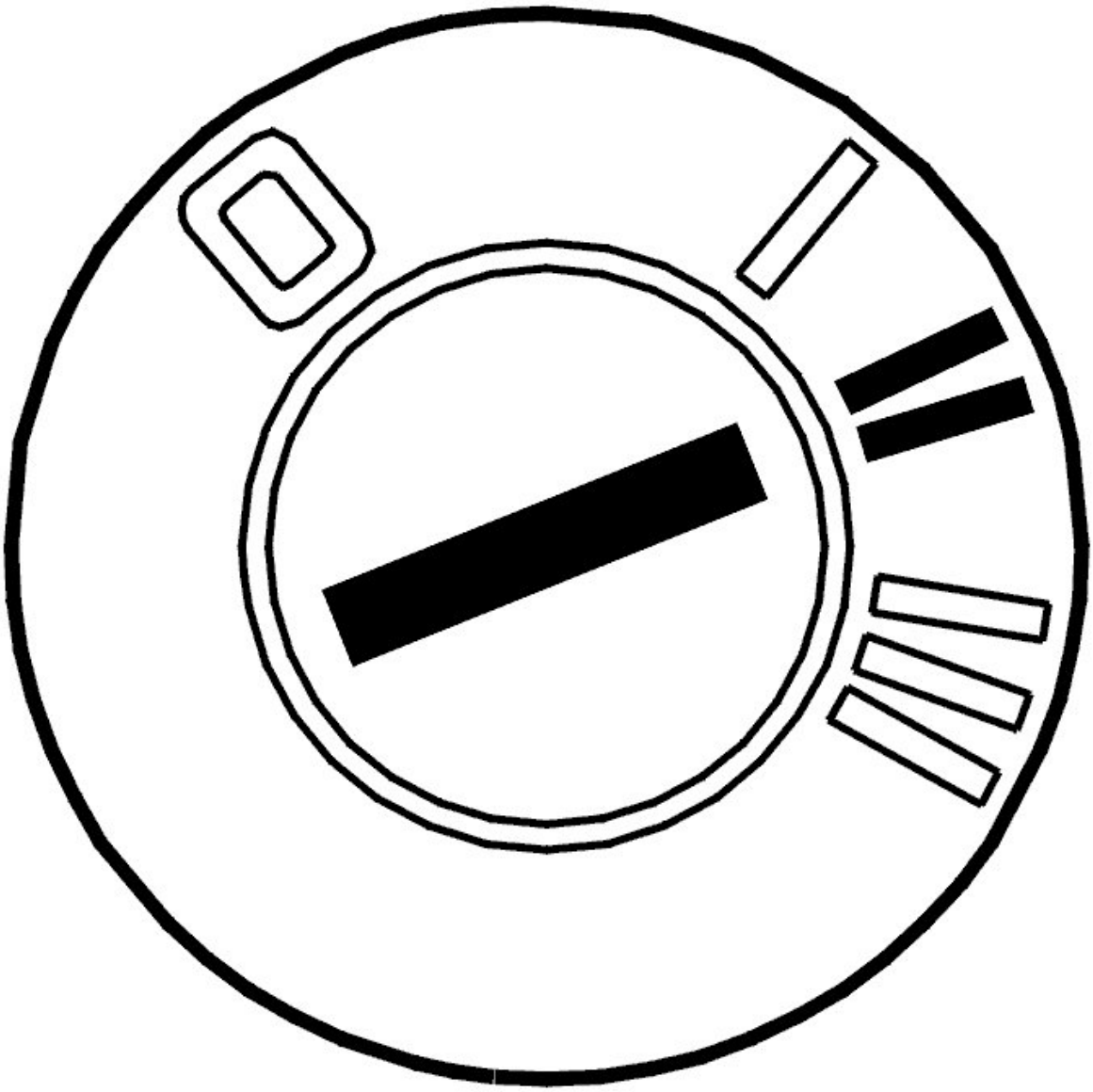
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply

SAS-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0010 Diagnostic trouble code information

Condition

If the control unit registers that the voltage in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-0010 is displayed.

Substitute value
- Nothing.

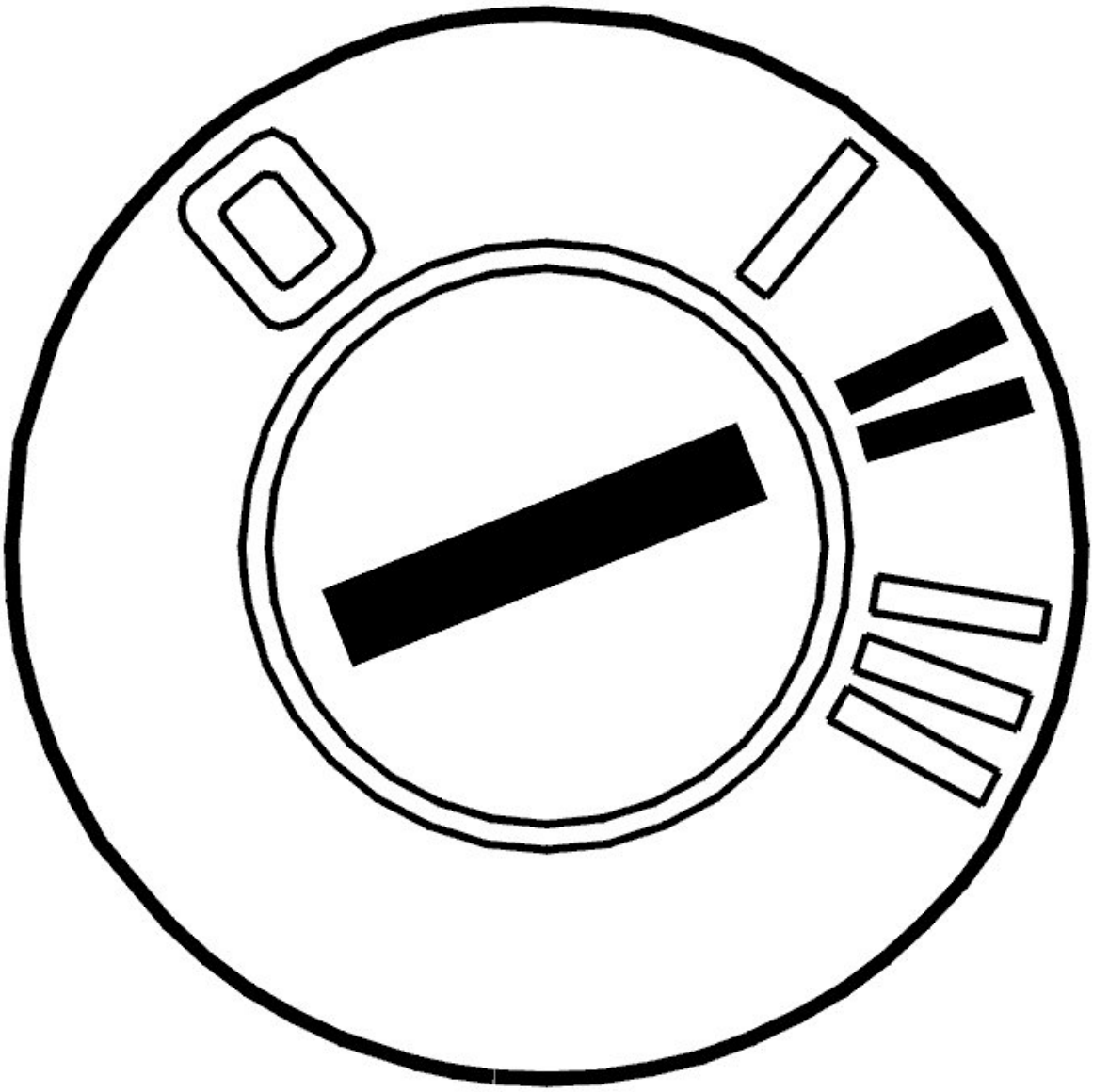
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in air bag
- Short circuit to voltage supply in contact reel.

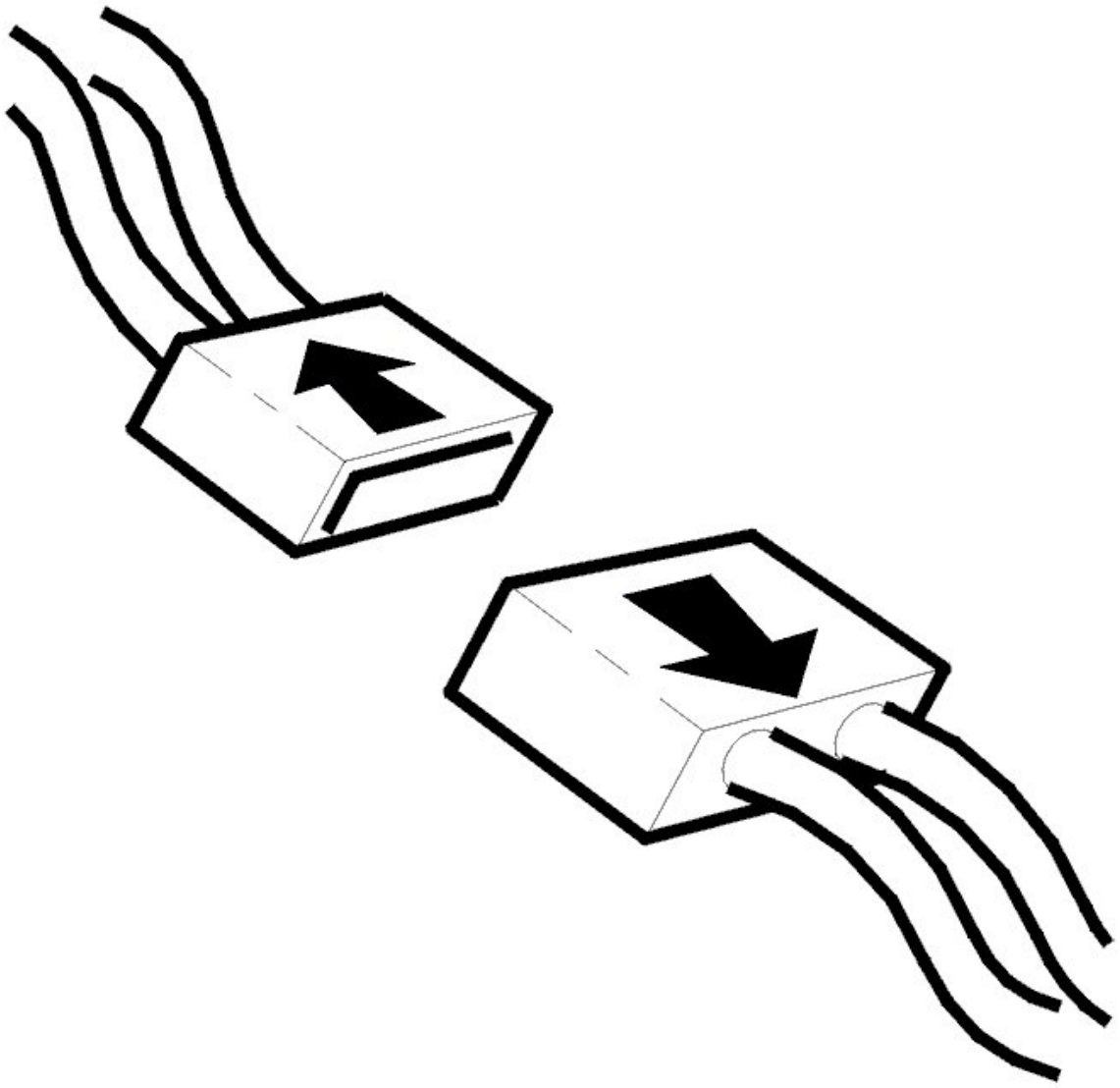
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

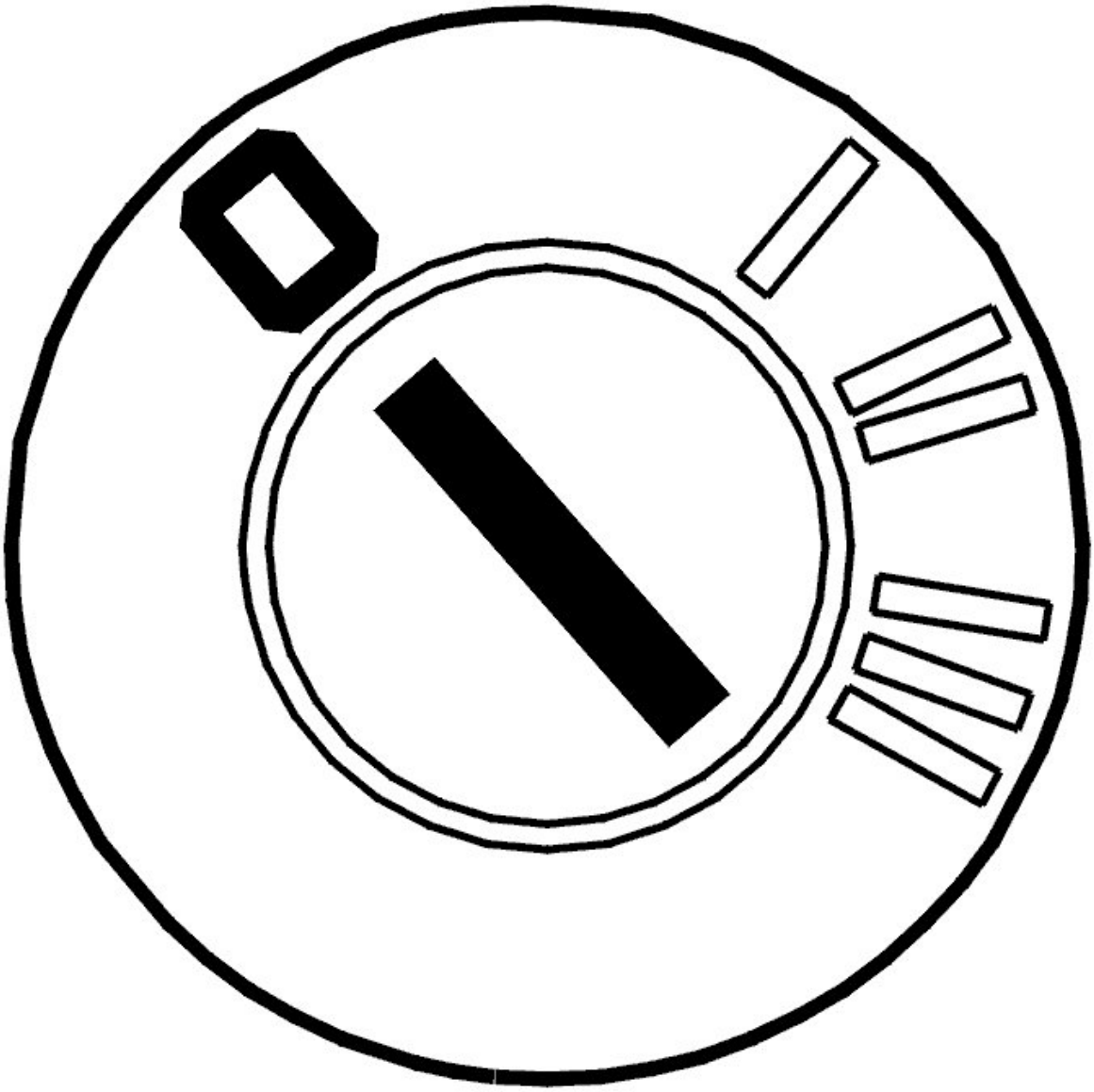
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

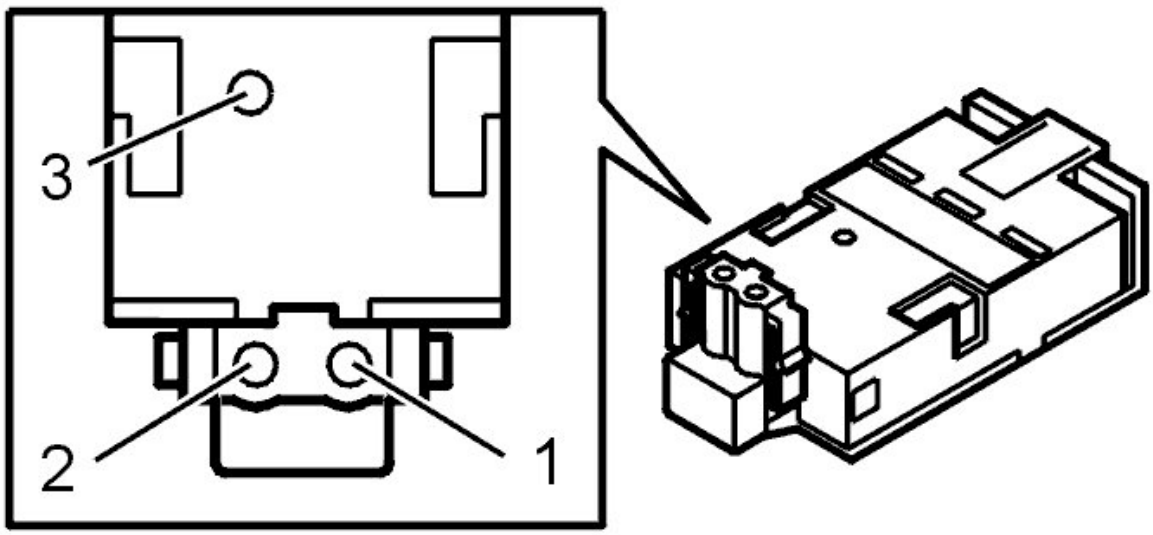
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

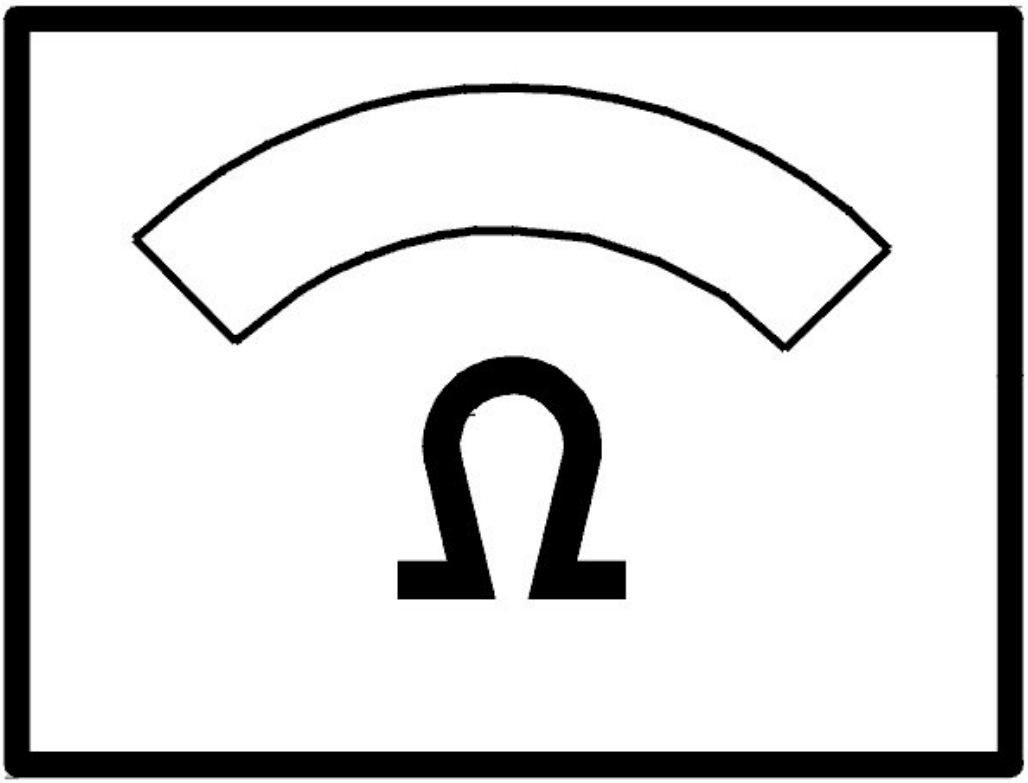
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side) and the disconnected battery positive terminal. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance for all steering wheel positions.
Remedy as necessary.

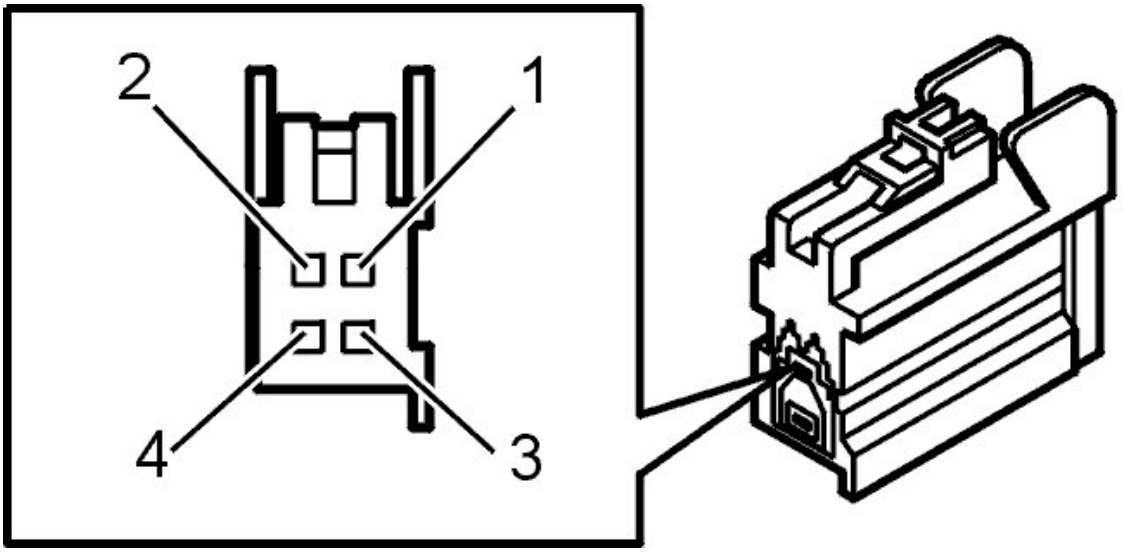
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the SRS control module disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select "Continue" when the fault has been remedied.

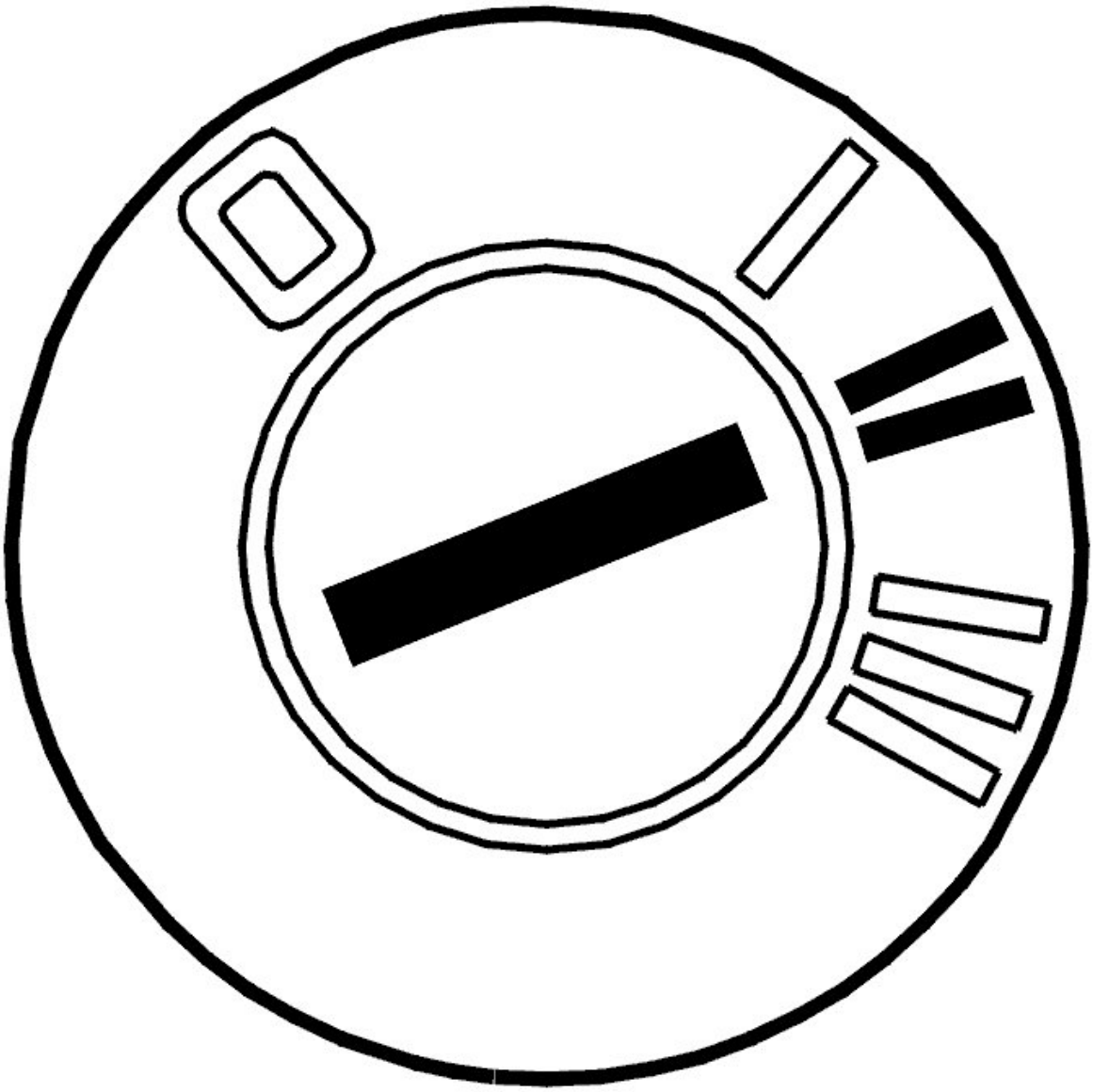
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0010 Diagnostic trouble code information

Condition

If the control unit registers that the voltage in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-0010 is displayed.

Substitute value

- Nothing.

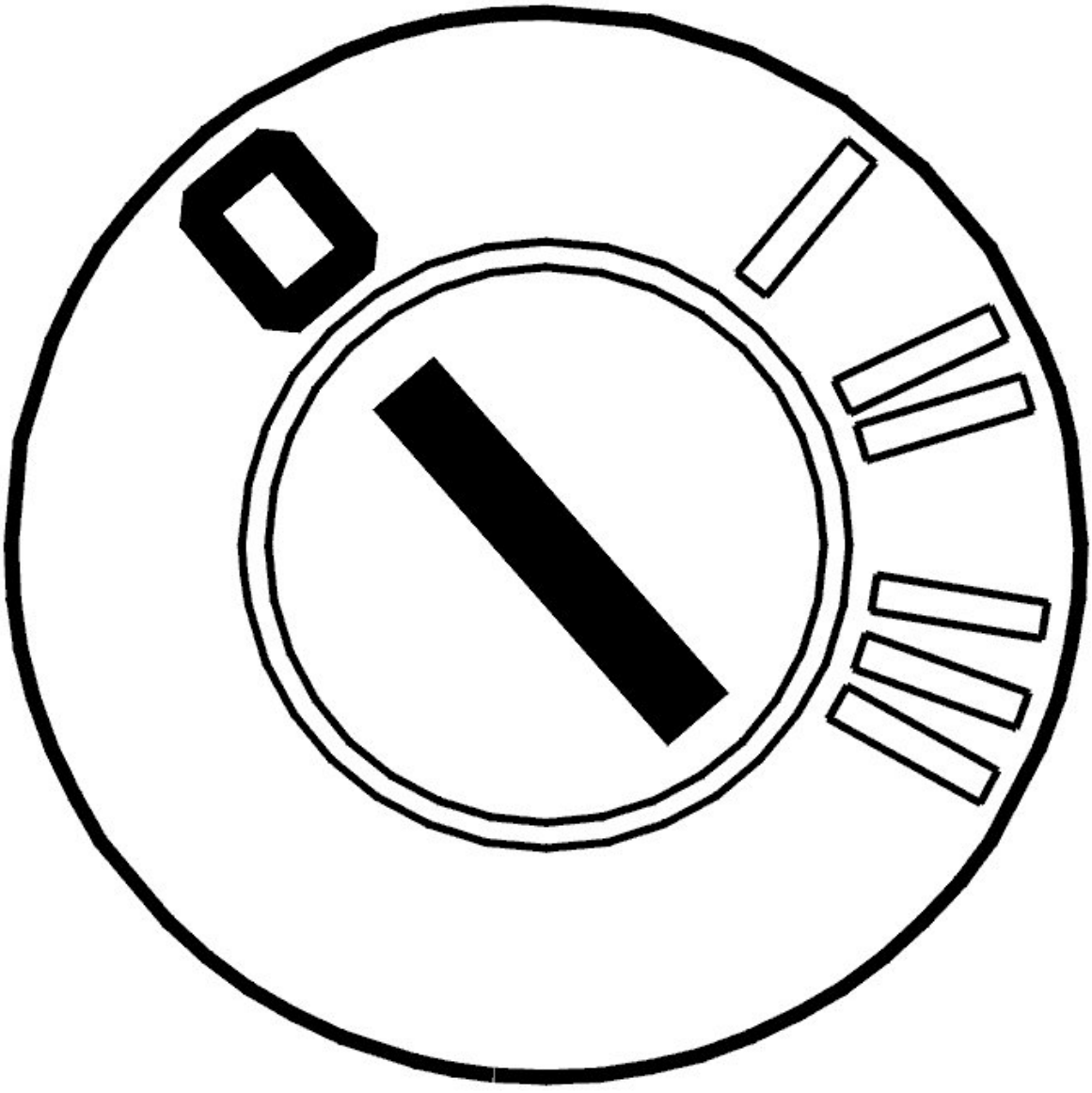
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in air bag
- Short circuit to voltage supply in contact reel.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

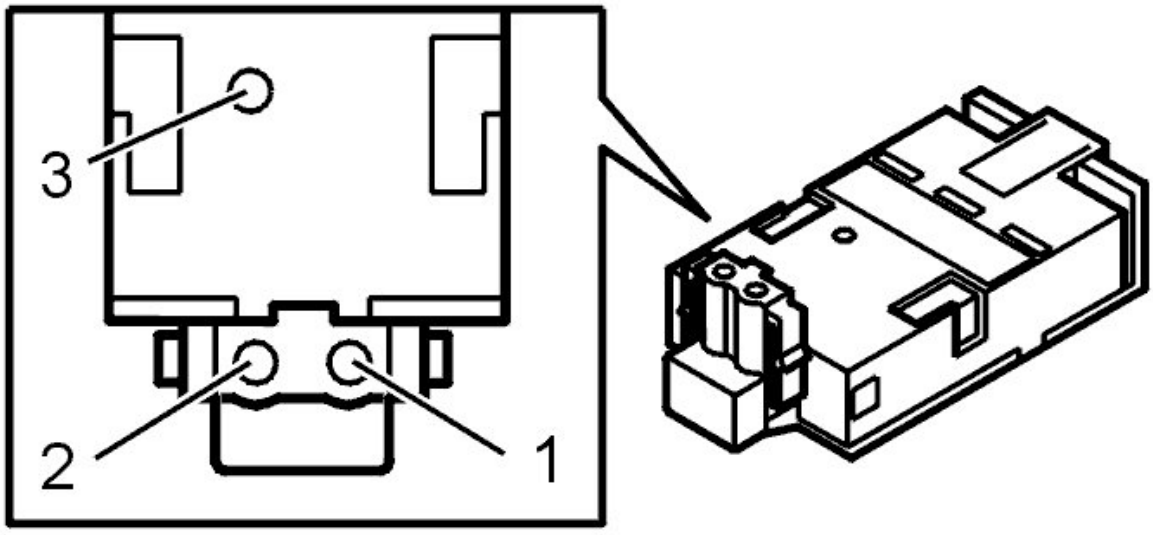
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

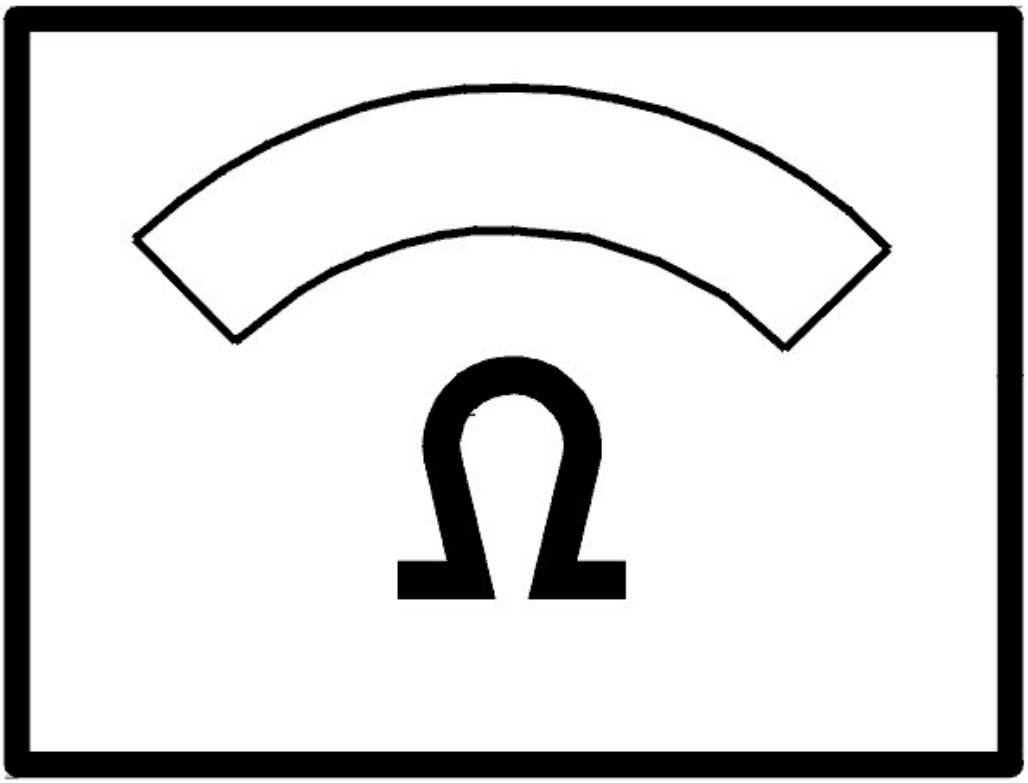
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

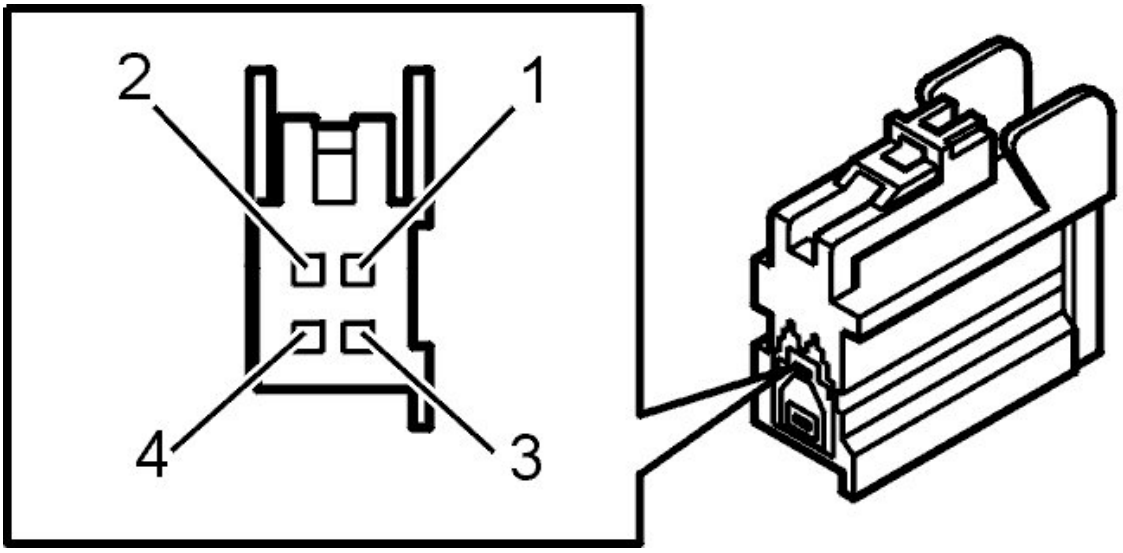
Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Disconnect the connector for the contact reel. Check the contact reel wiring by connecting an ohmmeter between terminals #1 and #2 (driver's airbag side) and the disconnected battery terminal. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and for the SRS control module disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0011 Diagnostic trouble code information

Condition

If the control unit registers that the voltage in the circuit is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0011 is displayed.

Substitute value
- Nothing.

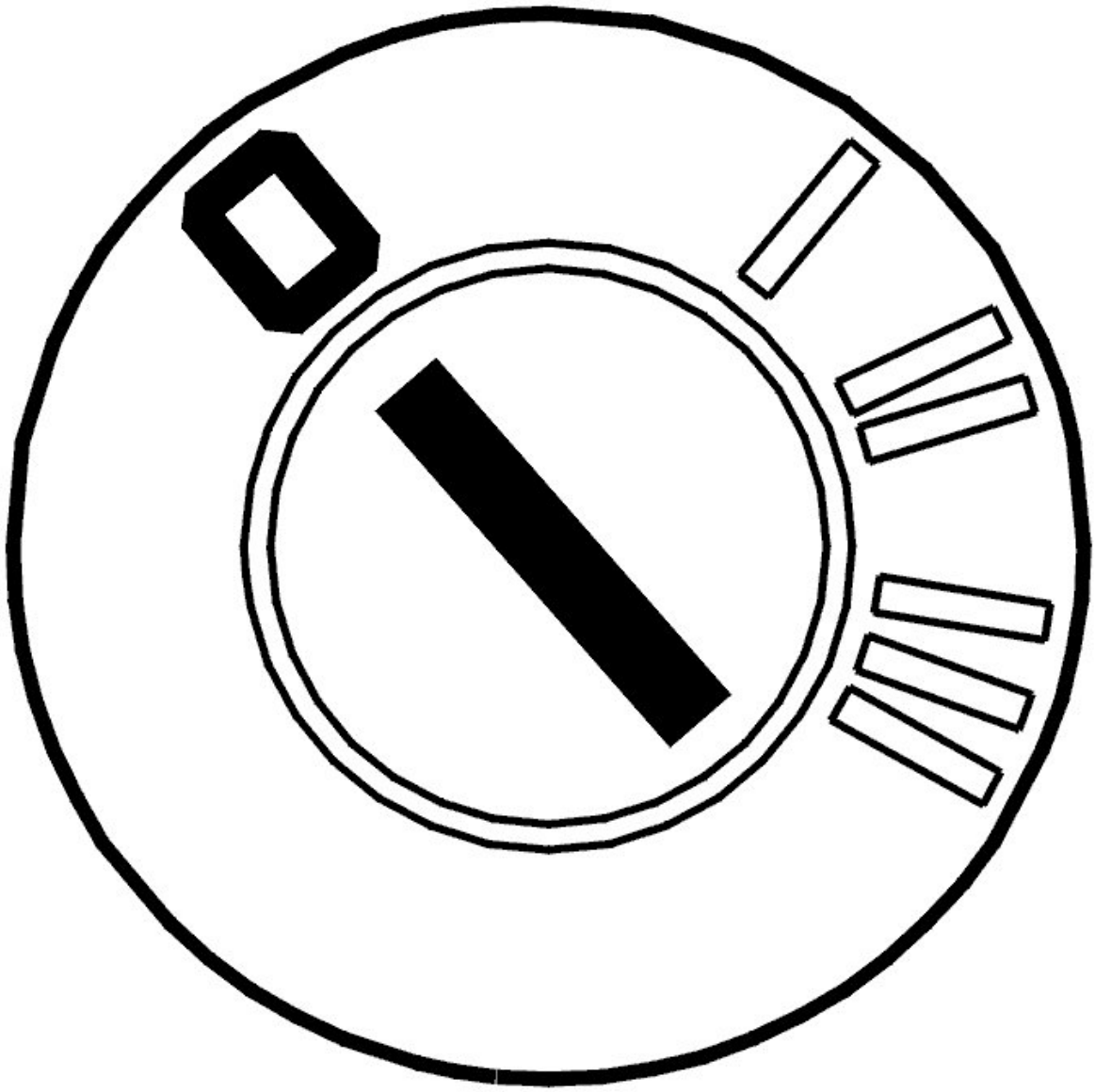
Possible source
- Short circuit to ground in igniter wire or in the connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to ground in air bag
- Short circuit to ground in contact reel.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

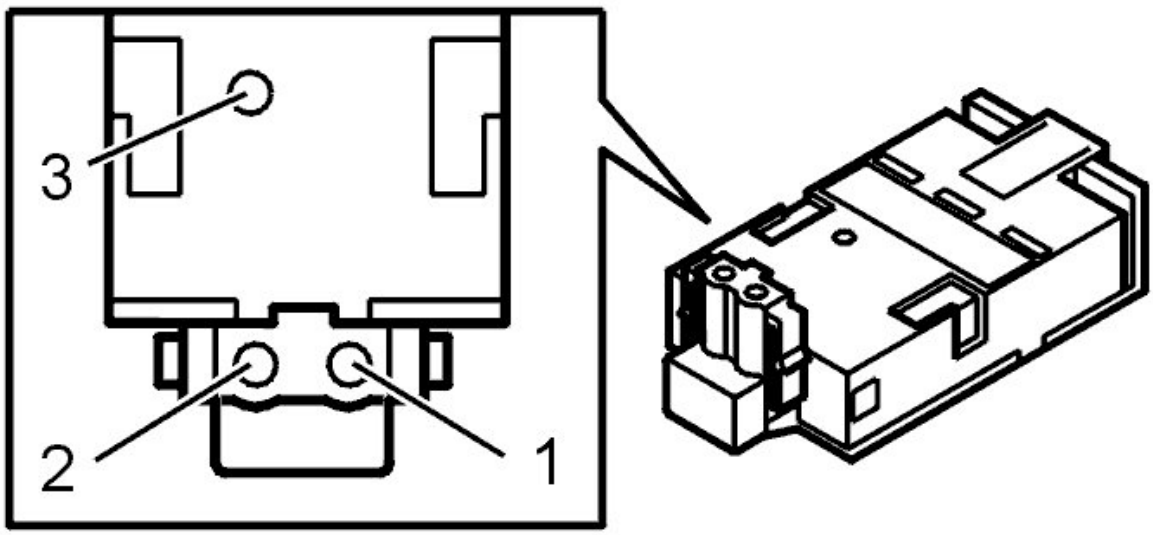
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

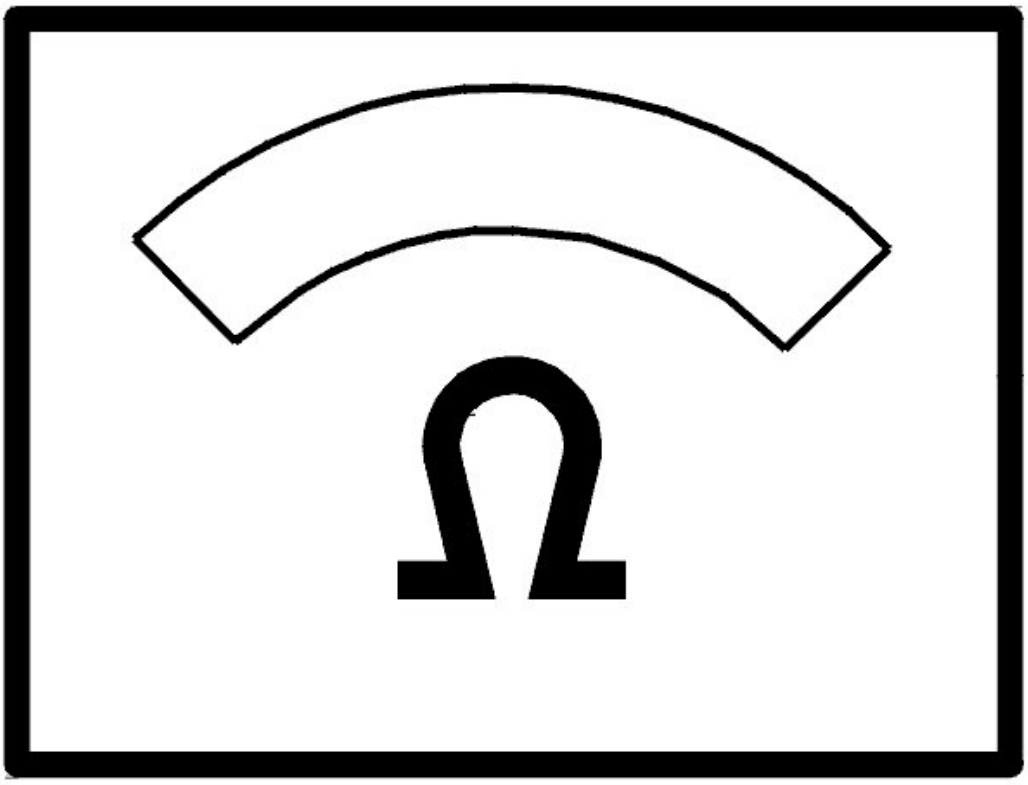
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

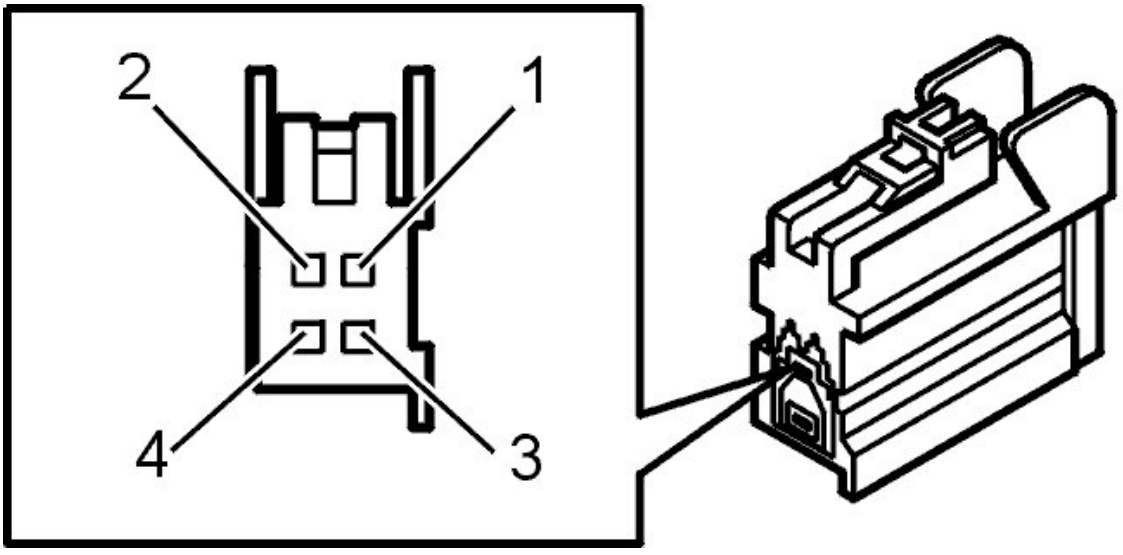
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0011 Diagnostic trouble code information

Condition

If the control unit registers that the voltage in the circuit is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0011 is displayed.

Substitute value
- Nothing.

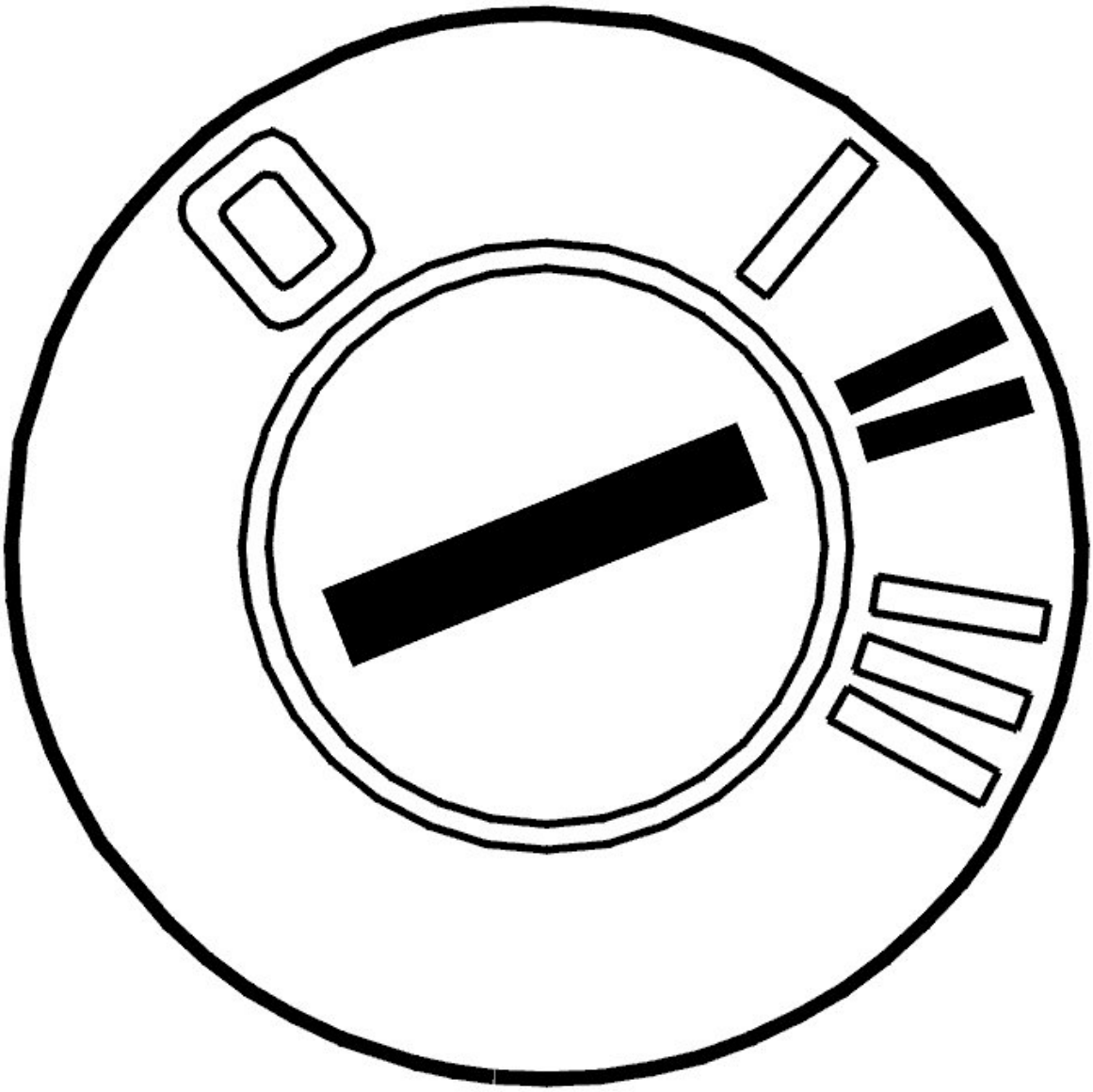
Possible source
- Short circuit to ground in igniter wire or in the connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to ground in air bag
- Short circuit to ground in contact reel.

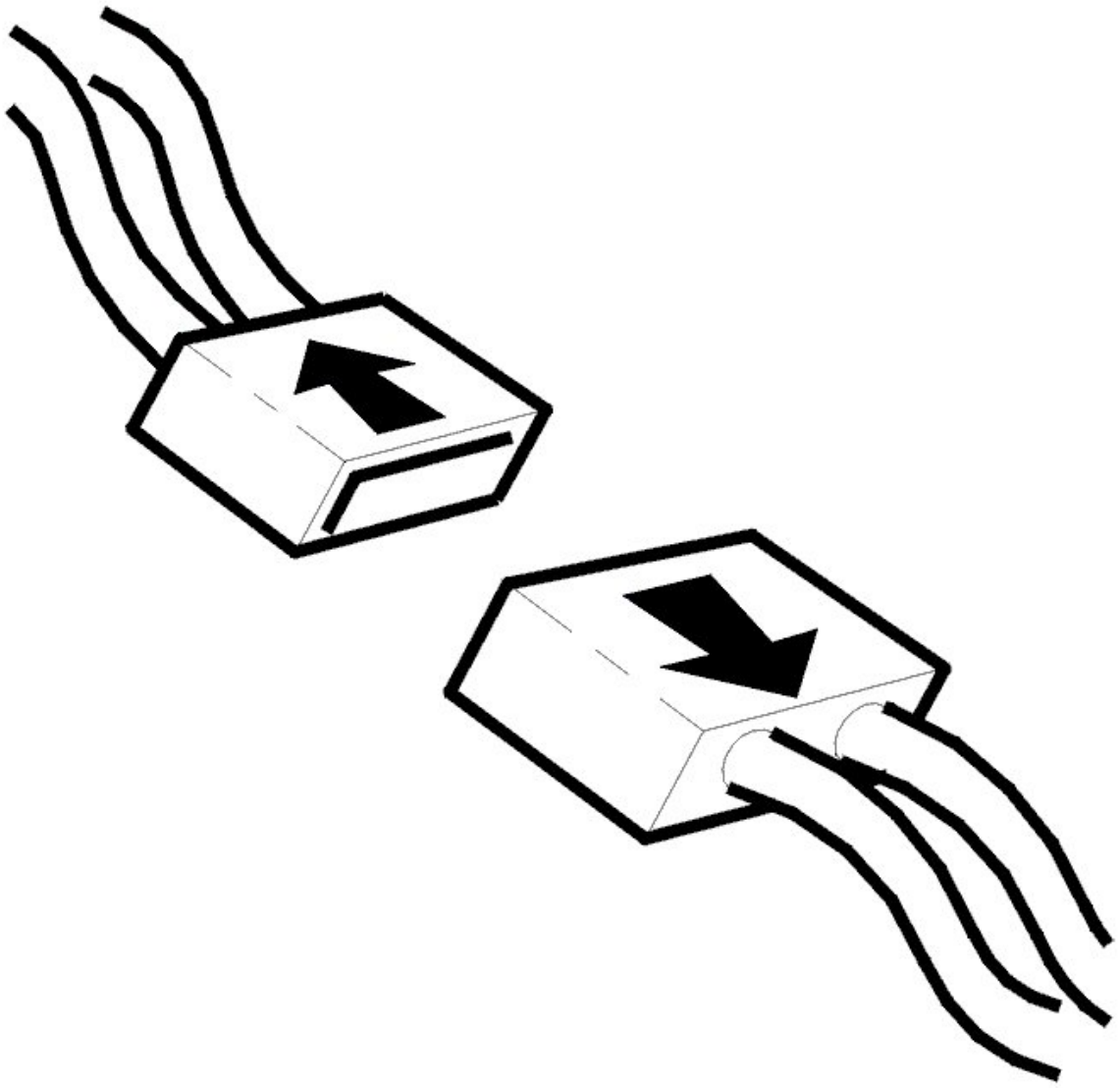
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the special tool is defective, the diagnostic readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

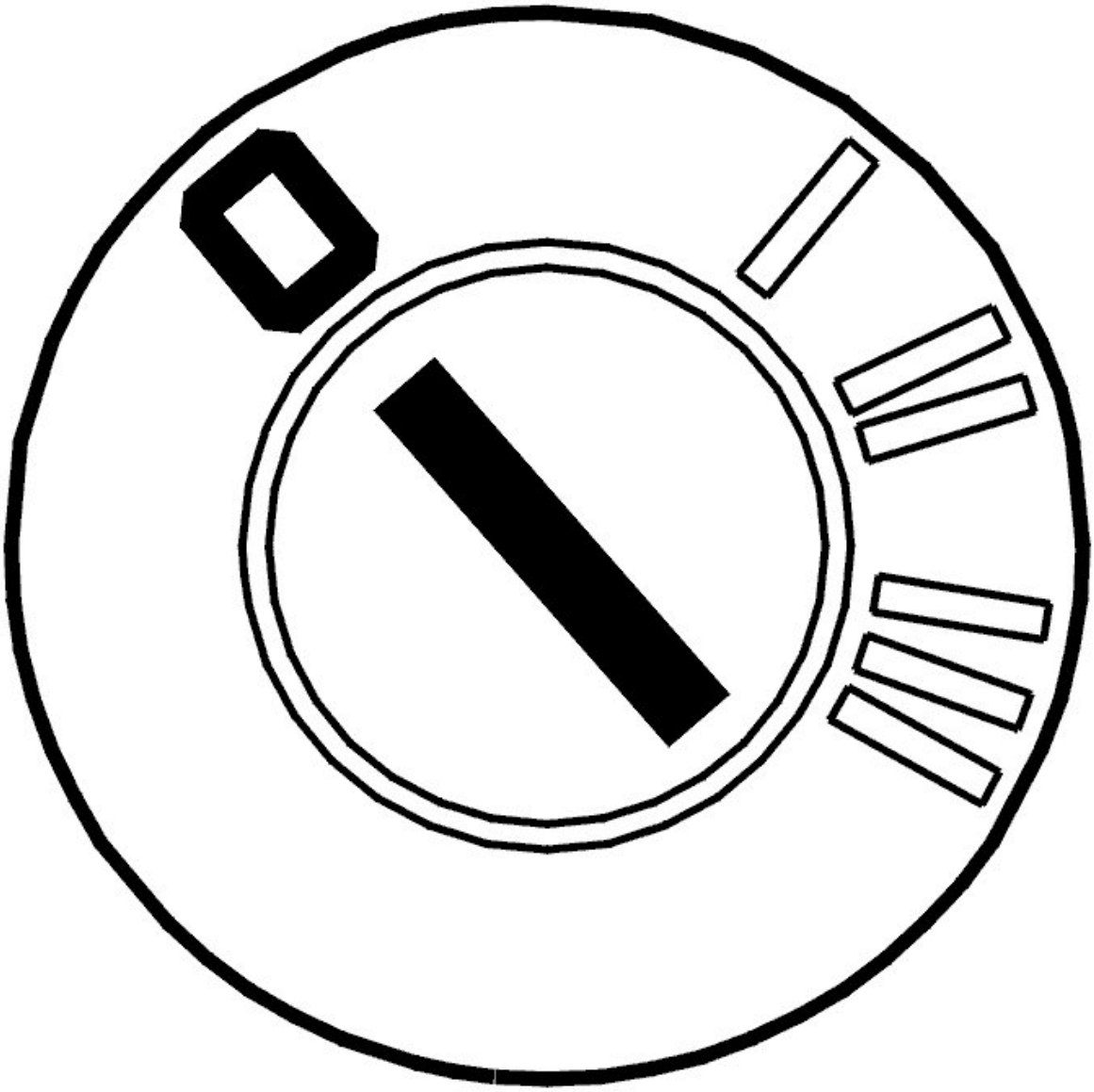
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking the component and wiring

Checking the component and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

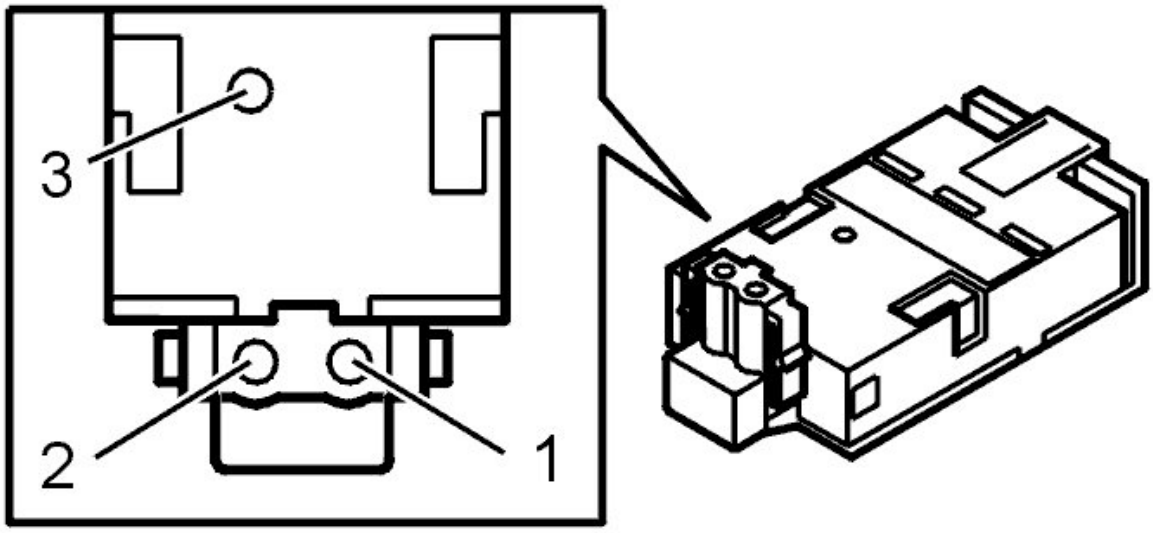
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

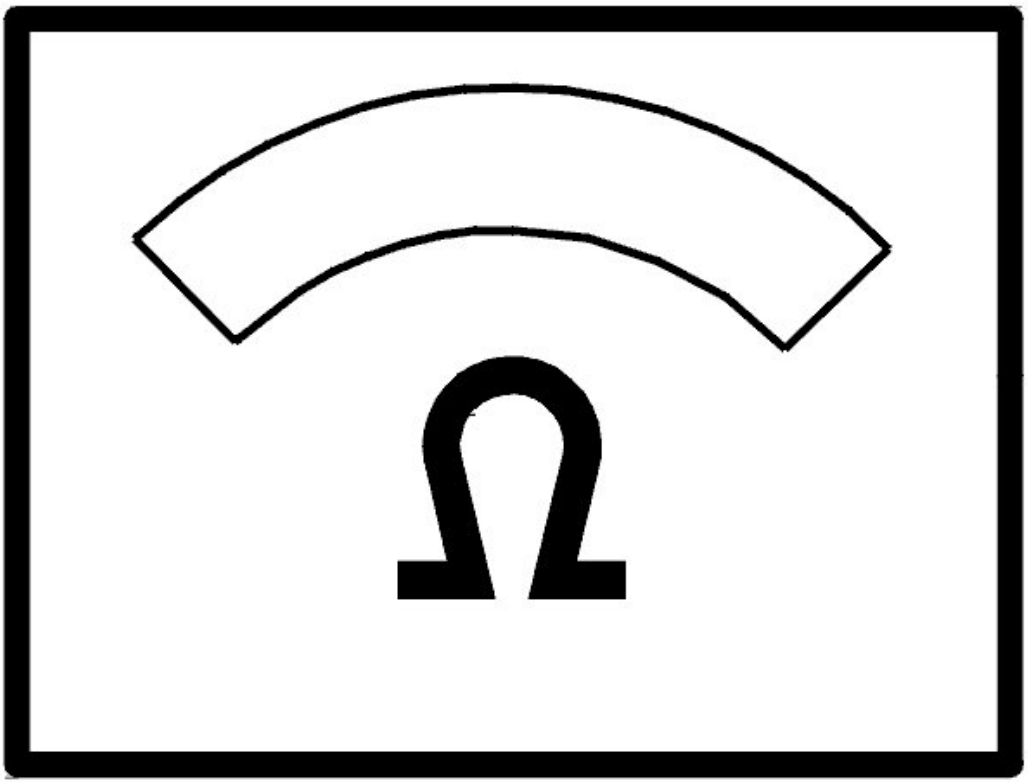
Check the cable between supplemental restraint system module (SRS) terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3. Check for a short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side) and ground. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

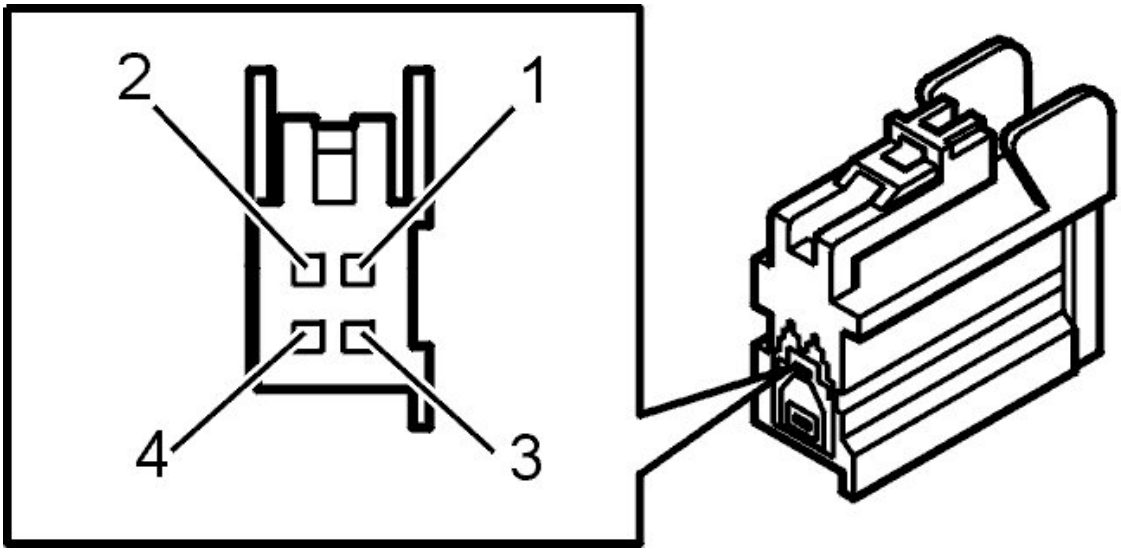
Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (supplemental restraint system module (SRS) side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







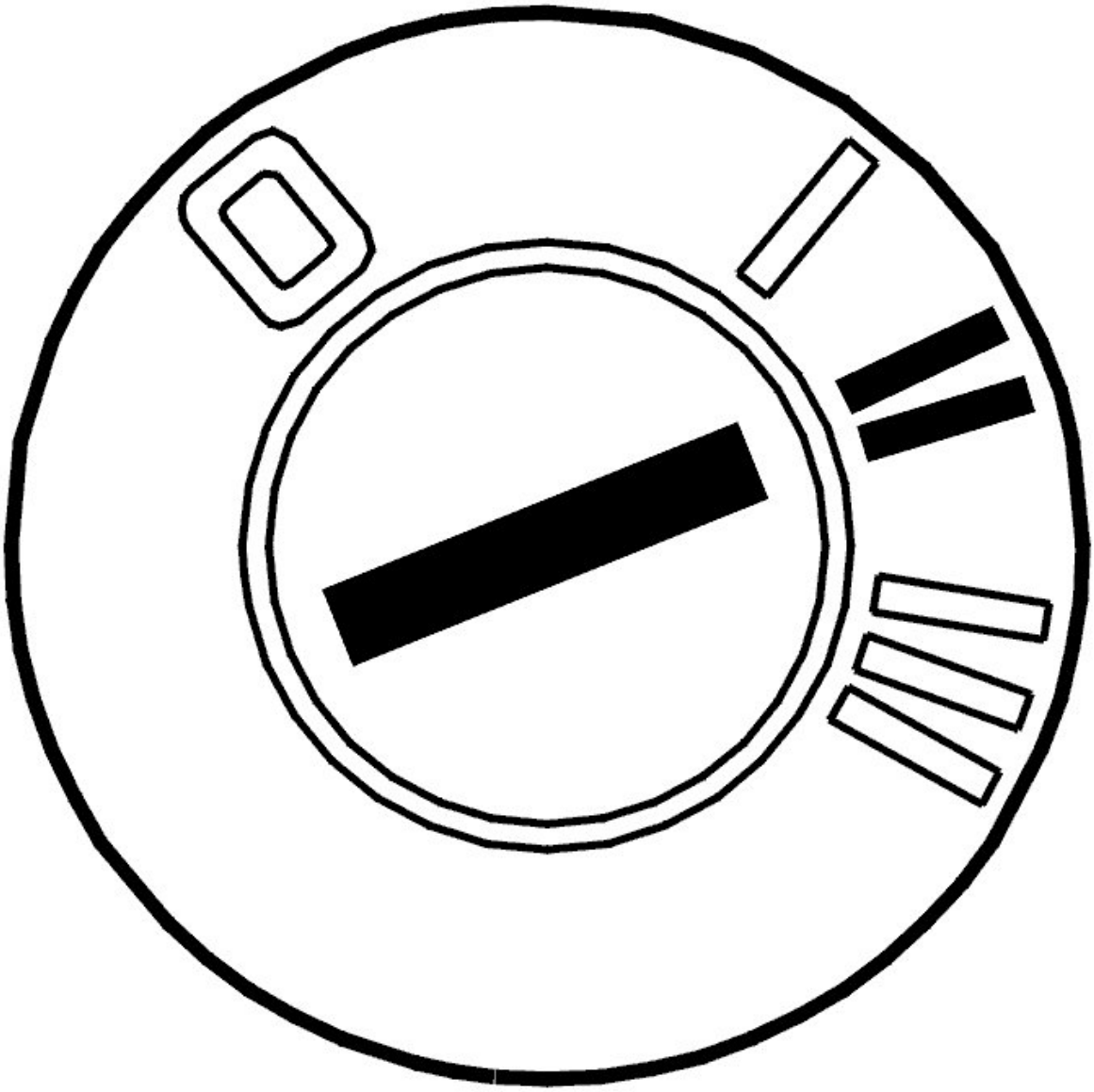
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0012 Diagnostic trouble code information

Condition

If the control unit registers that the capacitance in the circuit is too high for more than 10 seconds, diagnostic trouble code SRS-0012 is displayed.

Substitute value
- Nothing.

Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

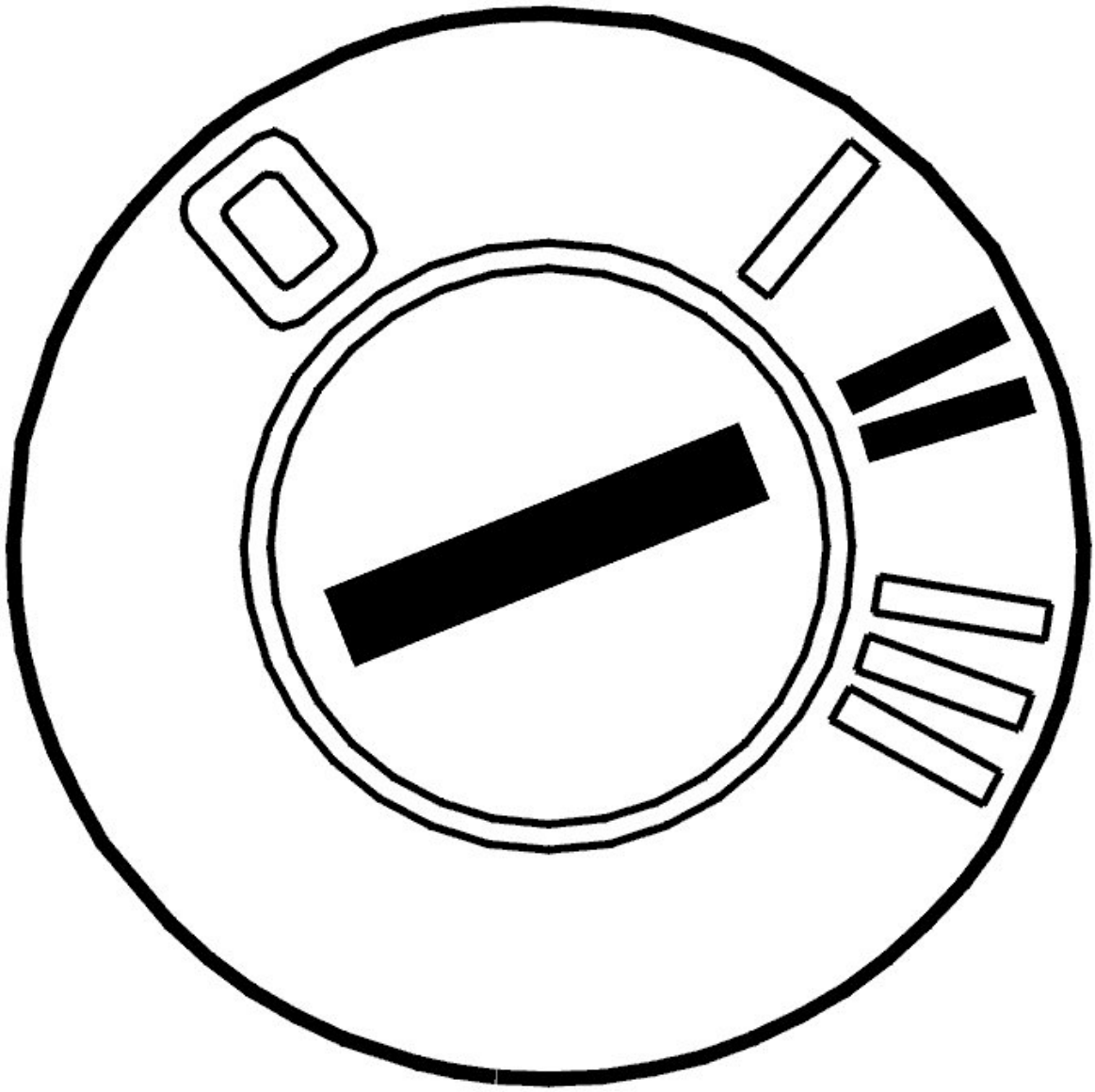
Fault symptom[s]

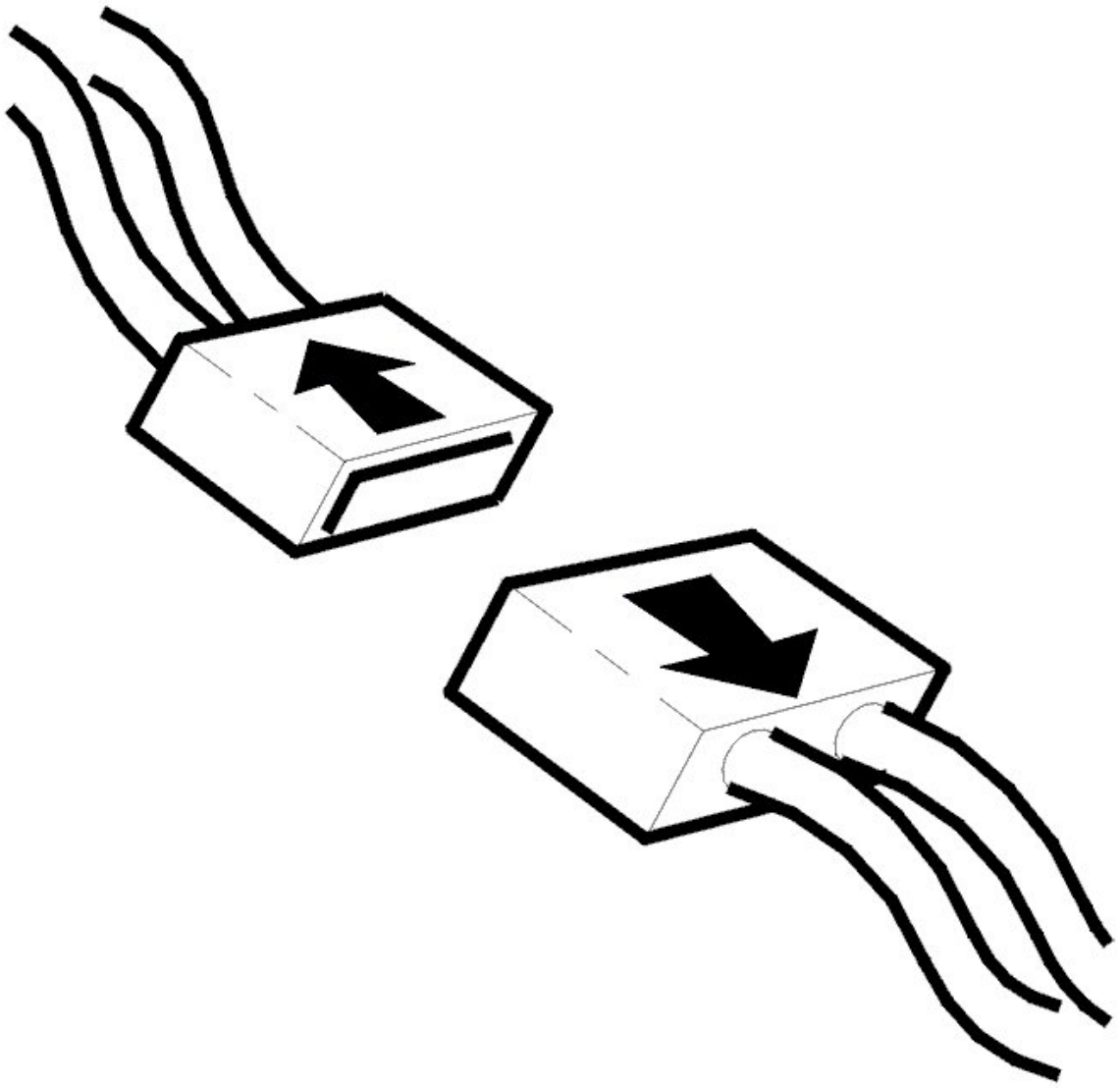
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

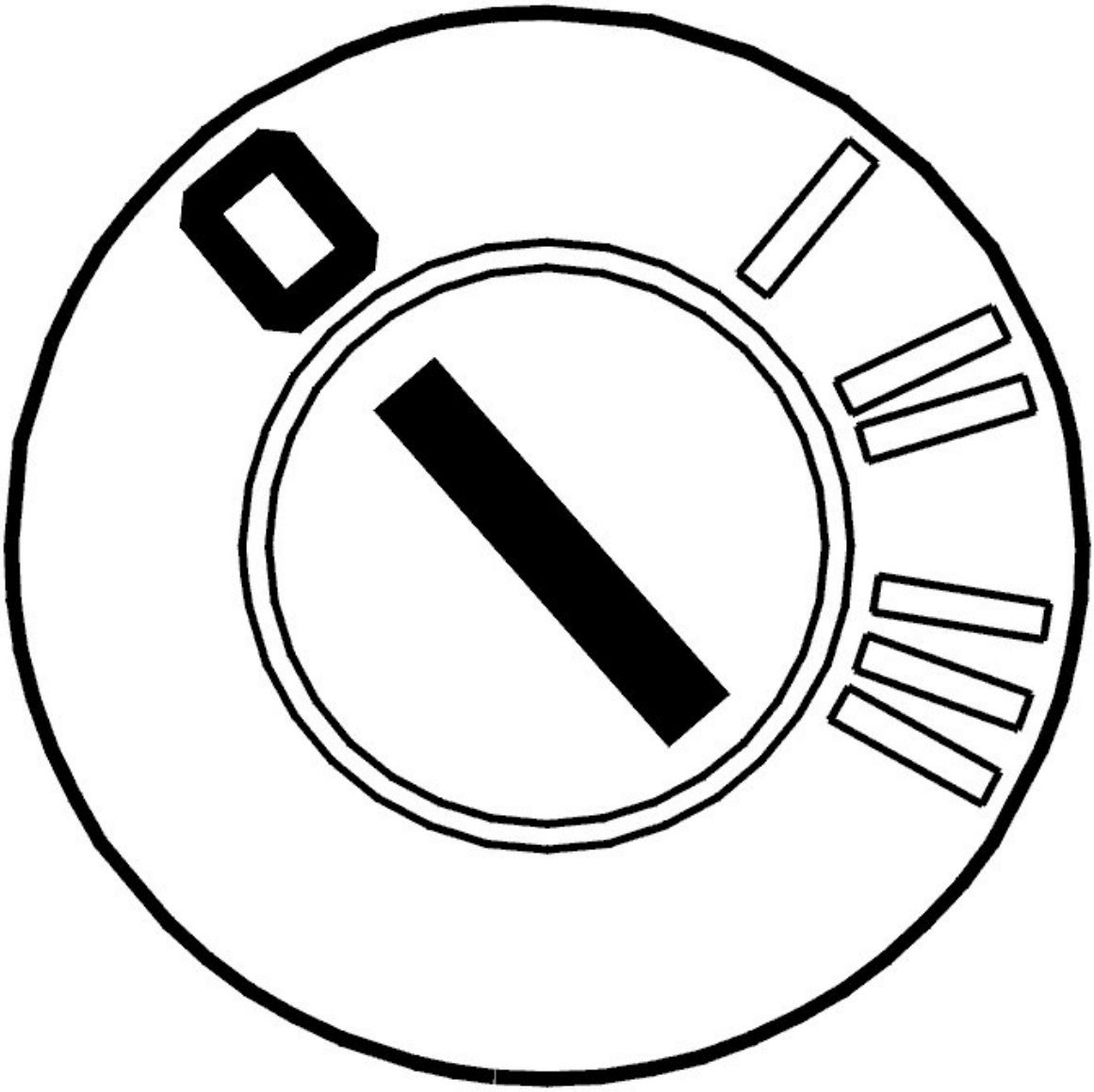
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

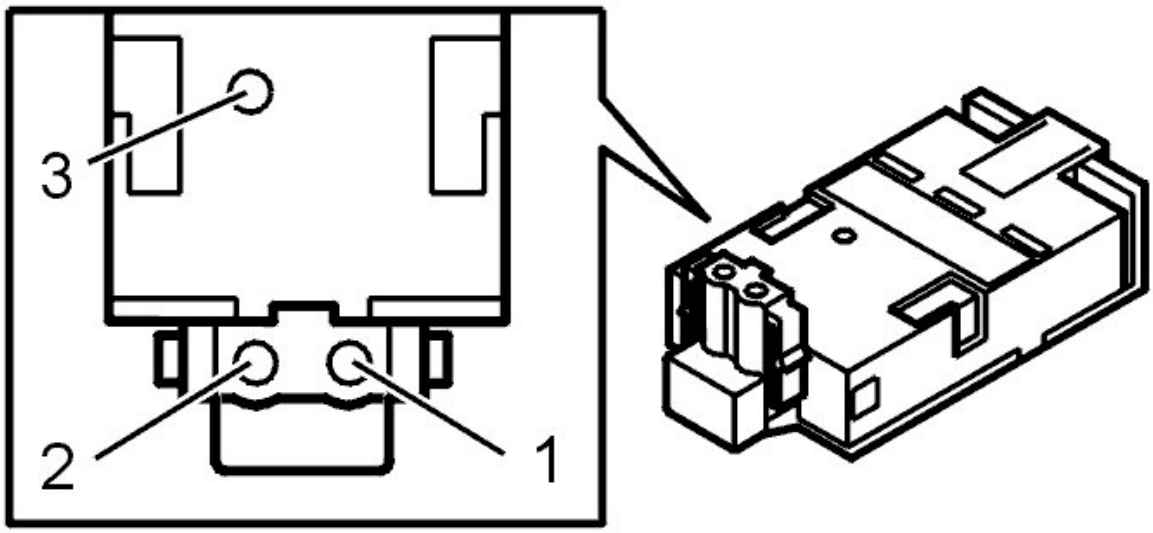
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

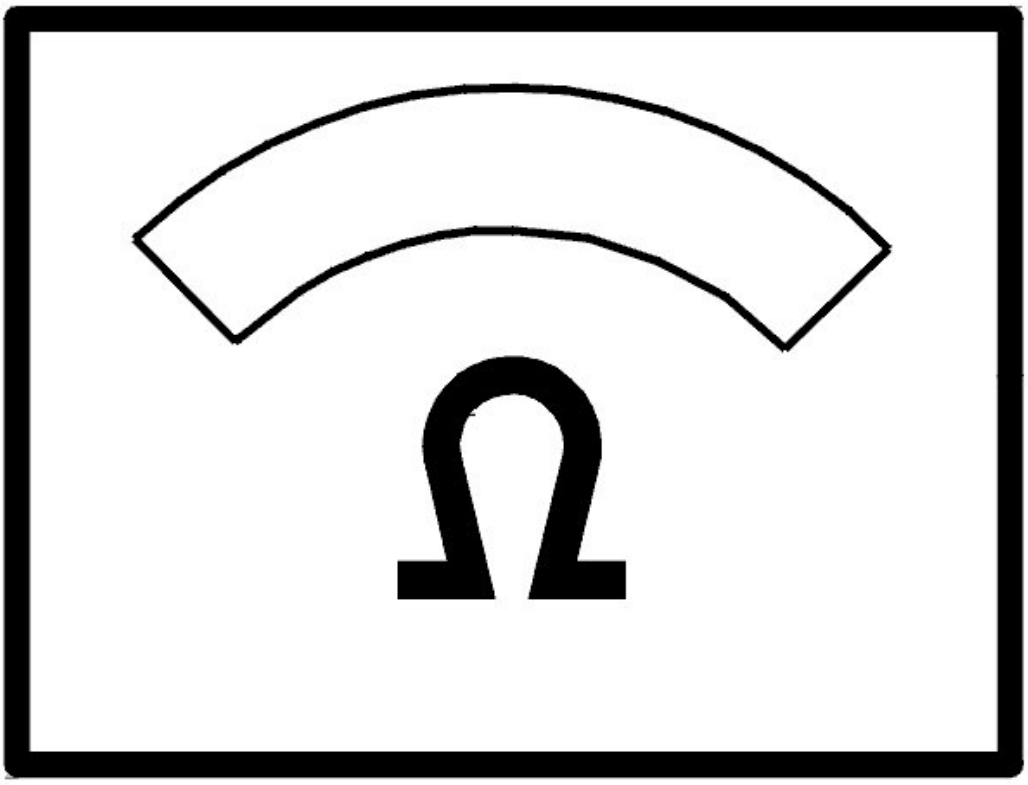
Other information:

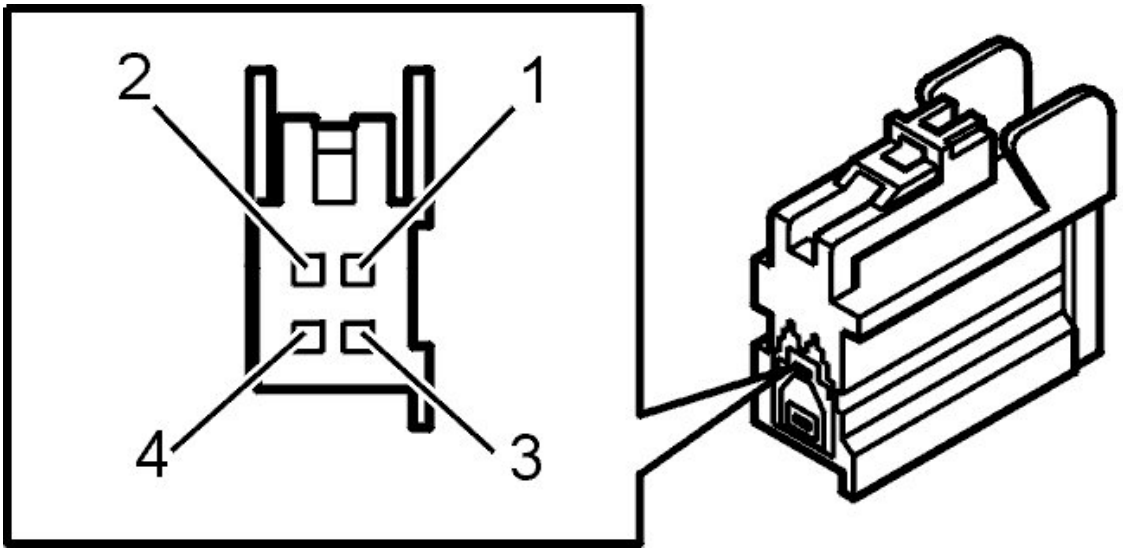
- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







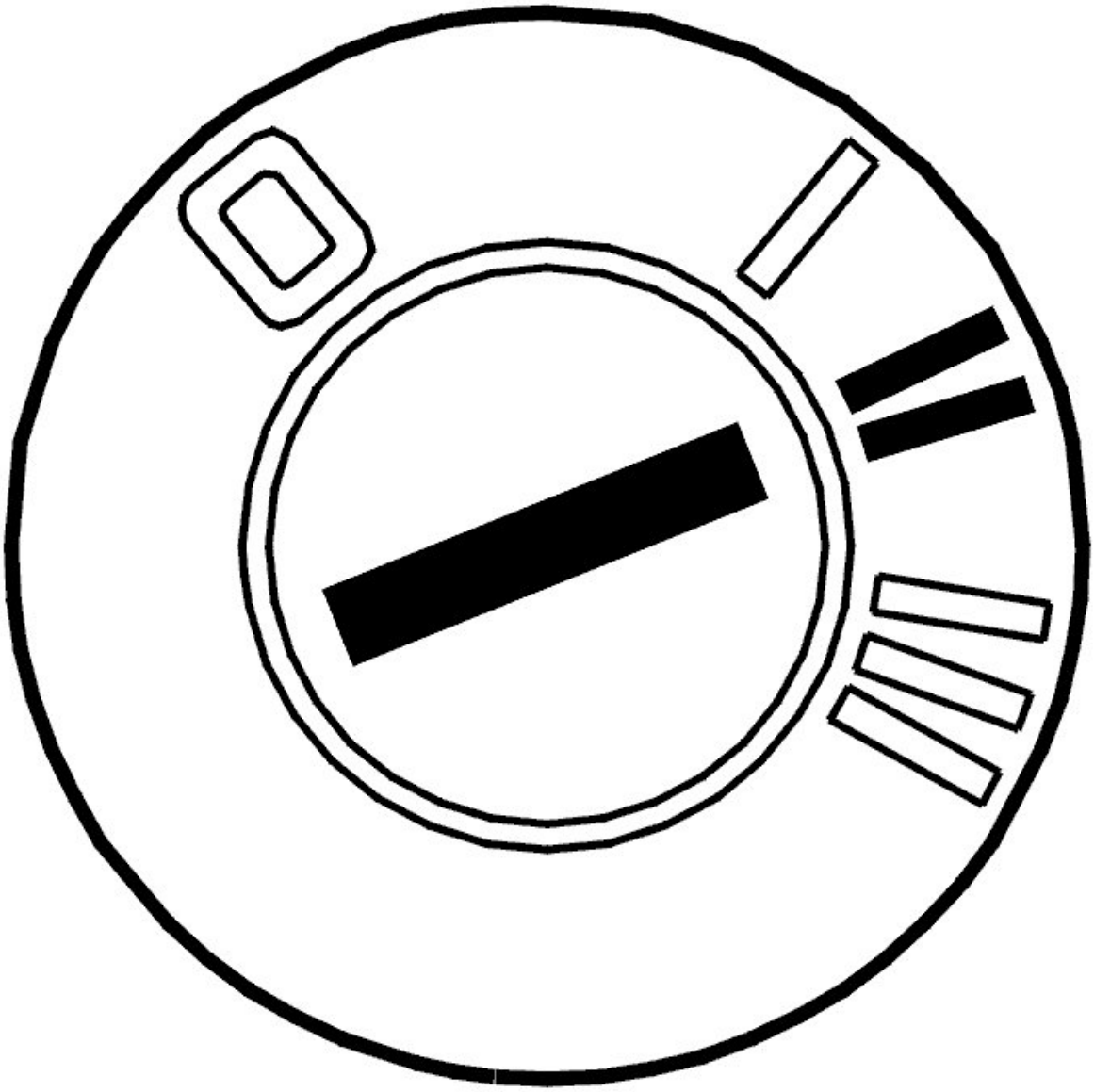
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0012 Diagnostic trouble code information

Condition

If the control unit registers that the capacitance in the circuit is too high for more than 10 seconds, diagnostic trouble code SRS-0012 is displayed.

Substitute value
- Nothing.

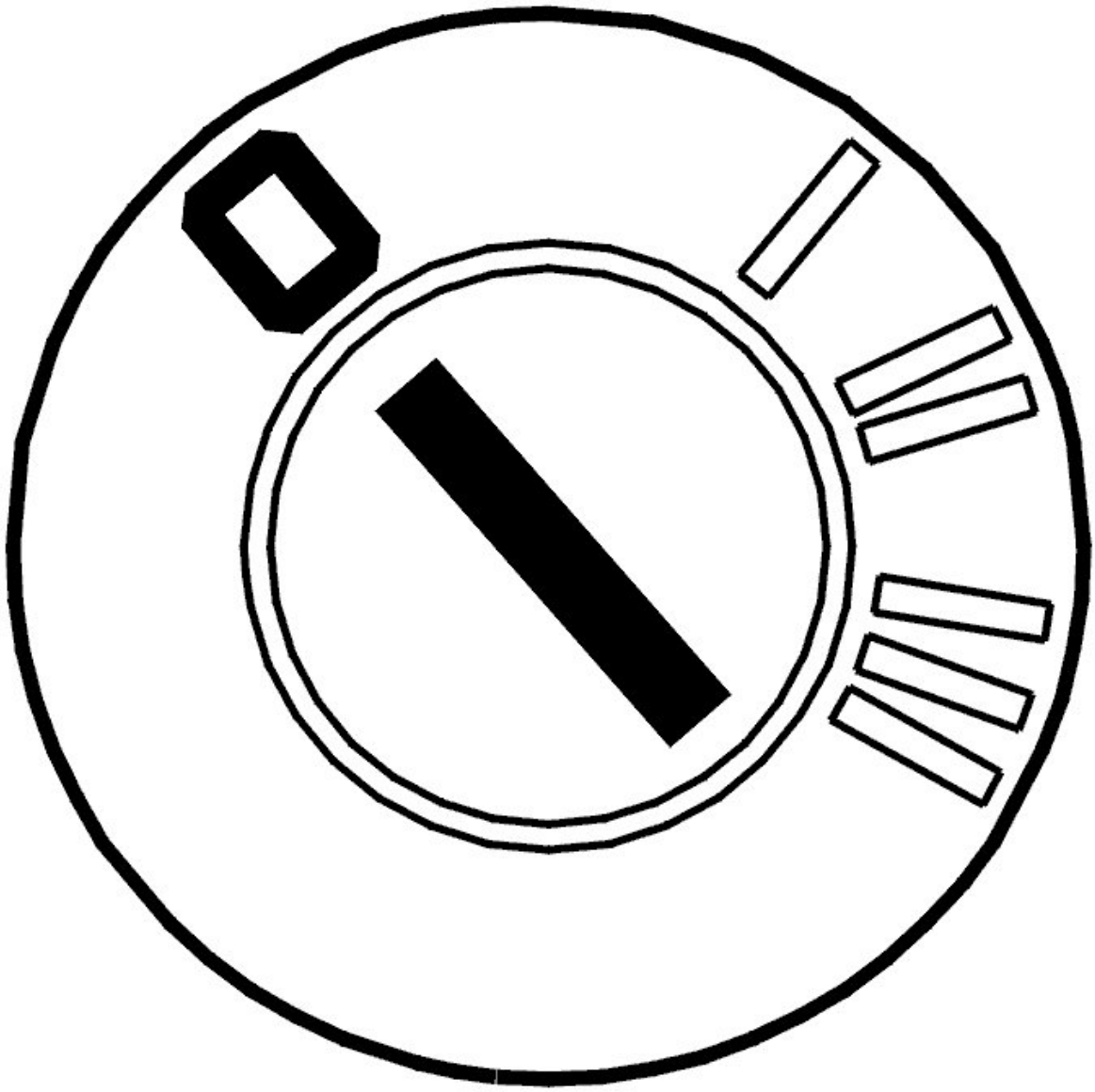
Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

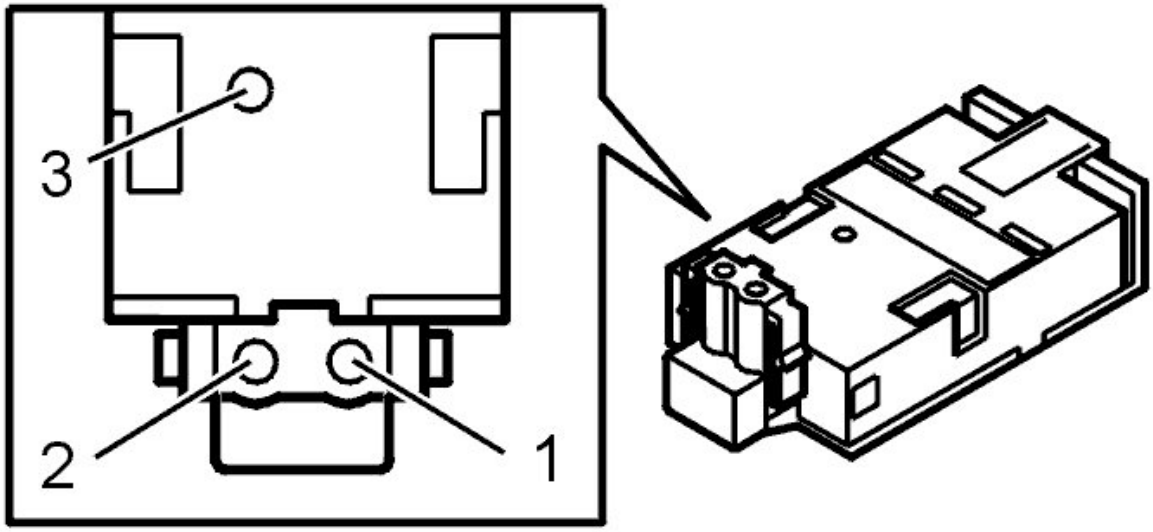
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

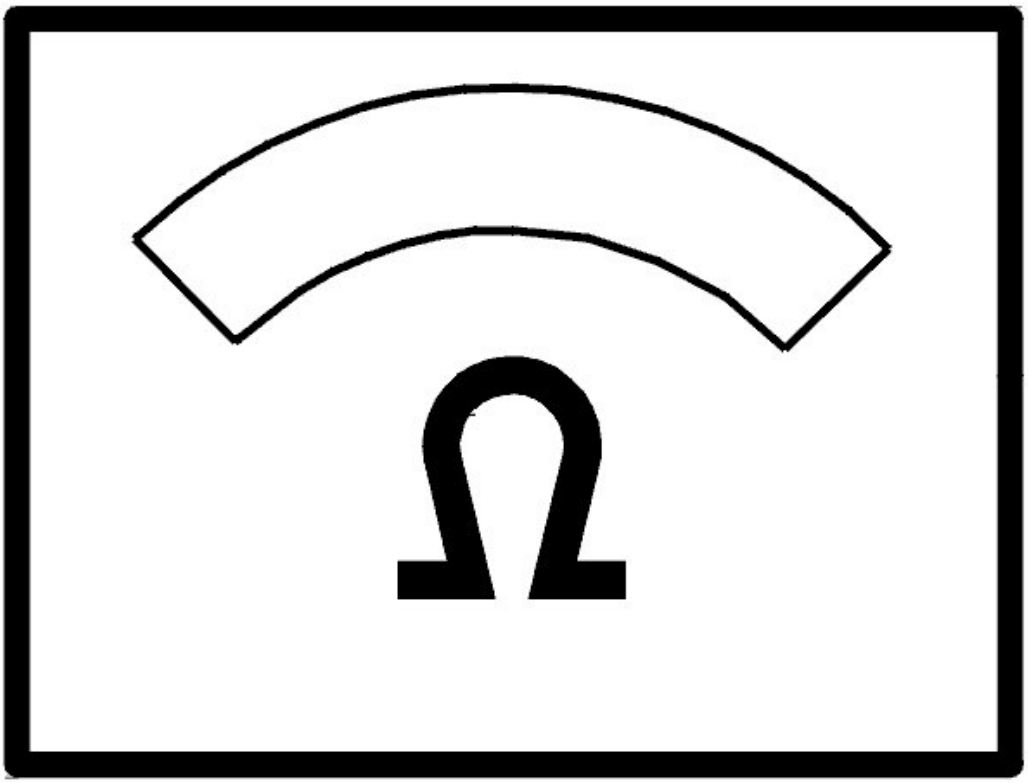
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side.

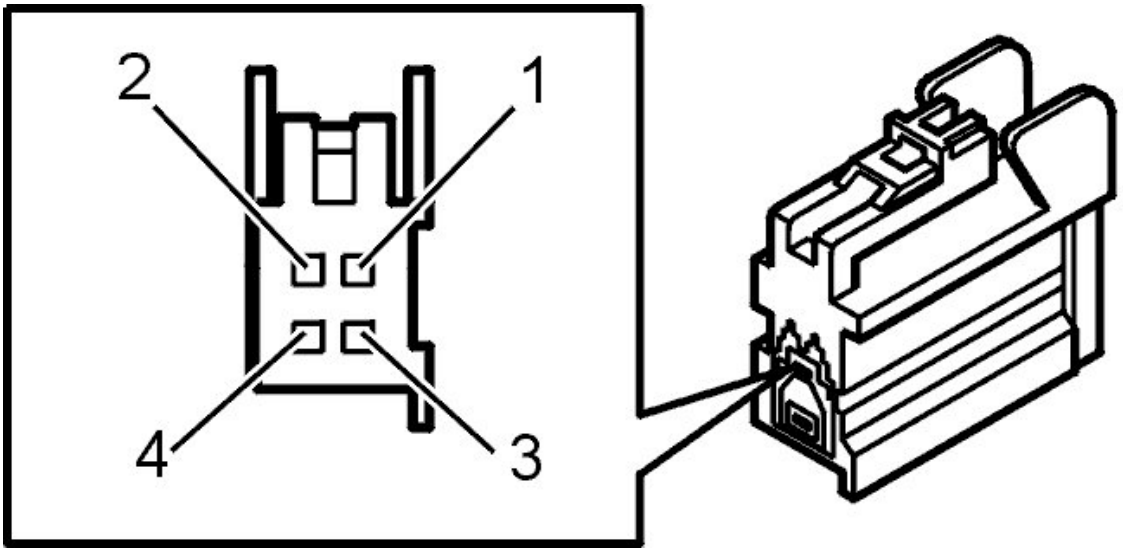
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0013 Diagnostic trouble code information

Condition

If the control unit registers that the capacitance in the circuit is too low for more than 10 seconds, diagnostic trouble code SRS-0013 is displayed.

Substitute value
- Nothing.

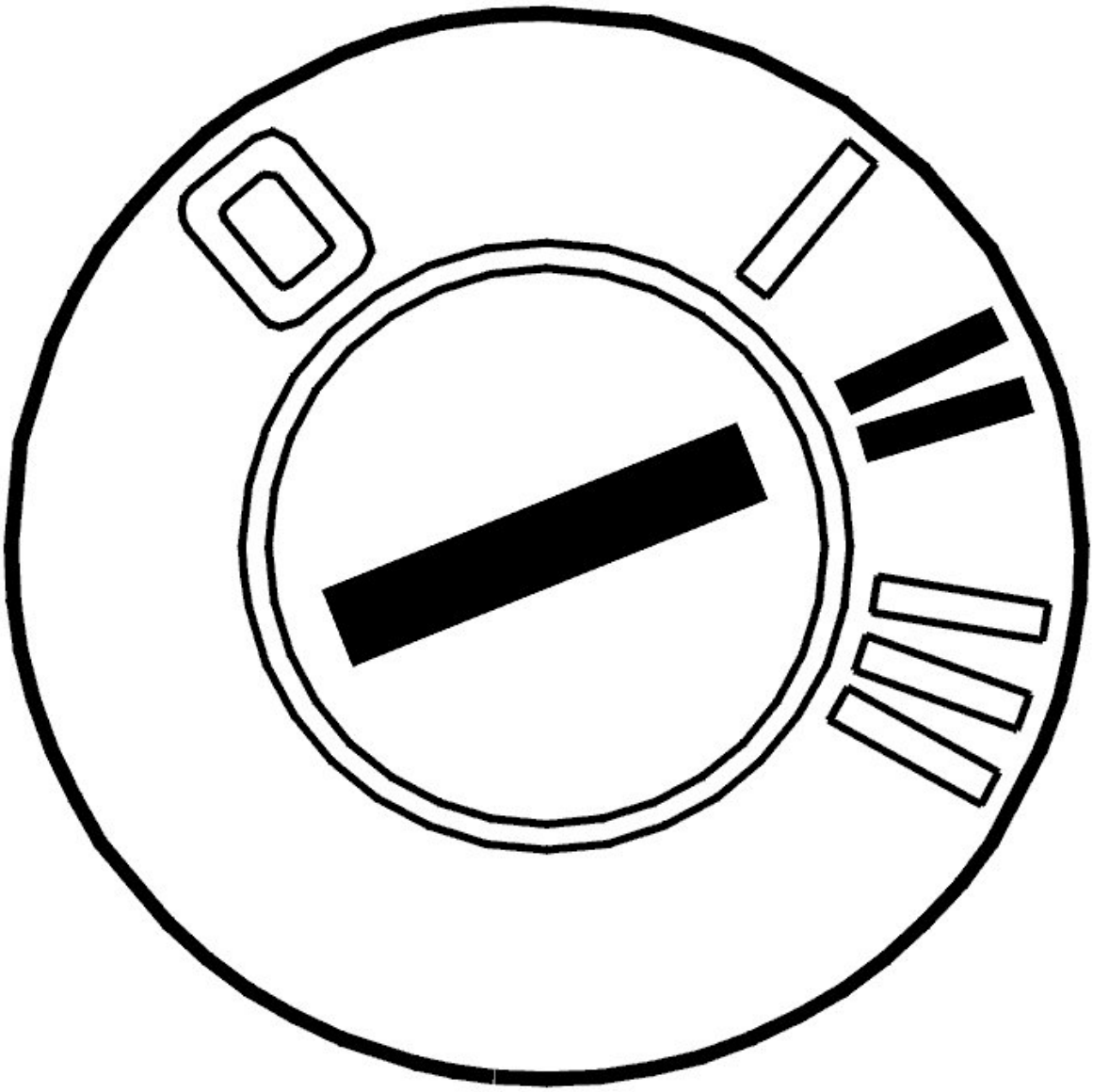
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

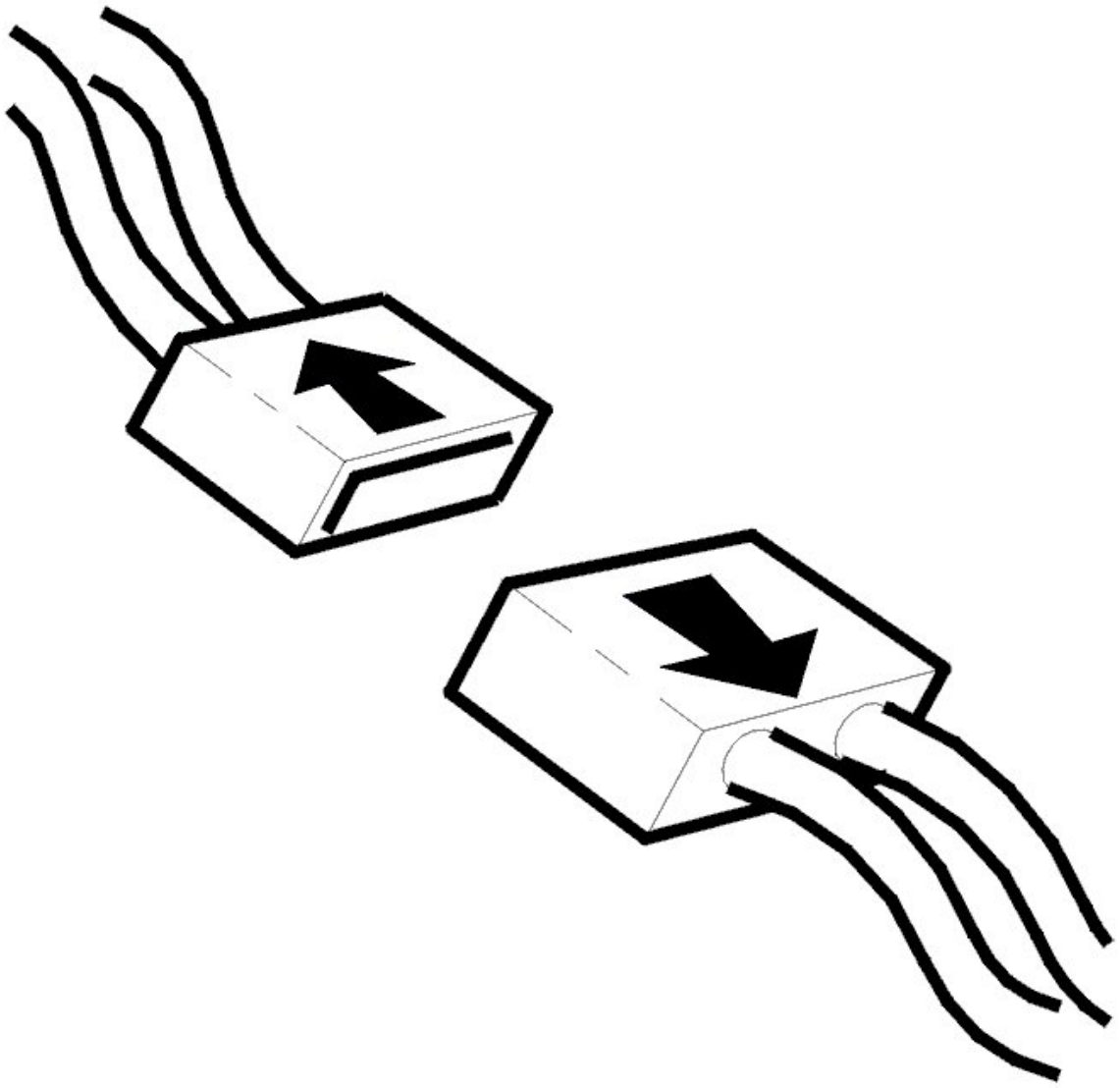
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

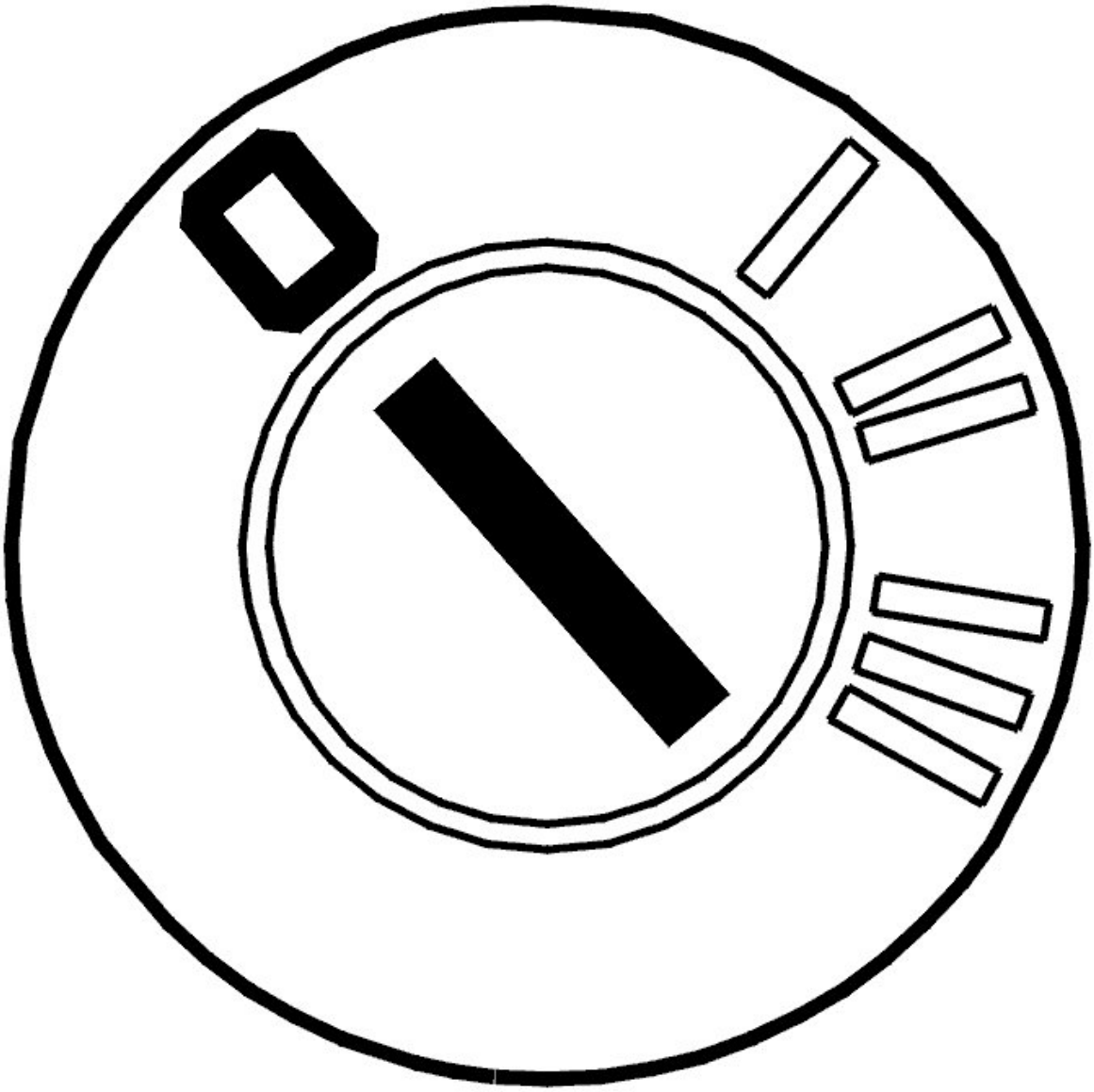
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Disconnect the connector from:
- the SRS control module
- the contact reel.

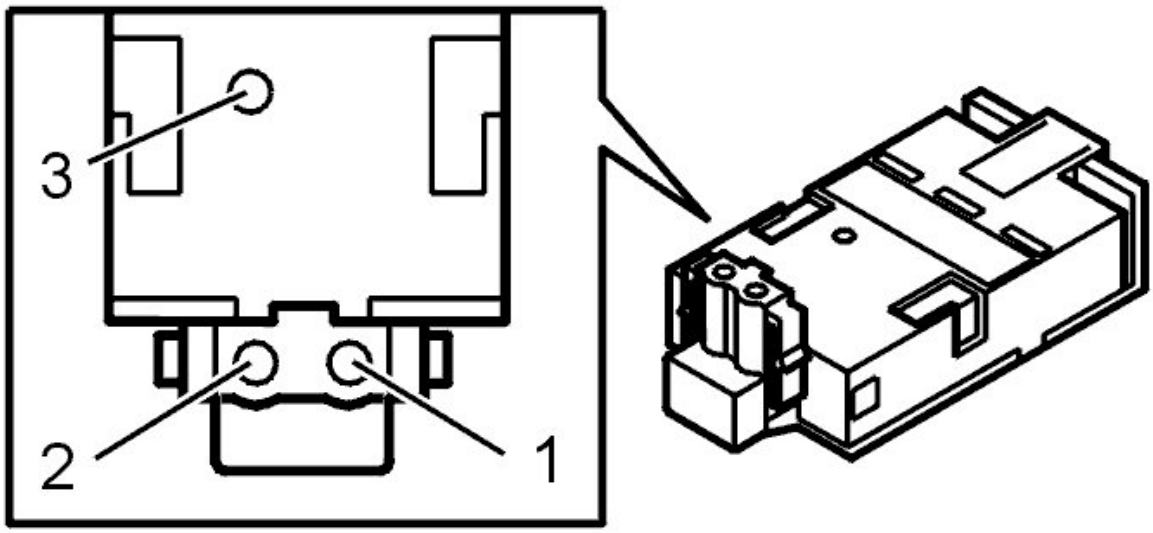
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

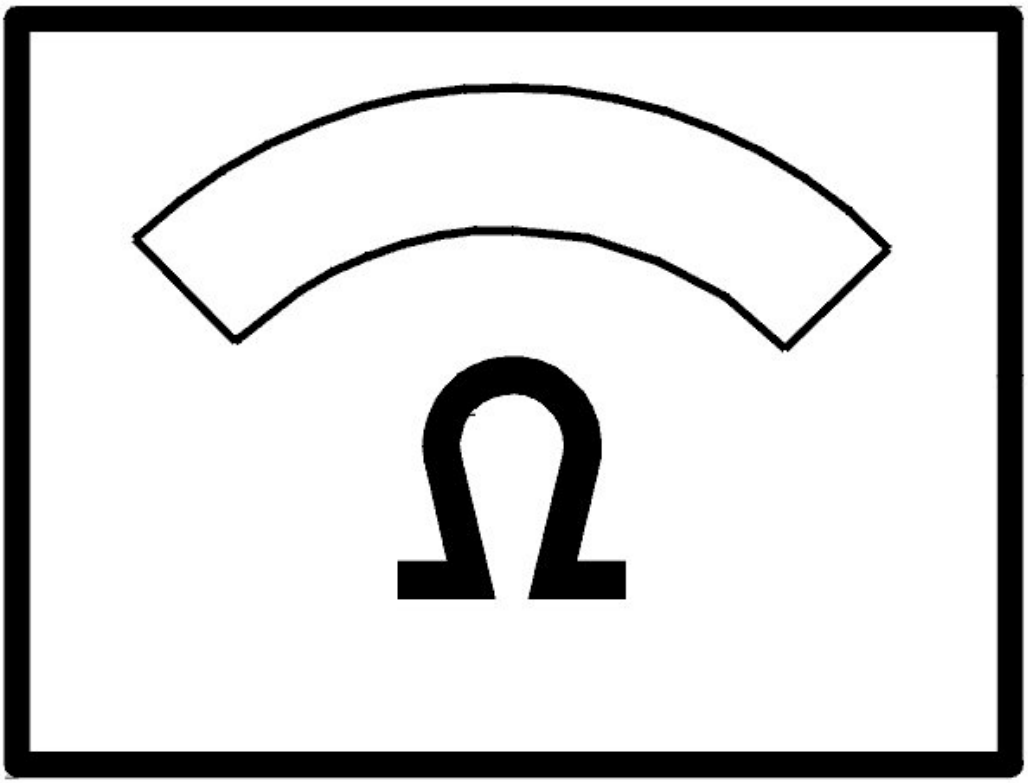
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the driver's airbag connector (green). The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

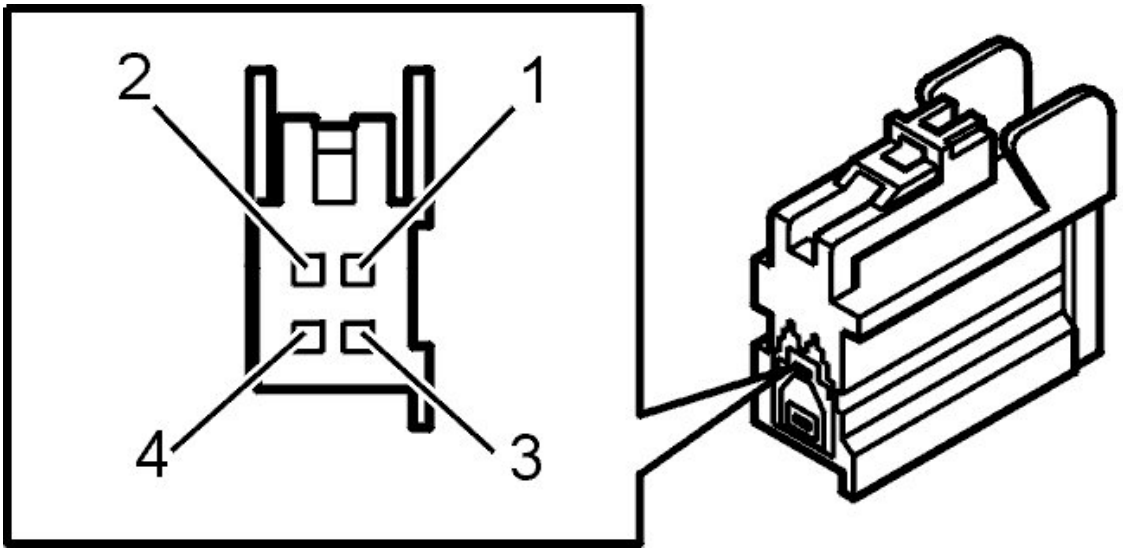
Disconnect the connector from the contact reel. Check the contact reel wiring by connecting an ohmmeter between terminals #1 and #2 (driver's airbag side) and driver's airbag connector terminals #1 and #3. The ohmmeter should read approximately 0 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read approximately 0 ohms for all positions for the steering wheel. Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







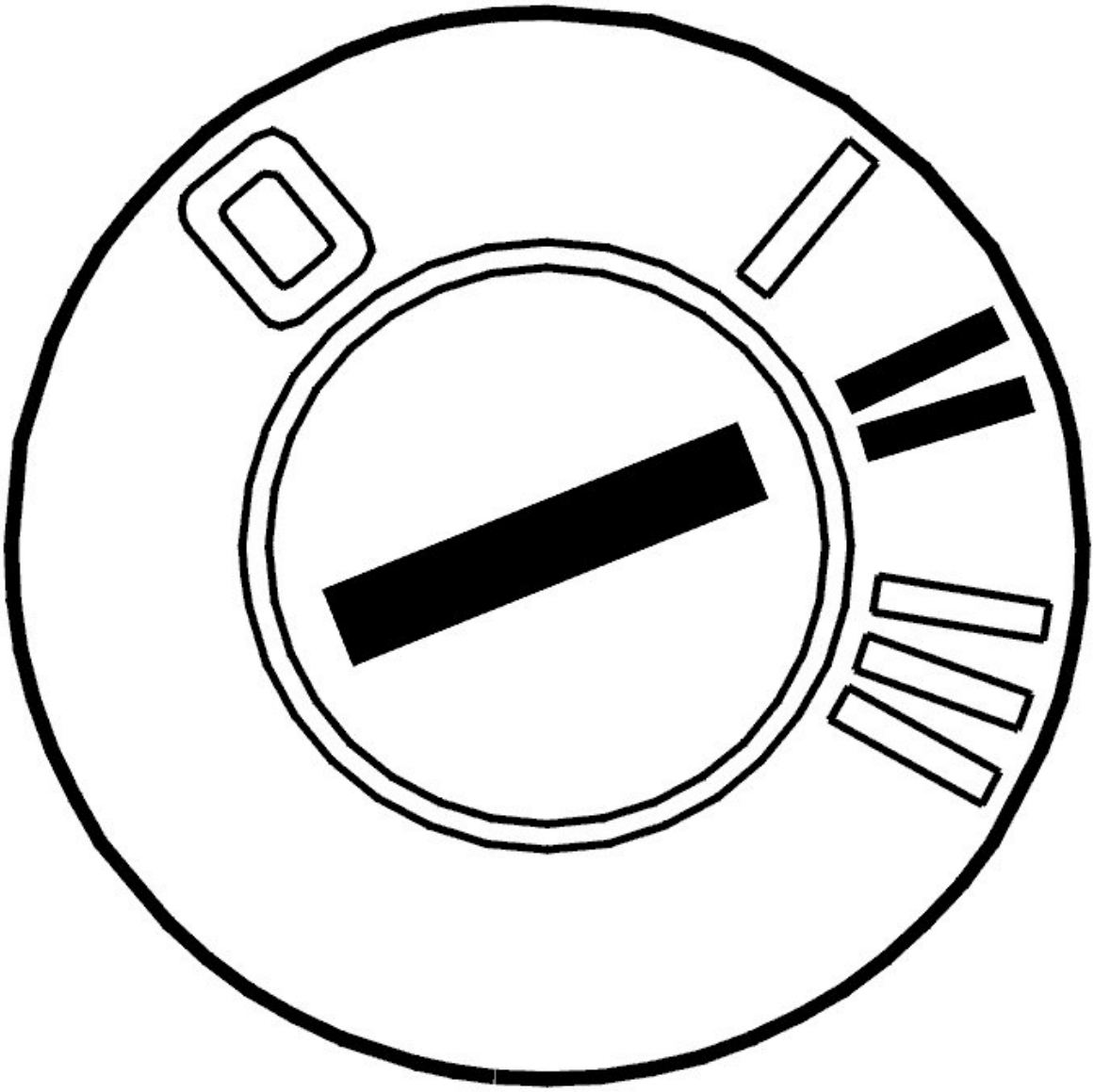
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0013 Diagnostic trouble code information

Condition

If the control unit registers that the capacitance in the circuit is too low for more than 10 seconds, diagnostic trouble code SRS-0013 is displayed.

Substitute value
- Nothing.

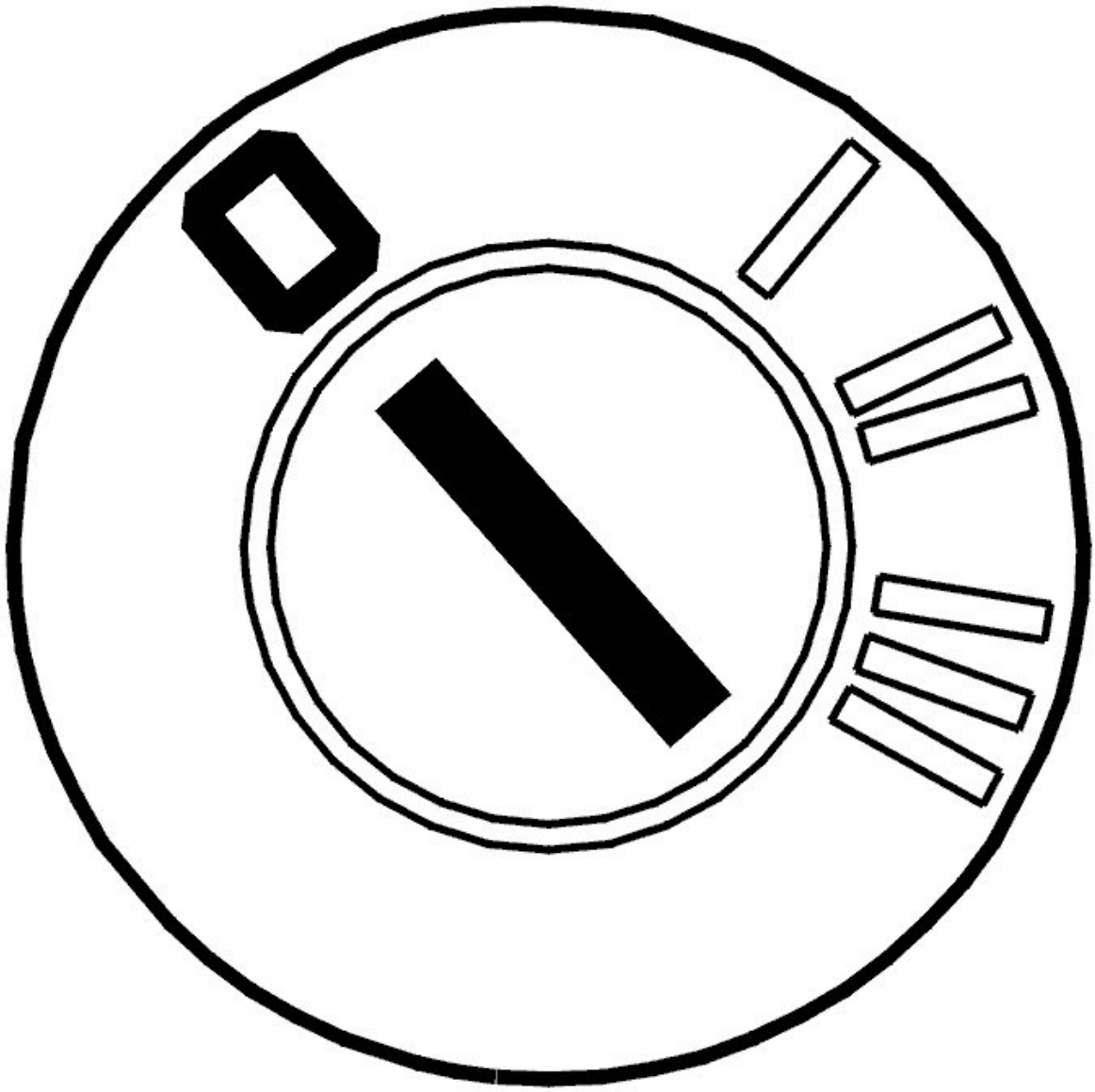
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

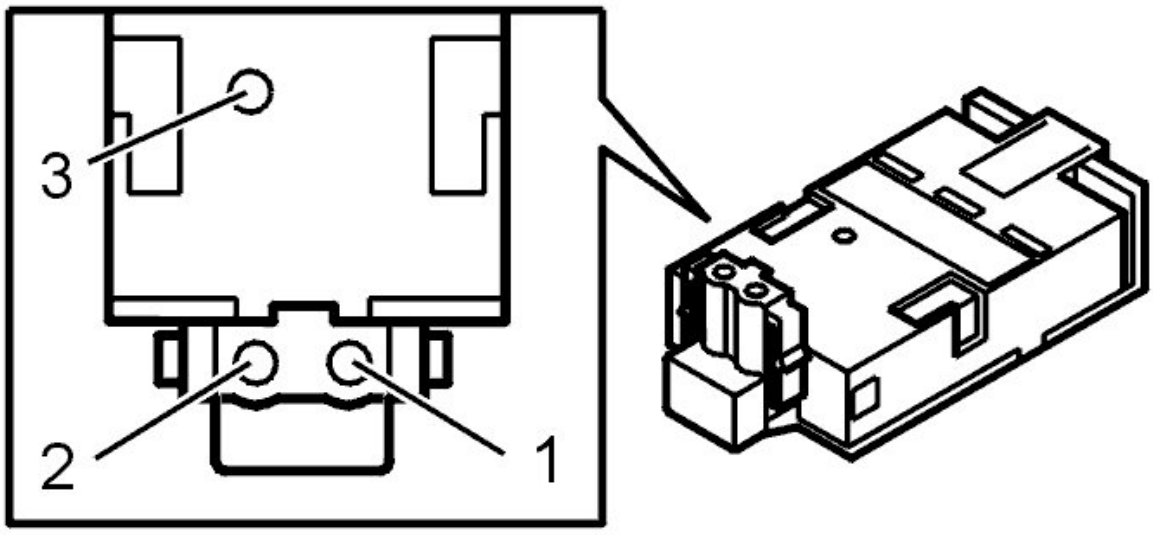
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults

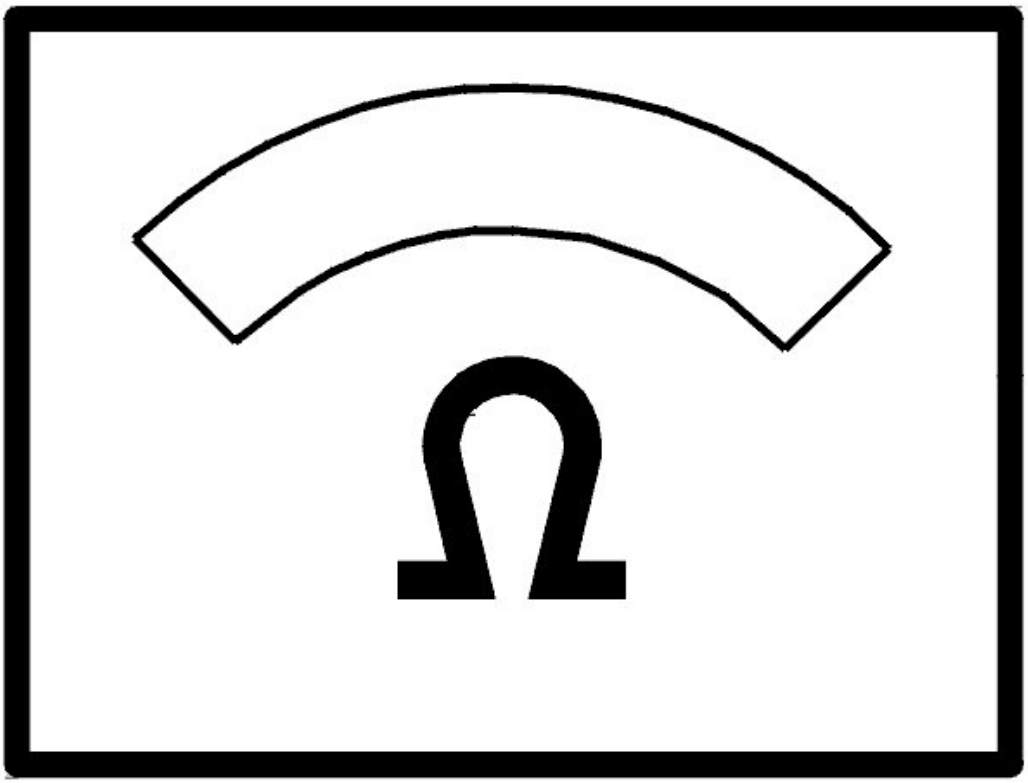
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the driver's airbag connector (green). The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

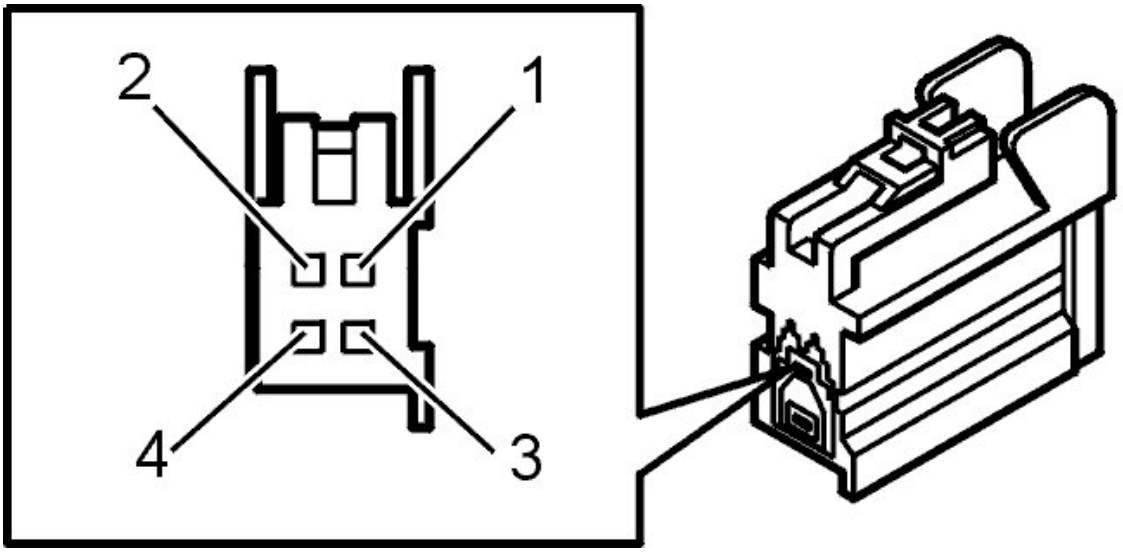
Disconnect the connector from the contact reel. Check the contact reel wiring by connecting an ohmmeter between terminals #1 and #2 (driver's airbag side) and driver's airbag connector (green) terminals #1 and #3. The ohmmeter should read approximately 0 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read approximately 0 ohms for all positions for the steering wheel.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0014 Diagnostic trouble code information

Condition

If the control unit registers that the resistance in the circuit is too high for more than 10 seconds, diagnostic trouble code SRS-0014 is displayed.

Substitute value
- Nothing.

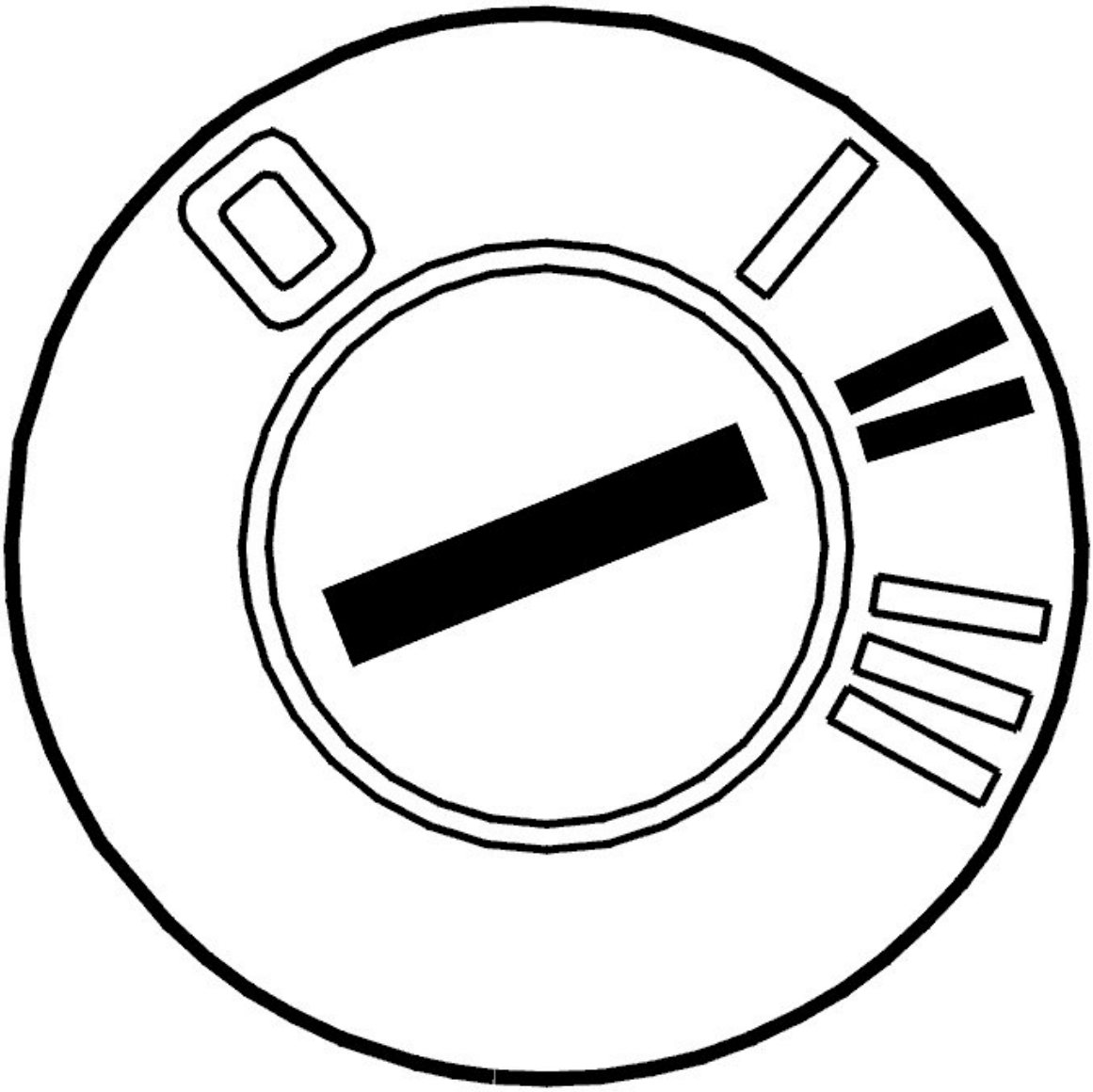
Possible source
- Open circuit in igniter wire or in the connector between the air bag and the supplemental restrain system (SRS) control unit.
- Open circuit in air bag (resistance in igniter too high).
- Open circuit in contact reel.

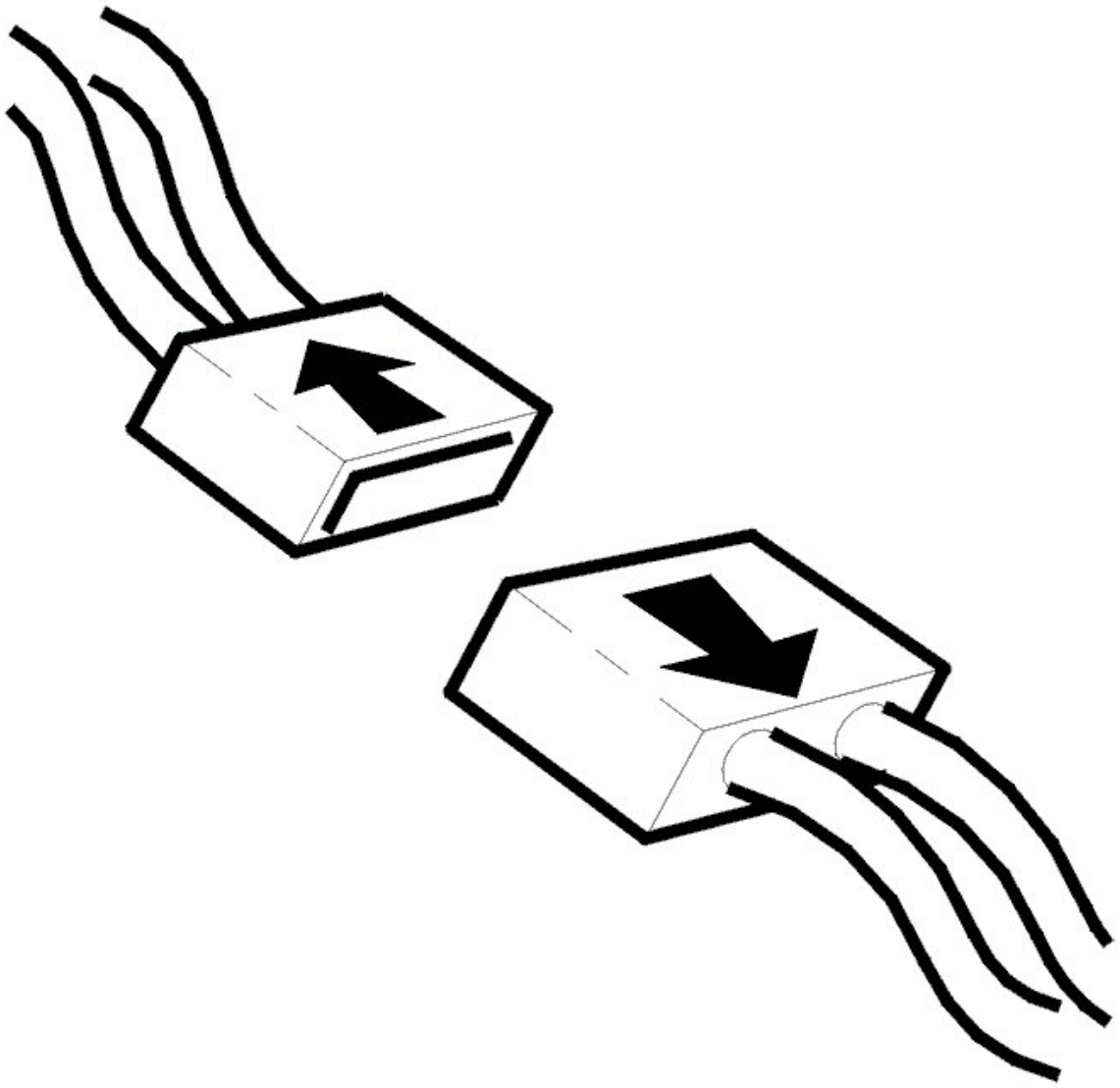
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

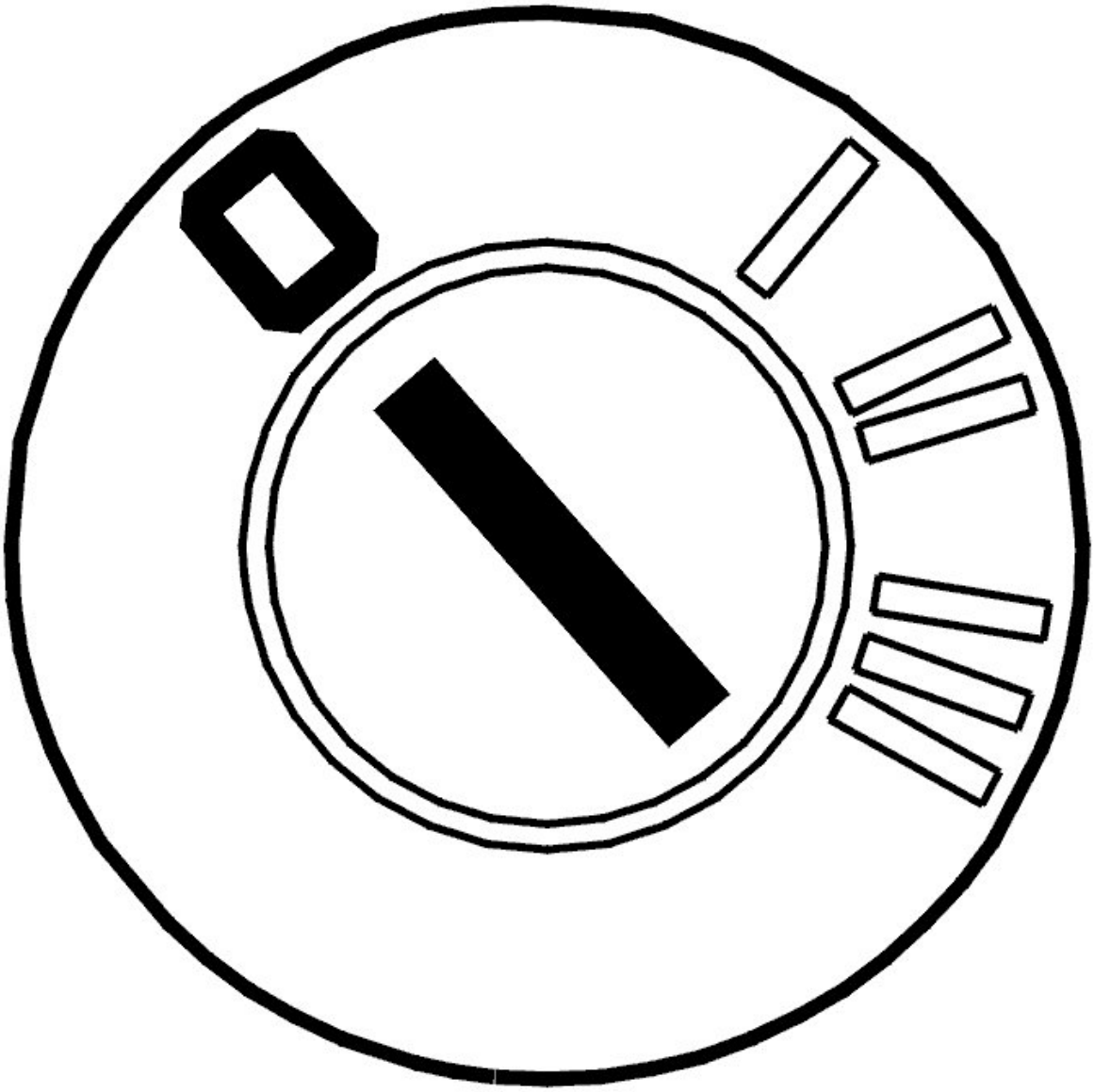
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Disconnect the connector from:
- the SRS control module
- the contact reel.

Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Disconnect the connector from the contact reel. Check the contact reel wiring by connecting an ohmmeter between terminals #1 and #2 (driver's airbag side) and driver's airbag connector (green) terminals #1 and #3. The ohmmeter should read less than 2 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read less than 2 ohms for all steering wheel positions.
Remedy as necessary.

Other information:

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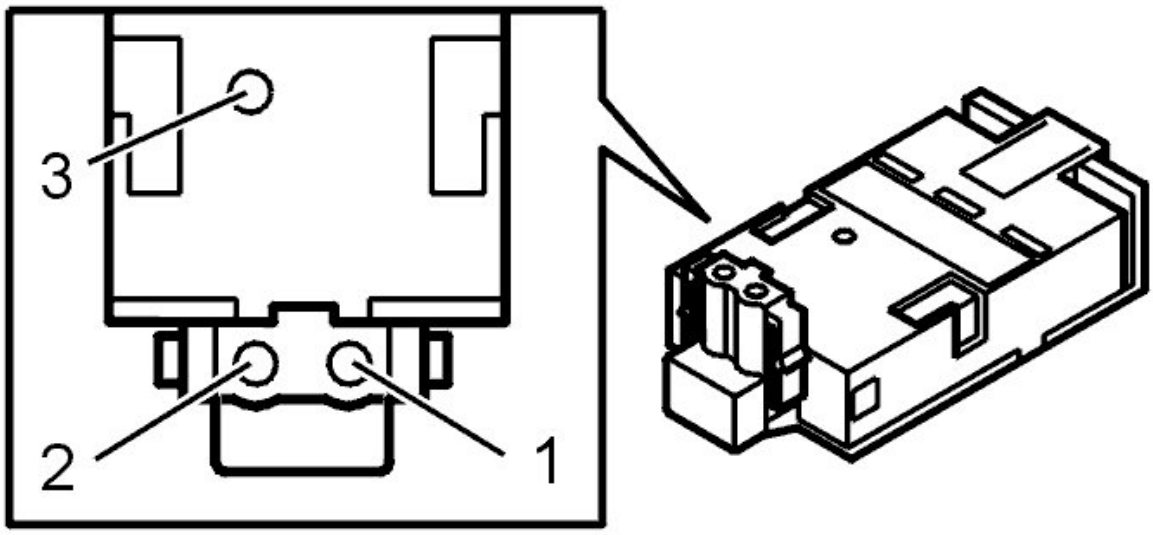
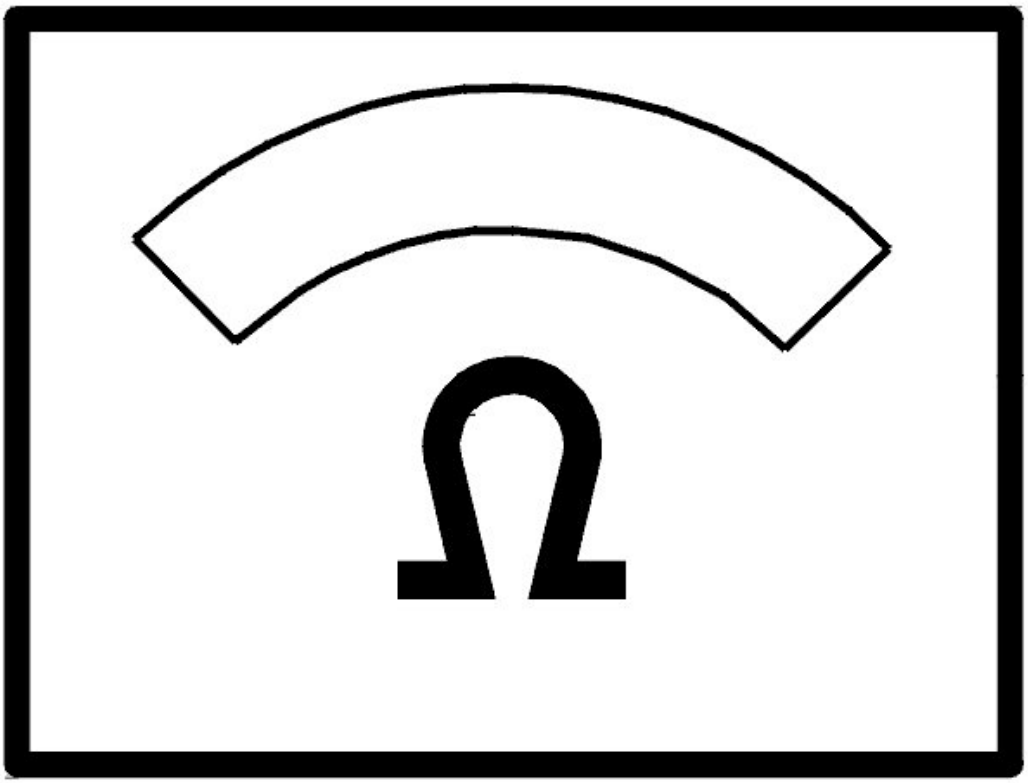
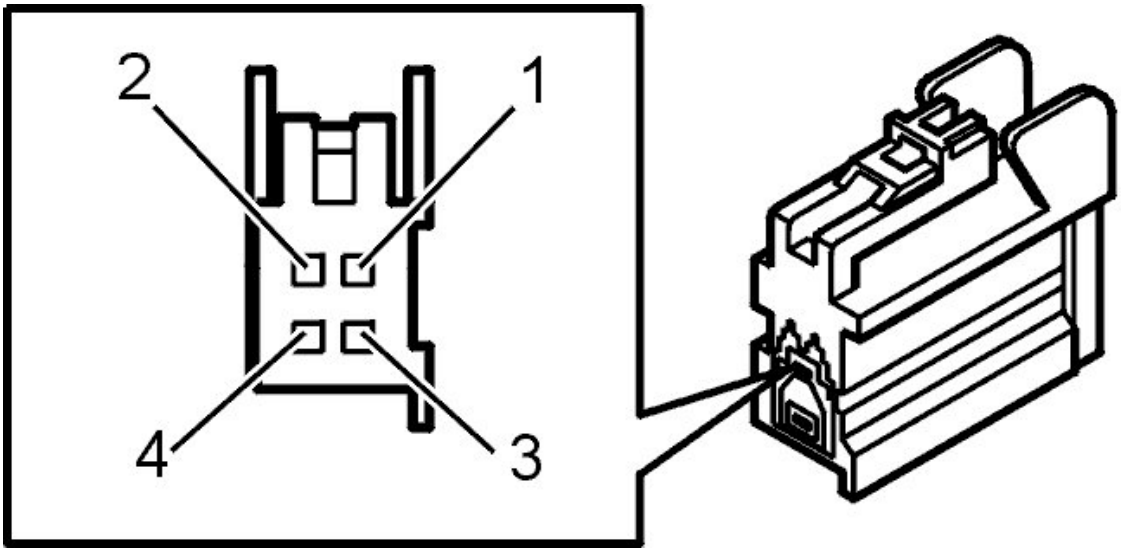
- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







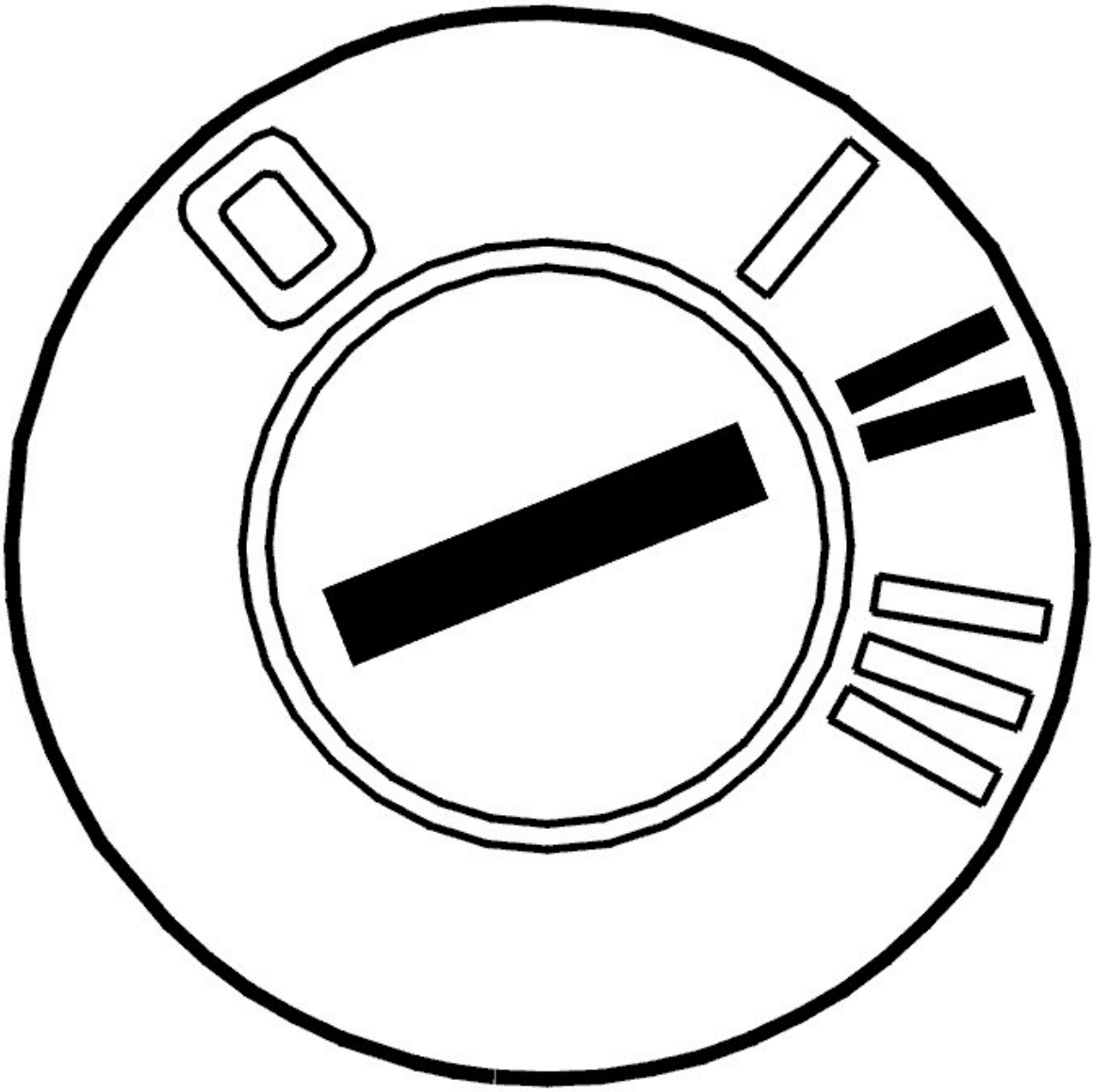
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0014 Diagnostic trouble code information

Condition

If the control unit registers that the resistance in the circuit is too high for more than 10 seconds, diagnostic trouble code SRS-0014 is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in igniter wire or in the connector between the air bag and the supplemental restrain system (SRS) control unit.

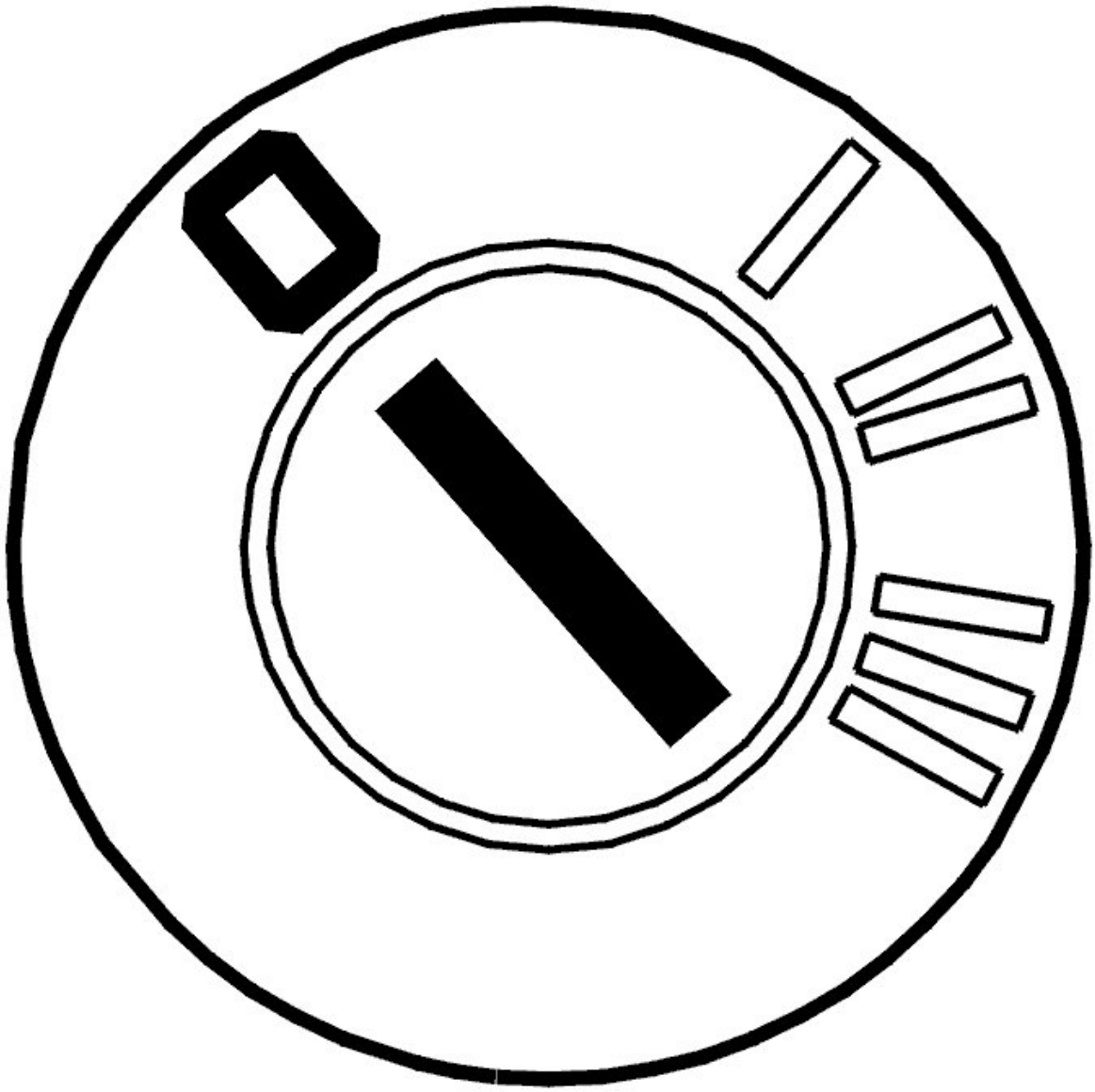
- Open circuit in air bag (resistance in igniter too high).
- Open circuit in contact reel.

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an

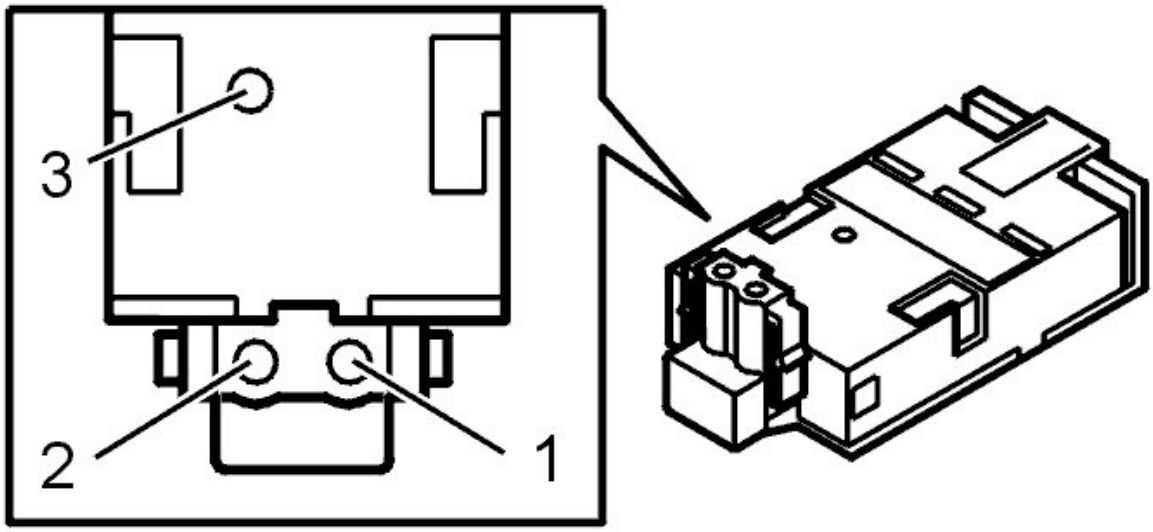
intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

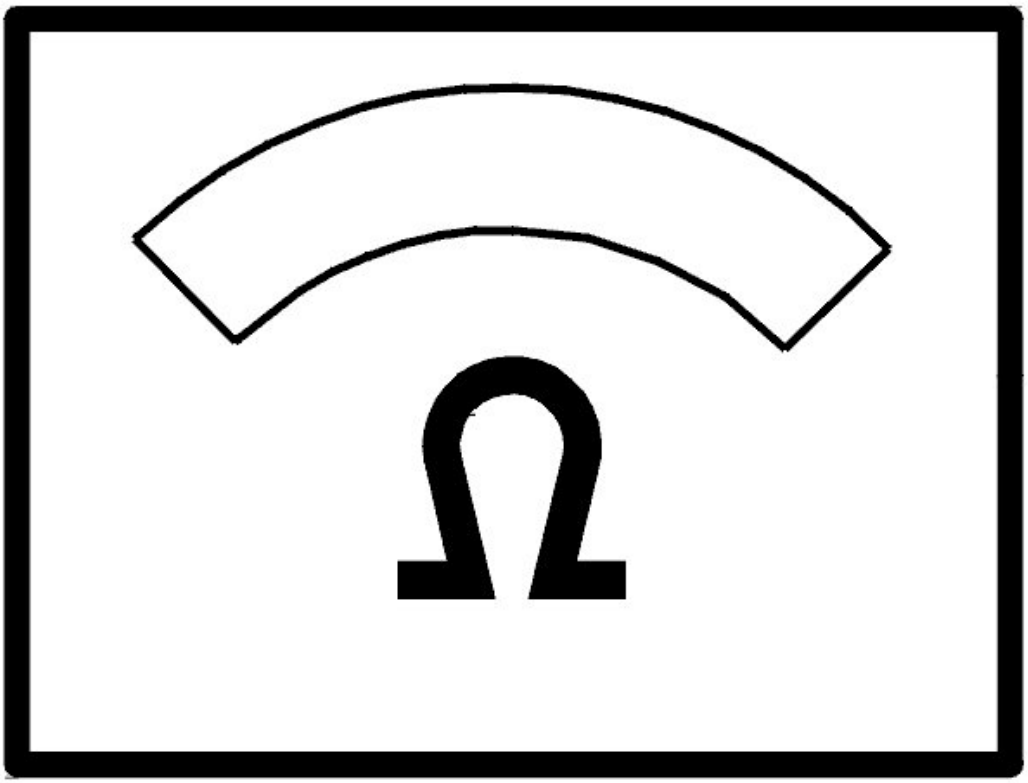
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the driver's airbag connector (green). The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

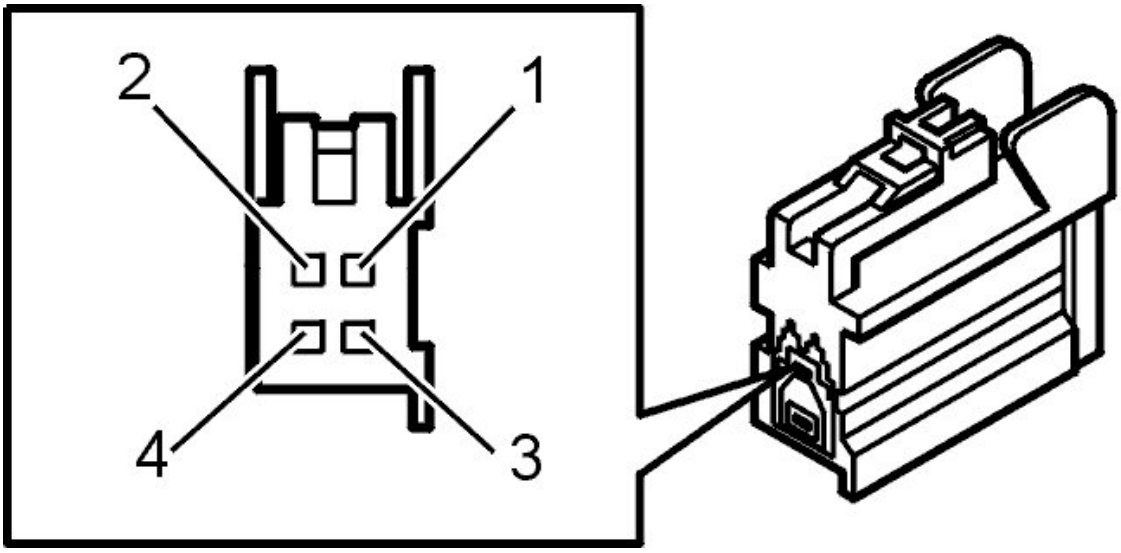
Disconnect the connector from the contact reel. Check the contact reel wiring by connecting an ohmmeter between terminals #1 and #2 (driver's airbag side) and driver's airbag connector (green) terminals #1 and #3. The ohmmeter should read less than 2 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read less than 2 ohms for all steering wheel positions.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0015 Diagnostic trouble code information

Condition

If the control unit registers that the resistance in the circuit is too low for more than 10 seconds, diagnostic trouble code SRS-0015 is displayed.

Substitute value
- Nothing.

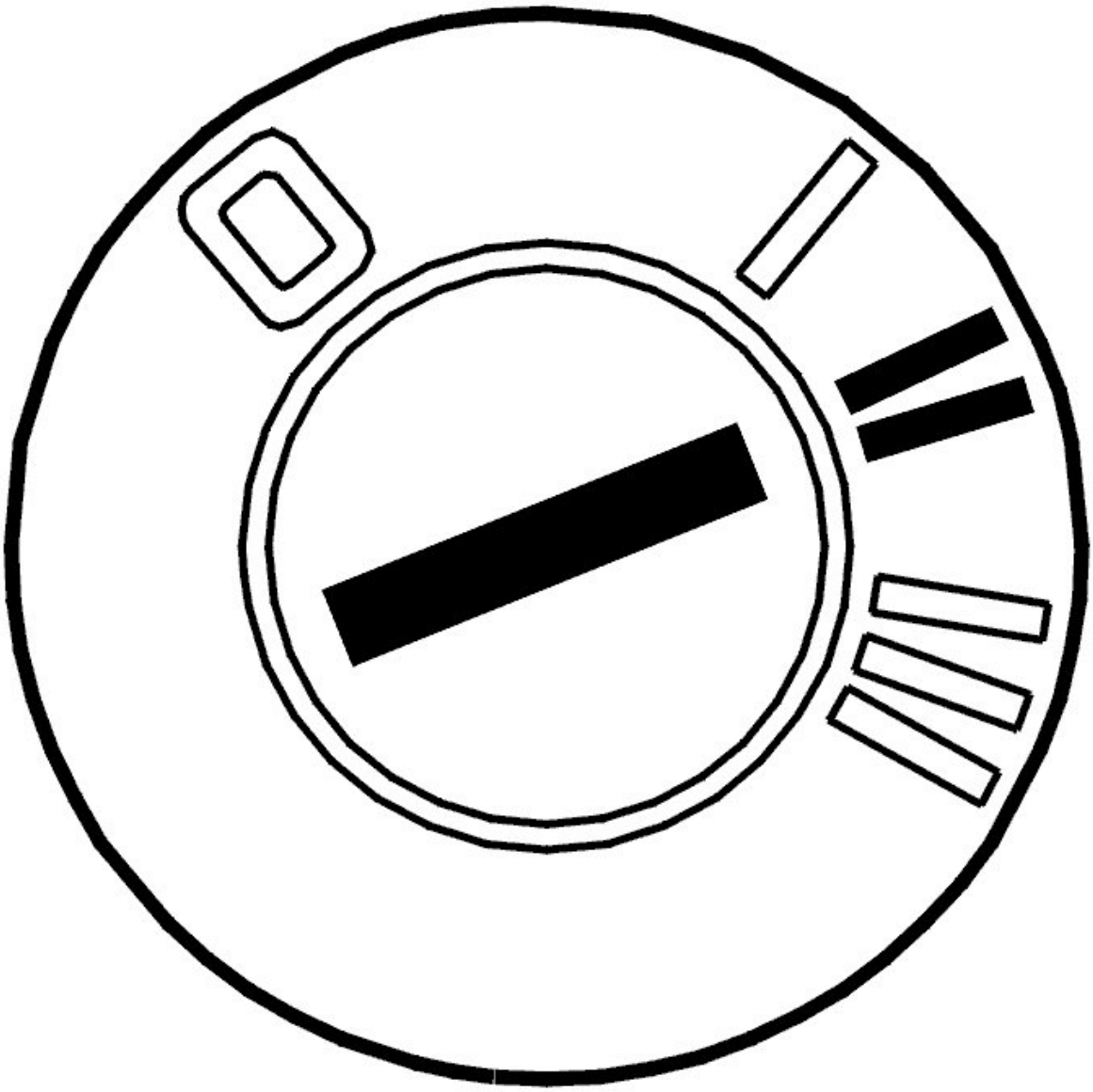
Possible source
- Short circuit in igniter wire or in the connectors between the air bag and the supplemental restraint system (SRS)
- Short circuit to air bag (resistance in igniter too low)
- Short circuit in contact reel.

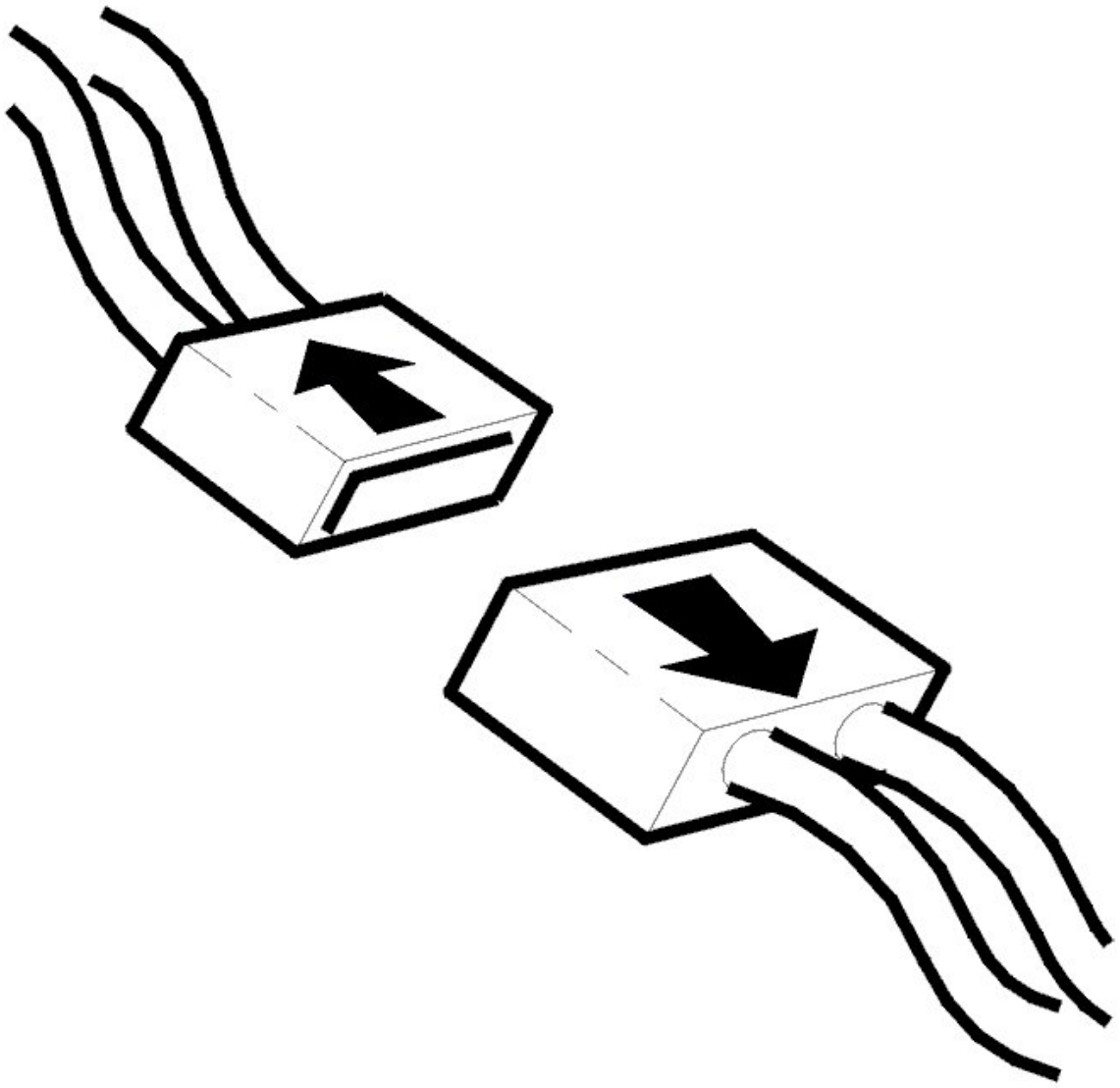
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

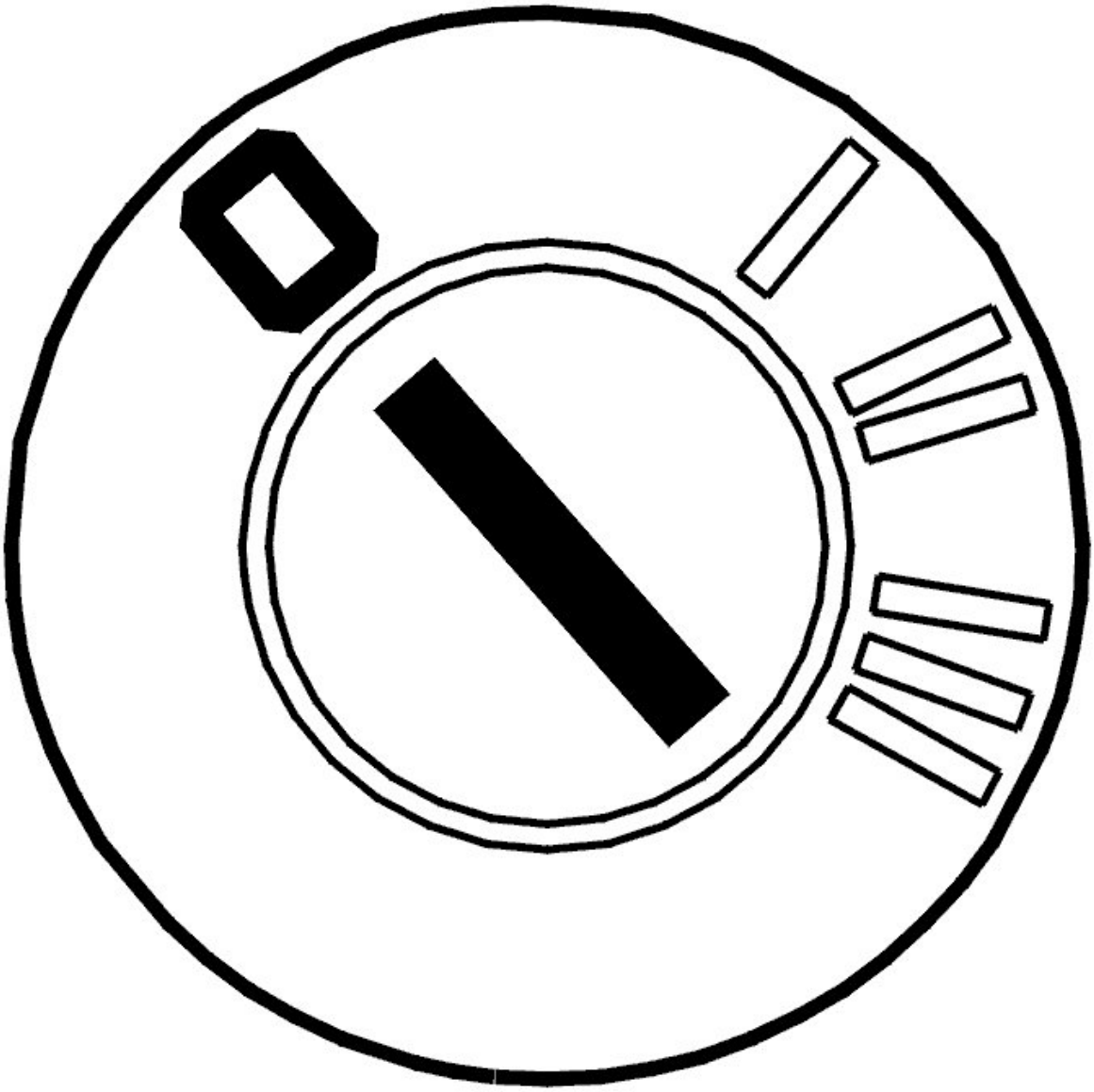
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

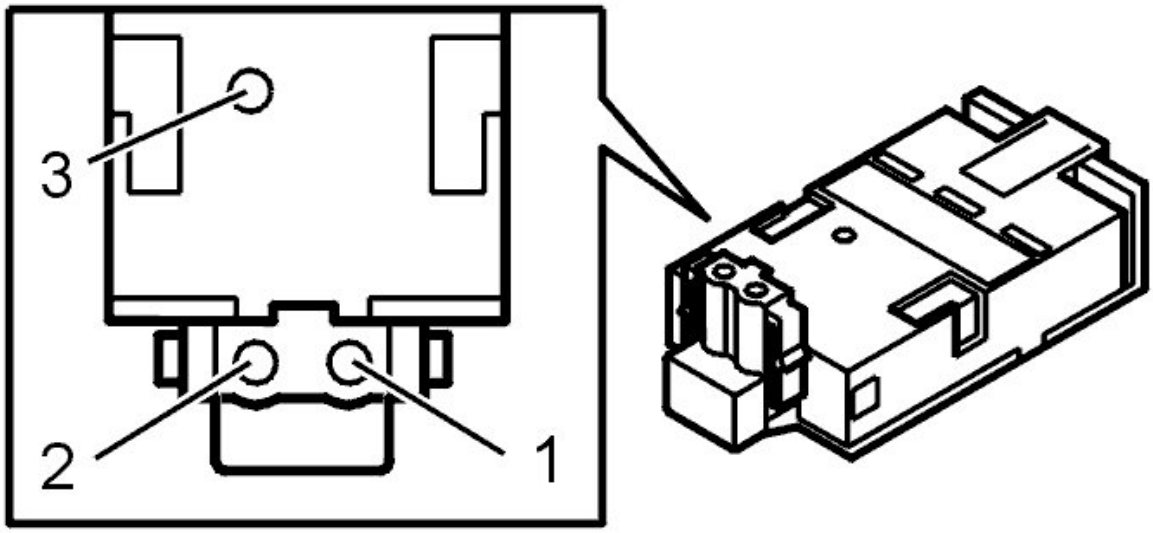
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

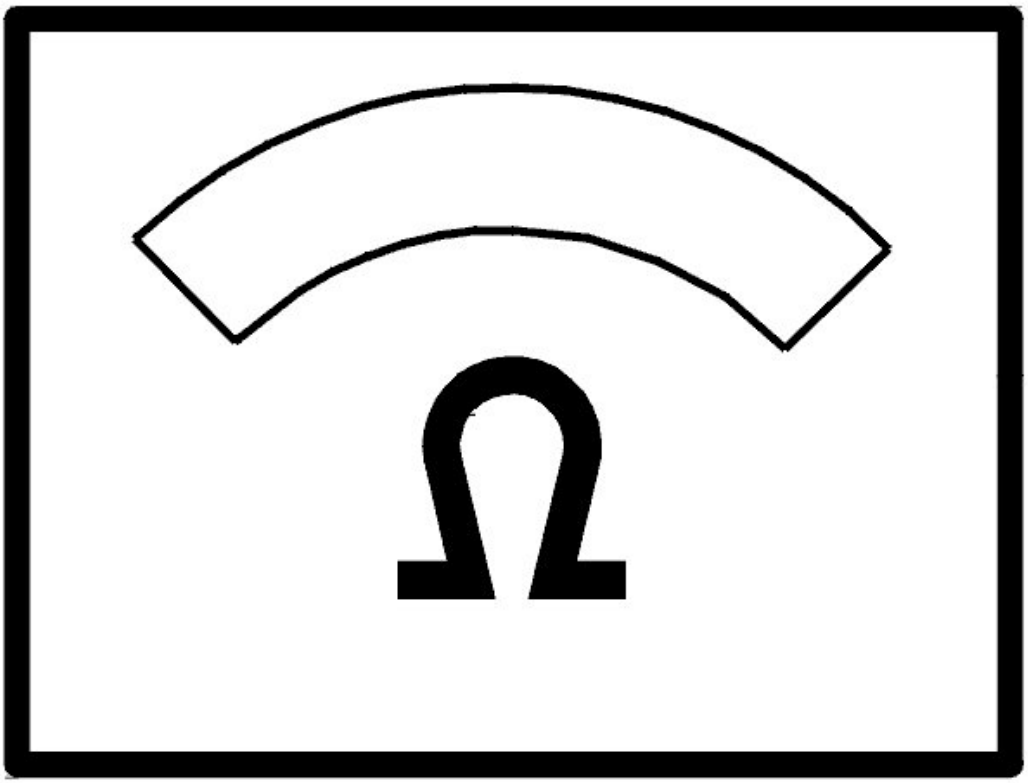
Other information:

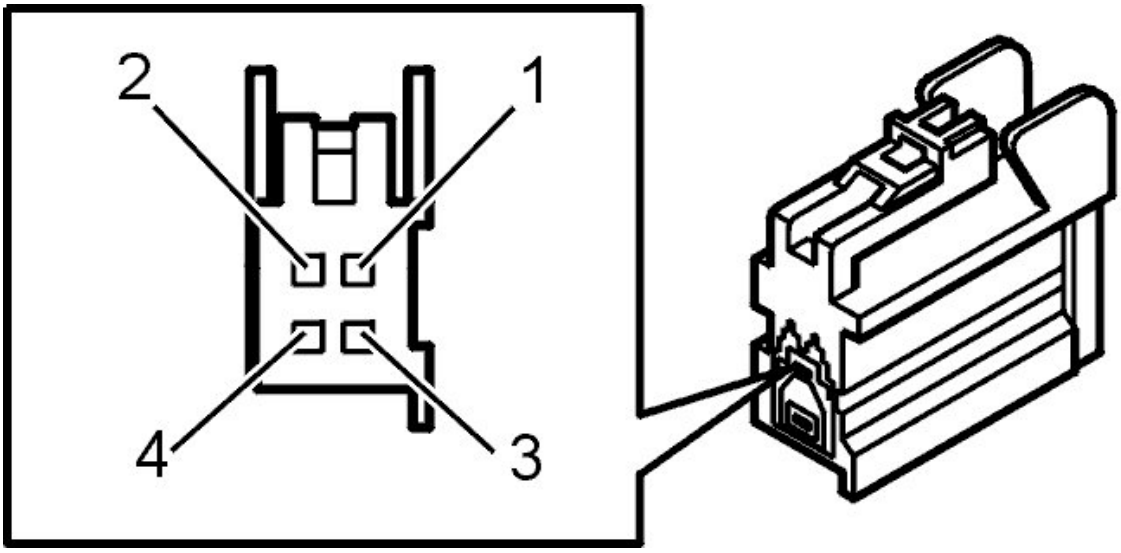
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







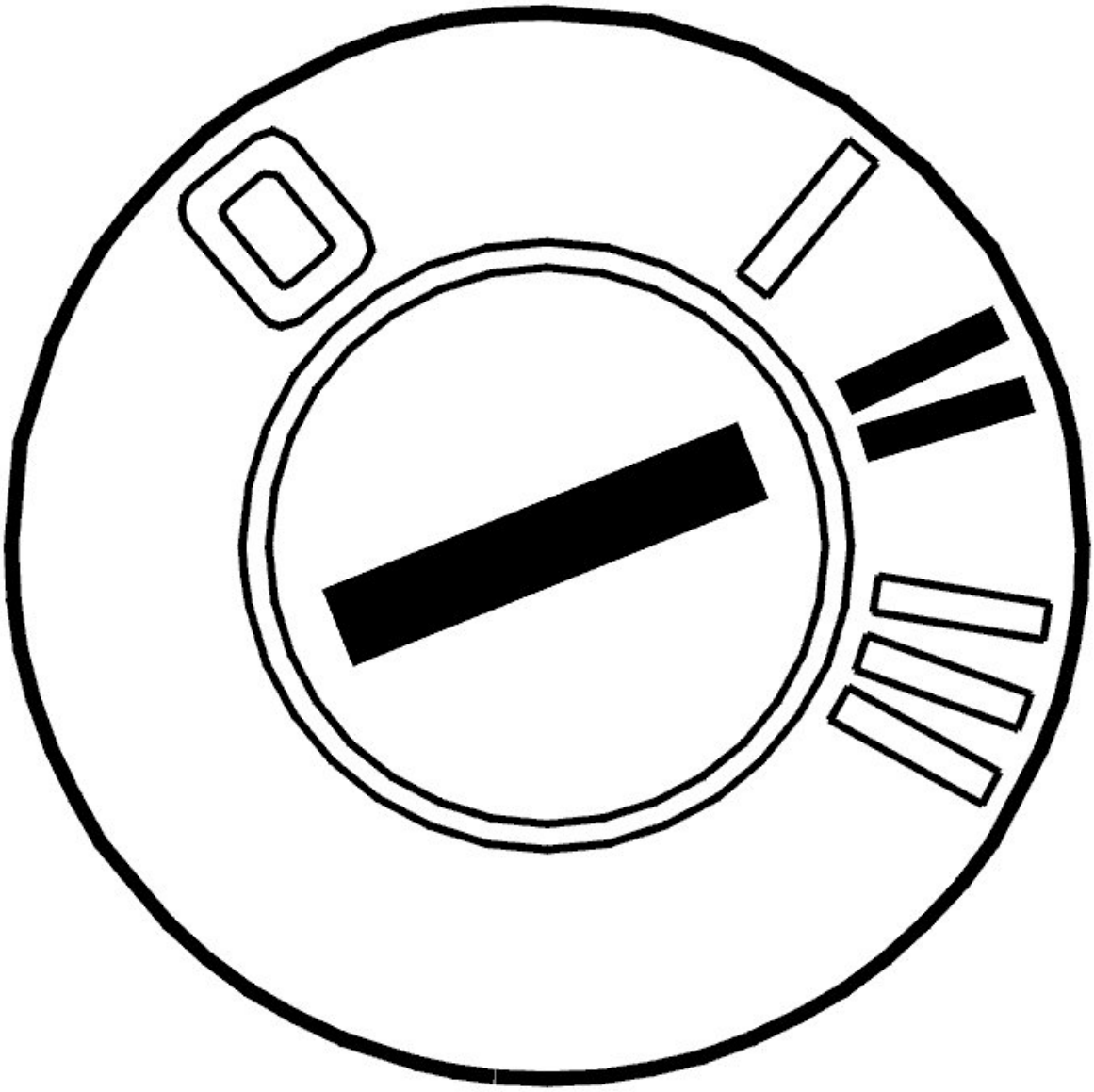
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-0015 Diagnostic trouble code information

Condition

If the control unit registers that the resistance in the circuit is too low for more than 10 seconds, diagnostic trouble code SRS-0015 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit in igniter wire or in the connectors between the air bag and the supplemental restraint system (SRS)

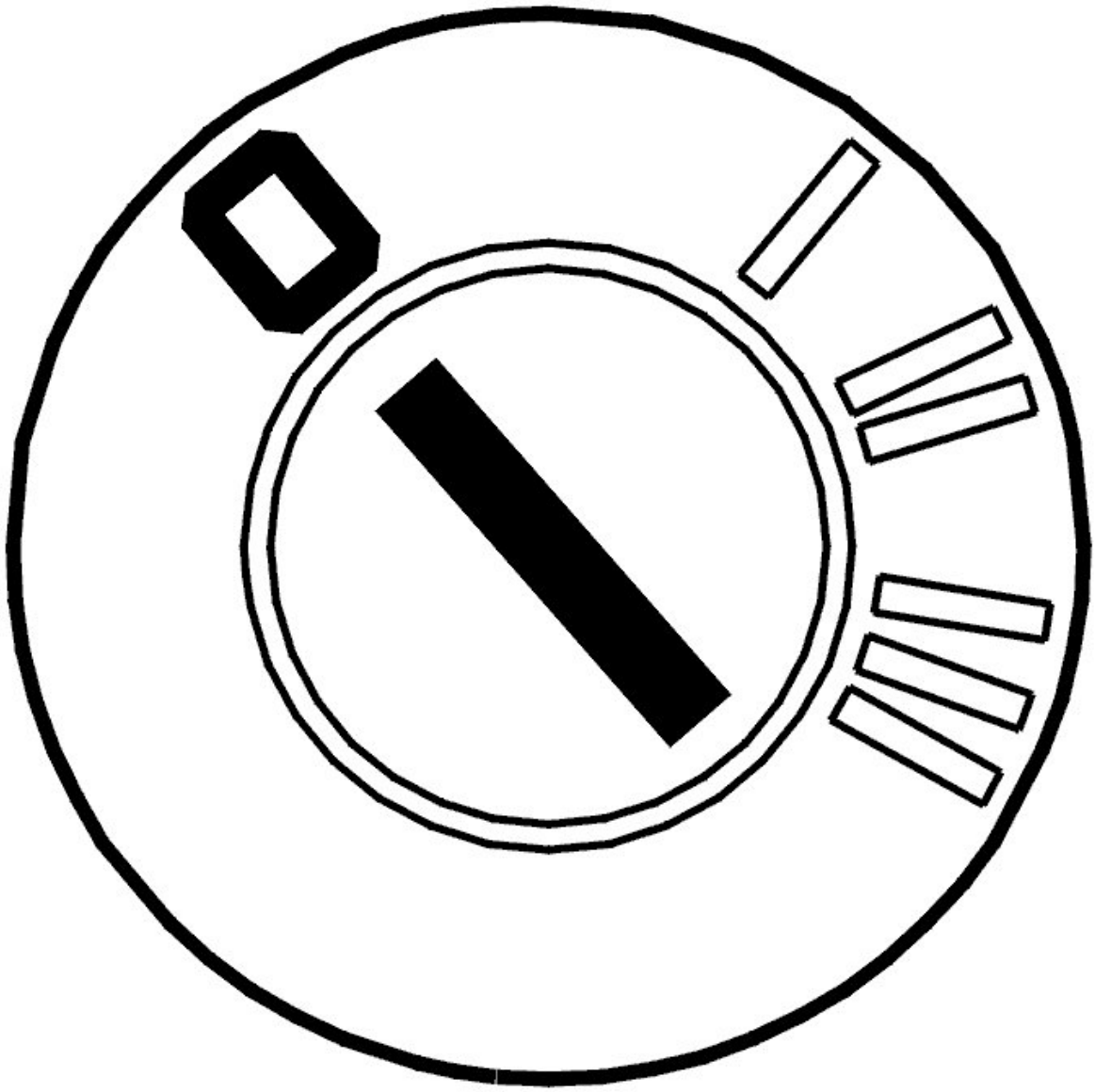
- Short circuit to air bag (resistance in igniter too low)
- Short circuit in contact reel.

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and driver's airbag connector (green) terminals #1 and #3 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests

and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #1 and #2 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #1 and #2 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #1 and #2 on the contact reel connector (SRS control module side) should be infinite
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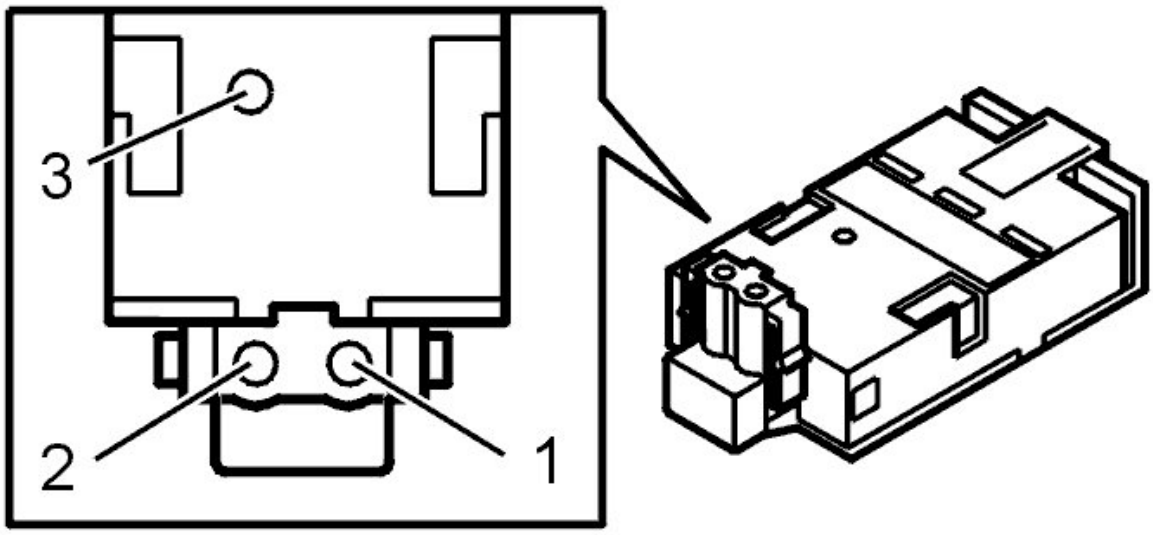
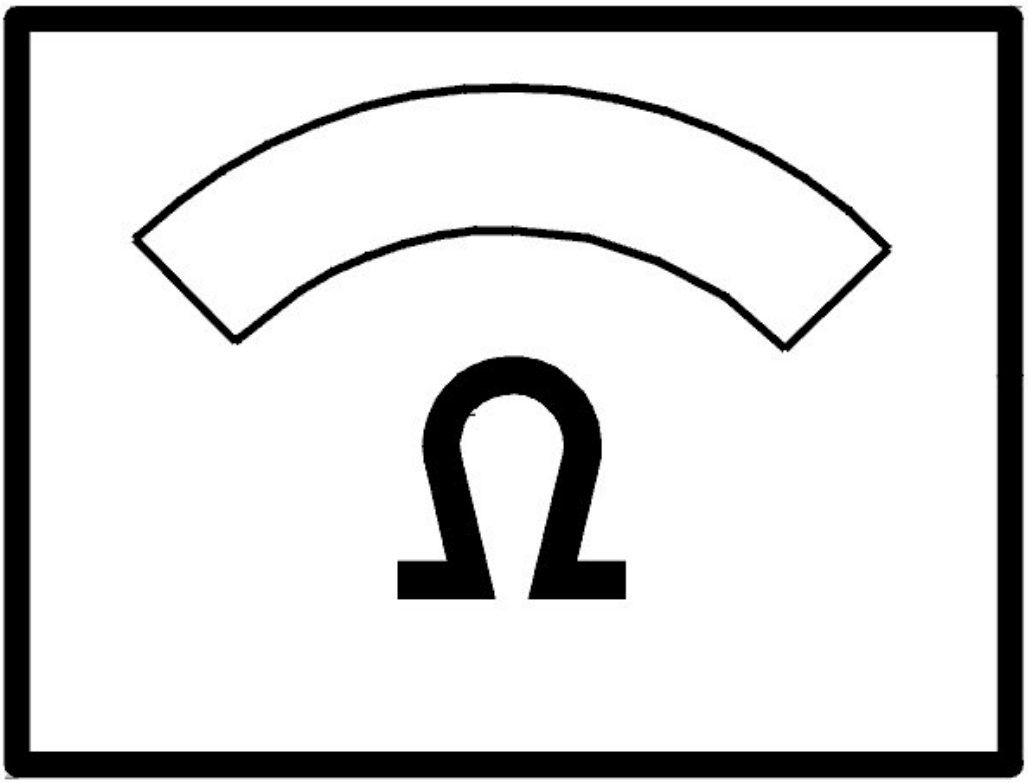
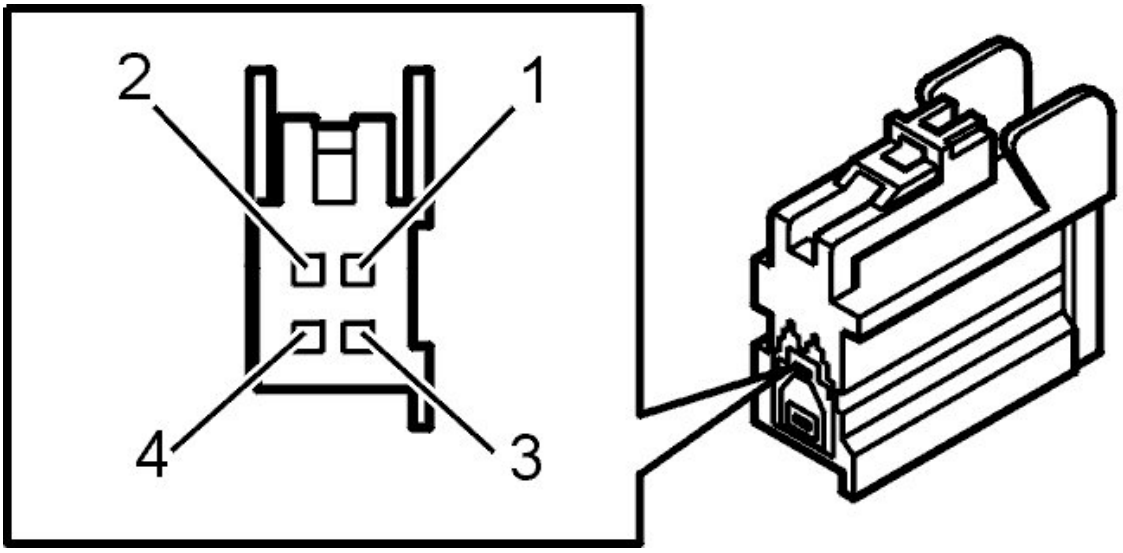
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

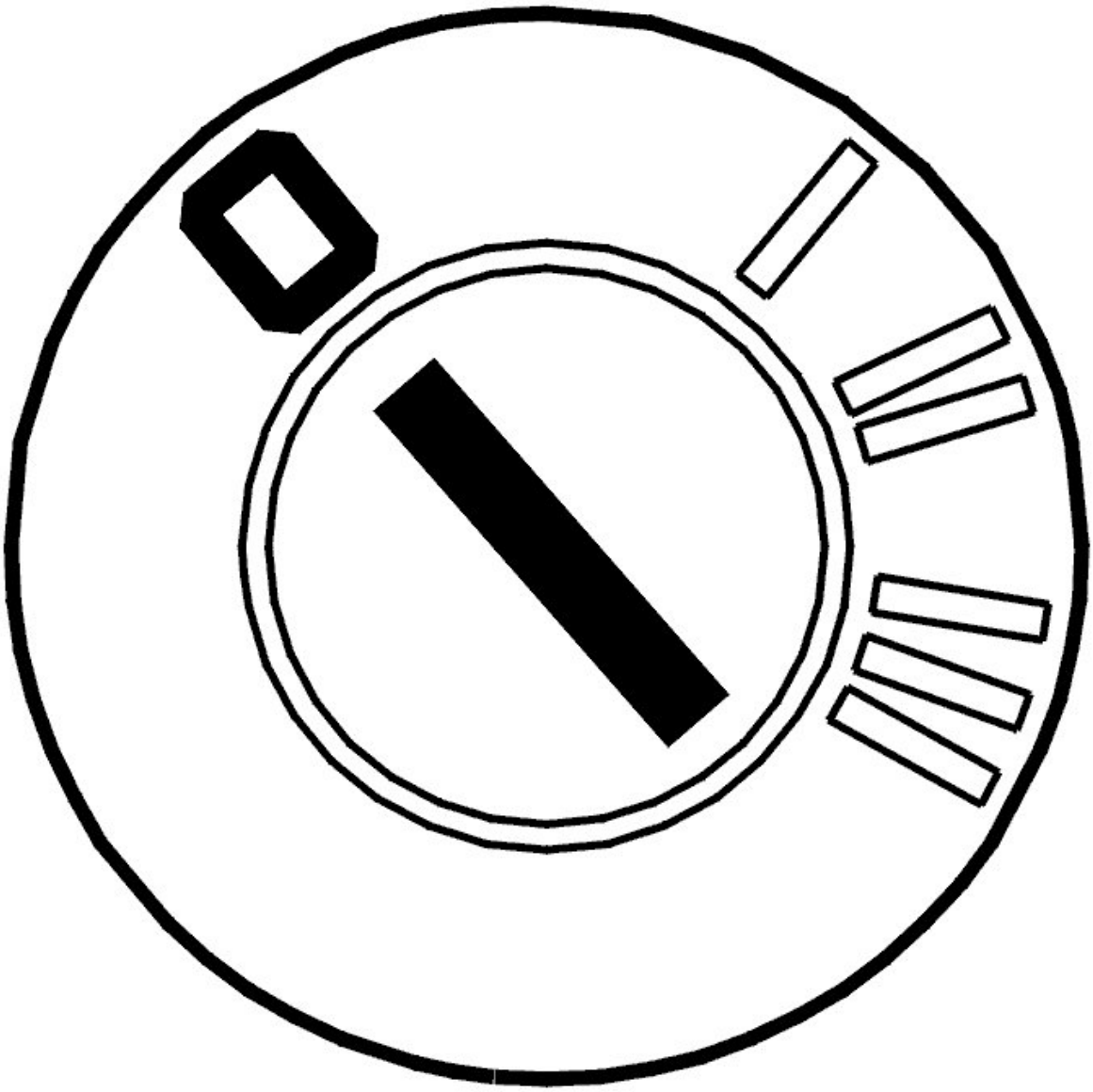
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

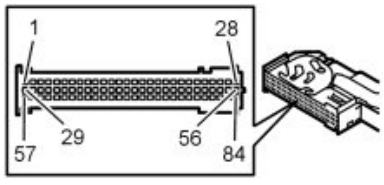


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

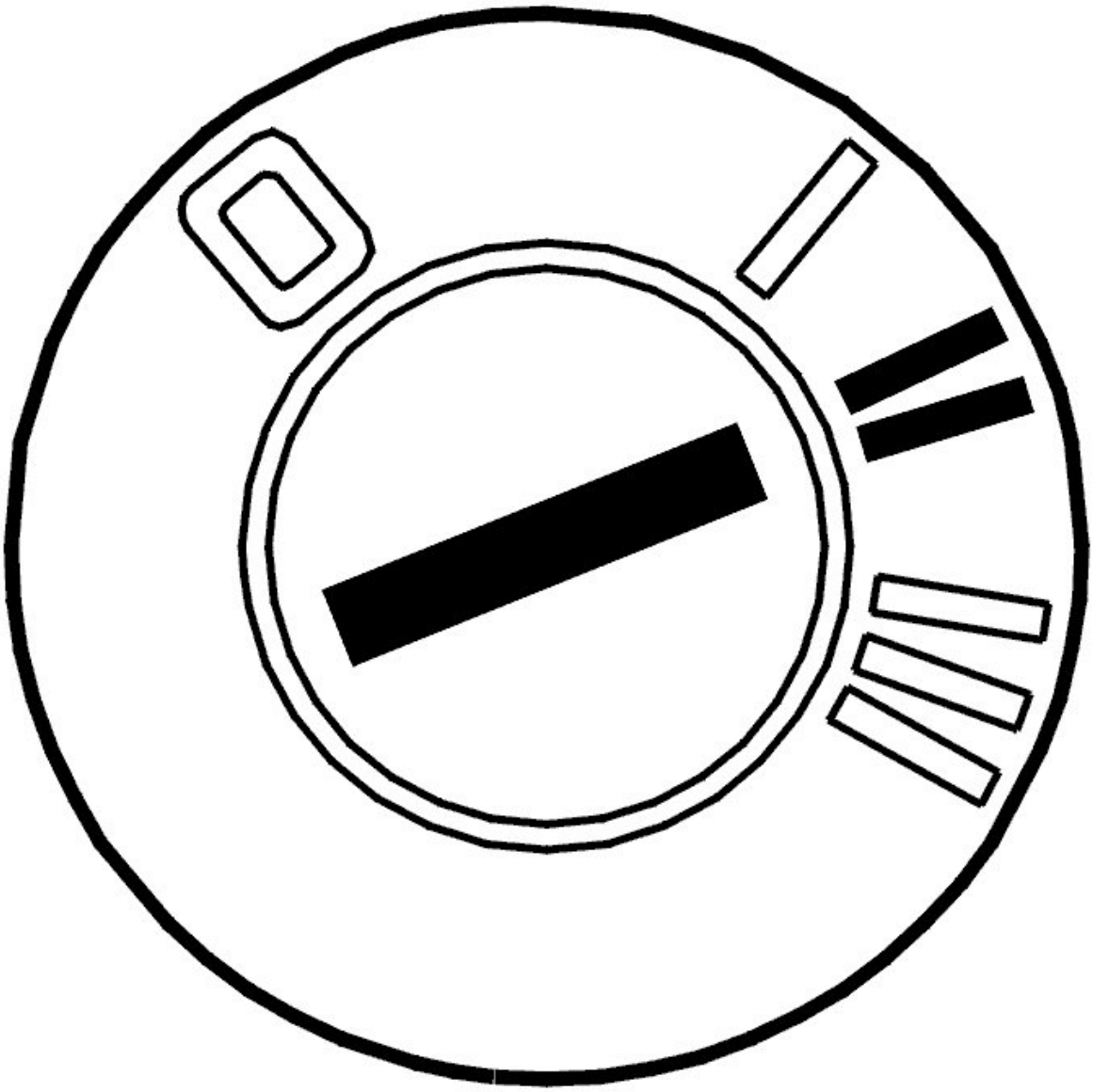
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

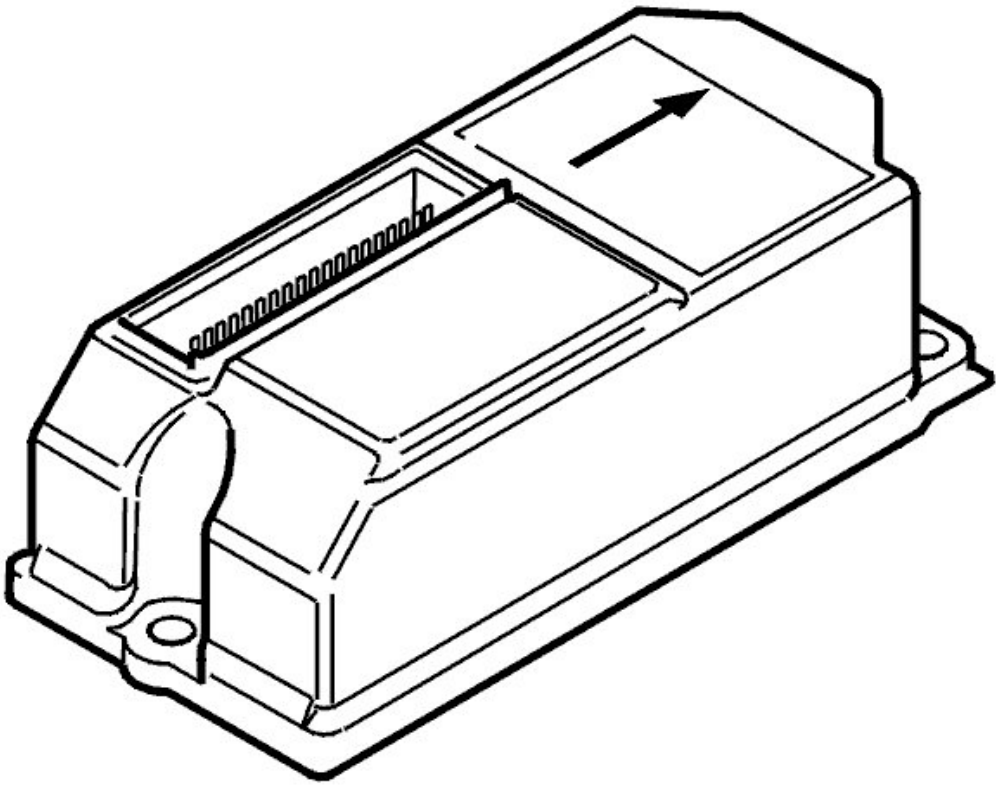
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0018

Condition

Diagnostic trouble code (DTC) SRS-0018 is stored if the control module registers that voltage in the circuit is high for longer than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Short-circuit to supply voltage in the airbag.
- Short-circuit to supply voltage in the contact reel.

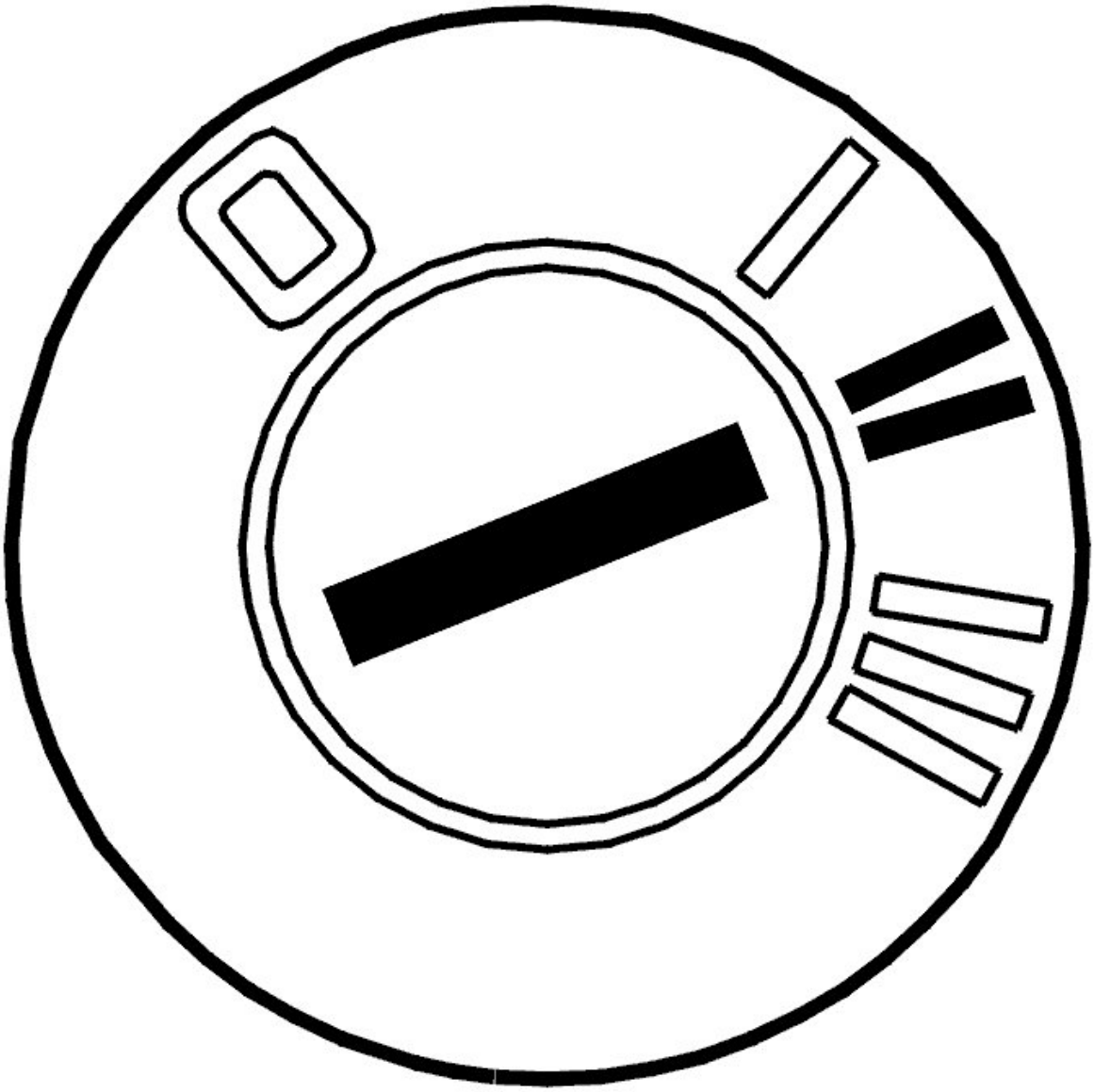
Fault symptom[s]

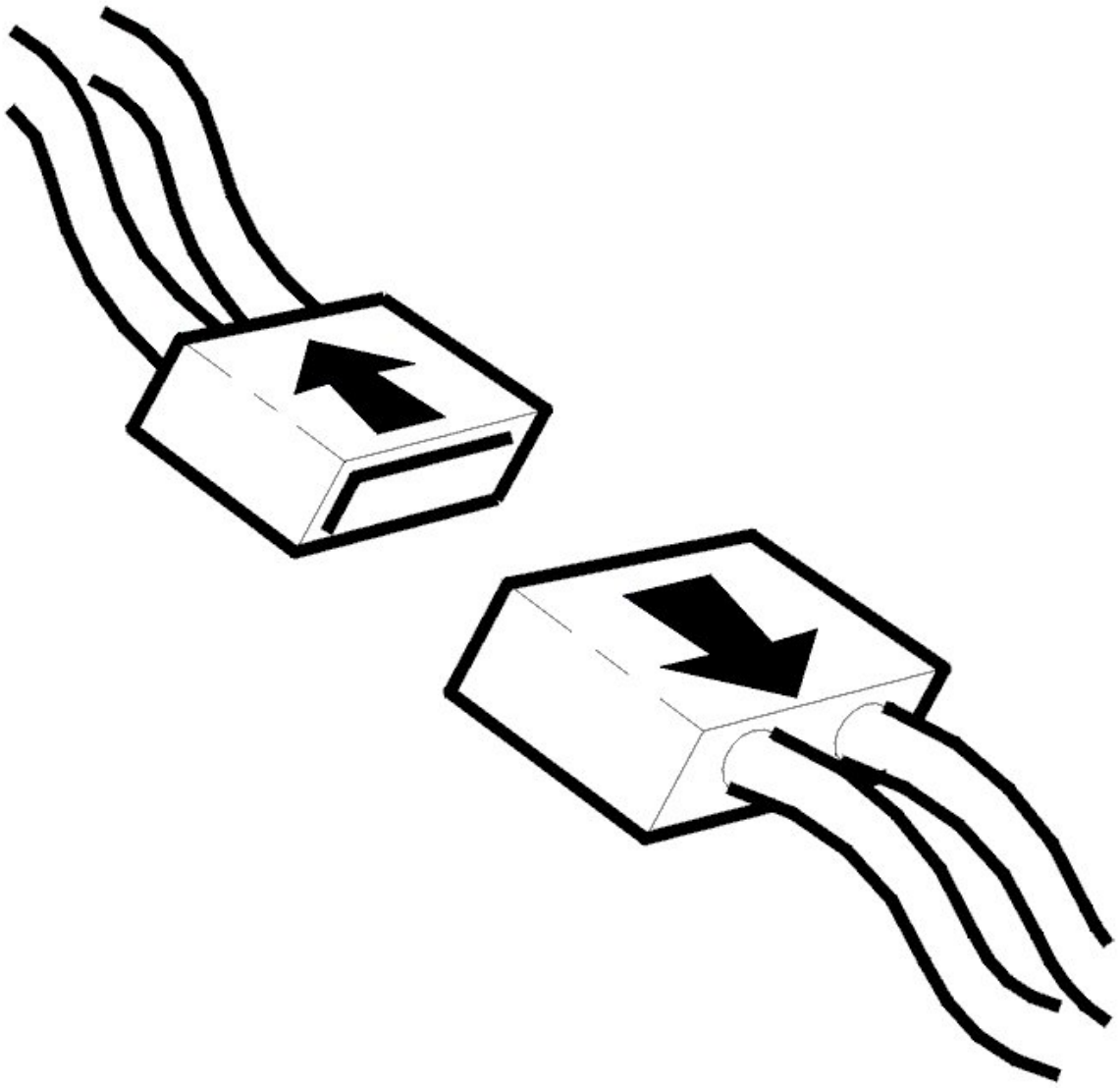
- The SRS indicator lamp is lit.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

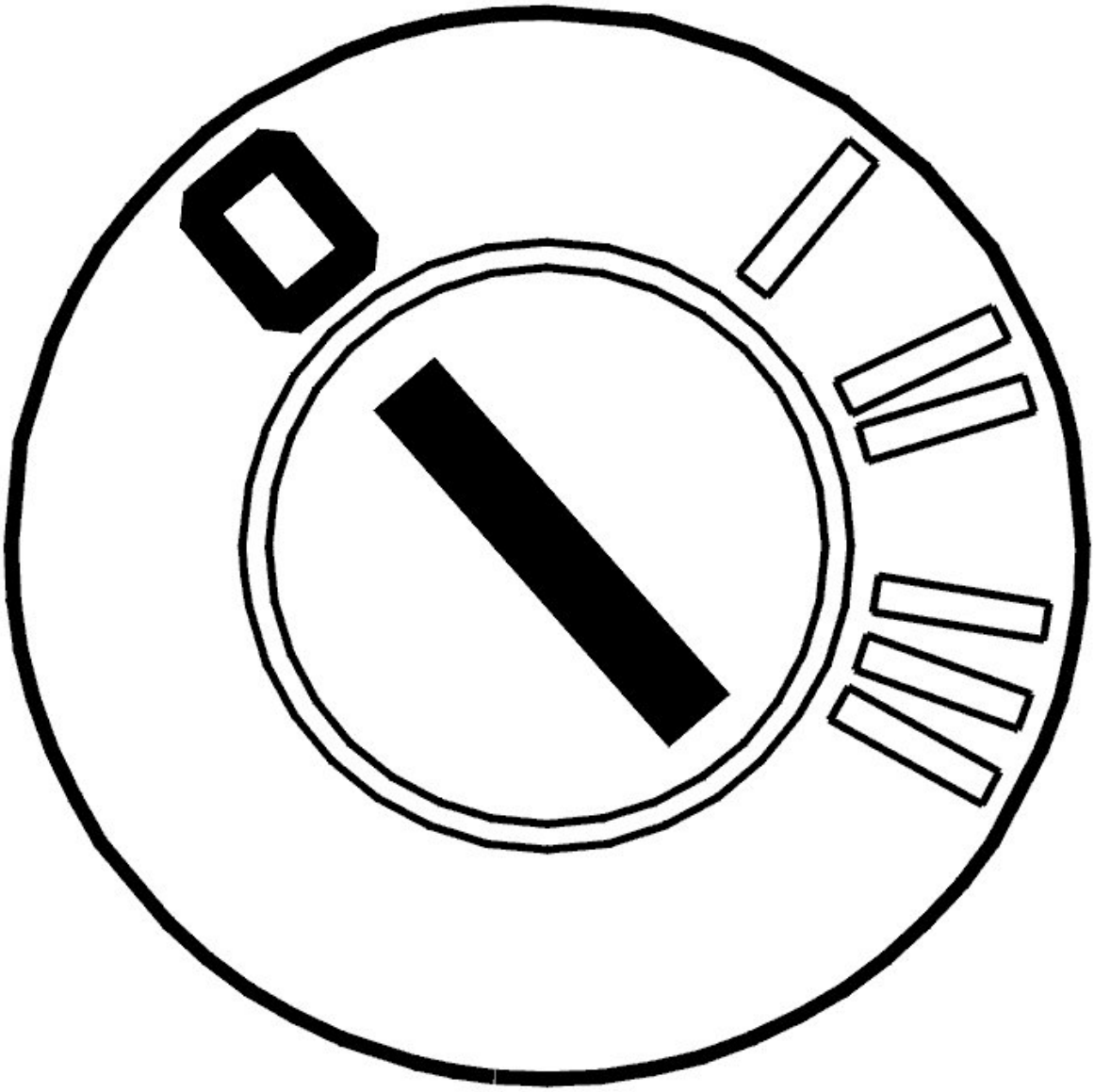
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking the component and wiring

Checking the component and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

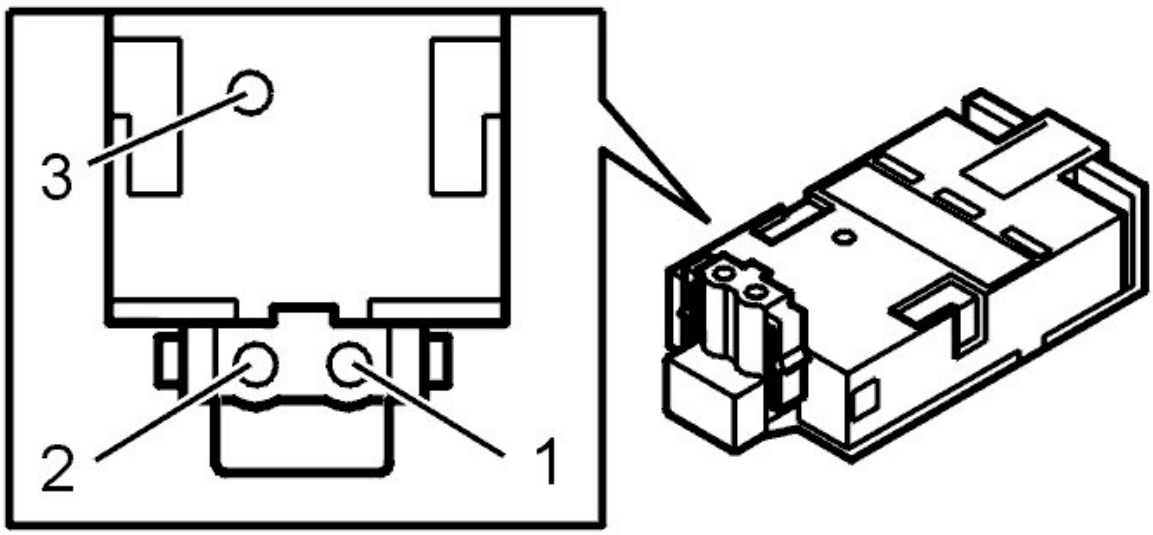
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

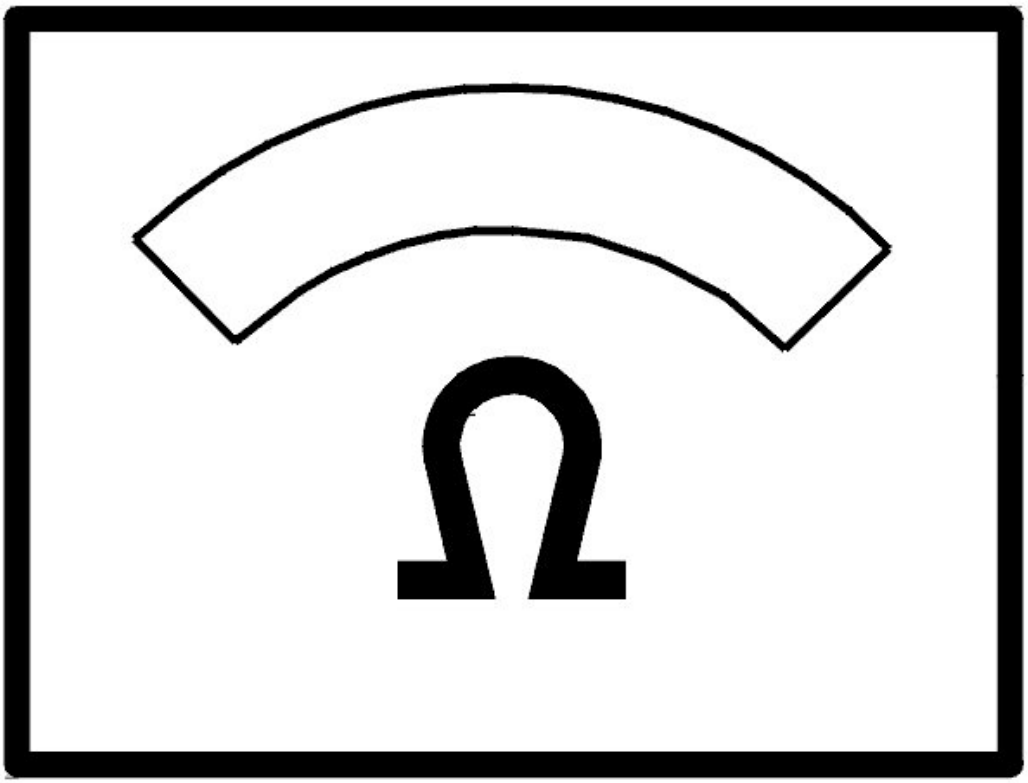
Check the cable between SRS control module terminals #9B (37) and #10B (38) and connector (violet) terminals #1 and #3 on the driver's side airbag for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side) and the disconnected battery positive terminal. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance for all steering wheel positions.
Remedy as necessary.

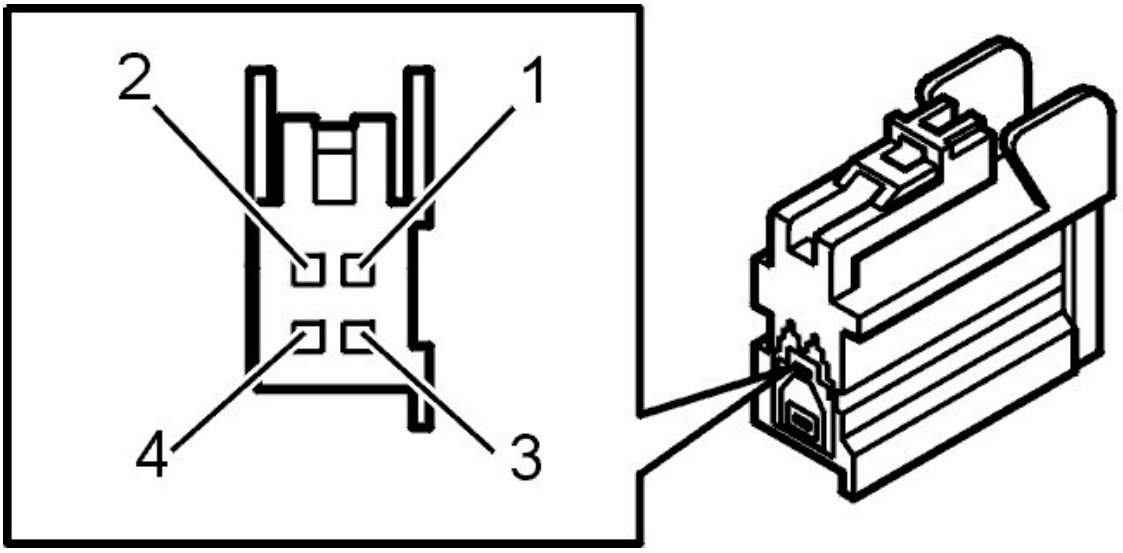
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access or replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the SRS control module disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select "Continue" when the fault has been remedied.

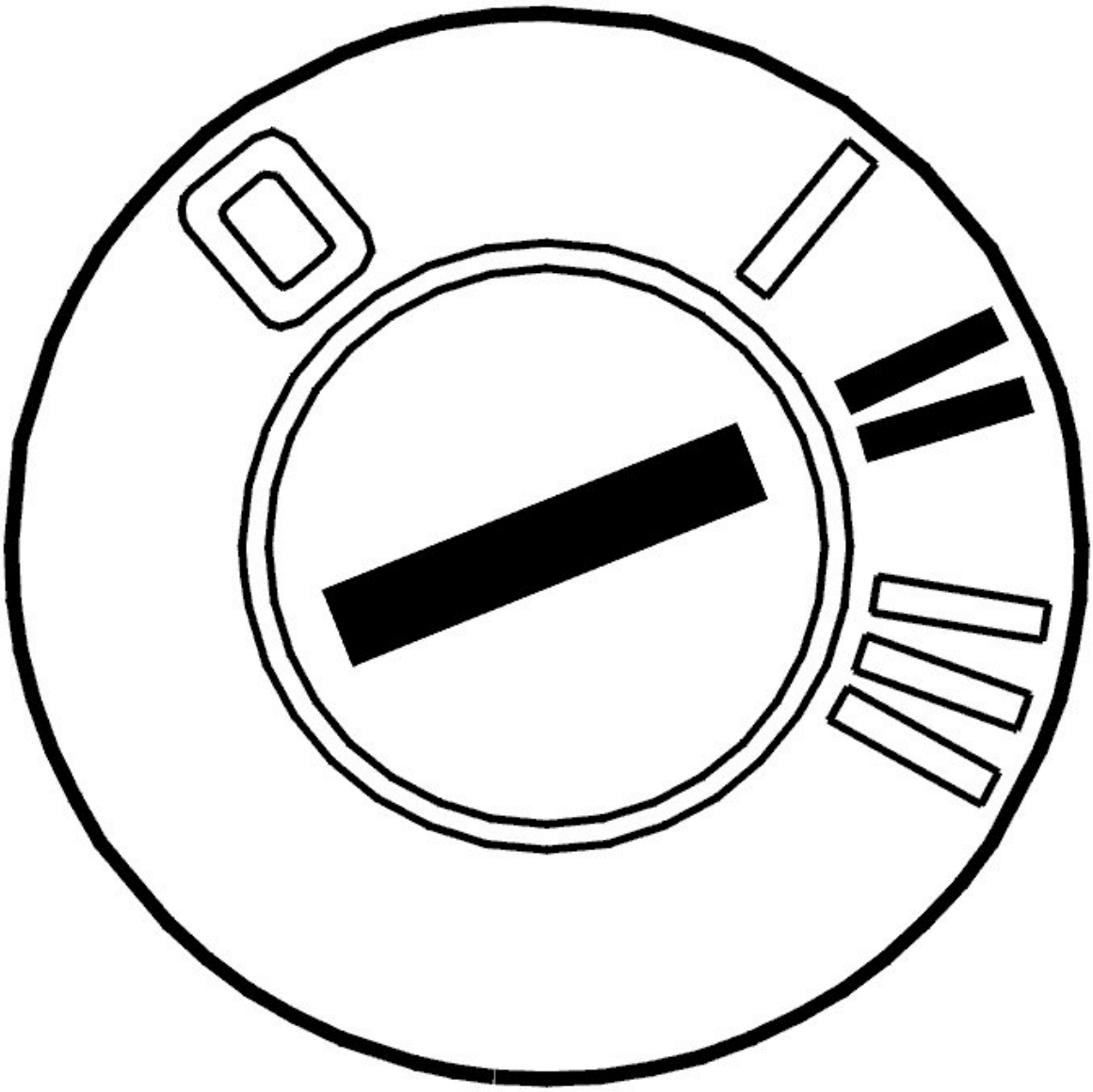
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0018

Condition

Diagnostic trouble code (DTC) SRS-0018 is stored if the control module registers that voltage in the circuit is high for longer than 10 seconds.

Substitute value

- None.

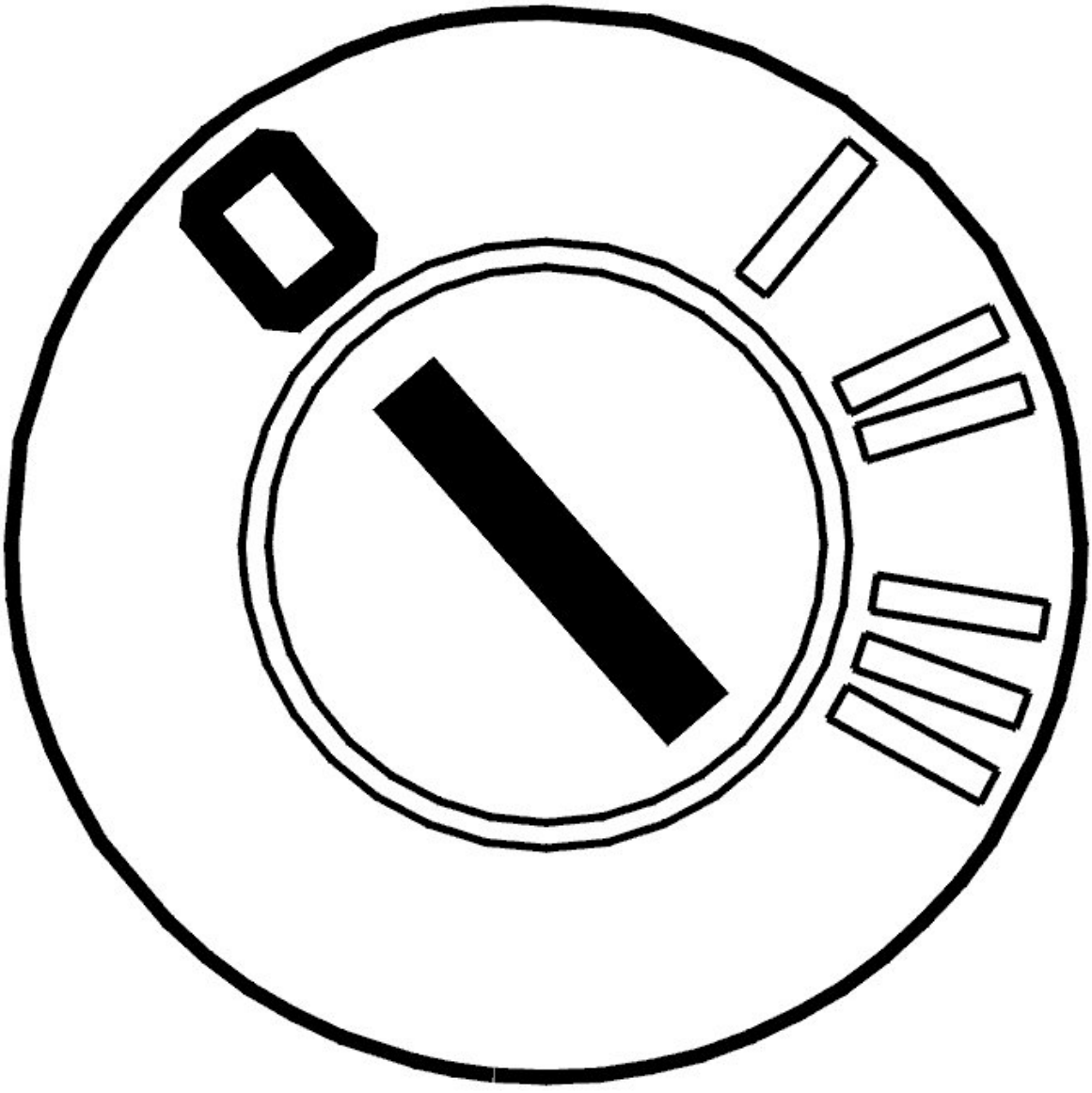
Possible source
- Short-circuit to supply voltage in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Short-circuit to supply voltage in the airbag.
- Short-circuit to supply voltage in the contact reel.

Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

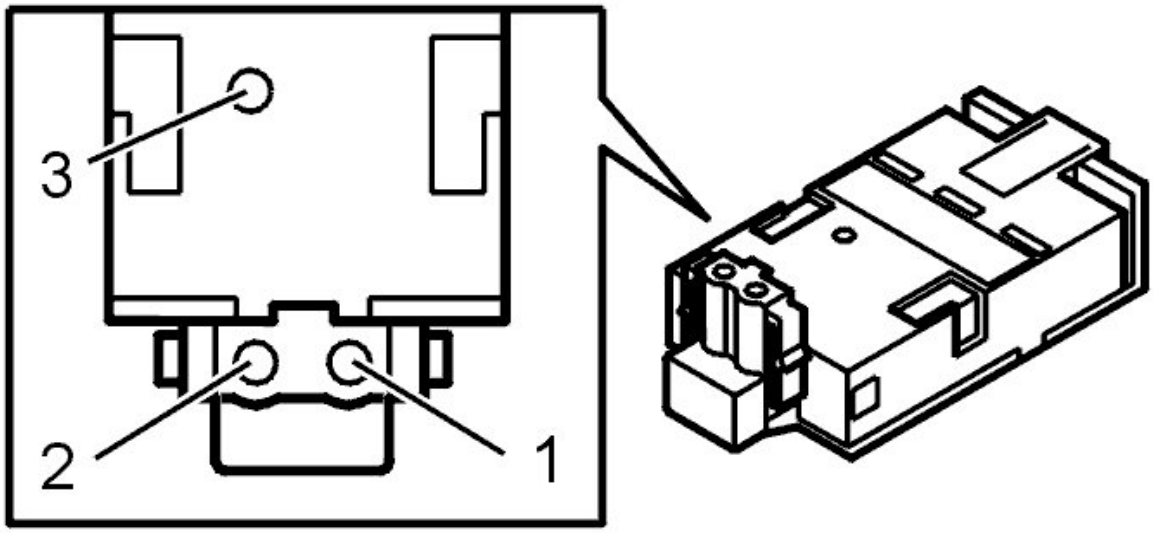
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

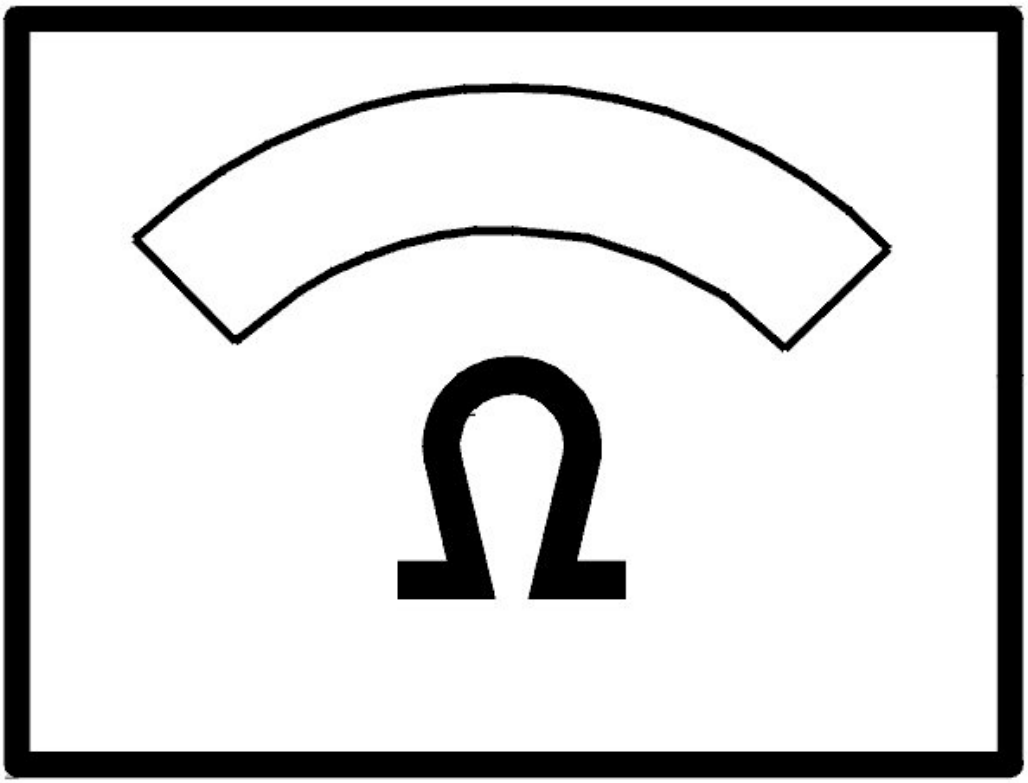
Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

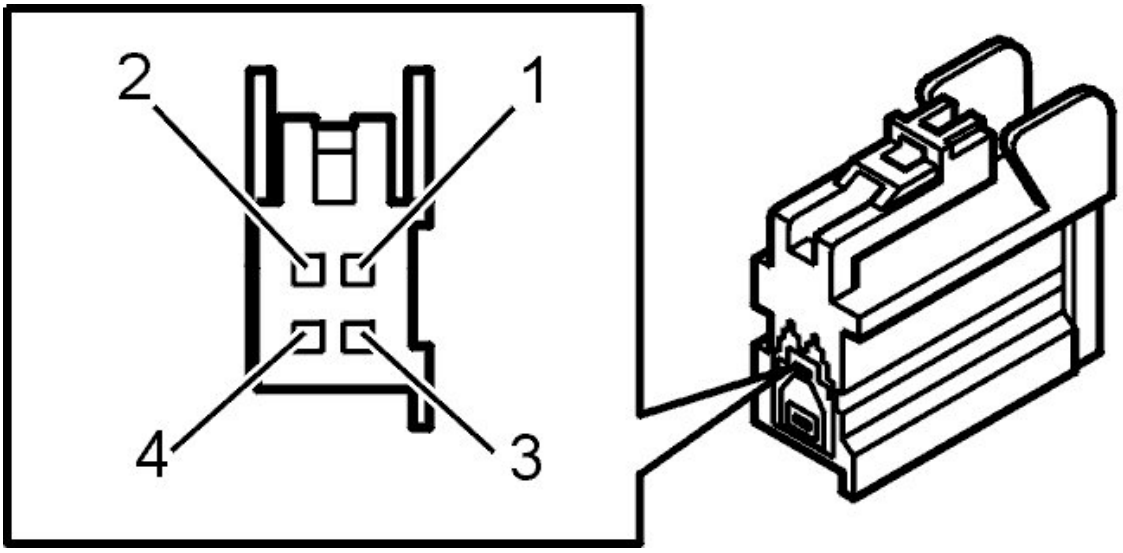
Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminals #9B (37) and #10B (38) and connector (violet) terminals #1 and #3 on the driver's side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side) and the disconnected battery positive terminal. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access or replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and for the SRS control module disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0019

Condition

Diagnostic trouble code (DTC) SRS-0019 is stored if the control module registers that the voltage in the circuit is low (0 V) for longer than 10 seconds.

Substitute value
- None.

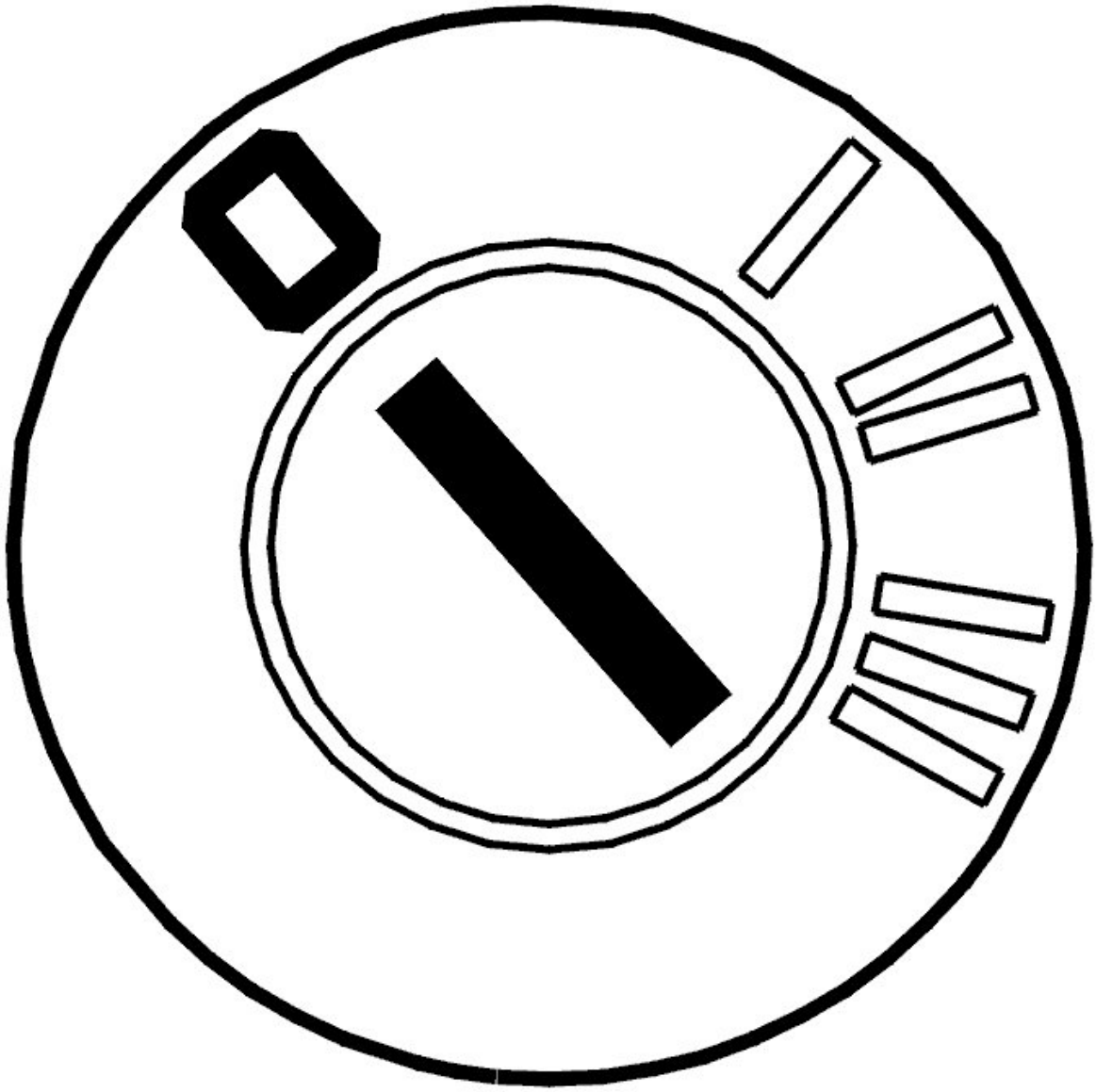
Possible source
- Short-circuit to ground in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Short-circuit to ground in the airbag.
- Short-circuit to ground in the contact reel.

Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

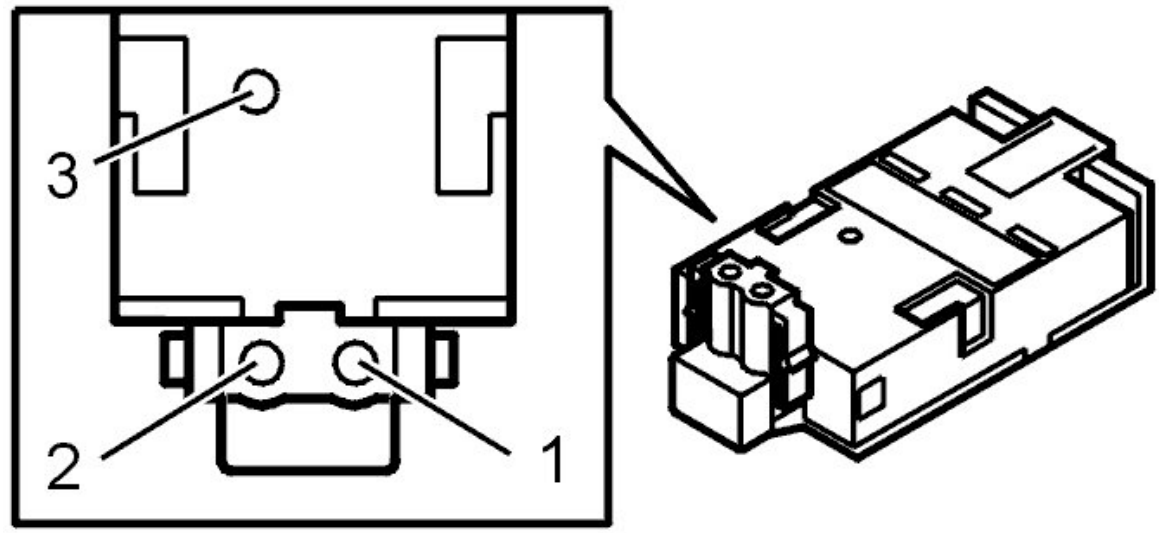
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

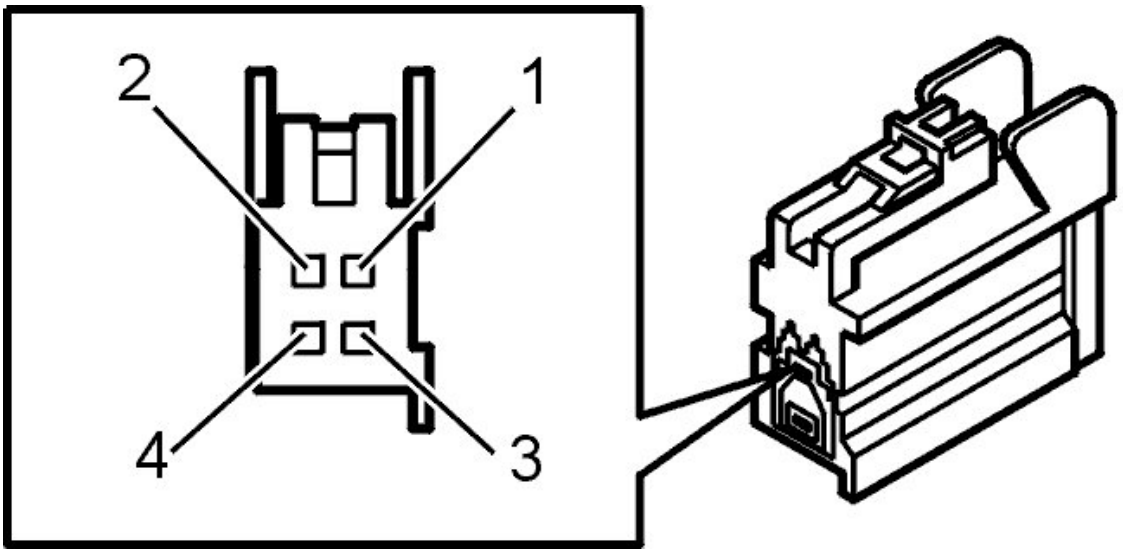
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the Supplemental restraint system module (SRS) and connector (purple) on airbag driver for short-circuiting to ground. Take readings between:
- Supplemental restraint system module (SRS) #9B(37) and connector (purple) #1 on airbag driver.
- Supplemental restraint system module (SRS) #10B(38) and connector (purple) #3 on airbag driver.

Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0019

Condition

Diagnostic trouble code (DTC) SRS-0019 is stored if the control module registers that the voltage in the circuit is low (0 V) for longer than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to ground in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Short-circuit to ground in the airbag.
- Short-circuit to ground in the contact reel.

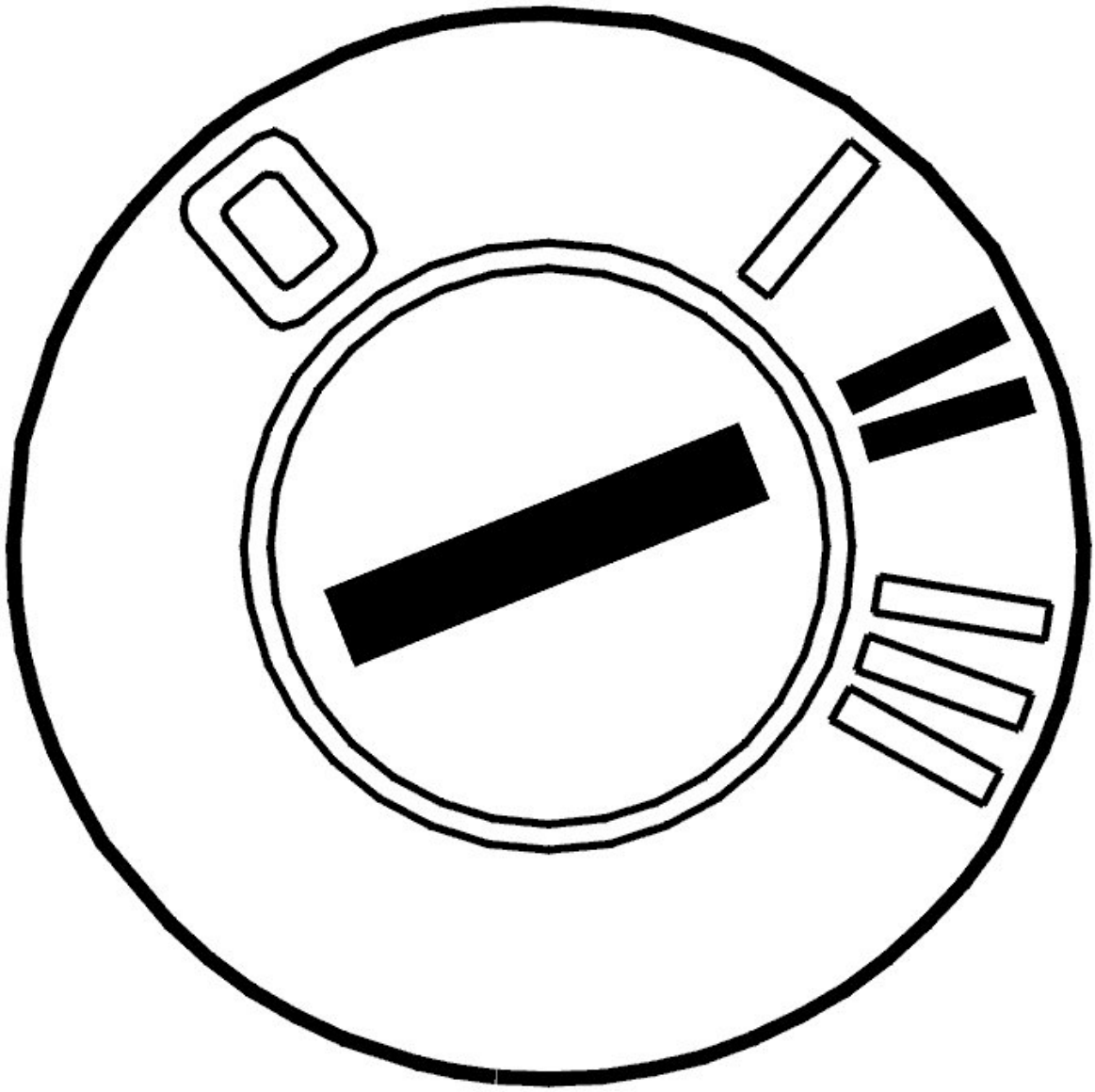
Fault symptom[s]
- The SRS indicator lamp is lit.

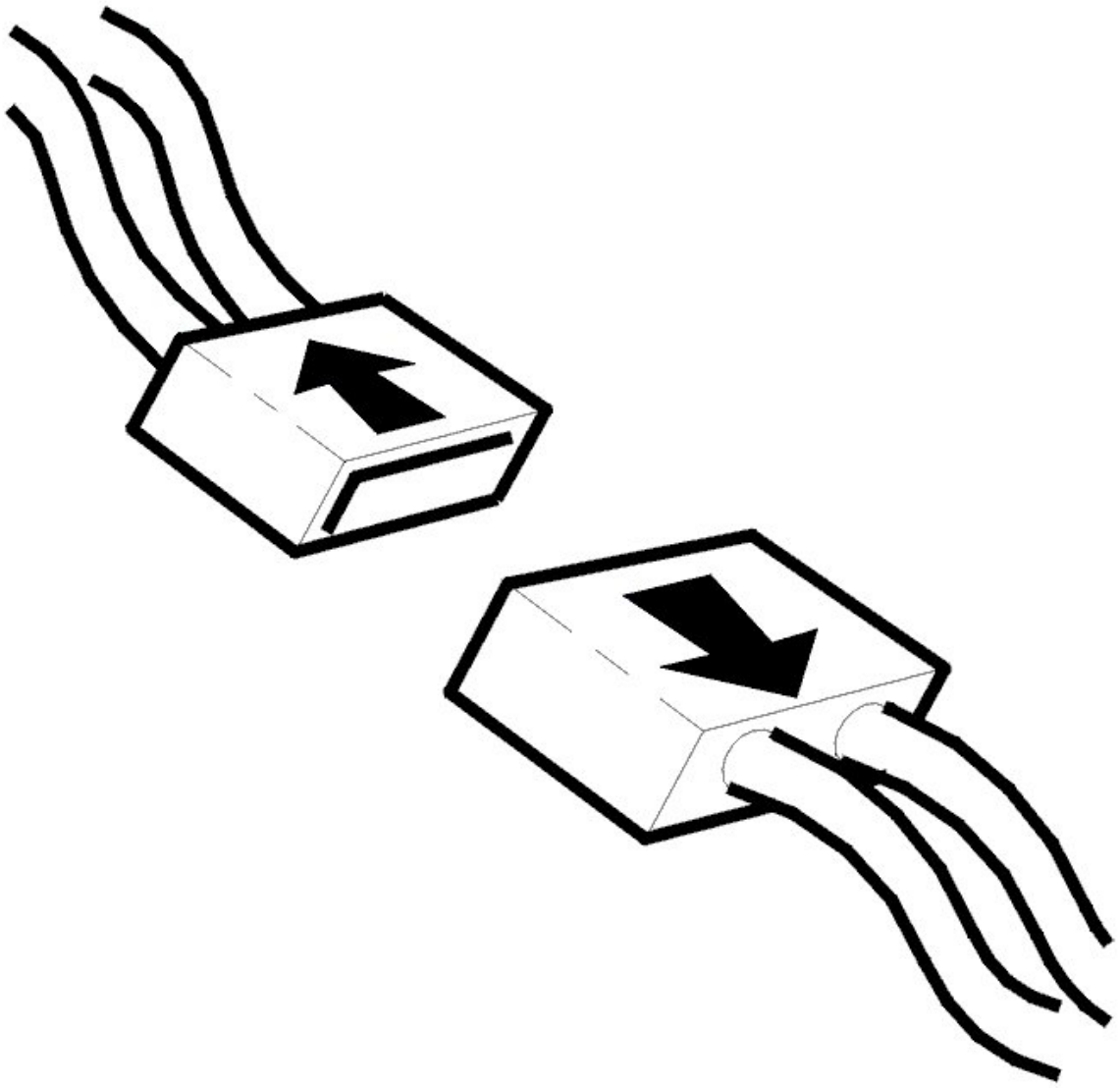
Signal Too Low

Signal too low. Permanent fault

Checking the component

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side
- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

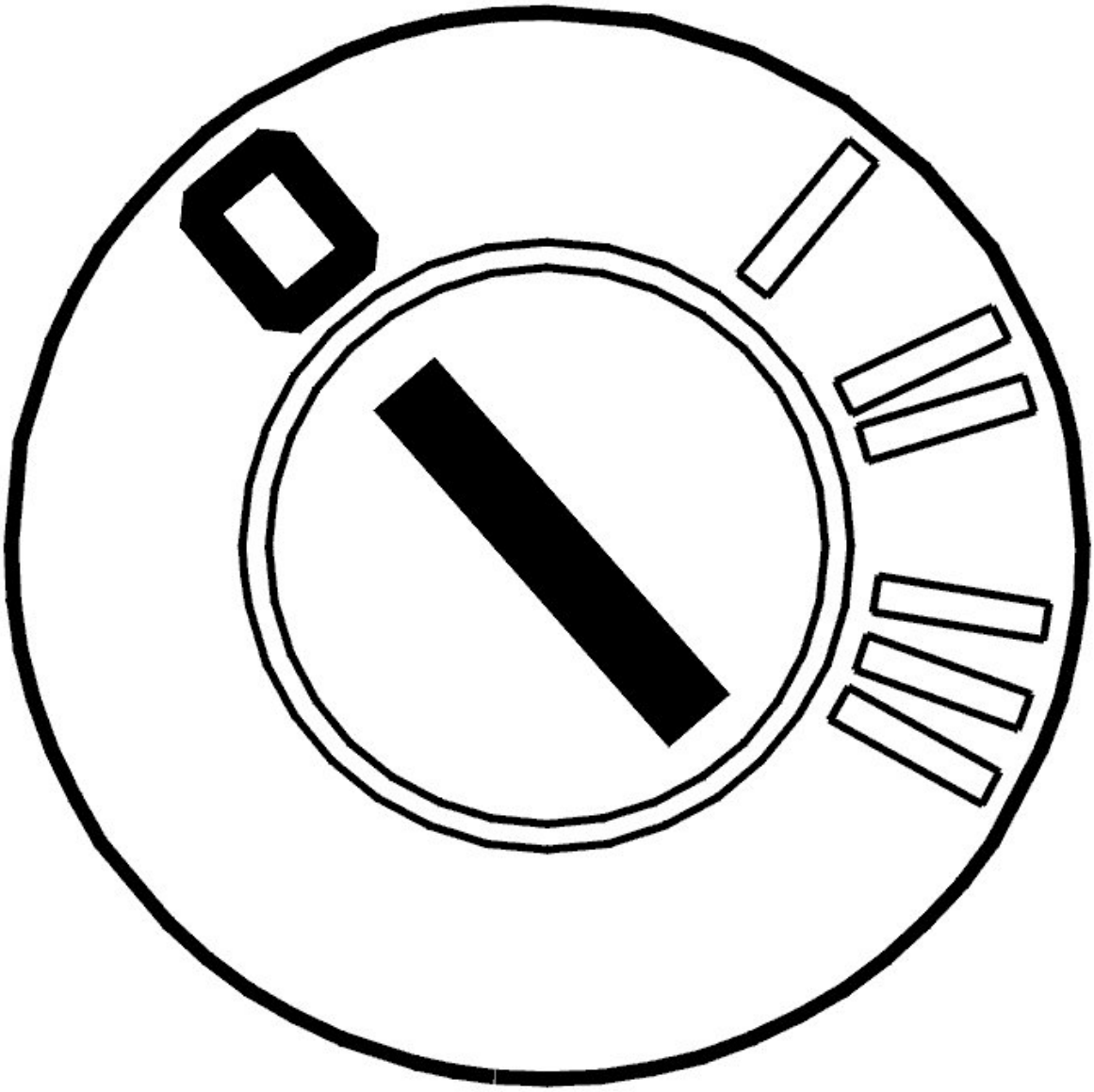
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking the component and wiring

Checking the component and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the Supplemental restraint system module (SRS) and connector (purple) on airbag driver for short-circuiting to ground. Take readings between:

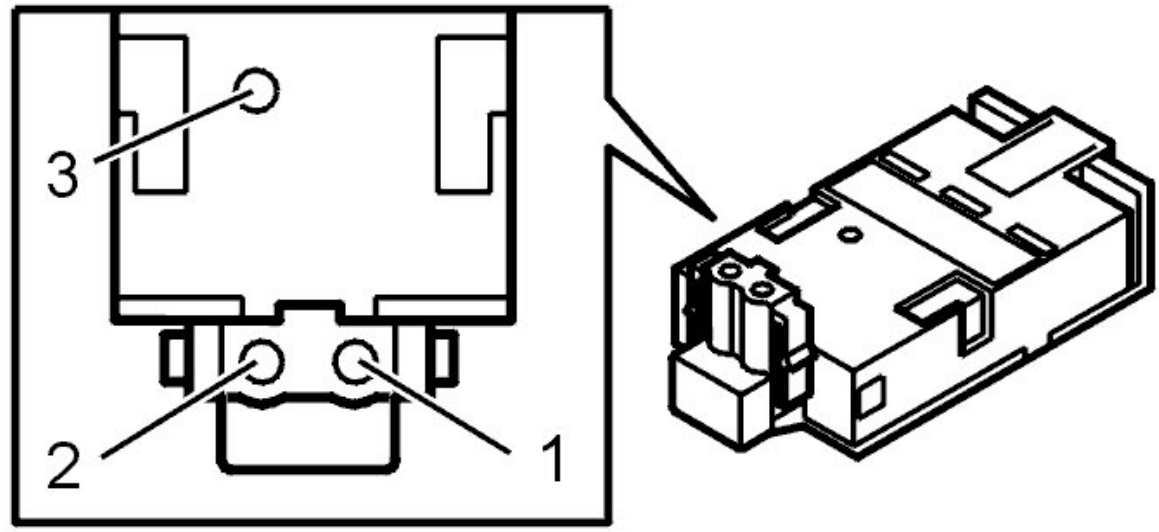
- Supplemental restraint system module (SRS) #9B(37) and connector (purple) #1 on airbag driver.
- Supplemental restraint system module (SRS) #10B(38) and connector (purple) #3 on airbag driver.

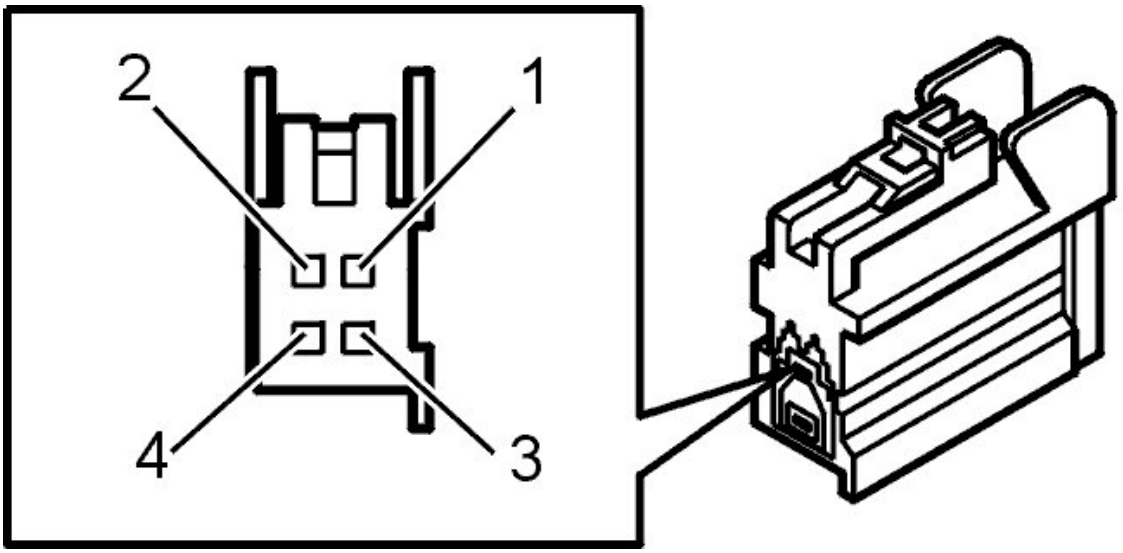
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side) and ground. The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (supplemental restraint system module (SRS) side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

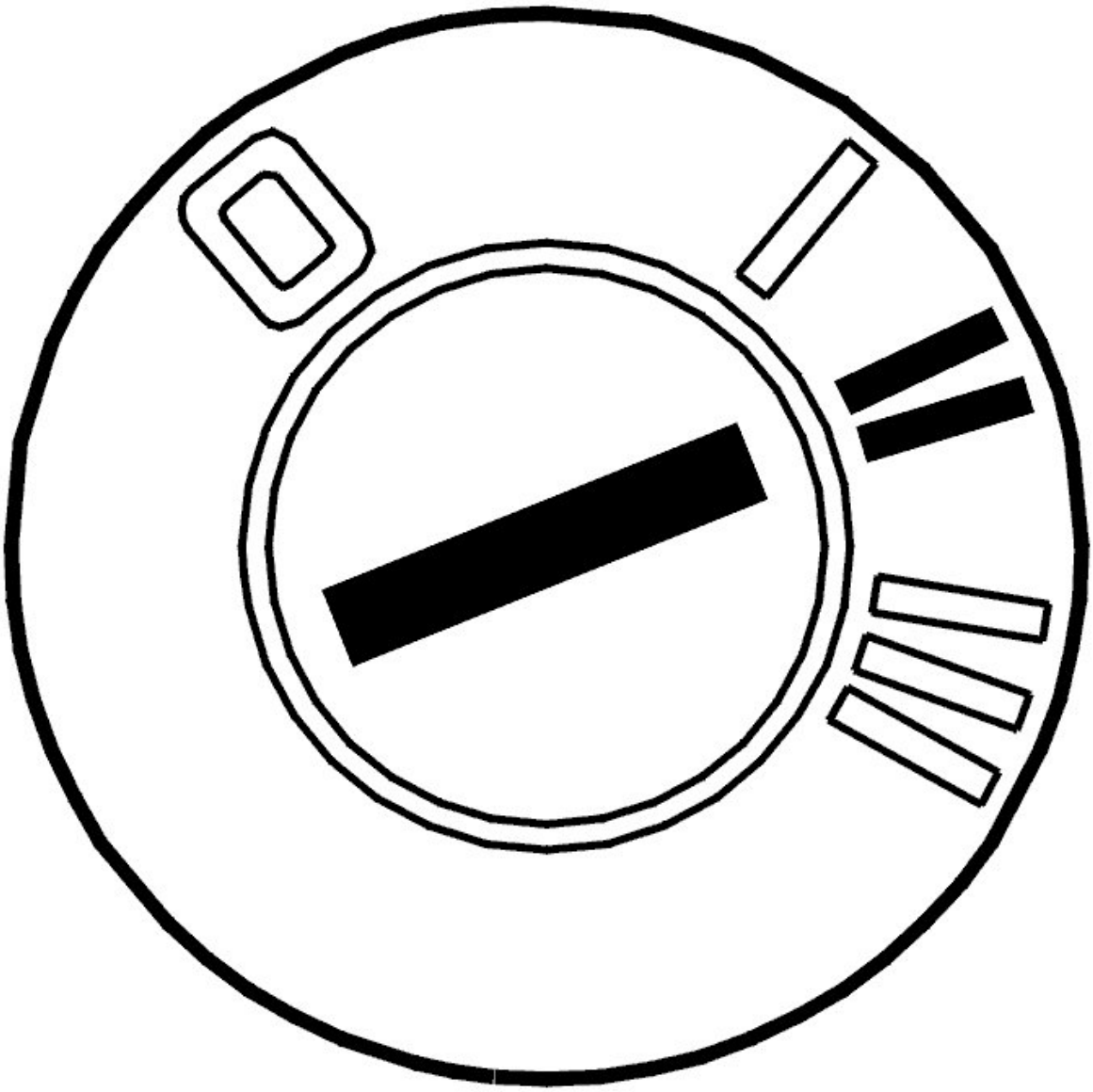
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001A

Condition

Diagnostic trouble code (DTC) SRS-001A is stored if the control module registers that capacitance in the circuit is too high for more than 10 seconds.

Substitute value

- None.

Possible source

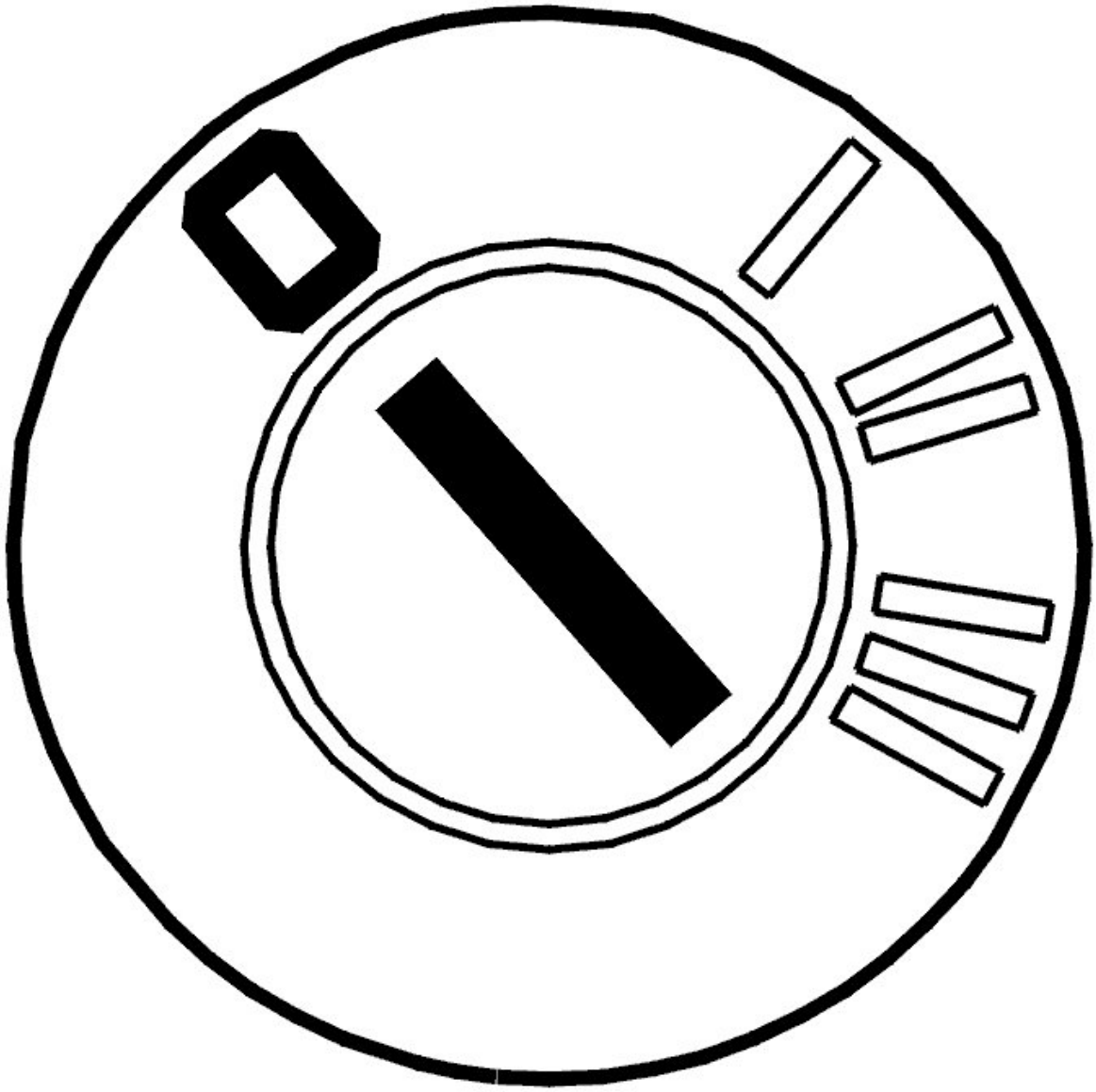
- The capacitance is too high or there is a short-circuit in the integrated capacitor in the connector for the SRS ignition cable.

Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

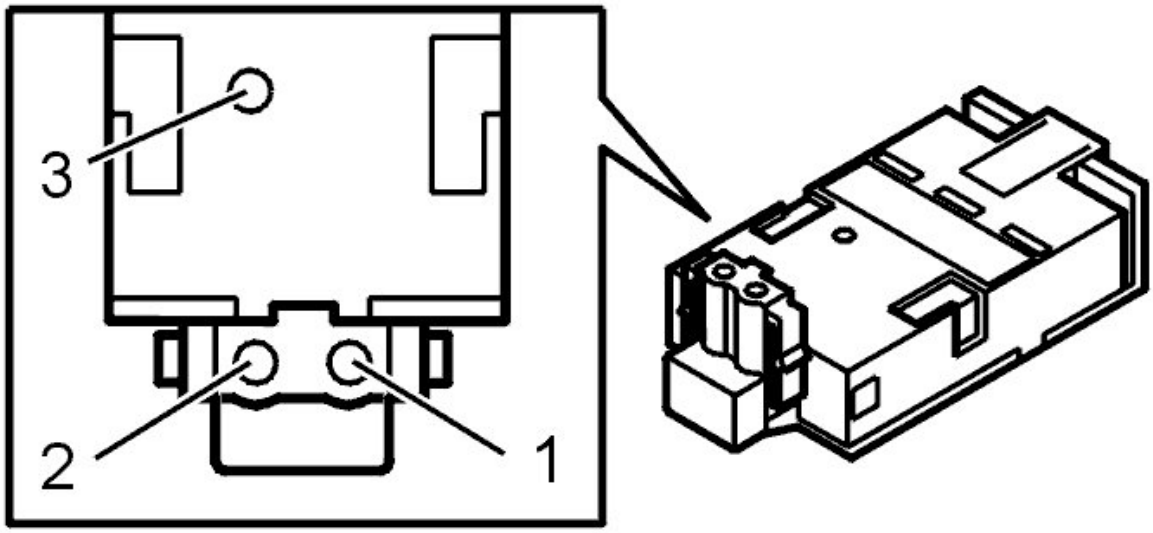
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

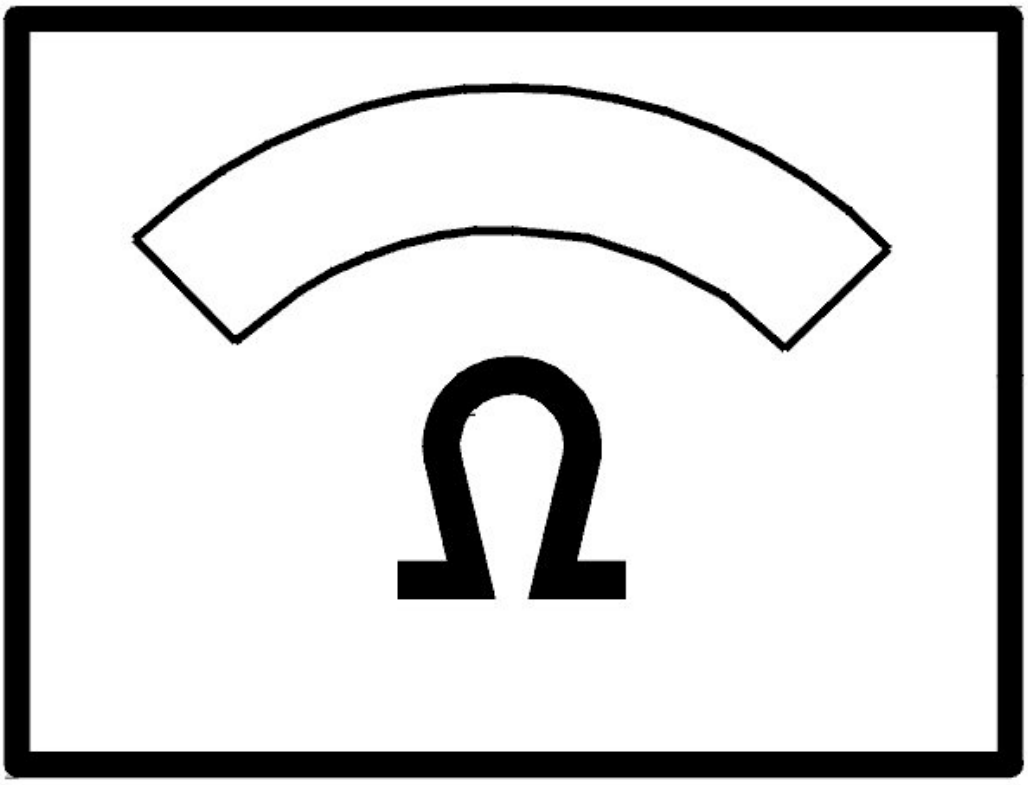
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between terminals #9B (37) and #10B (38) on the SRS control module and terminals #1 and #3 on the connector (violet) on the driver's side airbag for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

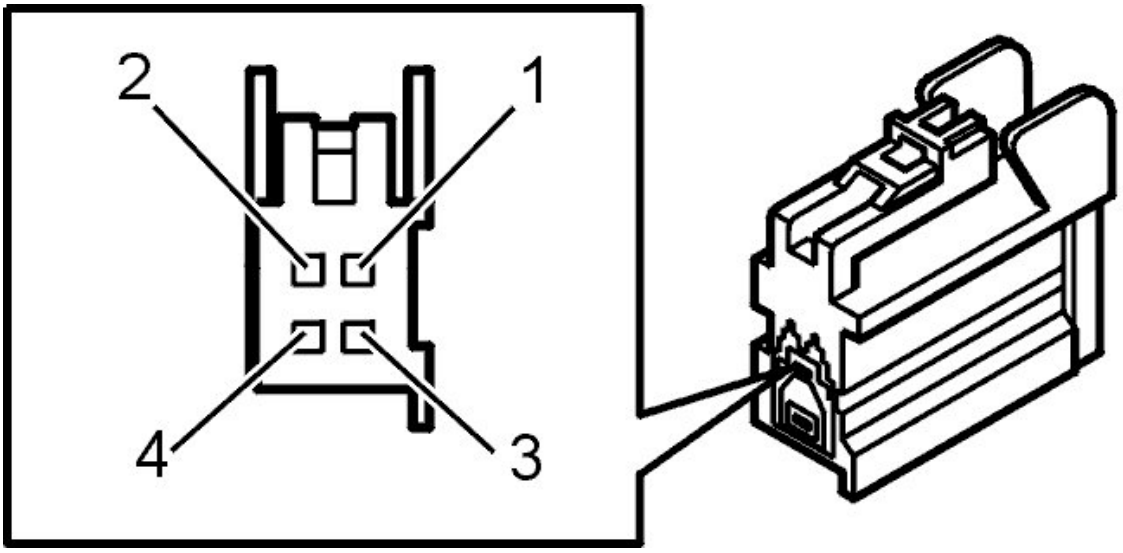
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #4 and #3 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001A

Condition

Diagnostic trouble code (DTC) SRS-001A is stored if the control module registers that capacitance in the circuit is too high for more than 10 seconds.

Substitute value
- None.

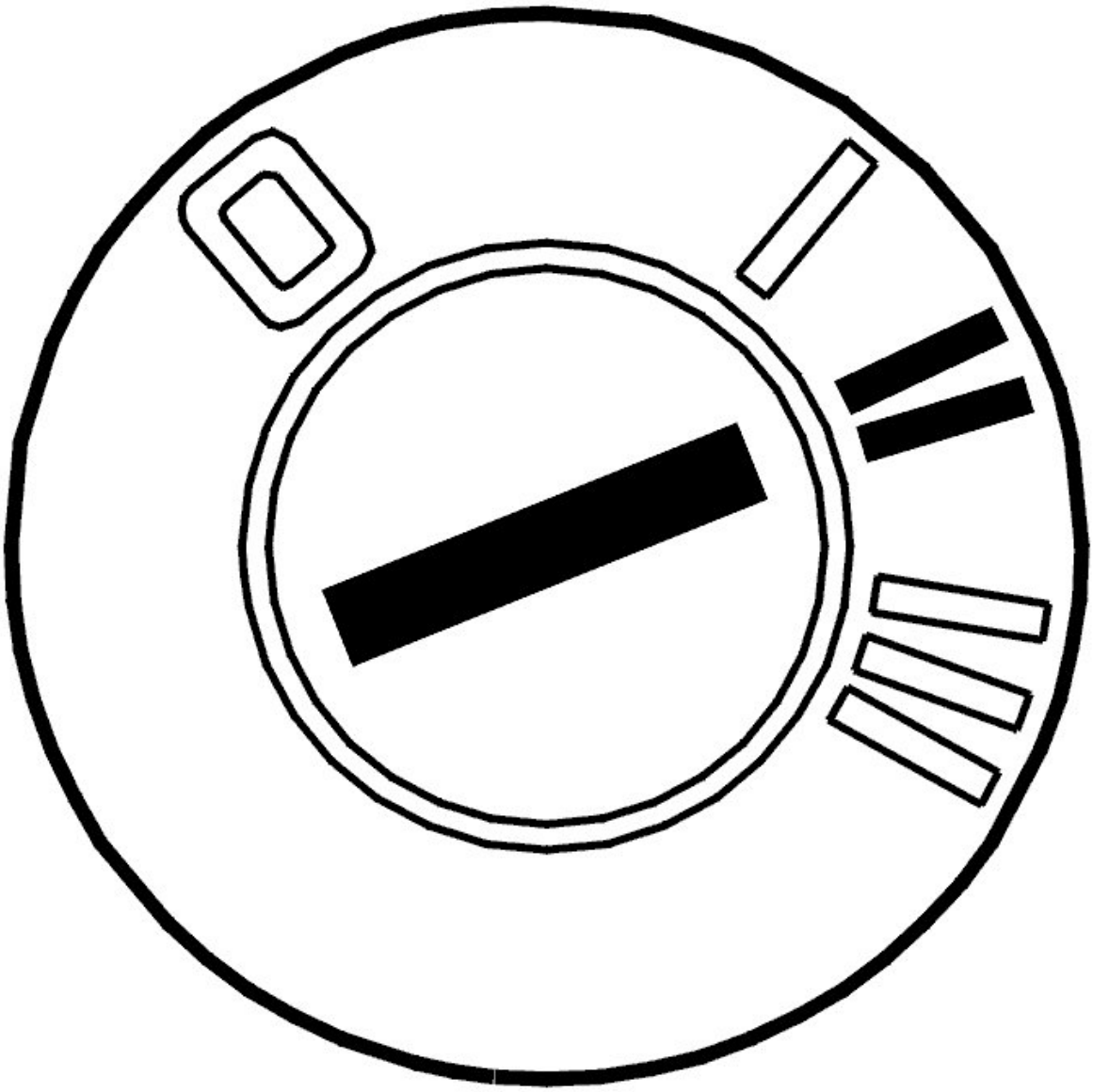
Possible source
- The capacitance is too high or there is a short-circuit in the integrated capacitor in the connector for the SRS ignition cable.

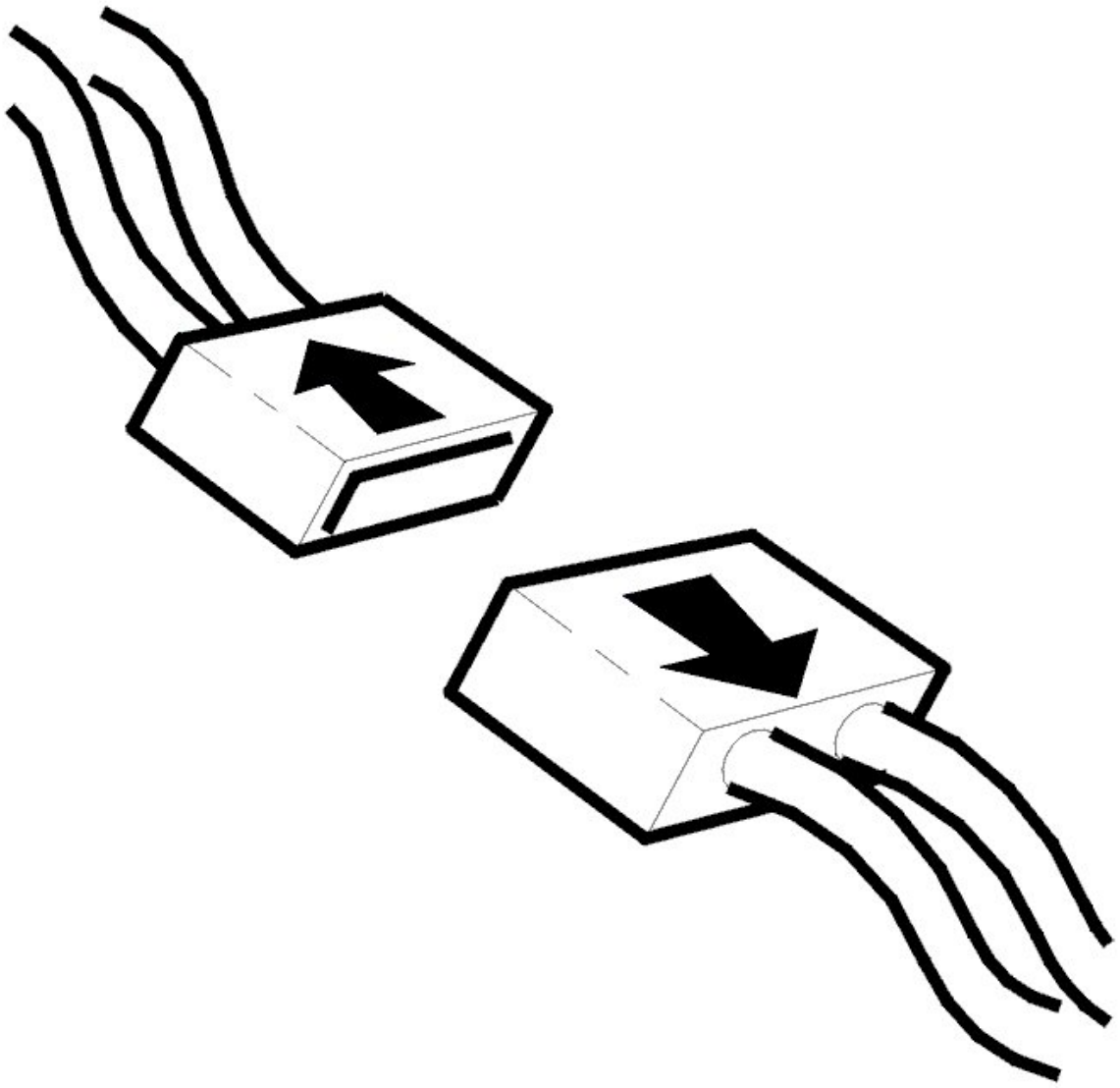
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

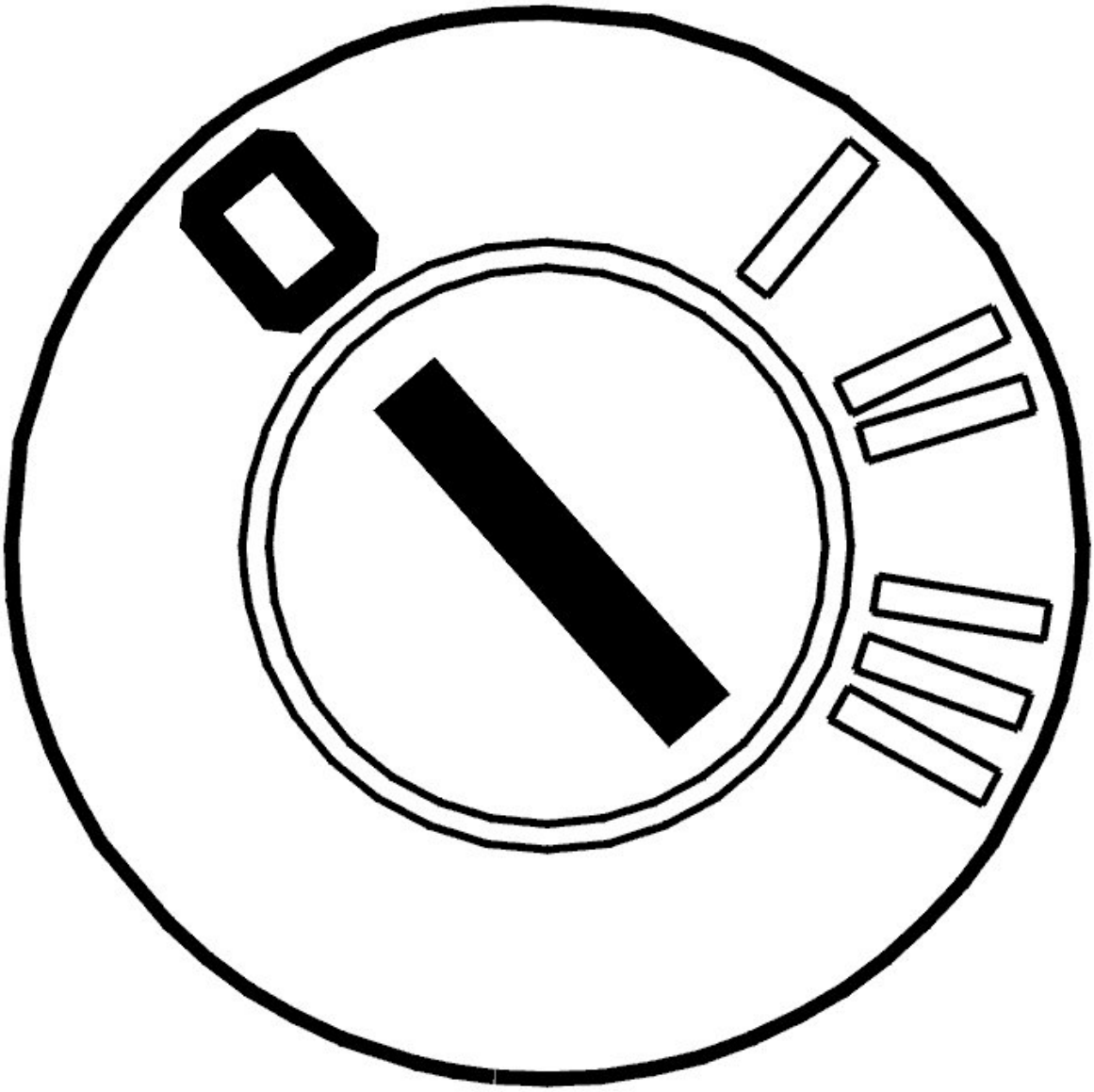
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

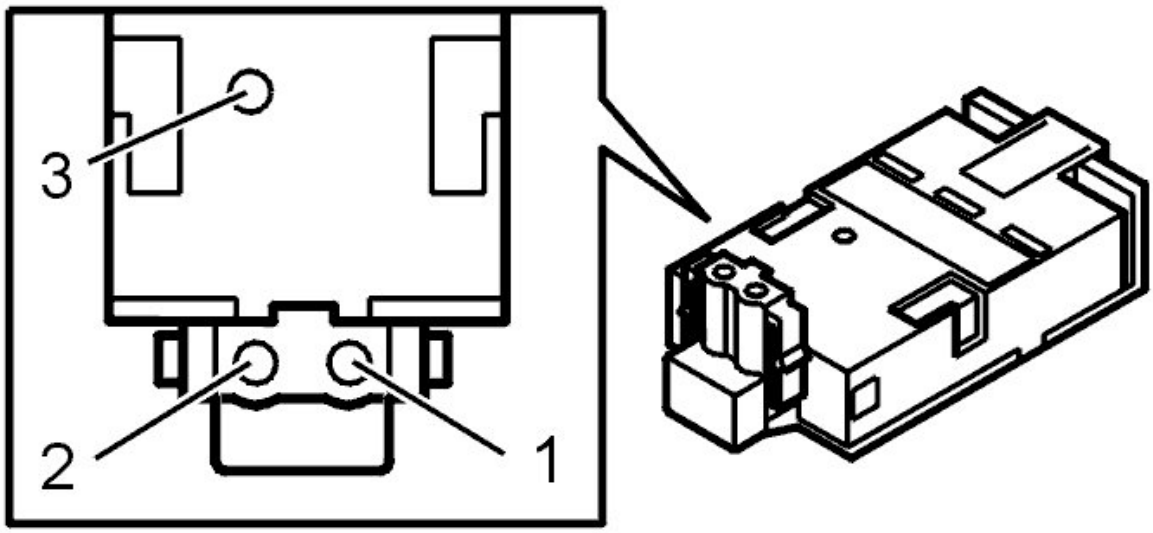
Check the cable between terminals #9B (37) and #10B (38) on the SRS control module and terminals #1 and #3 on the connector (violet) on the driver's side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

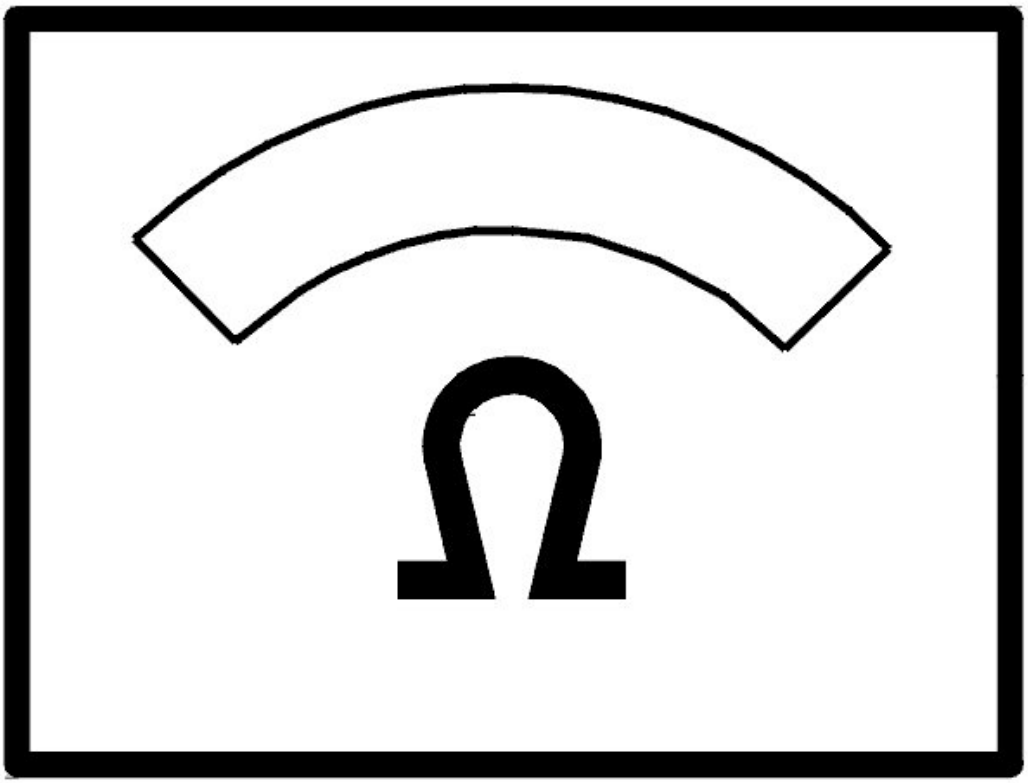
Other information:

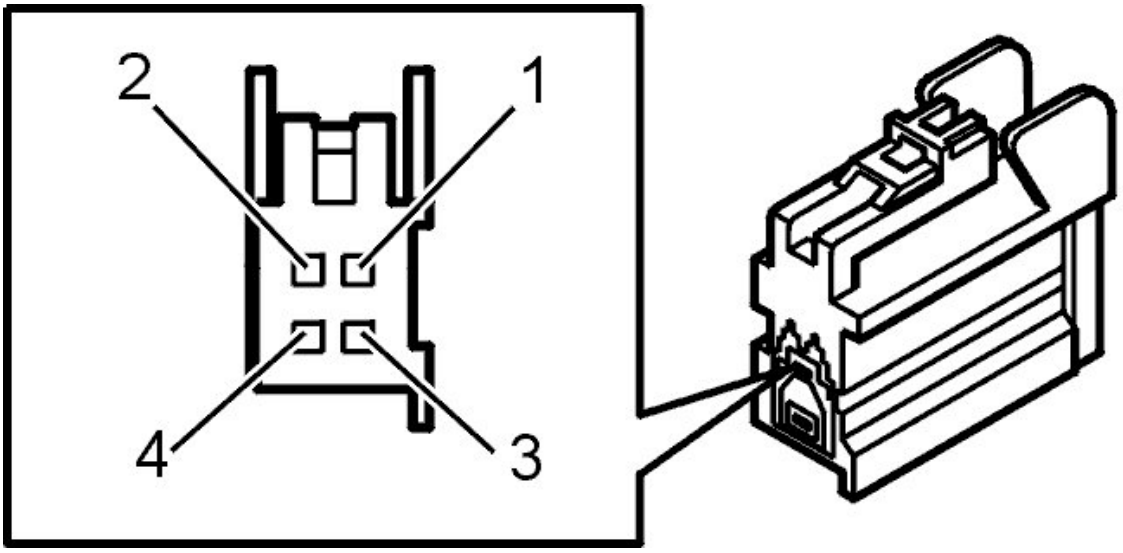
- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







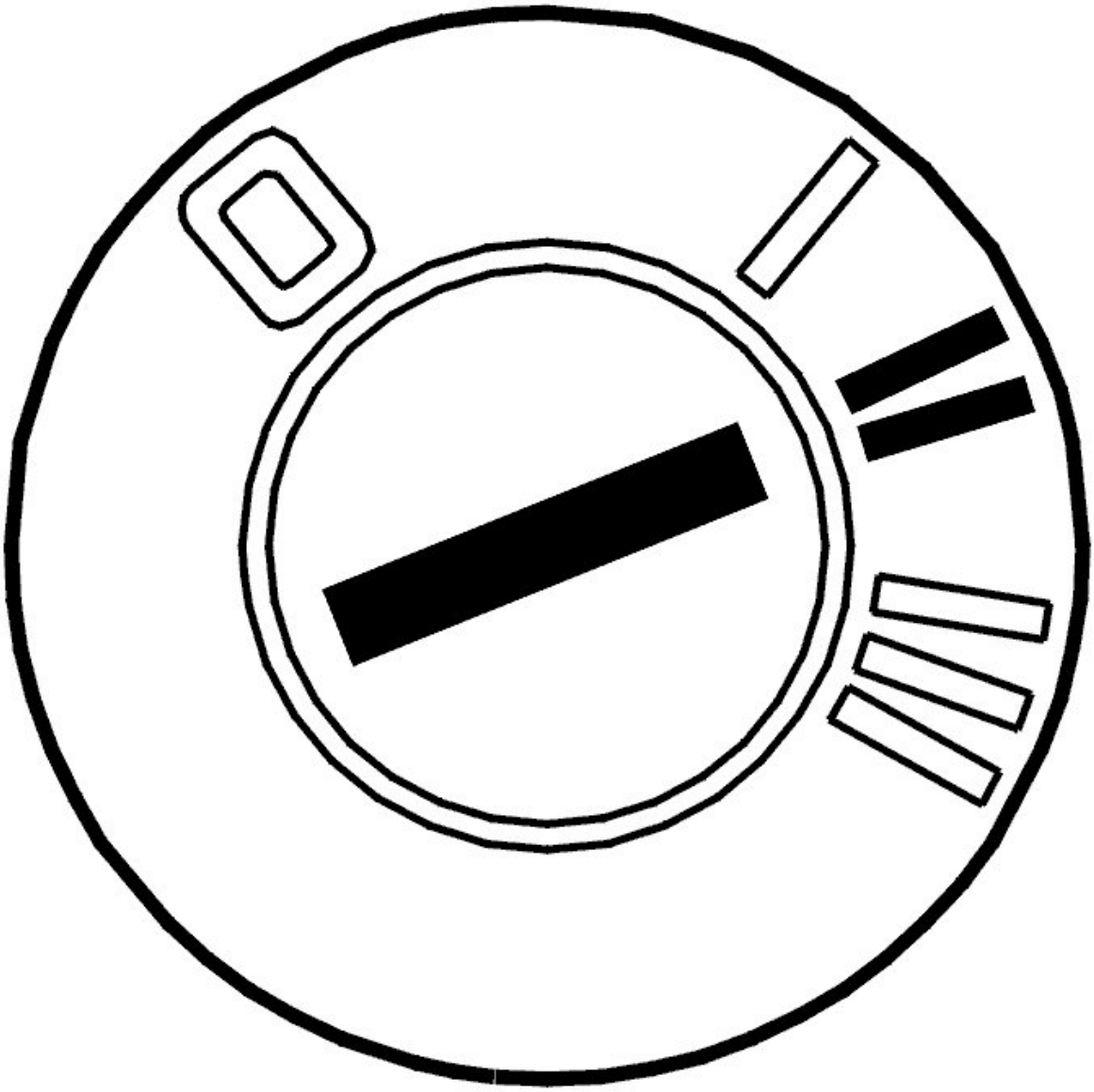
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001B

Condition

Diagnostic trouble code (DTC) SRS-001B is stored if the control module registers that capacitance in the circuit is too low for more than 10 seconds.

Substitute value

- None.

Possible source

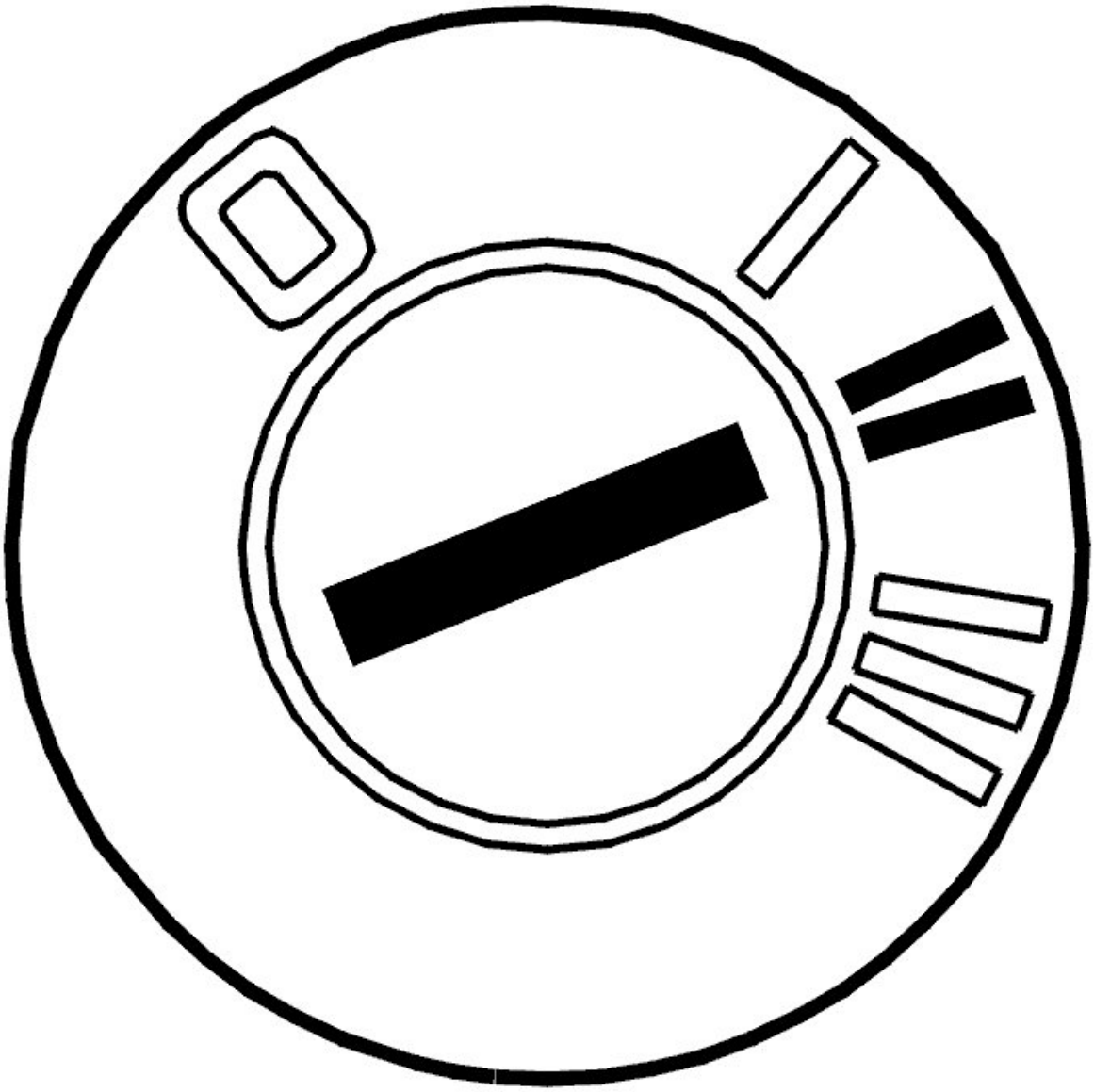
- The capacitance is too low or there is an open-circuit in the integrated capacitor in the connector for the SRS ignition cable.

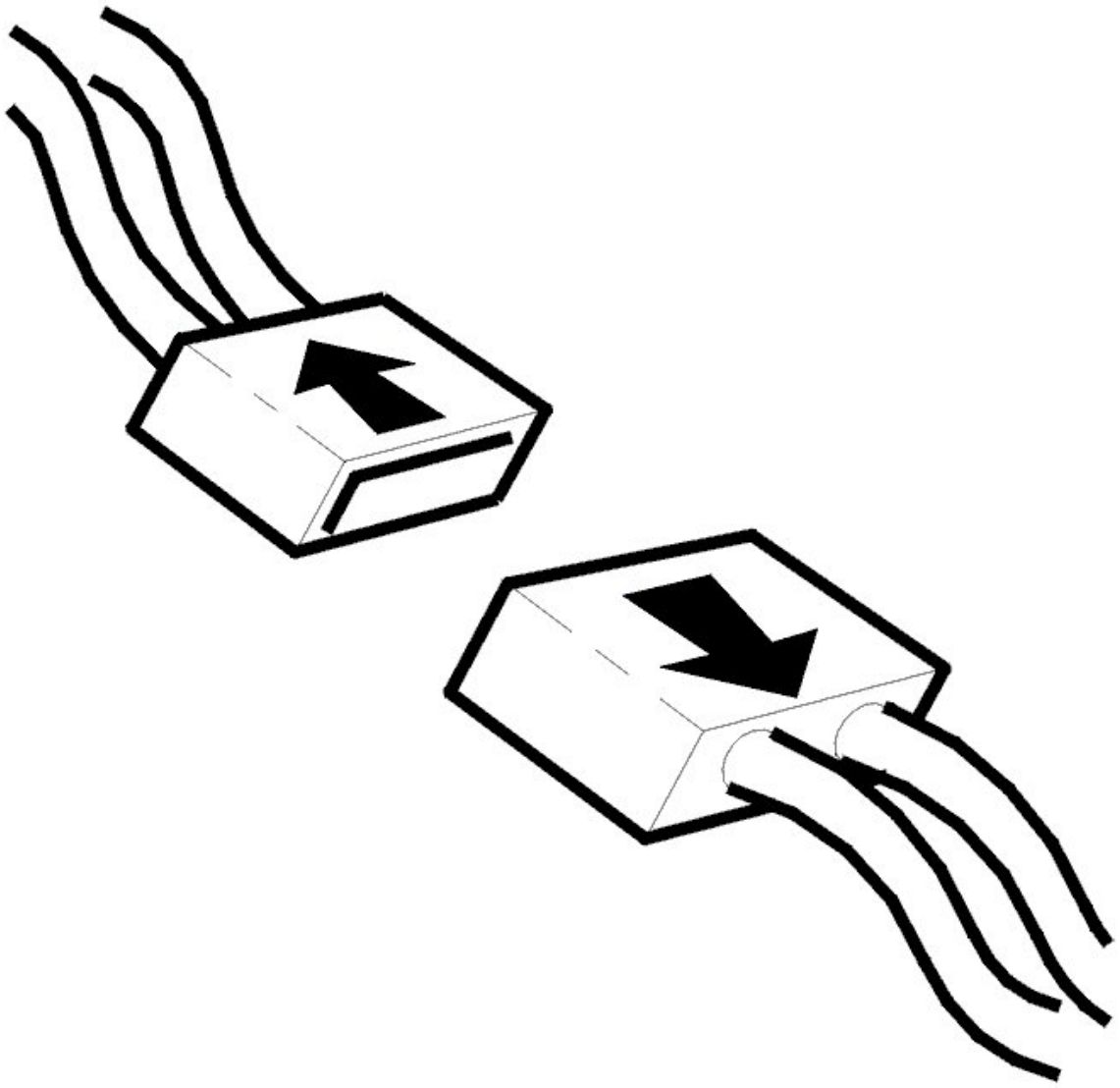
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

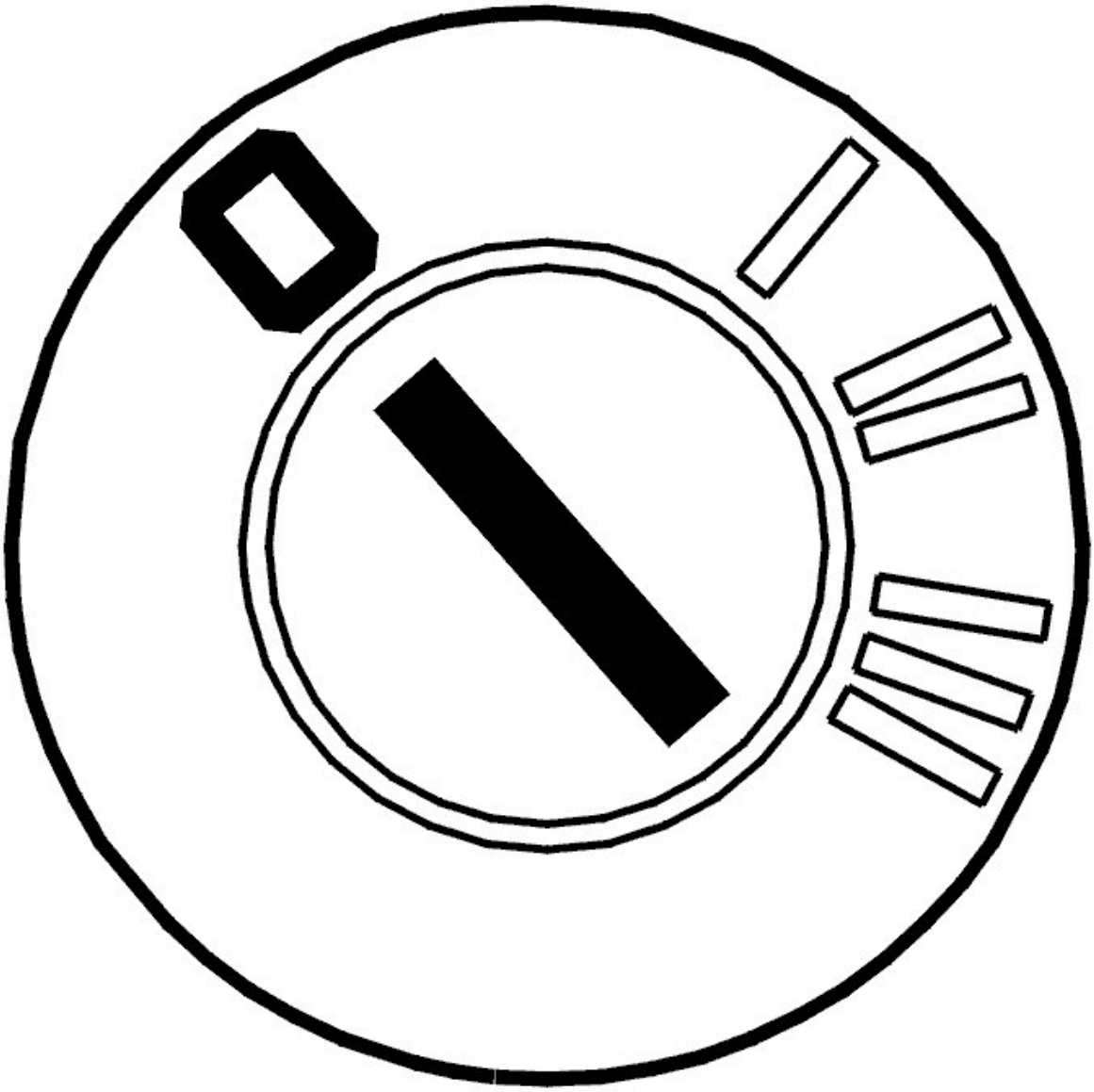
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking the component and wiring

Checking the component and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Disconnect the connector from:
- the SRS control module
- the contact reel.

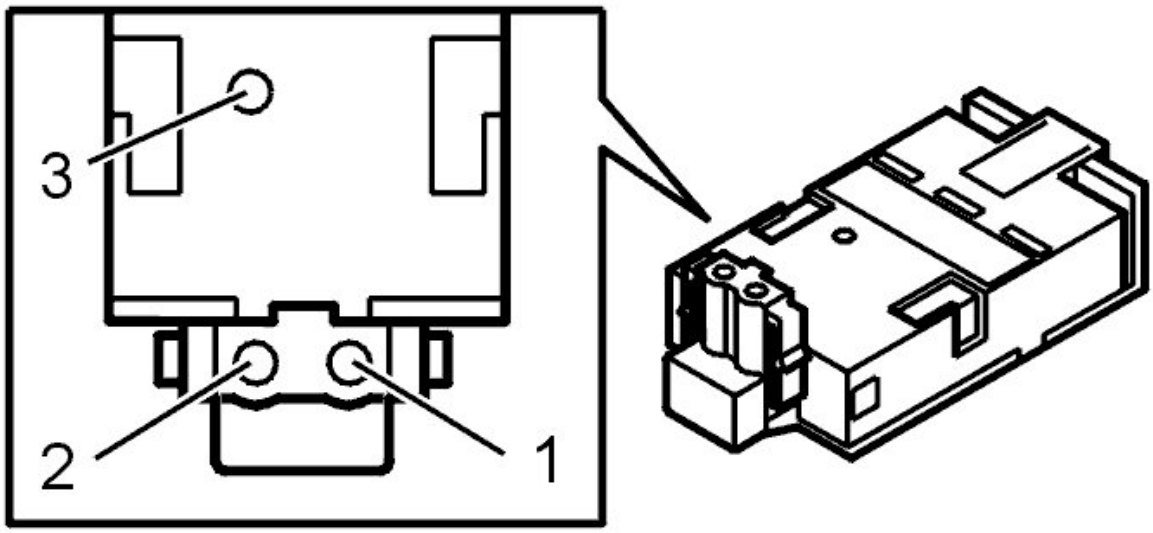
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and terminals #1 and #3 on the driver's airbag connector (violet) for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

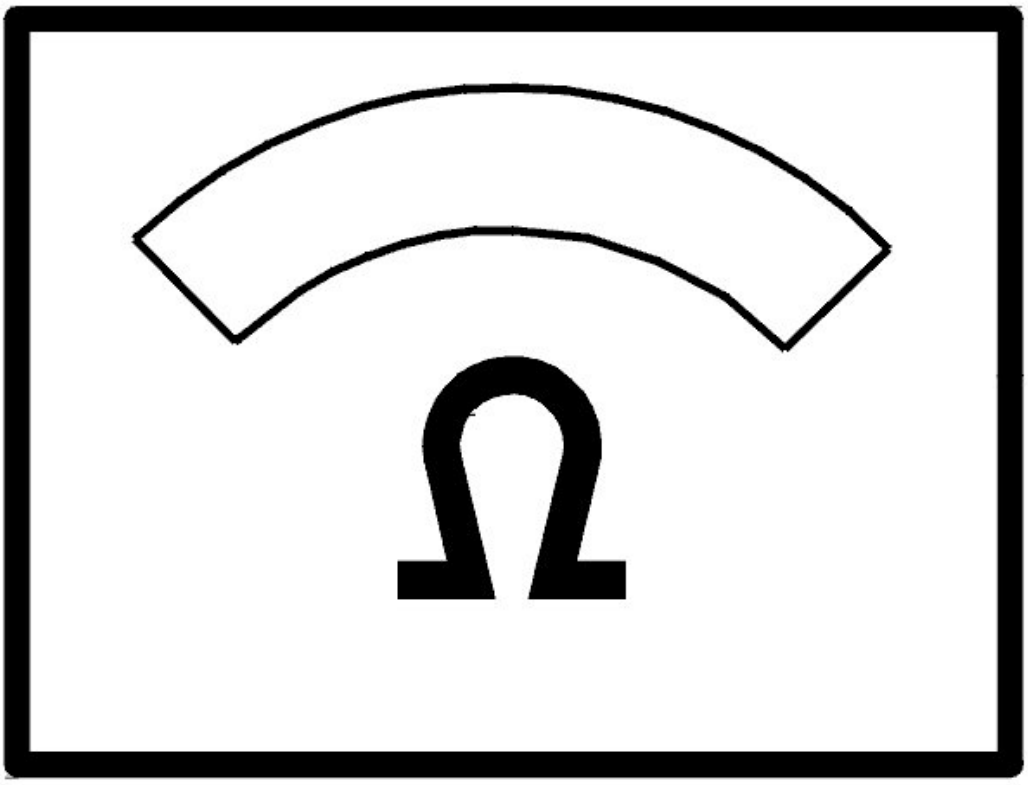
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector (violet) for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading must drop rapidly to approximately 0 ohms and then increase to an infinite value.

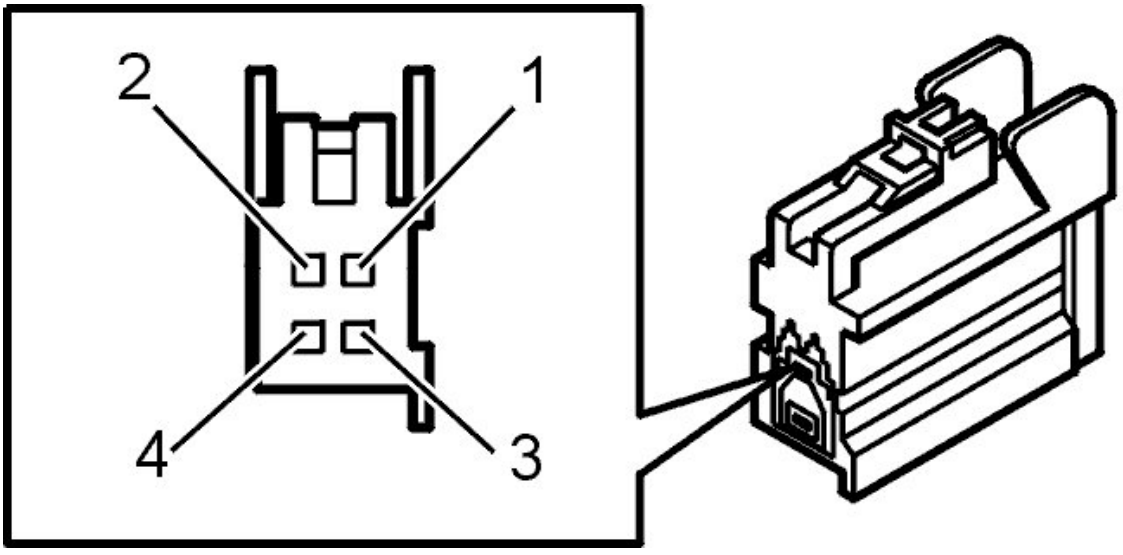
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #4 and #3 (driver's airbag side) and terminals #1 and #3 on the driver's airbag connector (violet). The ohmmeter should read approximately 0 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter must read 0 ohms for all positions of the steering wheel.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between the contact reel connector terminals #3 and #4 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







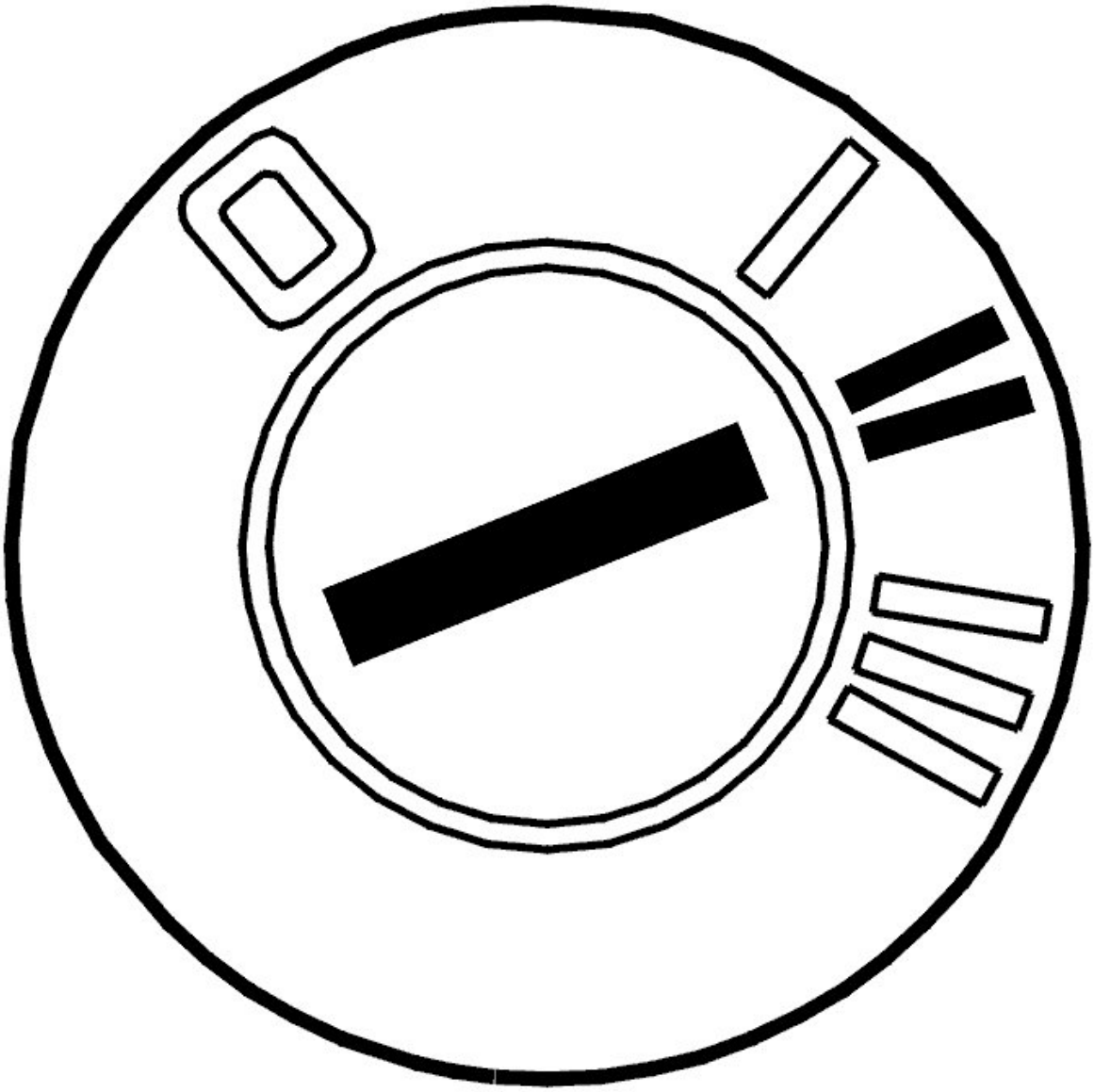
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001B

Condition

Diagnostic trouble code (DTC) SRS-001B is stored if the control module registers that capacitance in the circuit is too low for more than 10 seconds.

Substitute value

- None.

Possible source

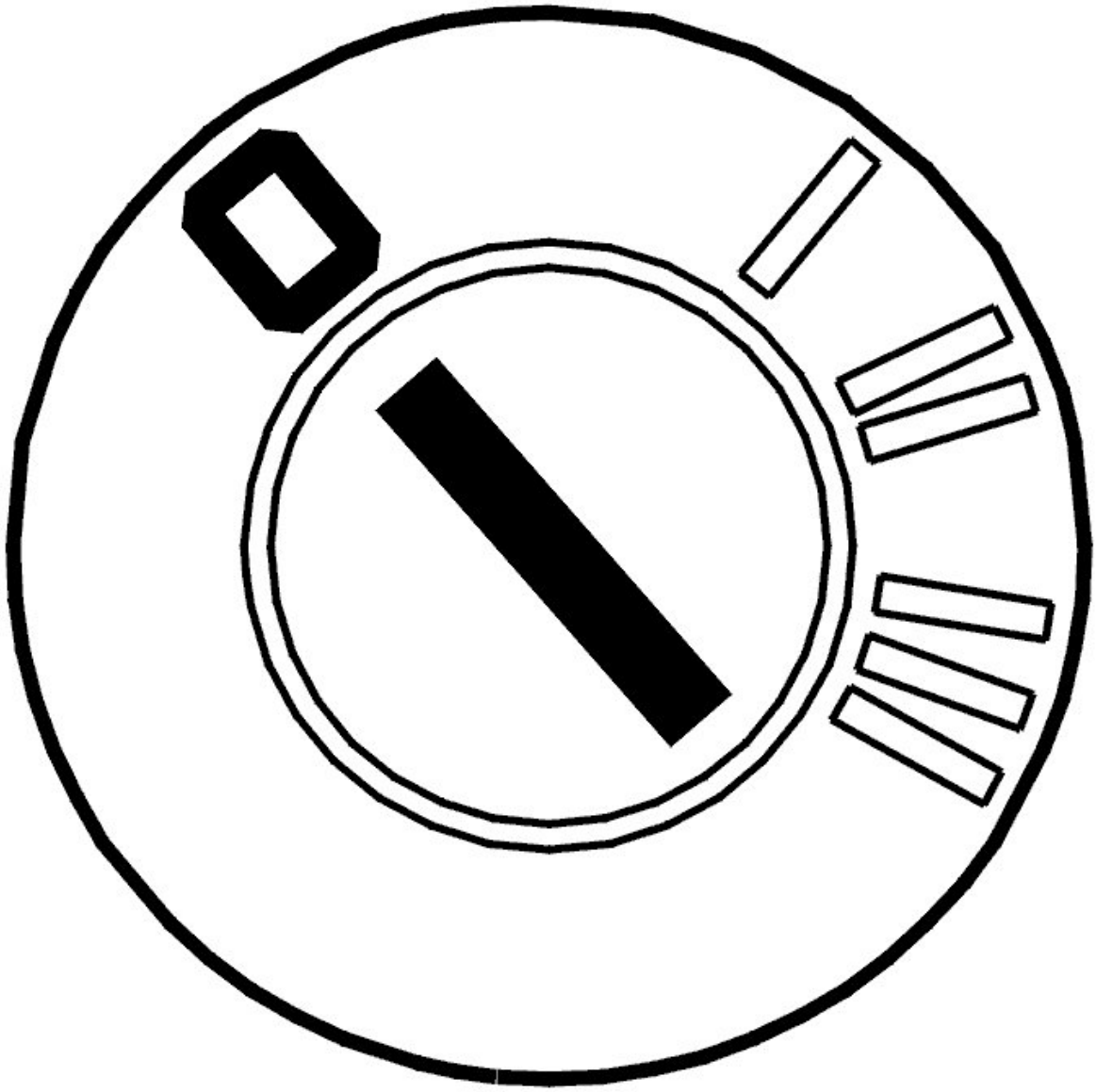
- The capacitance is too low or there is an open-circuit in the integrated capacitor in the connector for the SRS ignition cable.

Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #8B (36) and #7B (35) and terminals #1 and #3 on the driver's airbag connector (violet) for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and

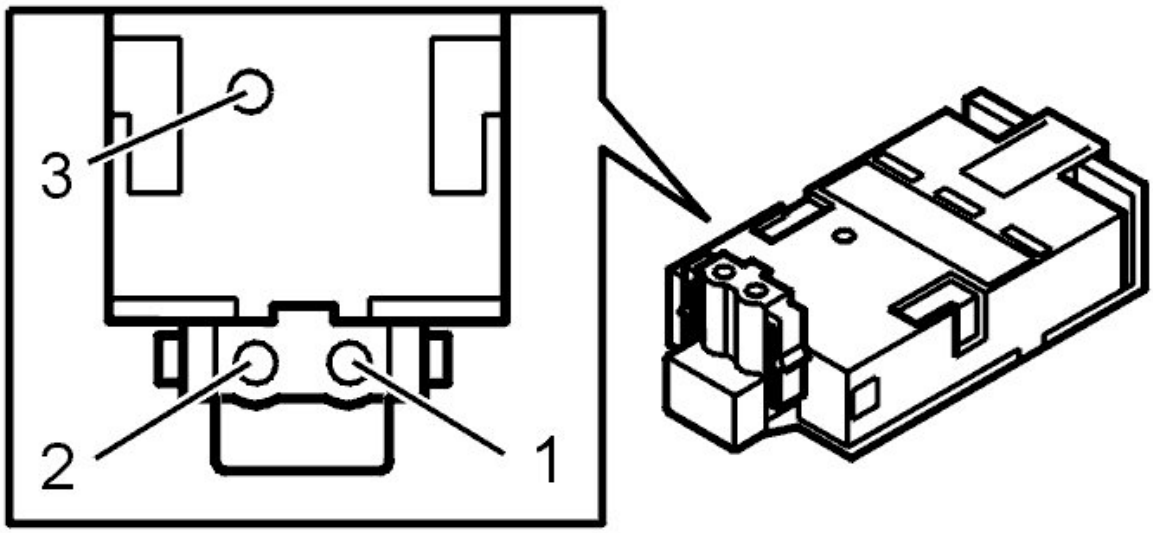
General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults

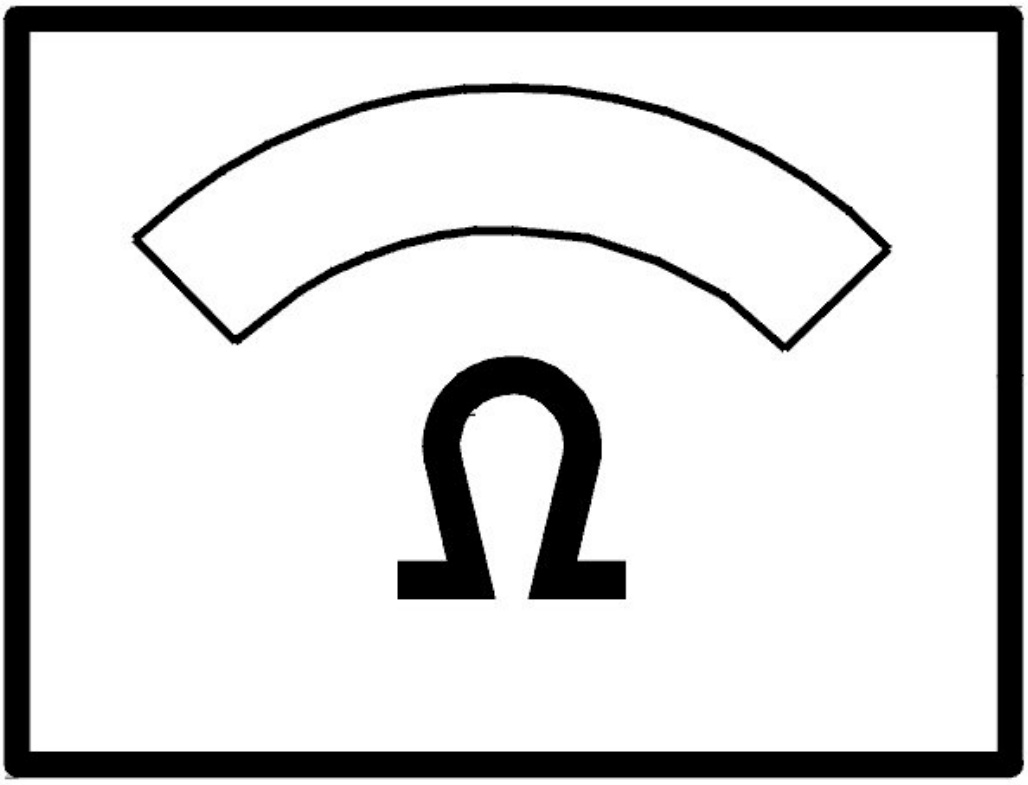
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector (violet) for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading must drop rapidly to approximately 0 ohms and then increase to an infinite value.

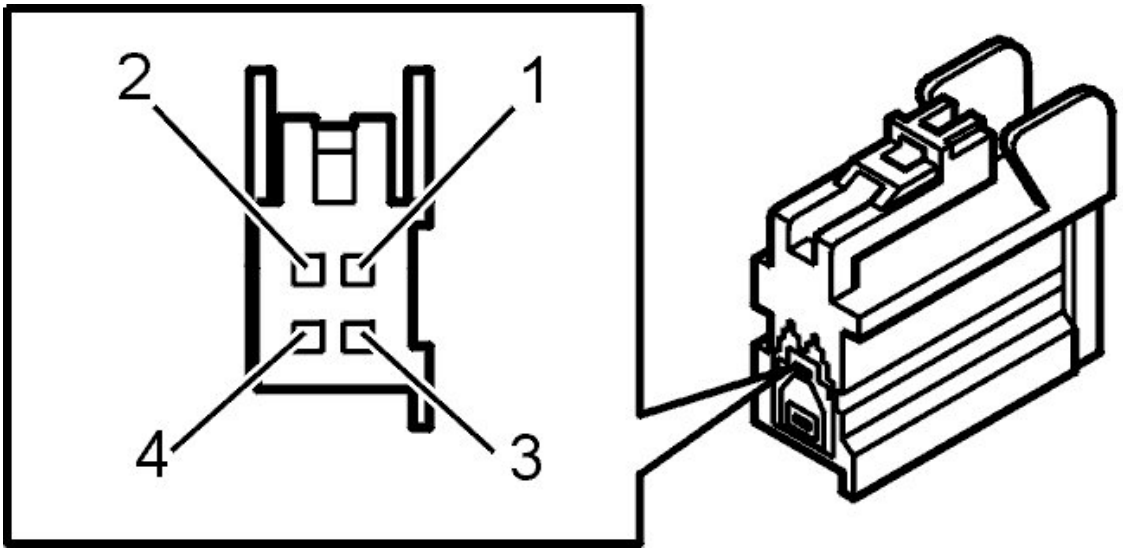
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #4 and #3 (driver's airbag side) and terminals #1 and #3 on the driver's airbag connector (violet). The ohmmeter should read approximately 0 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter must read 0 ohms for all positions of the steering wheel.
Remedy as necessary.

Other information:

- To access the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between the contact reel connector terminals #3 and #4 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001C

Condition

Diagnostic trouble code (DTC) SRS-001C is stored if the control module registers that resistance in the circuit is too high for more than 10 seconds.

Substitute value
- None.

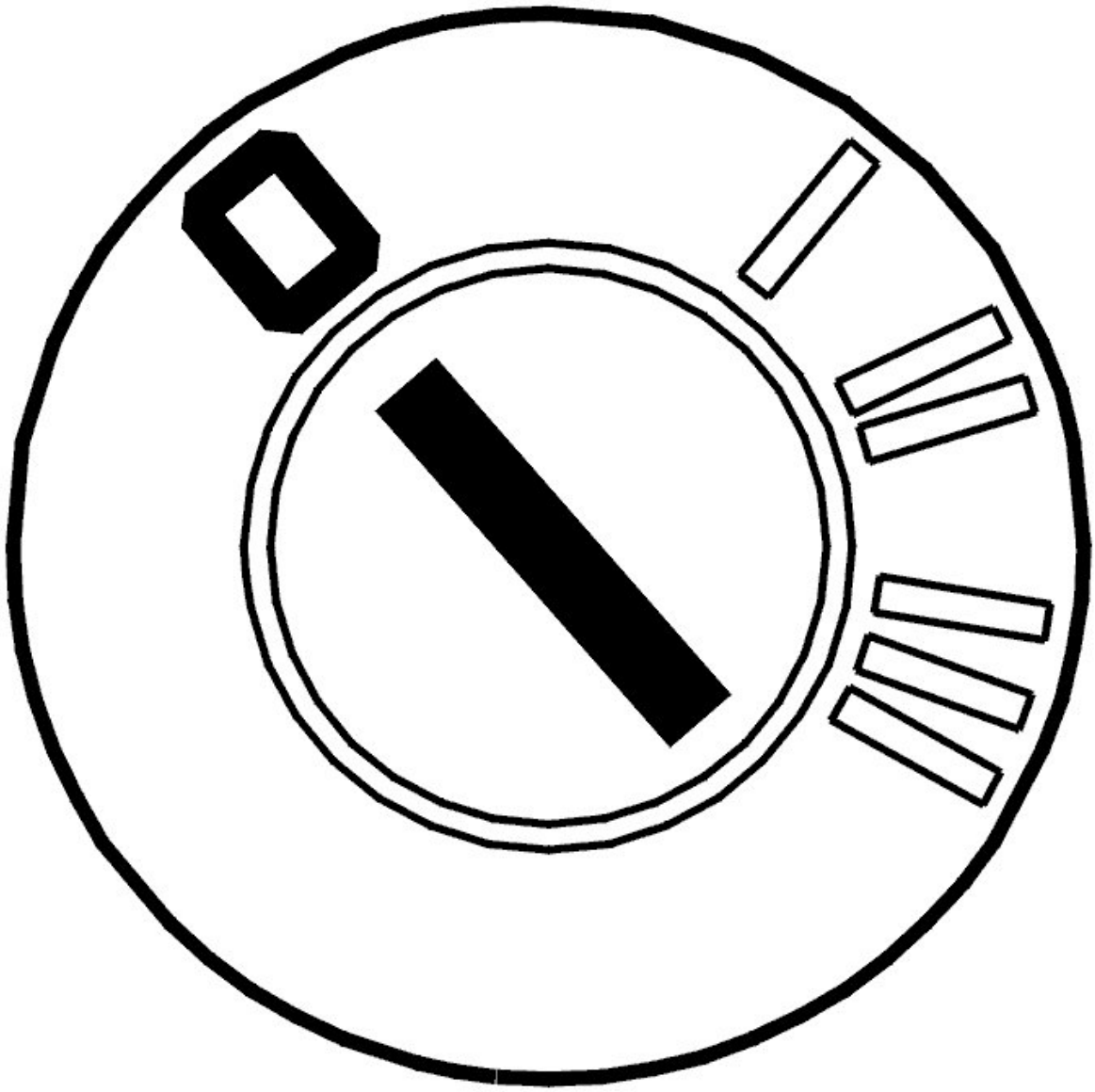
Possible source
- Open-circuit in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Open-circuit in the airbag (the resistance is too high in the igniter).
- Open-circuit in the contact reel.

Fault symptom[s]
- The SRS indicator lamp is lit.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

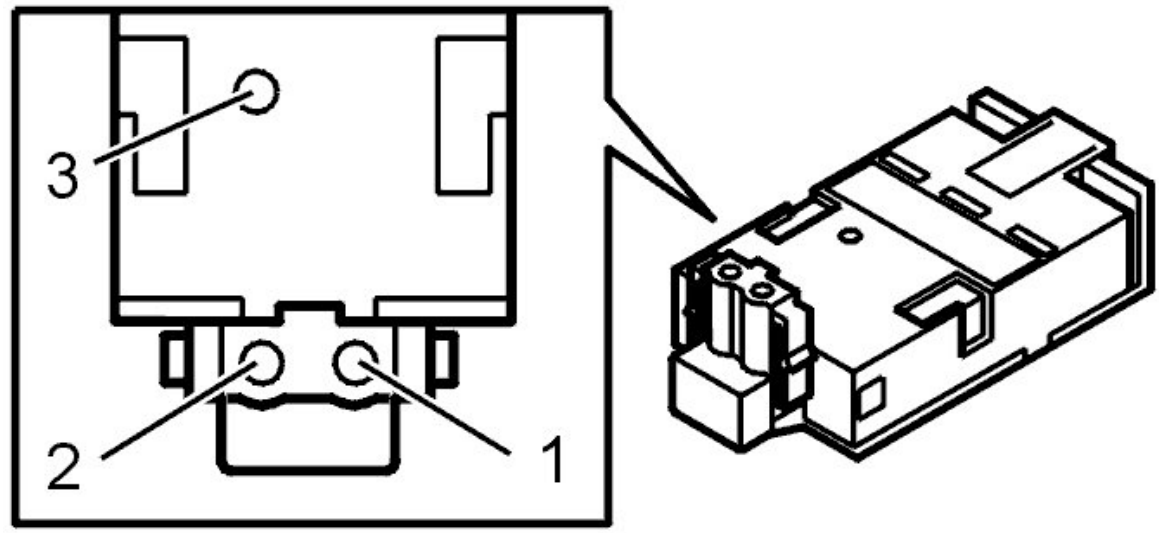
Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #9B (37) and #10B (38) and connector (violet) terminals #1 and #3 on the driver's side airbag. Check for an intermittent open-circuit. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

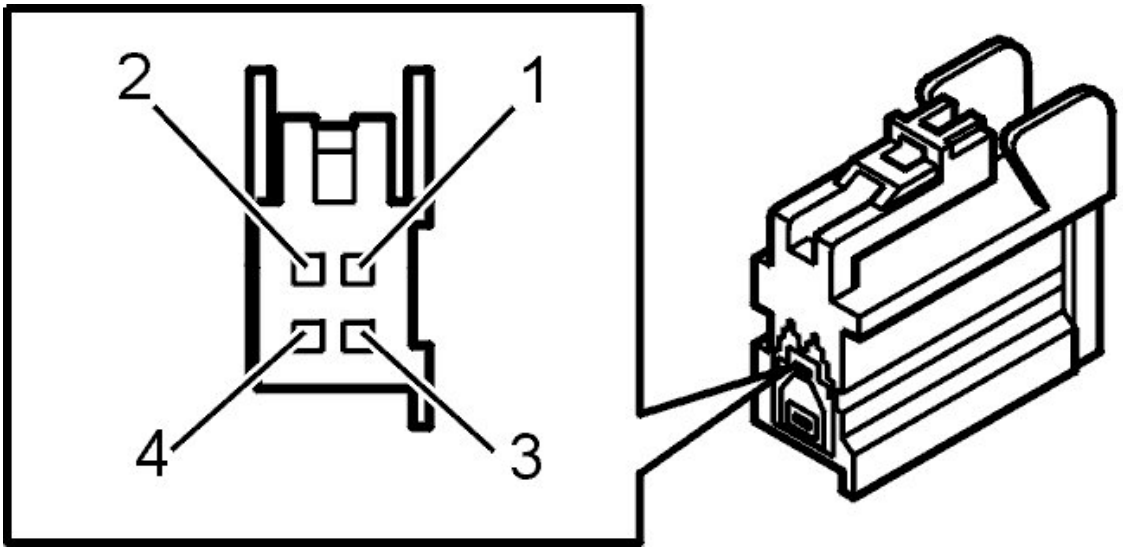
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector (violet) for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading must drop rapidly to approximately 0 ohms and then increase to an infinite value.

Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #4 and #3 (driver's airbag side) and terminals #1 and #3 on the driver's airbag connector (violet). The ohmmeter should read less than 2 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read less than 2 ohms for all steering wheel positions.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between the contact reel connector terminals #3 and #4 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001C

Condition

Diagnostic trouble code (DTC) SRS-001C is stored if the control module registers that resistance in the circuit is too high for more than 10 seconds.

Substitute value
- None.

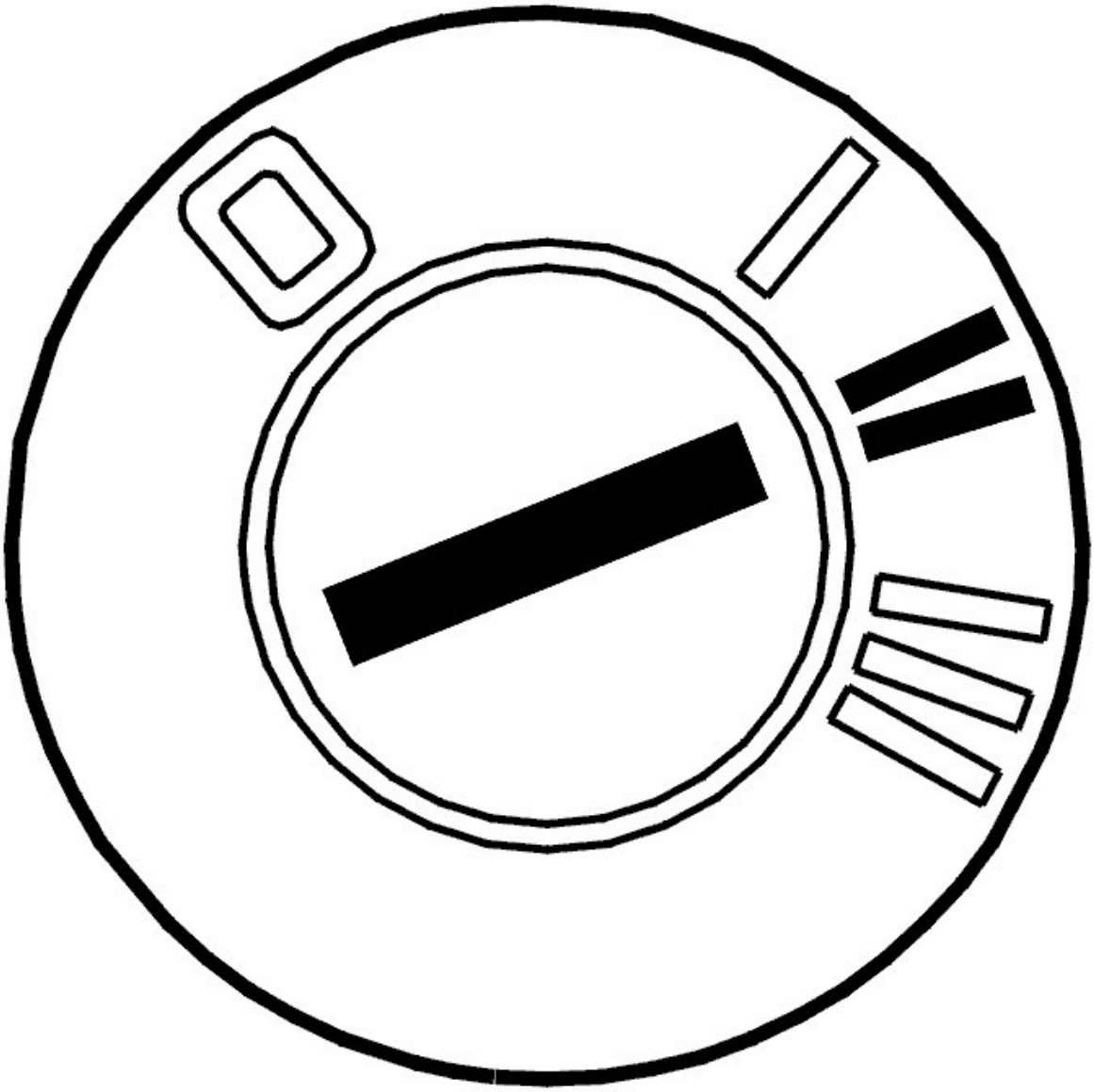
Possible source
- Open-circuit in the SRS ignition cable or in the connector between the airbag and the SRS control module.
- Open-circuit in the airbag (the resistance is too high in the igniter).
- Open-circuit in the contact reel.

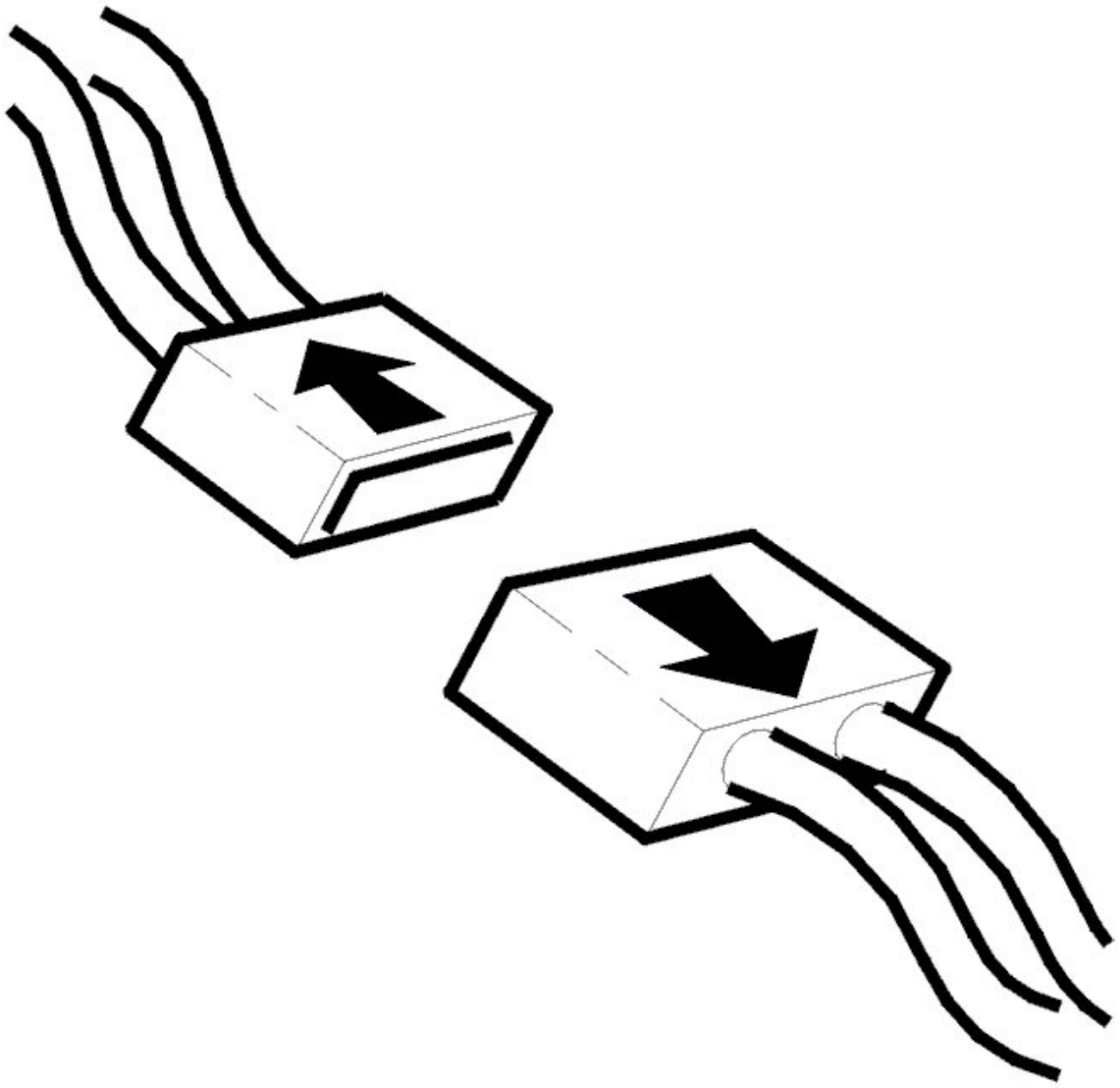
Fault symptom[s]
- The SRS indicator lamp is lit.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

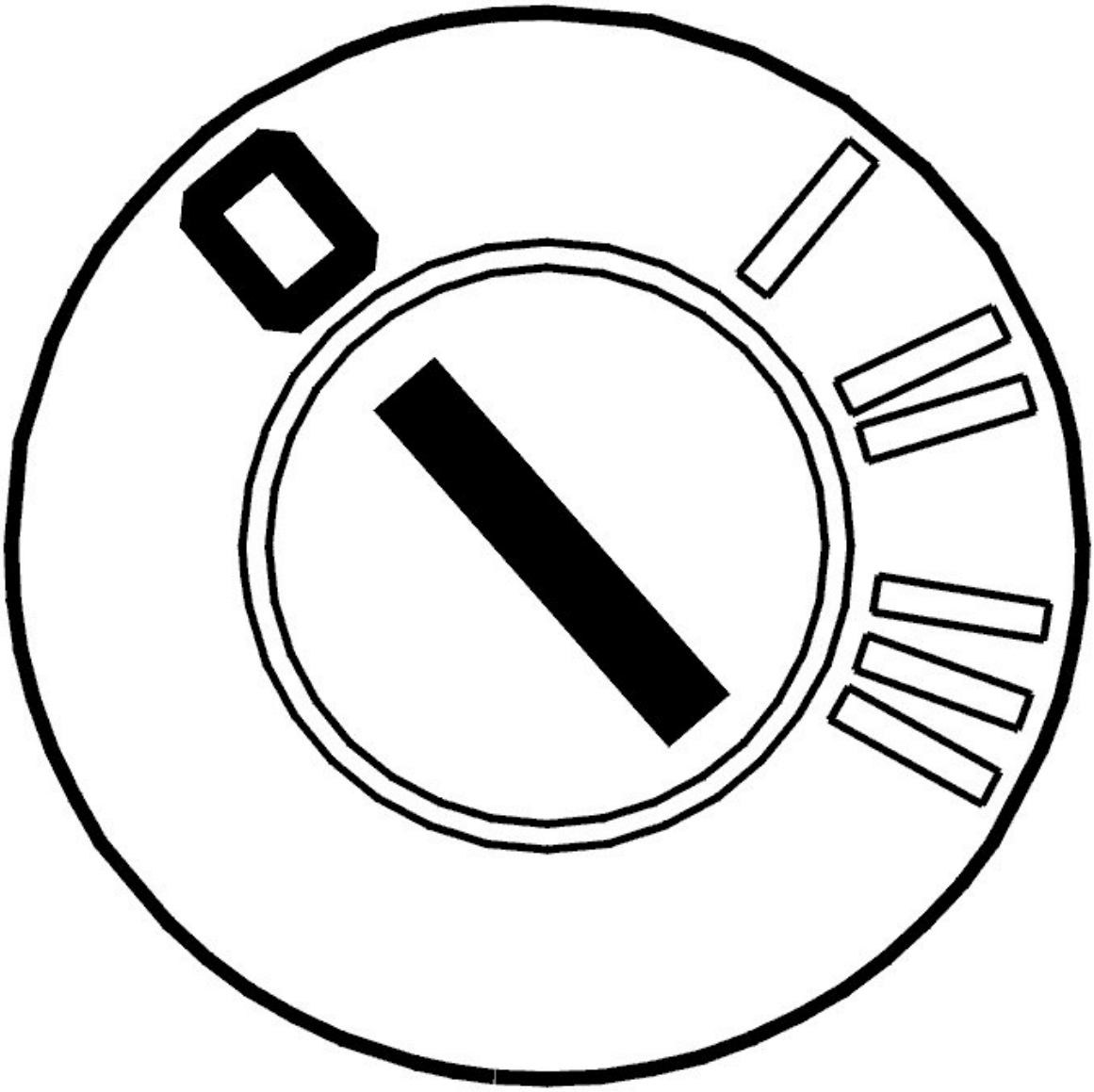
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

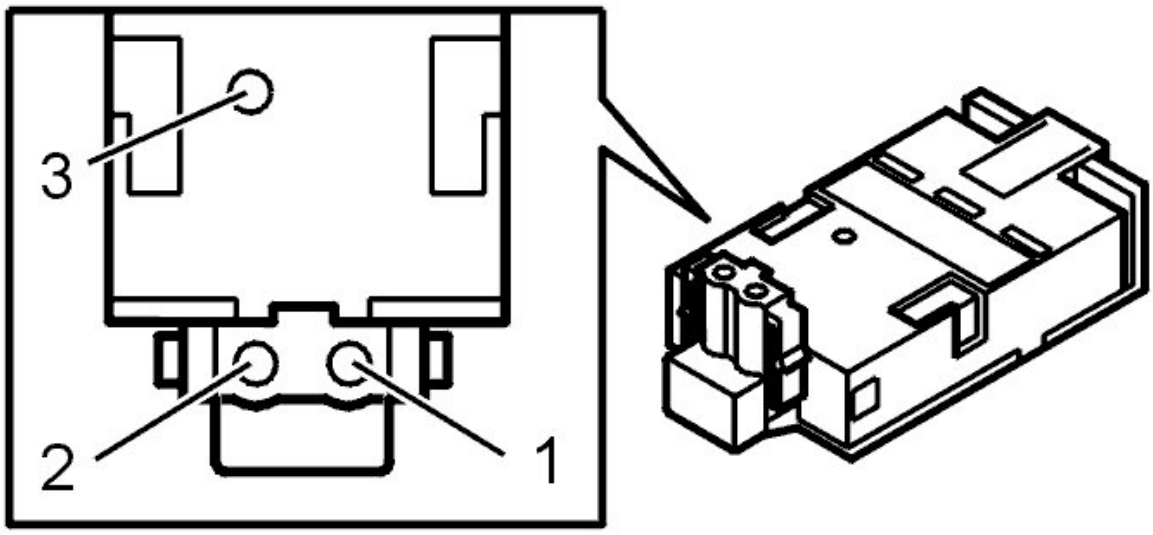
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

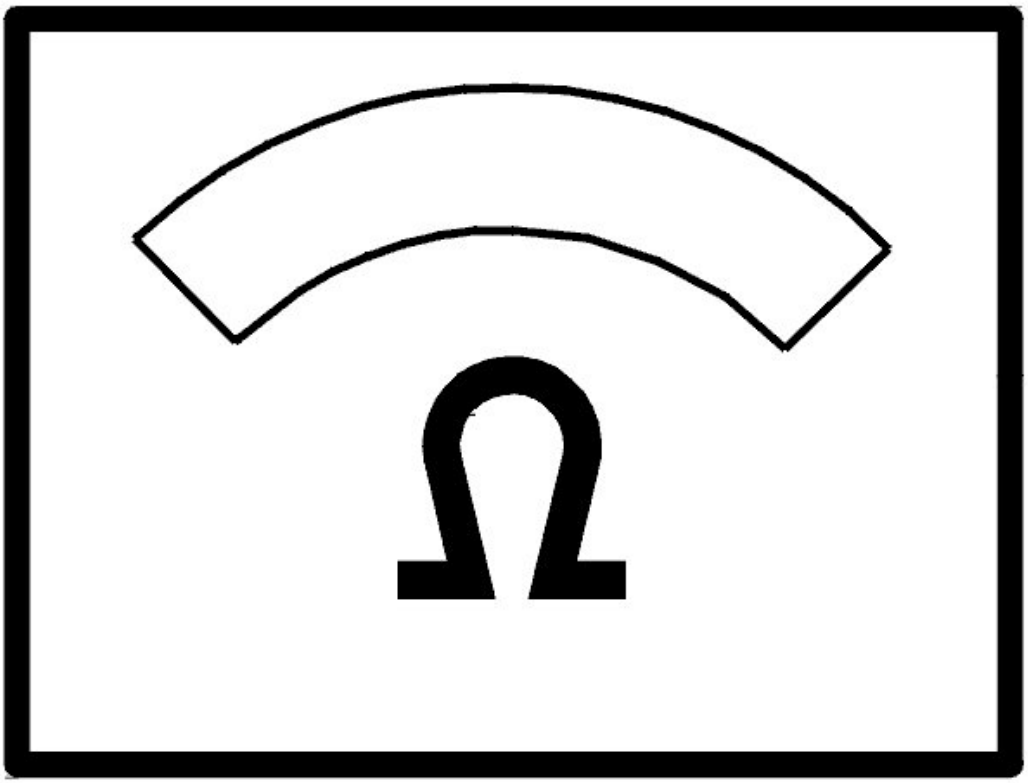
Disconnect the connector from:
- the SRS control module
- the contact reel.

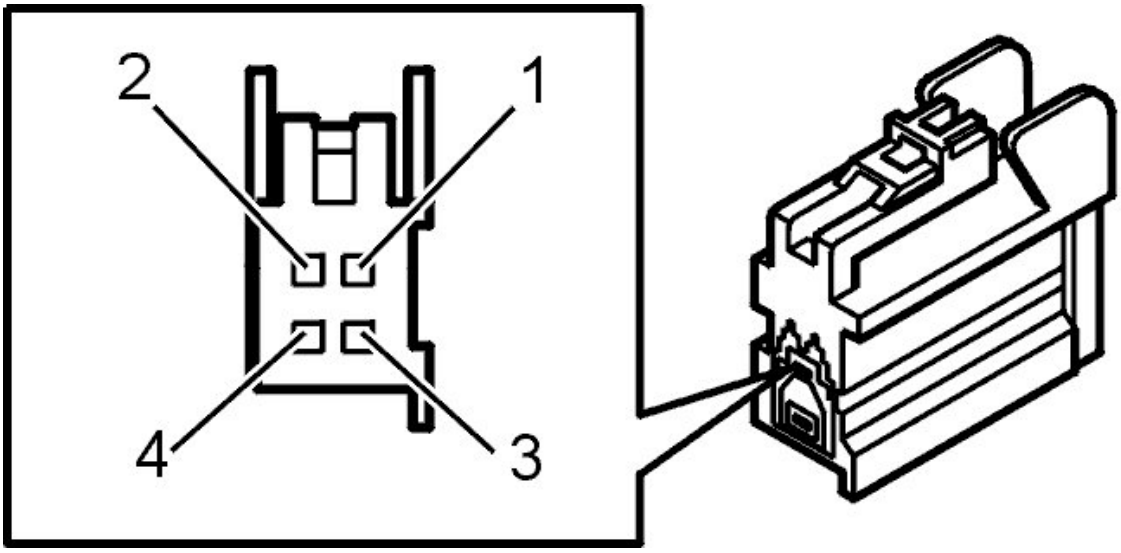
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #9B (37) and #10B (38) and terminals #1 and #3 on the driver's airbag connector (violet) for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #4 and #3 (driver's airbag side) and terminals #1 and #3 on the driver's airbag connector (violet). The ohmmeter should read less than 2 ohms. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read less than 2 ohms for all steering wheel positions.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the driver's airbag connector, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







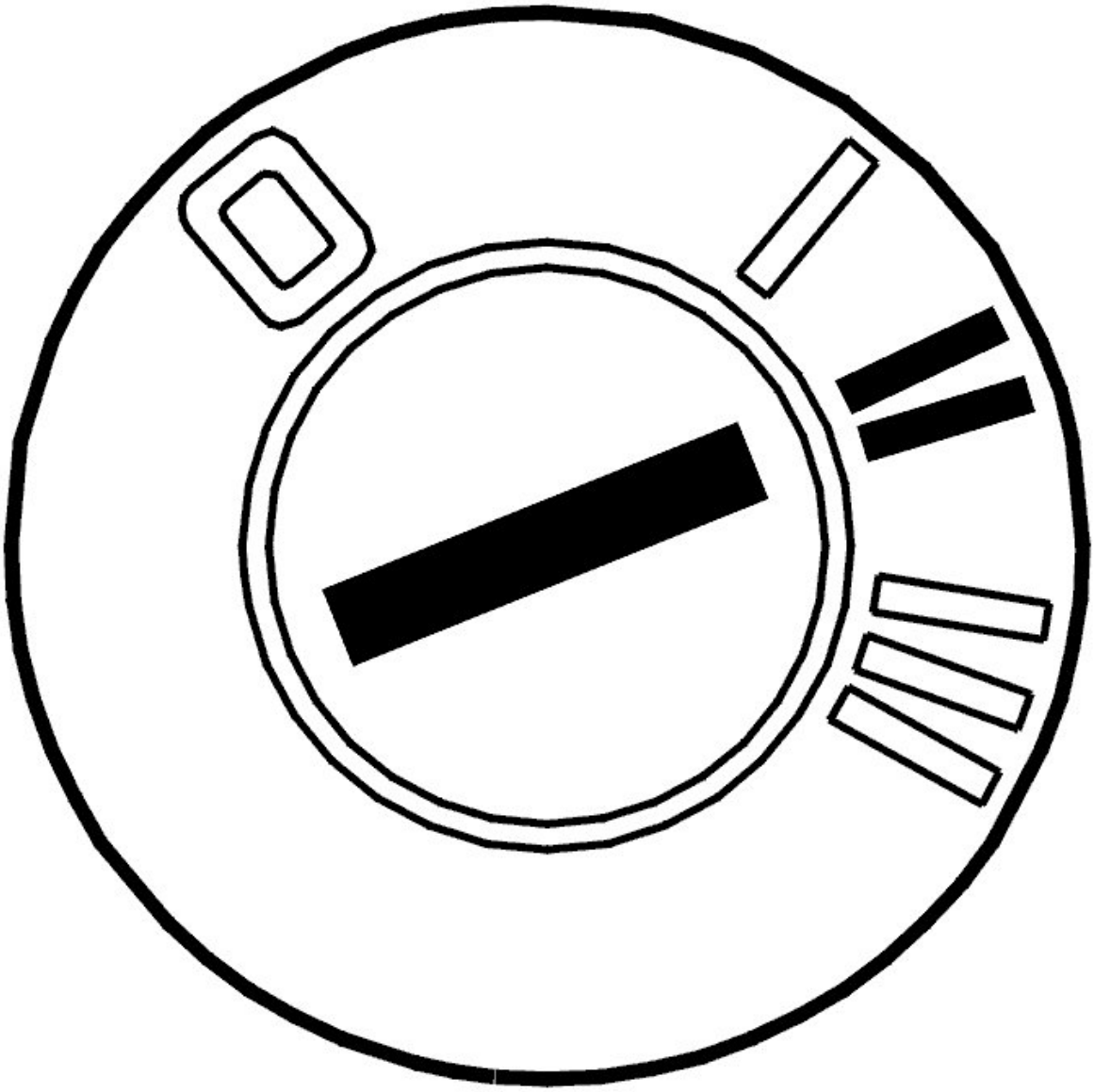
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001D

Condition

Diagnostic trouble code (DTC) SRS-001D is stored if the control module registers that the resistance in the circuit is too low for more than 10 seconds.

Substitute value

- None.

Possible source

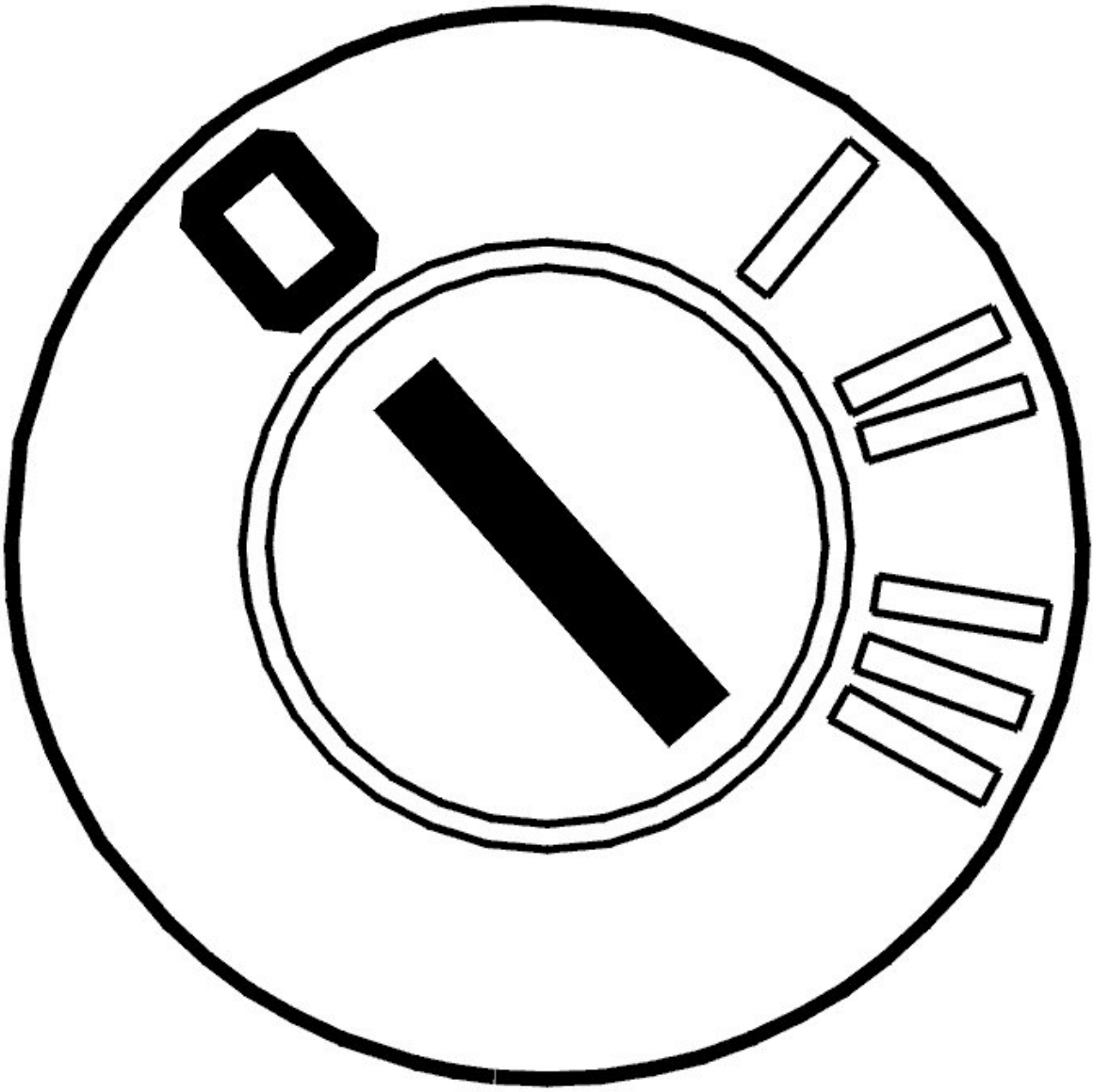
- Short-circuit in the SRS ignition cable or in the connectors between the airbag and the SRS control module.
- Short-circuit to the airbag (the resistance in the igniter is too low).
- Short-circuit in the contact reel.

Fault symptom[s]
- The SRS indicator lamp is lit.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

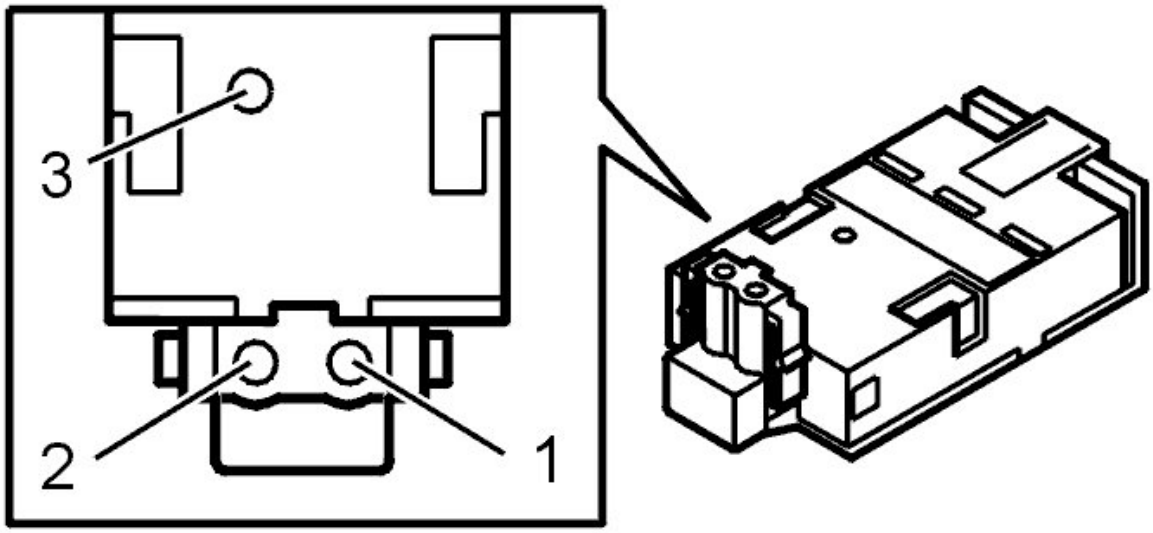
Check the connectors for:
- the driver's airbag
- the contact reel
- the SRS control module.

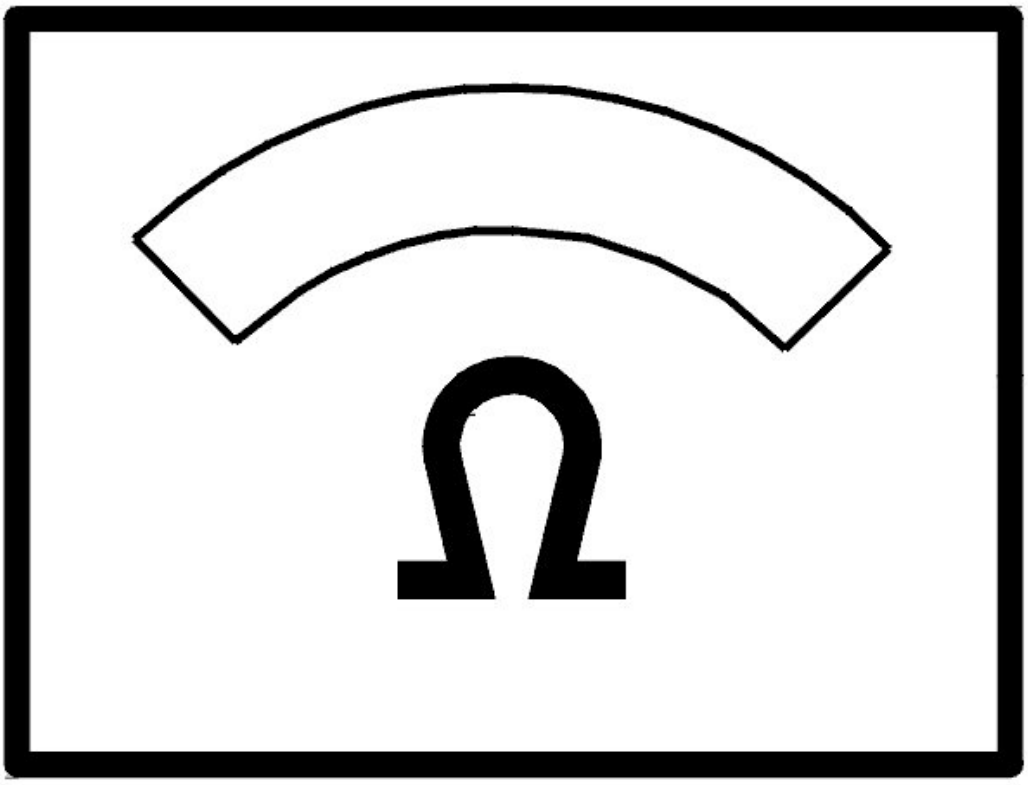
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between terminals #9B (37) and #10B (38) on the SRS control module and terminals #1 and #3 on the connector (violet) on the

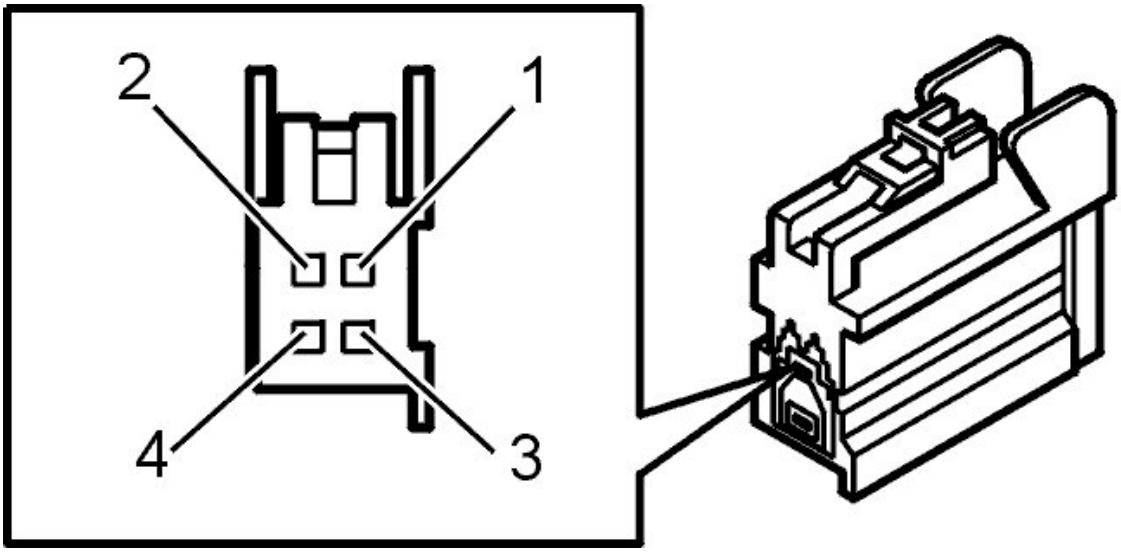
driver's side airbag for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-001D

Condition

Diagnostic trouble code (DTC) SRS-001D is stored if the control module registers that the resistance in the circuit is too low for more than 10 seconds.

Substitute value
- None.

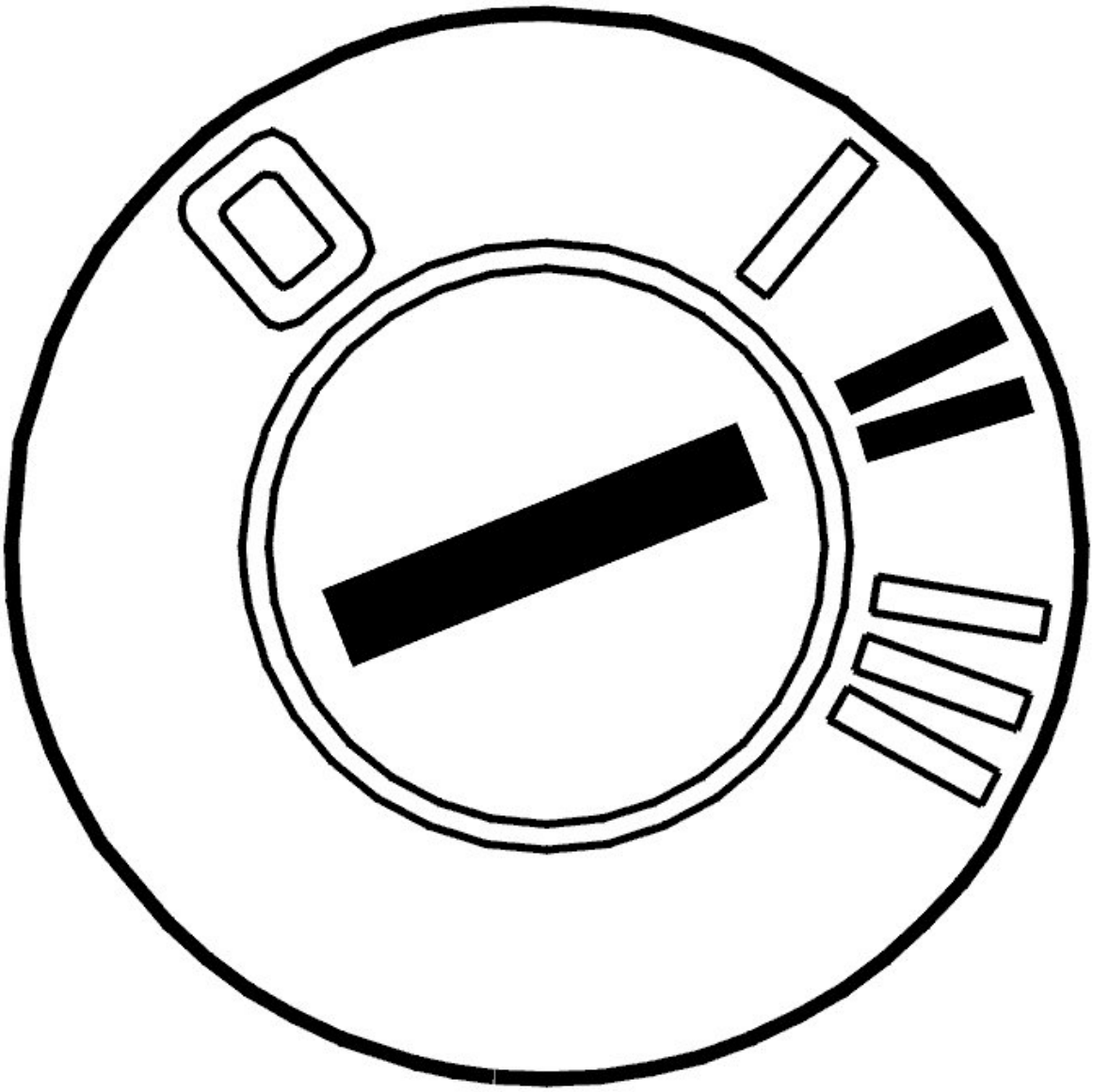
Possible source
- Short-circuit in the SRS ignition cable or in the connectors between the airbag and the SRS control module.
- Short-circuit to the airbag (the resistance in the igniter is too low).
- Short-circuit in the contact reel.

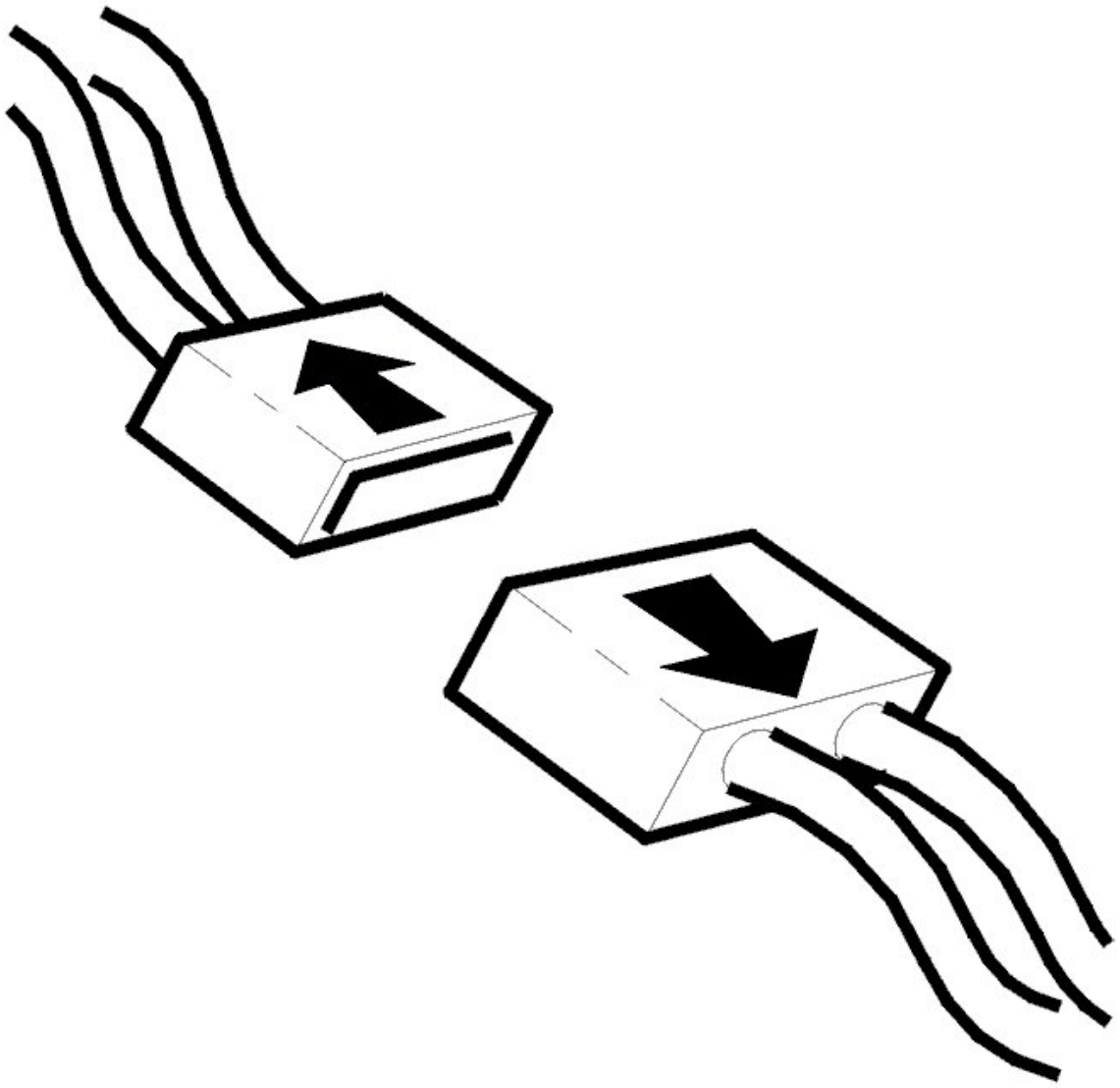
Fault symptom[s]
- The SRS indicator lamp is lit.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the driver's side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the driver's side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

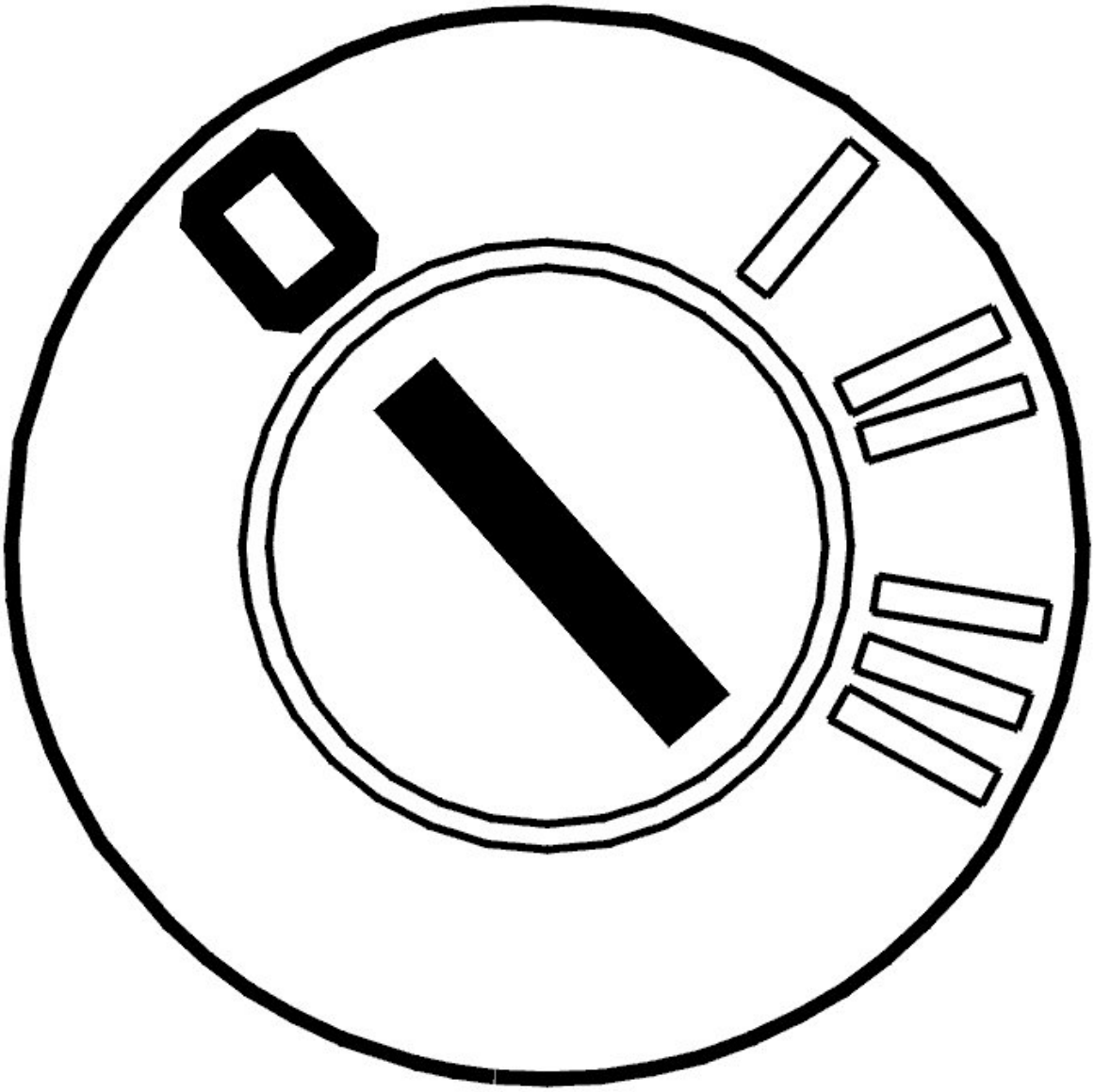
- To access and replace the airbag on the driver's side, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the driver's side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

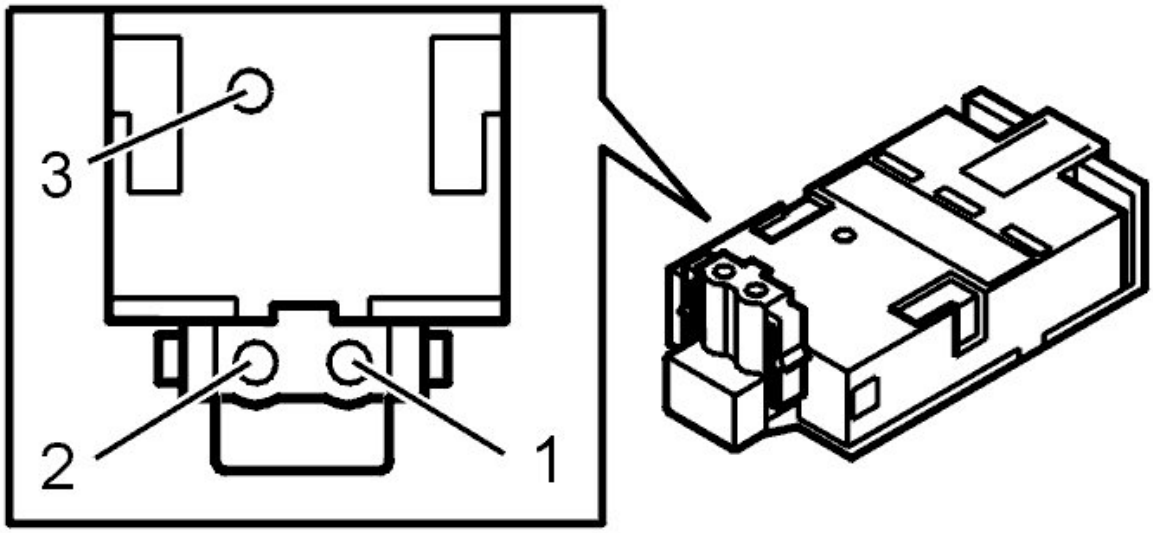
Check the cable between terminals #9B (37) and #10B (38) on the SRS control module and terminals #1 and #3 on the connector (violet) on the driver's side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the driver's side.
Check the contact reel wiring: Disconnect the contact reel connector. Connect an ohmmeter between terminals #3 and #4 (driver's airbag side). The ohmmeter should read infinite resistance. Take the readings again while turning the steering slowly to full lock in each direction. The ohmmeter should read infinite resistance.
Remedy as necessary.

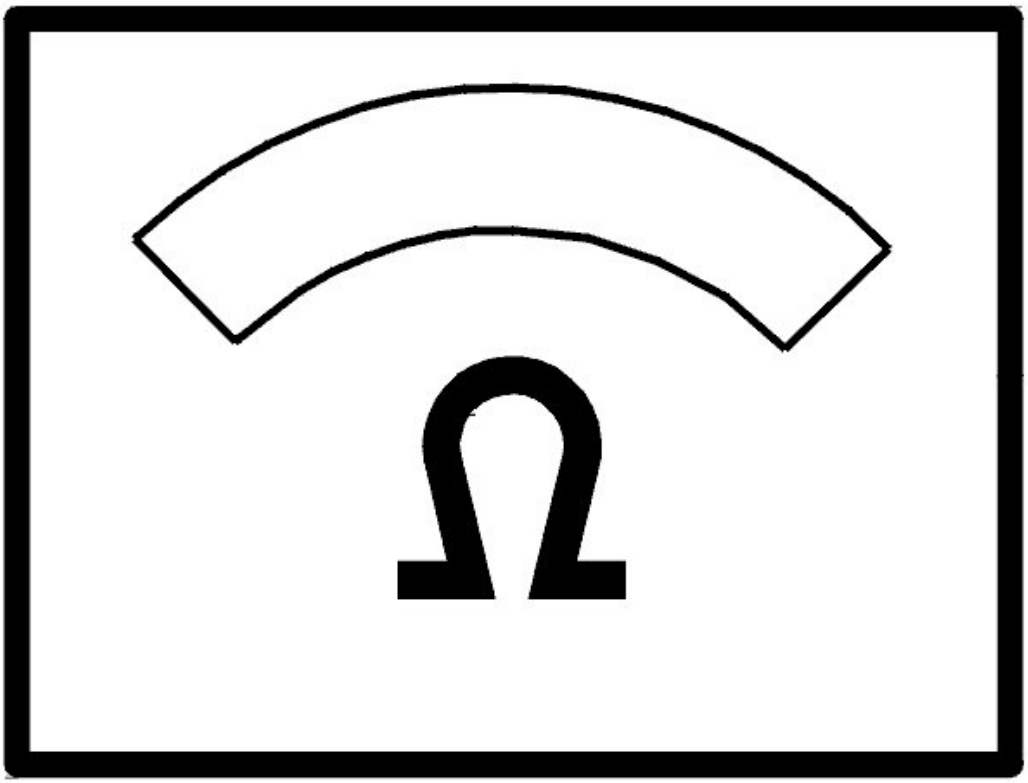
Other information:

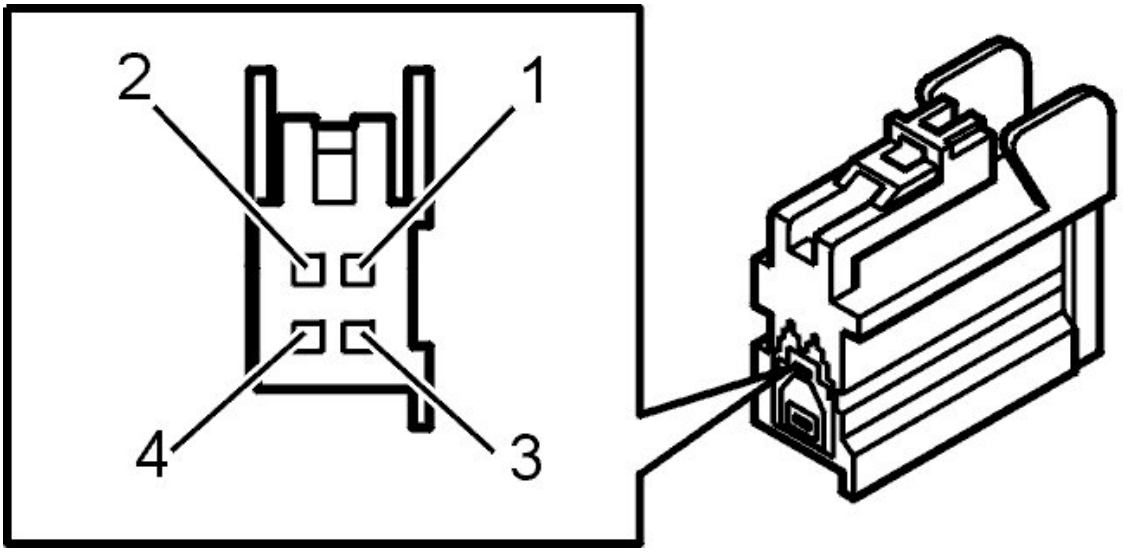
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the driver's airbag, see Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing

- To access and replace the contact reel, see Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the contact reel connector disconnected, the resistance between terminals #3 and #4 on the contact reel connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the connectors for the contact reel and the control module disconnected, the resistance between the terminals #3 and #4 on the contact reel connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







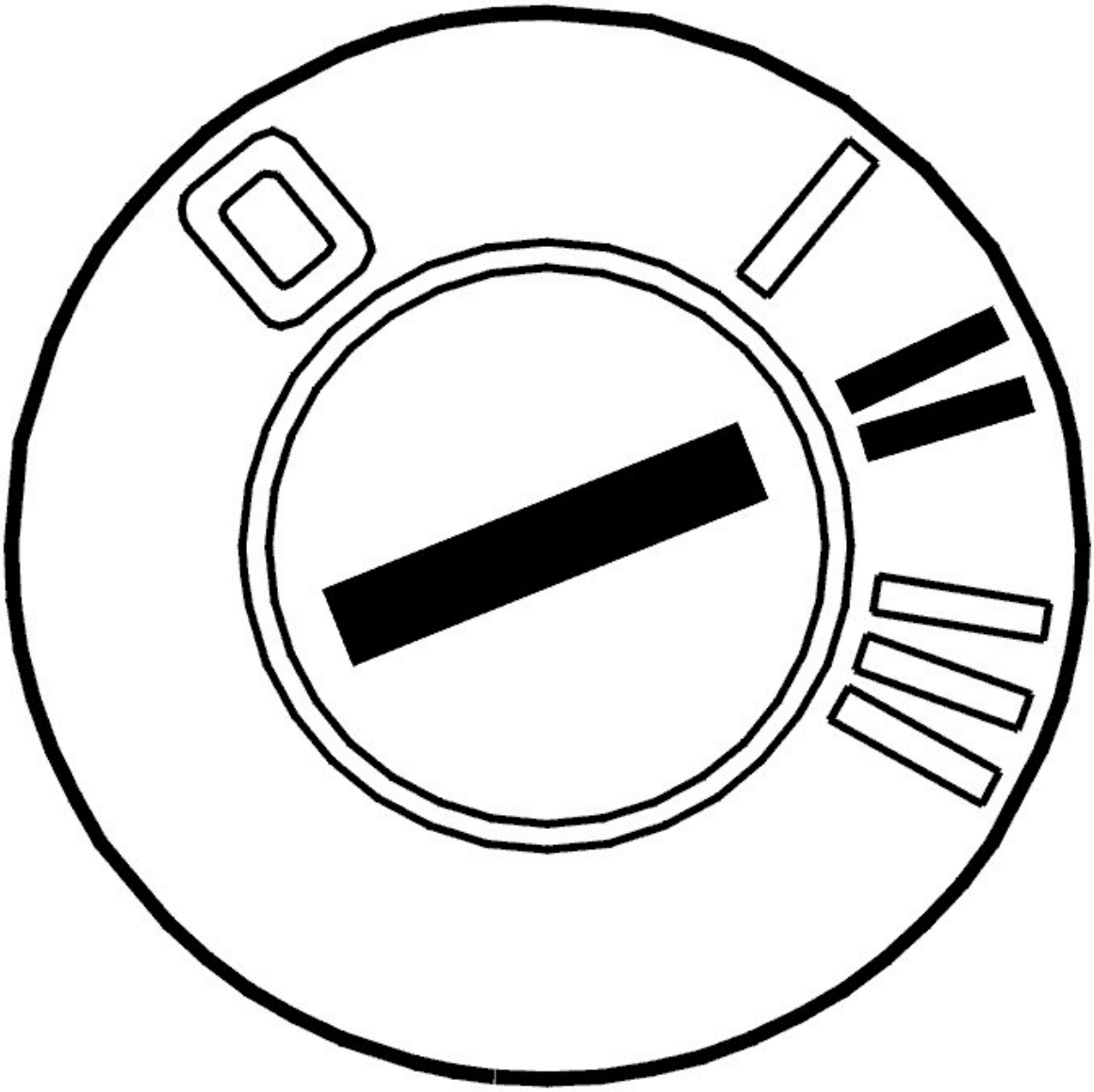
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
SRS-0066, SRS-006E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

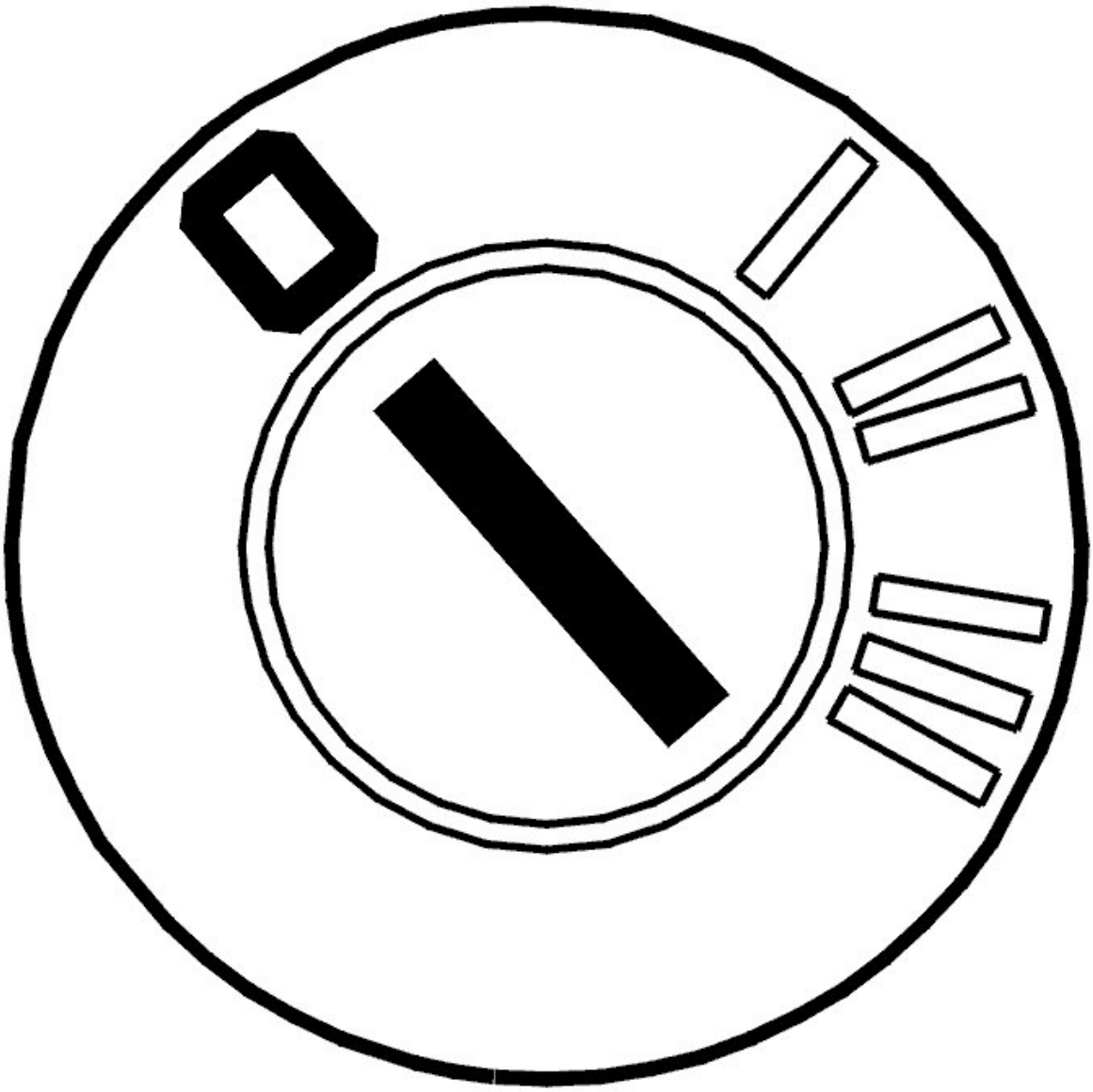
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

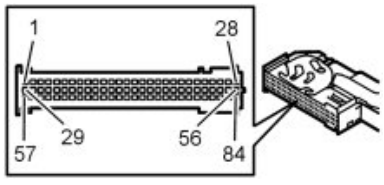


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

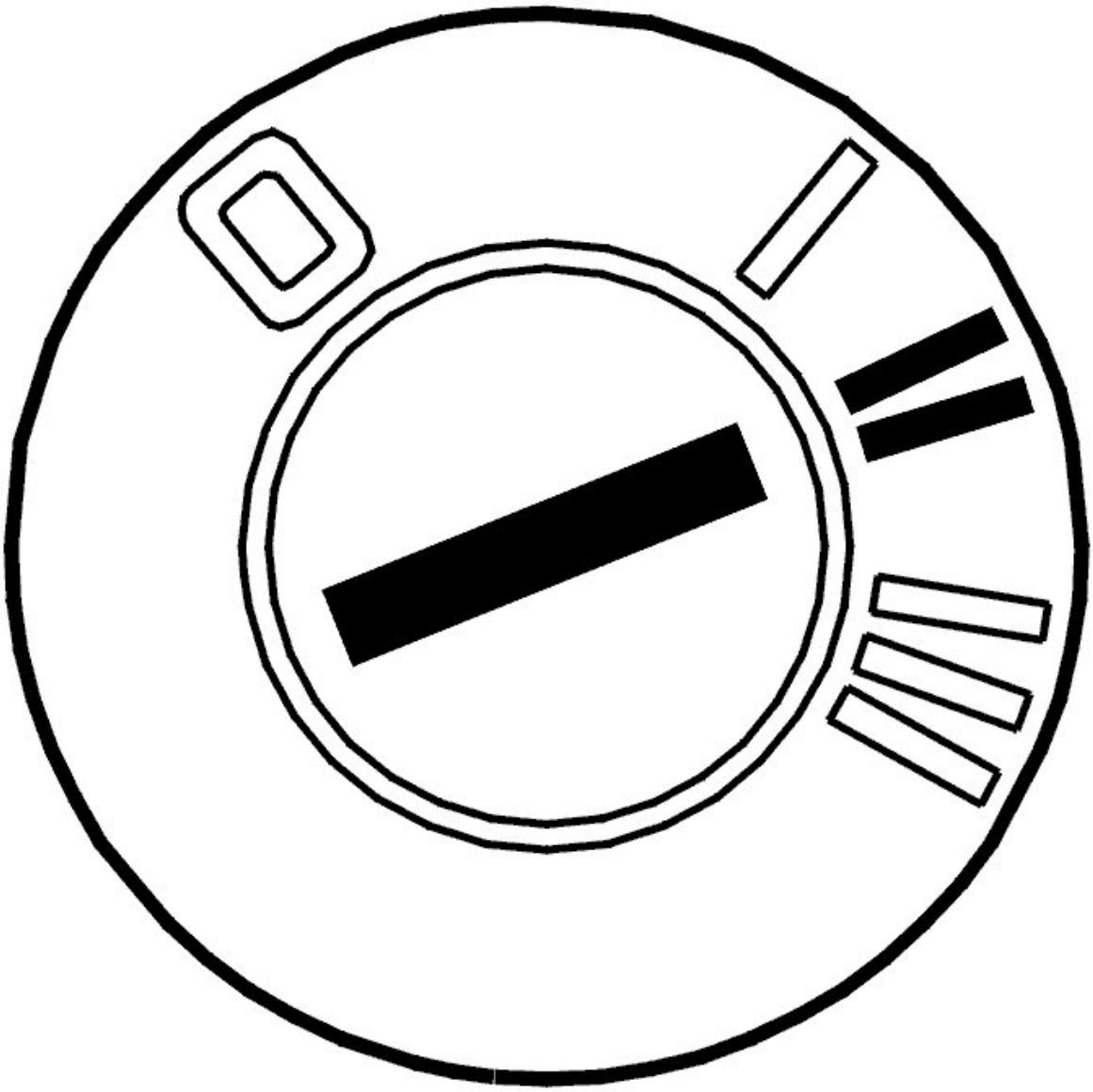
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
SRS-0066, SRS-006E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

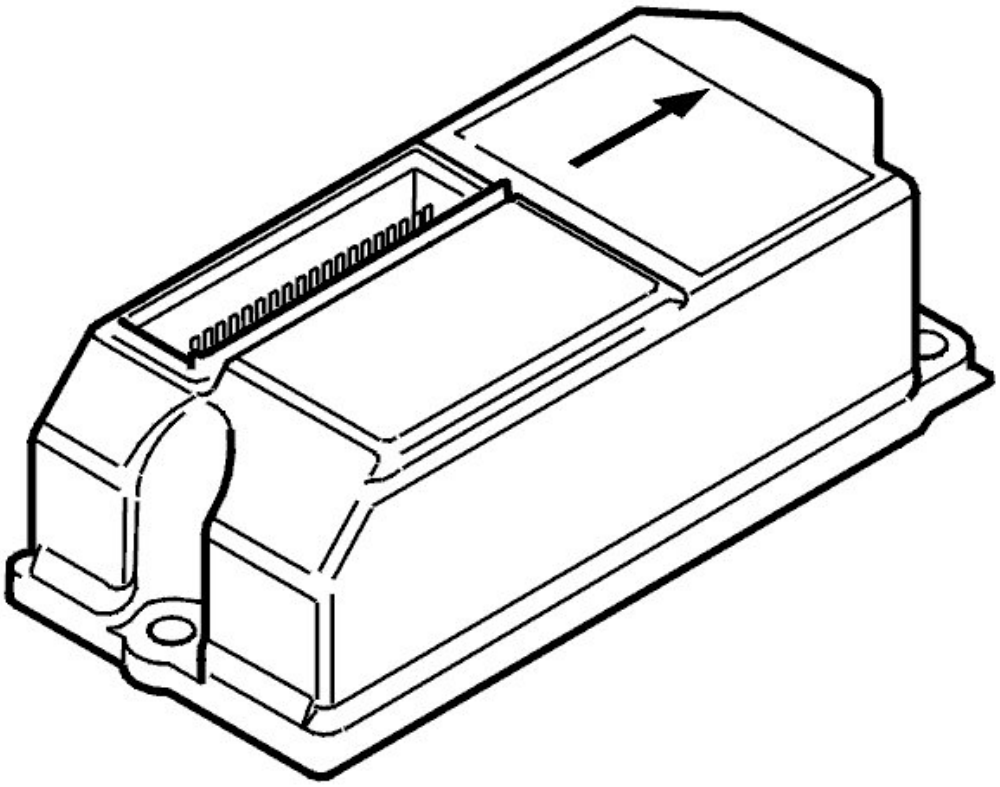
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

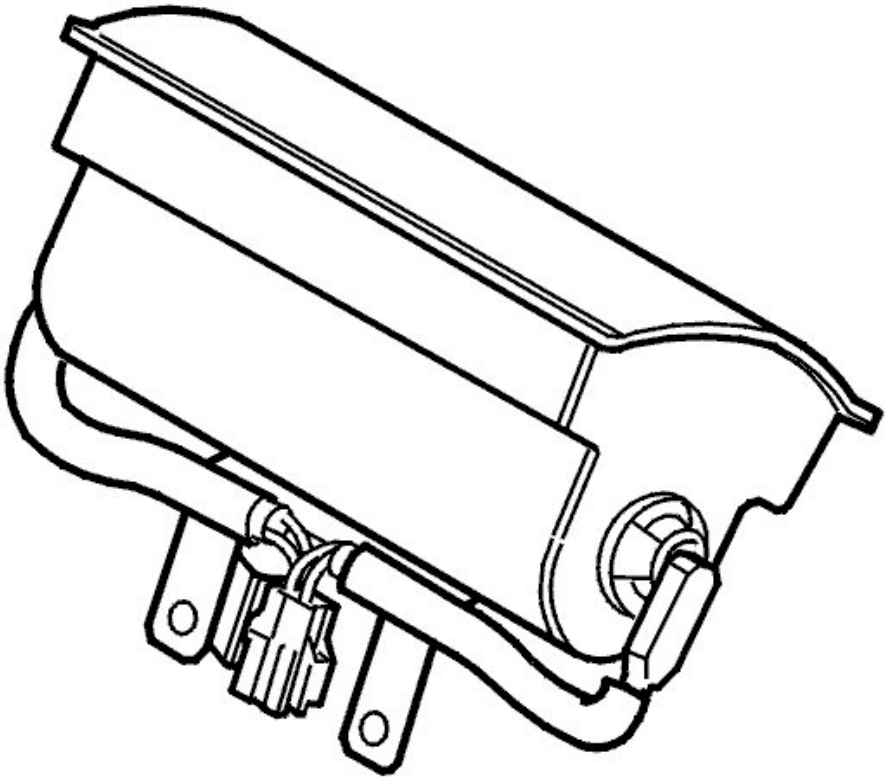
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0020 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0020 is displayed.

Substitute value
- Nothing.

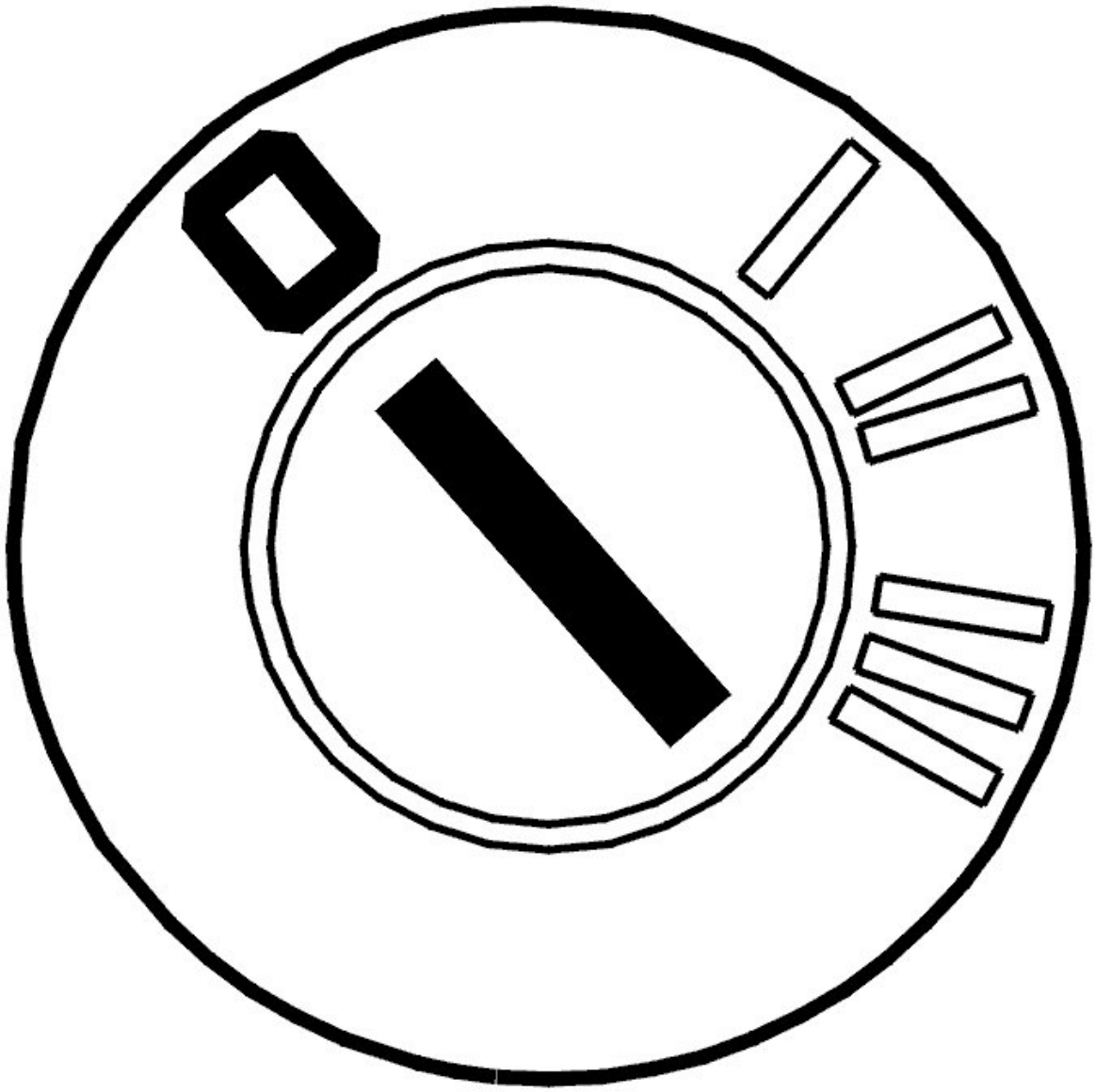
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the passenger air bag and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in passenger air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

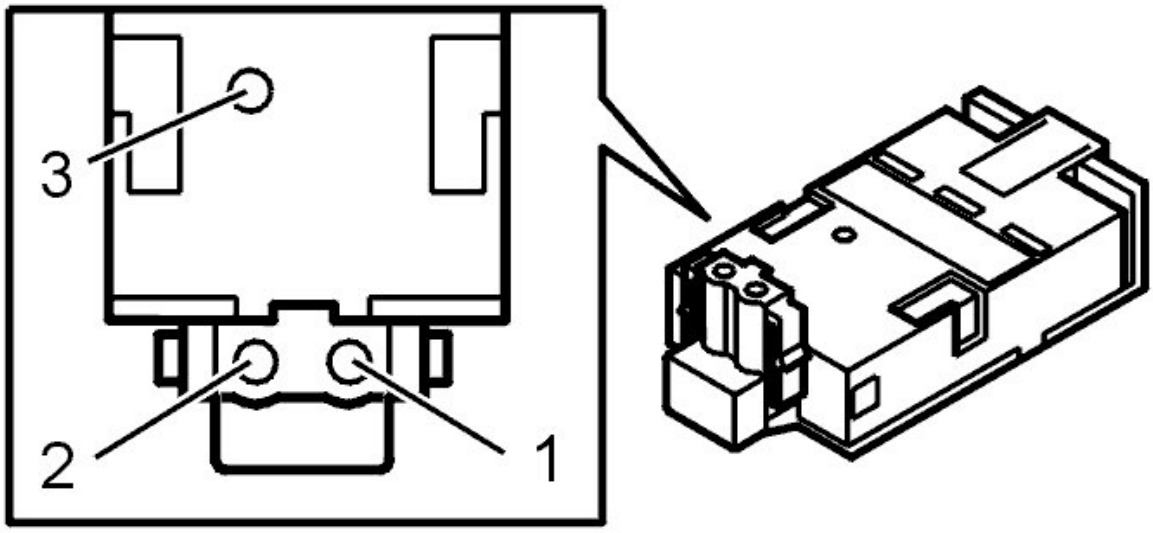
Check the connectors for:
- the passenger side airbag
- 4-pin
- the SRS control module.

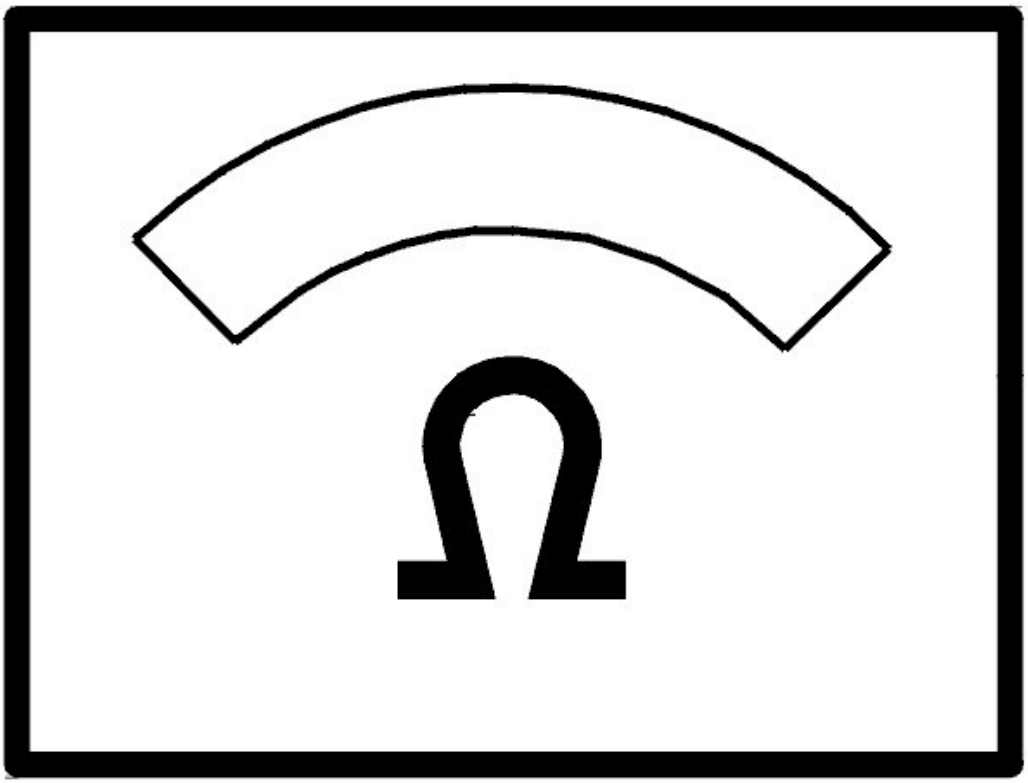
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent

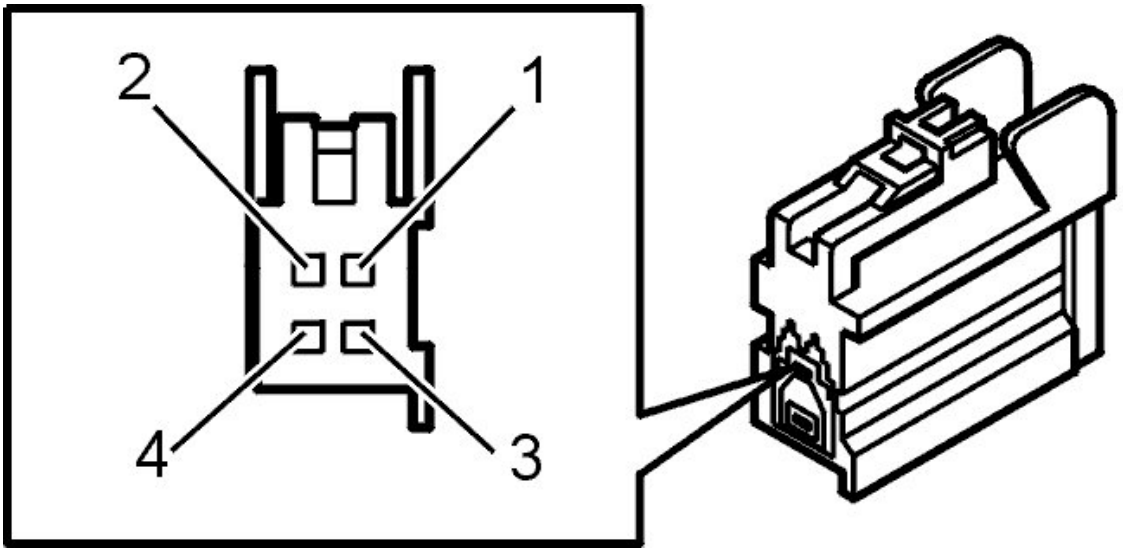
short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector and the control module connector disconnected, the resistance between the 4-pin connector terminals #1 and #2 (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

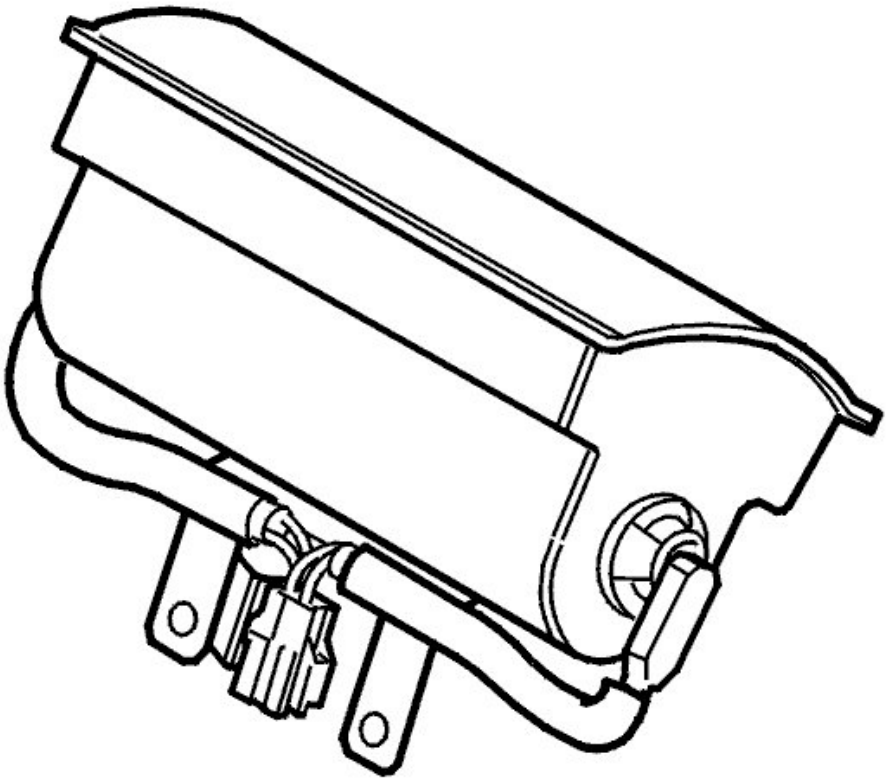
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0020 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0020 is displayed.

Substitute value
- Nothing.

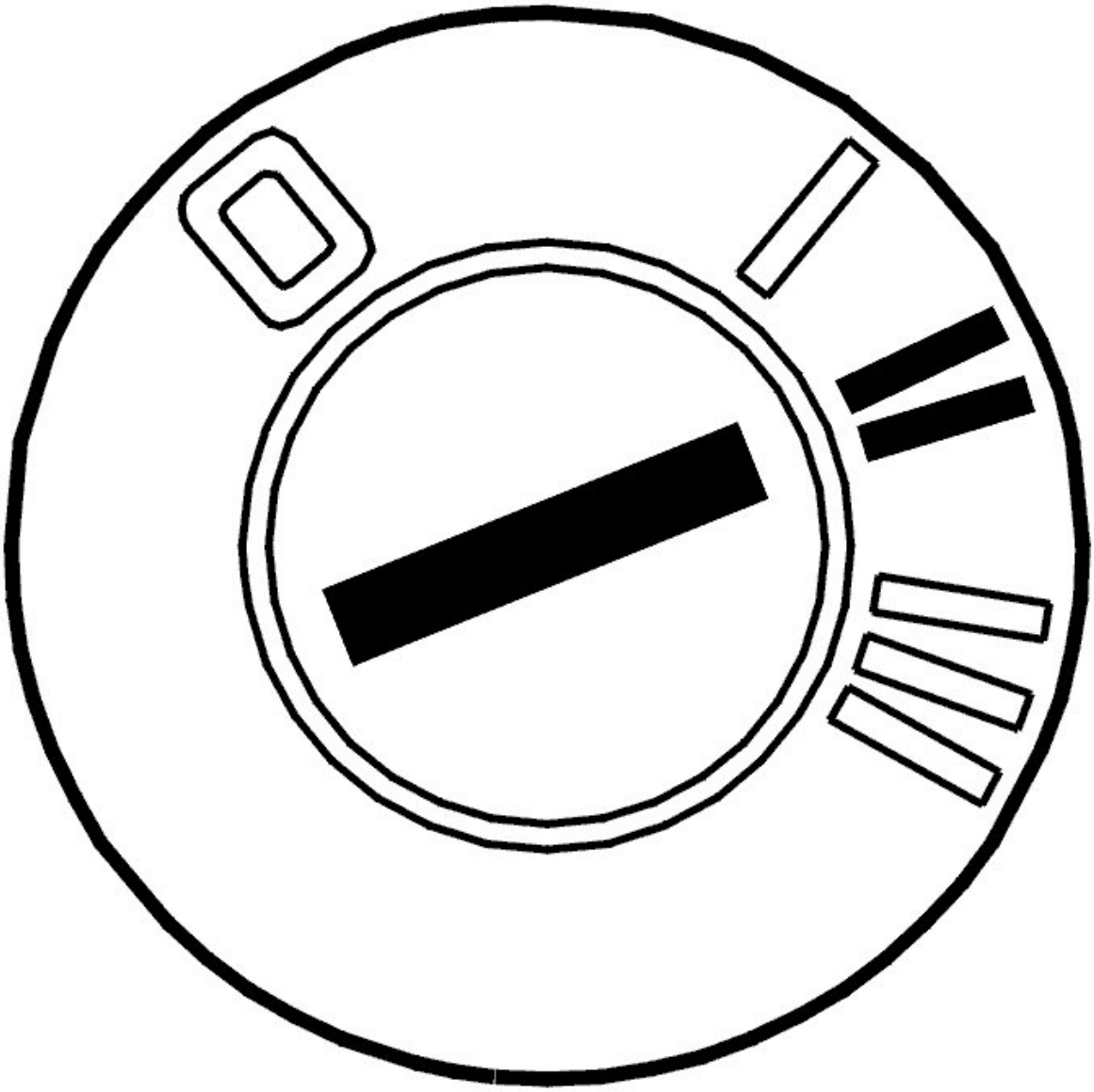
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the passenger air bag and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in passenger air bag.

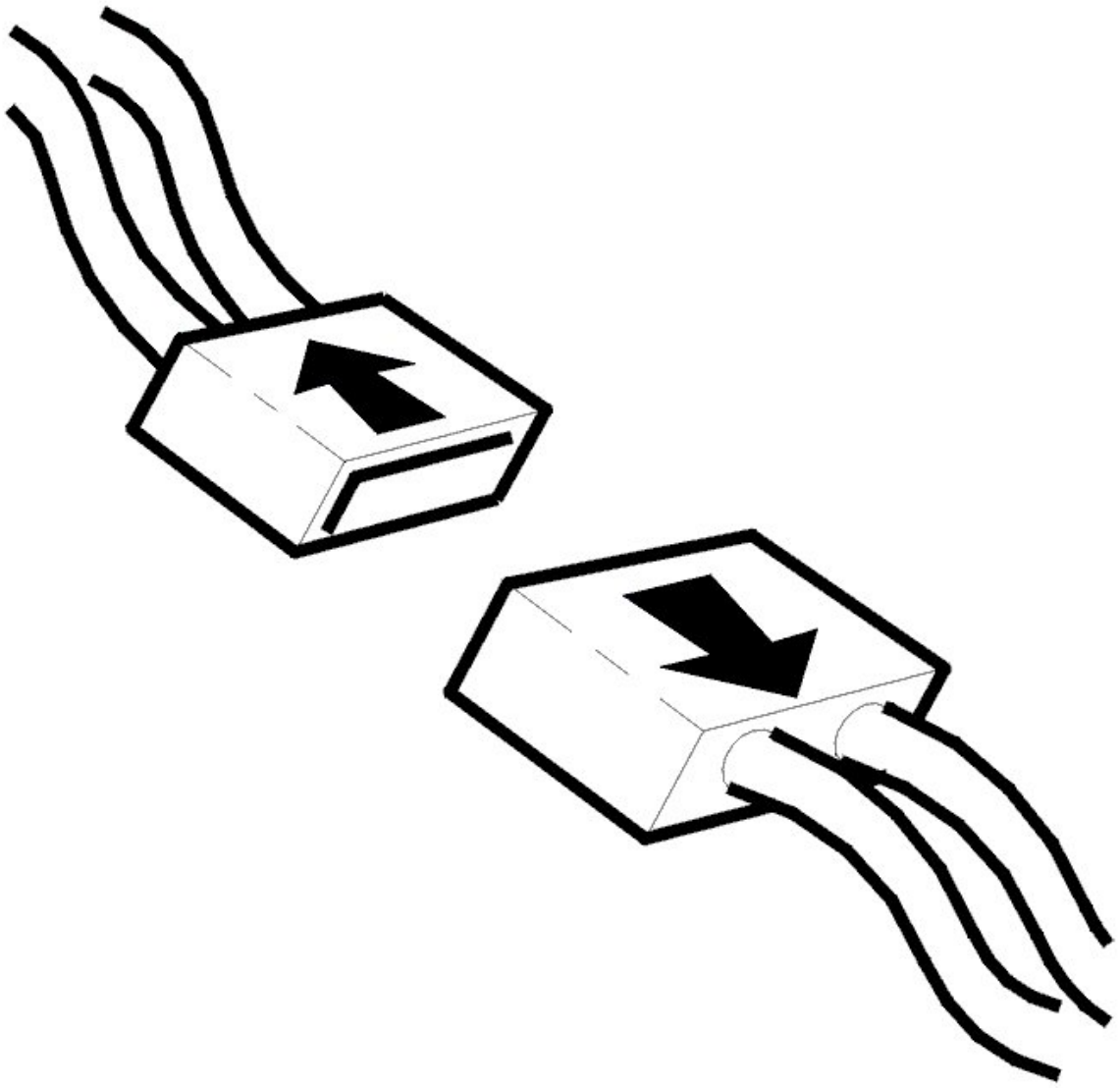
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

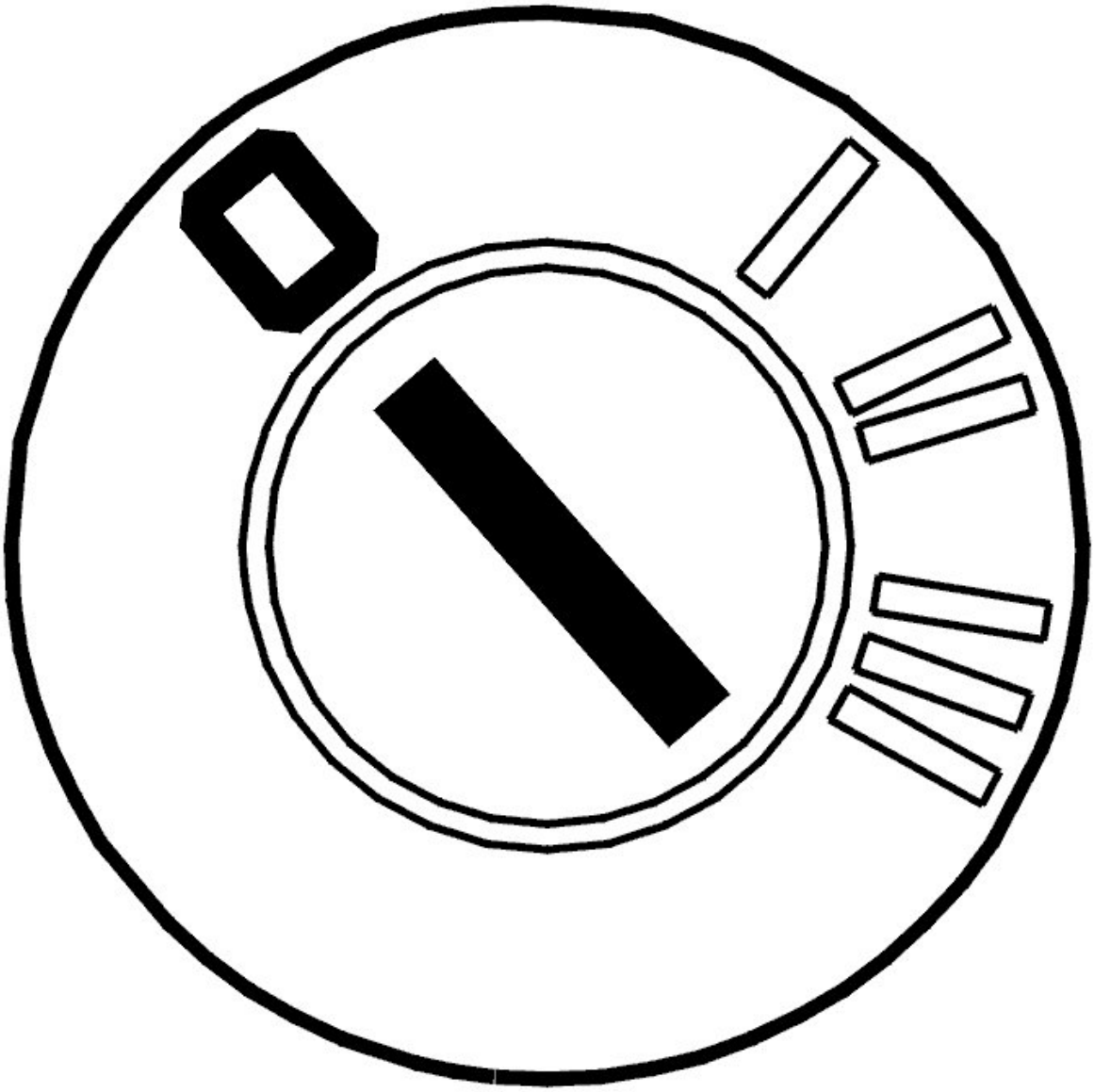
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

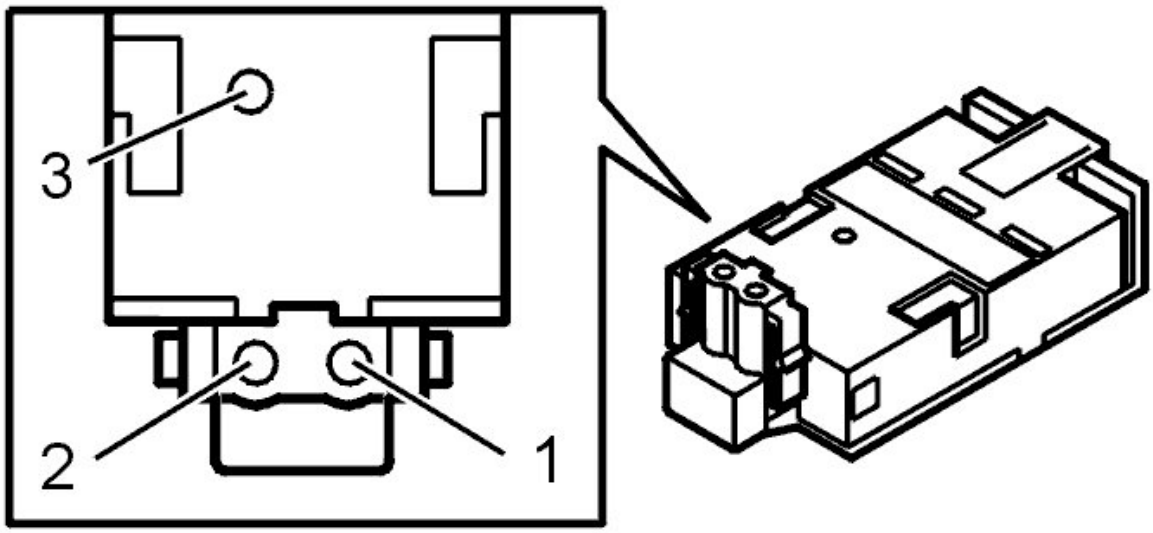
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

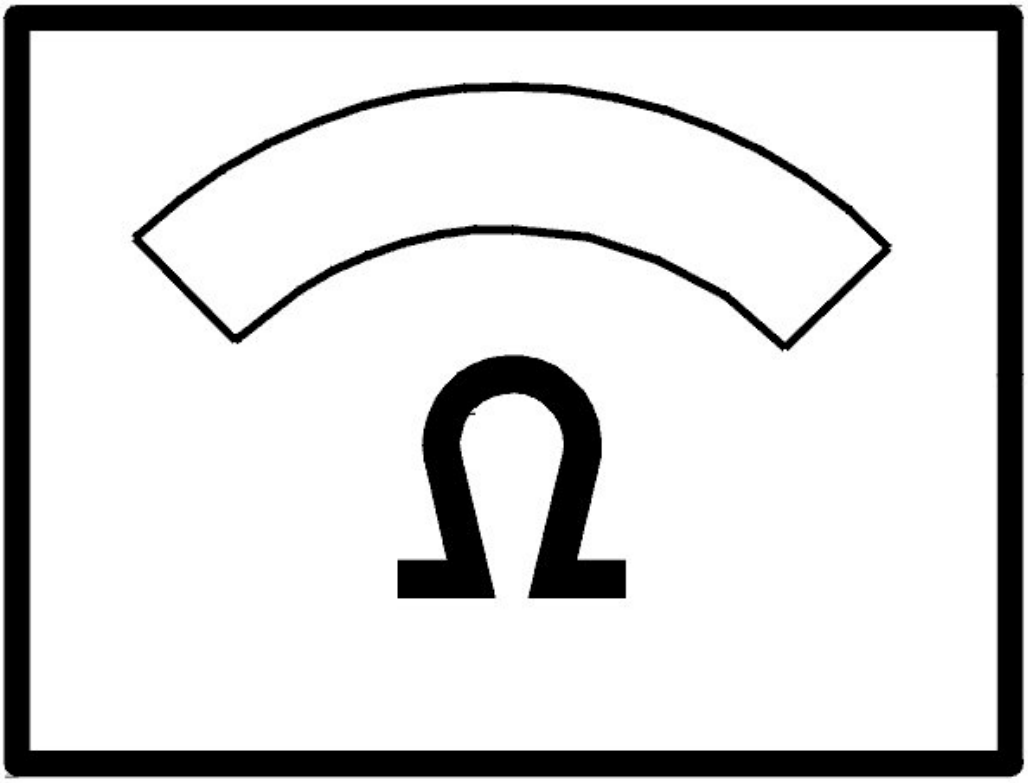
Other information:

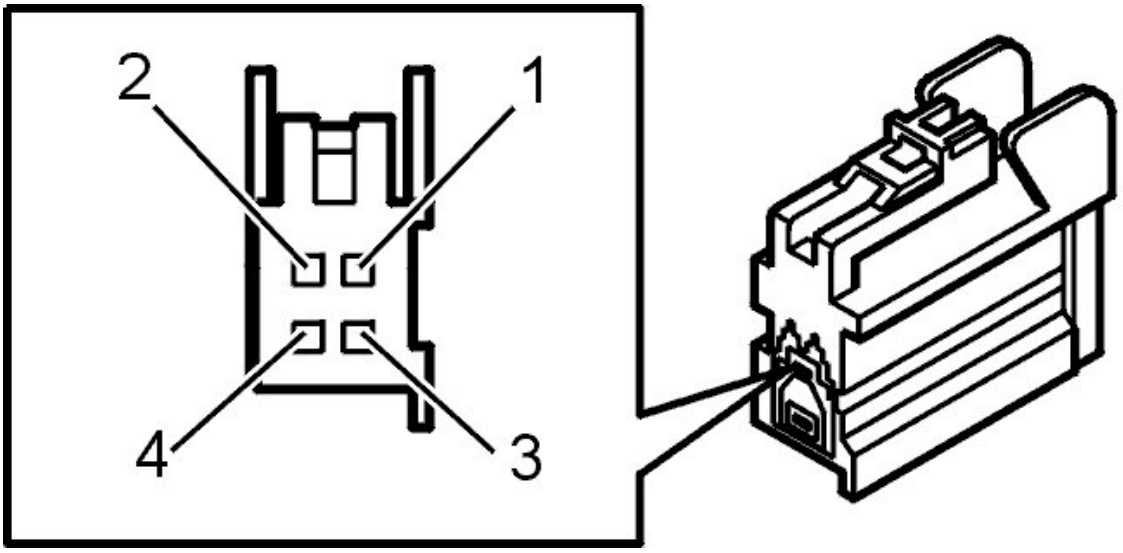
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the control module connector disconnected, the resistance between the 4-pin connector terminals #1 and #2 (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

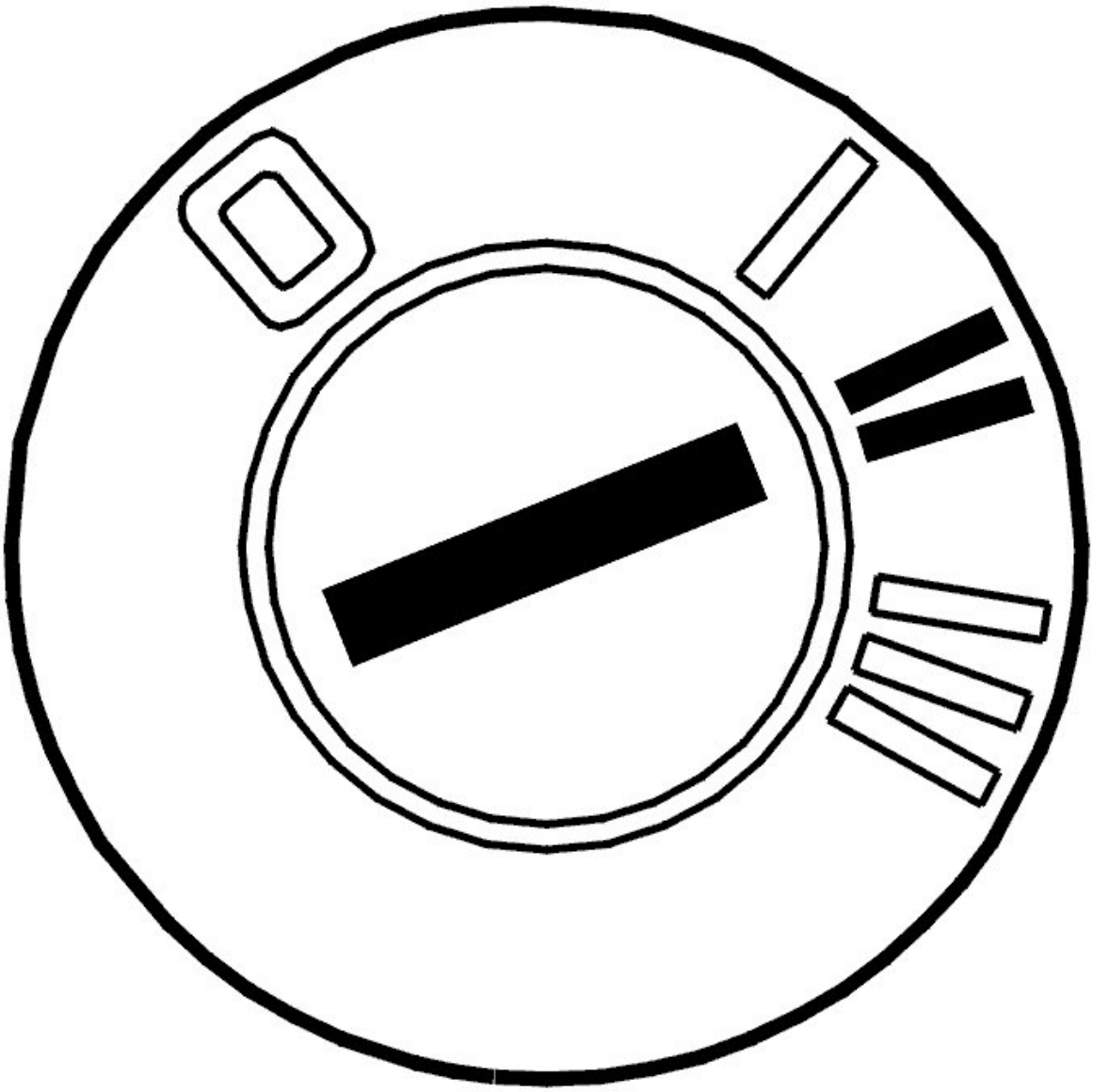
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

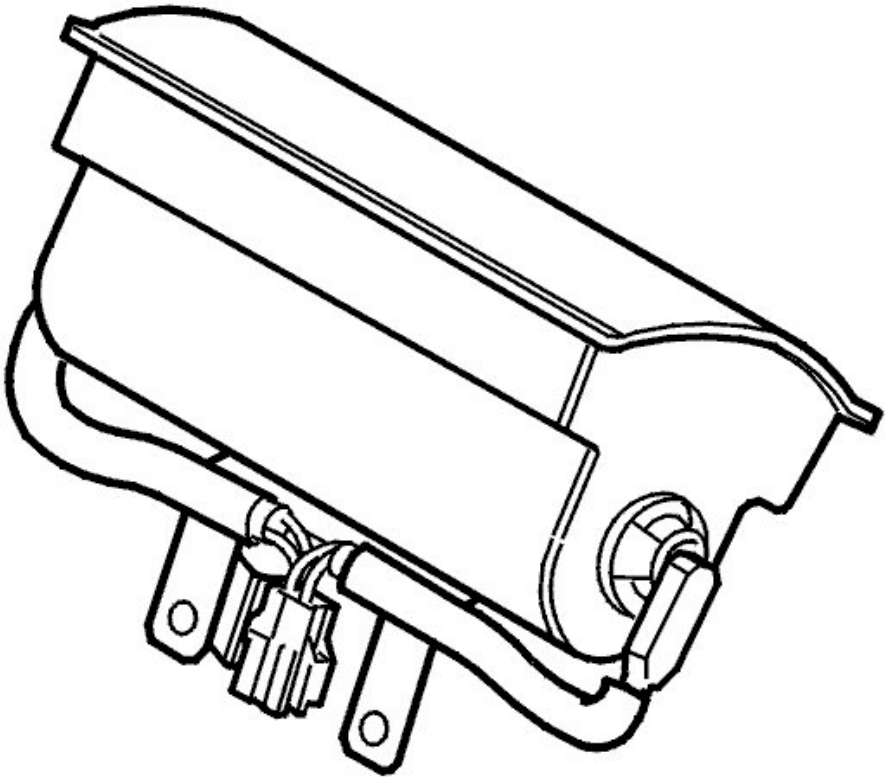
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0021 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0021 is displayed.

Substitute value
- Nothing.

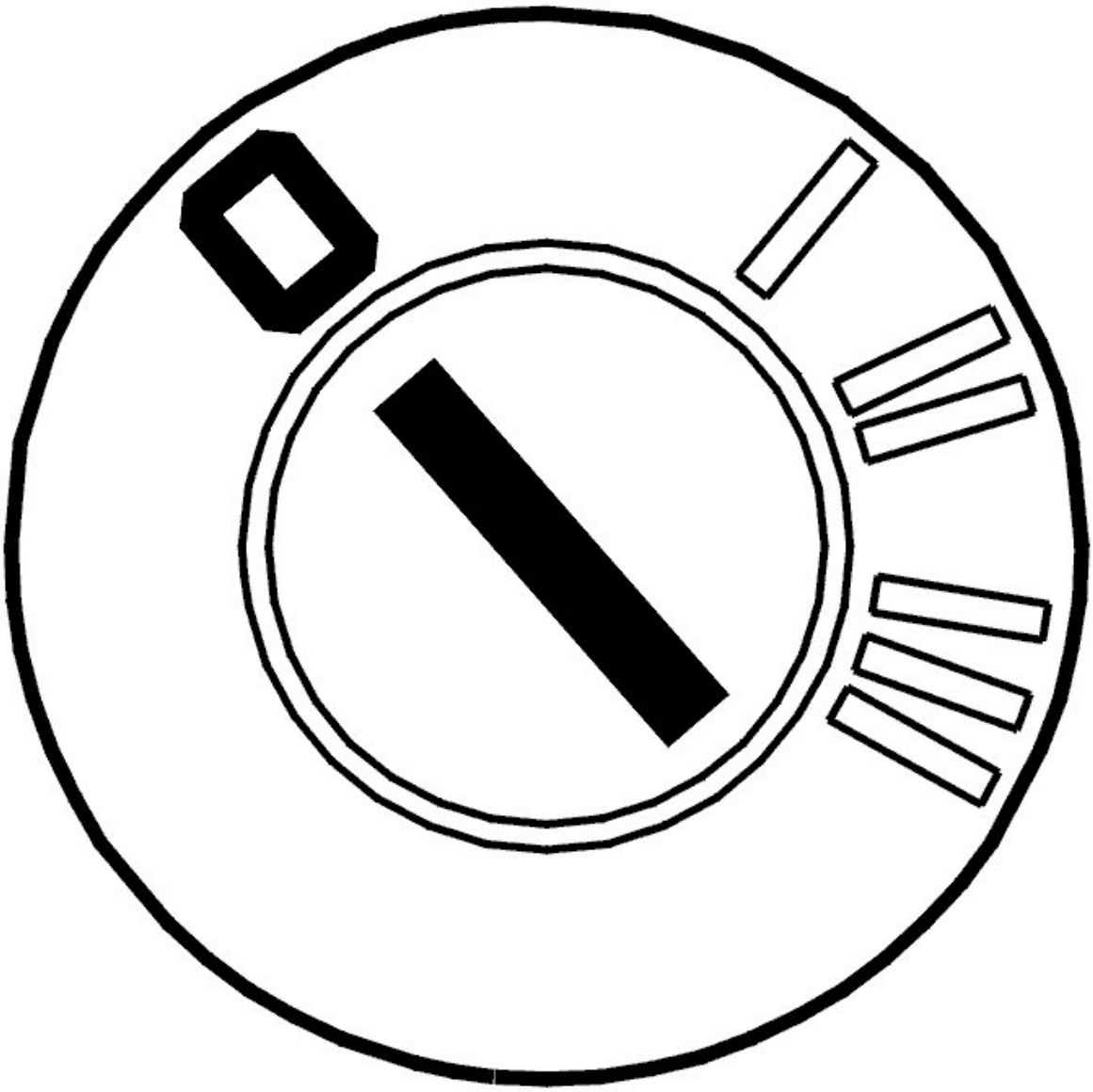
Possible source
- Short circuit to ground in igniter wire or connectors between the passenger air bag and SRS control unit
- Short circuit to ground in air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

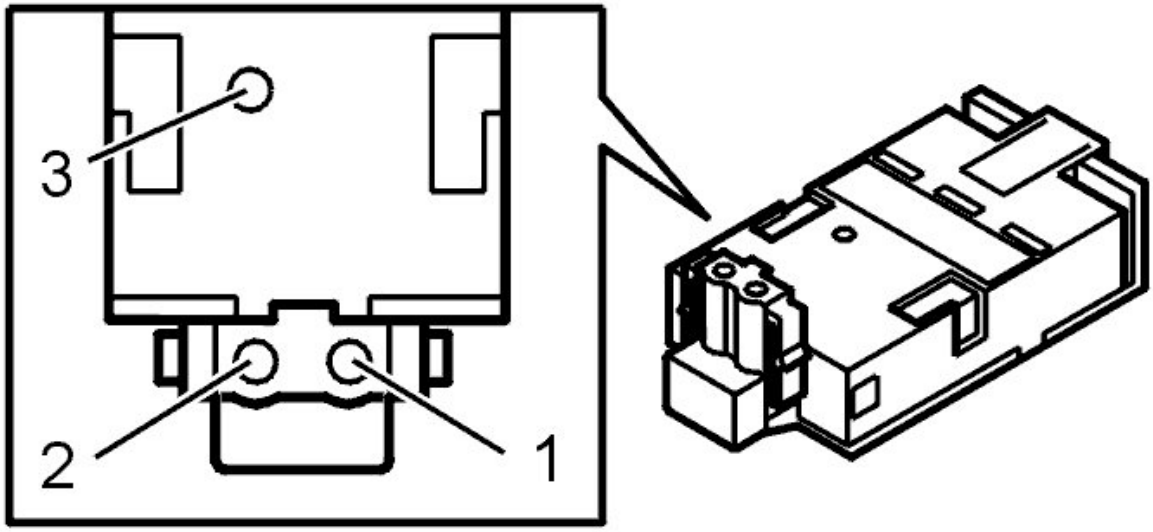
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

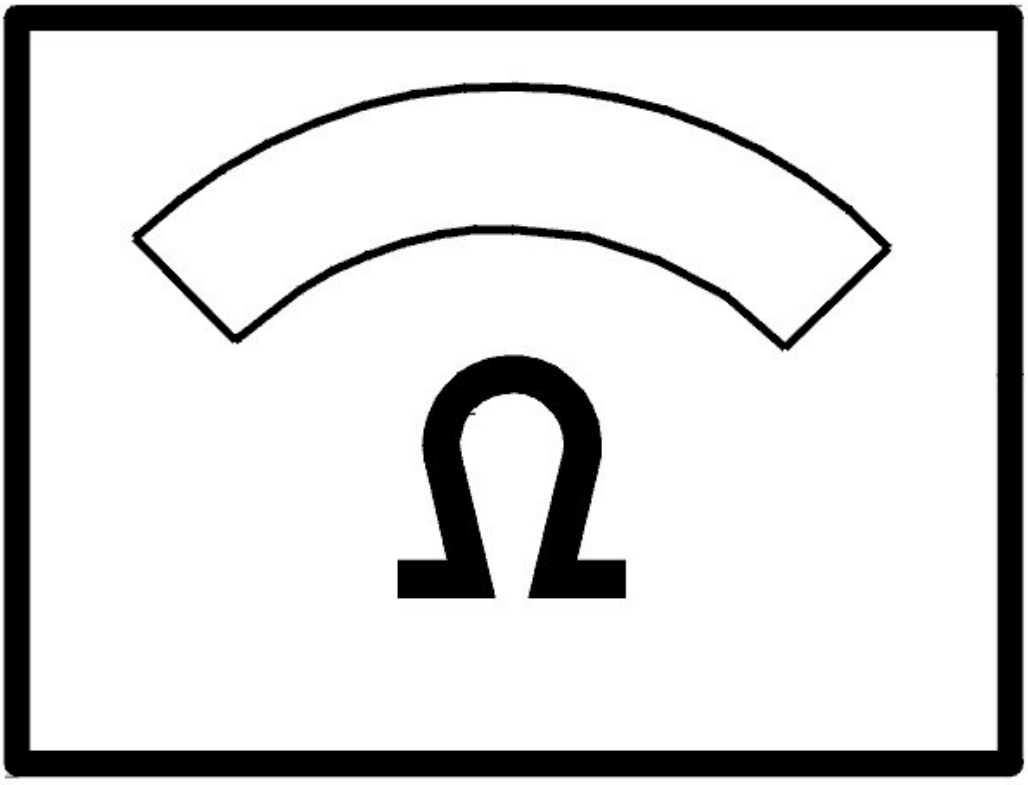
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

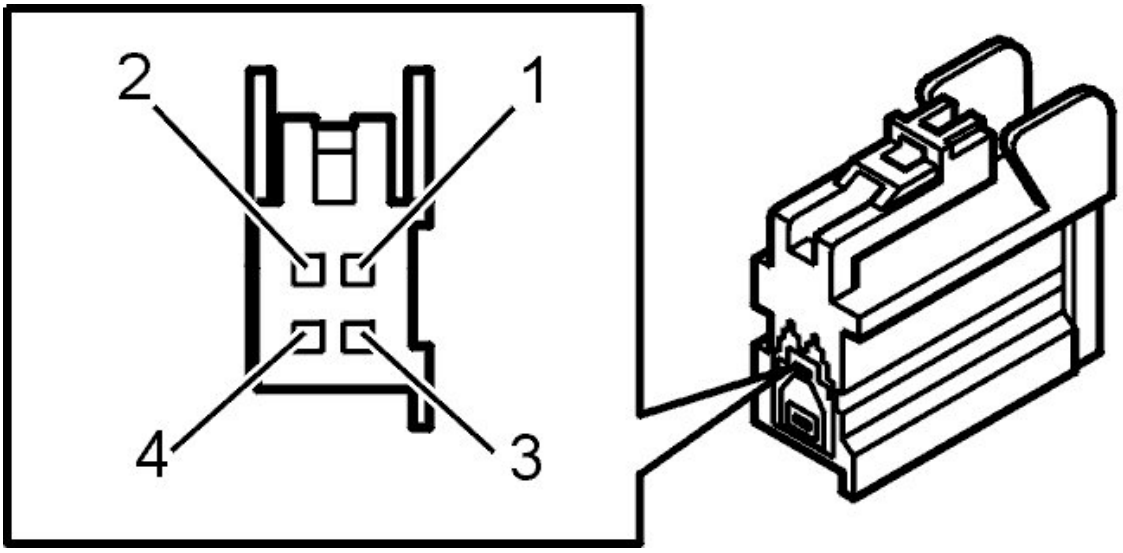
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) and ground should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

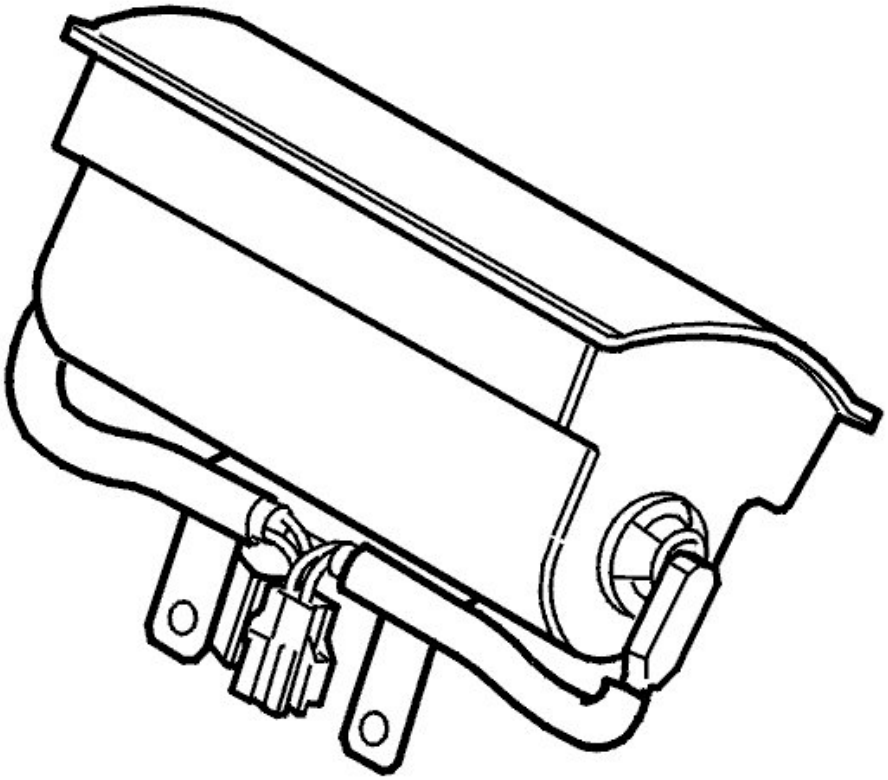
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0021 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0021 is displayed.

Substitute value
- Nothing.

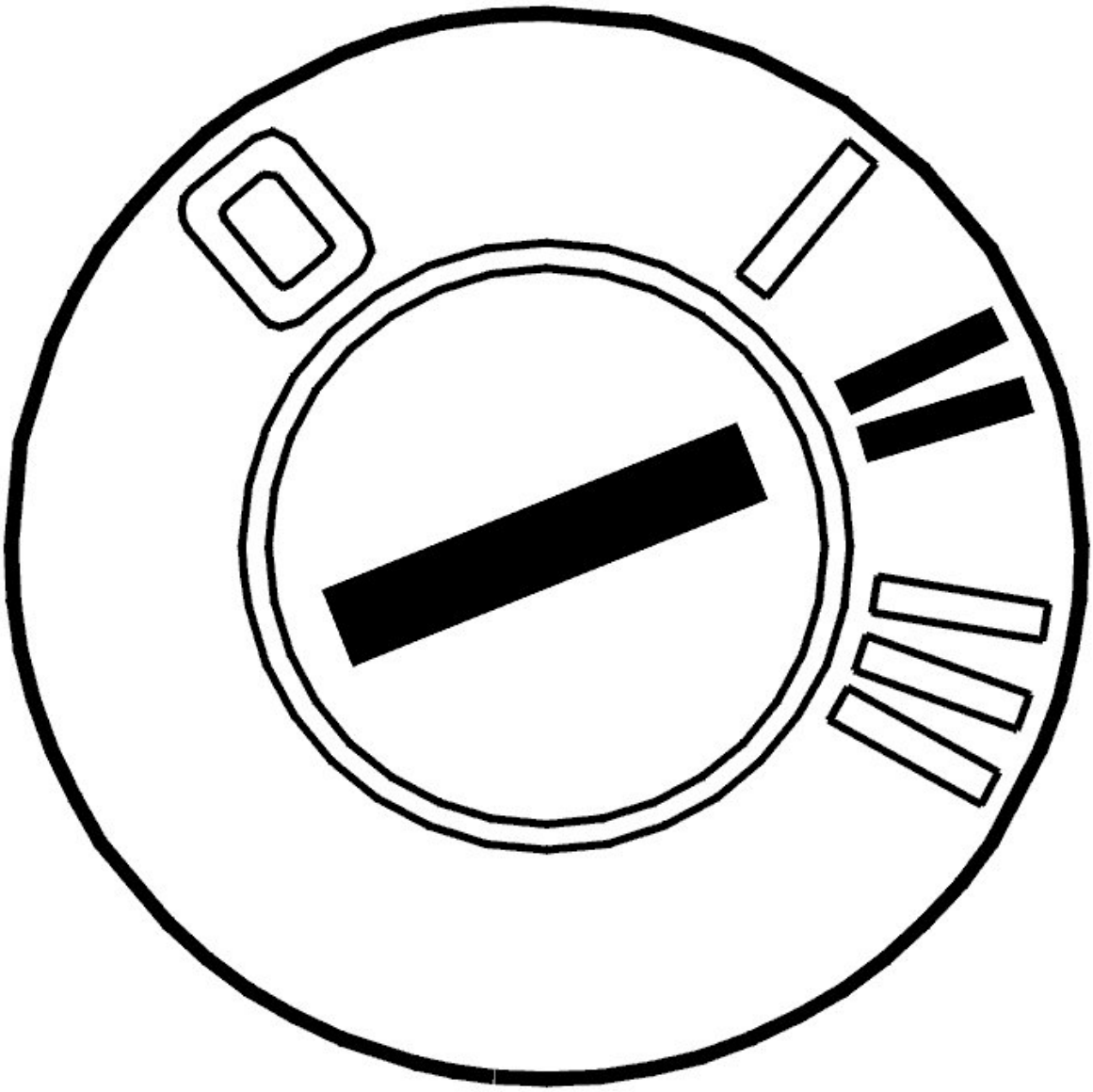
Possible source
- Short circuit to ground in igniter wire or connectors between the passenger air bag and SRS control unit
- Short circuit to ground in air bag.

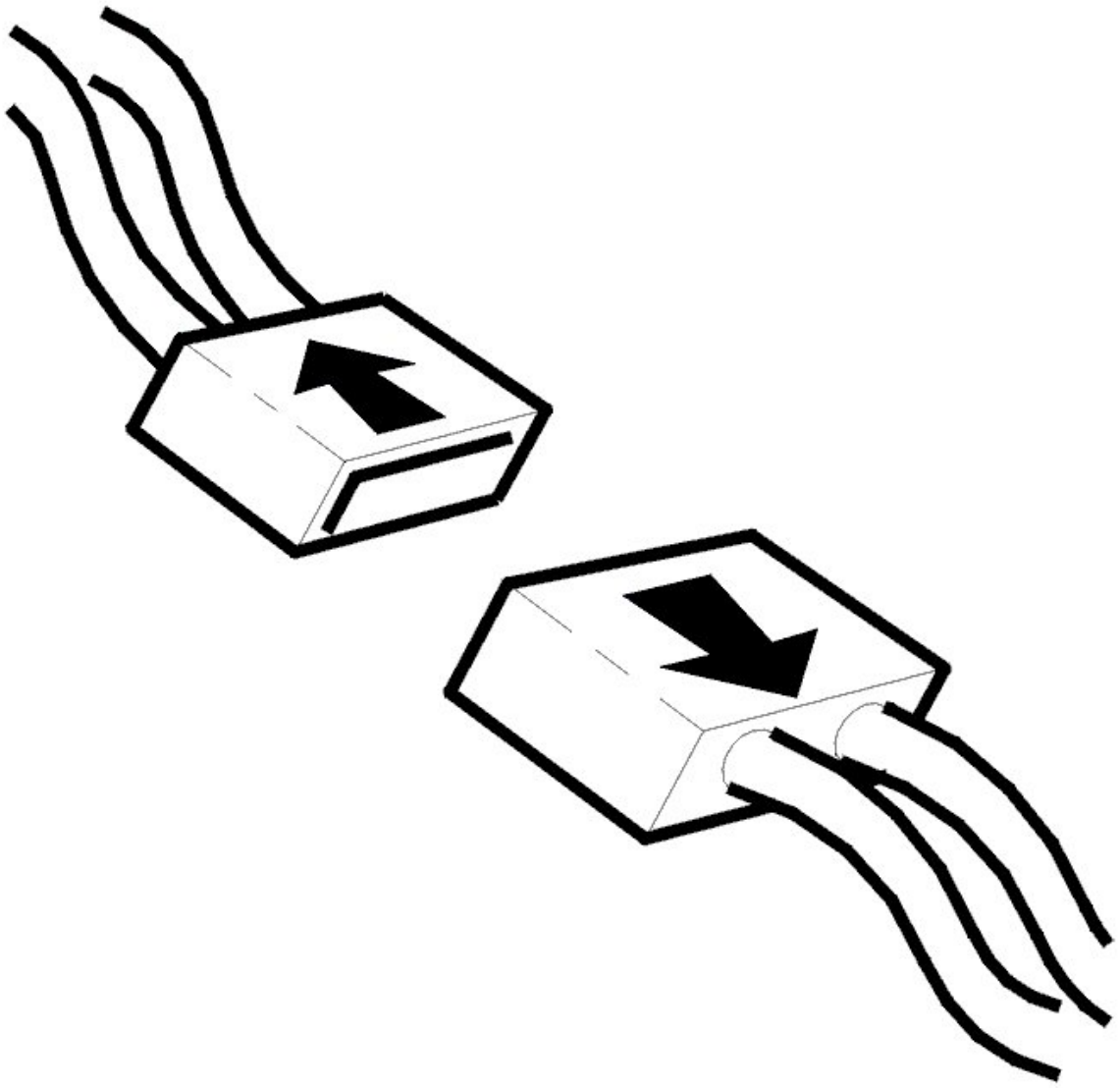
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected, non-deployed airbag module. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

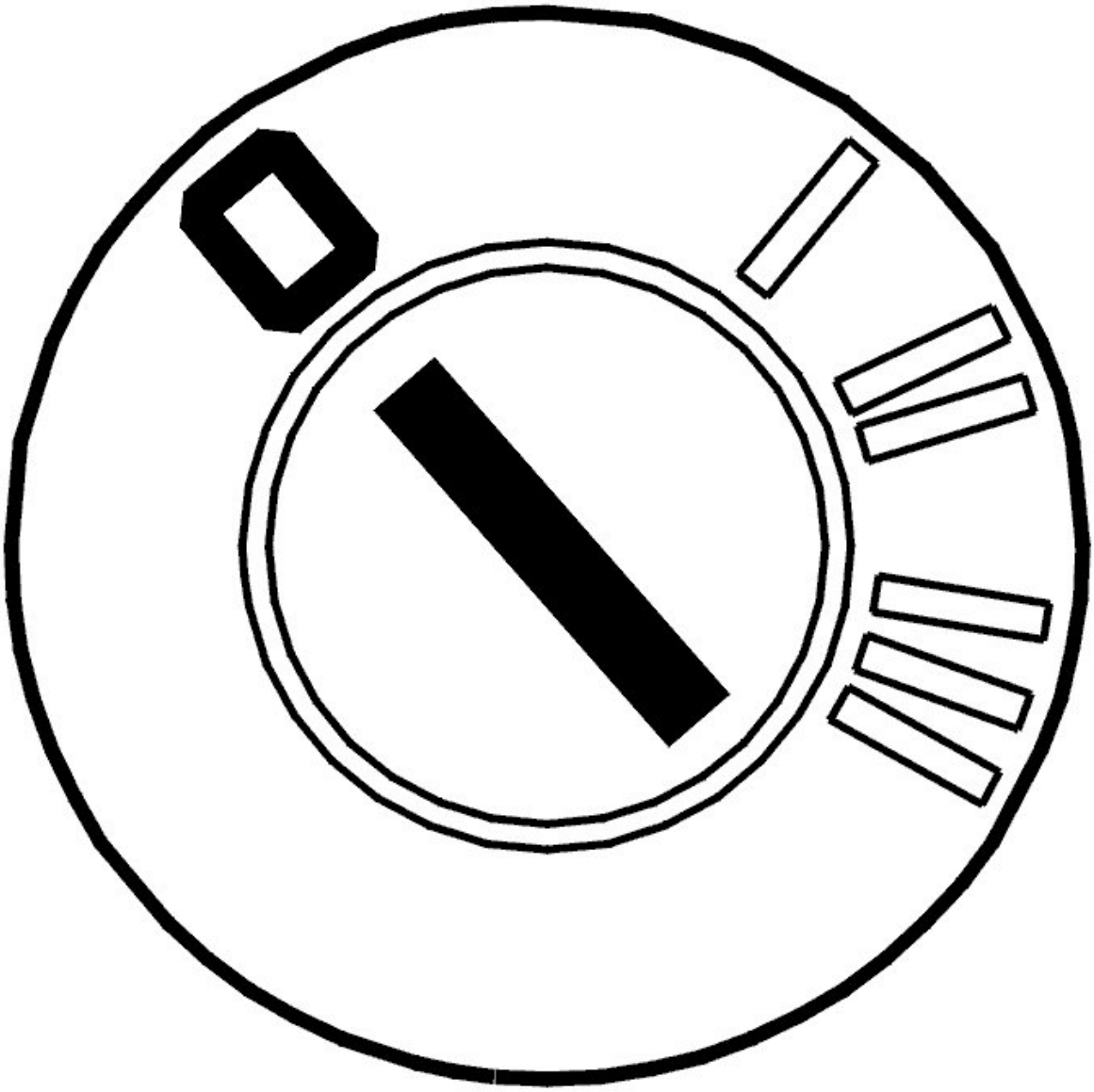
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

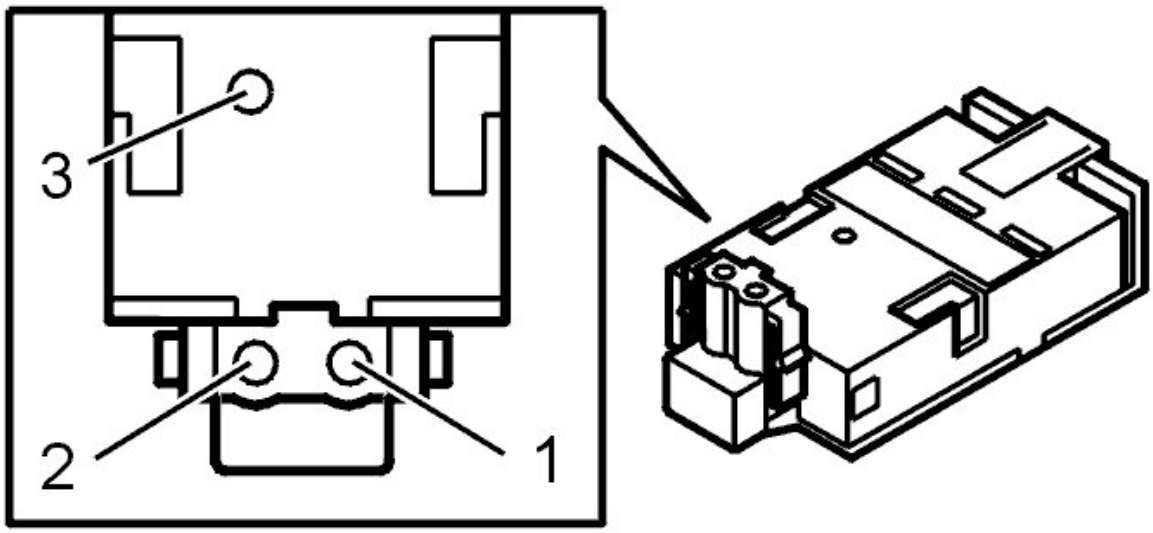
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

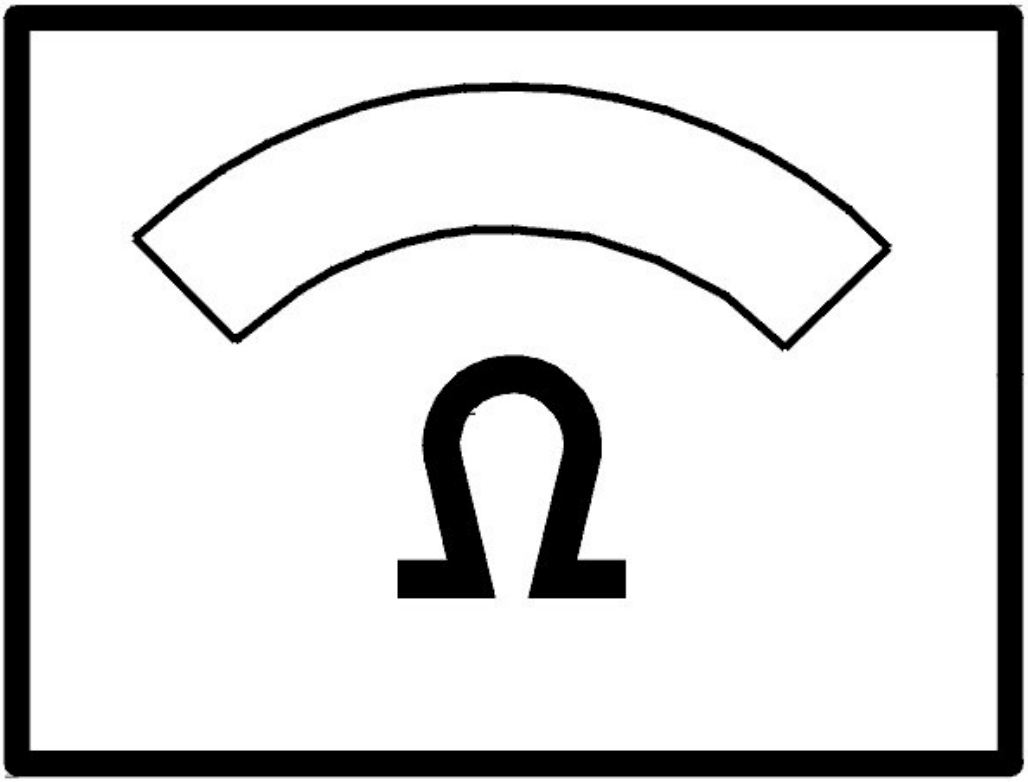
Other information:

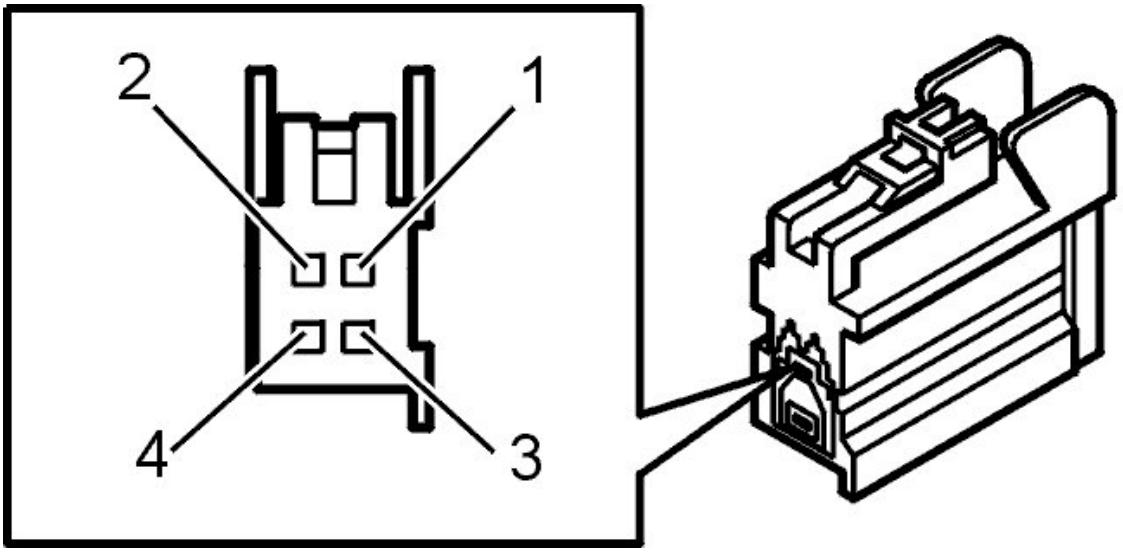
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) and ground should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

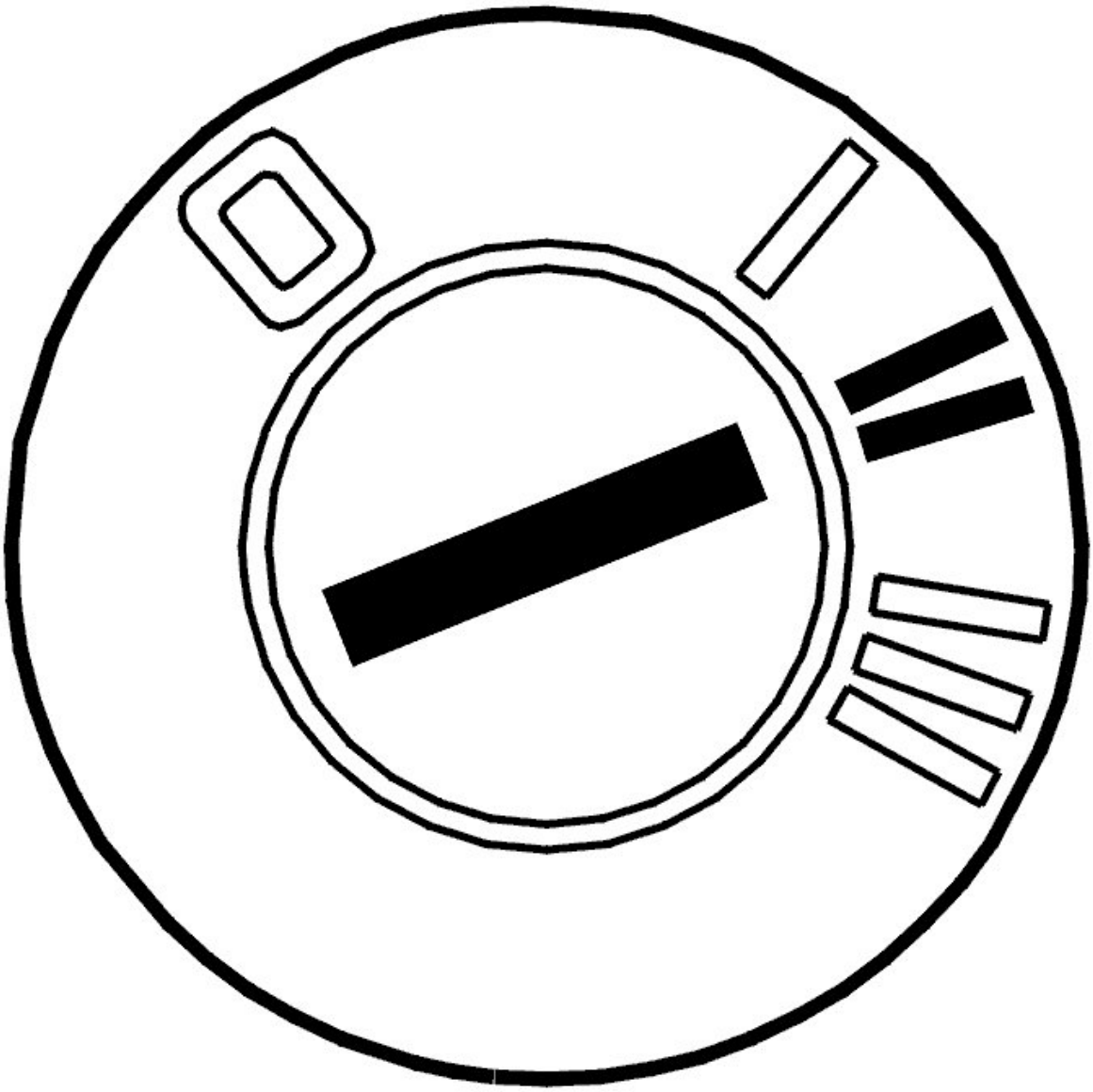
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

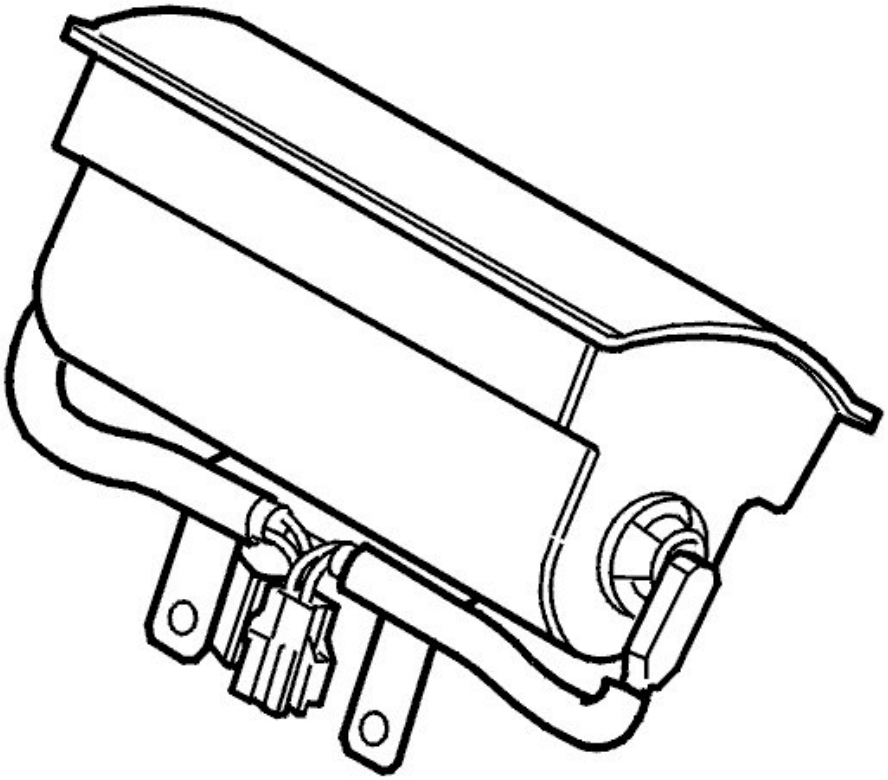
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0022 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0022 is displayed.

Substitute value
- Nothing.

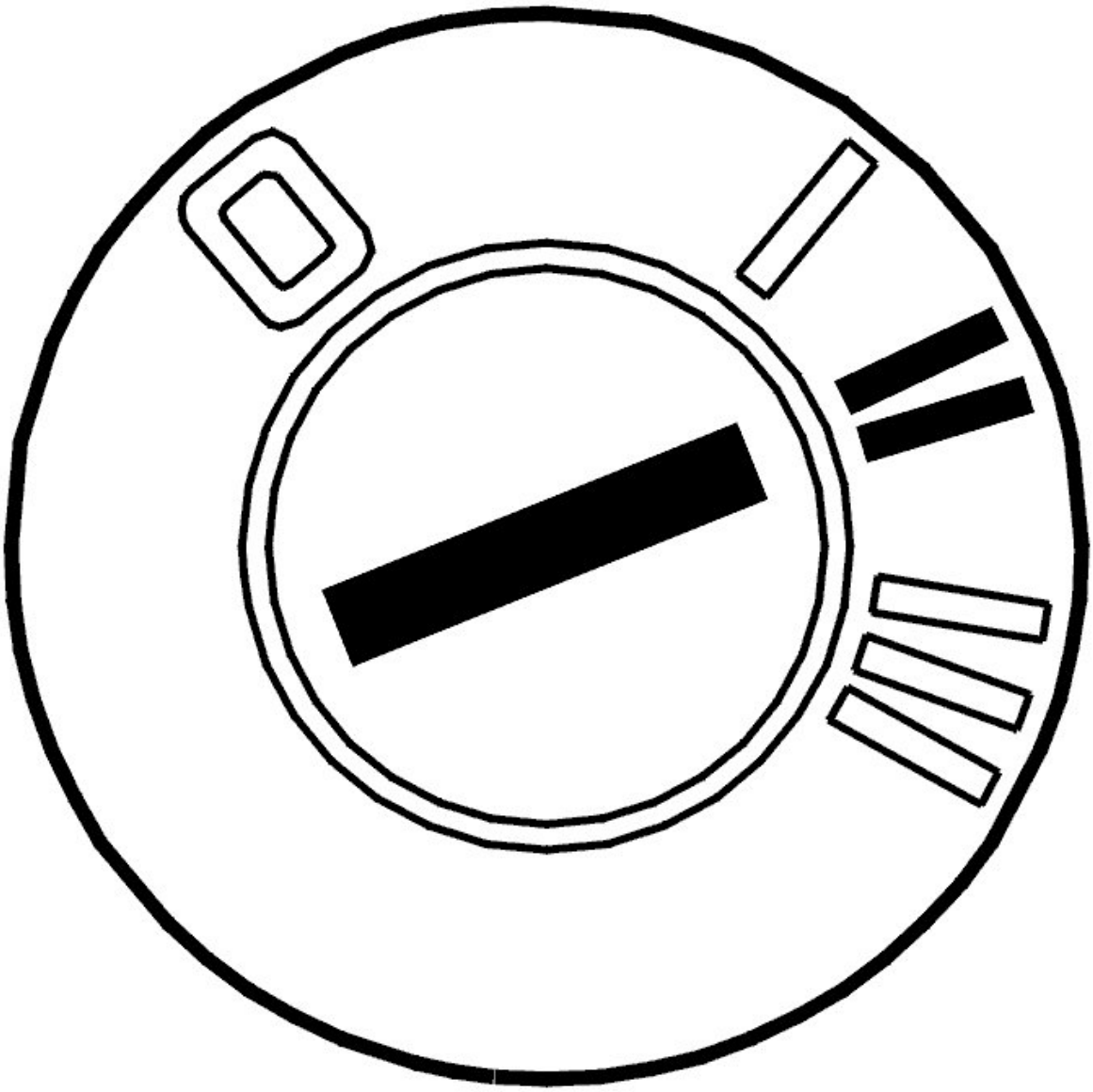
Possible source
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

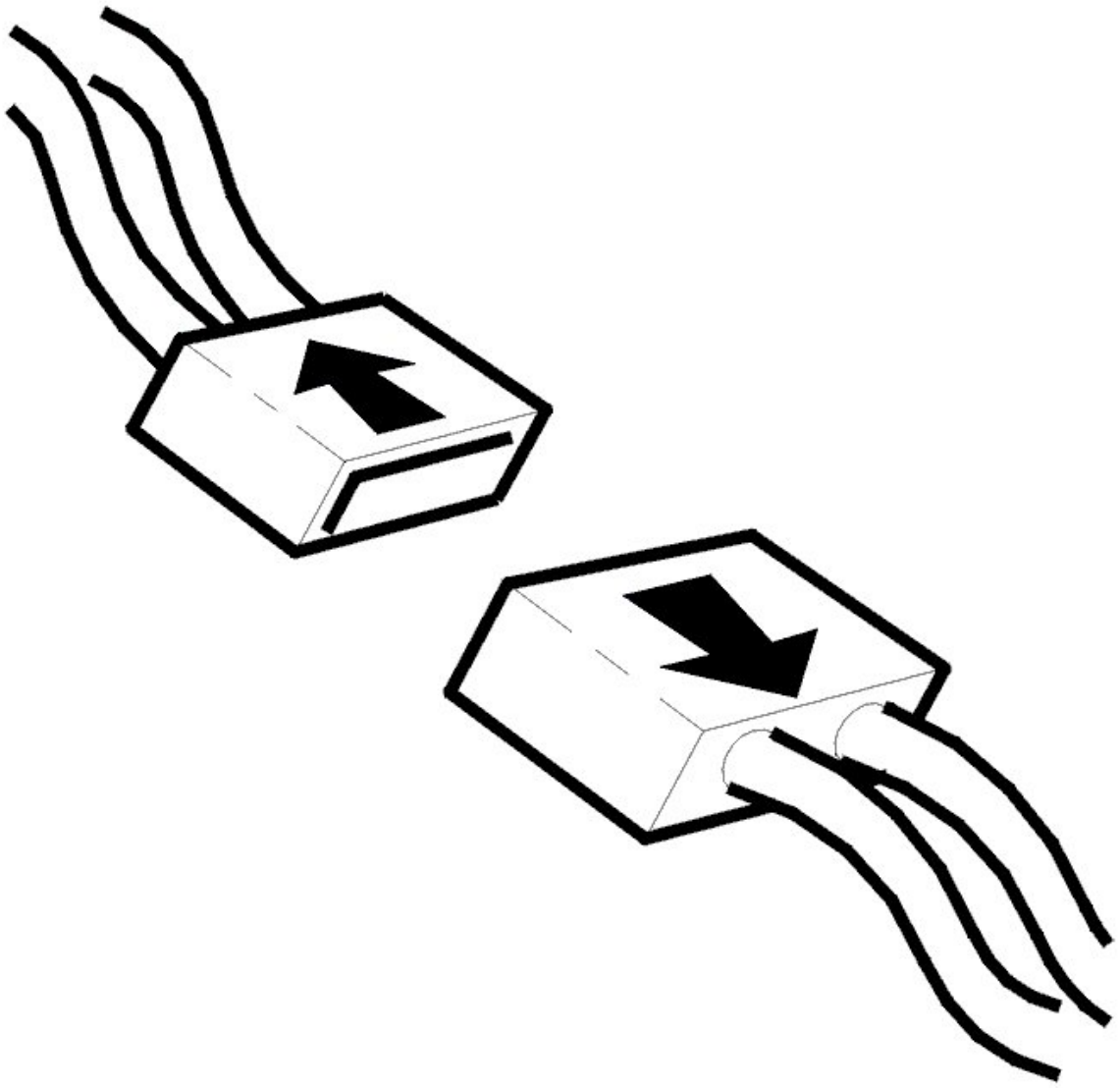
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

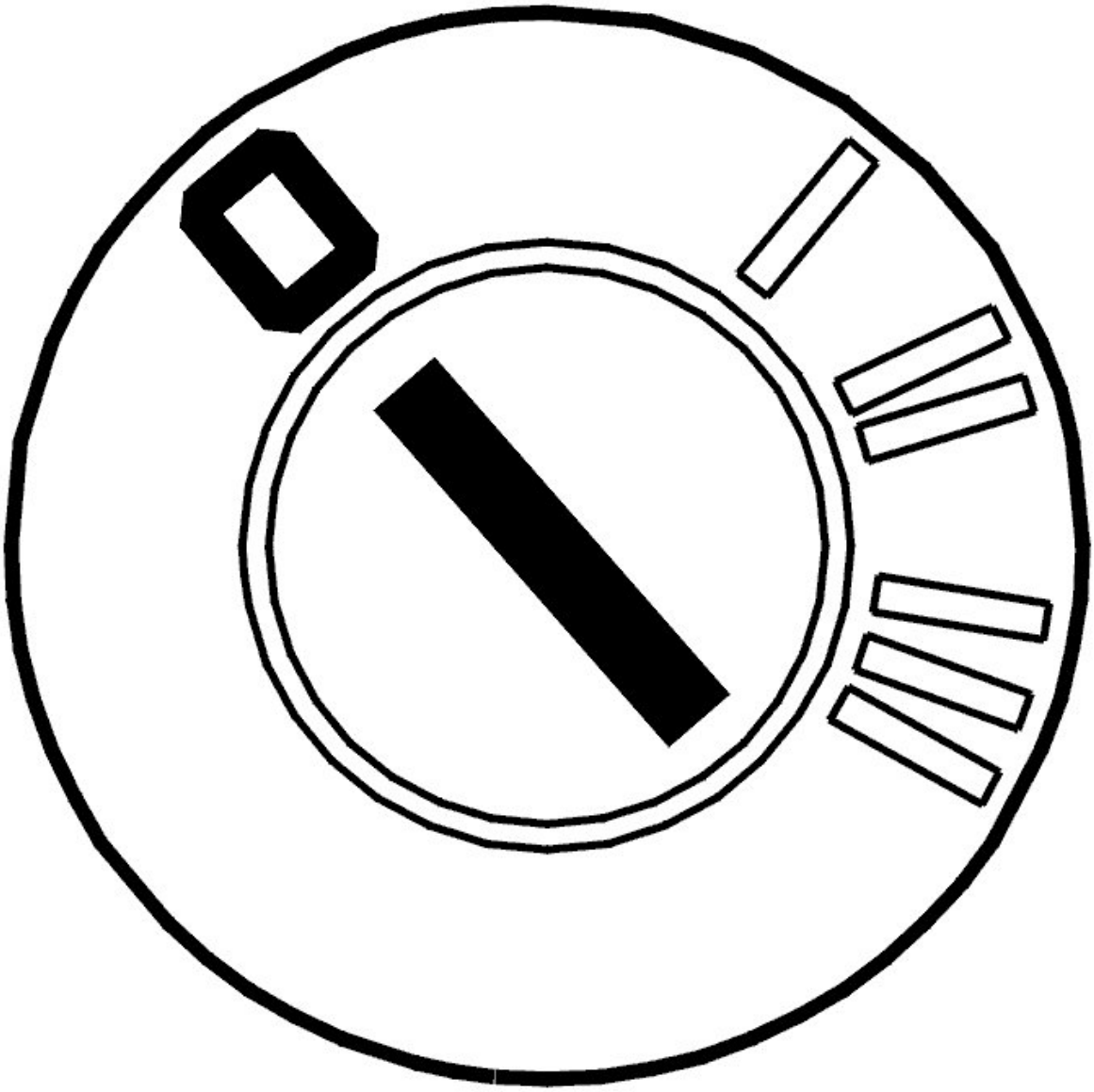
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

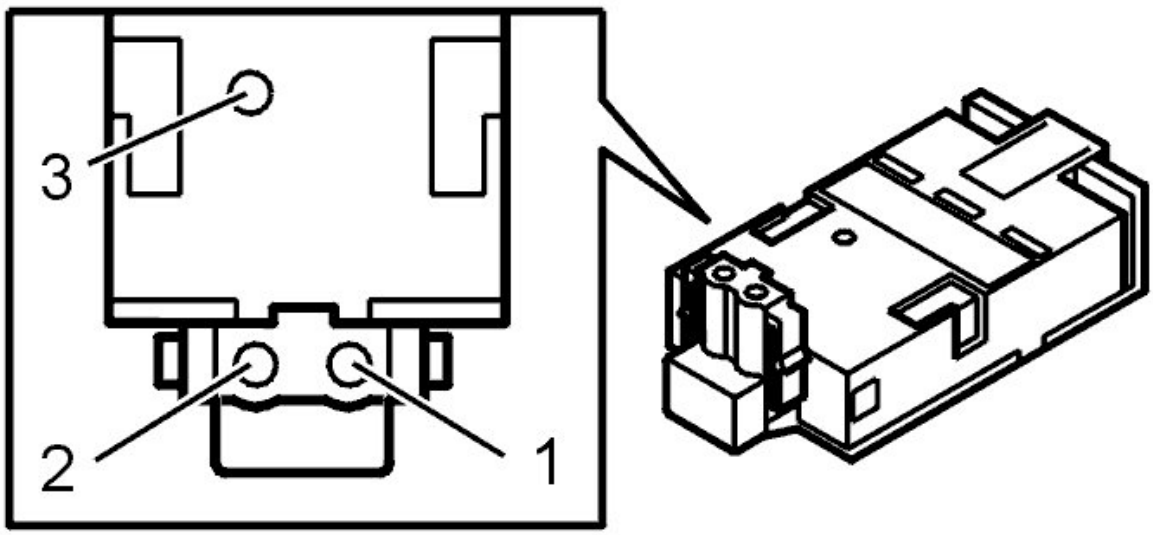
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

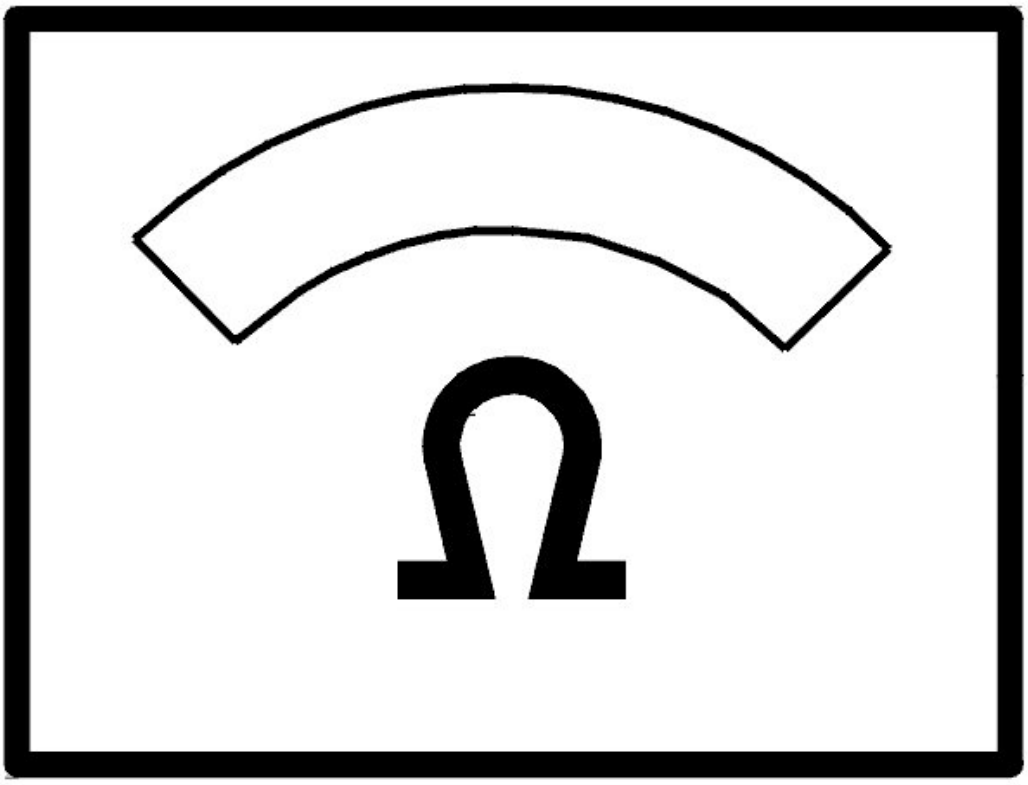
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

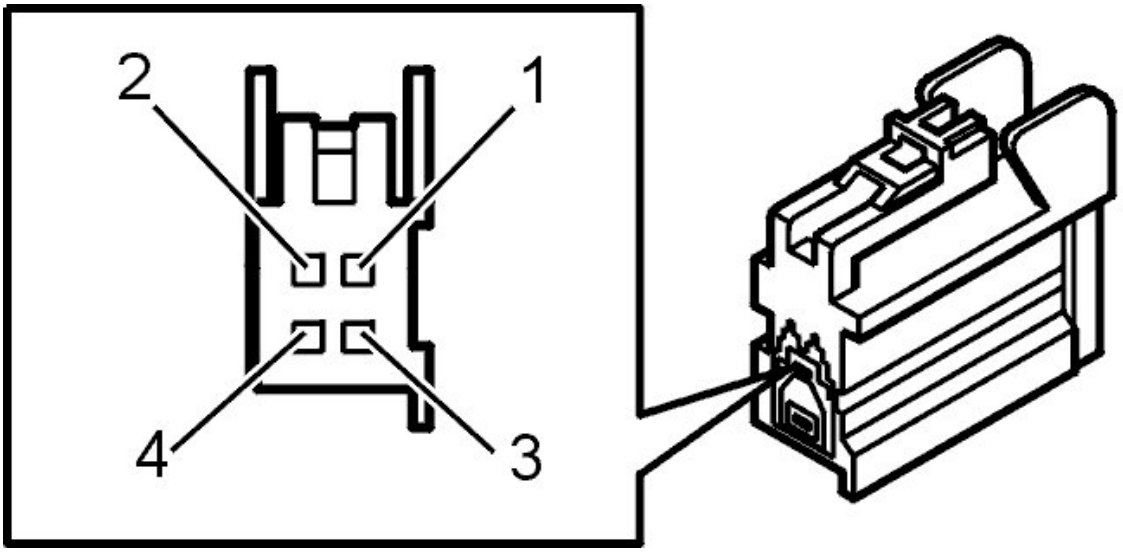
Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (green) for the passenger airbag, the resistance between terminals #1 and #2 of the 4-pin connector (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the SRS control module disconnected, the resistance between terminals #1 and #2 of the 4-pin connector (SRS control module side) should be infinite
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

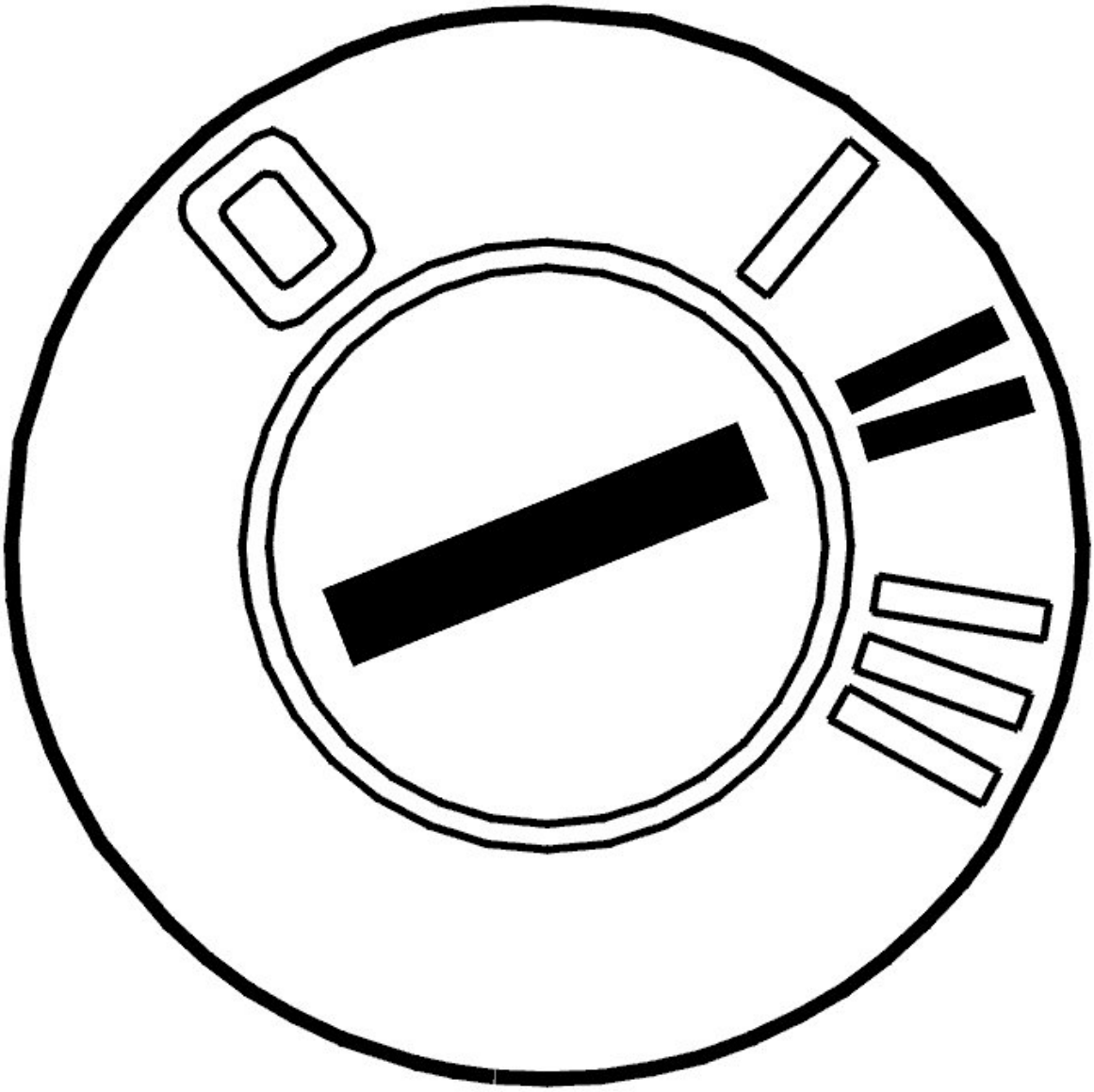
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

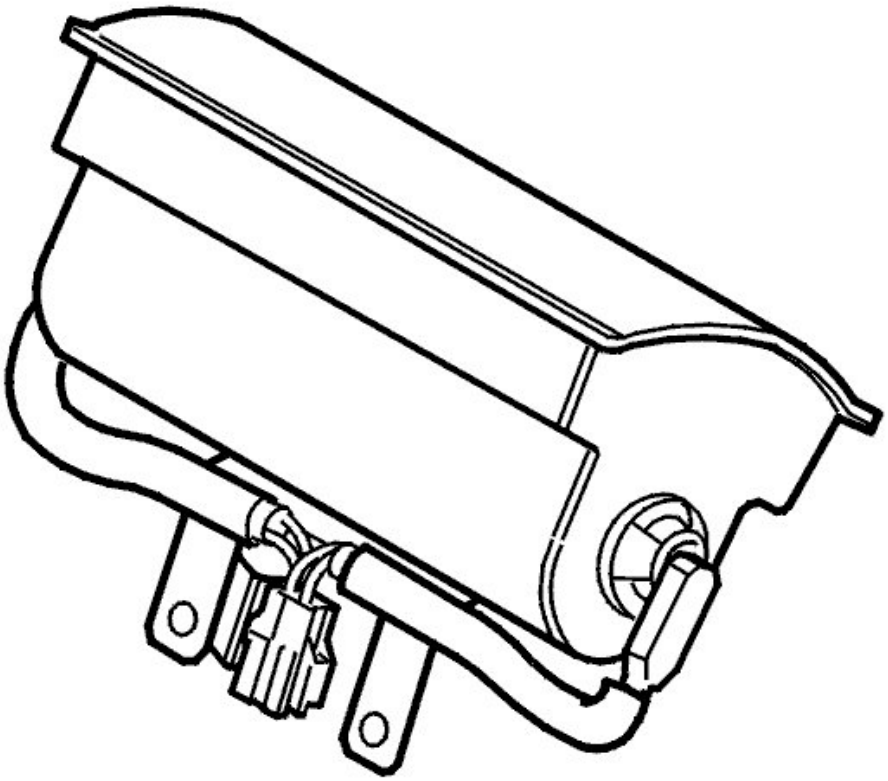
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0022 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0022 is displayed.

Substitute value

- Nothing.

Possible source

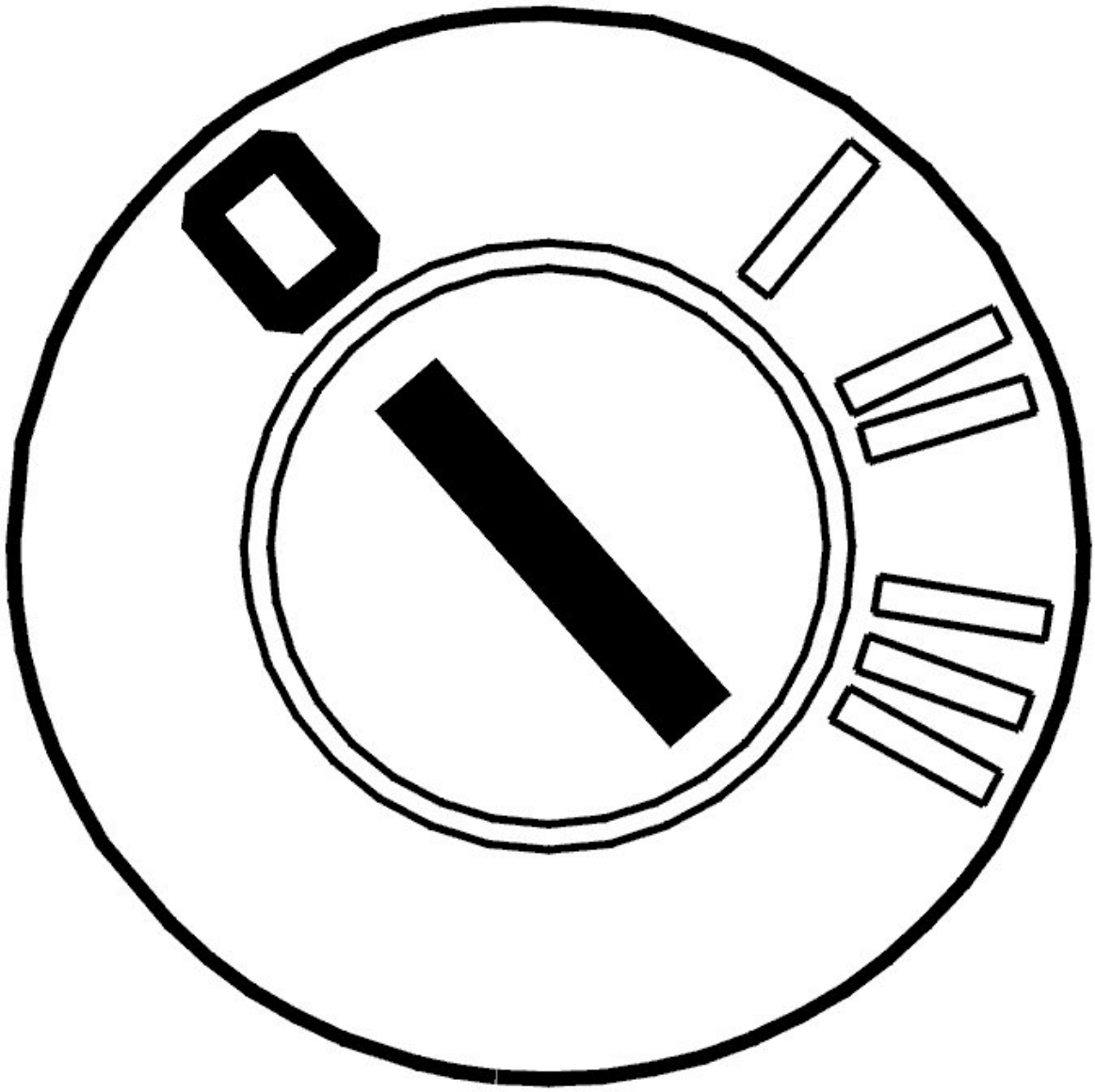
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

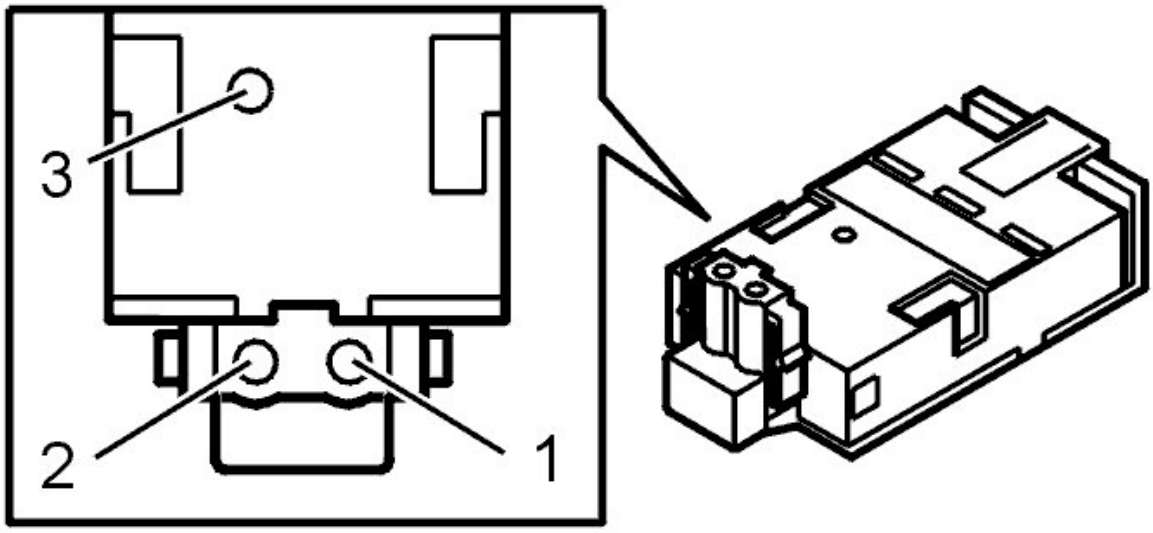
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

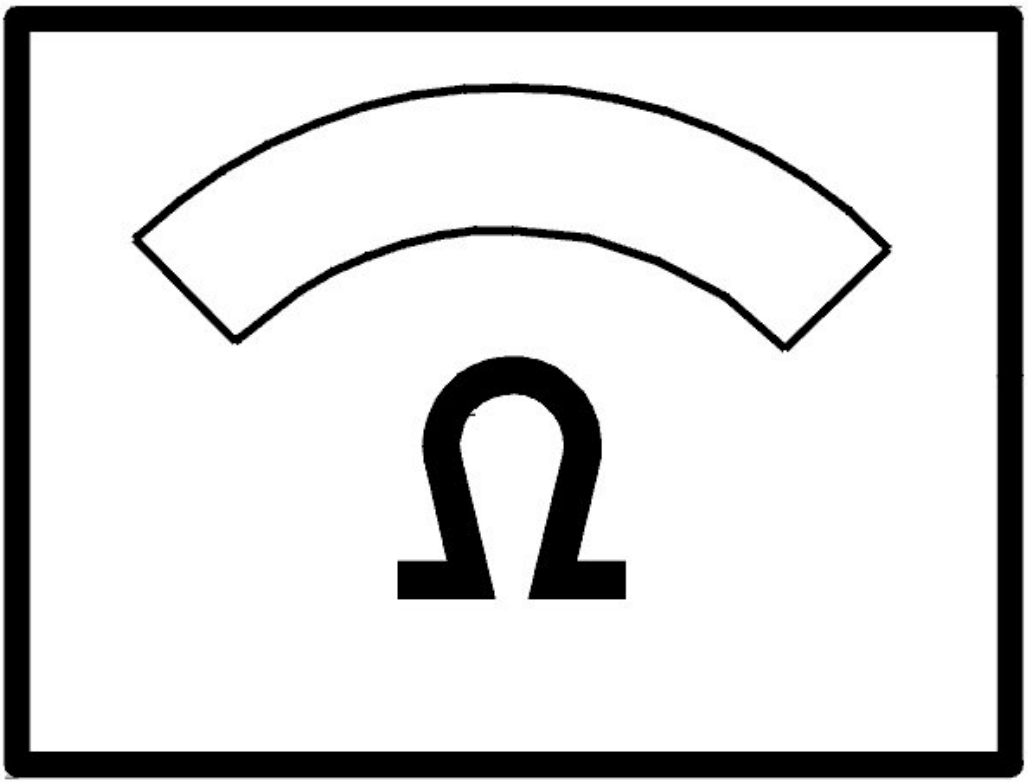
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent

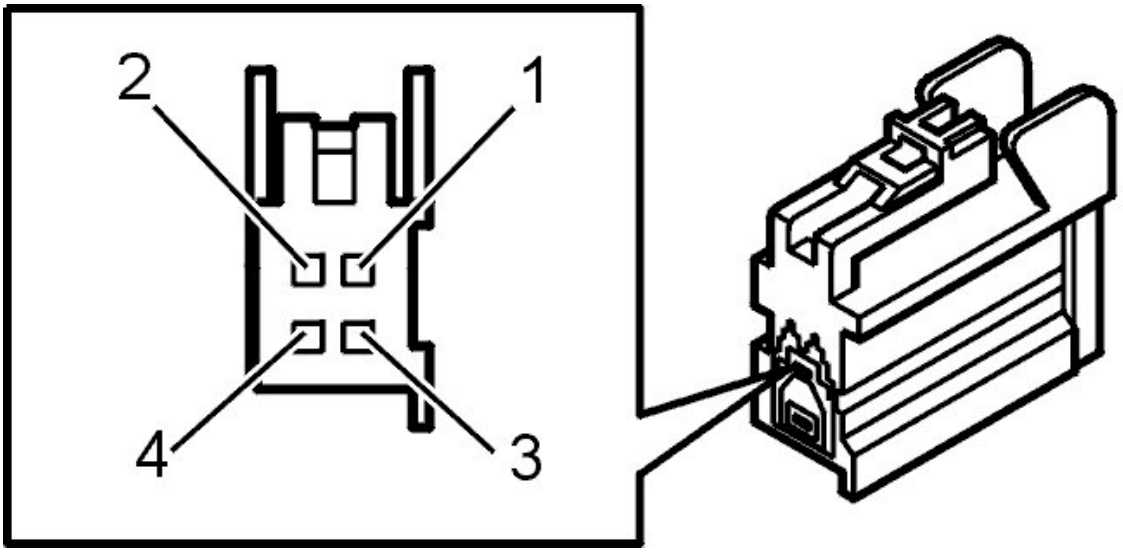
short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (green) for the passenger airbag, the resistance between terminals #1 and #2 of the 4-pin connector (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the SRS control module disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

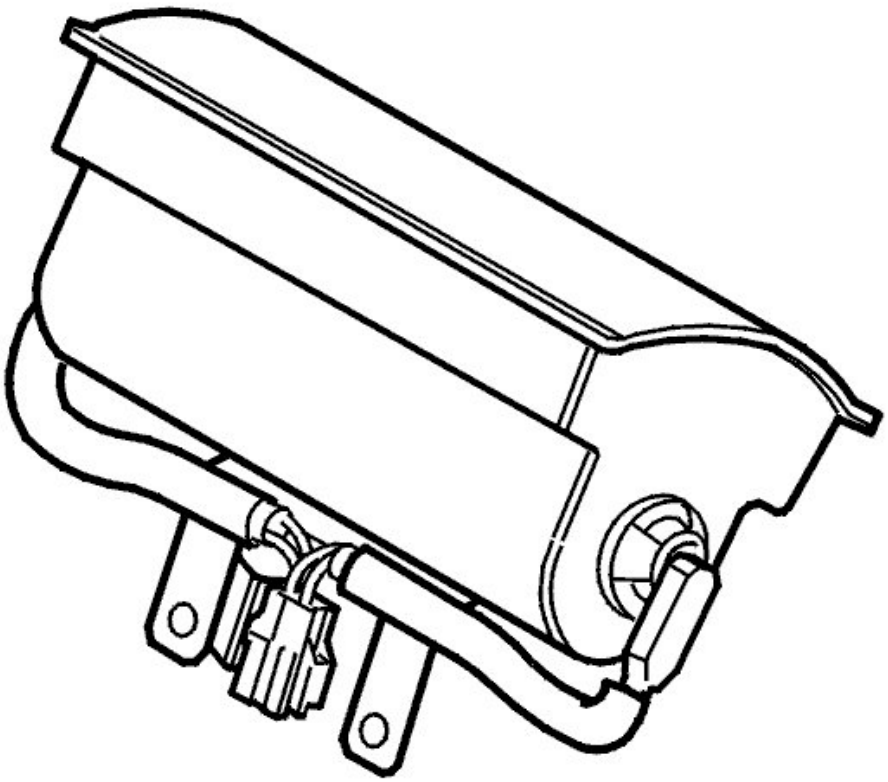
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0023 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0023 is displayed.

Substitute value
- Nothing.

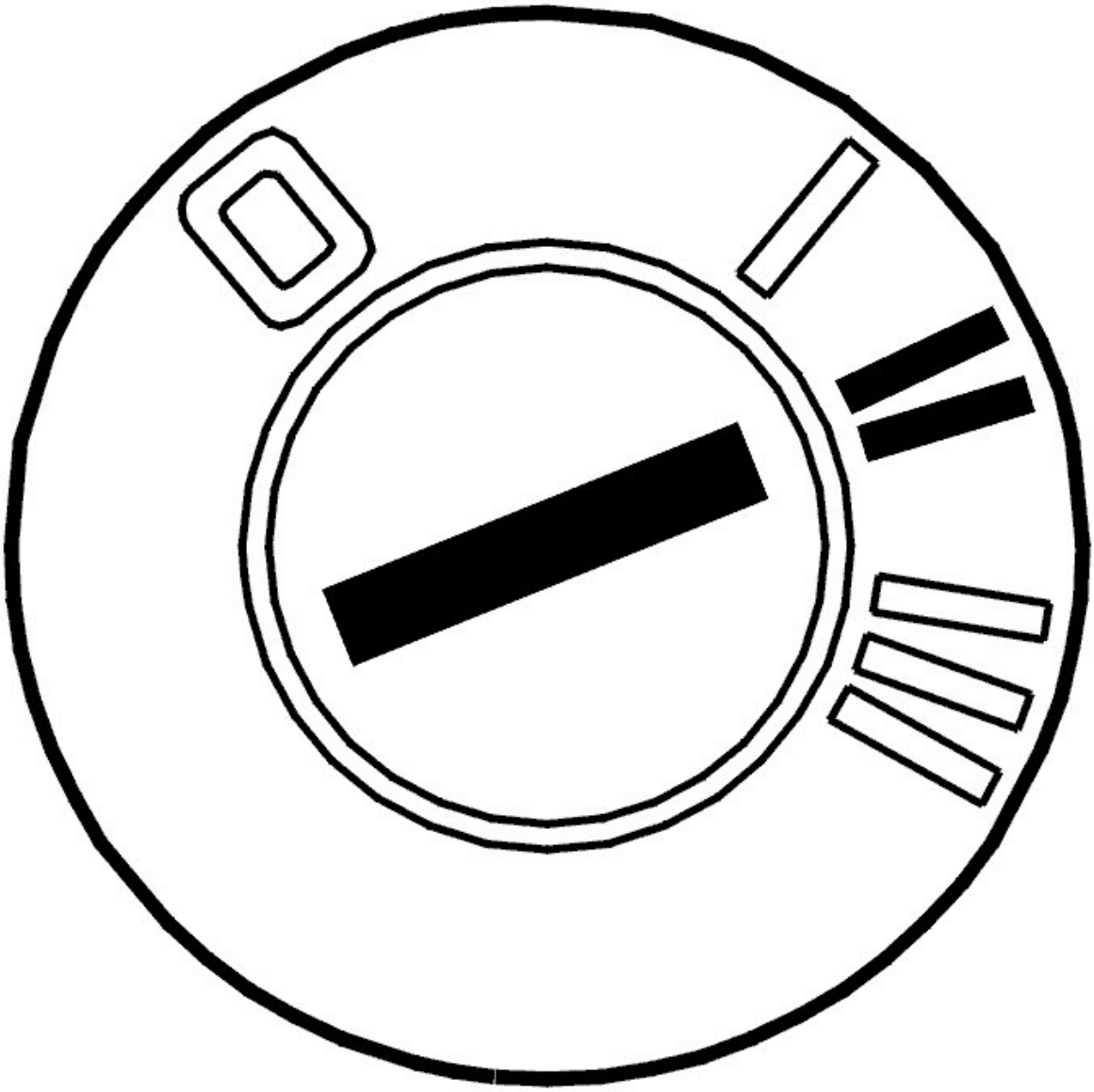
Possible source
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component



- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

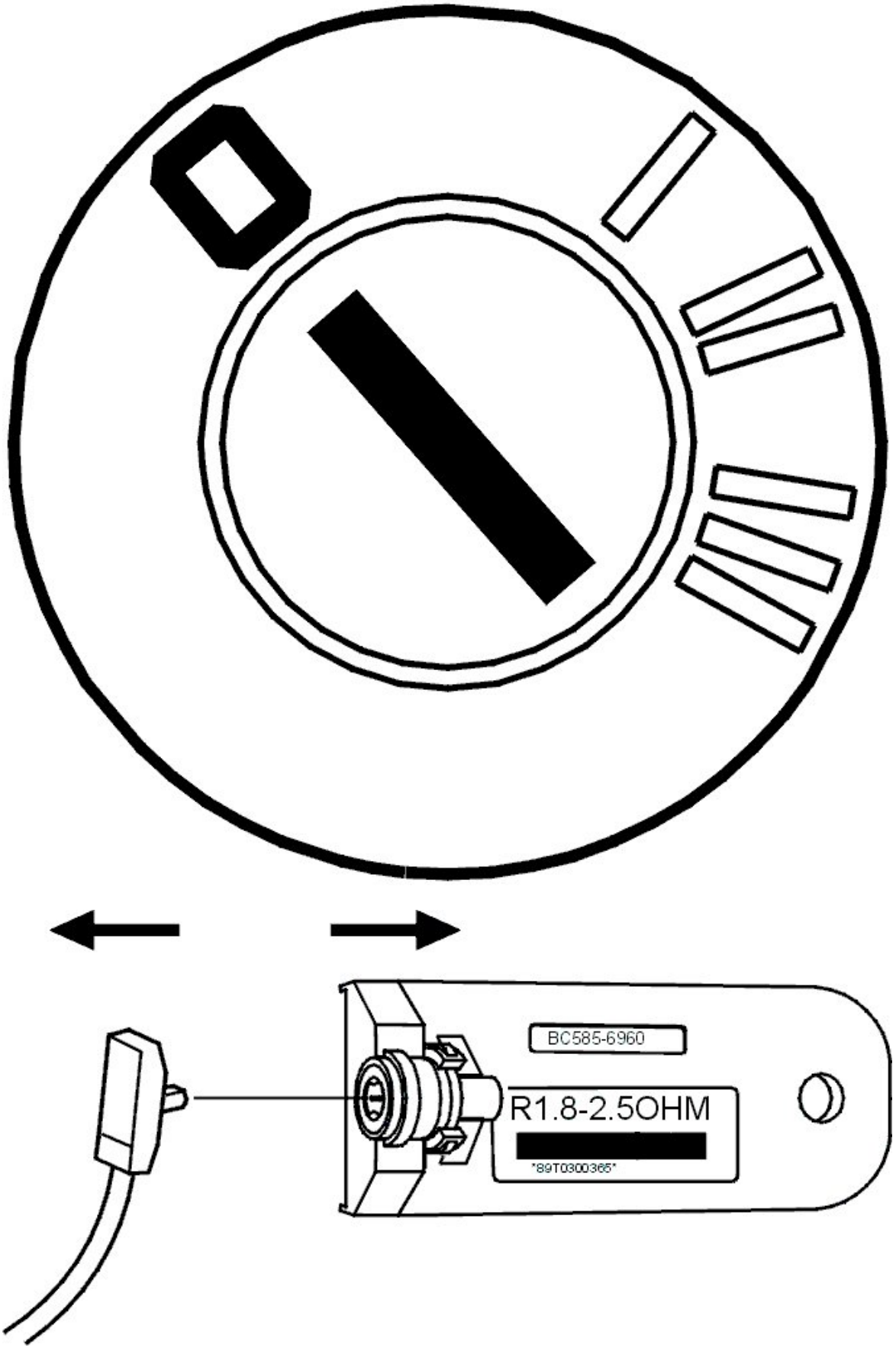
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

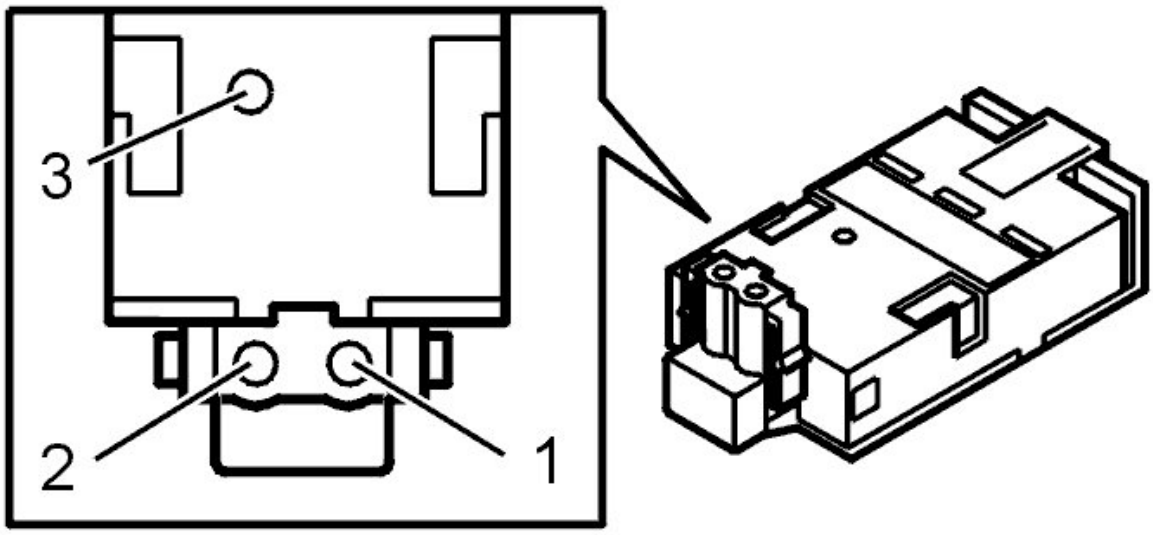
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #12B (40) and terminal #1 of the connector (green) on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and terminal #3 of the connector (green) on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

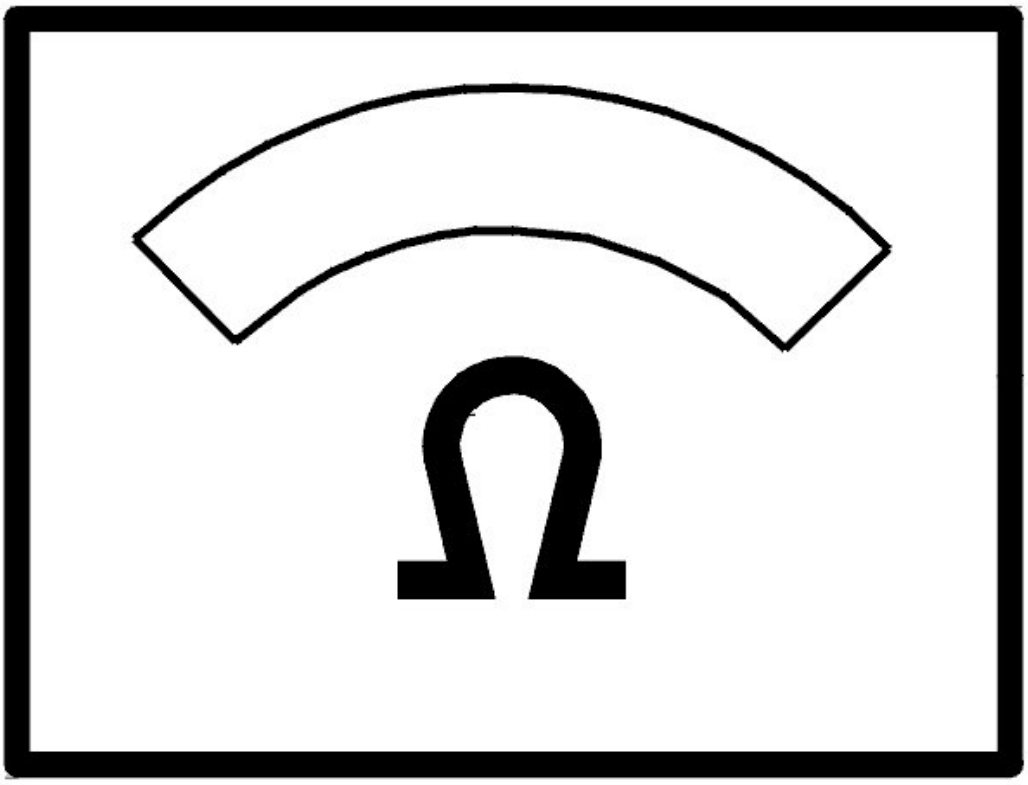
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the driver's airbag connector (green). The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

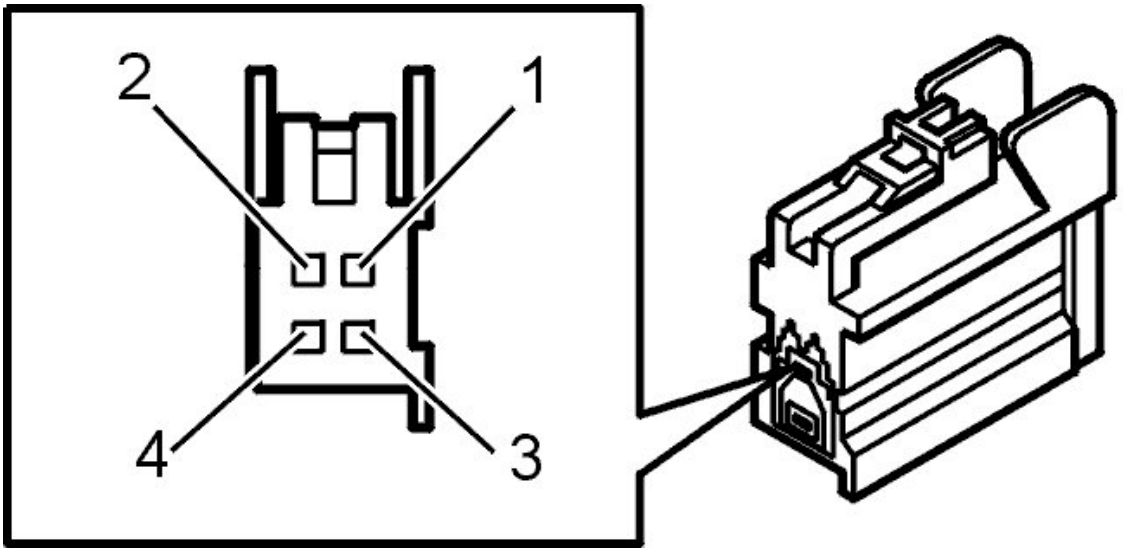
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

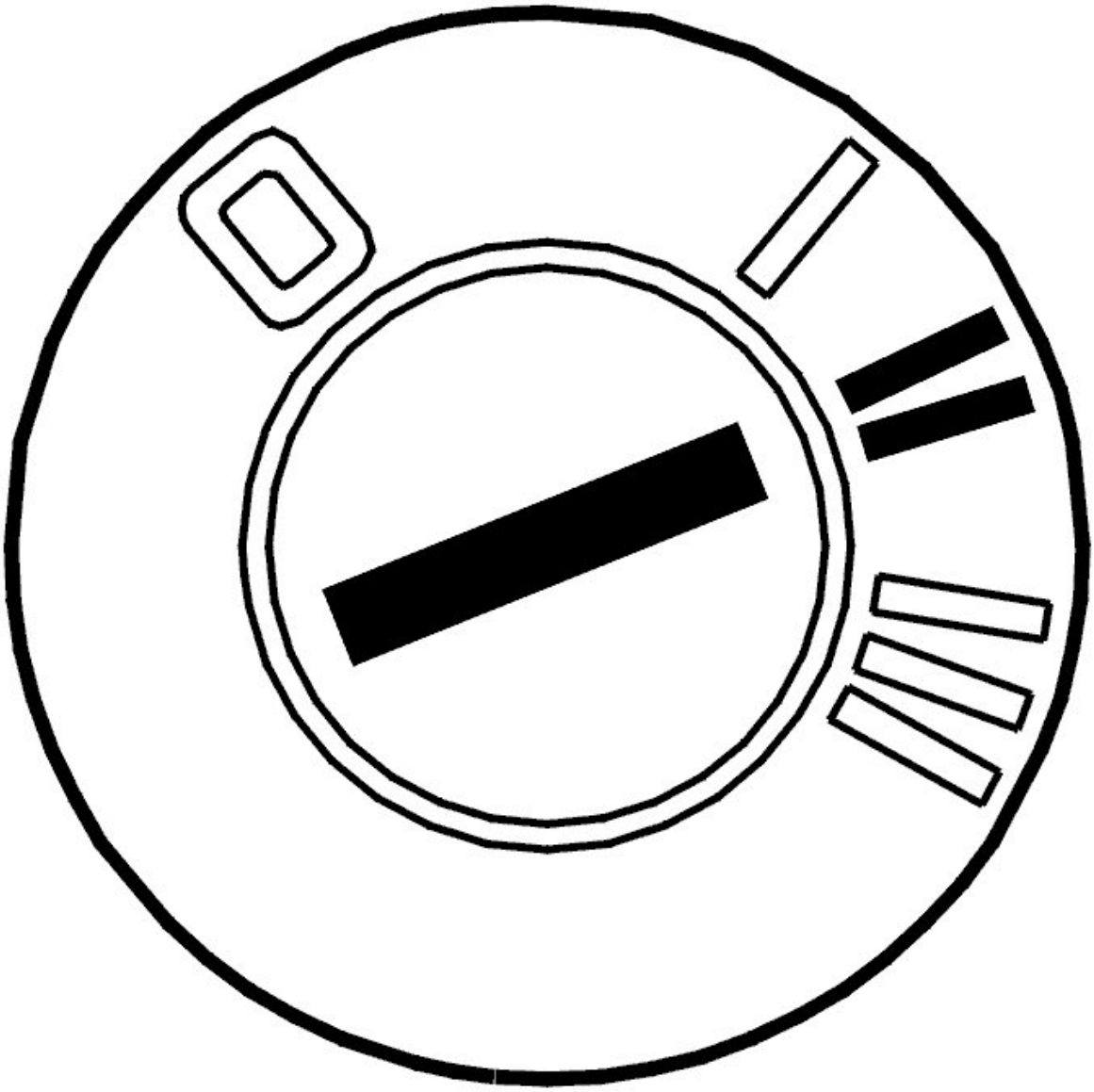
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

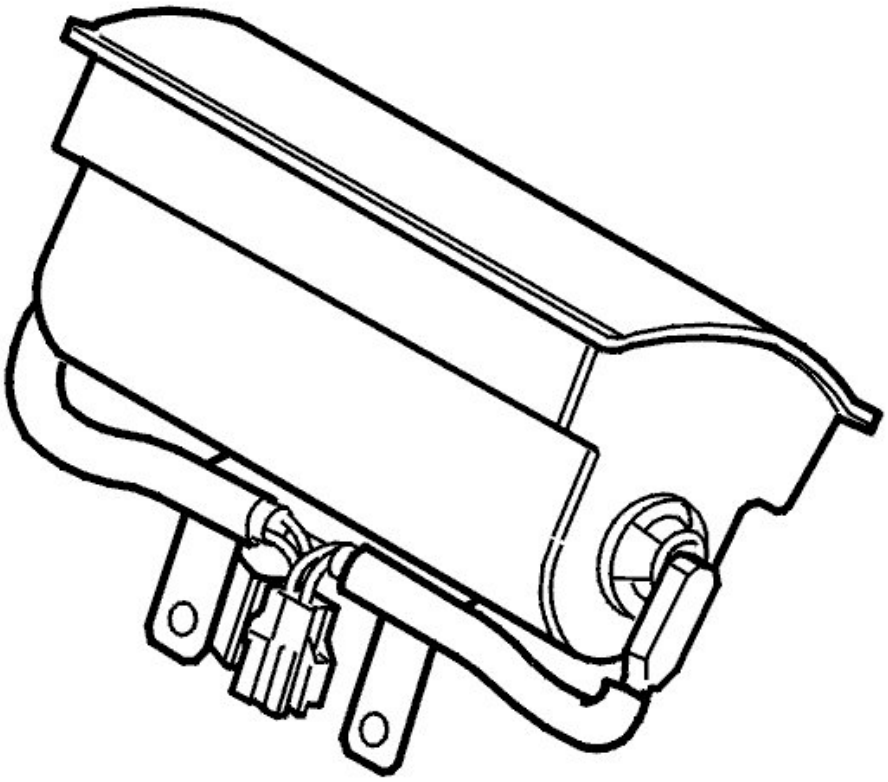
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0023 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0023 is displayed.

Substitute value

- Nothing.

Possible source

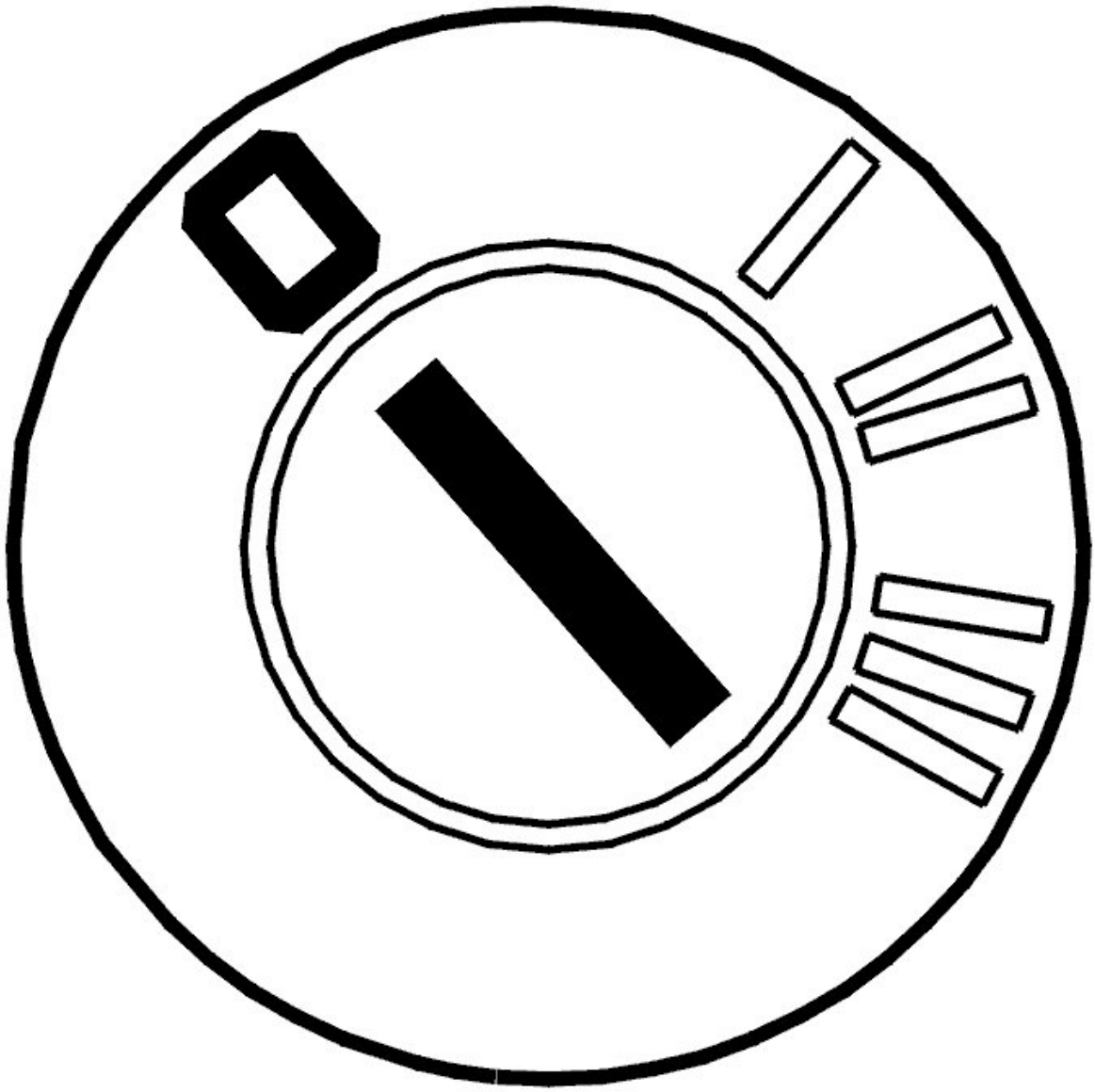
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General

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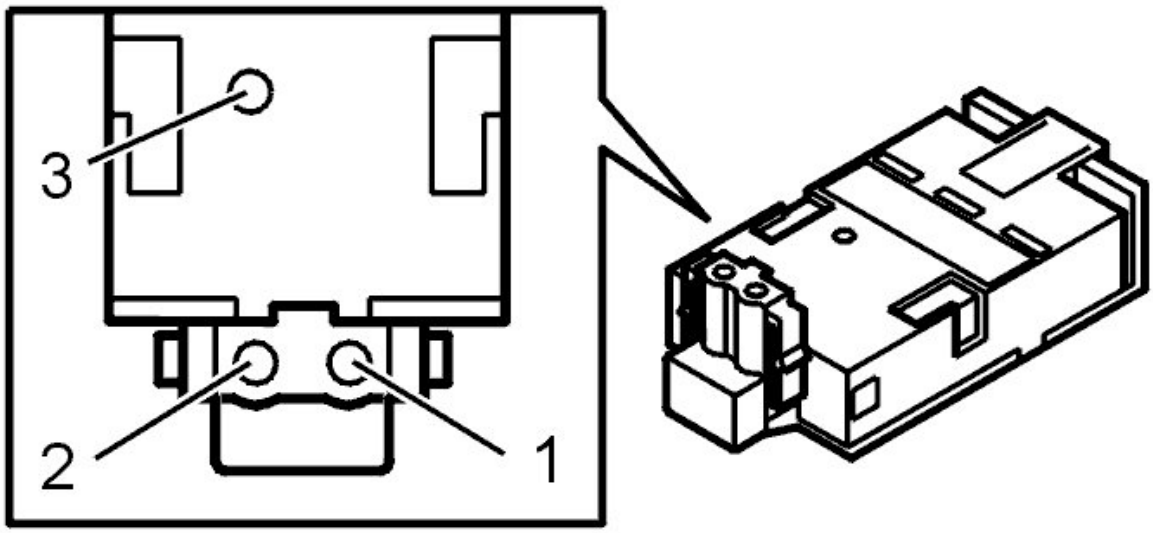
Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

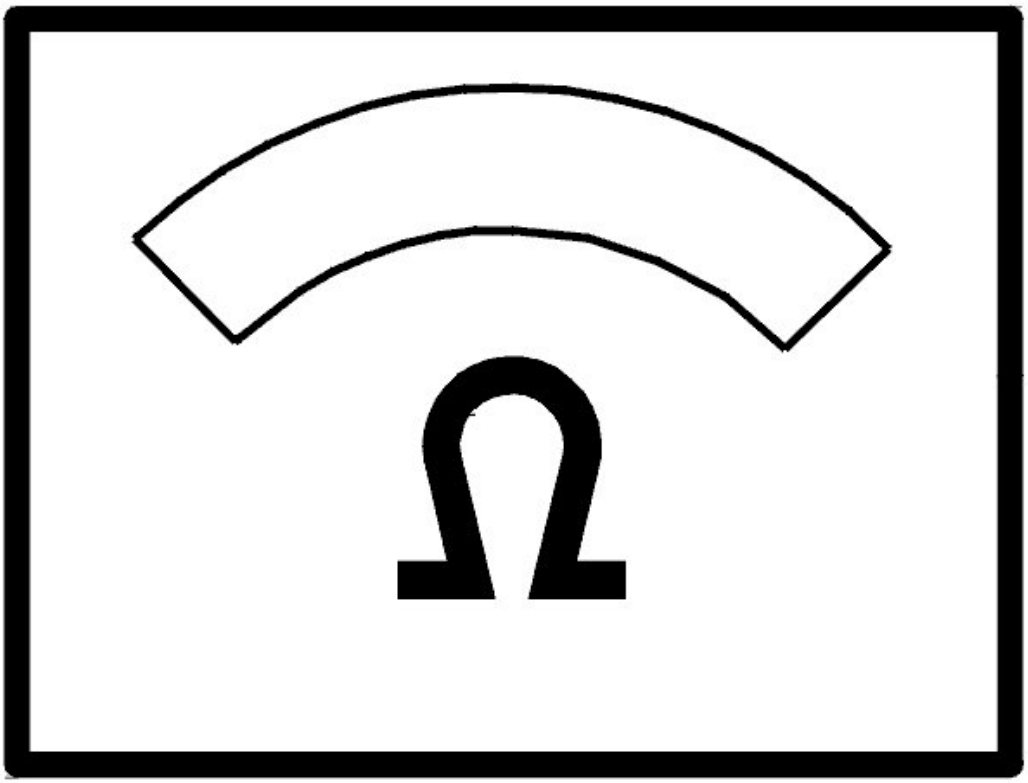
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the driver's airbag connector (green). The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

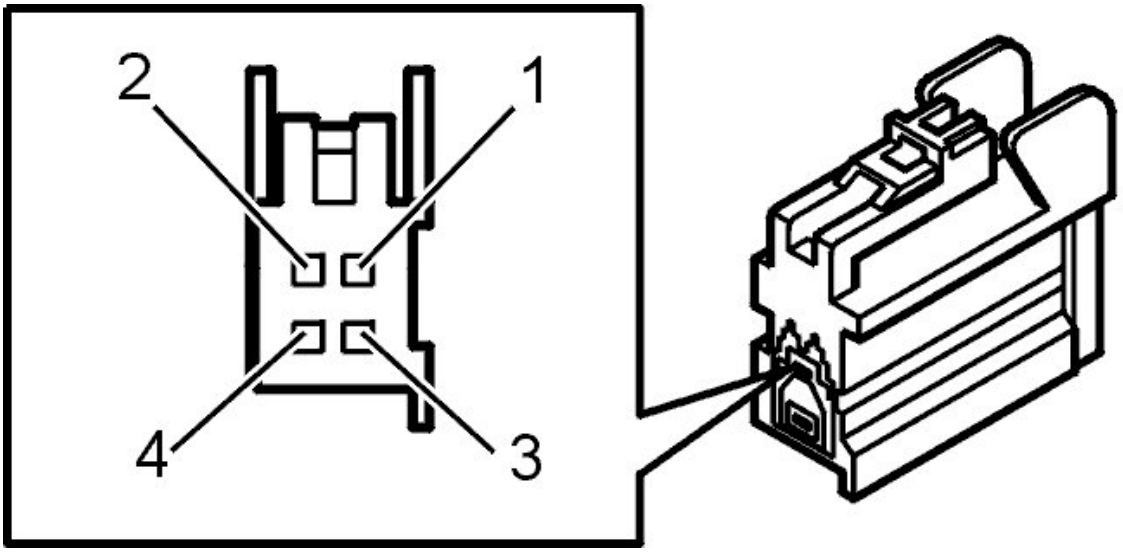
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

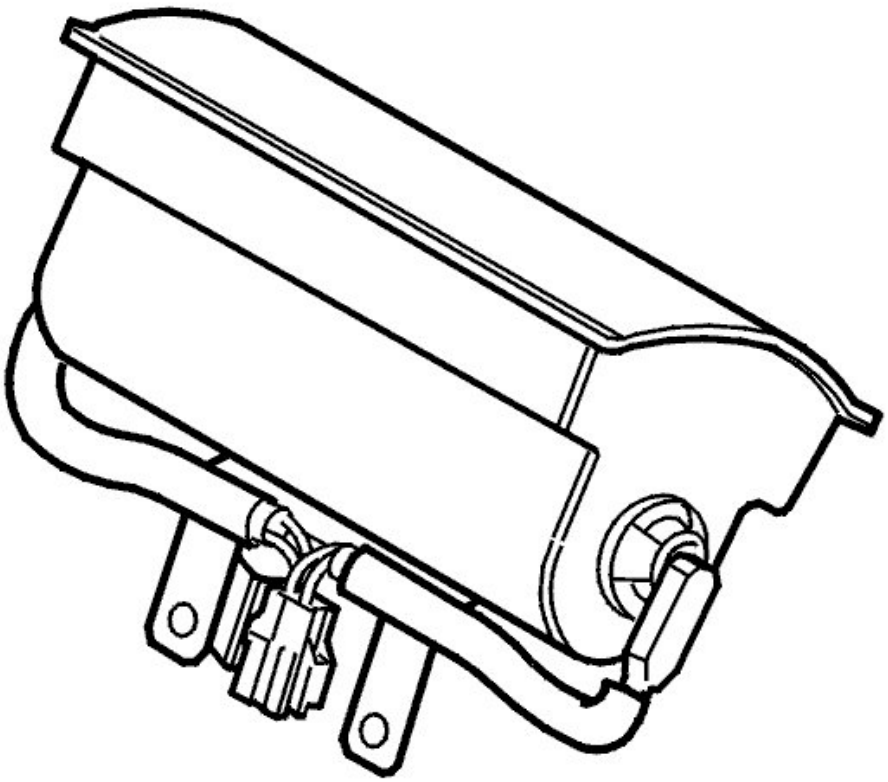
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0024 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0024 is displayed.

Substitute value
- Nothing.

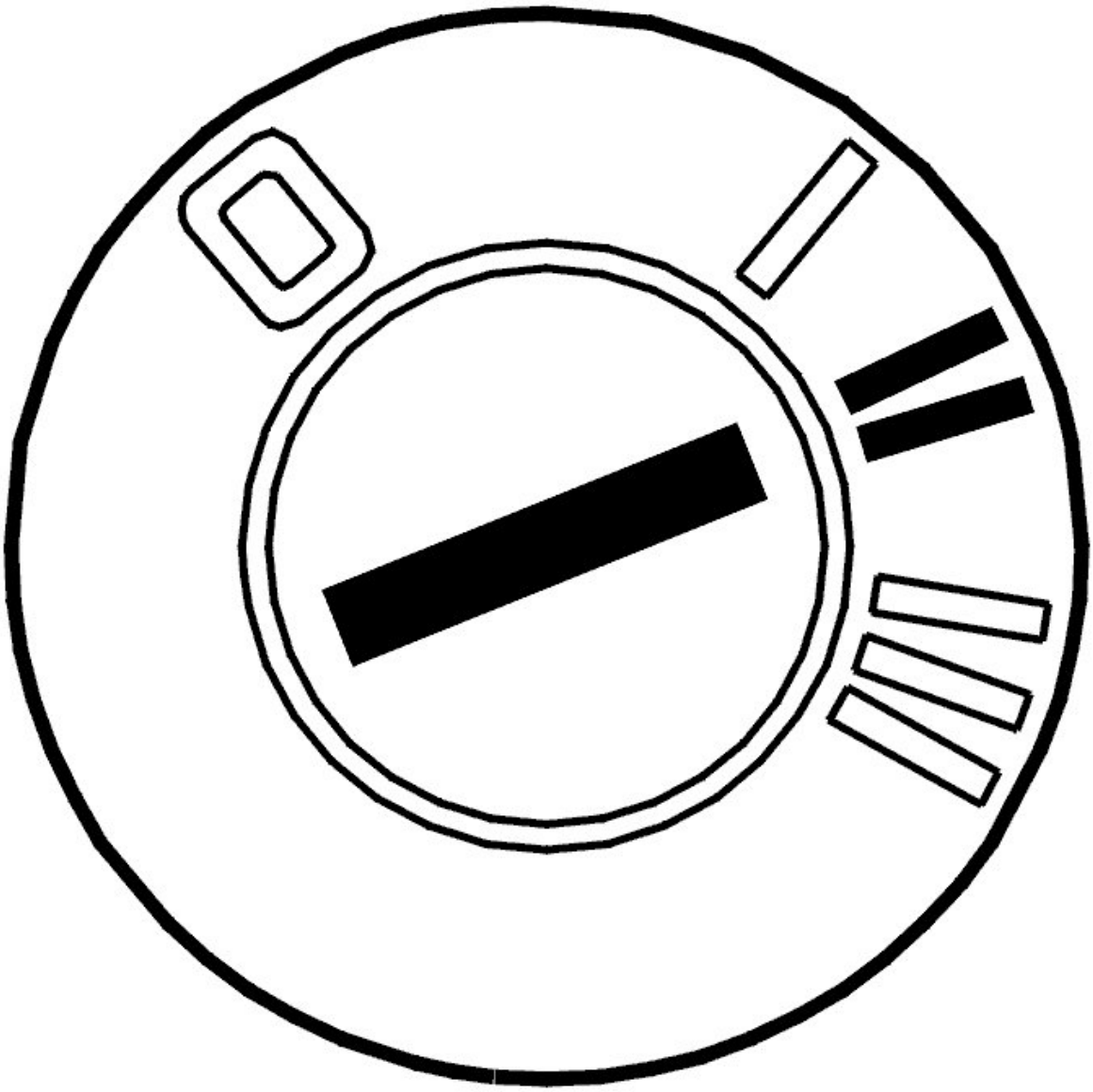
Possible source
- Open circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Open circuit in air bag (resistance in igniter too high).

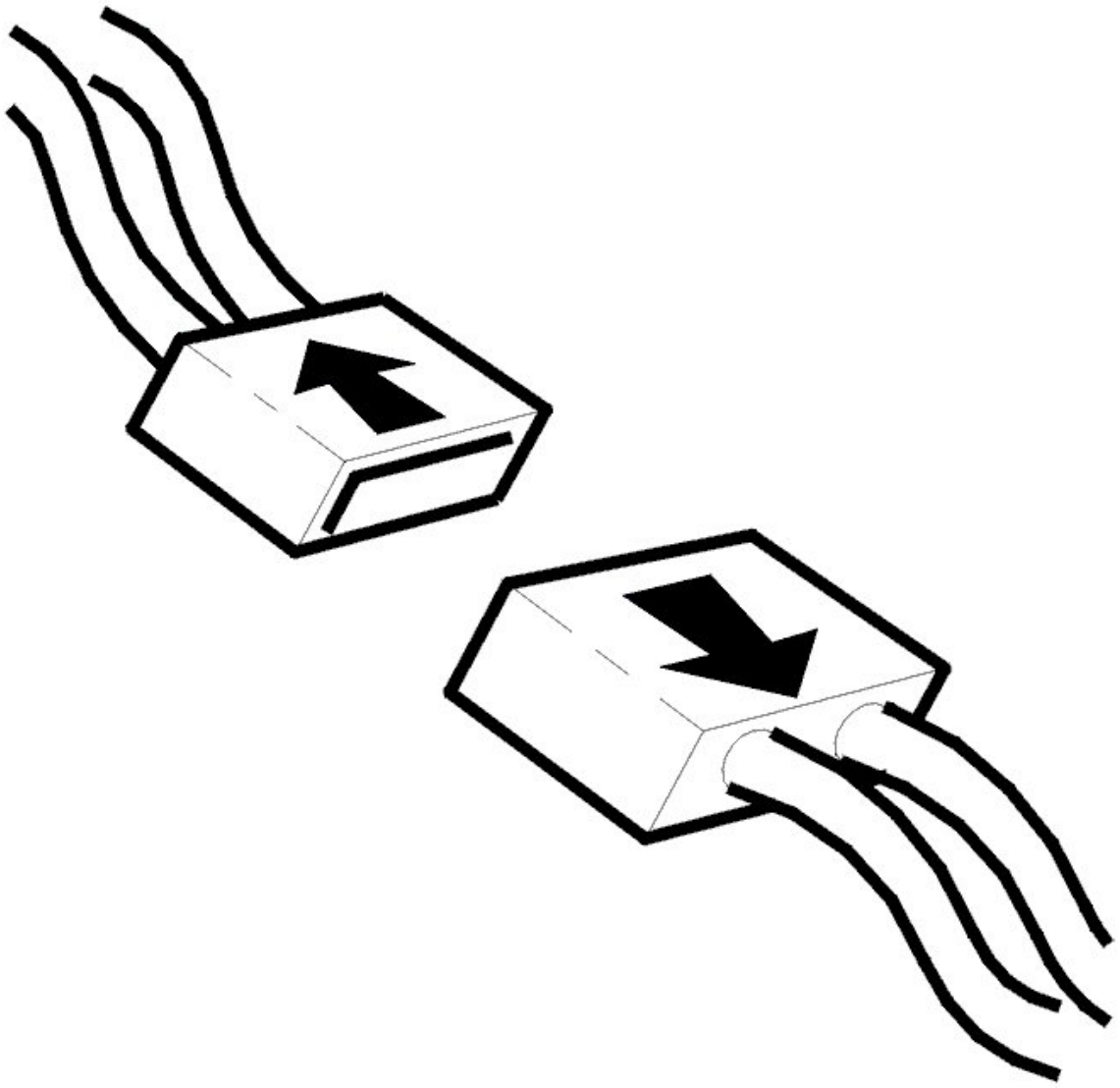
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

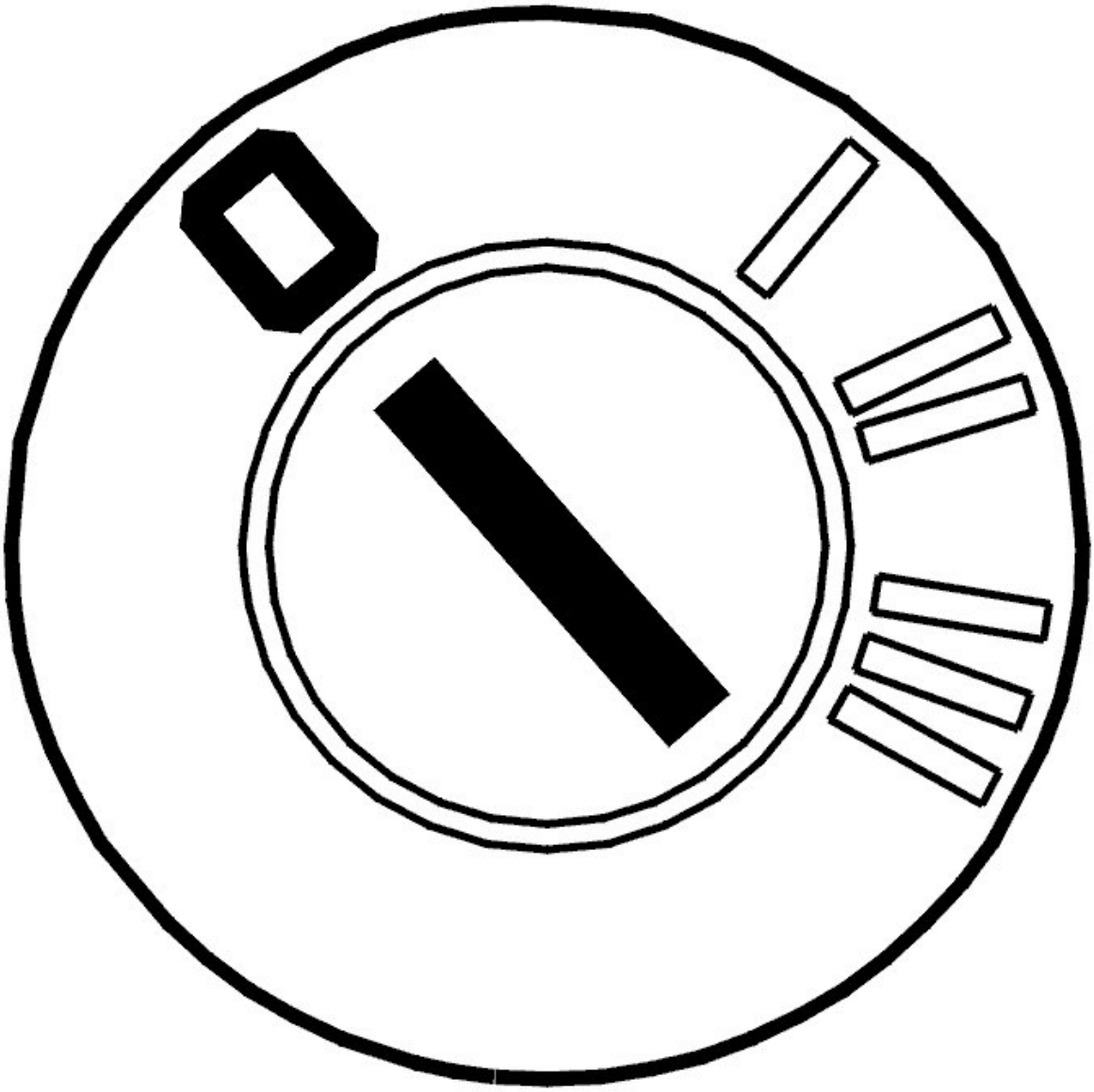
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

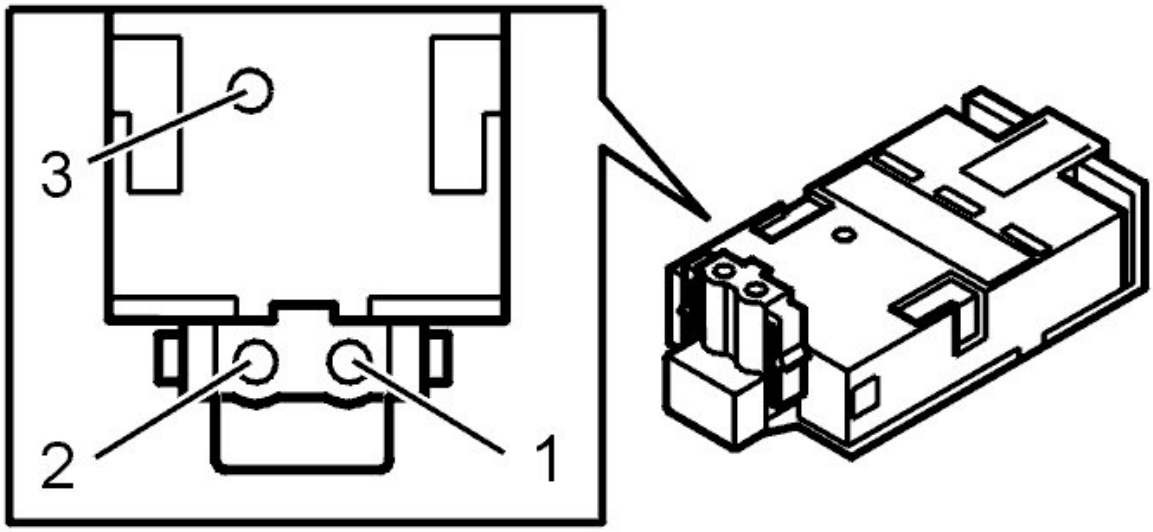
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

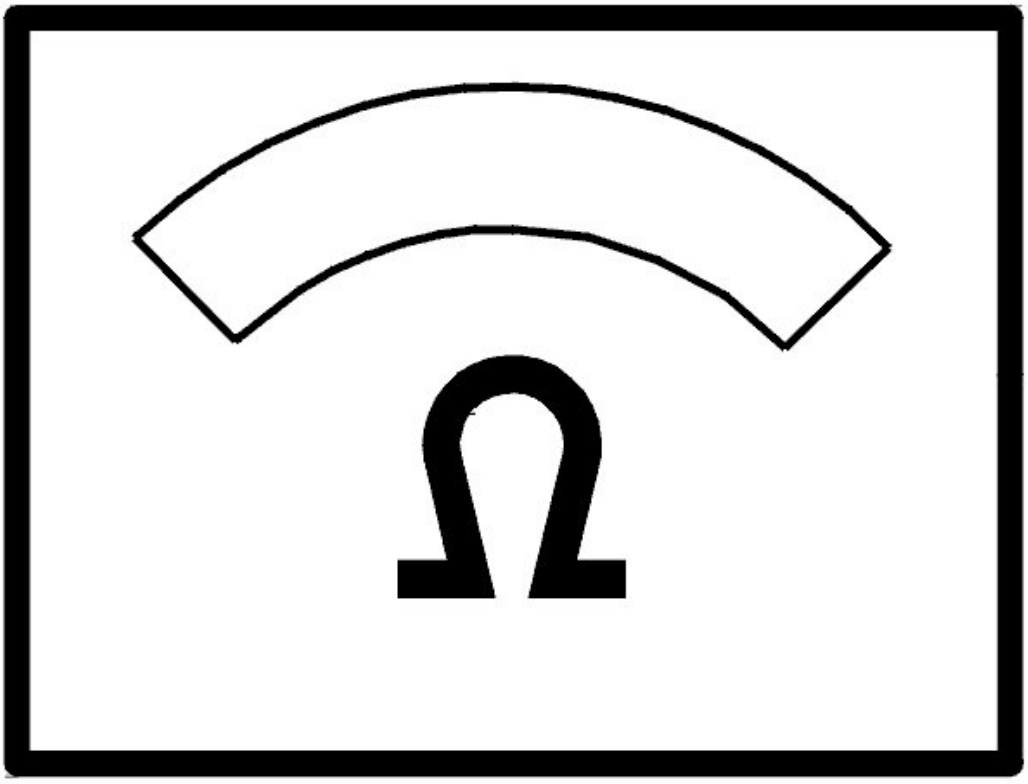
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #12B (40) and terminal #1 of the connector (green) on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and terminal #3 of the connector (green) on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

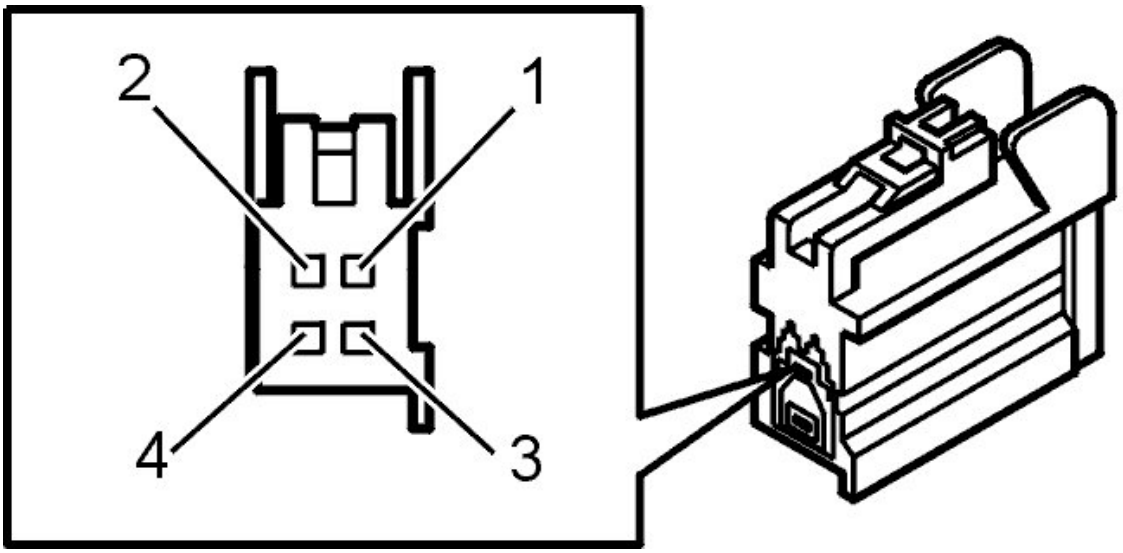
Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Information Bus/Testing and Inspection/Pinout Values and Diagnostic Parameters
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

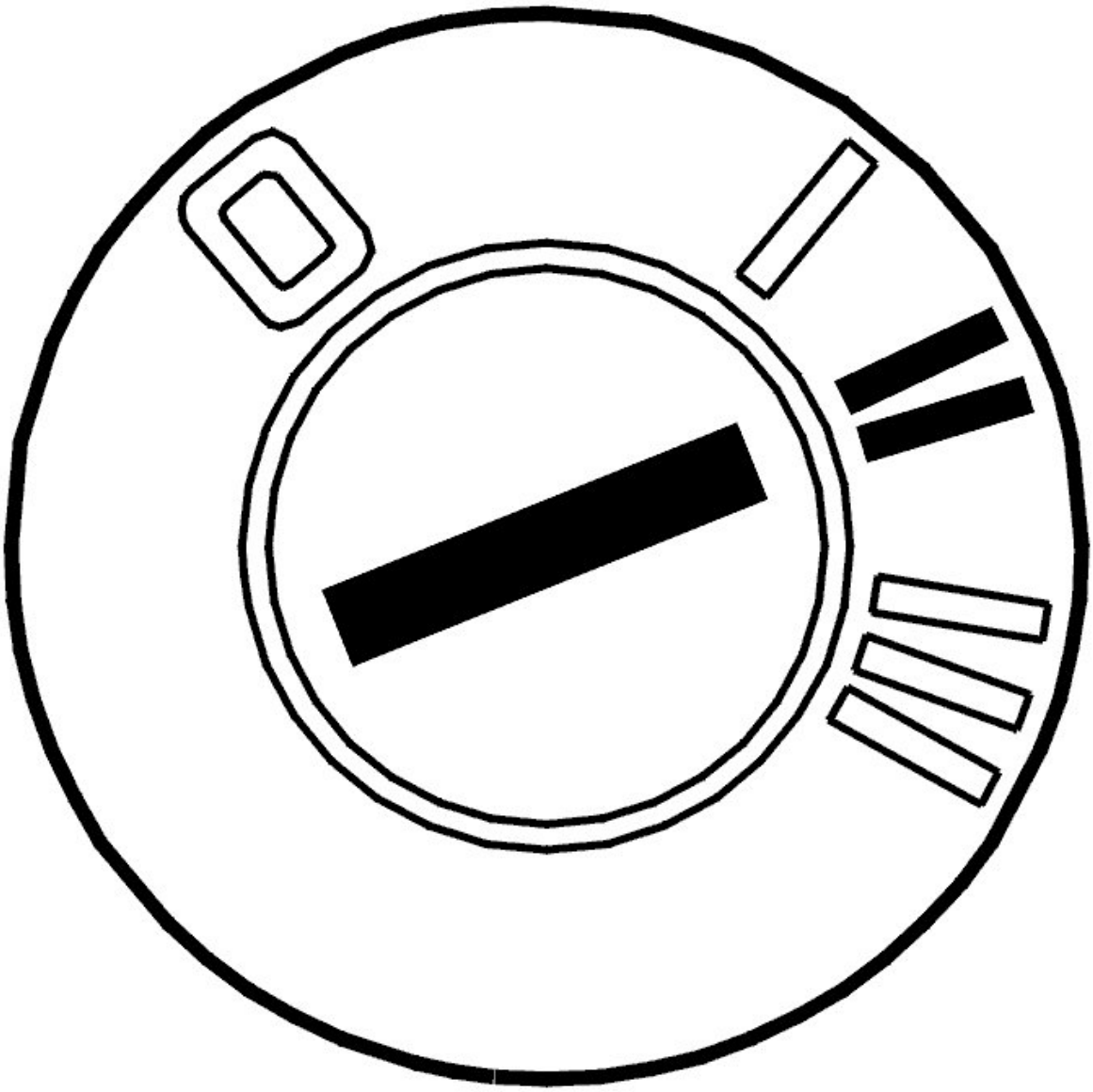
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

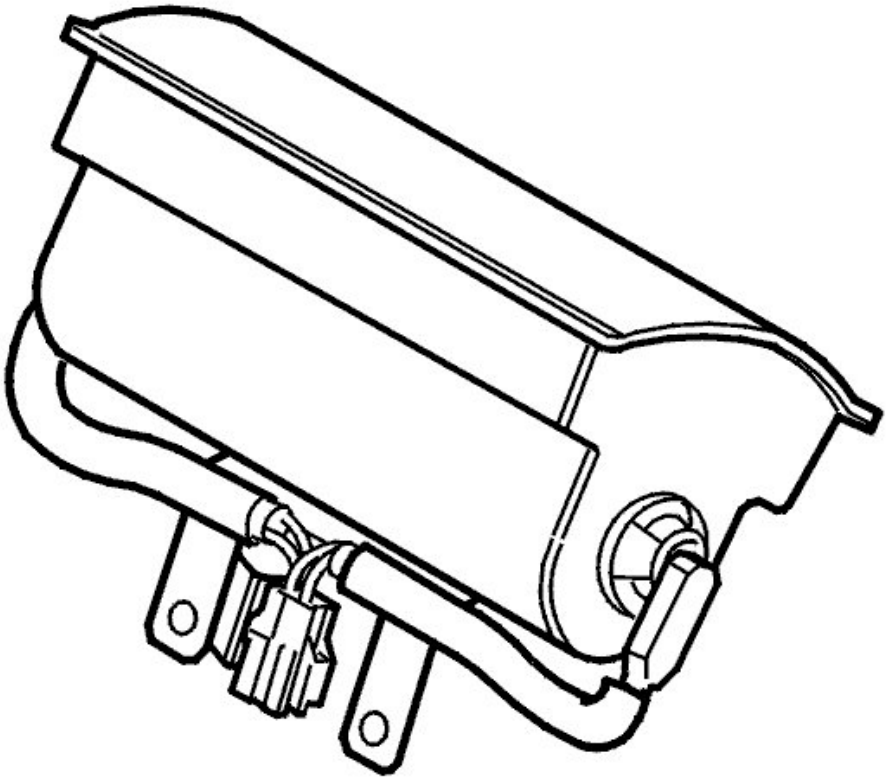
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0024 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0024 is displayed.

Substitute value
- Nothing.

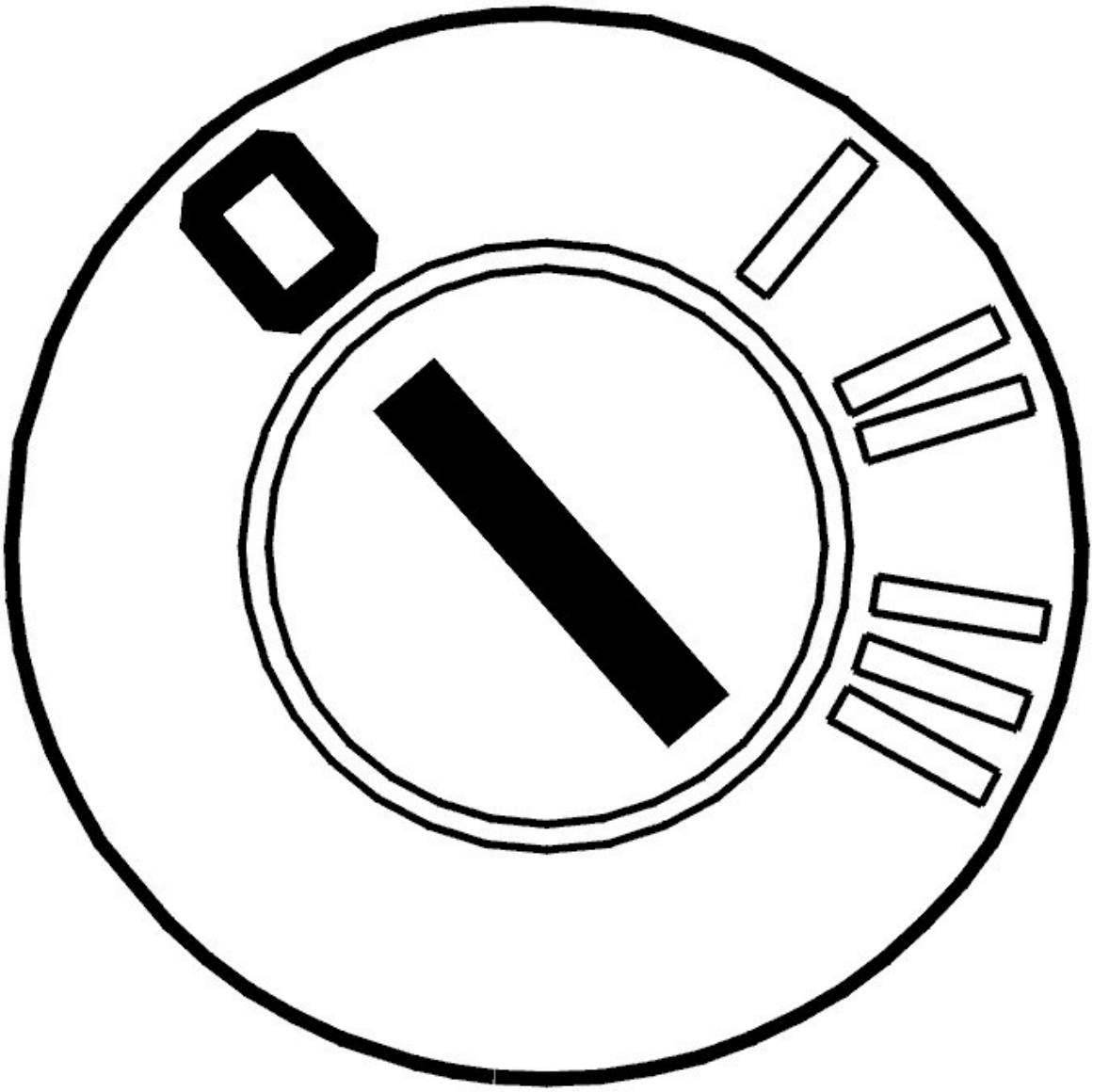
Possible source
- Open circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Open circuit in air bag (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

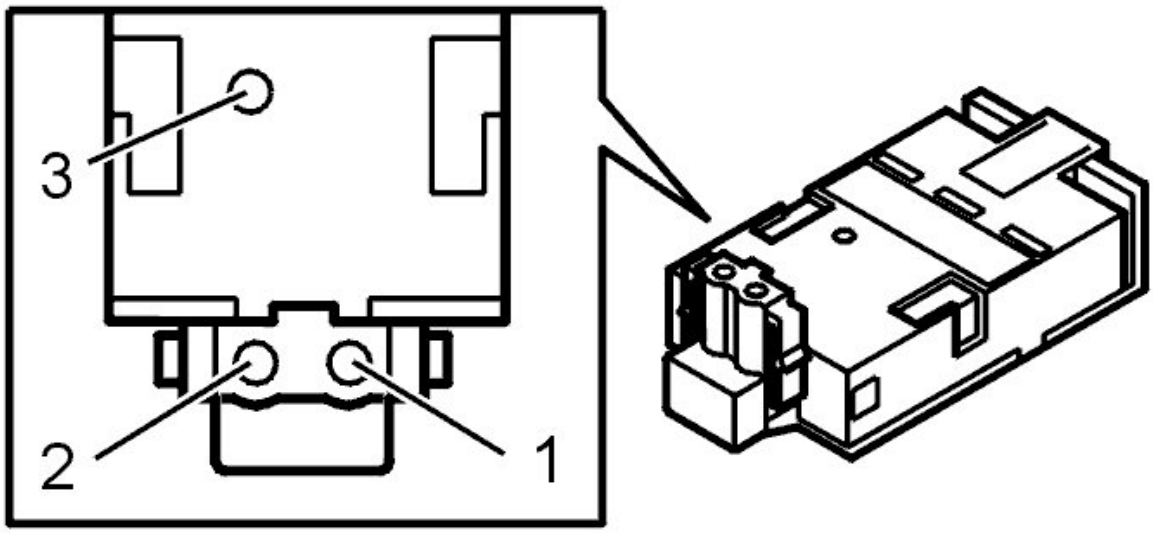
Check the connectors for:
- the passenger side airbag
- 4-pin
- the SRS control module.

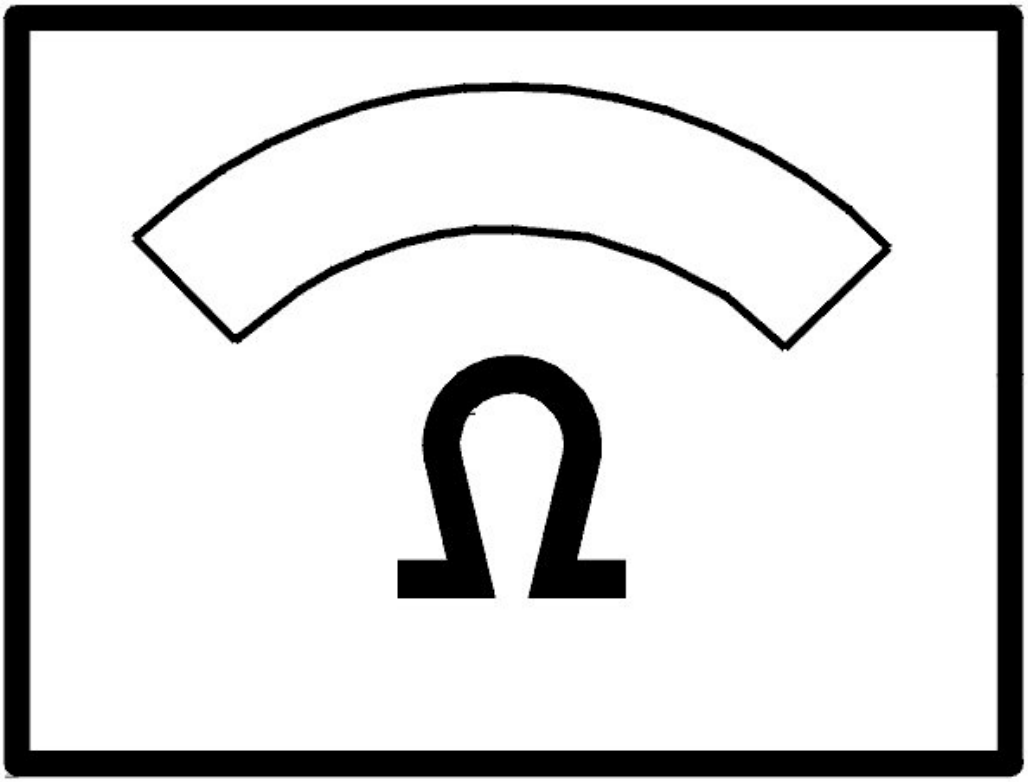
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

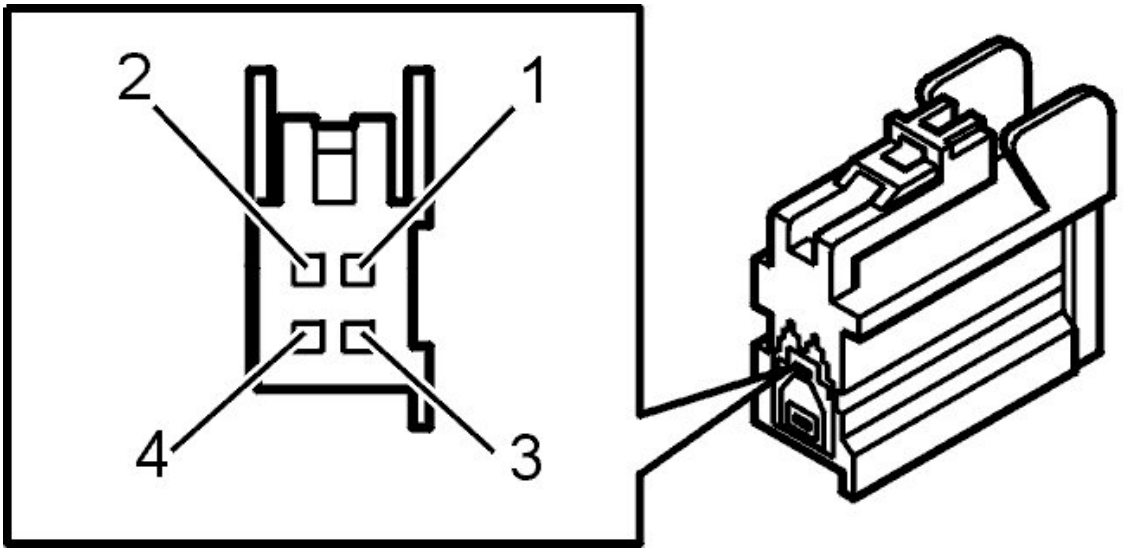
Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

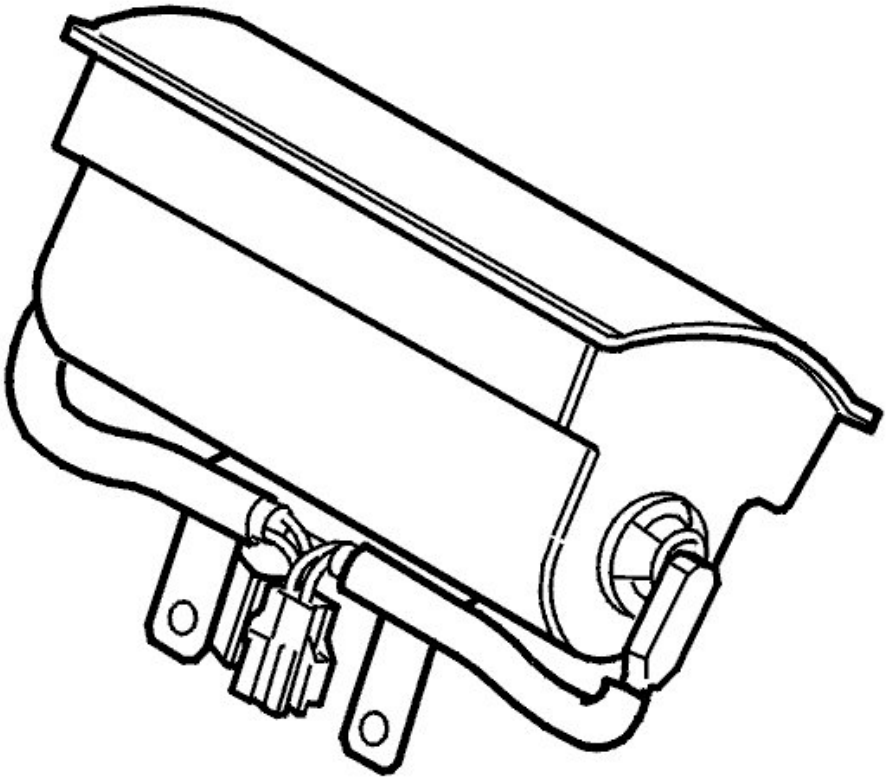
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0025 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0025 is displayed.

Substitute value
- Nothing.

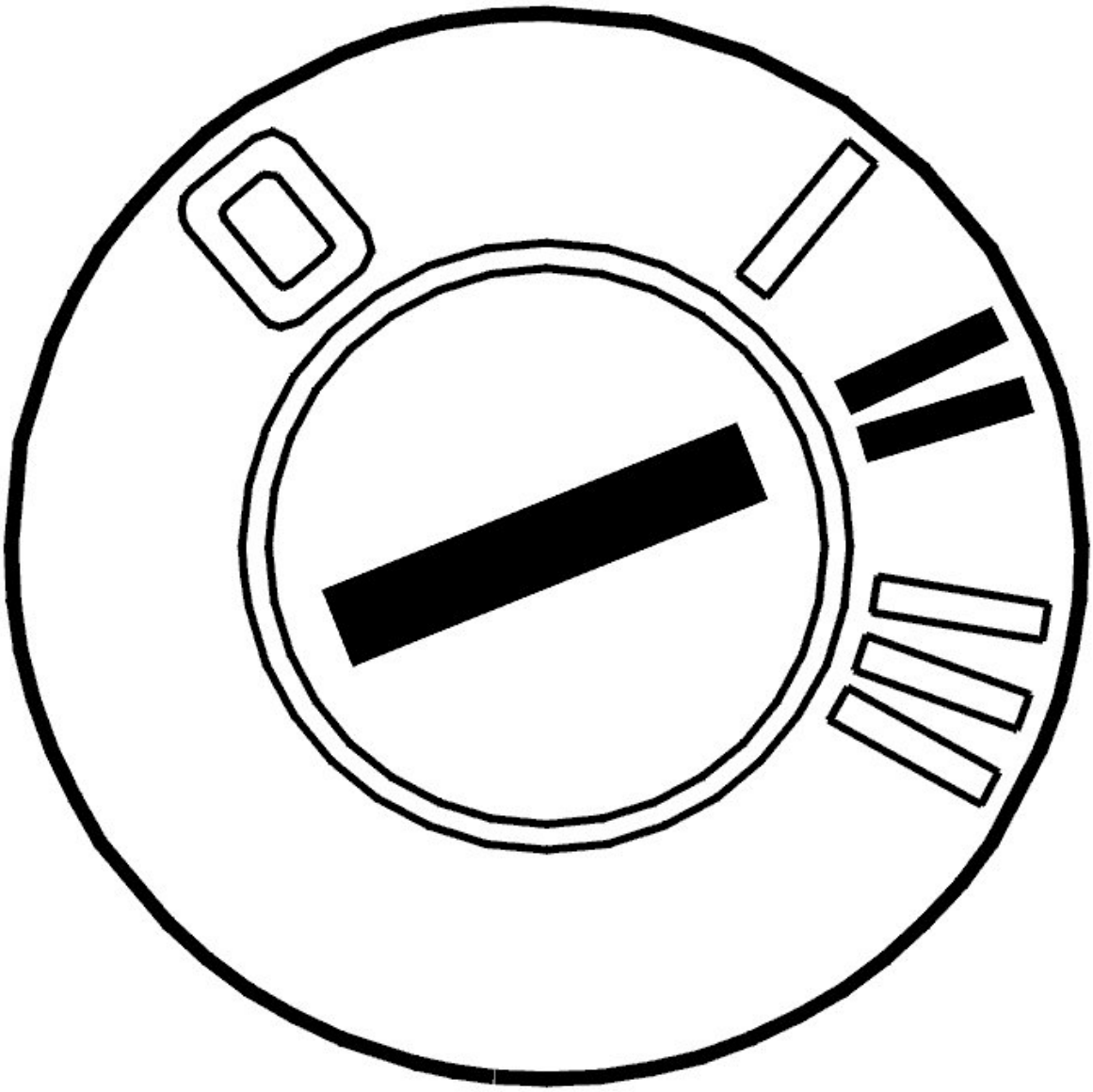
Possible source
- Short circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit in air bag (resistance in igniter too low).

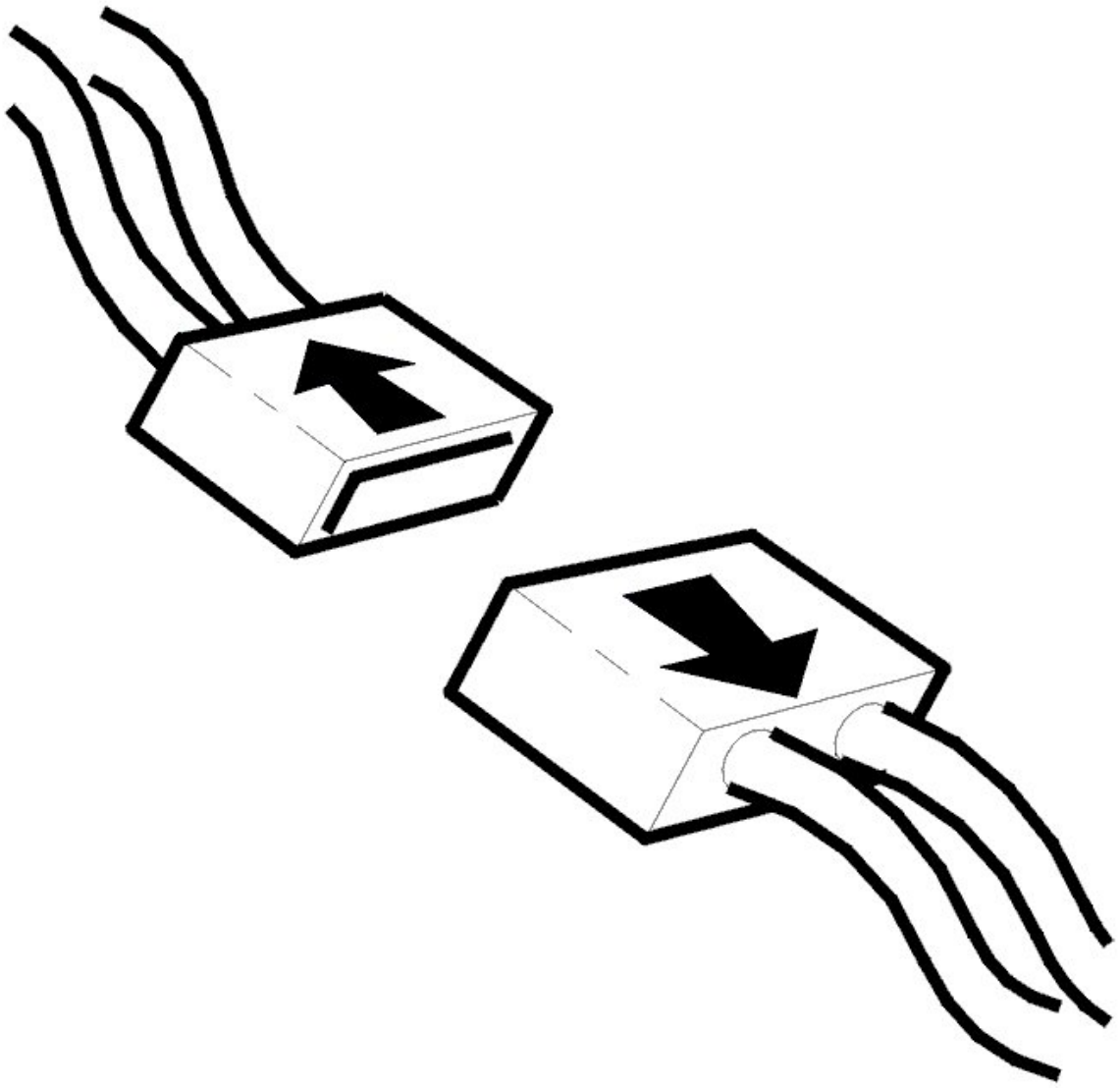
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (green) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (green) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

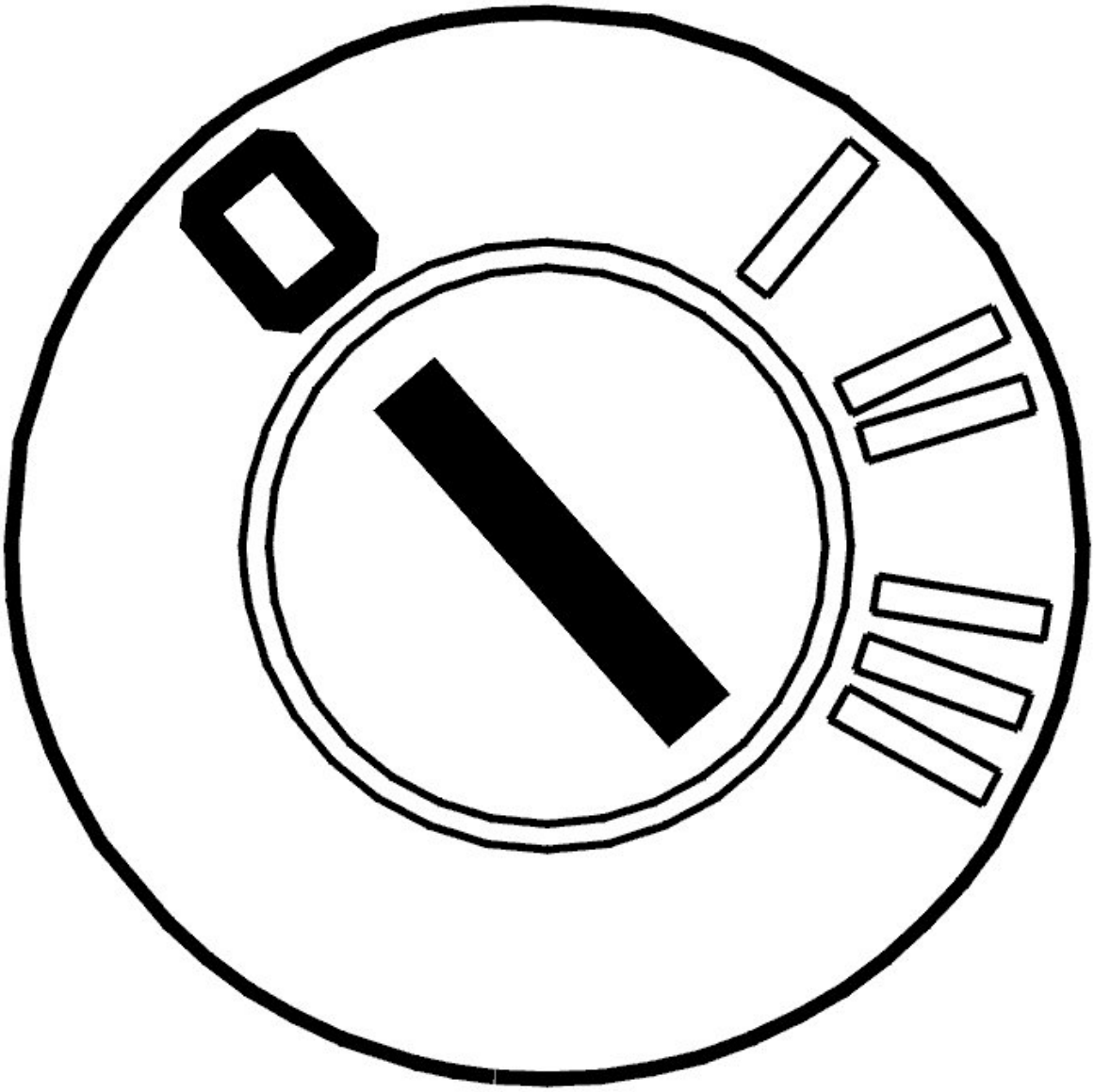
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

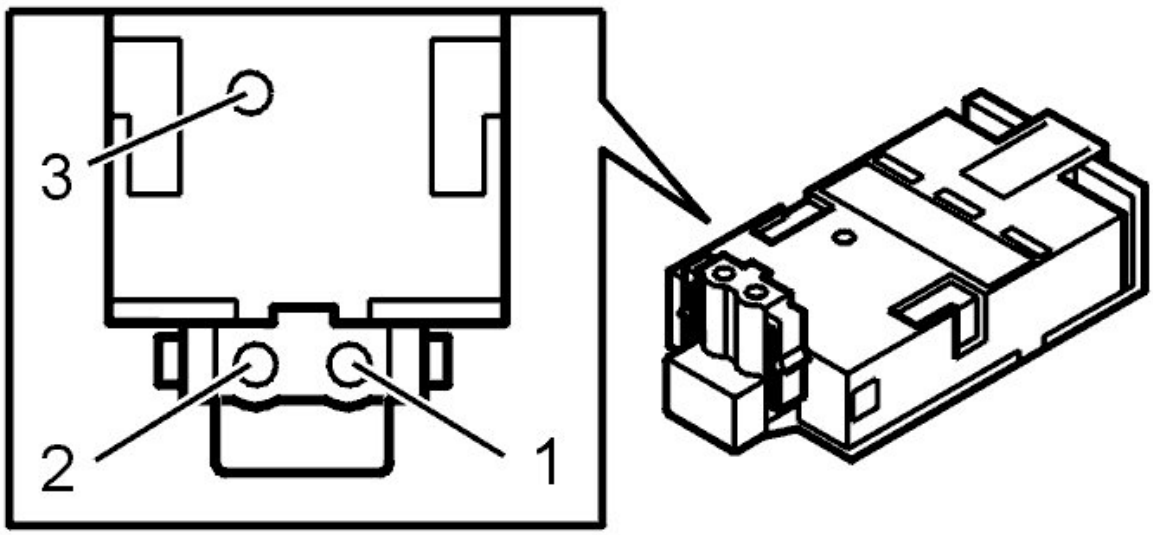
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

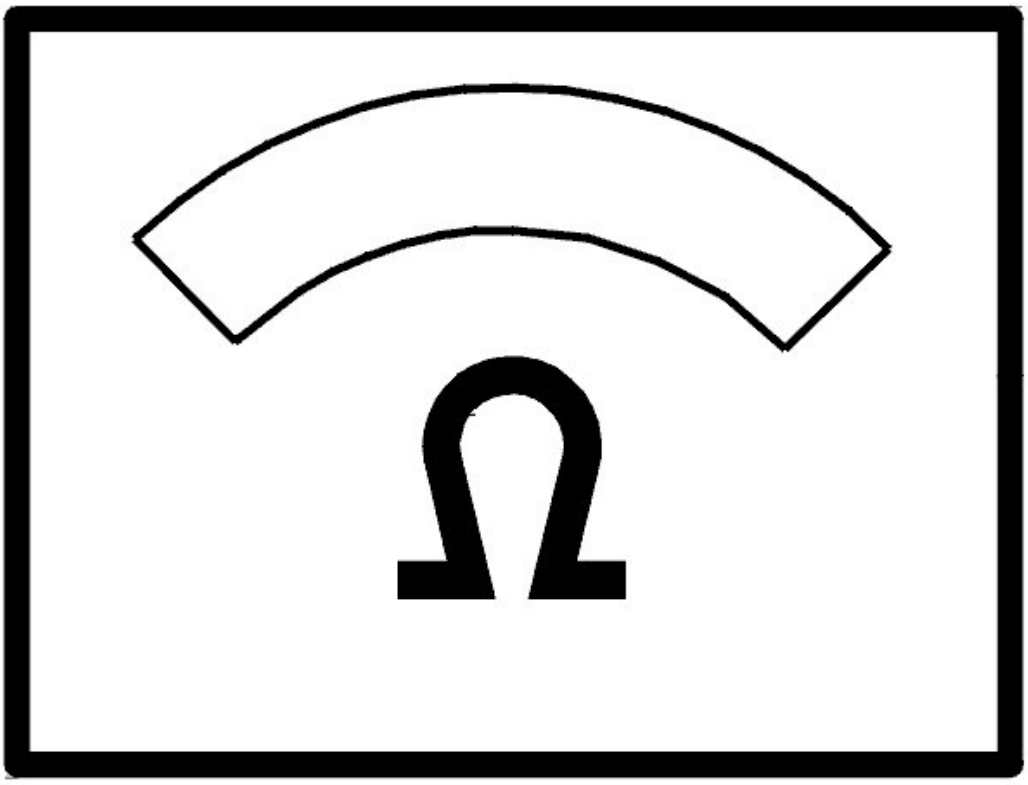
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

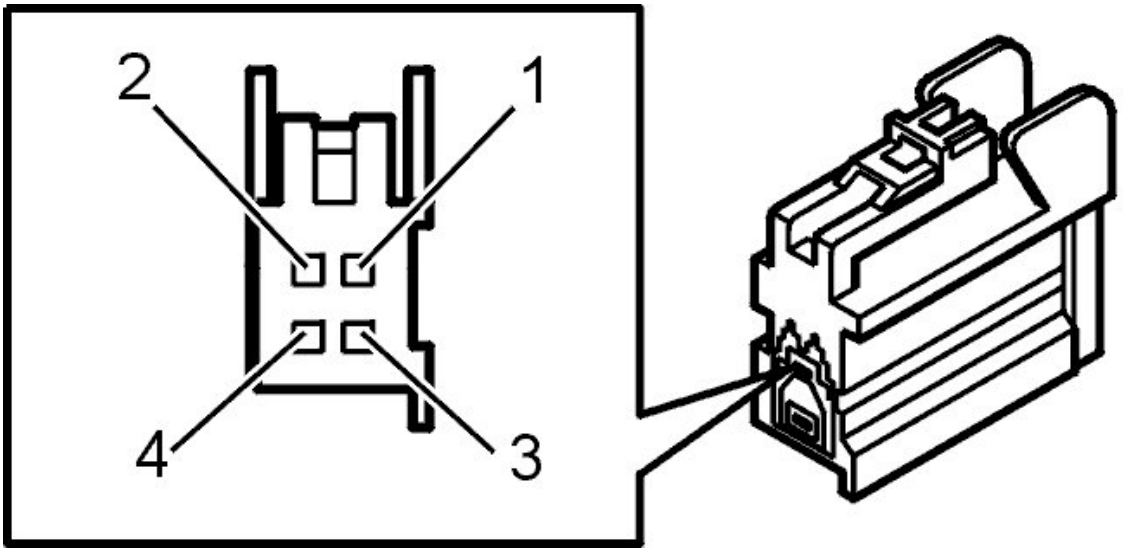
Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (green) for the passenger airbag, the resistance between terminals #1 and #2 of the 4-pin connector (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the SRS control module disconnected, the resistance between terminals #1 and #2 of the 4-pin connector (SRS control module side) should be infinite
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

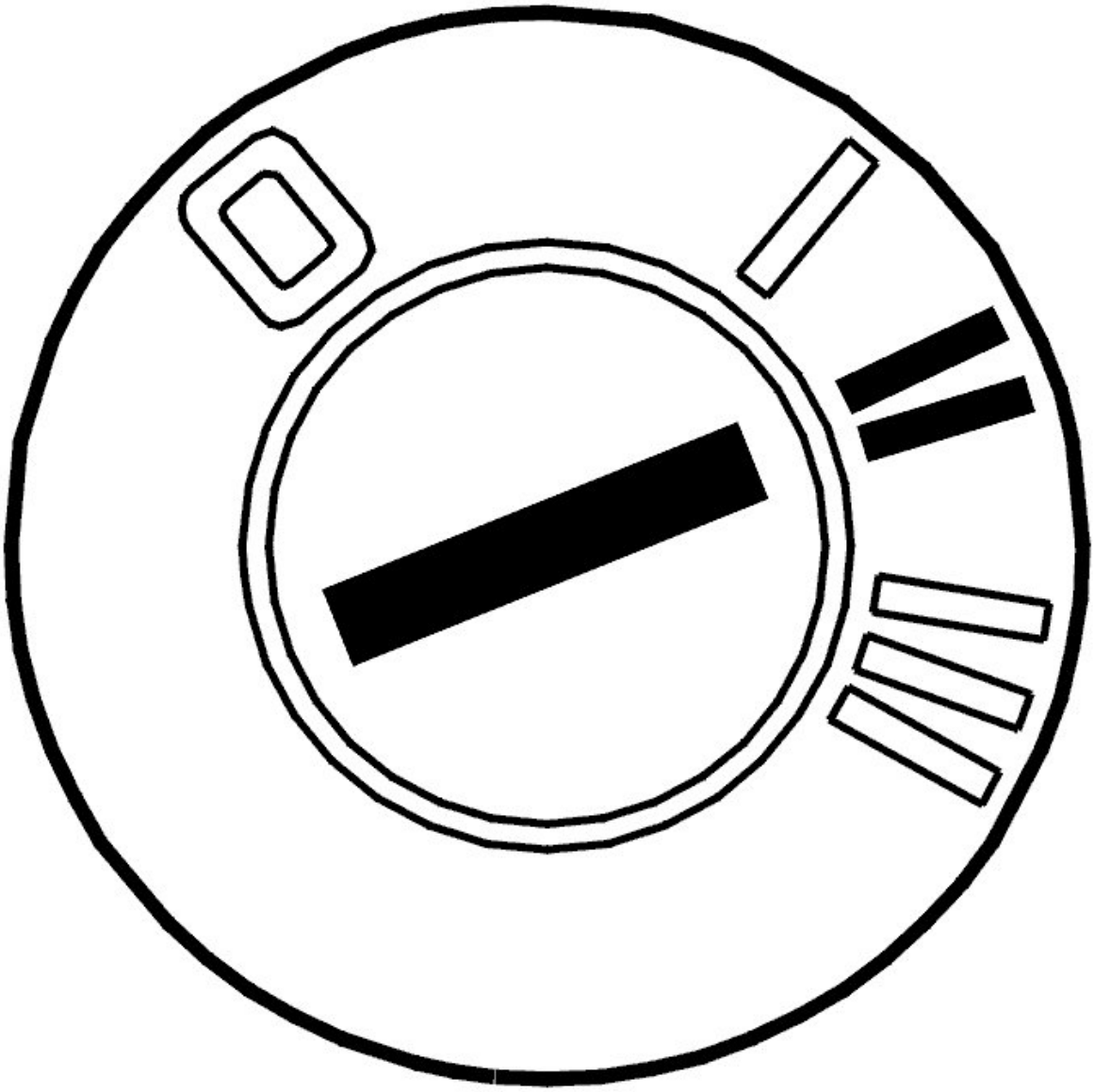
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

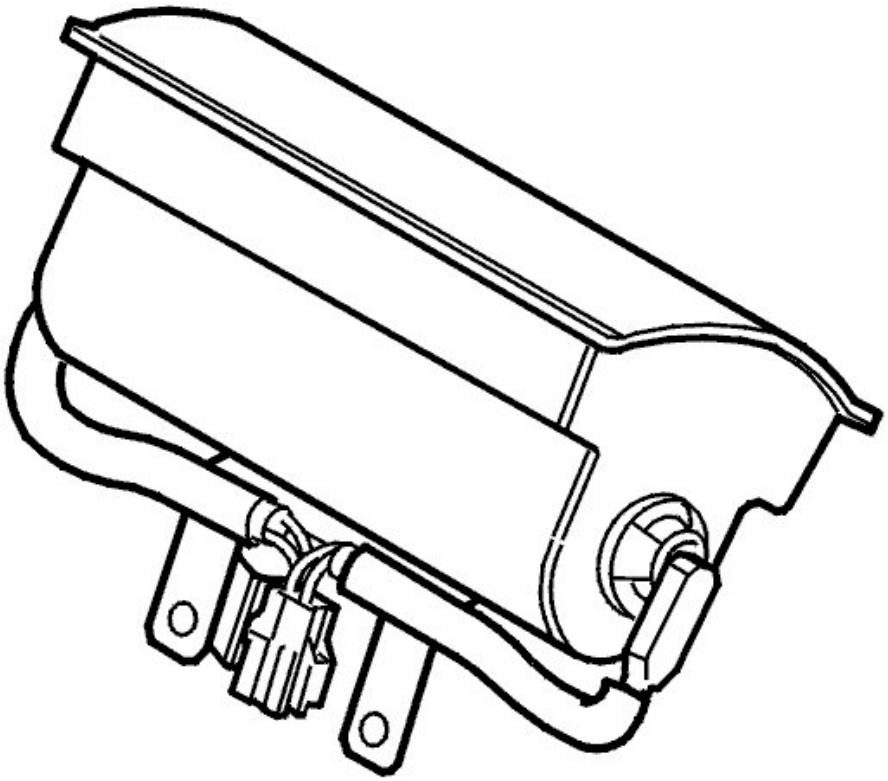
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0025 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0025 is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit

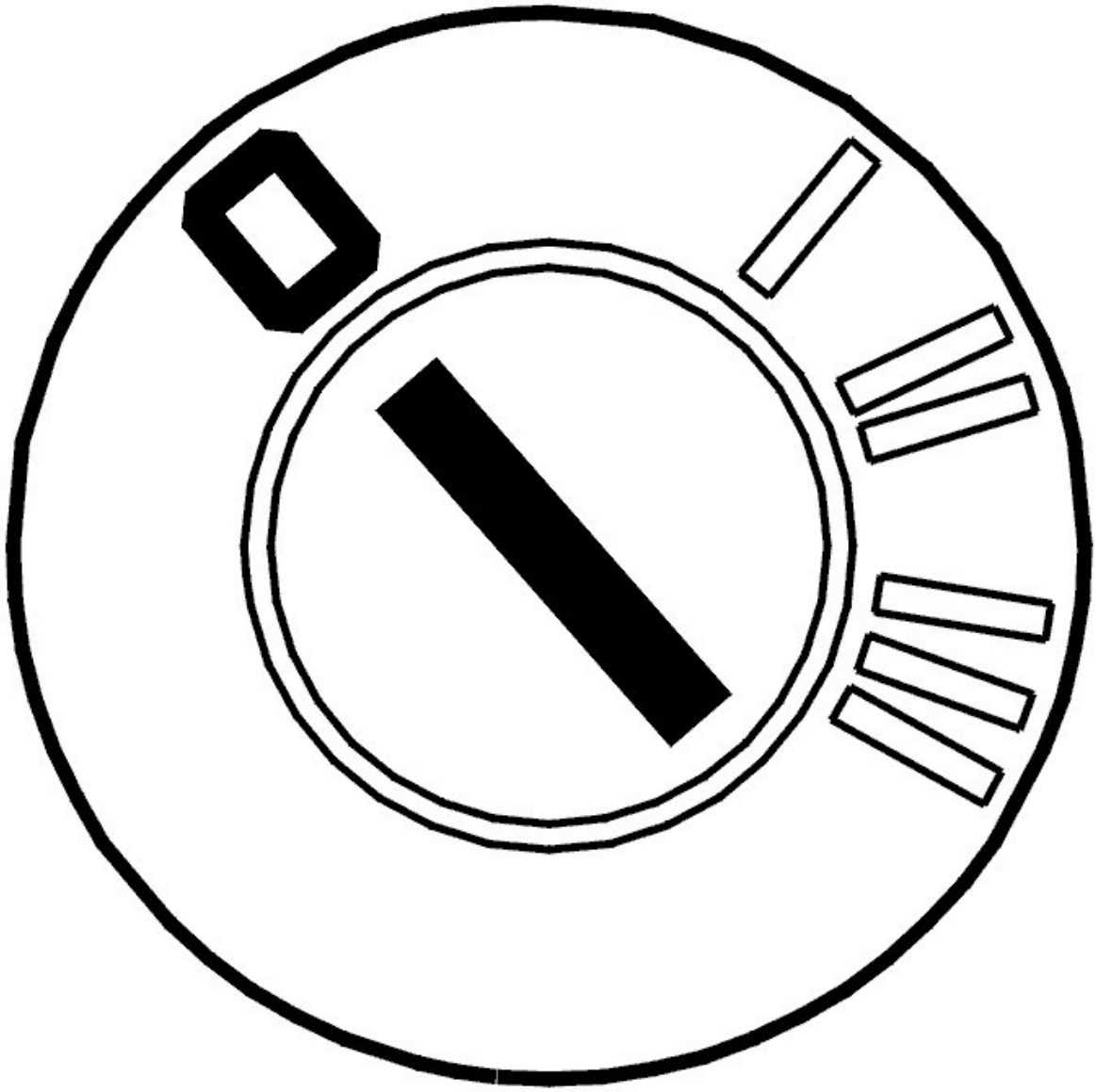
- Short circuit in air bag (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (green) terminal #1 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

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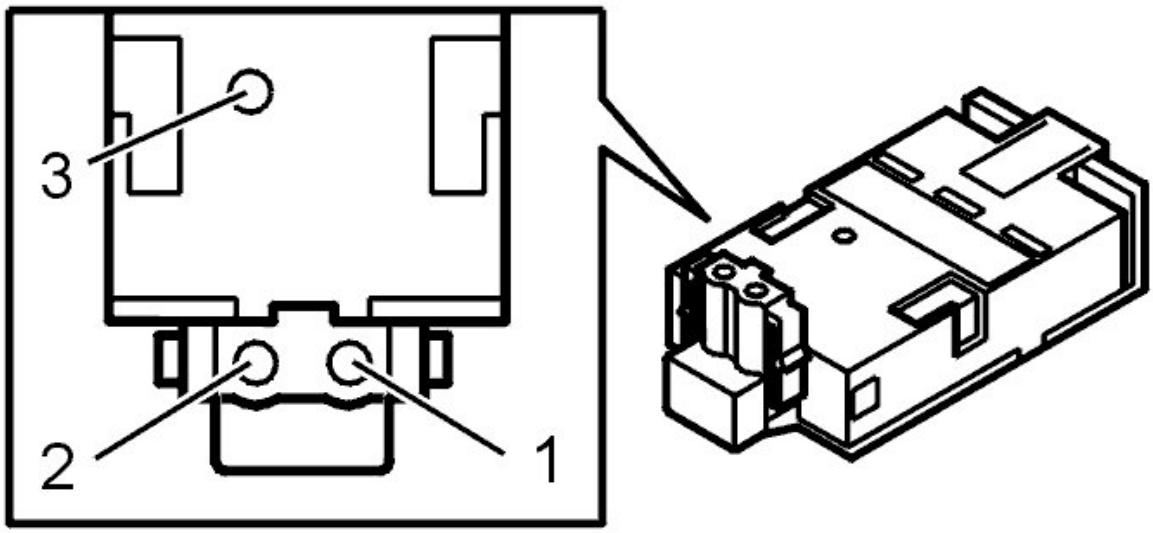
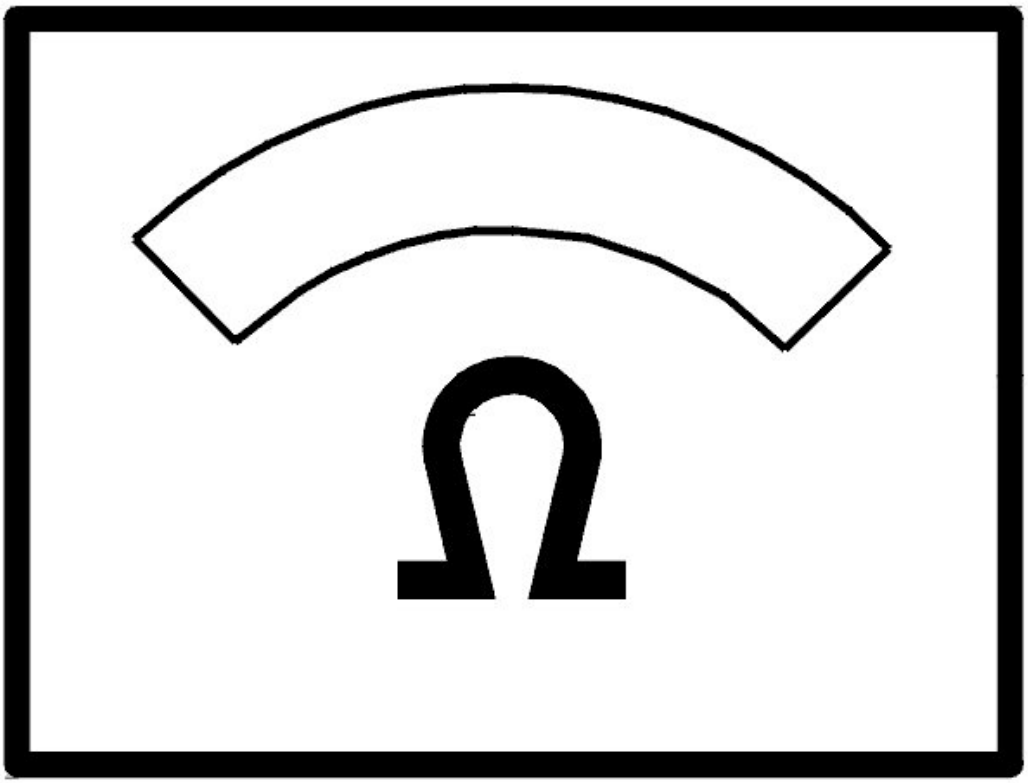
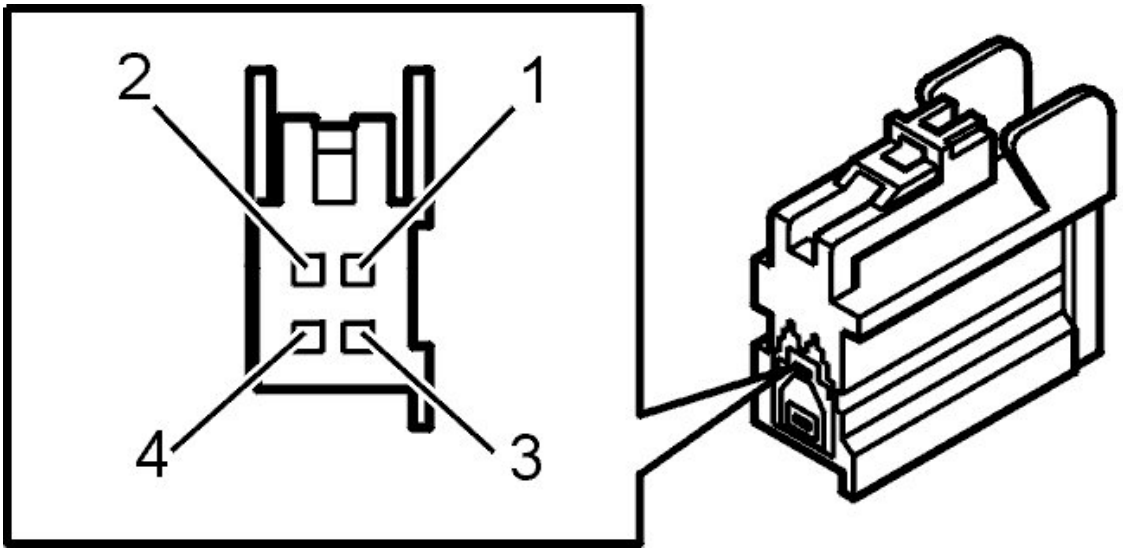
Check the cable between SRS control module terminal #11B (39) and connector (green) terminal #3 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (green) for the passenger airbag, the resistance between terminals #1 and #2 of the 4-pin connector (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

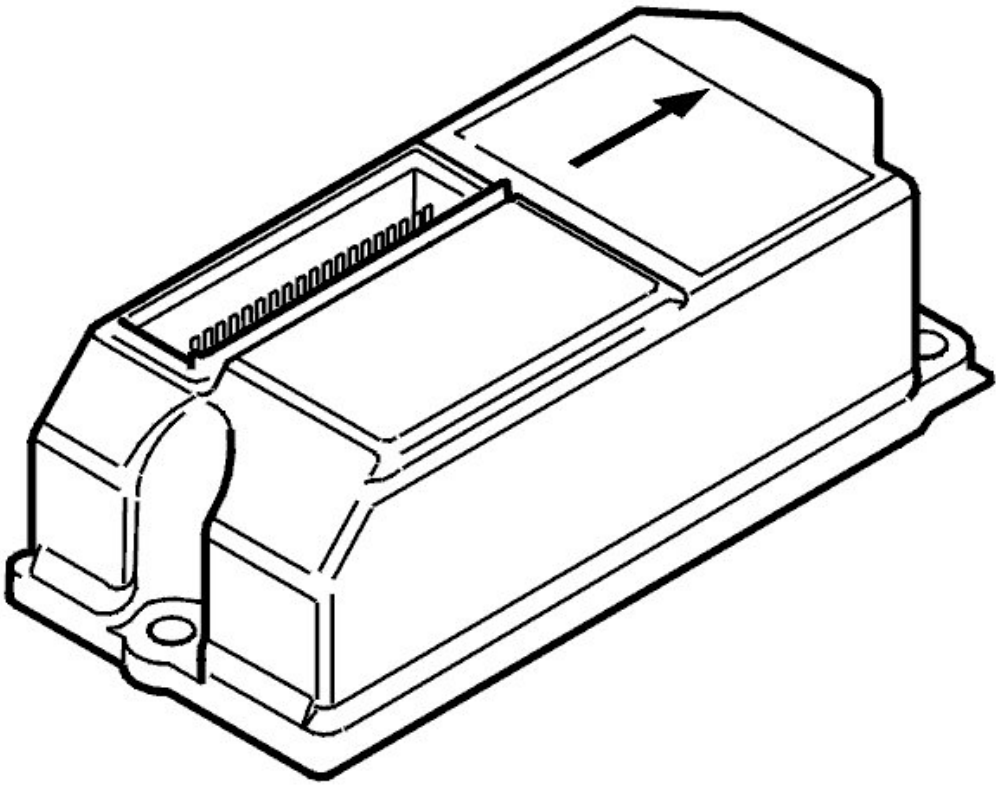
FAULT FOUND - DONE

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

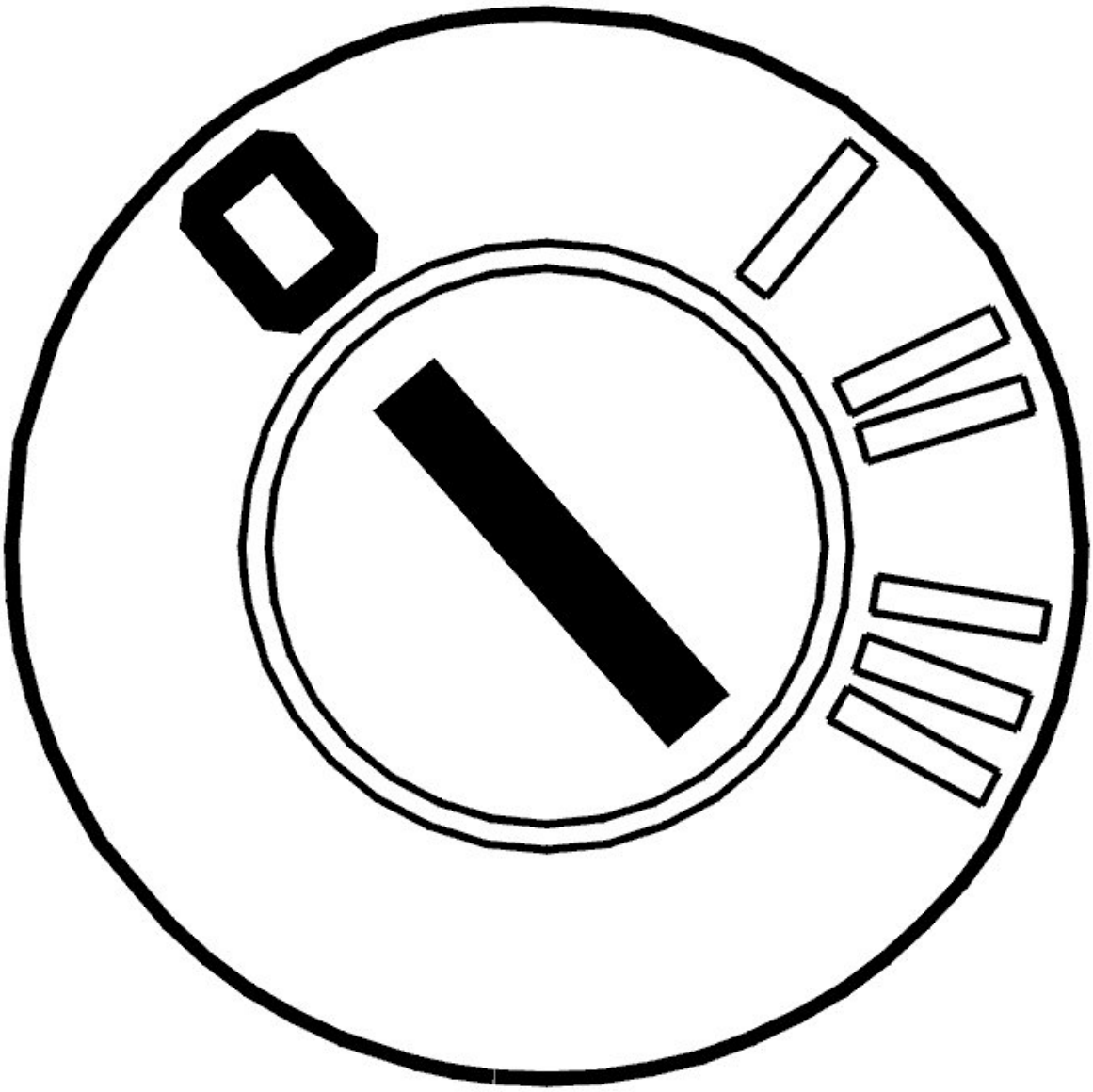
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

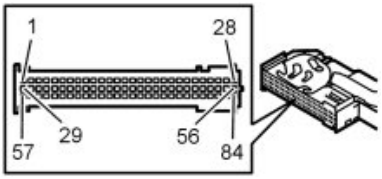


- Ignition off.

Check that there is no passenger airbag installed.
Check that the correct sensor is installed in the car.
Activate reading off the control module ID by clicking on the VCT2000 symbol.
Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
If no fault is found, try new software according to Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

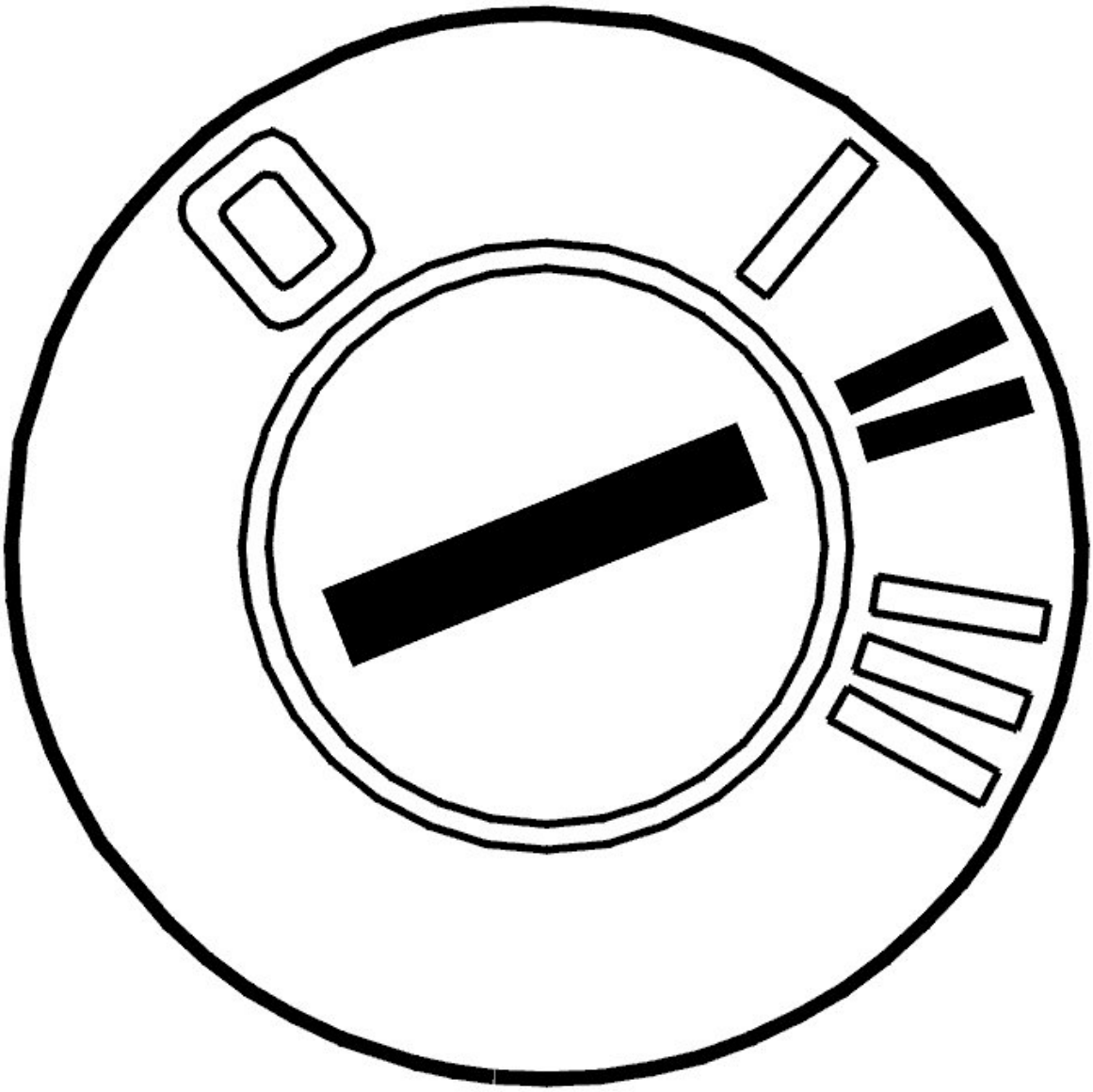
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

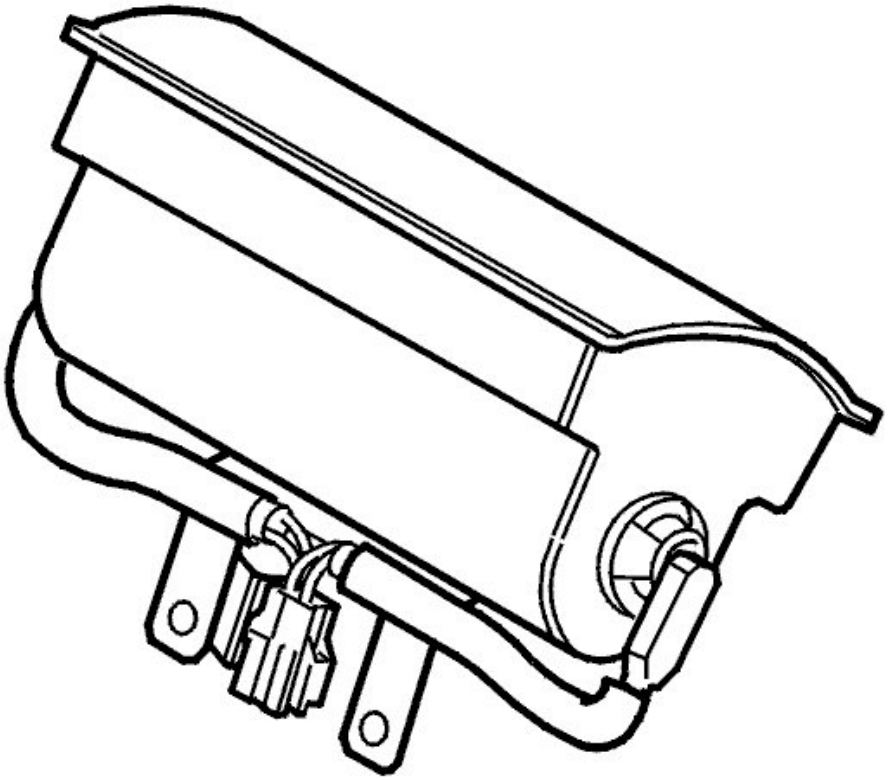
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0028 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0028 is displayed.

Substitute value
- Nothing.

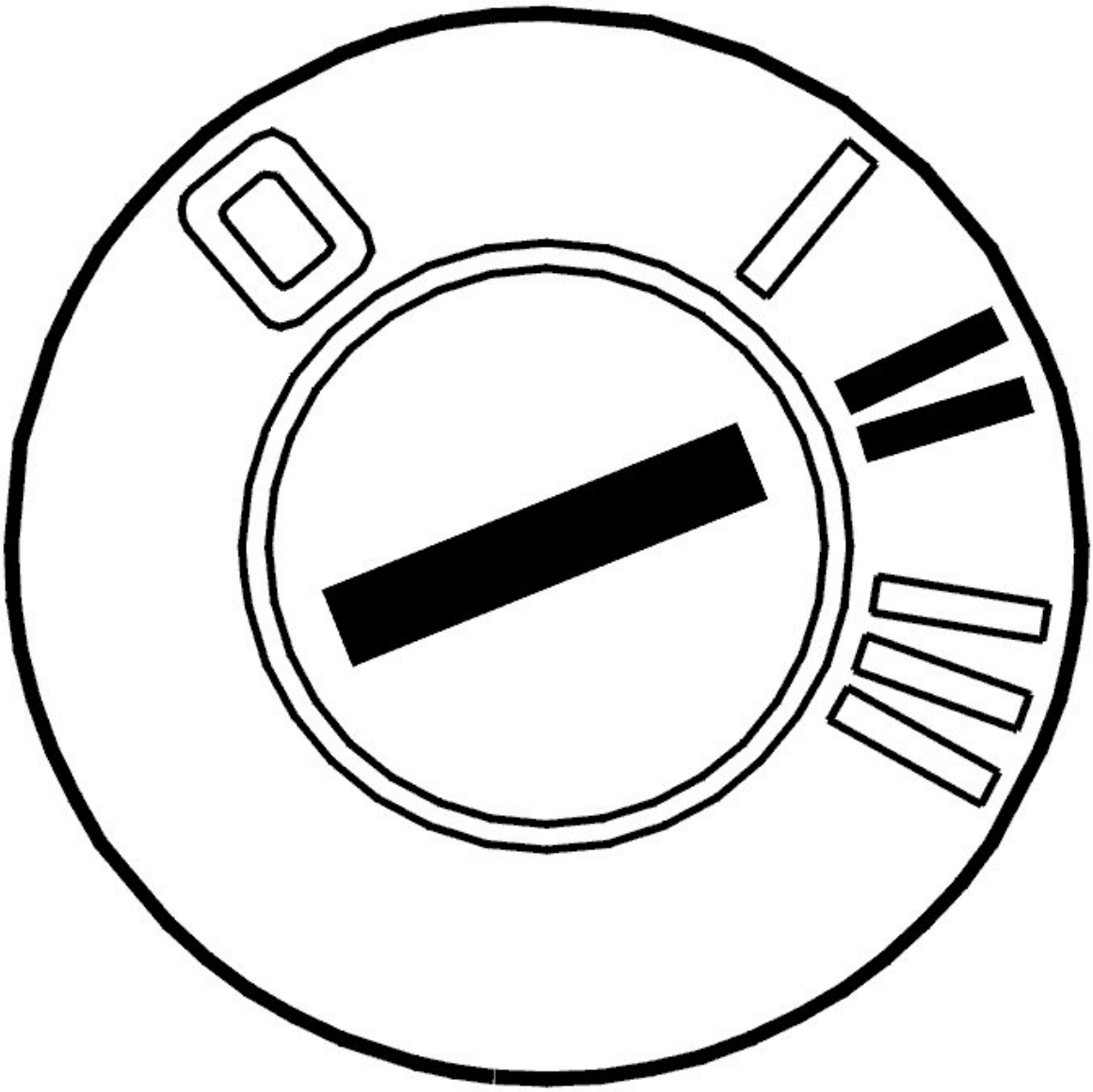
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the air bag and SRS sensor unit
- Short circuit to voltage supply in air bag.

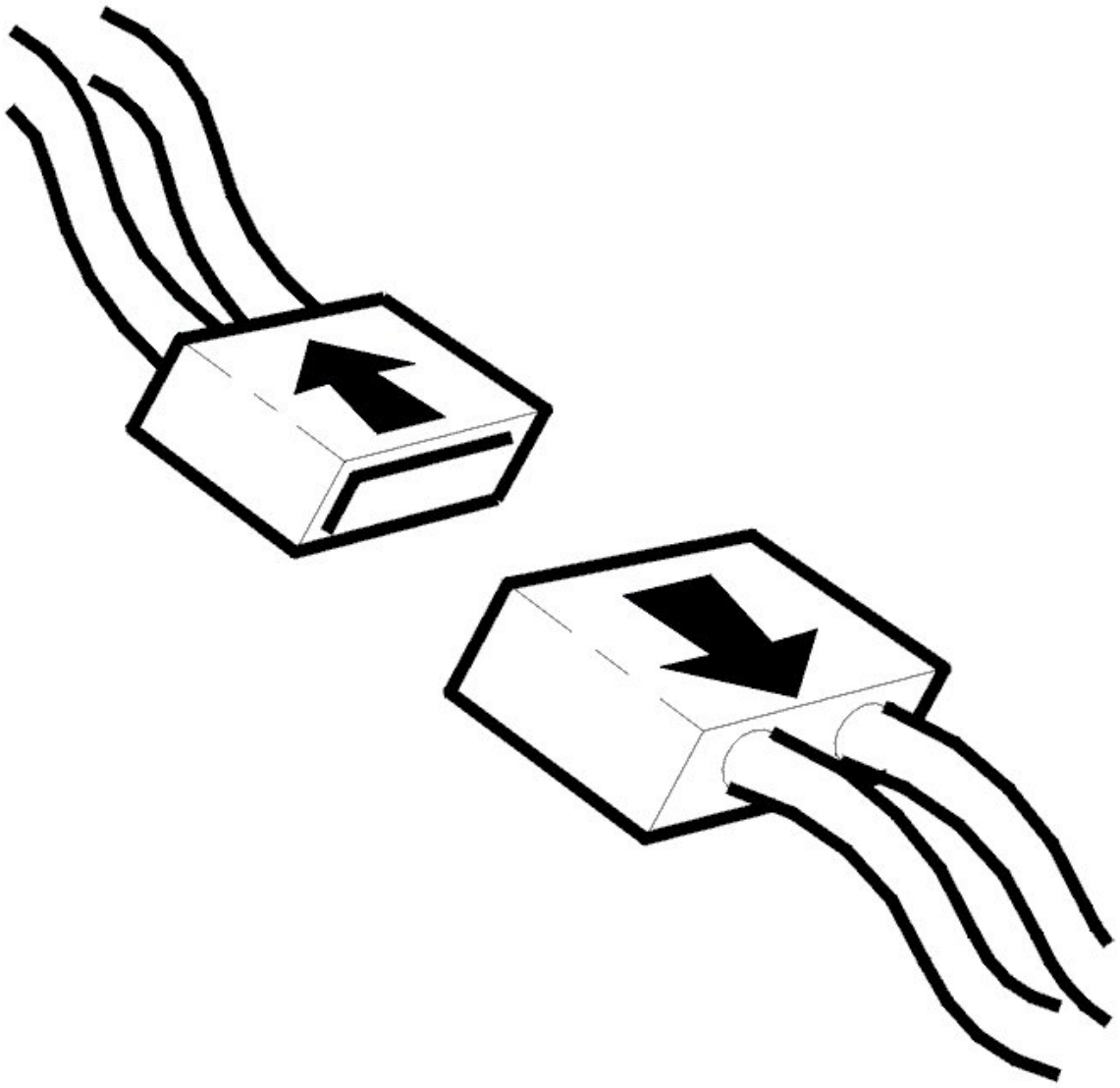
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

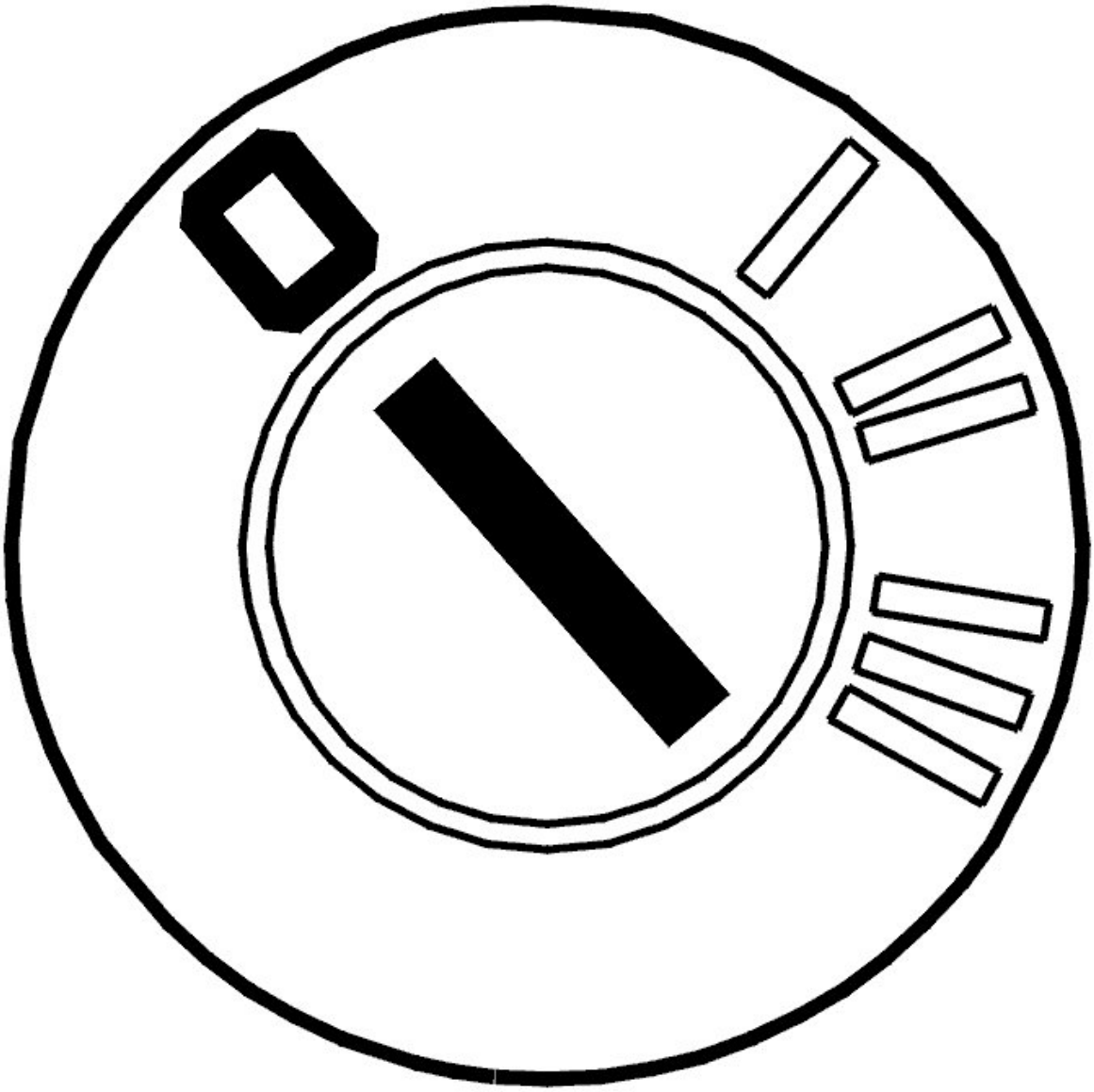
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (green) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

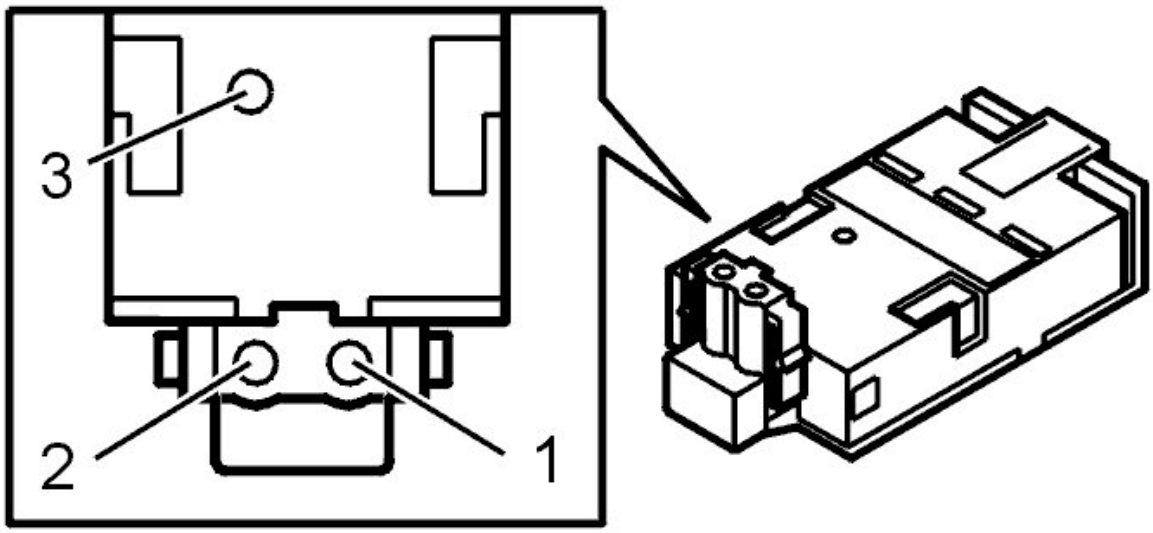
Check the cable between SRS control module terminal #12B (40) and connector (violet) terminal #1 on the passenger side airbag for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (violet) terminal #3 on the passenger side airbag for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

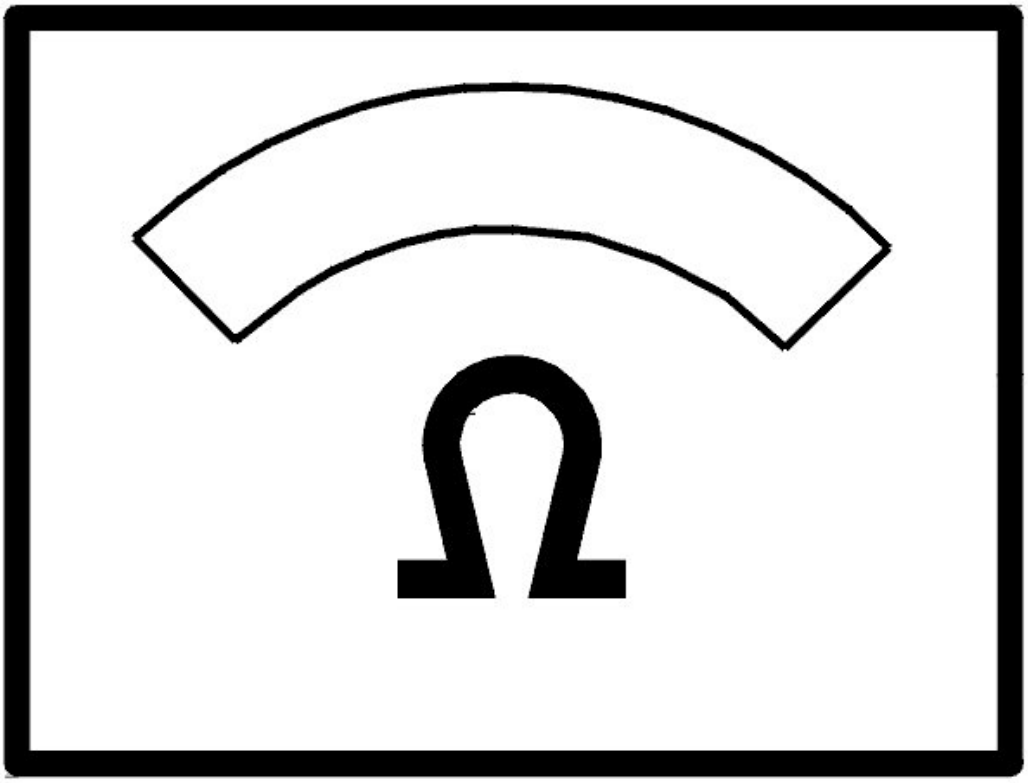
Other information:

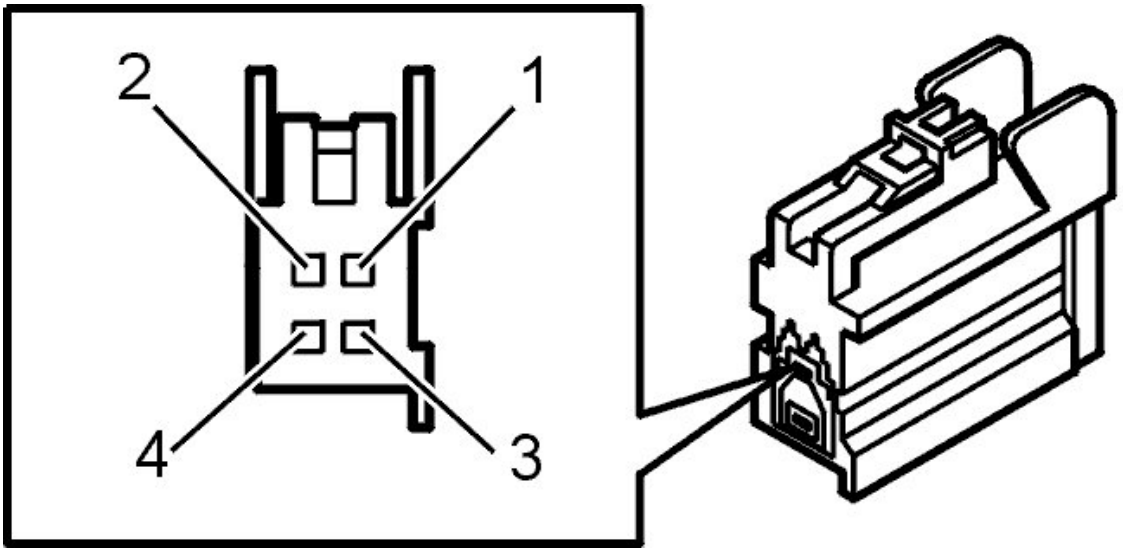
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the control module connector disconnected, the resistance between the 4-pin connector terminals #1 and #2 (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

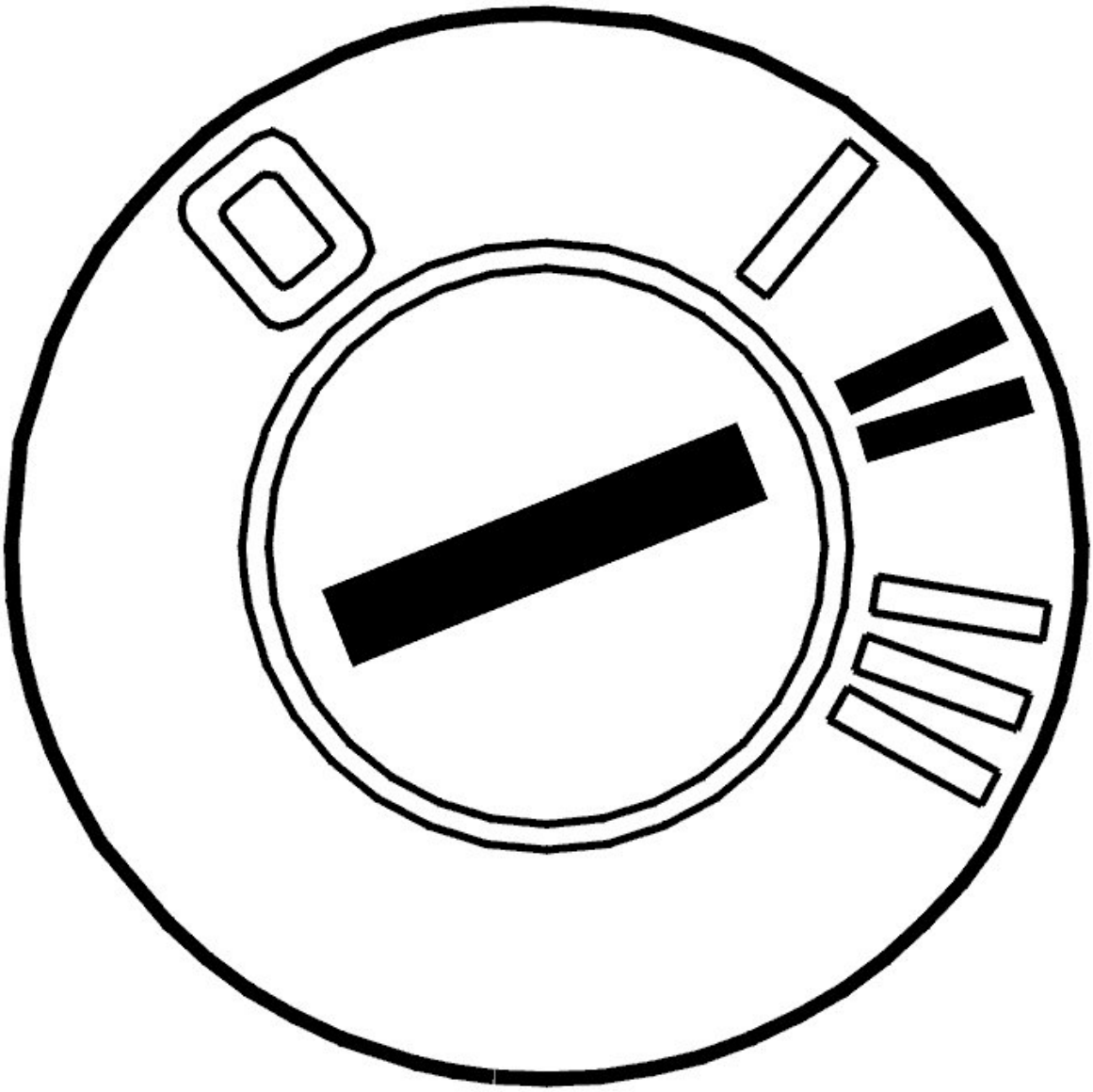
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

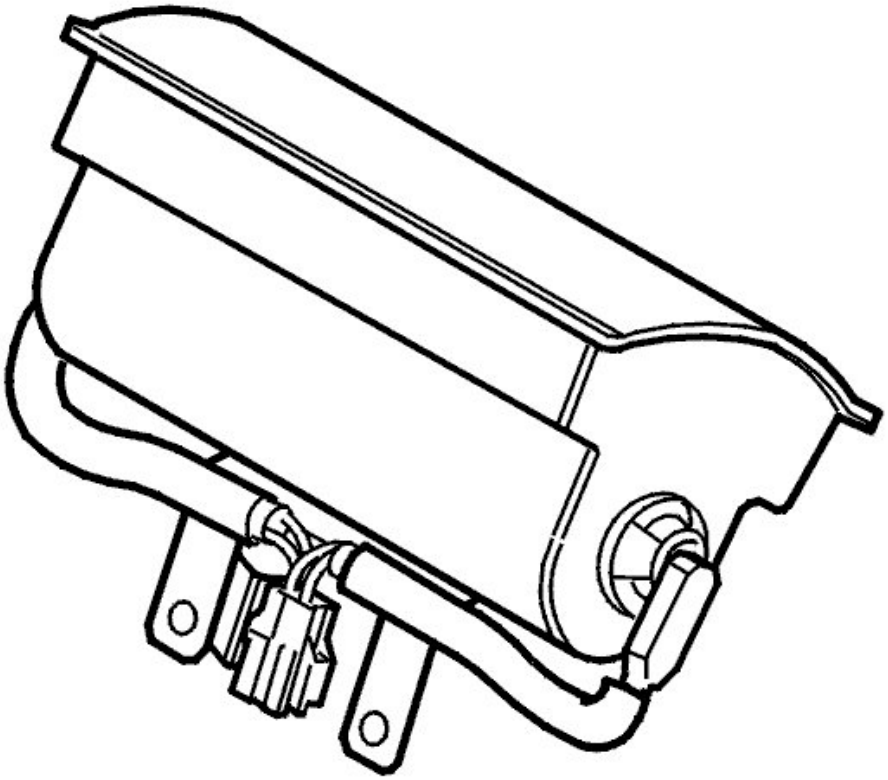
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0028 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0028 is displayed.

Substitute value
- Nothing.

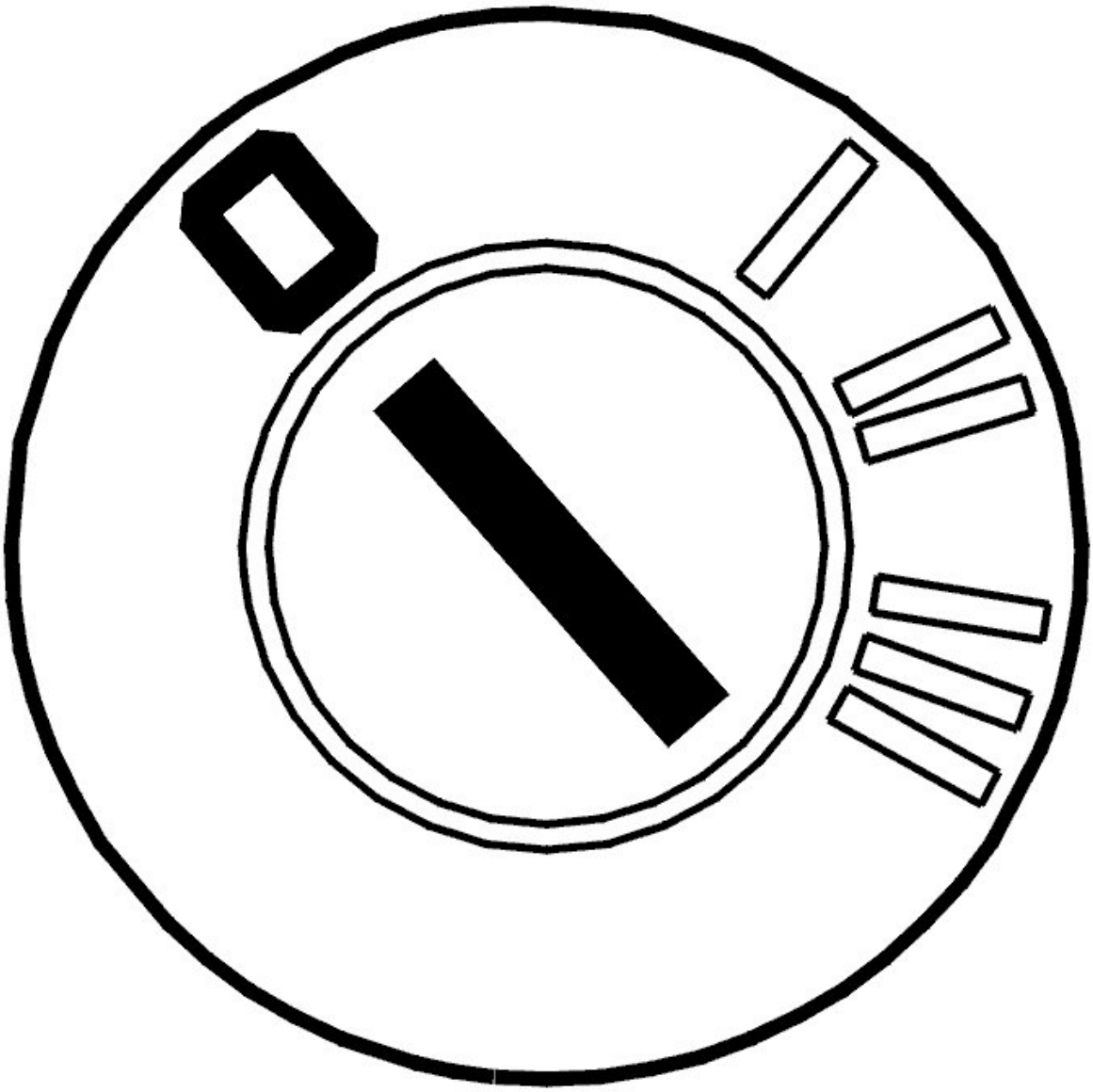
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the air bag and SRS sensor unit
- Short circuit to voltage supply in air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

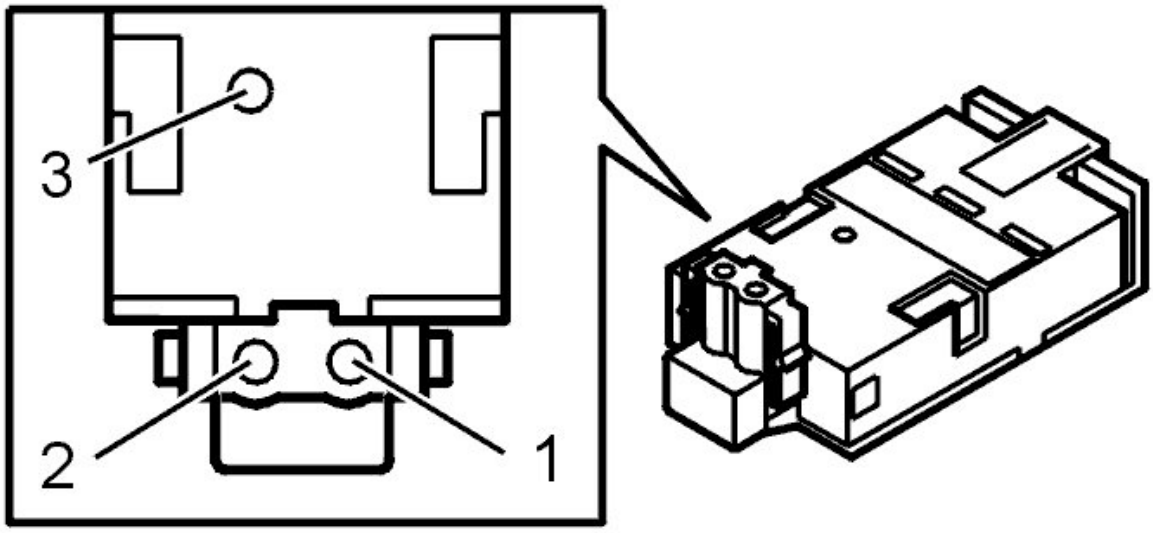
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

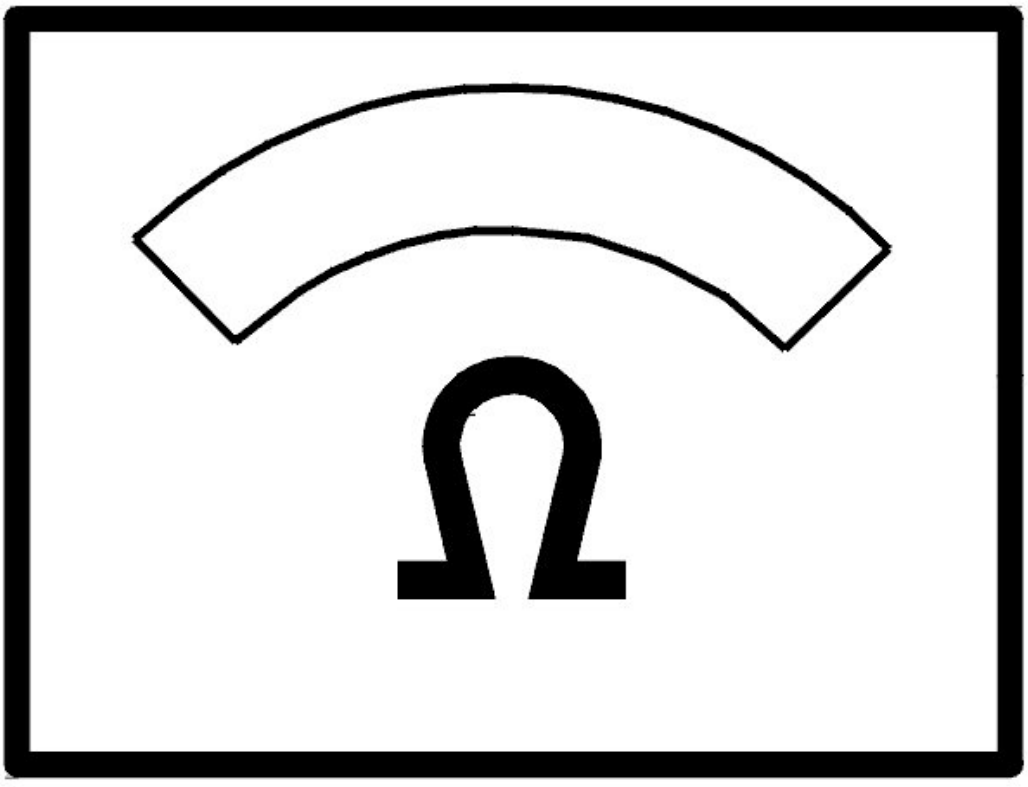
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

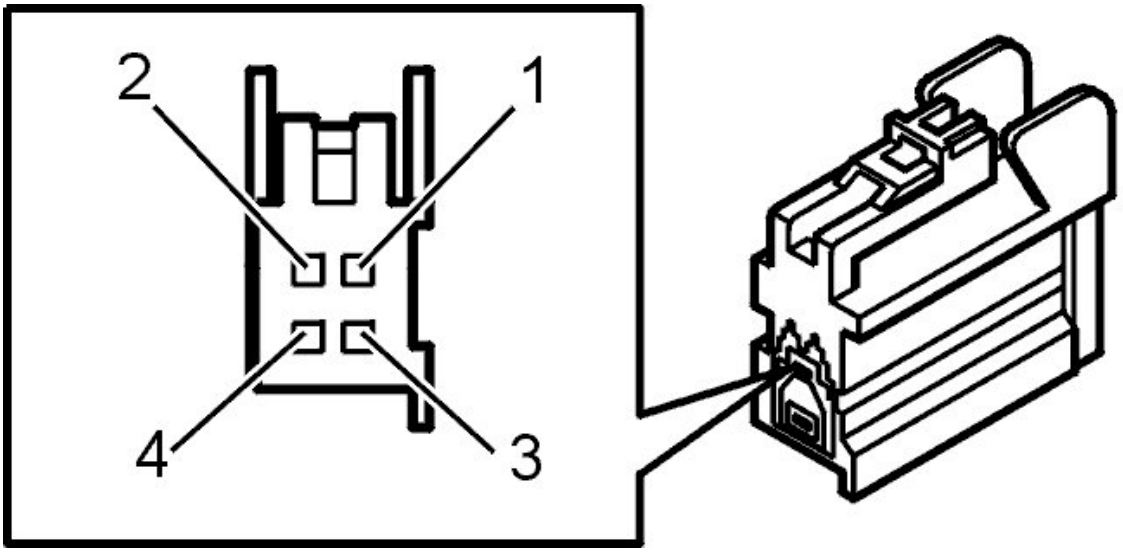
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (violet) terminal #1 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (violet) terminal #3 on the passenger side airbag for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the control module connector disconnected, the resistance between the 4-pin connector terminals #1 and #2 (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

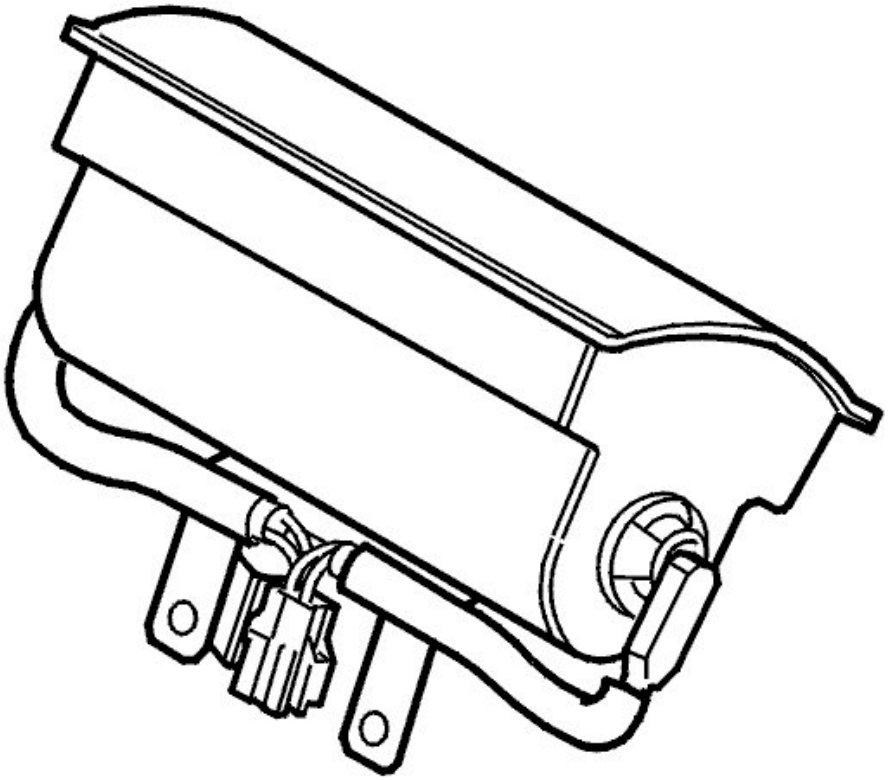
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0029 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0029 is displayed.

Substitute value
- Nothing.

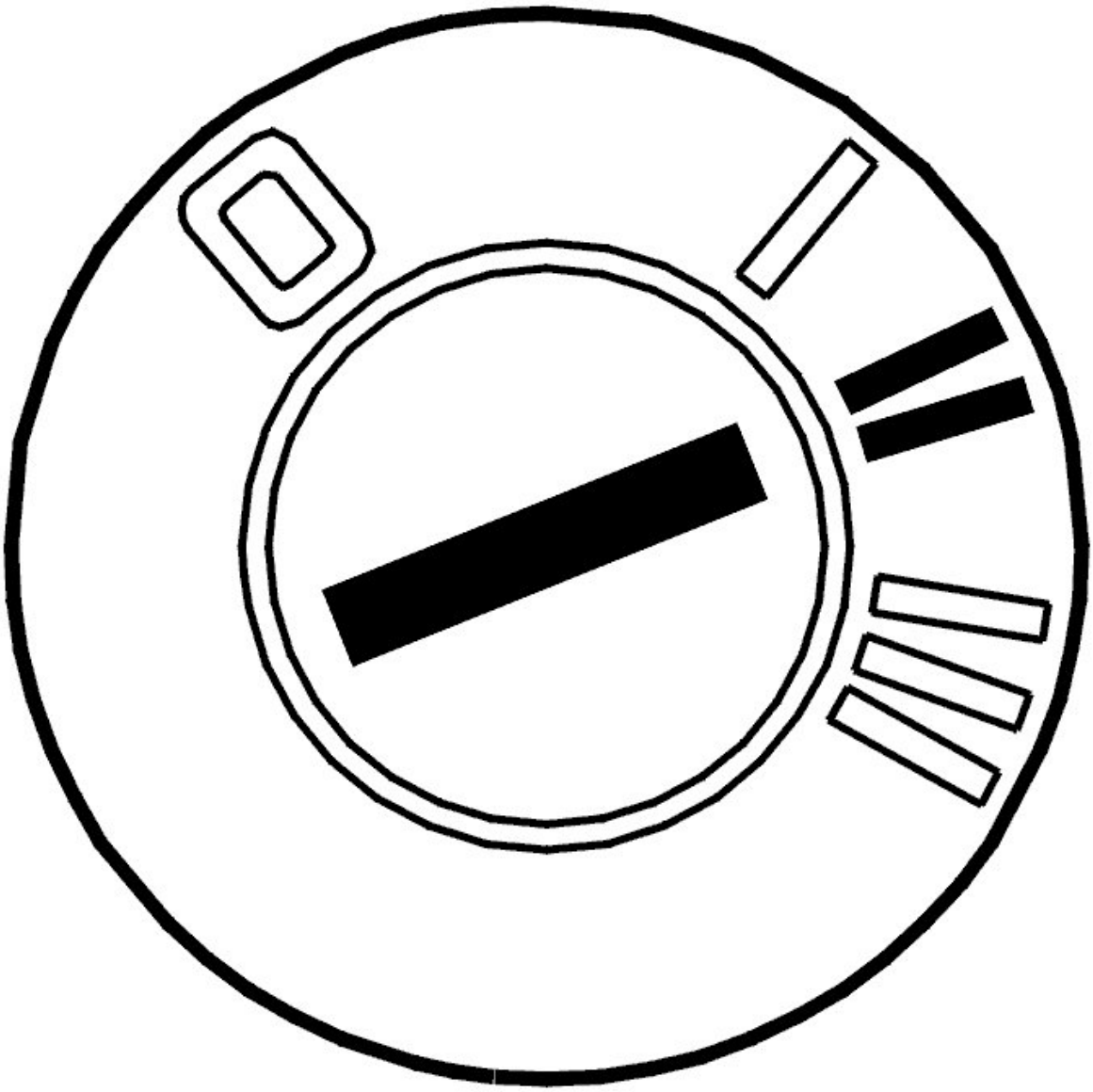
Possible source
- Short circuit to ground in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to ground in air bag.

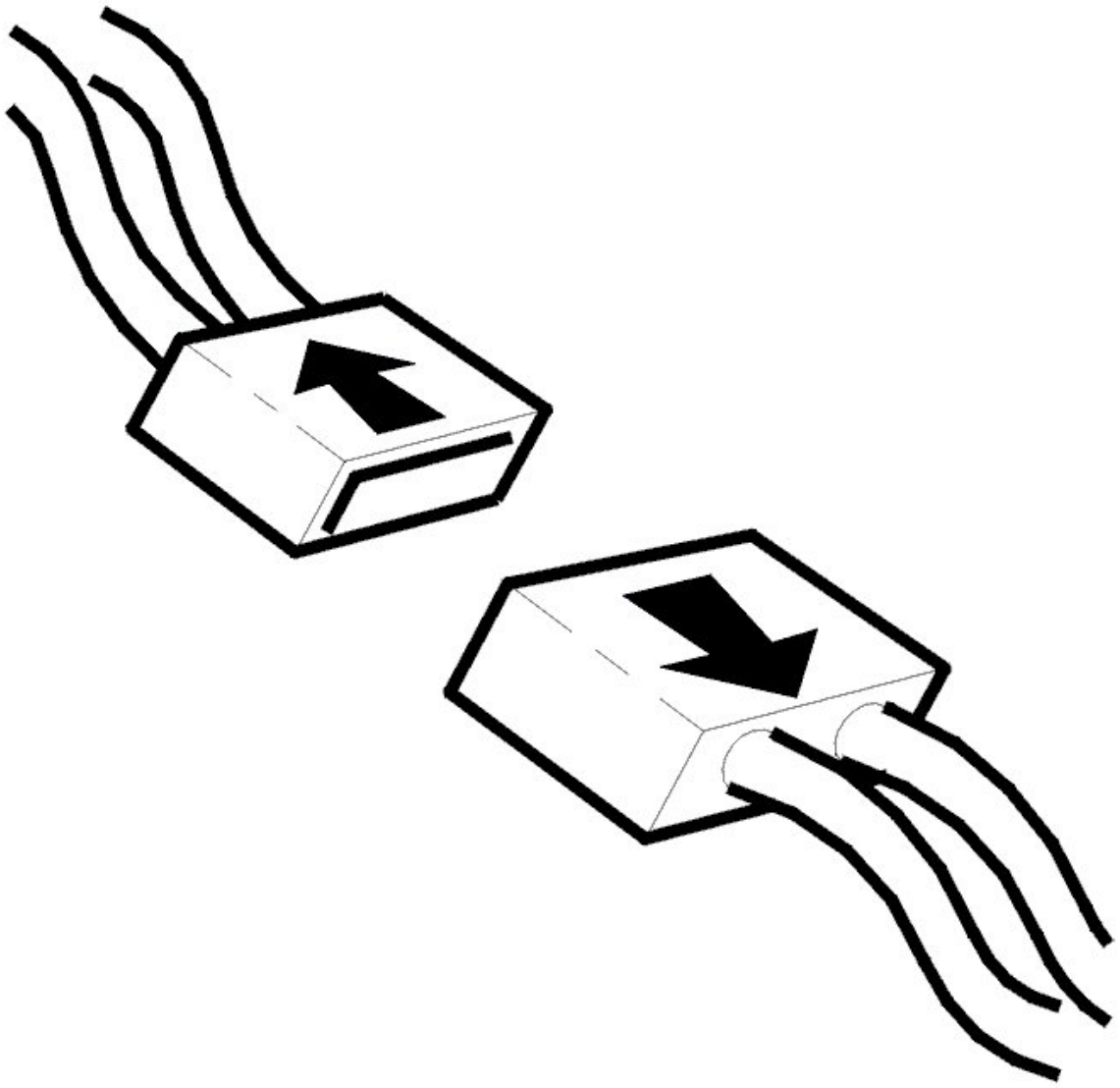
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected, non-deployed airbag module. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

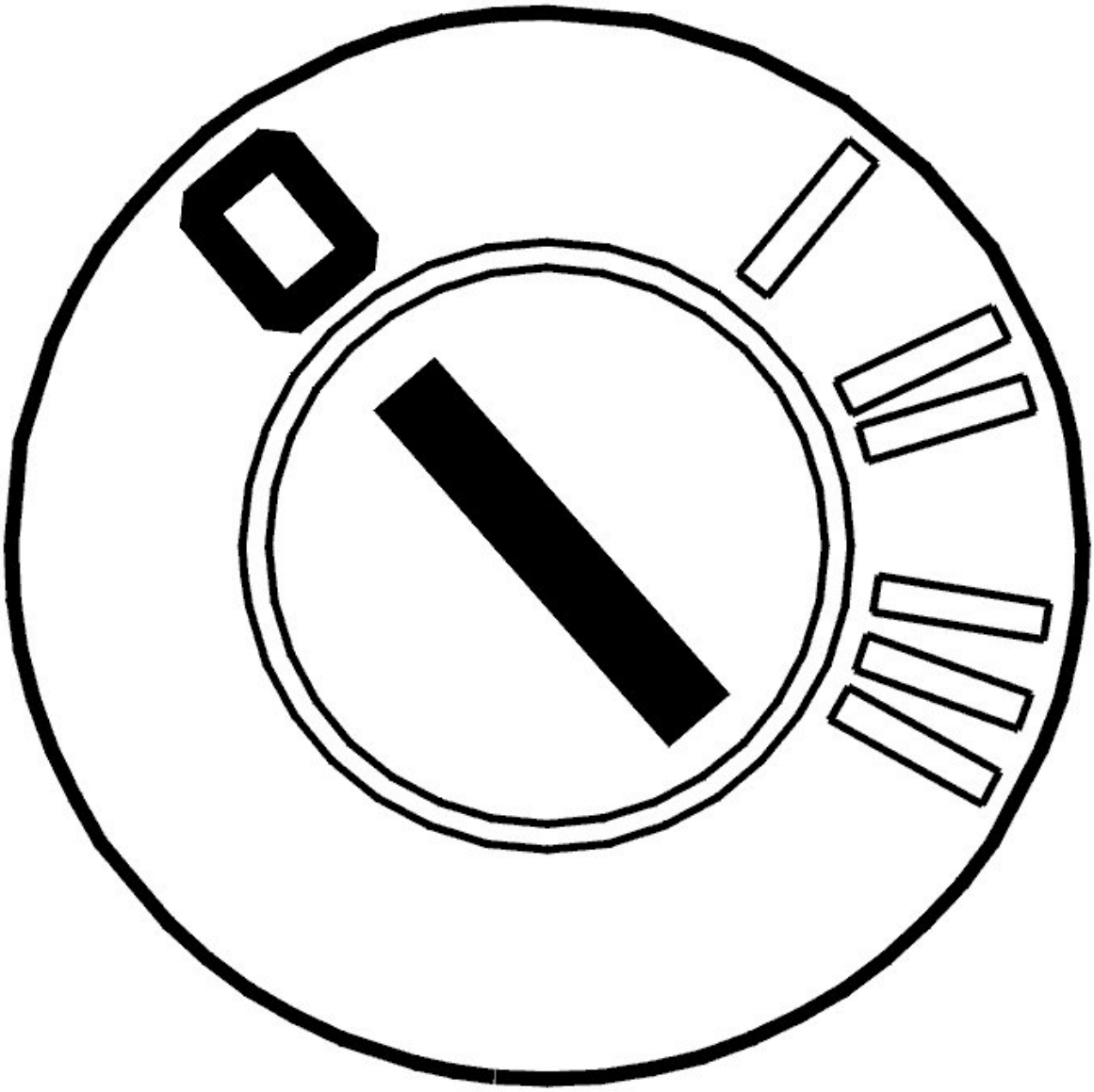
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

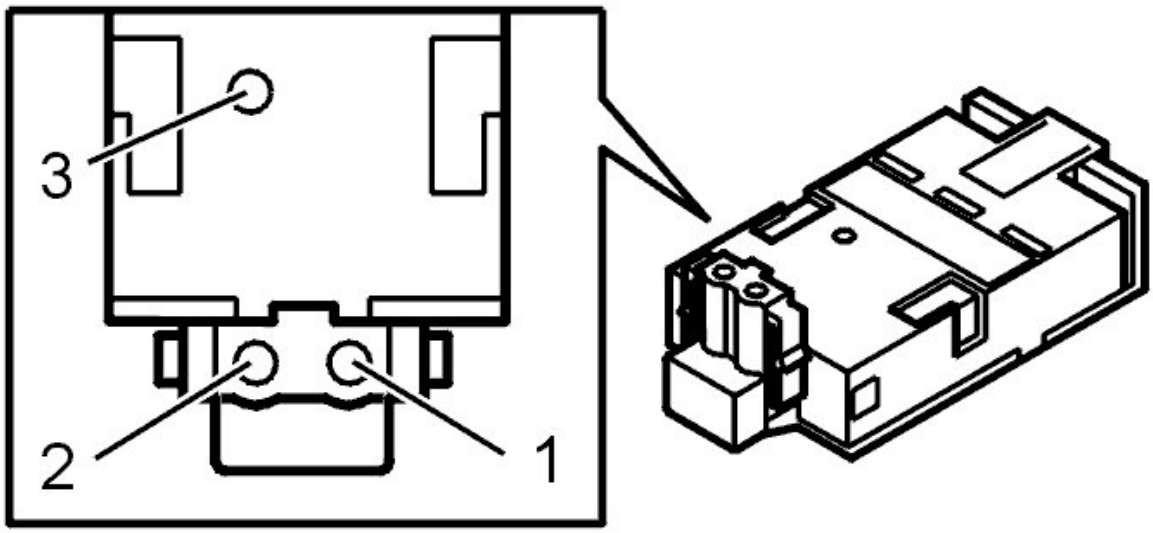
Check the cable between control module #13B (41) and connector (violet) terminal #1 on the passenger side airbag. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module #14B (42) and connector (violet) terminal #3 on the passenger side airbag. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

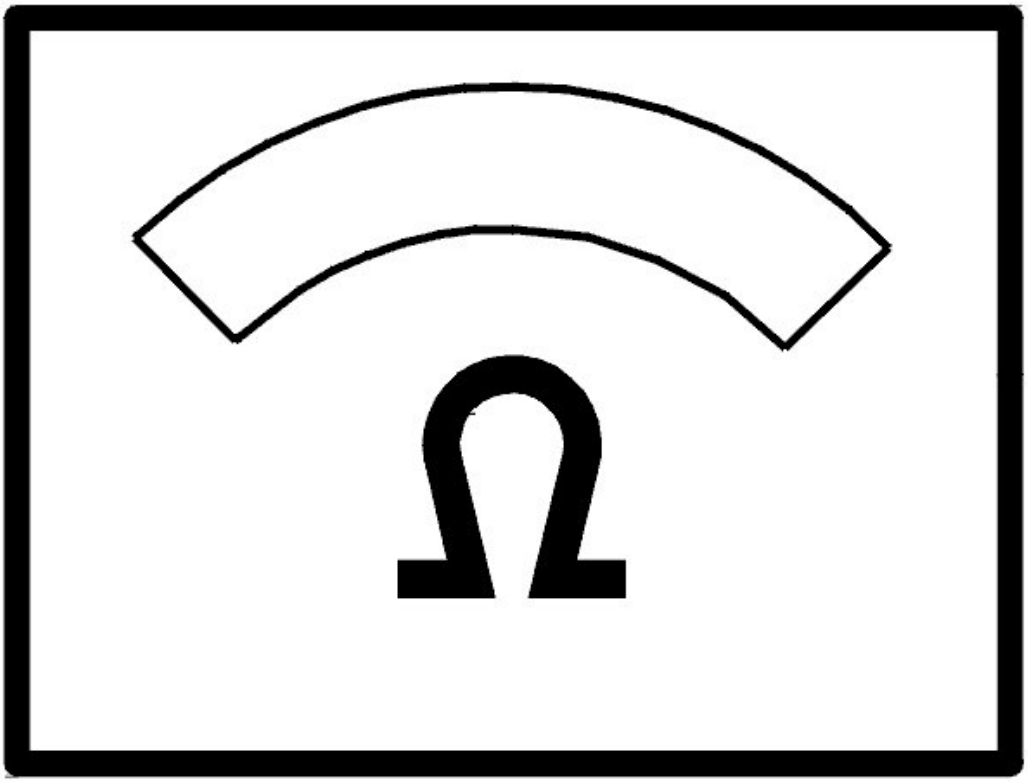
Other information:

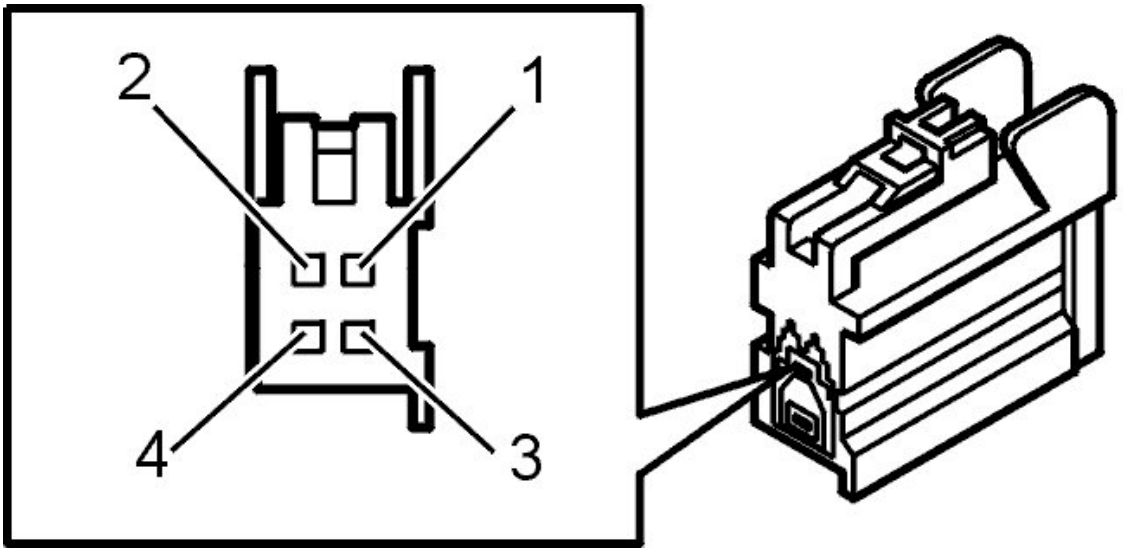
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) and ground should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

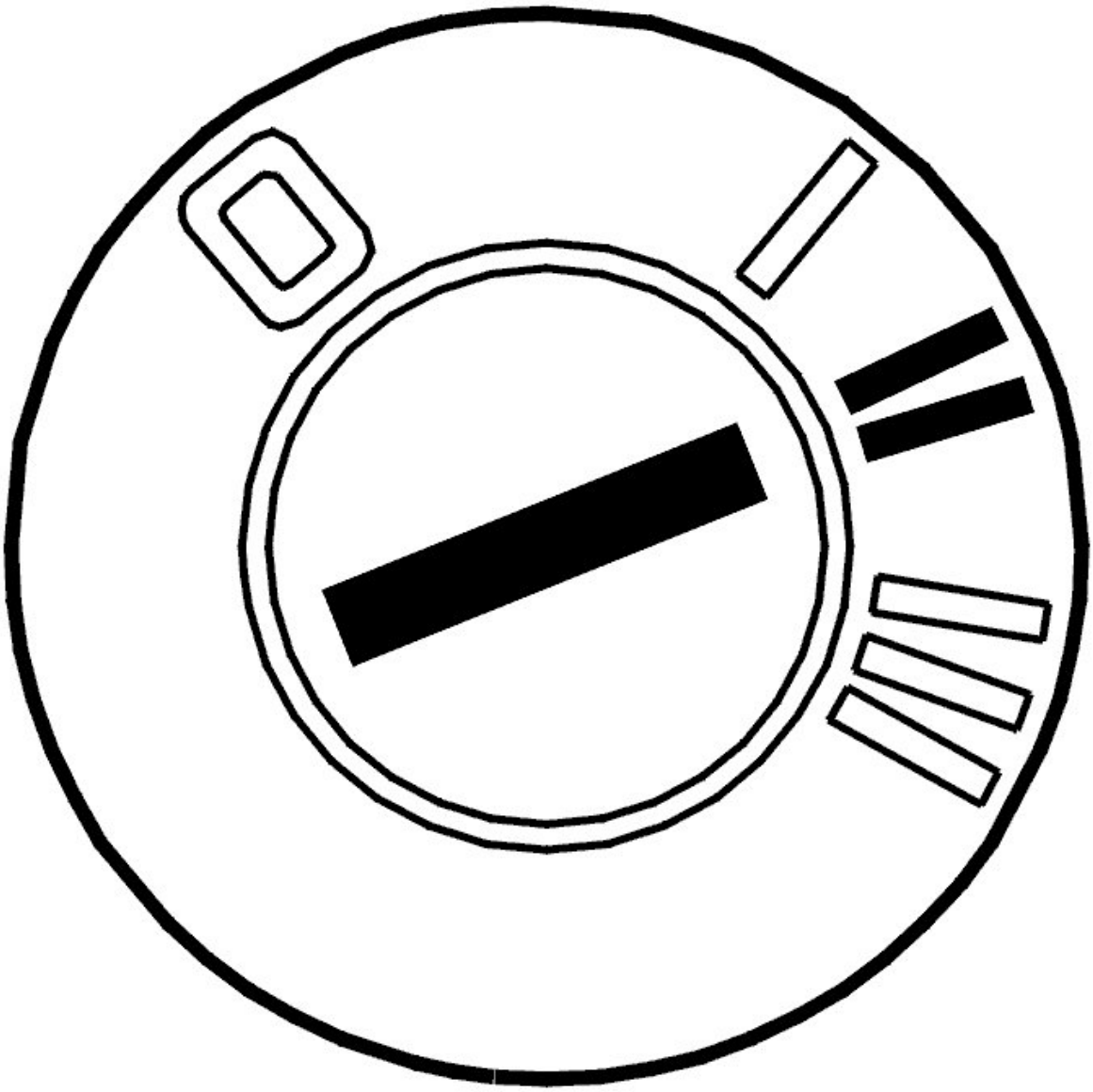
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

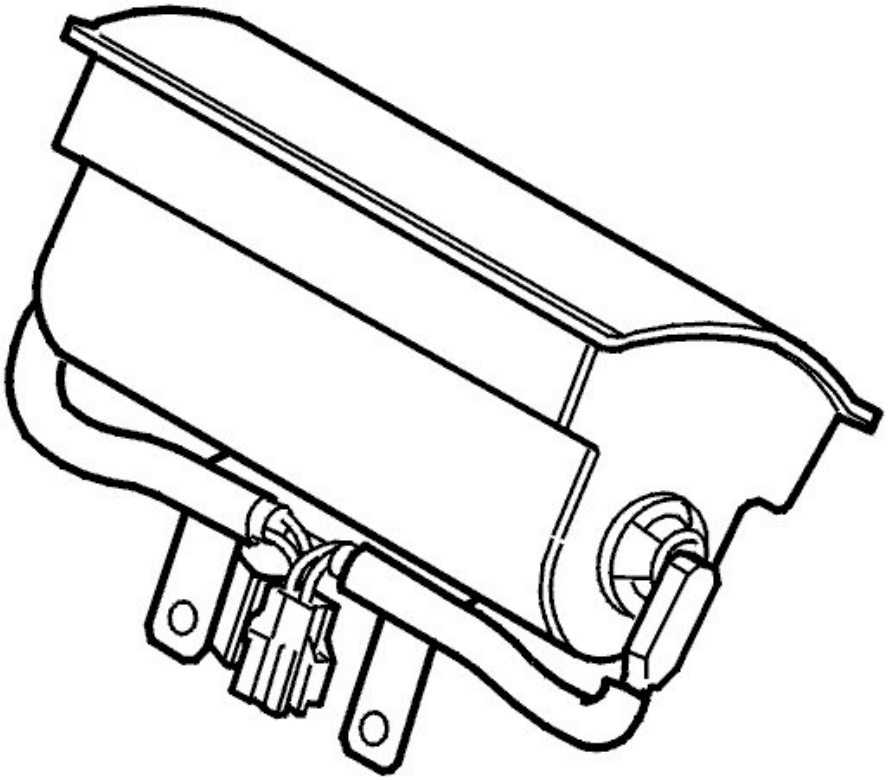
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0029 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0029 is displayed.

Substitute value
- Nothing.

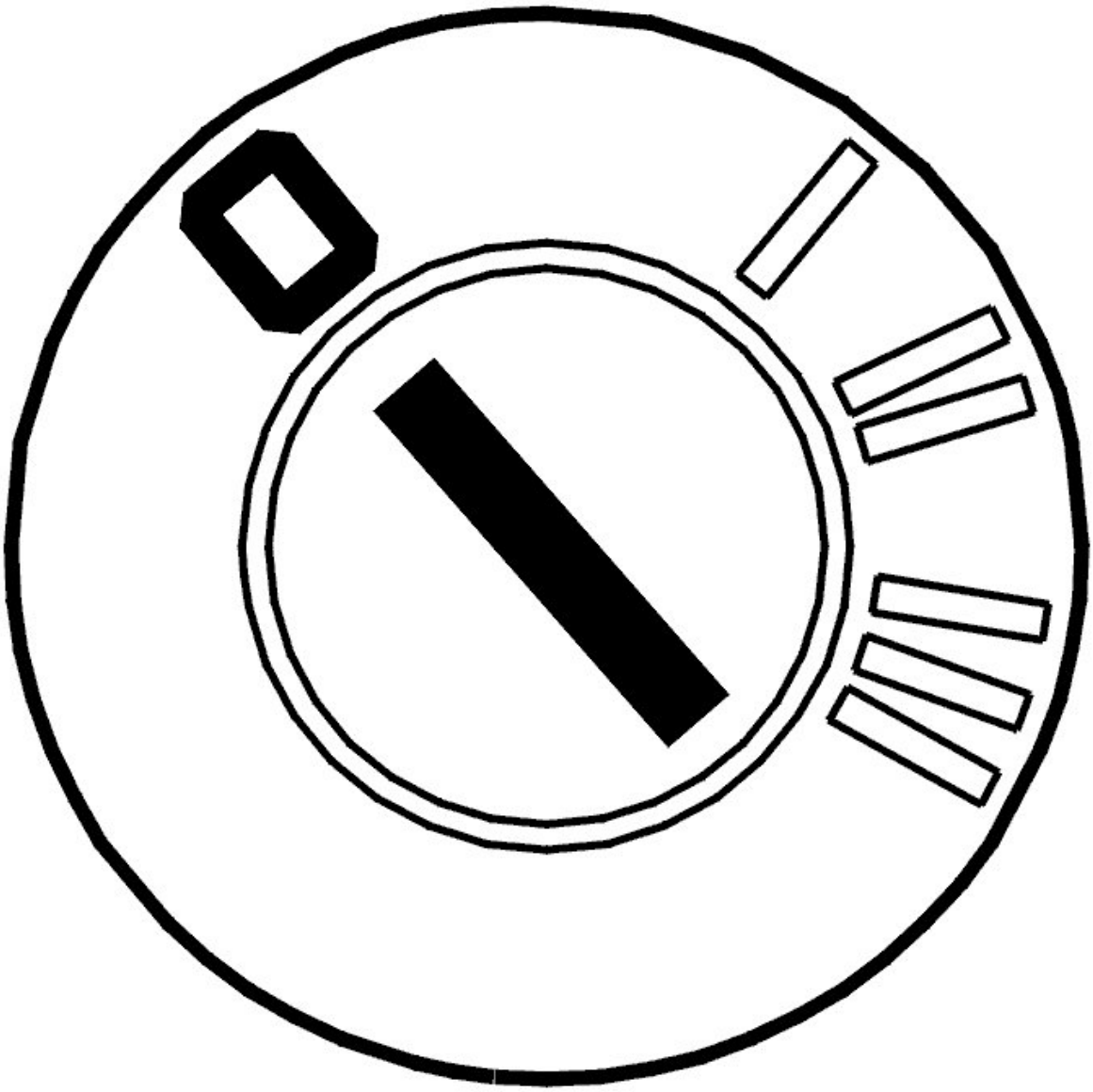
Possible source
- Short circuit to ground in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Short circuit to ground in air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

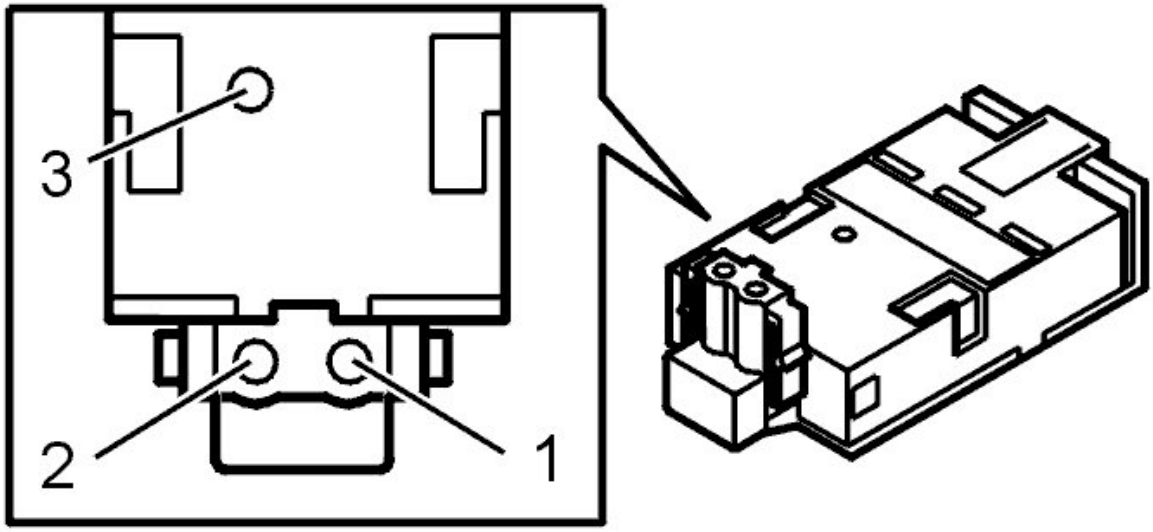
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

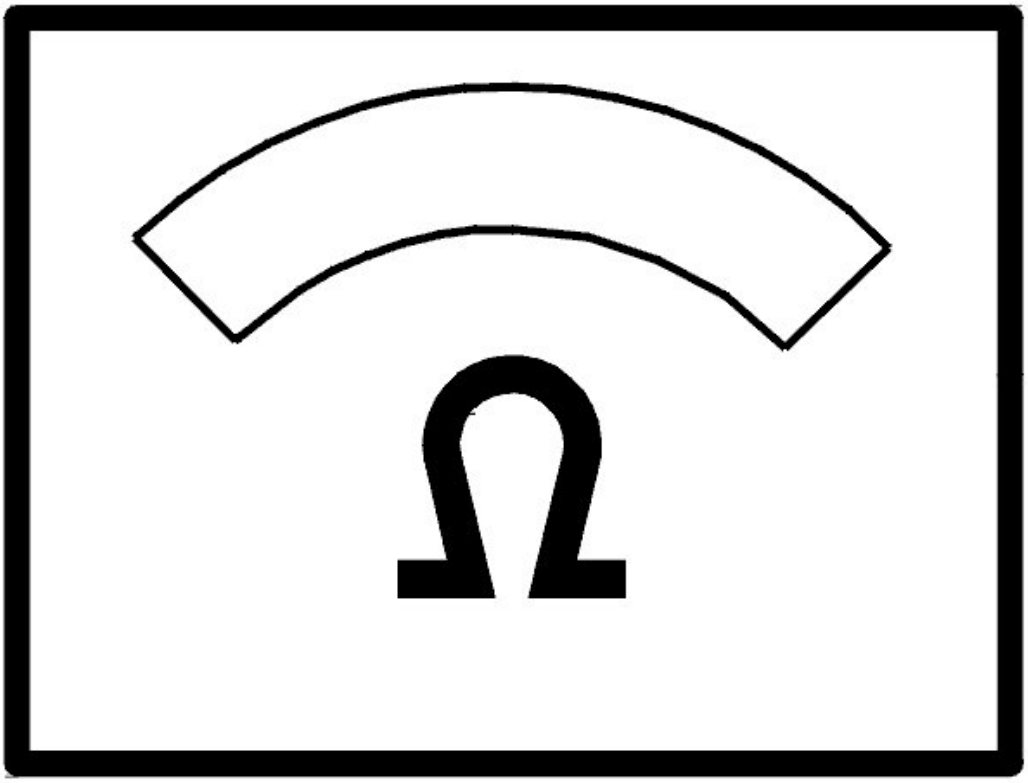
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

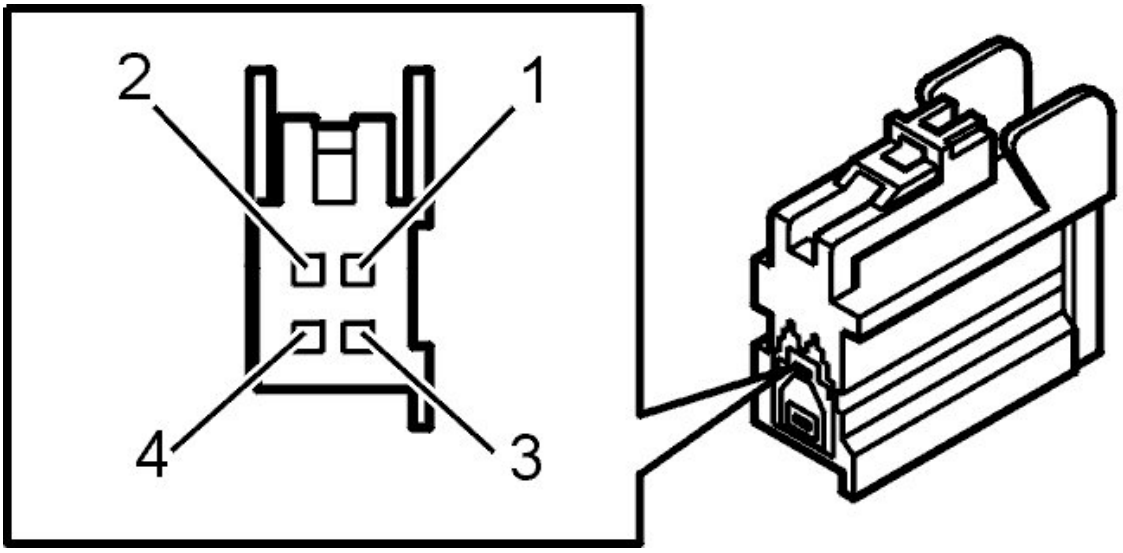
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module #13B (41) and connector (violet) terminal #1 on the passenger side airbag. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module #14B (42) and connector (violet) terminal #3 on the passenger side airbag. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) and ground should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

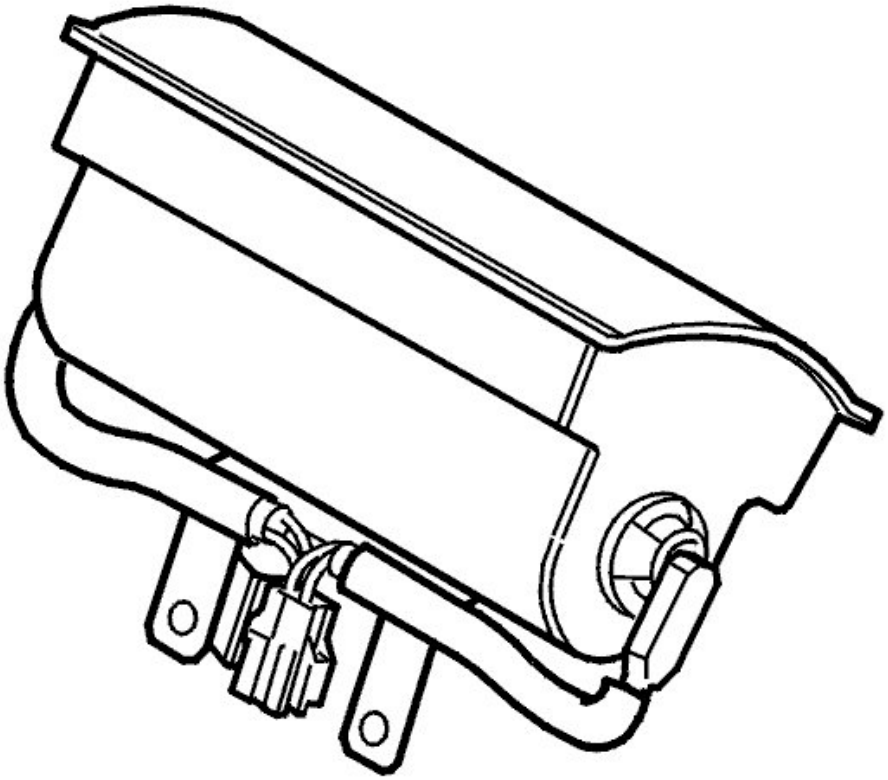
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-002A Diagnostic trouble code information

Condition



If the circuit capacitance is high for more than 10 seconds, diagnostic trouble code SRS-002A is displayed.

Substitute value
- Nothing.

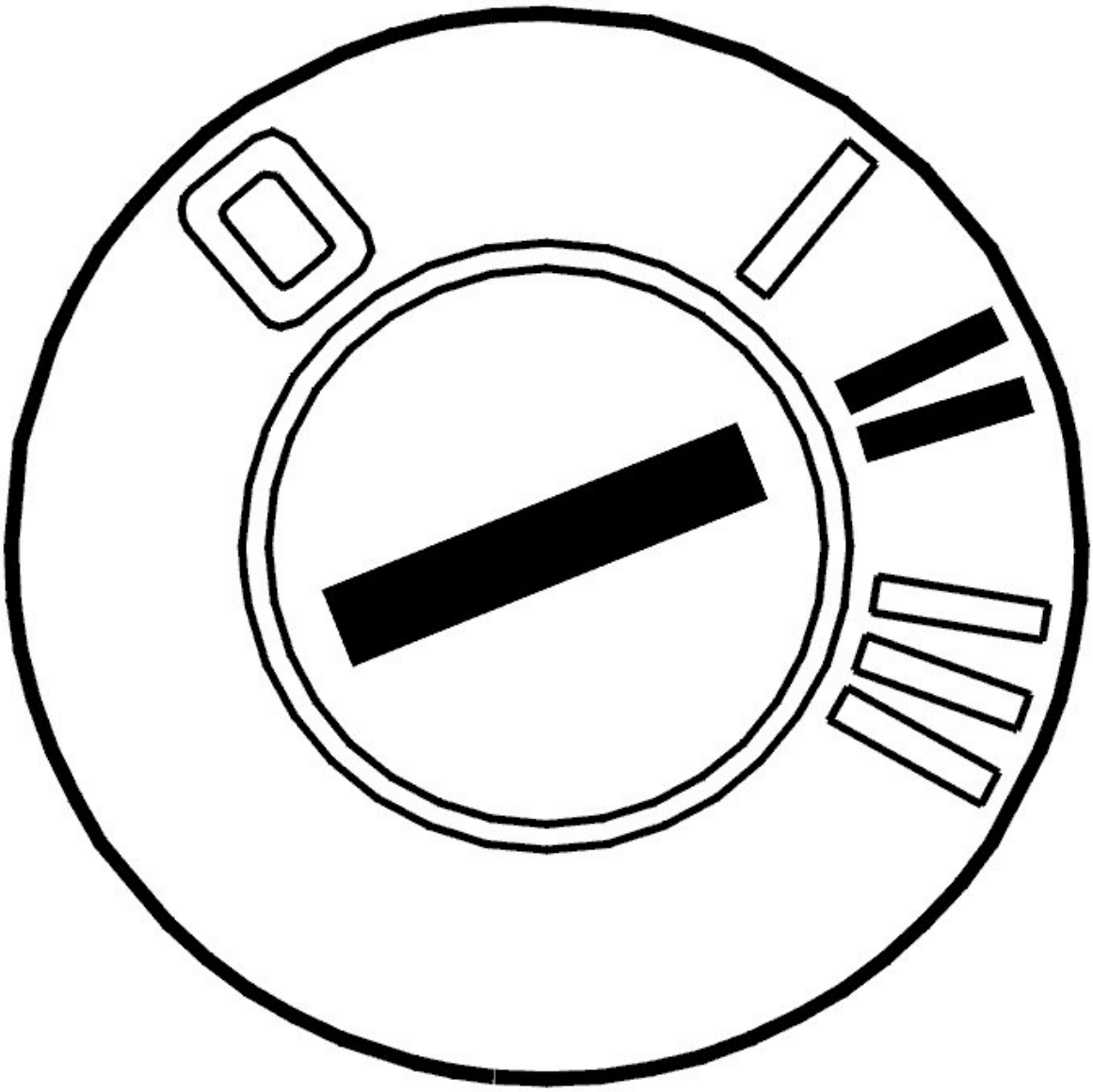
Possible source
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

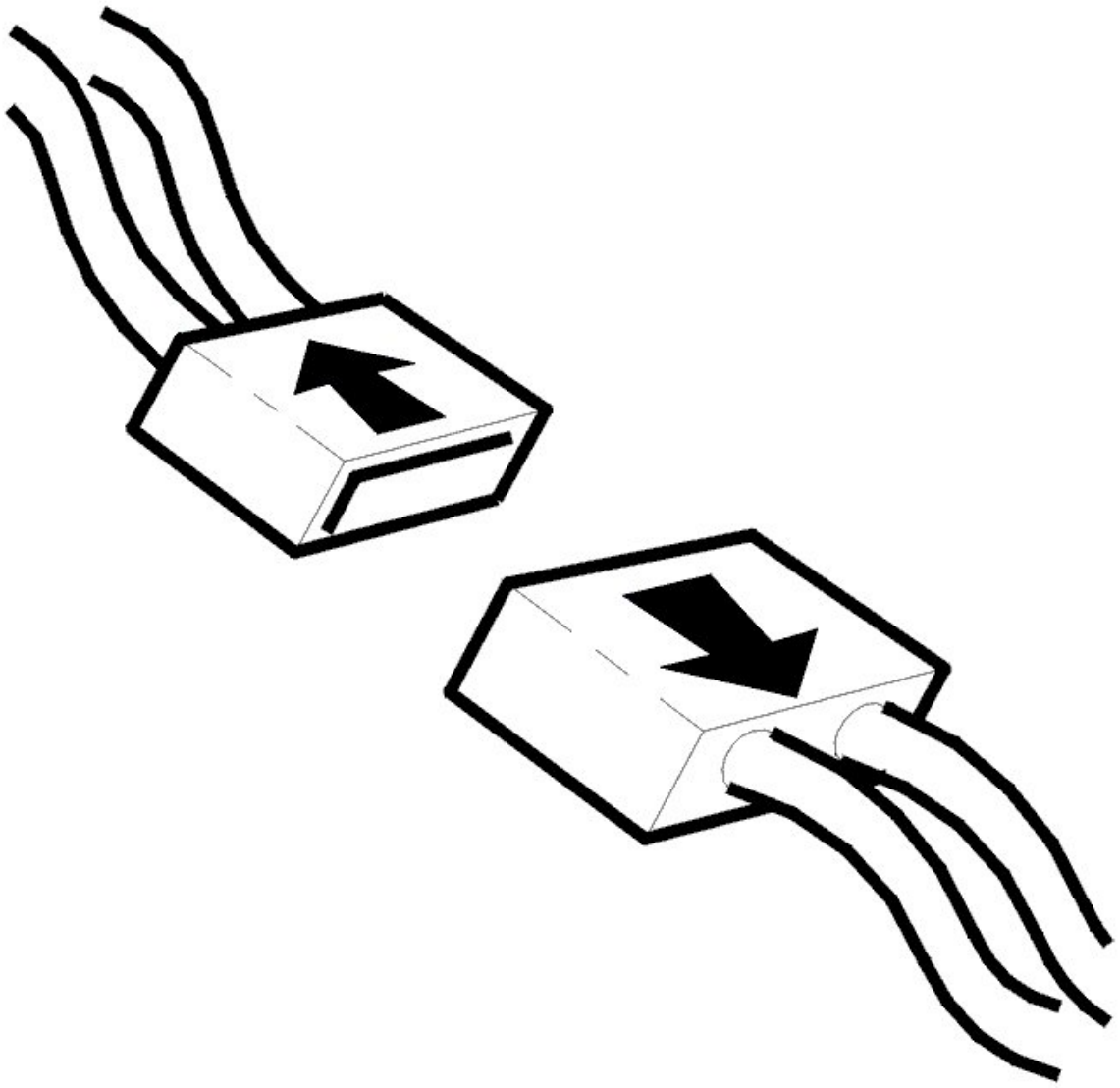
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

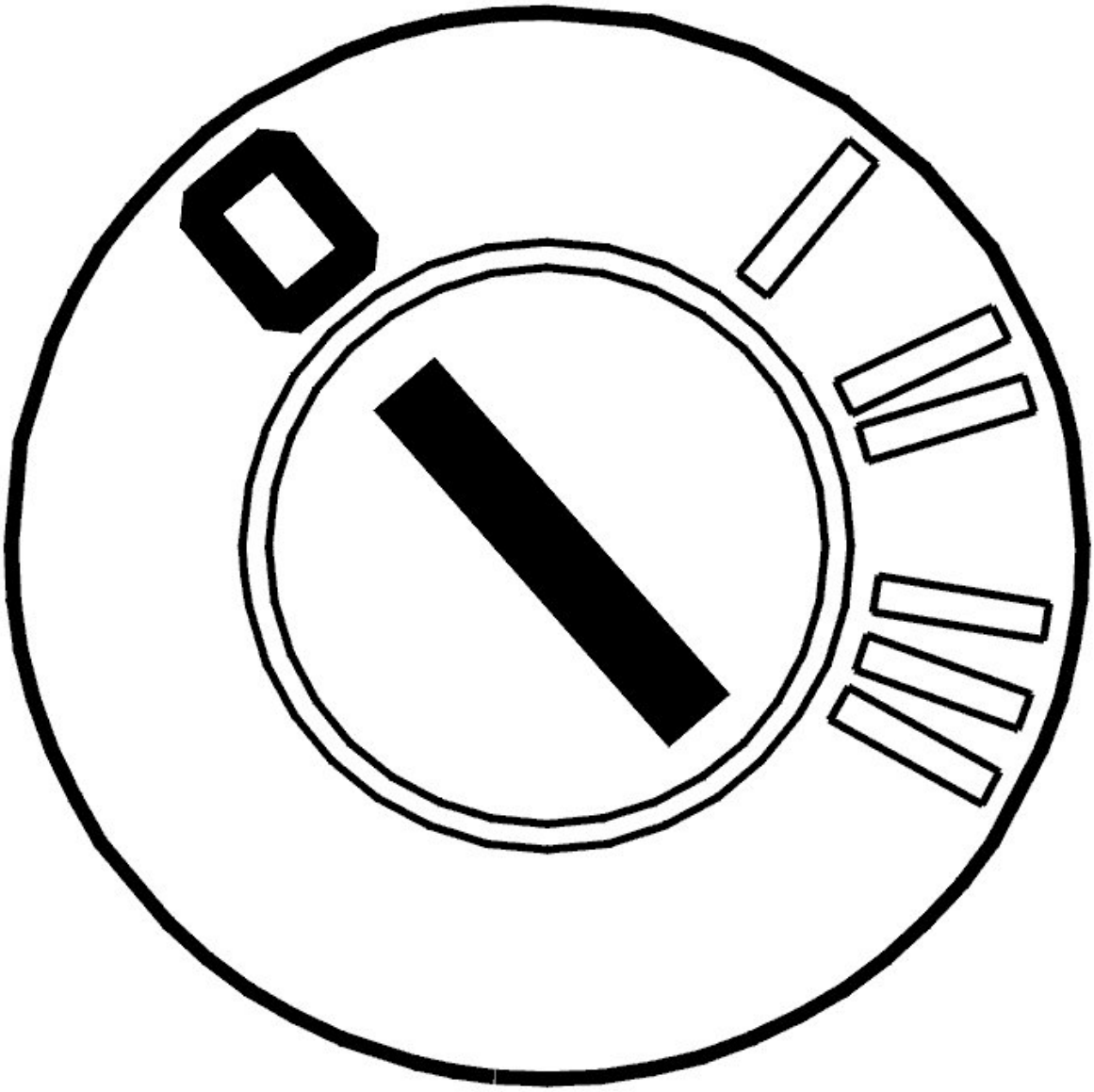
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the right hand connector (violet) for the airbag on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

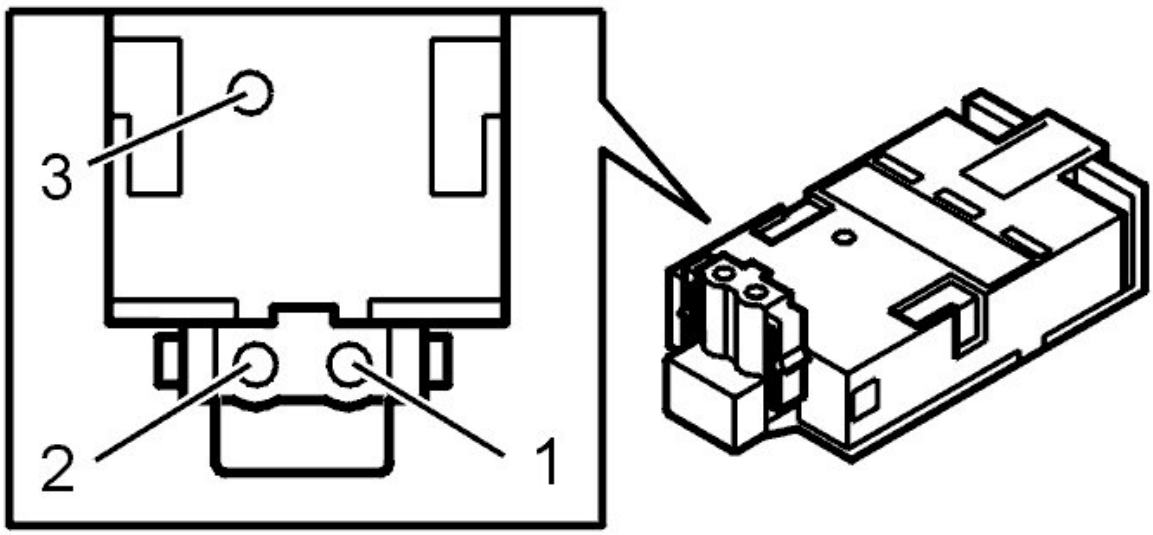
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

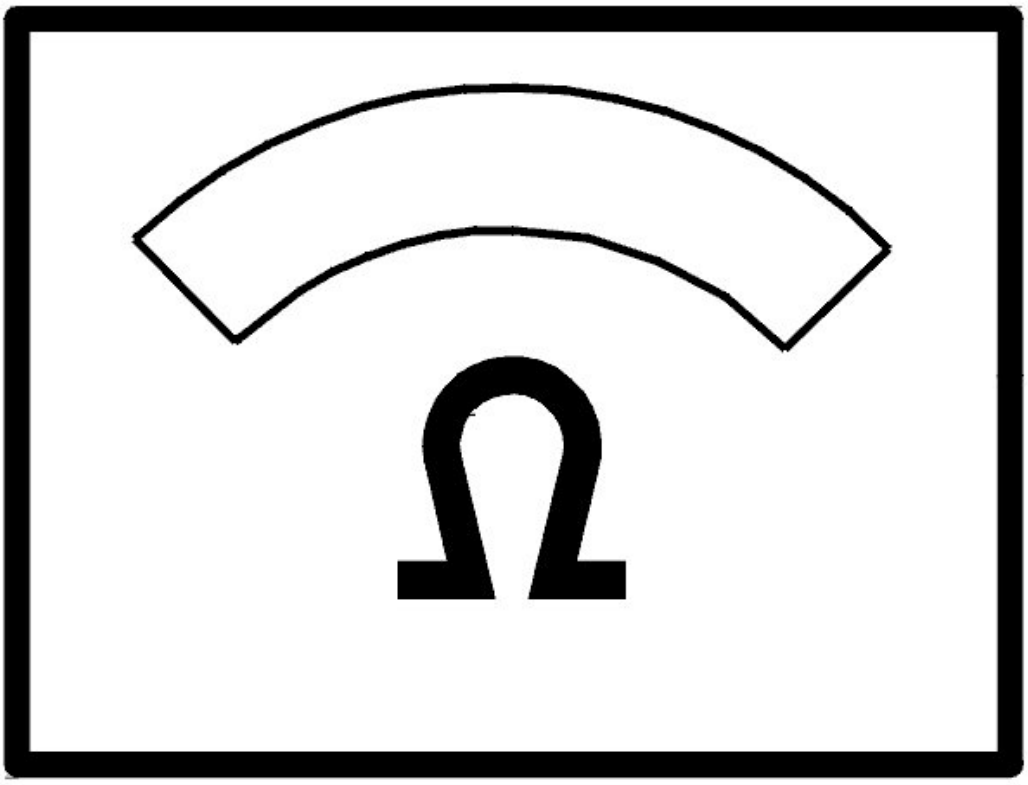
Check the cable between SRS control module terminal #12B (40) and connector (lilac) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #11B (39) and connector (lilac) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

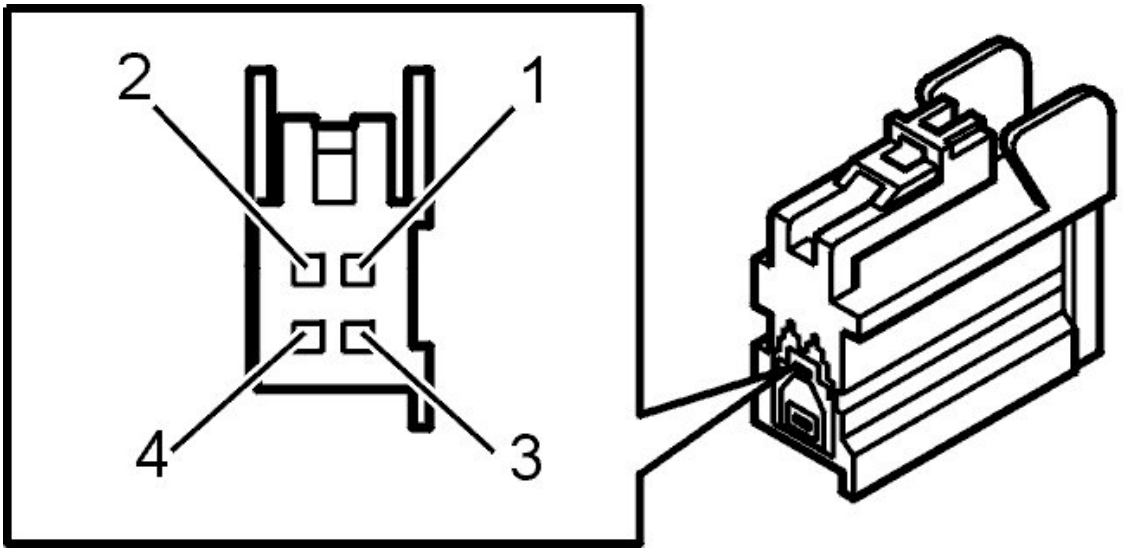
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the violet connector for the passenger side airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (lilac) for the passenger airbag, the resistance between the 4-pin connector terminals #3 and #4 (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the SRS control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be infinite
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

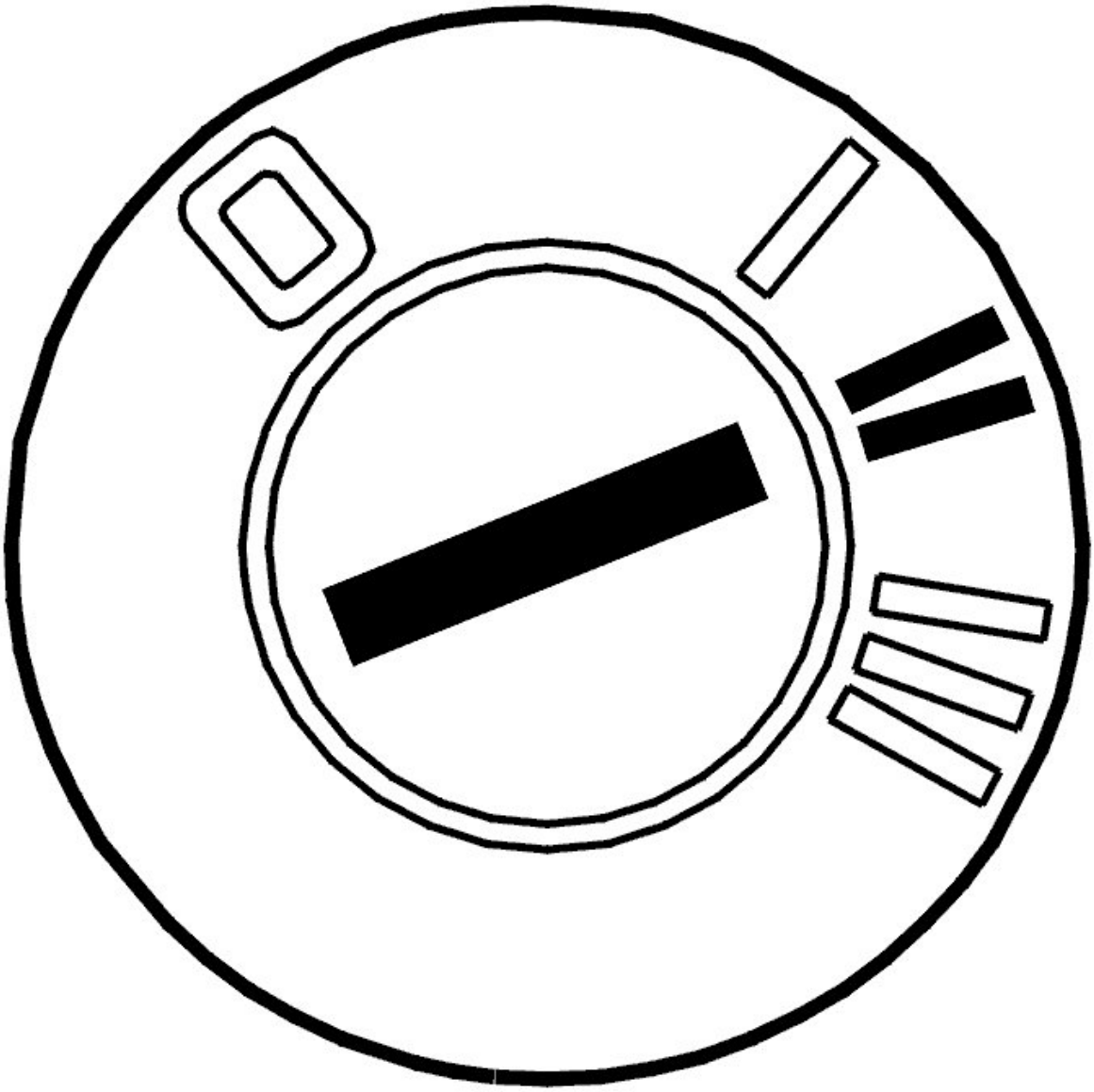
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

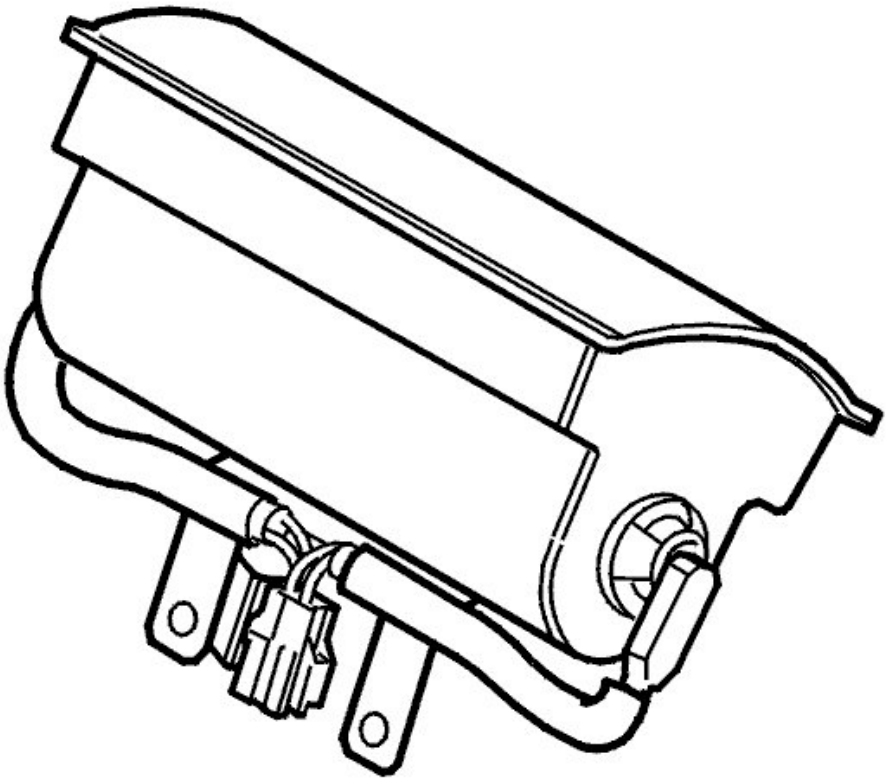
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-002A Diagnostic trouble code information

Condition



If the circuit capacitance is high for more than 10 seconds, diagnostic trouble code SRS-002A is displayed.

Substitute value

- Nothing.

Possible source

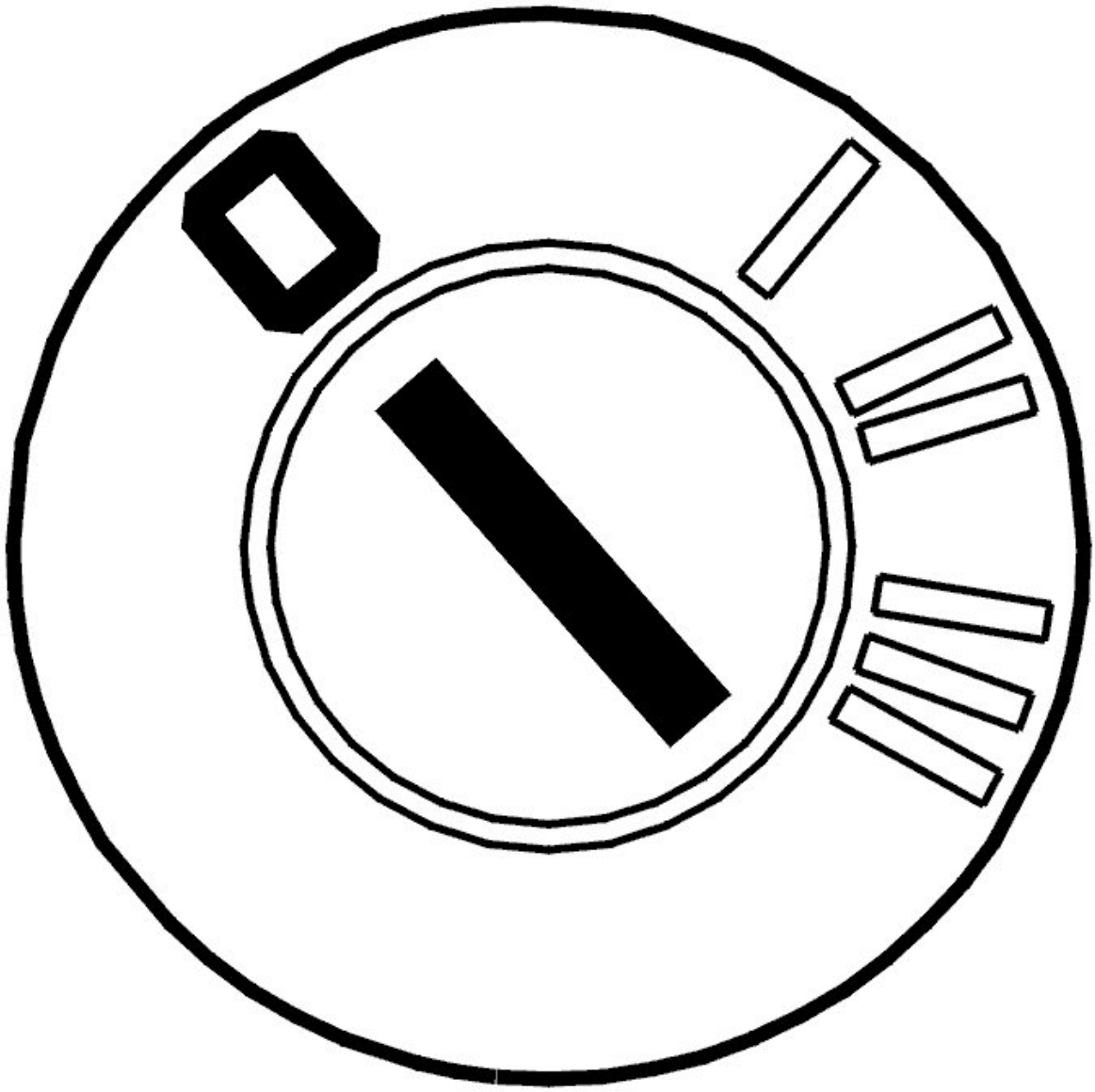
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

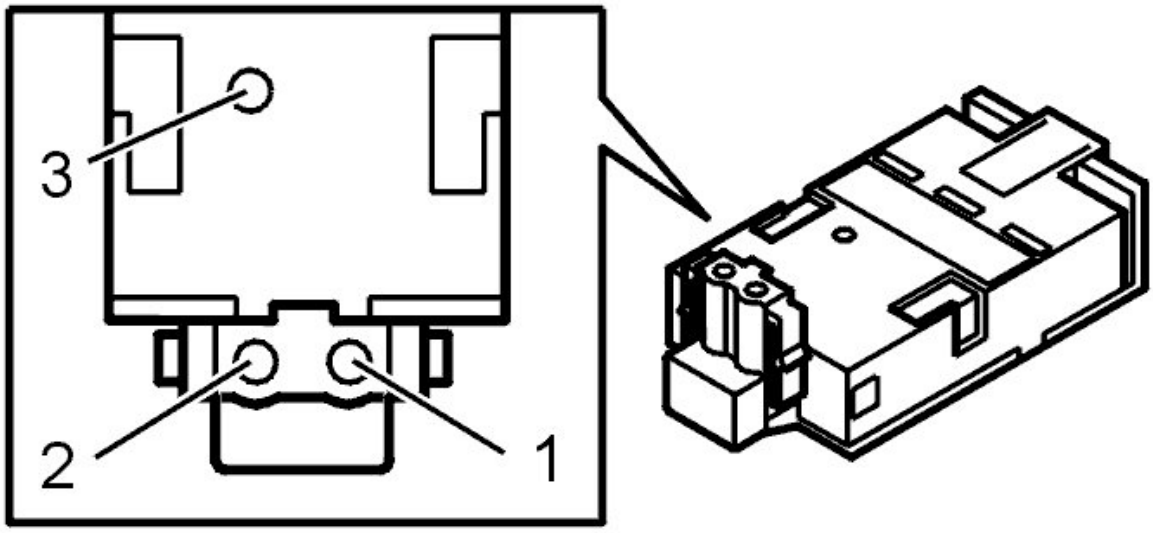
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

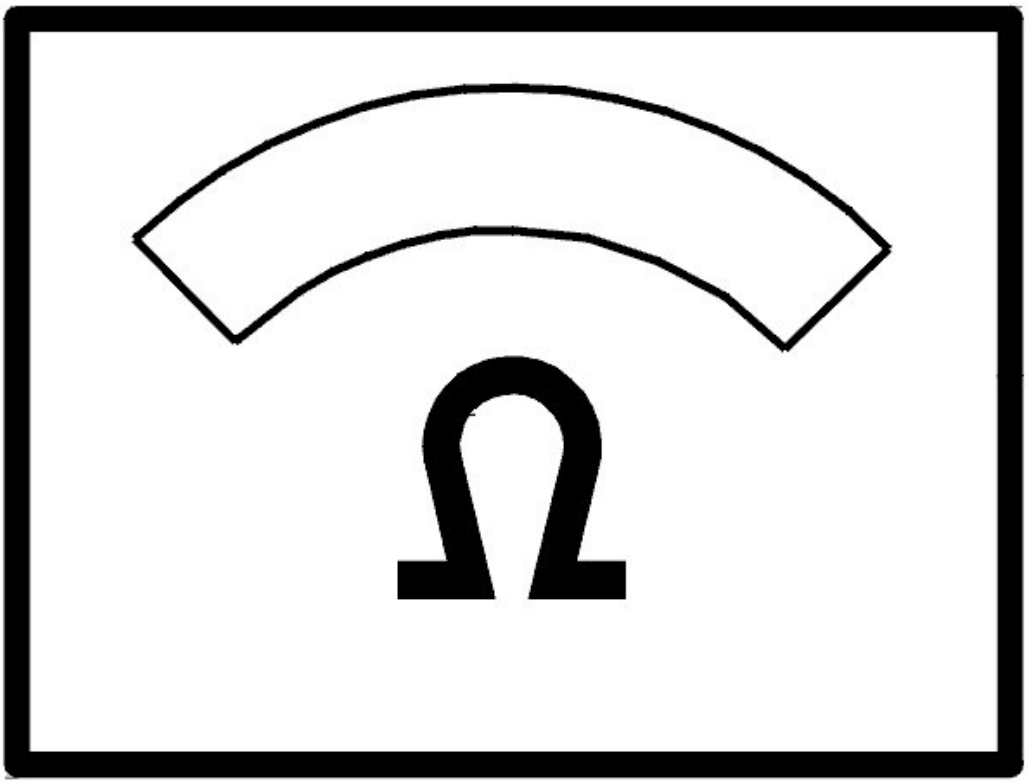
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #12B (40) and connector (lilac) terminal #1 on the passenger side airbag for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #11B (39) and connector (lilac) terminal #3 on the passenger side airbag for an intermittent

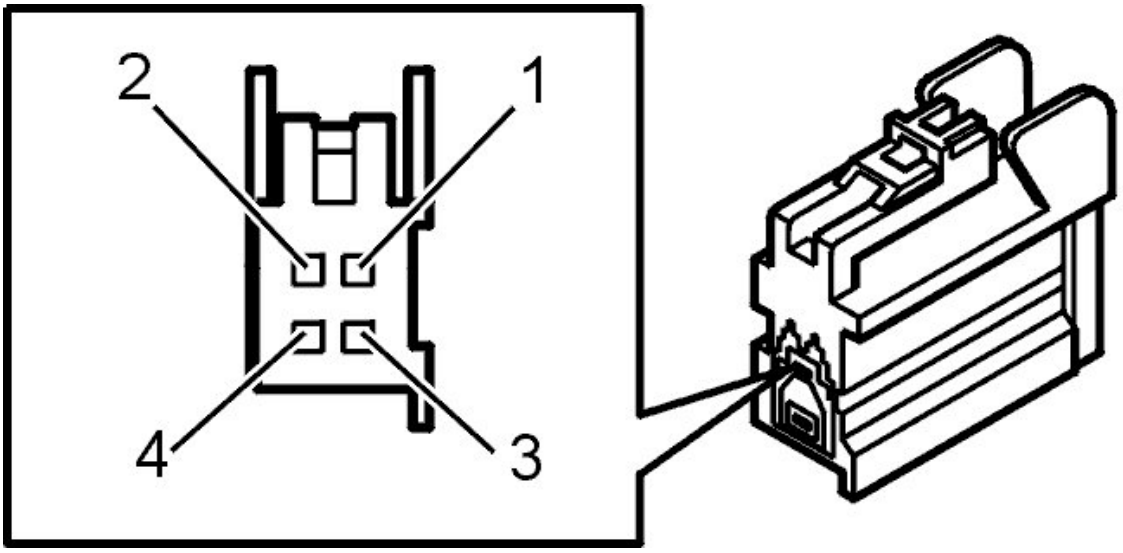
short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (violet) for the passenger airbag, the resistance between the 4-pin connector terminals #3 and #4 (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

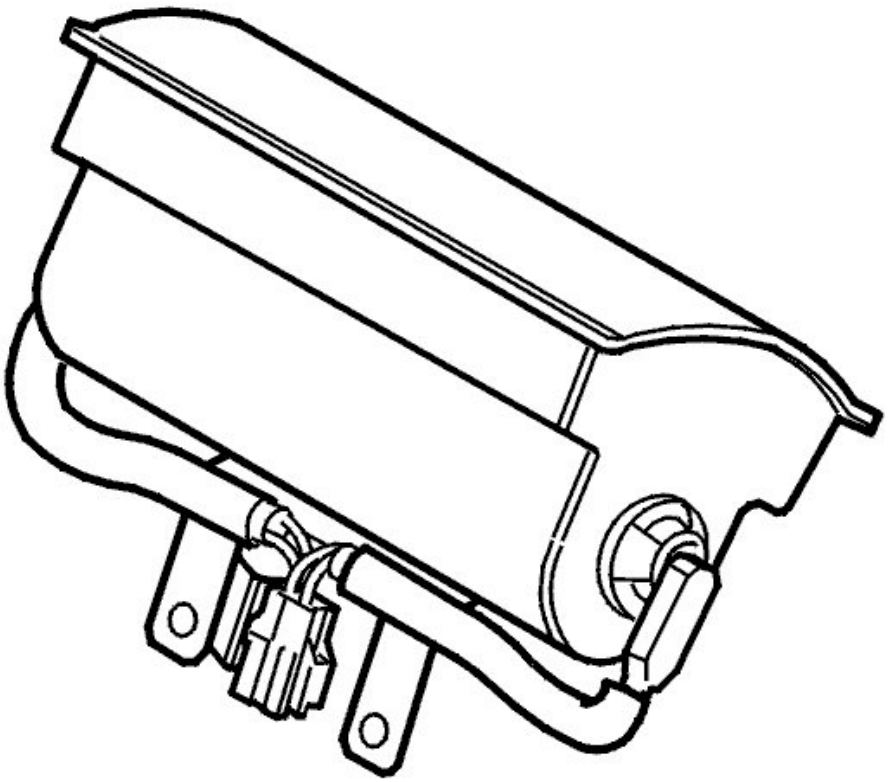
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-002B Diagnostic trouble code information

Condition



If the circuit capacitance is low for more than 10 seconds, diagnostic trouble code SRS-002B is displayed.

Substitute value
- Nothing.

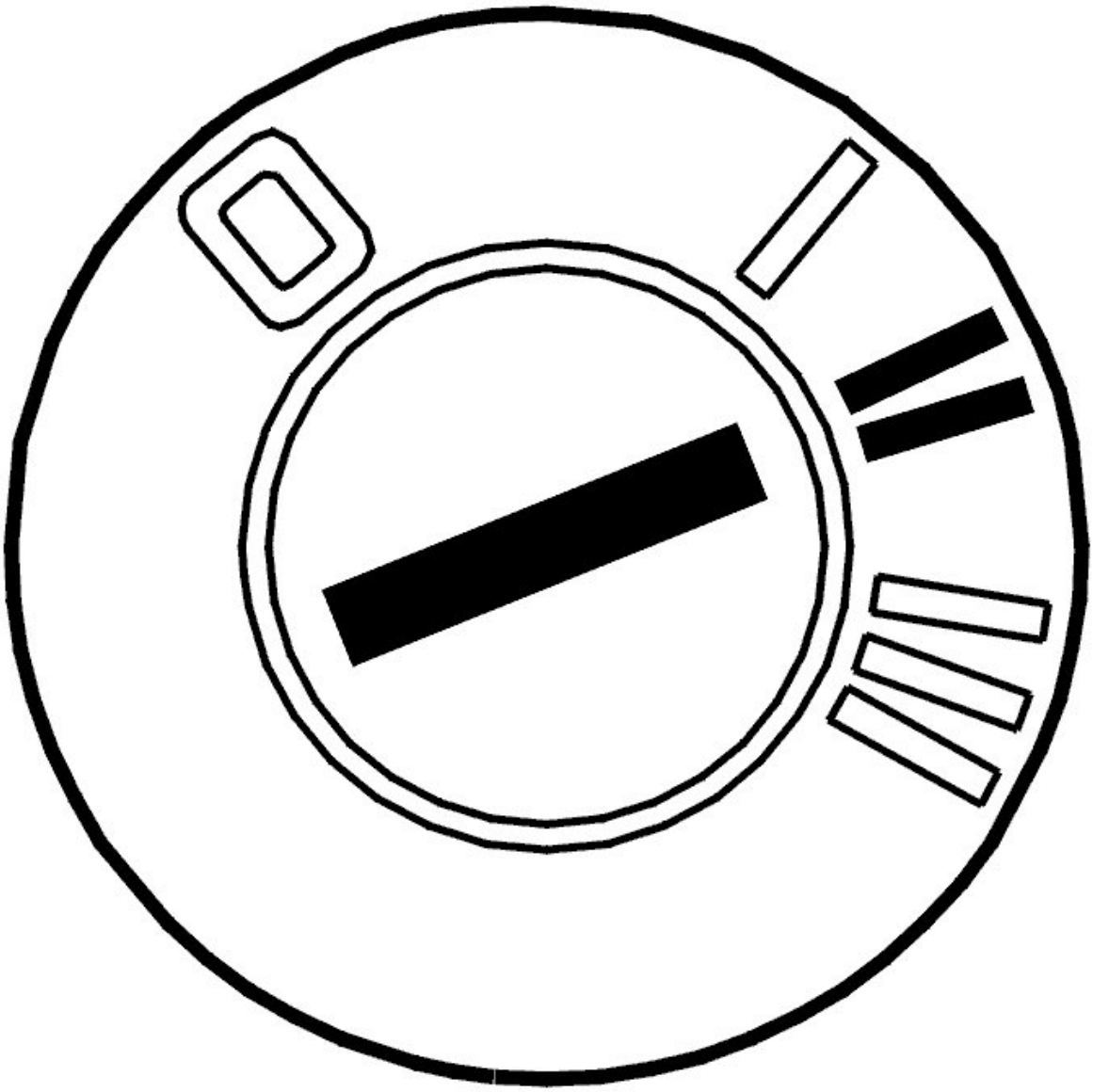
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

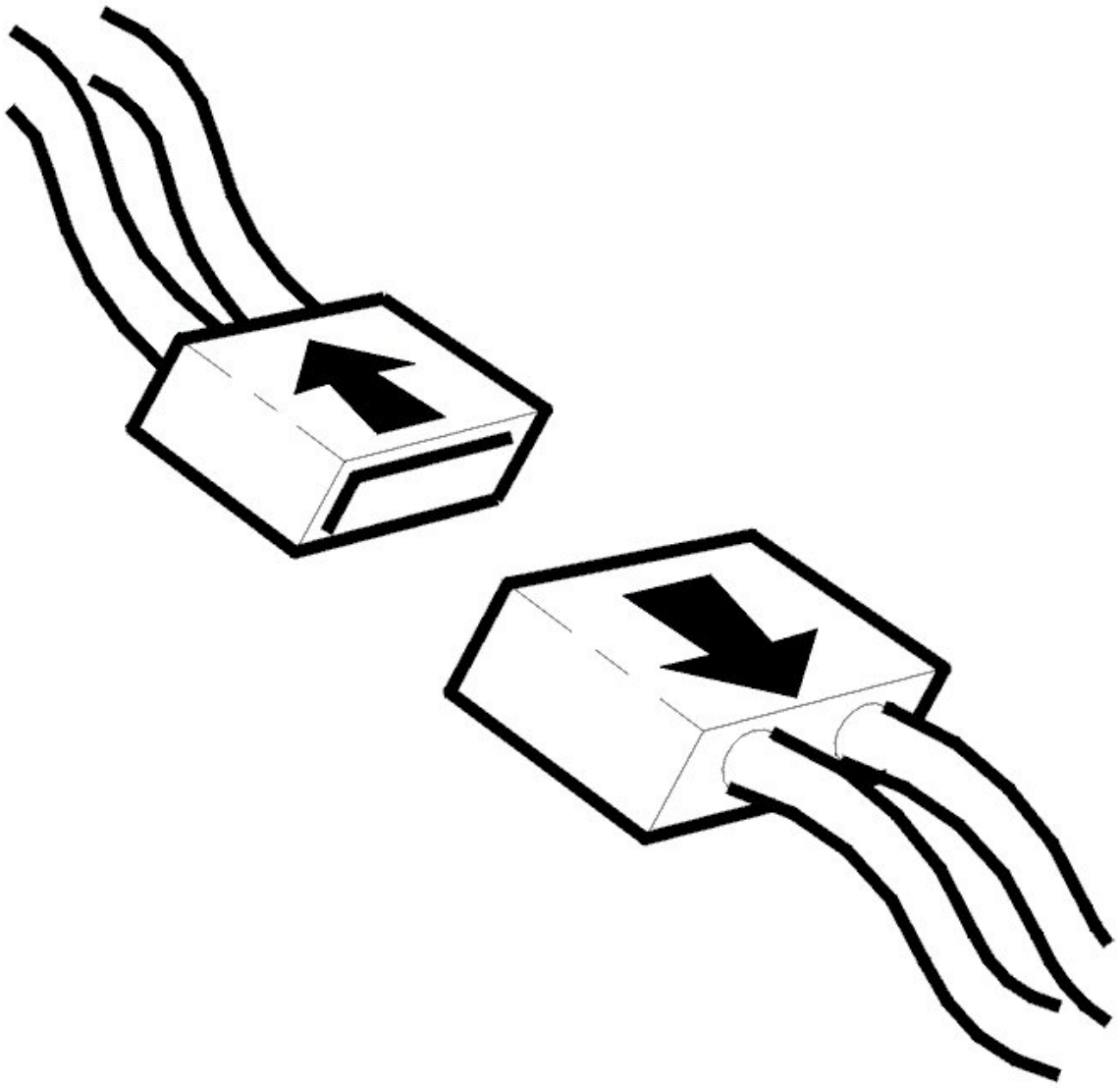
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

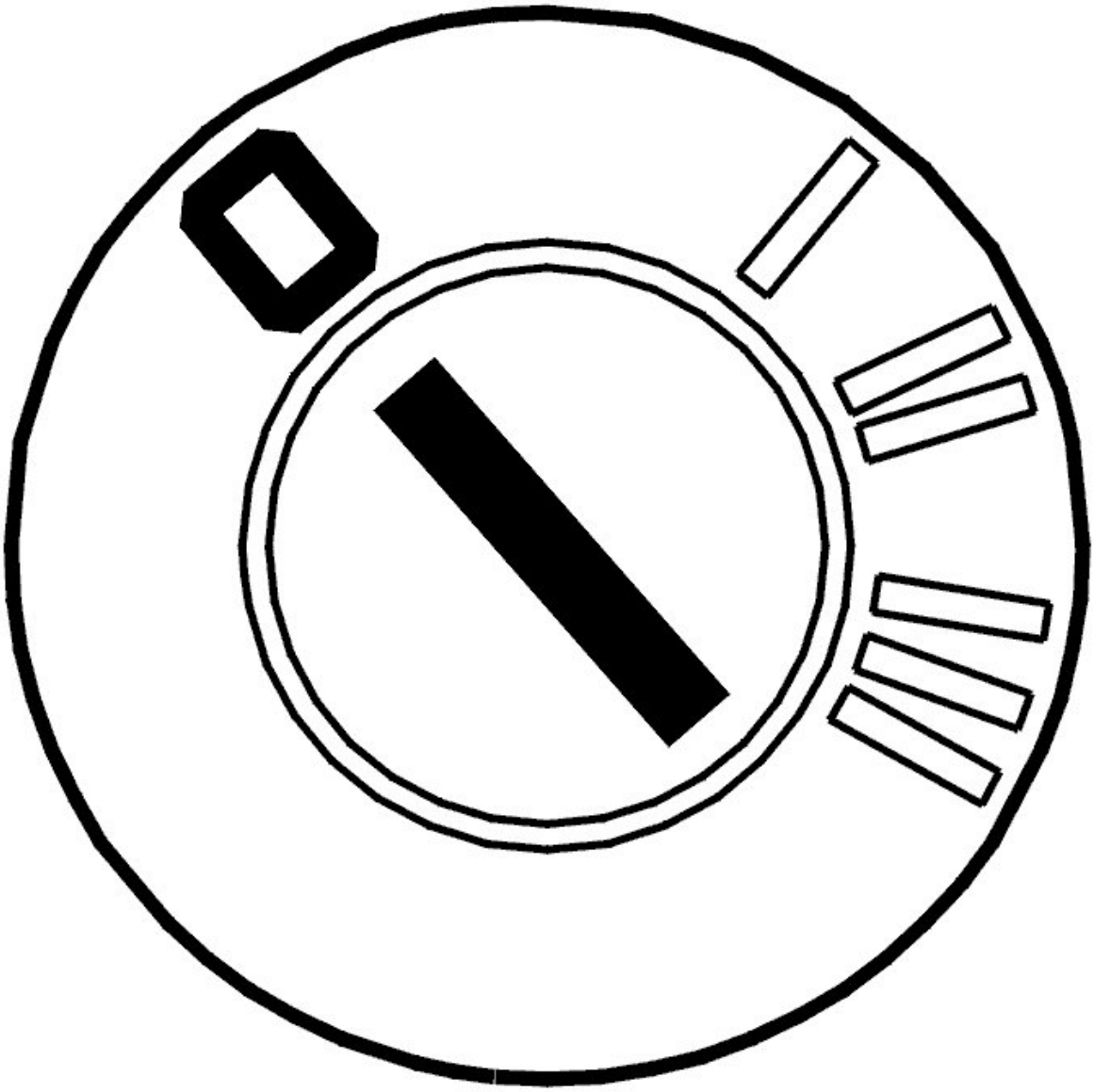
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #13B (41) and connector (violet) terminal #1 on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #14B (42) and connector (violet) terminal #3 on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

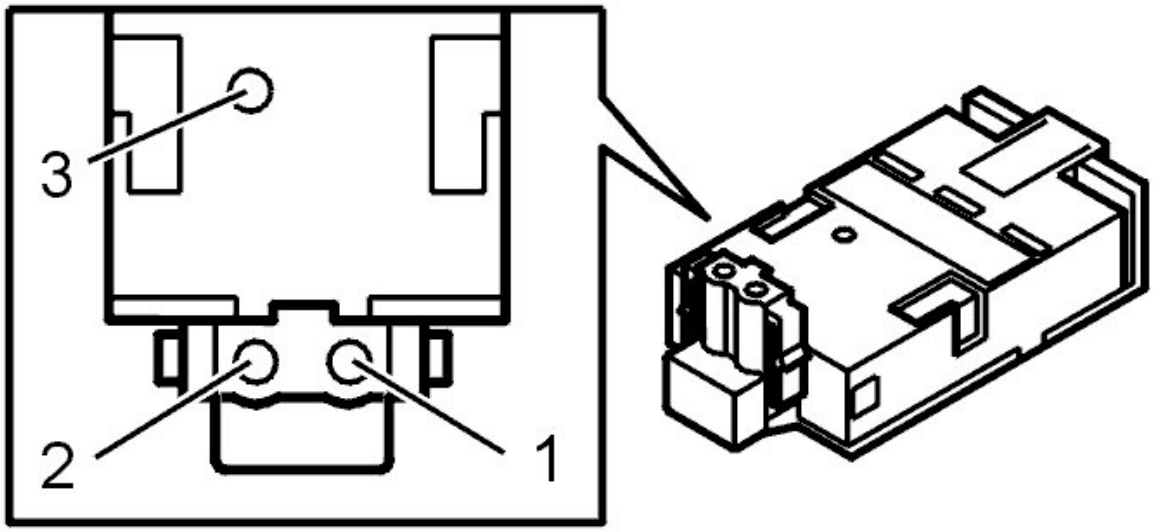
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector (violet) for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The

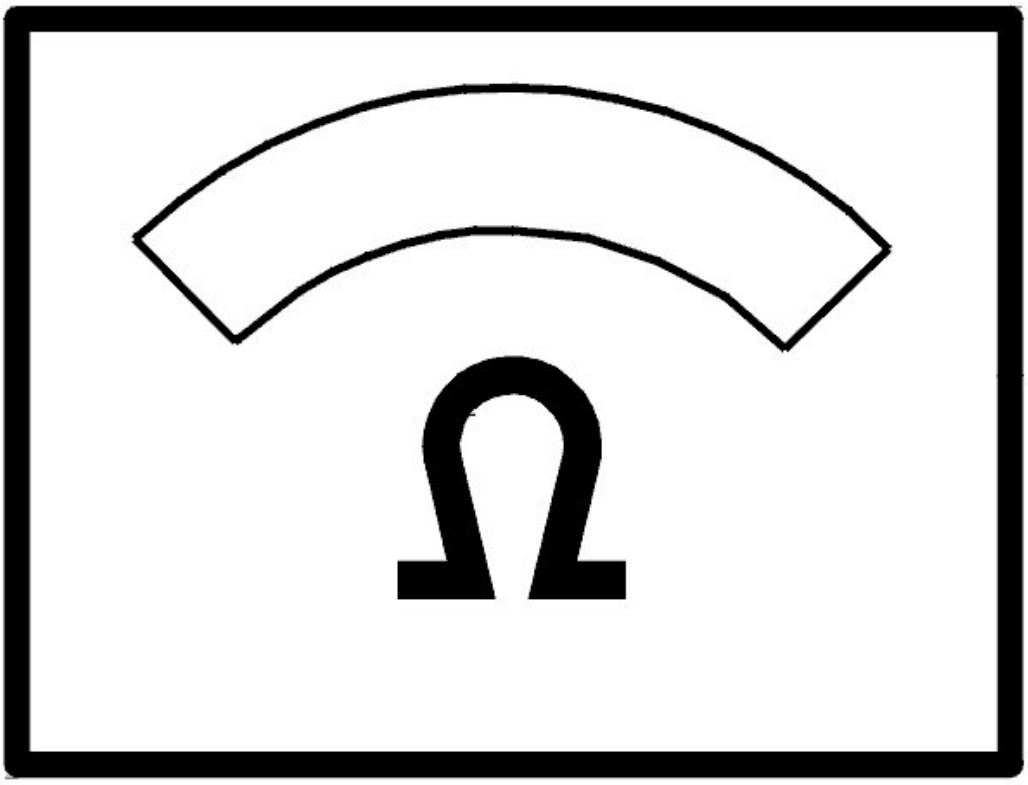
ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

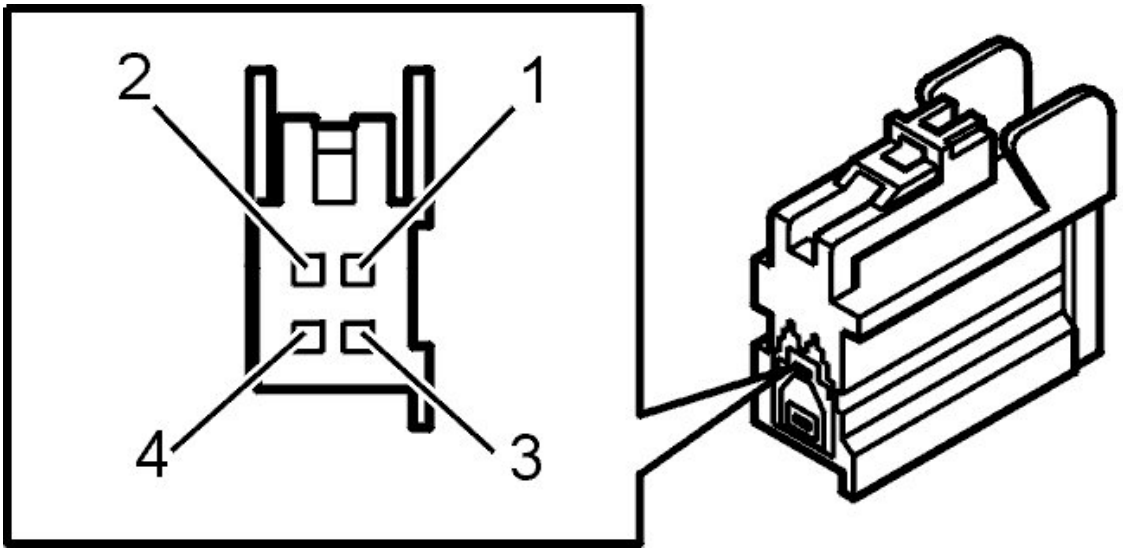
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 of the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To repair the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

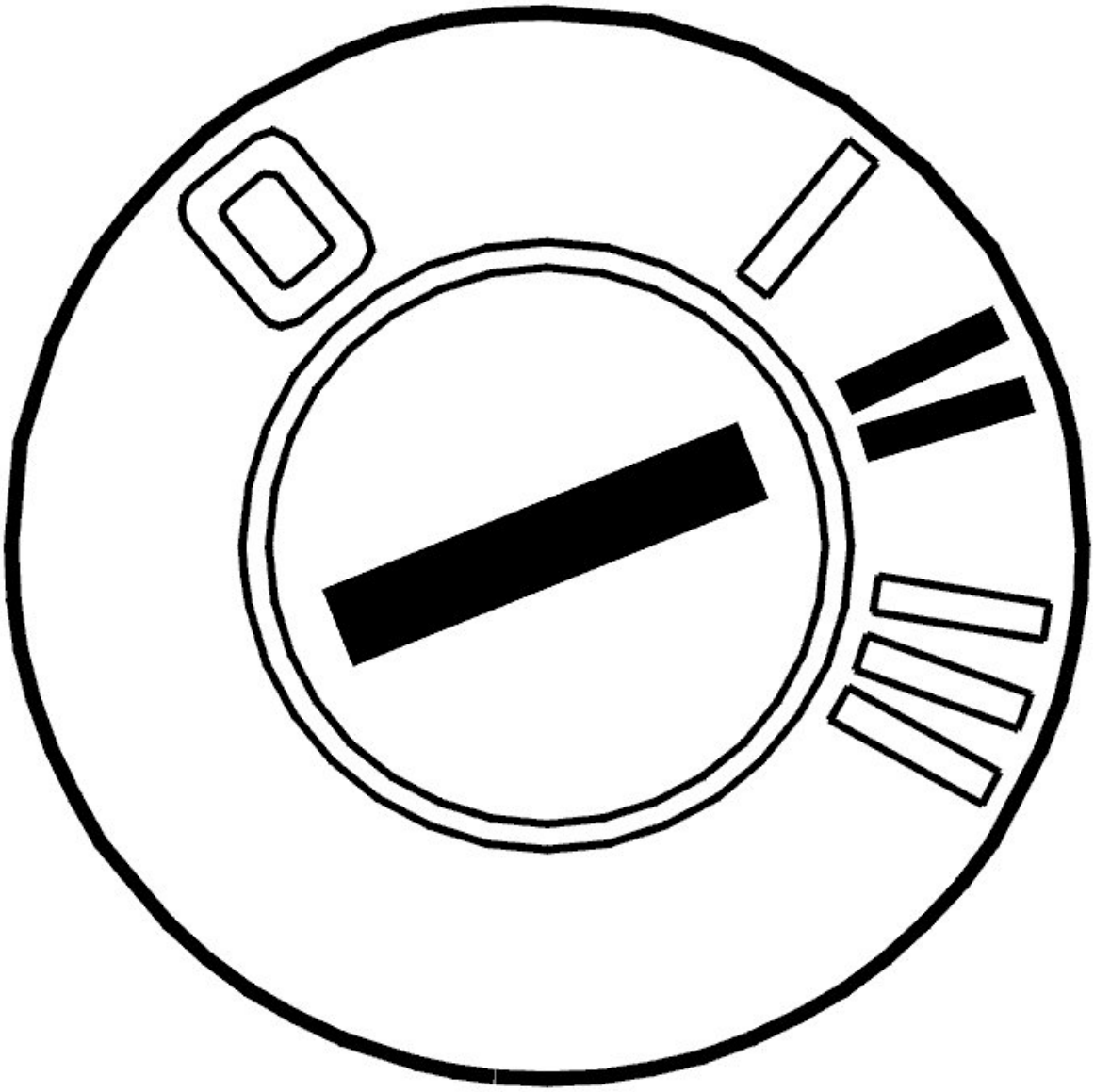
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

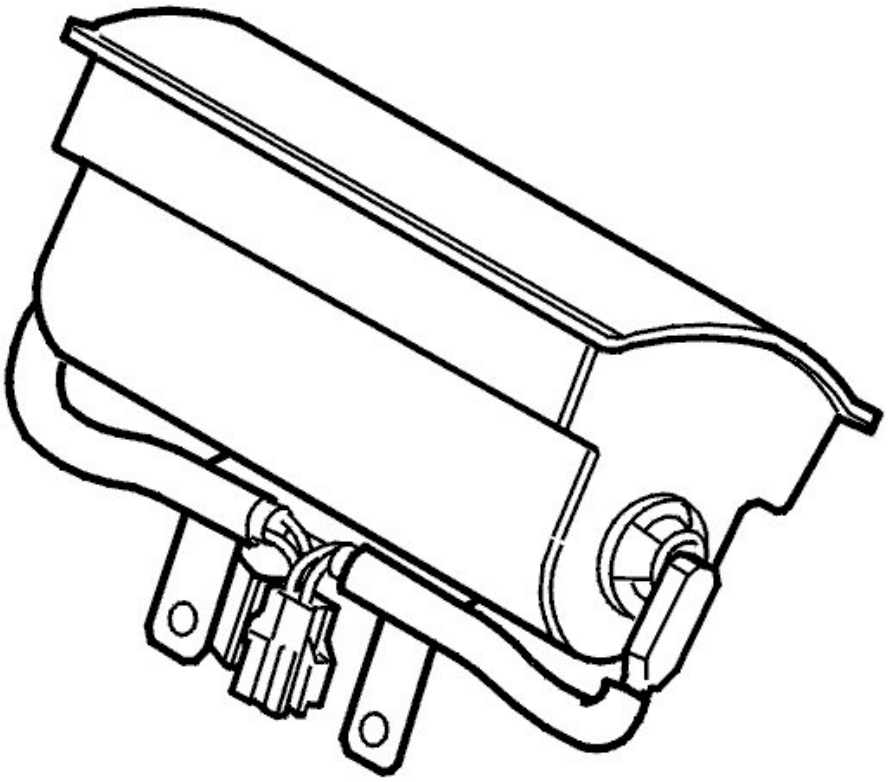
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-002B Diagnostic trouble code information

Condition



If the circuit capacitance is low for more than 10 seconds, diagnostic trouble code SRS-002B is displayed.

Substitute value

- Nothing.

Possible source

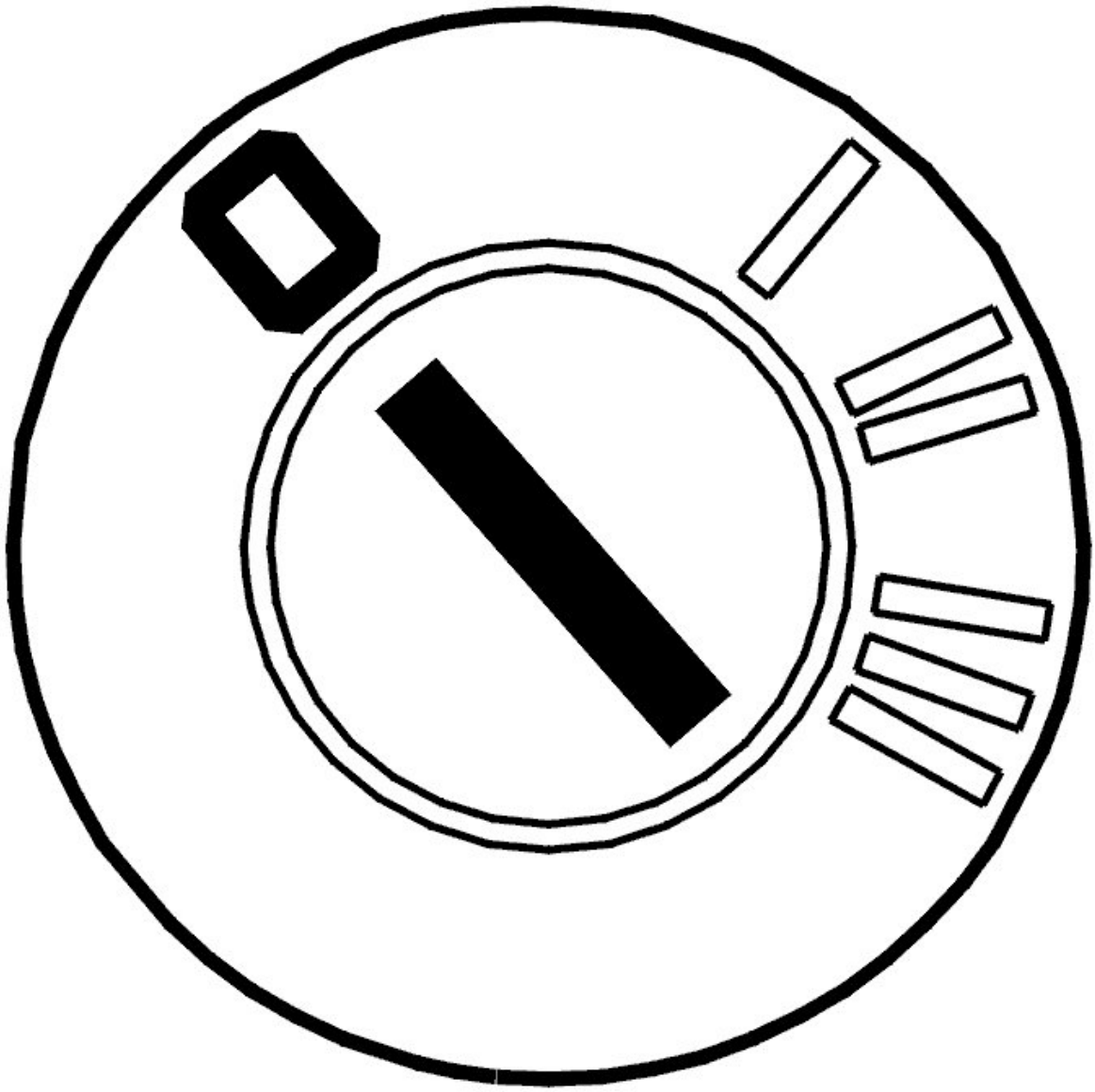
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #13B (41) and connector (violet) terminal #1 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General

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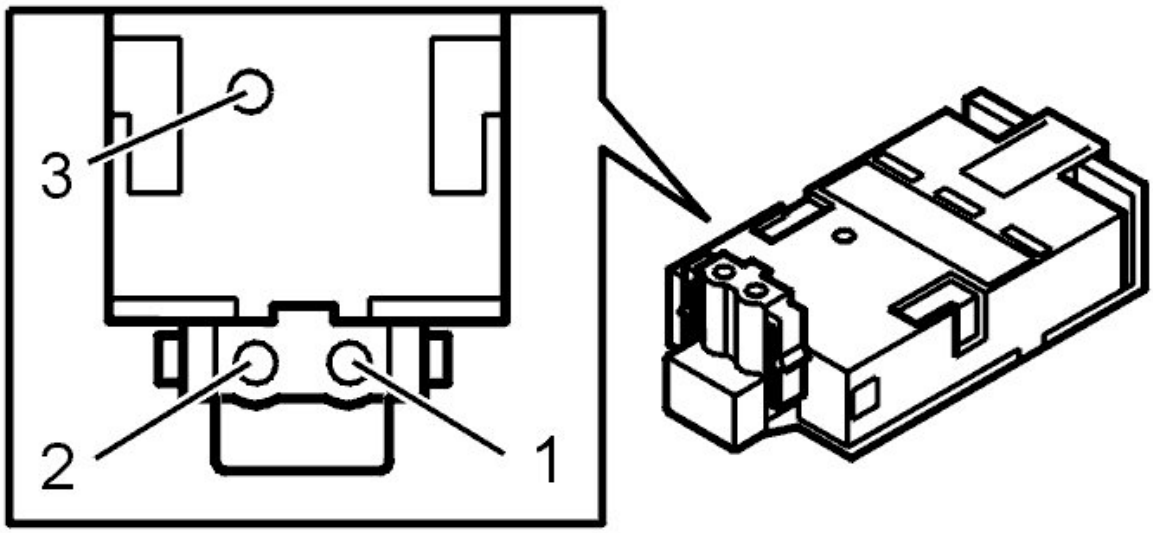
Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #14B (42) and connector (violet) terminal #3 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

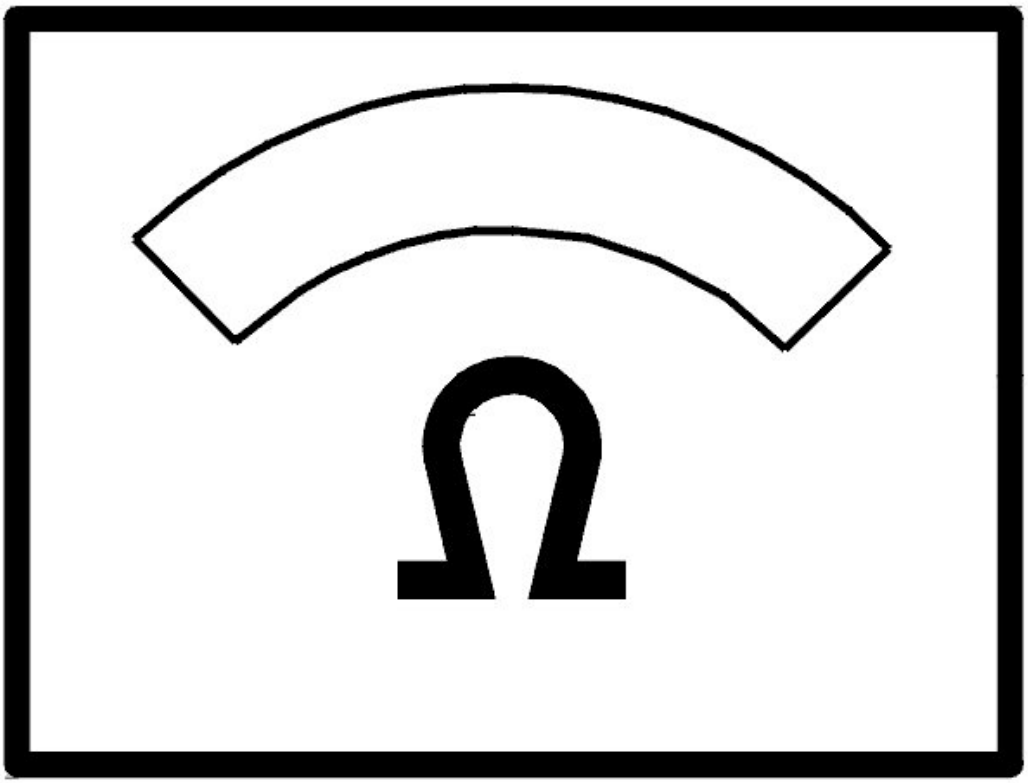
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector (violet) for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

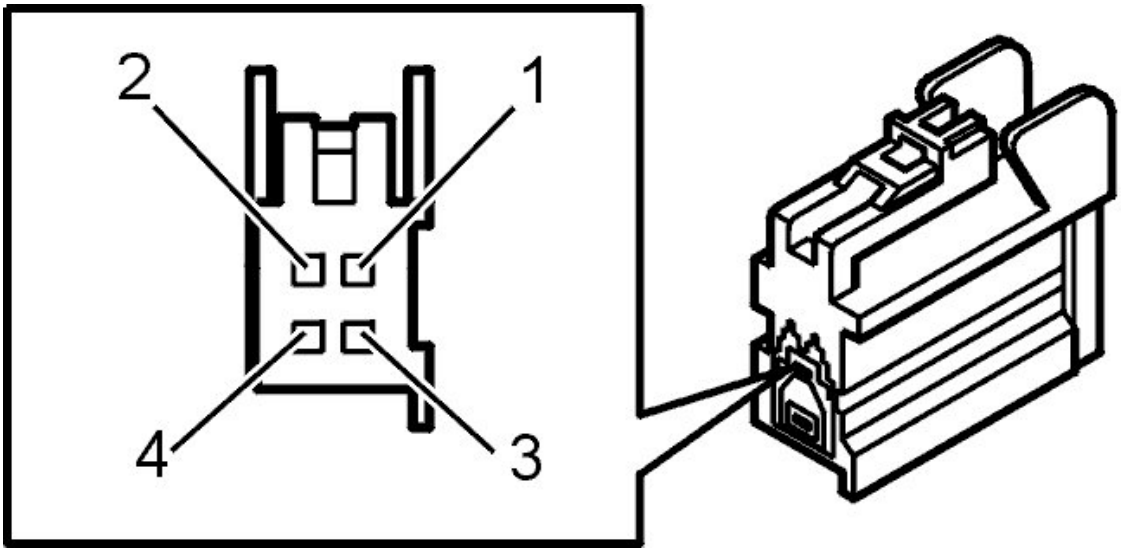
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (green) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #1 and #2 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

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It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

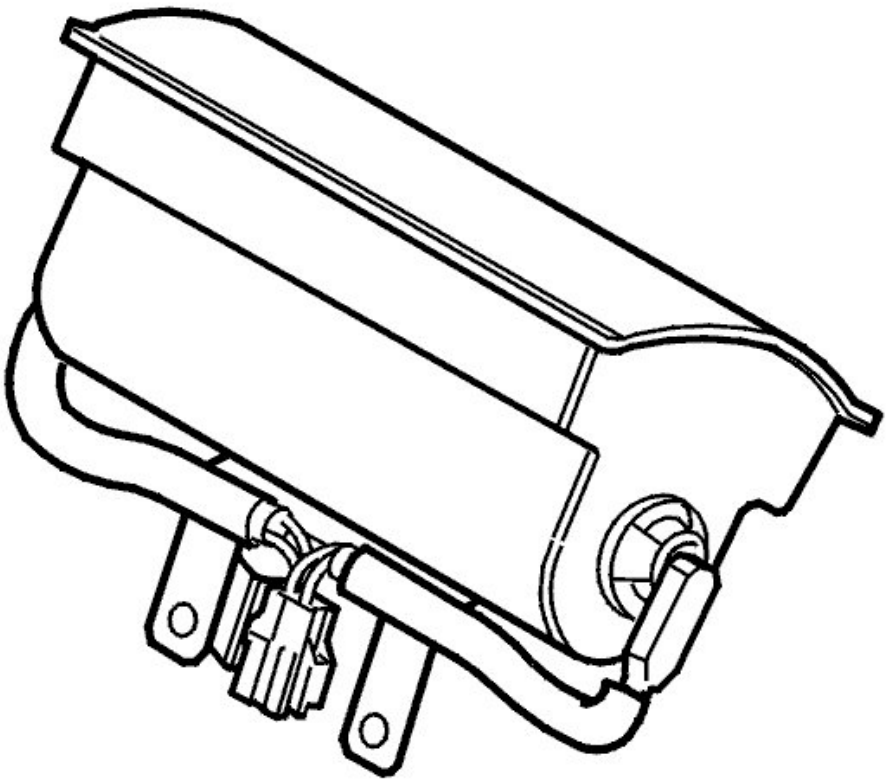
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-002C Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-002C is displayed.

Substitute value
- Nothing.

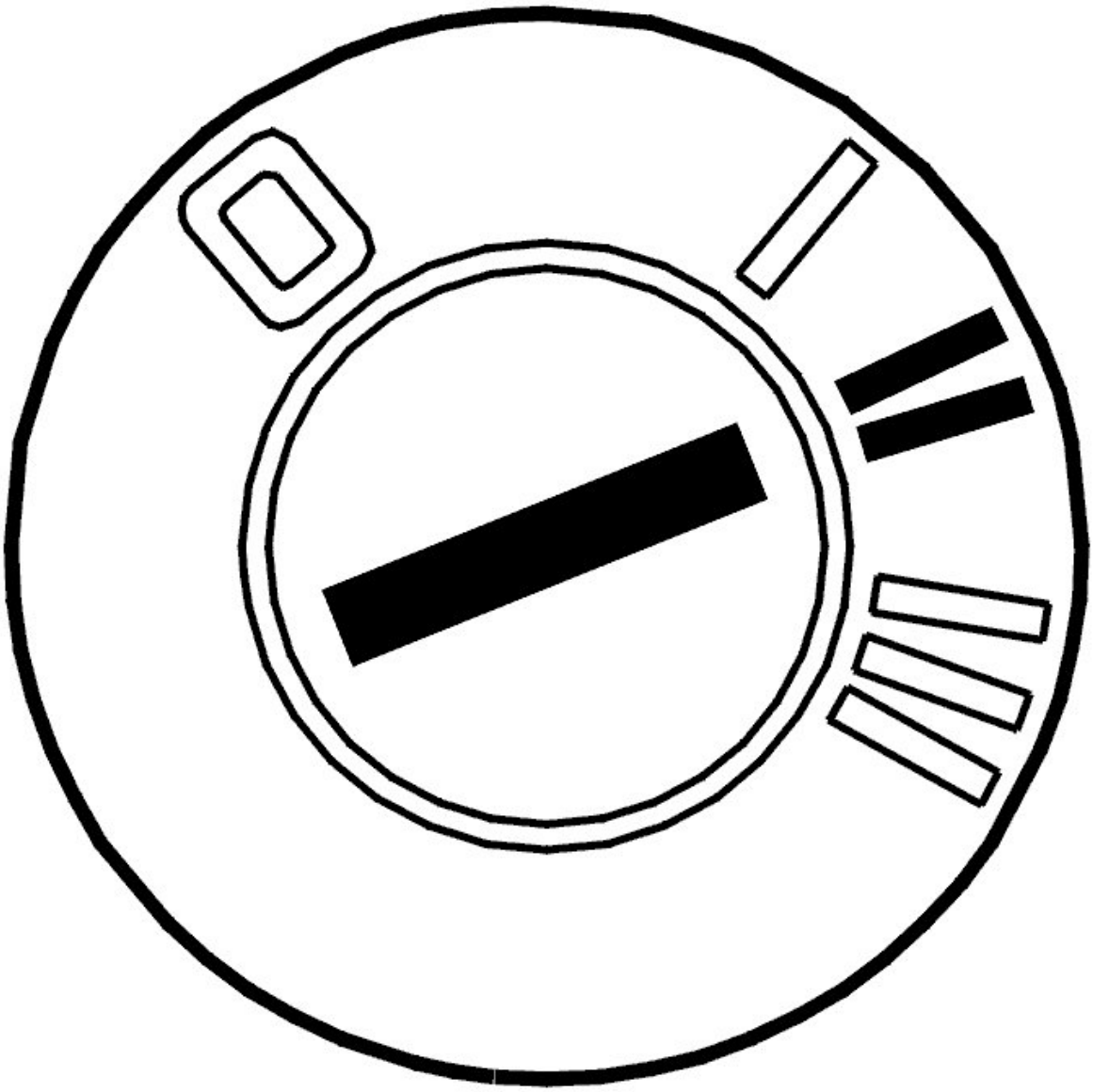
Possible source
- Open circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Open circuit in air bag (resistance in igniter too high).

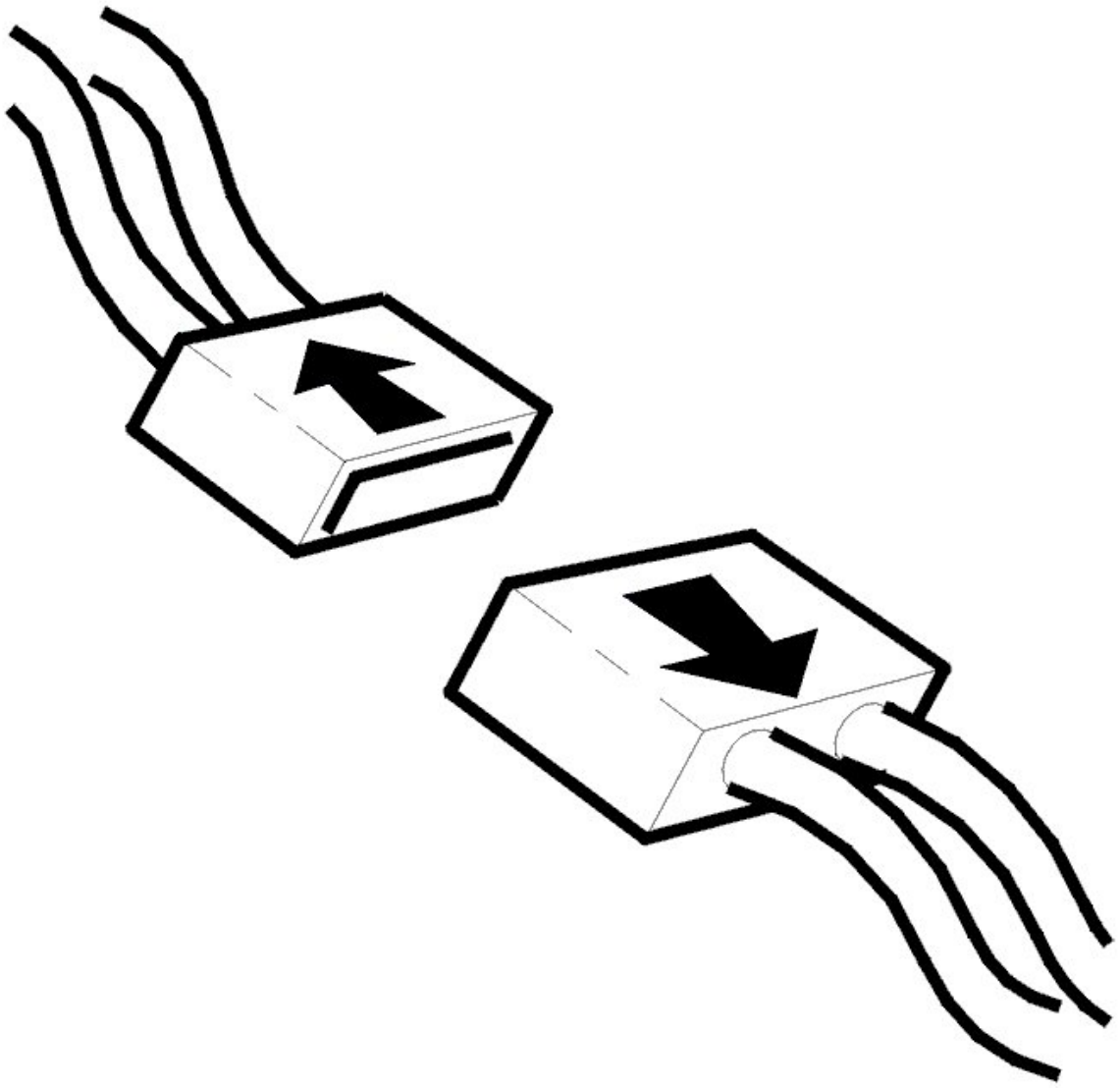
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

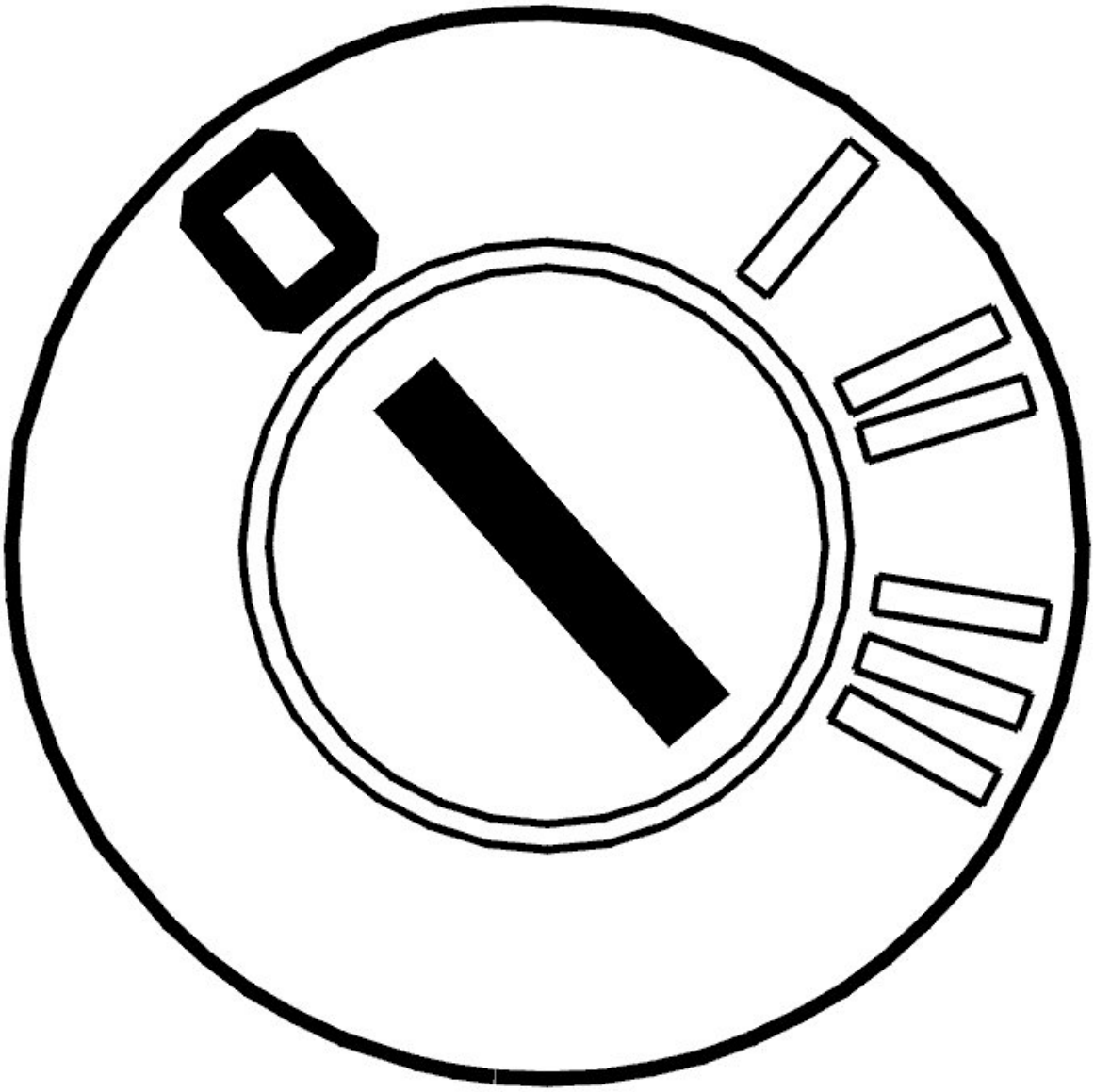
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the airbag connector (violet) on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

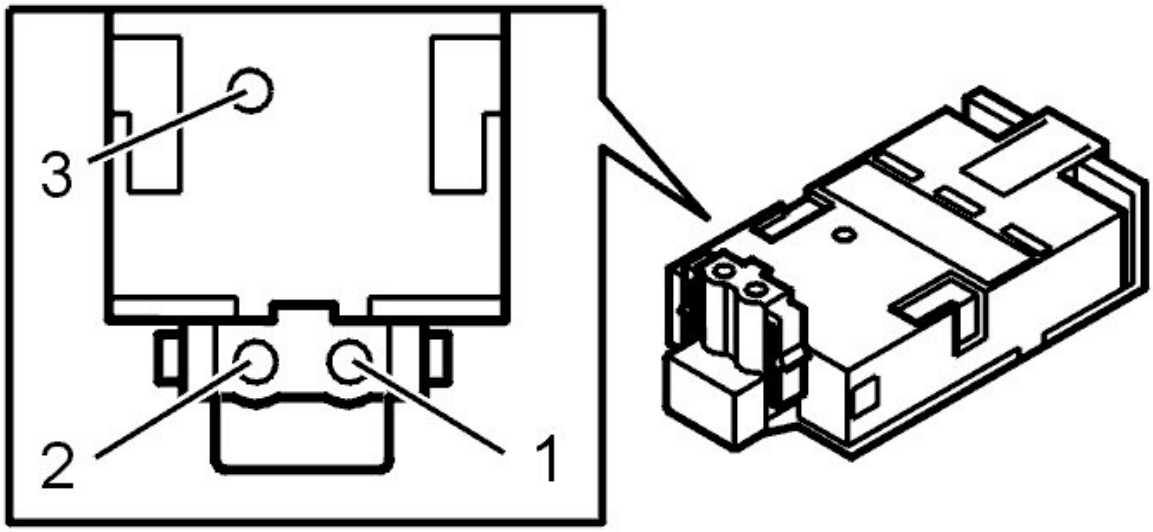
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

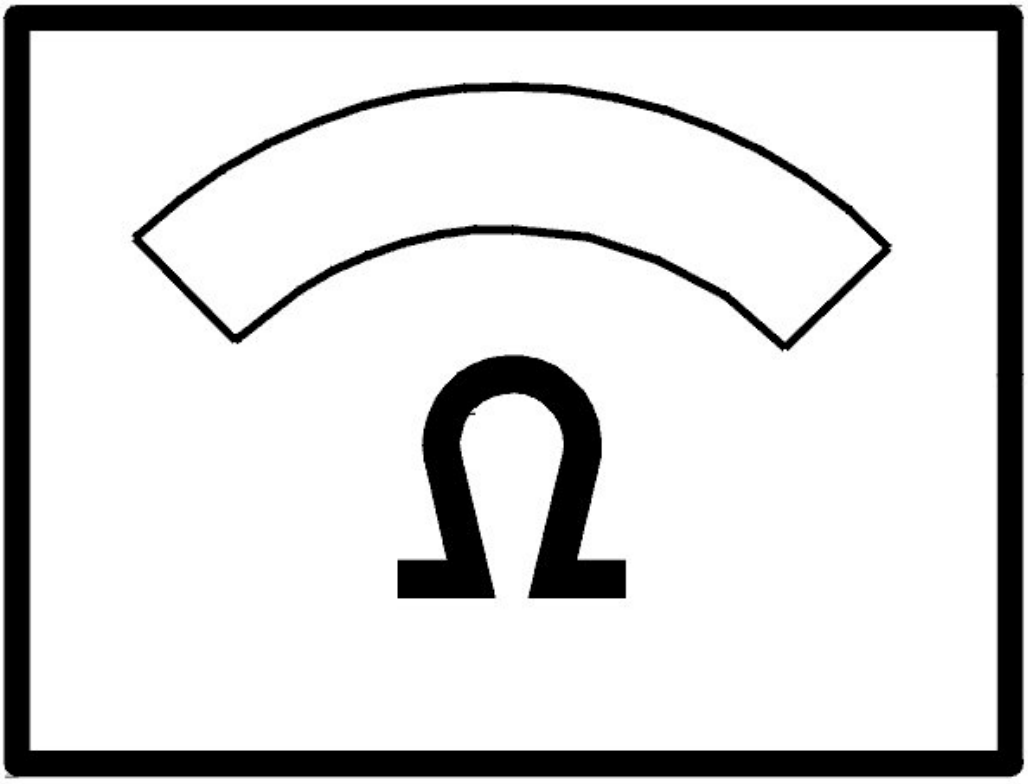
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #13B (41) and connector (violet) terminal #1 on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #14B (42) and connector (violet) terminal #3 on the passenger side airbag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

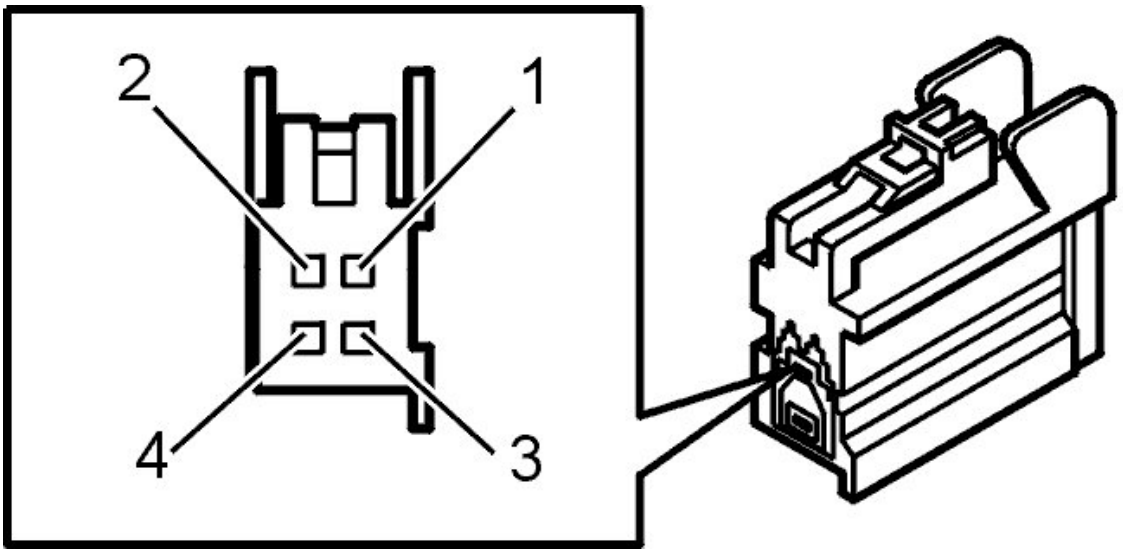
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

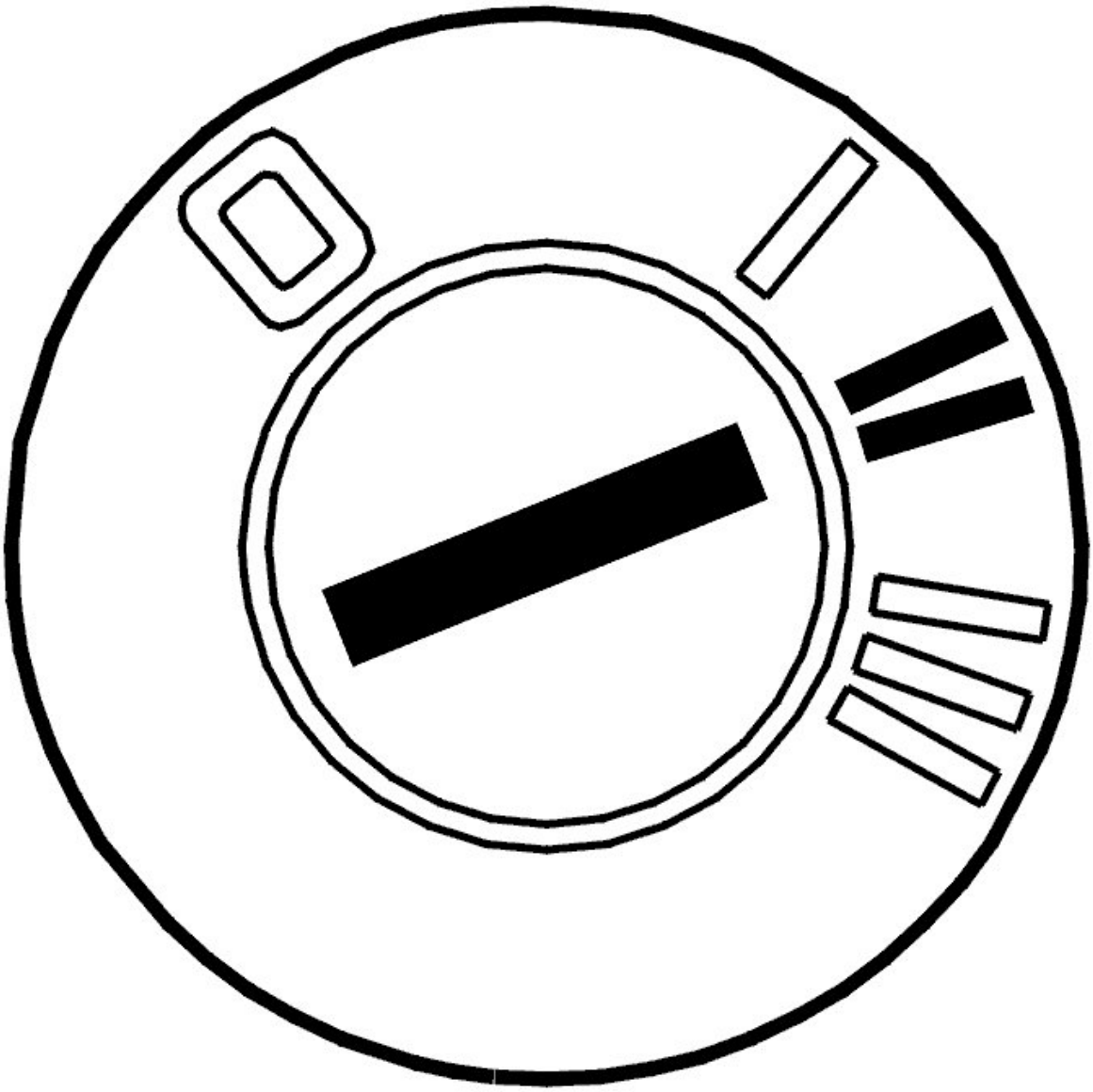
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

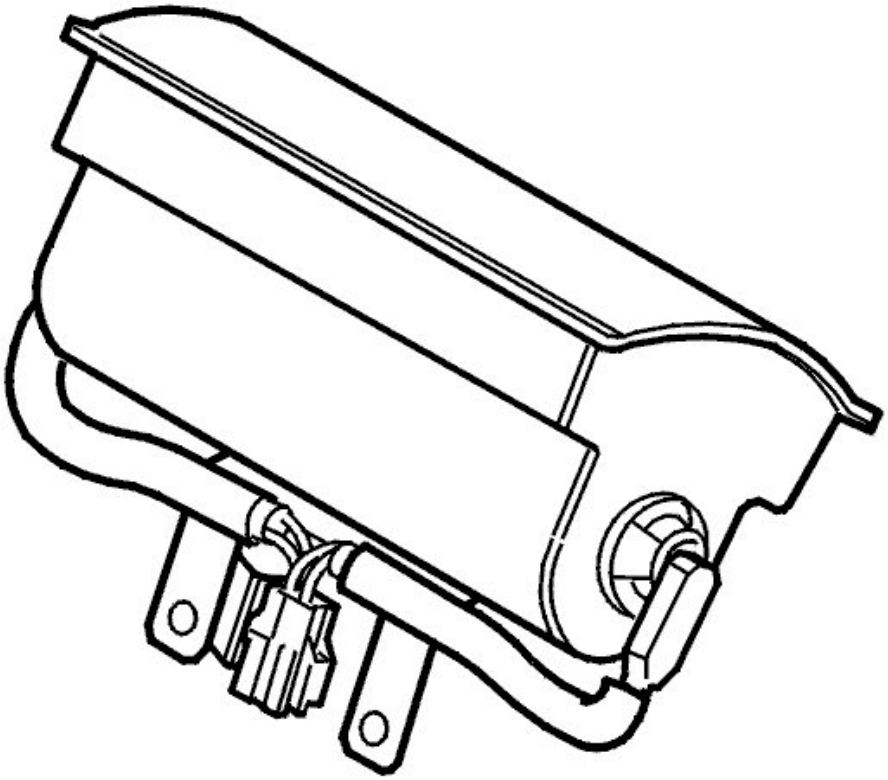
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-002C Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-002C is displayed.

Substitute value
- Nothing.

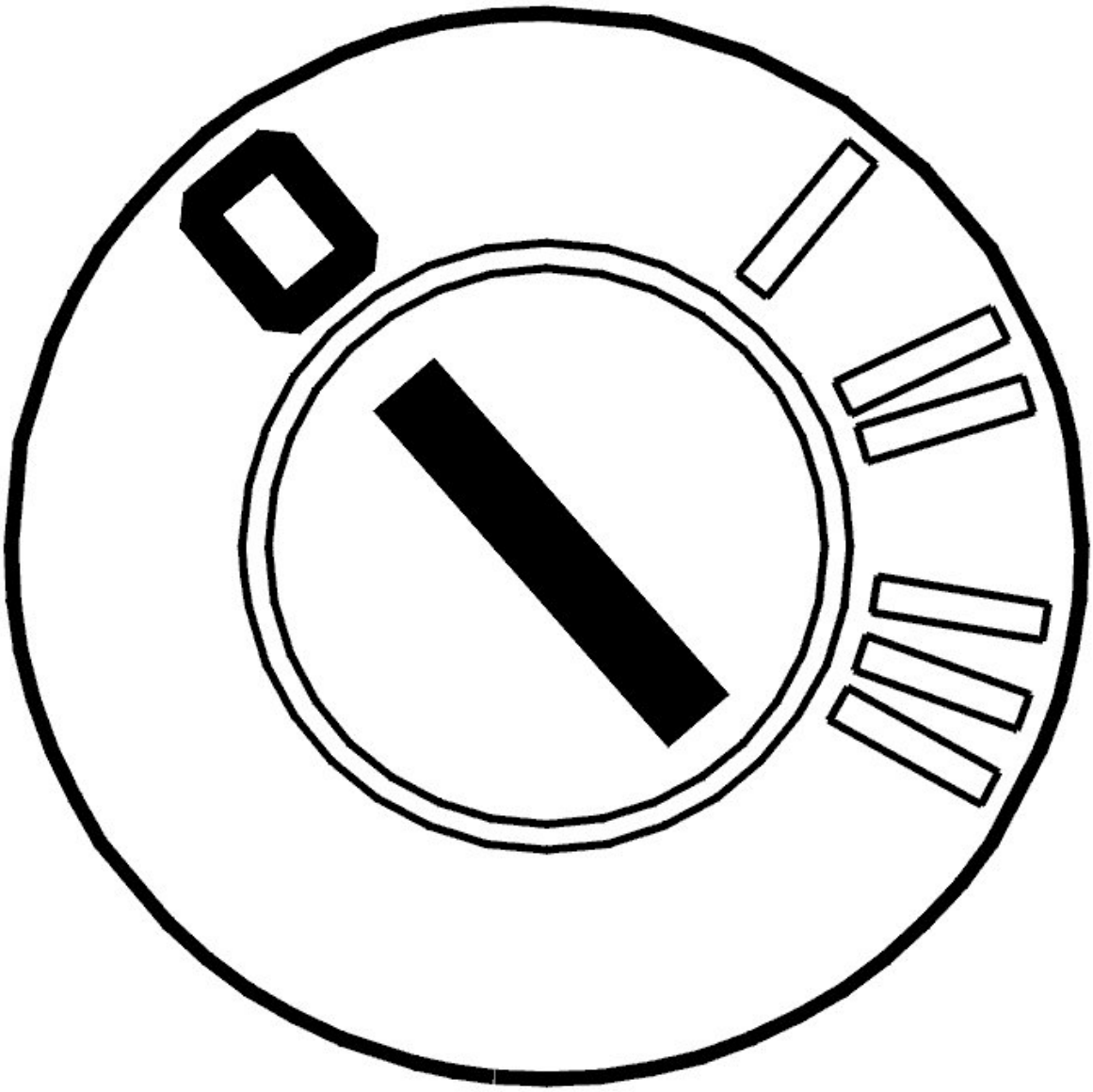
Possible source
- Open circuit in igniter wire or connectors between the air bag and the supplemental restraint system (SRS) control unit
- Open circuit in air bag (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

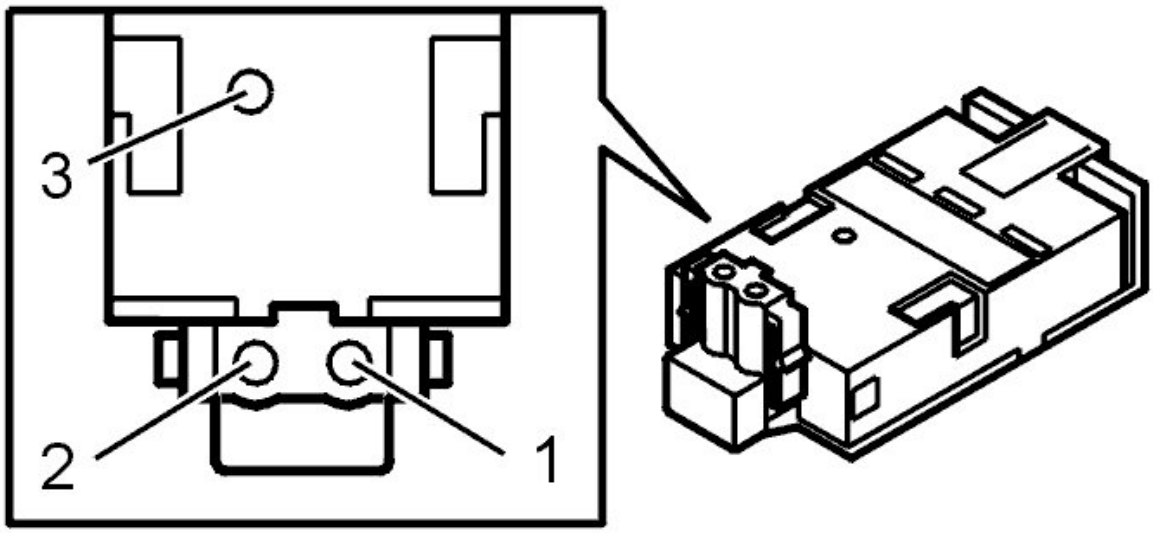
Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

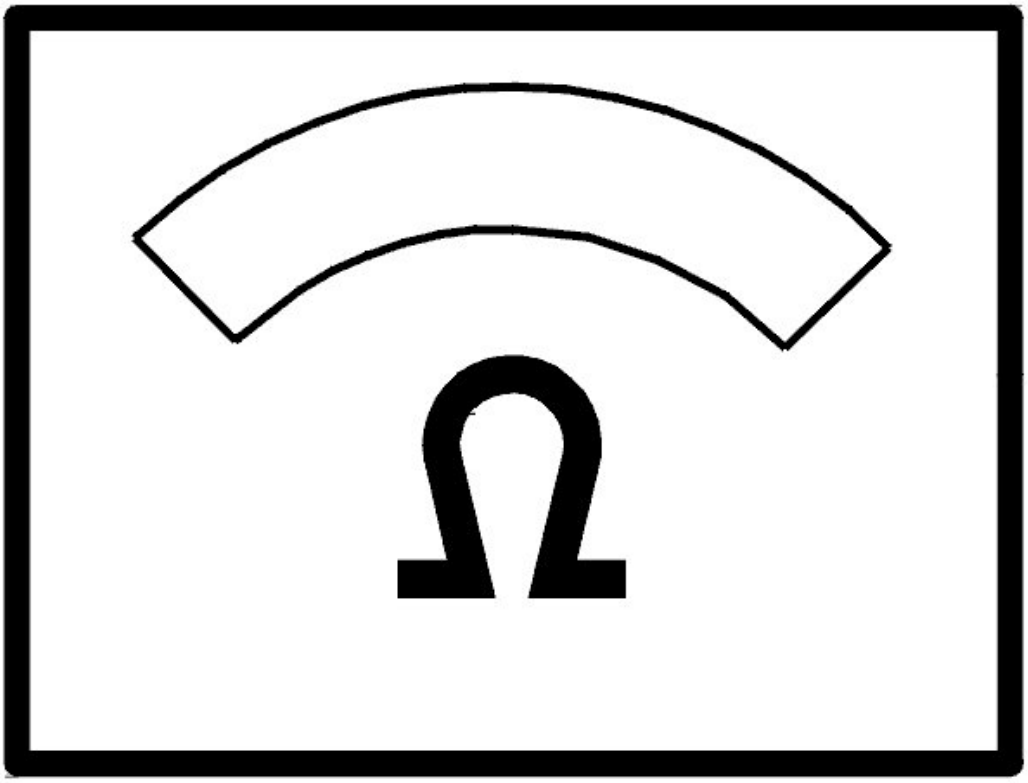
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 4-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #13B (41) and connector (violet) terminal #1 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #14B (42) and connector (violet) terminal #3 on the passenger side airbag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

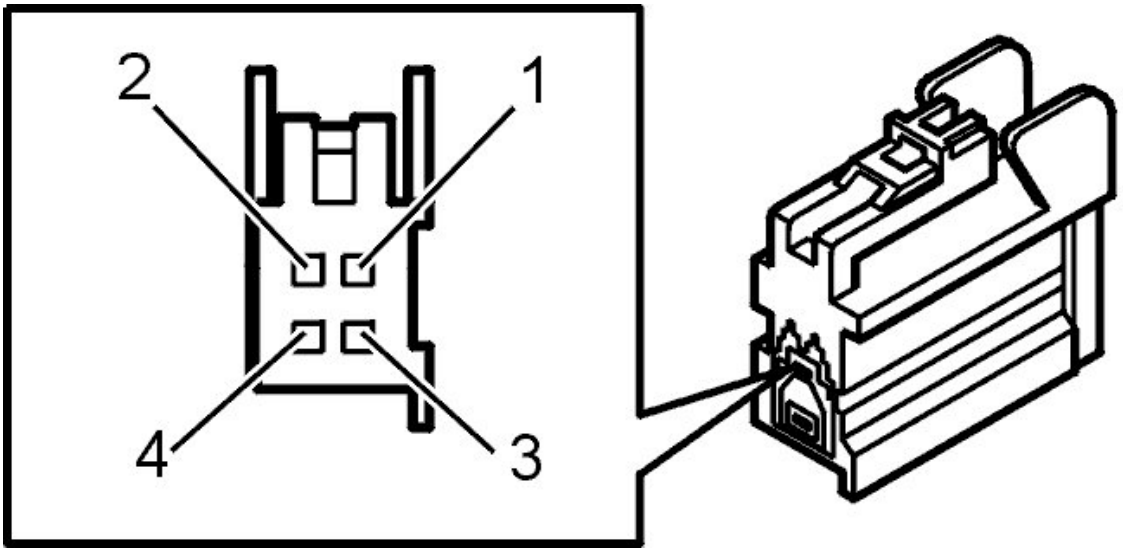
Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air

Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected, the resistance between the 4-pin connector terminals #3 and #4 (SRS control module side) should be approximately 22 kohms.
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

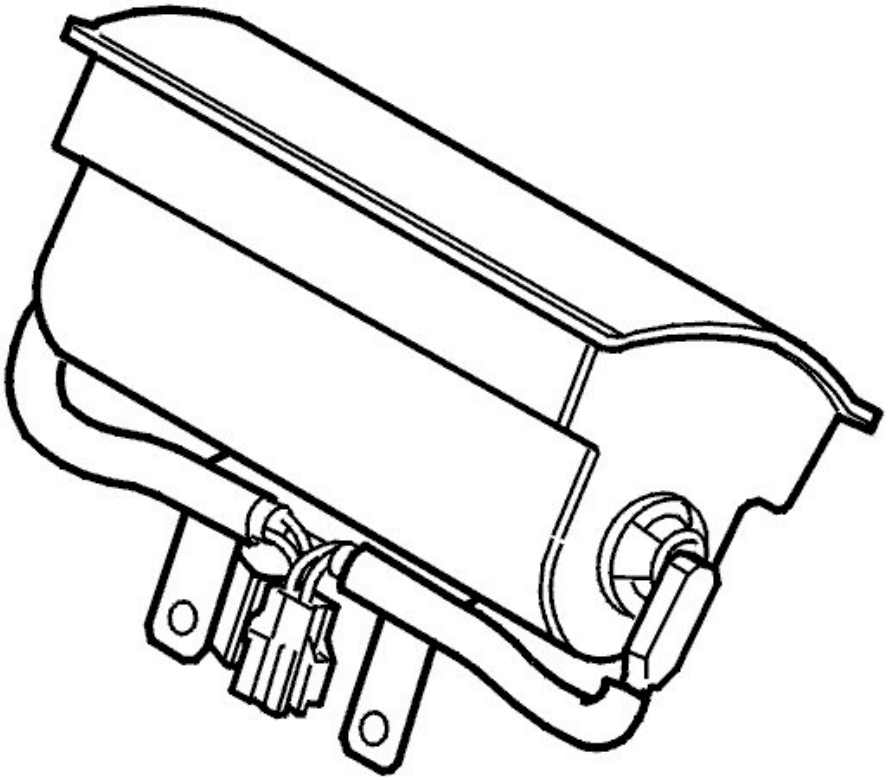
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-002D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-002D is displayed.

Substitute value
- Nothing.

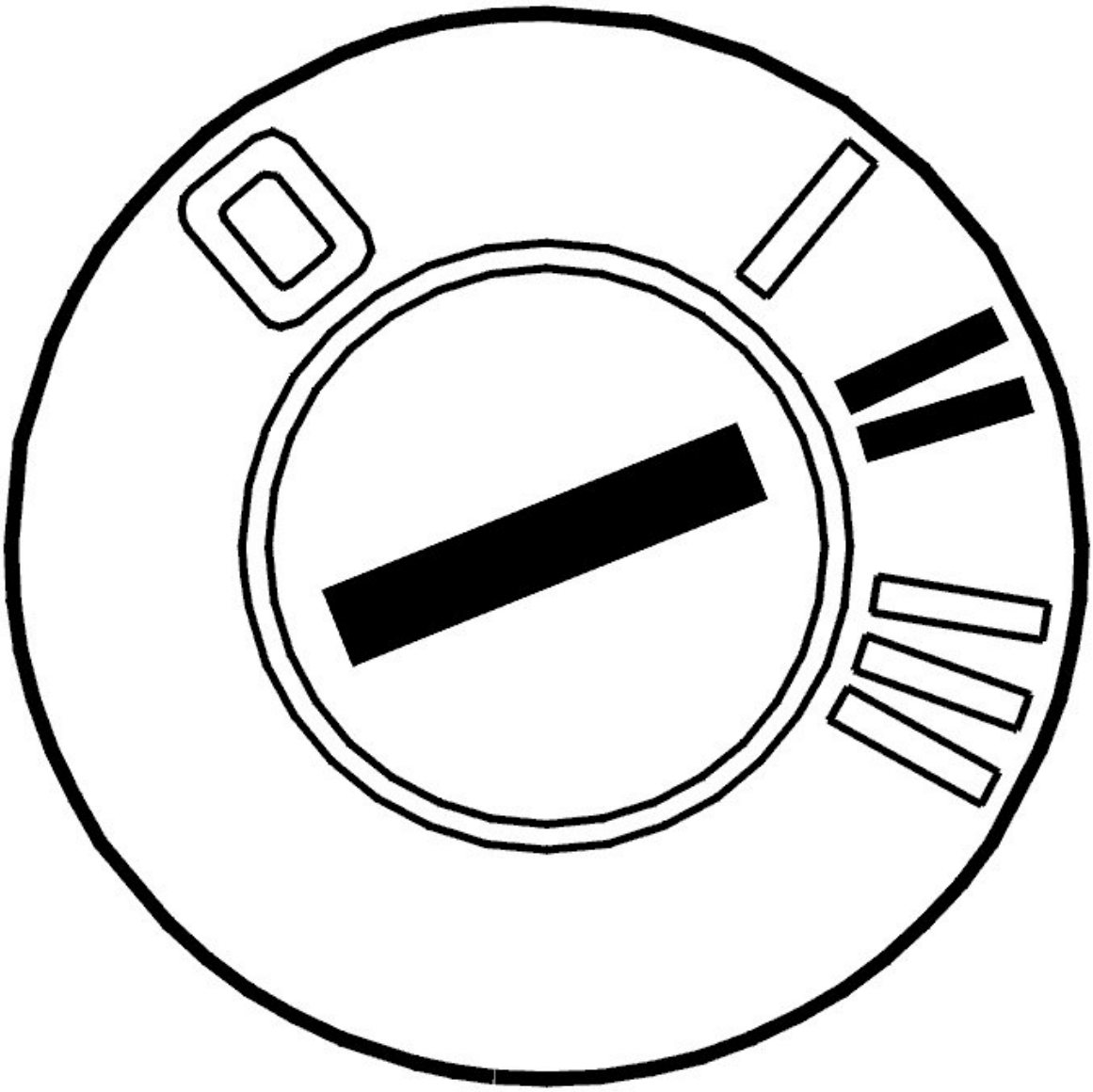
Possible source
- Short circuit in igniter wire or connectors between the air bag and SRS sensor unit
- Short circuit in air bag (resistance in igniter too low).

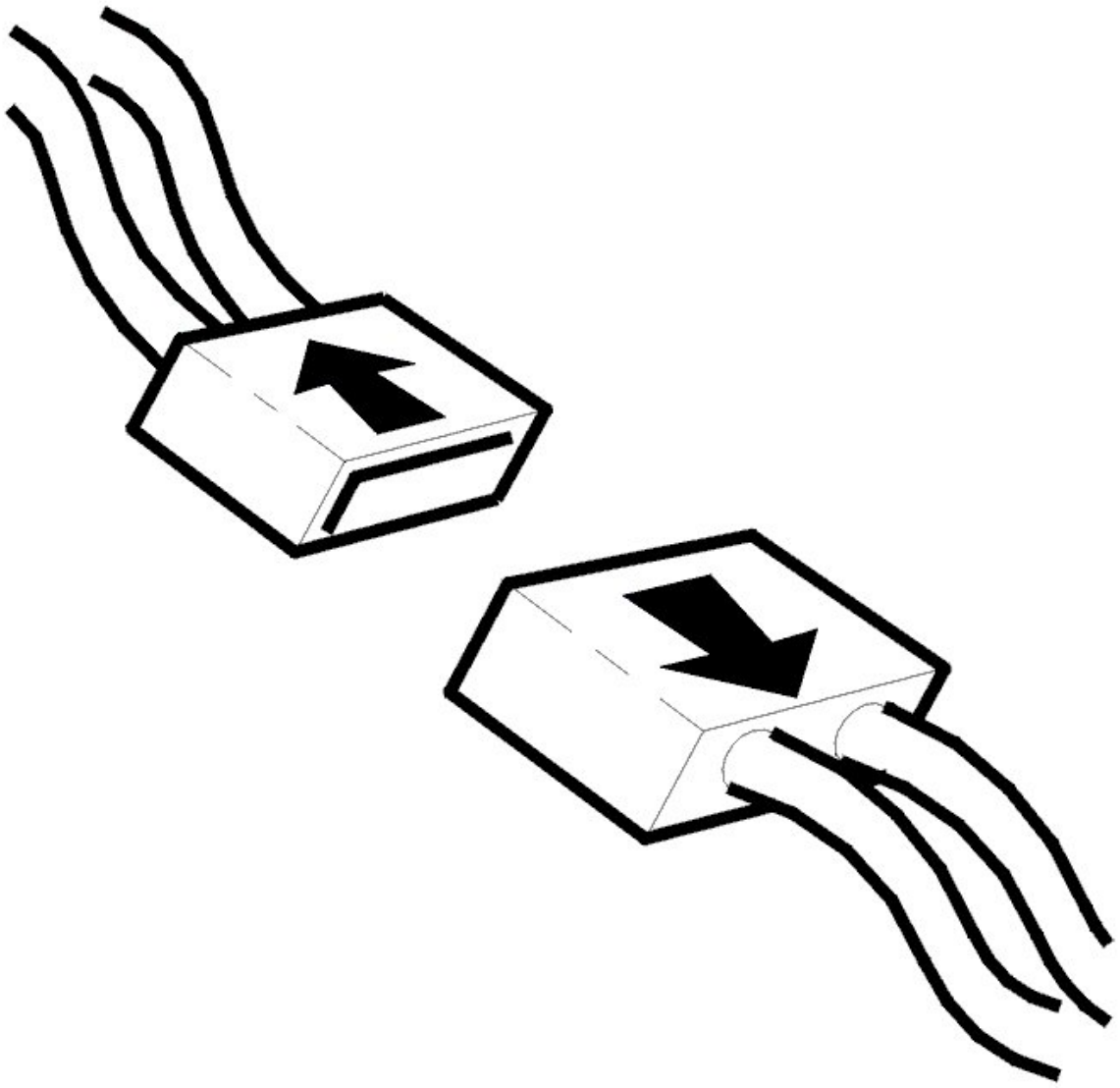
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the (violet) connector from the airbag on the passenger side
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the airbag connector (violet) on the passenger side

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new airbag on the passenger side if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

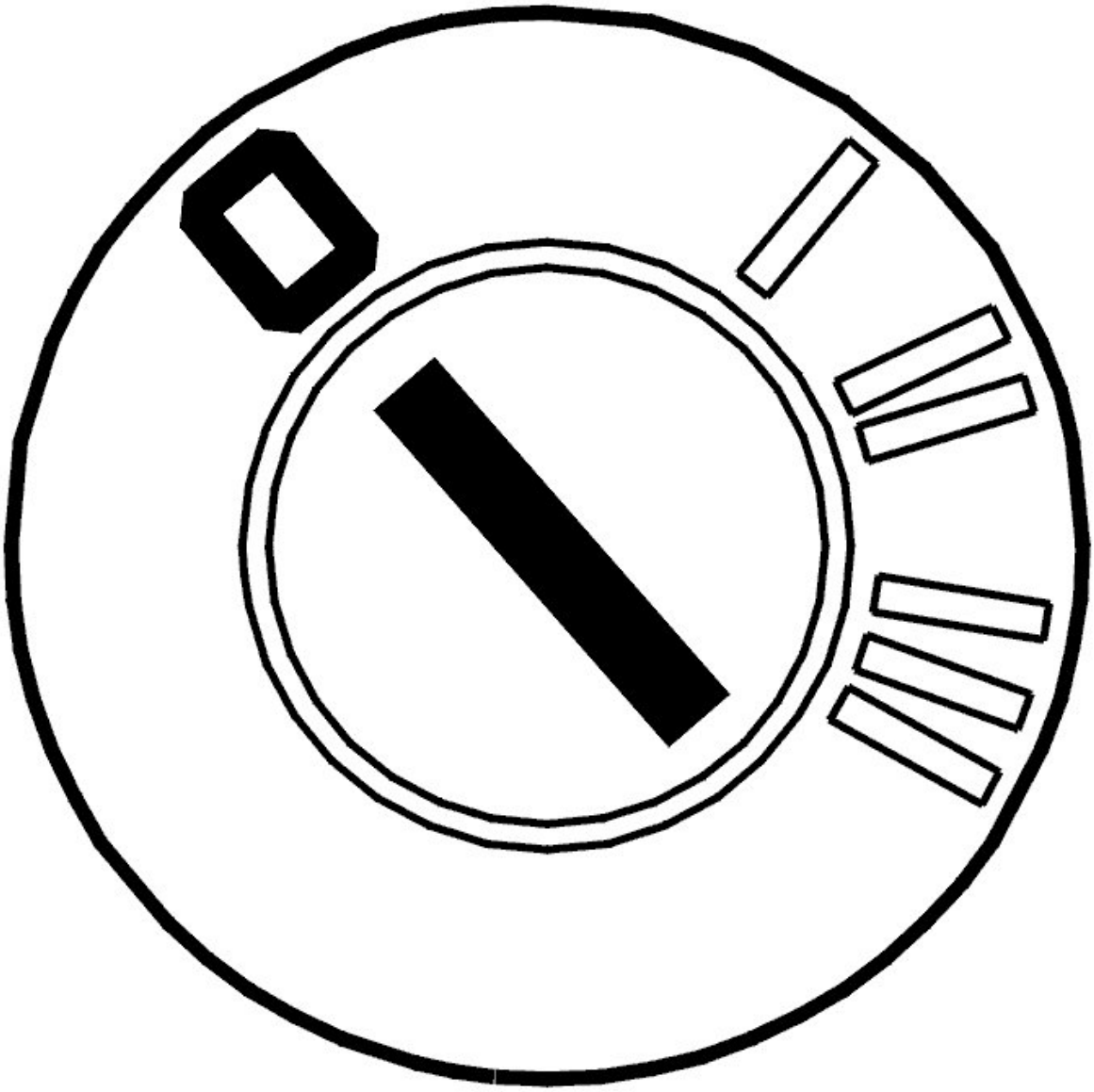
- To access or replace the airbag on the passenger side, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the right connector (lilac) for the airbag on the passenger side.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

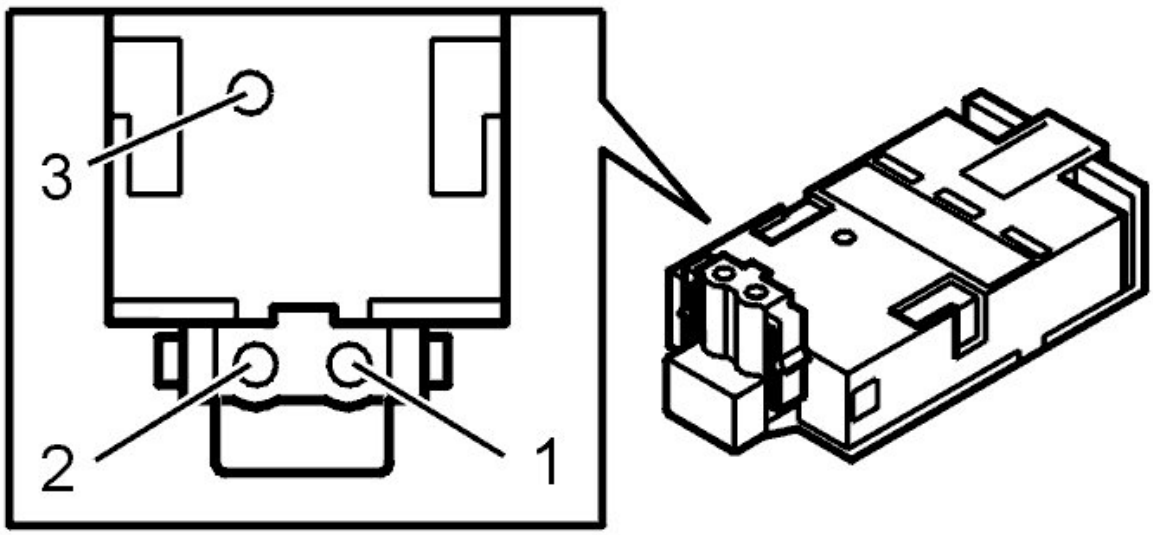
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

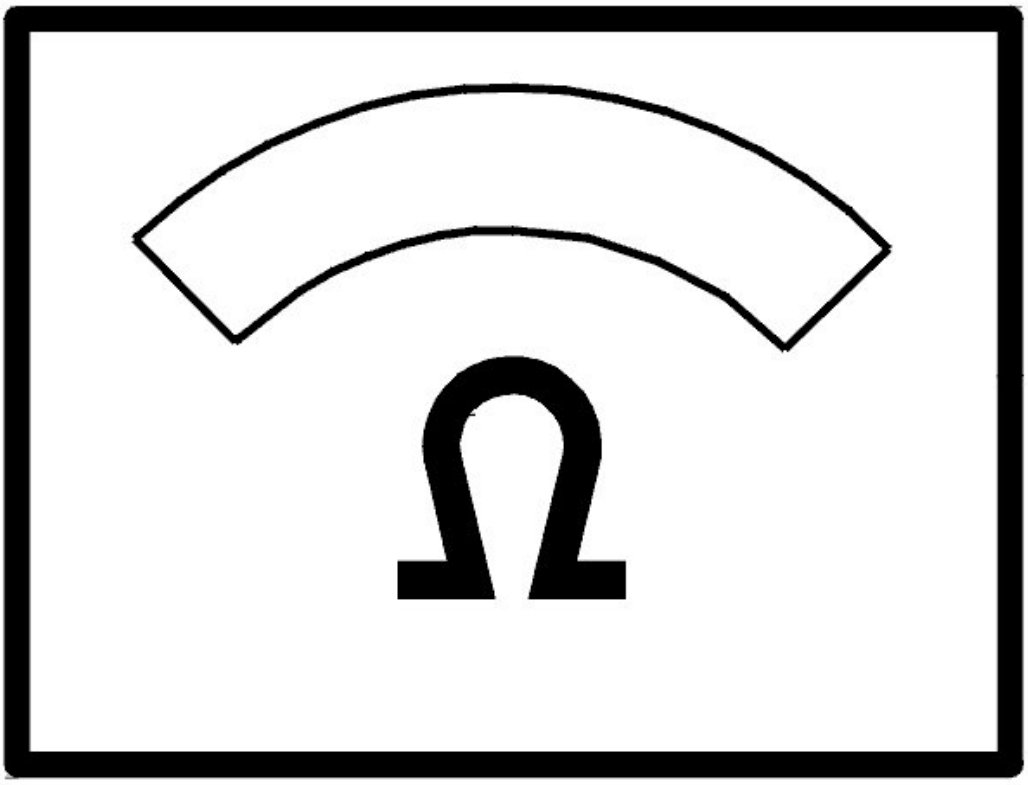
Check the cable between SRS control module terminal #13B (41) and connector (lilac) terminal #1 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #14B (42) and connector (lilac) terminal #3 on the passenger side airbag for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

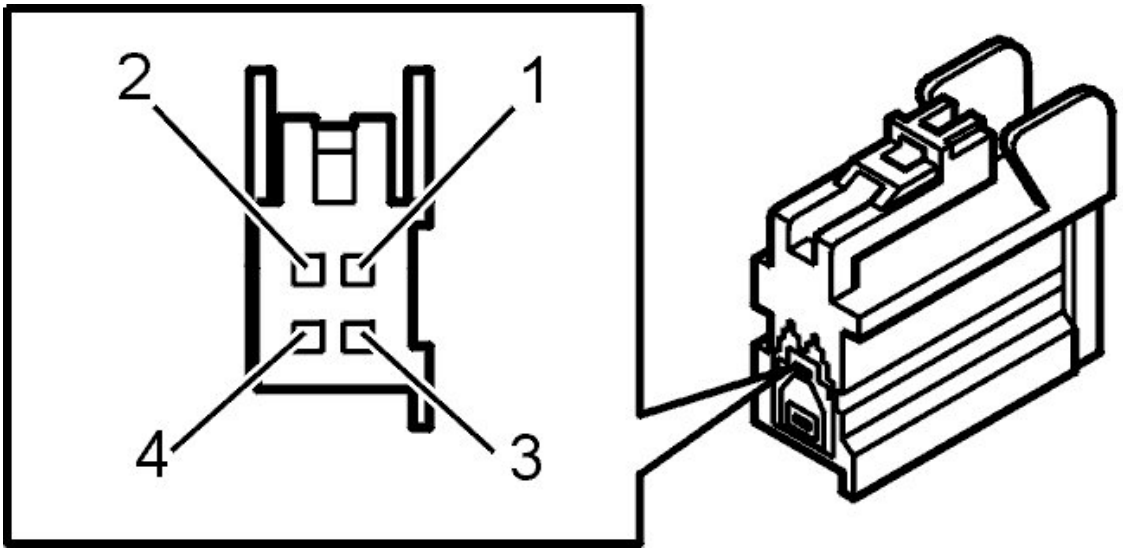
Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (lilac) for the passenger airbag, the resistance between the 4-pin connector terminals #3 and #4 (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

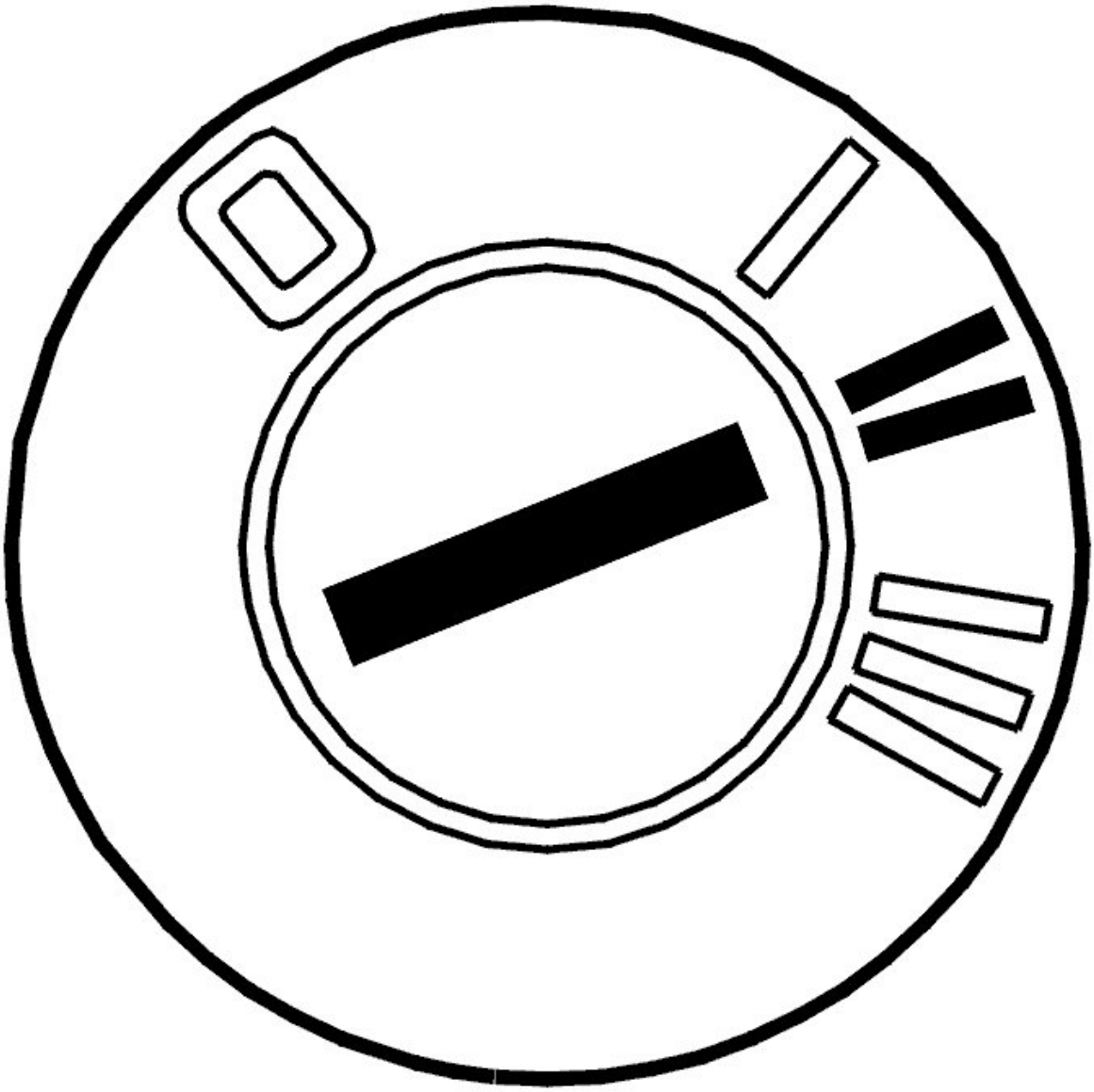
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

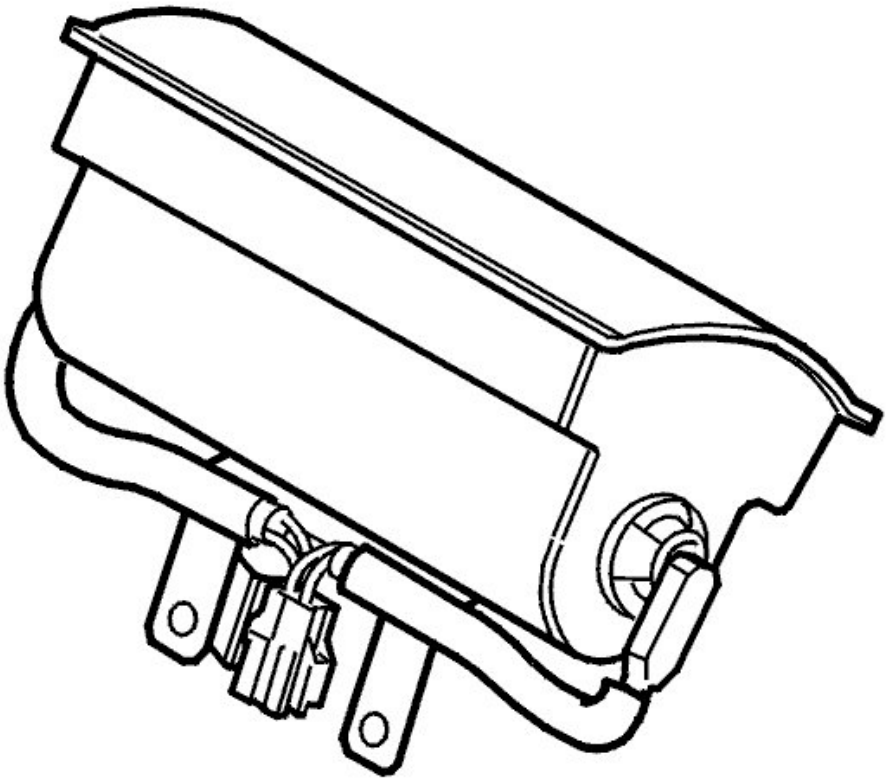
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-002D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-002D is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit in igniter wire or connectors between the air bag and SRS sensor unit

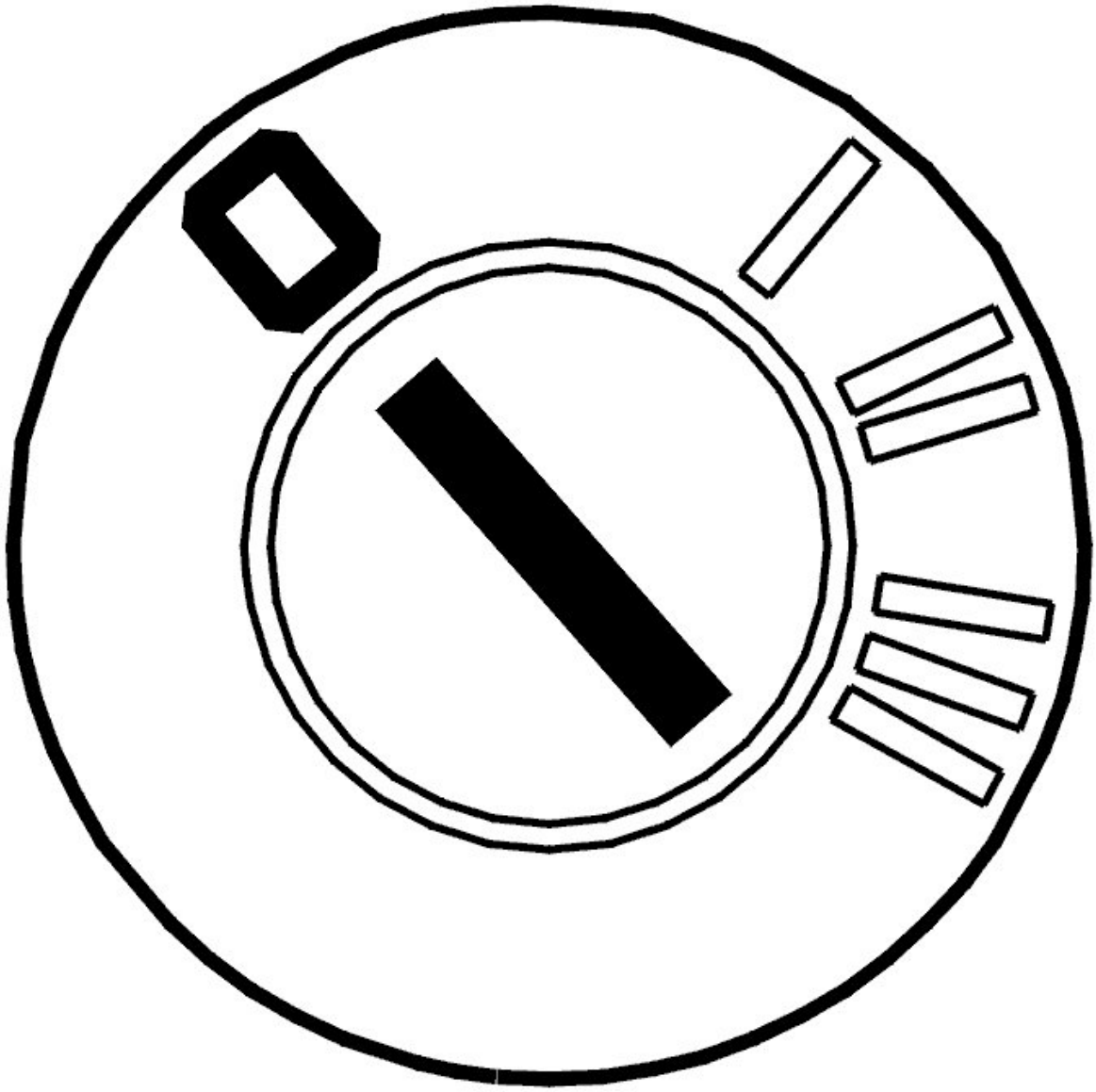
- Short circuit in air bag (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- the airbag on the passenger side
- 4-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #13B (41) and connector (lilac) terminal #1 on the passenger side airbag for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

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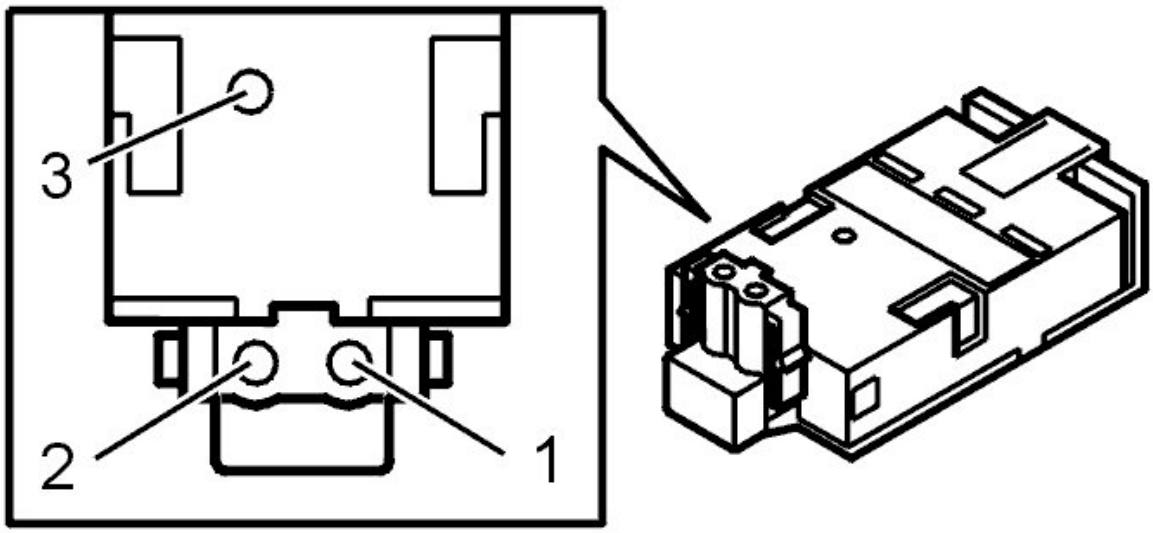
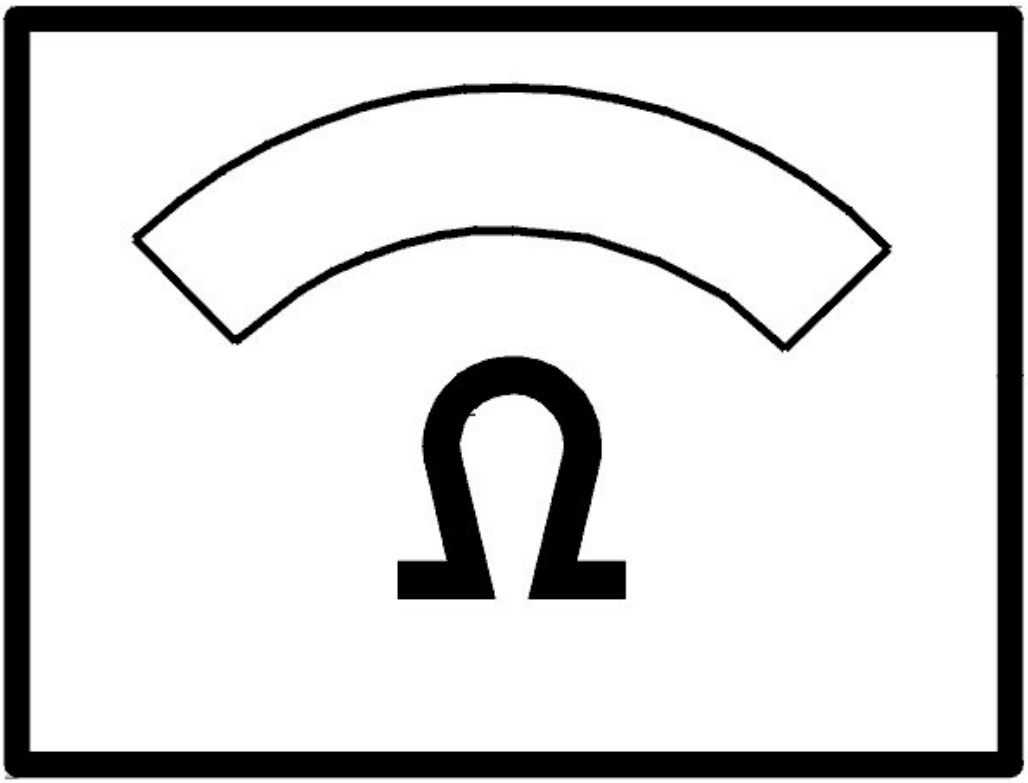
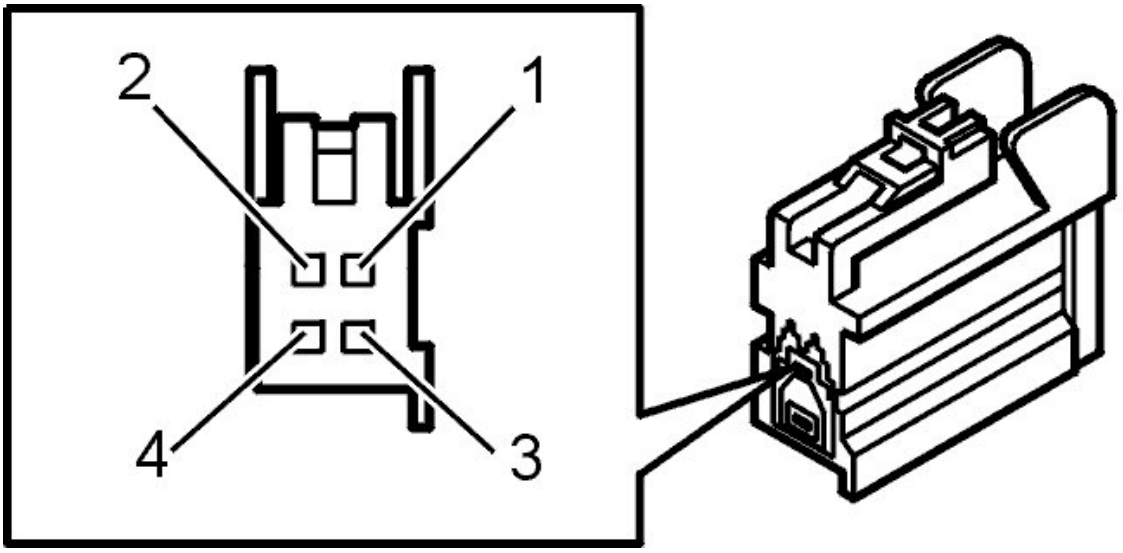
Check the cable between SRS control module terminal #14B (42) and connector (lilac) terminal #3 on the passenger side airbag for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector (violet) for the passenger airbag, see Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 4-pin connector disconnected and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected to the connector (green) for the passenger airbag, the resistance between the 4-pin connector terminals #3 and #4 (passenger airbag side) should be infinite
- With the ignition off and the 4-pin connector disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be approximately 22 kohms.
- With the ignition off and the 4-pin connector and the connector for the control module disconnected, the resistance between terminals #3 and #4 on the 4-pin connector (SRS control module side) should be infinite
- To replace the wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

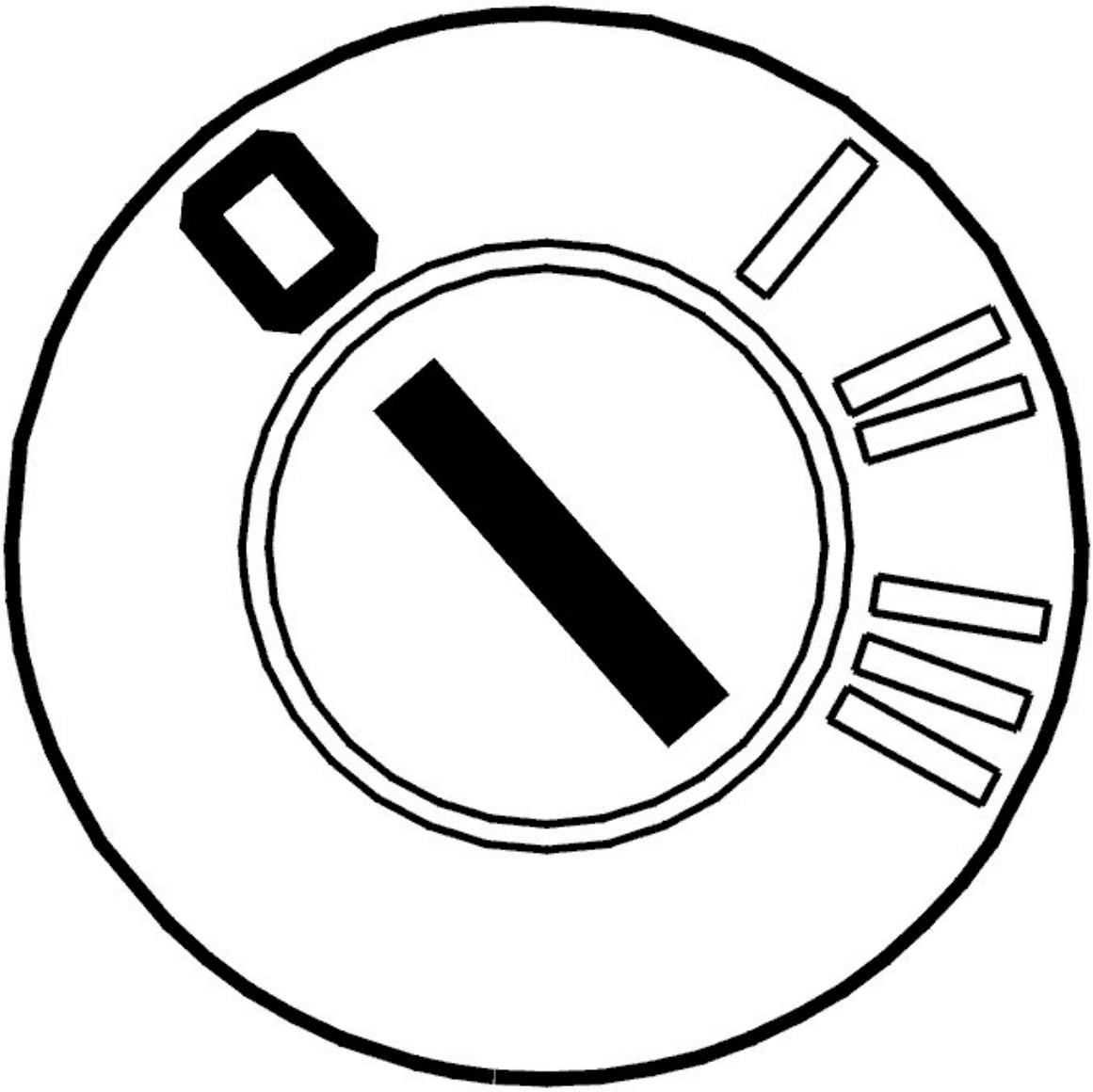
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

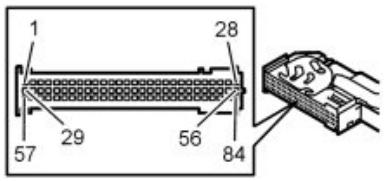


- Ignition off.

Check that there is no passenger airbag installed.
Check that the correct sensor is installed in the car.
Activate reading off the control module ID by clicking on the VCT2000 symbol.
Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
If no fault is found, try new software according to Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

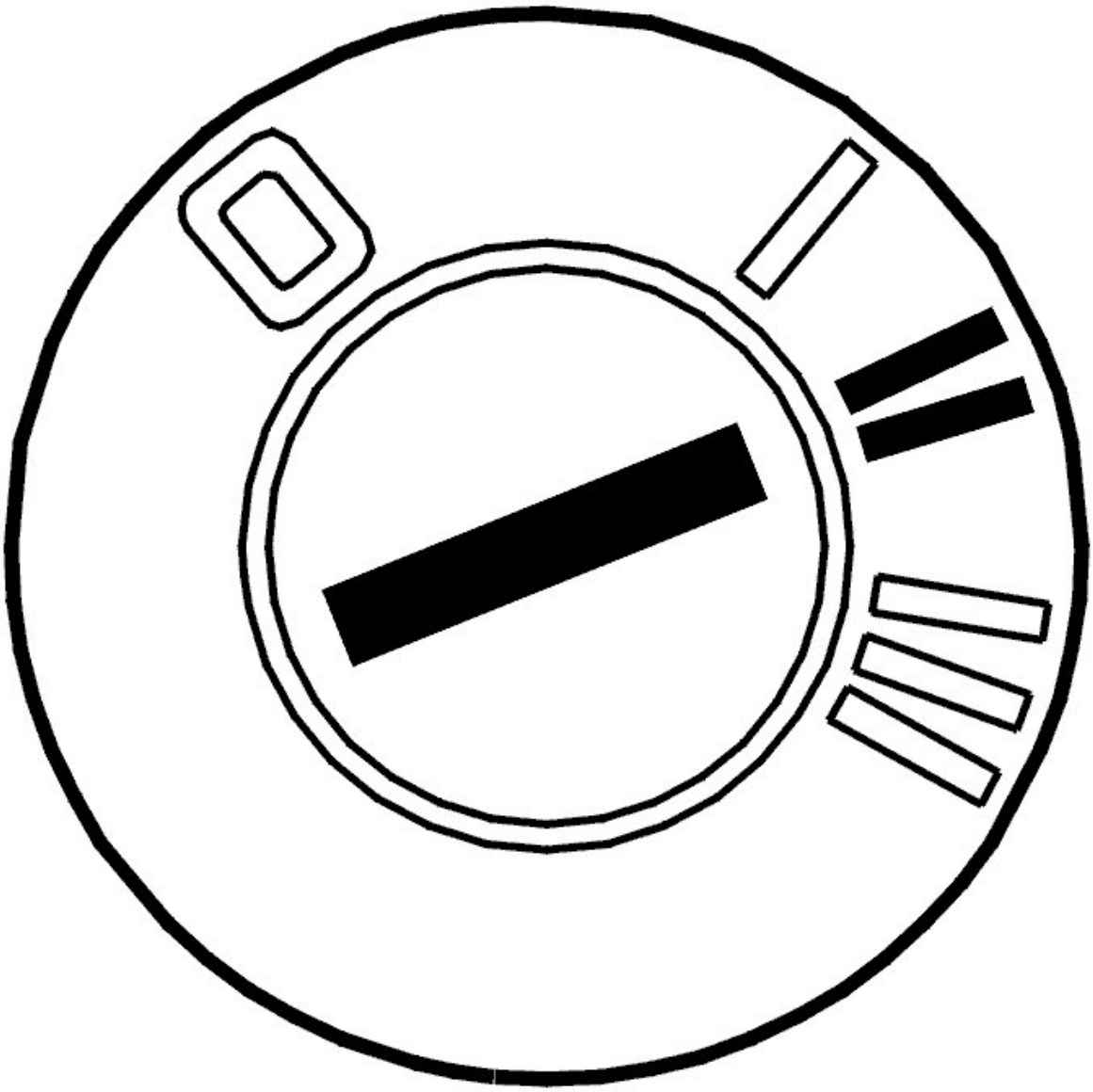
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

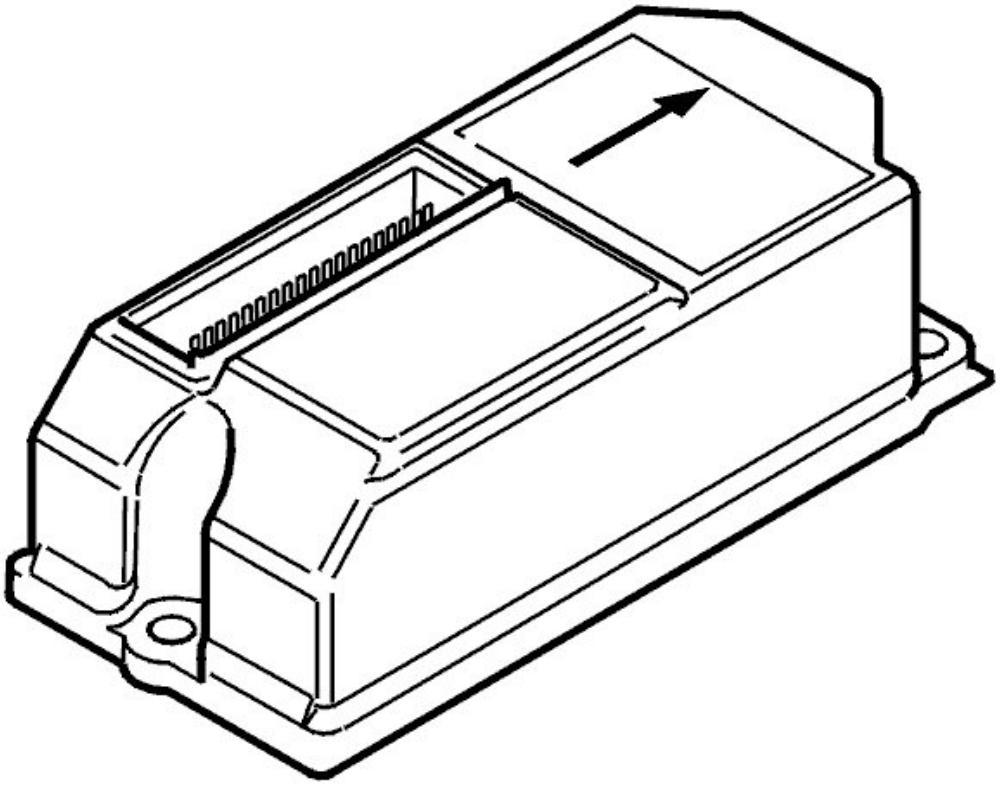
VERIFICATION FAILED - Fault-tracing information

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0026, SRS-002E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

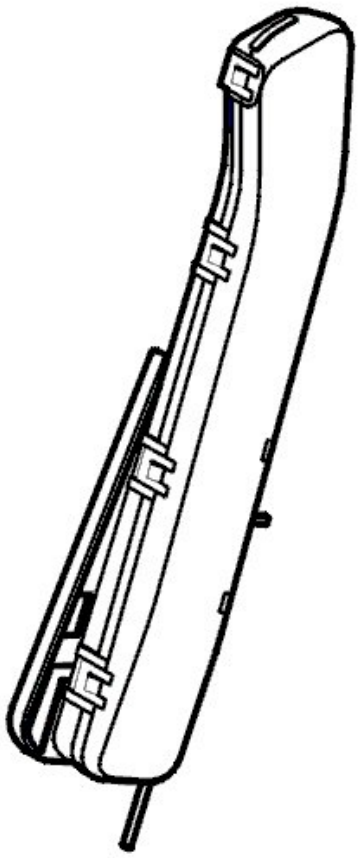
Fault symptom[s]

The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

SRS-0030 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0030 is displayed.

Substitute value

- Nothing.

Possible source

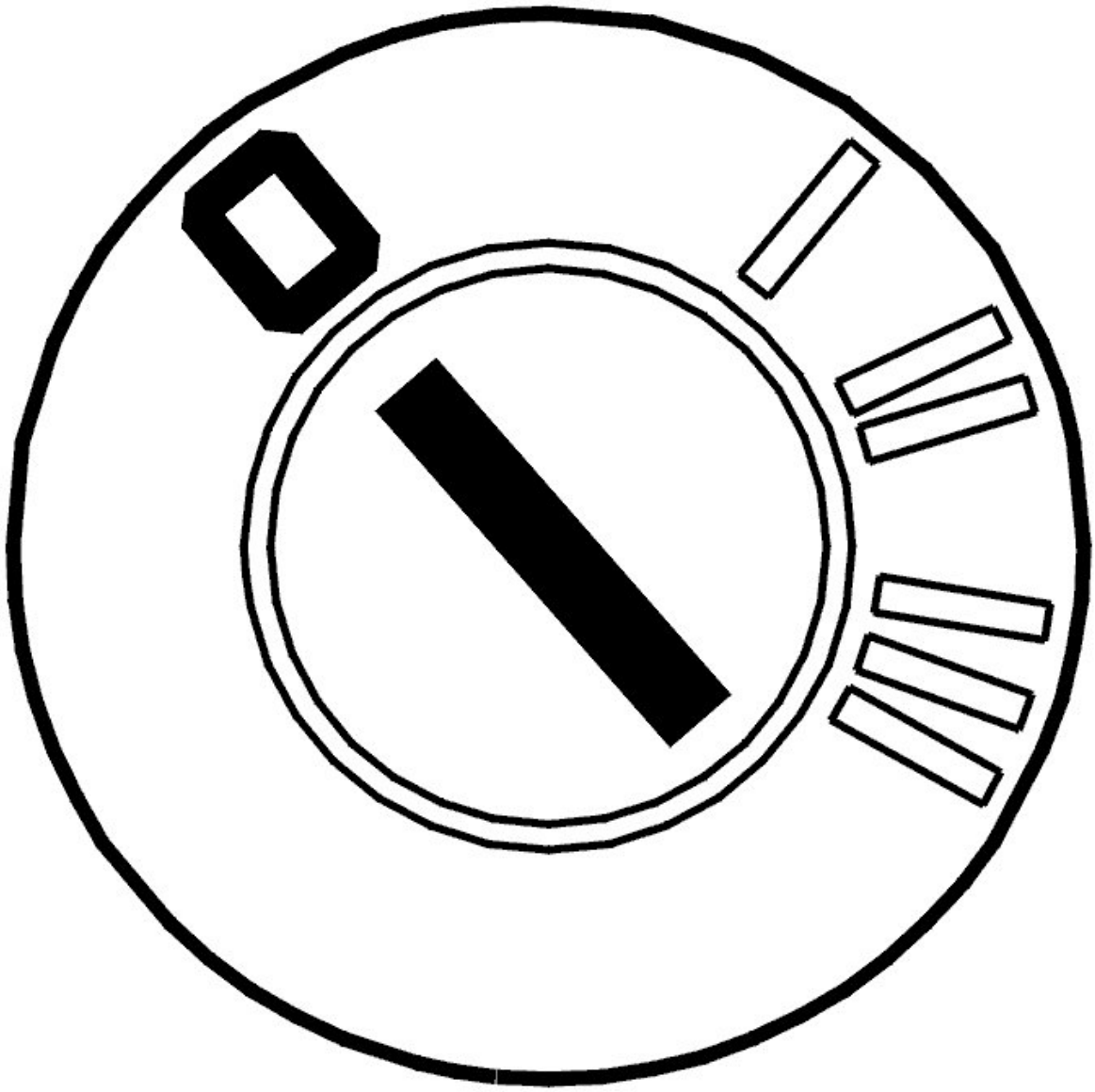
- Short circuit to voltage supply in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in the front left side air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- 2-pin
- the SRS control module.

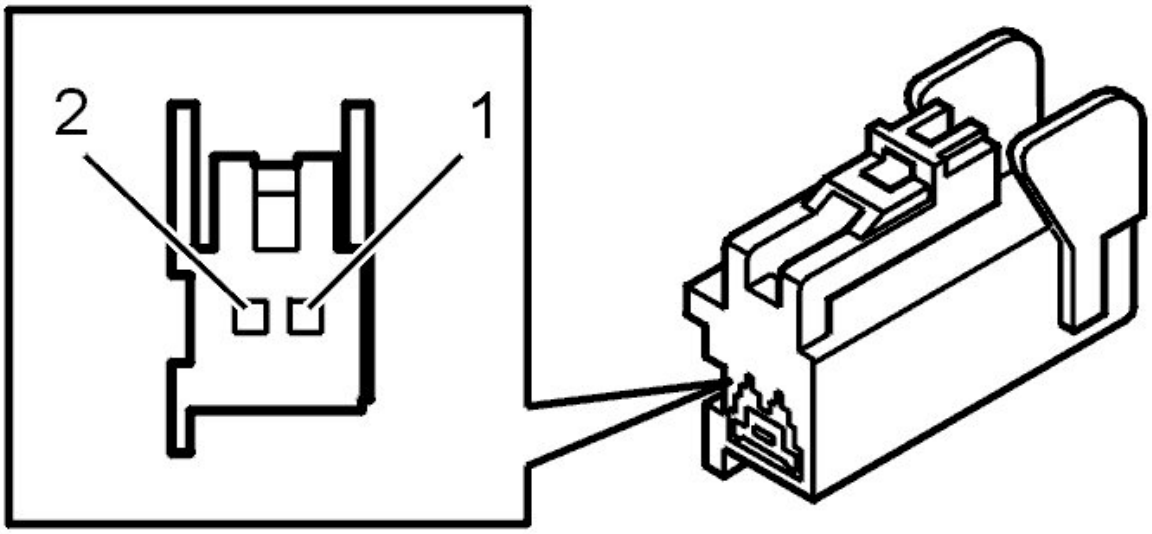
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General

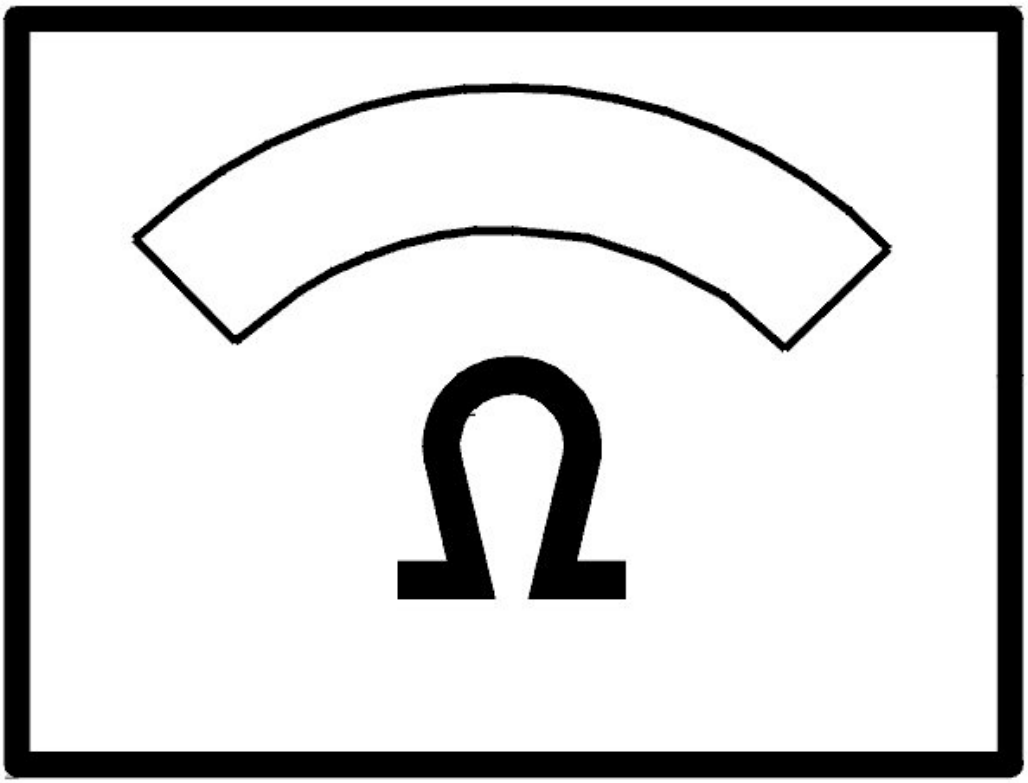
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the 2-pin connector disconnected, the resistance between the 2-pin connector terminals #1 and #2 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

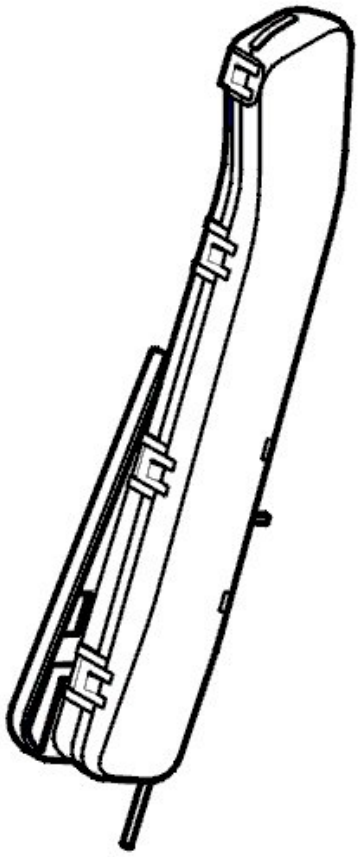
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0030 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0030 is displayed.

Substitute value
- Nothing.

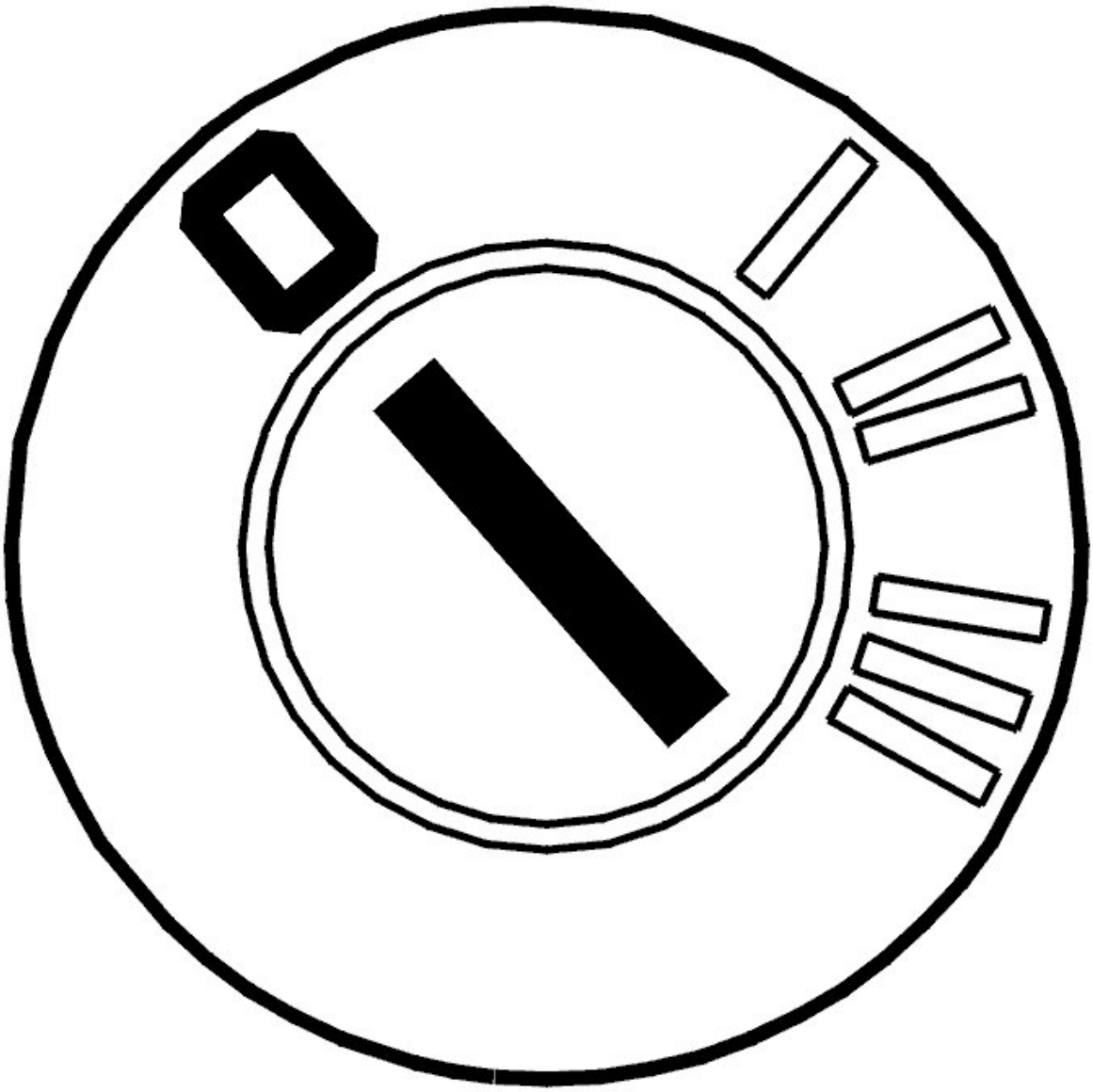
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in the front left side air bag.

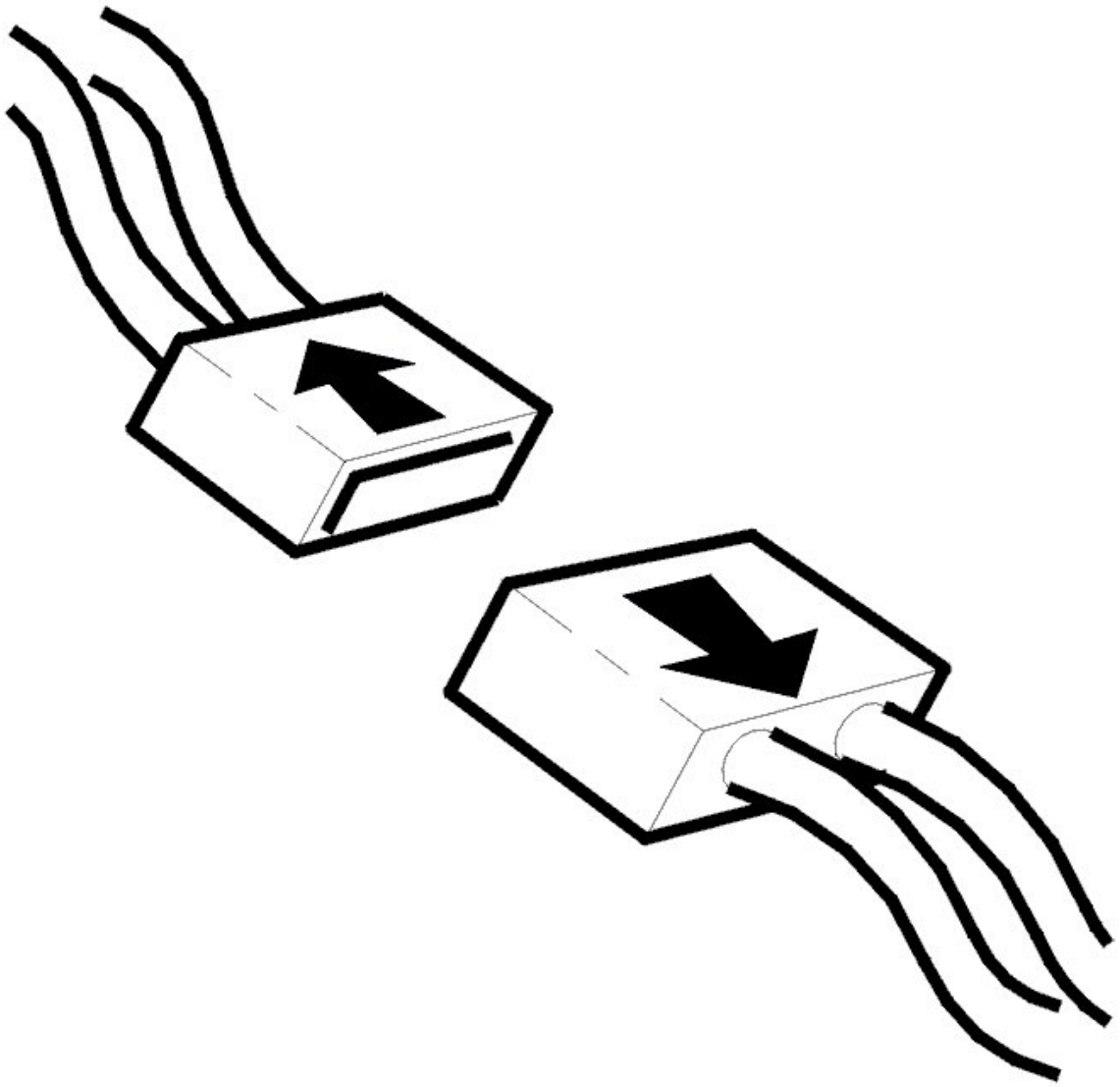
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

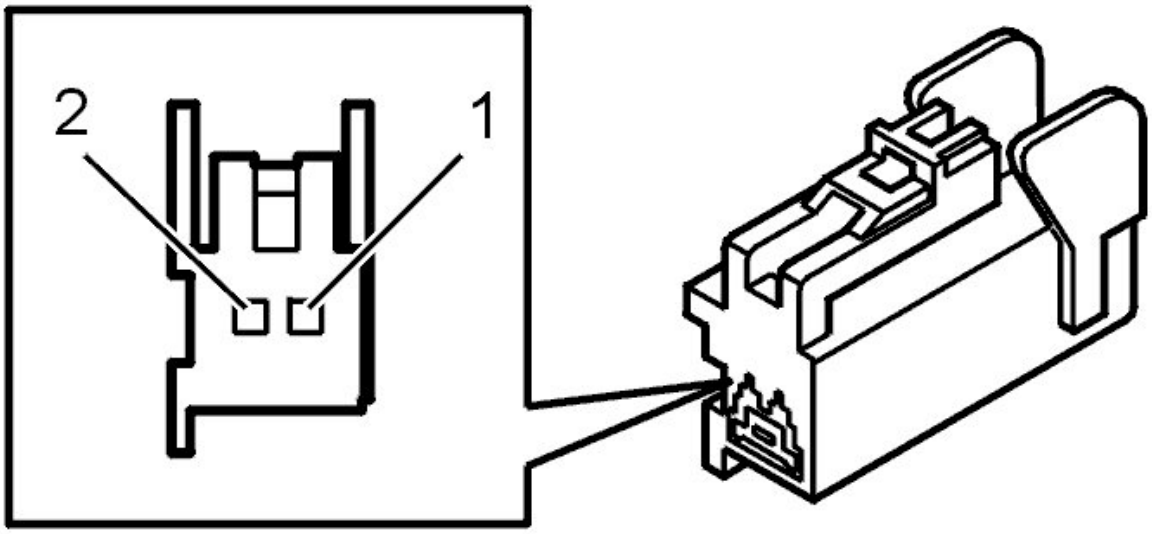
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

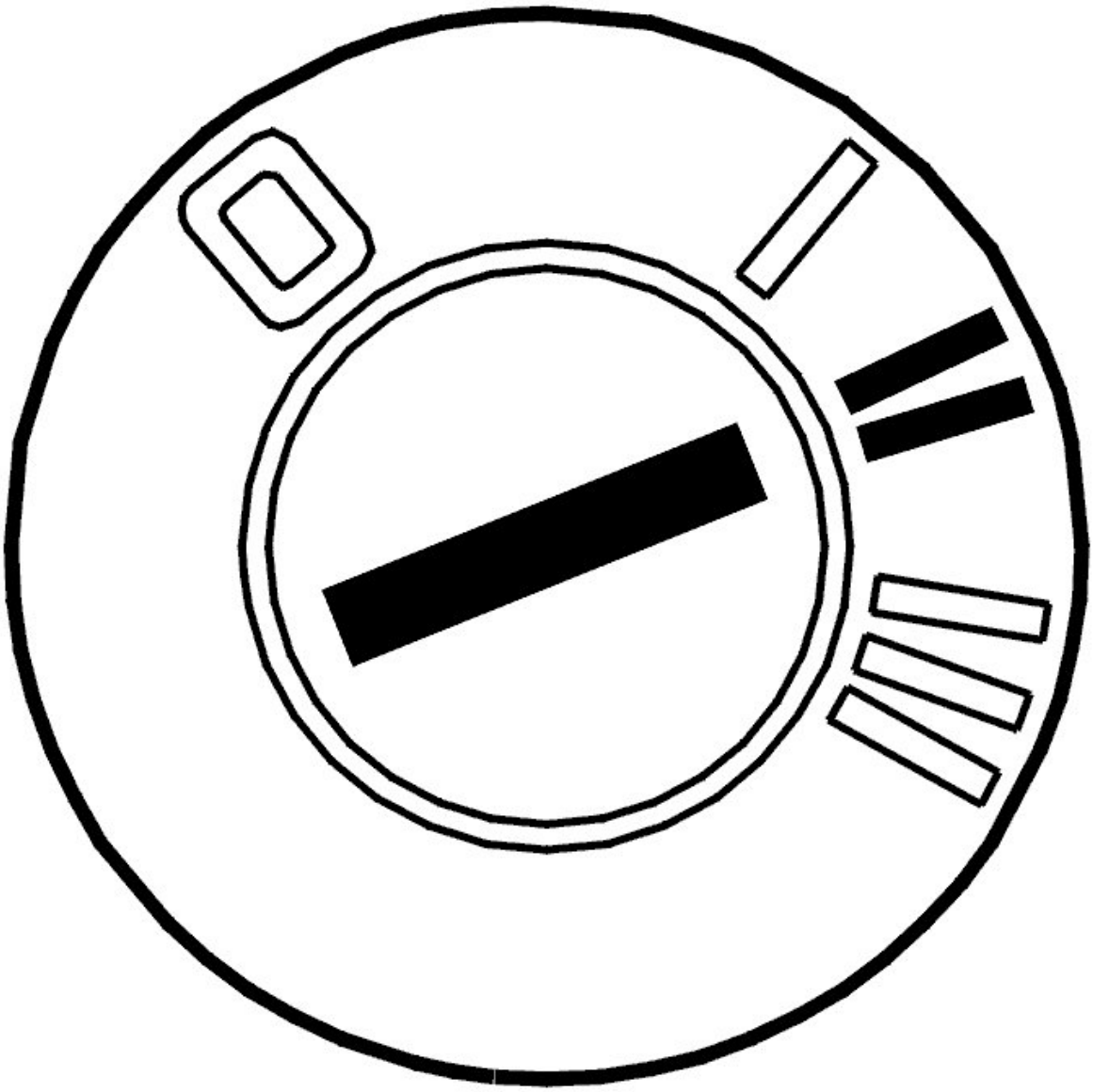
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

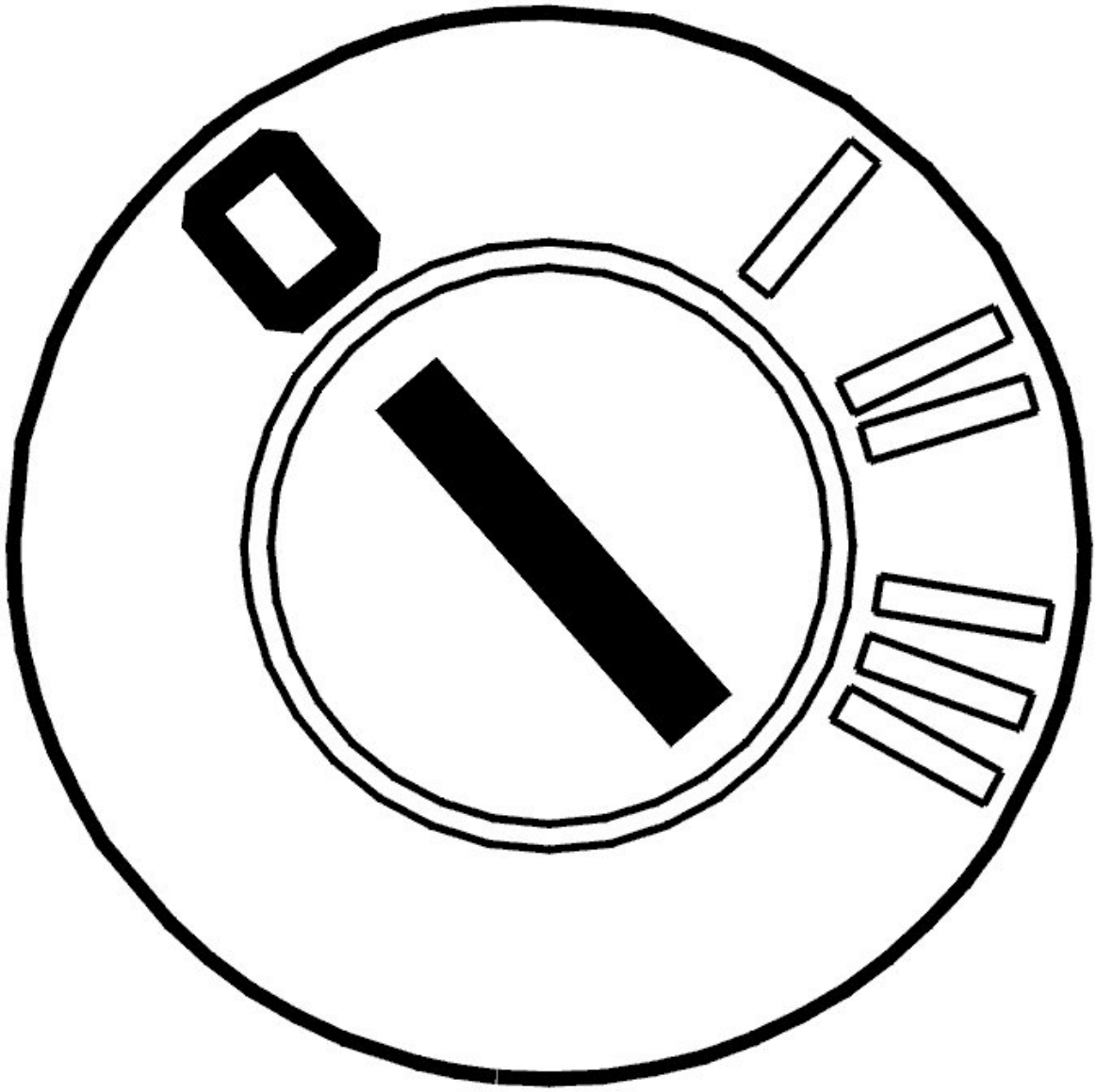
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable

Checking the resistance



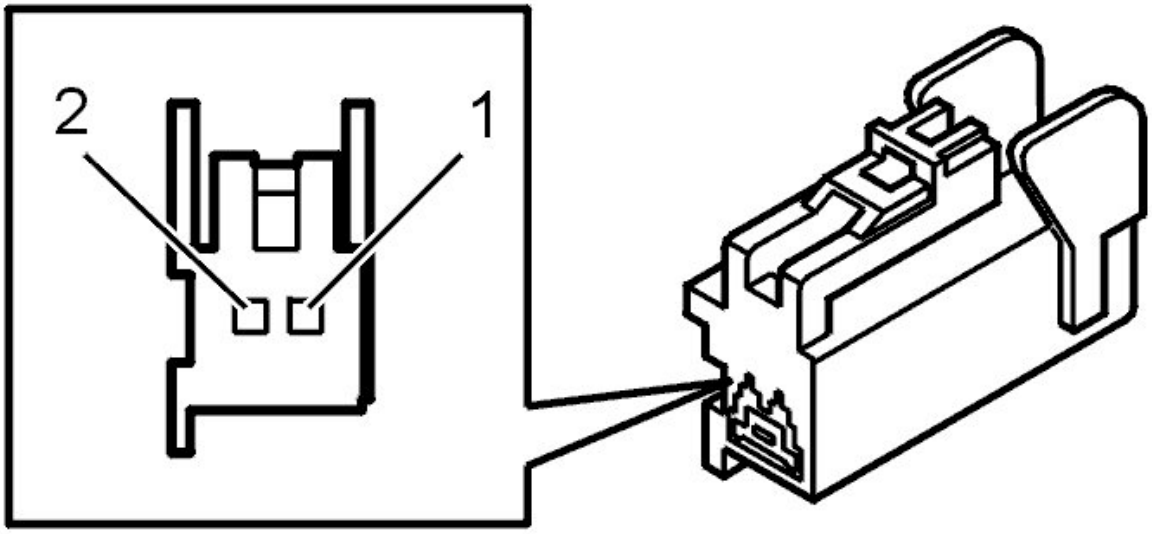
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

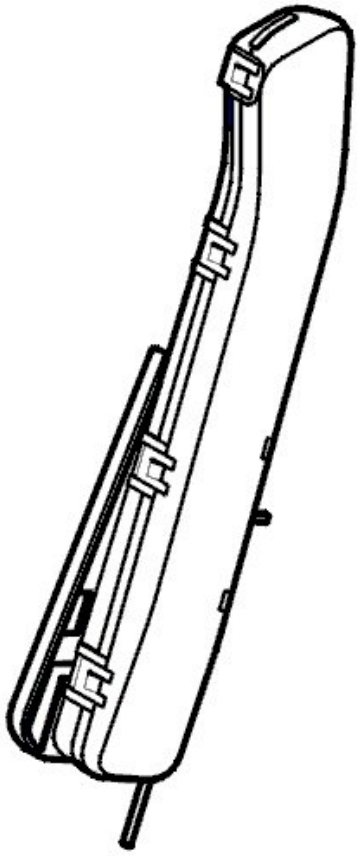
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0031 Diagnostic trouble code information

Condition



If the circuit voltage is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0031 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit.

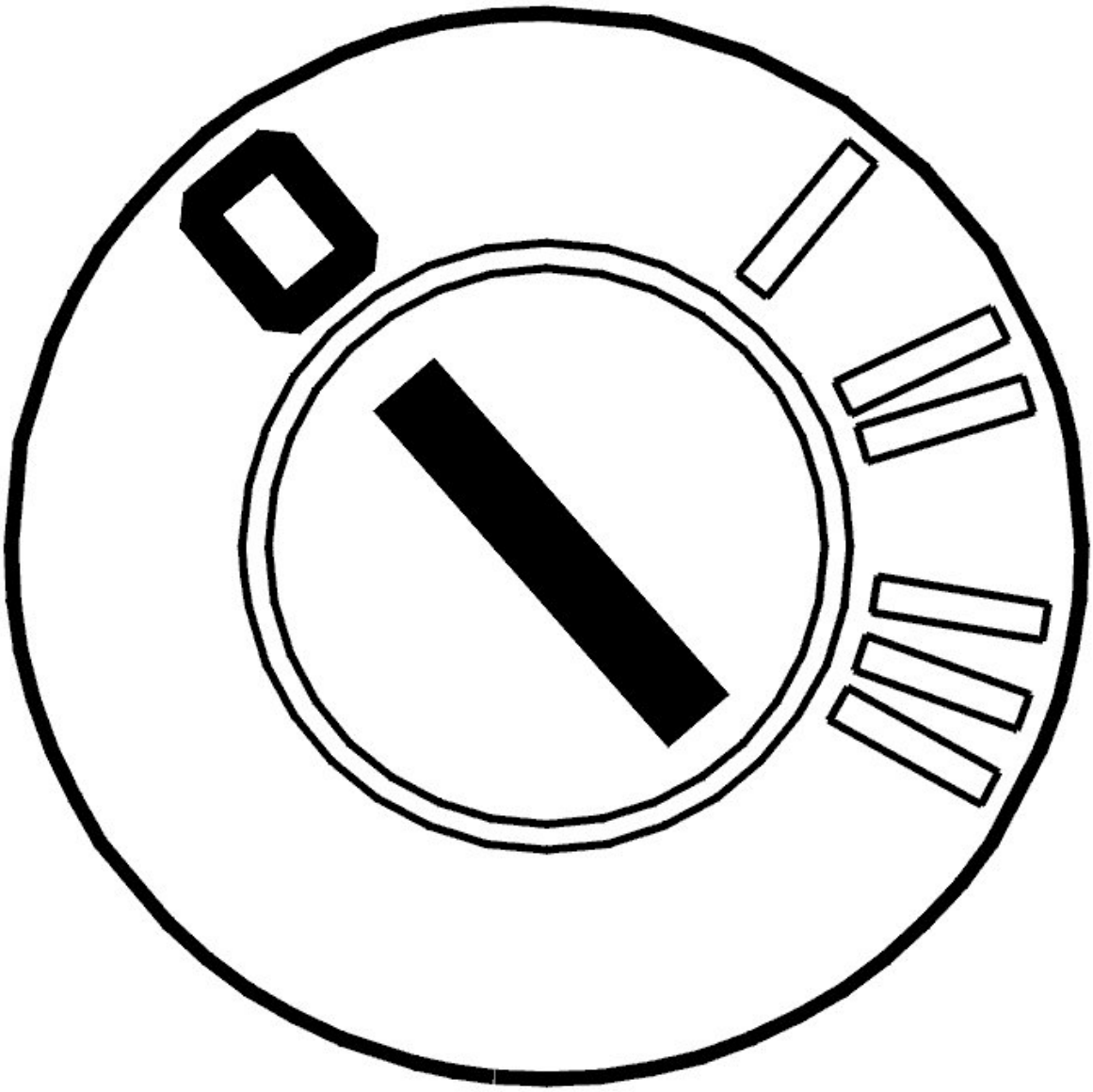
- Short circuit to ground in the front left side air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

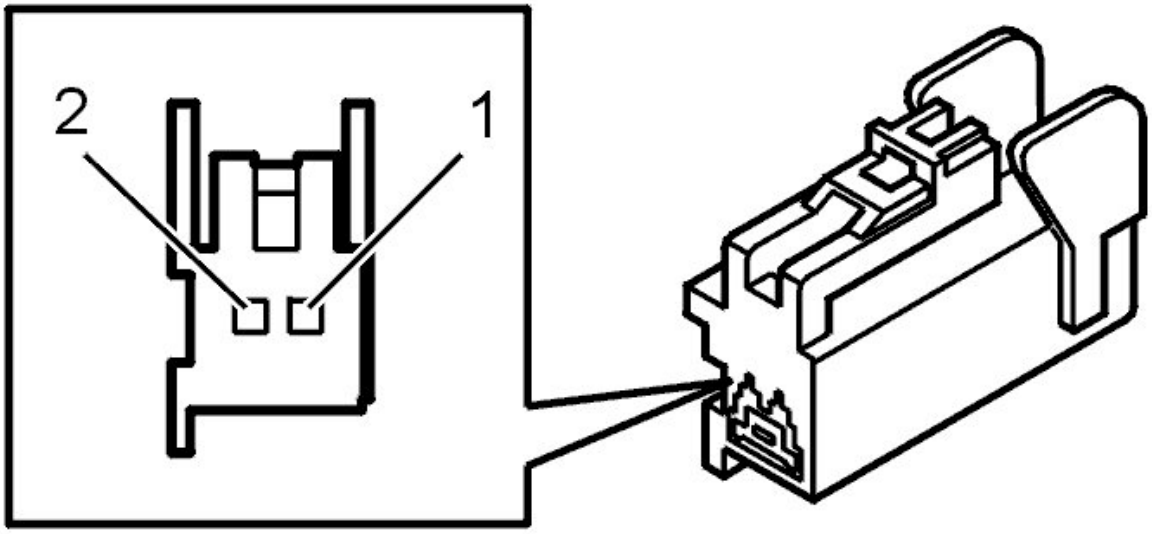
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

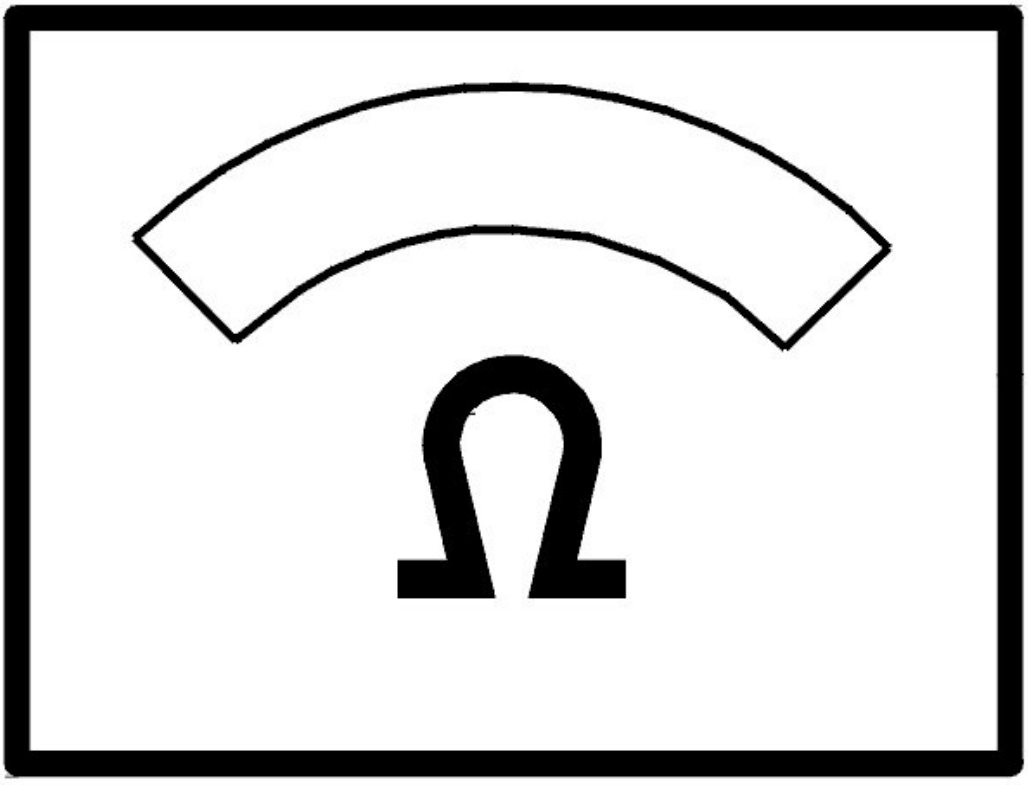
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite

- With the ignition off and the 2-pin connector disconnected, the resistance between the 2-pin connector terminals #1 and #2 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

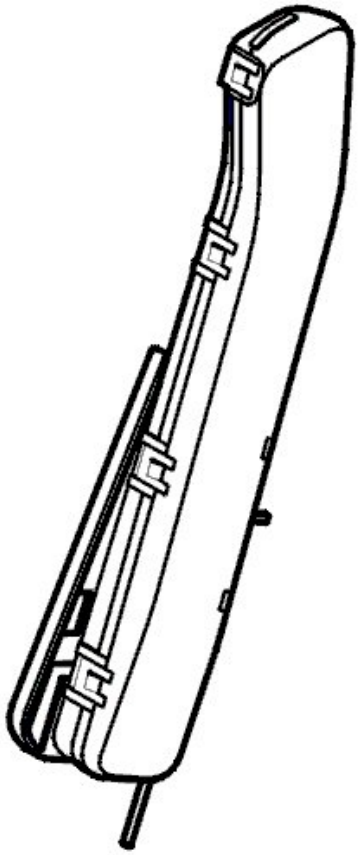
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0031 Diagnostic trouble code information

Condition



If the circuit voltage is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0031 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit.

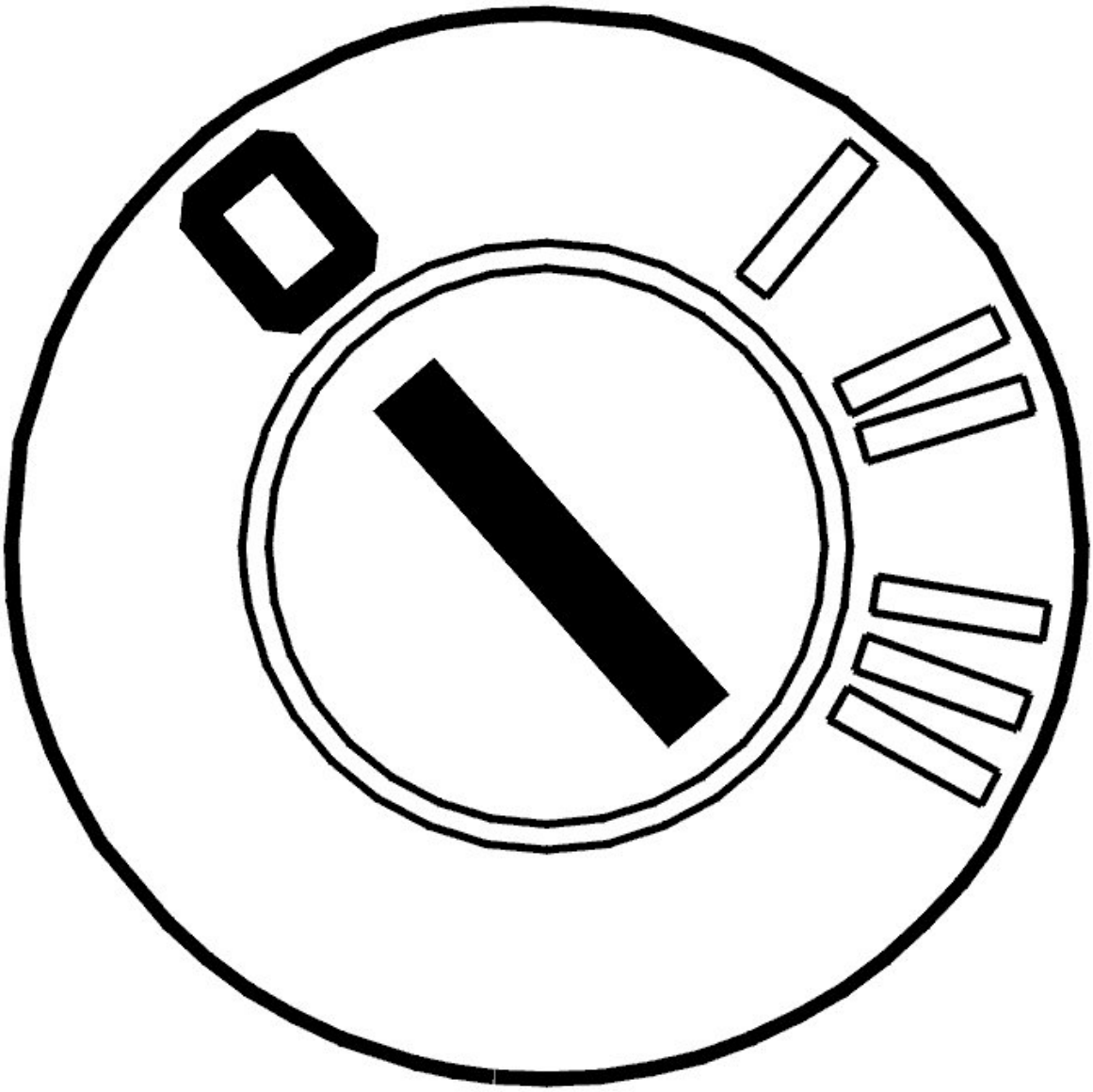
- Short circuit to ground in the front left side air bag.

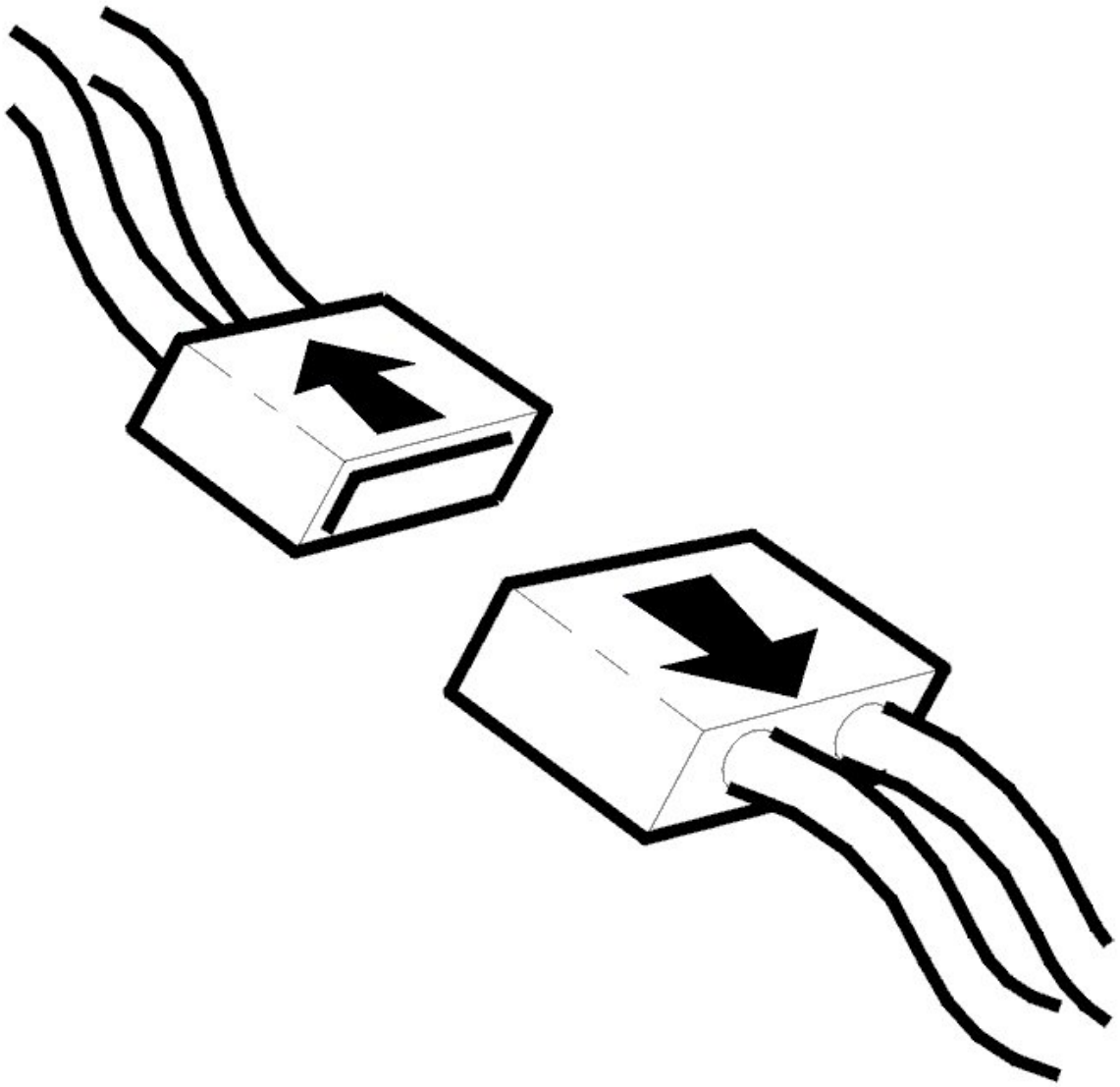
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

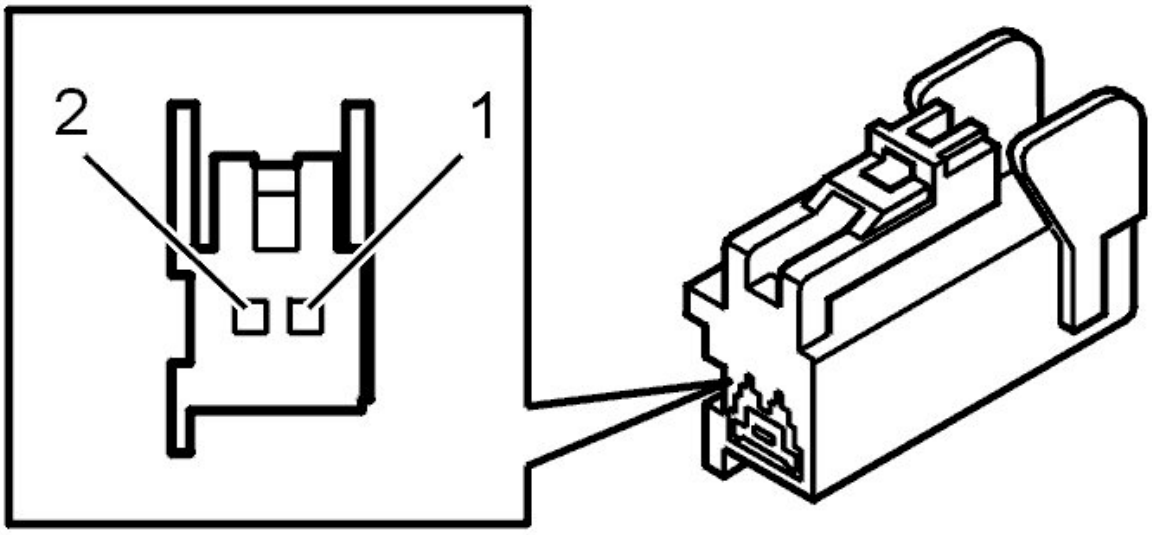
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite
- With the ignition off and the 2-pin connector disconnected, the resistance between the 2-pin connector terminals #1 and #2 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

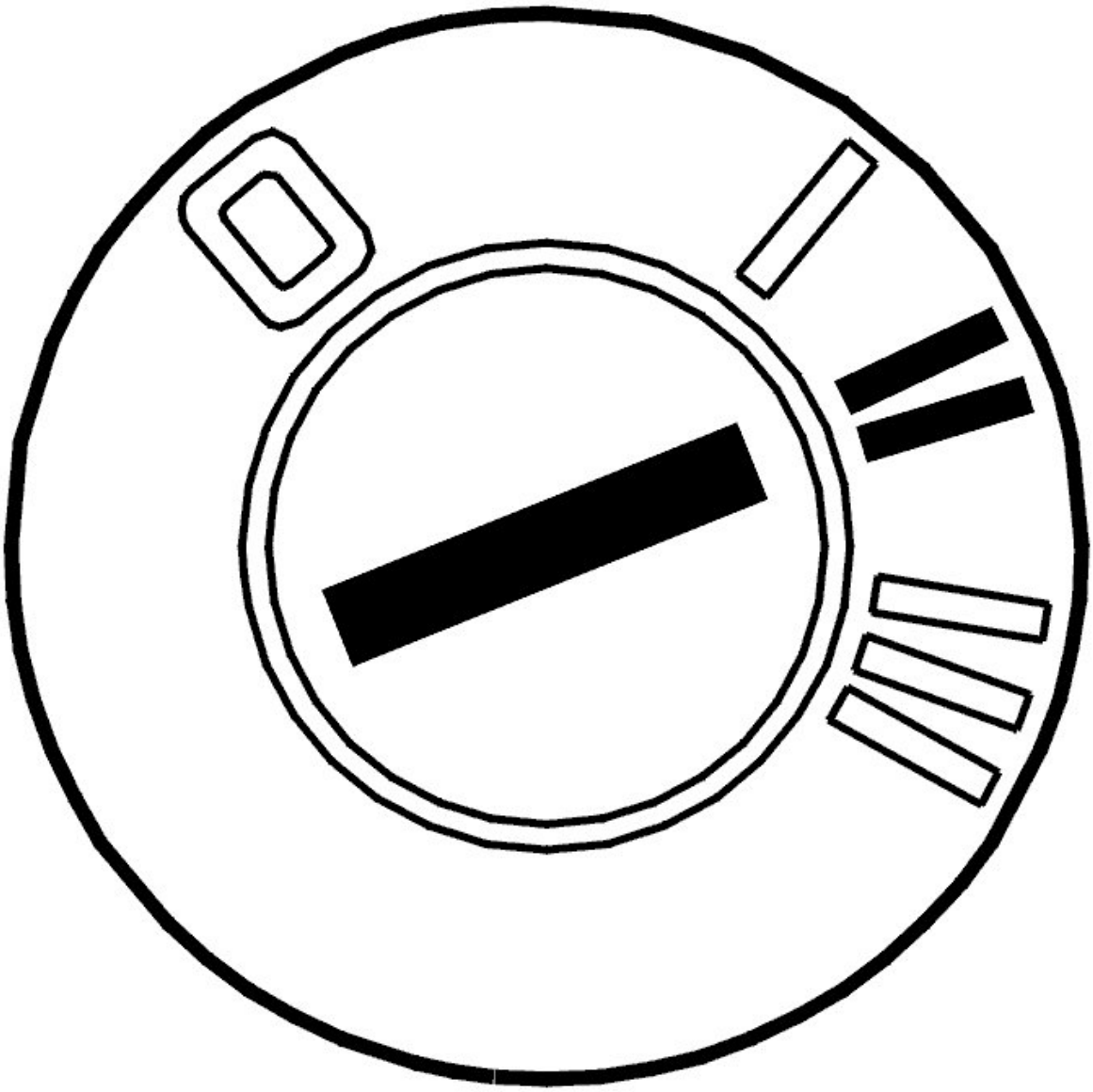
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

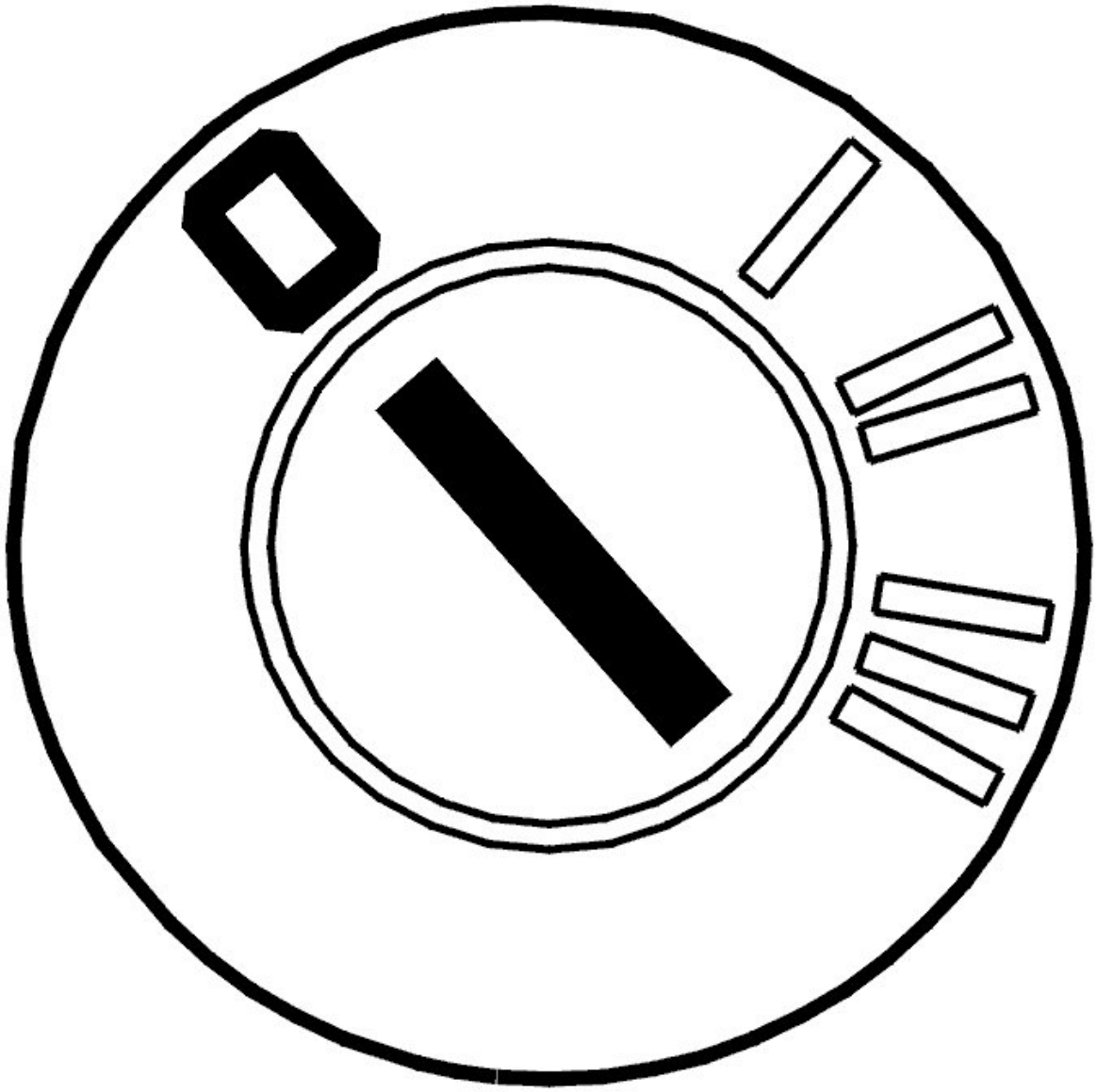
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance



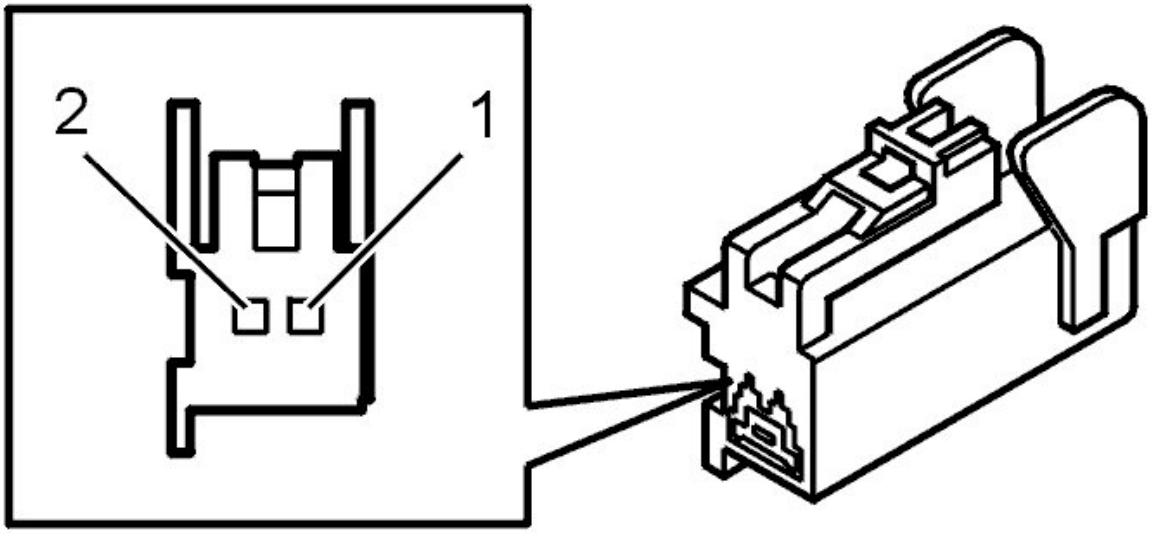
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

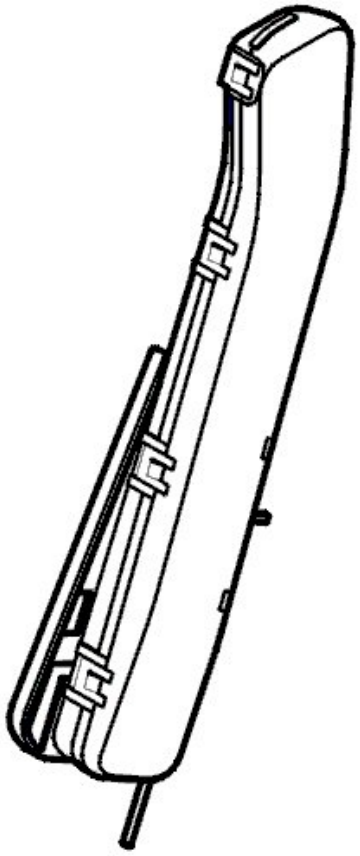
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0032 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0032 is displayed.

Substitute value
- Nothing.

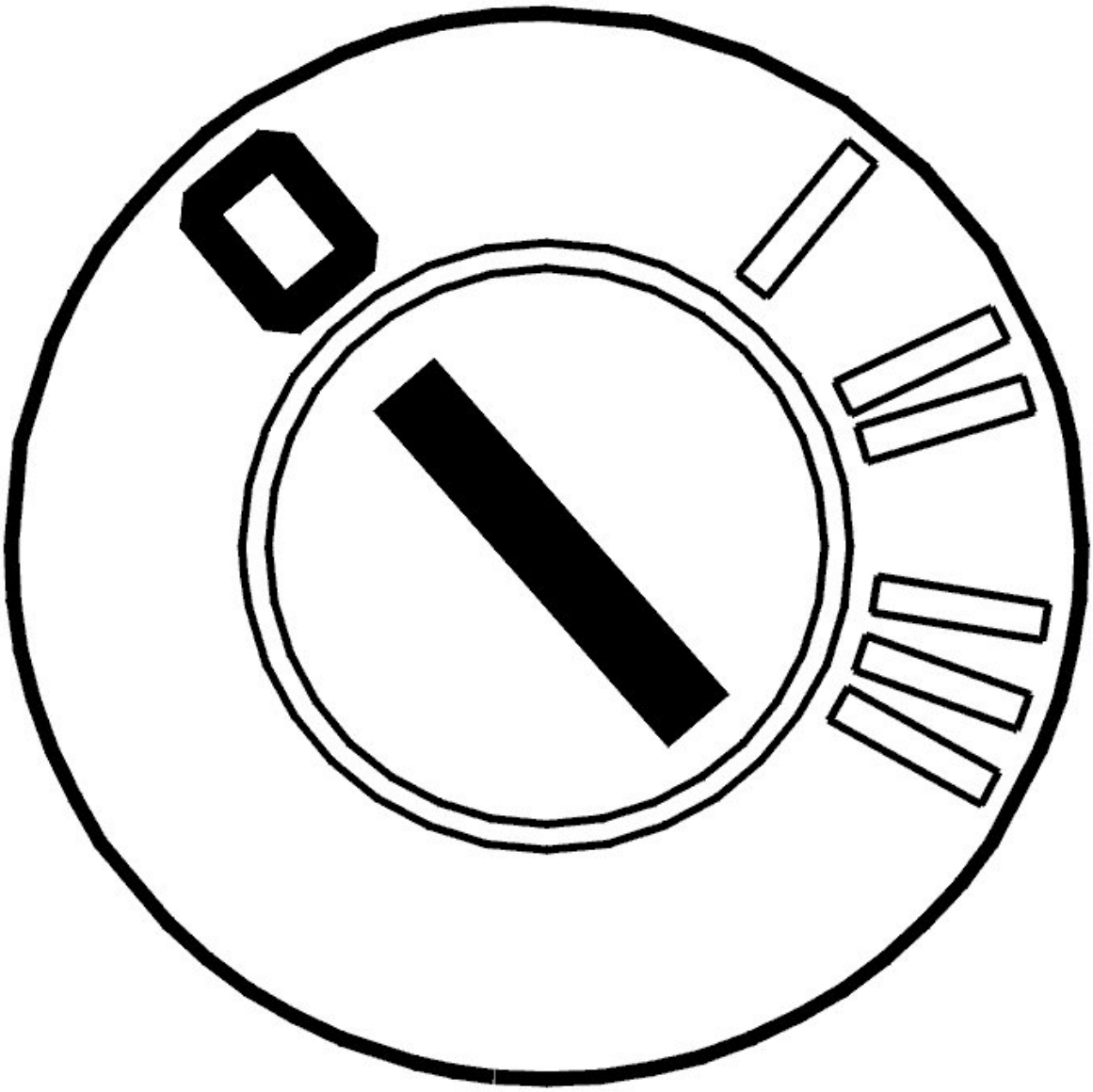
Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

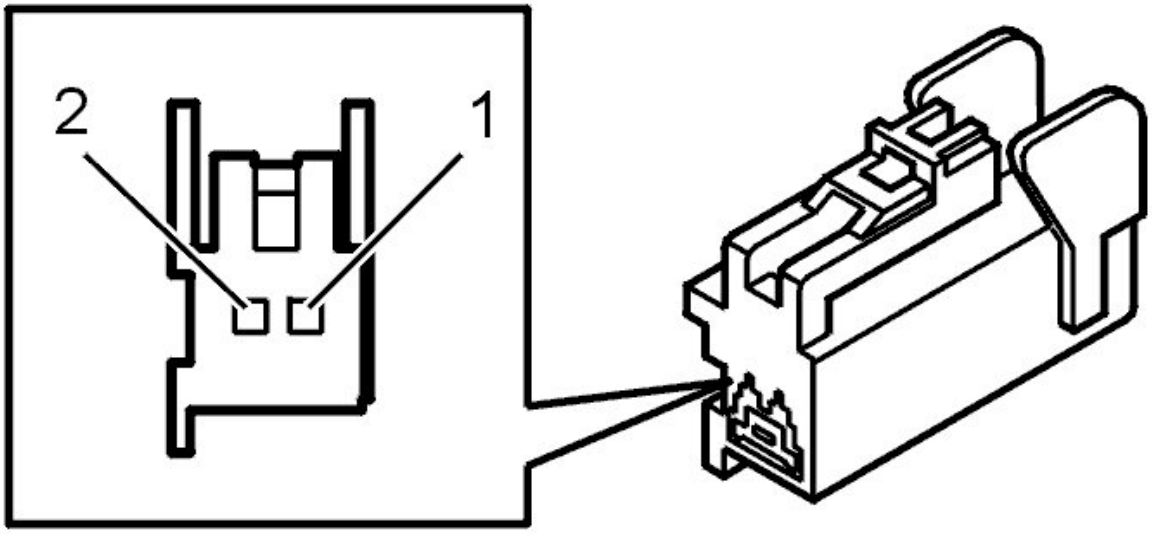
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

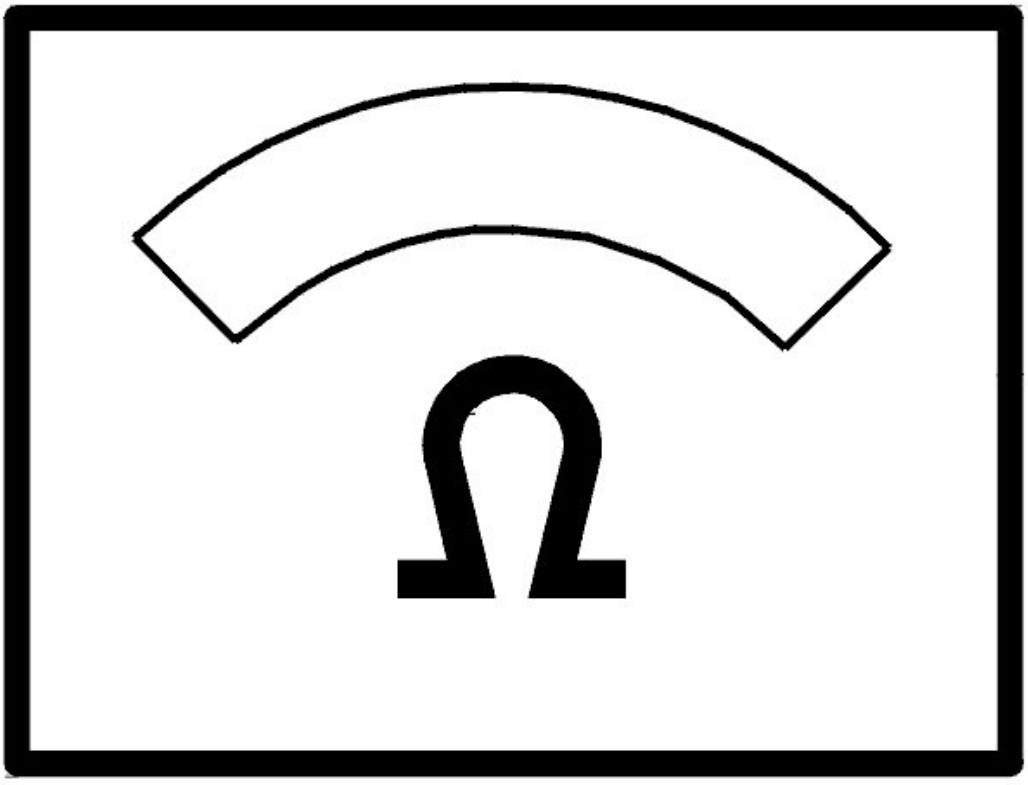
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite

- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

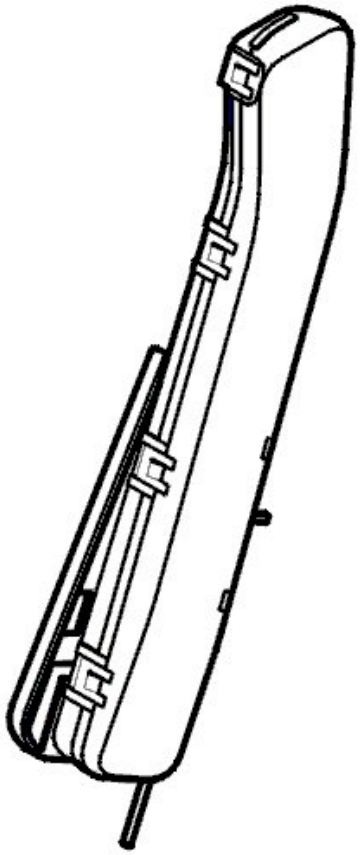
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0032 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0032 is displayed.

Substitute value
- Nothing.

Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]

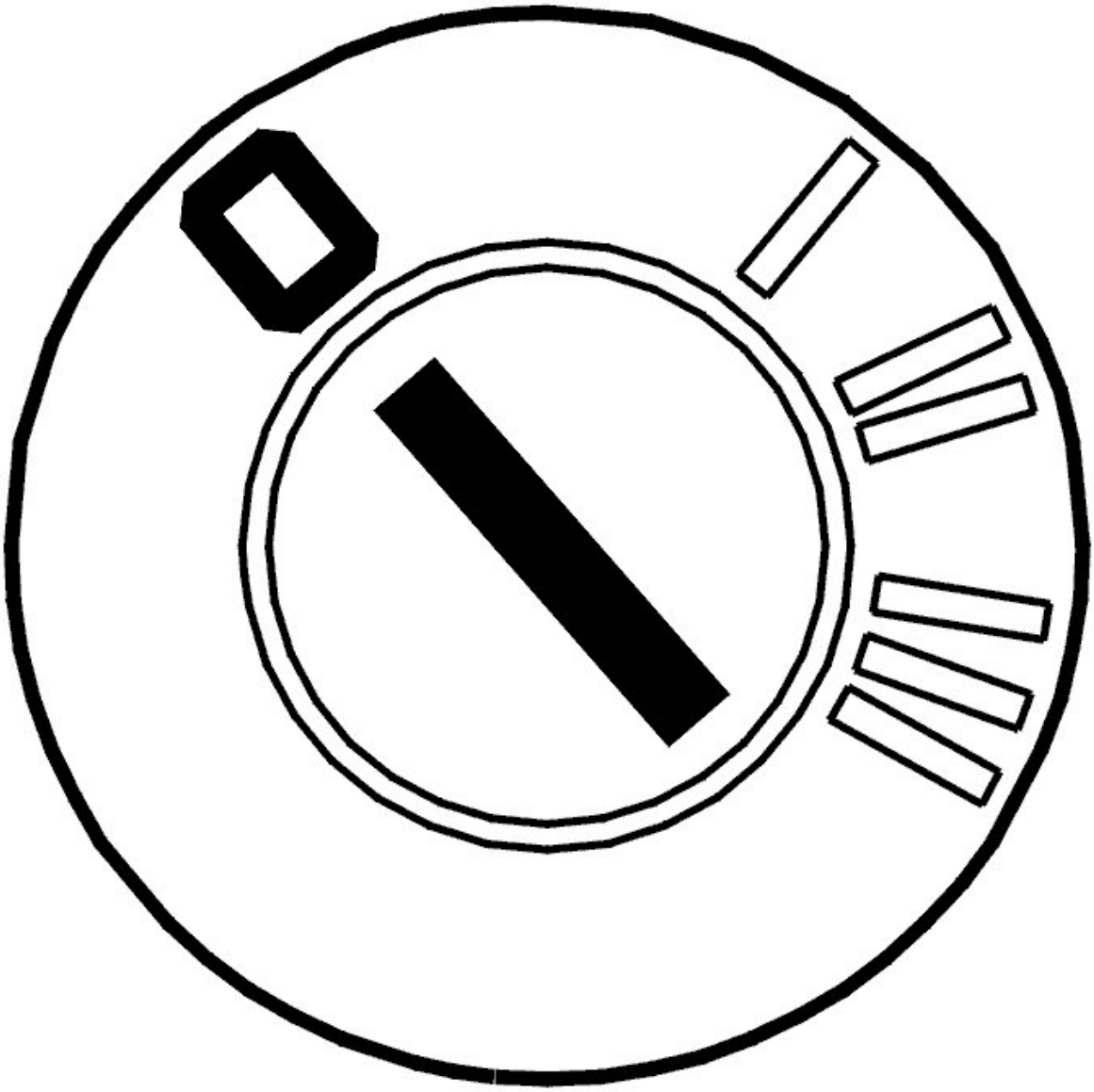
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

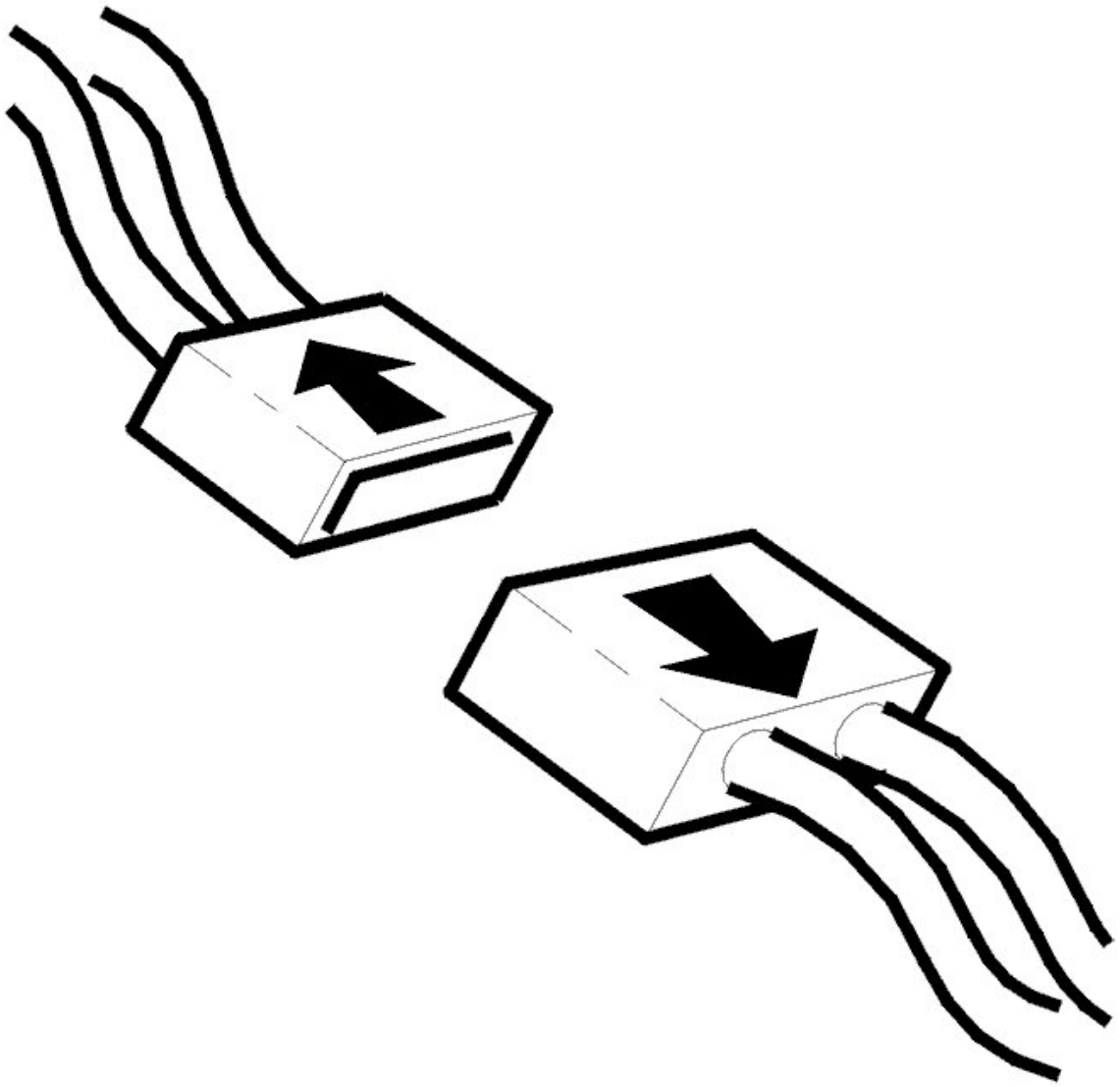
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

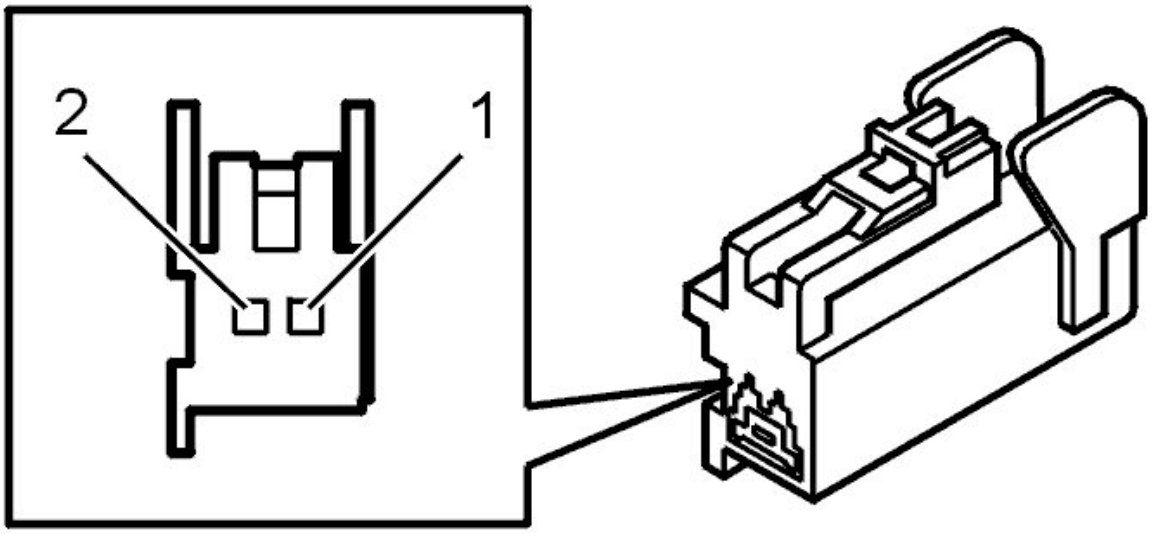
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

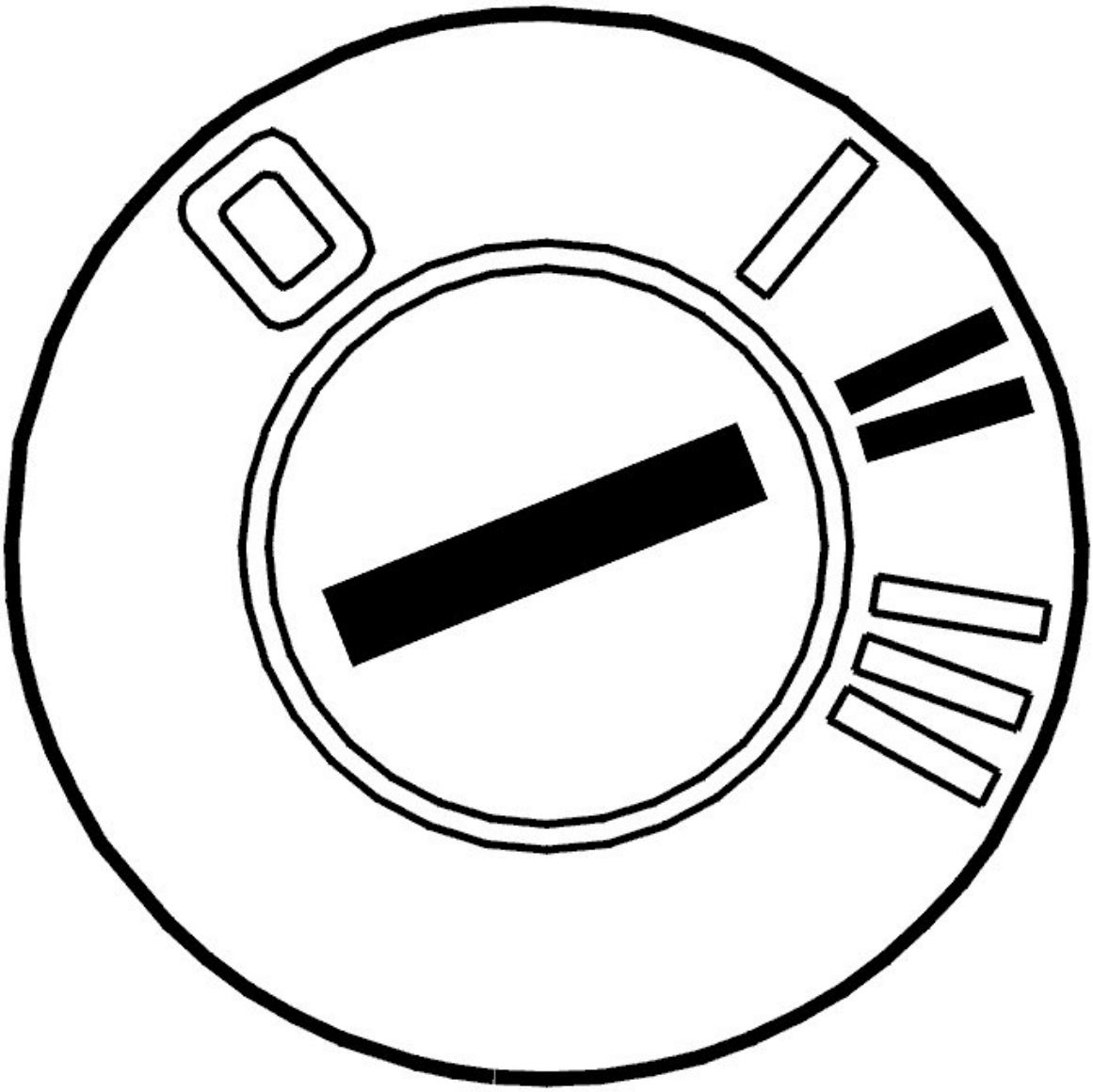
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

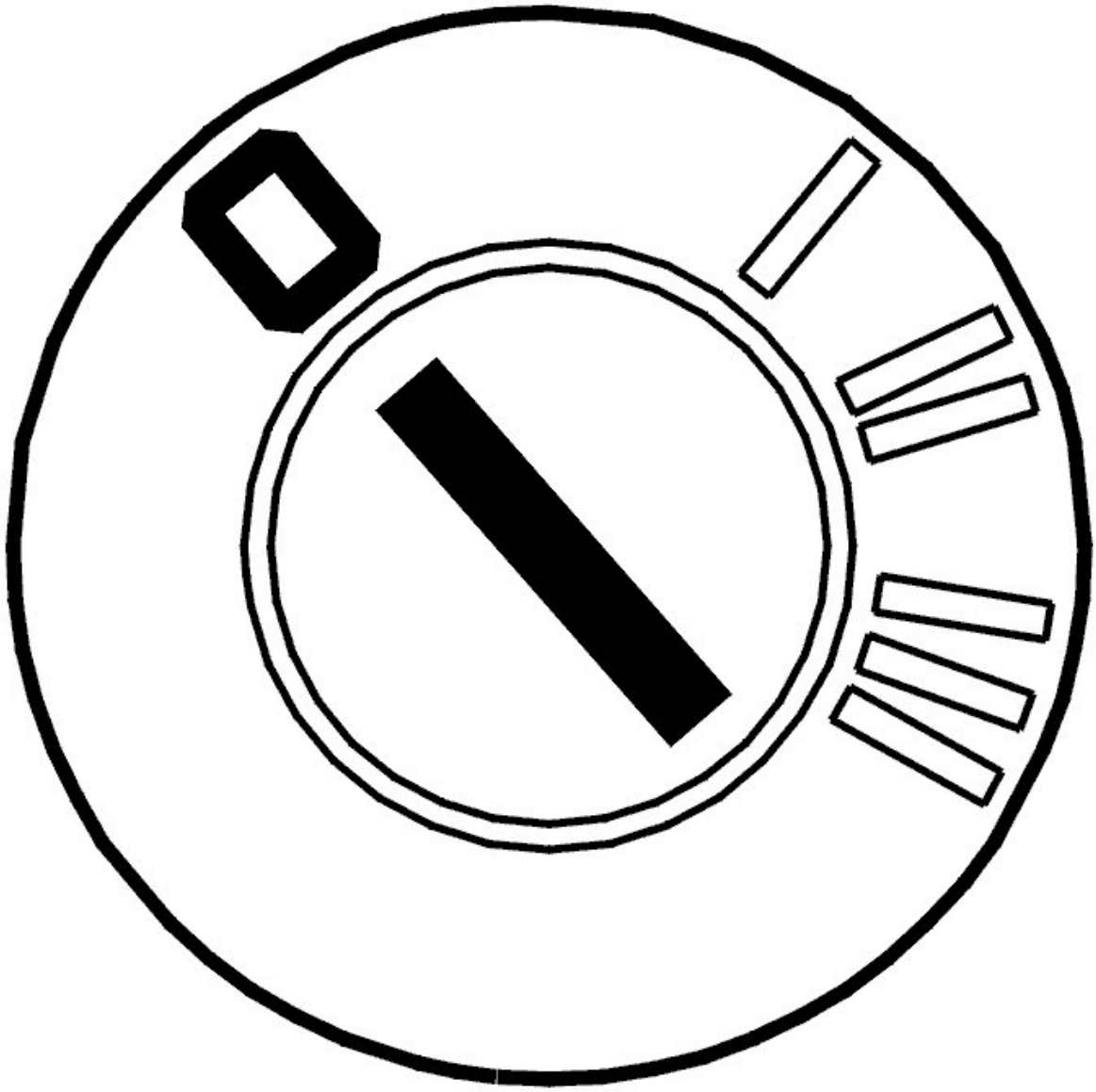
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance



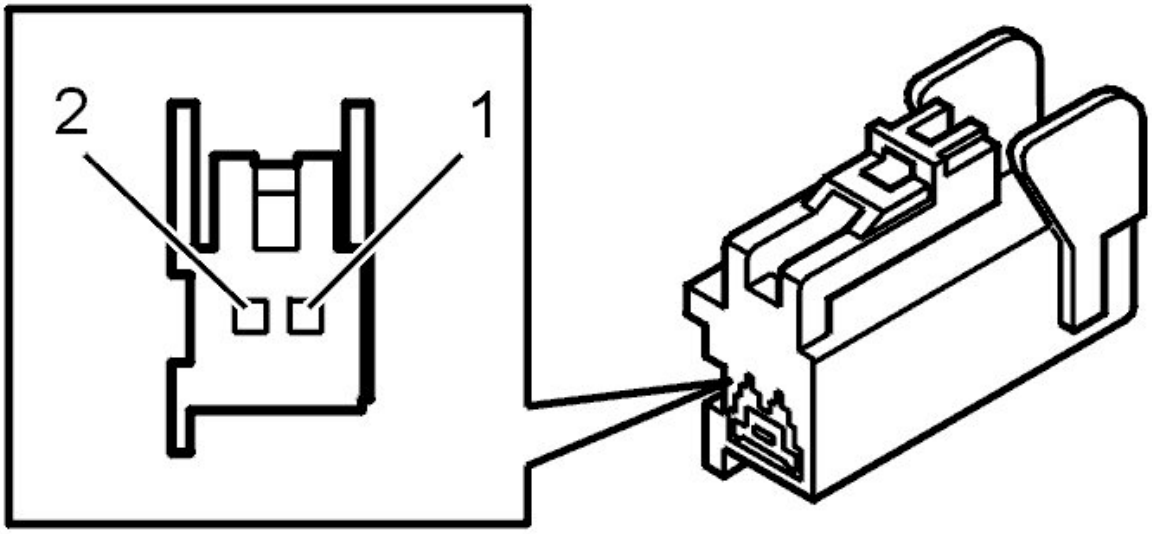
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

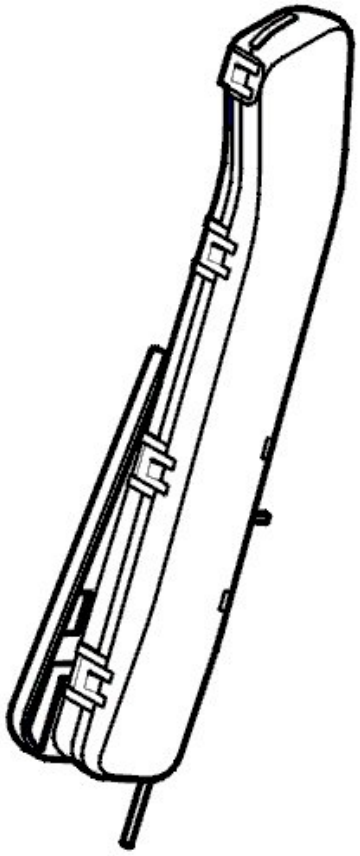
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0033 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0033 is displayed.

Substitute value
- Nothing.

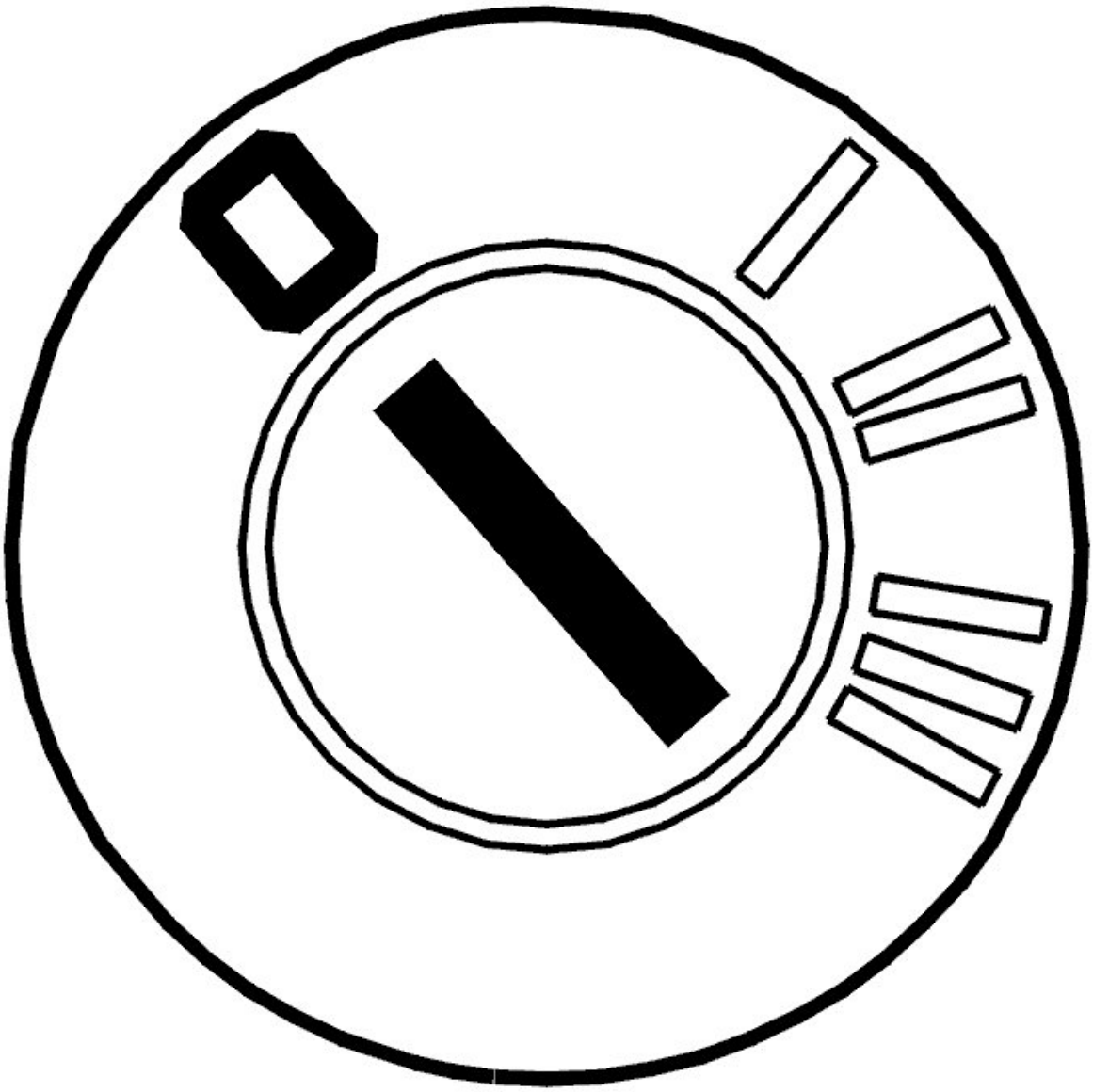
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking components and wiring



- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

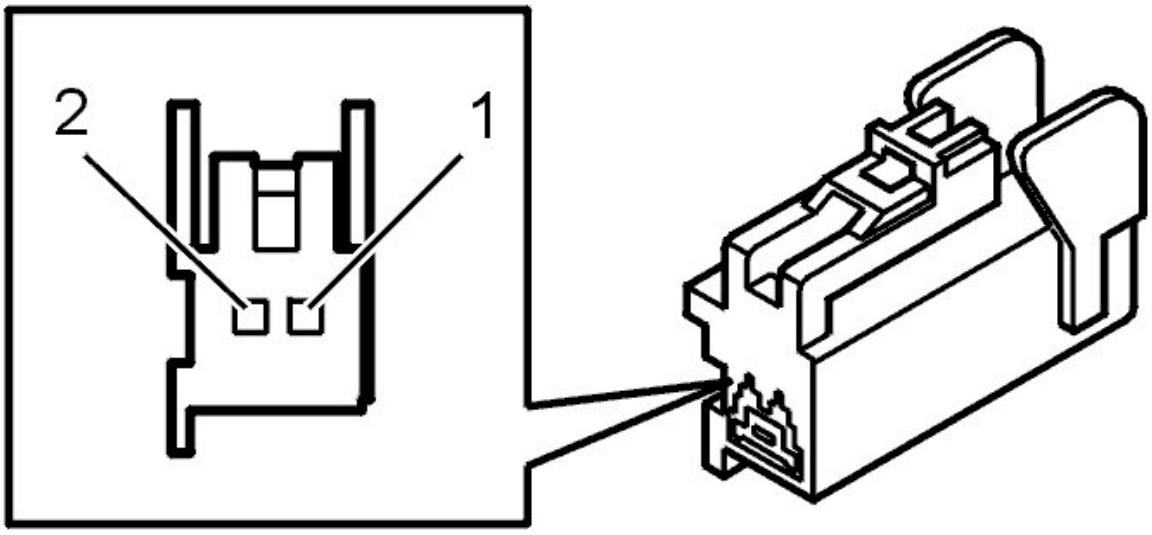
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 on the left-hand side impact protection (SIPS) bag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 on the left-hand side impact protection (SIPS) bag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the left-hand side impact protection (SIPS) bag, see Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Has the fault been remedied?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

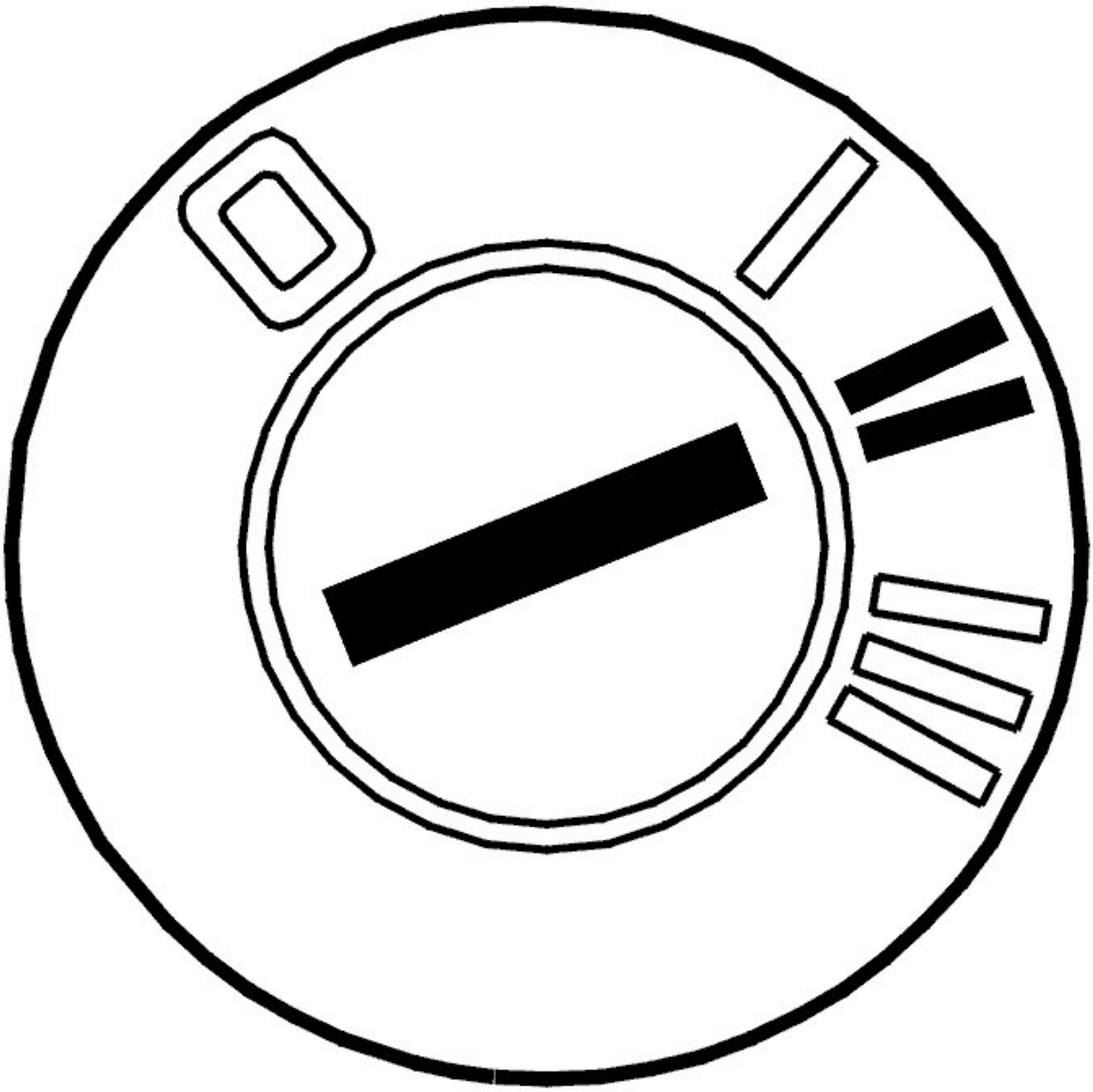
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

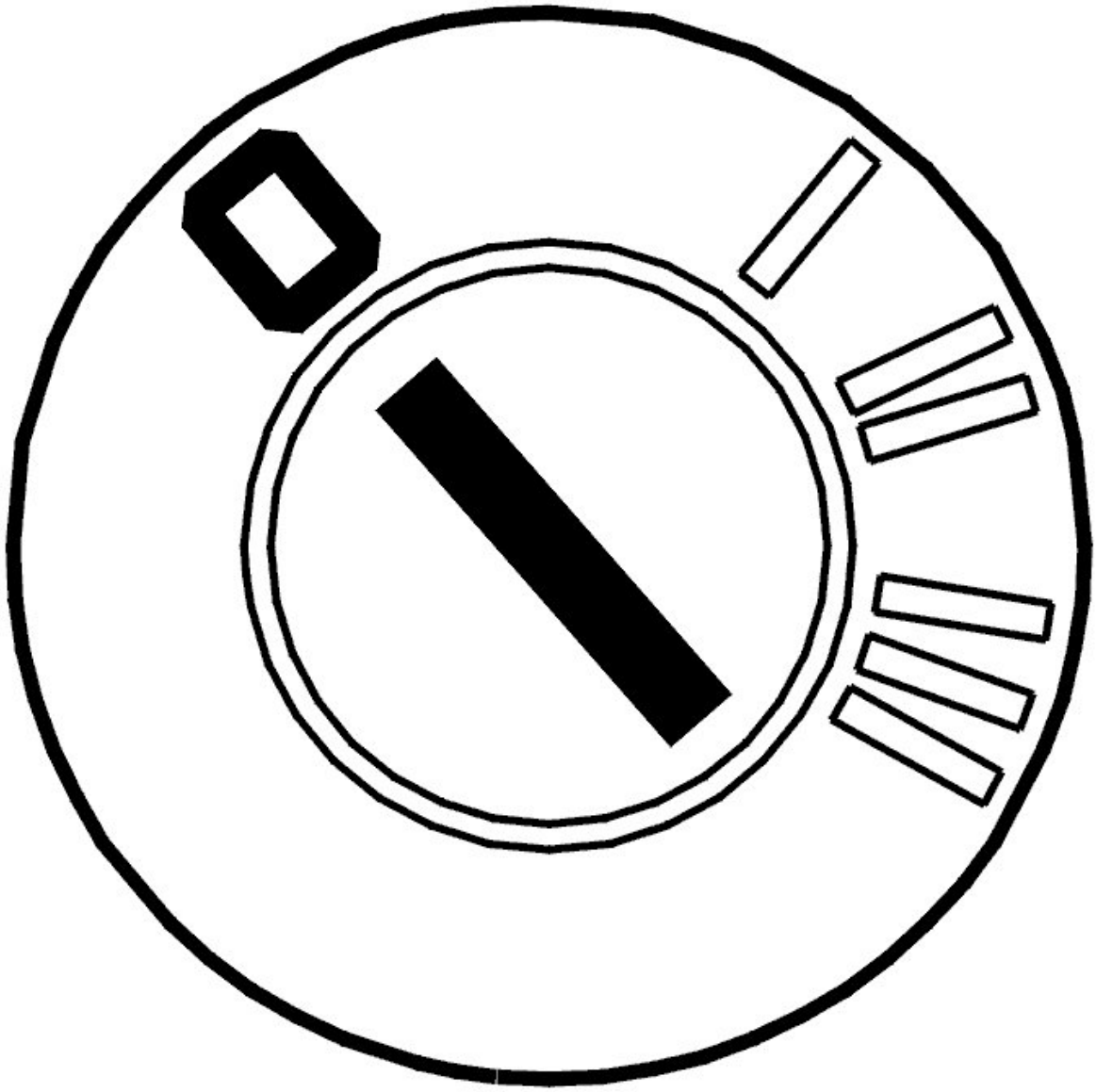
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Checking the resistance



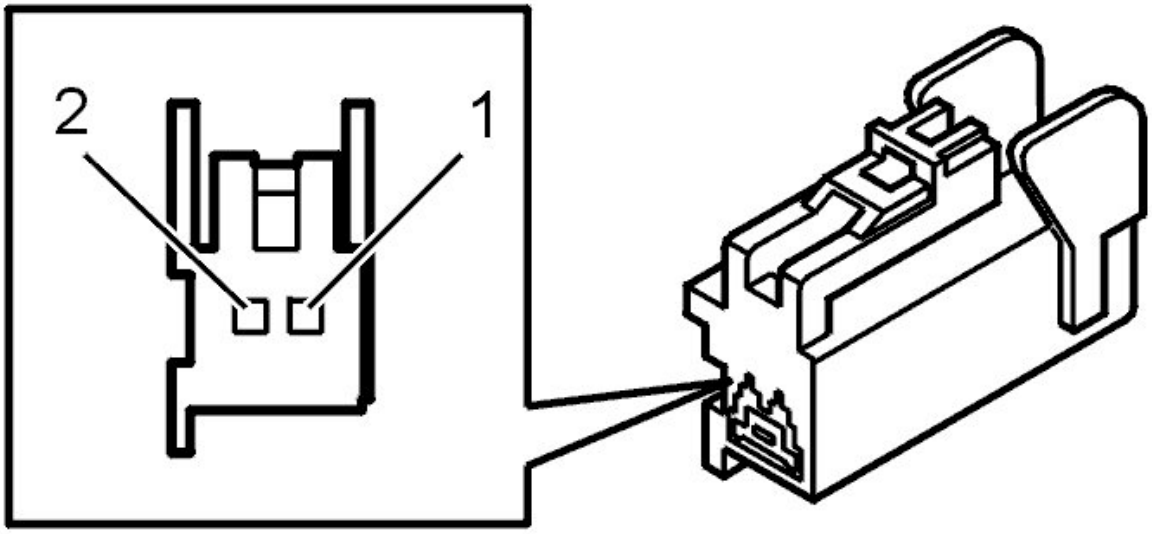
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

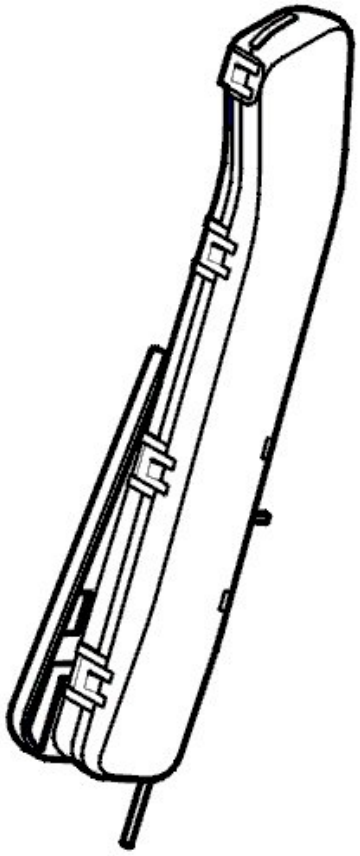
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0033 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0033 is displayed.

Substitute value
- Nothing.

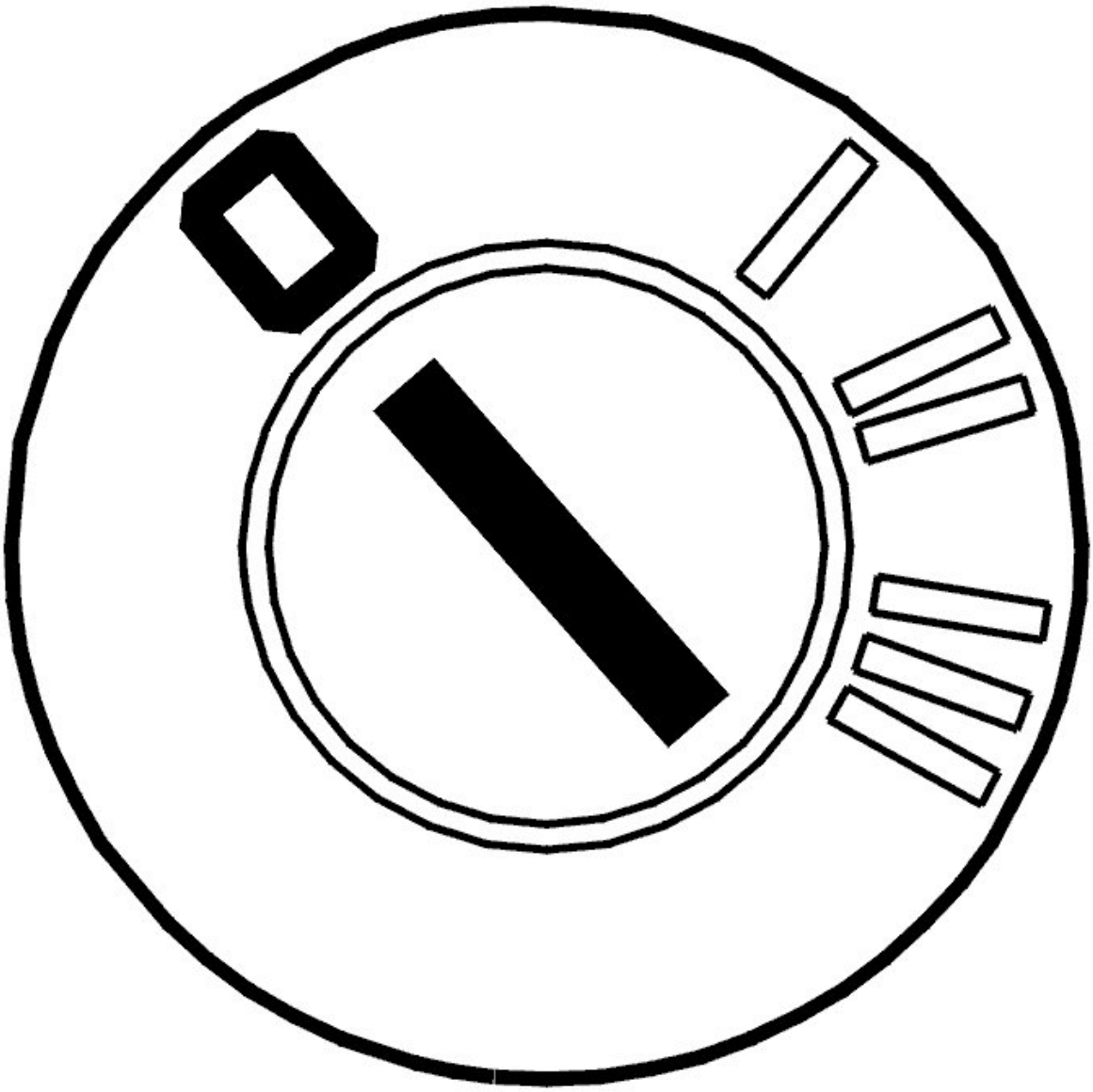
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

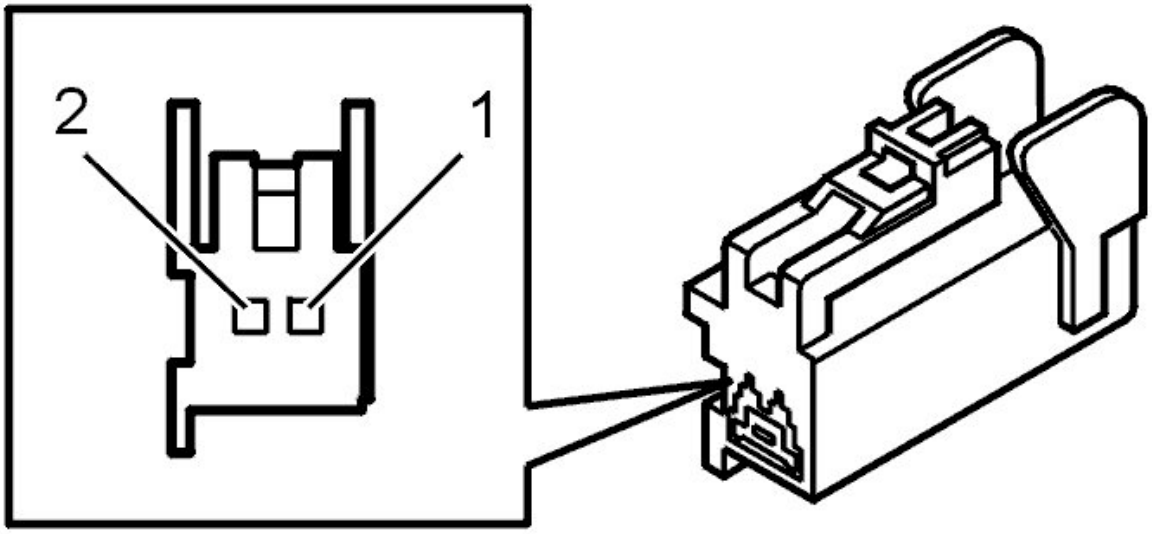
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

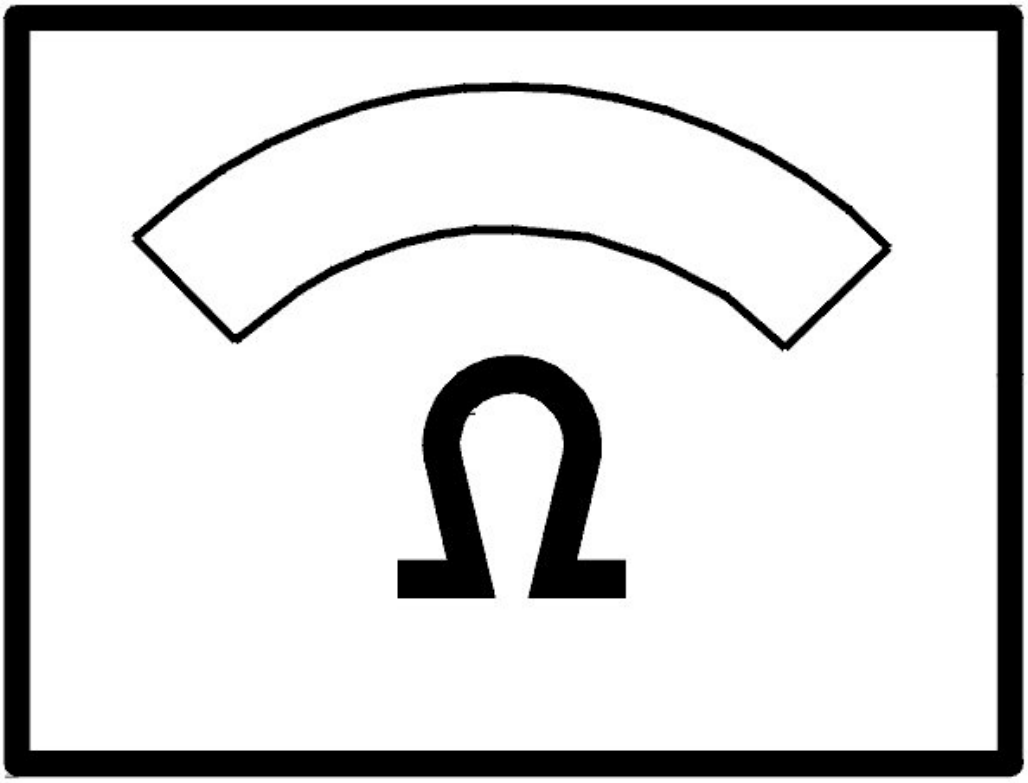
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

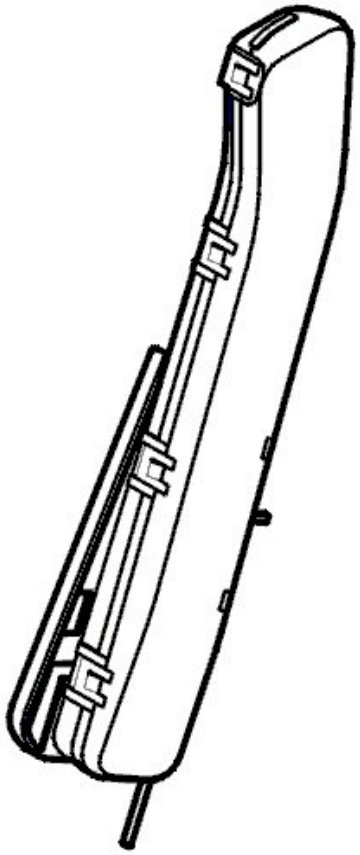
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0034 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0034 is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in igniter wire or connectors between the front left side air bag and the supplemental restraint system (SRS) control unit
- Open circuit in the front left side air bag (resistance in igniter too high).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

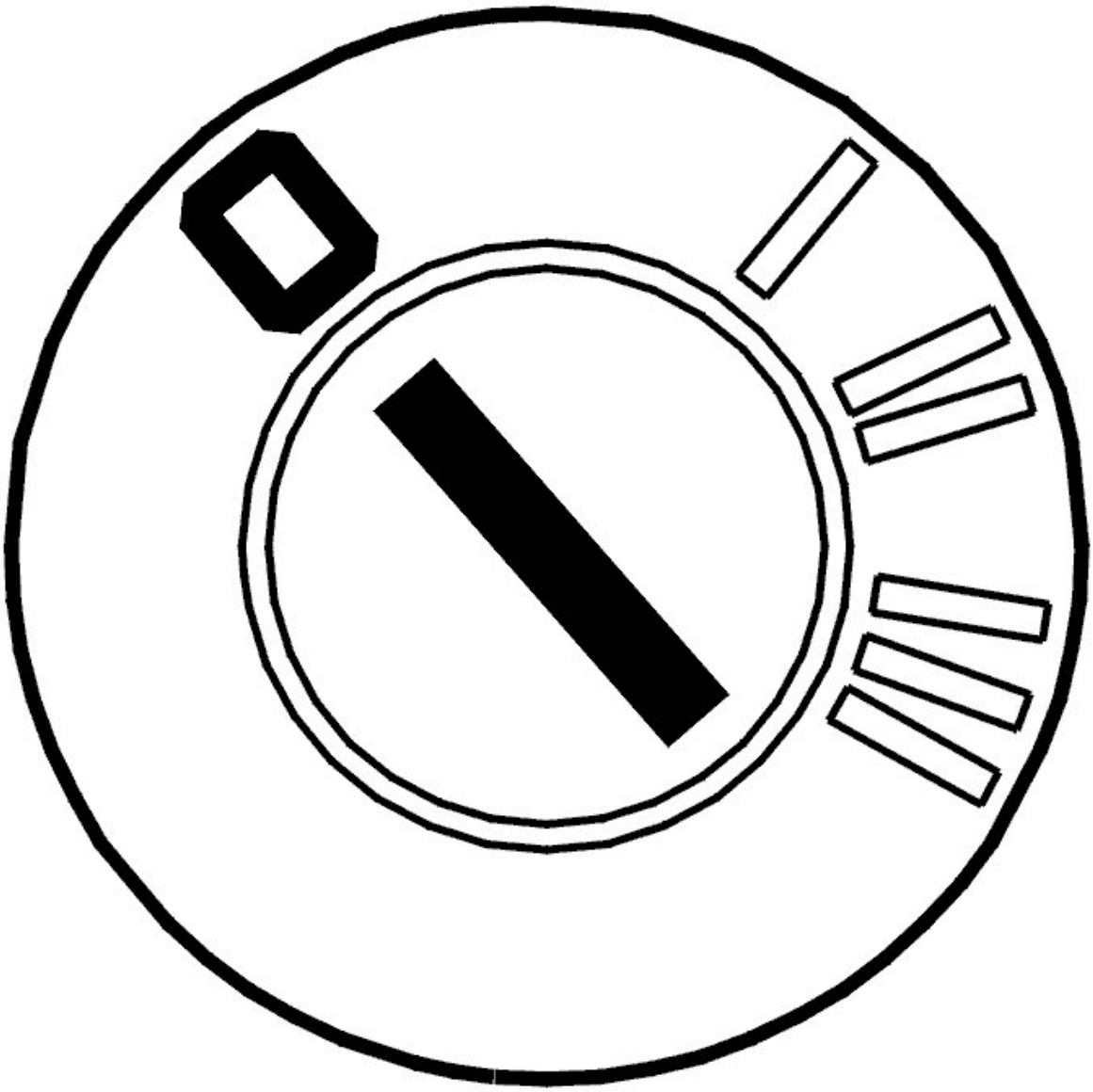
Fault symptom[s]

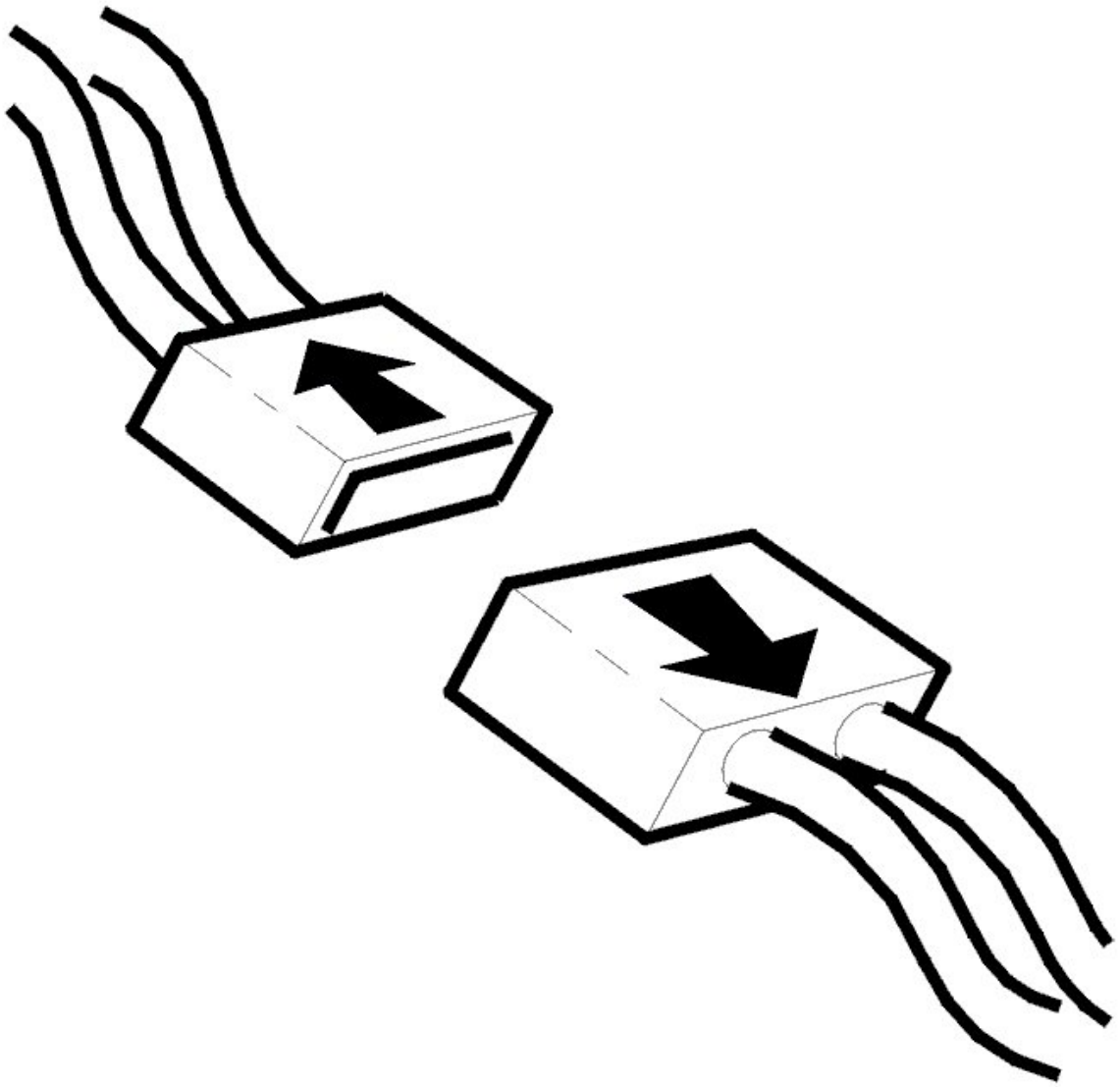
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

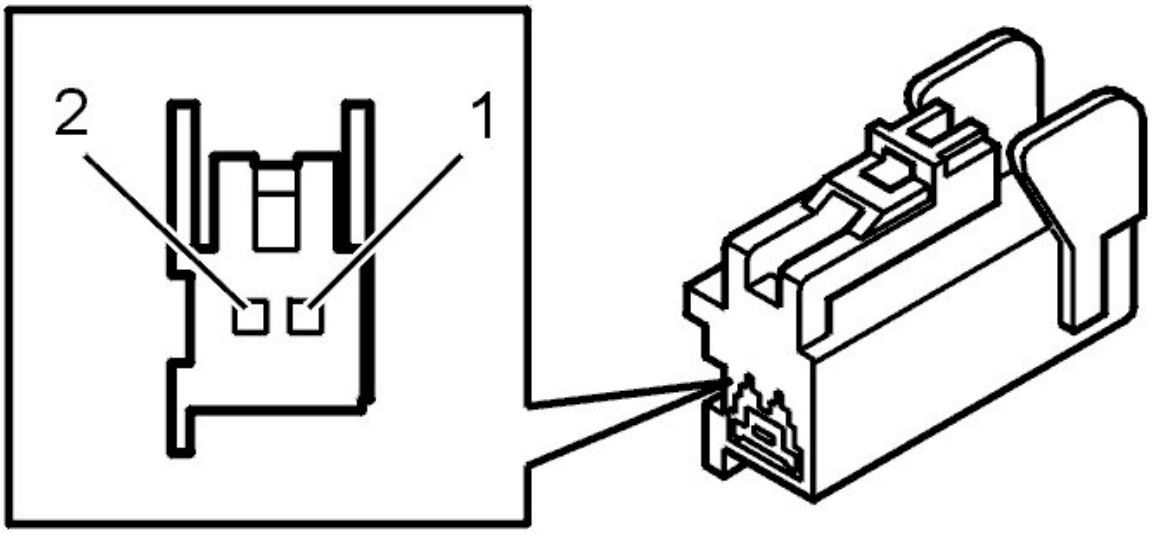
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

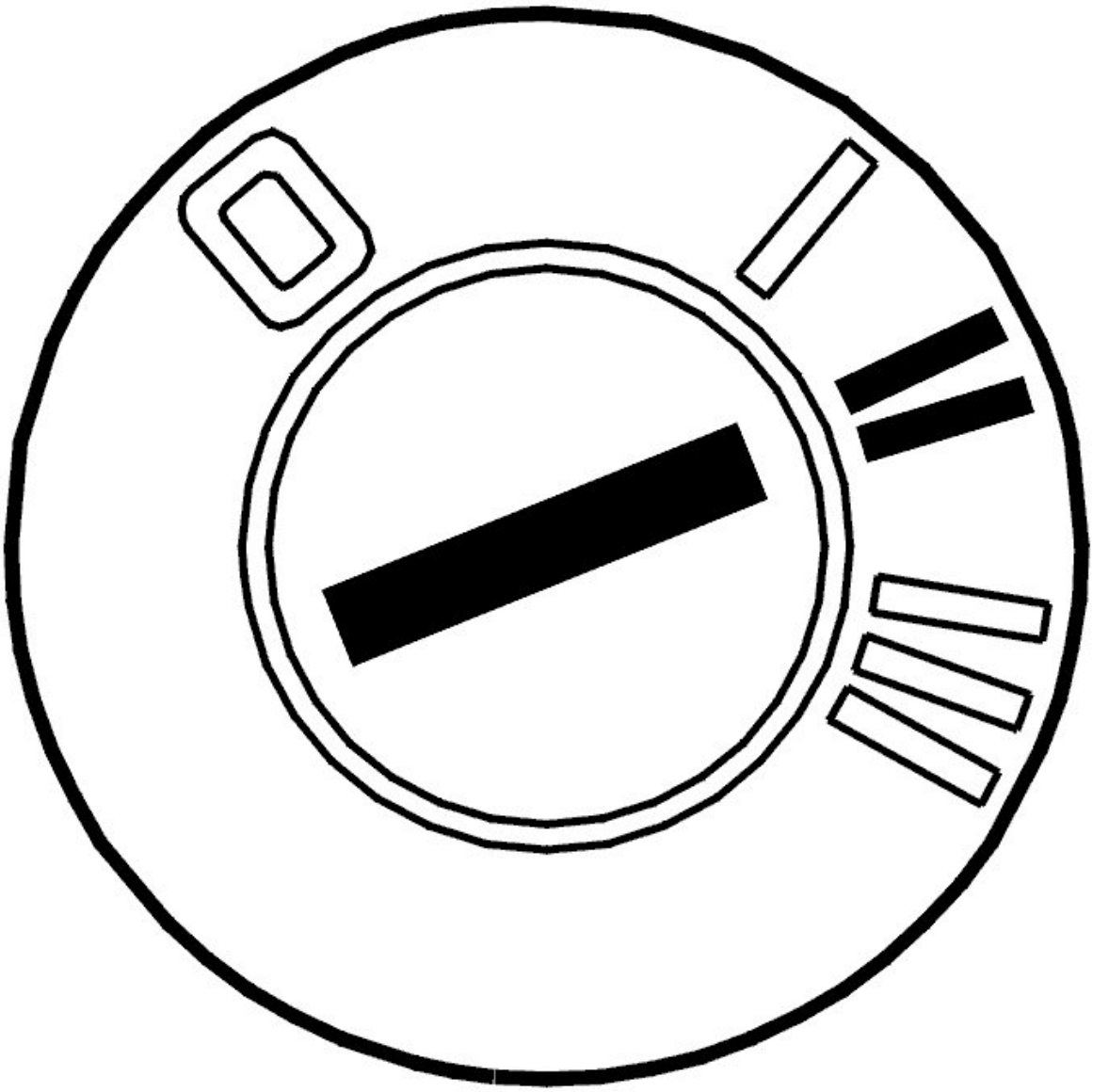
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

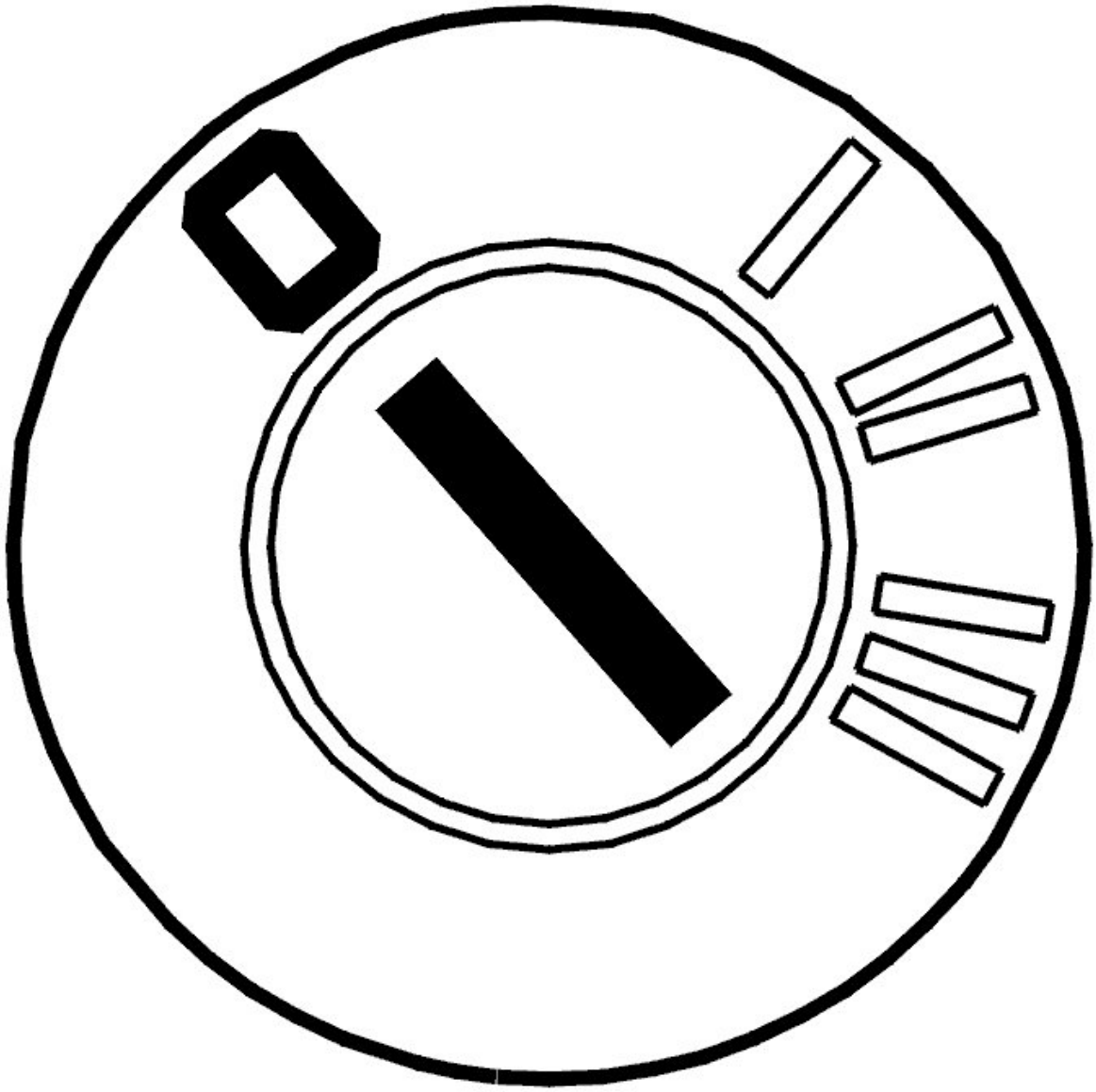
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable

Checking the resistance



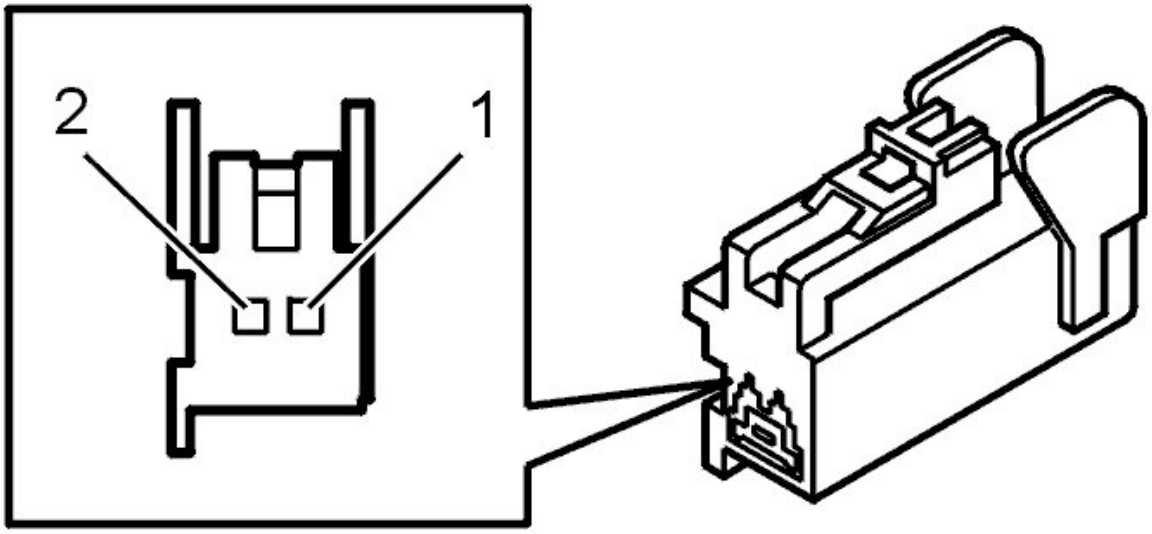
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

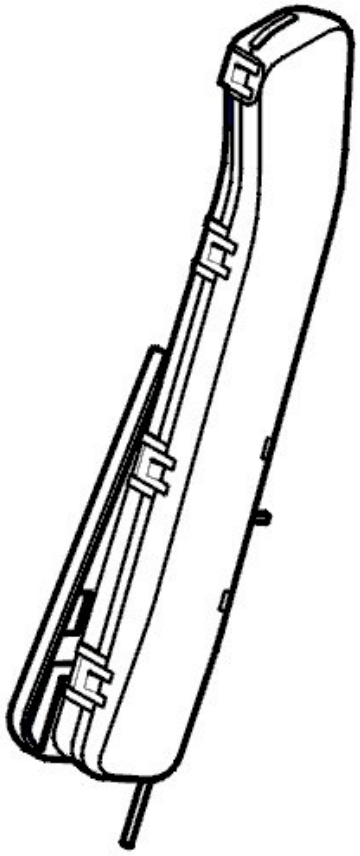
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0034 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0034 is displayed.

Substitute value
- Nothing.

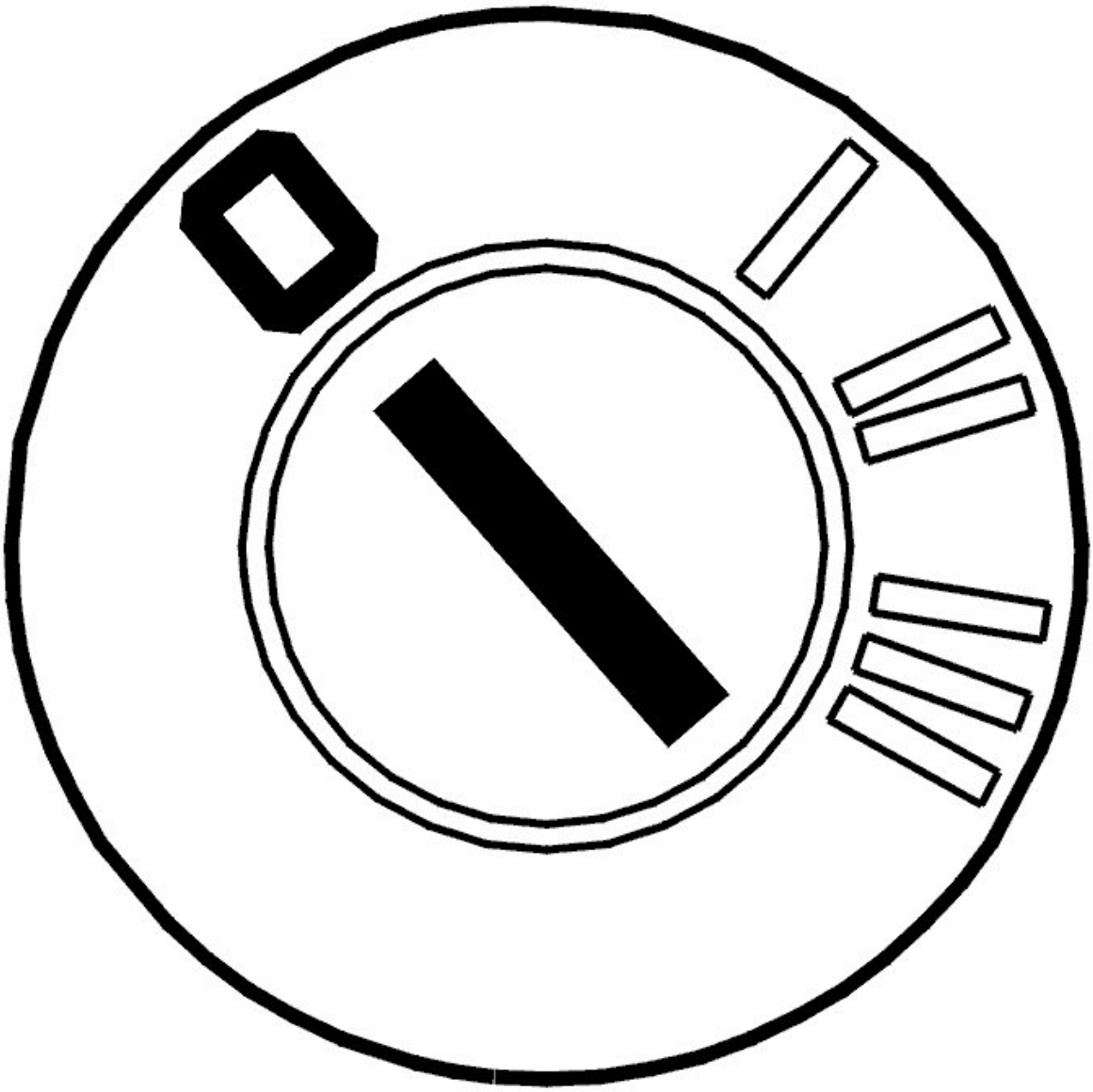
Possible source
- Open circuit in igniter wire or connectors between the front left side air bag and the supplemental restraint system (SRS) control unit
- Open circuit in the front left side air bag (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

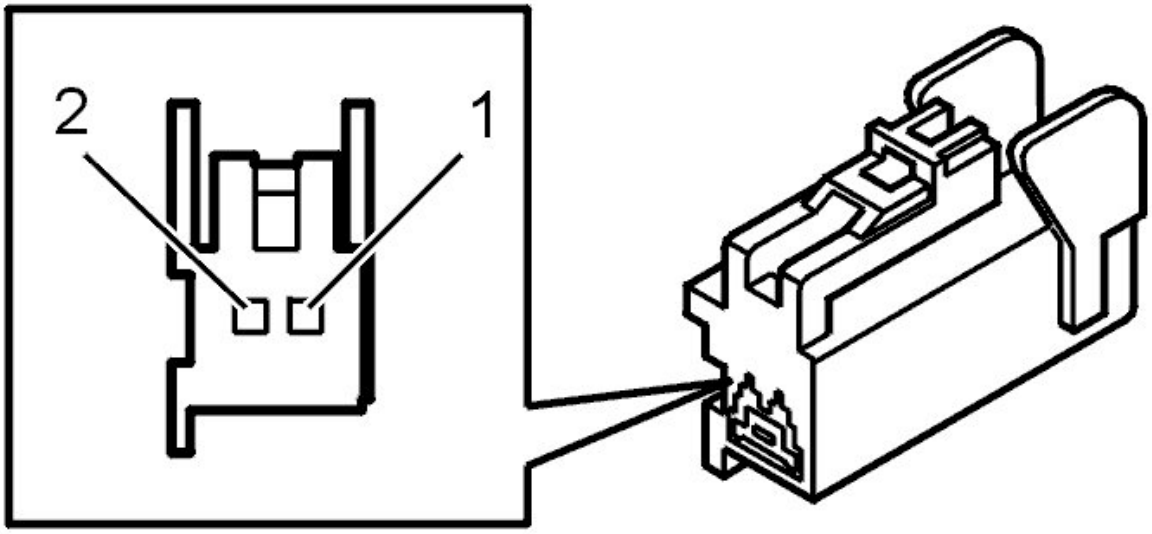
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

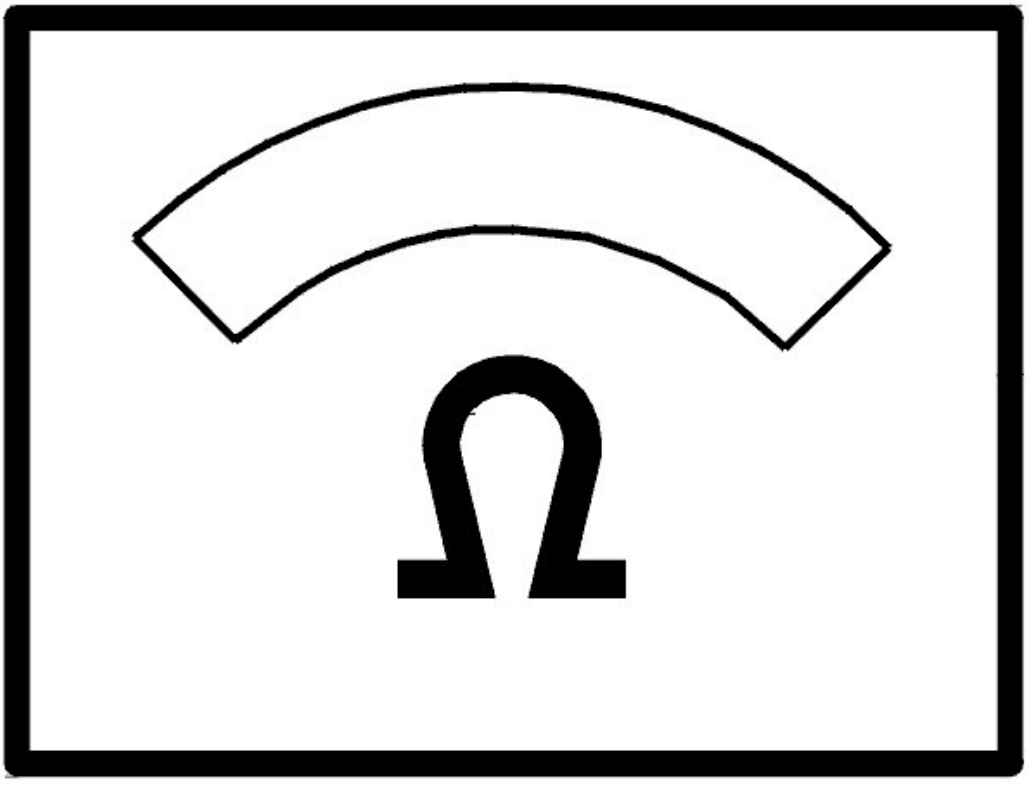
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the left-hand side impact protection (SIPS) bag, see Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

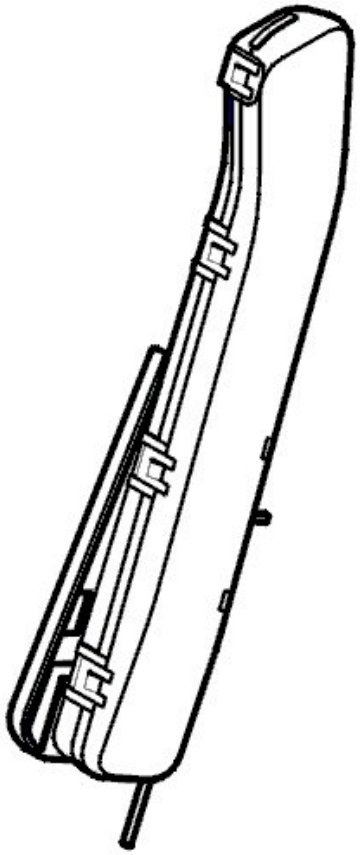
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0035 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0035 is displayed.

Substitute value
- Nothing.

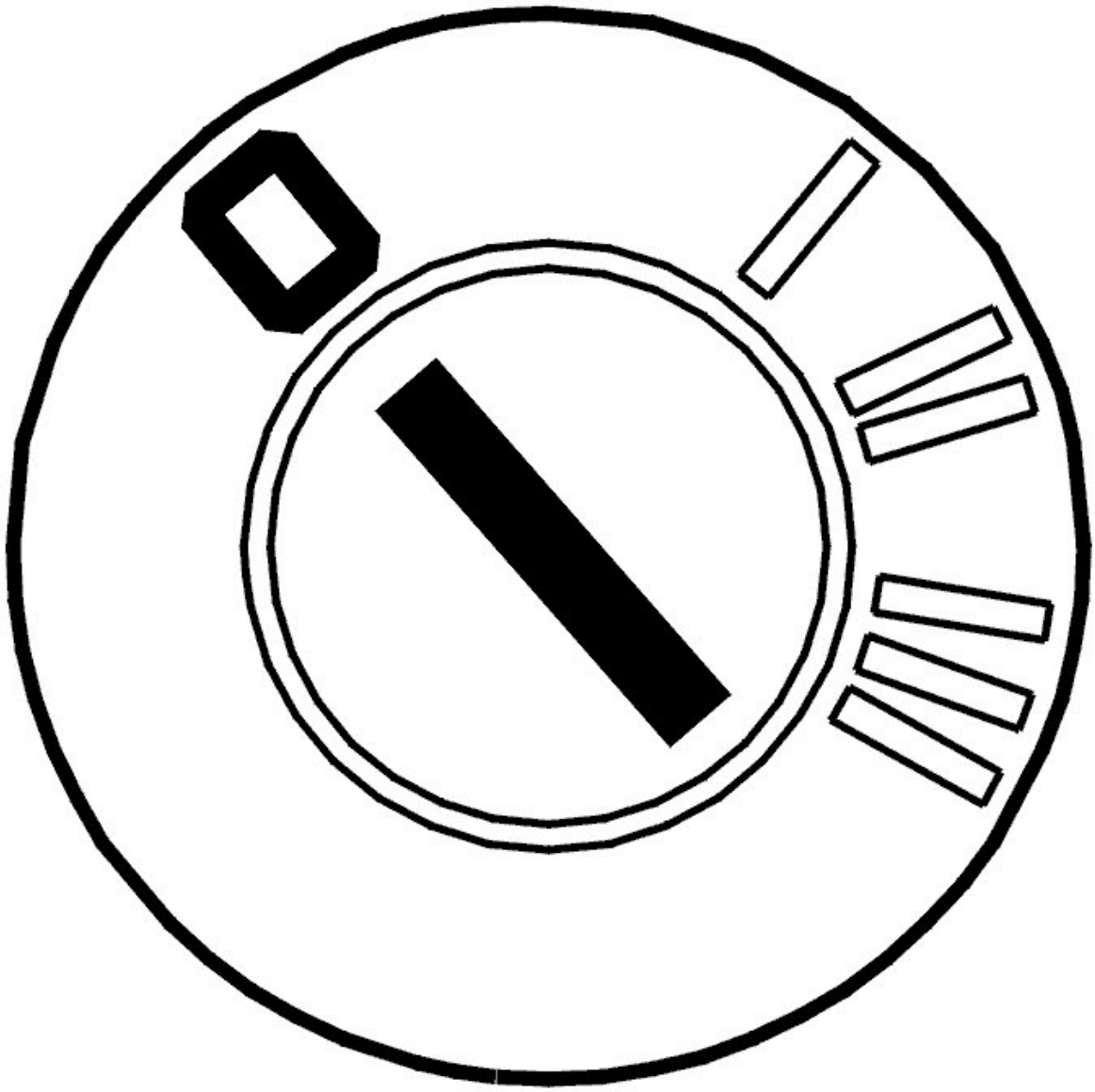
Possible source
- Short circuit in igniter wire or connectors between the front left side air bag and the supplemental restraint system (SRS) control unit
- Short circuit in the front left side air bag (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for:
- 2-pin
- the SRS control module.

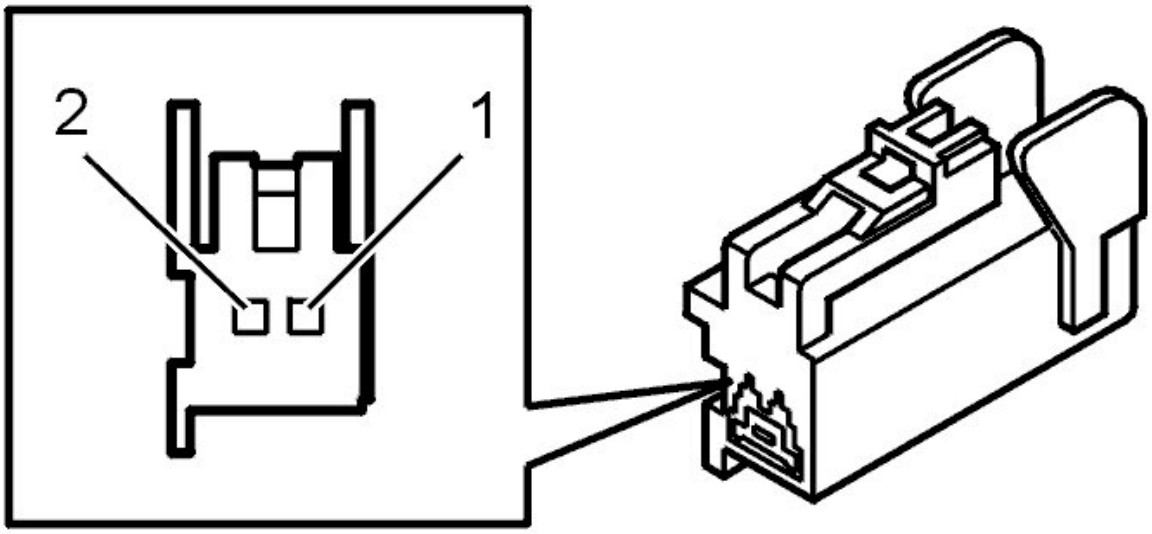
check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking

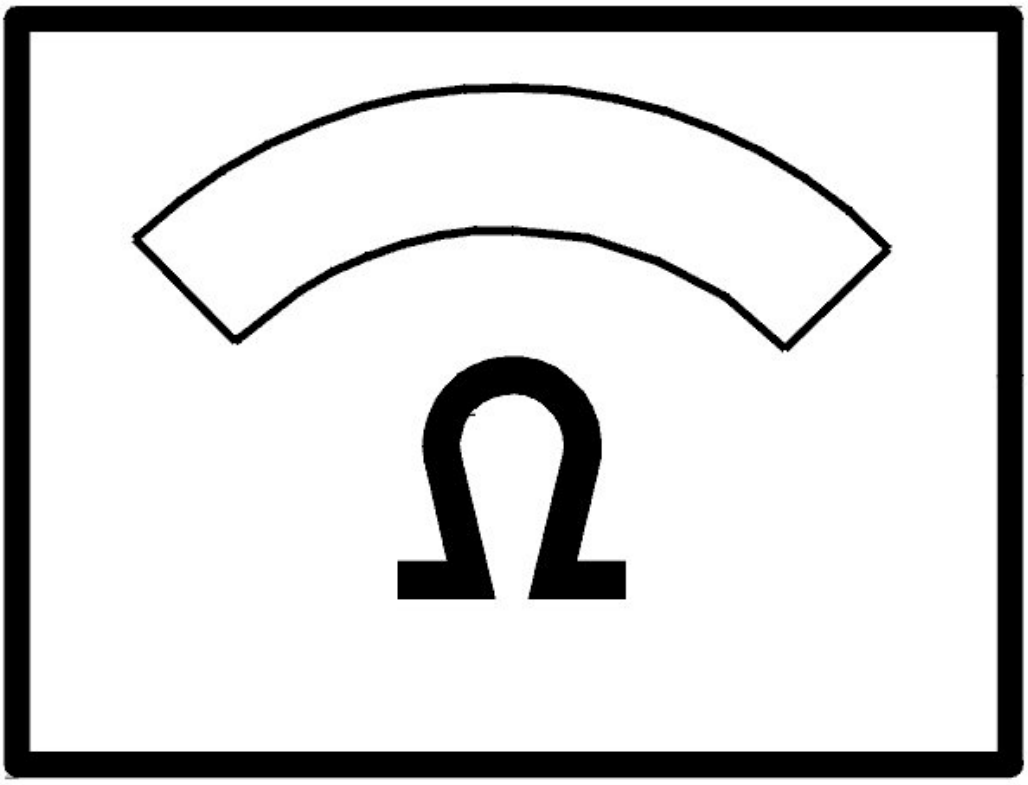
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

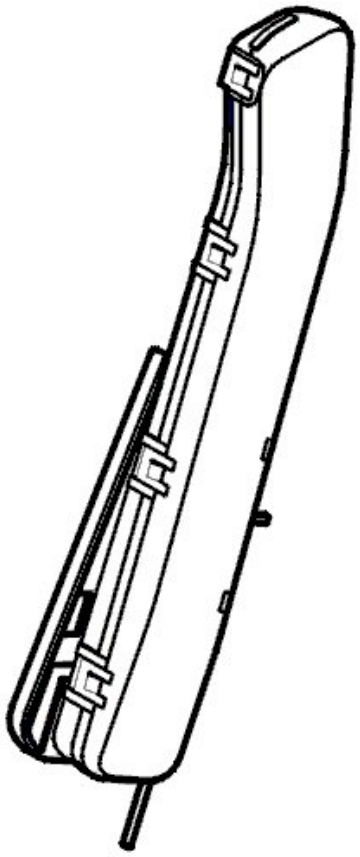
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0035 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0035 is displayed.

Substitute value
- Nothing.

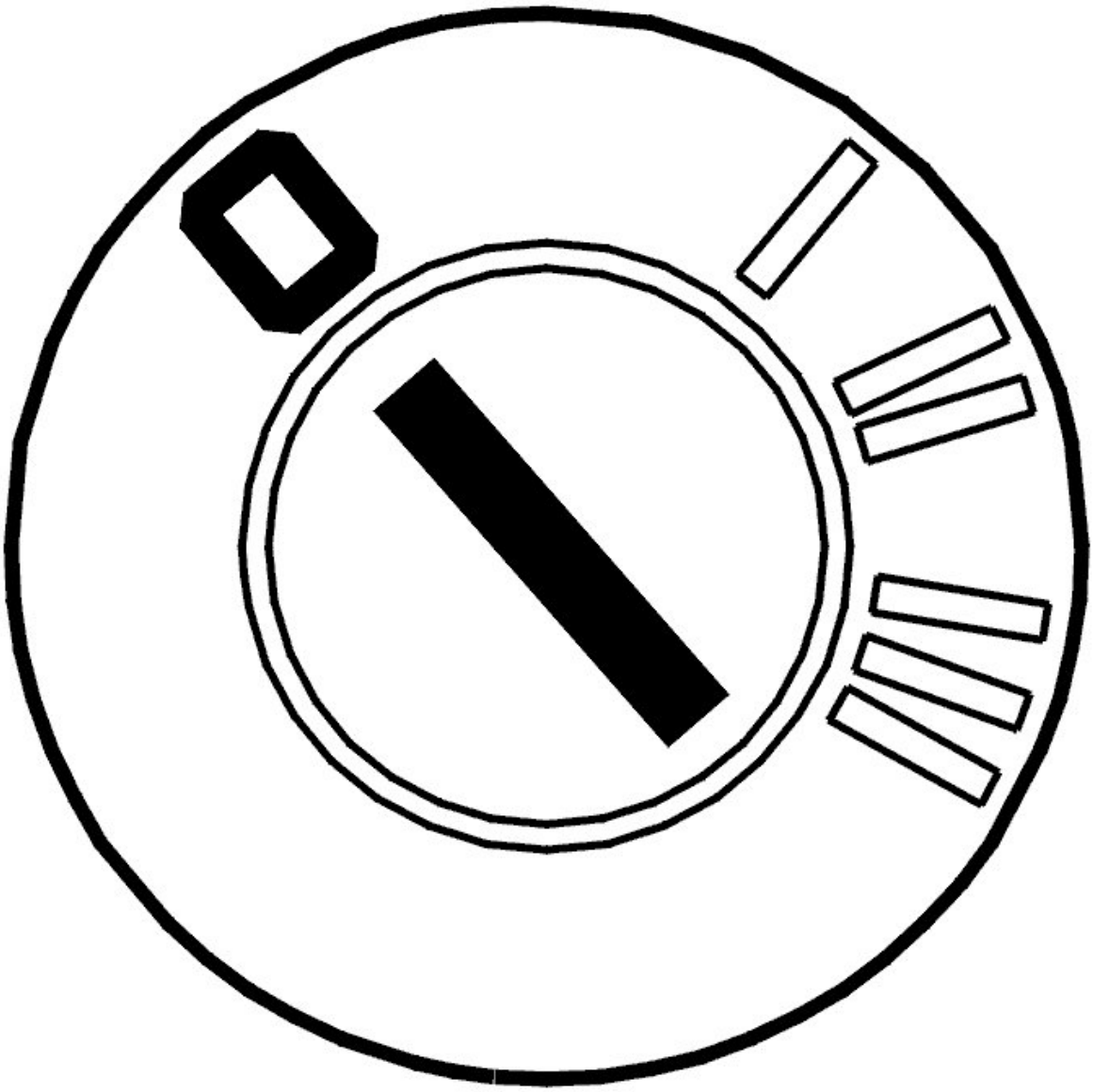
Possible source
- Short circuit in igniter wire or connectors between the front left side air bag and the supplemental restraint system (SRS) control unit
- Short circuit in the front left side air bag (resistance in igniter too low).

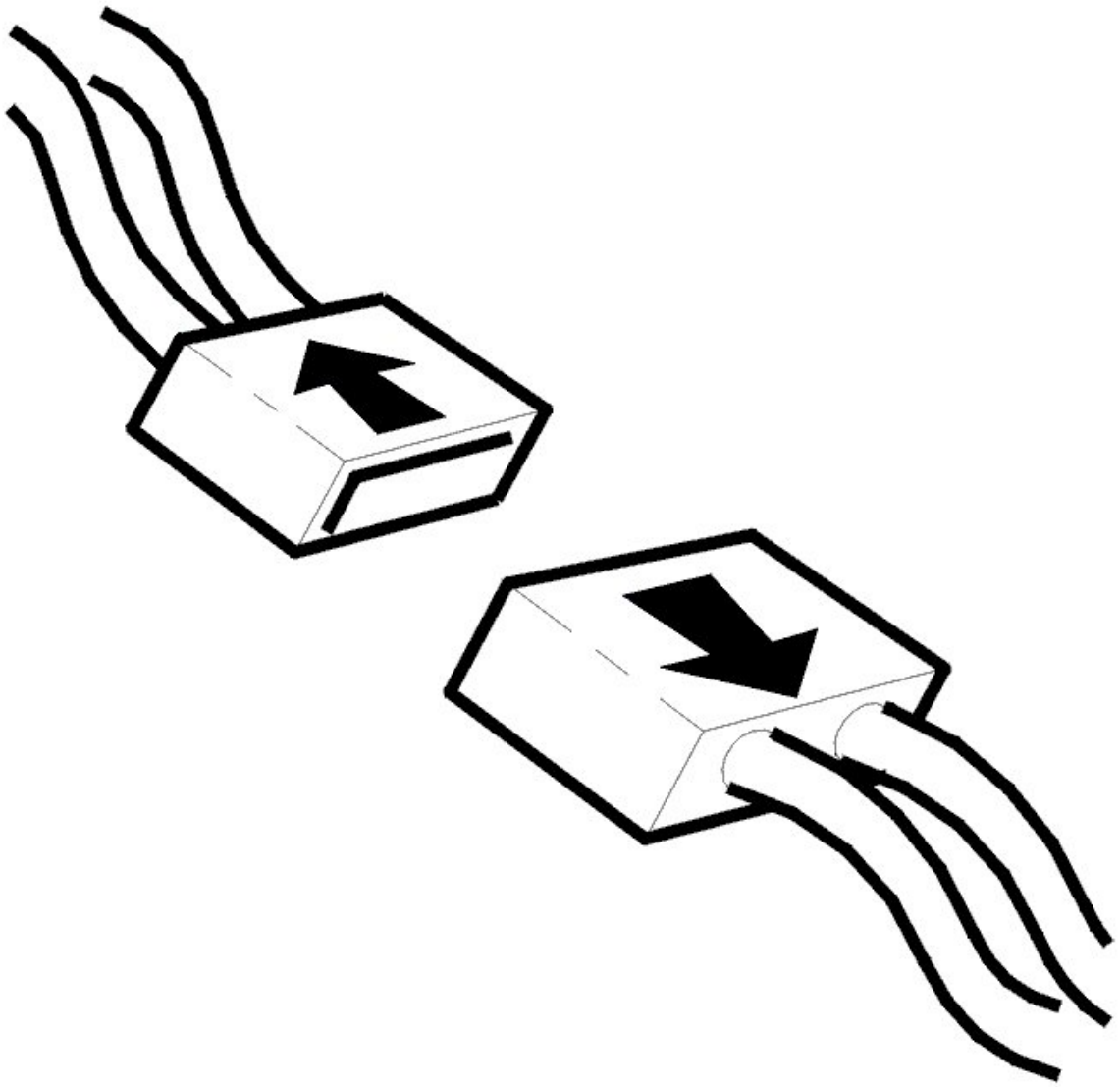
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the left-hand seat.

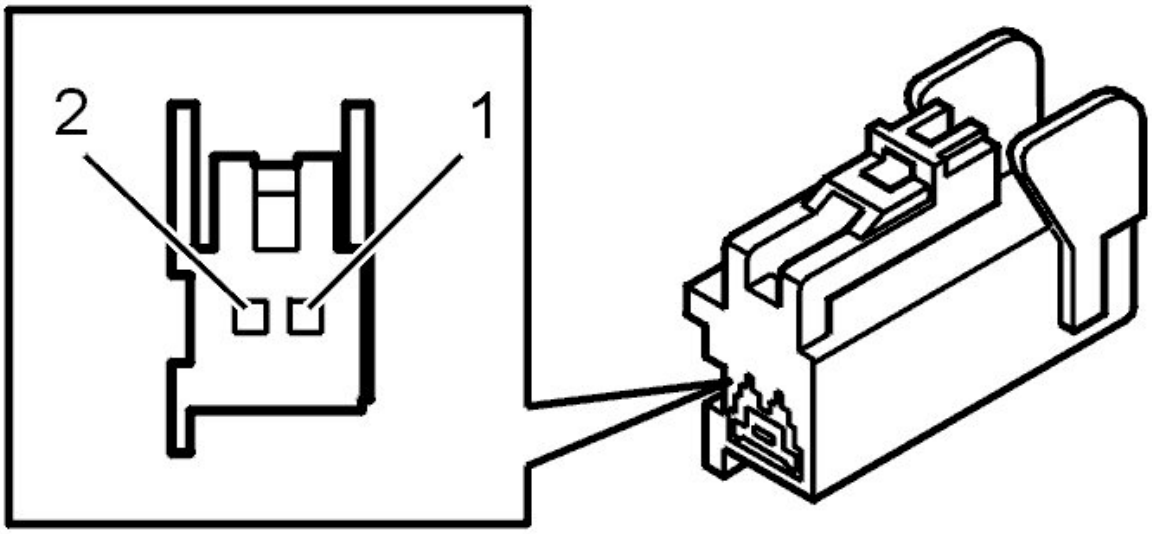
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4A (4) and the 2-pin connector terminal #1 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3A (3) and the 2-pin connector terminal #2 for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

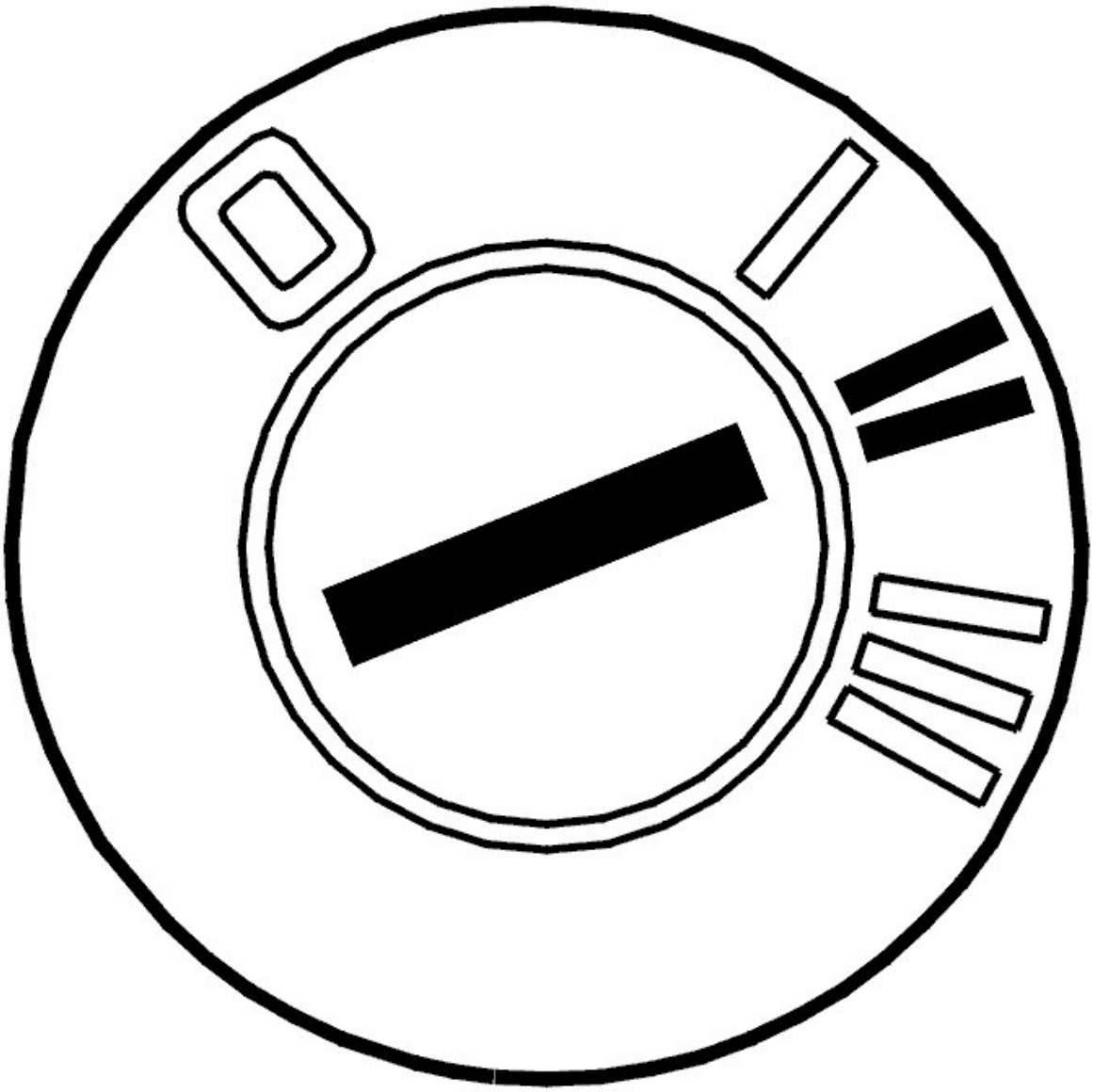
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

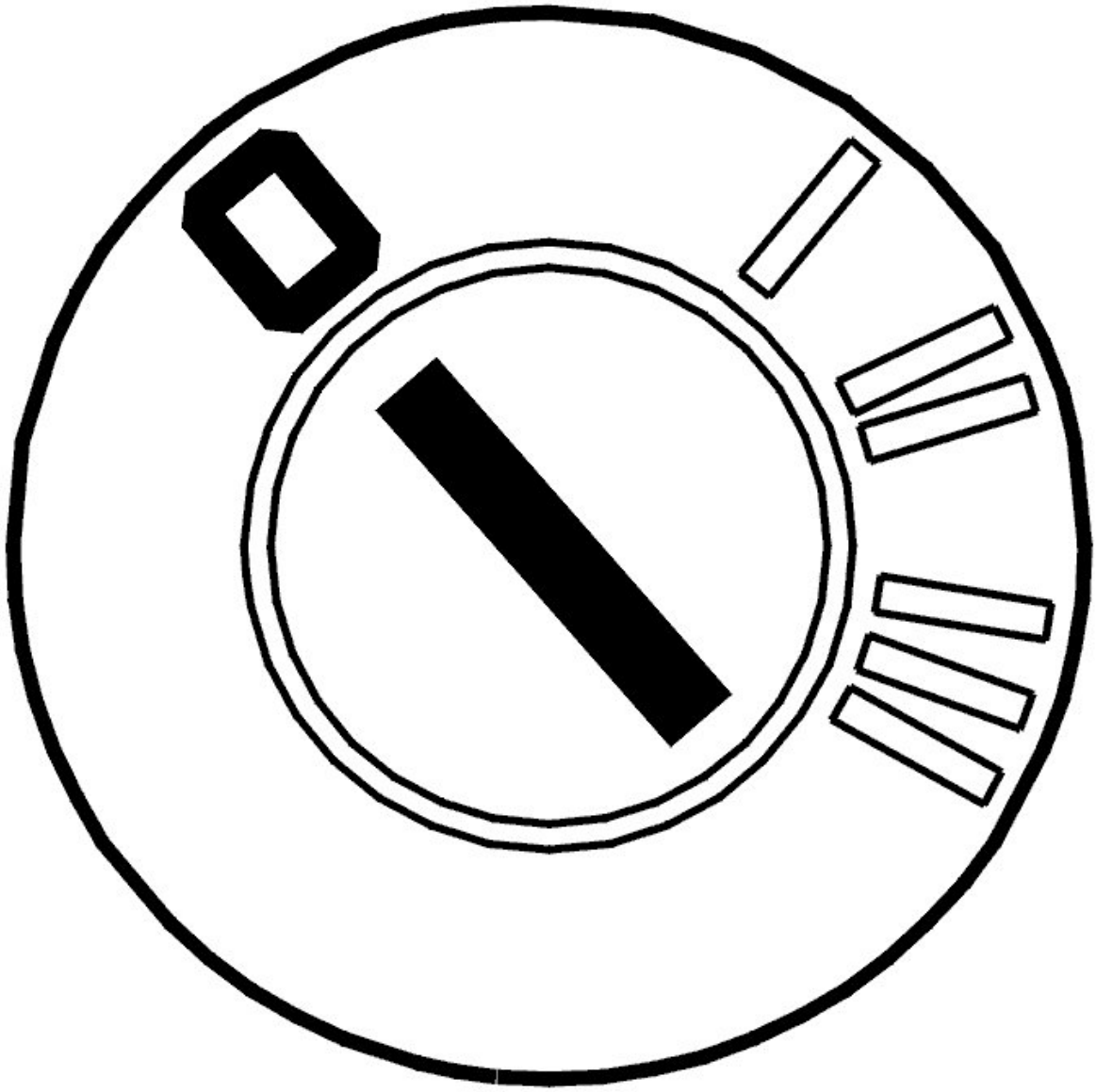
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance



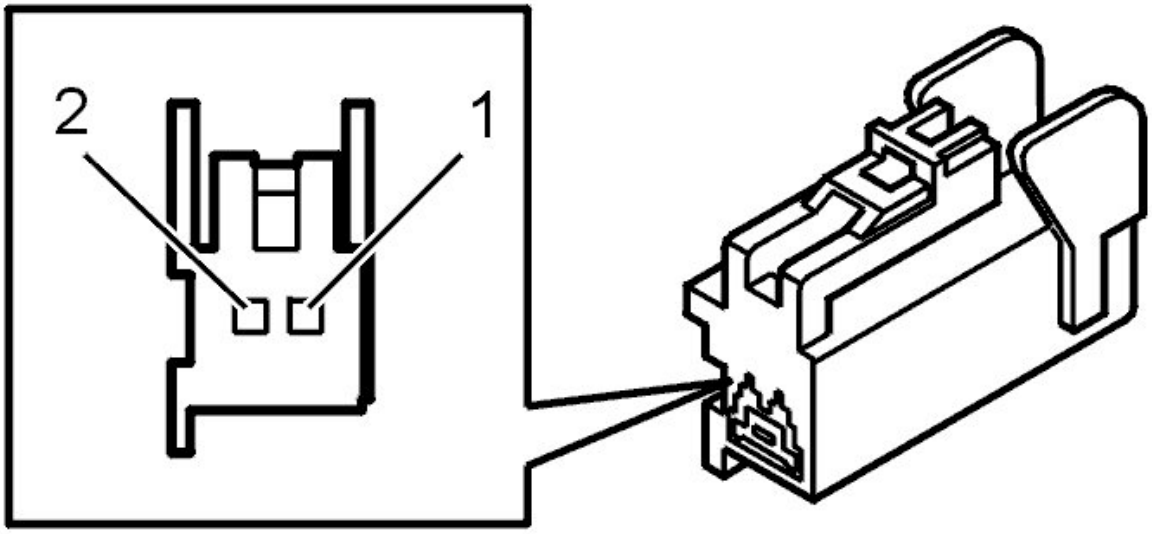
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

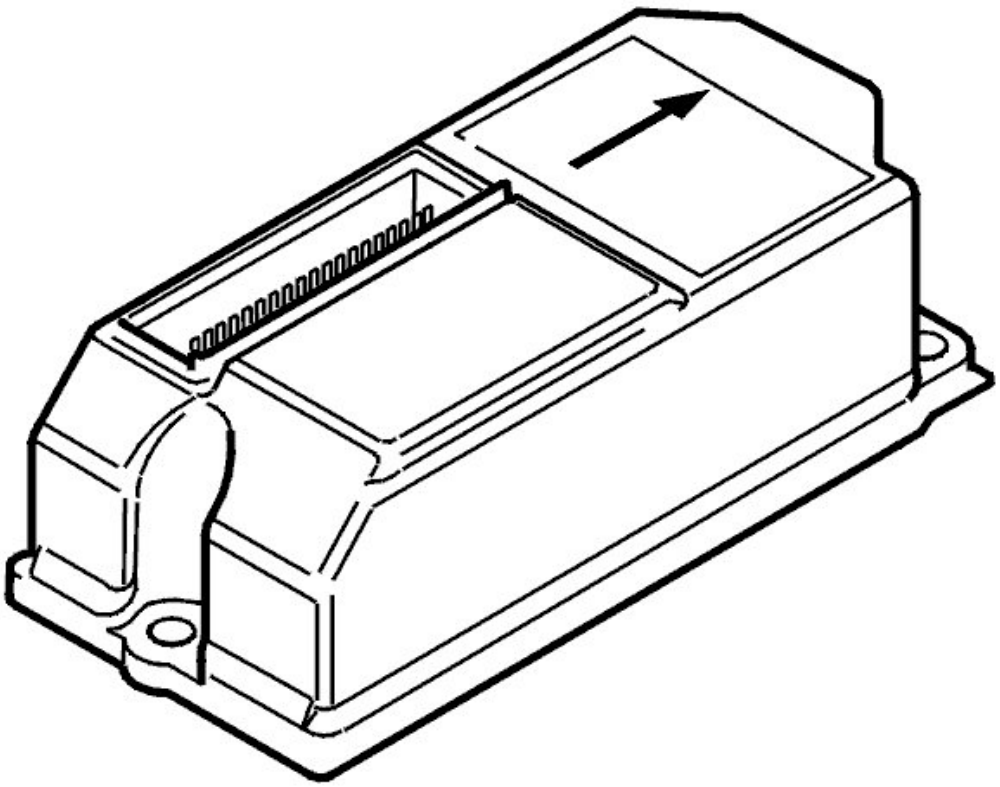
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0036
SRS-003E

SRS-0046
SRS-004E
SRS-0056
SRS-005E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a side impact protection (SIPS) bag is installed, despite the control module being programmed that a side impact protection (SIPS) bag is not installed.

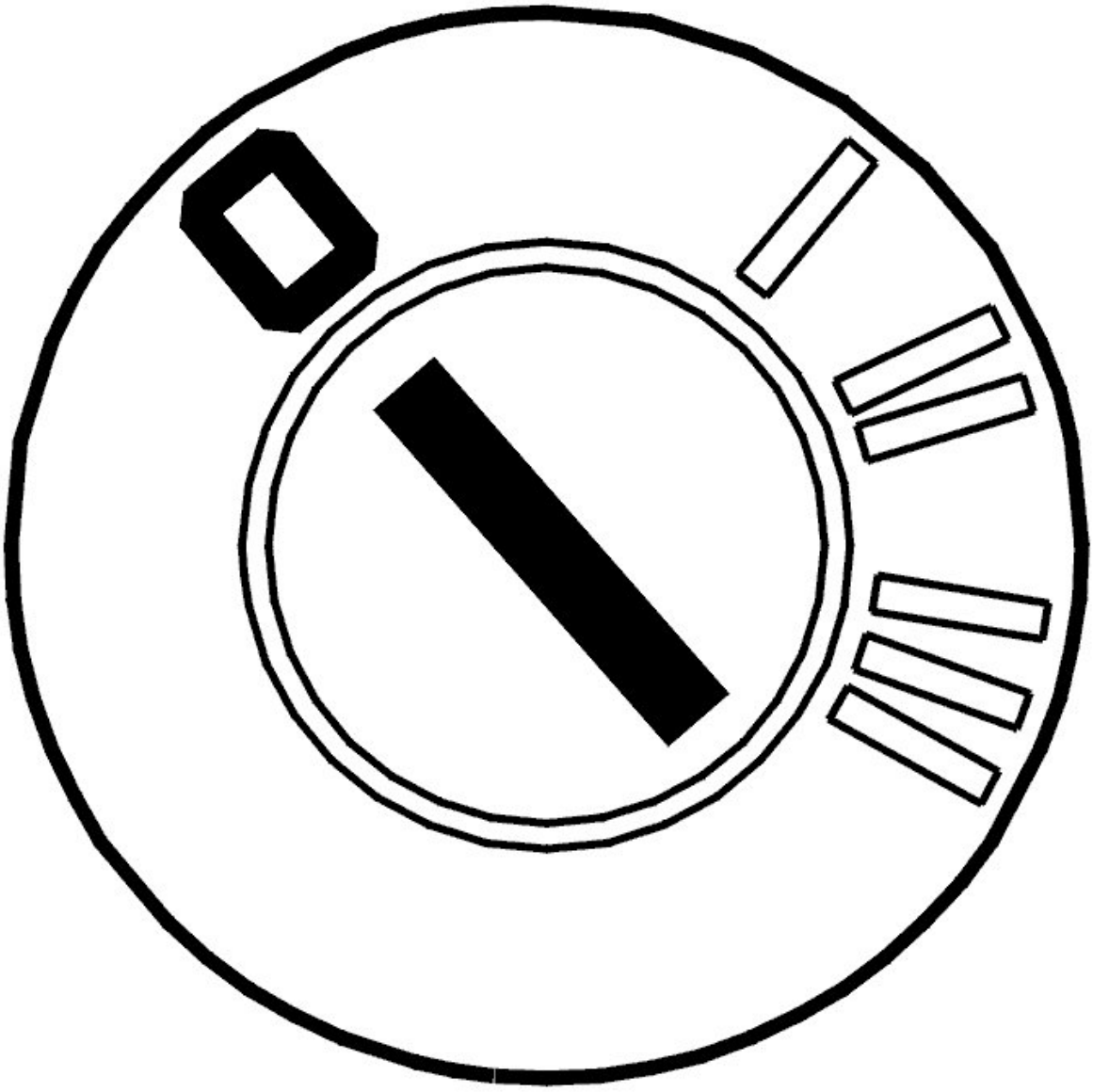
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

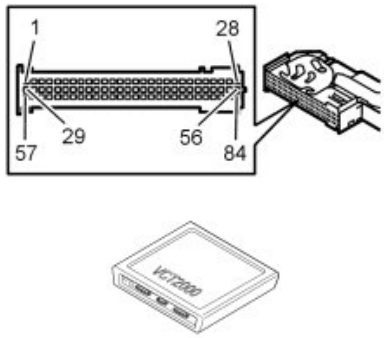


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

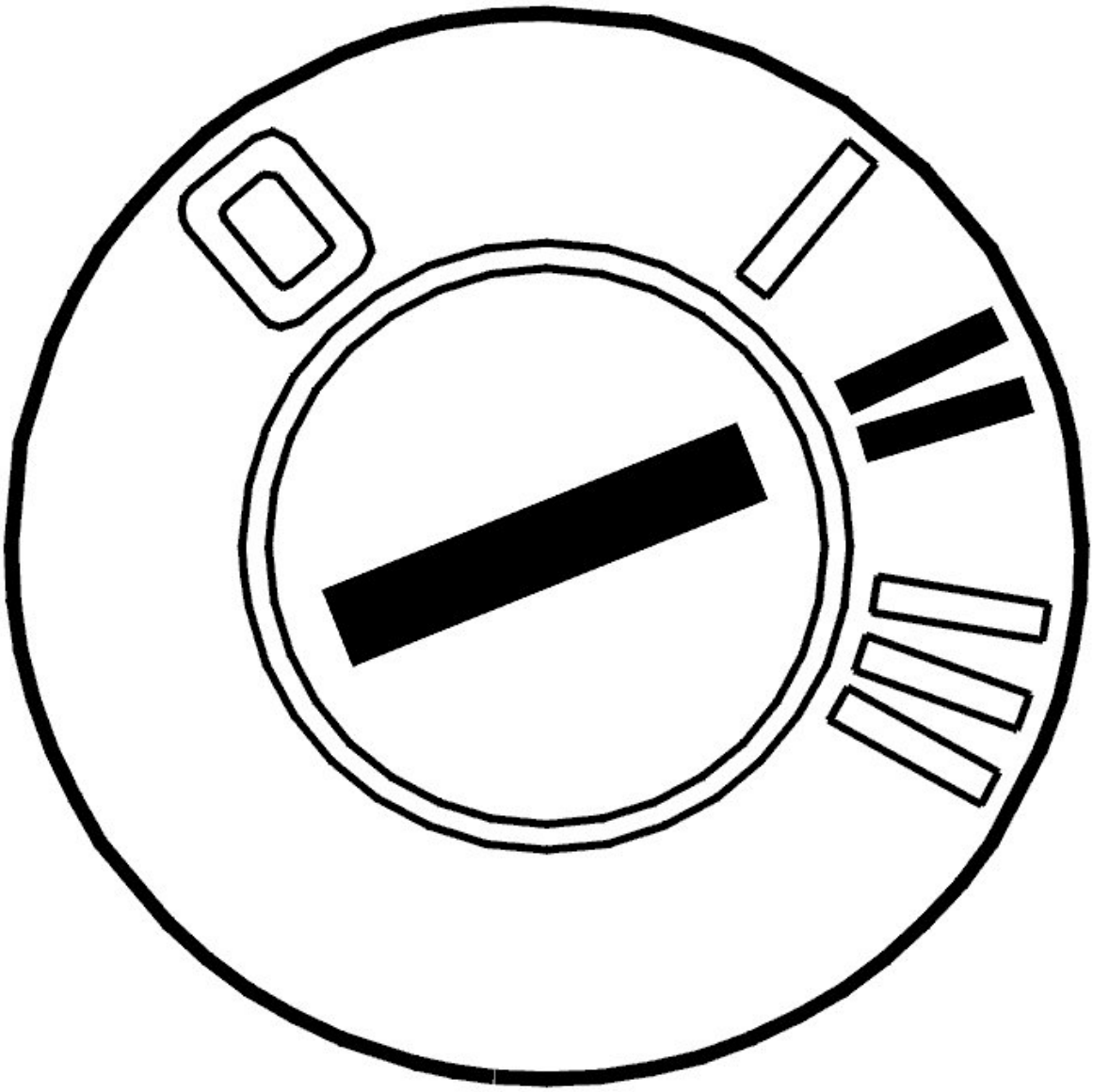
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

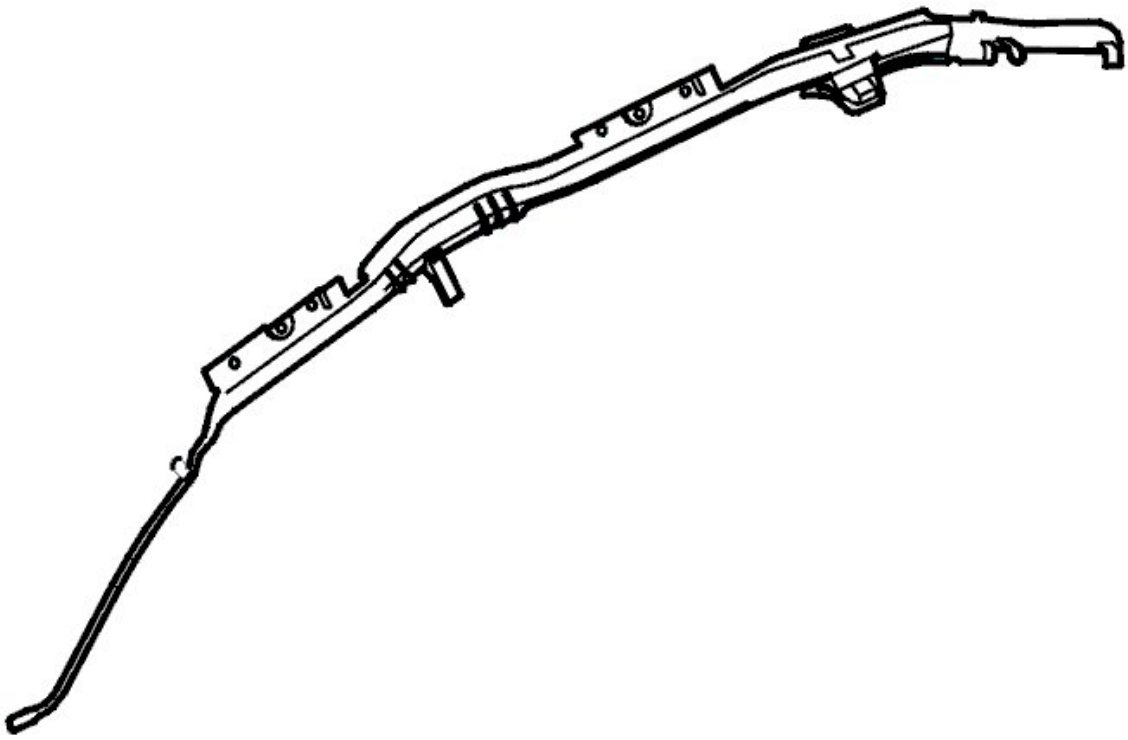
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

SRS-0038 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0038 is displayed.

Substitute value
- Nothing.

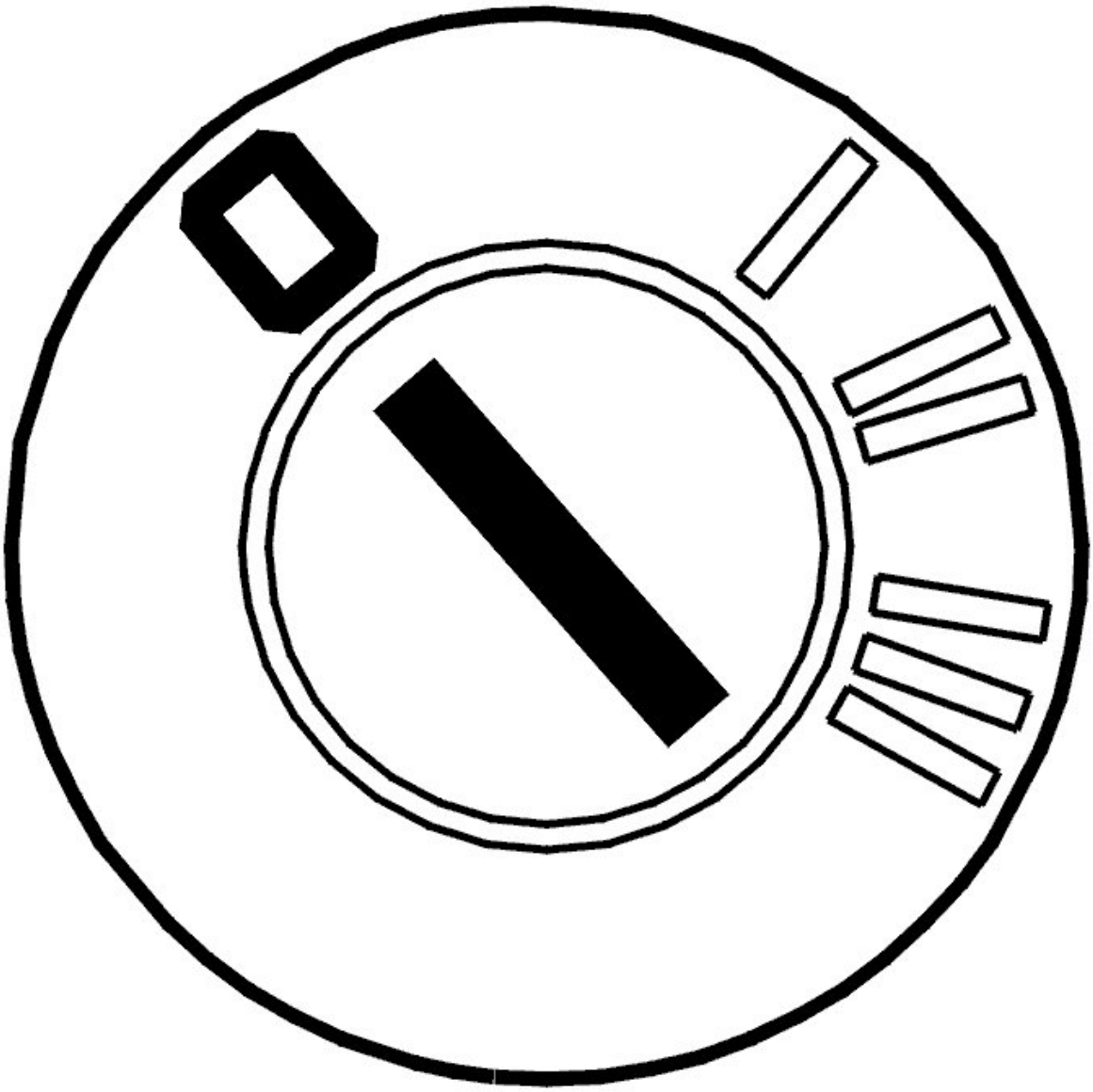
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in inflatable curtain.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

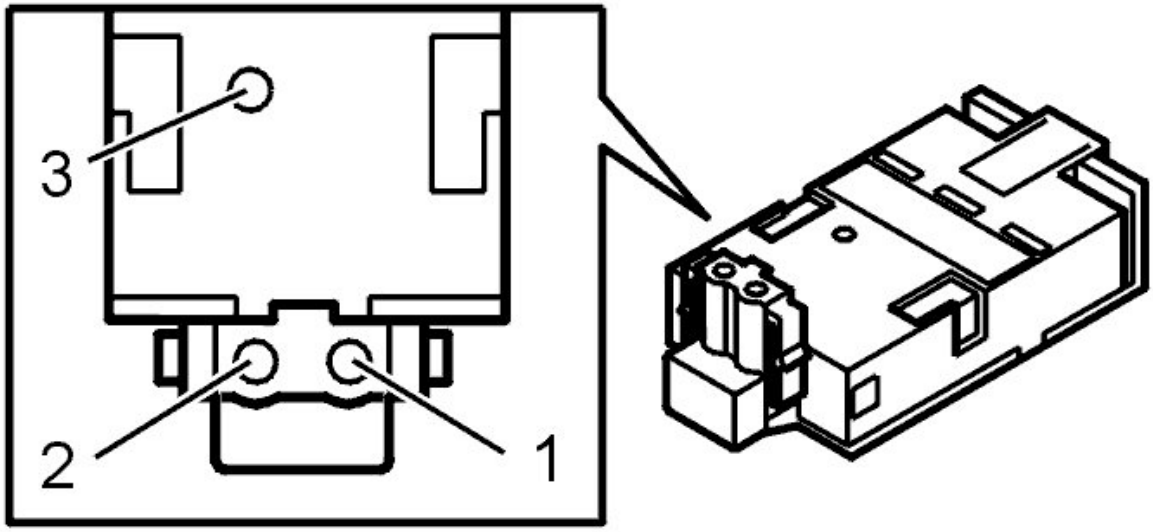
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between the SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

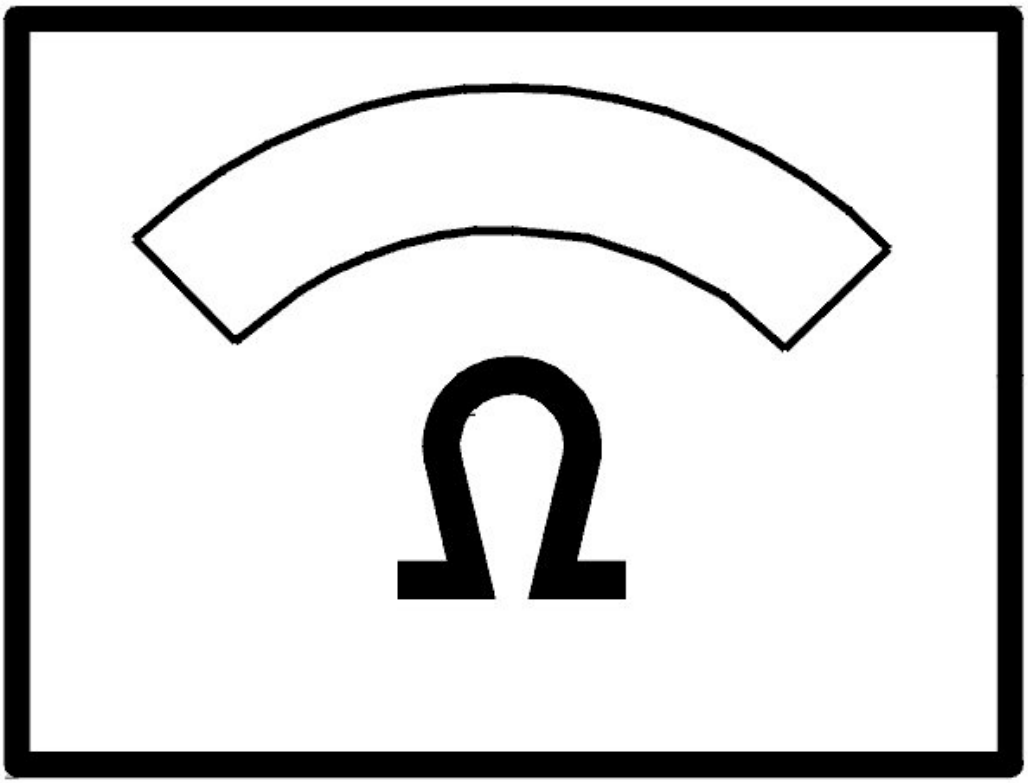
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (SRS control module side) and the disconnected battery terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

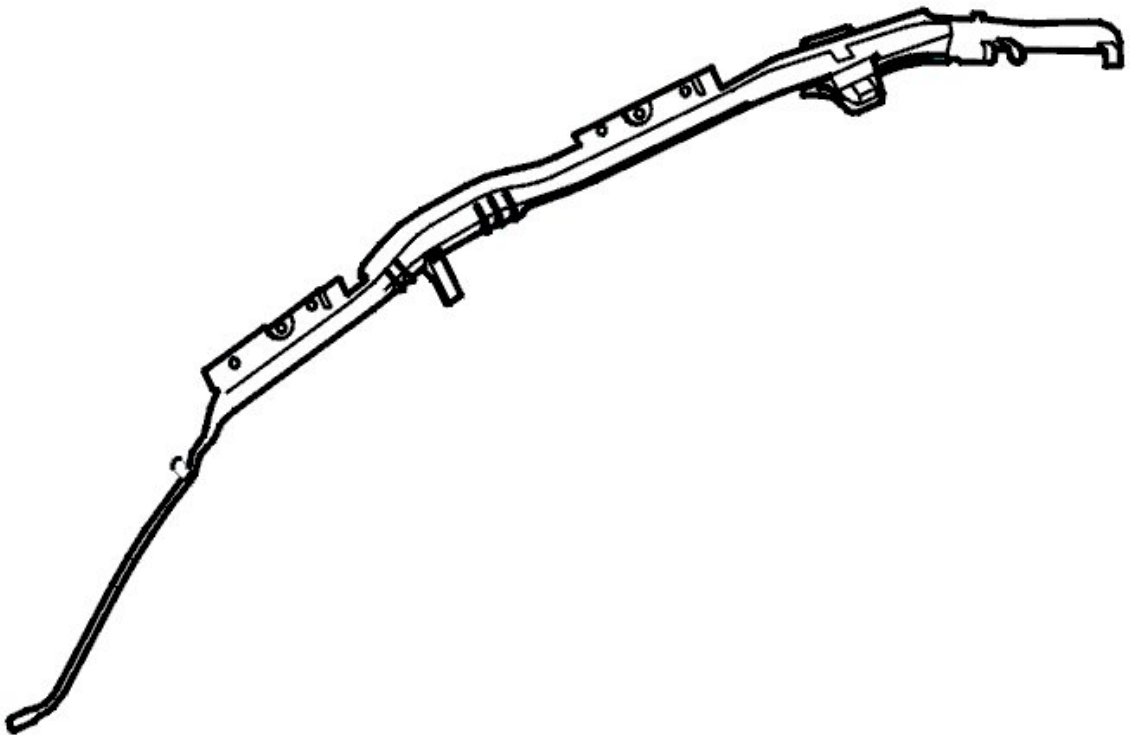
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0038 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0038 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to voltage supply in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in inflatable curtain.

Fault symptom[s]

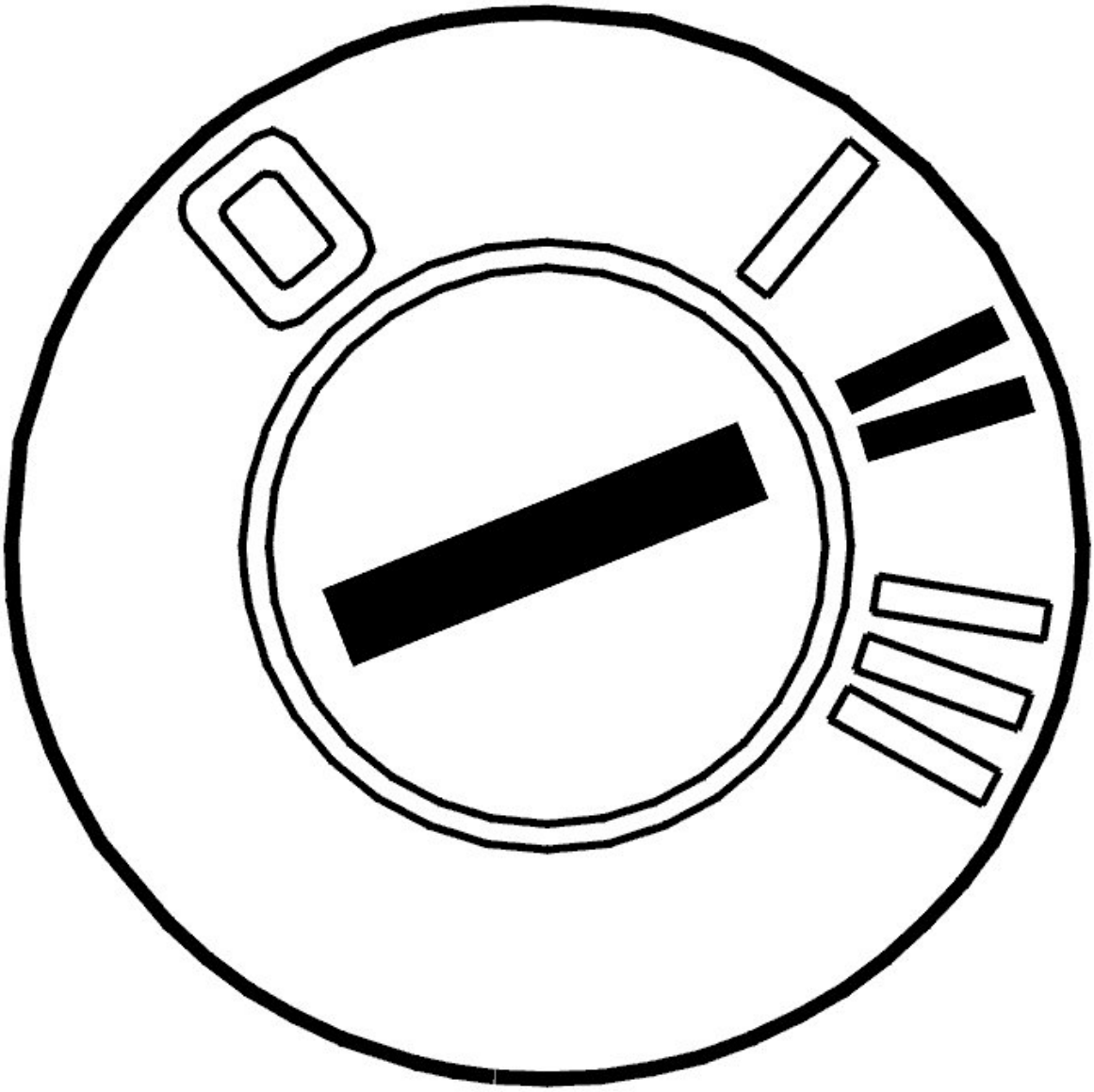
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

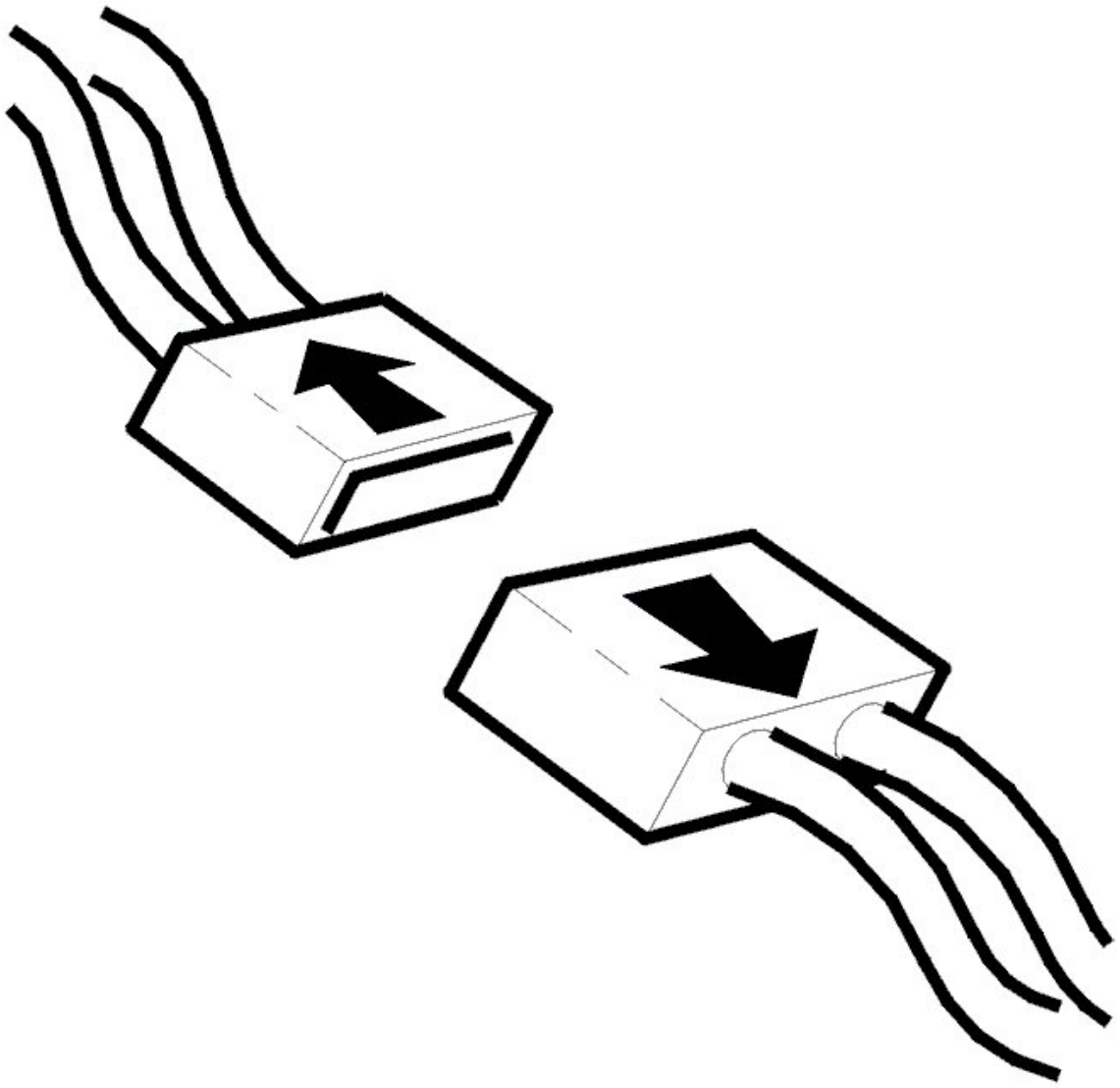
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

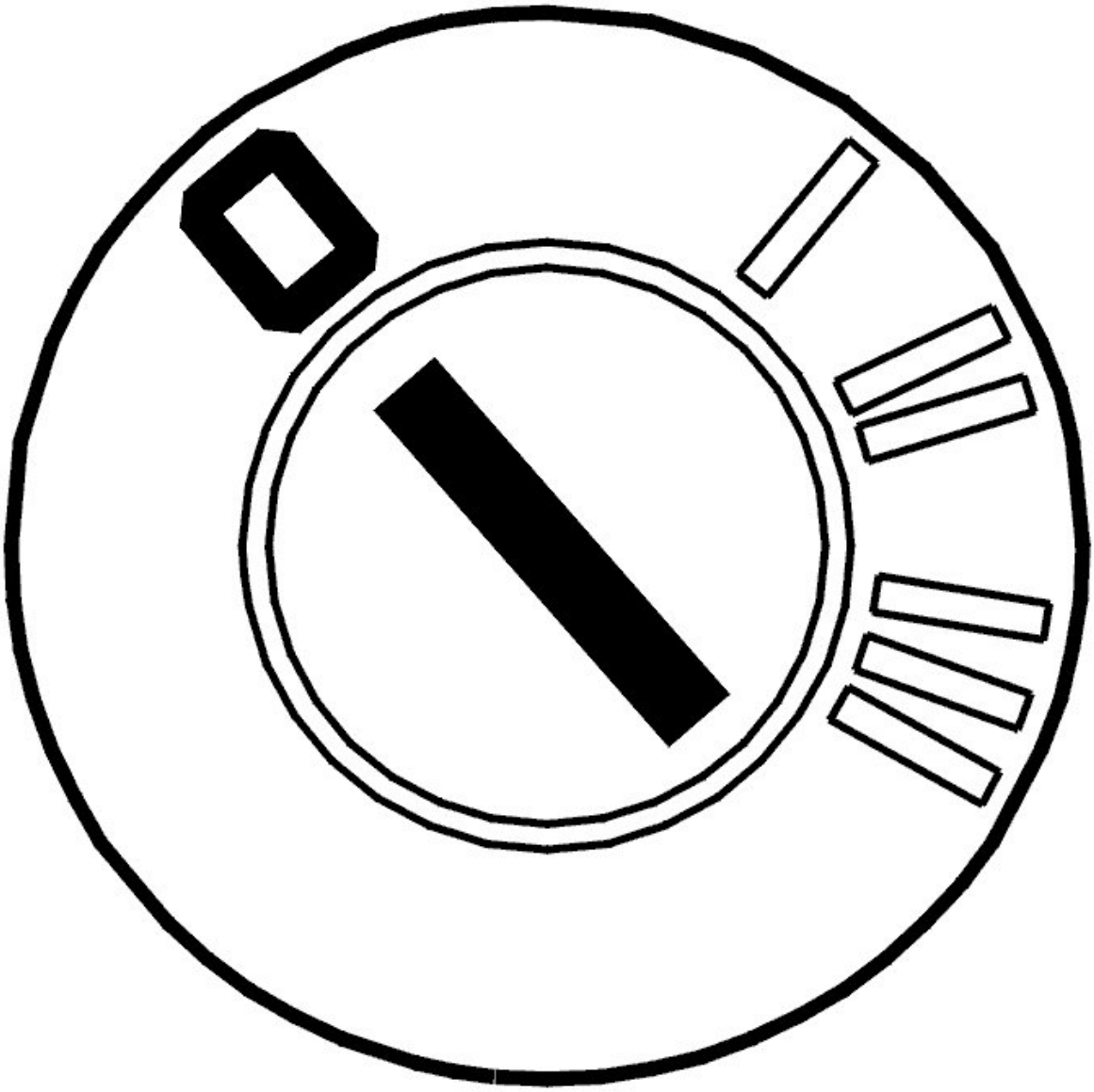
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

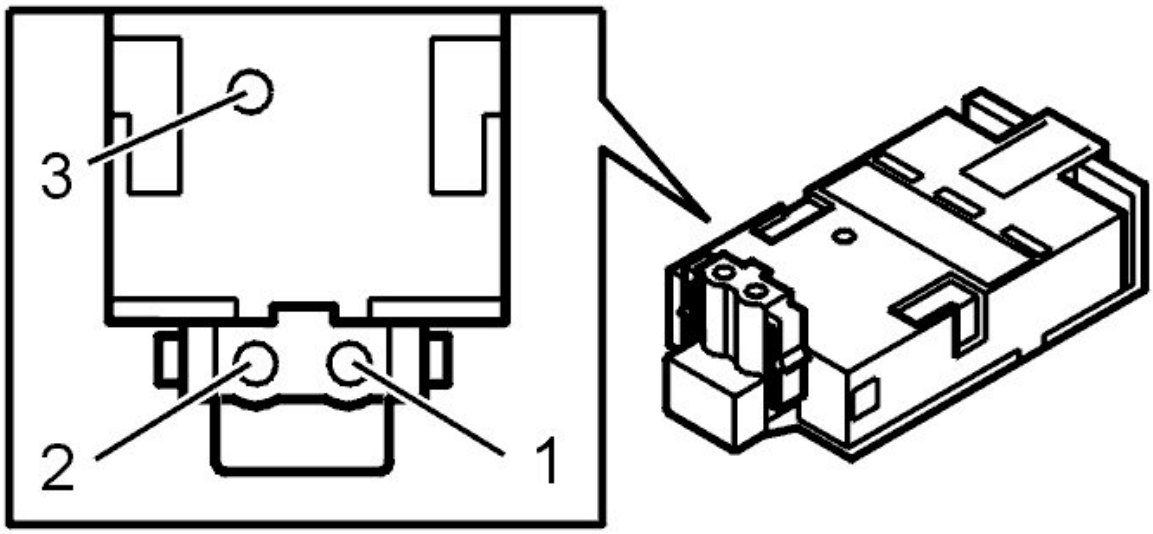
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

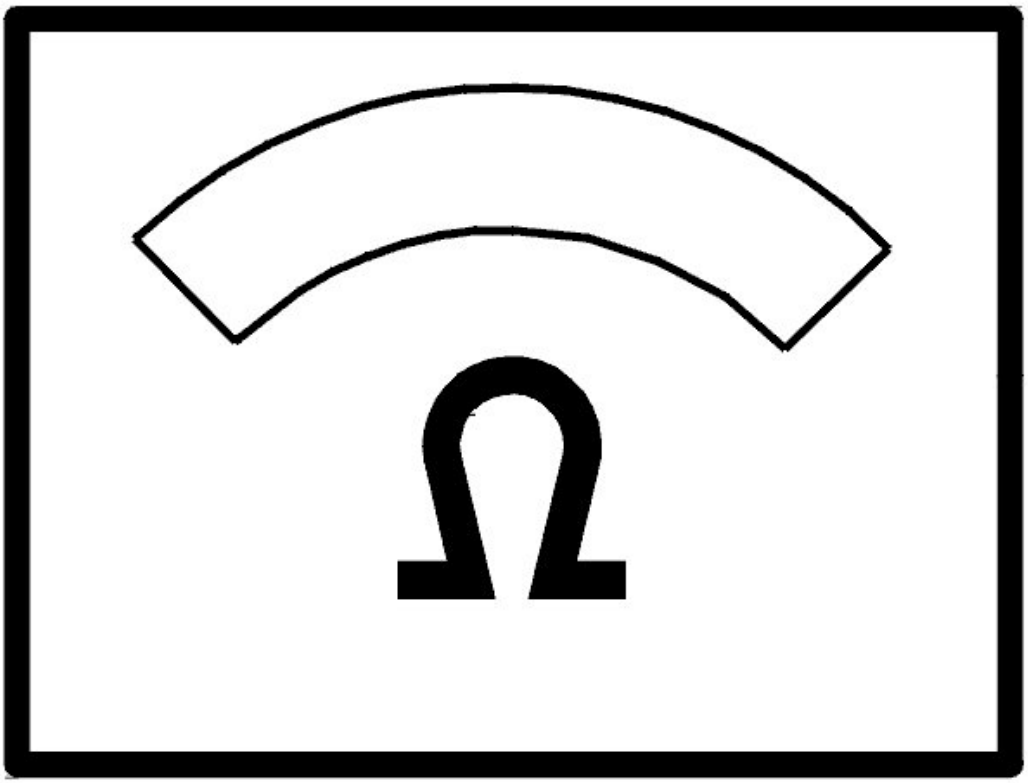
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance

between terminals #1 and #3 on the inflatable curtain connector (SRS control module side) and the battery positive terminal should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

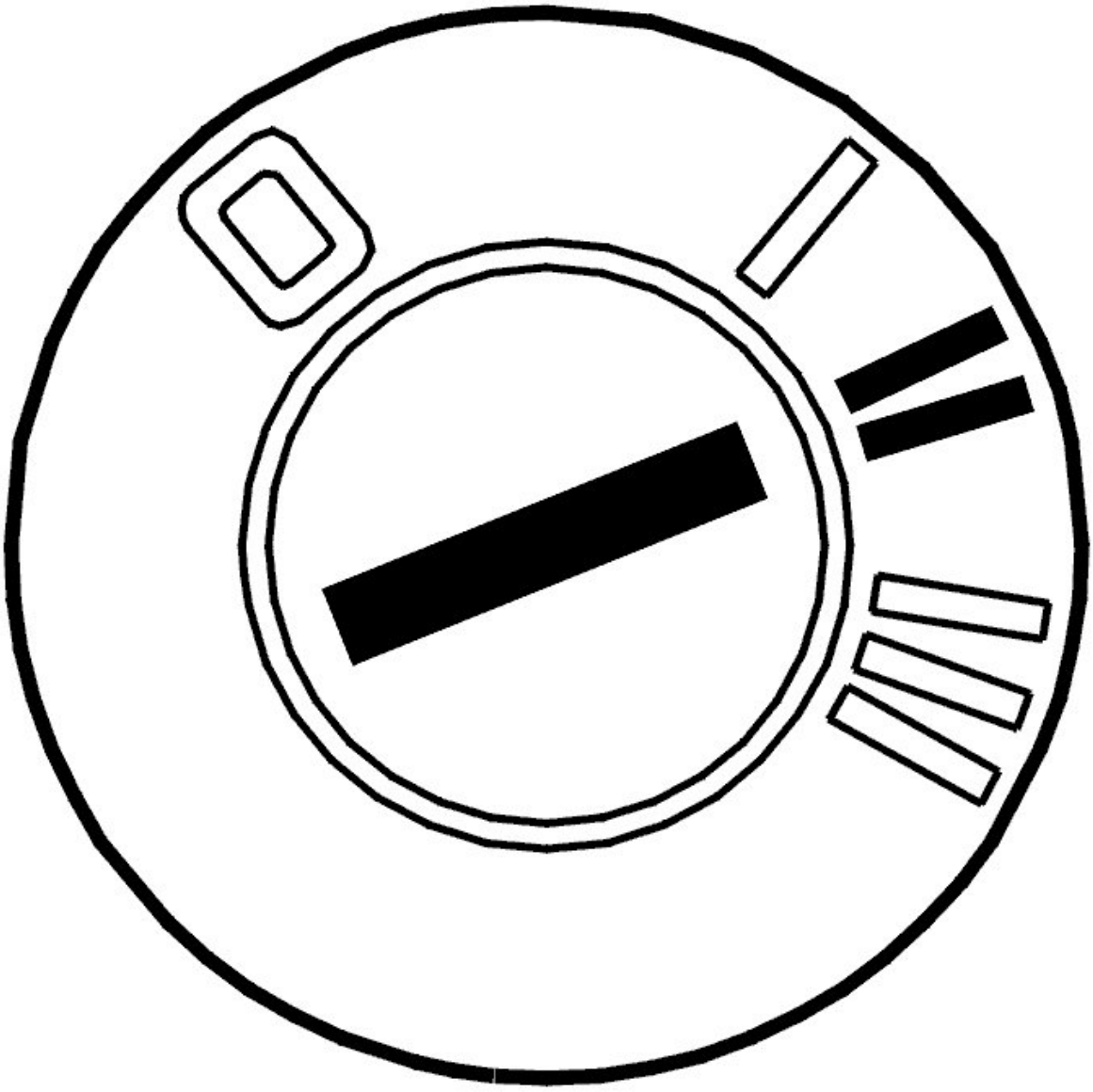
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

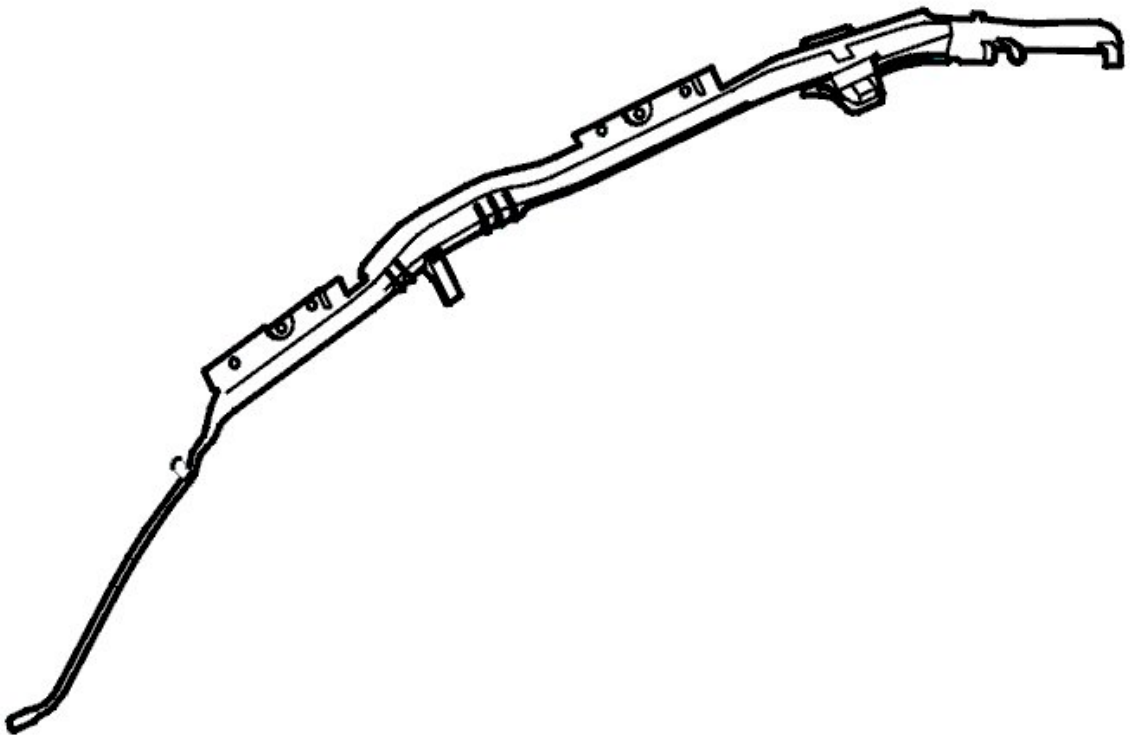
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0039 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0039 is displayed.

Substitute value
- Nothing.

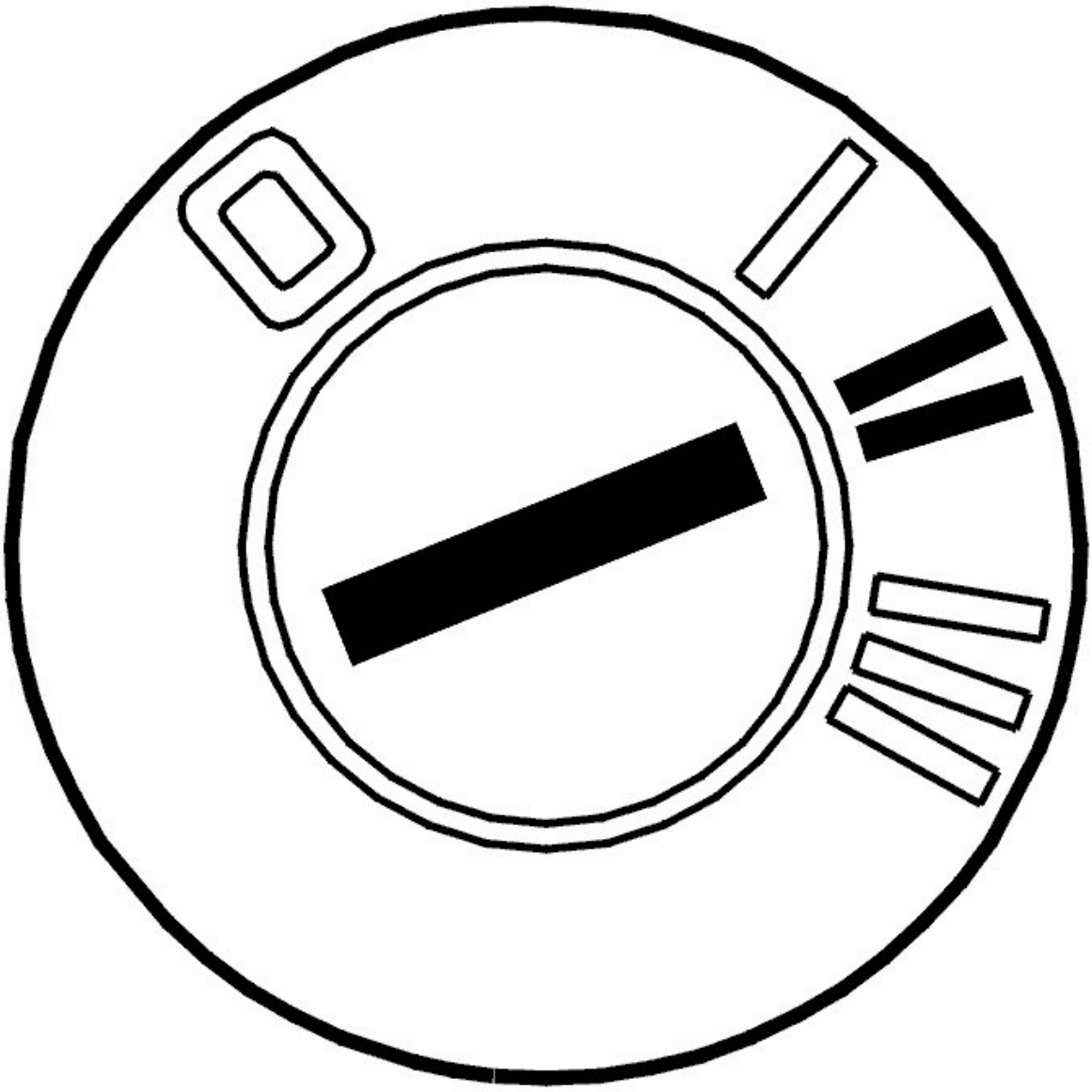
Possible source
- Short circuit to ground in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to ground in inflatable curtain.

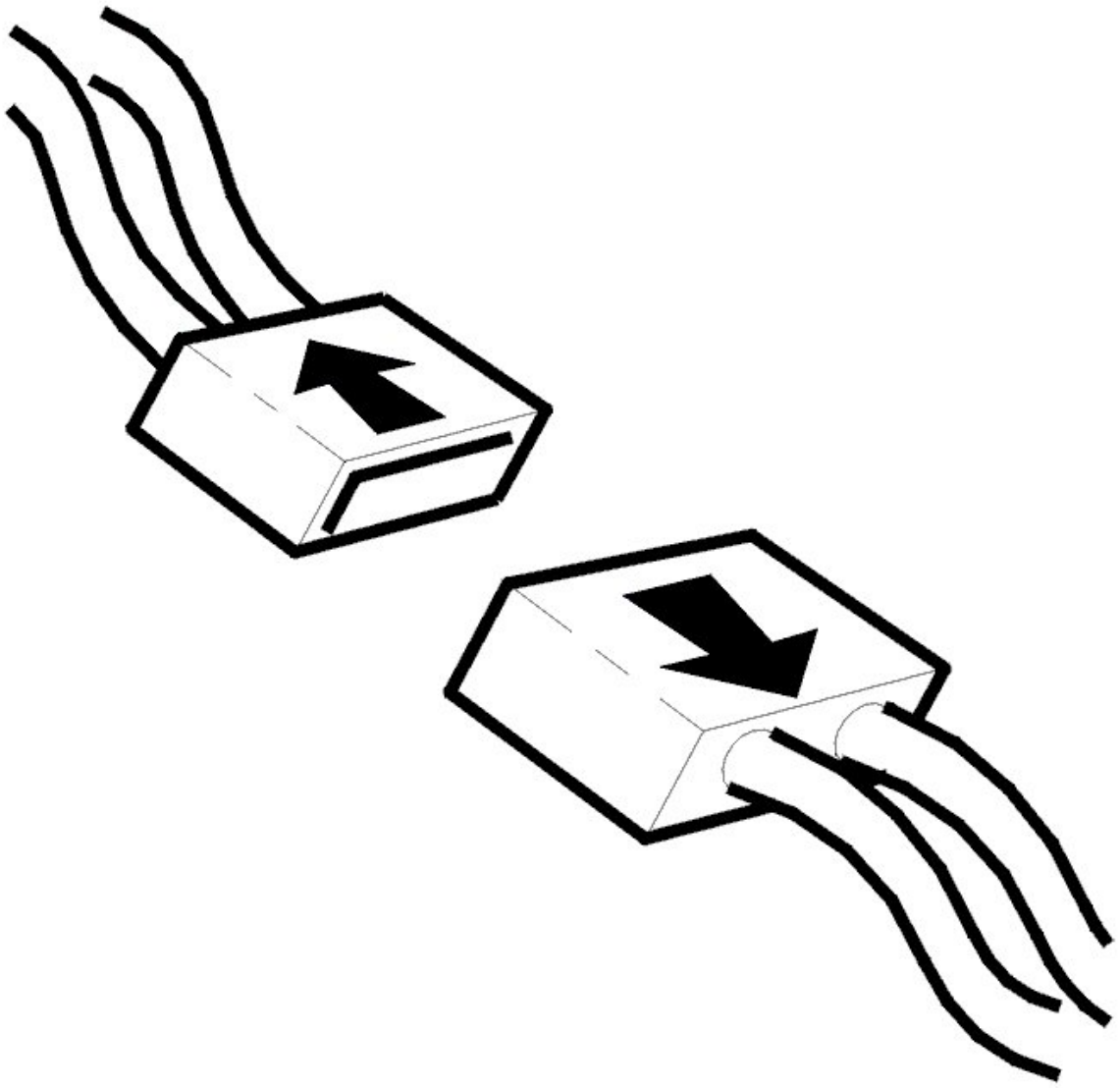
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the diagnostic trouble code (DTC) changes status from a permanent fault to an intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

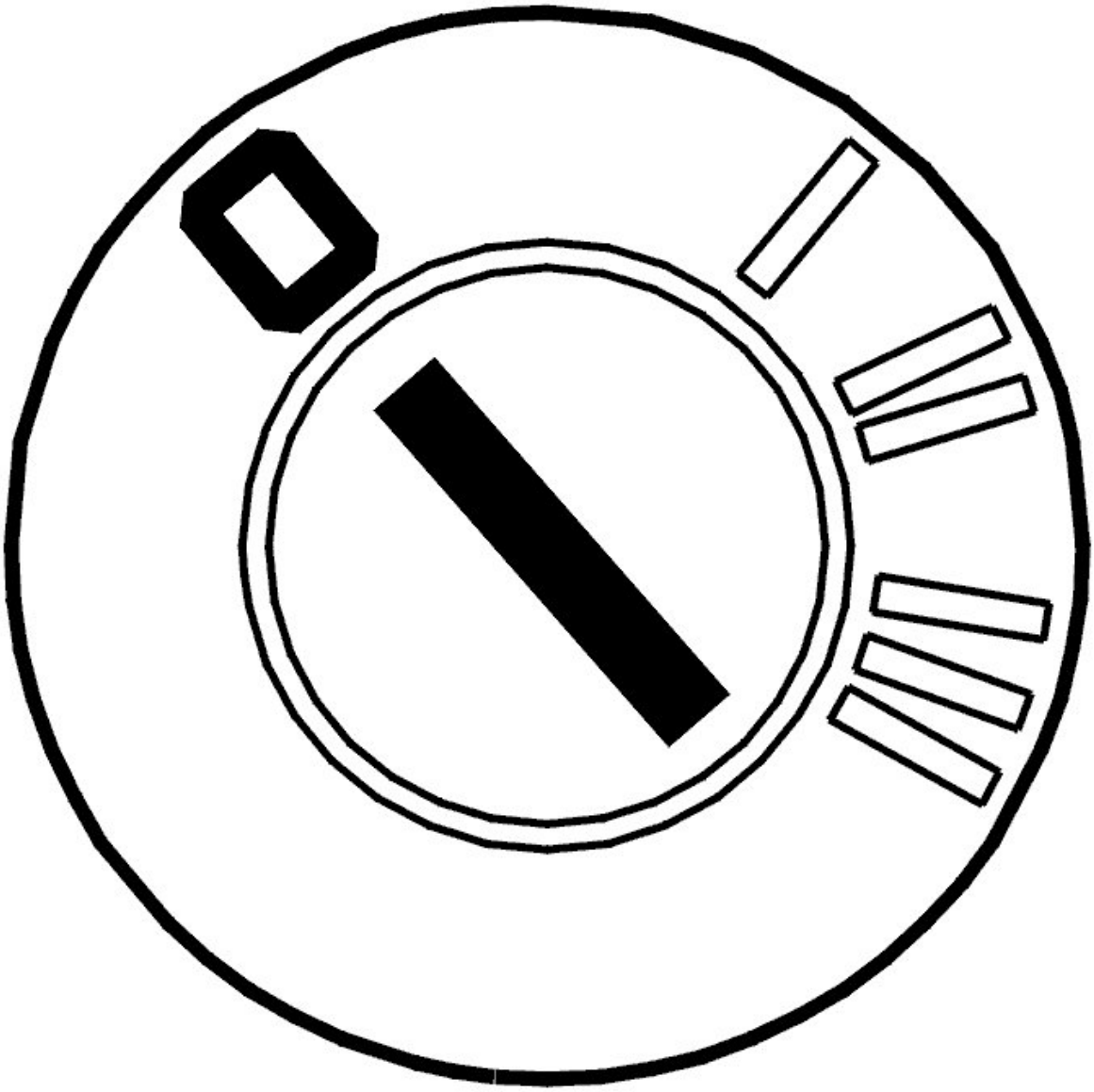
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

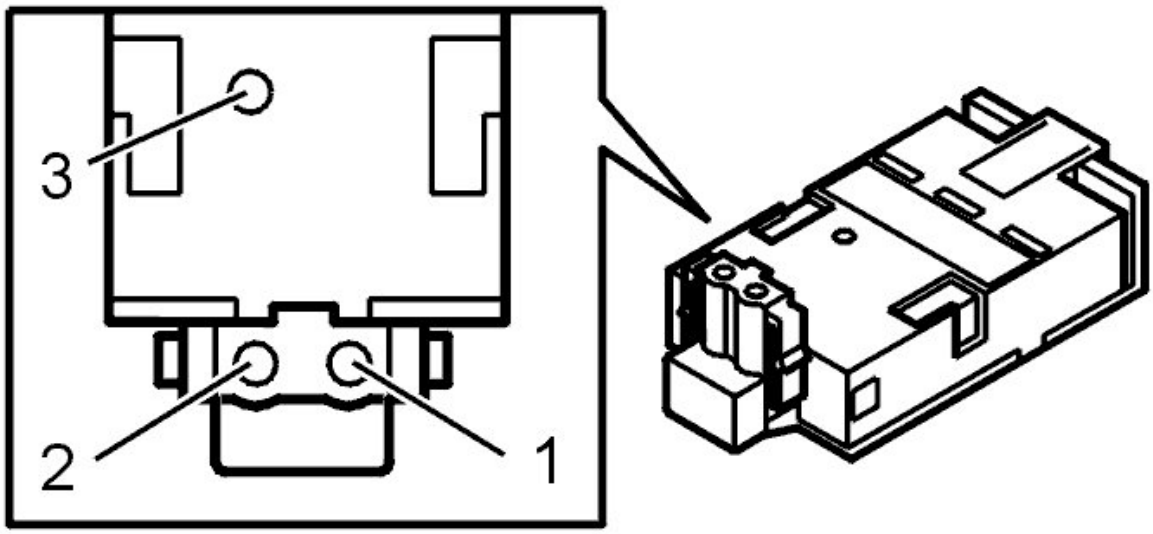
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

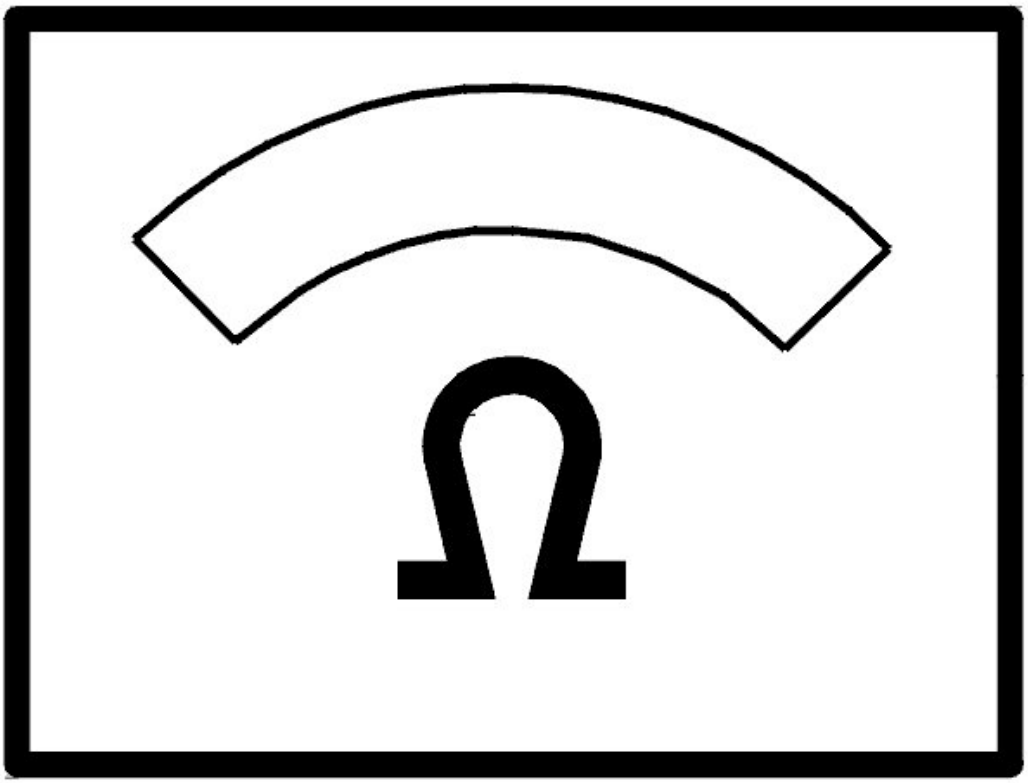
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance

between the inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

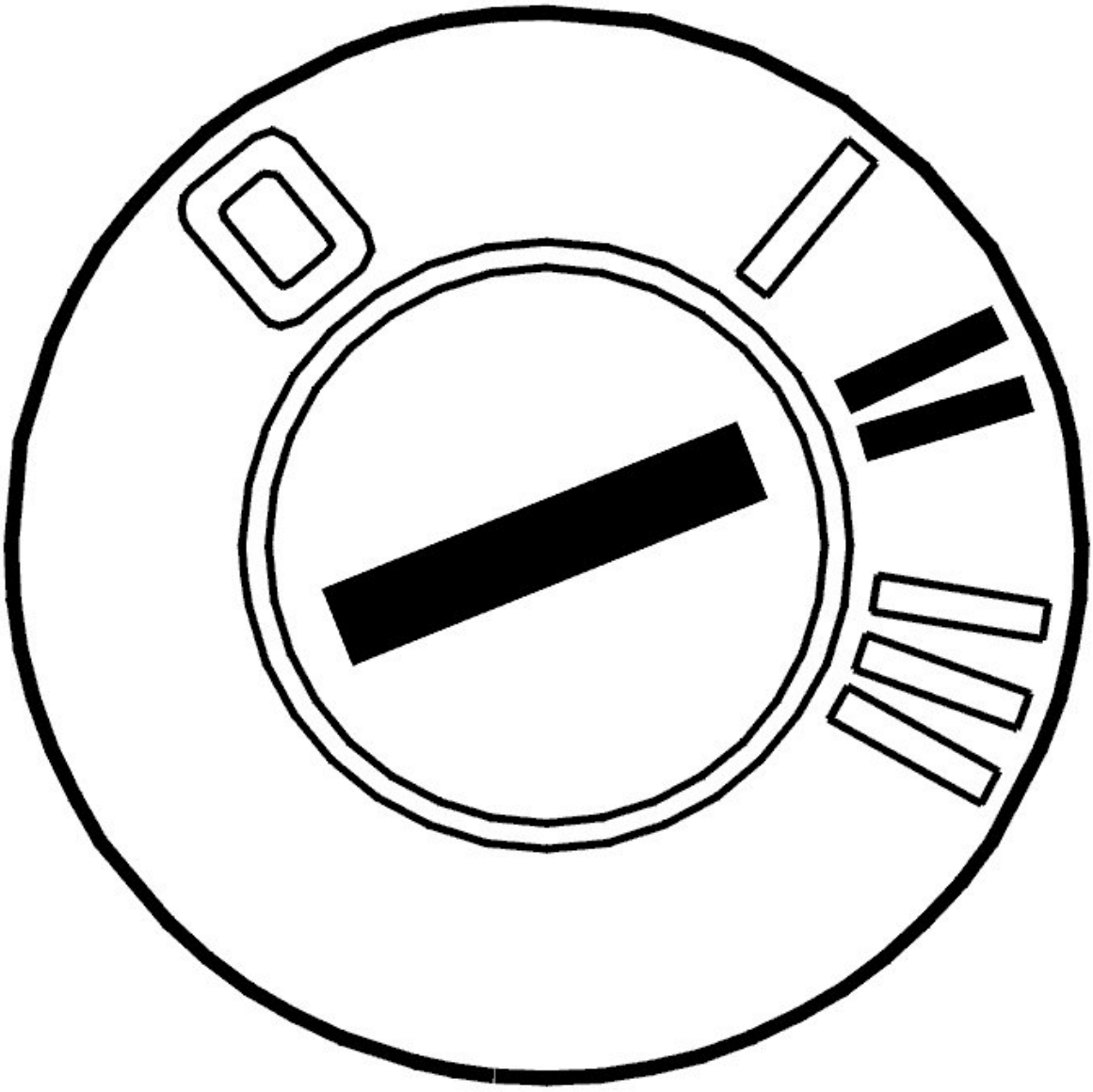
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

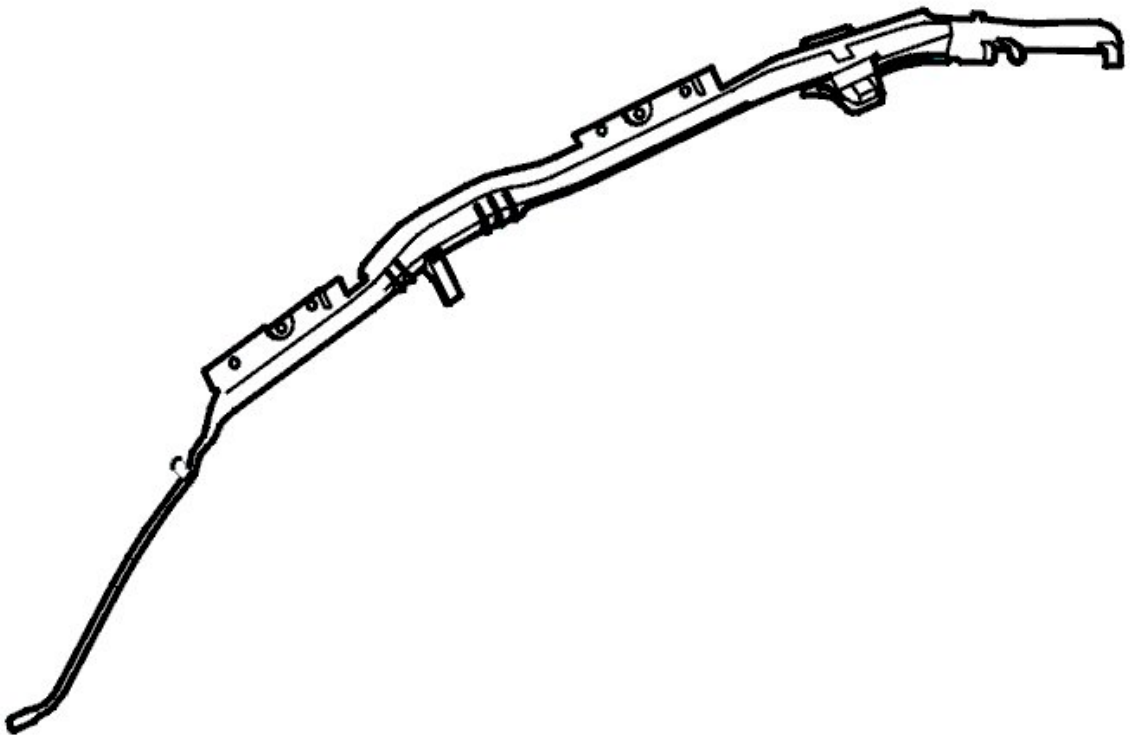
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0039 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0039 is displayed.

Substitute value
- Nothing.

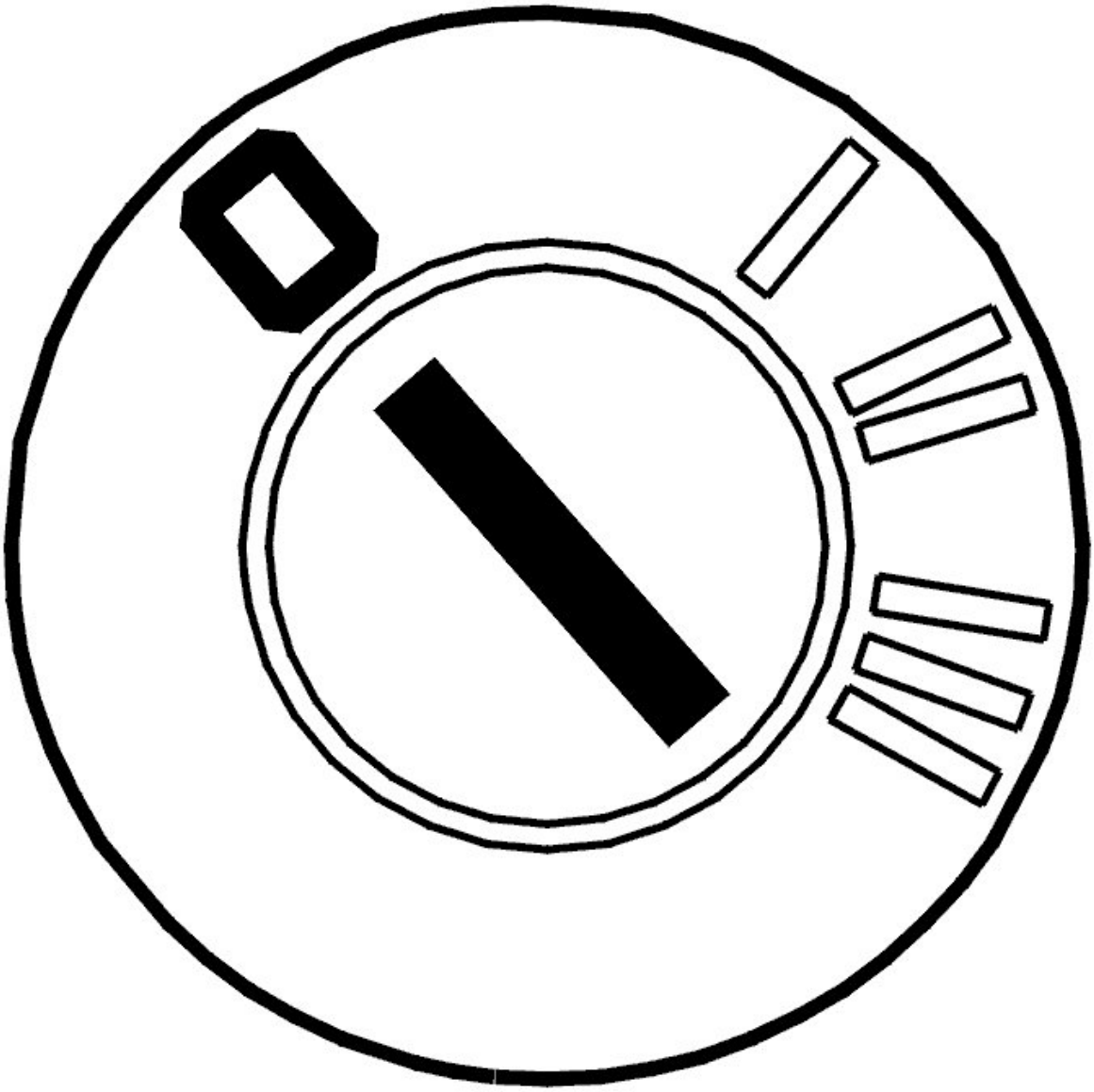
Possible source
- Short circuit to ground in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to ground in inflatable curtain.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

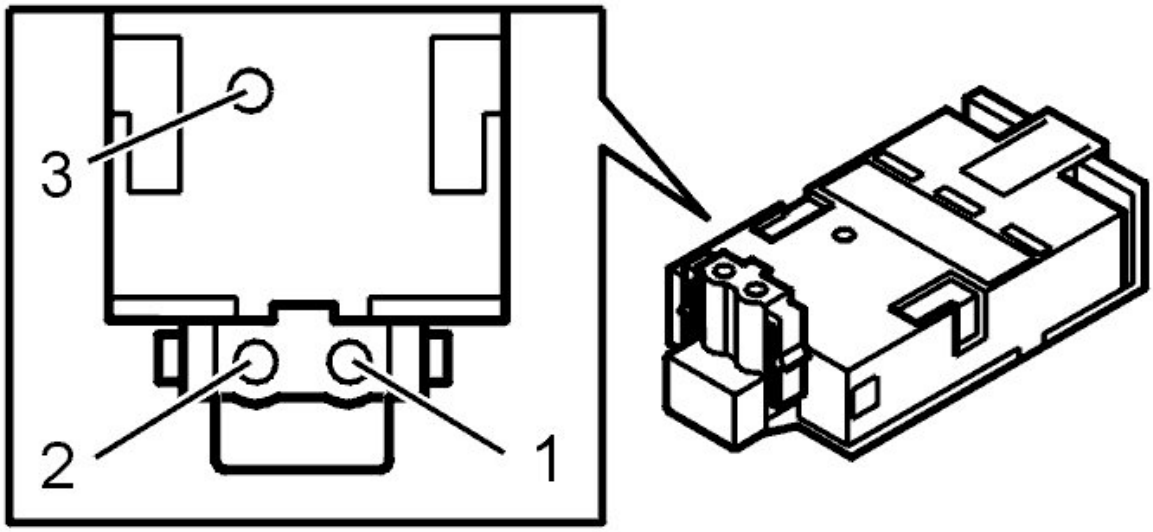
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

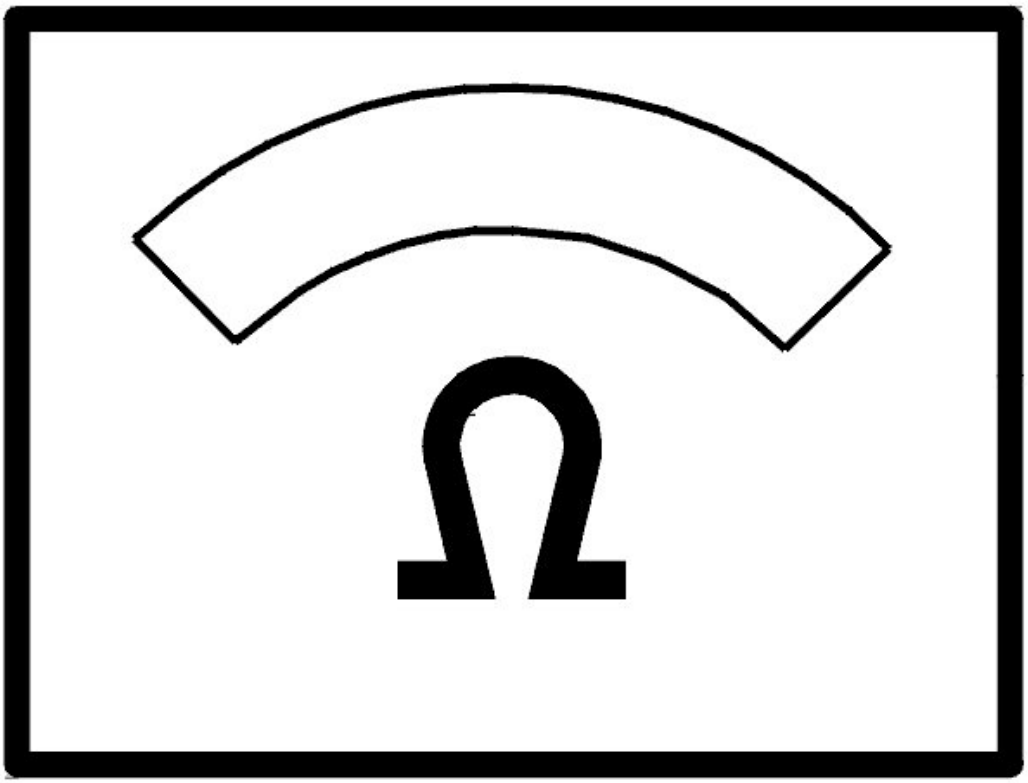
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between the SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable

curtain for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

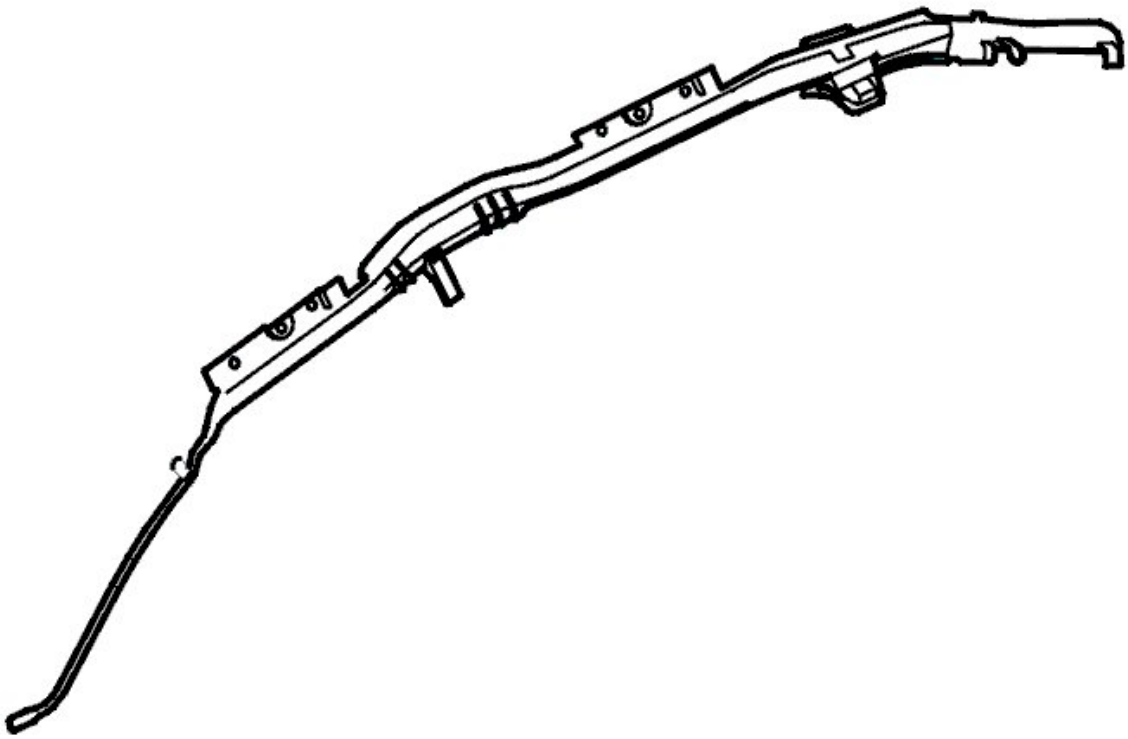
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-003A Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the capacitance in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-003A is displayed.

Substitute value
- Nothing.

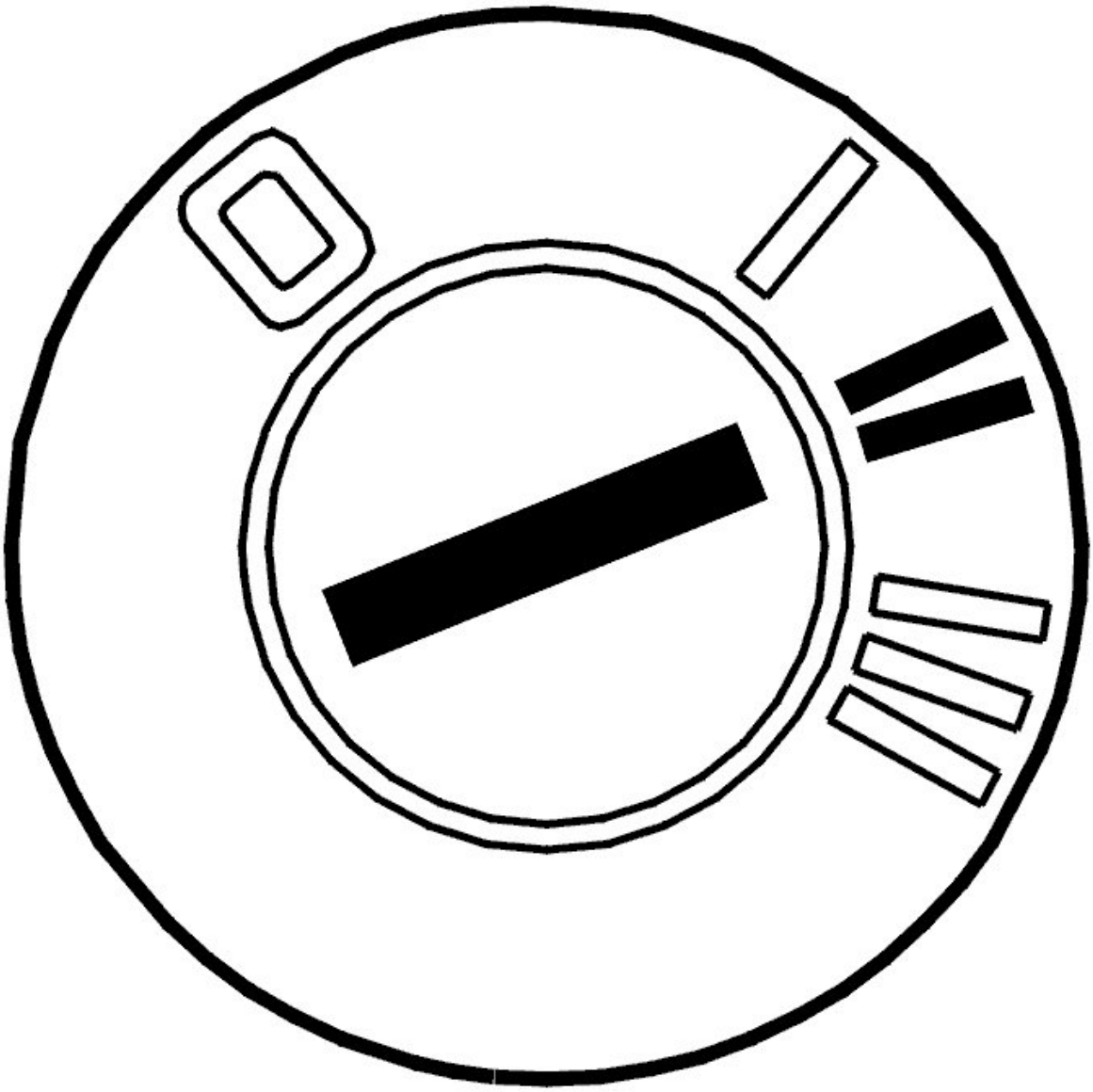
Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

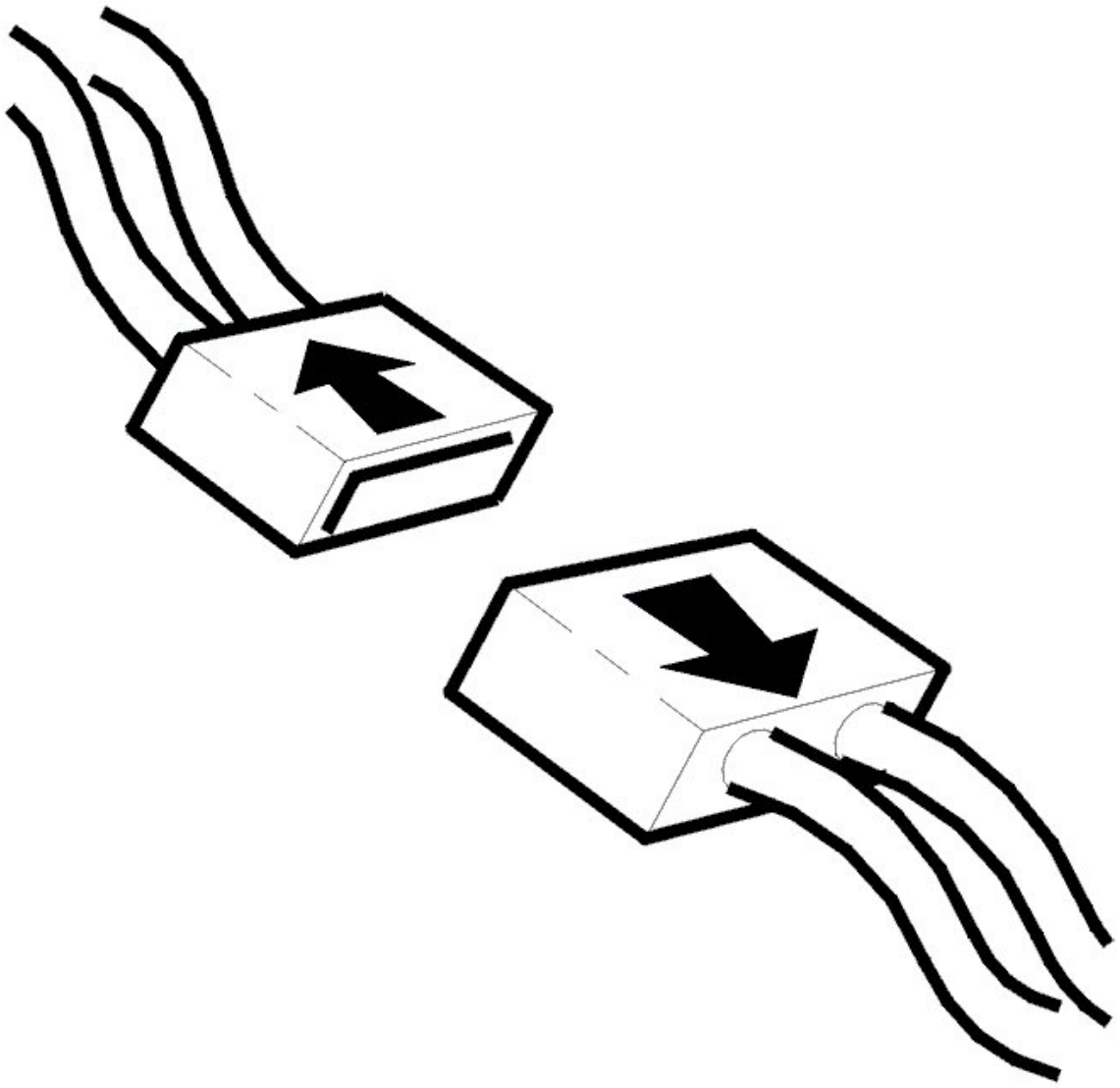
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the diagnostic trouble code (DTC) changes status from a permanent fault to an intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

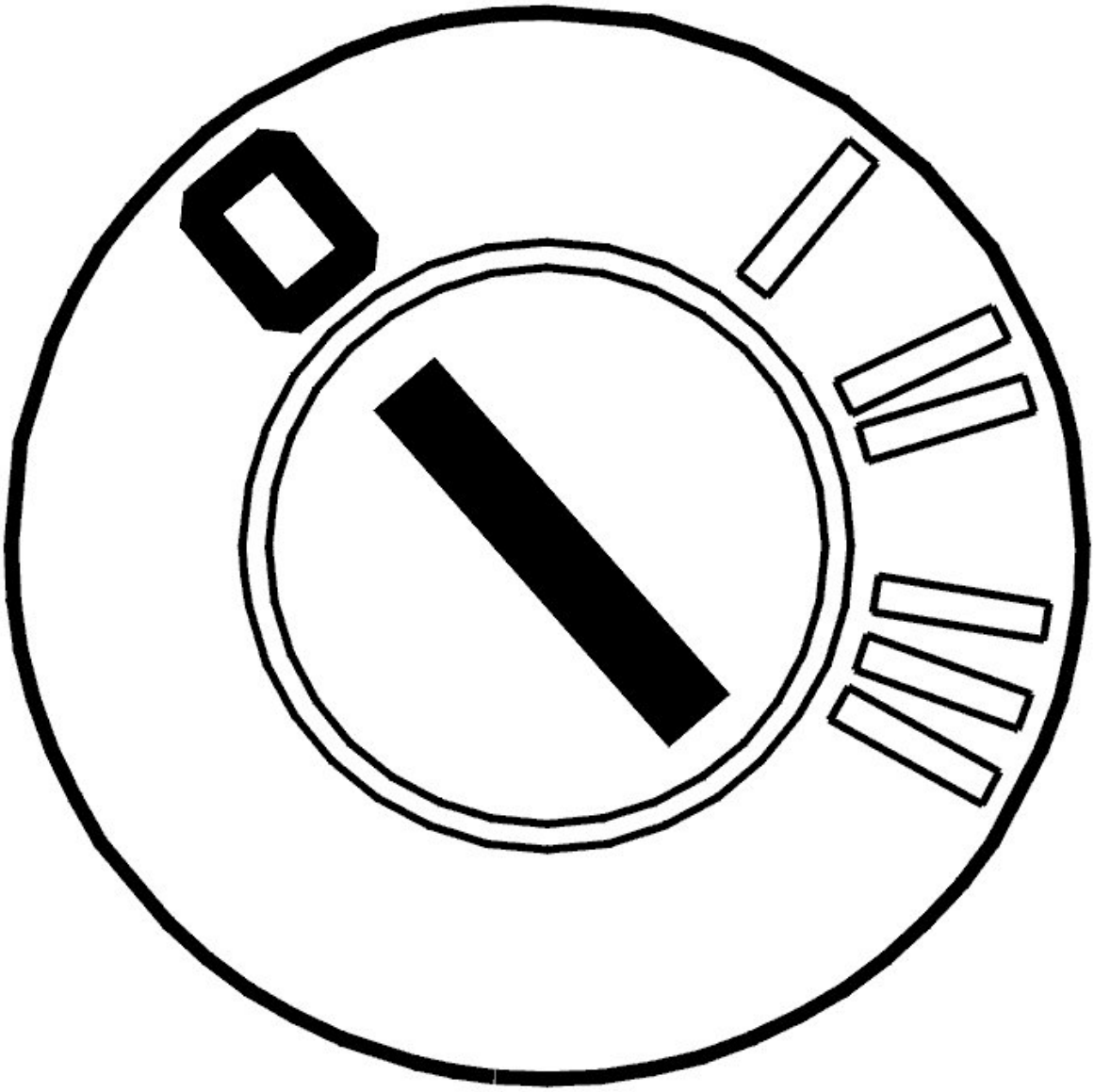
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

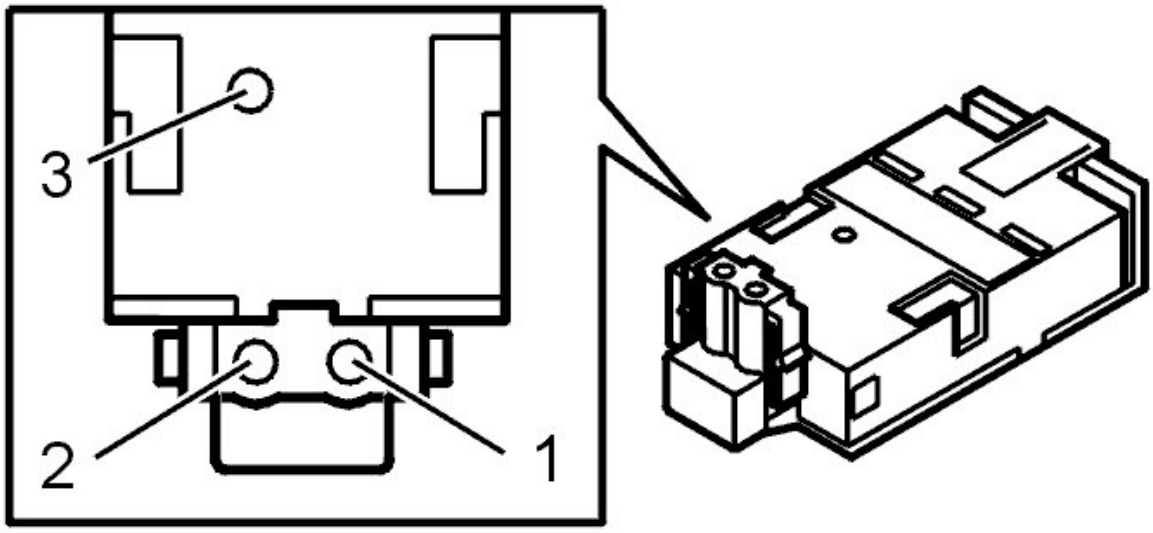
Check the cable between the control module for the SRS terminals #A21 (21), #A22 (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

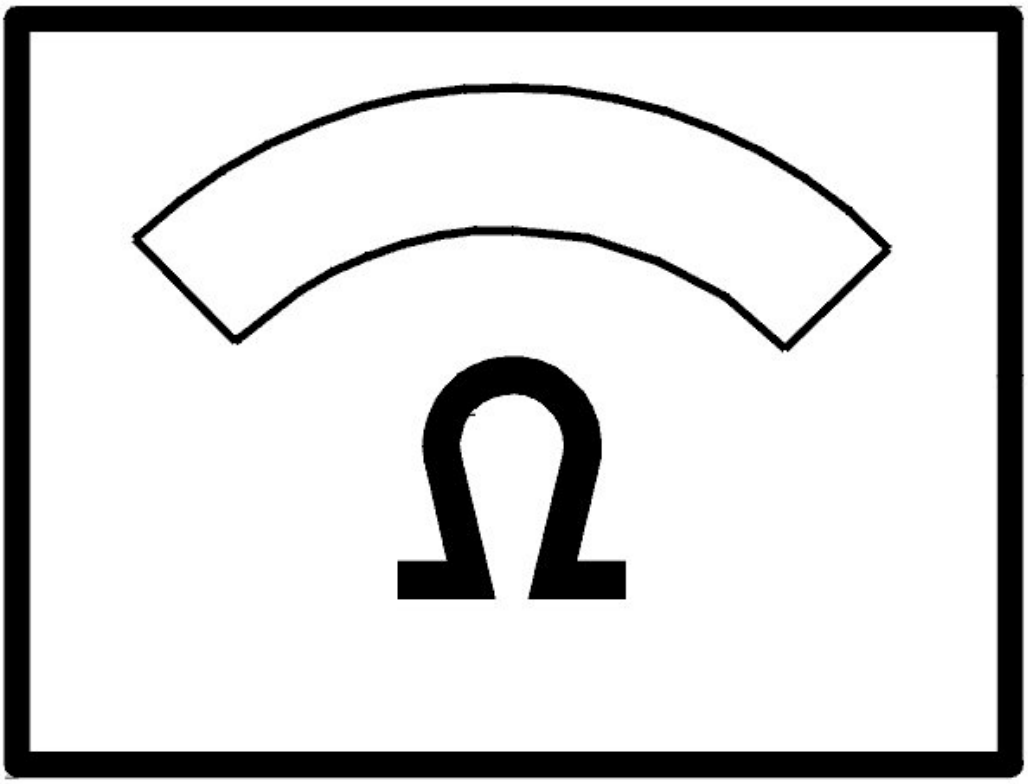
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the left-hand inflatable curtain connector and special tool951 1506 Test dummy See: Tools and Equipment/951

1506 Test Dummy connected, the resistance between terminals #21A (21) and #22A (22) on the SRS control module connector (inflatable curtain side) should be infinite

- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





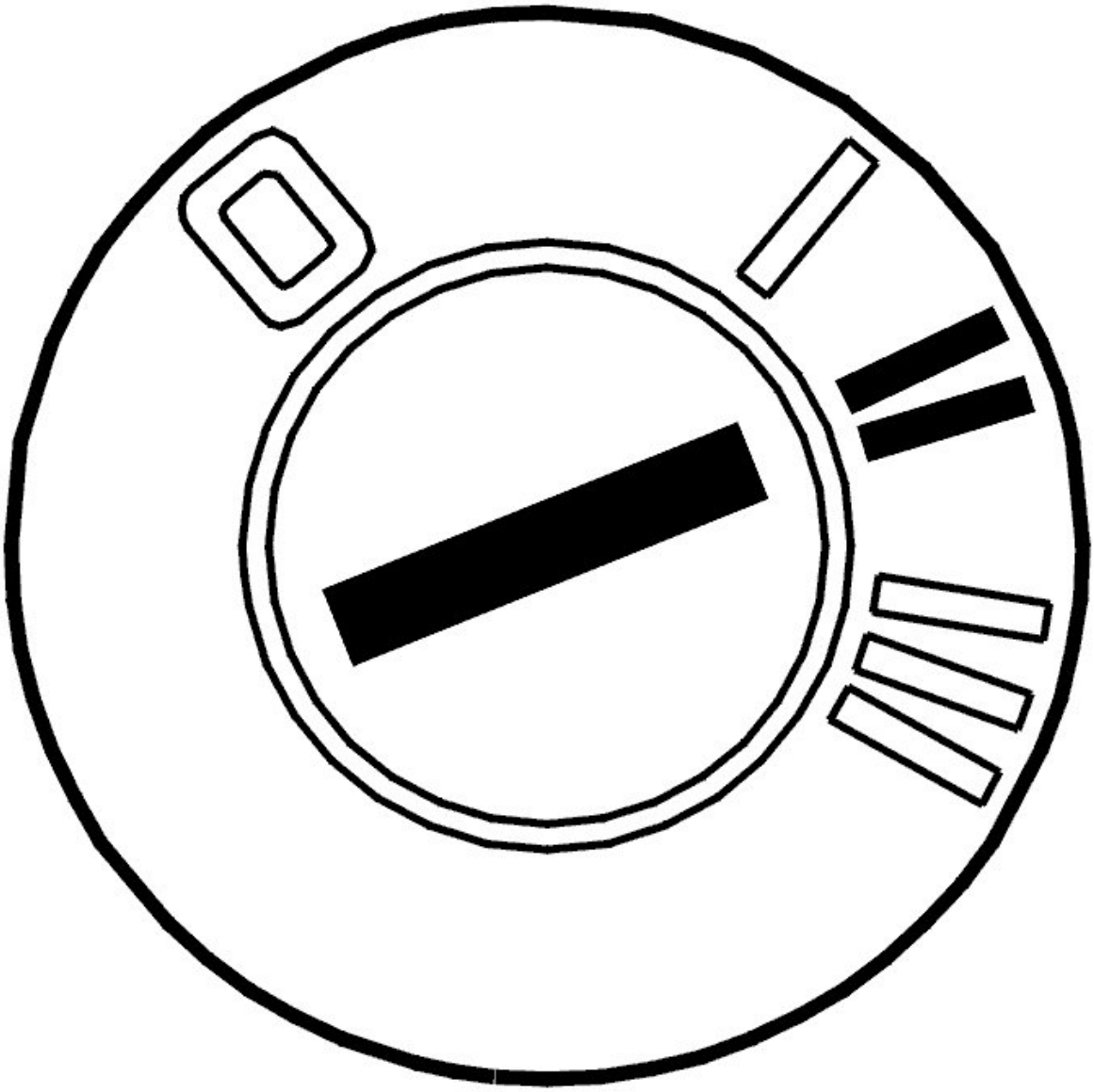
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

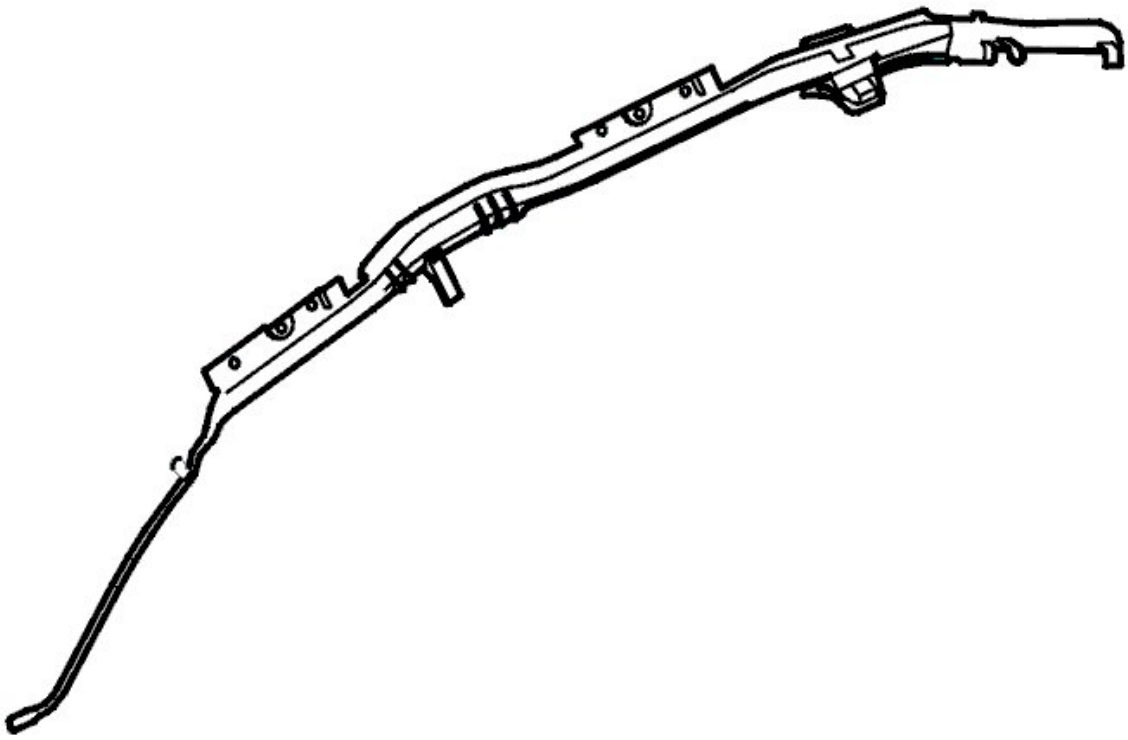
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-003A Diagnostic trouble code information

Condition



If the capacitance in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-003A is displayed.

Substitute value
- Nothing.

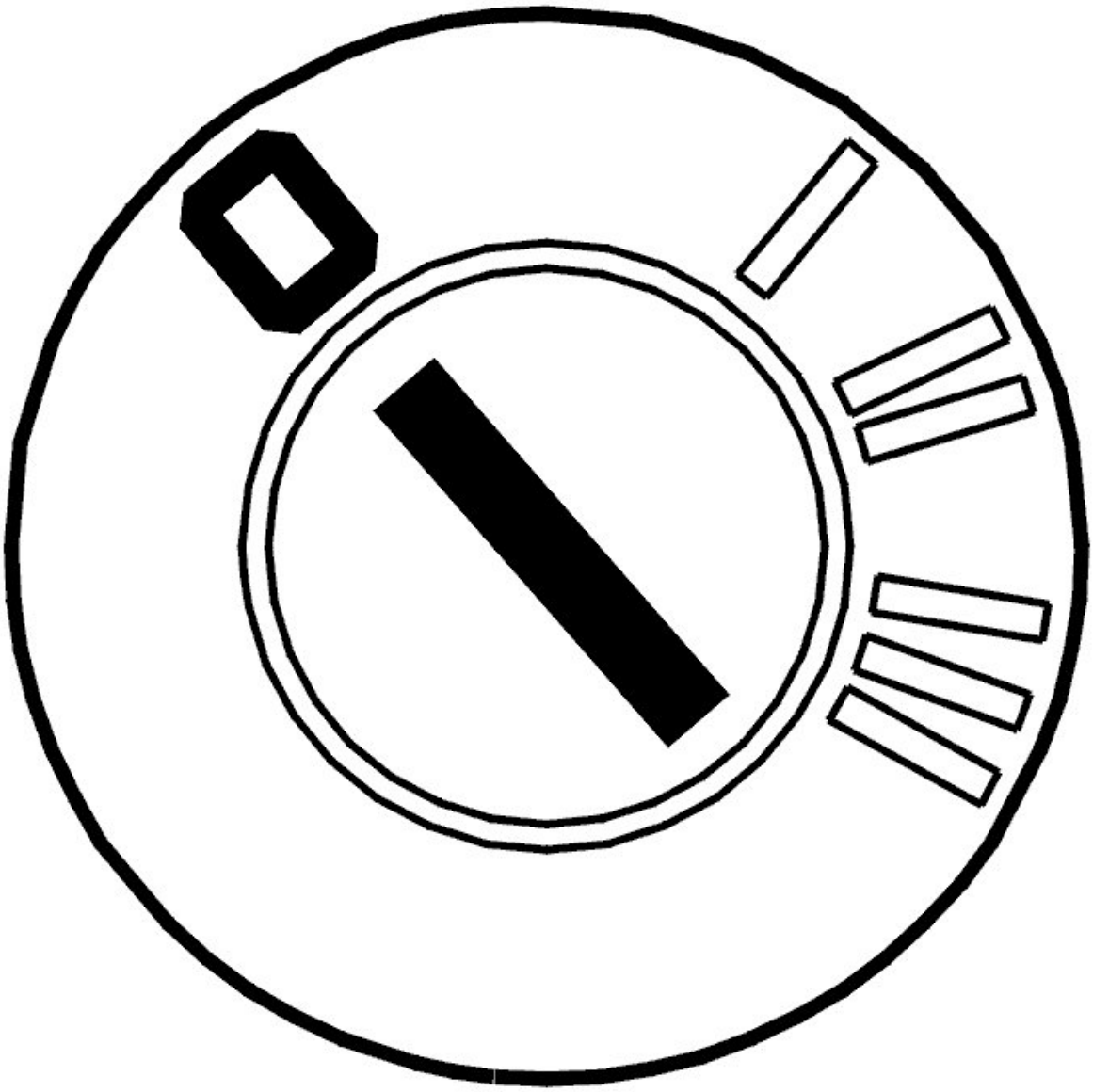
Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

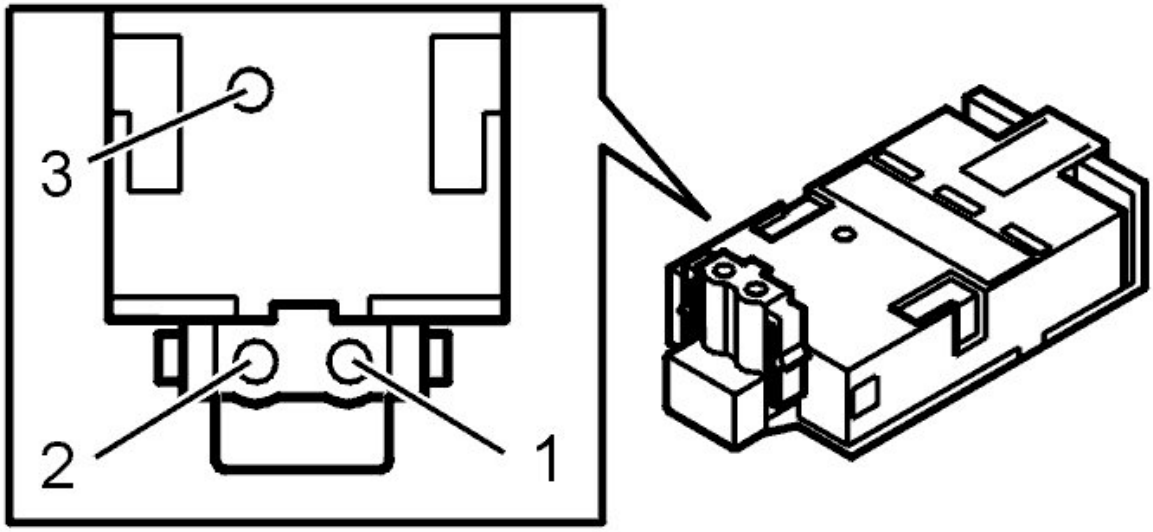
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between the SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

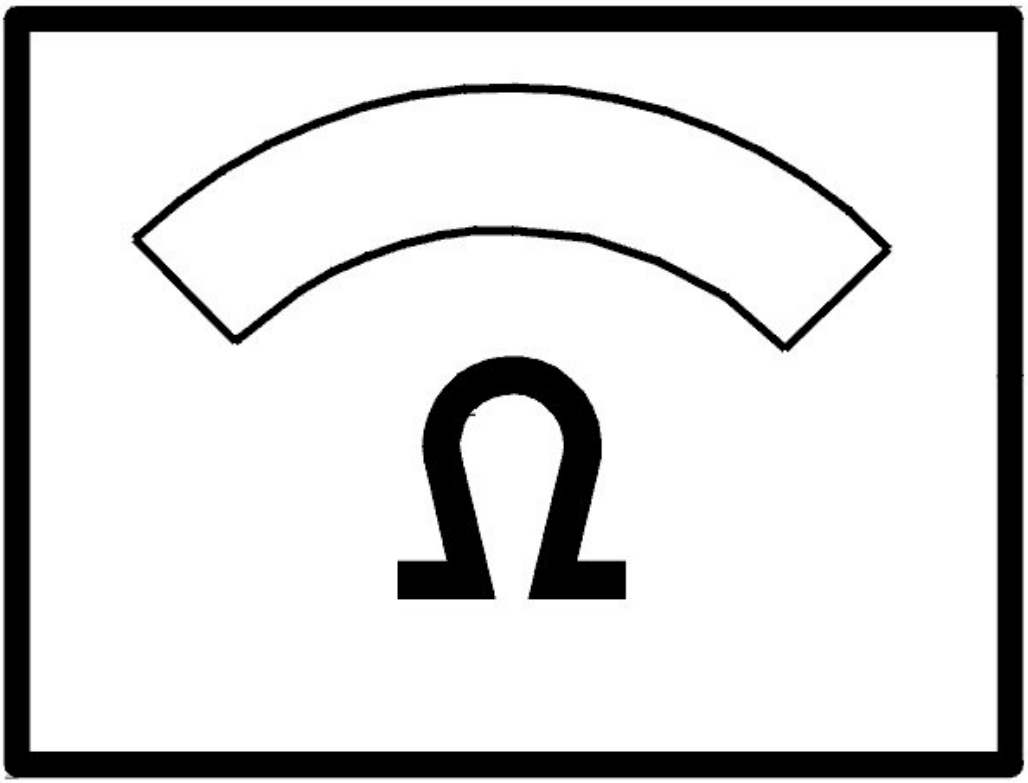
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the left-hand inflatable curtain connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #A21 (21) and #A22 (22) on the SRS control module connector (inflatable curtain side) should be infinite
- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

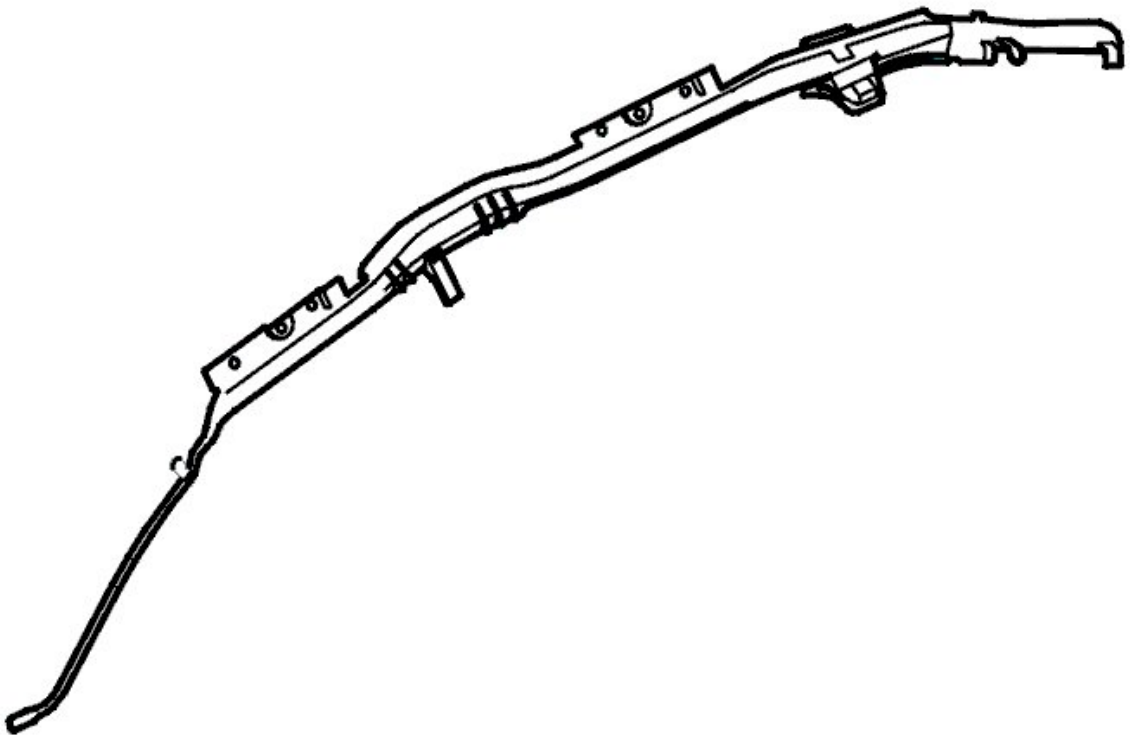
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-003B Diagnostic trouble code information

Condition



If the capacitance in the circuit is low for more than 10 seconds, diagnostic trouble code SRS-003B is displayed.

Substitute value
- Nothing.

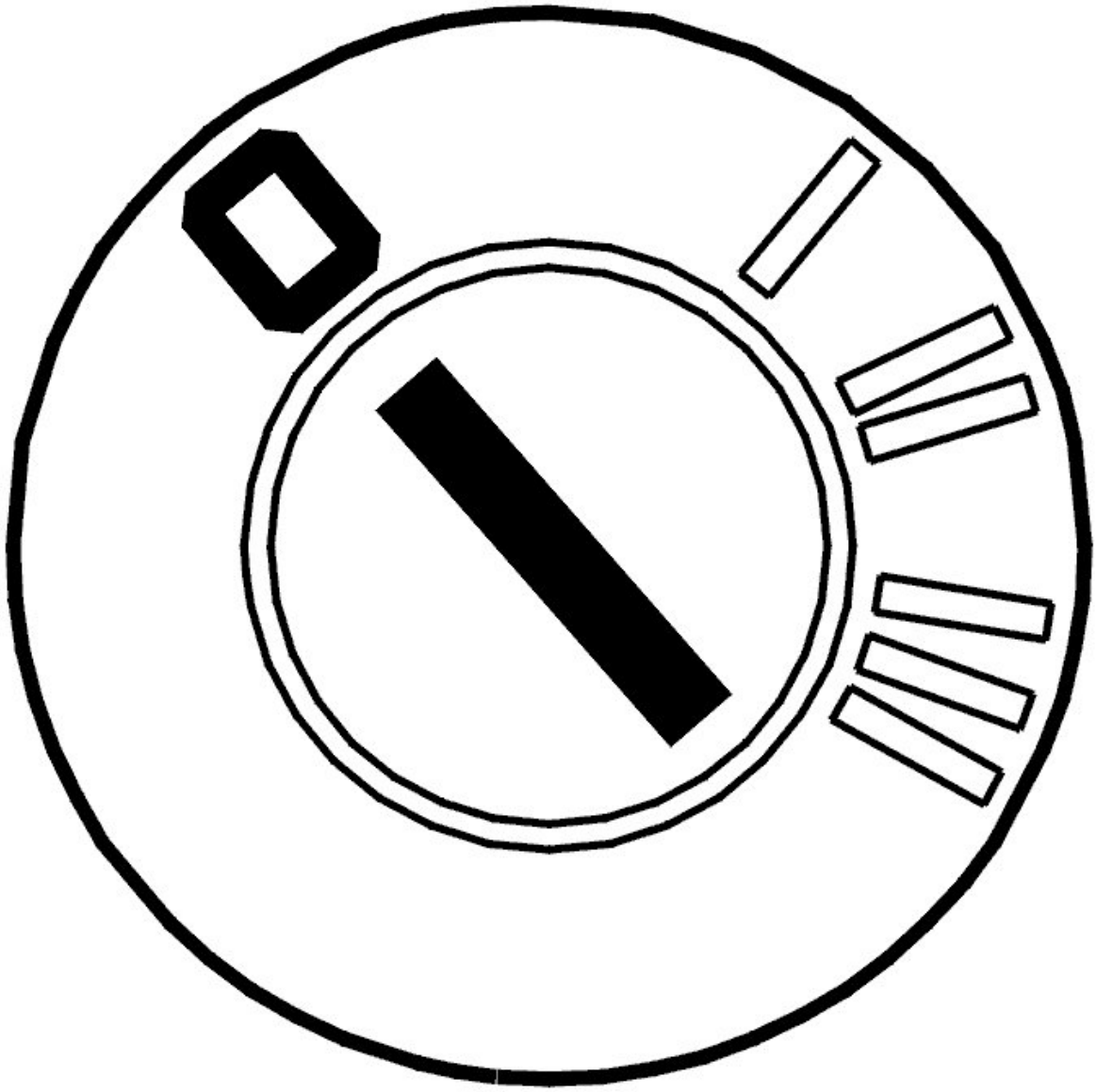
Possible source
- Capacitance too low or open circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

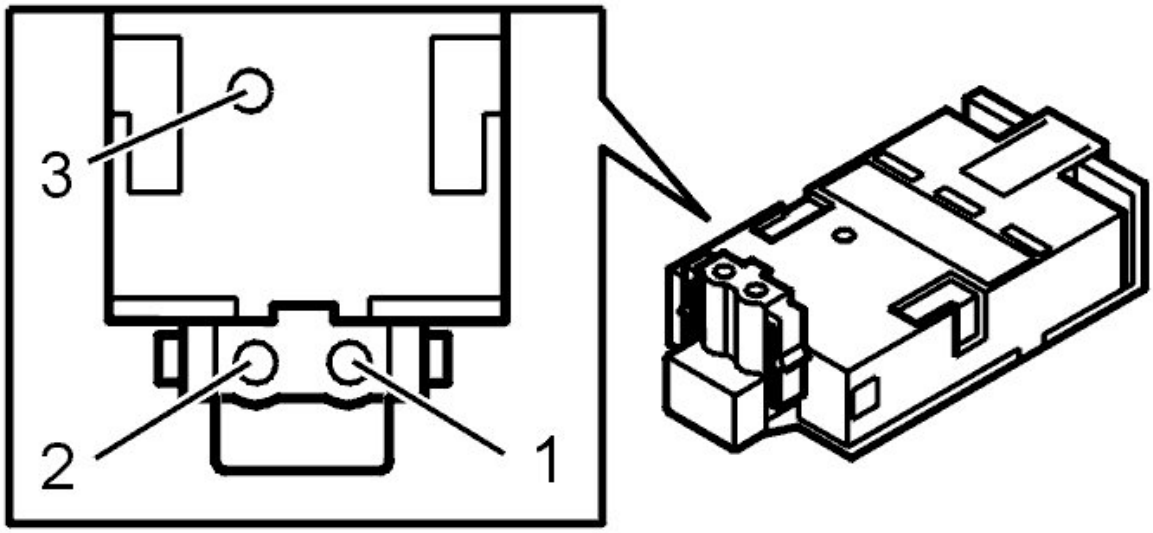
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

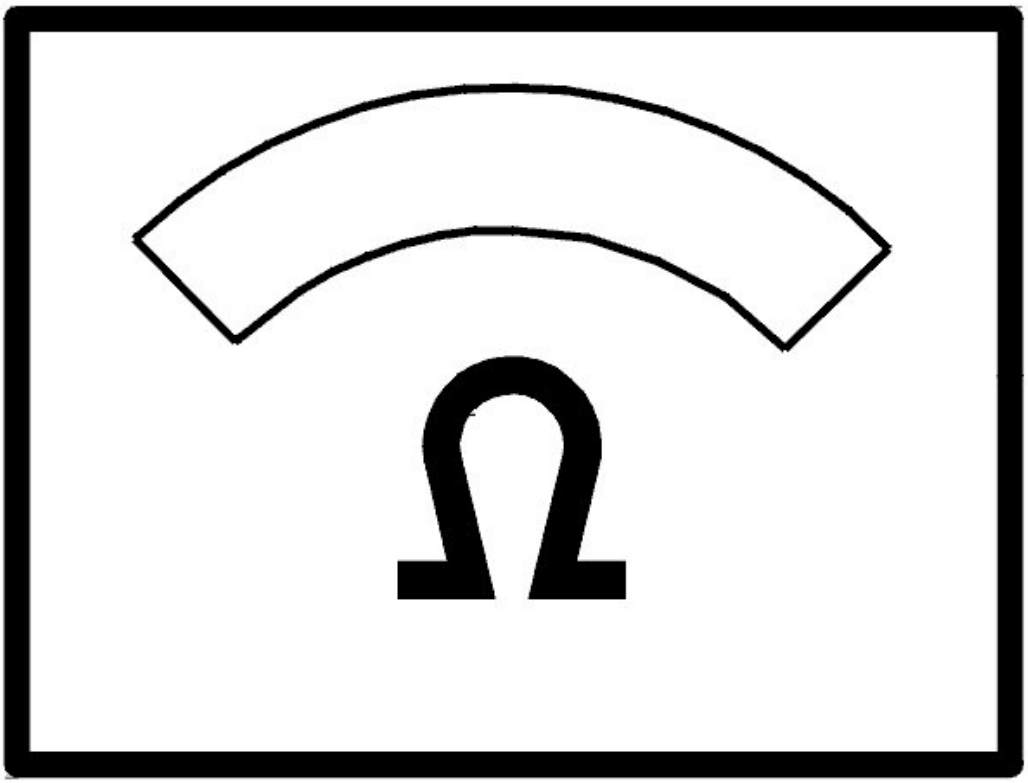
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between driver's airbag connector terminals #1 and #3. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

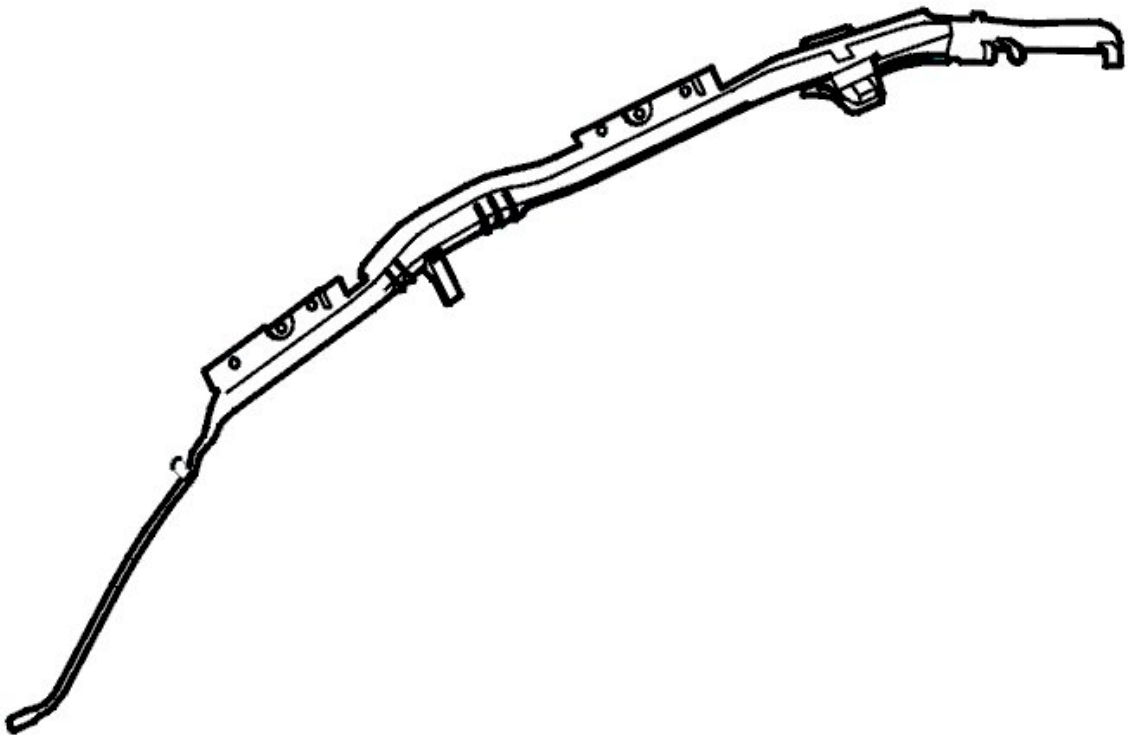
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-003B Diagnostic trouble code information

Condition



If the capacitance in the circuit is low for more than 10 seconds, diagnostic trouble code SRS-003B is displayed.

Substitute value
- Nothing.

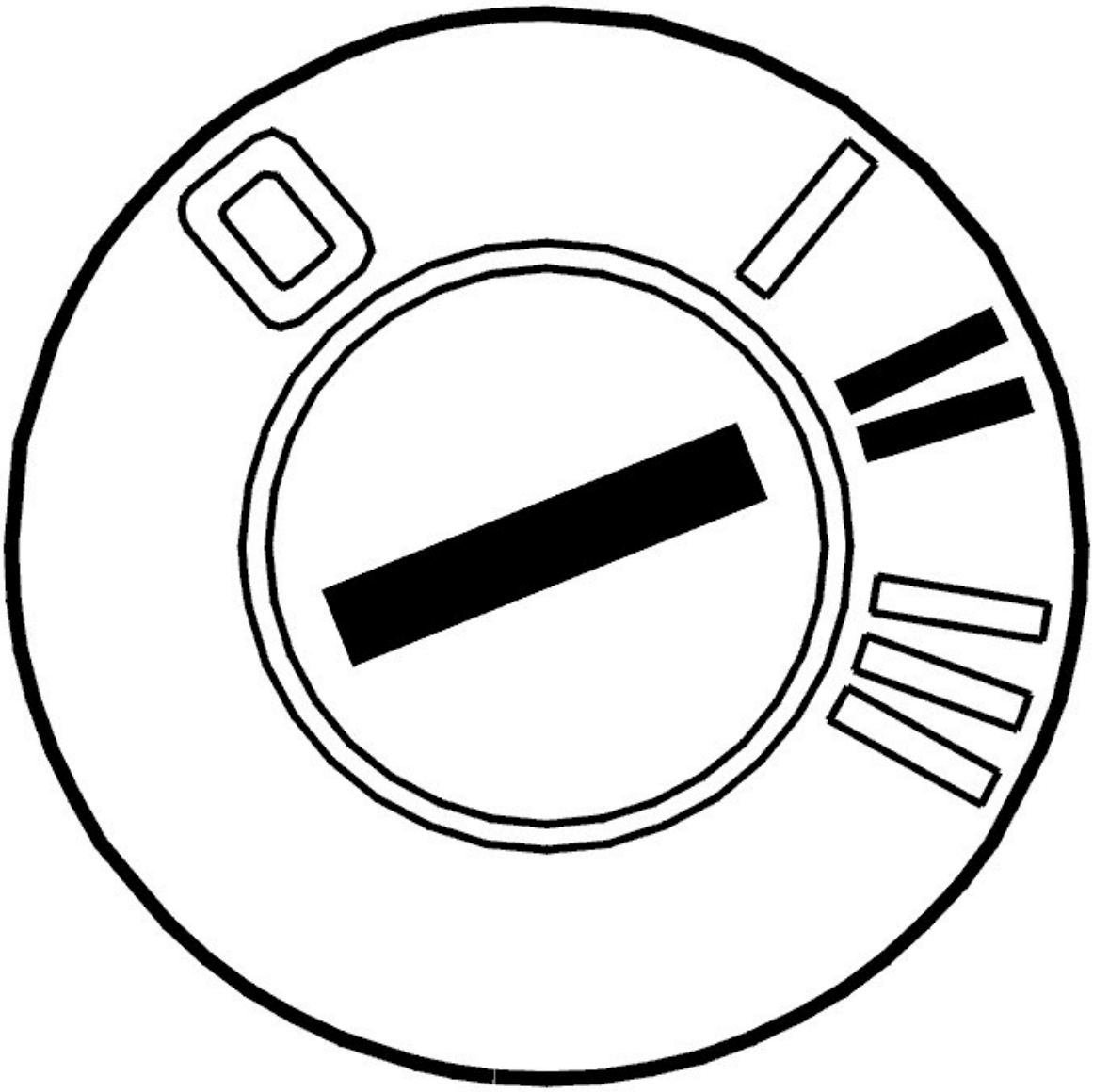
Possible source
- Capacitance too low or open circuit in built-in capacitor in igniter wire connector.

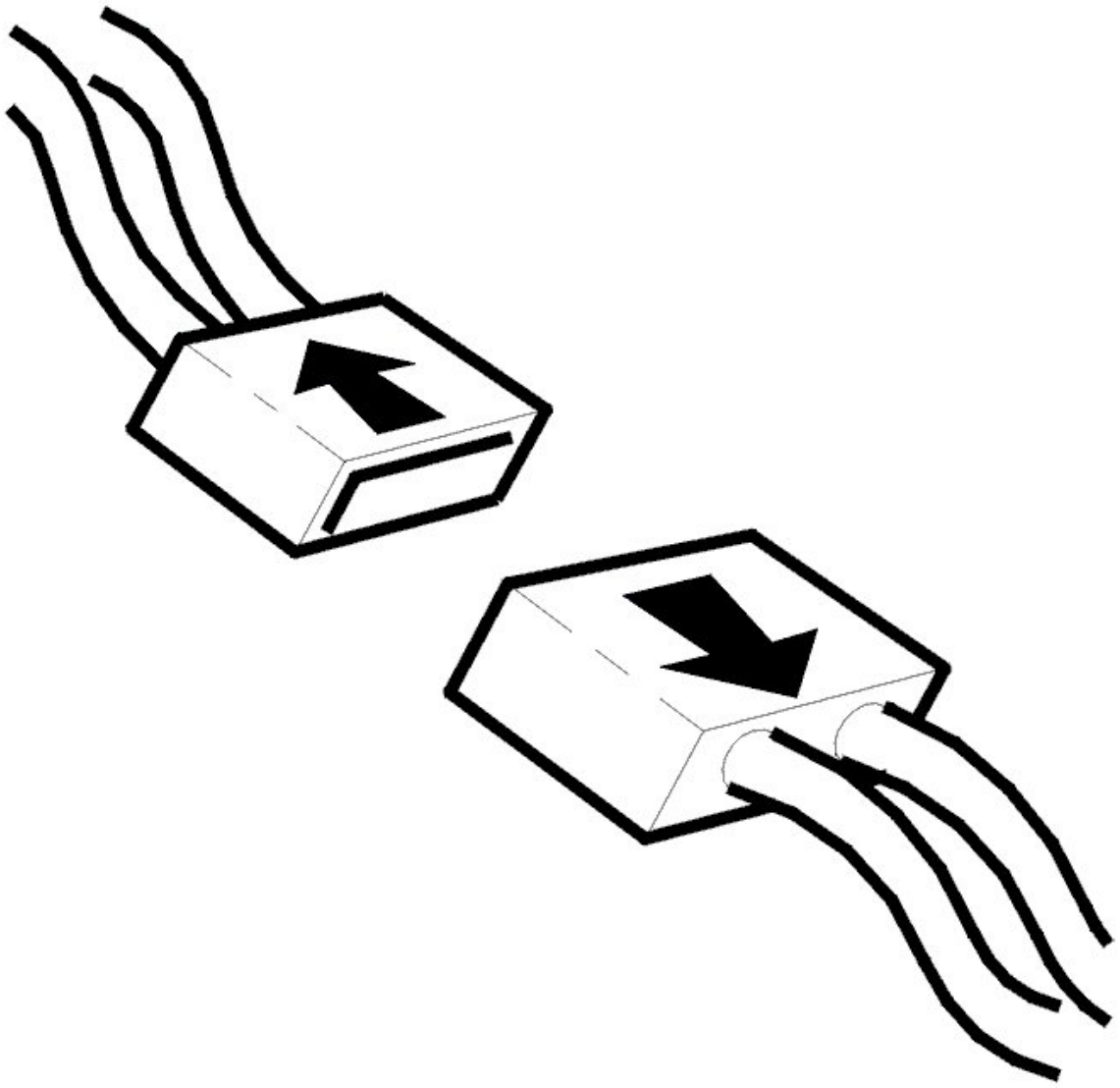
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

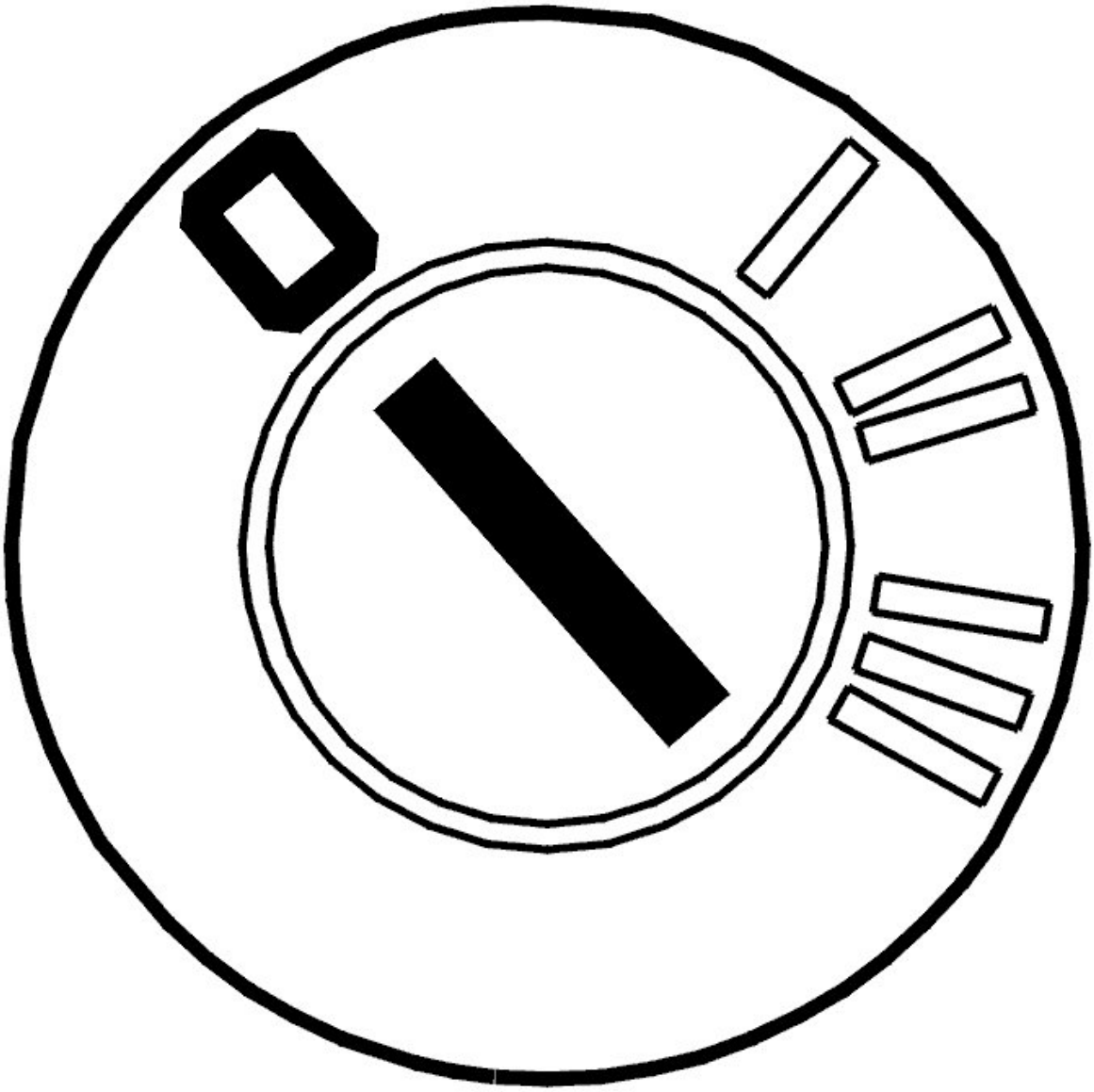
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

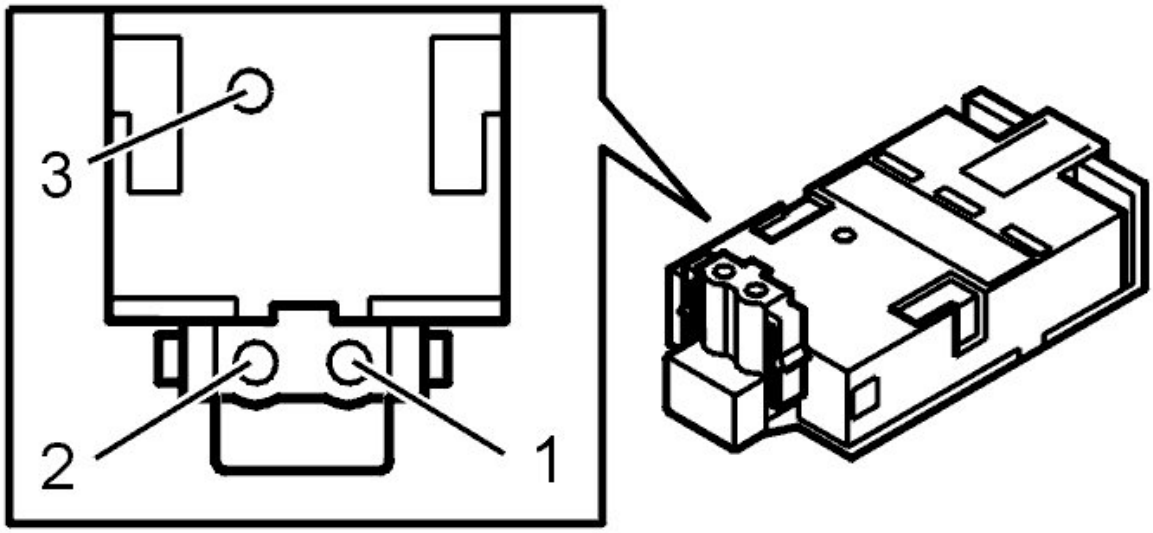
Check the female and male parts of the connectors for the SRS control module and the inflatable curtain. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

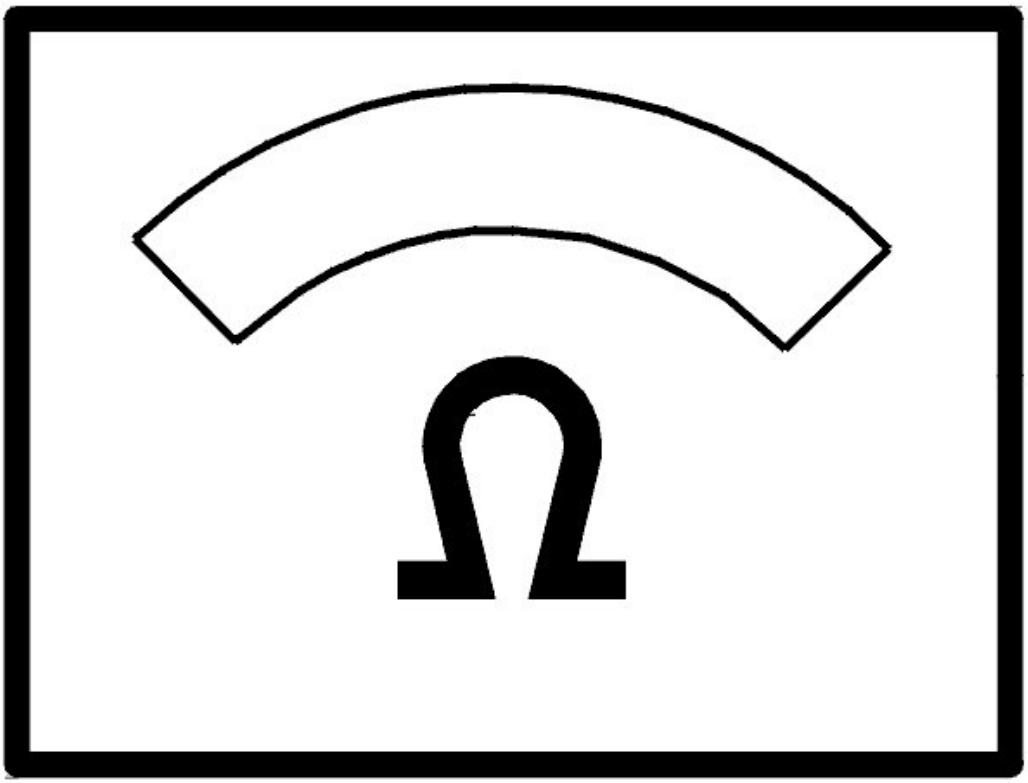
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between driver's airbag connector terminals #1 and #3. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





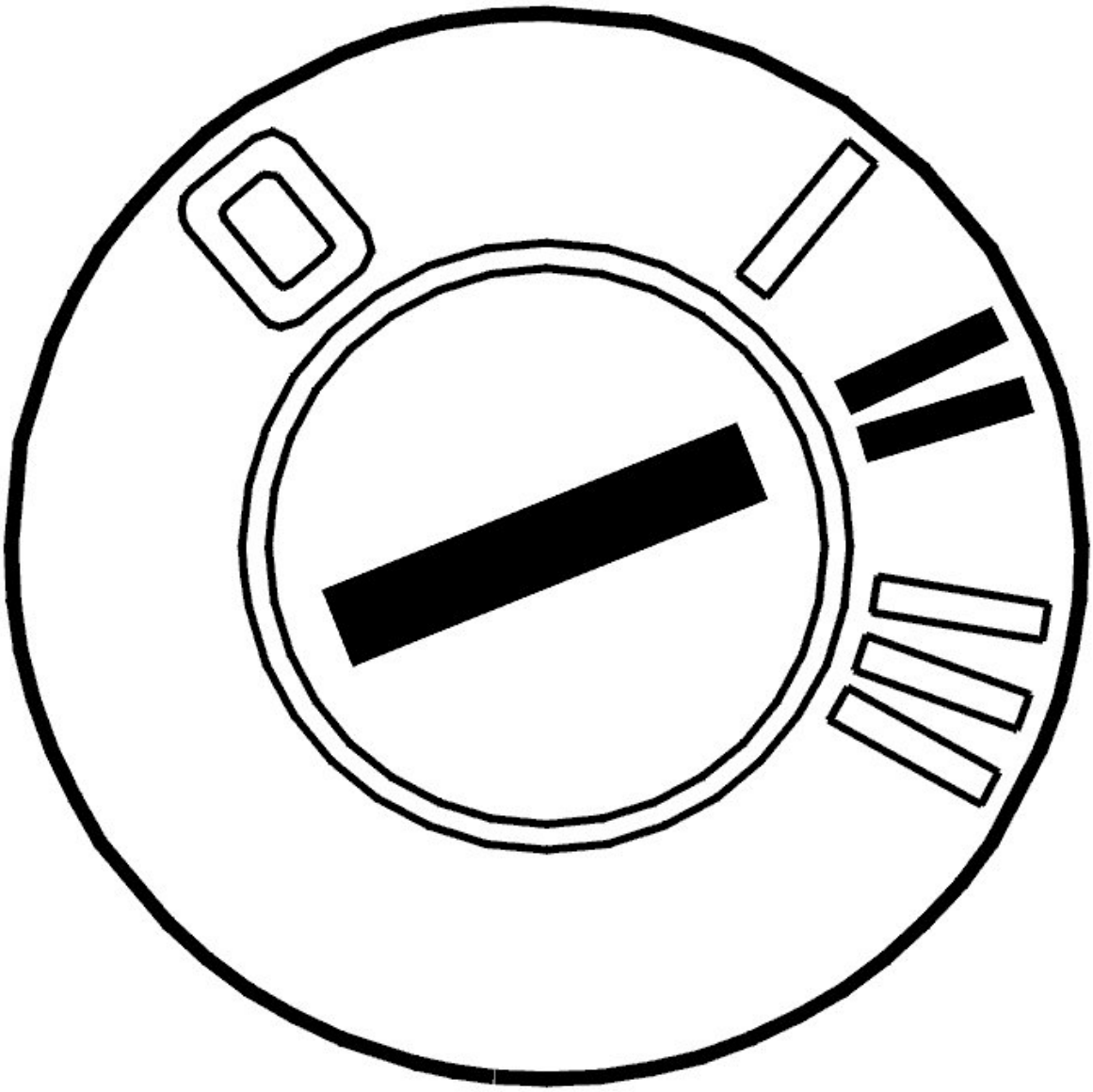
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

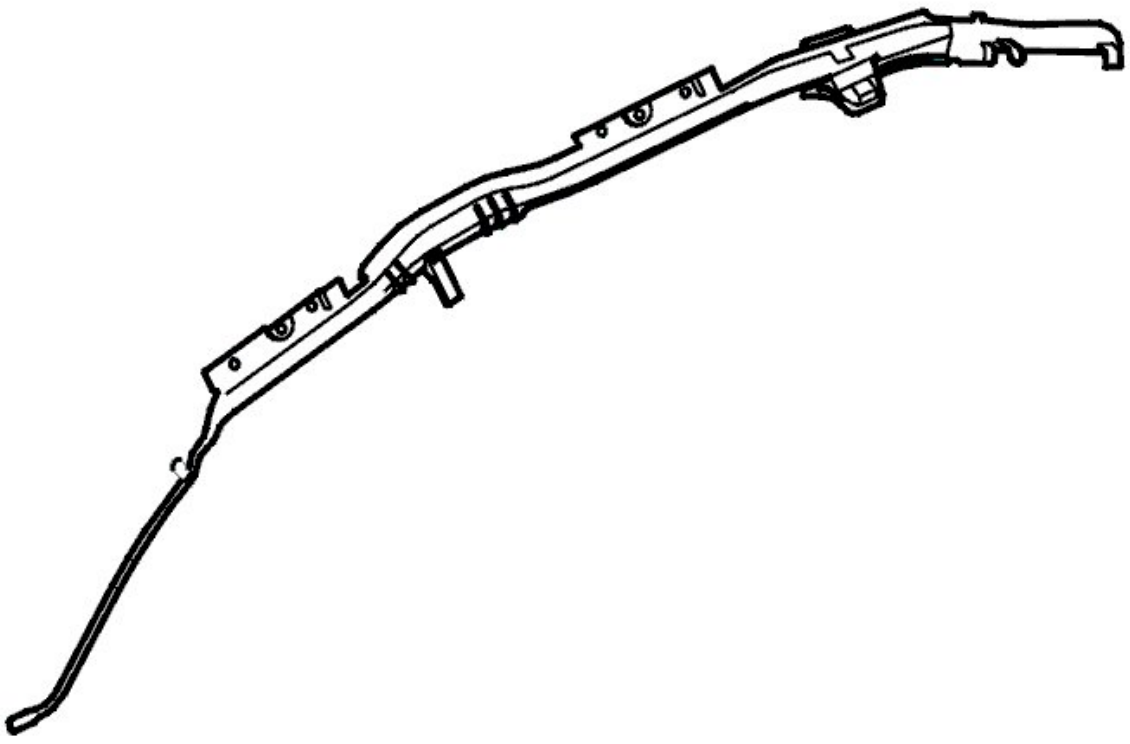
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-003C Diagnostic trouble code information

Condition



If the resistance in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-003C is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

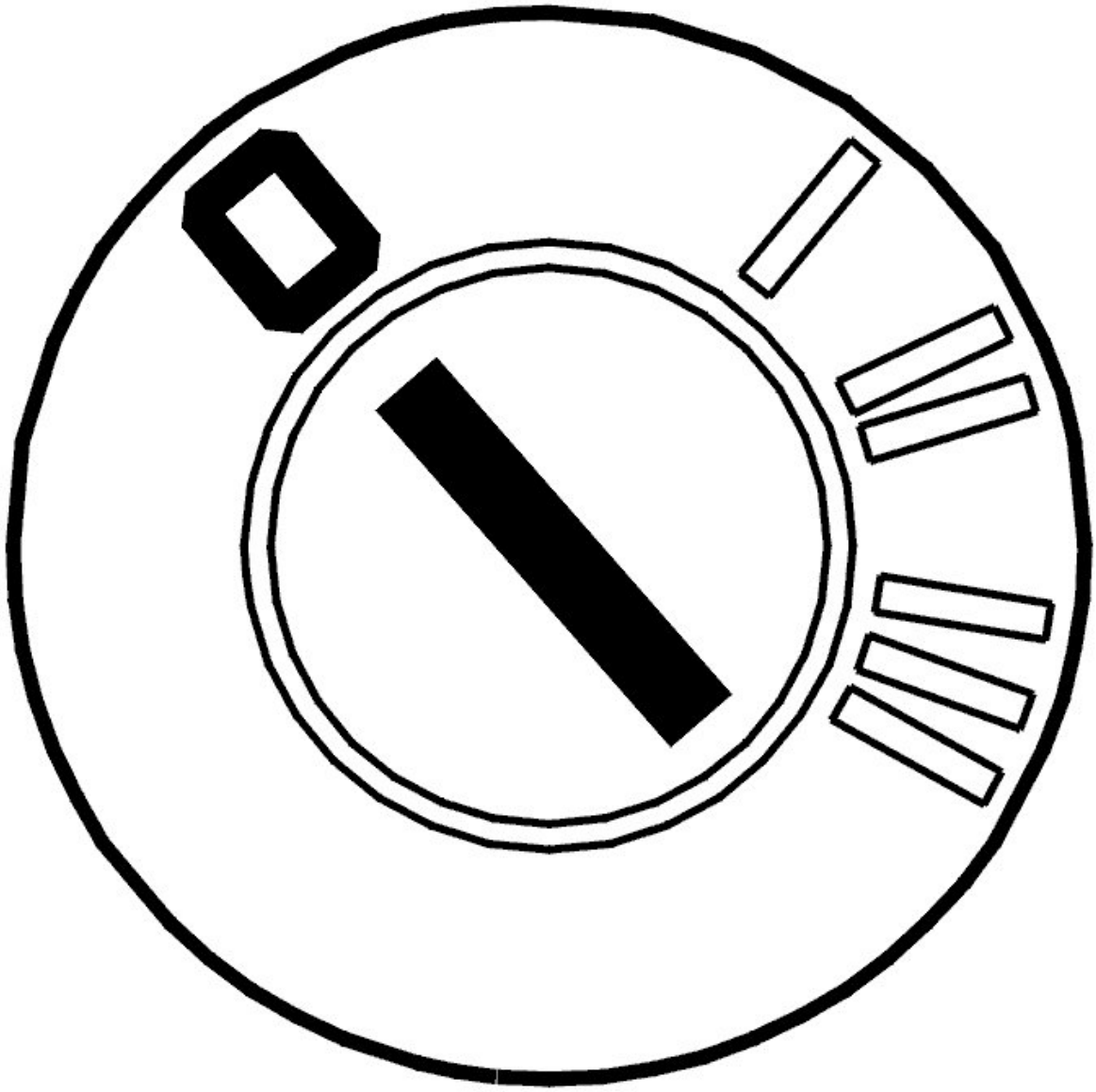
- Open circuit in inflatable curtain (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

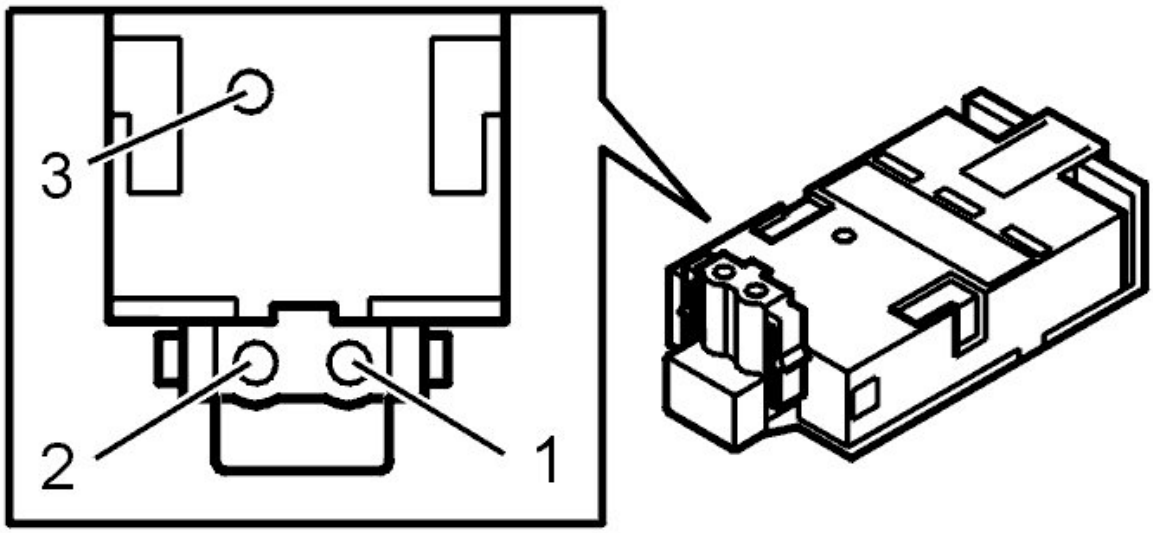
Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

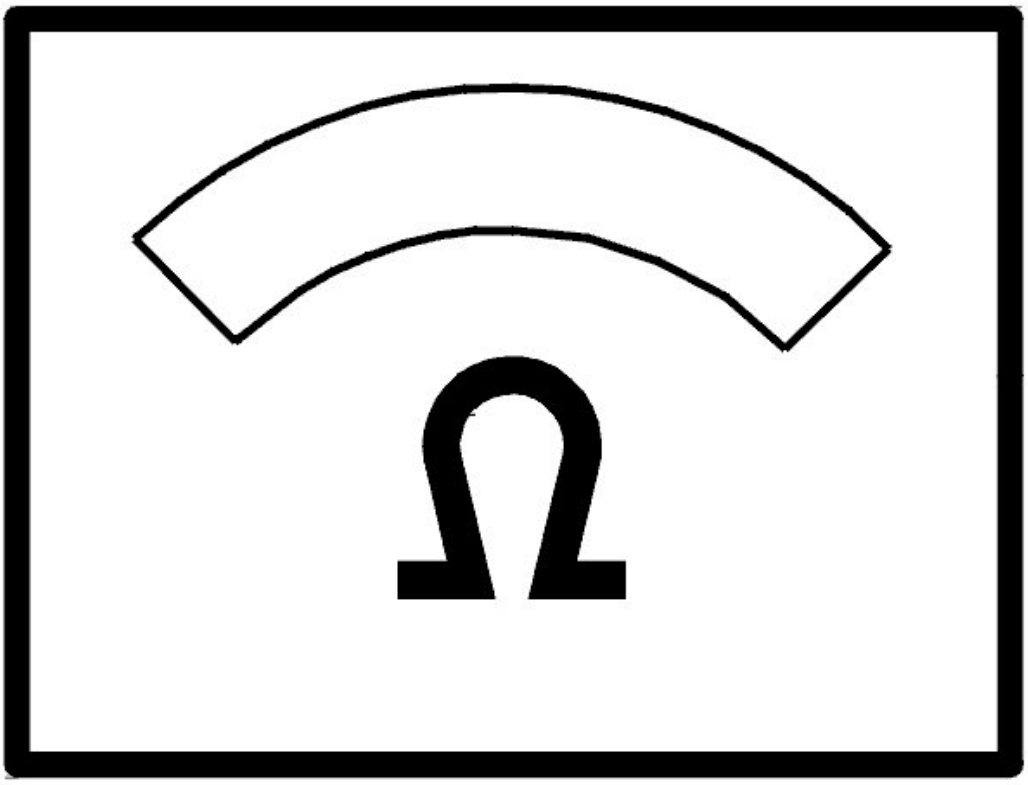
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

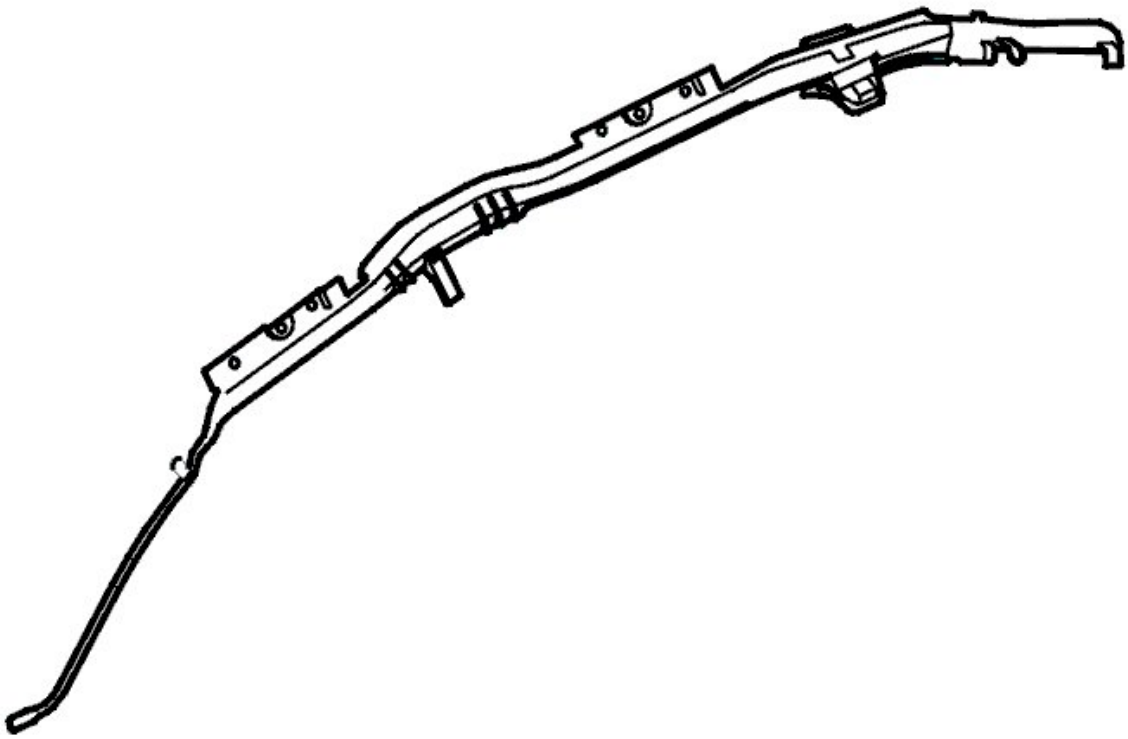
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-003C Diagnostic trouble code information

Condition



If the resistance in the circuit is high for more than 10 seconds, diagnostic trouble code SRS-003C is displayed.

Substitute value
- Nothing.

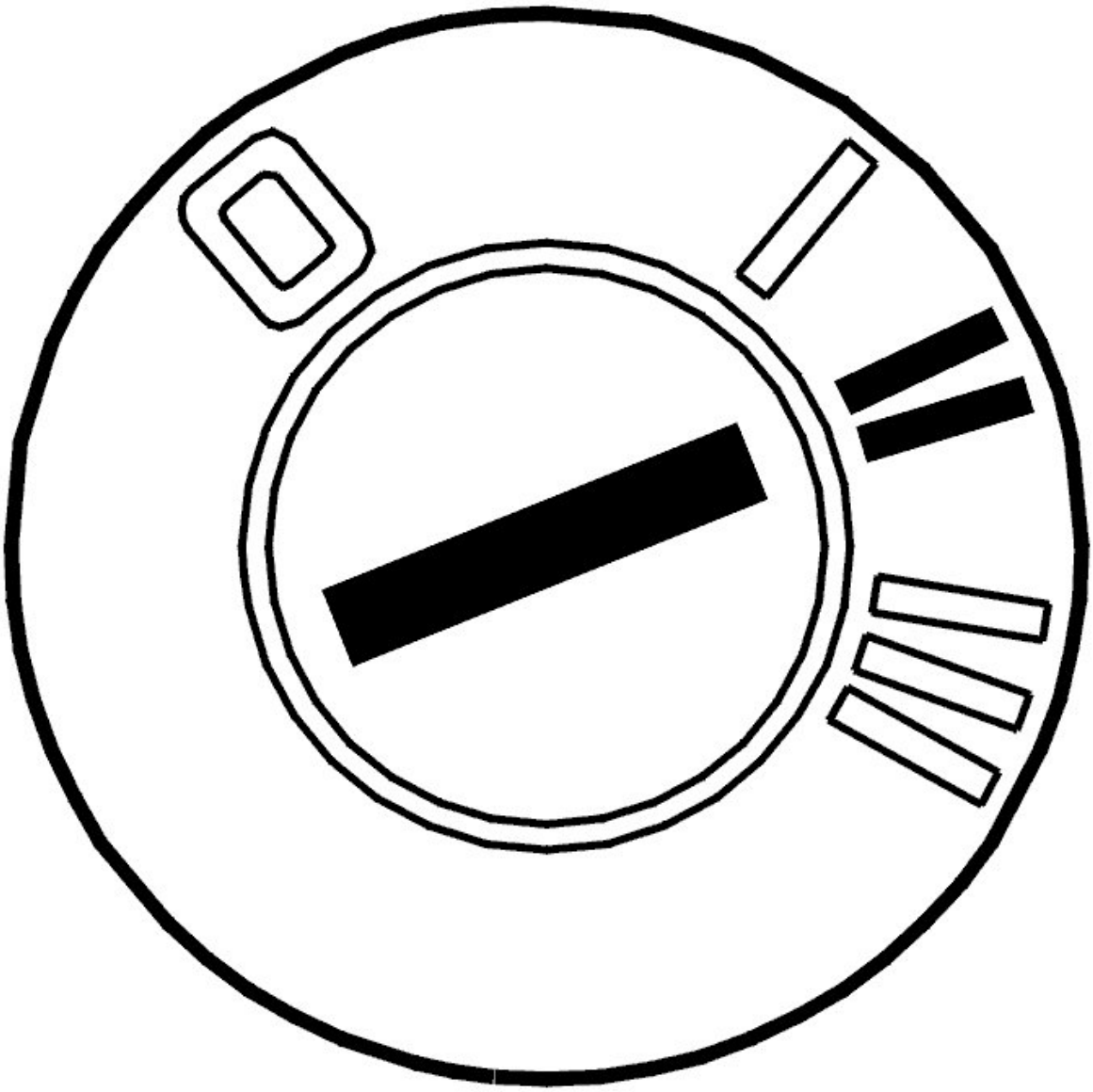
Possible source
- Open circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Open circuit in inflatable curtain (resistance in igniter too high).

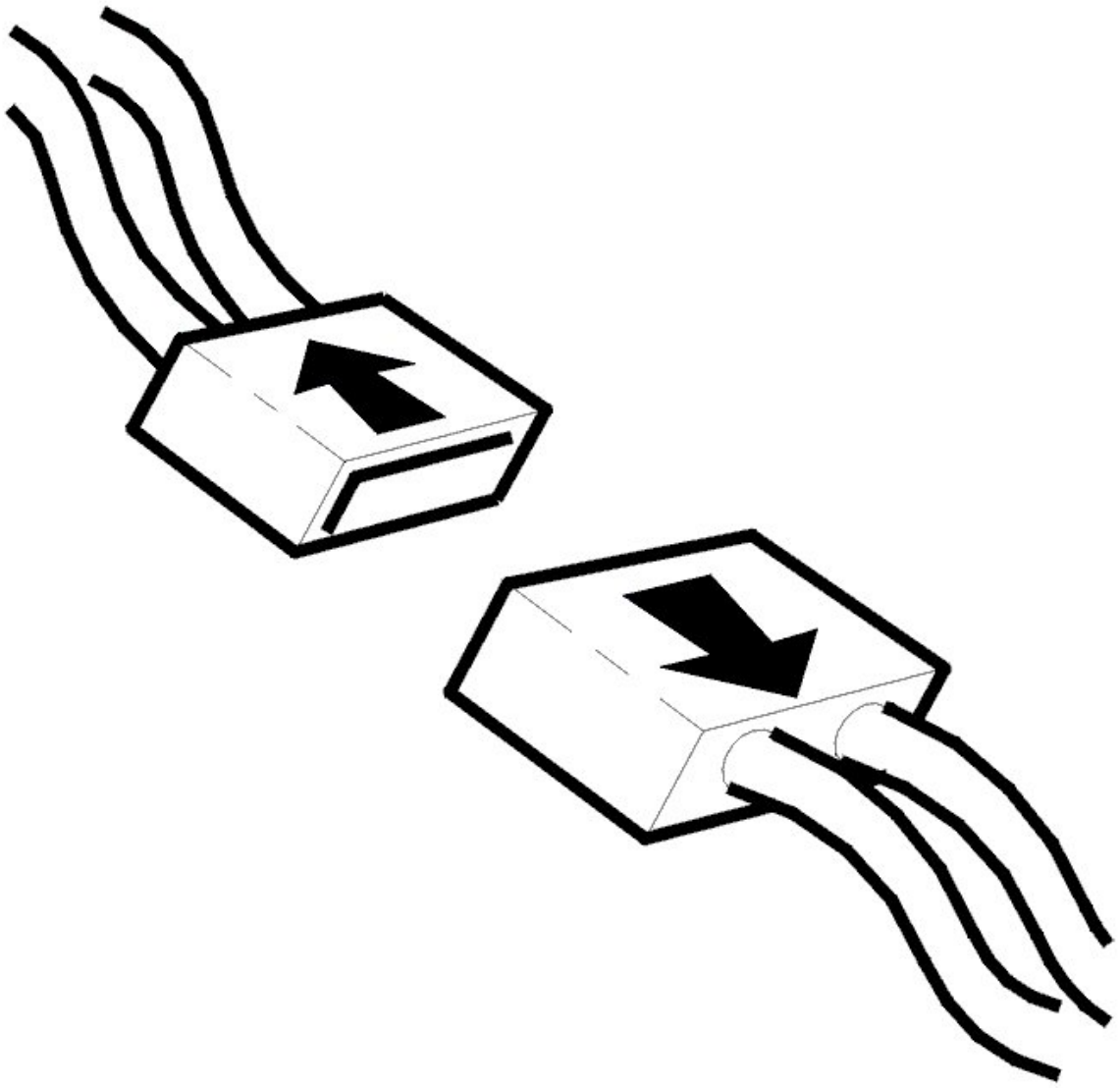
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

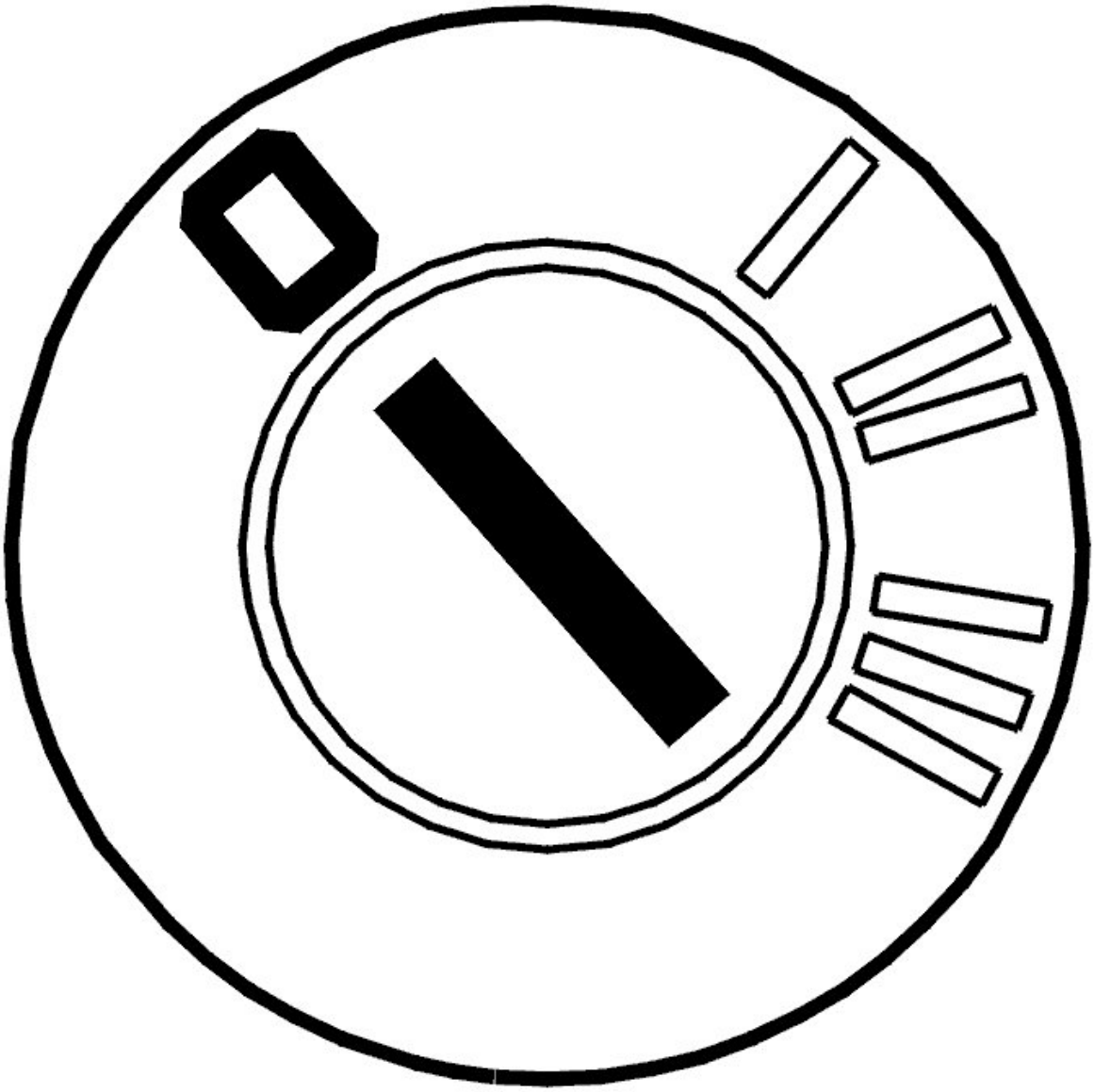
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

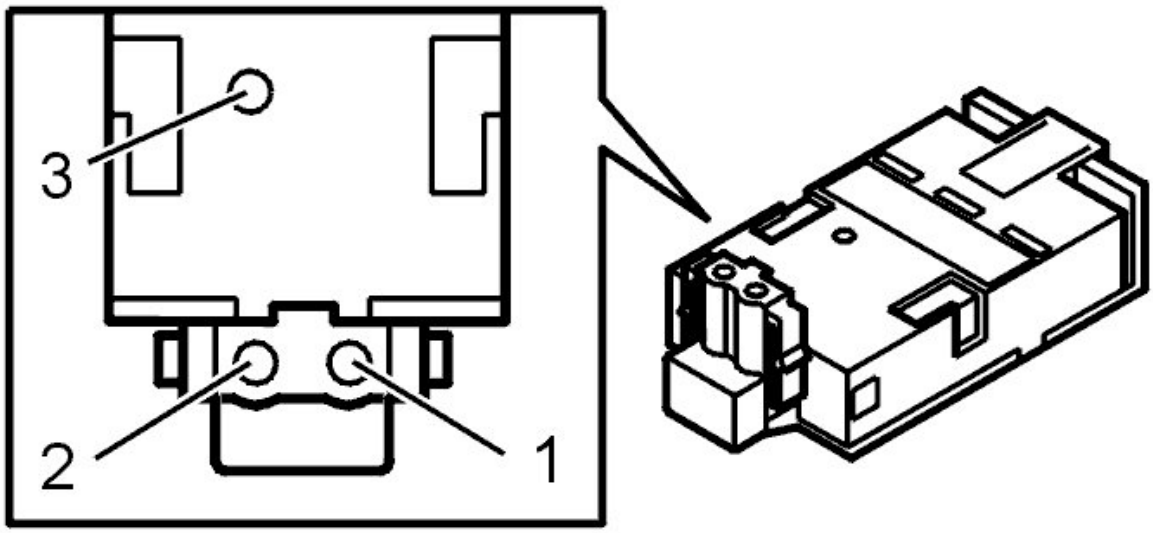
Check the female and male parts of the connectors for the SRS control module and the inflatable curtain. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

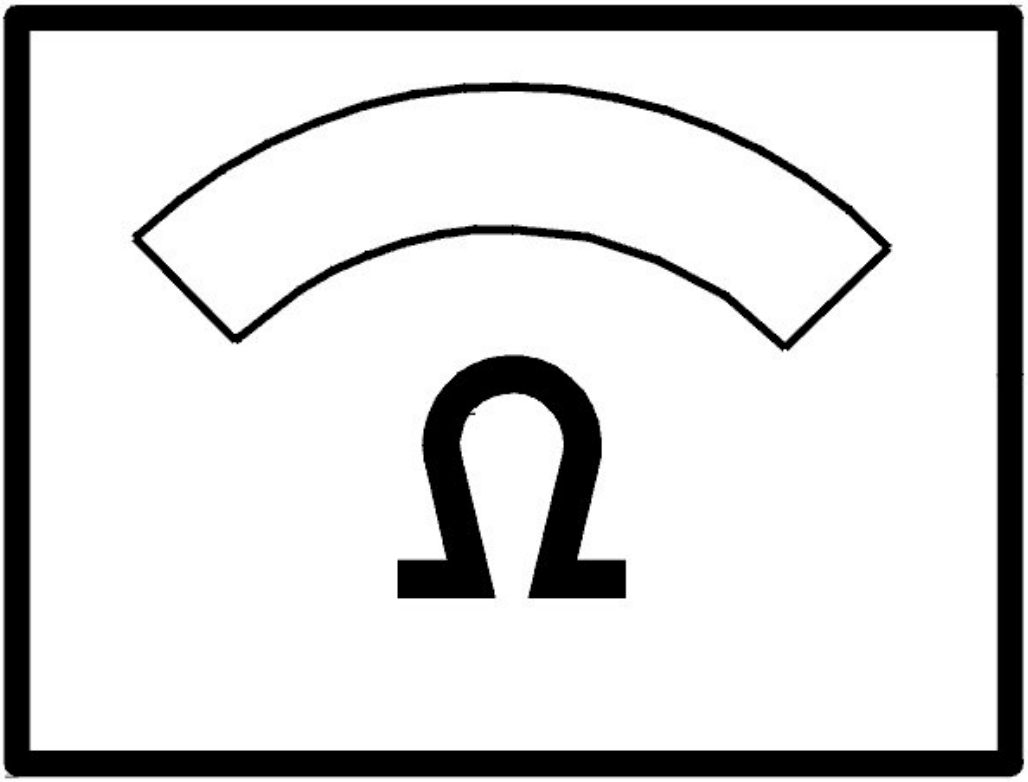
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





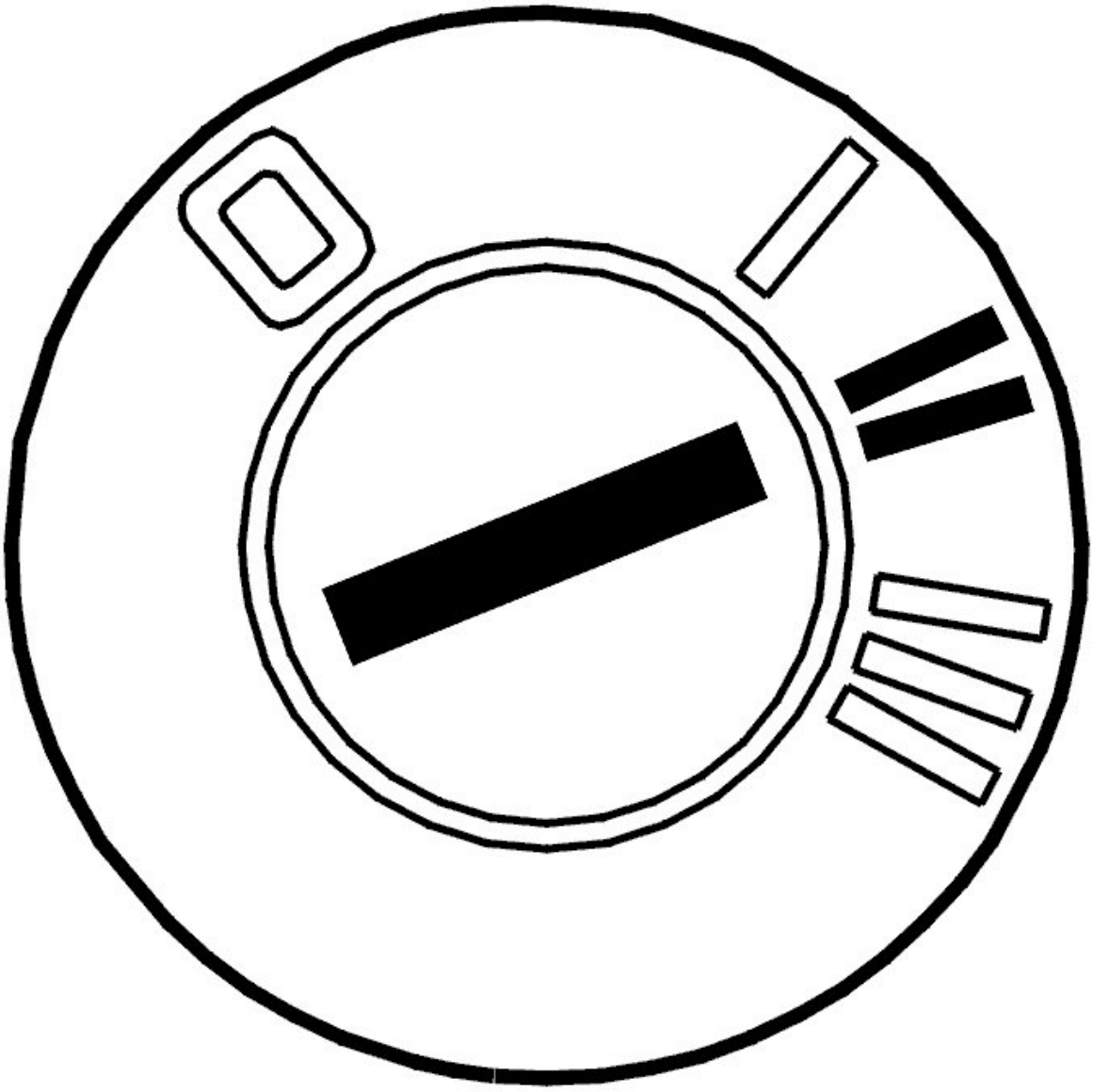
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

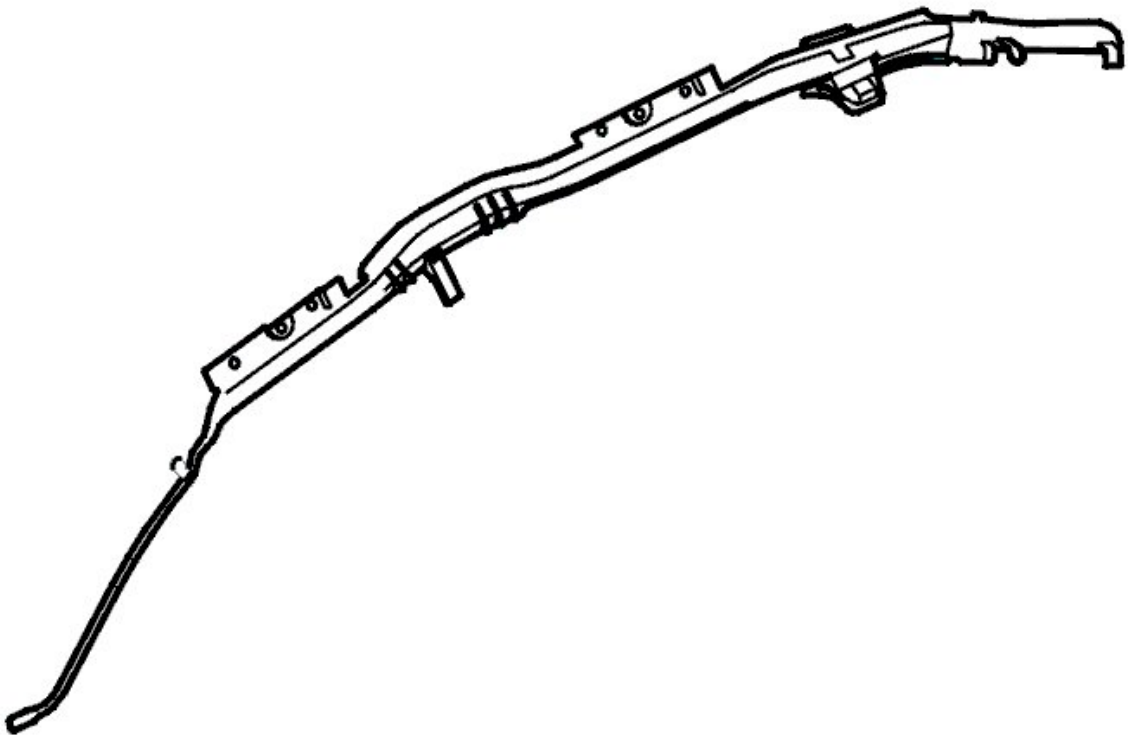
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-003D Diagnostic trouble code information

Condition



If the circuit resistance is low for more than 10 seconds, diagnostic trouble code SRS-003D is displayed.

Substitute value
- Nothing.

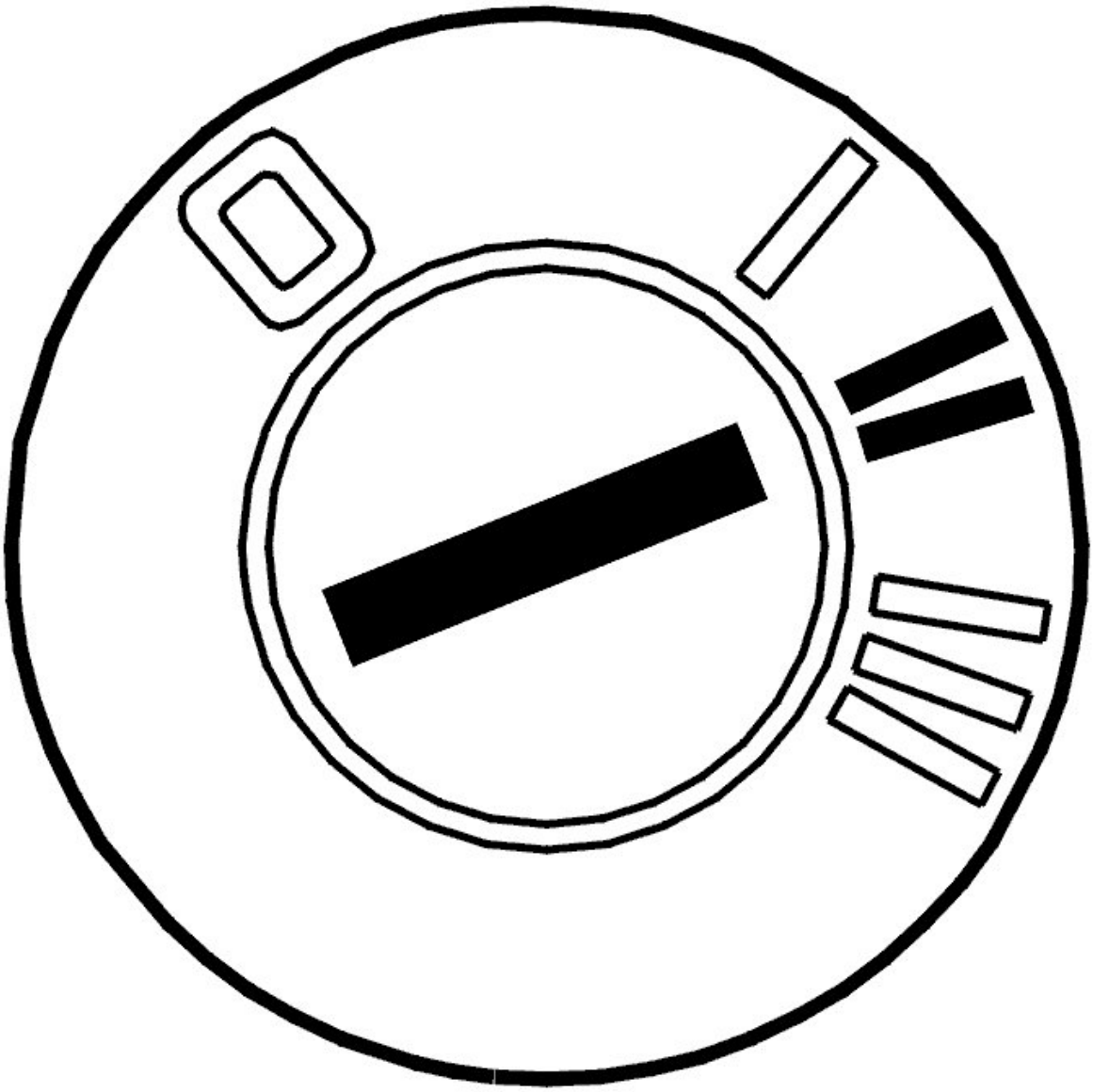
Possible source
- Short circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit in inflatable curtain (resistance in igniter too low).

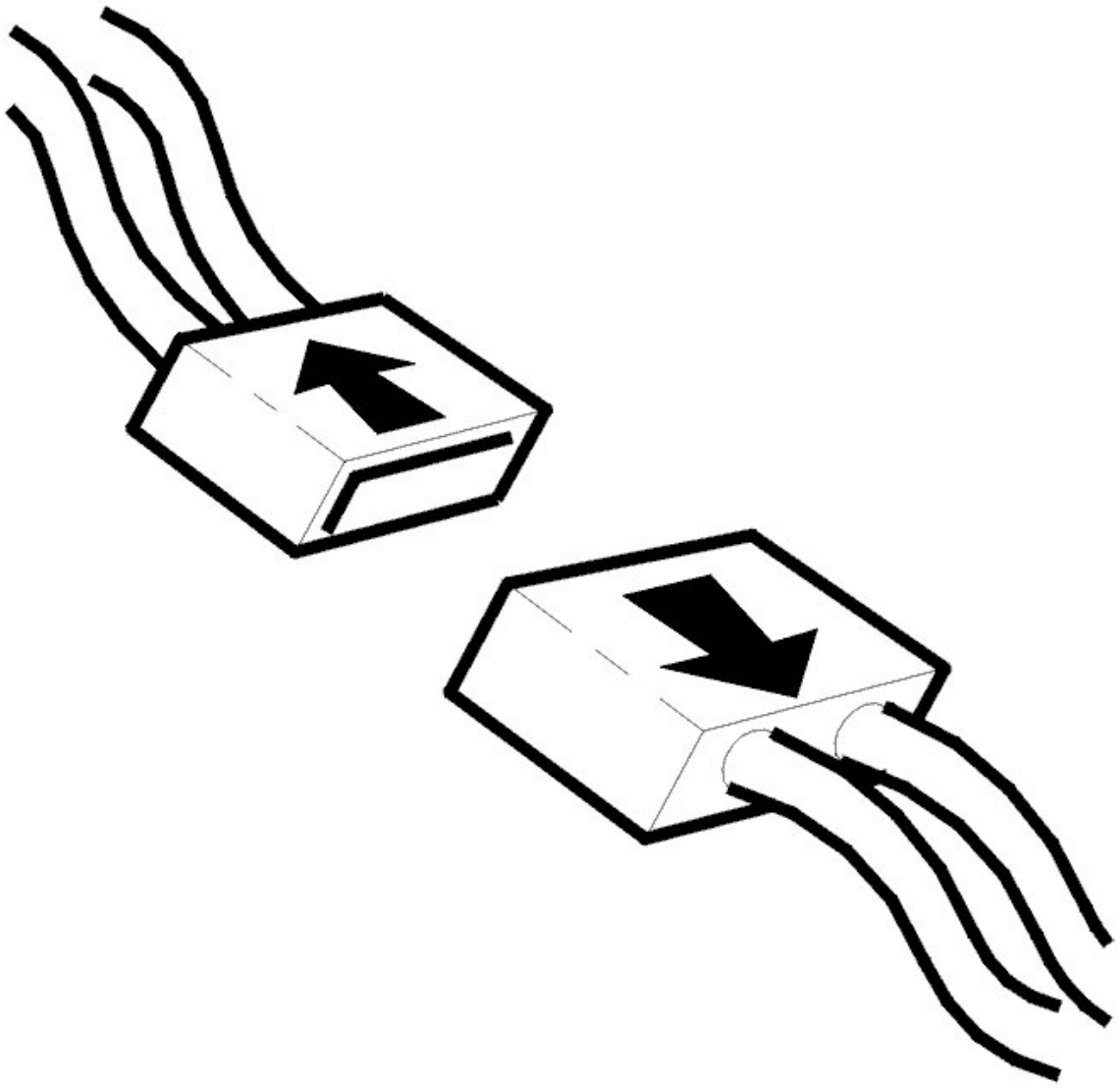
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Separate the connectors on the left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the left-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the diagnostic trouble code (DTC) changes status from a permanent fault to an intermittent fault, try replacing the left-hand inflatable curtain.

Other information:

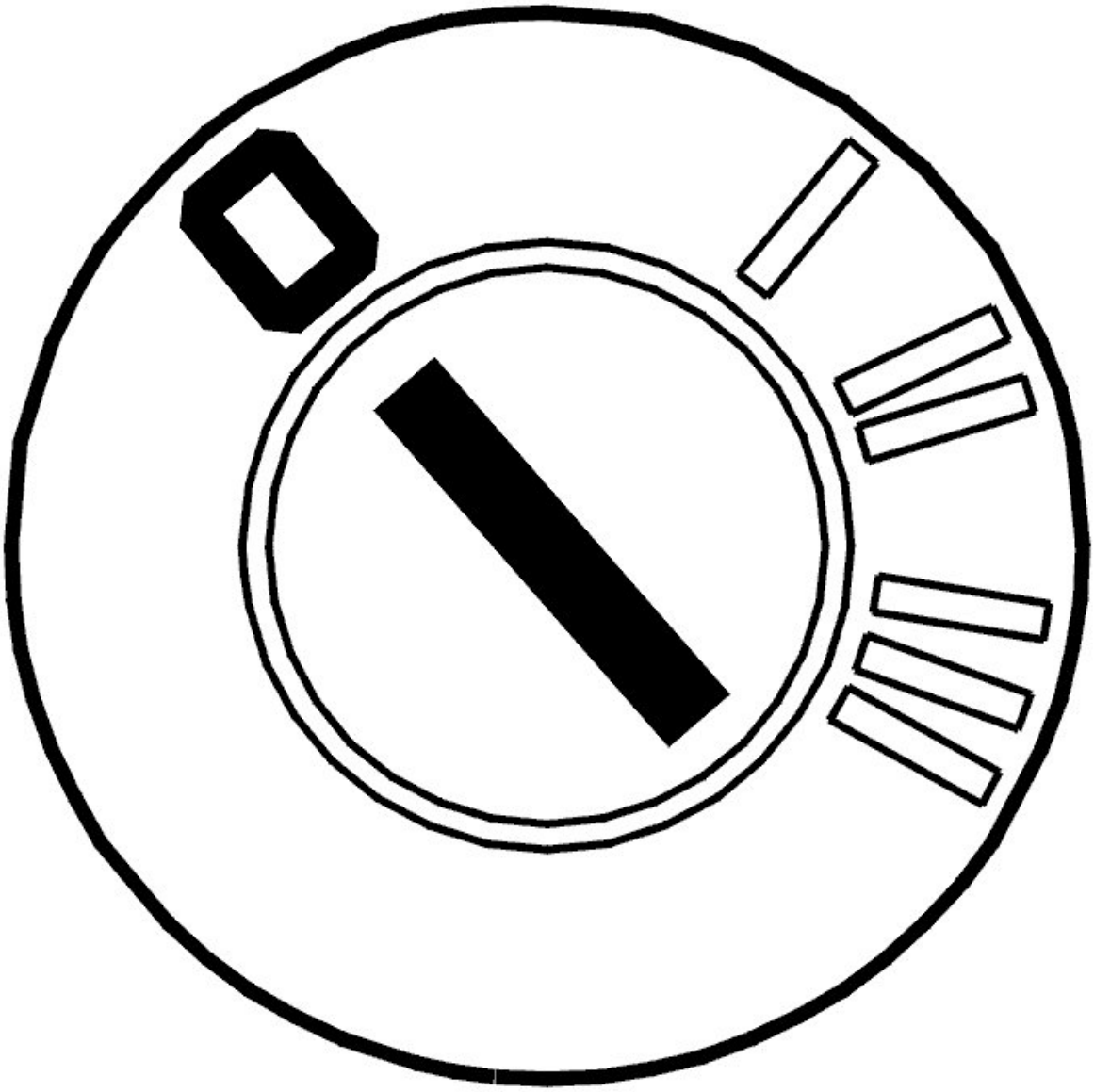
- To access and replace the left-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

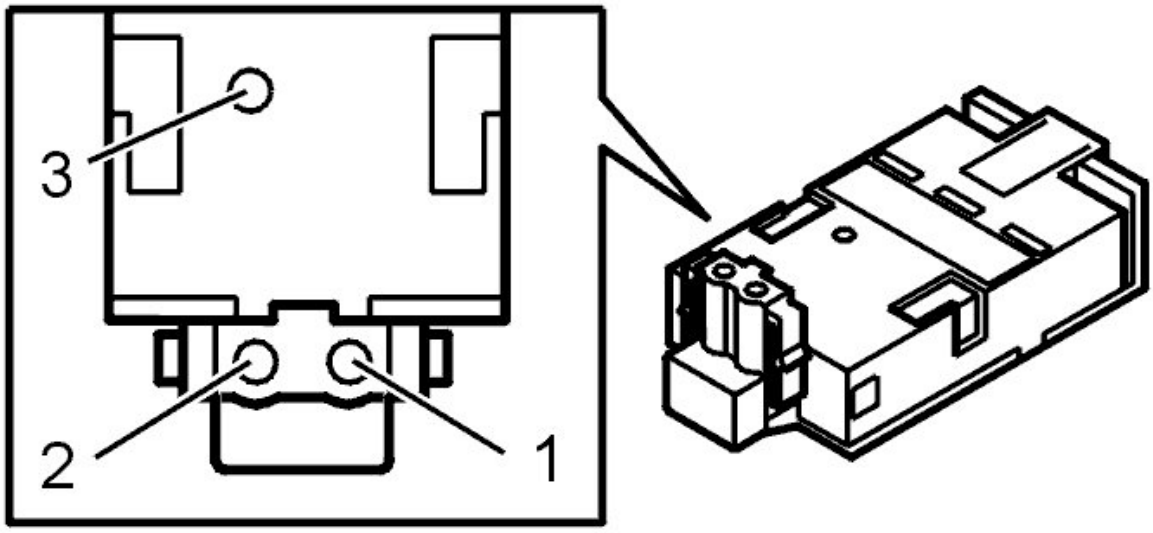
Check the cable between the control module for the SRS terminals #A21 (21), #A22 (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

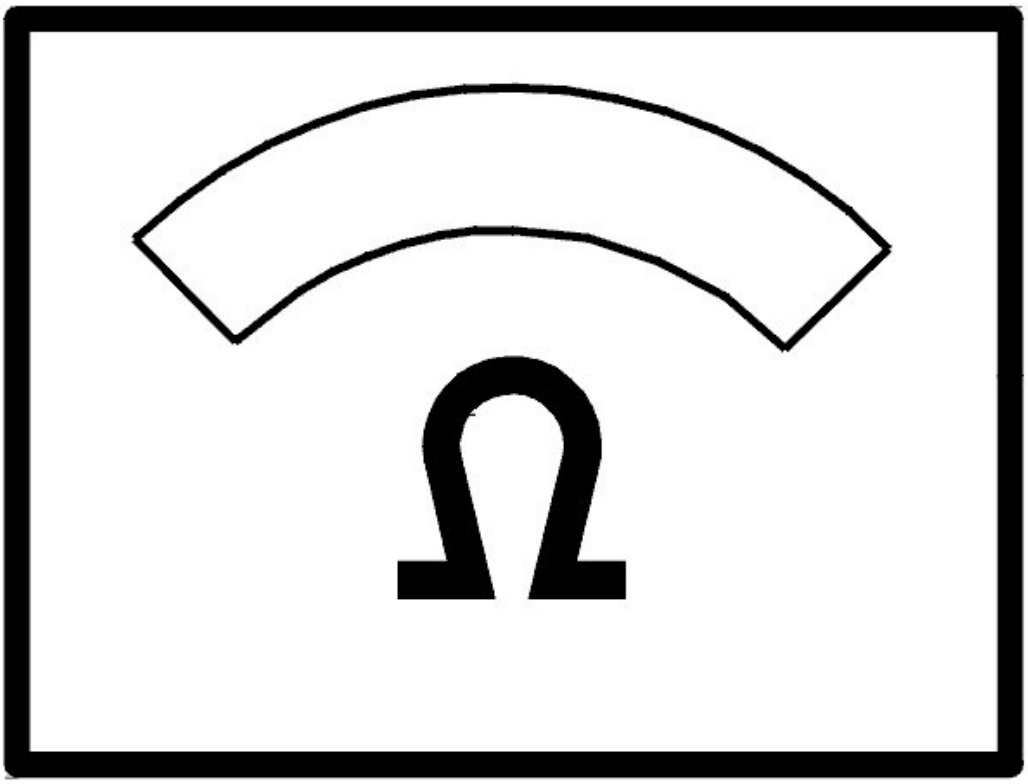
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with both the connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy

connected, the resistance between terminals #21A (21) and #22A (22) on the control module connector for the SRS system (inflatable curtain side) should be infinite

- With the ignition off and the connectors for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





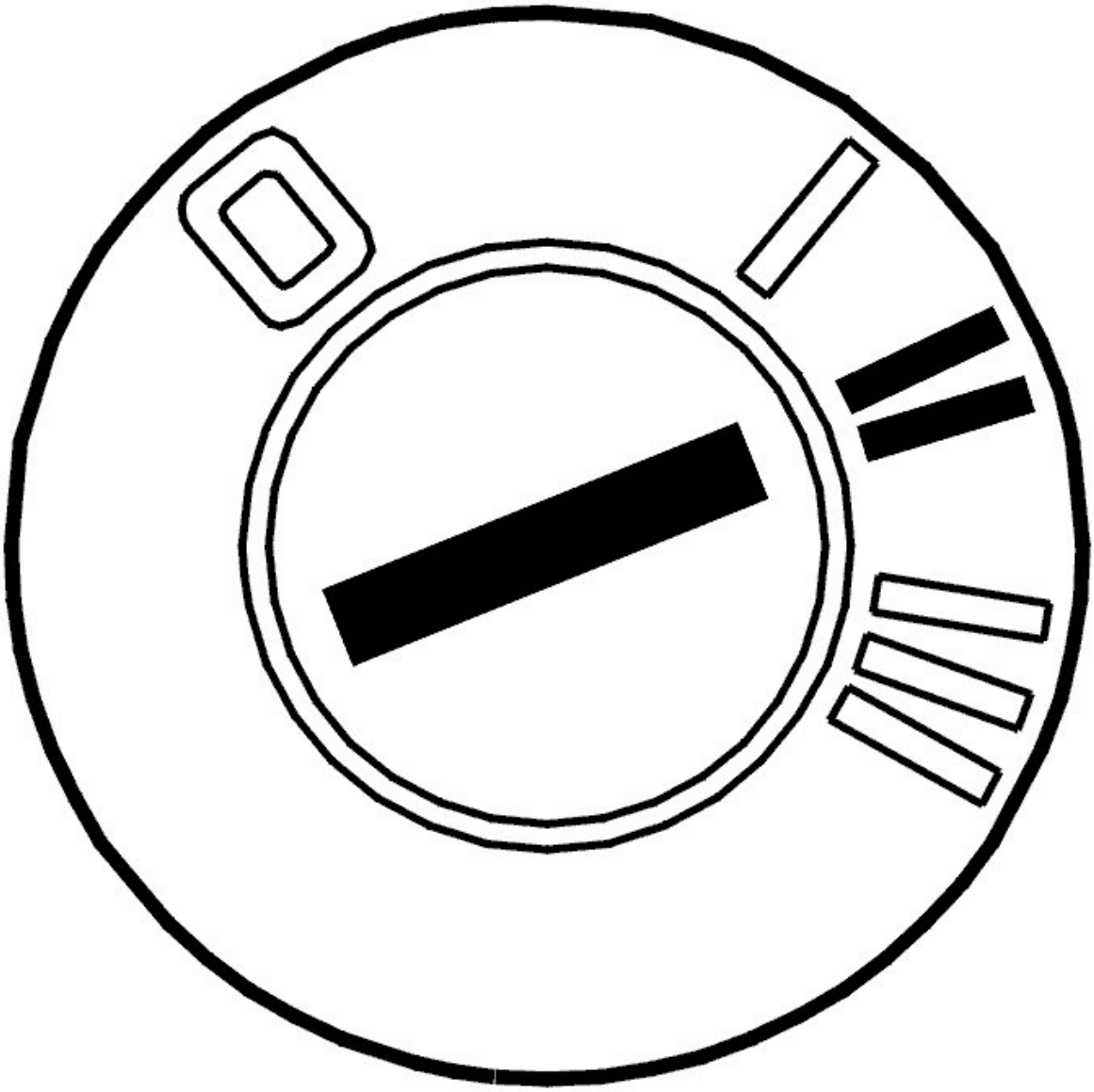
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

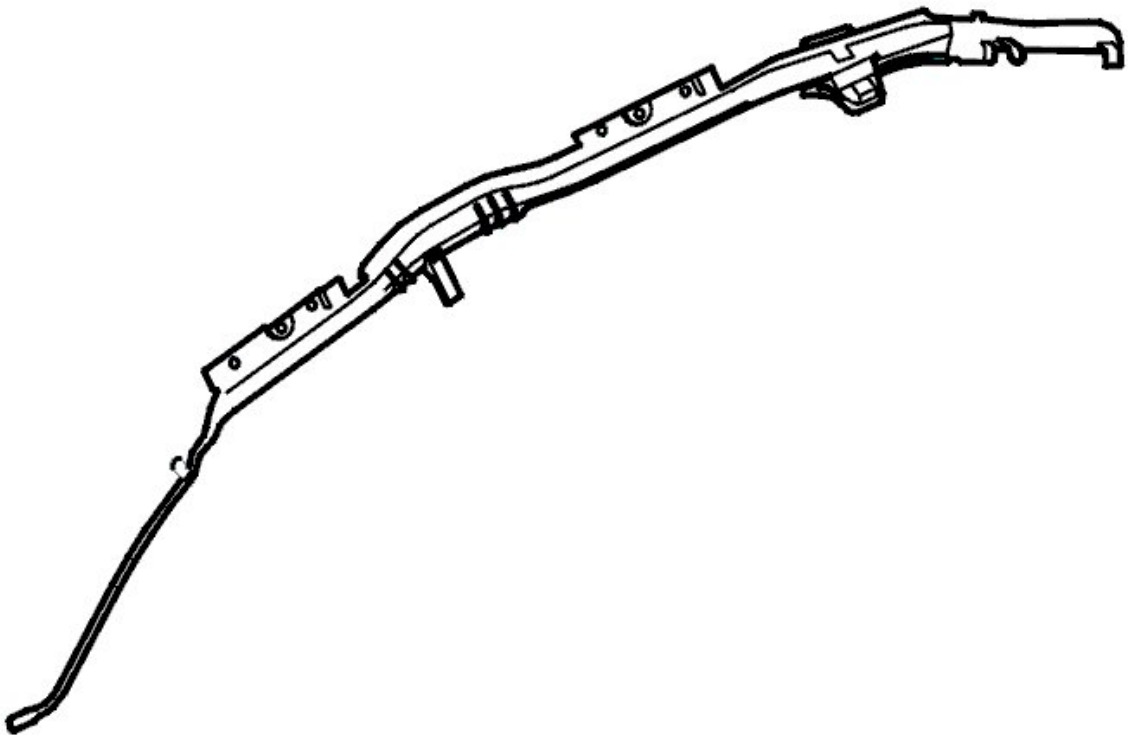
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-003D Diagnostic trouble code information

Condition



If the circuit resistance is low for more than 10 seconds, diagnostic trouble code SRS-003D is displayed.

Substitute value
- Nothing.

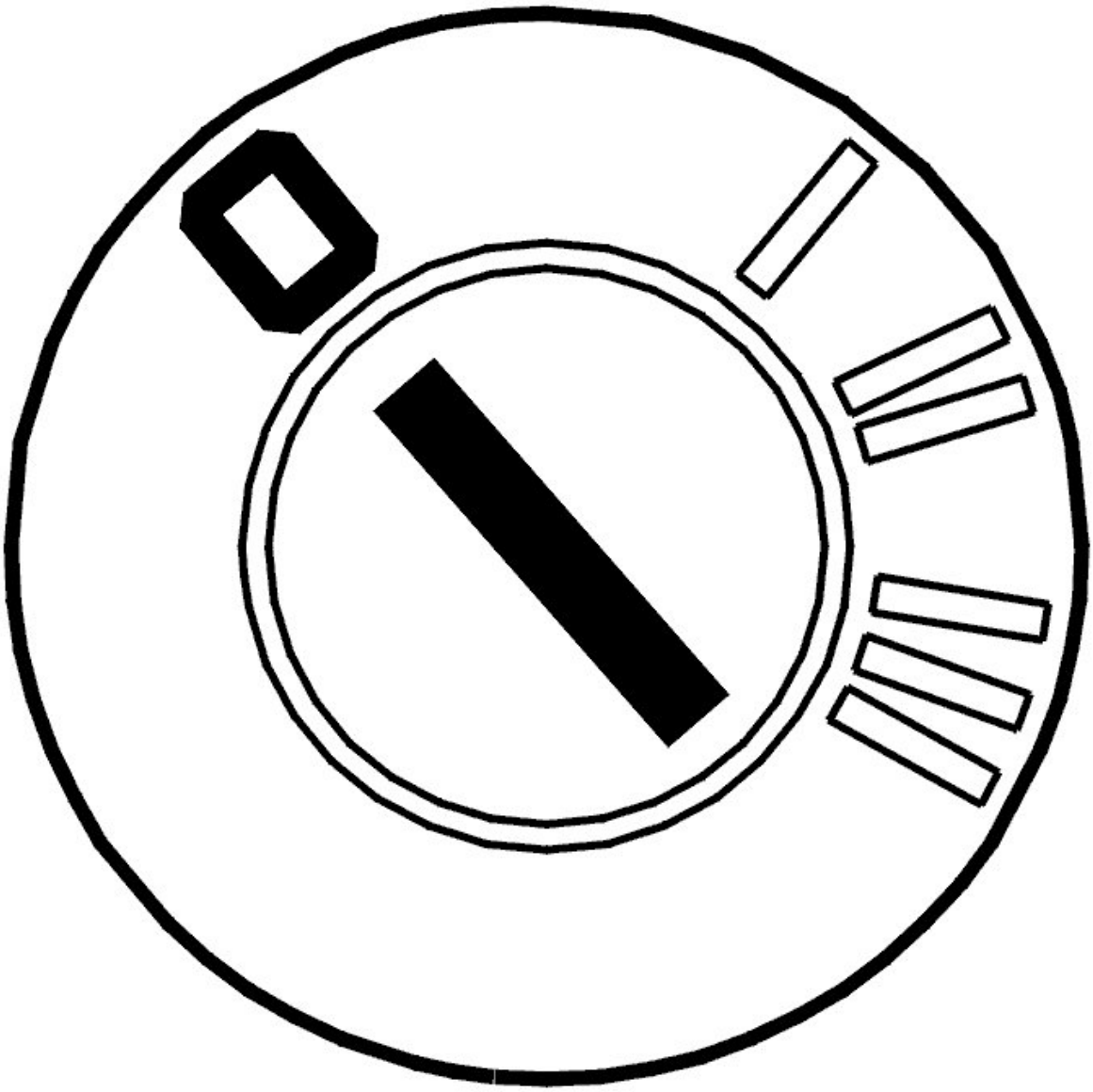
Possible source
- Short circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit in inflatable curtain (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

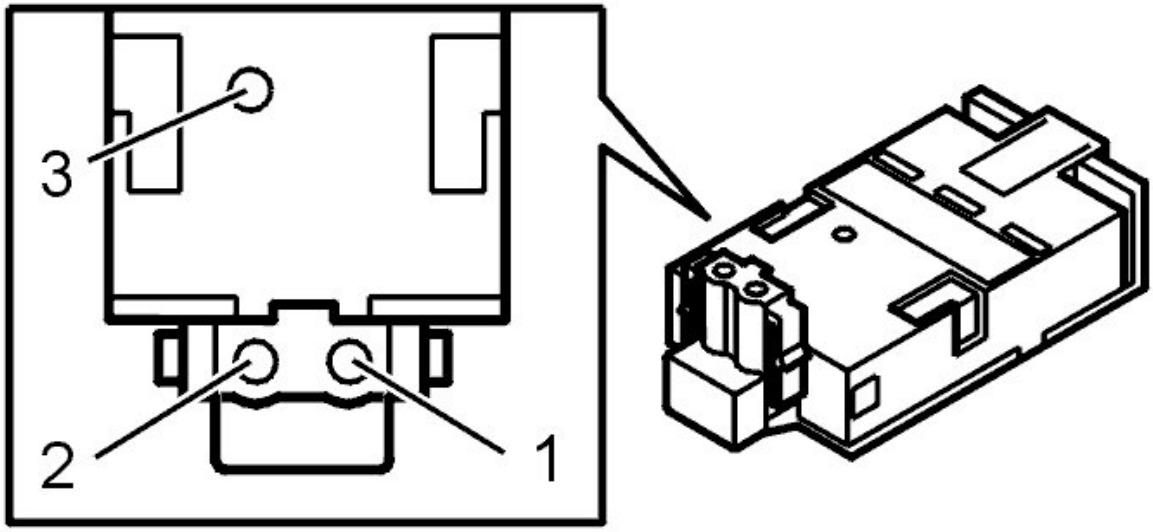
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between the SRS control module terminals #21A (21) and #22A (22) and connector terminals #1 and #3 on the left-hand inflatable curtain for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

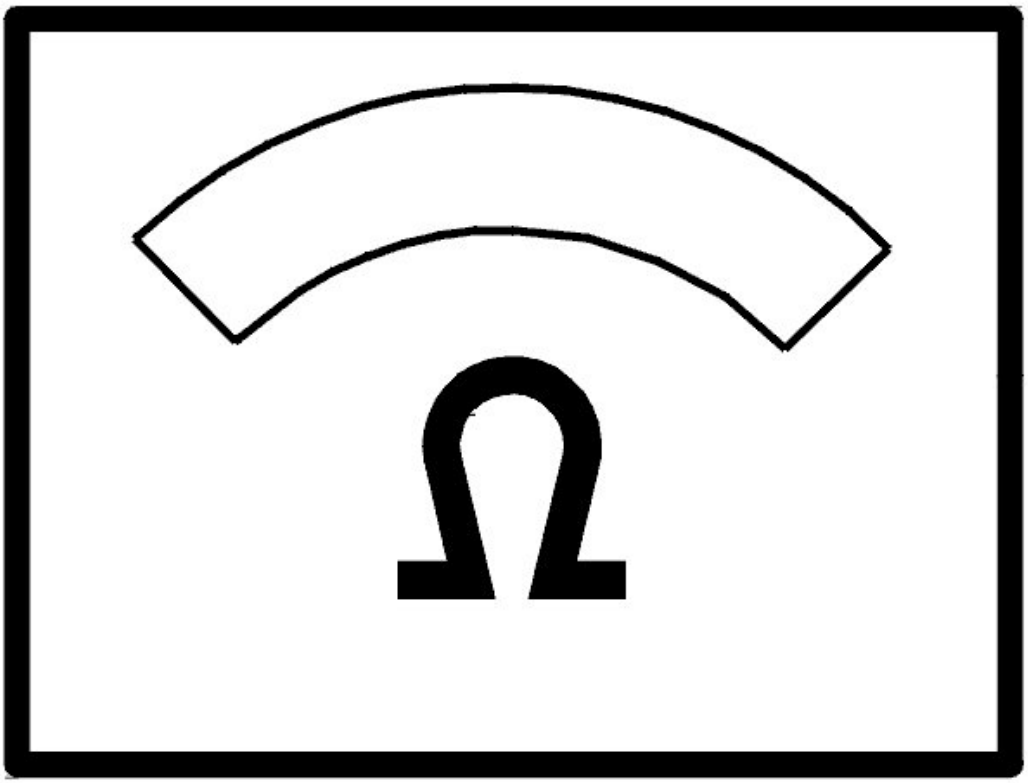
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the left-hand inflatable curtain (IC), see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the left-hand inflatable curtain connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #A21 (21) and #A22 (22) on the SRS control module connector (inflatable curtain side) should be infinite
- With the ignition off and the connector for the left-hand inflatable curtain and for the SRS control module disconnected, the resistance between terminals #1 and #3 of the inflatable curtain connector (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0036
SRS-003E
SRS-0046
SRS-004E
SRS-0056
SRS-005E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a side impact protection (SIPS) bag is installed, despite the control module being programmed that a side impact protection (SIPS) bag is not installed.

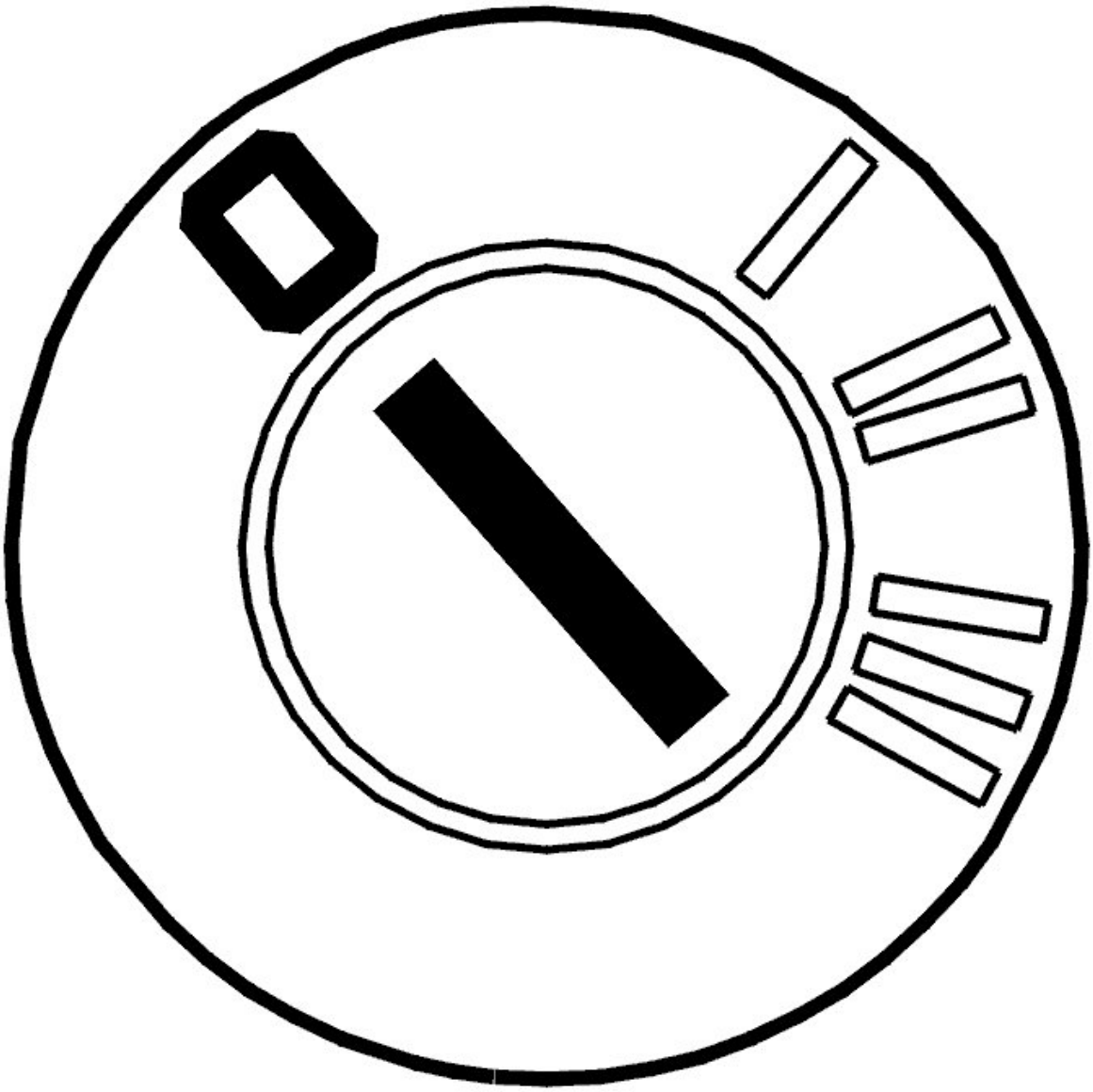
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

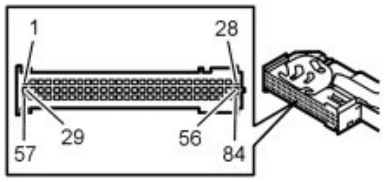


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

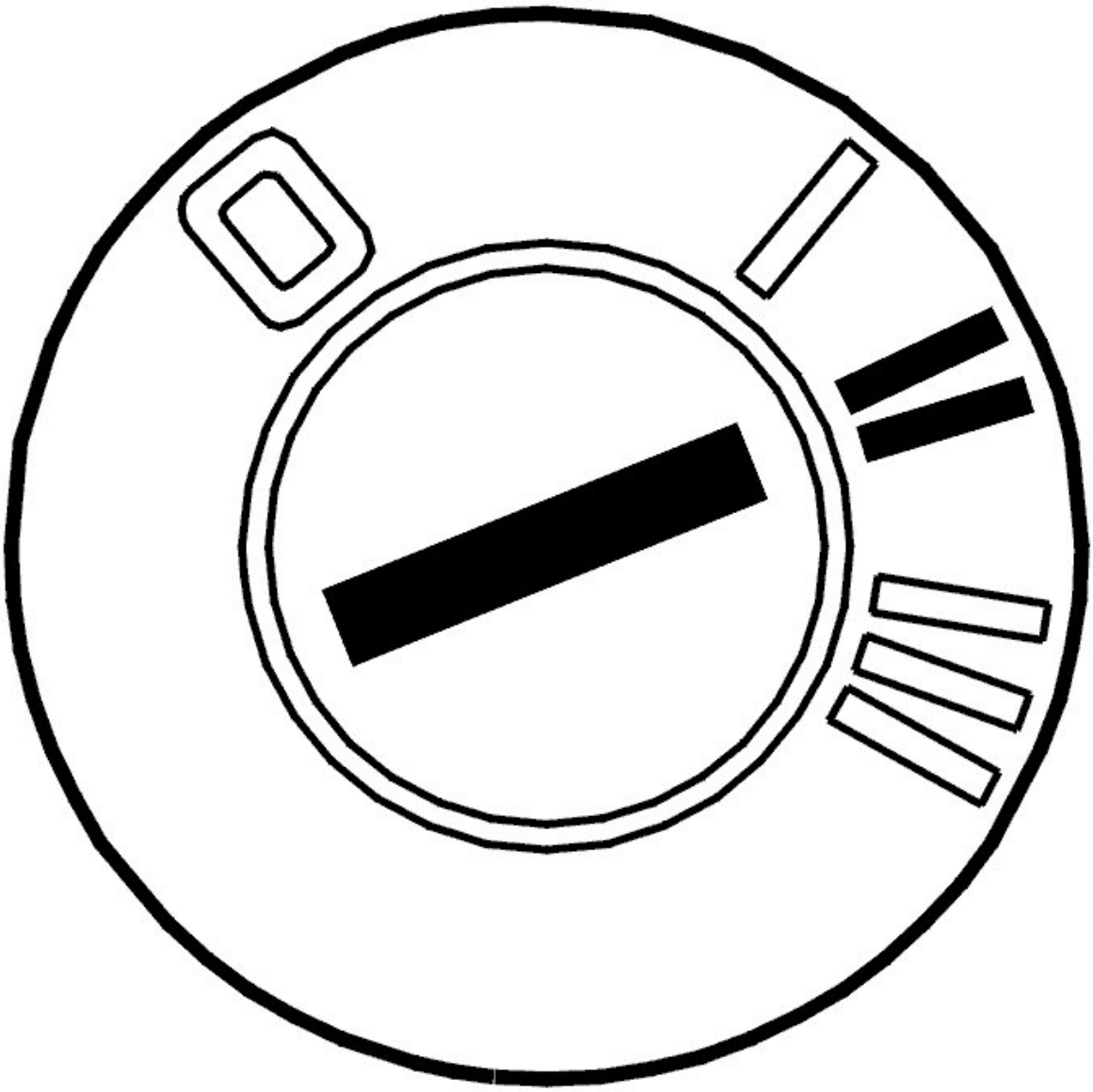
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

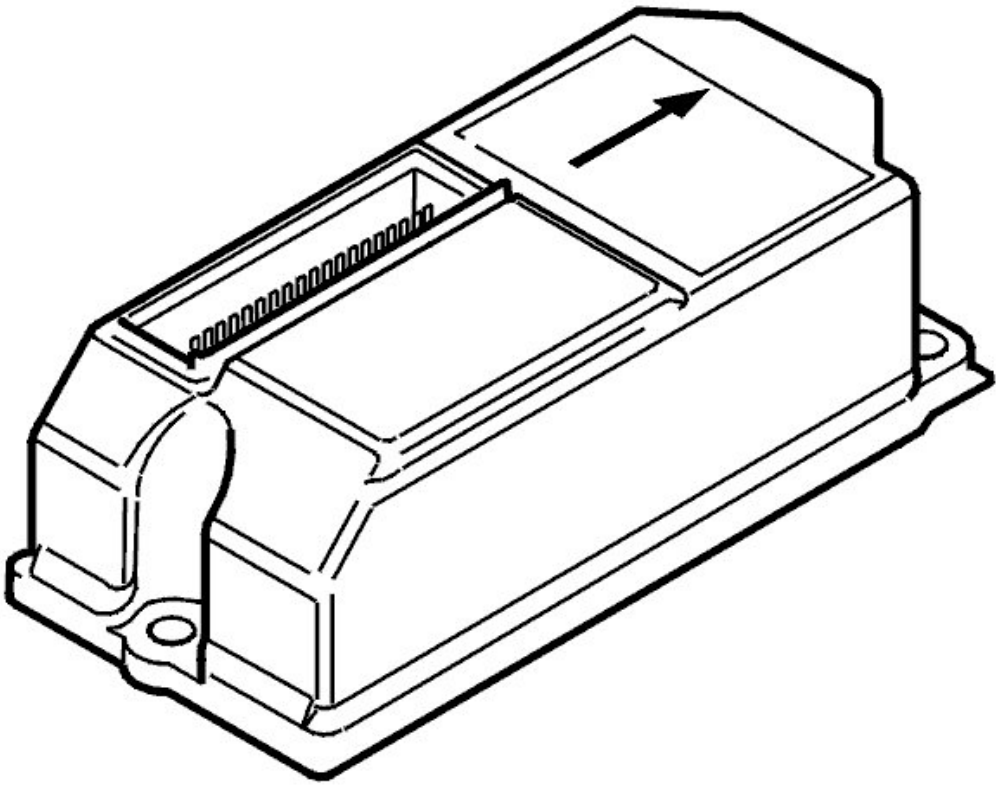
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

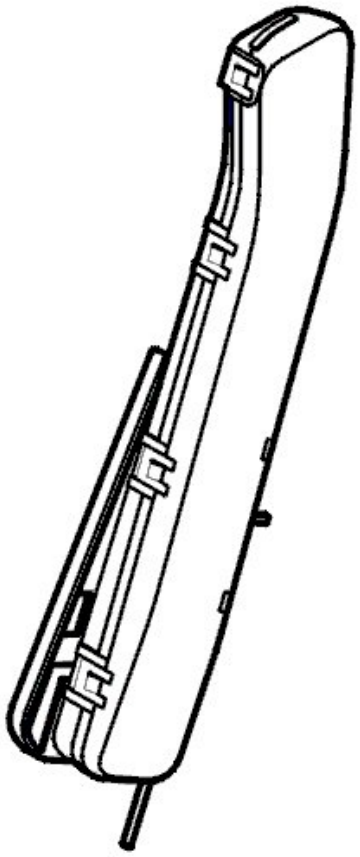
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0040 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0040 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to voltage supply in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in the front right side air bag.

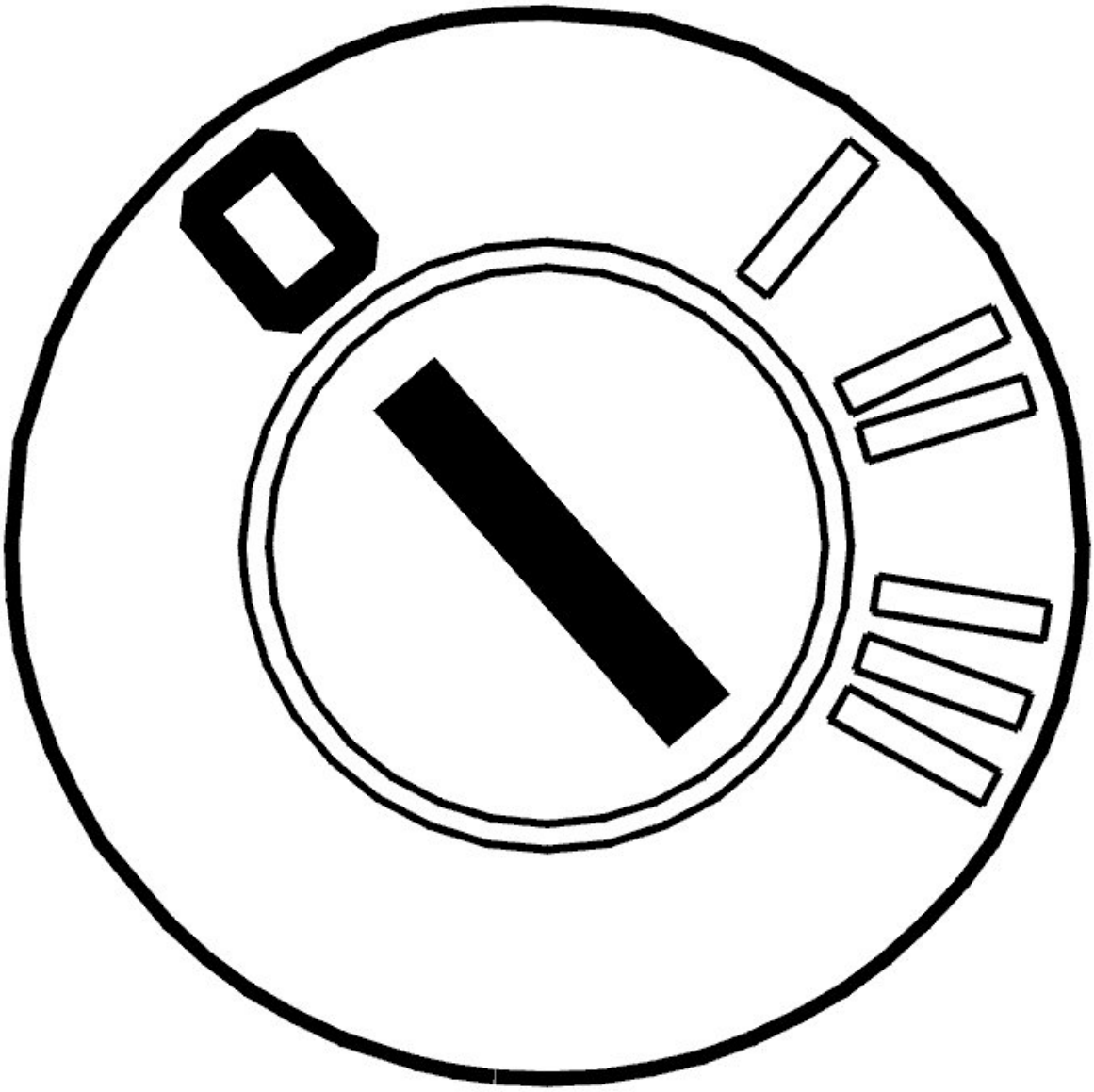
Fault symptom[s]

- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

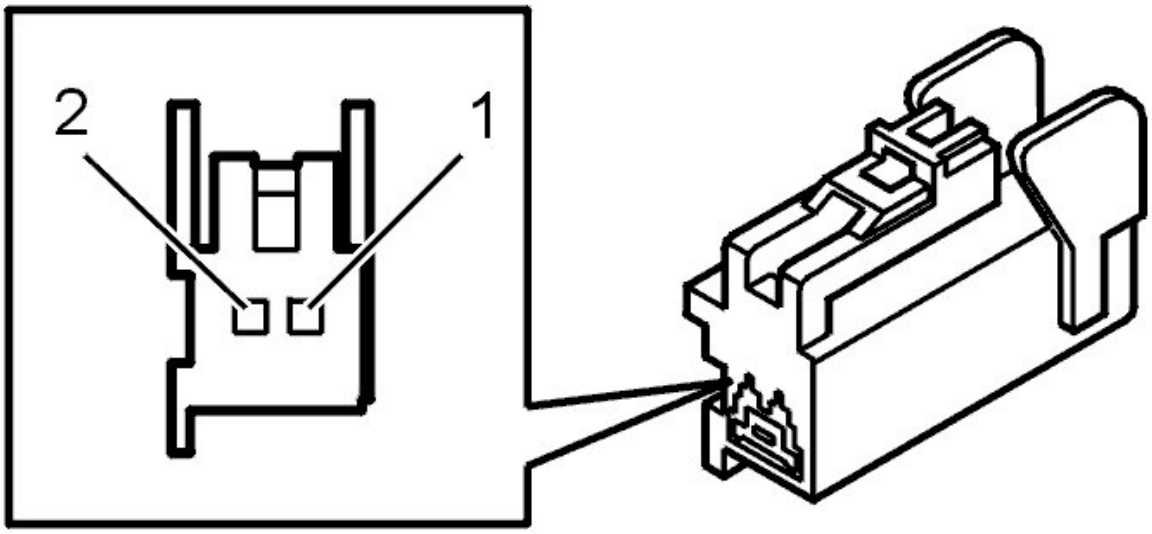
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

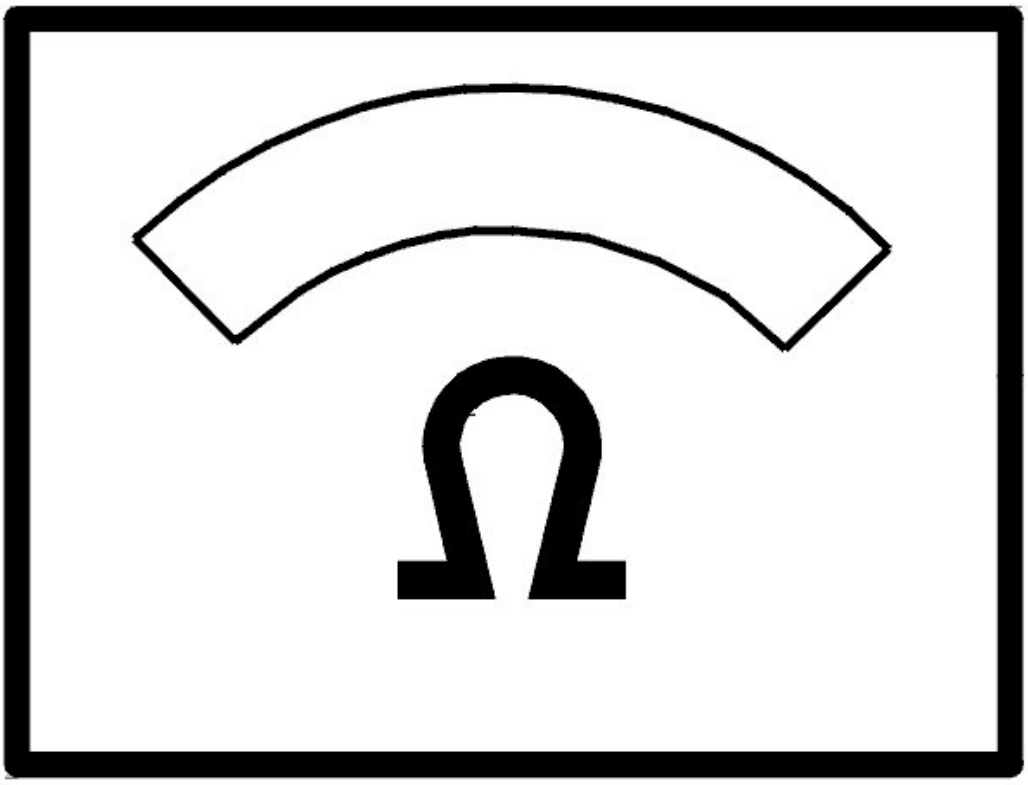
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

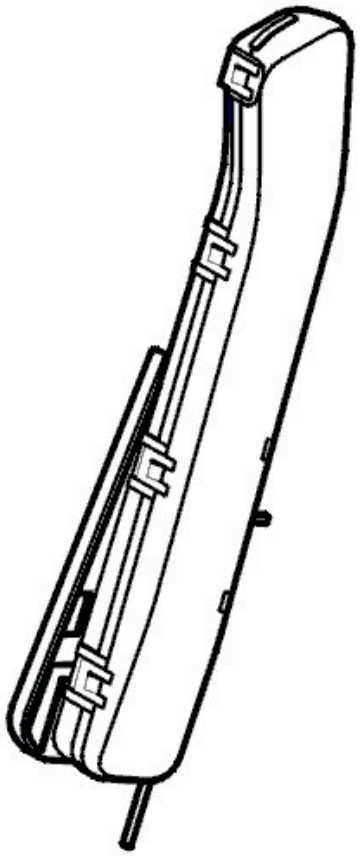
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0040 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0040 is displayed.

Substitute value
- Nothing.

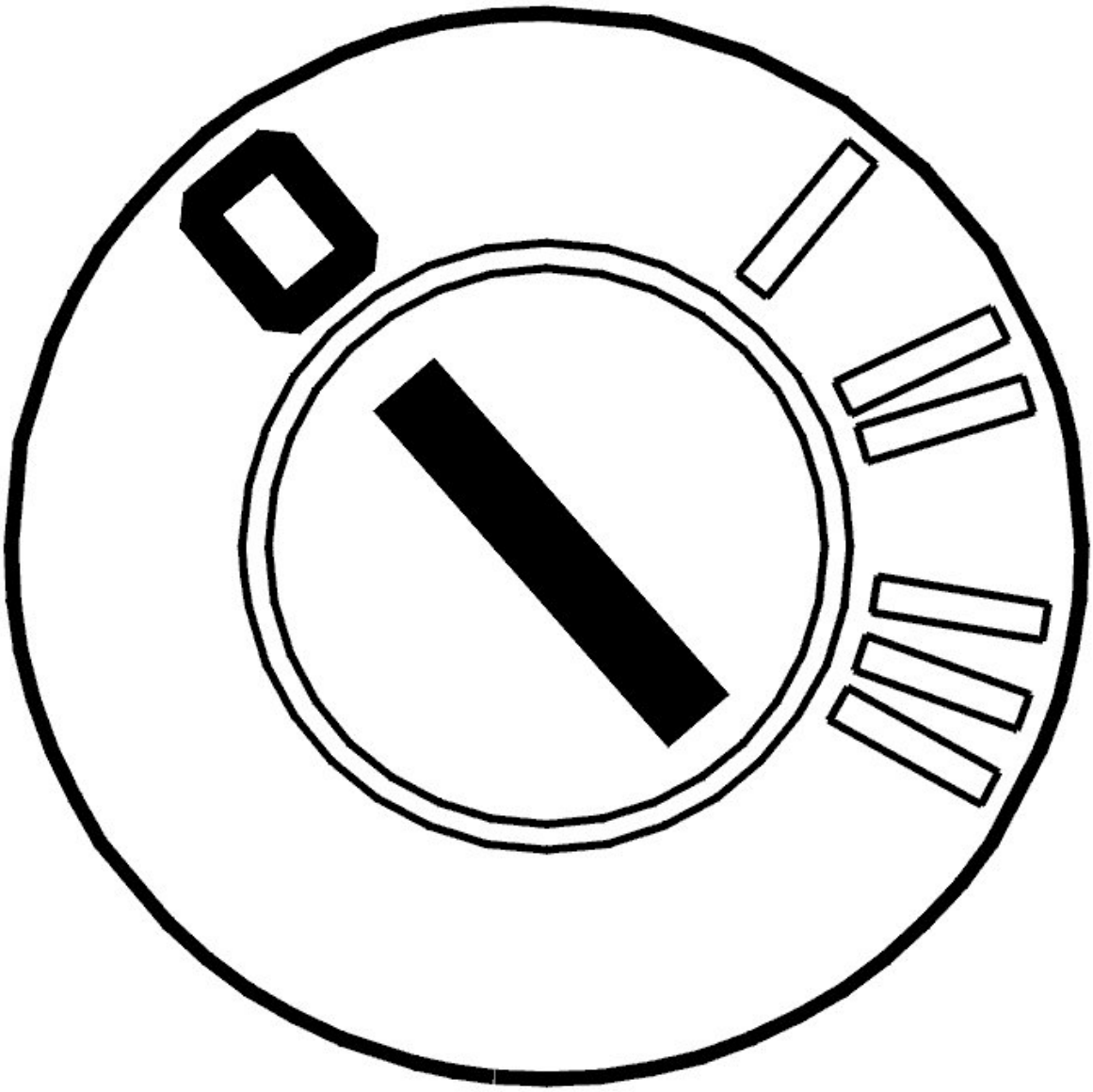
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in the front right side air bag.

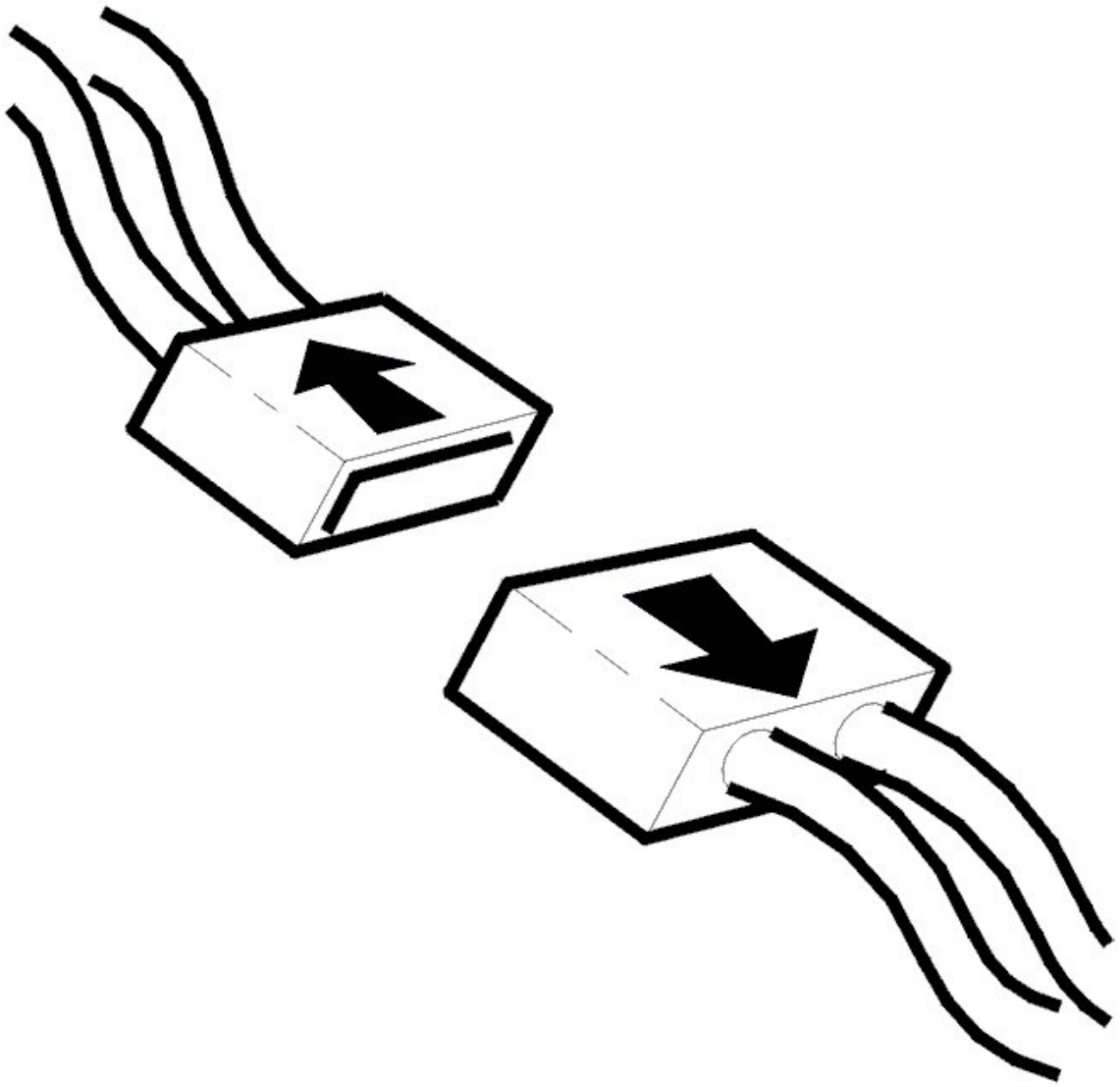
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

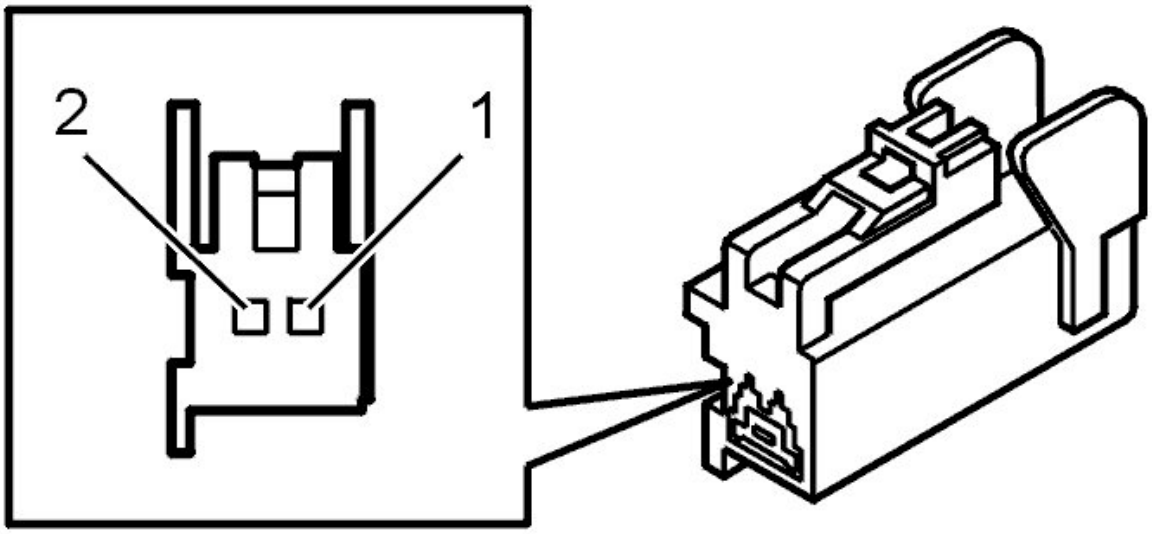
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

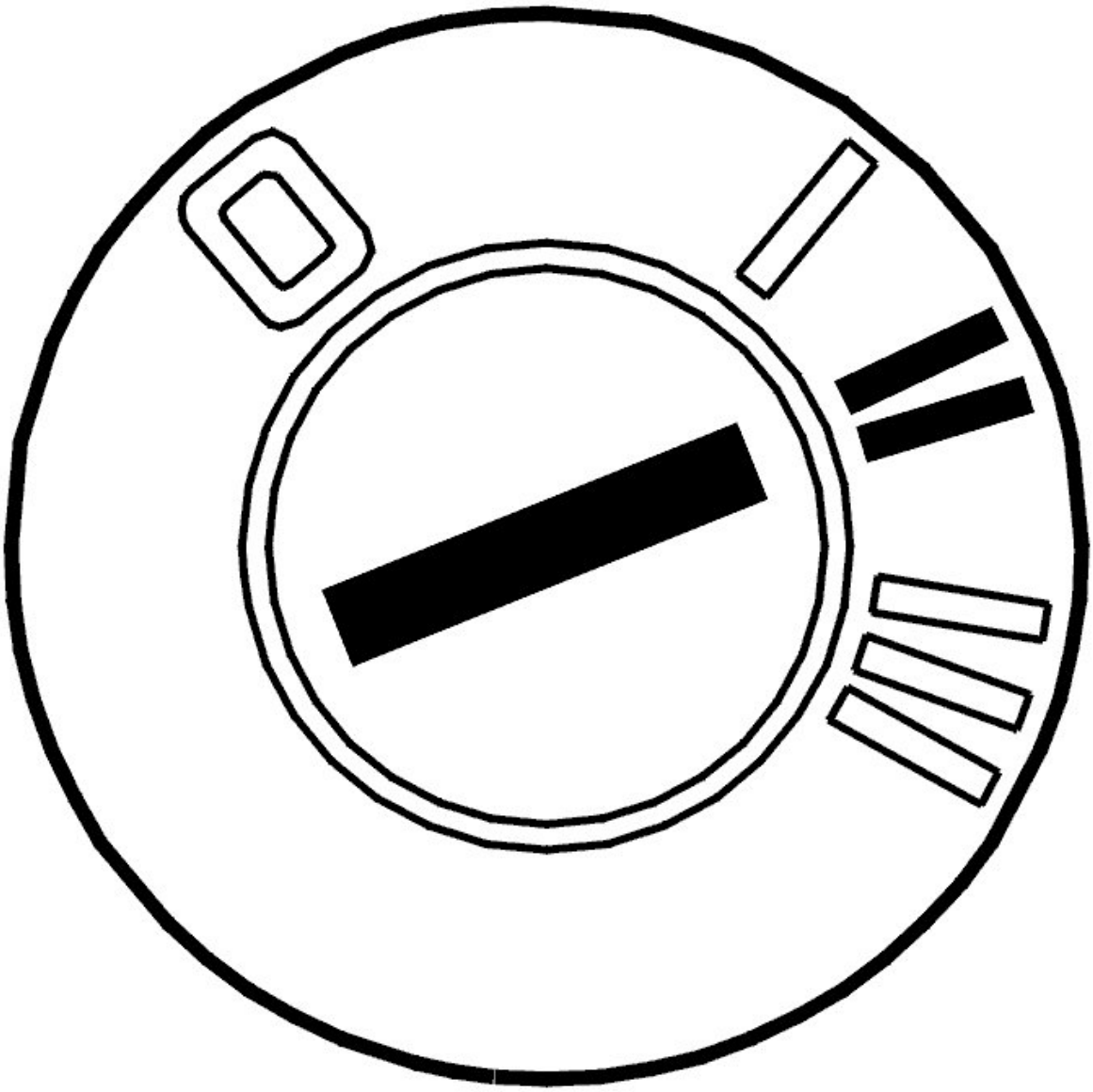
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

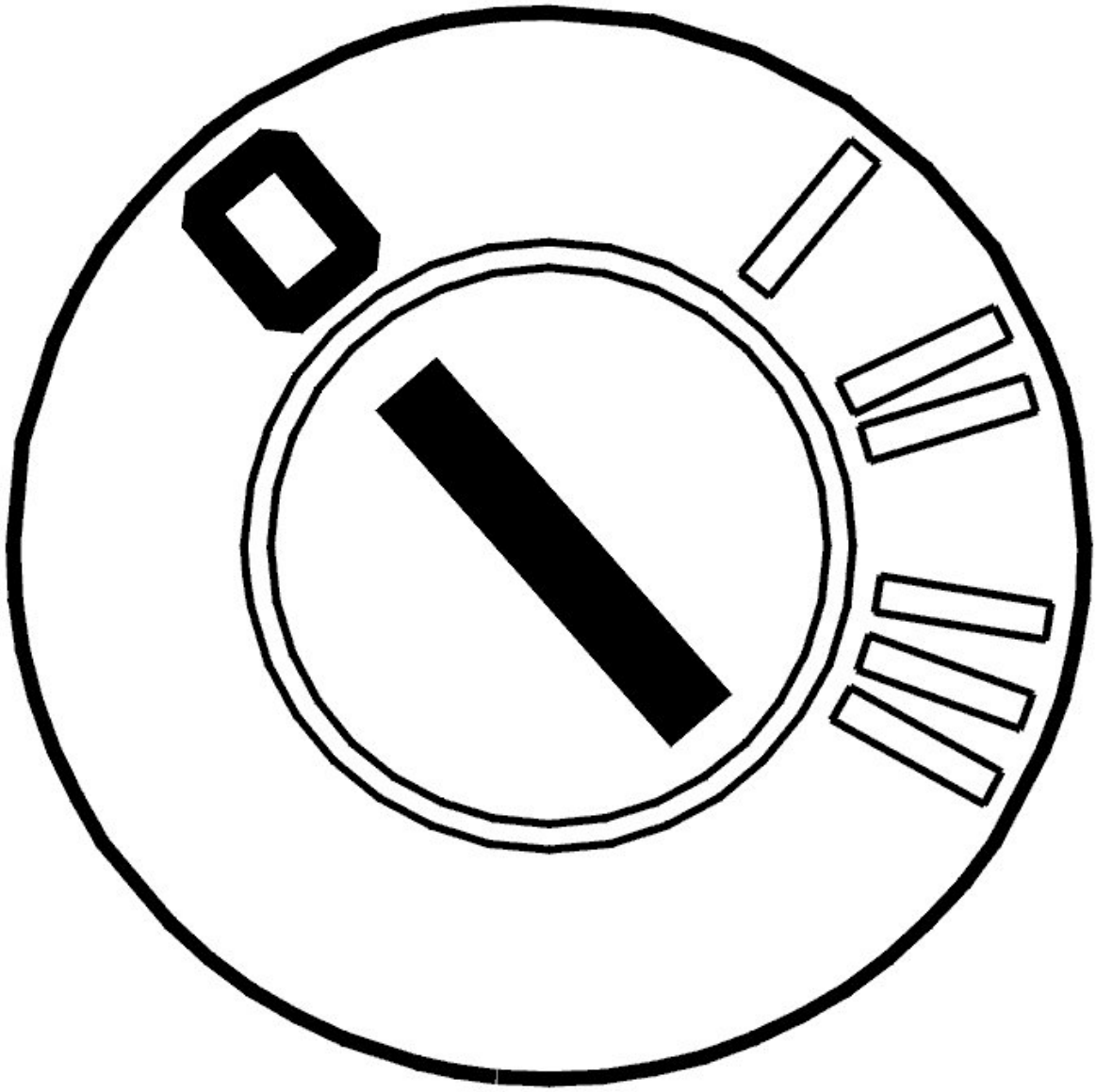
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the cable

Checking the resistance



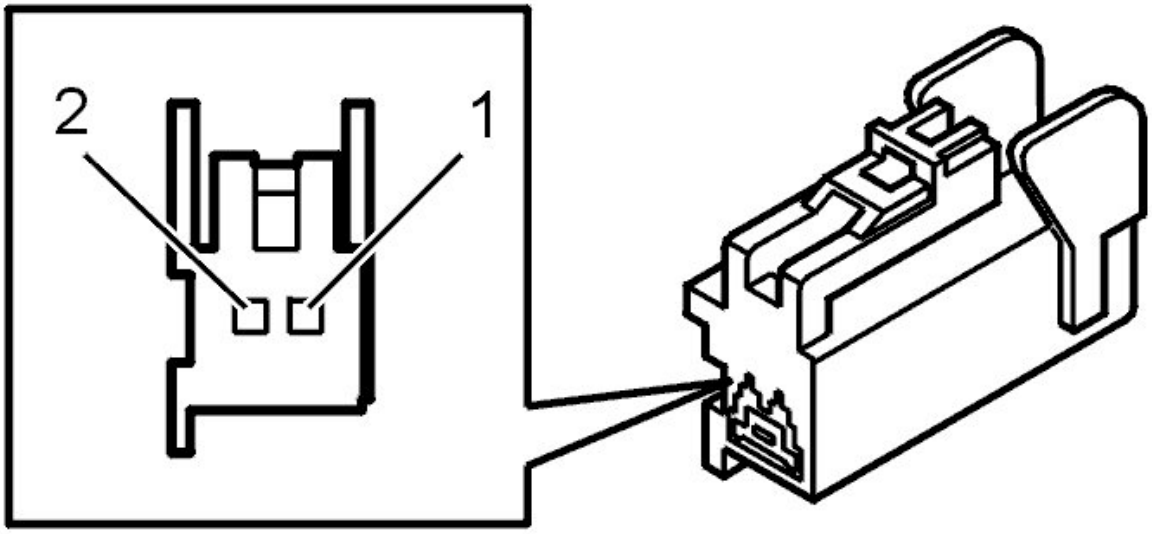
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

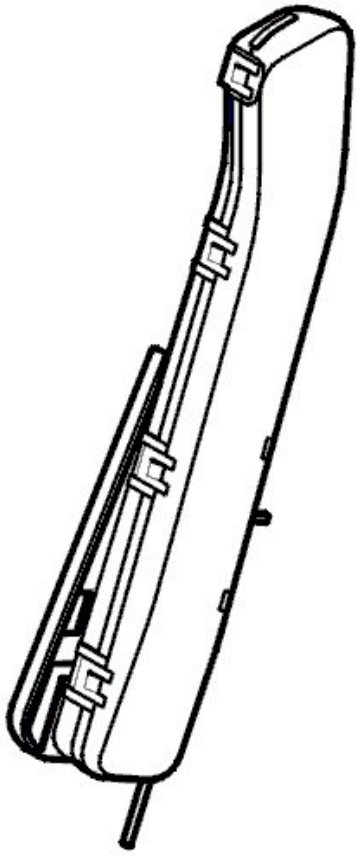
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0041 Diagnostic trouble code information

Condition



If the circuit voltage is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0041 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit.

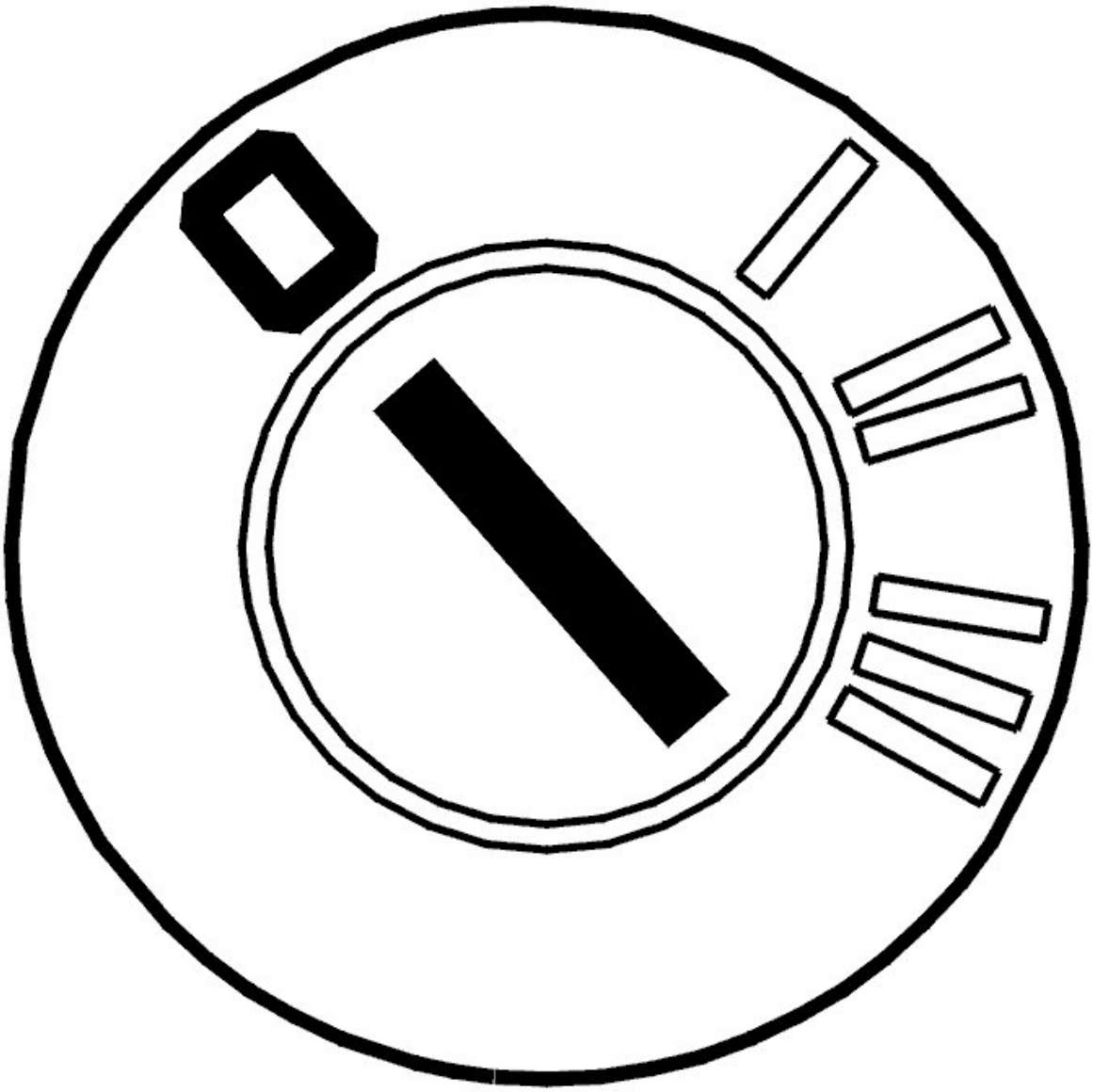
- Short circuit to ground in the front right side air bag.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

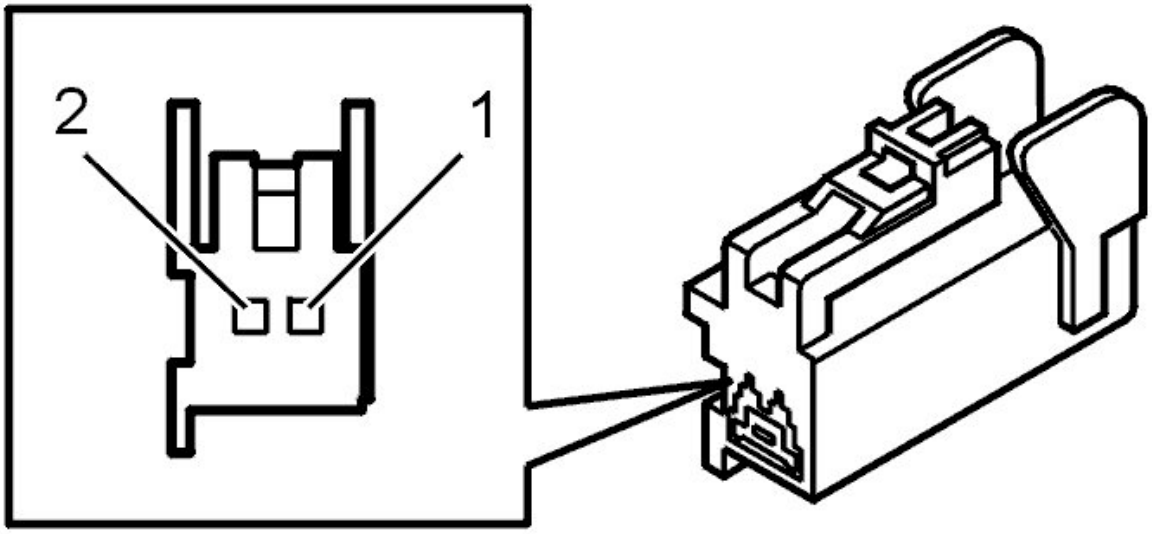
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

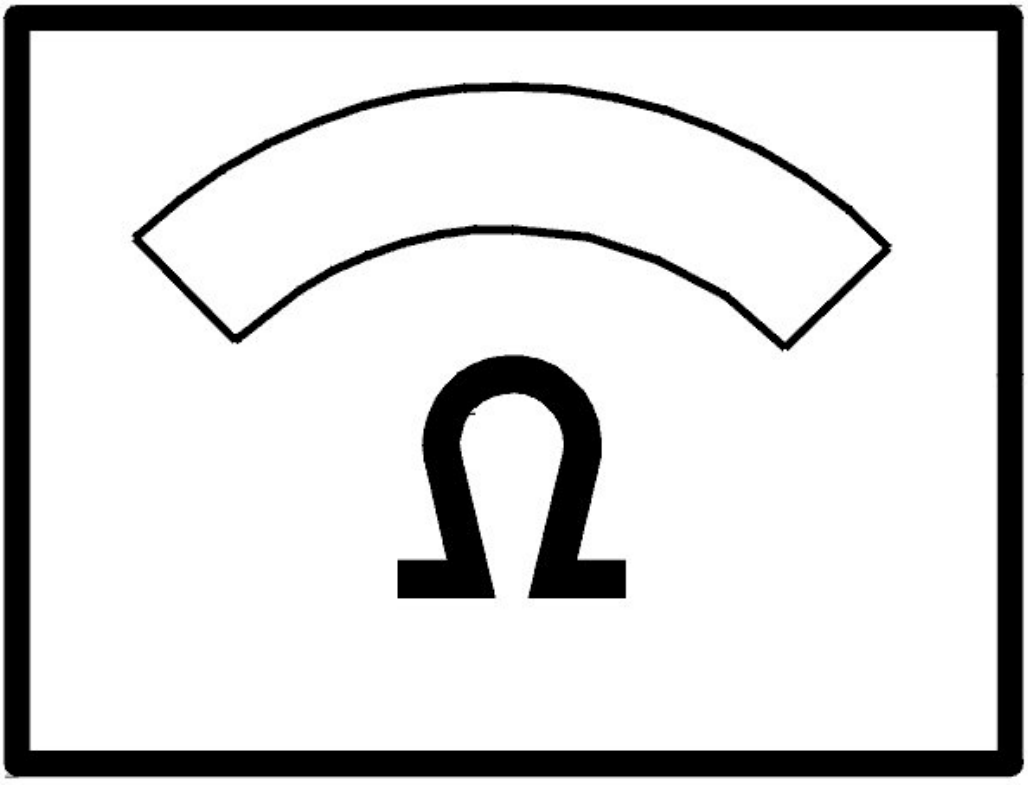
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite

- With the ignition off and the 2-pin connector disconnected, the resistance between the 2-pin connector terminals #1 and #2 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

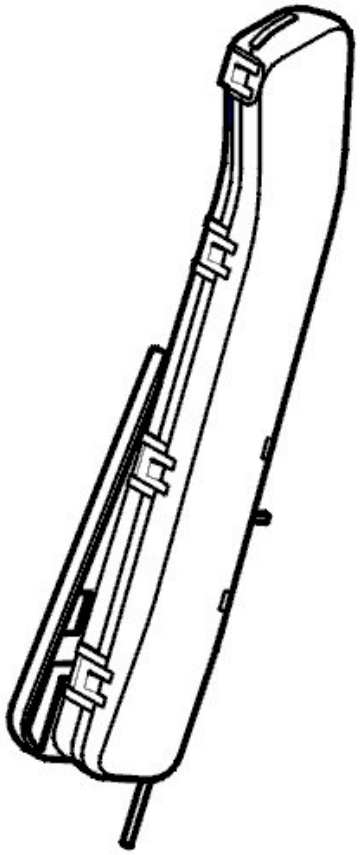
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0041 Diagnostic trouble code information

Condition



If the circuit voltage is low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0041 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in igniter wire or connectors between the front left/right side air bags and the supplemental restraint system (SRS) control unit.

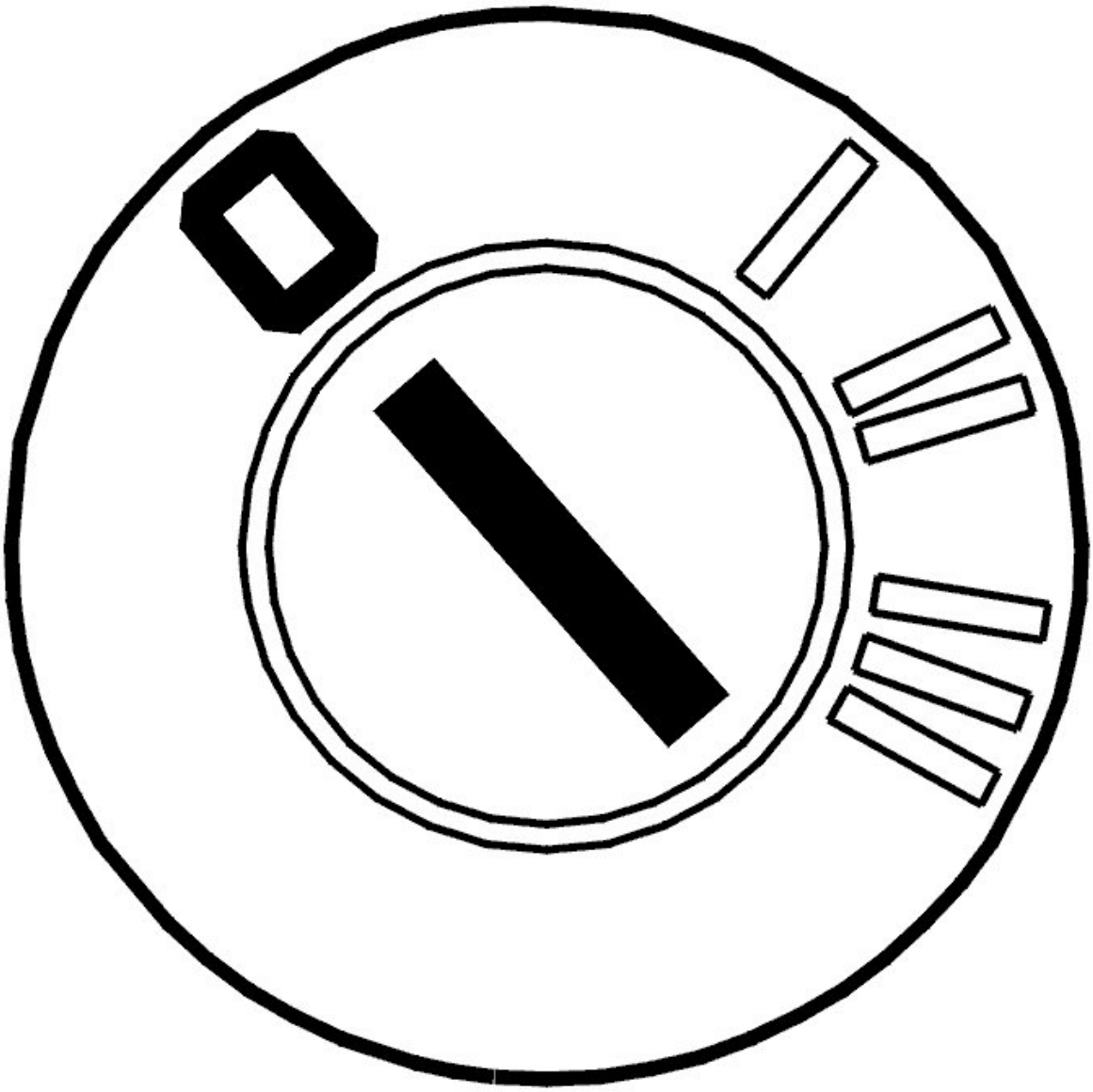
- Short circuit to ground in the front right side air bag.

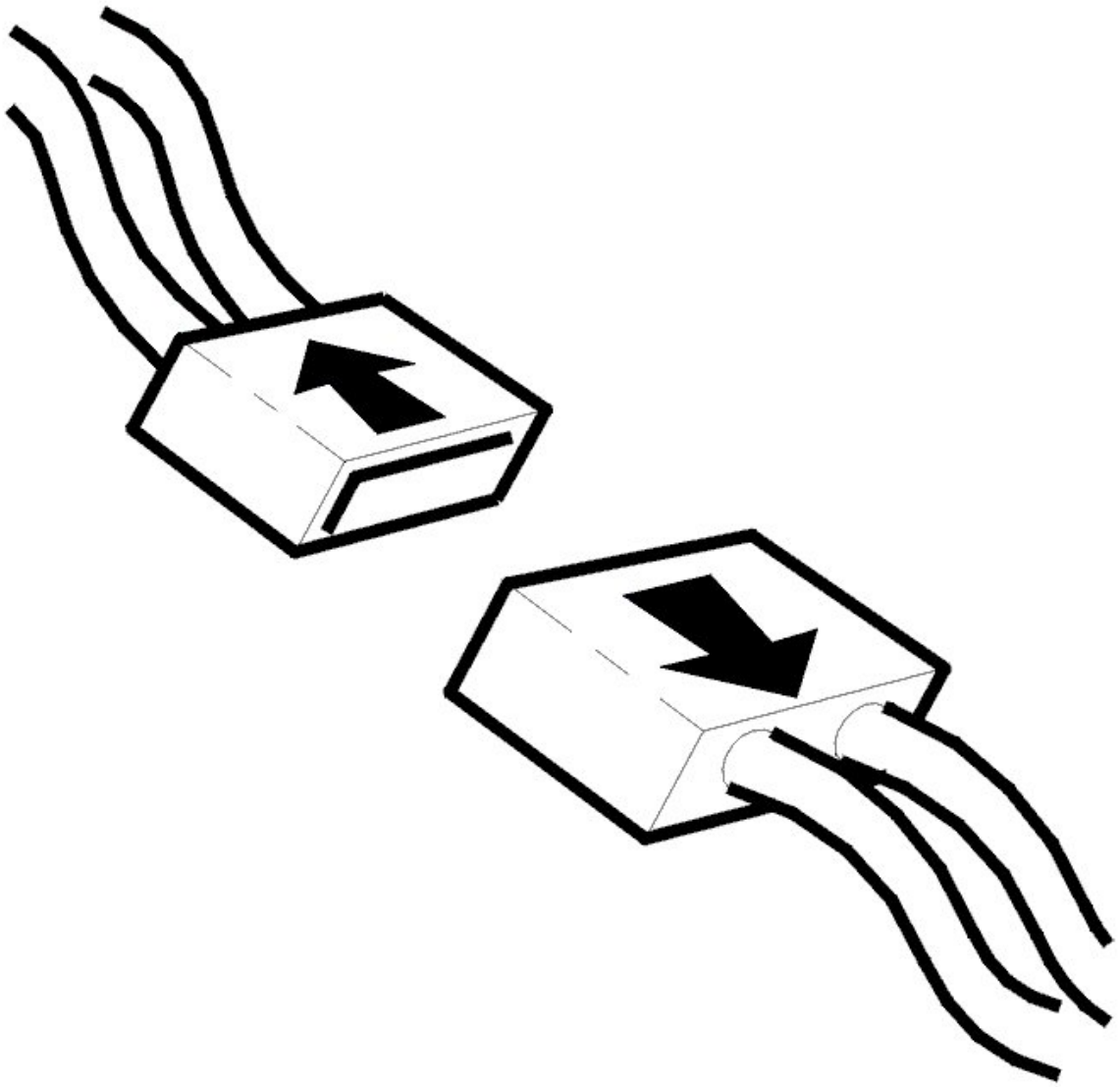
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

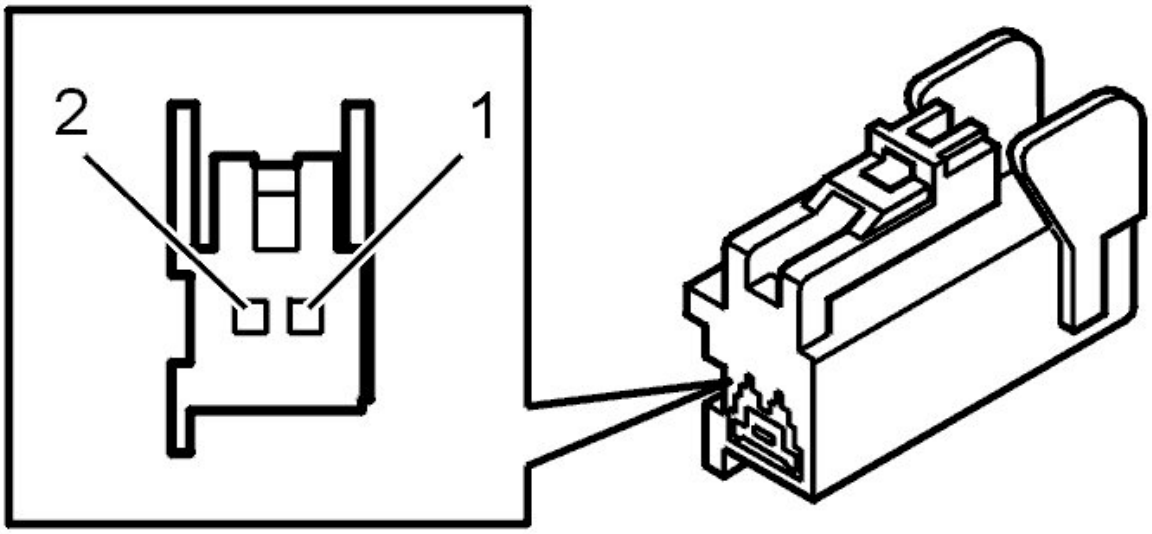
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4C (60) and the 2-pin connector terminal #1. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between the SRS control module terminal #3C (59) and the 2-pin connector terminal #2. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

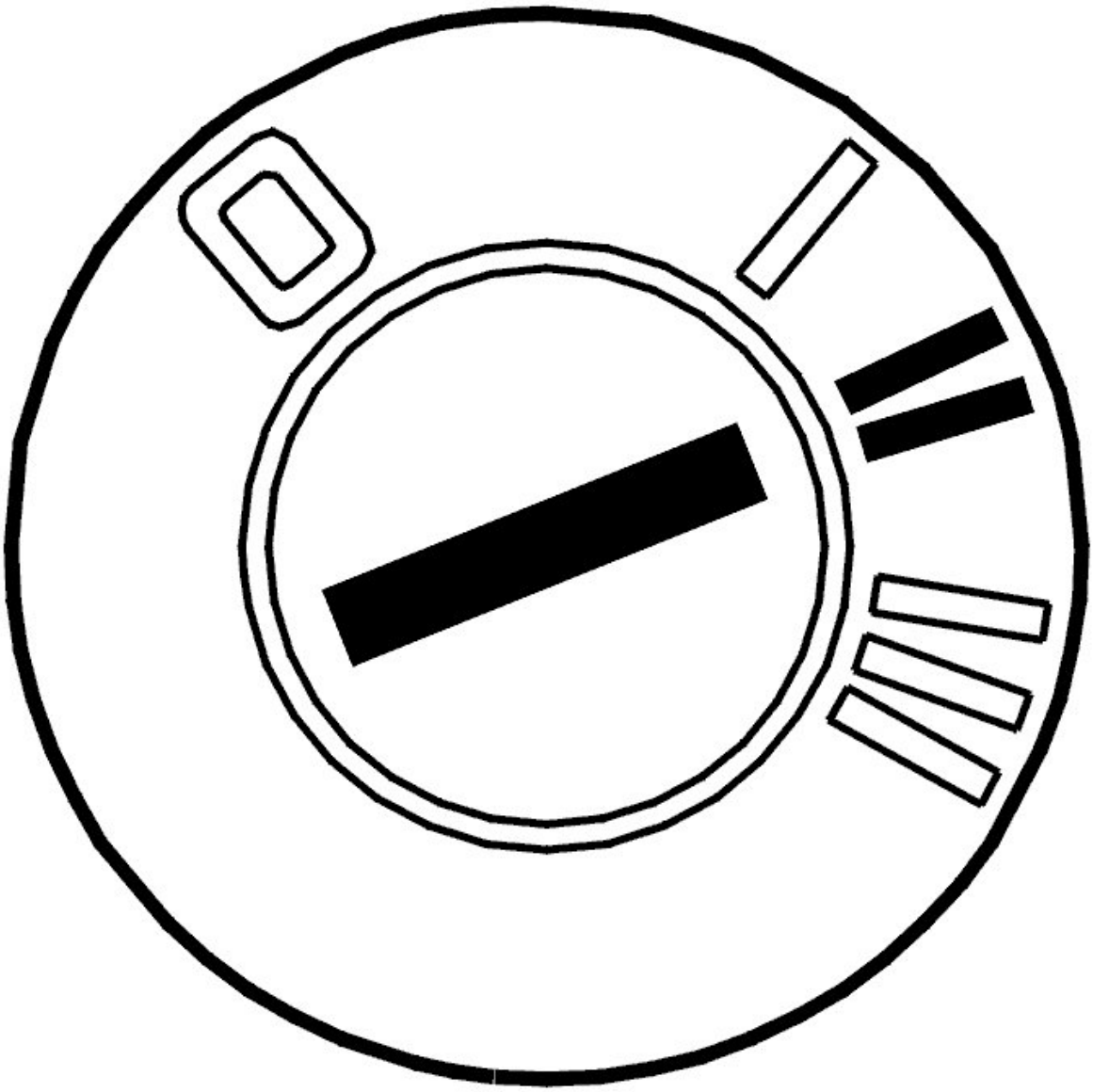
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

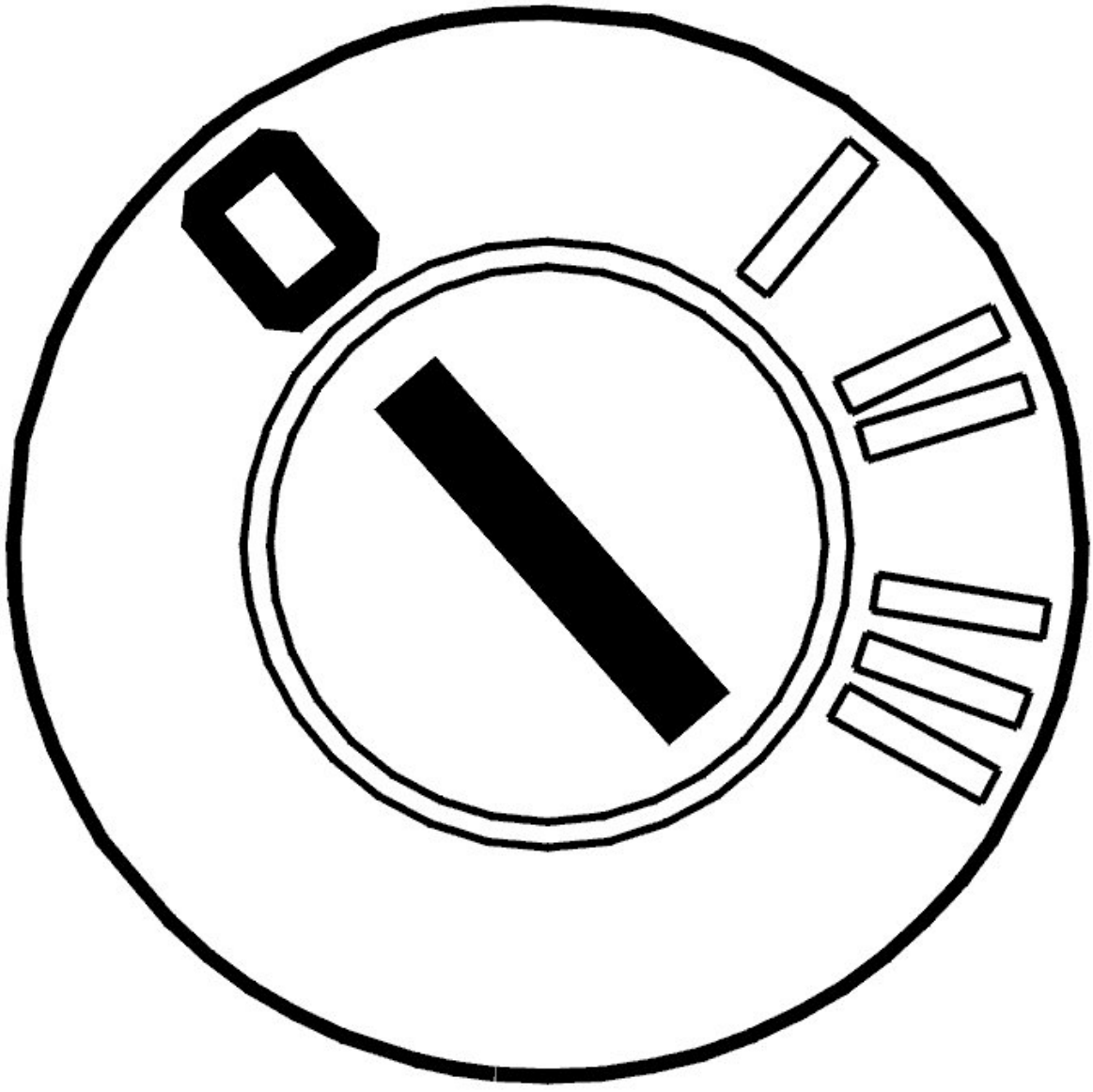
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance

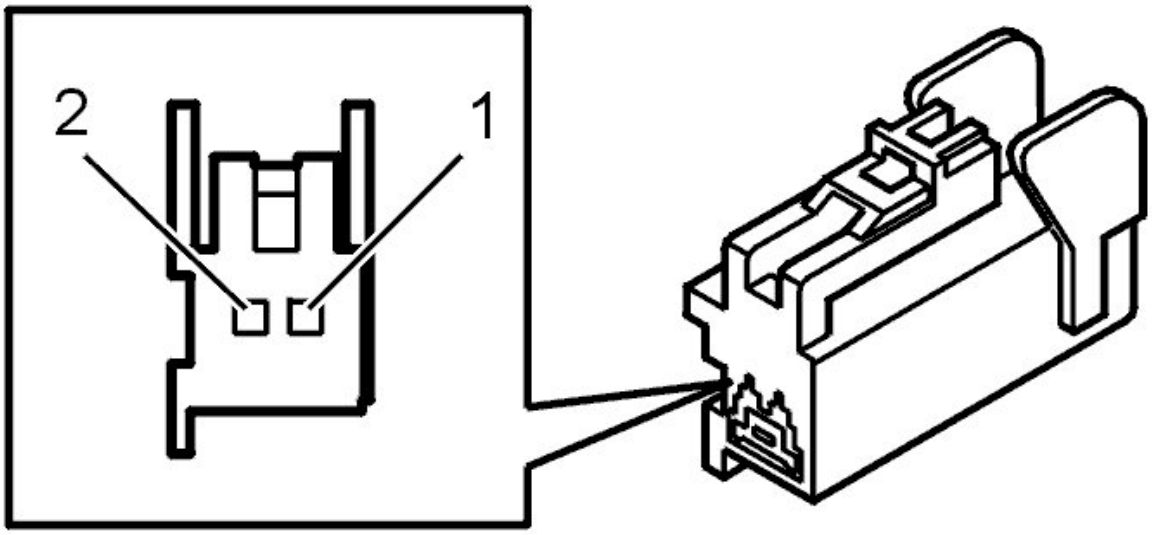


- Ignition off.
- Disconnect the 2-pin connector under the left-hand seat.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).
The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

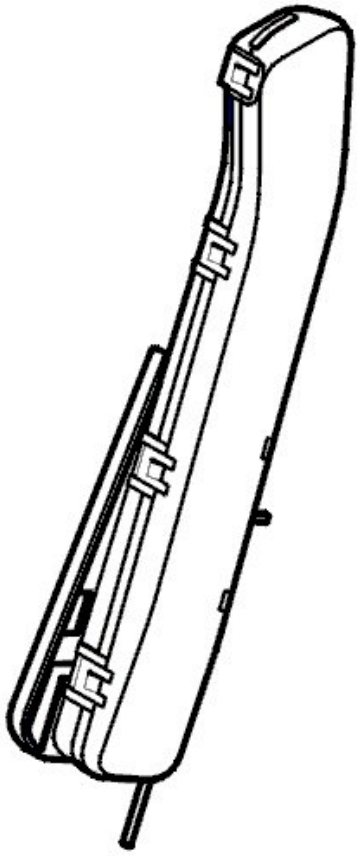
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0042 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0042 is displayed.

Substitute value
- Nothing.

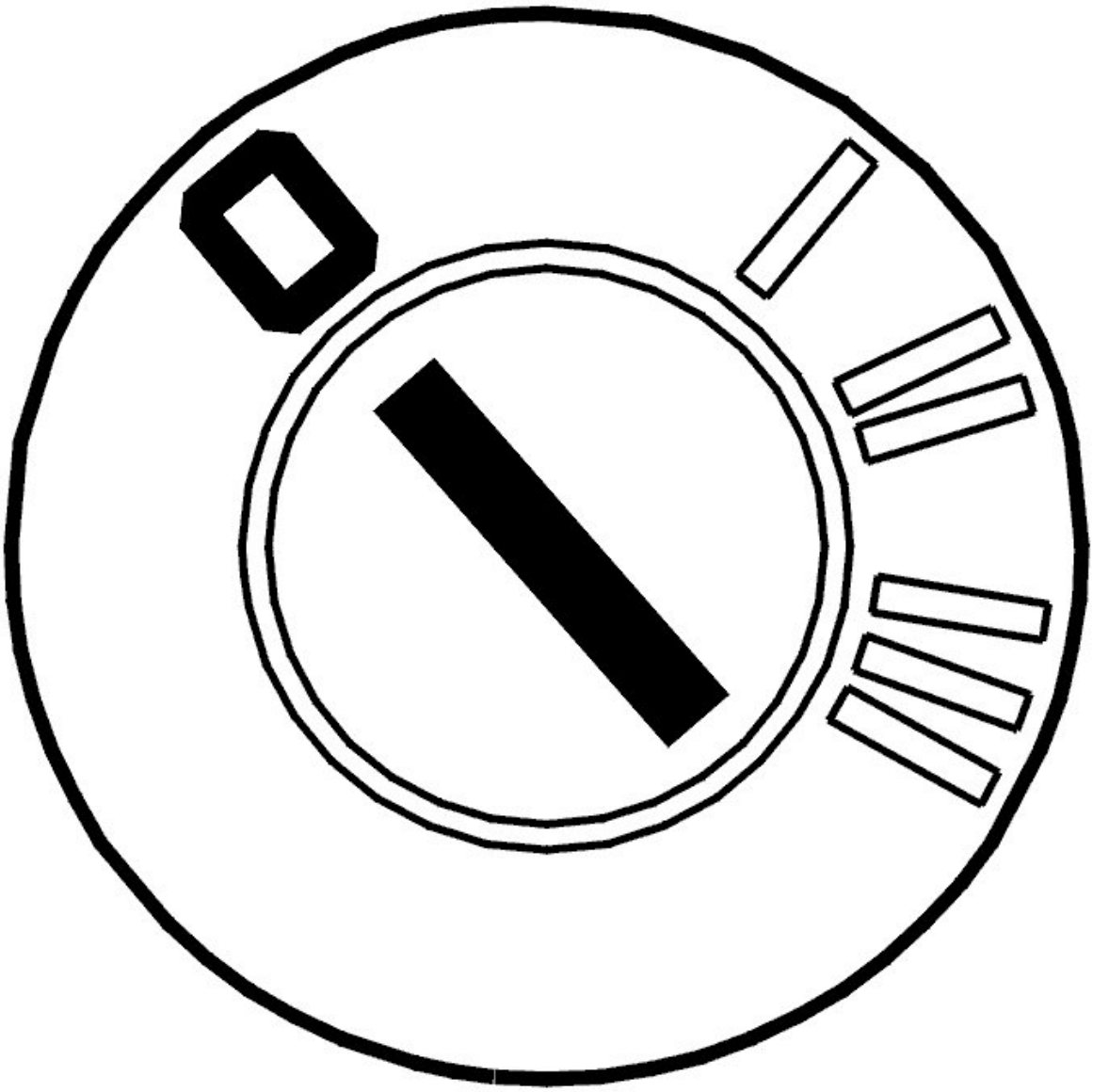
Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

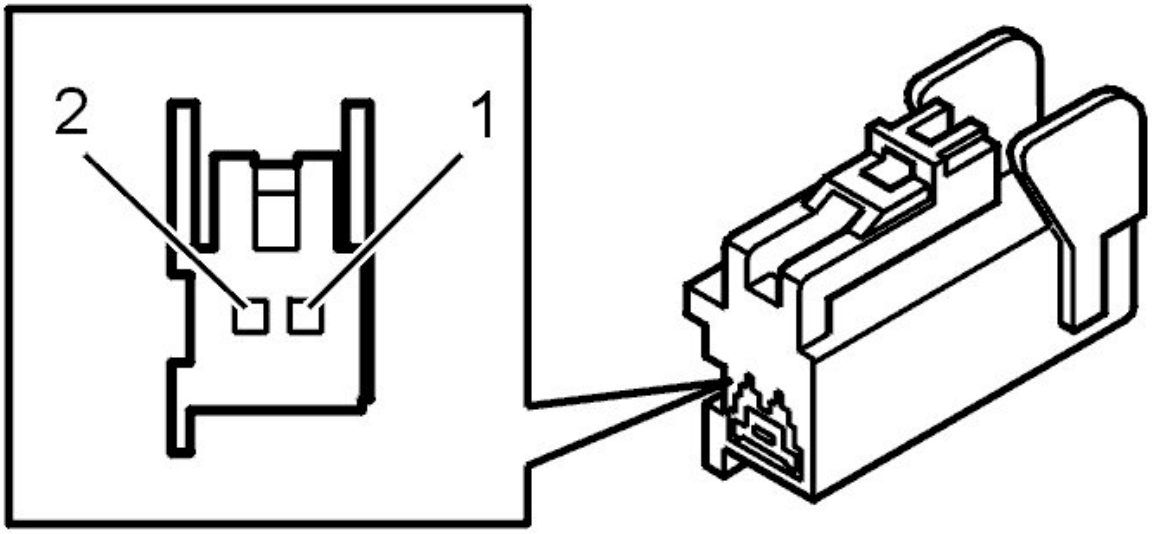
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

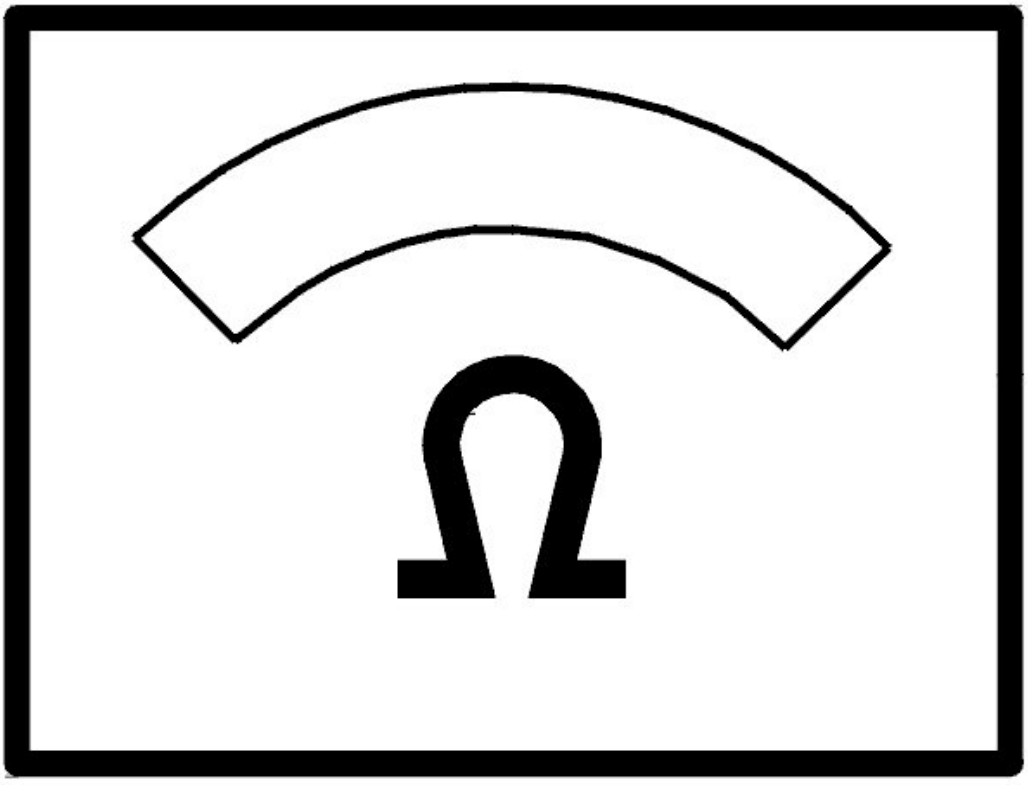
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite

- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

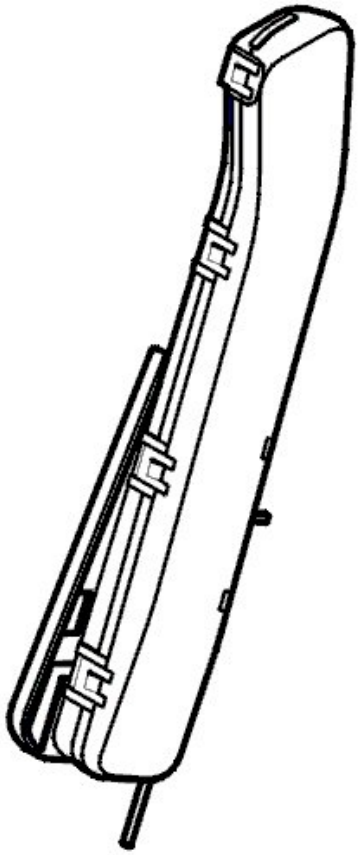
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0042 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0042 is displayed.

Substitute value
- Nothing.

Possible source
- Capacitance too high or short circuit in built-in capacitor in igniter wire connector.

Fault symptom[s]

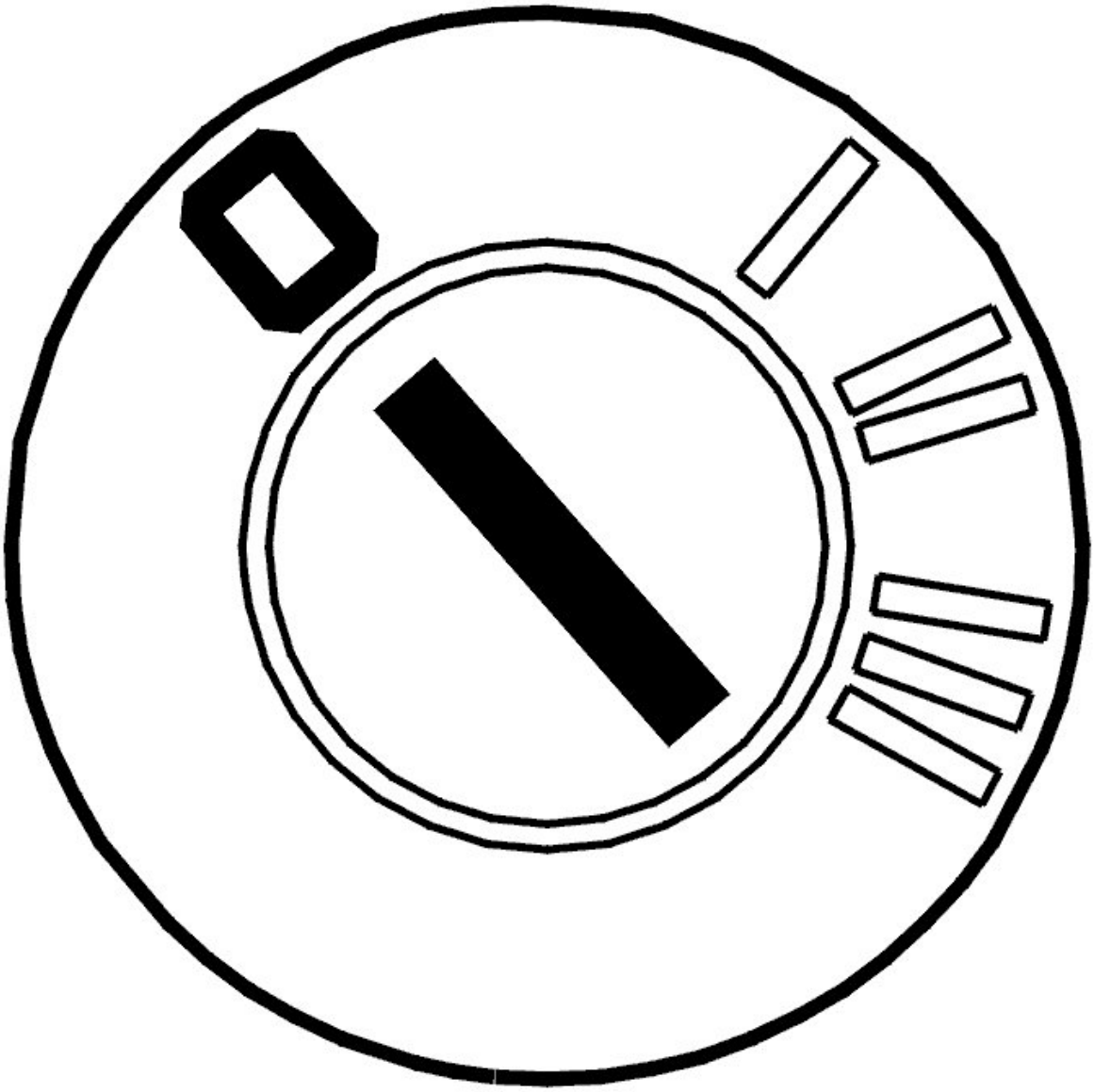
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

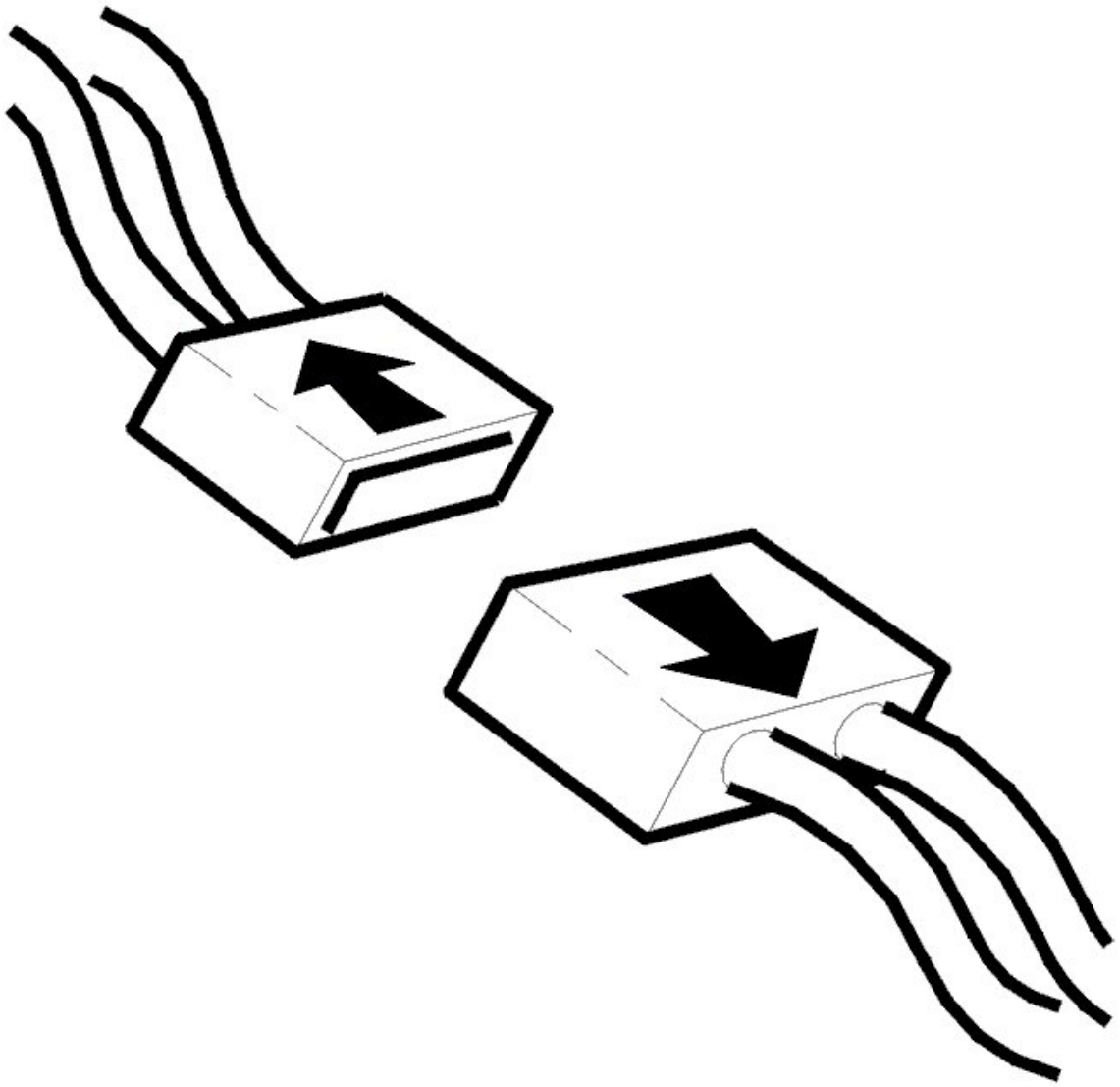
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

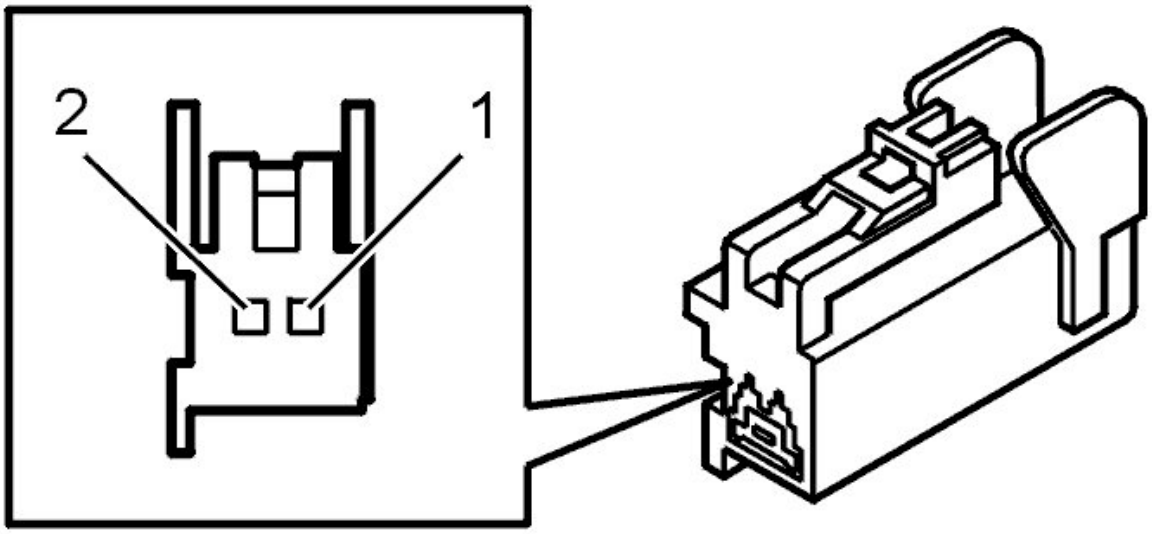
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

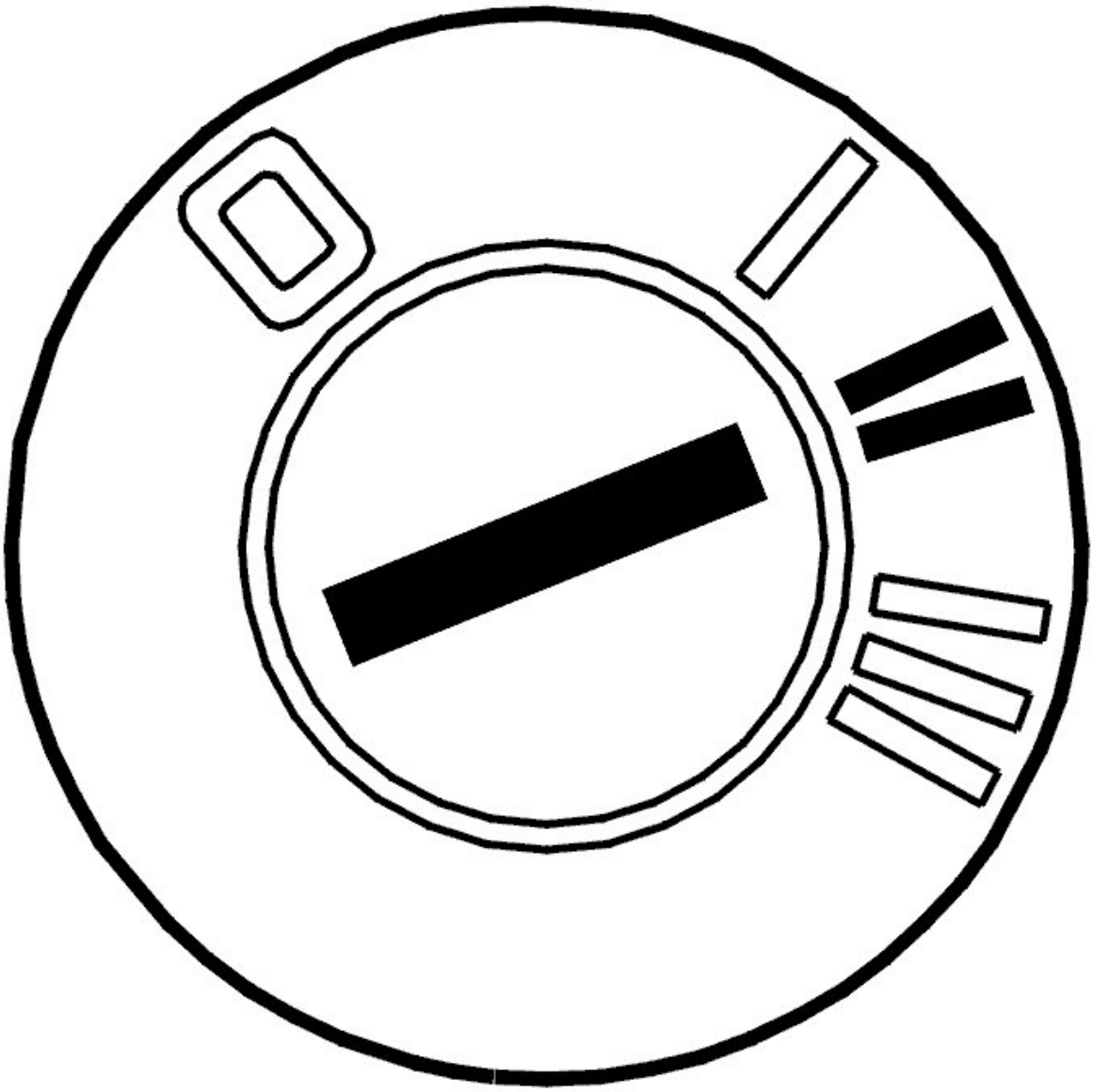
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

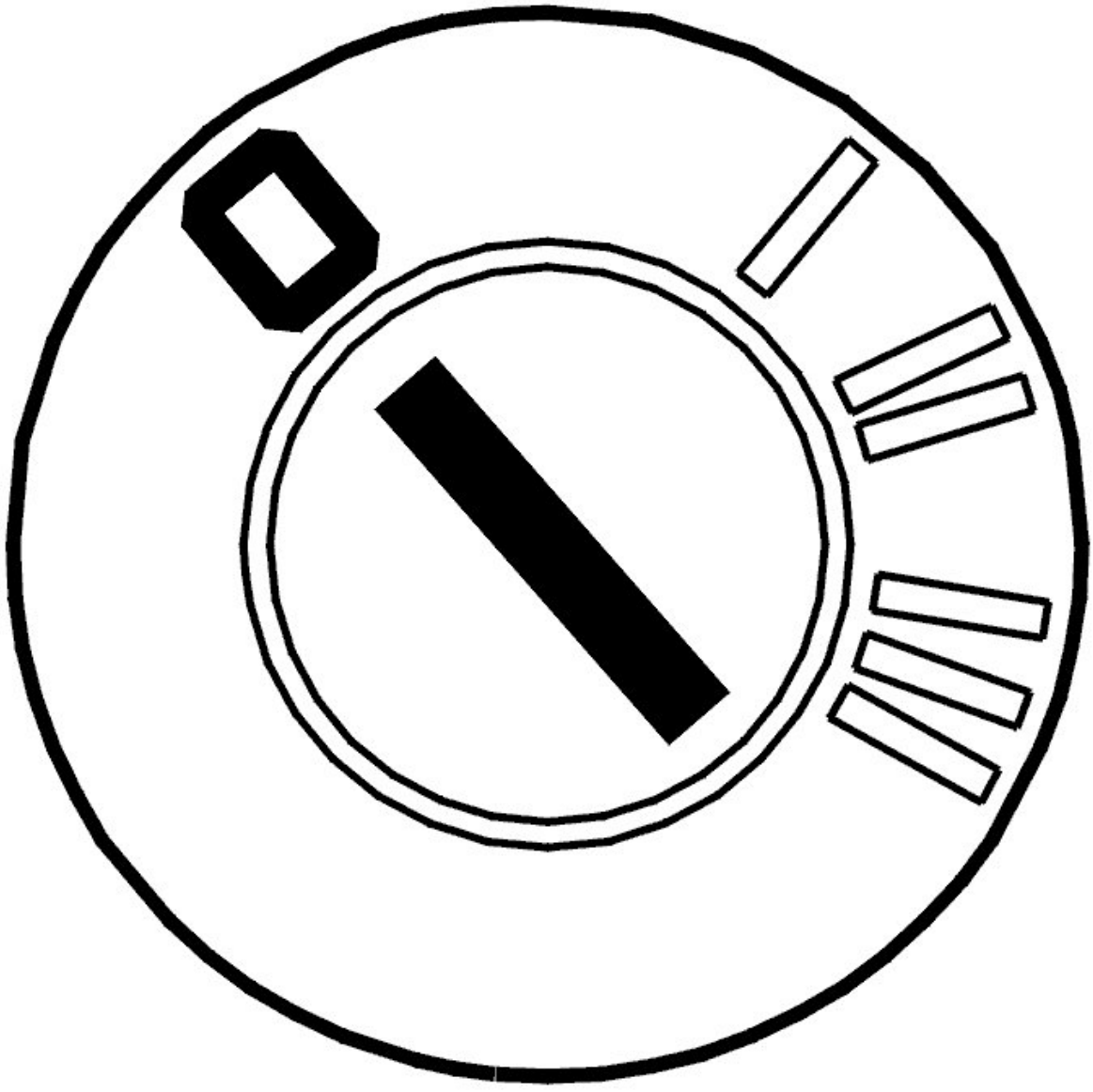
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance

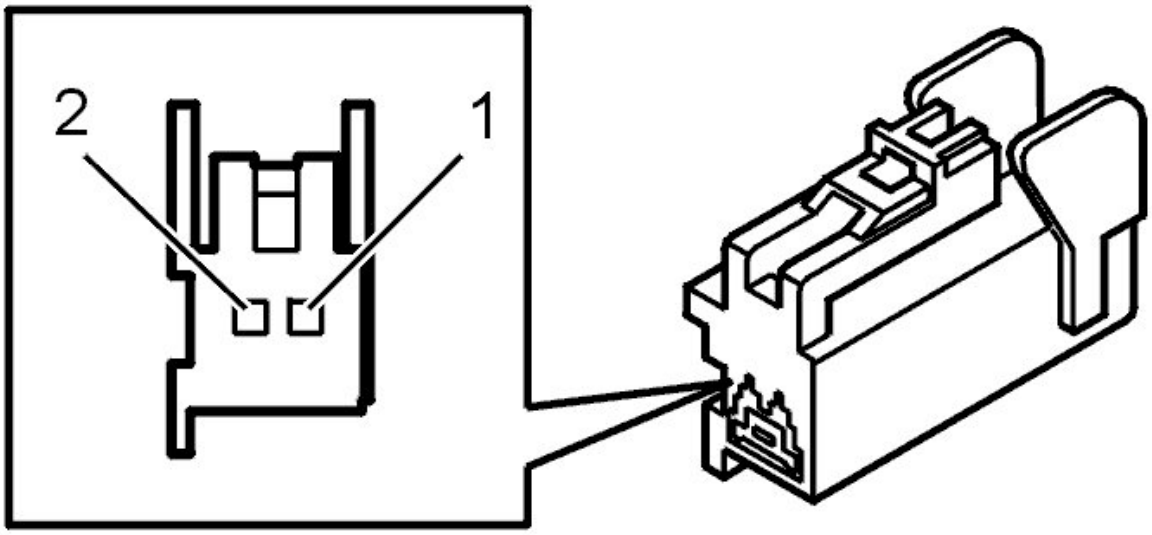


- Ignition off.
- Disconnect the 2-pin connector under the right-hand seat.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).
The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

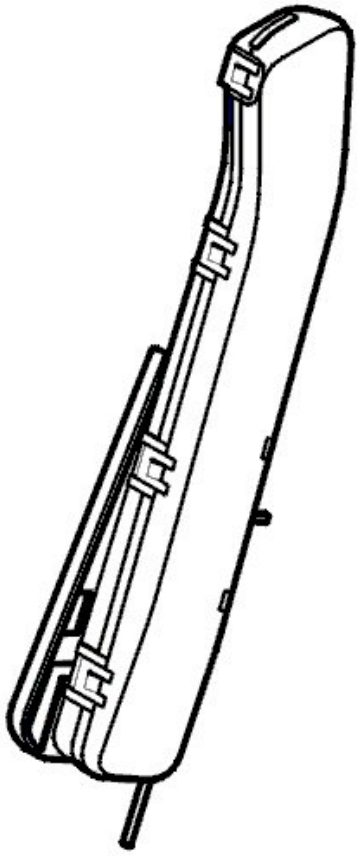
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0043 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0043 is displayed.

Substitute value
- Nothing.

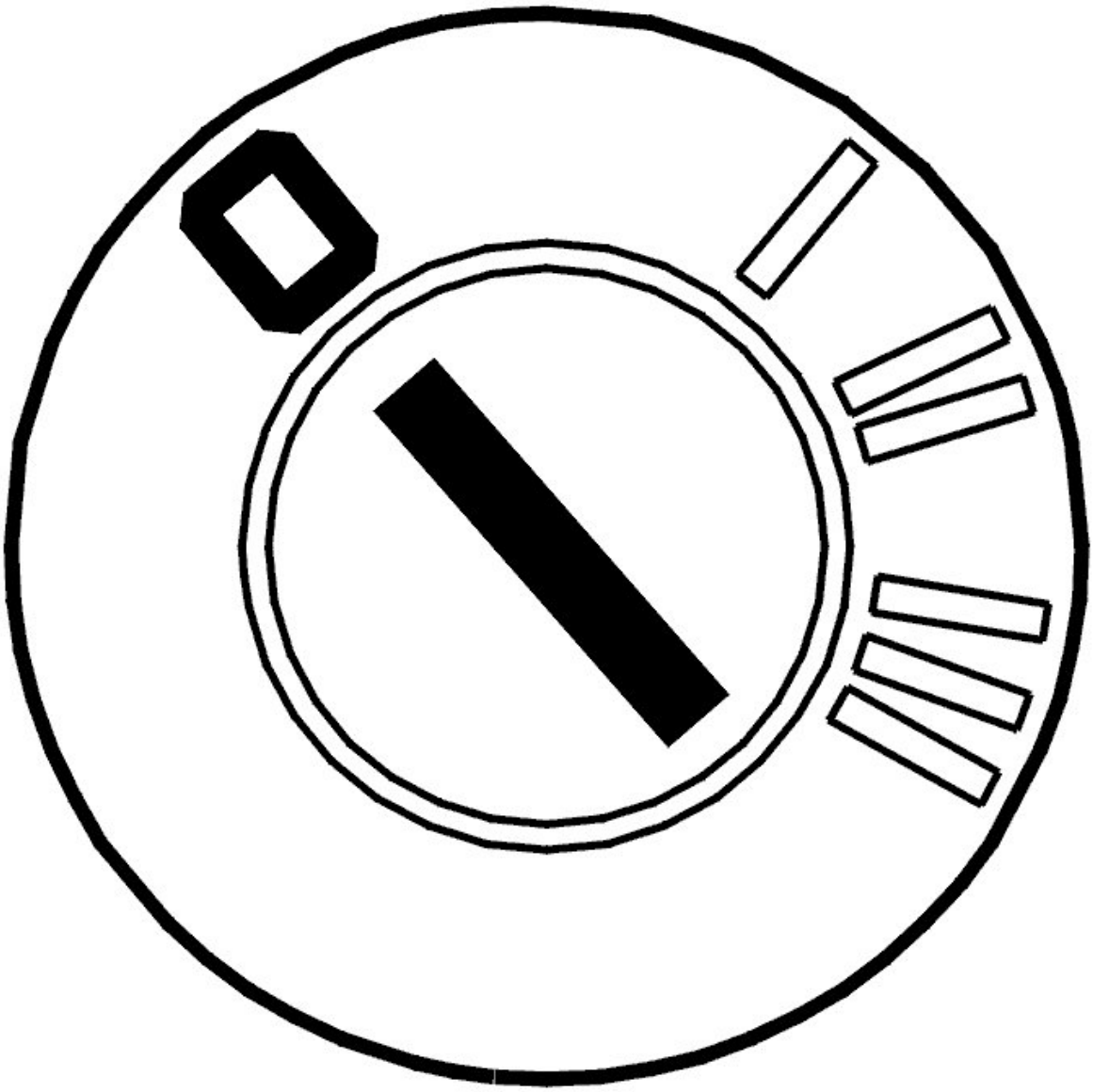
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

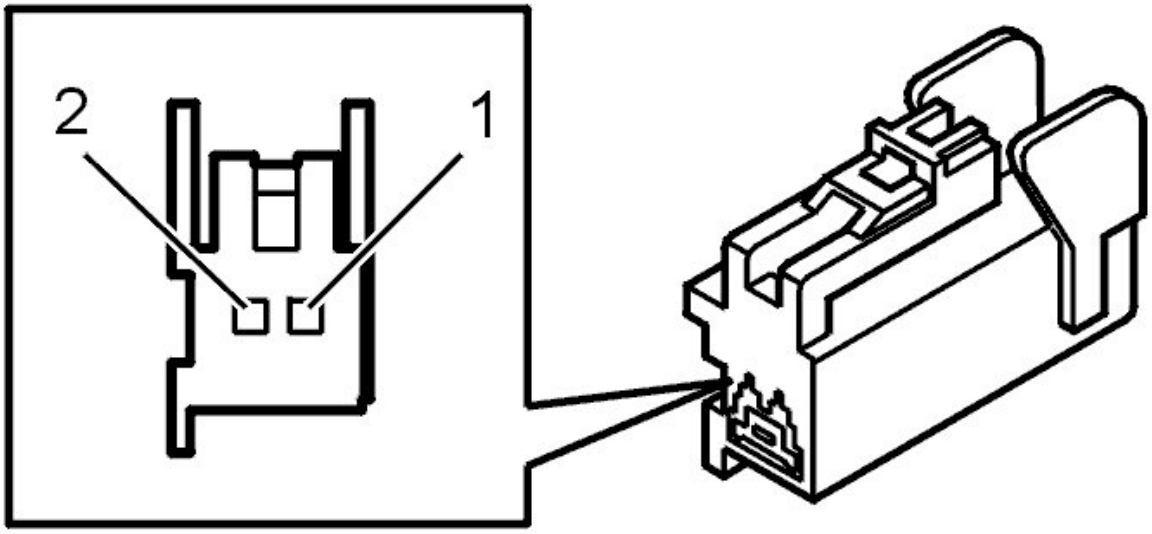
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

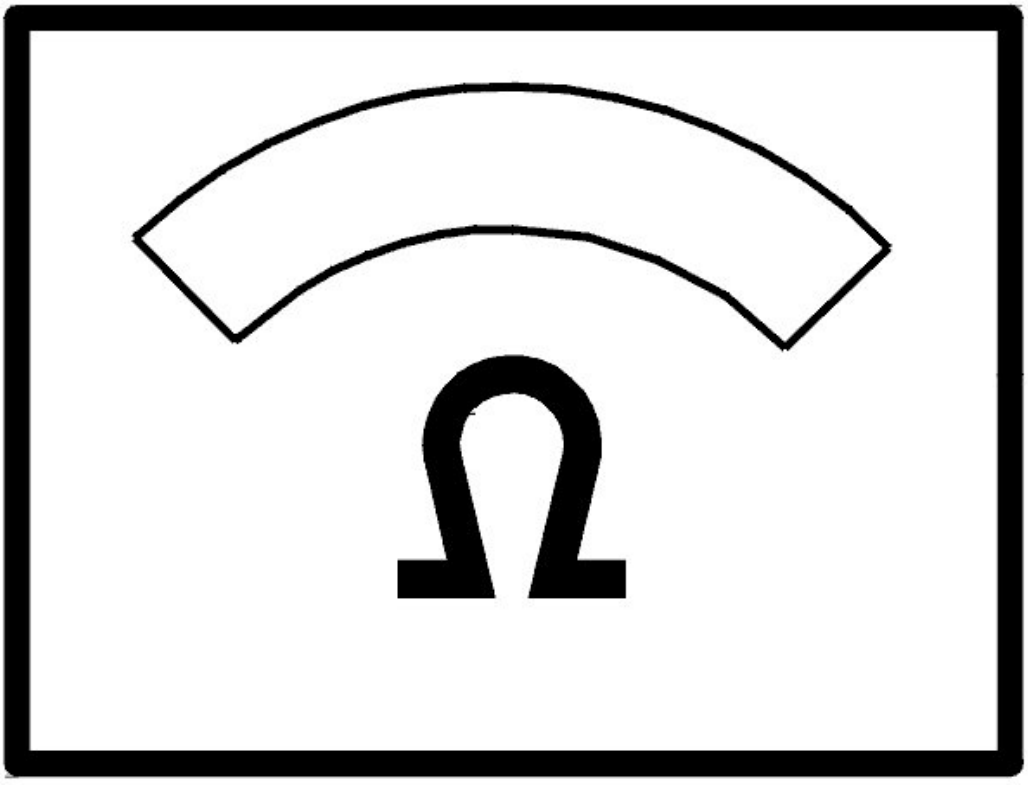
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the female and male sections of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #4C (60) and connector terminal #1 on the right-hand side impact protection (SIPS) bag for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the 2-pin connector disconnected, the resistance between the 2-pin connector terminals #1 and #2 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

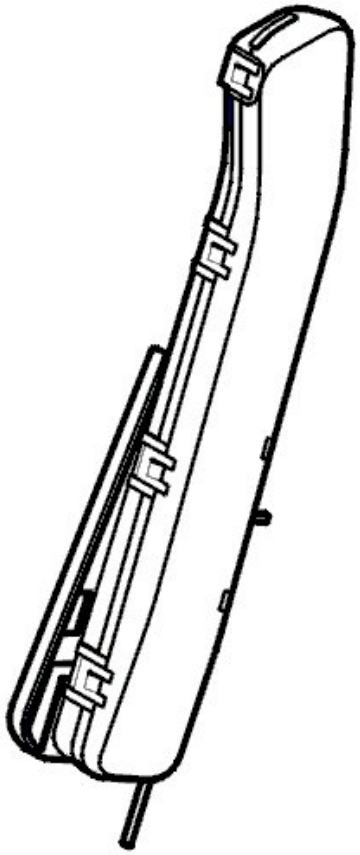
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0043 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0043 is displayed.

Substitute value
- Nothing.

Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

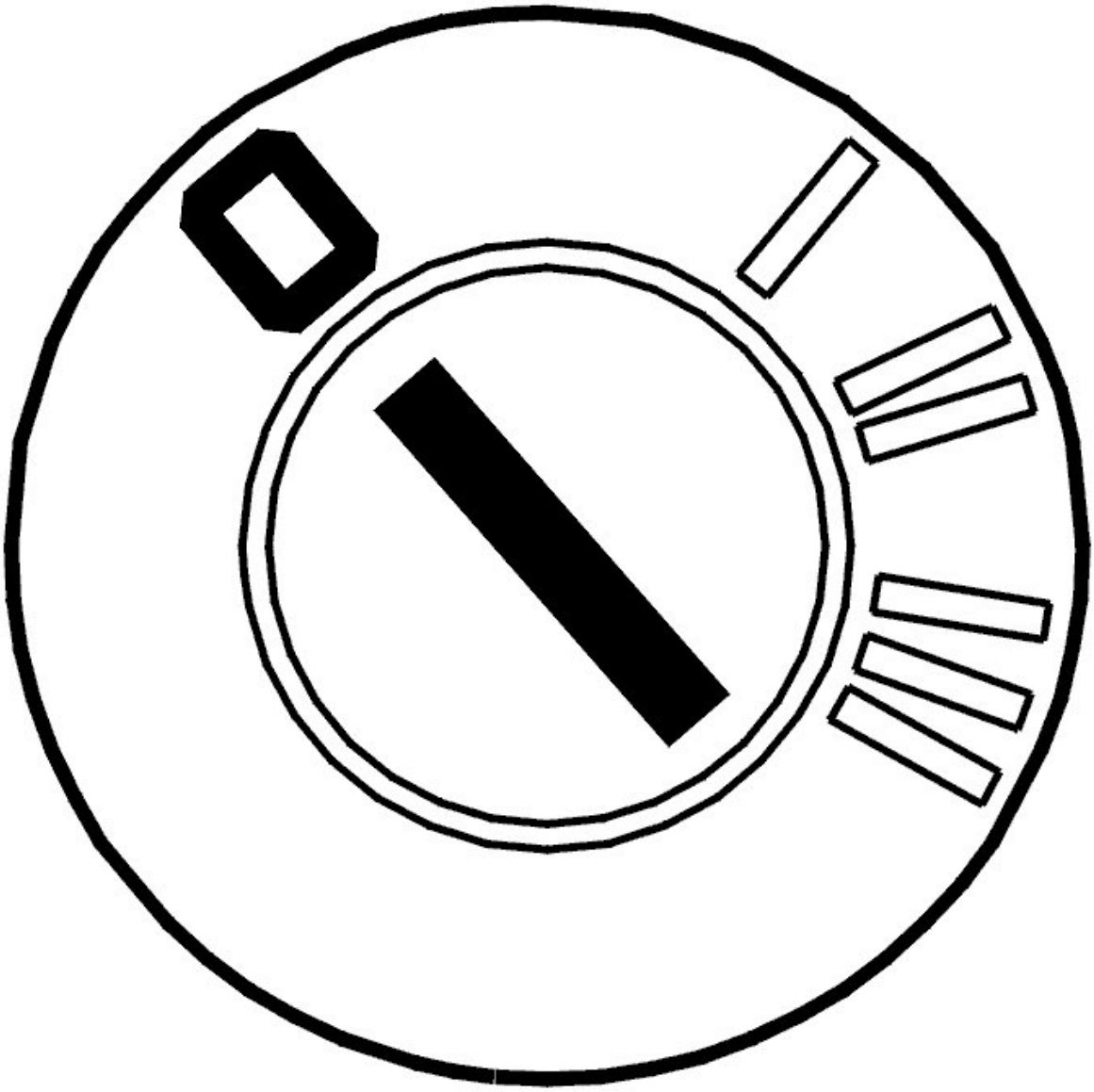
Fault symptom[s]

- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking components and wiring



- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

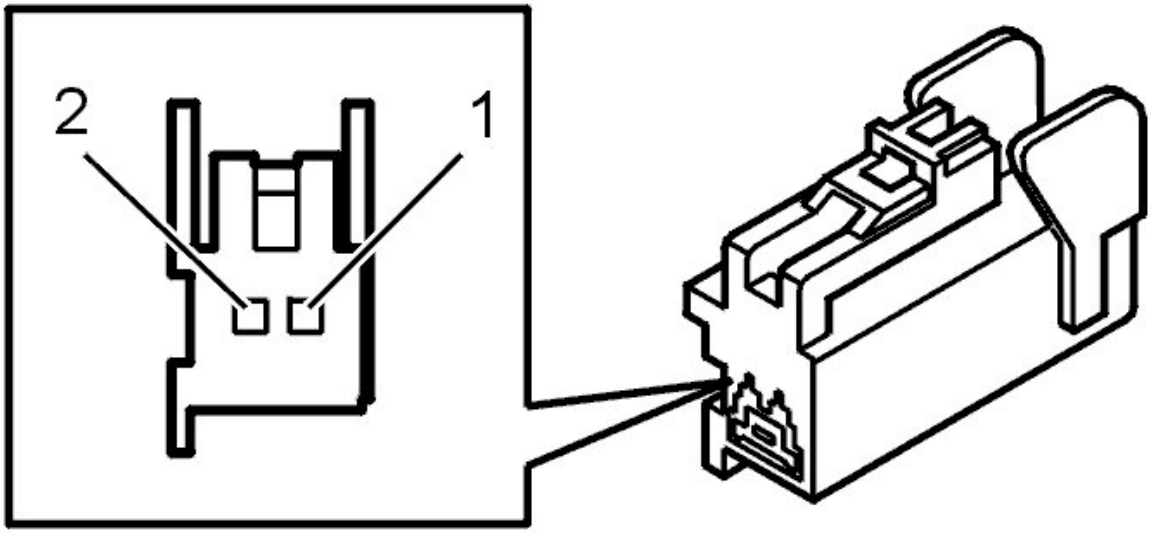
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male sections of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 on the right side impact protection (SIPS) bag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 on the right side impact protection (SIPS) bag for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Has the fault been remedied?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

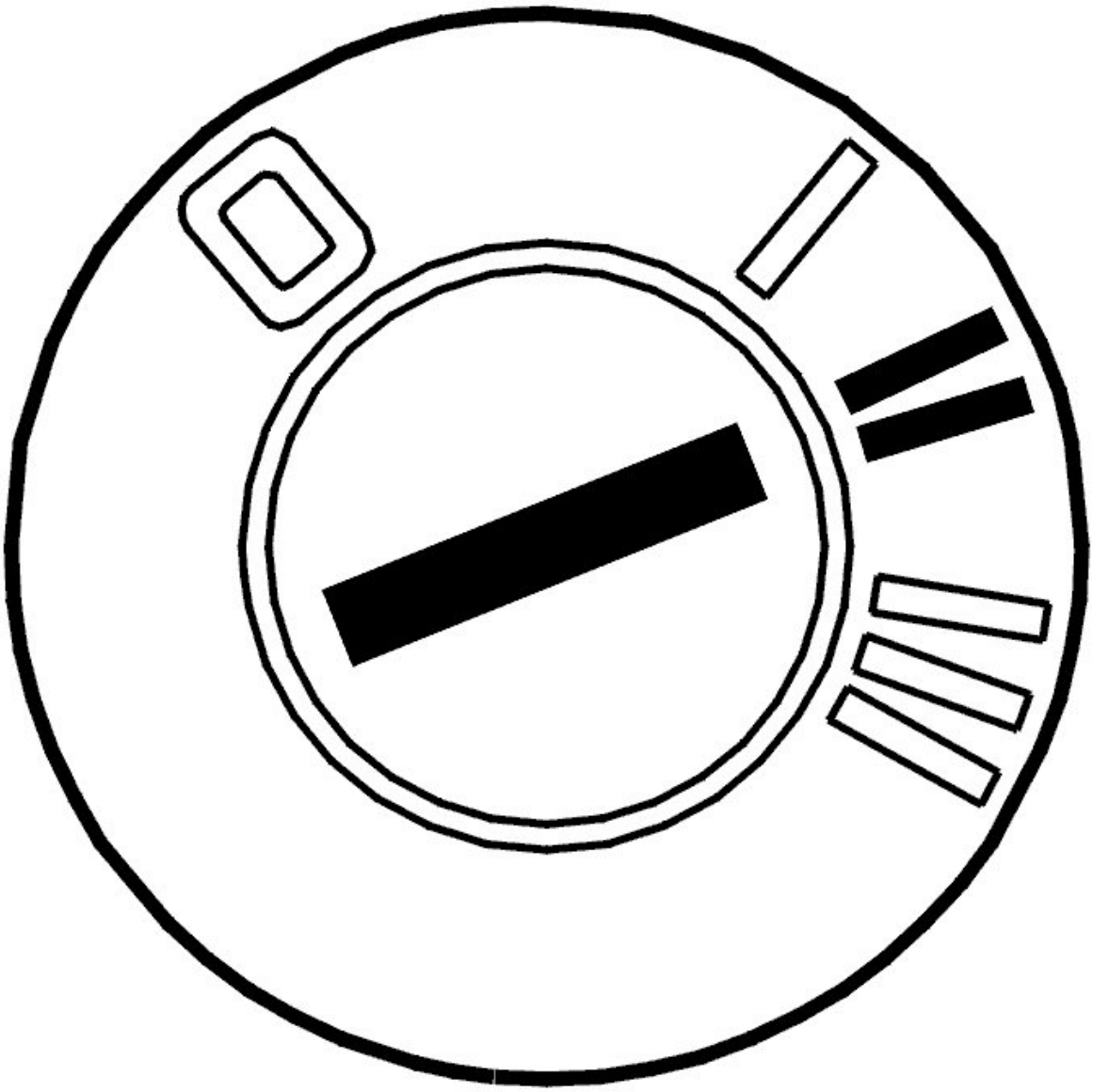
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

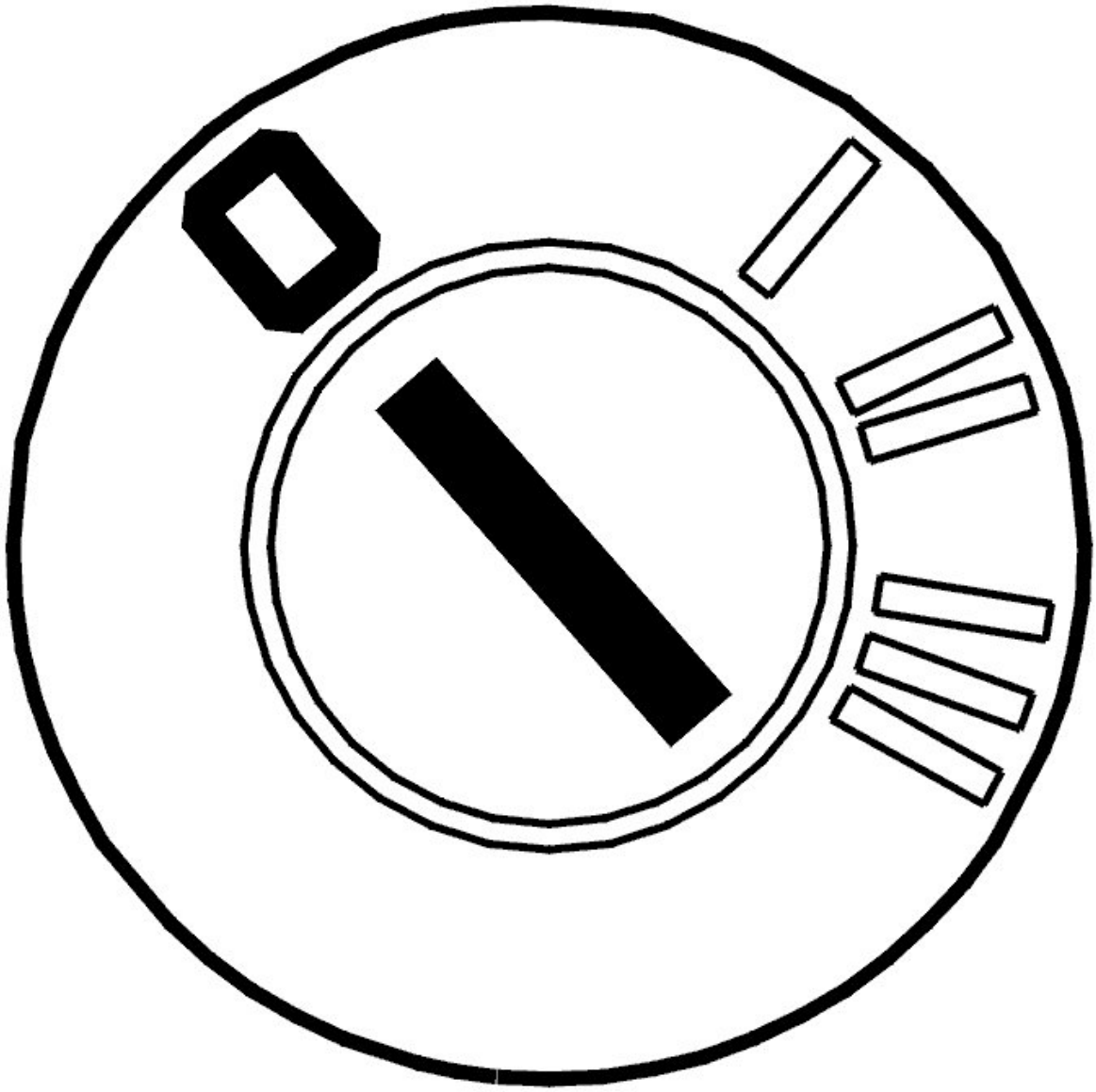
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Checking the resistance



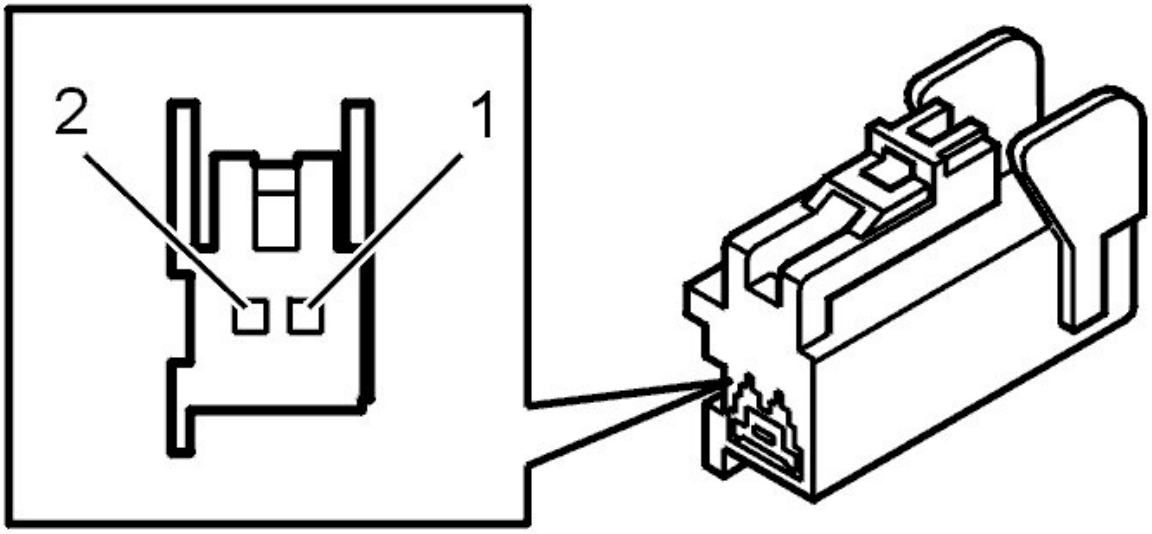
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

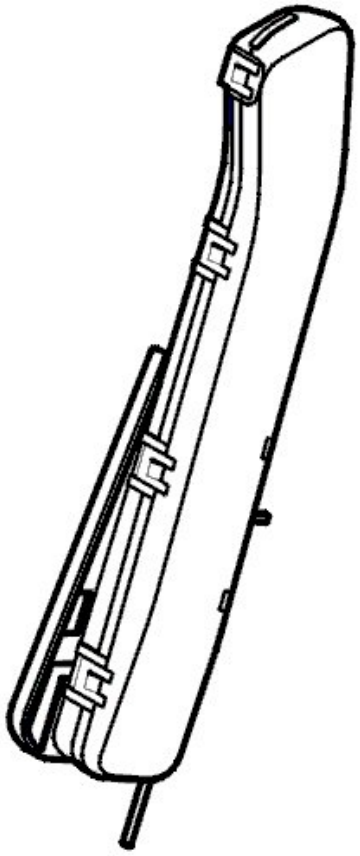
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0044 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0044 is displayed.

Substitute value
- Nothing.

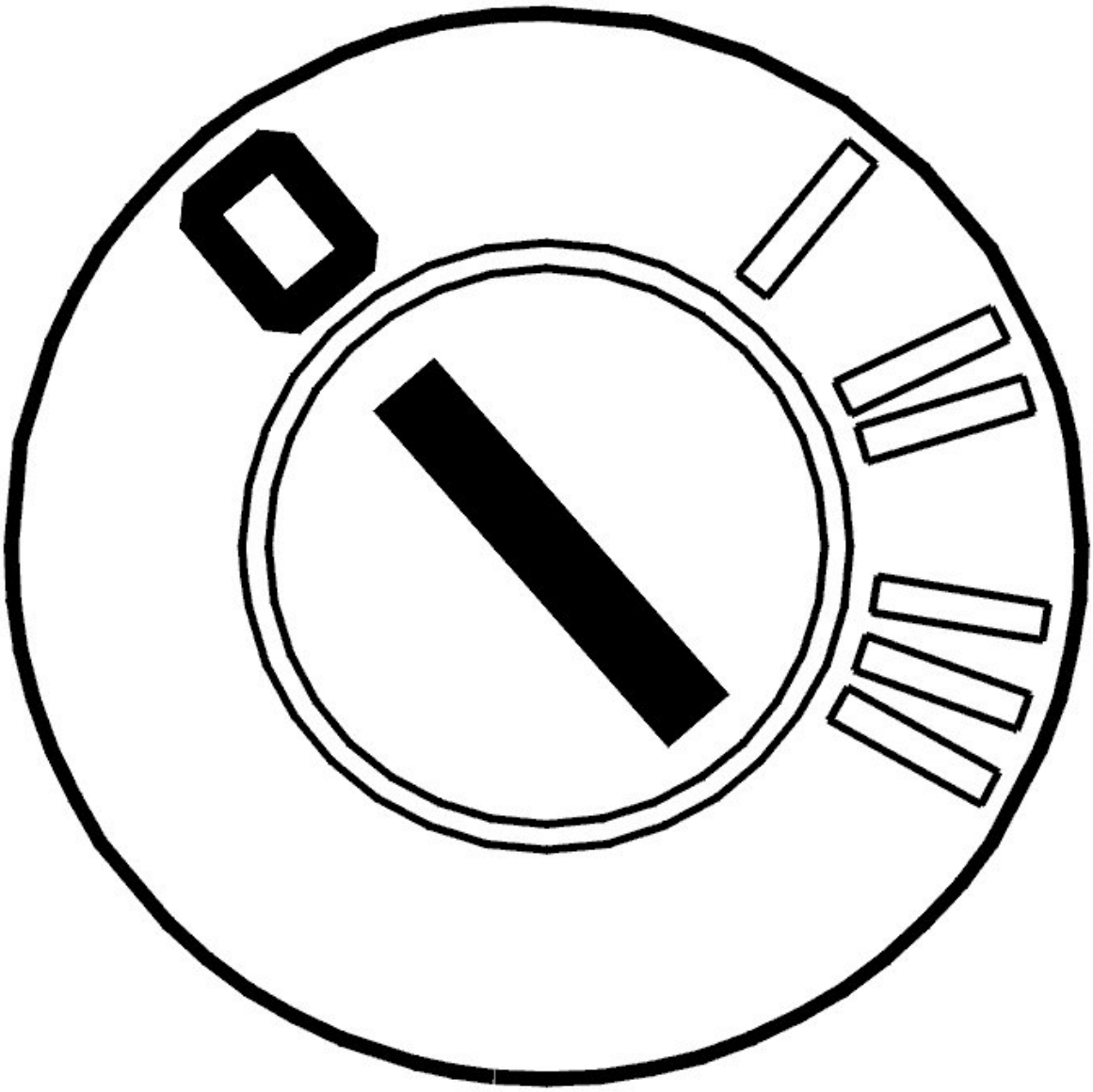
Possible source
- Open circuit in igniter wire or connectors between the front right side air bag and the supplemental restraint system (SRS) control unit
- Open circuit in the front right side air bag (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

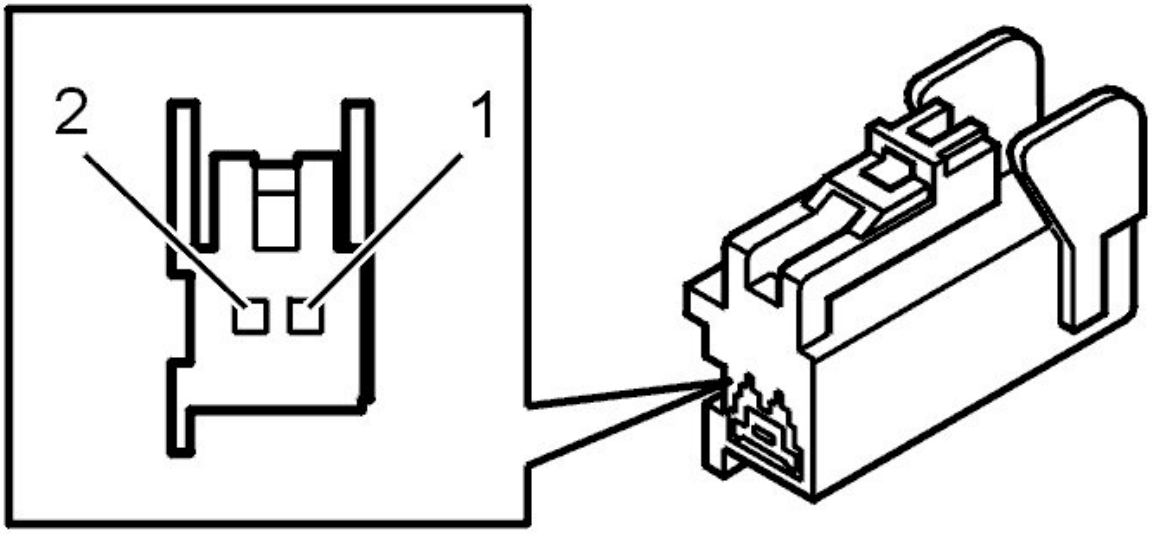
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

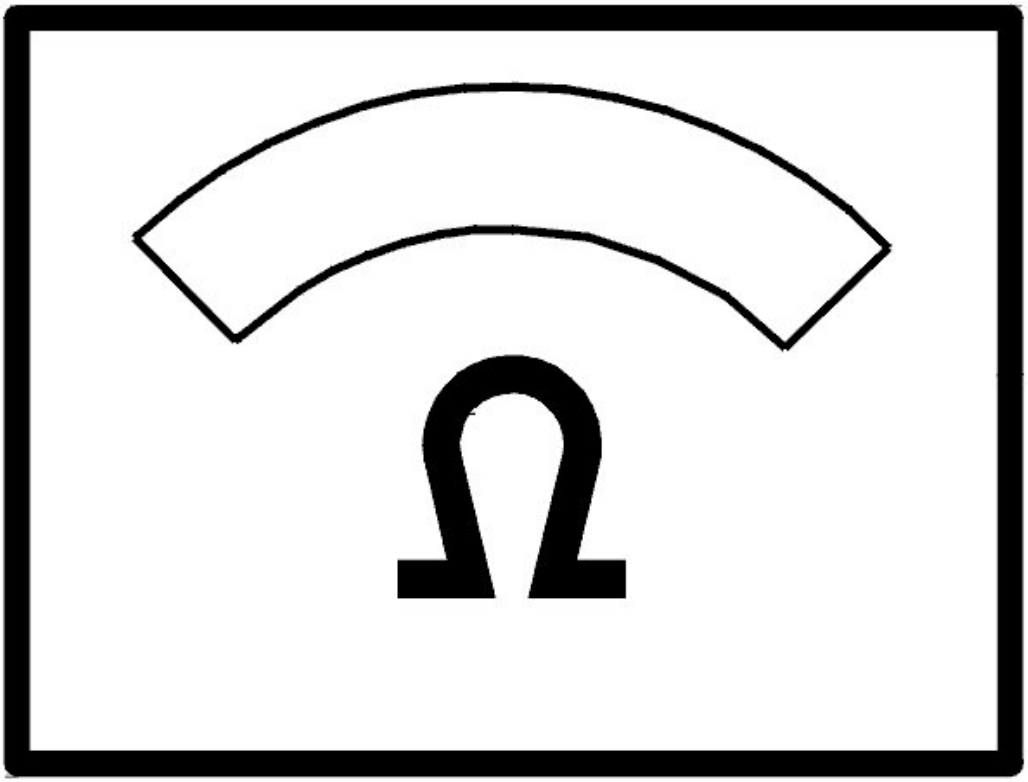
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

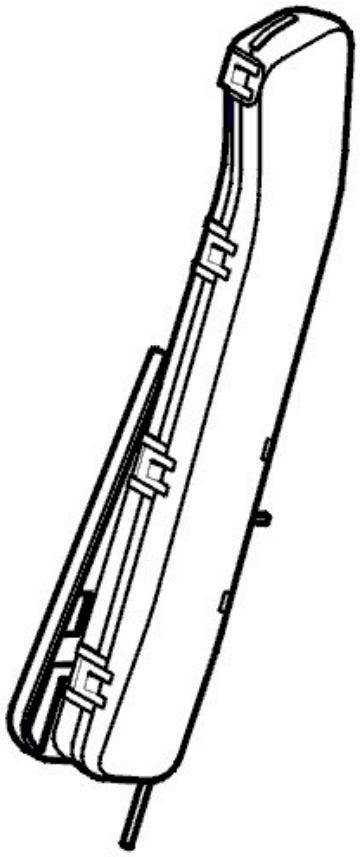
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0044 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0044 is displayed.

Substitute value
- Nothing.

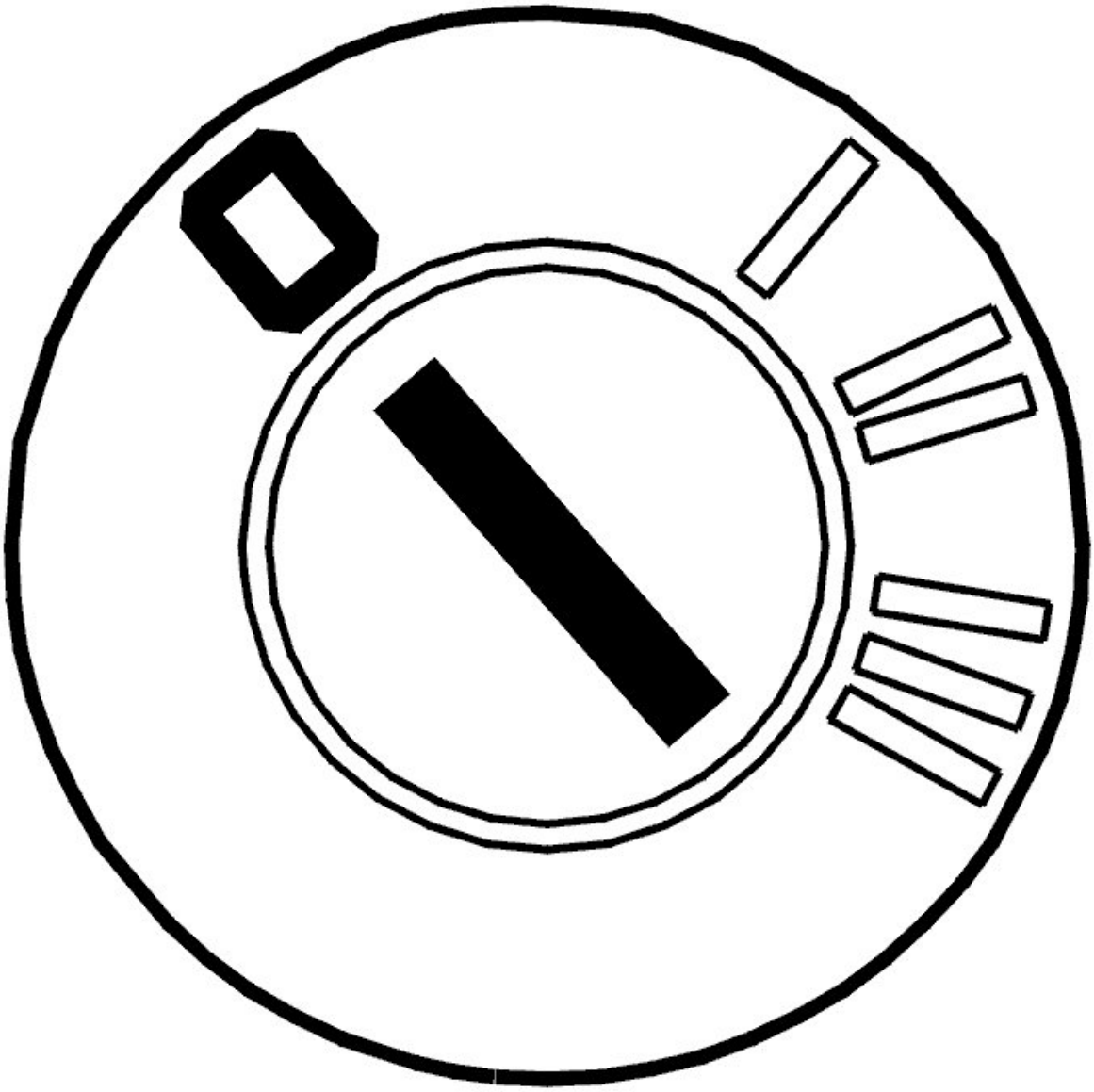
Possible source
- Open circuit in igniter wire or connectors between the front right side air bag and the supplemental restraint system (SRS) control unit
- Open circuit in the front right side air bag (resistance in igniter too high).

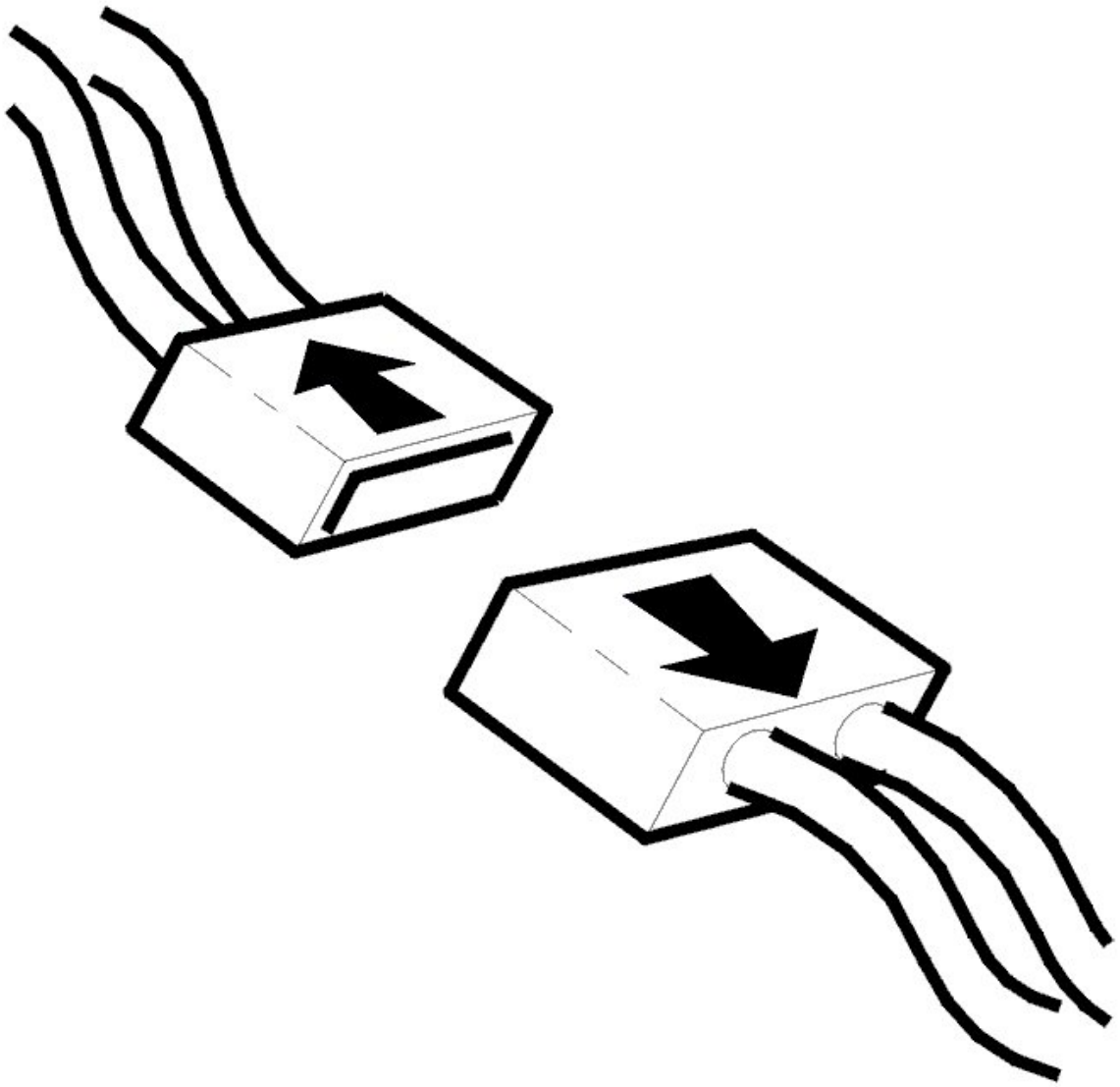
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

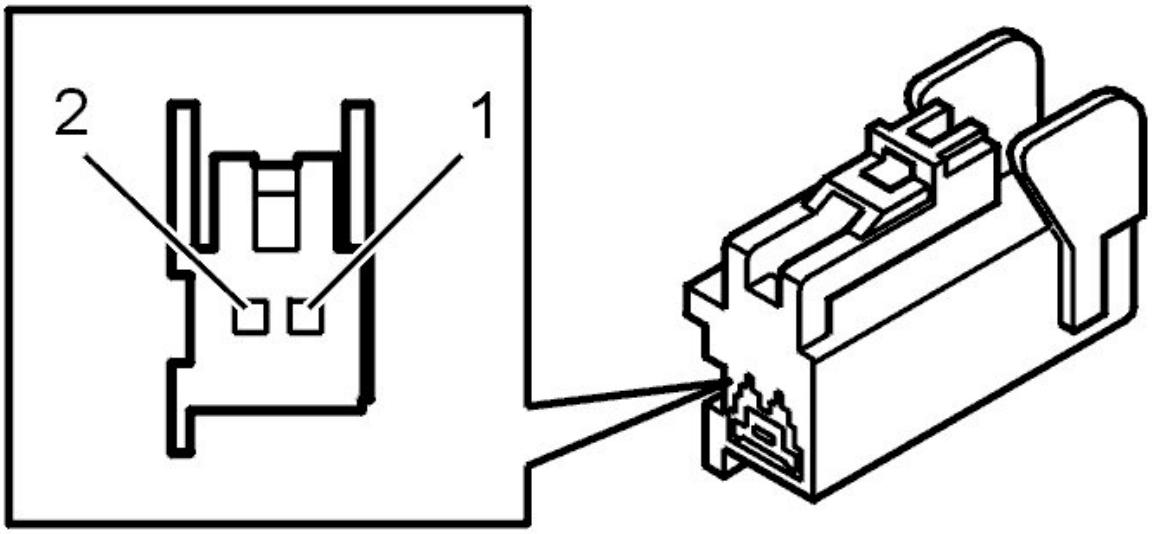
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male sections of the connector for the SRS control module and the 2-pin connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

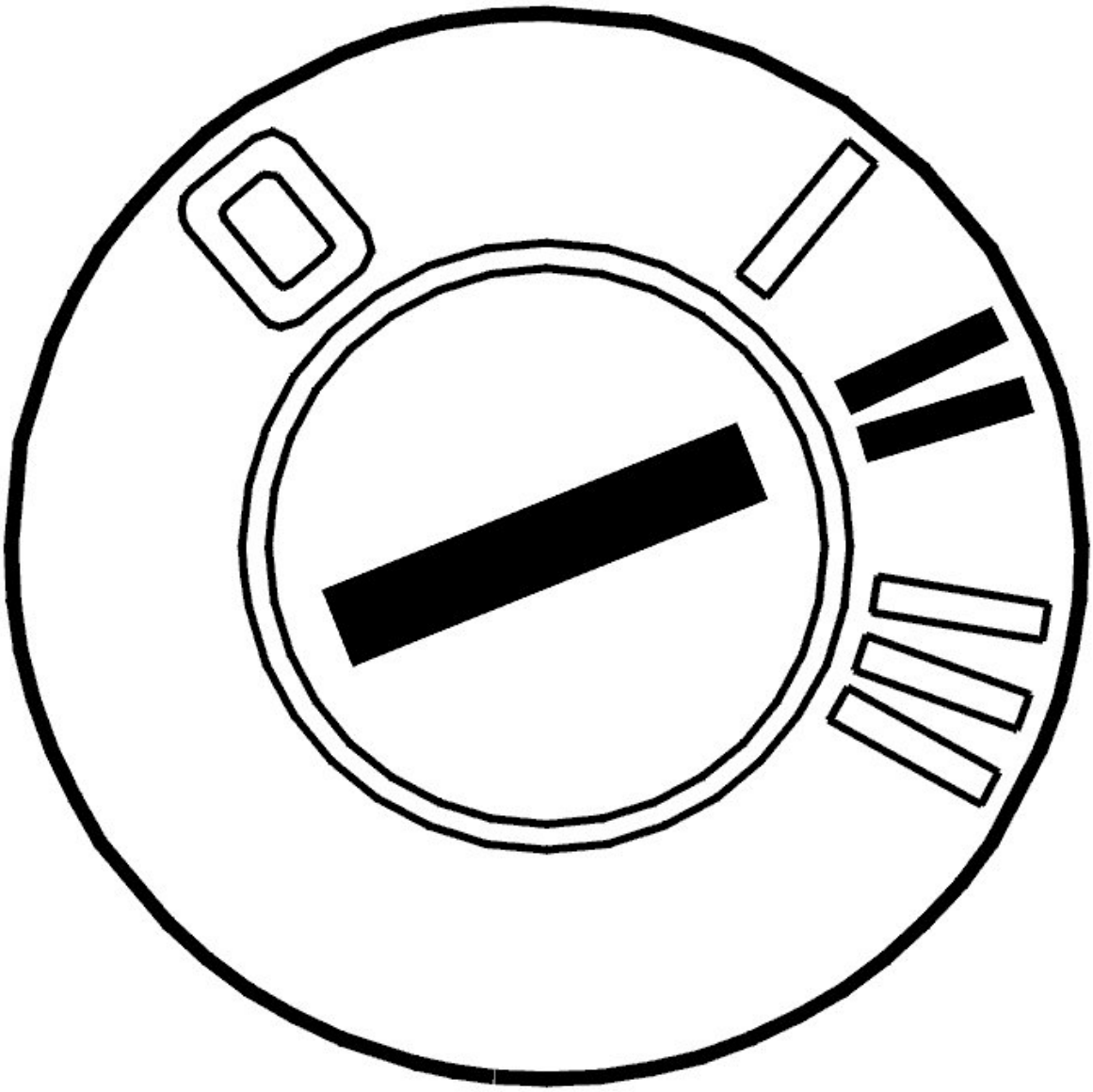
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

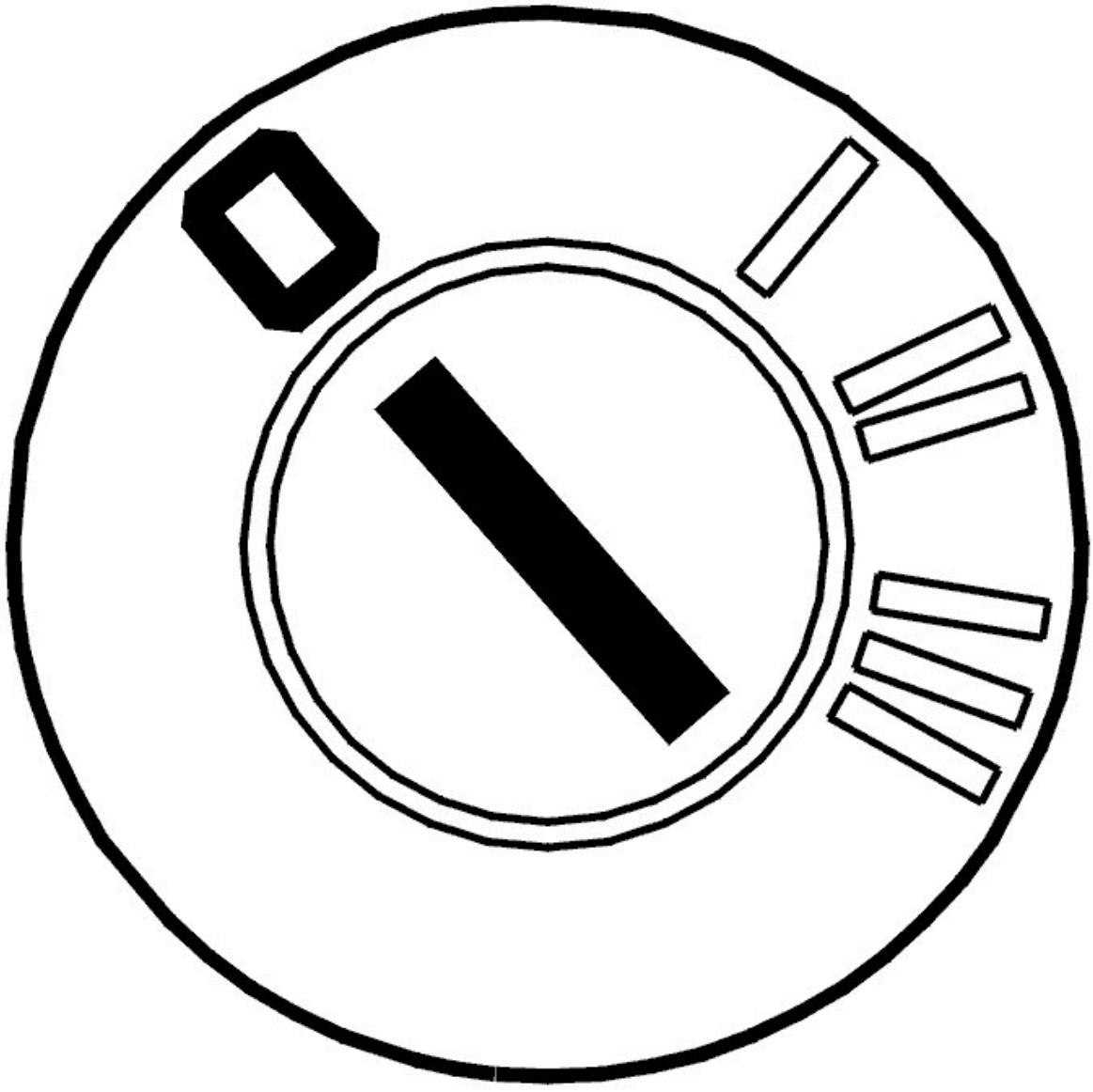
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance



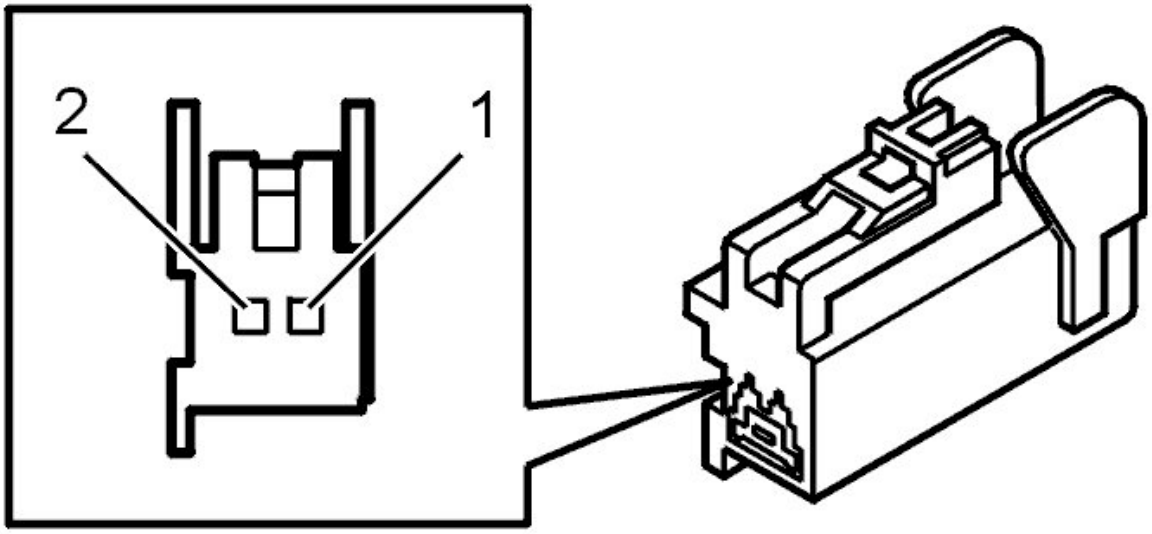
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

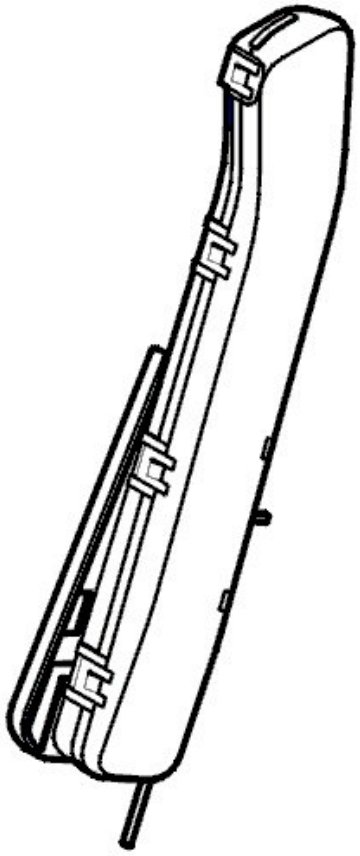
Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

SRS-0045 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0045 is displayed.

Substitute value
- Nothing.

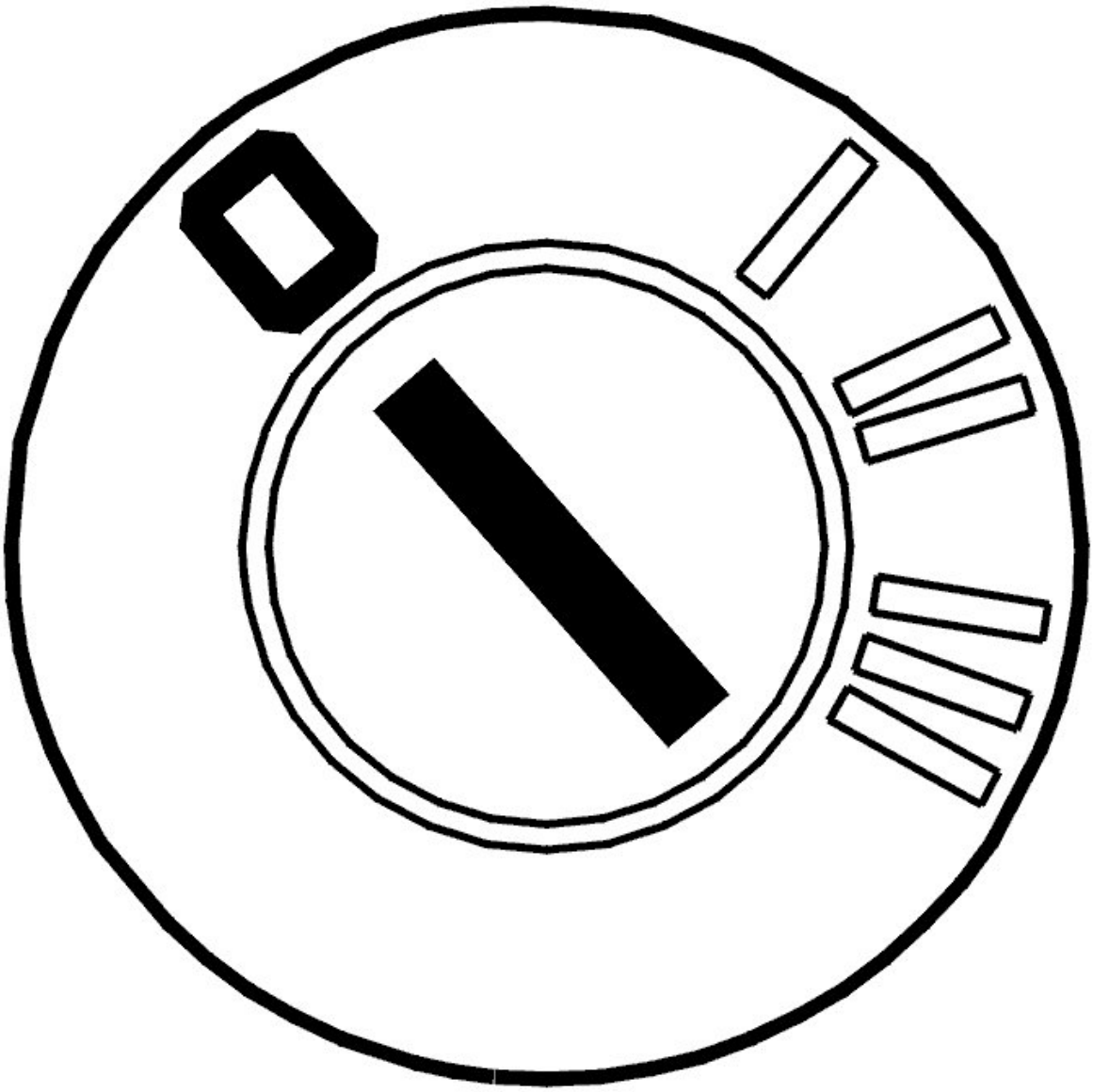
Possible source
- Short circuit in igniter wire or connectors between the front right side air bag and the supplemental restraint system (SRS) control unit
- Short circuit in the front right side air bag (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

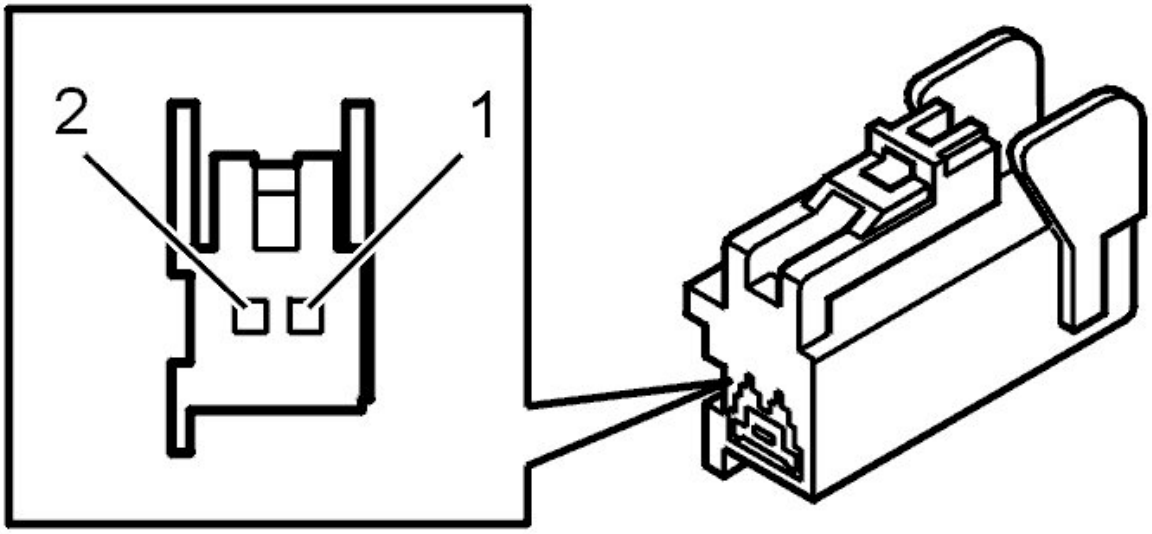
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

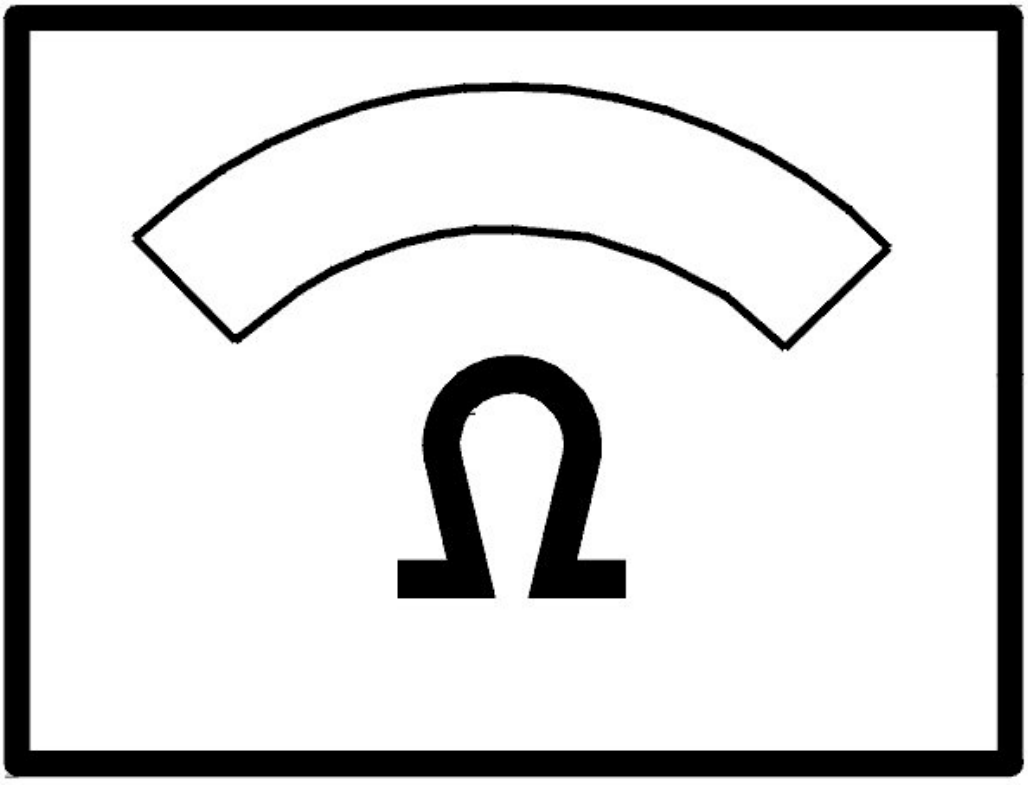
Check the connectors for:
- 2-pin
- the SRS control module.

check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) and ground should be infinite

- With the ignition off and the 2-pin connector disconnected, the resistance between terminals #1 and #2 on the 2-pin connector (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

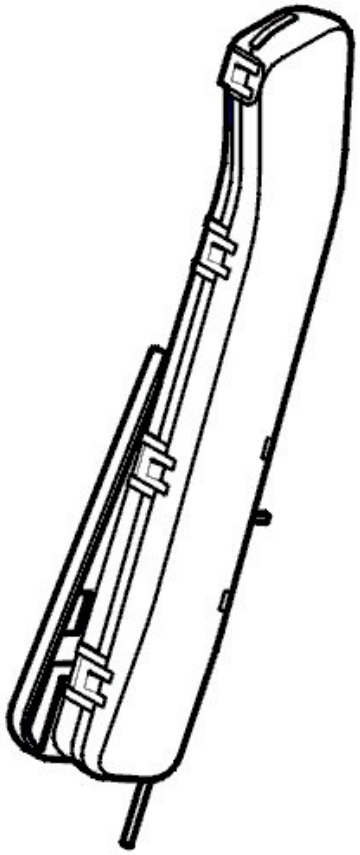
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0045 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0045 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit in igniter wire or connectors between the front right side air bag and the supplemental restraint system (SRS) control unit
- Short circuit in the front right side air bag (resistance in igniter too low).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

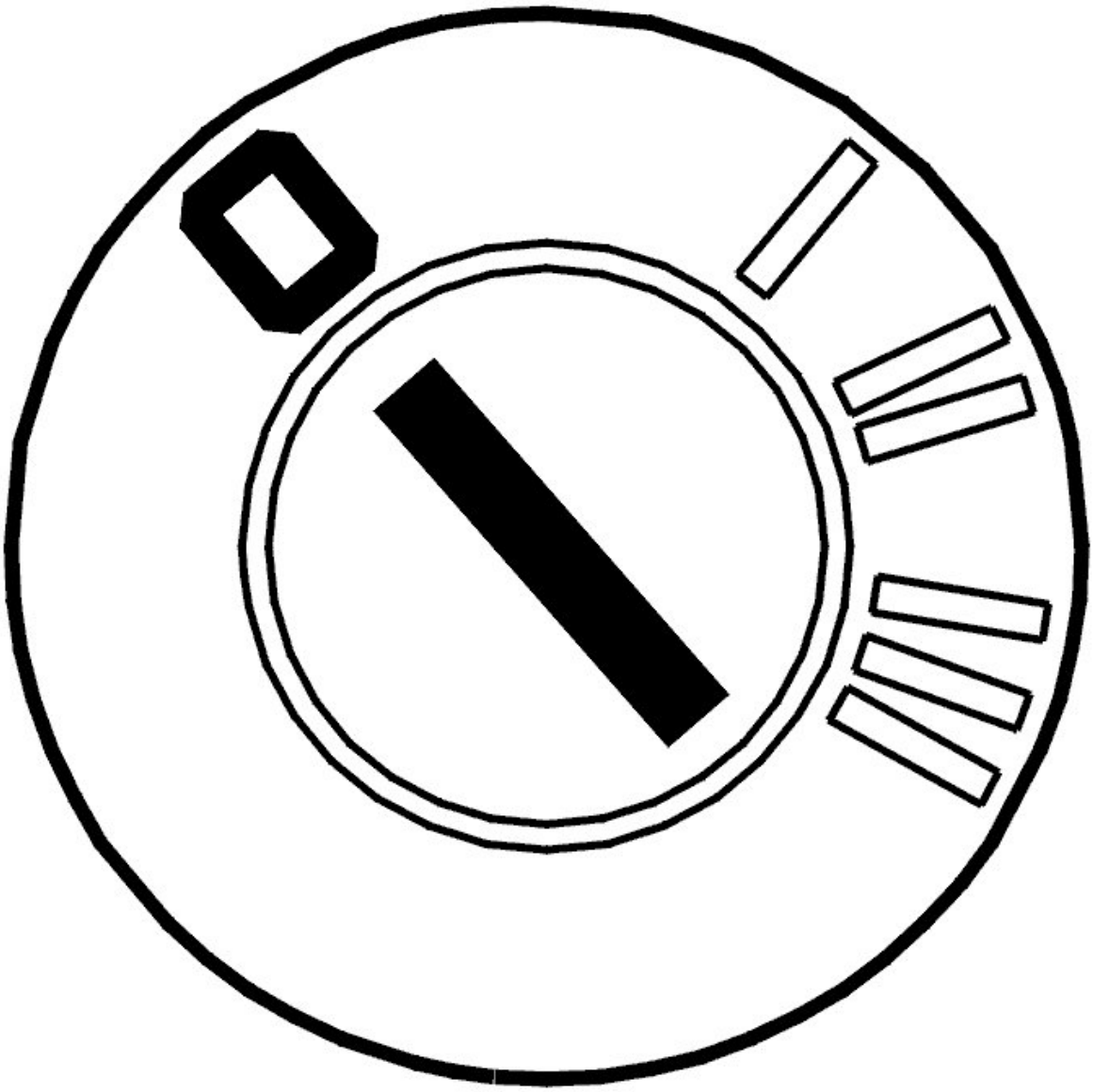
Fault symptom[s]

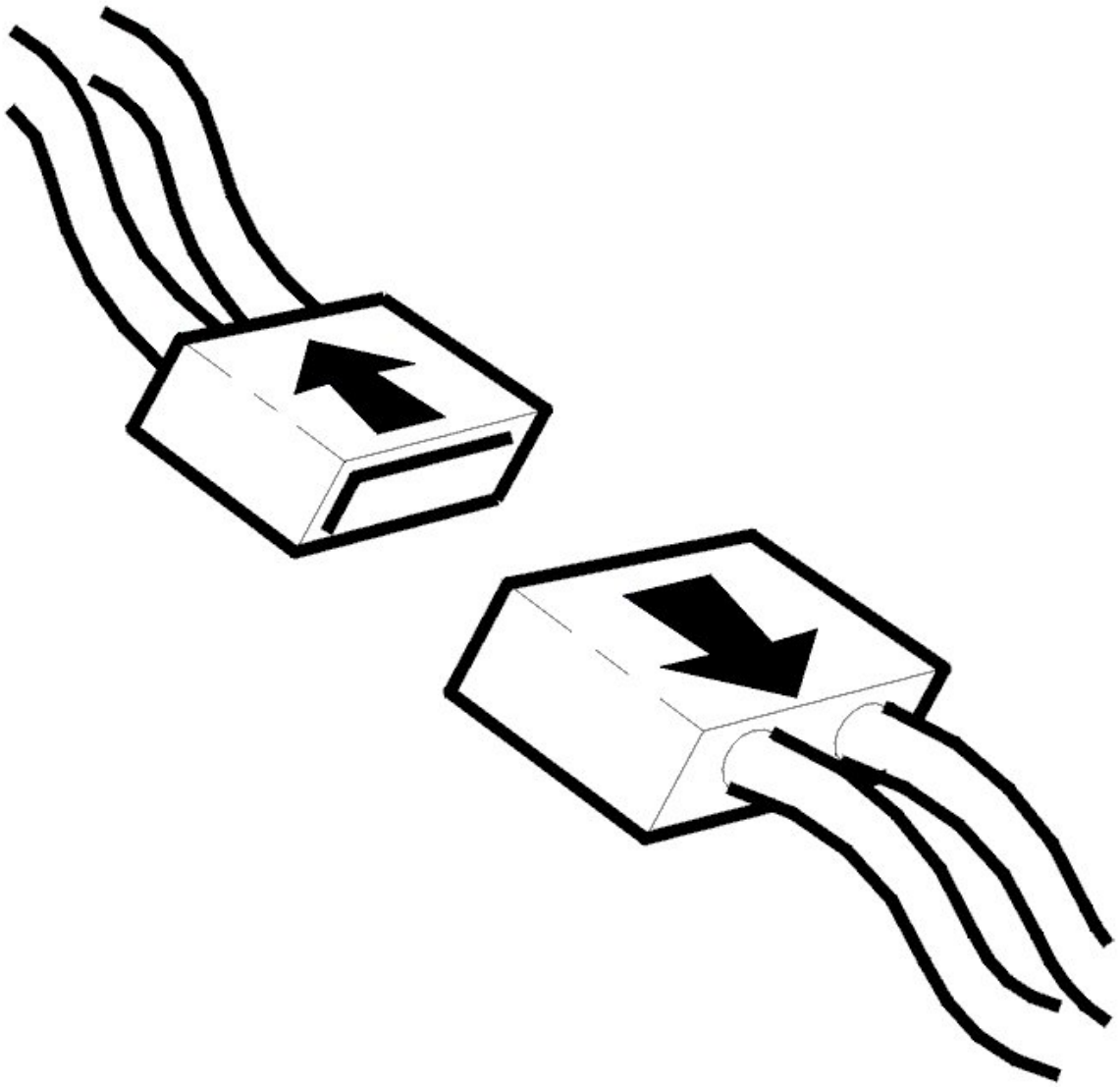
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the cable





- Ignition off
- Disconnect the 2-pin connector under the right-hand seat.

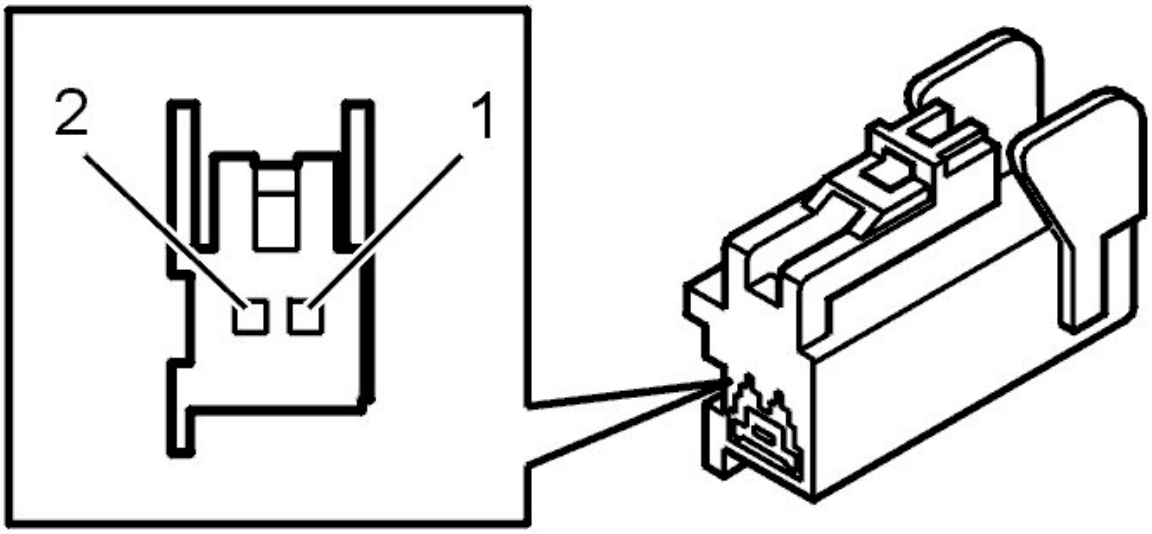
Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module terminal #4C (60) and the 2-pin connector terminal #1 for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between SRS control module terminal #3C (59) and the 2-pin connector terminal #2 for short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Other information:

- To access and replace the SRS control module and the connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Were any faults found in the cable?

Yes - Verification

No - Checking the resistance

Replacing the component

Try replacing the side impact protection (SIPS) bag according to Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing.

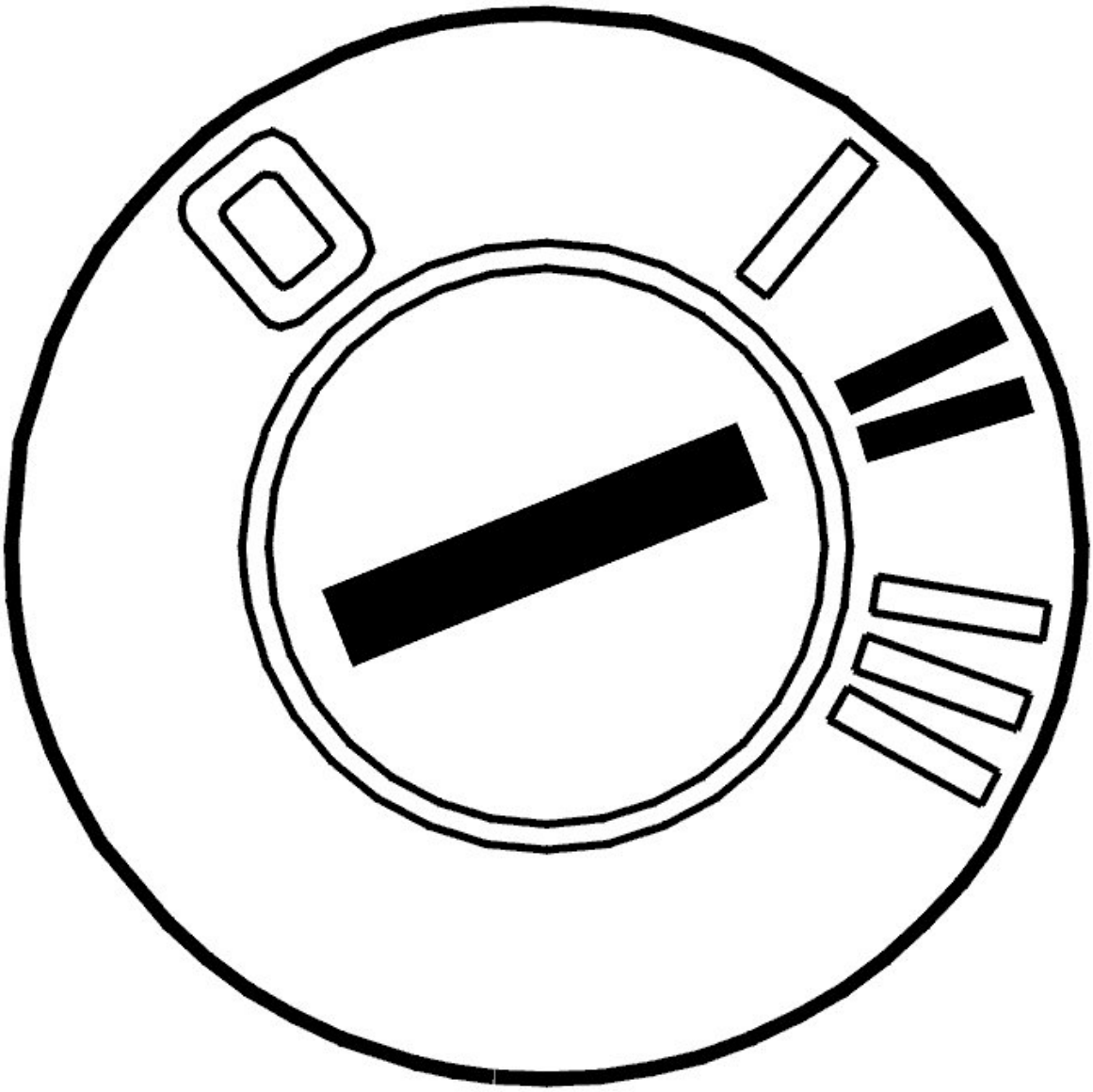
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

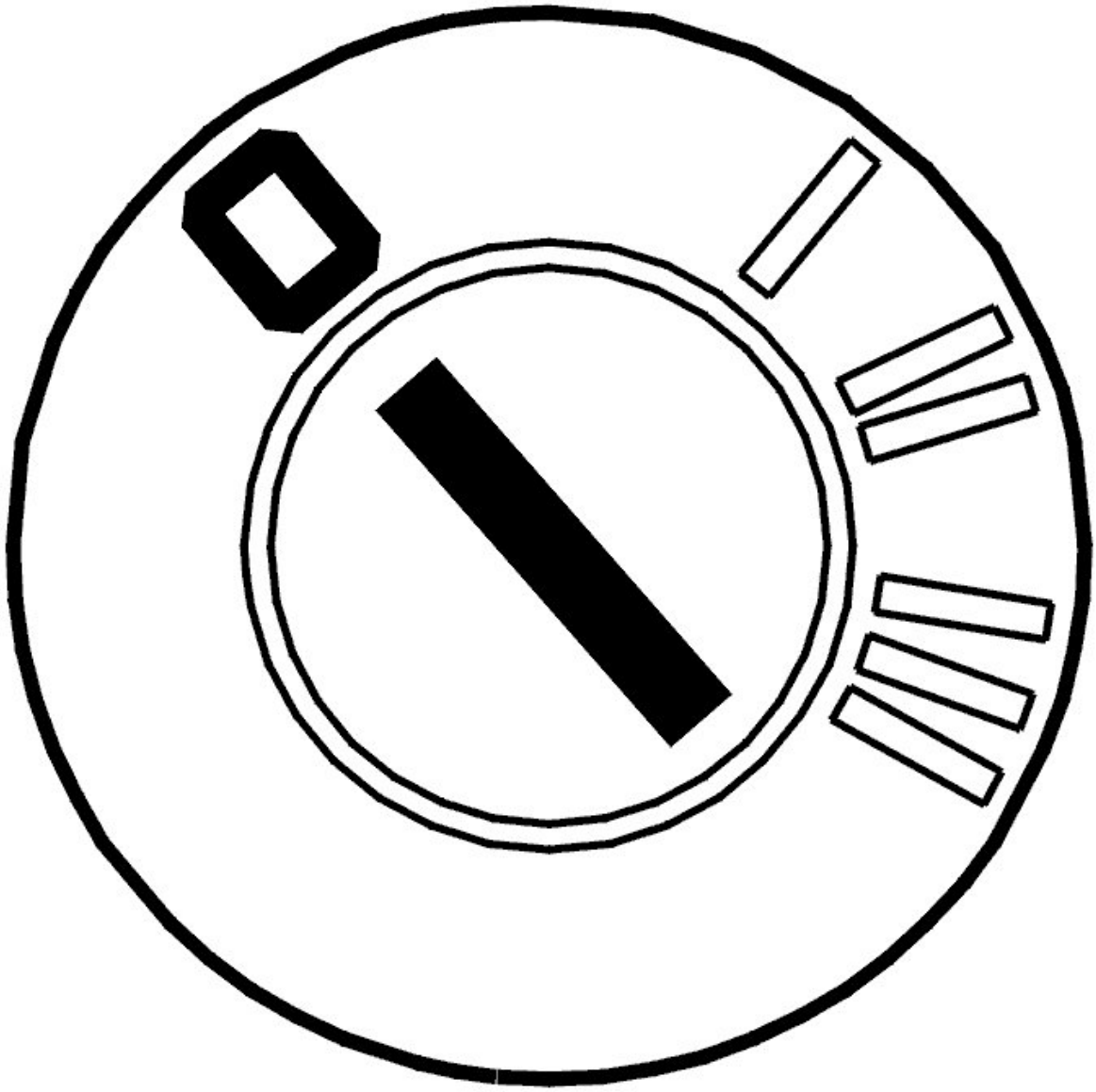
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the cable

Checking the resistance



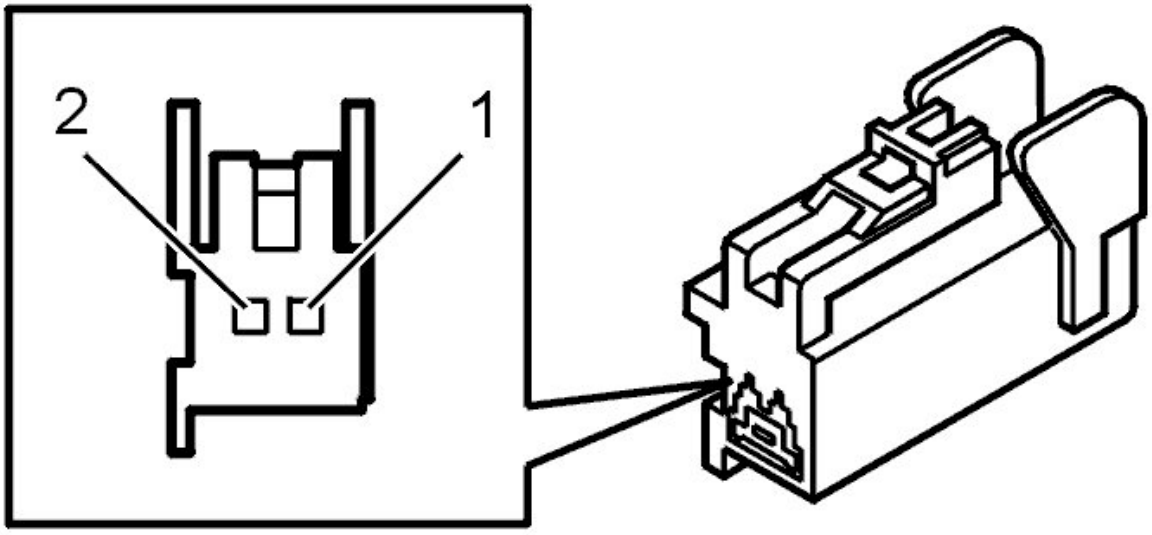
- Ignition off.

Measure the resistance between the 2-pin connector #1 and #2 (against Supplemental Restraint System Module (SRS)).

The resistance shall be approx. 22 kohms.
If the value does not match the likely cause is some internal defect in Supplemental Restraint System Module (SRS) or in its connectors.
Remedy as necessary.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)



Has the fault been remedied?

Yes - Verification

No - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

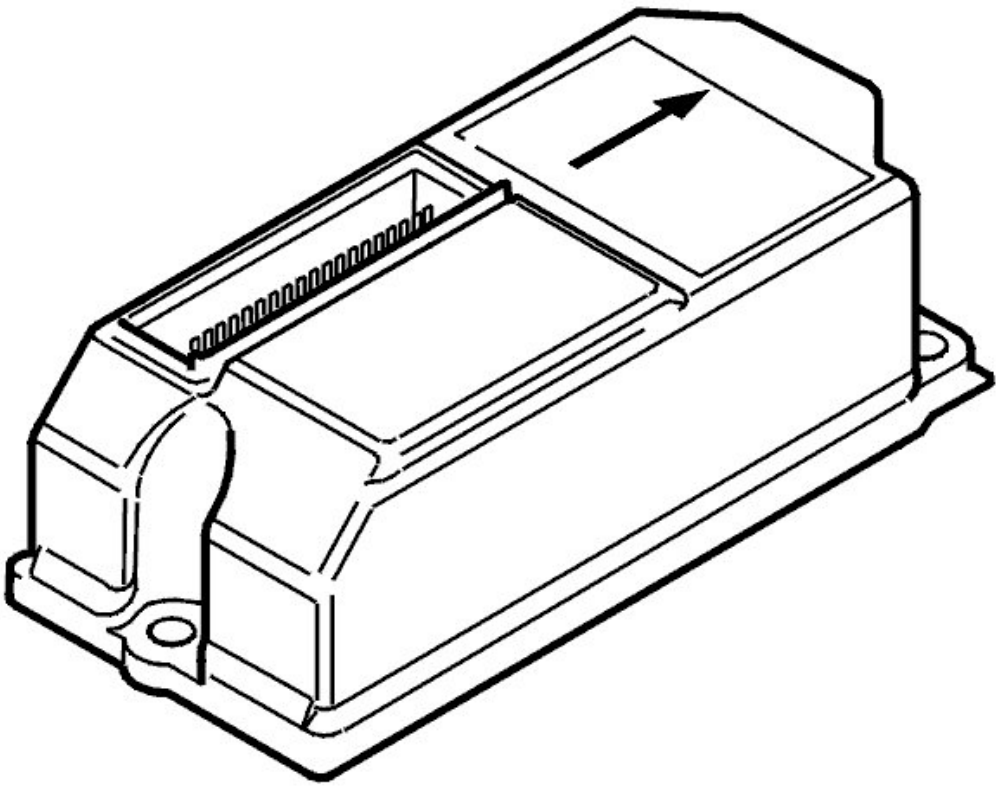
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0036
SRS-003E

SRS-0046
SRS-004E
SRS-0056
SRS-005E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a side impact protection (SIPS) bag is installed, despite the control module being programmed that a side impact protection (SIPS) bag is not installed.

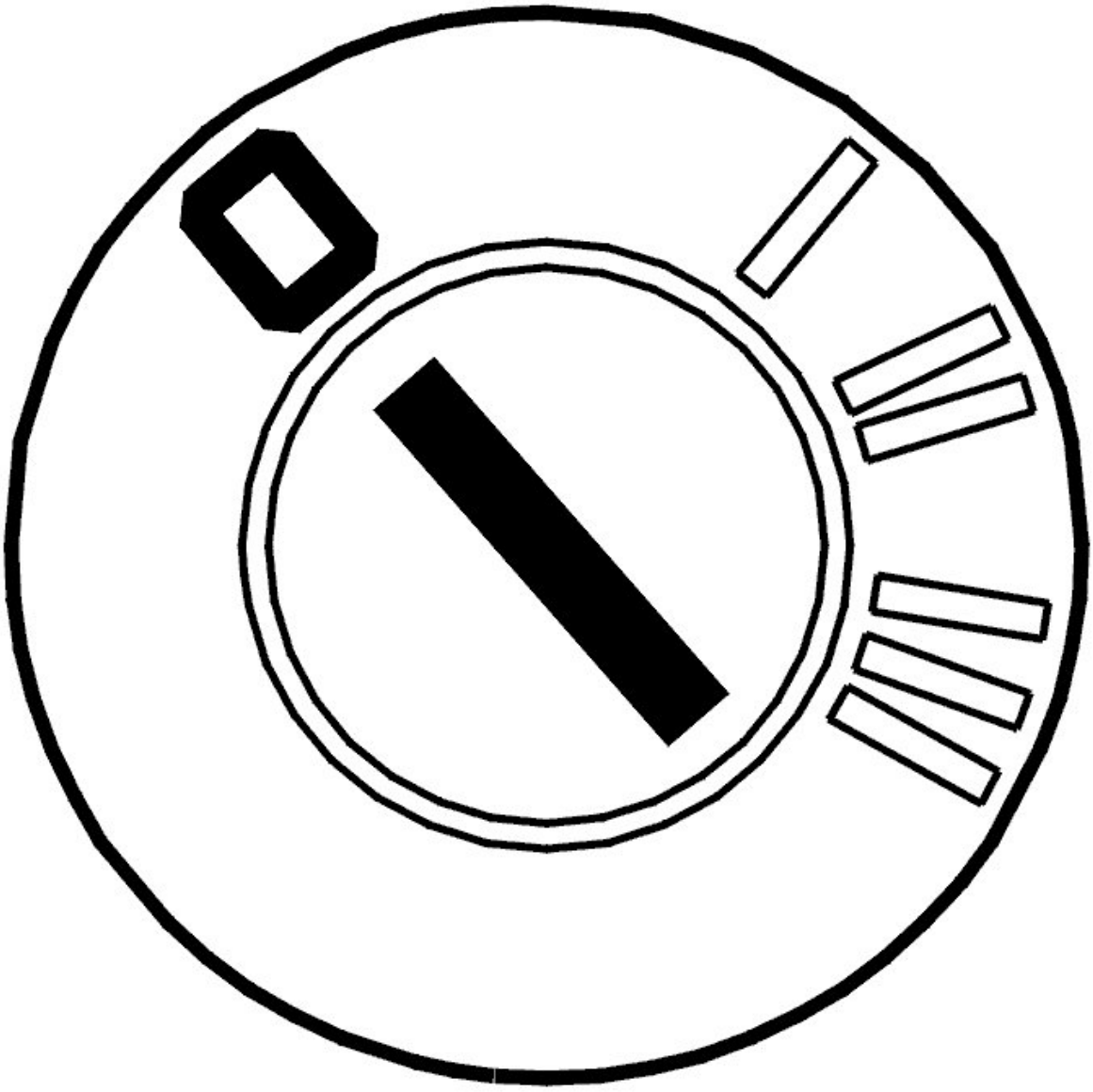
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

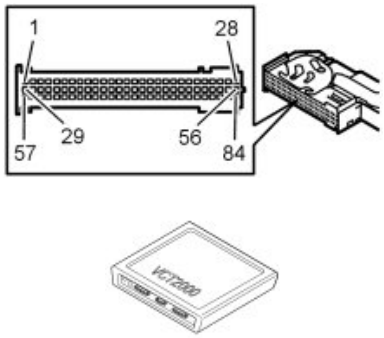


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

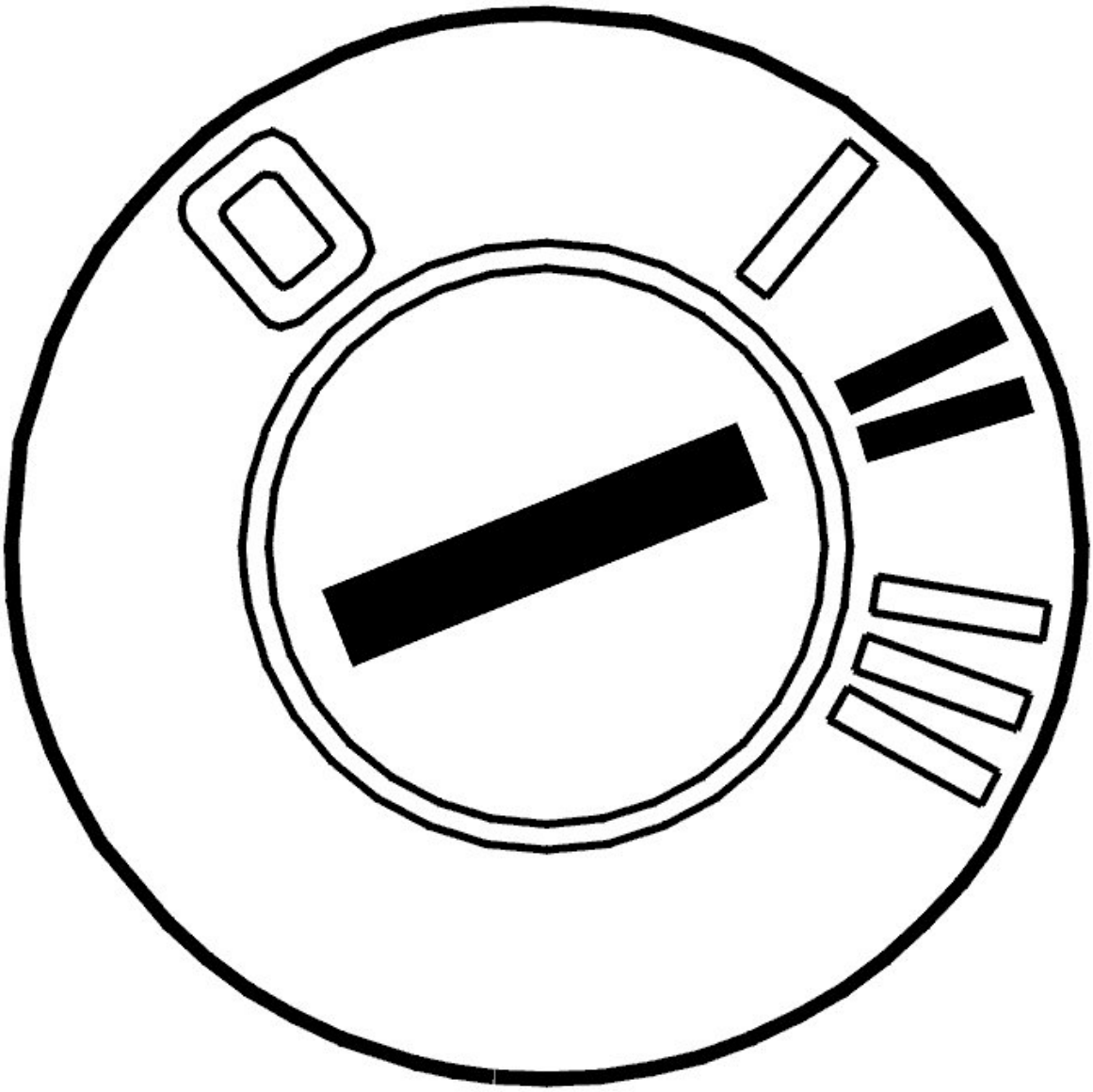
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

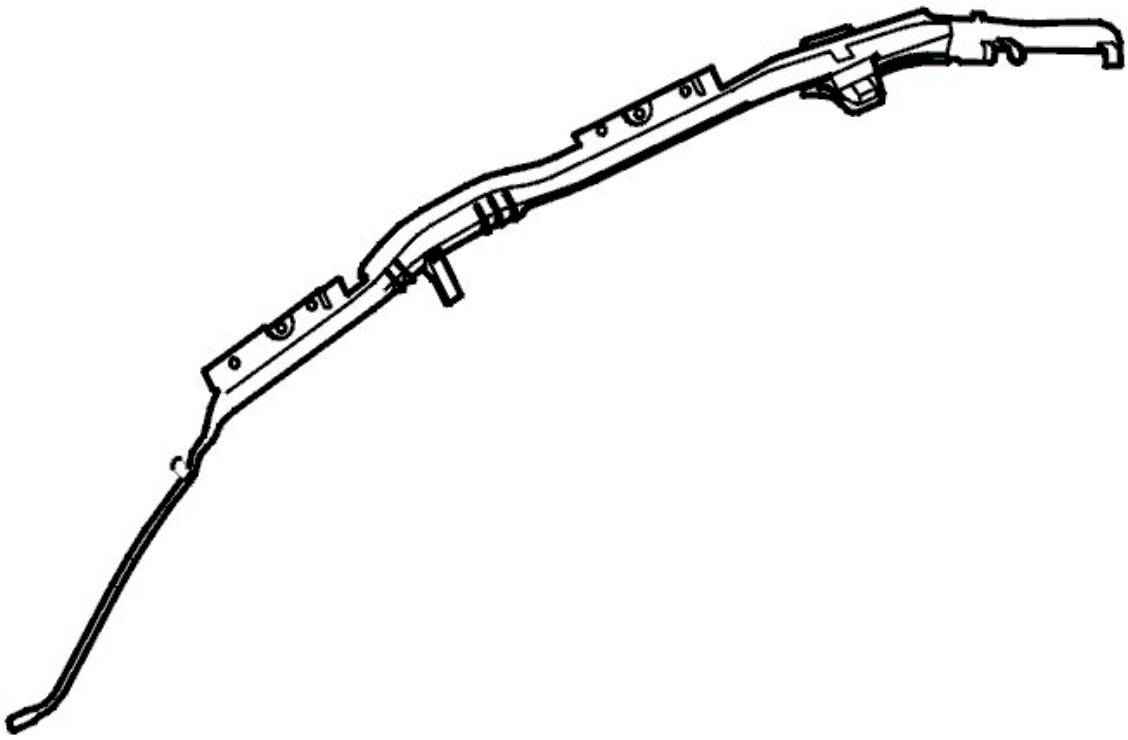
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0048 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0048 is displayed.

Substitute value
- Nothing.

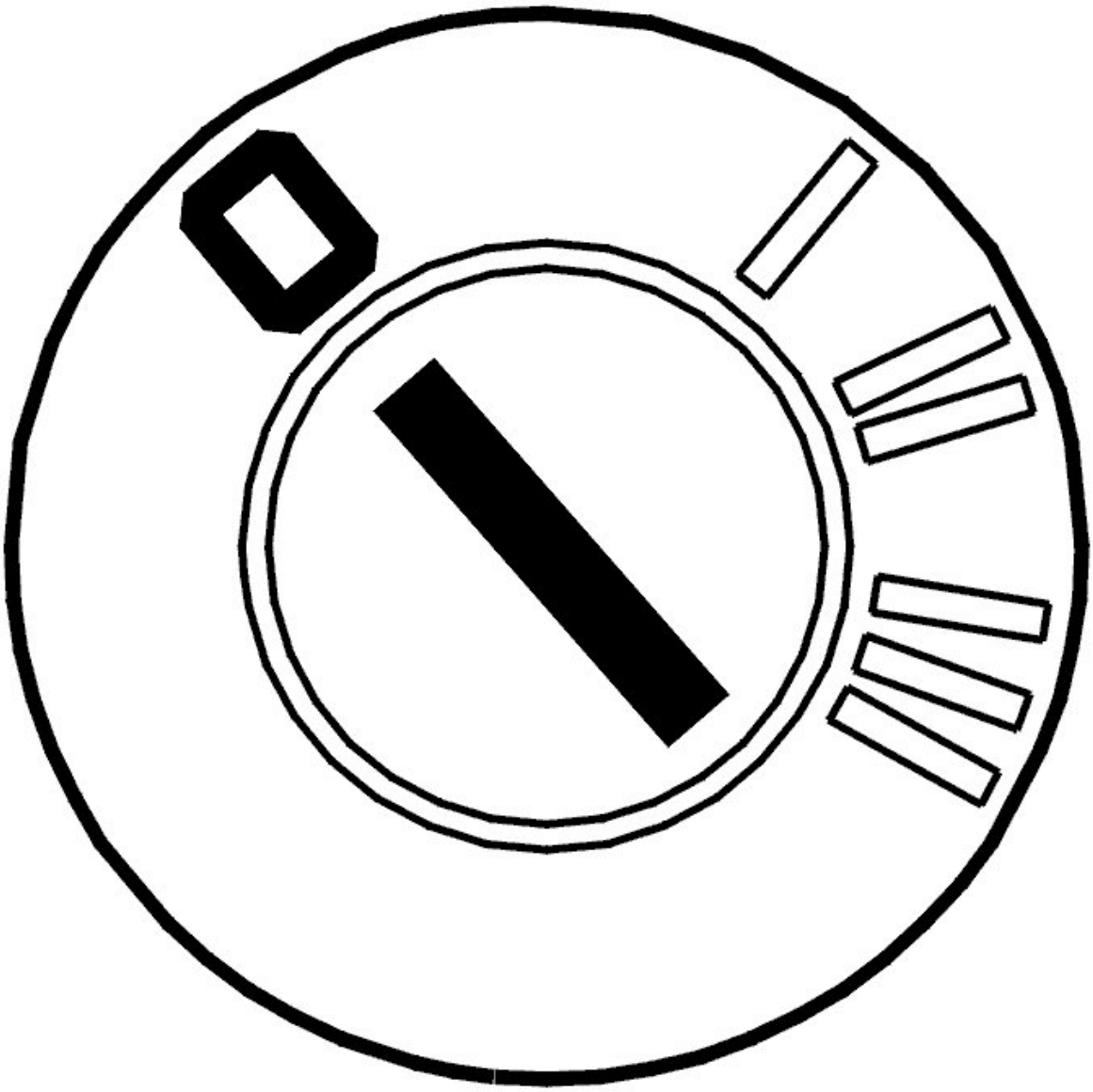
Possible source
- Short circuit to voltage supply in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in inflatable curtain.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

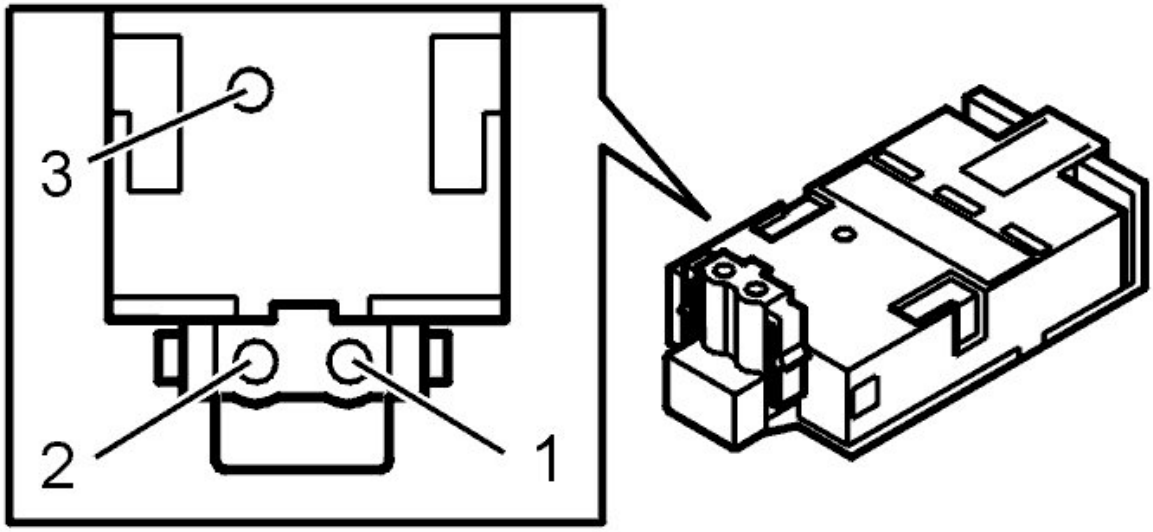
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

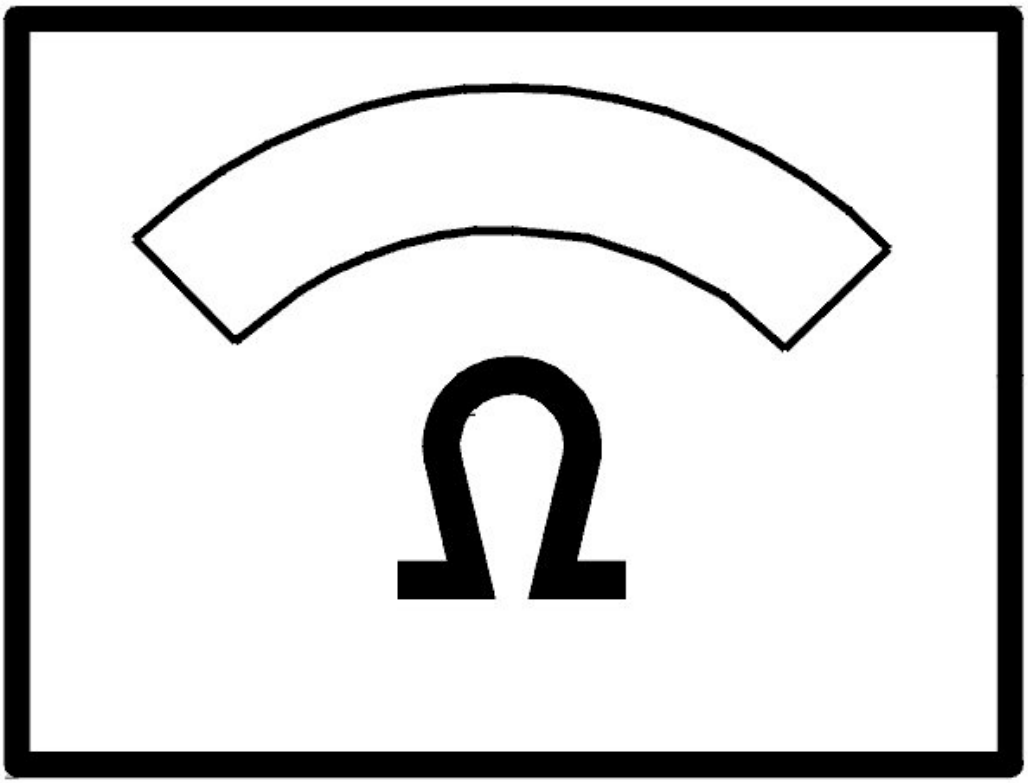
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between inflatable curtain connector terminals #1 and #3 (SRS control module side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

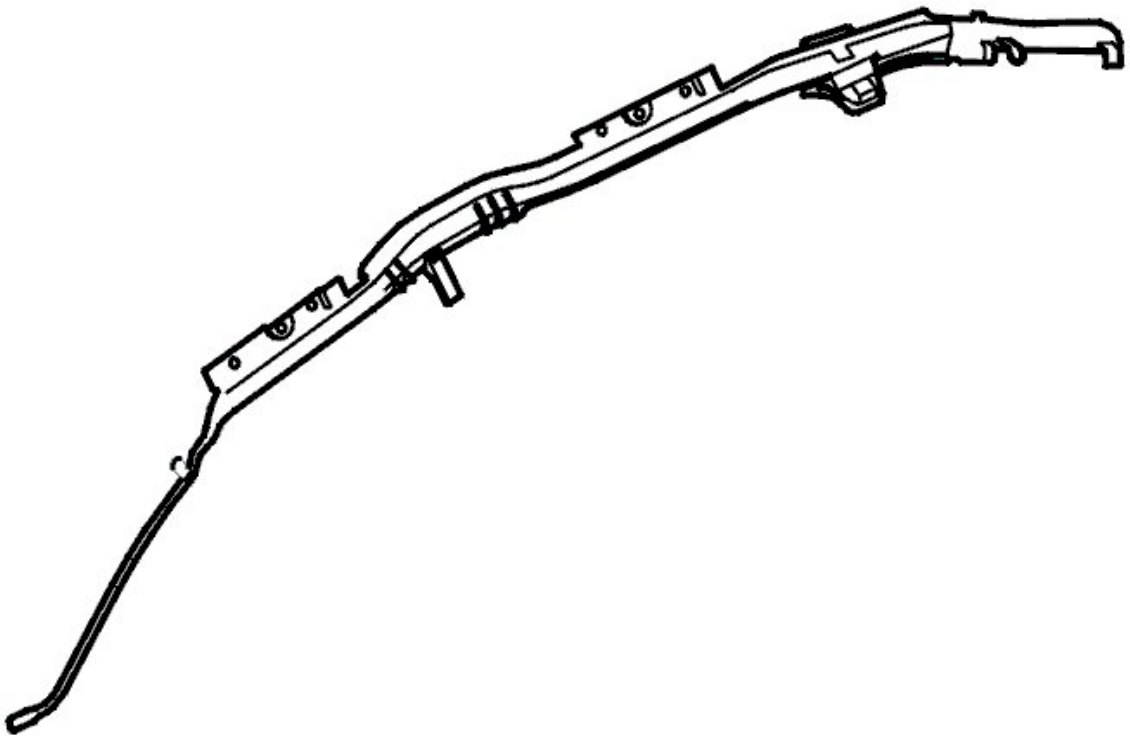
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0048 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0048 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to voltage supply in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit to voltage supply in inflatable curtain.

Fault symptom[s]

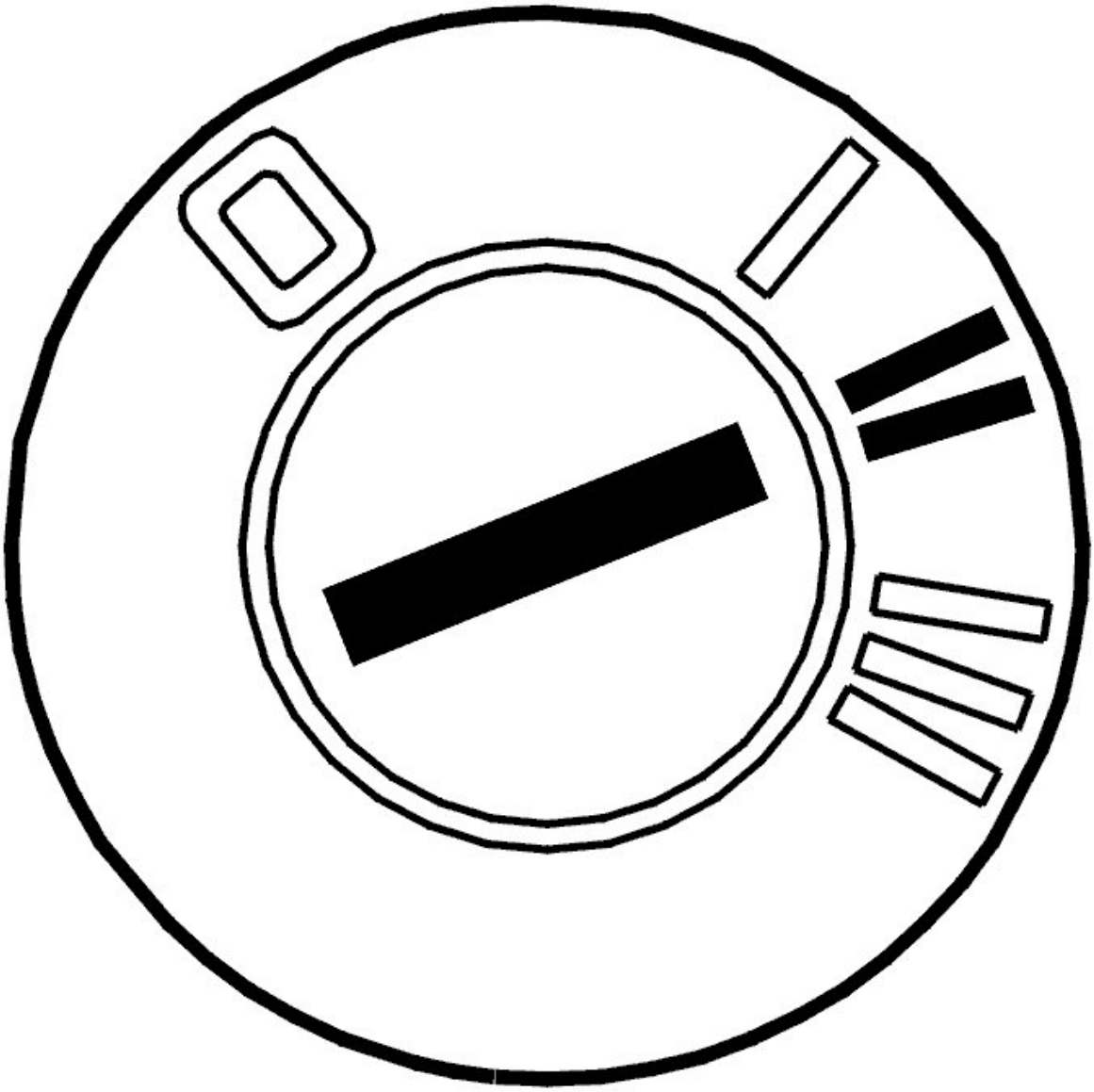
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

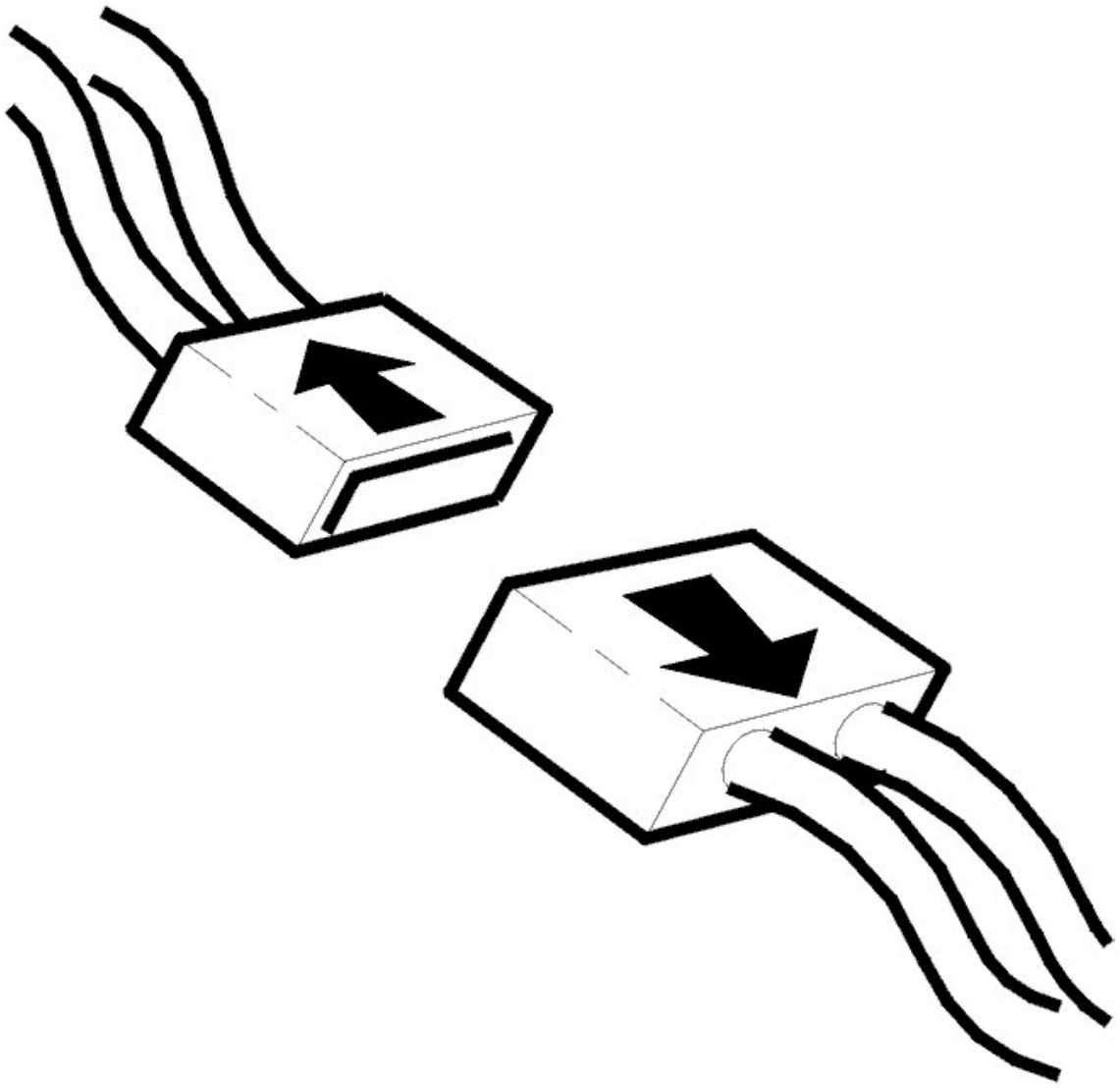
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

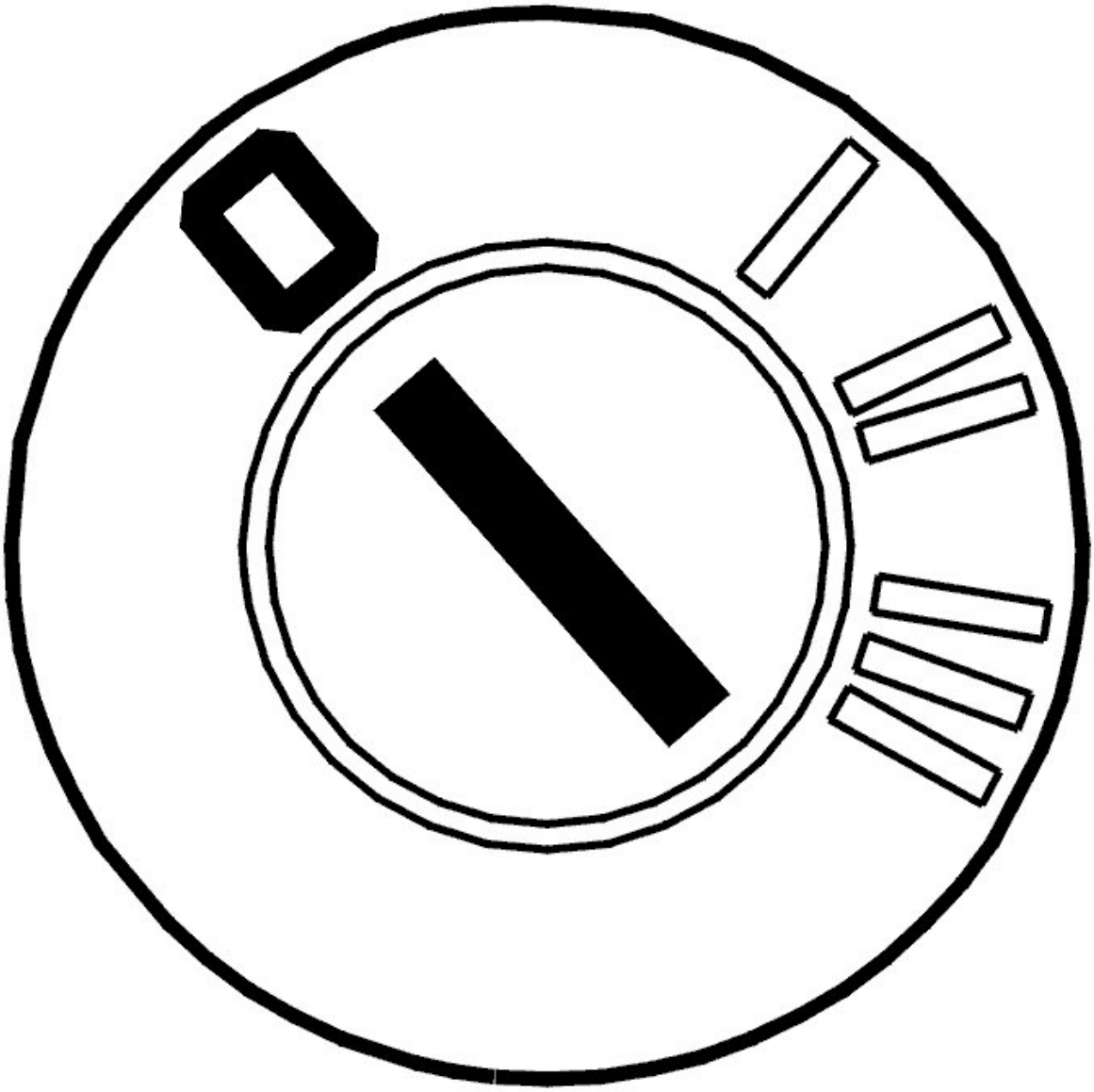
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

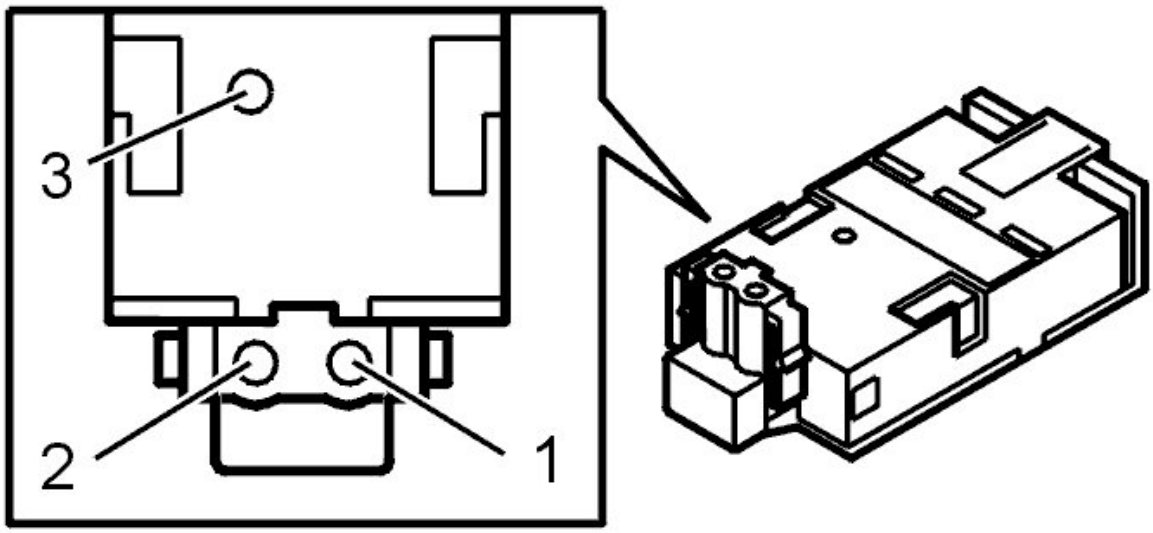
Check the cable between the SRS control module terminals #21C(17) and #22C(18) and connector terminals #1, #3 on the right-hand inflatable curtain for a short-circuit to supply voltage according to approproate procedure.
Remedy as necessary.

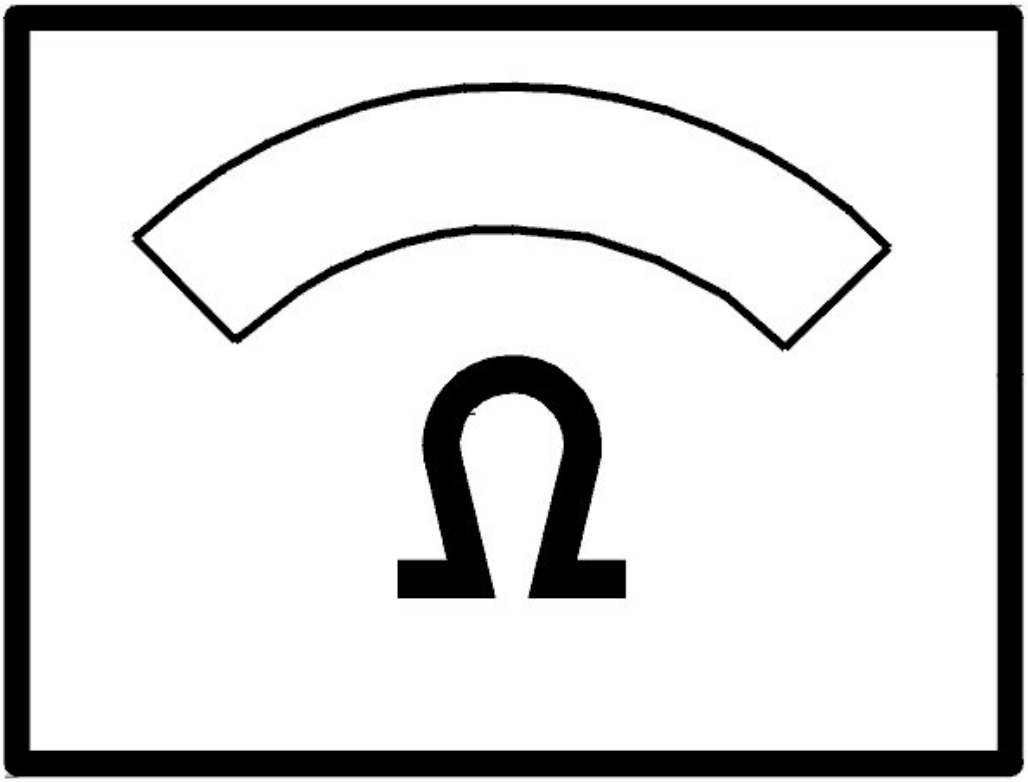
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between inflatable curtain connector terminals #1 and #3 (SRS control module side) and the disconnected battery positive terminal should be

infinite

- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

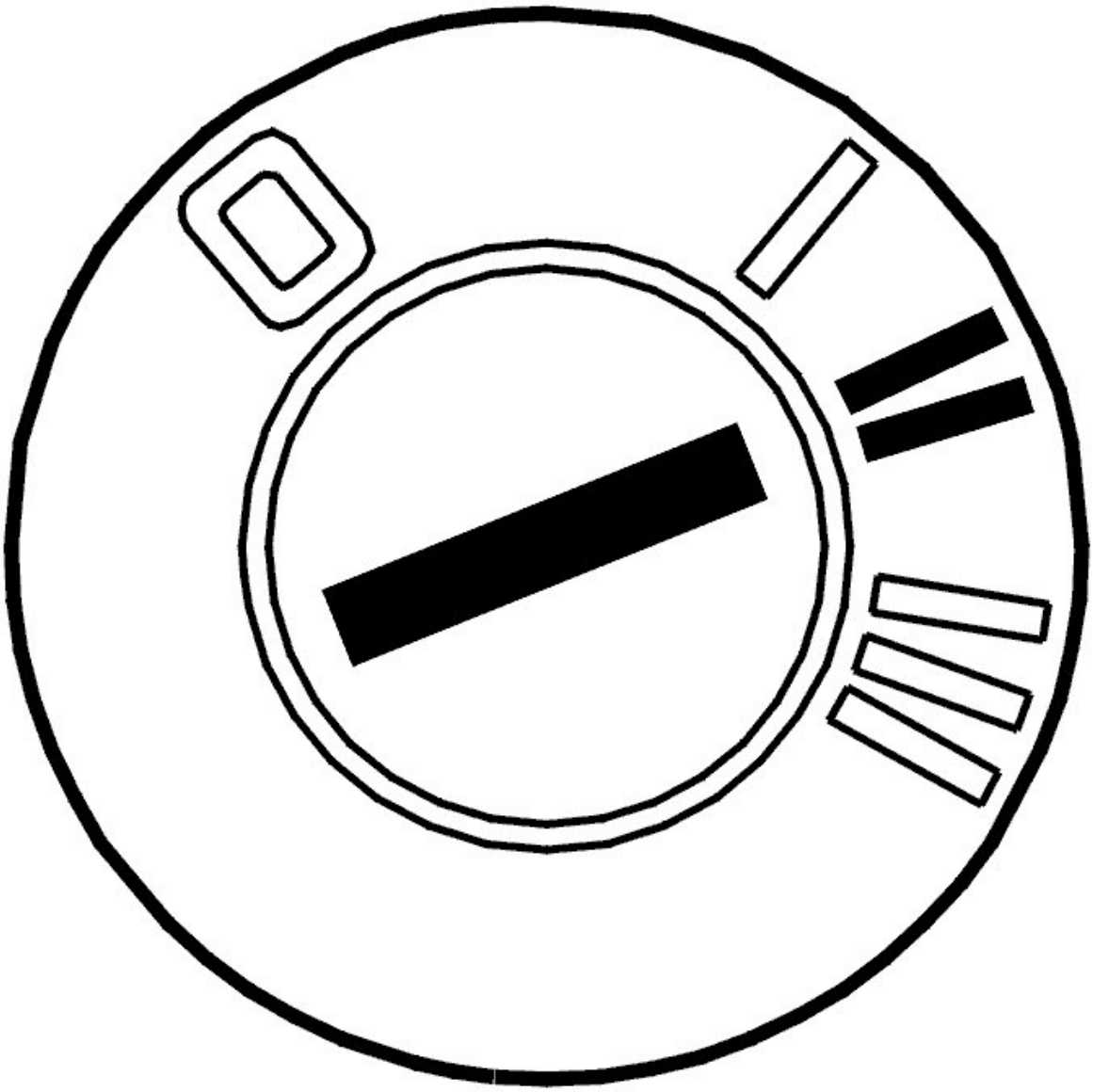
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

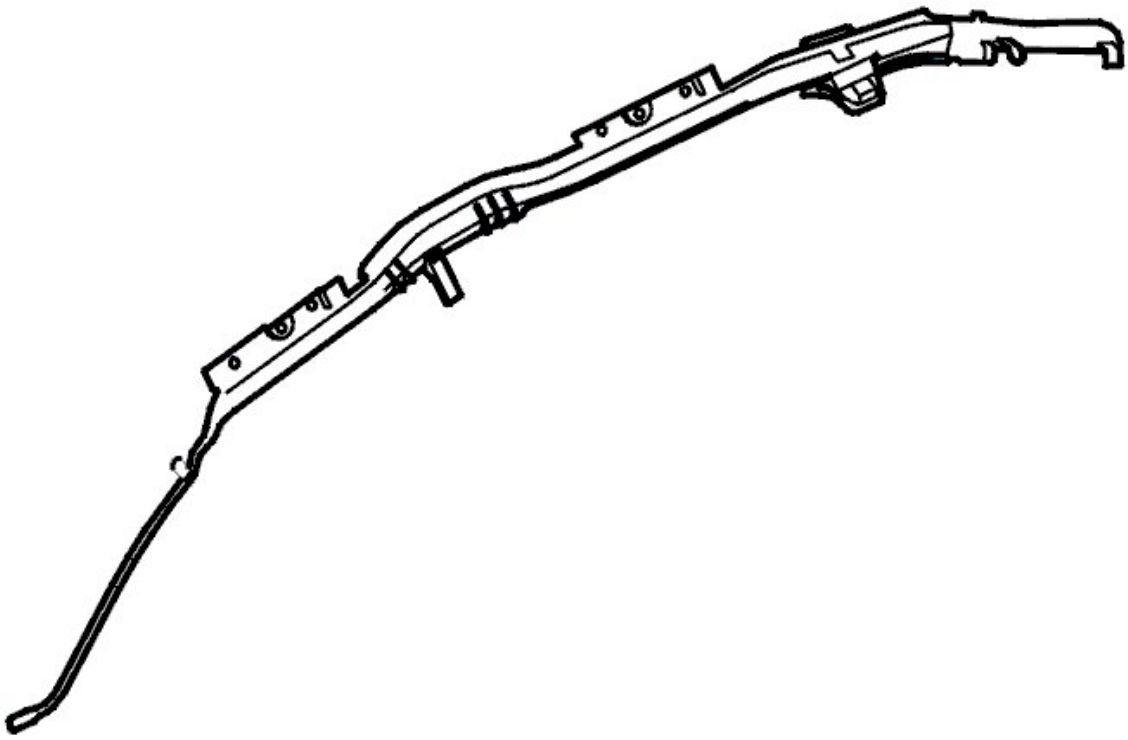
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0049 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0049 is displayed.

Substitute value
- Nothing.

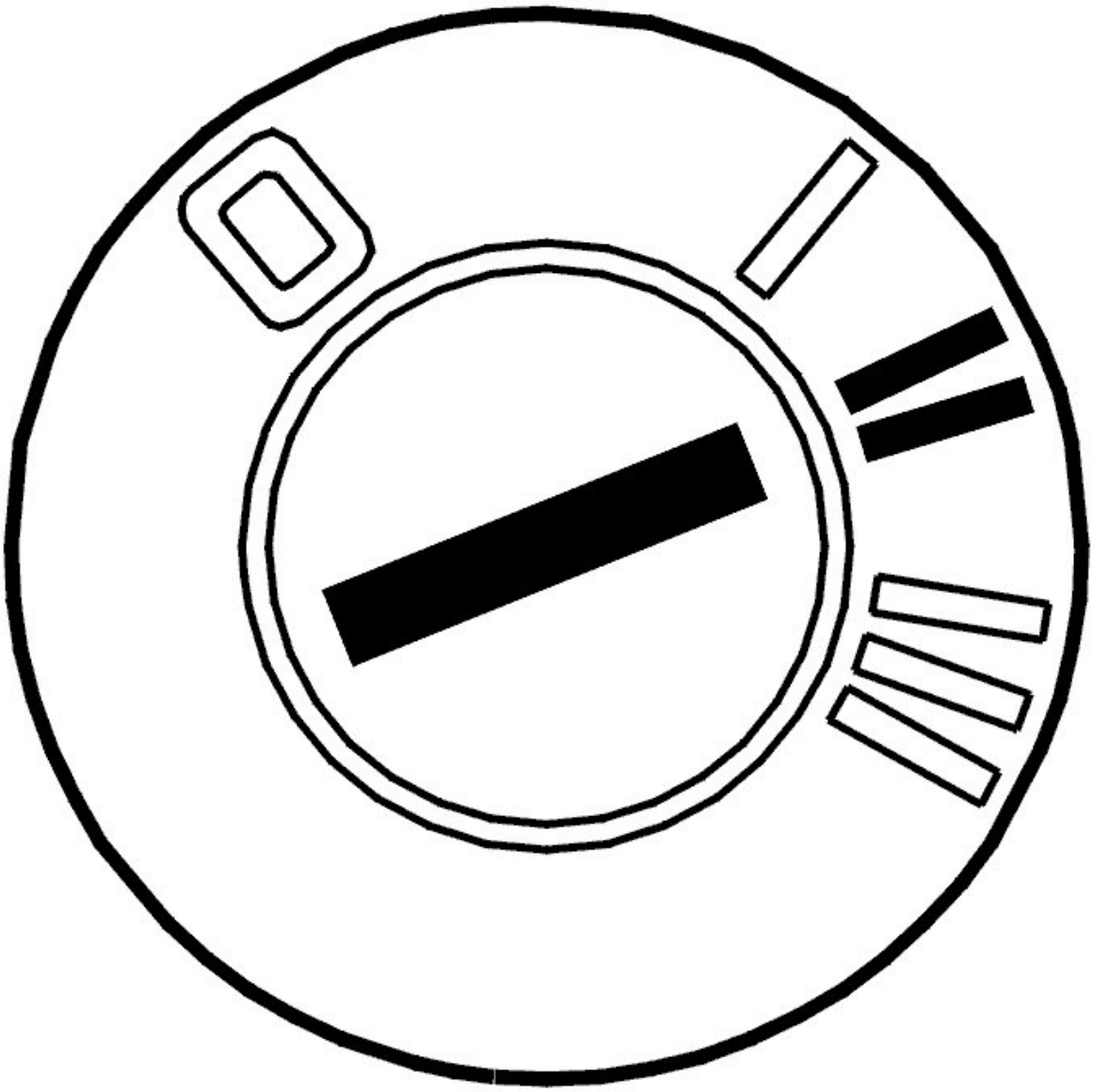
Possible source
- Short circuit to ground in igniter wire or connectors between the inflatable curtain and SRS control unit
- Short circuit to ground in inflatable curtain.

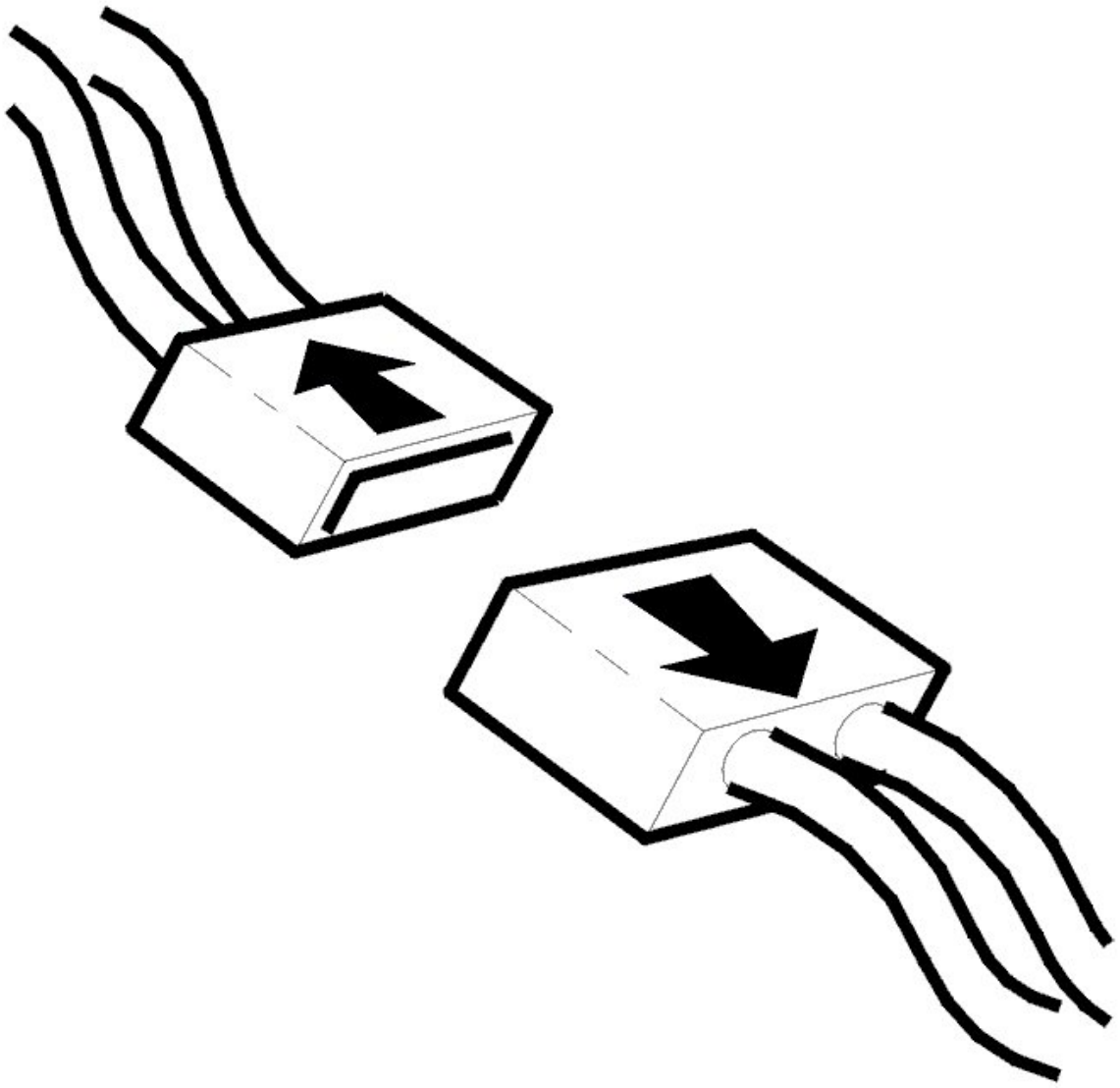
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

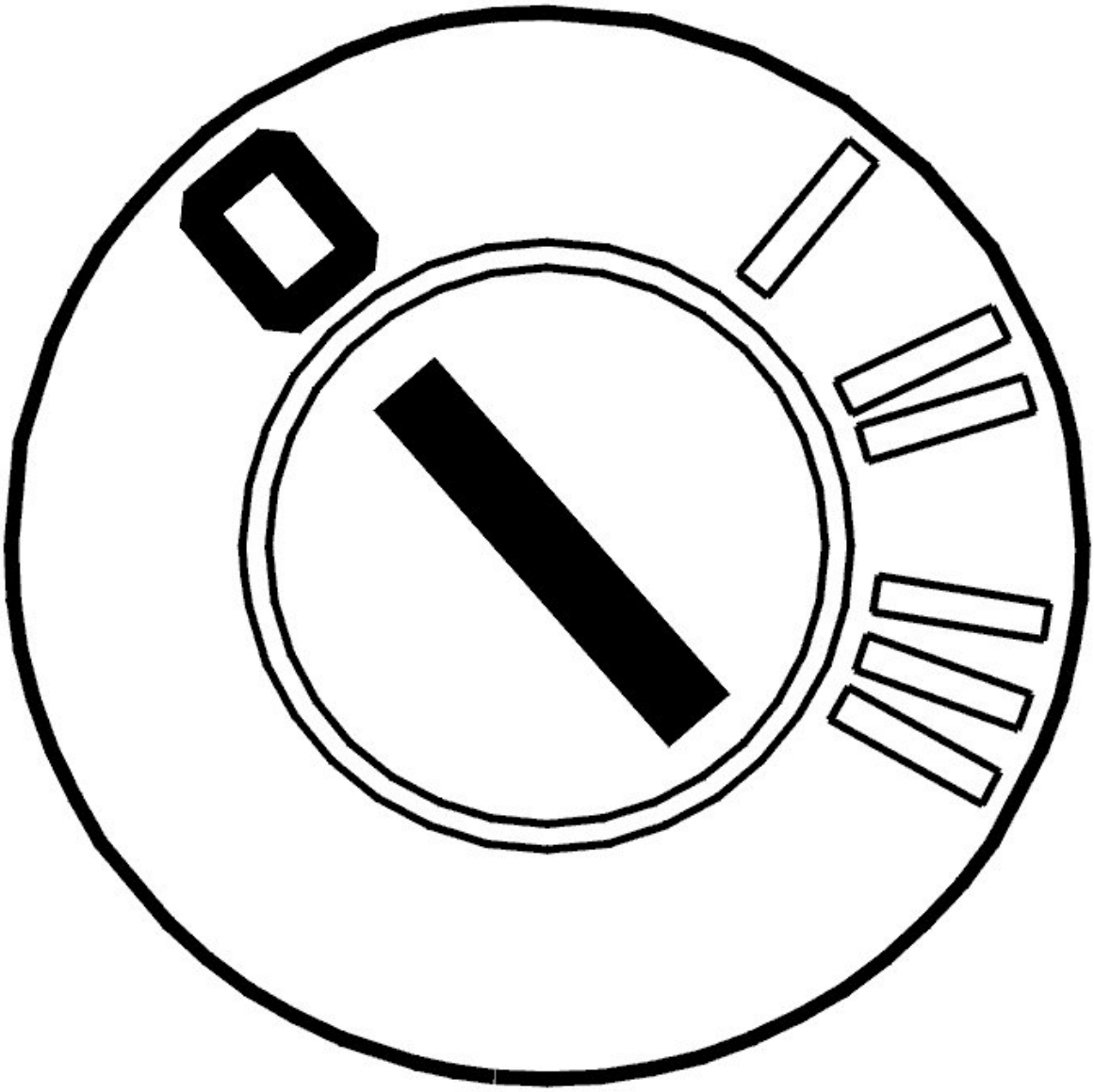
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

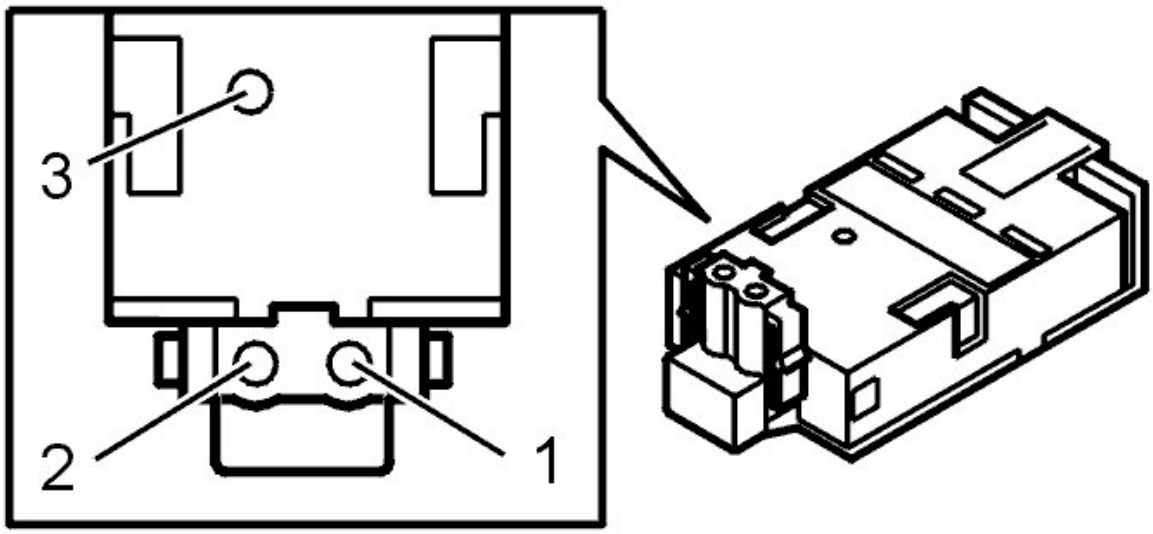
Check the cable between SRS control module terminals #21C (17) and #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

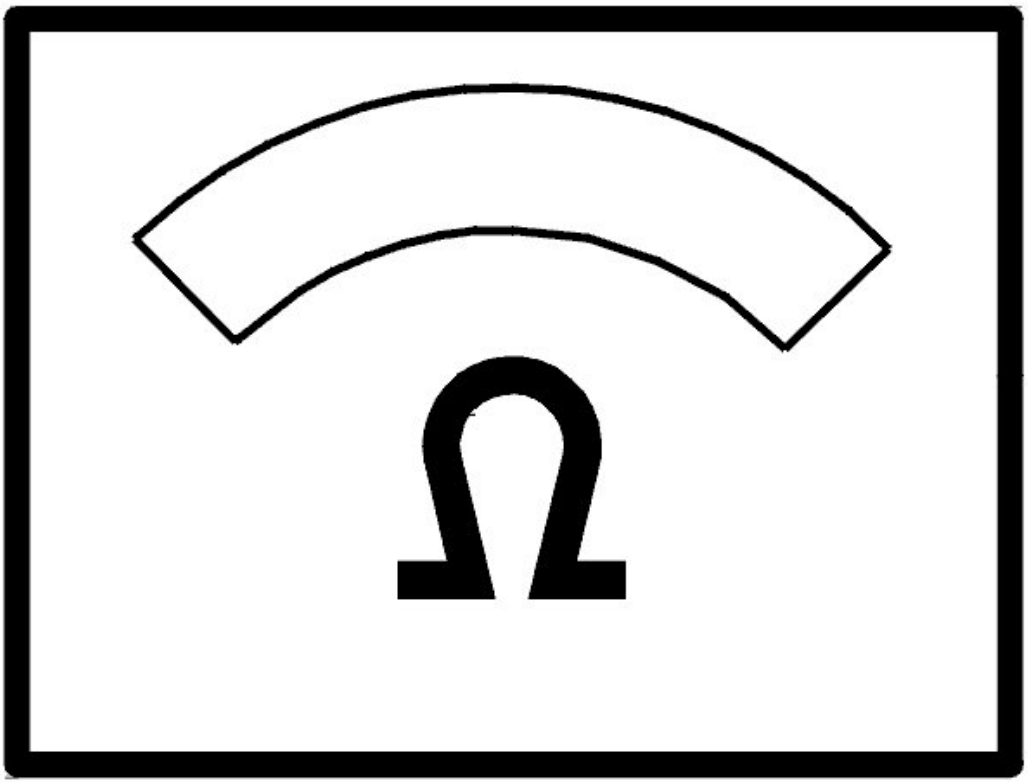
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance

between inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

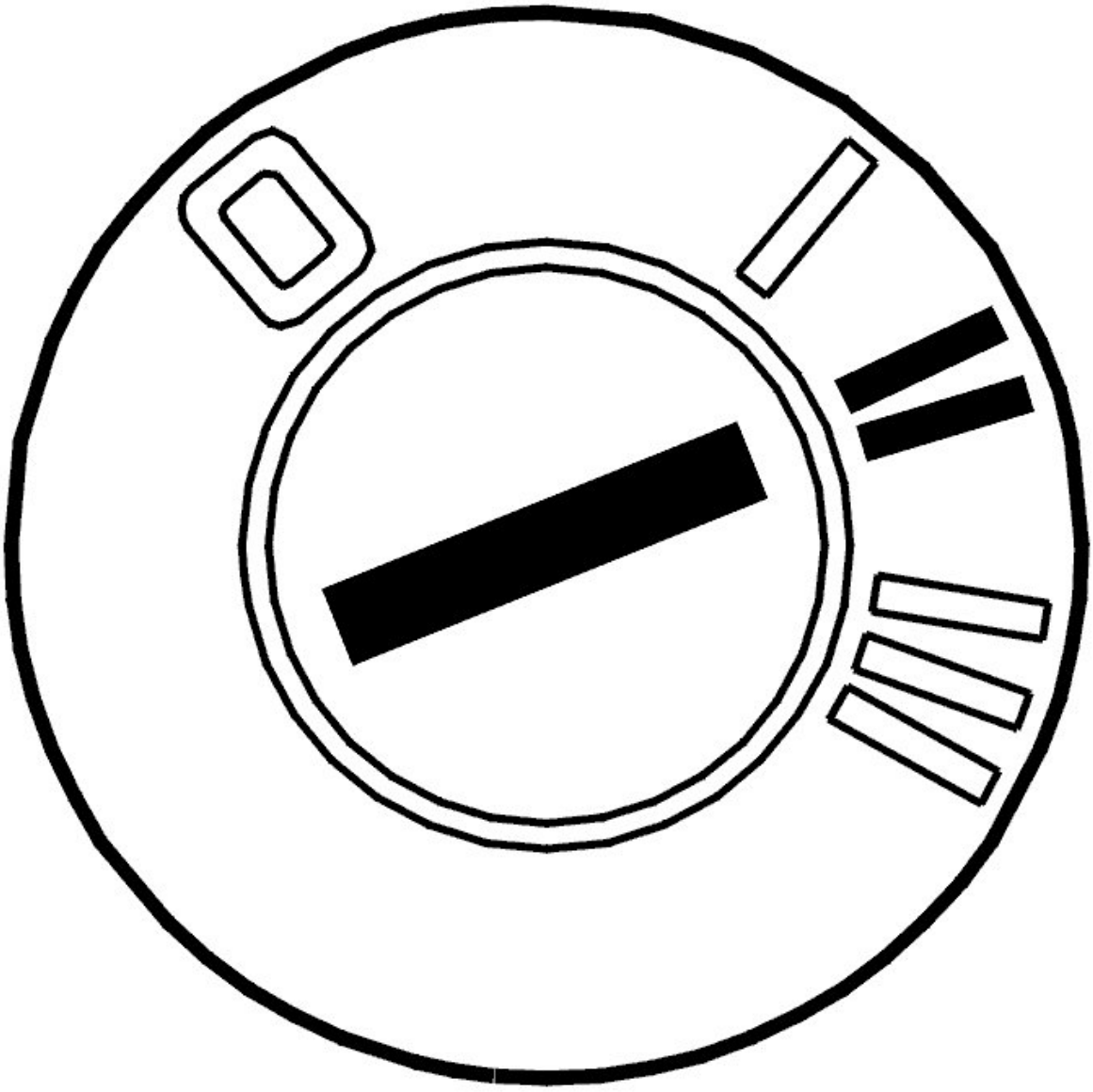
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

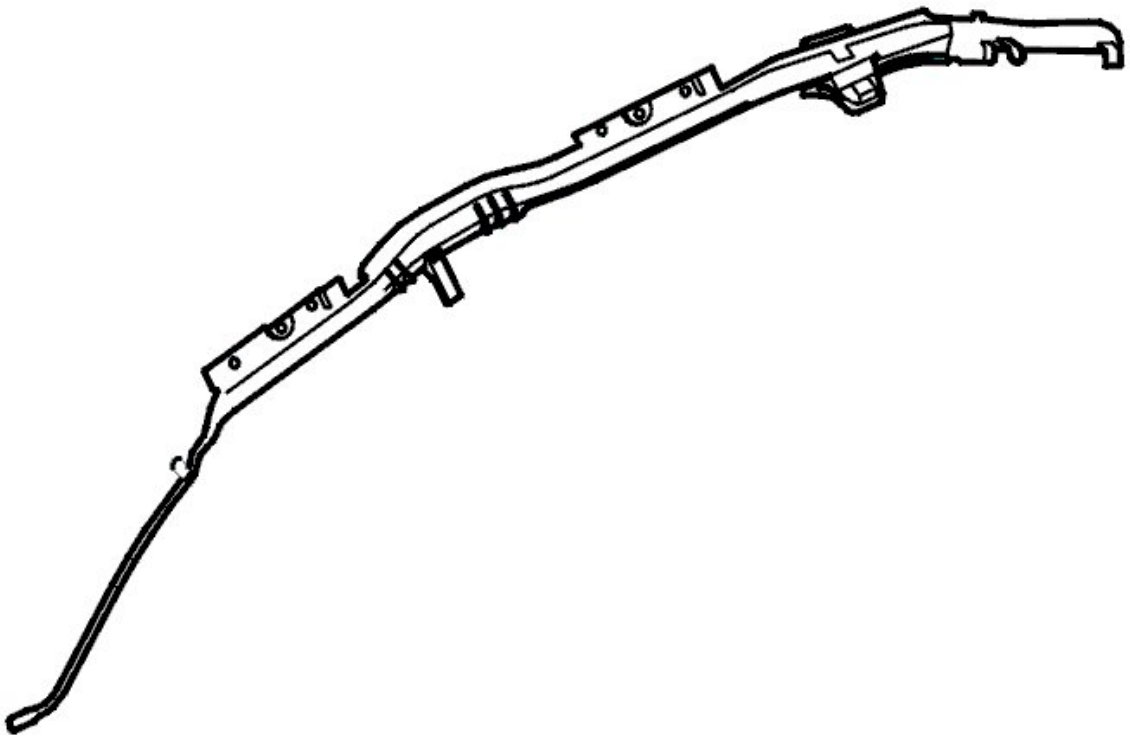
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0049 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0049 is displayed.

Substitute value
- Nothing.

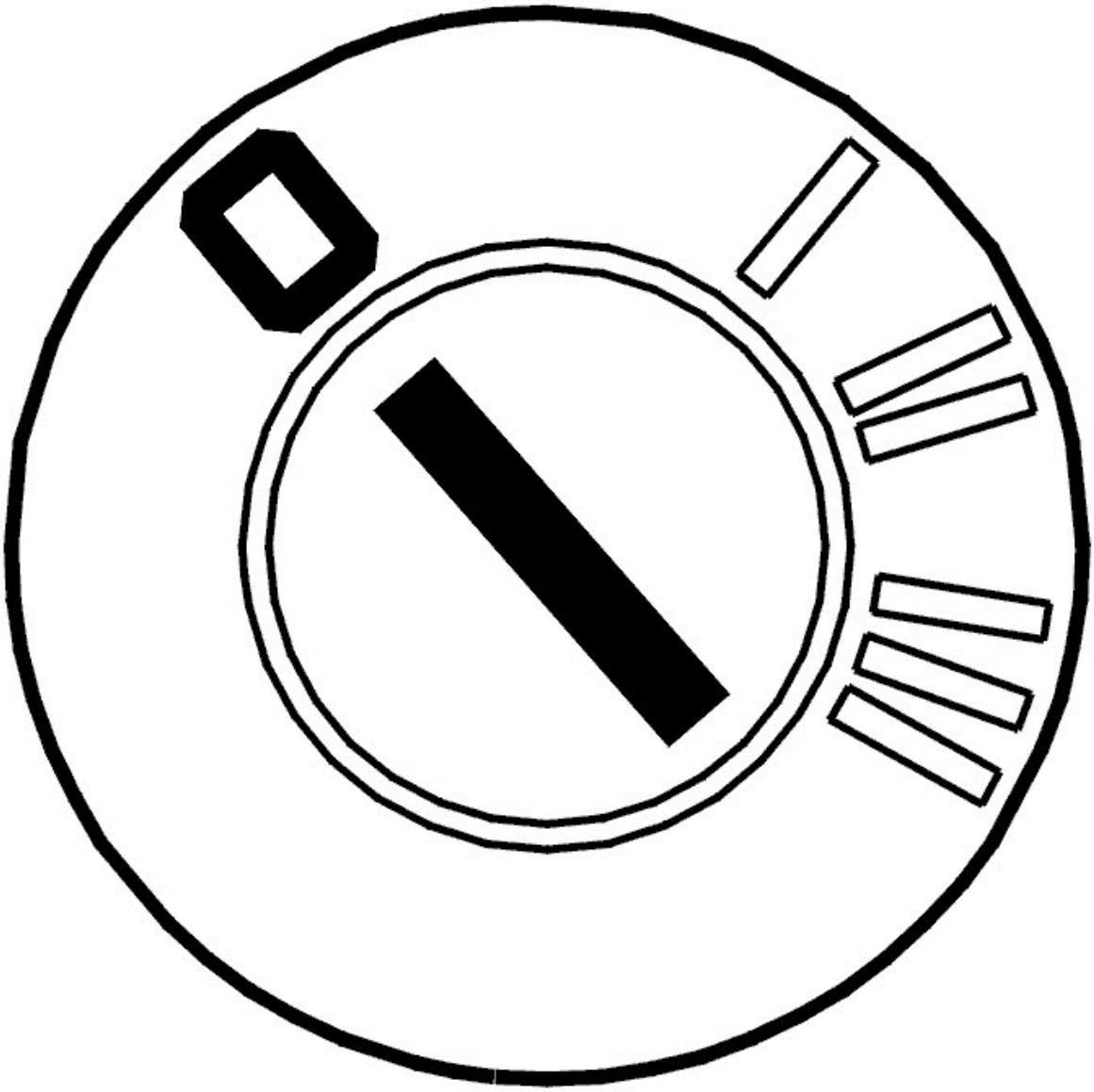
Possible source
- Short circuit to ground in igniter wire or connectors between the inflatable curtain and SRS control unit
- Short circuit to ground in inflatable curtain.

Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

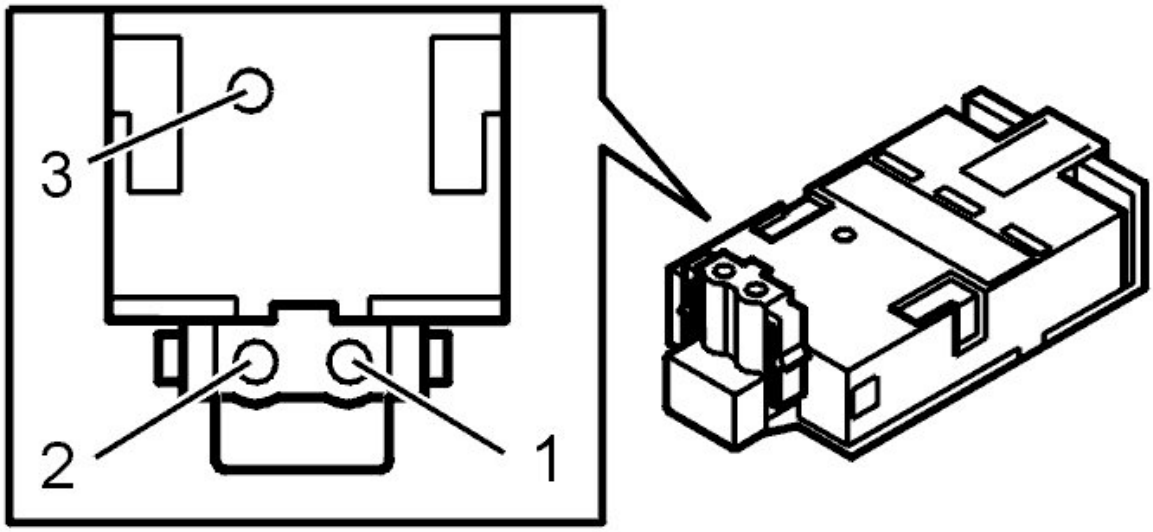
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

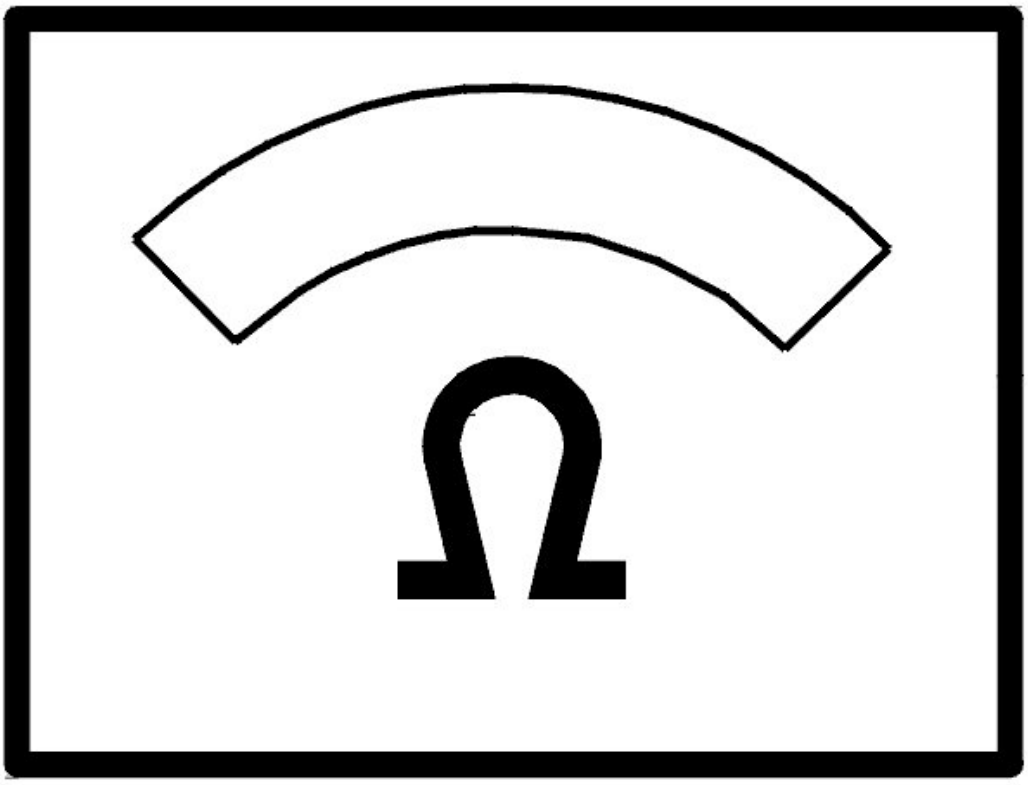
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable

curtain for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

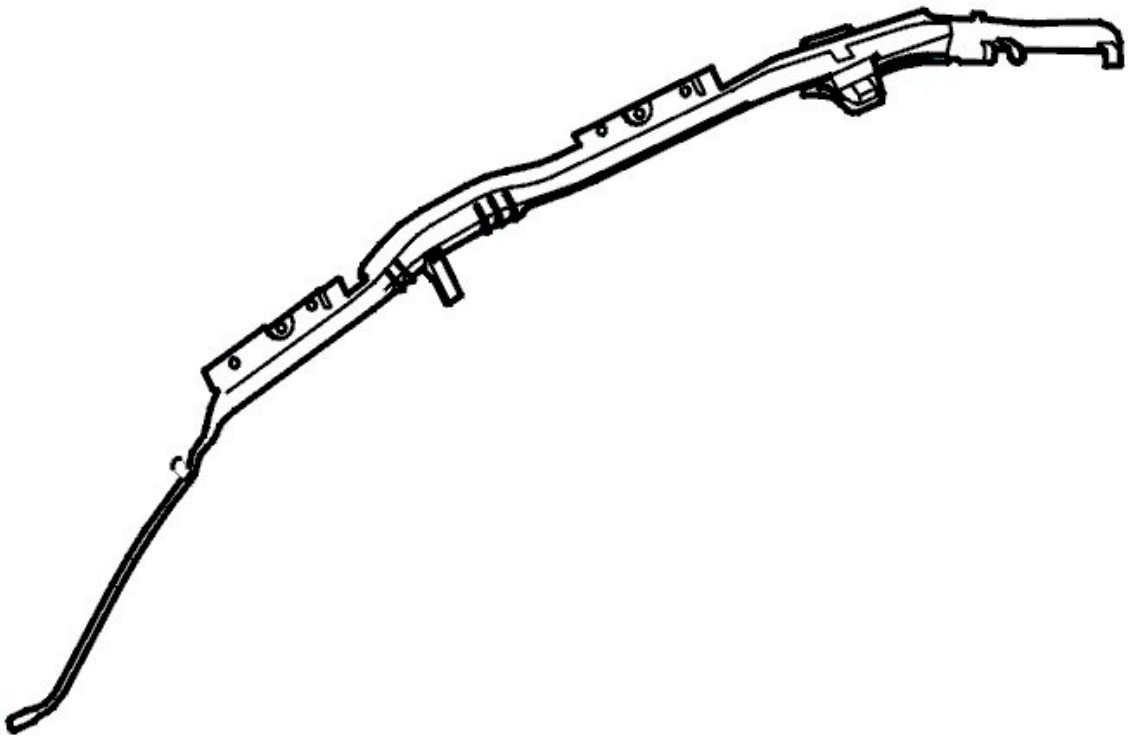
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-004A Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-004A is displayed.

Substitute value
- Nothing.

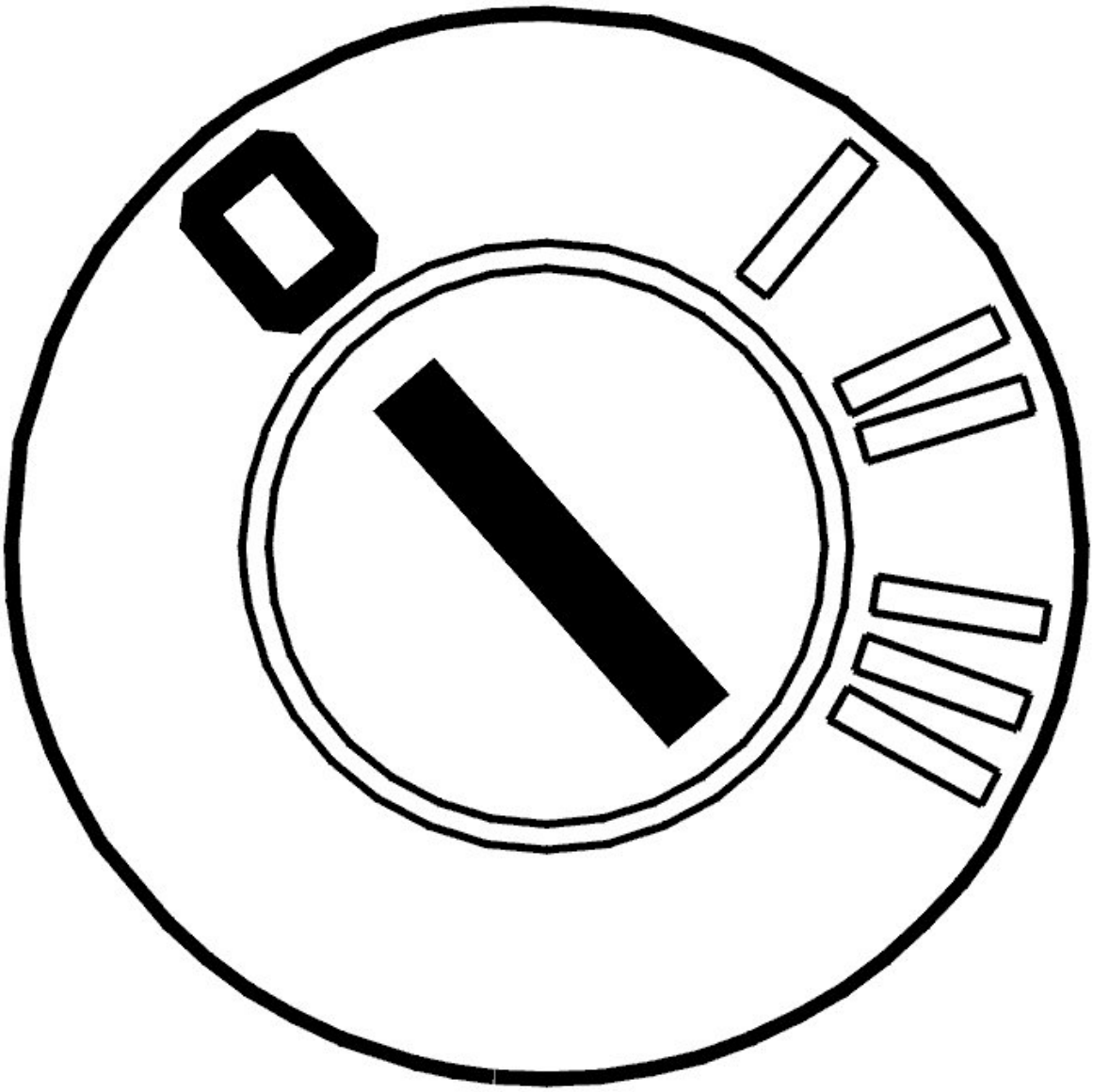
Possible source
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

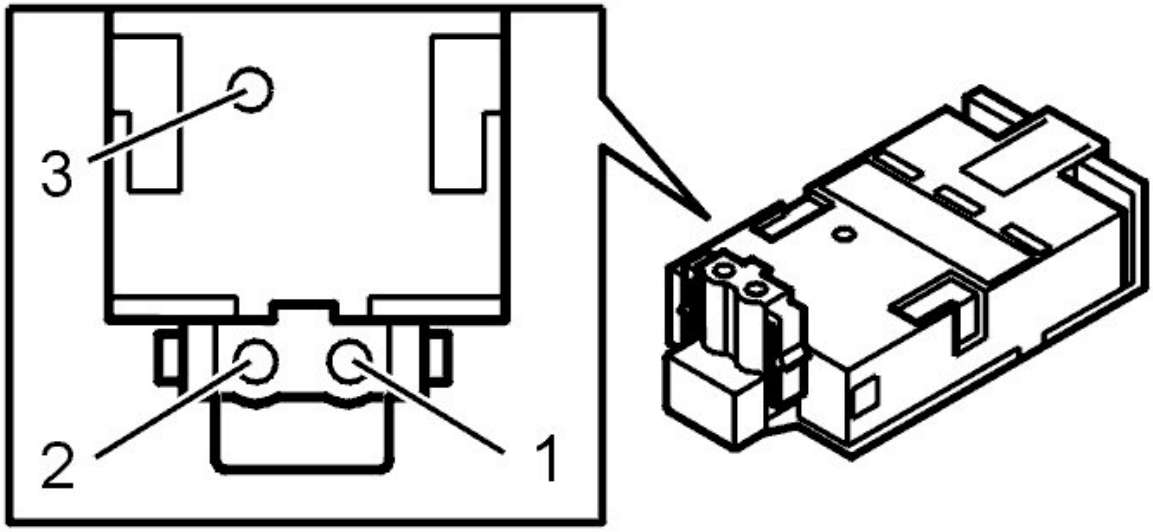
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

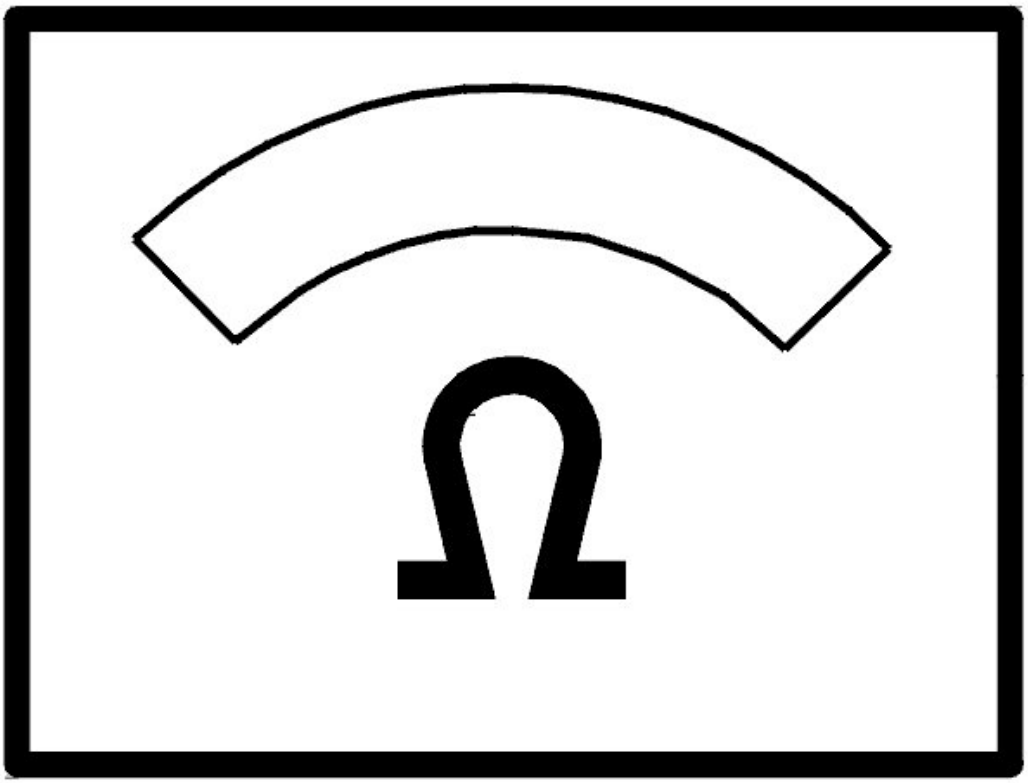
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the connector for the right inflatable curtain and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #21C (17) and #22C (18) on the SRS control module connector (inflatable curtain side) should be infinite
- With the ignition off and the connectors for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

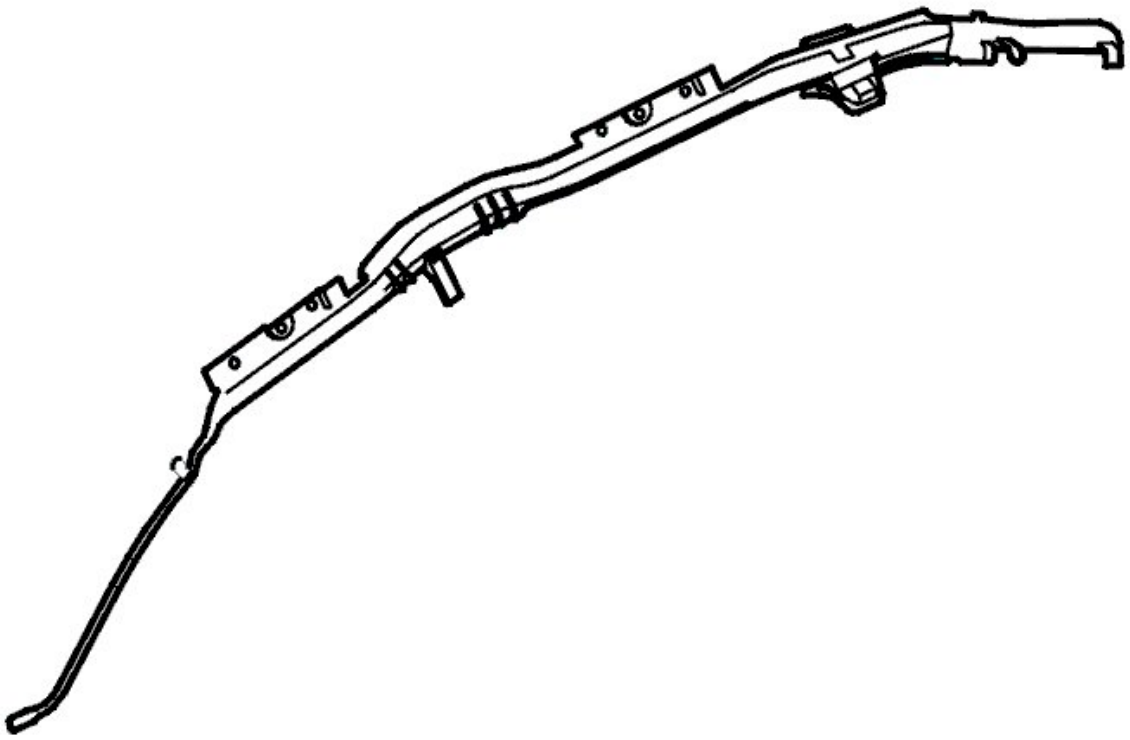
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-004A Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-004A is displayed.

Substitute value
- Nothing.

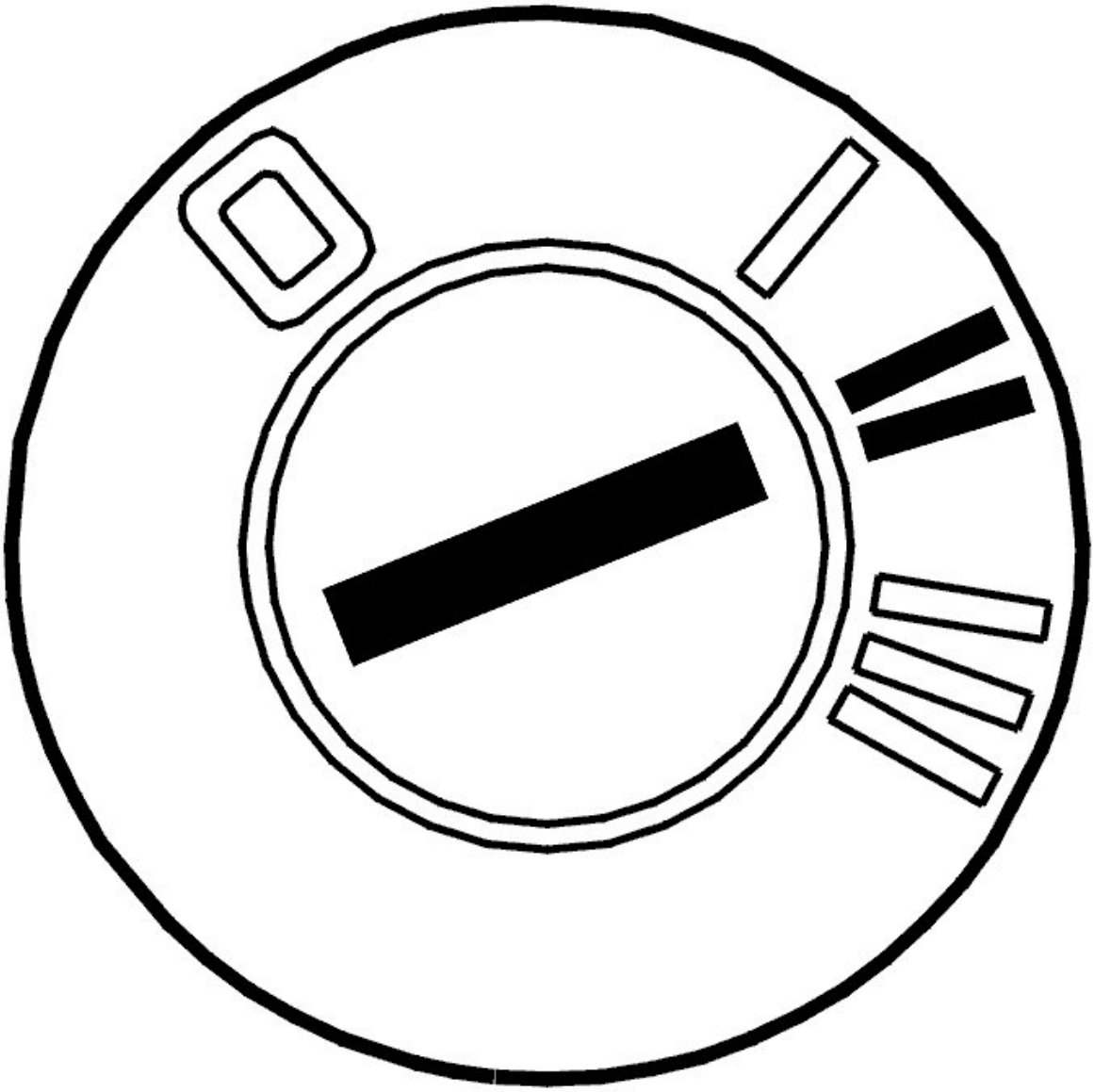
Possible source
- Capacitance too high or short circuit in in-built capacitor in igniter wire connector.

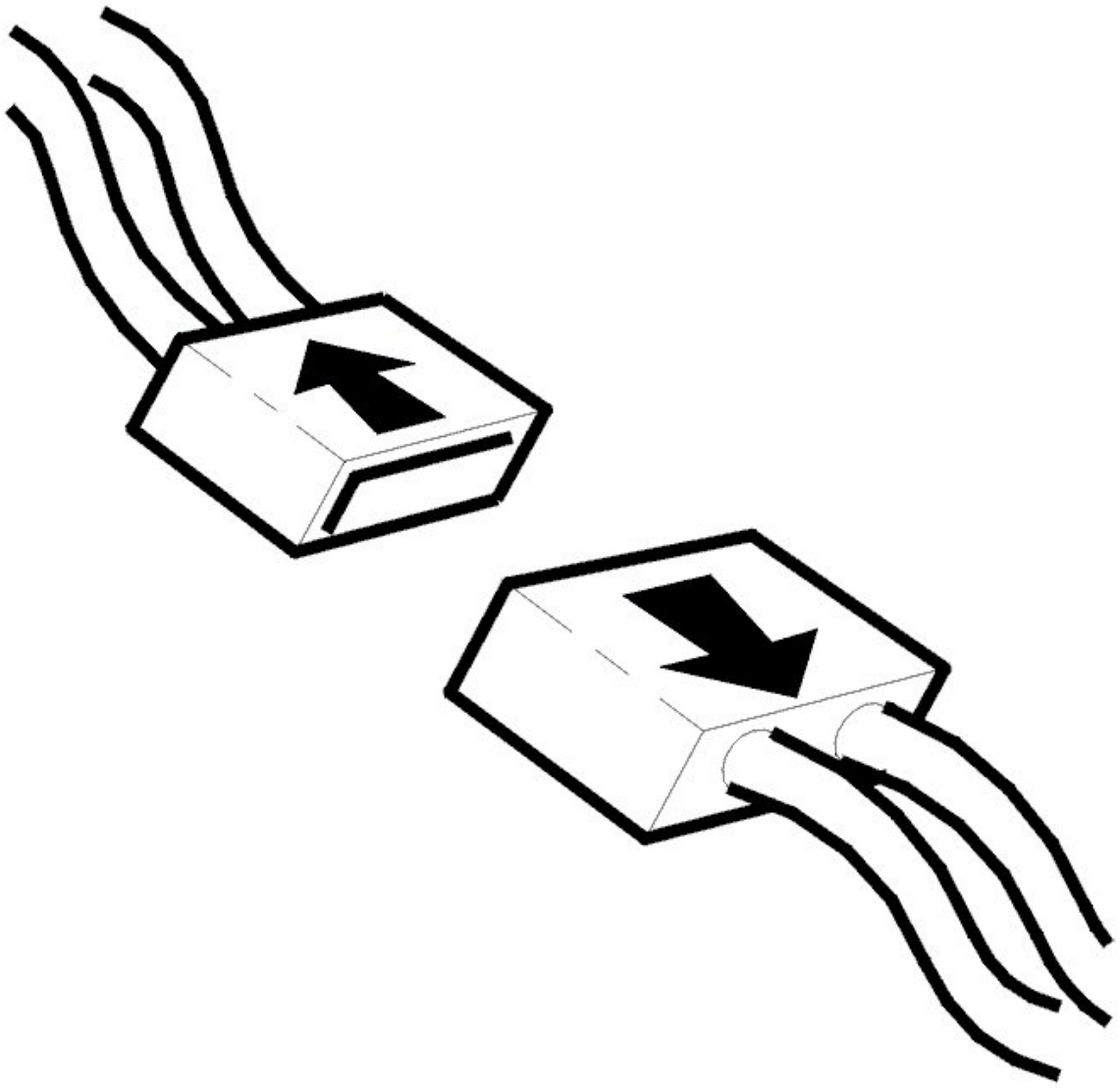
Fault symptom[s]
- SRS warning lamp on

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

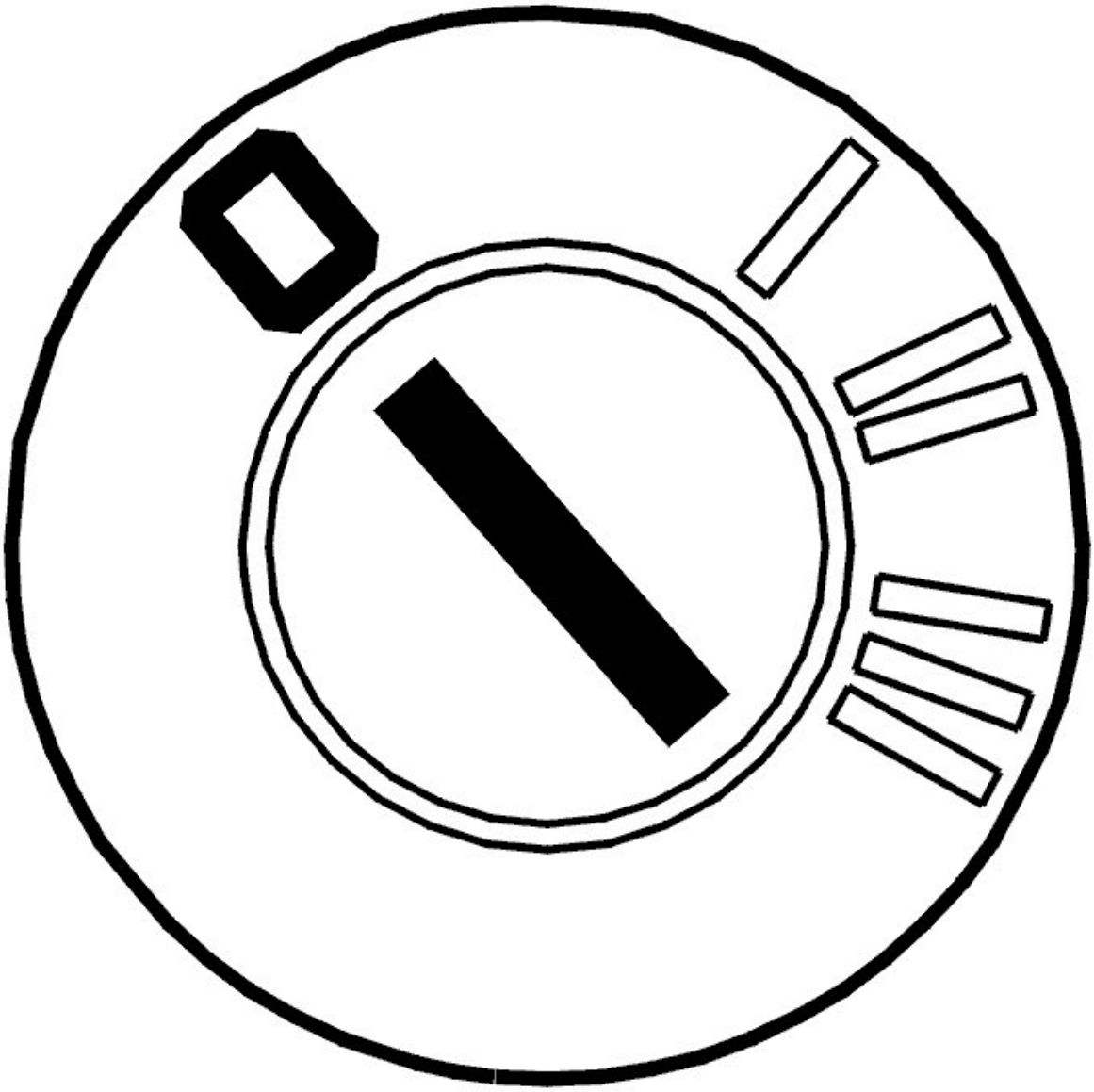
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

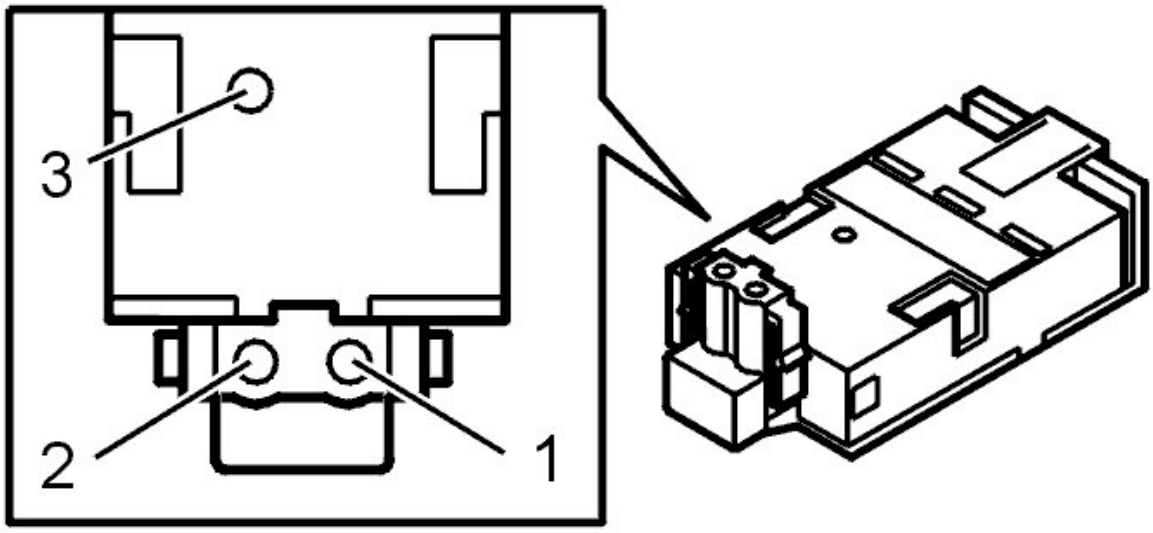
Check the cable between SRS control module terminals #21C (17) and #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

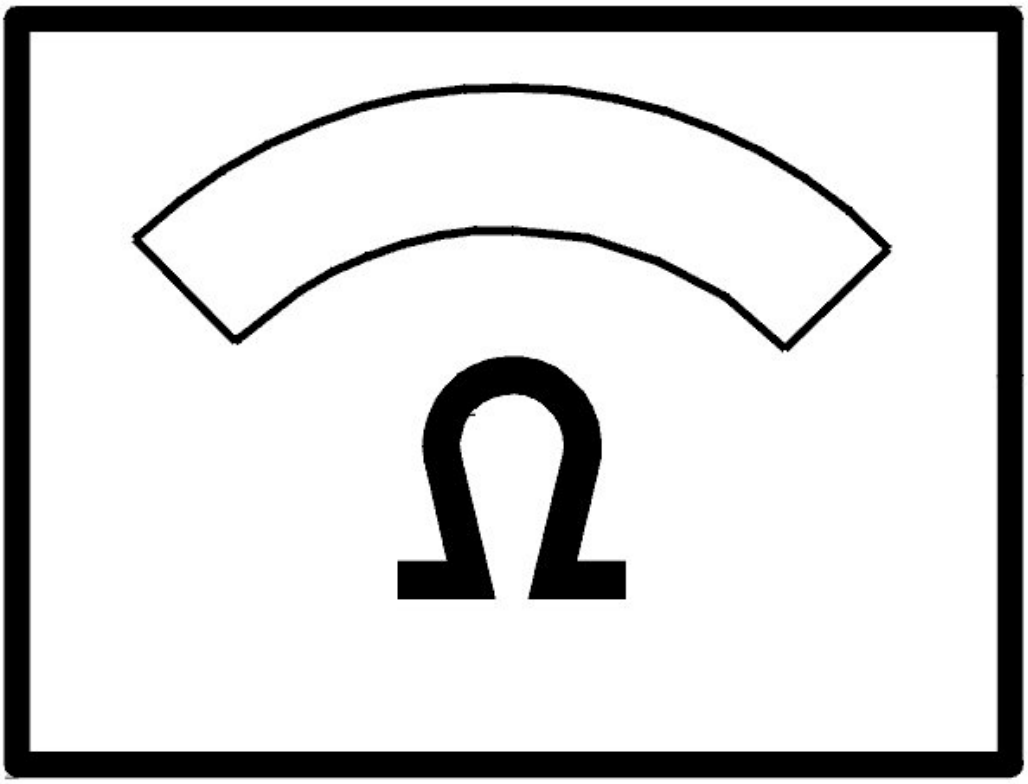
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the connector for the right inflatable curtain and special tool951 1506 Test dummy See: Tools and

Equipment/951 1506 Test Dummy connected, the resistance between terminals #21C(17) and #22C(18) on the SRS control module connector (inflatable curtain side) should be infinite

- With the ignition off and the connector for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





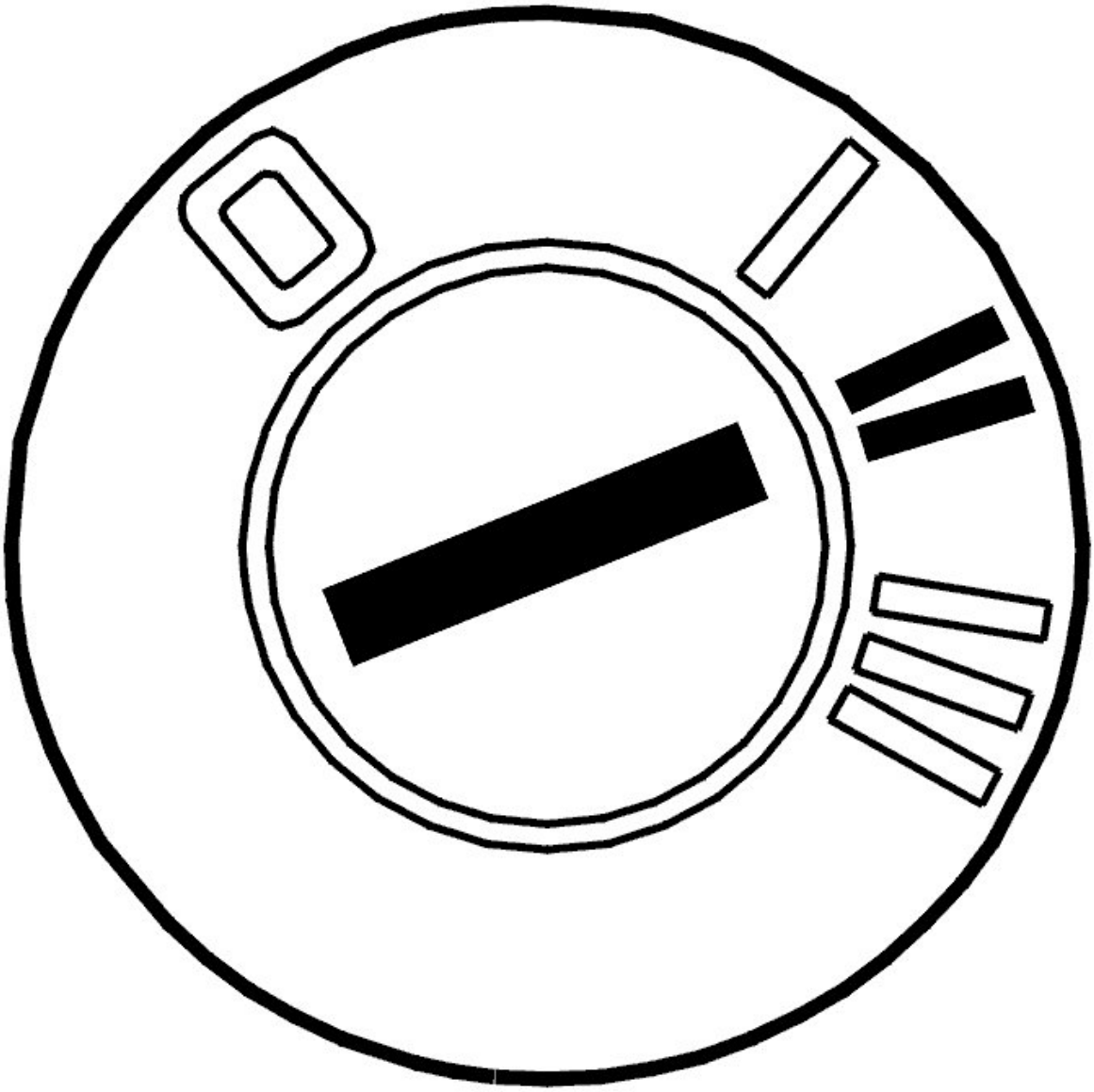
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

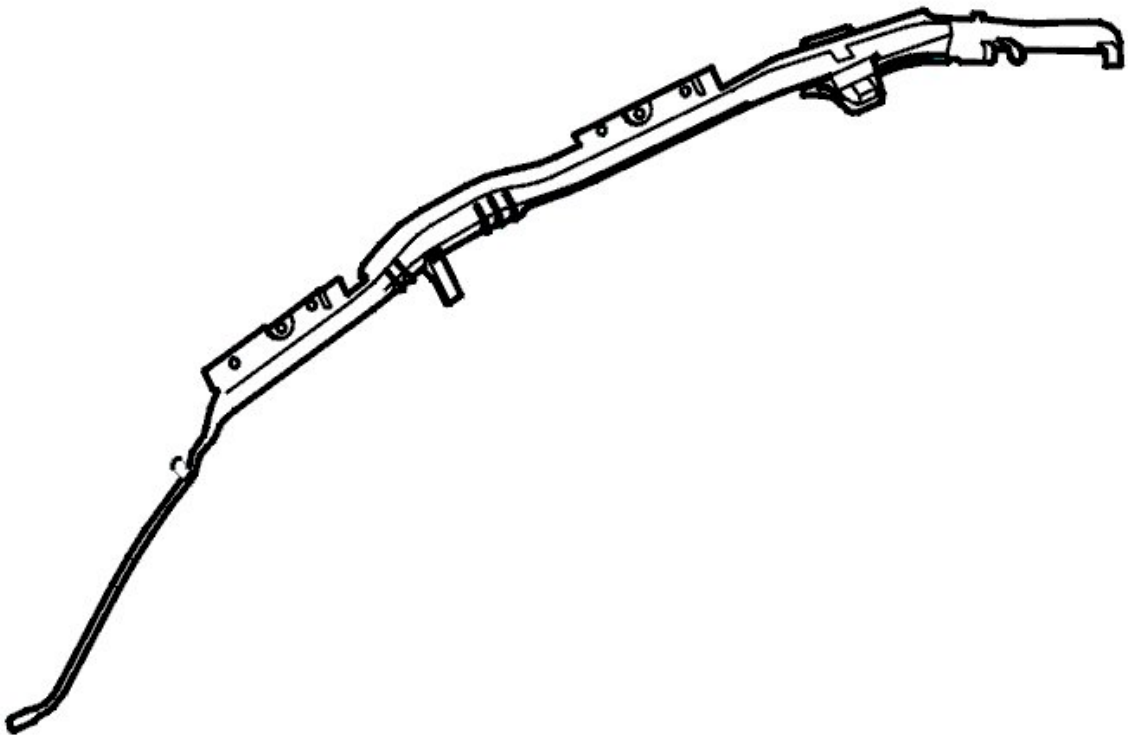
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-004B Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-004B is displayed.

Substitute value
- Nothing.

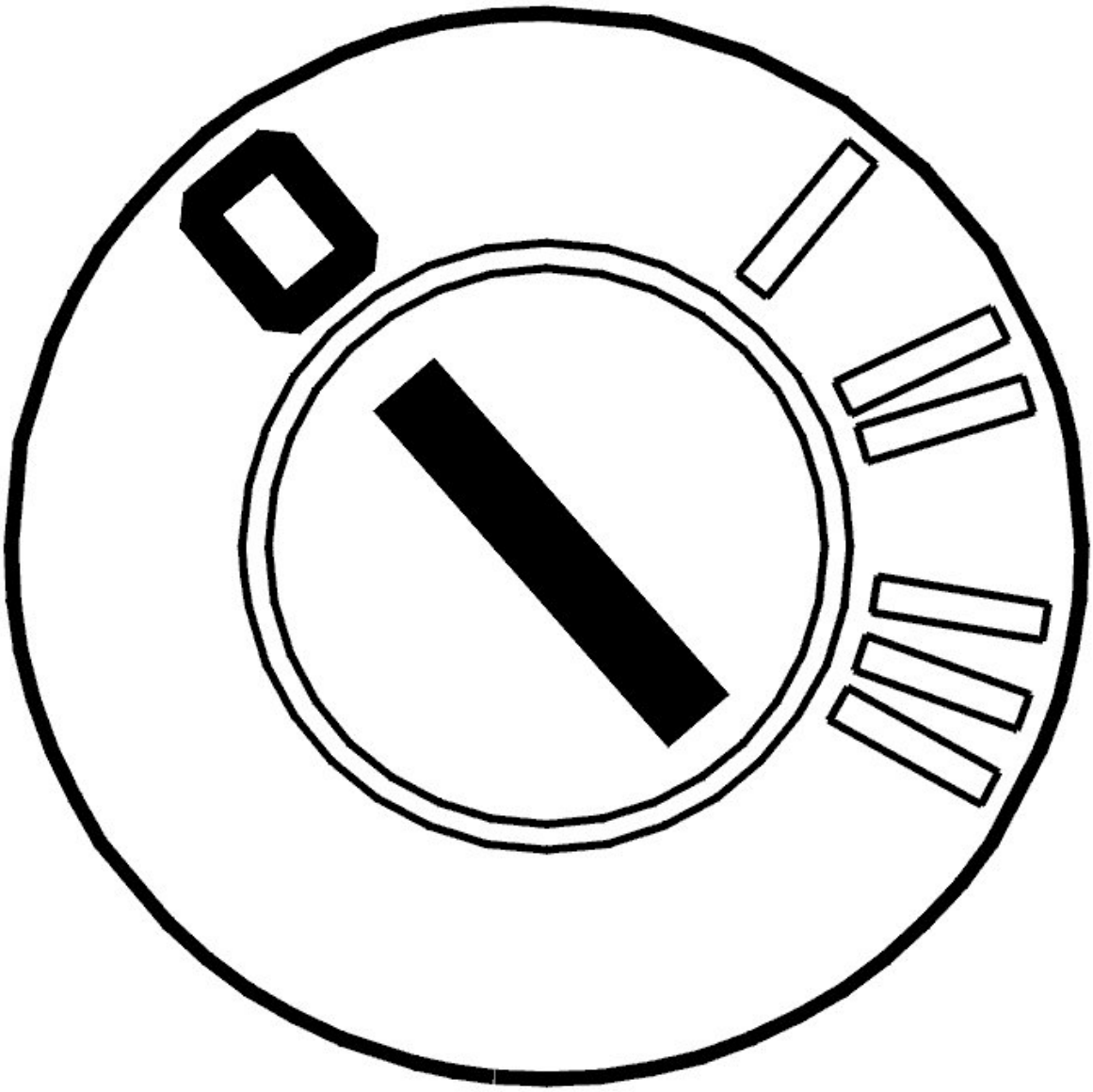
Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

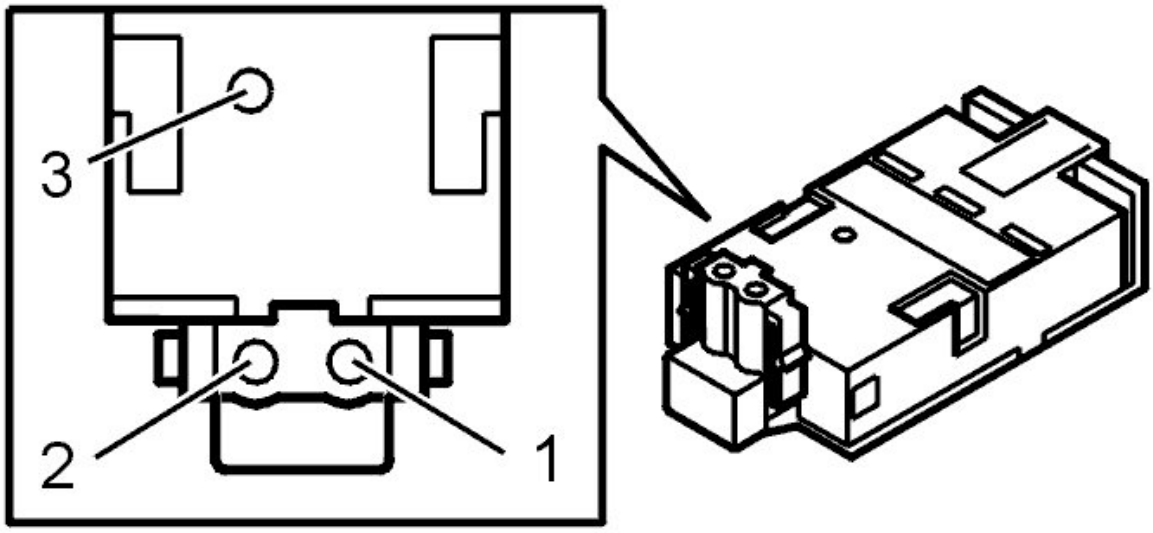
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

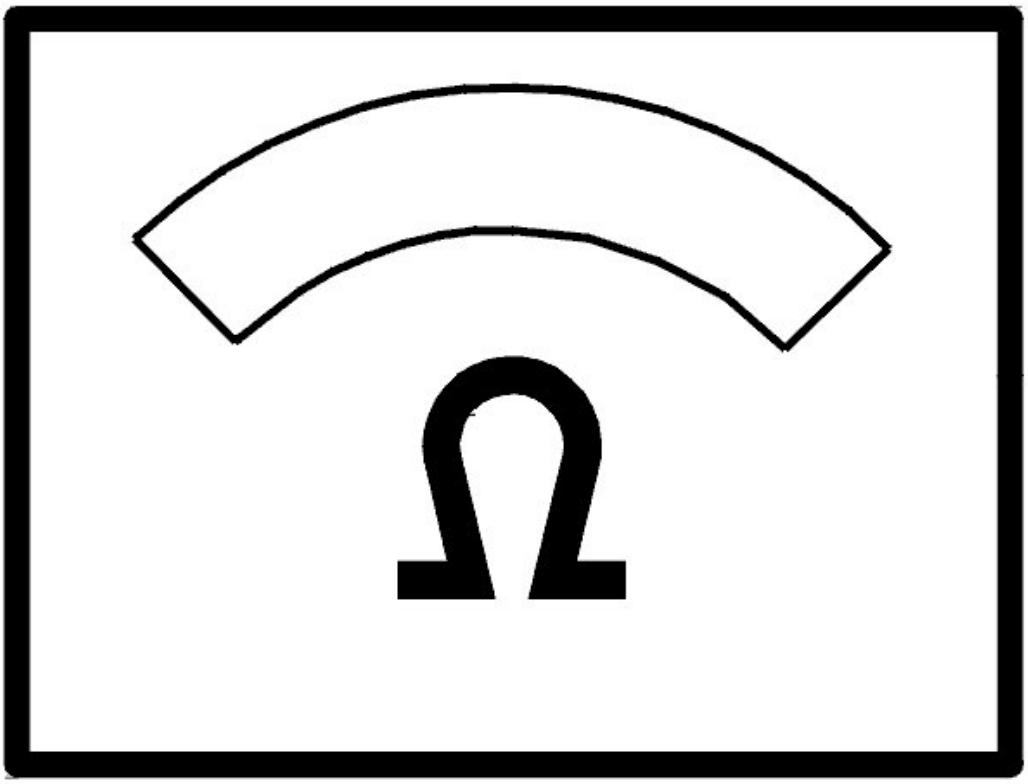
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing

- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

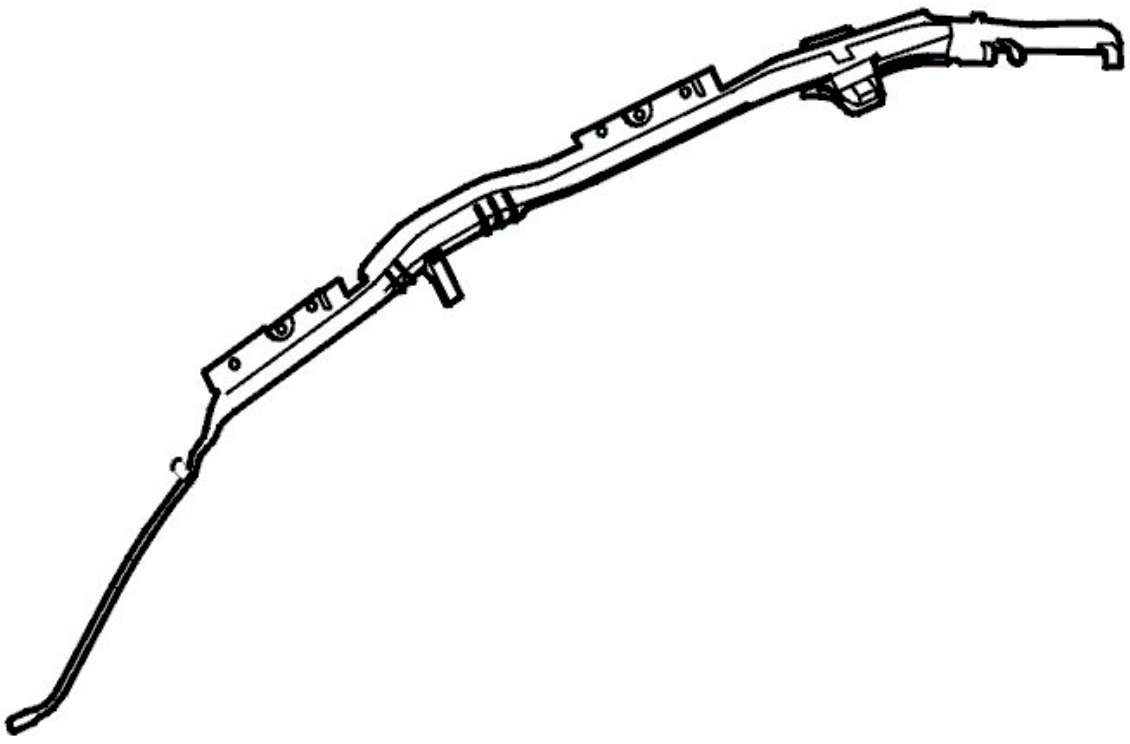
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-004B Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-004B is displayed.

Substitute value
- Nothing.

Possible source
- Capacitance too low or open circuit in in-built capacitor in igniter wire connector.

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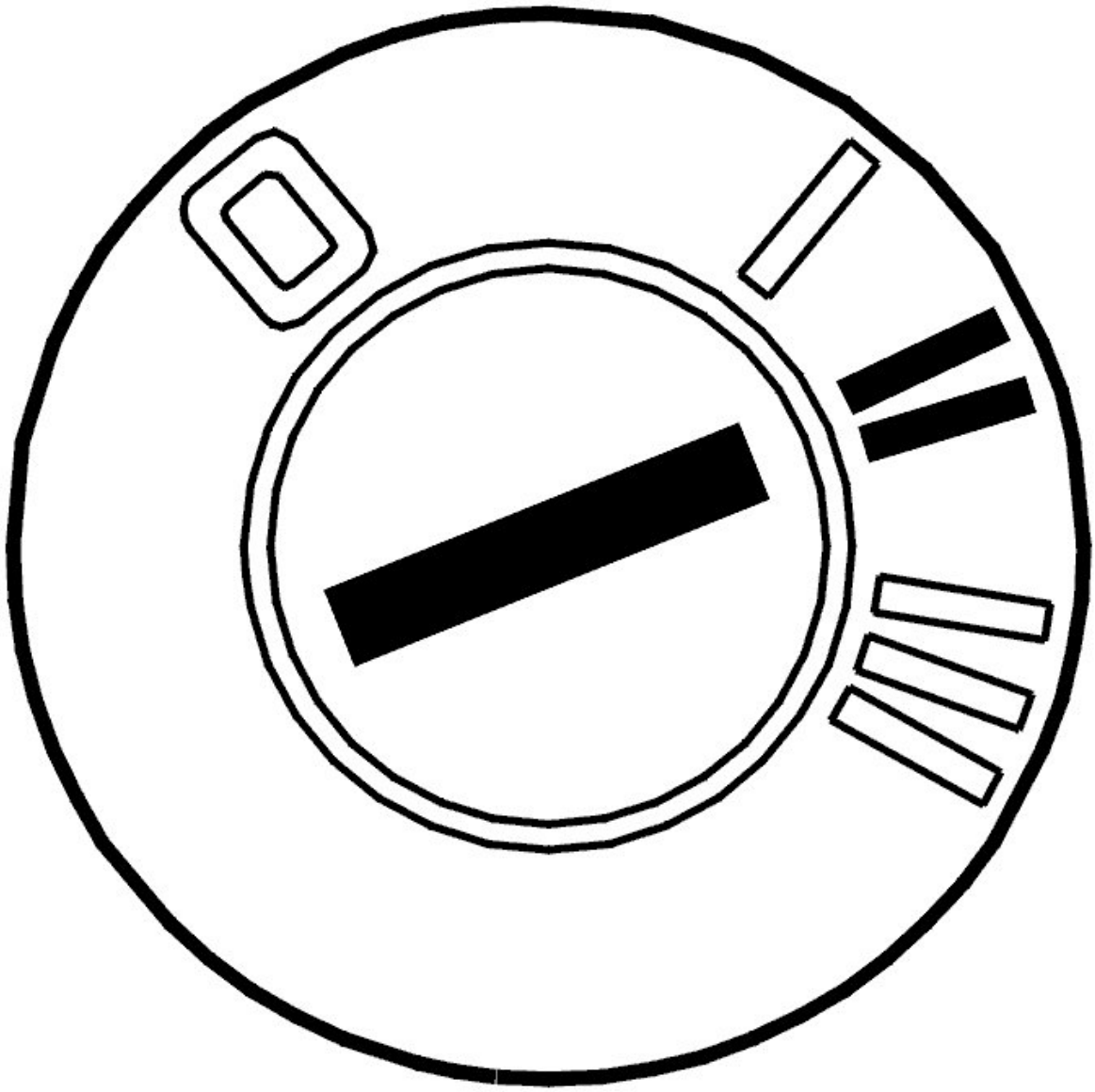
Fault symptom[s]

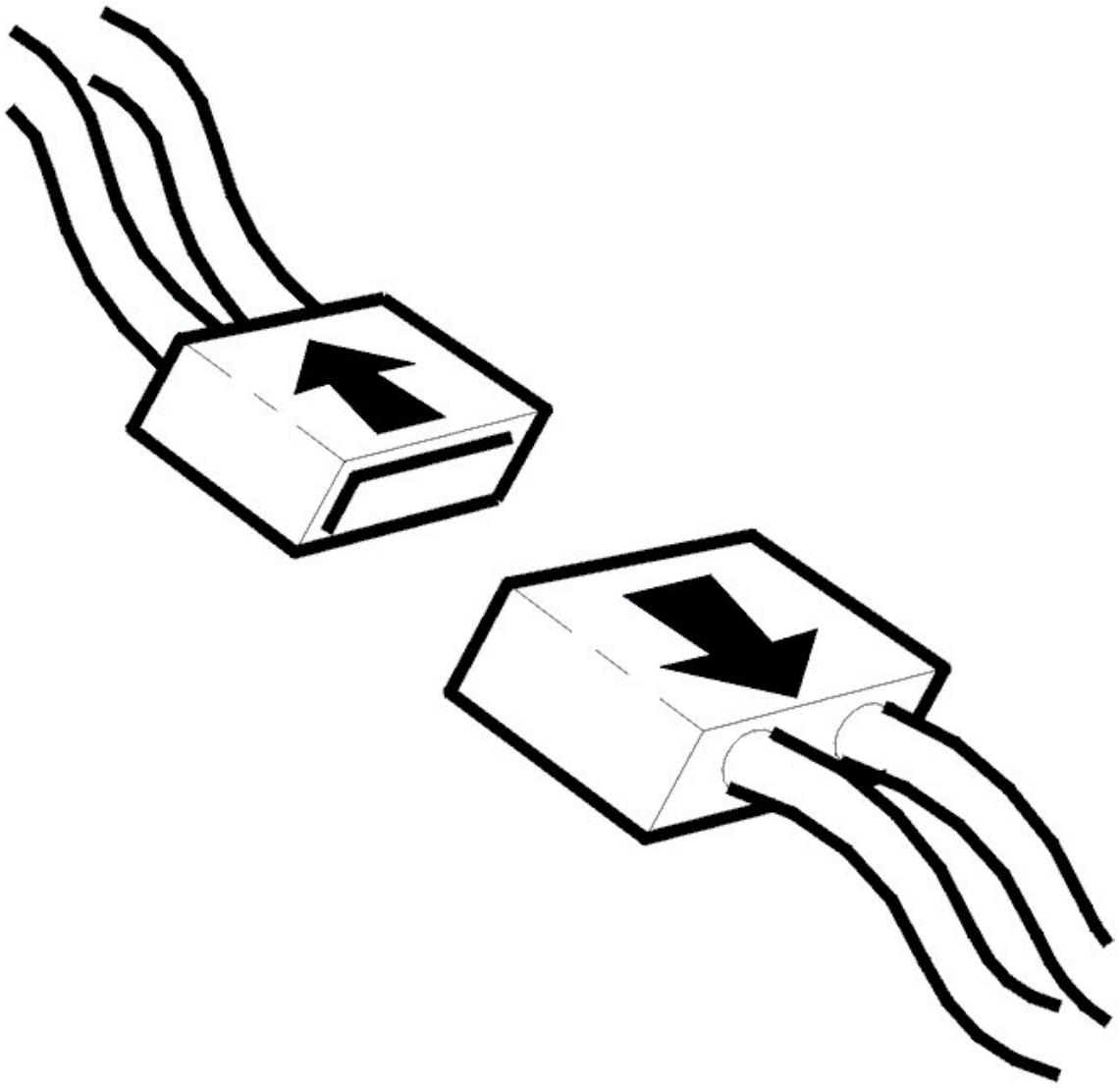
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

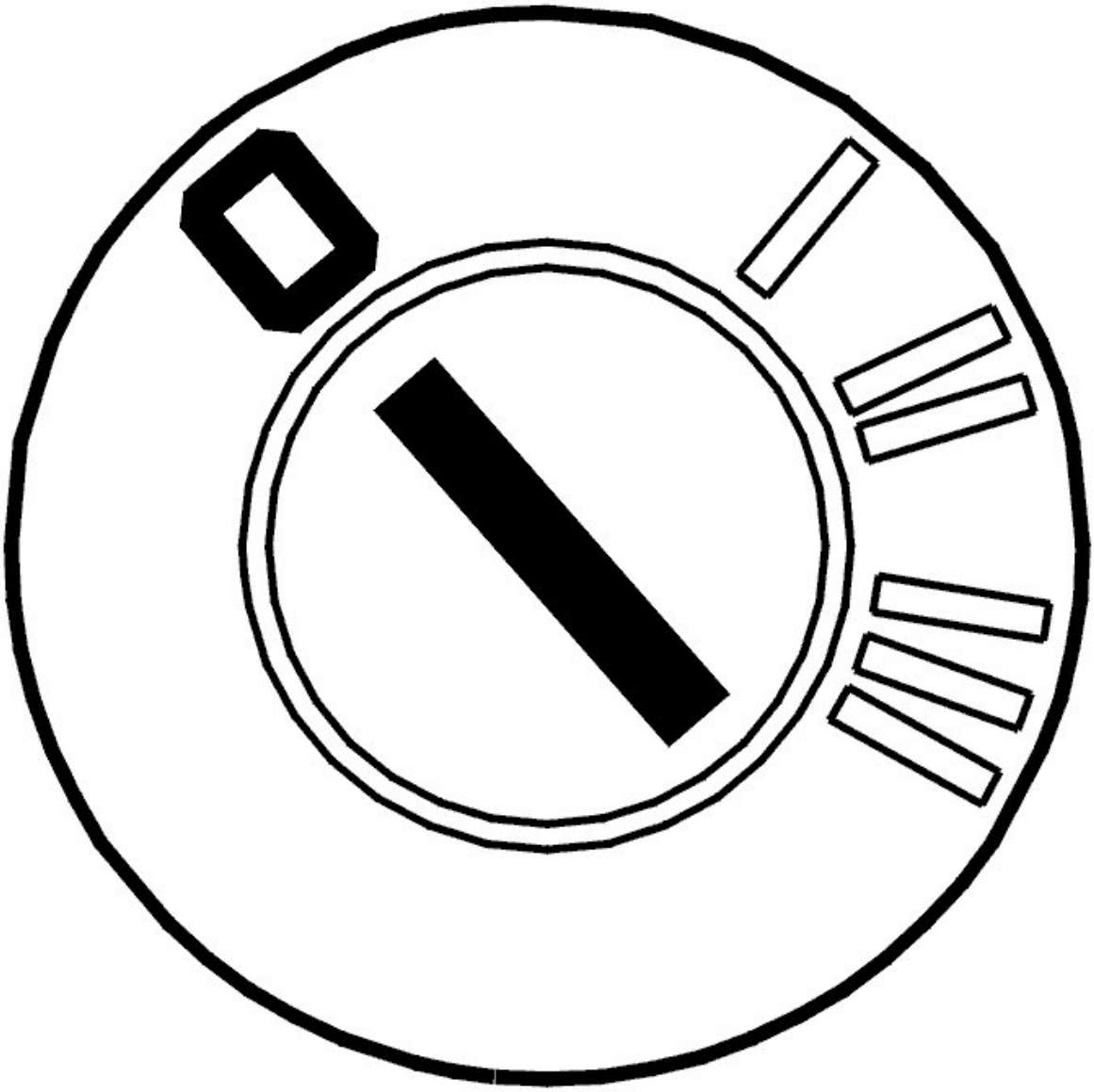
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

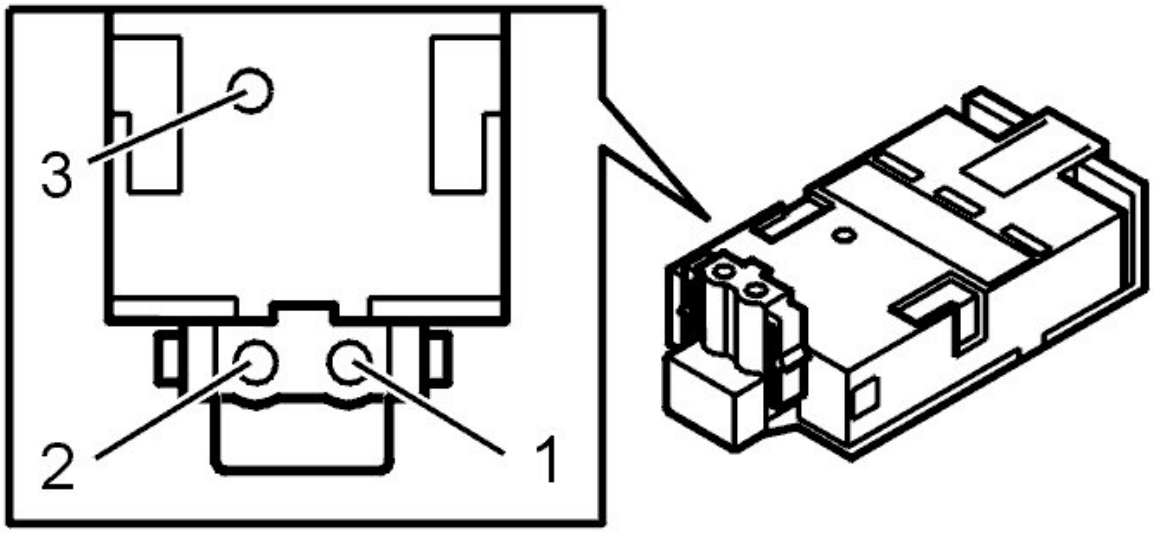
Check the female and male parts of the connectors for the SRS control module and the inflatable curtain. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

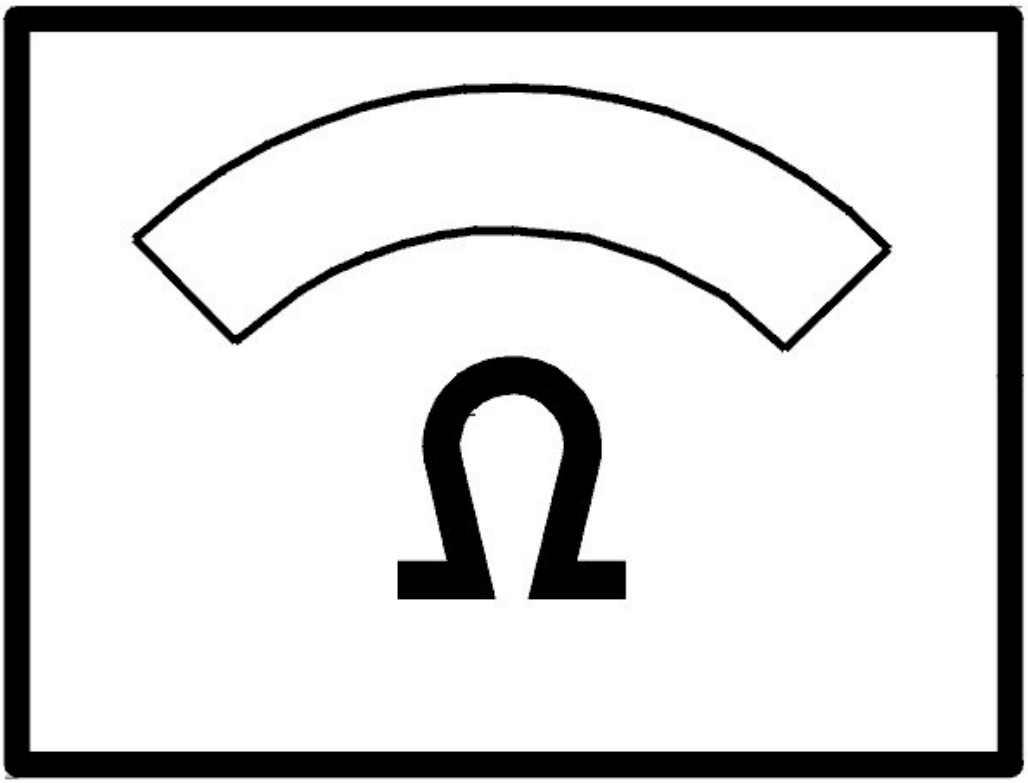
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





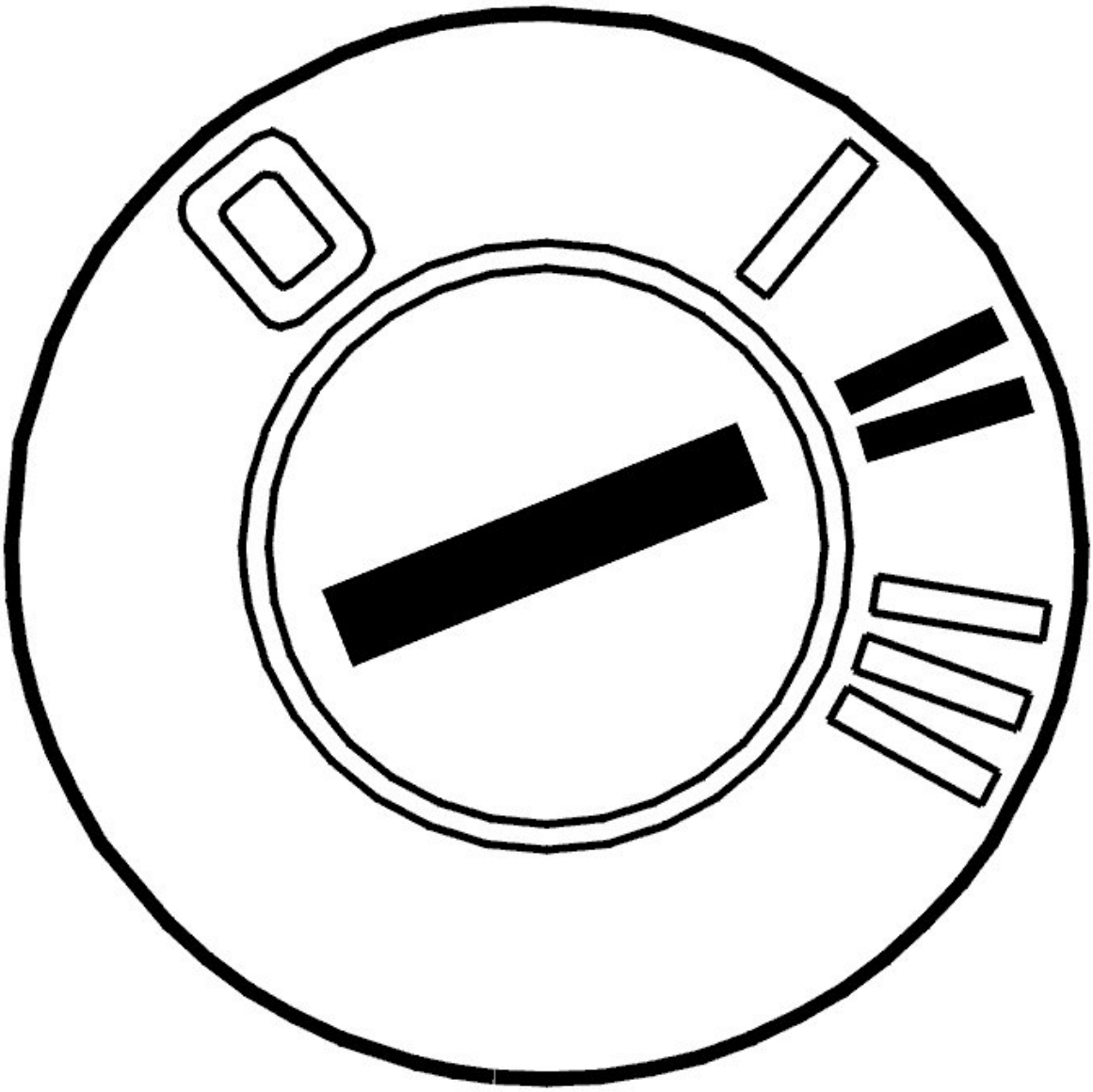
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

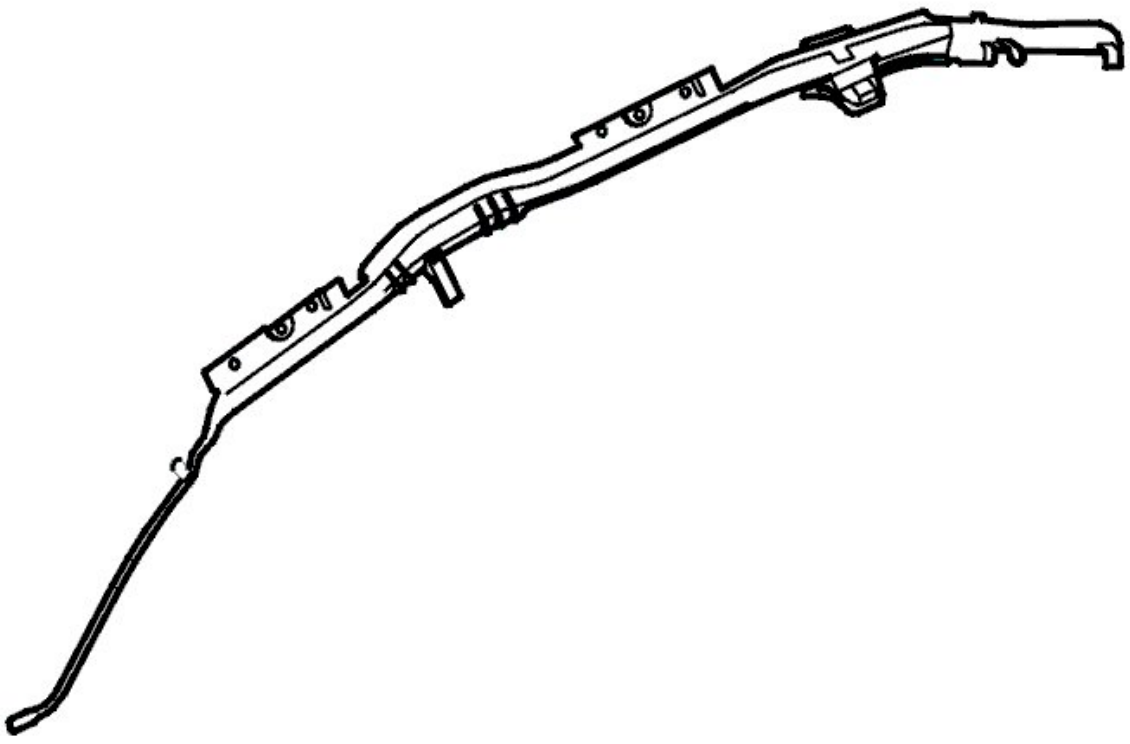
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-004C Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-004C is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit

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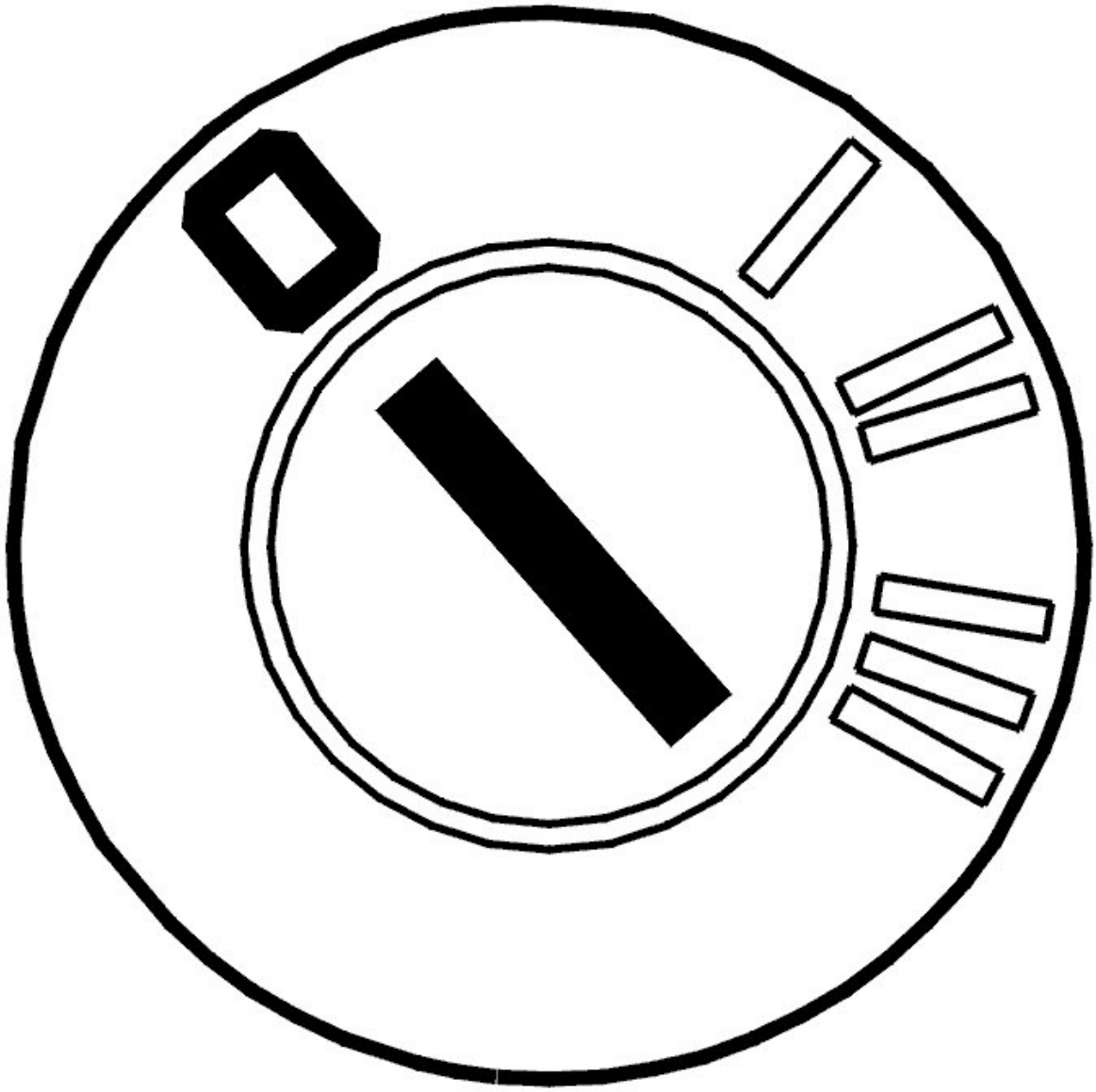
- Open circuit in inflatable curtain (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

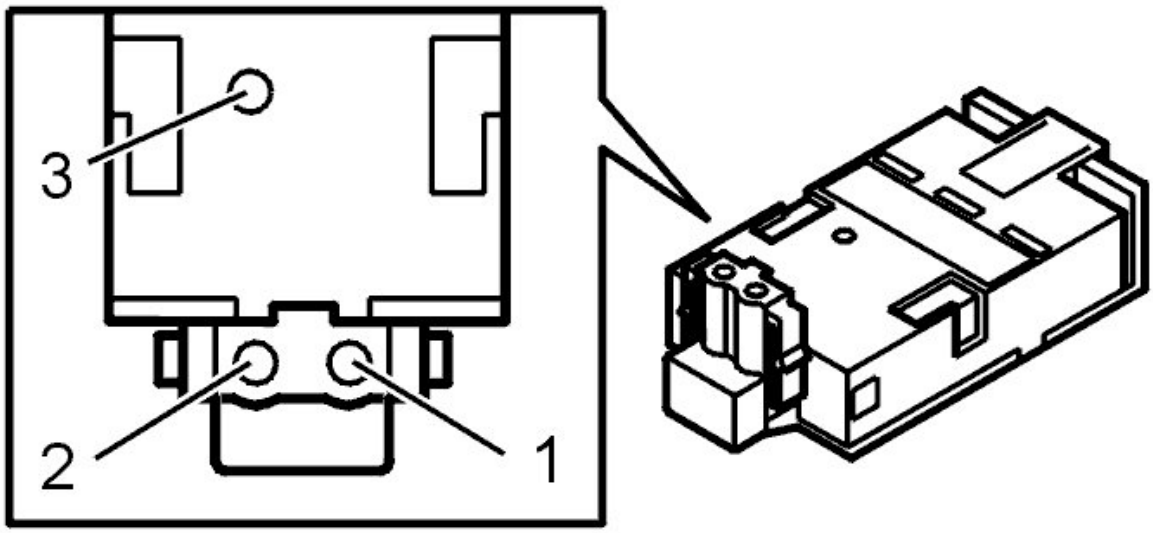
Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

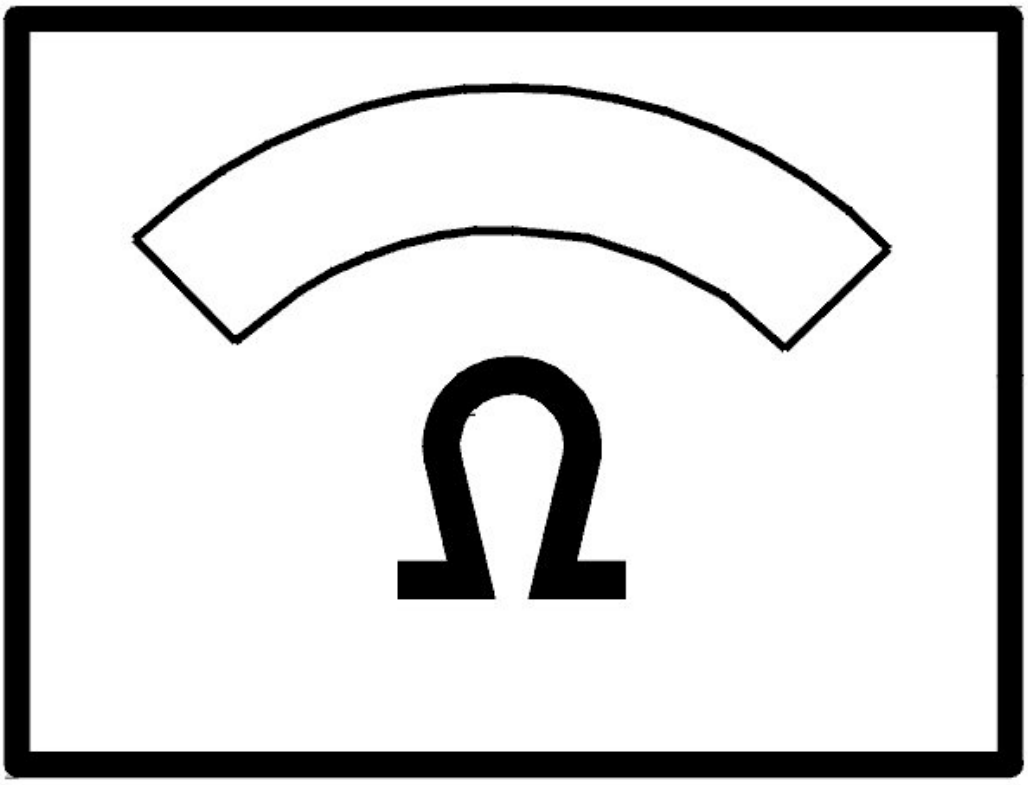
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable terminals in the female and male sections of the connector. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

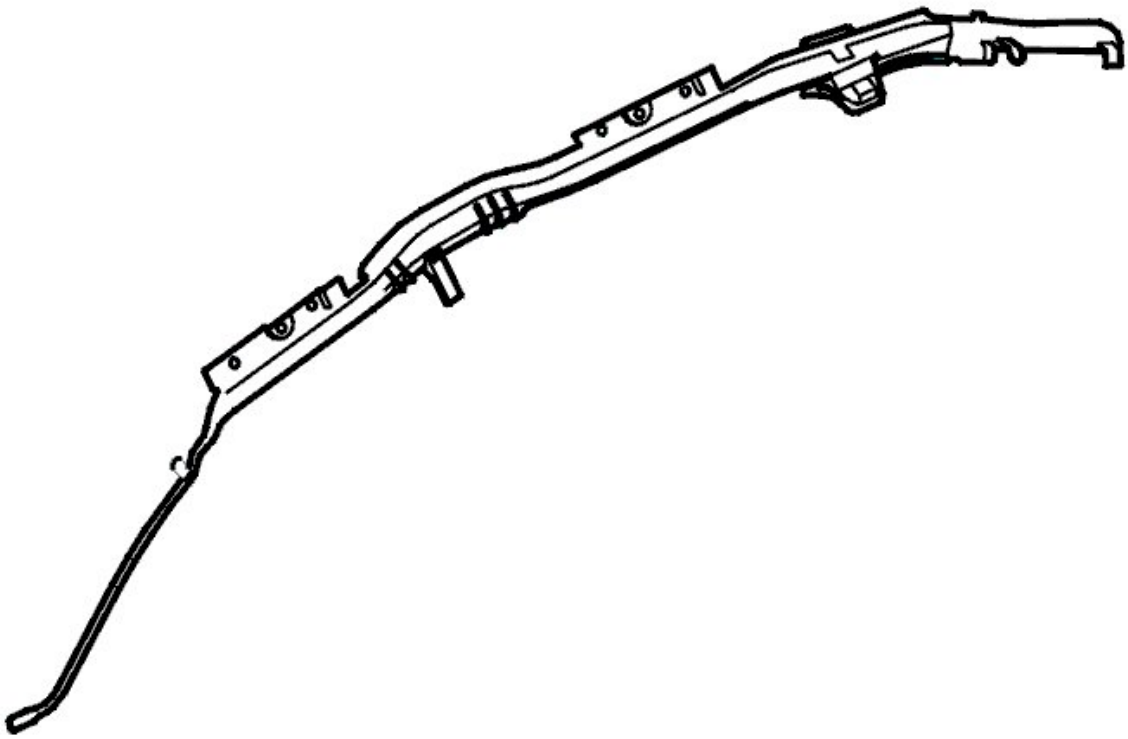
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-004C Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-004C is displayed.

Substitute value
- Nothing.

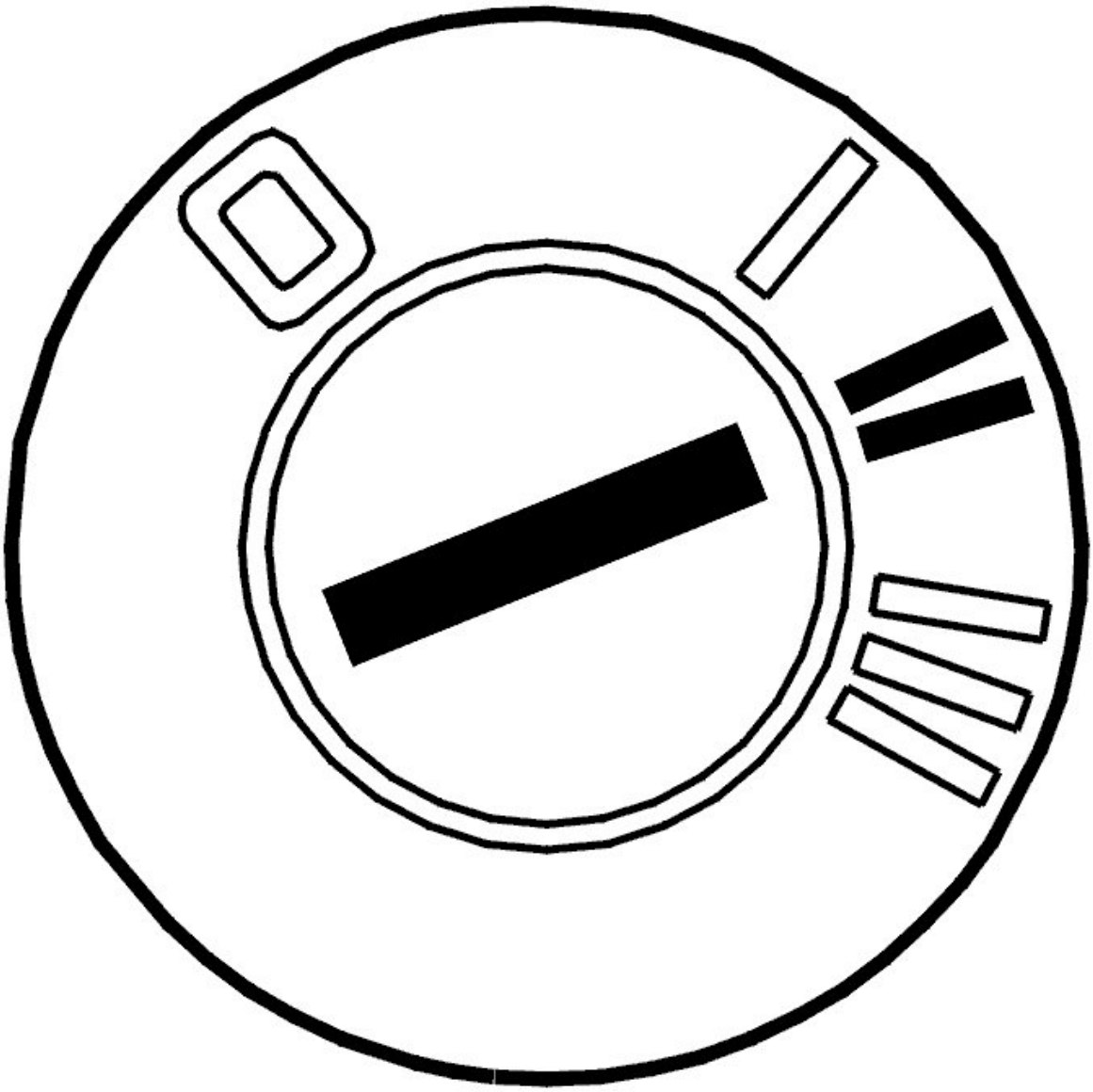
Possible source
- Open circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Open circuit in inflatable curtain (resistance in igniter too high).

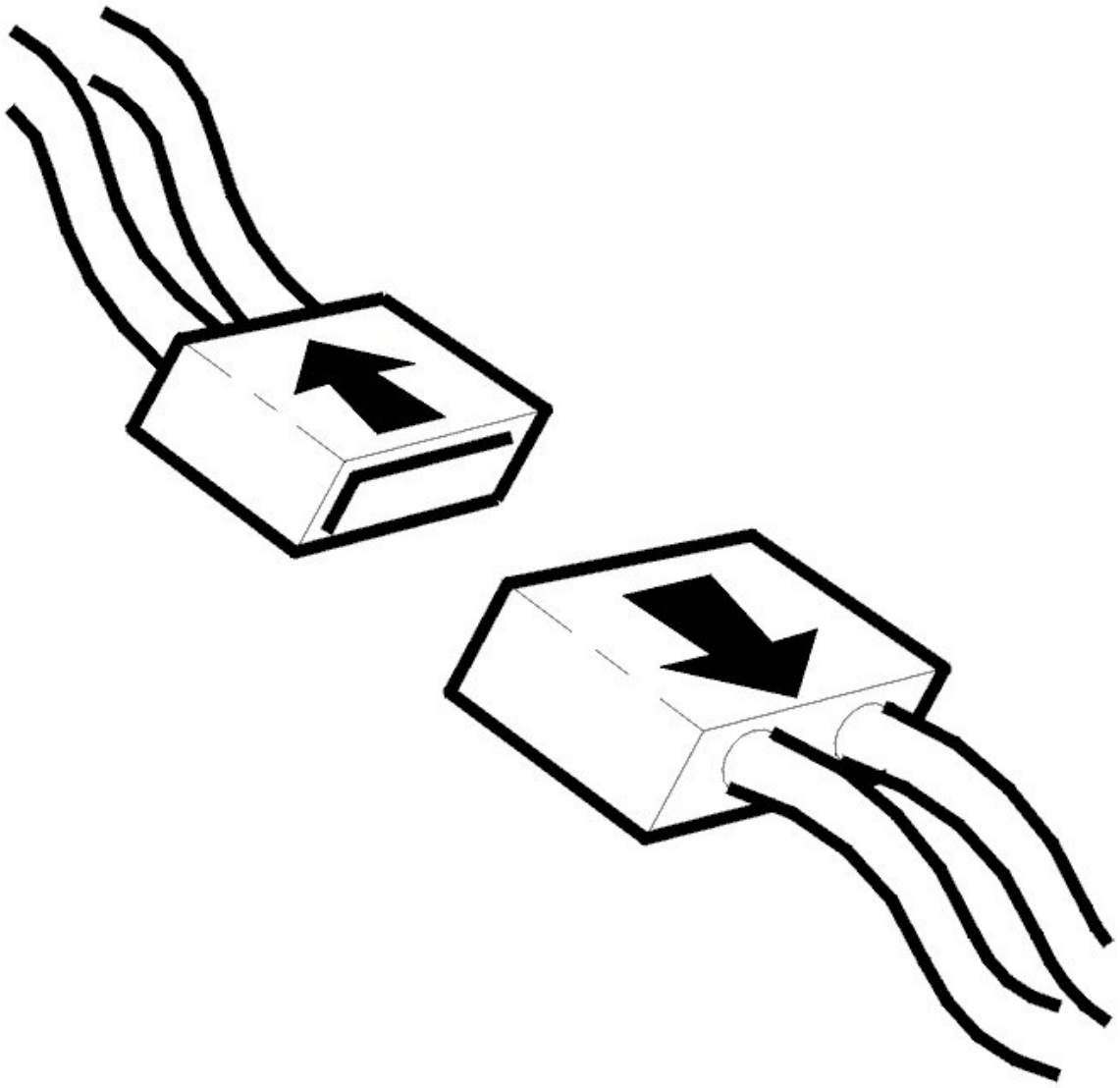
Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

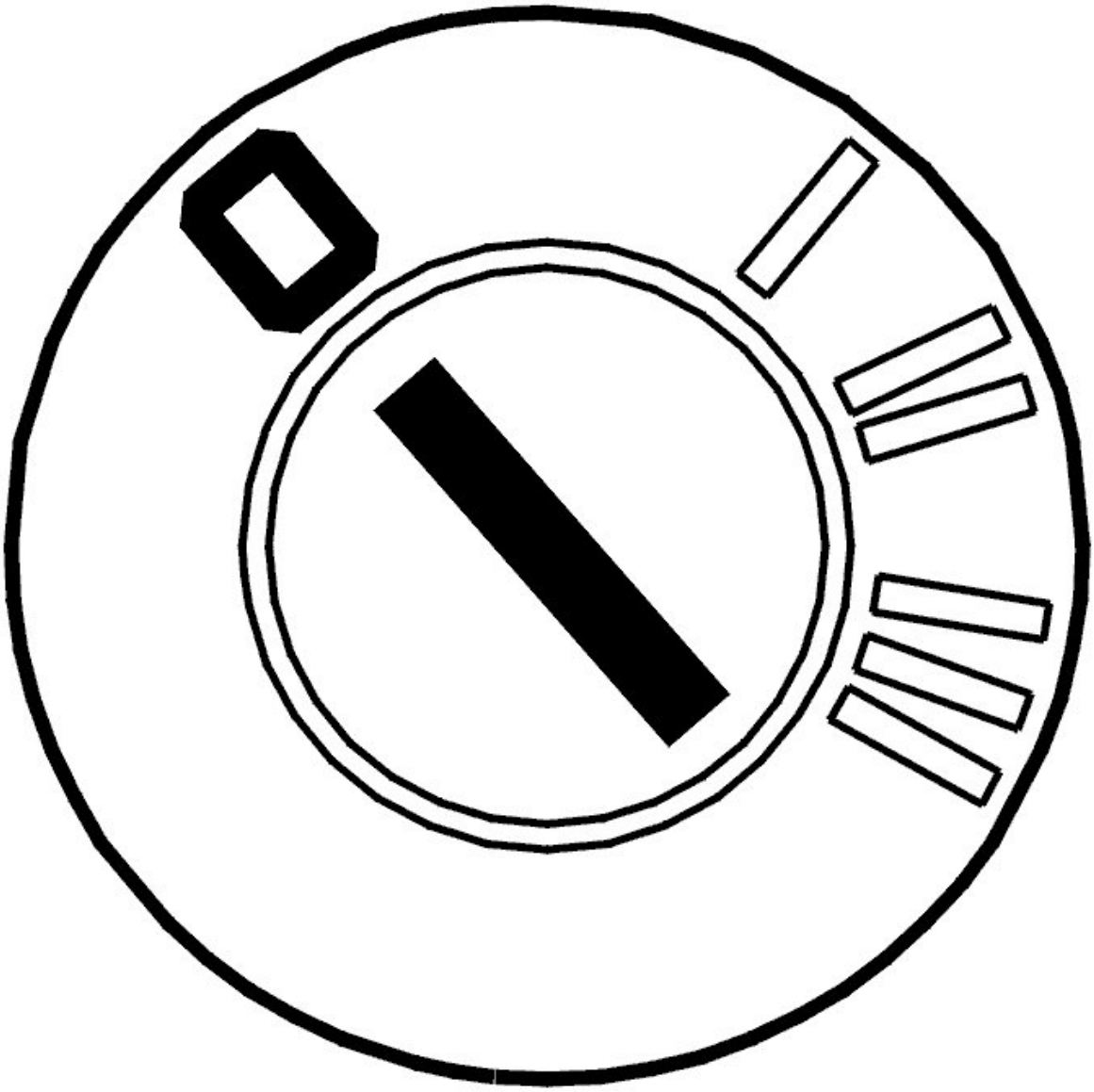
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

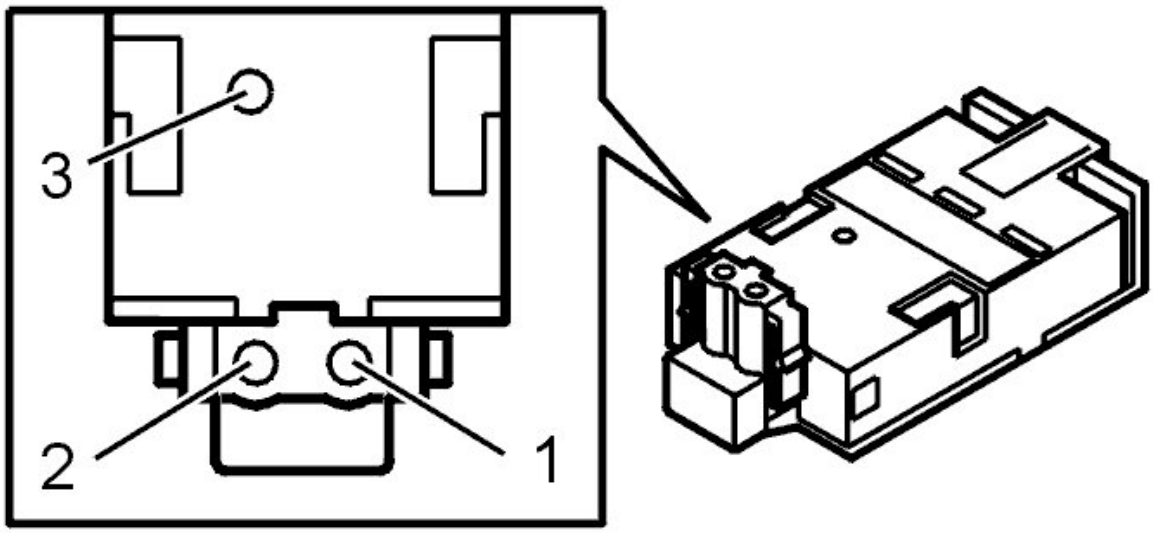
Check the female and male parts of the connectors for the SRS control module and the inflatable curtain. The cable terminals must not be damaged or pressed back.
Check the cable between SRS control module terminal #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

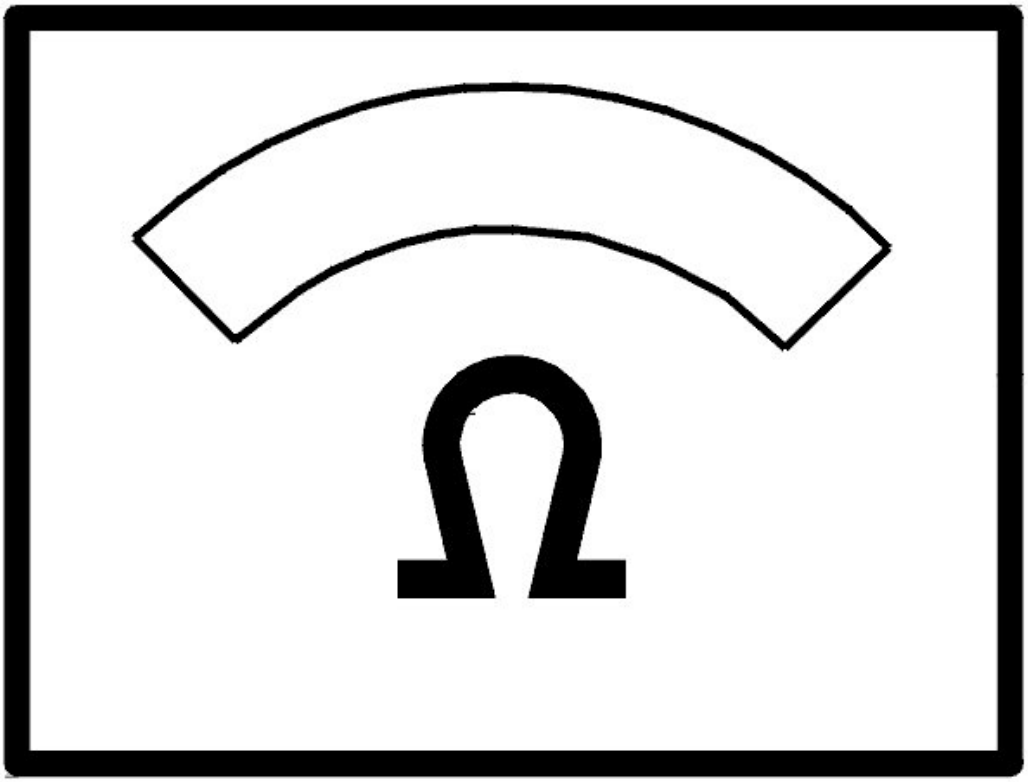
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout

Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)

- With the ignition off and the inflatable curtain connector disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





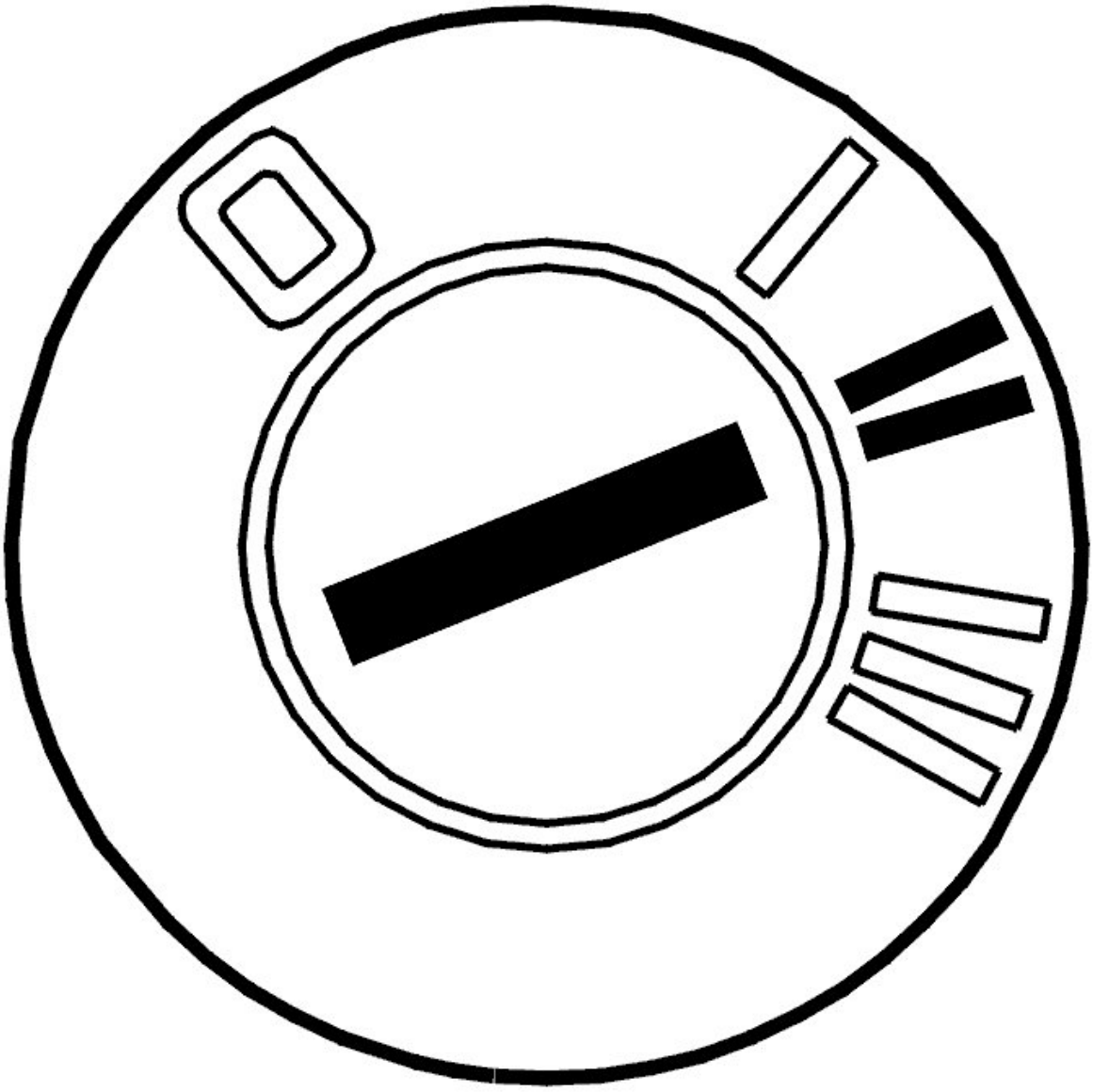
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

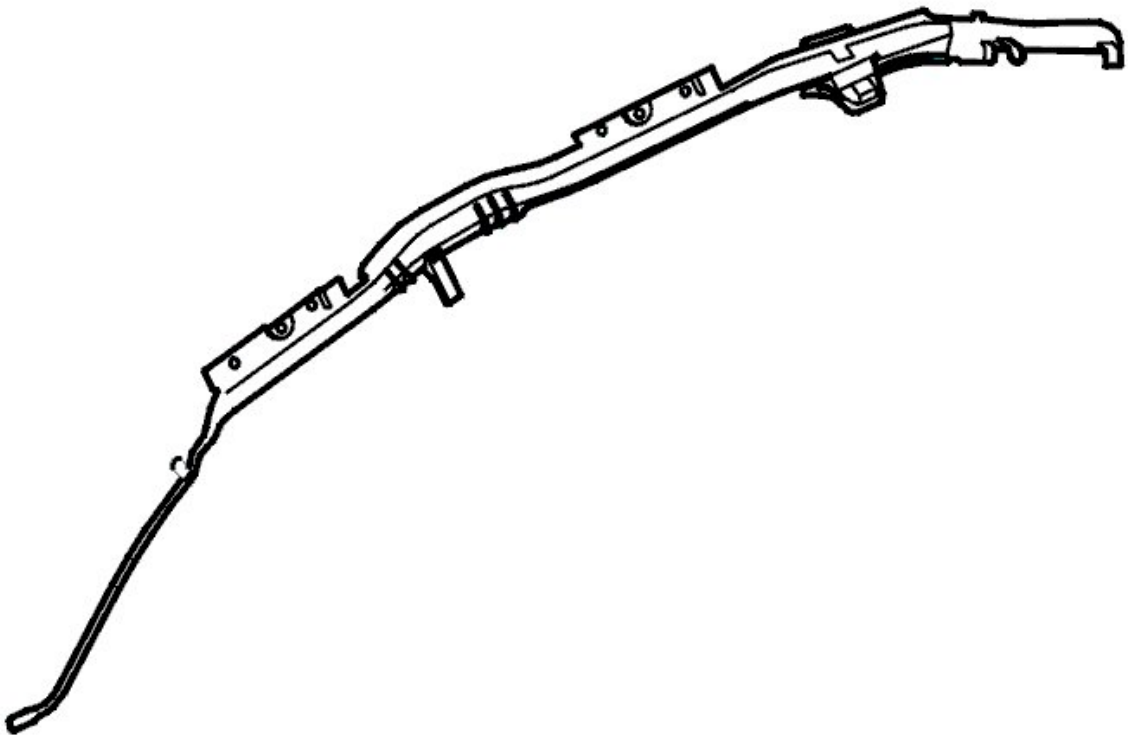
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-004D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-004D is displayed.

Substitute value
- Nothing.

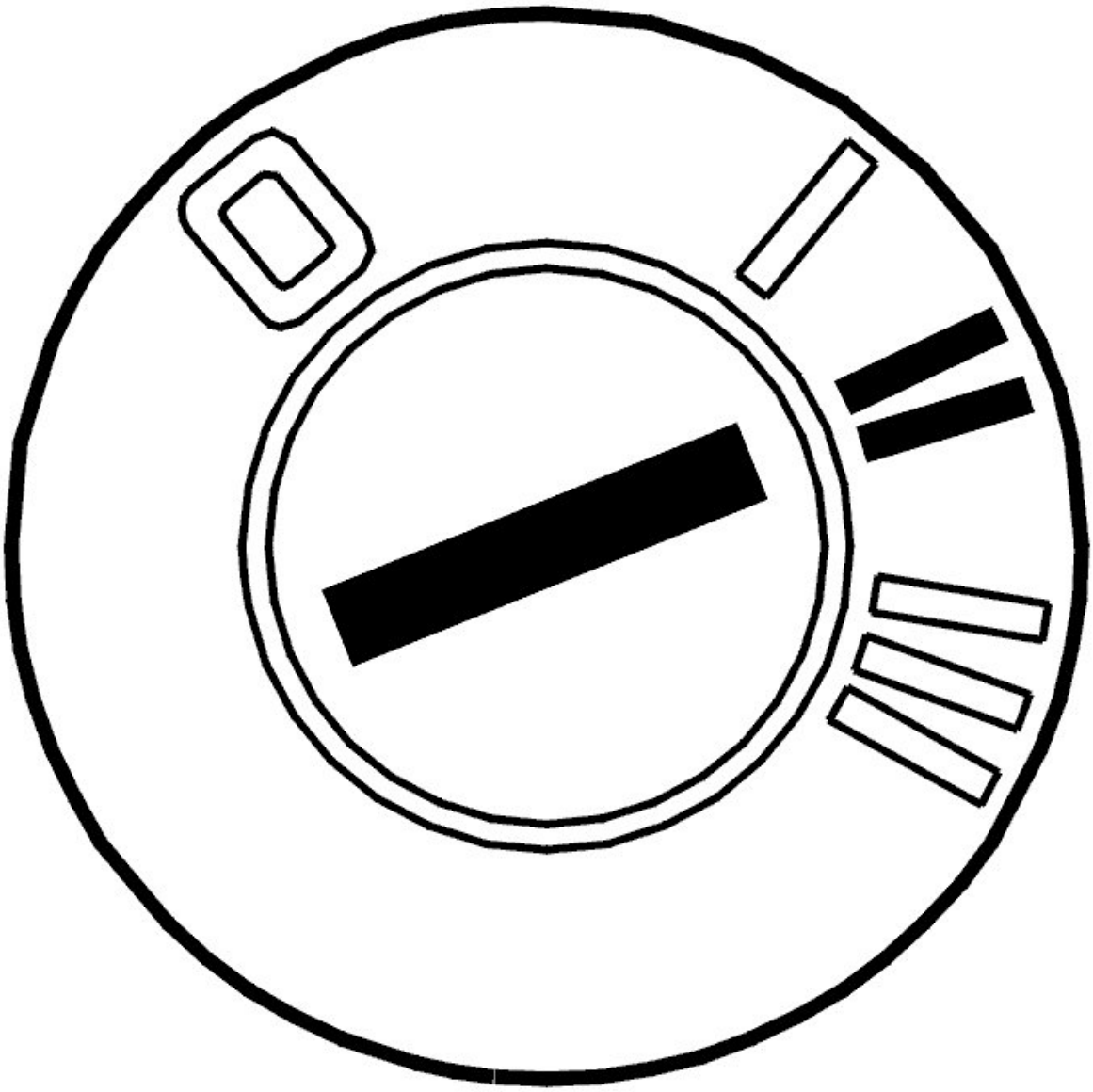
Possible source
- Short circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit in inflatable curtain (resistance in igniter too low).

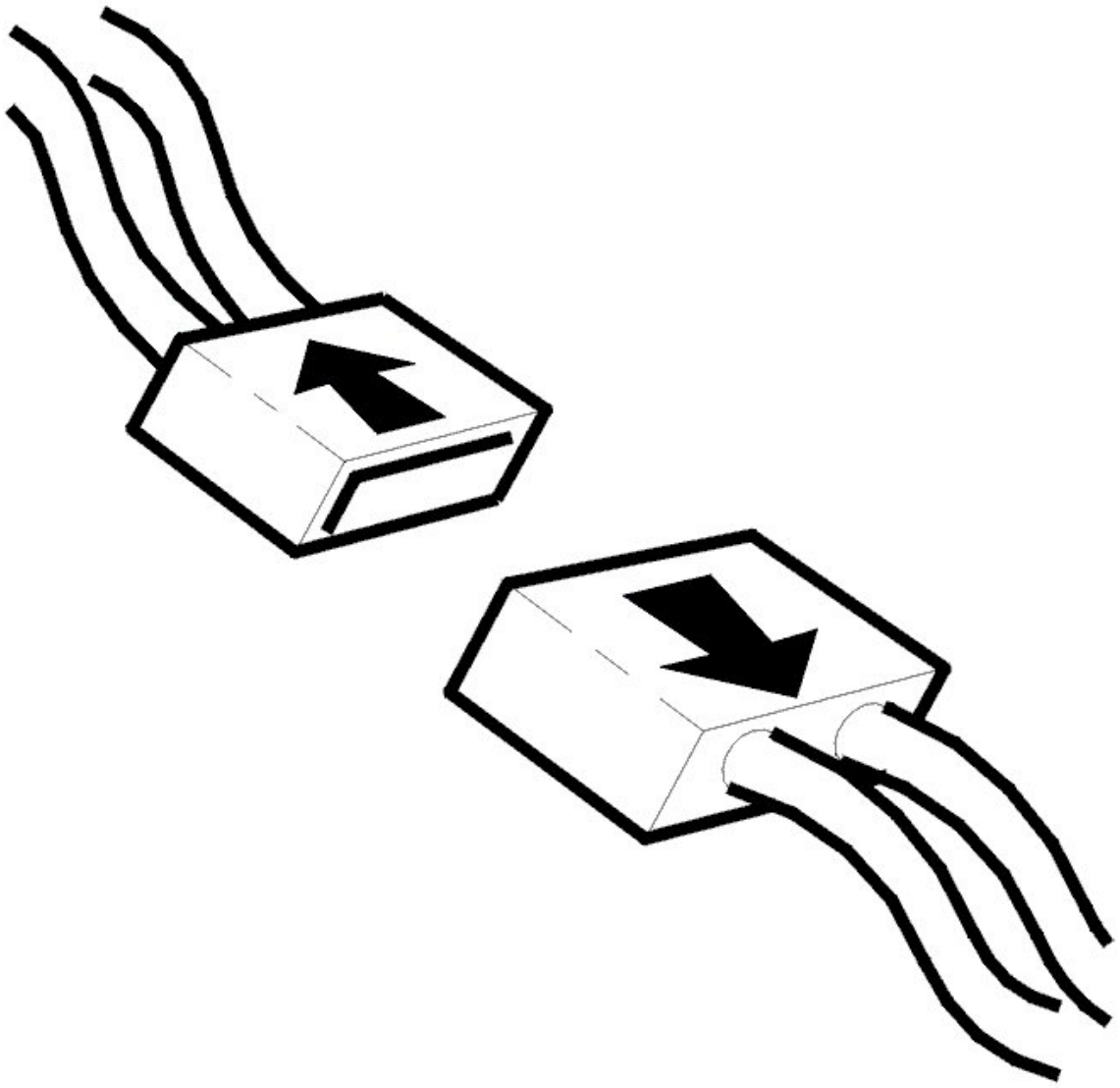
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the right-hand inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the status of the diagnostic trouble code (DTC) changes from permanent fault to intermittent fault, try replacing the right-hand inflatable curtain.

Other information:

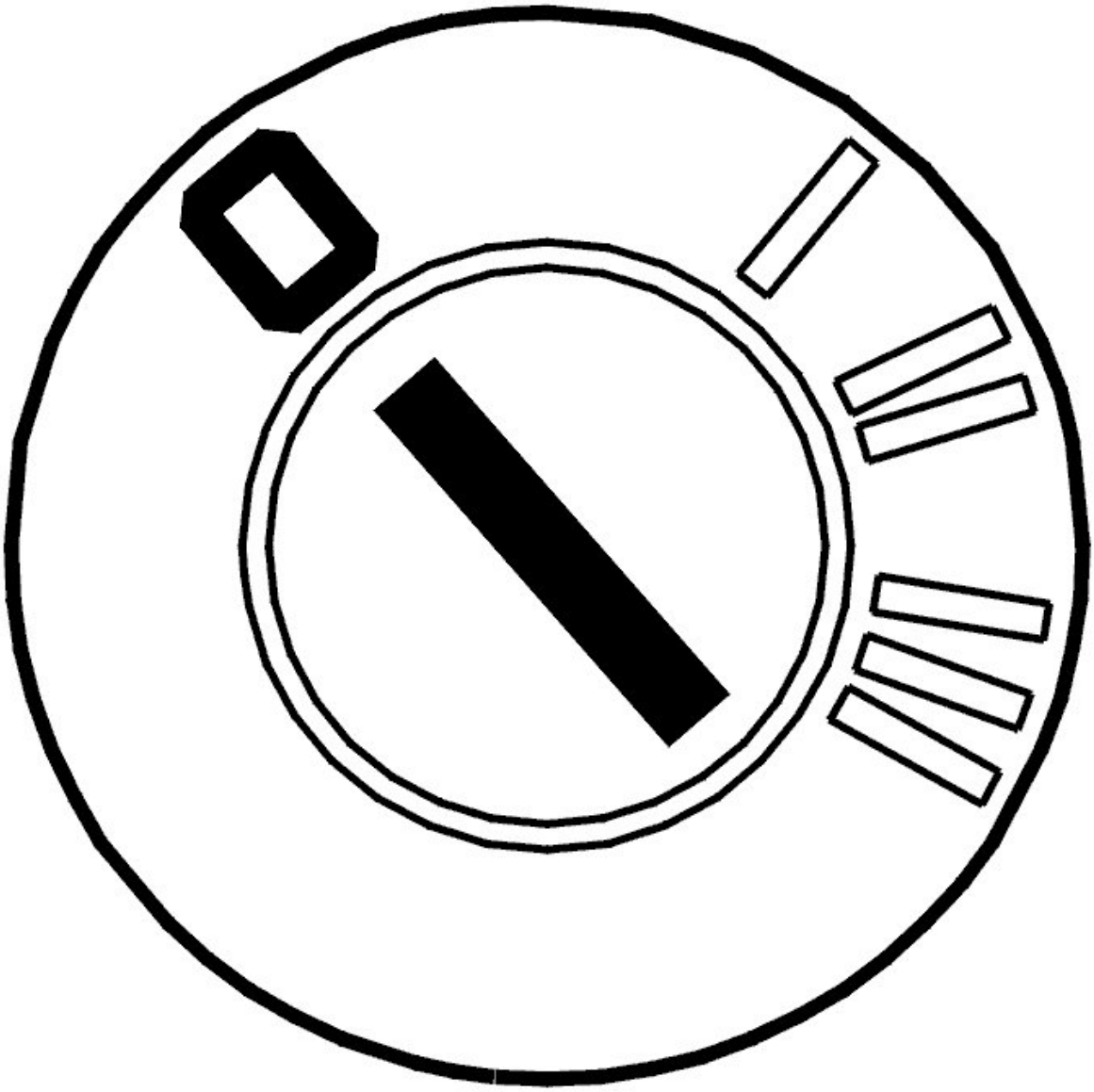
- To access and replace the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the right-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

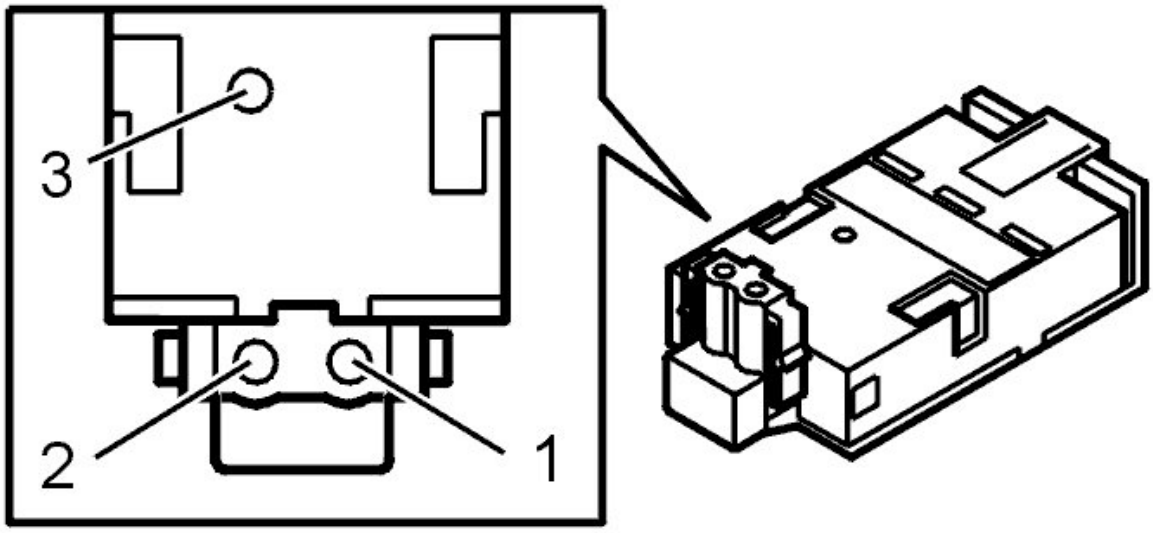
Check the cable between SRS control module terminals #C21 (17) and #C22 (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

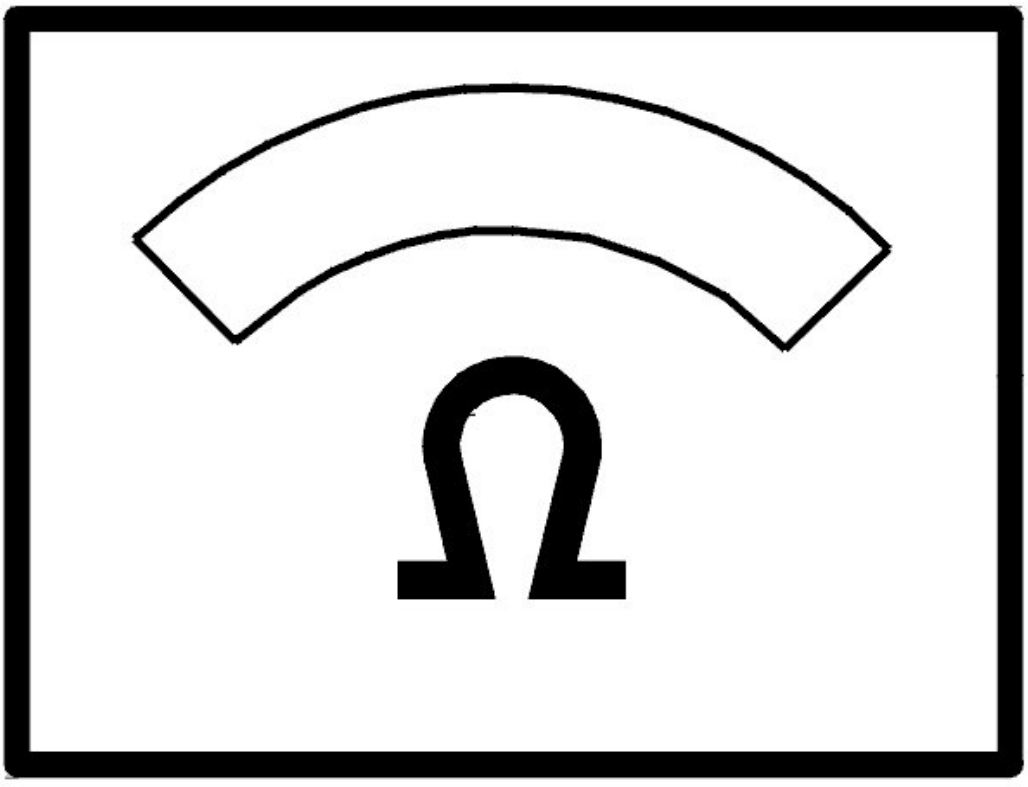
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the connector for the right inflatable curtain and special tool951 1506 Test dummy See: Tools and

Equipment/951 1506 Test Dummy connected, the resistance between terminals #21C(17) and #22C(18) on the SRS control module connector (inflatable curtain side) should be infinite

- With the ignition off and the connector for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between the inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





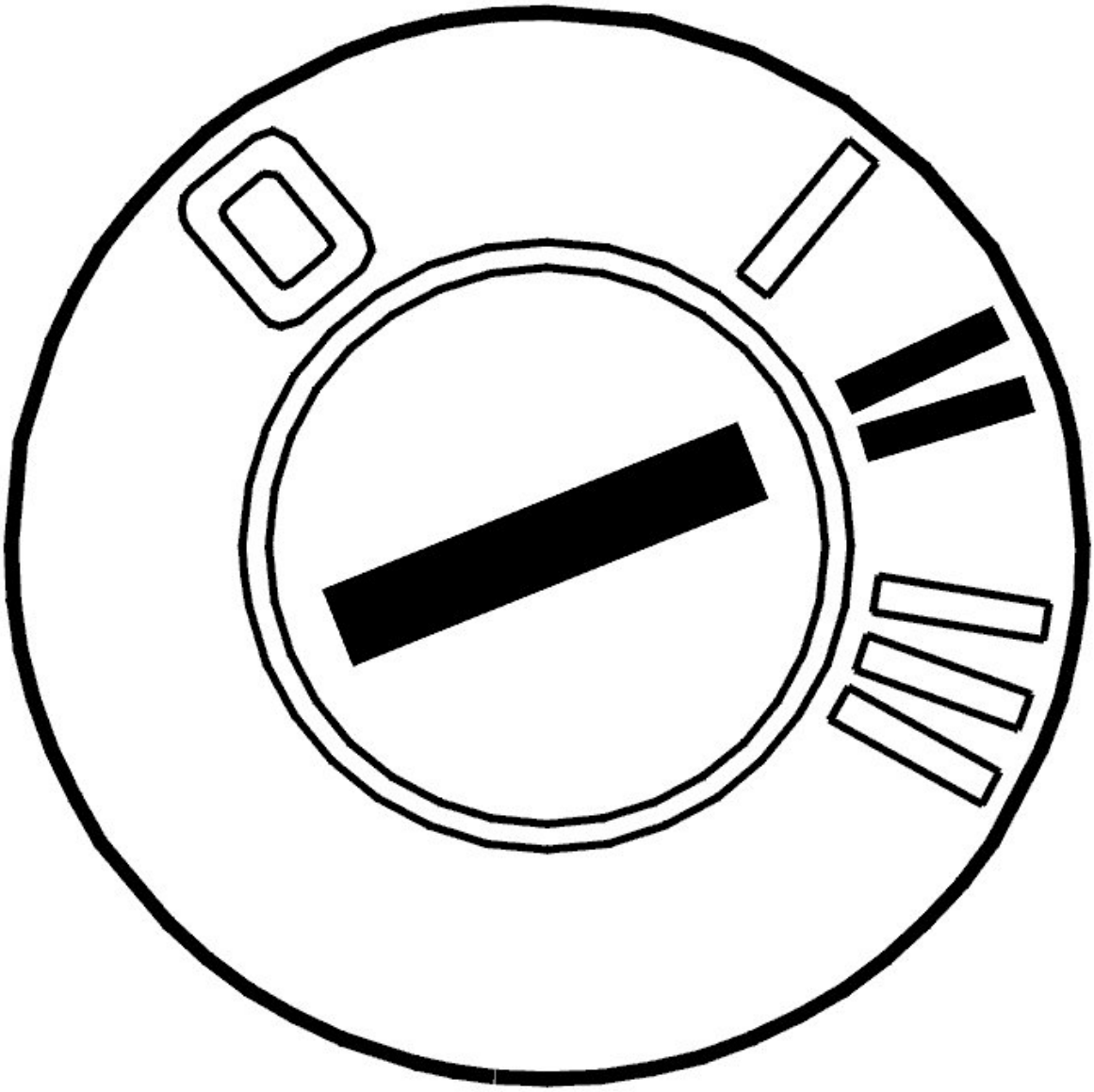
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

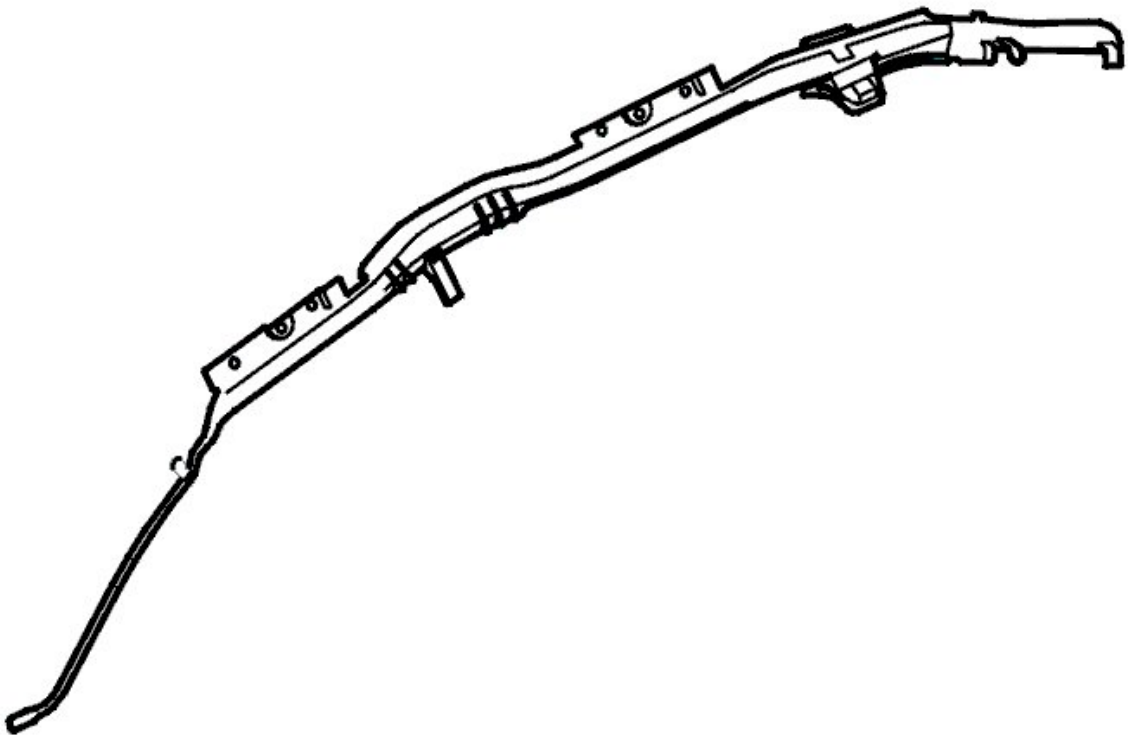
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

SRS-004D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-004D is displayed.

Substitute value
- Nothing.

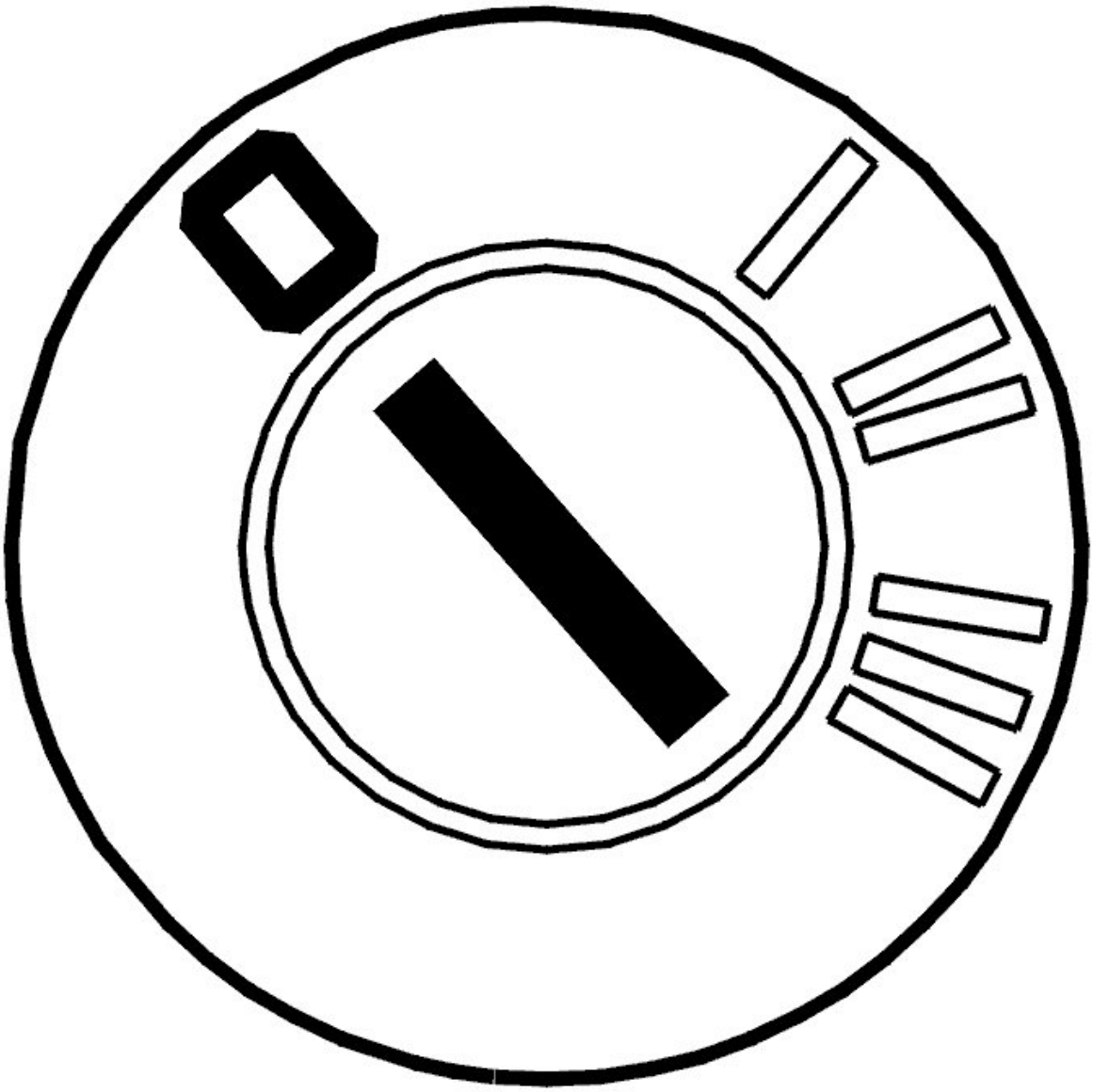
Possible source
- Short circuit in igniter wire or connectors between the inflatable curtain and the supplemental restraint system (SRS) control unit
- Short circuit in inflatable curtain (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

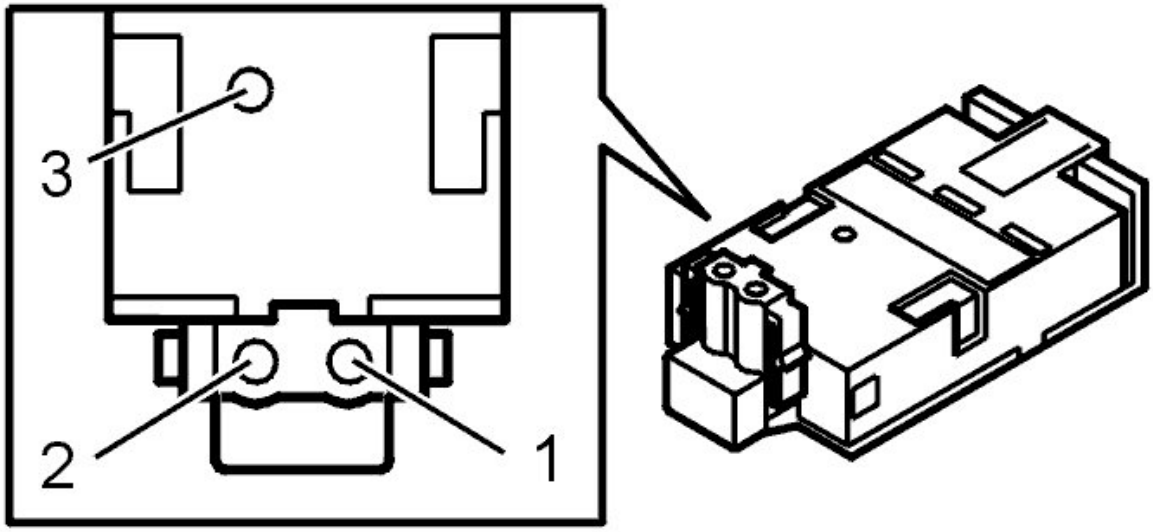
Check the connectors for the SRS module and inflatable curtain. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between SRS control module terminals #21C (17), #22C (18) and connector terminals #1 and #3 on the right-hand inflatable curtain for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

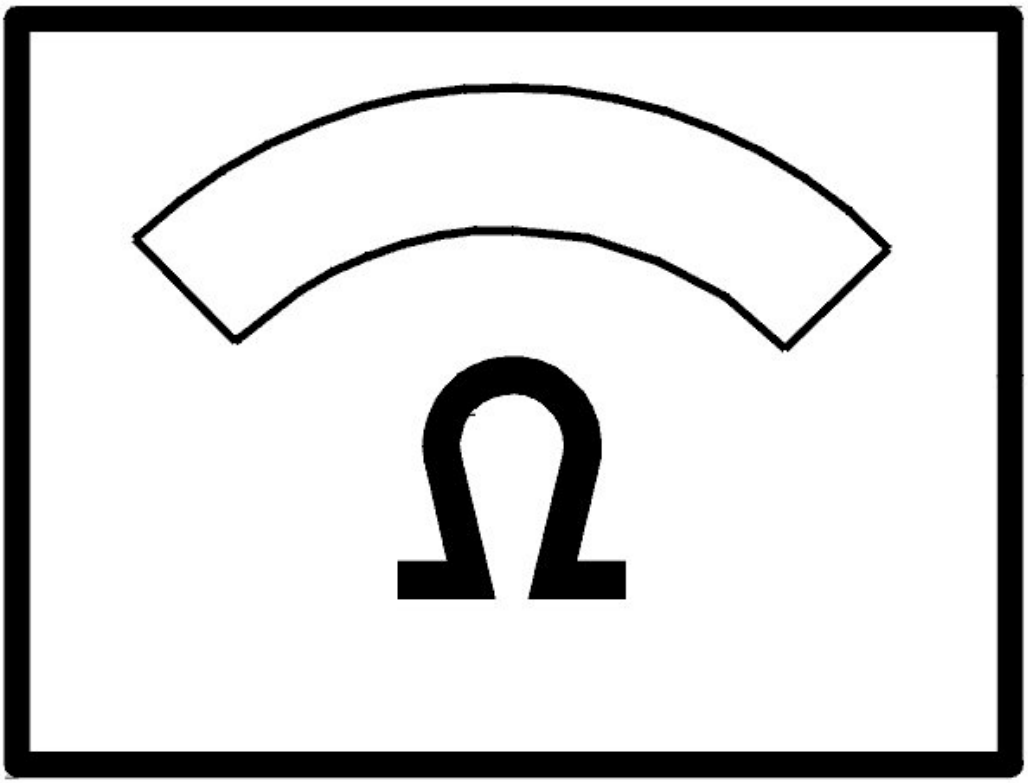
Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the connector for the right-hand inflatable curtain, see IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the connector for the right inflatable curtain and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #21C (17) and #22C (18) on the SRS control module connector (inflatable curtain side) should be infinite
- With the ignition off and the connectors for the right-hand inflatable curtain and for the SRS control module disconnected, the resistance between inflatable curtain connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0036
SRS-003E
SRS-0046
SRS-004E
SRS-0056
SRS-005E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a side impact protection (SIPS) bag is installed, despite the control module being programmed that a side impact protection (SIPS) bag is not installed.

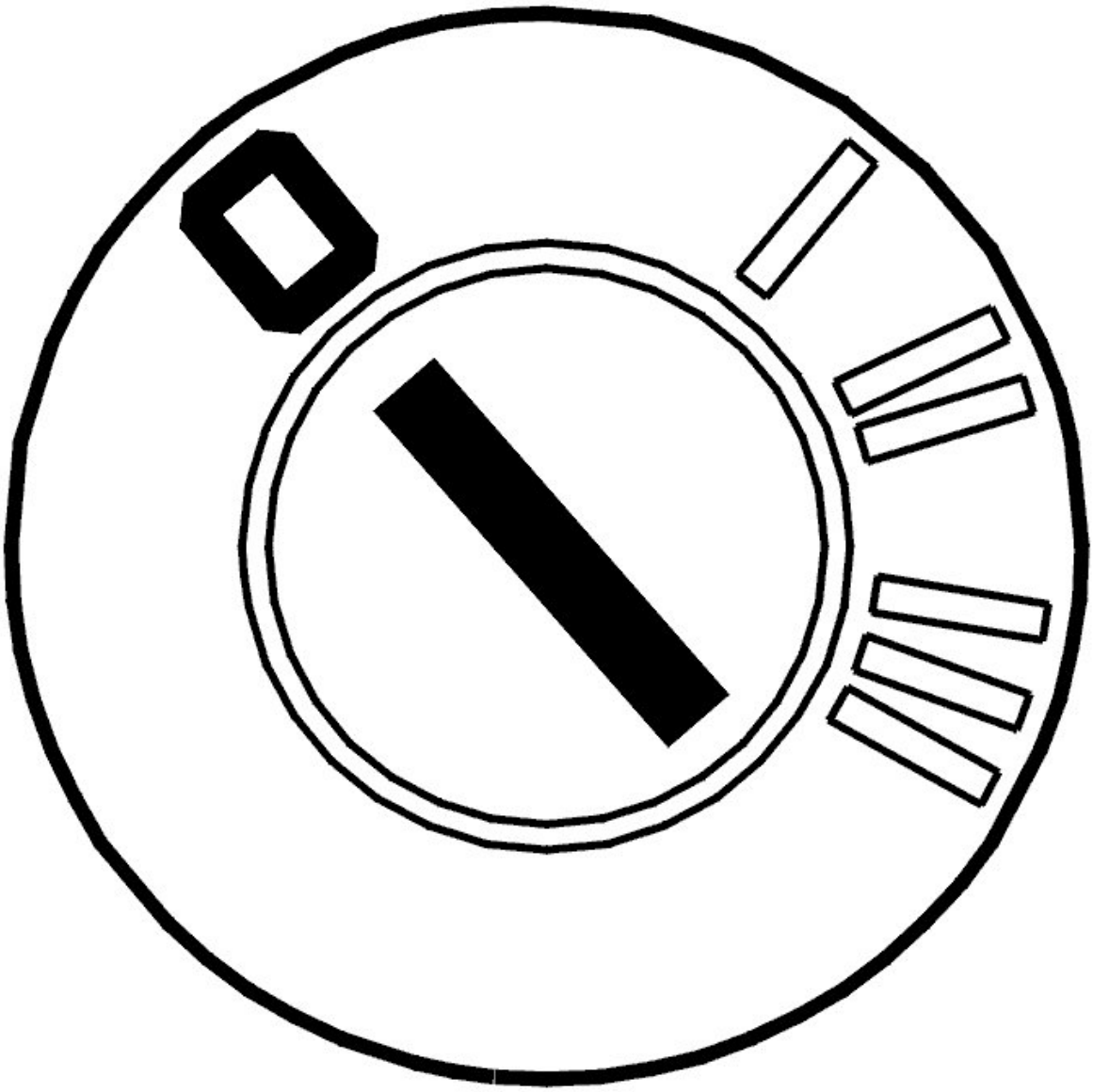
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

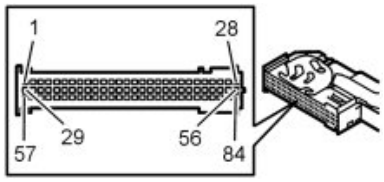


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

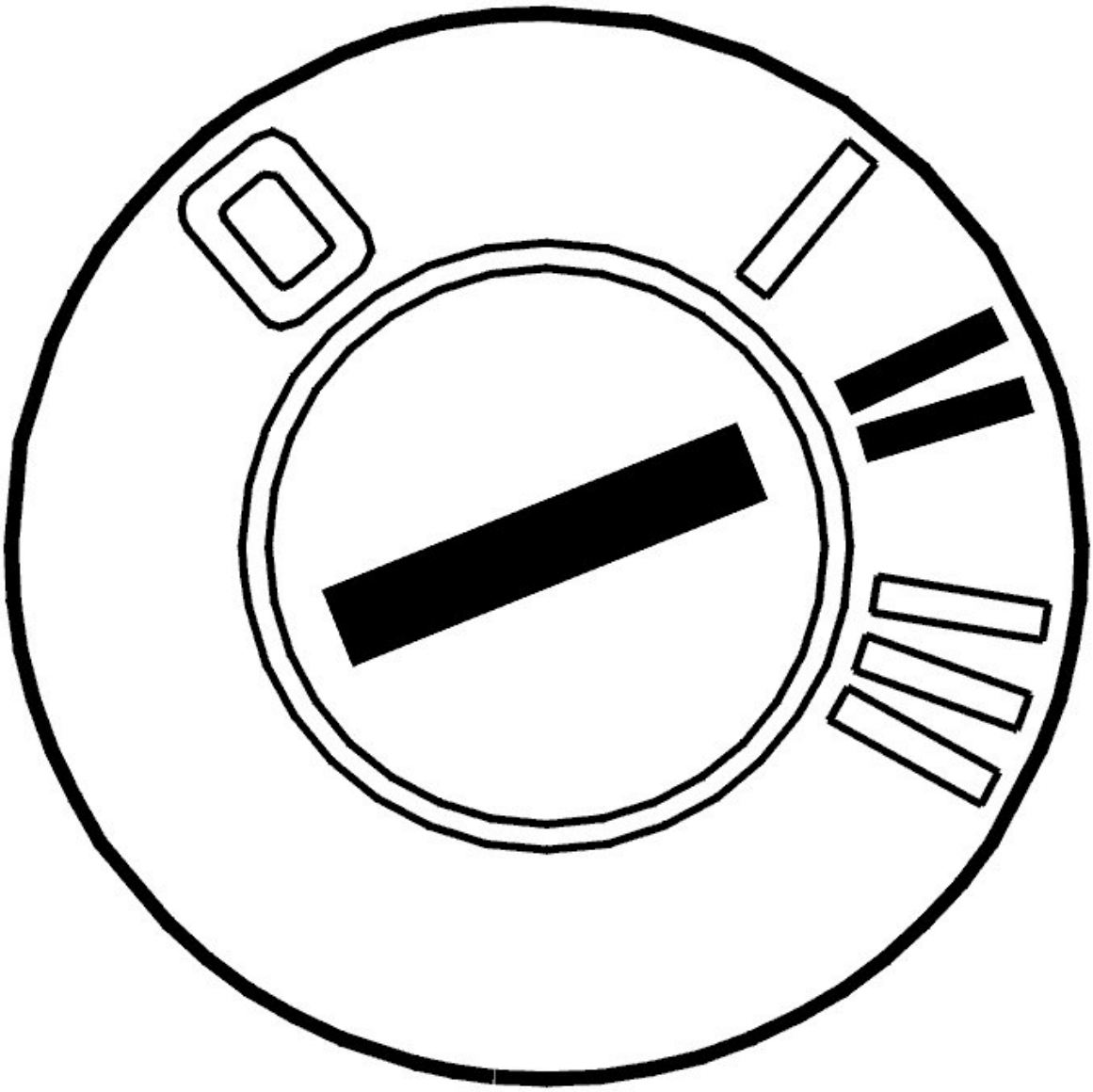
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0016, SRS-001E,
SRS-0036, SRS-003E,
SRS-0046, SRS-004E,
SRS-0056, SRS-005E,
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that an airbag or a seat belt tensioner is installed, despite the control module being programmed that neither should be installed.

Fault symptom[s]

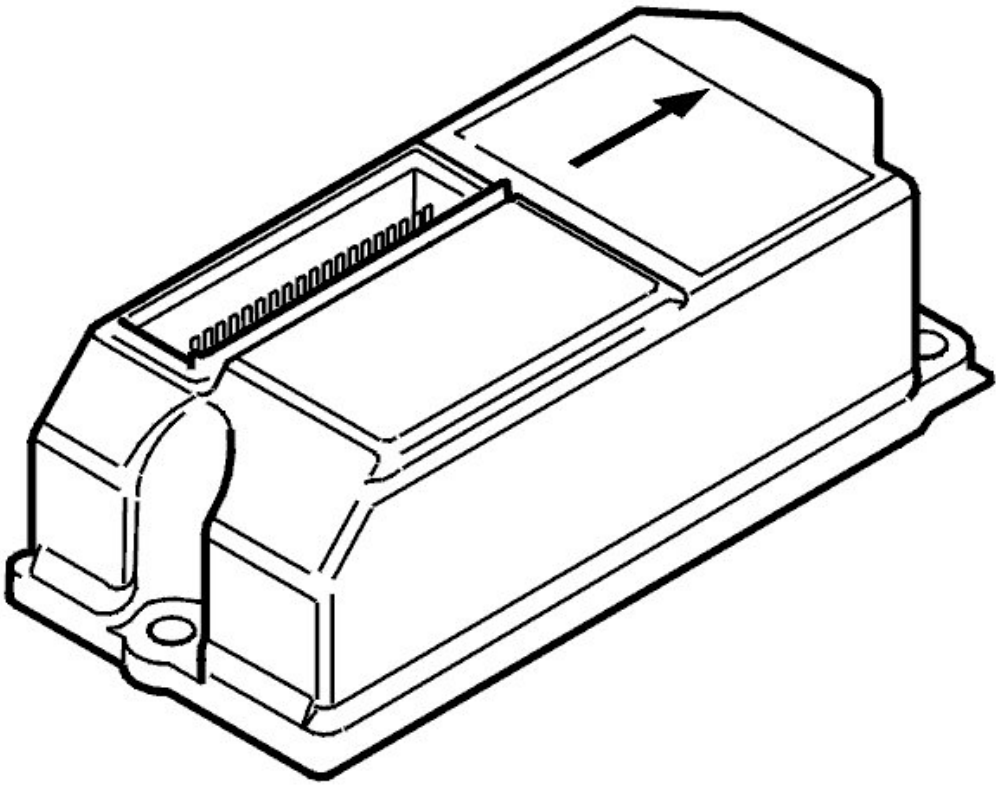
The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

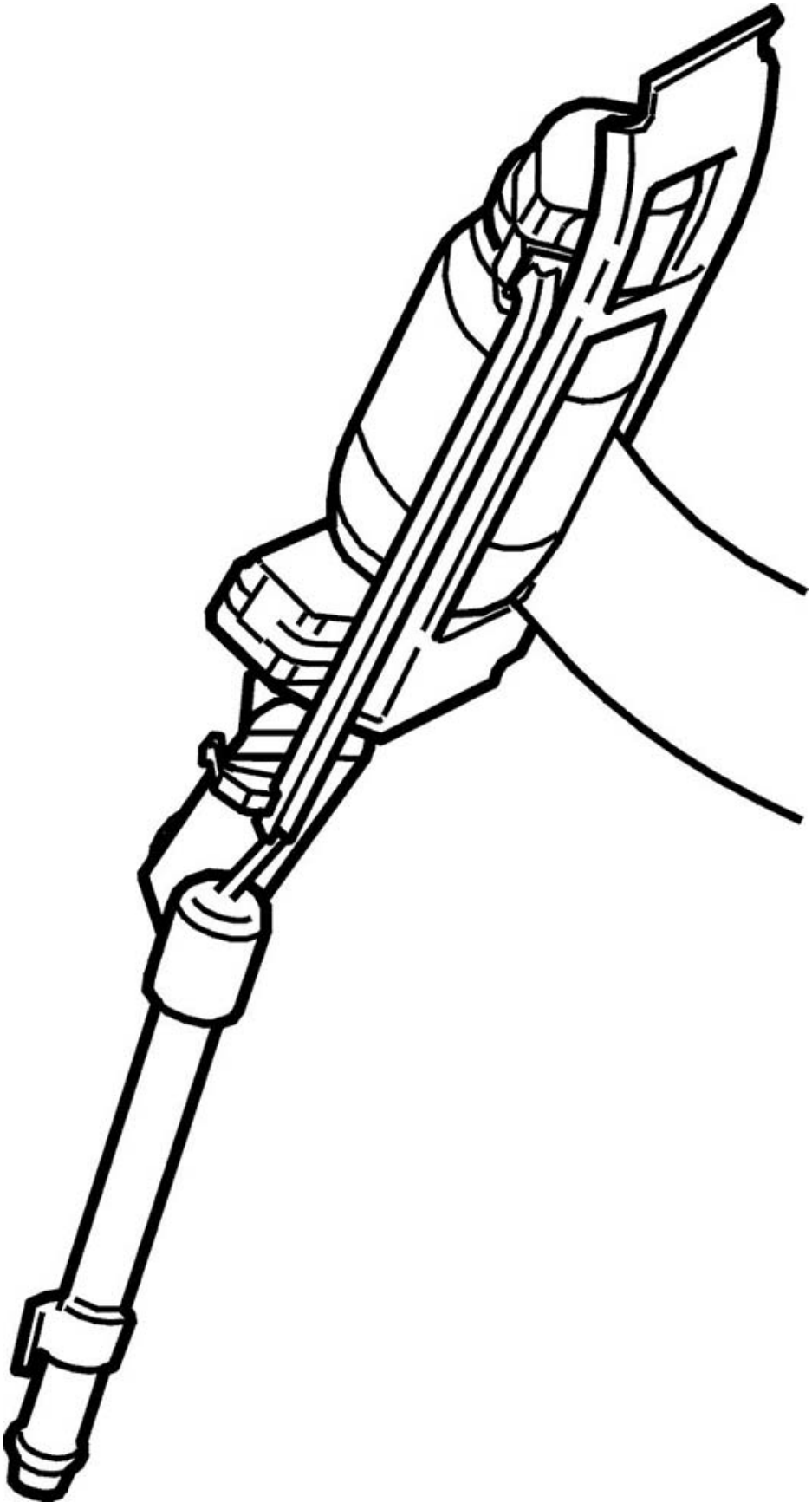
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0060 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0060 is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit to voltage supply in connector
- Short circuit in the signal wire between driver seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to voltage supply in driver seat-belt tensioner.

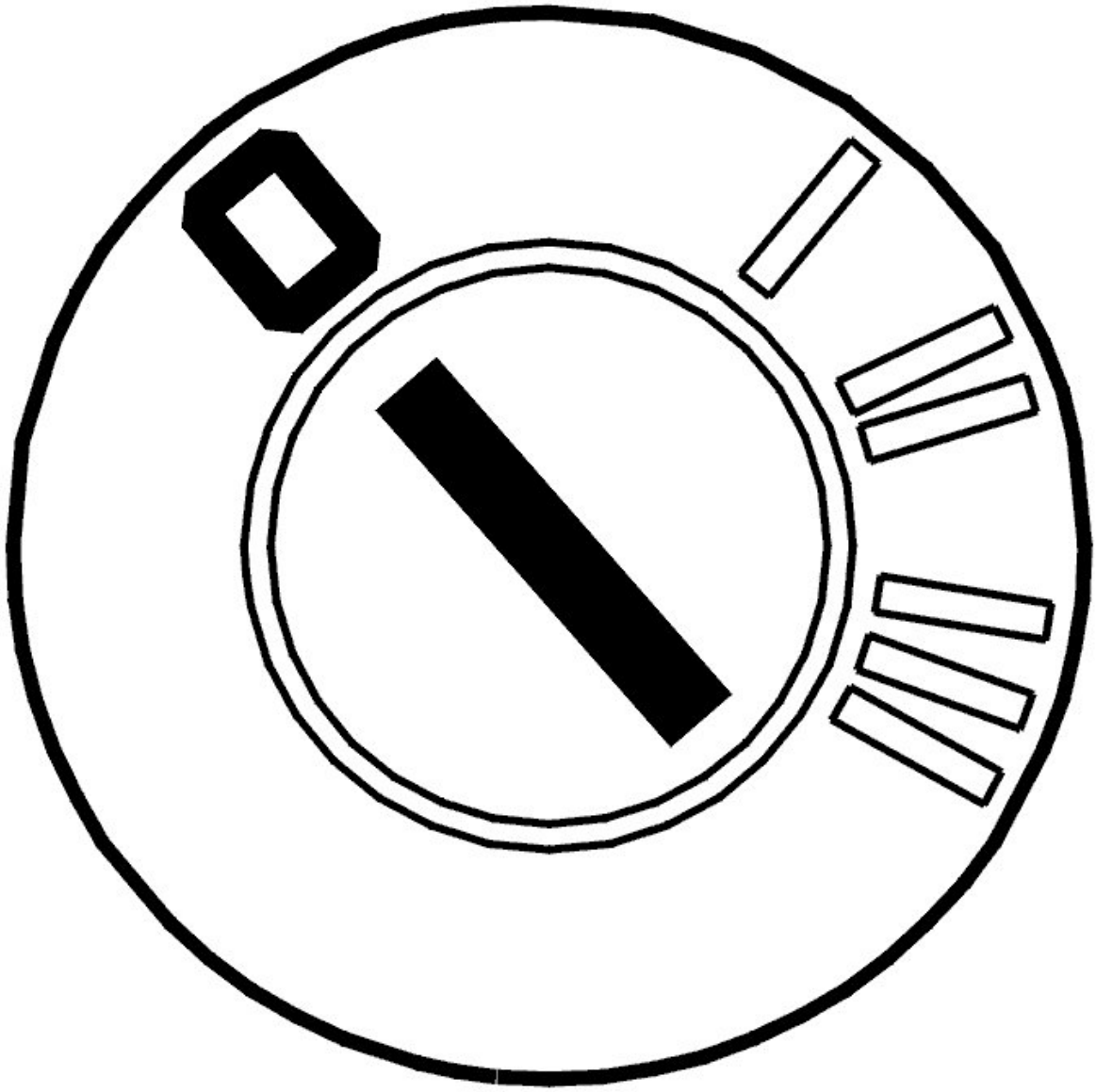
Fault symptom[s]

- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

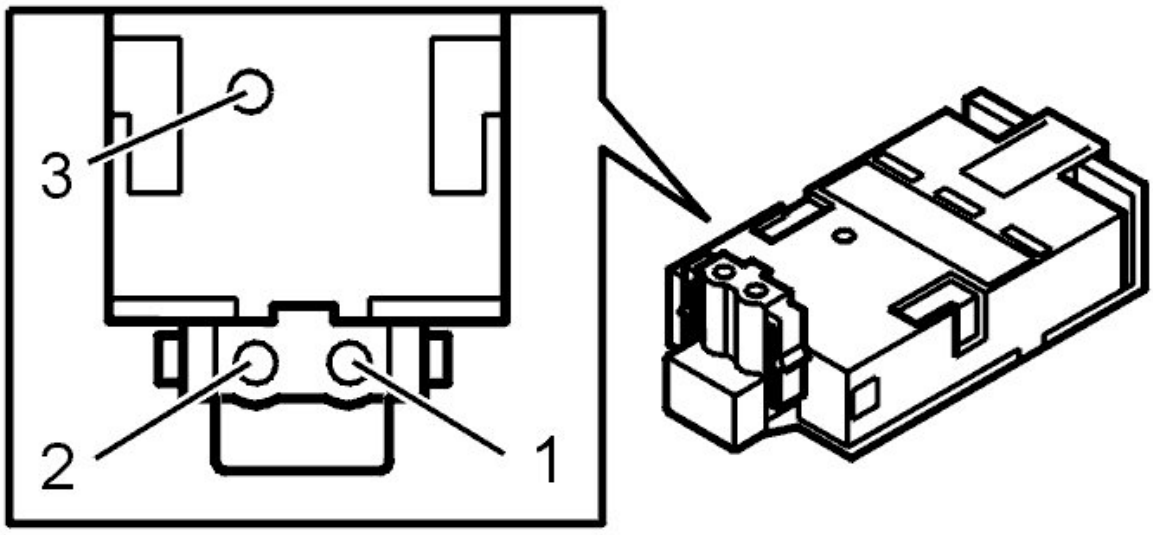
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

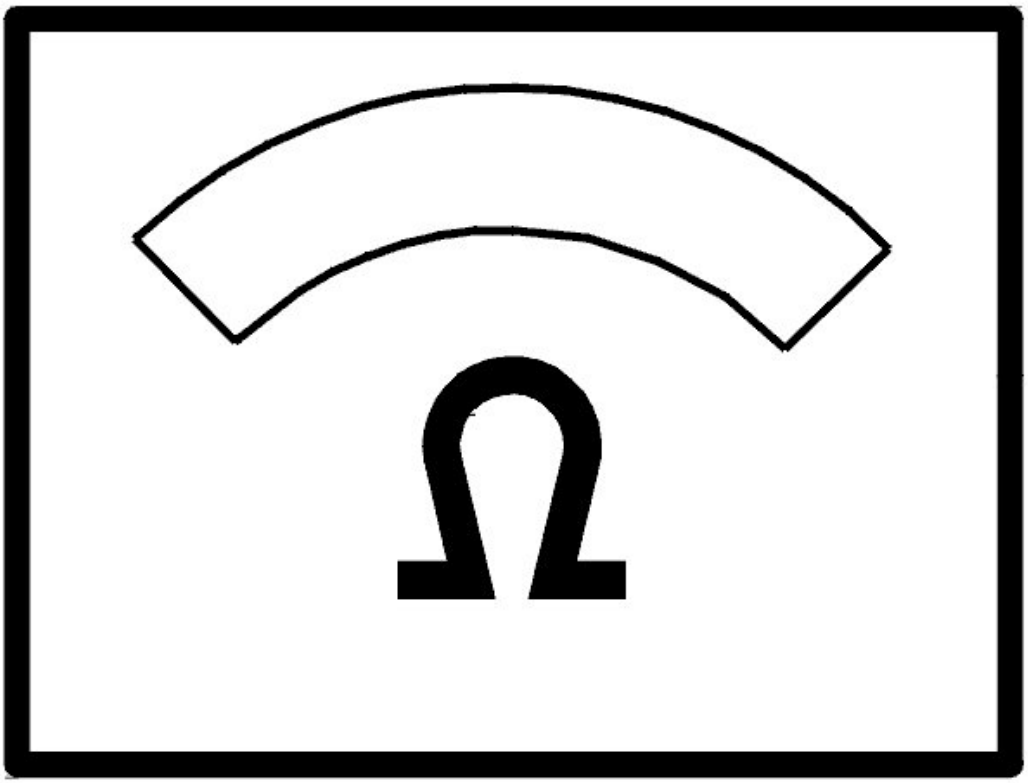
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminal #1, terminal #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

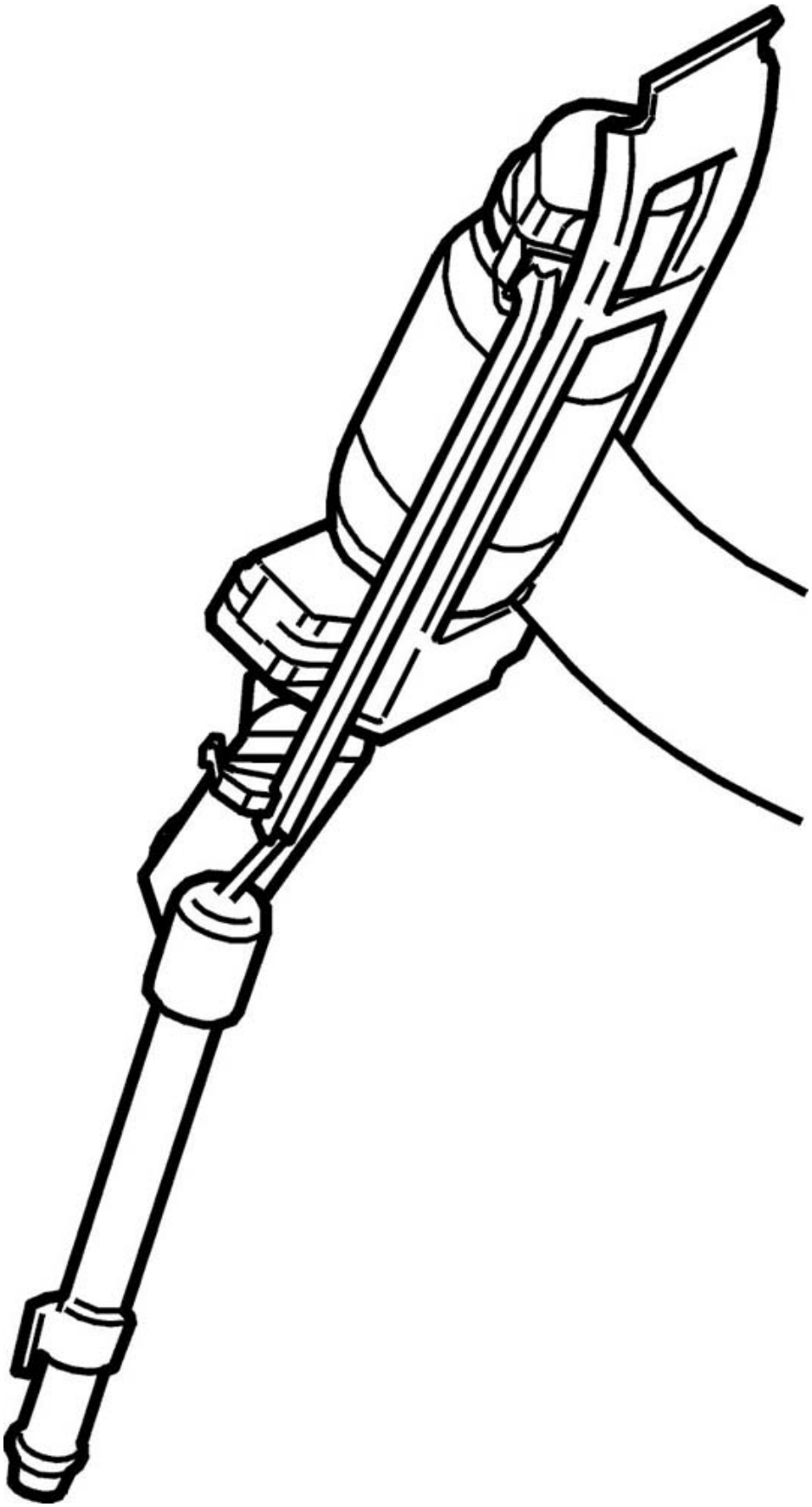
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0060 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0060 is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit to voltage supply in connector
- Short circuit in the signal wire between driver seat-belt tensioner and the supplemental restrain system (SRS)

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- Short circuit to voltage supply in driver seat-belt tensioner.

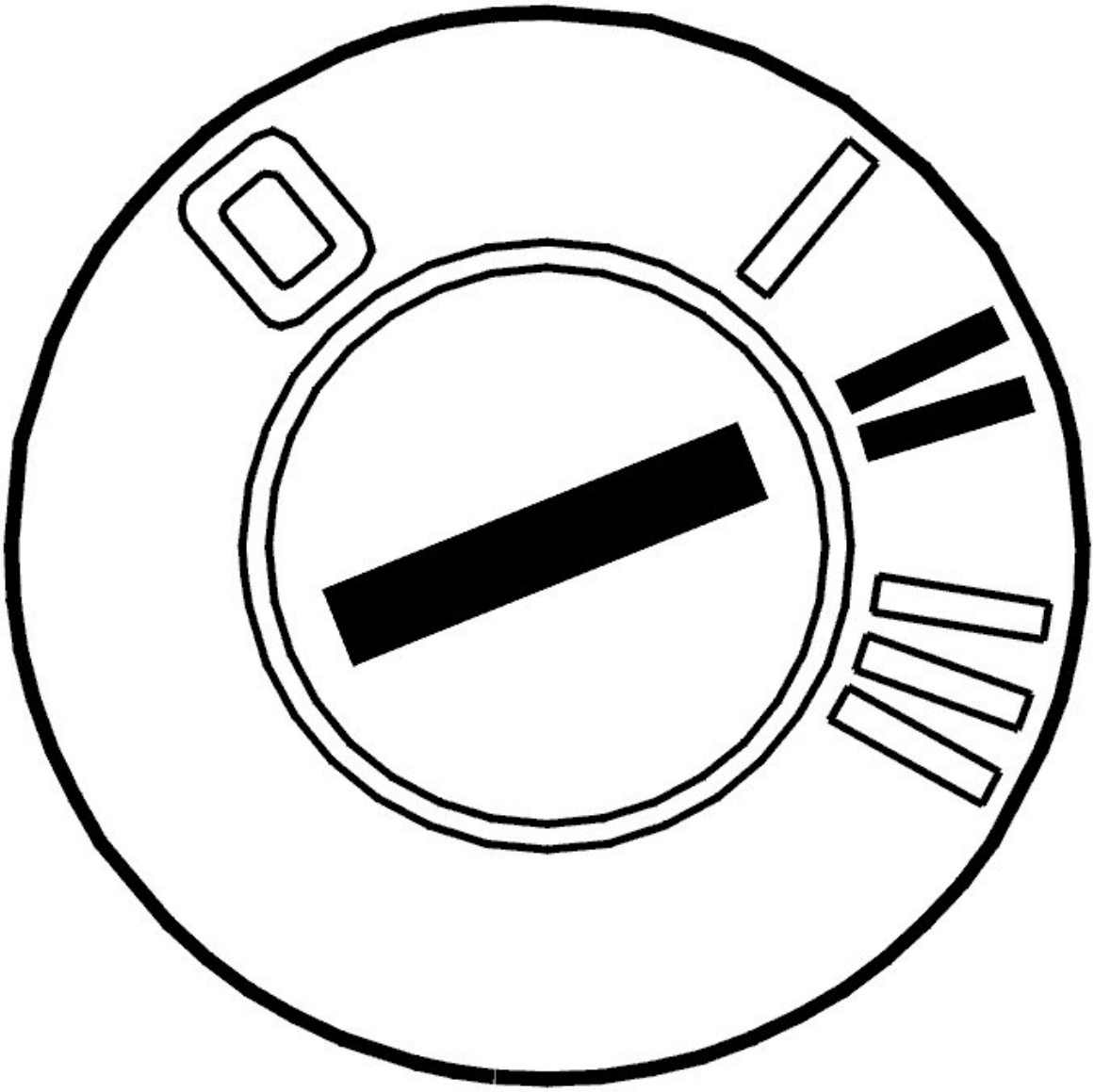
Fault symptom[s]

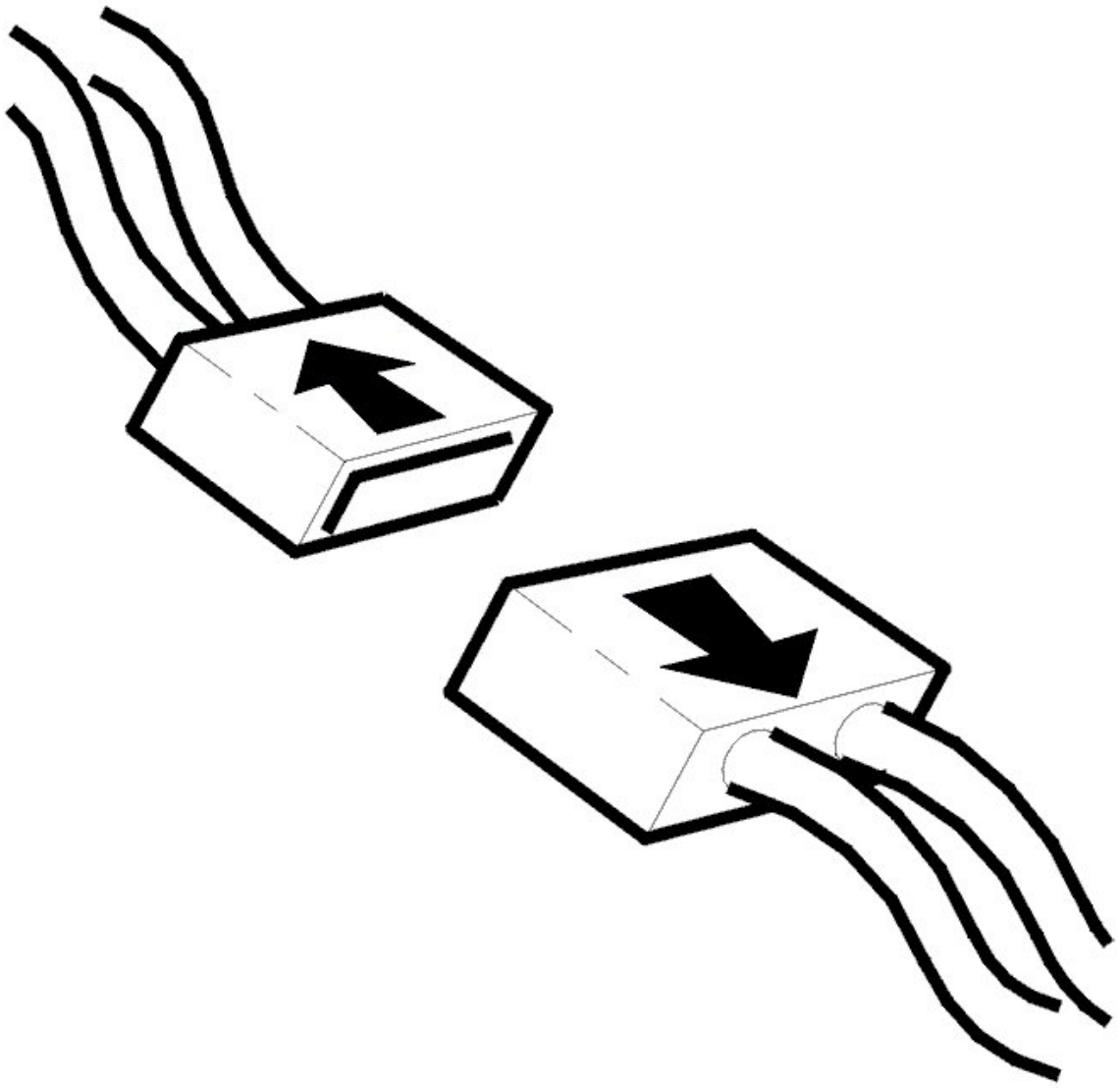
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

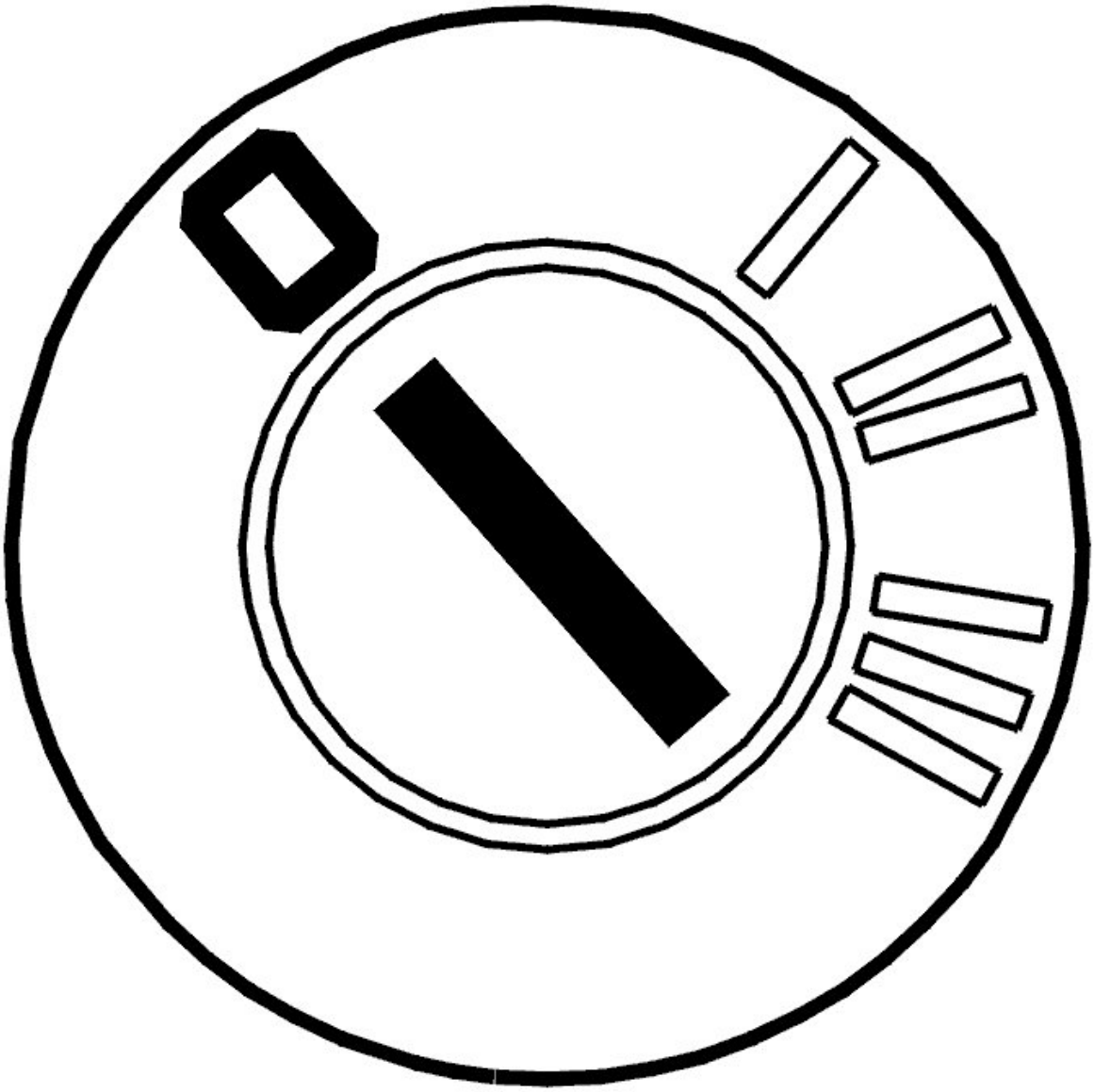
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

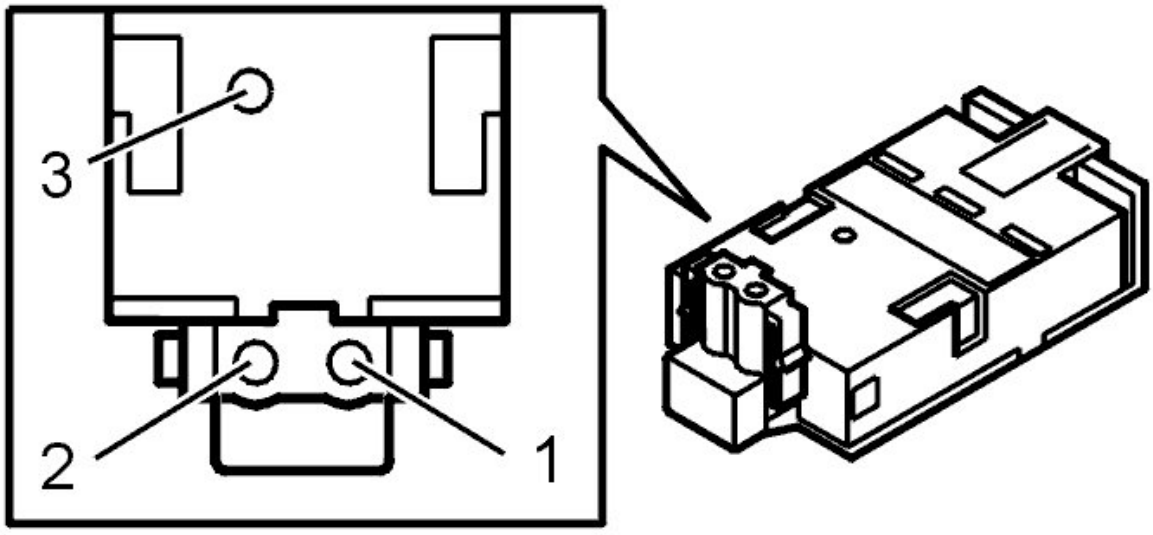
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

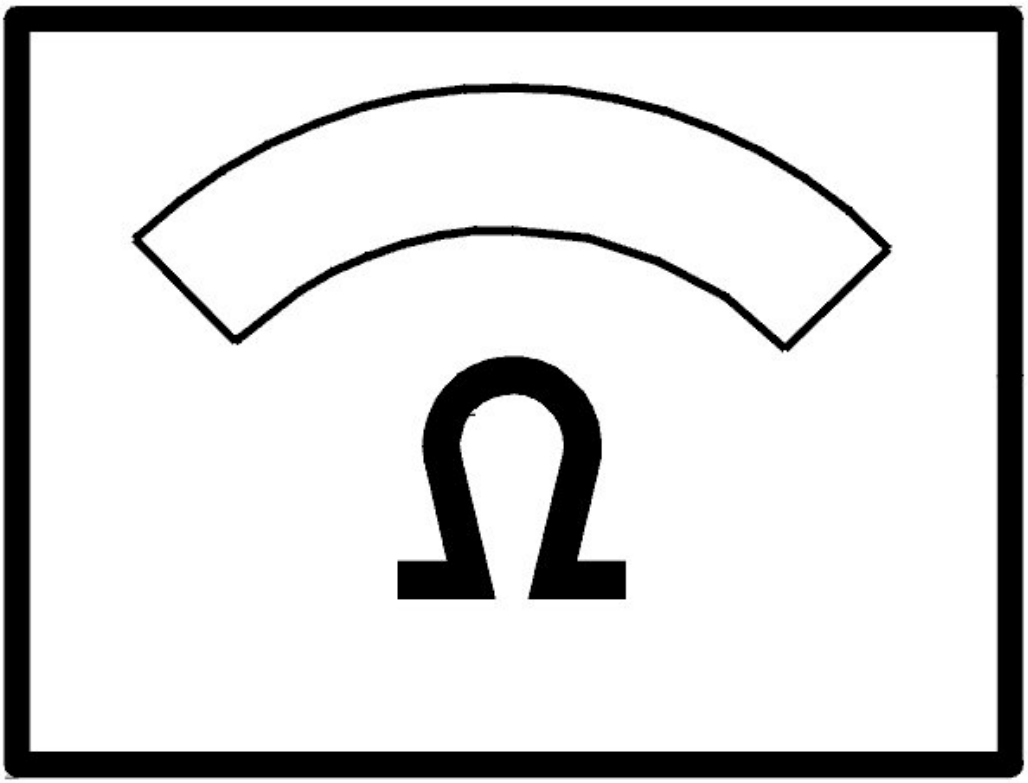
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

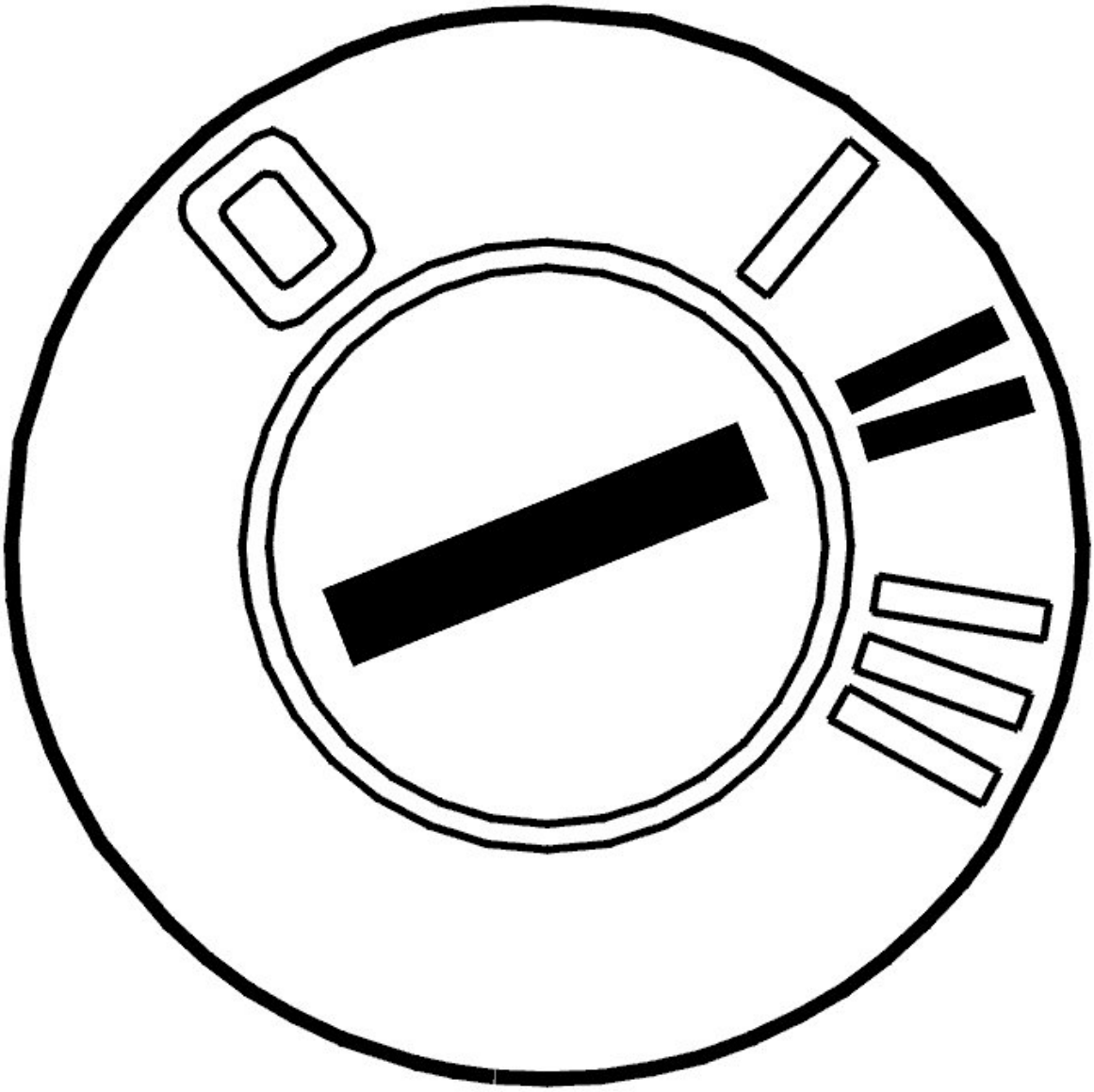
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

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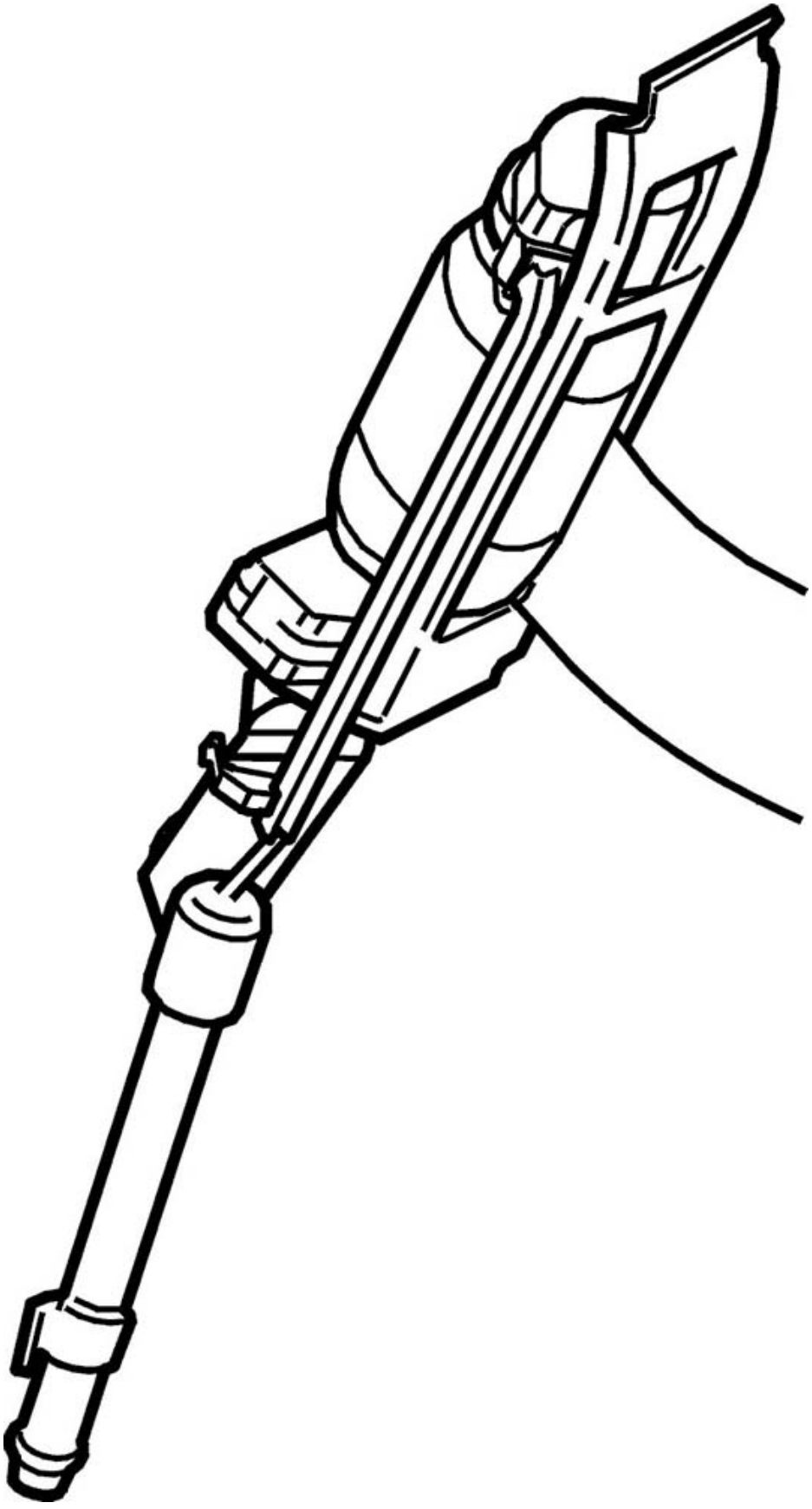
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0061 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0061 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

Fault symptom[s]

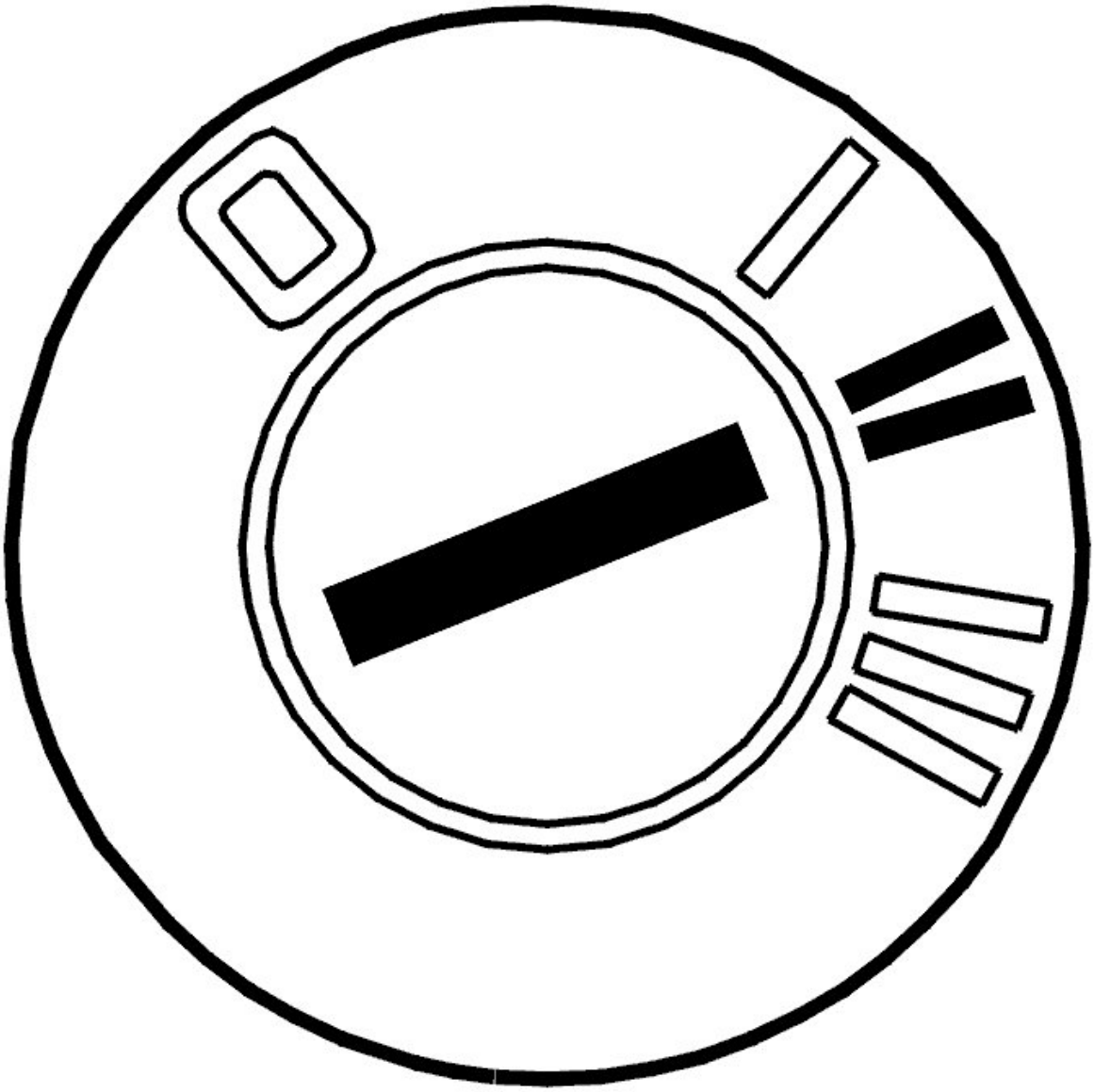
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

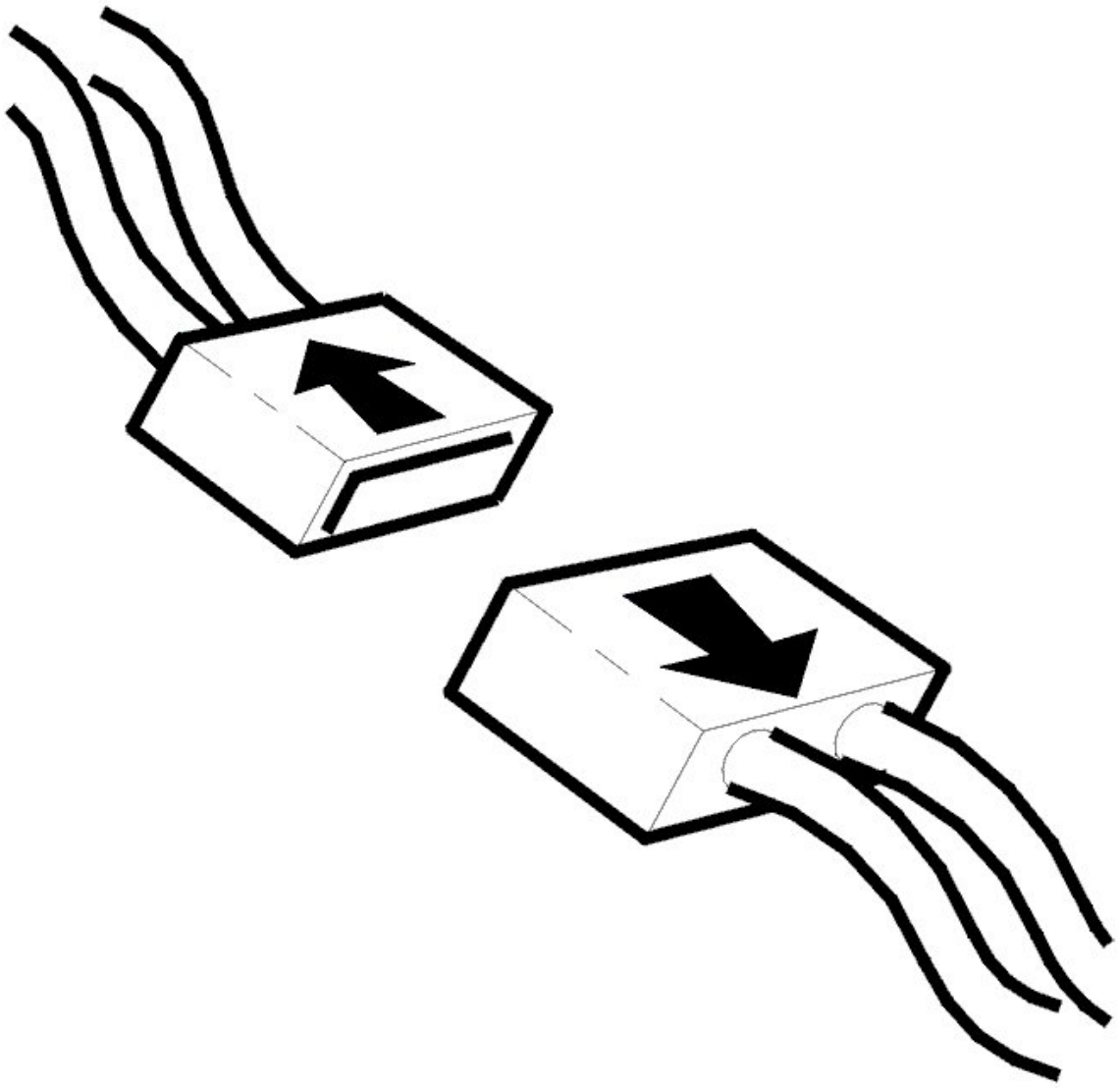
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

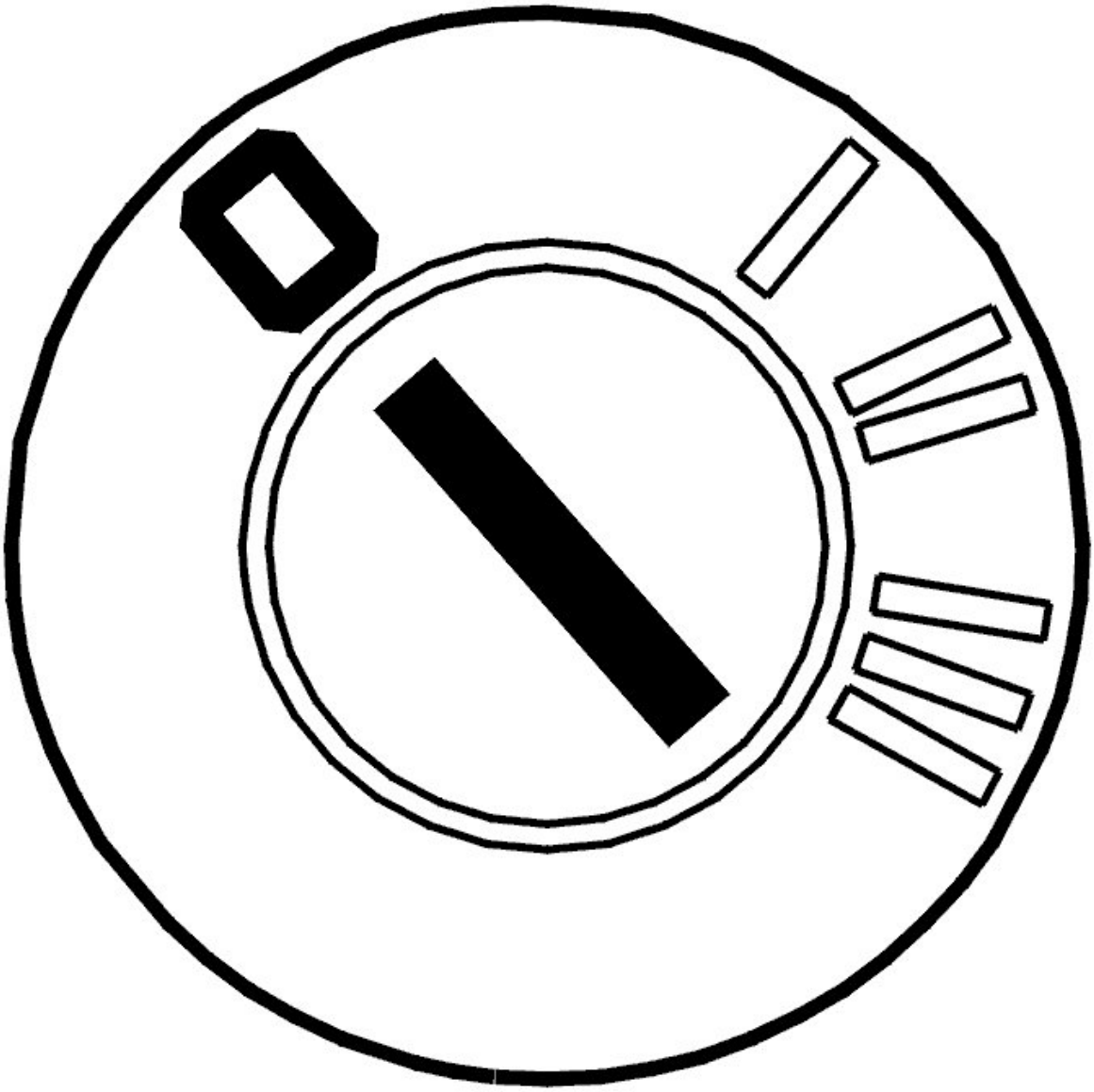
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

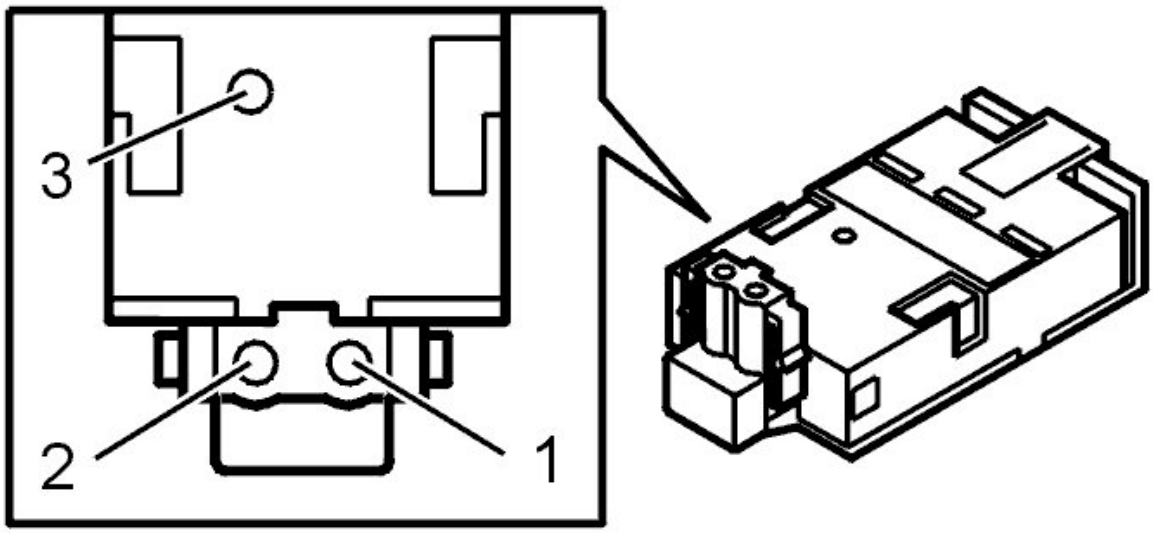
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

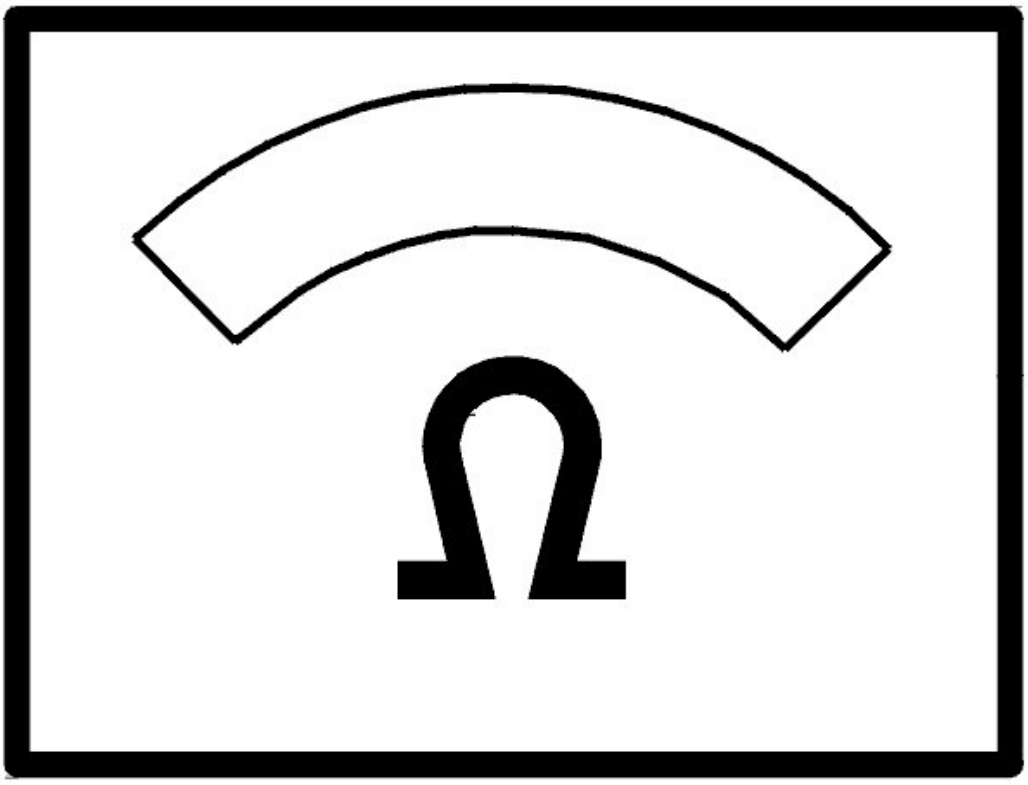
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

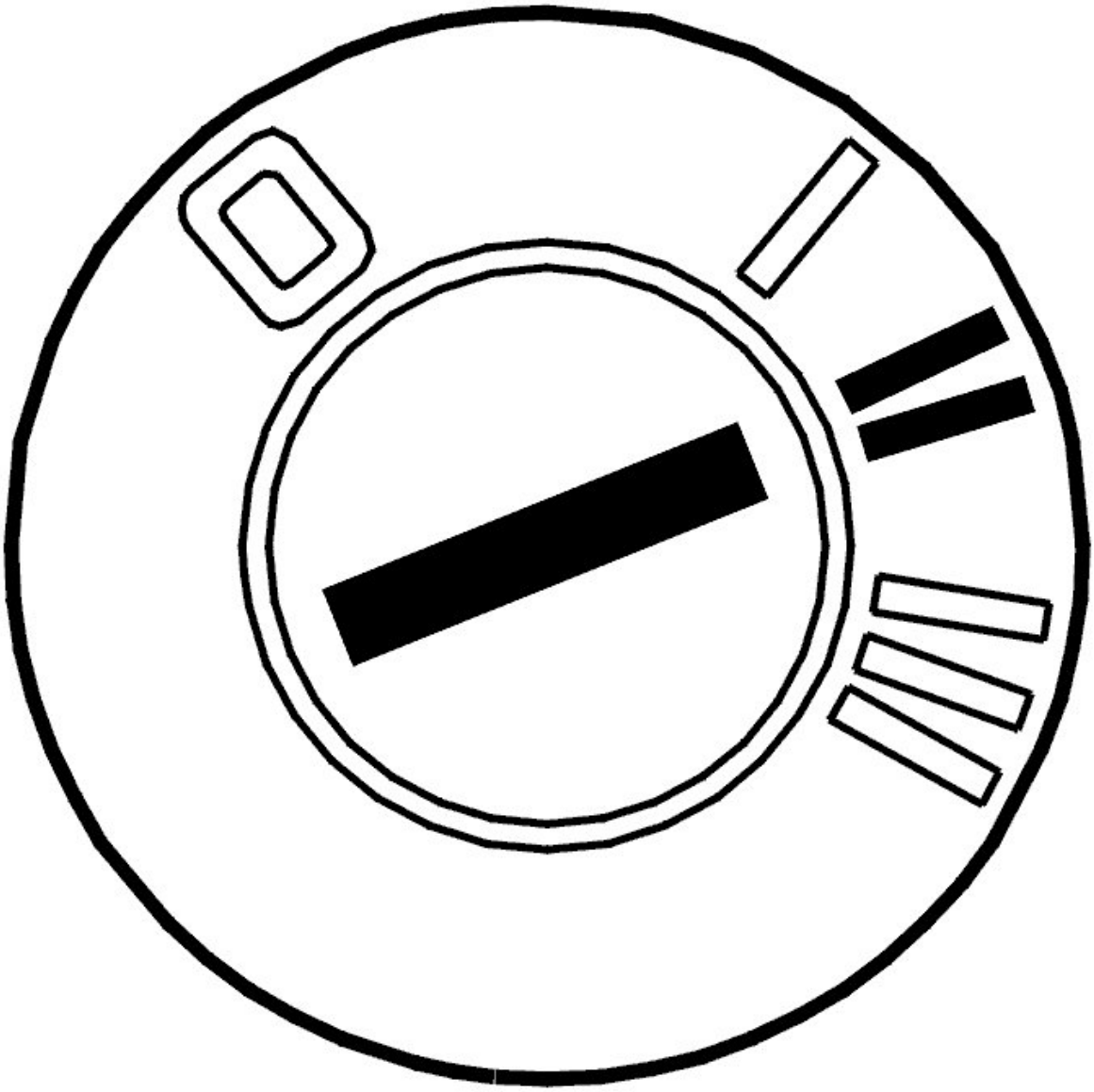
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

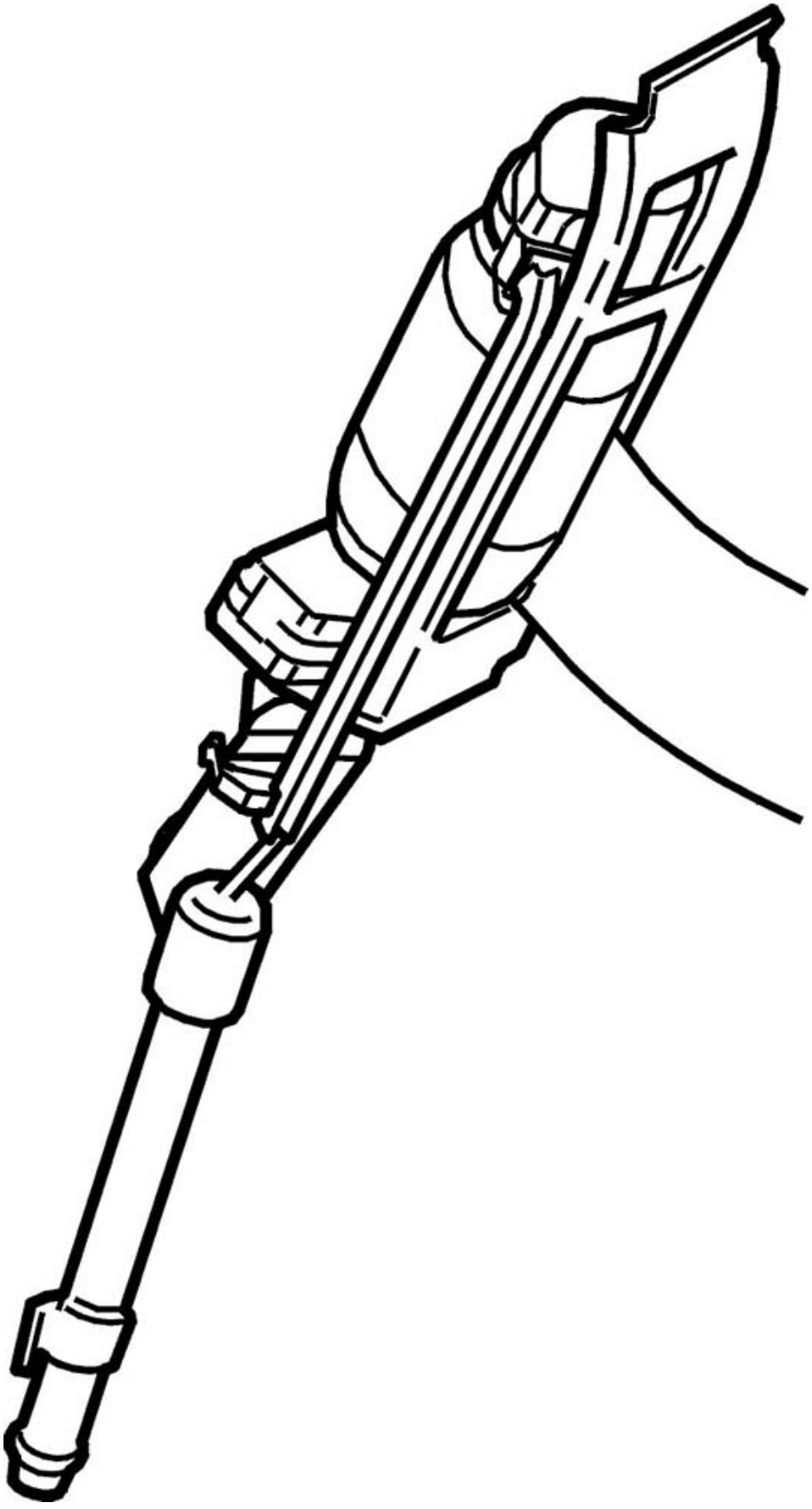
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0061 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0061 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

Fault symptom[s]

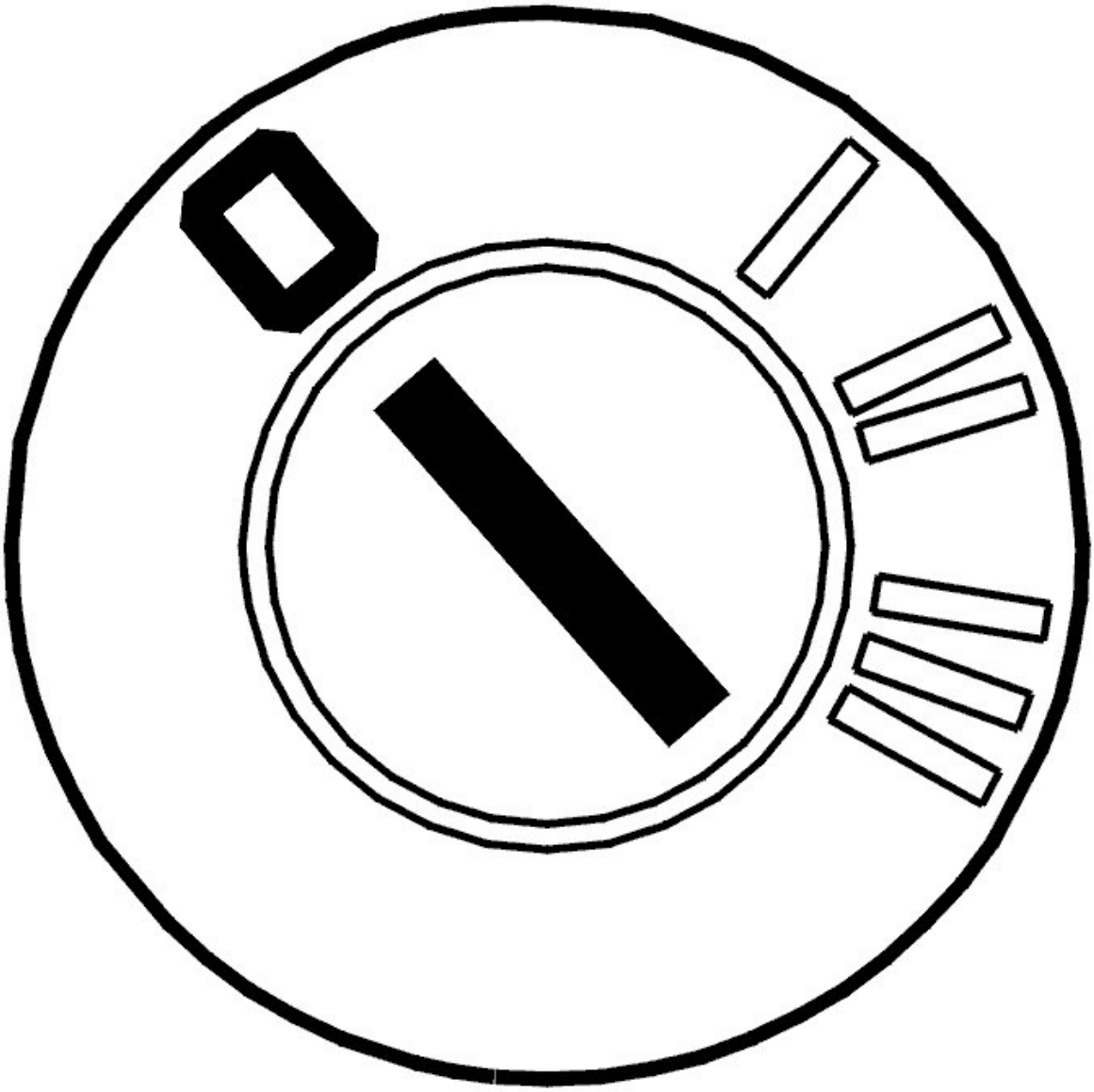
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

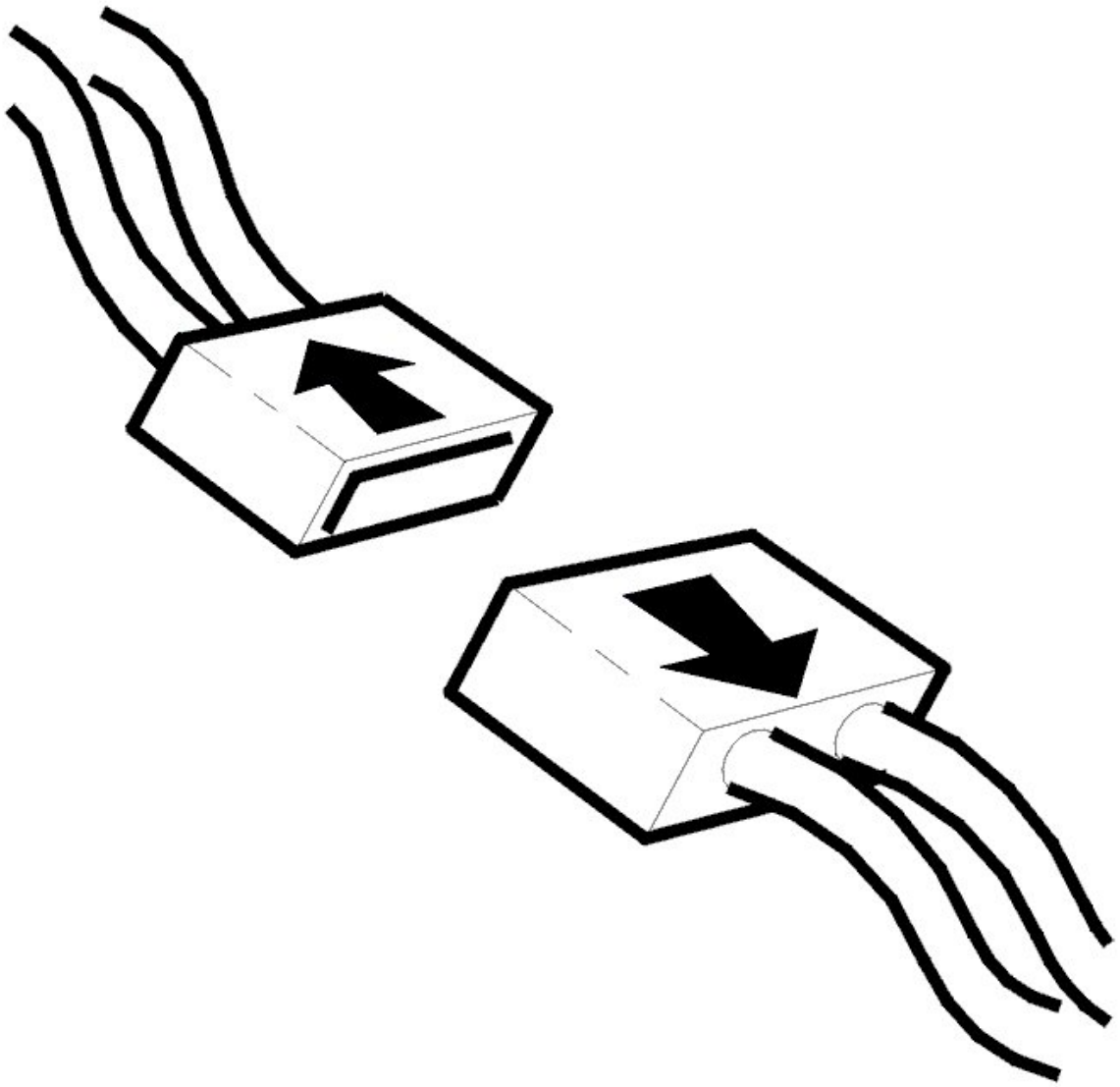
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

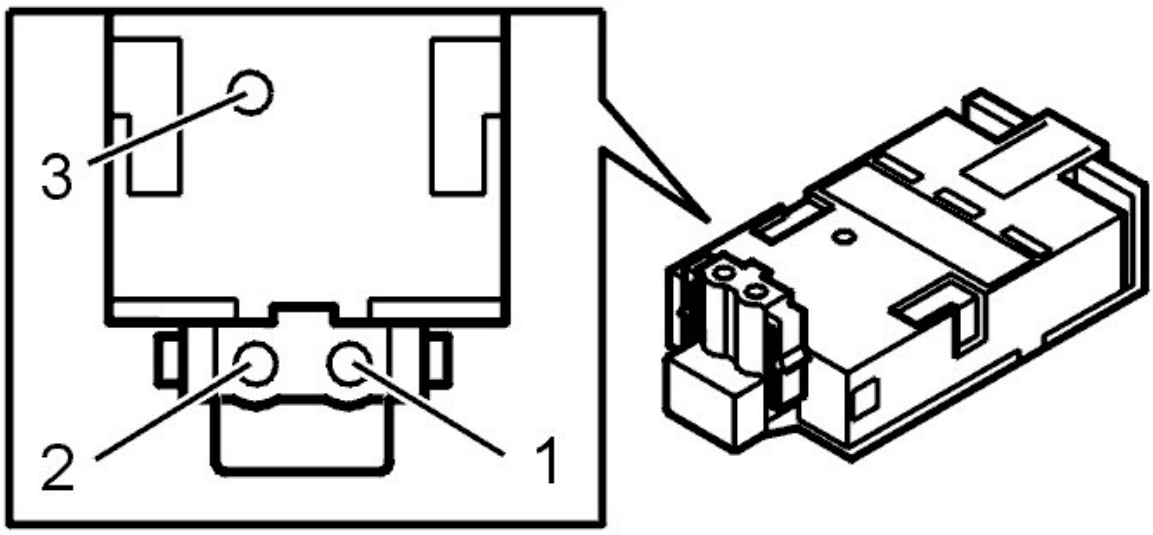
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

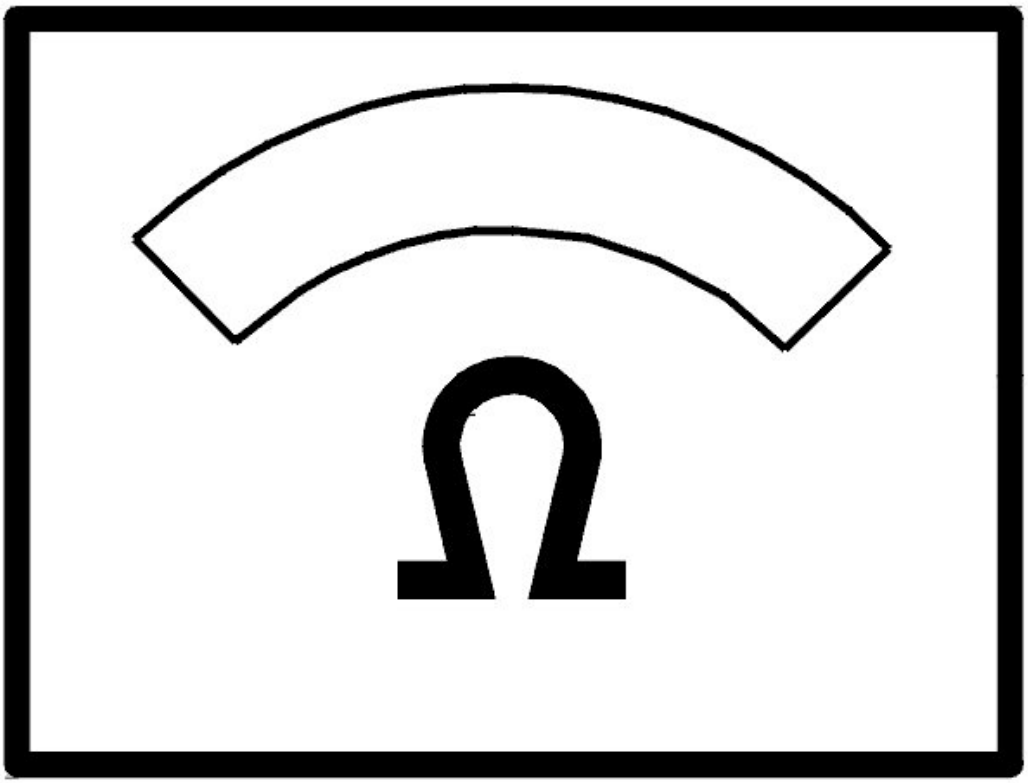
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

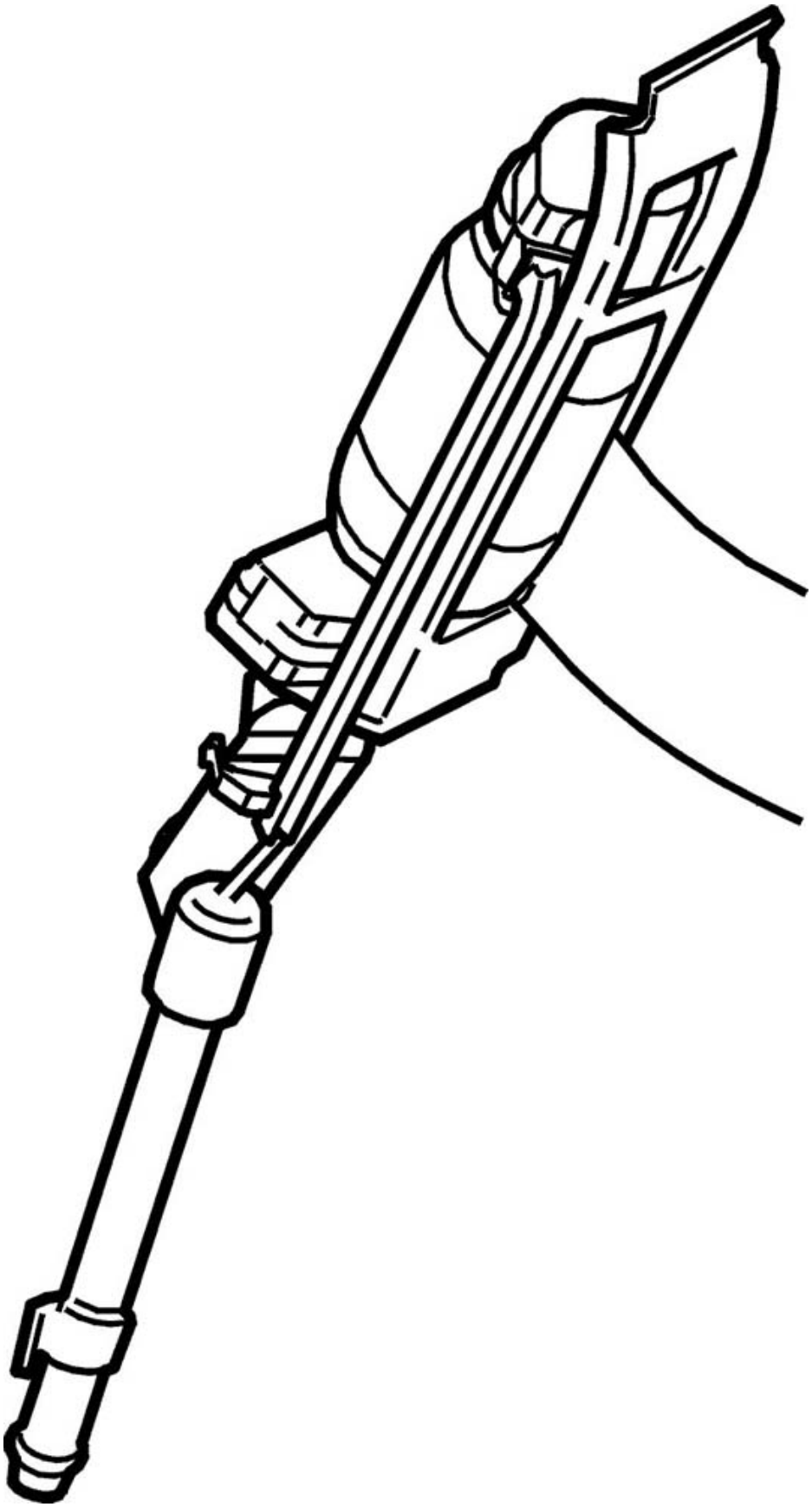
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0062 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0062 is displayed.

Substitute value

- Nothing.

Possible source

- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

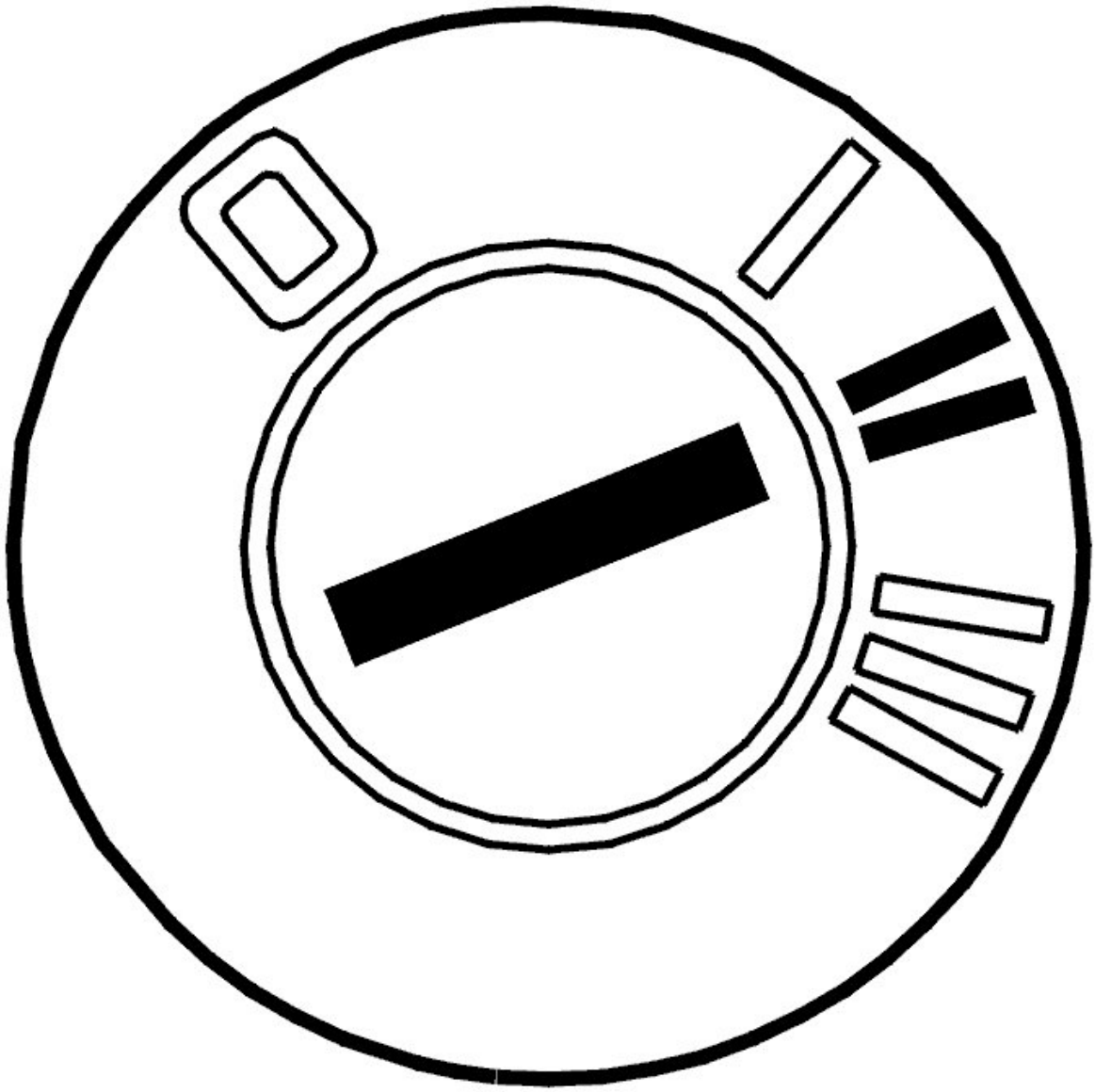
Fault symptom[s]

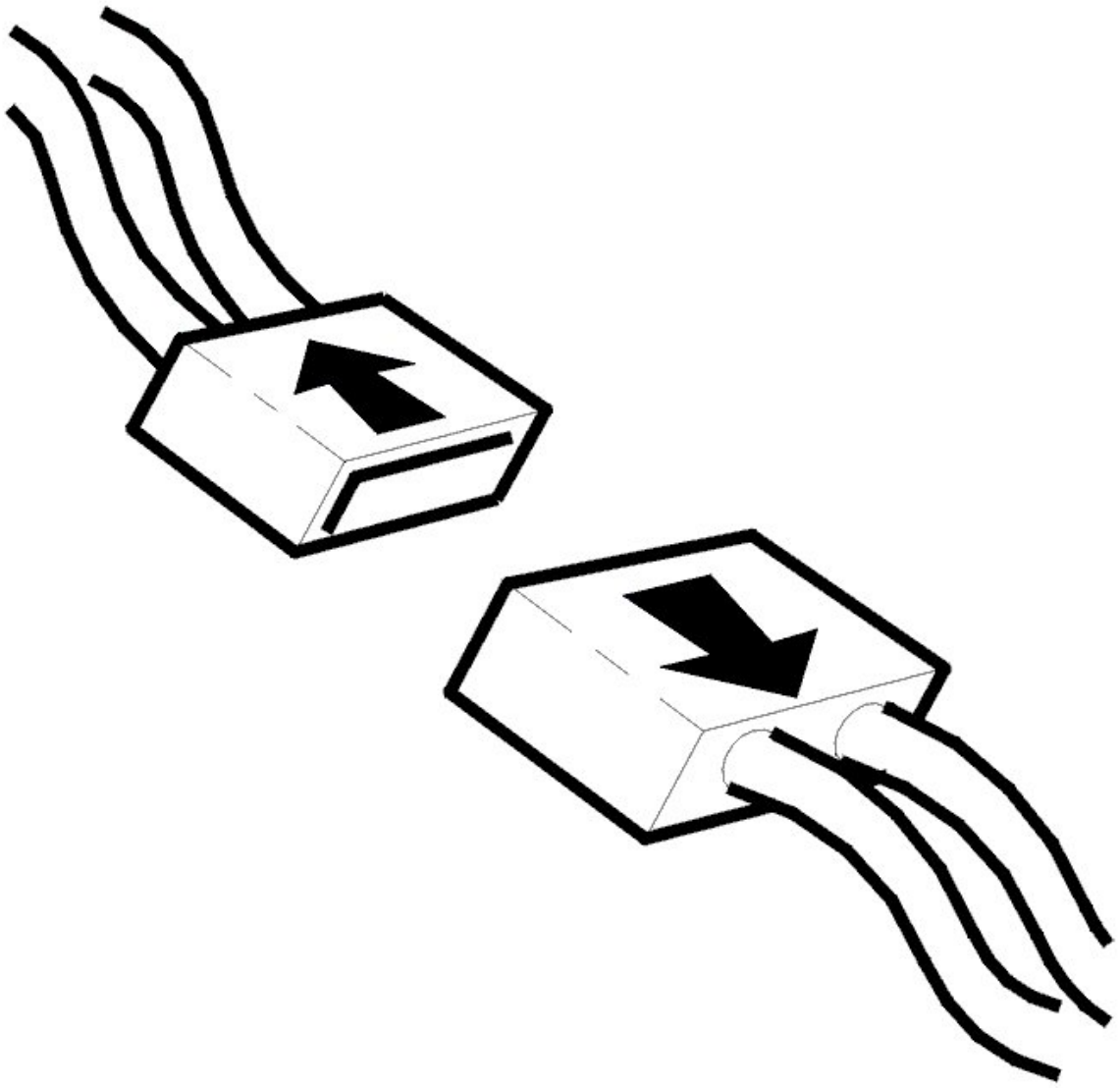
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

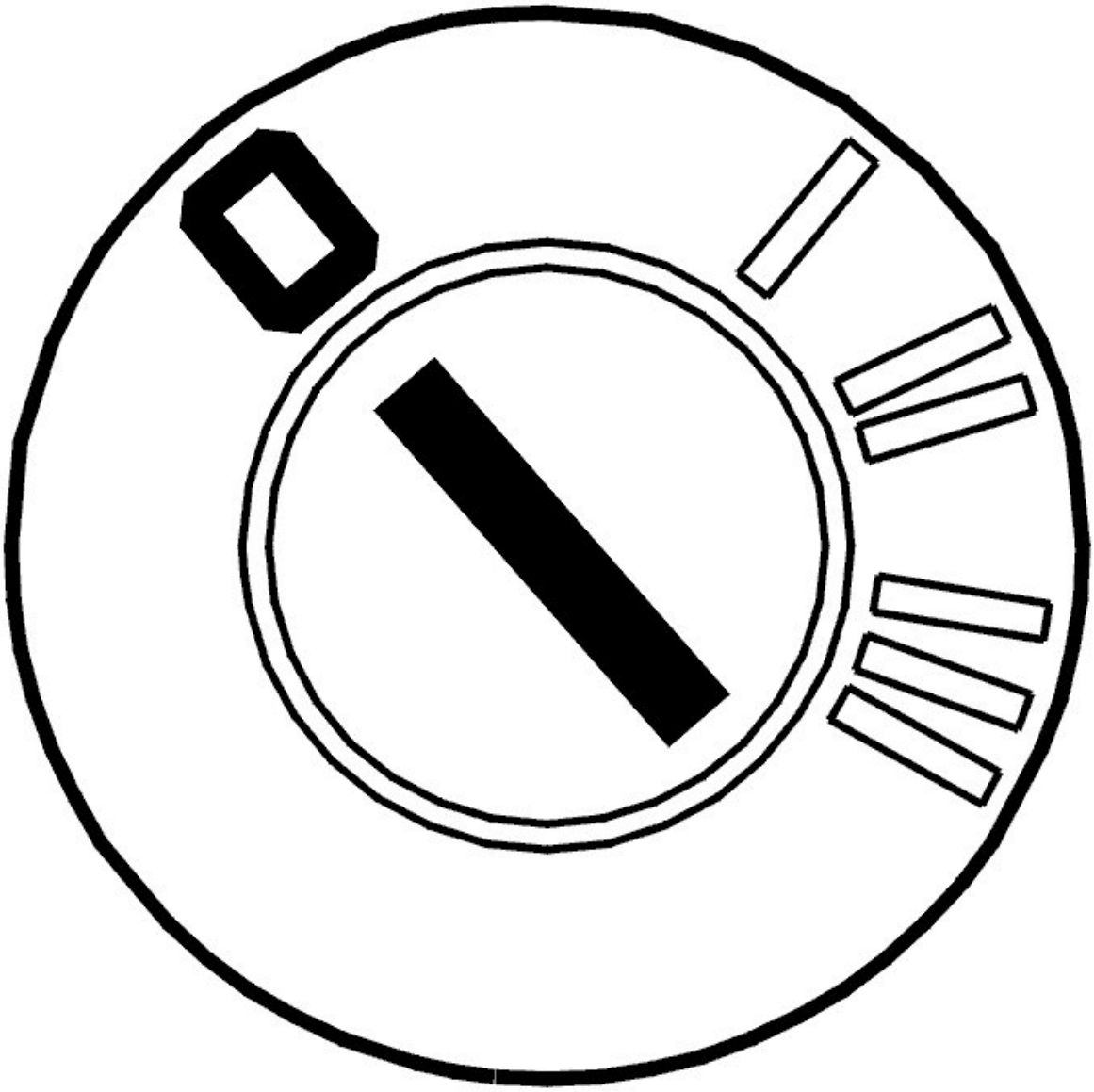
- To replace the front seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A

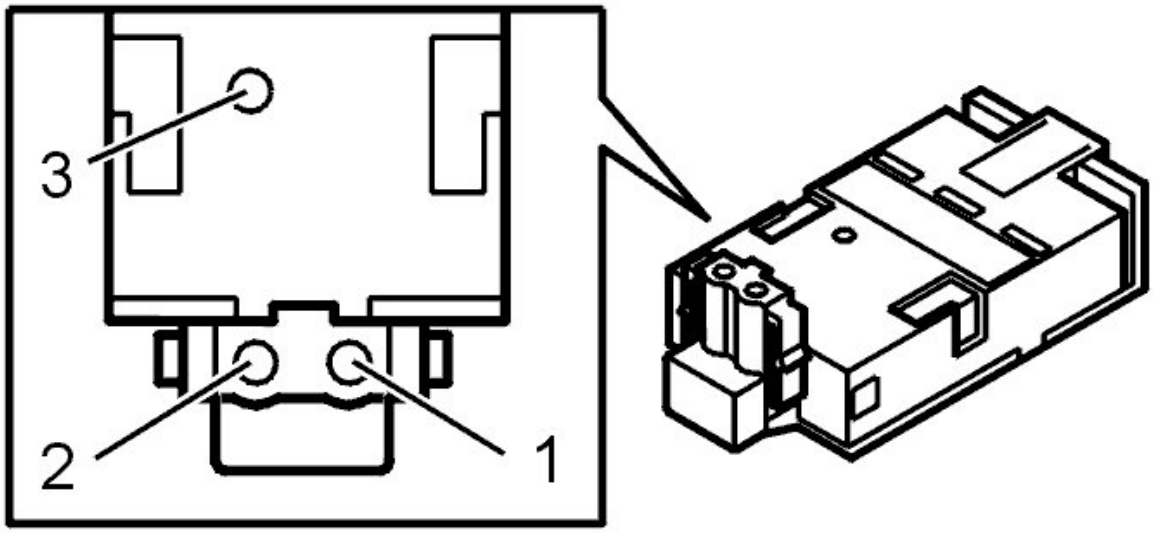
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

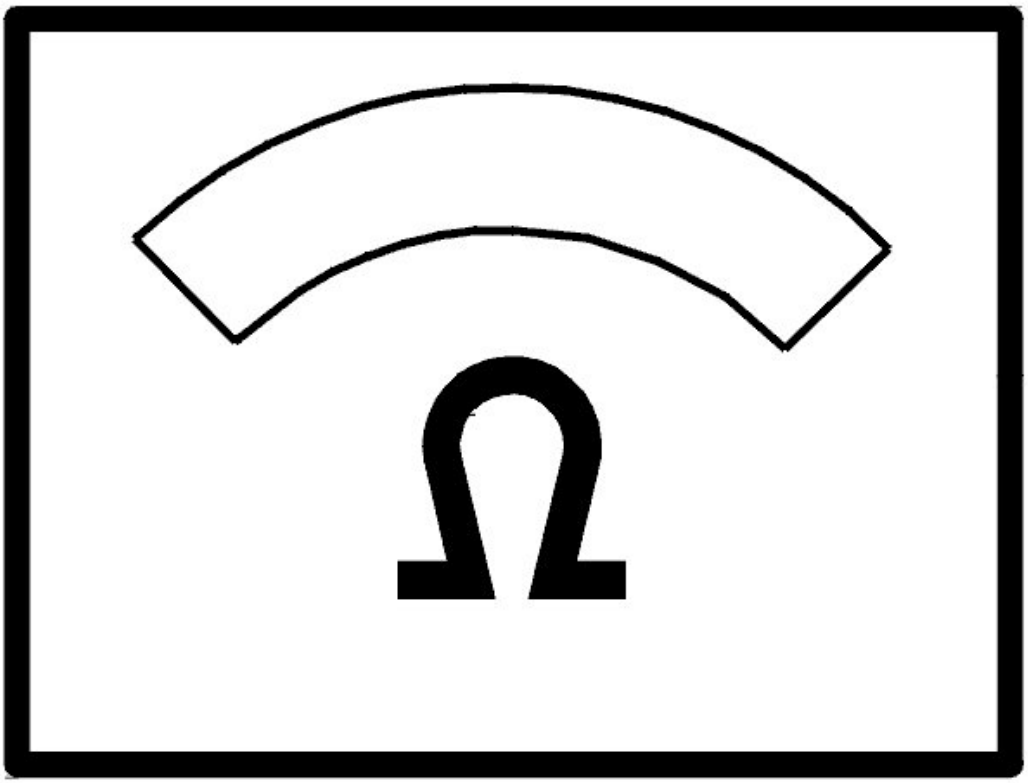
for diagnostic trouble code (DTC) SRS-0082

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

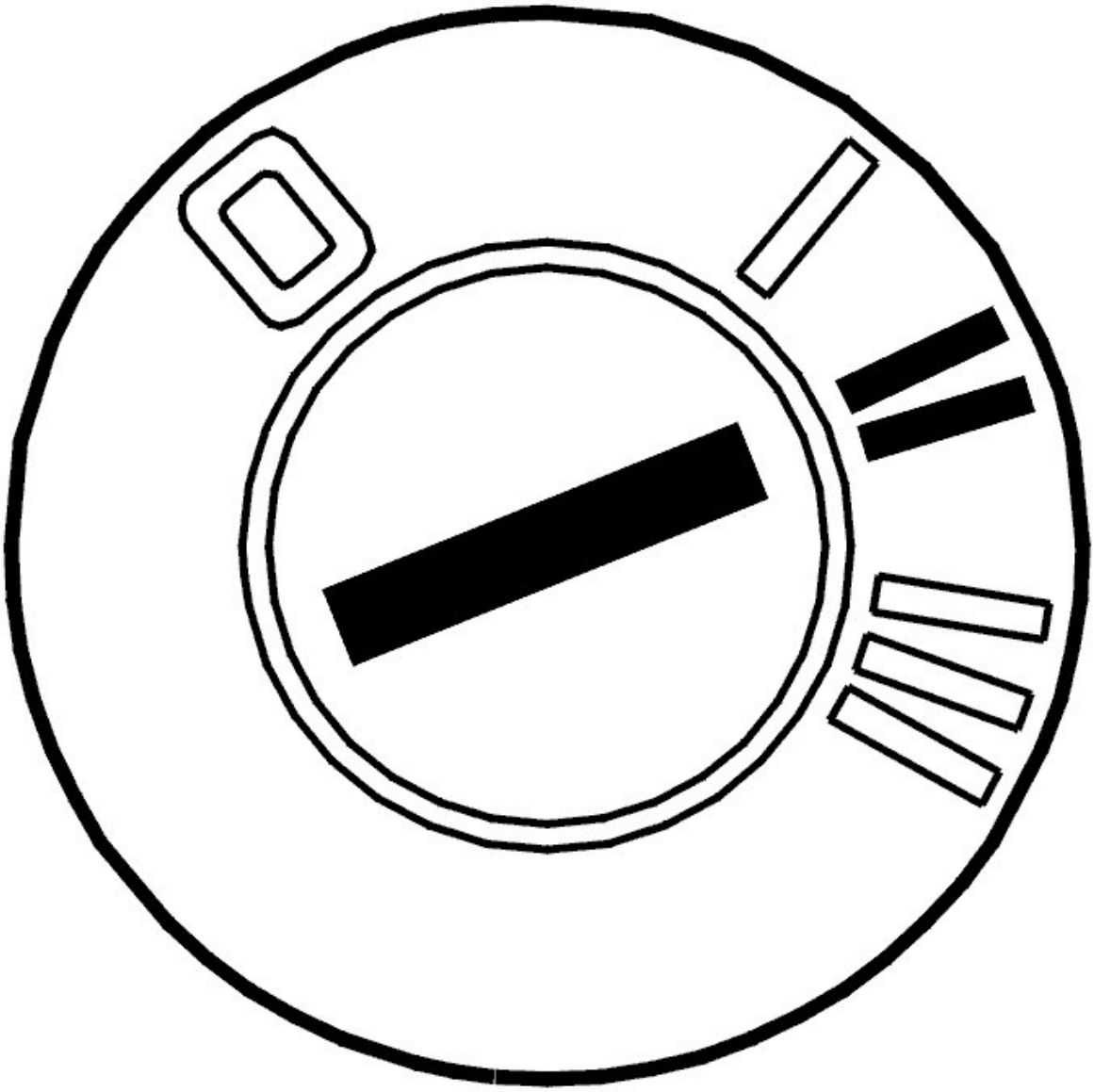
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

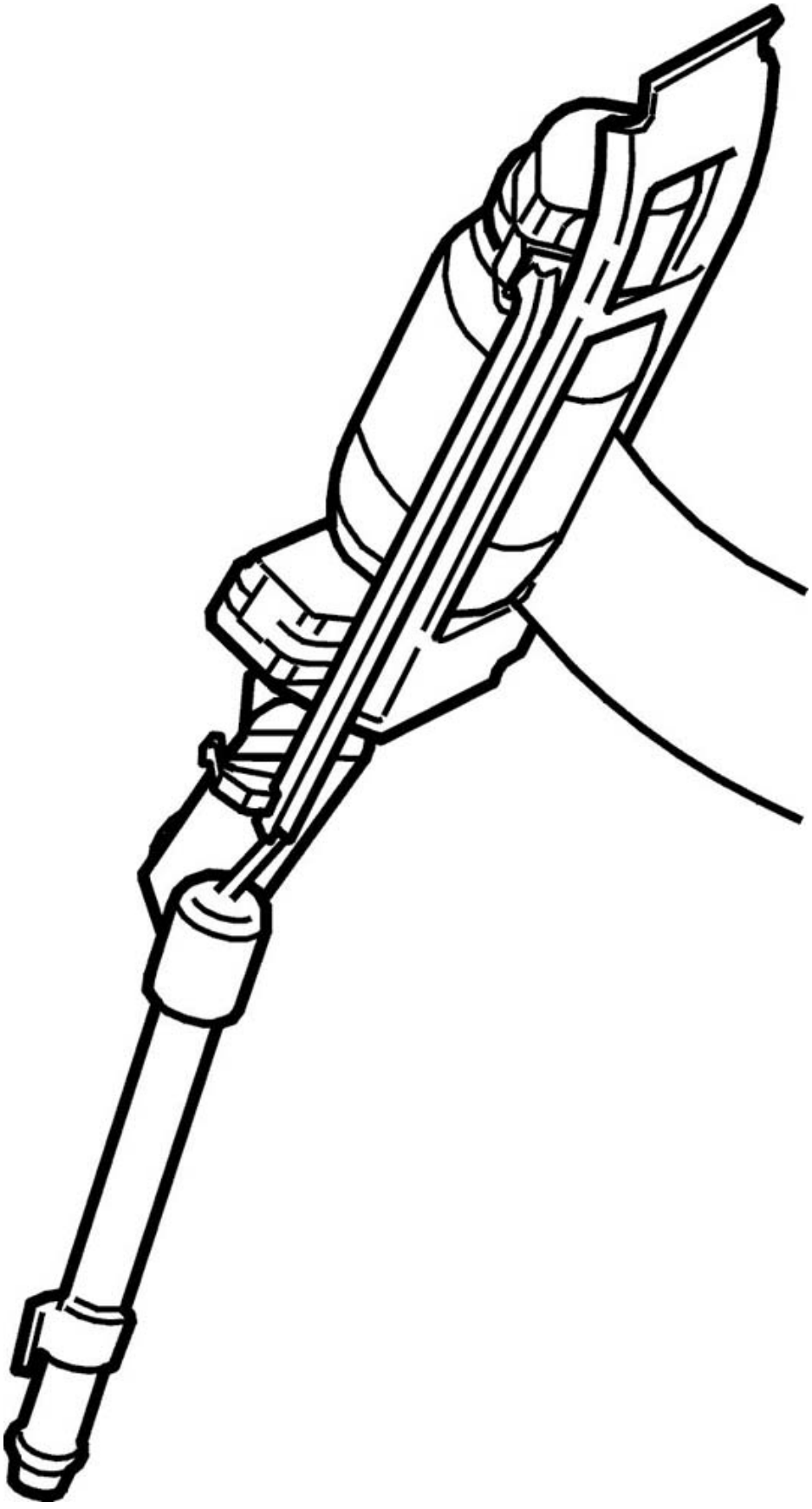
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0062 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0062 is displayed.

Substitute value
- Nothing.

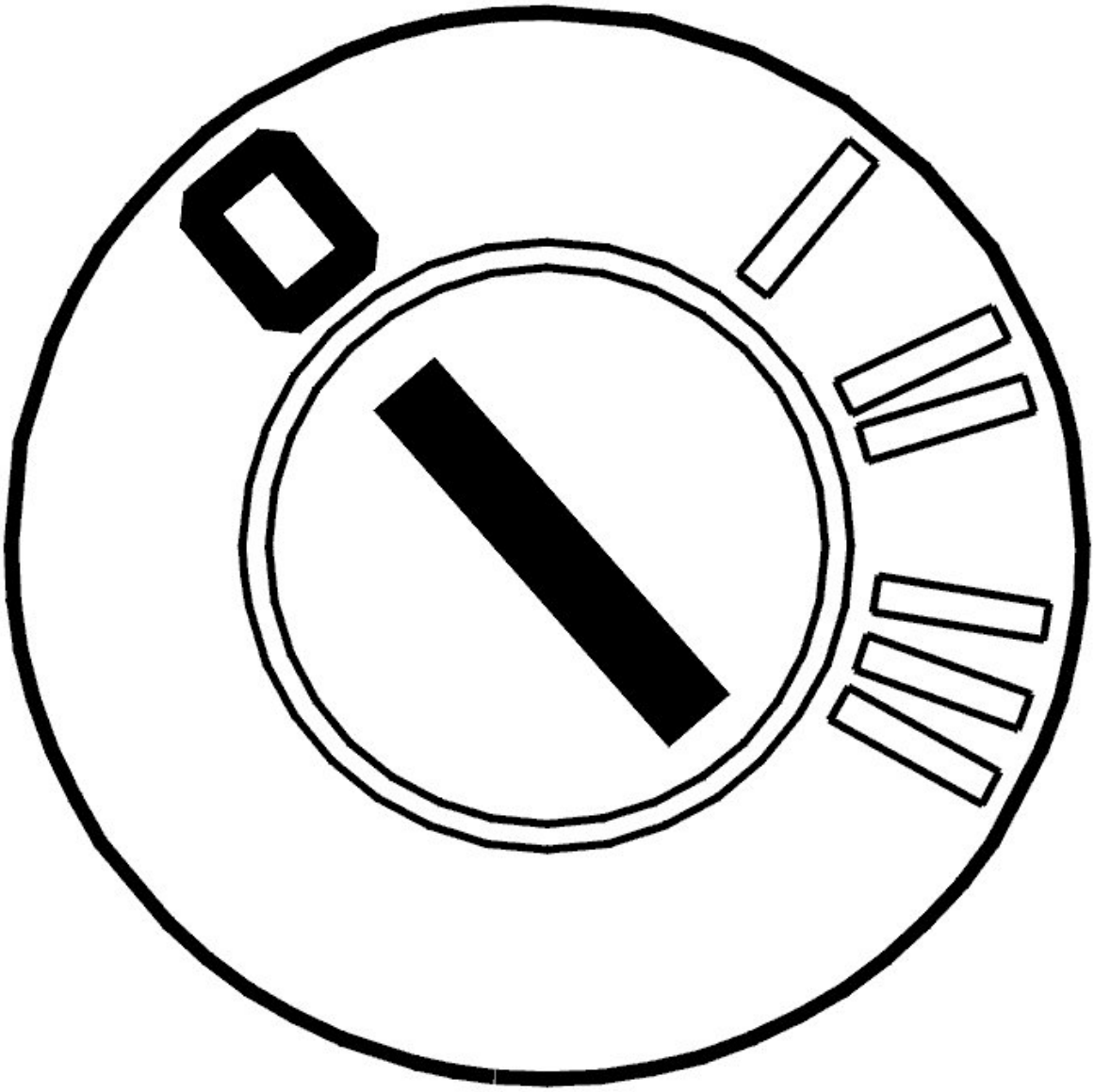
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

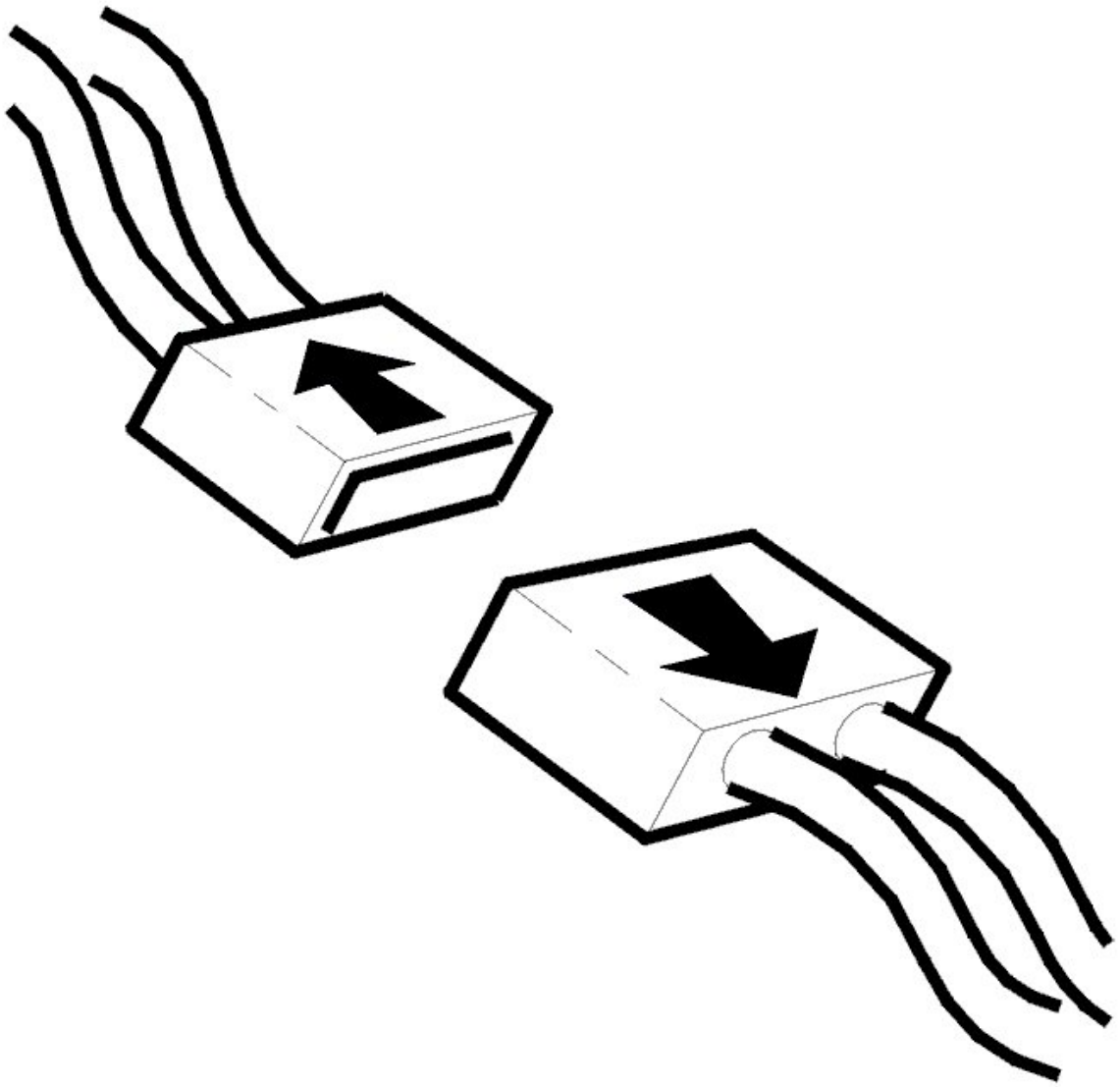
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A,

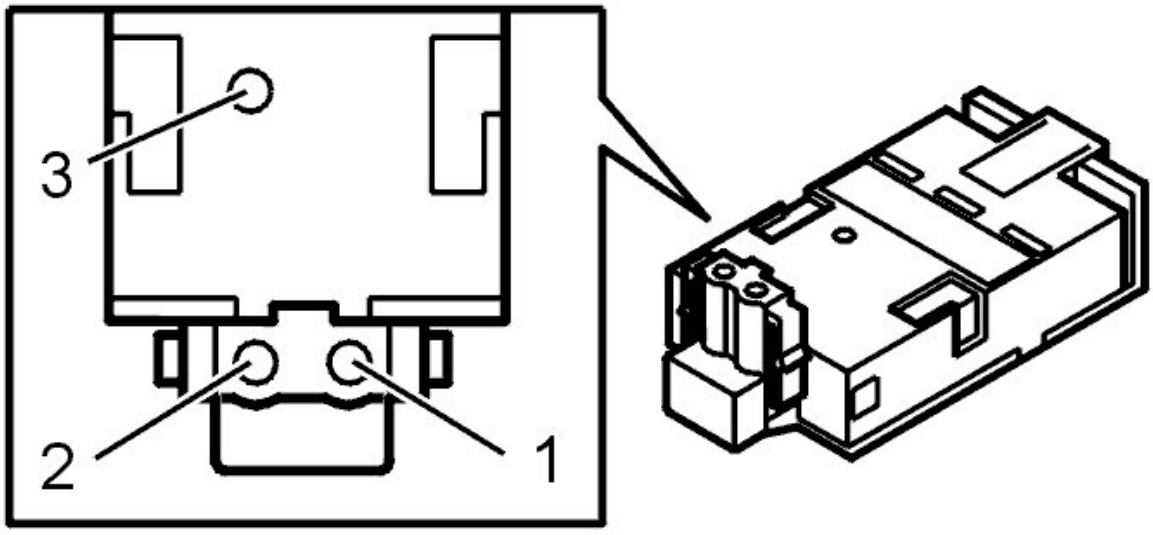
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

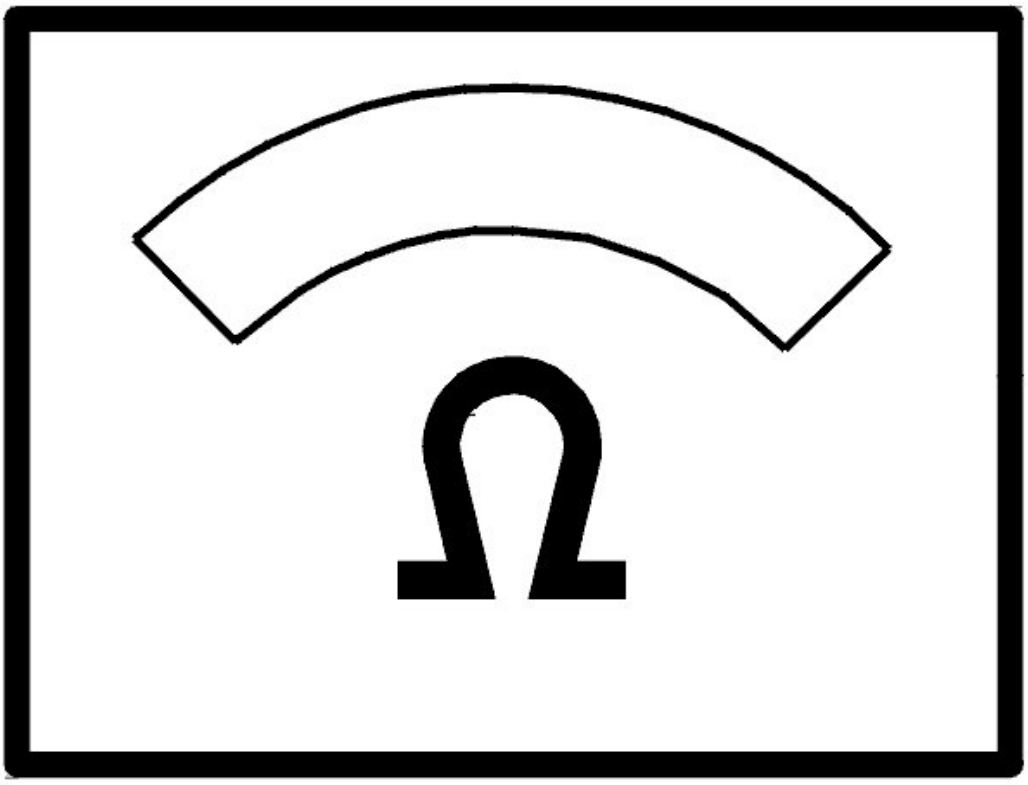
for diagnostic trouble code (DTC) SRS-0082,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

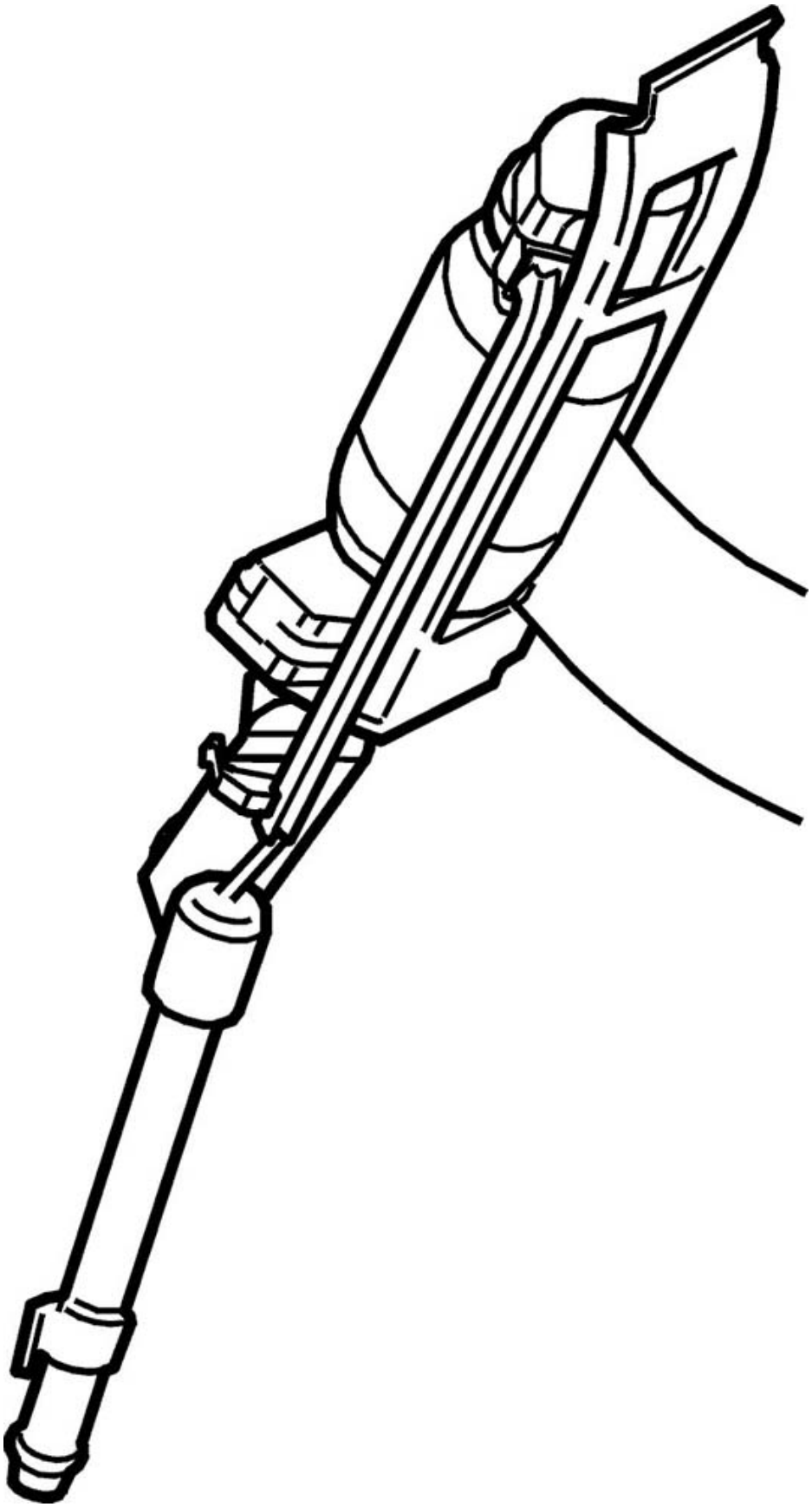
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0063 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0063 is displayed.

Substitute value

- Nothing.

Possible source

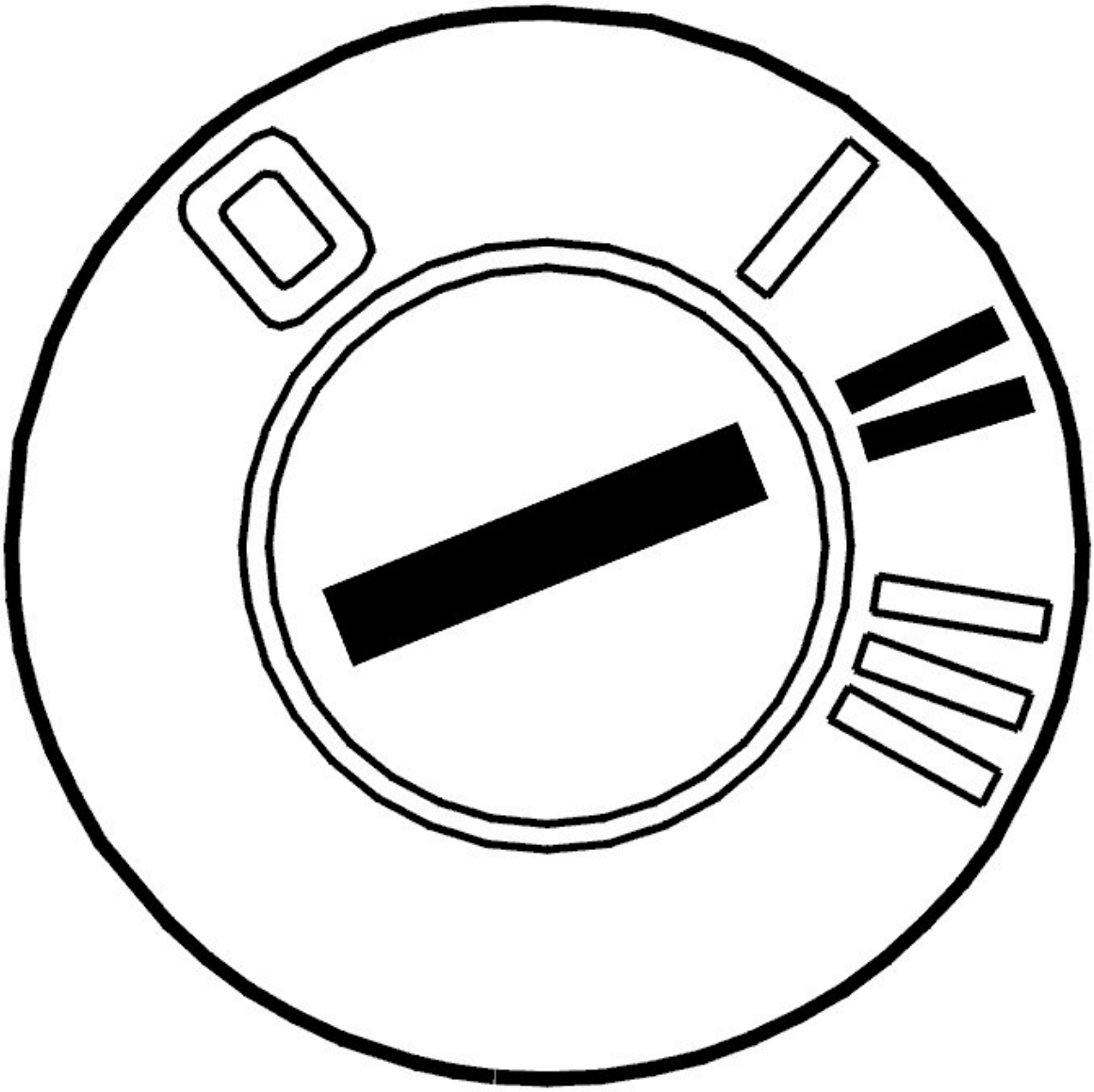
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

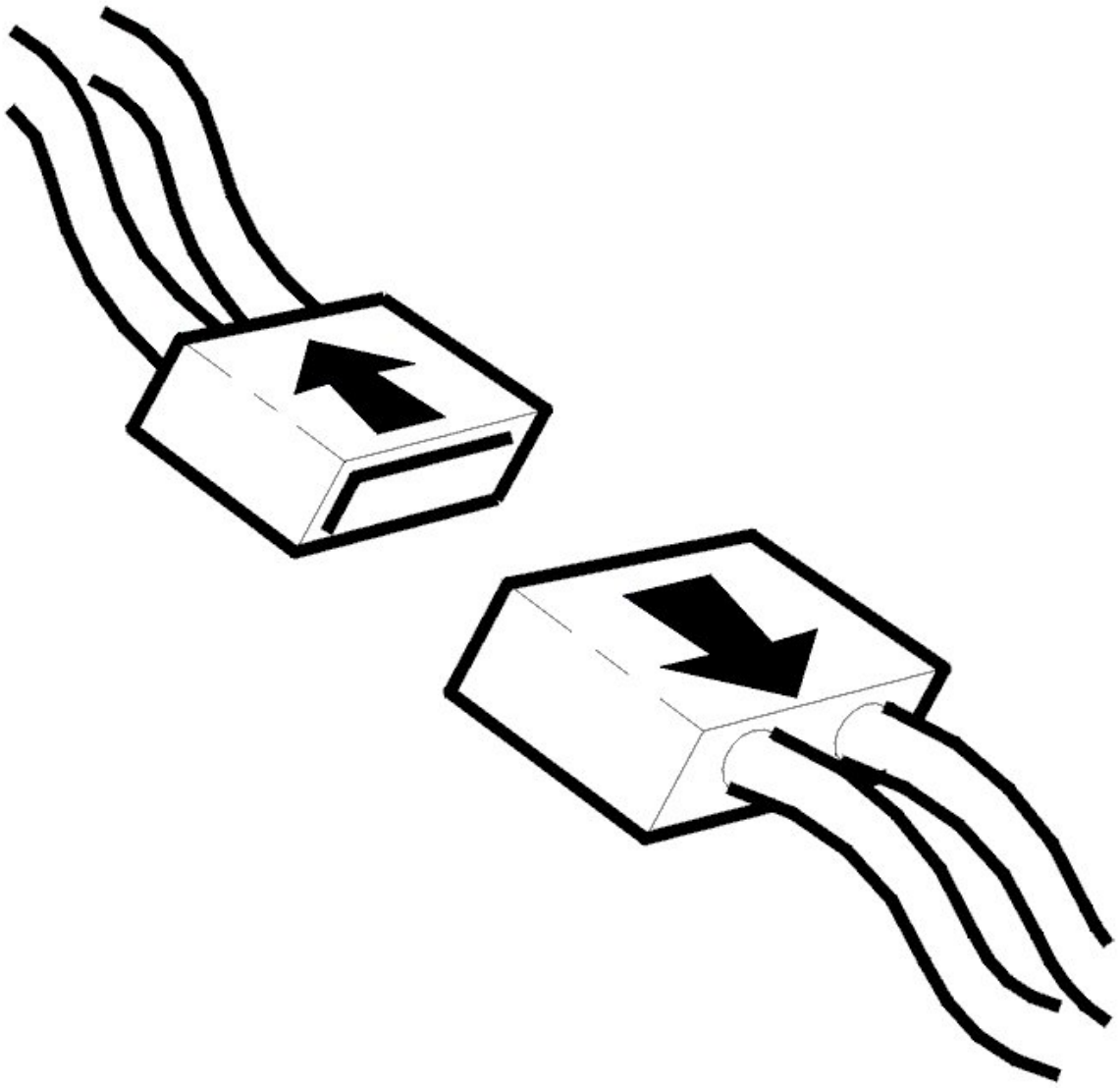
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

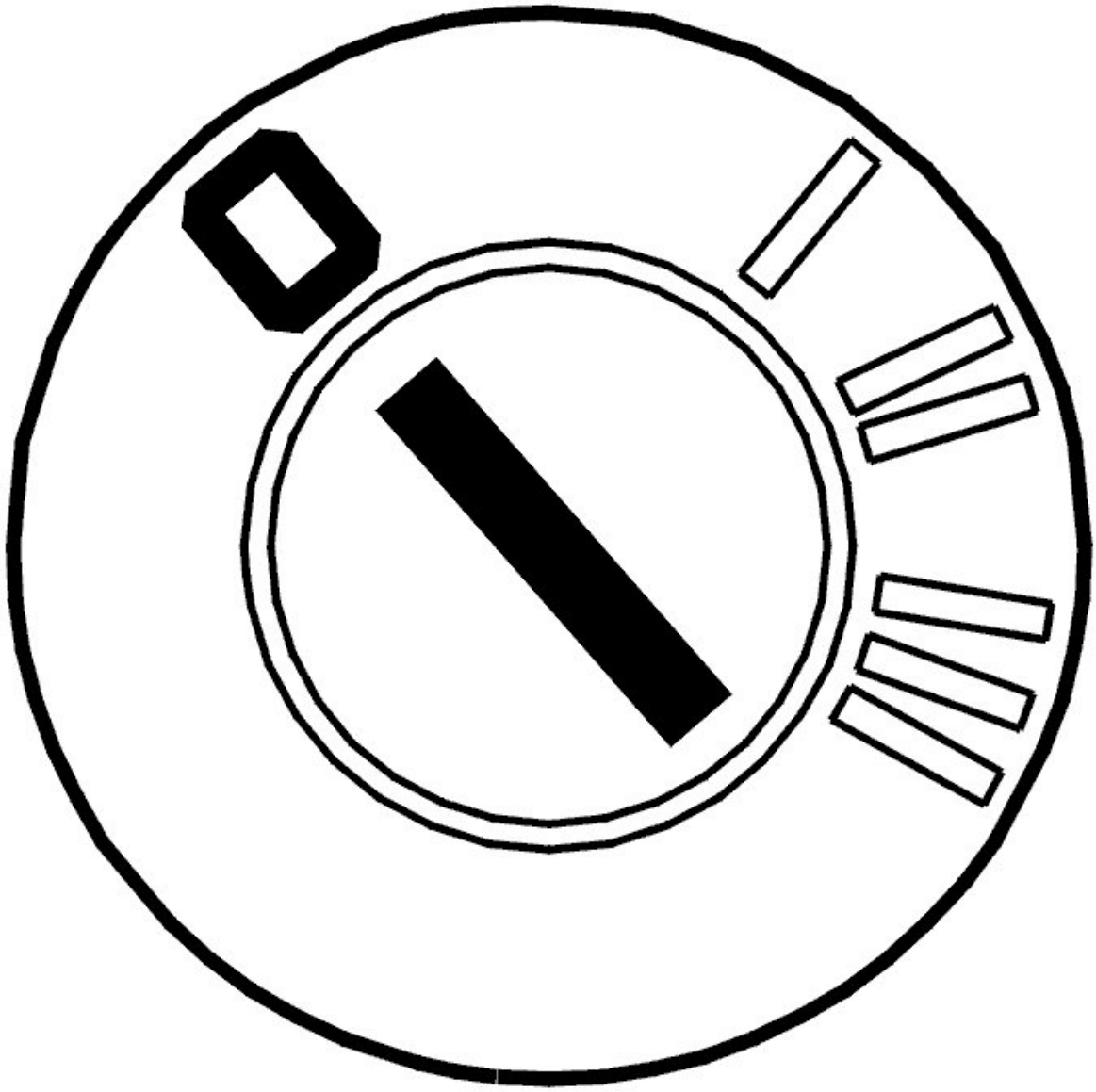
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0063,

front left seat belt tensioner terminals #5A(5) and #6A(6) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-006B,

front right seat belt tensioner terminals #5C(1) and #6C(2) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0073,

rear left seat belt tensioner terminals #16A(16) and #15A(15) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-007B,

centre rear seat belt tensioner terminals 17A(17) and #18A(18) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0083,

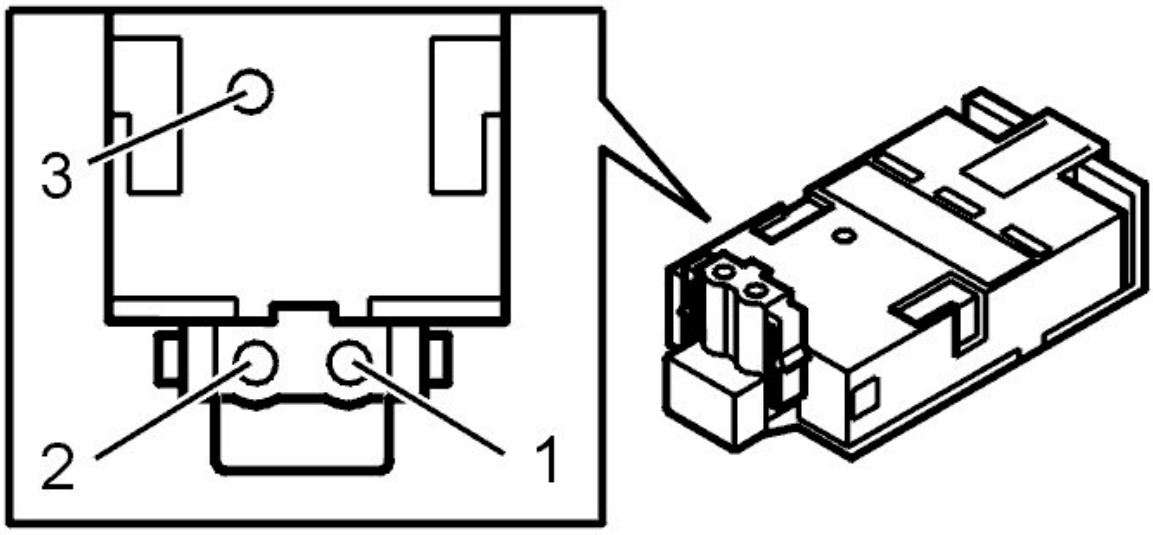
rear right seat belt tensioner terminals #16C(12) and #15C(11) and connector terminals #1 and #3
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

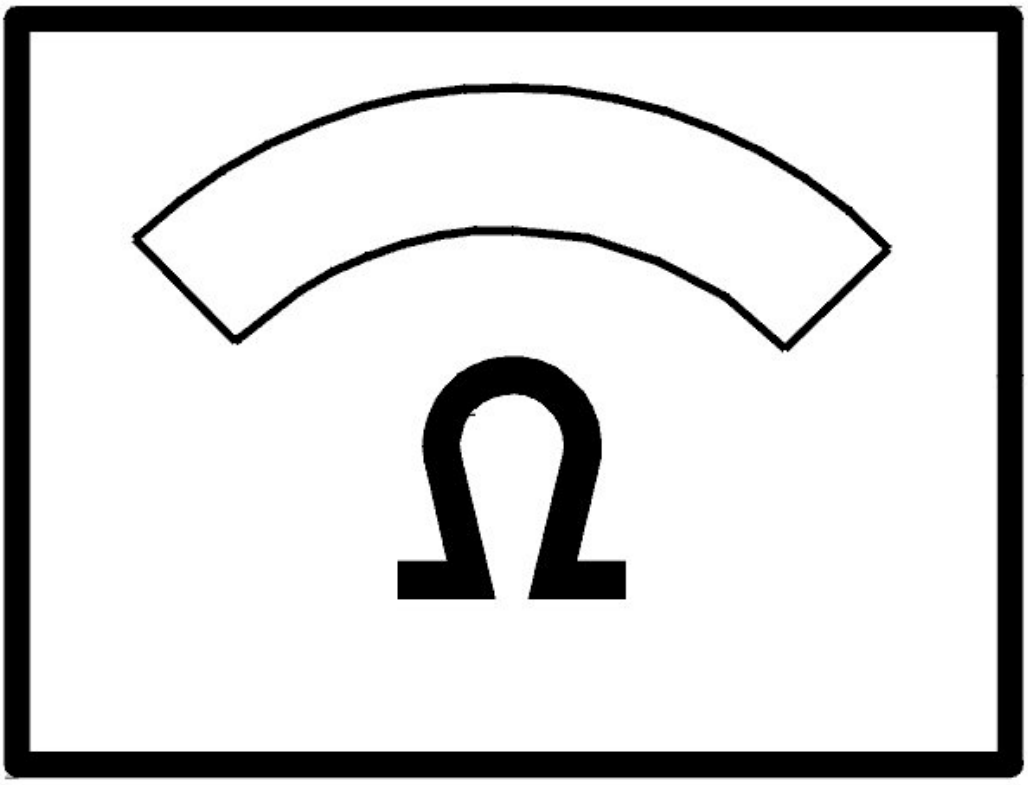
Hint: Checking the integrated capacitor in the igniter connector by taking resistance measurements.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

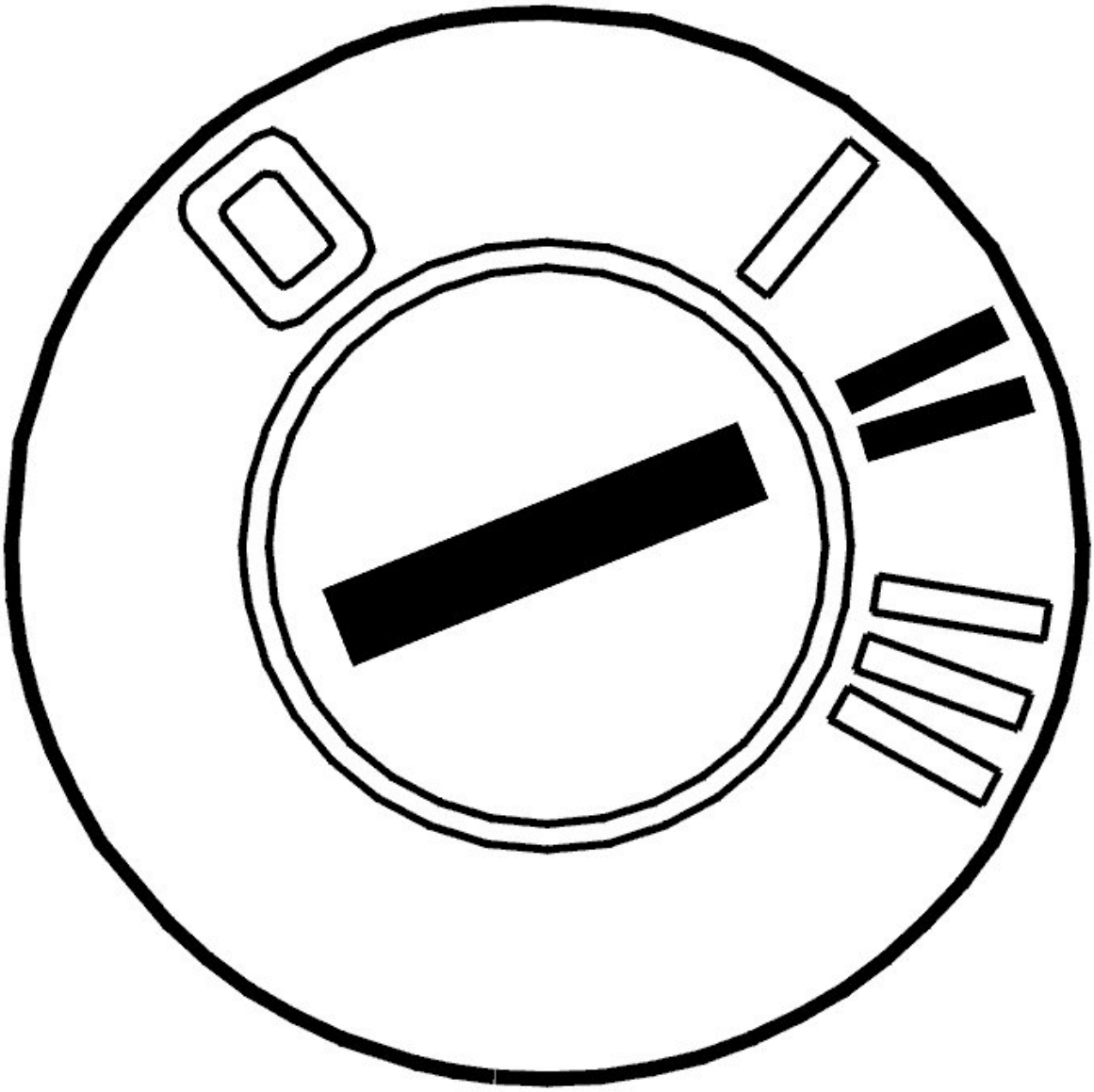
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

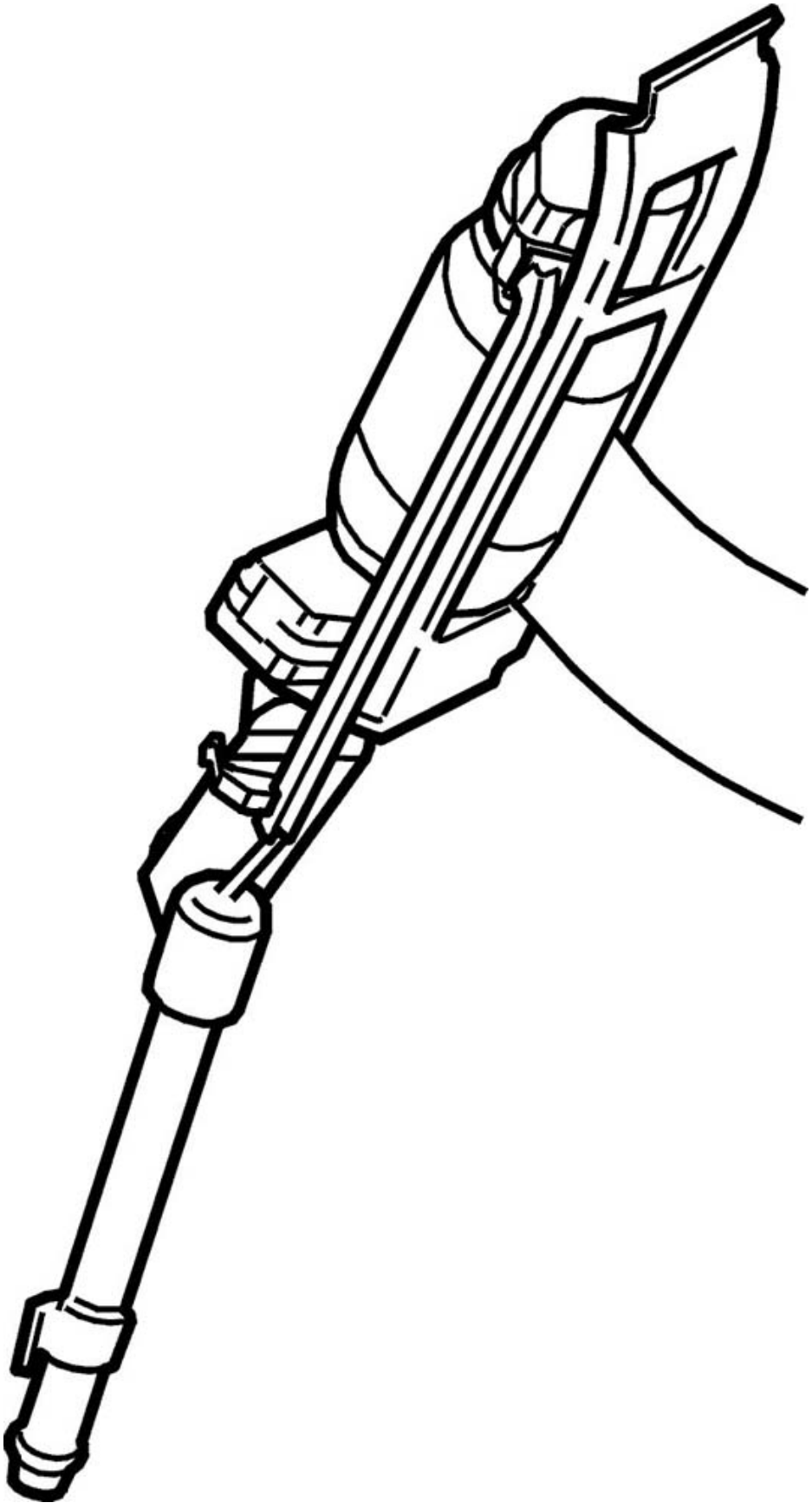
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0063 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0063 is displayed.

Substitute value
- Nothing.

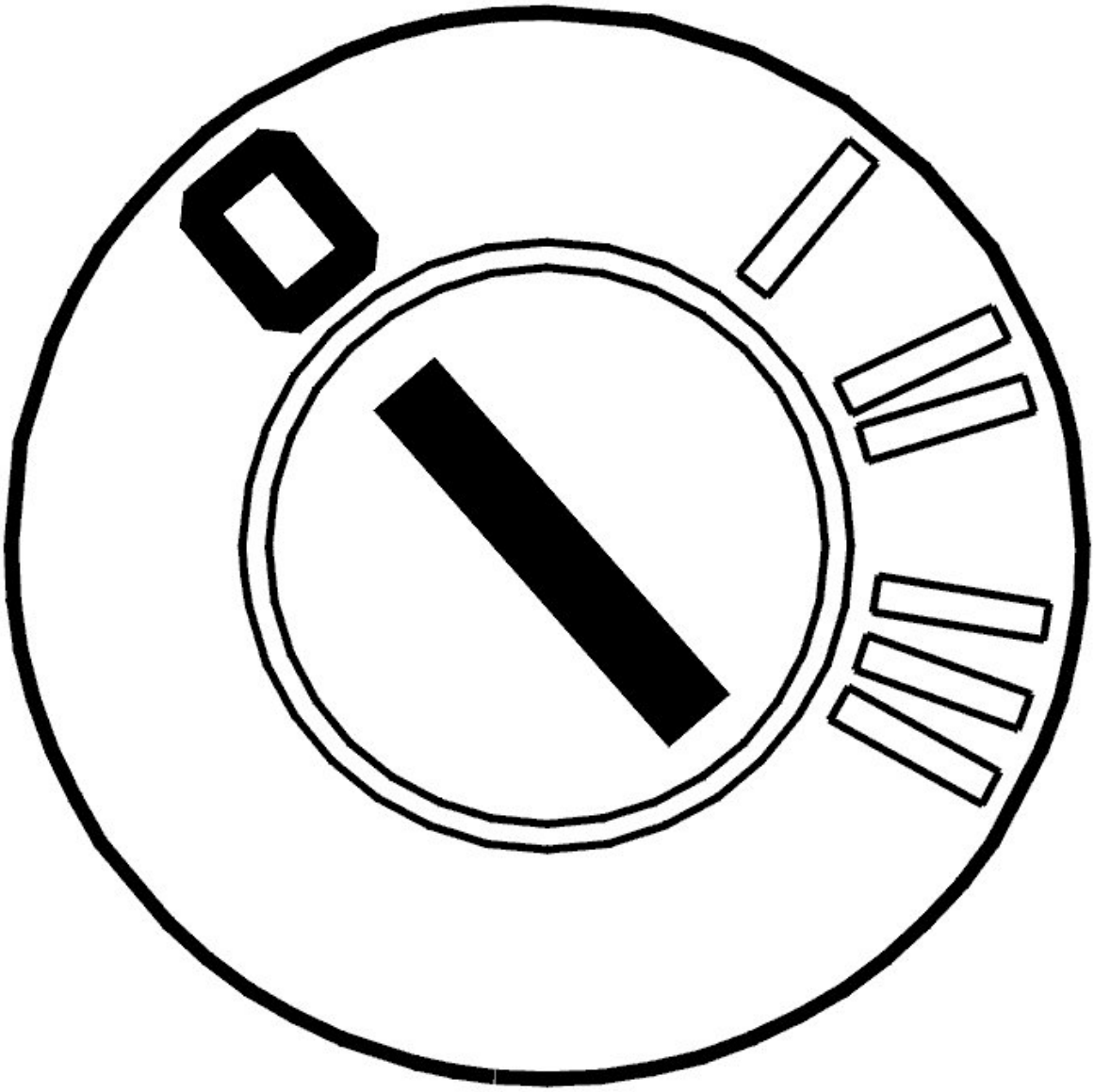
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0063,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006B,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0073,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007B,

terminals #17A(17), #18A(18) of the centre rear seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0083,

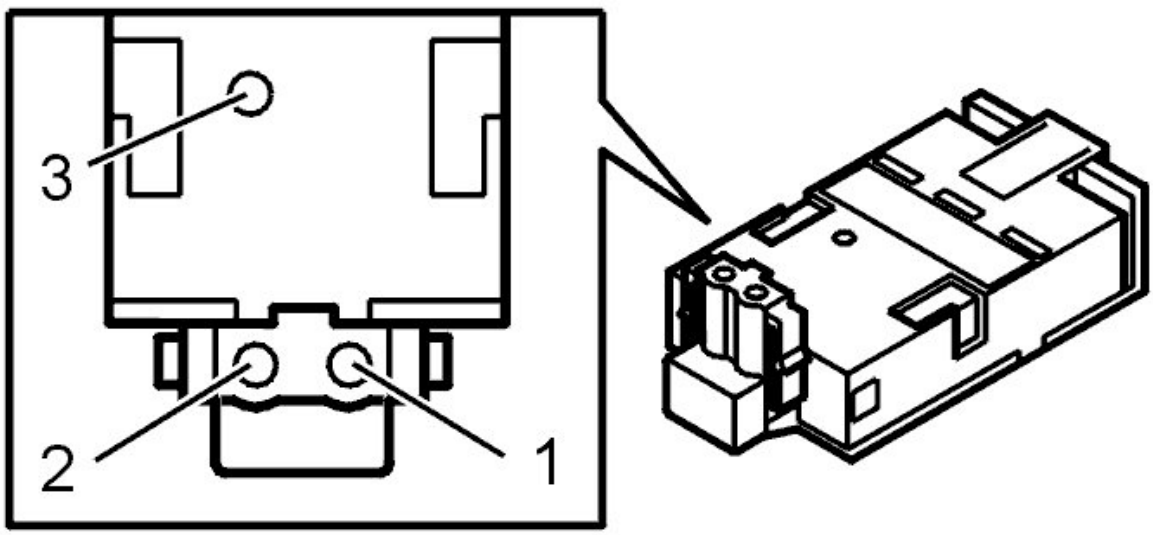
terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

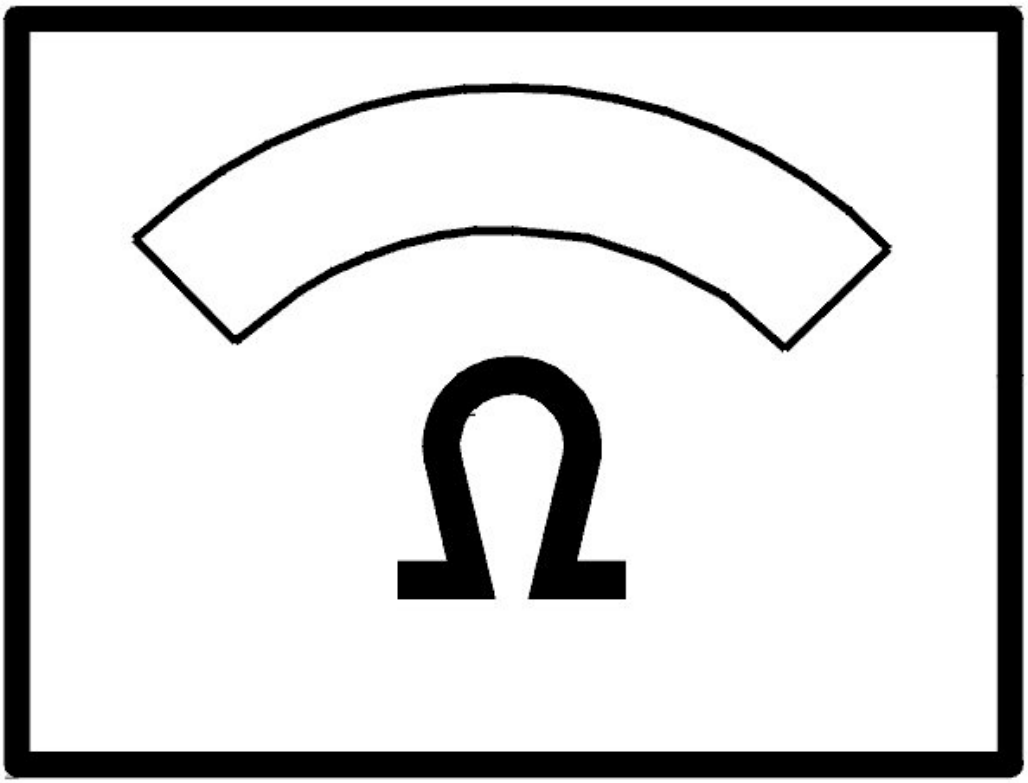
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

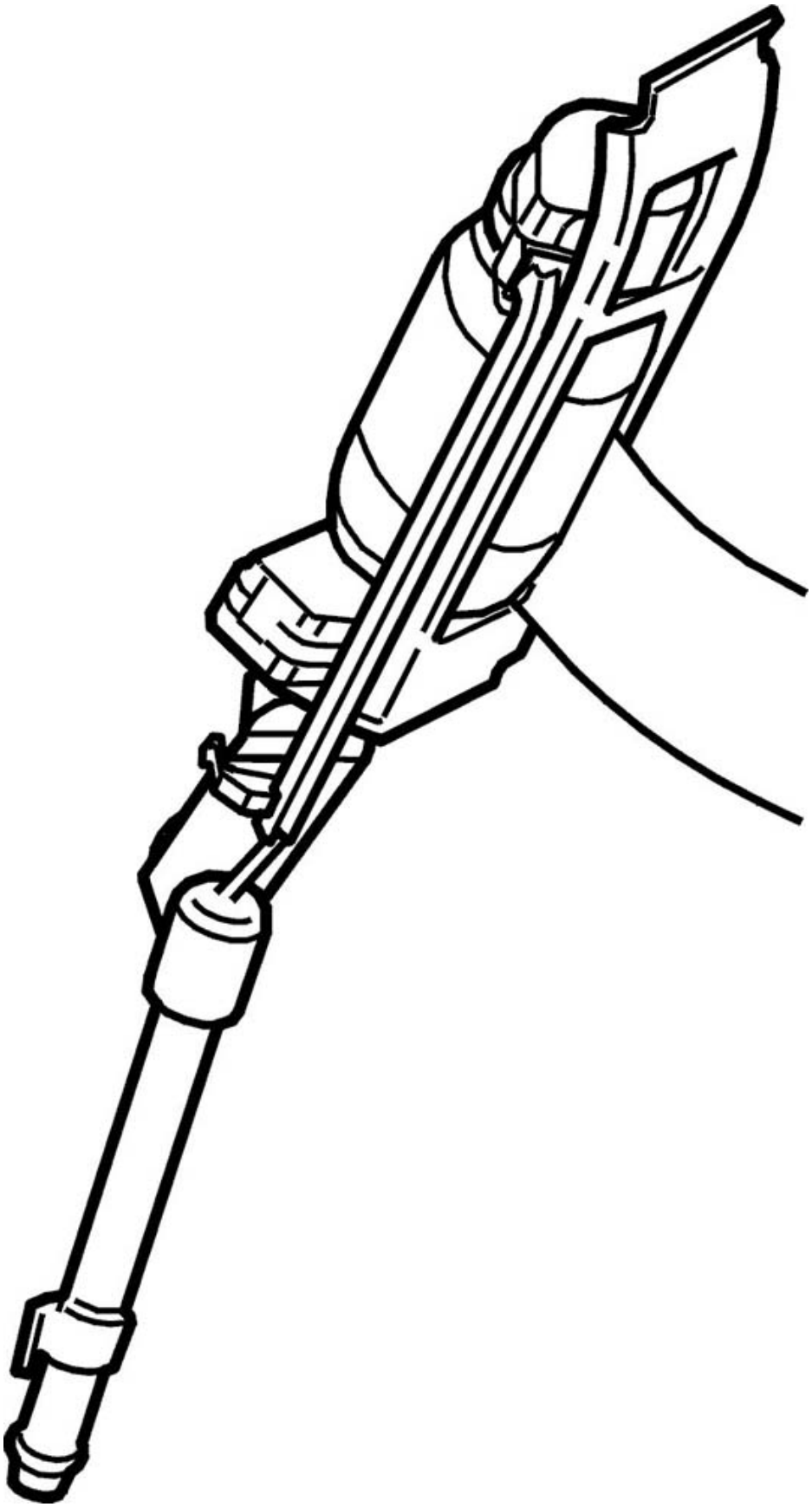
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0064

Condition



The diagnostic trouble code (DTC) is stored if the resistance is too high in the circuit for longer than 10 seconds.

Substitute value

- None.

Possible source

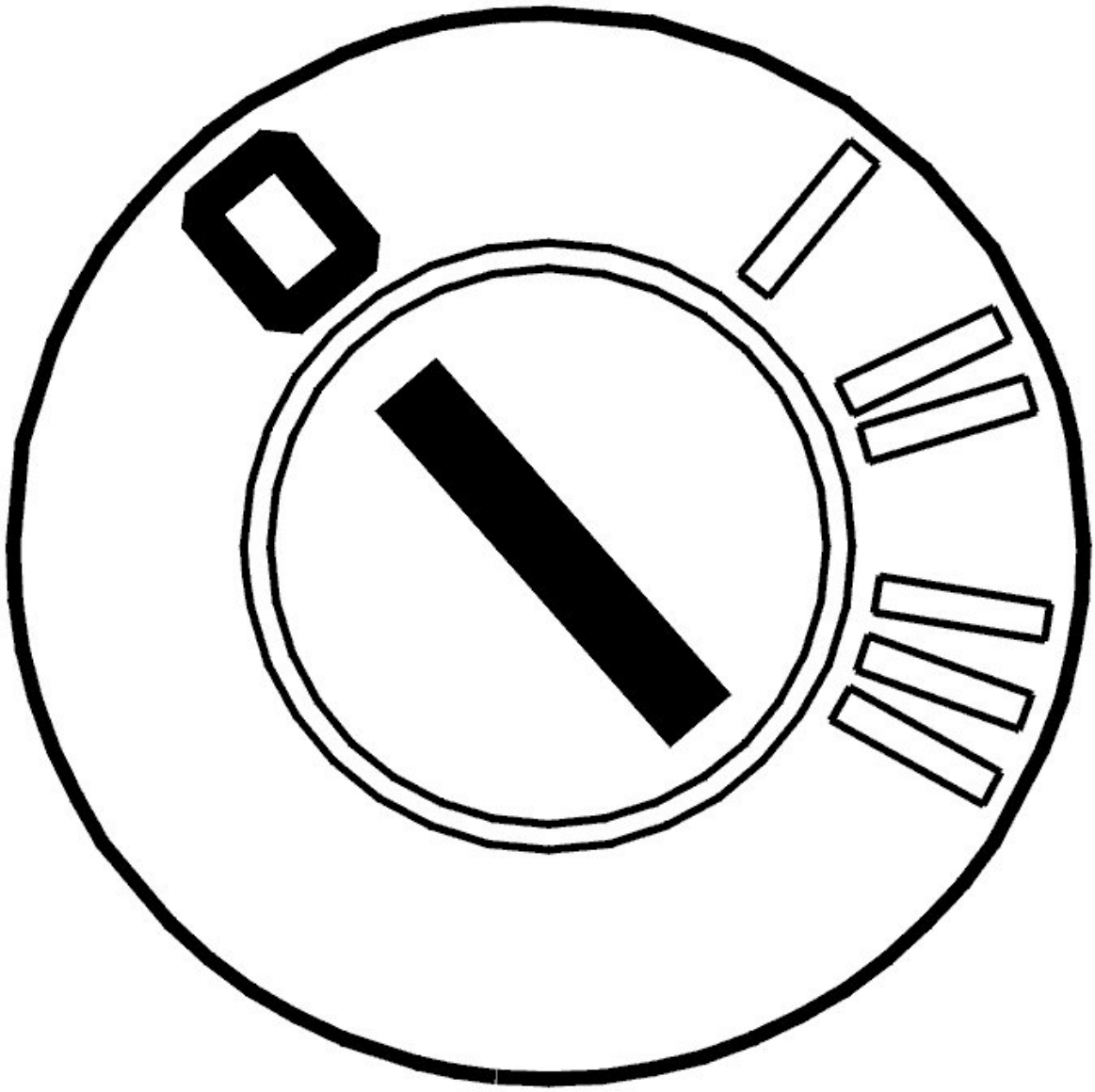
- Contact resistance or an open-circuit in the cable between the seat belt tensioner and the supplemental restraint system module (SRS).
- Open-circuit in the seat belt tensioner (the resistance is too high in the igniter).

Fault symptom[s]
- SRS warning light on

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

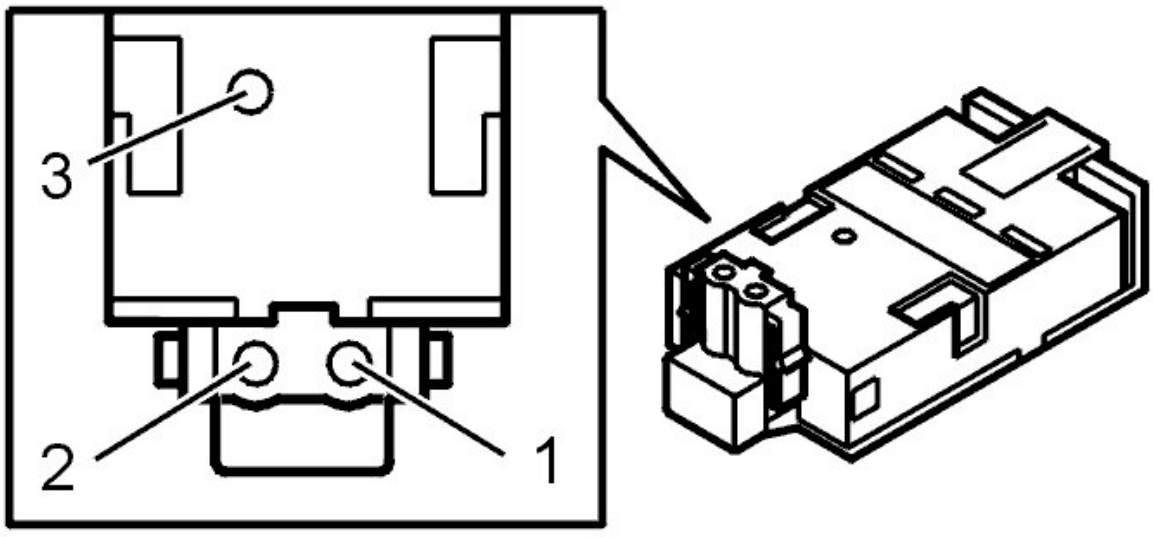
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

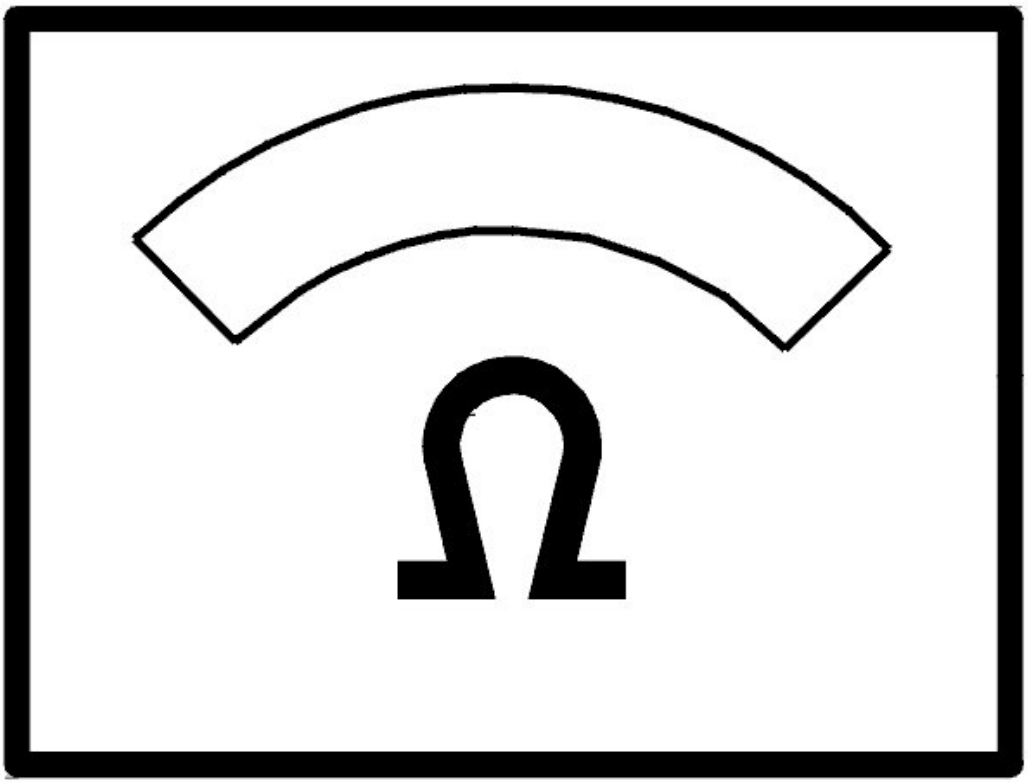
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

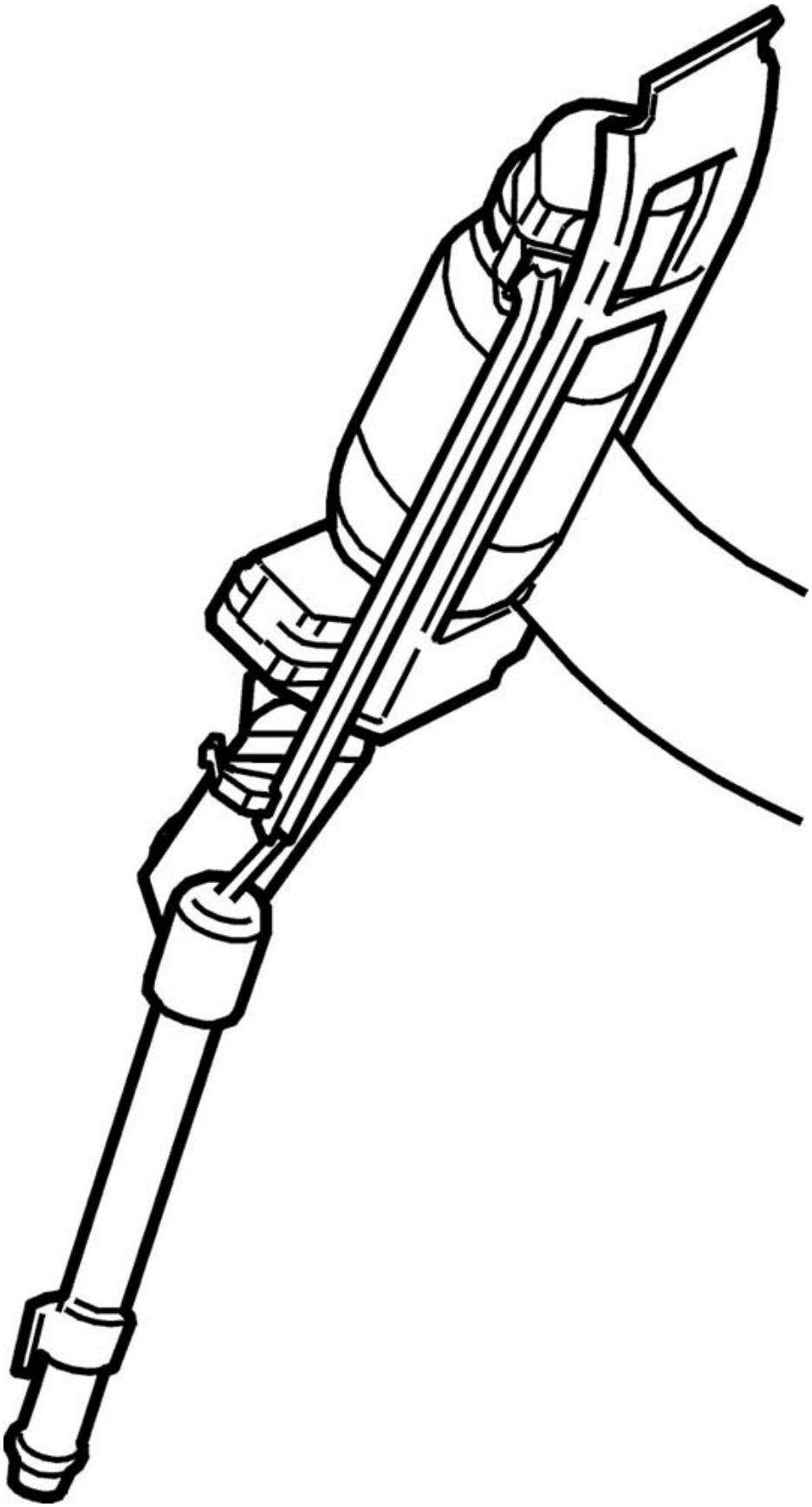
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0064

Condition



The diagnostic trouble code (DTC) is stored if the resistance is too high in the circuit for longer than 10 seconds.

Substitute value

- None.

Possible source

- Contact resistance or an open-circuit in the cable between the seat belt tensioner and the supplemental restraint system module (SRS).
- Open-circuit in the seat belt tensioner (the resistance is too high in the igniter).

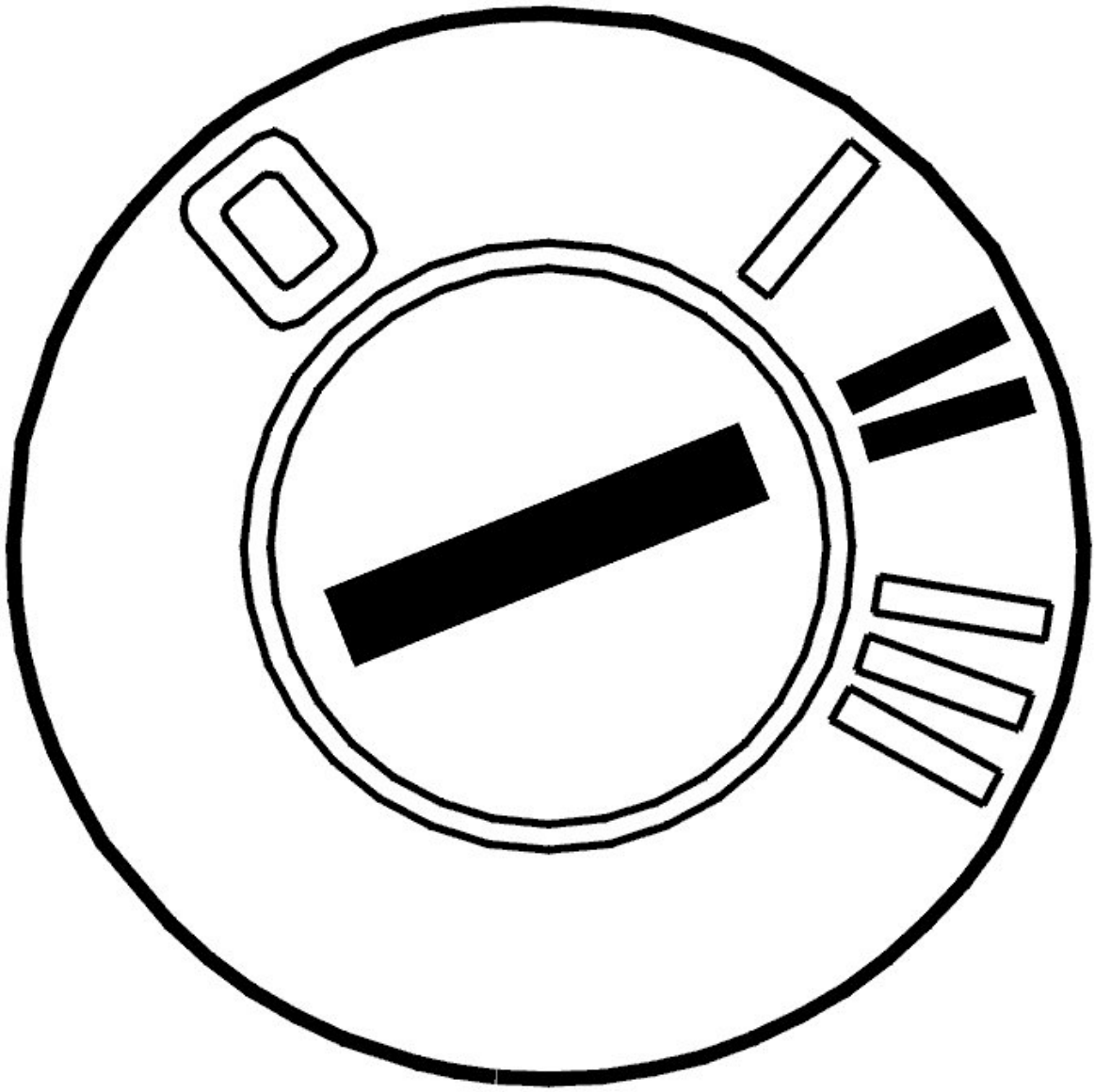
Fault symptom[s]

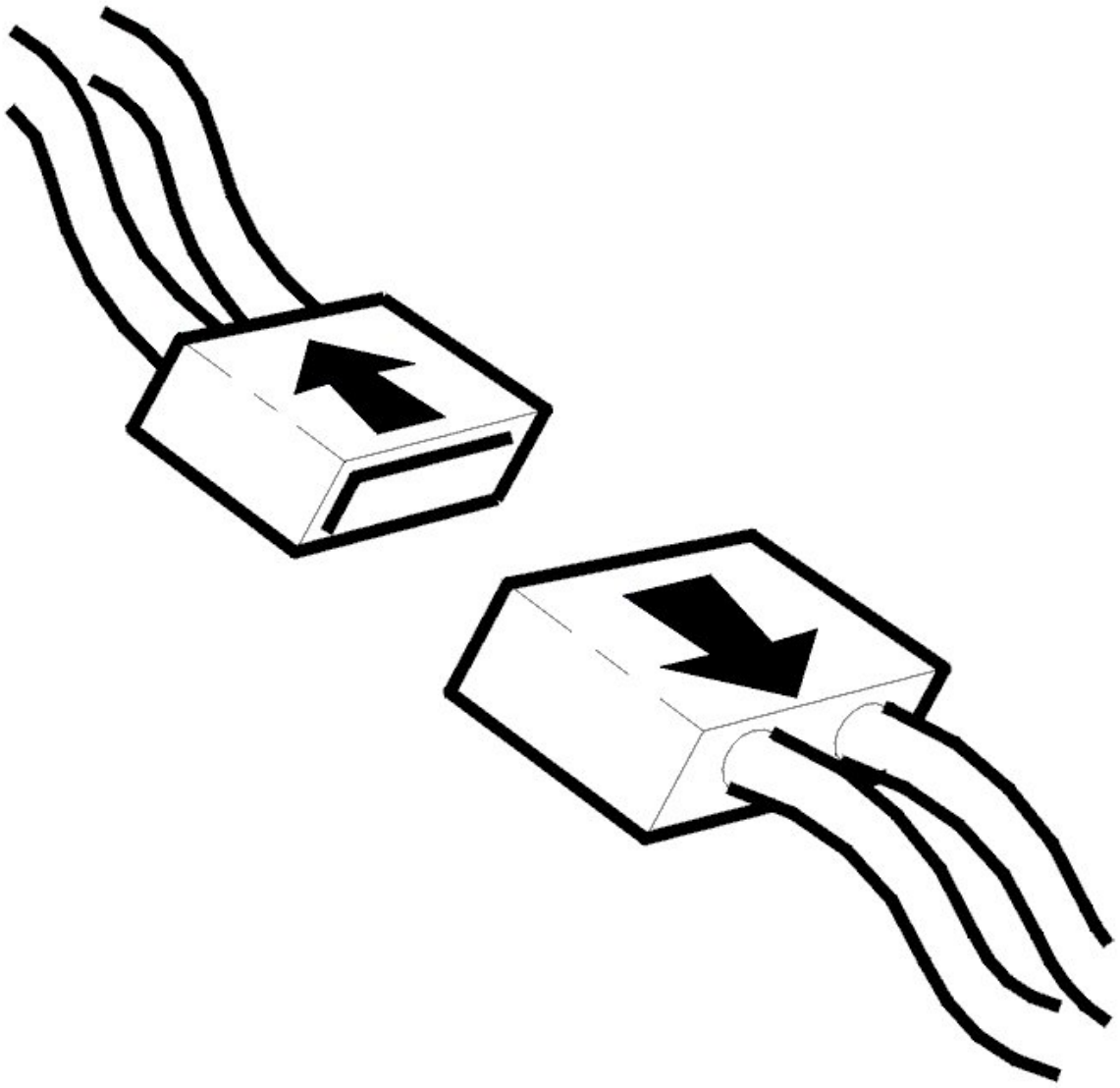
- SRS warning light on

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

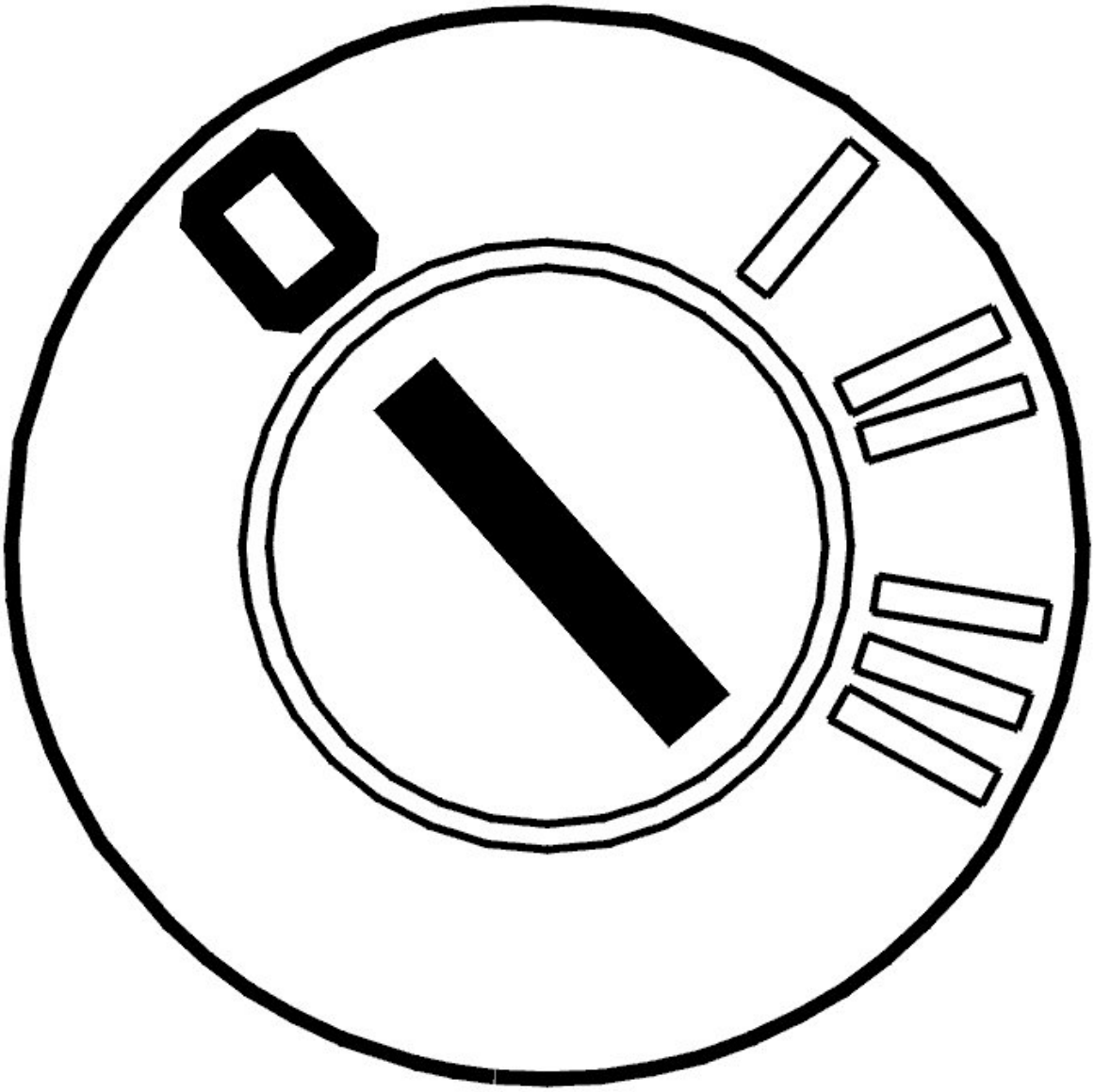
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

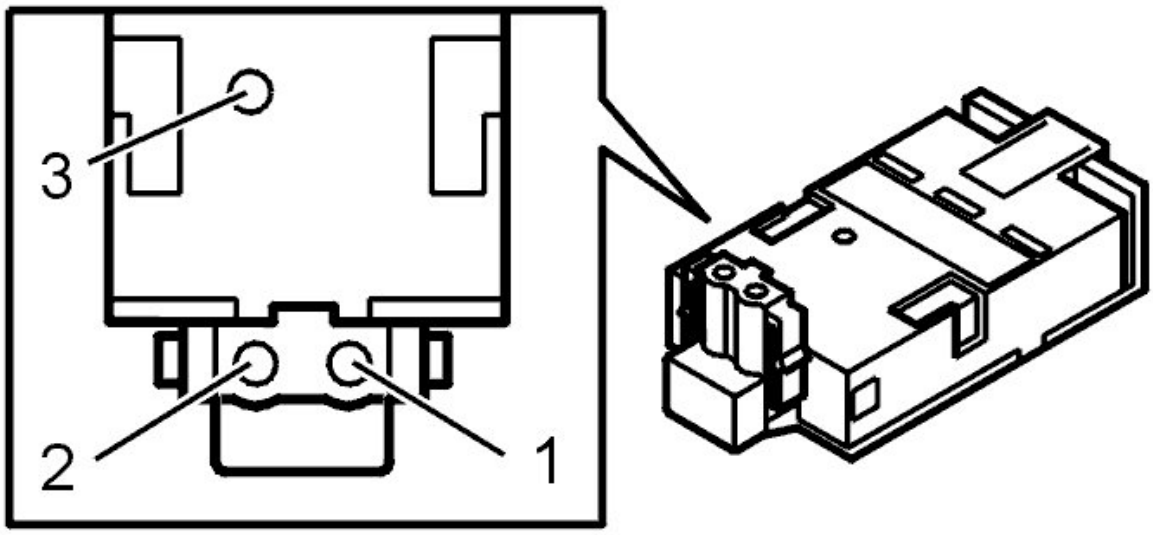
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

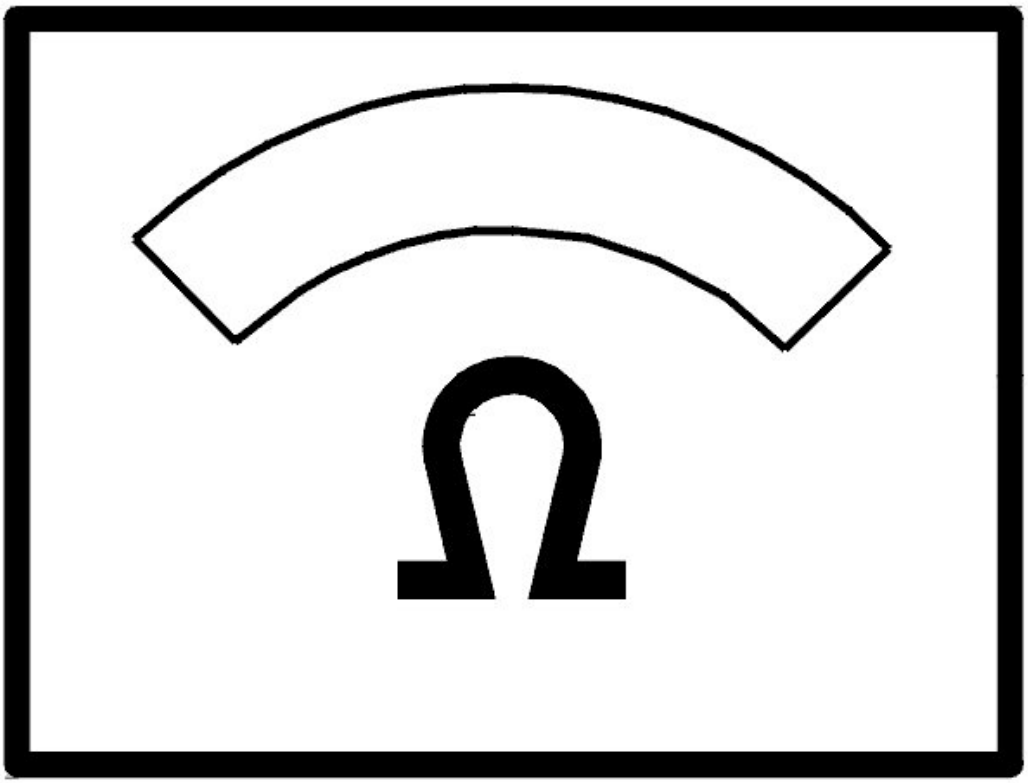
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

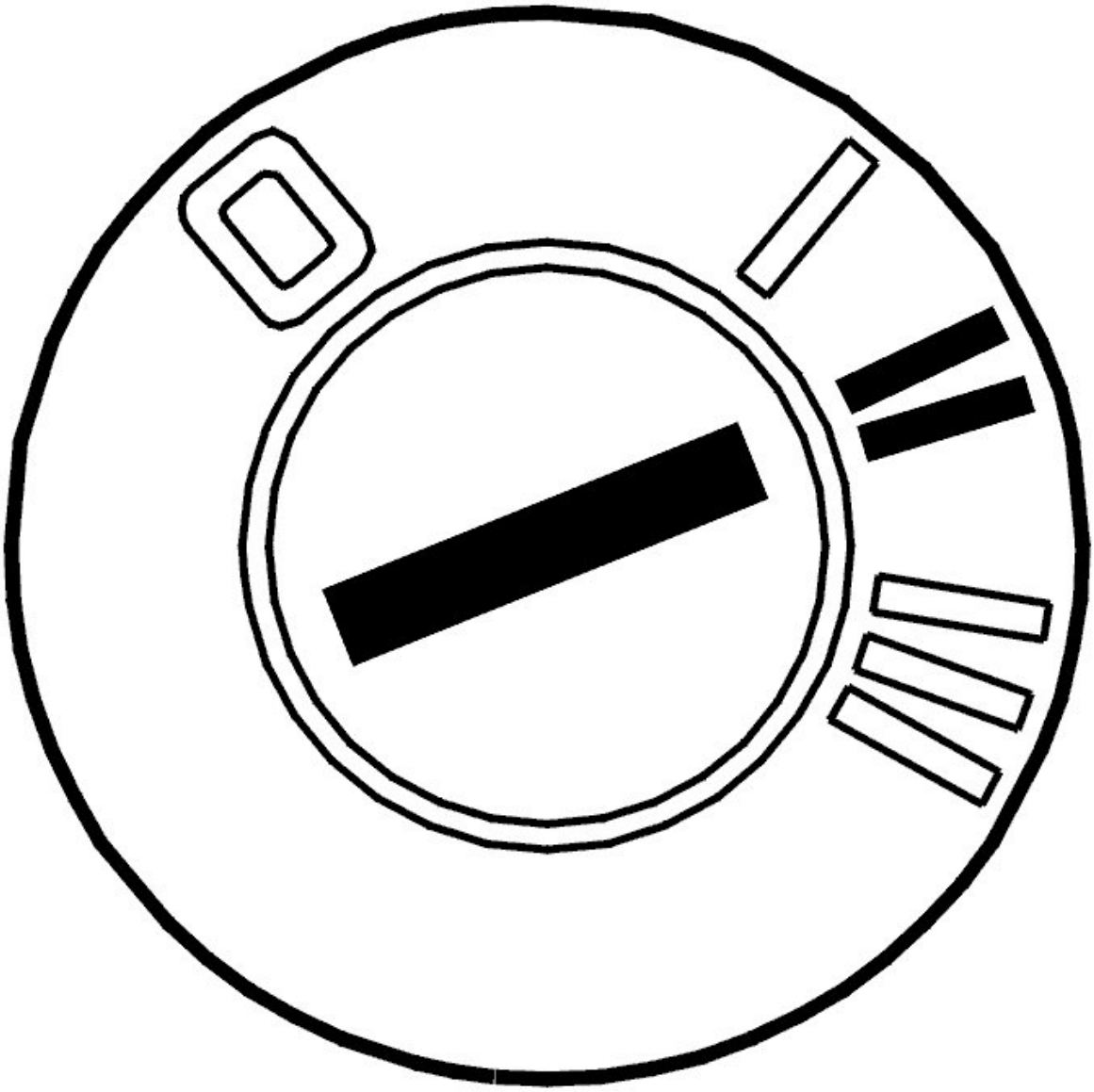
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

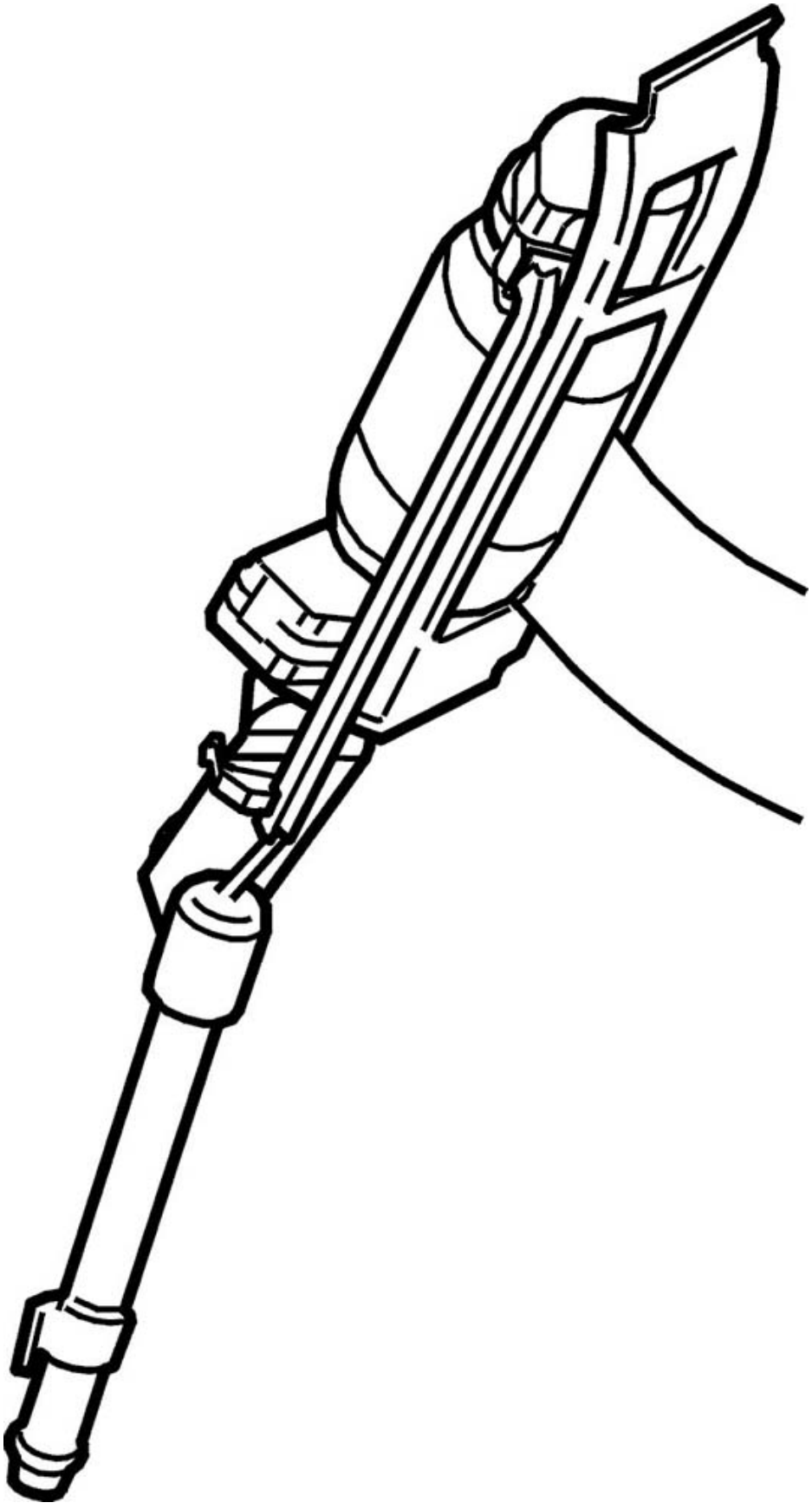
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0065 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0065 is displayed.

Substitute value
- Nothing.

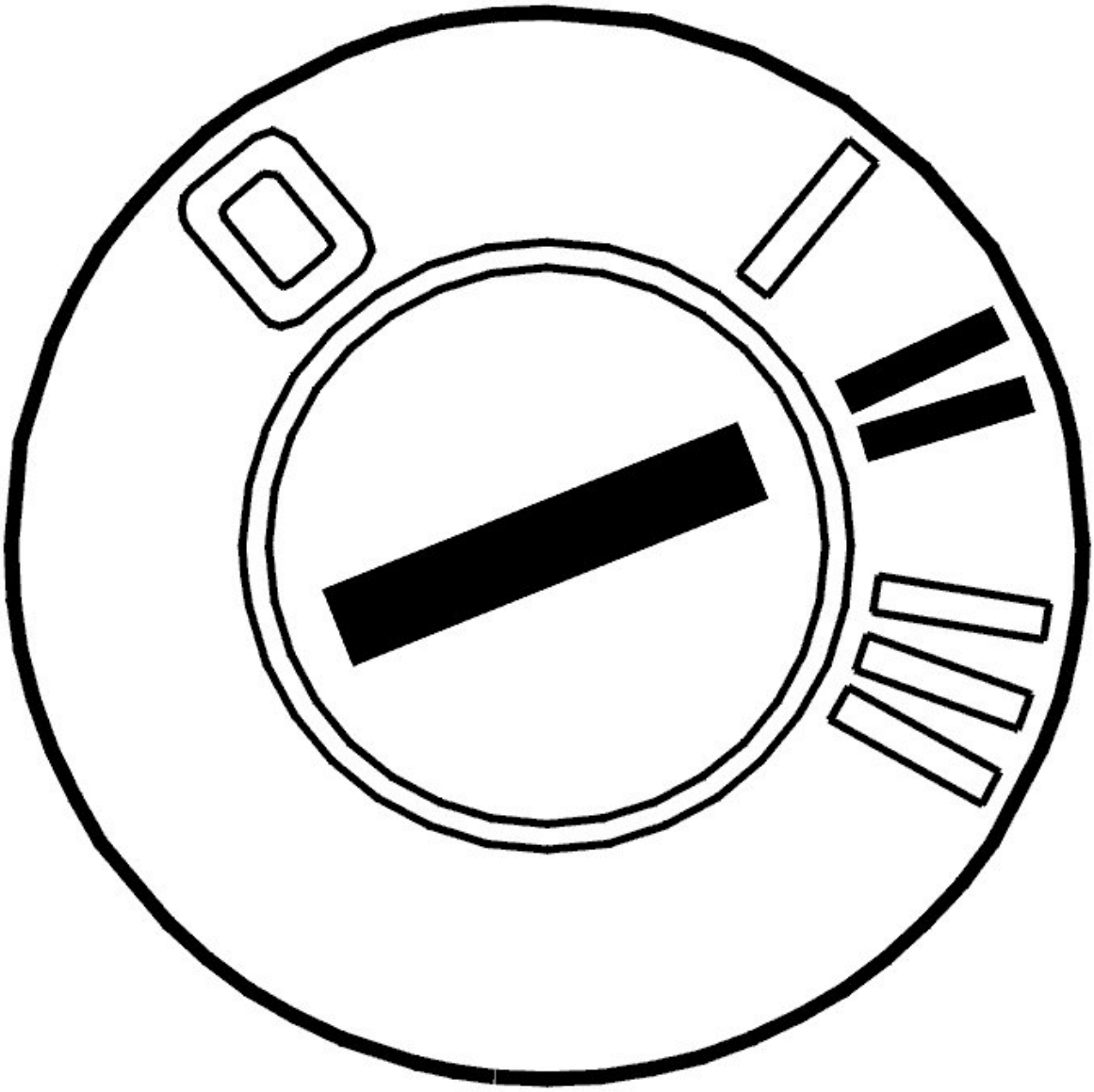
Possible source
- Short circuit in the connector or in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

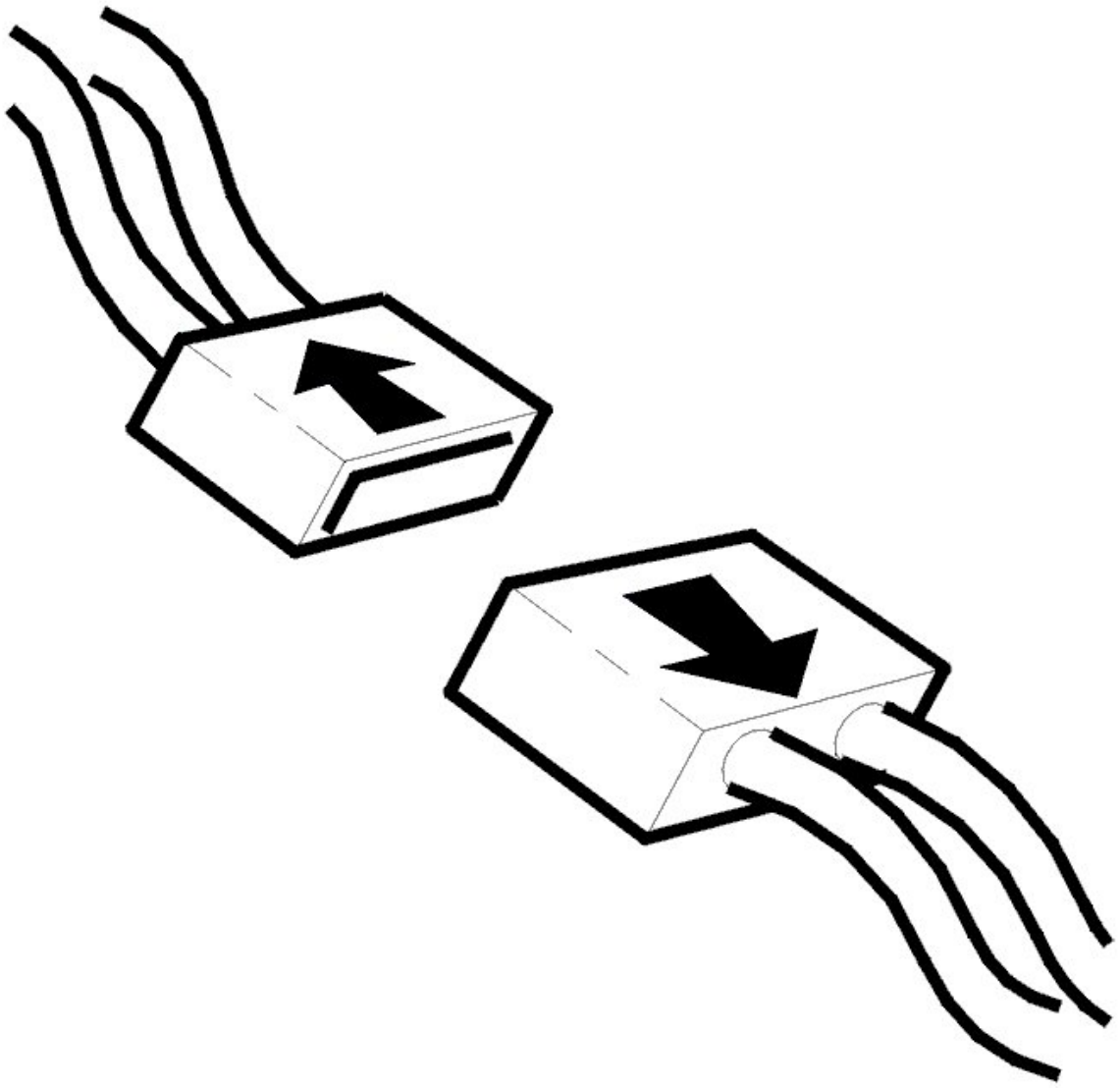
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

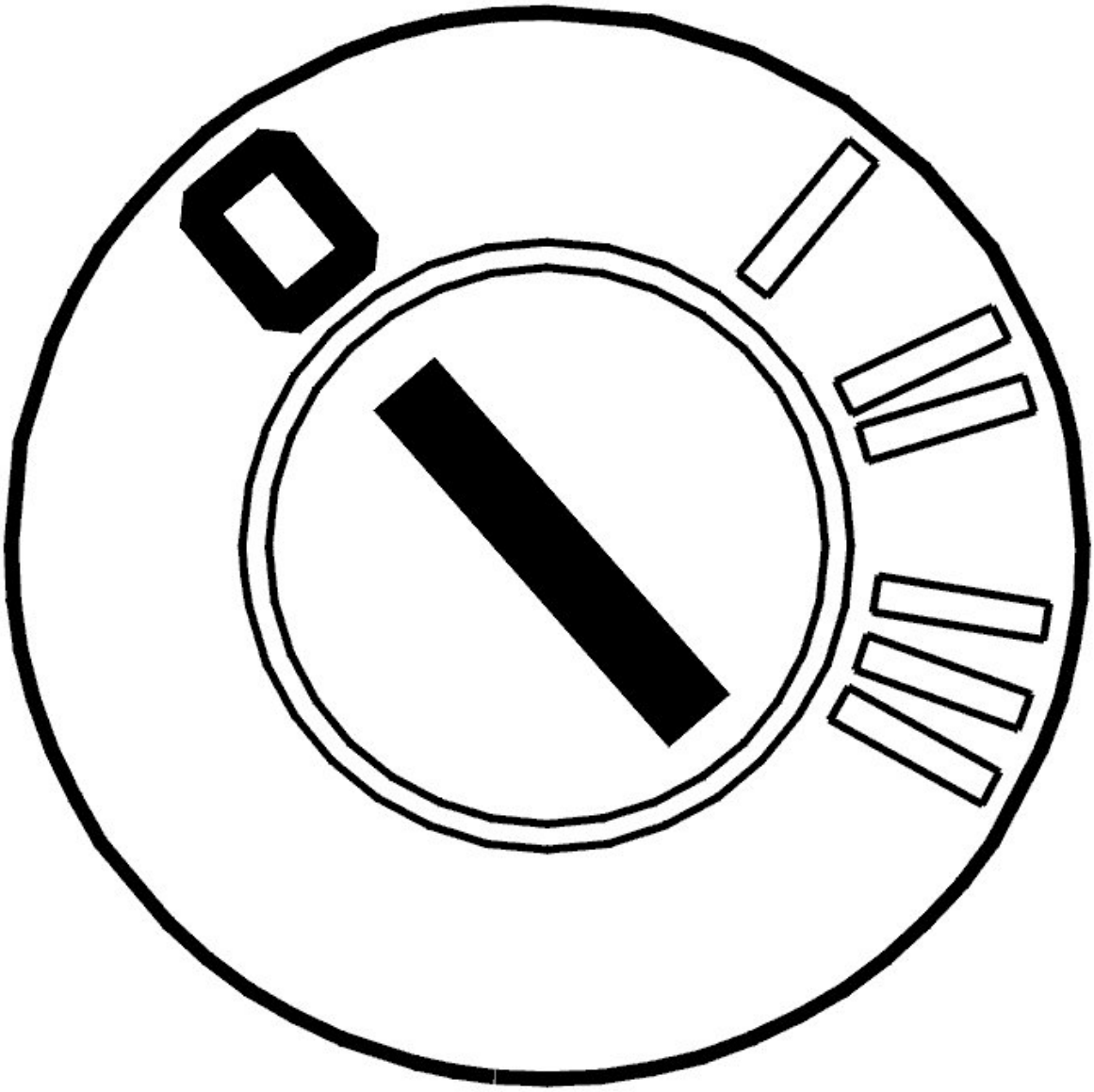
- To replace the front seat belt tensioner, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat. To replace the rear seat belt tensioner, see Buckle seat belt rear, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Buckle Seat Belt Rear, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

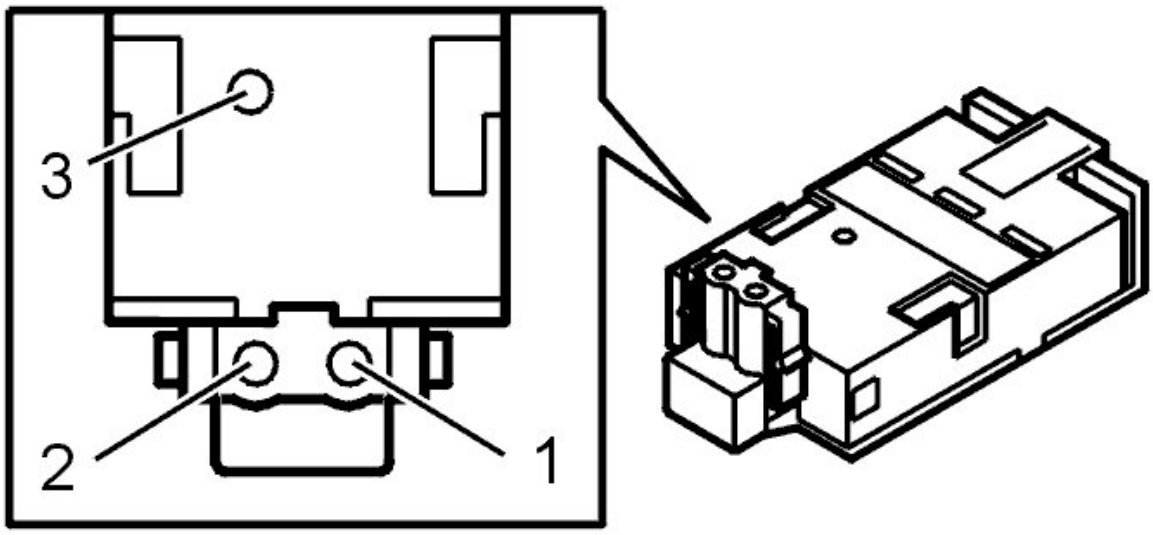
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

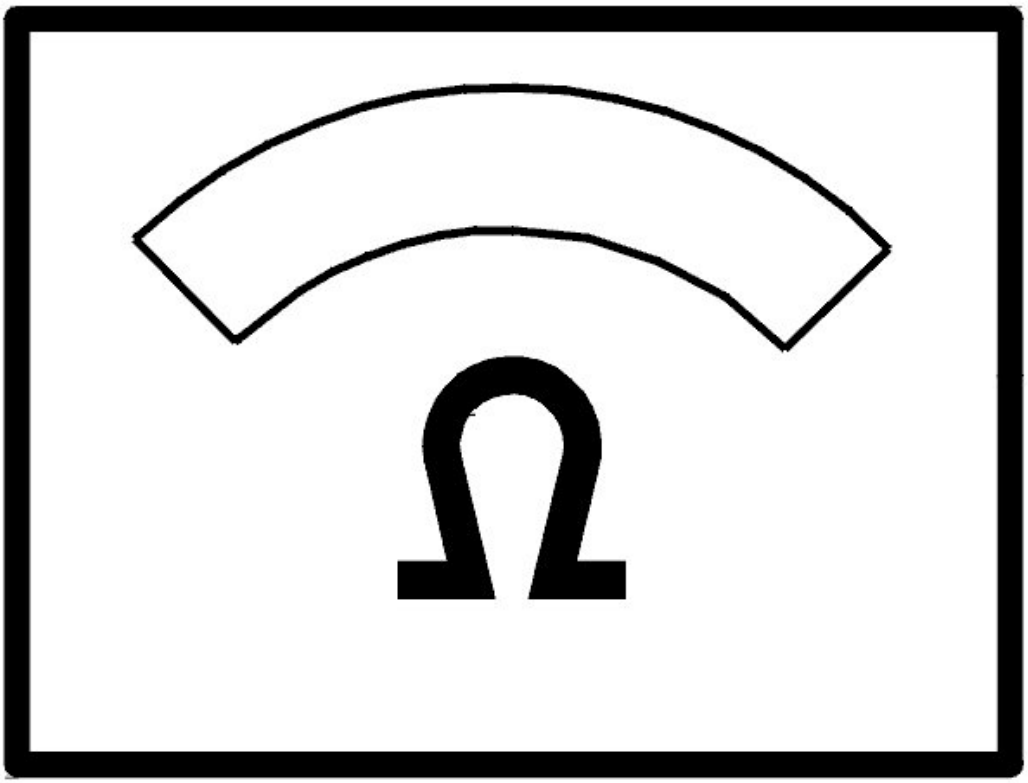
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

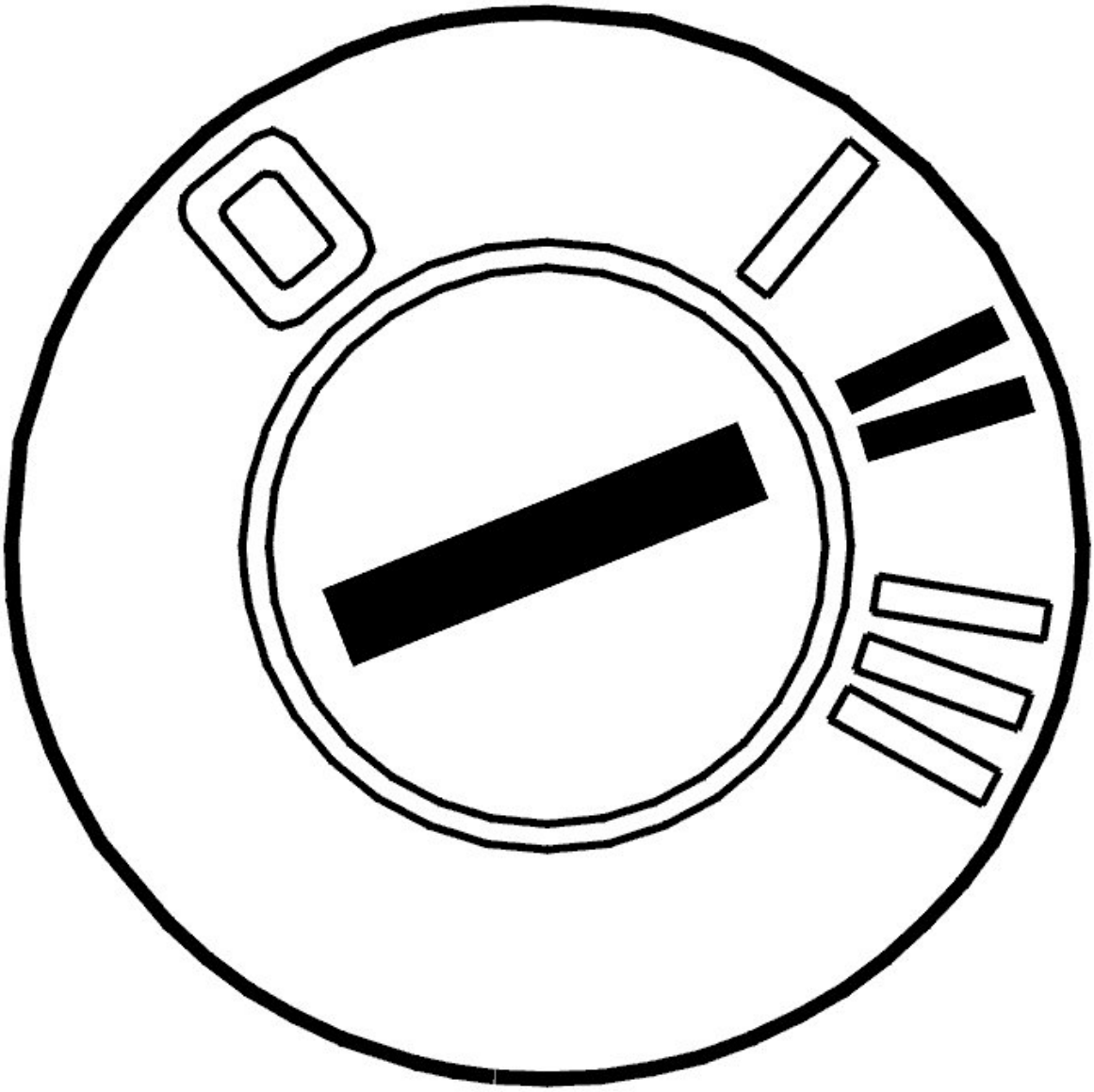
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

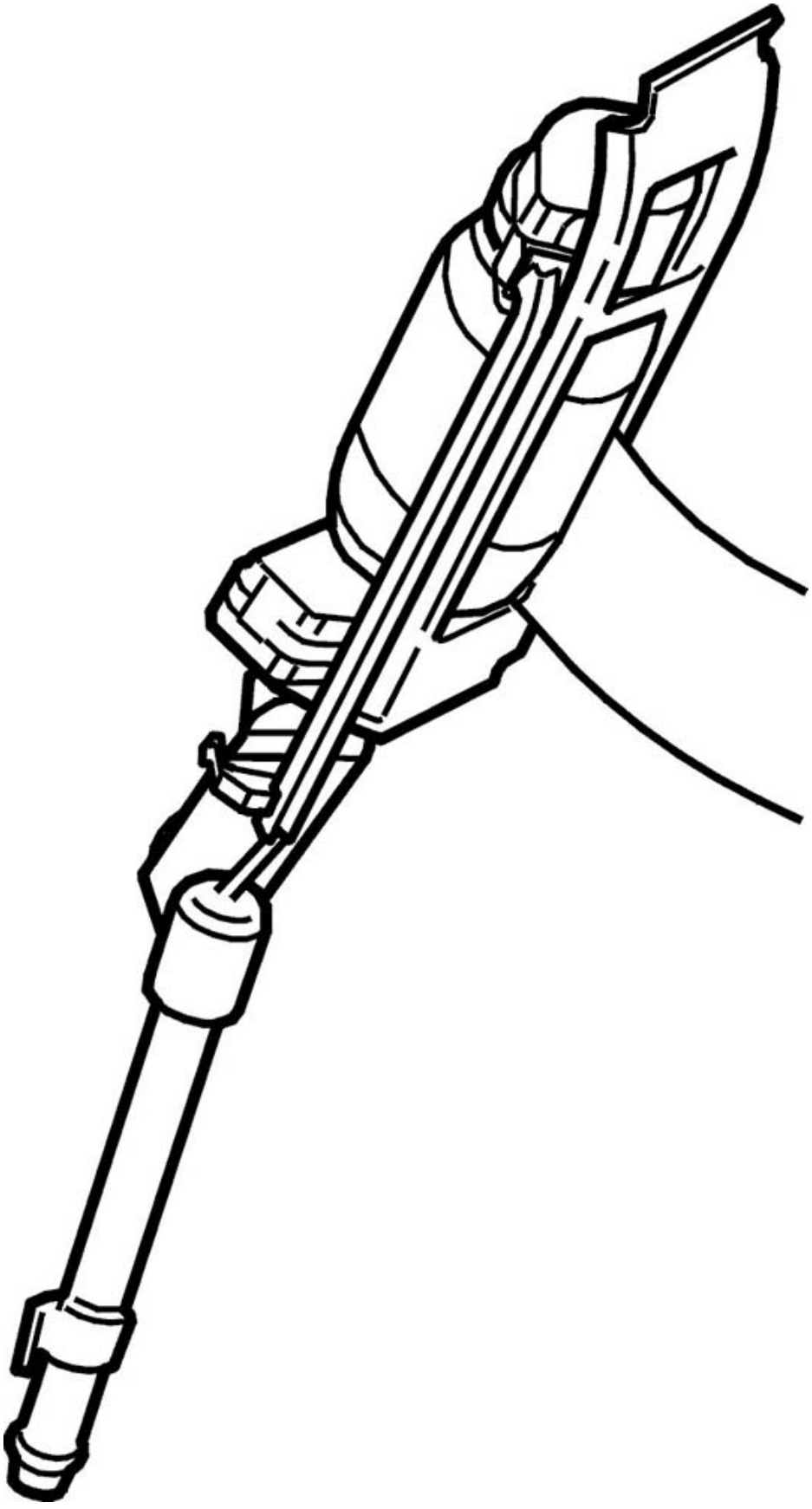
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0065 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0065 is displayed.

Substitute value
- Nothing.

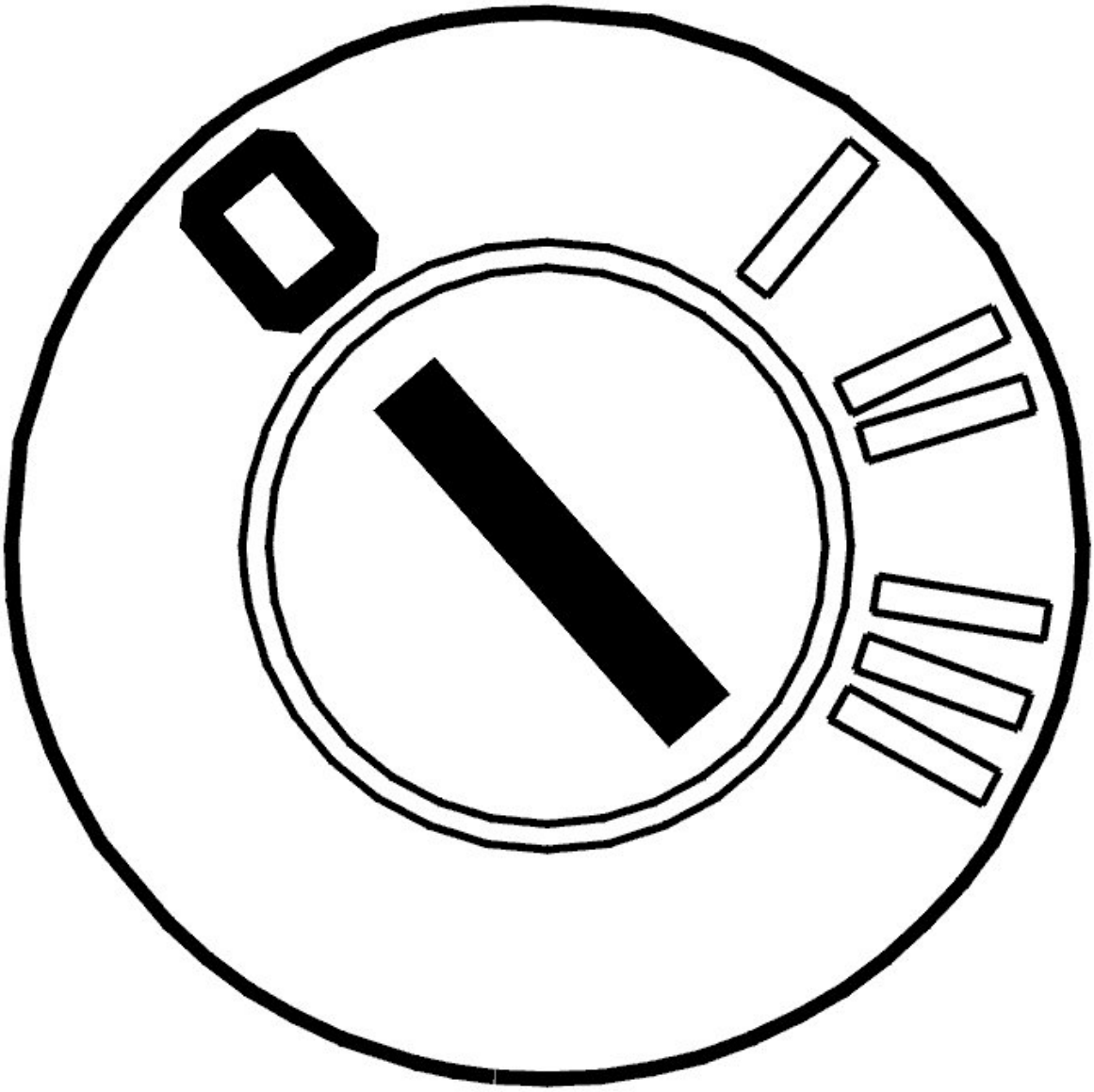
Possible source
- Short circuit in the connector or in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

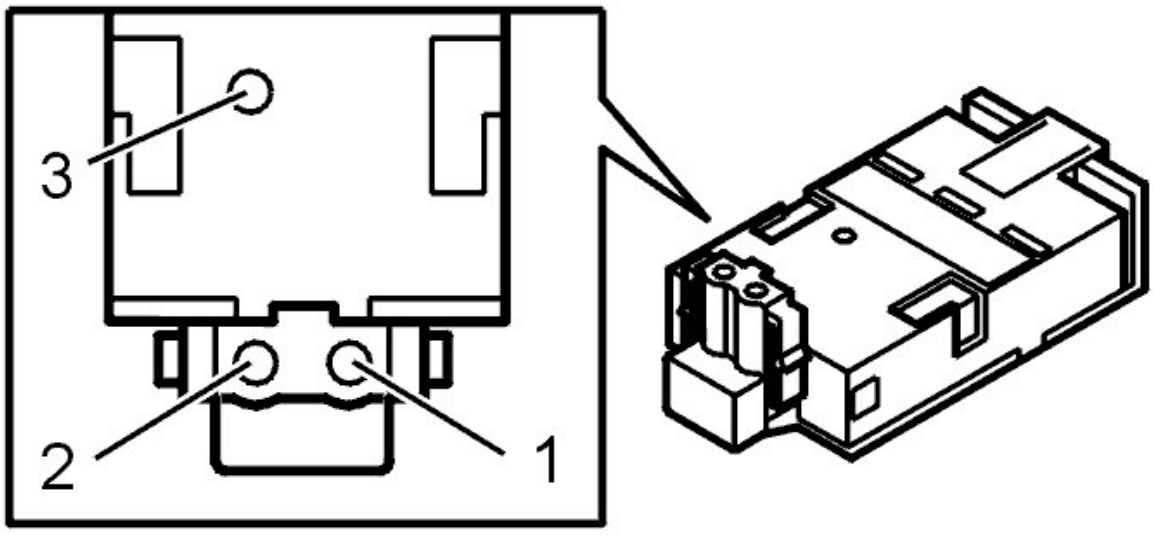
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

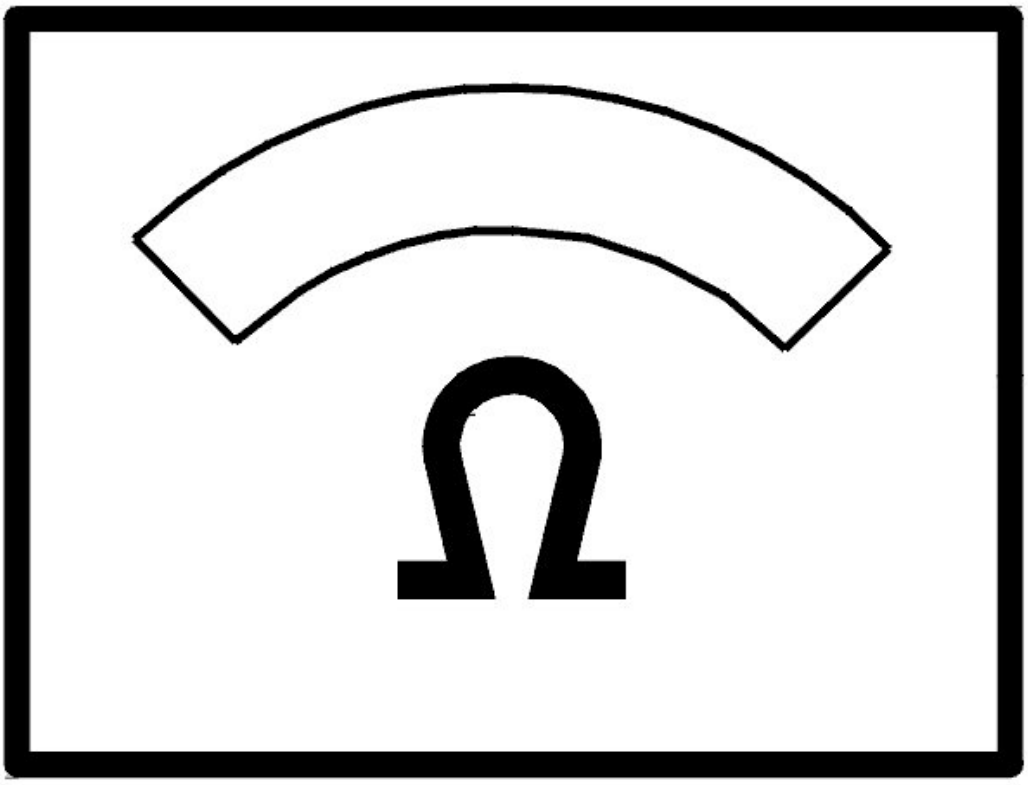
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

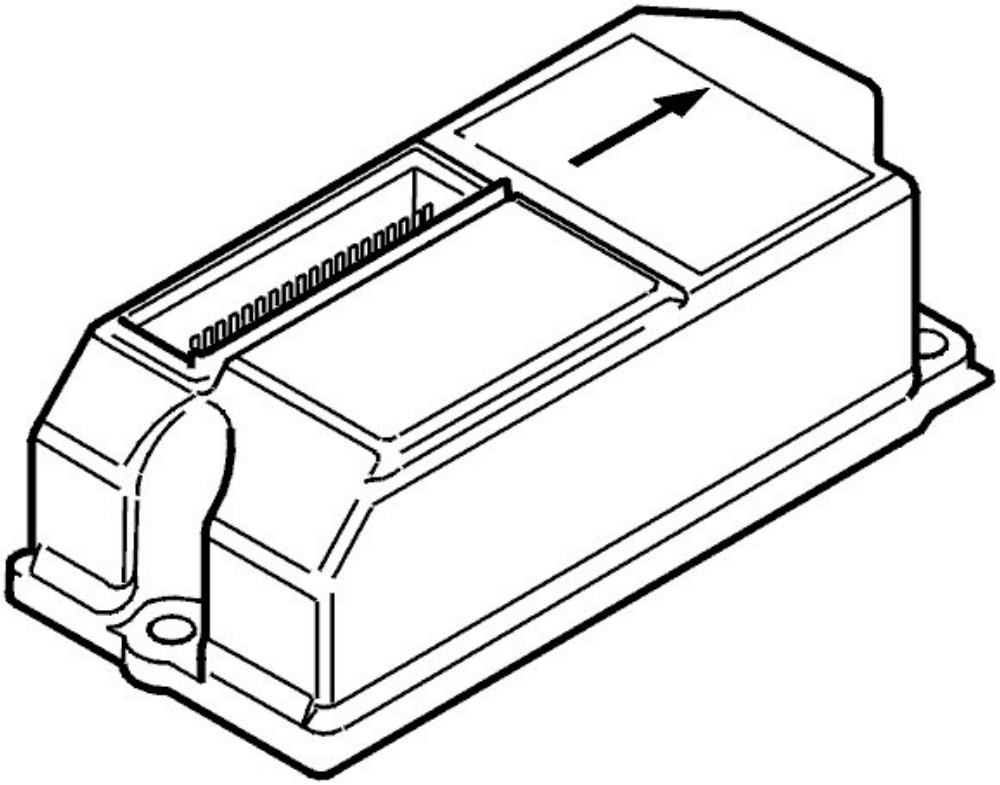
FAULT FOUND - DONE

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0066
SRS-006E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

Fault symptom[s]

The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0066
SRS-006E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

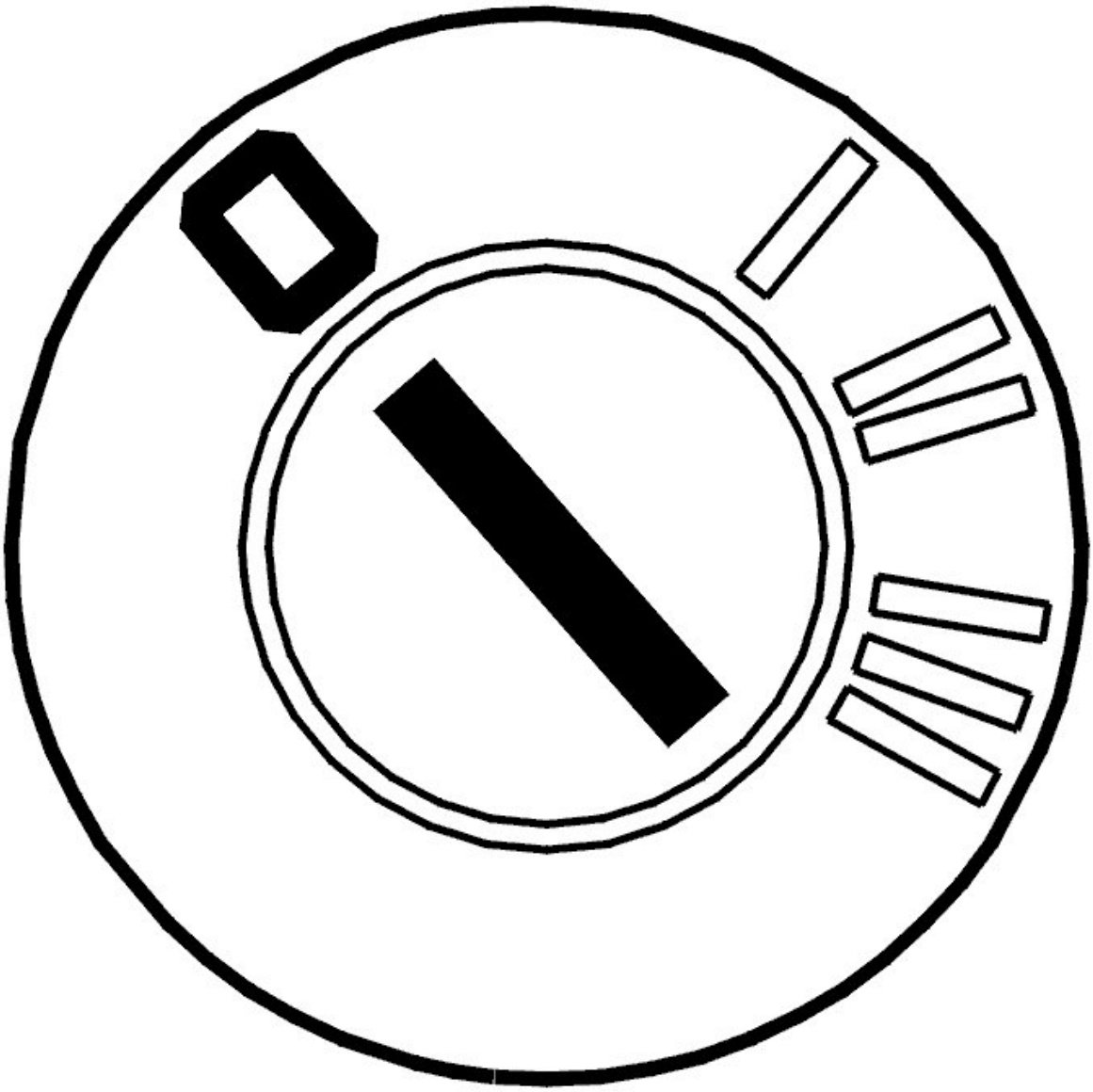
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component



- Ignition off.

Check that the wiring from the seat belt tensioners is correctly connected to the control module.
Check that nothing in the connector connected to the control module or in the control module connector is short-circuited.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

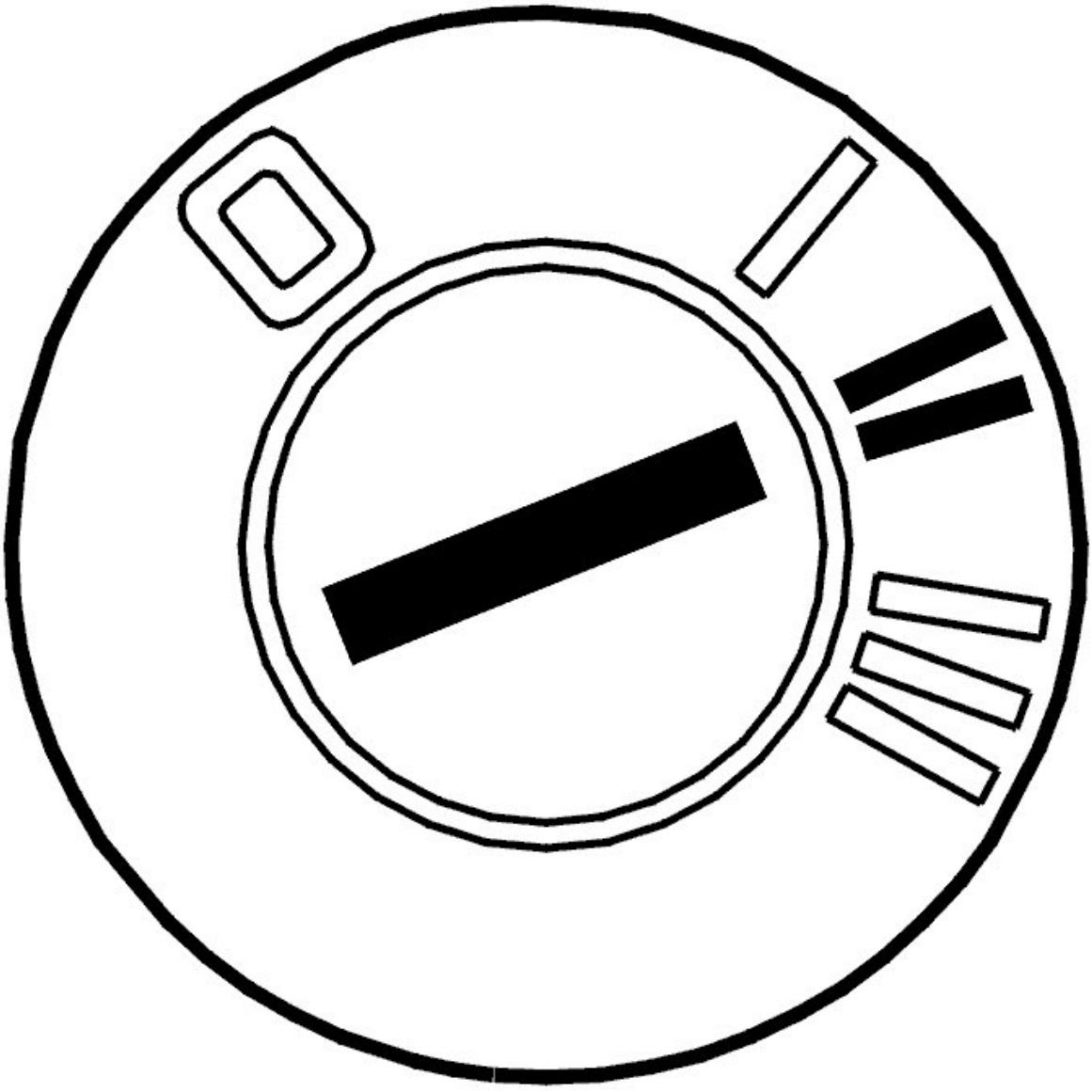
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

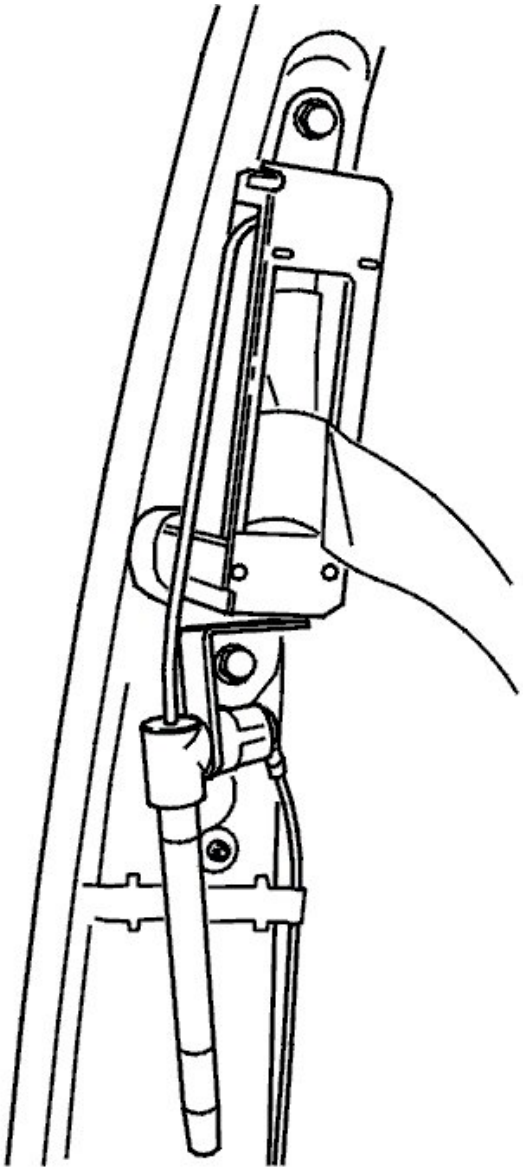
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0068 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0068 is displayed.

Substitute value
- Nothing.

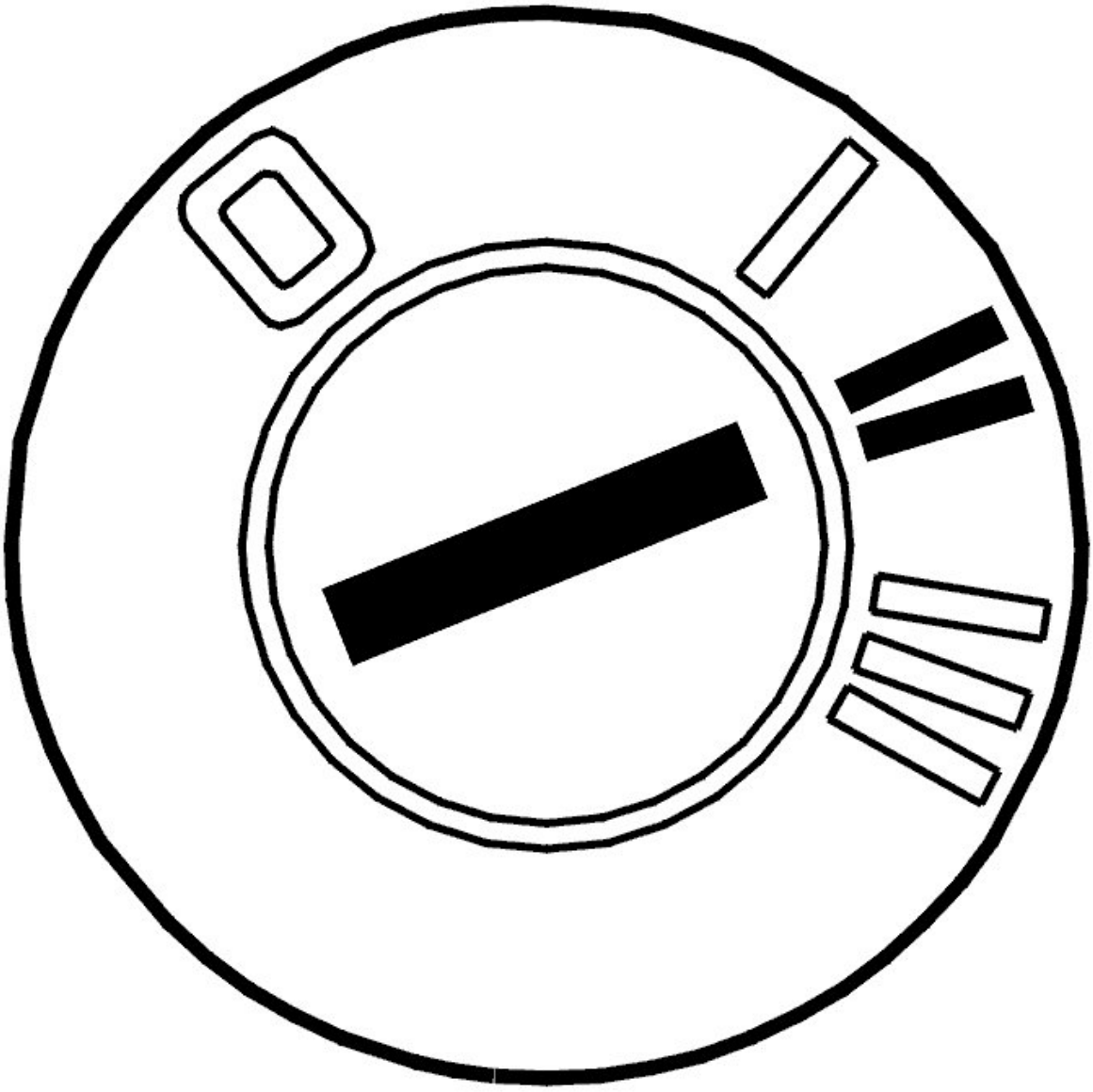
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to voltage supply in seat-belt tensioner.

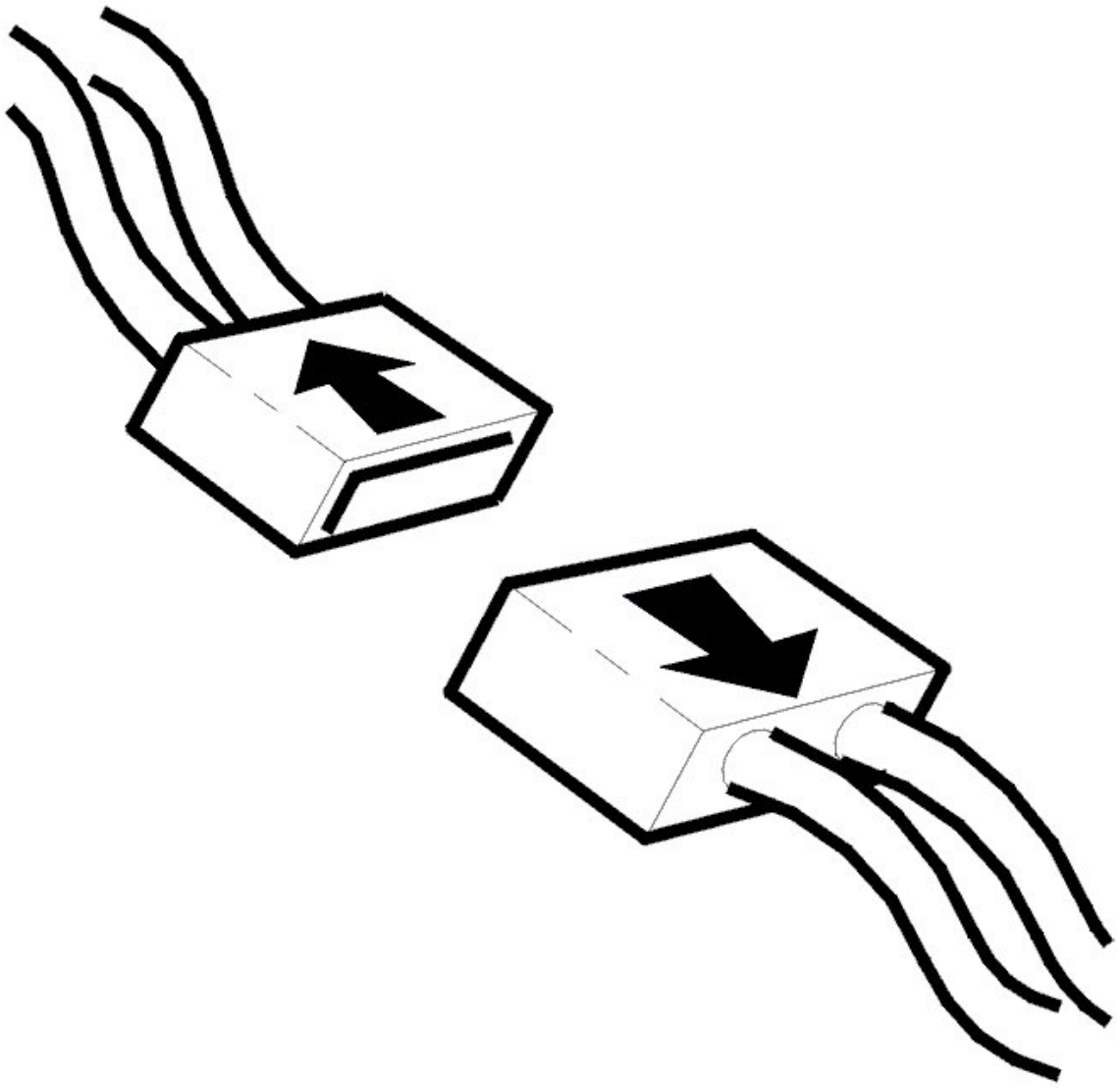
Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

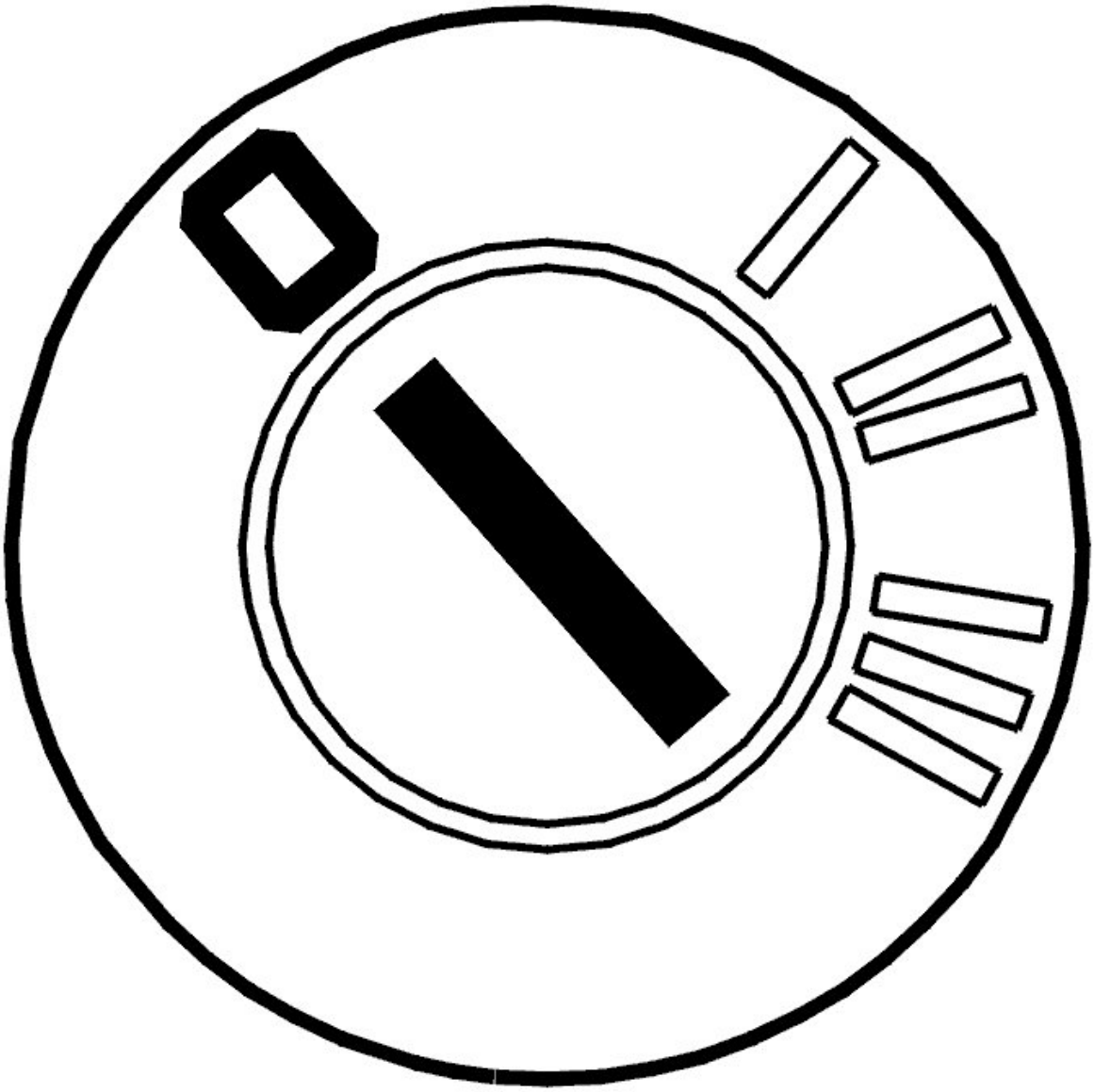
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

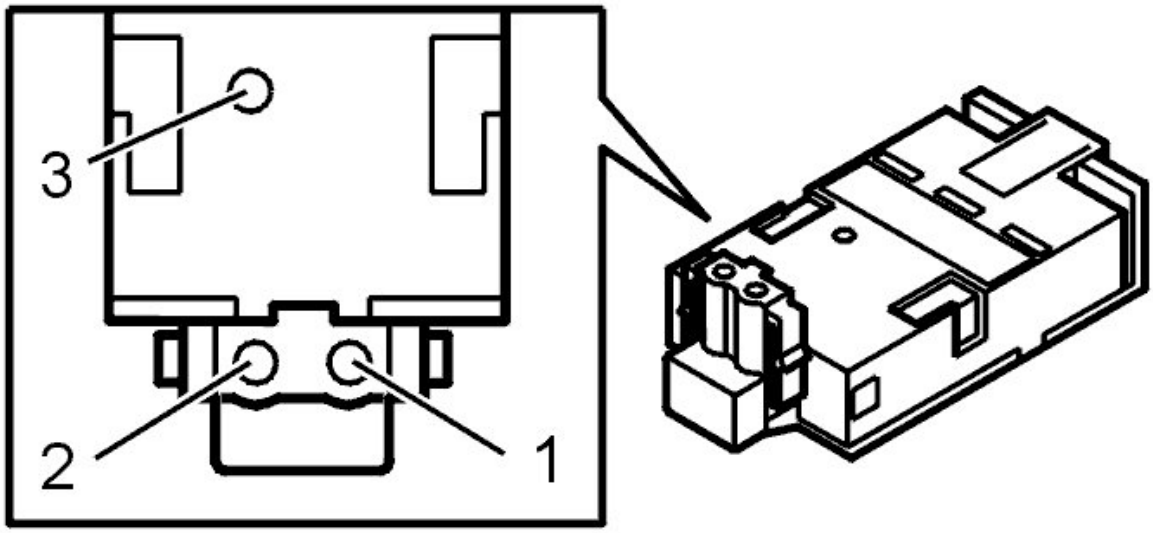
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

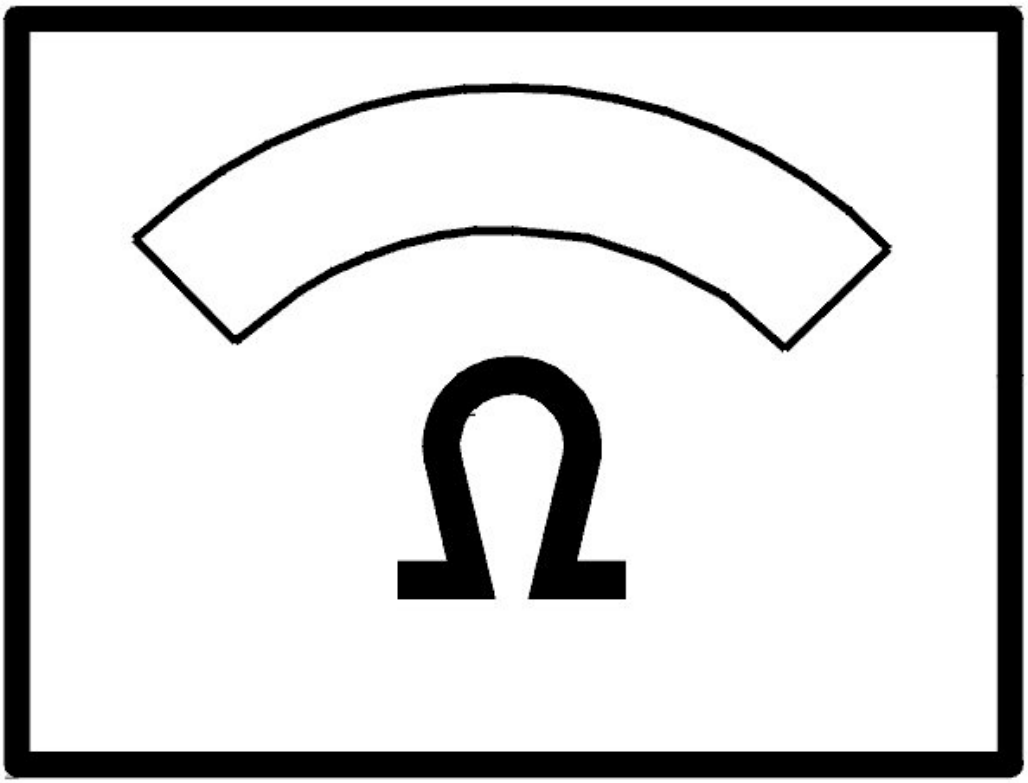
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

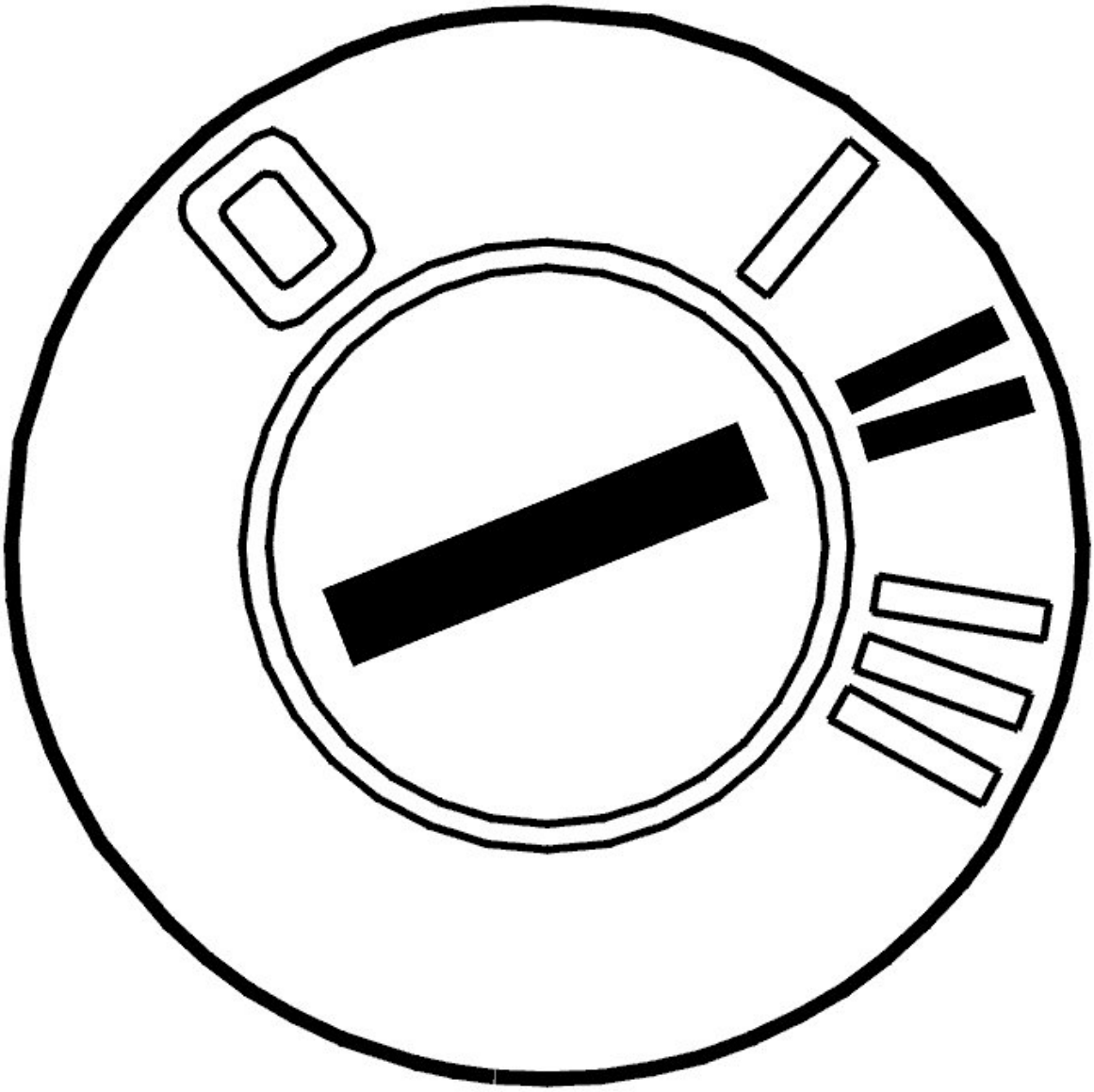
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

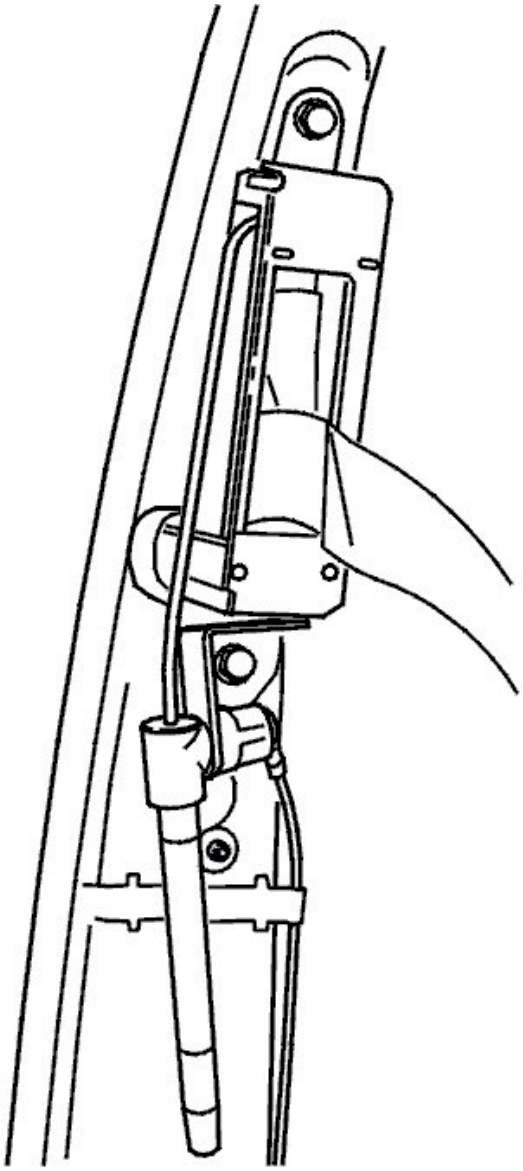
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0068 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0068 is displayed.

Substitute value
- Nothing.

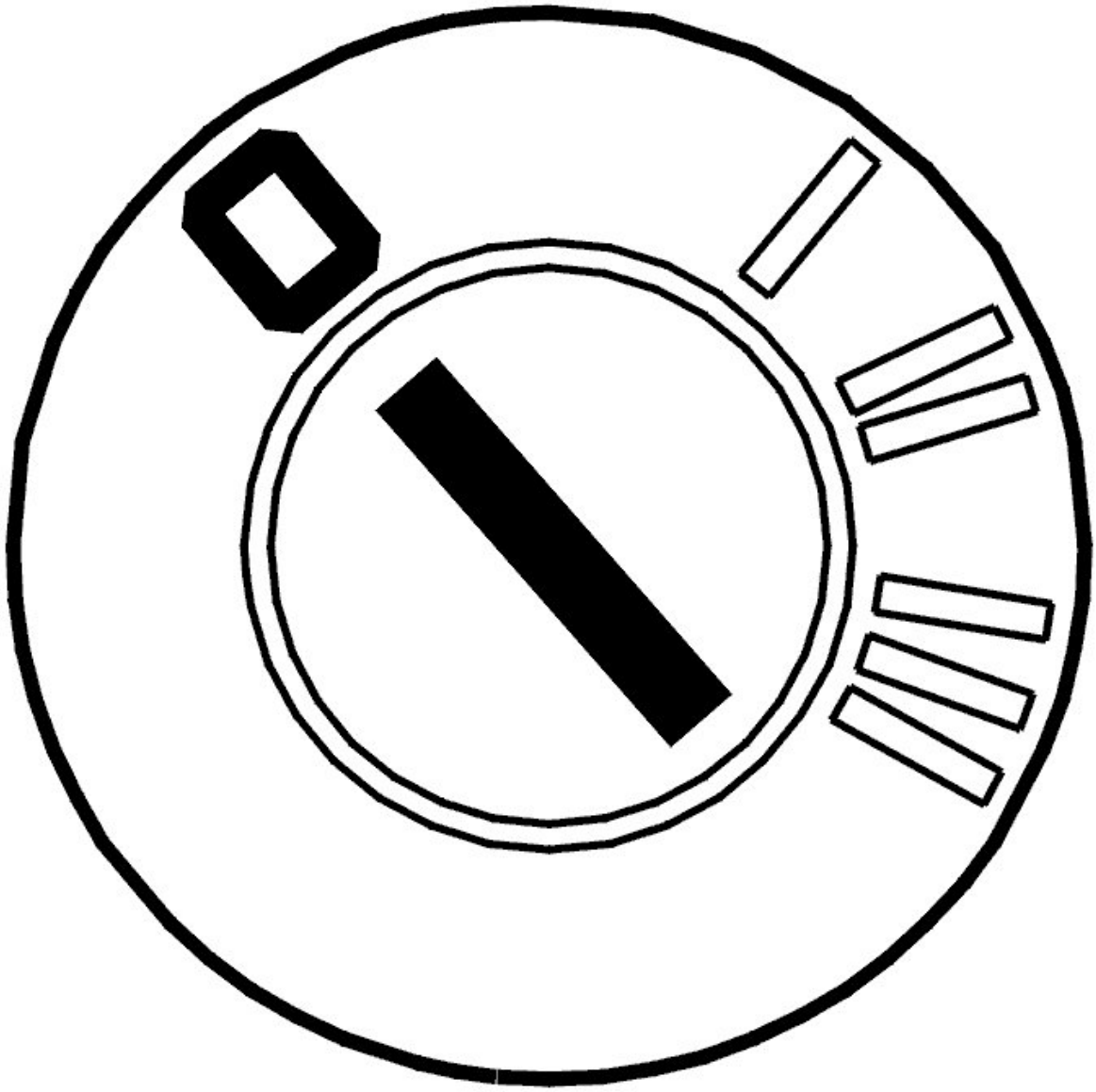
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to voltage supply in seat-belt tensioner.

Fault symptom[s]
- SRS warning lamp on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

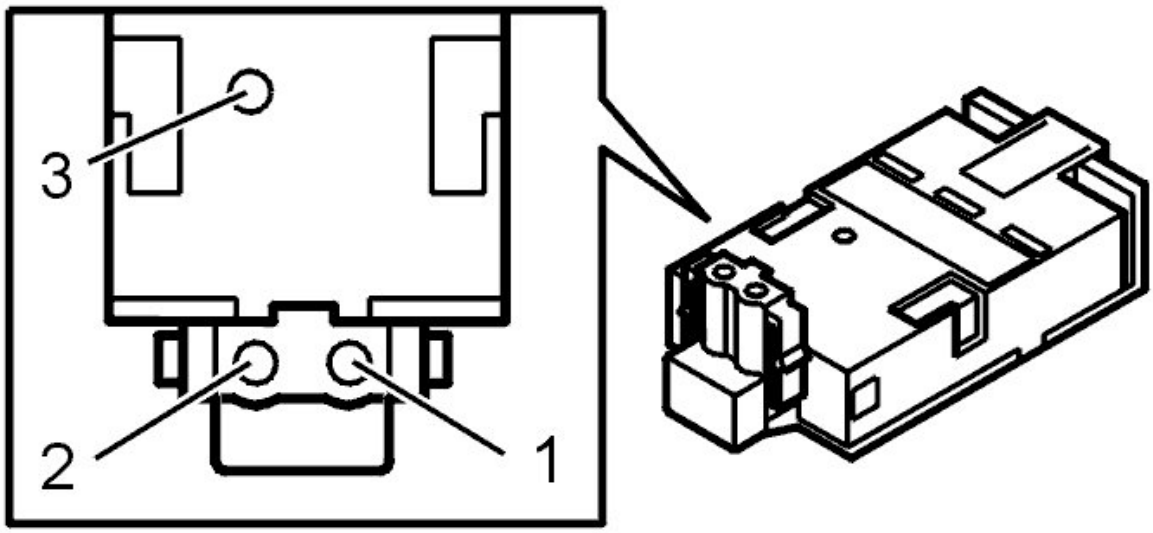
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

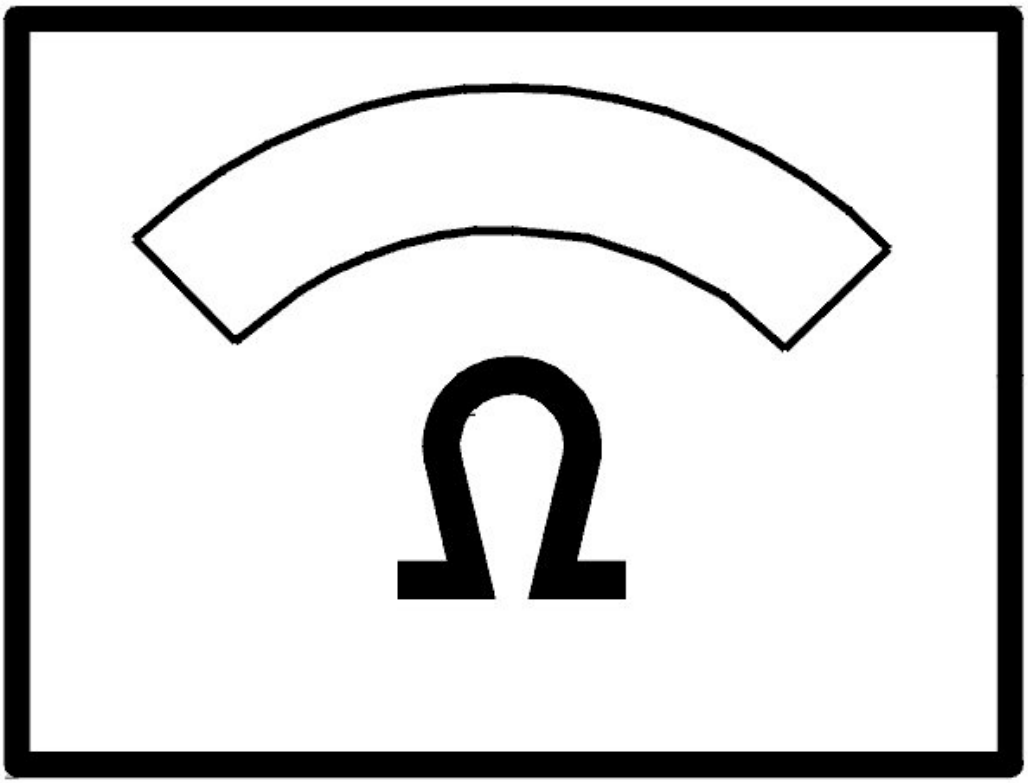
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminal #1, terminal #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

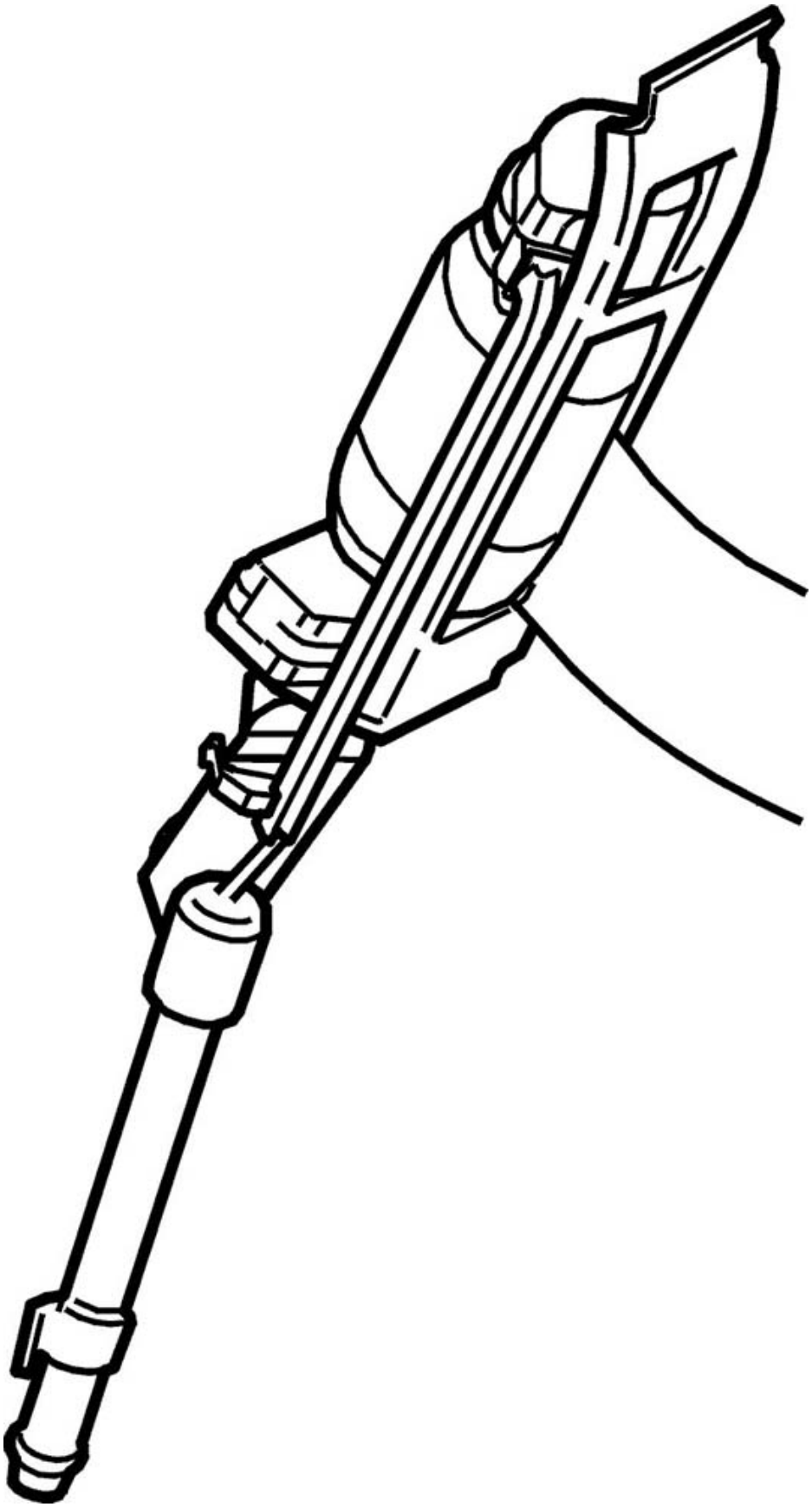
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0069 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0069 is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)

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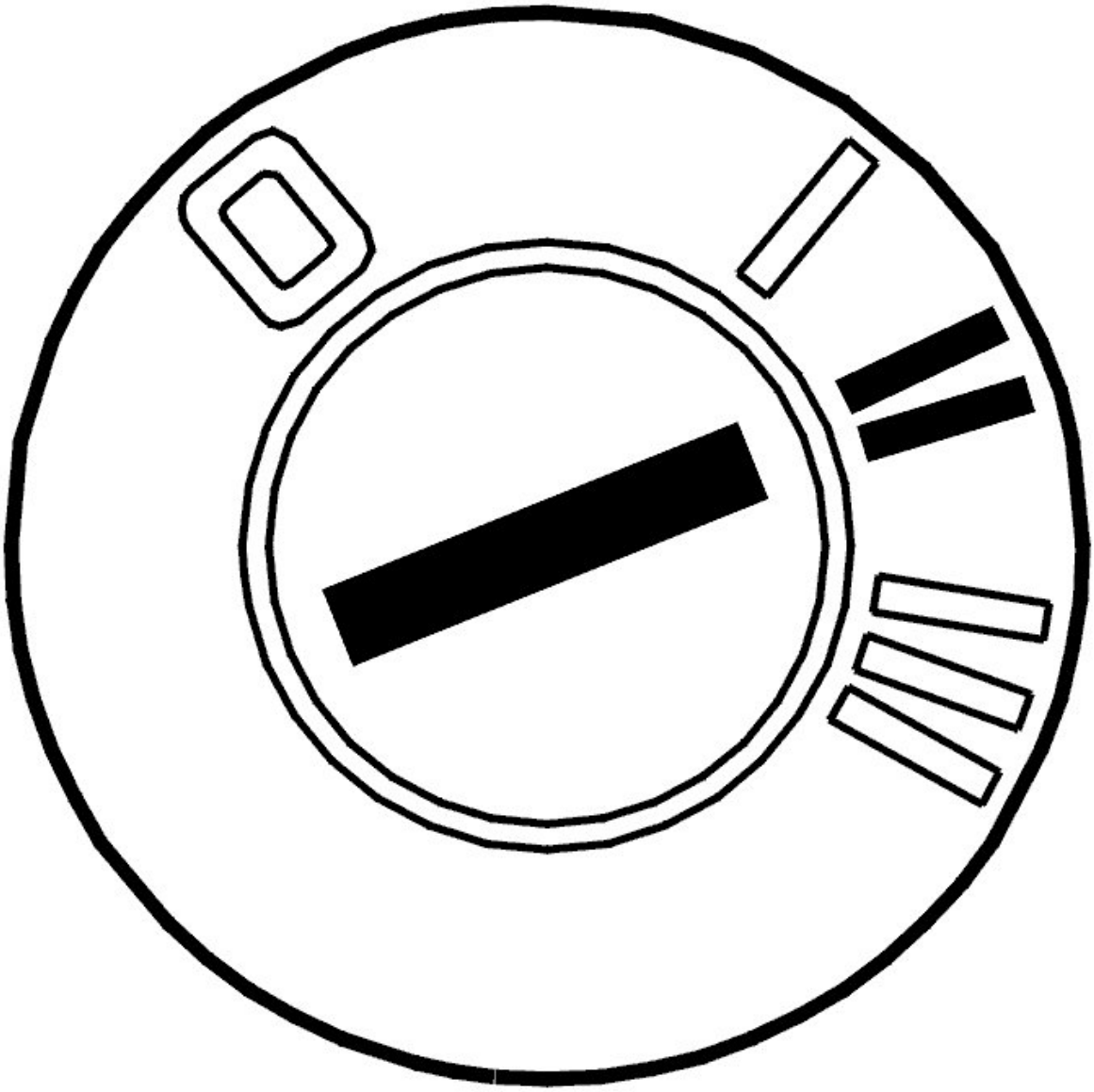
- Short circuit to ground in seat-belt tensioner.

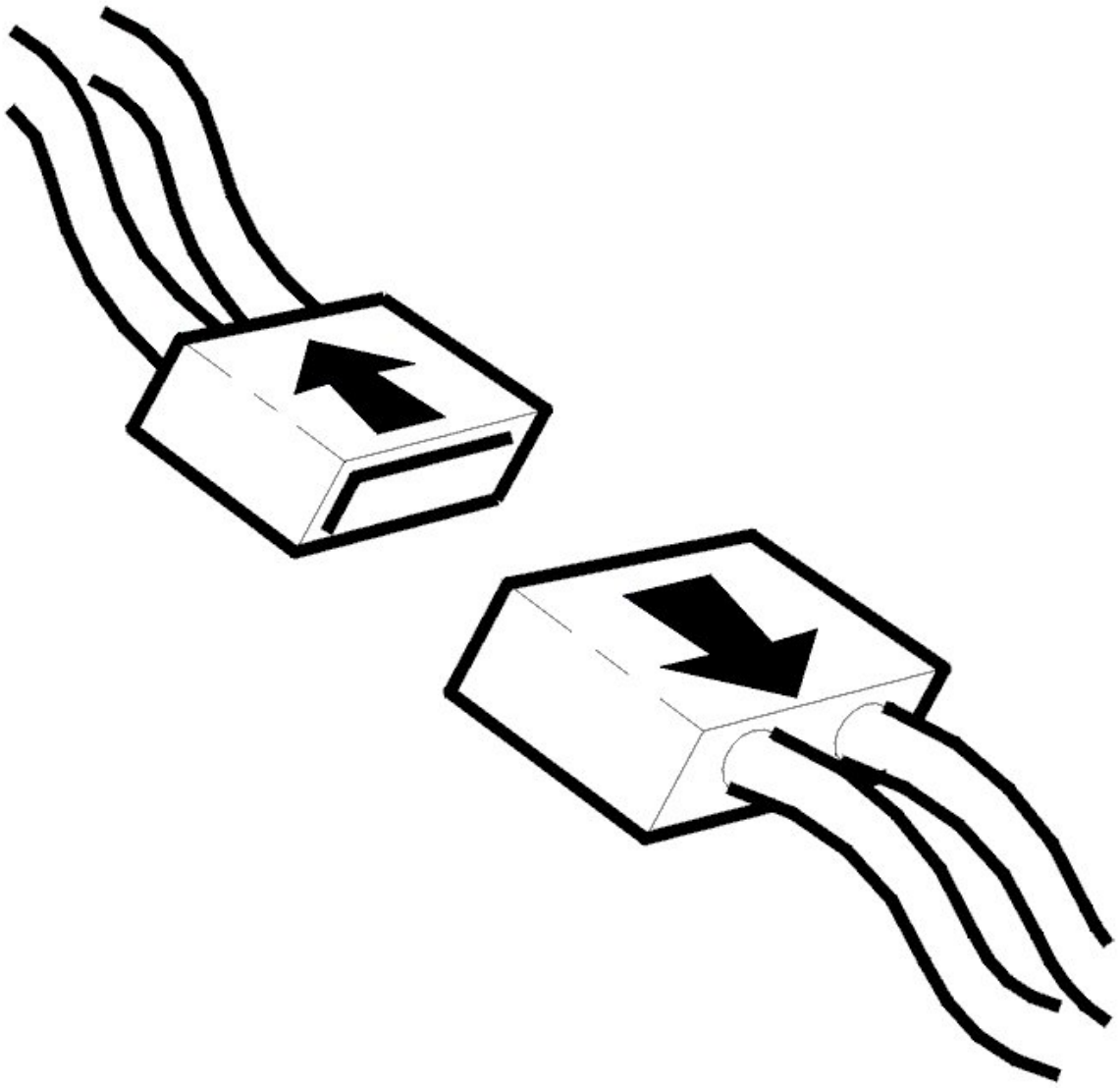
Fault symptom[s]
- SRS warning lamp on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

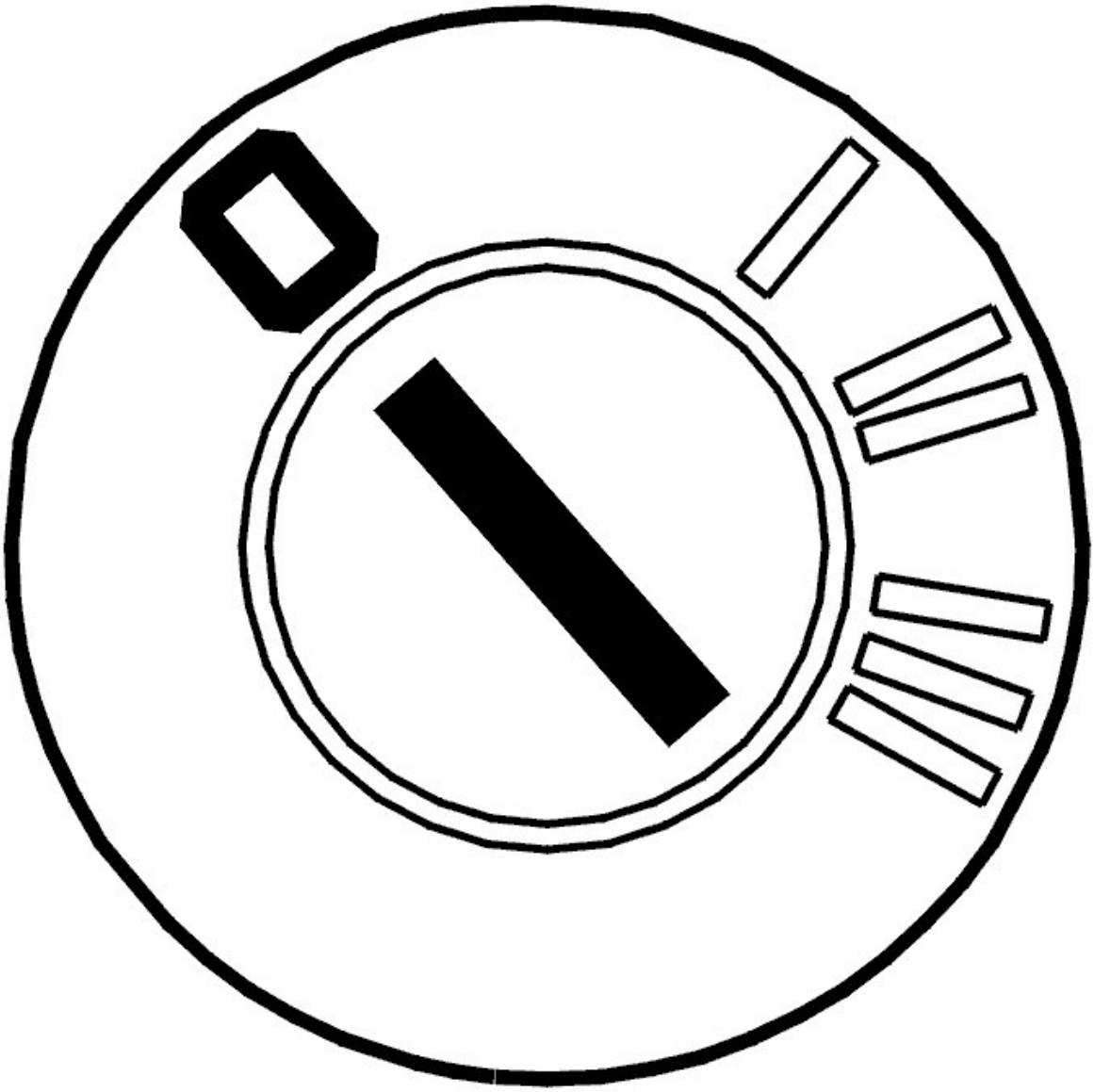
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

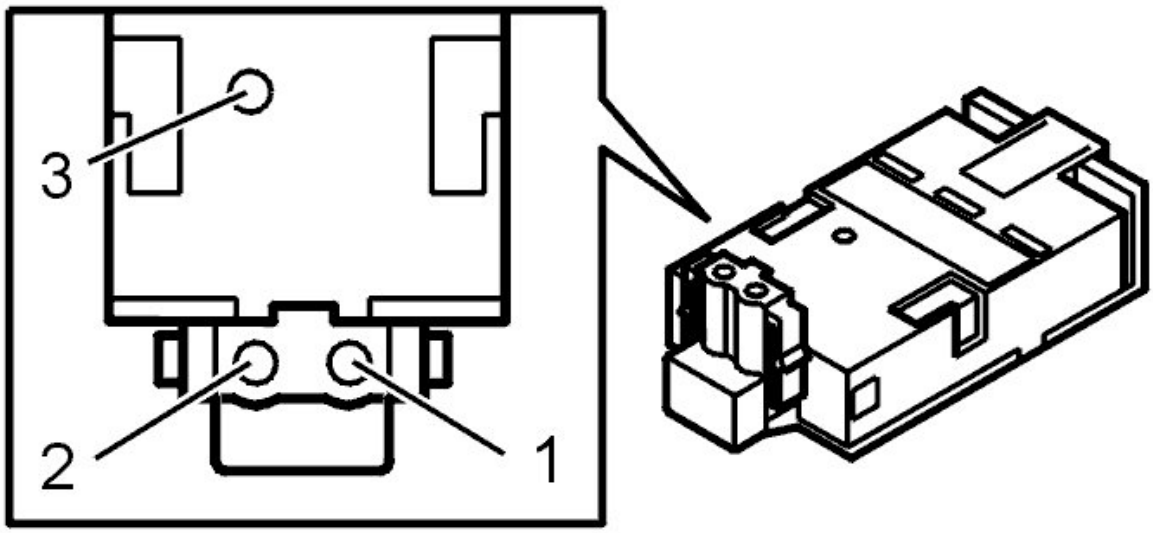
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

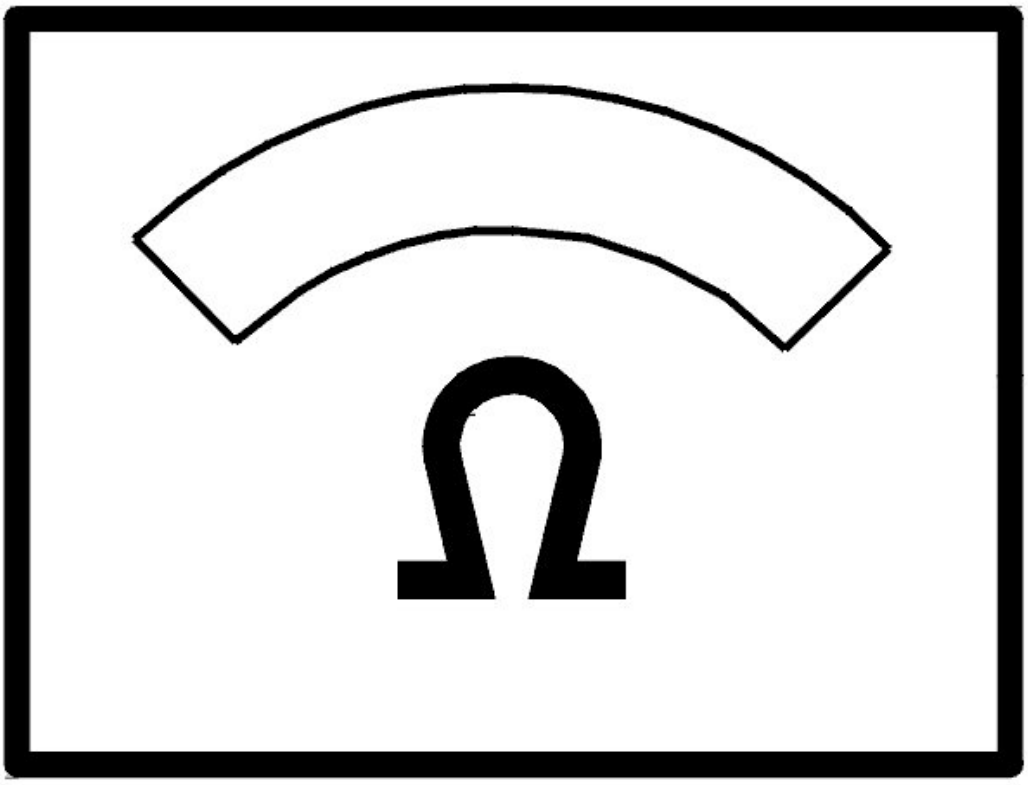
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

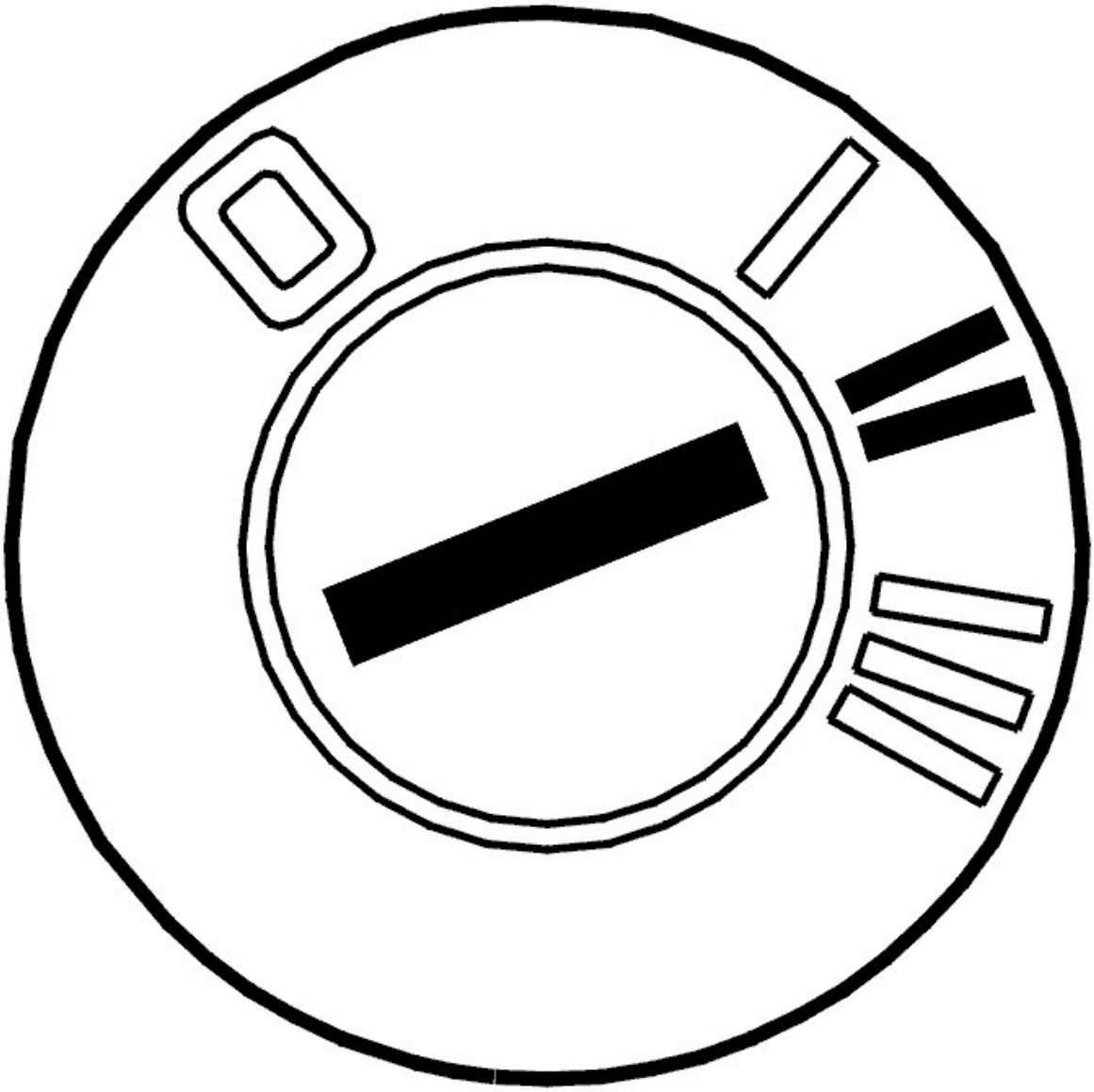
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

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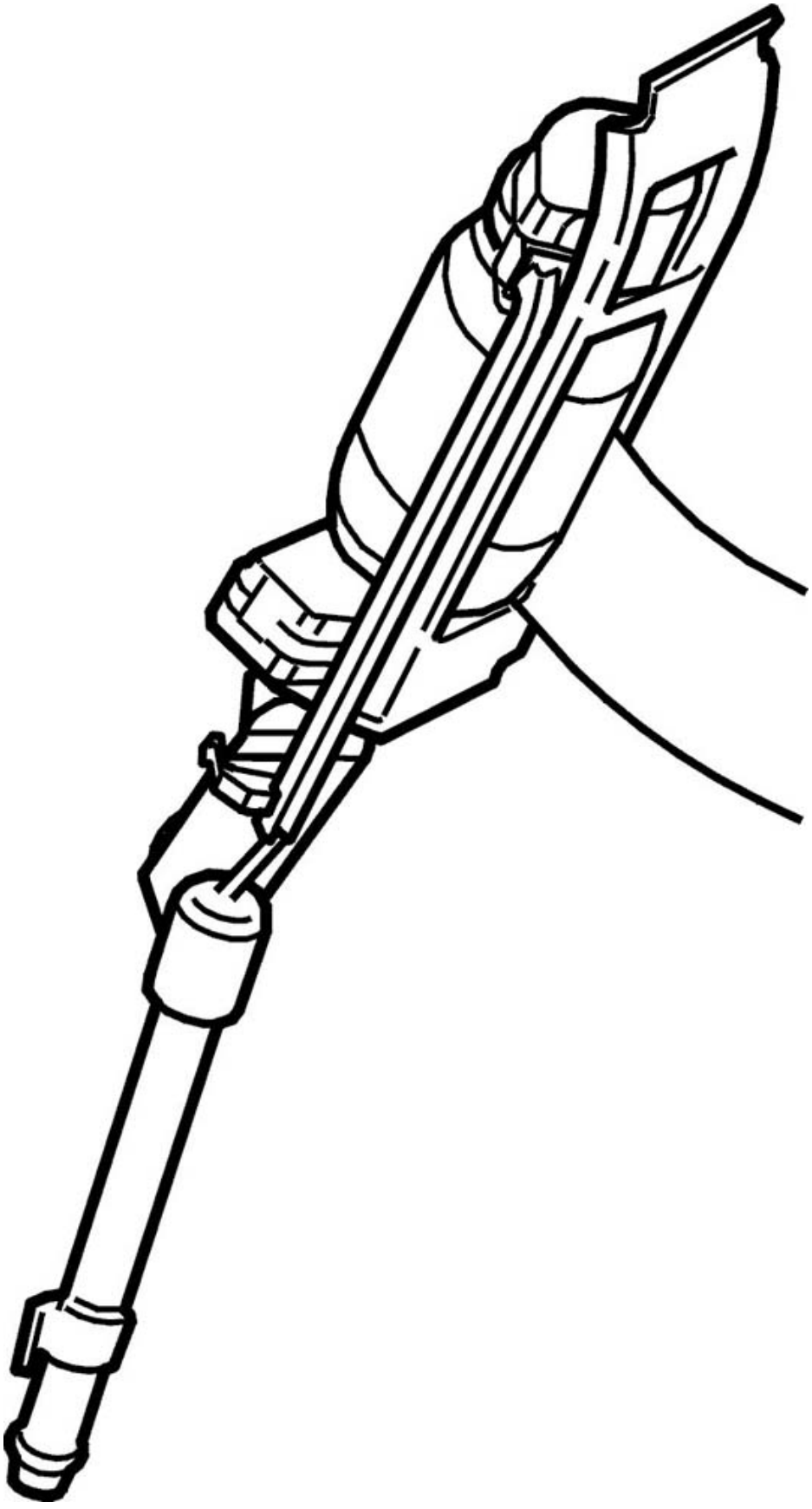
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0069 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0 V) for more than 10 seconds, diagnostic trouble code SRS-0069 is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

Fault symptom[s]

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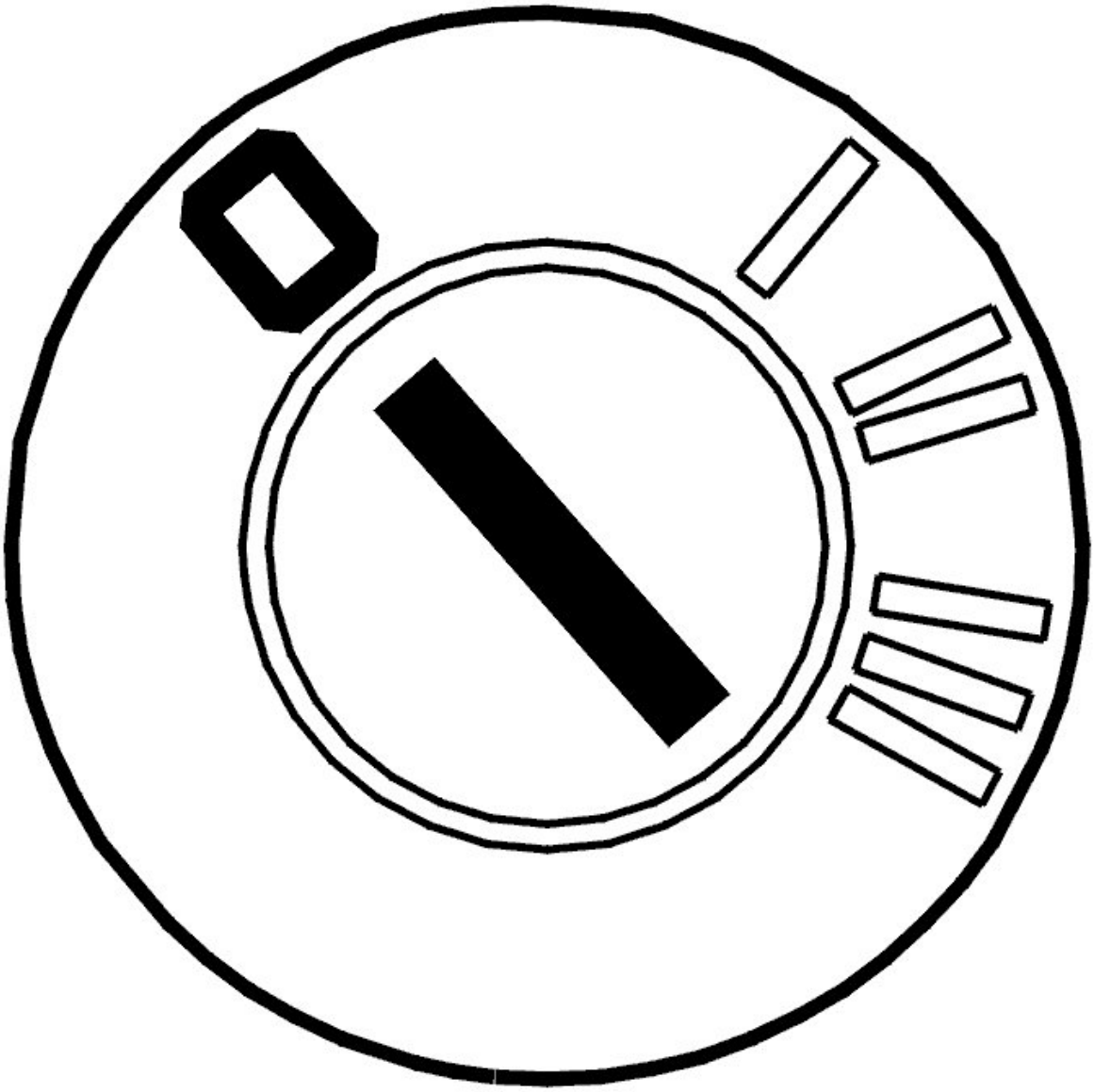
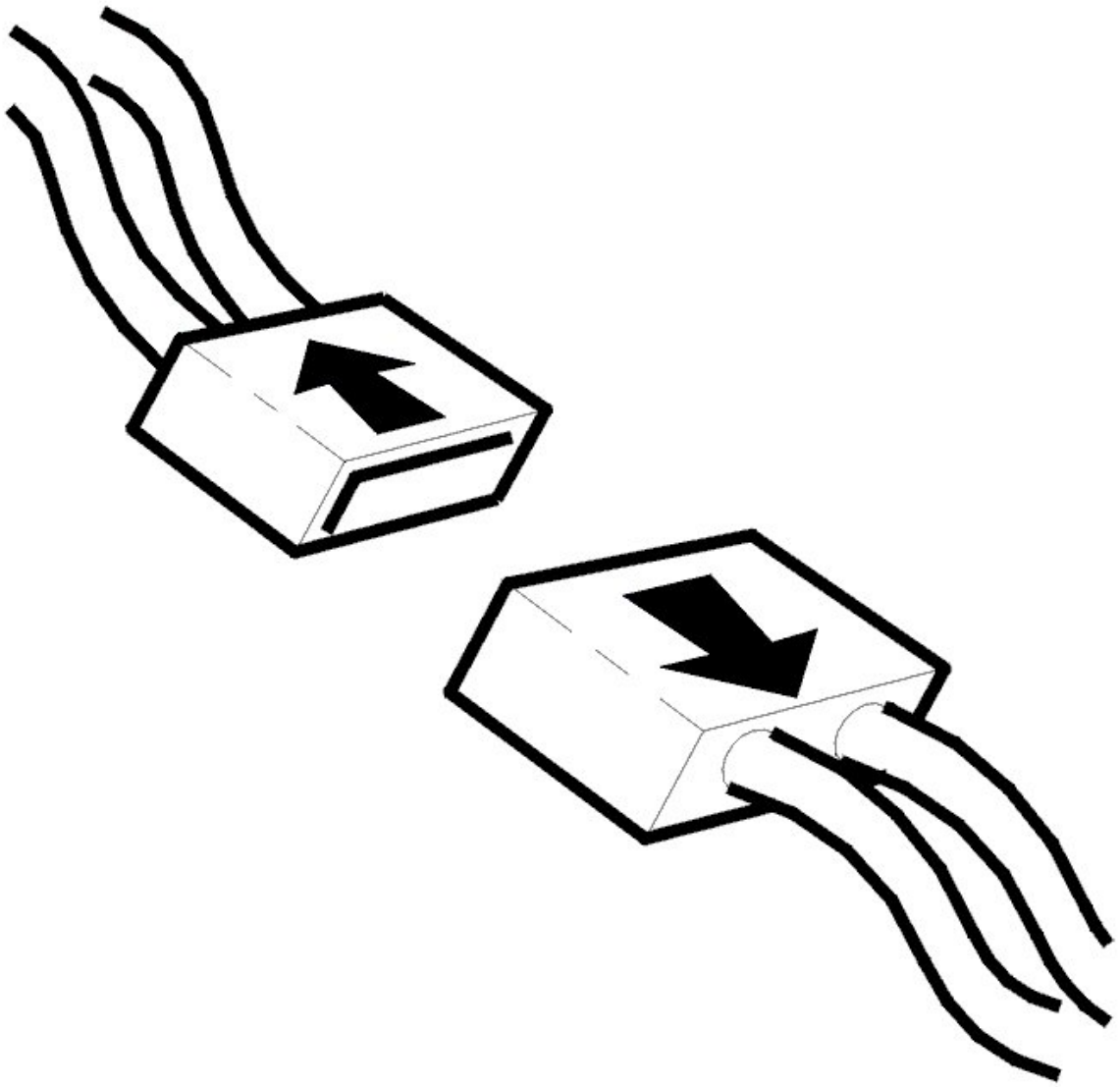
- SRS warning lamp on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

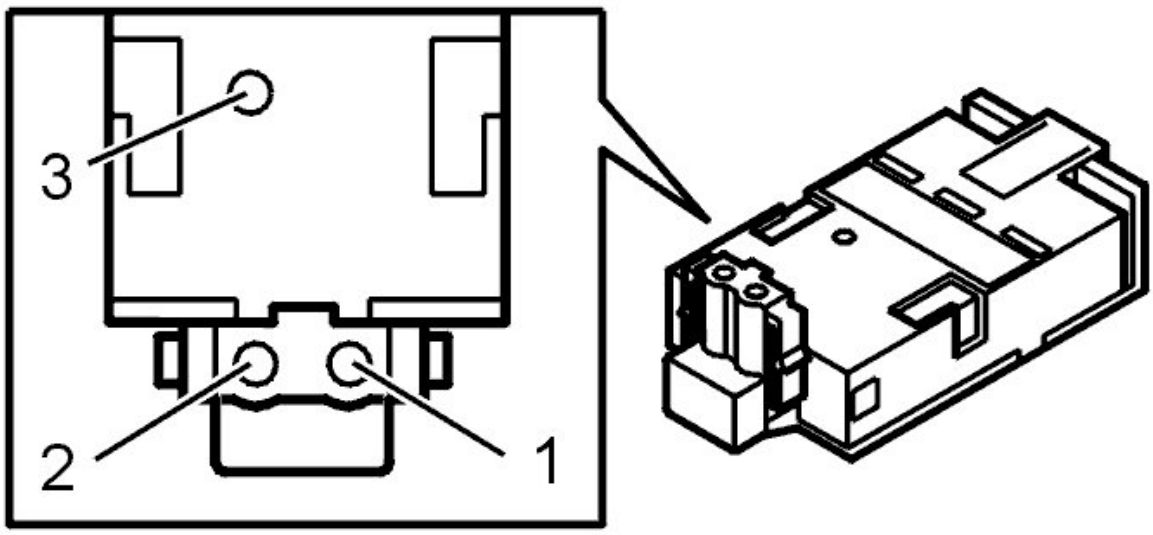
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

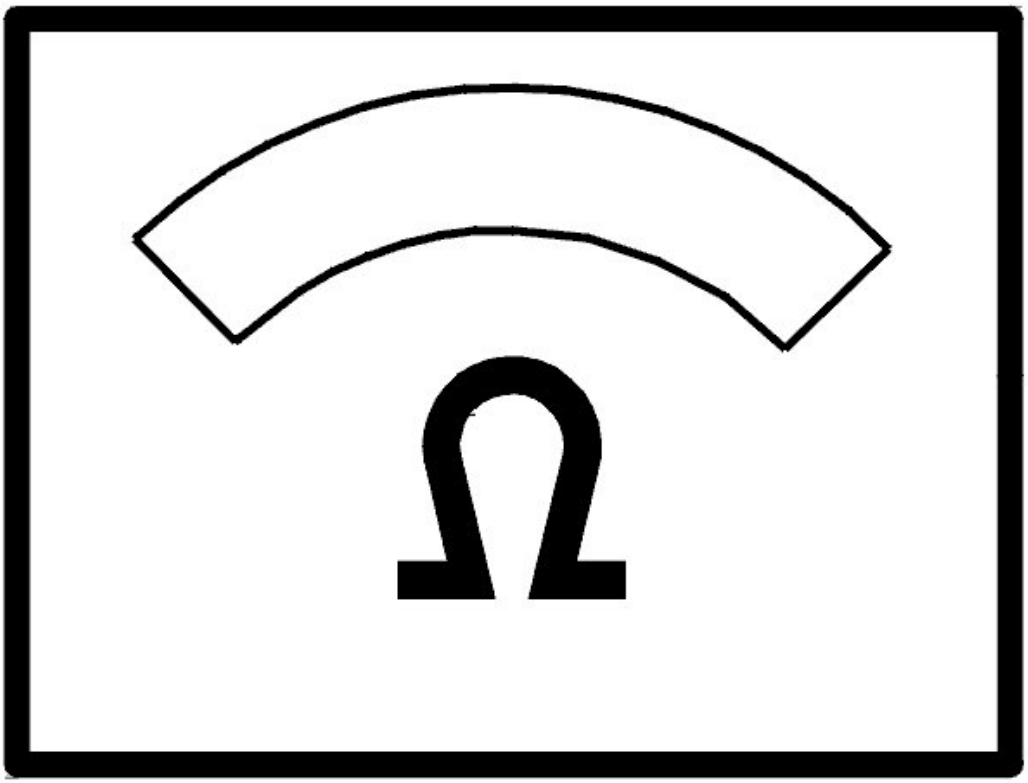
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

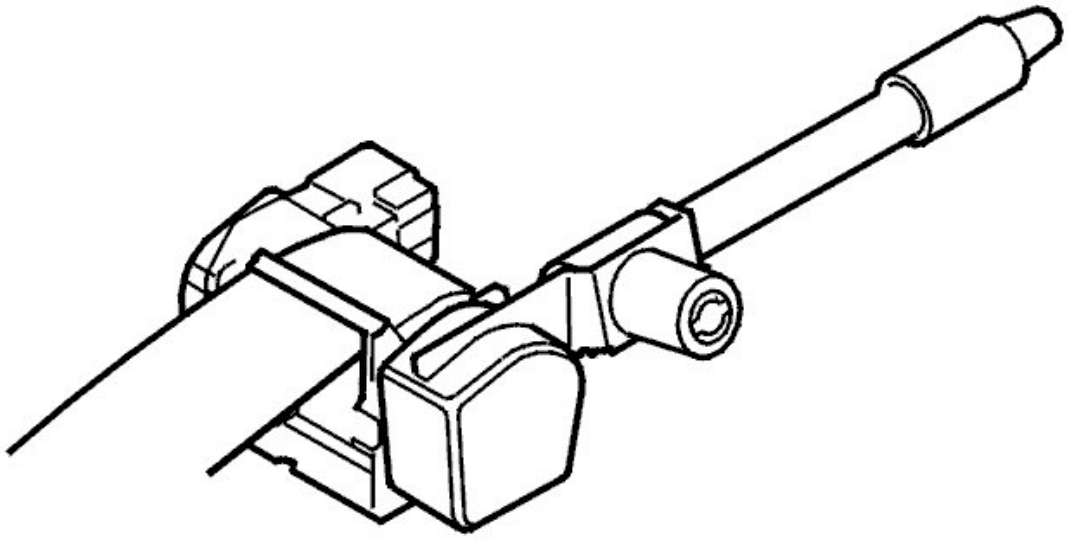
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-006A Diagnostic trouble code information

Condition



If the circuit capacitance is high for more than 10 sec, diagnostic trouble code SRS-006A is displayed.

Substitute value
- Nothing.

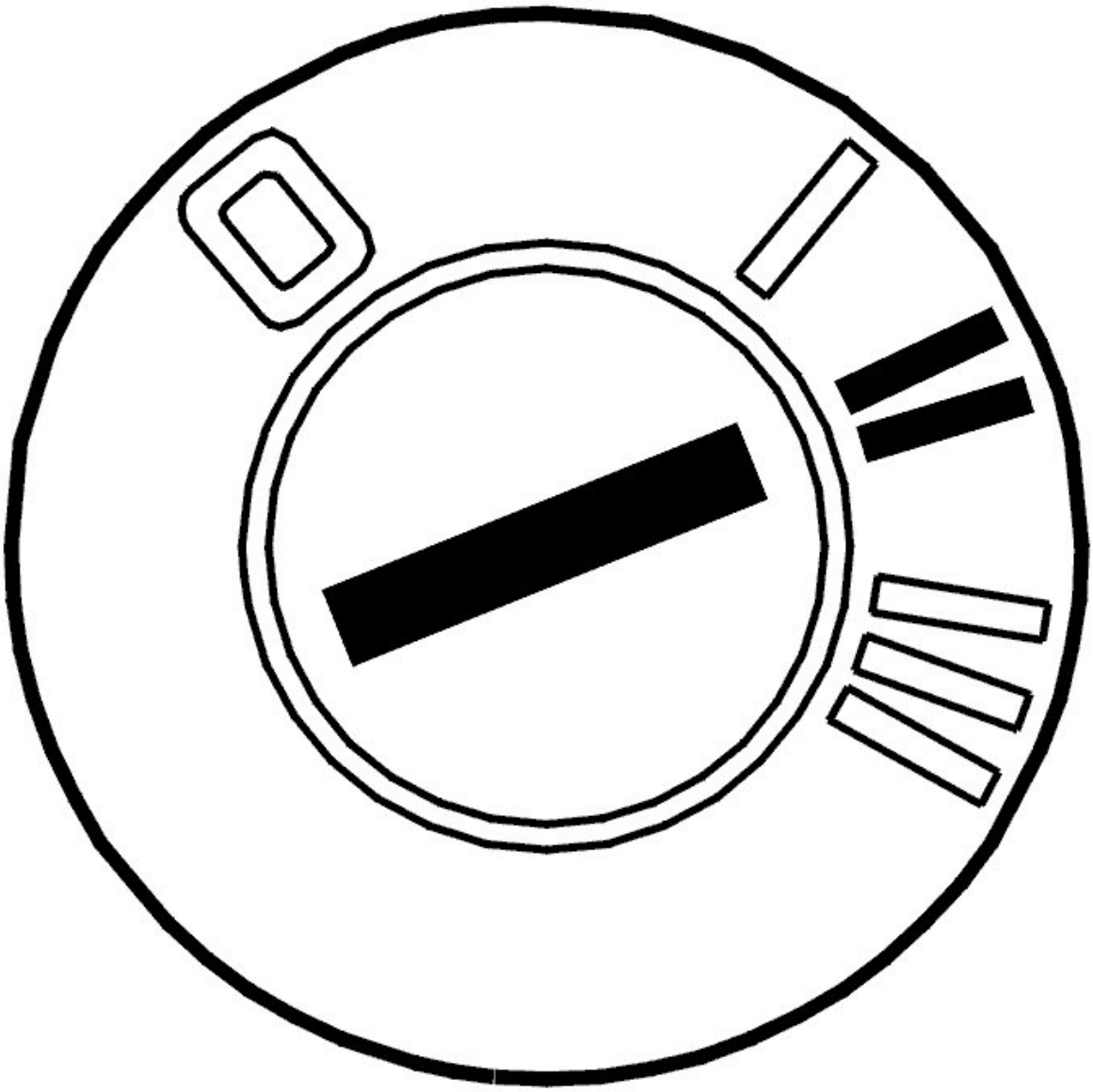
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

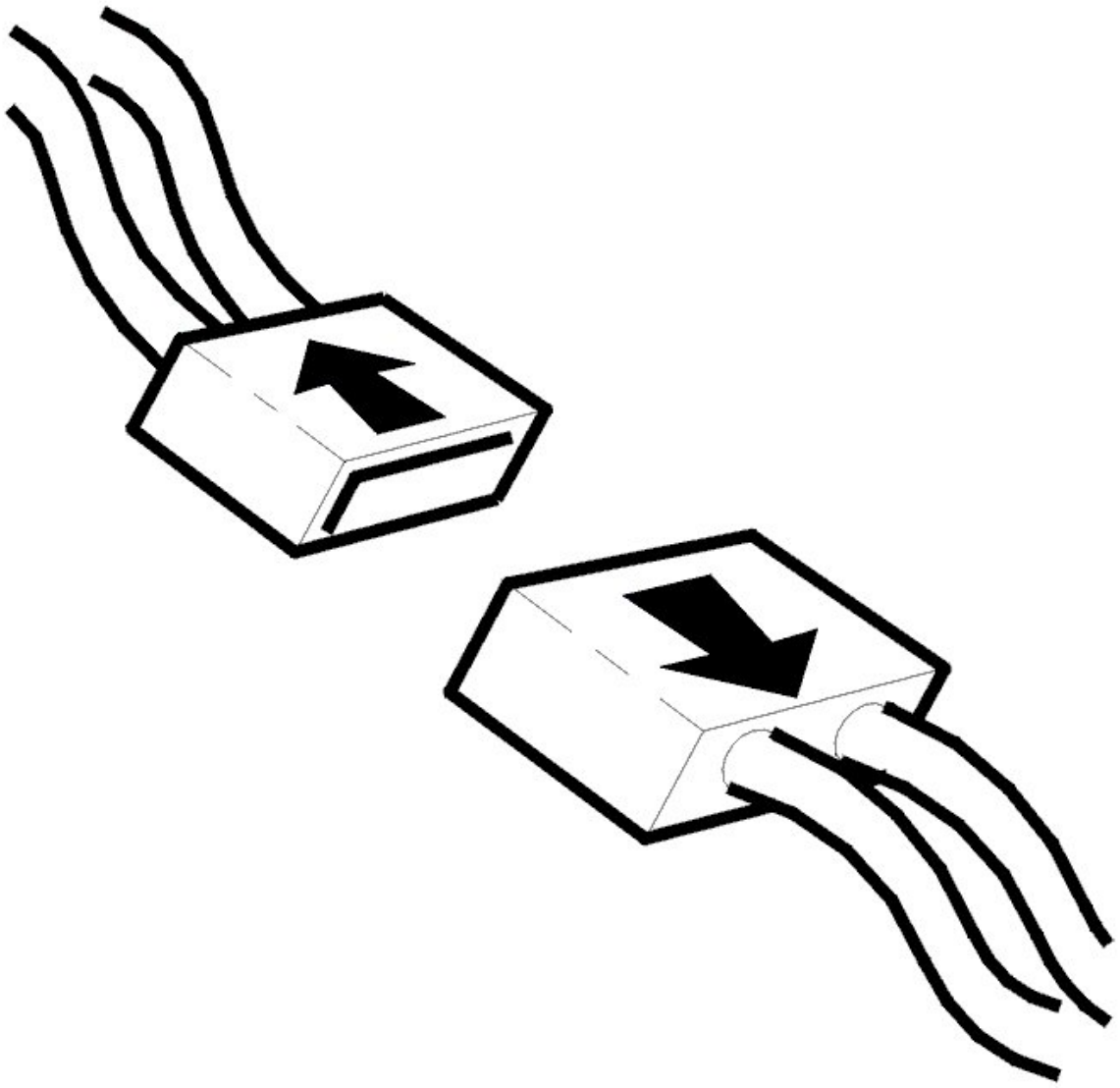
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

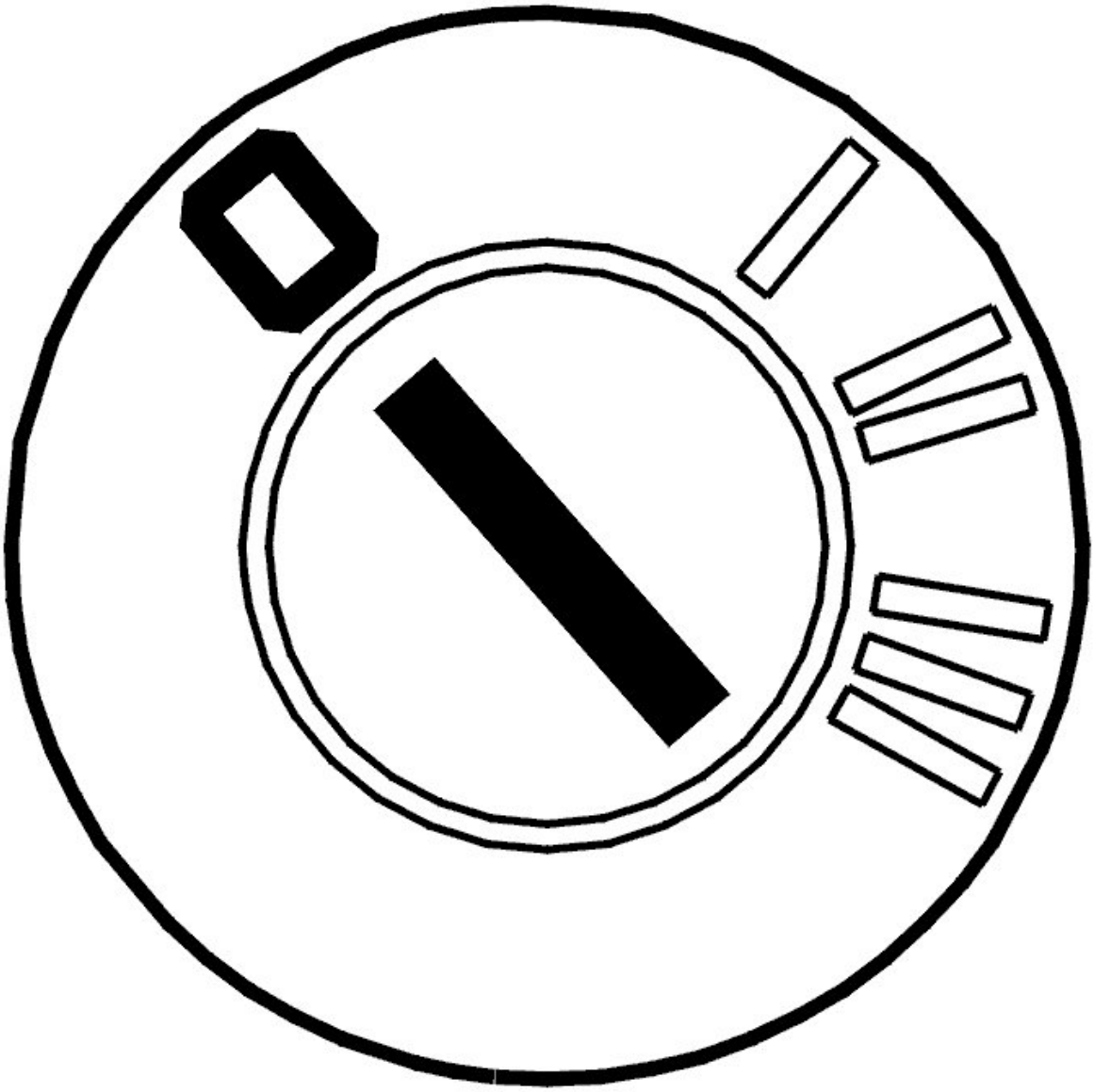
- To replace the front seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A

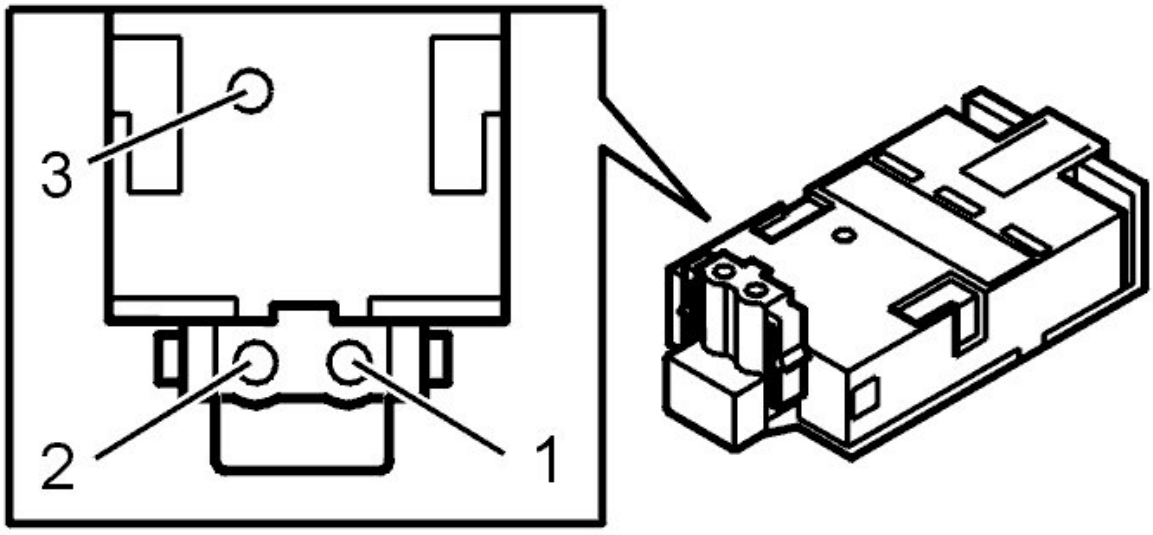
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

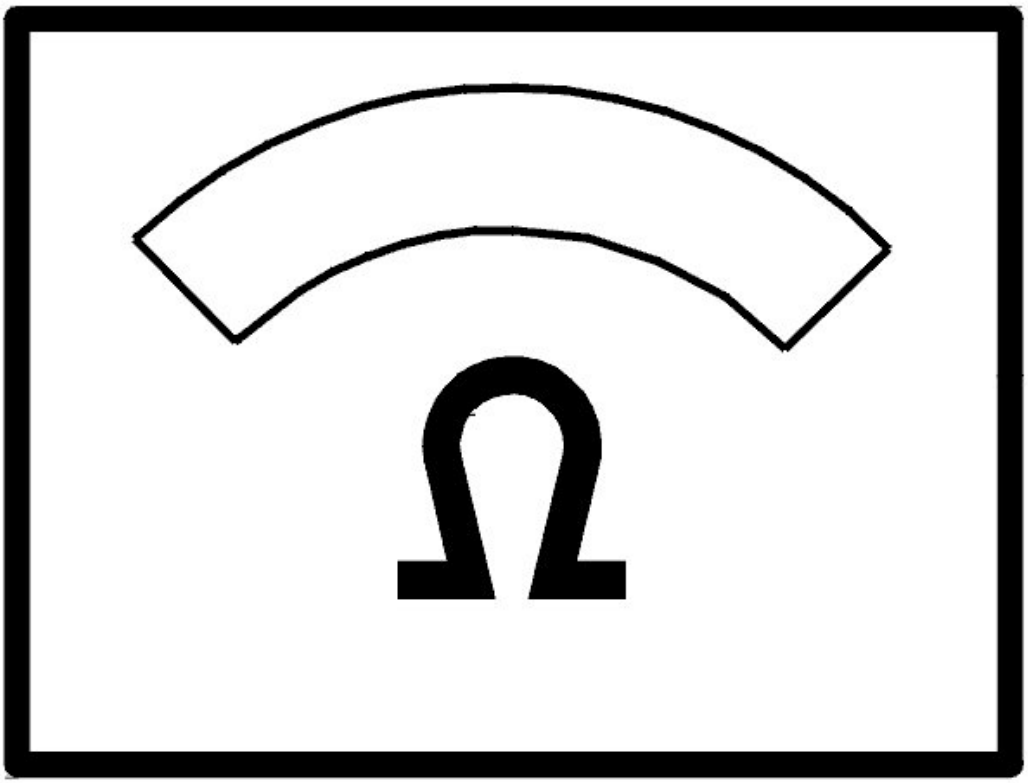
for diagnostic trouble code (DTC) SRS-0082

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

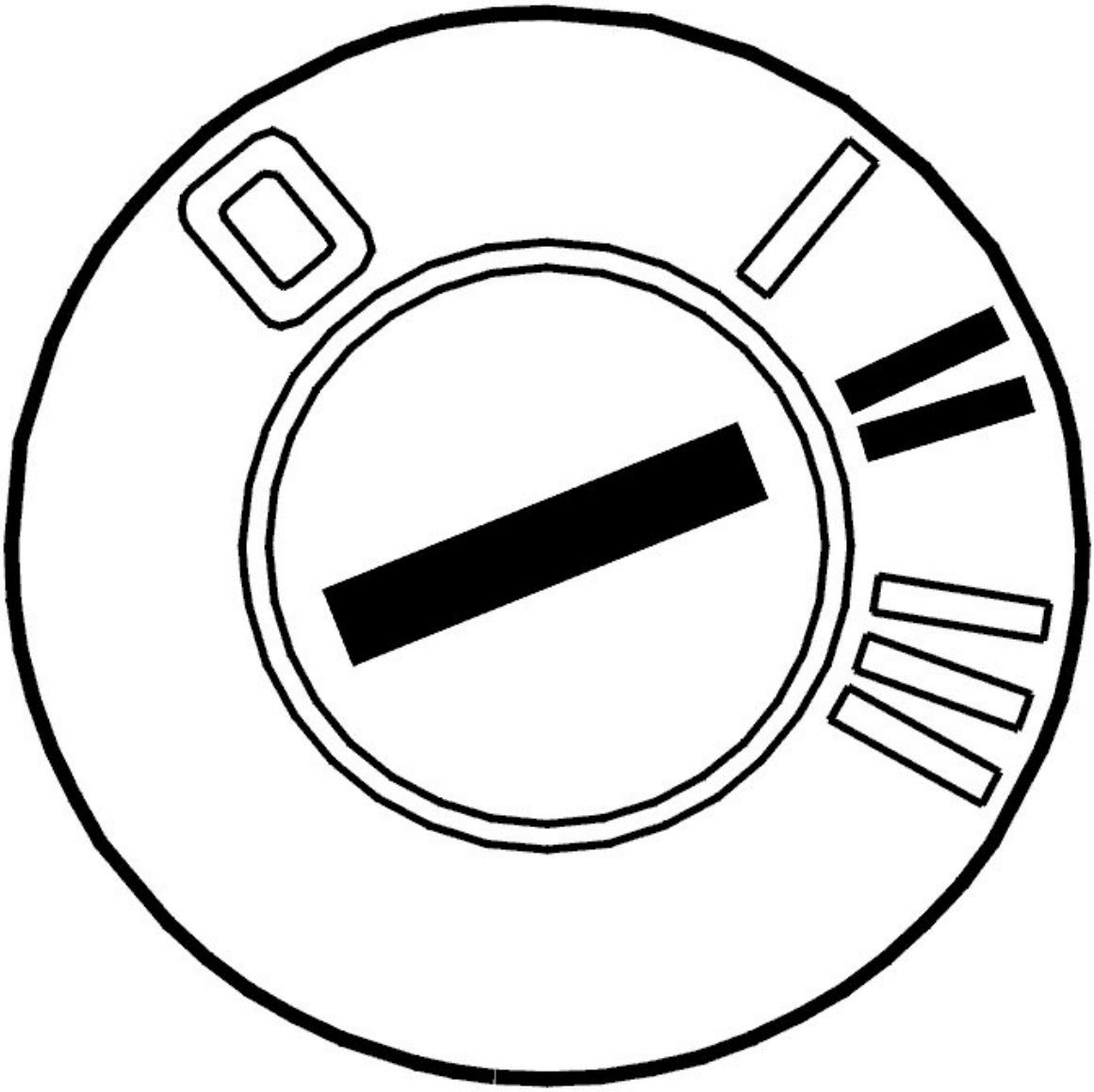
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

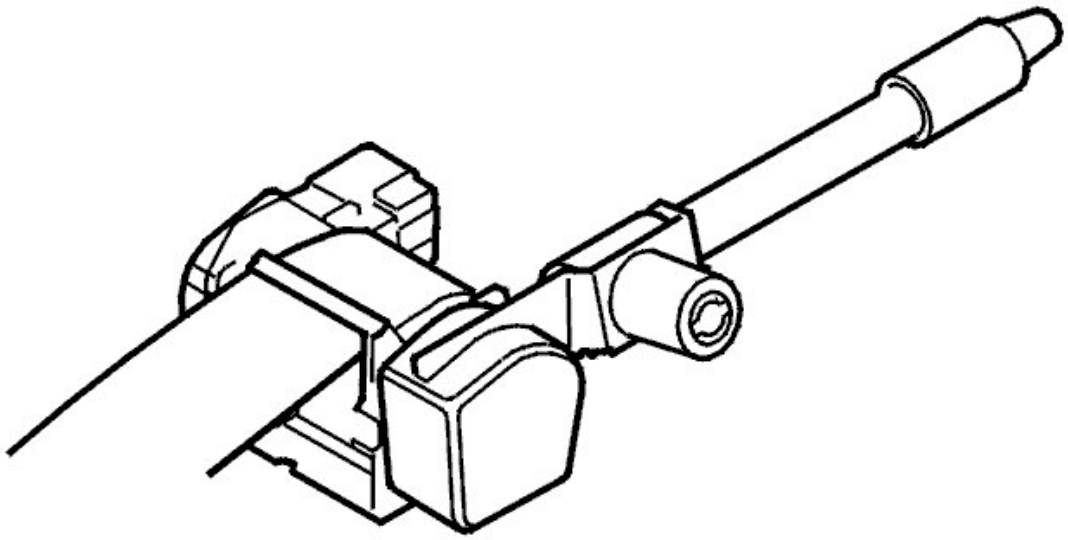
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-006A Diagnostic trouble code information

Condition



If the circuit capacitance is high for more than 10 sec, diagnostic trouble code SRS-006A is displayed.

Substitute value
- Nothing.

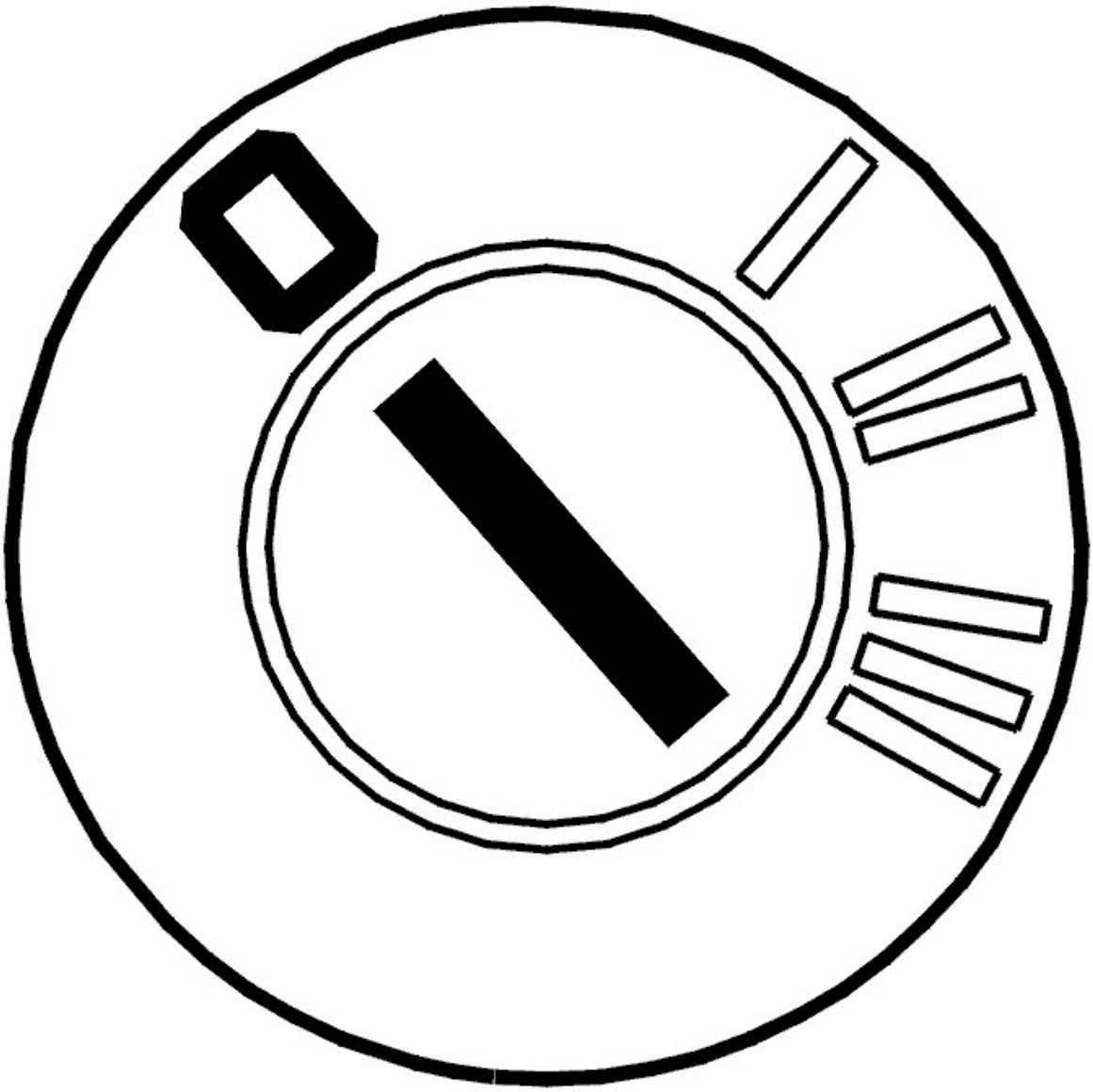
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

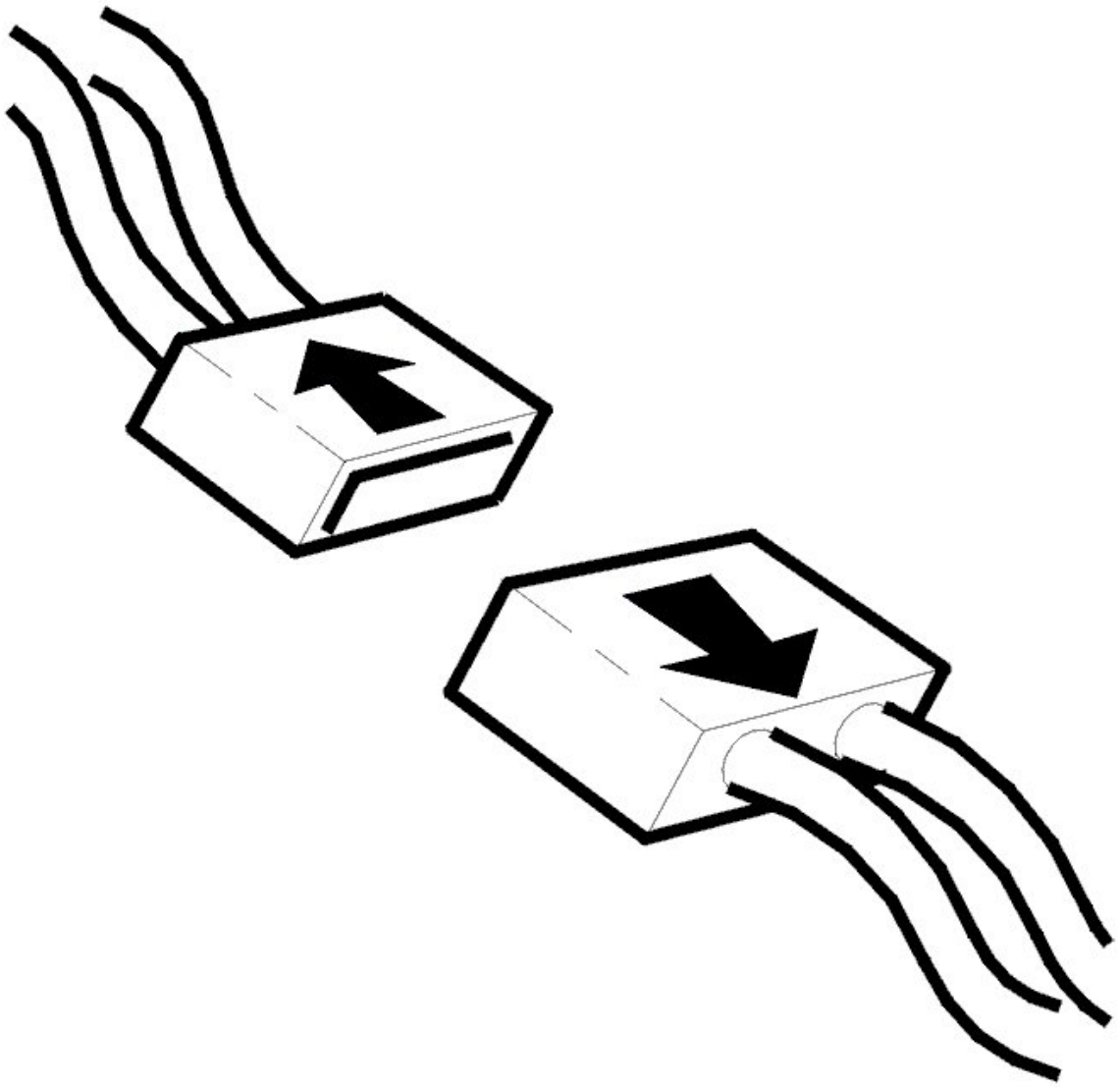
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A,

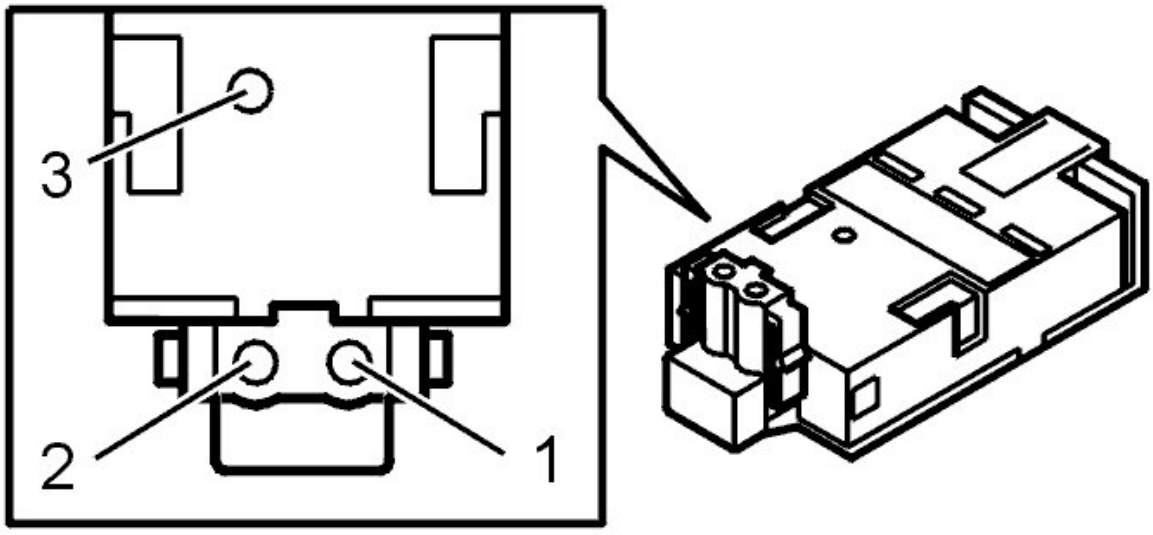
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

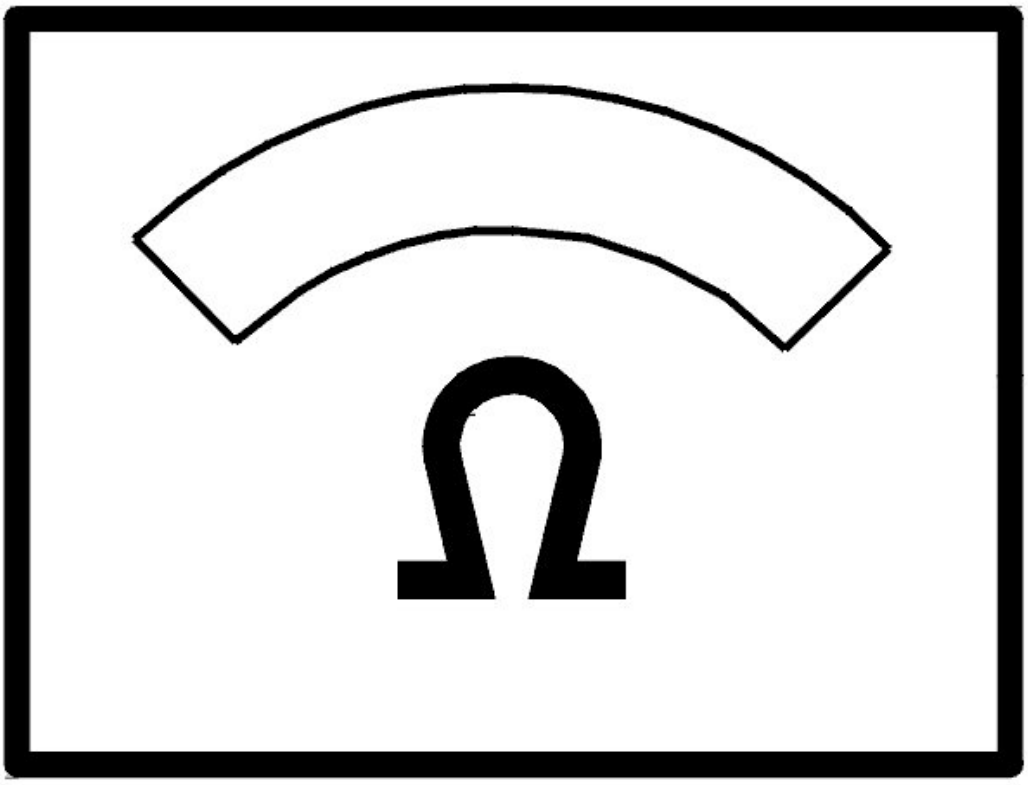
for diagnostic trouble code (DTC) SRS-0082,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

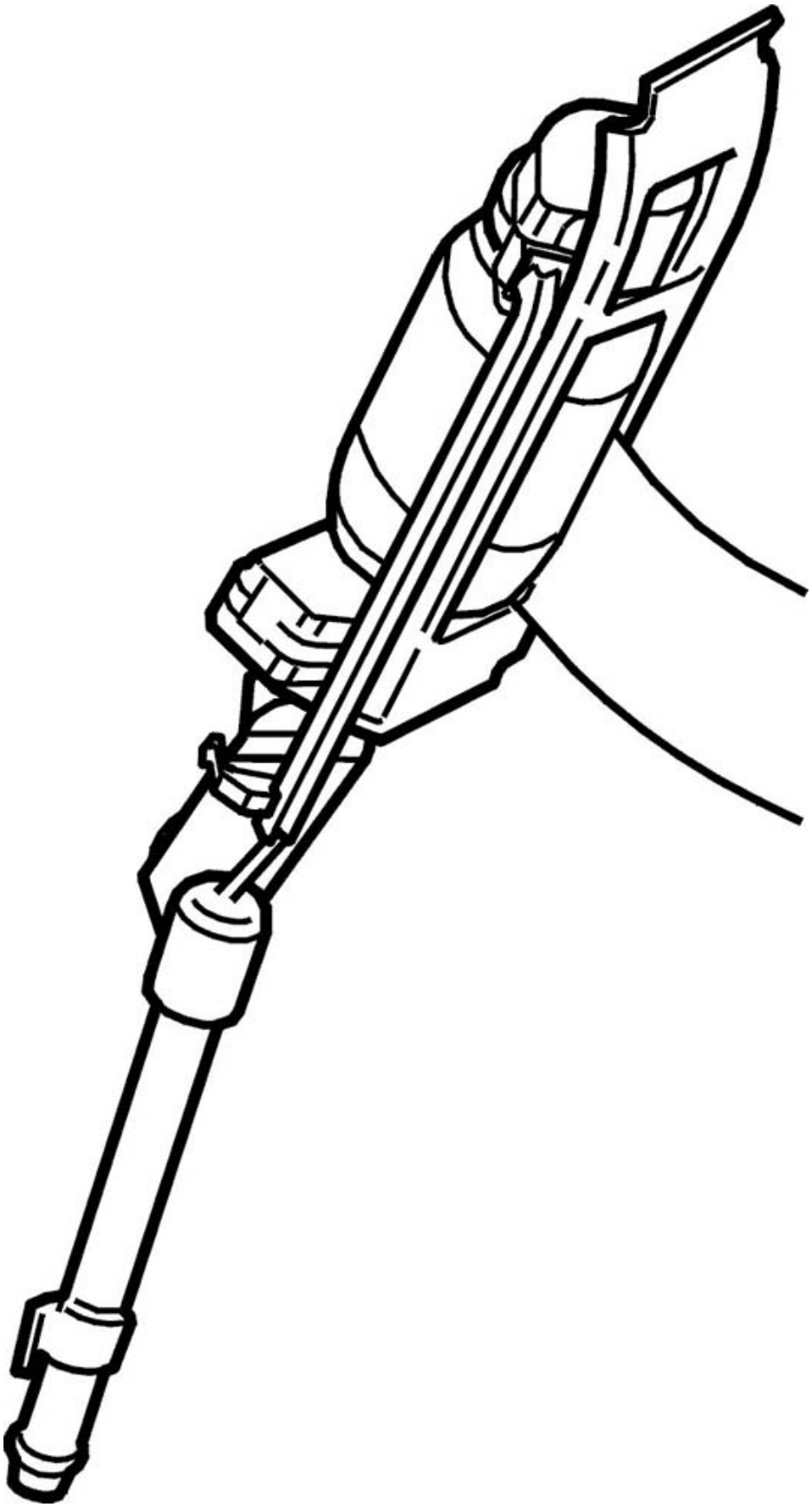
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-006B Diagnostic trouble code information

Condition



If the circuit capacitance is low for more than 10 sec, diagnostic trouble code SRS-006B is displayed.

Substitute value

- Nothing.

Possible source

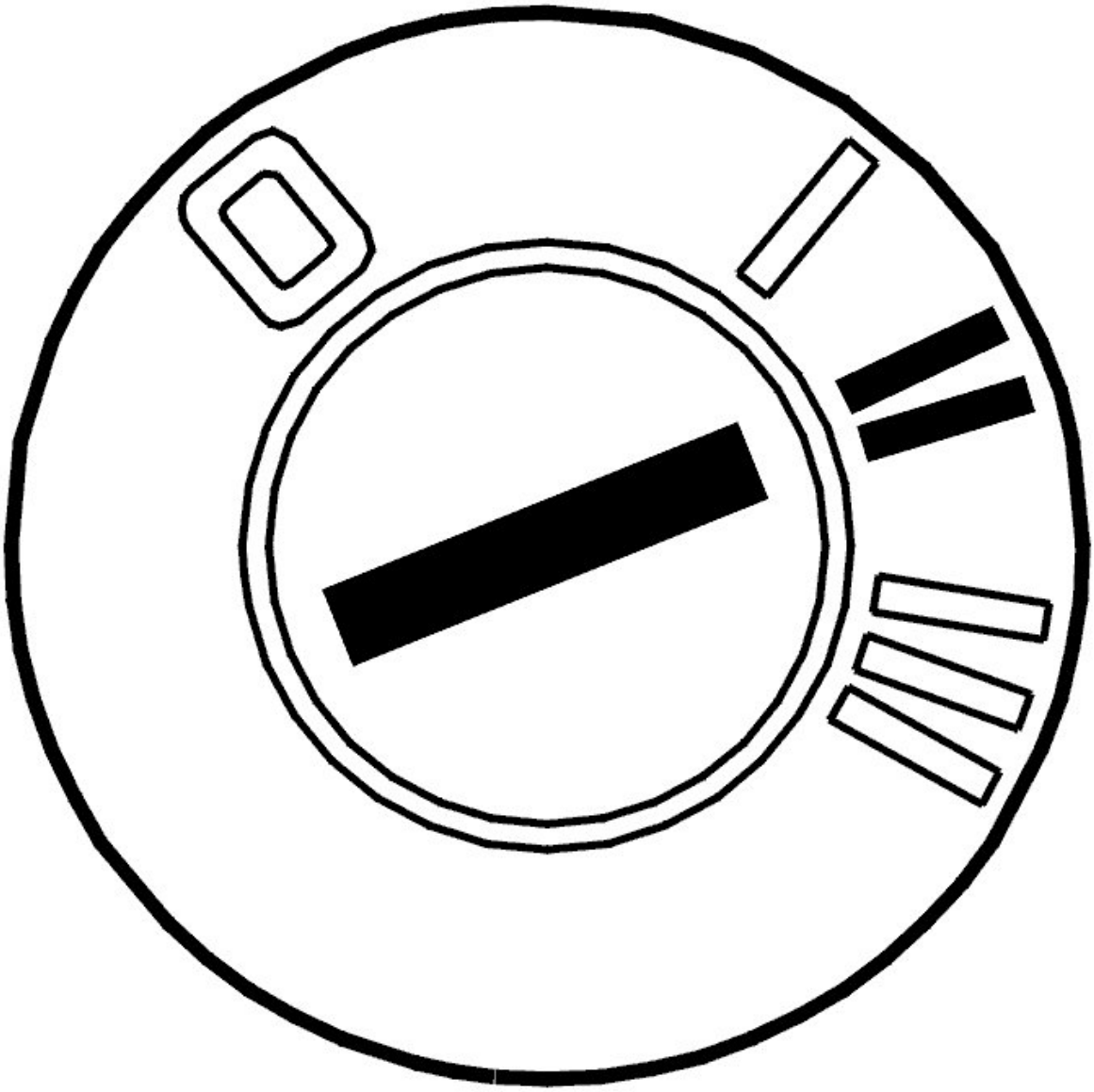
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

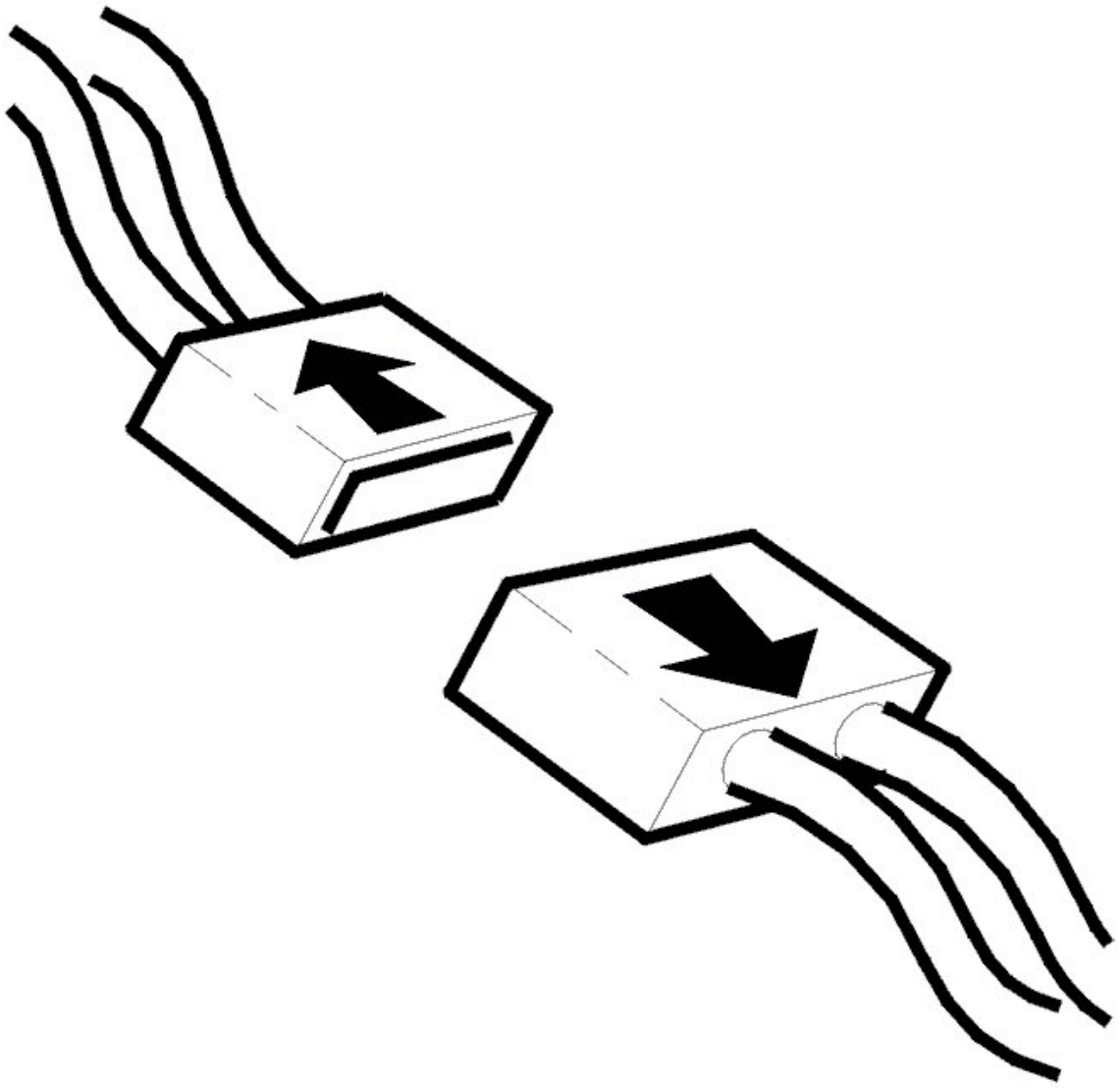
Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

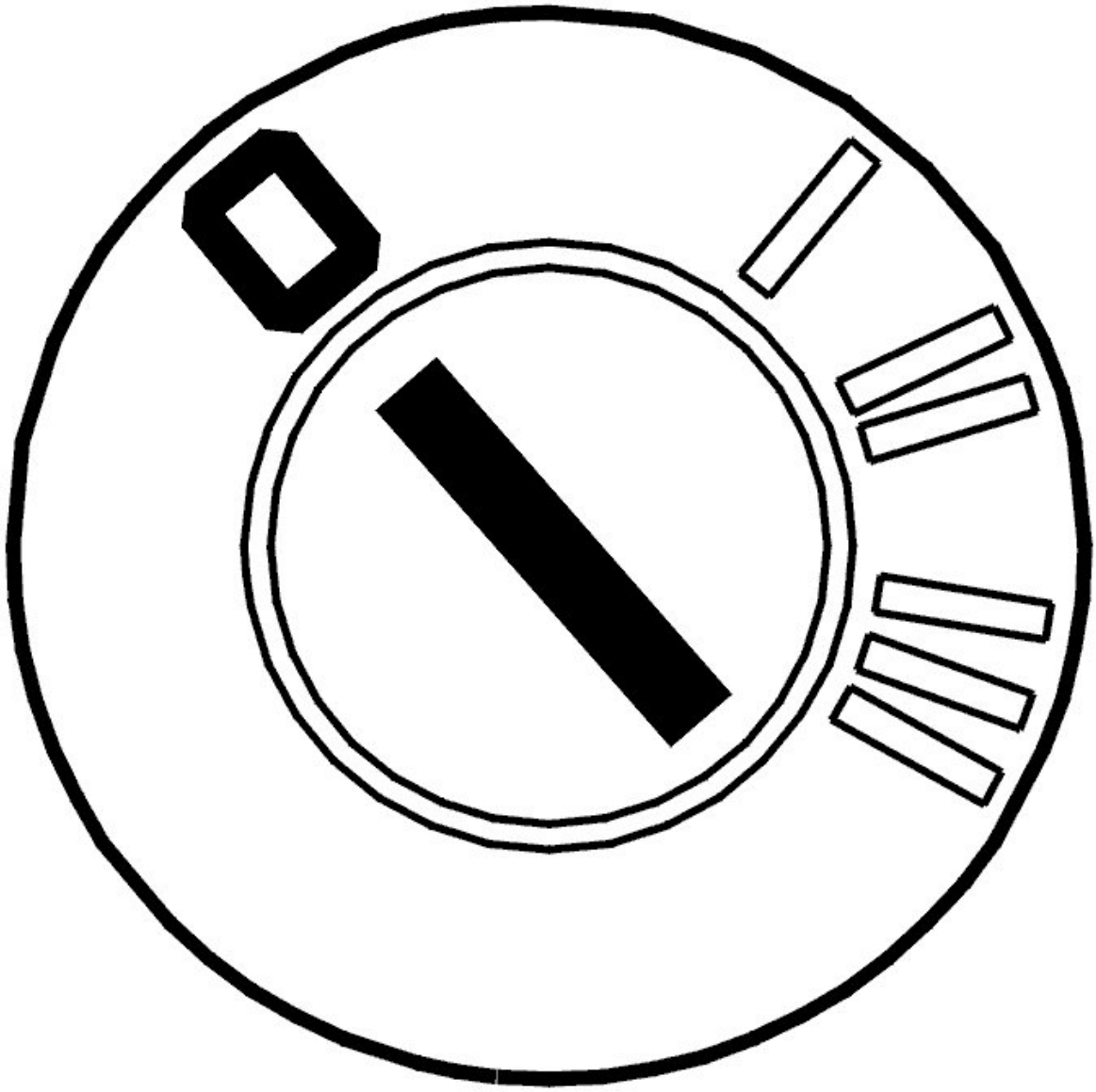
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0063,

front left seat belt tensioner terminals #5A(5) and #6A(6) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-006B,

front right seat belt tensioner terminals #5C(1) and #6C(2) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0073,

rear left seat belt tensioner terminals #16A(16) and #15A(15) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-007B,

centre rear seat belt tensioner terminals 17A(17) and #18A(18) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0083,

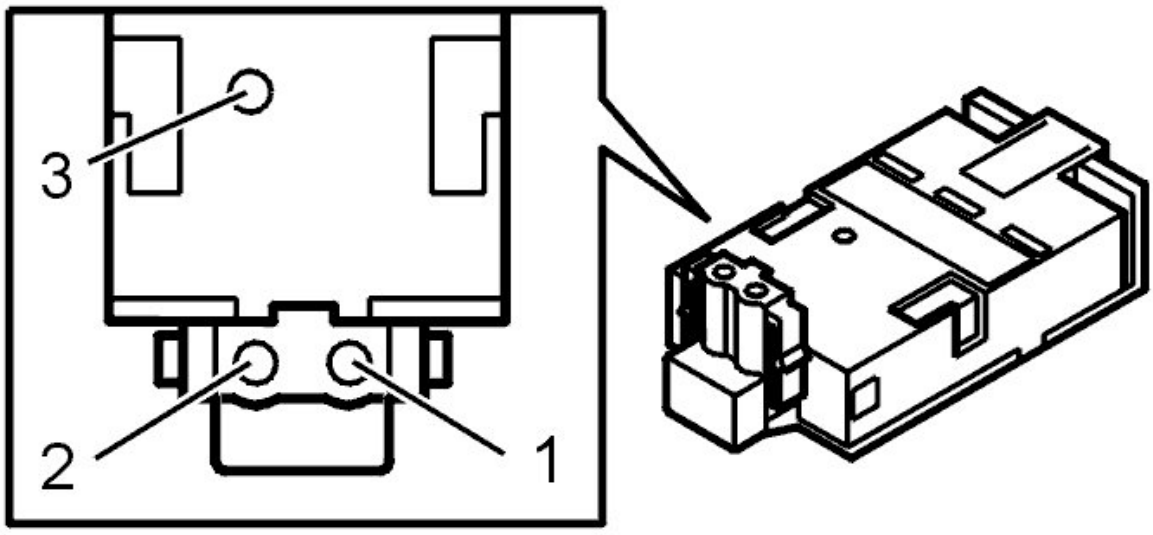
rear right seat belt tensioner terminals #16C(12) and #15C(11) and connector terminals #1 and #3
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

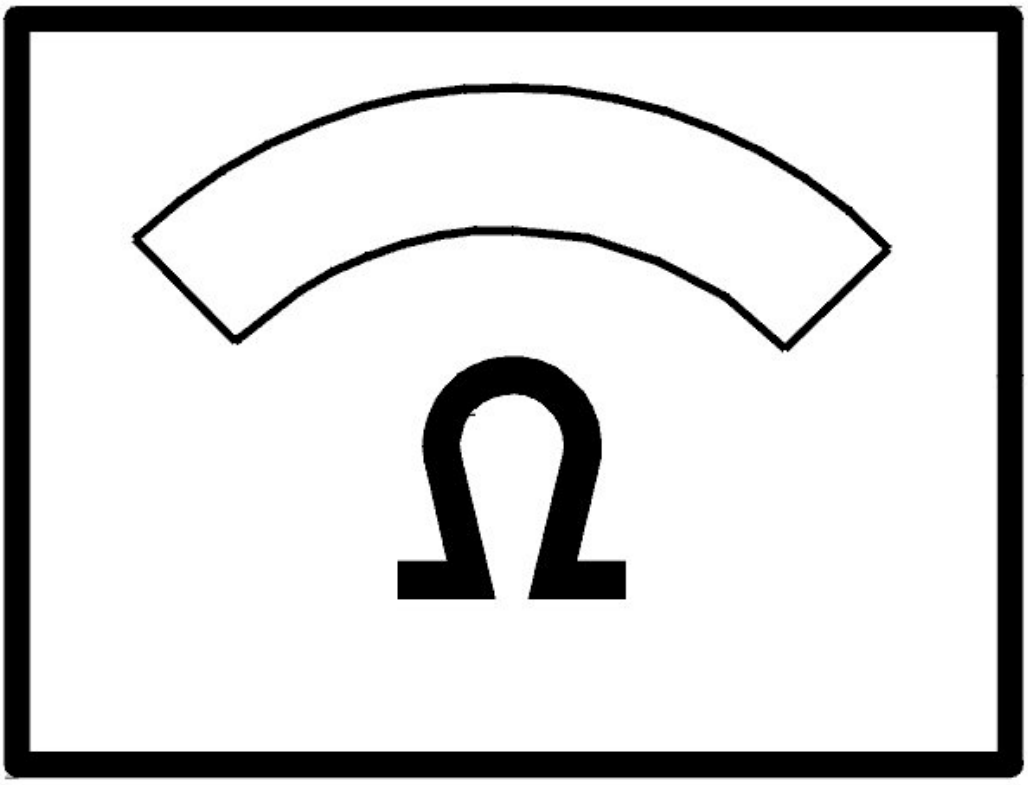
Hint: Checking the integrated capacitor in the igniter connector by taking resistance measurements.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

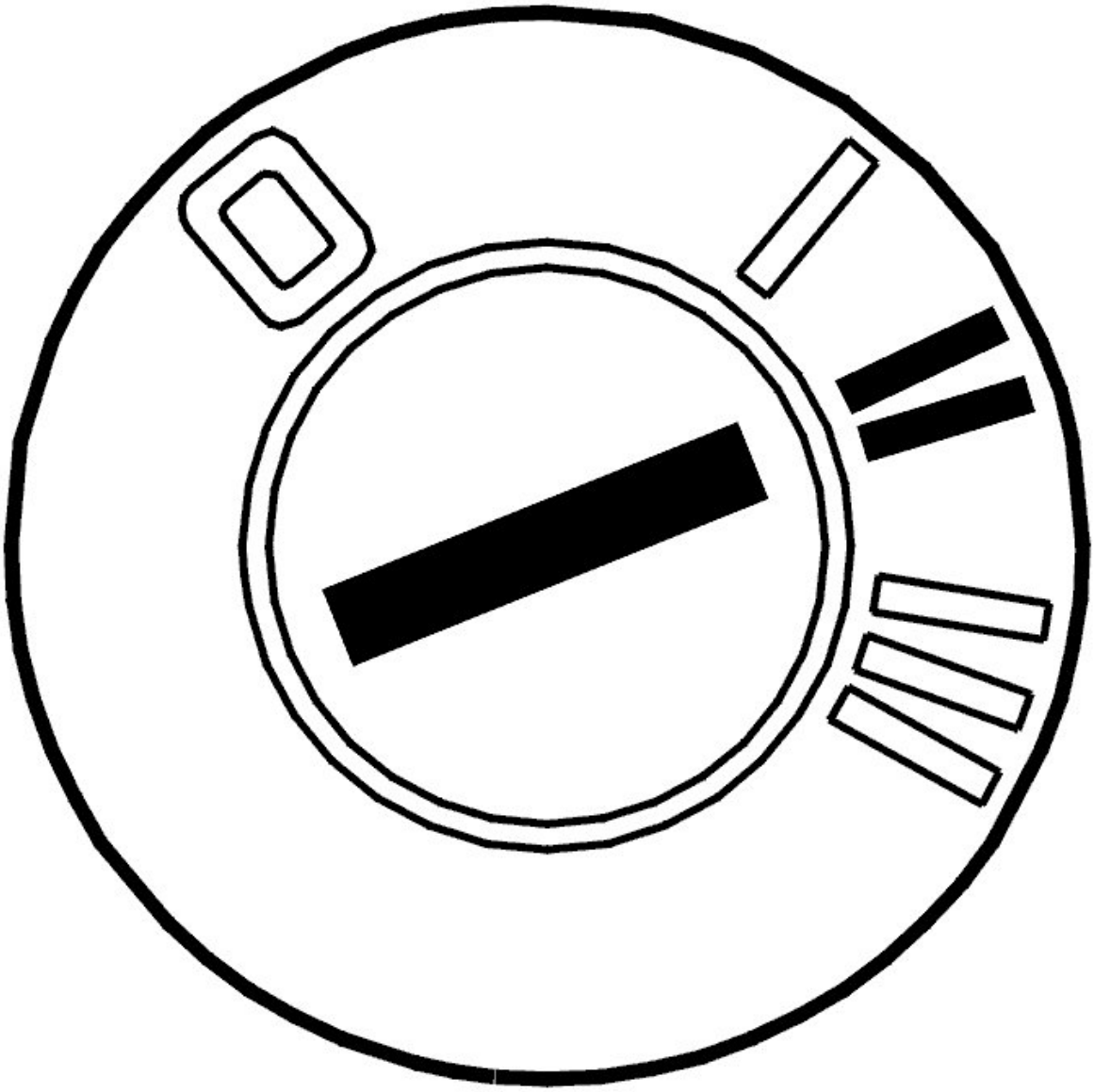
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

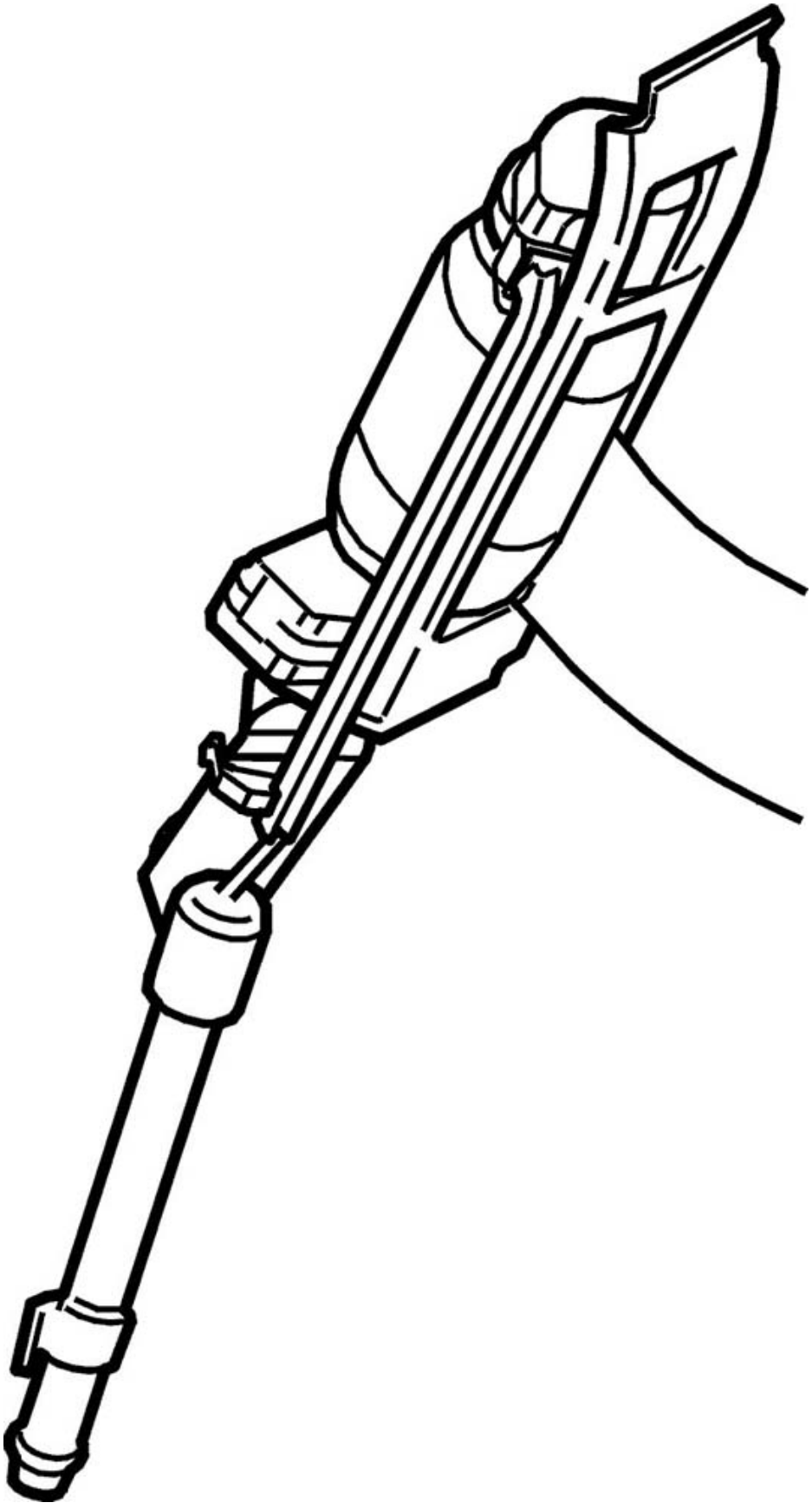
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-006B Diagnostic trouble code information

Condition



If the circuit capacitance is low for more than 10 sec, diagnostic trouble code SRS-006B is displayed.

Substitute value
- Nothing.

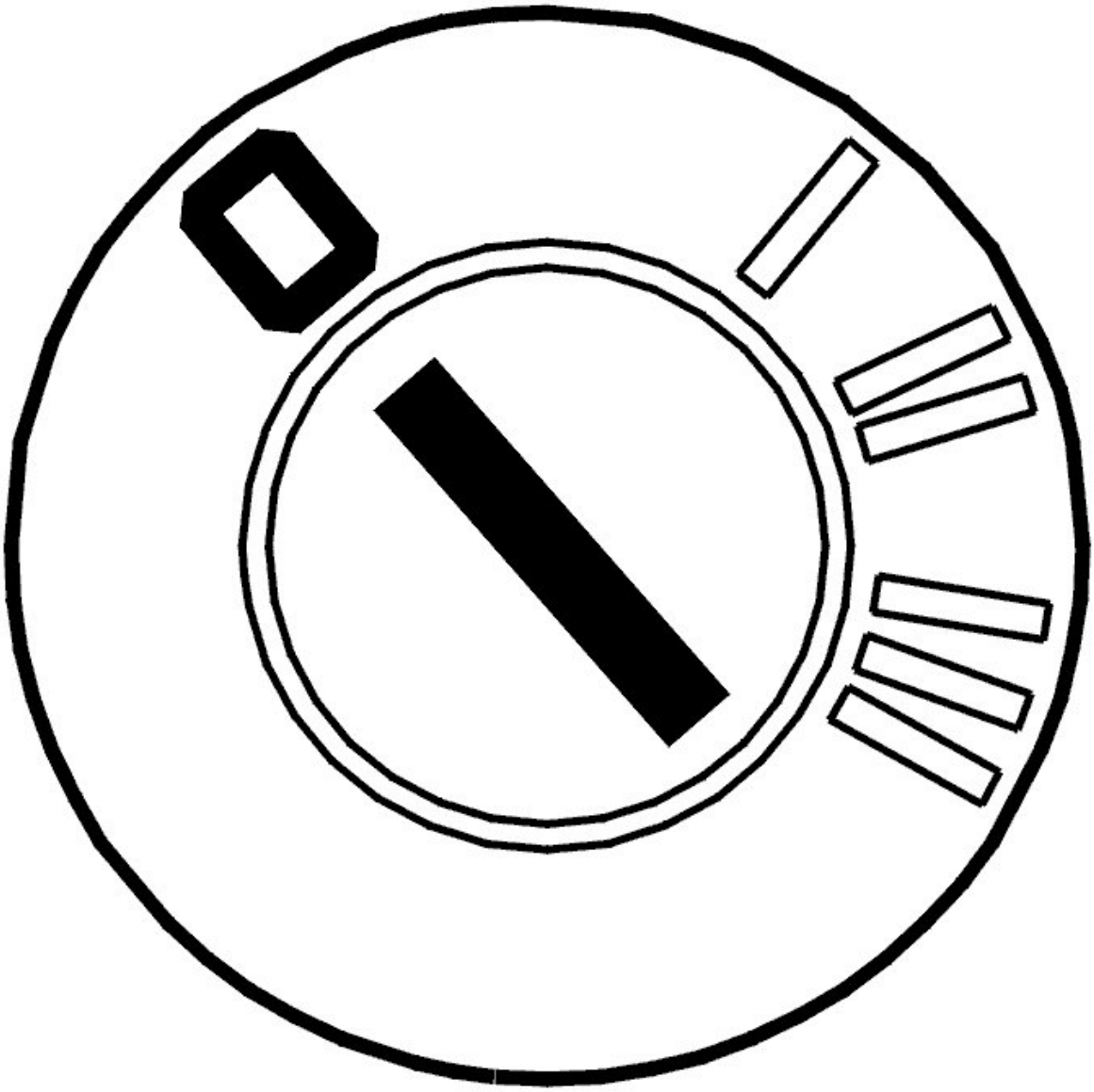
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- SRS warning lamp on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0063,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006B,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0073,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007B,

terminals #17A(17), #18A(18) of the centre rear seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0083,

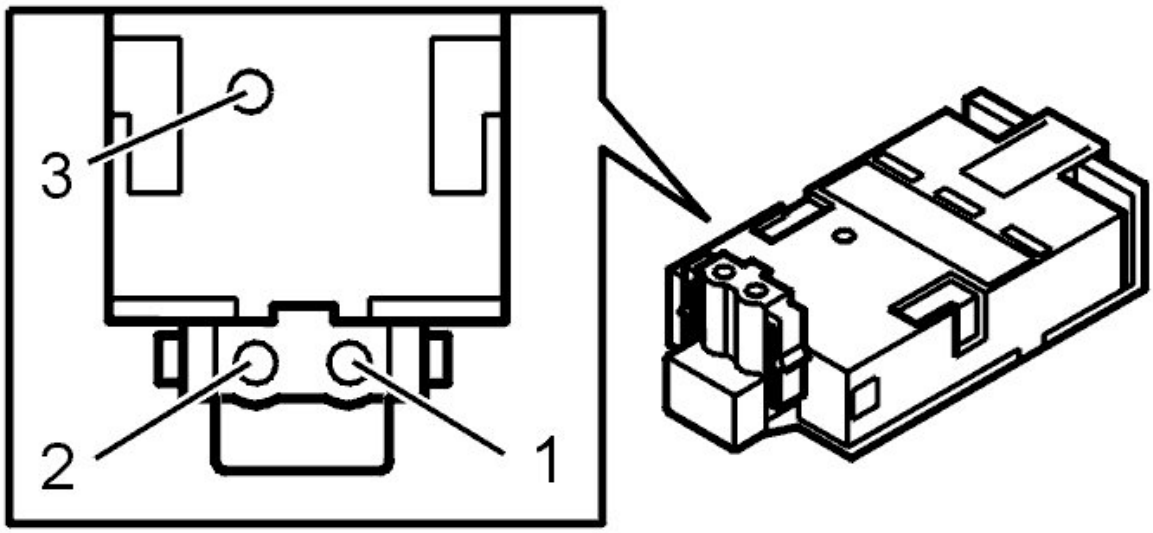
terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

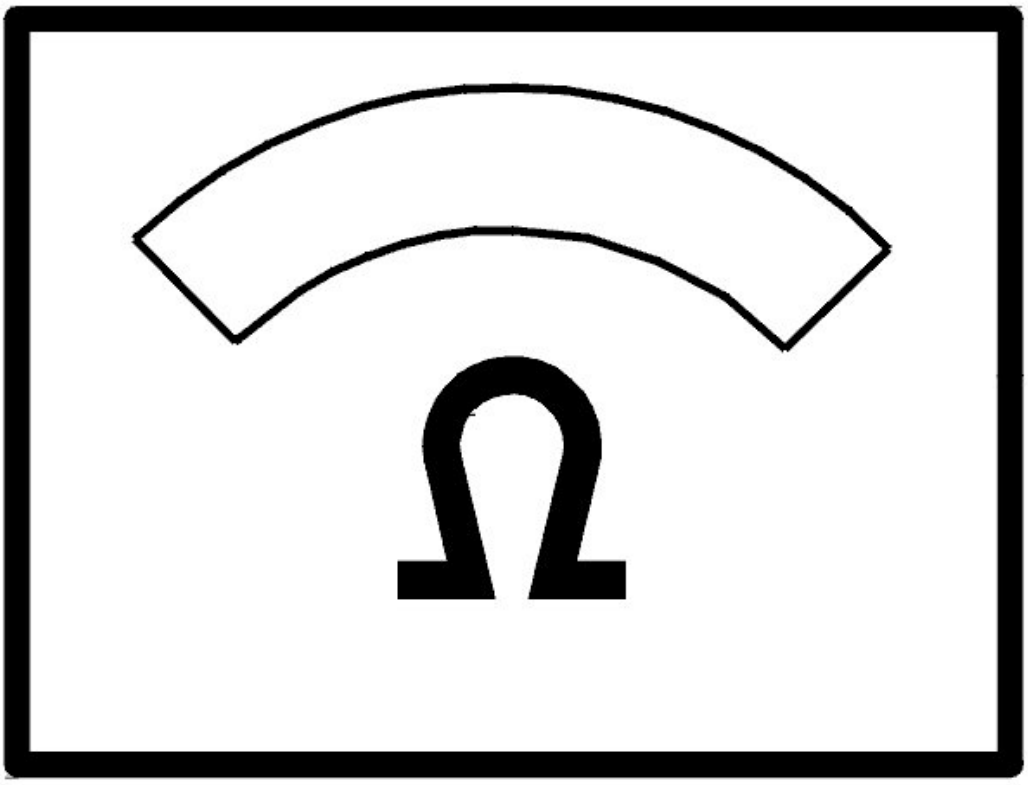
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

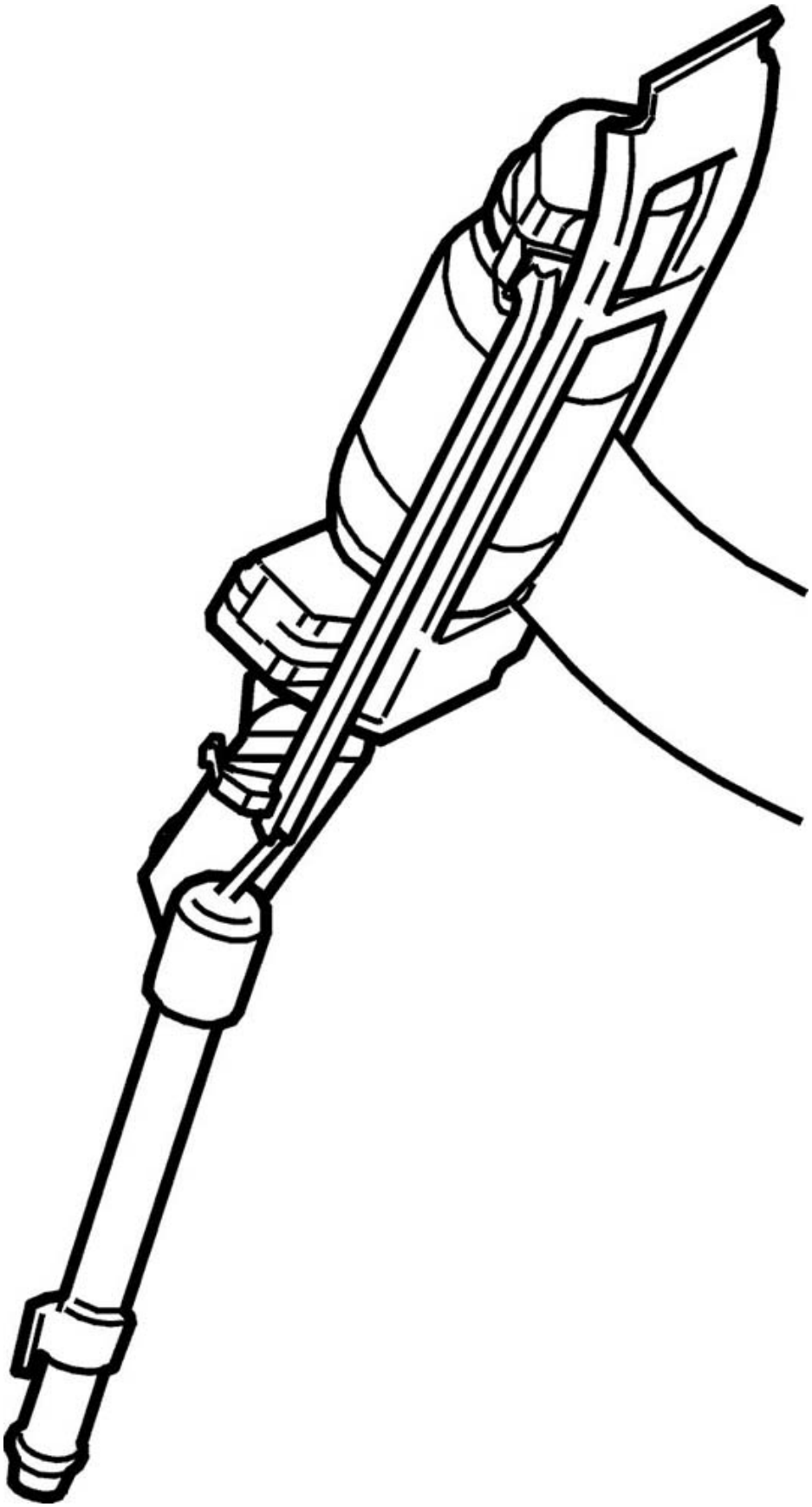
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information SRS-006C

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-006C is displayed.

Substitute value

- Nothing.

Possible source

- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

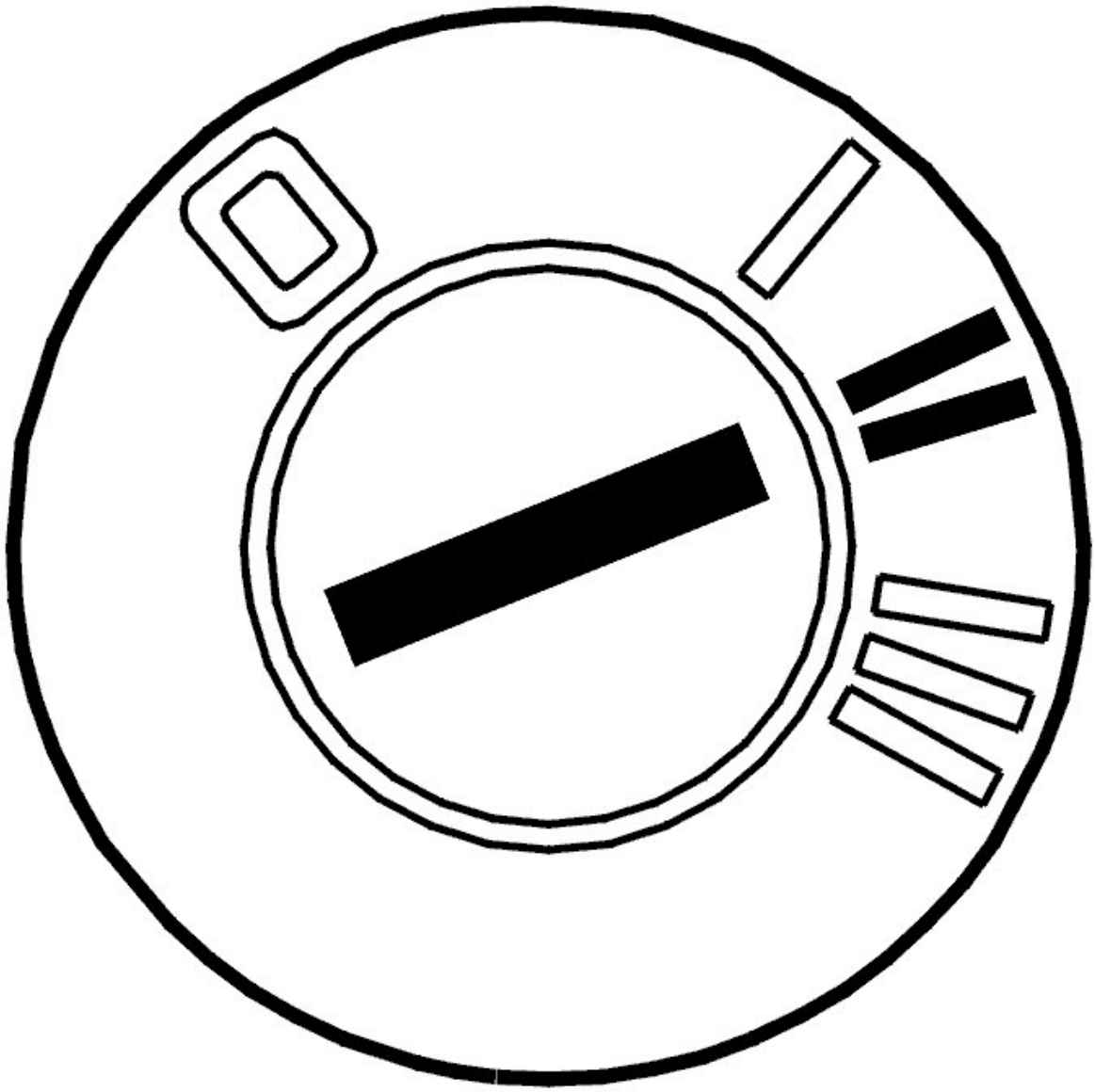
Fault symptom[s]

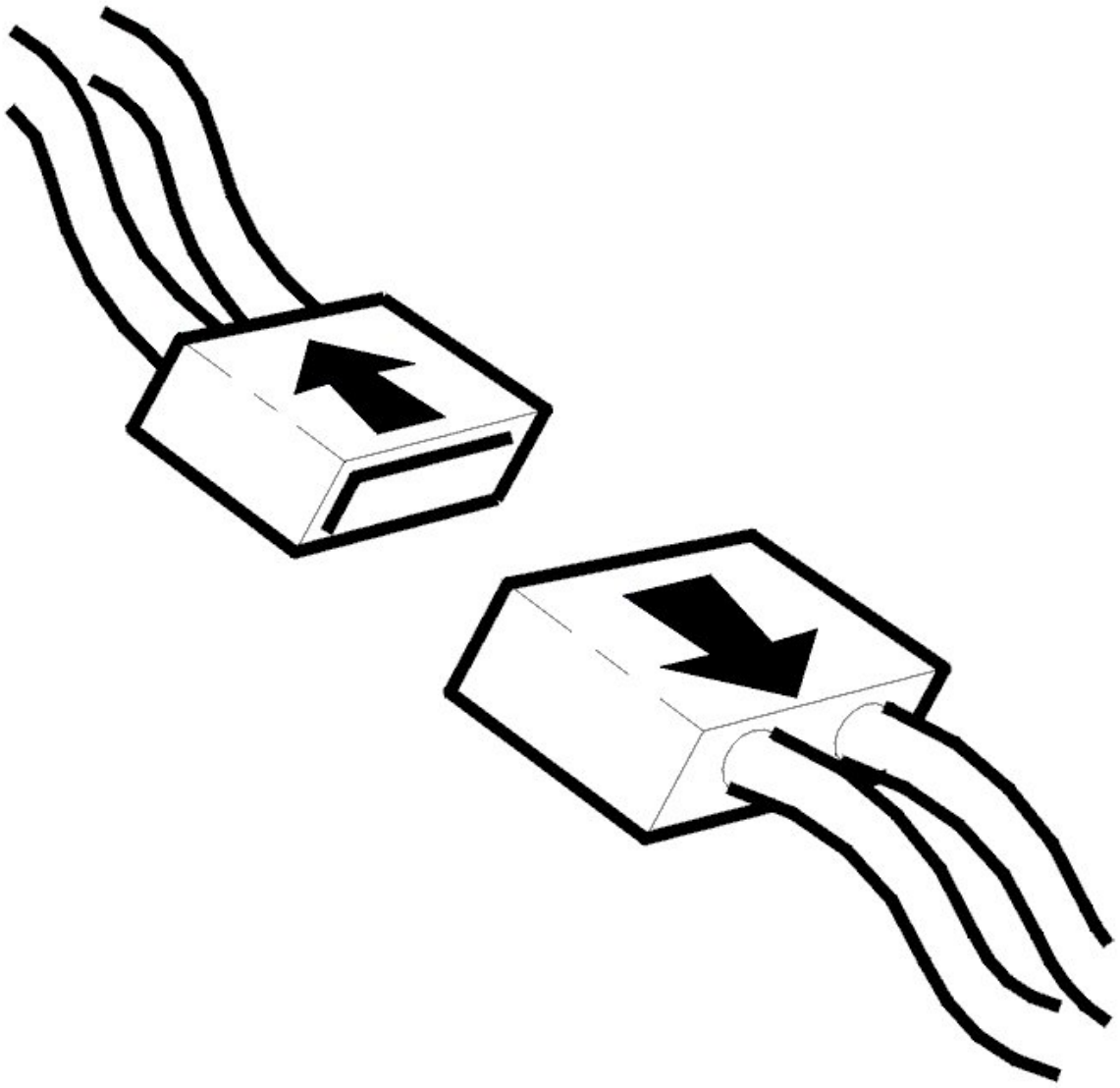
- SRS warning lamp on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

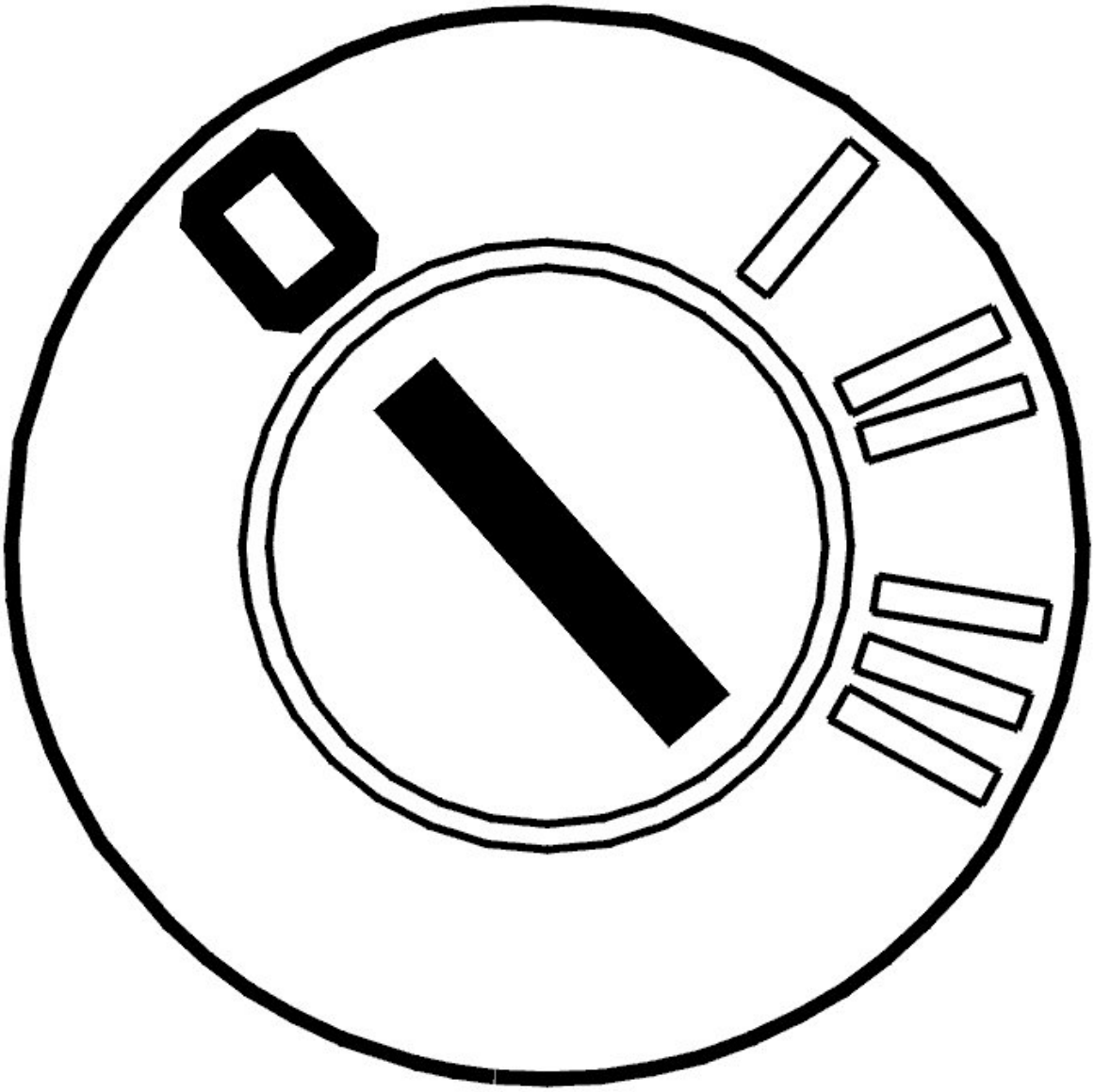
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

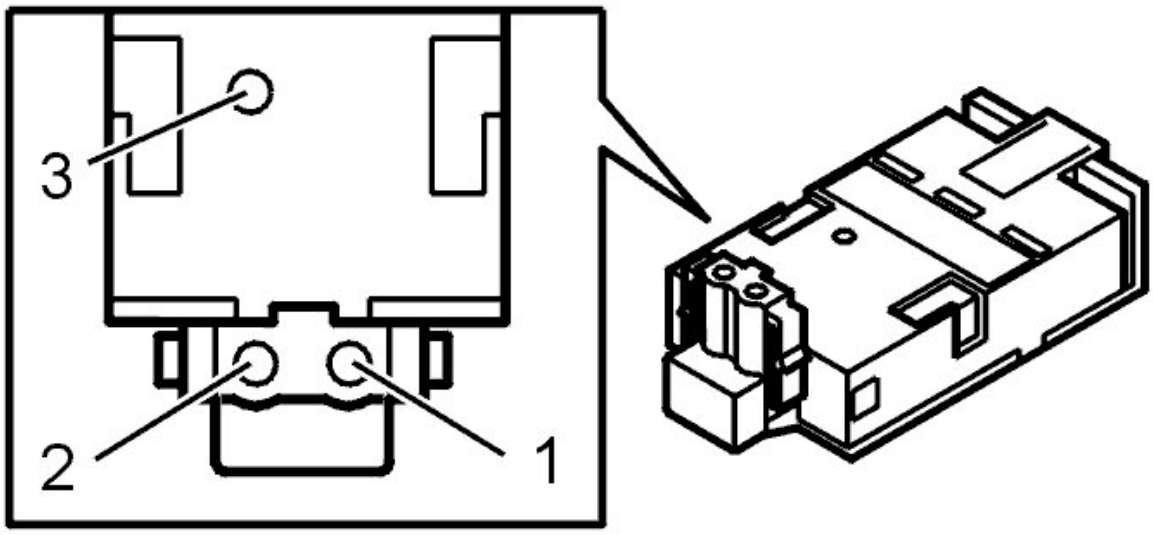
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

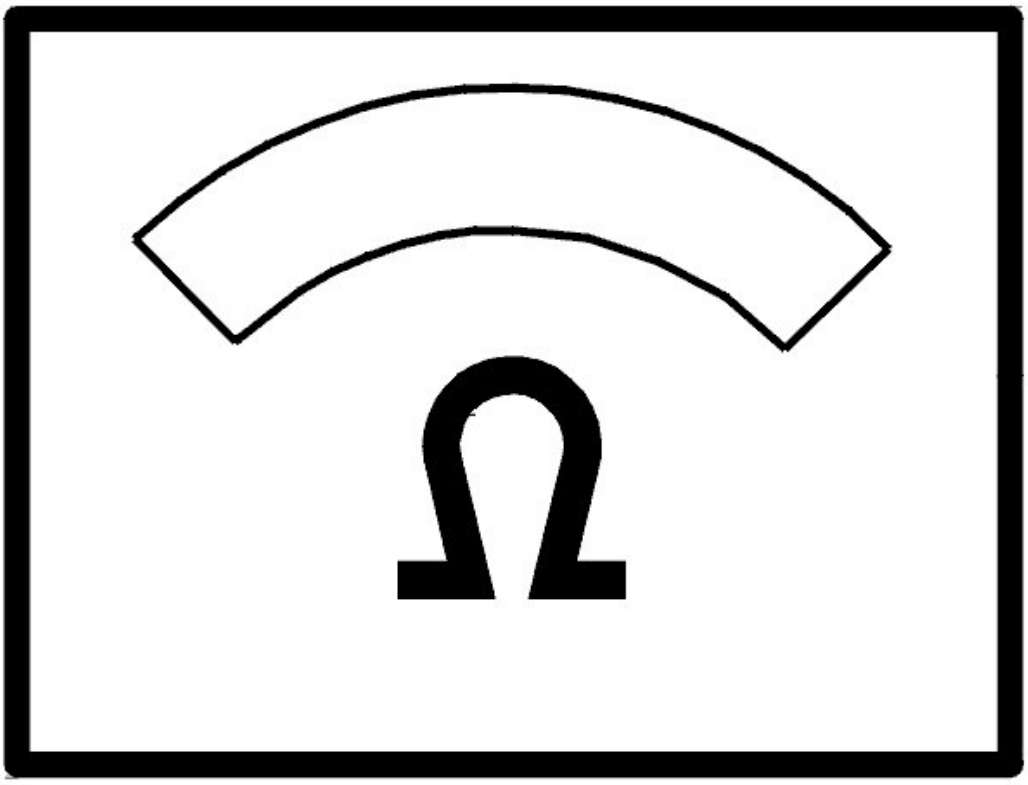
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

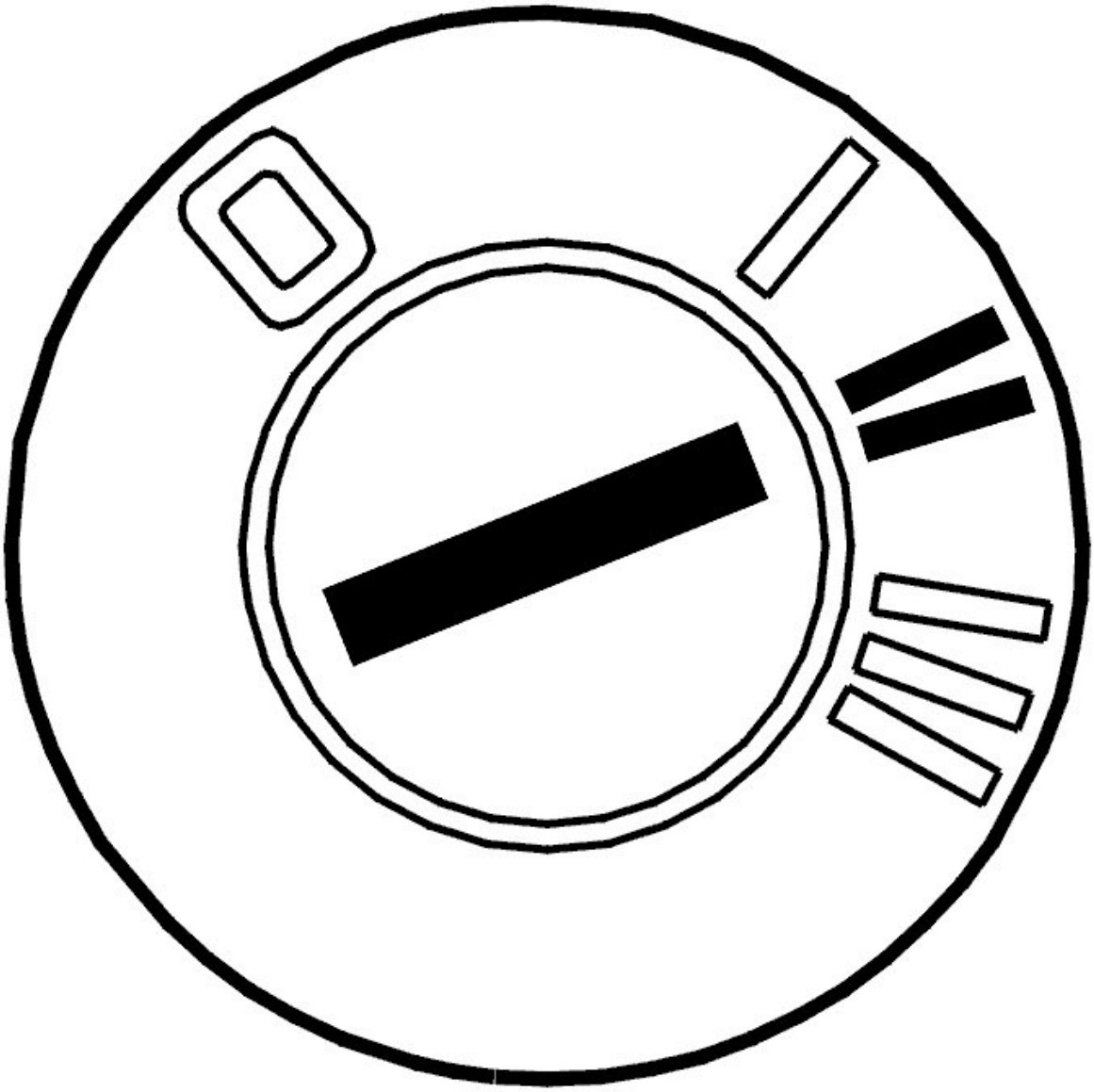
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

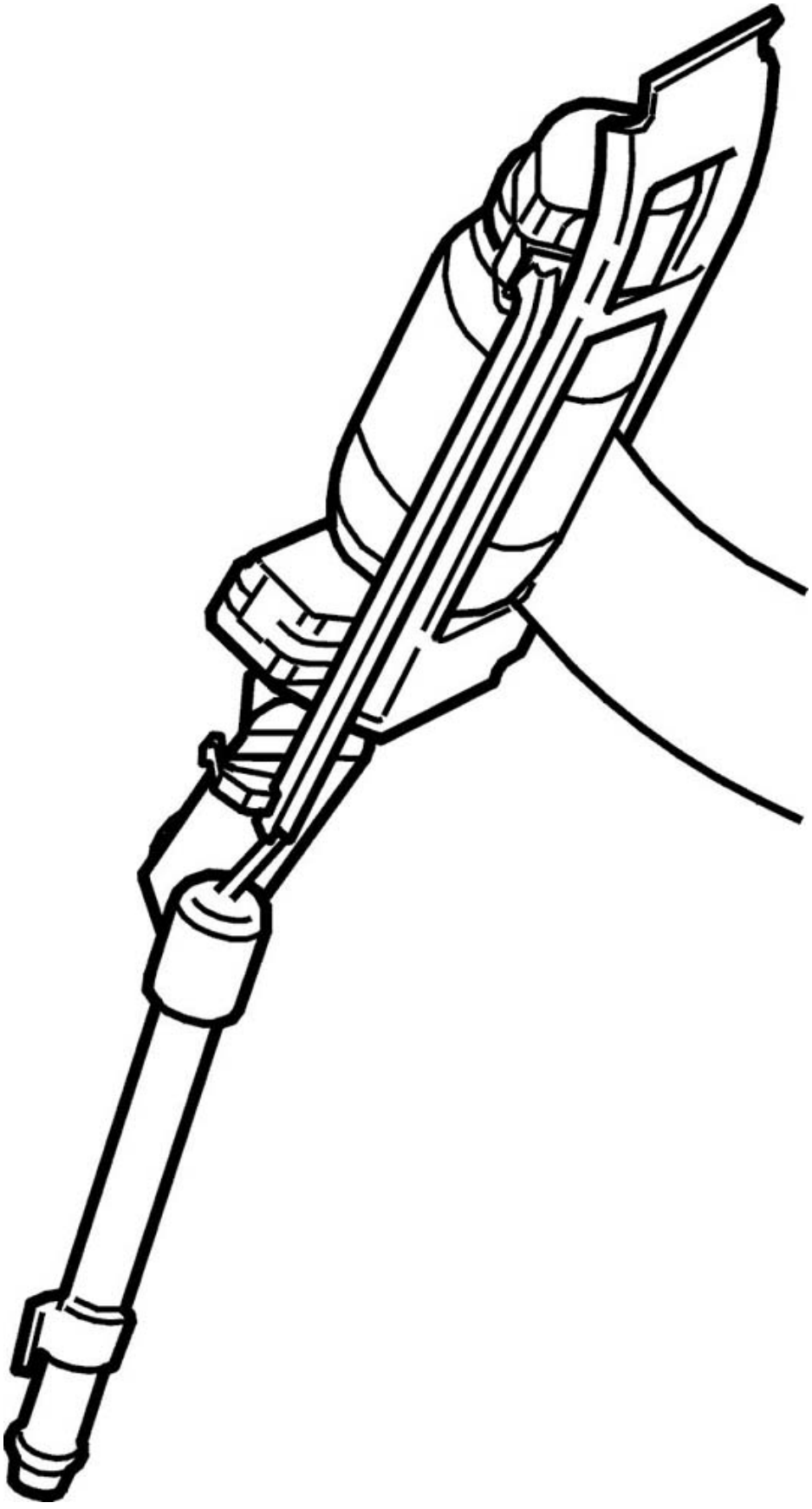
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information SRS-006C

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-006C is displayed.

Substitute value
- Nothing.

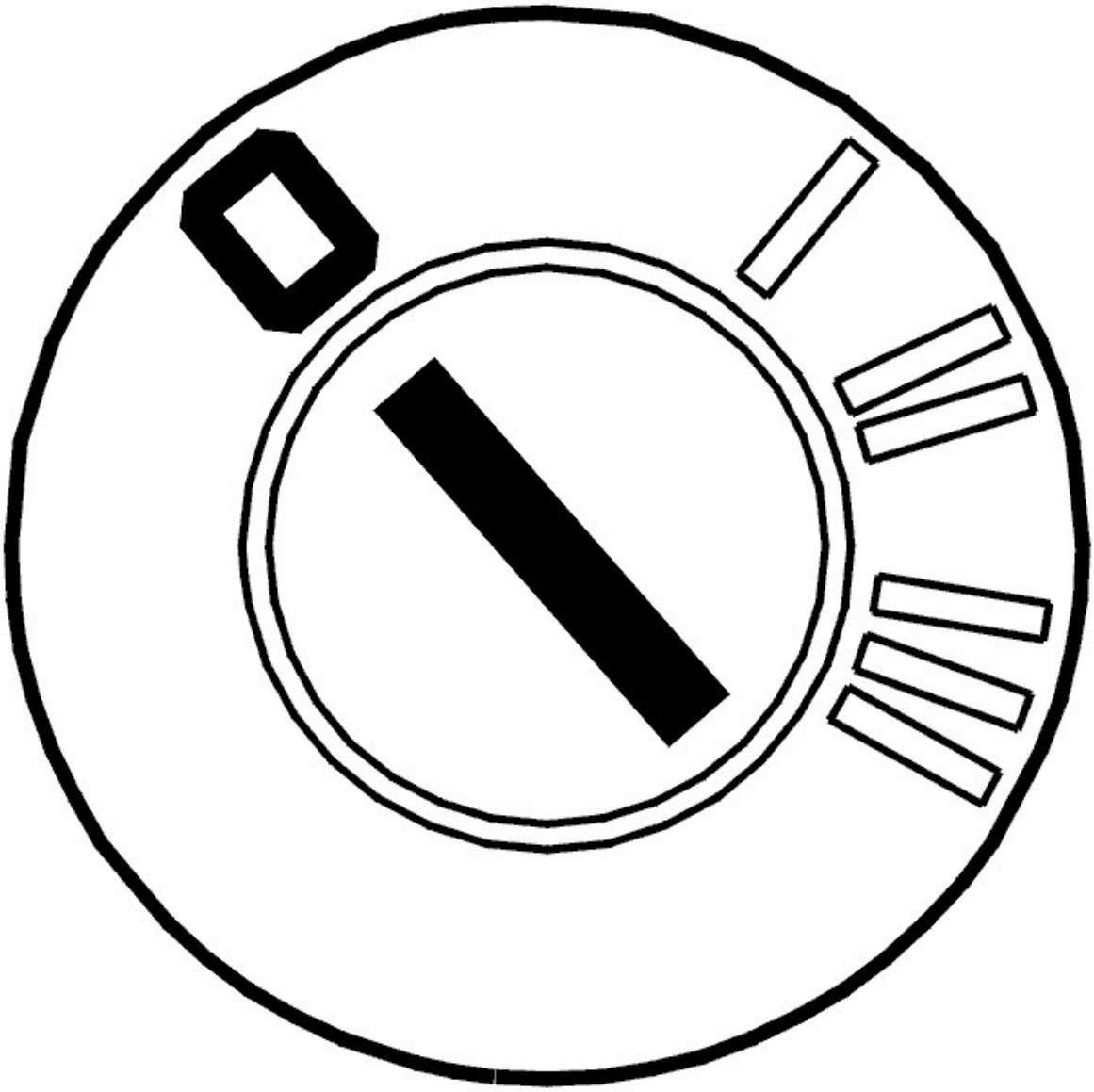
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

Fault symptom[s]
- SRS warning lamp on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

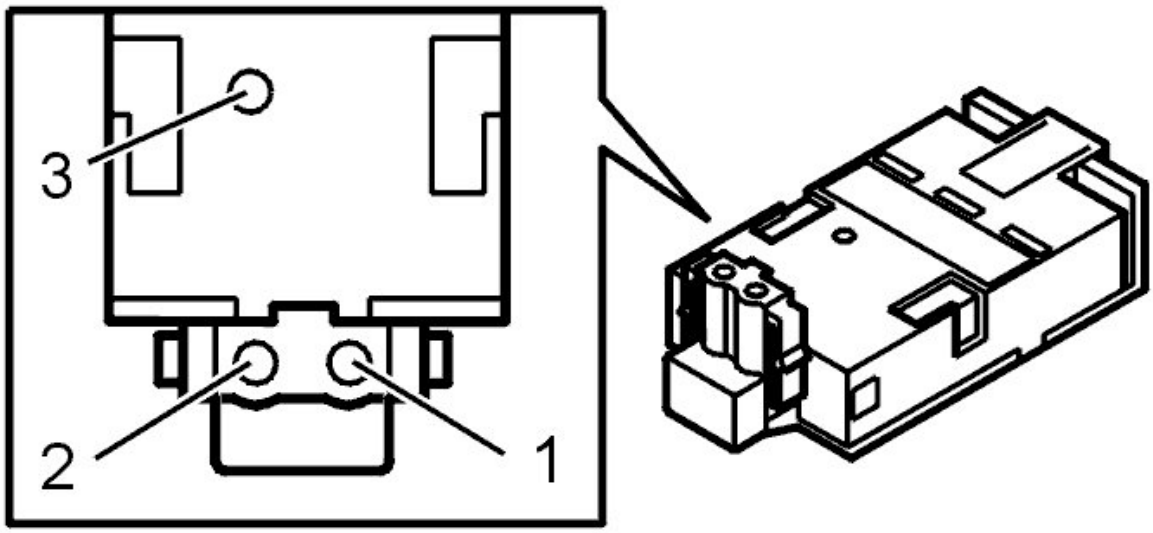
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

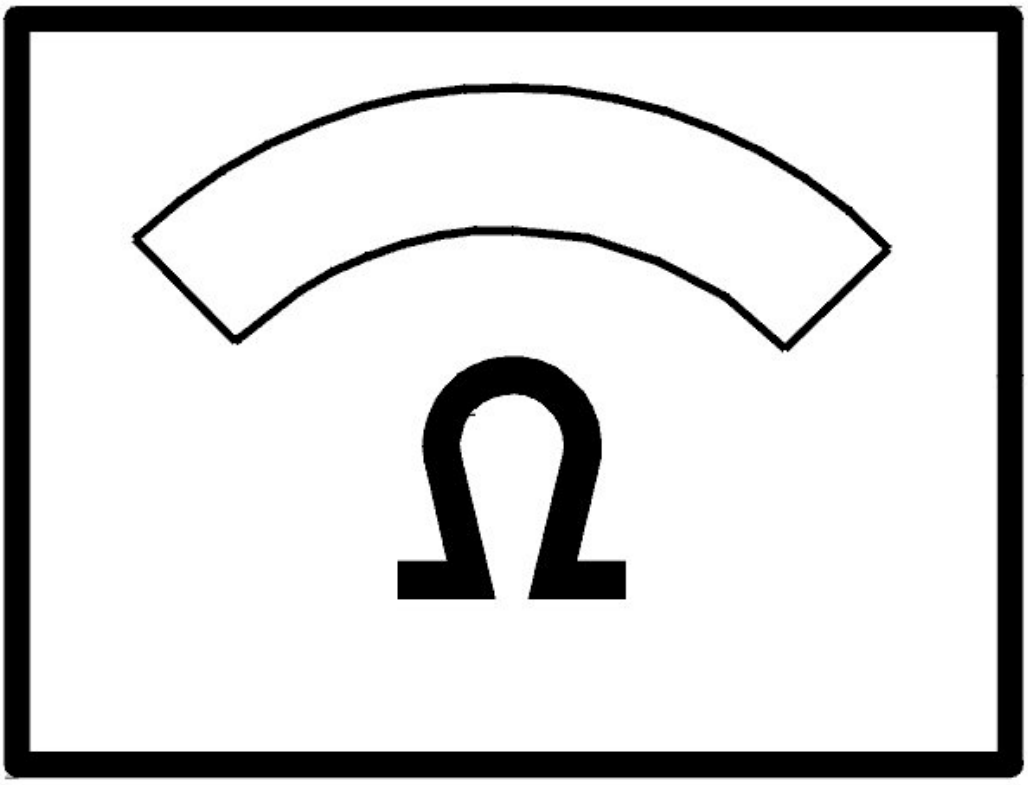
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

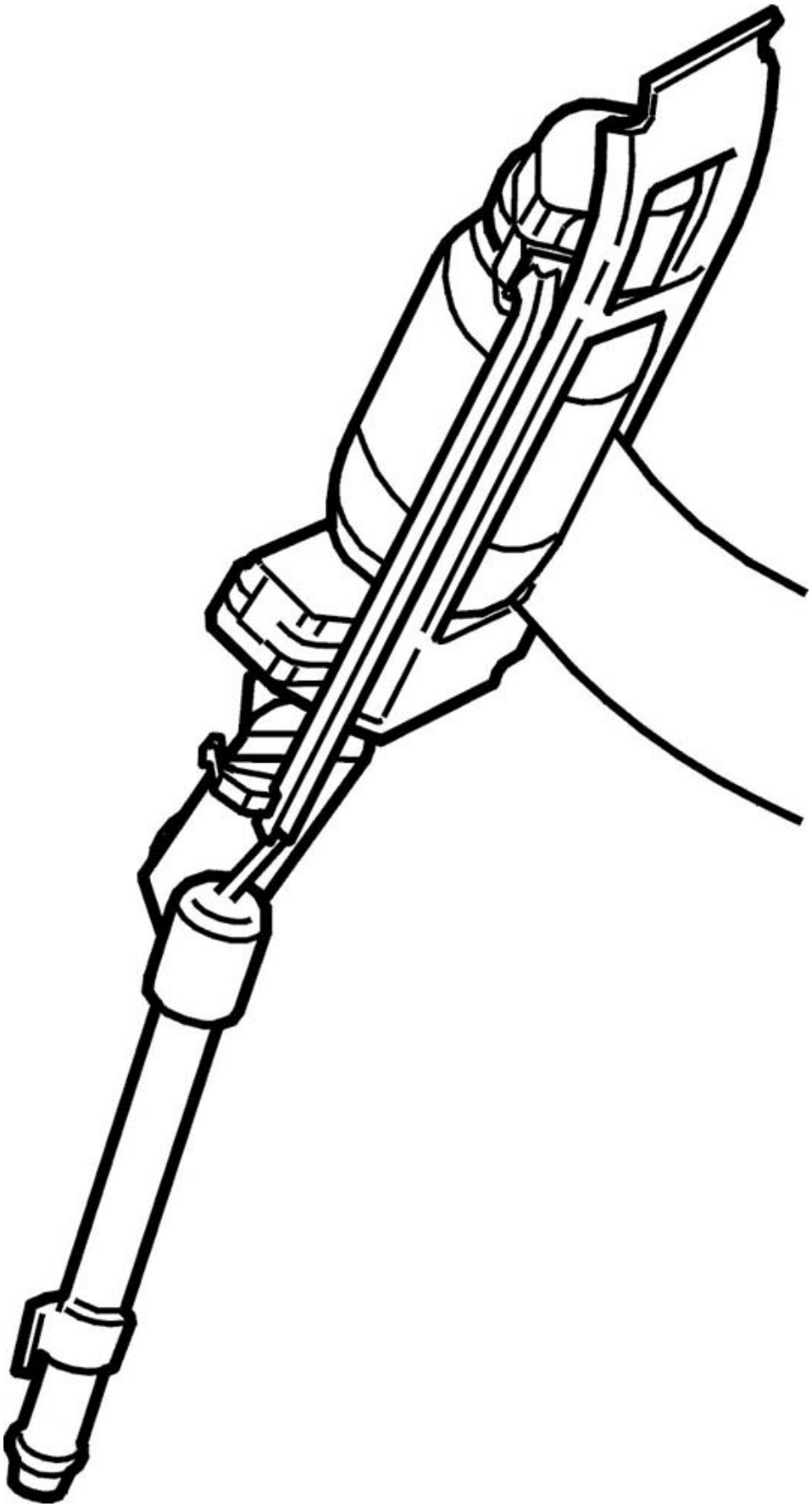
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-006D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-006D is displayed.

Substitute value

- Nothing.

Possible source

- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)

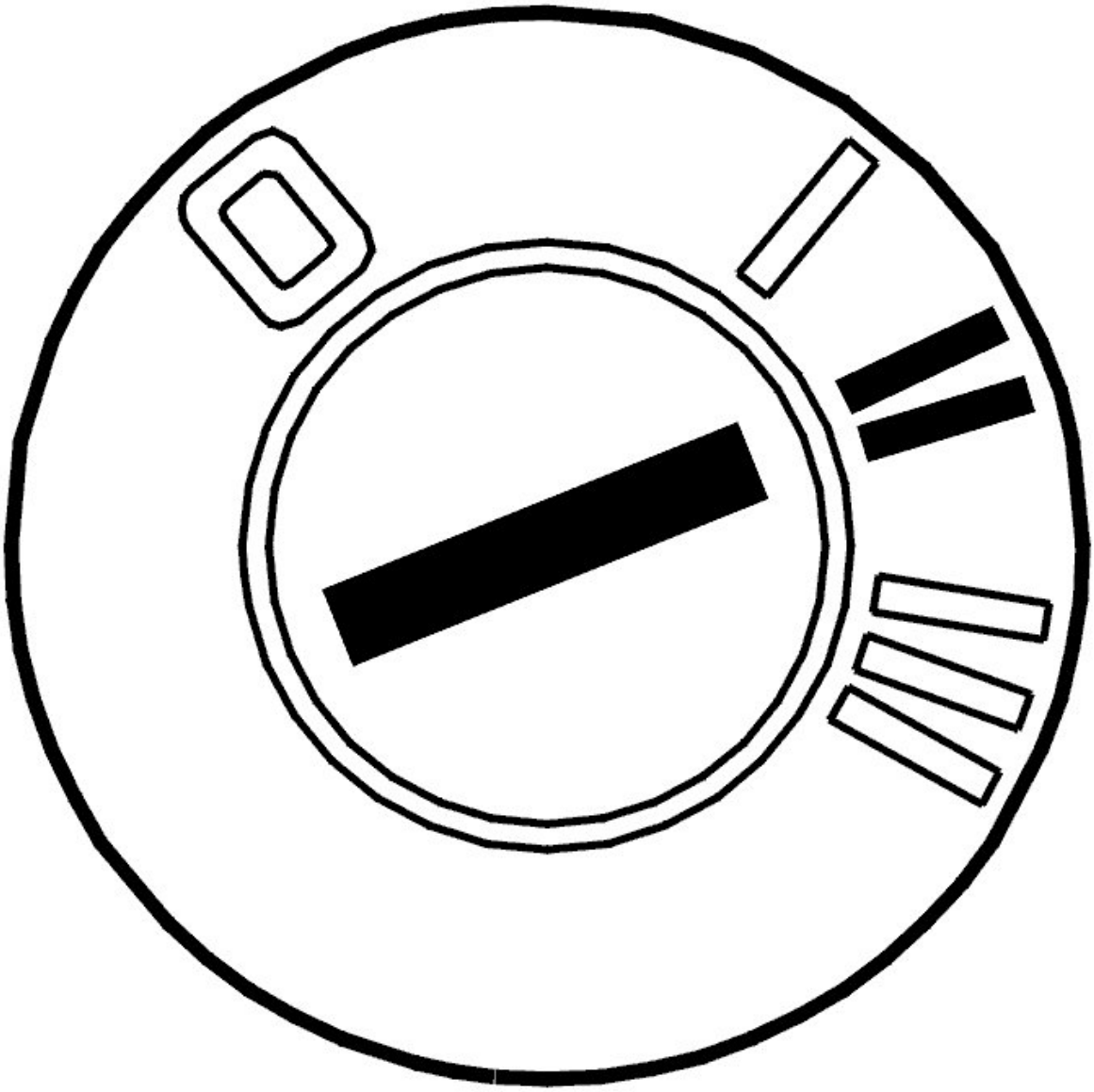
- Short circuit in seat-belt tensioner (resistance in igniter too low).

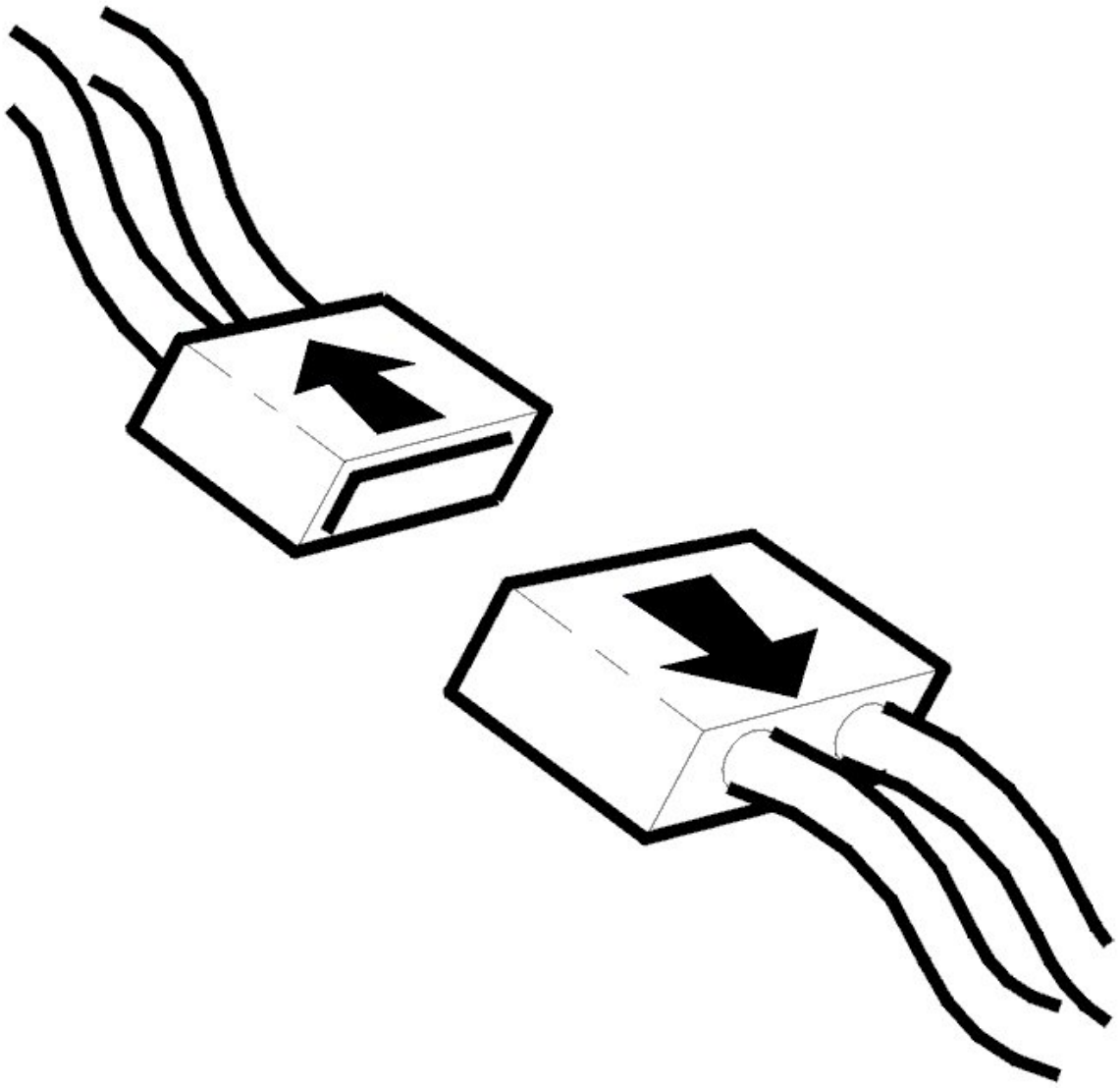
Fault symptom[s]
- SRS warning lamp on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

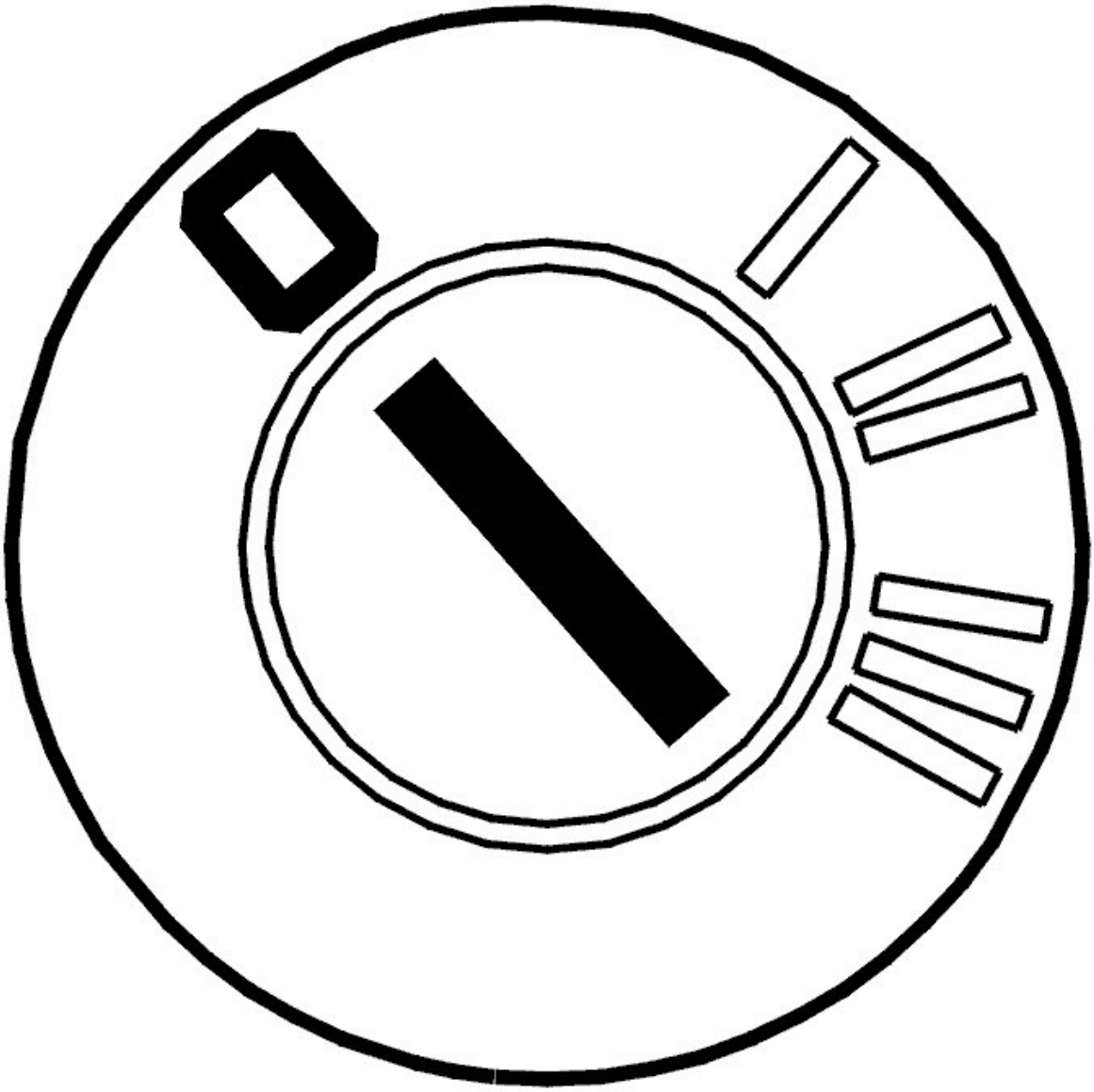
- To replace the front seat belt tensioner, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat. To replace the rear seat belt tensioner, see Buckle seat belt rear, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Buckle Seat Belt Rear, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

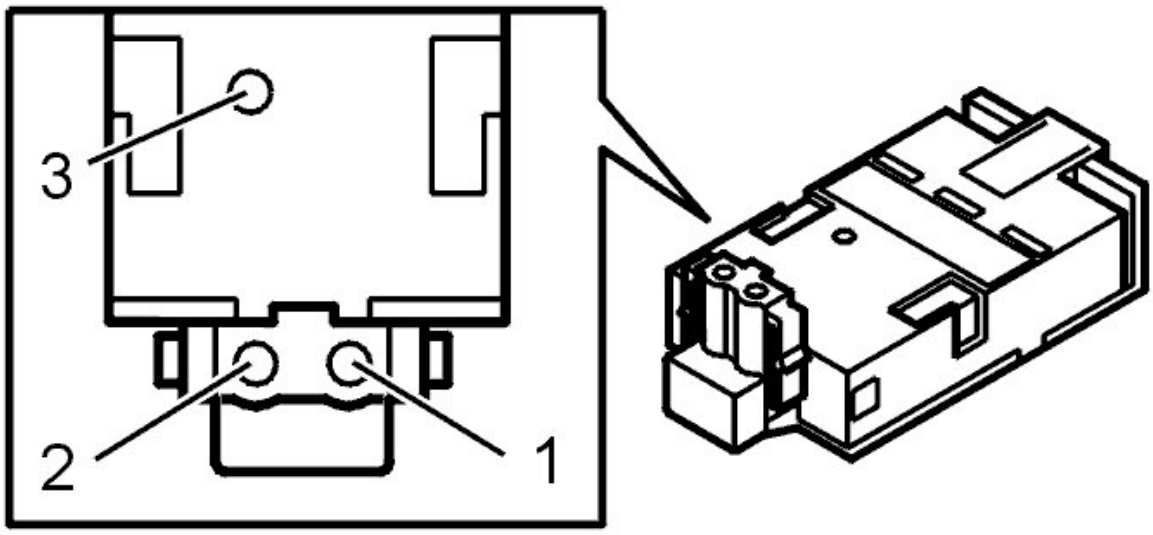
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

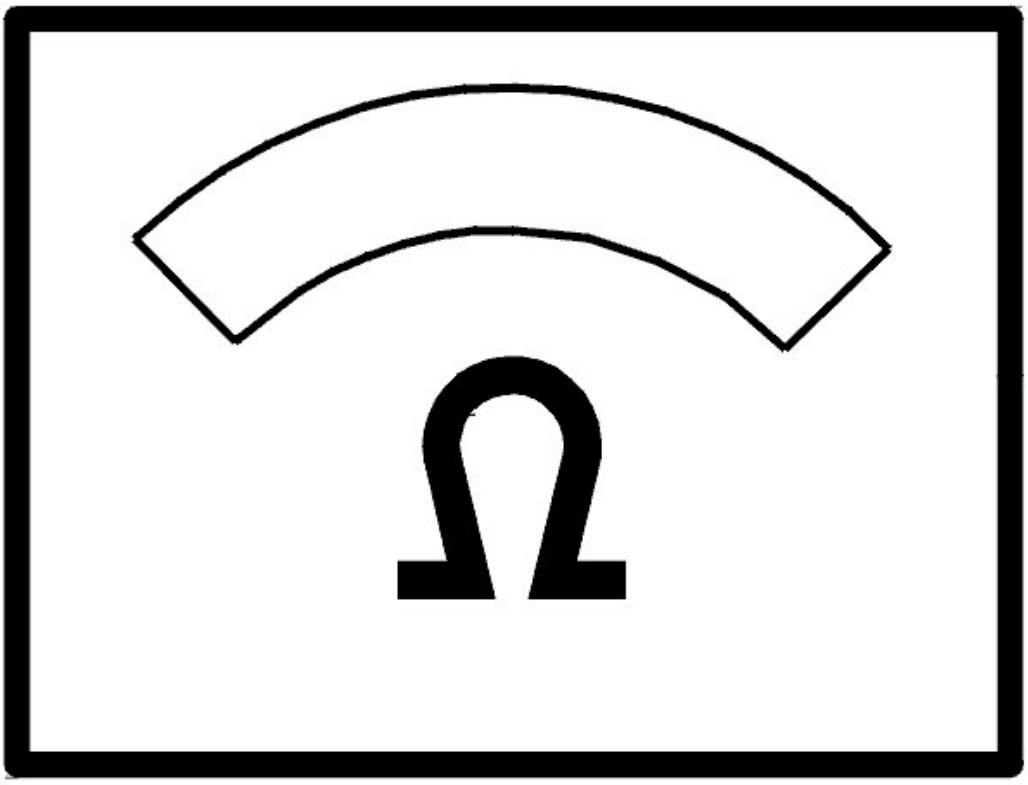
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

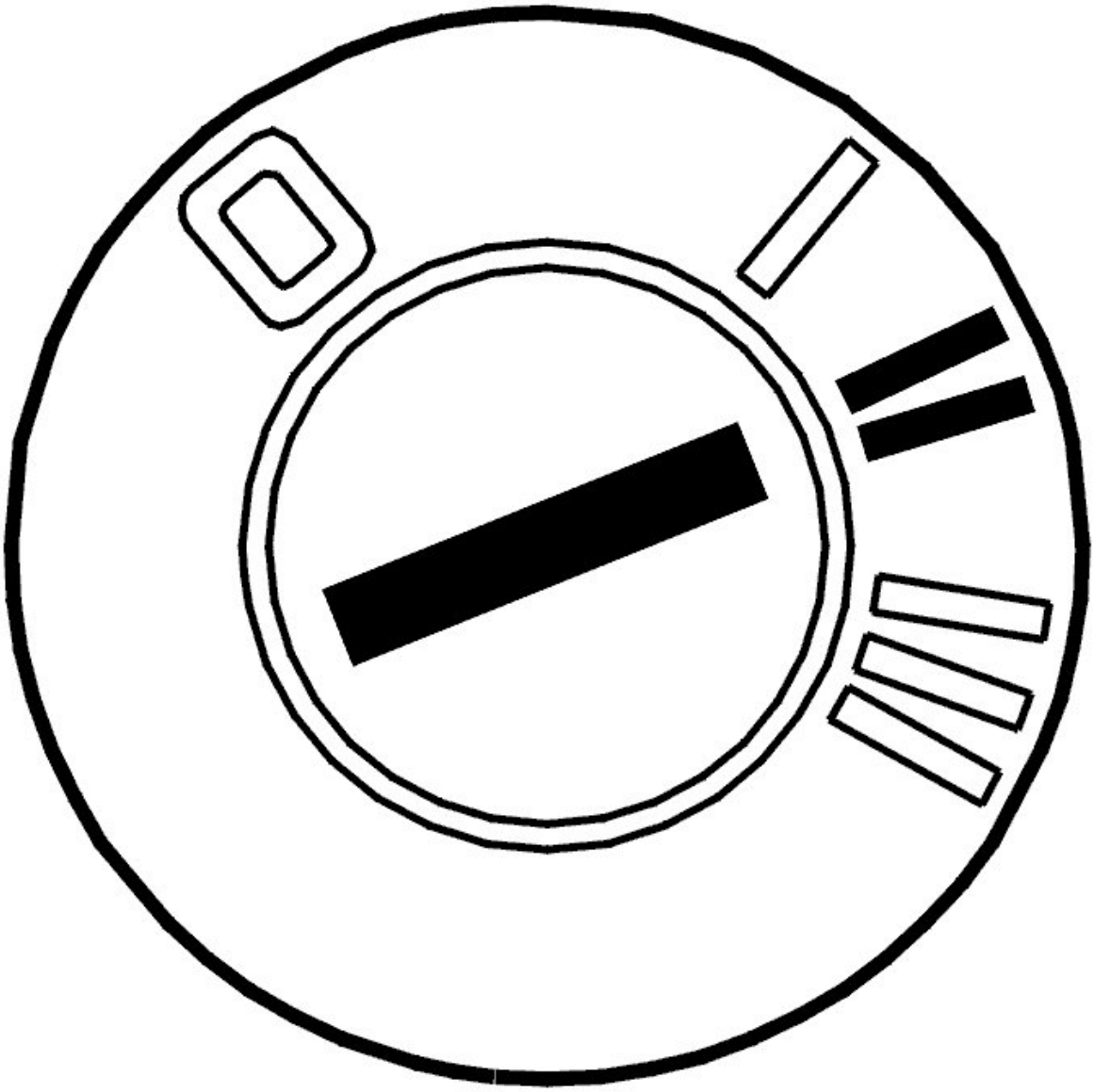
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

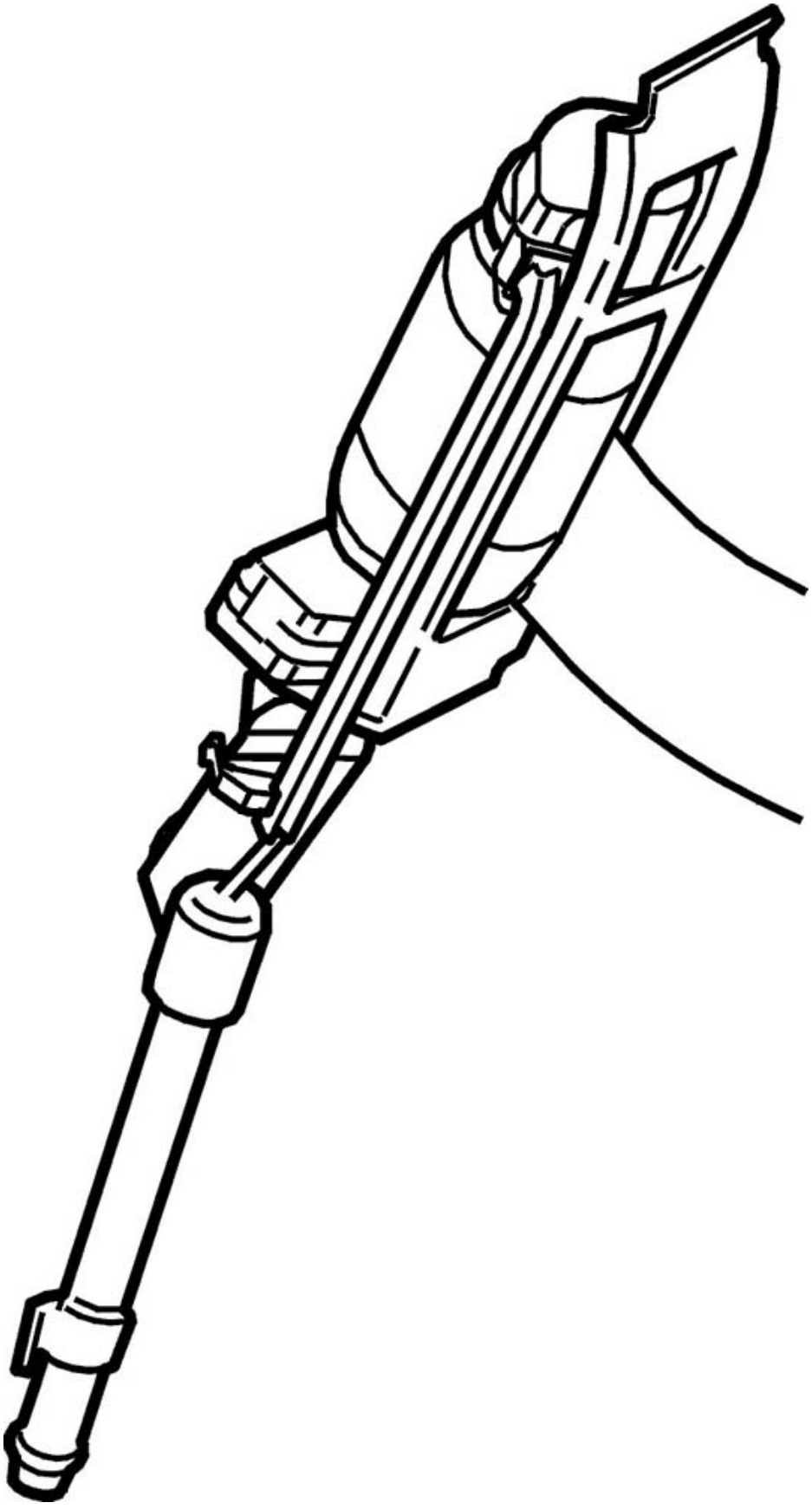
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-006D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-006D is displayed.

Substitute value
- Nothing.

Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

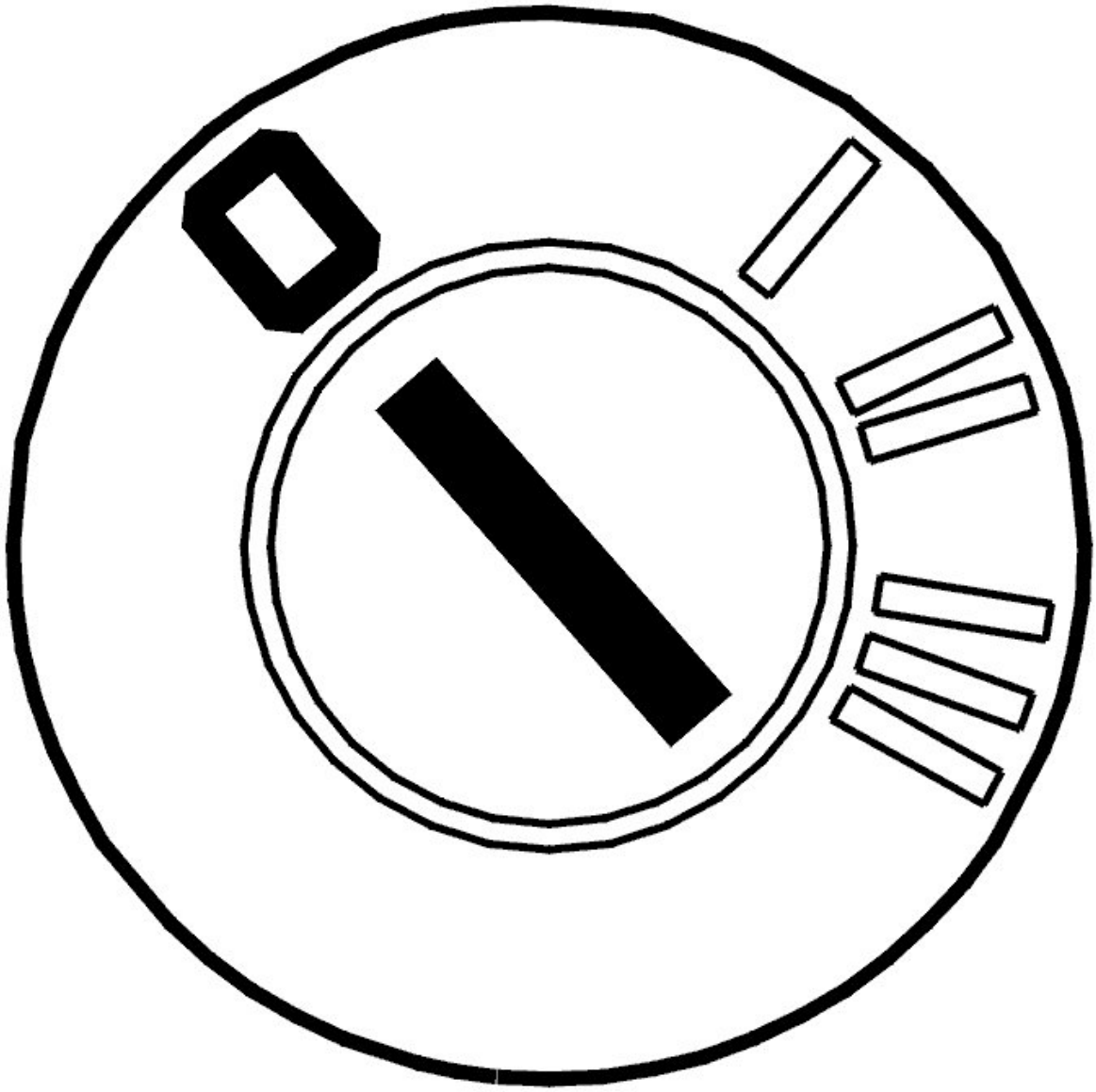
Fault symptom[s]

- SRS warning lamp on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

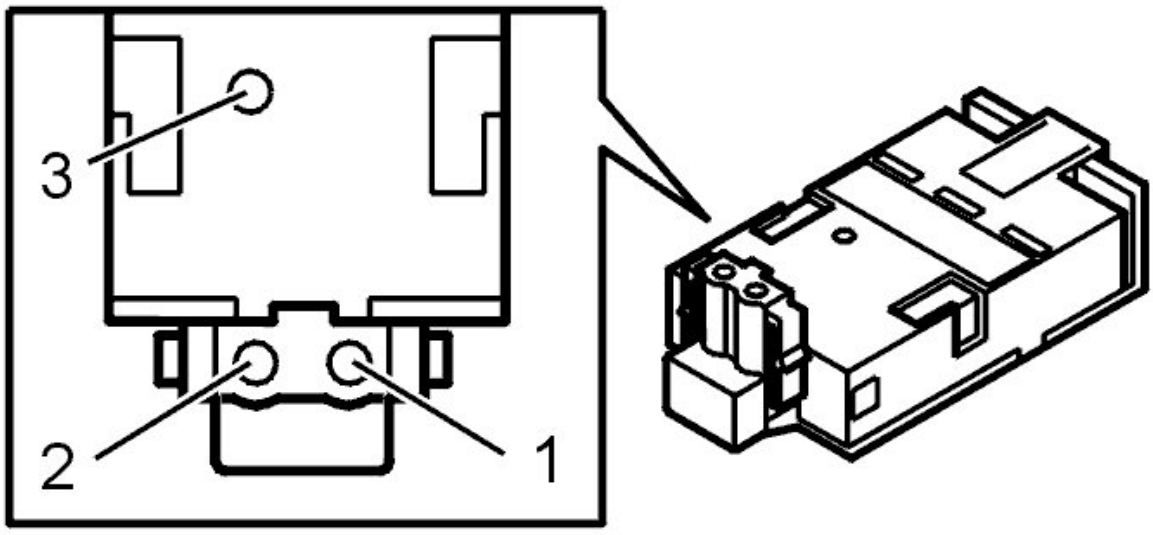
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

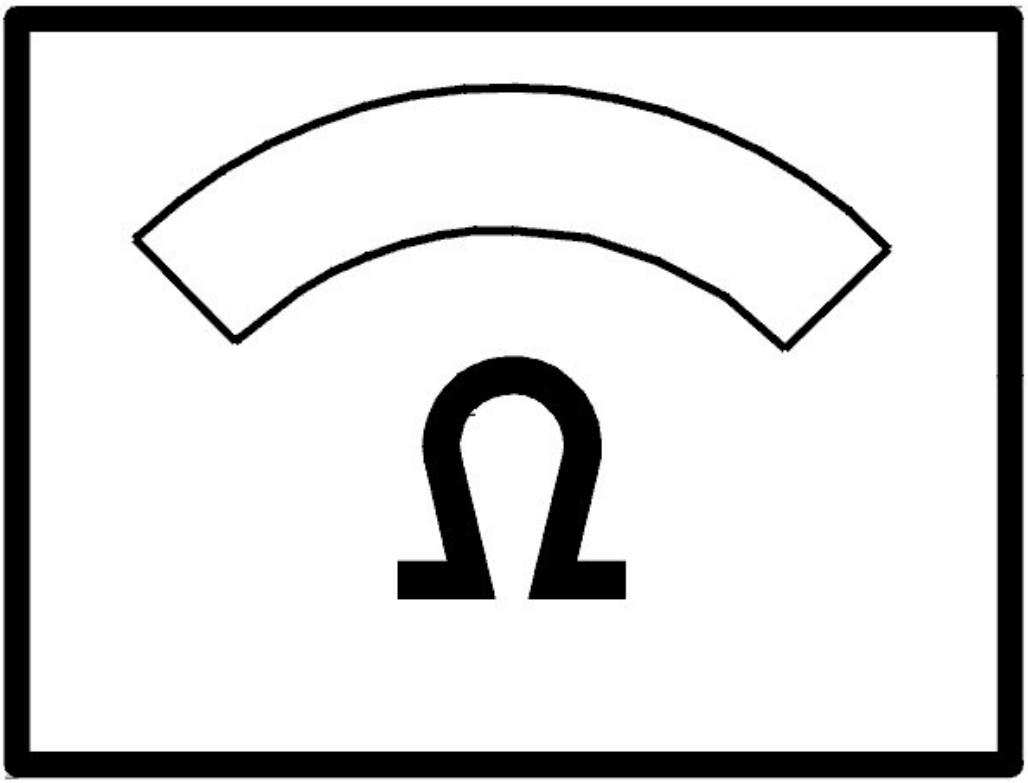
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0066
SRS-006E
depending on which wiring circuit the fault is in.

Possible source

- If the SRS control module identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

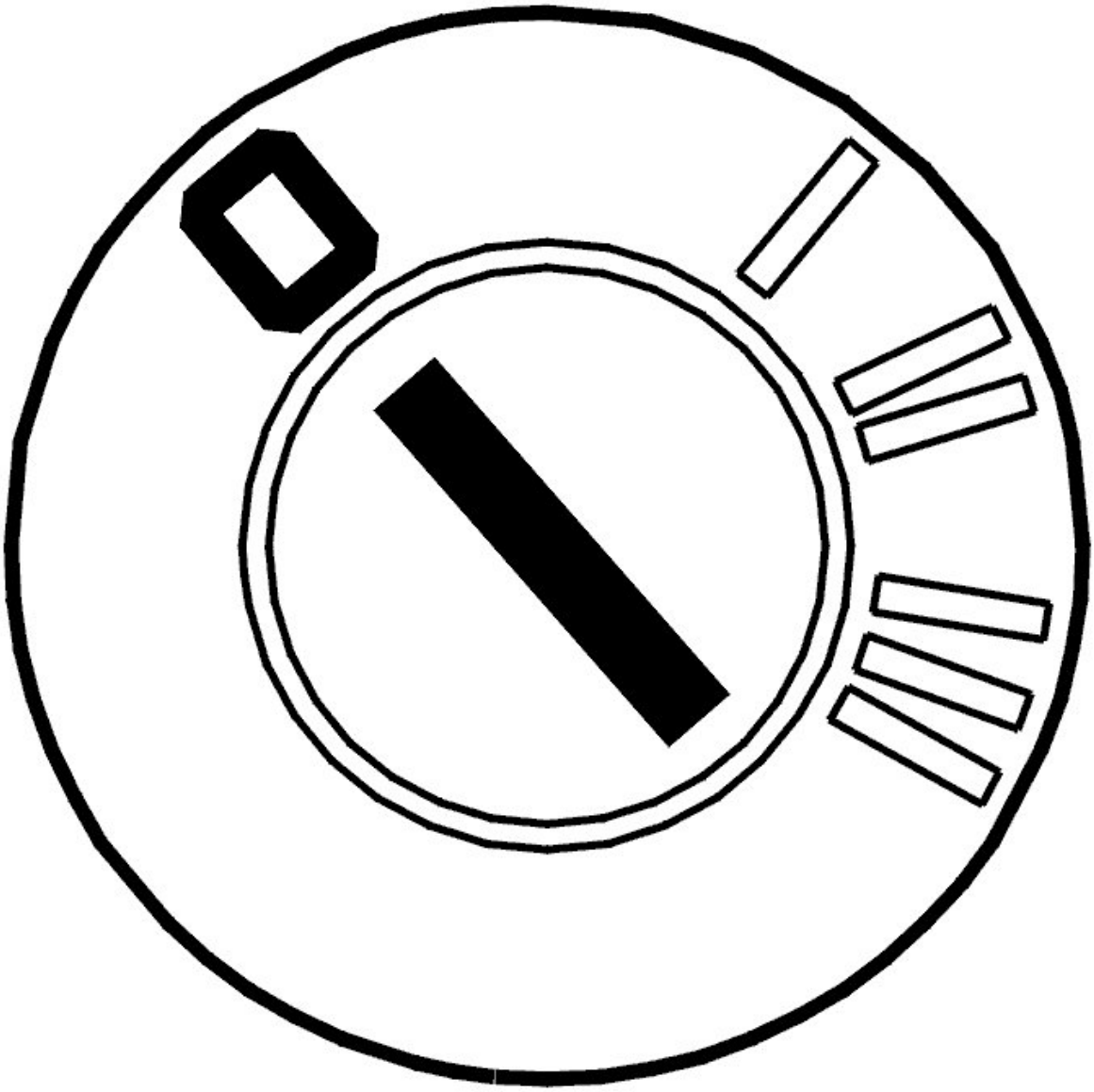
Fault symptom[s]

The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Checking the component



- Ignition off.

Check that the wiring from the seat belt tensioners is correctly connected to the control module.
Check that nothing in the connector connected to the control module or in the control module connector is short-circuited.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays

and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

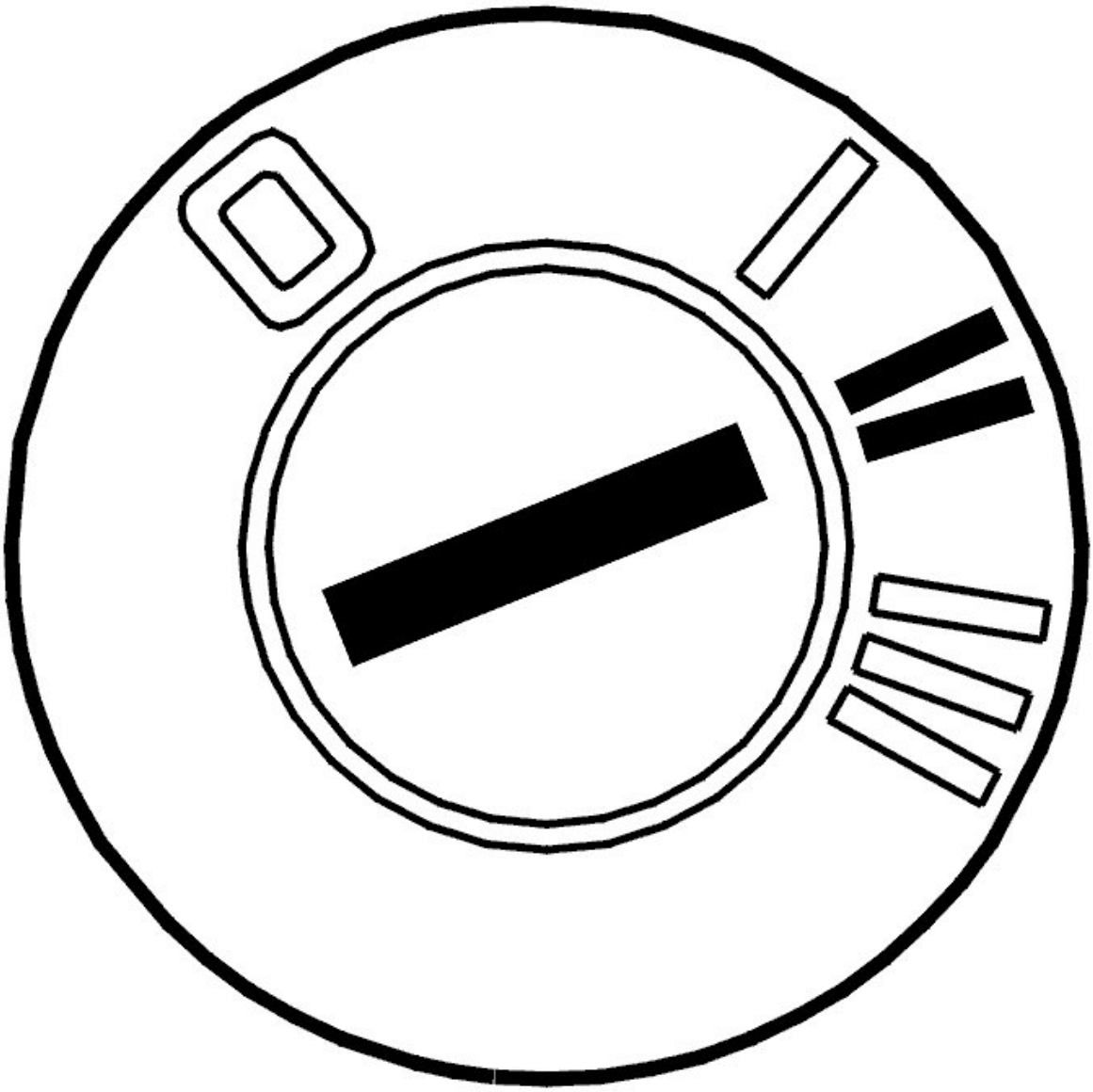
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

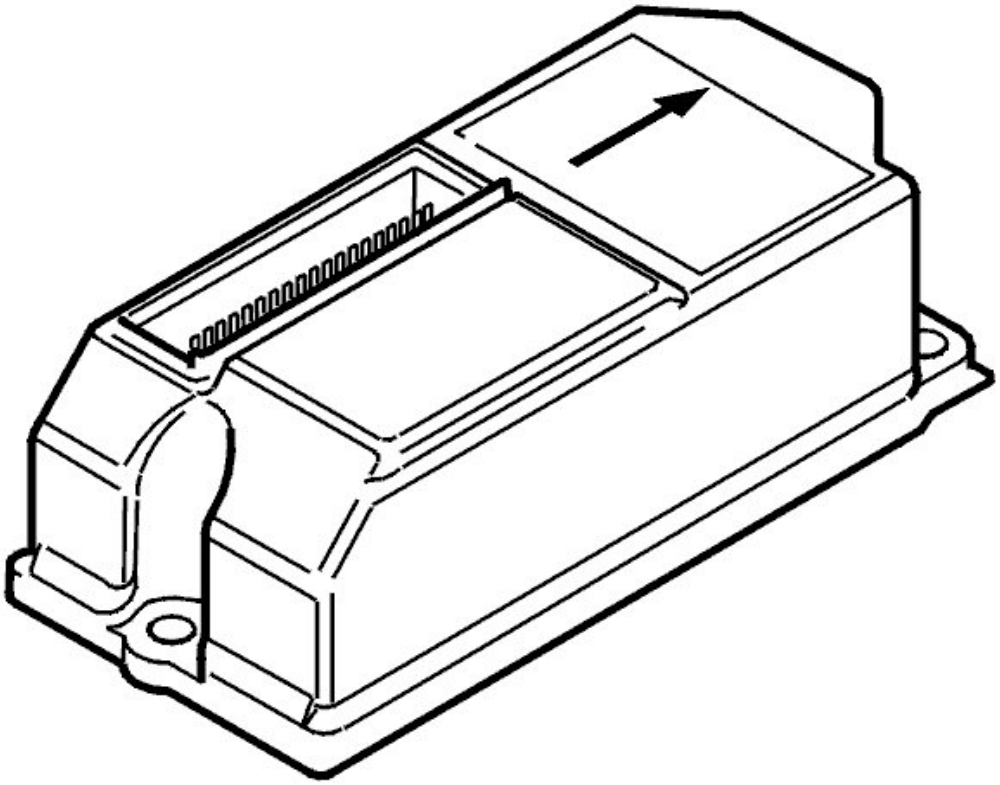
VERIFICATION FAILED - Fault-tracing information

Configuration Fault. Intermittent Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0066
SRS-006E
depending on which wiring circuit the fault is in.

Possible source
- If the SRS control module identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

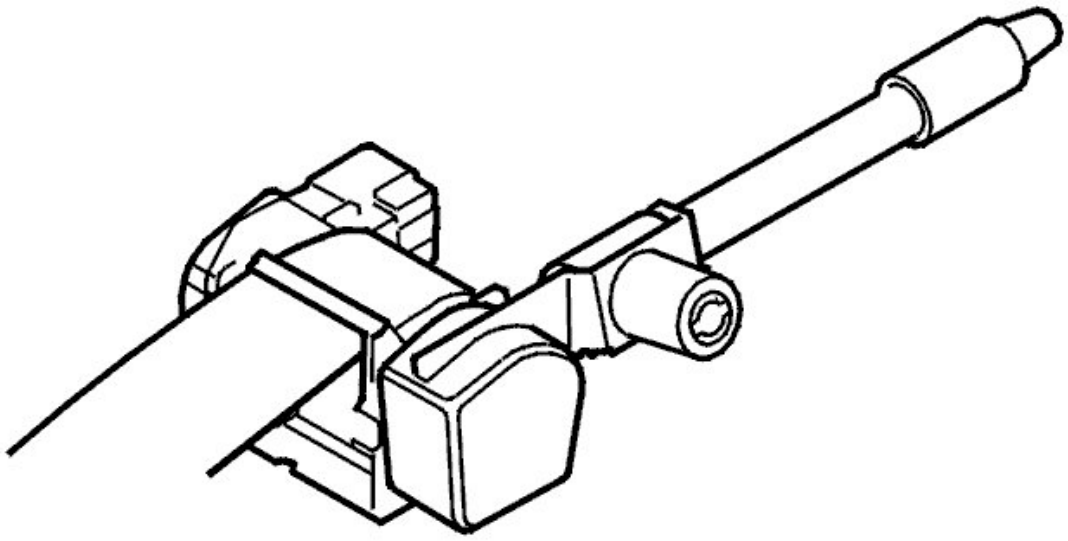
Fault symptom[s]

The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

SRS-0070 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0070 is displayed.

Substitute value
- Nothing.

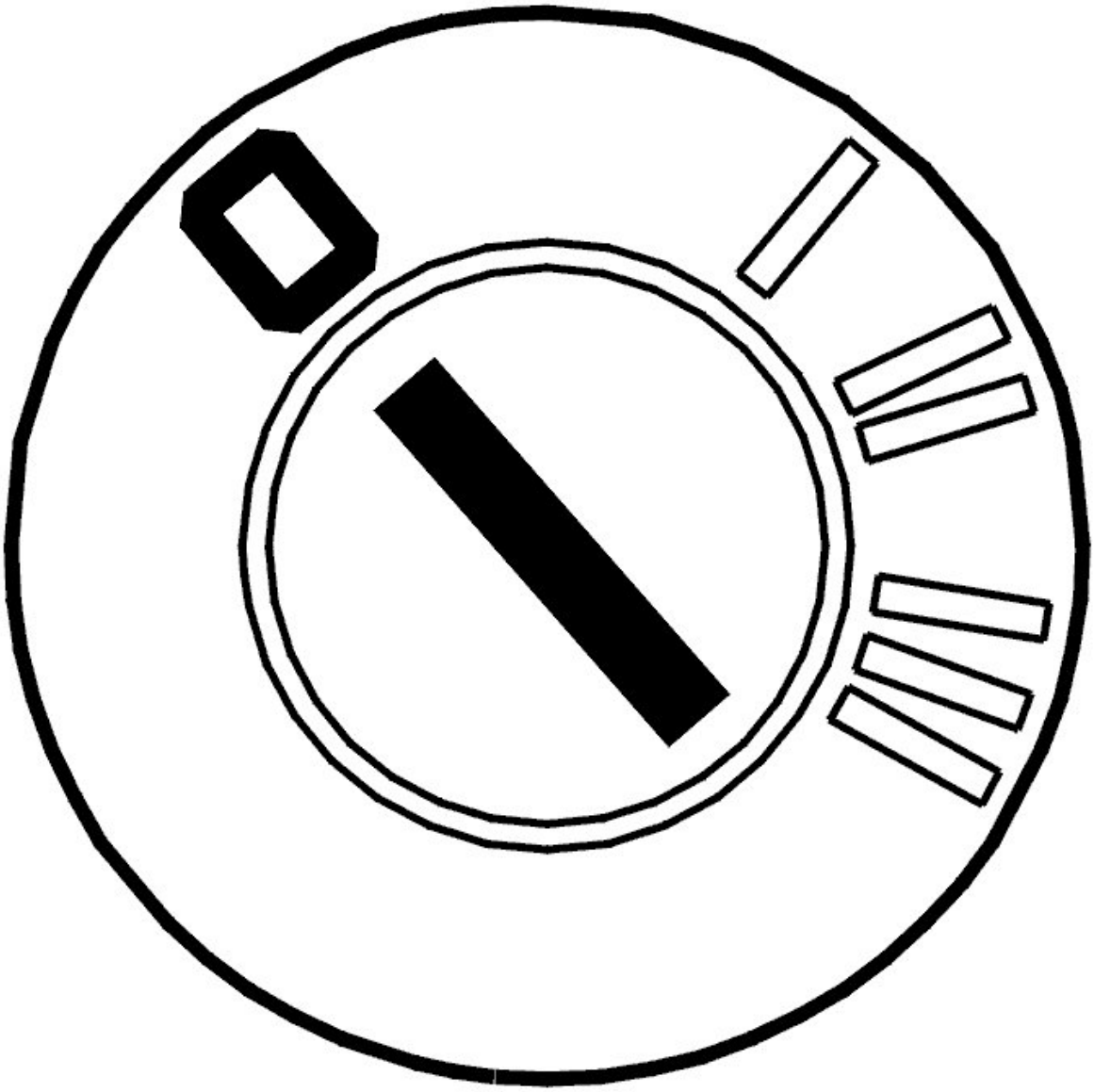
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in seat-belt tensioner
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

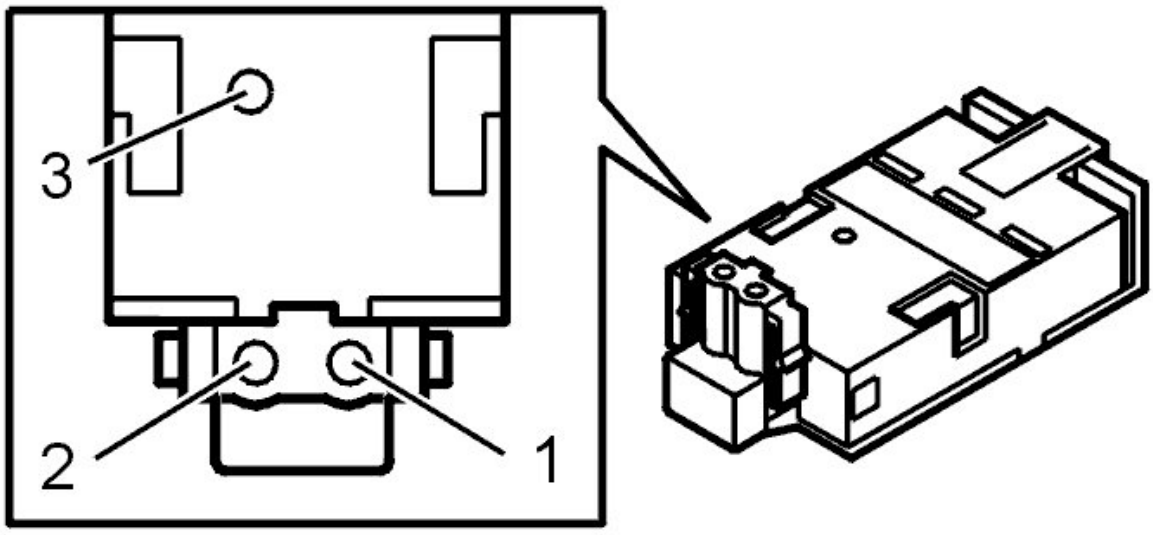
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

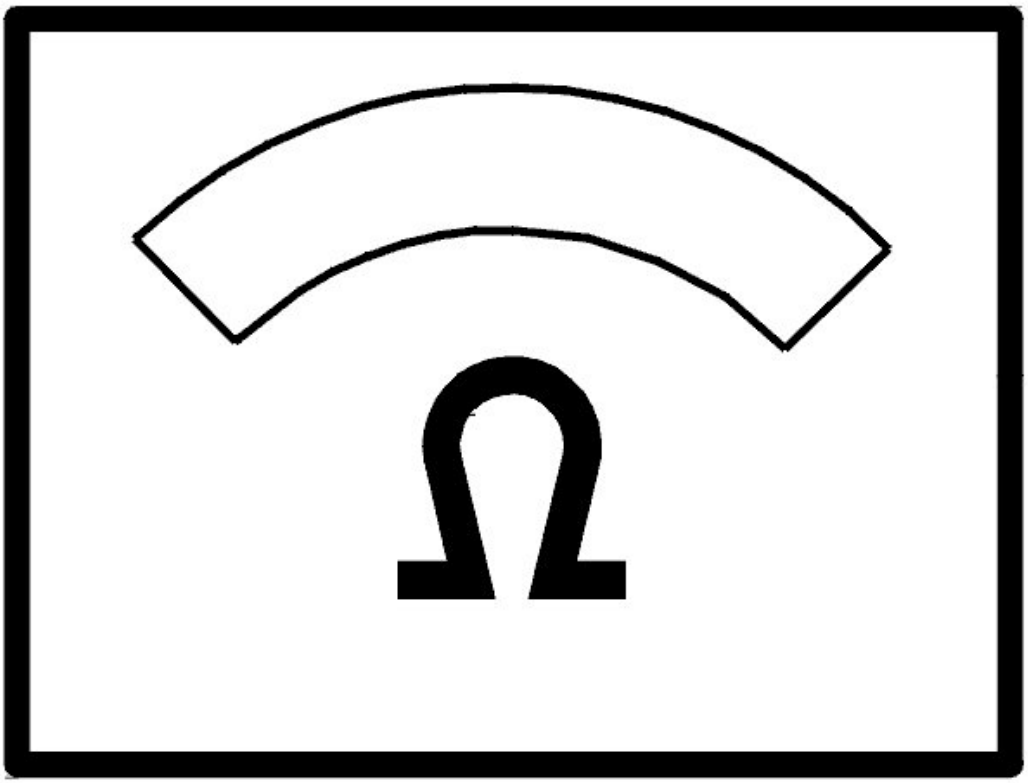
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminal #1, terminal #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

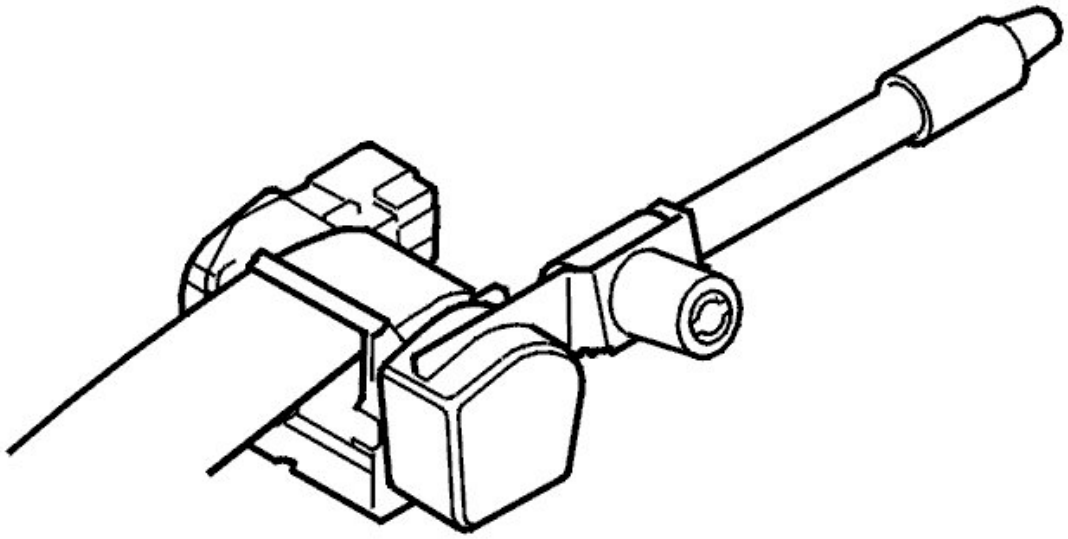
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0070 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0070 is displayed.

Substitute value
- Nothing.

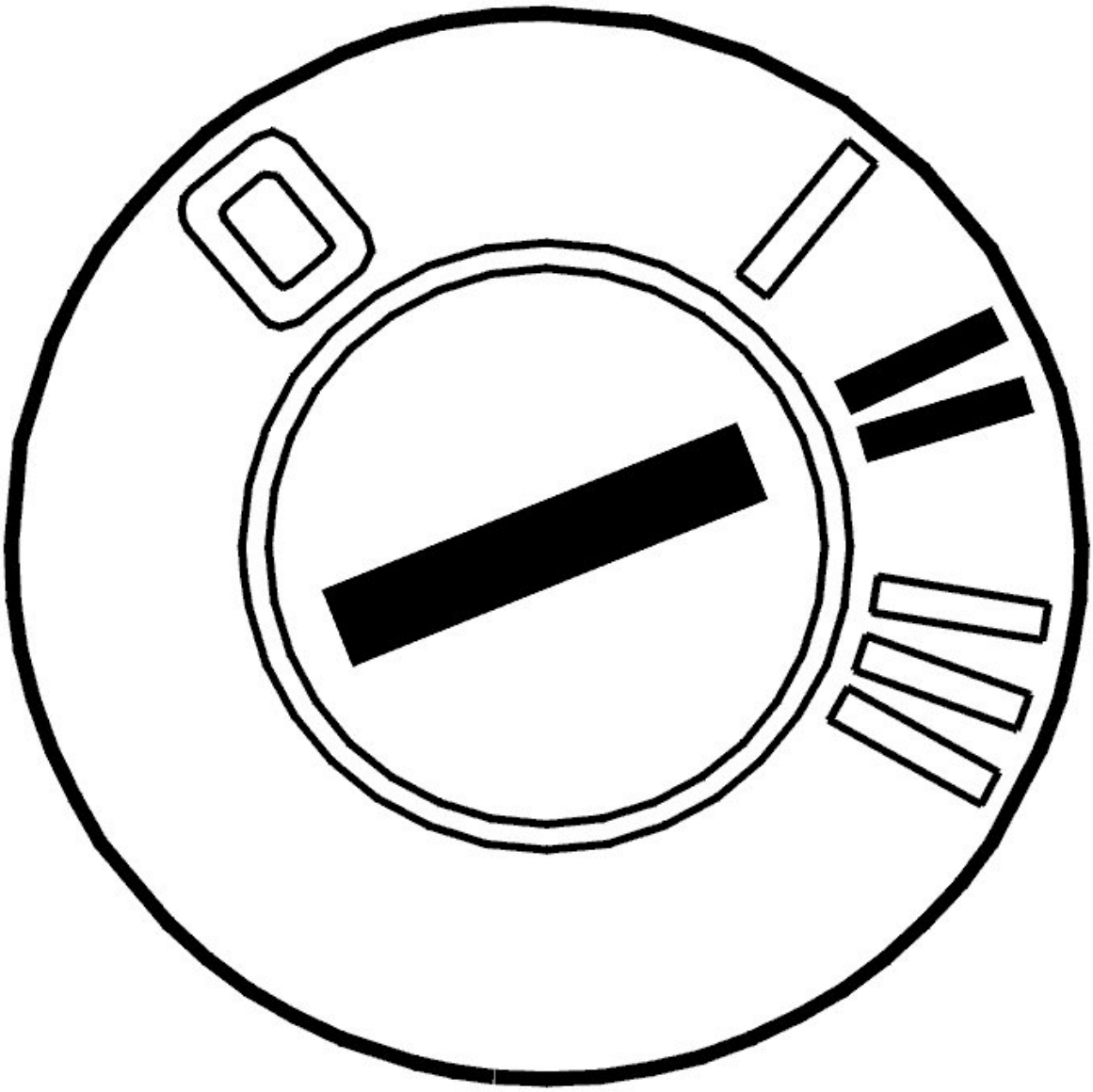
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in seat-belt tensioner
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

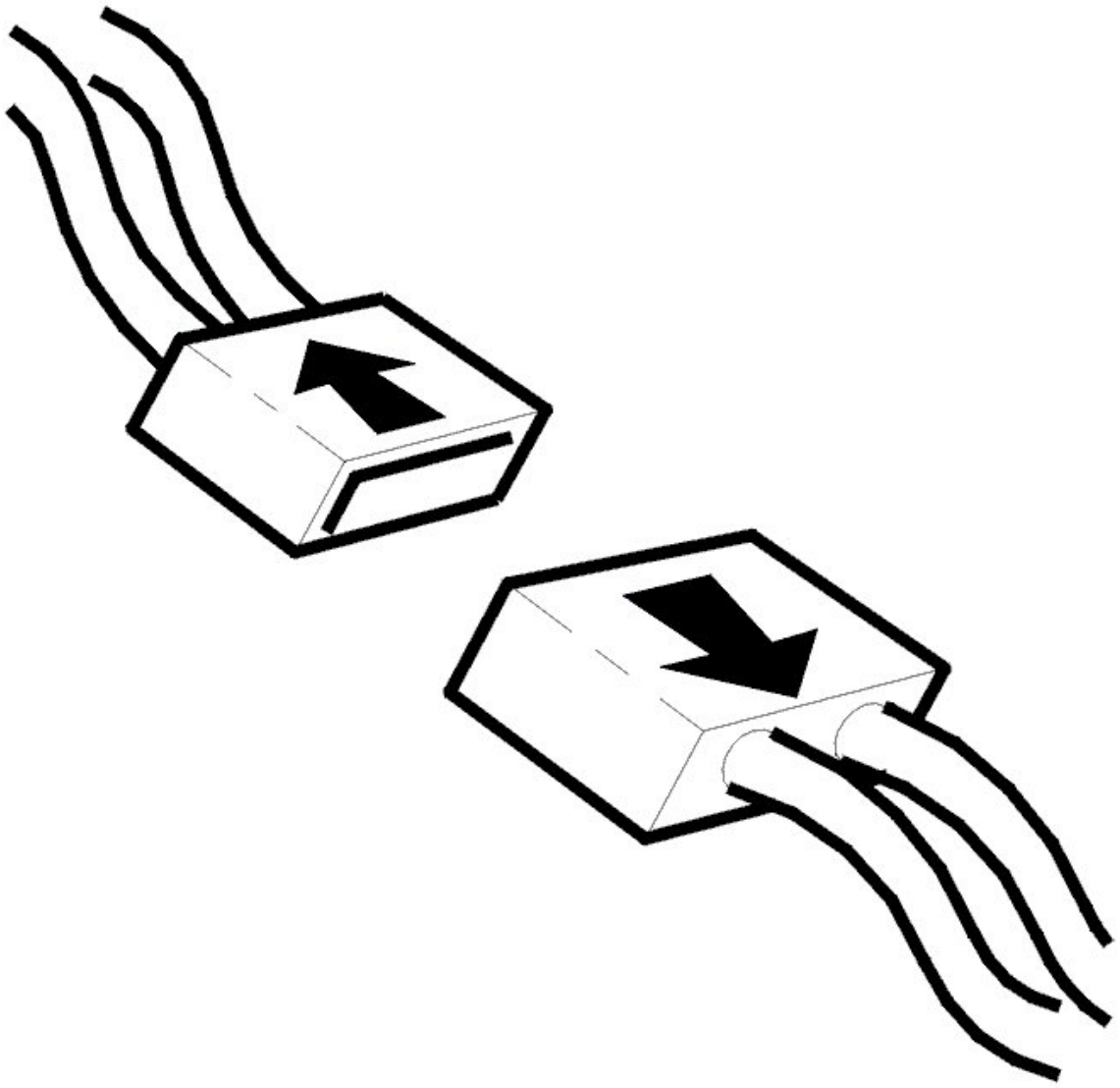
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

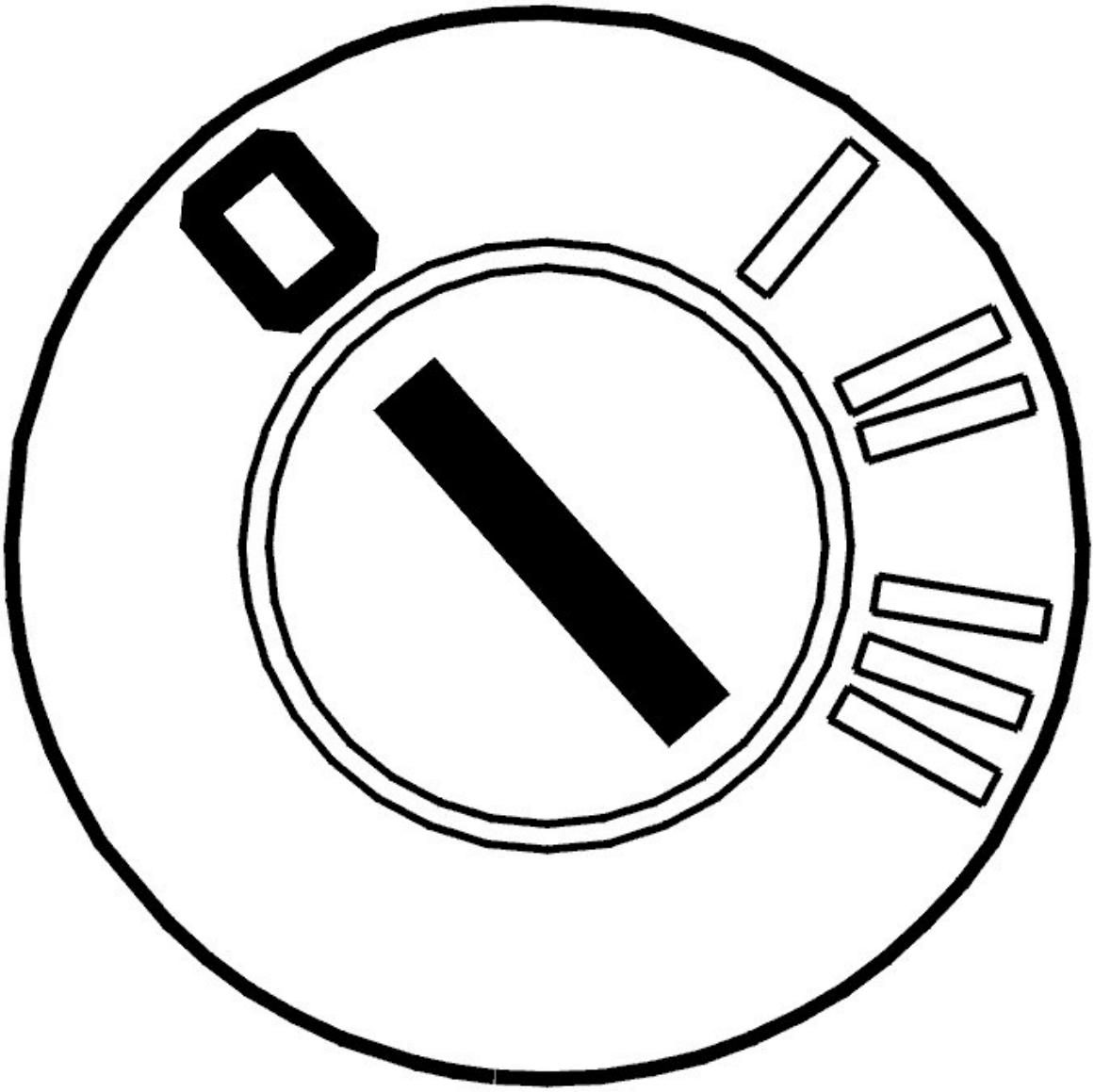
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

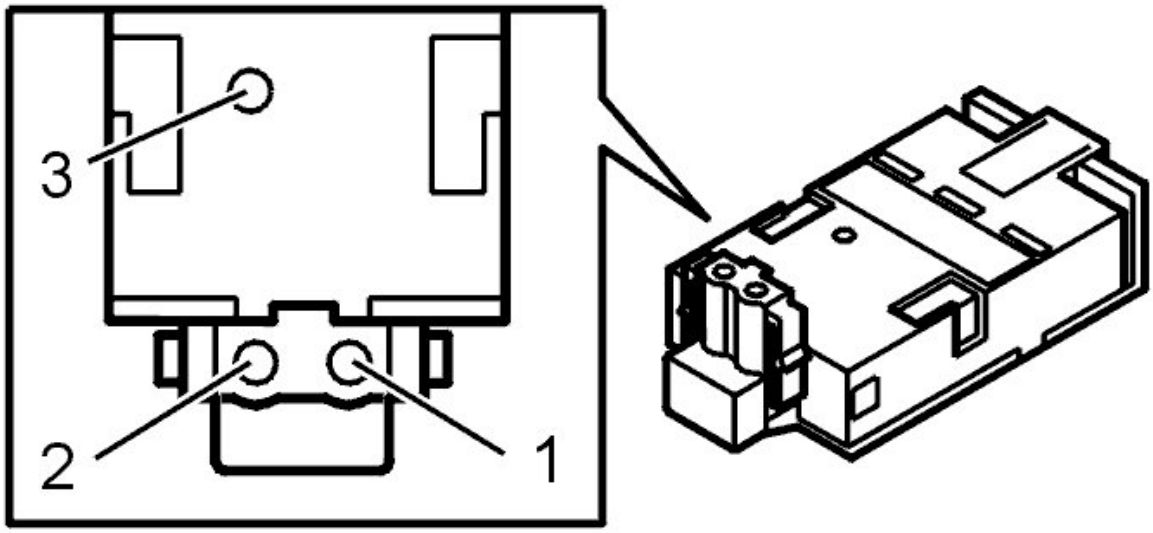
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

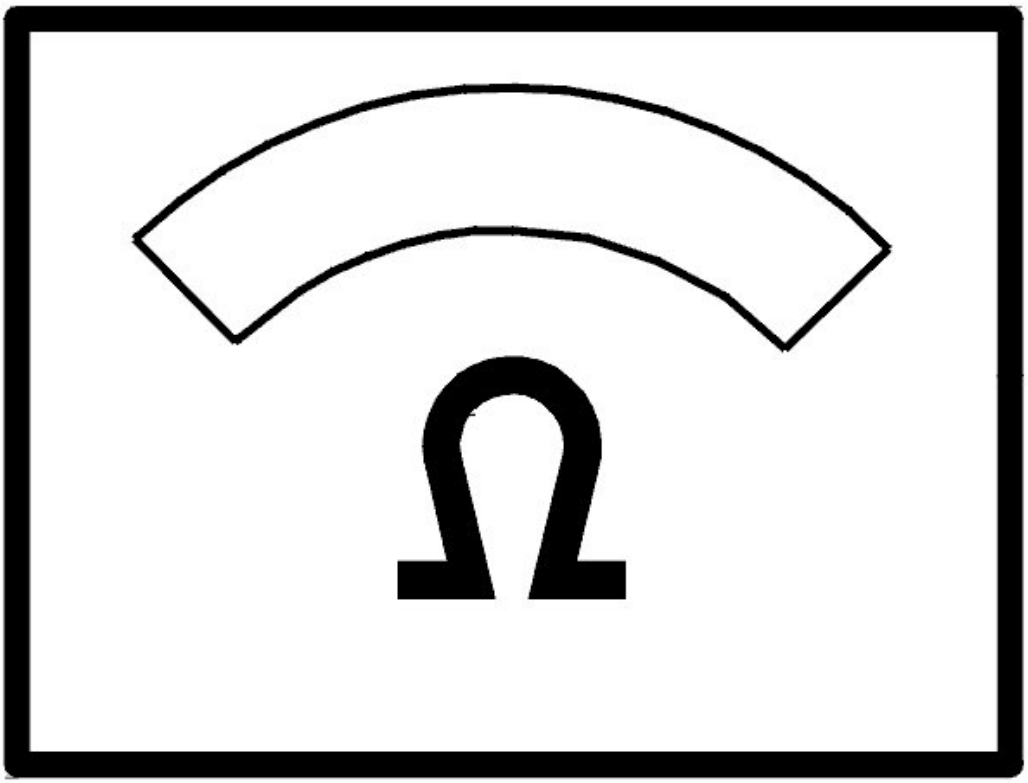
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

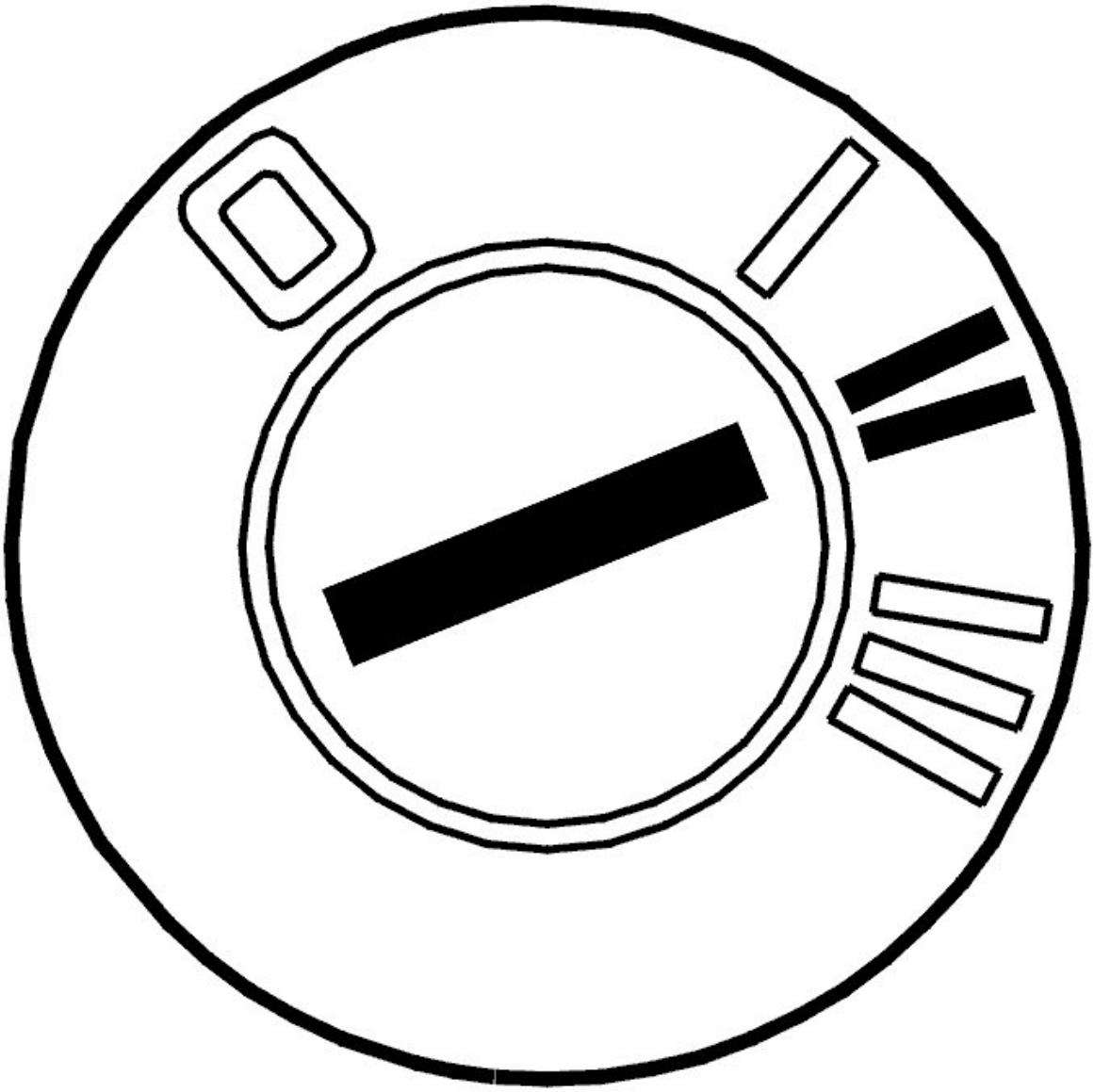
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

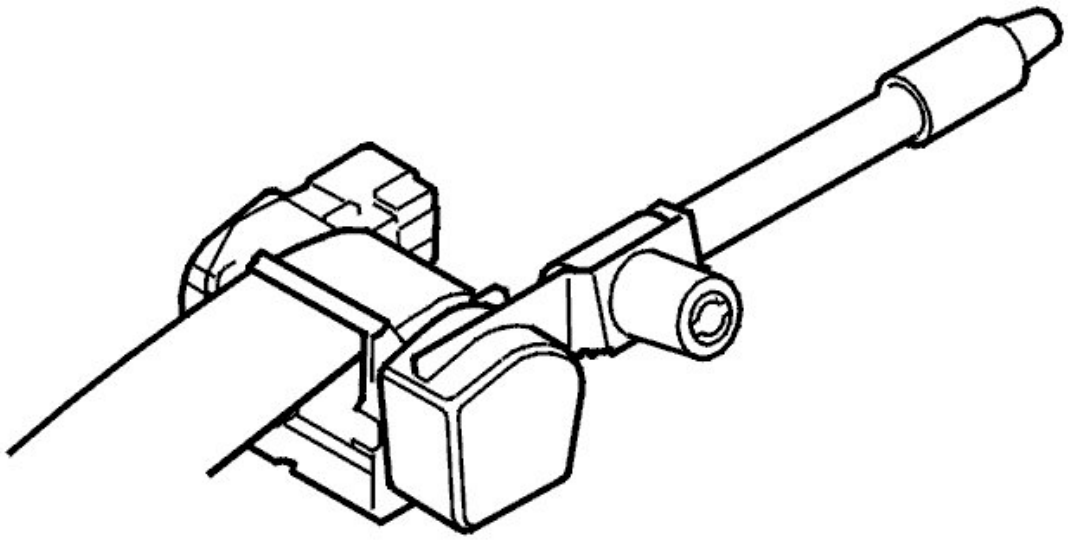
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0071 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0071 is displayed.

Substitute value
- Nothing.

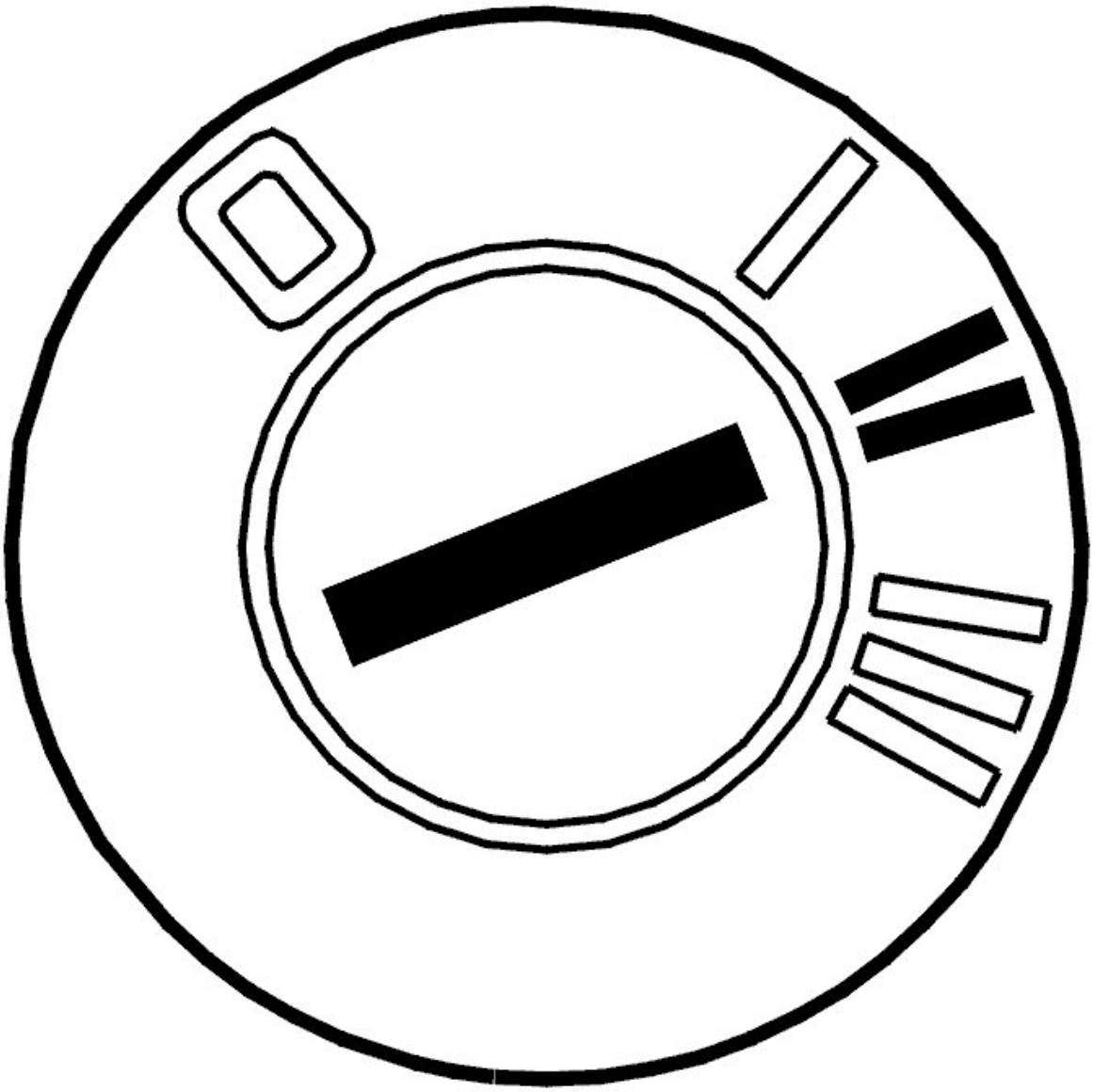
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

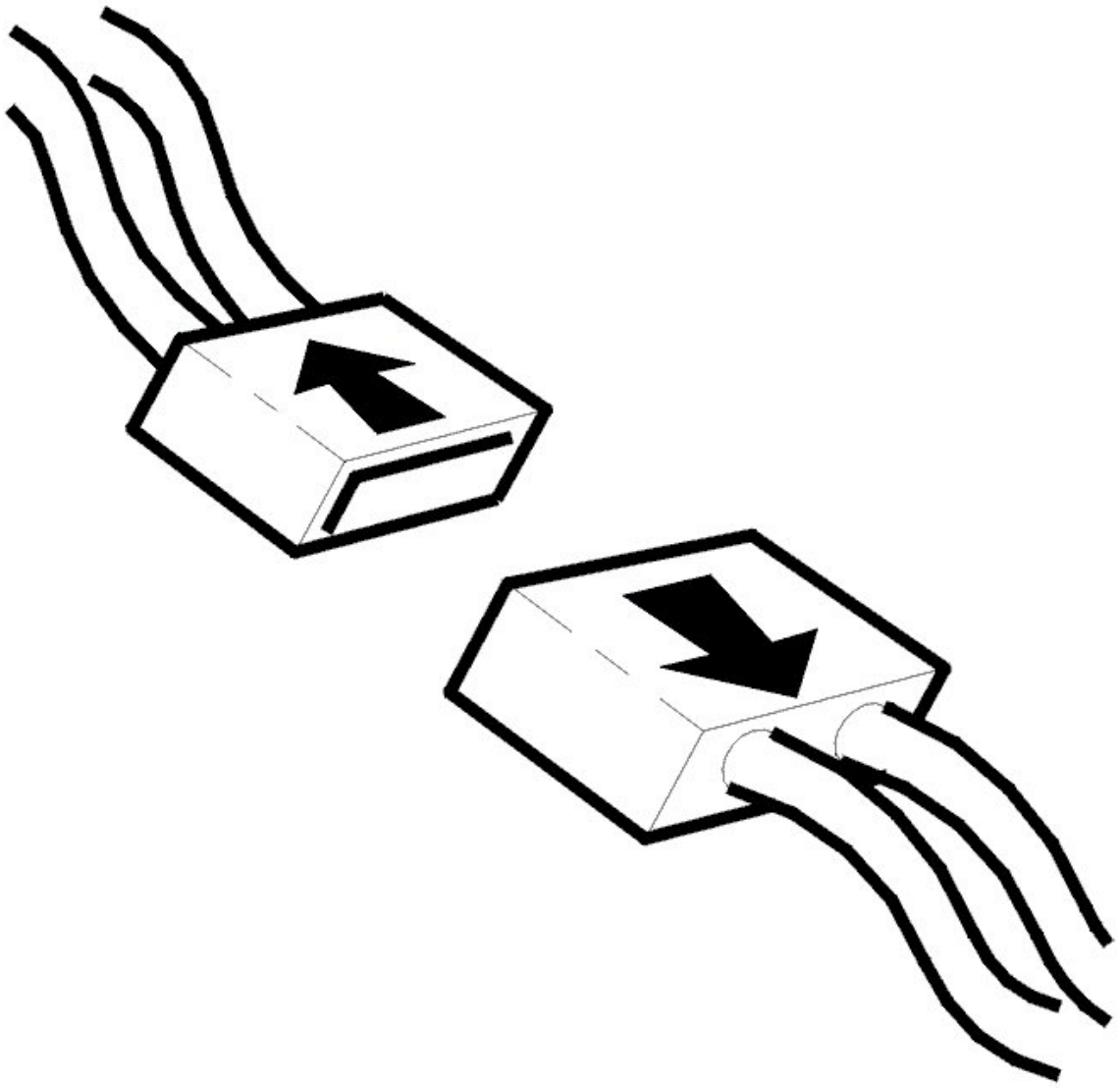
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

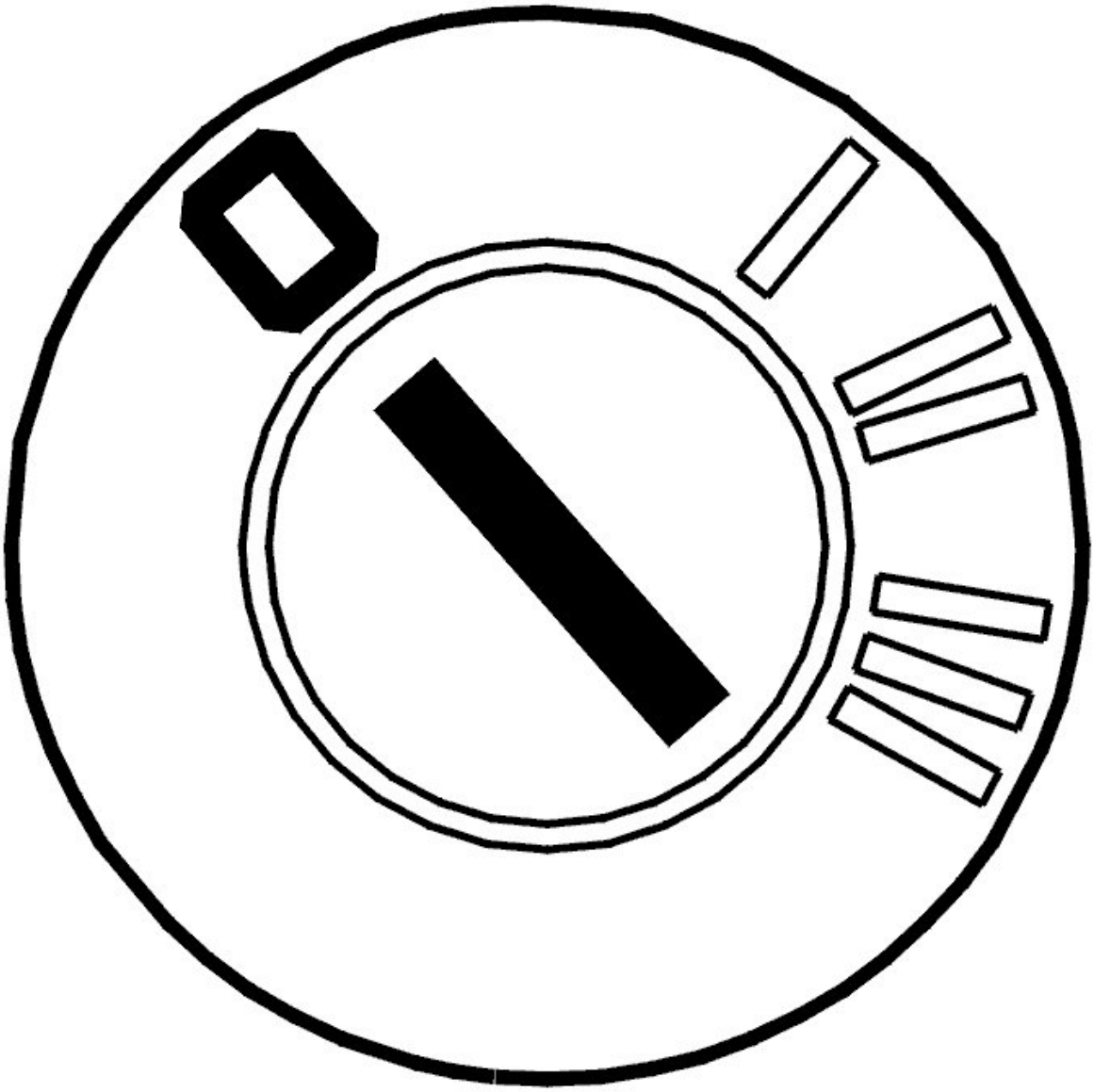
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

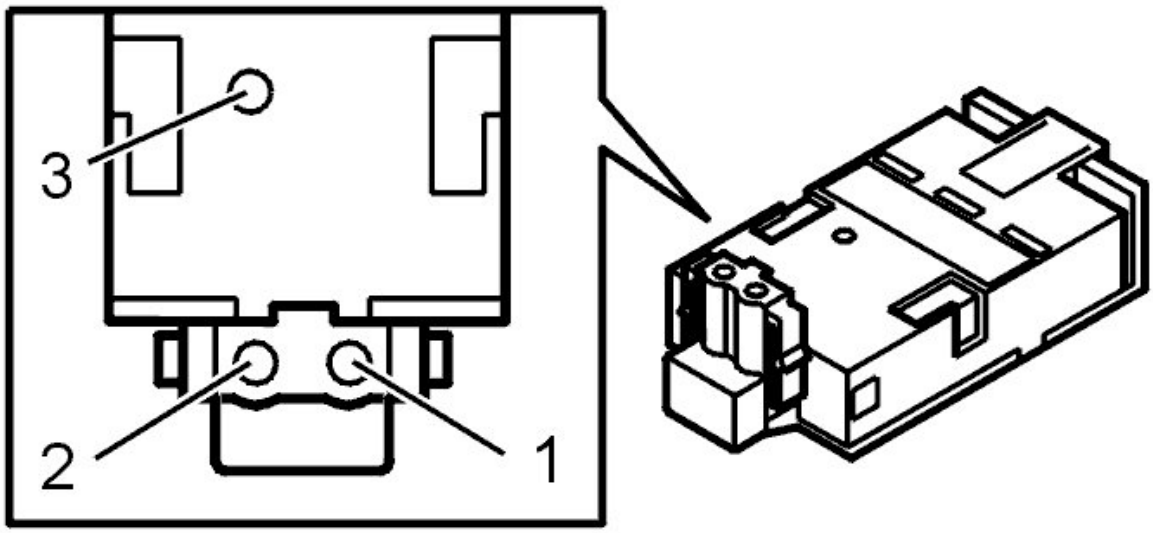
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

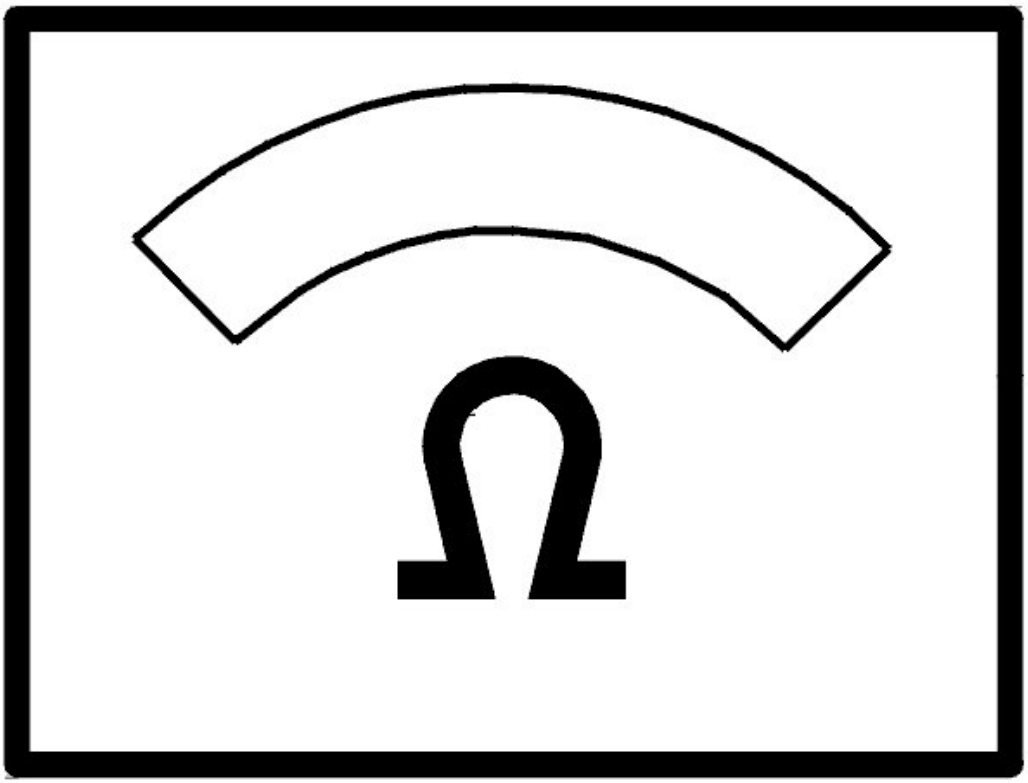
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

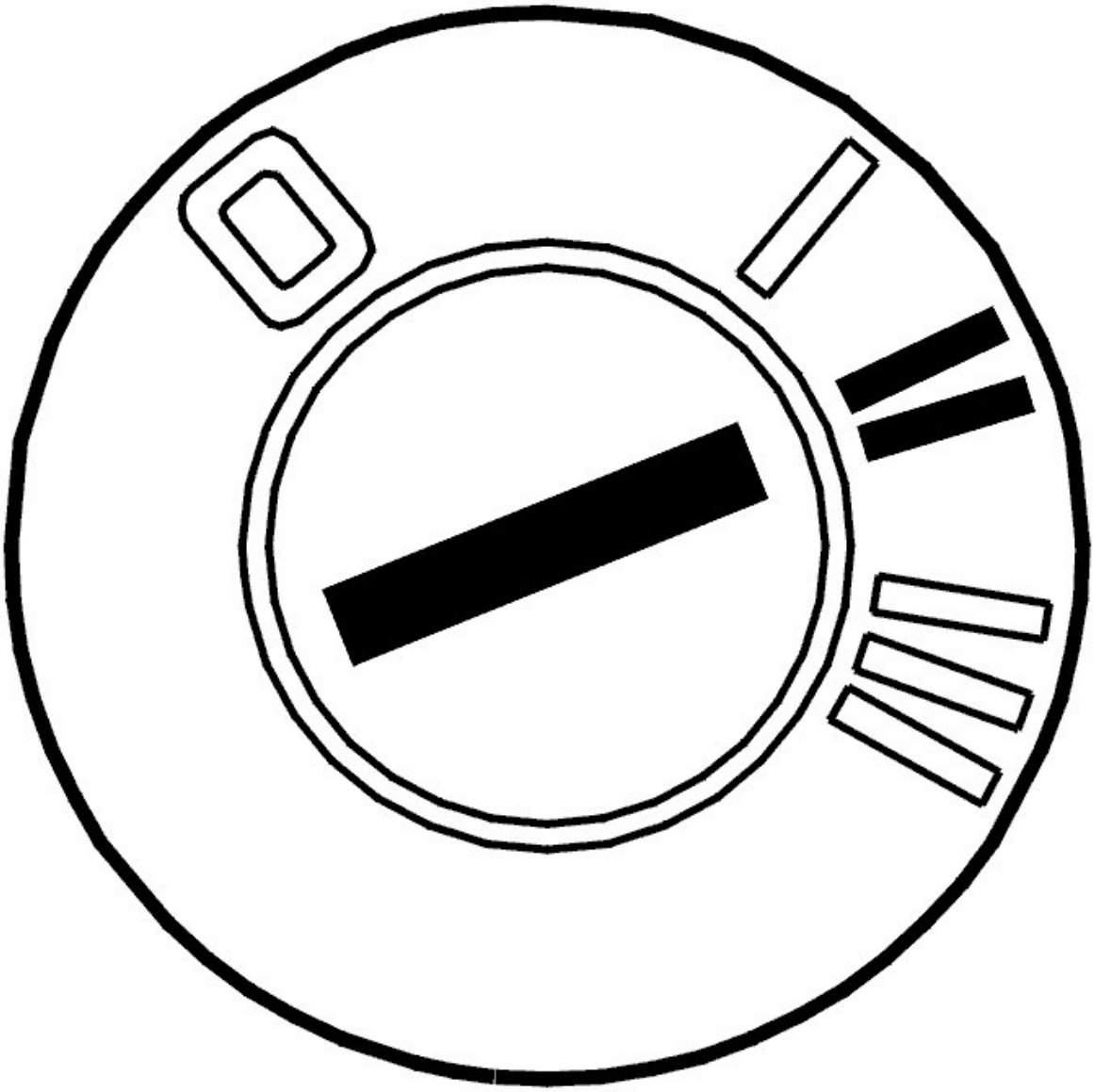
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

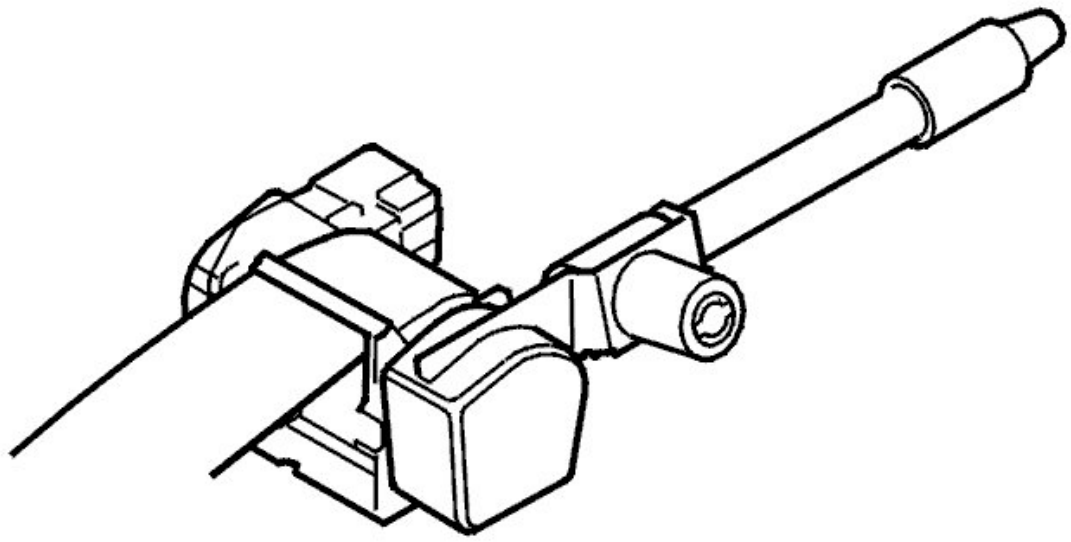
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0071 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0071 is displayed.

Substitute value
- Nothing.

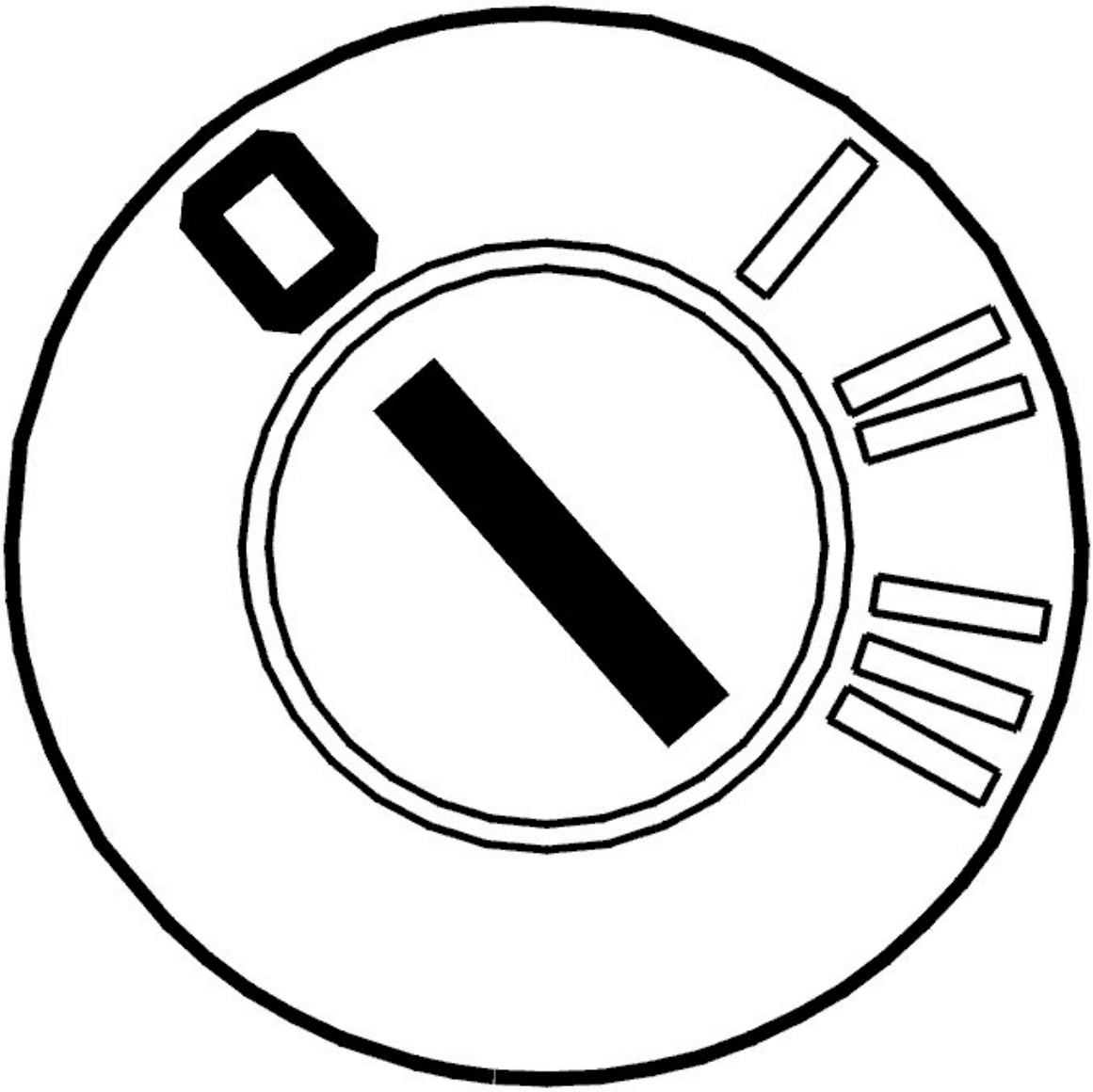
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

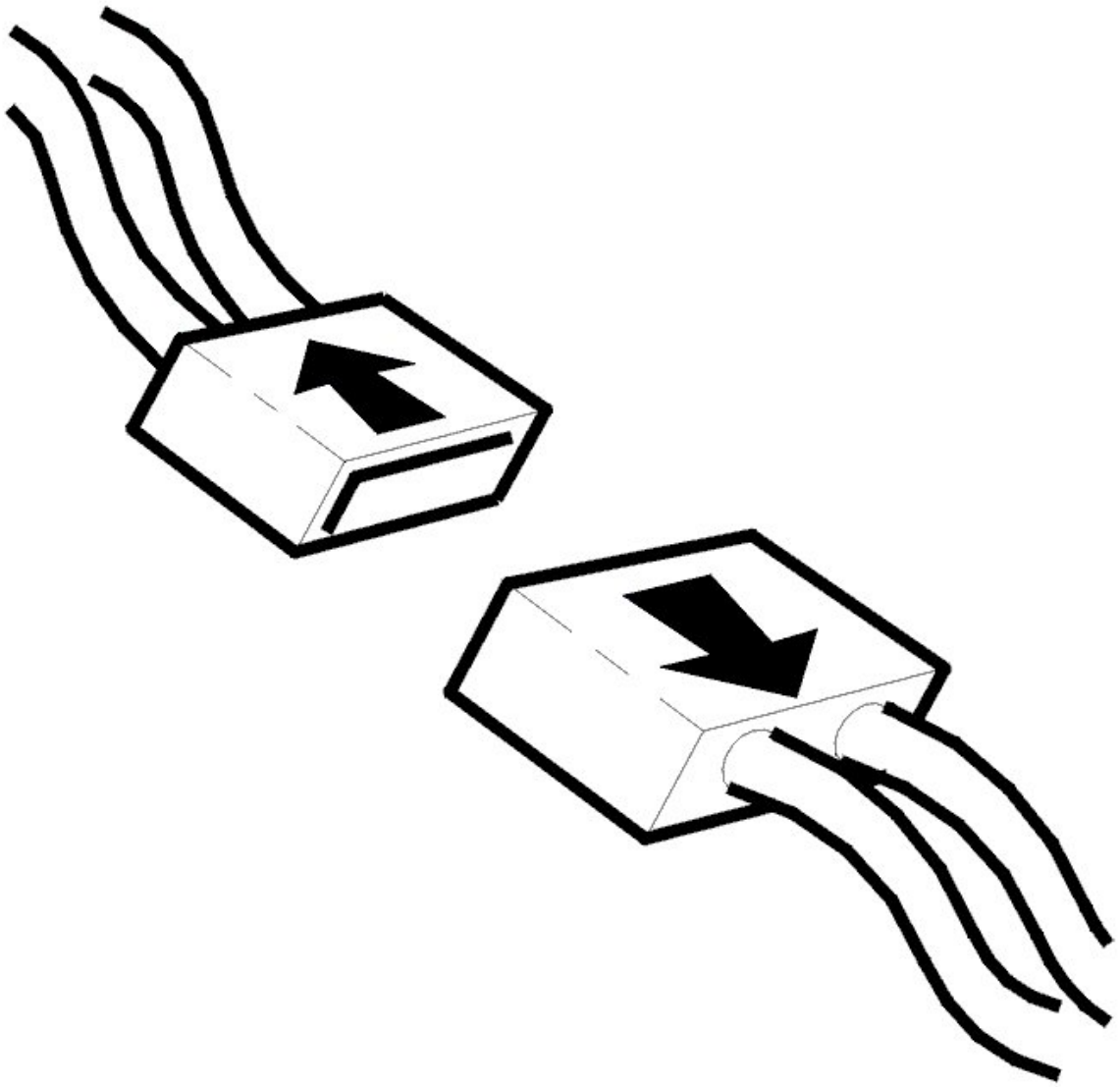
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

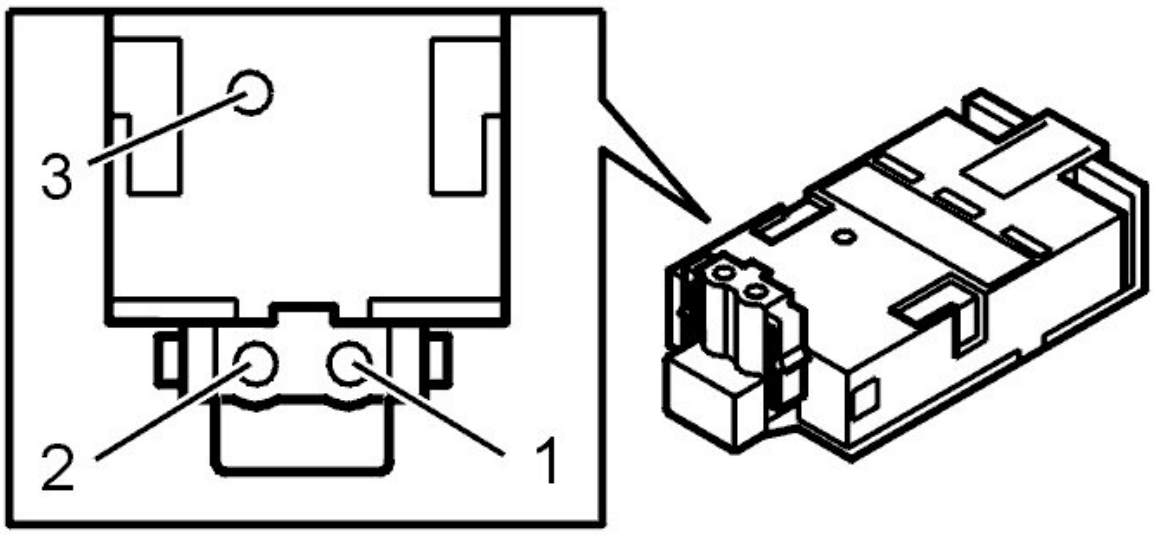
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

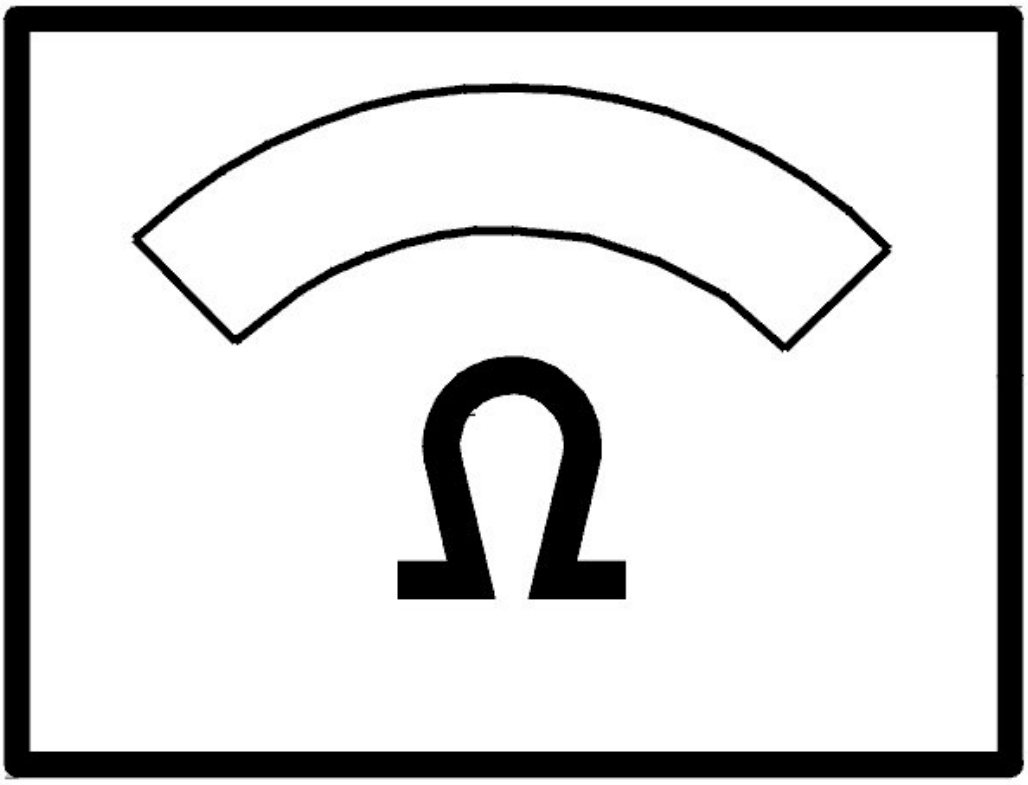
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

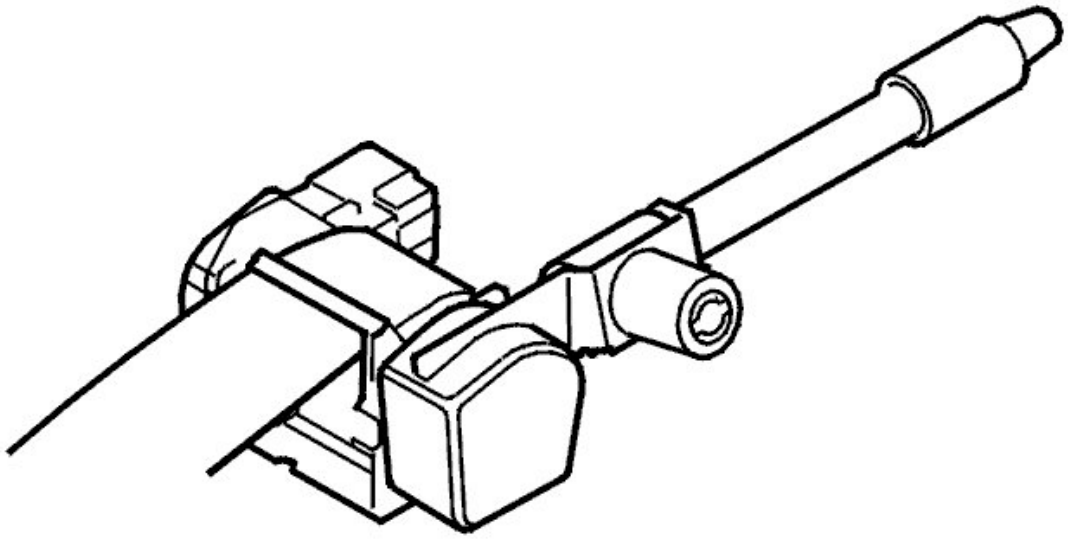
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0072 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0072 is displayed.

Substitute value
- Nothing.

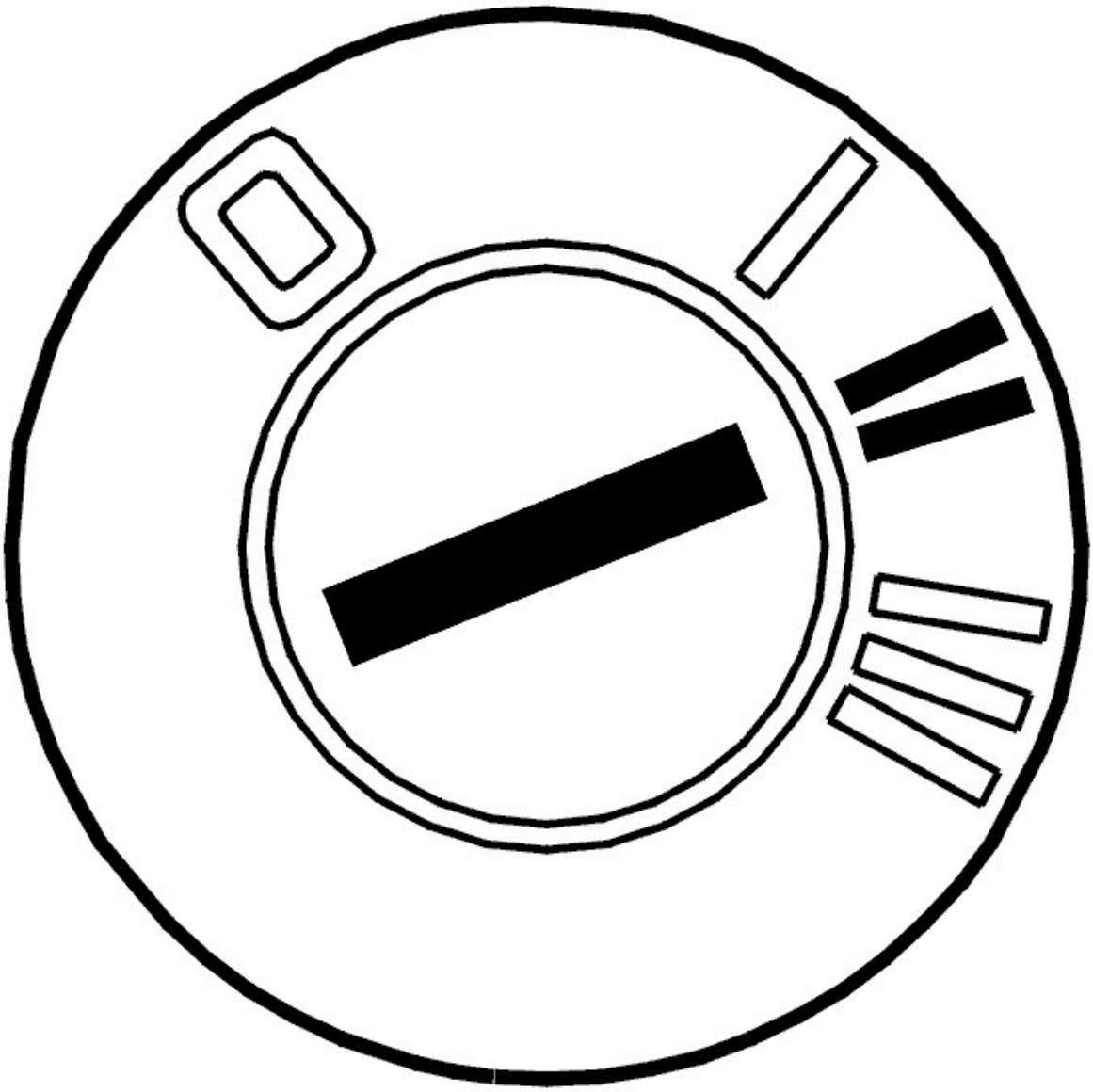
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

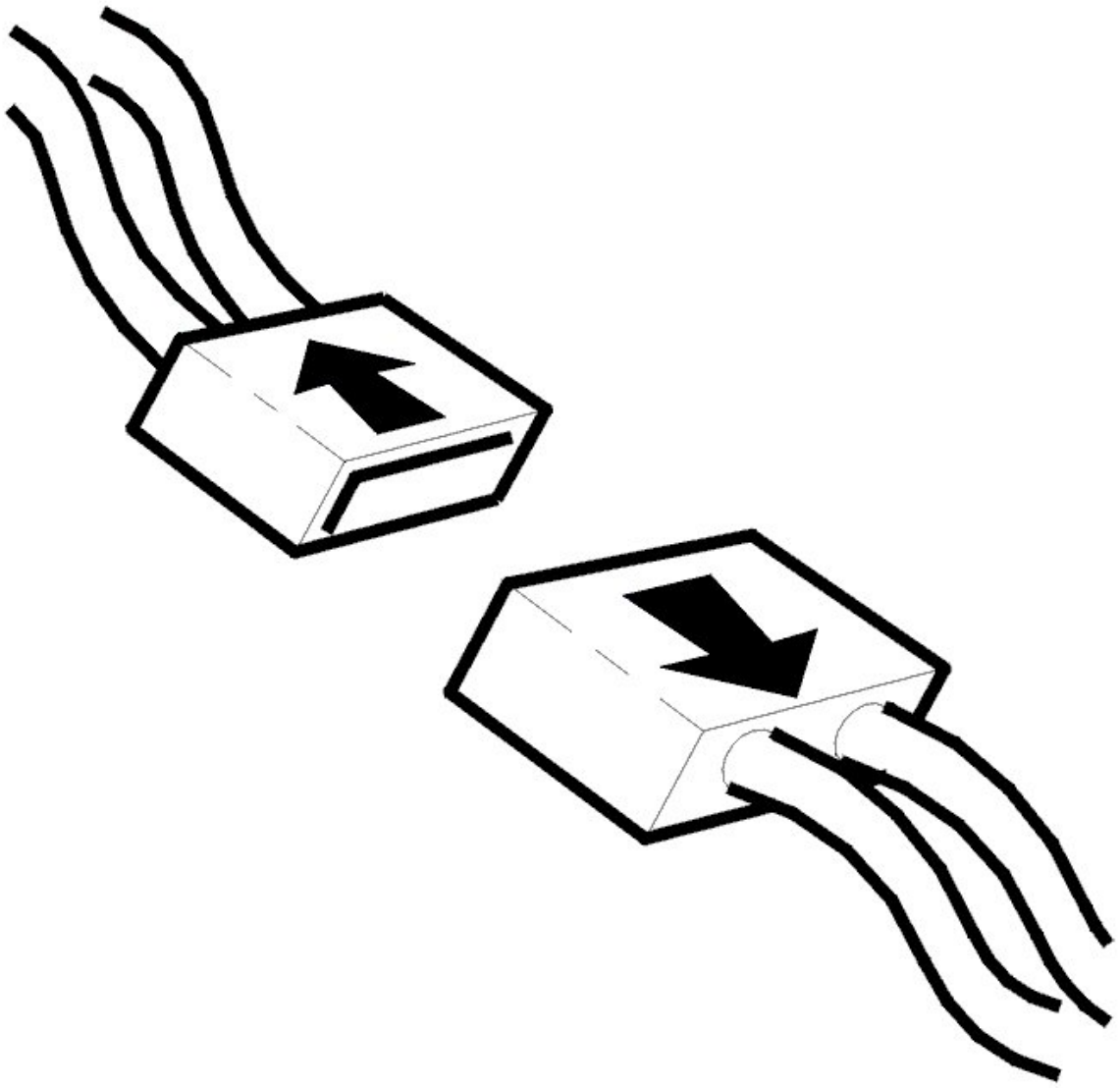
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

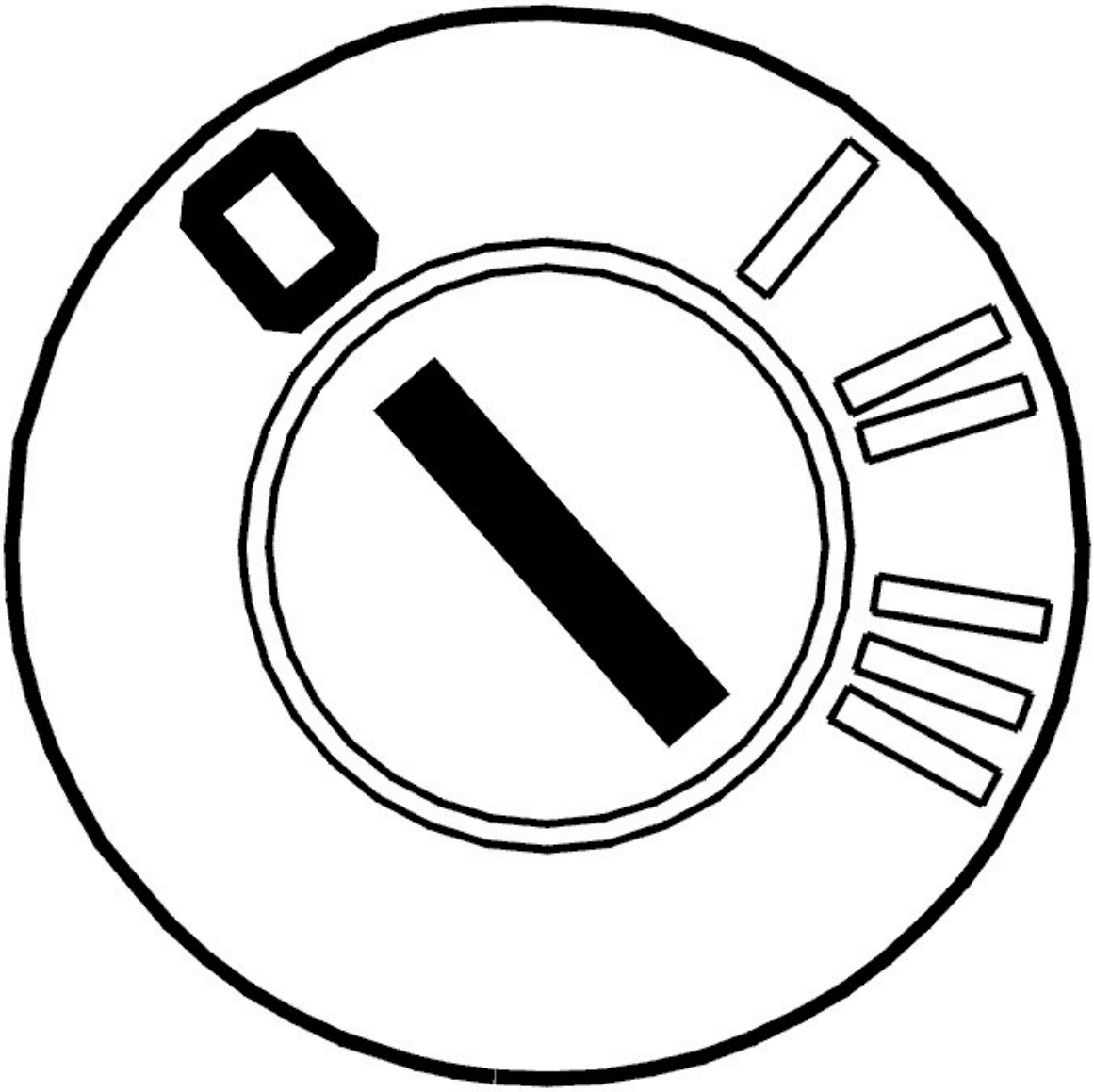
- To replace the front seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A

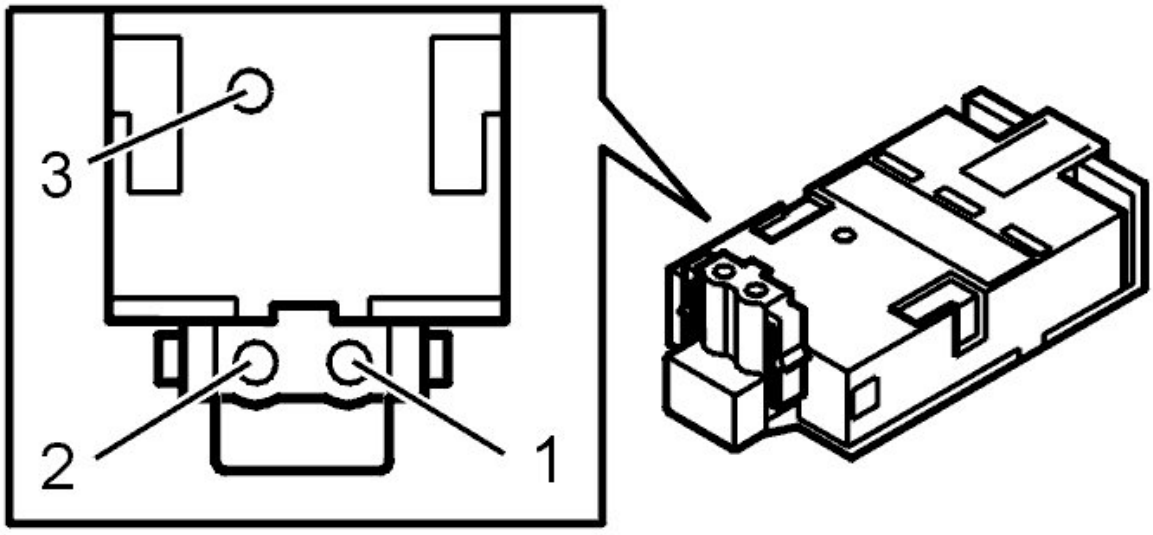
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

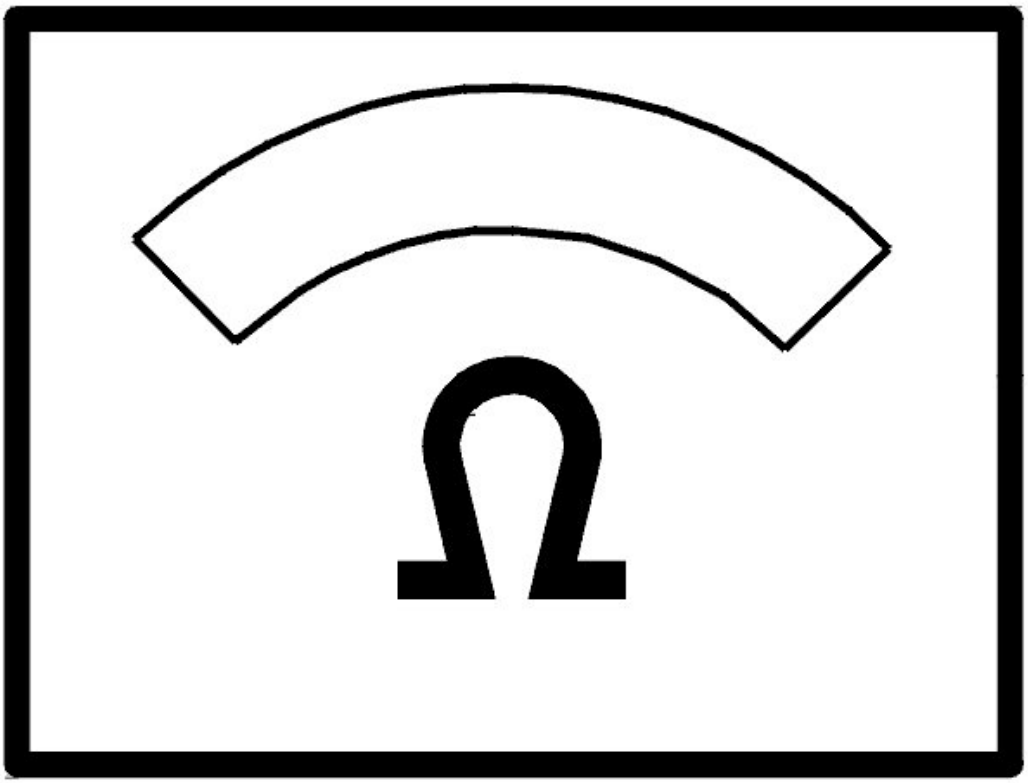
for diagnostic trouble code (DTC) SRS-0082

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

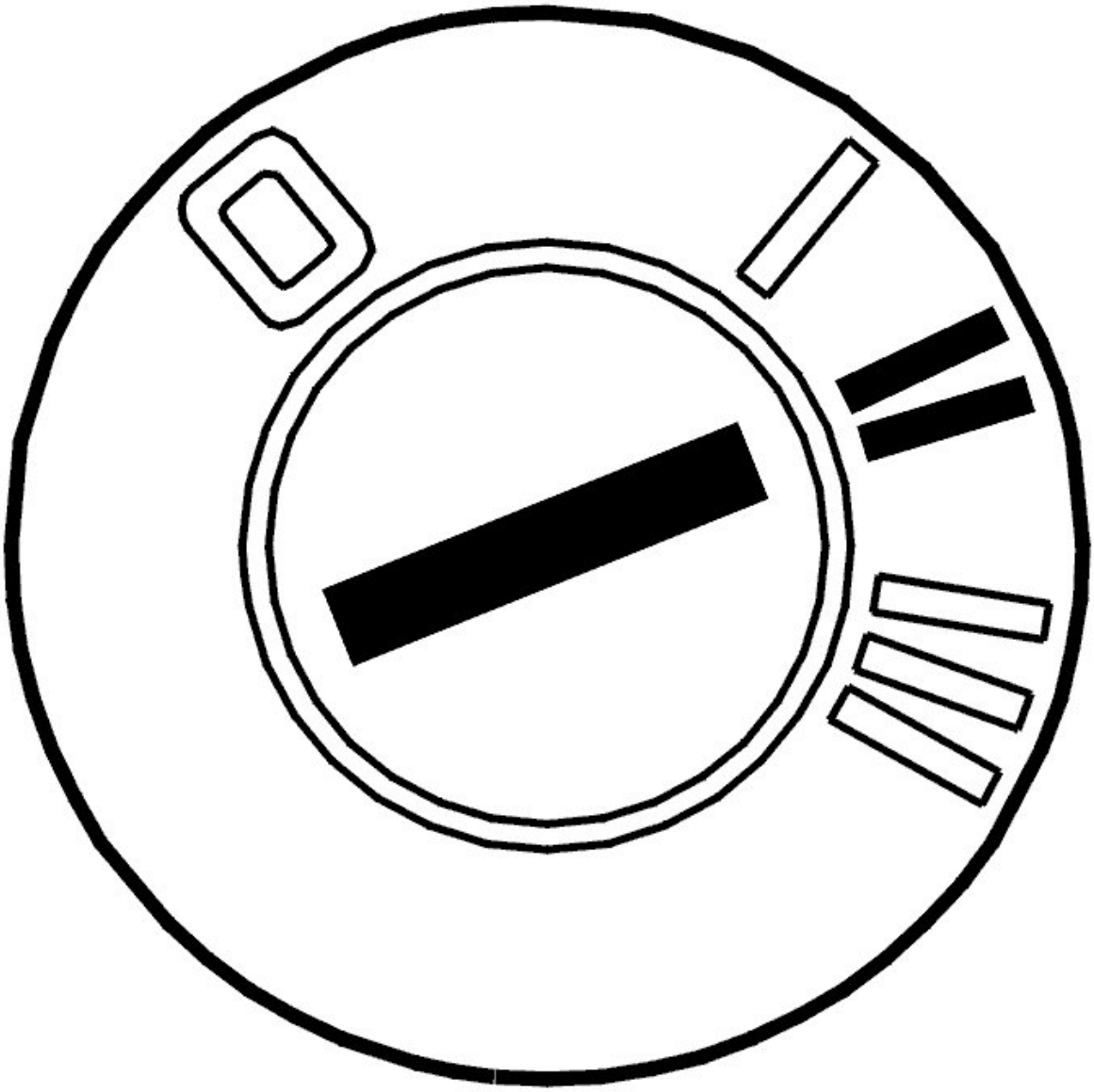
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

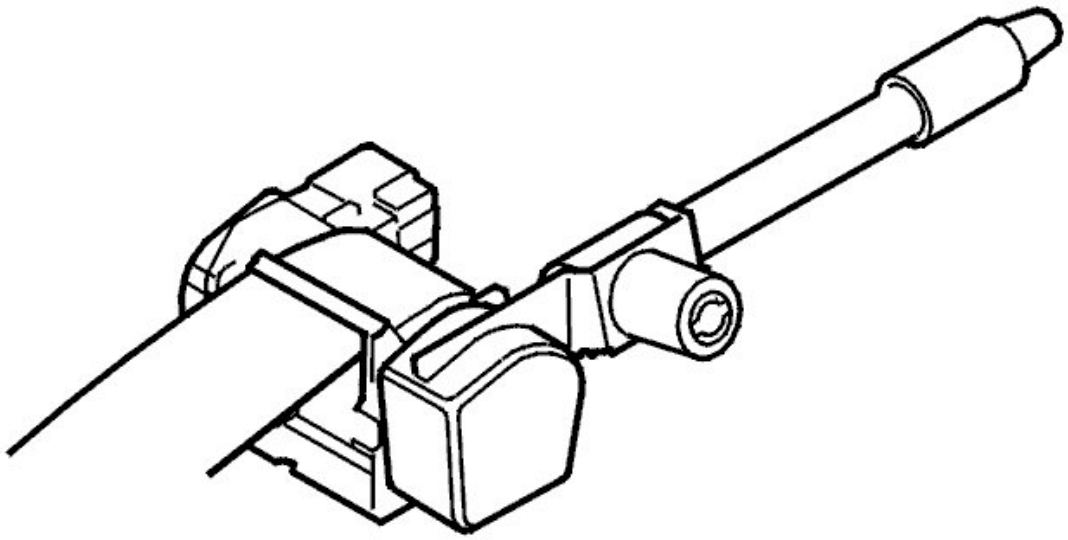
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0072 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0072 is displayed.

Substitute value
- Nothing.

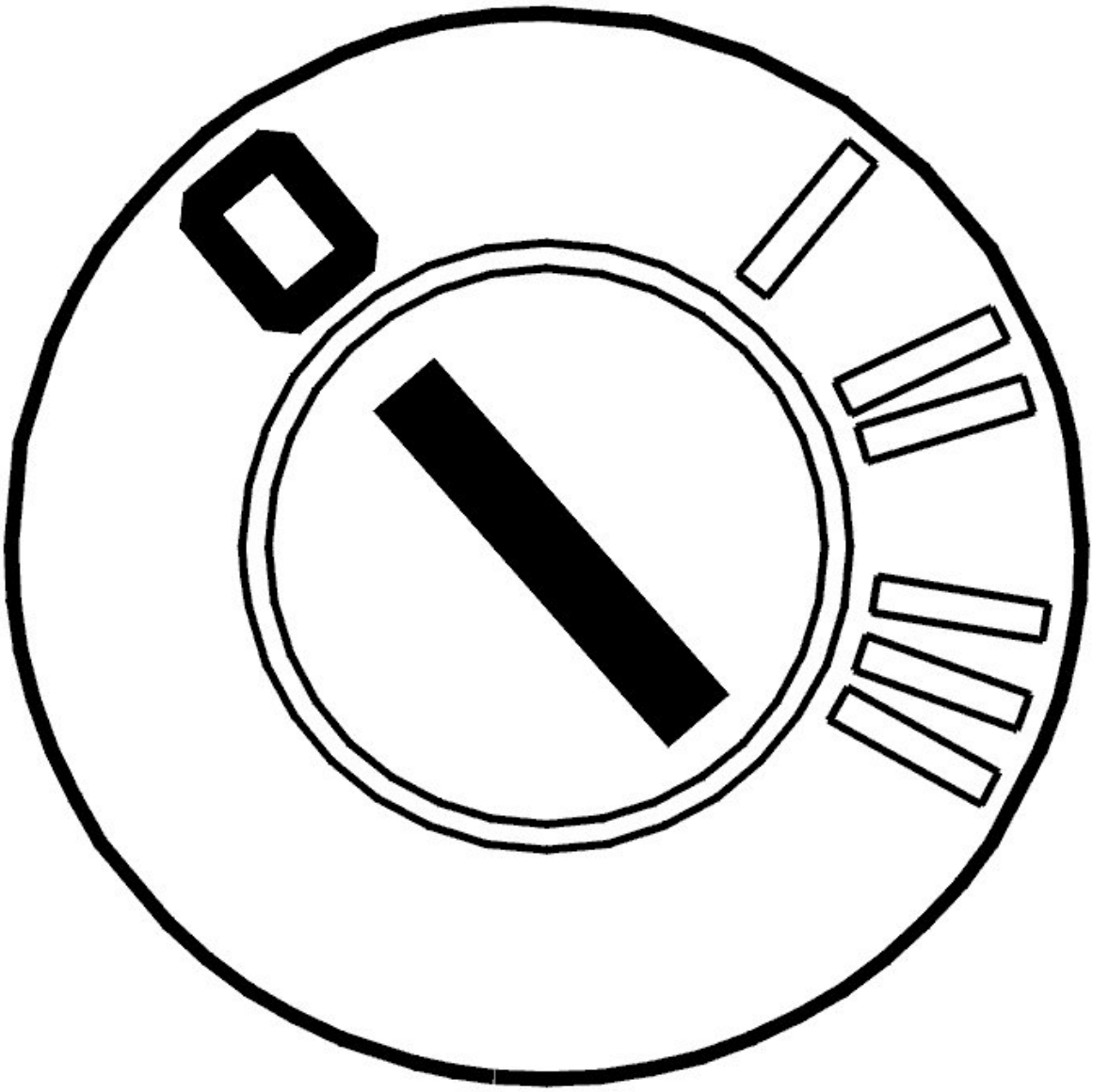
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

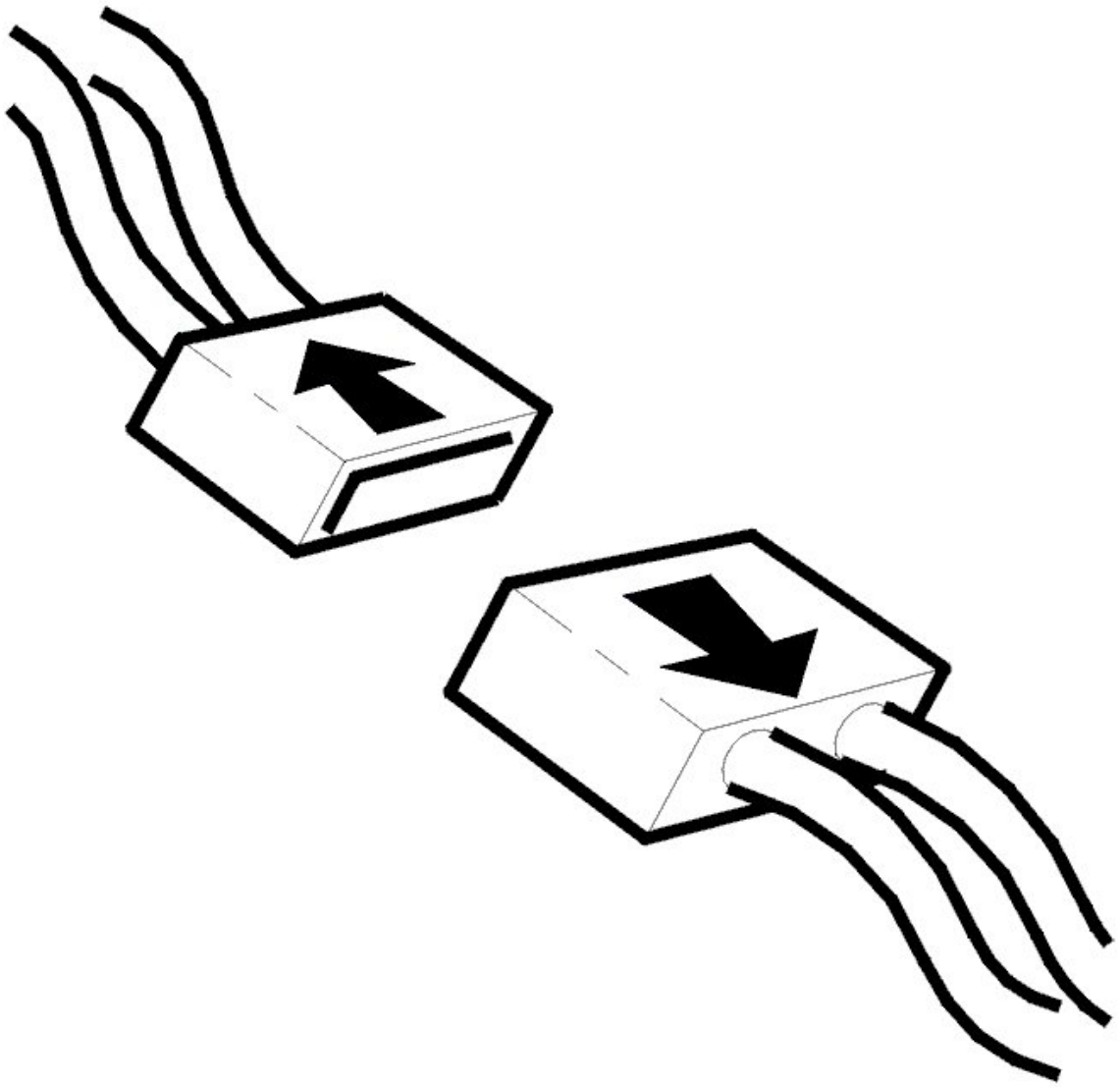
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A,

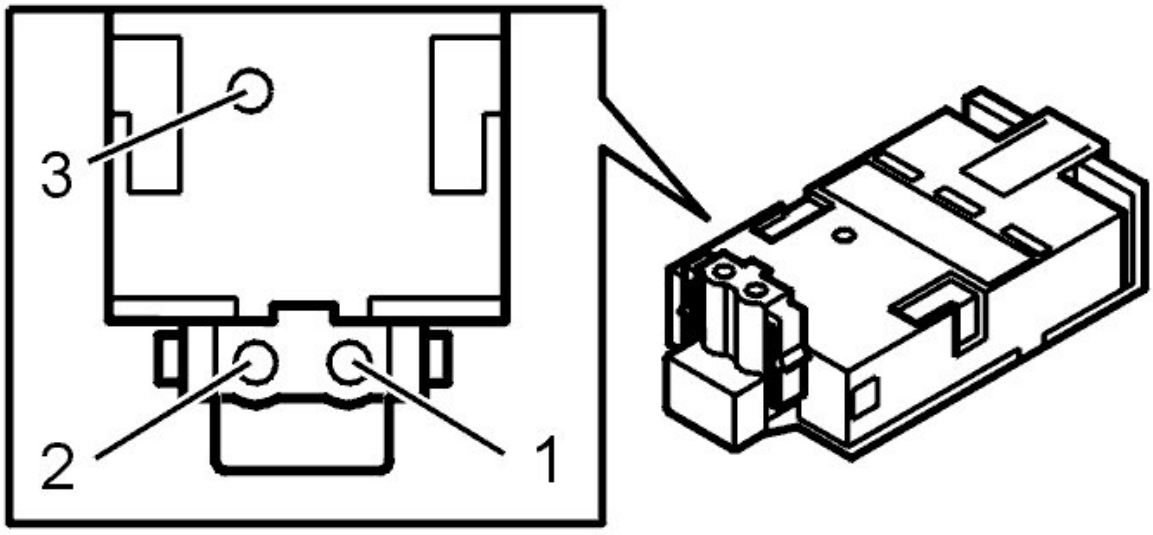
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

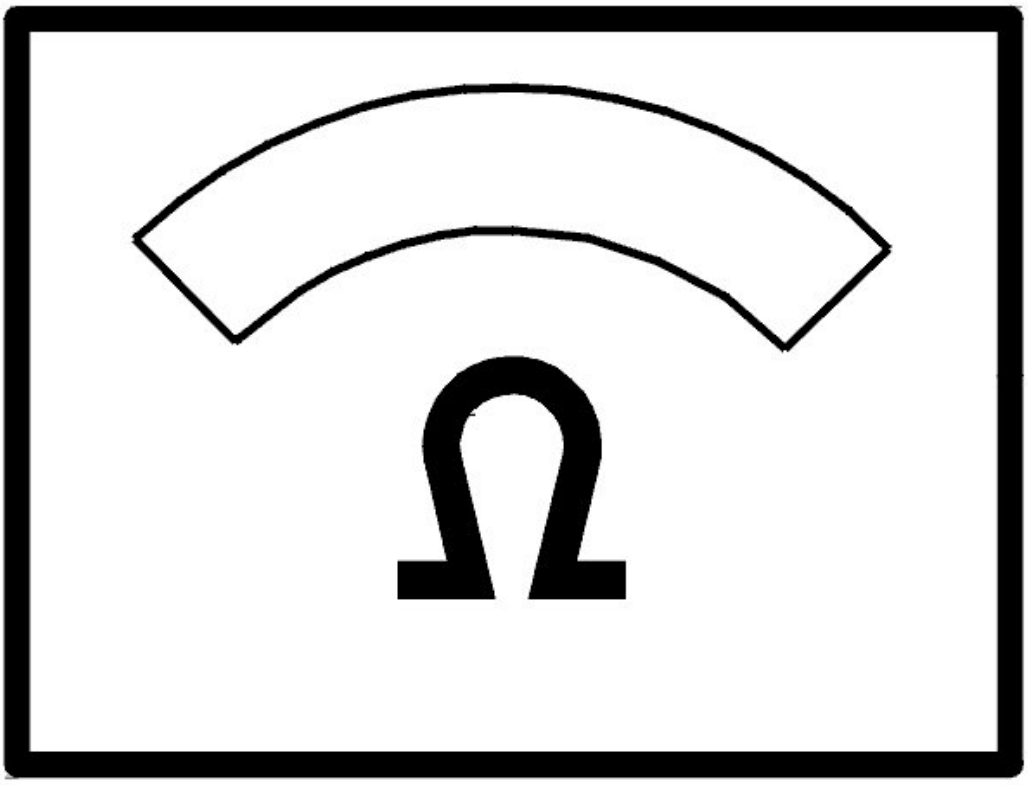
for diagnostic trouble code (DTC) SRS-0082,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

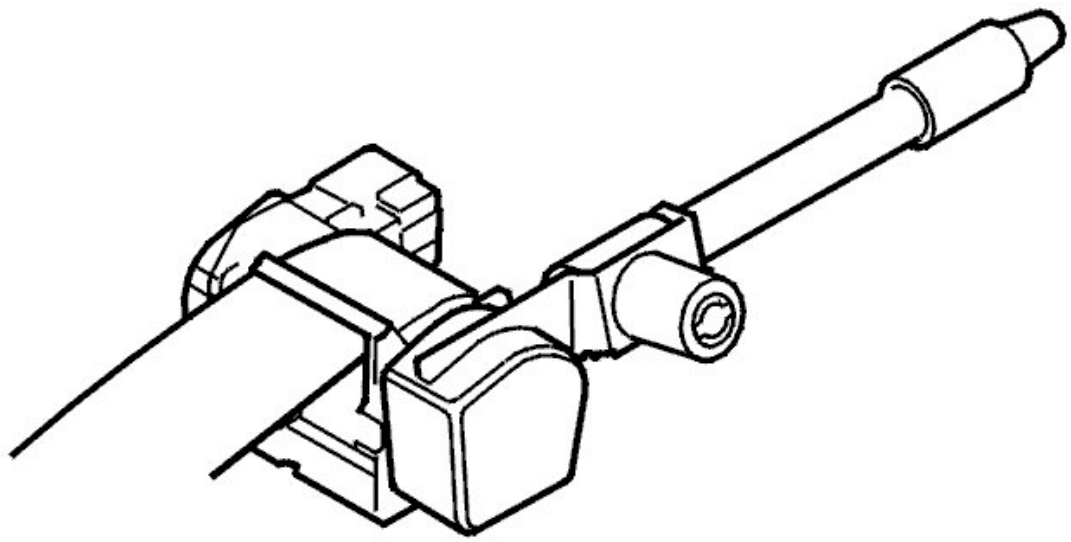
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0073 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0073 is displayed.

Substitute value
- Nothing.

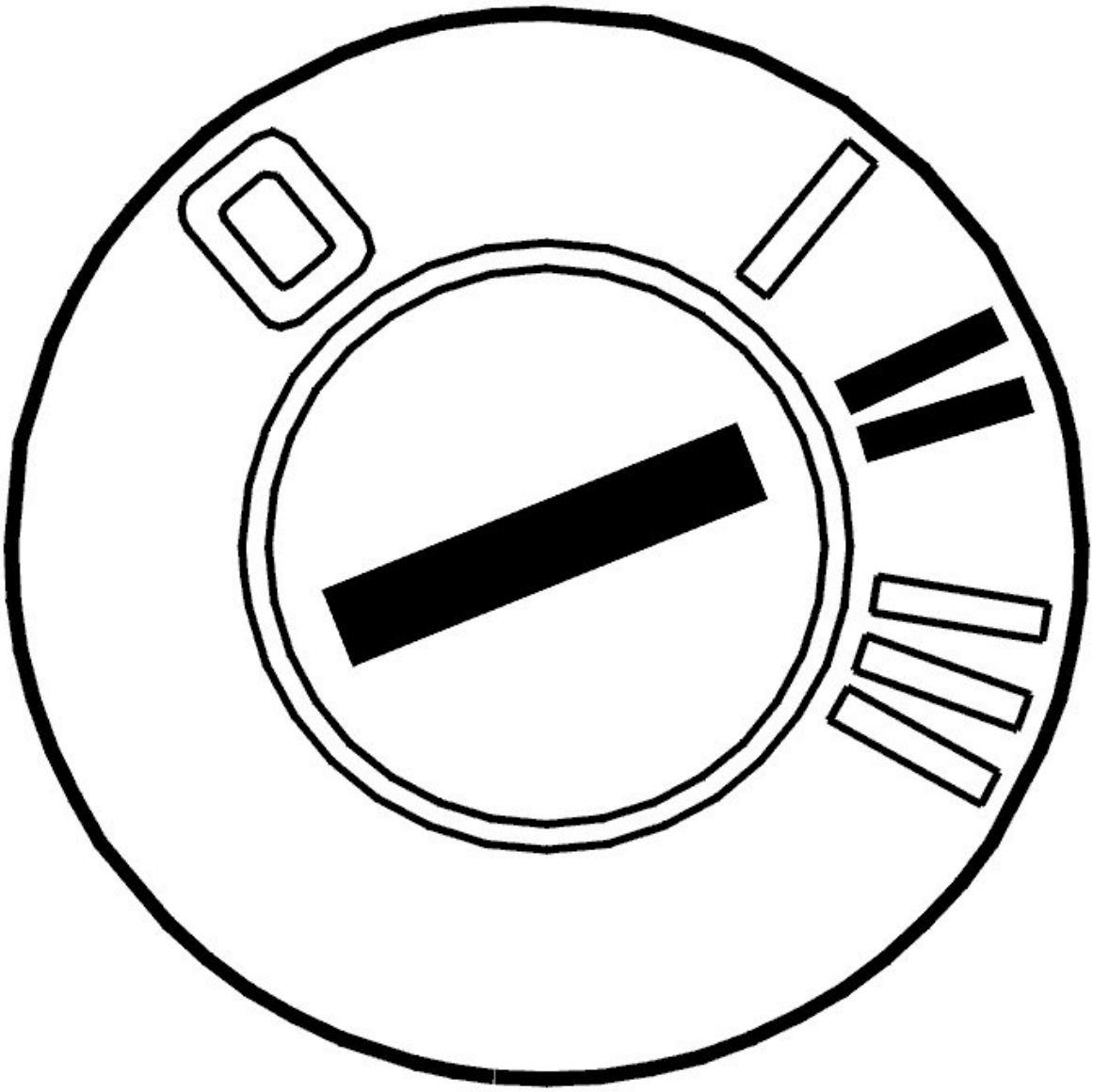
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

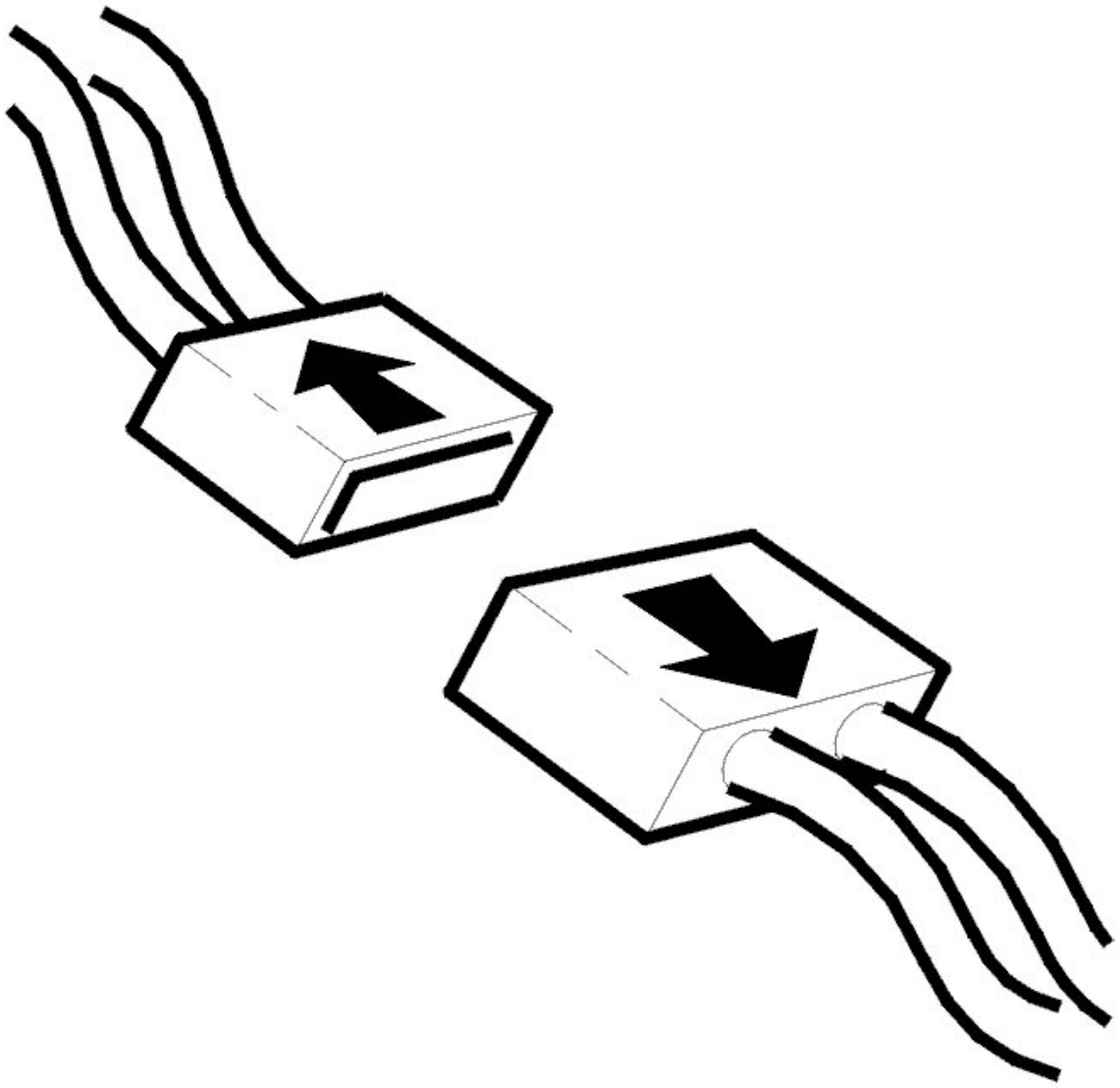
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

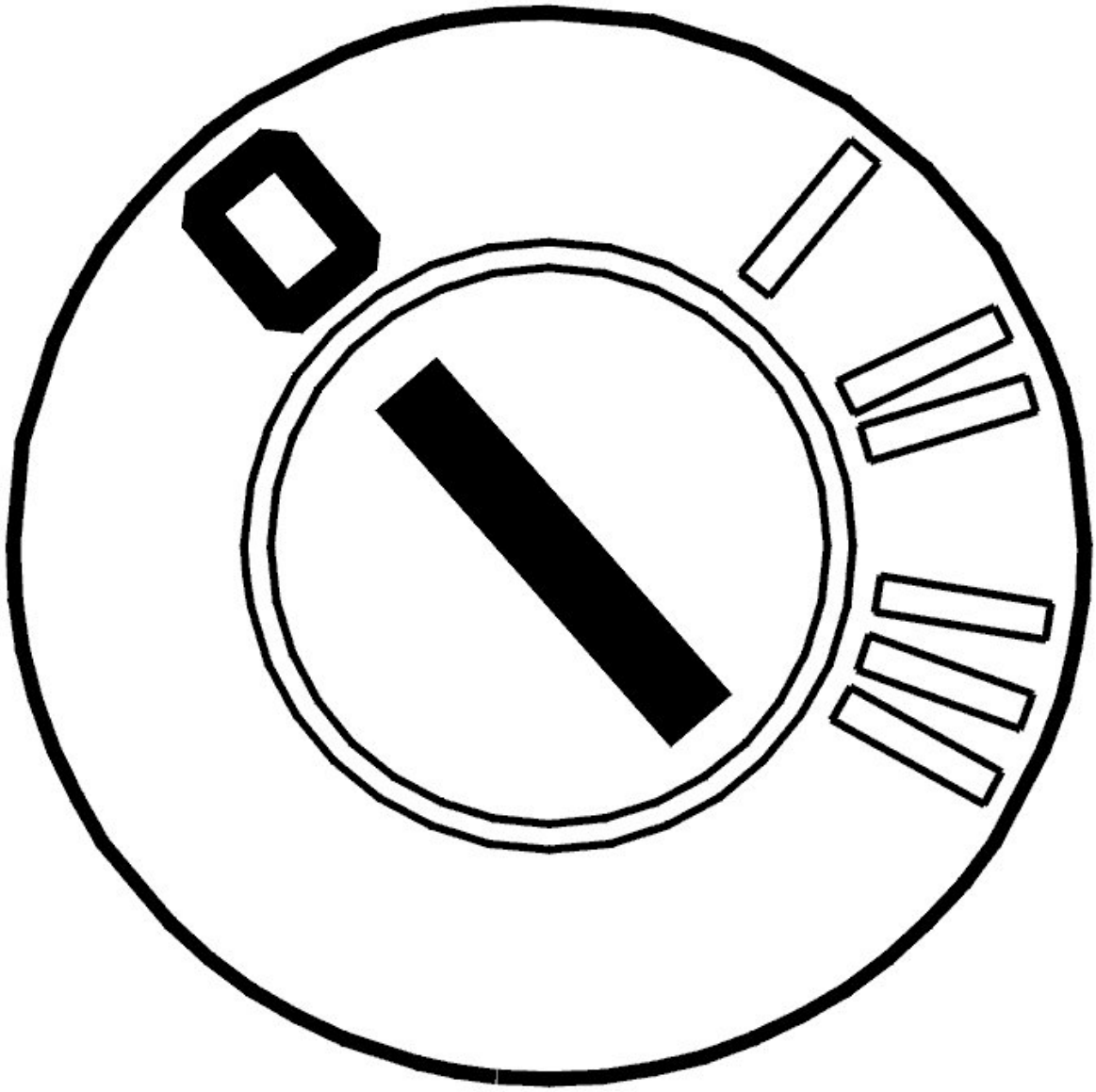
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0063,

front left seat belt tensioner terminals #5A(5) and #6A(6) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-006B,

front right seat belt tensioner terminals #5C(1) and #6C(2) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0073,

rear left seat belt tensioner terminals #16A(16) and #15A(15) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-007B,

centre rear seat belt tensioner terminals 17A(17) and #18A(18) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0083,

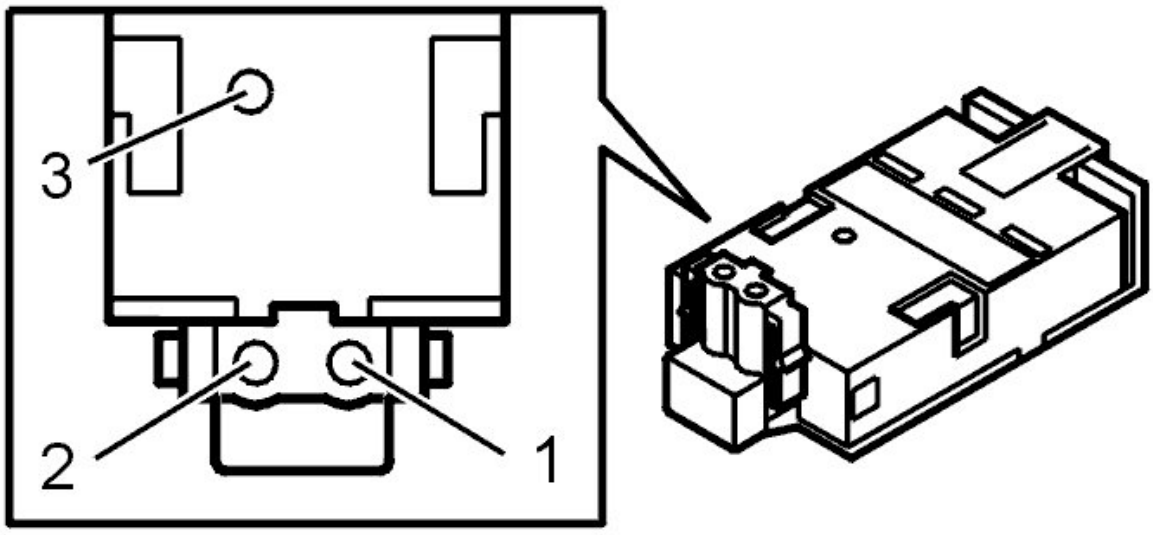
rear right seat belt tensioner terminals #16C(12) and #15C(11) and connector terminals #1 and #3
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

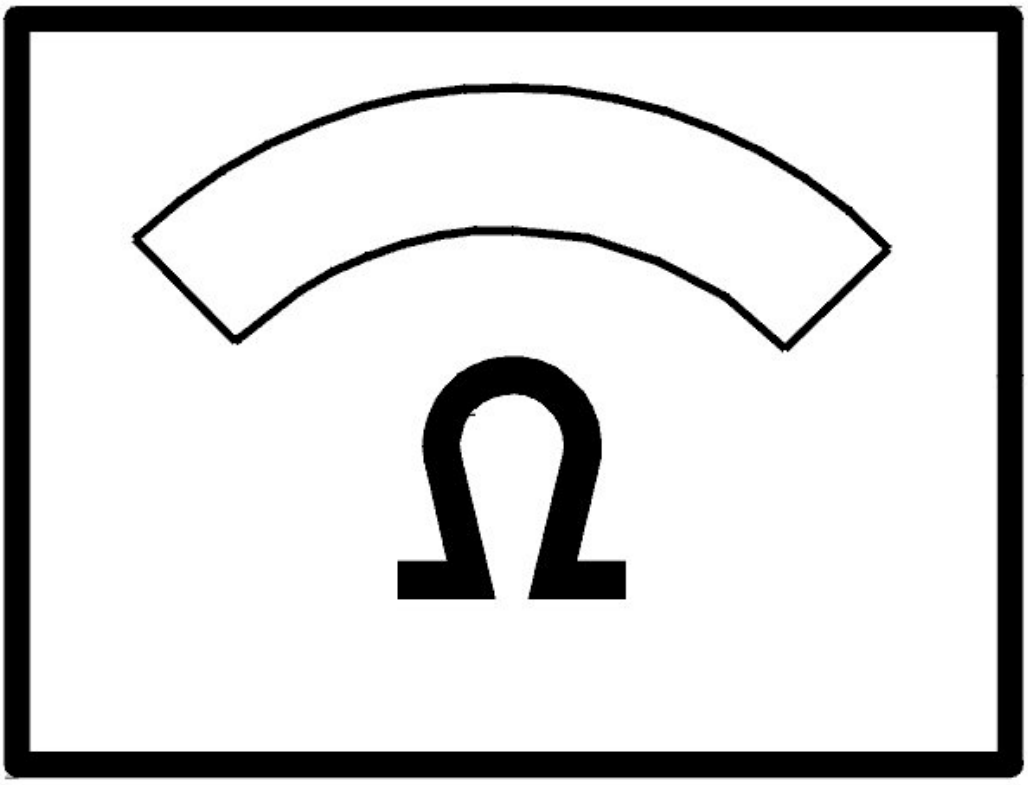
Hint: Checking the integrated capacitor in the igniter connector by taking resistance measurements.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

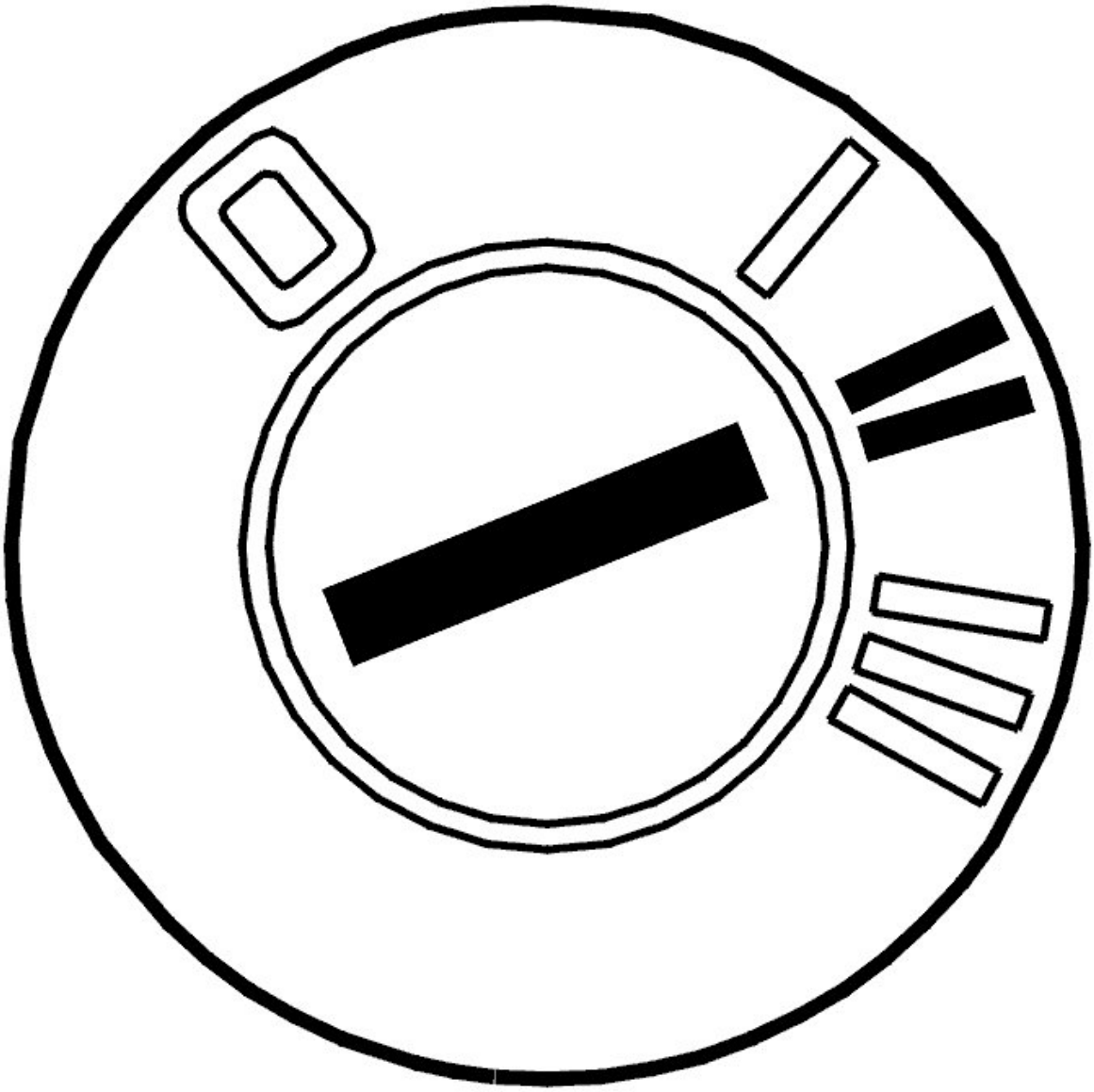
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

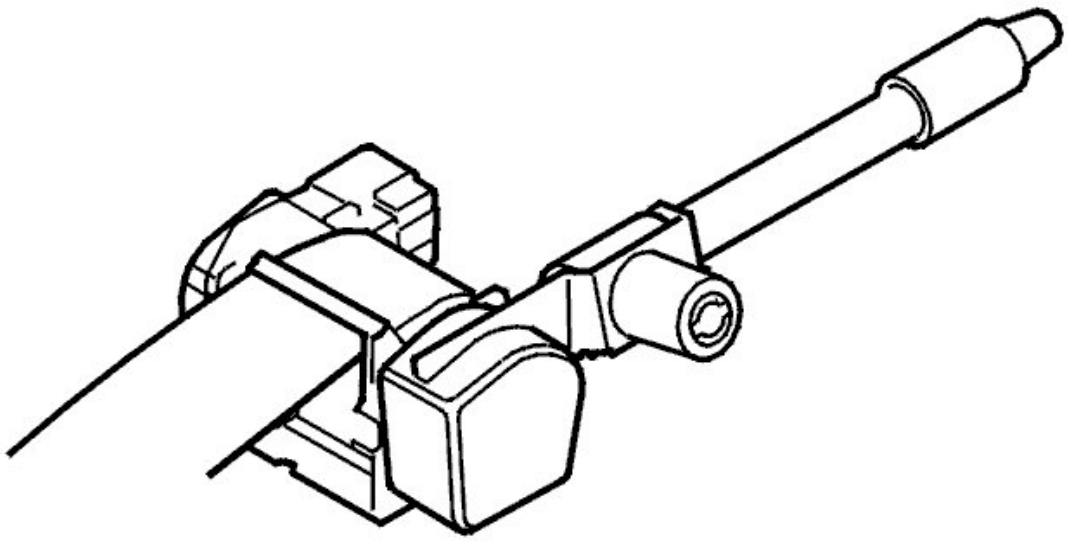
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0073 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0073 is displayed.

Substitute value
- Nothing.

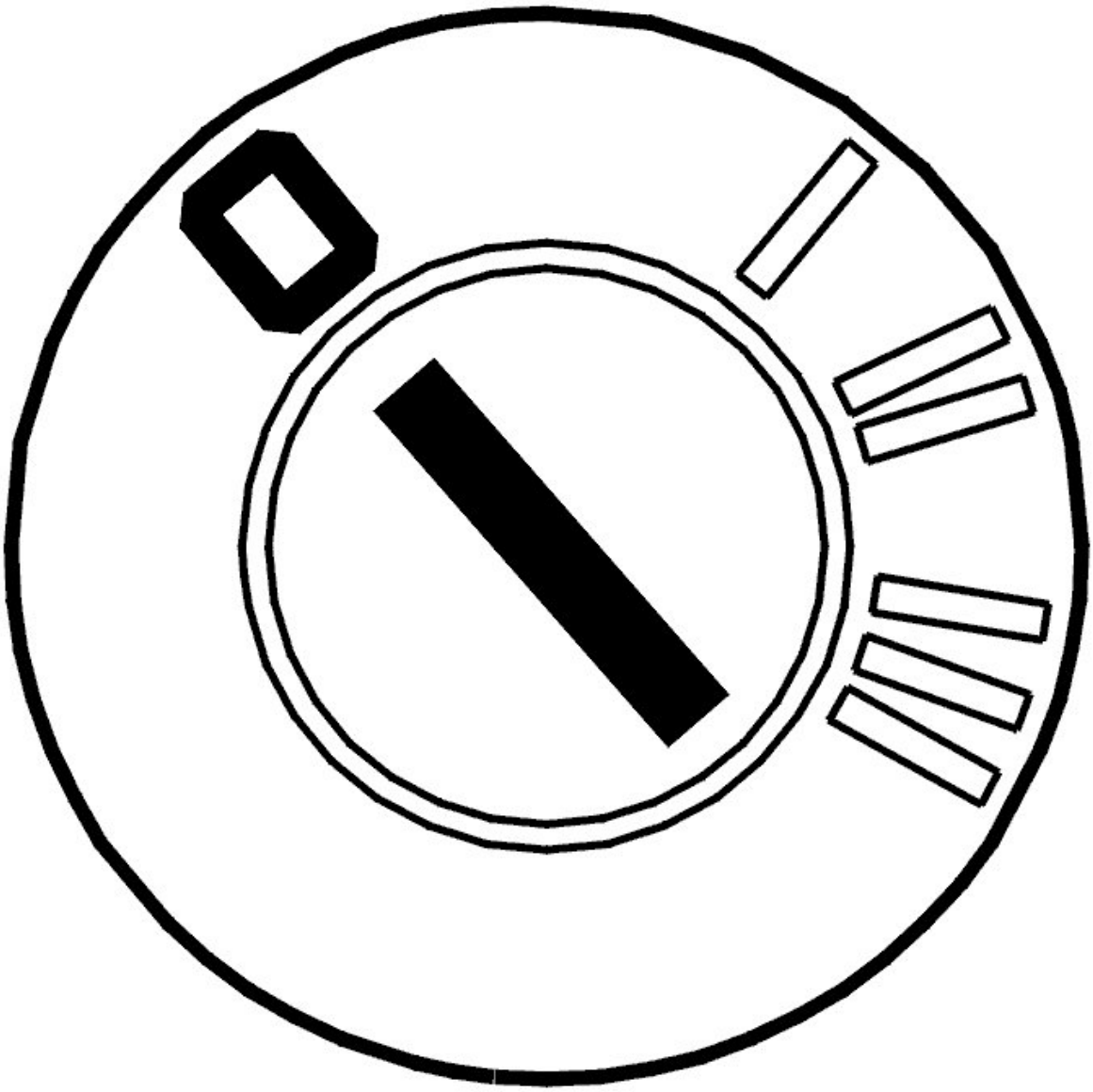
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0063,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006B,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0073,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007B,

terminals #17A(17), #18A(18) of the centre rear seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0083,

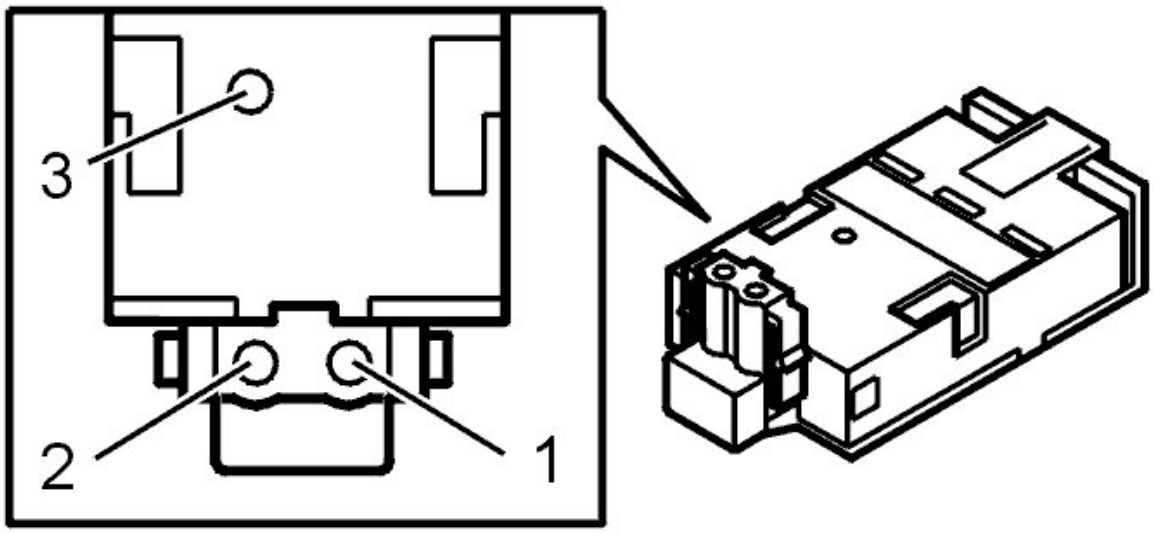
terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

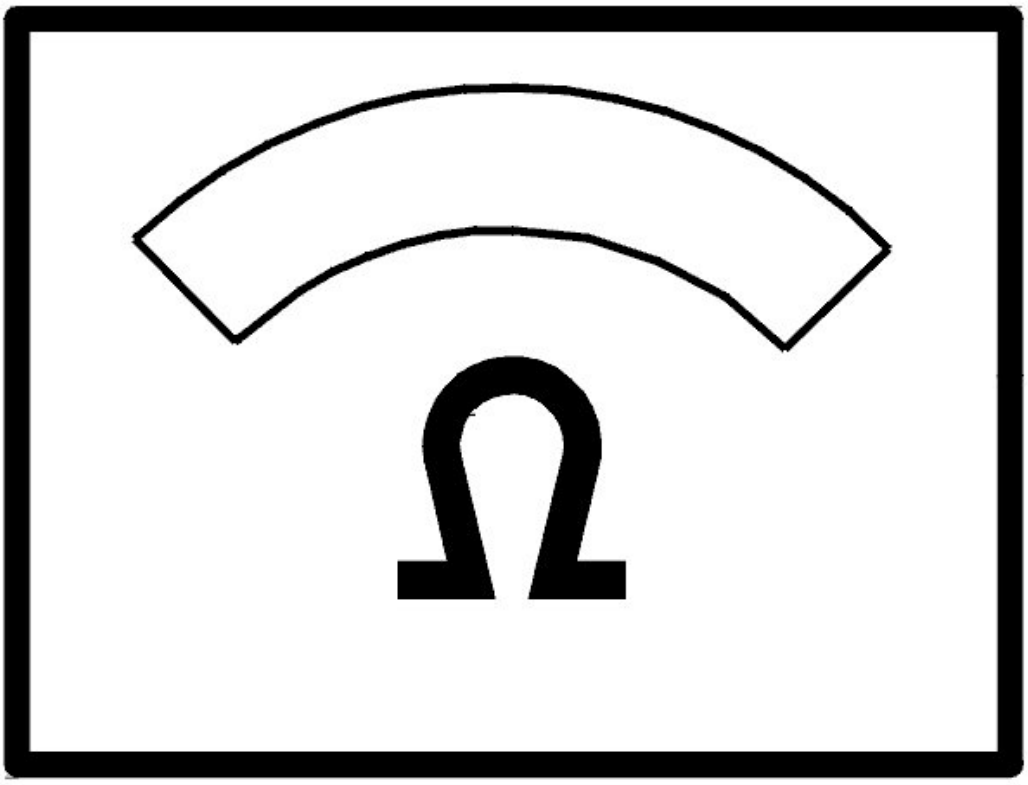
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

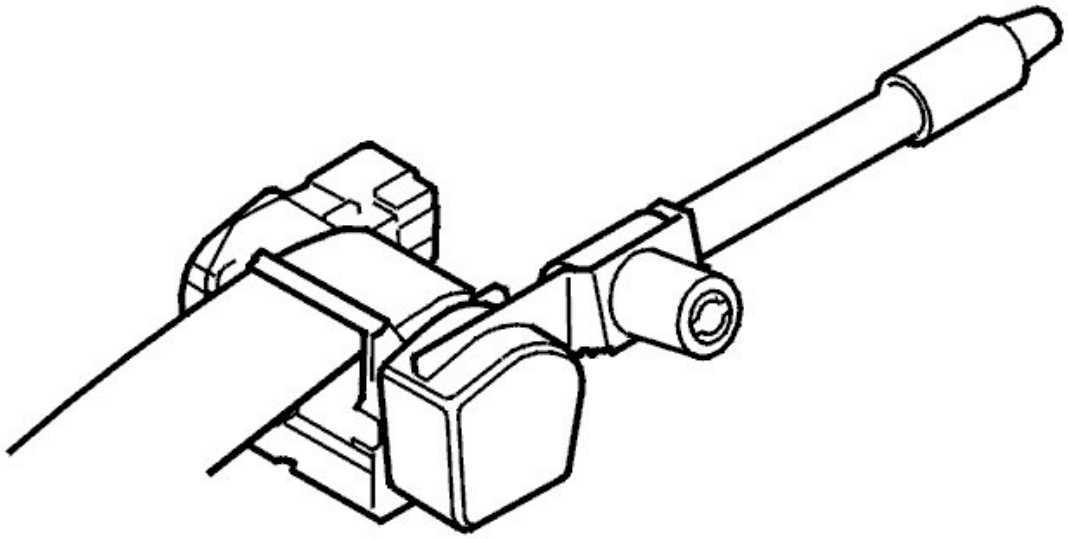
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0074 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0074 is displayed.

Substitute value
- Nothing.

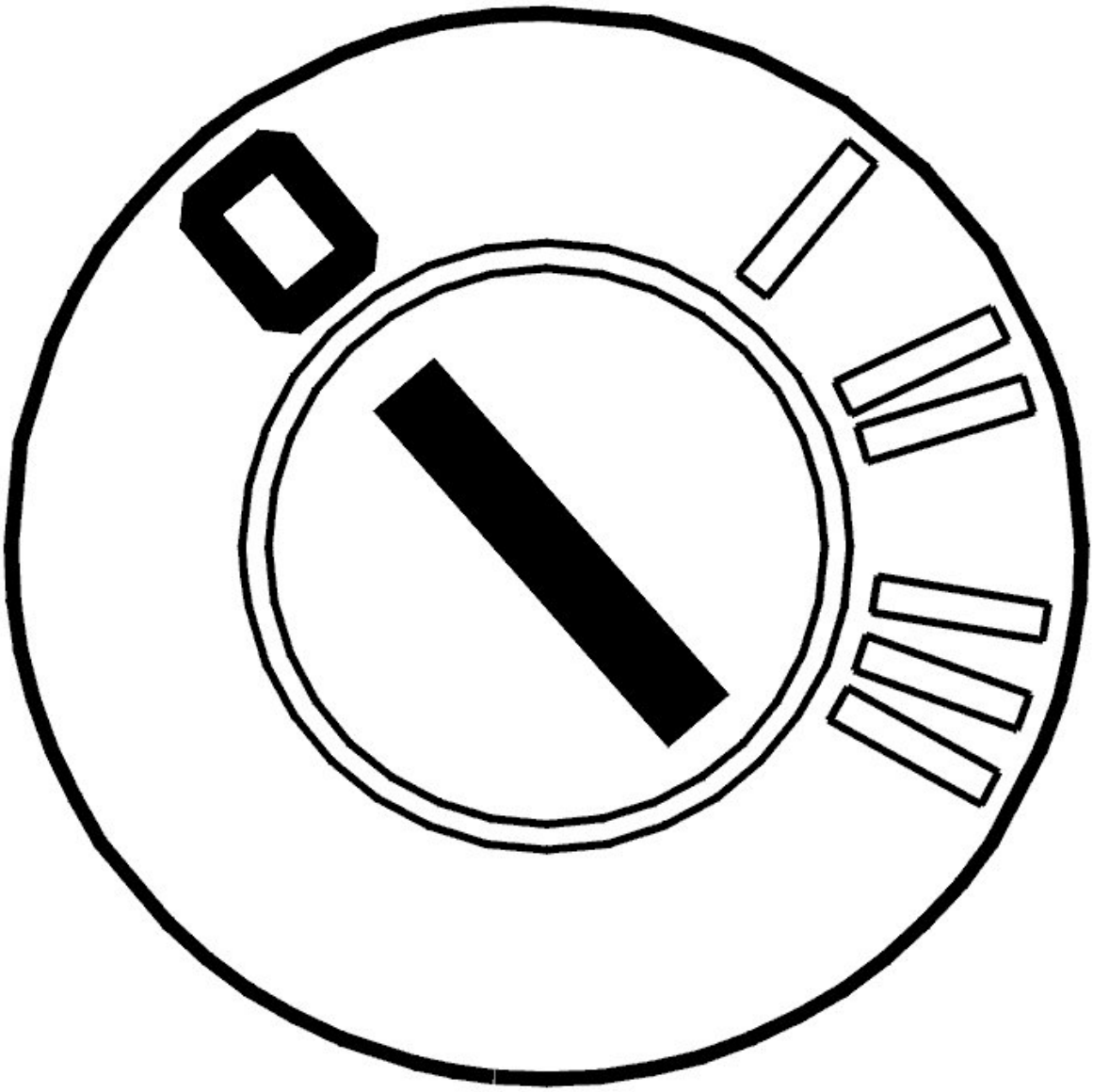
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

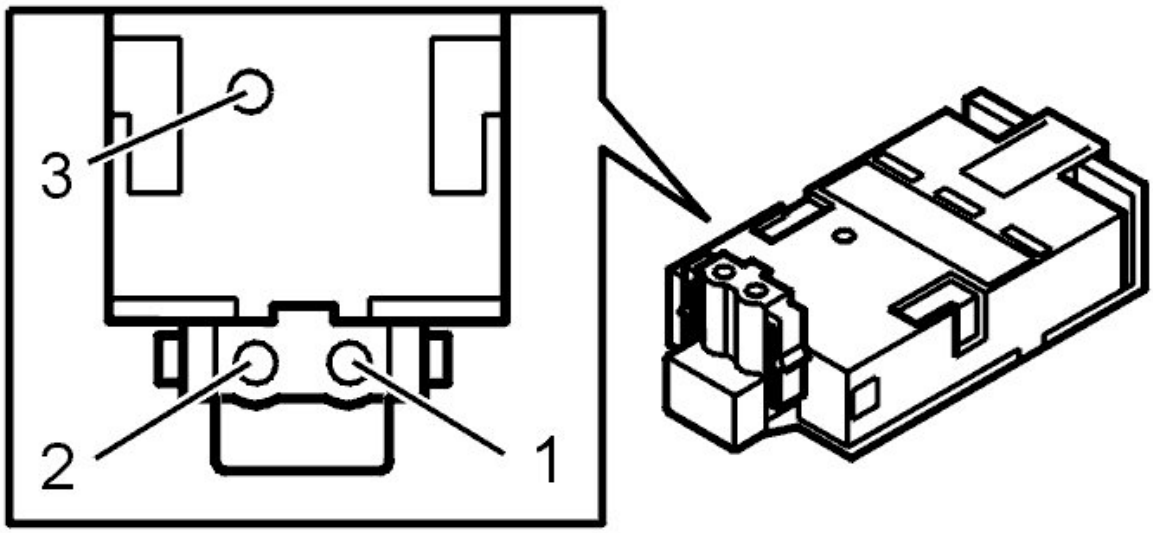
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

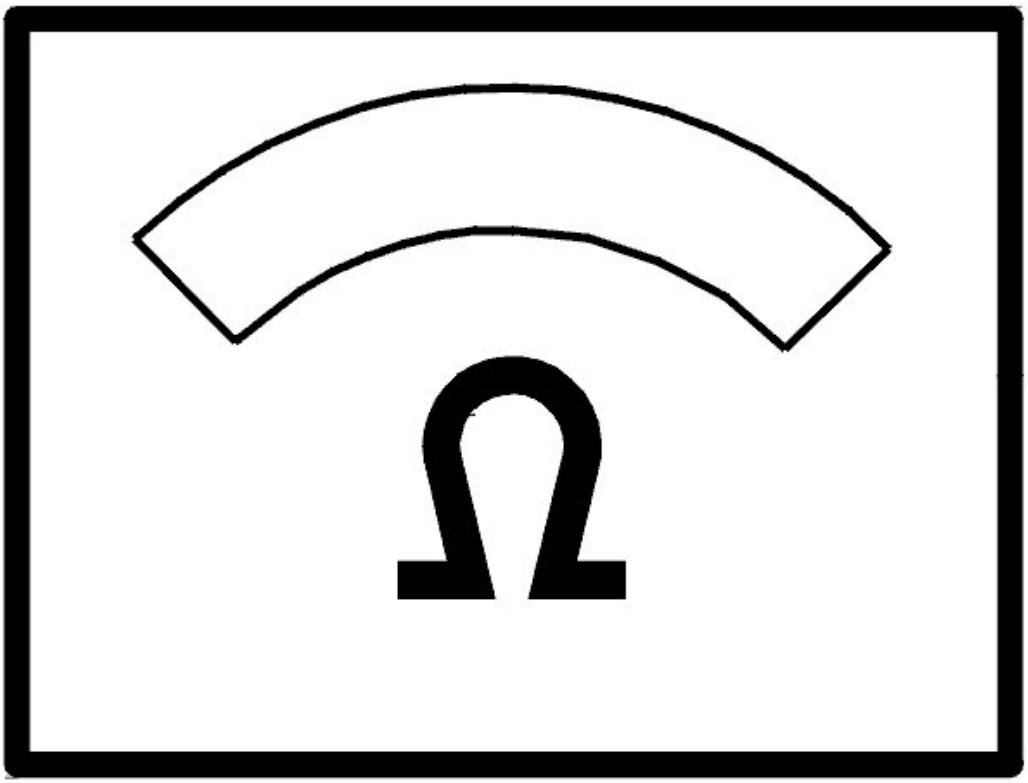
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

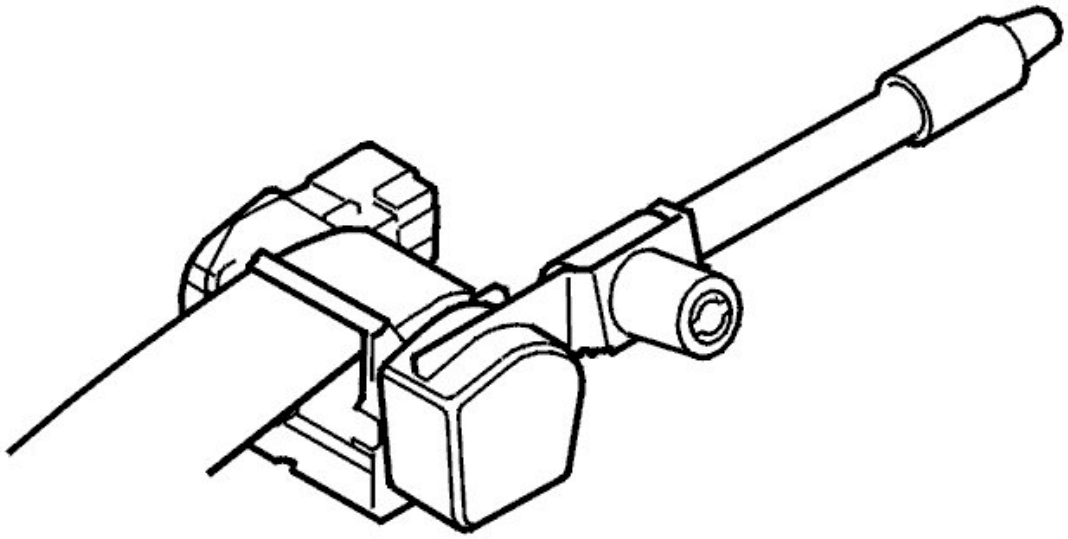
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0074 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0074 is displayed.

Substitute value
- Nothing.

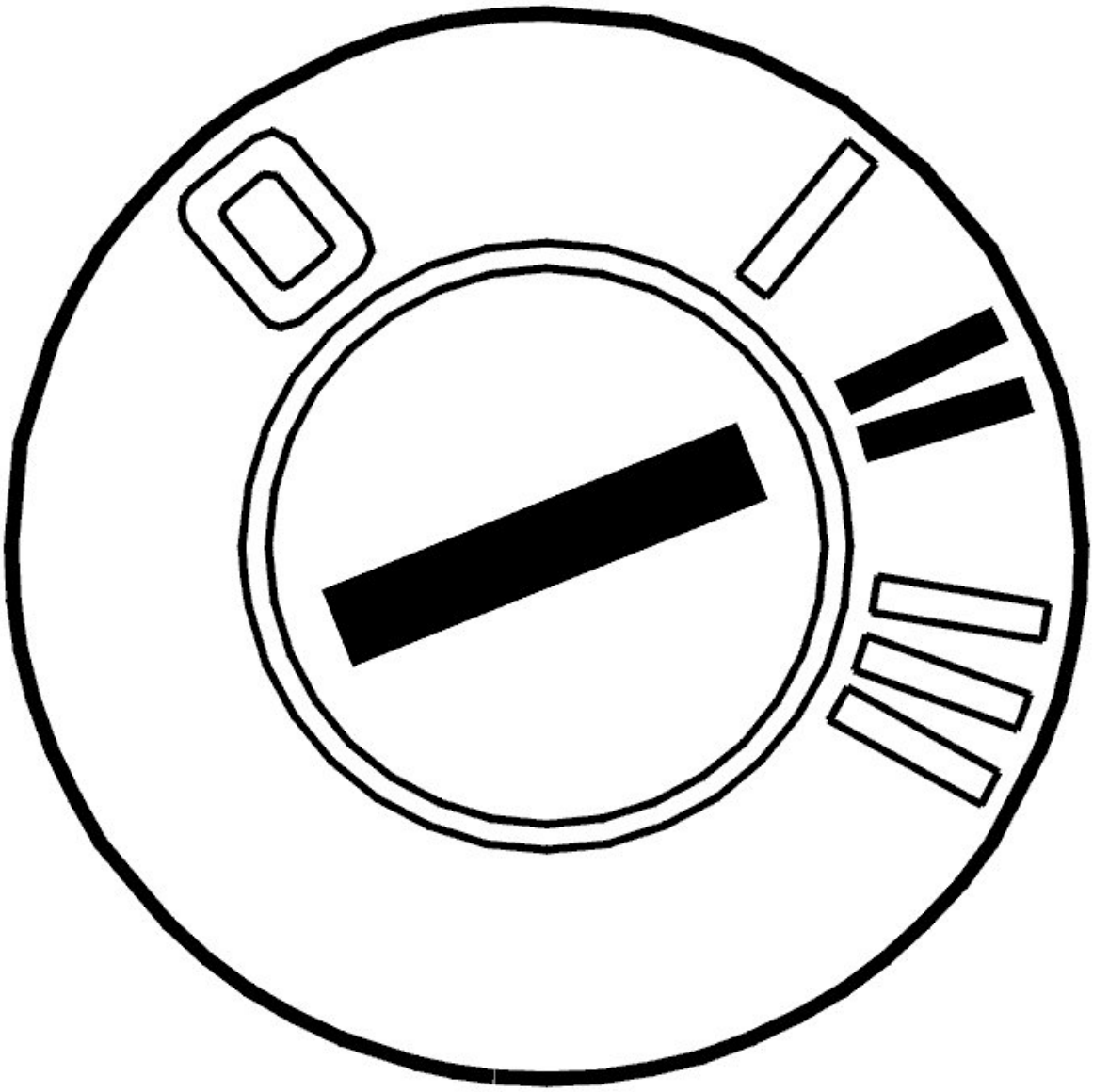
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

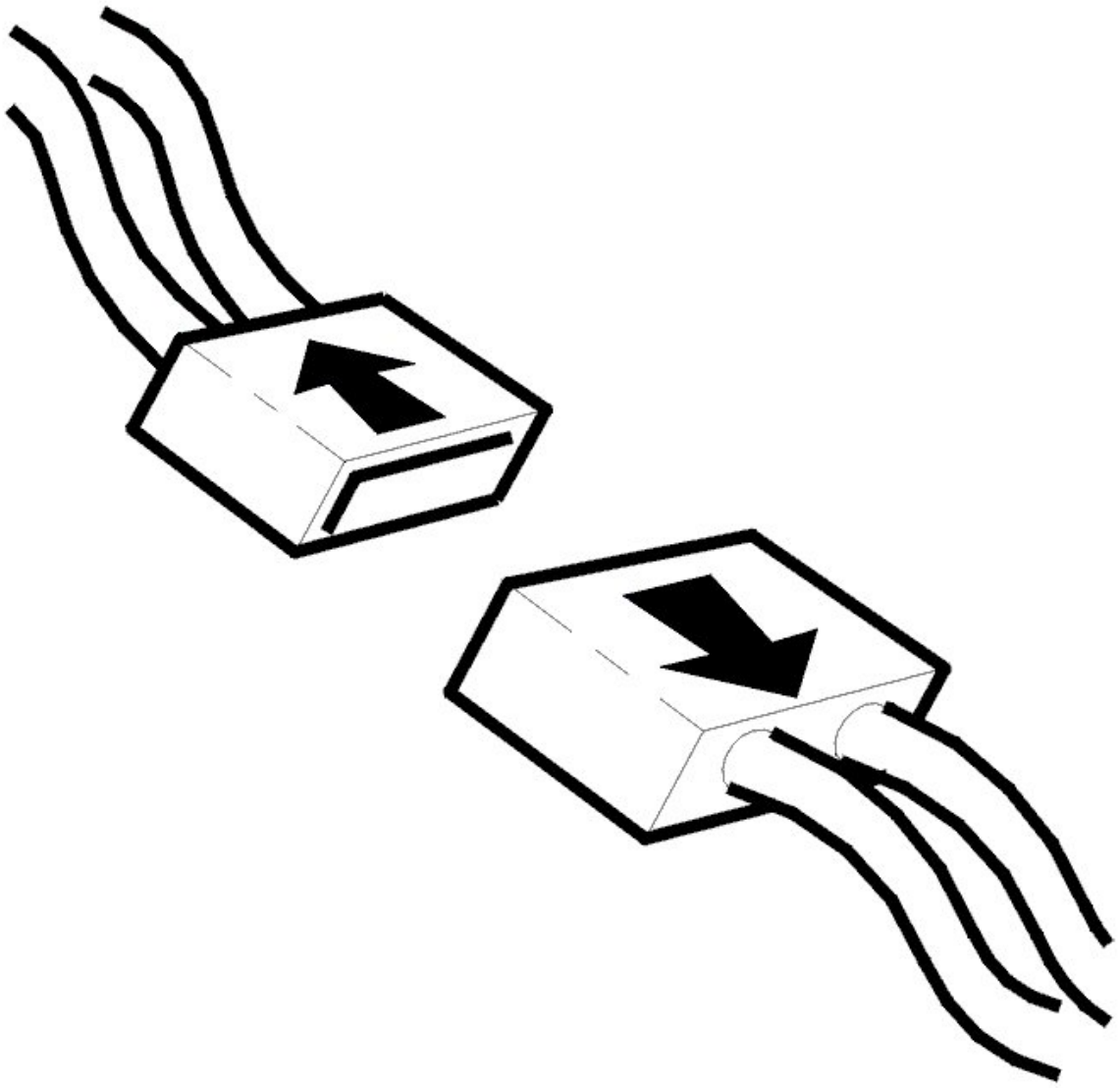
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

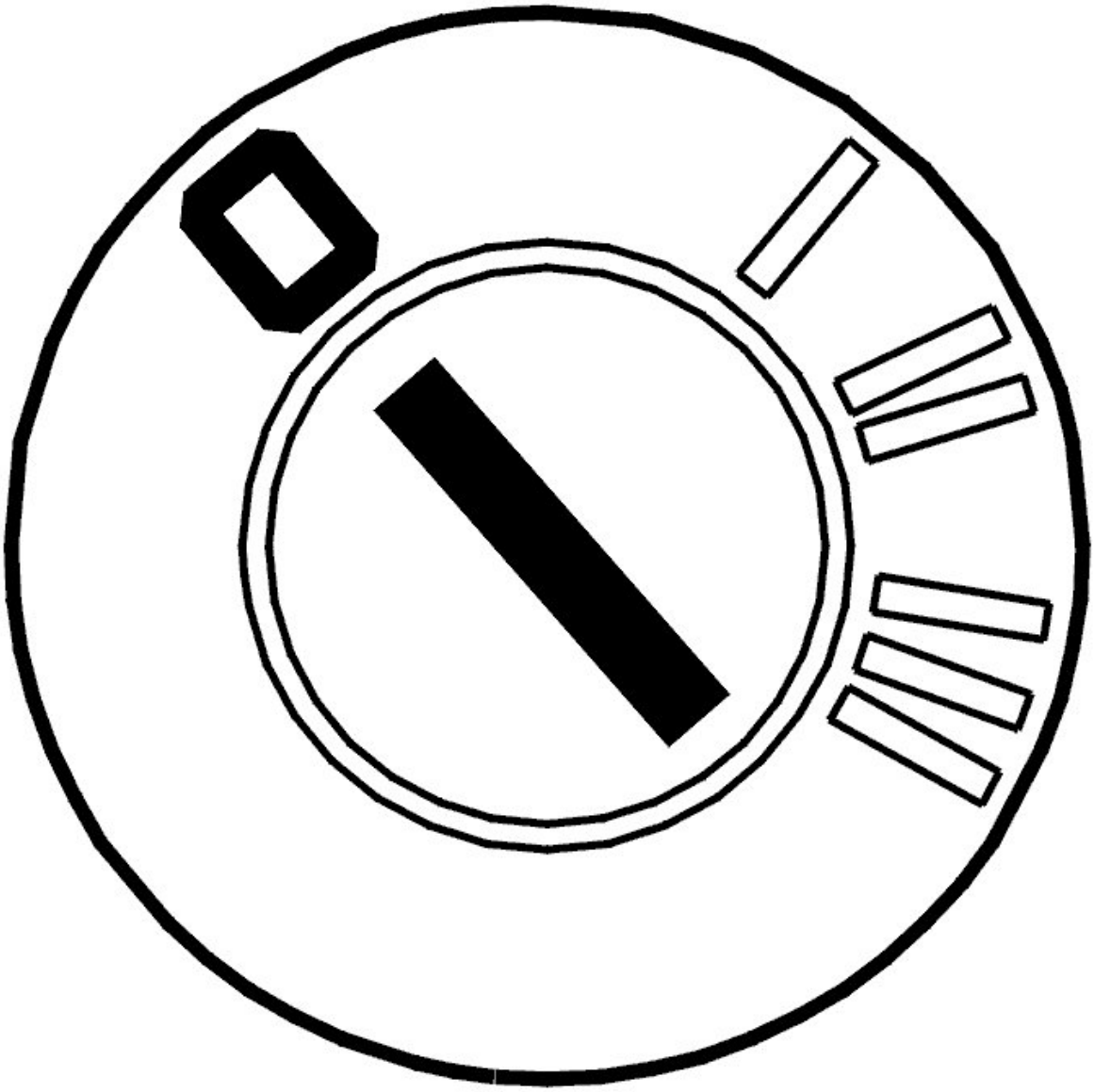
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

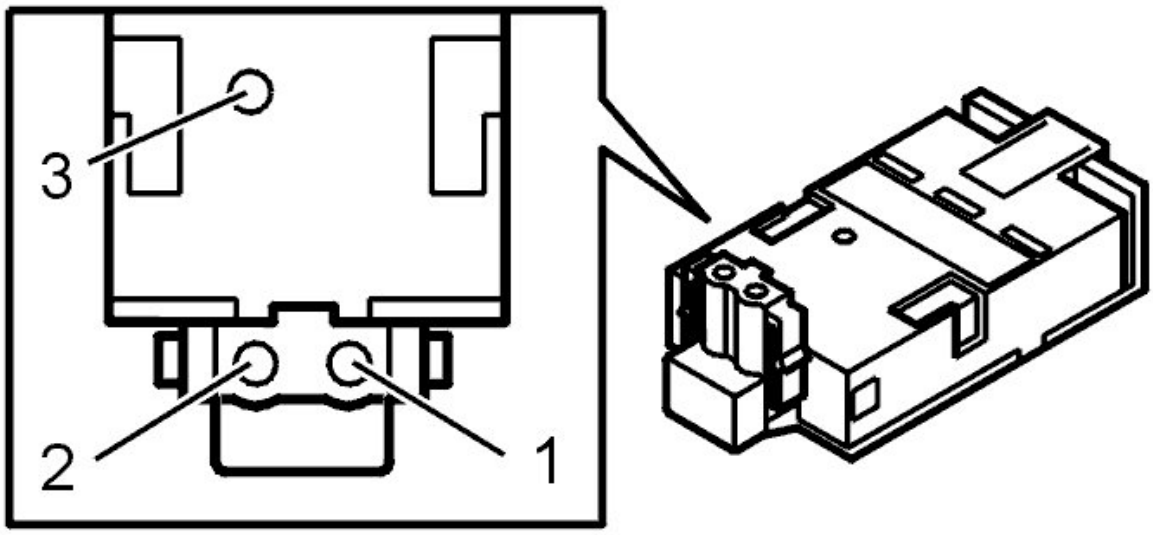
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

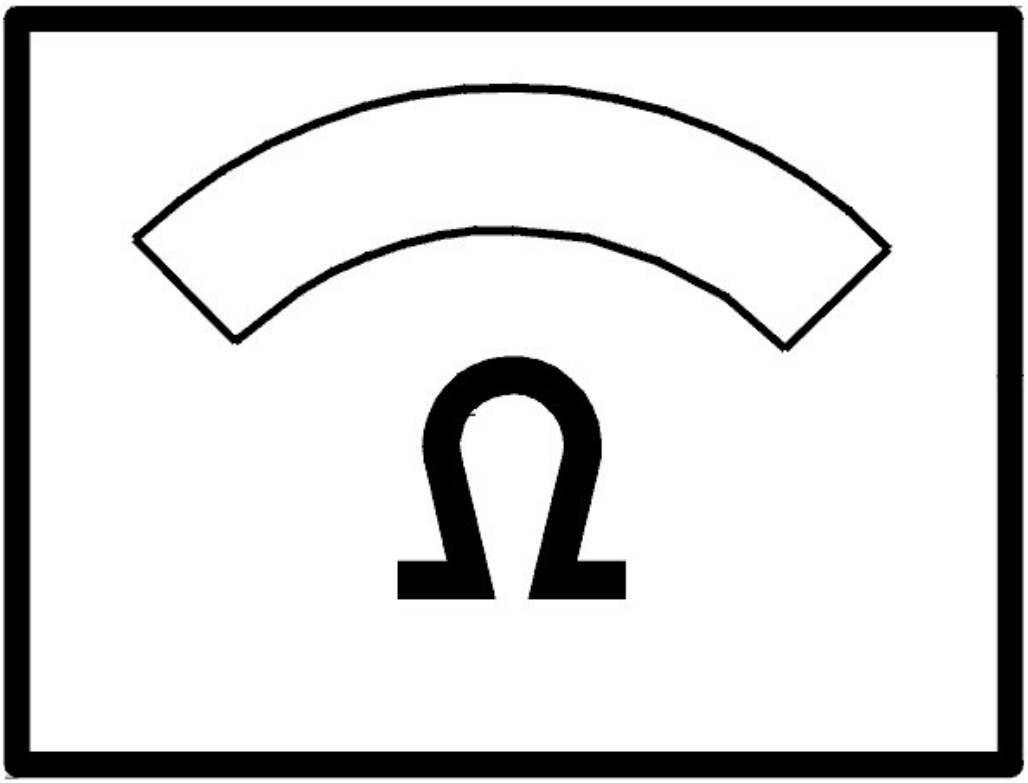
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

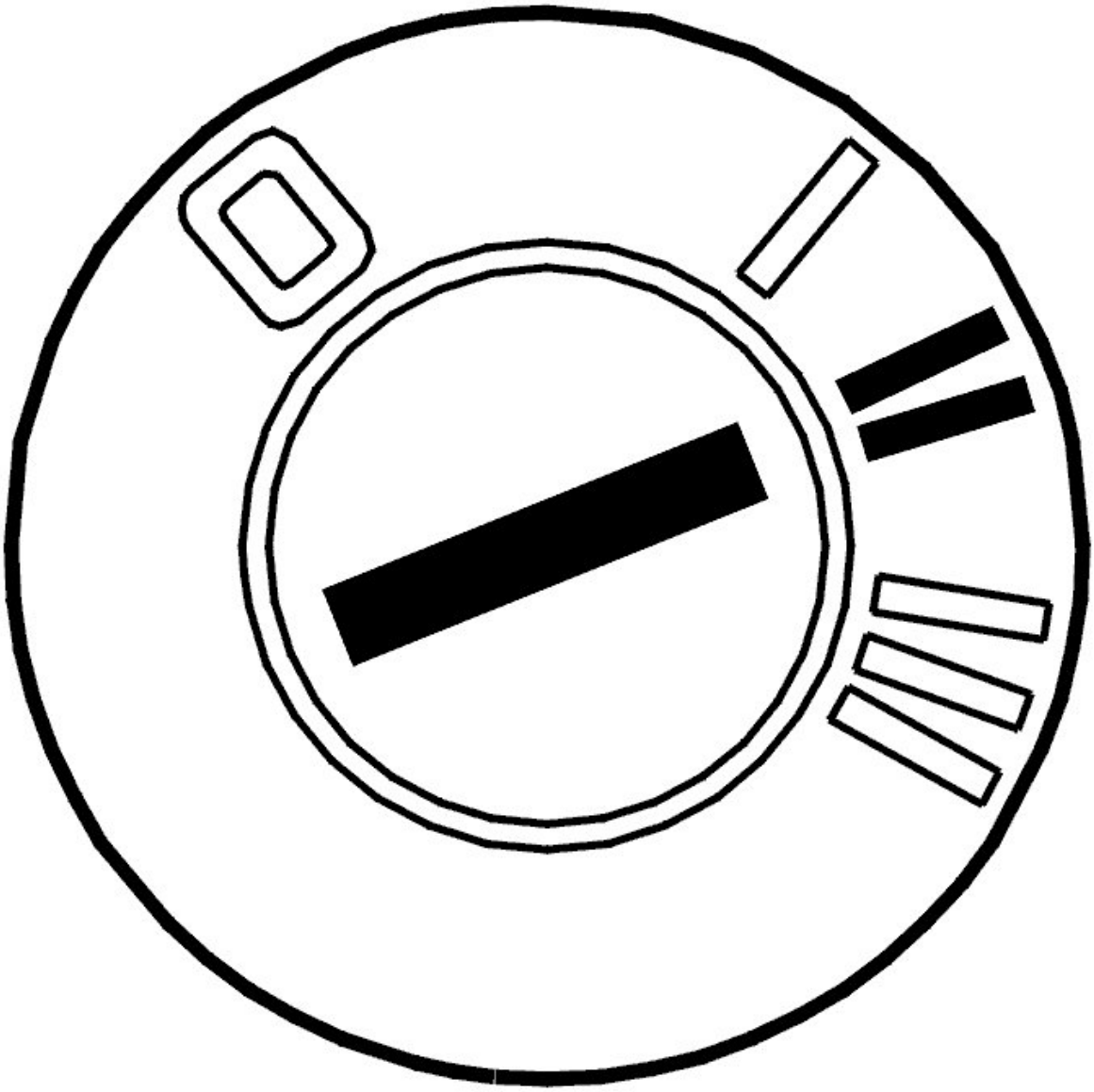
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

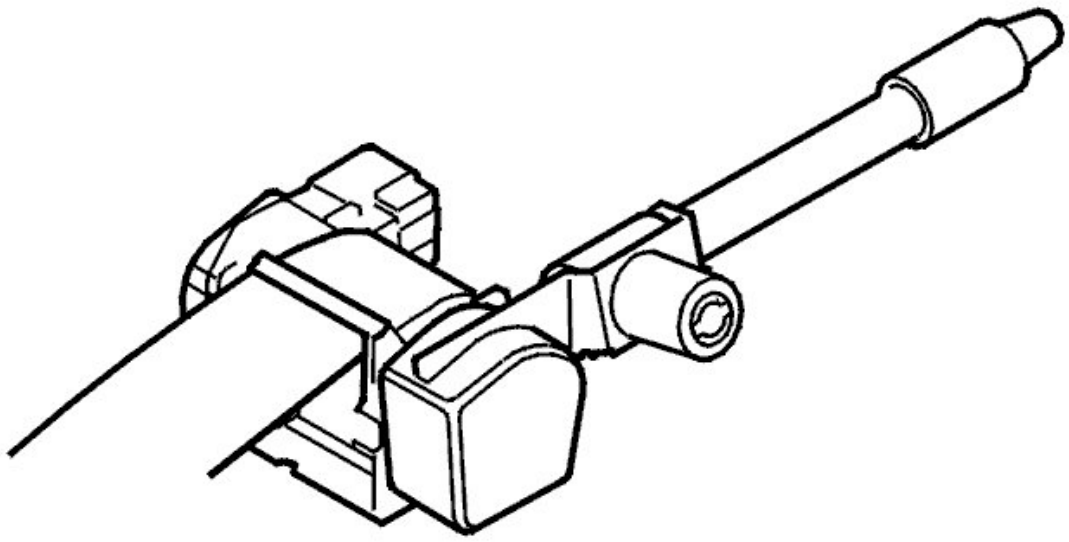
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0075 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0075 is displayed.

Substitute value
- Nothing.

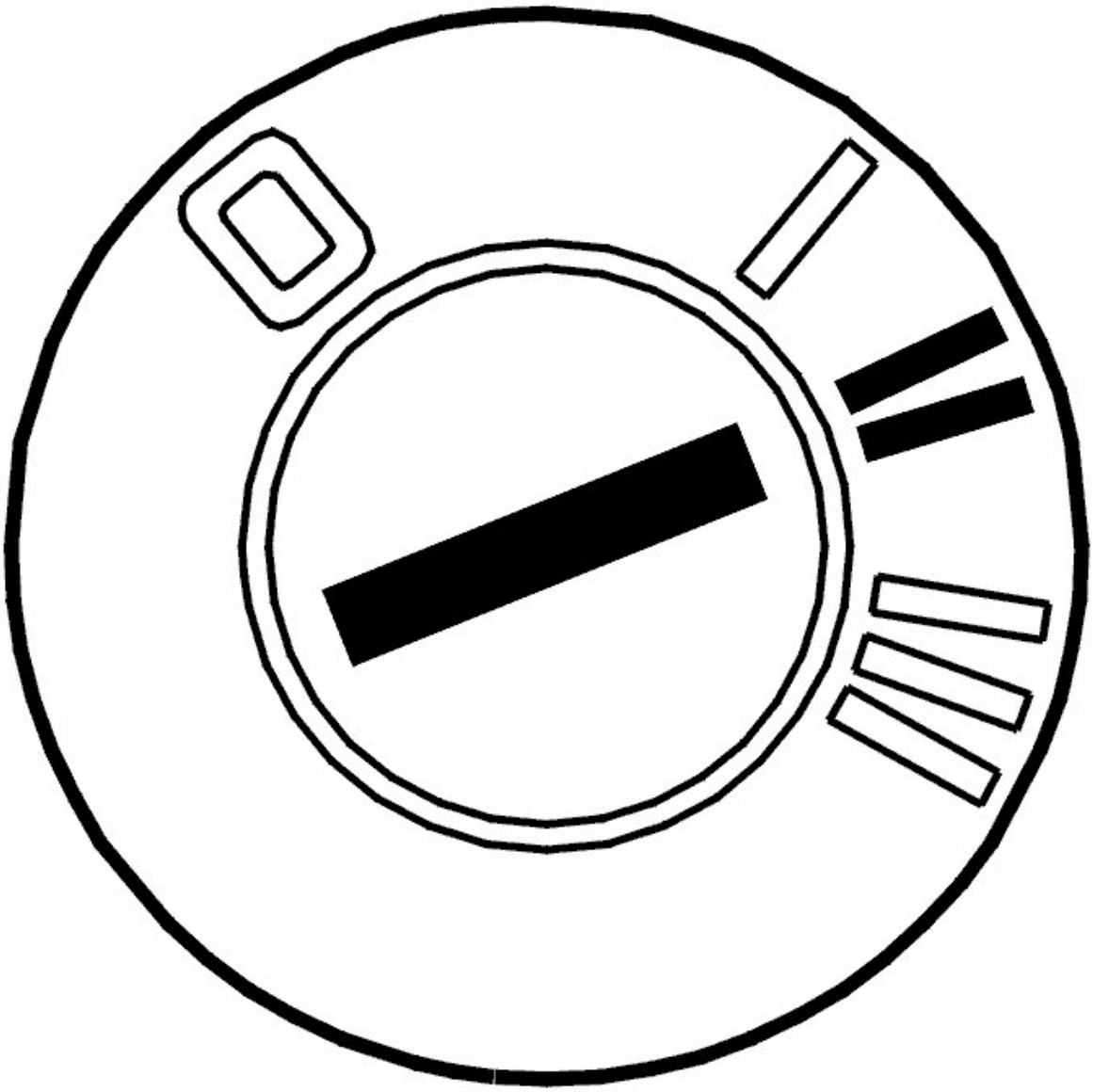
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

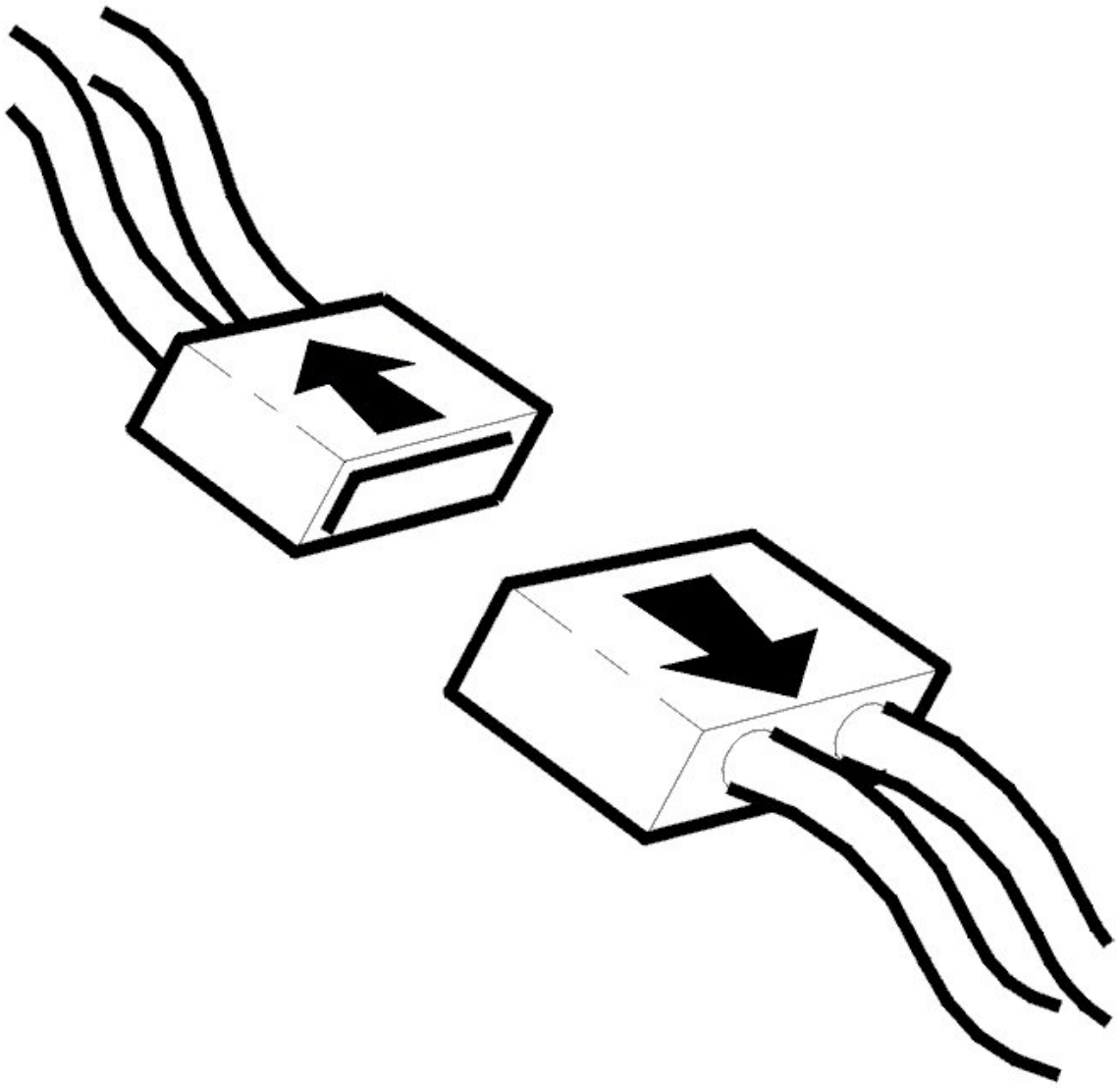
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

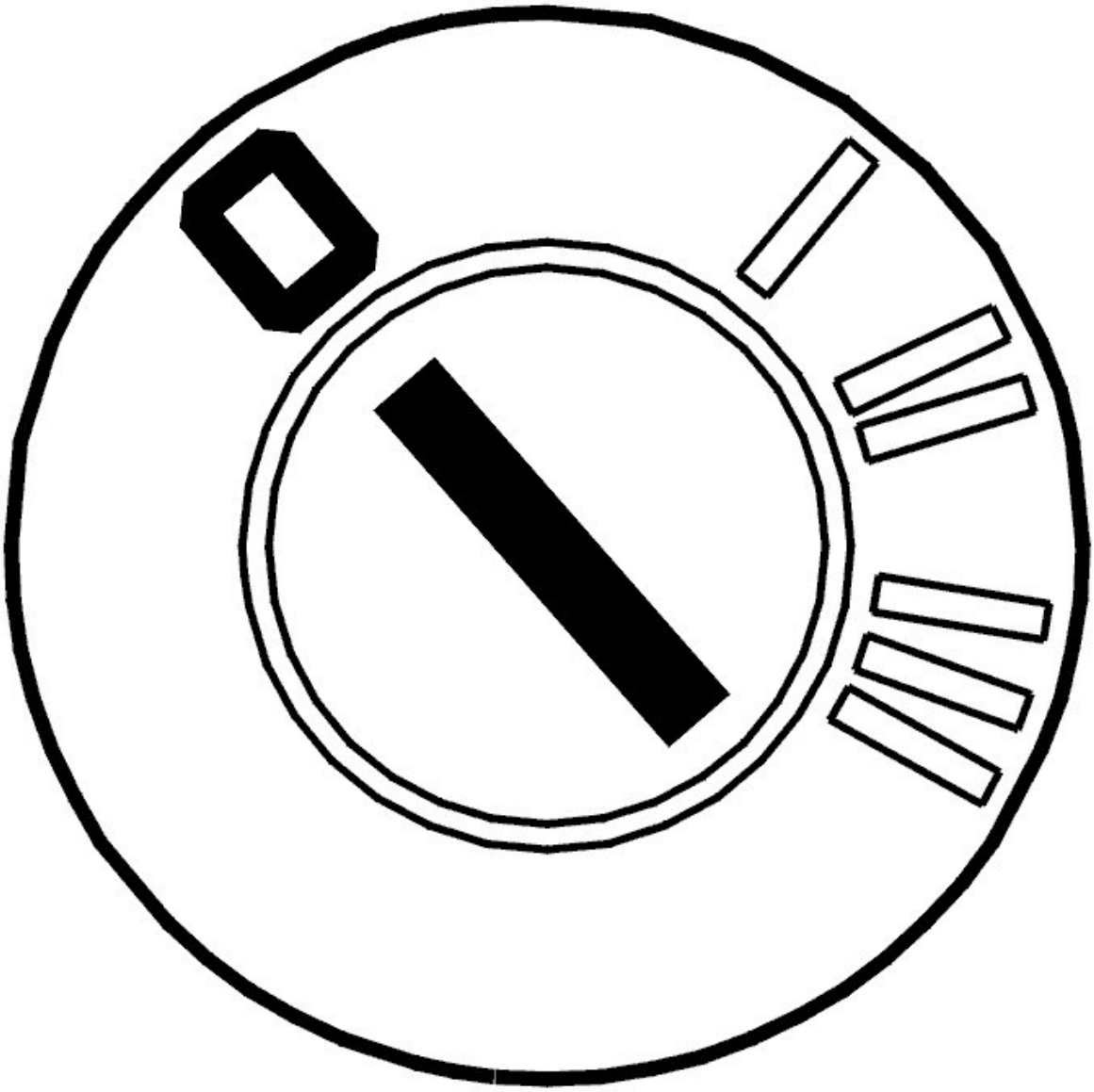
- To replace the front seat belt tensioner, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat. To replace the rear seat belt tensioner, see Buckle seat belt rear, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Buckle Seat Belt Rear, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

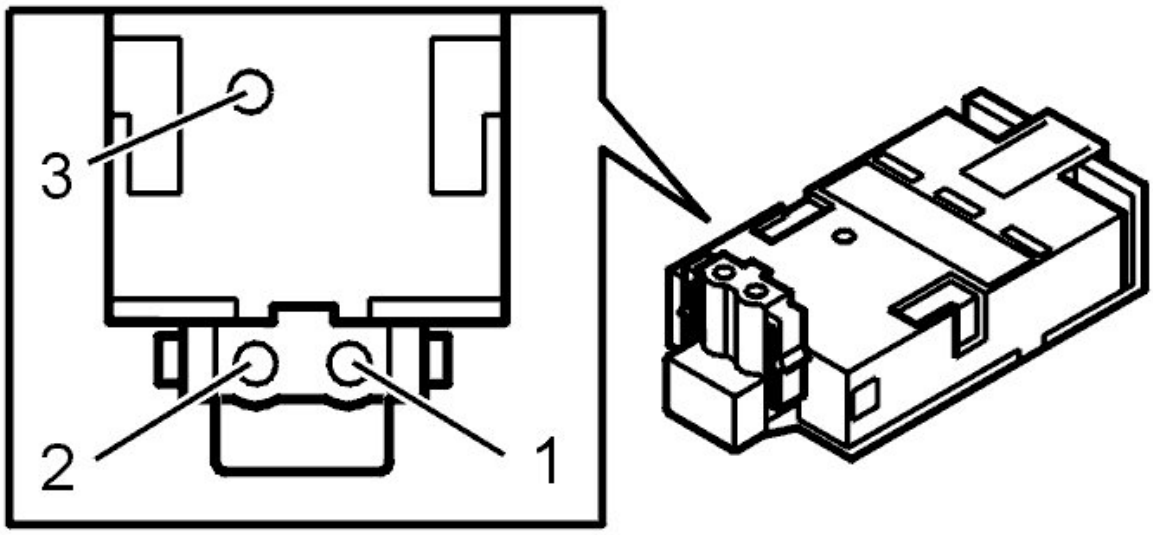
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

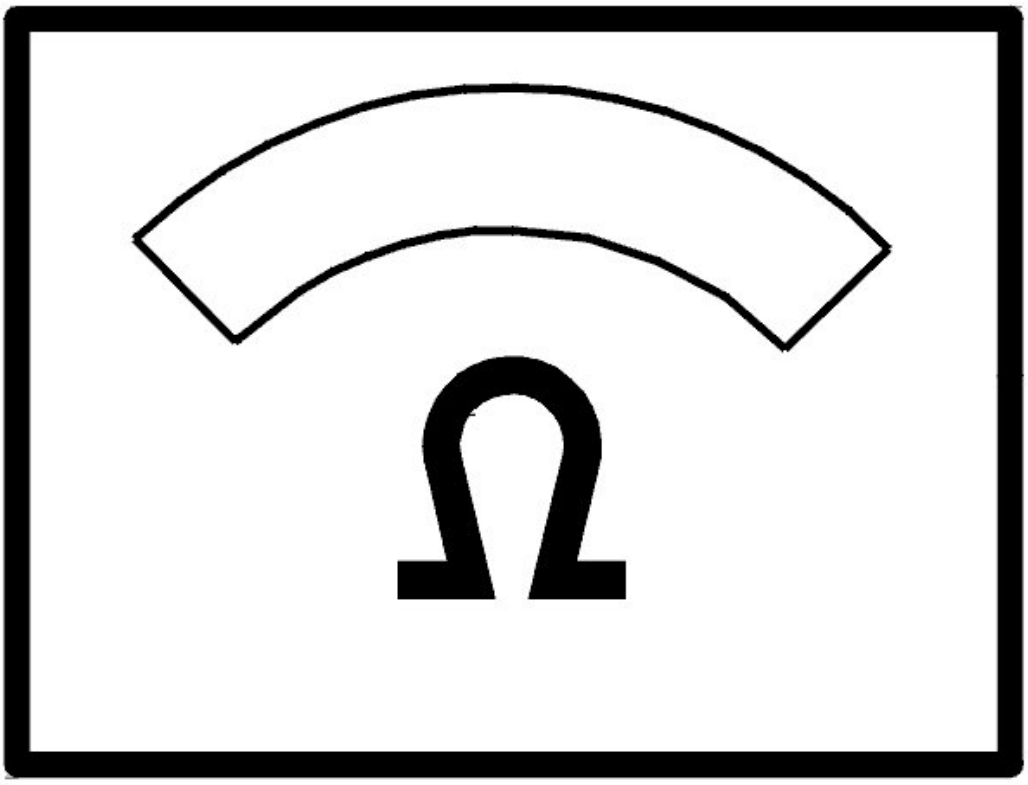
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

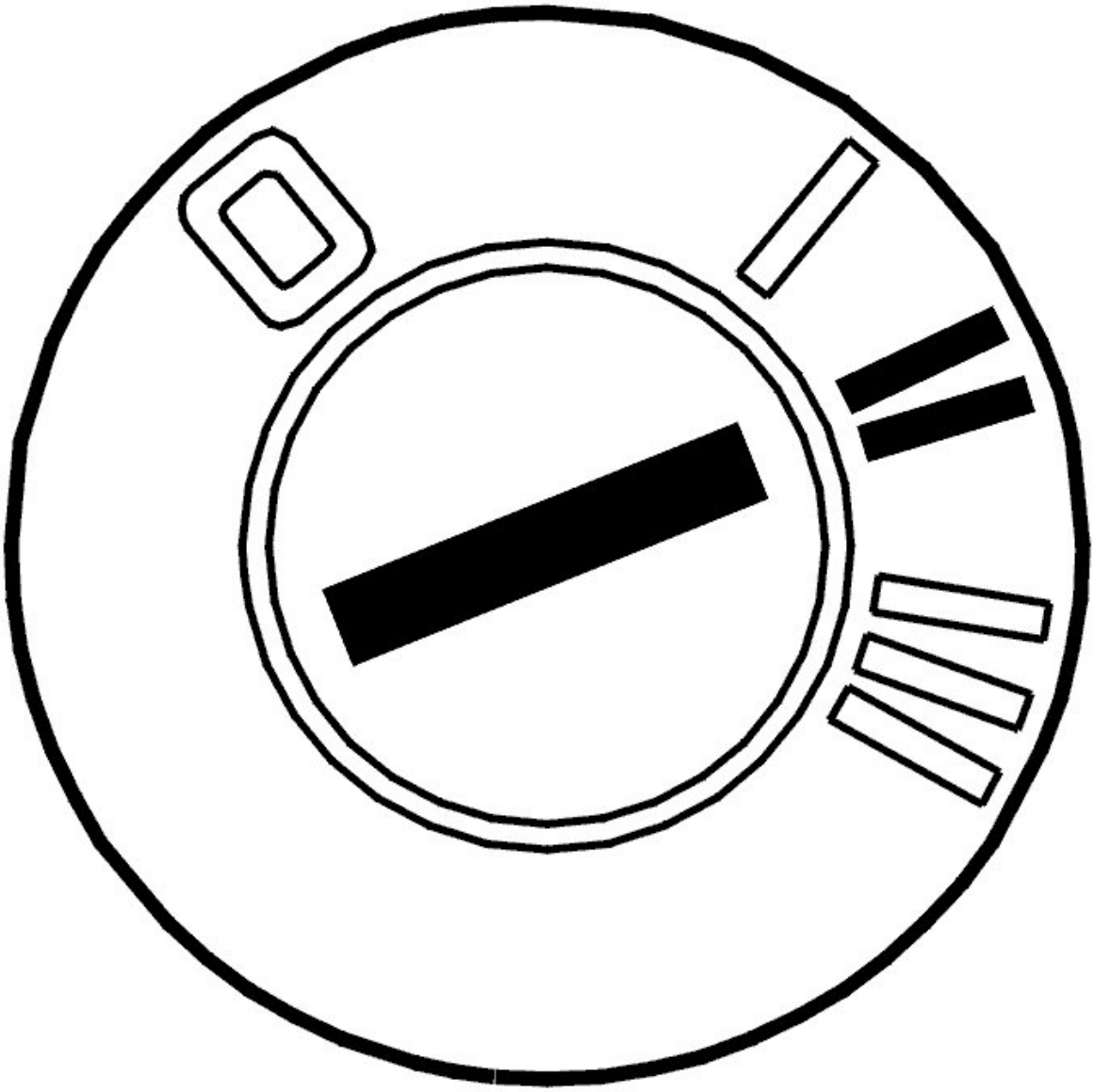
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

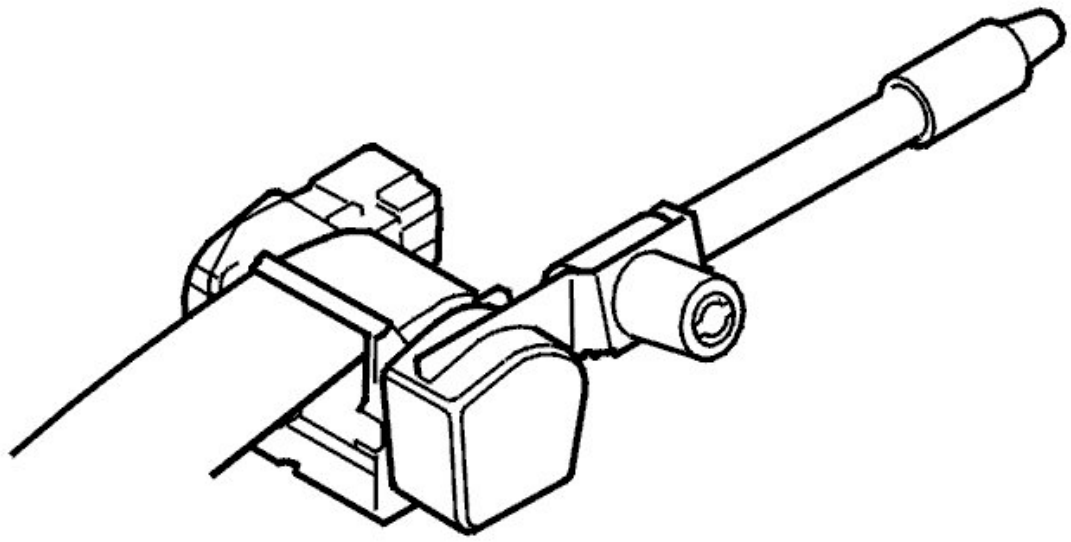
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0075 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0075 is displayed.

Substitute value
- Nothing.

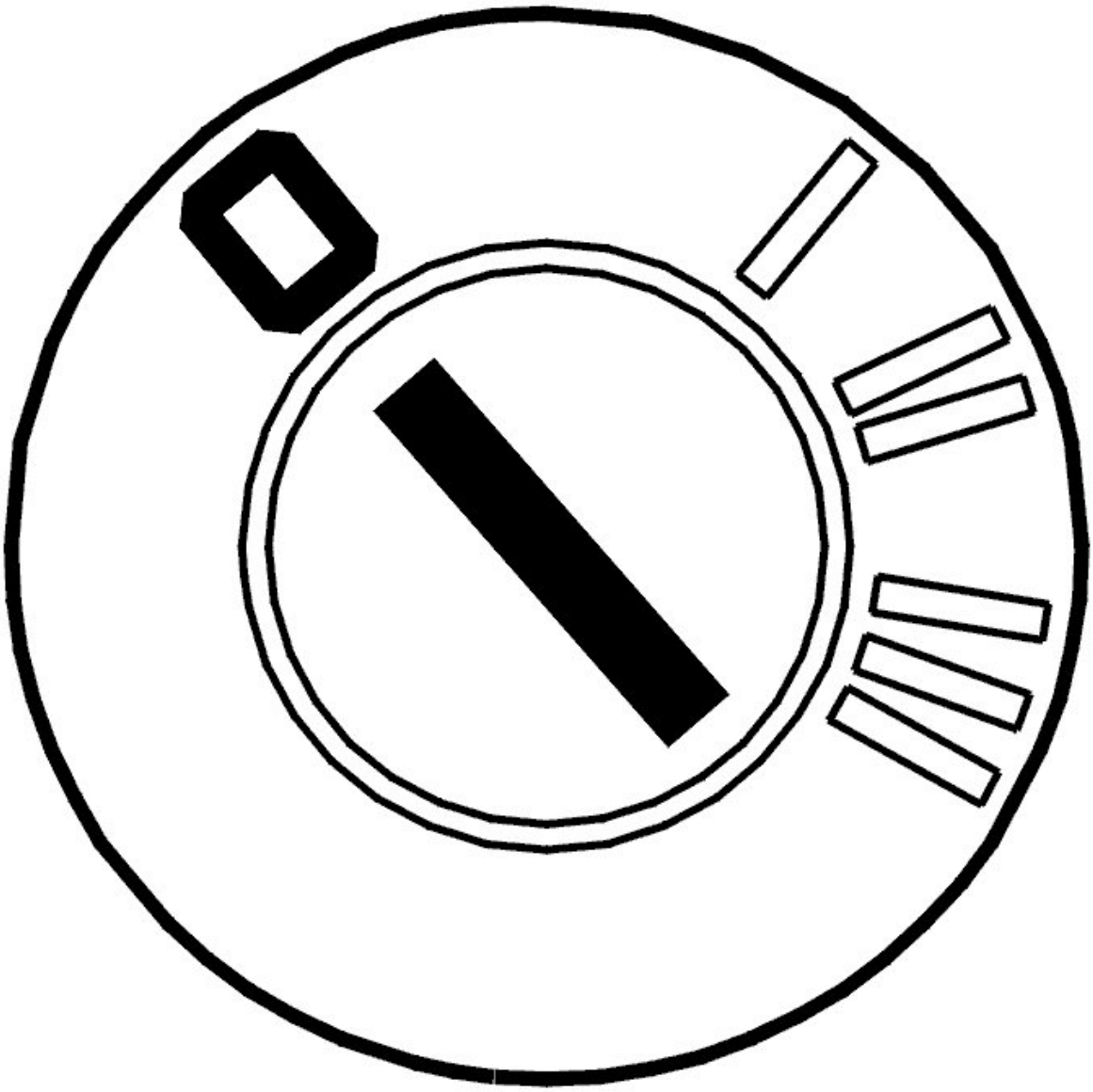
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

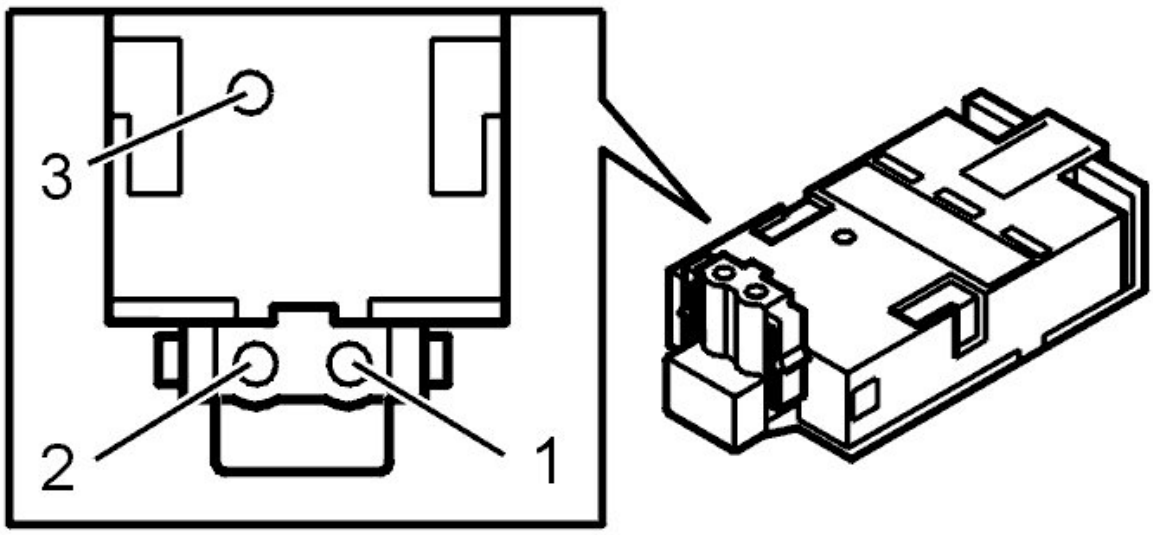
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

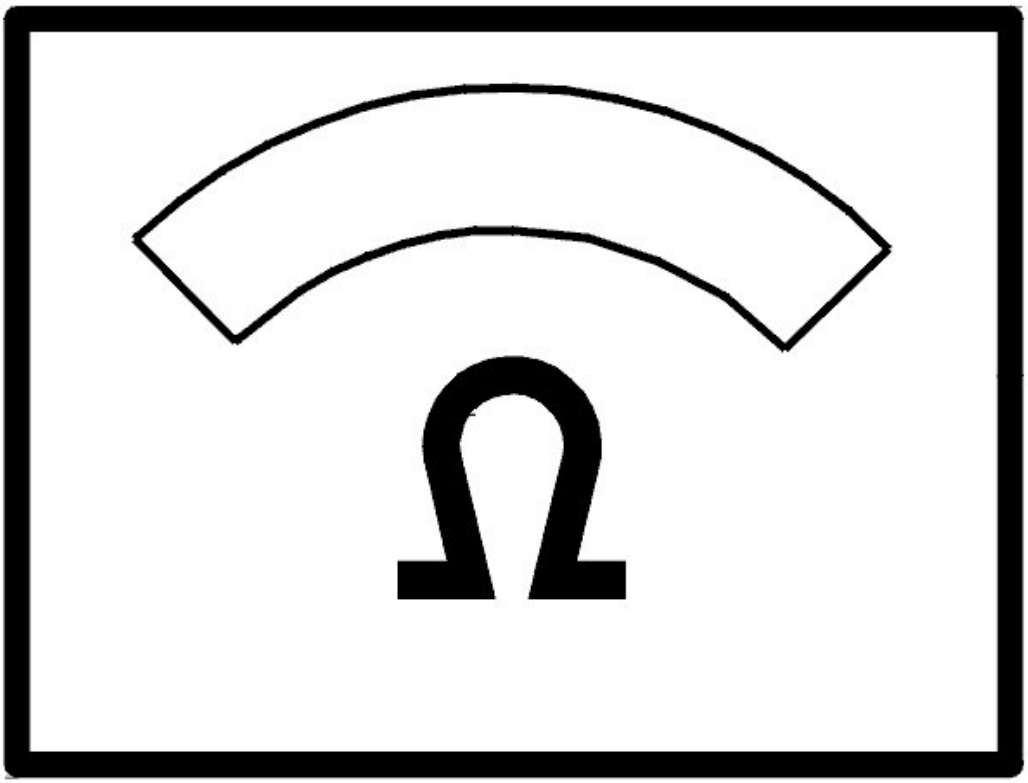
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

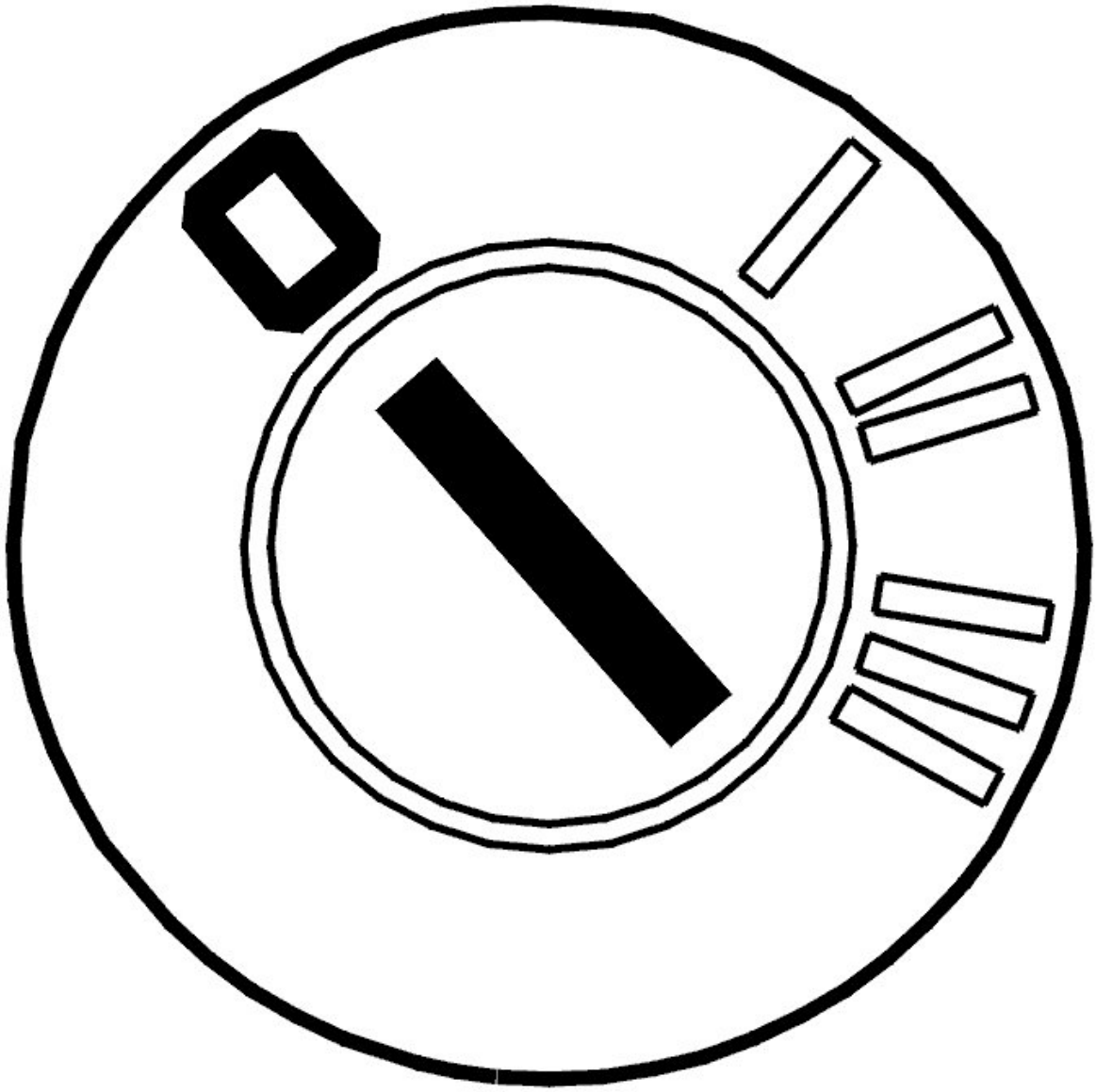
Fault symptom[s]

Orange general warning lamp is on.

Configuration Fault

Configuration fault. Permanent fault

Checking the component



- Ignition off.

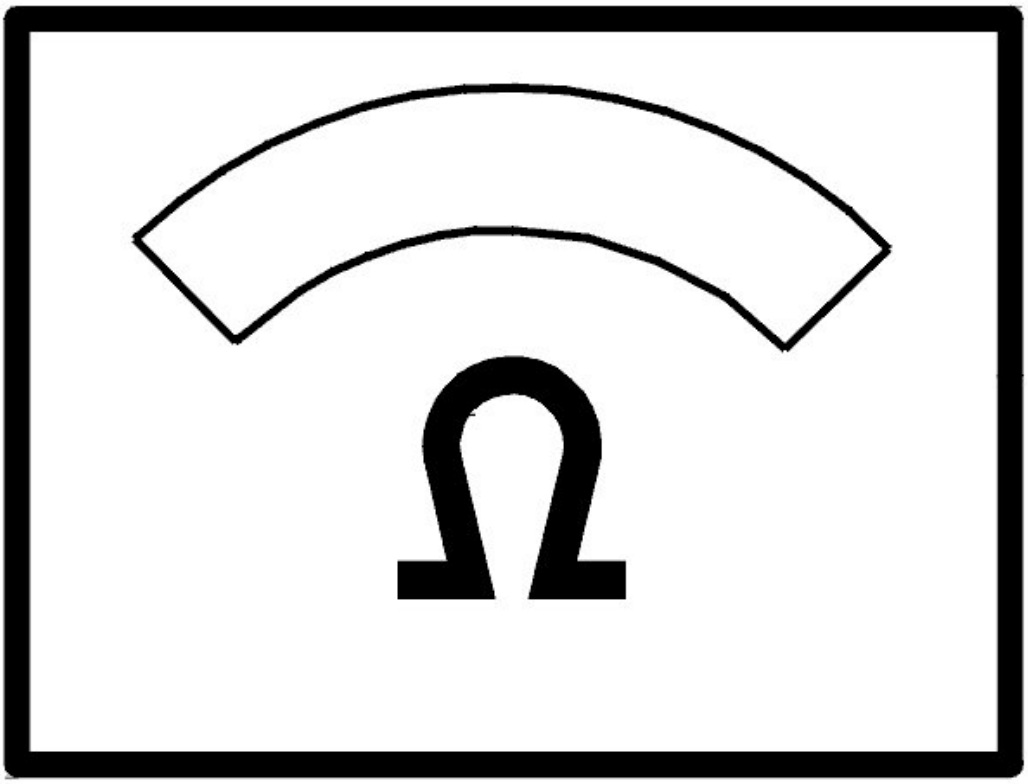
Check that the wiring from the seat belt tensioners is correctly connected to the control module.
Check that nothing in the connector connected to the control module or in the control module connector is short-circuited.
Replace the control module if no fault is found.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and

Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

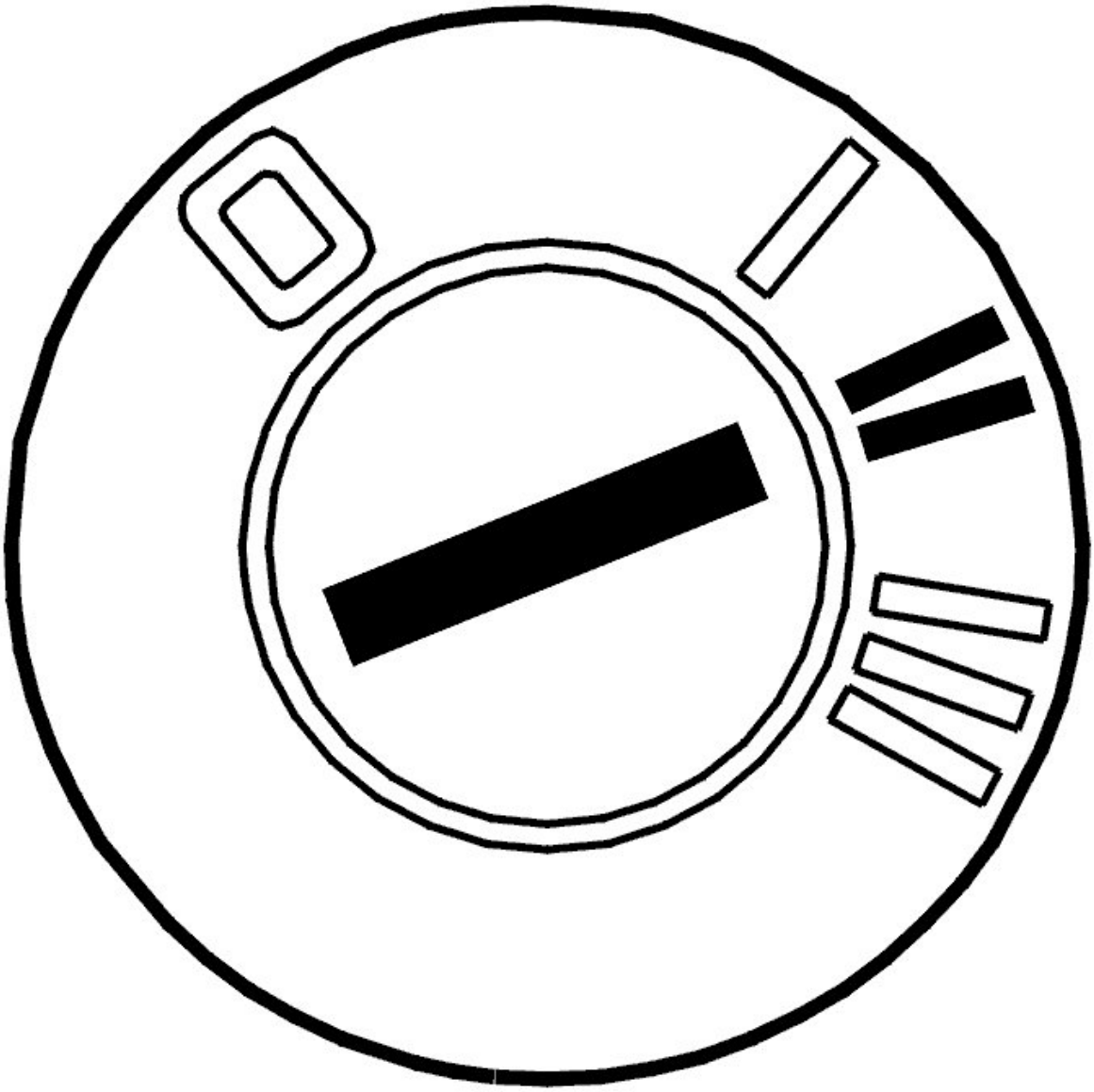
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

Fault symptom[s]

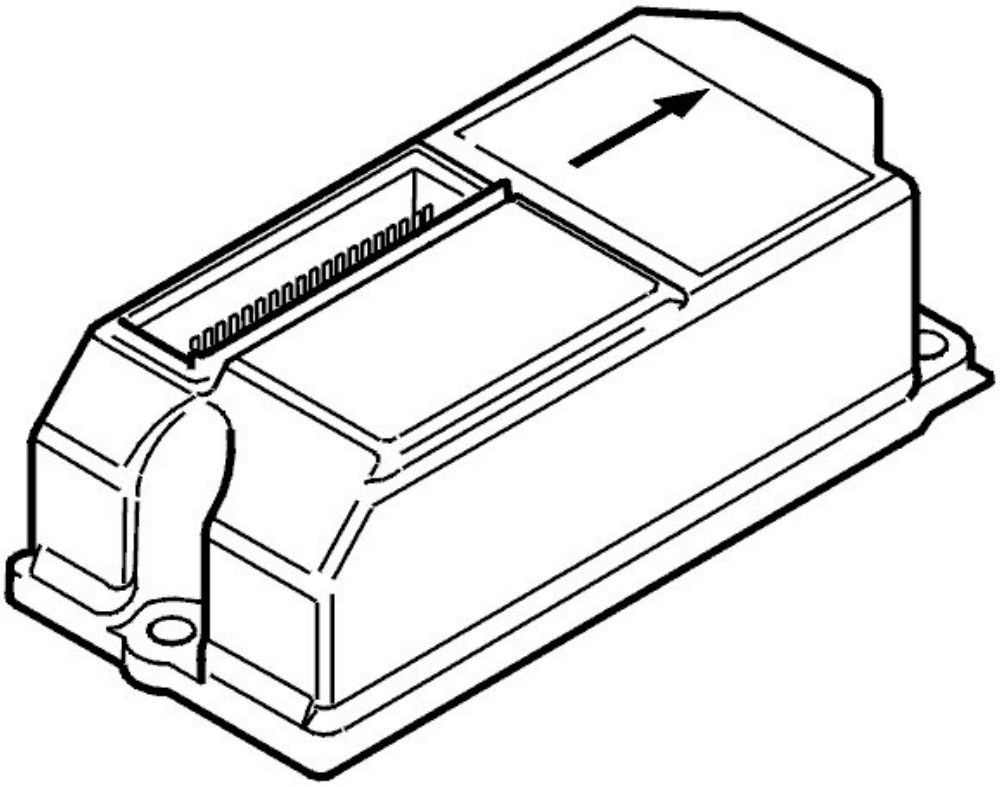
Orange general warning lamp is on.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

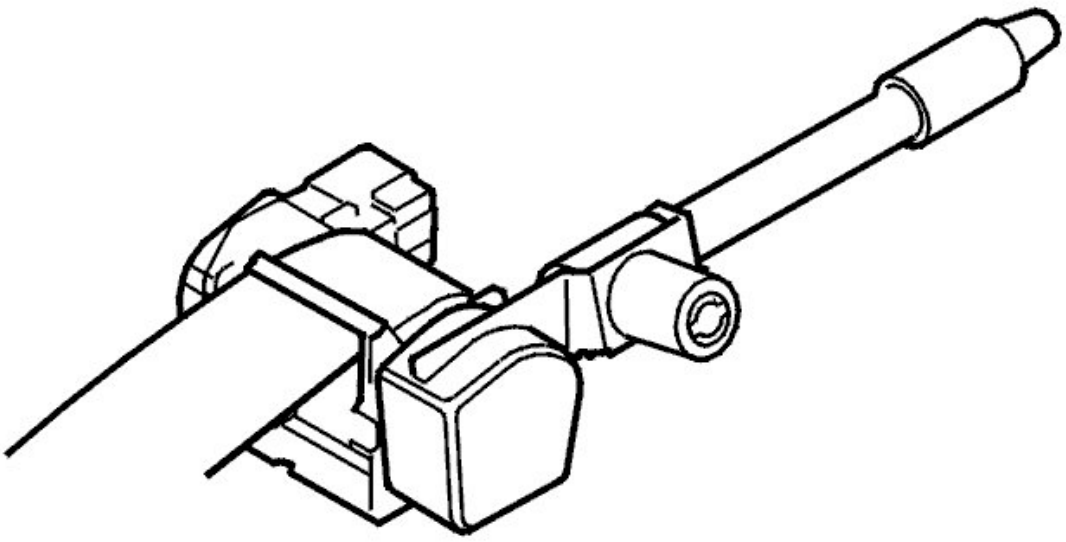
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0078 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0078 is displayed.

Substitute value
- Nothing.

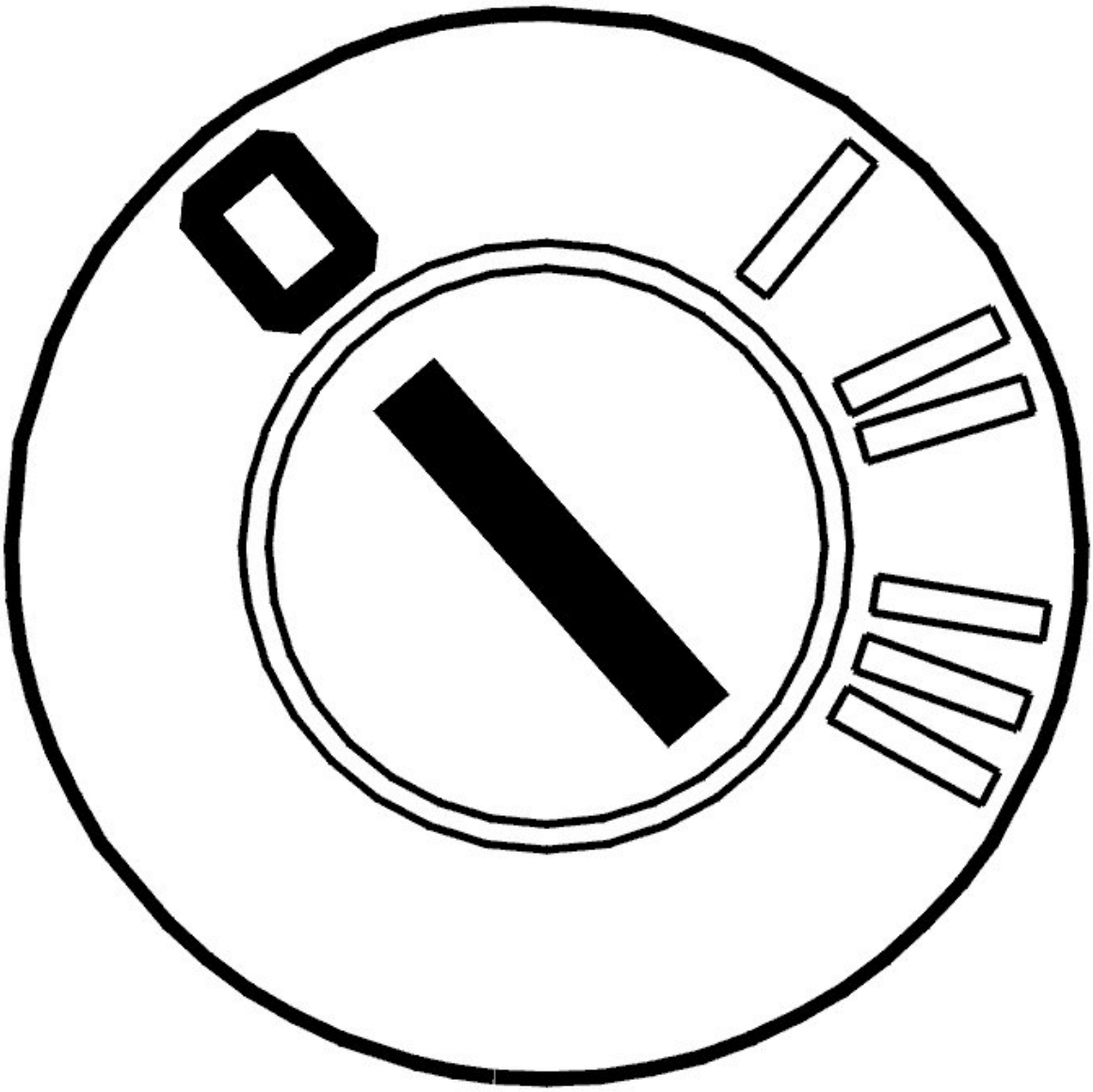
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to voltage supply in seat-belt tensioner.

Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

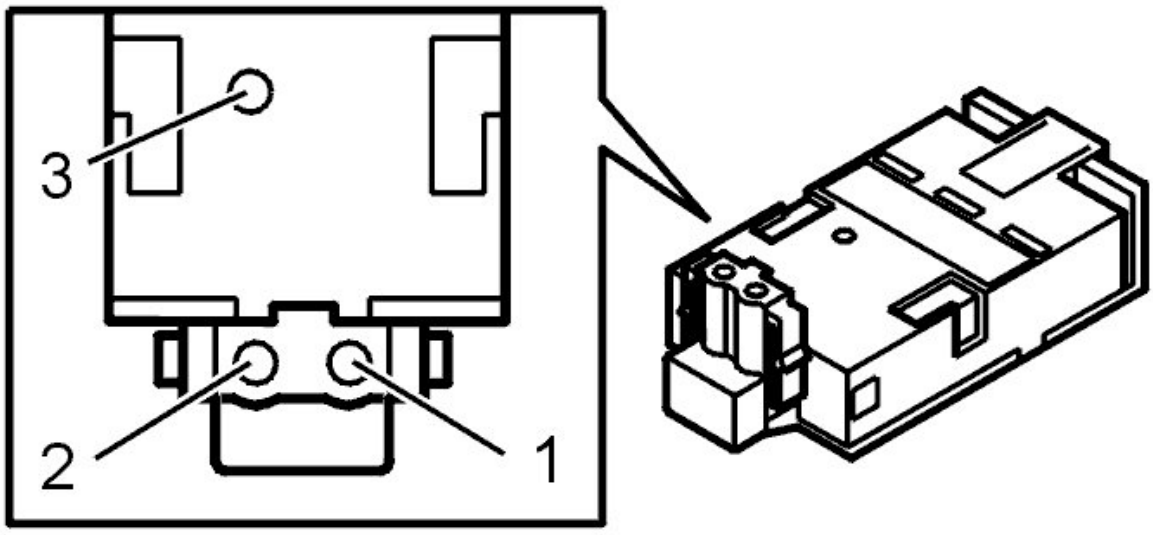
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

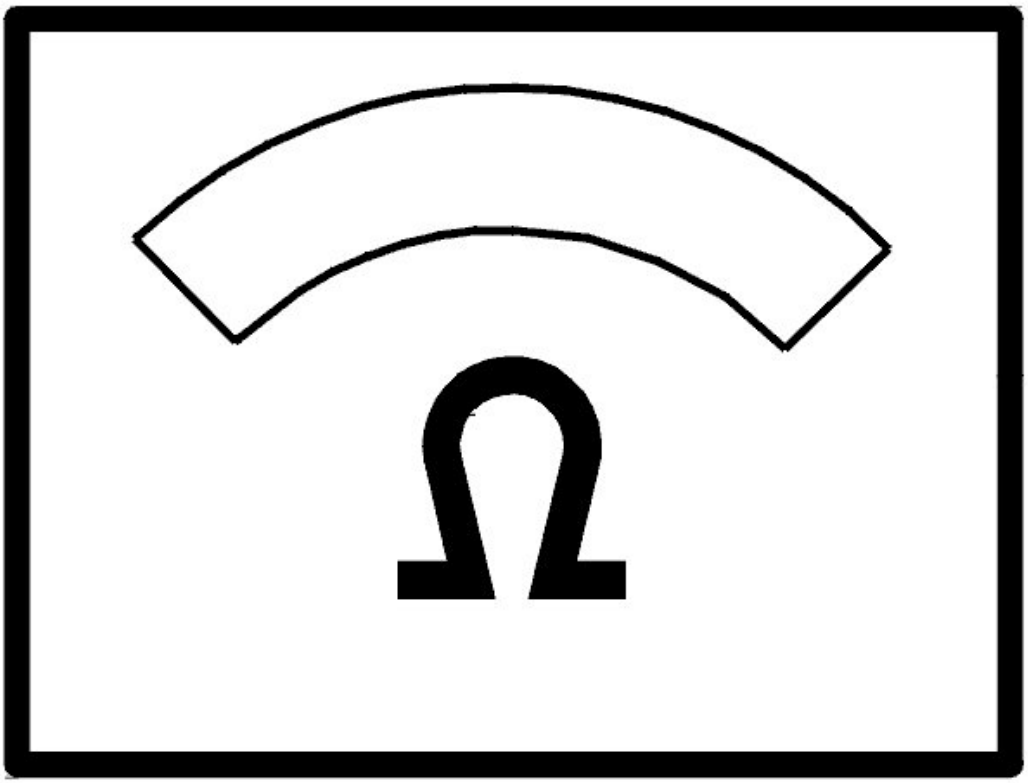
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminal #1, terminal #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

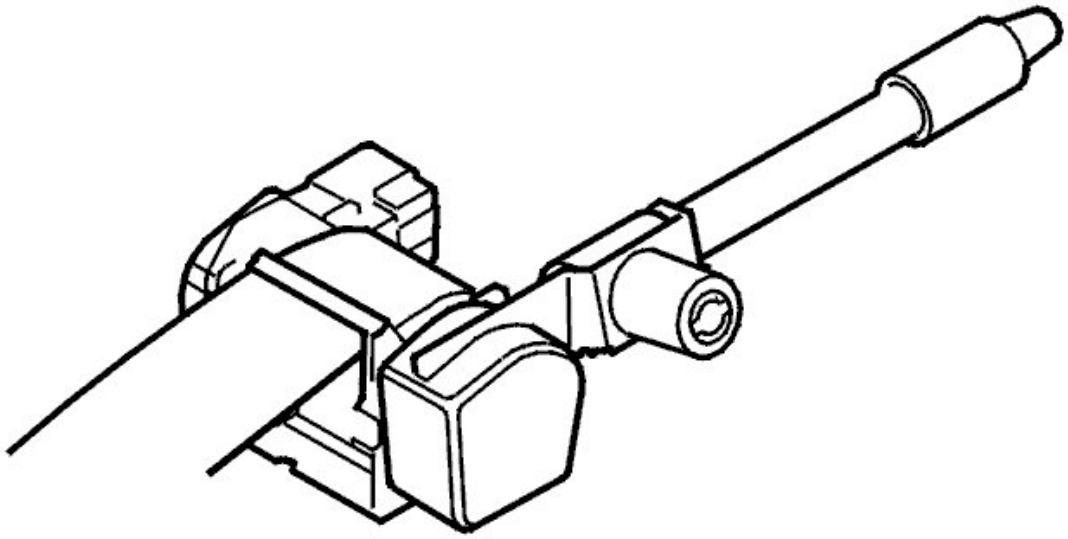
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0078 Diagnostic trouble code information

Condition



If the circuit voltage is high for more than 10 seconds, diagnostic trouble code SRS-0078 is displayed.

Substitute value
- Nothing.

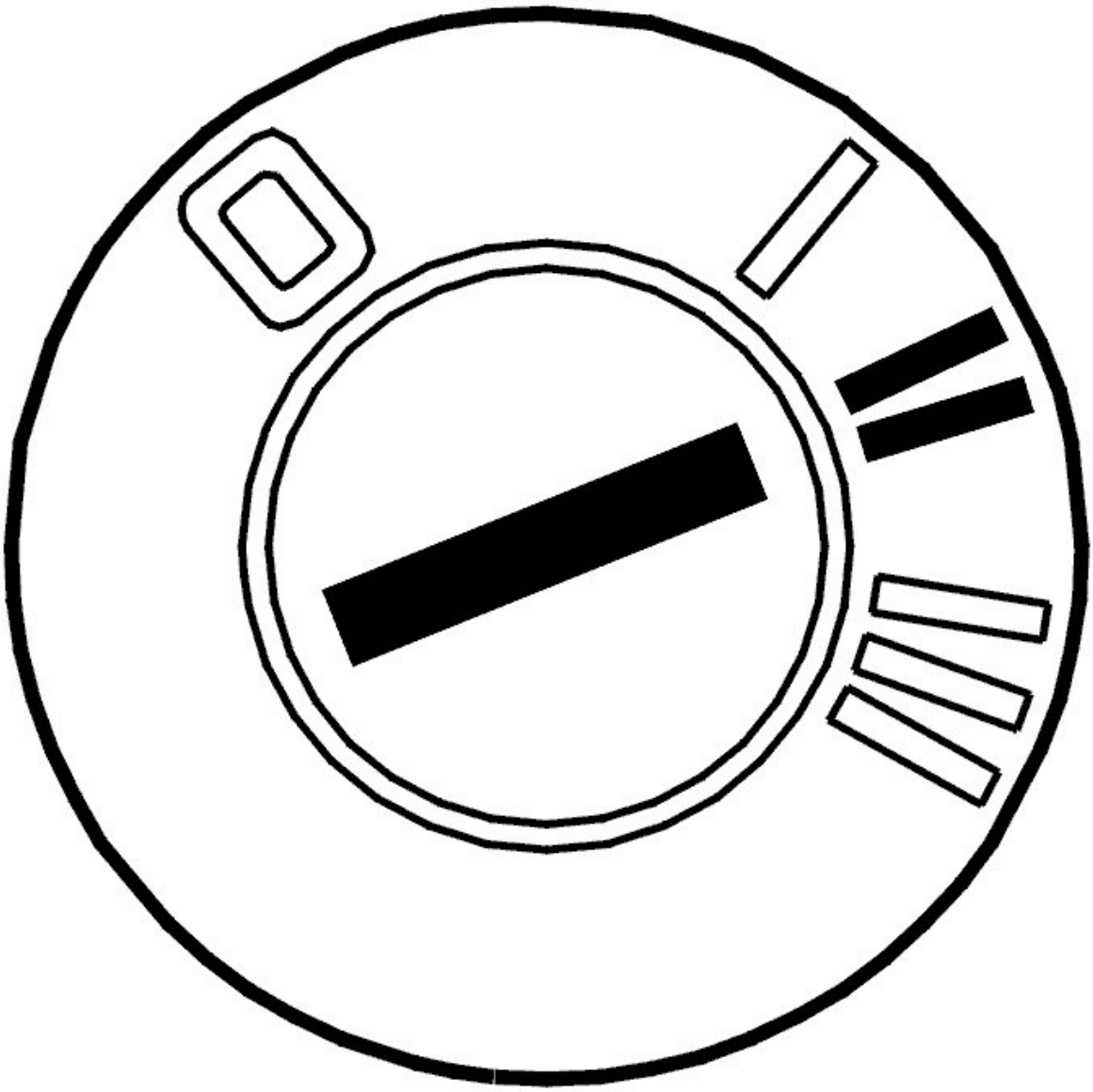
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to voltage supply in seat-belt tensioner.

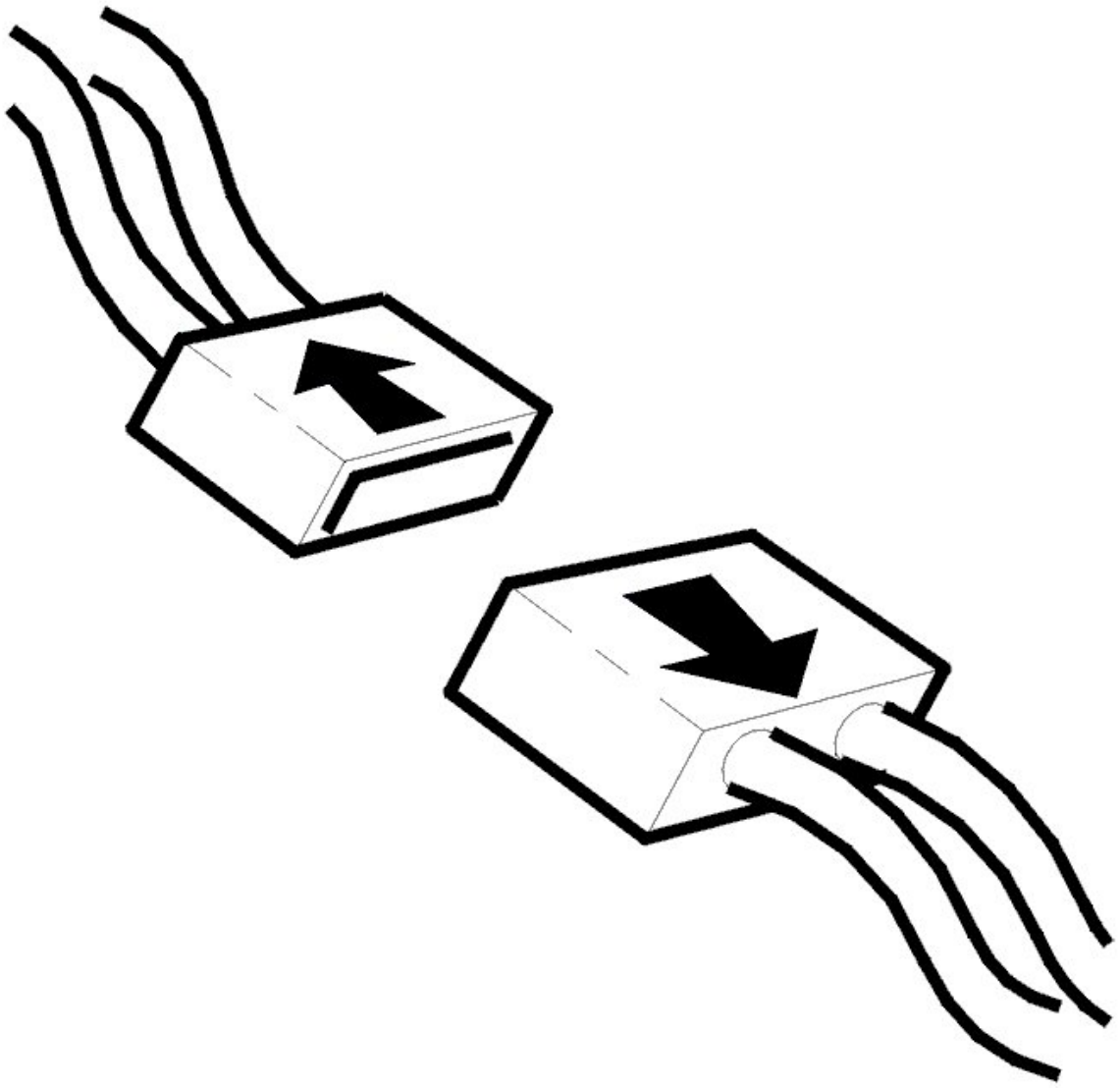
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

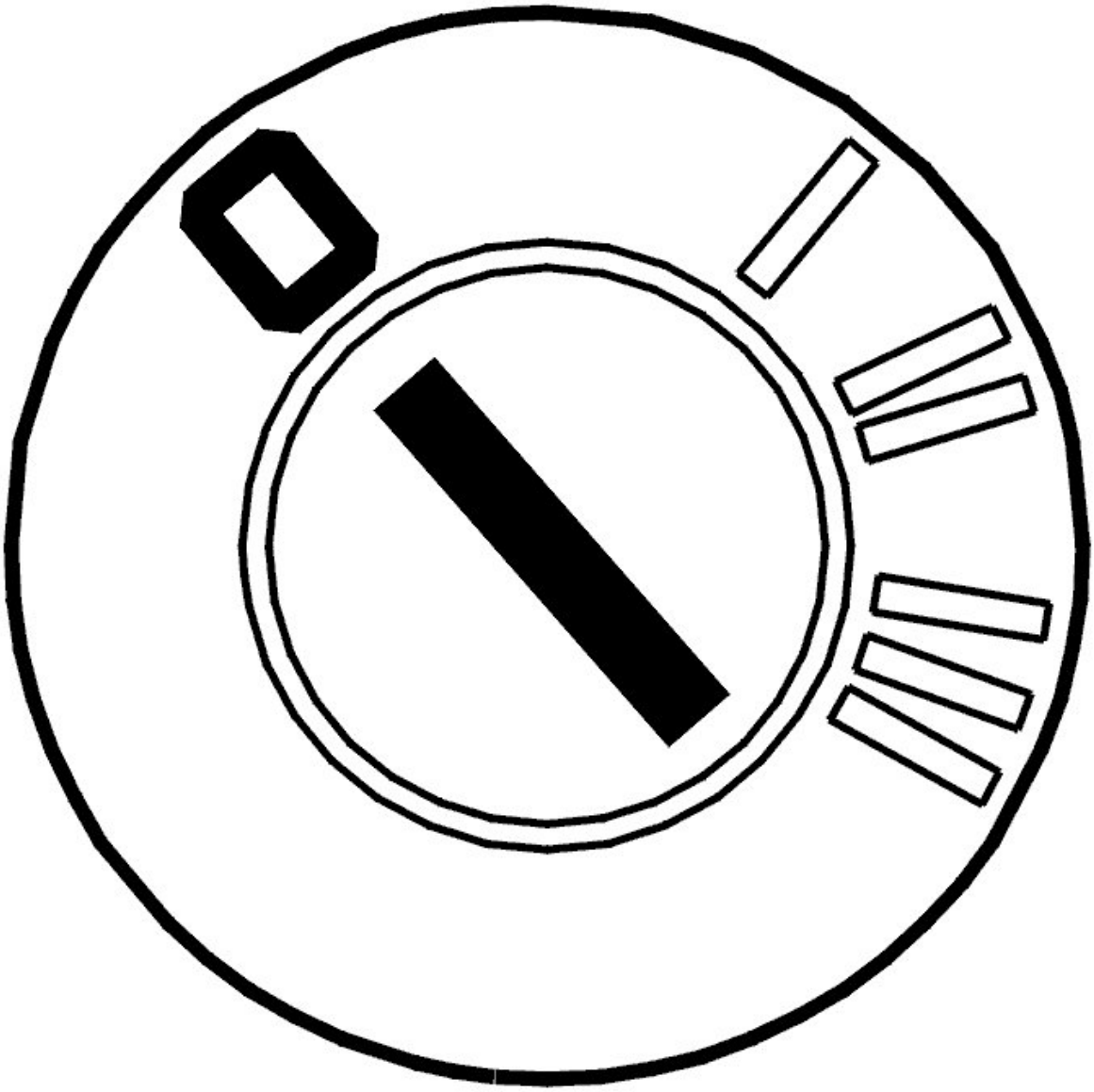
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

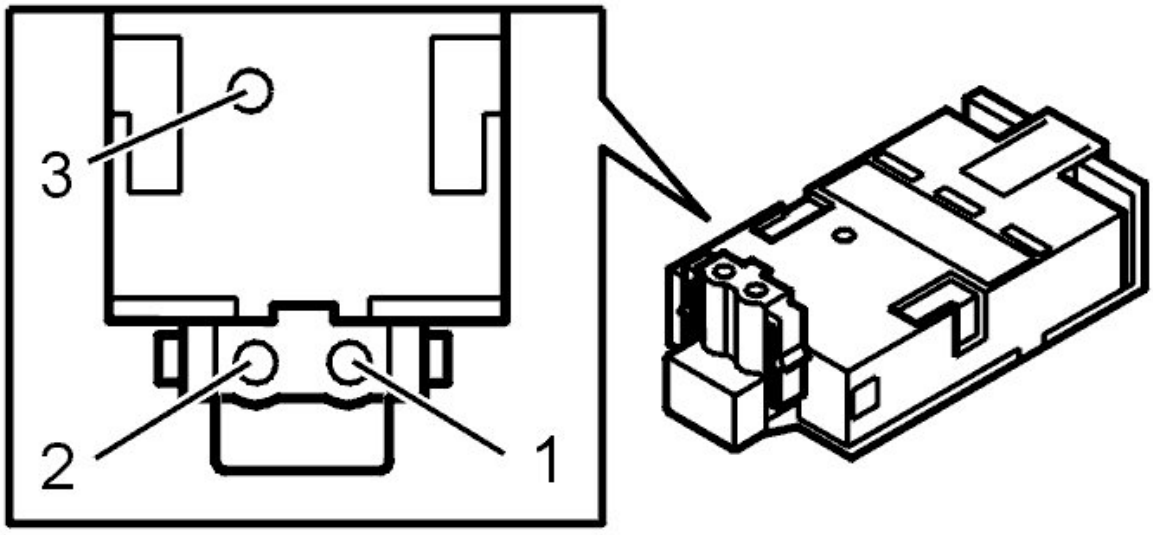
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

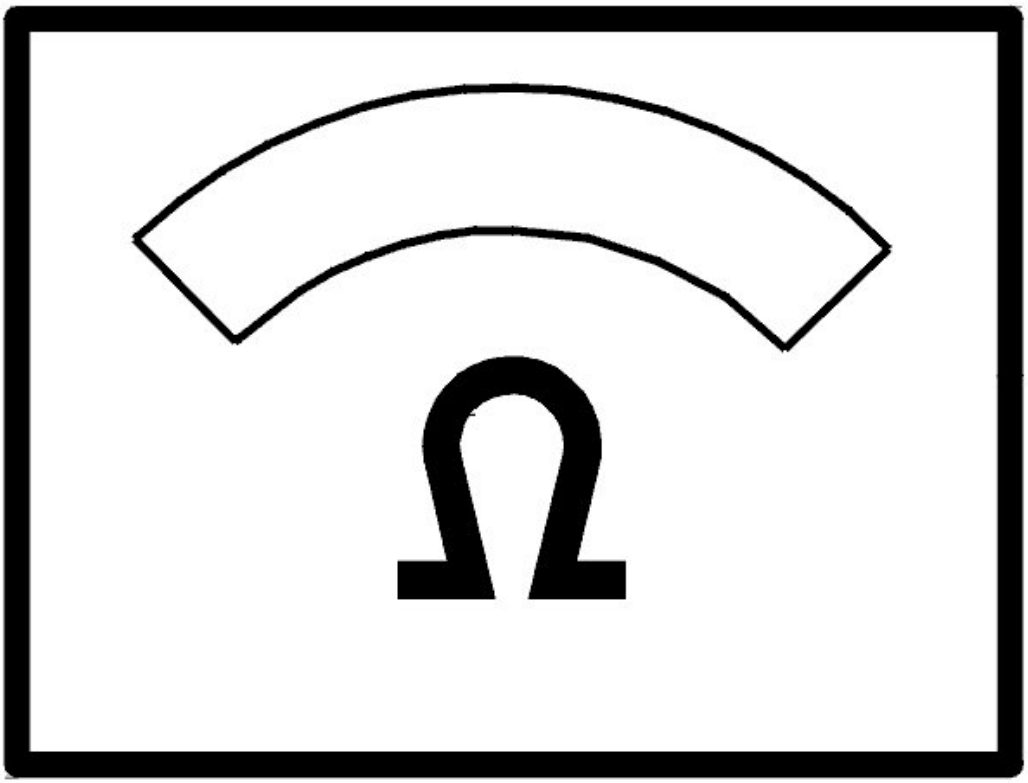
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

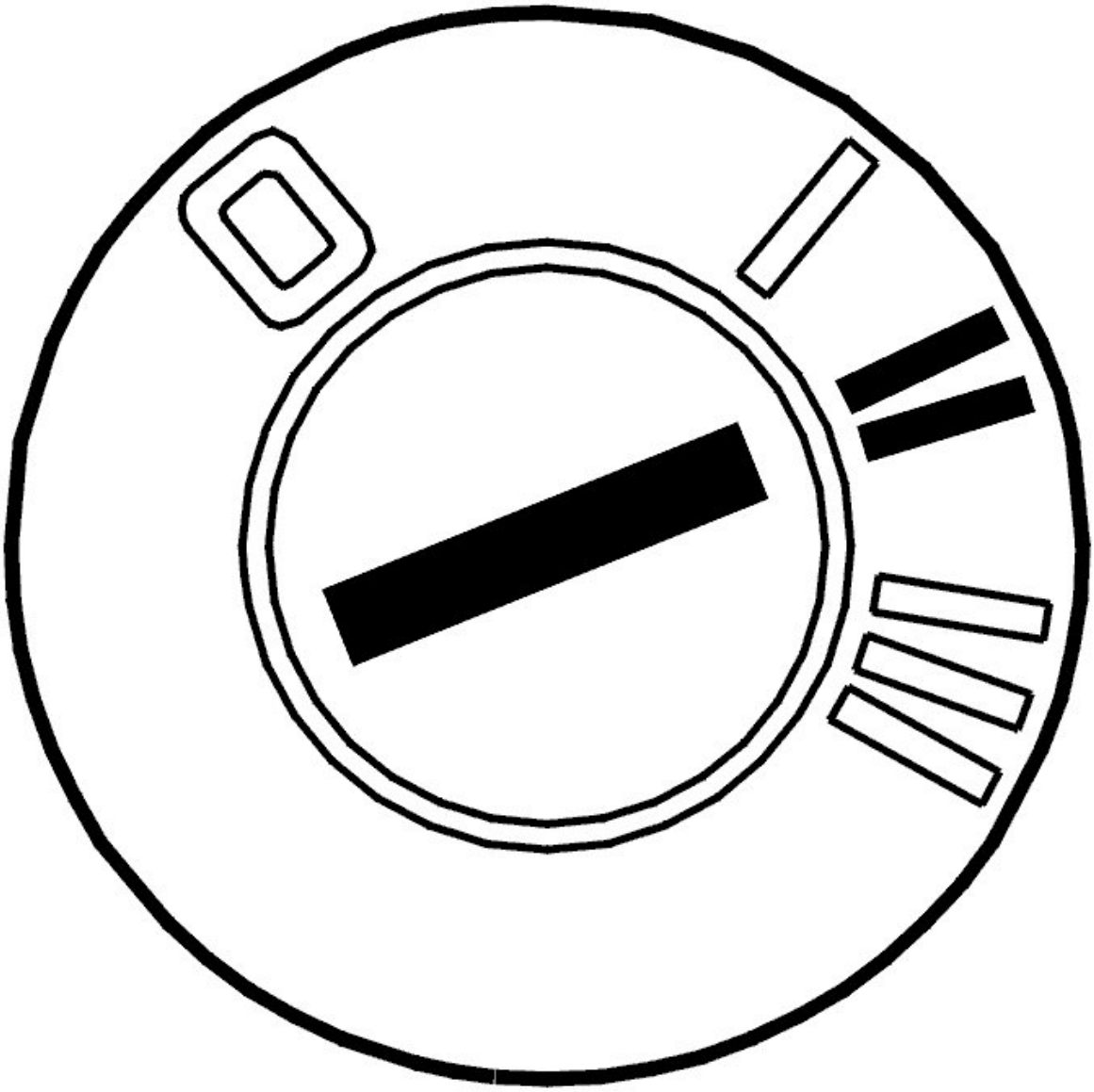
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

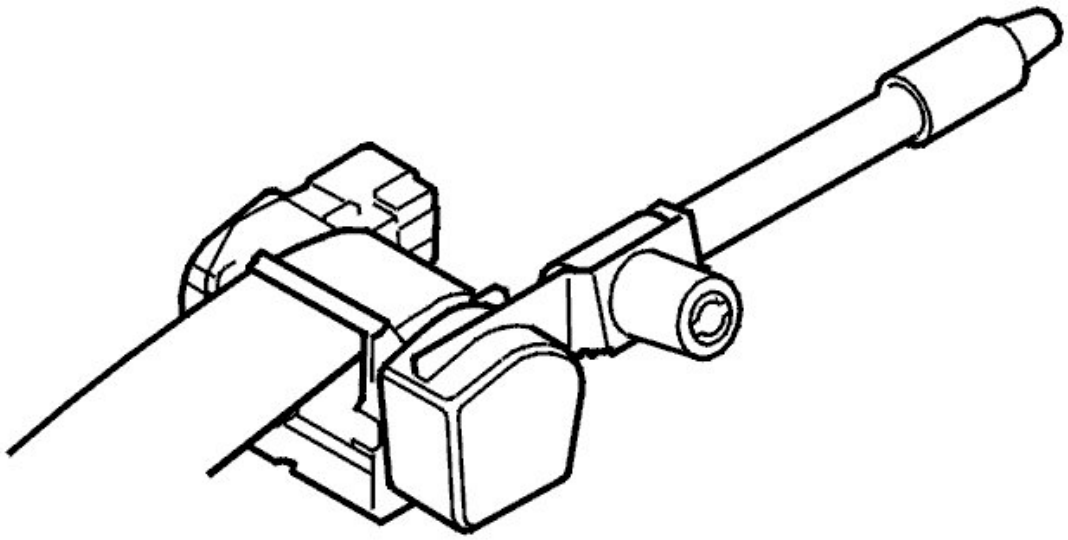
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0079 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0079 is displayed.

Substitute value
- Nothing.

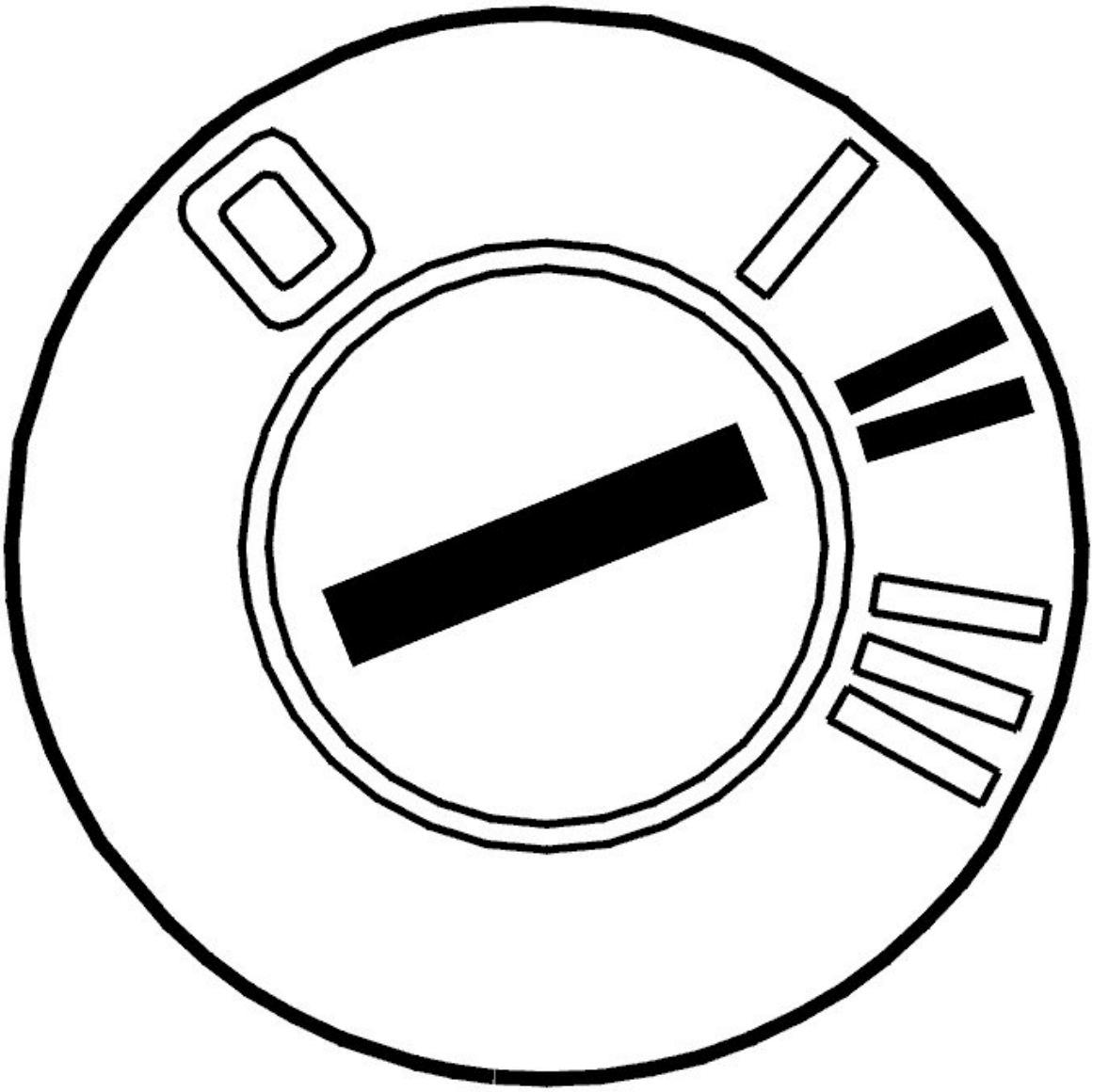
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

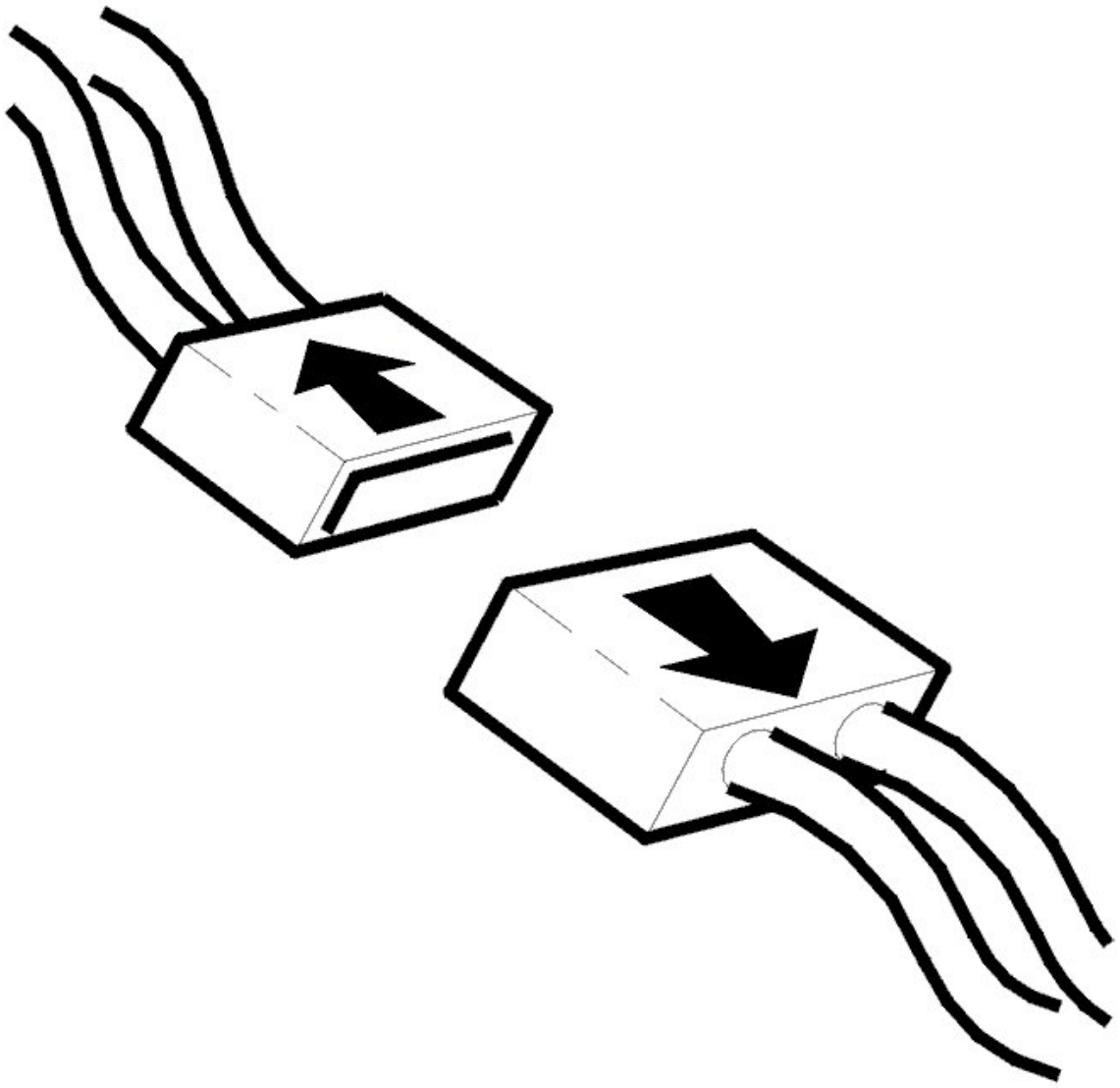
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

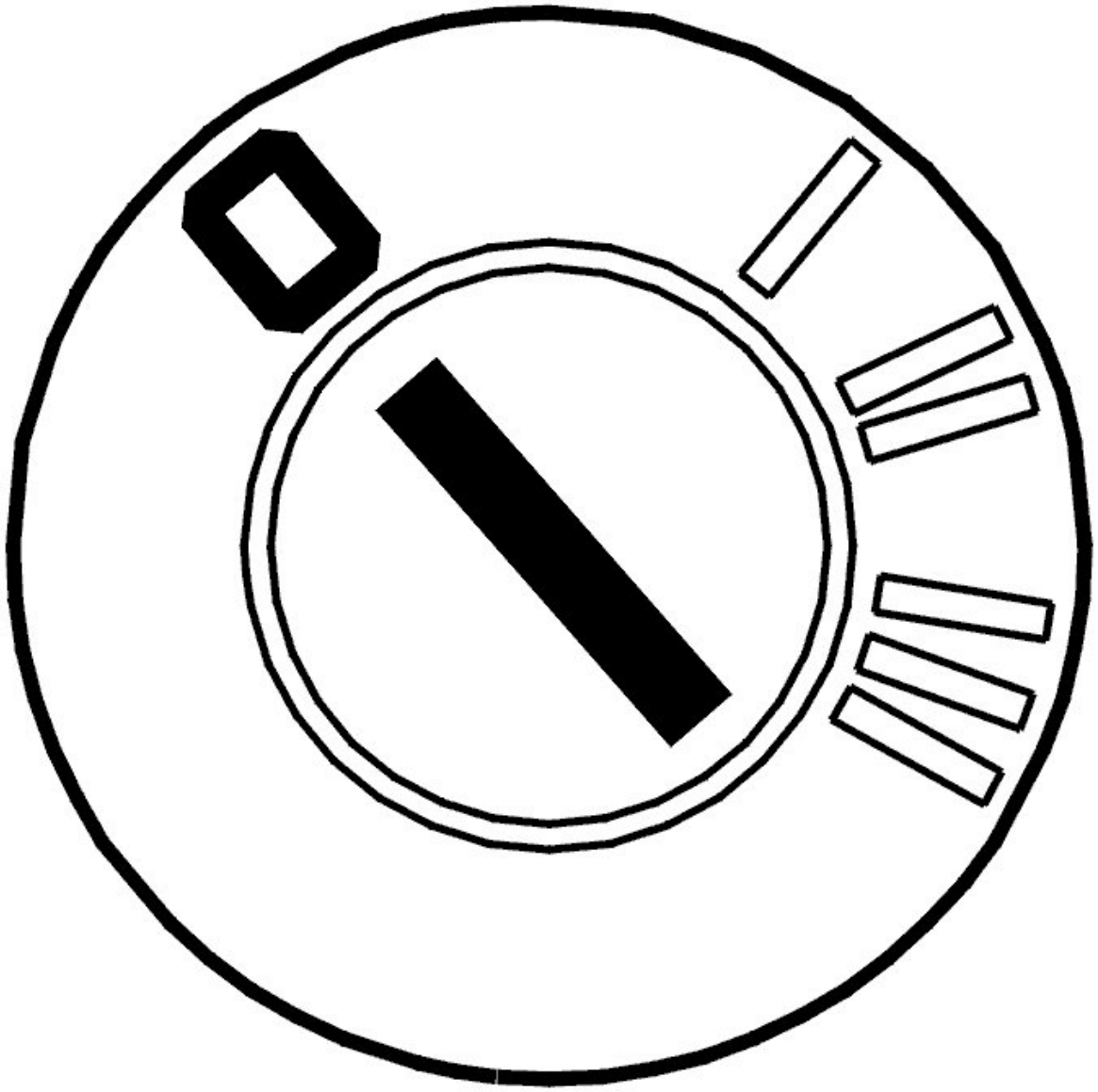
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

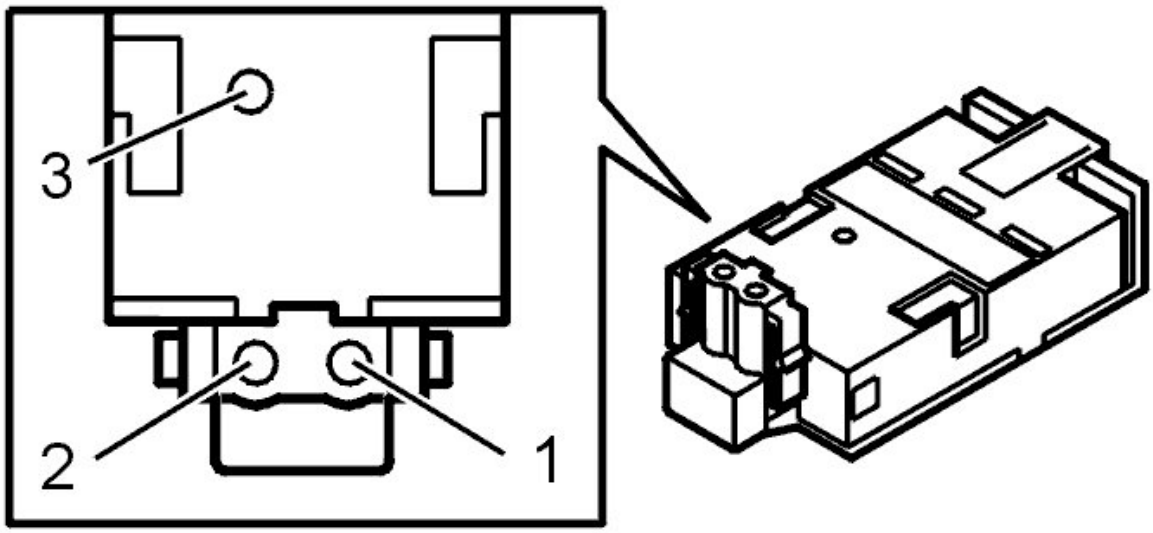
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

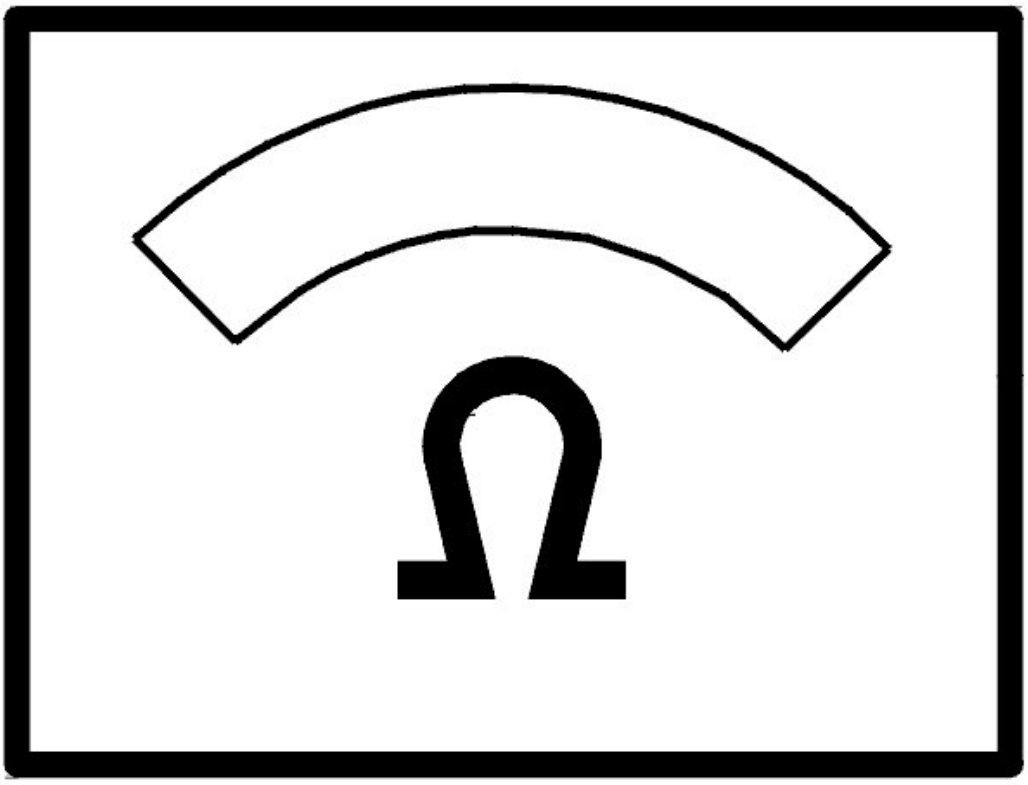
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

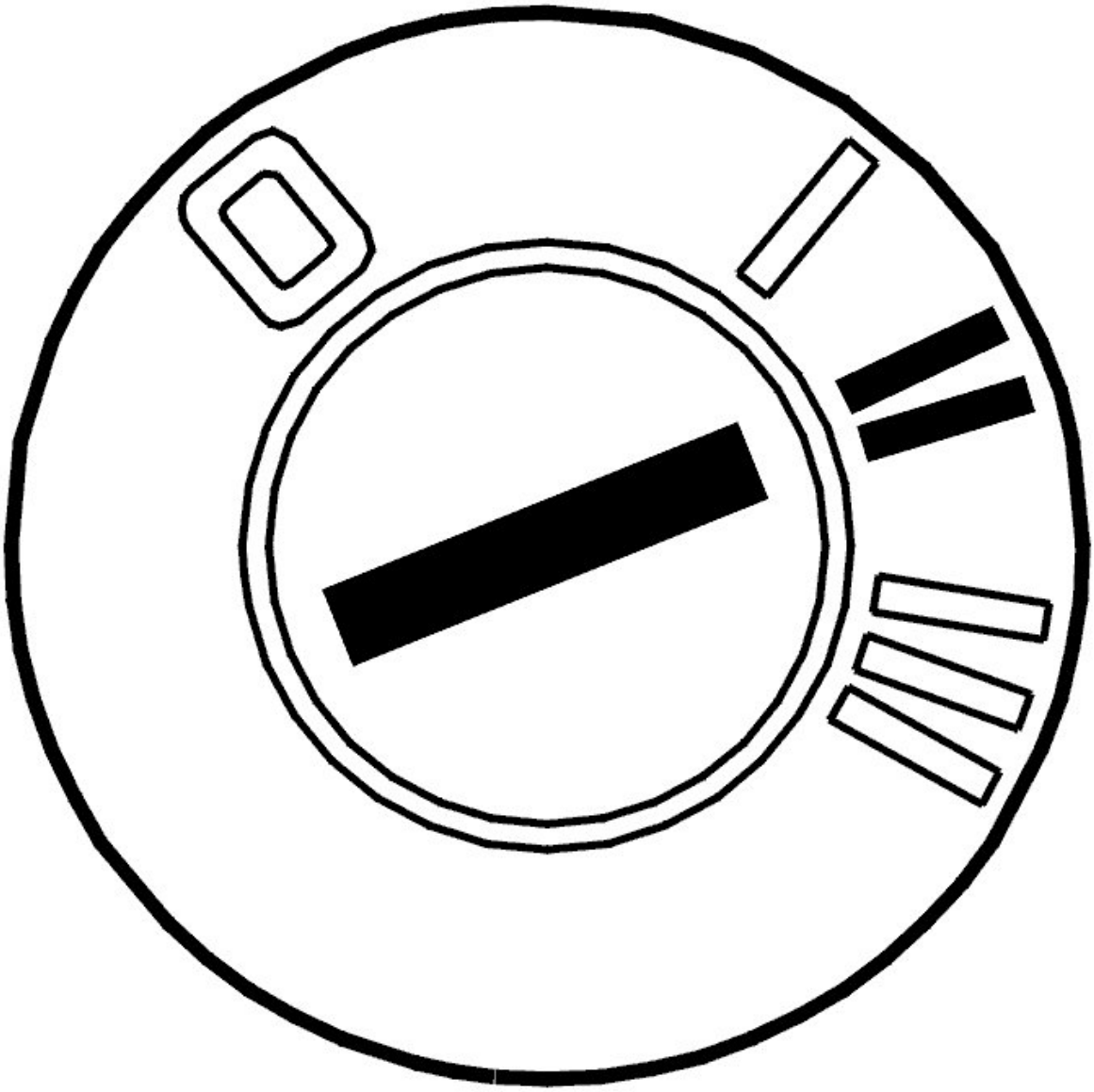
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

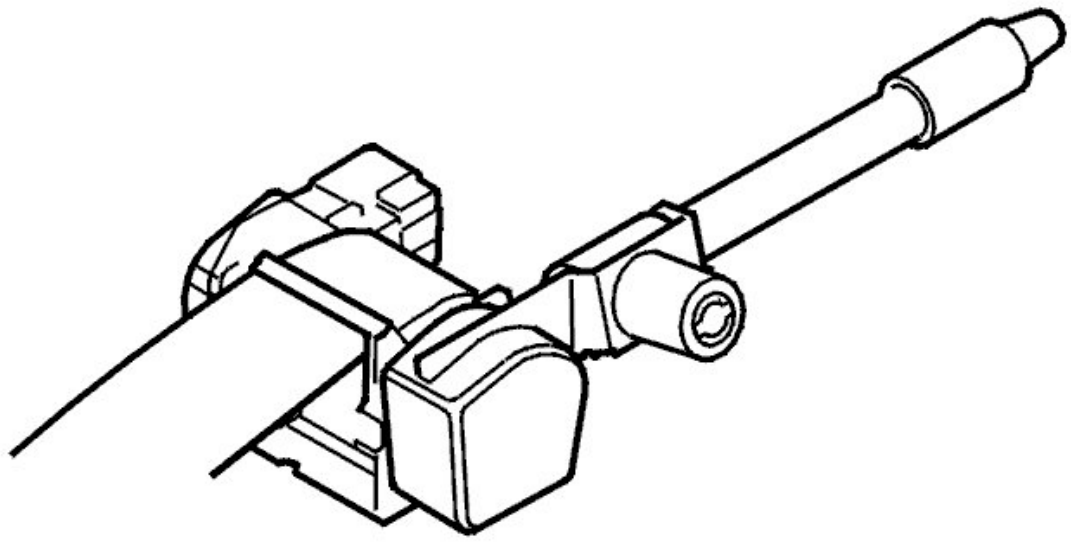
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0079 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0079 is displayed.

Substitute value
- Nothing.

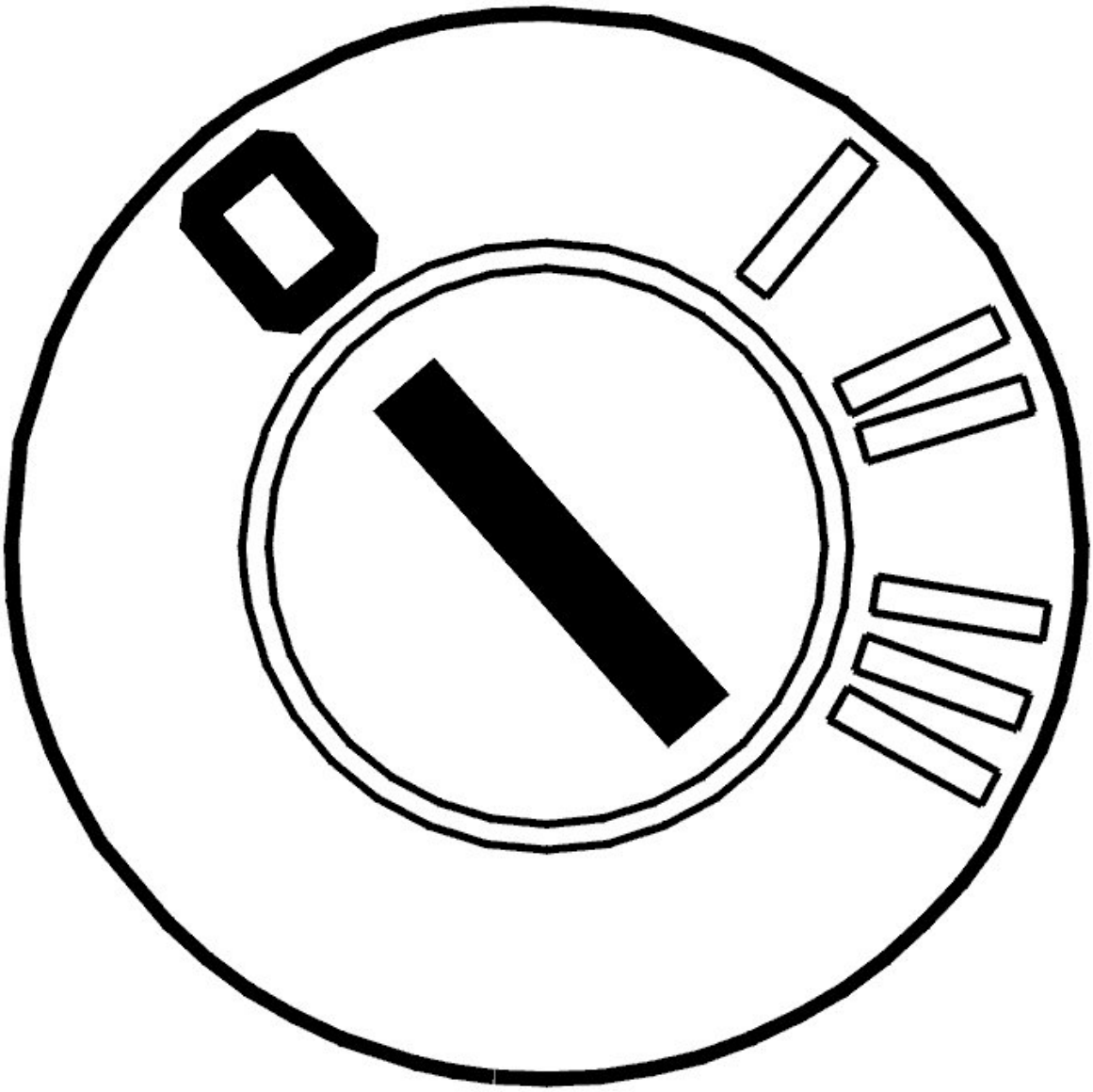
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

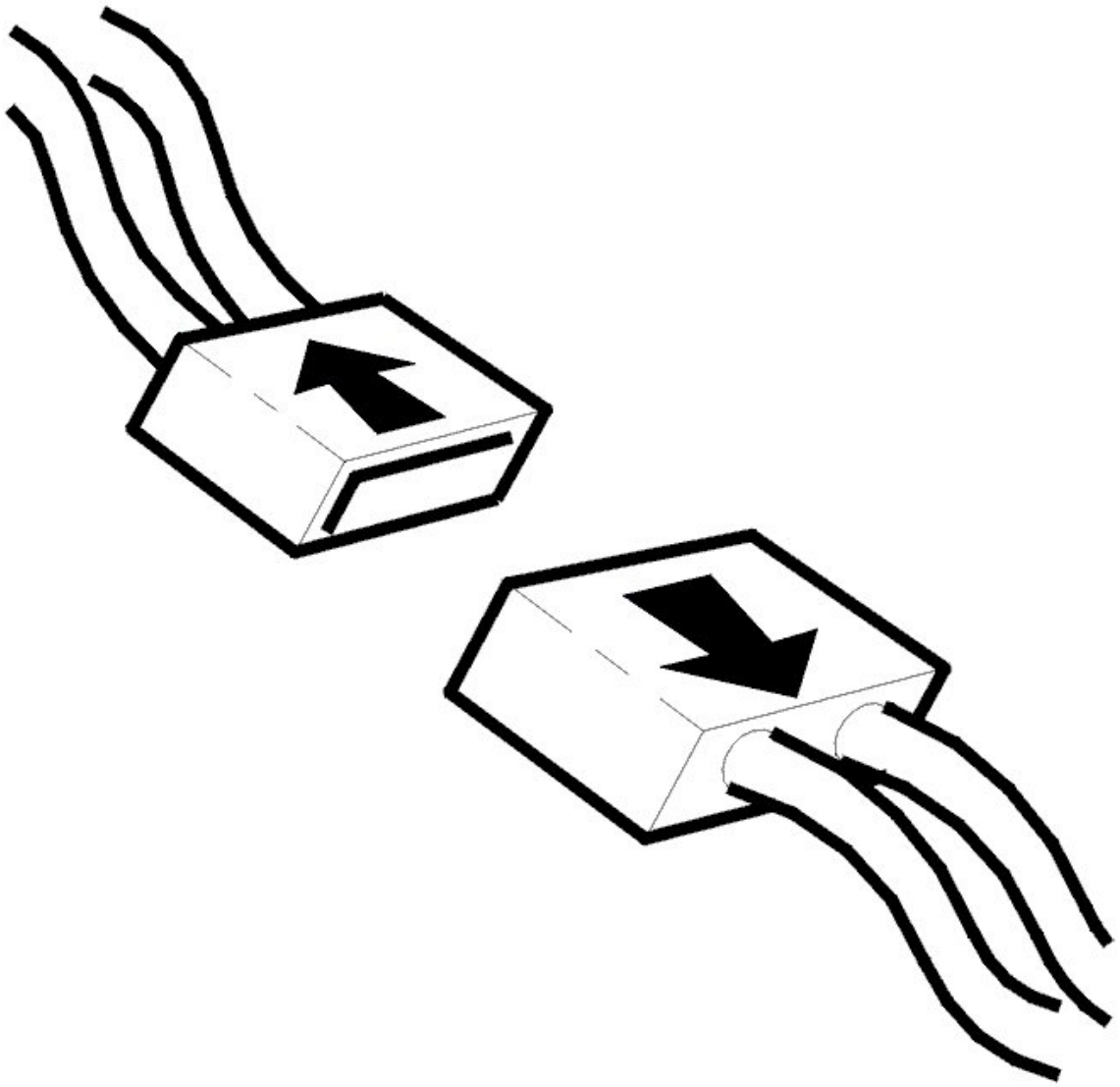
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

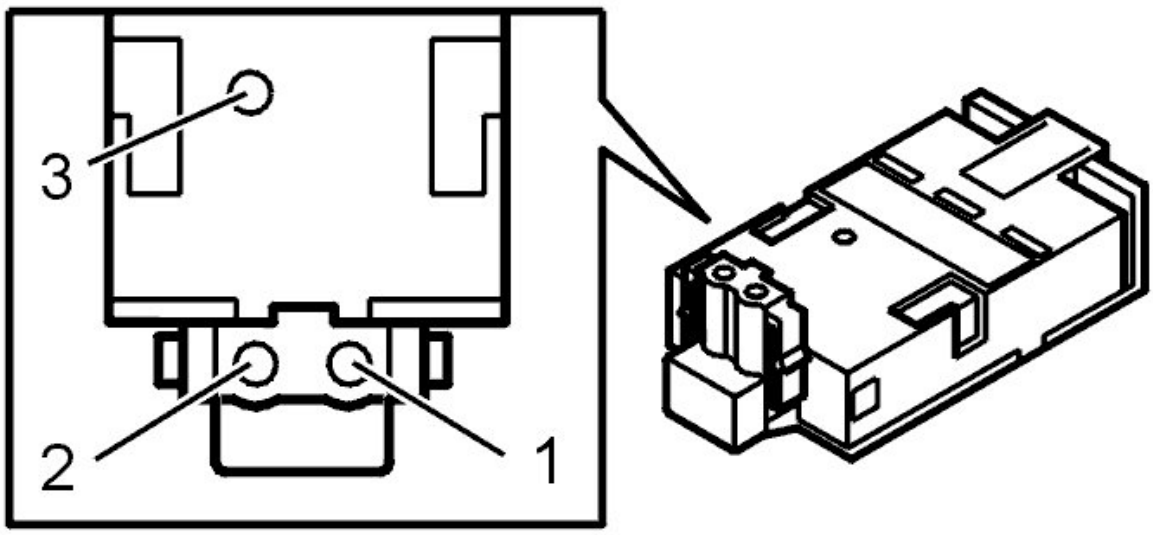
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

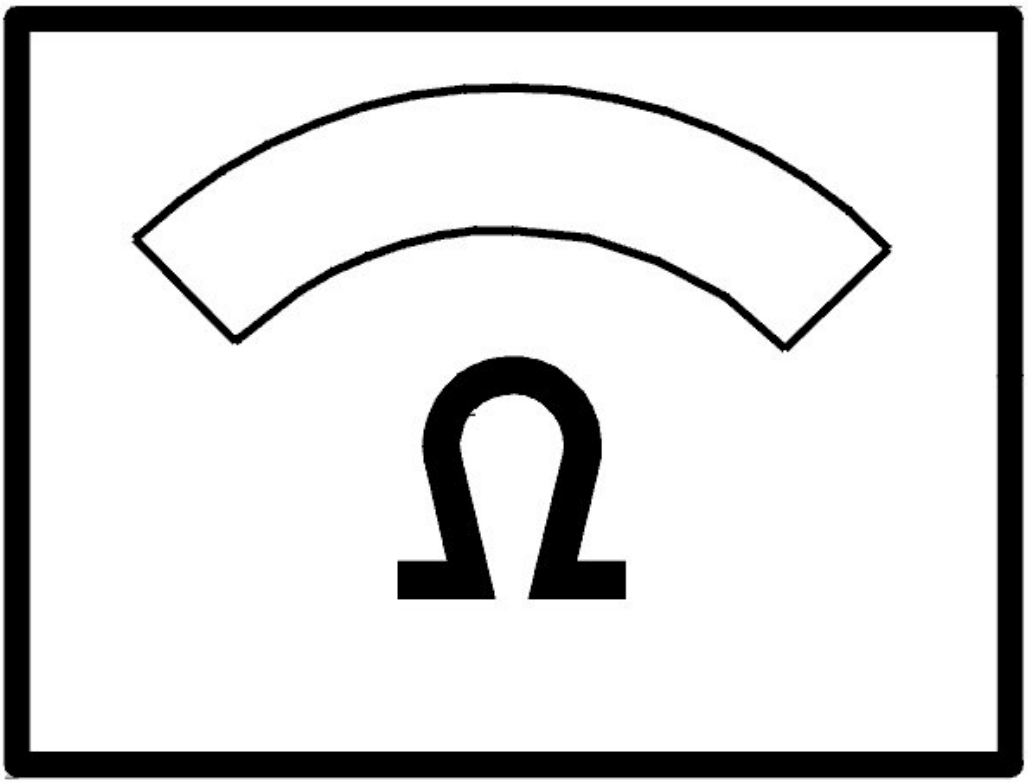
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

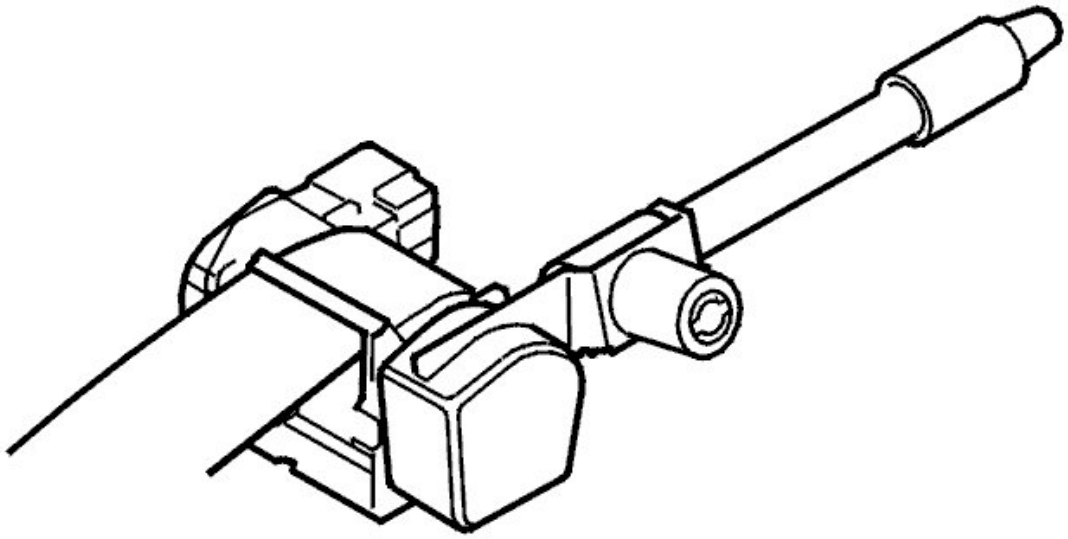
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-007A Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-007A is displayed.

Substitute value
- Nothing.

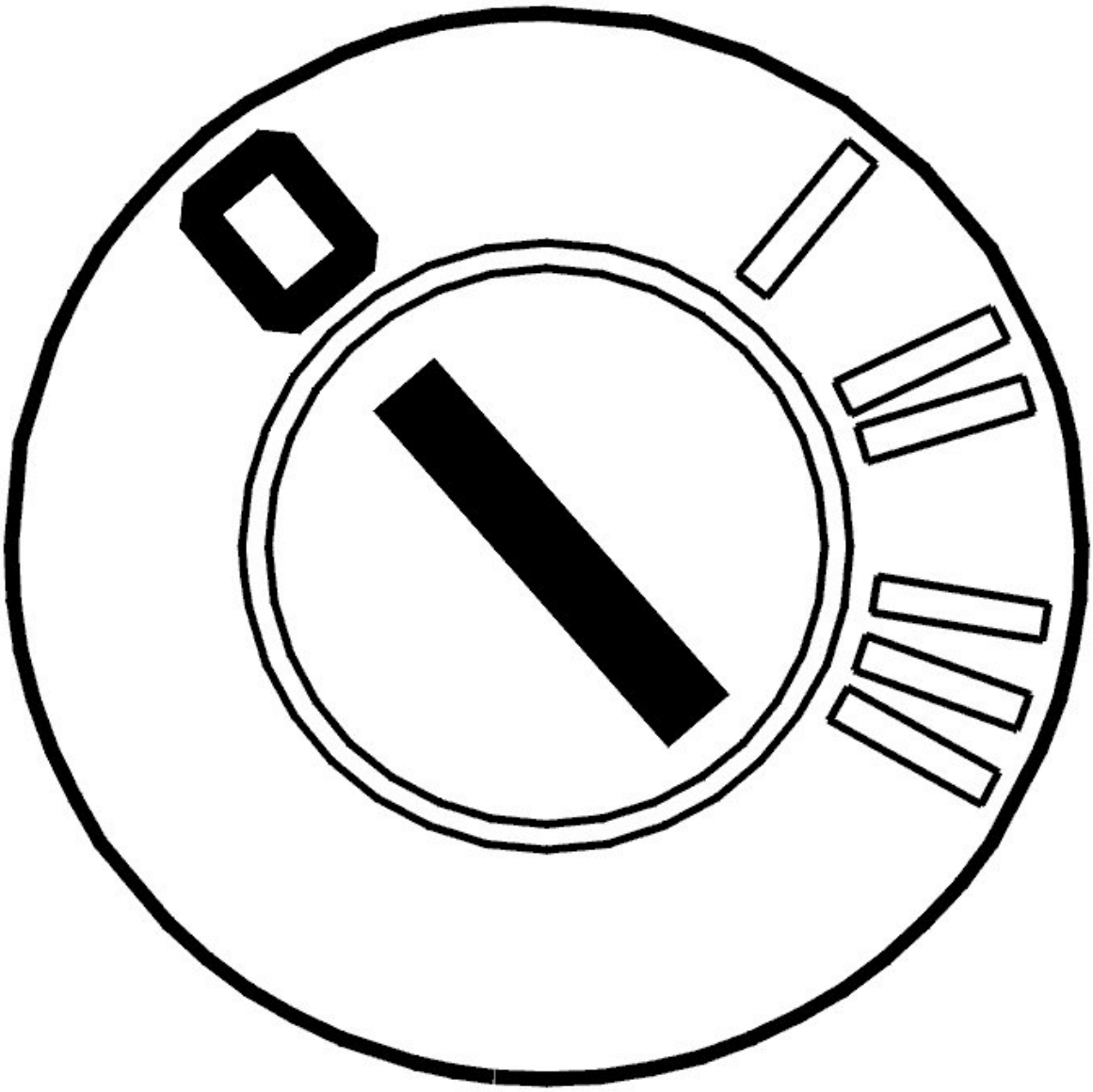
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

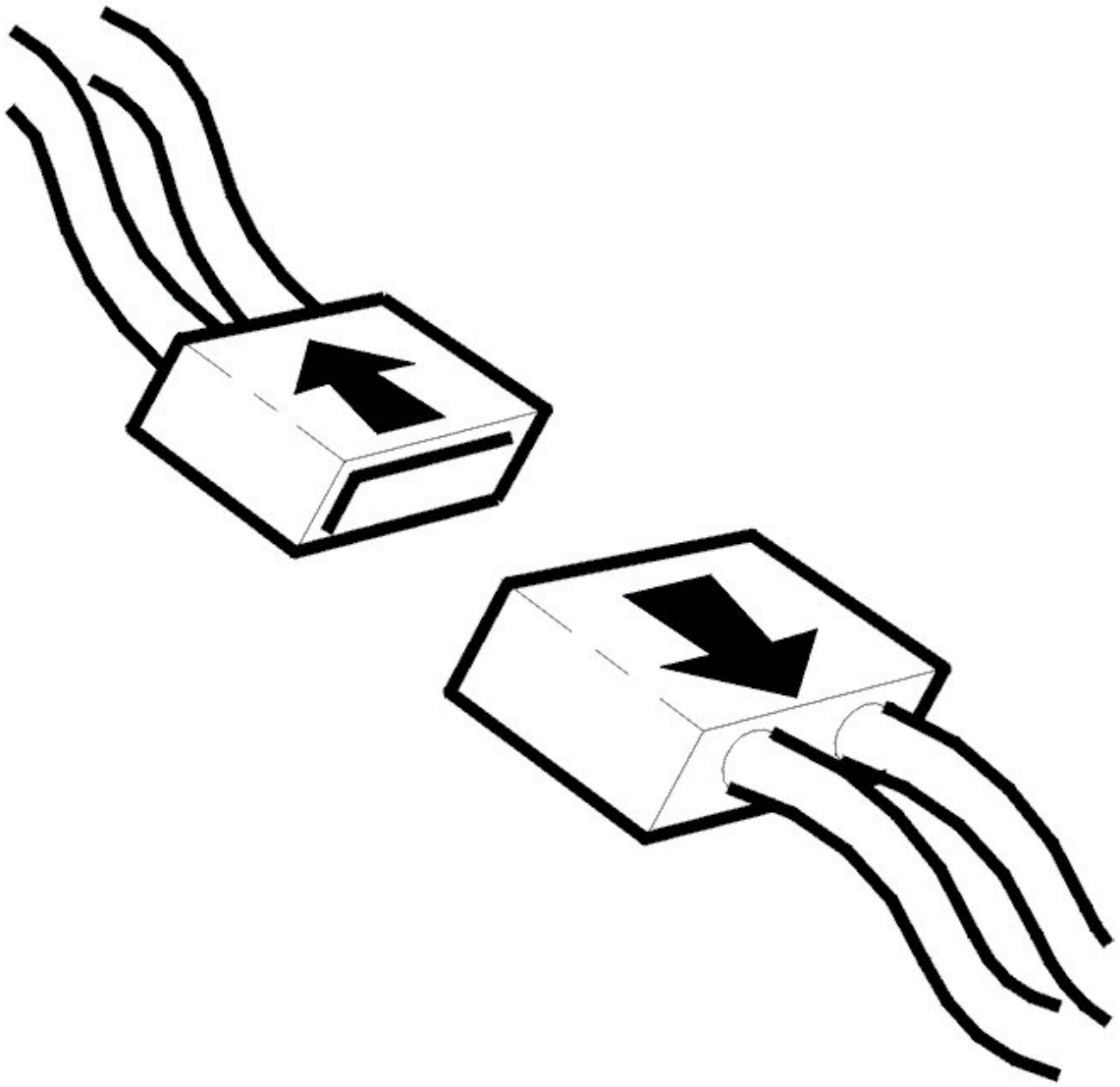
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A,

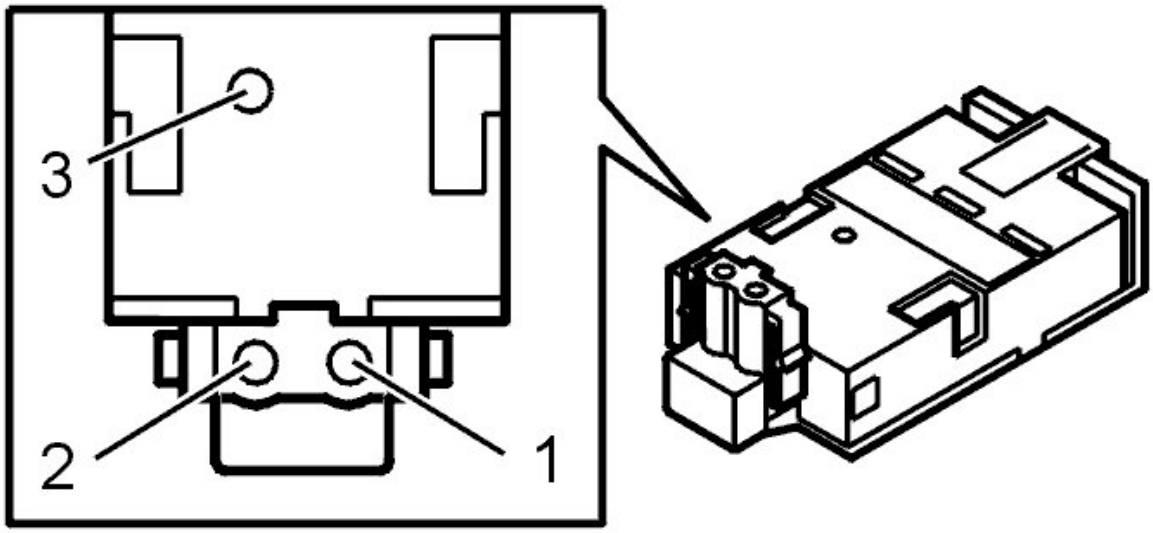
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

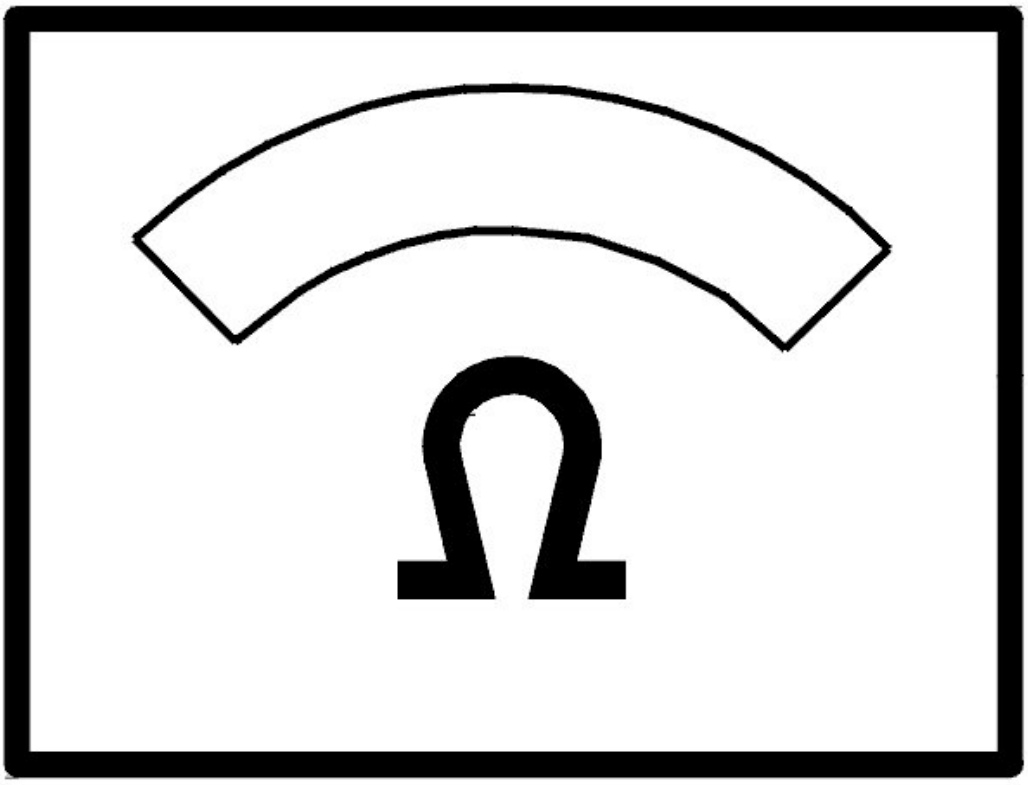
for diagnostic trouble code (DTC) SRS-0082,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

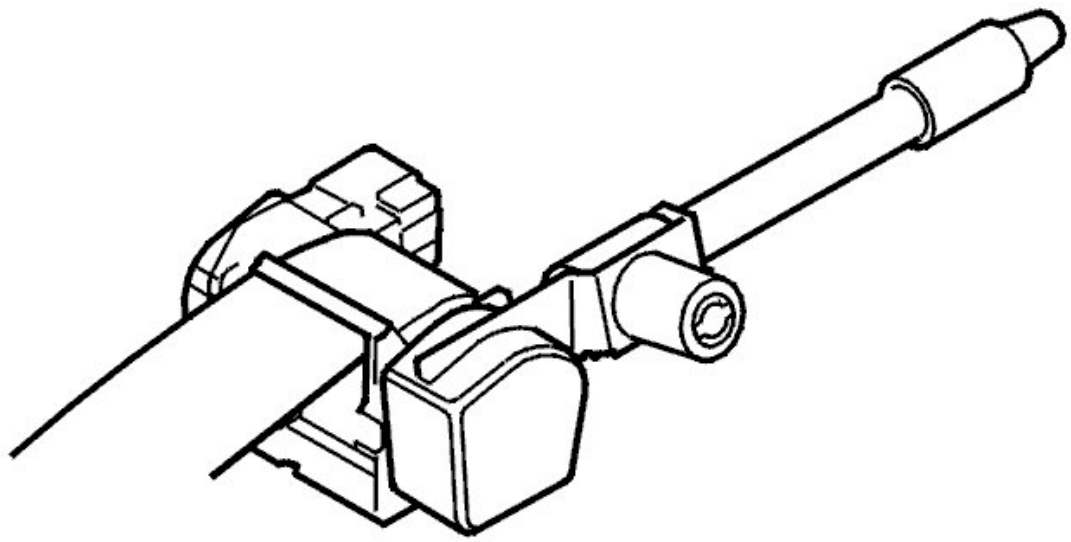
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-007A Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-007A is displayed.

Substitute value
- Nothing.

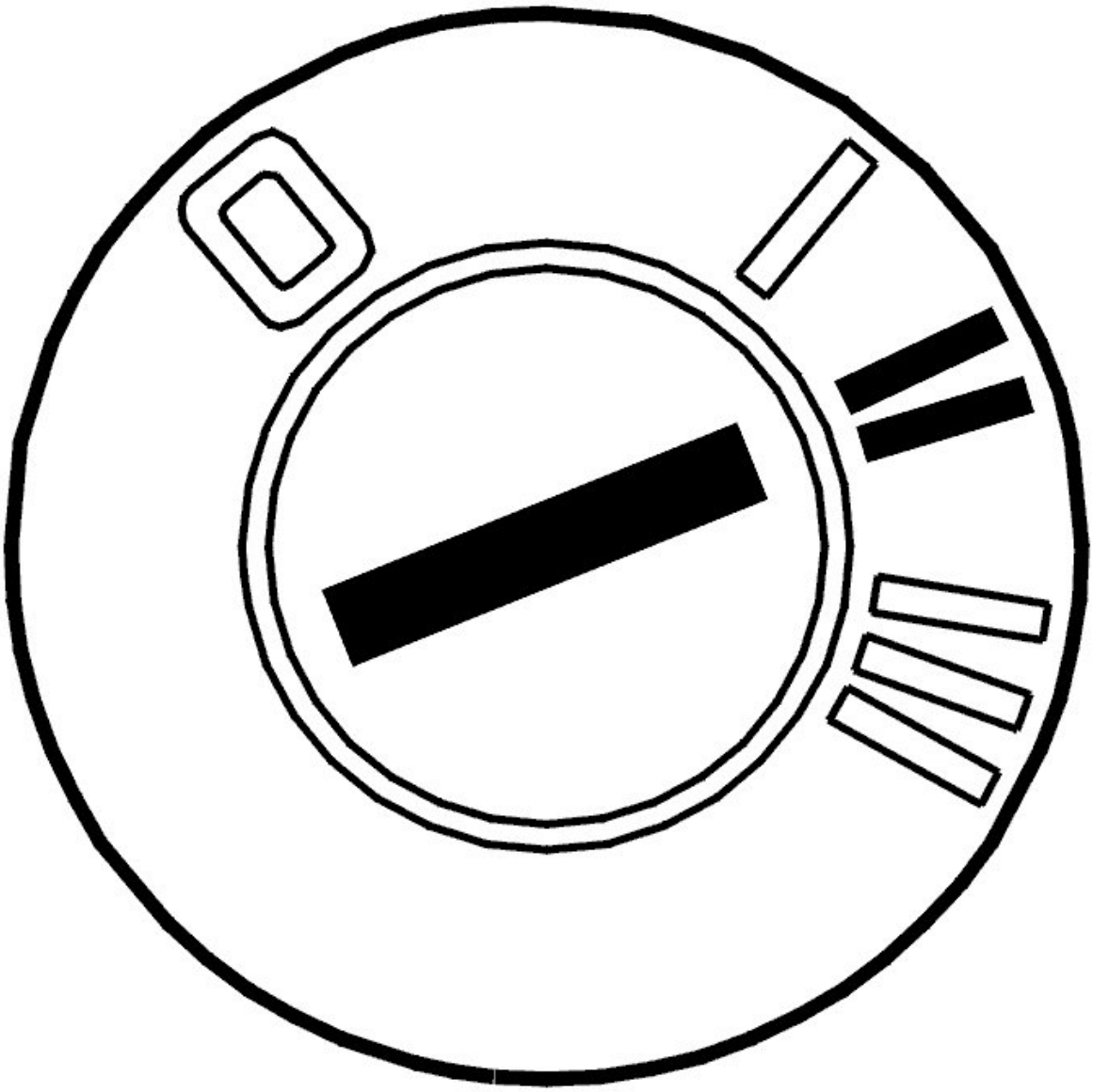
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

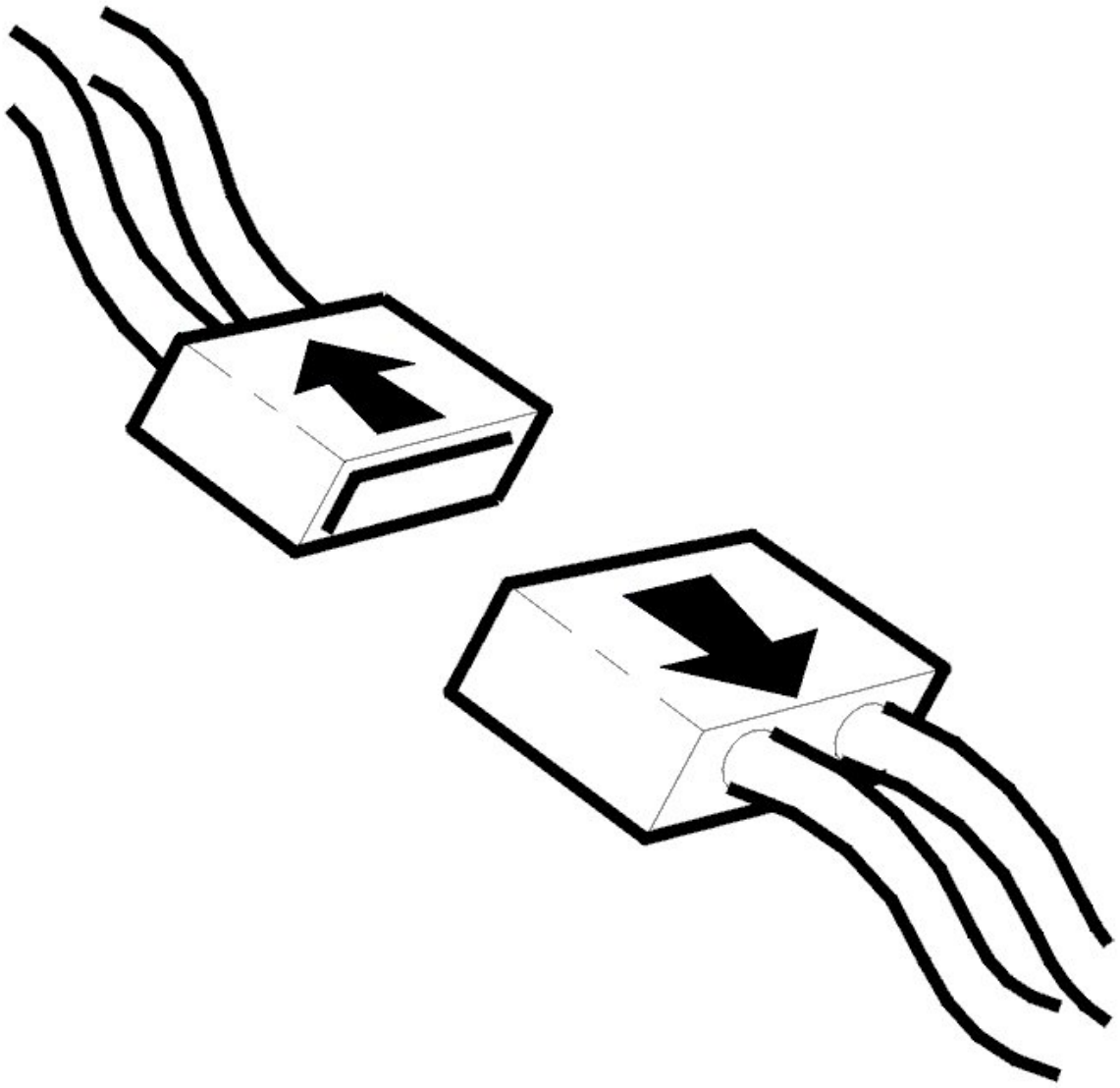
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

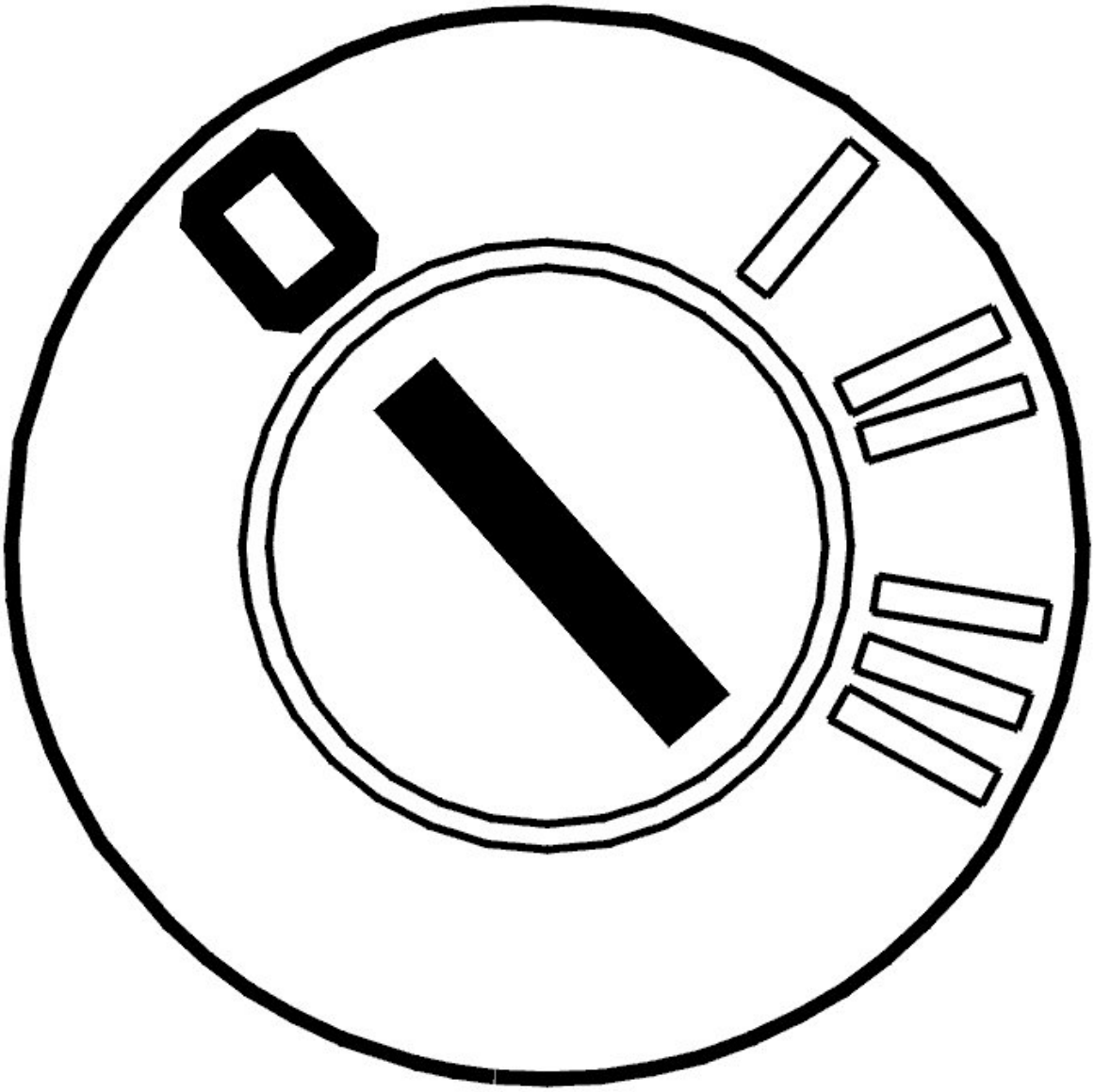
- To replace the front seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A

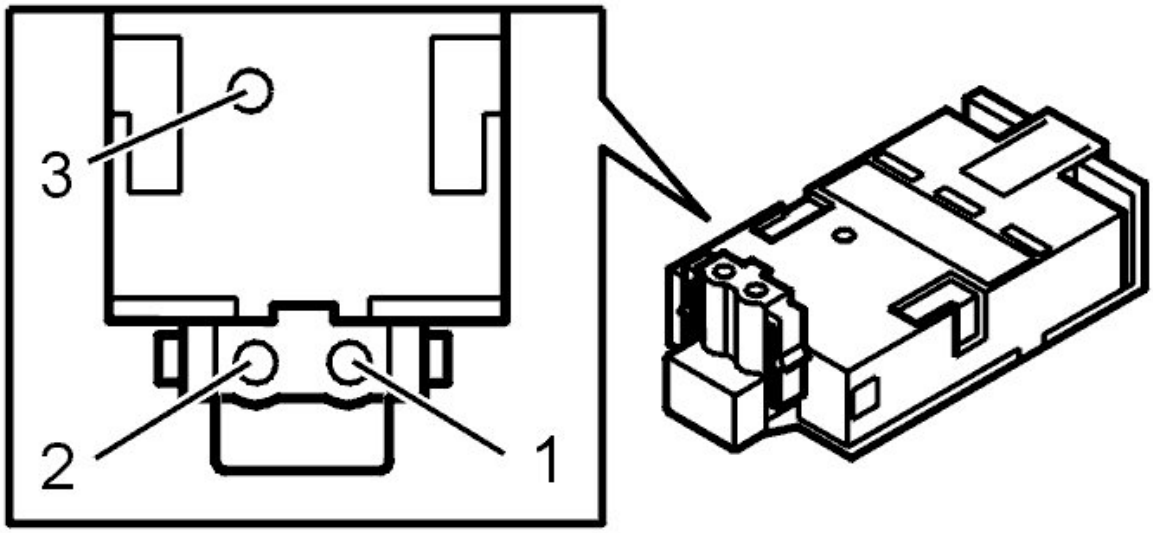
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

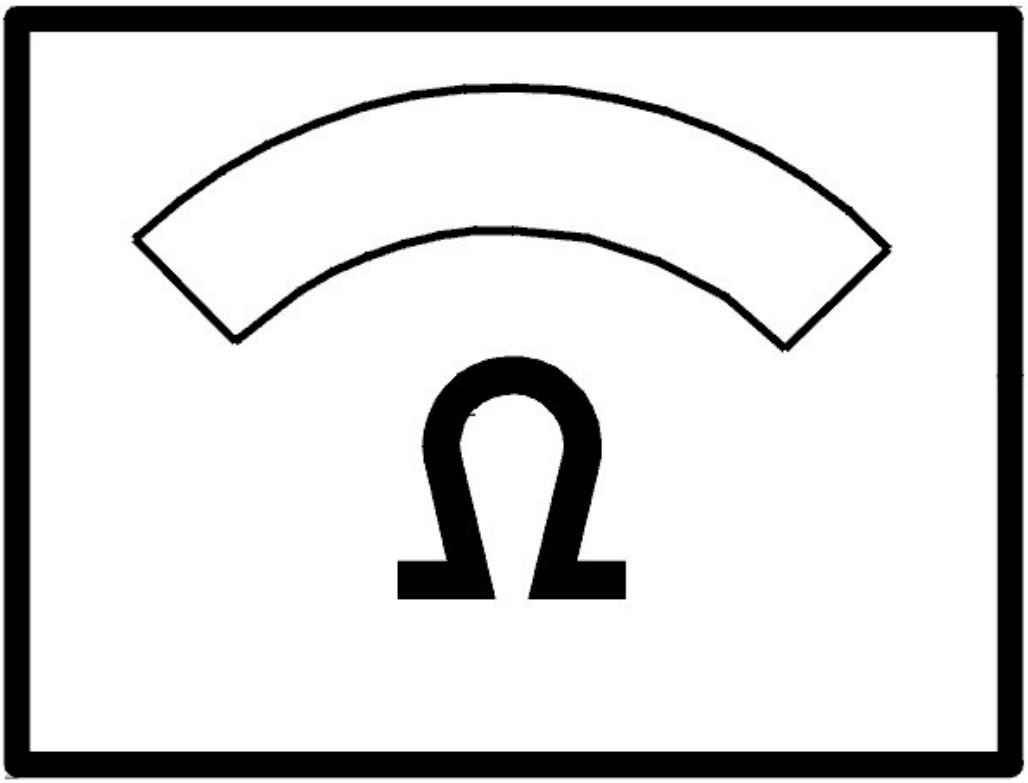
for diagnostic trouble code (DTC) SRS-0082

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

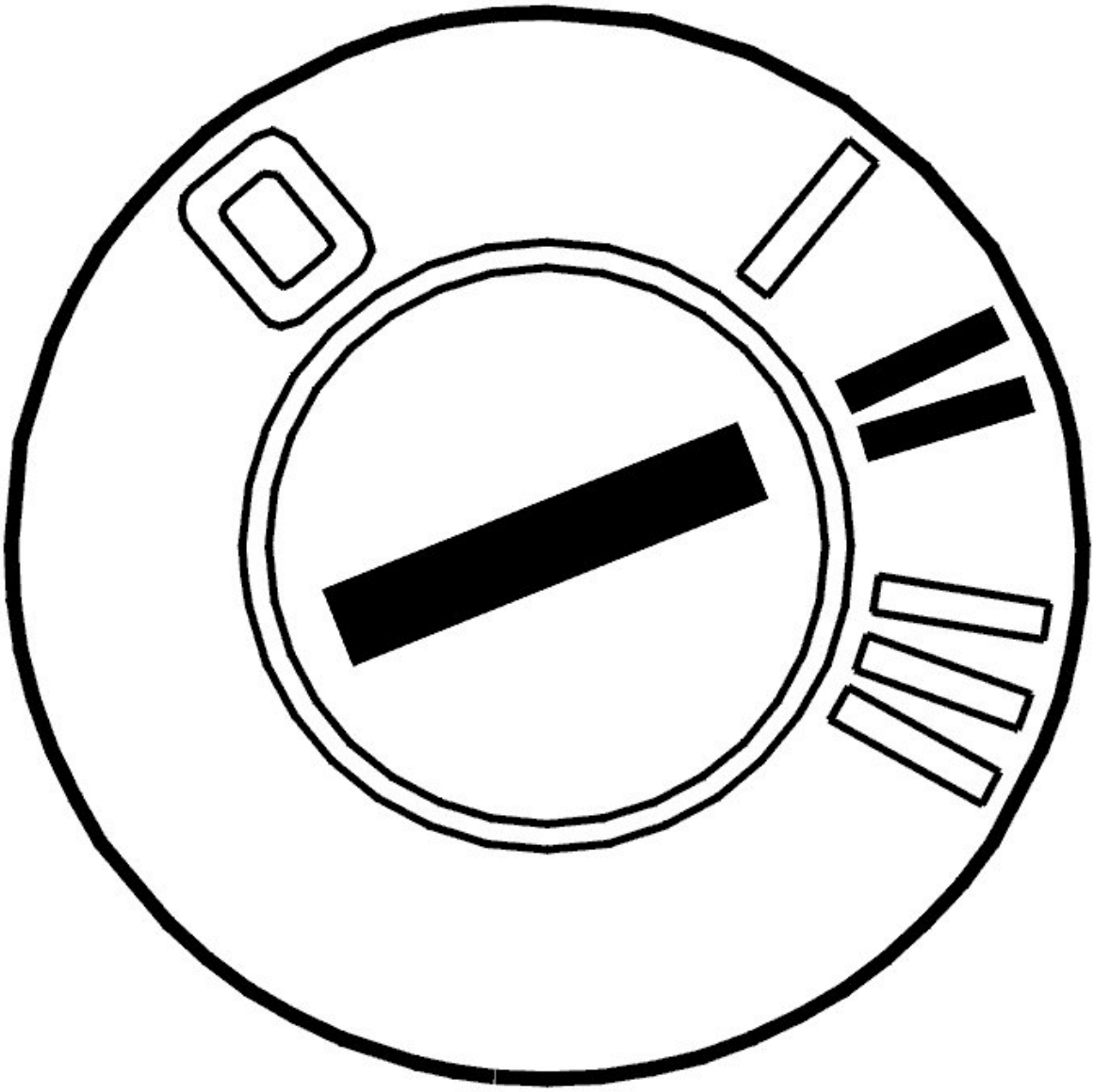
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

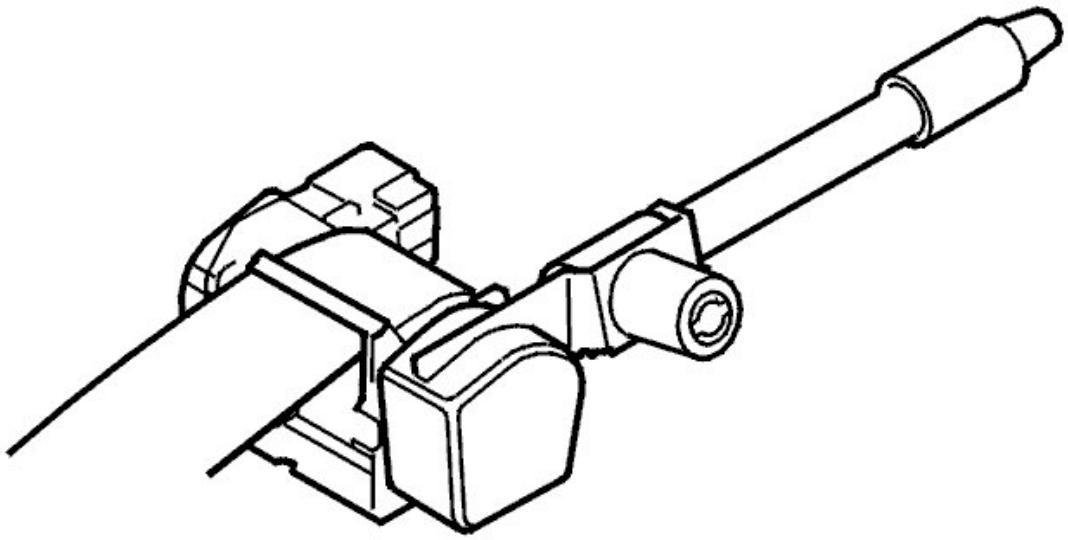
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-007B Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-007B is displayed.

Substitute value
- Nothing.

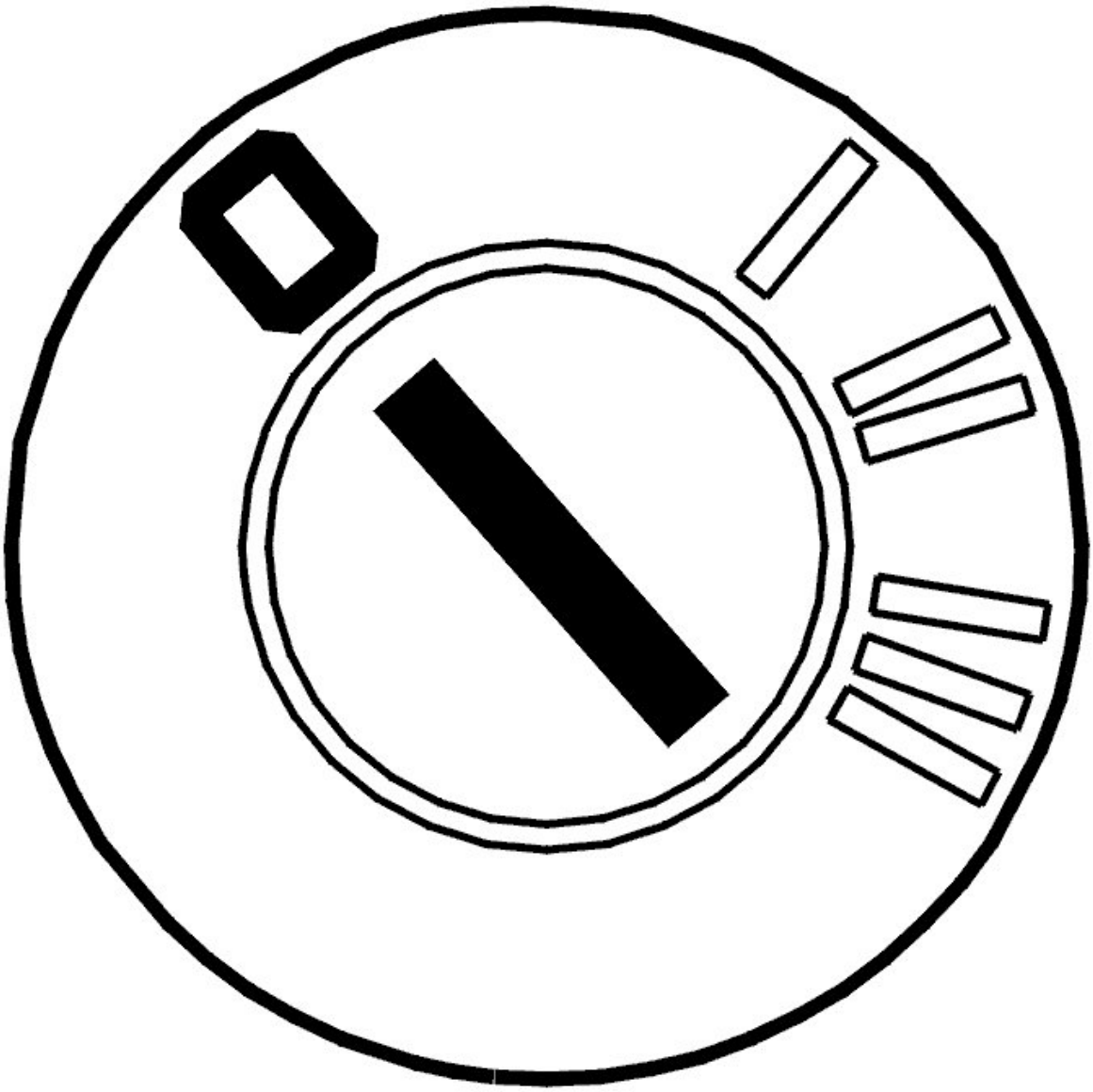
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0063,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006B,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0073,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007B,

terminals #17A(17), #18A(18) of the centre rear seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0083,

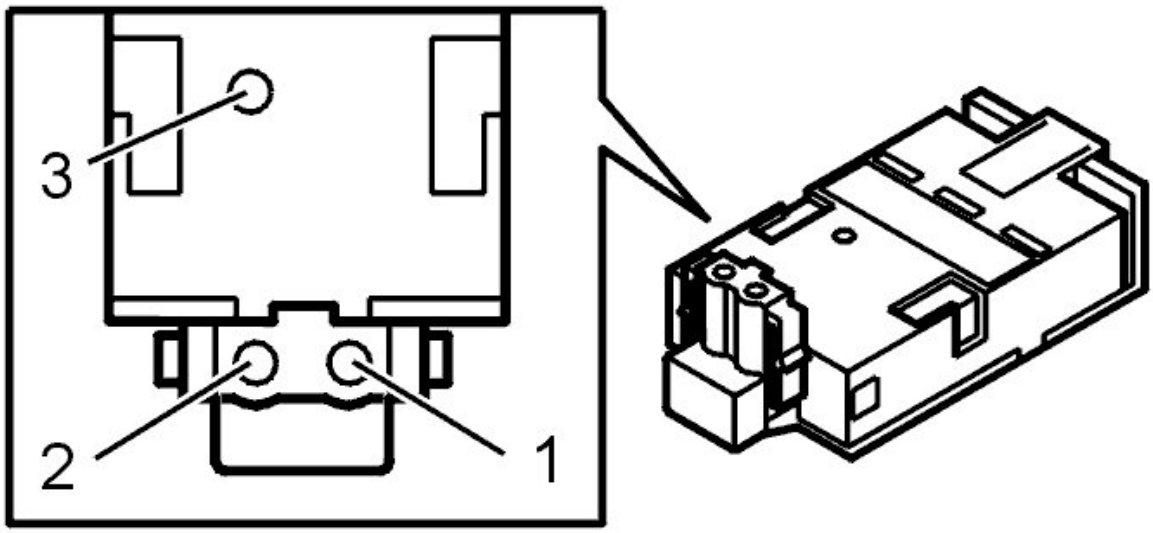
terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

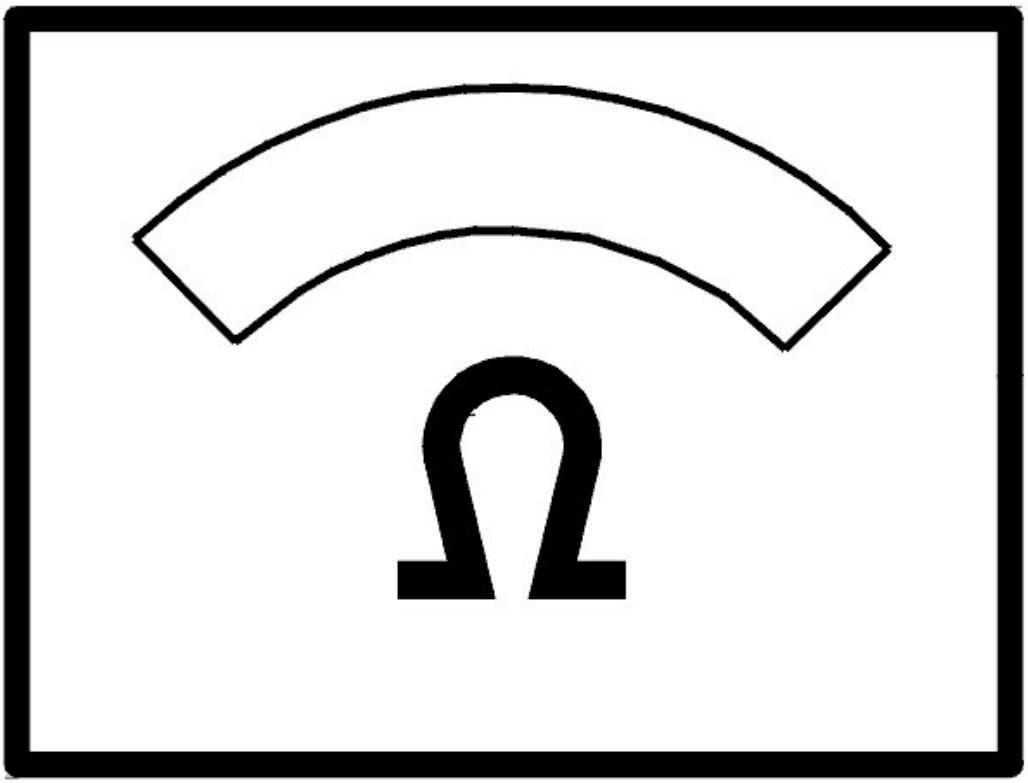
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

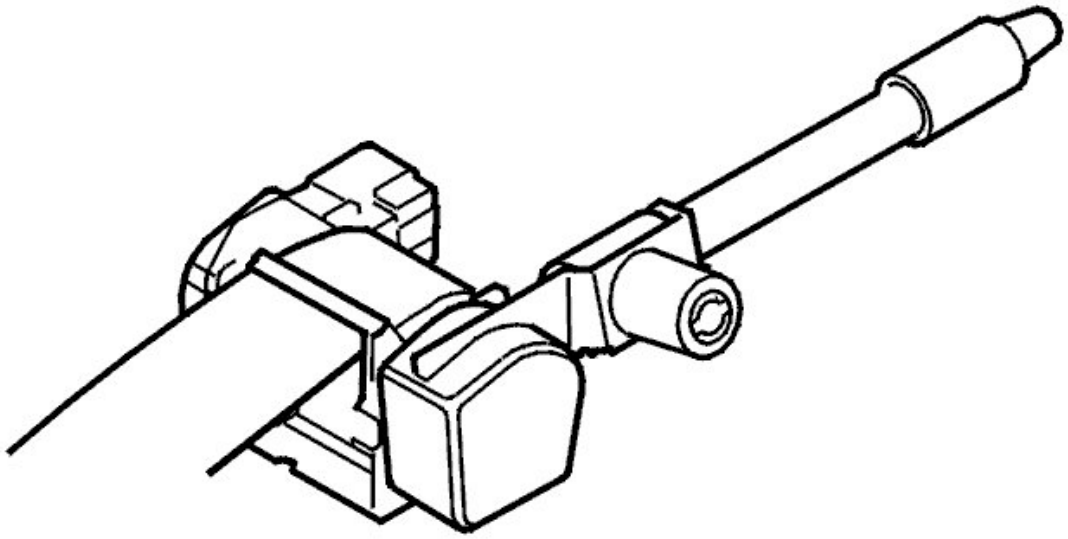
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-007B Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-007B is displayed.

Substitute value
- Nothing.

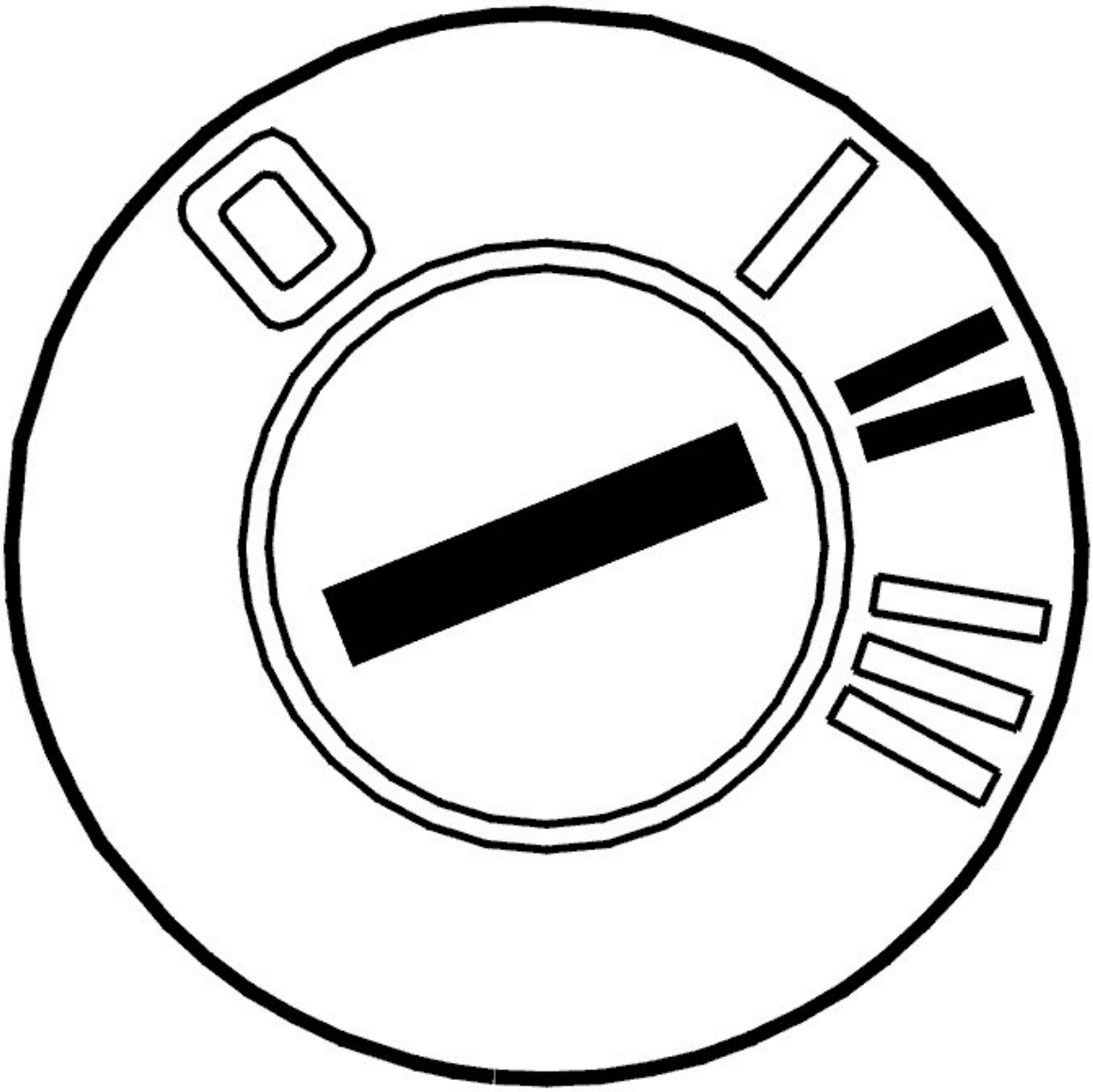
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

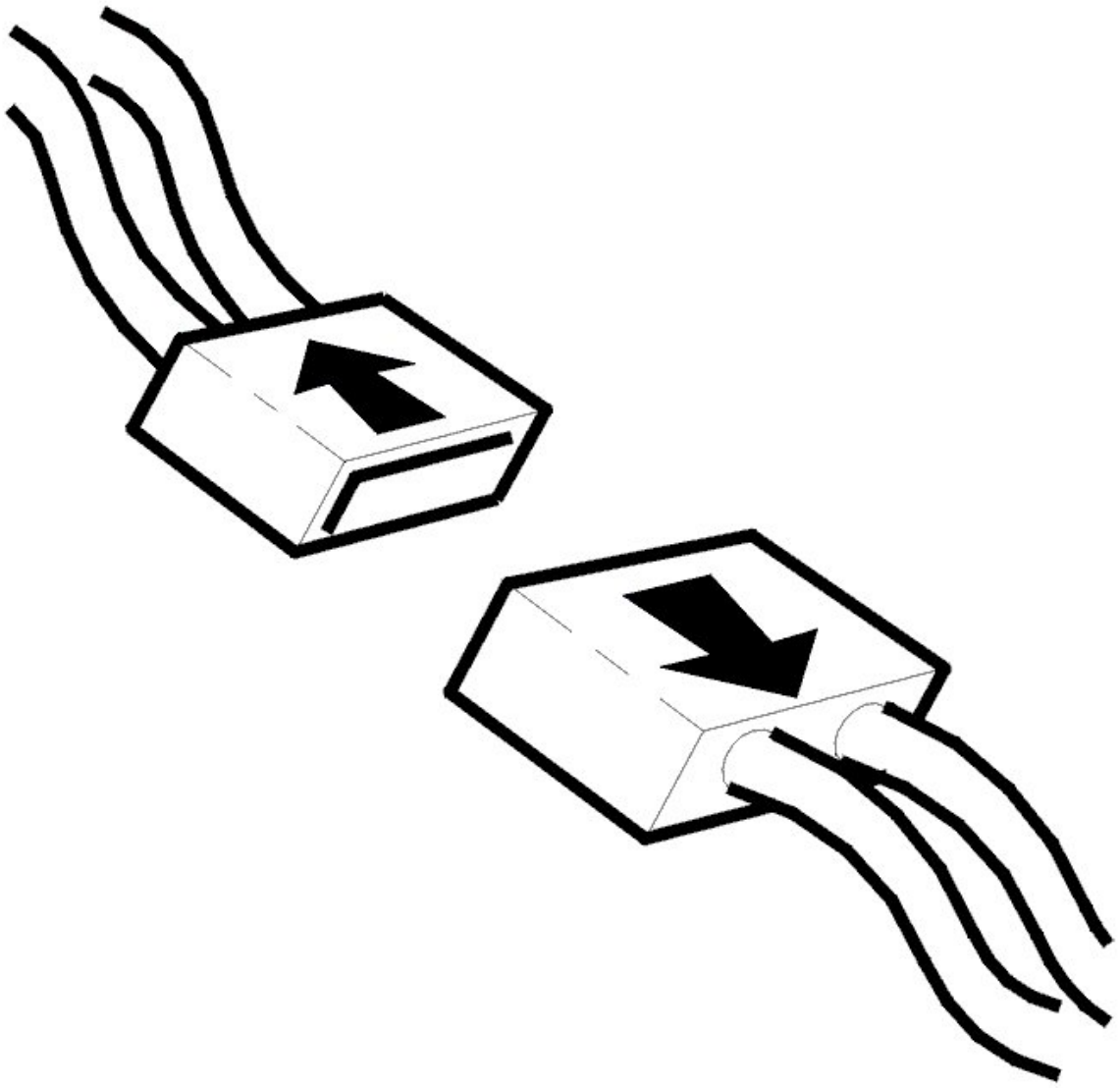
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

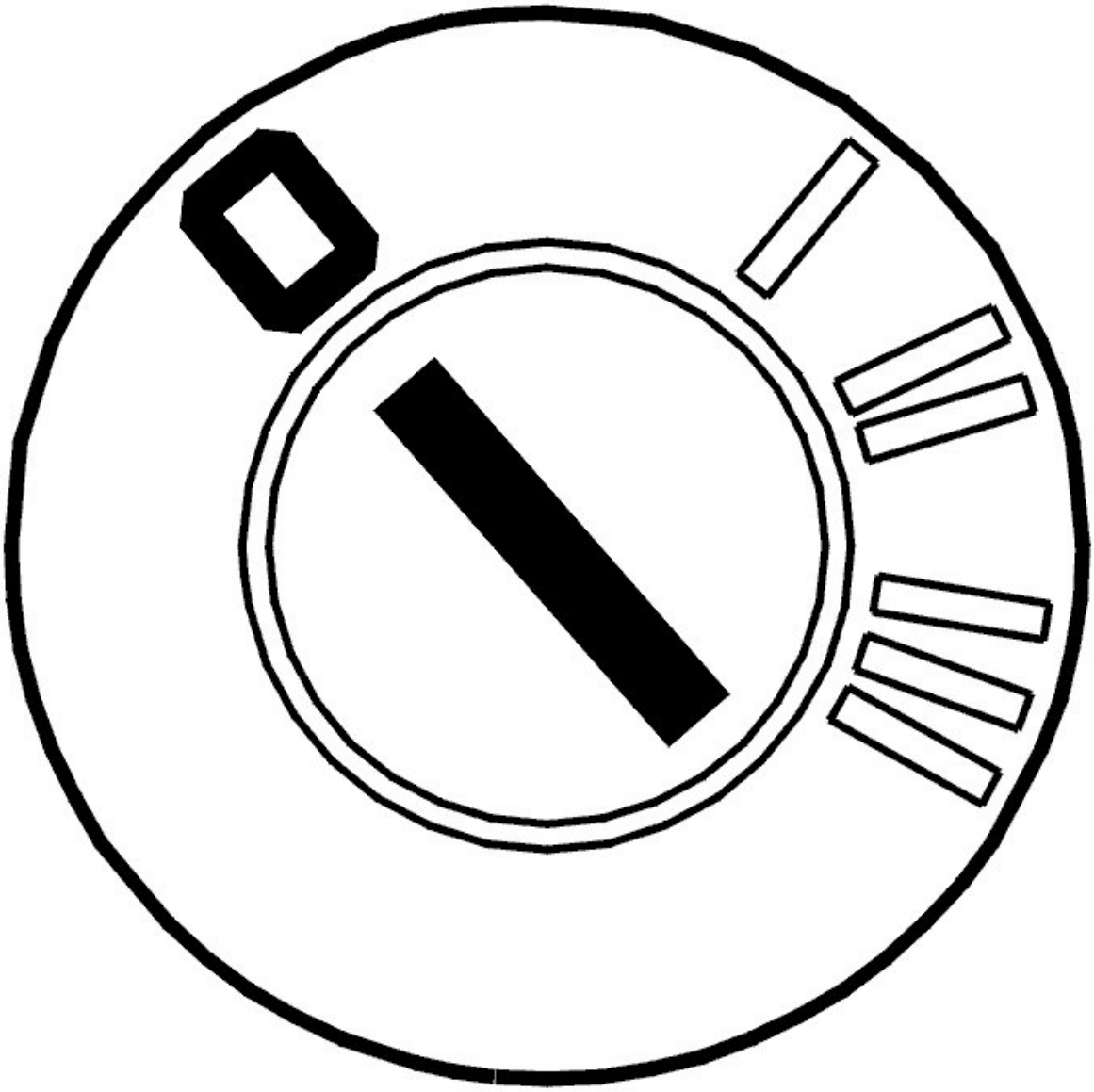
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0063,

front left seat belt tensioner terminals #5A(5) and #6A(6) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-006B,

front right seat belt tensioner terminals #5C(1) and #6C(2) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0073,

rear left seat belt tensioner terminals #16A(16) and #15A(15) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-007B,

centre rear seat belt tensioner terminals 17A(17) and #18A(18) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0083,

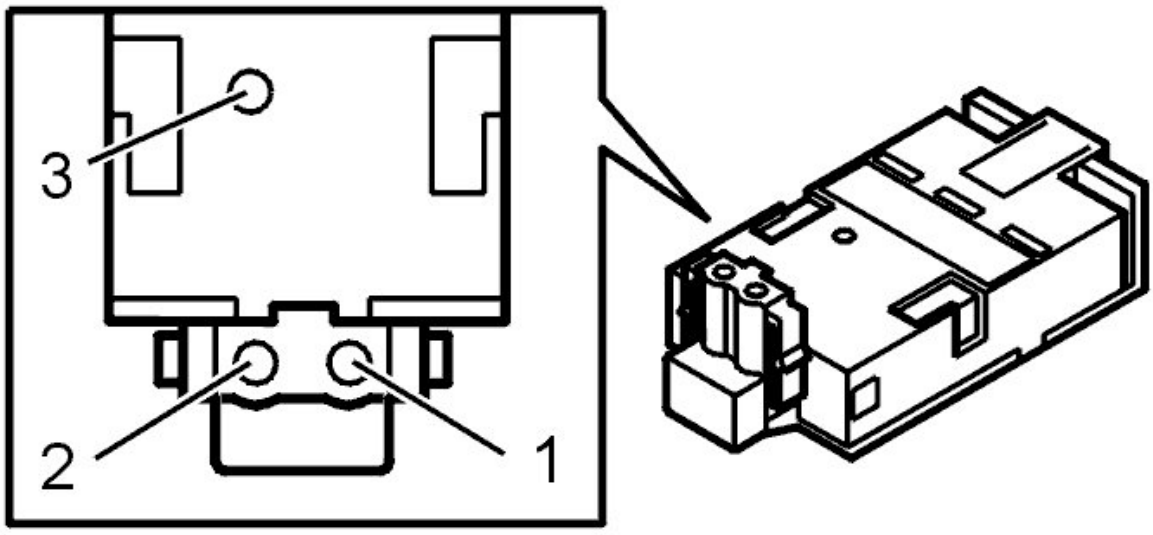
rear right seat belt tensioner terminals #16C(12) and #15C(11) and connector terminals #1 and #3
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

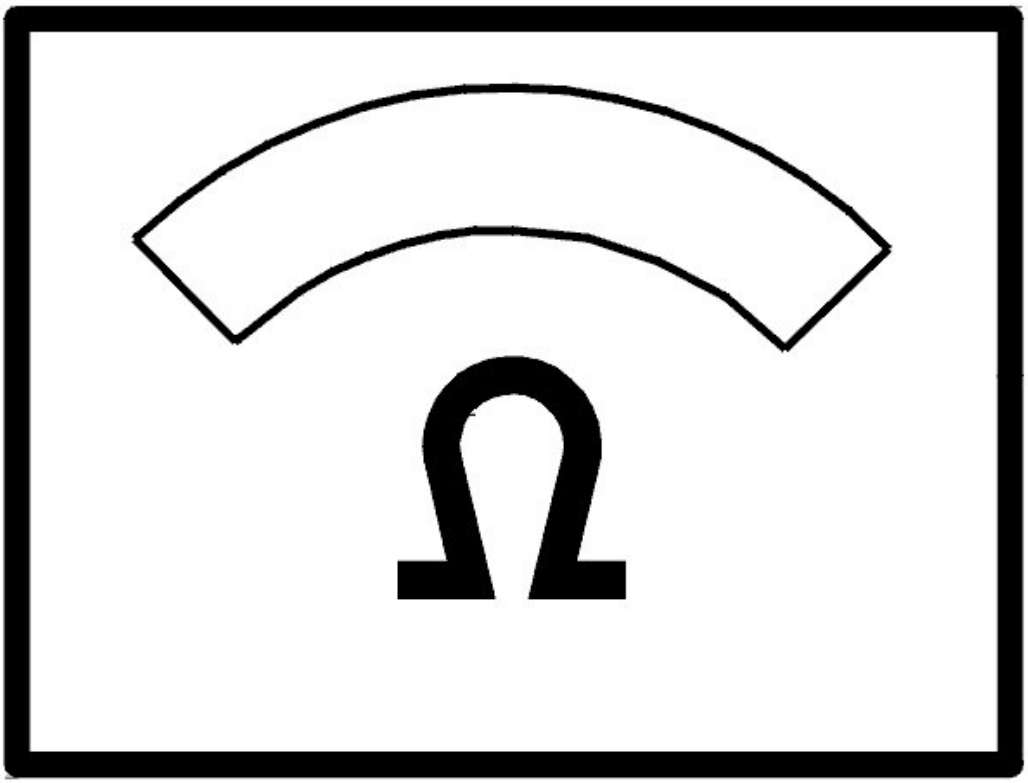
Hint: Checking the integrated capacitor in the igniter connector by taking resistance measurements.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

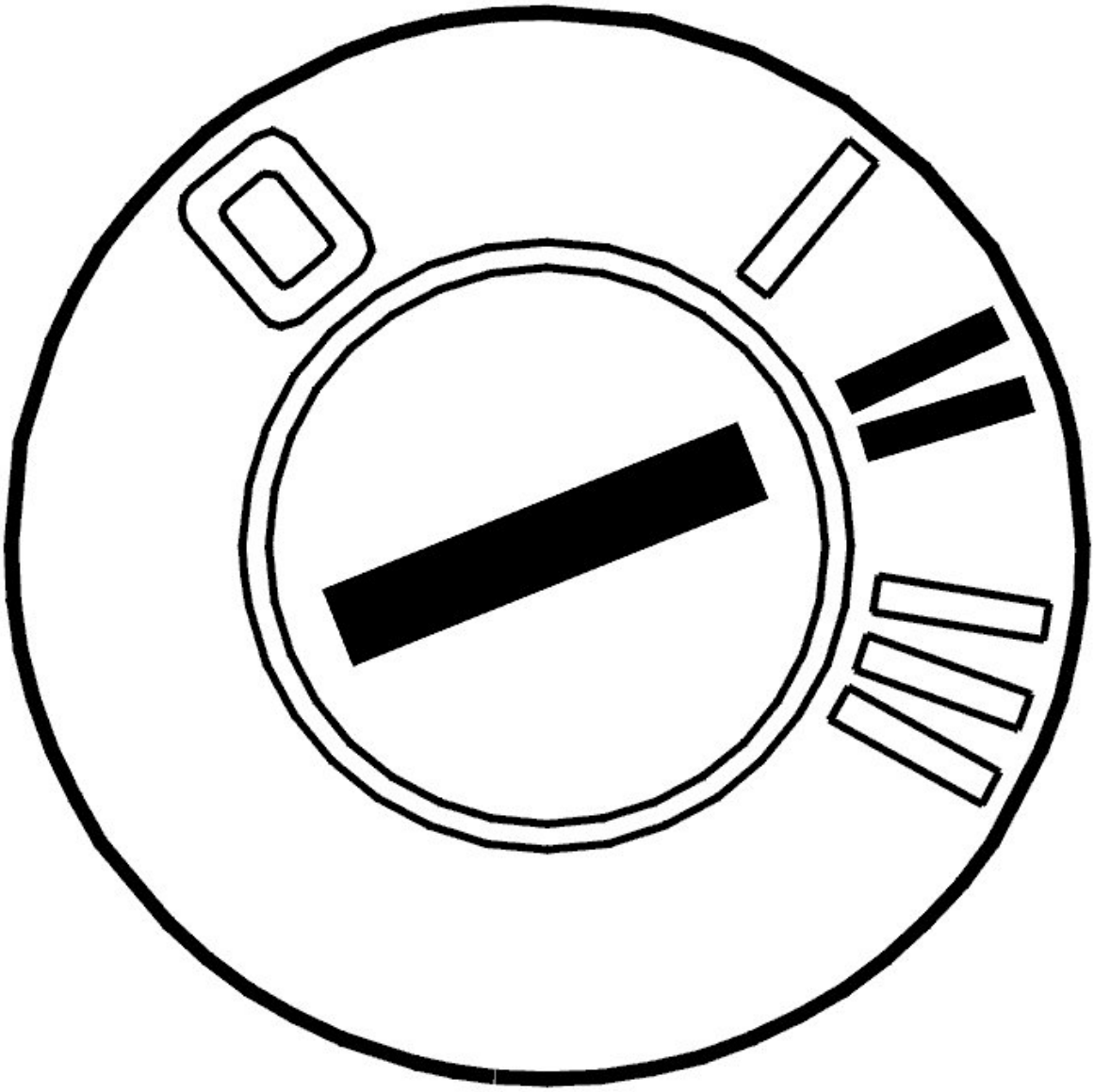
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

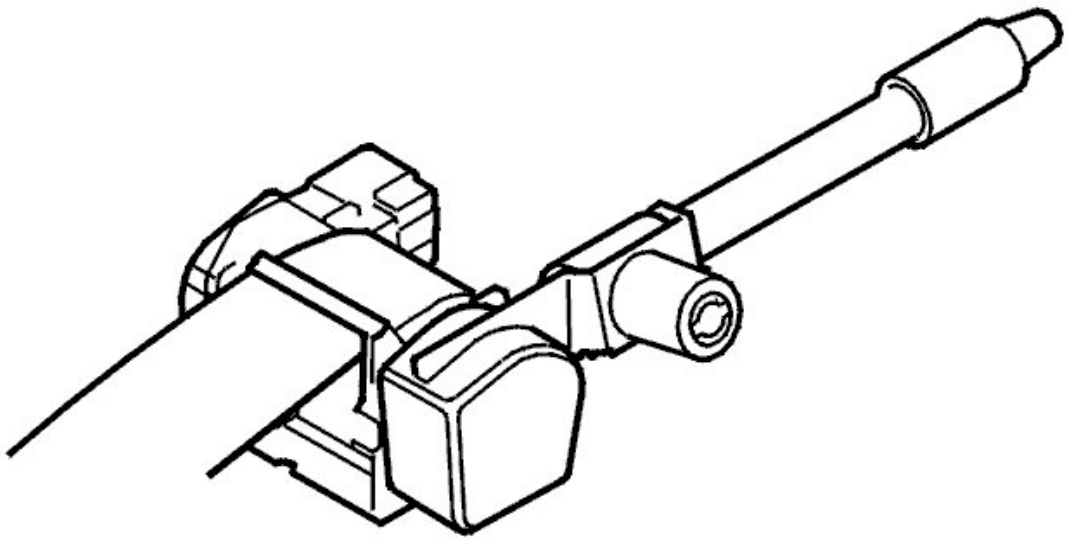
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information SRS-007C

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-007C is displayed.

Substitute value
- Nothing.

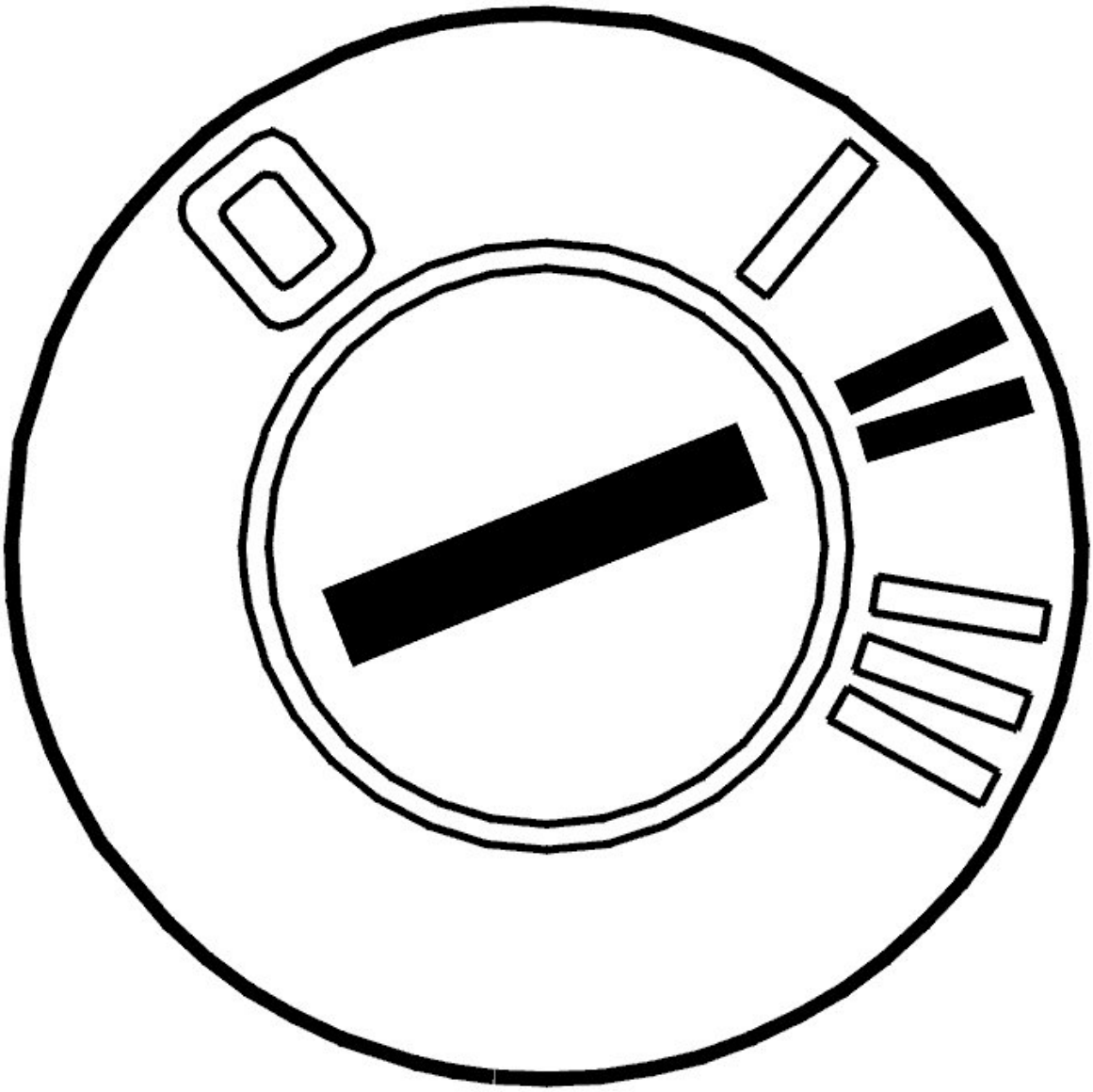
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

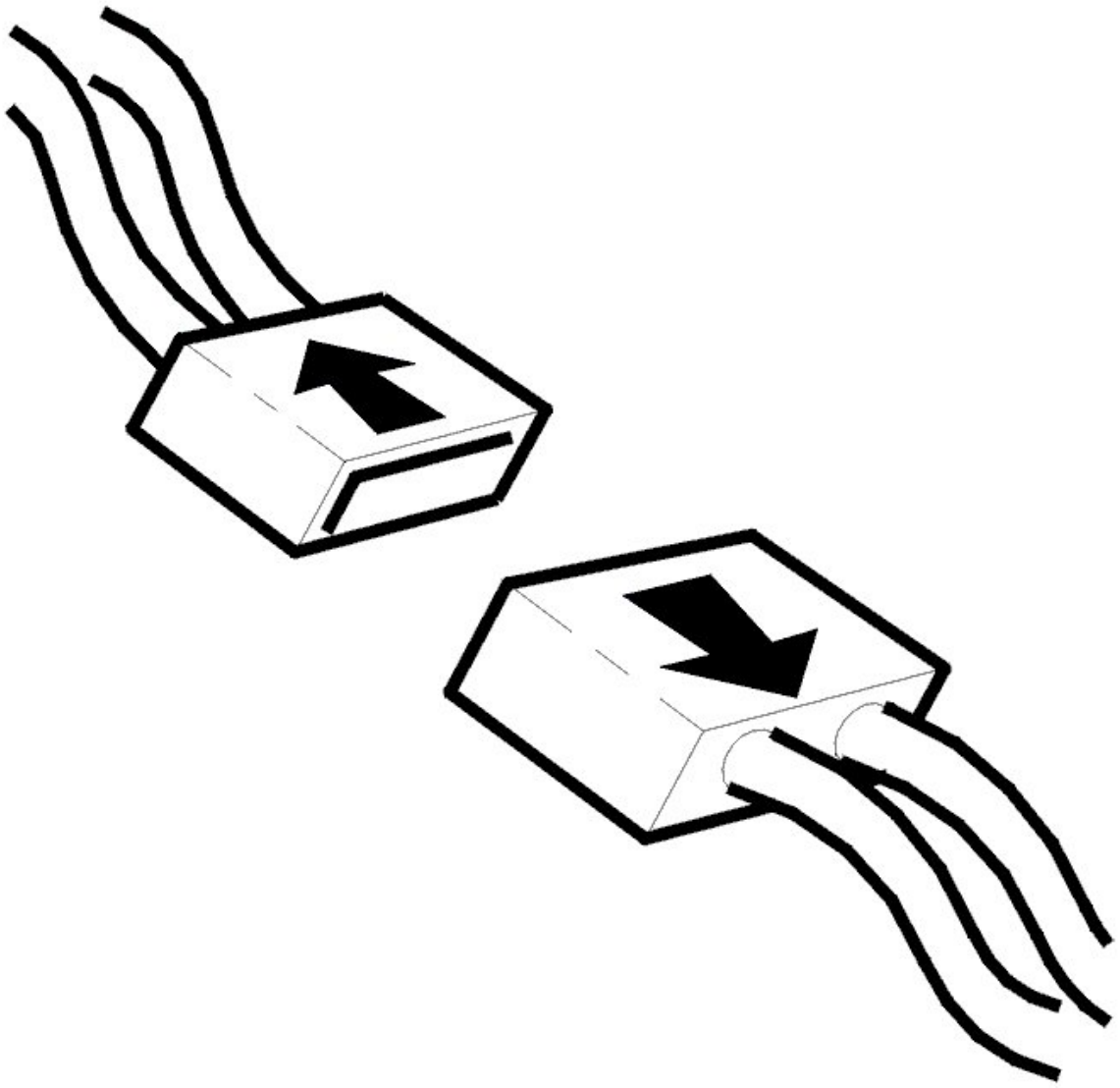
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

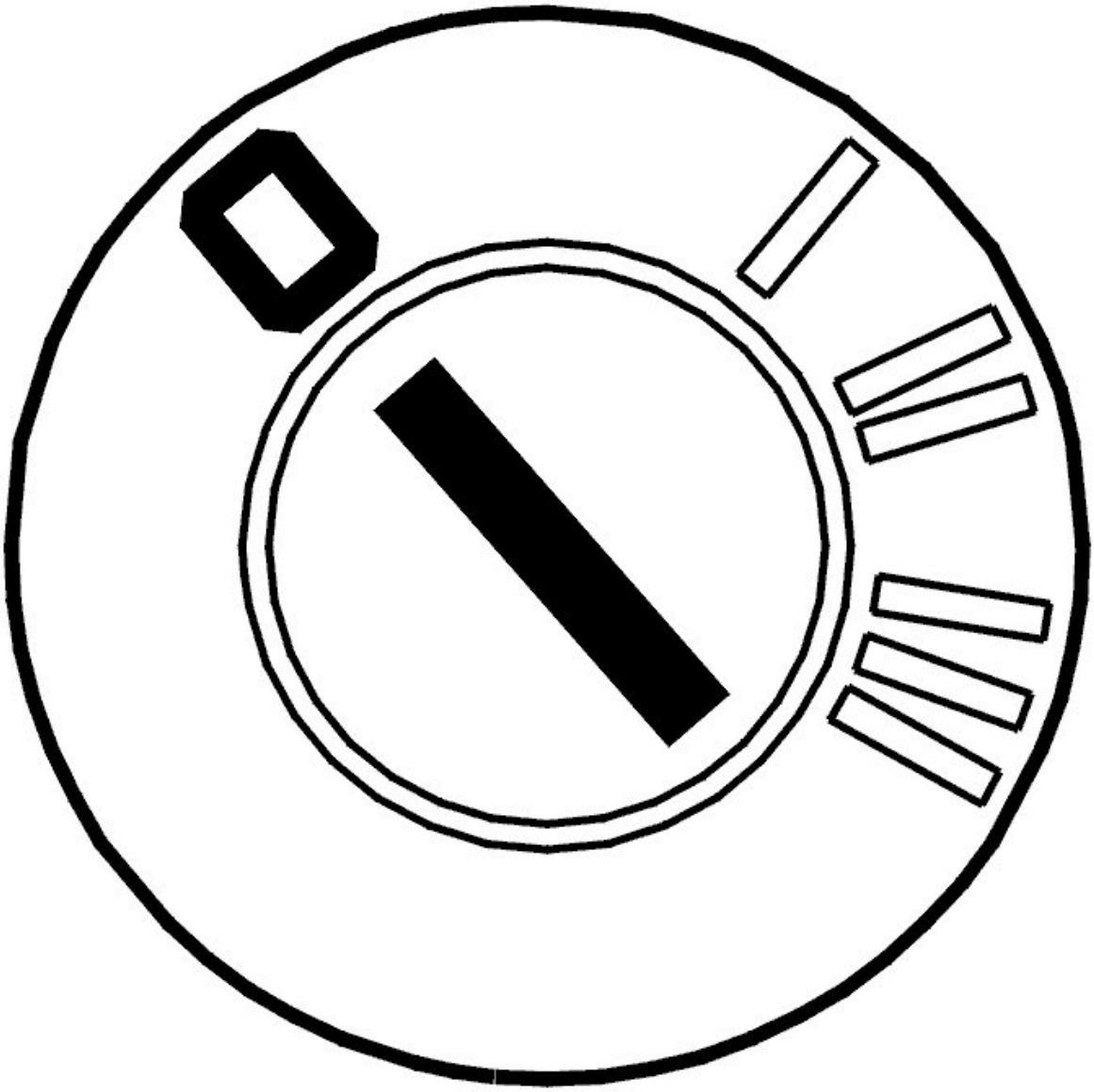
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

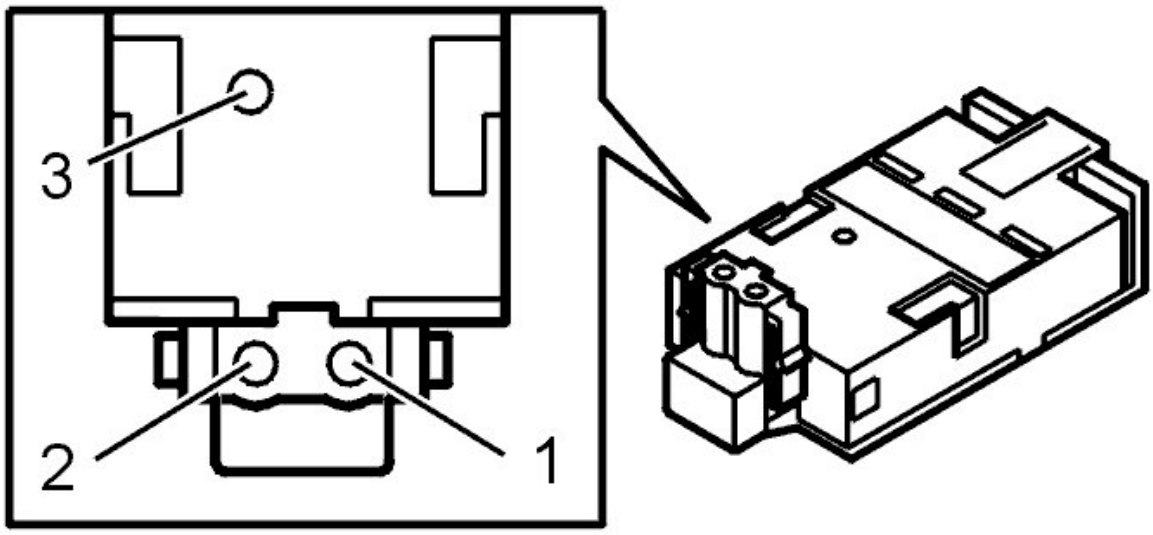
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

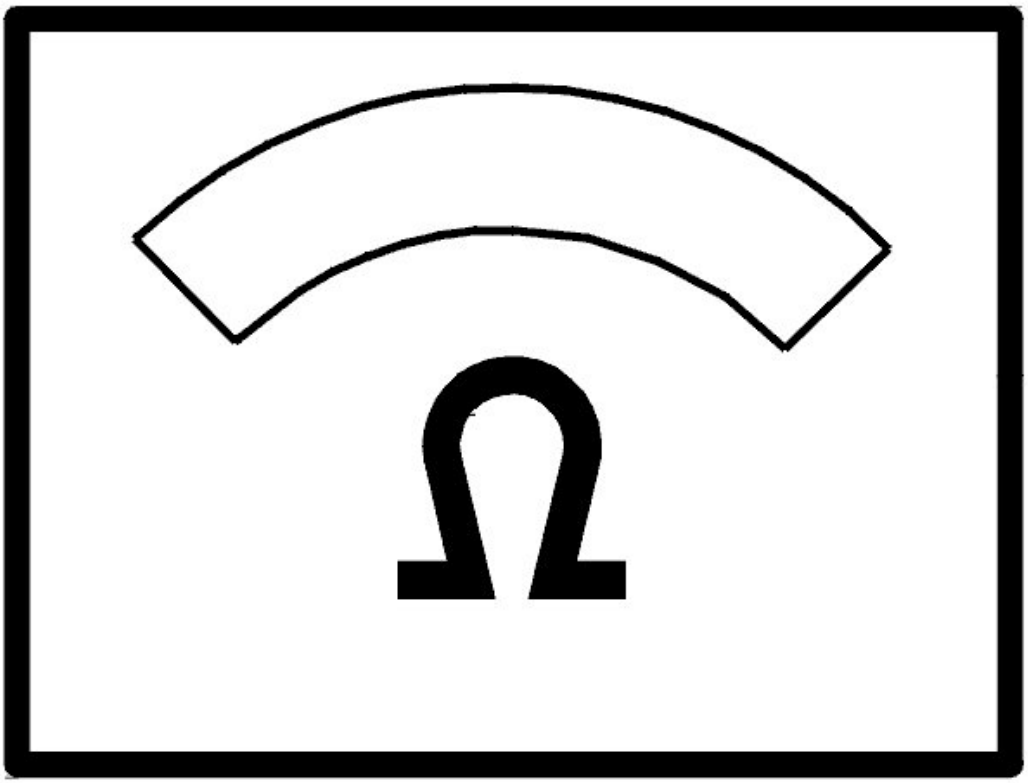
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

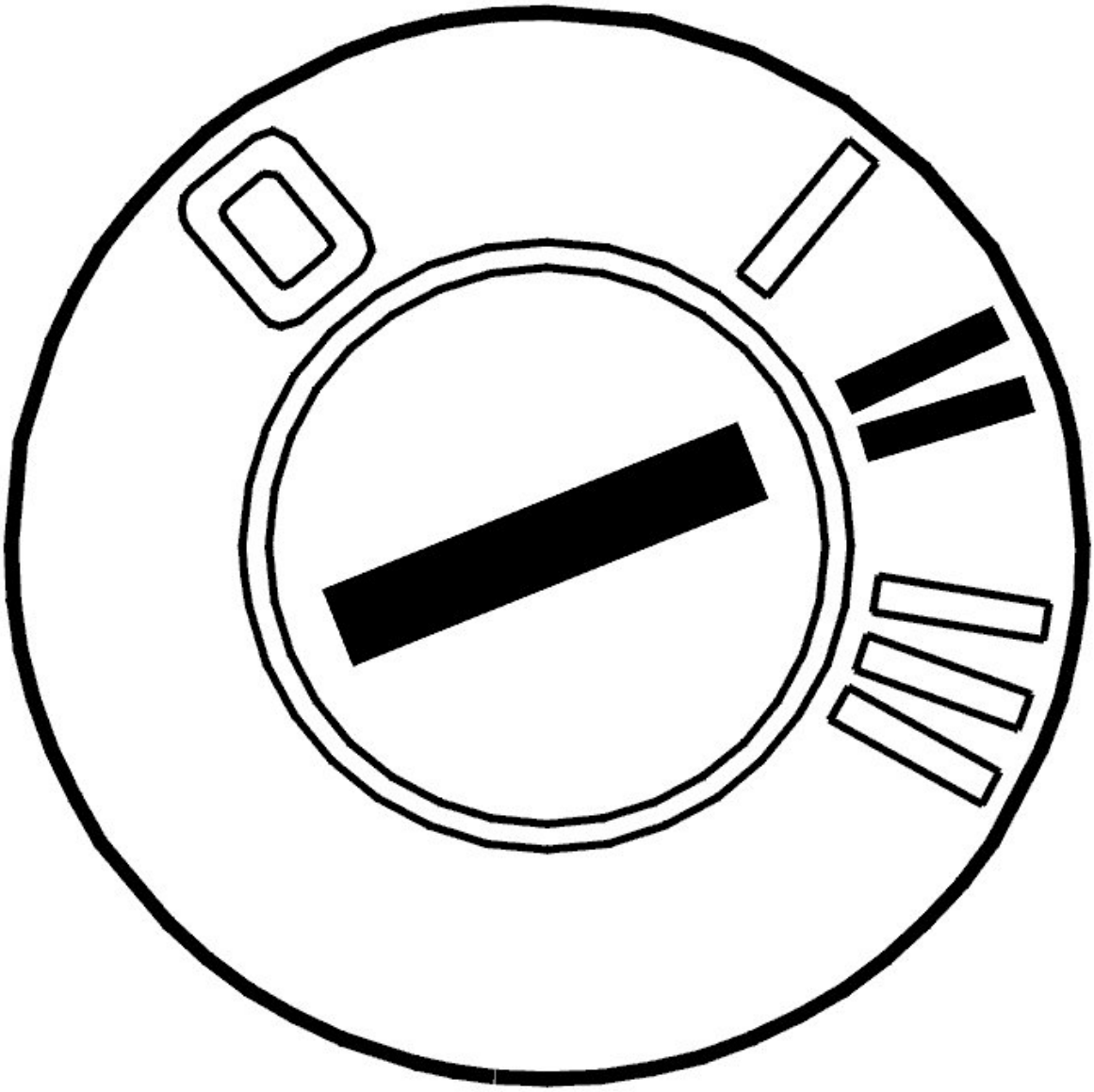
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

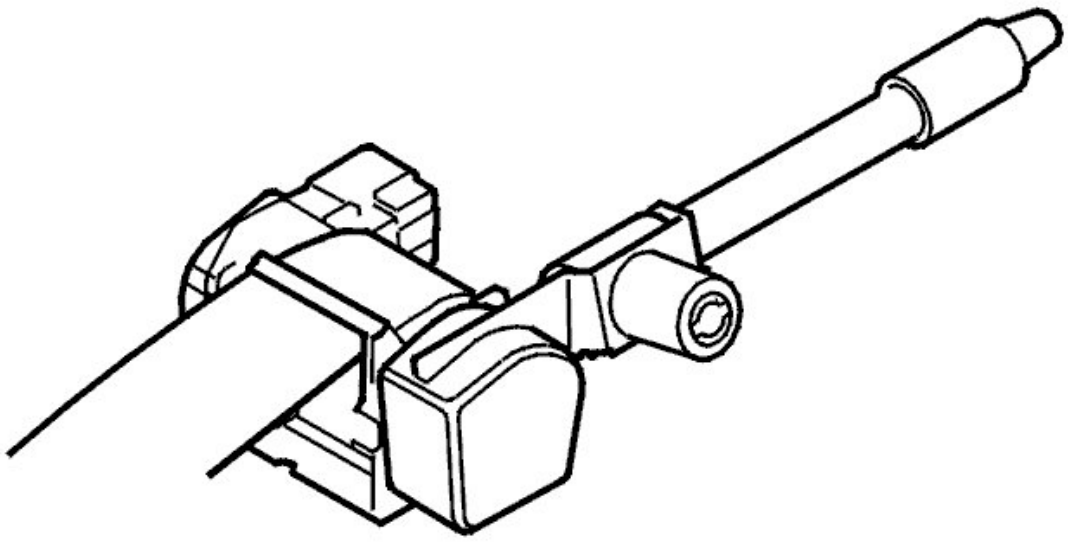
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information SRS-007C

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-007C is displayed.

Substitute value
- Nothing.

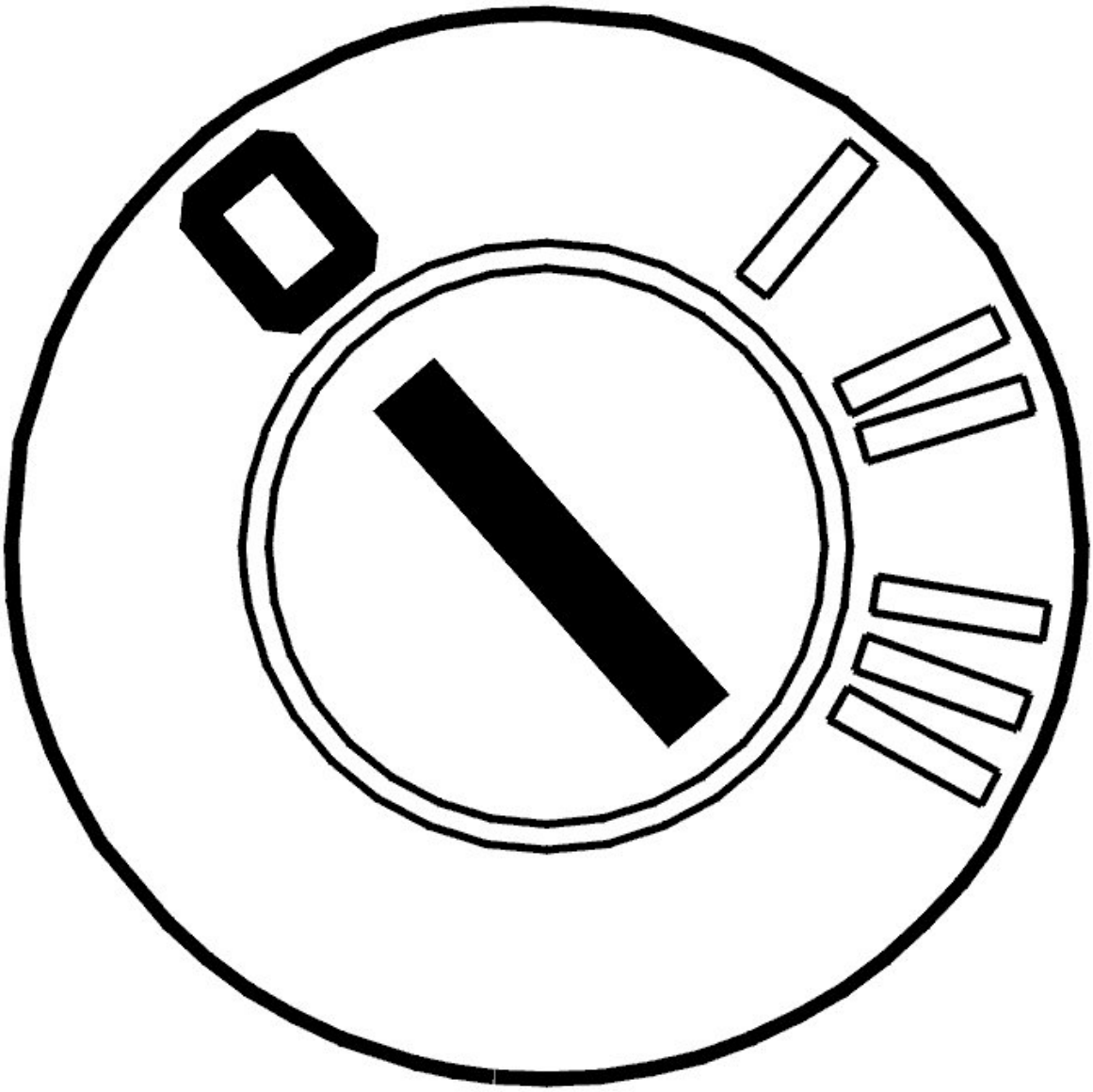
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

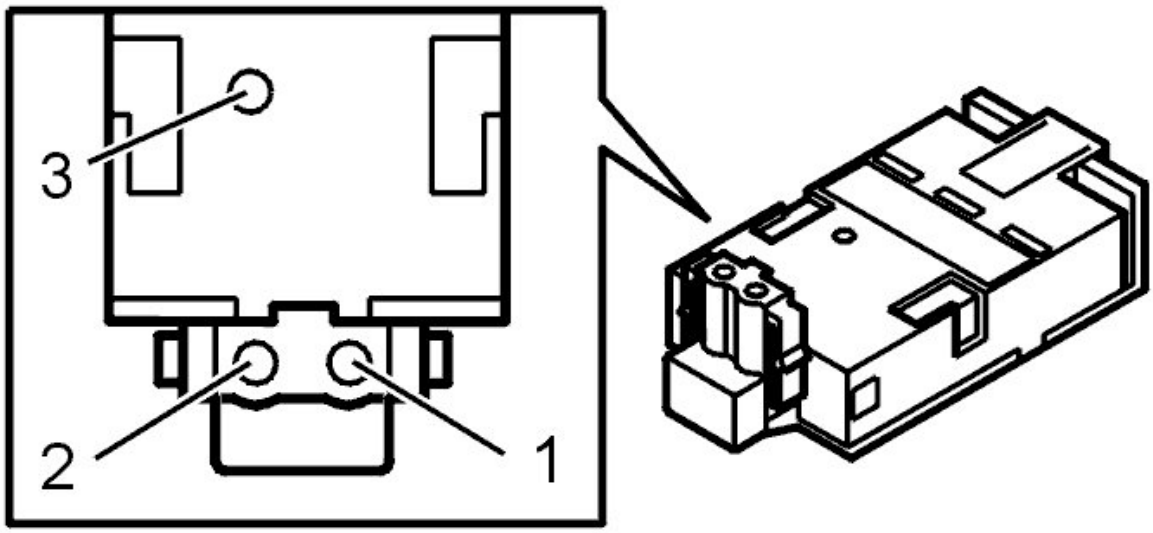
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

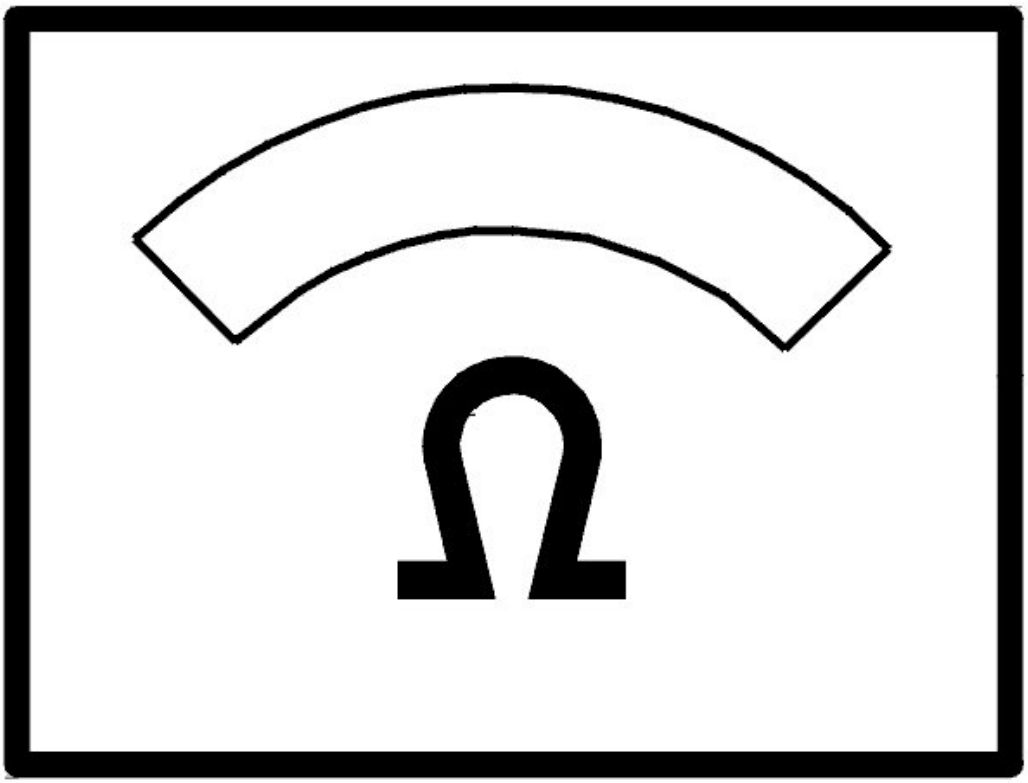
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

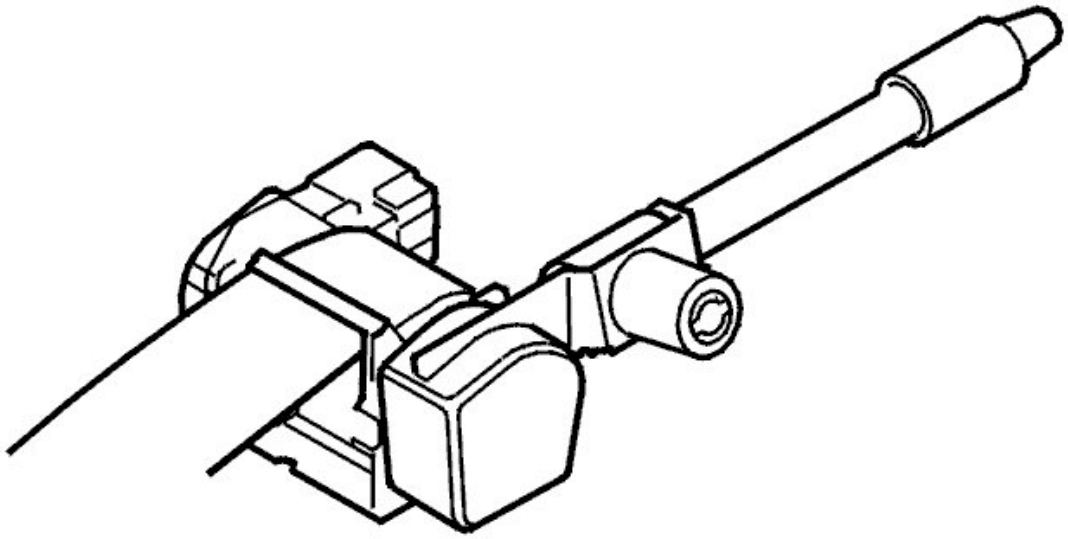
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-007D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-007D is displayed.

Substitute value
- Nothing.

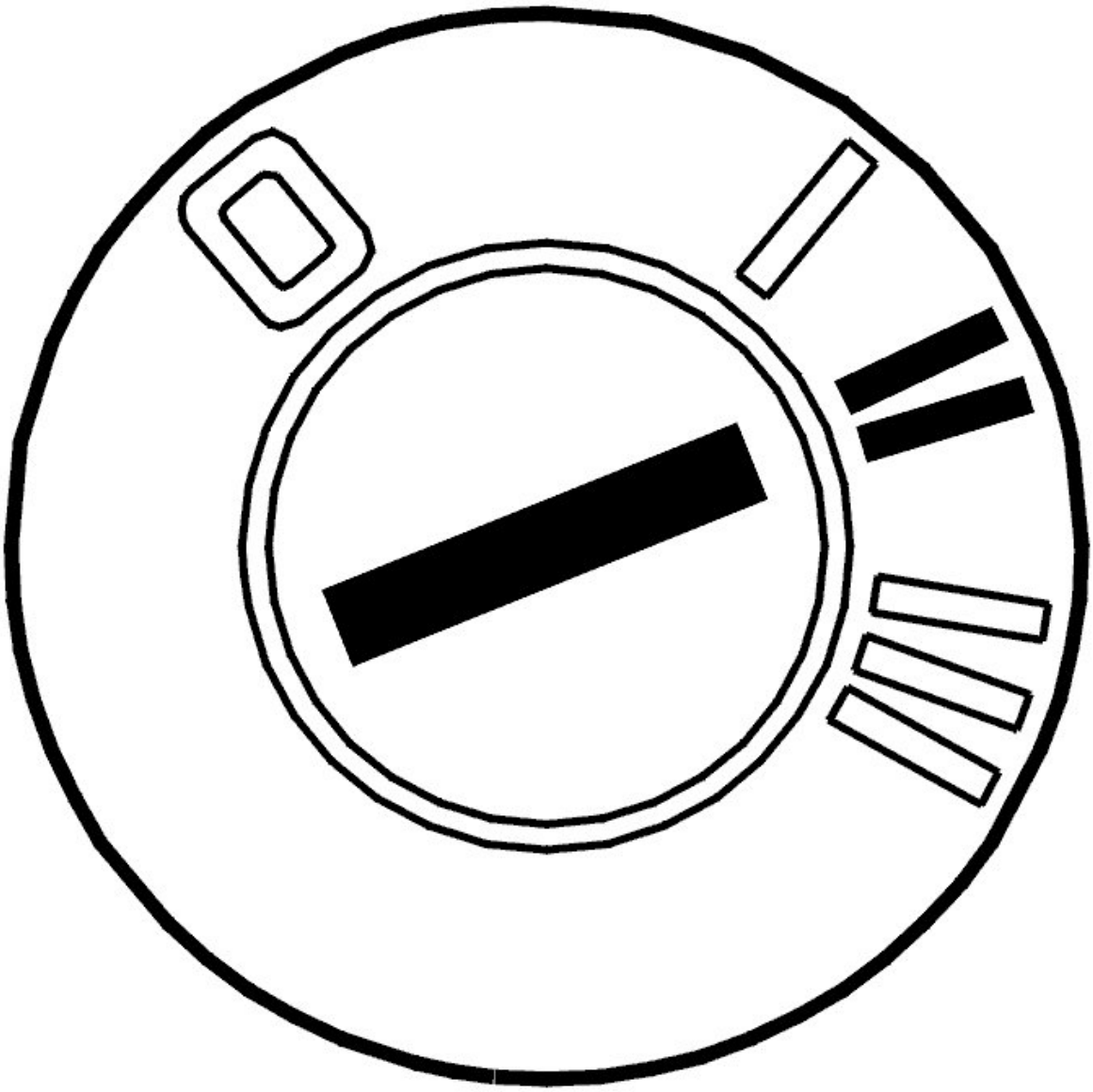
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

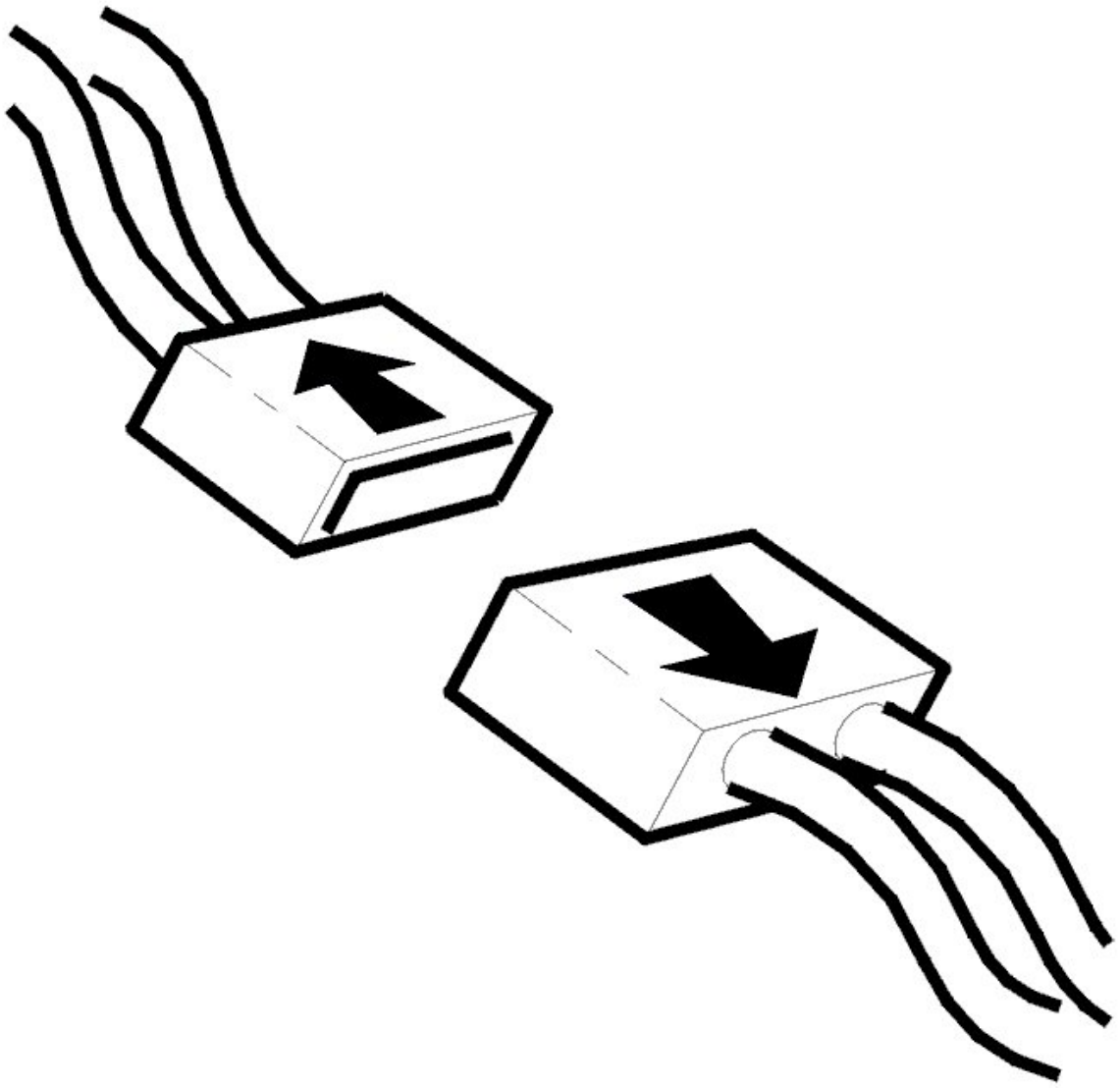
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

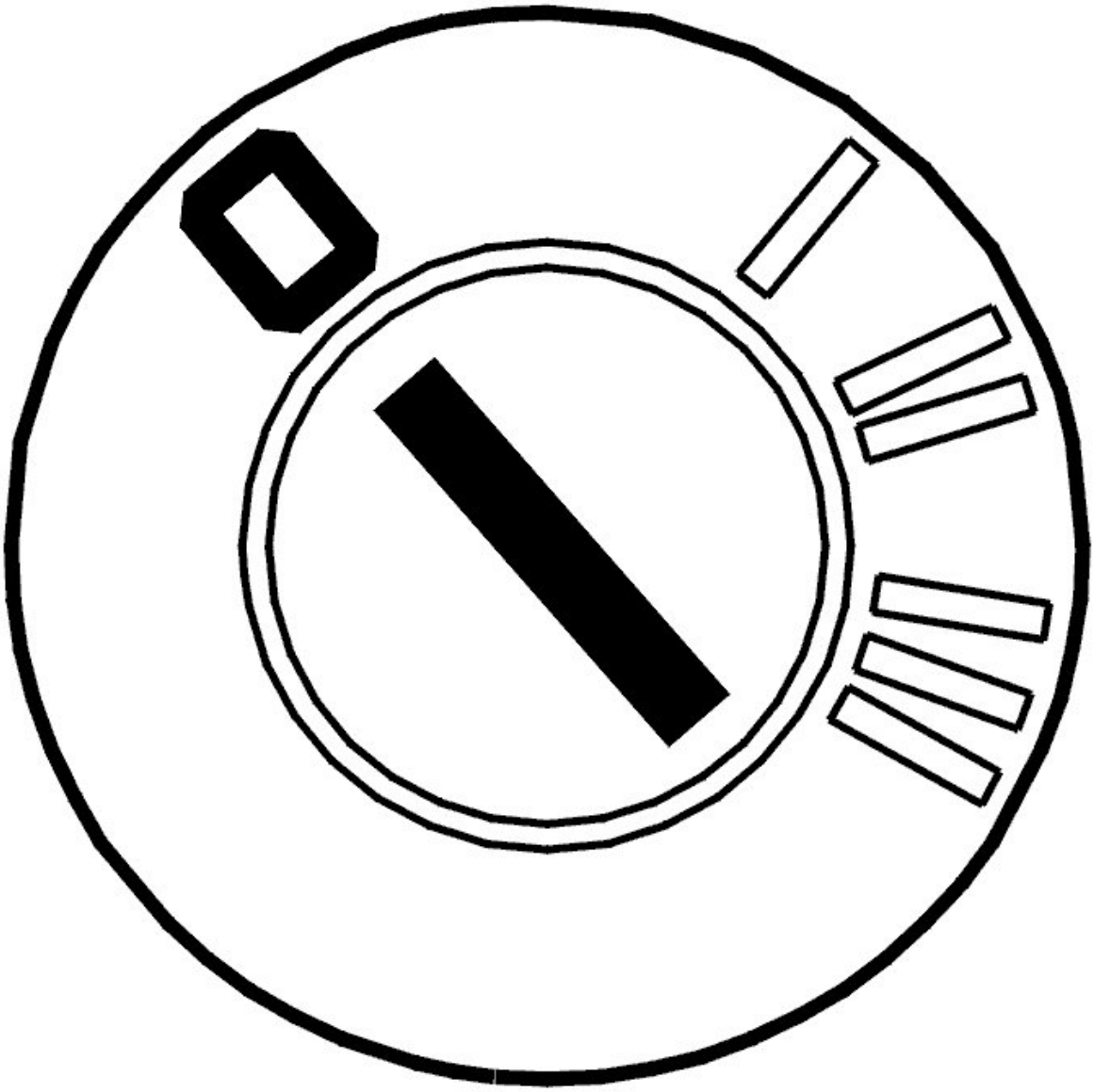
- To replace the front seat belt tensioner, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat. To replace the rear seat belt tensioner, see Buckle seat belt rear, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Buckle Seat Belt Rear, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

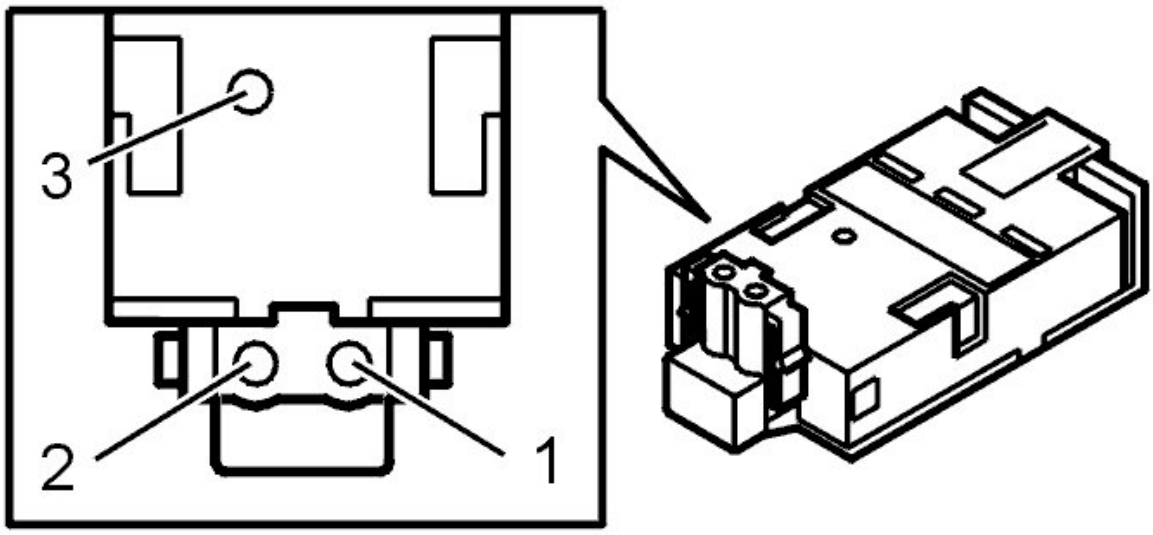
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

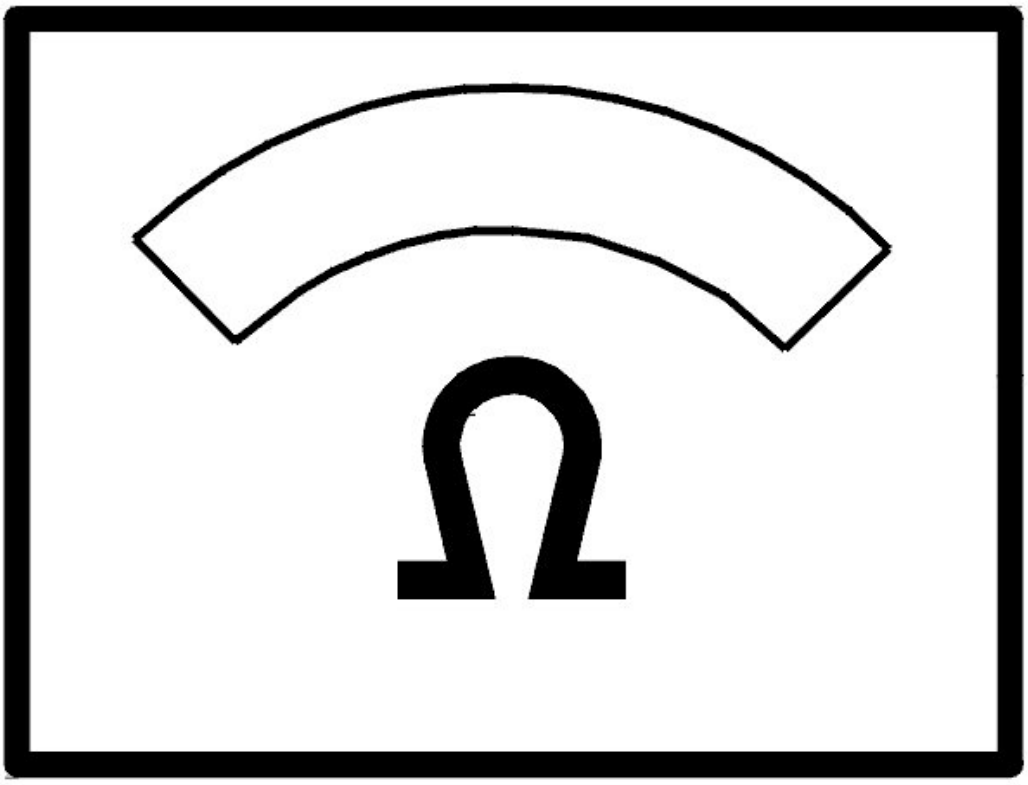
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

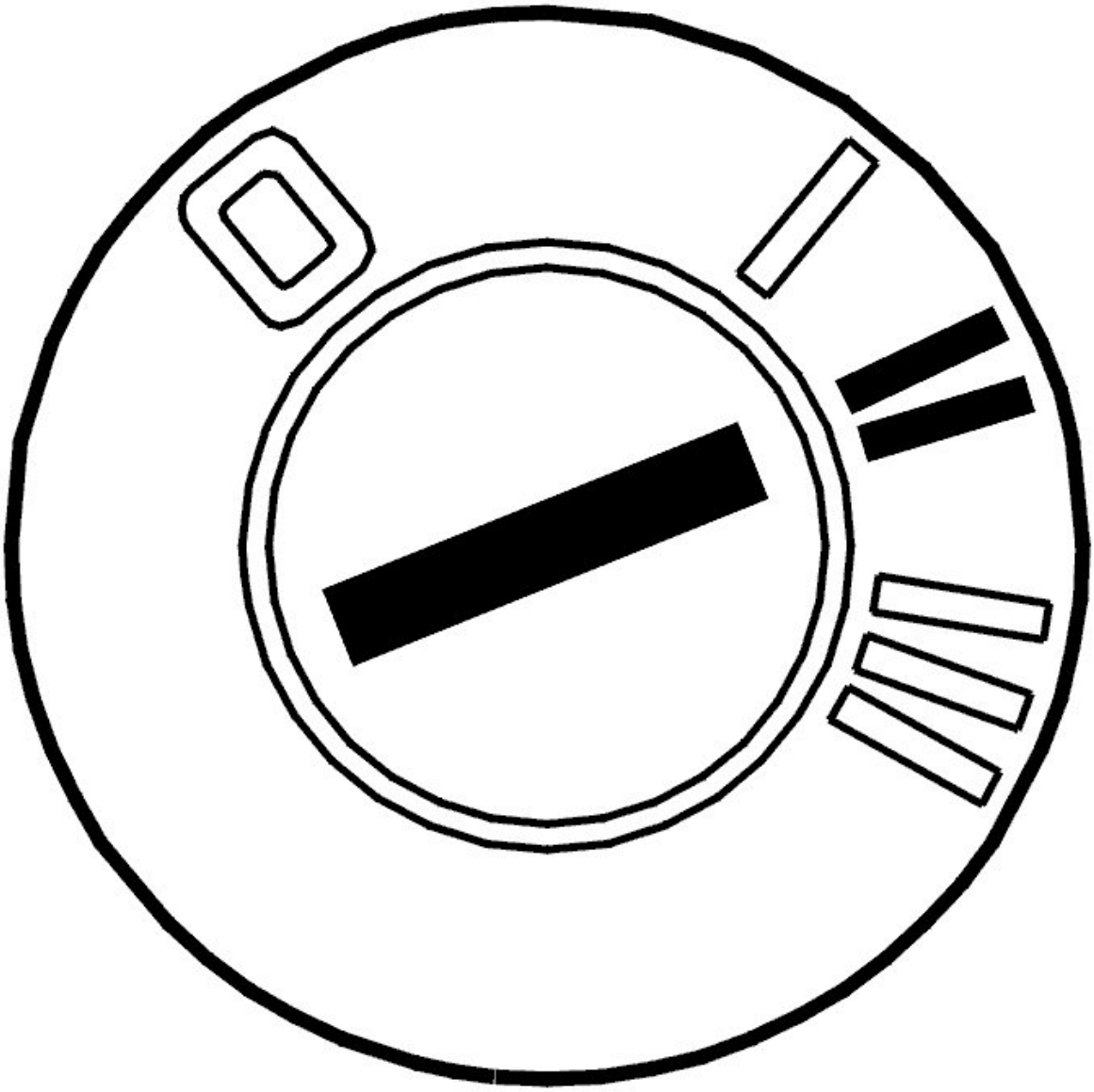
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

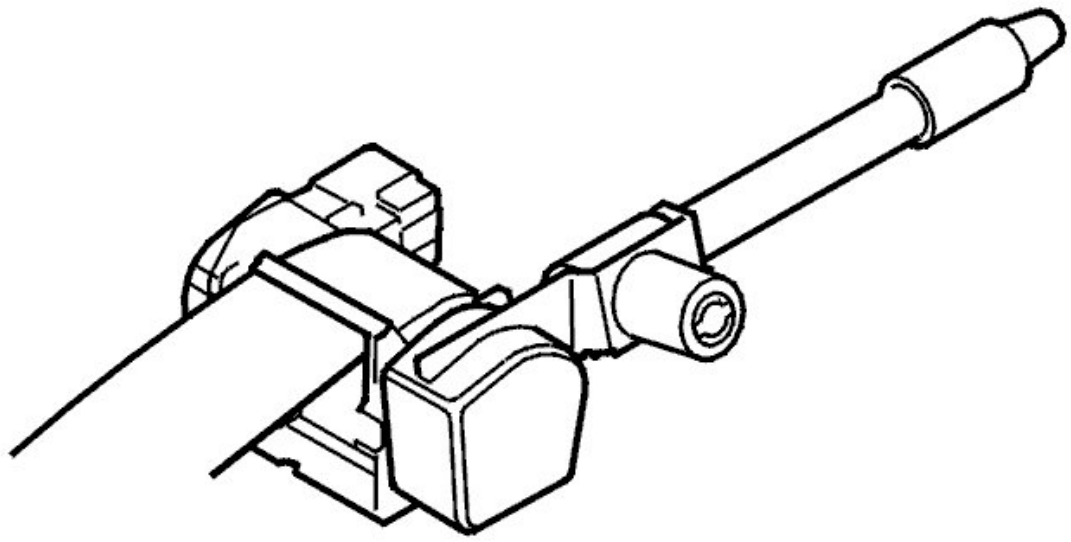
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-007D Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-007D is displayed.

Substitute value
- Nothing.

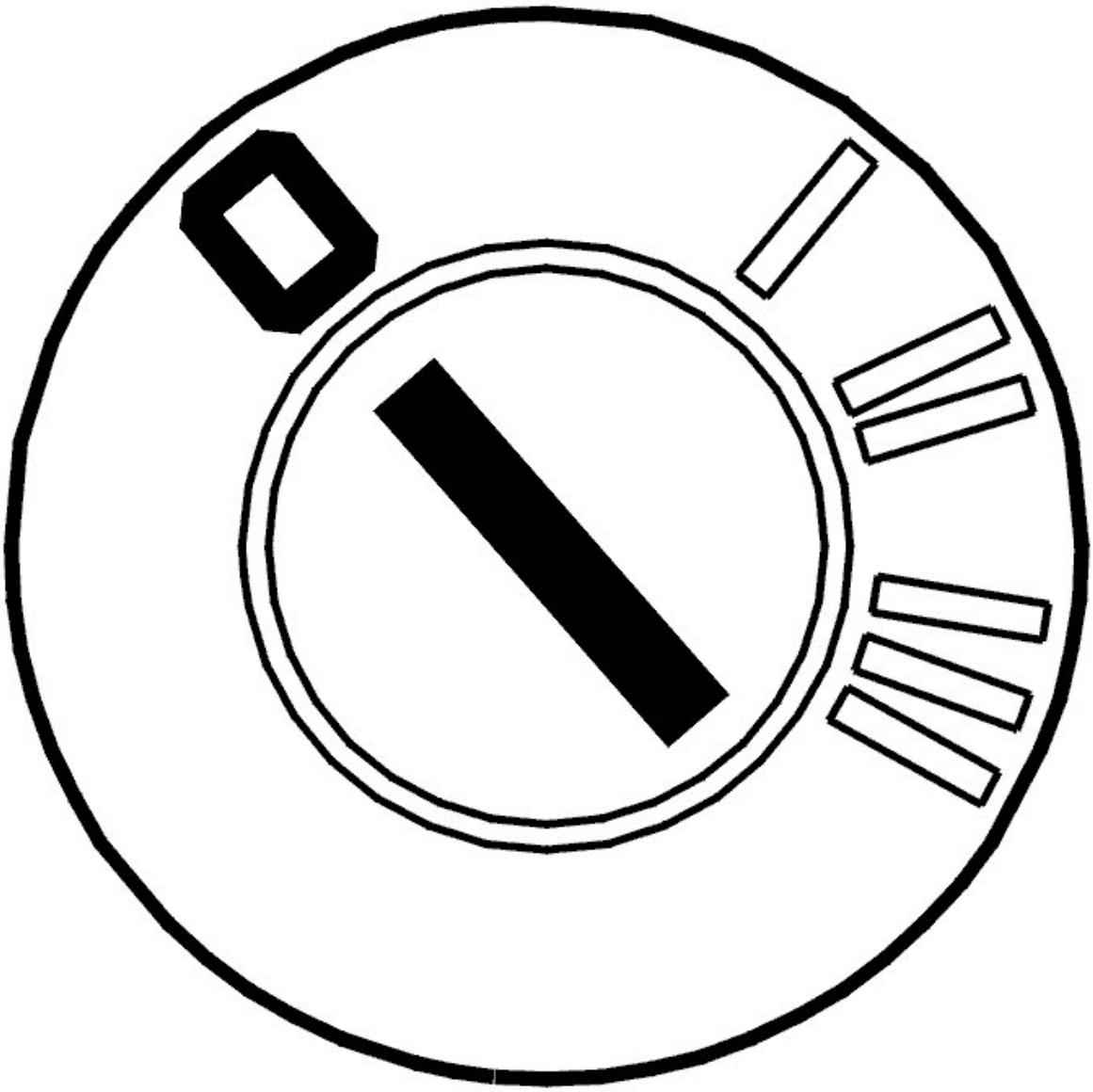
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

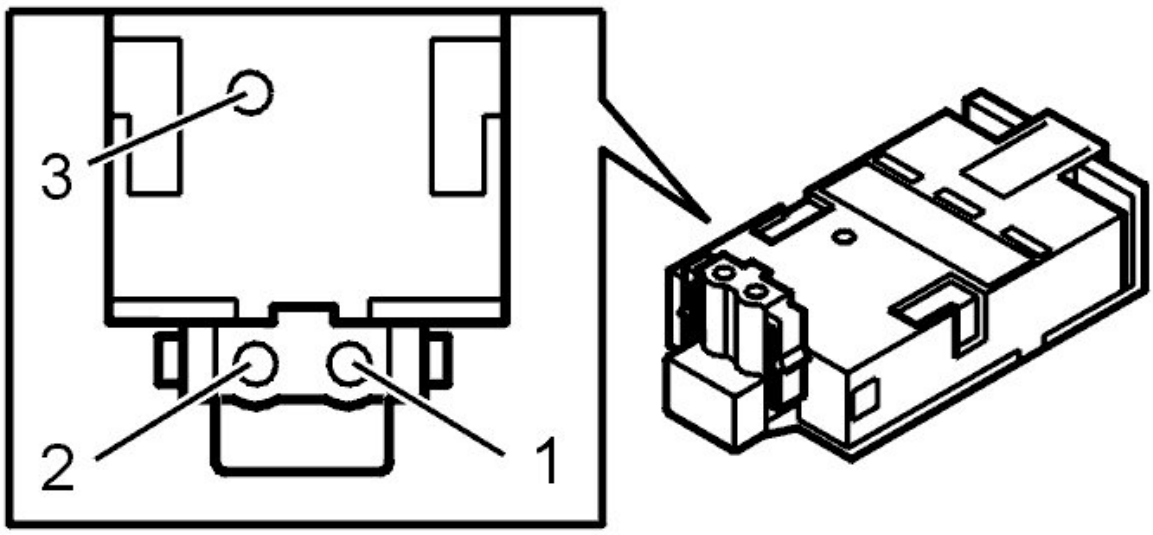
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

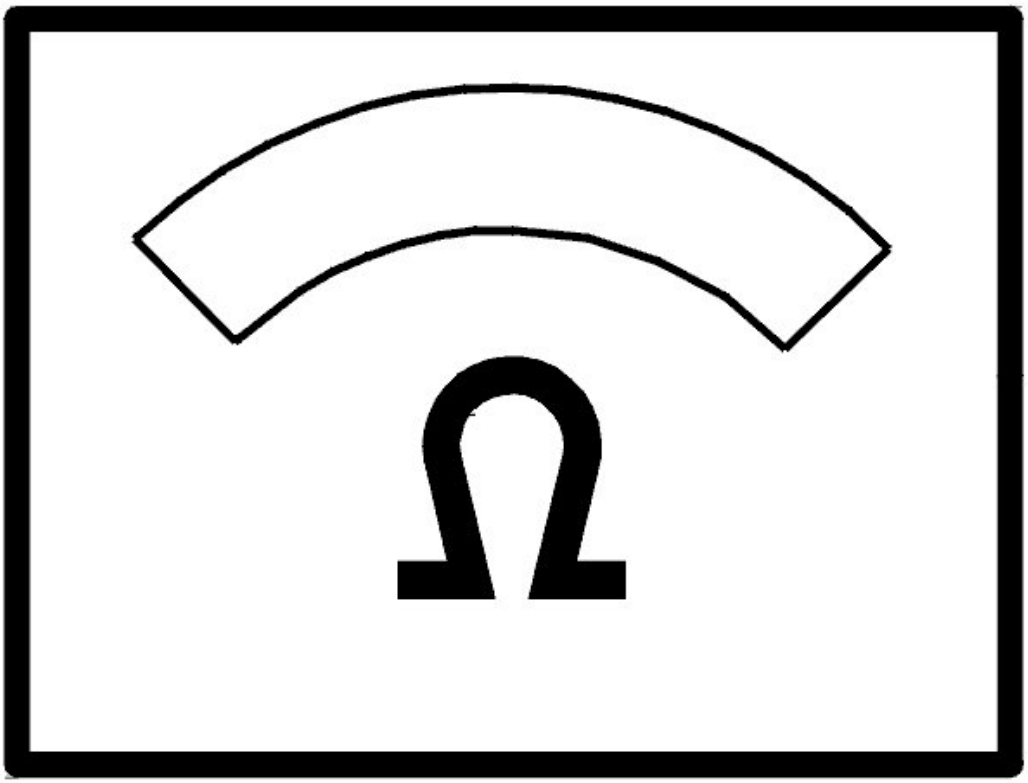
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

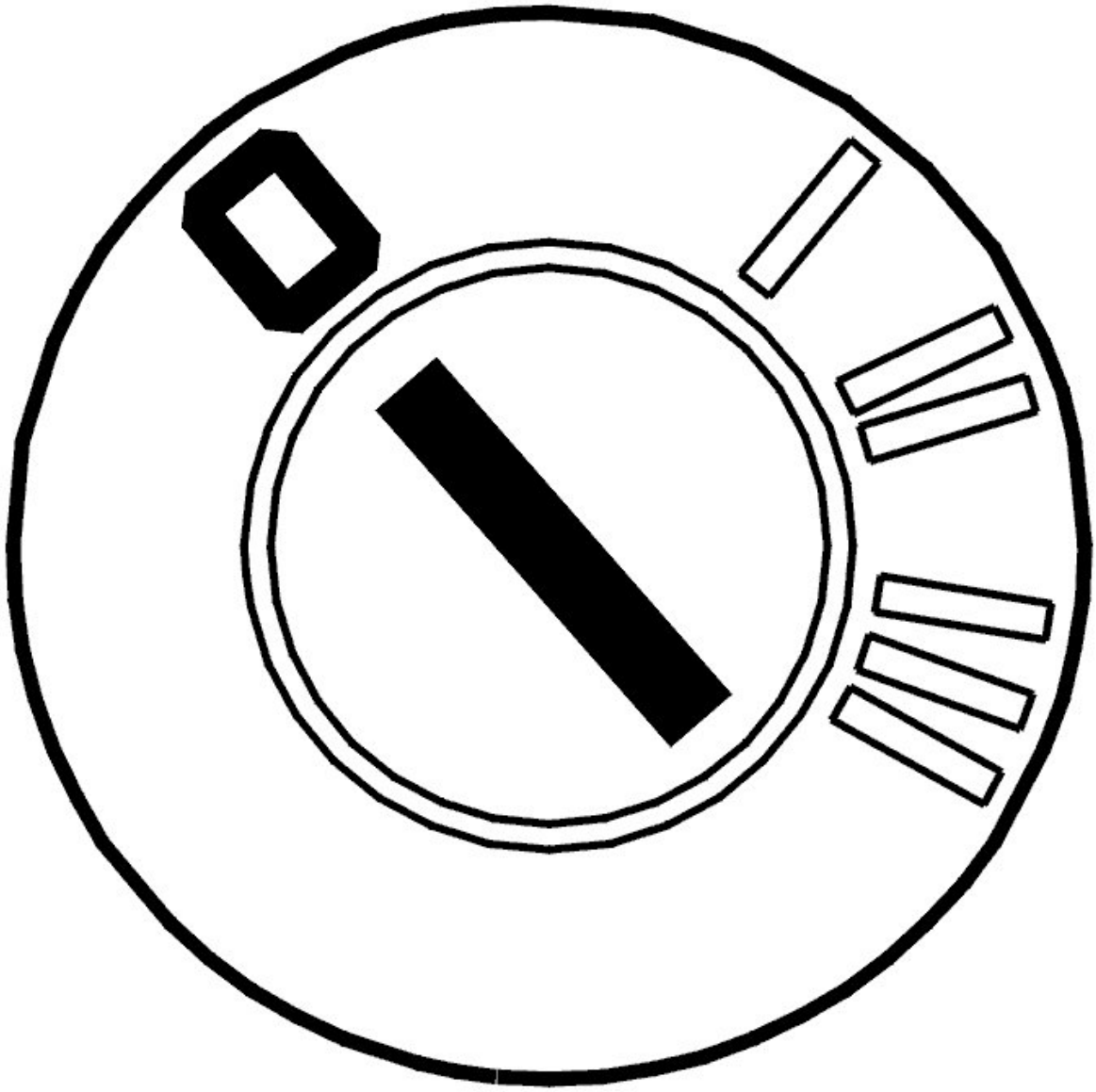
Fault symptom[s]

Orange general warning lamp is on.

Configuration Fault

Configuration fault. Permanent fault

Checking the component



- Ignition off.

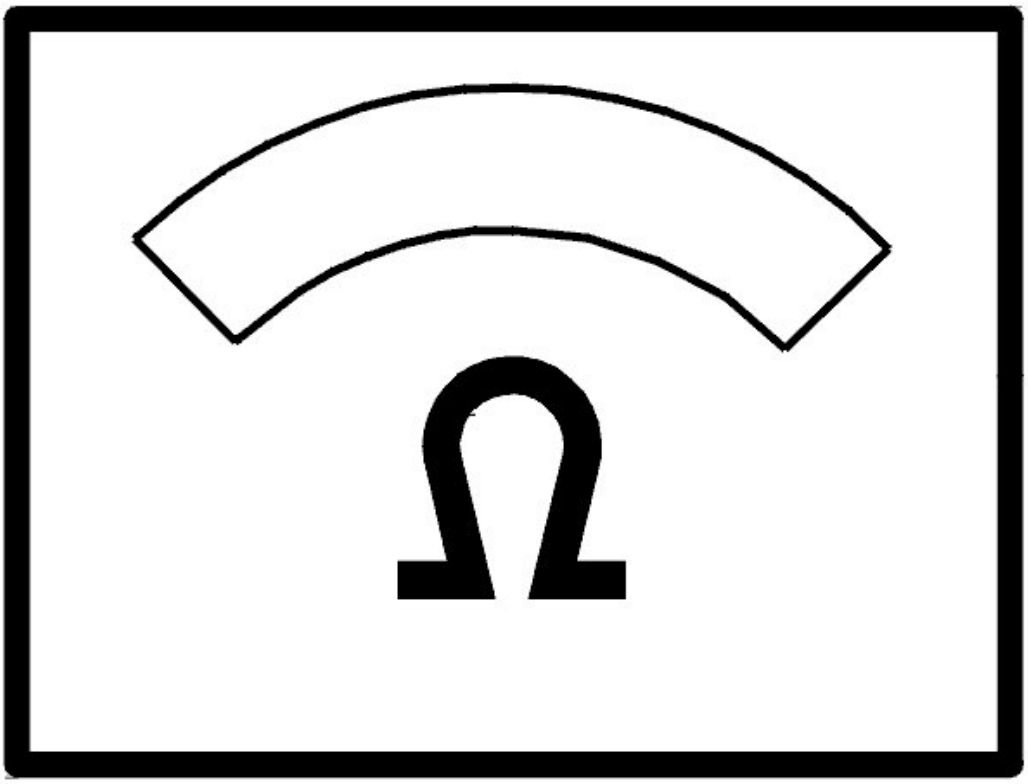
Check that the wiring from the seat belt tensioners is correctly connected to the control module.
Check that nothing in the connector connected to the control module or in the control module connector is short-circuited.
Replace the control module if no fault is found.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and

Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

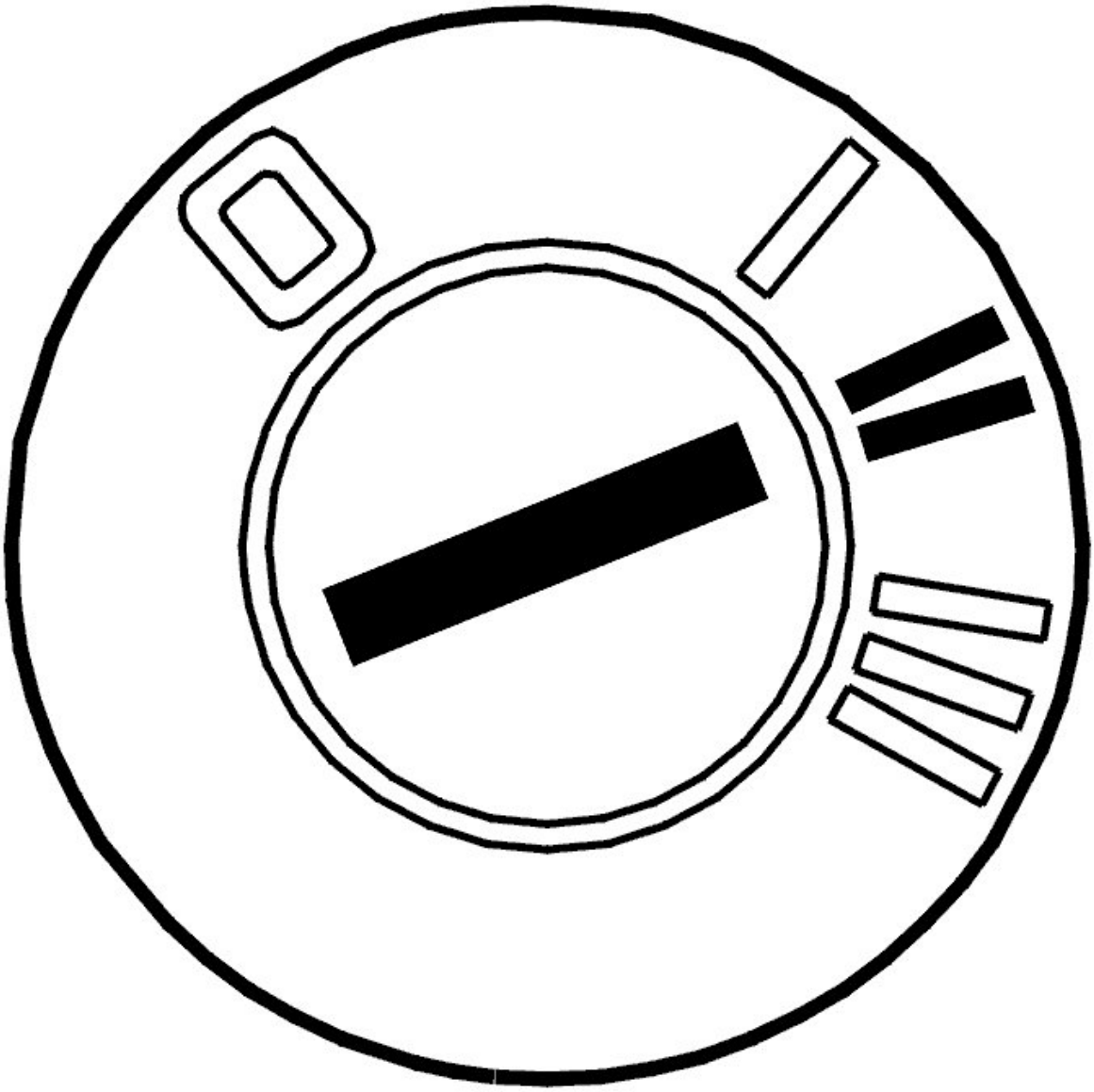
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

Fault symptom[s]

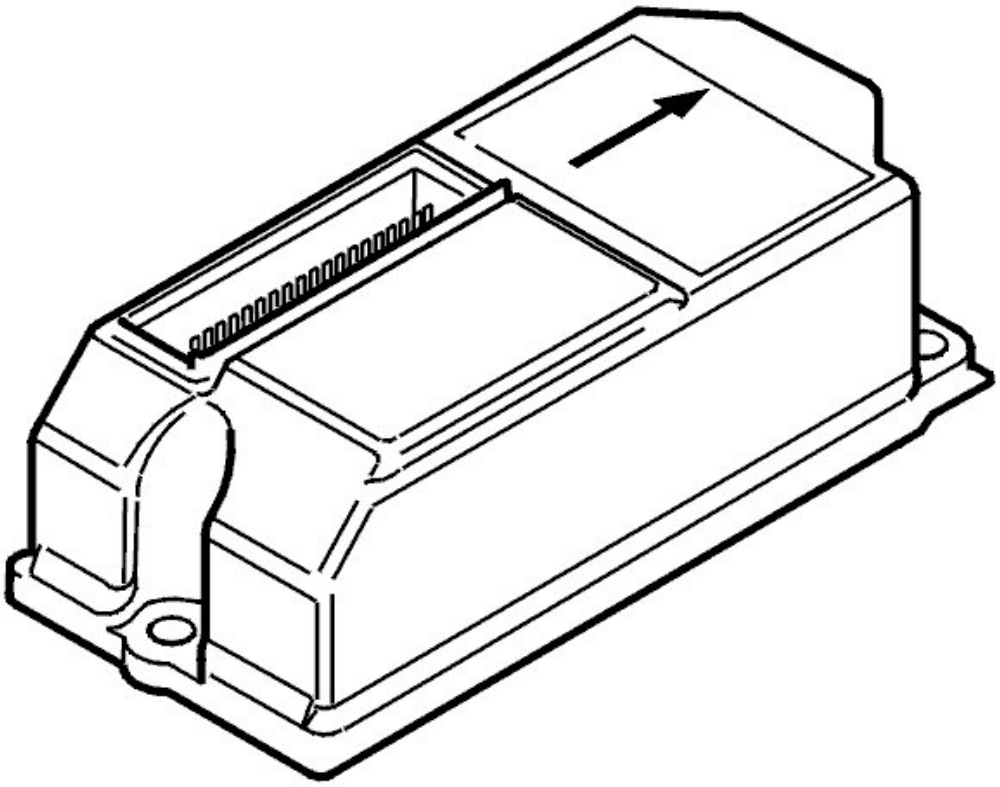
Orange general warning lamp is on.

Configuration fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

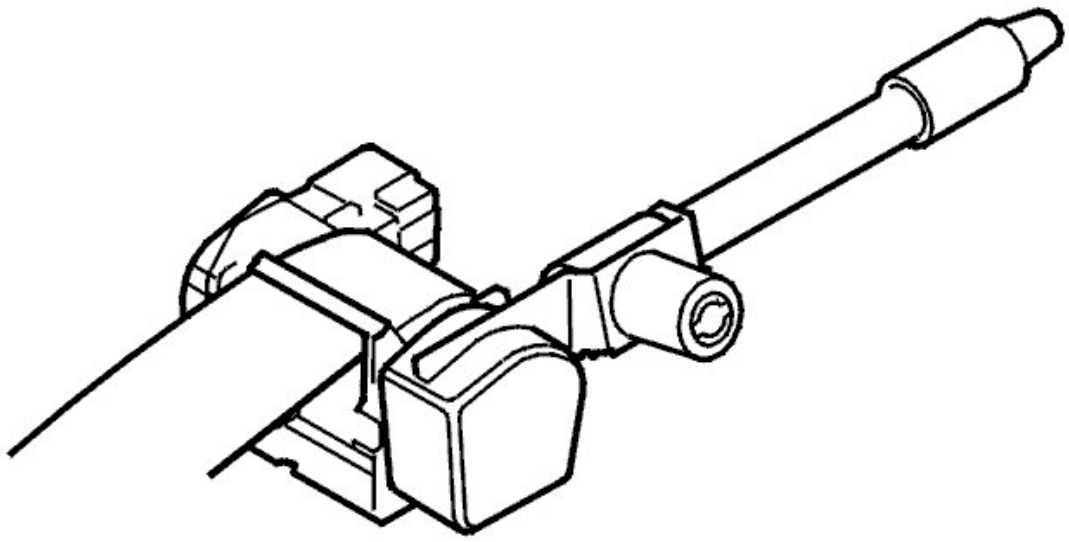
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0080 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0080 is displayed.

Substitute value
- Nothing.

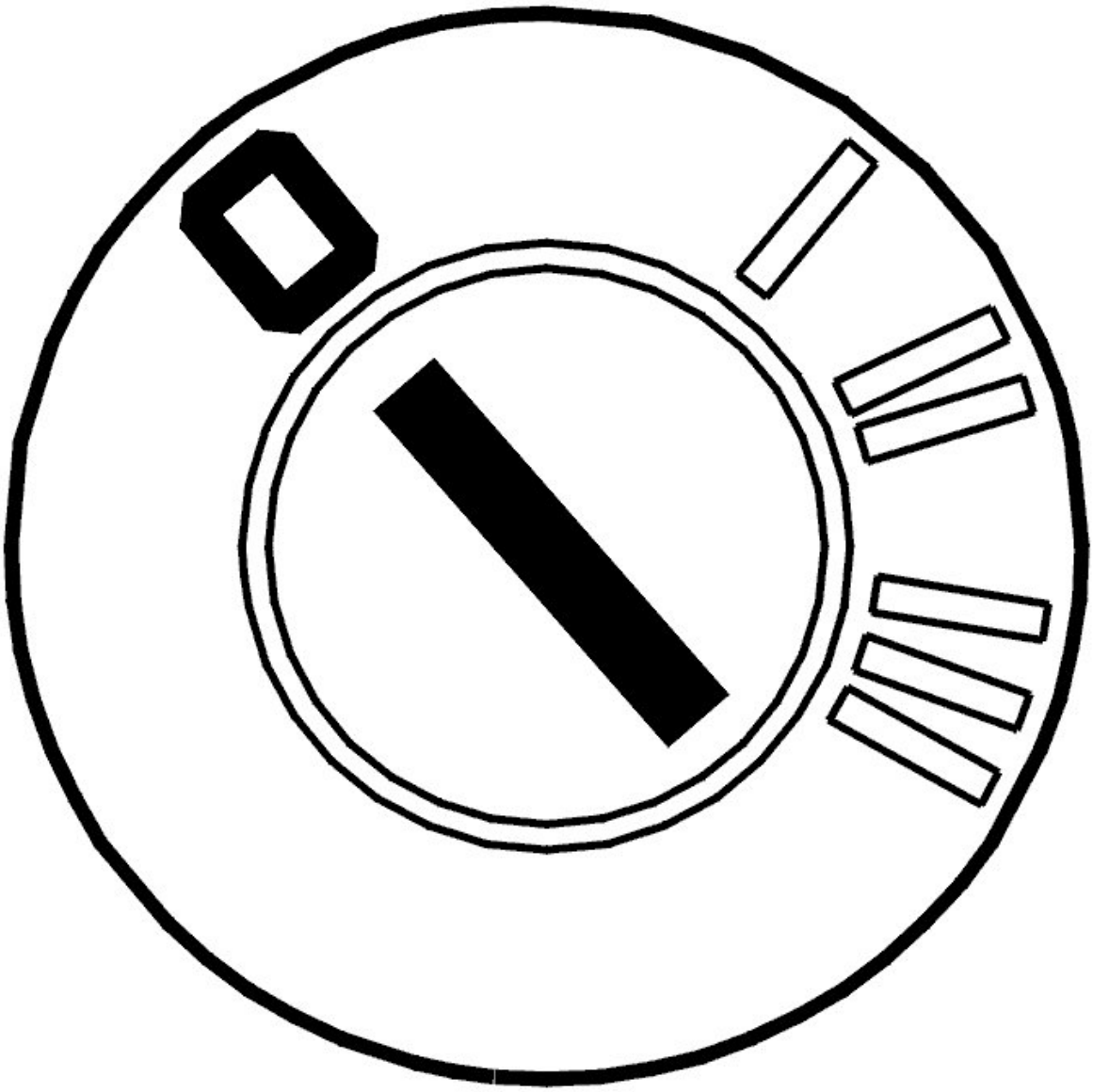
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in seat-belt tensioner
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

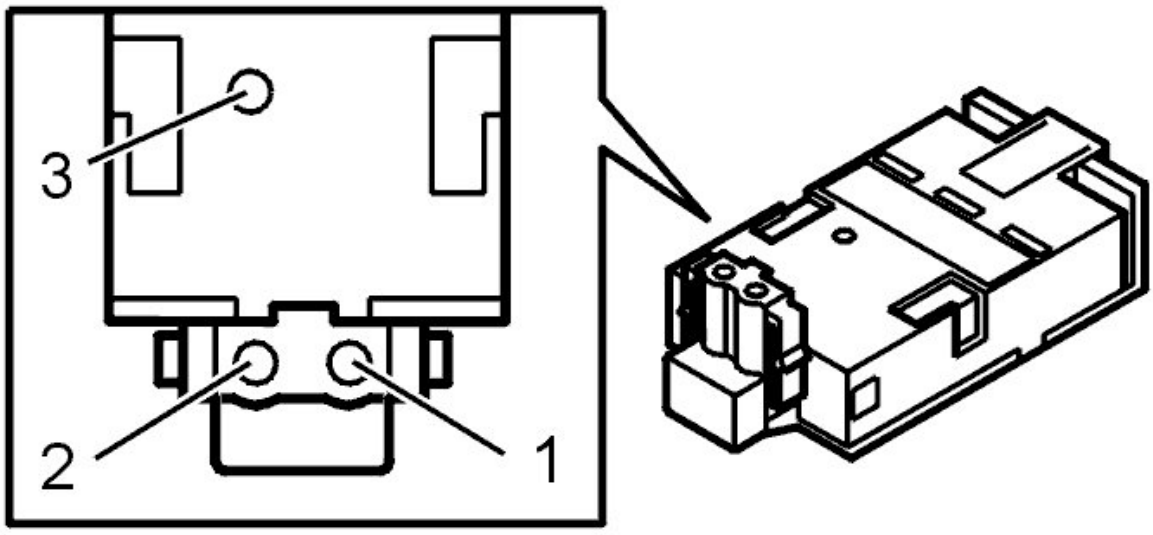
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

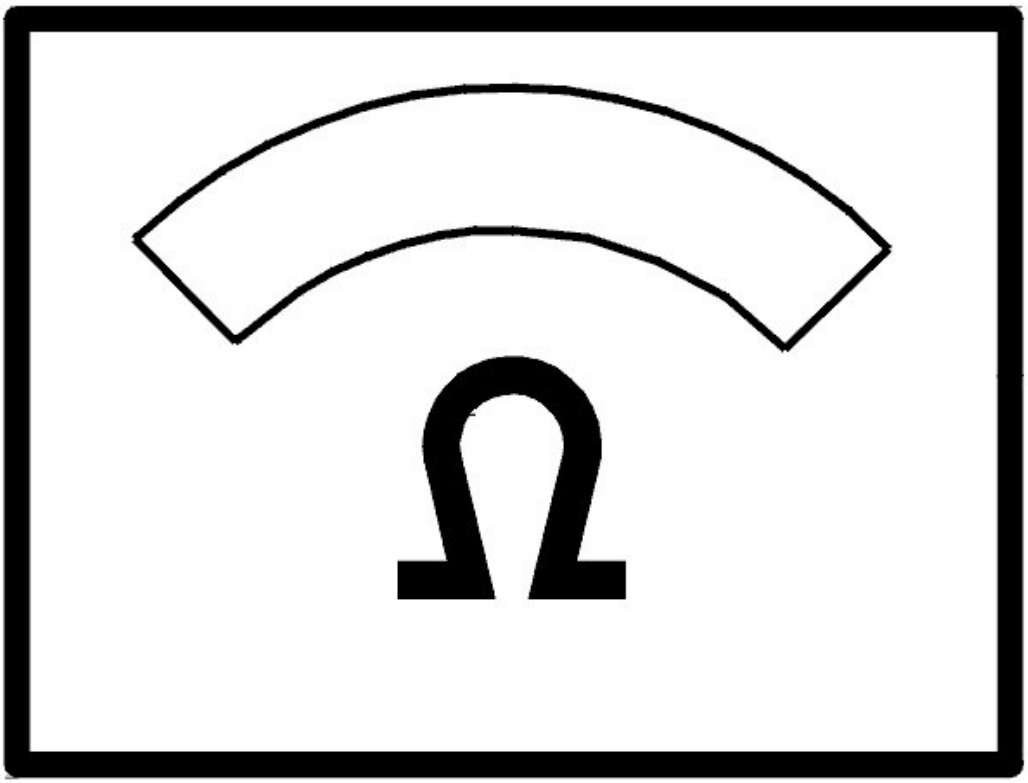
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminal #1, terminal #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

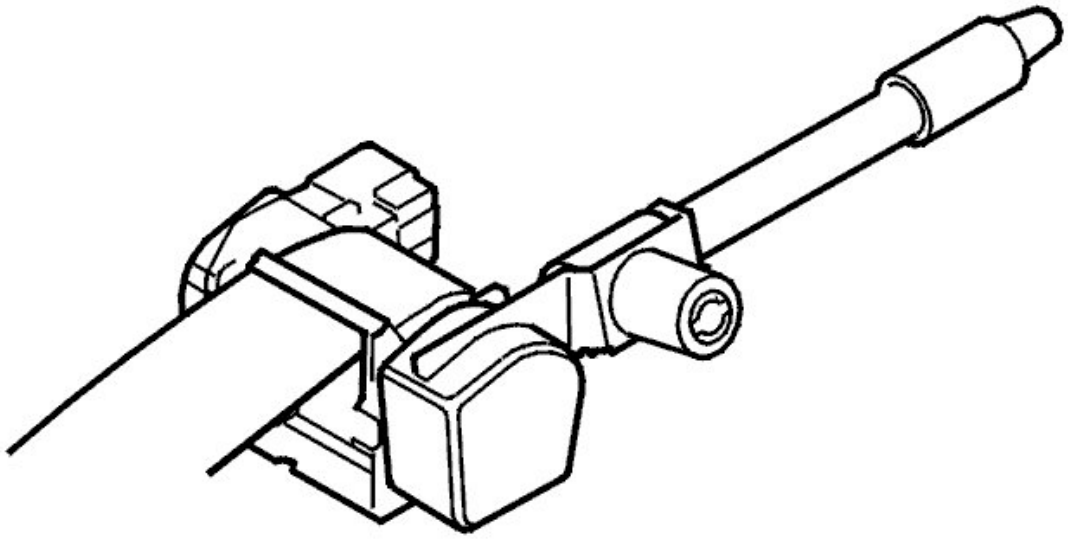
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0080 Diagnostic trouble code information

Condition



If the circuit voltage is too high for more than 10 seconds, diagnostic trouble code SRS-0080 is displayed.

Substitute value
- Nothing.

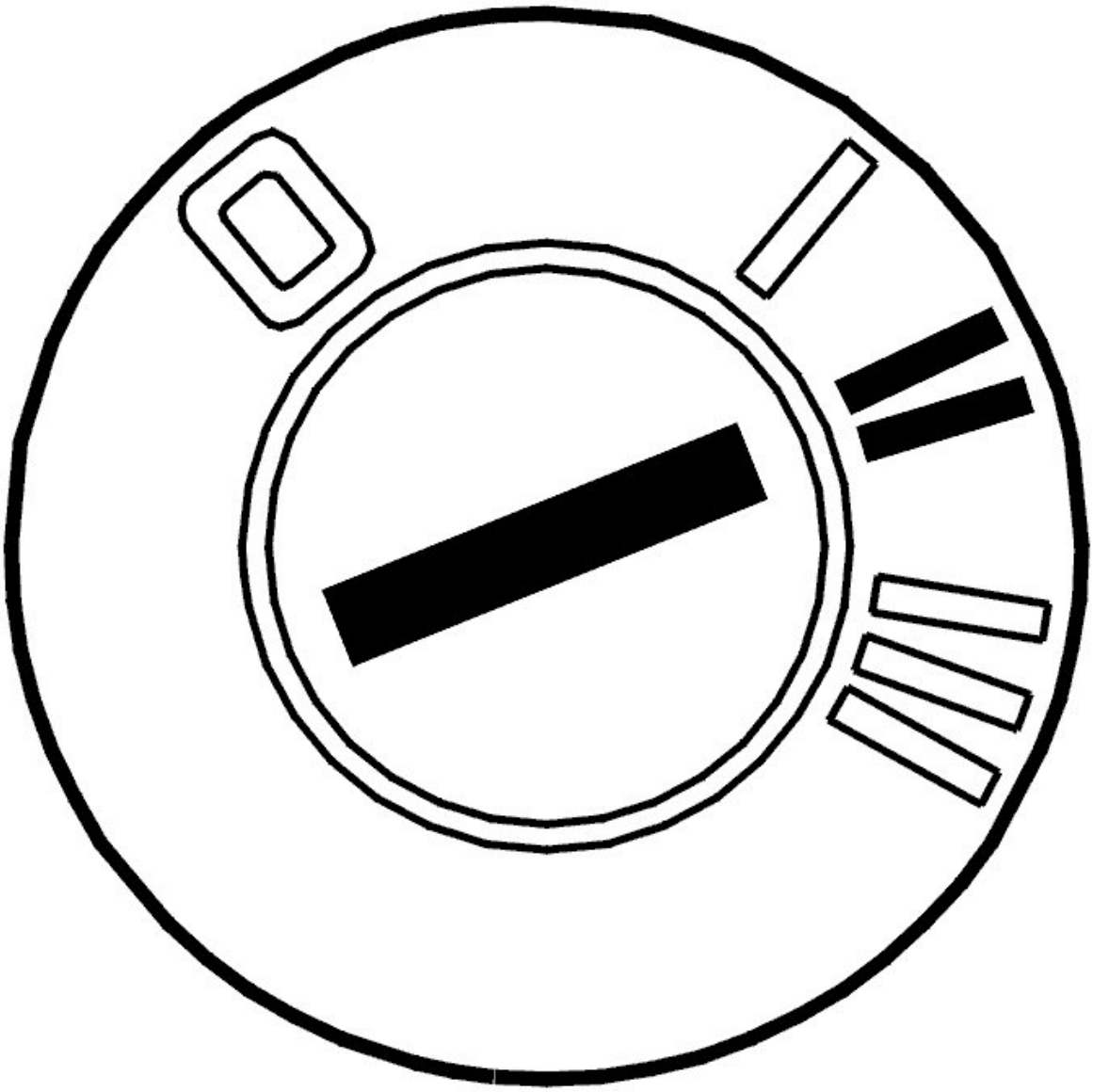
Possible source
- Short circuit to voltage supply in connector
- Short circuit to voltage supply in seat-belt tensioner
- Short circuit to voltage supply in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

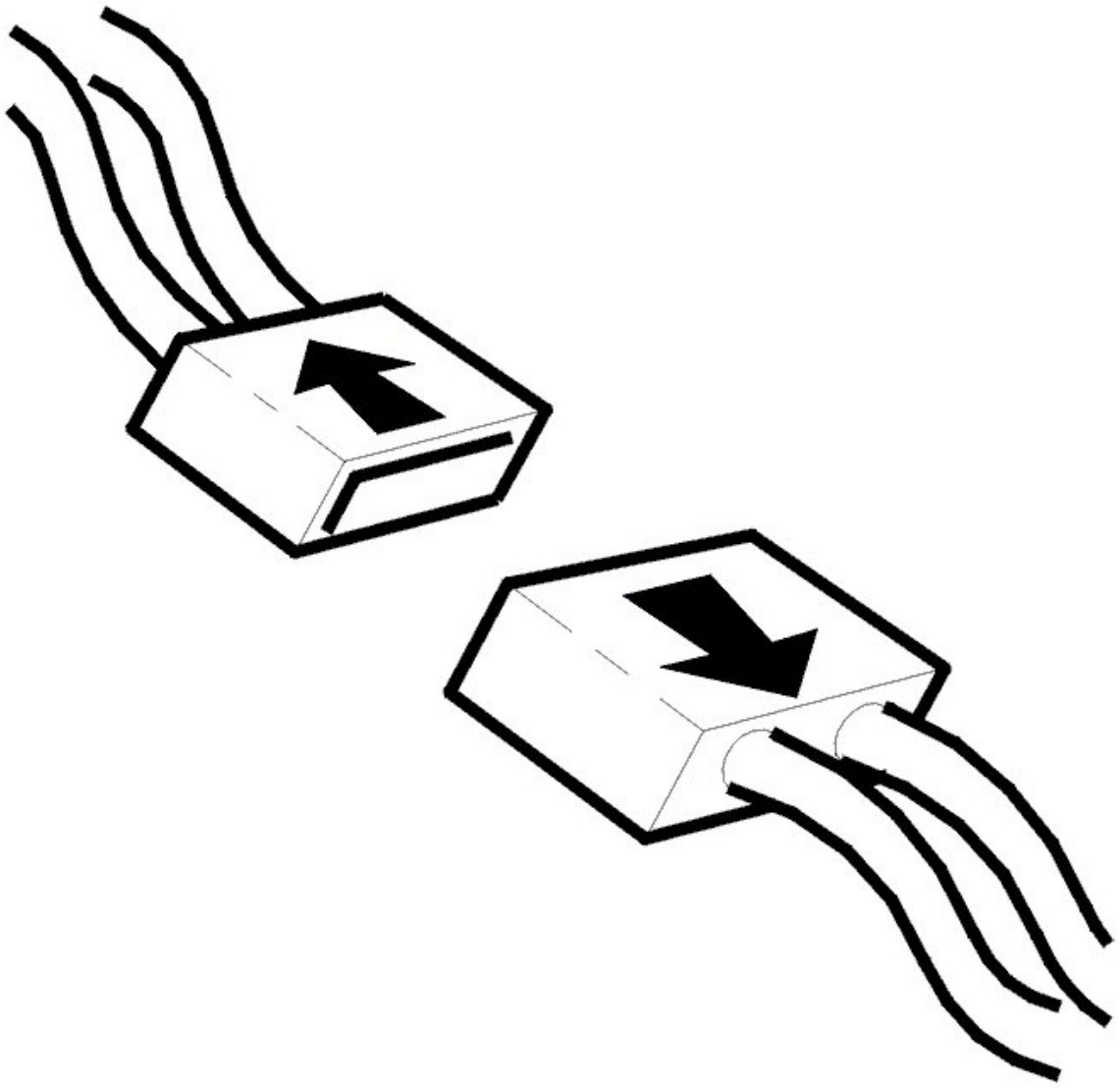
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too High

Signal too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

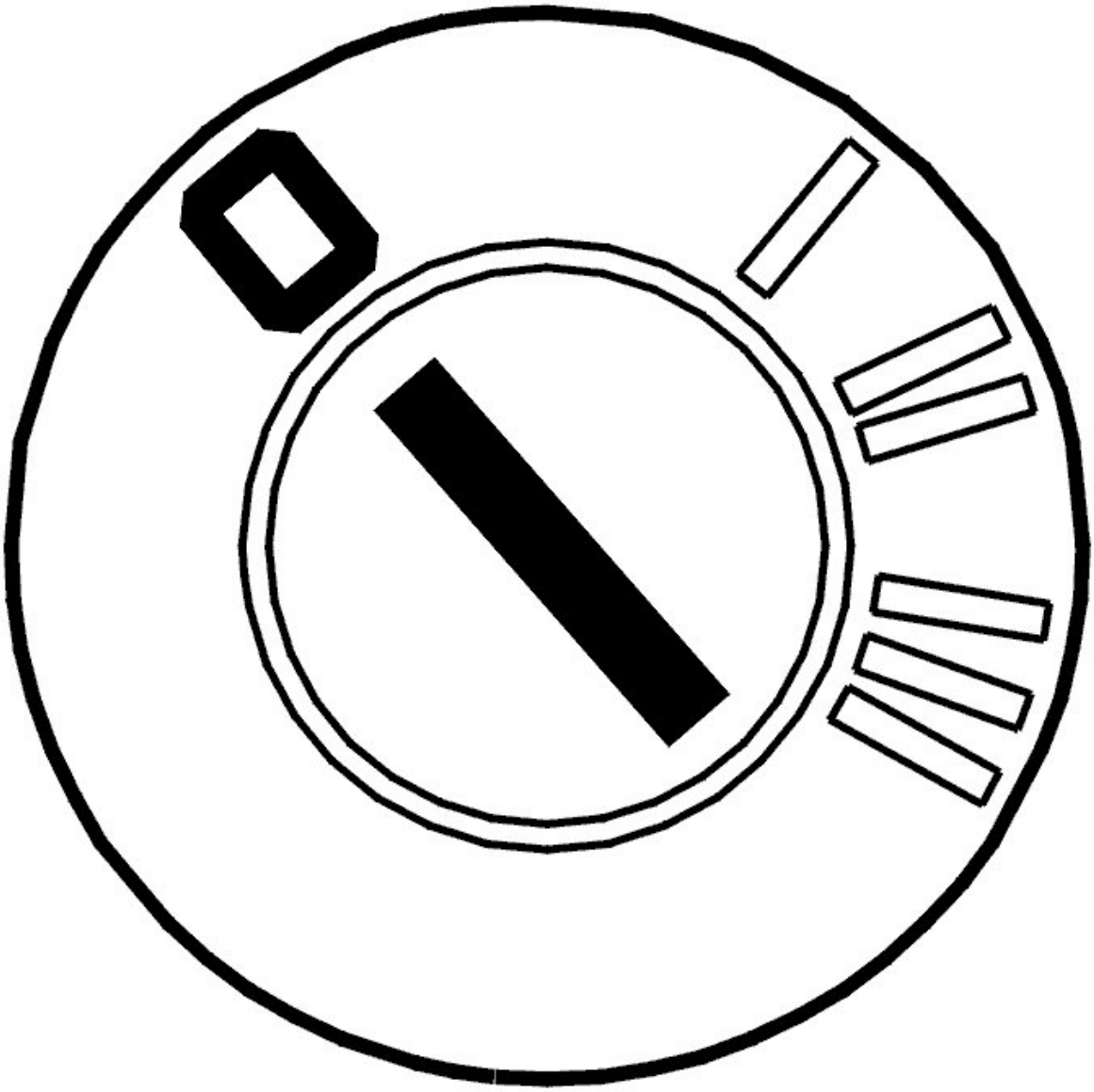
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0080 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0078).- If diagnostic trouble code (DTC) SRS-0078 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0080).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0060,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0068,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0070,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0078,

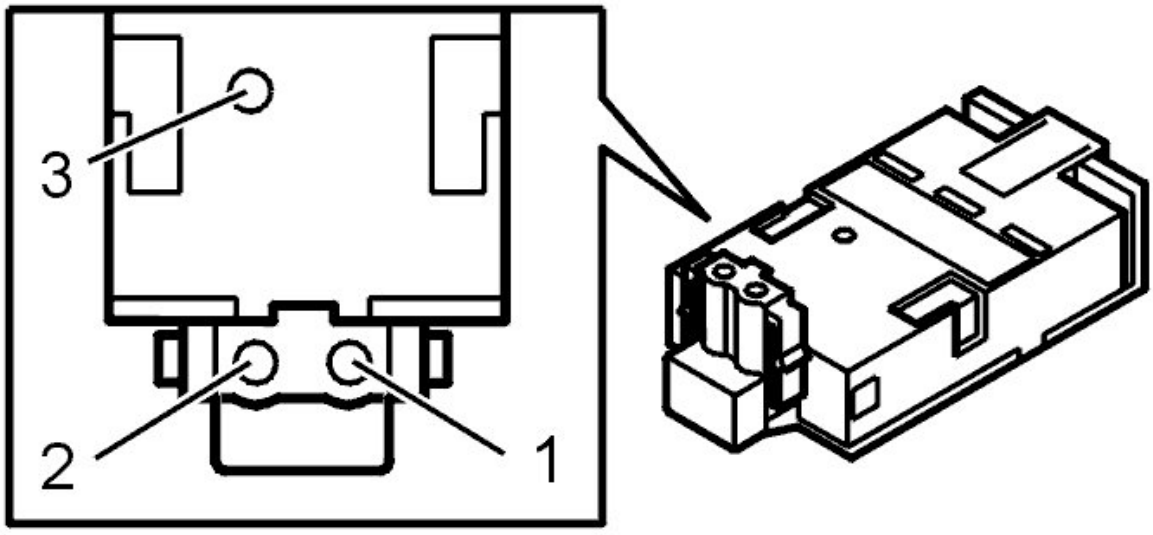
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

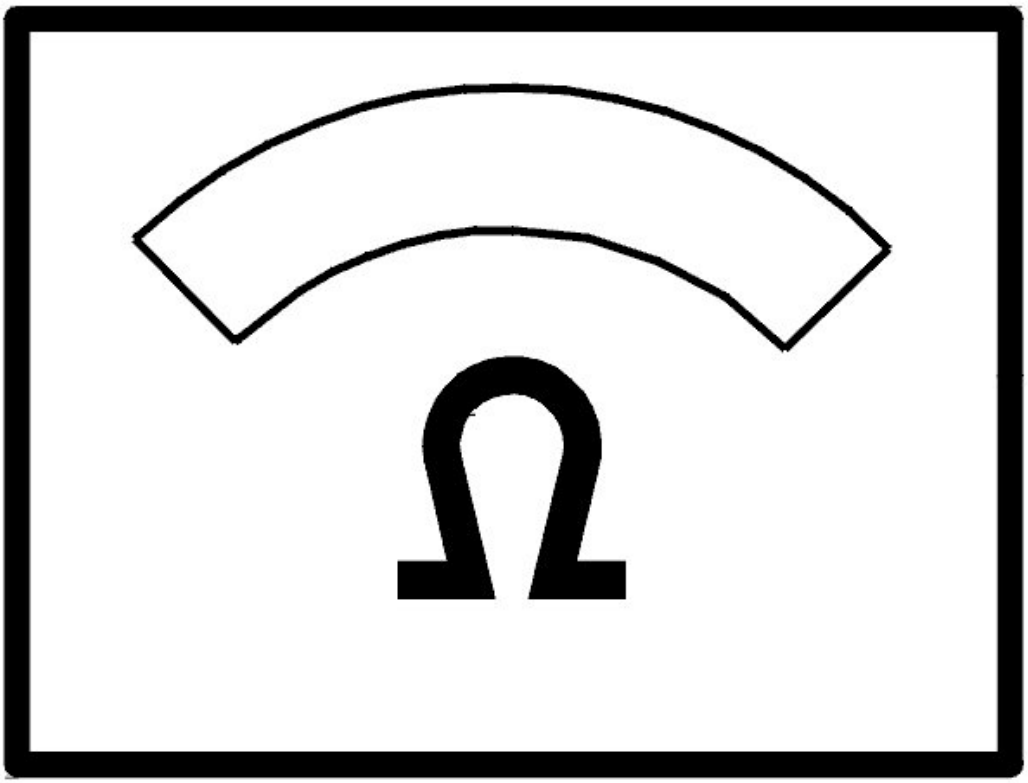
for diagnostic trouble code (DTC) SRS-0080,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

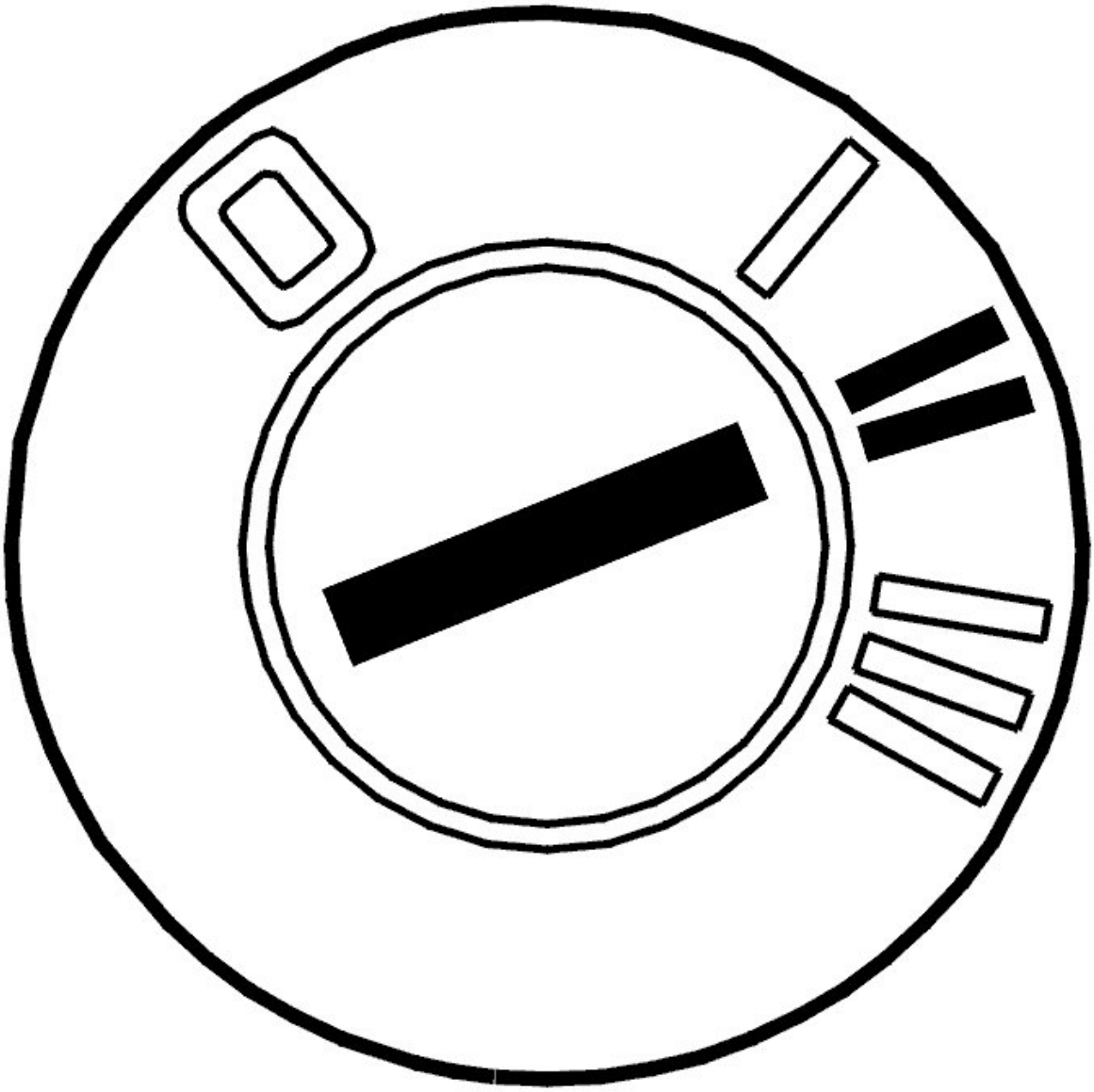
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

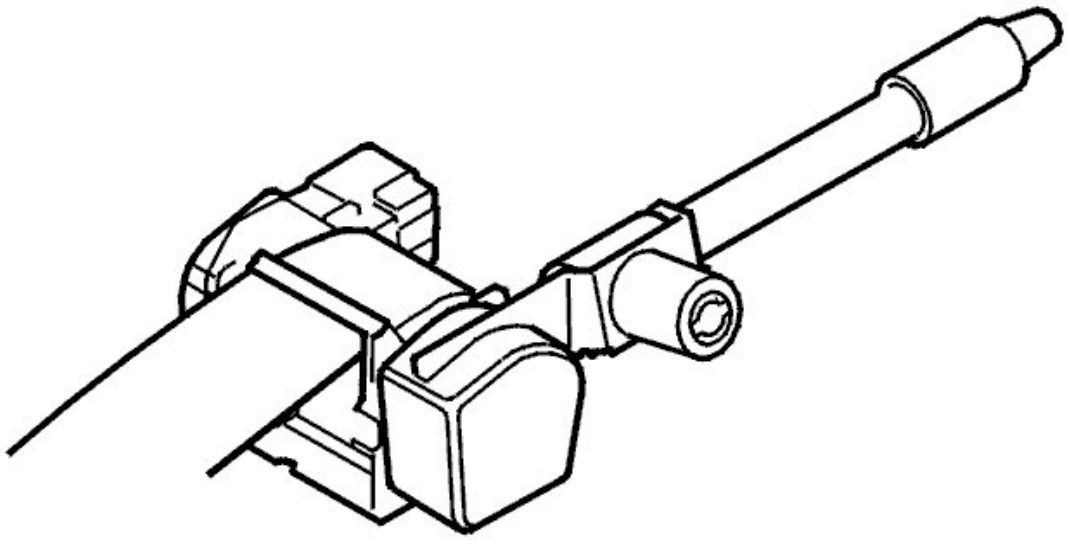
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0081 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0081 is displayed.

Substitute value
- Nothing.

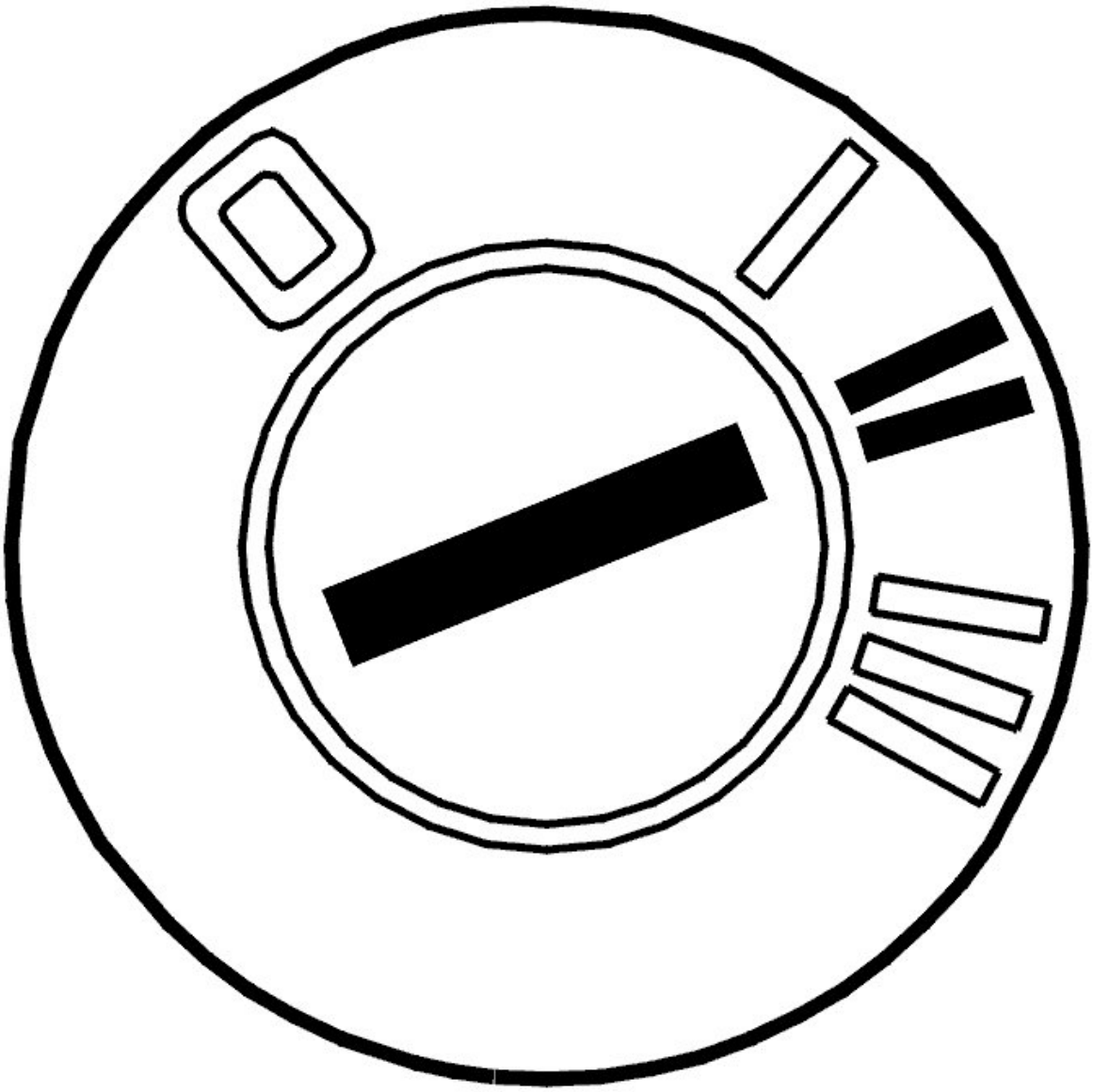
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

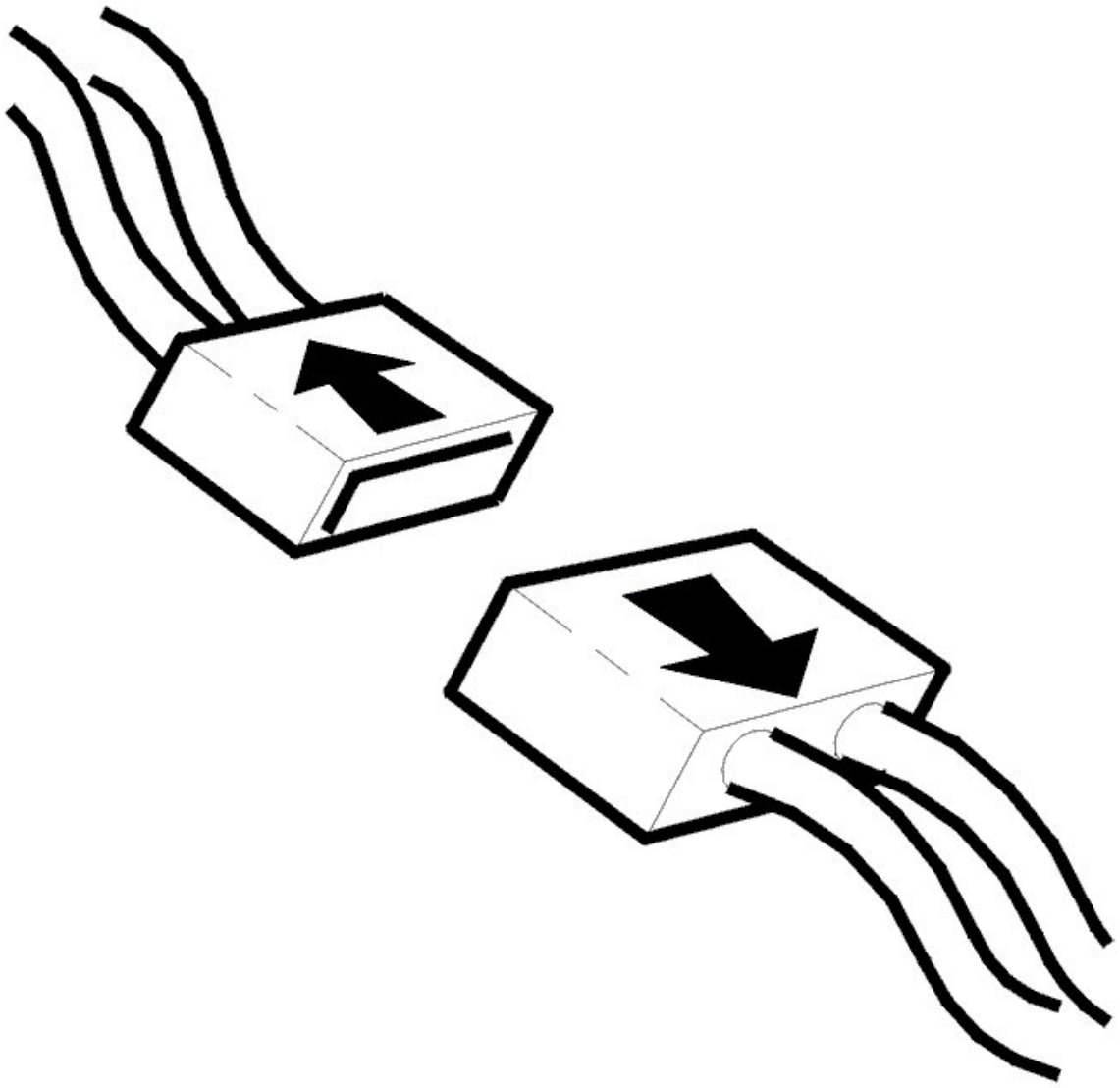
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

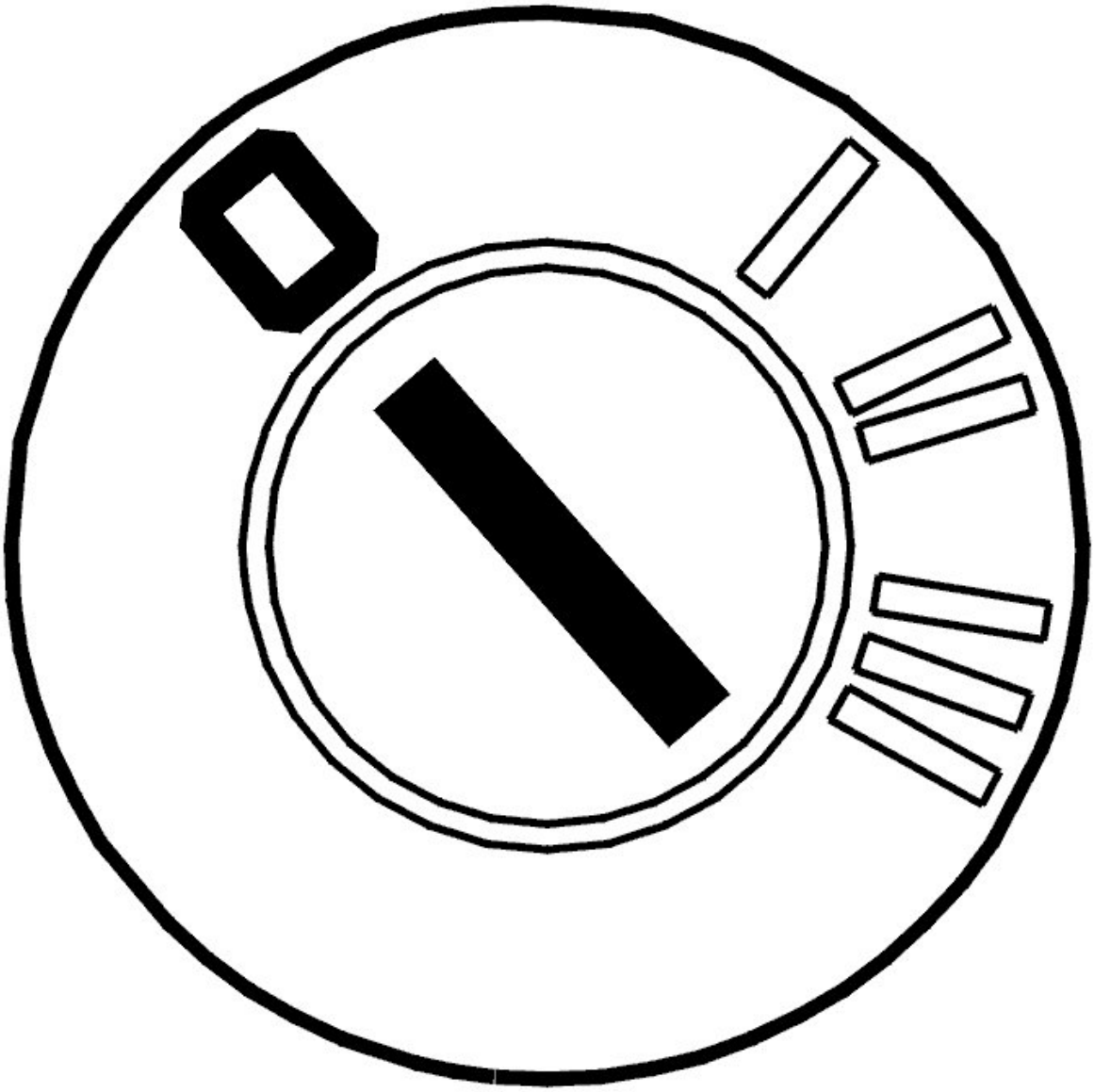
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

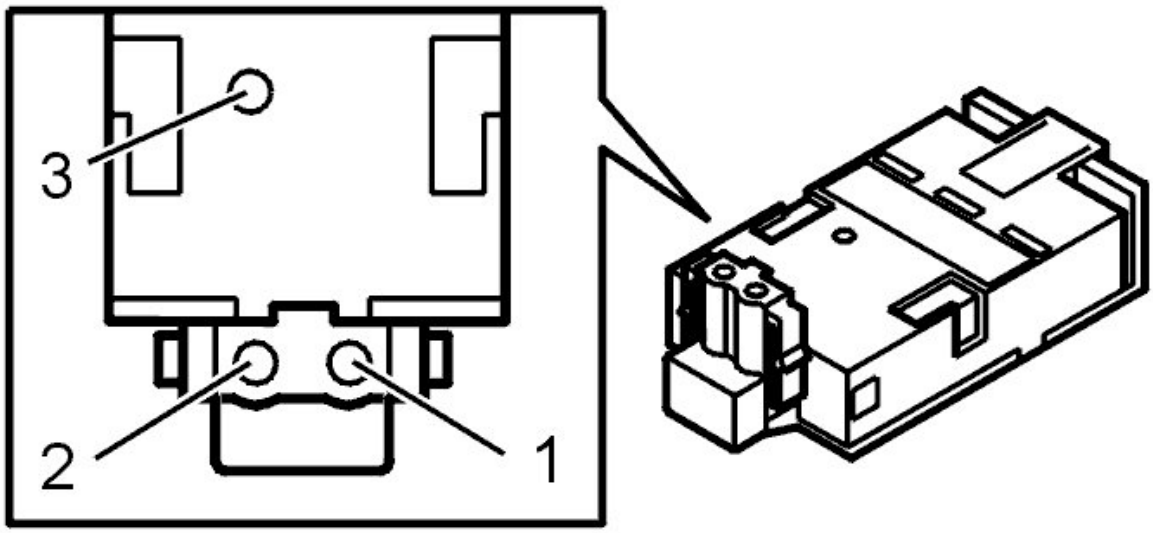
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

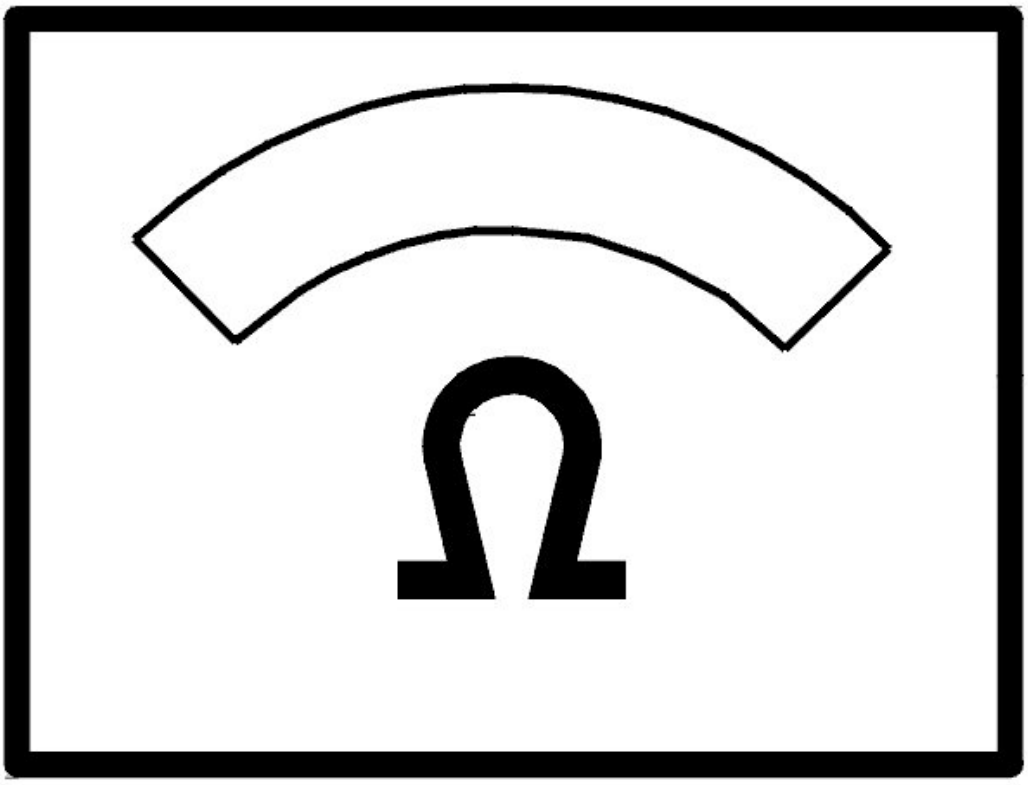
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

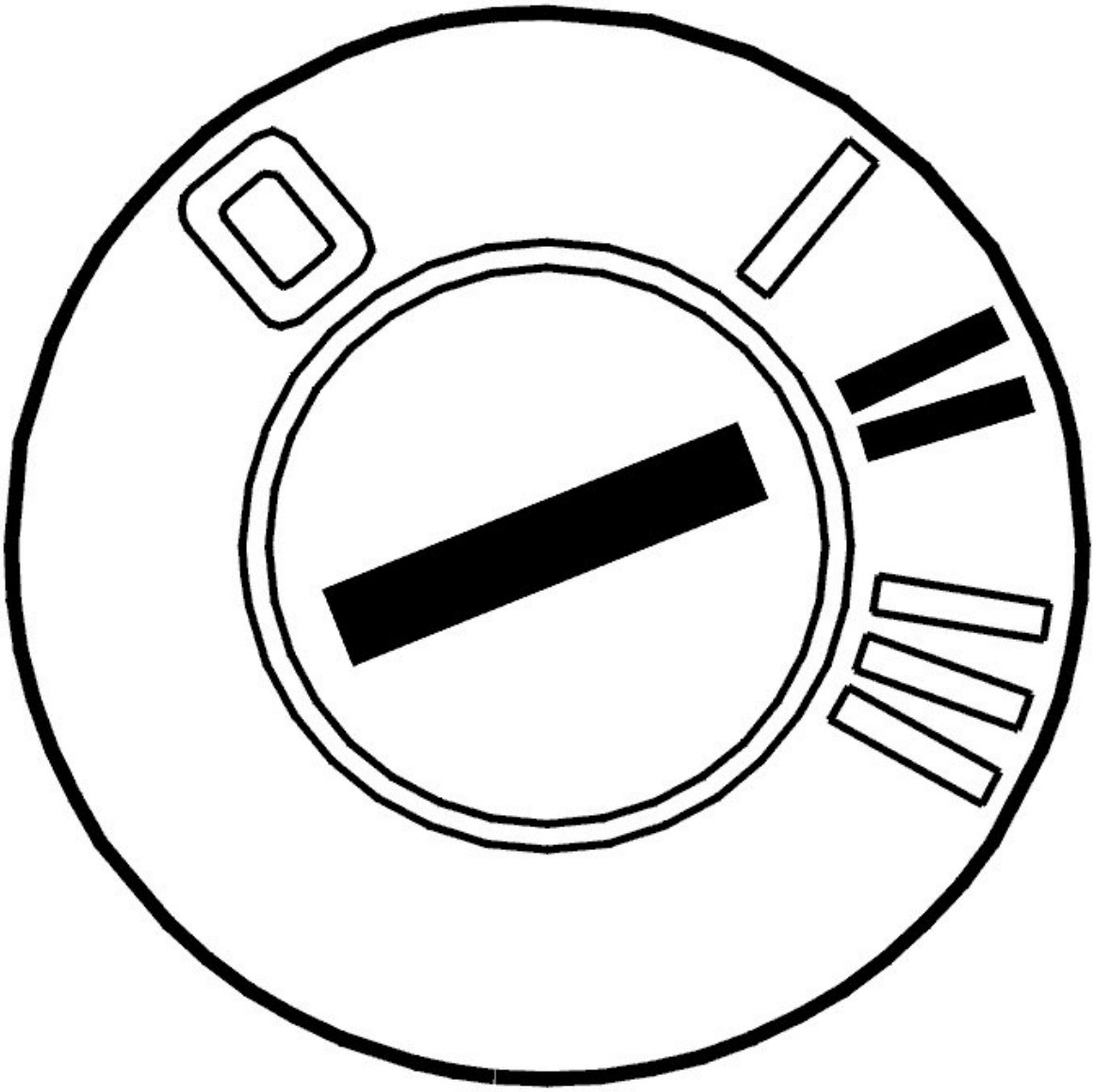
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

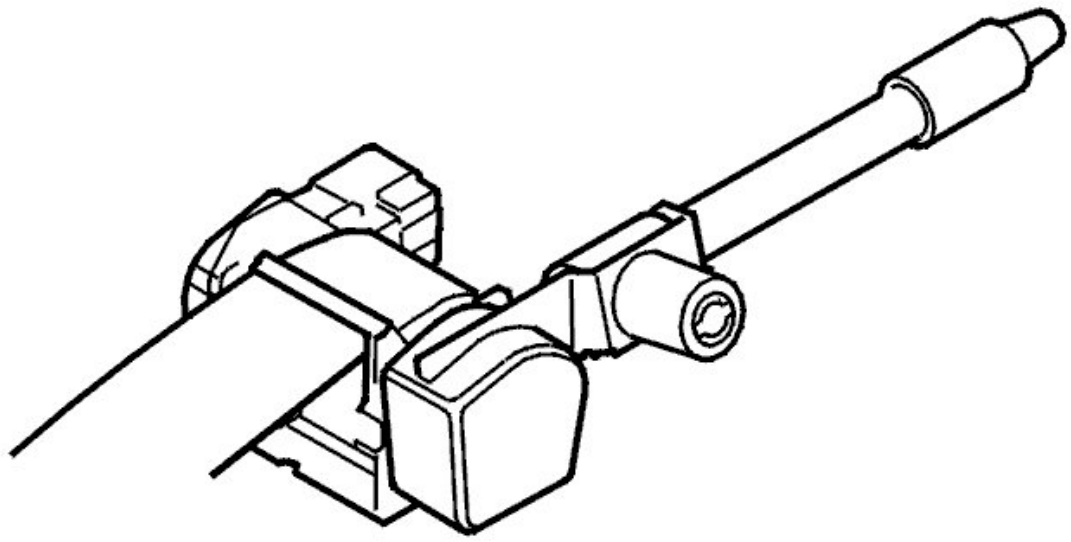
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0081 Diagnostic trouble code information

Condition



If the circuit voltage is too low (0V) for more than 10 seconds, diagnostic trouble code SRS-0081 is displayed.

Substitute value
- Nothing.

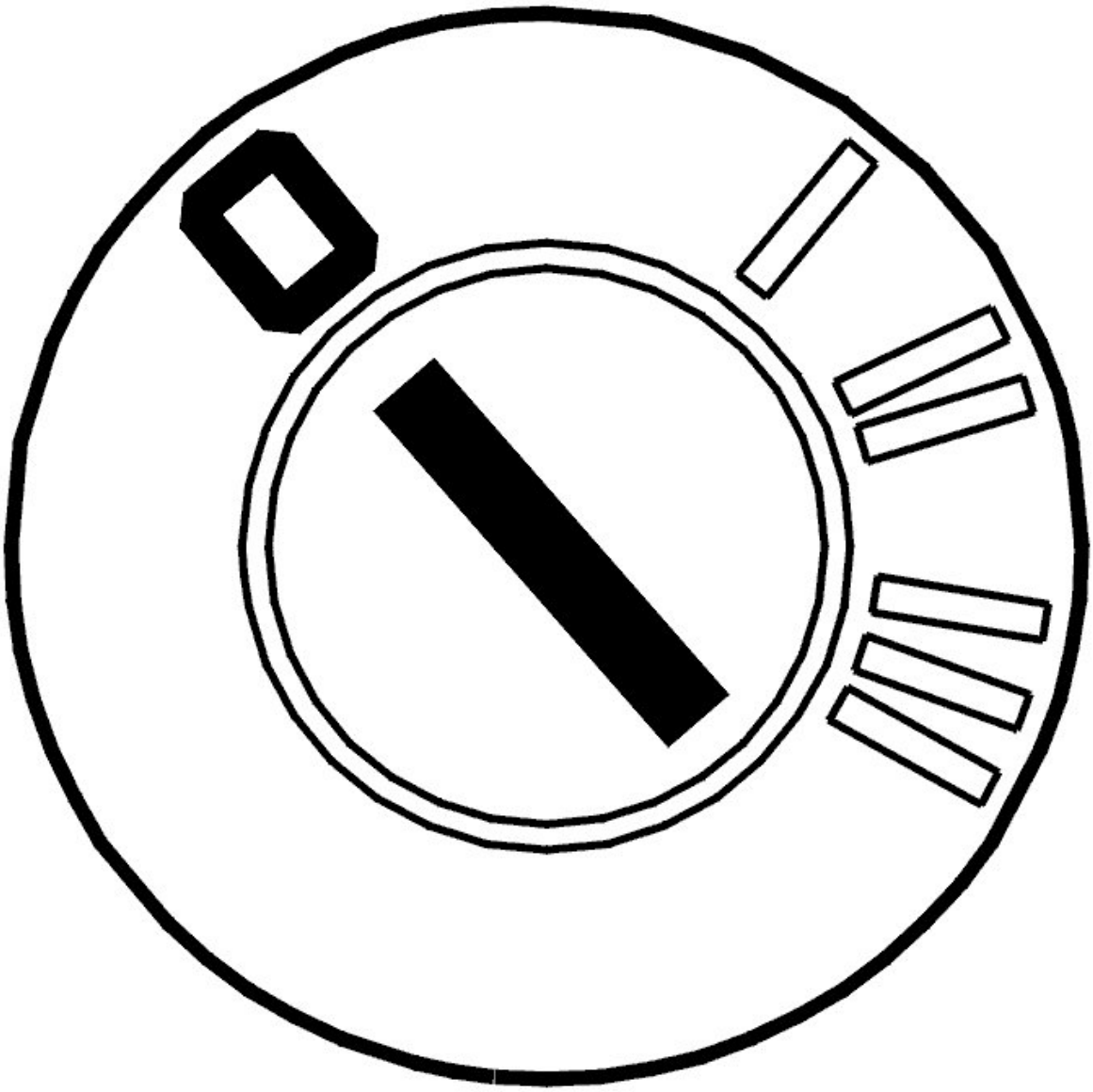
Possible source
- Short circuit to ground in connector
- Short circuit to ground in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit to ground in seat-belt tensioner.

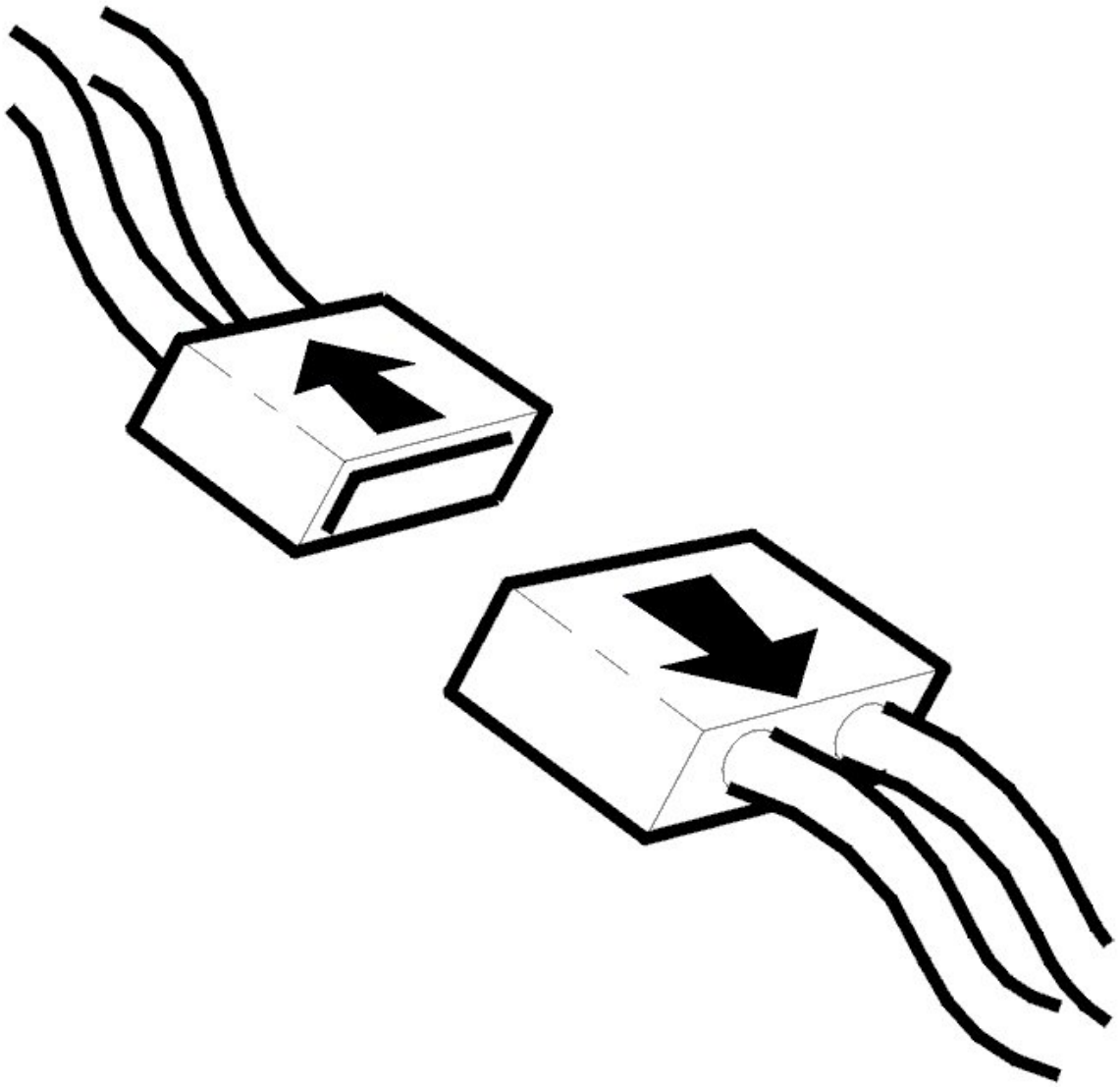
Fault symptom[s]
- Orange general warning lamp is on.

Signal Too Low

Signal too low. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0081 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-0079).- If diagnostic trouble code (DTC) SRS-0079 for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0081).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0061,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0069,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0071,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0079,

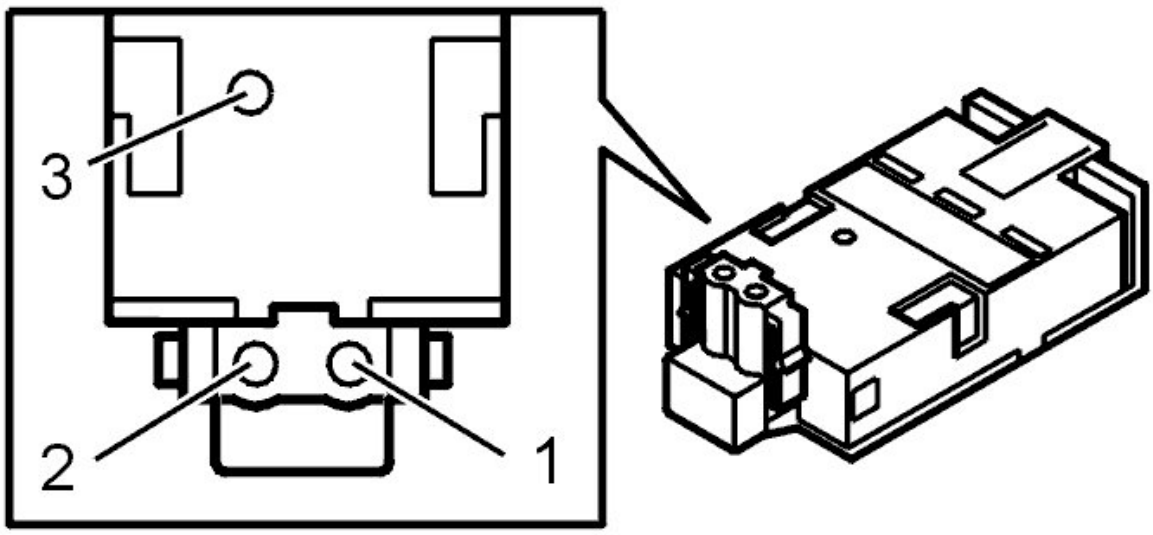
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

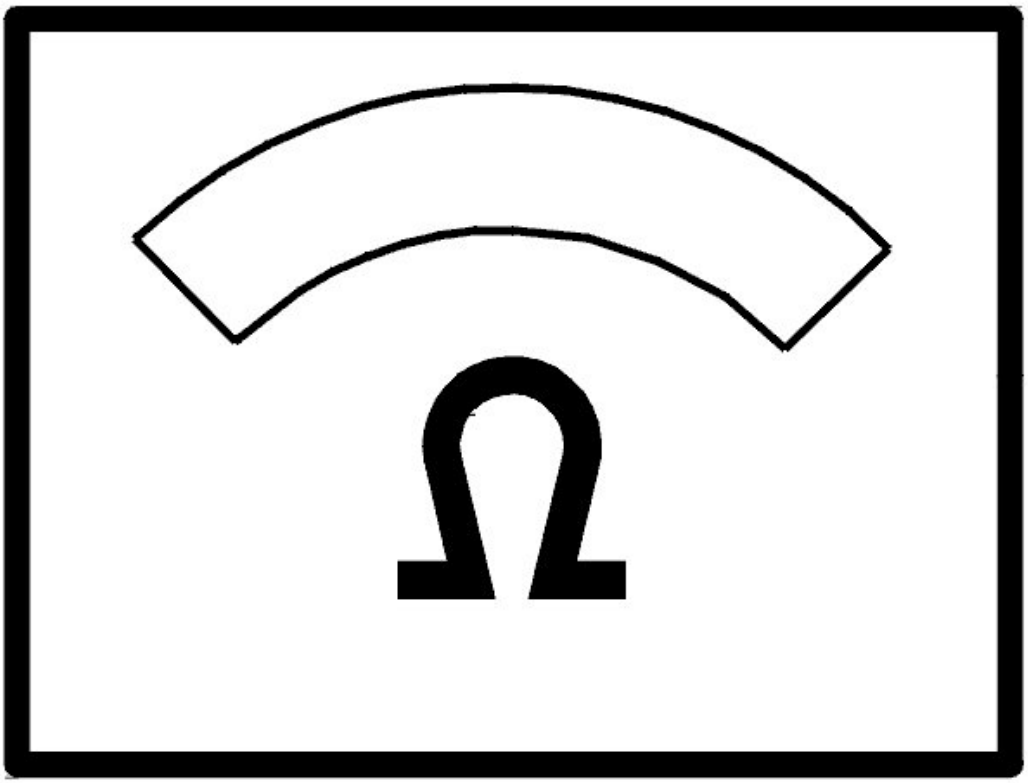
for diagnostic trouble code (DTC) SRS-0081,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

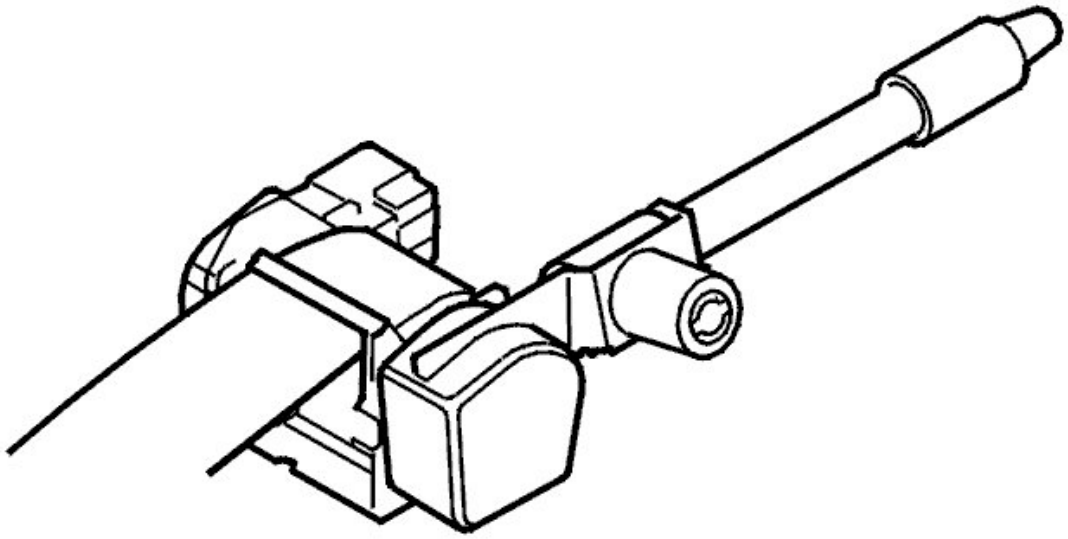
FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0082 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0082 is displayed.

Substitute value
- Nothing.

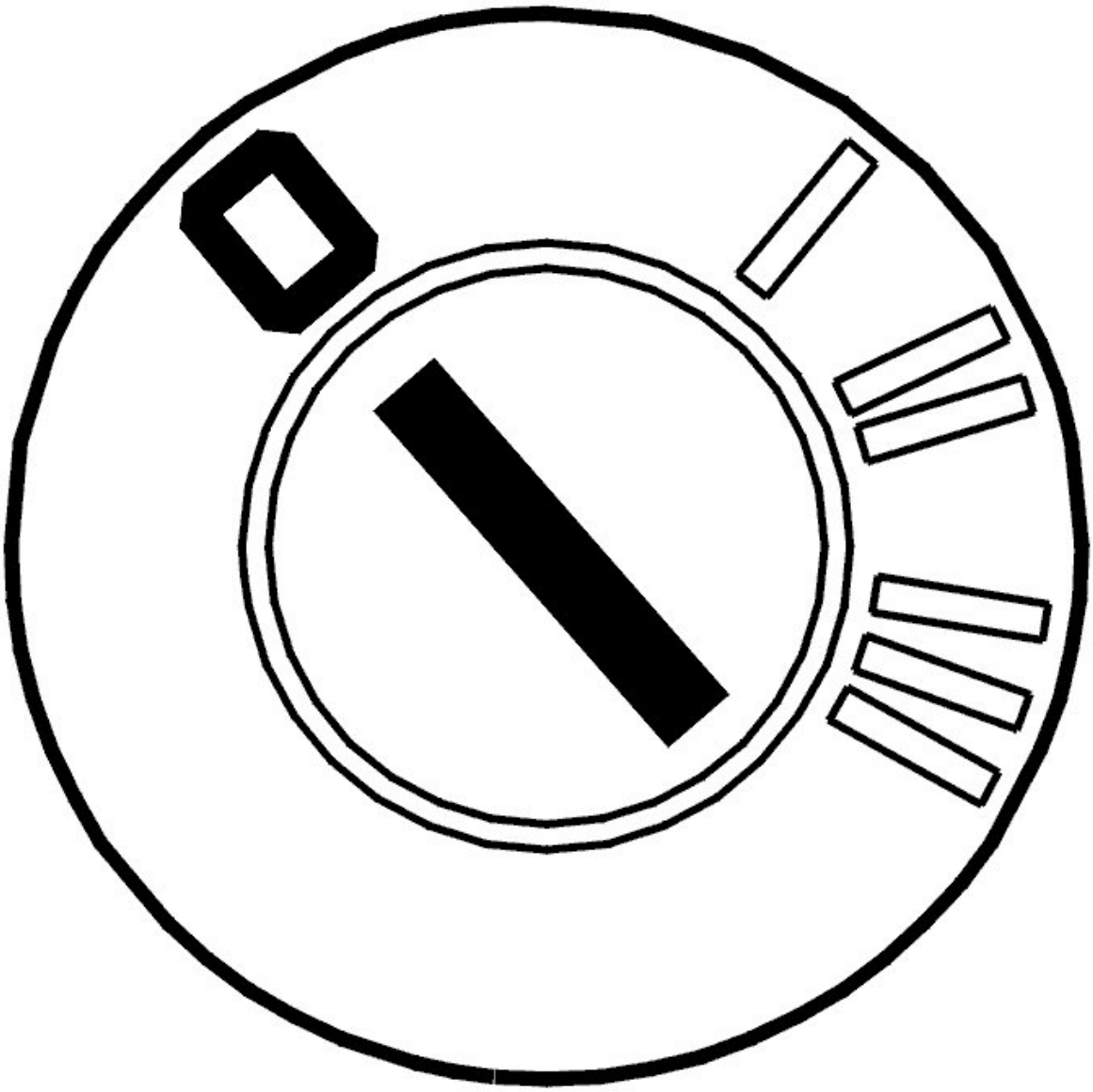
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

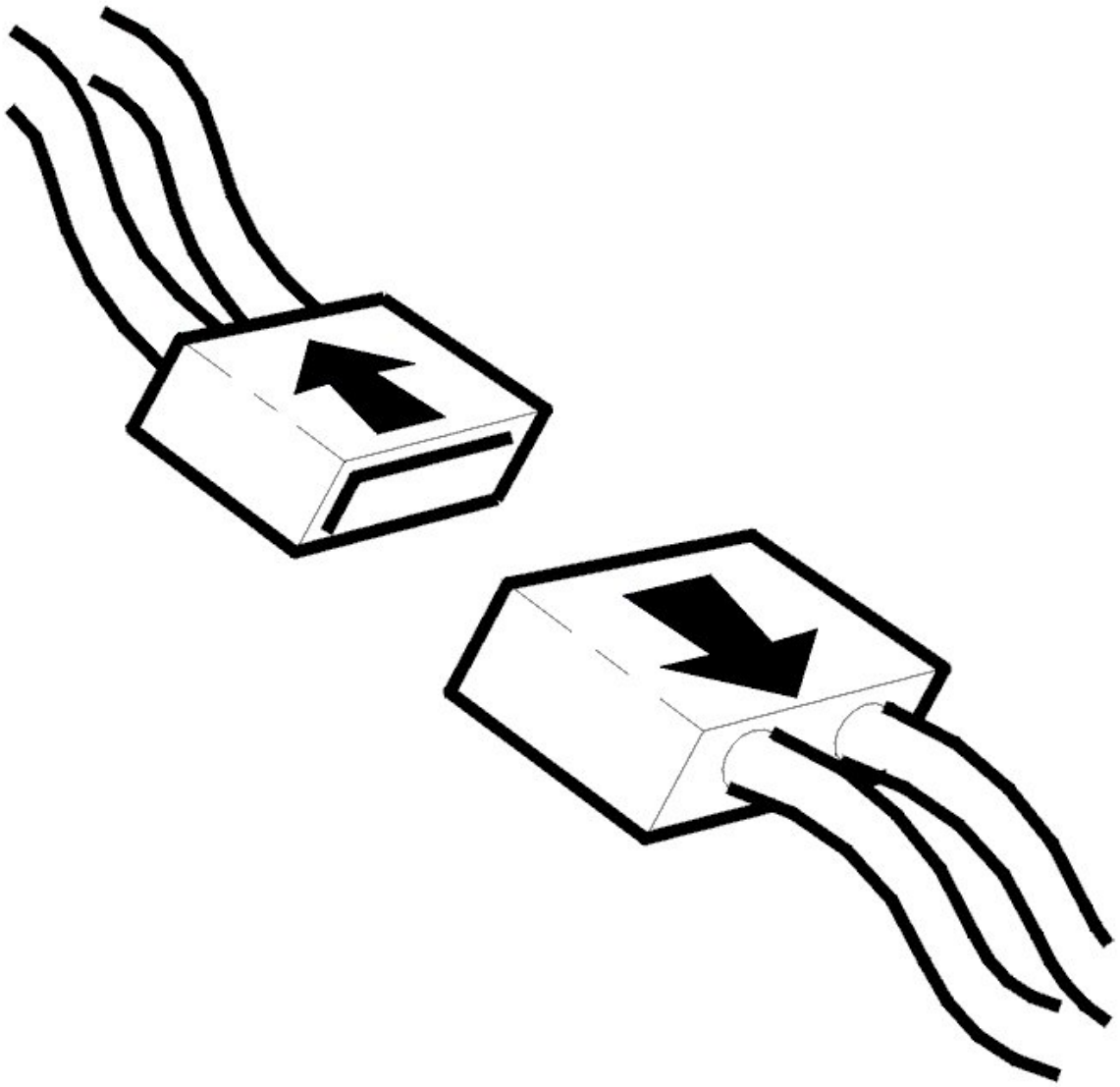
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Intermittent fault

Intermittent fault





- Ignition off
- Disconnect the connector from the seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A,

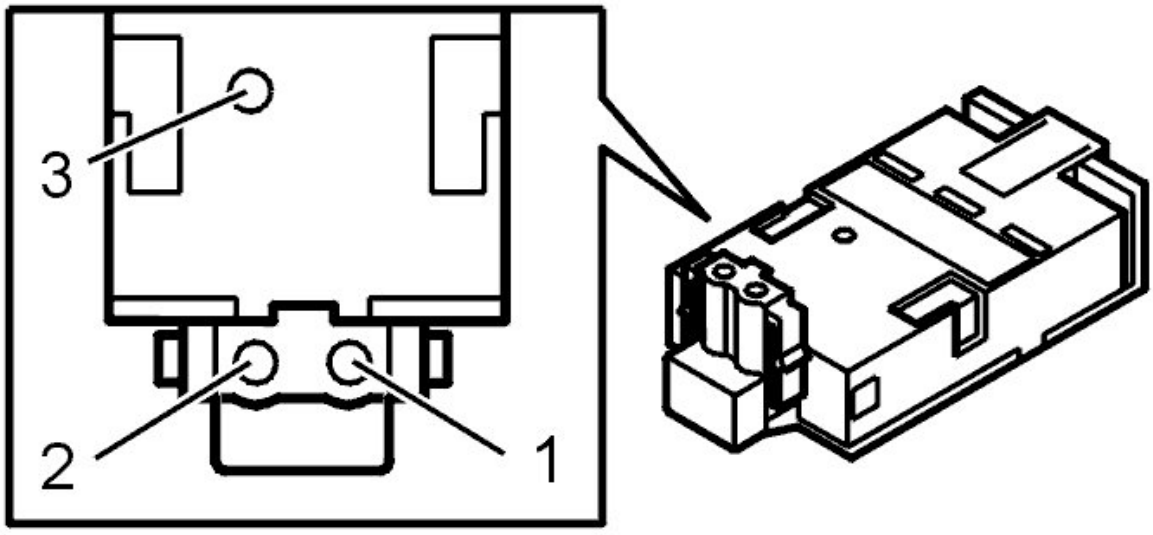
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

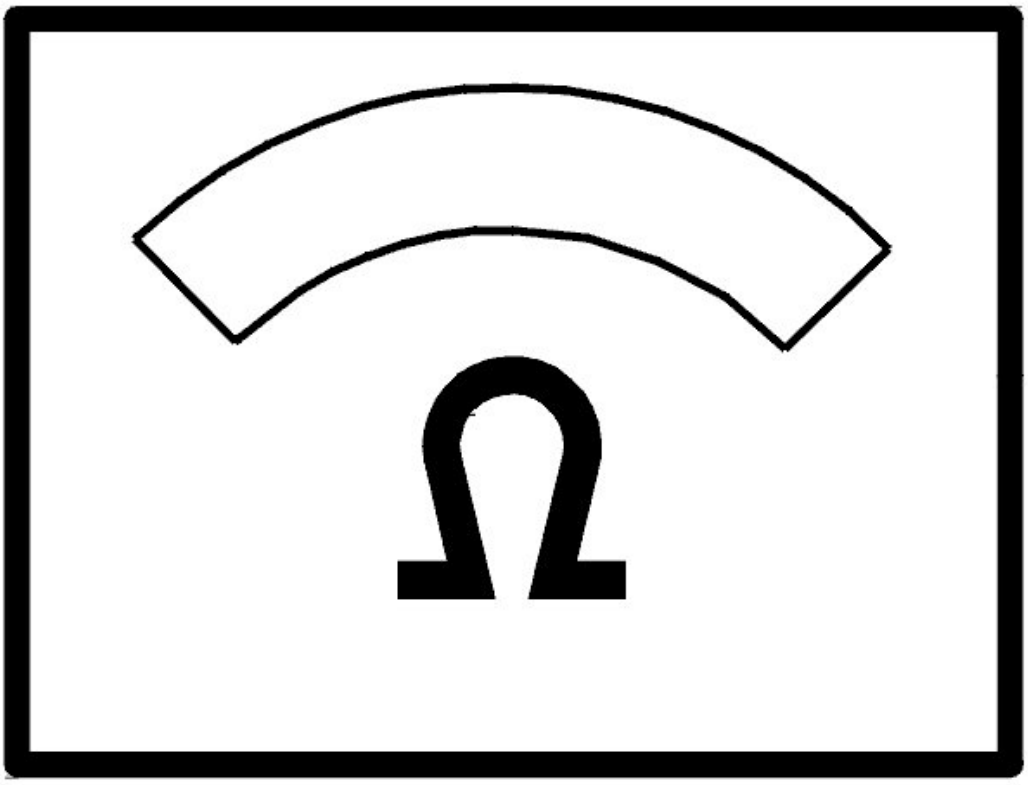
for diagnostic trouble code (DTC) SRS-0082,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

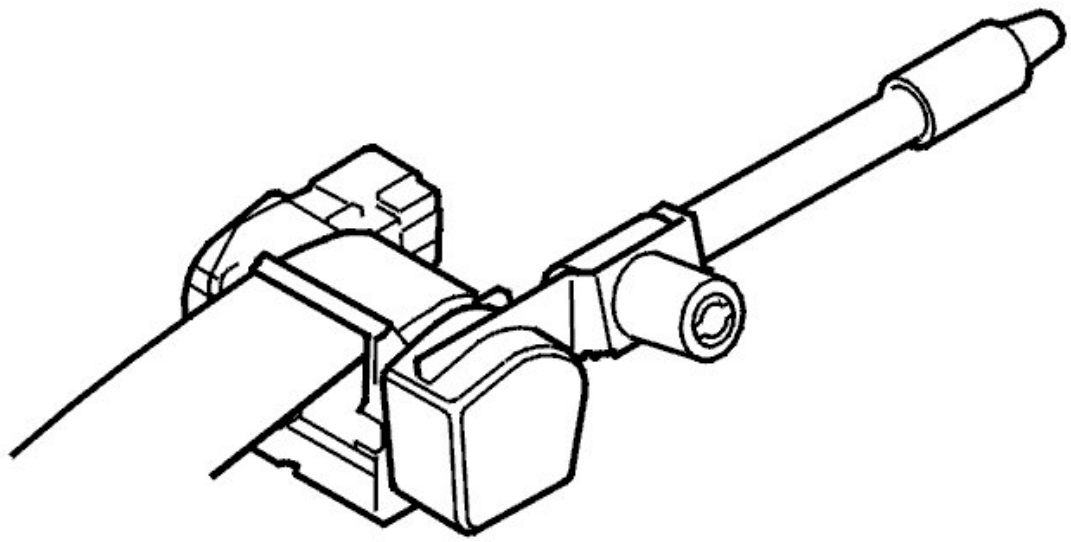
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0082 Diagnostic trouble code information

Condition



If the circuit capacitance is too high for more than 10 seconds, diagnostic trouble code SRS-0082 is displayed.

Substitute value
- Nothing.

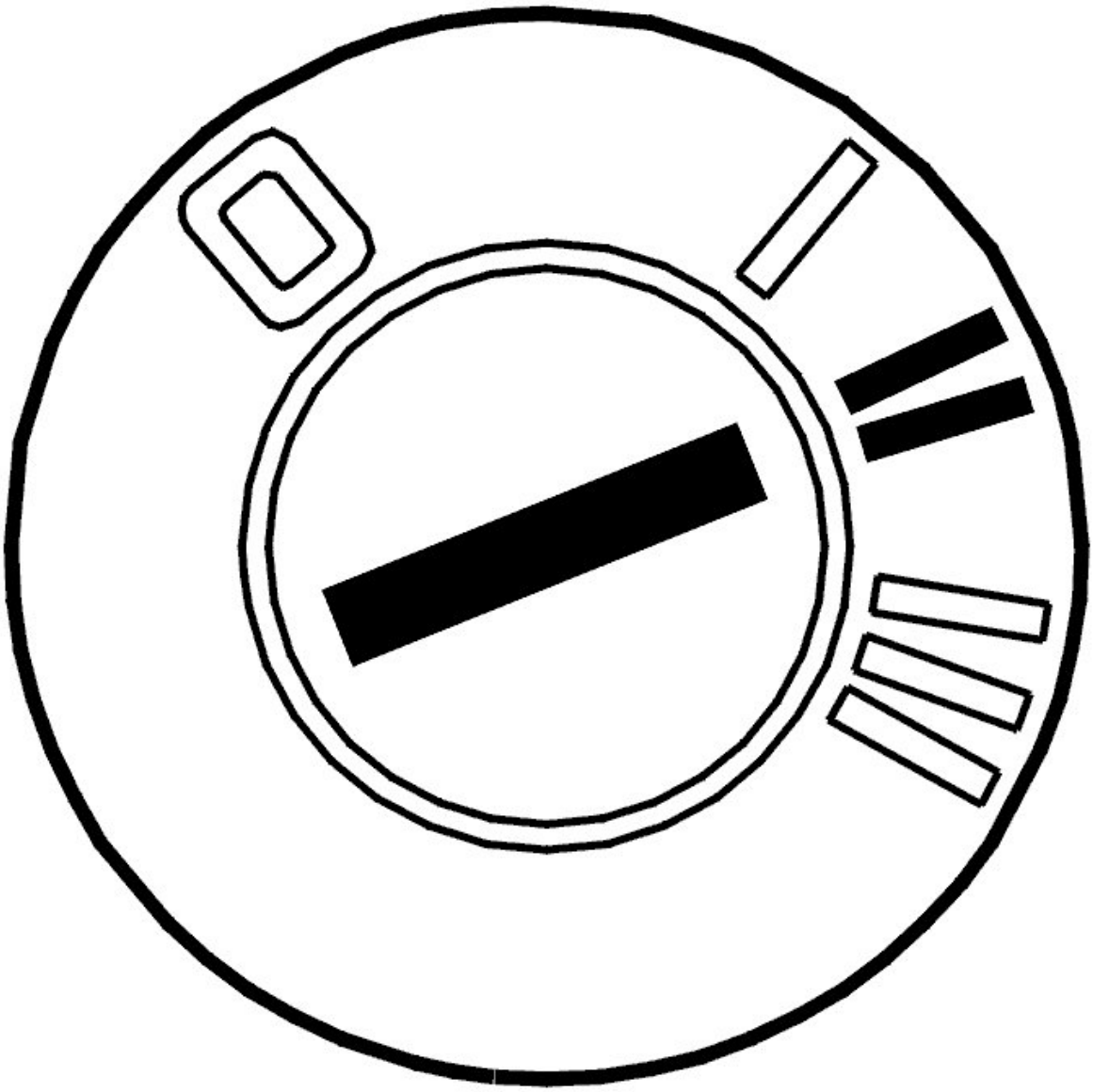
Possible source
- Capacitance too high in connector
- Capacitance too high in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

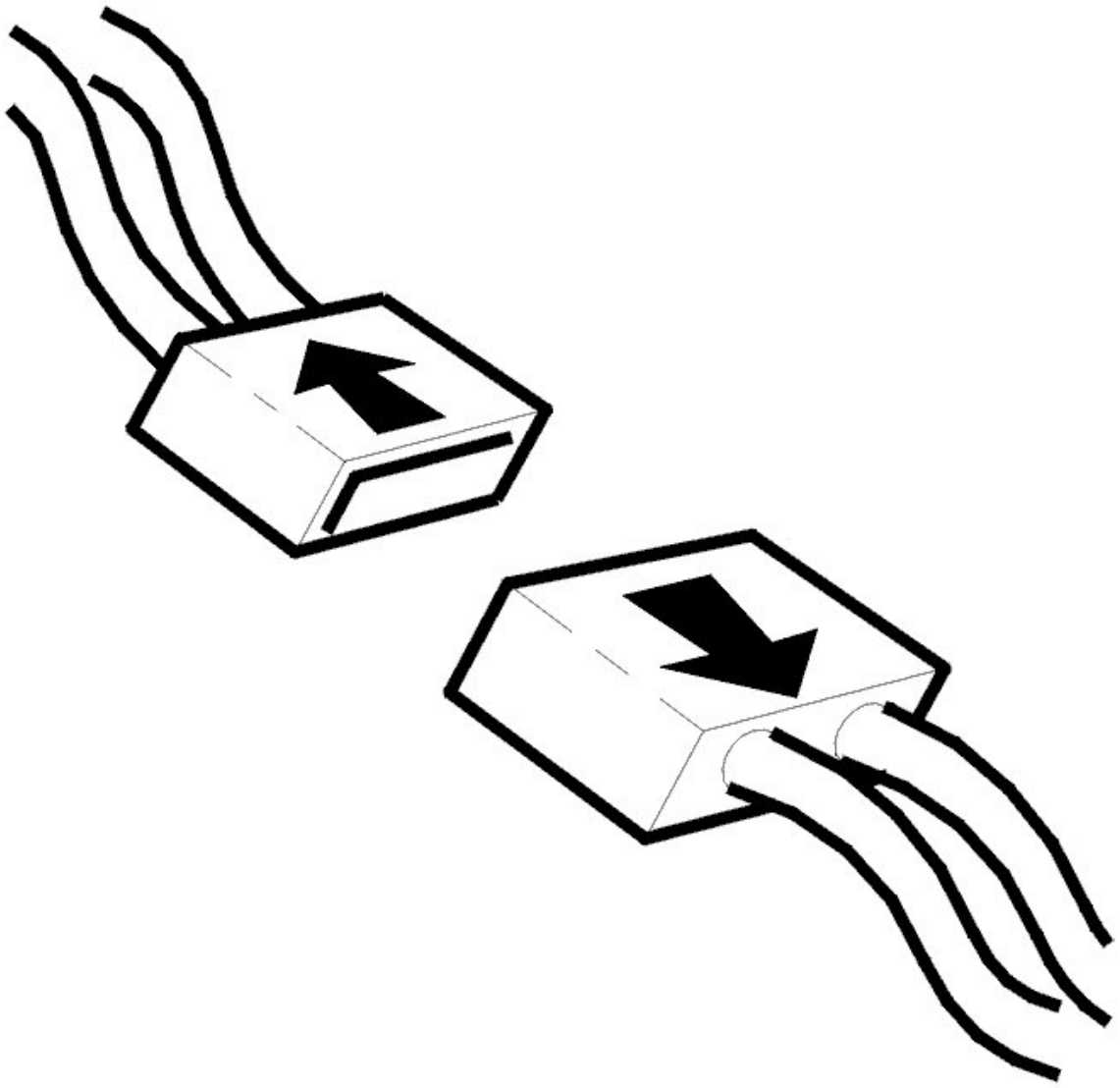
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too High

Capacitance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

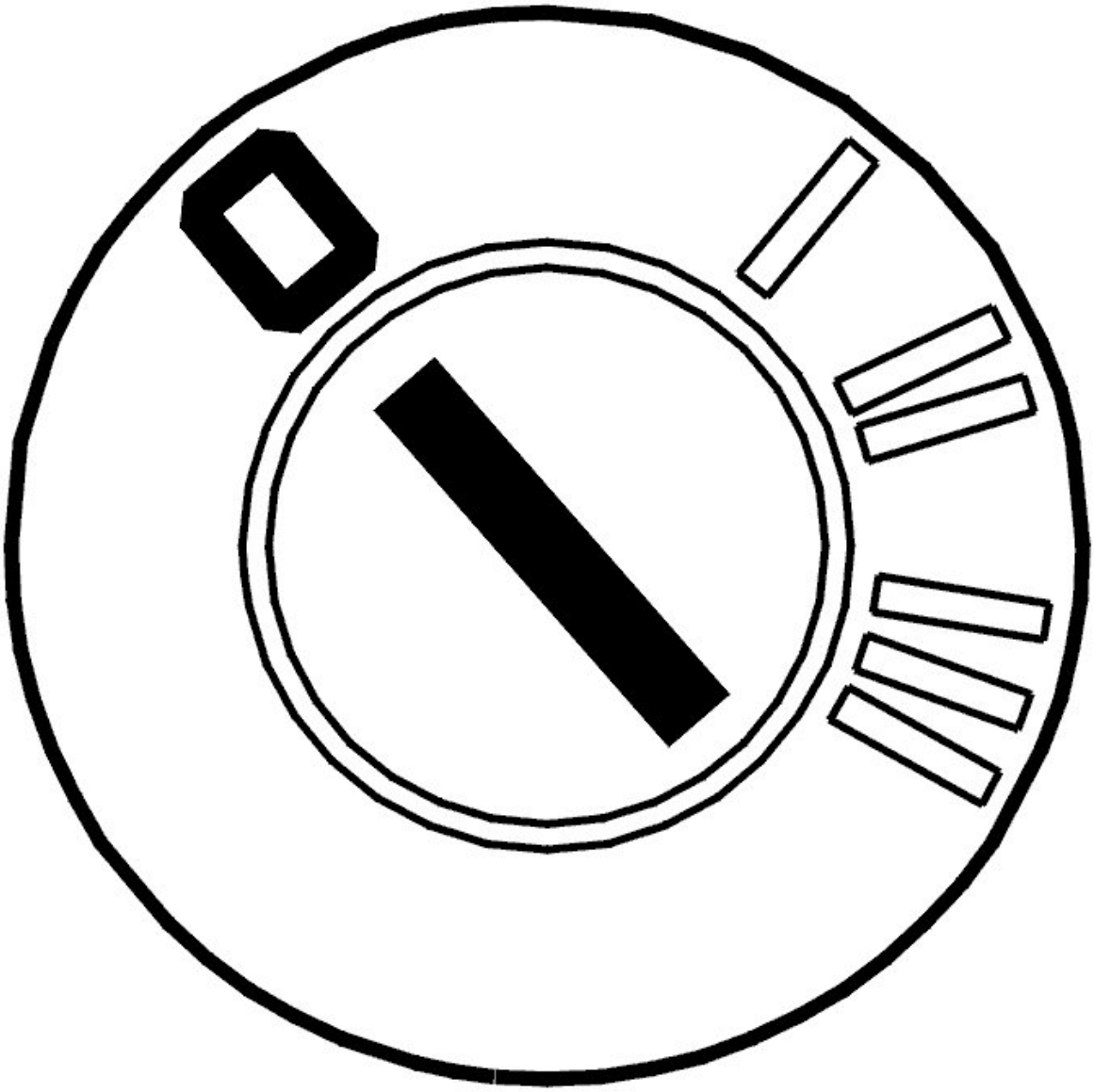
- To replace the front seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0082 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007A).- If diagnostic trouble code (DTC) SRS-007A for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0082).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0062

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006A

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0072

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007A

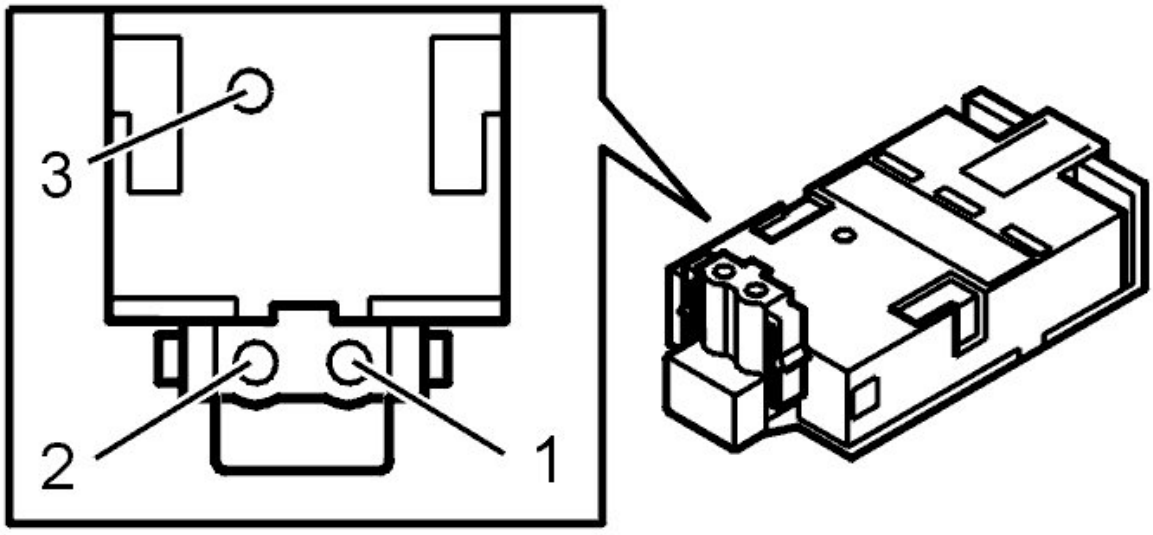
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

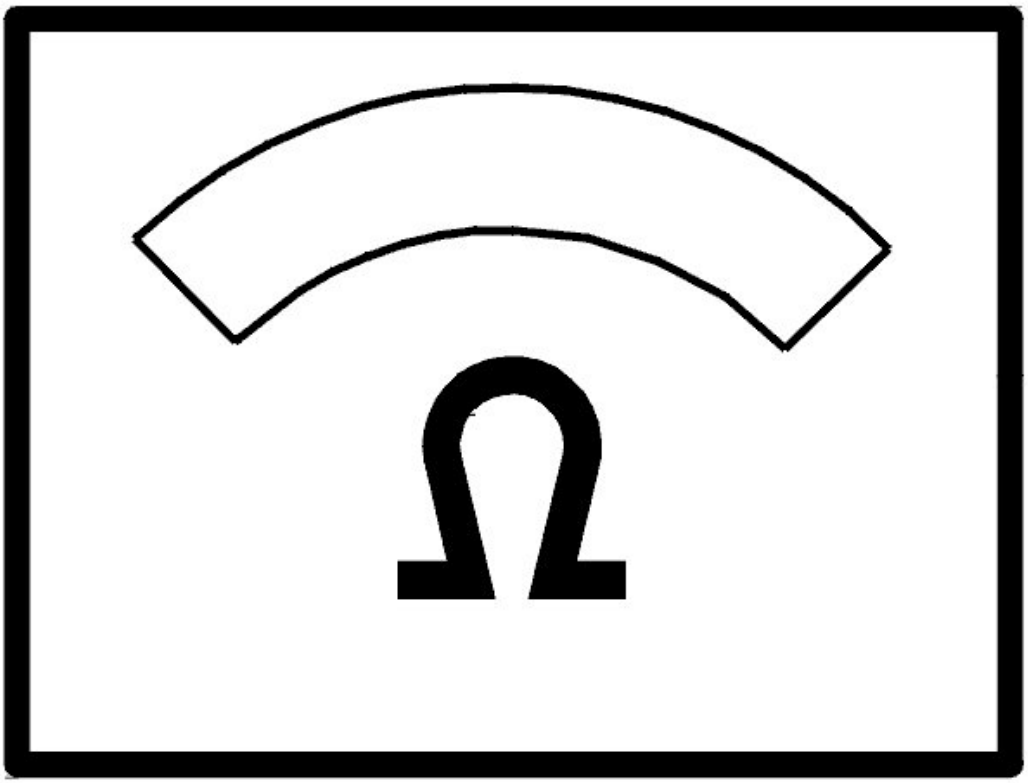
for diagnostic trouble code (DTC) SRS-0082

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and the removed battery positive pole should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

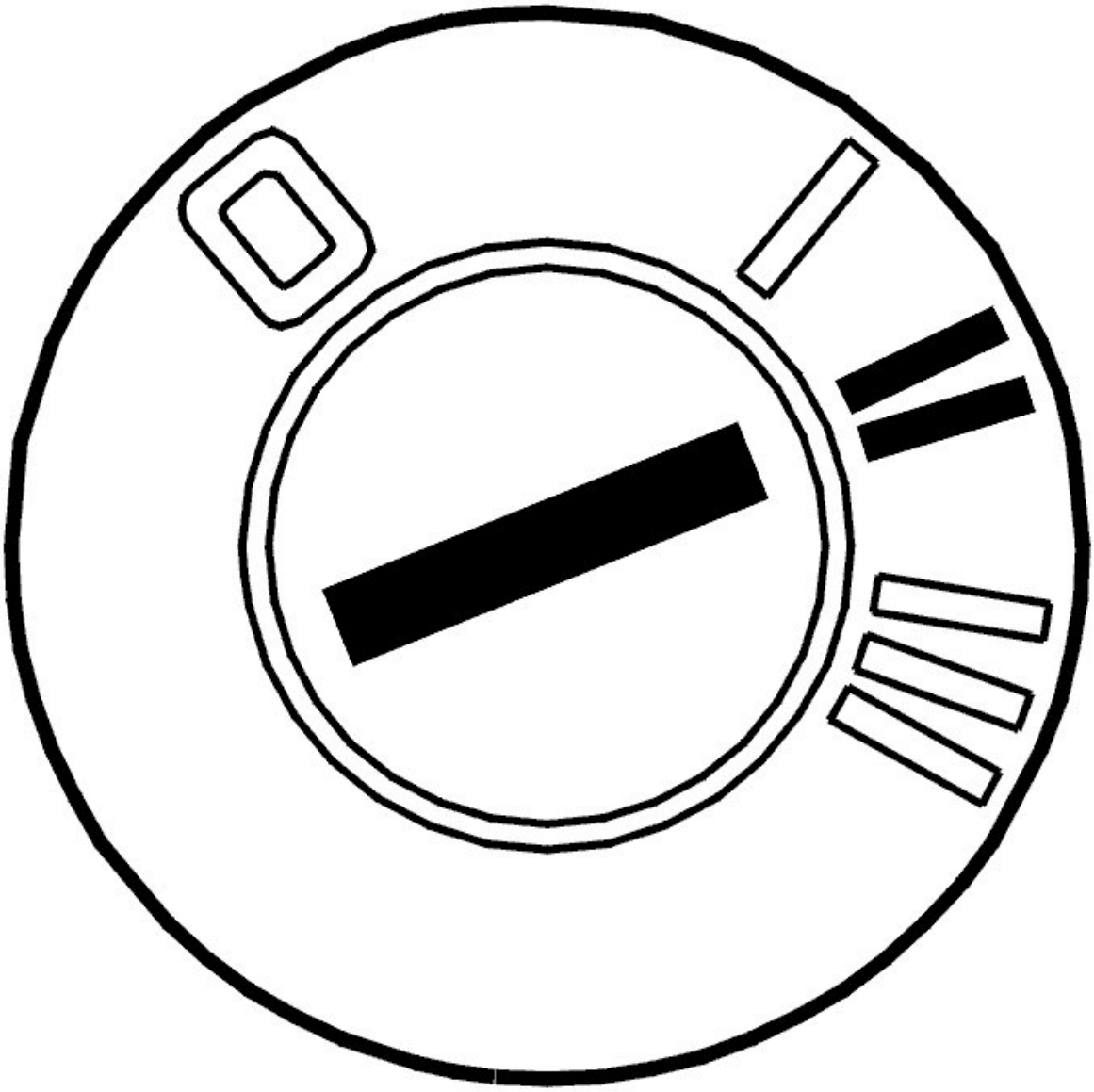
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

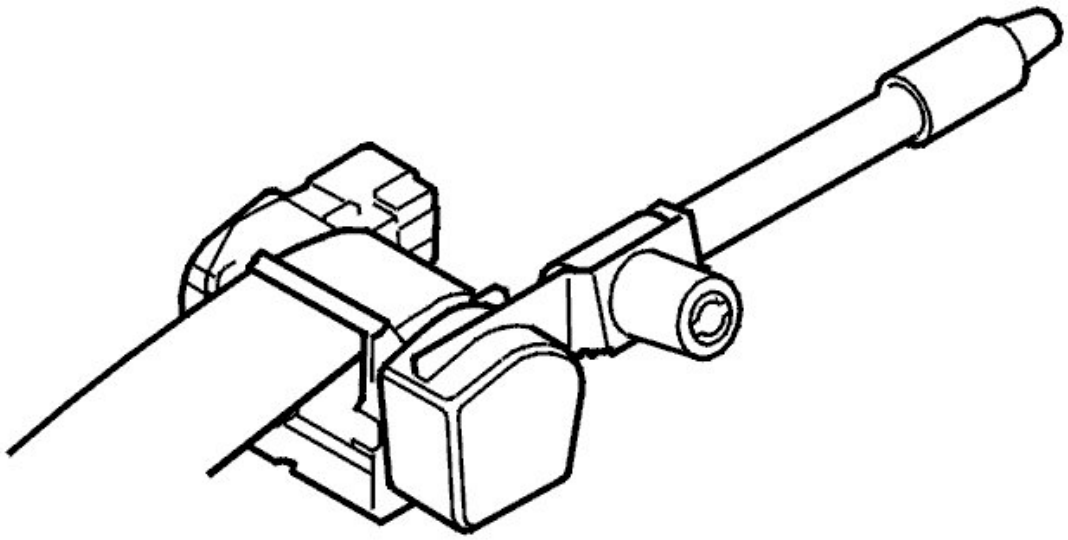
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0083 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0083 is displayed.

Substitute value
- Nothing.

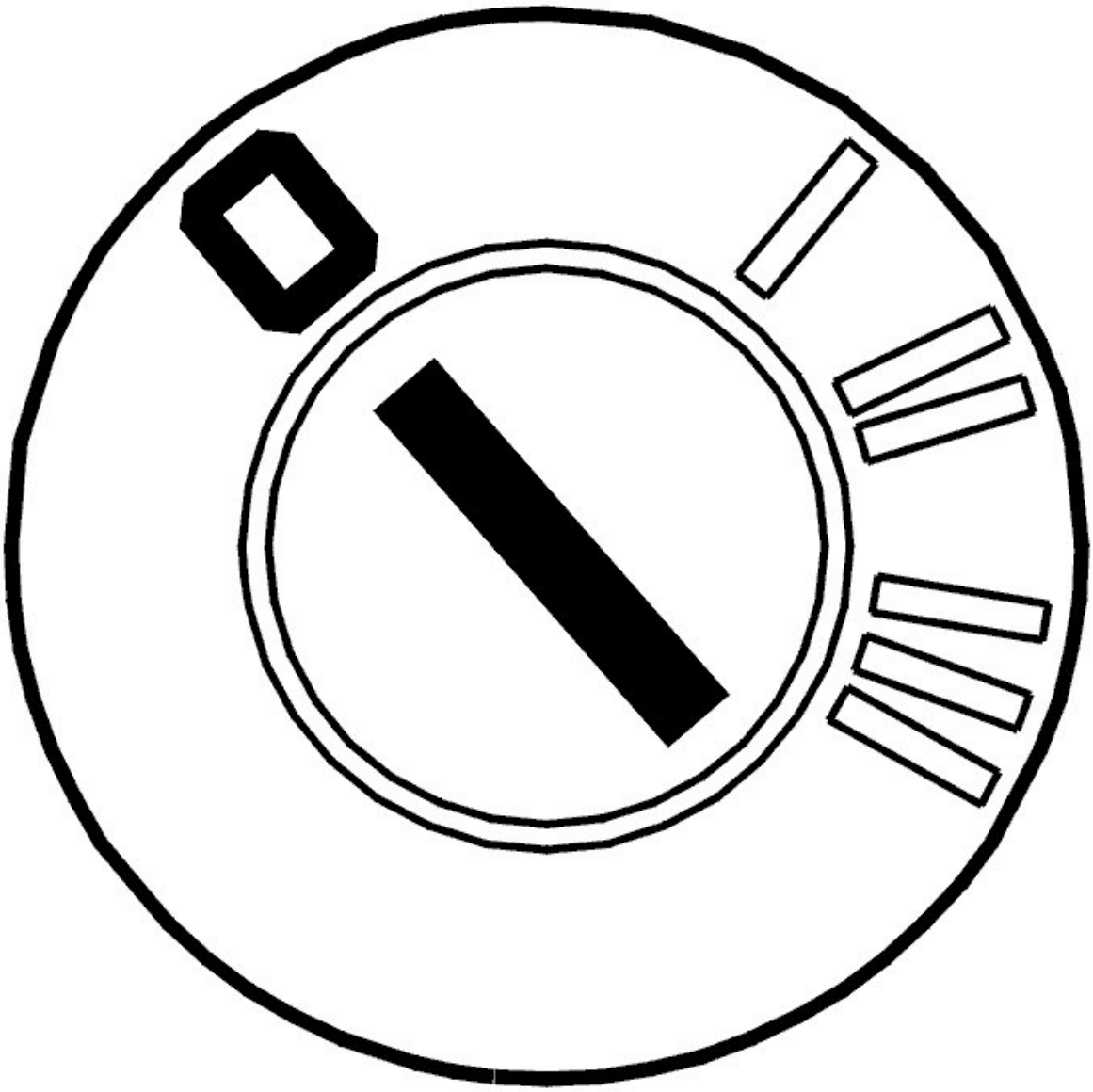
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0063,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006B,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0073,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007B,

terminals #17A(17), #18A(18) of the centre rear seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0083,

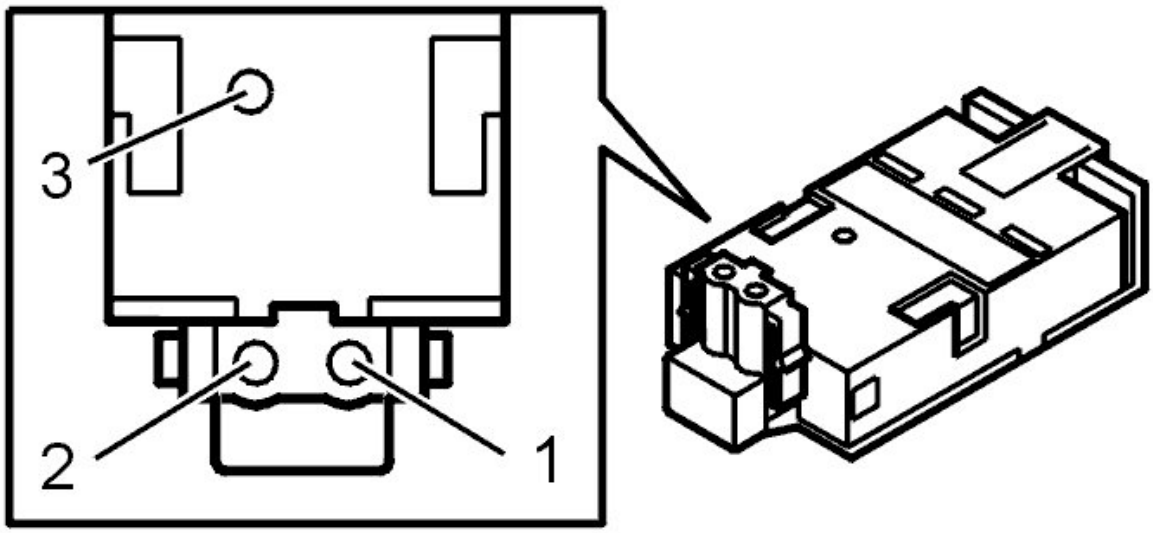
terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

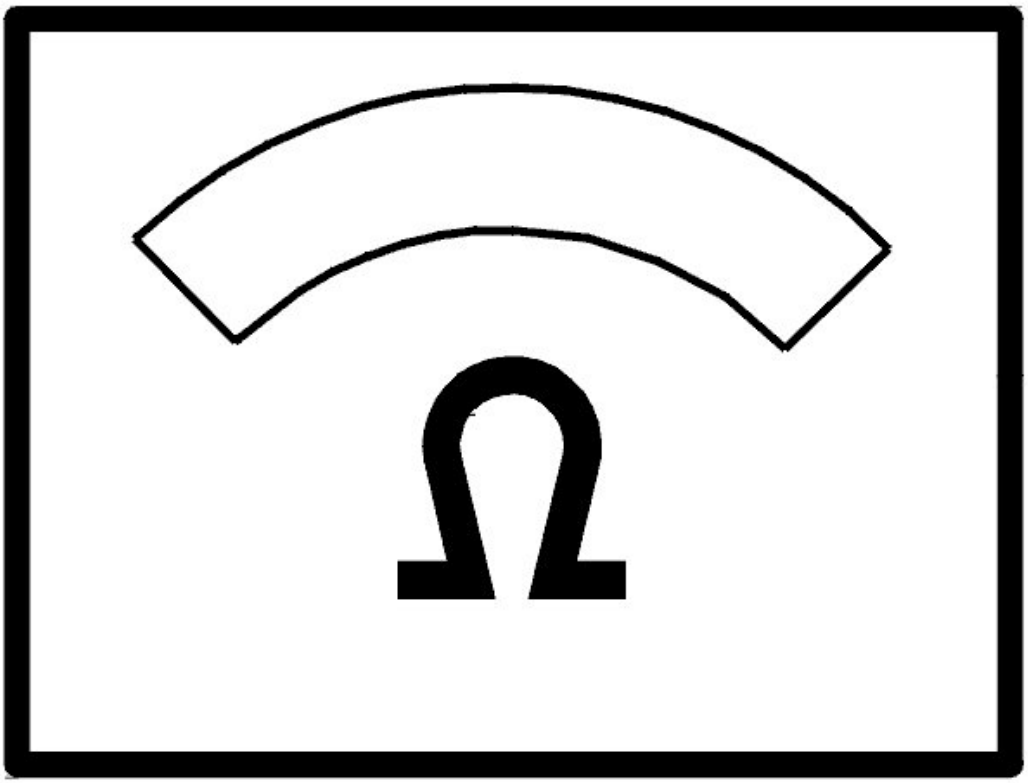
Hint: Check the integrated capacitor in the igniter connector: Measure the resistance.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

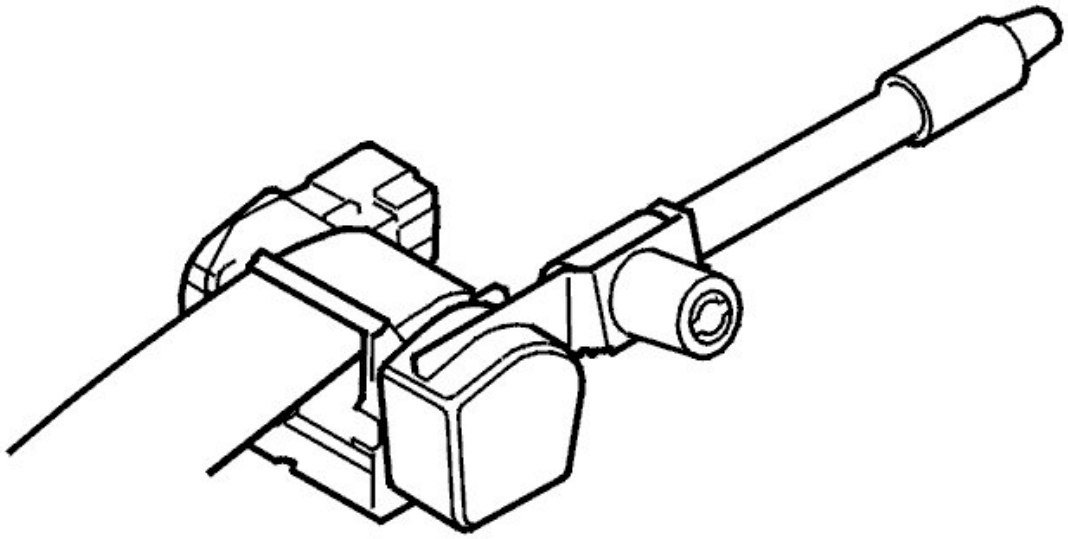
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0083 Diagnostic trouble code information

Condition



If the circuit capacitance is too low for more than 10 seconds, diagnostic trouble code SRS-0083 is displayed.

Substitute value
- Nothing.

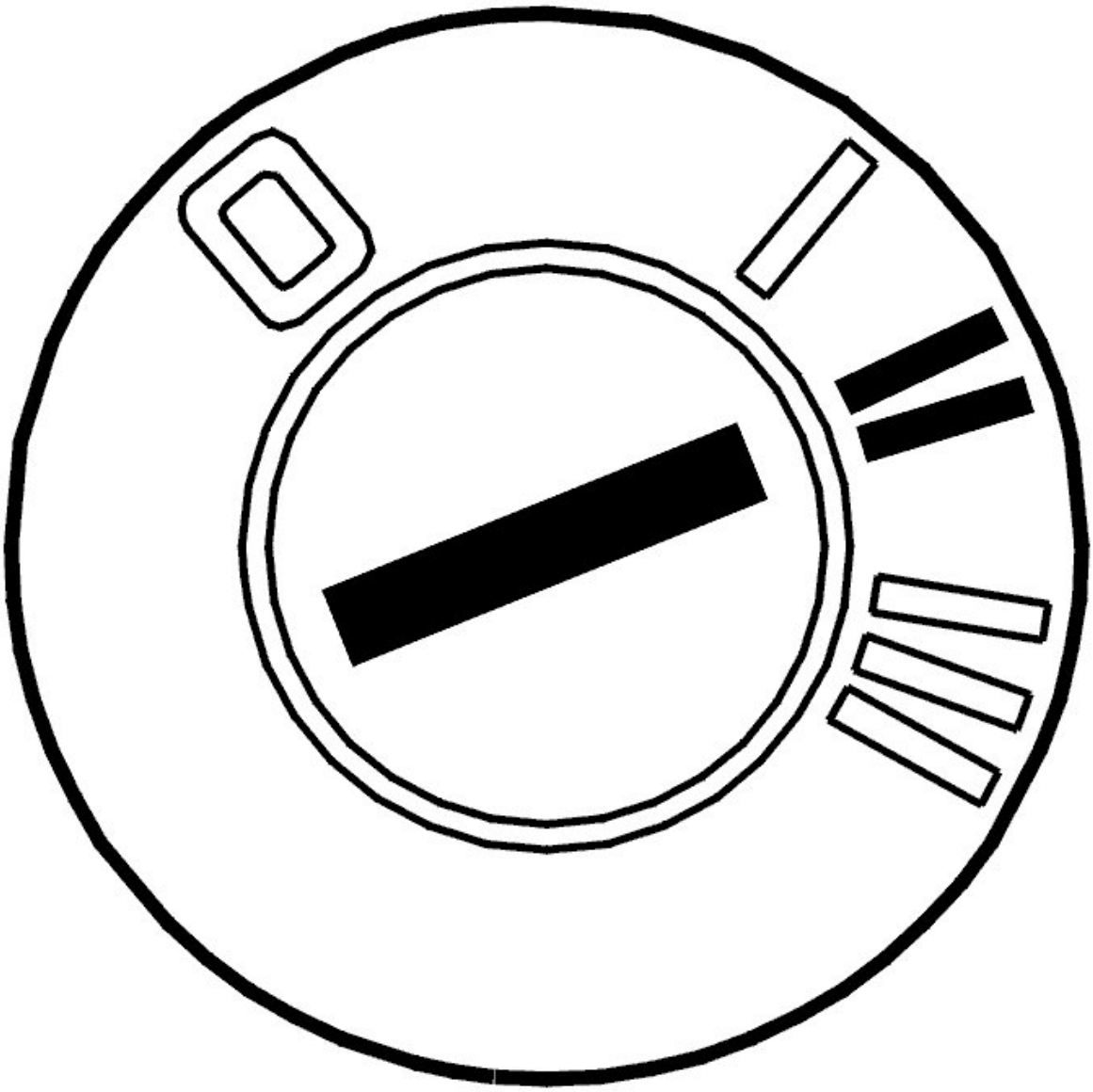
Possible source
- Capacitance too low in connector
- Capacitance too low in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS).

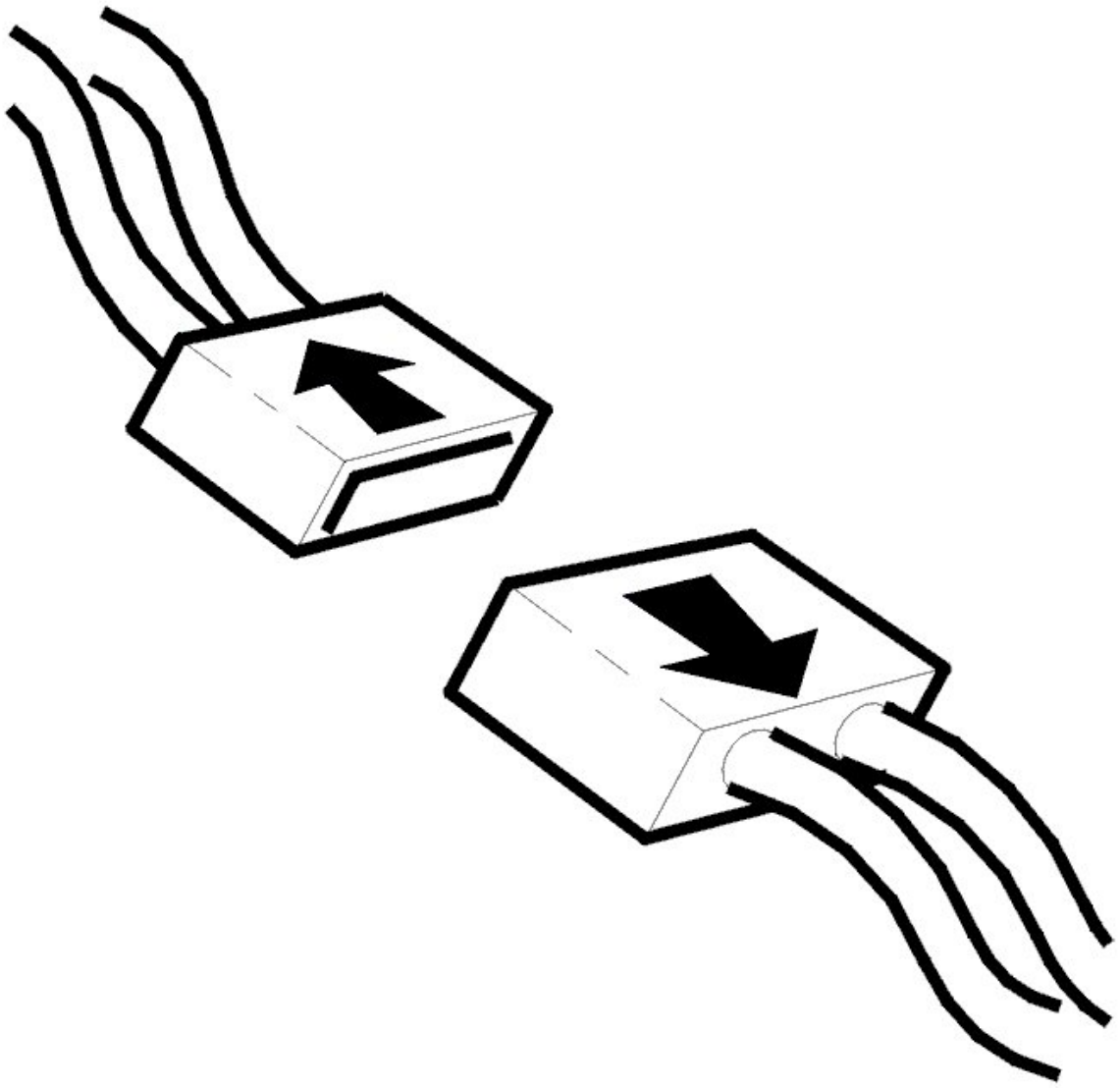
Fault symptom[s]
- Orange general warning lamp is on.

Capacitance Too Low

Capacitance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

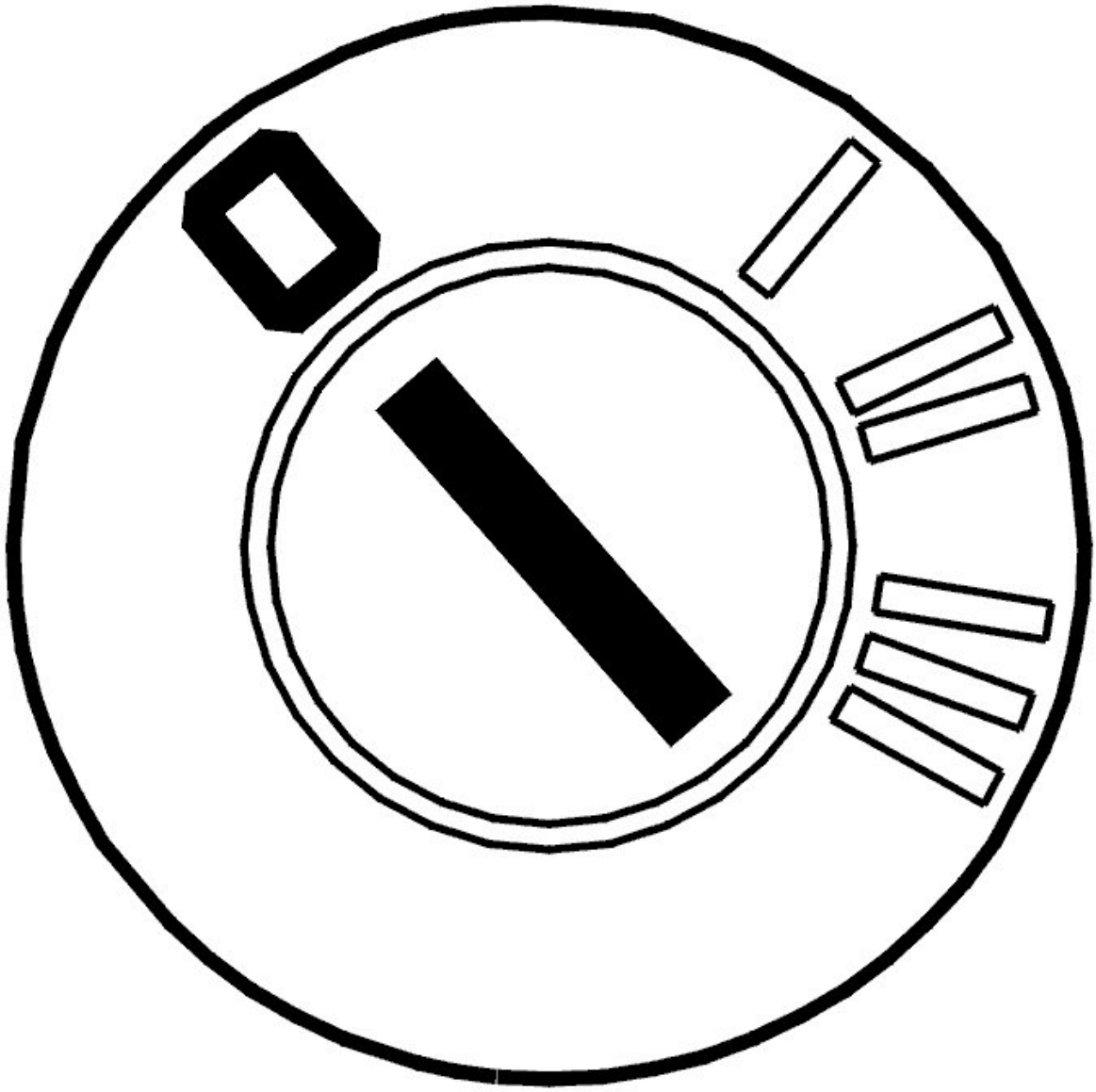
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0083 for the right seat belt tensioner is registered, follow fault-tracing for the centre seat belt tensioner (SRS-007B).- If diagnostic trouble code (DTC) SRS-007B for the centre seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0083).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0063,

front left seat belt tensioner terminals #5A(5) and #6A(6) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-006B,

front right seat belt tensioner terminals #5C(1) and #6C(2) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0073,

rear left seat belt tensioner terminals #16A(16) and #15A(15) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-007B,

centre rear seat belt tensioner terminals 17A(17) and #18A(18) and connector terminals #1 and #3

for diagnostic trouble code (DTC) SRS-0083,

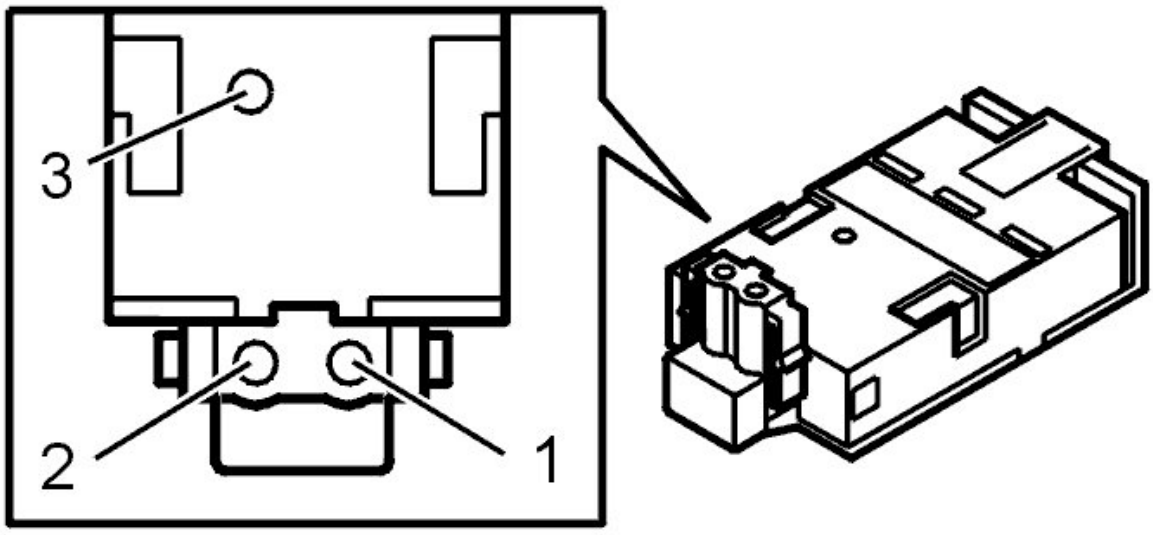
rear right seat belt tensioner terminals #16C(12) and #15C(11) and connector terminals #1 and #3
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

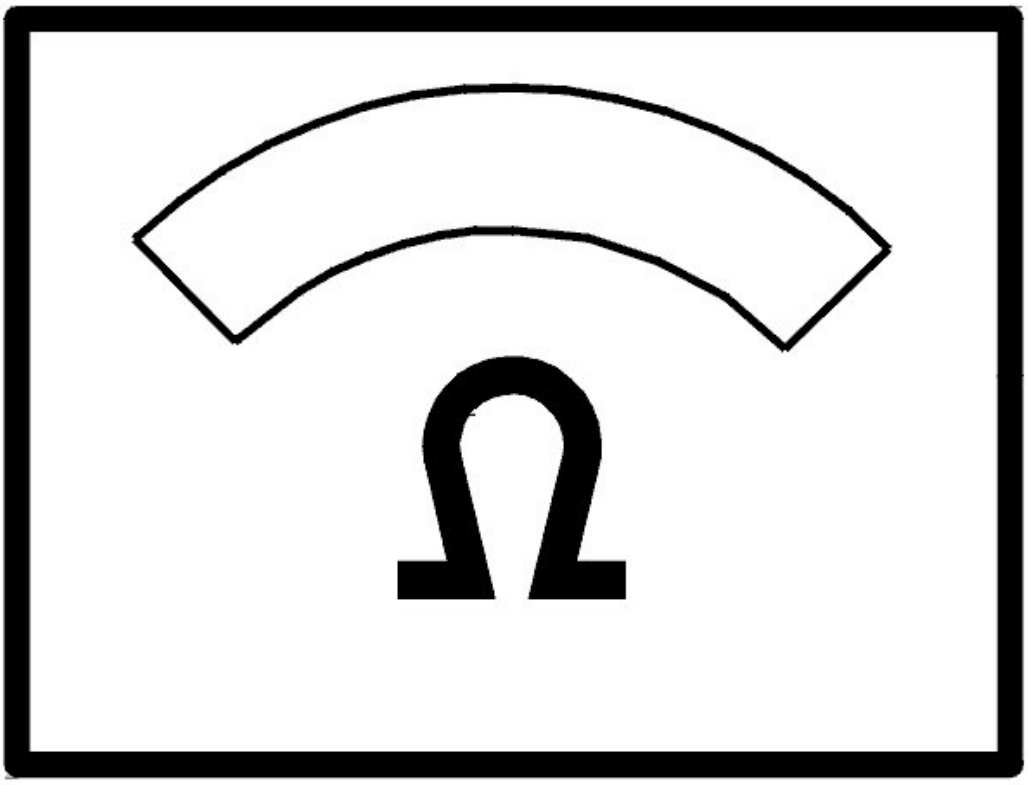
Hint: Checking the integrated capacitor in the igniter connector by taking resistance measurements.
With the ignition off, connect the test instrument probes between terminals #1 and #3 on the connector for the driver's airbag. The ohmmeter reading should rise rapidly to infinity.
Reverse the position of the ohmmeter positive and negative test probes. Connect them to the connector as in the previous measurement. The ohmmeter reading should drop rapidly to approximately 0 ohms and then increase to infinity.

Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing.
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS).
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

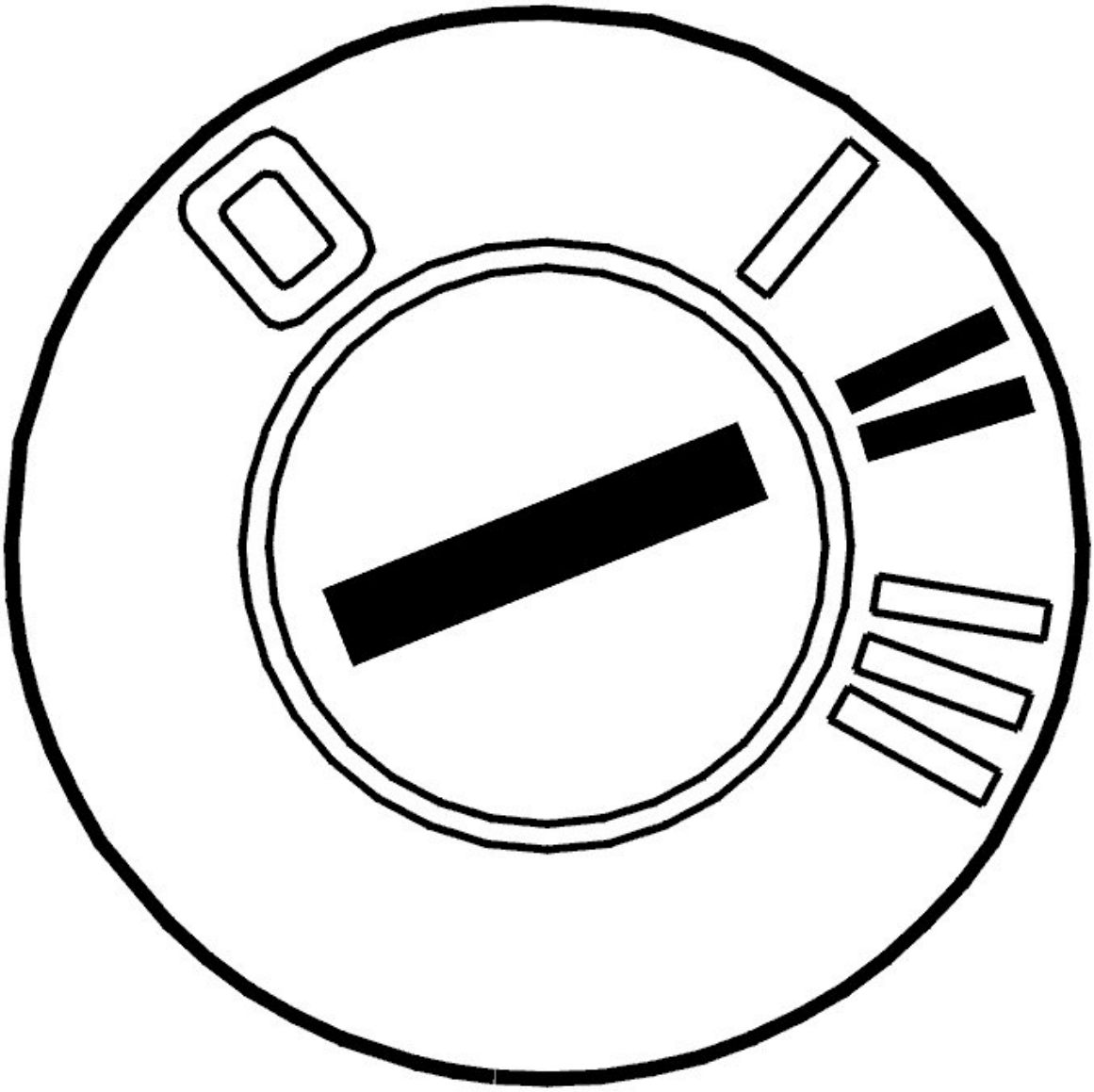
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

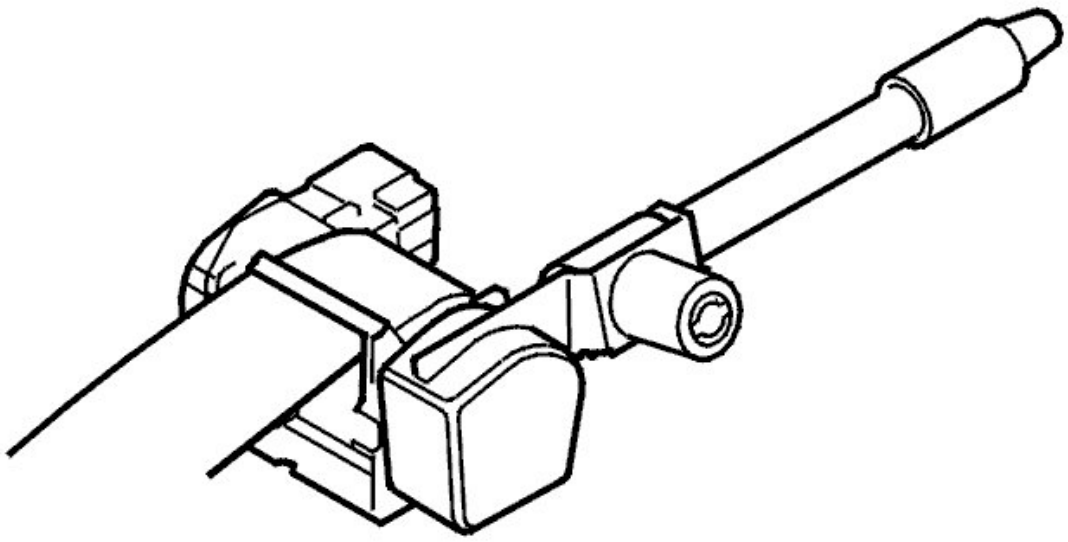
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0084 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0084 is displayed.

Substitute value
- Nothing.

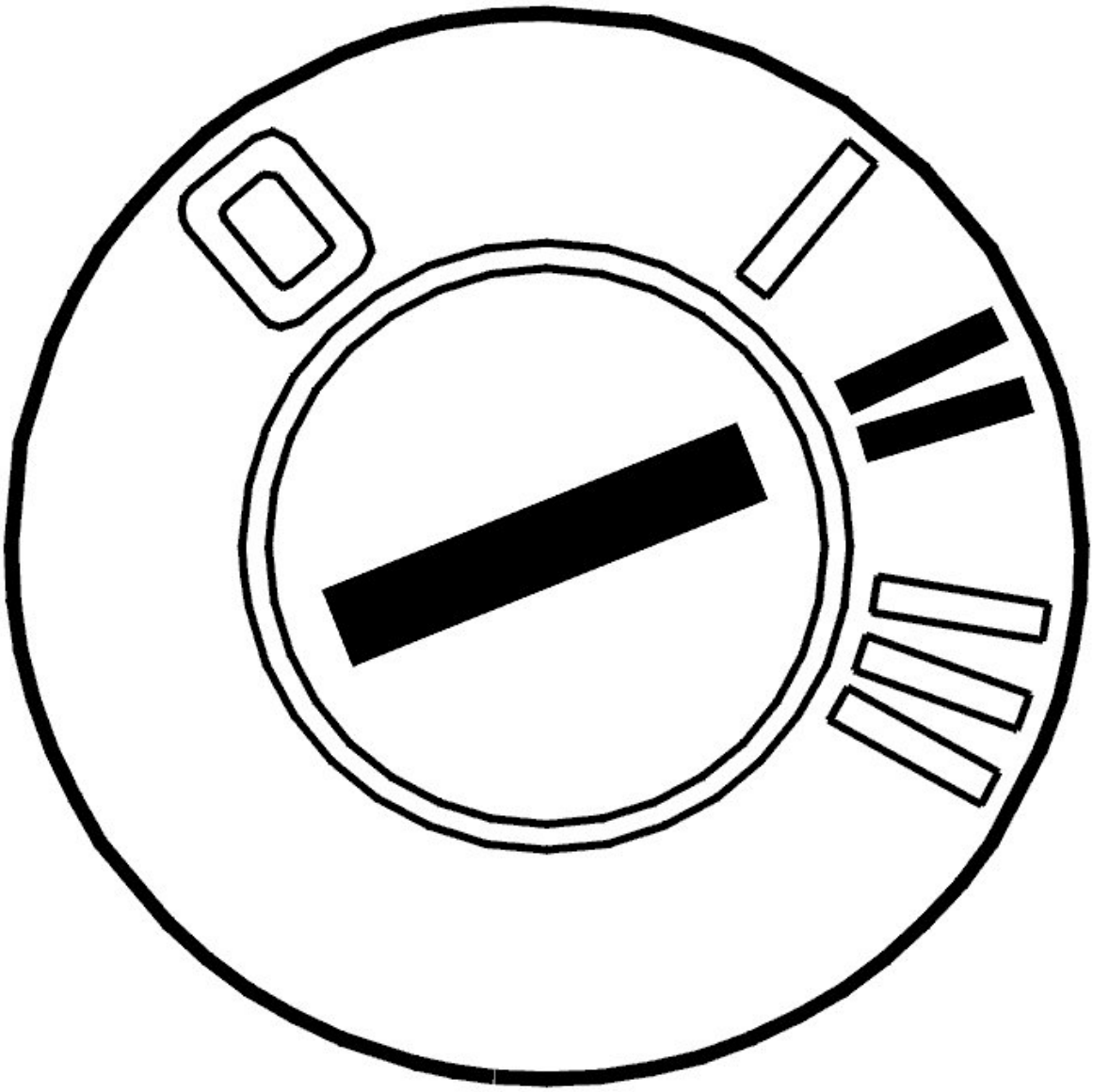
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

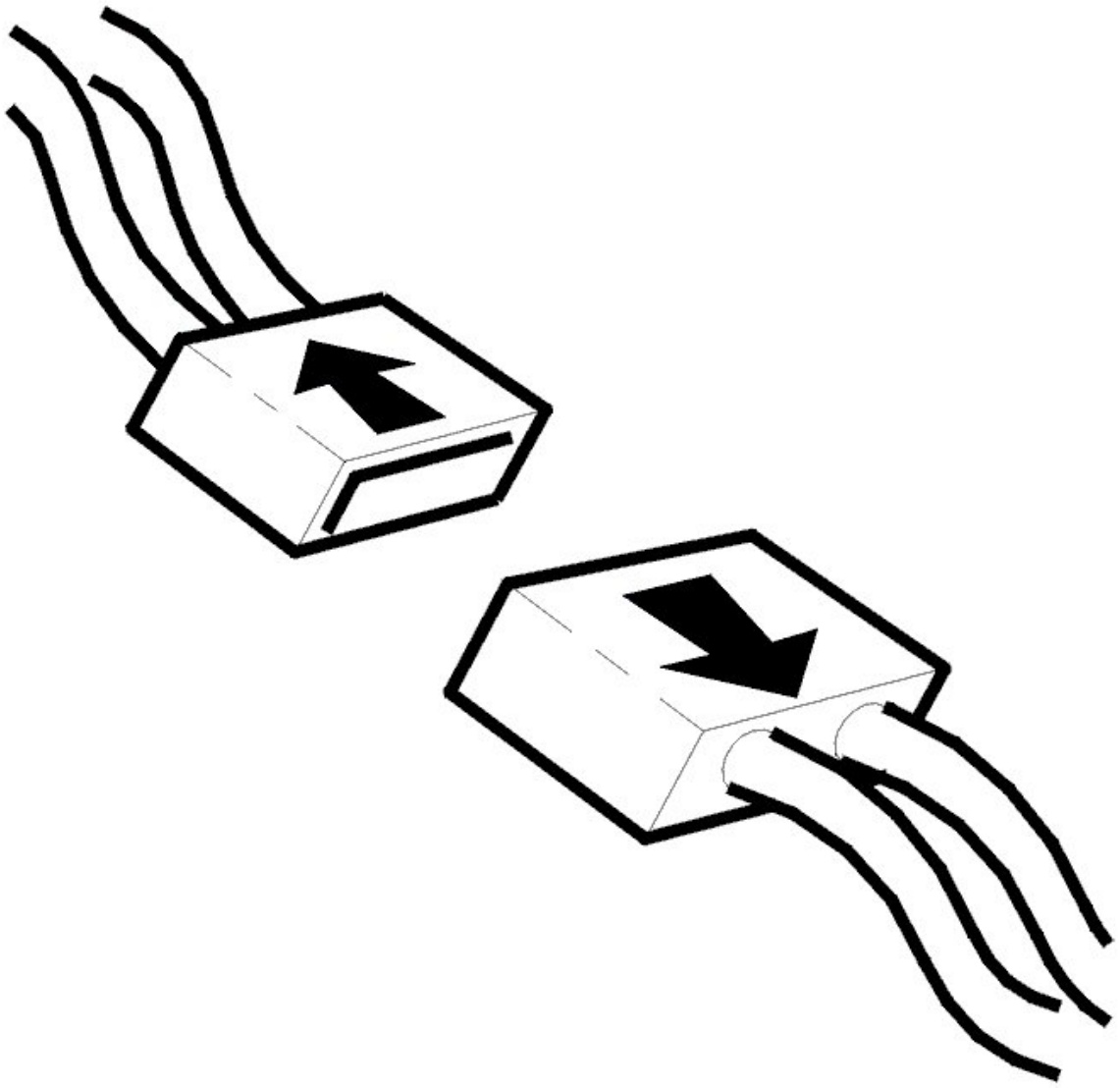
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

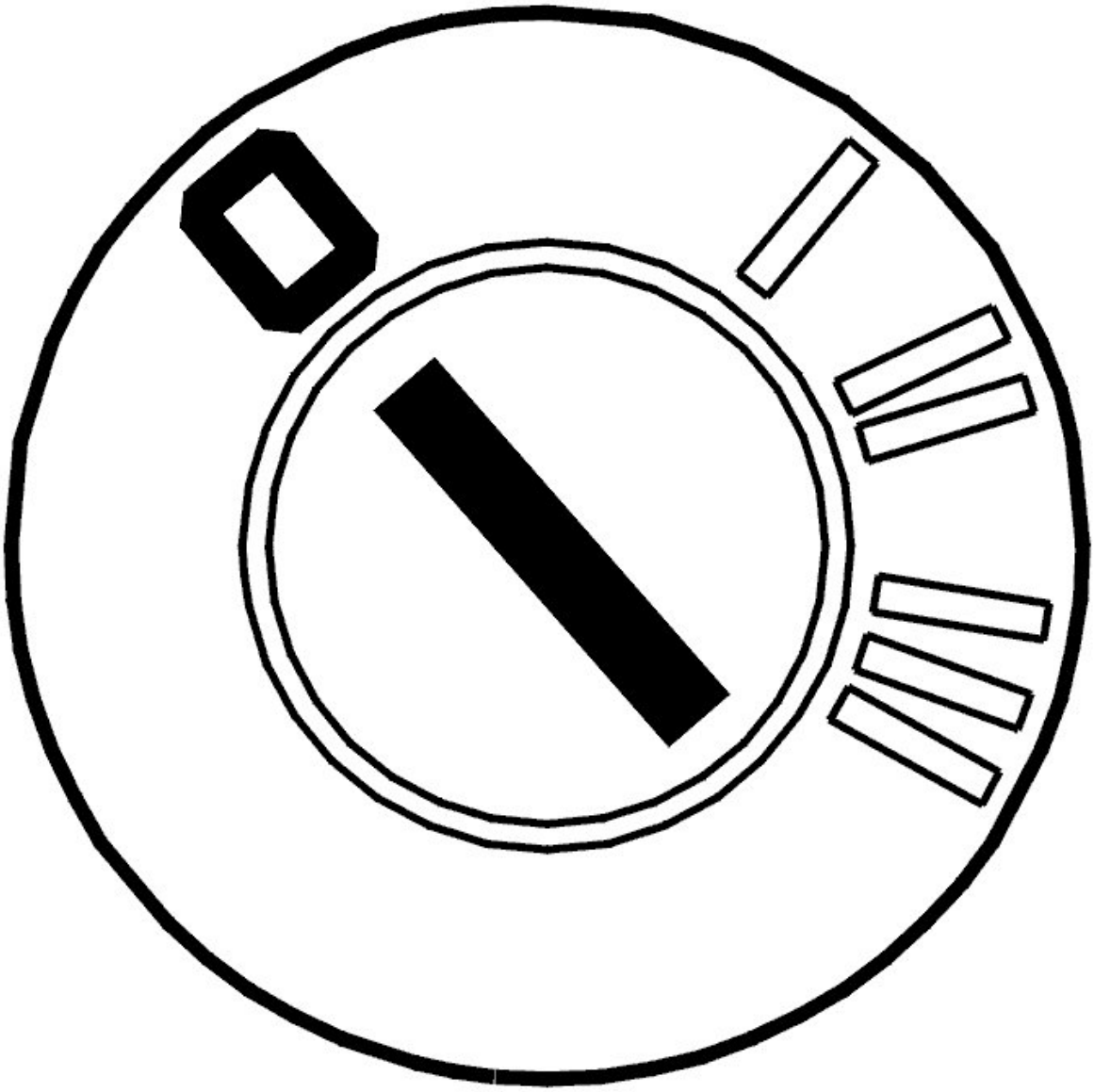
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

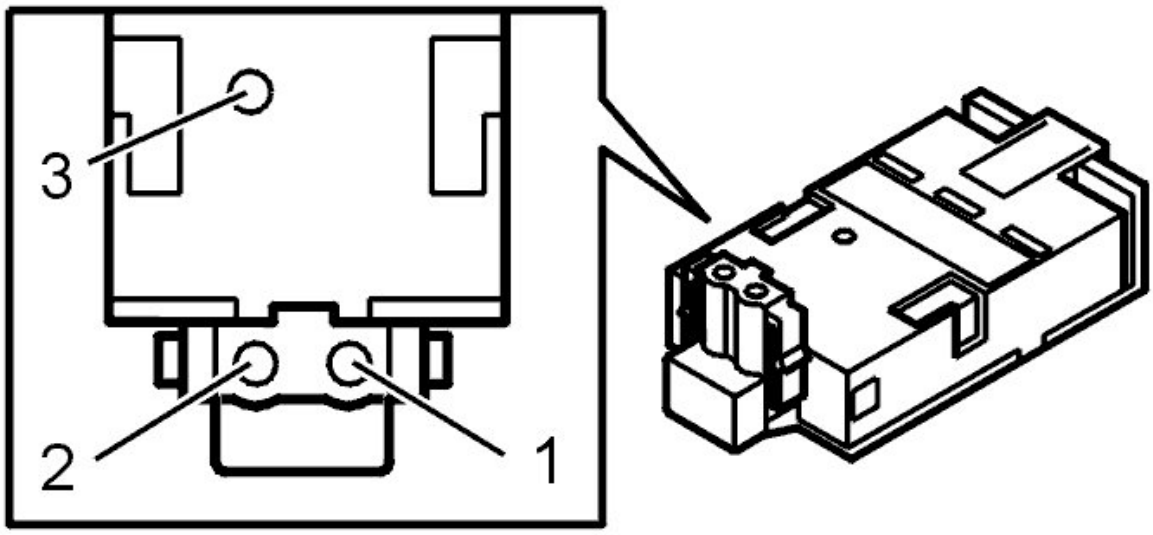
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

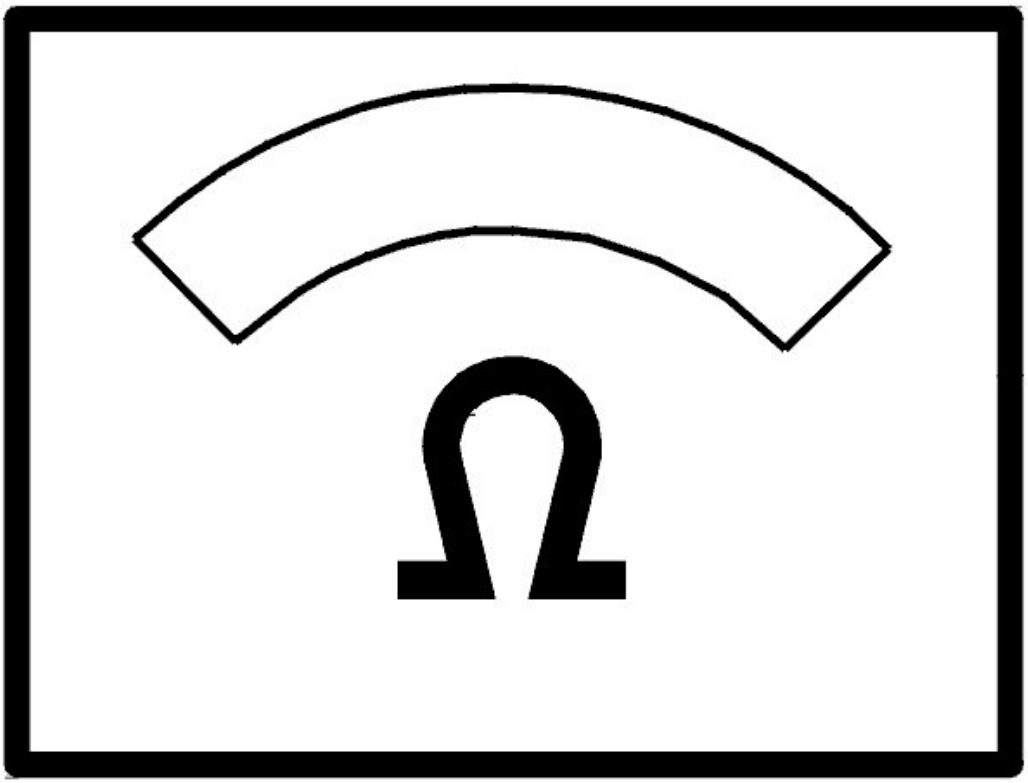
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) should be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

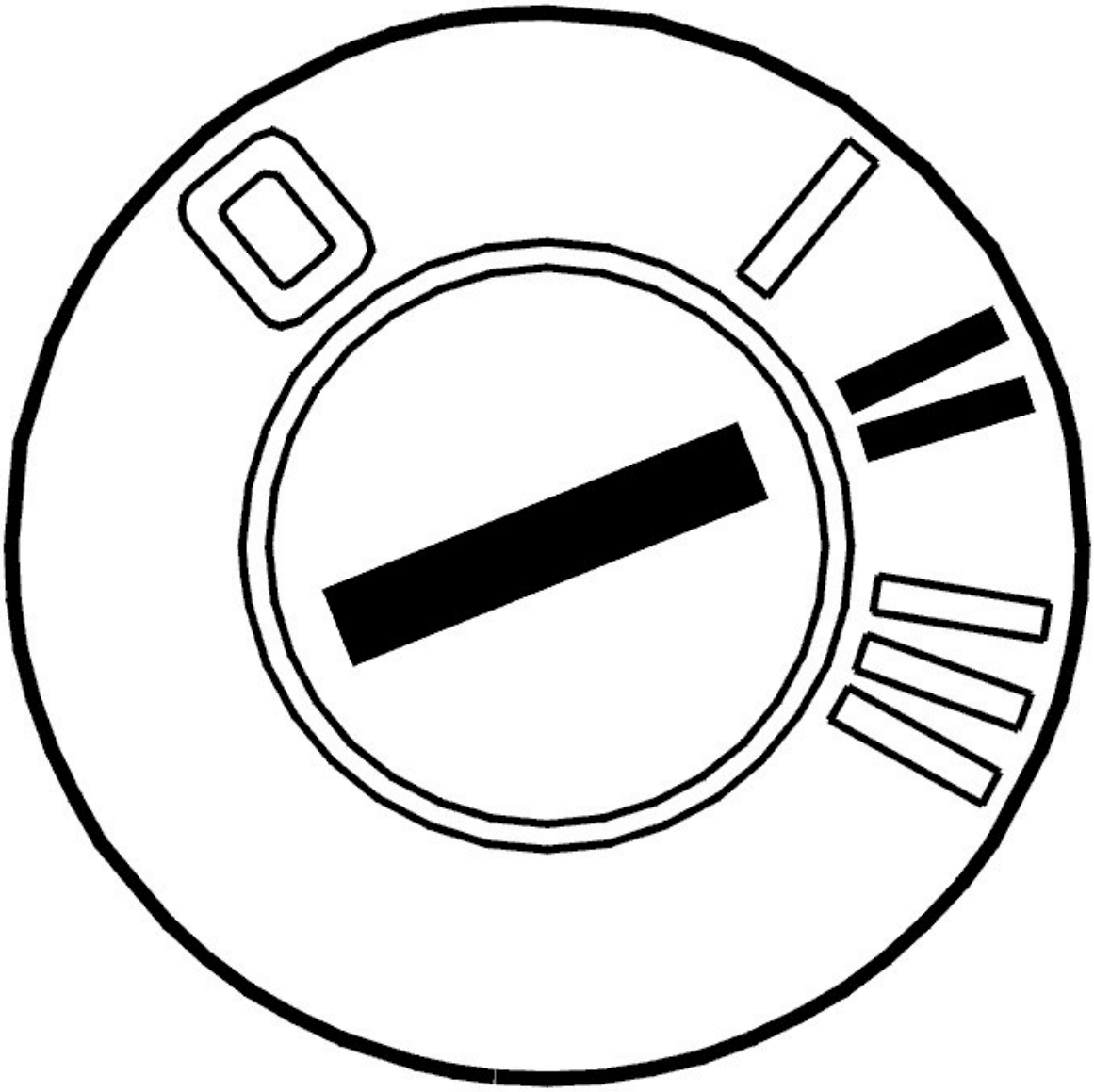
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

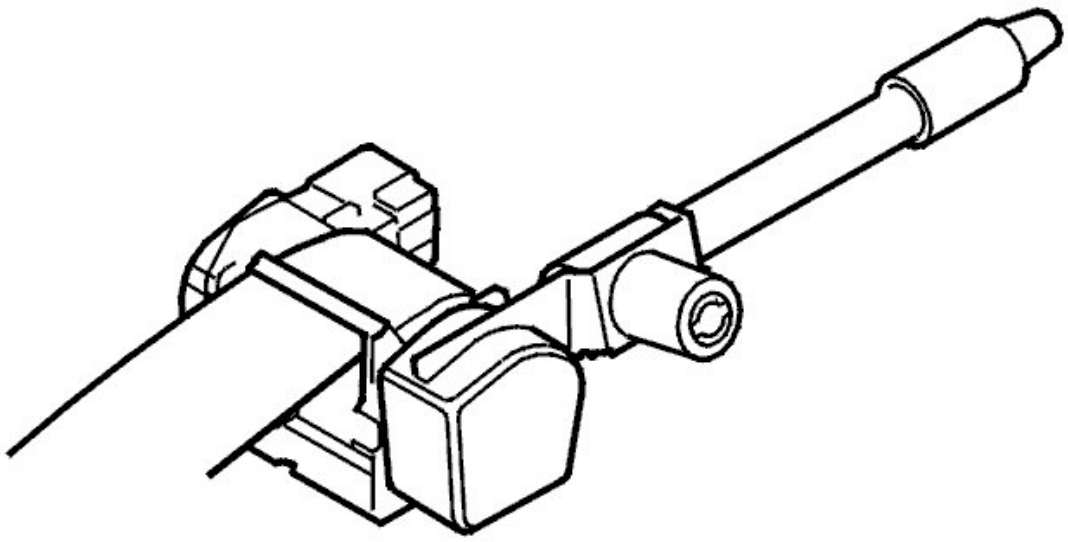
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0084 Diagnostic trouble code information

Condition



If the circuit resistance is too high for more than 10 seconds, diagnostic trouble code SRS-0084 is displayed.

Substitute value
- Nothing.

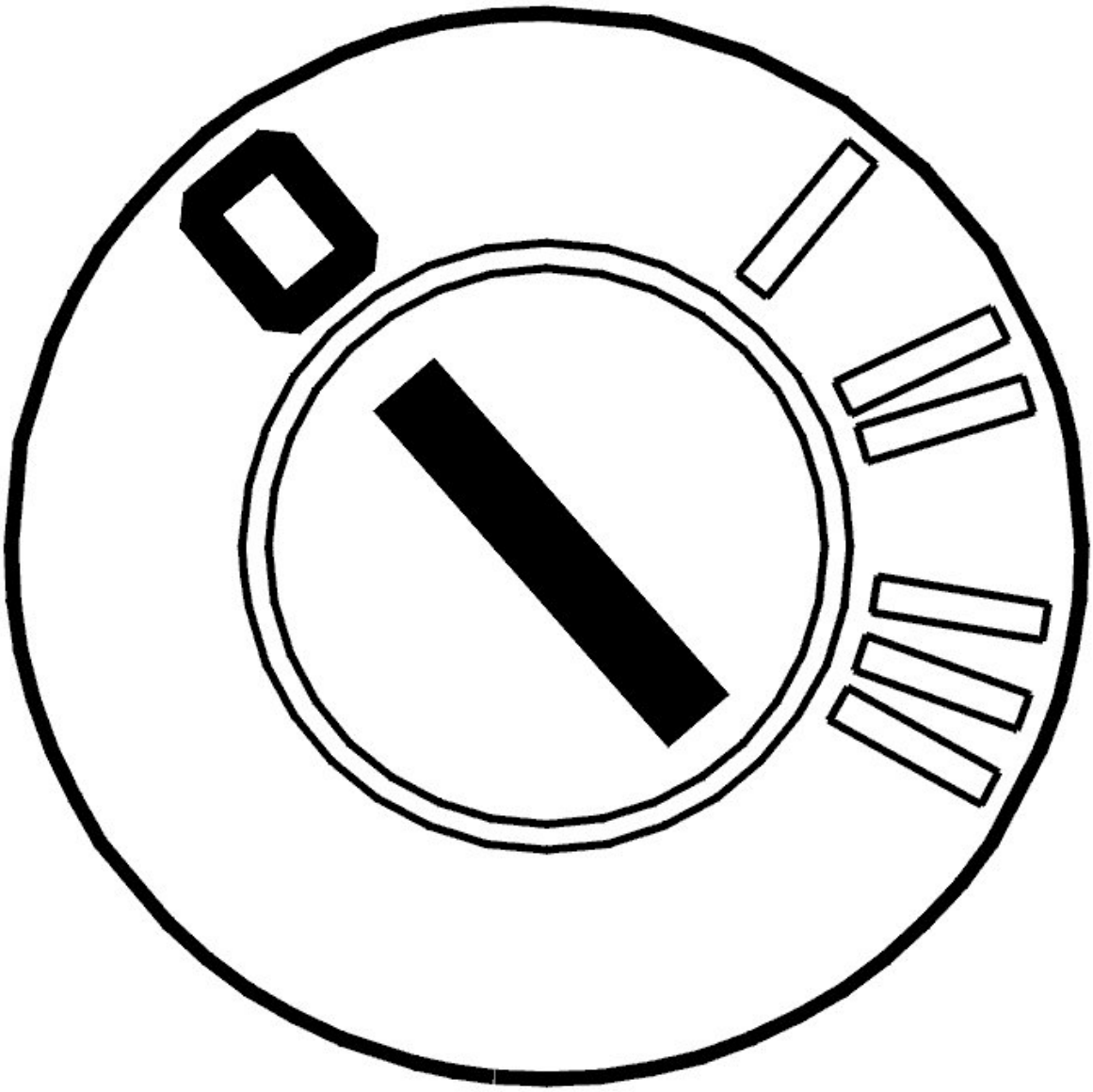
Possible source
- Contact resistance or open circuit in the wire between the seat-belt tensioner and supplemental restrain system (SRS)
- Open circuit in seat-belt tensioner (resistance in igniter too high).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too High

Resistance too high. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the female and male parts of the connectors for the SRS control module and the seat belt tensioner. The cable terminals must not be damaged or pressed back.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0084 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007C).- If diagnostic trouble code (DTC) SRS-007C for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0084).

Check the cable between the SRS control module and the terminal on the seat belt tensioner connector according to the following:

for diagnostic trouble code (DTC) SRS-0064,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006C,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0074,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007C,

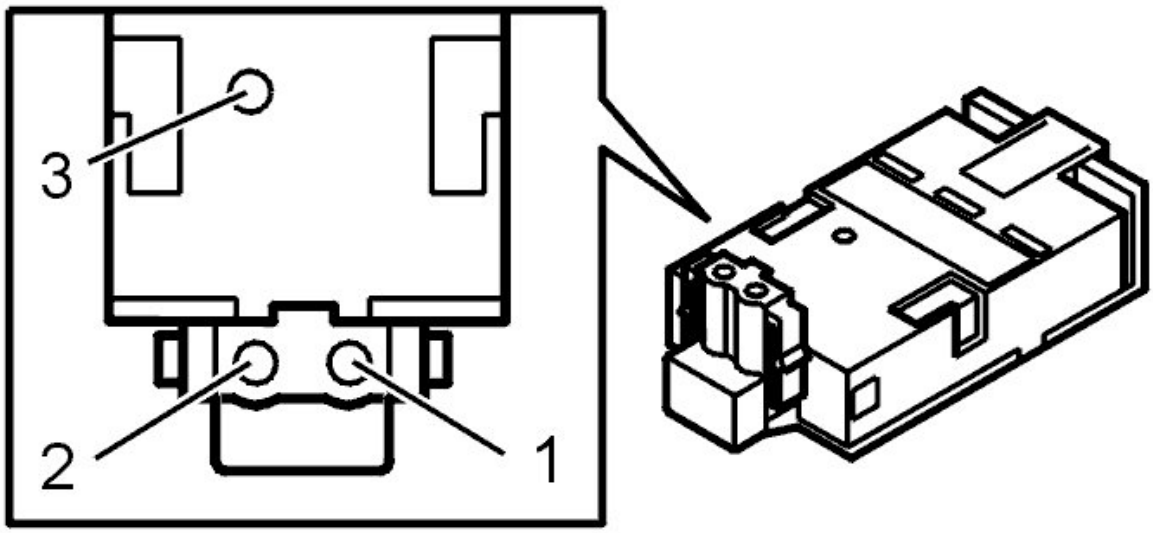
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

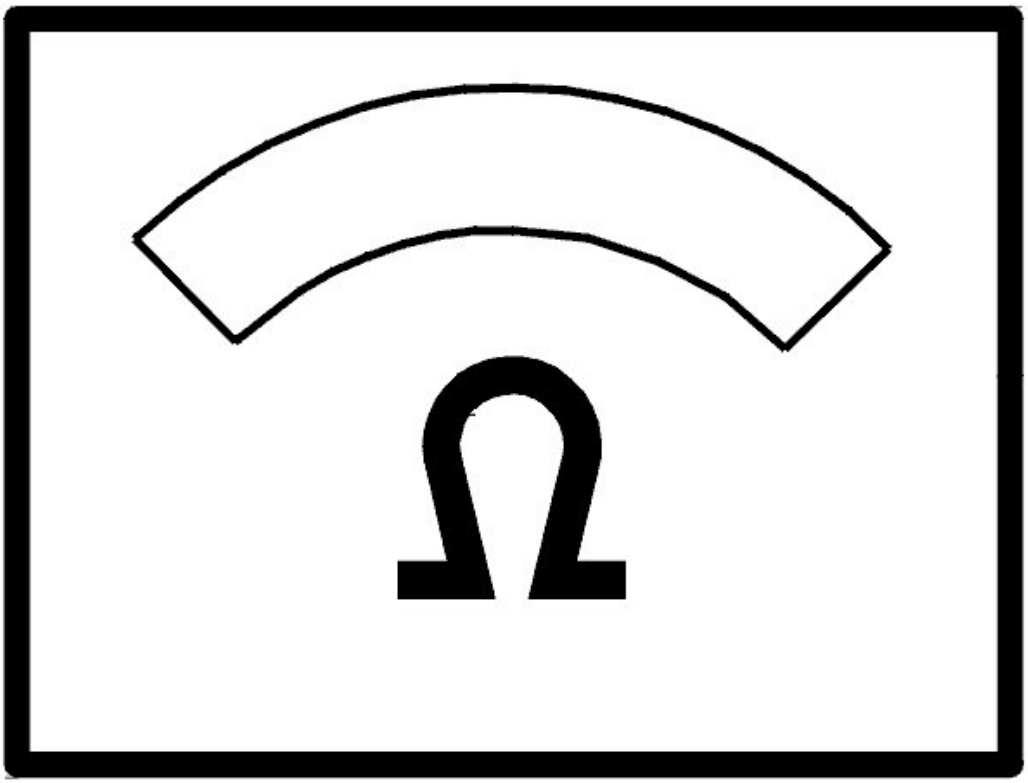
for diagnostic trouble code (DTC) SRS-0084,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner connector disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) must be approximately 22 kohms.
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

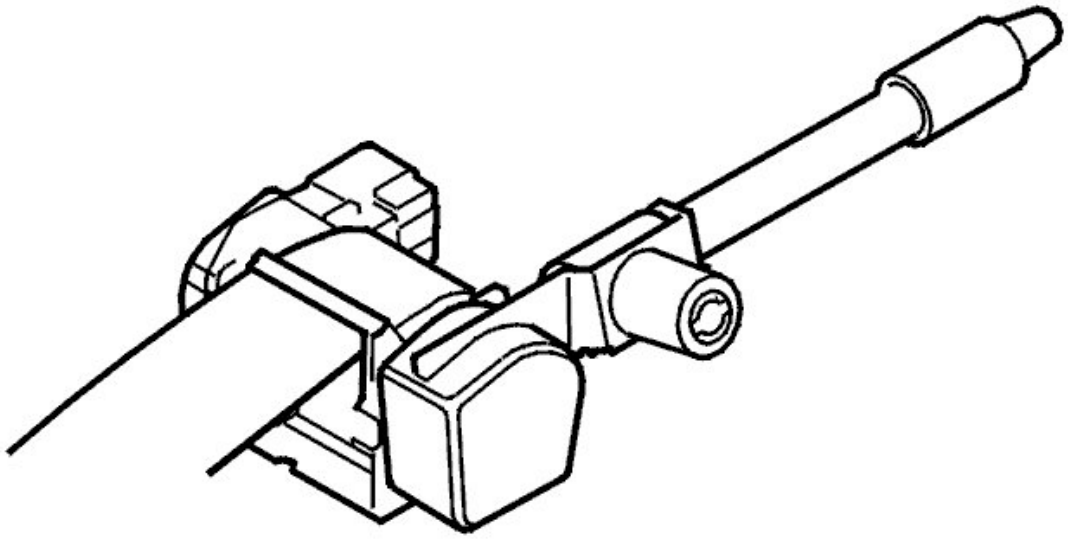
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0085 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0085 is displayed.

Substitute value
- Nothing.

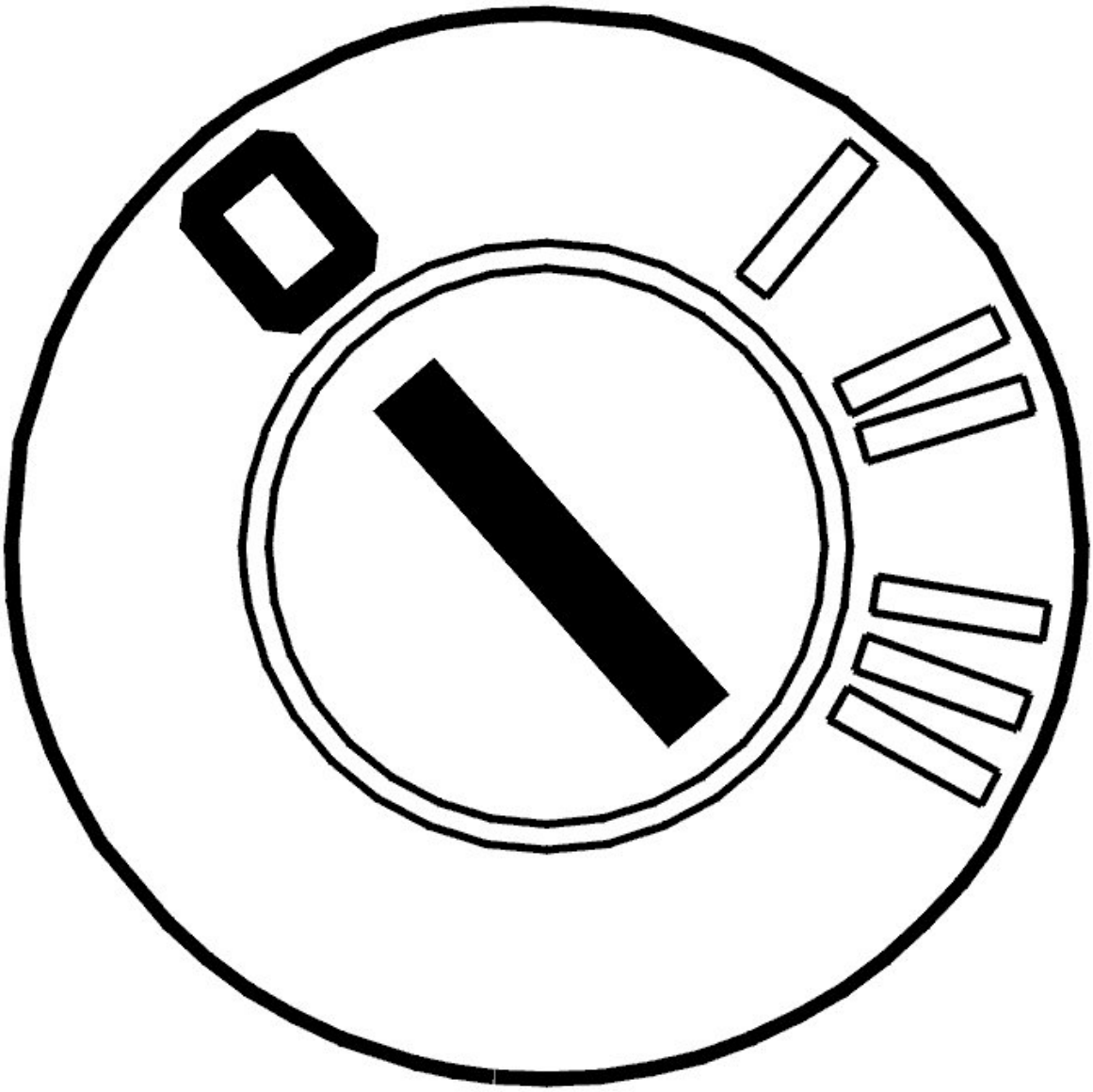
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Intermittent fault

Intermittent fault



- Ignition off.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the SRS module and seat belt tensioner. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

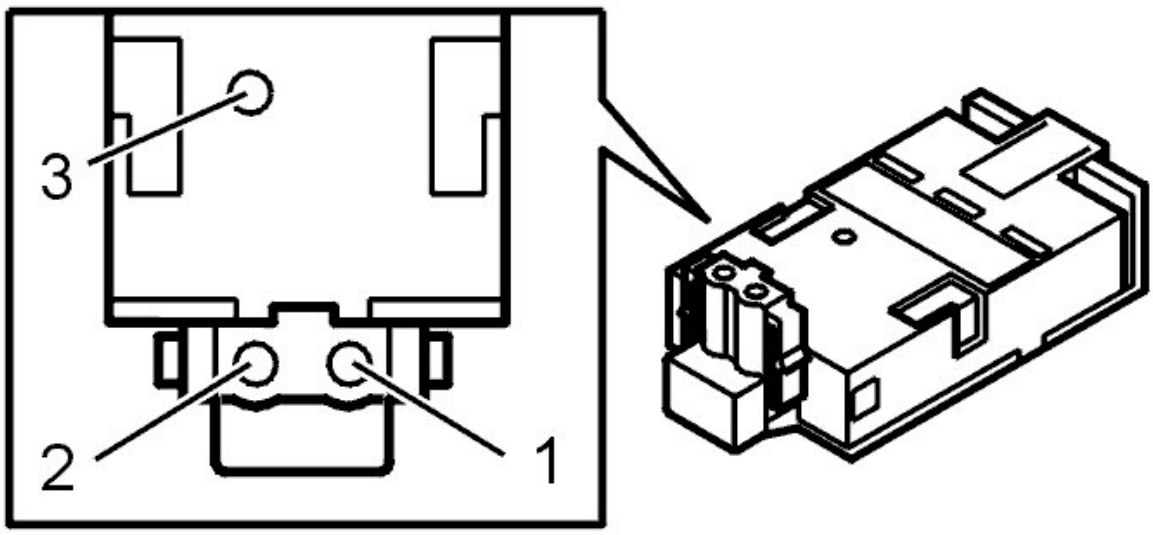
terminals #17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

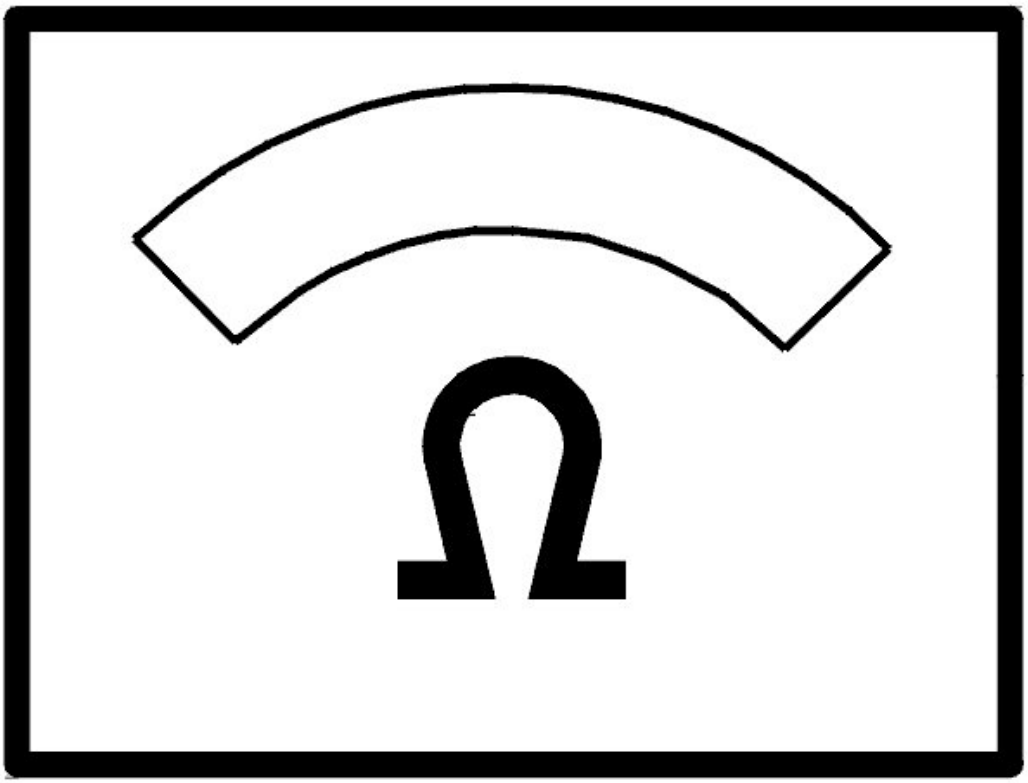
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

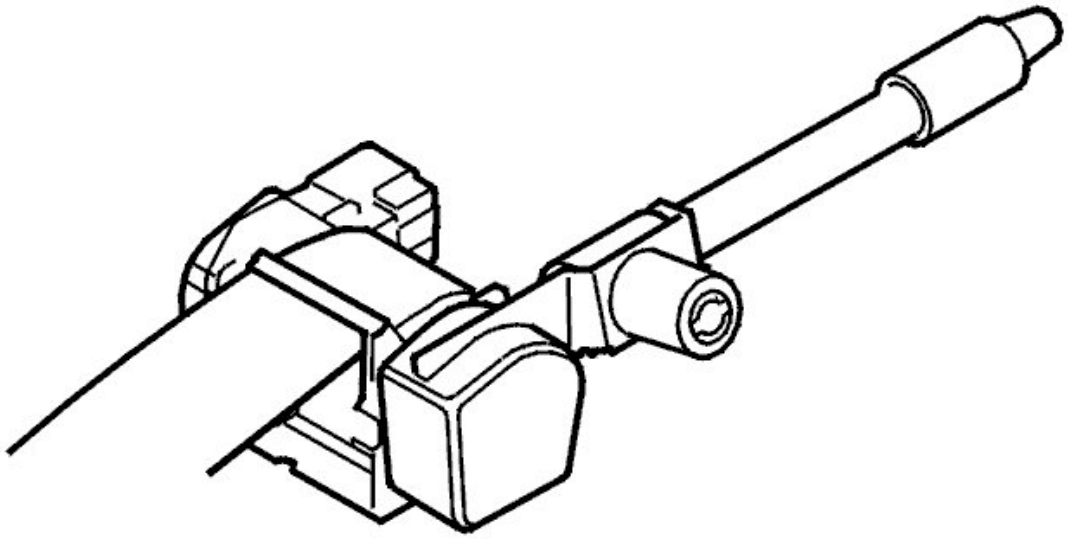
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-0085 Diagnostic trouble code information

Condition



If the circuit resistance is too low for more than 10 seconds, diagnostic trouble code SRS-0085 is displayed.

Substitute value
- Nothing.

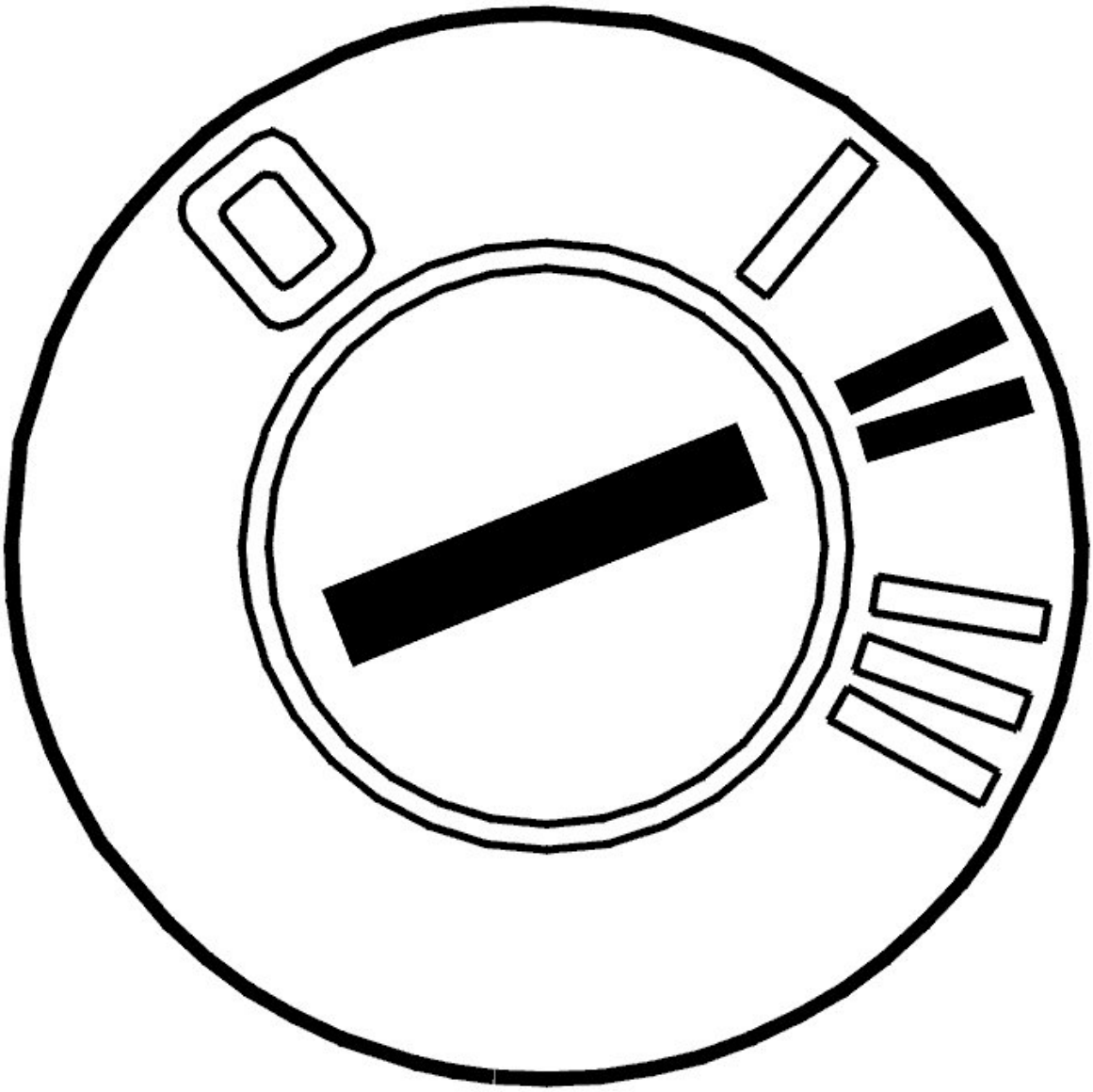
Possible source
- Short circuit in connector
- Short circuit in the signal wire between seat-belt tensioner and the supplemental restrain system (SRS)
- Short circuit in seat-belt tensioner (resistance in igniter too low).

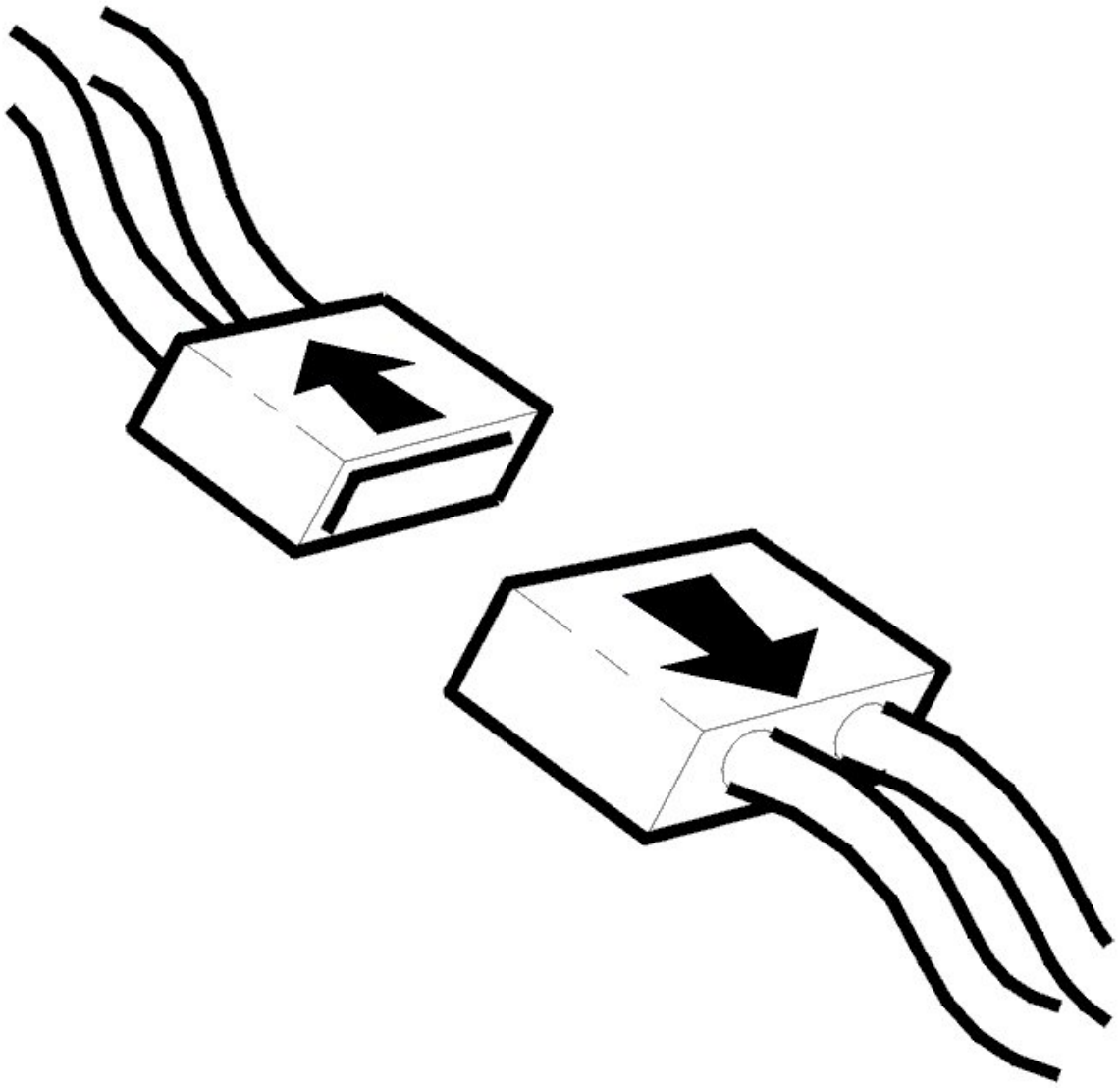
Fault symptom[s]
- Orange general warning lamp is on.

Resistance Too Low

Resistance too low. Permanent fault

Checking the component





- Ignition off
- Disconnect the connector from the seat belt tensioner
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

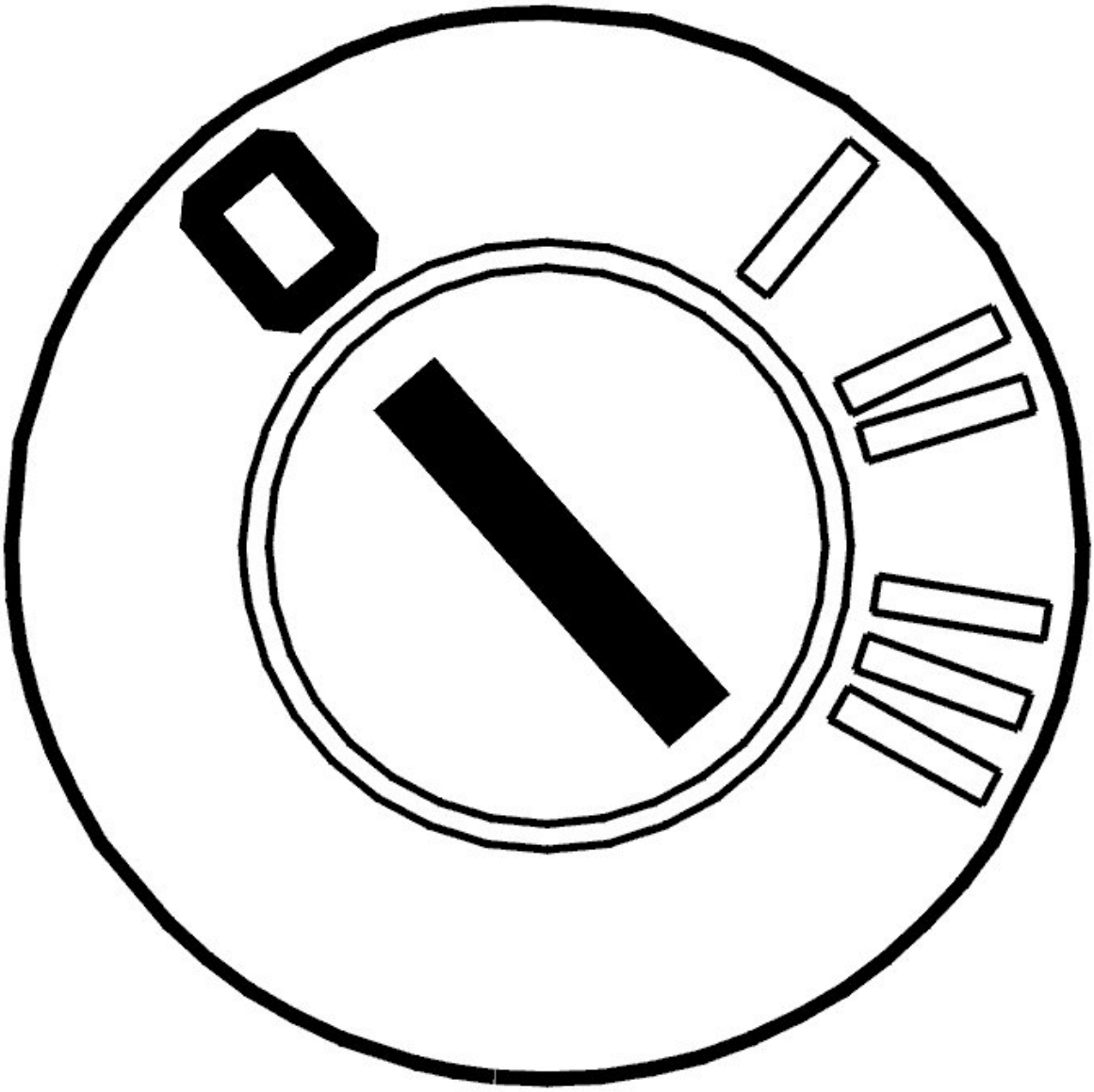
- To replace the front seat belt tensioner, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat. To replace the rear seat belt tensioner, see Buckle seat belt rear, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Buckle Seat Belt Rear, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Caution! For V70 2000- with model year 2000 and 2001:- If diagnostic trouble code (DTC) SRS-0085 for the right seat belt tensioner is registered, follow fault-tracing for the center seat belt tensioner (SRS-007D).- If diagnostic trouble code (DTC) SRS-007D for the center seat belt tensioner is registered, follow fault-tracing for the right seat belt tensioner (SRS-0085).

Check the cable between the SRS control module and the connector terminal for the seat belt tensioner as follows:

for diagnostic trouble code (DTC) SRS-0065,

terminals #5A(5), #6A(6) of the front left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-006D,

terminals #5C(1), #6C(2) of the front right seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-0075,

terminals #16A(16), #15A(15) of the rear left seat belt tensioner and connector terminals #1, #3.

for diagnostic trouble code (DTC) SRS-007D,

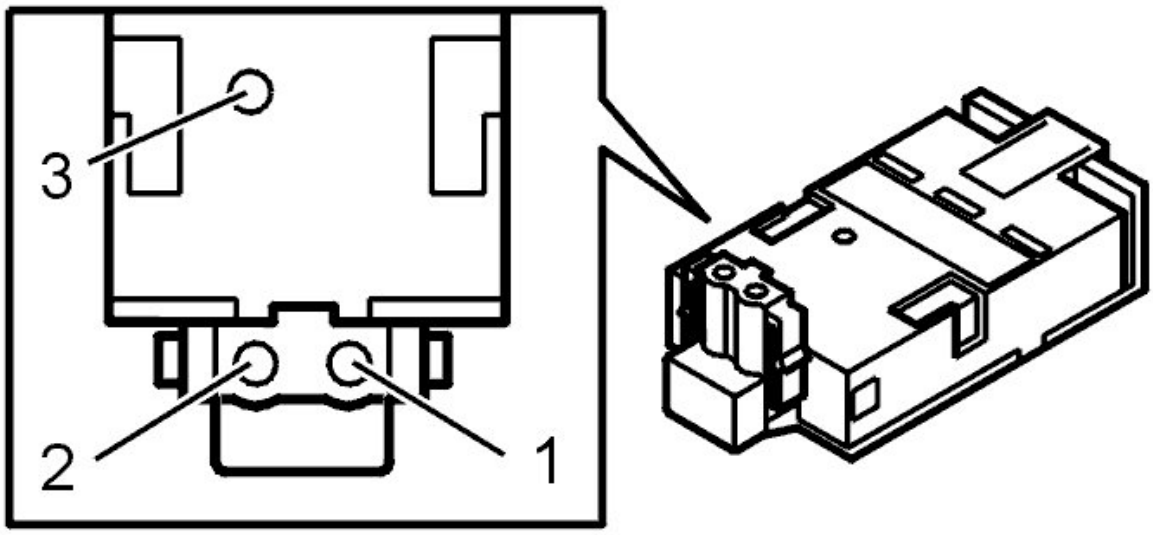
terminals 17A(17), #18A(18) of the center rear seat belt tensioner and connector terminals #1, #3.

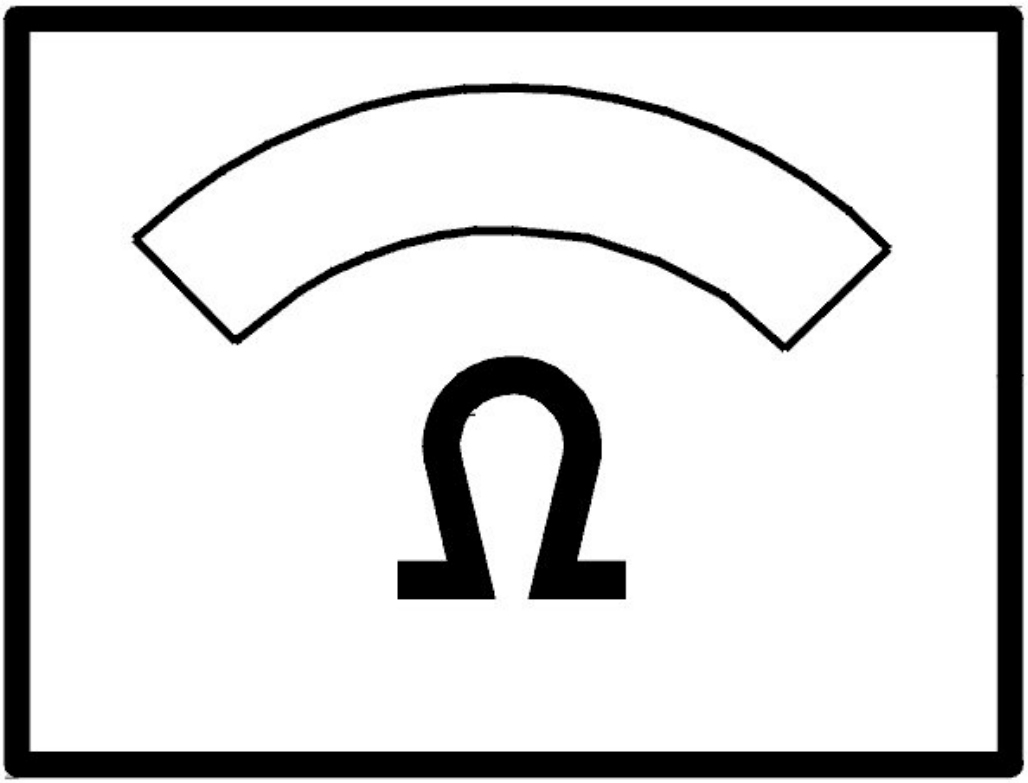
for diagnostic trouble code (DTC) SRS-0085,

terminals #16C(12), #15C(11) of the rear right seat belt tensioner and connector terminals #1, #3.
for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connector for the seat belt tensioner and the SRS control module disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (SRS control module side) must be infinite
- With the ignition off and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the different terminals for each diagnostic trouble code (DTC) (see above) on the SRS control module connector (seat belt tensioner side) must be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

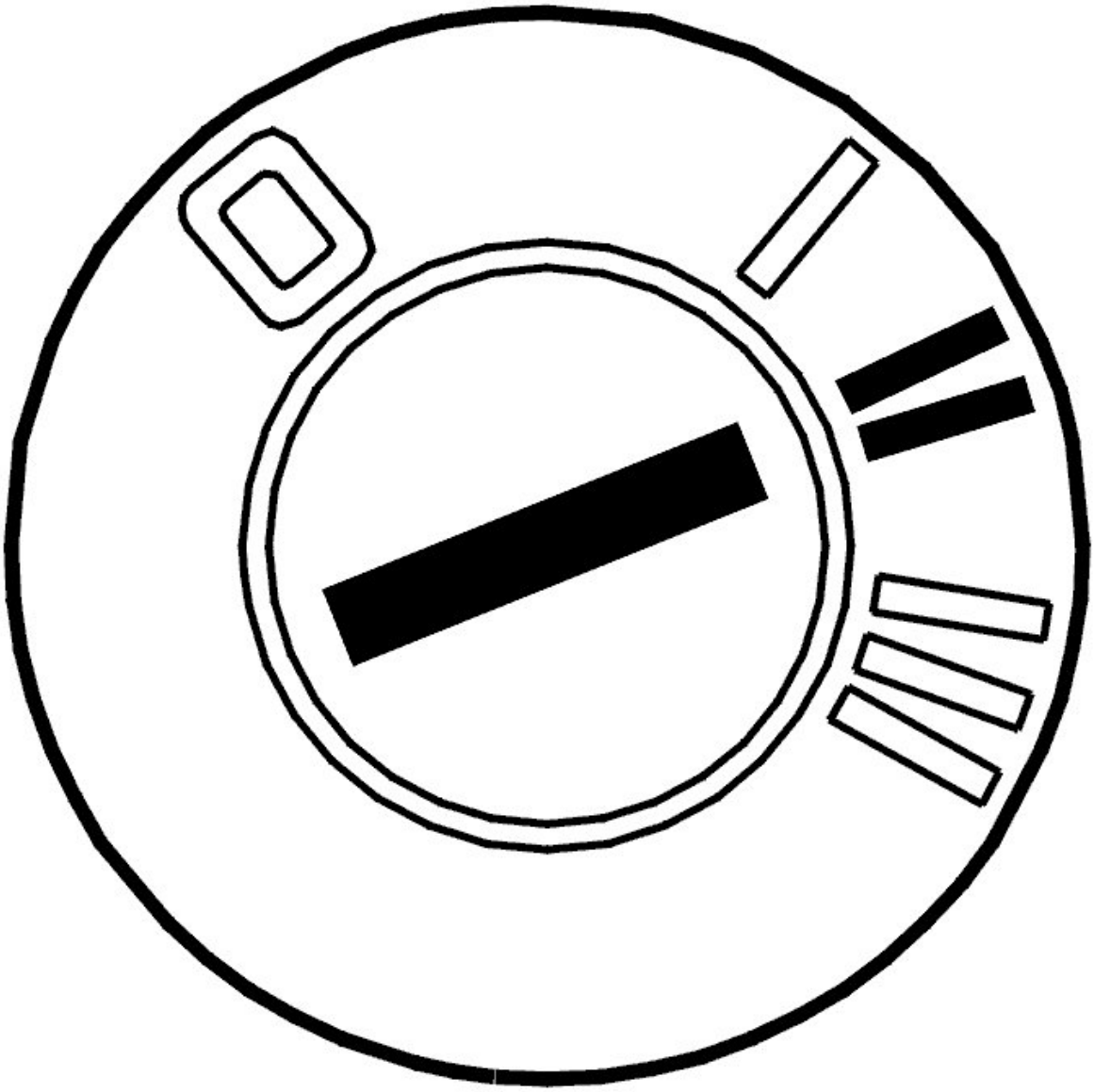
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

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VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

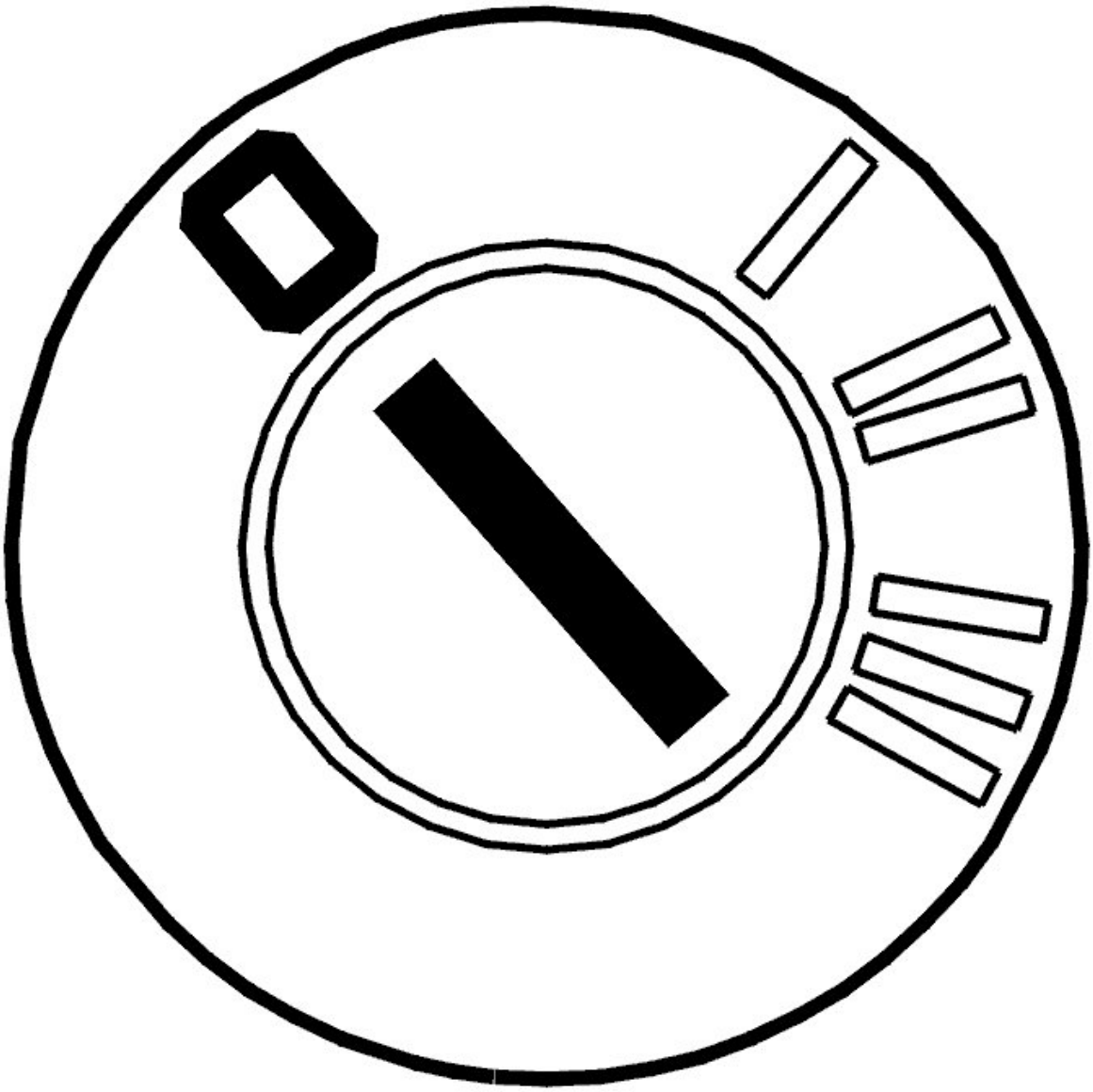
Fault symptom[s]

Orange general warning lamp is on.

Configuration Fault

Configuration fault. Permanent fault

Checking the component

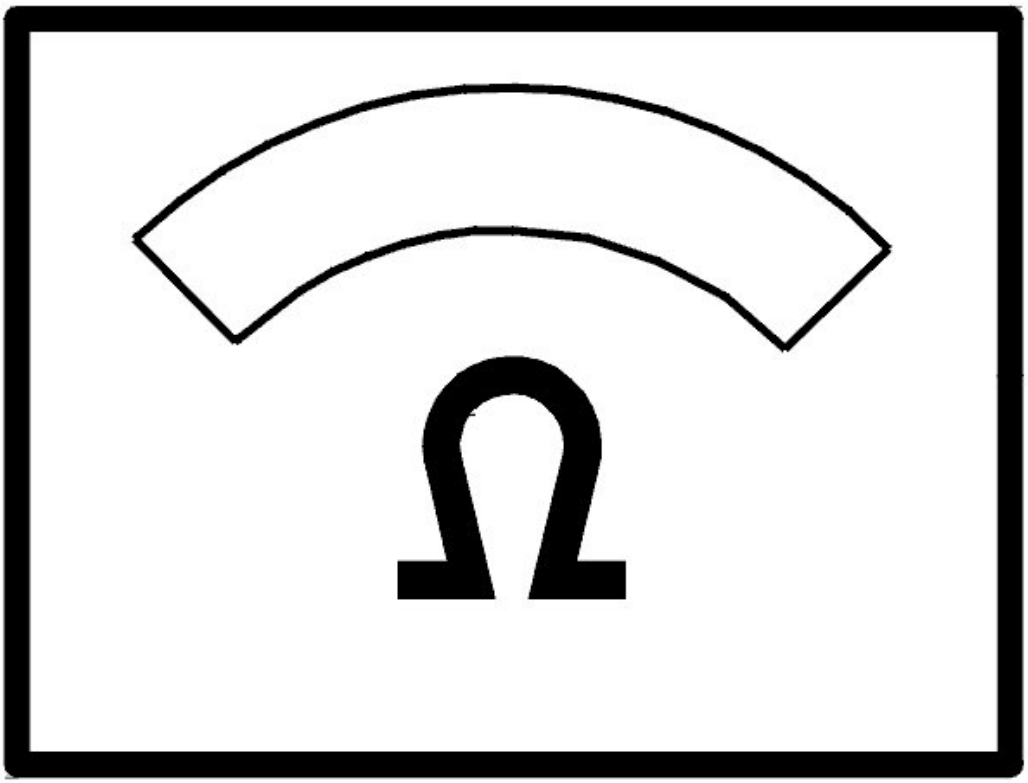


- Ignition off.

Check that the wiring from the seat belt tensioners is correctly connected to the control module.
Check that nothing in the connector connected to the control module or in the control module connector is short-circuited.
Replace the control module if no fault is found.

Other information:

- To access and replace the SRS control module connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

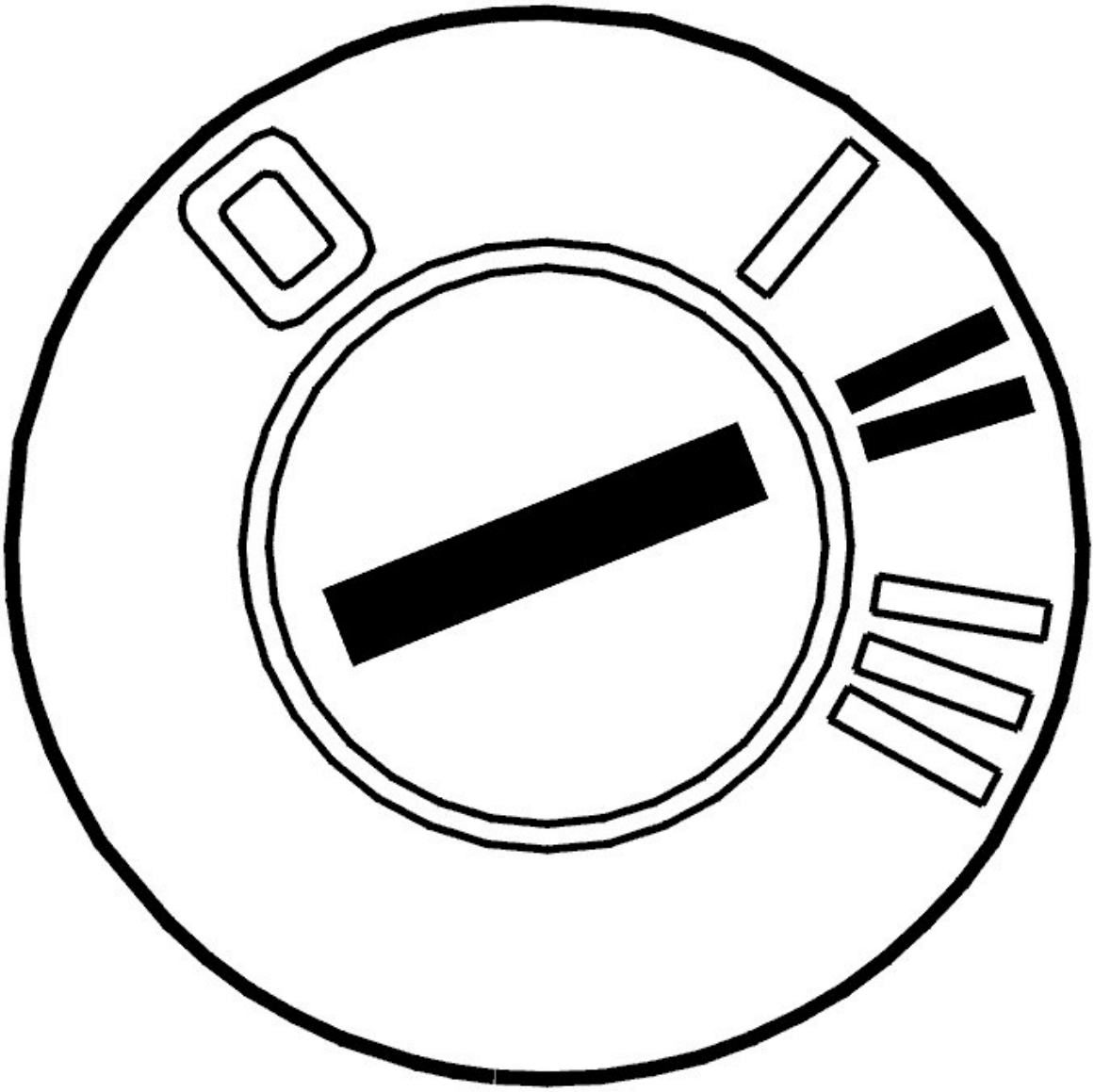
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the respective circuit resistance is below 12 (for more than 10 seconds, one of the following diagnostic trouble codes is displayed:
SRS-0076
SRS-007E
SRS-0086
depending on which circuit is faulty.

Possible source

- The supplemental restrain system (SRS) control unit registers that a seat belt tensioner is installed when the control unit is not programmed for a seat belt tensioner to be installed.

Fault symptom[s]

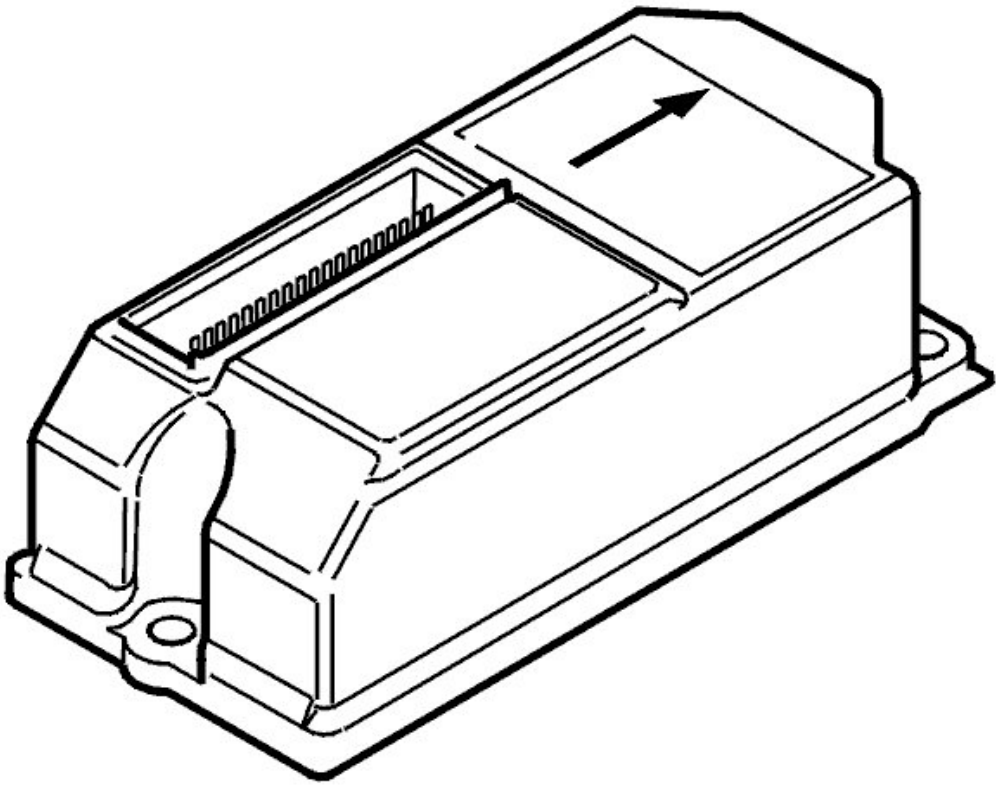
Orange general warning lamp is on.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

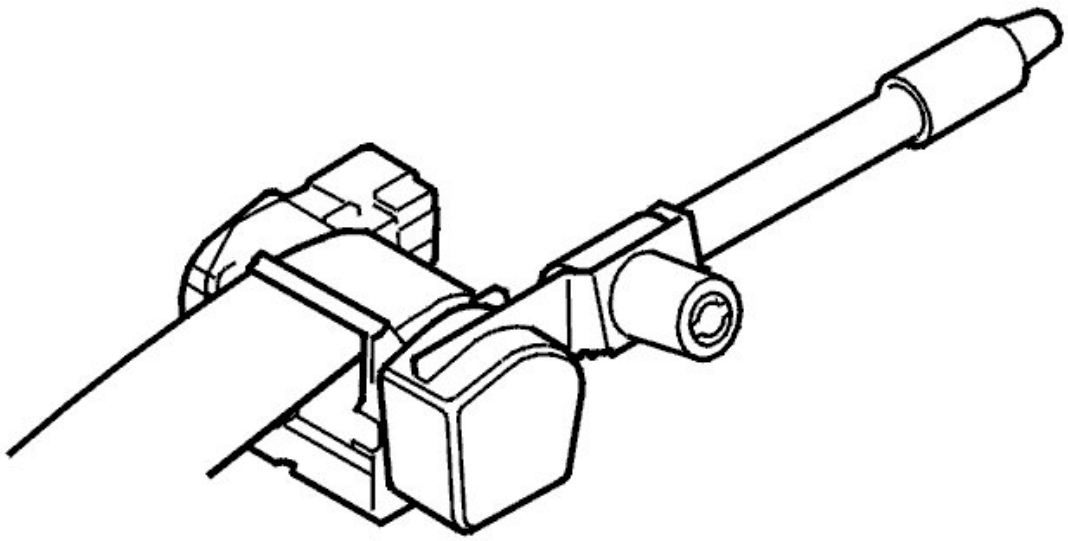
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0090

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0090 is stored if the control module registers that the voltage in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0090 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

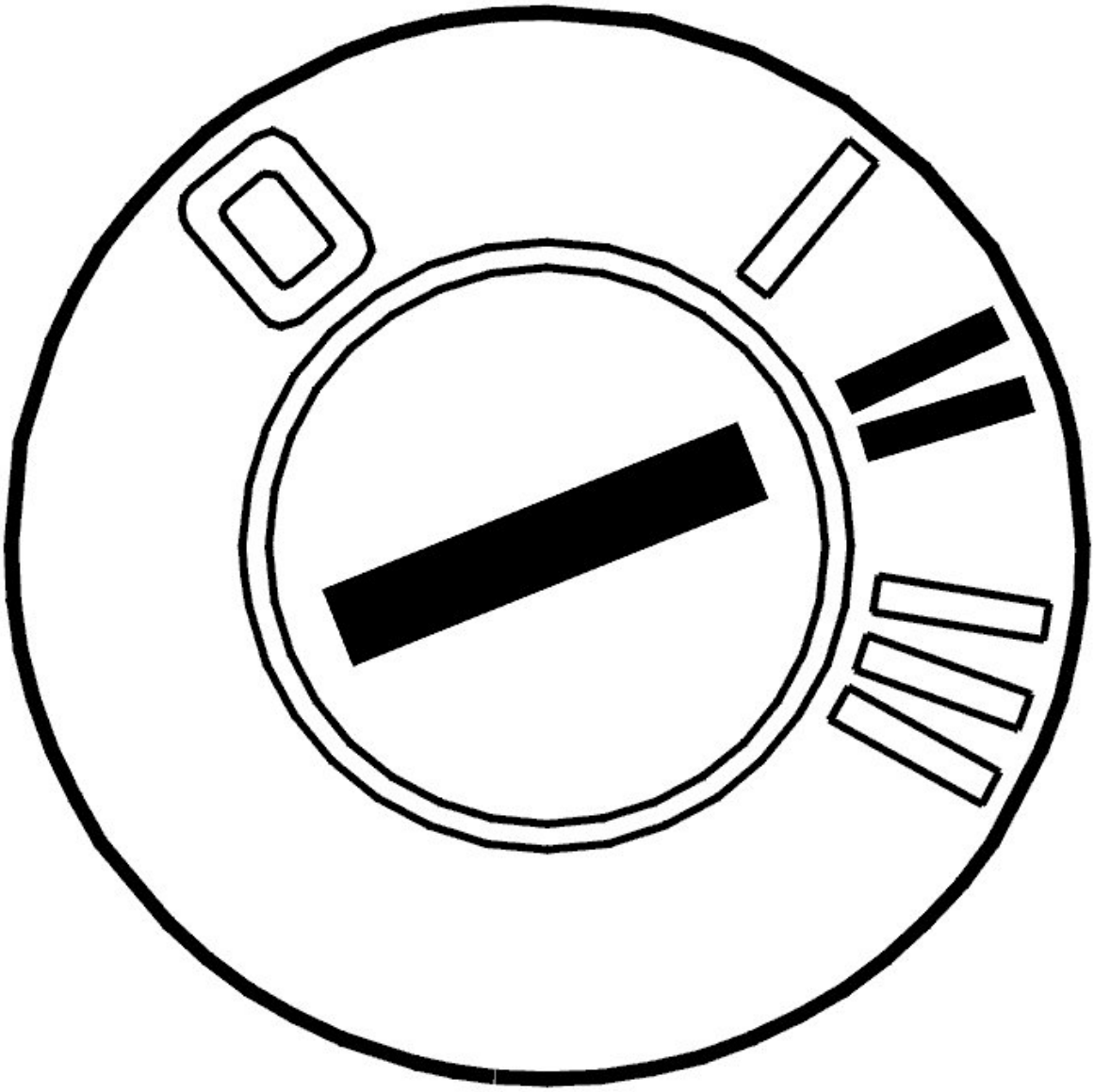
- Short-circuit to supply voltage in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit to supply voltage in the seat belt tensioner.

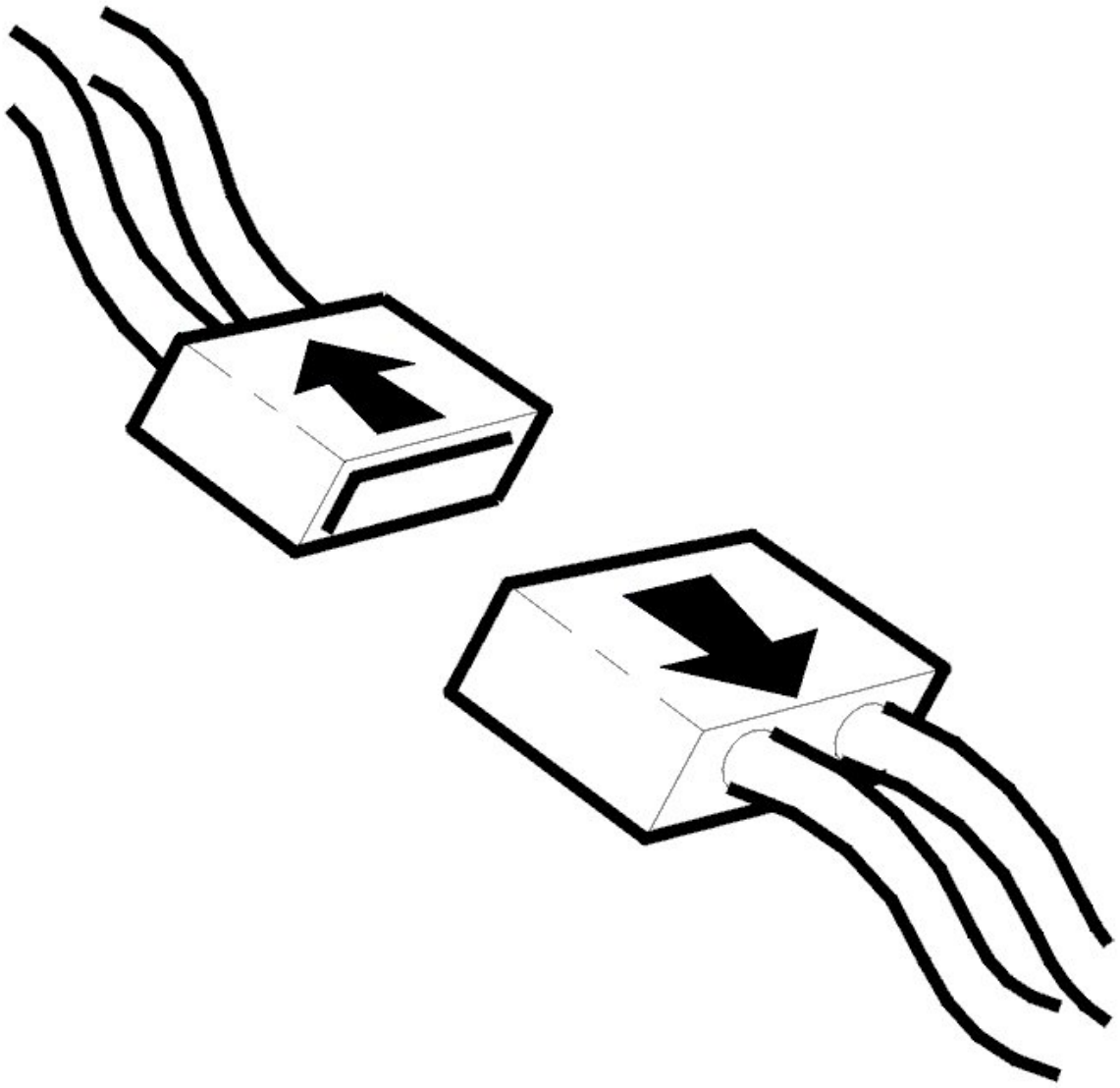
Fault symptom[s]
- General warning lamp lit.

Signal Too High

Signal too high

Checking the component





- Ignition off
- Disconnect the connector from the left seat belt tensioner on the 3rd seat row
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

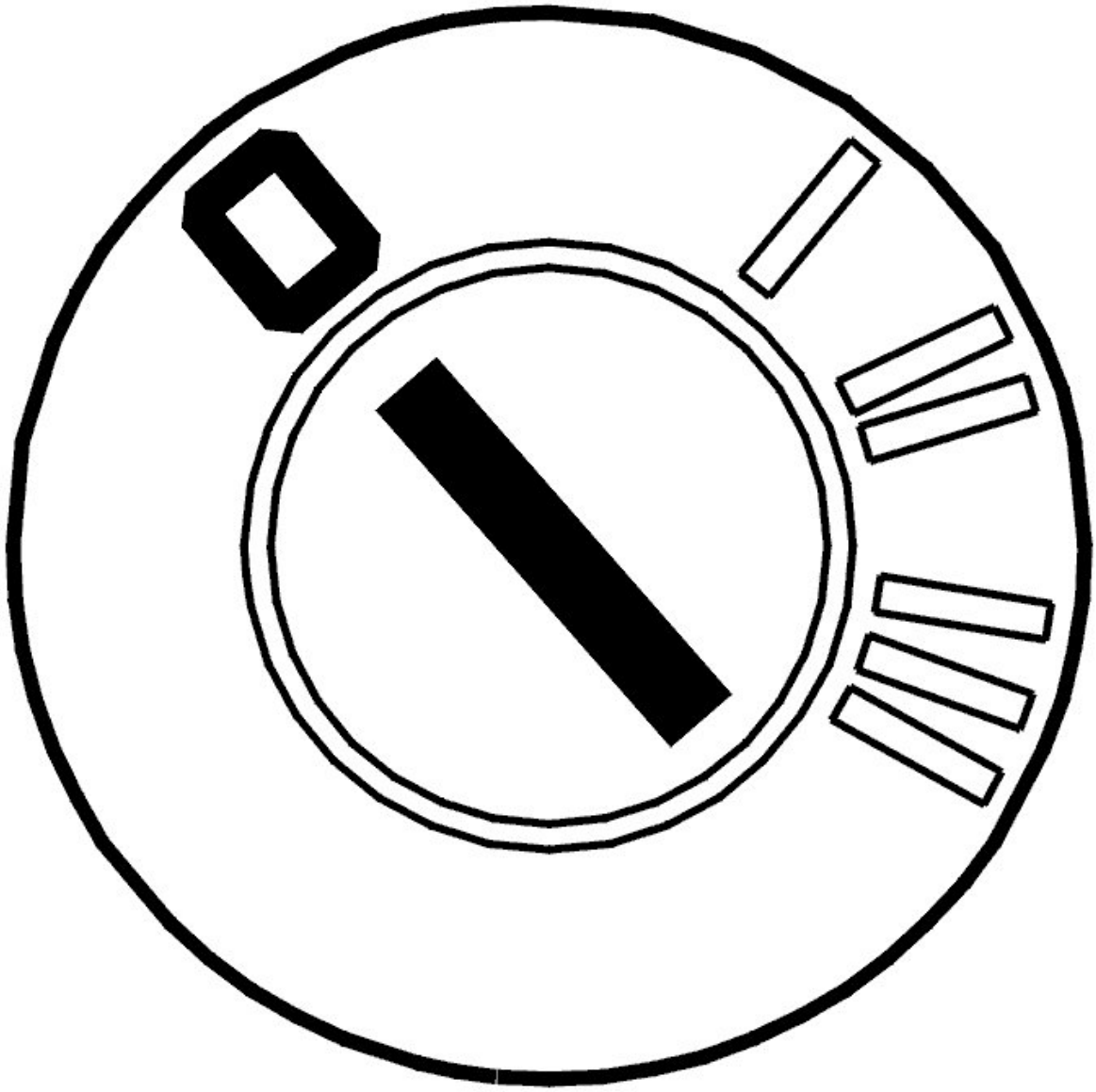
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

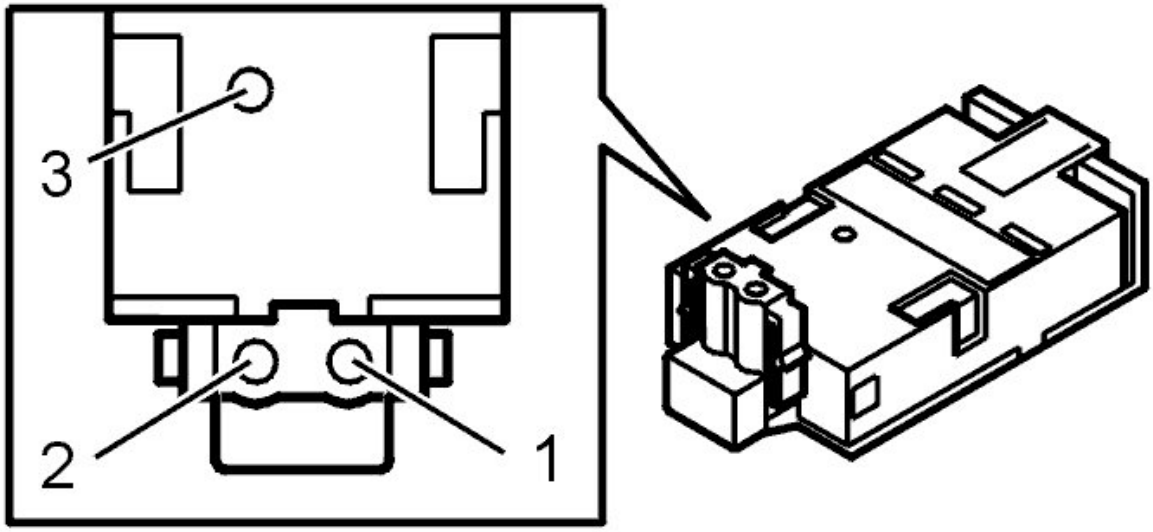
Check the cable between the Supplemental Restraint System Module (SRS) terminal #12A(12), terminal #11A(11) and connector terminal #1, terminal #3 on the left seat belt tensioner on the 3rd seat row. Check for a short-circuit to supply voltage.
Remedy as necessary.

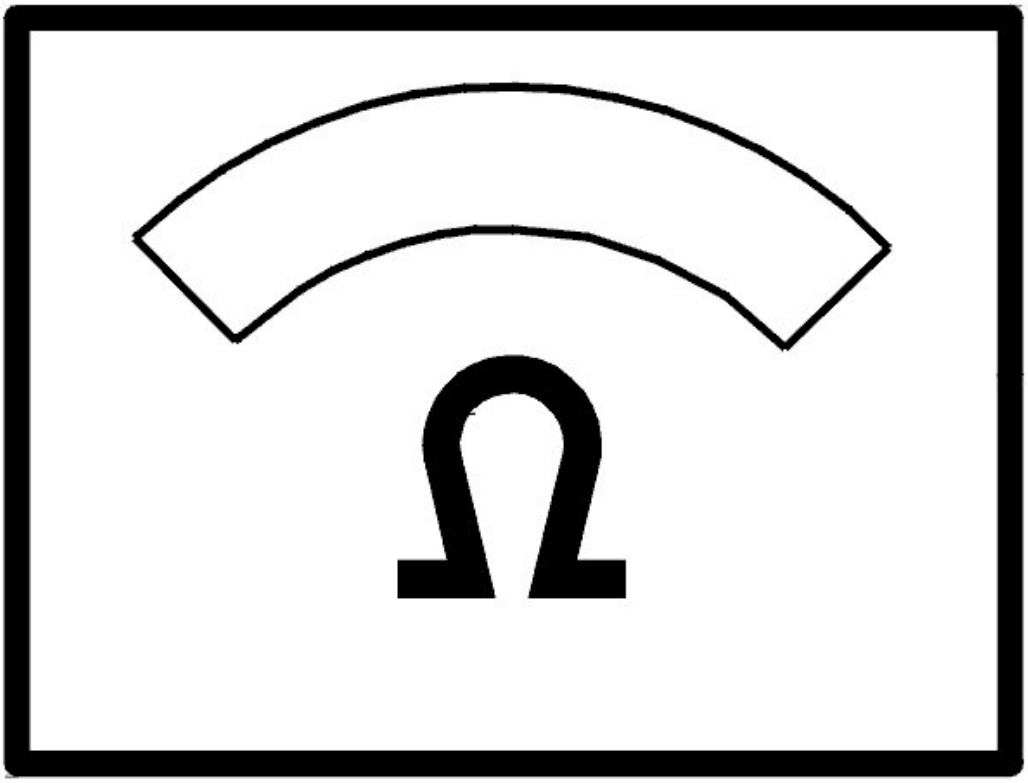
Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and the Supplemental Restraint System Module (SRS) disconnected, the resistance between terminals #1 and #3 on the seat belt tensioner connector (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between terminals #12A(12) and #11A(11) on

the Supplemental Restraint System Module (SRS) connector should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

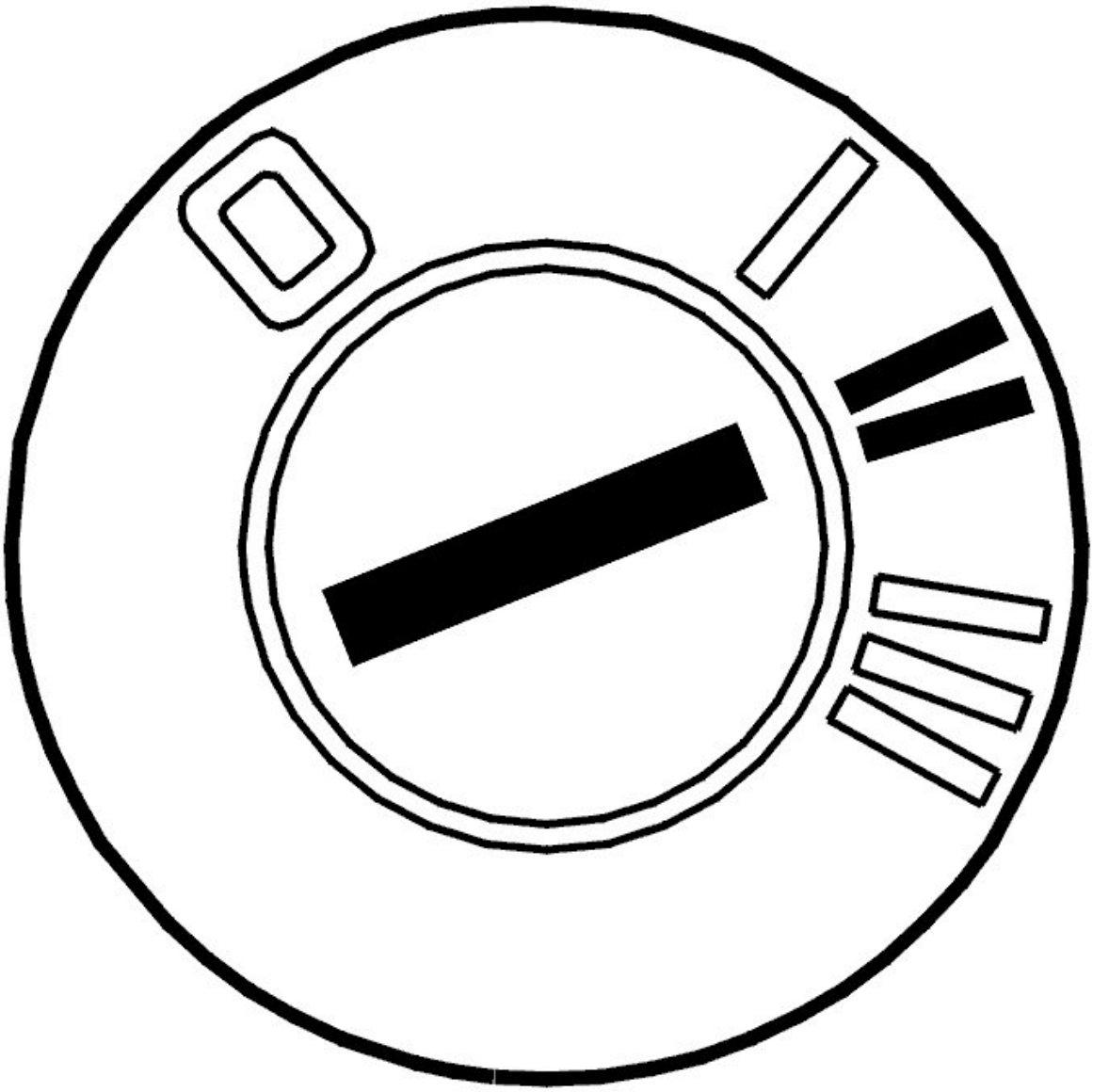
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

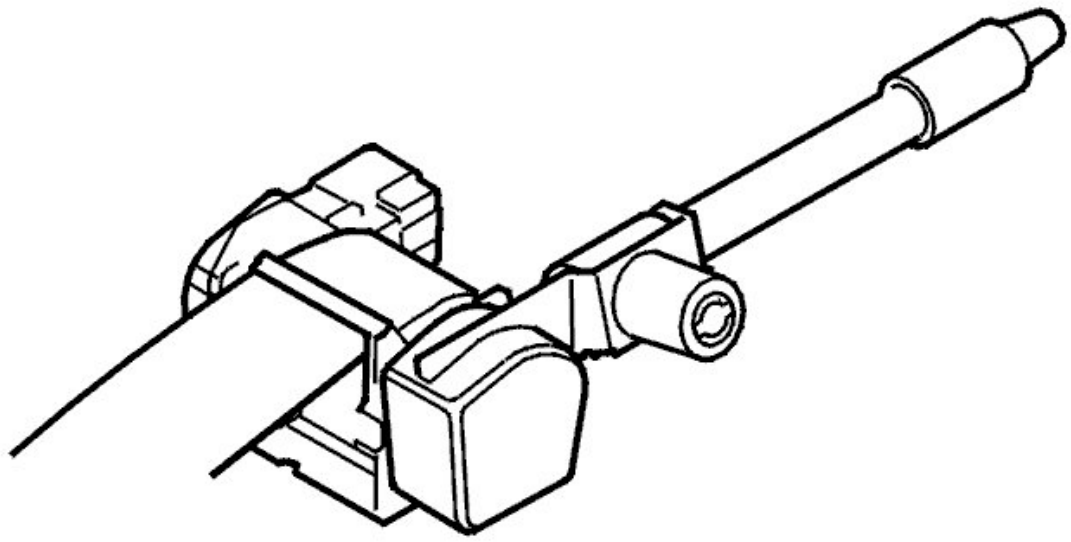
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0091

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0091 is stored if the control module registers that the voltage in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0091 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

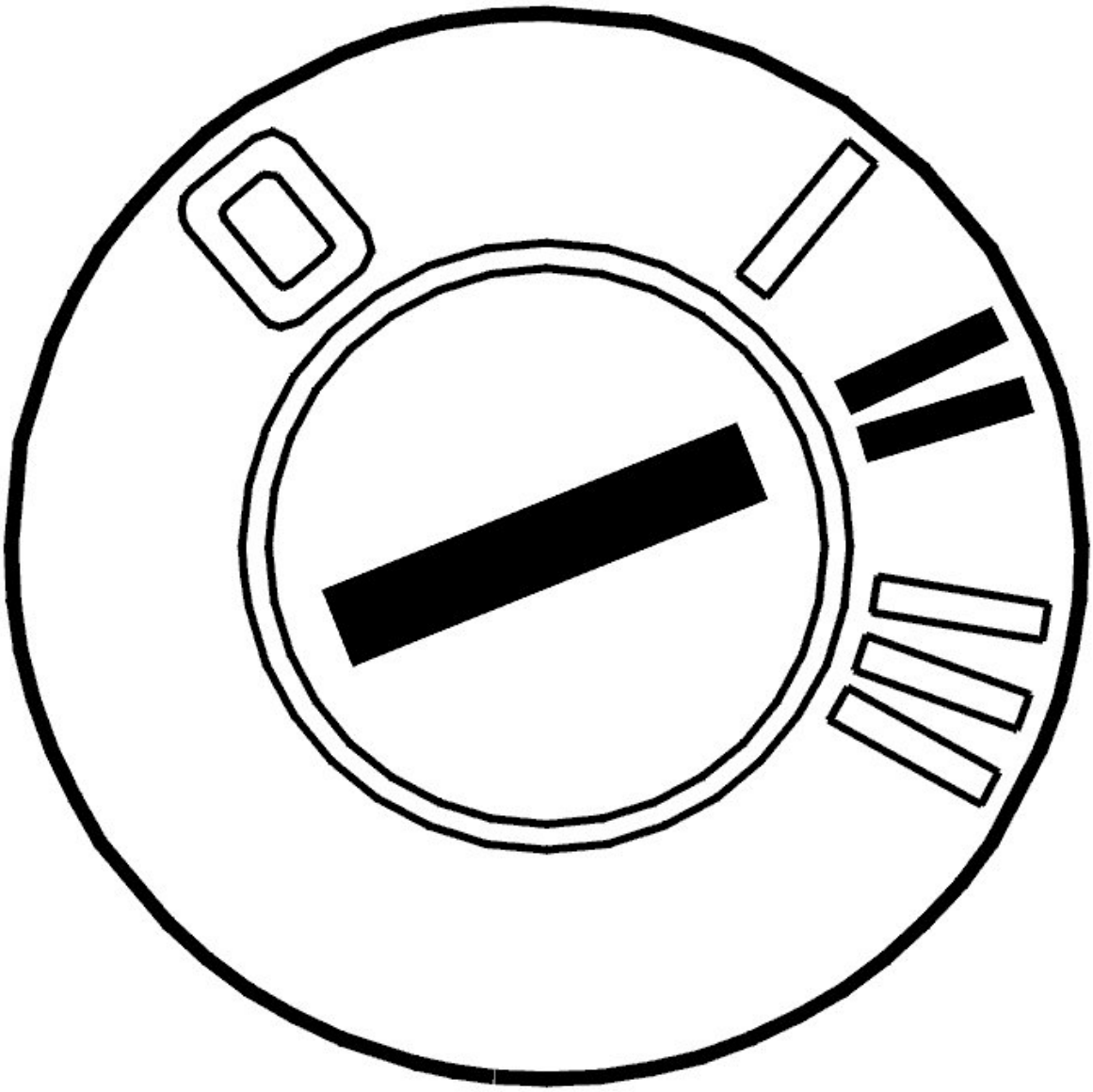
Possible source
- Short-circuit to ground in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the connector
- Short-circuit to ground in the seat belt tensioner.

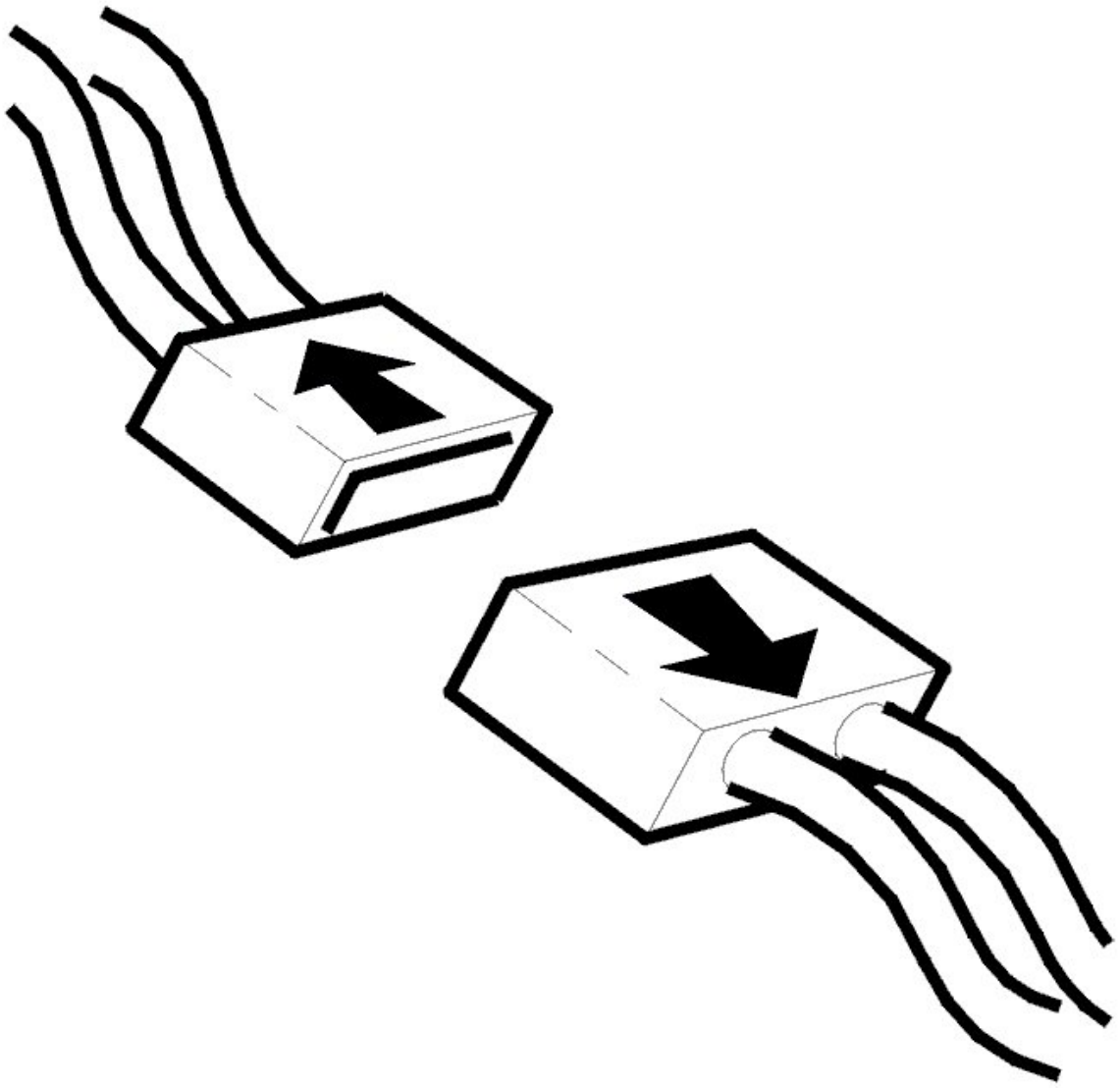
Fault symptom[s]
- General warning lamp lit.

Signal Too Low

Signal too low

Checking the component





- Ignition off
- Disconnect the connector from the left seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

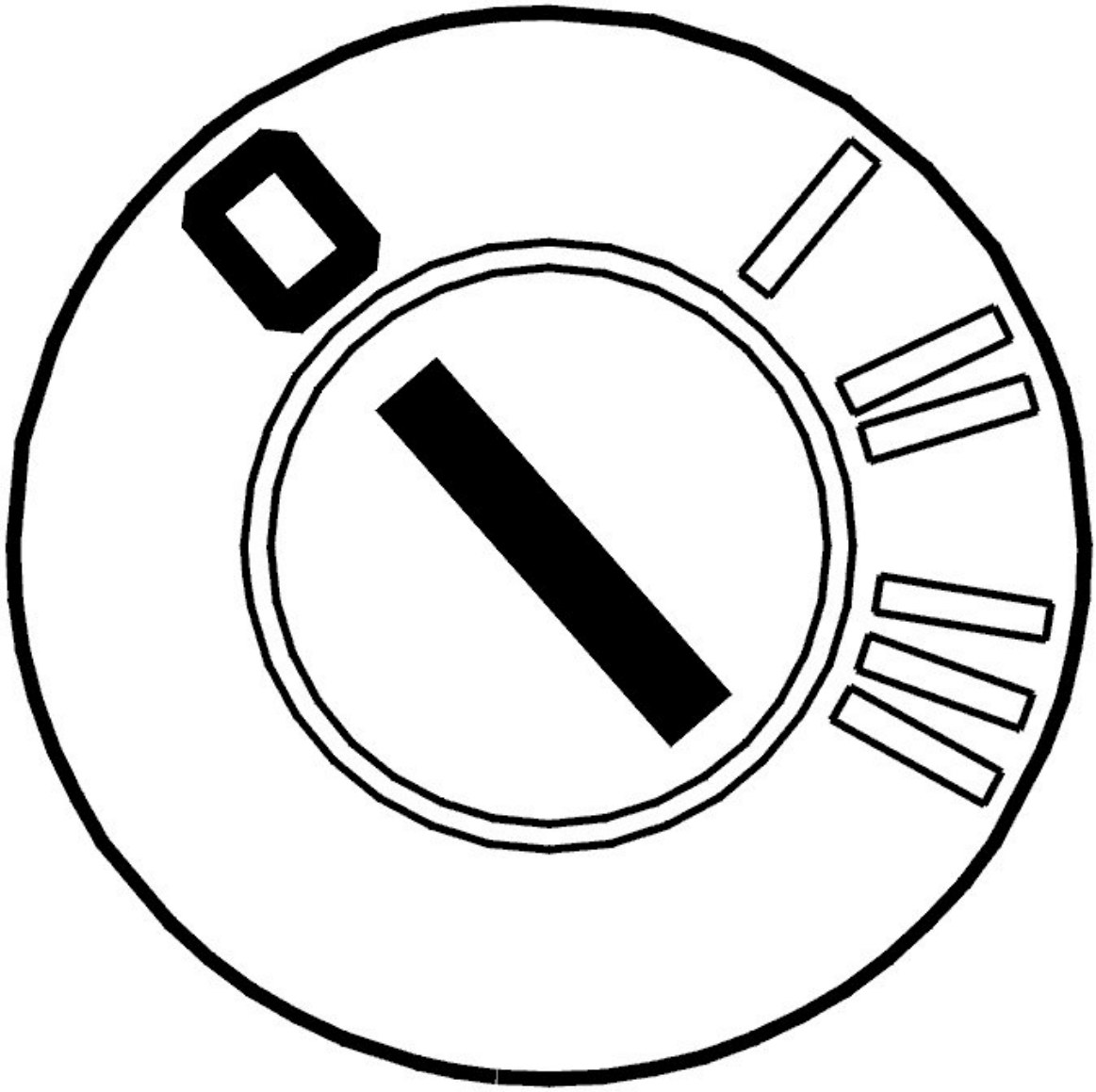
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

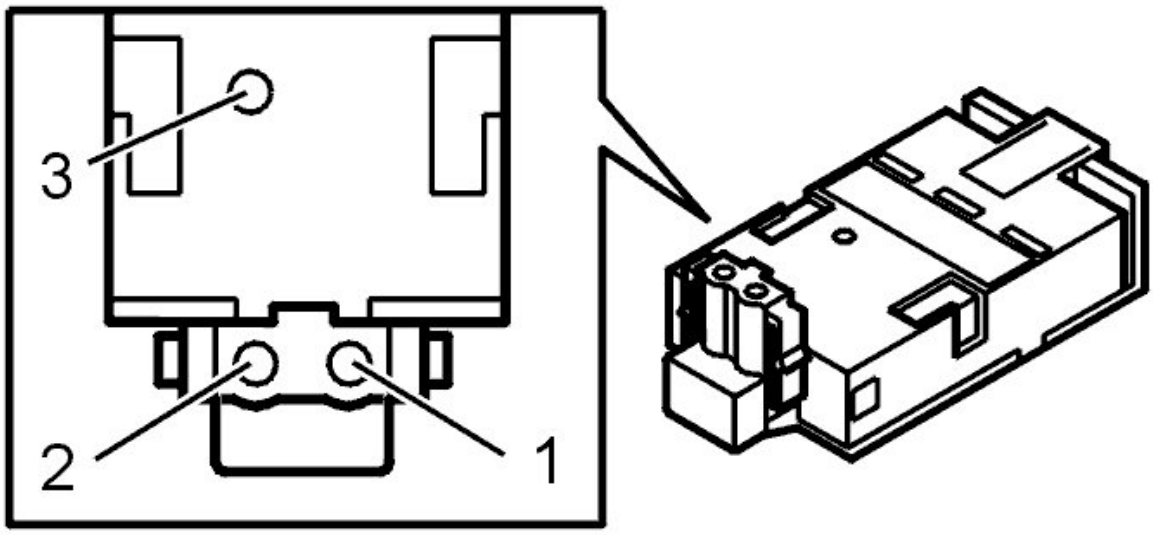
Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

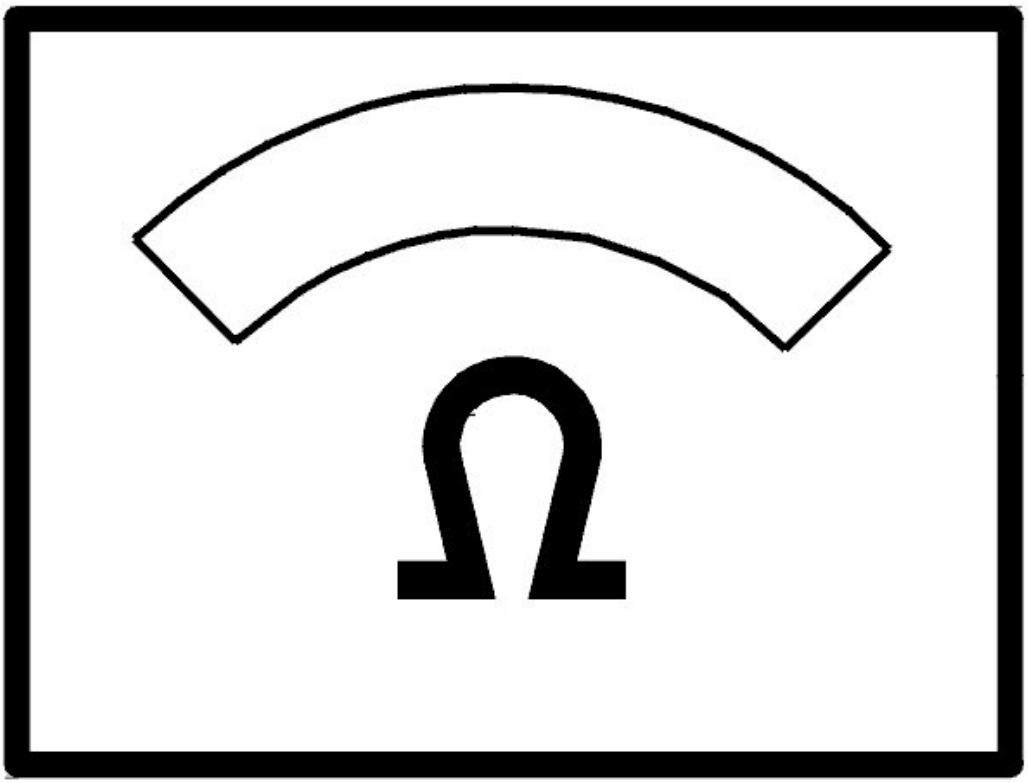
Check the cable between the Supplemental Restraint System Module (SRS) terminal #12A(12), terminal #11A(11) and connector terminal #1, terminal #3 on the left seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

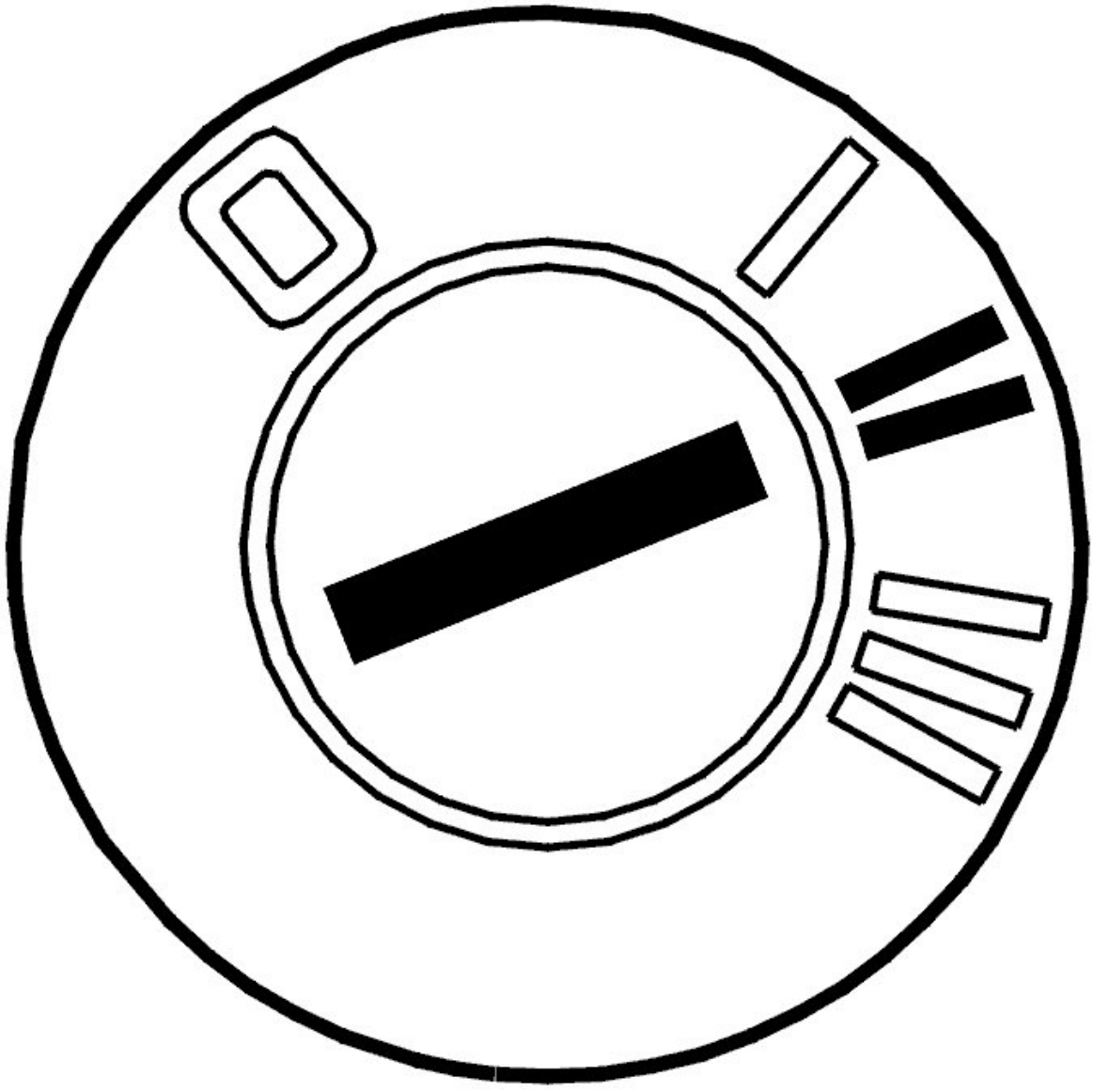
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead

- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

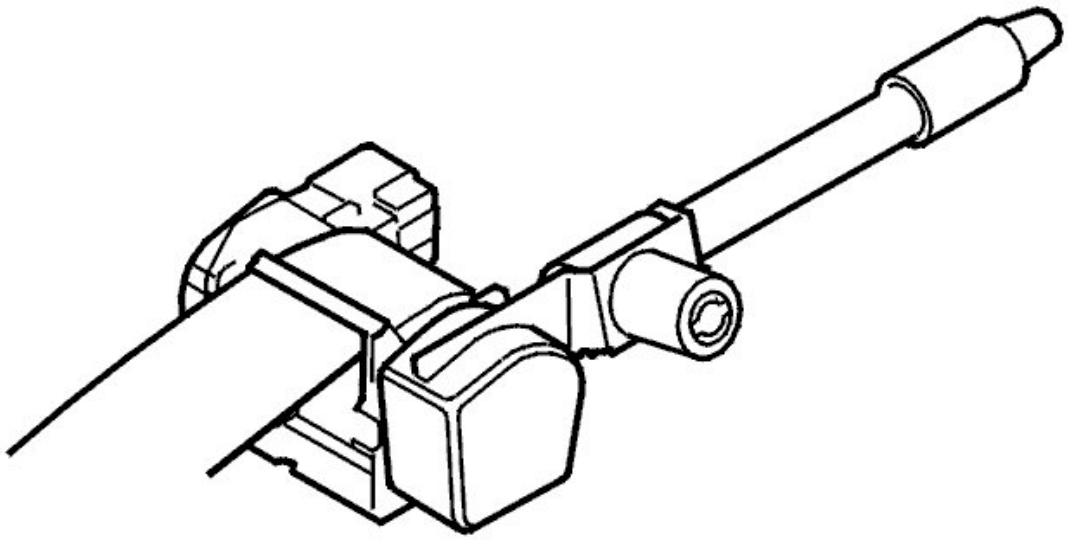
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0092

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0092 is stored if the control module registers that the capacitance in the signal cable is high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0092 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

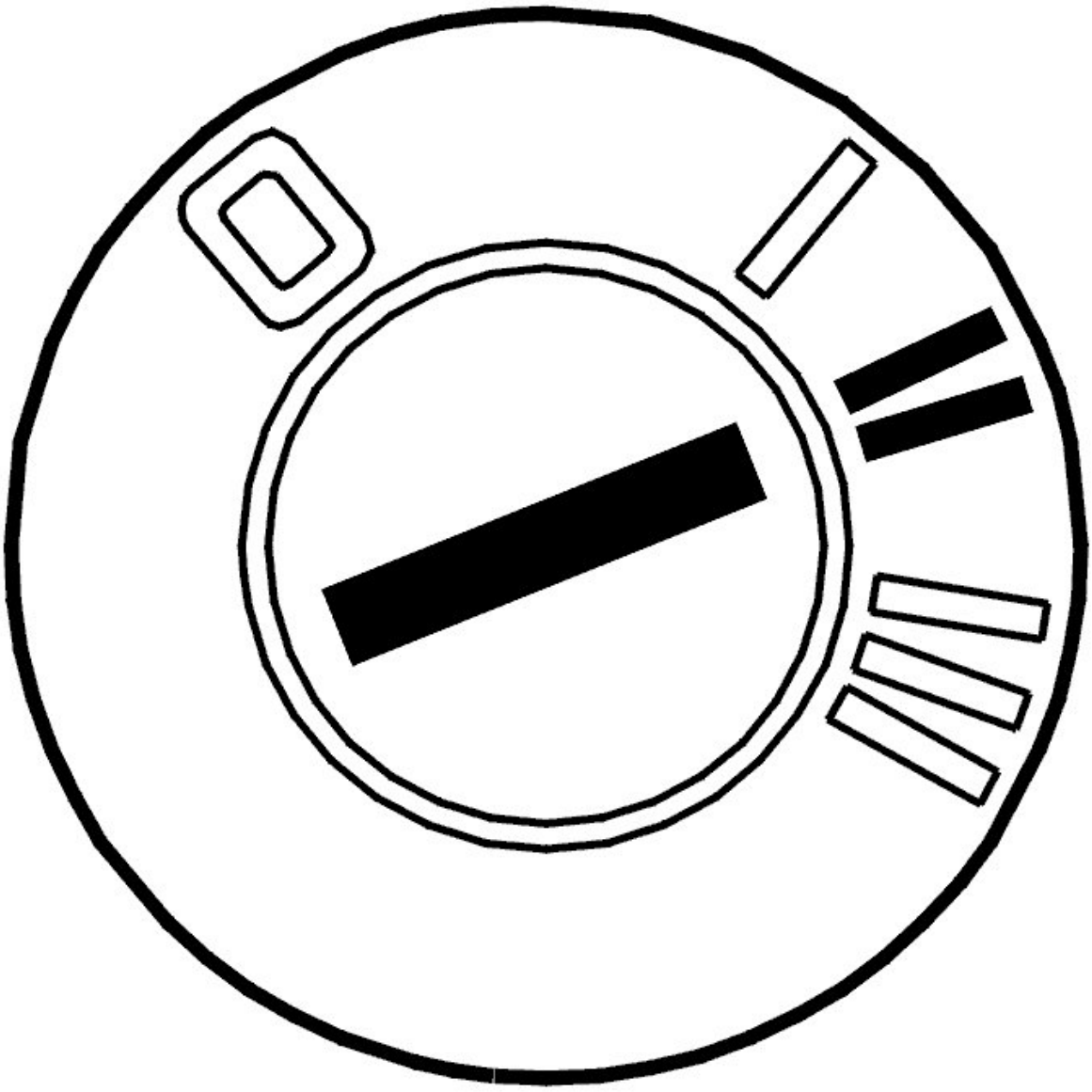
Possible source
- Too high capacitance in connector
- Too high capacitance in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS).

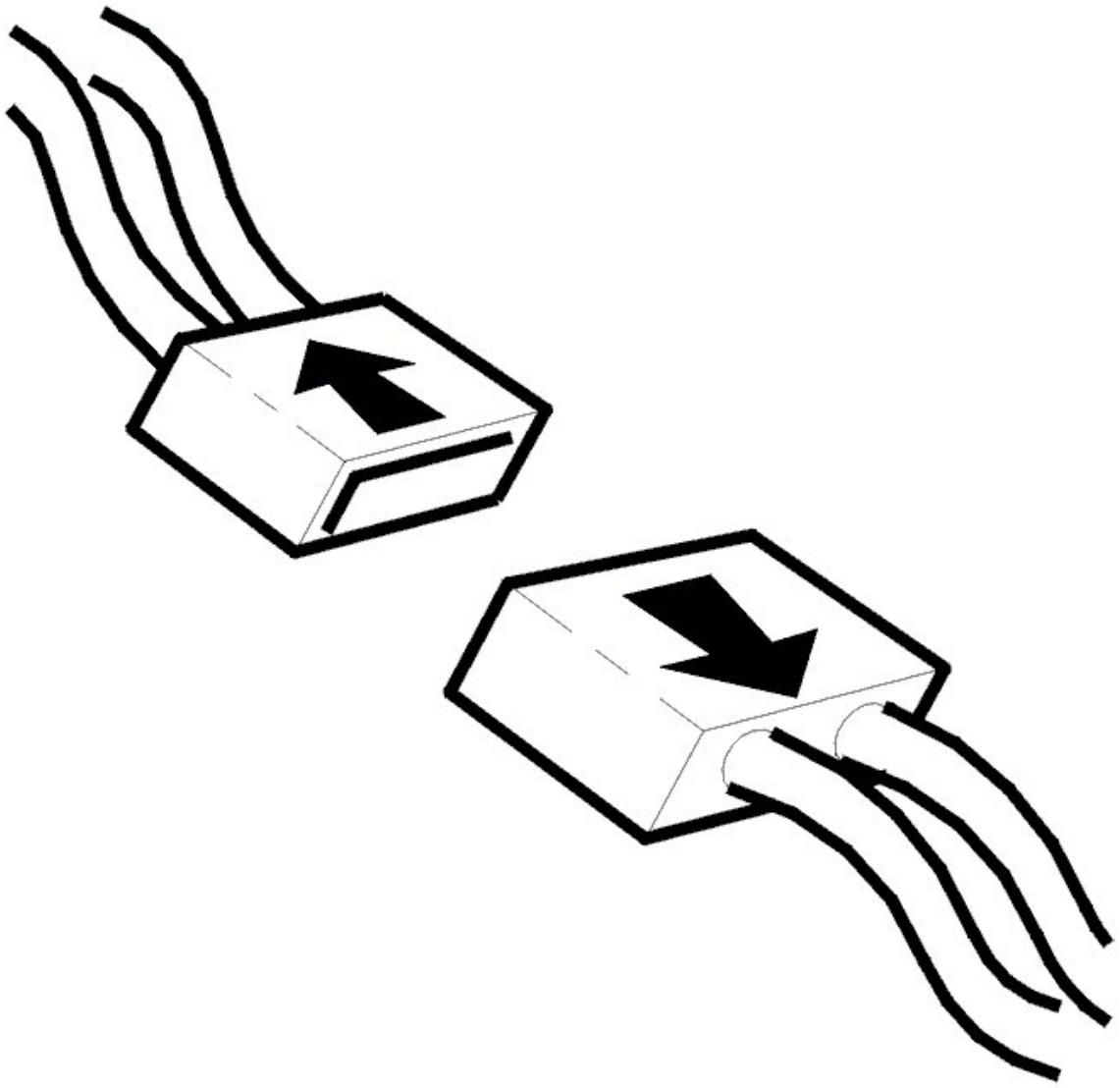
Fault symptom[s]
- General warning lamp lit.

Capacitance Too High

Capacitance too high

Checking the component





- Ignition off
- Disconnect the connector from the left seat belt tensioner on the 3rd seat row
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

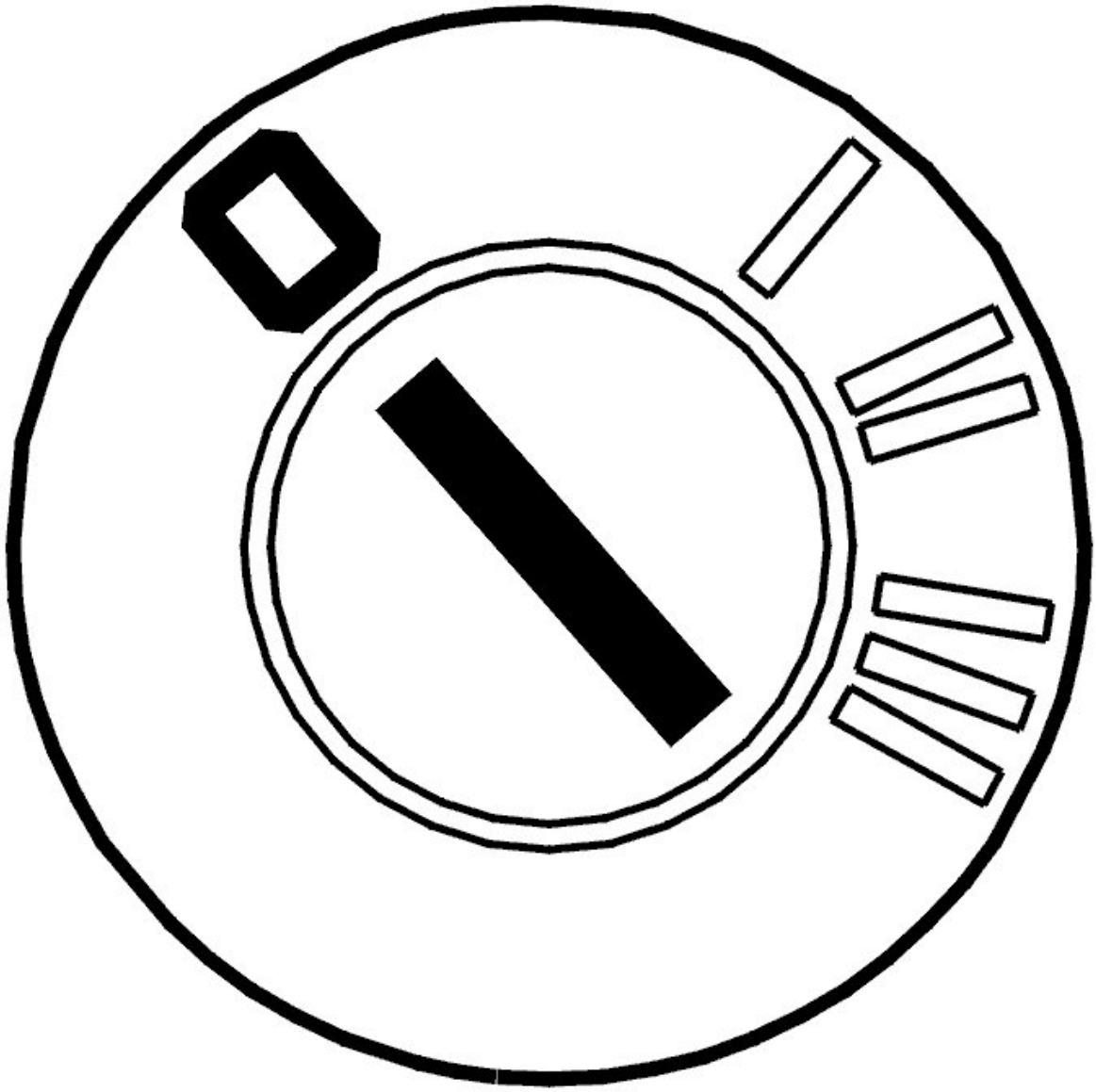
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

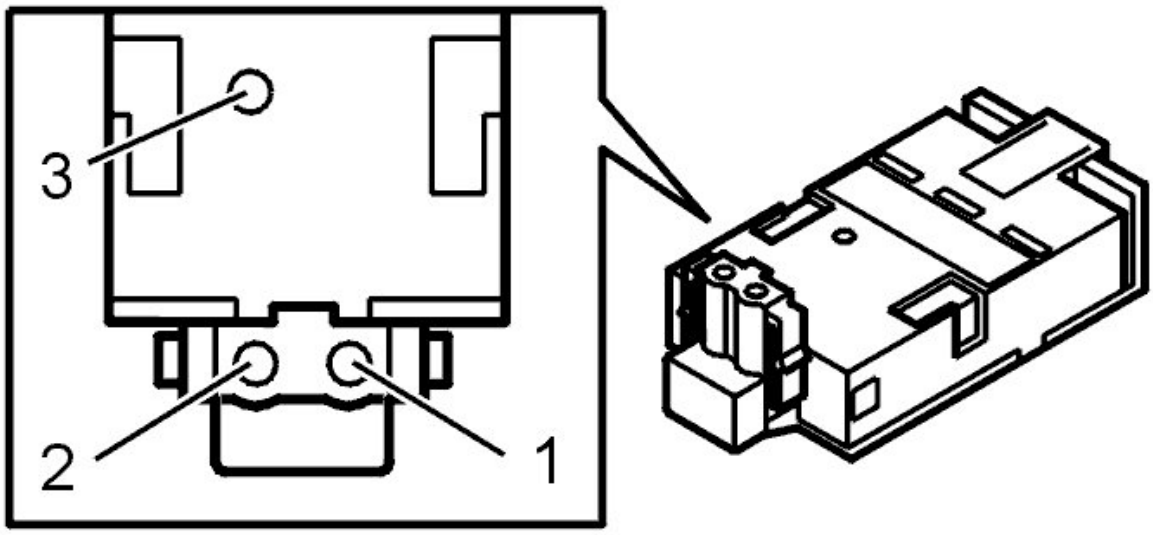
Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

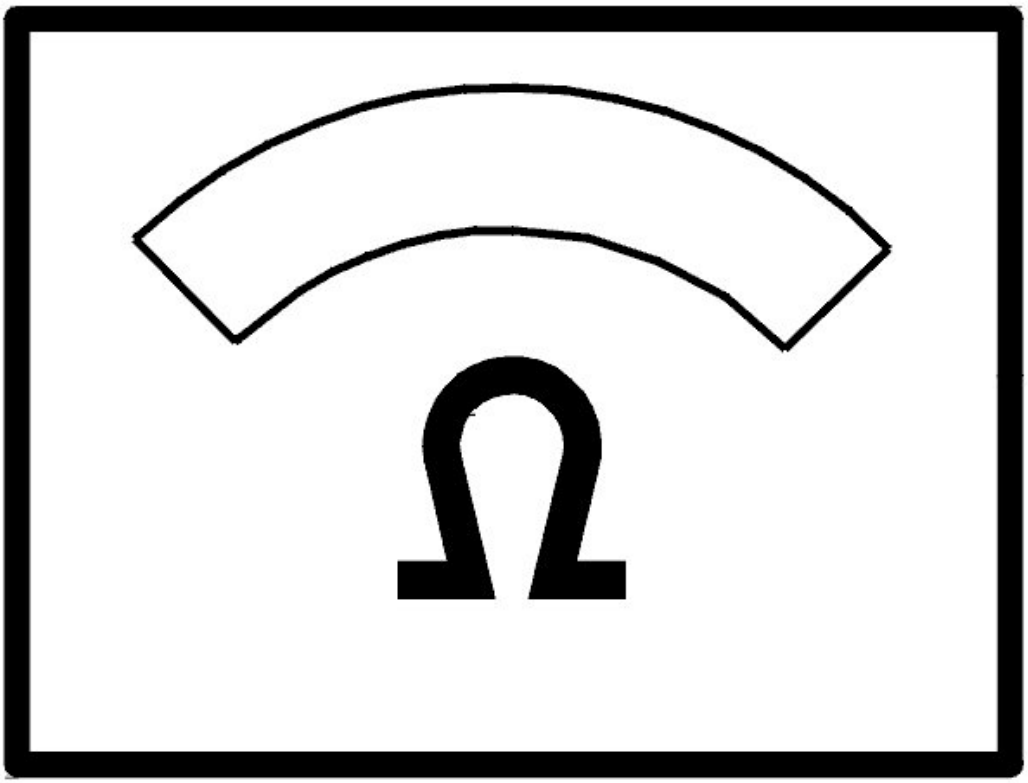
Check the cable between the Supplemental Restraint System Module (SRS) terminal #12A(12), terminal #11A(11) and connector terminal #1, terminal #3 on the left seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for seat belt tensioner.
Check the resistance between terminals #12A(12), #11A(11) to the Supplemental Restraint System Module (SRS). The resistance between the terminals should be infinite.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To access or replace the seat belt tensioner connector, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

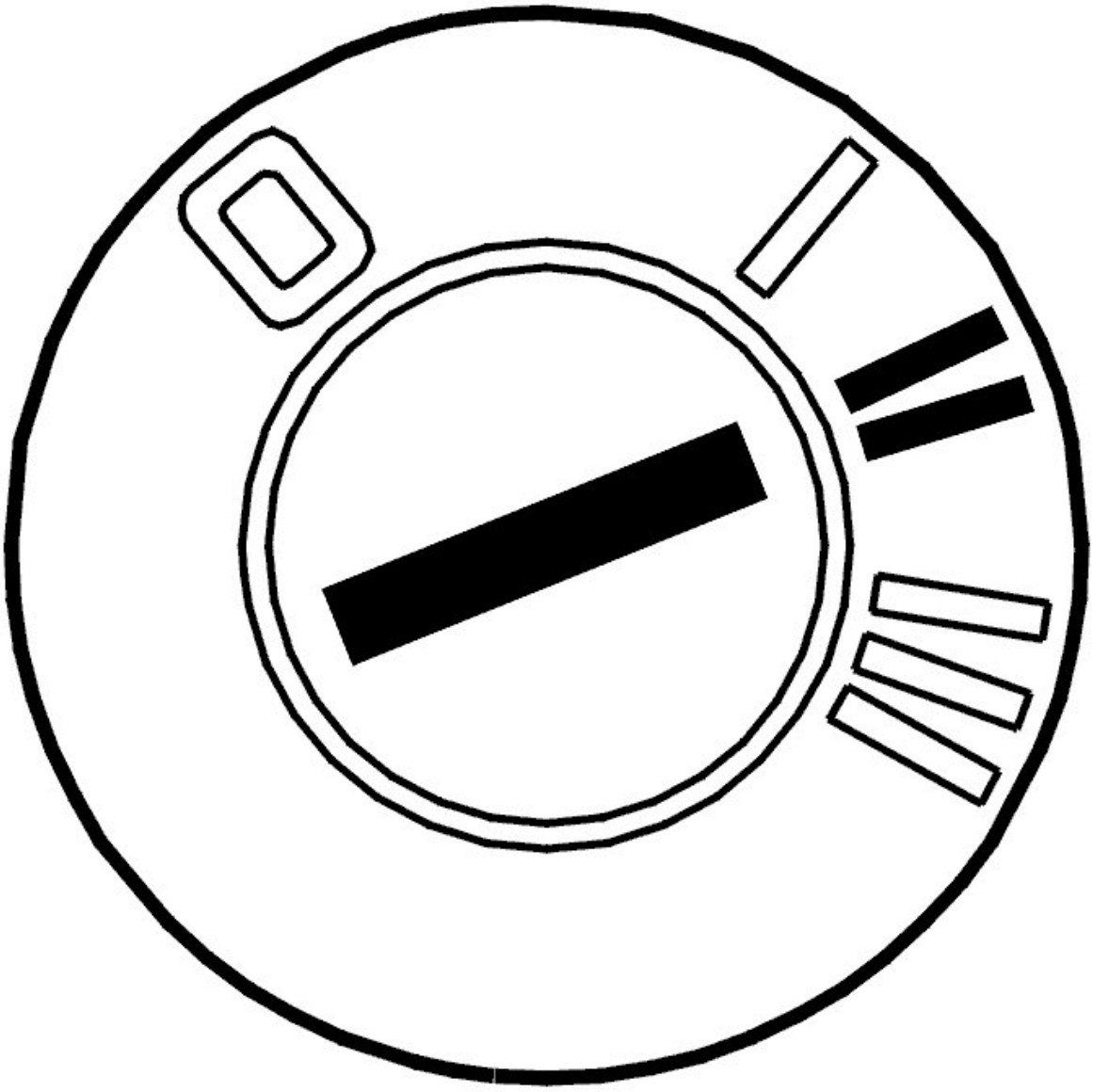
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

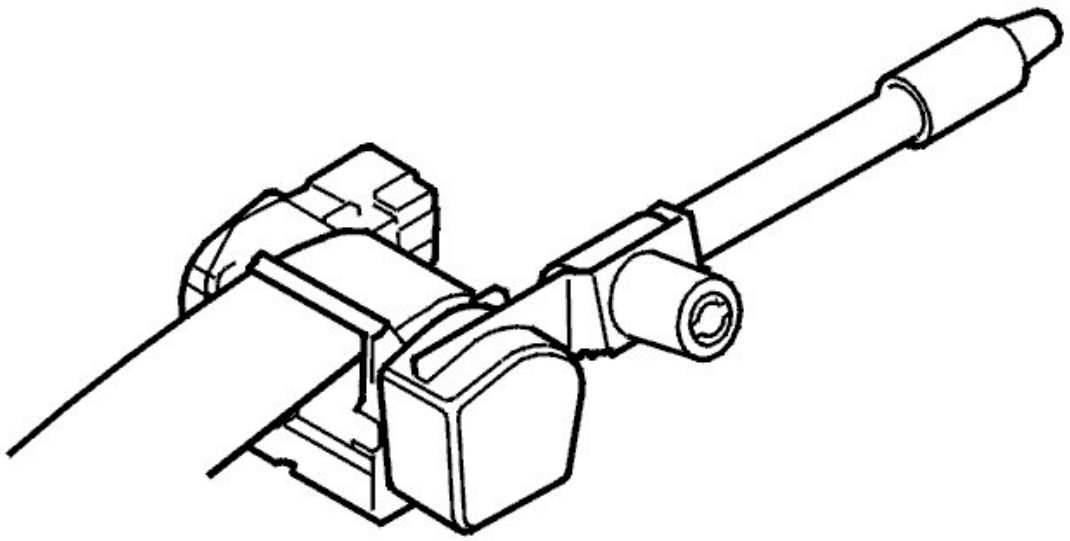
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0093

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0093 is stored if the control module registers that the capacitance in the signal cable is too low for longer than

10 seconds.
Diagnostic trouble code (DTC) SRS-0093 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

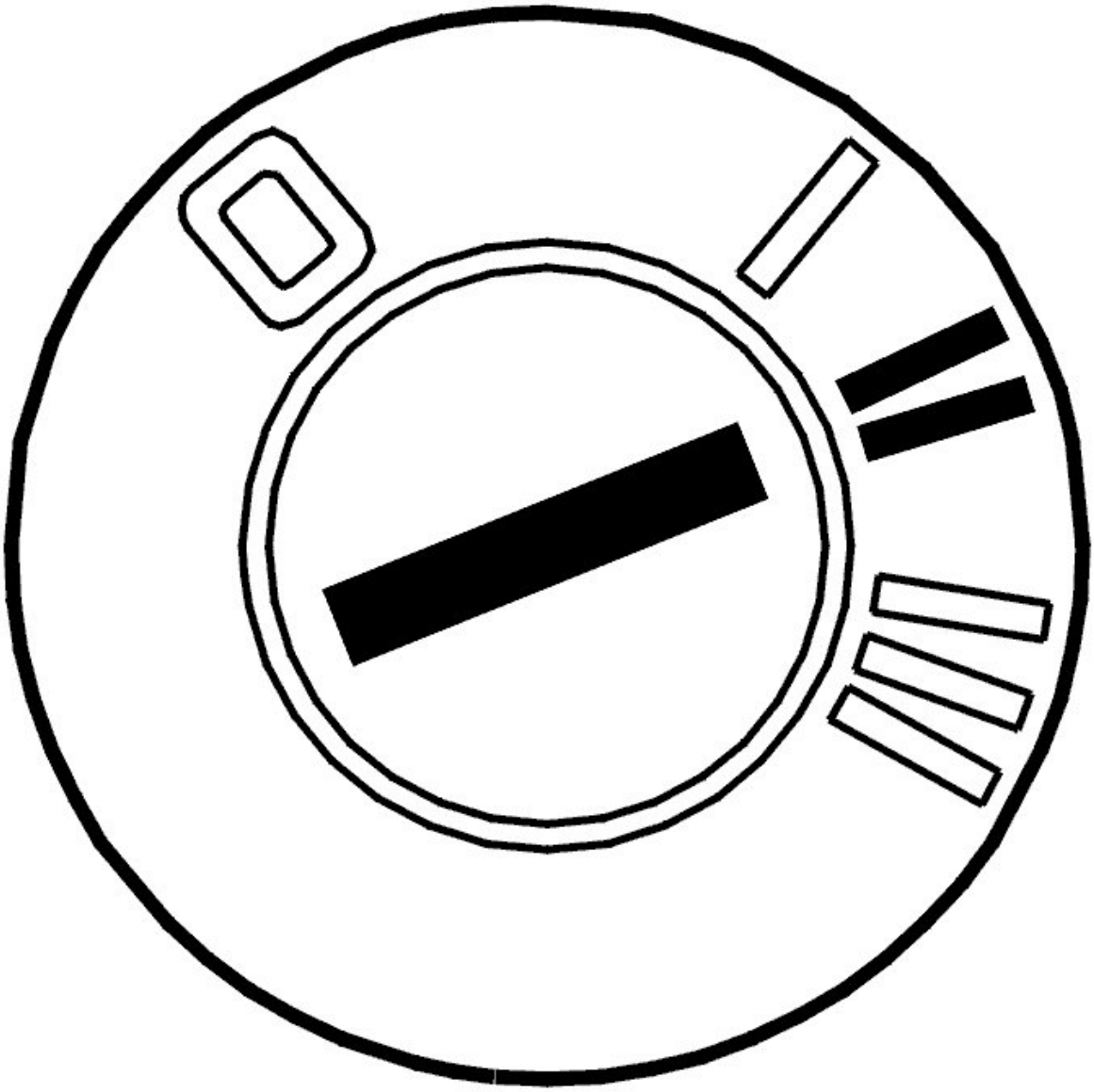
Possible source
- Too low capacitance in connector
- Too low capacitance in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS).

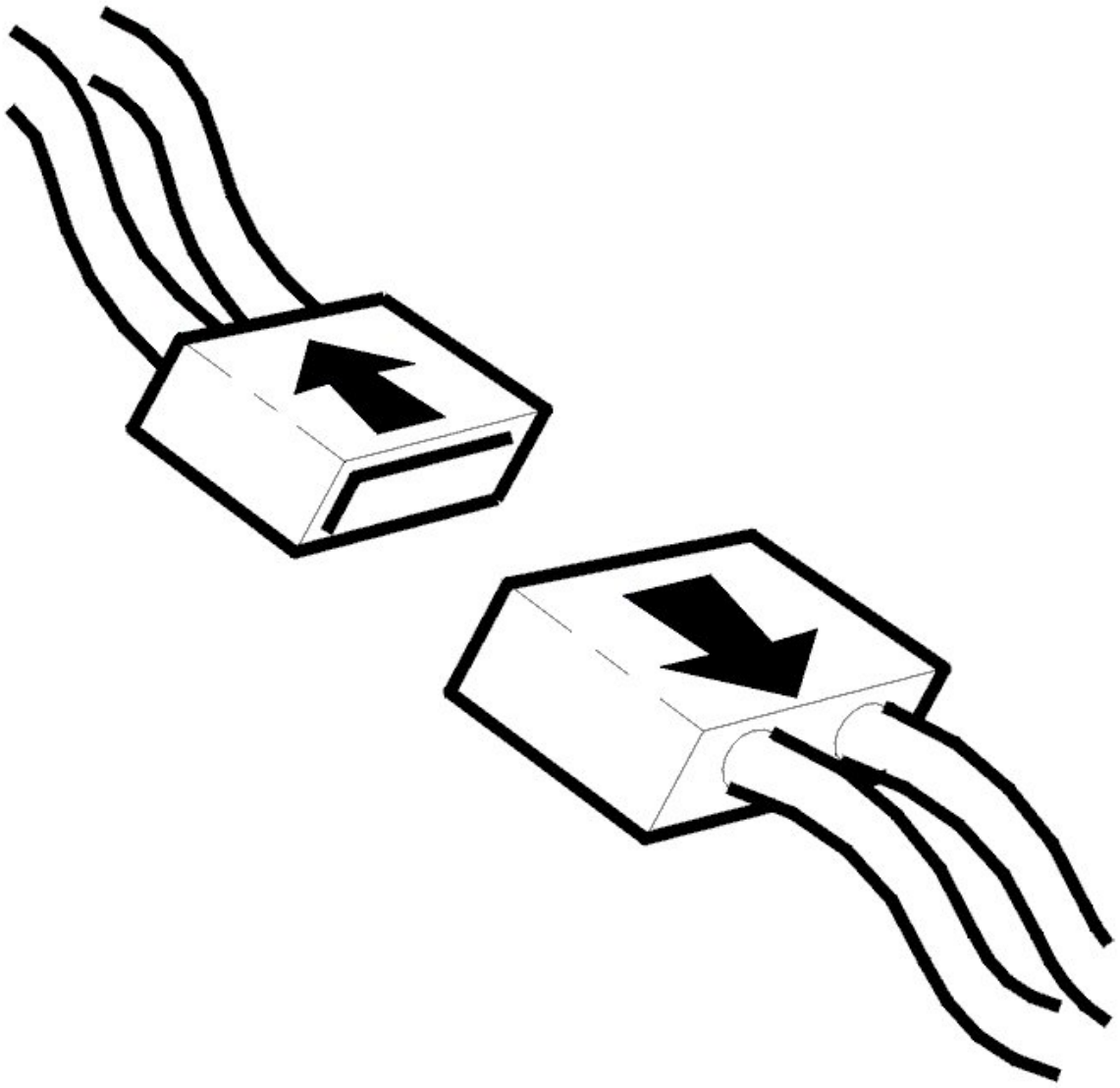
Fault symptom[s]
- General warning lamp lit.

Capacitance Too Low

Capacitance too low

Checking the cable





Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

The probable cause of this fault is that the terminal nearest the left seat belt tensioner on the 3rd seat row is defective. Try replacing the wiring for the seat belt tensioner.
Remedy as necessary.

Other information:

- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

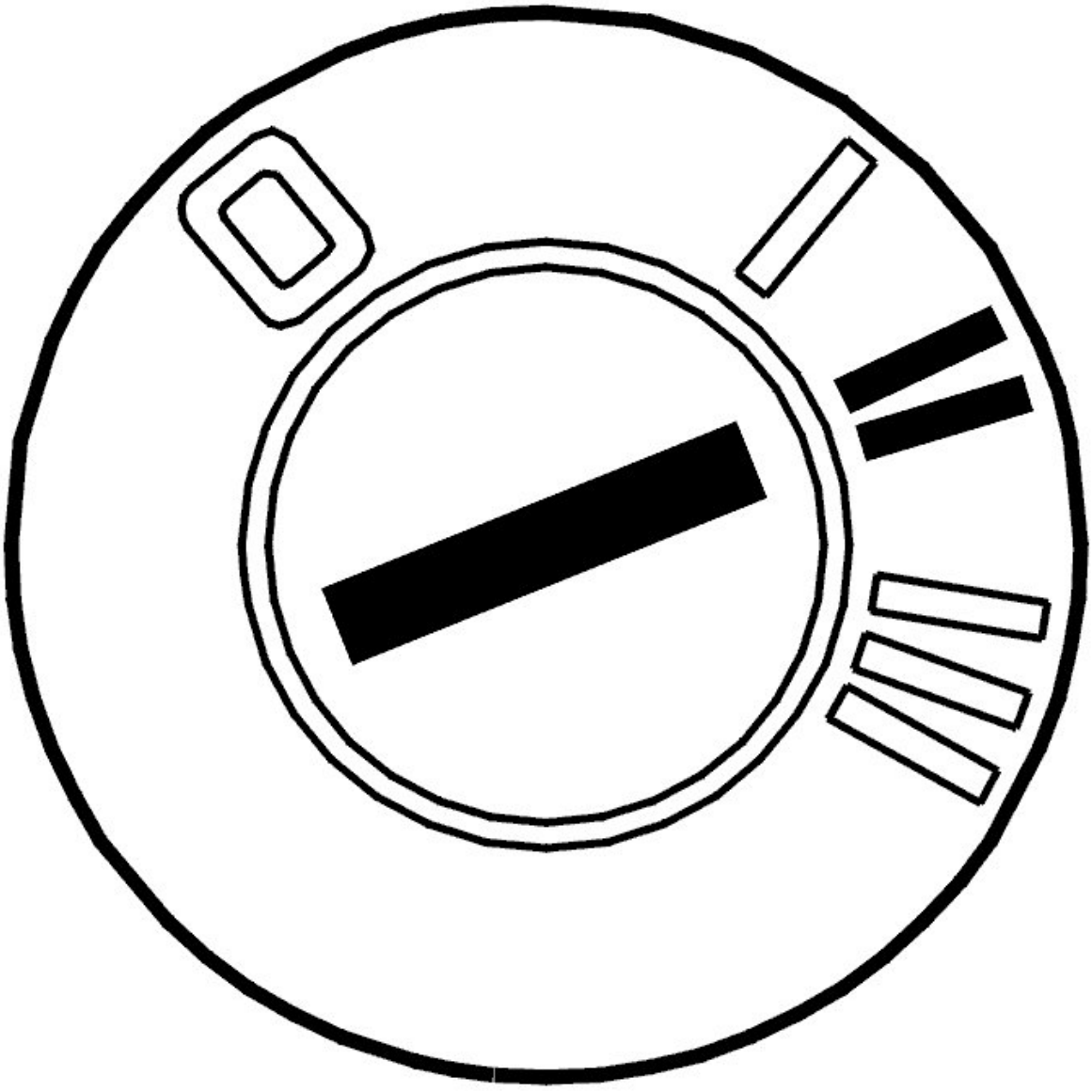
Attempt New Test - Checking the cable

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

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Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

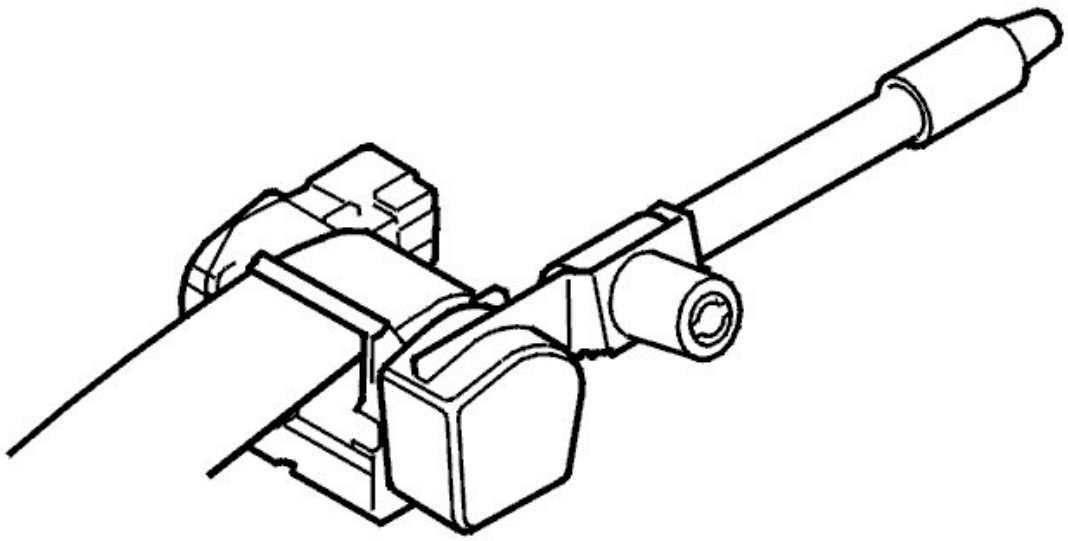
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0094

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0094 is stored if the control module registers that the resistance in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0094 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Contact resistance or an open-circuit in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Open-circuit in the seat belt tensioner (the resistance is too high in the igniter).

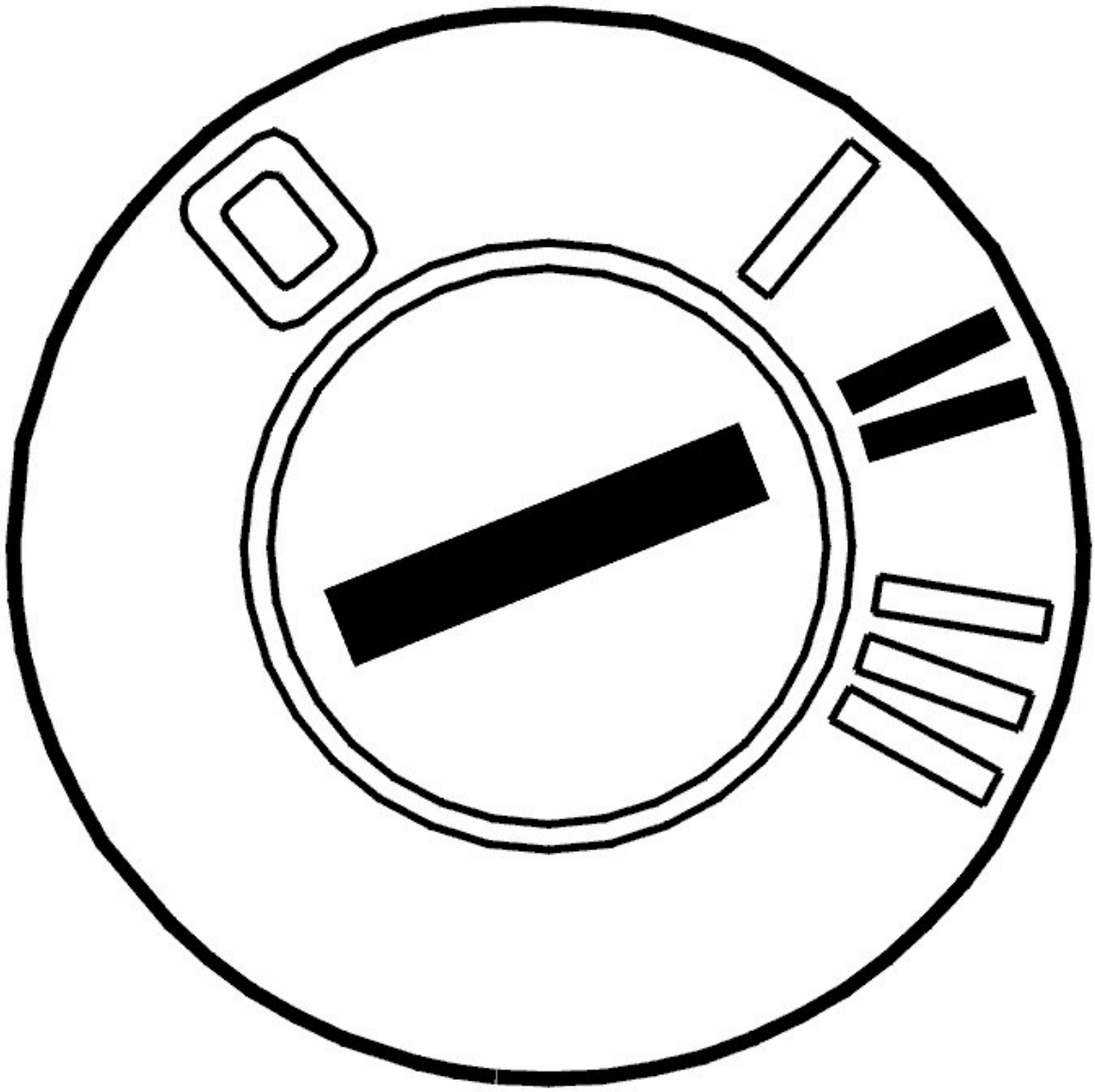
Fault symptom[s]

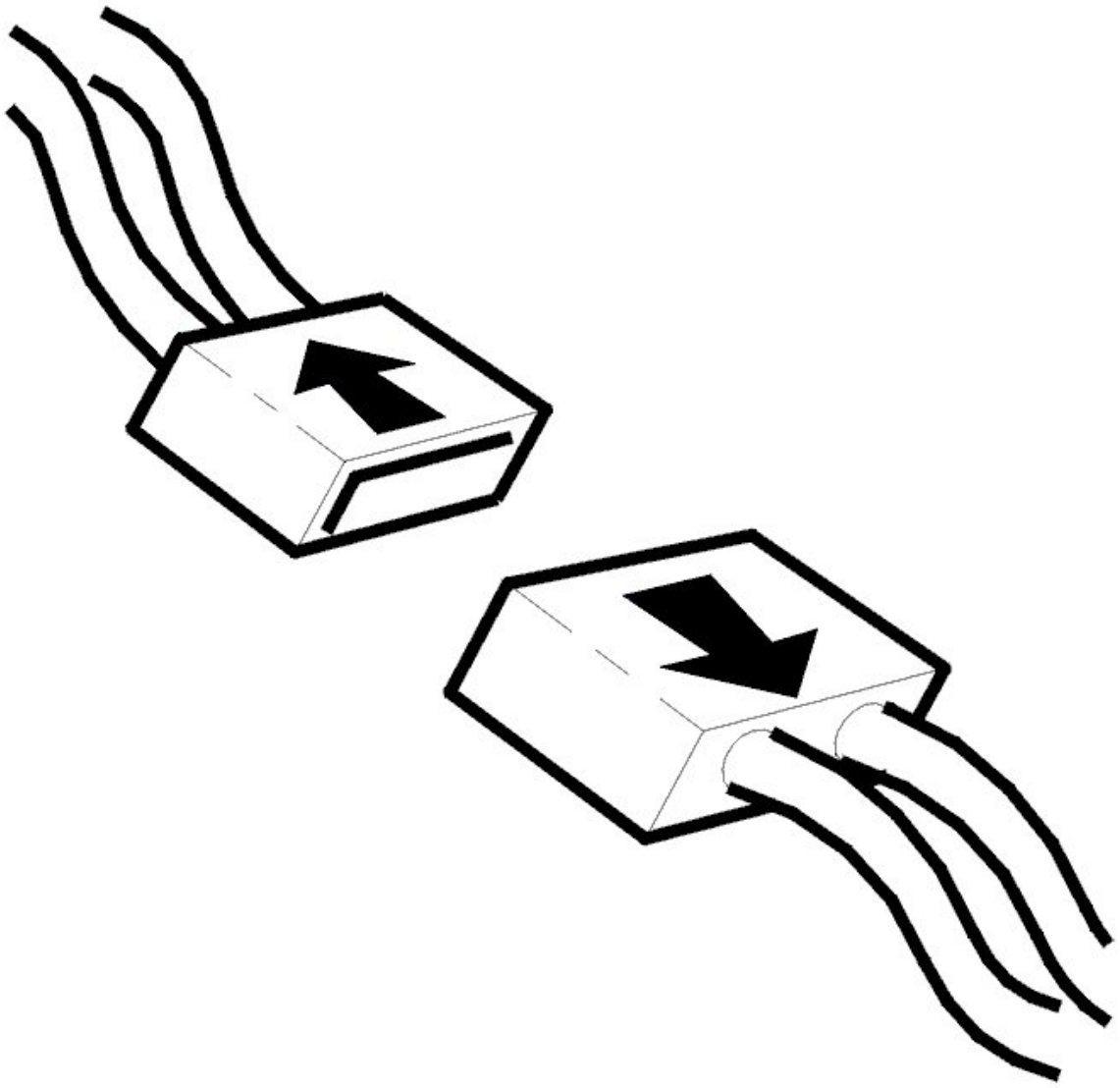
- General warning lamp lit.

Resistance Too High

Resistance too high

Checking the component





- Ignition off
- Disconnect the connector from the left seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

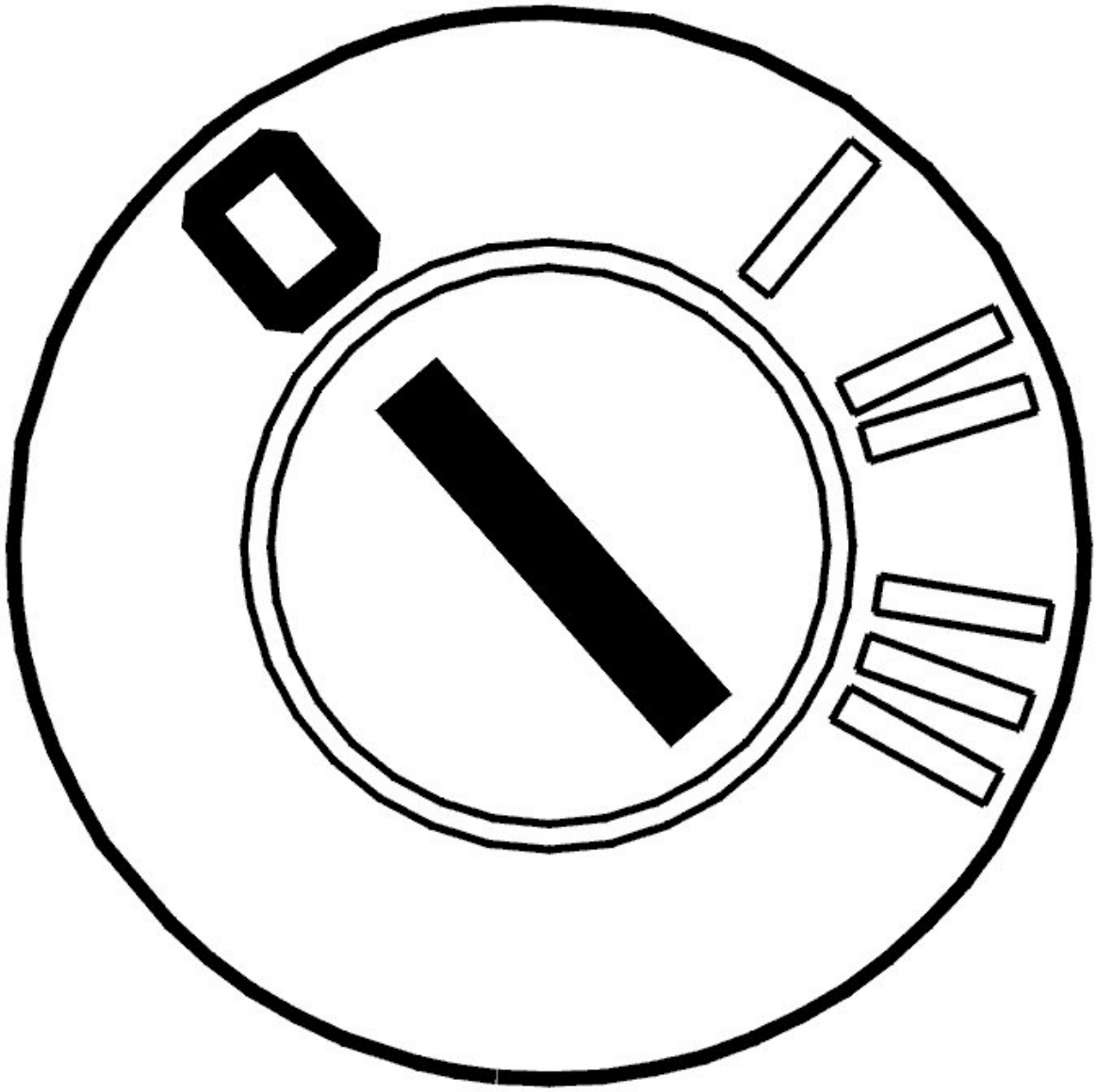
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

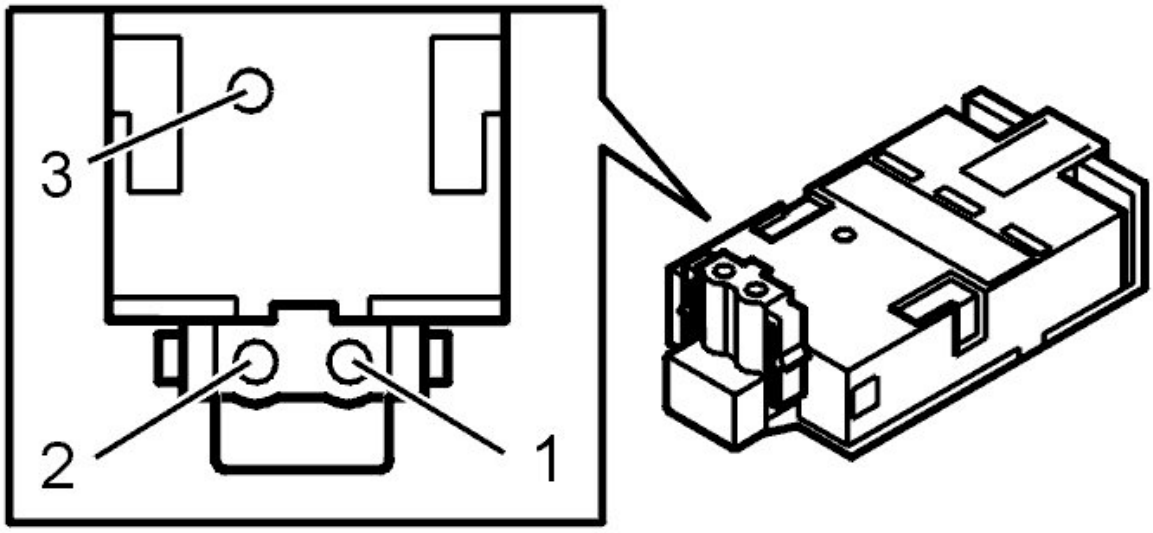
Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

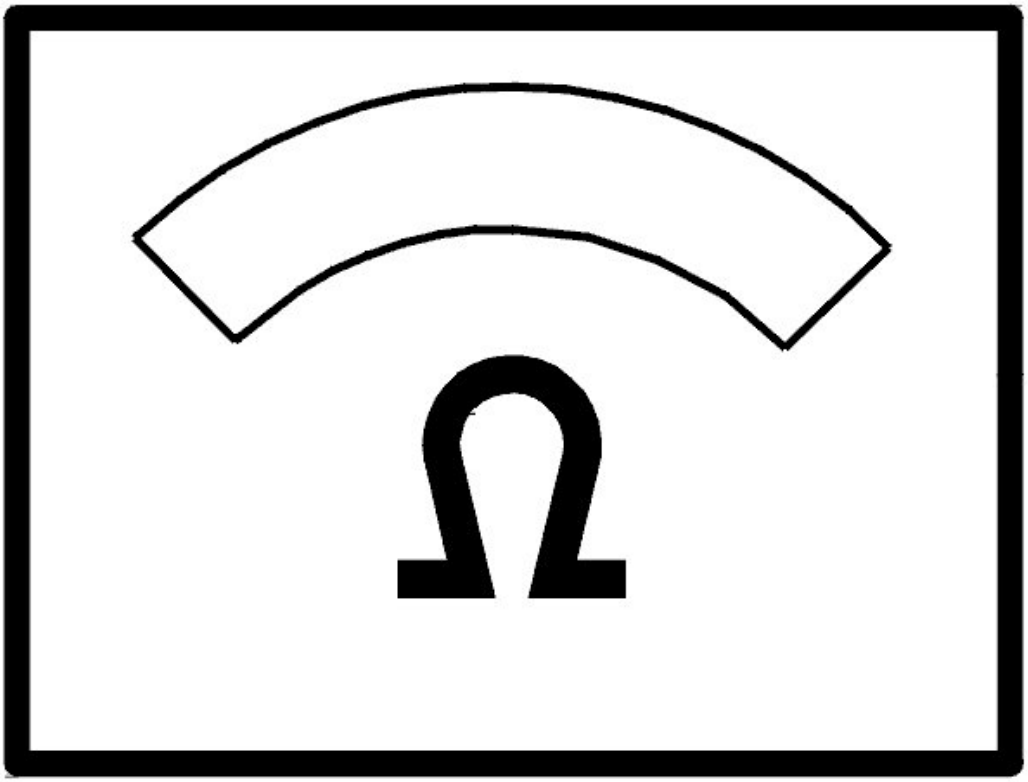
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt tensioner. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #12A(12), terminal #11A(11) and connector terminal #1, terminal #3 on the left seat belt tensioner on the 3rd seat row. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

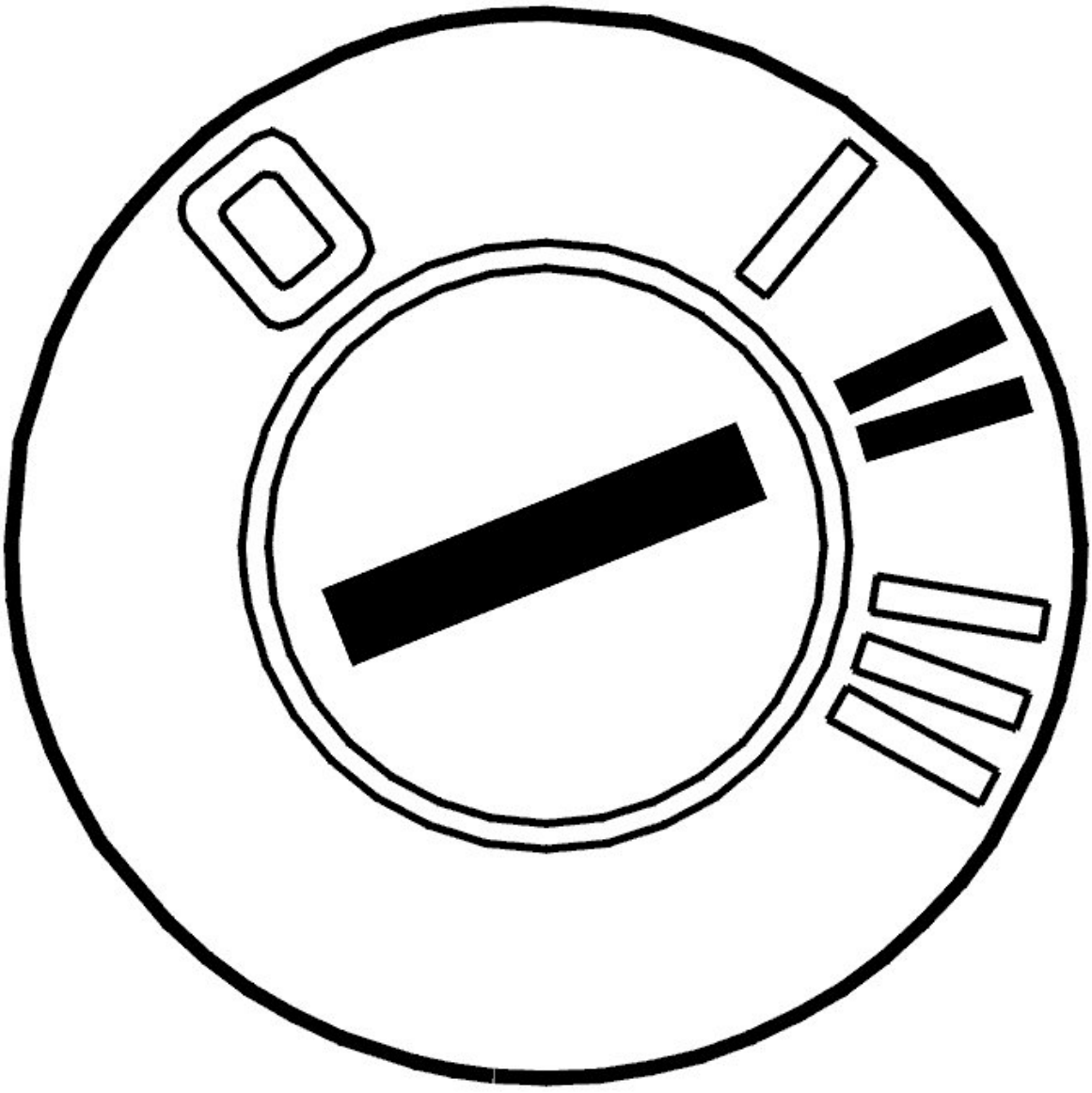
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on

- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

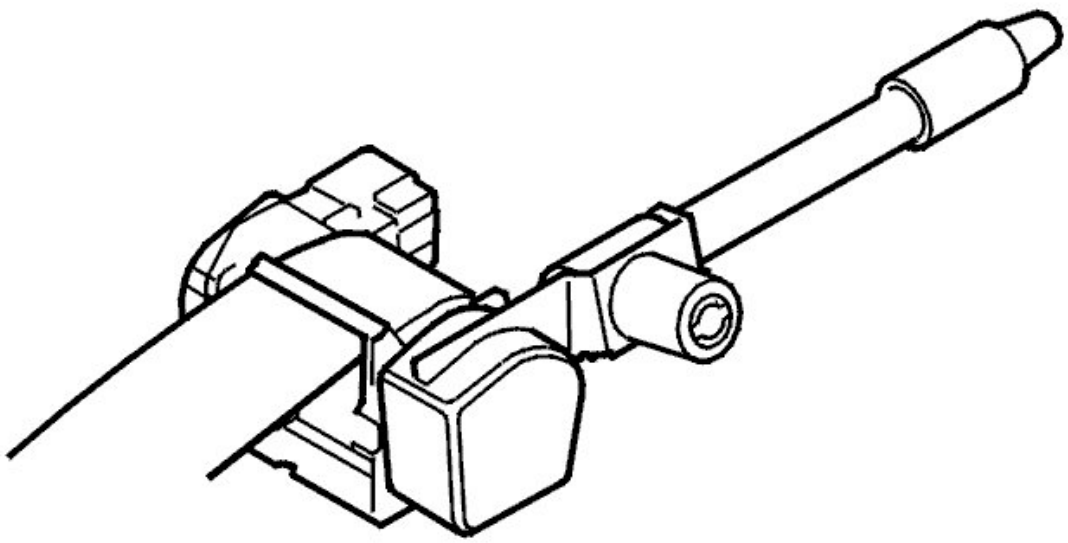
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0095

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0095 is stored if the control module registers that the resistance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0095 can be diagnosed in ignition positions I, II or III.

Substitute value

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- None.

Possible source

- Short-circuit in connector
- Short-circuit in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit in seat belt tensioner (resistance too low in igniter).

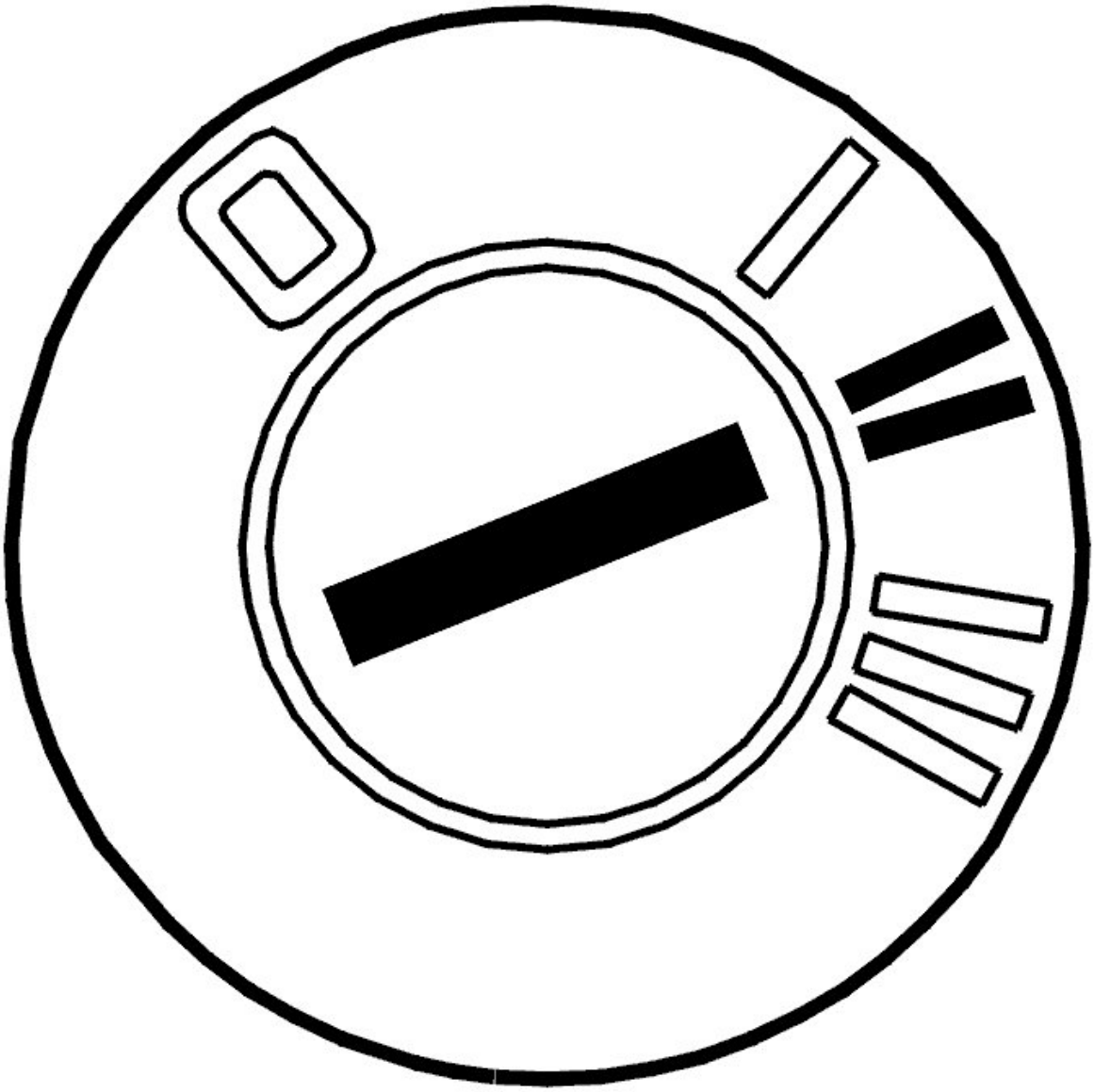
Fault symptom[s]

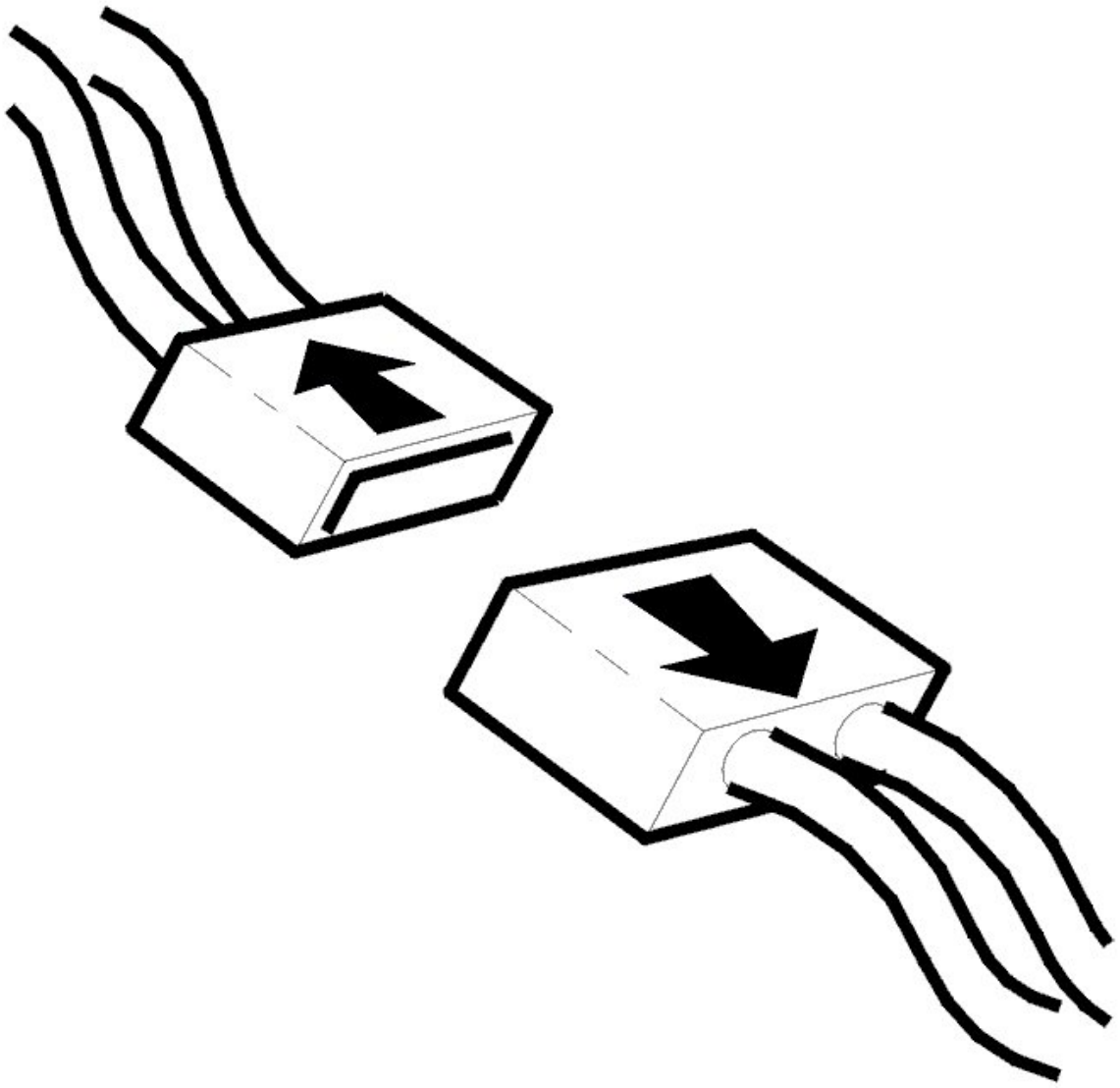
- General warning lamp lit.

Resistance Too Low

Resistance too low

Checking the component





- Ignition off
- Disconnect the connector from the left seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

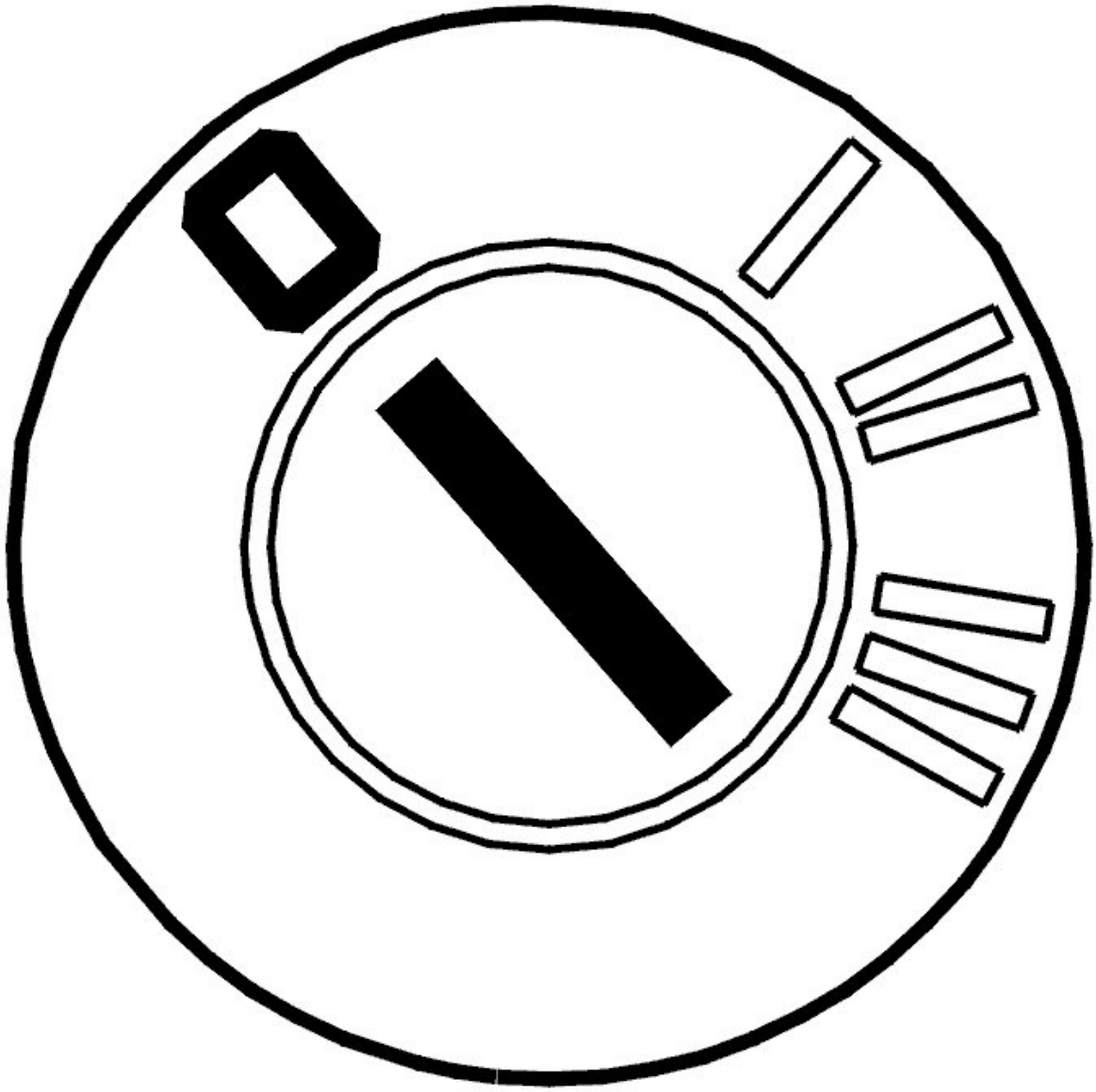
- To replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

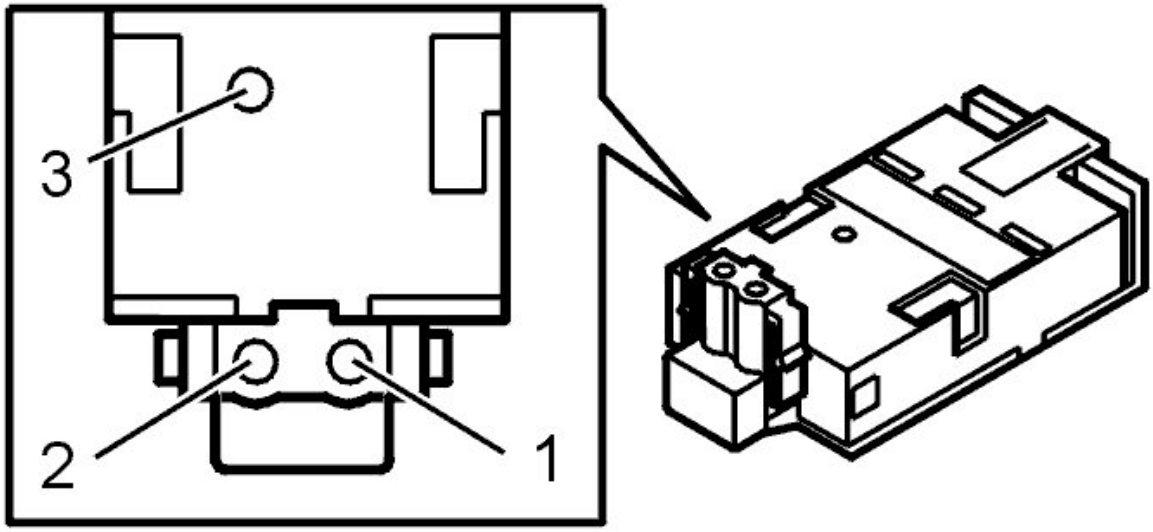
Check the cable between the Supplemental Restraint System Module (SRS) terminal #12A(12), terminal #11A(11) and connector terminal #1, terminal #3 on the left seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Check the resistance between terminals #12A(12), #11A(11) to the Supplemental Restraint System Module (SRS). The resistance between the terminals should be infinite.
Remedy as necessary.

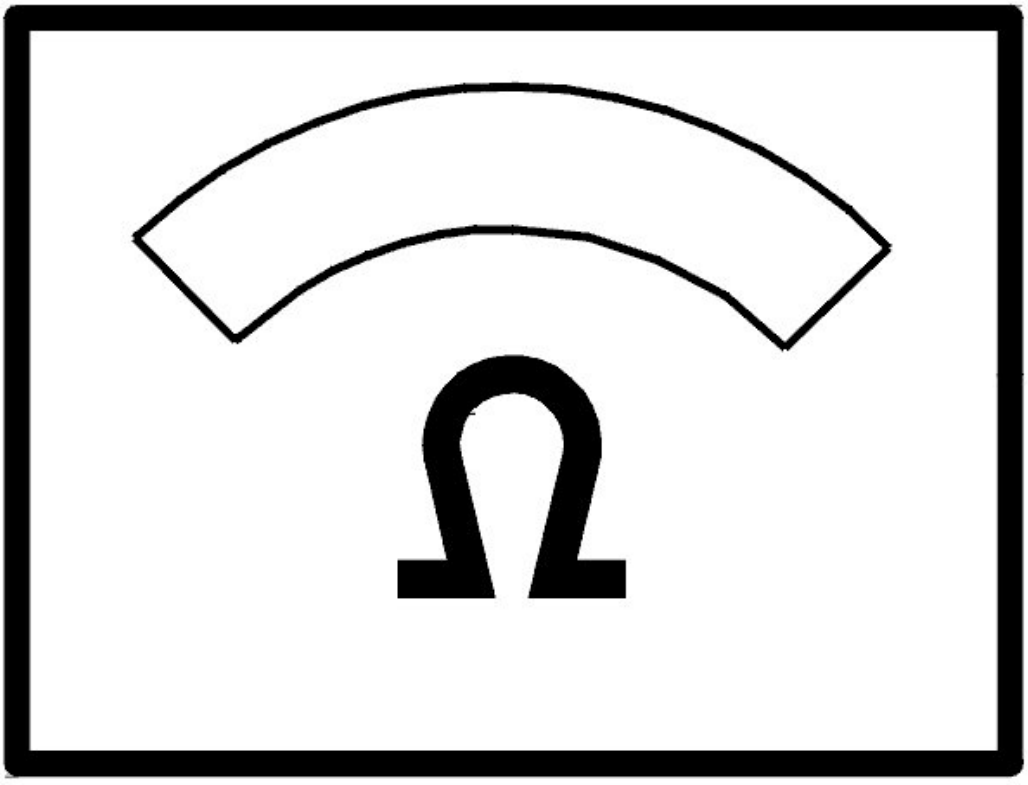
Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and the Supplemental Restraint System Module (SRS) disconnected, the resistance between connector terminals #1 and #3 on the seat belt tensioner connector (Supplemental Restraint System Module (SRS) side) should be infinite
- With the ignition off and with the special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the

resistance between terminals #12A(12) and #11A(11) on the Supplemental Restraint System Module (SRS) connector should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

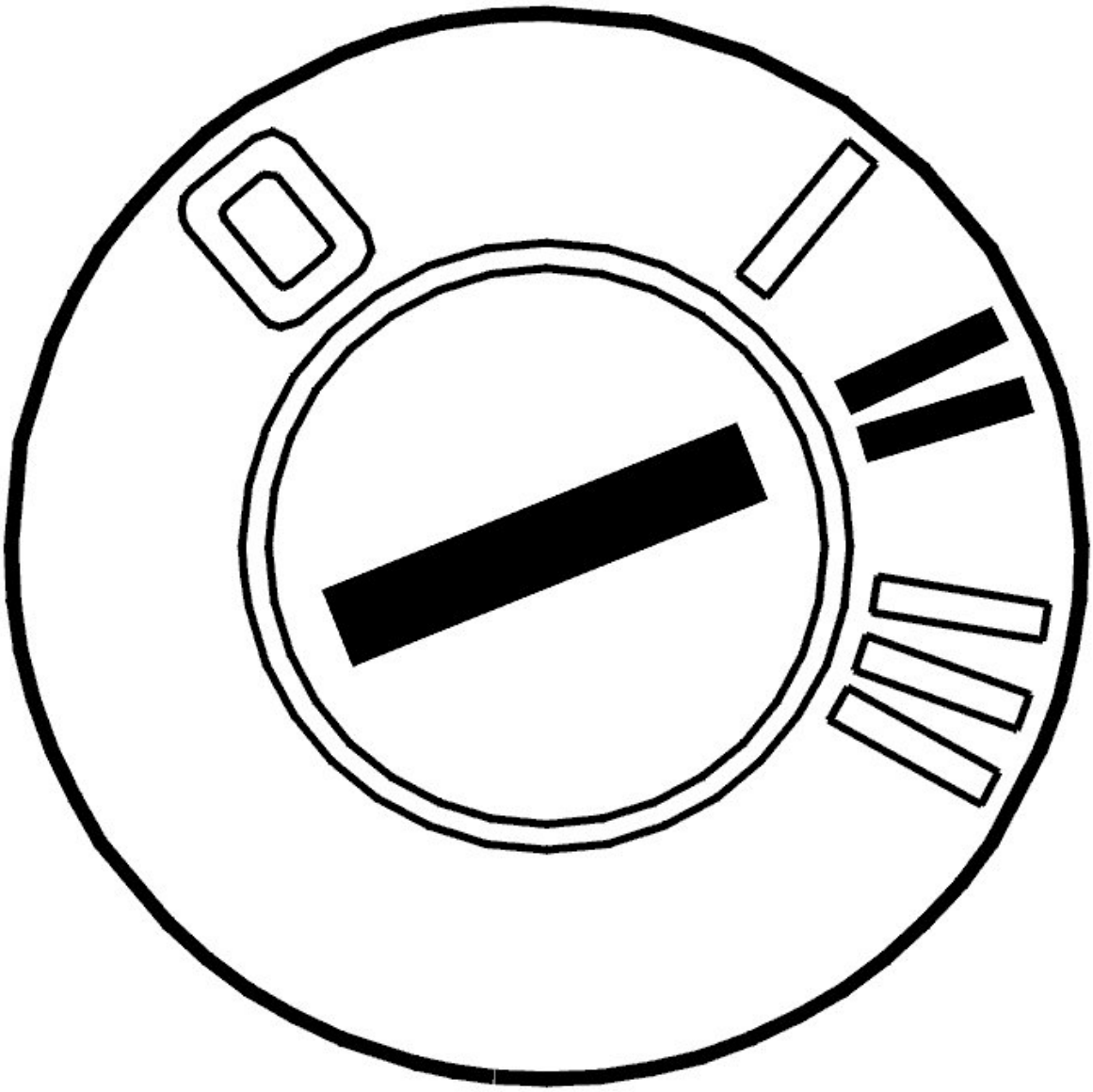
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

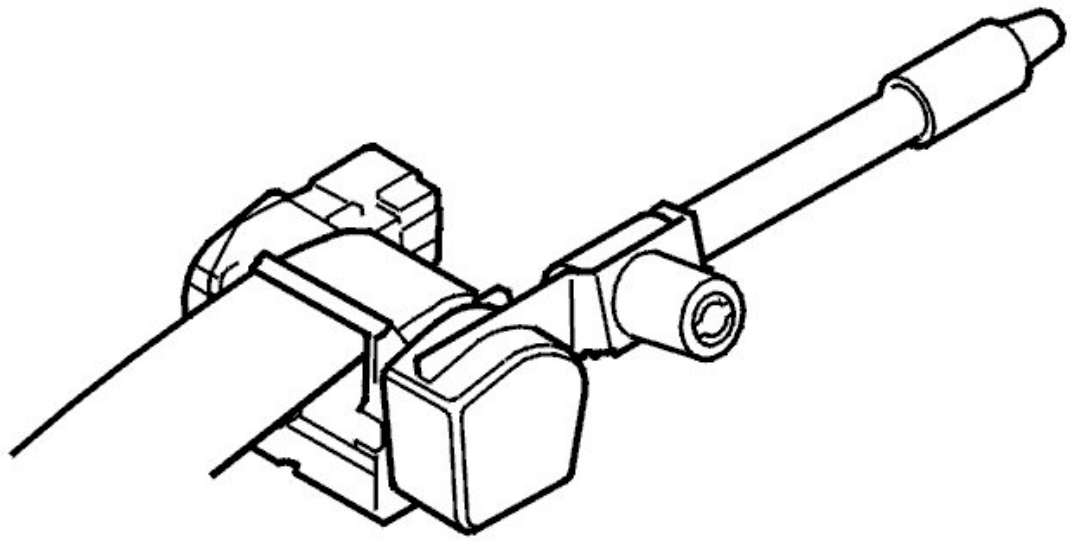
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0096

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0096
SRS-009E
depending on which wiring circuit the fault is in.
Diagnostic trouble codes (DTCs):
SRS-0096
SRS-009E
can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble codes (DTCs) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

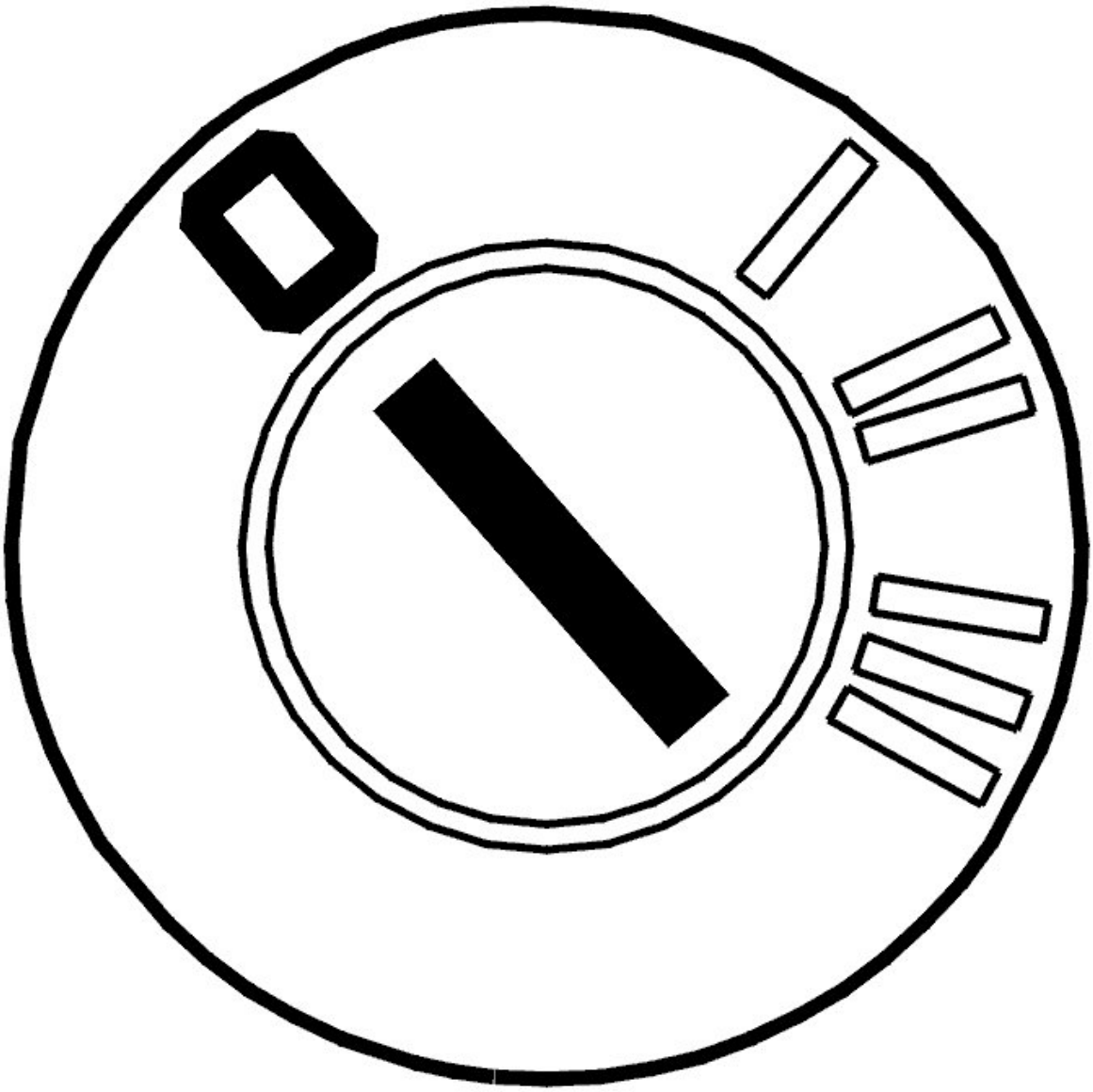
Possible source
- If the Supplemental Restraint System Module (SRS) identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

Fault symptom[s]
- General warning lamp lit.

Configuration Fault

Configuration fault

Checking the component



- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct control module is installed in the car. Read off by clicking the VCT2000 symbol.
Check that the switch for the left seat belt tensioner on the 3rd seat row is not connected to a seat belt tensioner if the car is a 5-seat model.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see the relevant service procedure.
- For information about signals, see Signal Specifications.

Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

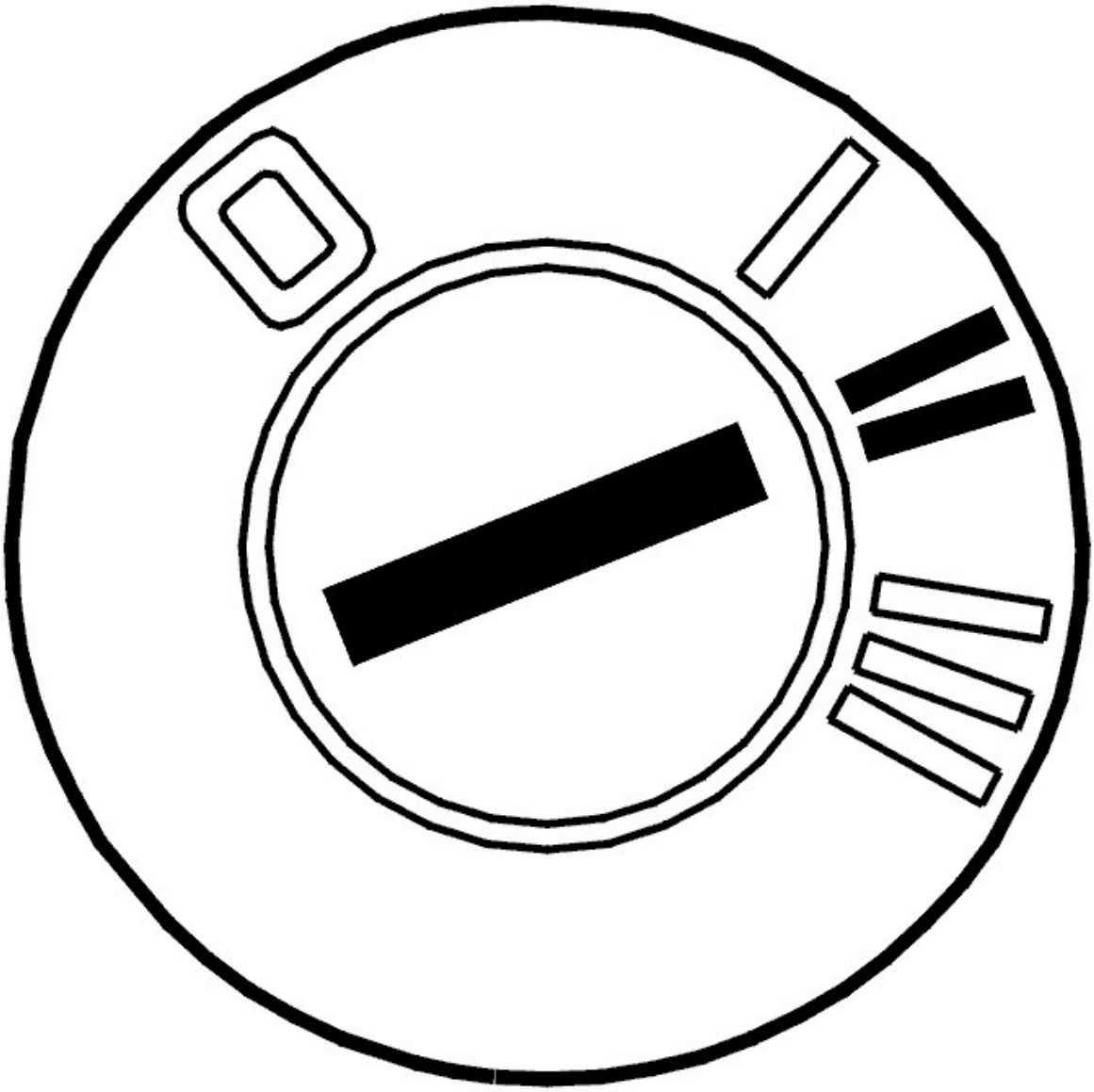
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

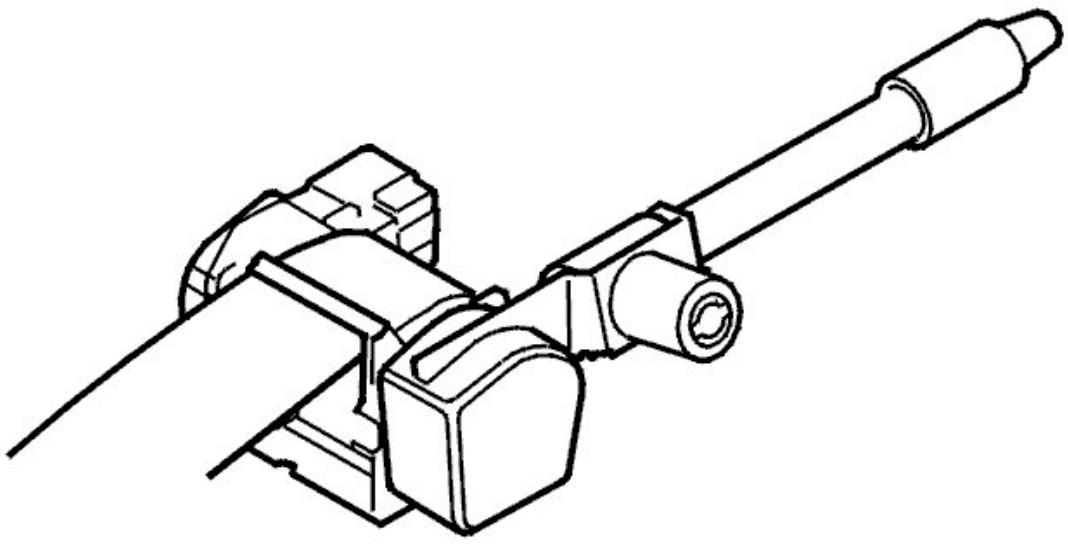
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0098

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0098 is stored if the control module registers that the voltage in the signal cable is high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0098 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit to supply voltage in the seat belt tensioner.

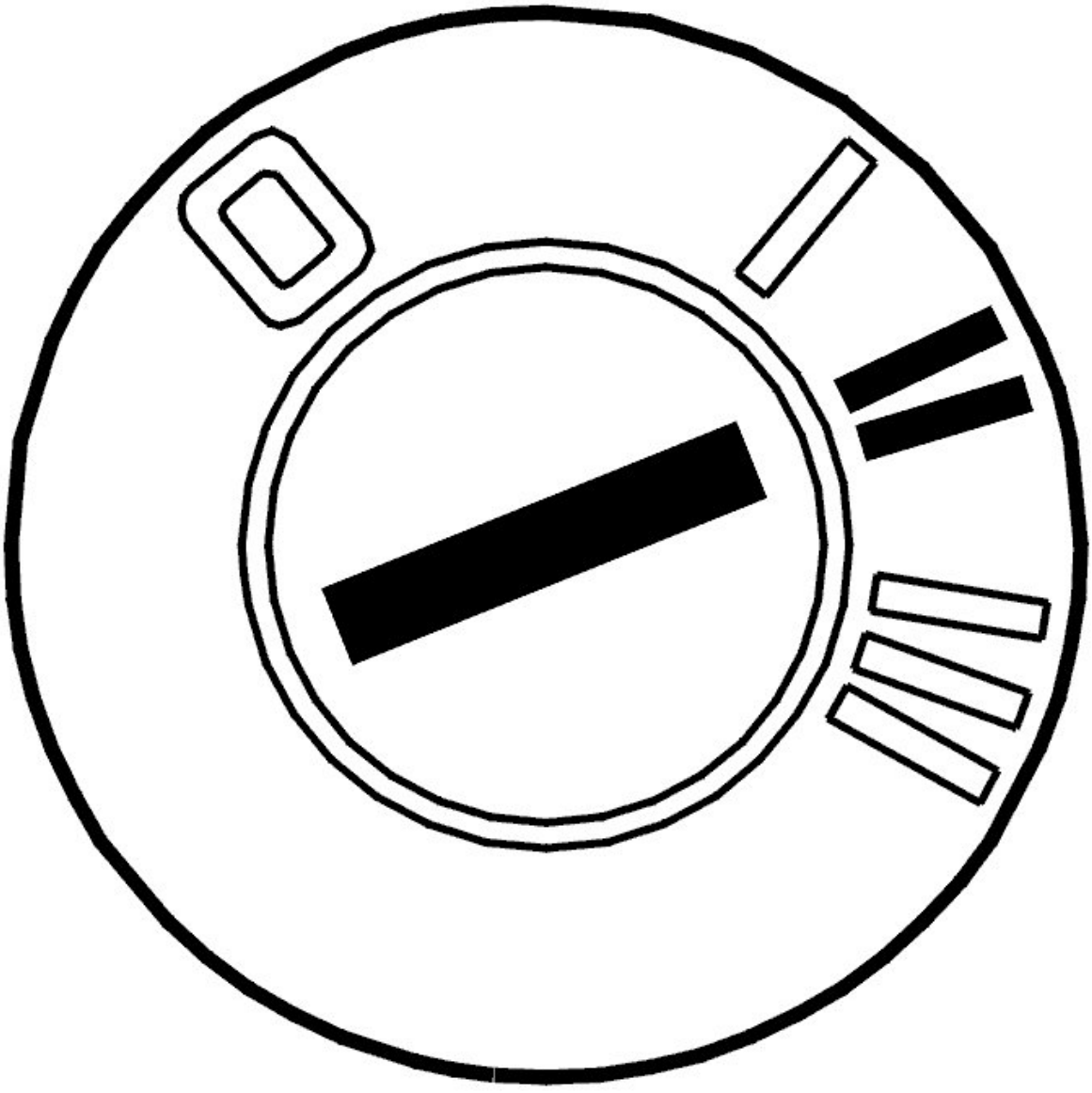
Fault symptom[s]

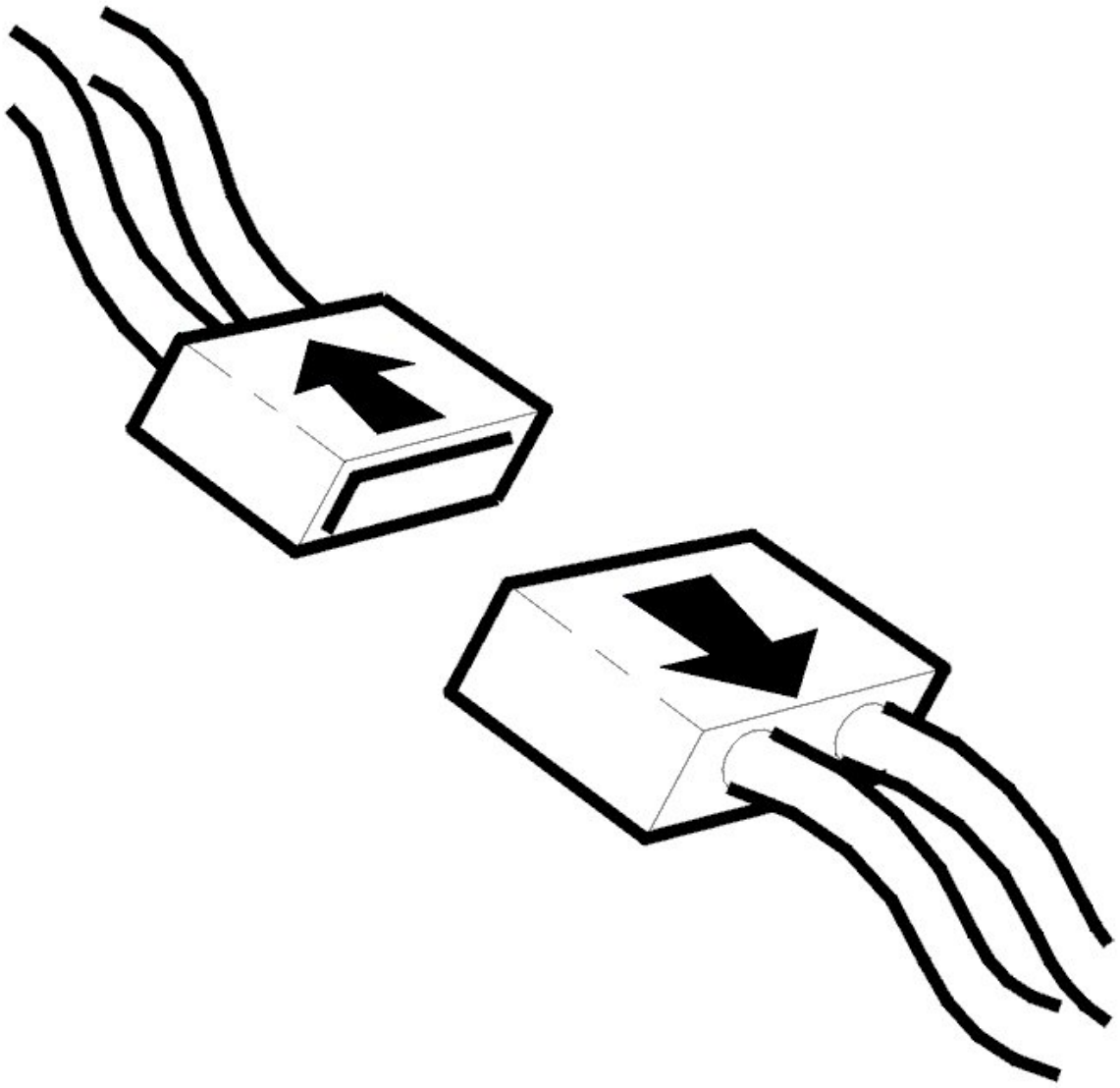
- General warning lamp lit.

Signal Too High

Signal too high

Checking the component





- Ignition off
- Disconnect the connector from the right seat belt tensioner on the 3rd seat row
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

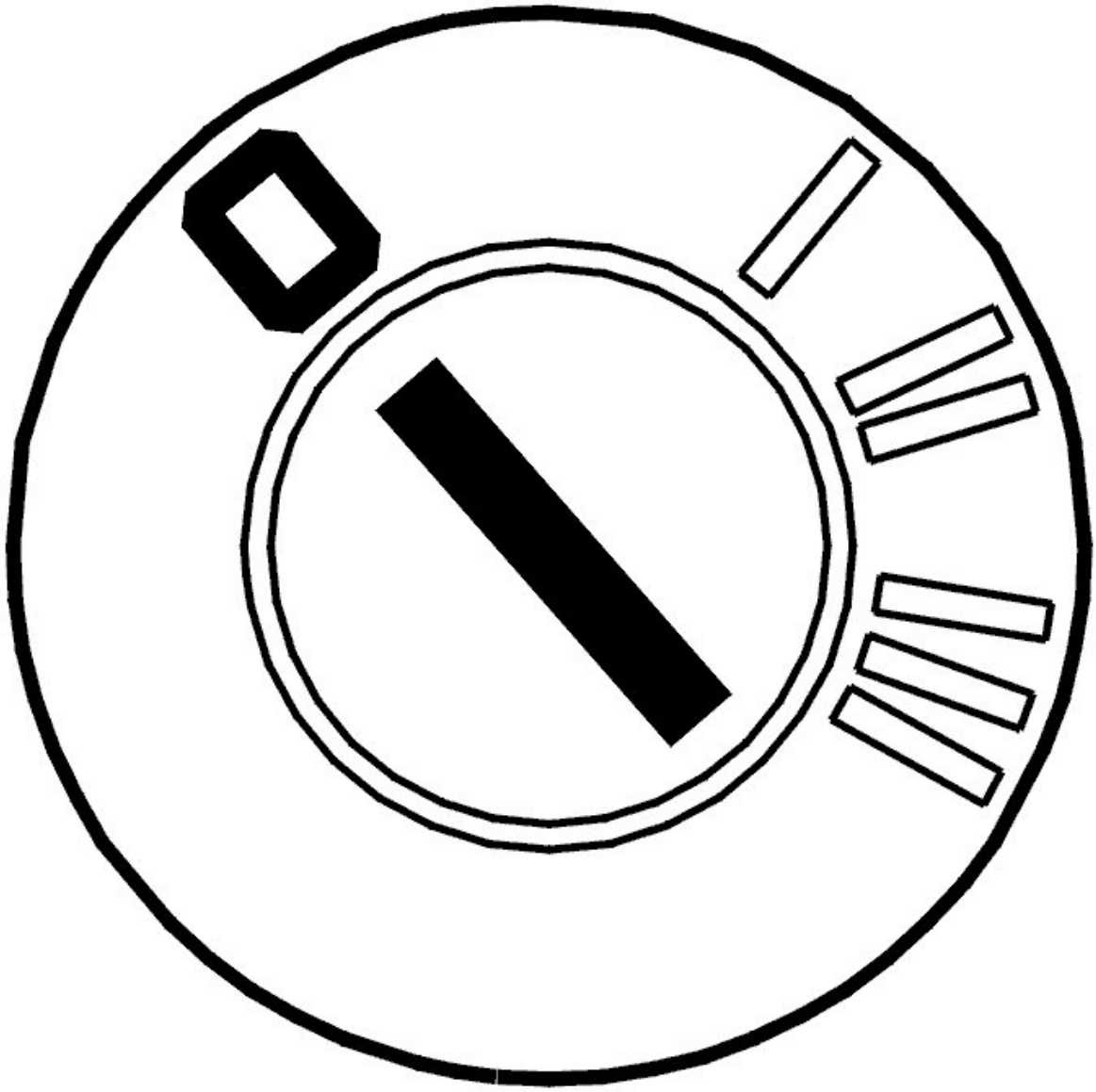
Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the Supplemental Restraint System Module (SRS). There is a risk of static discharge. This could damage the Supplemental Restraint System Module (SRS).

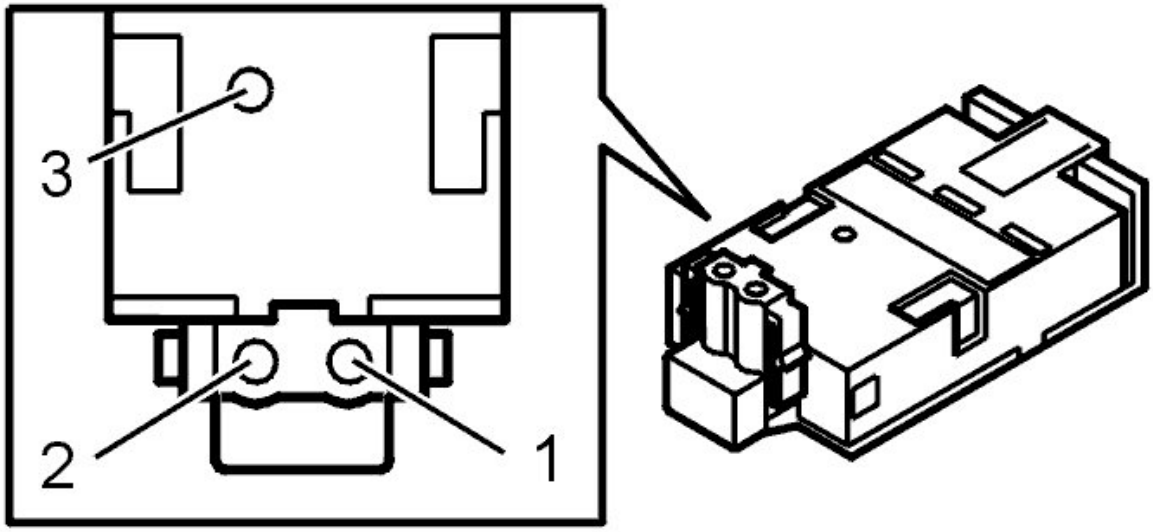
Check the cable between the Supplemental Restraint System Module (SRS) terminal #13C(9), terminal #14C(10) and connector terminal #1, terminal #3 on the right seat belt tensioner on the 3rd seat row. Check for a short-circuit to supply voltage.
Remedy as necessary.

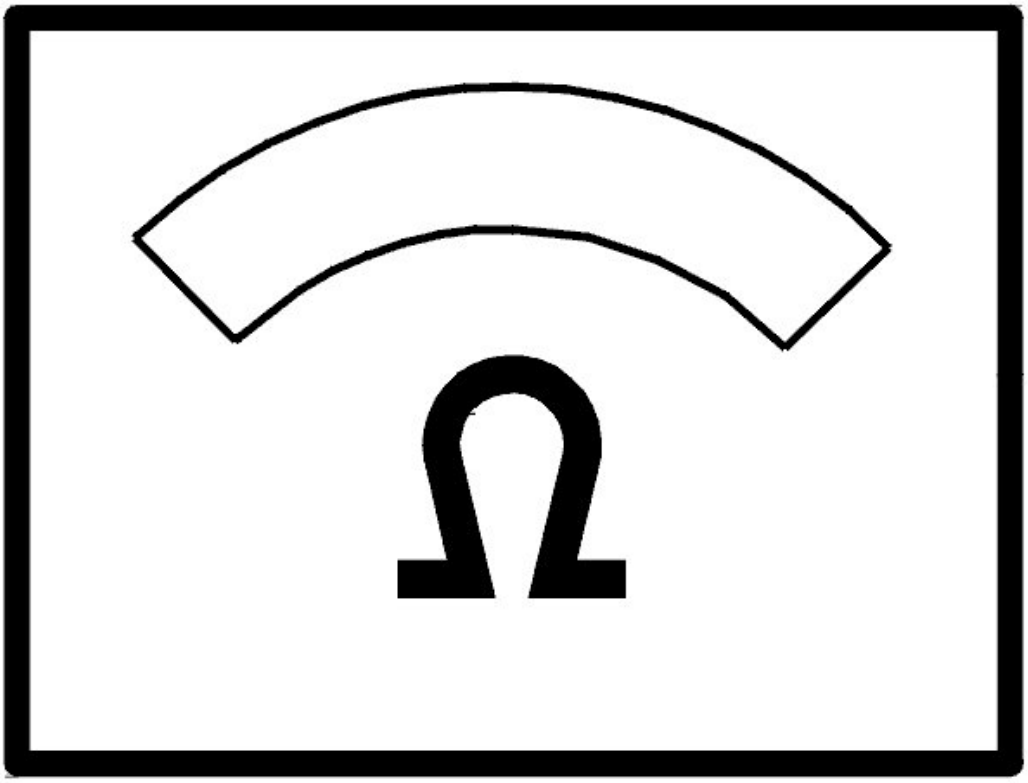
Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the seat belt tensioner and Supplemental Restraint System Module (SRS) connectors disconnected, the resistance between seat belt tensioner connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive pole must be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- With the ignition off and the connector for the seat belt tensioner disconnected, the resistance between terminals #13C(9) and #14C(10) on

the Supplemental Restraint System Module (SRS) connector should be infinite

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

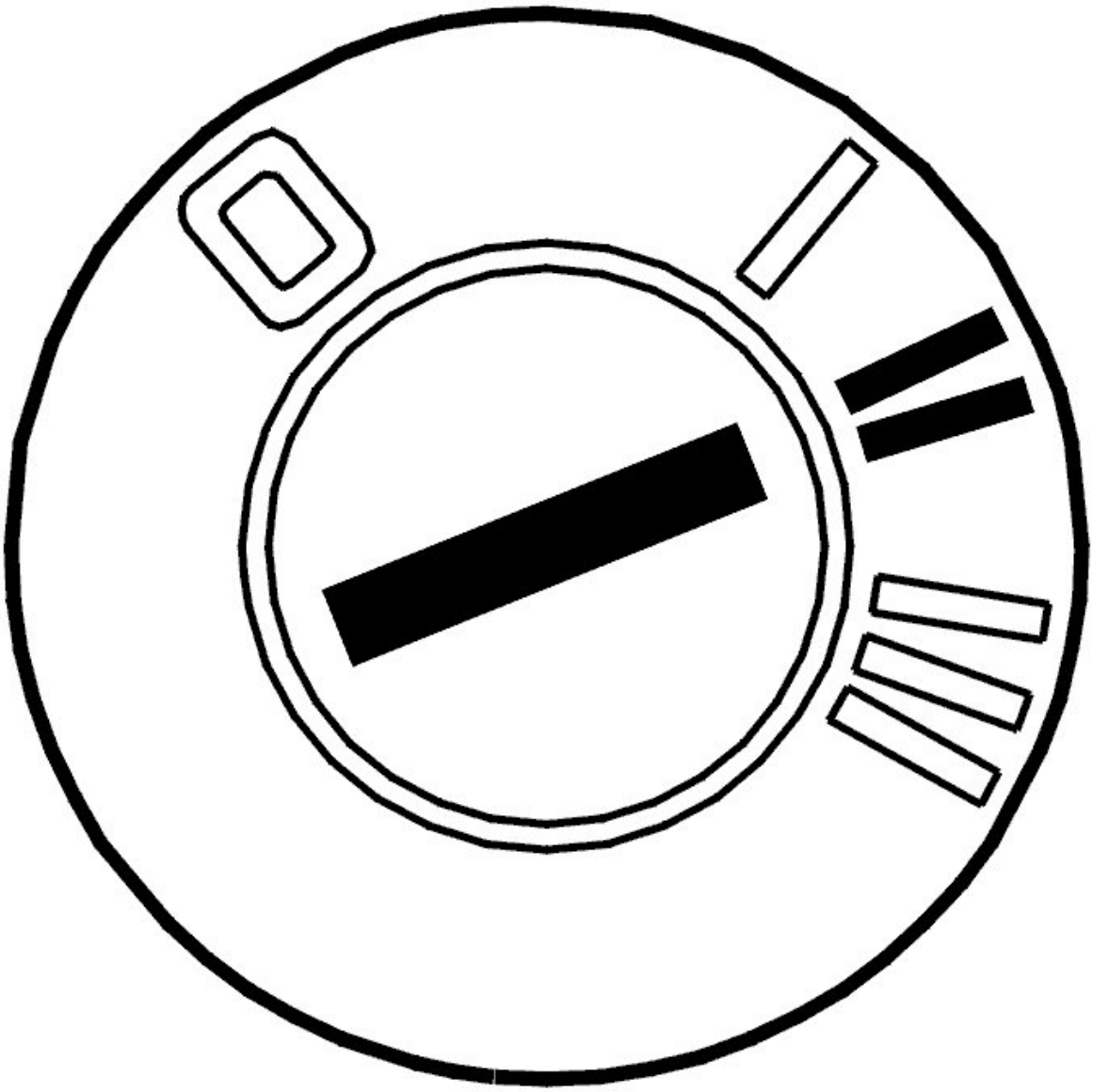
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

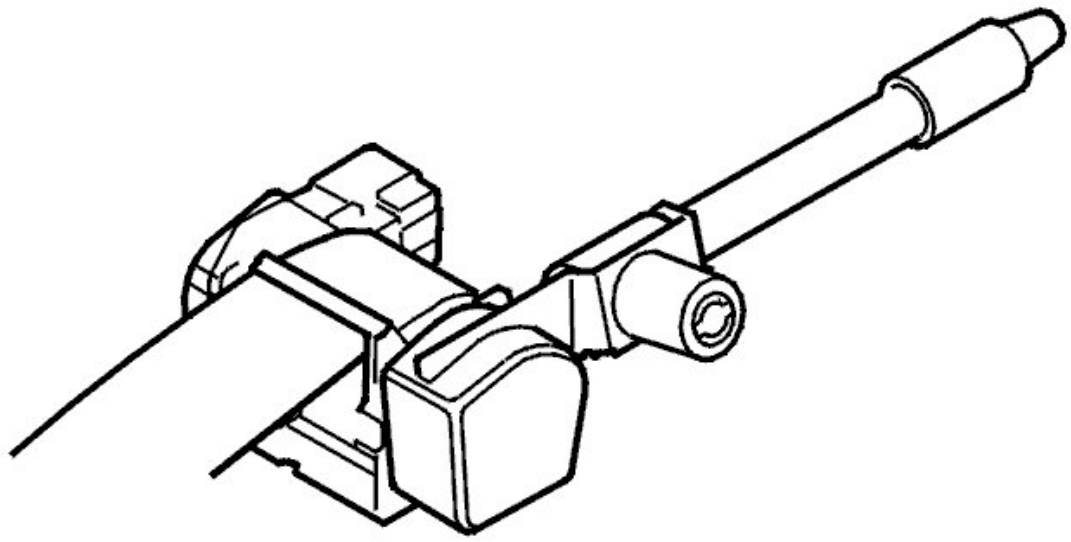
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0099

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-0099 is stored if the control module registers that the voltage in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0099 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

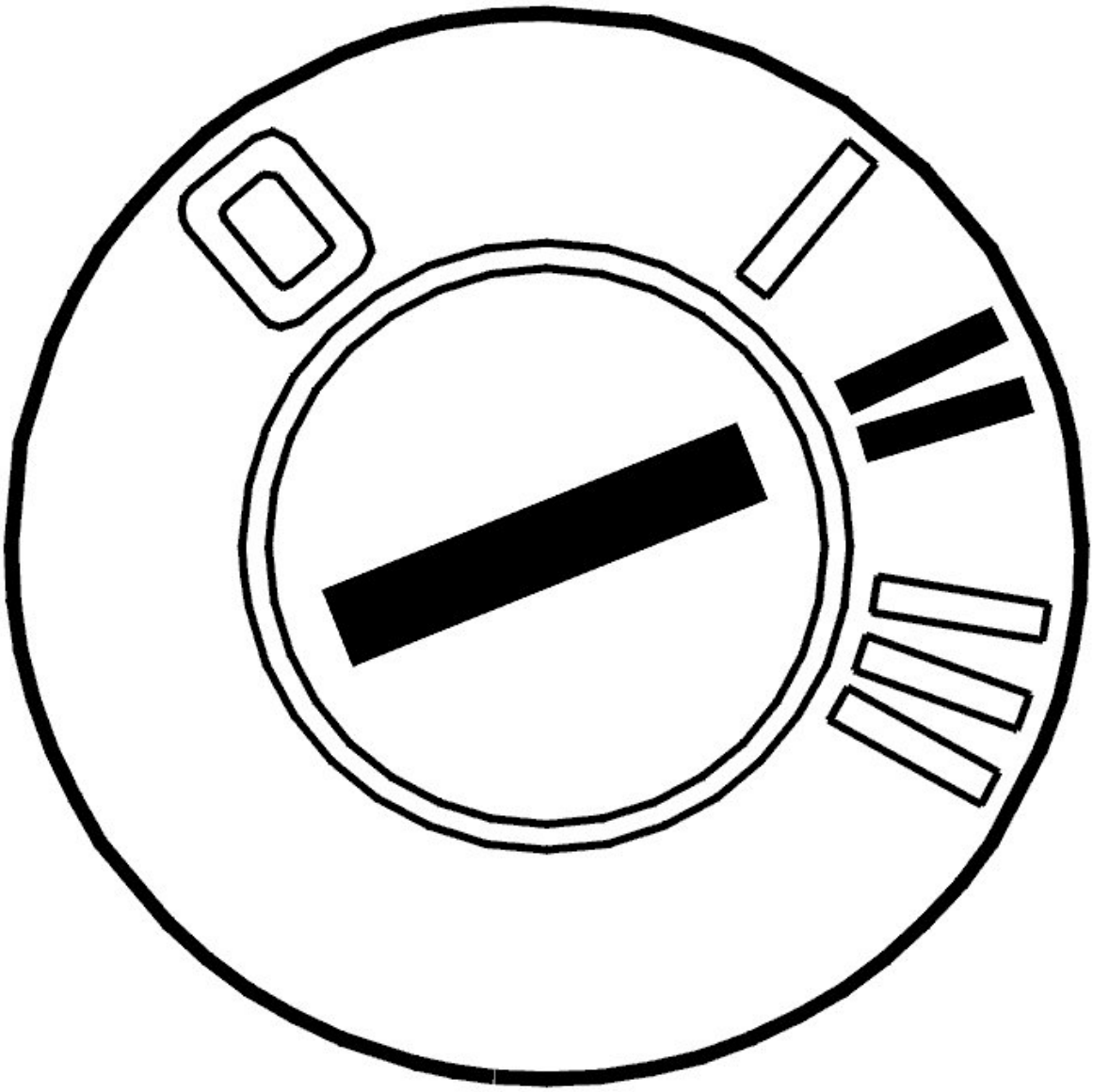
Possible source
- Short-circuit to ground in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the connector
- Short-circuit to ground in the seat belt tensioner.

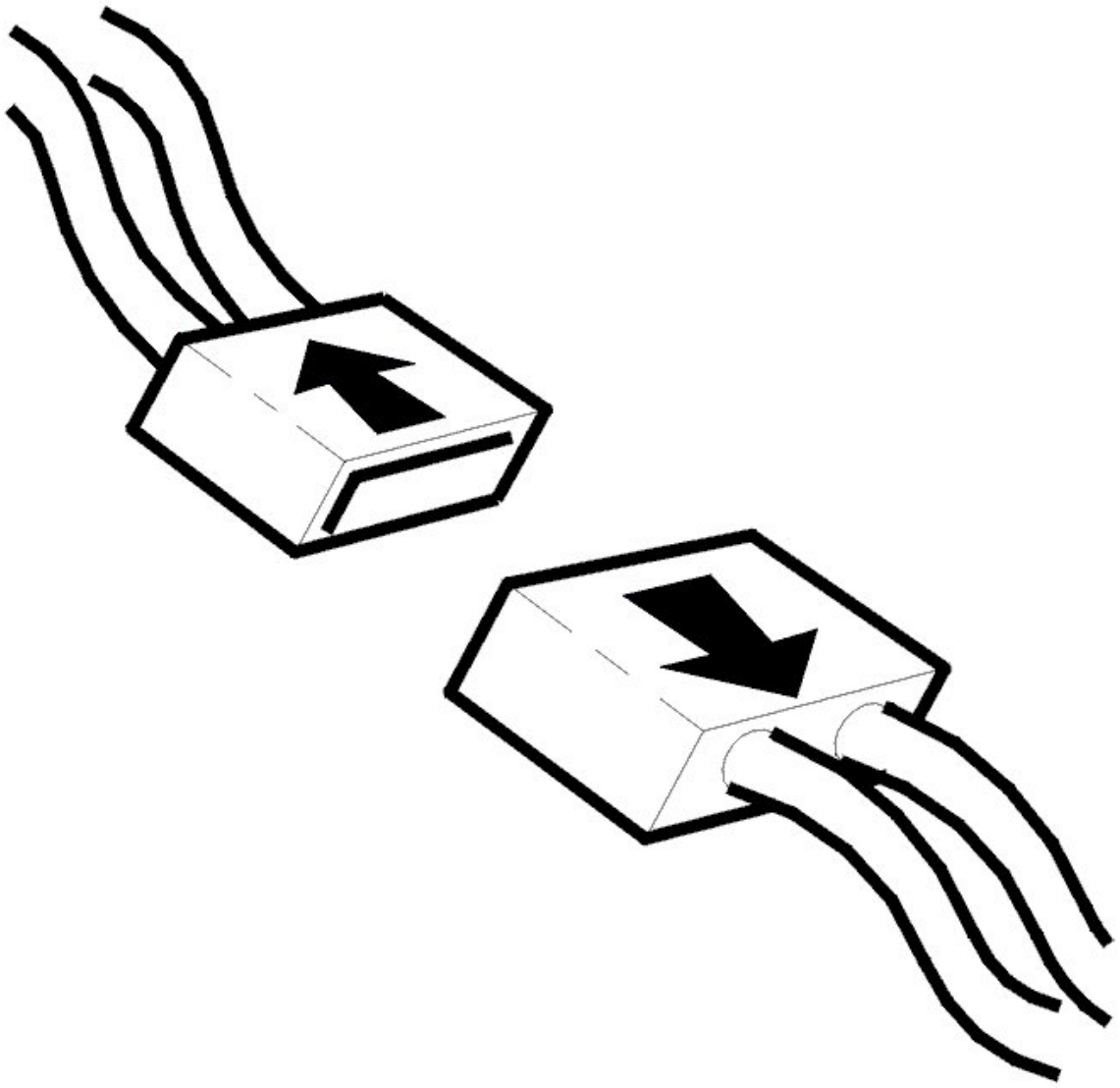
Fault symptom[s]
- General warning lamp lit.

Signal Too Low

Signal too low

Checking the component





- Ignition off
- Disconnect the connector from the right seat belt tensioner on the 3rd seat row
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

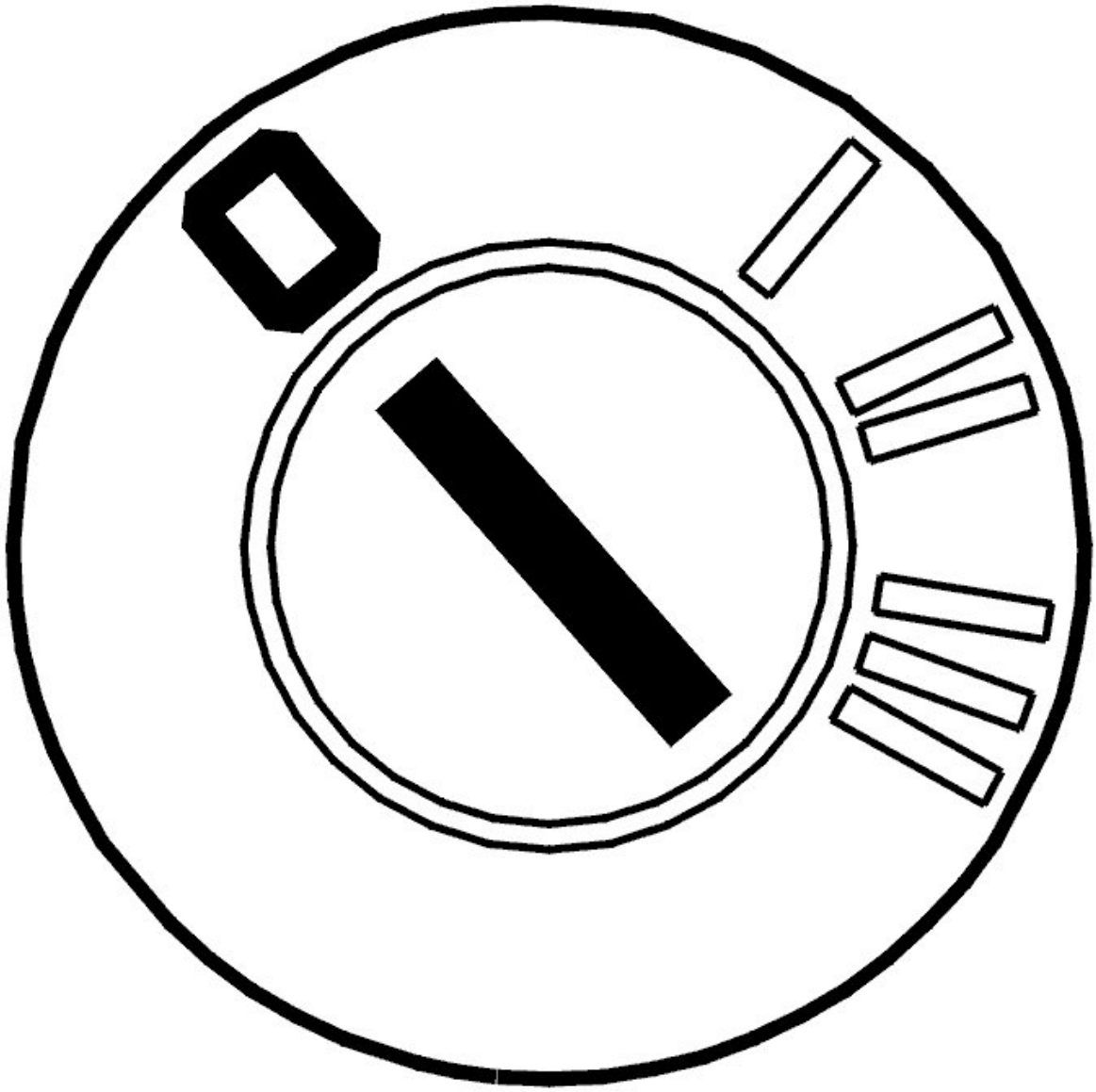
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

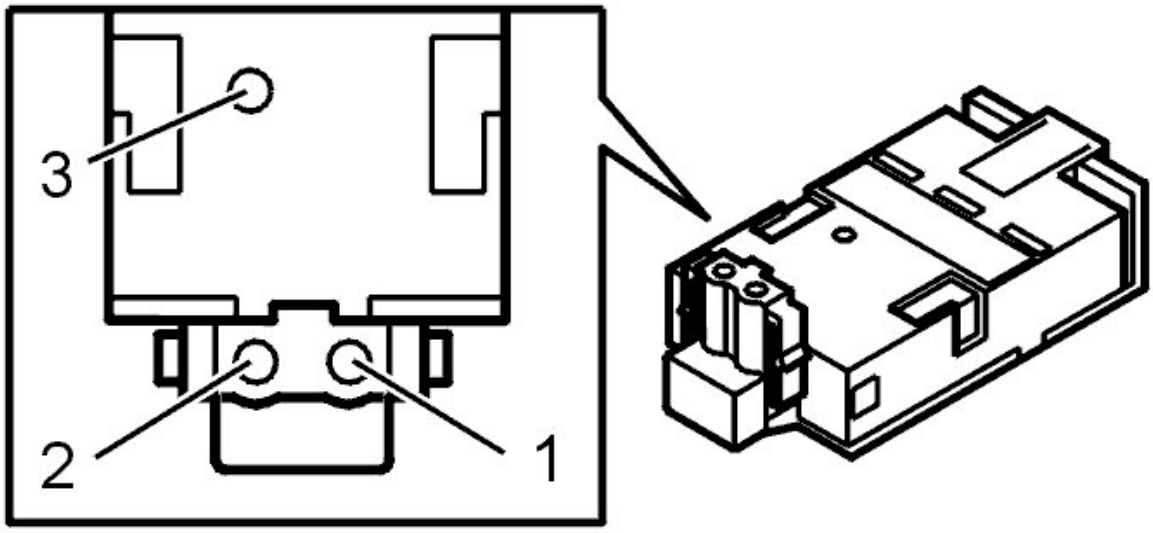
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

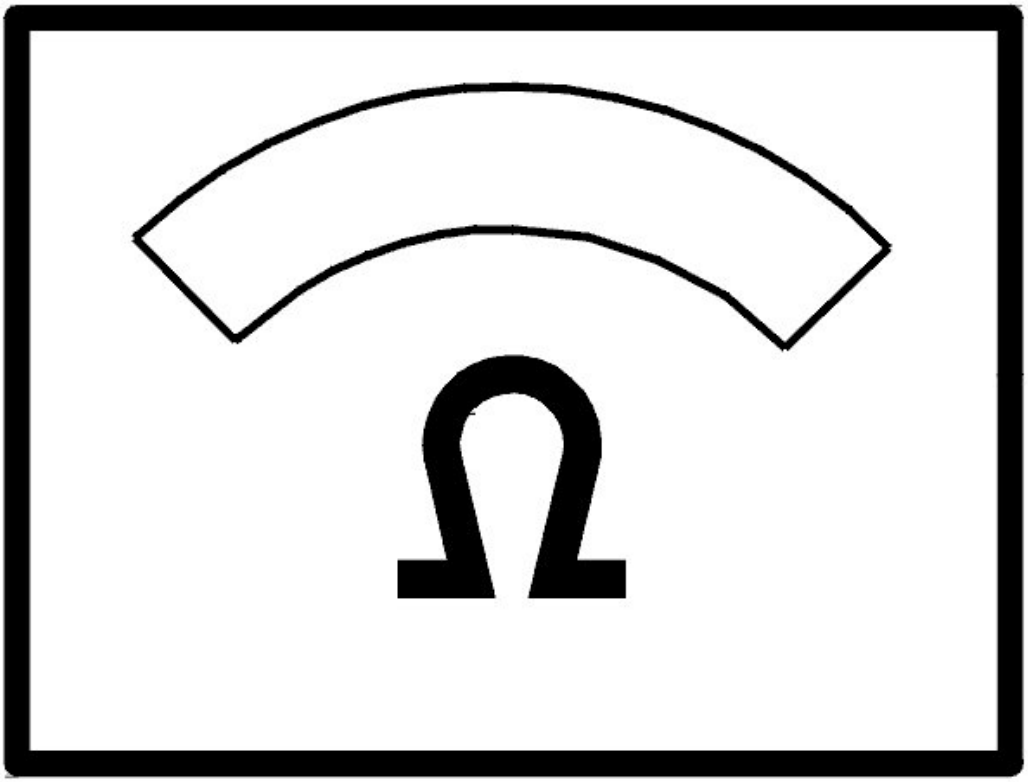
Check the cable between the Supplemental Restraint System Module (SRS) terminal #13C(9), terminal #14C(10) and connector terminal #1, terminal #3 on the right seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and for the SRS control module disconnected, the resistance between the seat belt tensioner connector terminals #1 and #3 (SRS control module side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

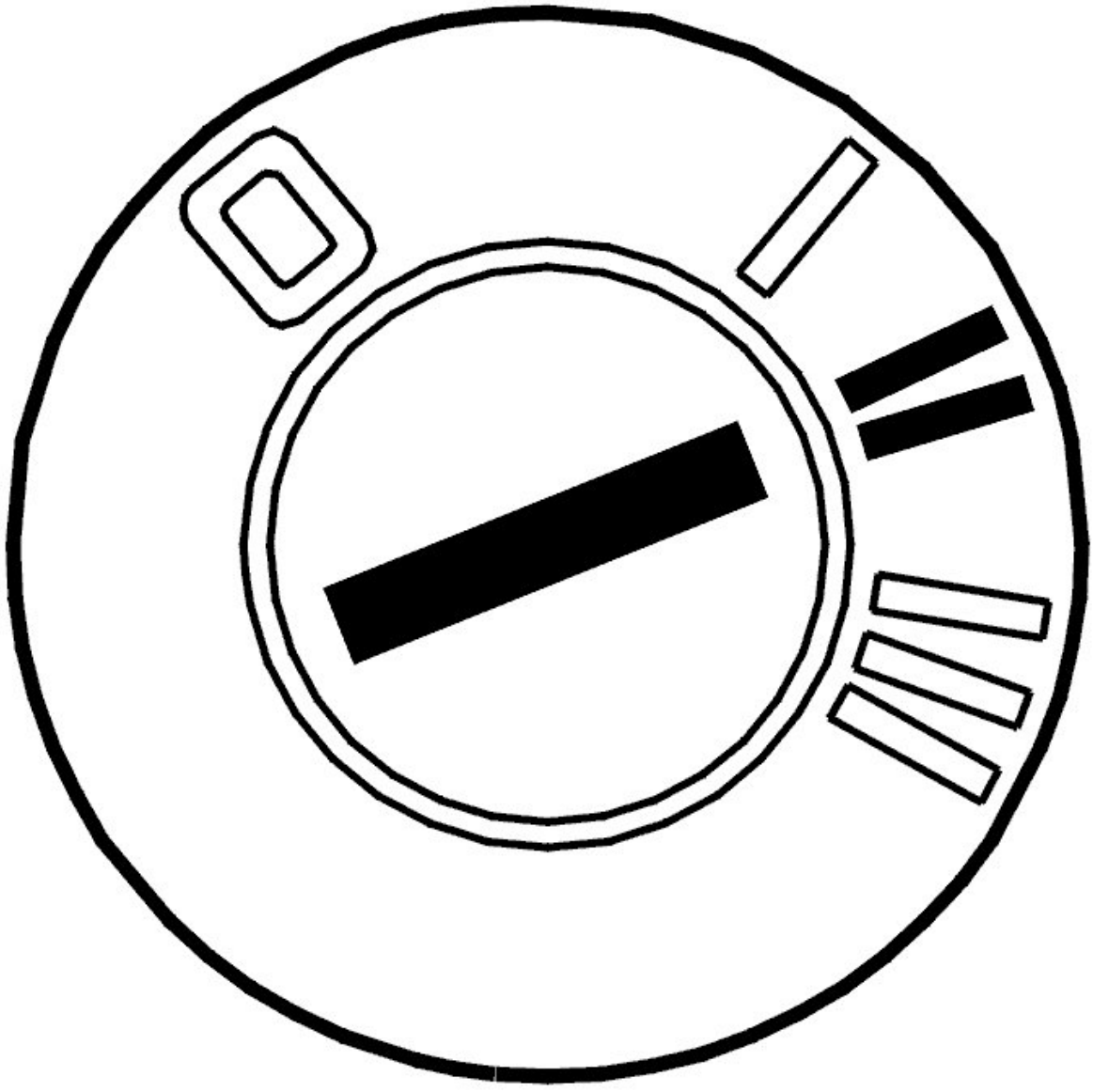
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead

- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

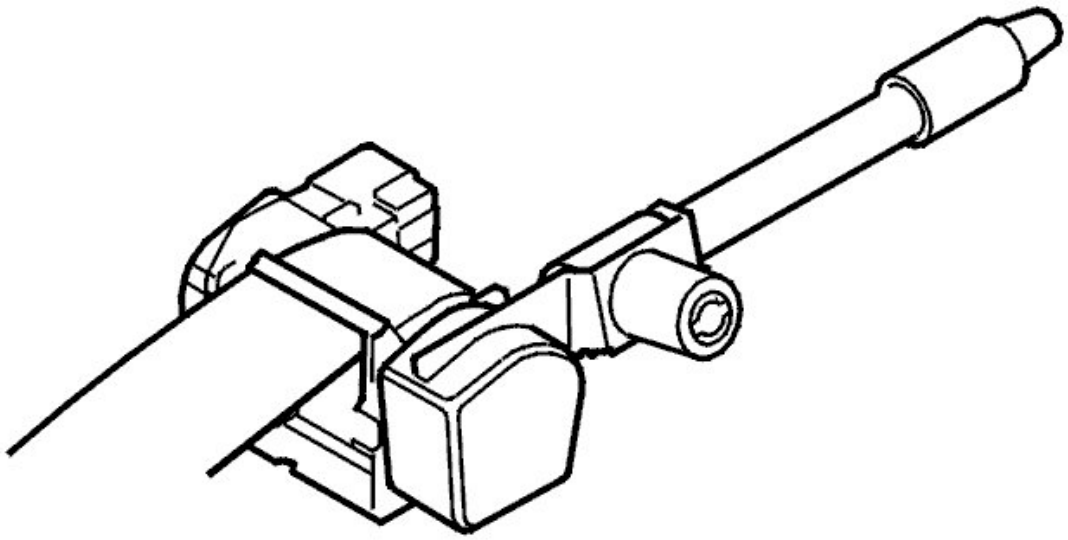
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-009A

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-009A is stored if the control module registers that the capacitance in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-009A can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

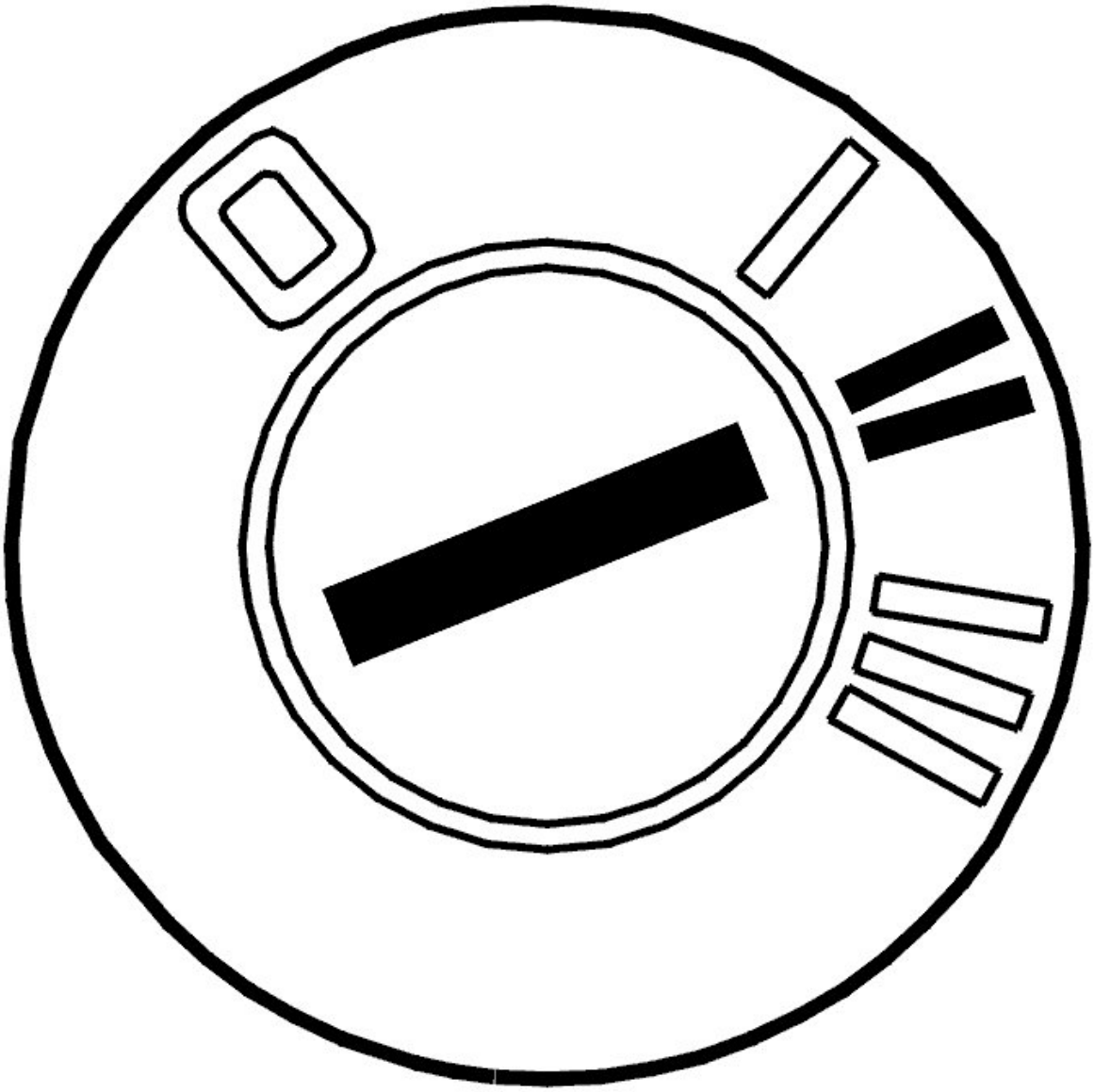
Possible source
- The capacitance is too high or there is a short-circuit in the integrated capacitor in the connector for the SRS ignition cable.

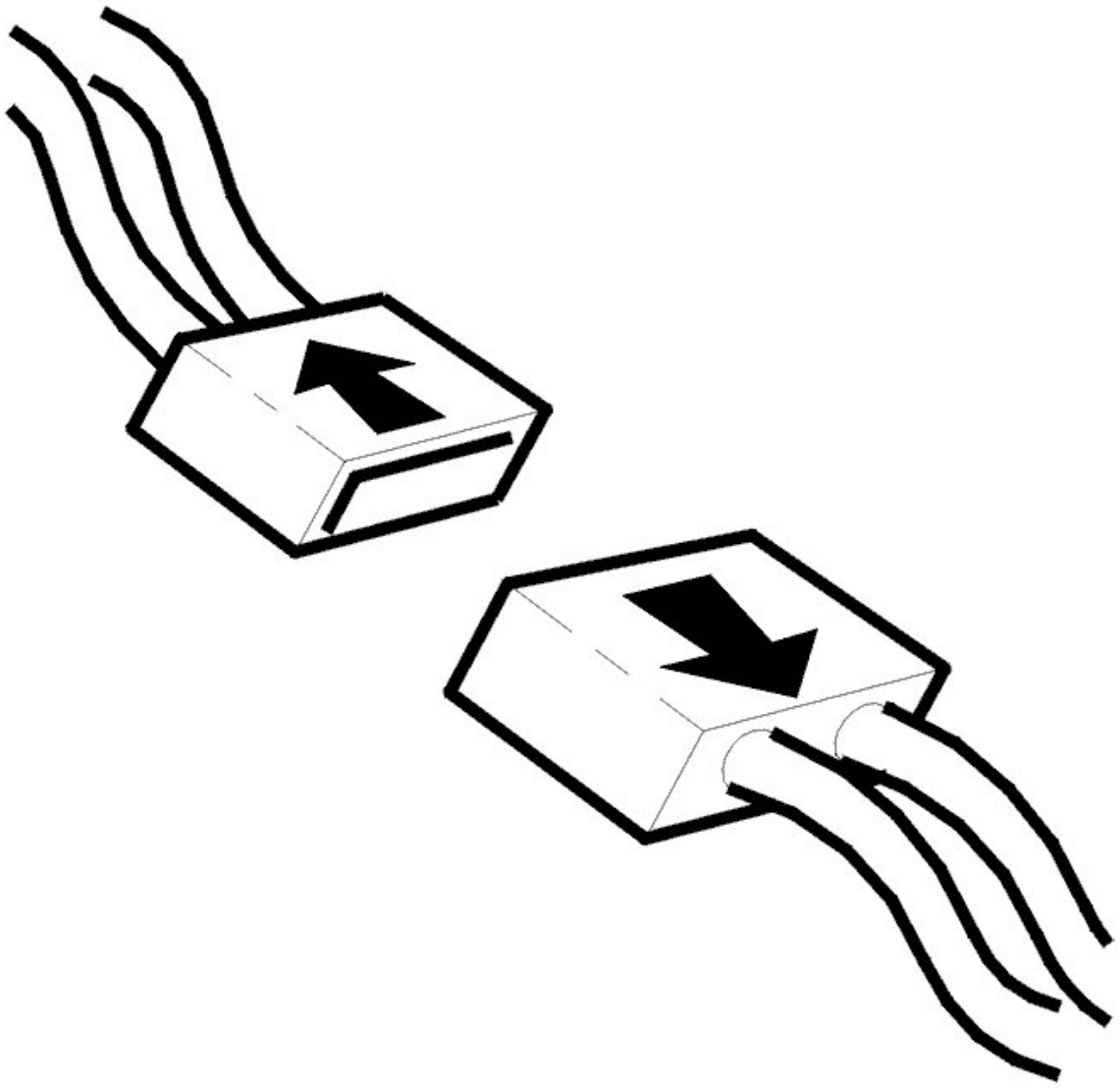
Fault symptom[s]
- General warning lamp lit.

Capacitance Too High

Capacitance too high

Checking the component





- Ignition off
- Disconnect the connector from the right seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

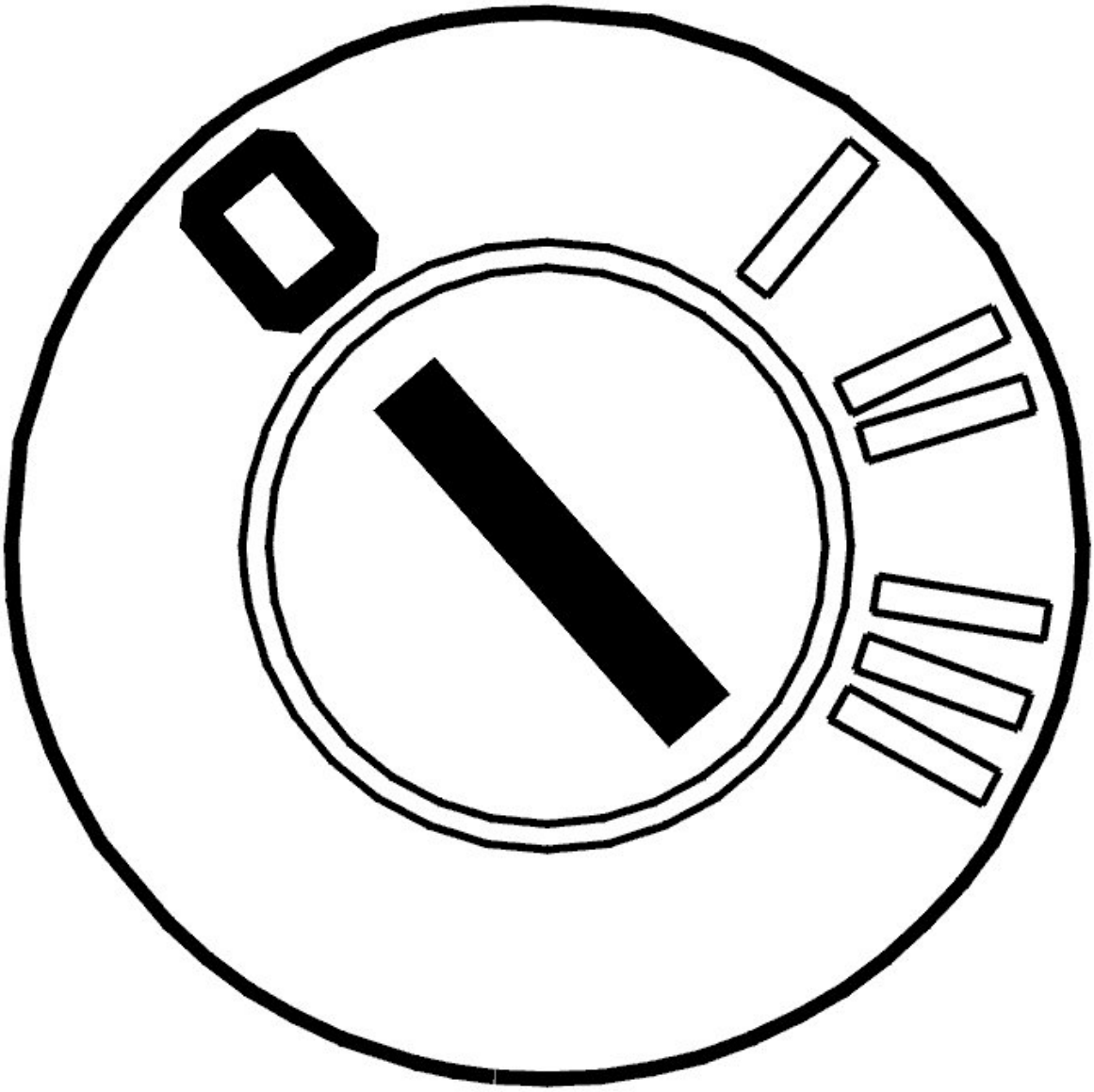
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings from a disconnected undeployed seat belt tensioner. This could deploy the seat belt tensioner!

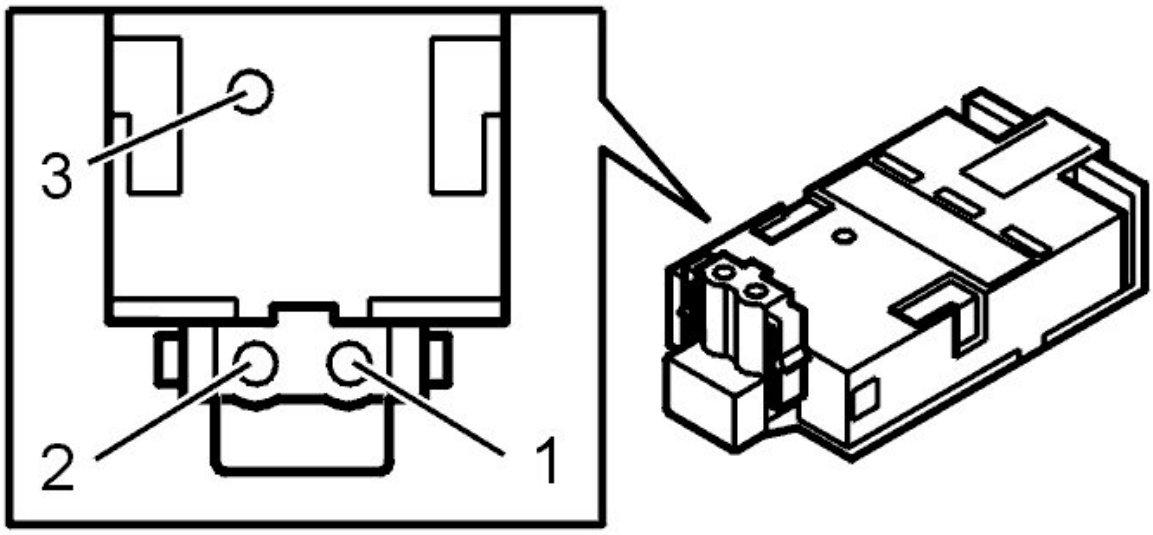
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

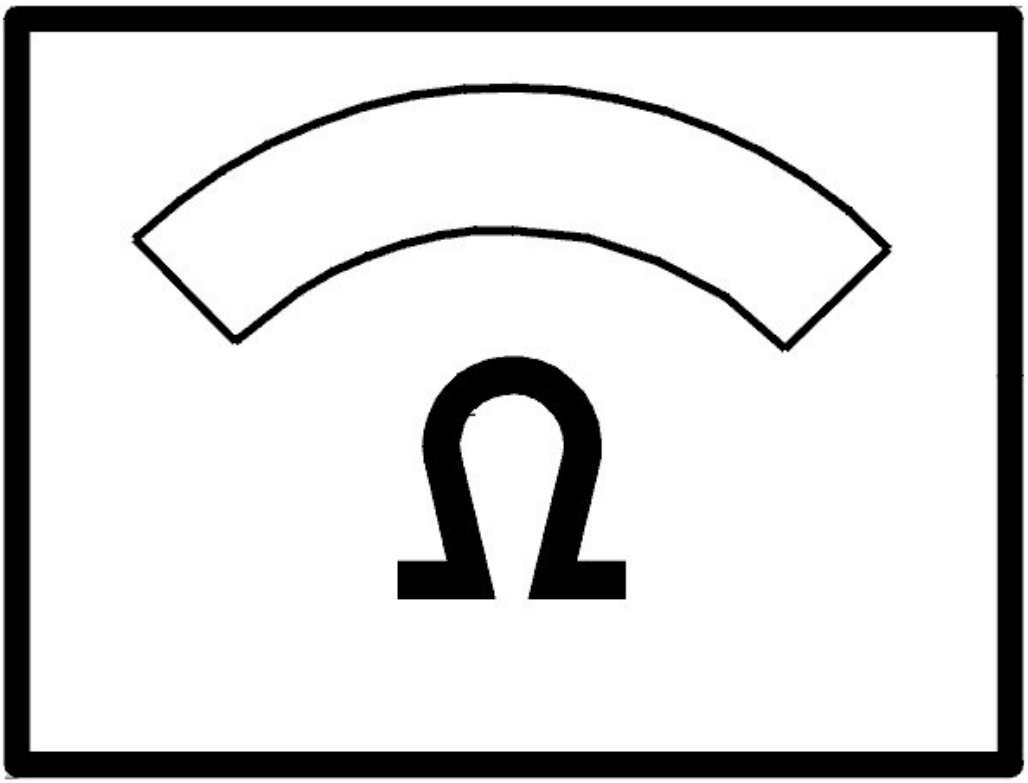
Check the cable between the Supplemental Restraint System Module (SRS) terminal #13C(9), terminal #14C(10) and connector terminal #1, terminal #3 on the right seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for seat belt tensioner.
Check the resistance between terminals #13C(9), #14C(10) to the Supplemental Restraint System Module (SRS). The resistance between the terminals should be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access and replace the switch for the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

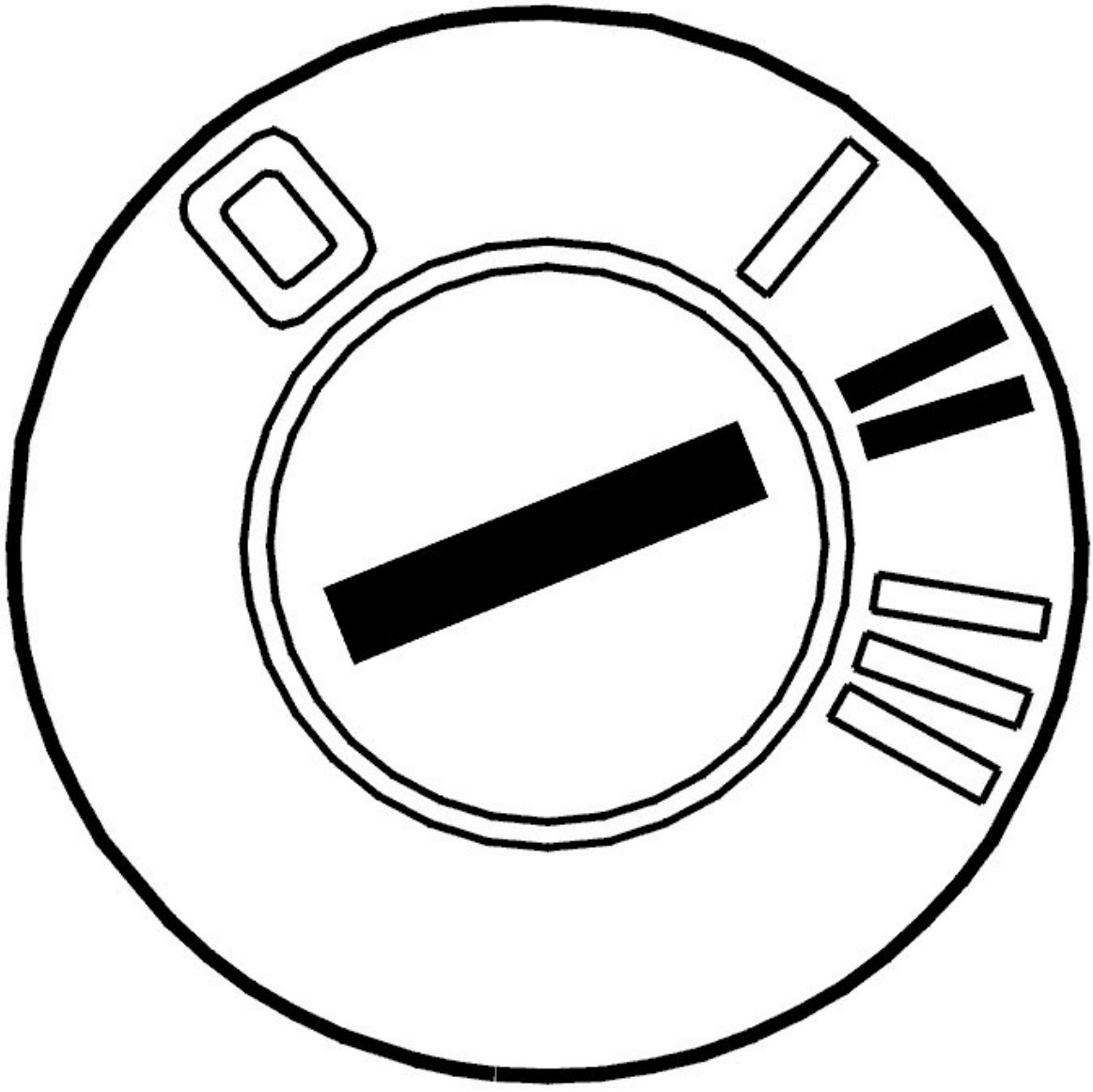
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead

- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

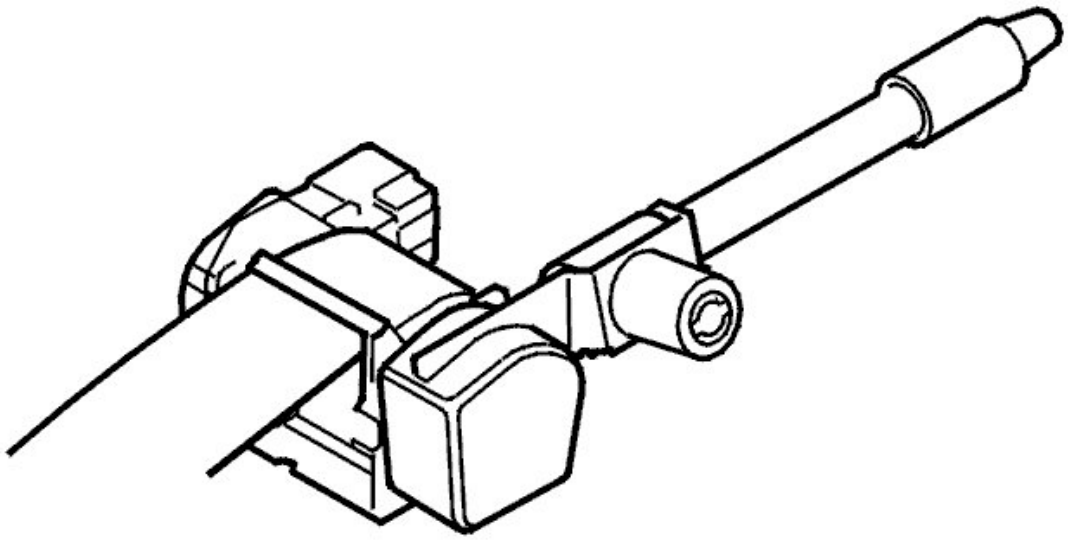
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-009B

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-009B is stored if the control module registers that the capacitance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-009B can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

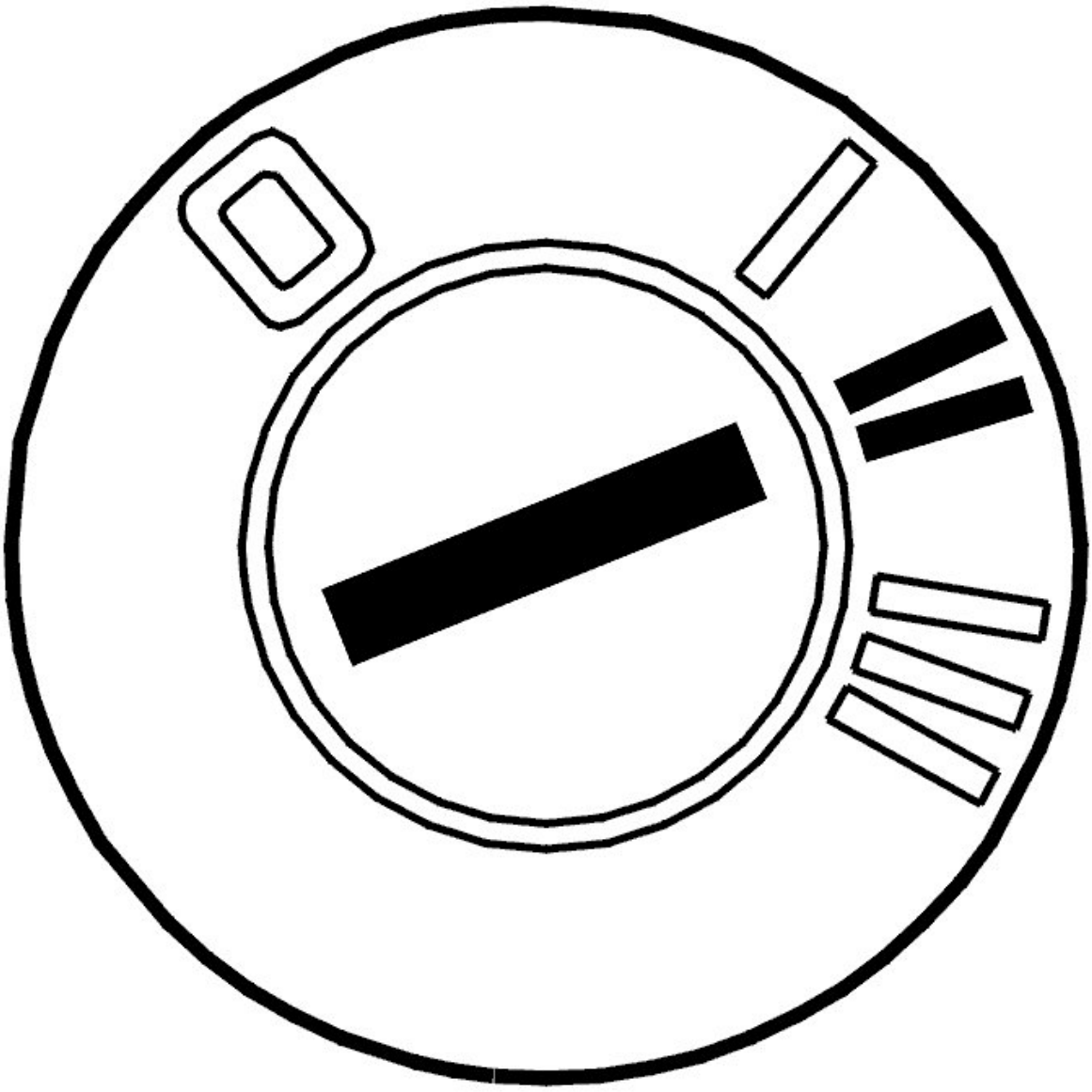
Possible source
- Too low capacitance in connector
- Too low capacitance in the signal cable between the seat belt tensioner and the SRS control module.

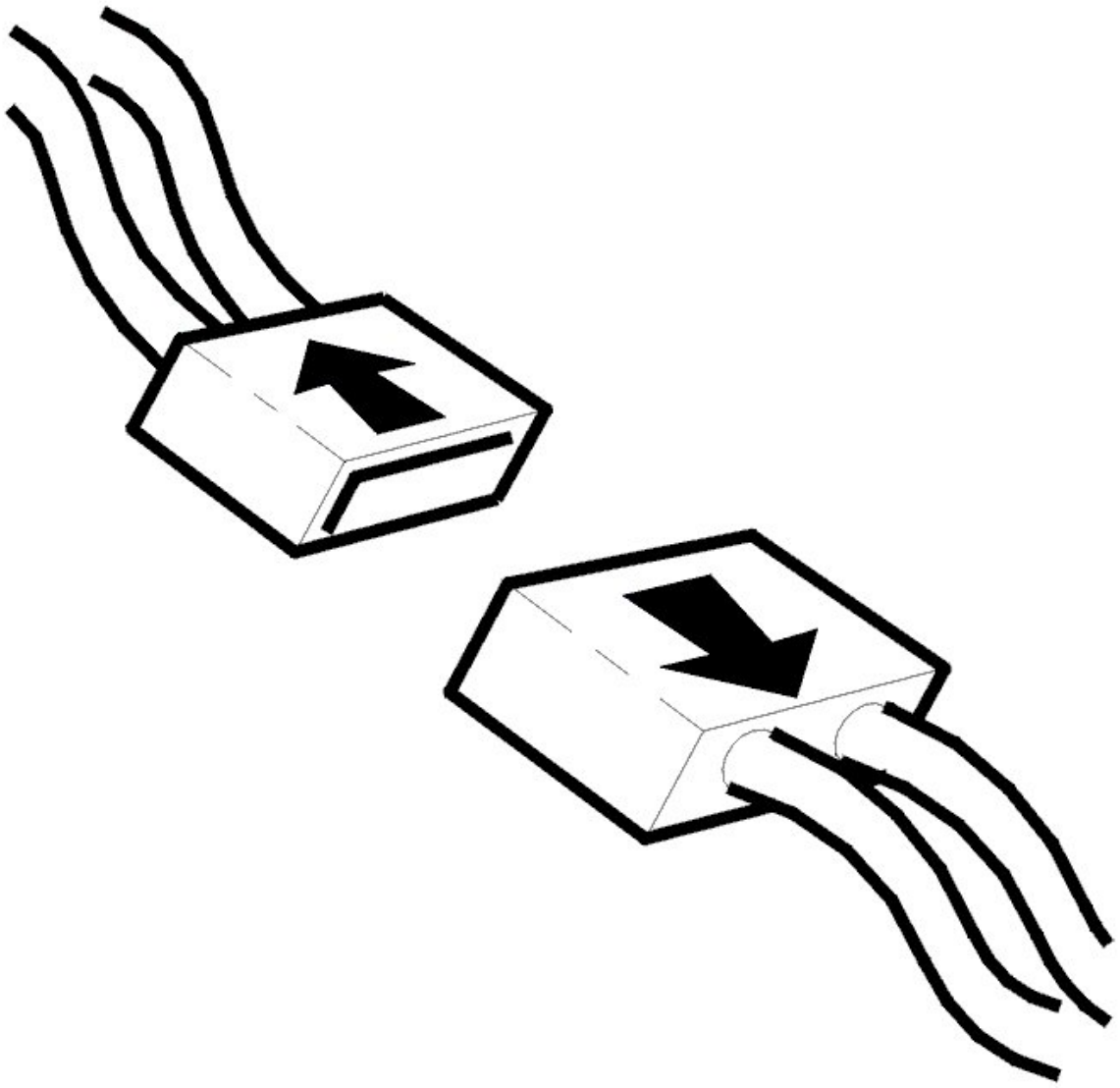
Fault symptom[s]
- General warning lamp lit.

Capacitance Too Low

Capacitance too low

Checking the cable





Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

The probable cause of this fault is that the terminal nearest the right seat belt tensioner on the 3rd seat row is defective. Try replacing the wiring for the seat belt tensioner.
Remedy as necessary.

Other information:

- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

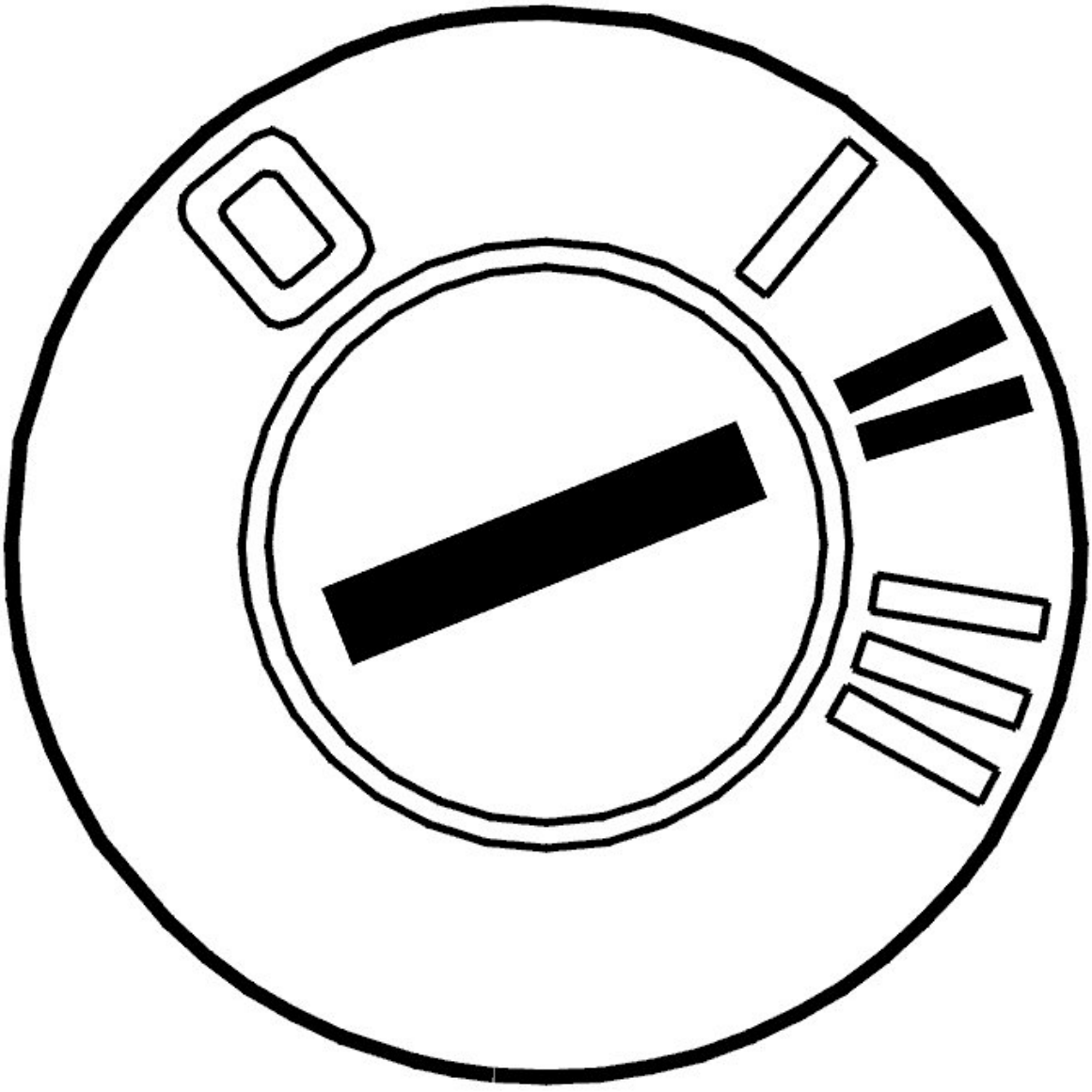
Attempt New Test - Checking the cable

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

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Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

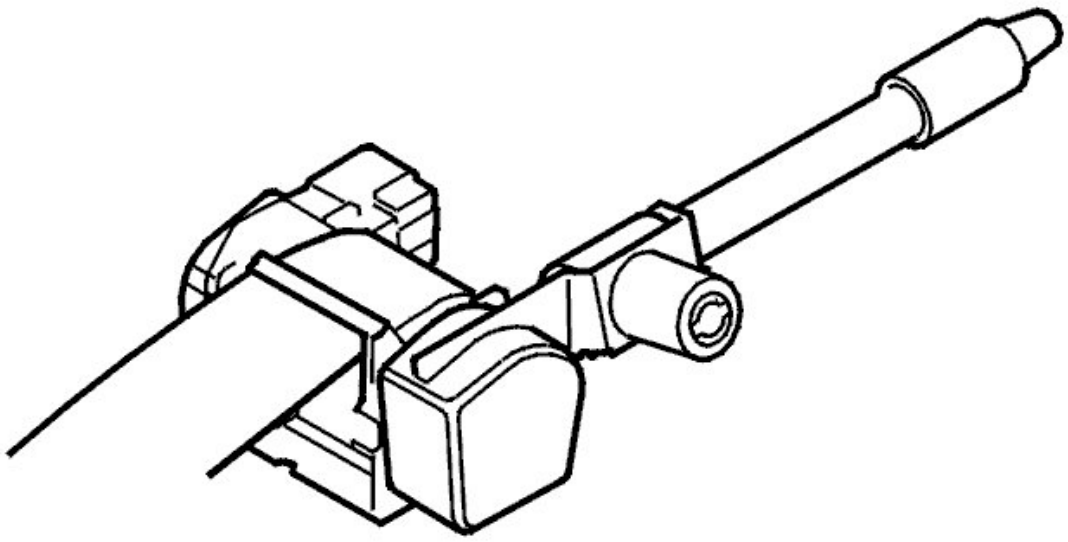
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-009C

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-009C is stored if the control module registers that the resistance in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-009C can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Contact resistance or an open-circuit in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Open-circuit in the seat belt tensioner (the resistance is too high in the igniter).

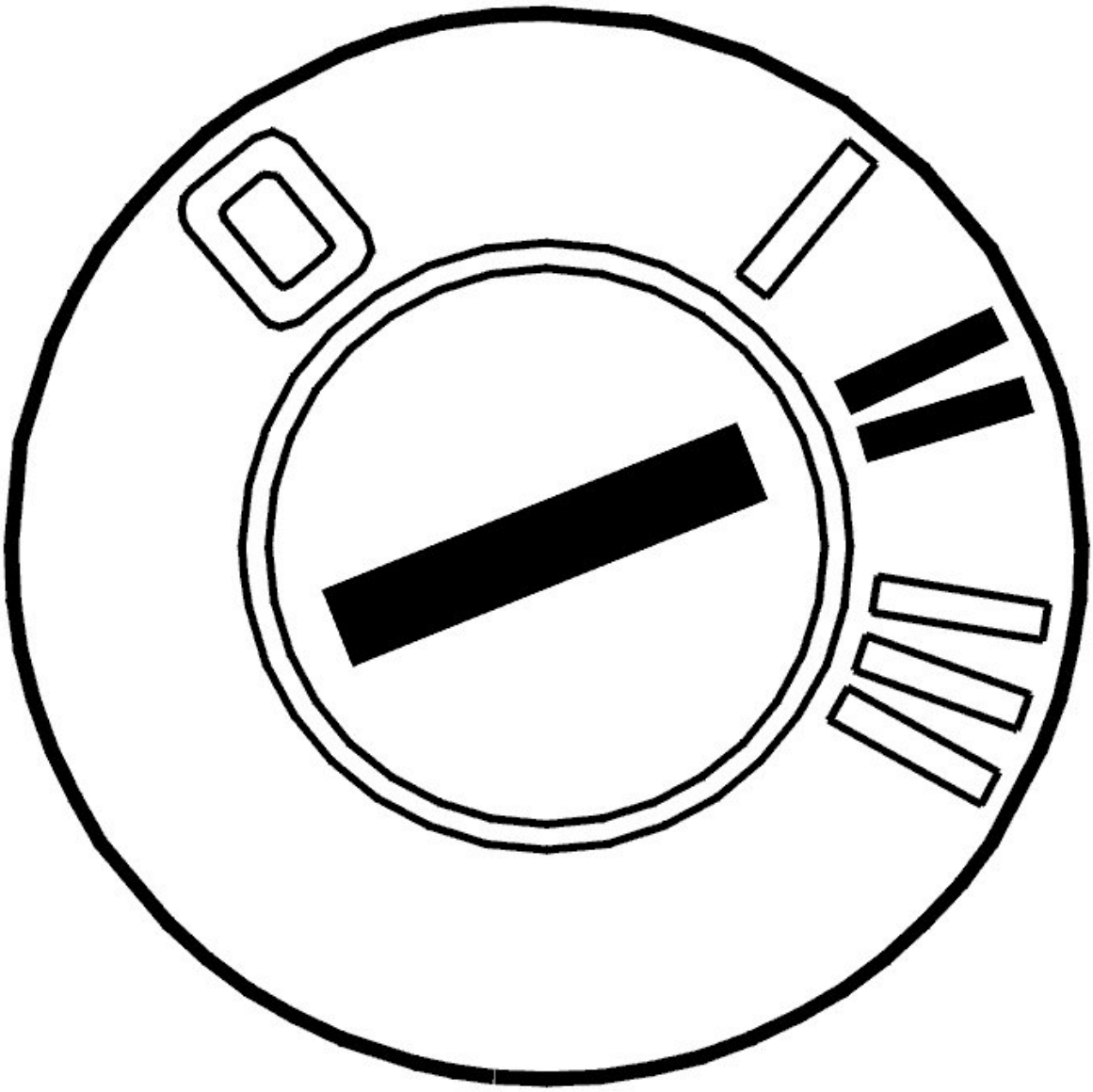
Fault symptom[s]

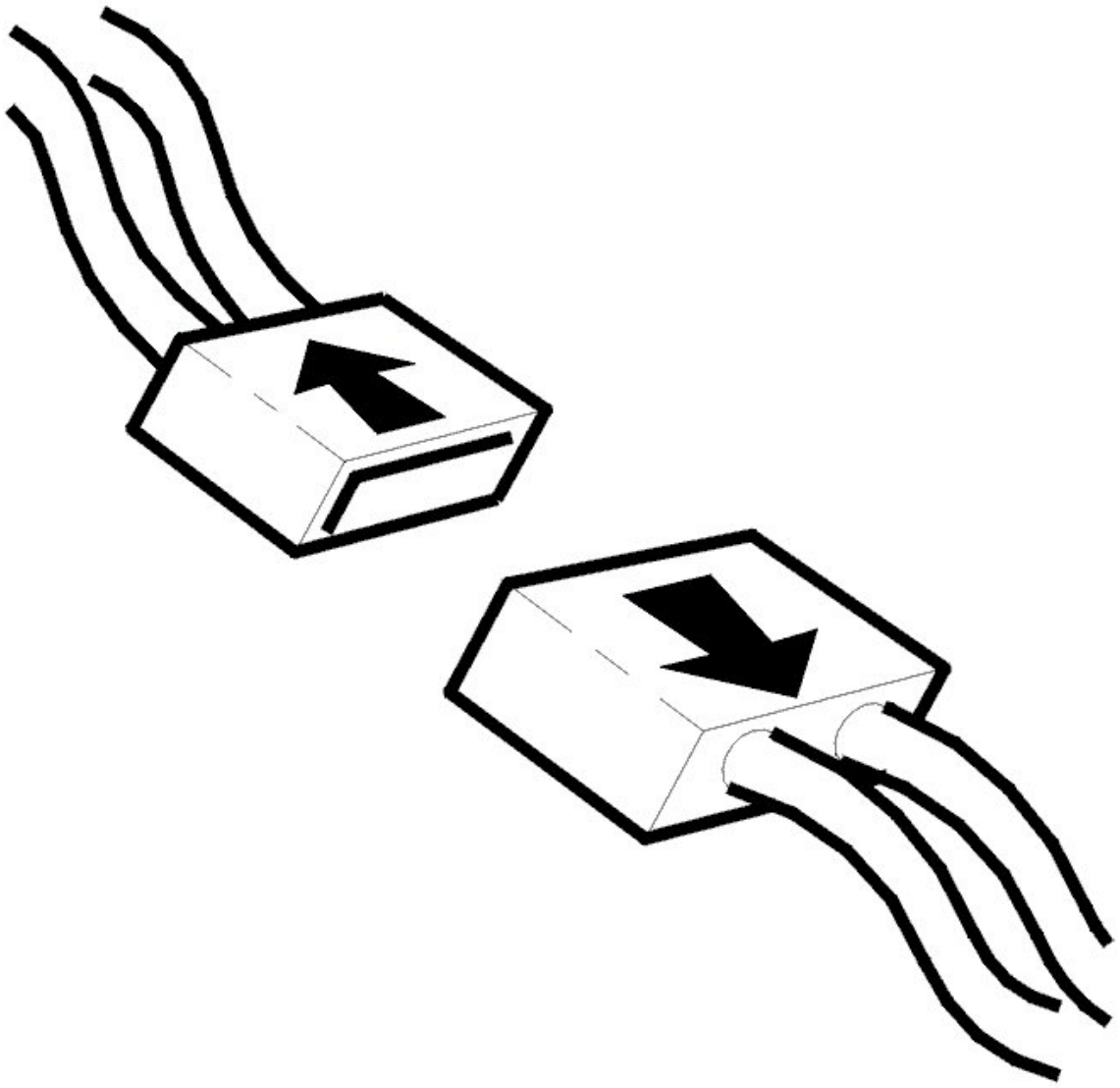
- General warning lamp lit.

Resistance Too High

Resistance too high

Checking the component





- Ignition off
- Disconnect the connector from the right seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

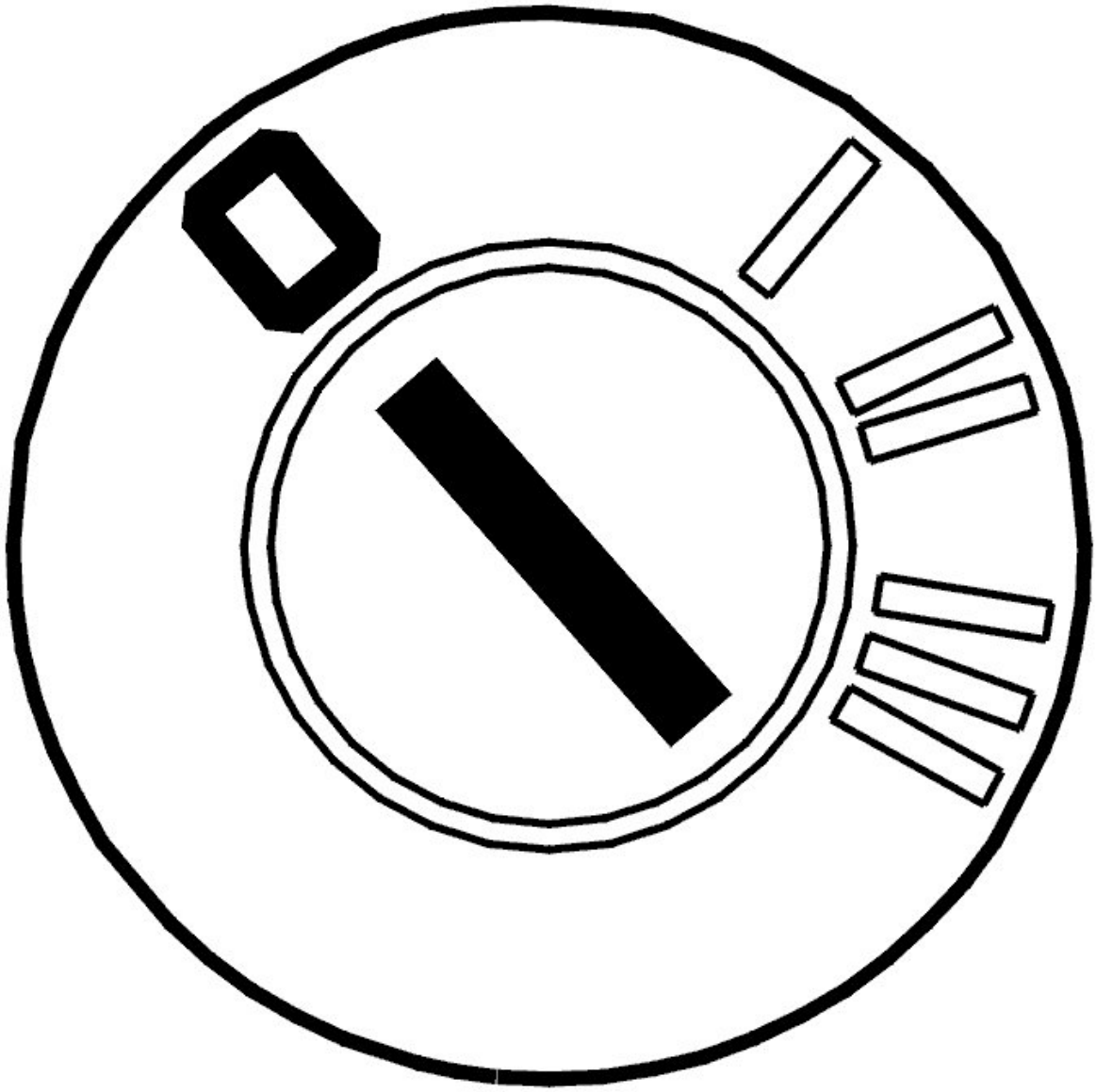
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

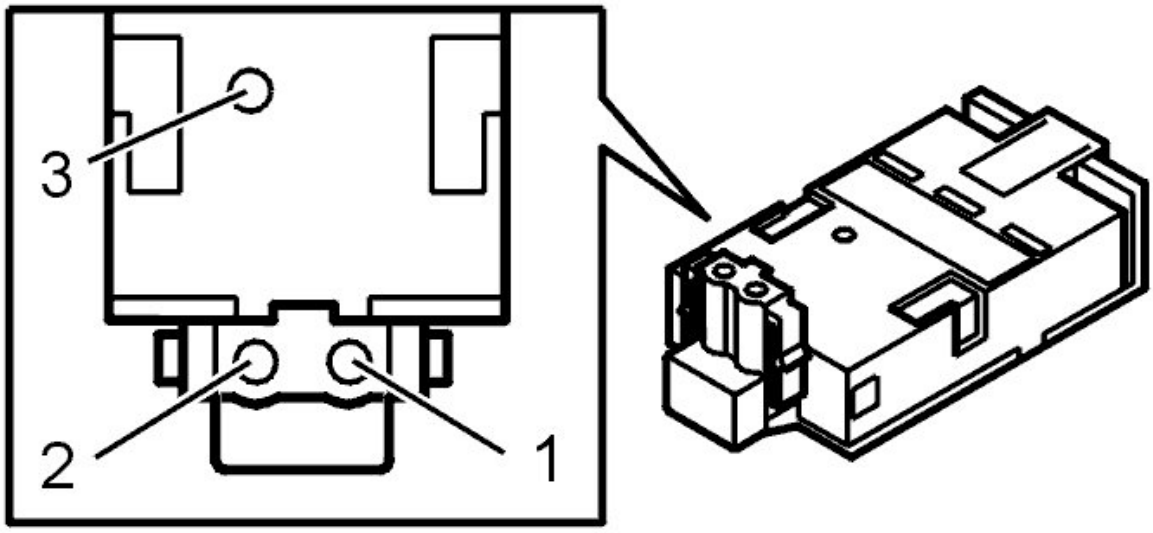
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

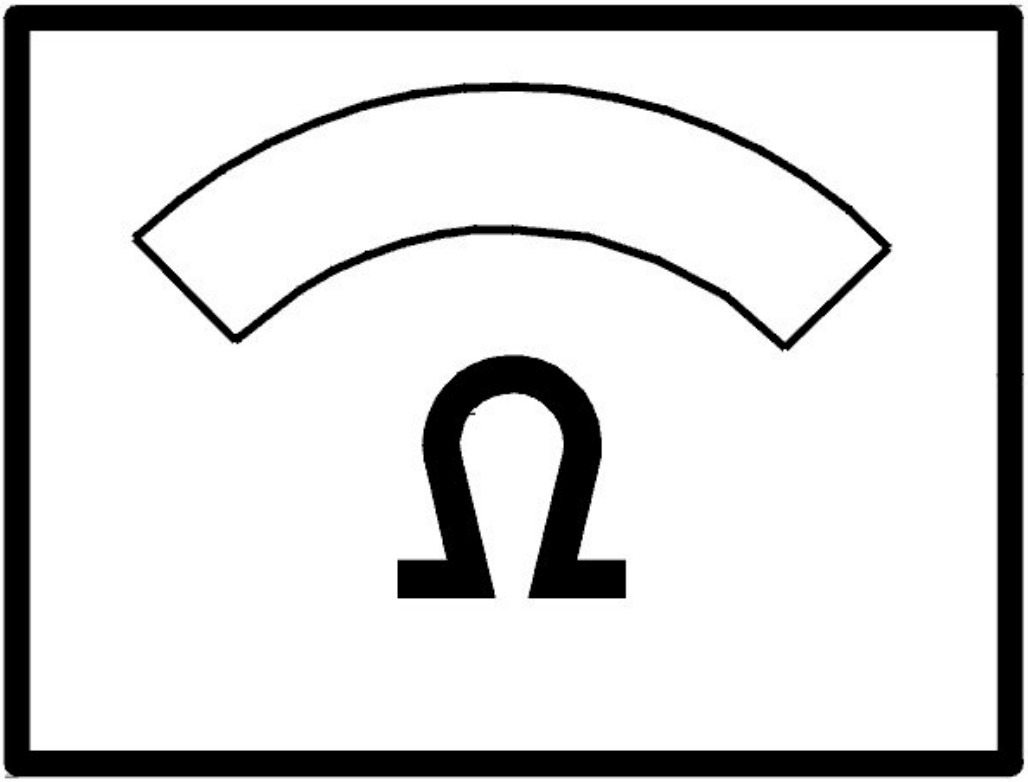
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt tensioner. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #13C(9), terminal #14C(10) and connector terminal #1, terminal #3 on the right seat belt tensioner on the 3rd seat row. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

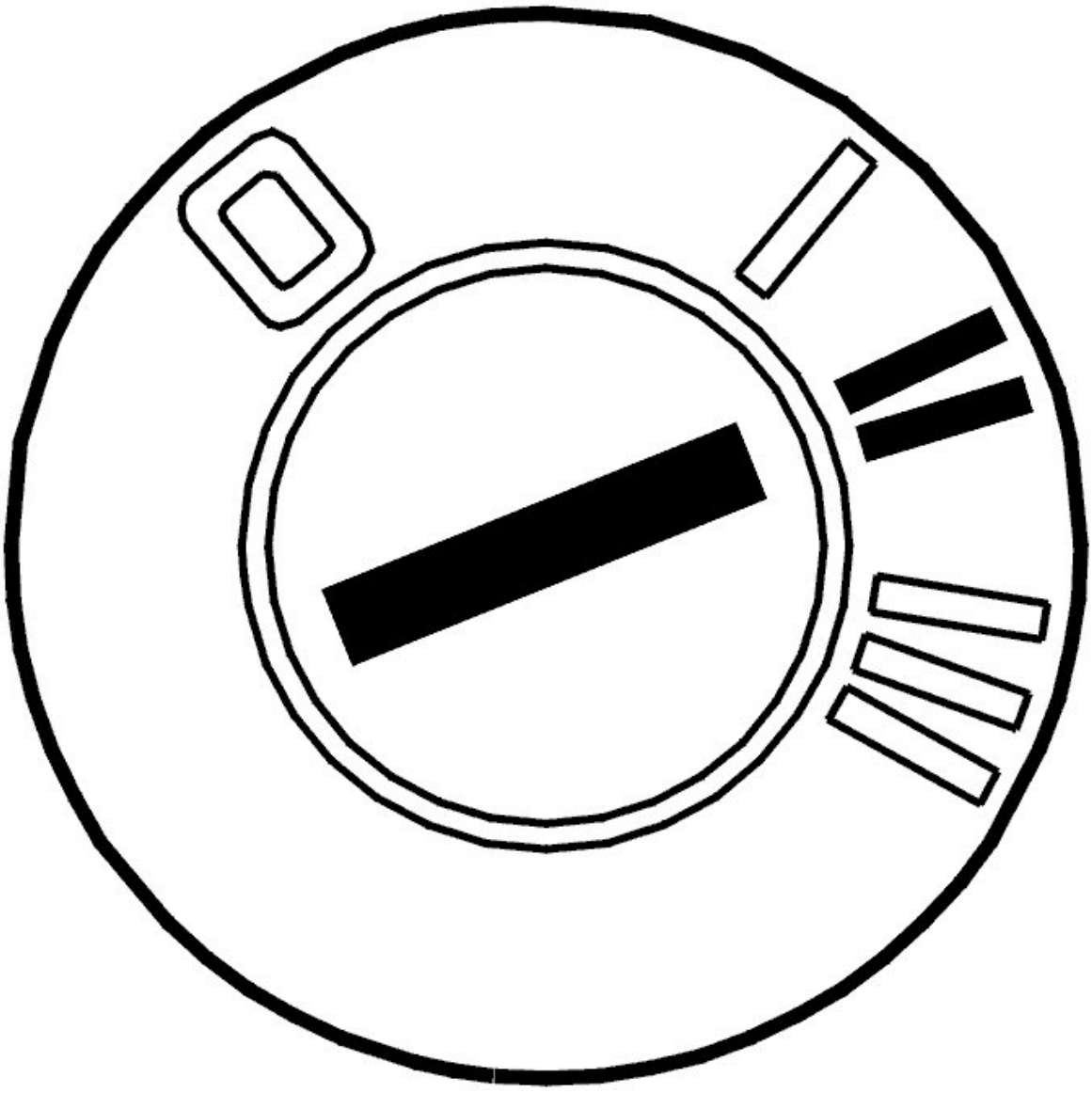
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on

- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

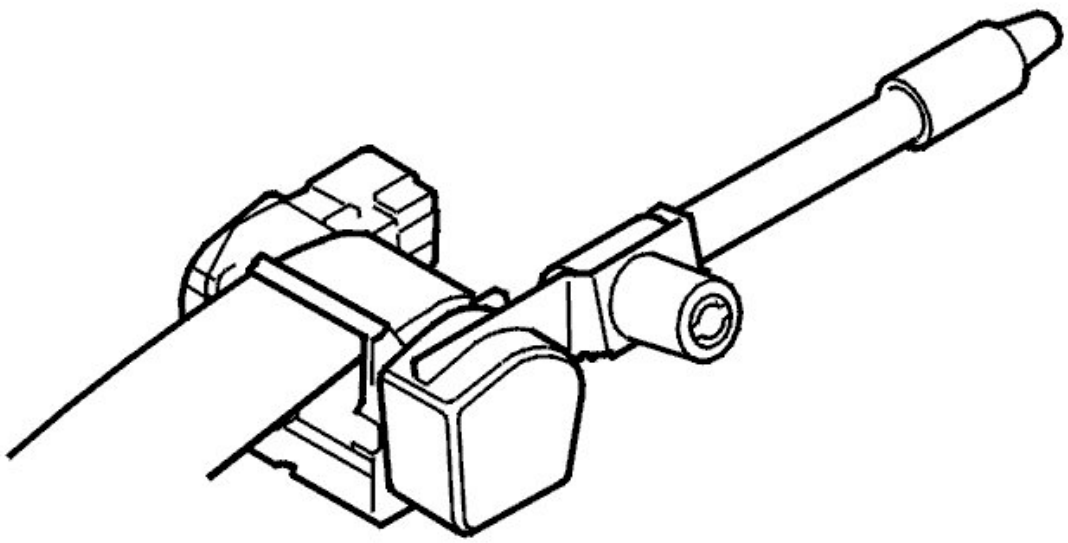
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-009D

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
Diagnostic trouble code (DTC) SRS-009D is stored if the control module registers that the resistance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-009D can be diagnosed in ignition positions I, II or III.

Substitute value

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- None.

Possible source

- Short-circuit in connector
- Short-circuit in the signal cable between the seat belt tensioner and the Supplemental Restraint System Module (SRS)
- Short-circuit in seat belt tensioner (resistance too low in igniter).

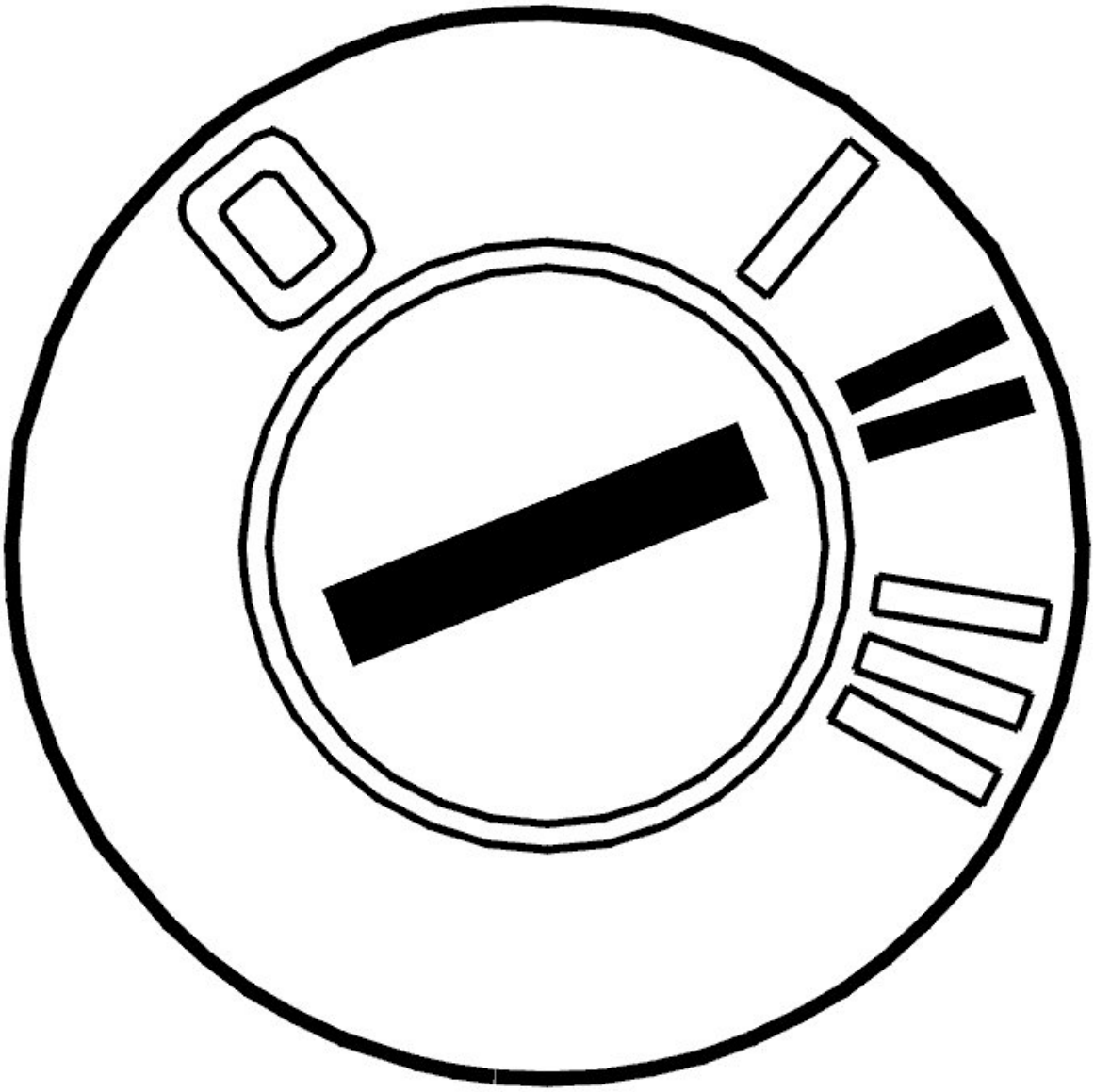
Fault symptom[s]

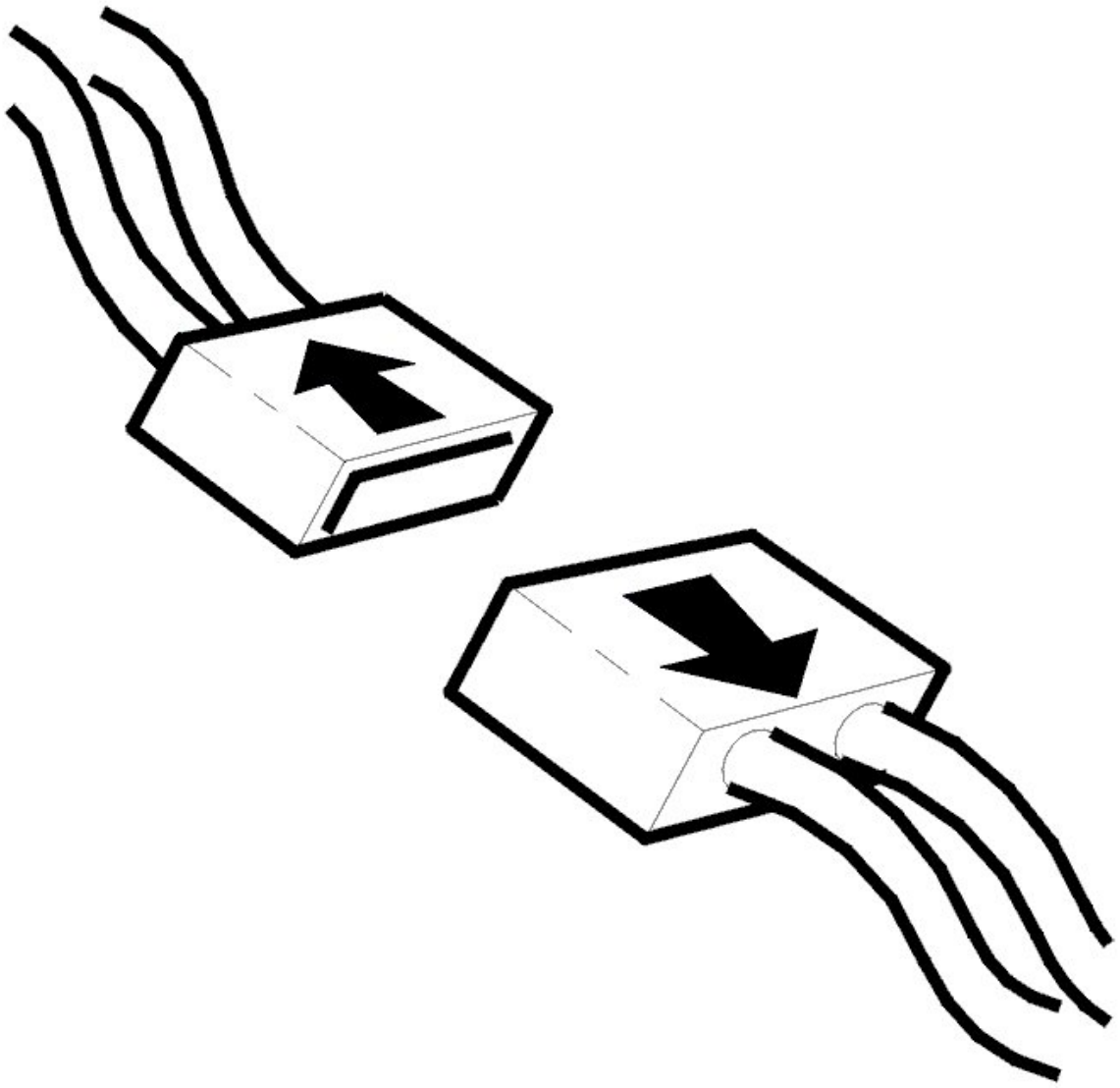
- General warning lamp lit.

Resistance Too Low

Resistance too low

Checking the component





- Ignition off
- Disconnect the connector from the right seat belt tensioner on the 3rd seat row
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the seat belt tensioner

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new seat belt tensioner if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

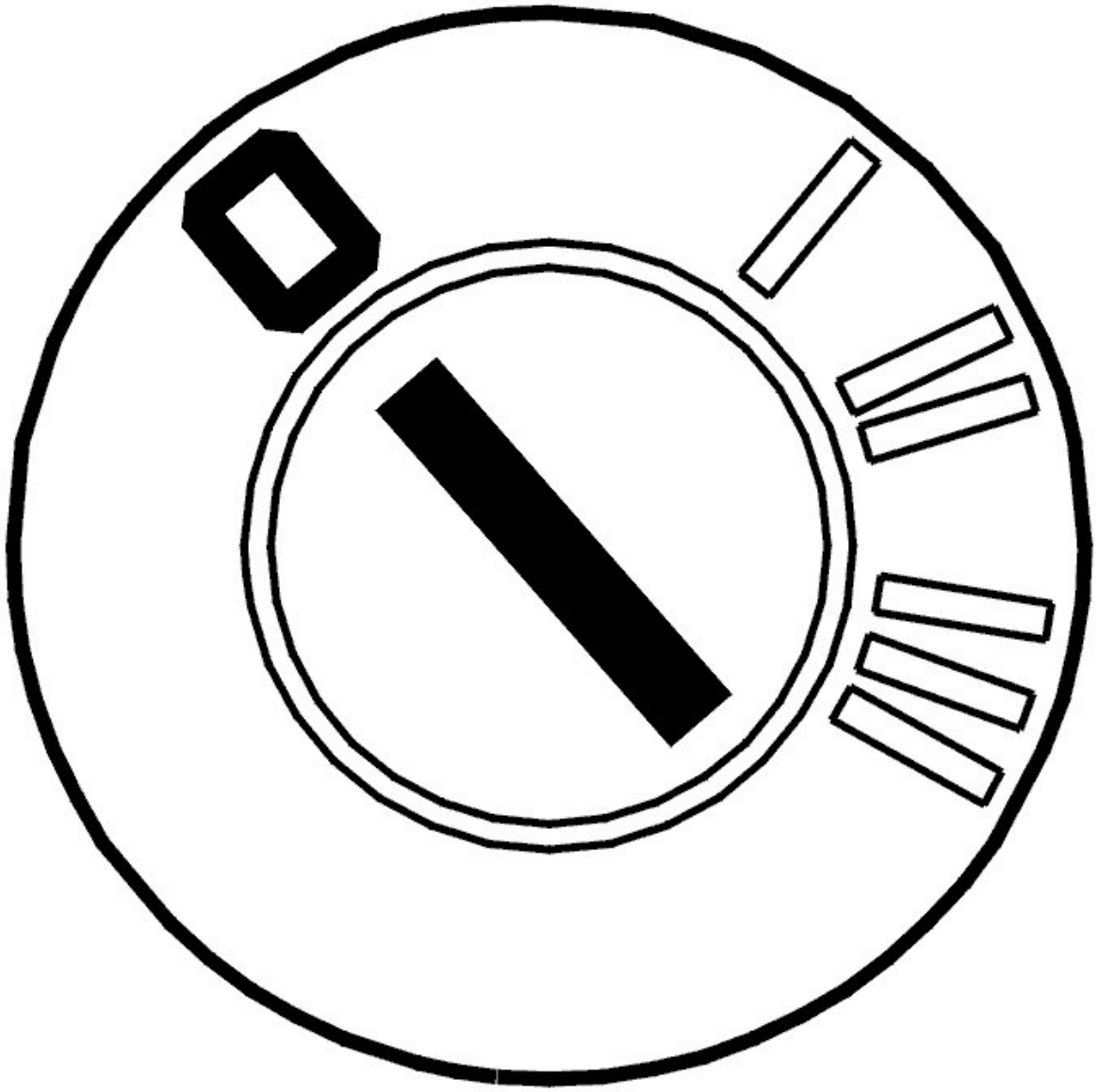
Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for seat belt tensioner.

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the seat belt tensioner!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

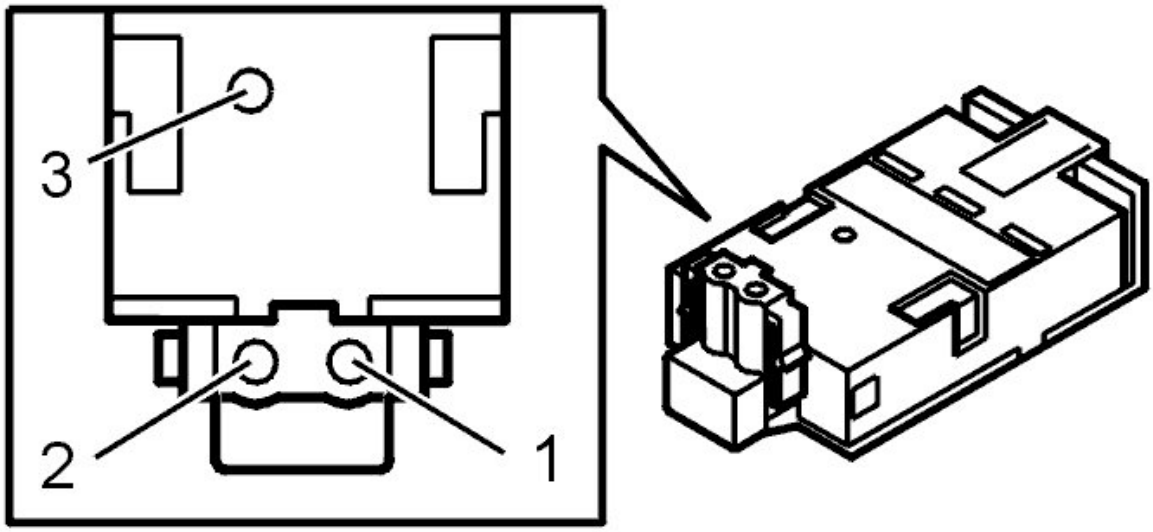
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt tensioner. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #13C(9), terminal #14C(10) and connector terminal #1, terminal #3 on the right seat belt tensioner on the 3rd seat row. Check for a short-circuit to ground.
Check the resistance between terminals #13C(9), #14C(10) to the Supplemental Restraint System Module (SRS). The resistance between the terminals should be infinite.
Remedy as necessary.

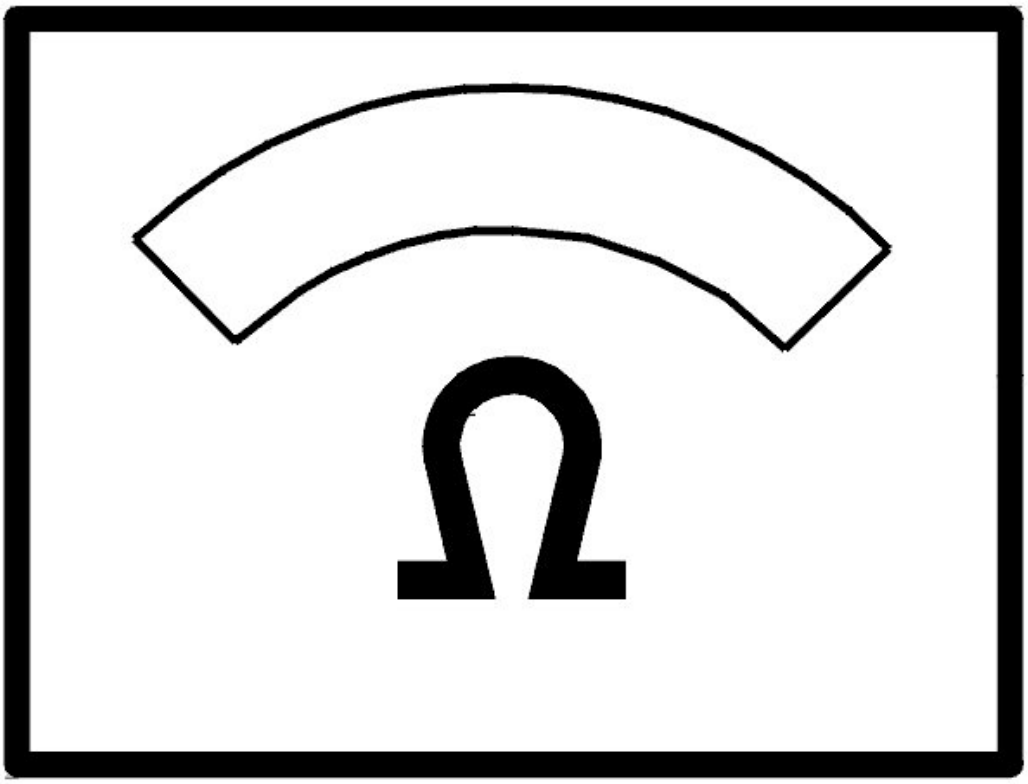
Other information:

- To access and replace the SRS control module and connector, see
- To access and replace the seat belt tensioner, see Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the seat belt tensioner and the Supplemental Restraint System Module (SRS) disconnected, the resistance between connector terminals #1 and #3 on the seat belt tensioner connector (Supplemental Restraint System Module (SRS) side)

should be infinite

- With the ignition off and with the special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between the terminals on the Supplemental Restraint System Module (SRS) connector should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

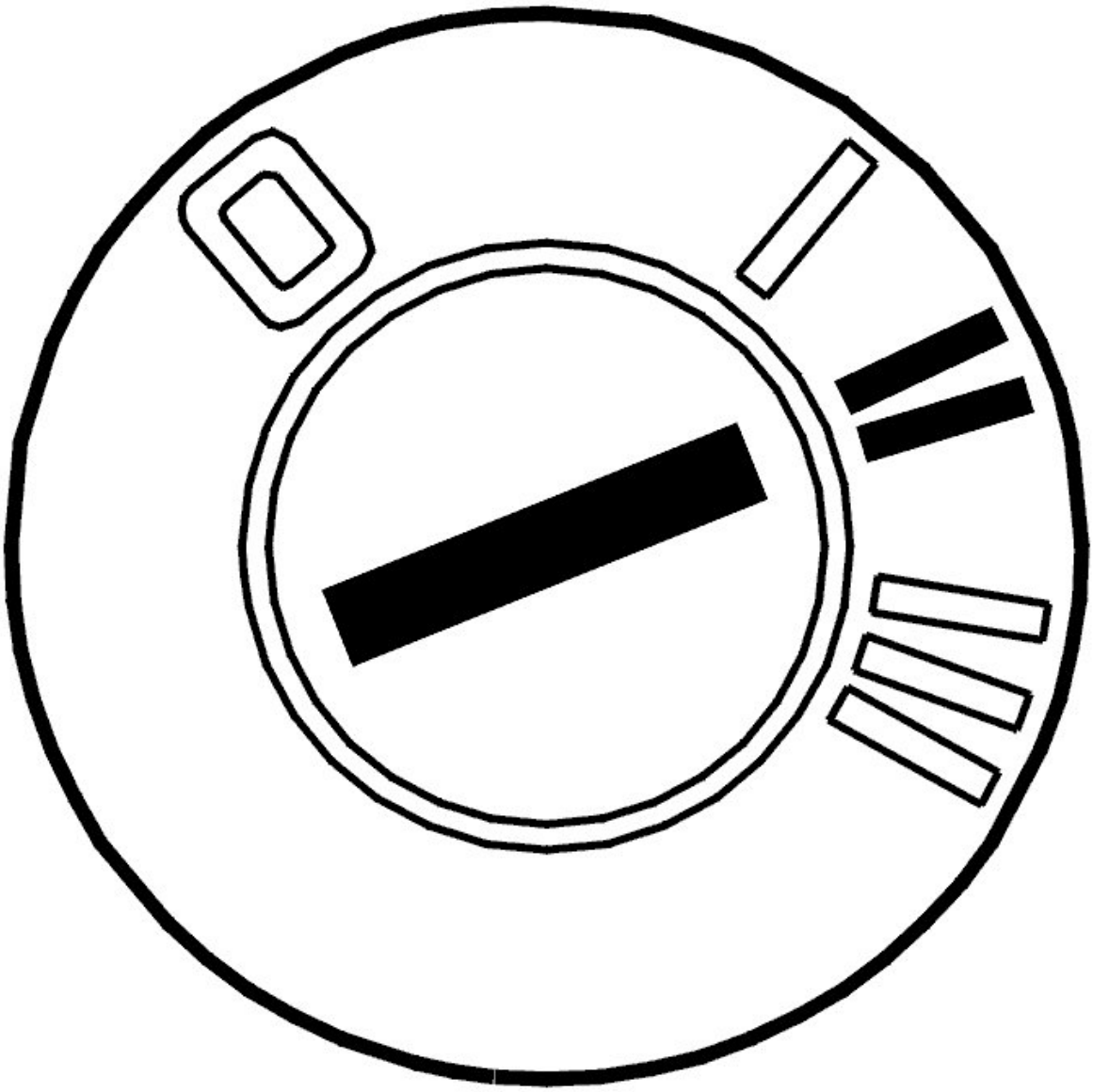
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

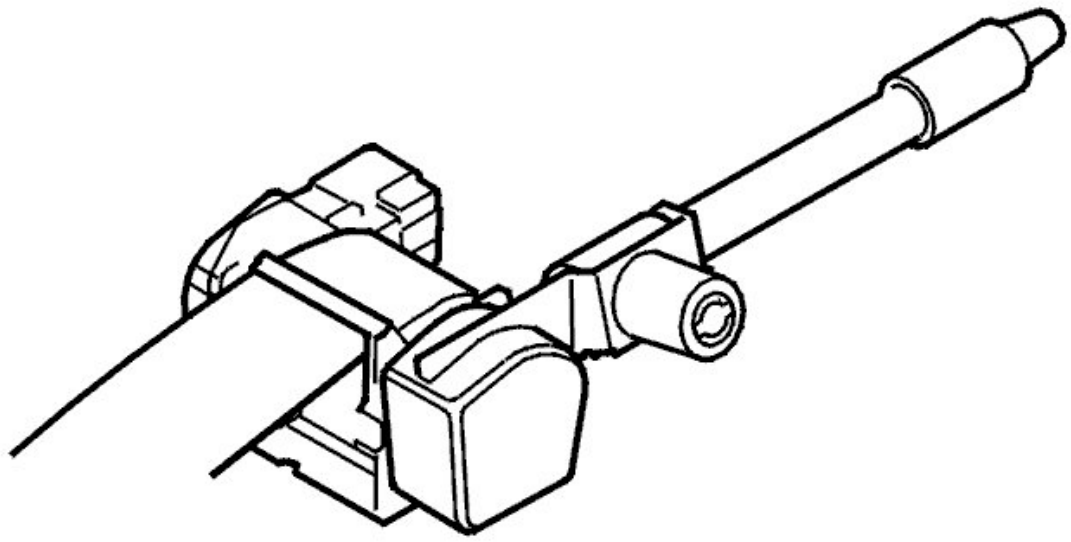
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-009E

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-0096
SRS-009E
depending on which wiring circuit the fault is in.
Diagnostic trouble codes (DTCs):
SRS-0096
SRS-009E
can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble codes (DTCs) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

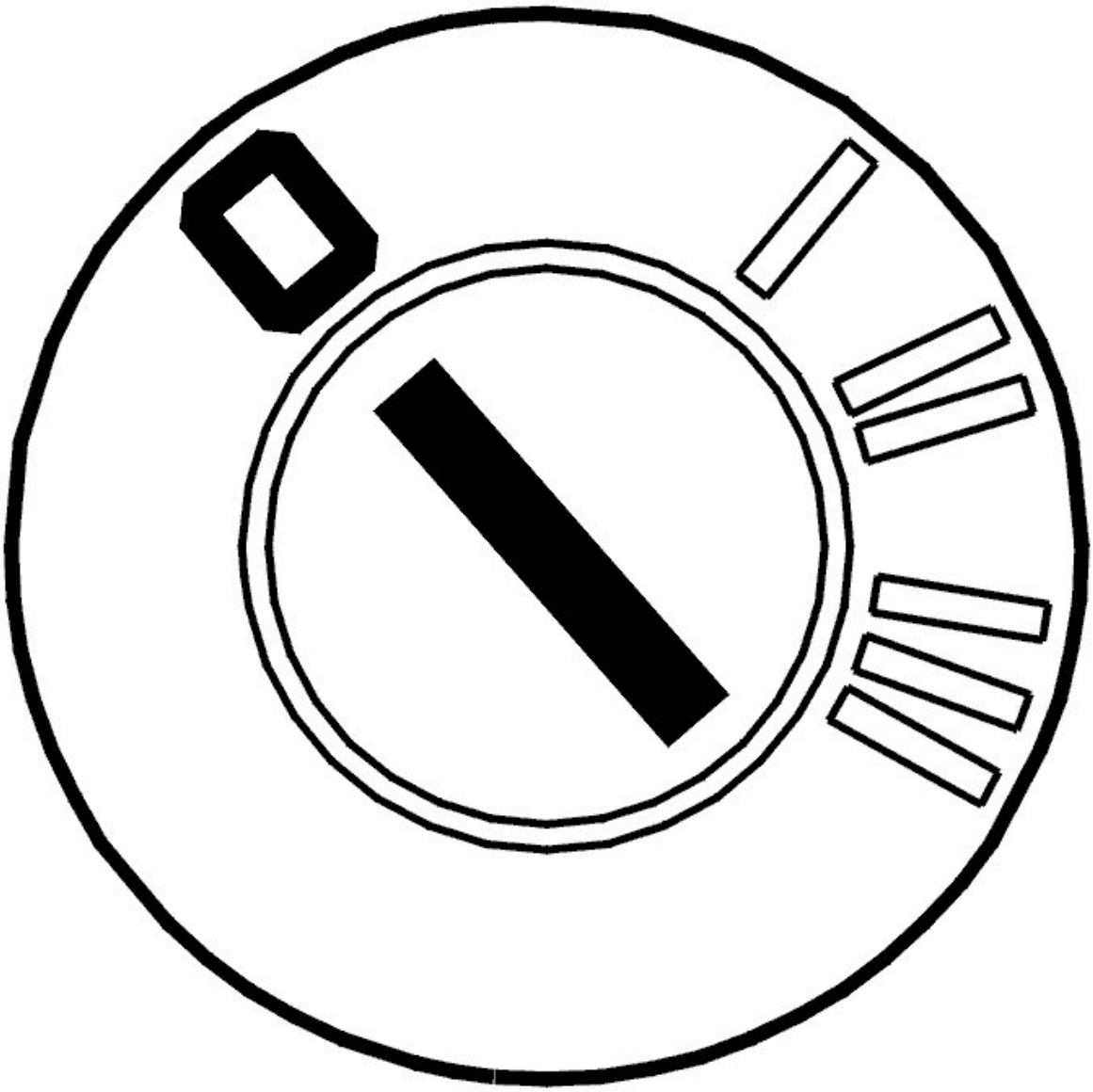
Possible source
- If the Supplemental Restraint System Module (SRS) identifies that a seat belt tensioner is installed, despite the control module being programmed that a seat belt tensioner is not installed.

Fault symptom[s]
- General warning lamp lit.

Configuration Fault

Configuration fault

Checking the component



- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct control module is installed in the car. Read off by clicking the VCT2000 symbol.
Check that the switch for the right seat belt tensioner on the 3rd seat row is not connected to a seat belt tensioner if the car is a 5-seat model.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see the relevant service procedure.
- For information about signals, see Signal Specifications.

Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

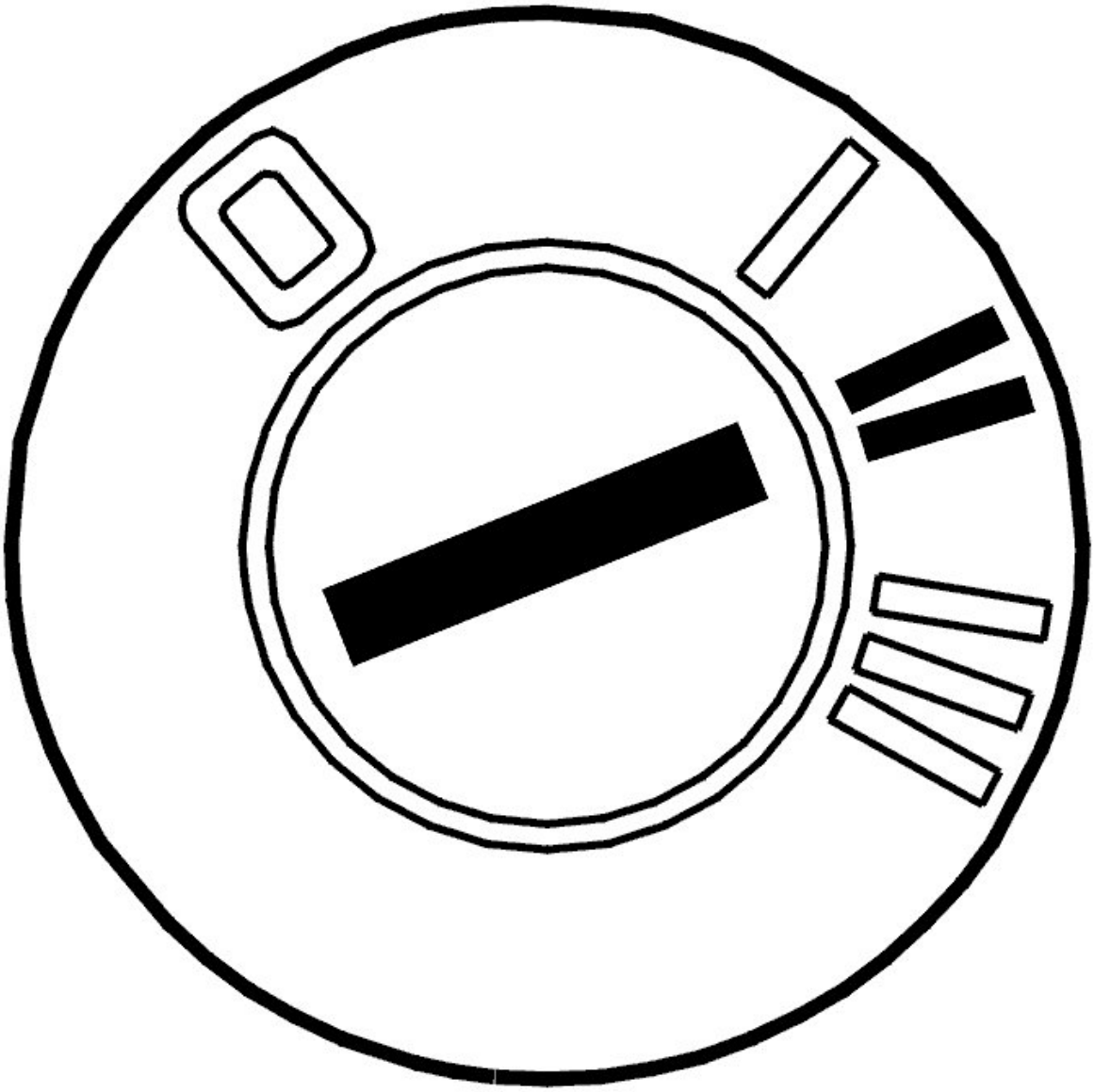
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

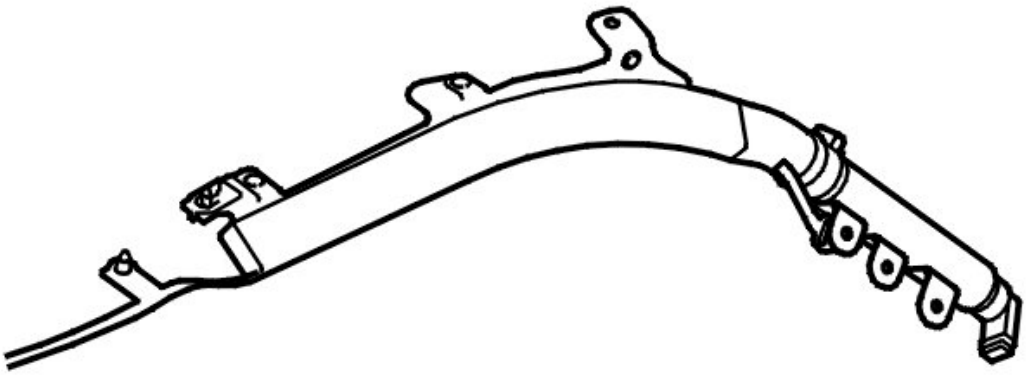
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A0

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A0 is stored if the control module registers that the voltage in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A0 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in the SRS ignition cable or in the connector between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the inflatable curtain.

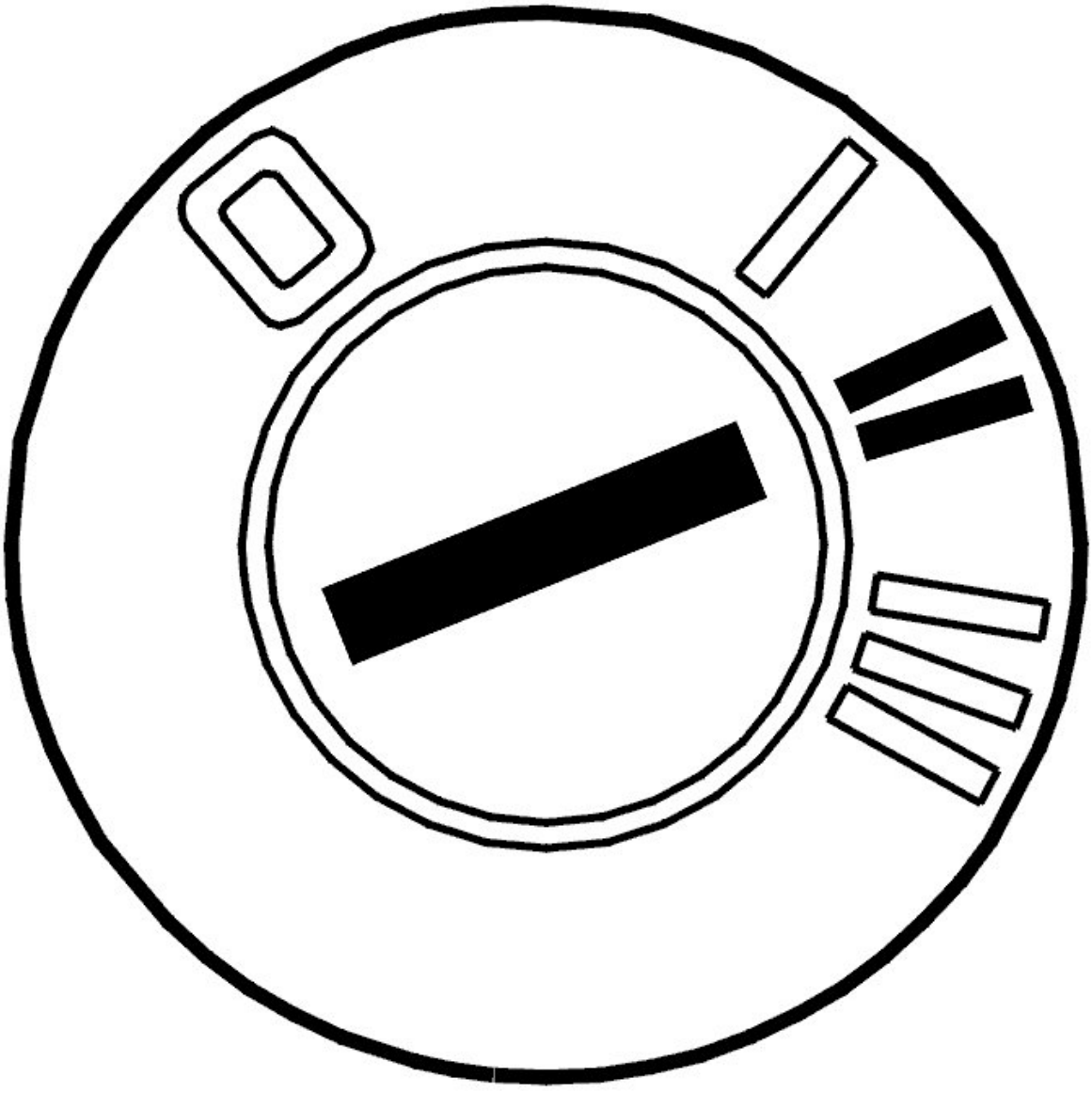
Fault symptom[s]

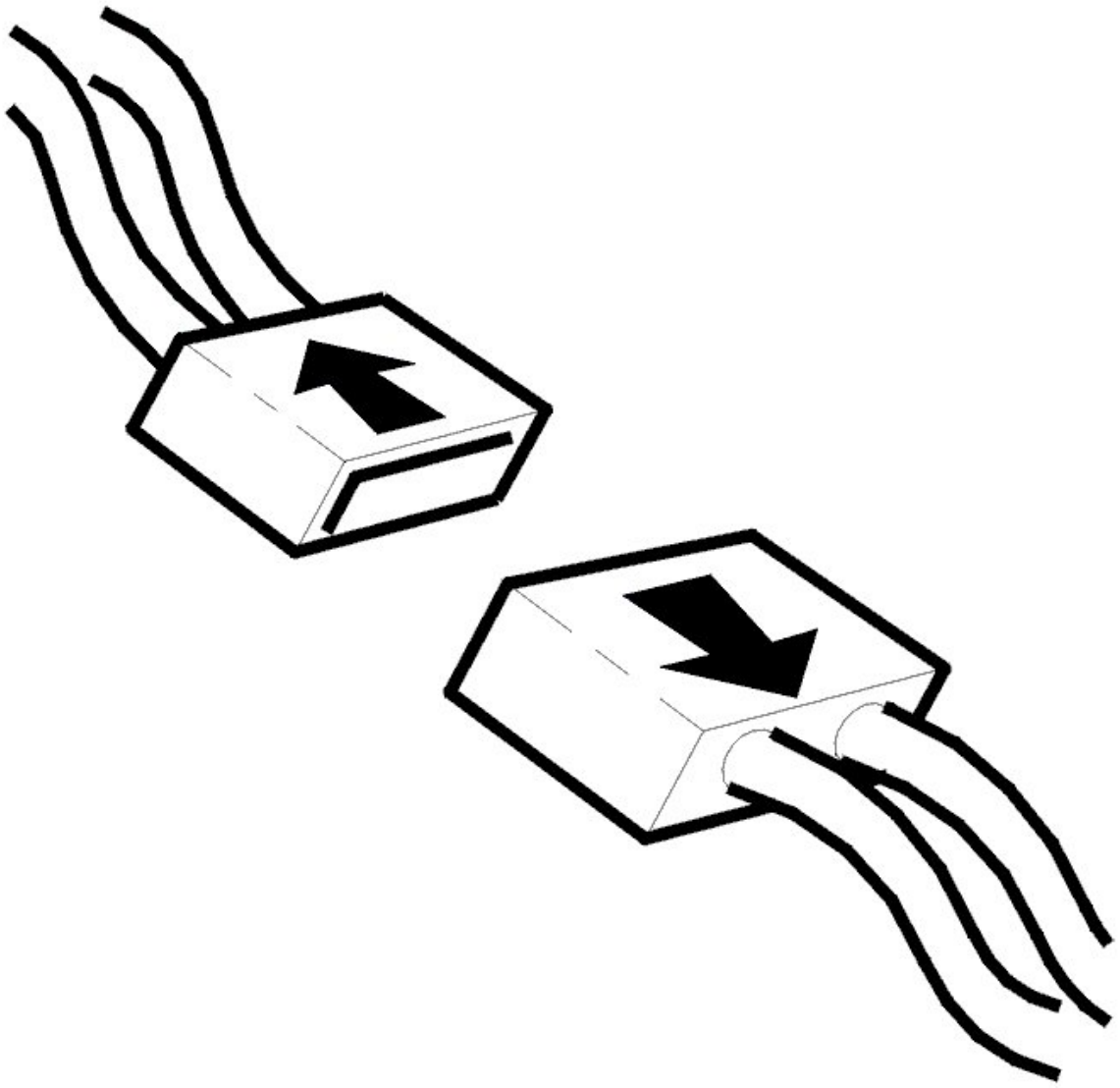
- The SRS indicator lamp is lit.

Signal Too High

Signal too high

Checking the component





- Ignition off
- Disconnect the connector from the rear left-hand inflatable curtain
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

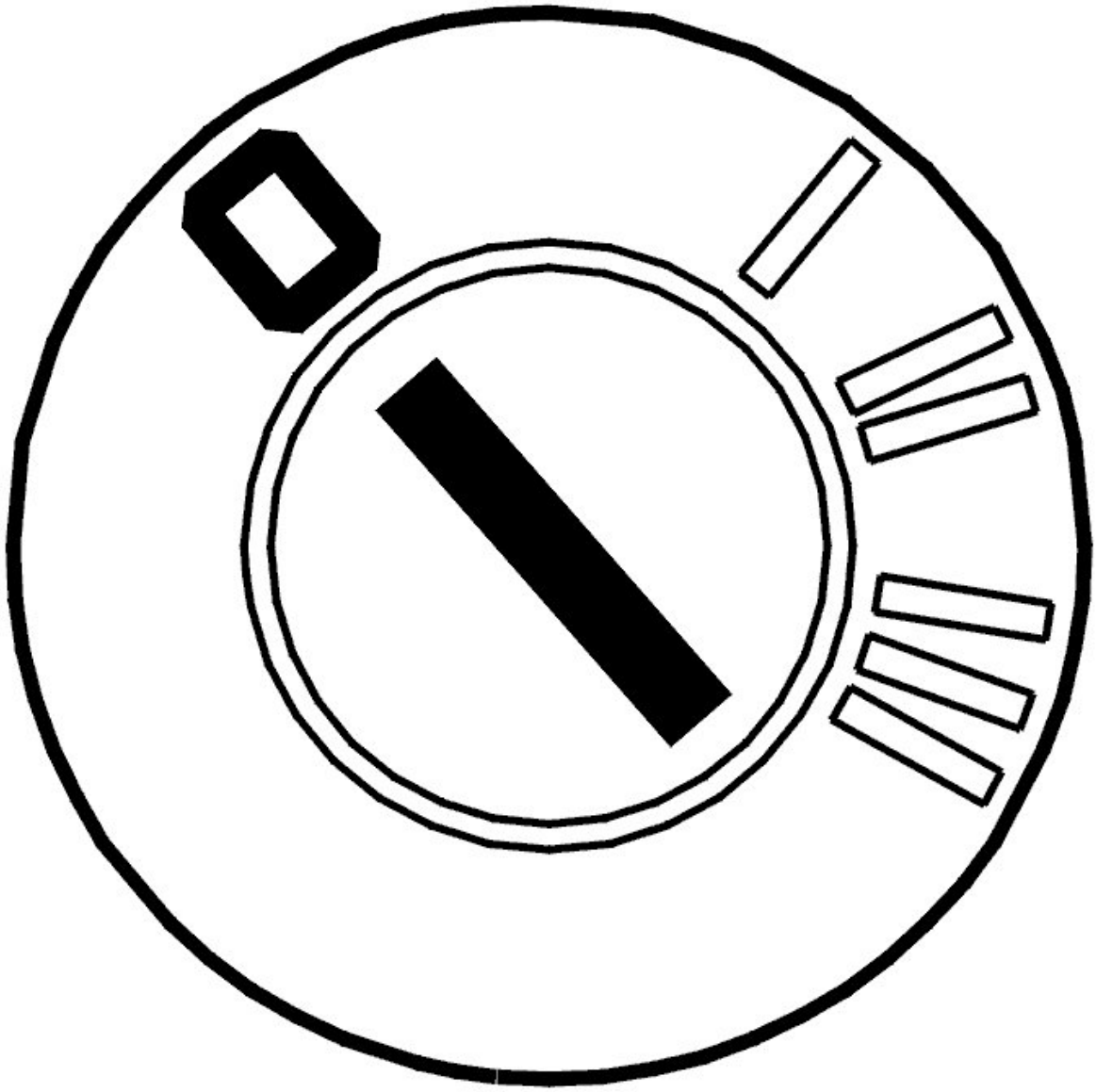
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

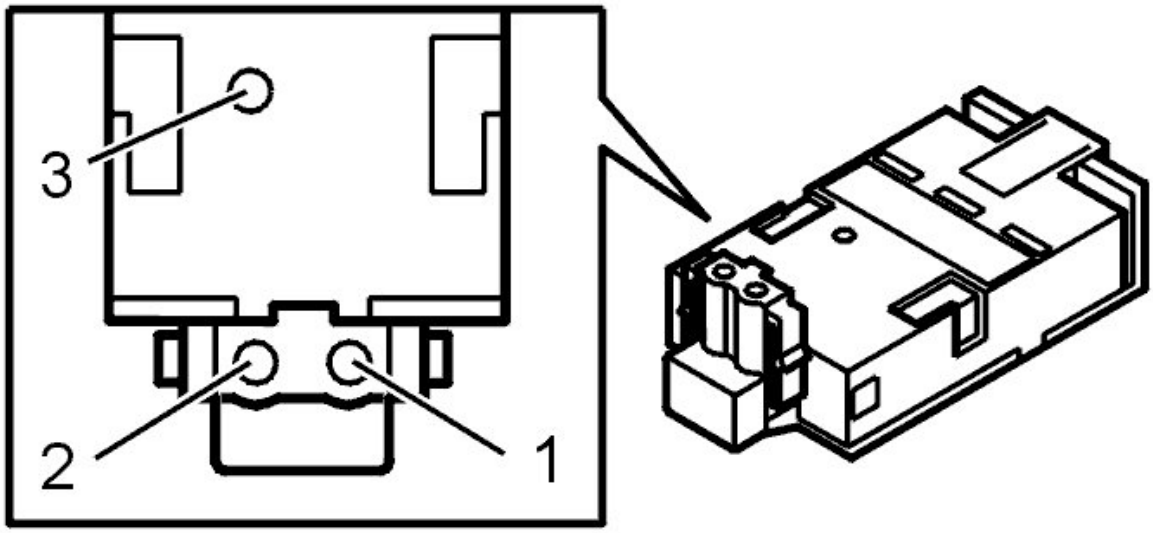
Check the cable between Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) and connector terminals #1 and #3 on the rear left-hand inflatable curtain. Check for a short-circuit to supply voltage.
Remedy as necessary.

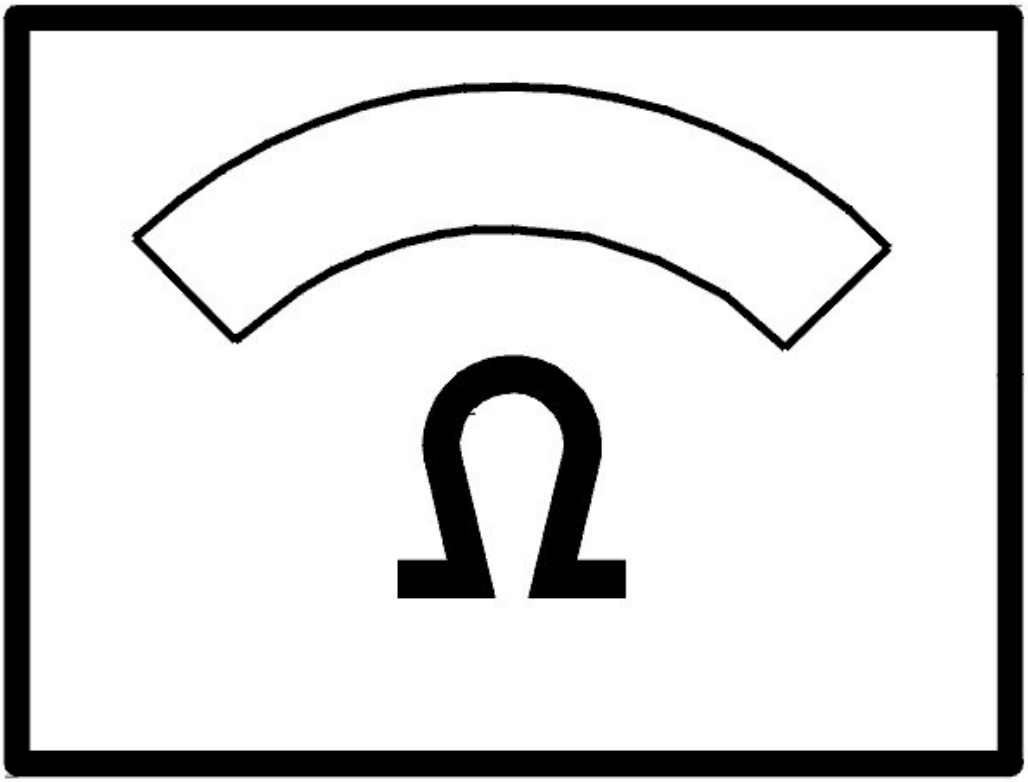
Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the rear left-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive terminal should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

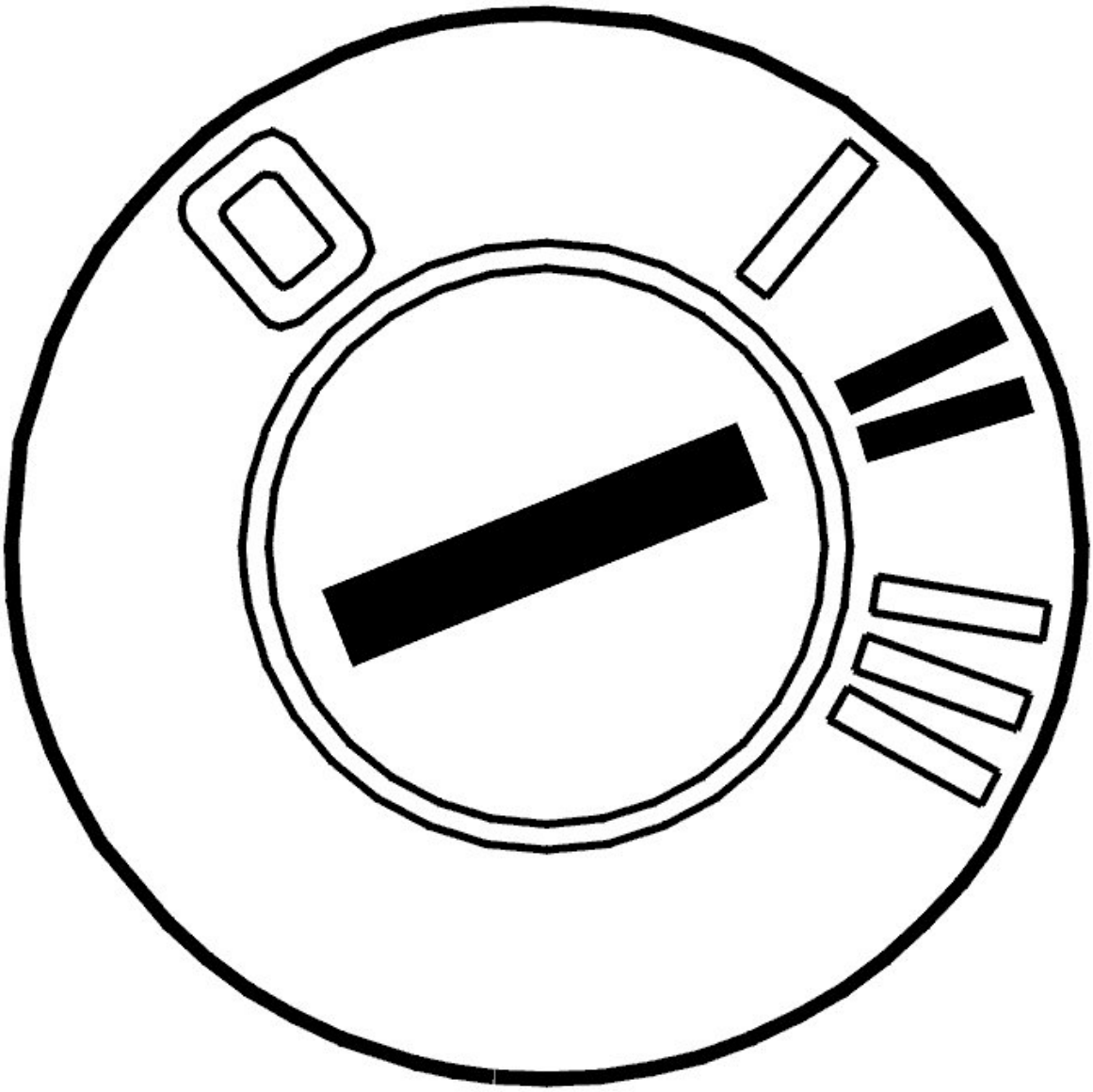
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

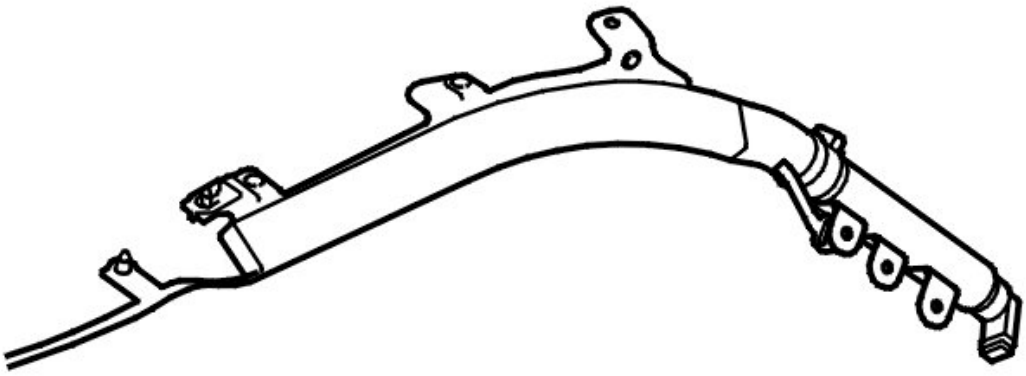
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A1

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A1 is stored if the control module registers that the voltage in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A1 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

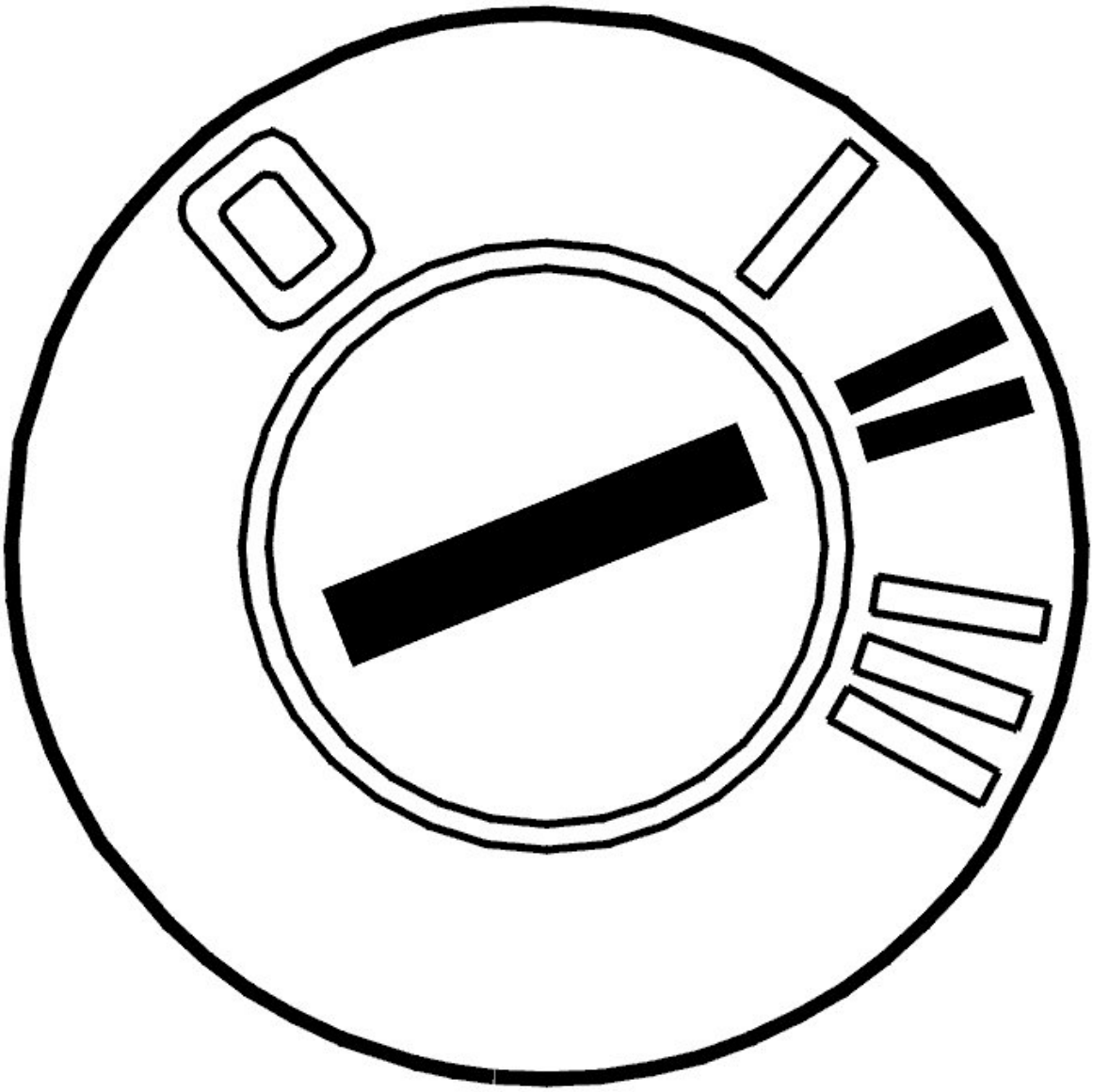
Possible source
- Short-circuit to ground in the SRS ignition cable or in the connector between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the inflatable curtain.

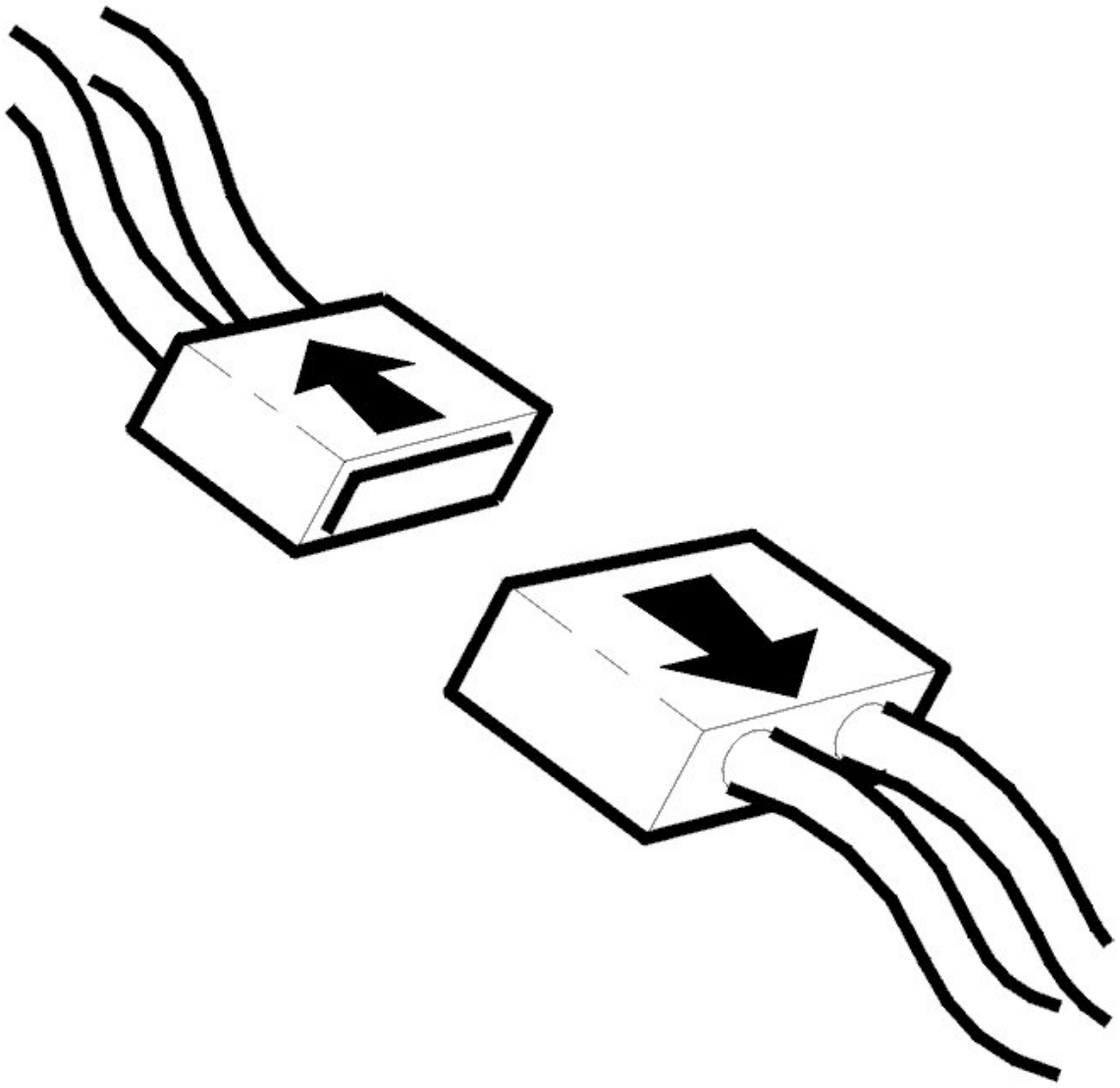
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Too Low

Signal too low

Checking the component





- Ignition off
- Disconnect the connector from the rear left-hand inflatable curtain
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

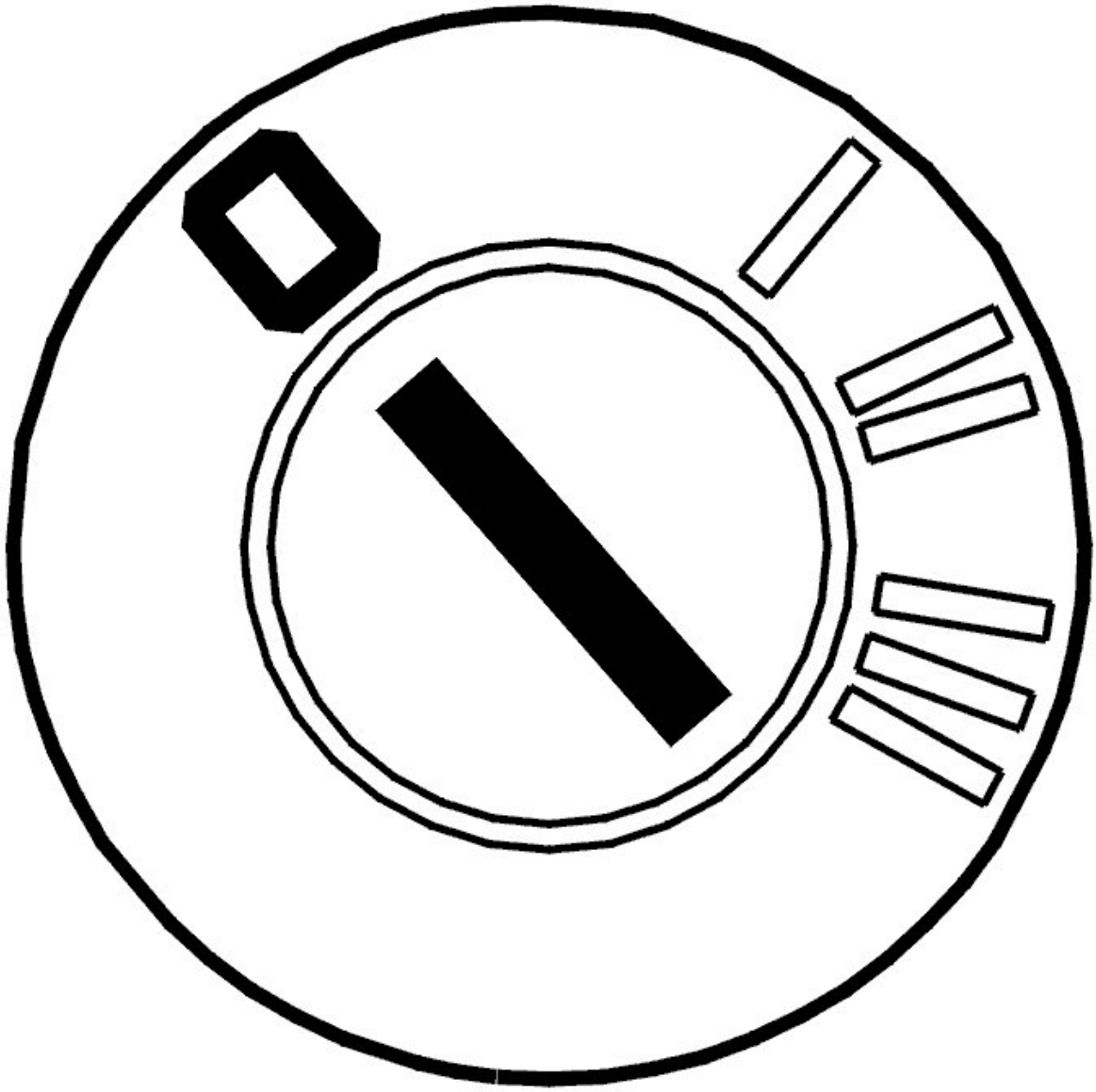
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

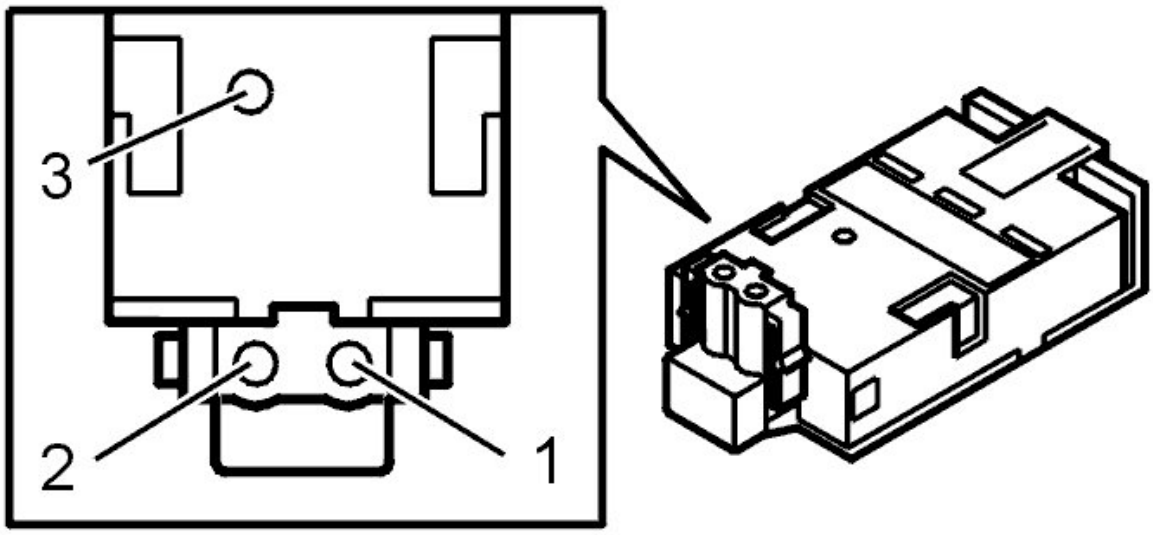
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

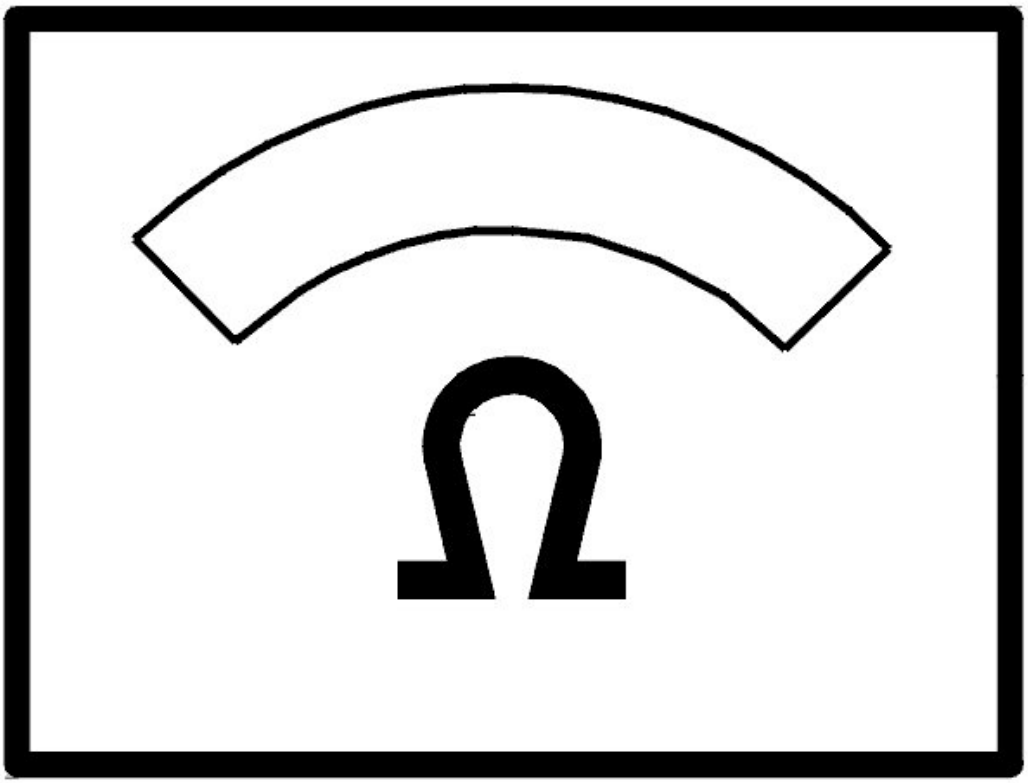
Check the cable between Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) and connector terminals #1 and #3 on the rear left-hand inflatable curtain. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the rear left-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

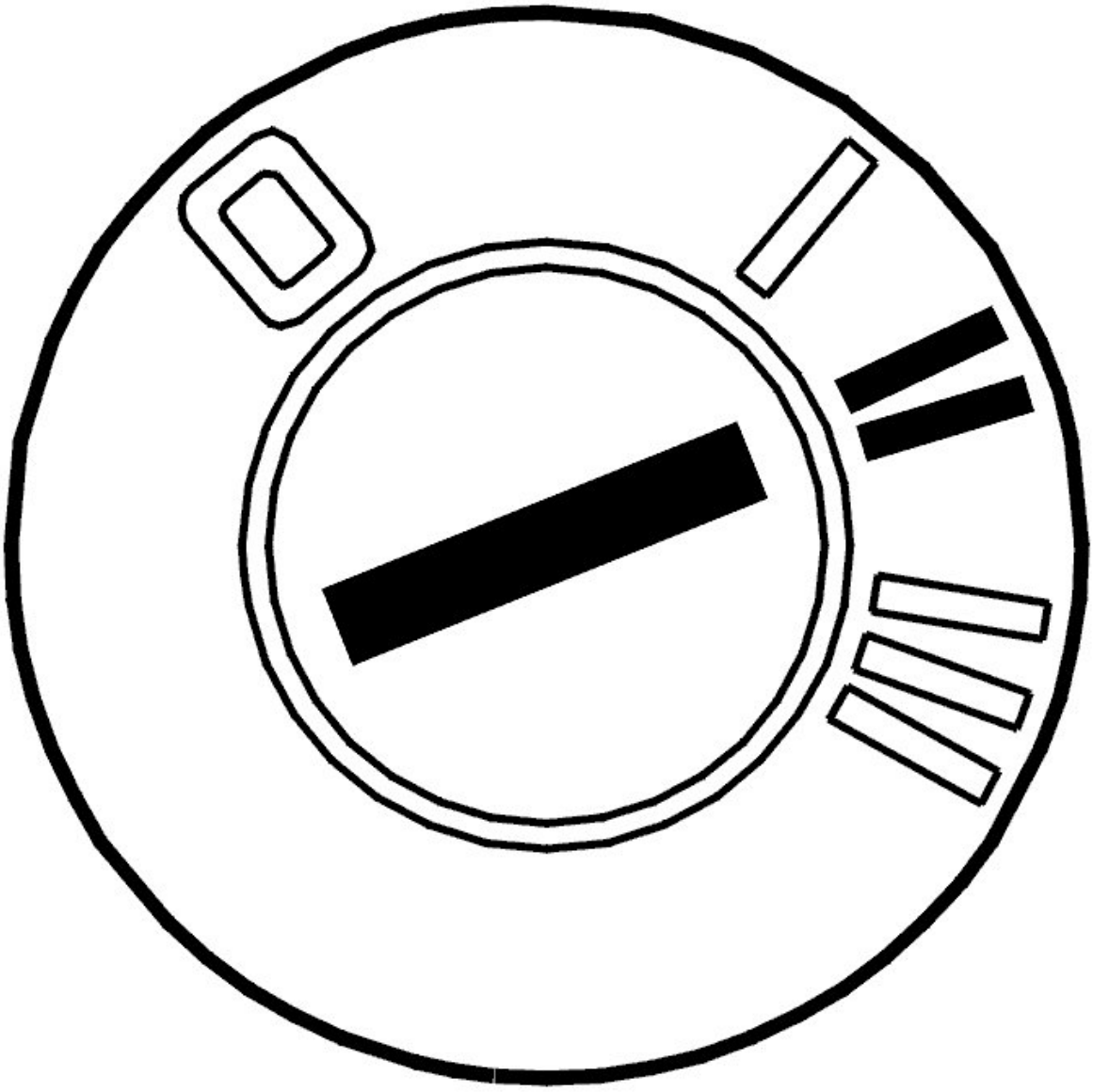
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

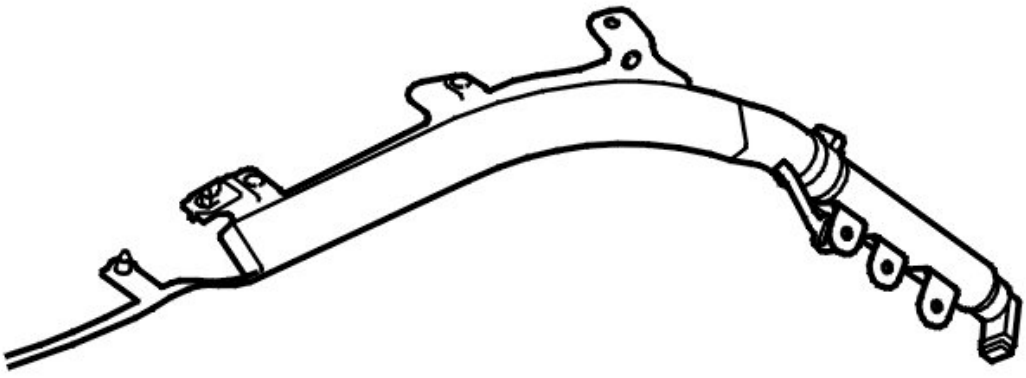
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A2

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A2 is stored if the control module registers that the capacitance in the signal cable is high for longer than 10

seconds.
Diagnostic trouble code (DTC) SRS-00A2 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

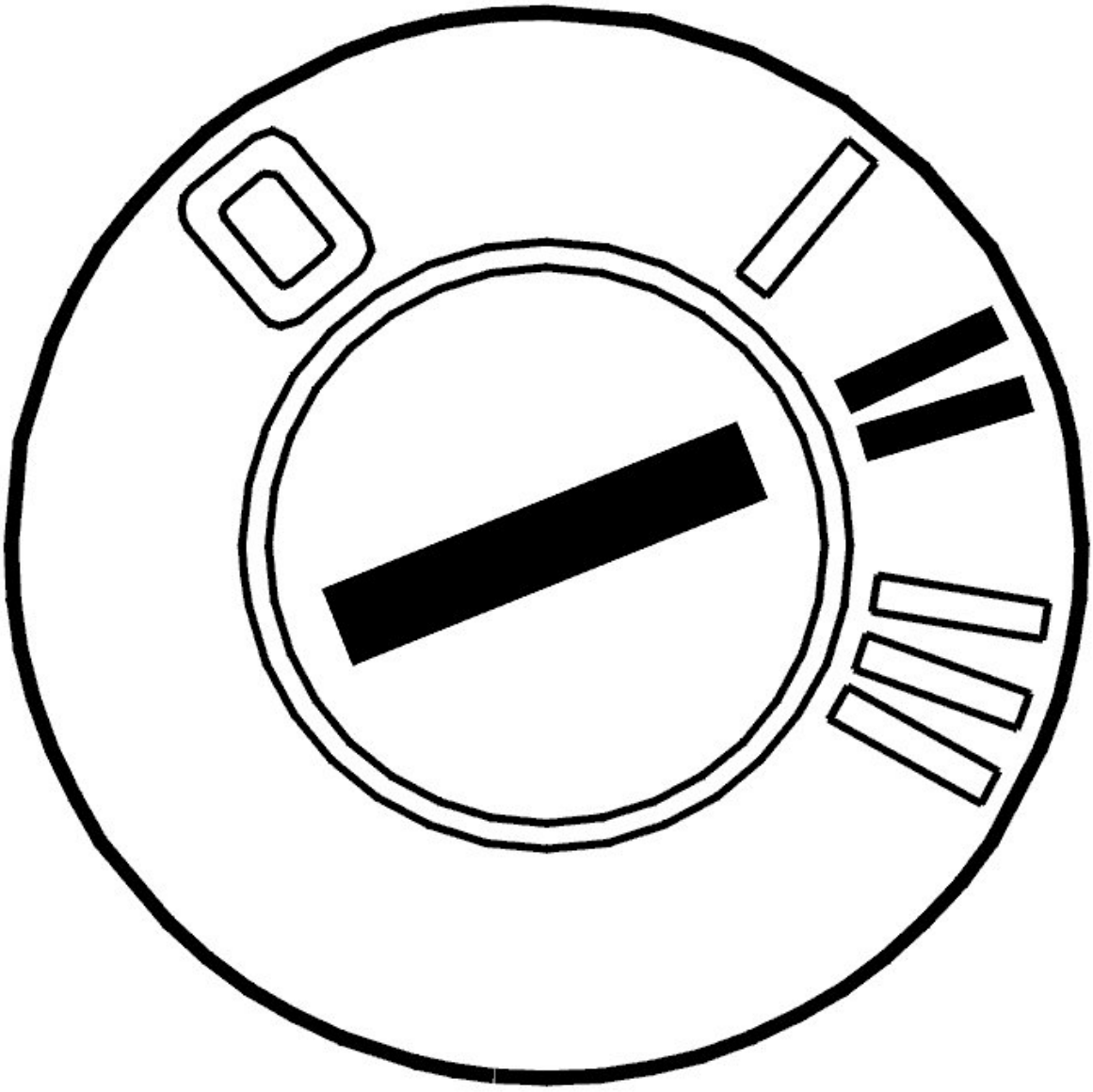
Possible source
- The capacitance is too high or there is a short-circuit in the integrated capacitor in the connector for the SRS ignition cable.

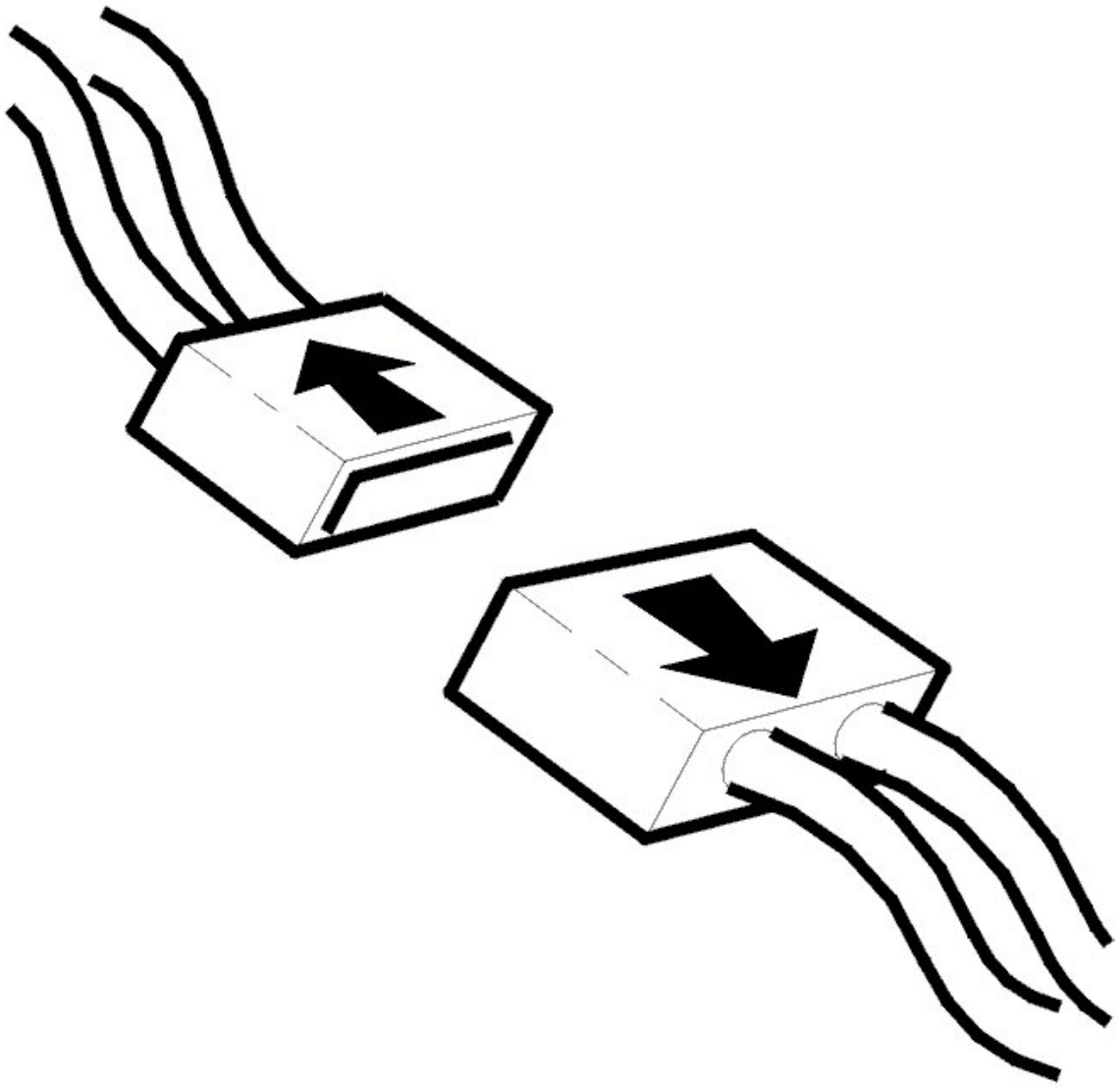
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too High

Capacitance too high

Checking the component





- Ignition off
- Disconnect the connector from the rear left-hand inflatable curtain
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

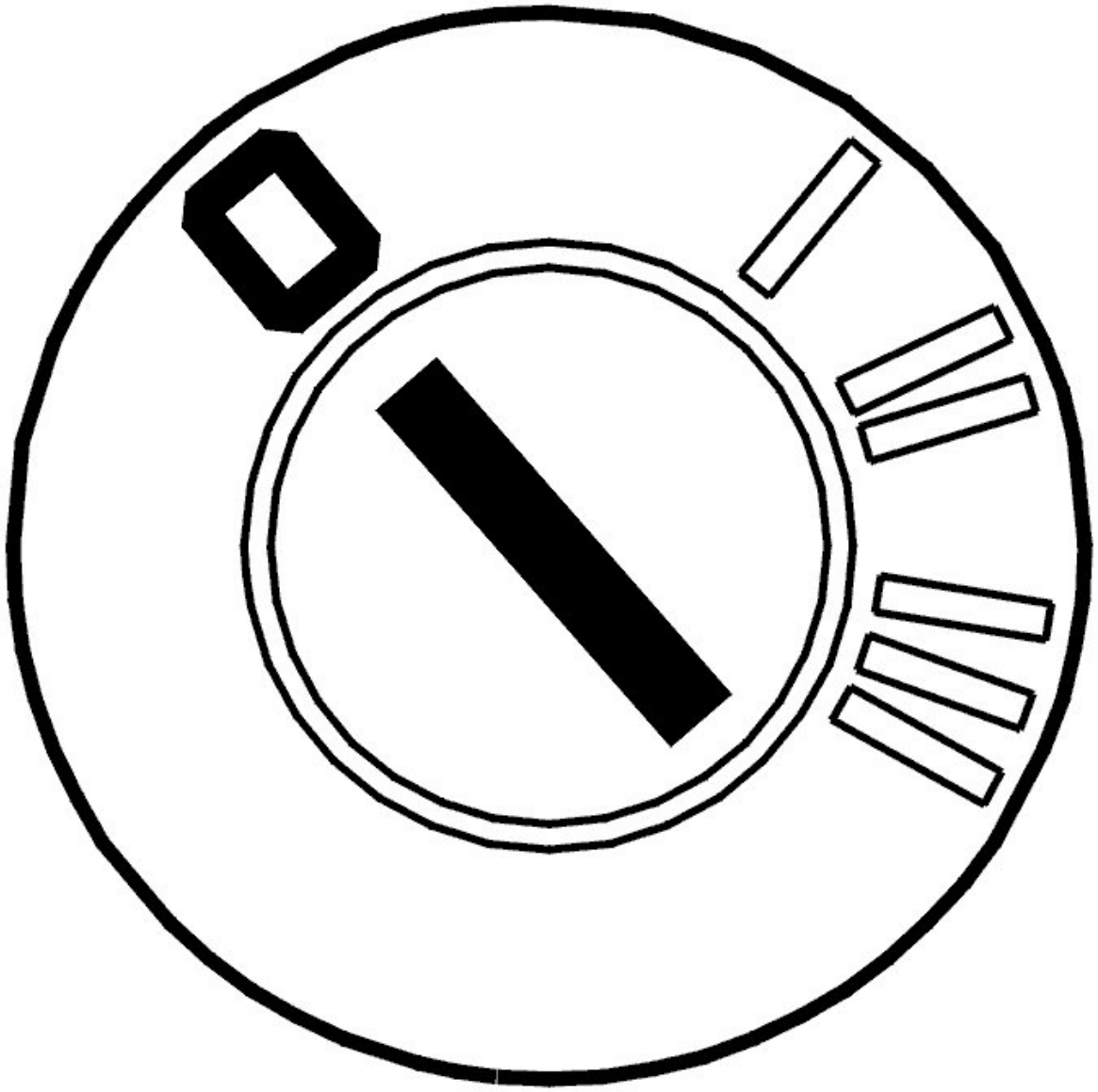
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

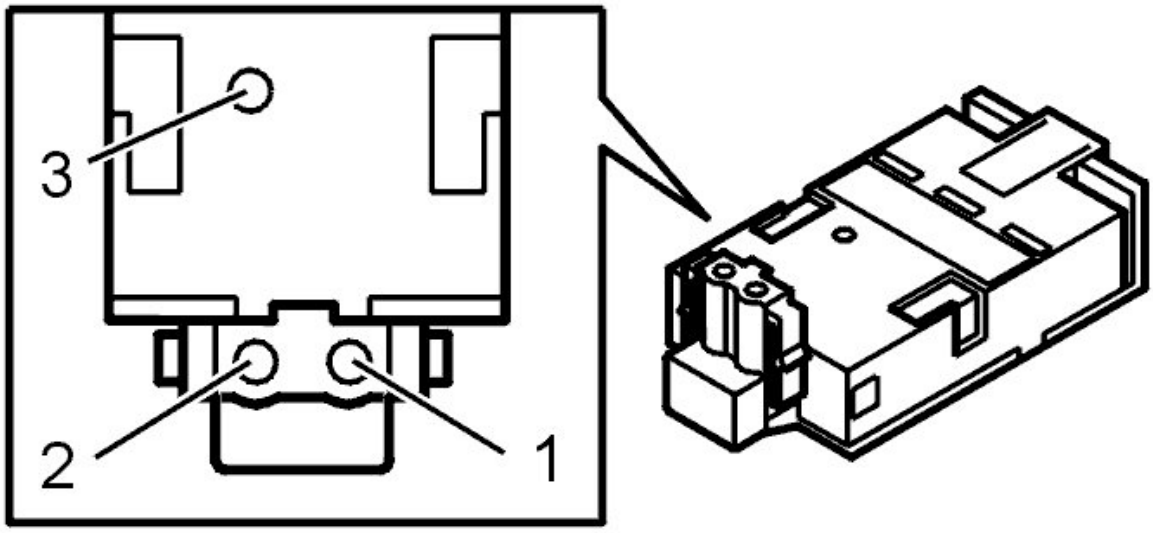
Check the cable between Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) and connector terminals #1 and #3 on the rear left-hand inflatable curtain. Check for a short-circuit to ground.
Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the rear left-hand inflatable curtain.
Check the cable between the Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) for resistance between these terminals. The resistance between the terminals should be infinite.
Remedy as necessary.

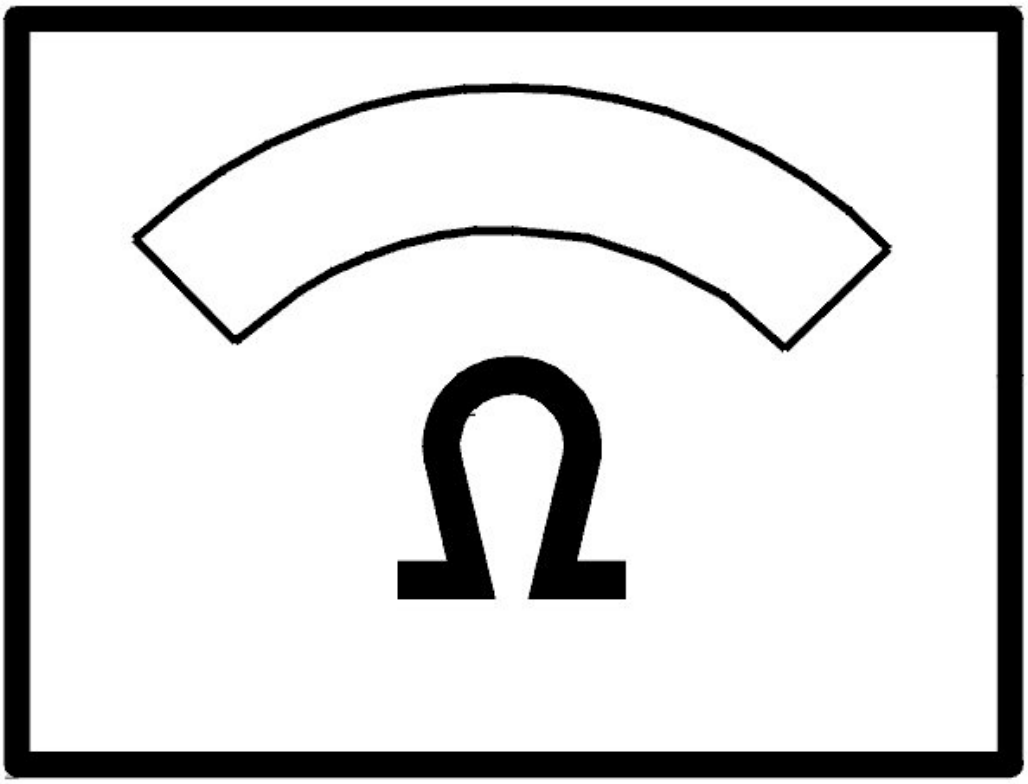
Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the rear left-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between the rear inflatable curtain connector terminals #1 and #3 (Supplemental Restraint System Module (SRS)

side) and ground should be infinite

- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

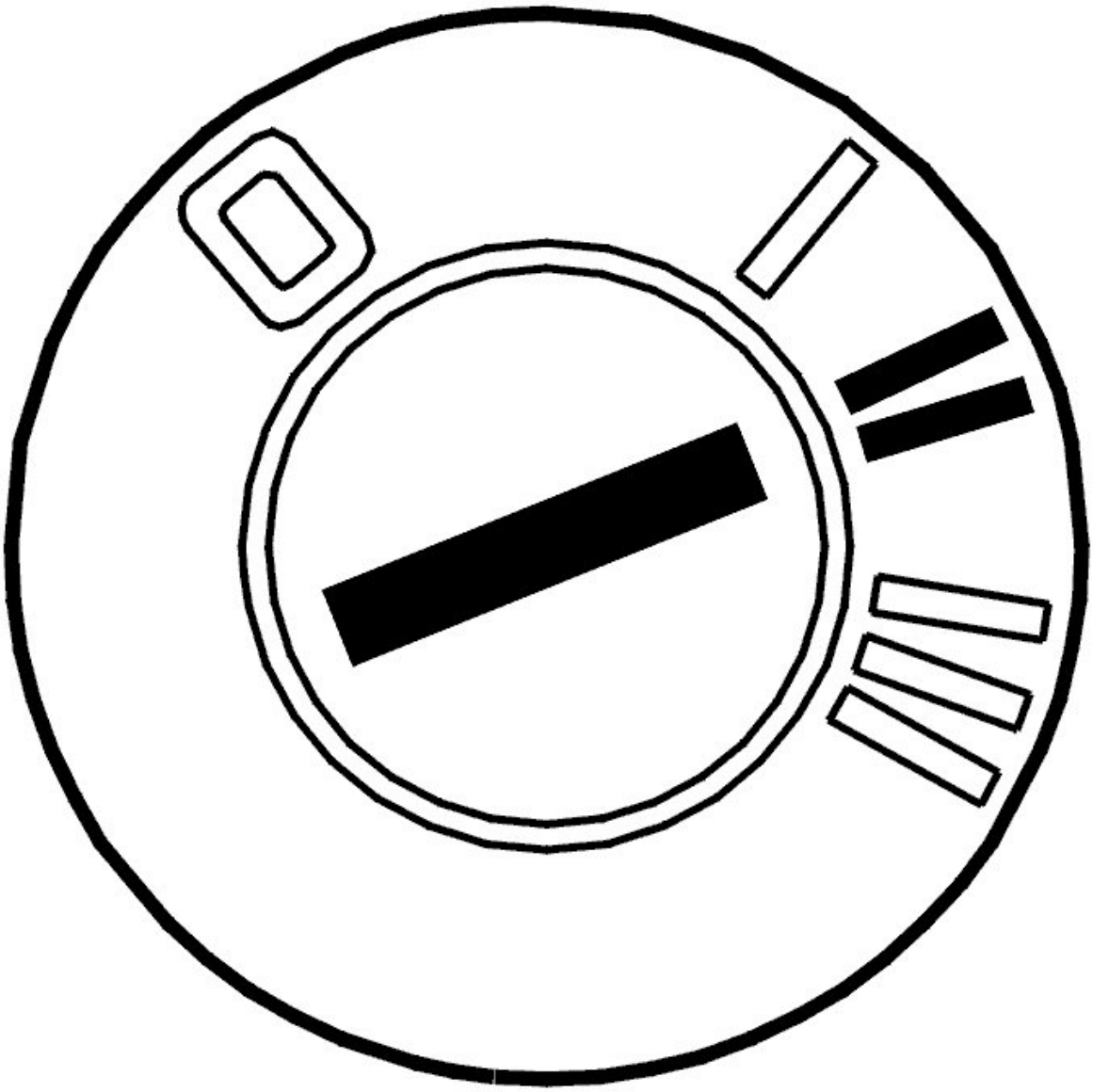
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

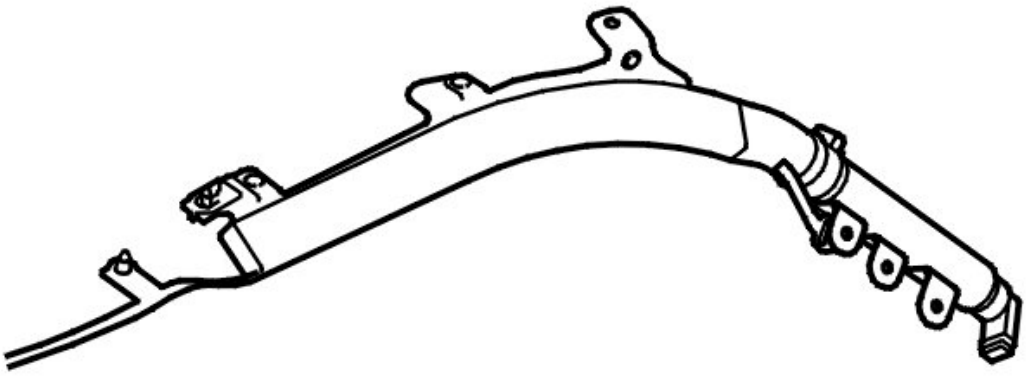
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A3

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A3 is stored if the control module registers that the capacitance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A3 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

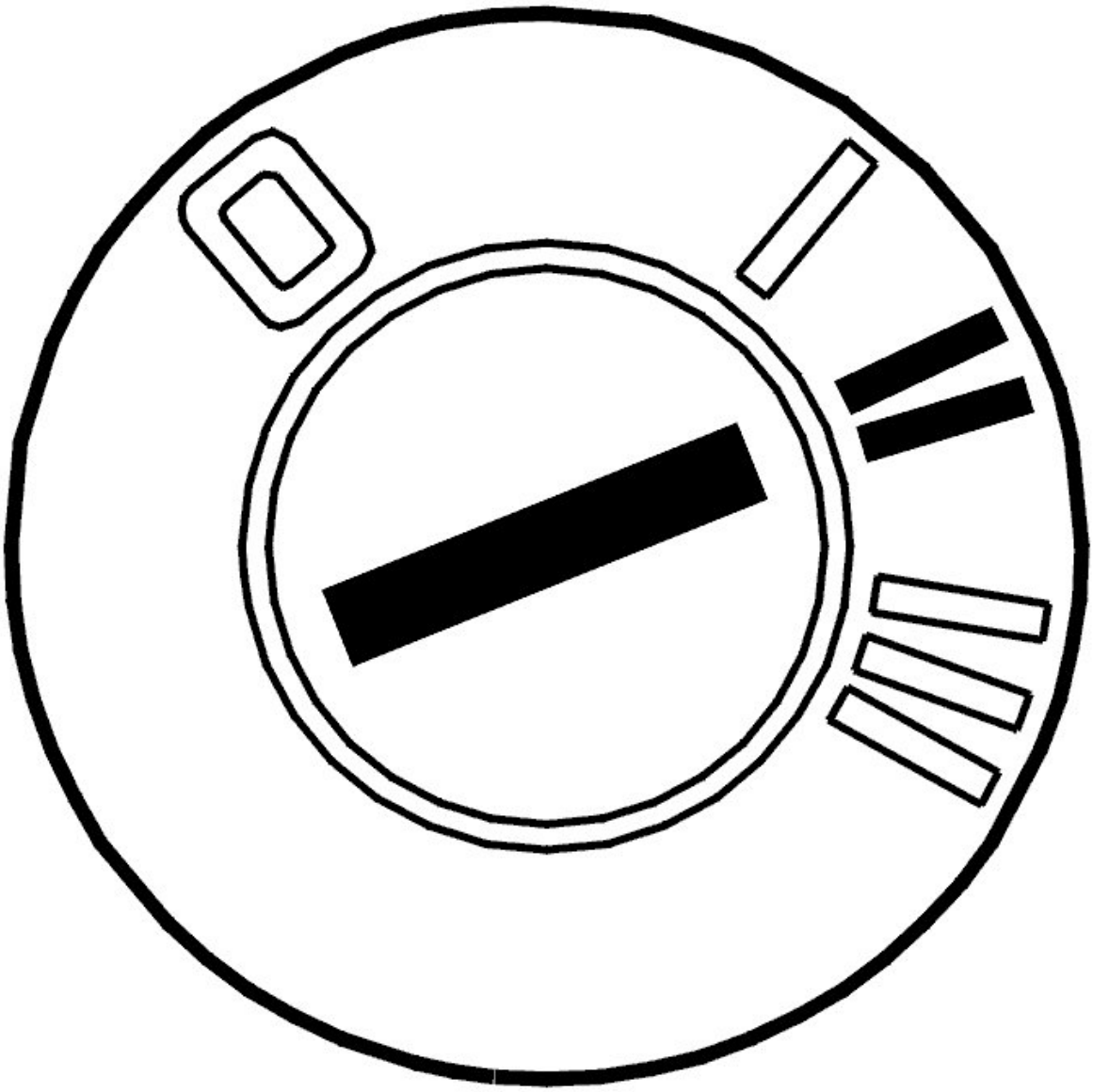
Possible source
- The capacitance is too low in the integrated capacitor in the connector for the SRS ignition cable.

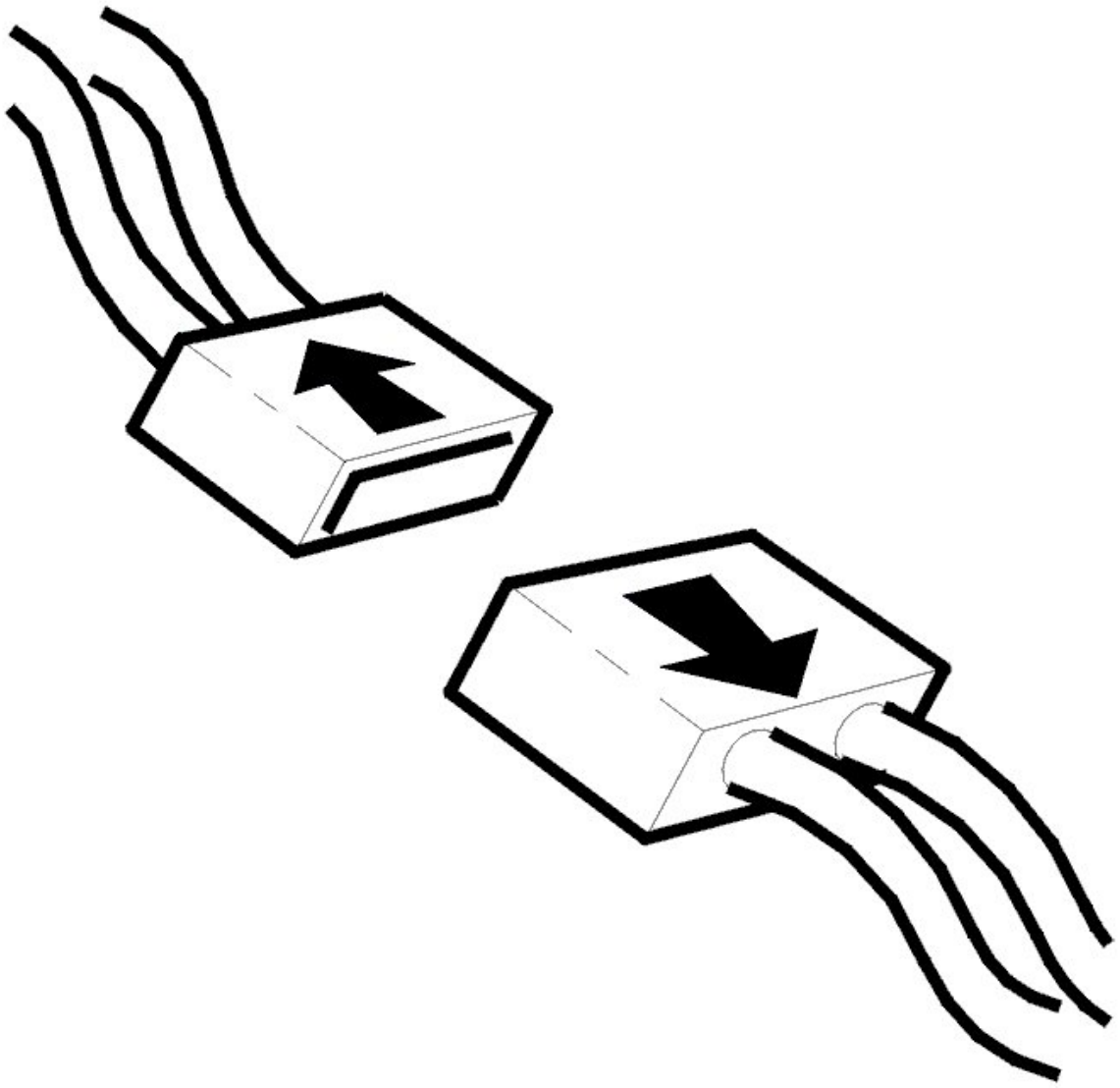
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too Low

Capacitance too low

Checking the cable





Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

The probable cause of this fault is that the terminal nearest the rear left inflatable curtain is defective. Try replacing the wiring for the inflatable curtain.
Remedy as necessary.

Other information:

- To access and replace the inflatable curtain, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

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FAULT-TRACING FAILED - No Fault Found

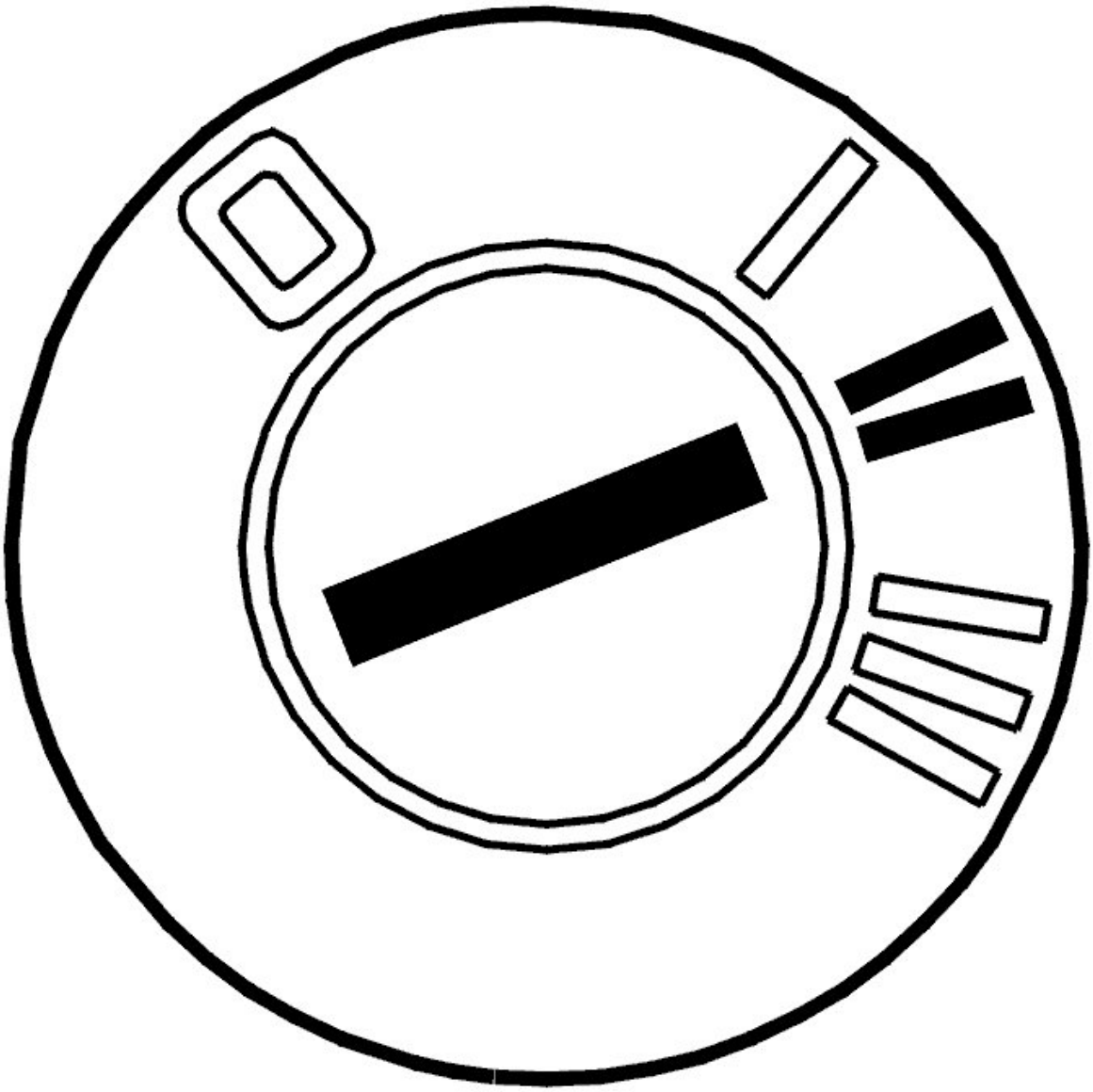
Attempt New Test - Checking the cable

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

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Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

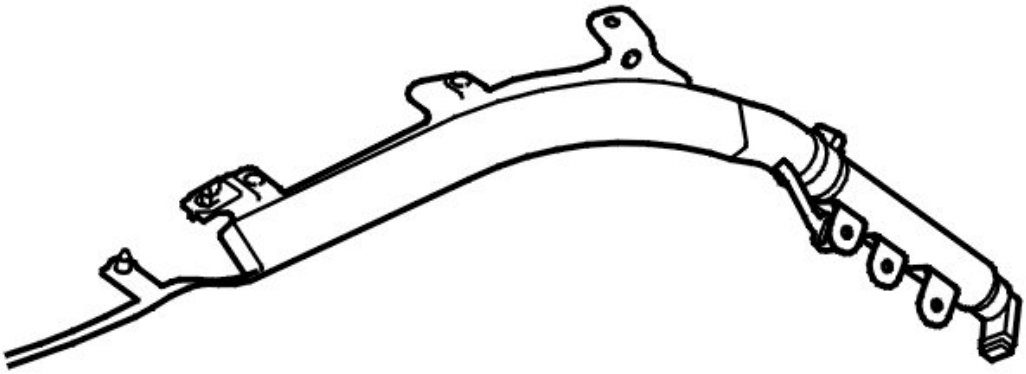
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A4

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A4 is stored if the control module registers that the resistance in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A4 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Contact resistance or an open-circuit in the signal cable between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Open-circuit in the inflatable curtain (resistance too high in igniter).

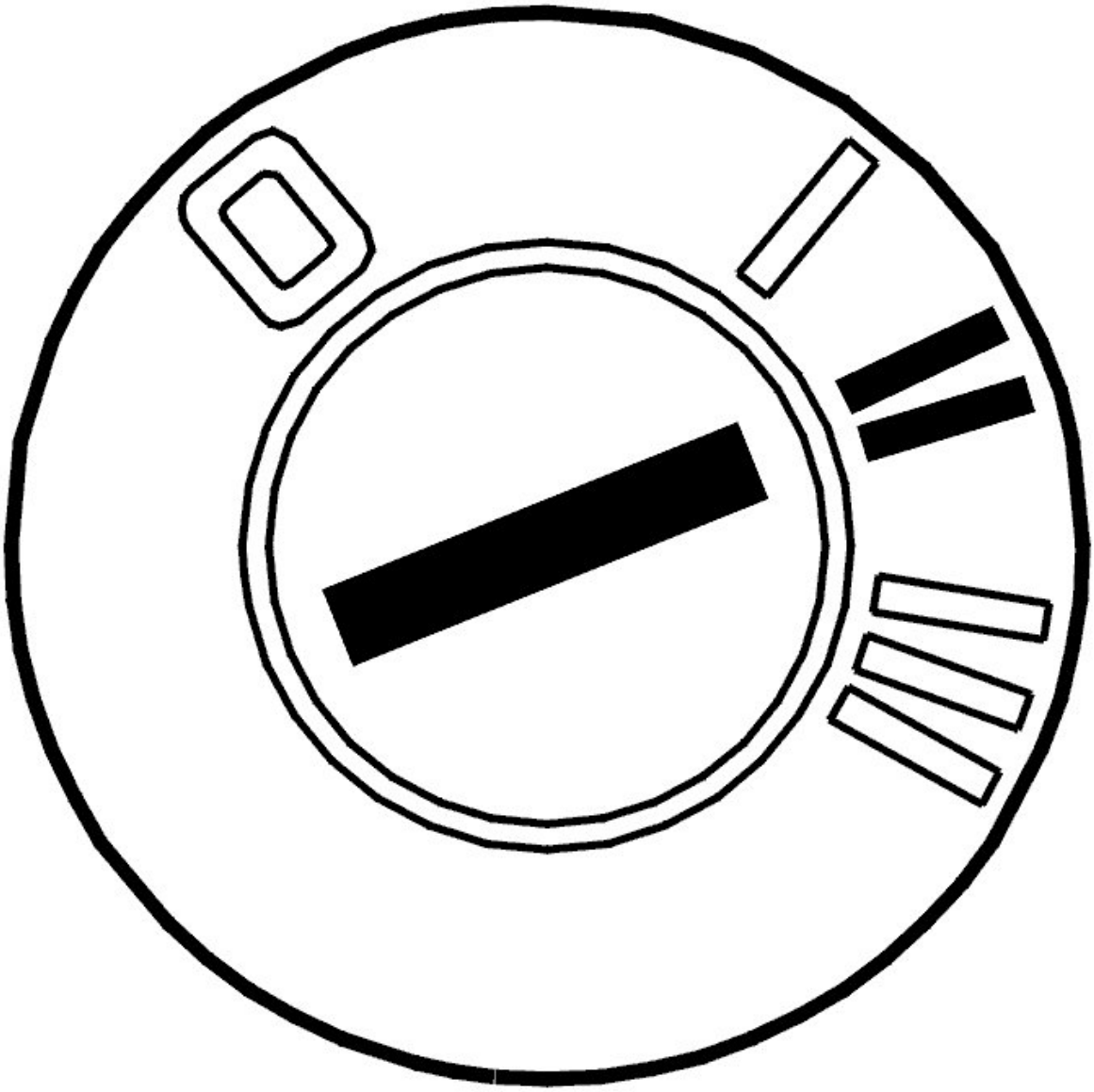
Fault symptom[s]

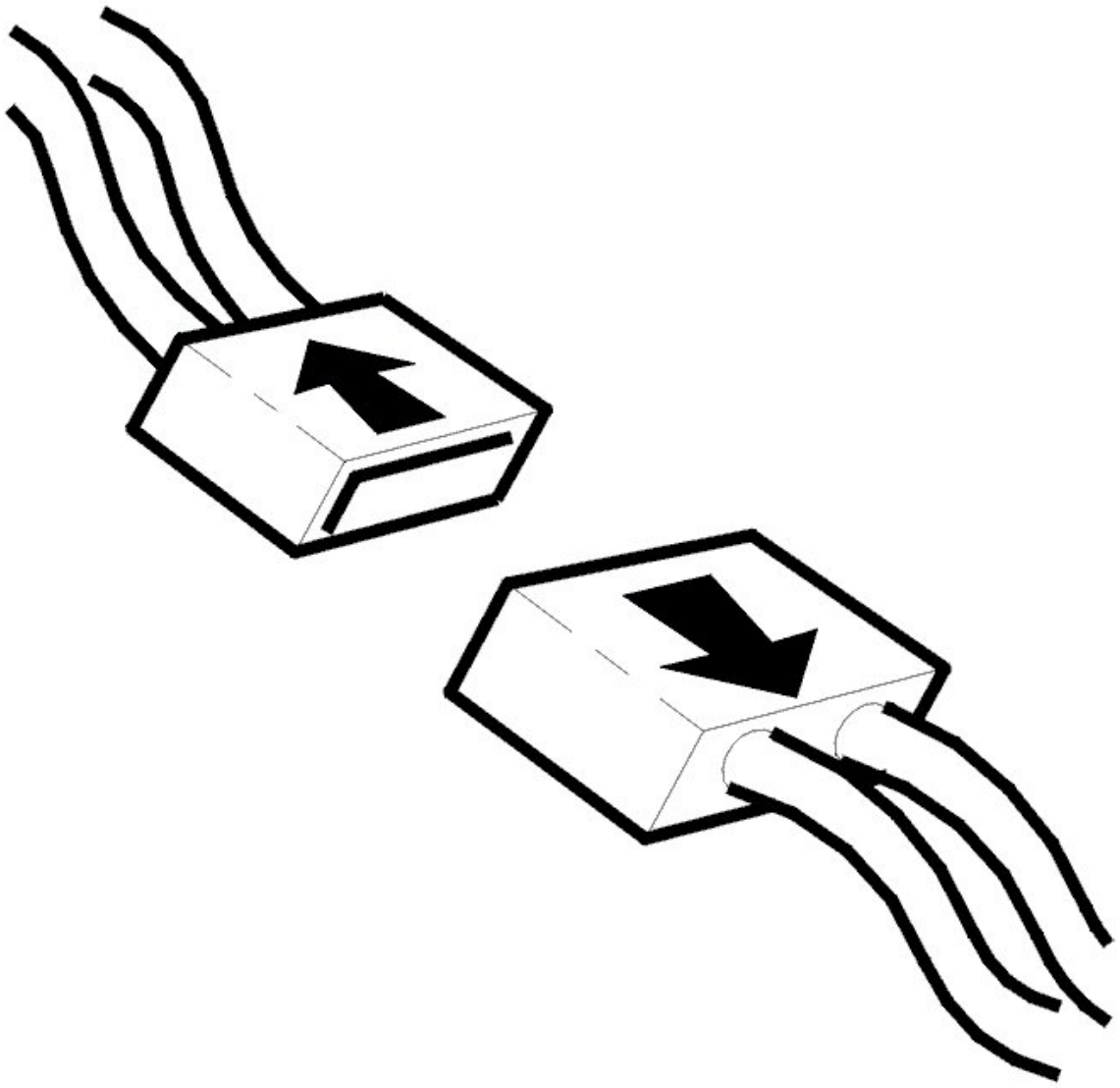
- The SRS indicator lamp is lit.

Resistance Too High

Resistance too high

Checking the component





- Ignition off
- Disconnect the connector from the rear left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

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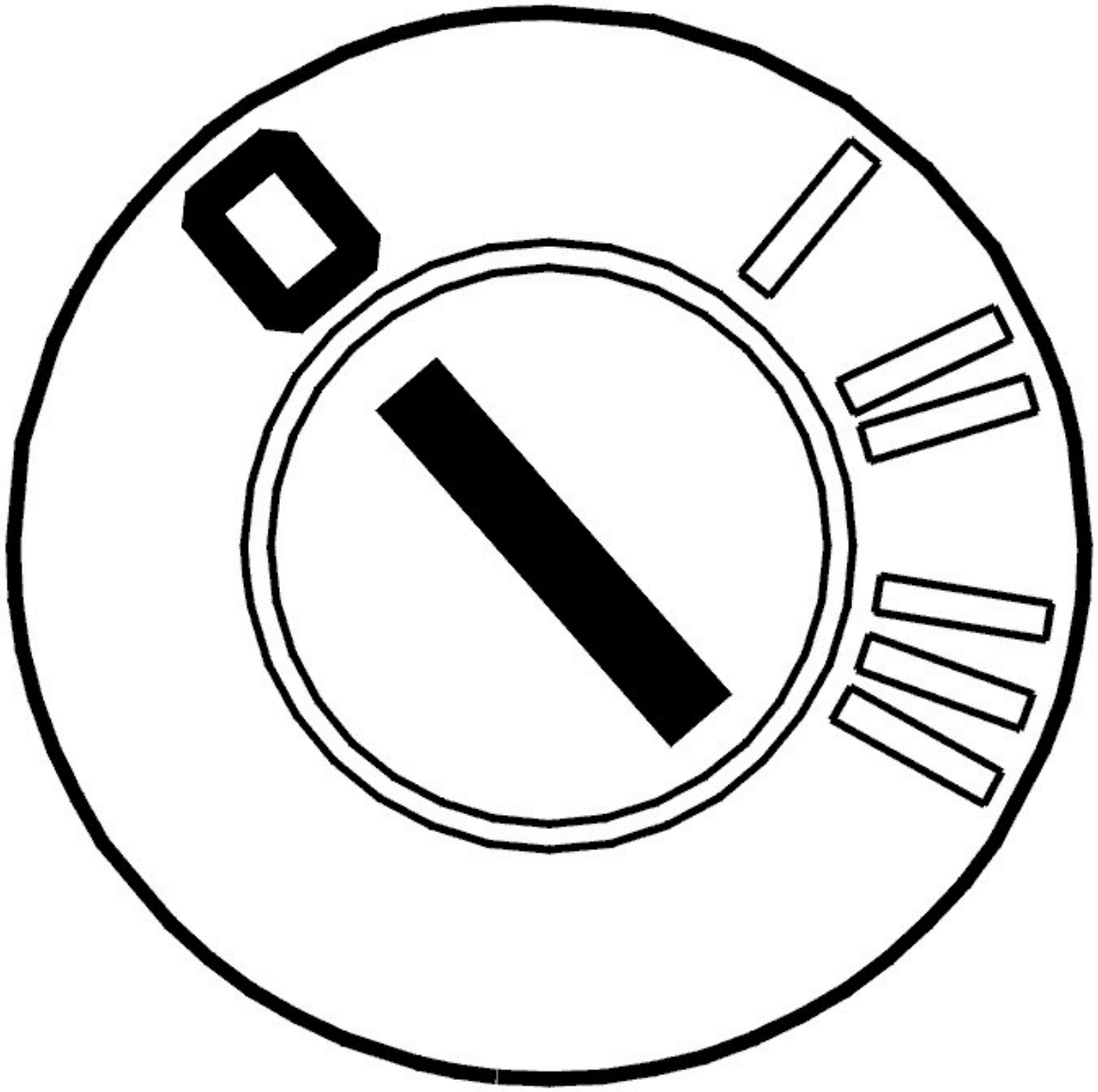
Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

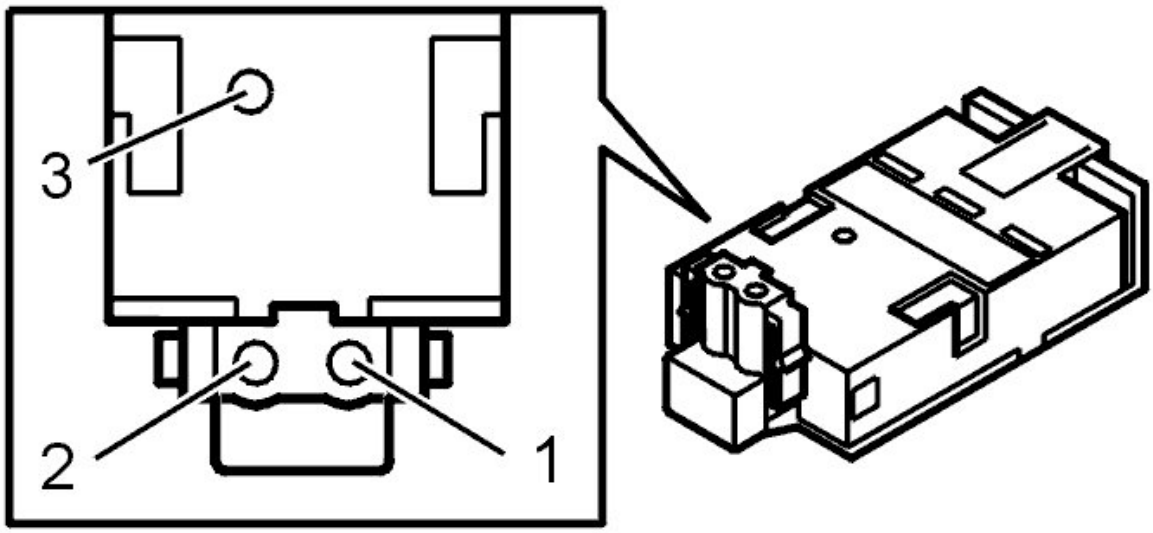
Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

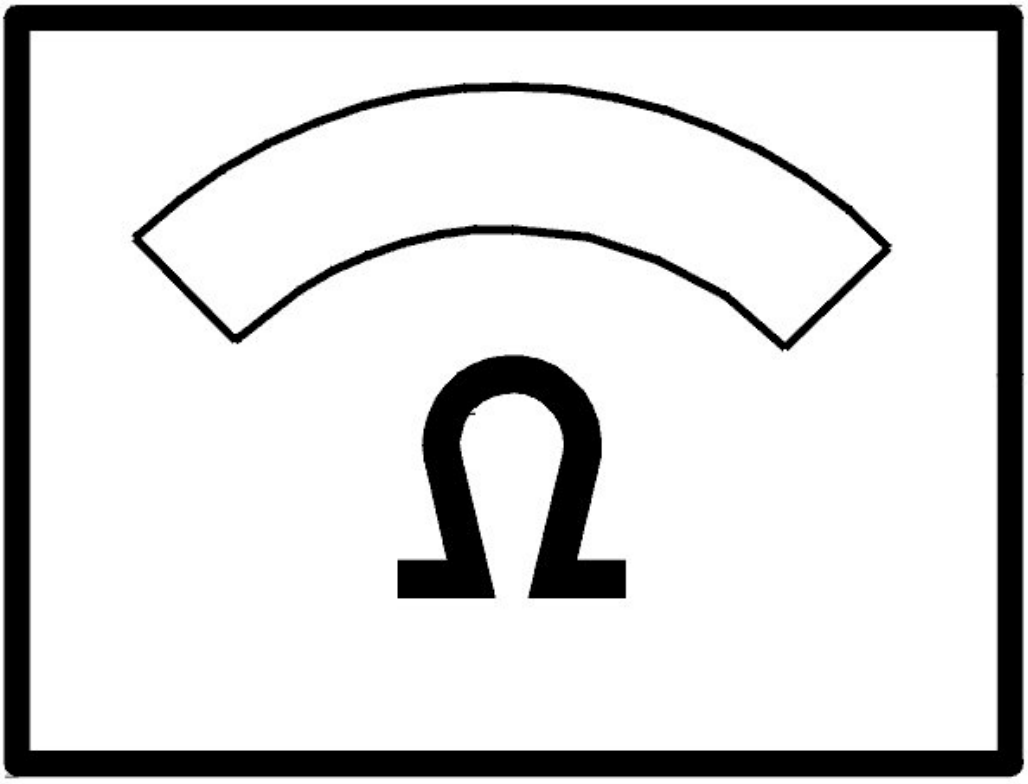
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the inflatable curtain. The cable terminals must not be damaged or pressed back
Check the cable between the control module for the Supplemental Restraint System Module (SRS) terminals #13A(13), #14A(14) and connector terminals #1, #3 on the rear left-hand inflatable curtain. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- To fault-trace the wiring and terminals, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

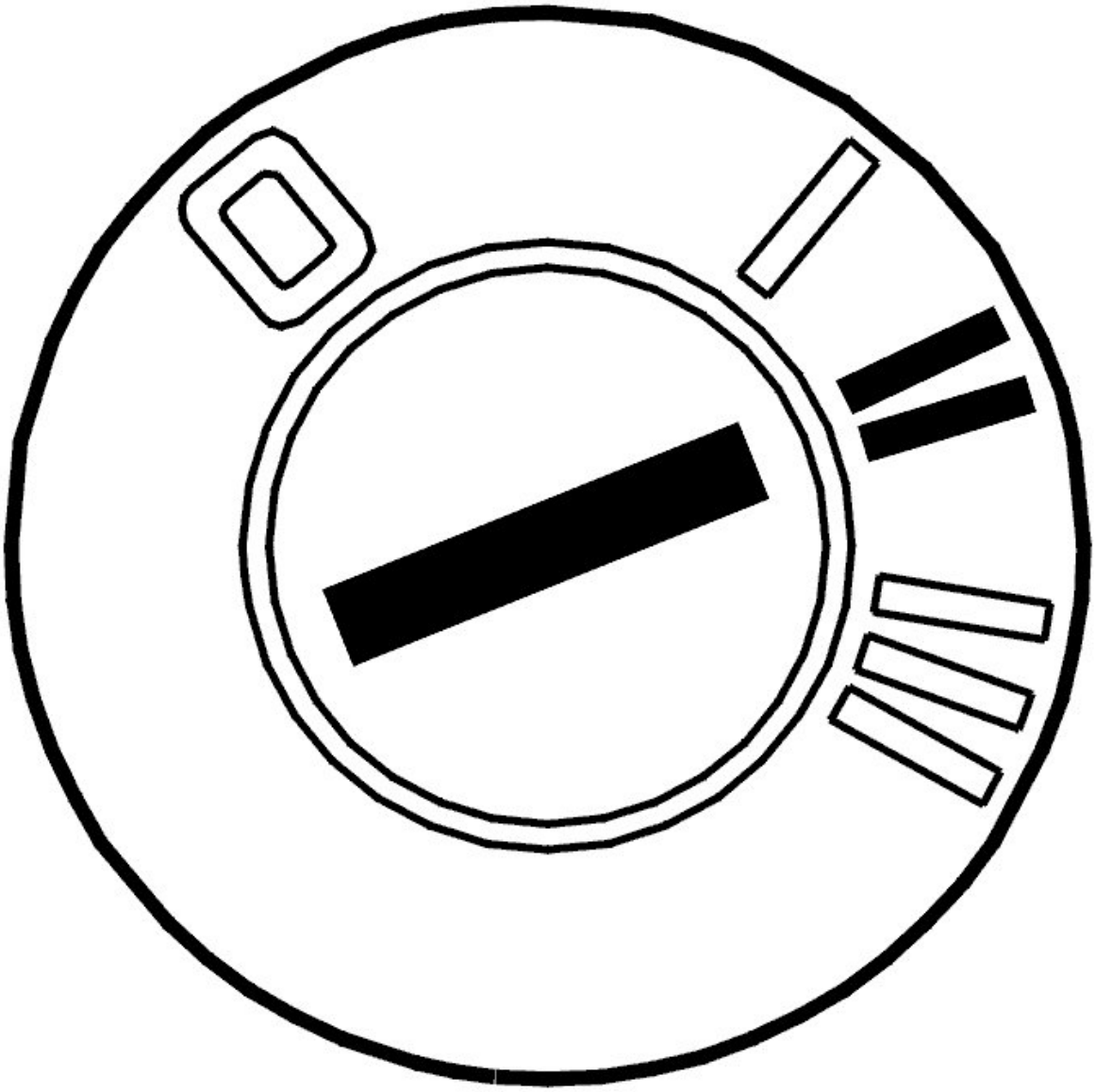
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

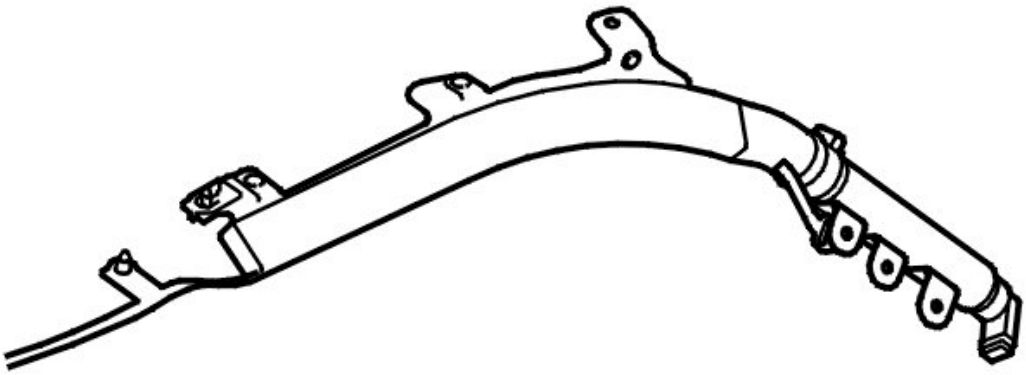
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A5

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A5 is stored if the control module registers that the resistance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A5 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

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Possible source

- Short-circuit in the ignition circuit or in the connectors between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Short-circuit in the inflatable curtain (resistance too low in igniter).

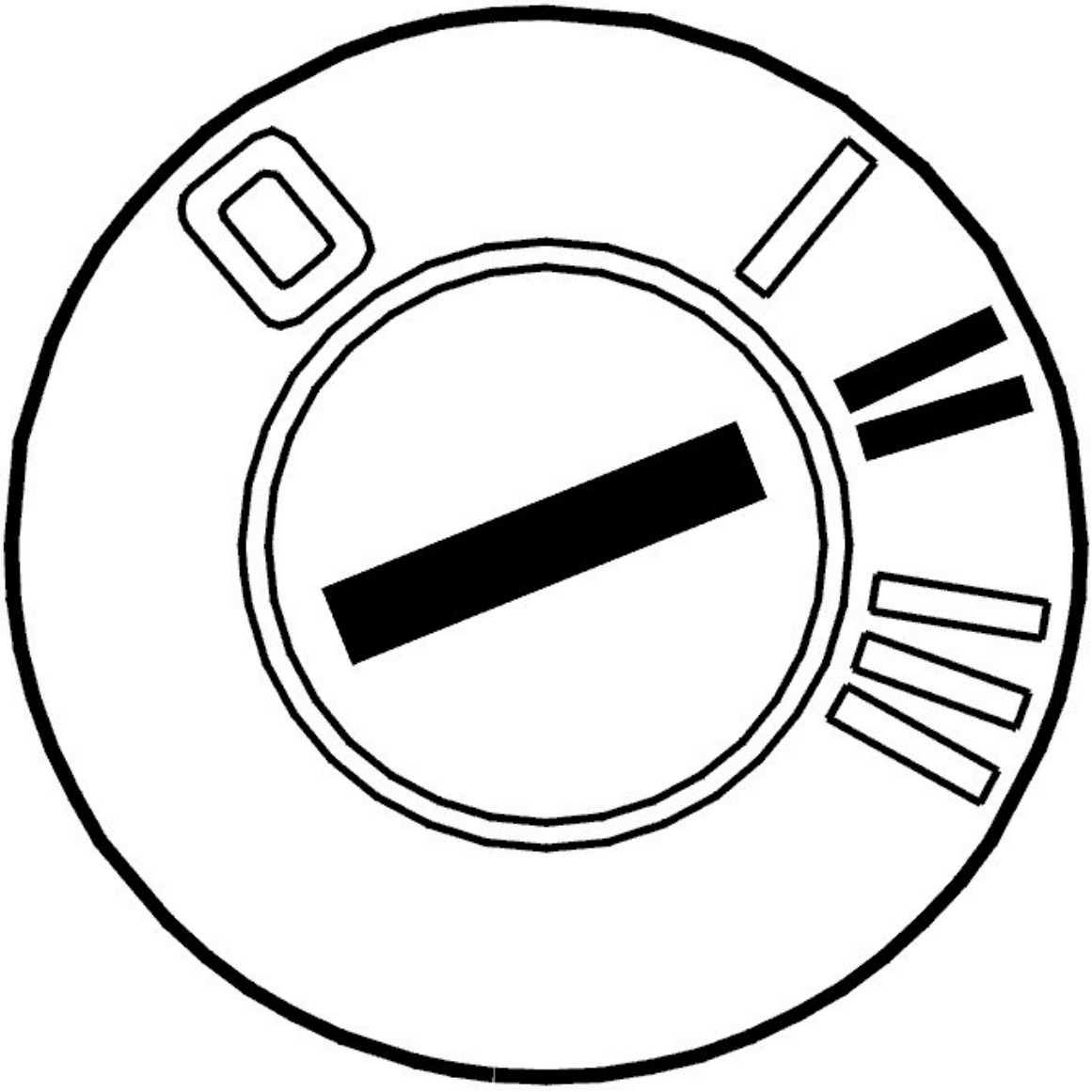
Fault symptom[s]

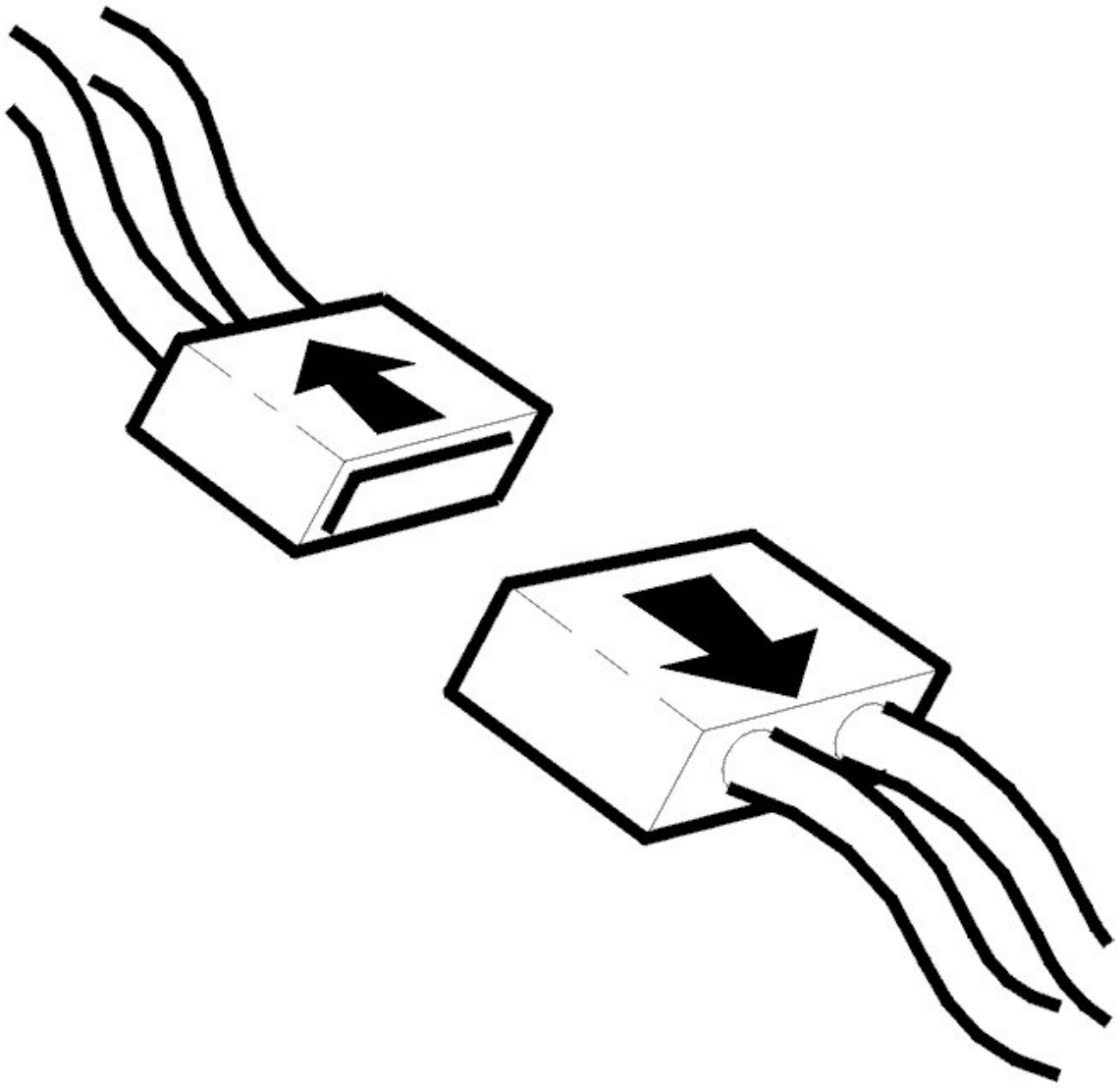
- The SRS indicator lamp is lit.

Resistance Too Low

Resistance too low

Checking the component





- Ignition off
- Disconnect the connector from the rear left-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

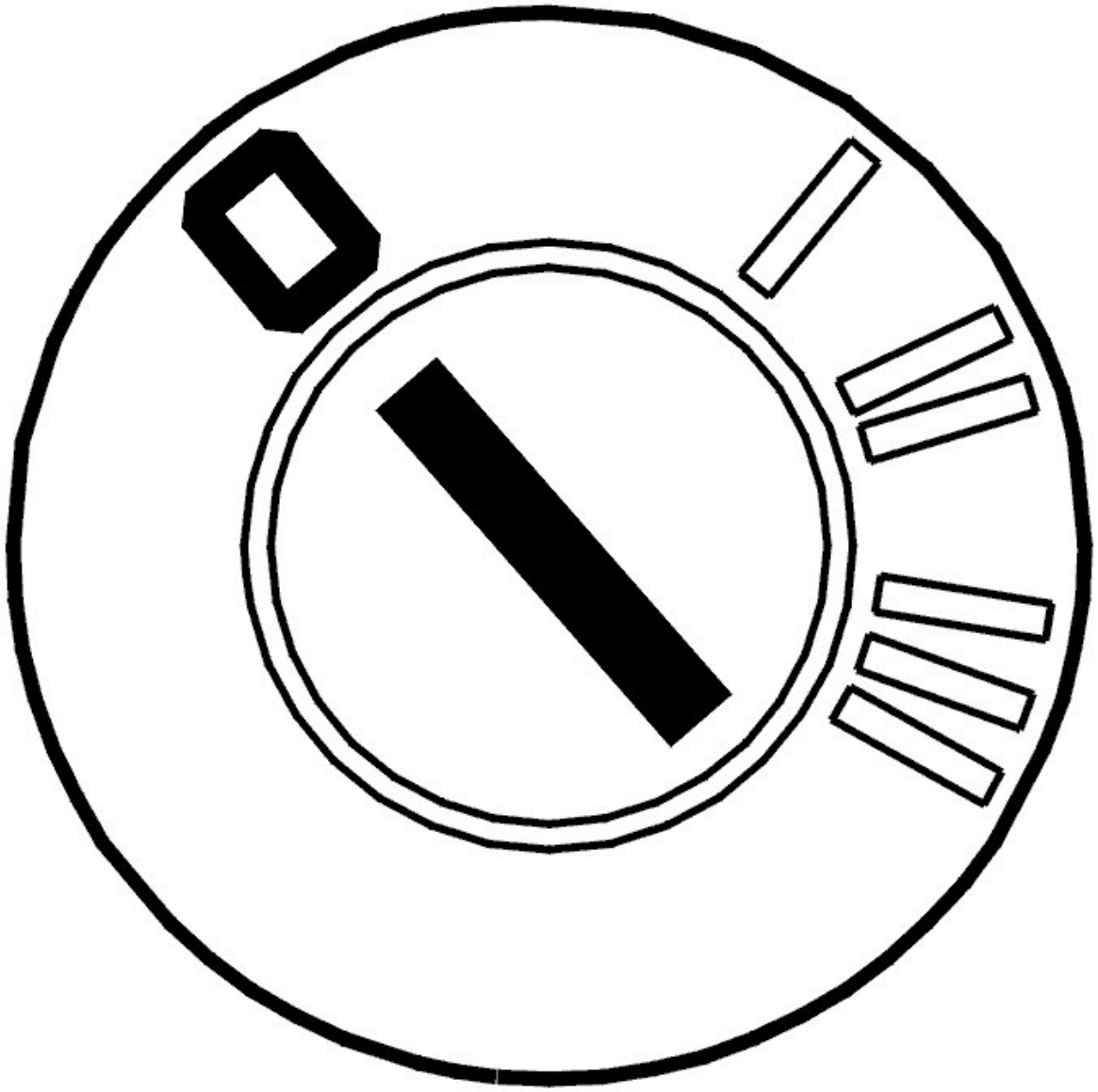
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the rear left-hand inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

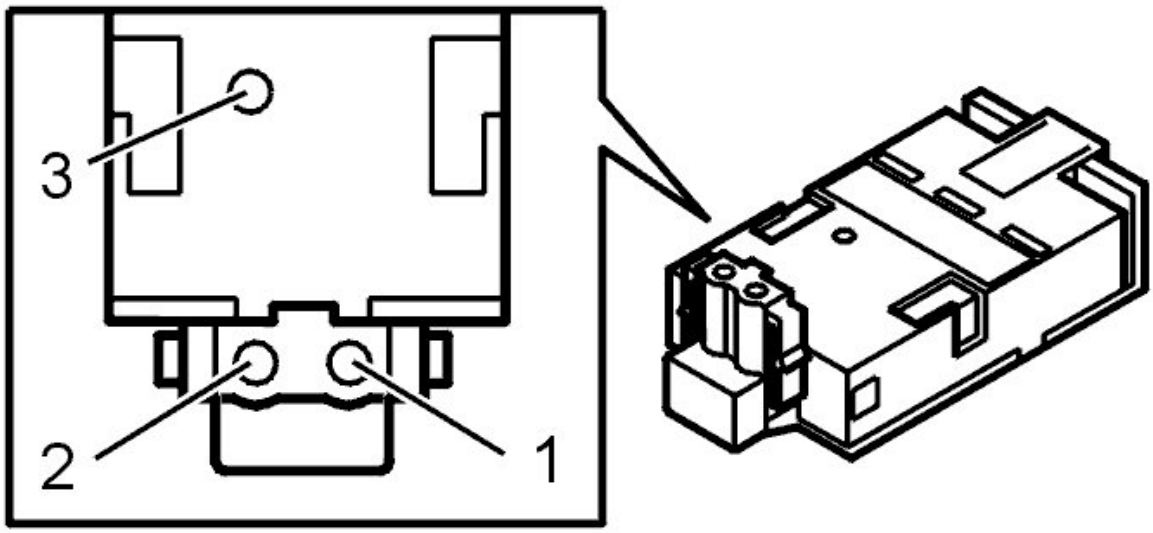
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the inflatable curtain. The cable terminals must not be damaged or pressed back
Check the cable between Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) and connector terminals #1 and #3 on the rear left-hand inflatable curtain. Check for a short-circuit to ground.
Check the cable between the Supplemental Restraint System Module (SRS) terminals #13A(13) and #14A(14) for resistance between these terminals. The resistance between the terminals should be infinite.
Remedy as necessary.

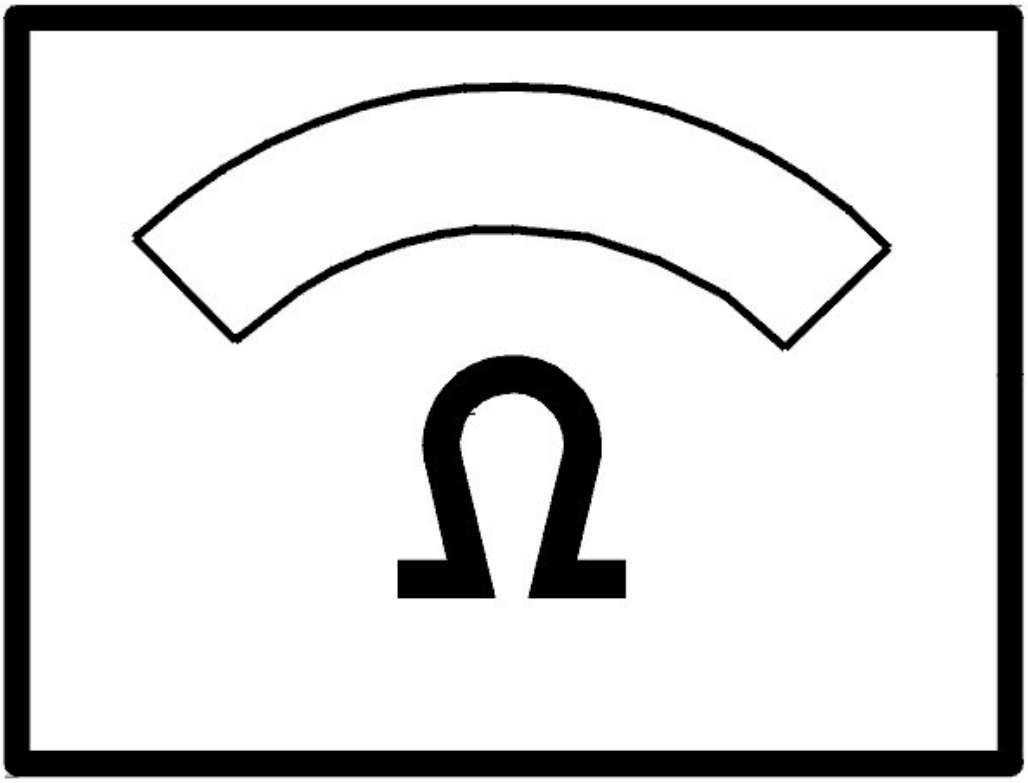
Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the rear left-hand inflatable curtain connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #14A (14) and #13A(13) on the Supplemental Restraint

System Module (SRS) connector should be infinite

- With the ignition off and the connectors for the rear left-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between the rear inflatable curtain connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

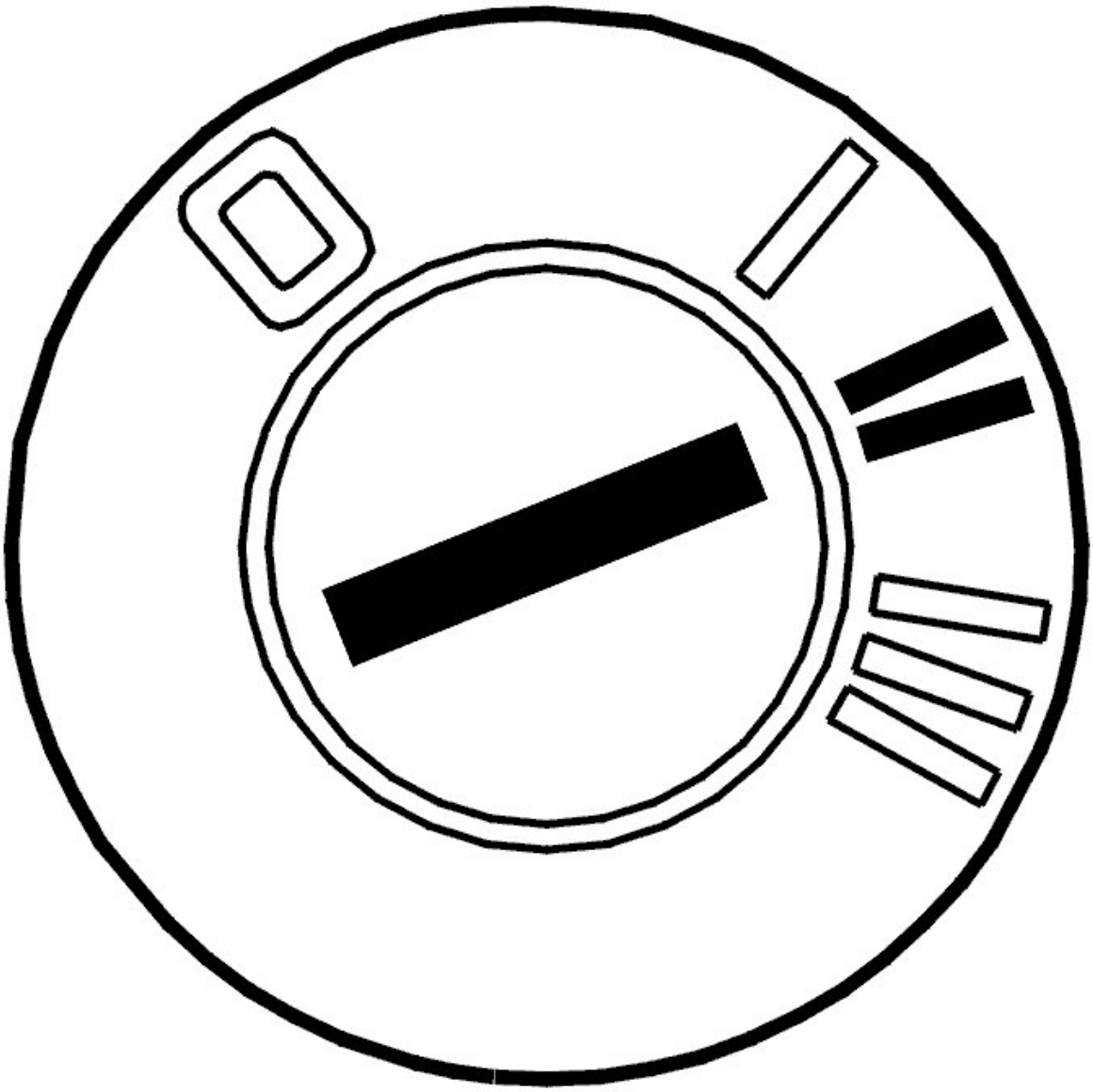
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

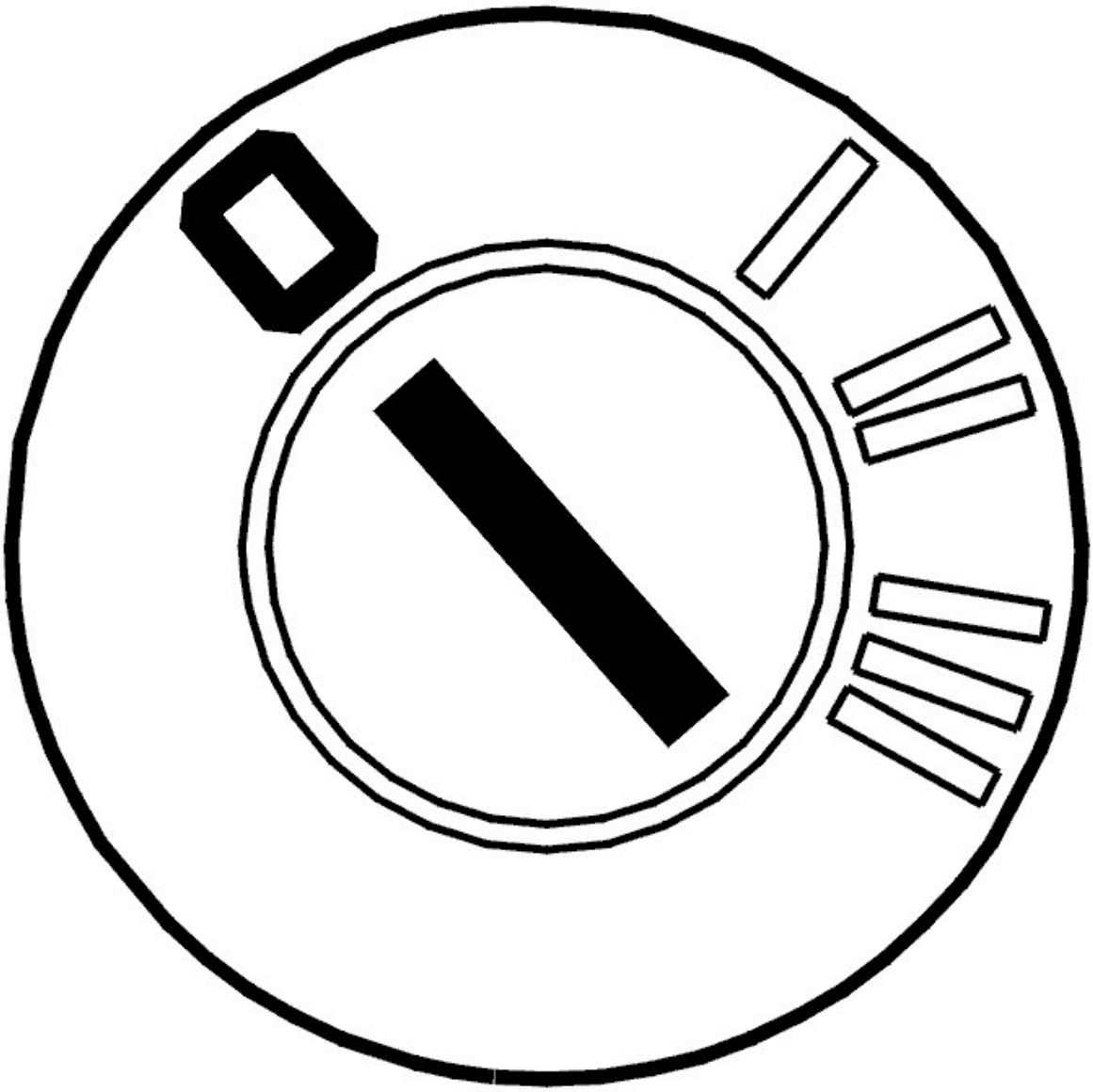
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Configuration Fault

Configuration fault

Checking the component

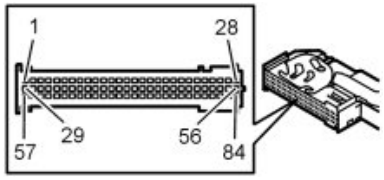


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct control module is installed in the car. Read off by clicking the VCT2000 symbol.
Check that the switch for the rear left inflatable curtain is not connected to an inflatable curtain if the car is a 5-seat model.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see the relevant service procedure.
- For information about signals, see Signal Specifications.



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

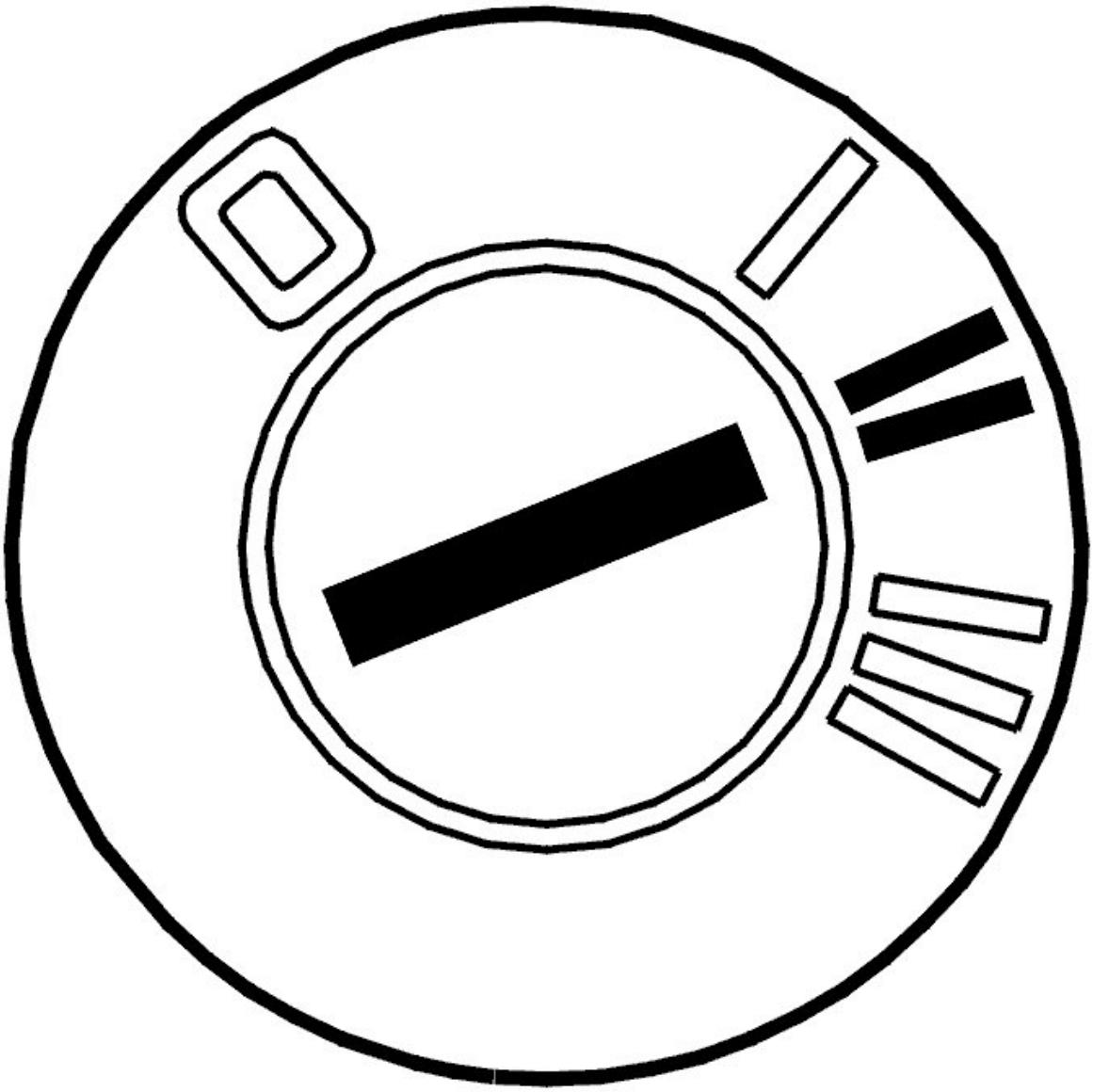
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

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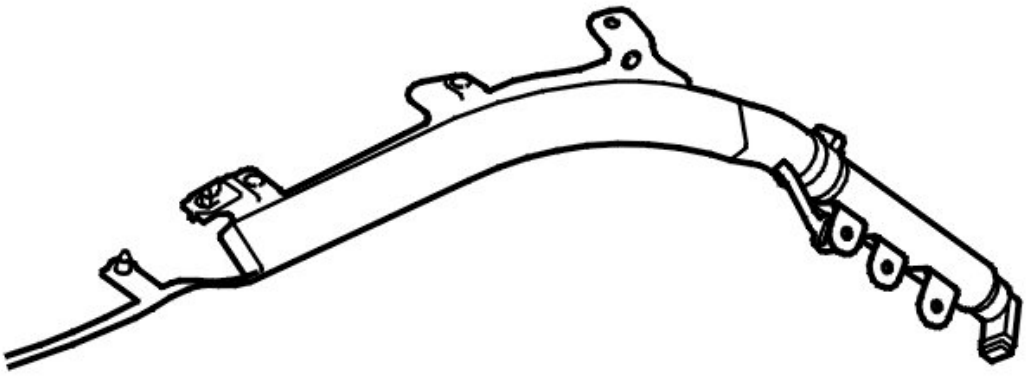
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A6

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-00A6
SRS-00AE
depending on which wiring circuit the fault is in.
Diagnostic trouble codes (DTCs):
SRS-00A6
SRS-00AE
can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble codes (DTCs) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

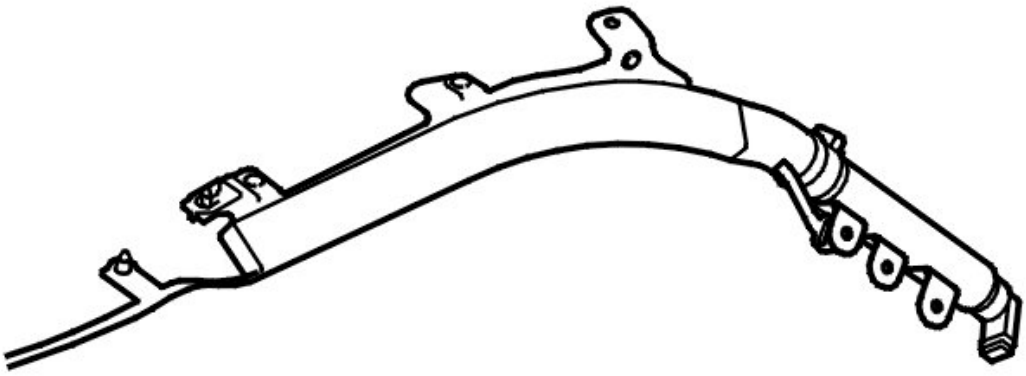
Possible source
- If the Supplemental Restraint System Module (SRS) identifies that an inflatable curtain is installed, despite the control module being programmed that an inflatable curtain is not installed.

Fault symptom[s]
- The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A8

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A8 is stored if the control module registers that the voltage in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A8 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

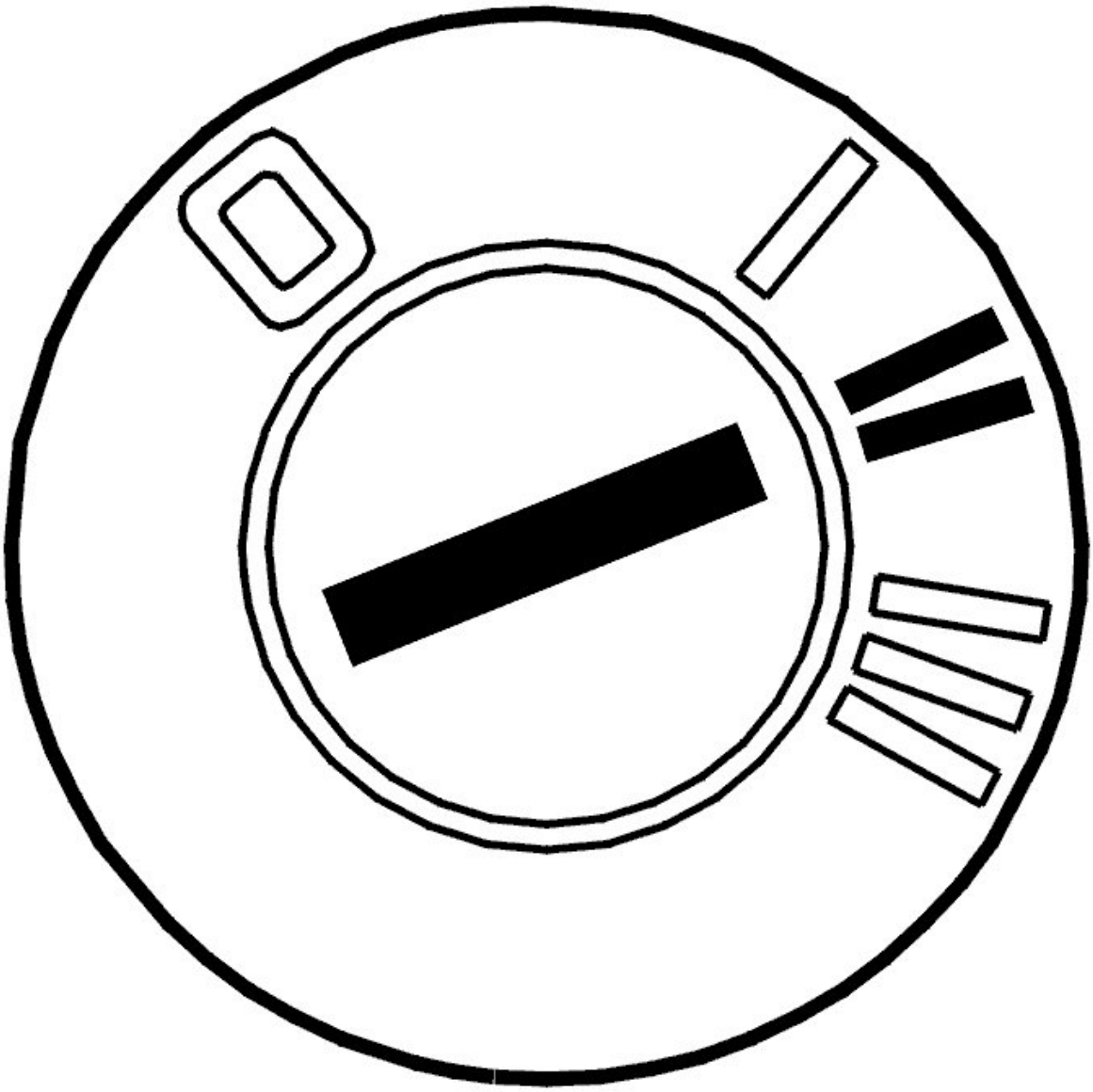
Possible source
- Short-circuit to supply voltage in the SRS ignition cable or in the connector between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the inflatable curtain.

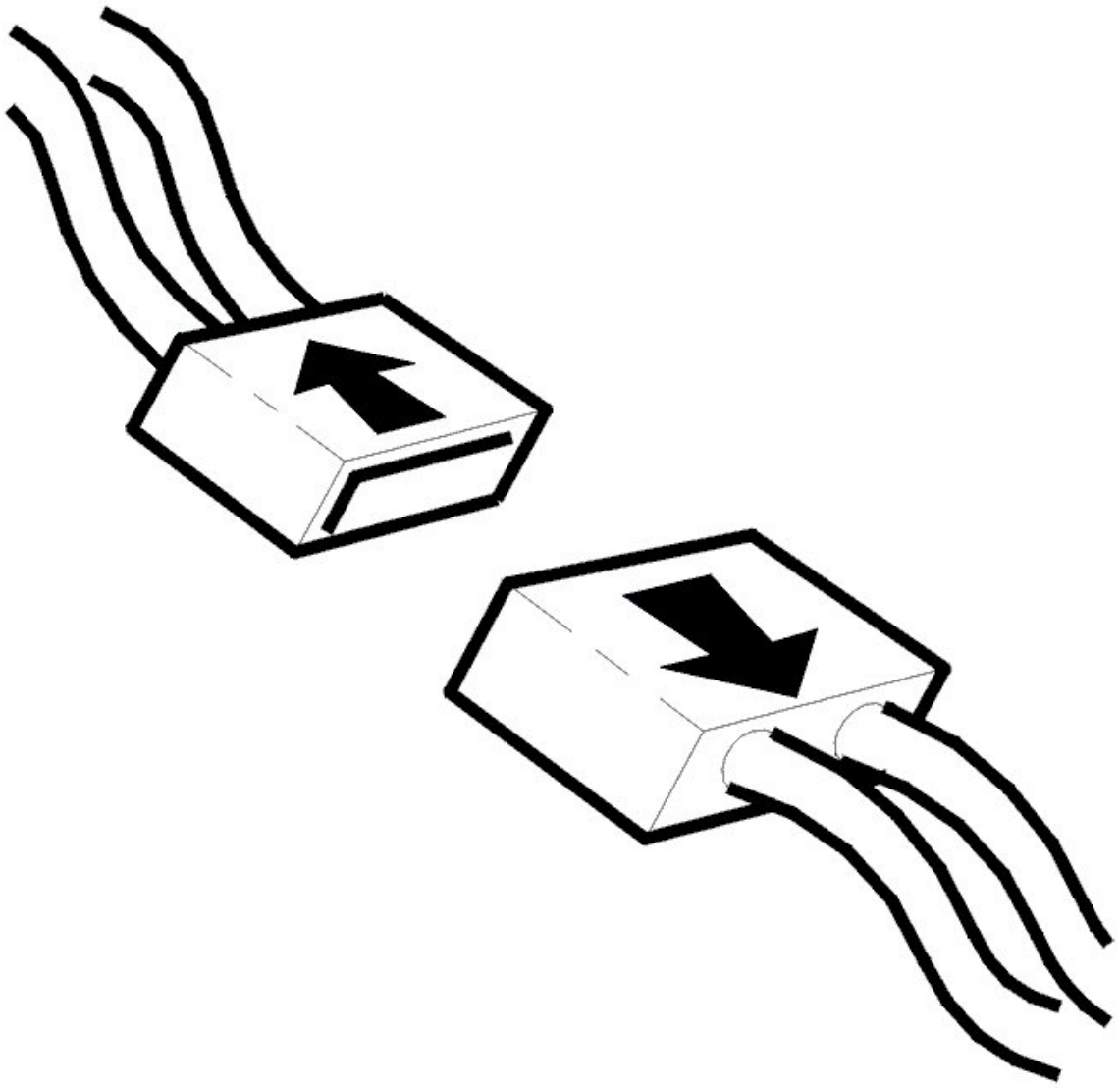
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Too High

Signal too high

Checking the component





- Ignition off
- Disconnect the connector from the rear right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

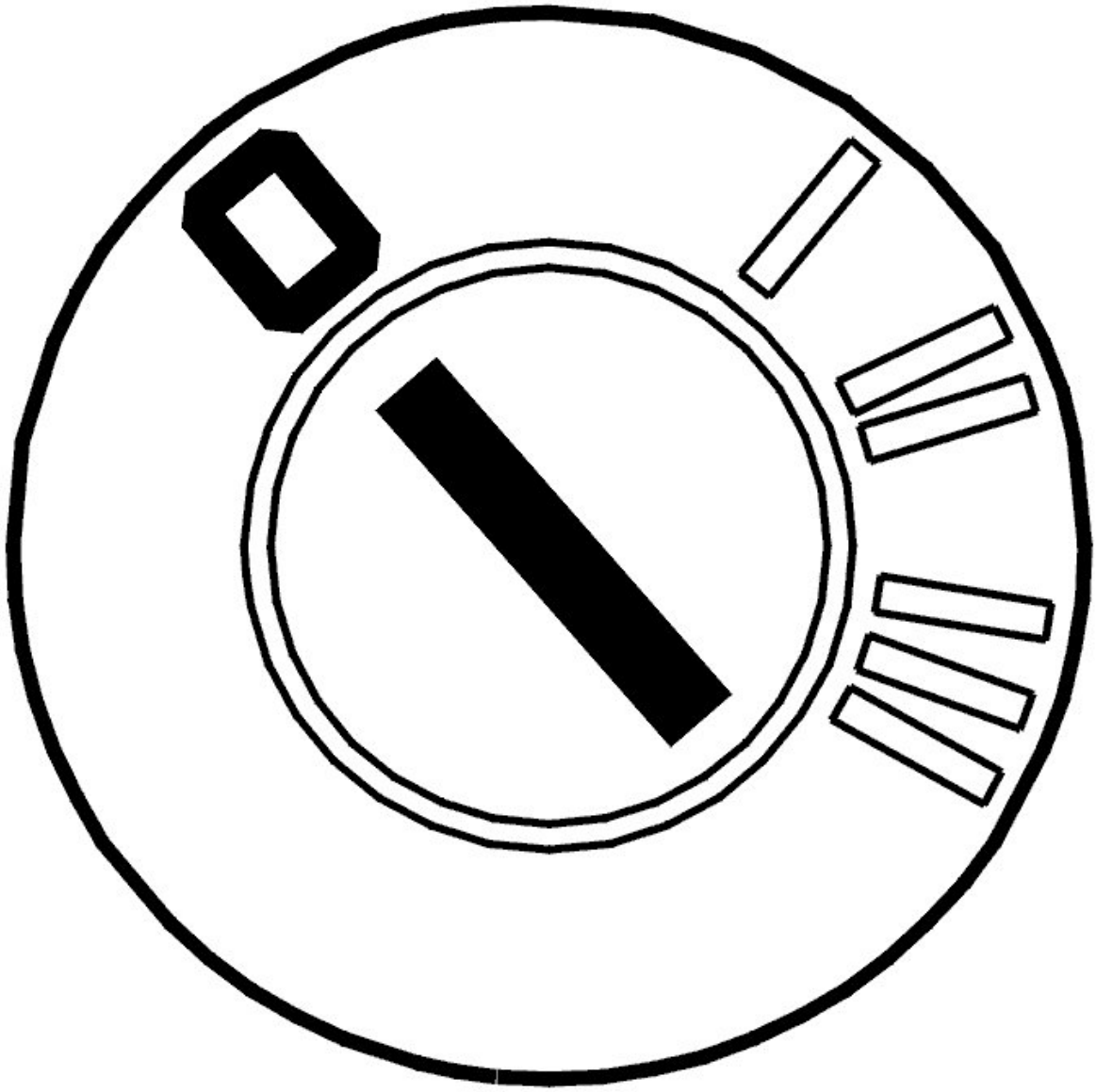
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

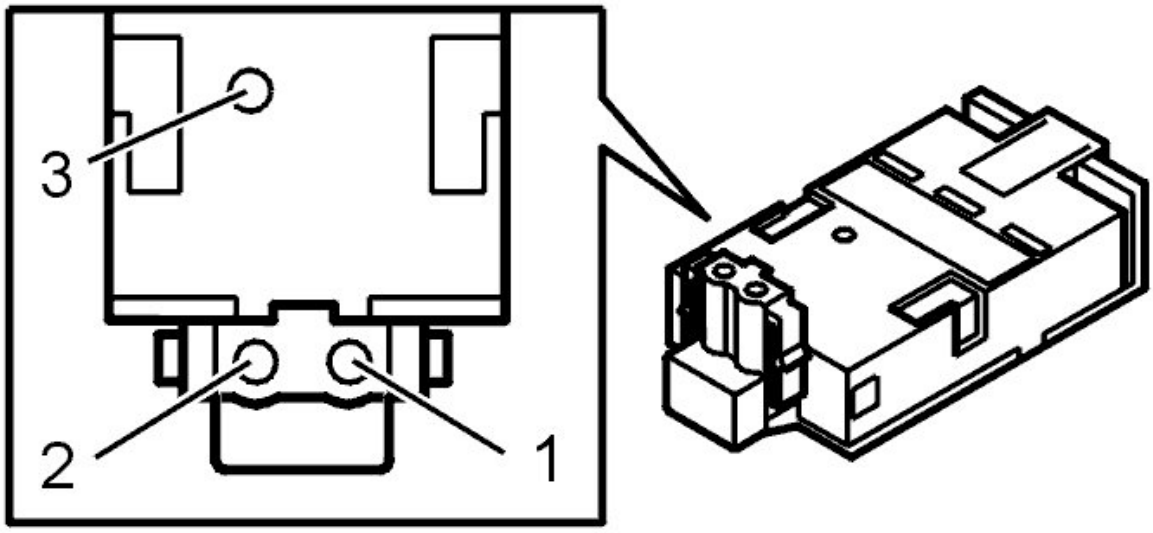
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

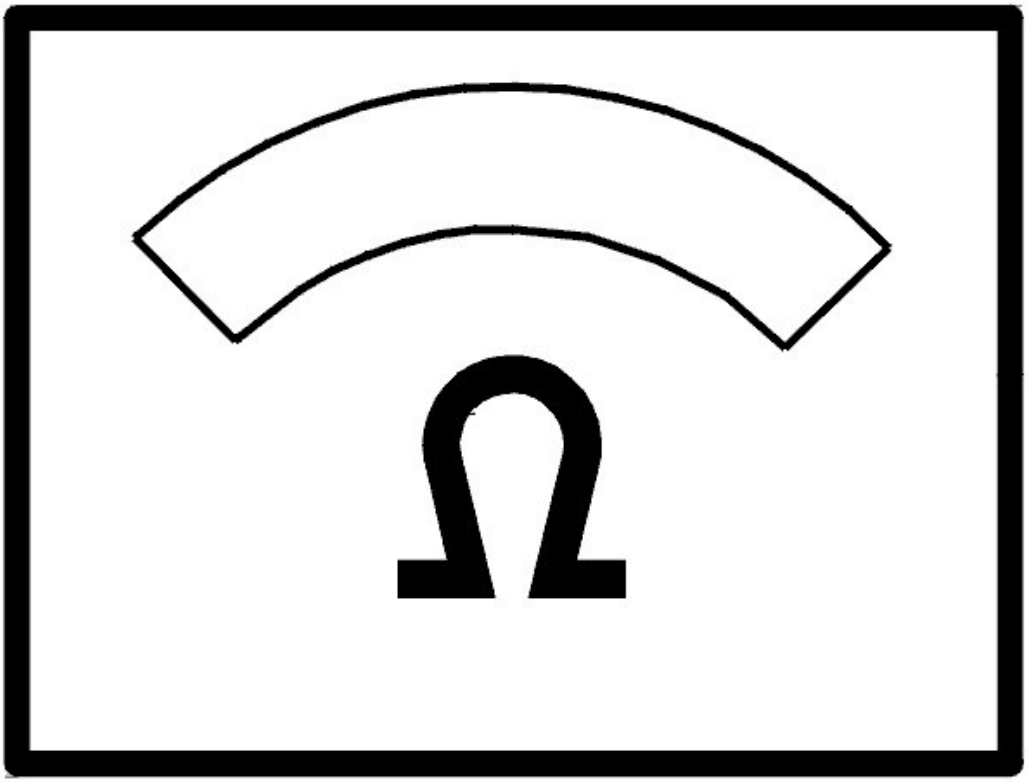
Check the cable between Supplemental Restraint System Module (SRS) terminals #11C(7) and #12C(8) and connector terminals #1 and #3 on the rear right-hand inflatable curtain. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the rear right-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (Supplemental Restraint System Module (SRS) side) and the disconnected battery positive terminal should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

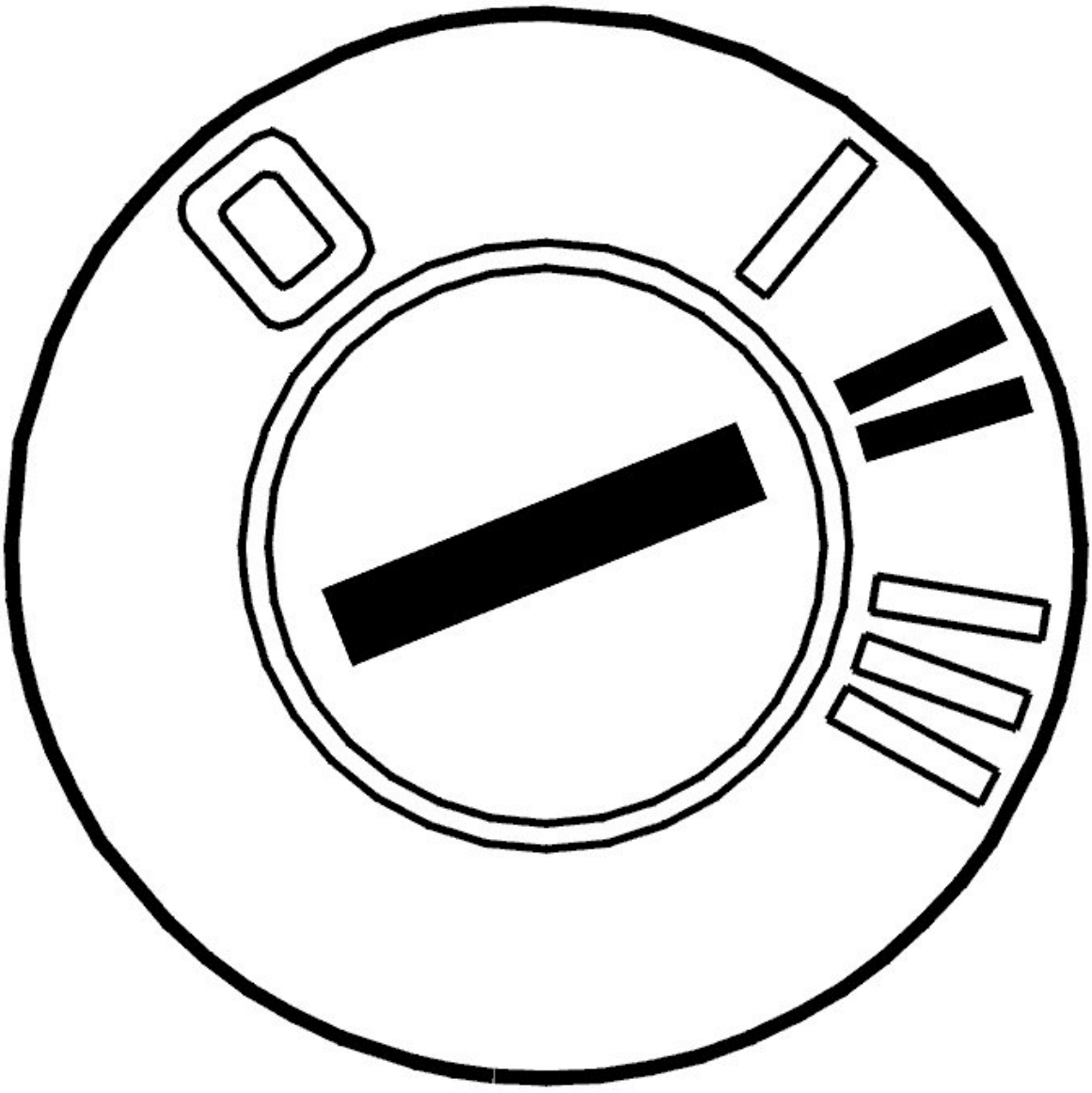
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on

- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

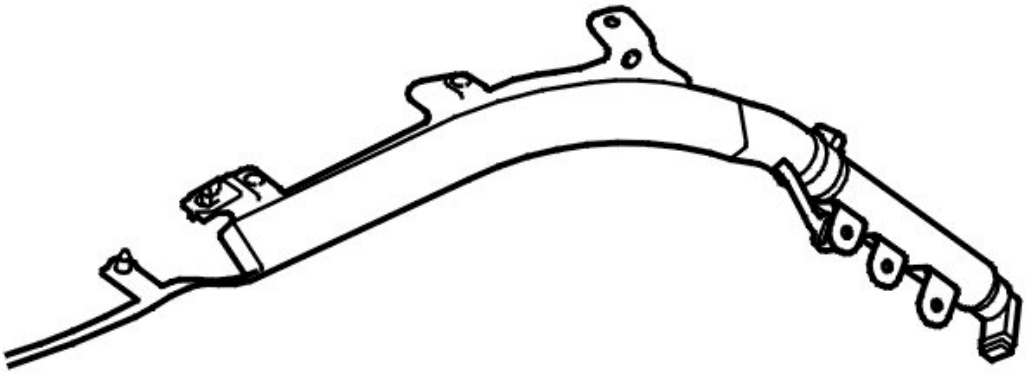
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00A9

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00A9 is stored if the control module registers that the voltage in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00A9 can be diagnosed in ignition positions I, II or III.

Substitute value

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- None.

Possible source

- Short-circuit to ground in the SRS ignition cable or in the connector between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the inflatable curtain.

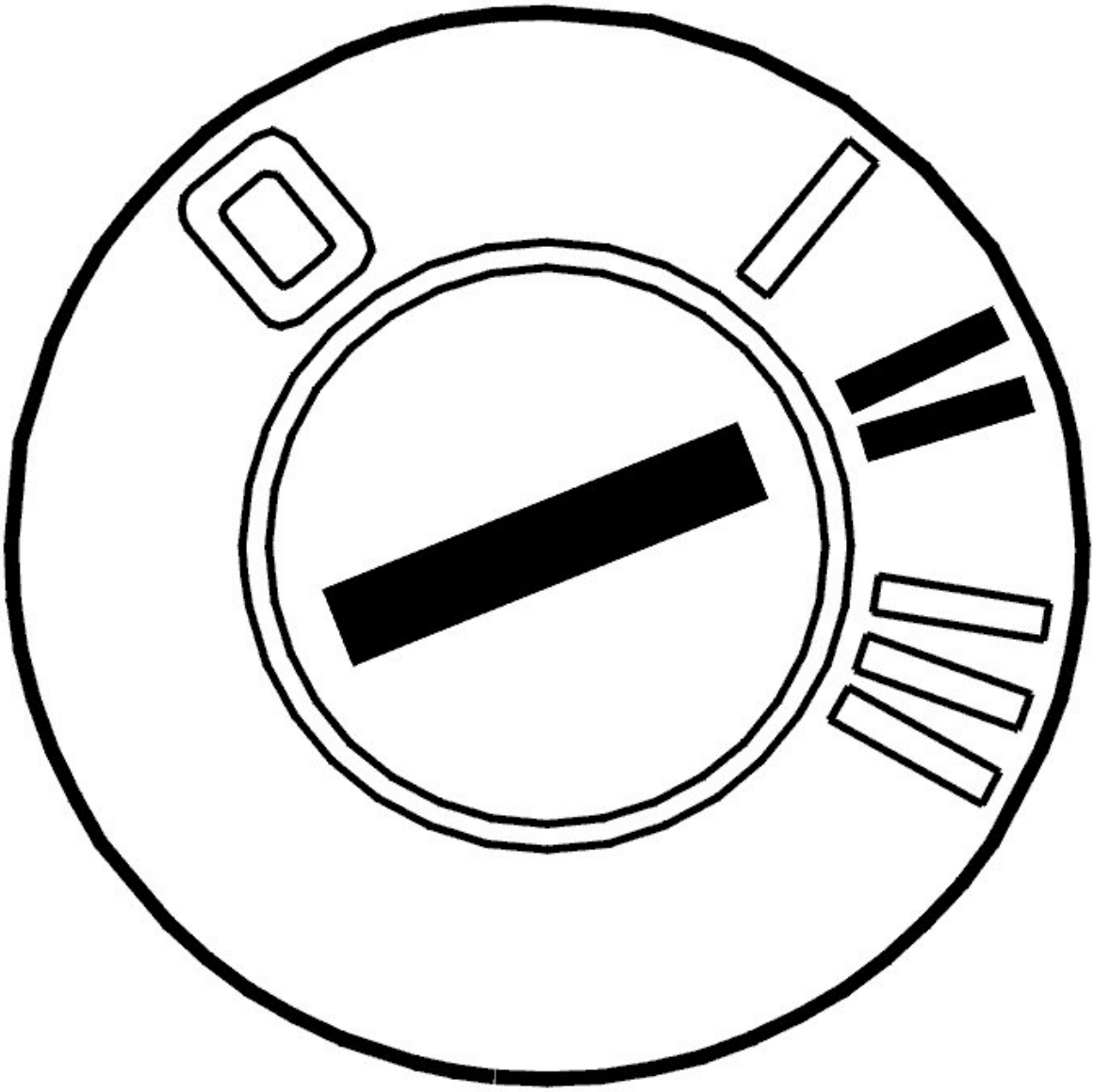
Fault symptom[s]

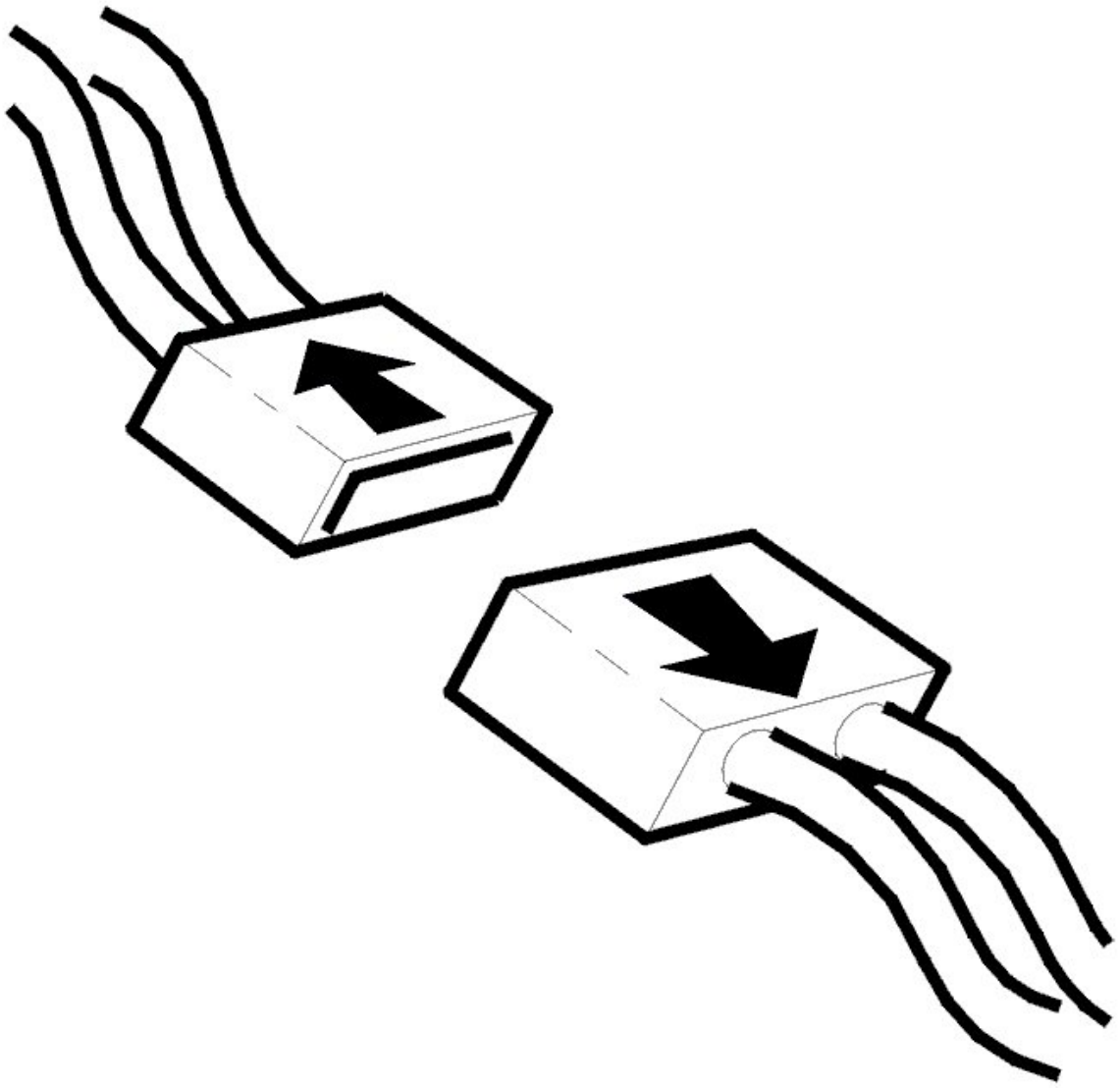
- The SRS indicator lamp is lit.

Signal Too Low

Signal too low

Checking the component





- Ignition off
- Disconnect the connector from the rear right-hand inflatable curtain
- Connect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

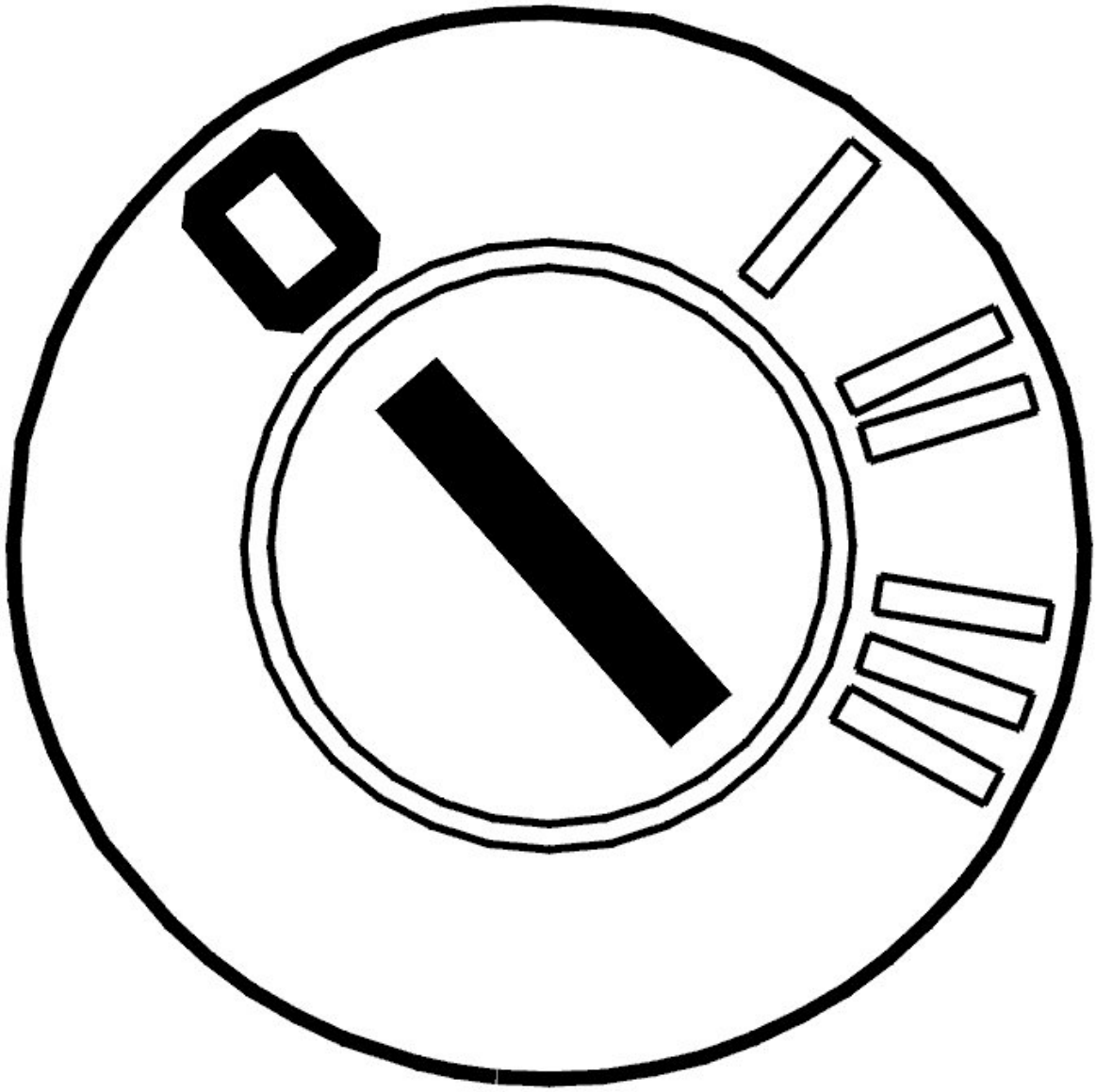
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool 951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

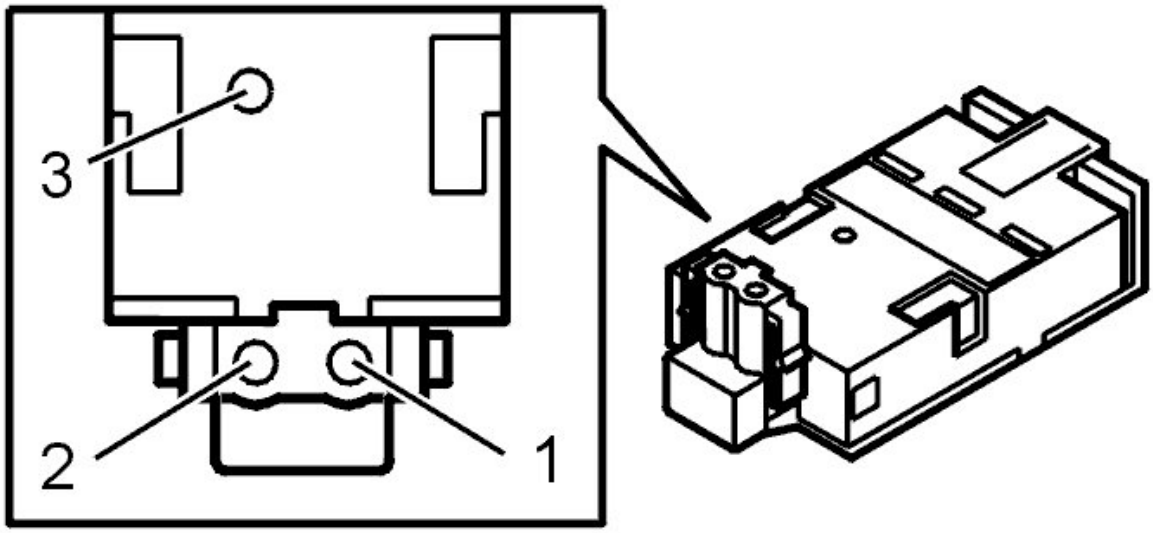
Check the cable between Supplemental Restraint System Module (SRS) terminals #11C(7) and #12C(8) and connector terminals #1 and #3 on the rear right-hand inflatable curtain. Check for a short-circuit to ground.
Remedy as necessary.

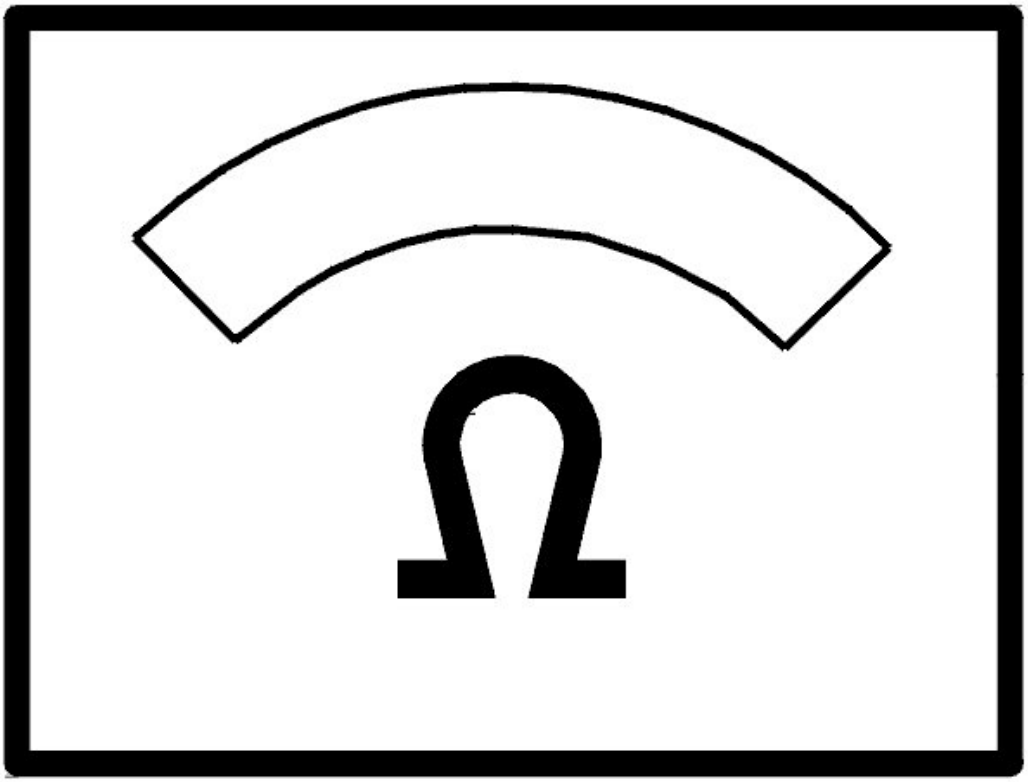
Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the rear right-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between terminals #1 and #3 on the inflatable curtain connector (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about removing the battery cables, see Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

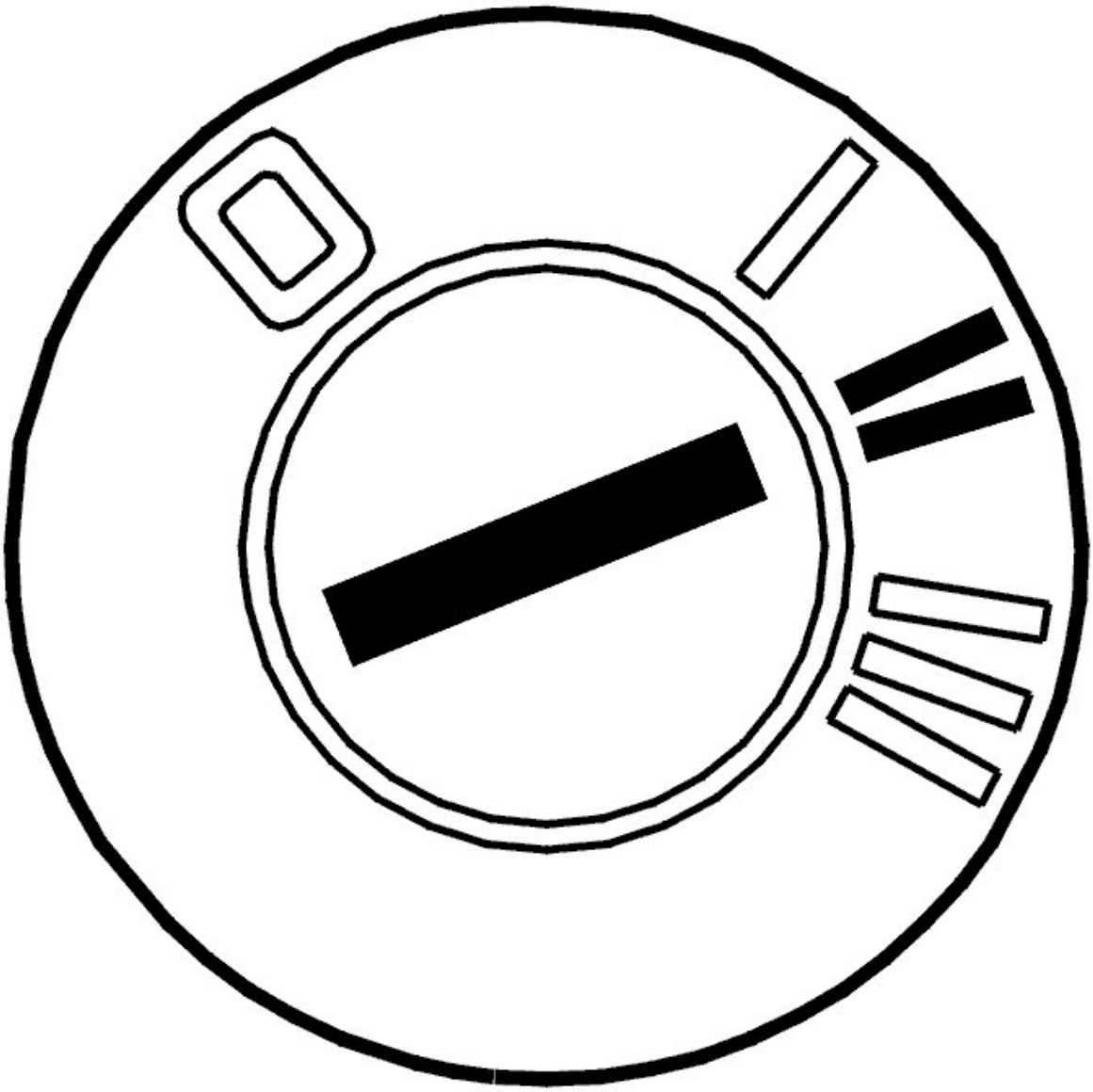
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

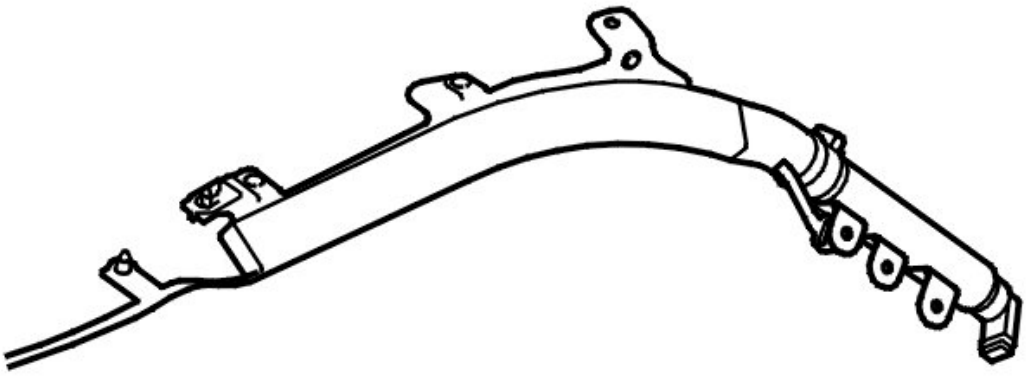
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00AA

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00AA is stored if the control module registers that the capacitance in the signal cable is high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00AA can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

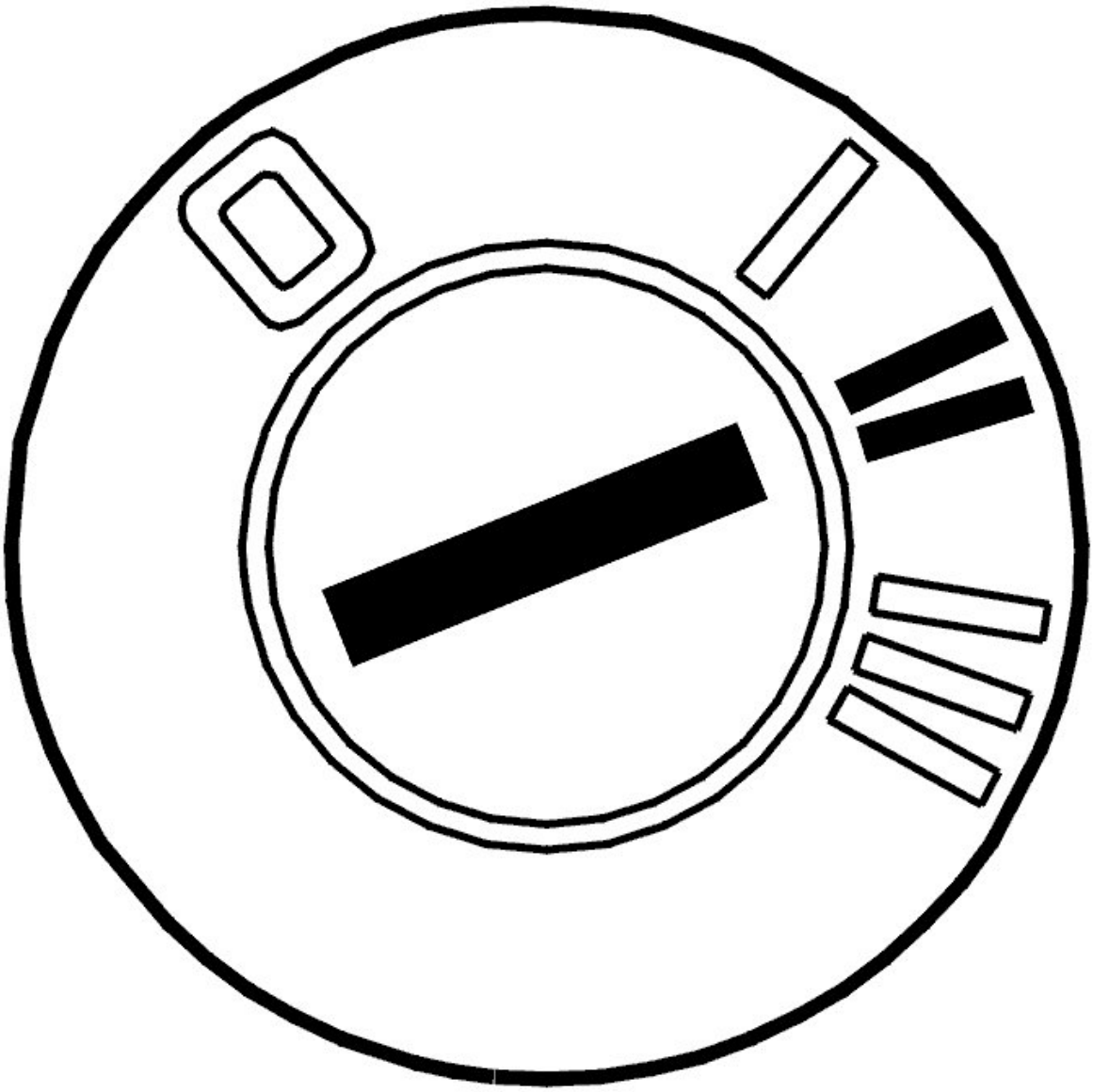
Possible source
- The capacitance is too high or there is a short-circuit in the integrated capacitor in the connector for the SRS ignition cable.

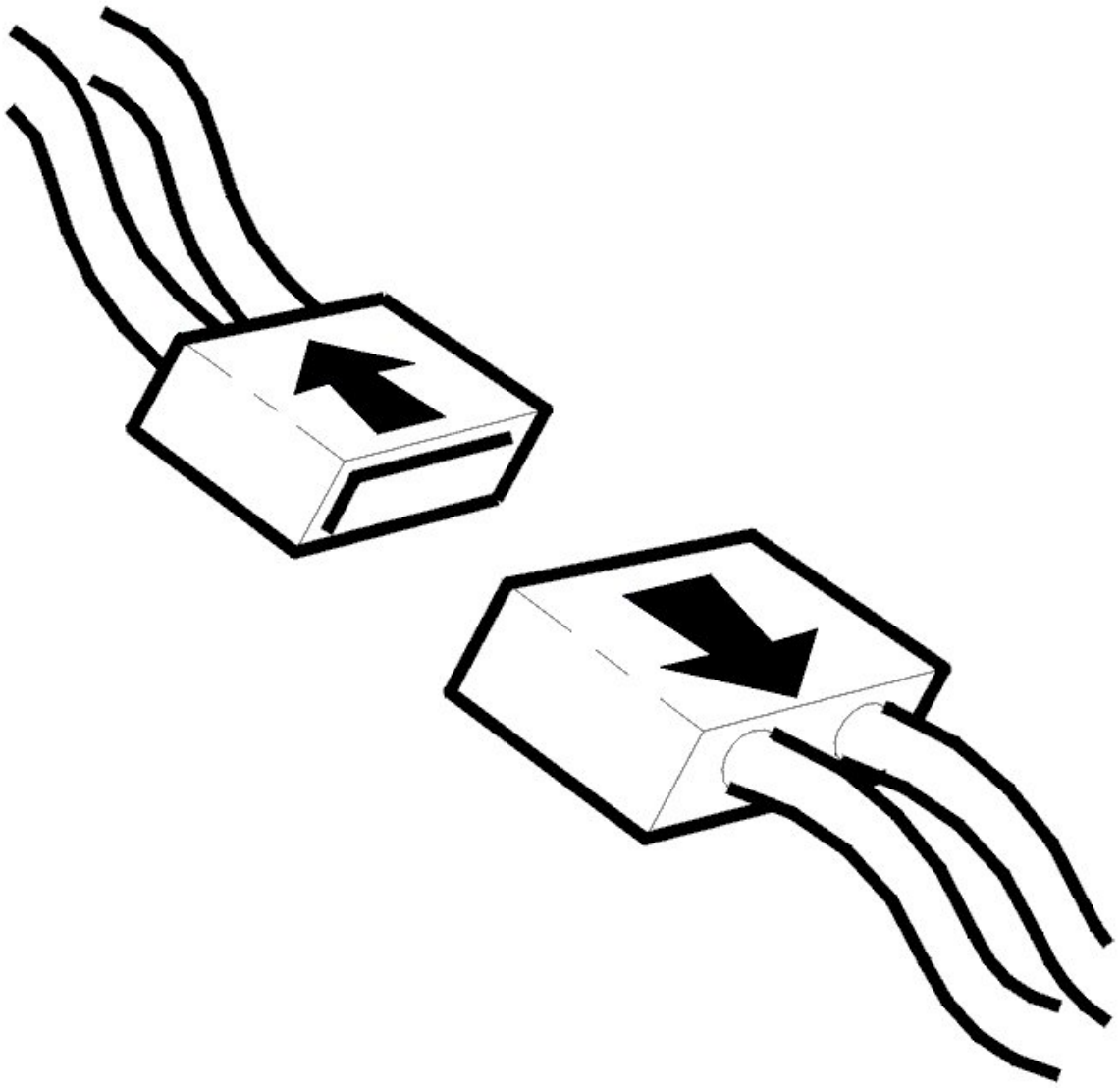
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too High

Capacitance too high

Checking the component





- Ignition off
- Disconnect the connector from the rear right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

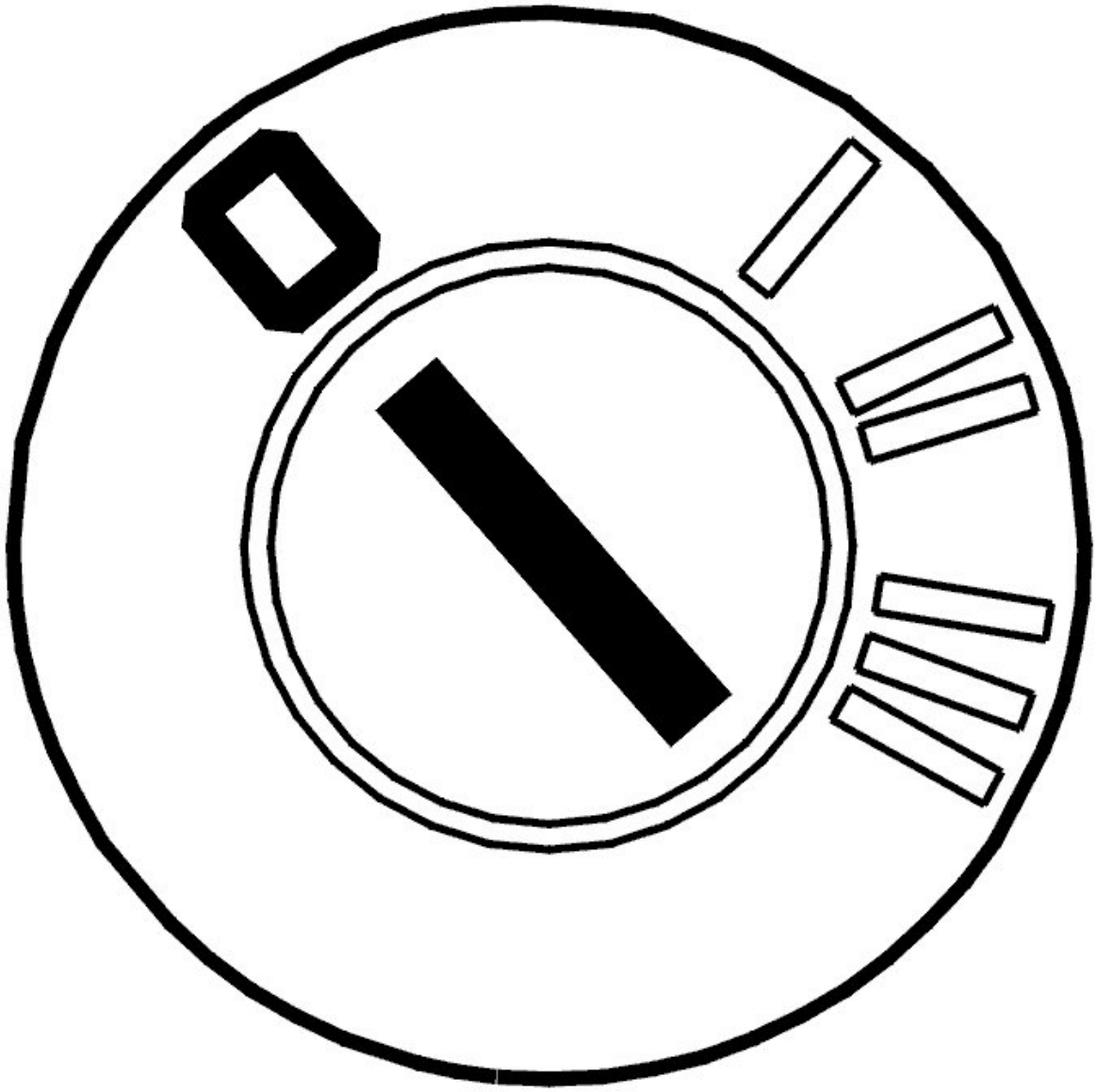
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

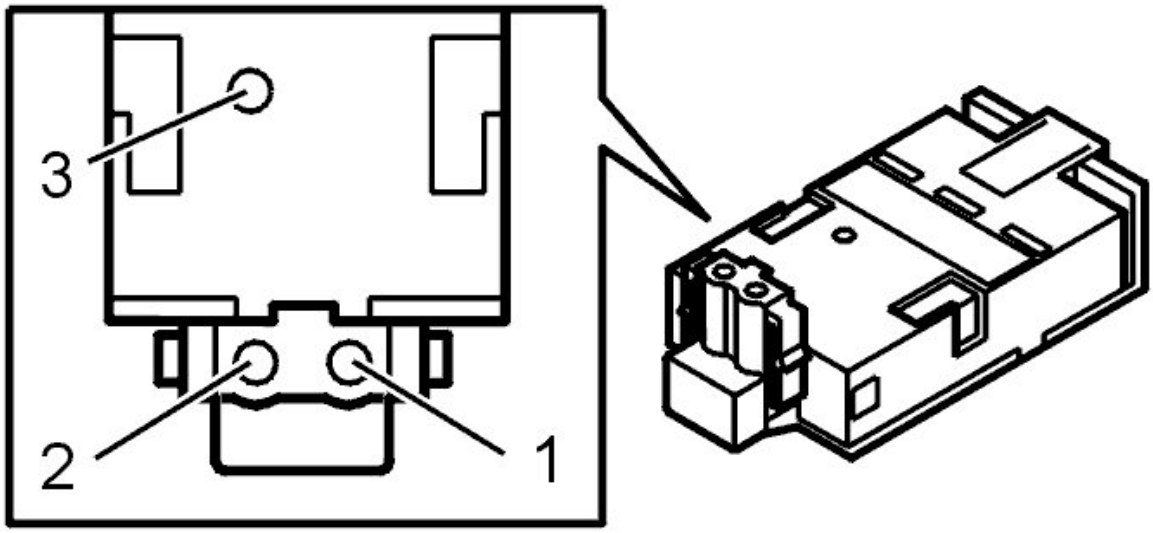
Check the cable between Supplemental Restraint System Module (SRS) terminals #11C(7) and #12C(8) and connector terminals #1 and #3 on the rear right-hand inflatable curtain. Check for a short-circuit to ground.
Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain.
Check the cable between the Supplemental Restraint System Module (SRS) terminals #12C(8) and #11C(7) for resistance between these terminals. The resistance between the terminals should be infinite.
Remedy as necessary.

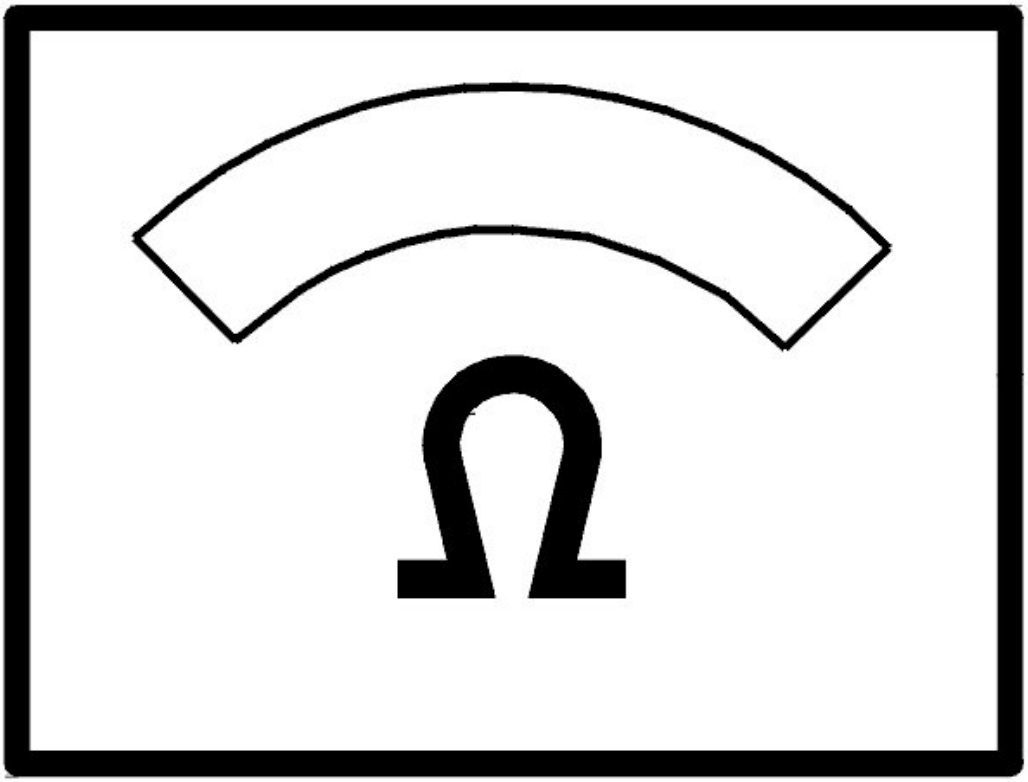
Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and the connectors for the steering column and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between the rear inflatable curtain connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

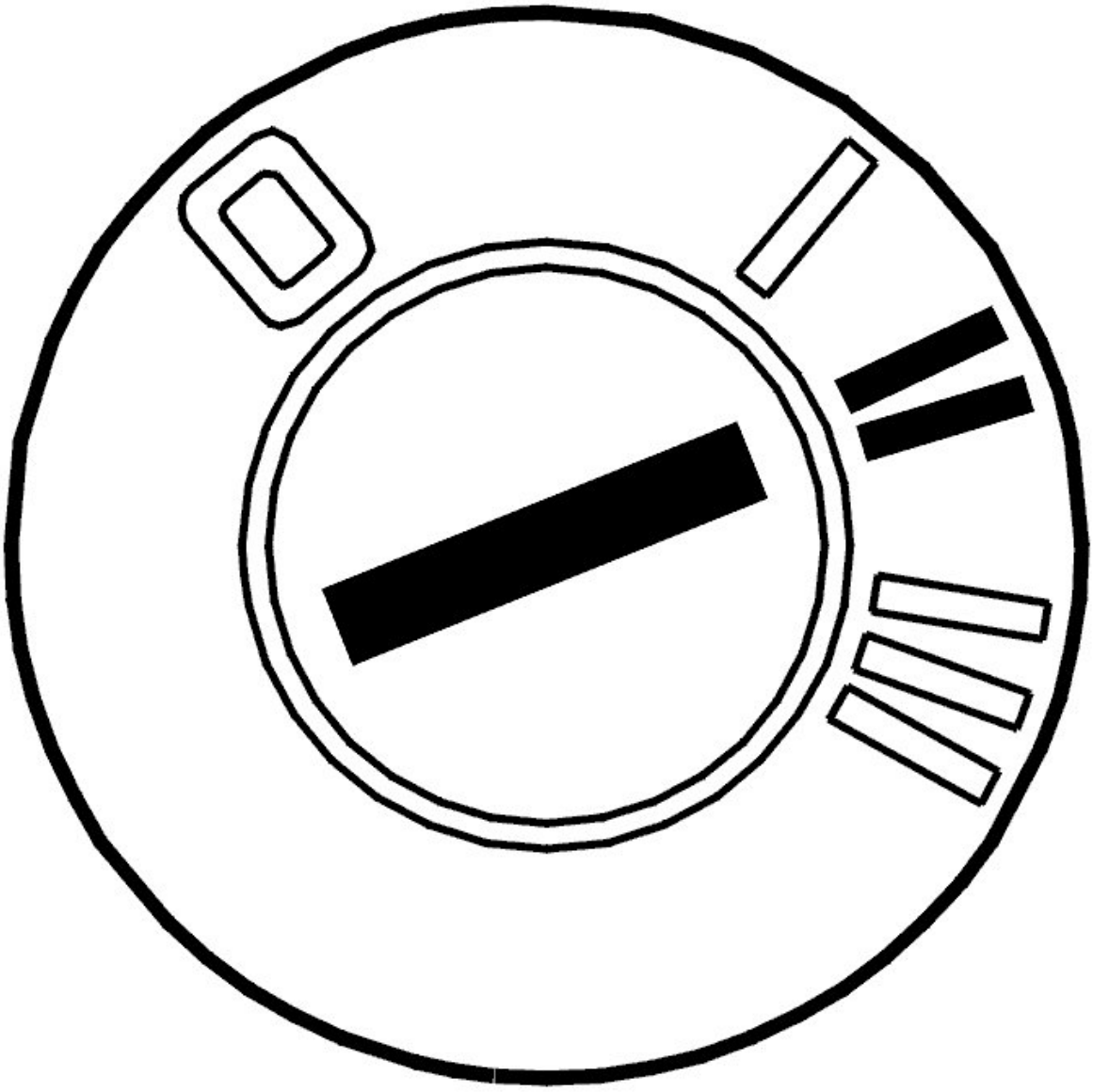
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

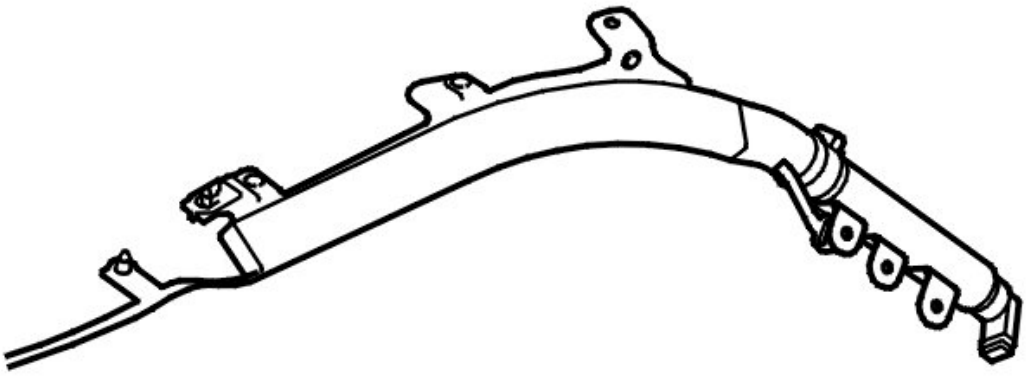
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00AB

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00AB is stored if the control module registers that the capacitance in the signal cable is too low for longer than

10 seconds.
Diagnostic trouble code (DTC) SRS-00AB can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

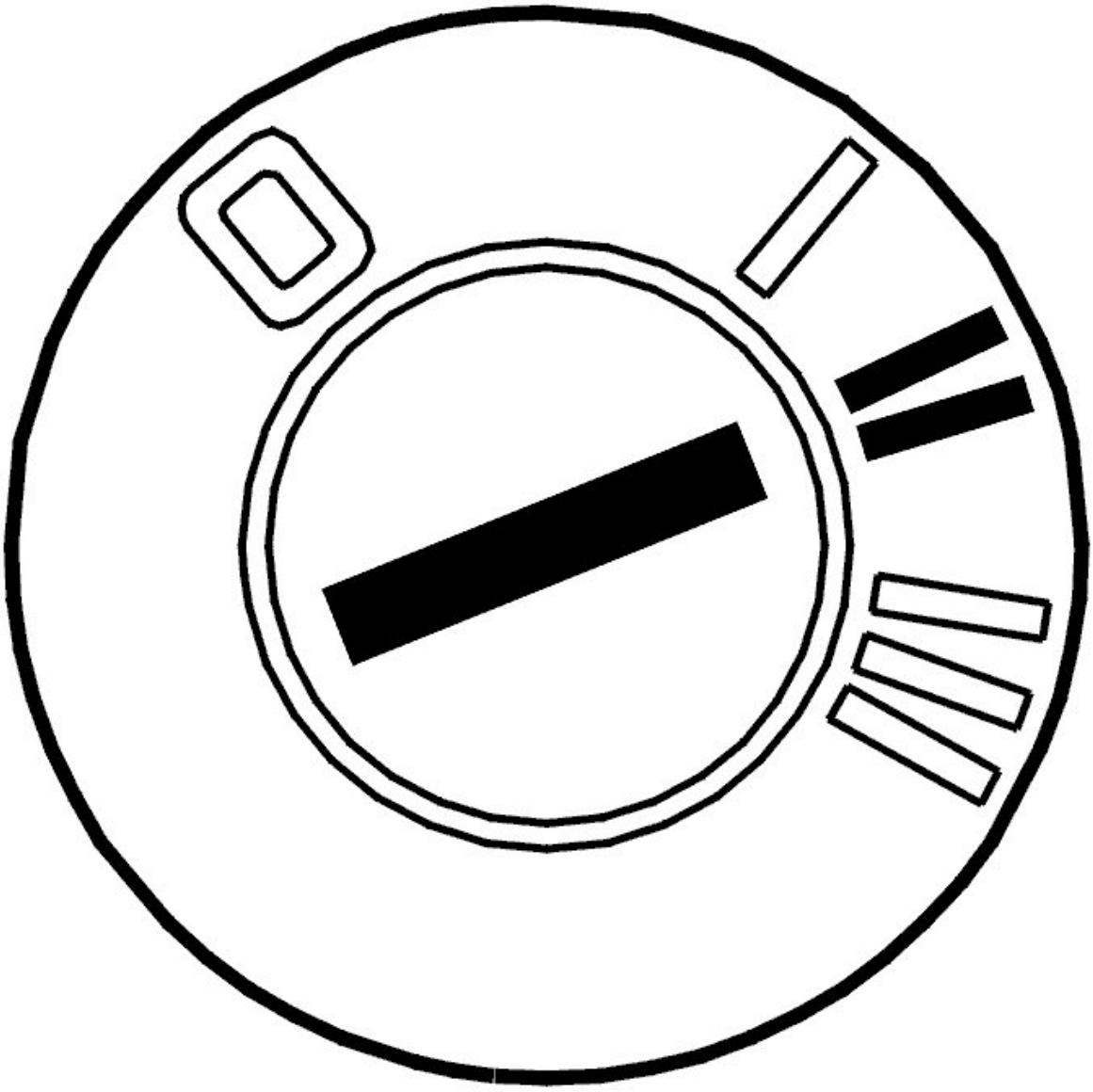
Possible source
- The capacitance is too low in the integrated capacitor in the connector for the SRS ignition cable.

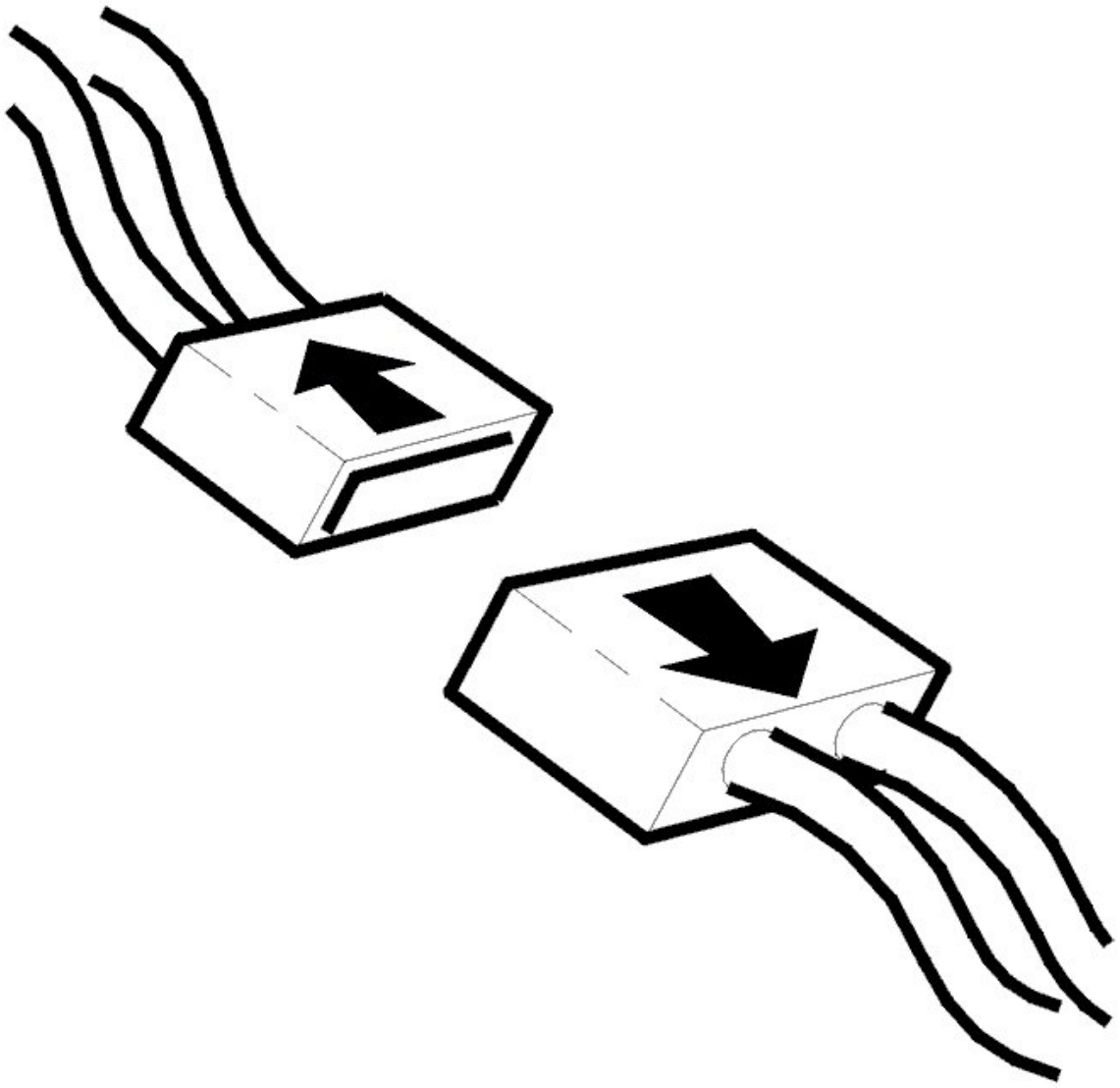
Fault symptom[s]
- The SRS indicator lamp is lit.

Capacitance Too Low

Capacitance too low

Checking the cable





Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical seat belt tensioner. This could deploy the inflatable curtain!

The probable cause of this fault is that the terminal nearest the rear right inflatable curtain is defective. Try replacing the wiring for the inflatable curtain.
Remedy as necessary

Other information:

- To access and replace the inflatable curtain, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT-TRACING FAILED - No Fault Found

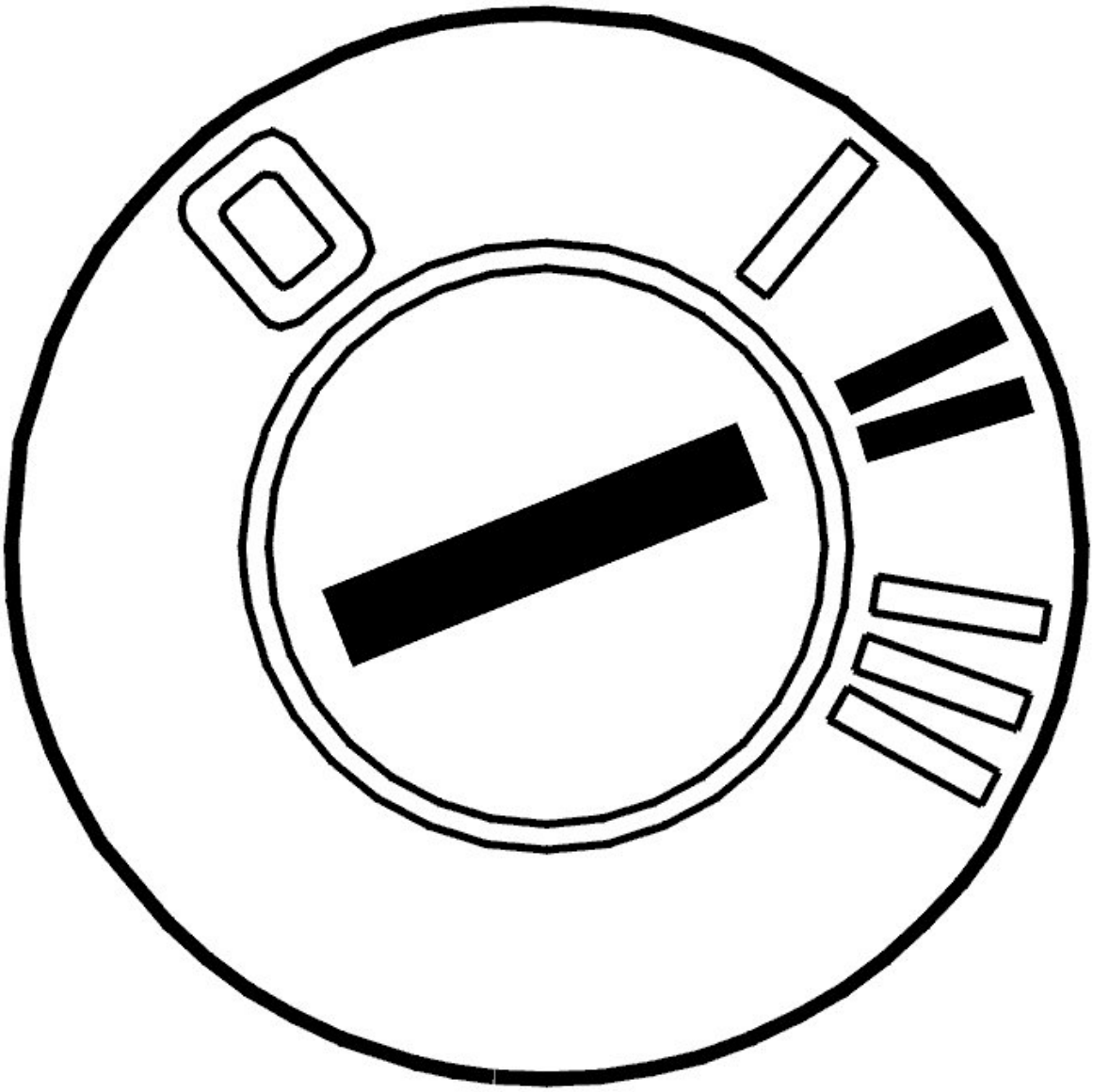
Attempt New Test - Checking the cable

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

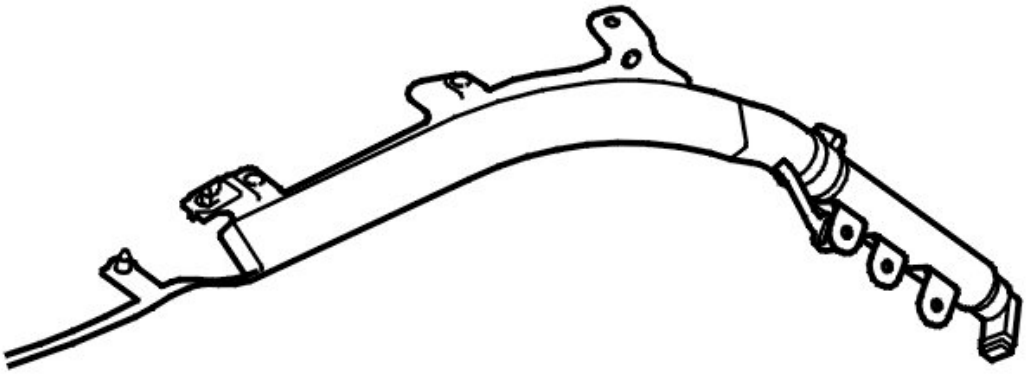
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00AC

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00AC is stored if the control module registers that the resistance in the signal cable is too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00AC can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Contact resistance or an open-circuit in the signal cable between the inflatable curtain and the Supplemental Restraint System Module (SRS)
- Open-circuit in the inflatable curtain (resistance too high in igniter).

Fault symptom[s]

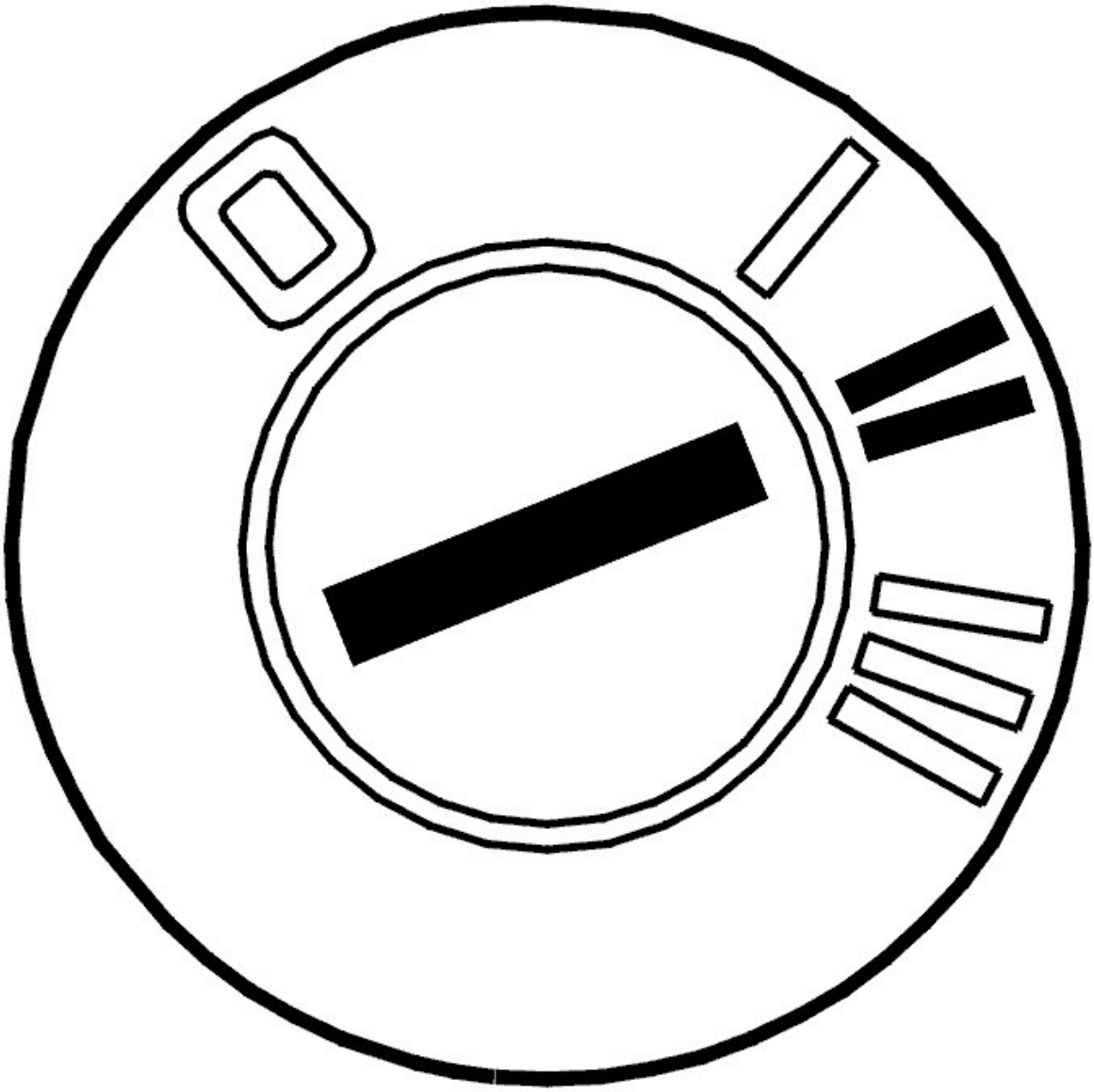
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

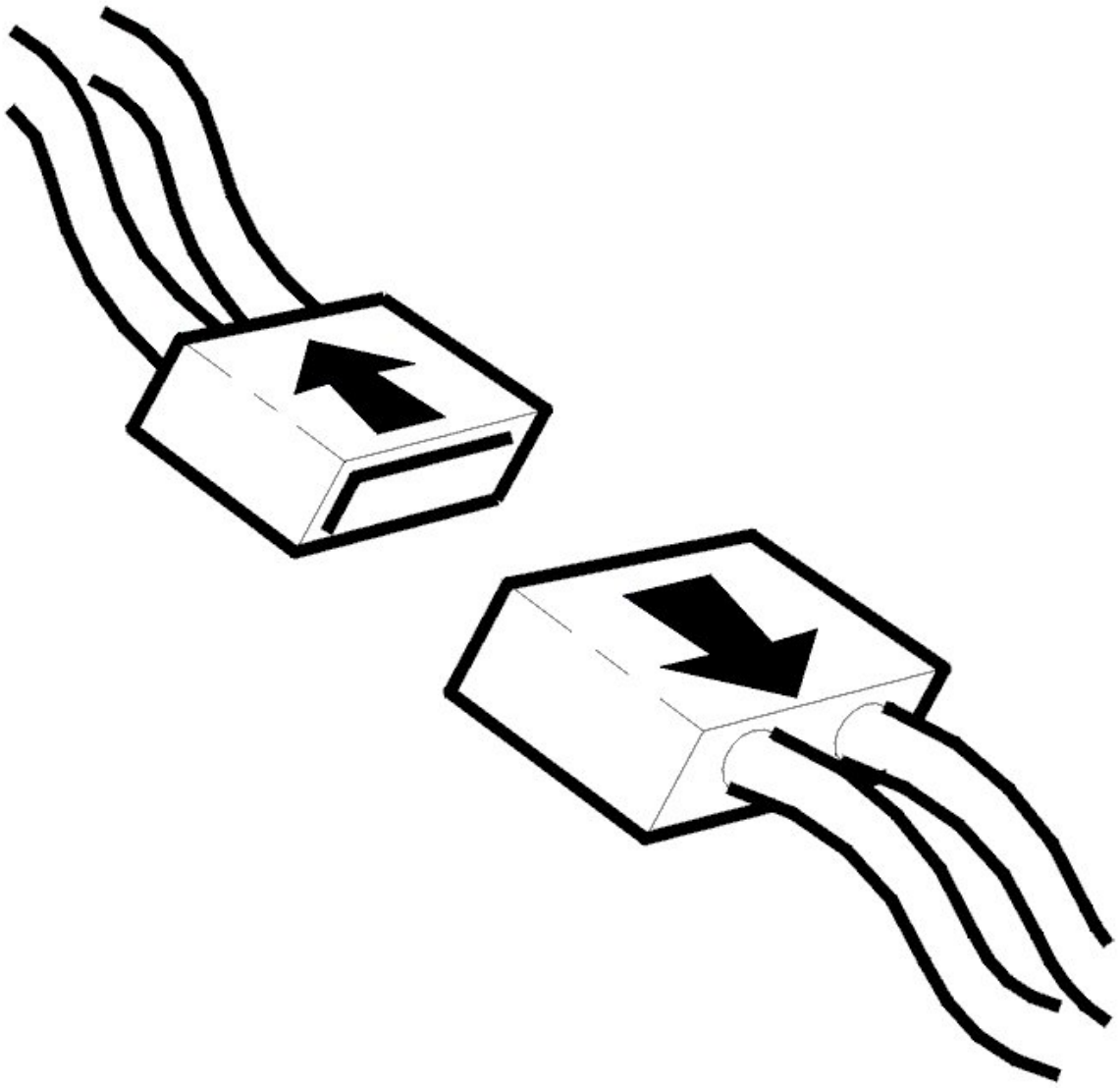
- The SRS indicator lamp is lit.

Resistance Too High

Resistance too high

Checking the component





- Ignition off
- Disconnect the connector from the rear right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

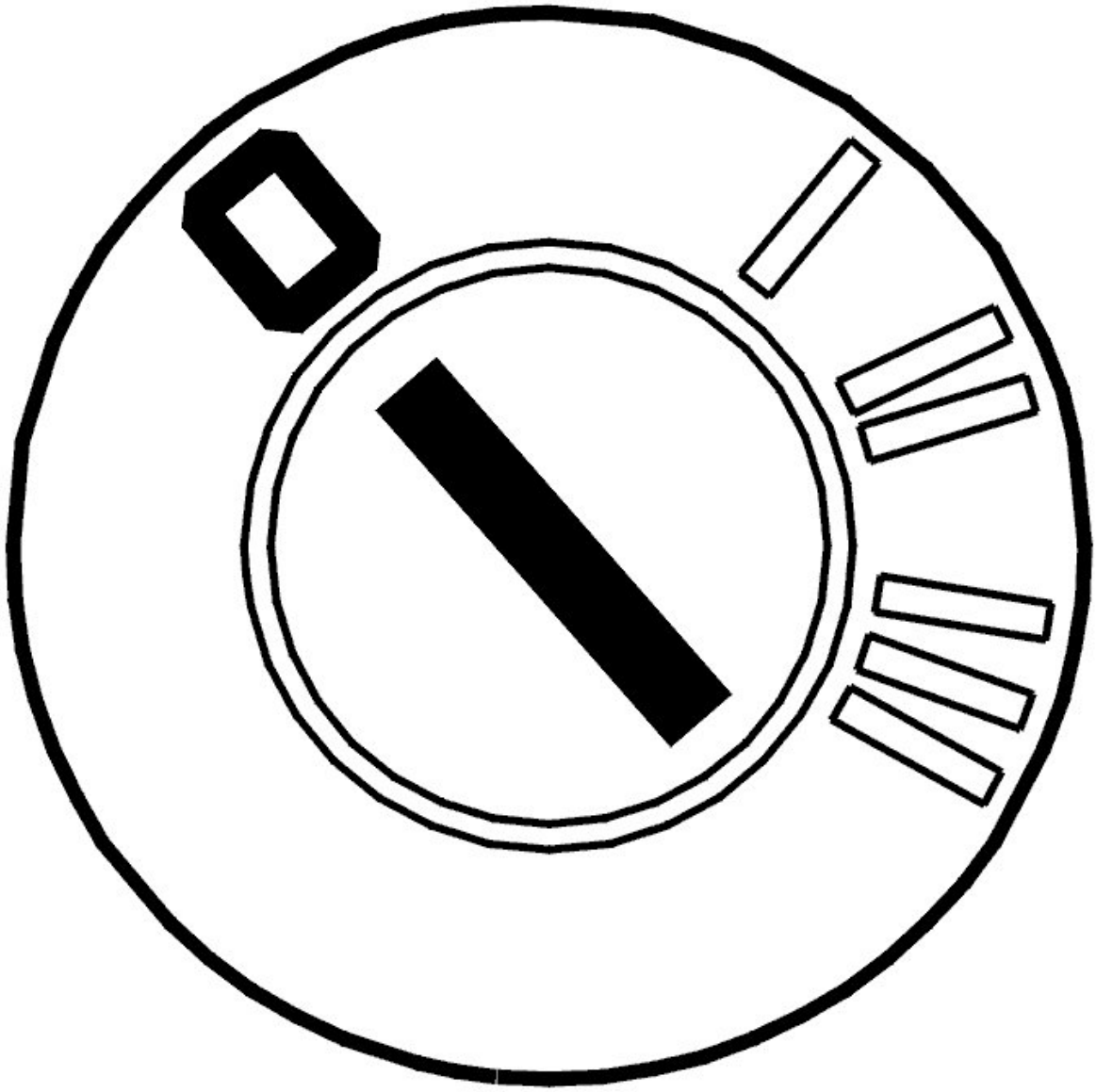
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

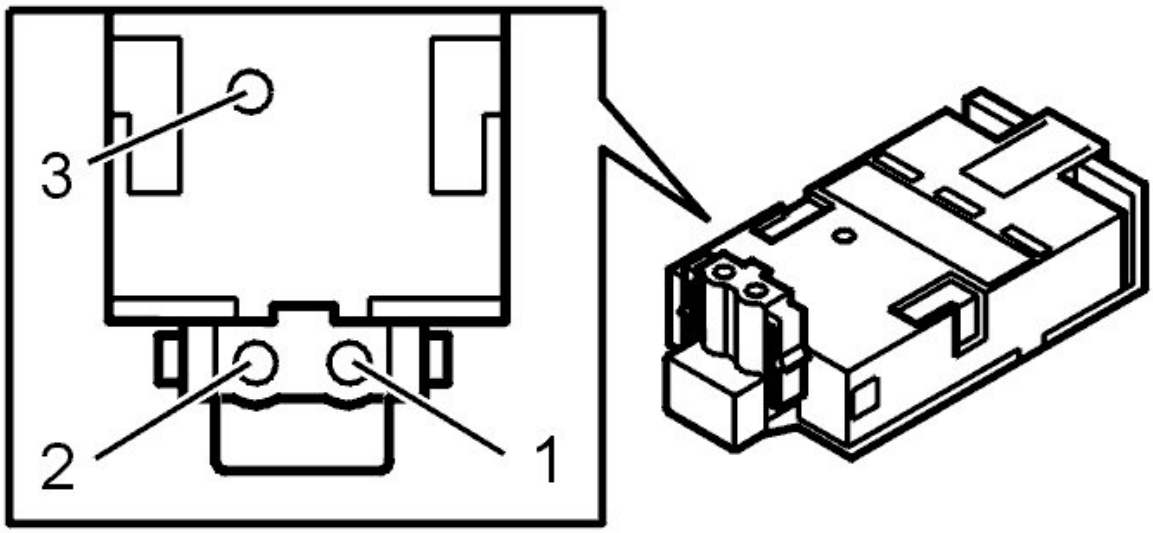
Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

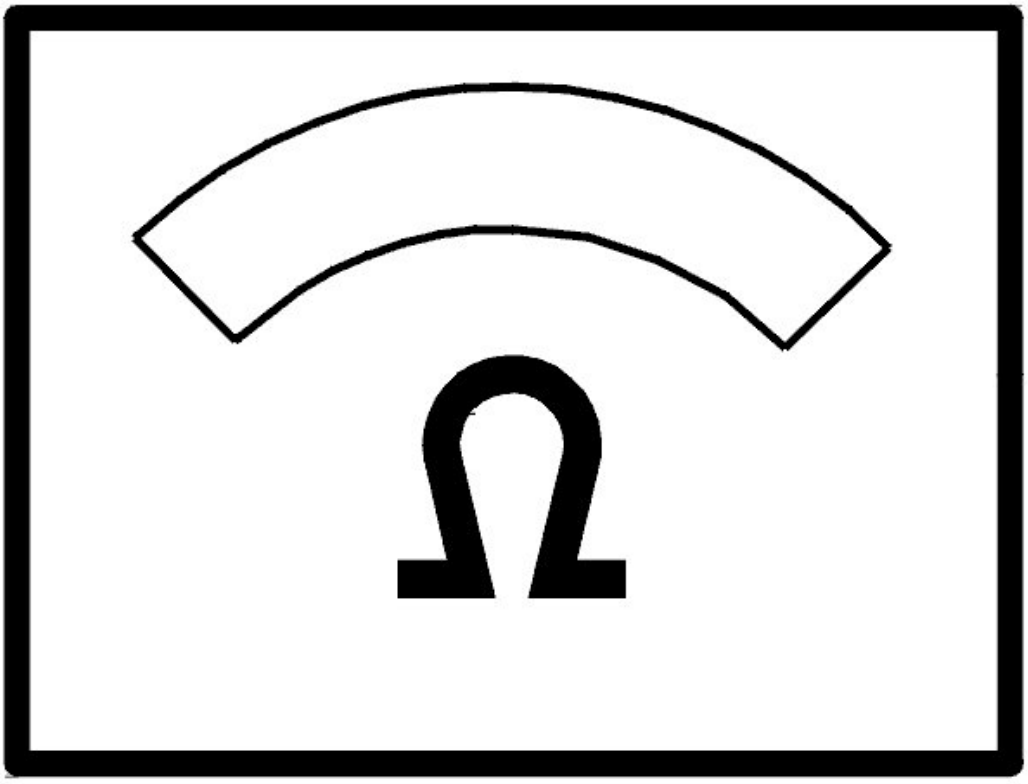
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the inflatable curtain. The cable terminals must not be damaged or pressed back
Check the cable between the Supplemental Restraint System Module (SRS) terminals #11C(7), #12C(8) and connector terminals #1, #3 on the rear right-hand inflatable curtain. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

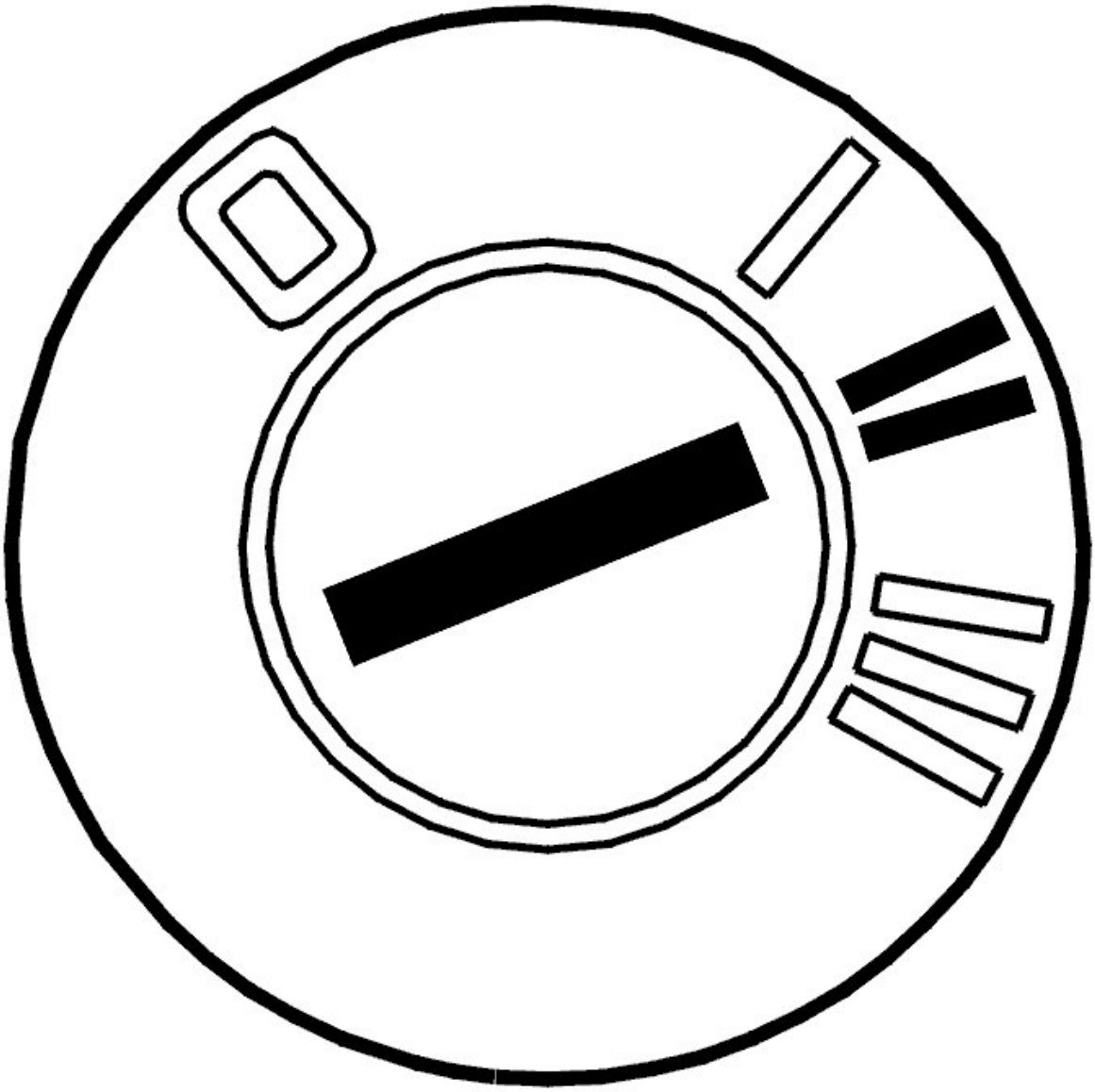
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

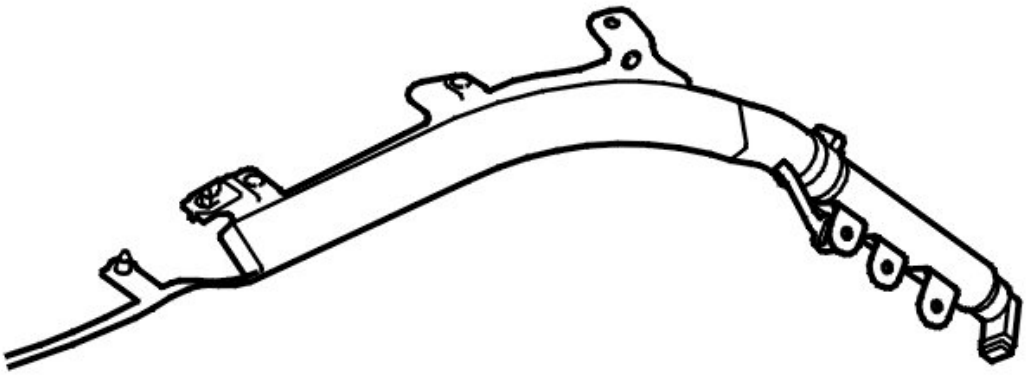
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00AD

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the inflatable curtain.
Diagnostic trouble code (DTC) SRS-00AD is stored if the control module registers that the resistance in the signal cable is too low for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-00AD can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit in SRS ignition cable or in the connectors between the inflatable curtain and control module
- Short-circuit in the inflatable curtain (resistance too low in igniter).

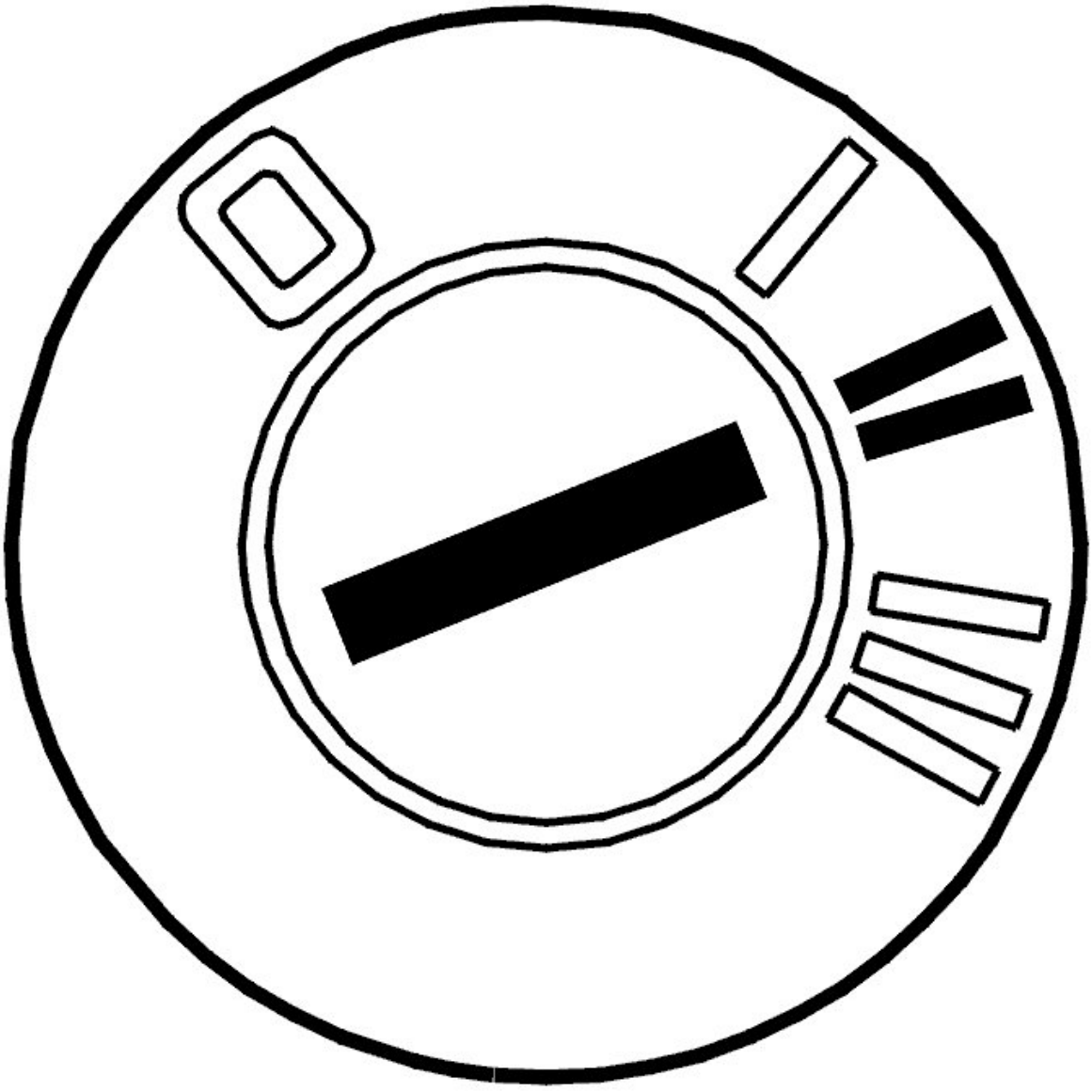
Fault symptom[s]

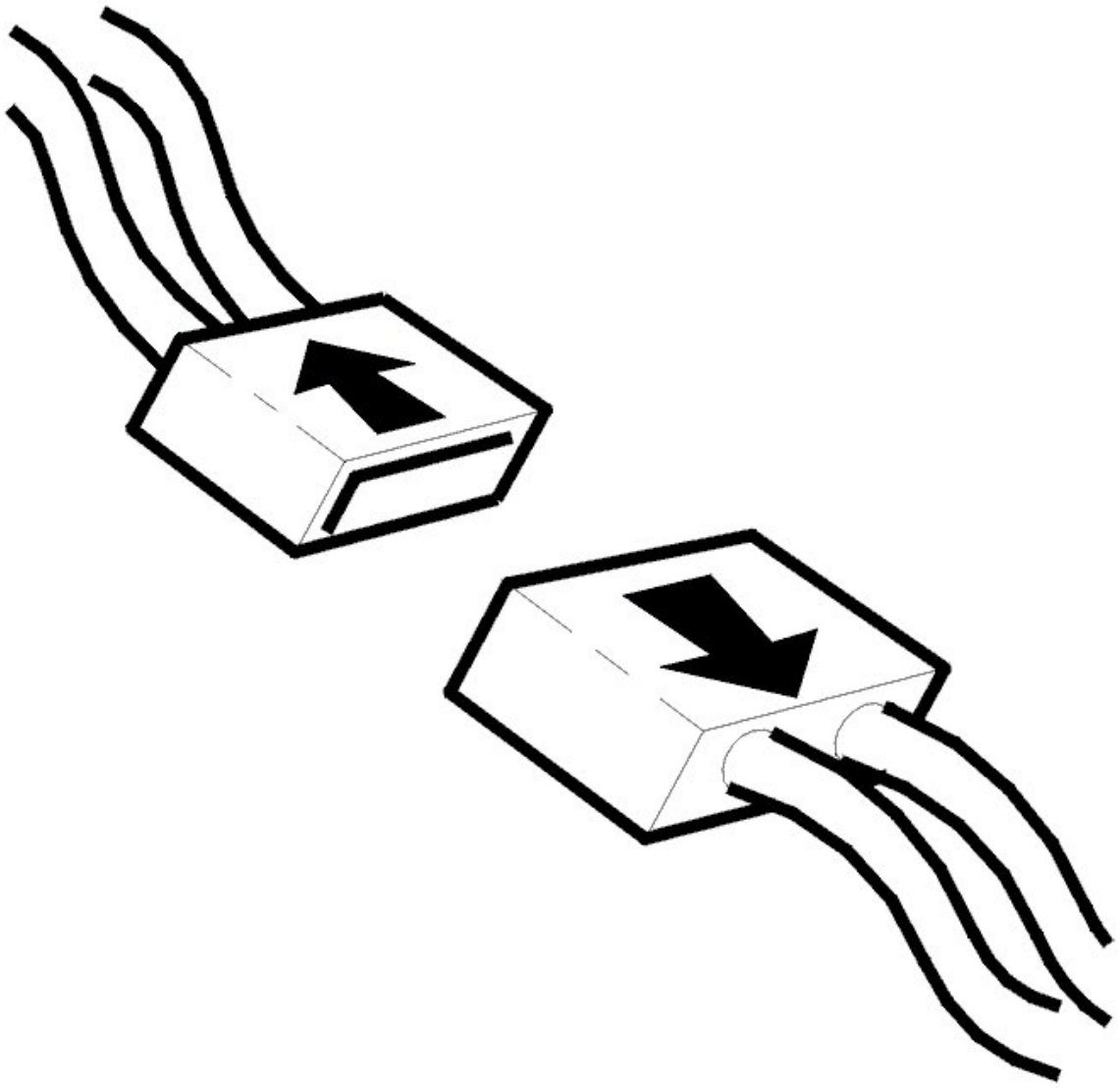
- The SRS indicator lamp is lit.

Resistance Too Low

Resistance too low

Checking the component





- Ignition off
- Disconnect the connector from the rear right-hand inflatable curtain
- Connect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy to the connector for the inflatable curtain

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Note! The special tool must be checked and fault-free. If the tool is defective, the diagnosis readings will be incorrect. This will make fault-tracing harder.

- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
Try a new inflatable curtain if the diagnostic trouble code (DTC) changes status from a permanent to an intermittent fault.

Other information:

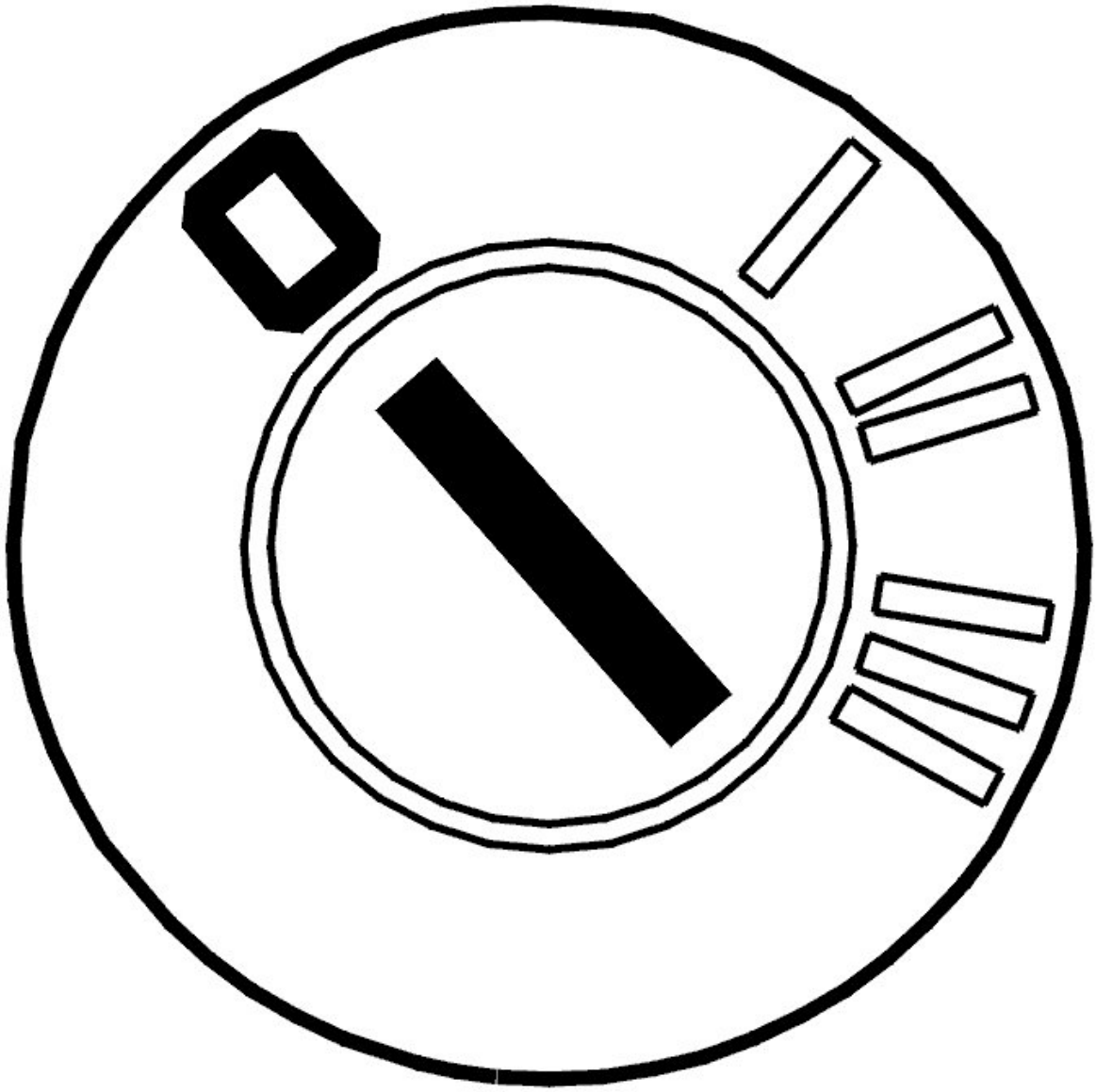
- To access and replace the inflatable curtain, see
- To check the special tool, see Calibration See: Restraint Systems/Service and Repair/Calibrating the Special Tool.

Does the status of the diagnostic trouble code (DTC) change?

Yes - Verification

No - Checking components and wiring

Checking components and wiring



- Ignition off
- Disconnect special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy from the connector for the inflatable curtain.

Warning! Under no circumstances use an ohmmeter or other live measuring instruments to take readings on a disconnected non-deployed pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

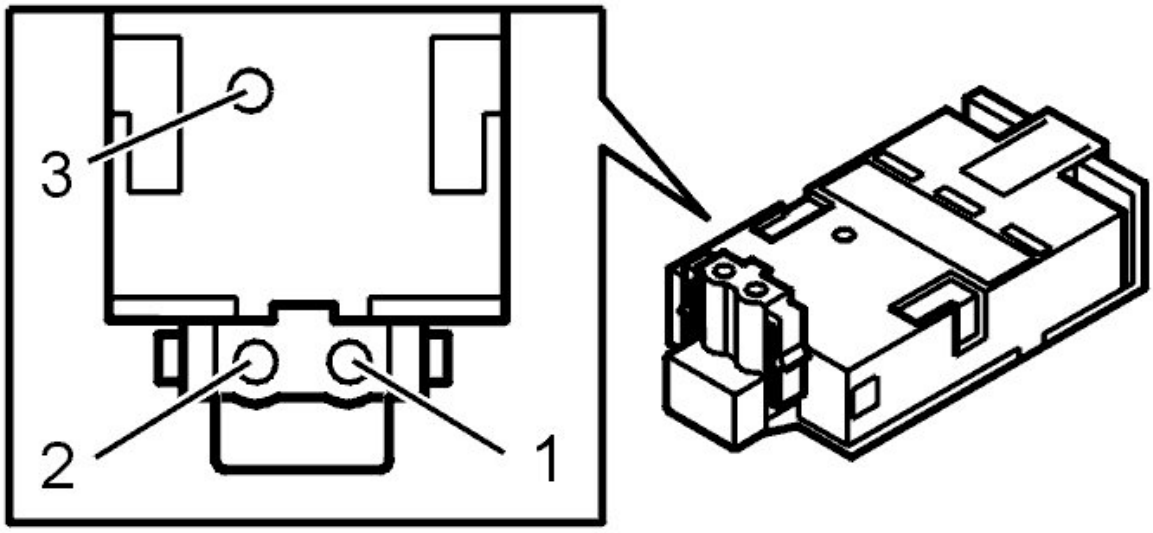
Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

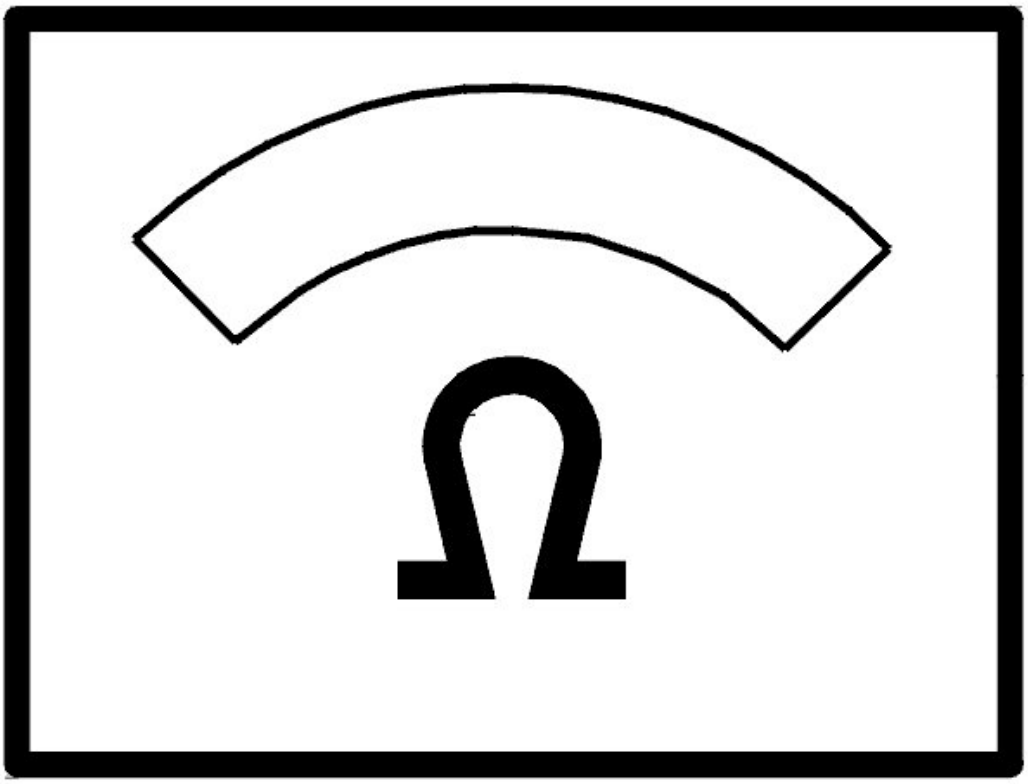
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the inflatable curtain. The cable terminals must not be damaged or pressed back.
Check the cable between Supplemental Restraint System Module (SRS) terminals #11C(7) and #12C(8) and connector terminals #1 and #3 on the rear right-hand inflatable curtain. Check for a short-circuit to ground.
Check the cable between the Supplemental Restraint System Module (SRS) terminals #12C(8) and #11C(7) for resistance between these terminals. The resistance between the terminals should be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To access or replace the inflatable curtain connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- With the ignition off and with the rear right-hand inflatable curtain connector and special tool951 1506 Test dummy See: Tools and Equipment/951 1506 Test Dummy connected, the resistance between terminals #11C (7) and #12C(8) on the Supplemental Restraint System Module (SRS) connector should be more than 1 Mohms.

- With the ignition off and the connectors for the rear right-hand inflatable curtain and for the Supplemental Restraint System Module (SRS) disconnected, the resistance between the rear inflatable curtain connector terminals #1 and #3 (Supplemental Restraint System Module (SRS) side) and ground should be infinite
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

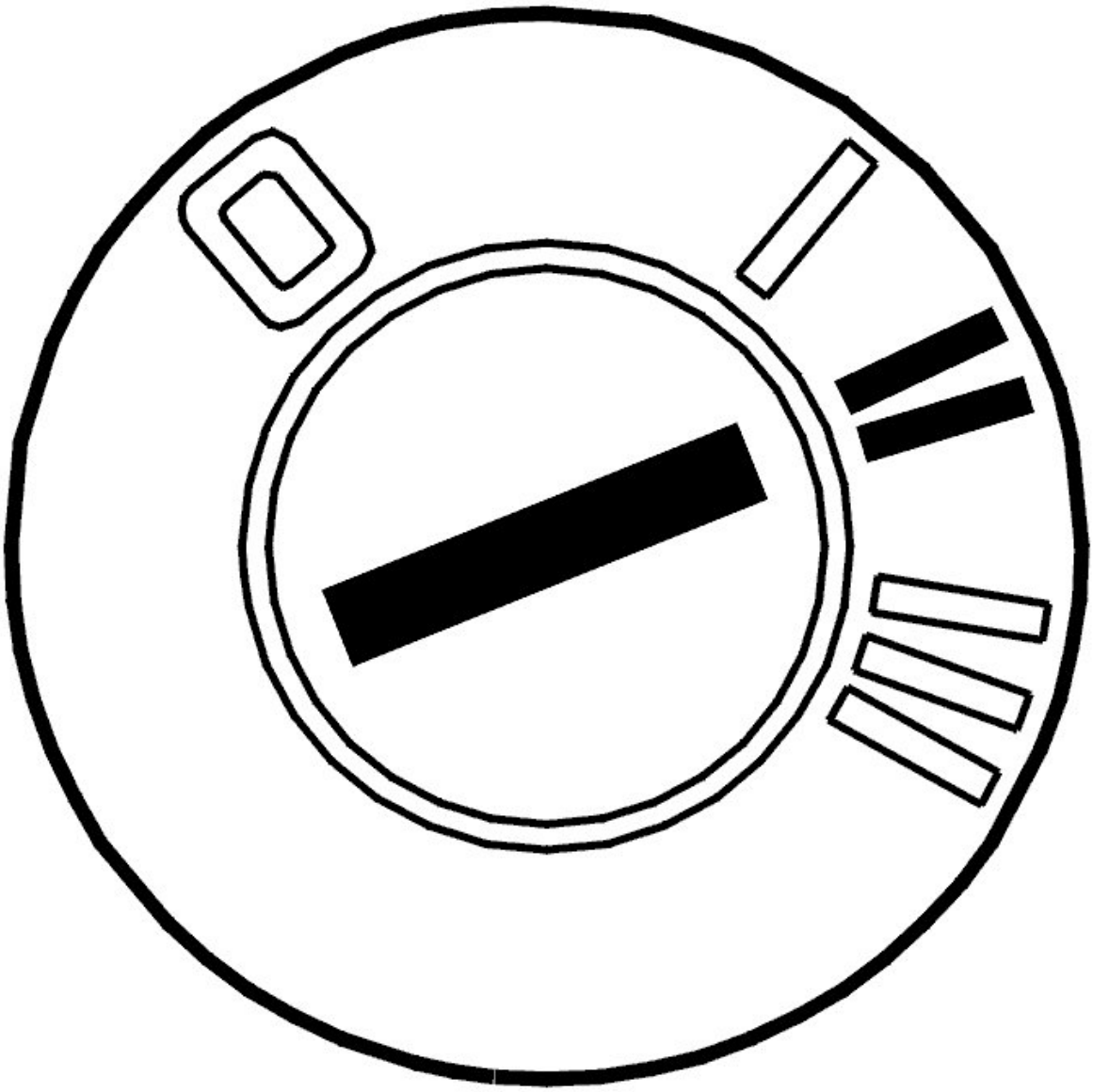
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

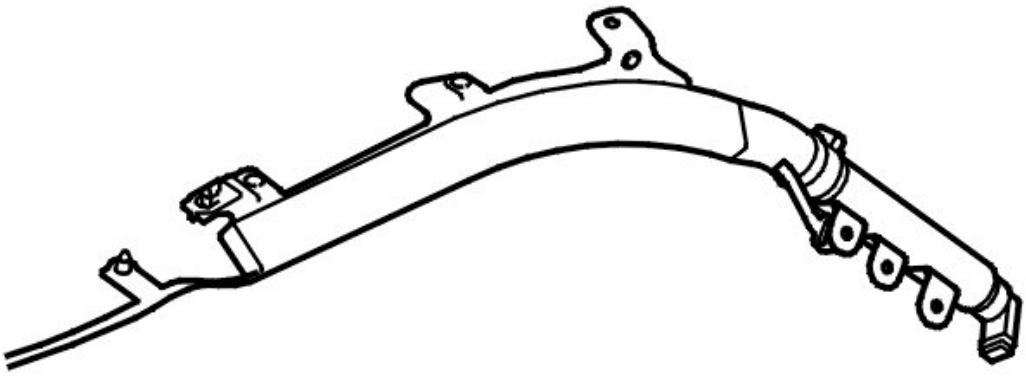
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00AE

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the seat belt tensioner.
One of the following diagnostic trouble codes (DTCs) will be stored if the resistance in any of the wiring circuits is lower than 10 ohms for longer than 10 seconds:
SRS-00A6
SRS-00AE
depending on which wiring circuit the fault is in.
Diagnostic trouble codes (DTCs):
SRS-00A6
SRS-00AE
can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble codes (DTCs) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

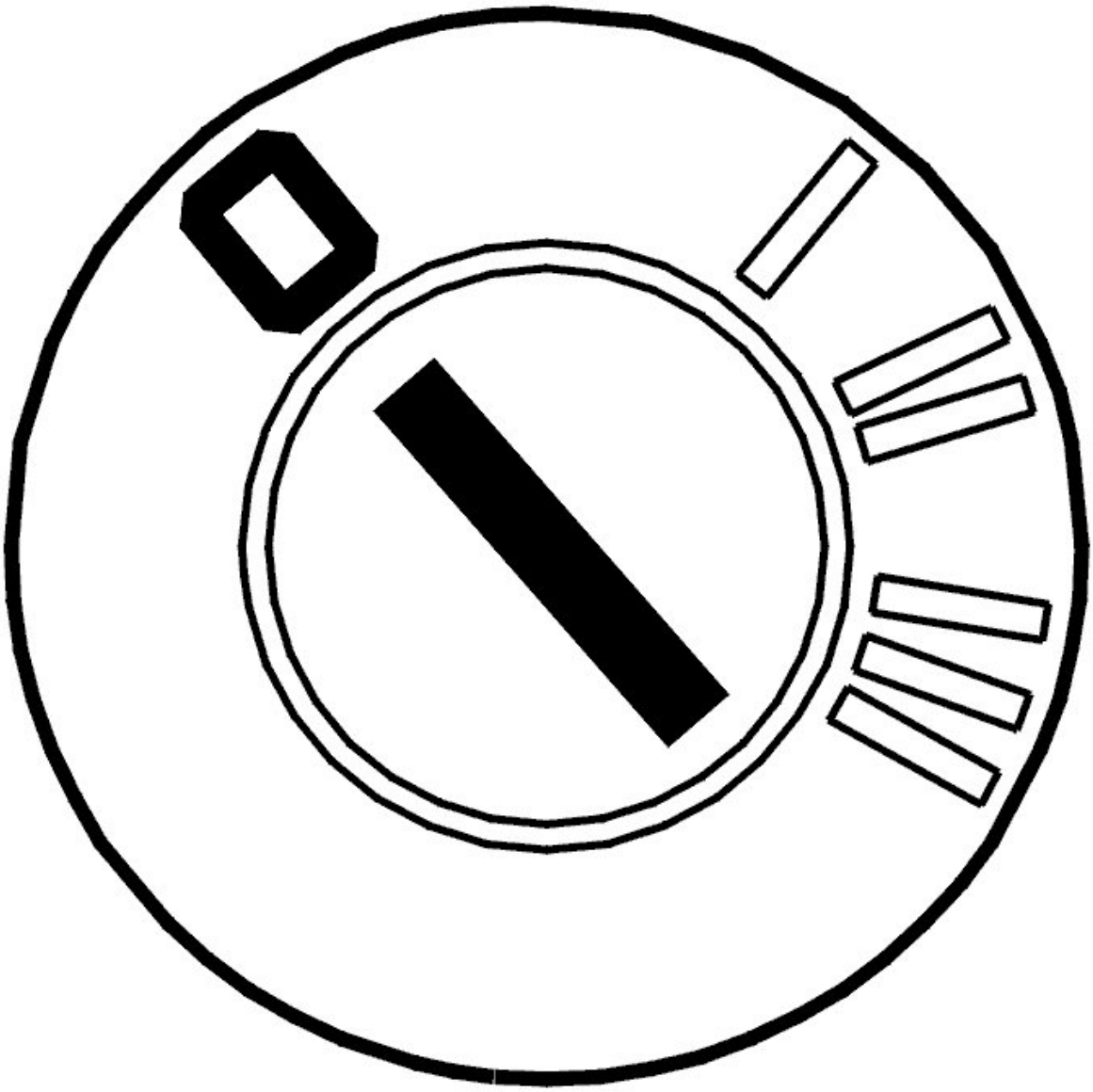
Possible source
- If the Supplemental Restraint System Module (SRS) identifies that an inflatable curtain is installed, despite the control module being programmed that an inflatable curtain is not installed.

Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault

Checking the component

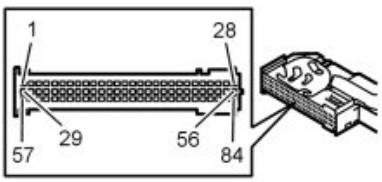


- Ignition off.

Check the control module and SRS system connectors to ensure that no terminal pins are damaged. Also check the wiring.
Check that the correct SRS control module is installed in the car. Read off by clicking the VCT2000 symbol.
Check that the switch for the rear right inflatable curtain is not connected to an inflatable curtain if the car is a 5-seat model.
Replace the control module if no fault is found.

Other information:

- To access or replace the control module, see
- For information about signals, see Signal Specifications.



Select "Continue".

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

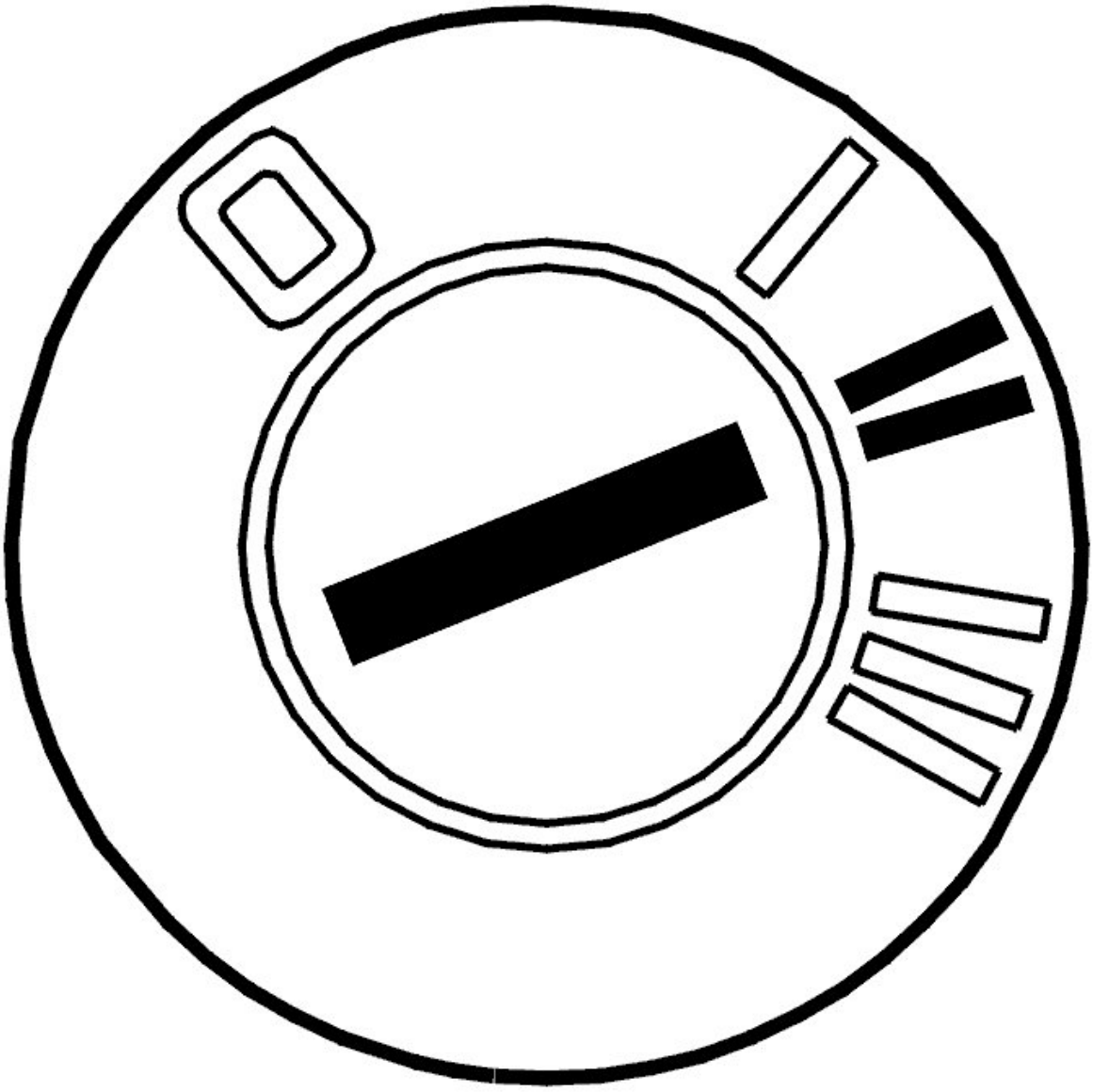
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

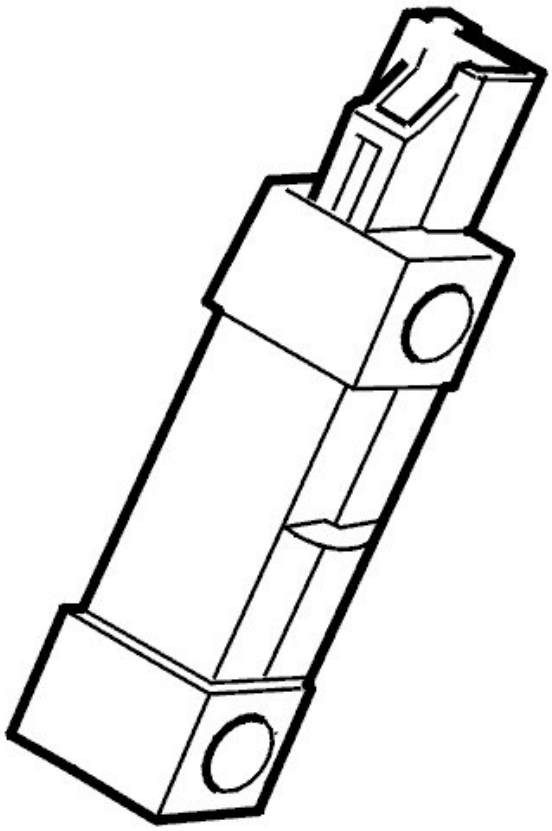
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-00B0 Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00B0 is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

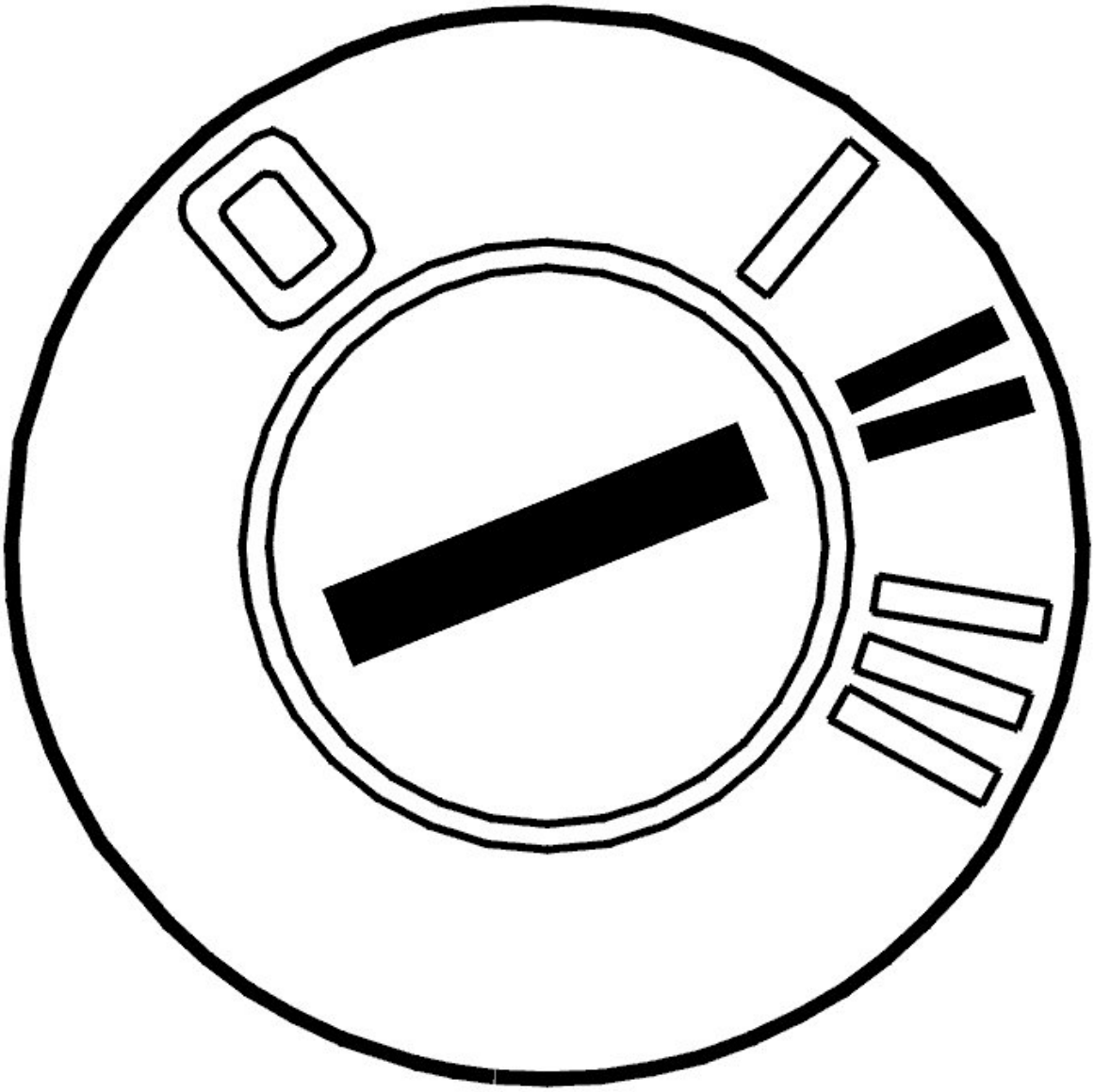
Signal too low:
- Signal wire short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

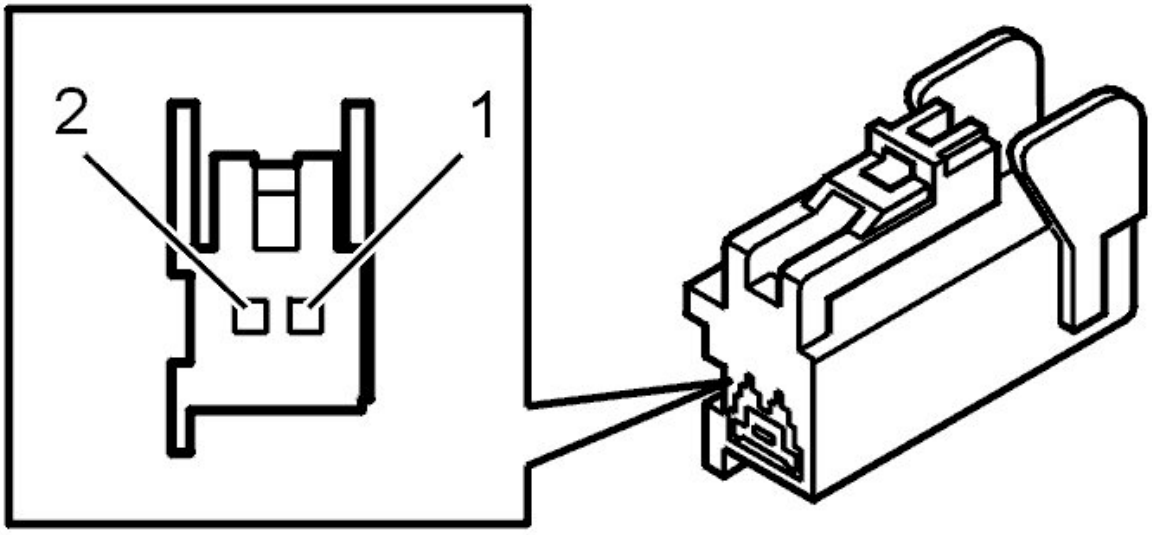
rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

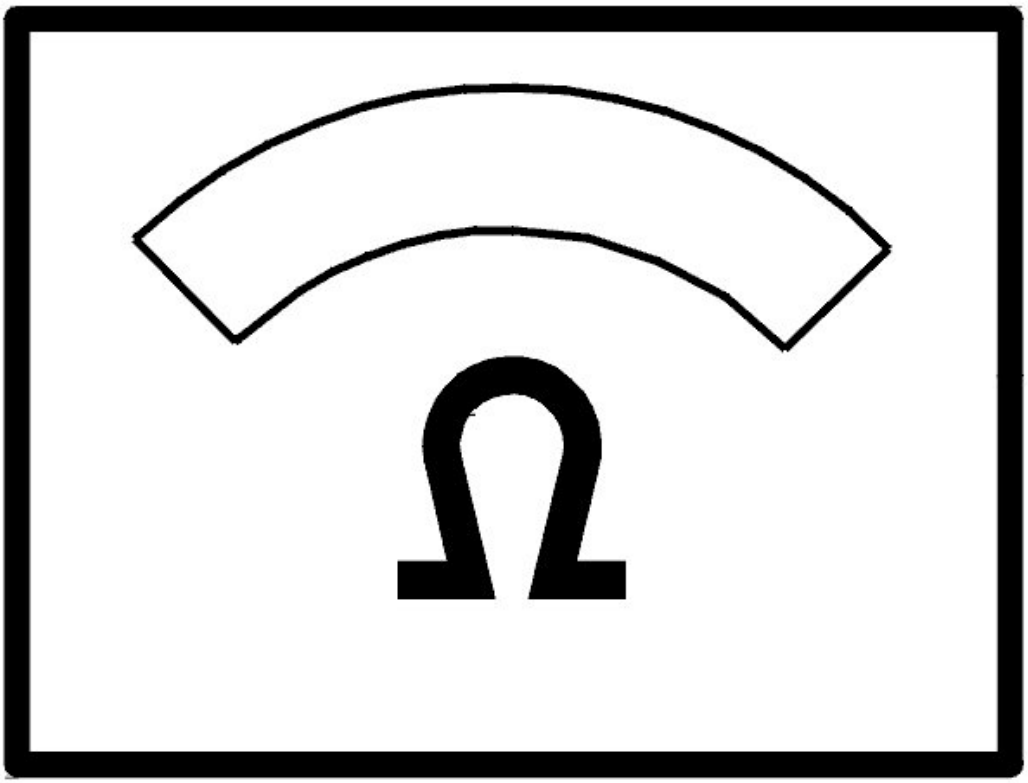
for diagnostic trouble code (DTC) SRS-00BF,

rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

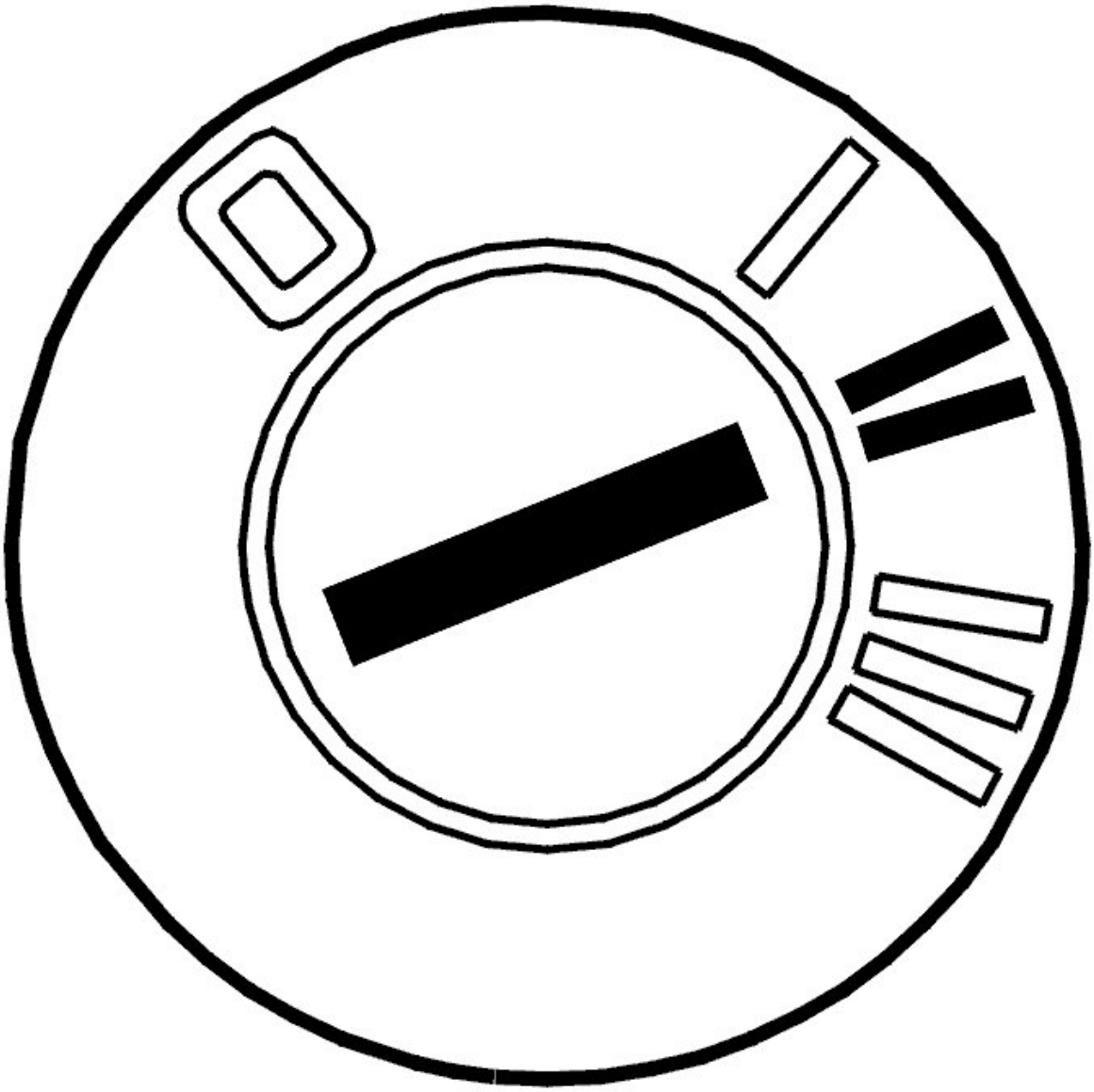
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

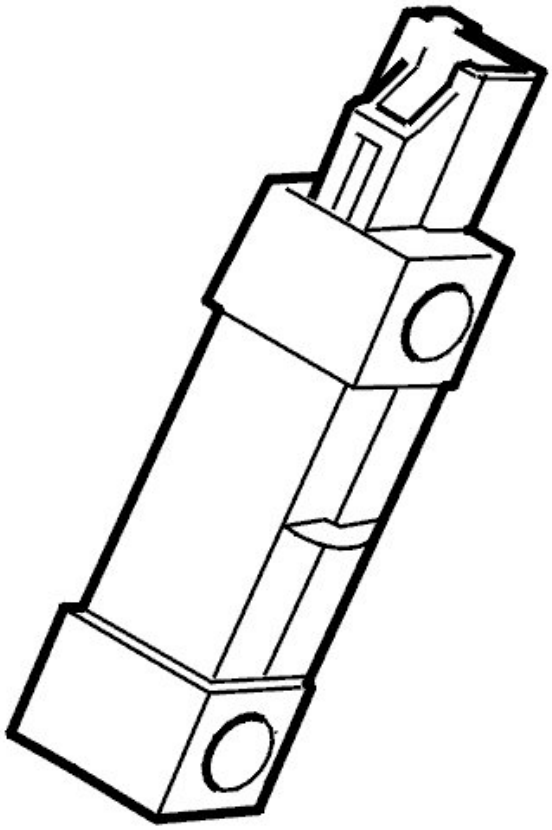
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-00B0 Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00B0 is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

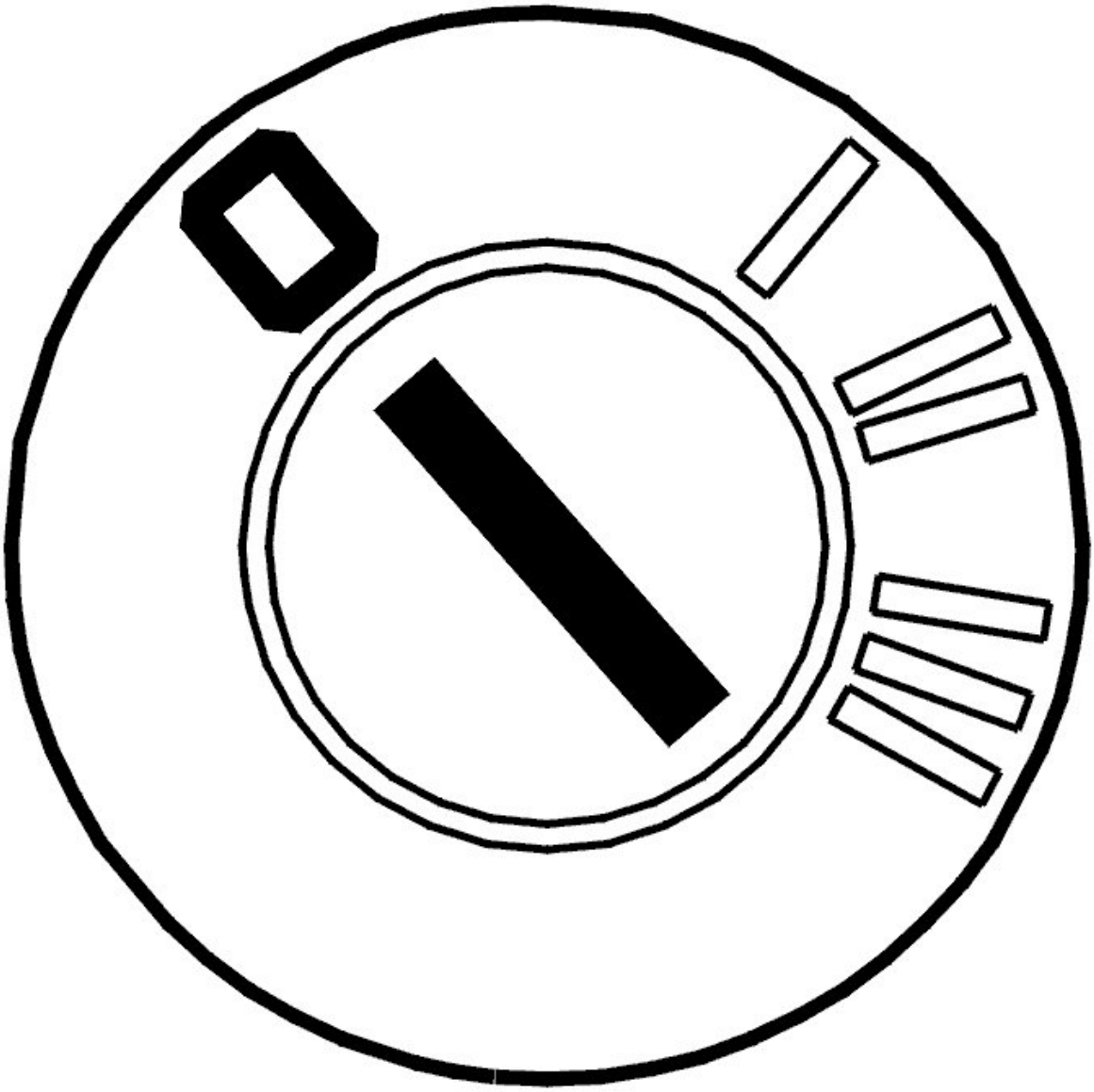
Signal too low:
- Signal wire short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Intermittent fault

Intermittent fault



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the supplemental restraint system module (SRS) and side impact sensor. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

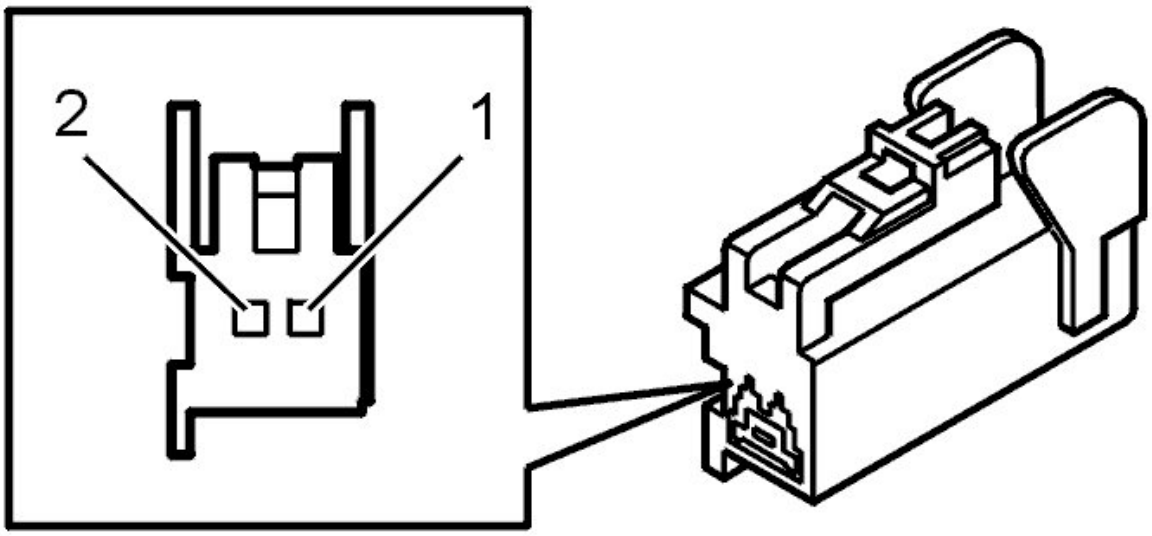
for diagnostic trouble code (DTC) SRS-00BF,

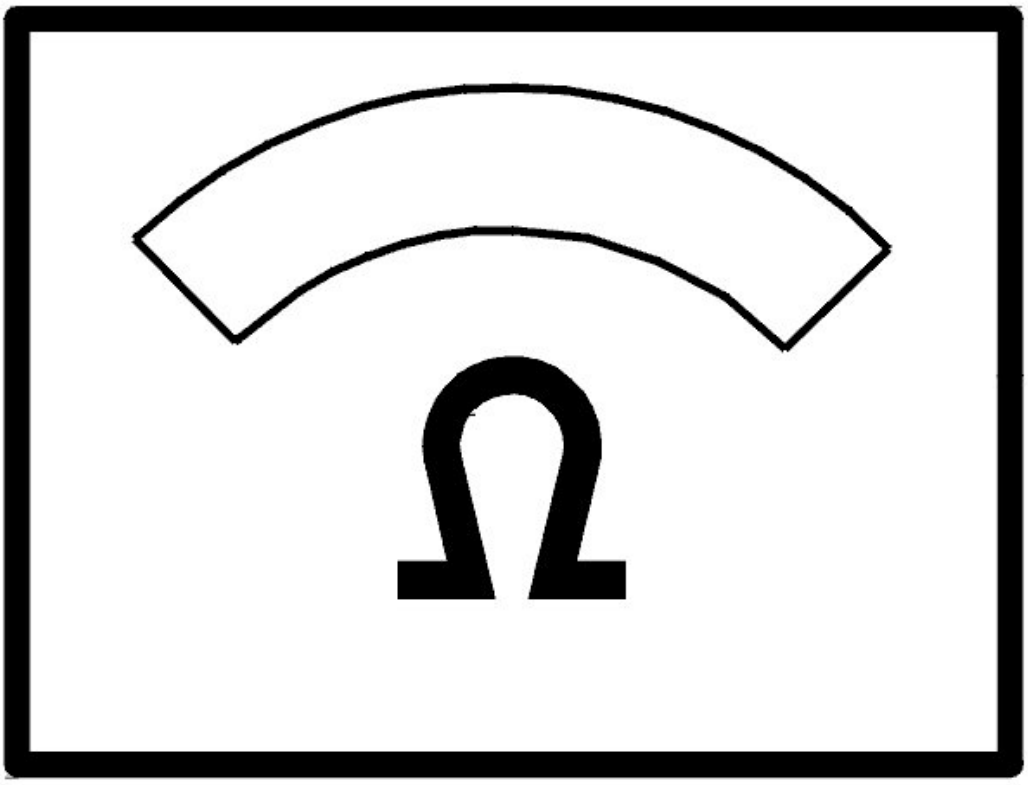
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for an intermittent short-circuit to supply voltage. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check

for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

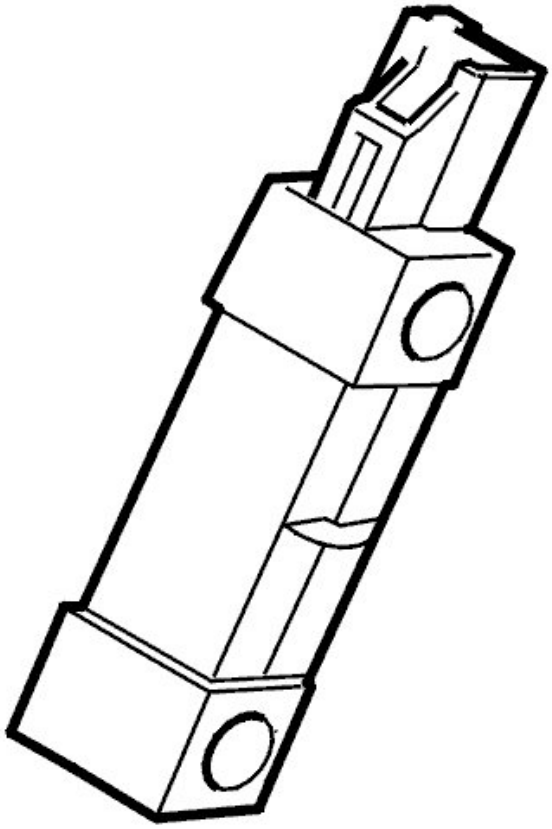
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00B1 Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00B1 is displayed.

Substitute value
- Nothing.

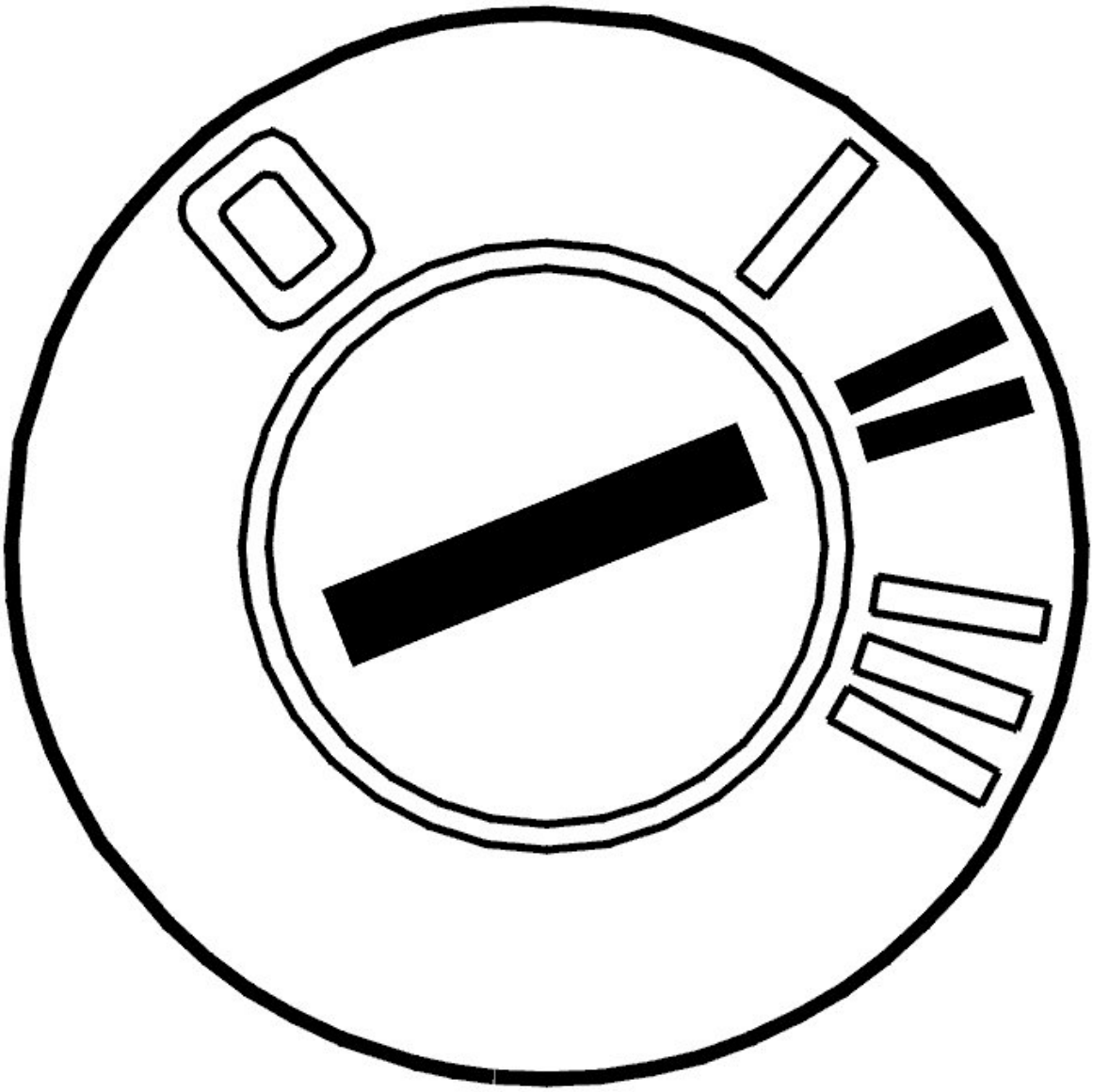
Possible source
- Open circuit in signal wire.

Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Note! Check that the side impact sensor is connected.

Check the cable between the SRS control module and the connector or terminal for the side impact sensor according to the following:

for diagnostic trouble code (DTC) SRS-00B1,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B6,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BB,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00C0,

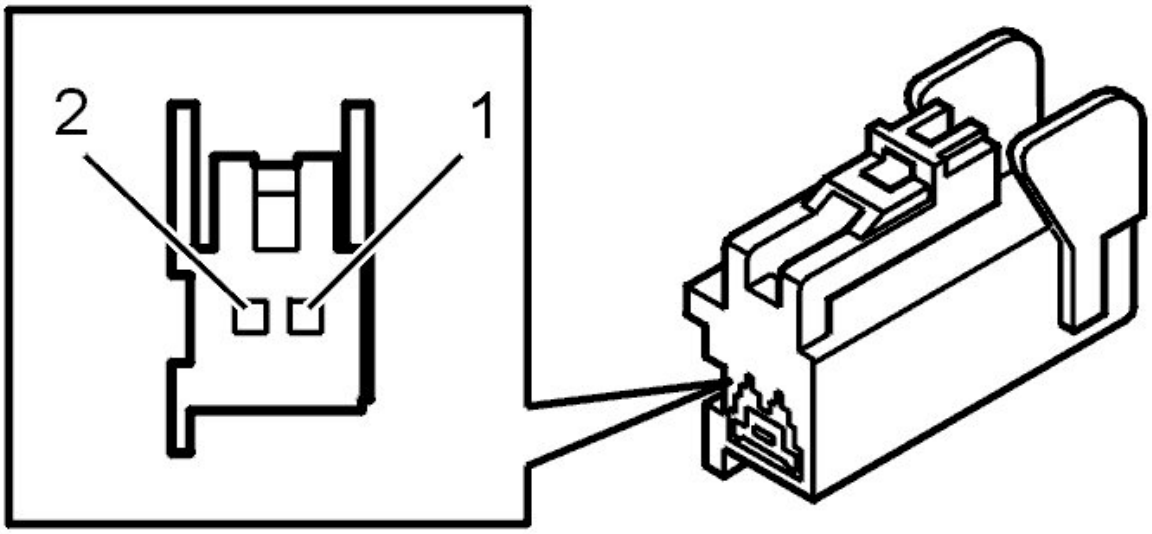
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

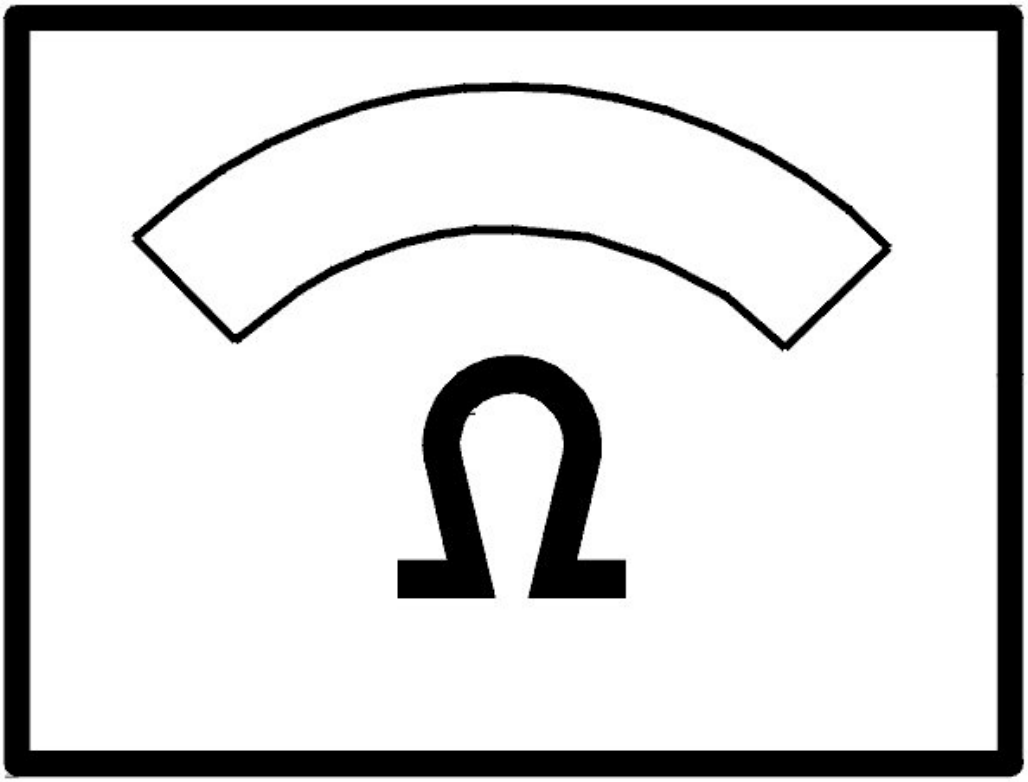
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Was a fault detected?

Yes - Verification

No - Replacing side impact sensor

Replacing side impact sensor

Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

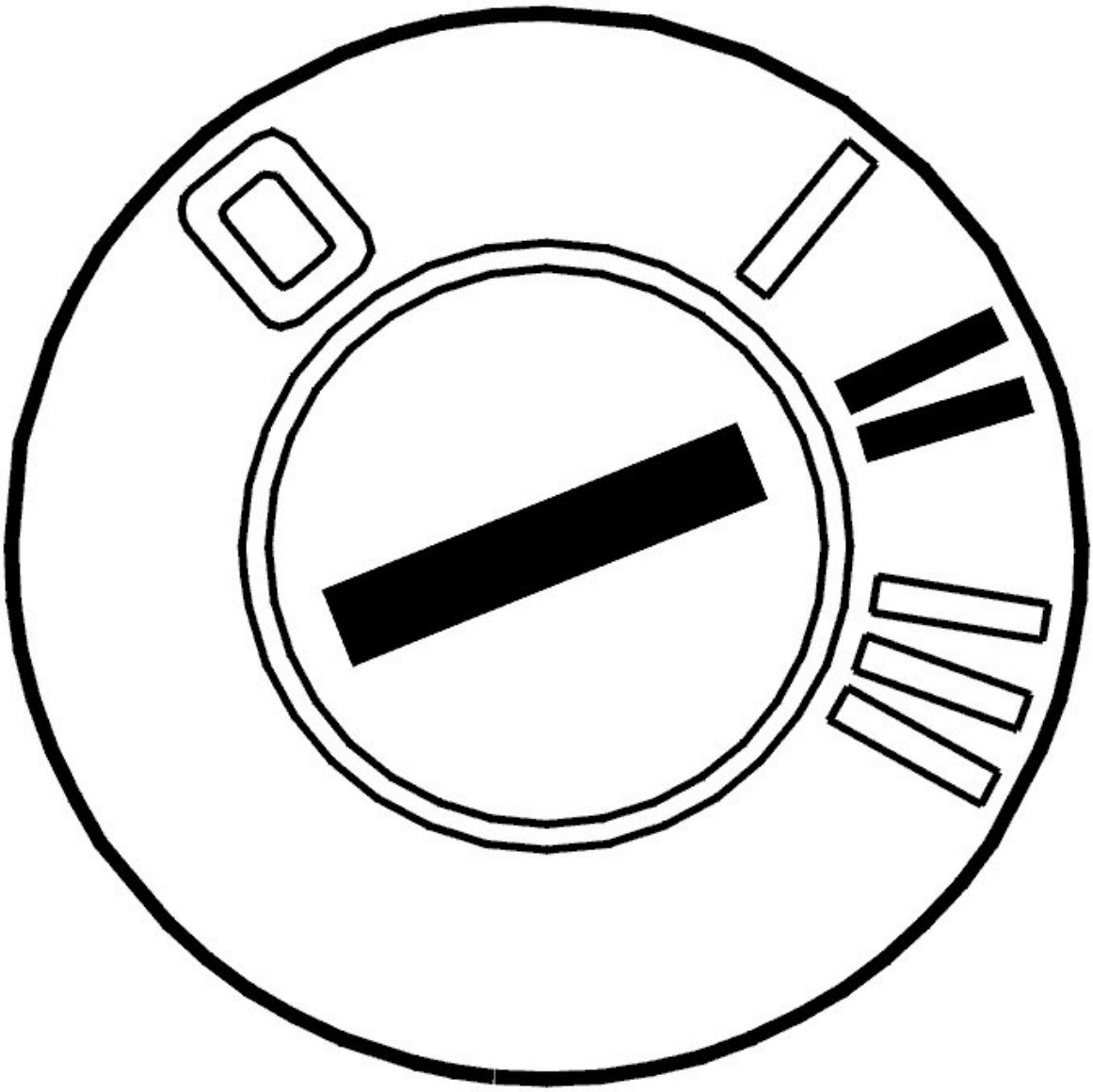
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

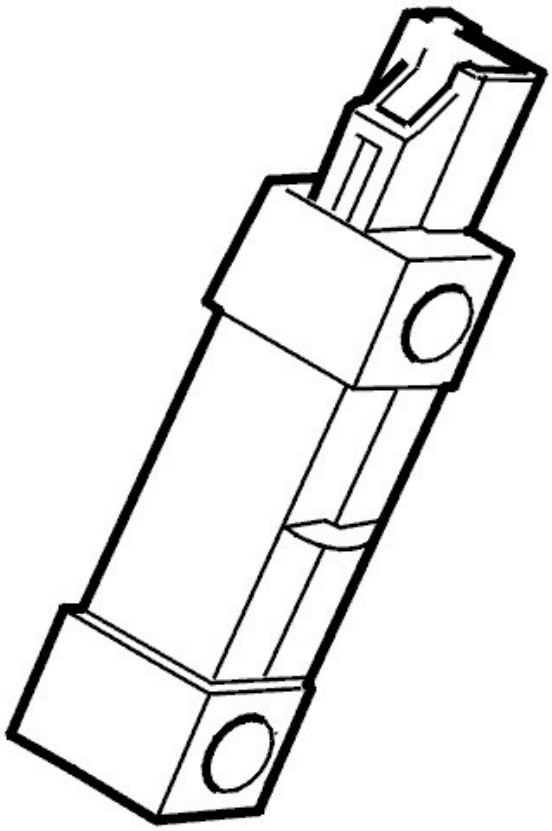
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

SRS-00B1 Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00B1 is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in signal wire.

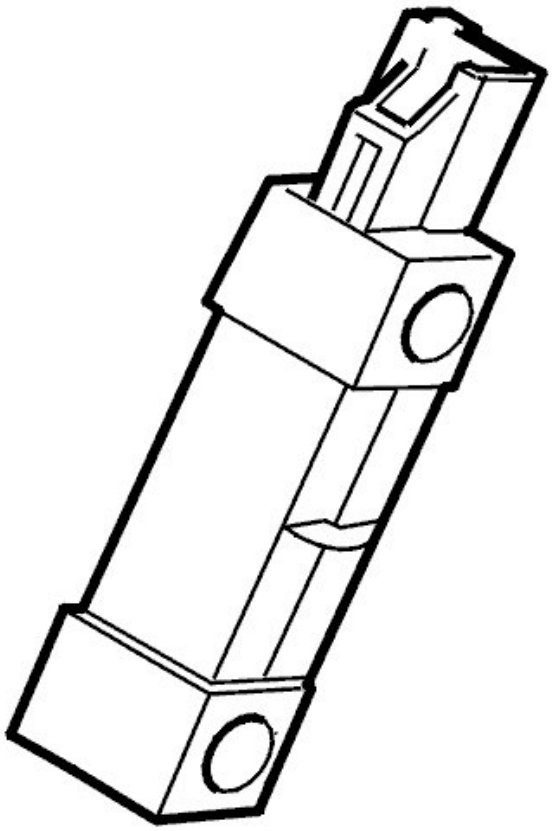
Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

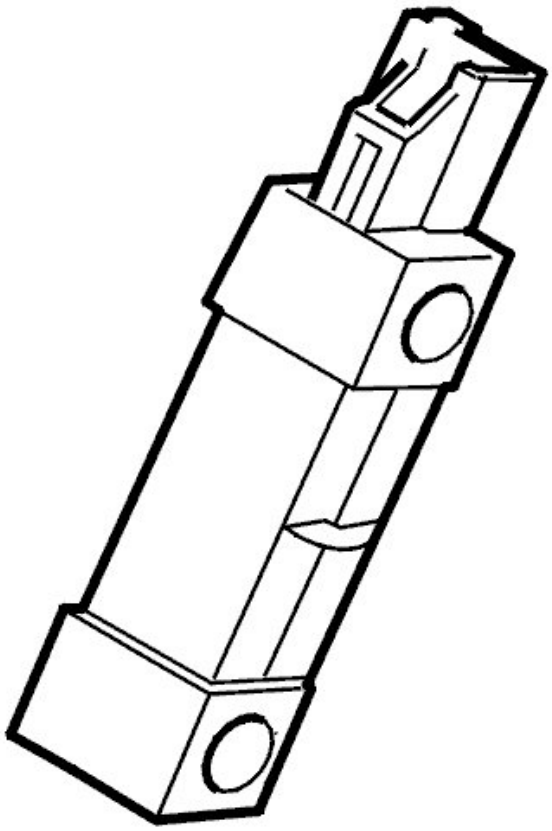
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B2

Condition



Diagnostic trouble code (DTC) SRS-00B2 is stored if the SRS control module identifies a faulty side impact sensor identity.

Possible source

- Faulty side impact sensor identity.
- Faulty side impact sensor.

Fault symptom[s]

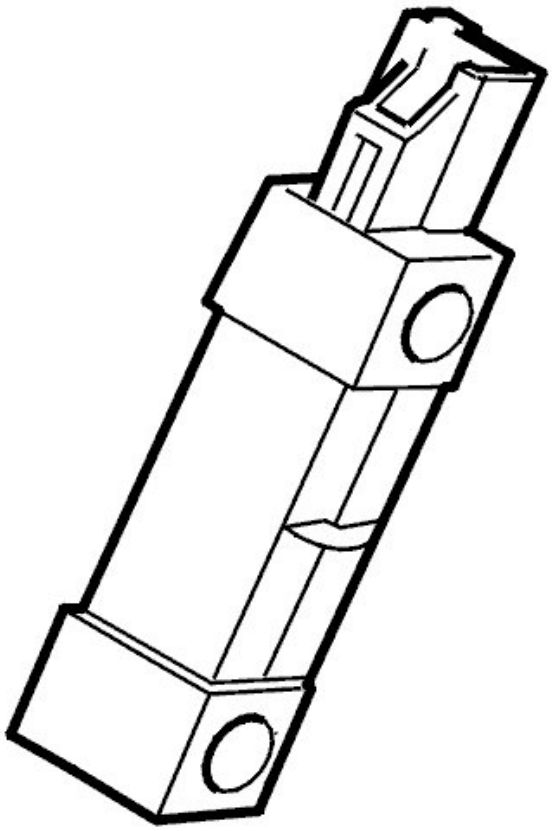
- The SRS indicator lamp is lit.

Faulty identity

Faulty identity. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

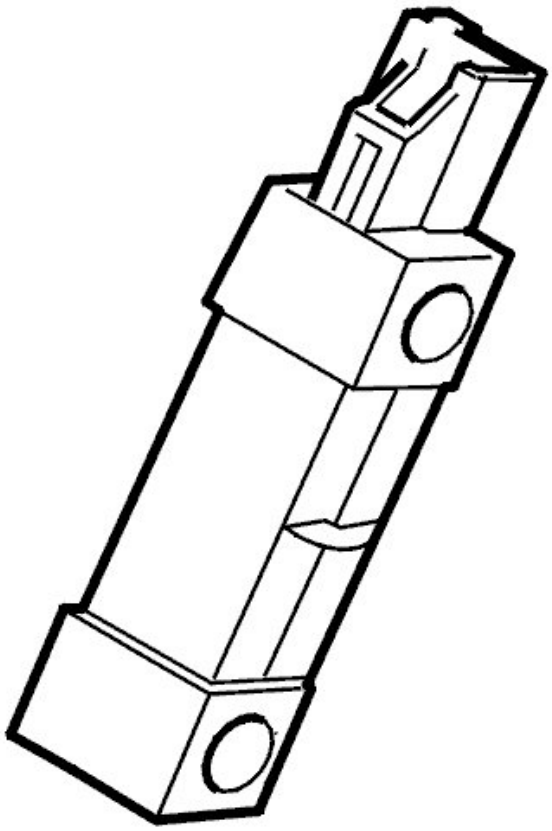
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B2

Condition



Diagnostic trouble code (DTC) SRS-00B2 is stored if the SRS control module identifies a faulty side impact sensor identity.

Possible source
- Faulty side impact sensor identity.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

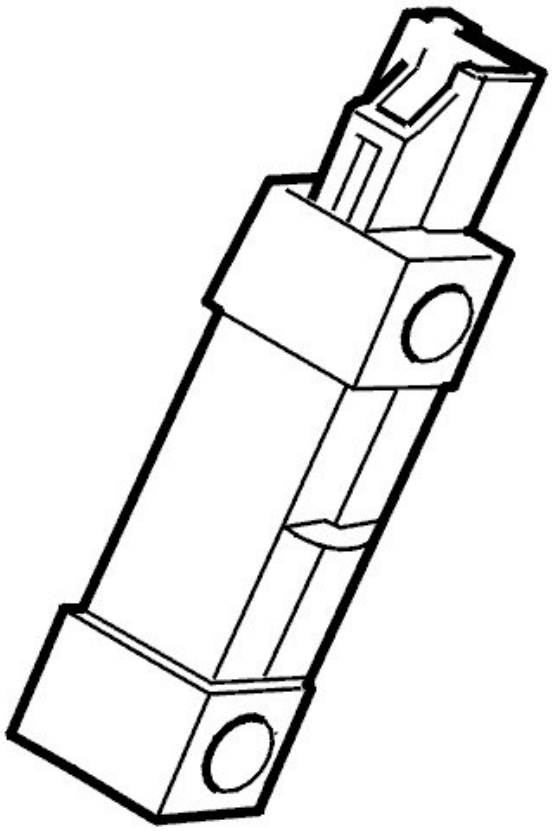
Faulty identity

Faulty identity. Permanent fault

Checking the component

The control module does not recognize the identity of the side impact sensor. Check that the P/N of the side impact sensor is correct.
Ignition on.
Read off the side impact sensor identity by clicking on the VCT2000 symbol.
Replace the side impact sensor if no fault is found.

Other information:
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.



Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

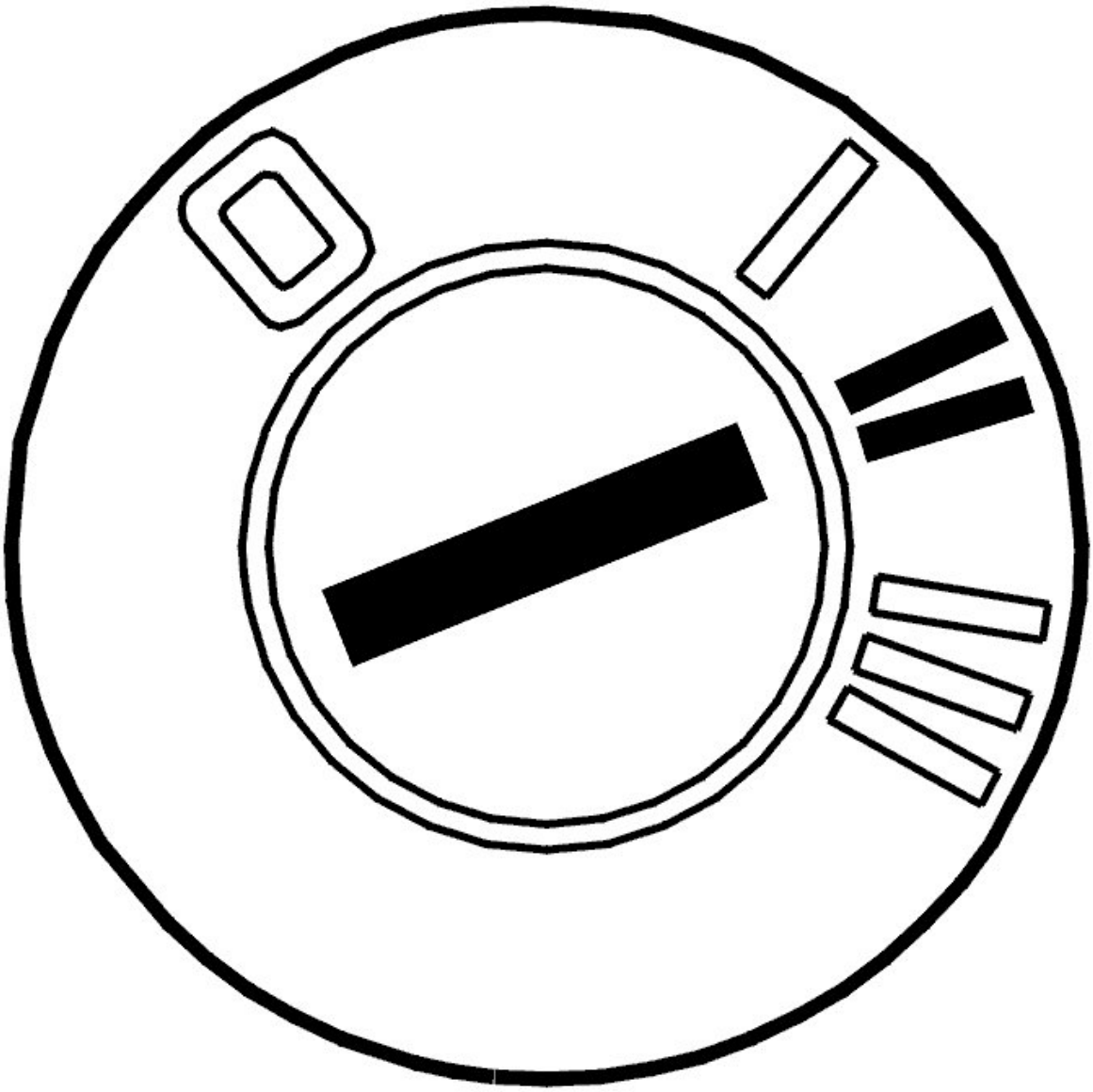
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

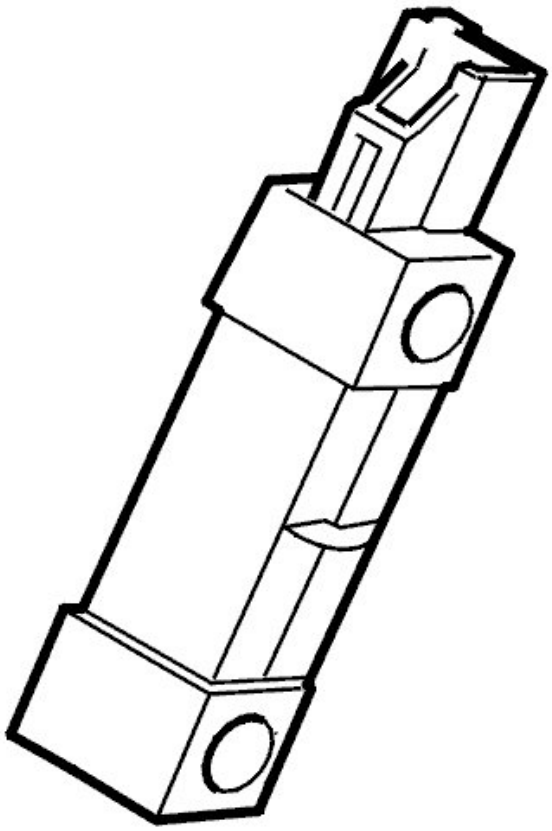
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B3

Condition



Diagnostic trouble code (DTC) SRS-00B3 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

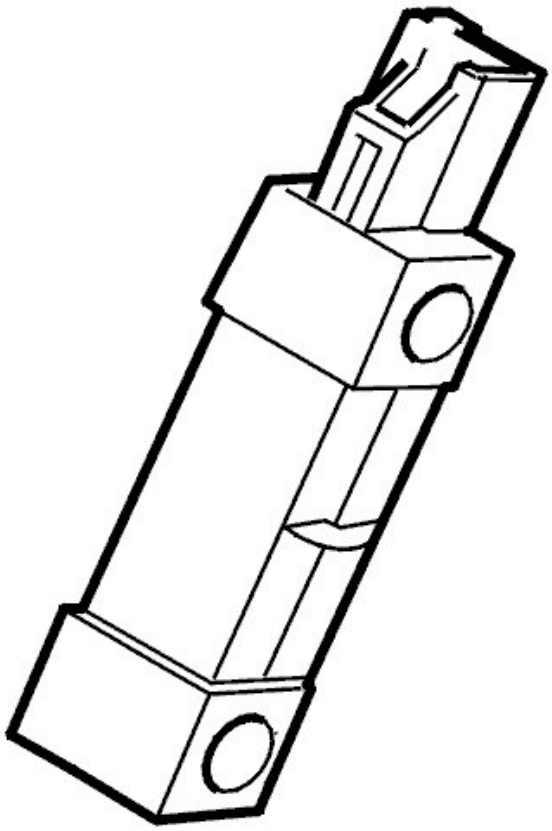
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

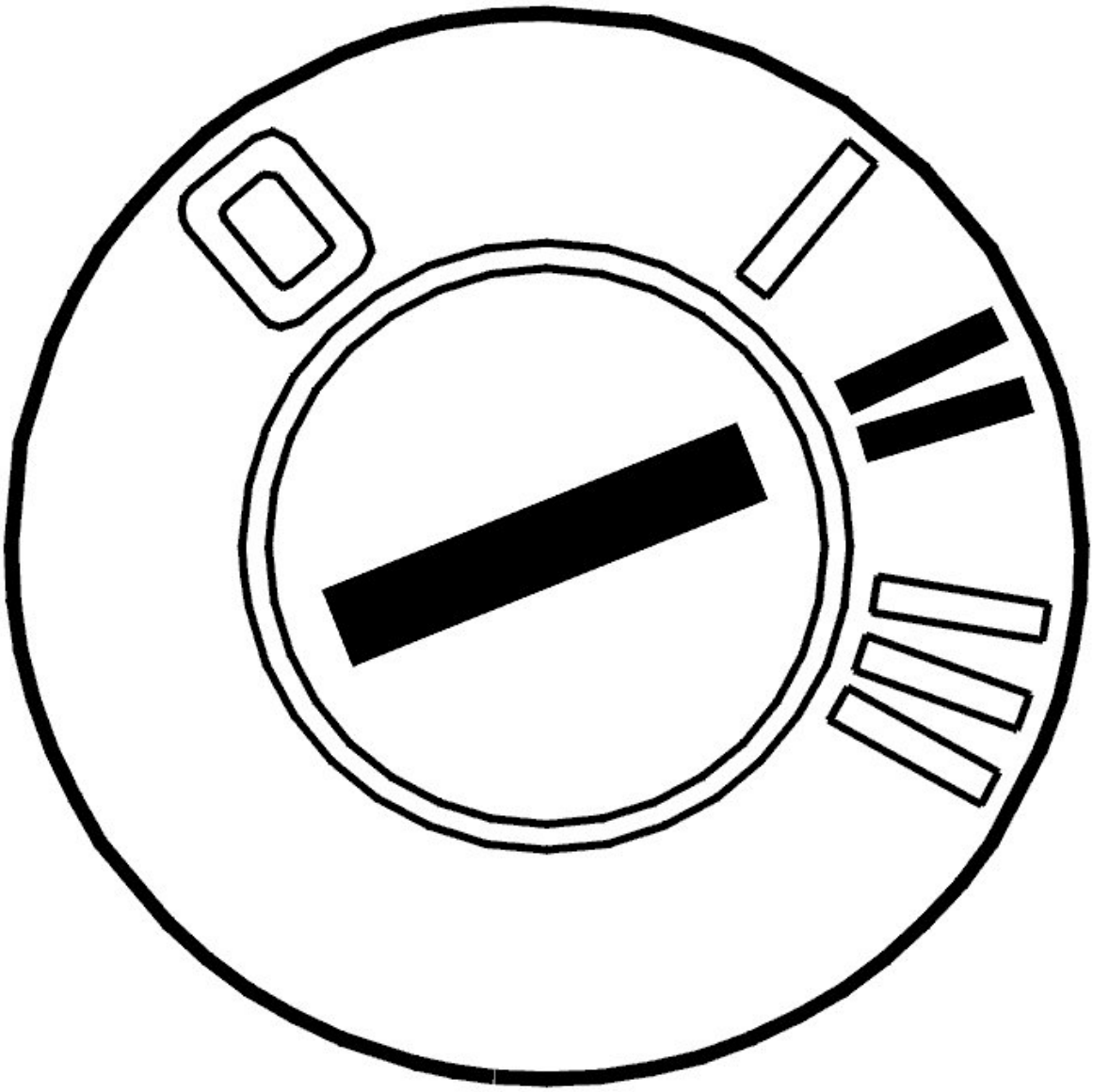
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

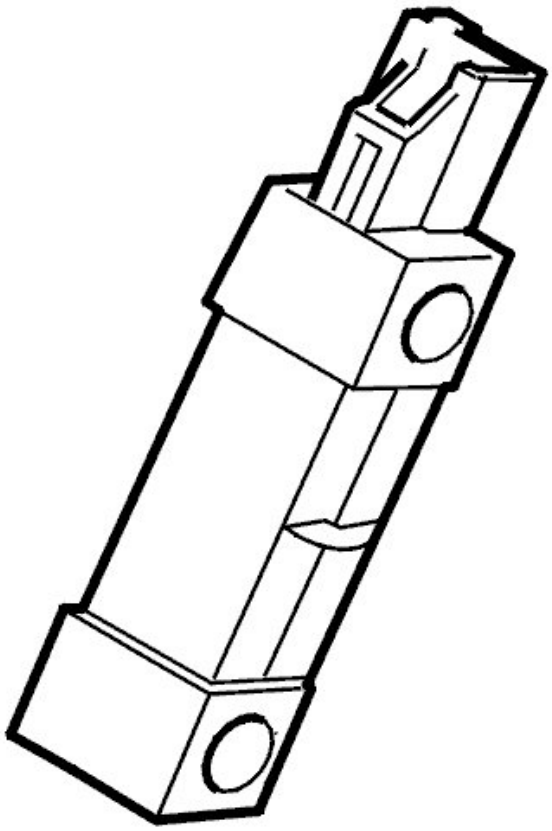
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B3

Condition



Diagnostic trouble code (DTC) SRS-00B3 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

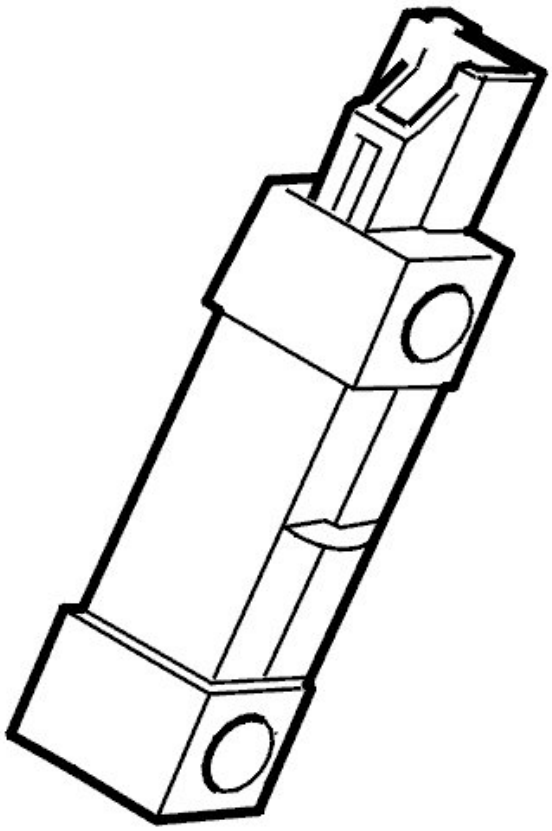
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

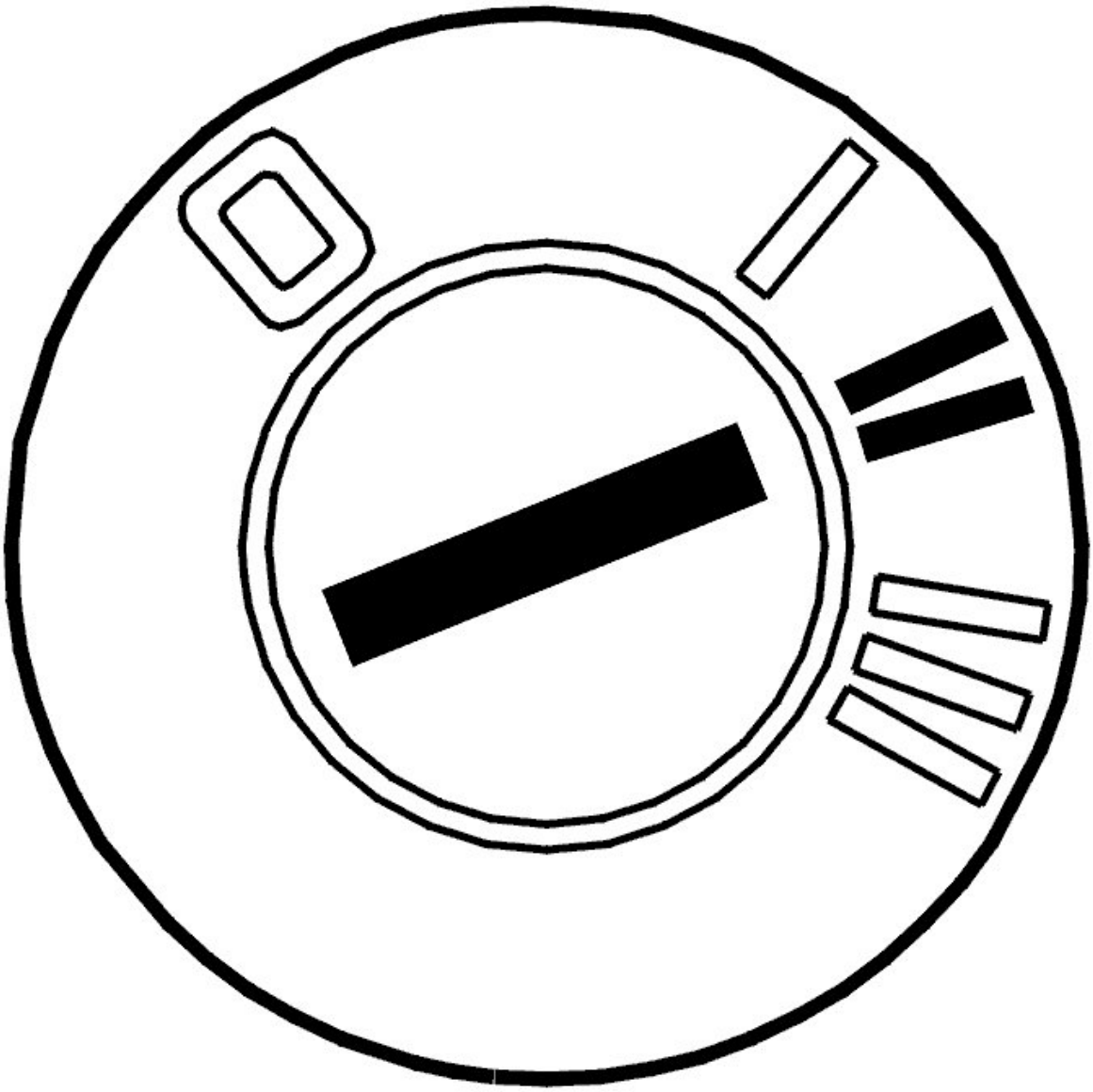
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

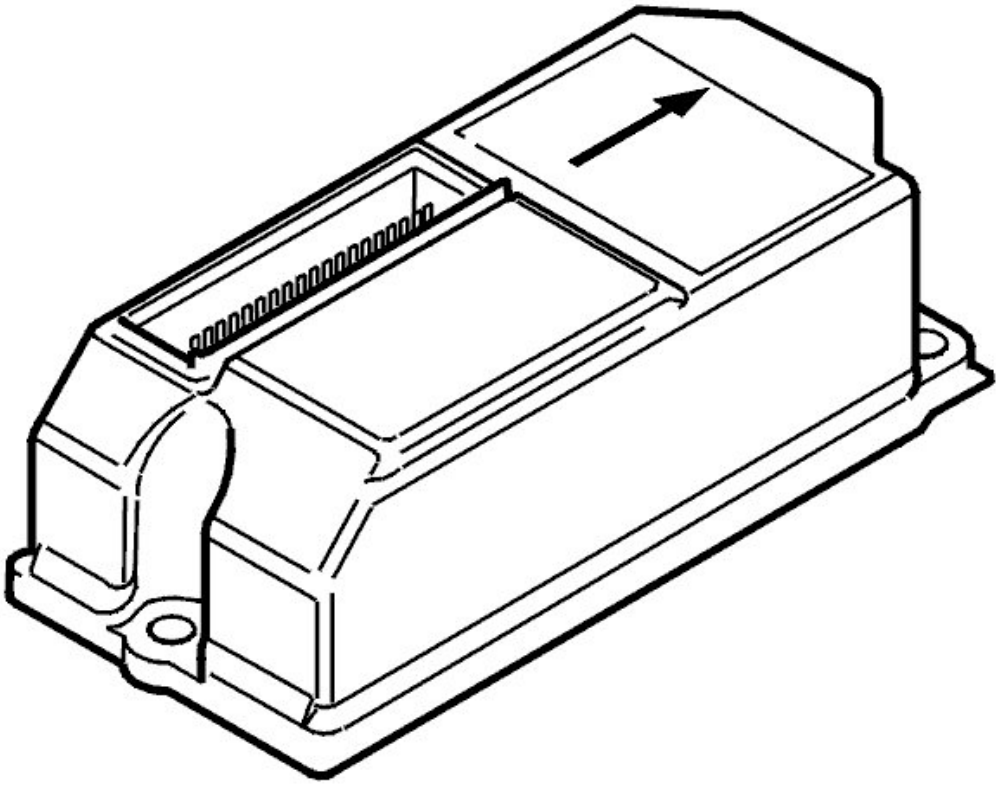
VERIFICATION FAILED - Fault-tracing information

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

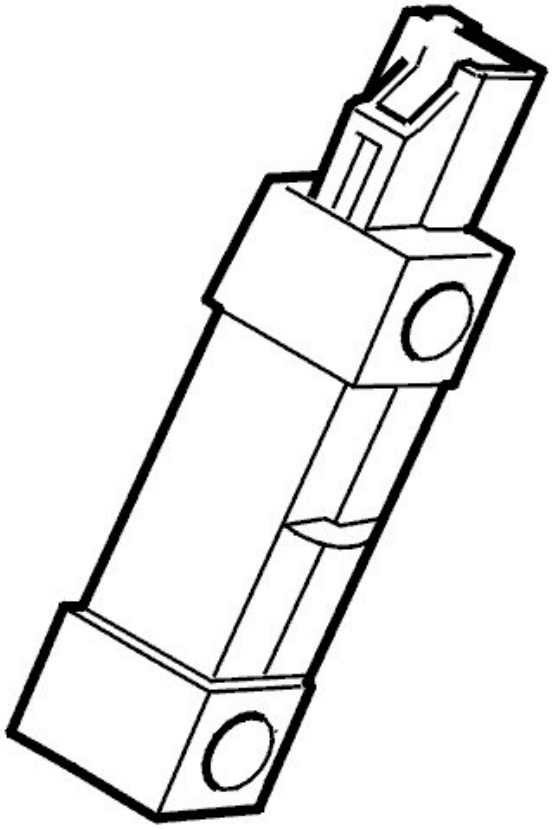
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B4

Condition



Diagnostic trouble code (DTC) SRS-00B4 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

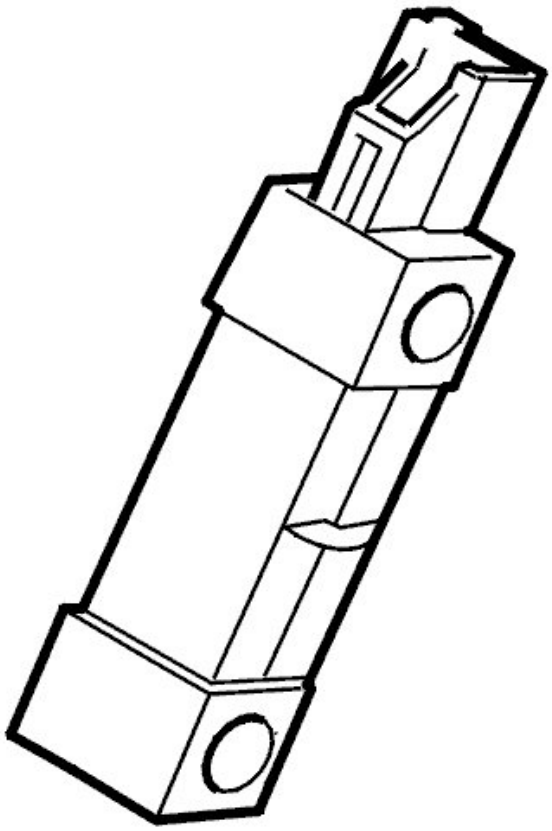
Possible source
- Incorrect side impact sensor installation.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B4

Condition



Diagnostic trouble code (DTC) SRS-00B4 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Information

Fault-tracing for this diagnostic trouble code (DTC) will not be forthcoming.
For further information about this diagnostic trouble code (DTC), read the diagnostic trouble code (DTC) information.

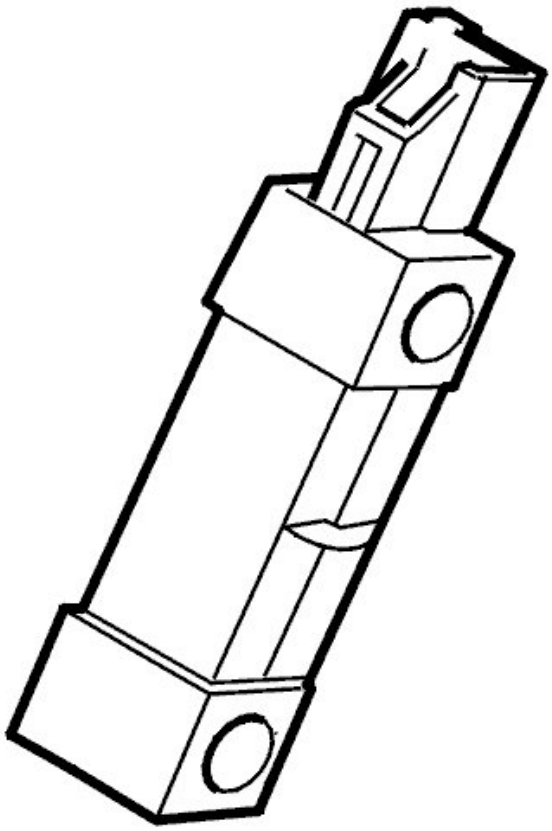
Select "Continue" to finish.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00B5 Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00B5 is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

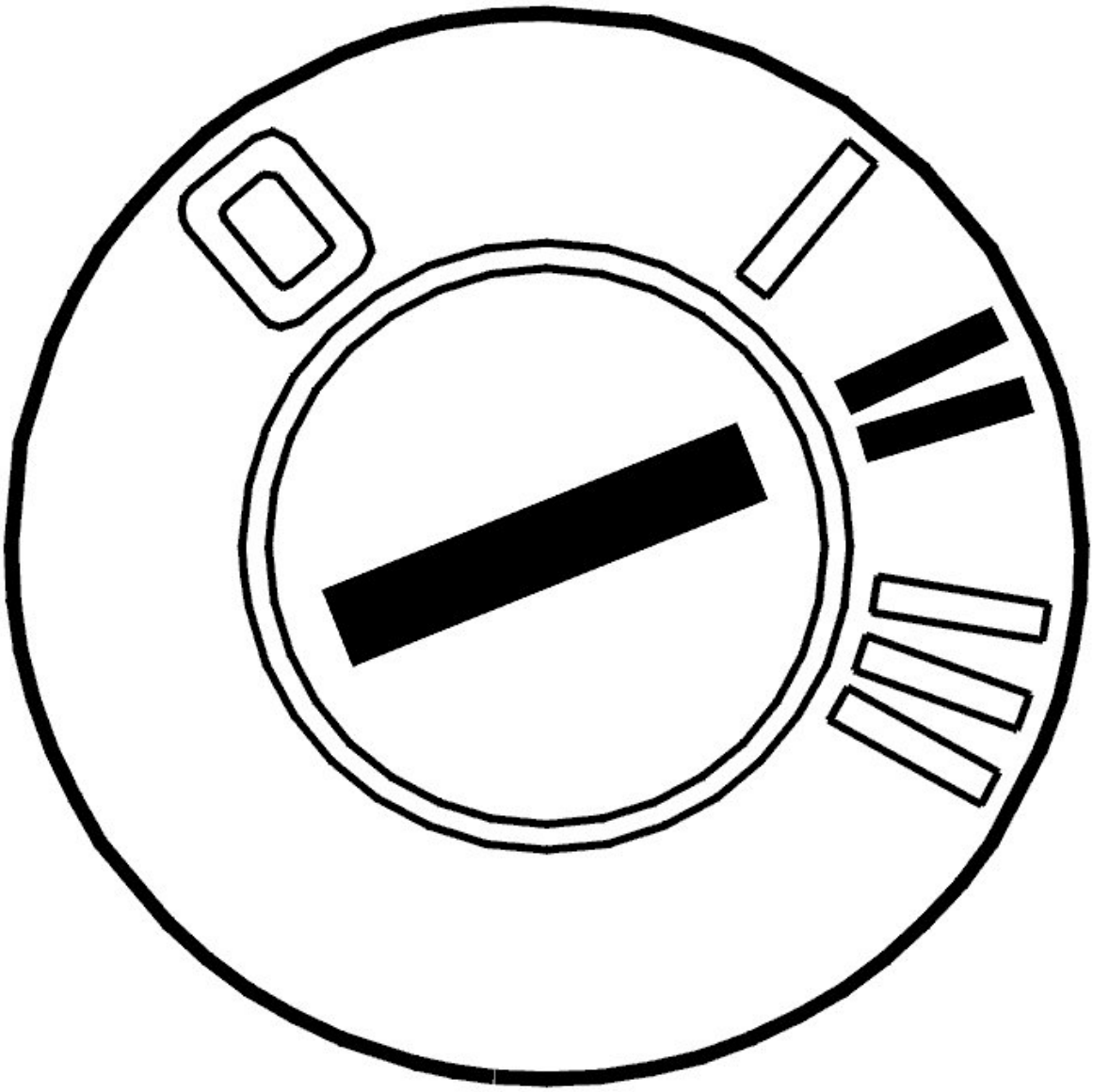
Signal too low:
- Signal wire short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

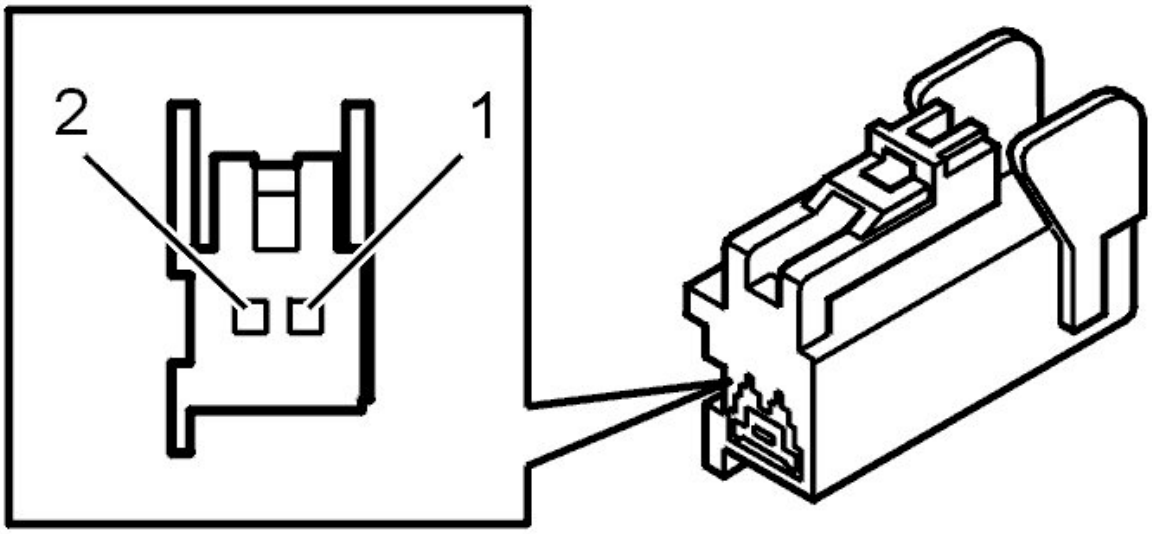
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

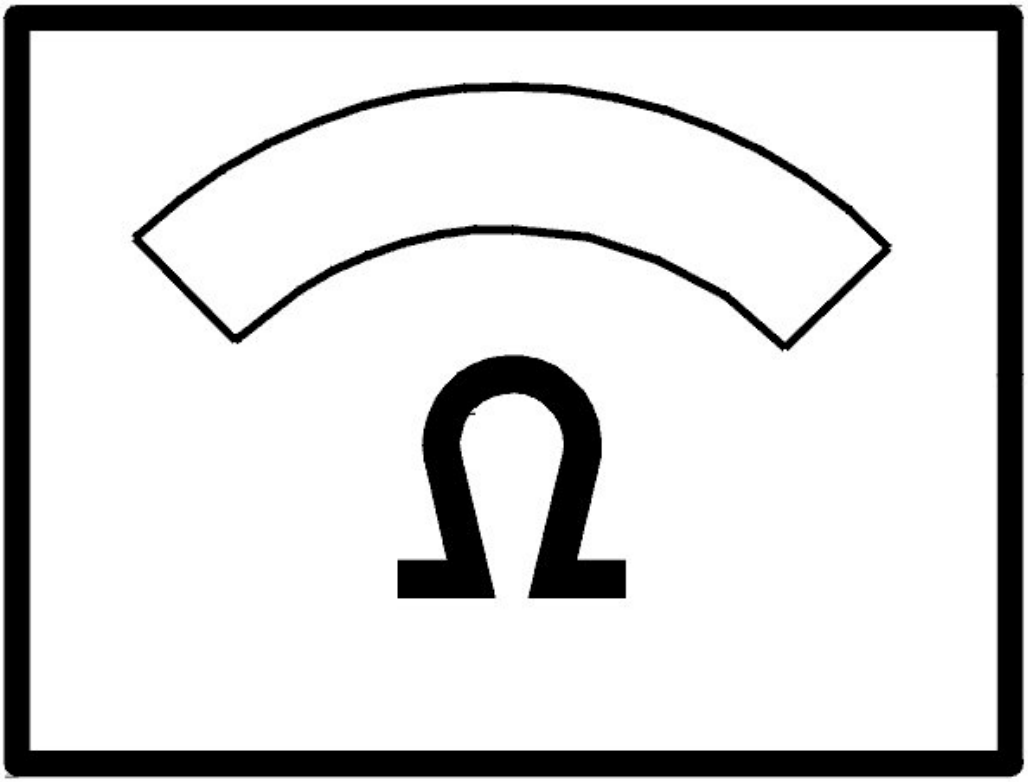
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

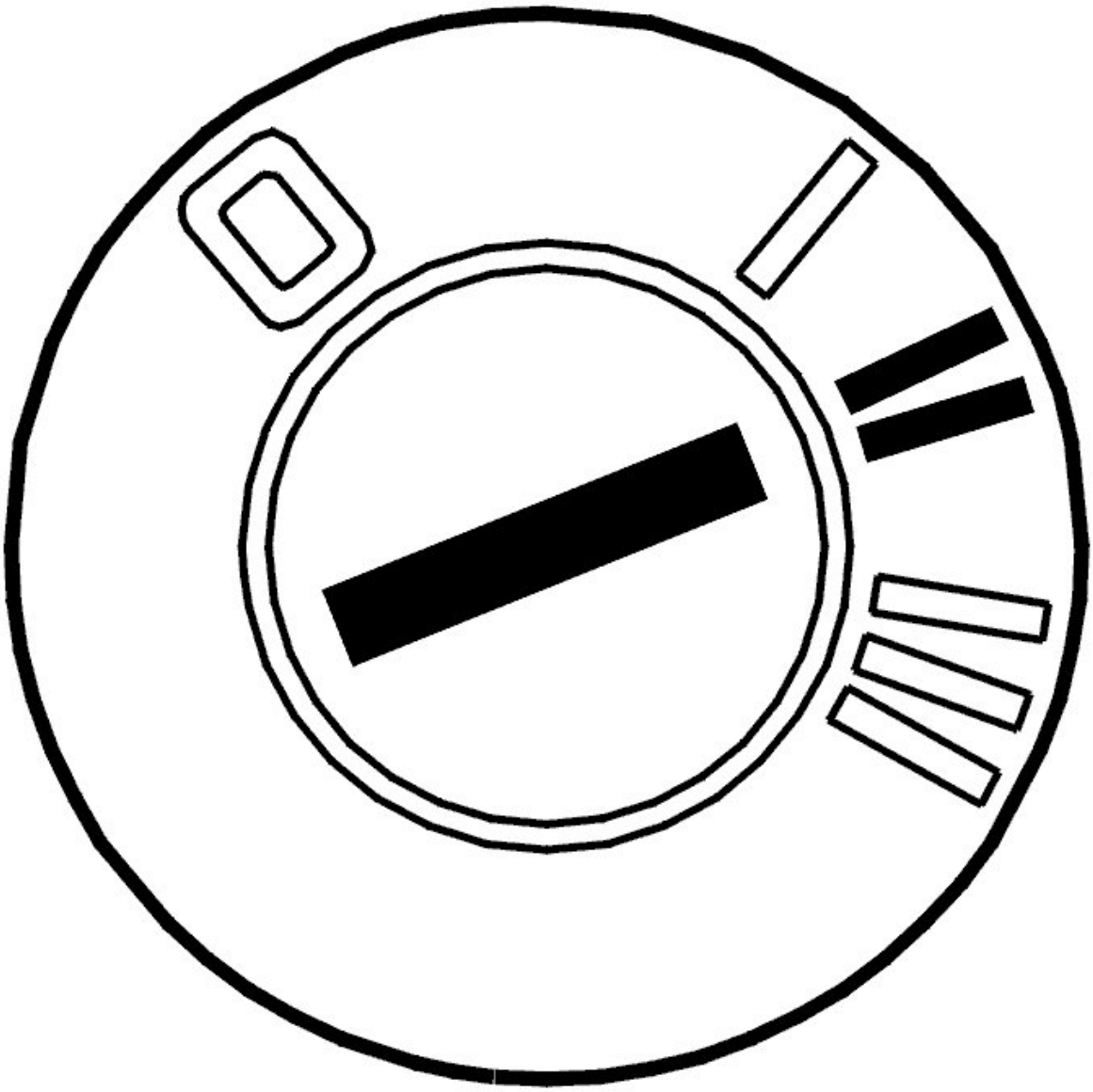
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

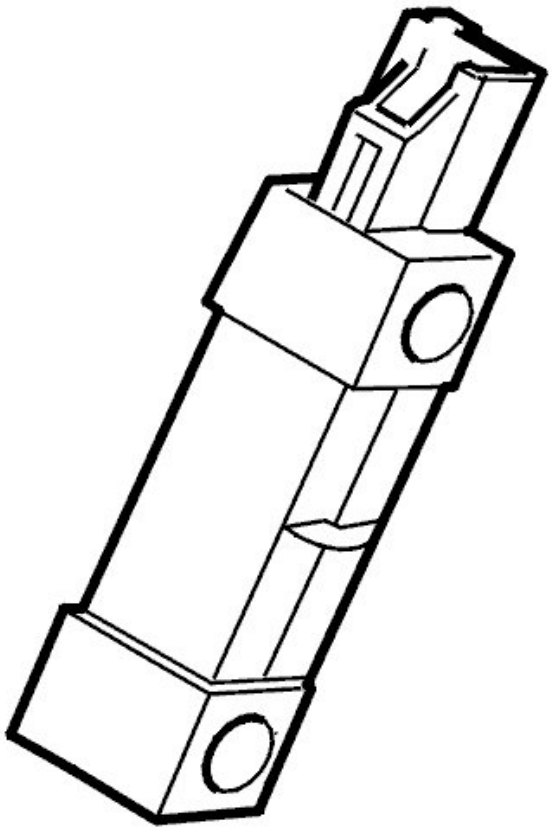
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

SRS-00B5 Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00B5 is displayed.

Substitute value

- Nothing.

Possible source

Signal too high:

- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

Signal too low:

- Signal wire short circuited to ground
- Faulty side impact sensor.

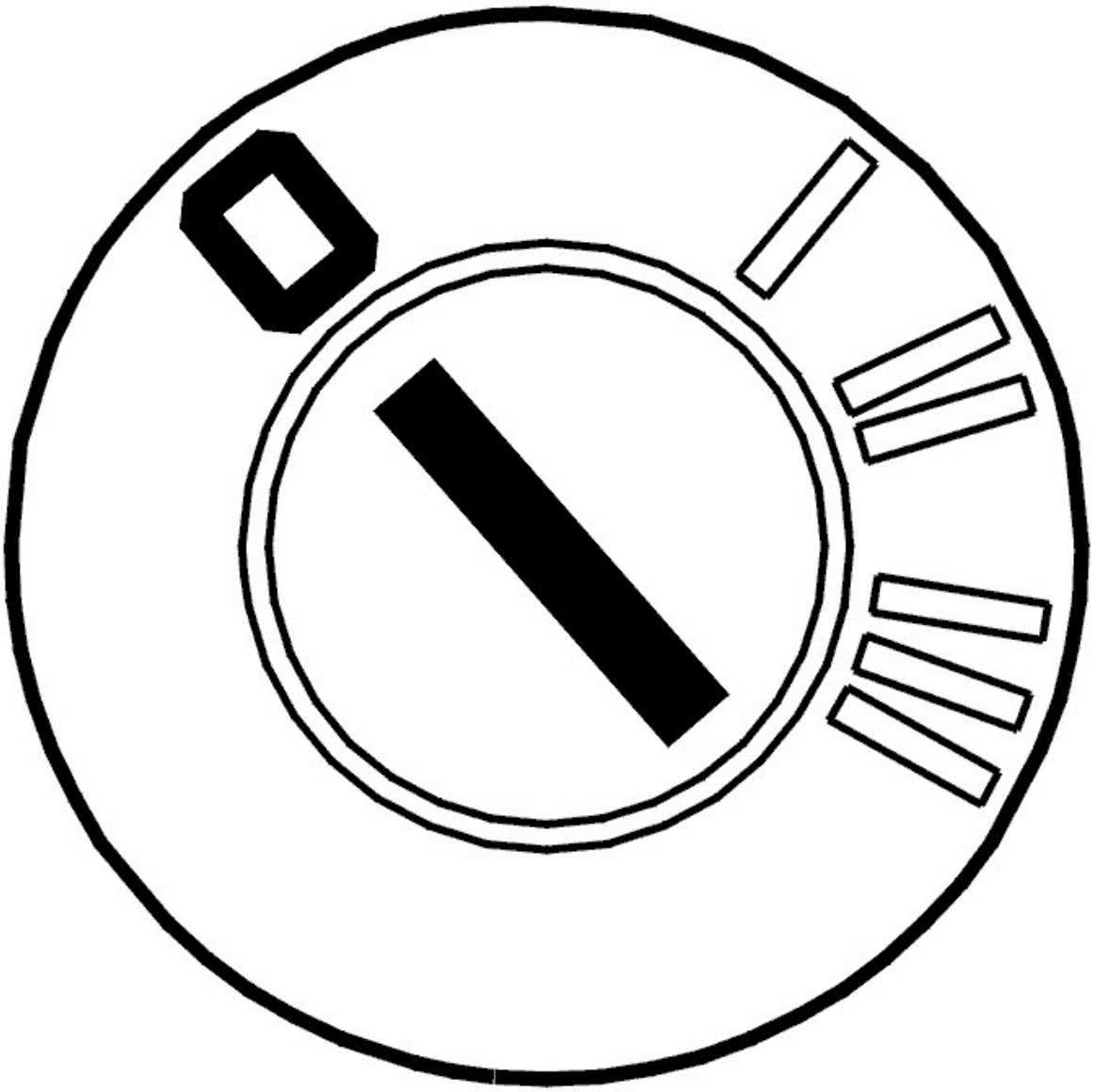
Fault symptom[s]

- SRS warning lamp on.

Faulty Signal

Faulty signal. Intermittent fault

Intermittent fault



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the supplemental restraint system module (SRS) and side impact sensor. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for an intermittent short-circuit to supply voltage. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and

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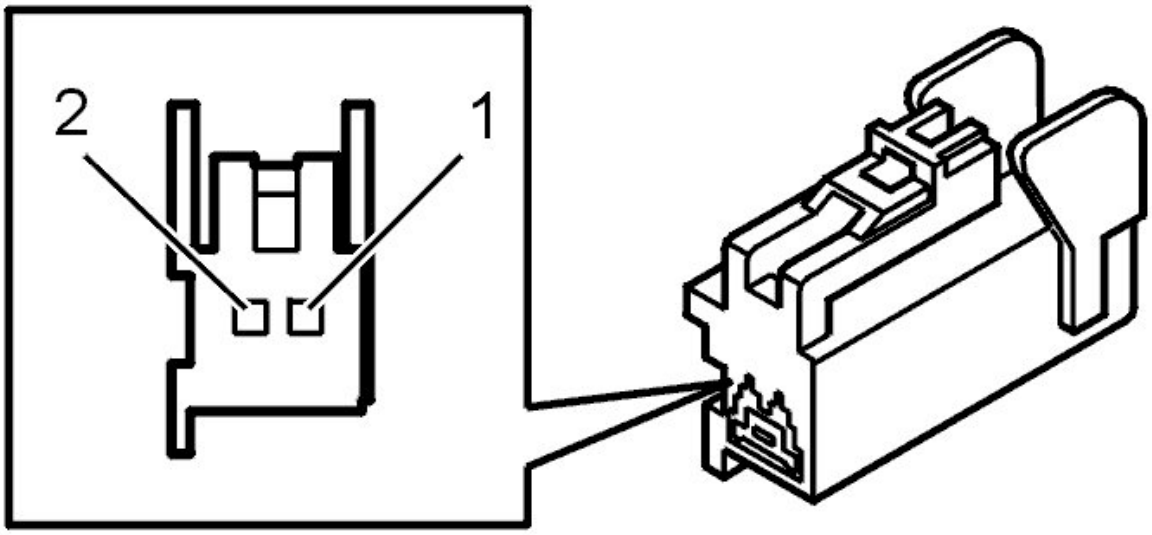
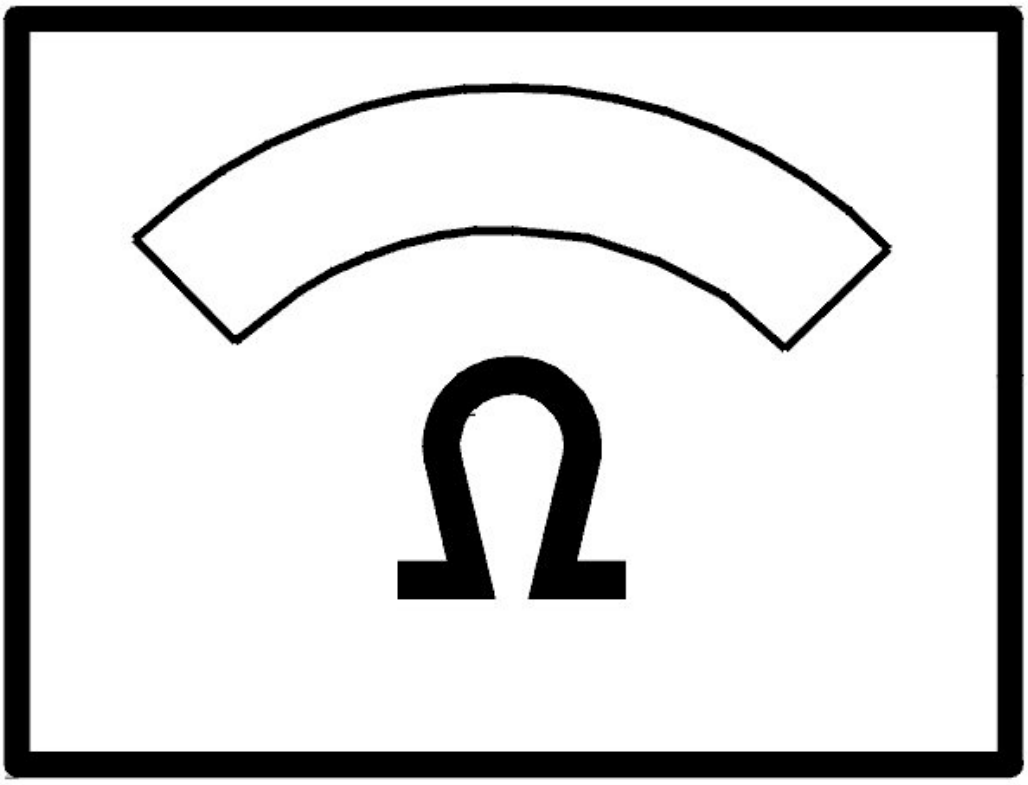
General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

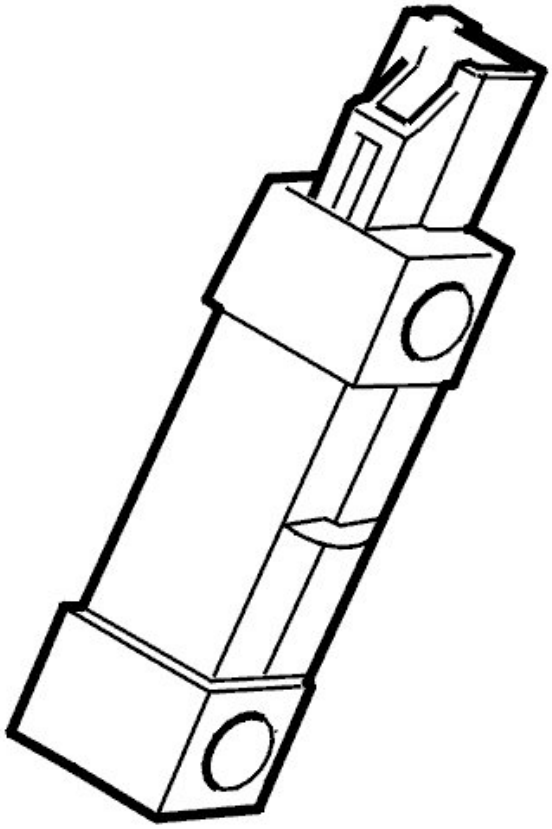
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00B6 Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00B6 is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in signal wire.

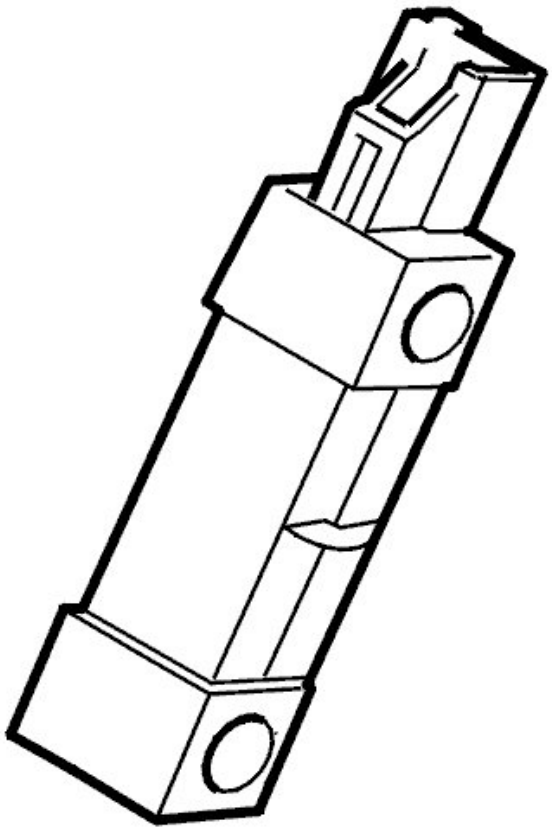
Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

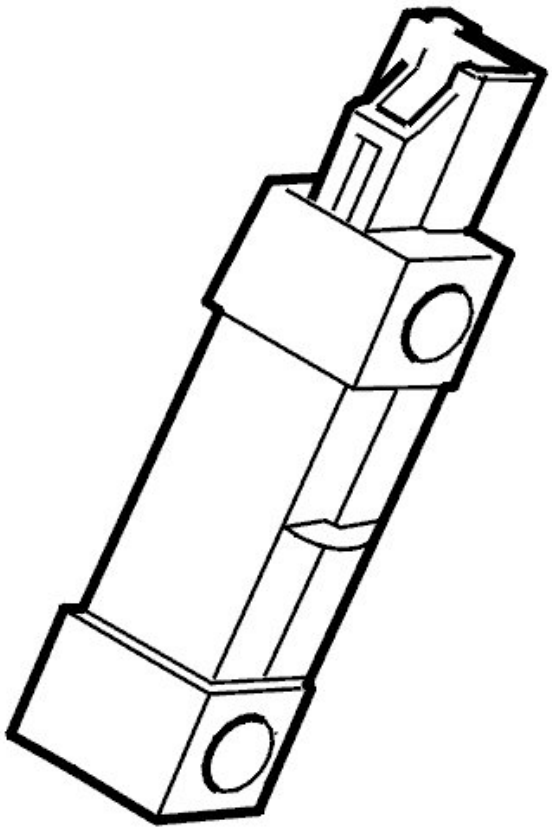
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00B6 Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00B6 is displayed.

Substitute value
- Nothing.

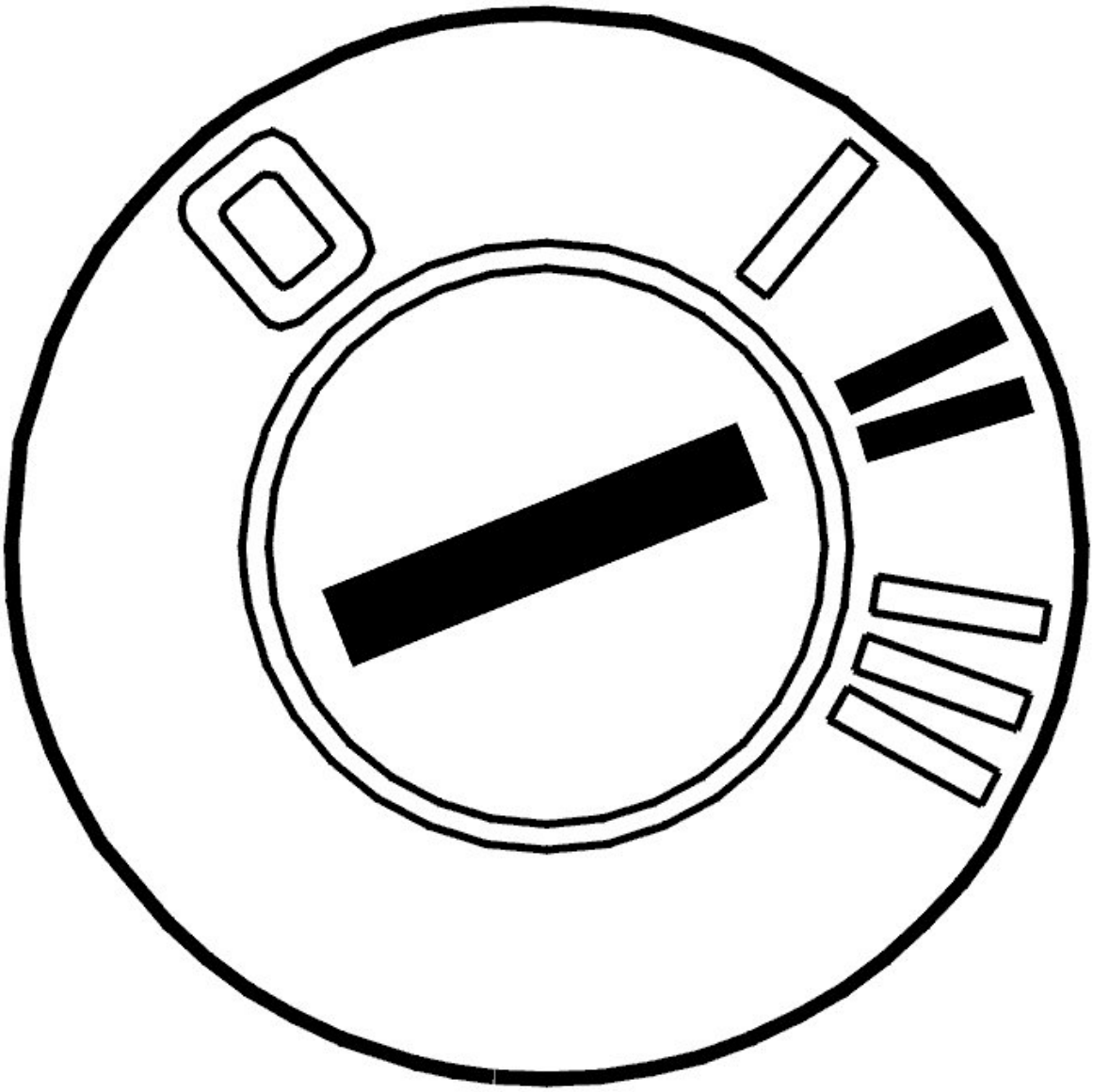
Possible source
- Open circuit in signal wire.

Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Note! Check that the side impact sensor is connected.

Check the cable between the SRS control module and the connector or terminal for the side impact sensor according to the following:

for diagnostic trouble code (DTC) SRS-00B1,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B6,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BB,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00C0,

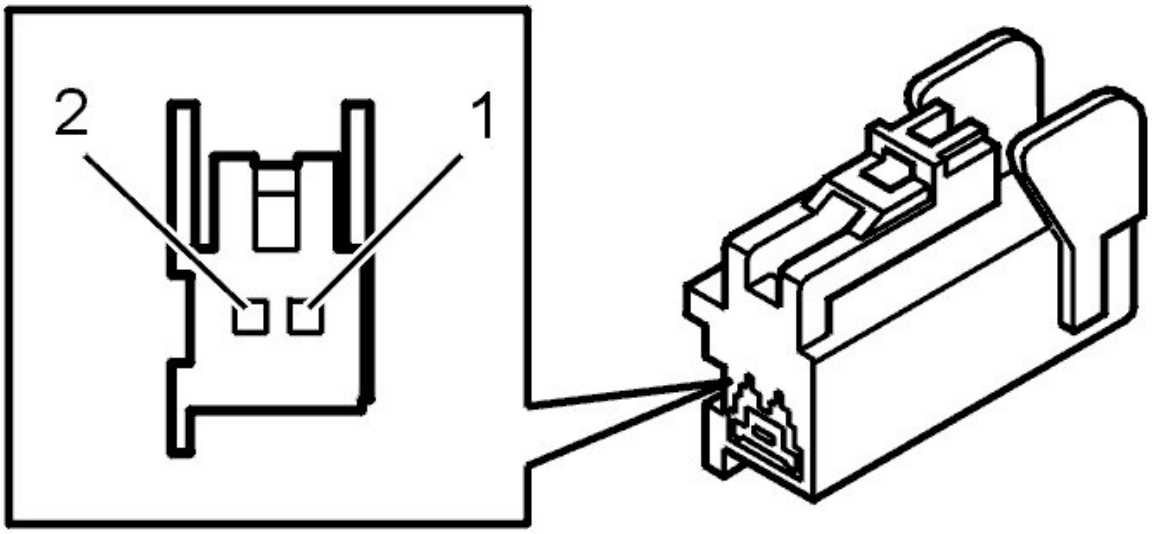
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

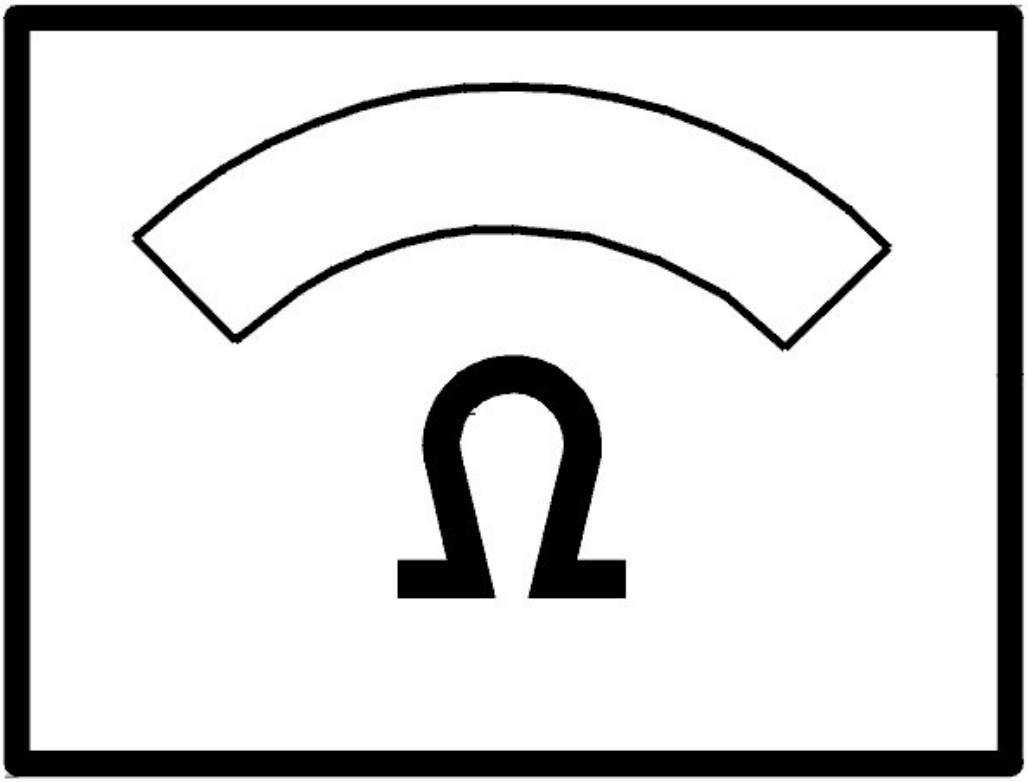
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Was a fault detected?

Yes - Verification

No - Replacing side impact sensor

Replacing side impact sensor

Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

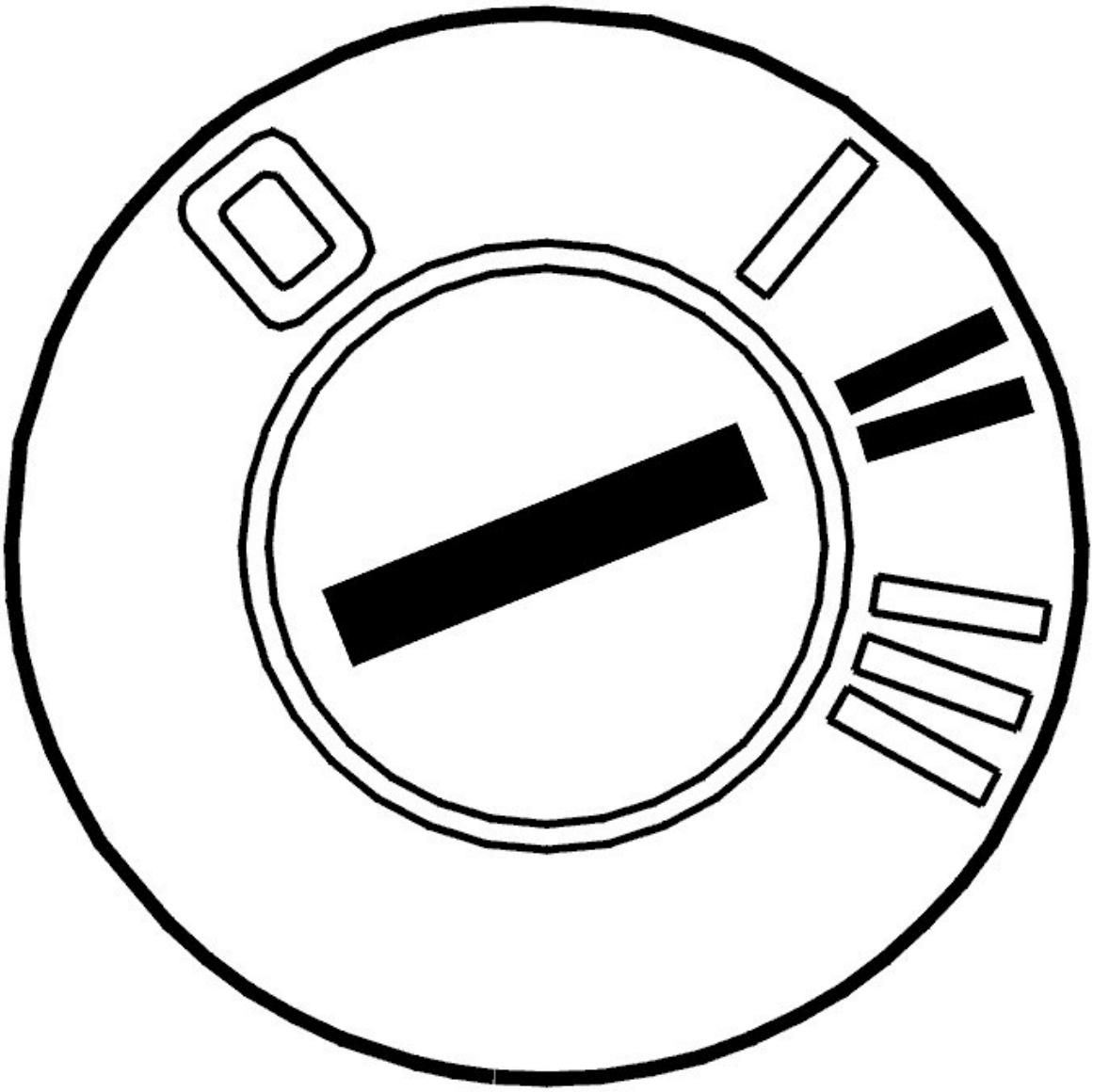
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

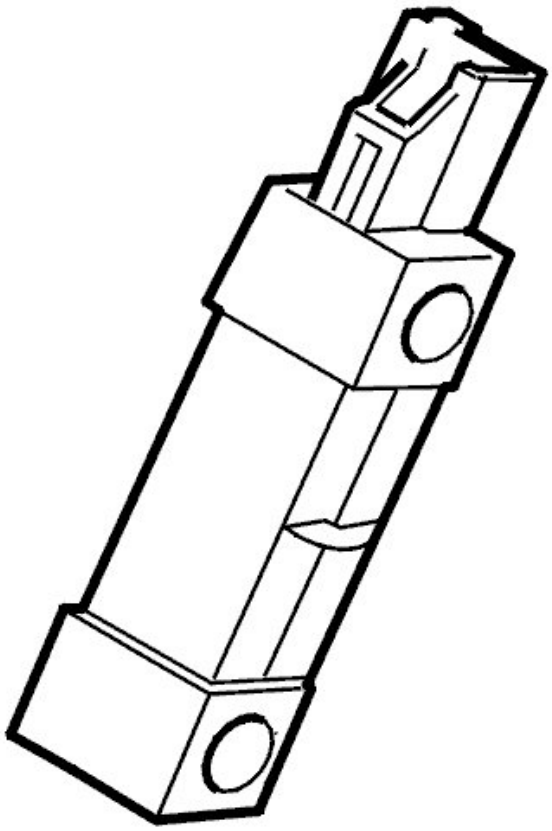
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B7

Condition



Diagnostic trouble code (DTC) SRS-00B7 is stored if the SRS control module identifies an incorrect side impact sensor identity.

Possible source
- Faulty side impact sensor identity.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

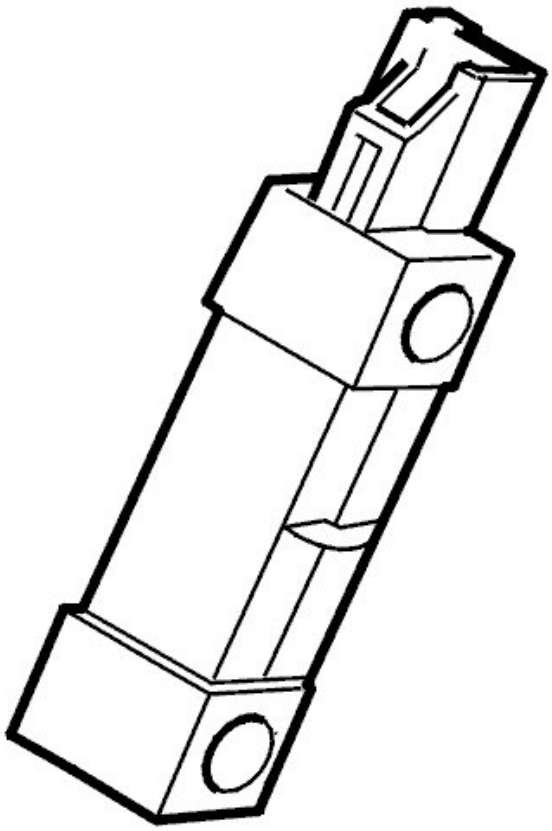
Faulty identity

Faulty identity. Permanent fault

Checking the component

The control module does not recognize the identity of the side impact sensor. Check that the P/N of the side impact sensor is correct.
Ignition on.
Read off the side impact sensor identity by clicking on the VCT2000 symbol.
Replace the side impact sensor if no fault is found.

Other information:
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.



Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

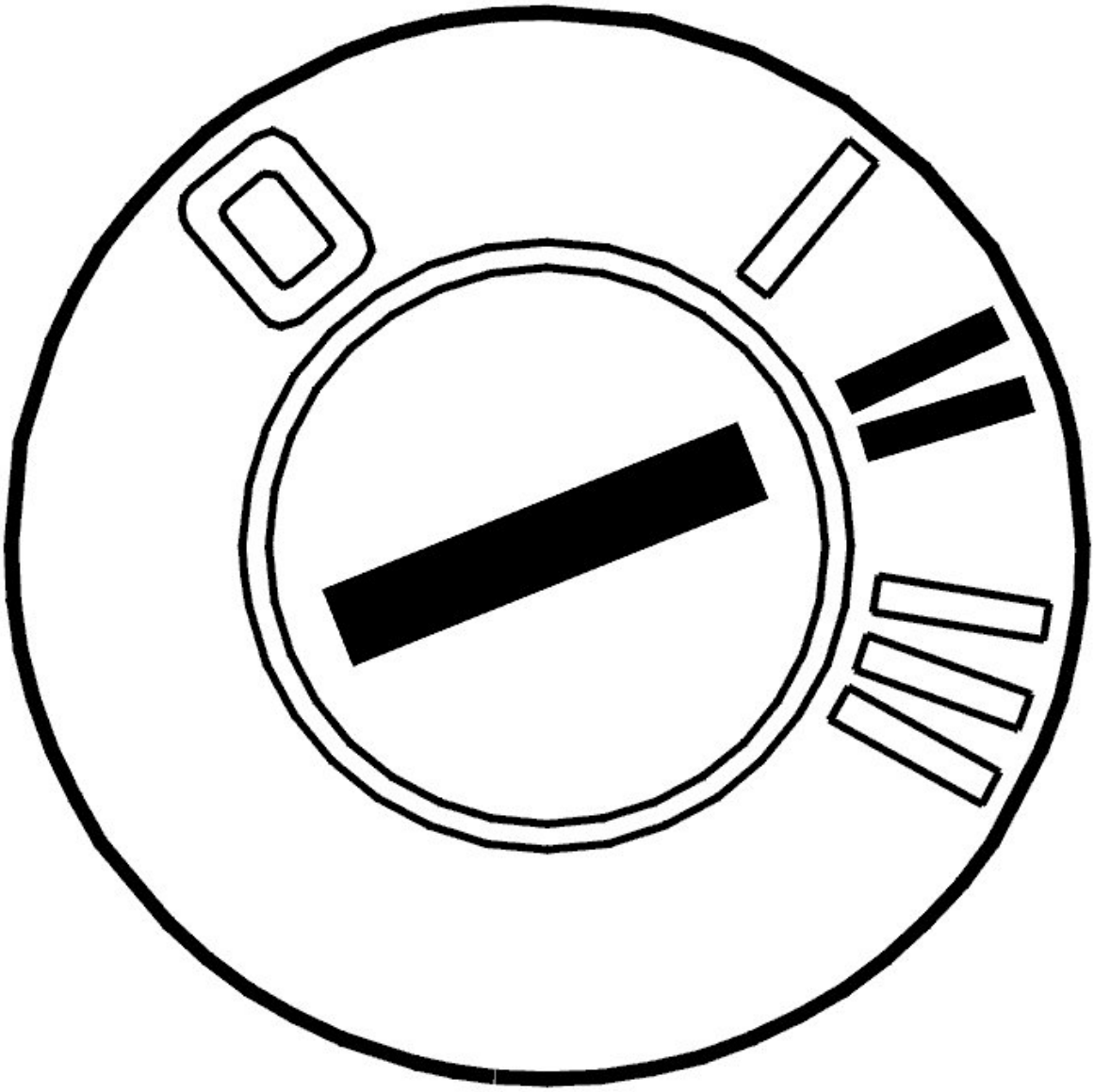
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

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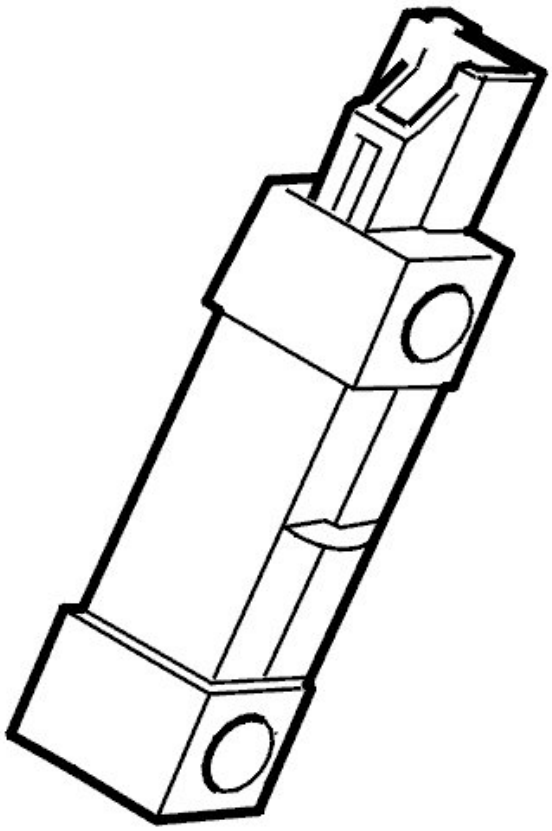
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B7

Condition



Diagnostic trouble code (DTC) SRS-00B7 is stored if the SRS control module identifies an incorrect side impact sensor identity.

Possible source
- Faulty side impact sensor identity.
- Faulty side impact sensor.

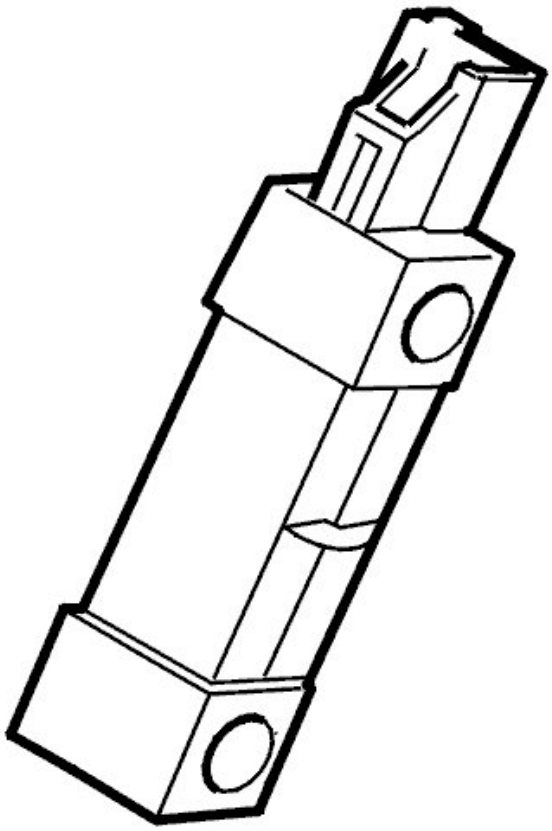
Fault symptom[s]
- The SRS indicator lamp is lit.

Faulty identity

Faulty identity. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

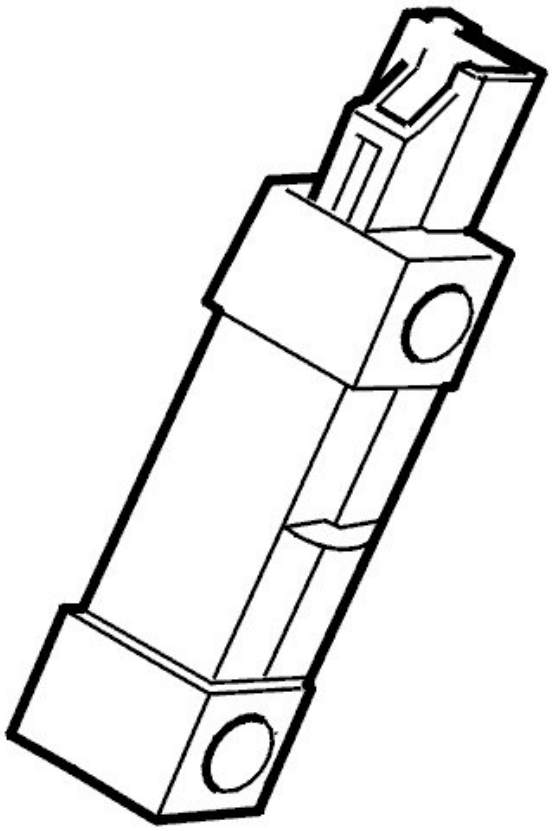
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B8

Condition



Diagnostic trouble code (DTC) SRS-00B8 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

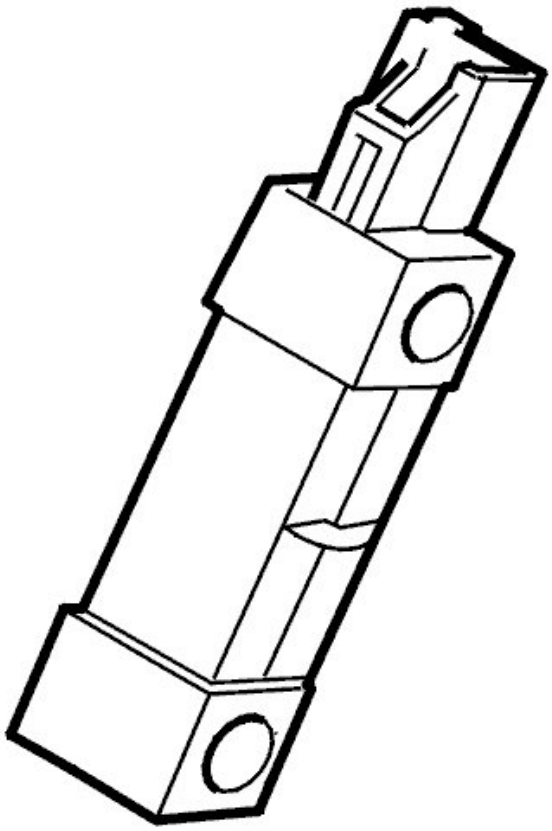
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

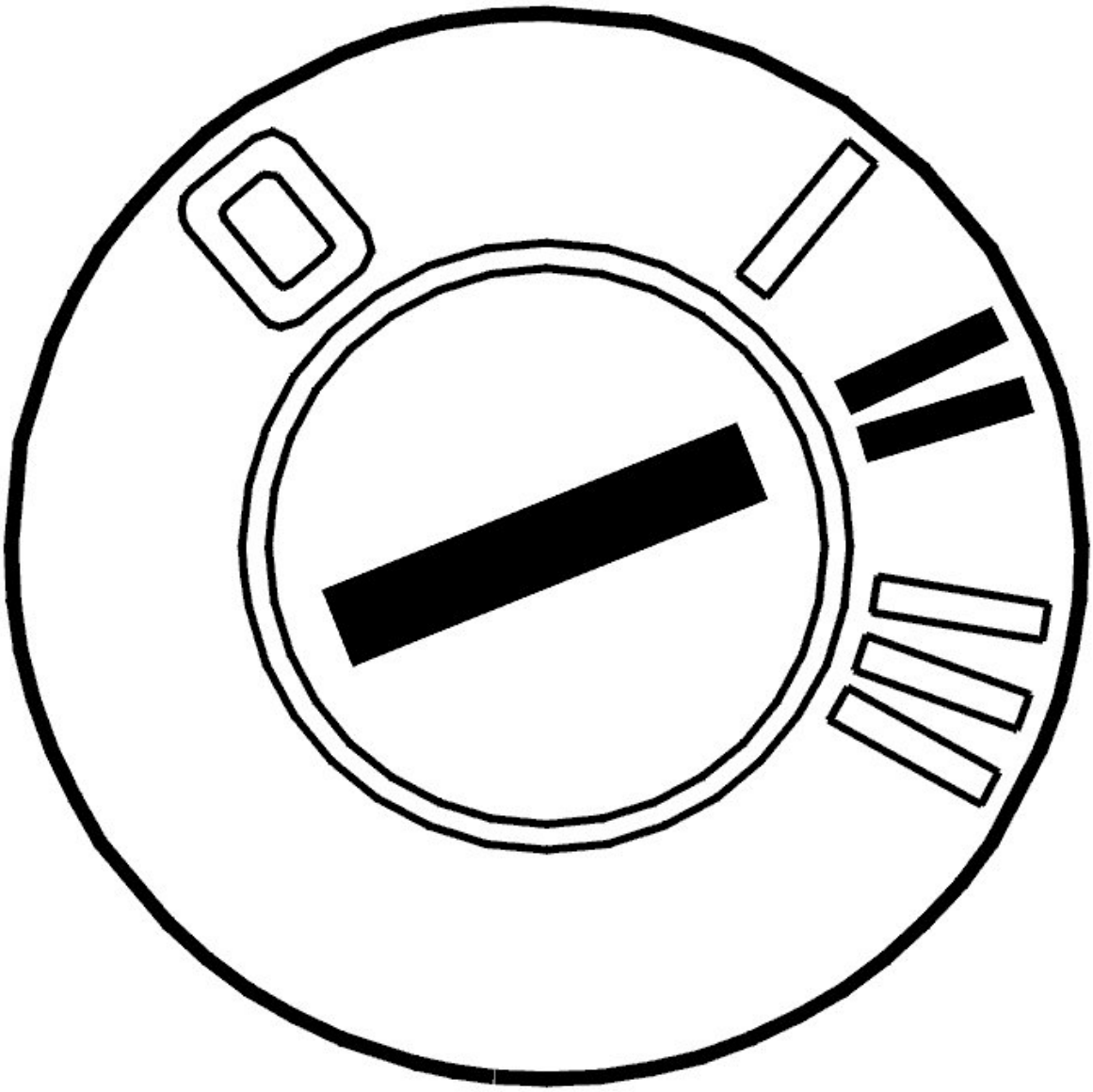
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

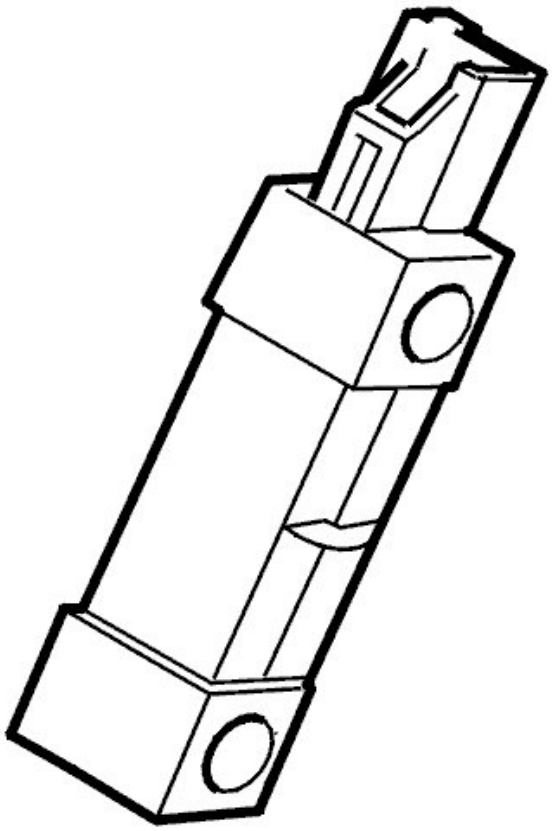
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B8

Condition



Diagnostic trouble code (DTC) SRS-00B8 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

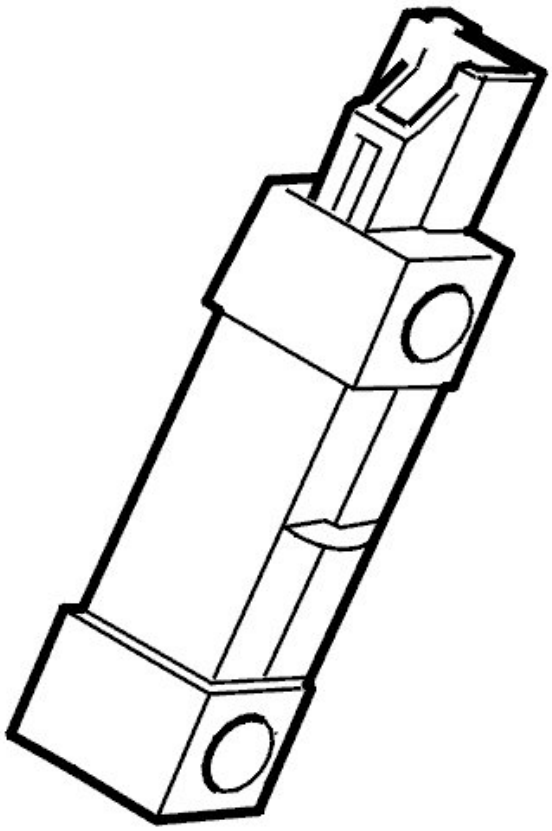
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

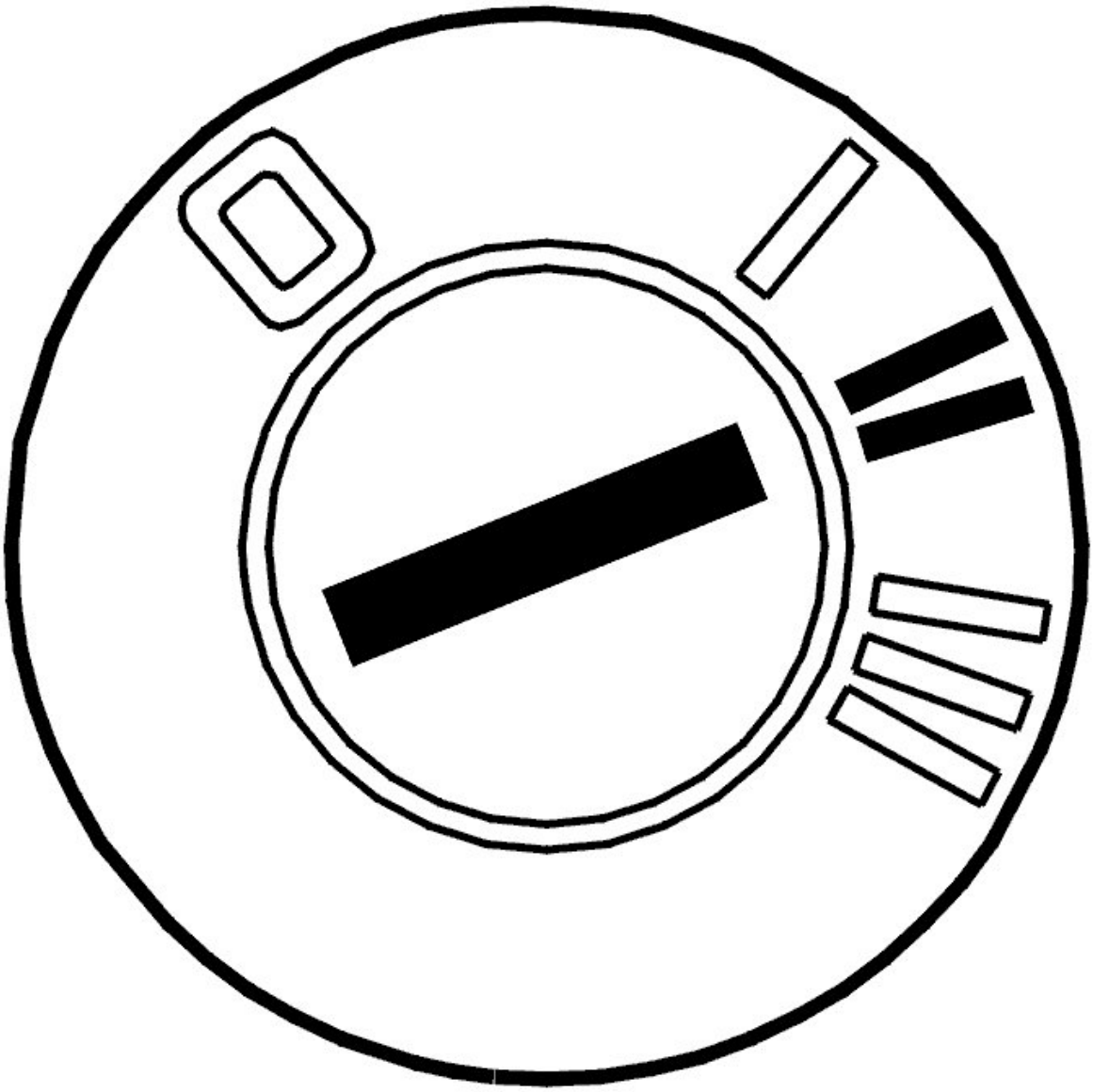
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

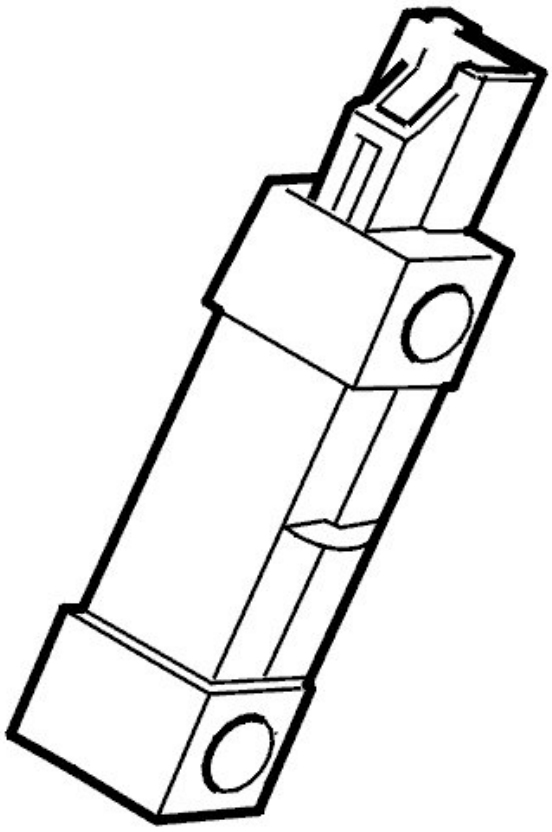
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B9

Condition



Diagnostic trouble code (DTC) SRS-00B9 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Information

Fault-tracing for this diagnostic trouble code (DTC) will not be forthcoming.
For further information about this diagnostic trouble code (DTC), read the diagnostic trouble code (DTC) information.

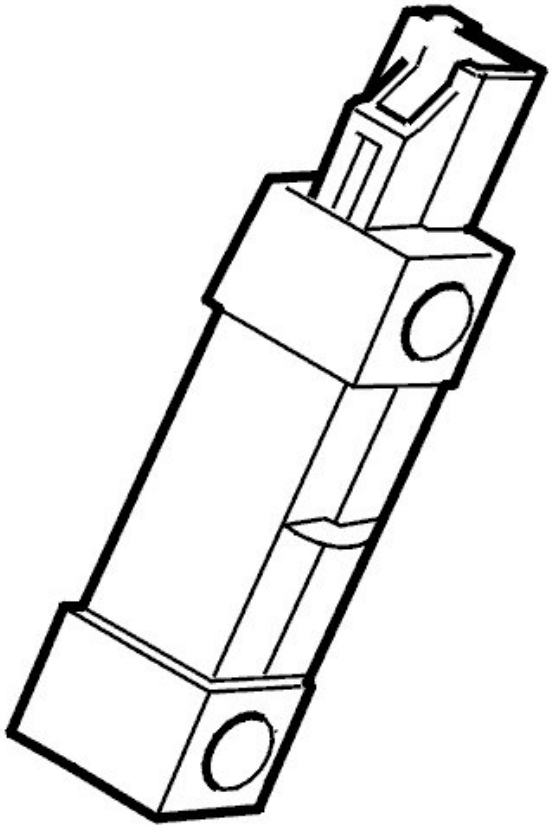
Select "Continue" to finish.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00B9

Condition



Diagnostic trouble code (DTC) SRS-00B9 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Faulty side impact sensor.

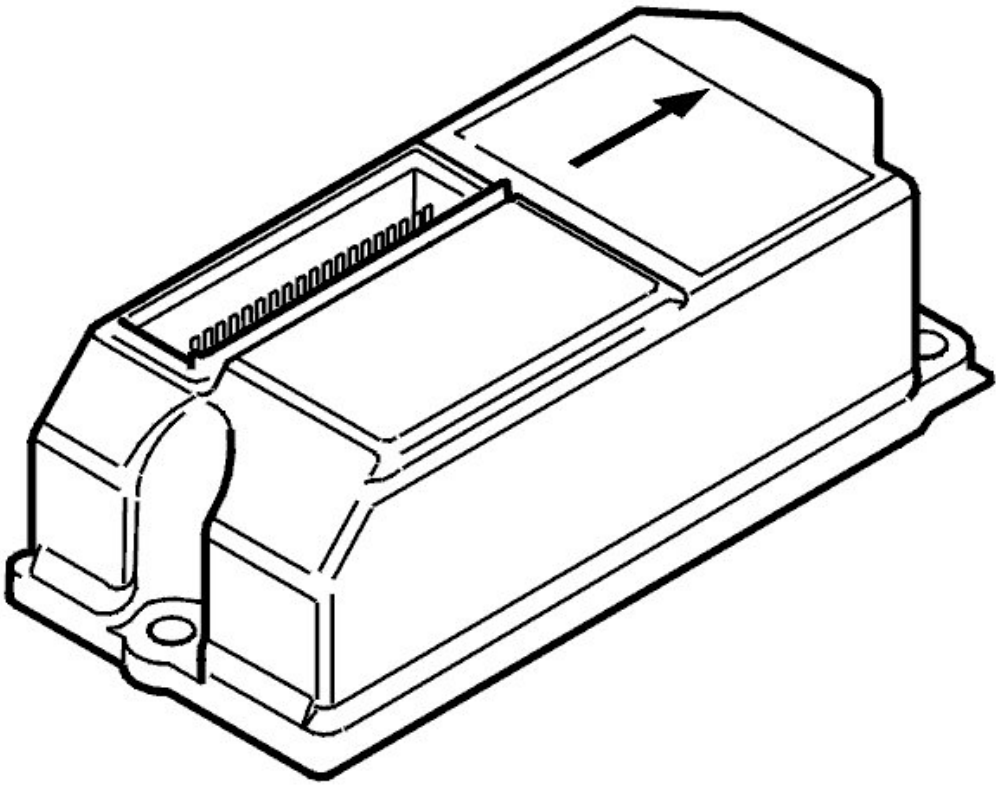
Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

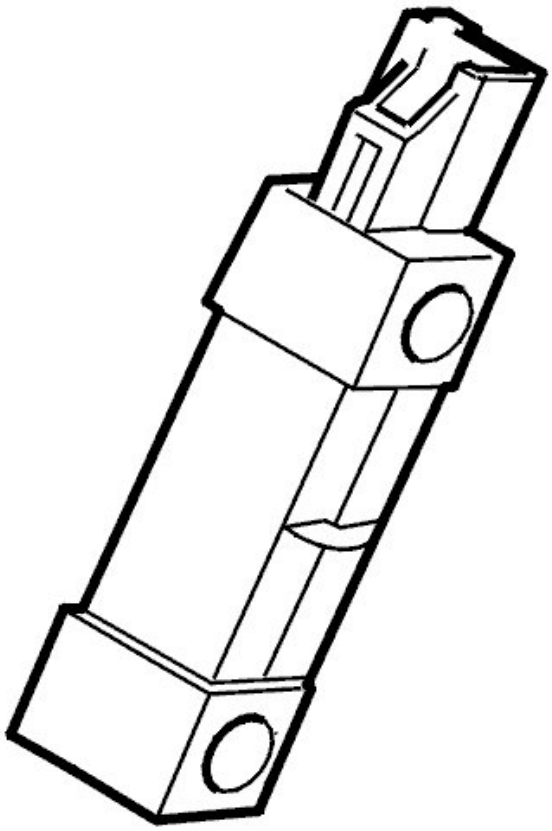
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00BA Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00BA is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire is short circuited to voltage supply
- Faulty side impact sensor.

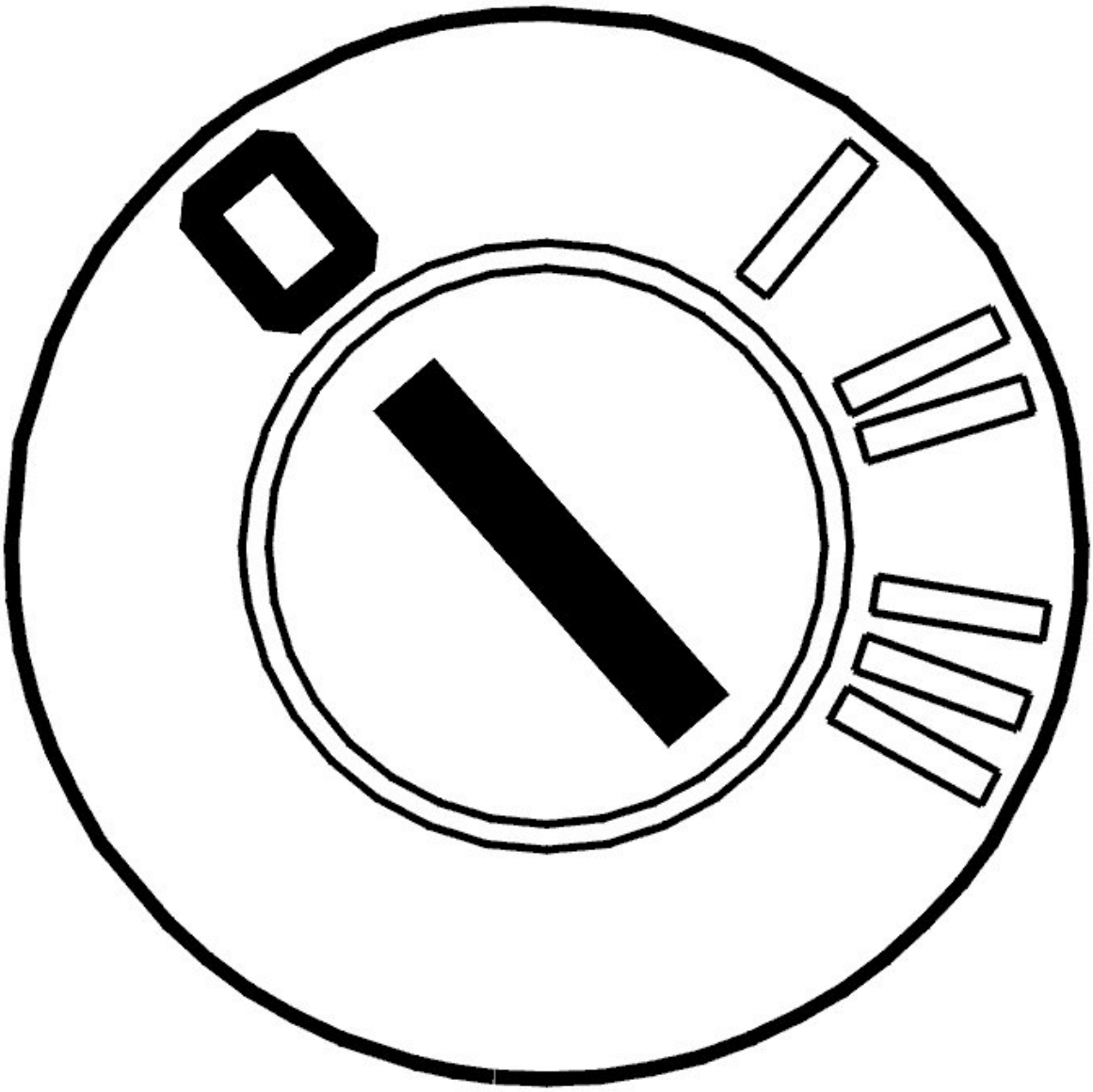
Signal too low:
- Signal wire is short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Intermittent fault

Intermittent fault



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the supplemental restraint system module (SRS) and side impact sensor. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

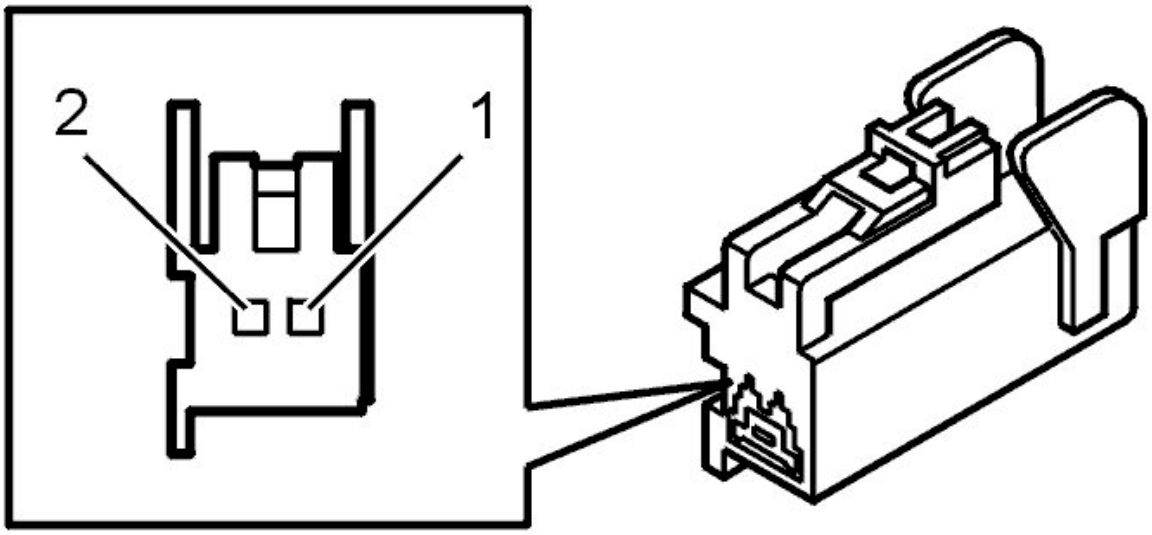
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for an intermittent short-circuit to supply voltage. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and

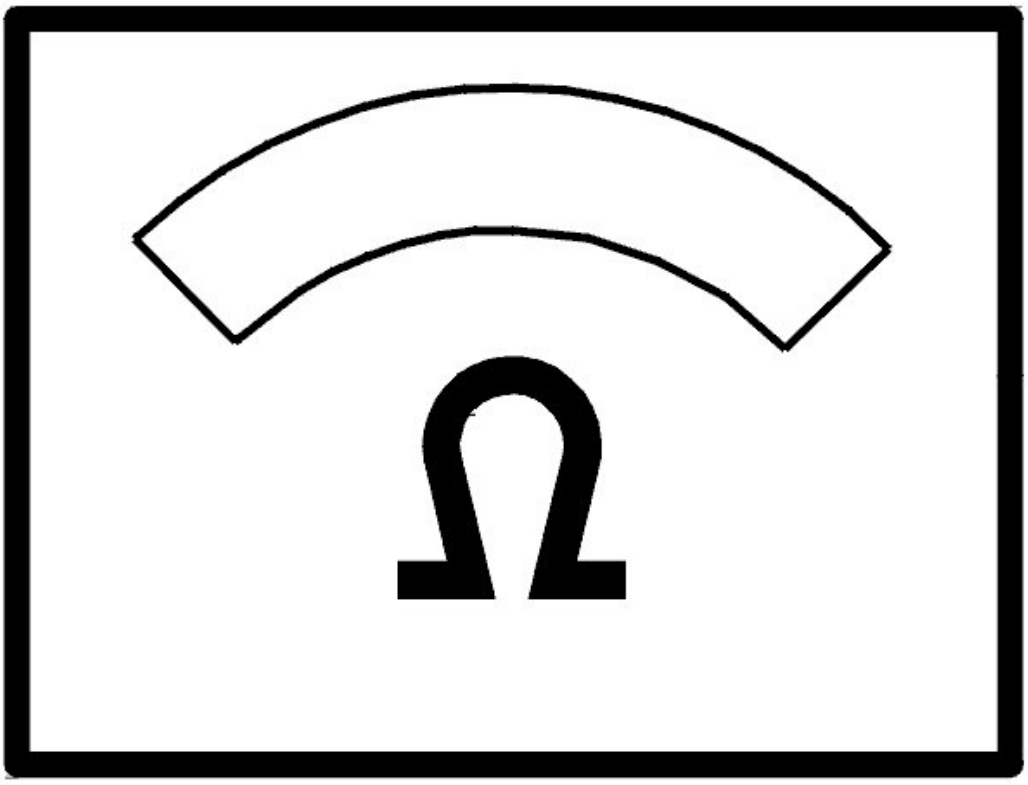
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

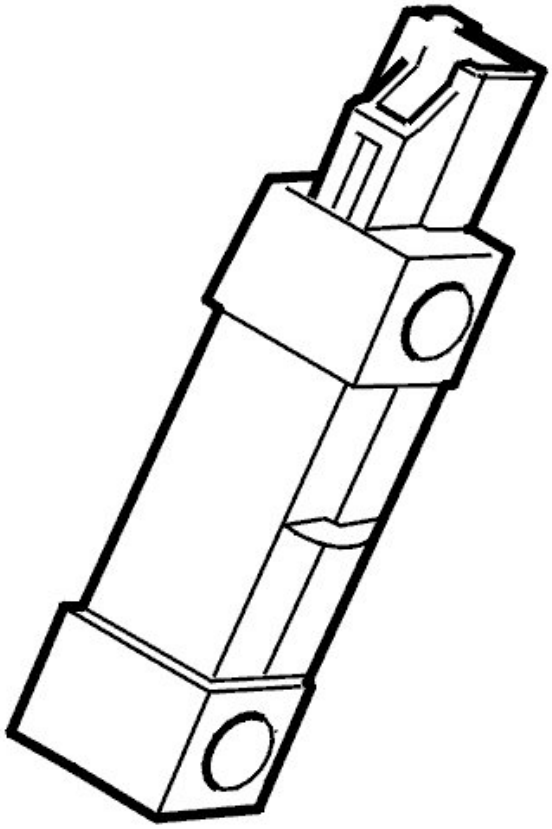
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00BA Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00BA is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire is short circuited to voltage supply
- Faulty side impact sensor.

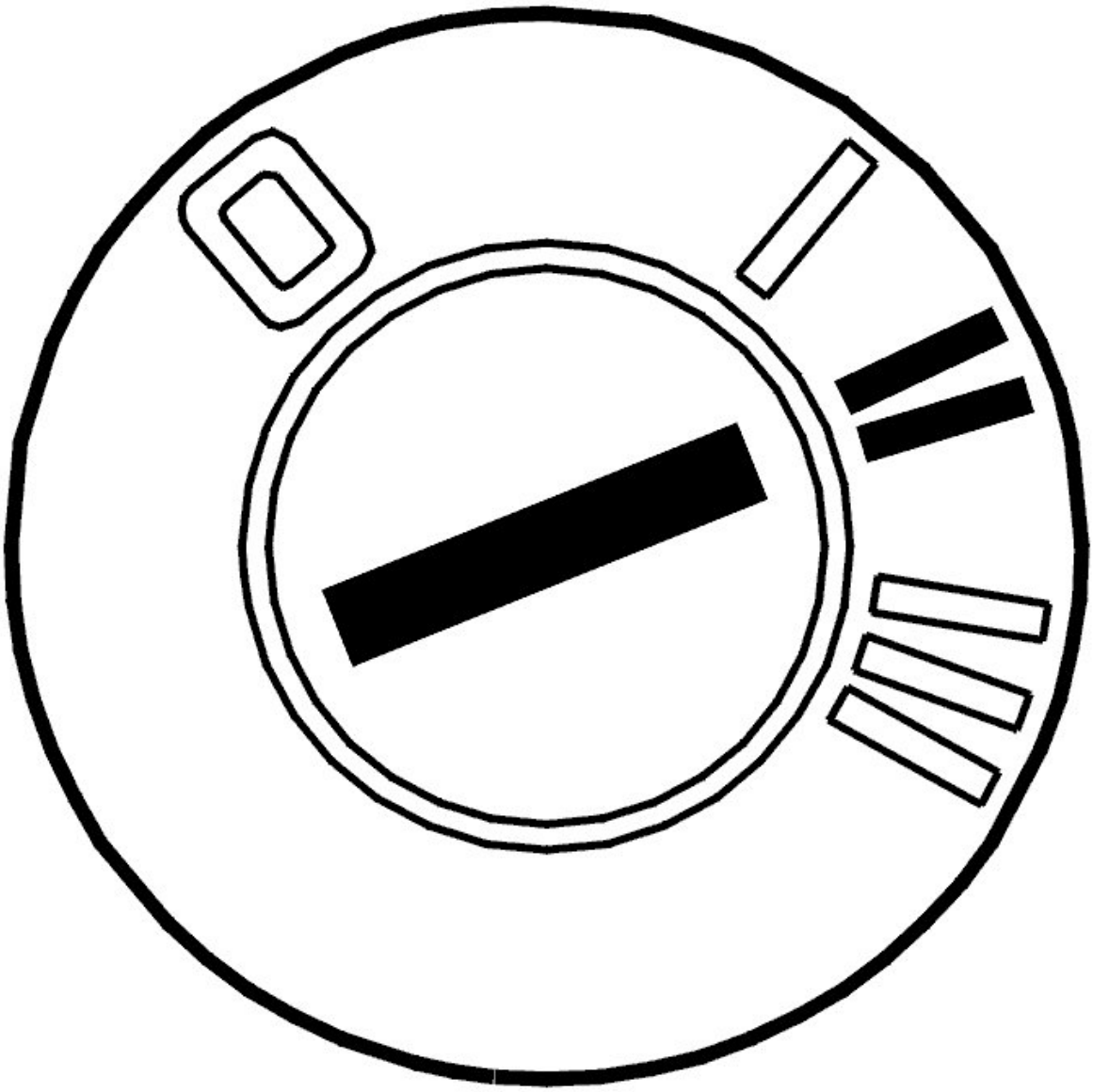
Signal too low:
- Signal wire is short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

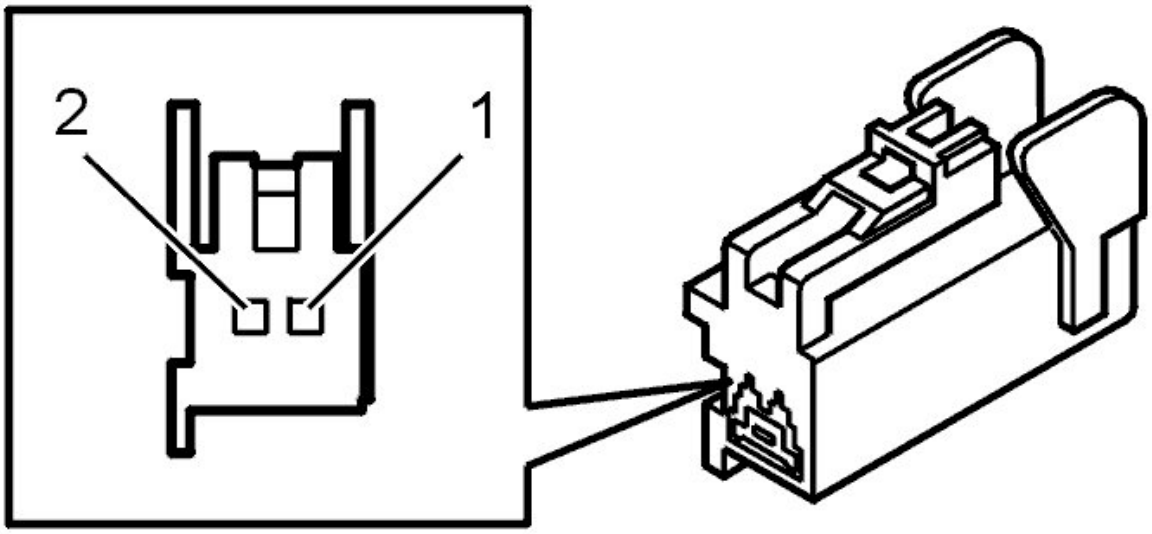
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

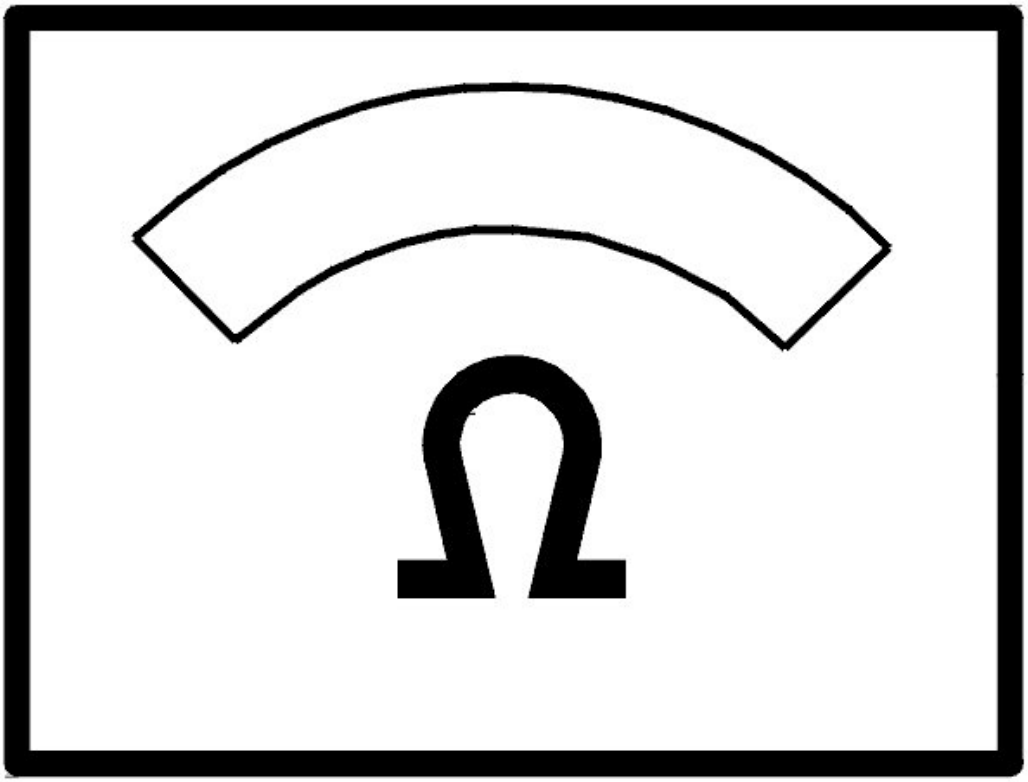
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

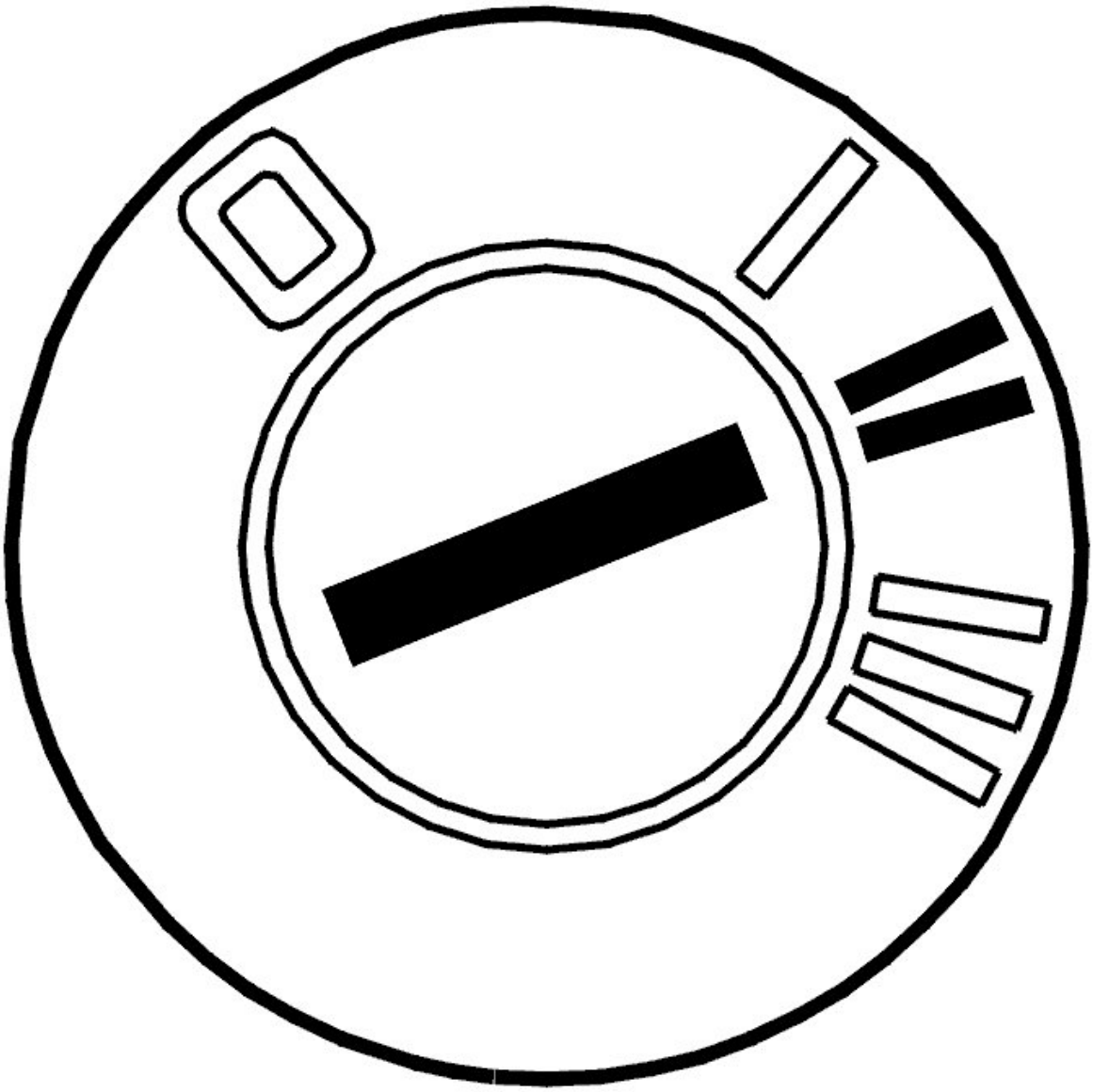
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

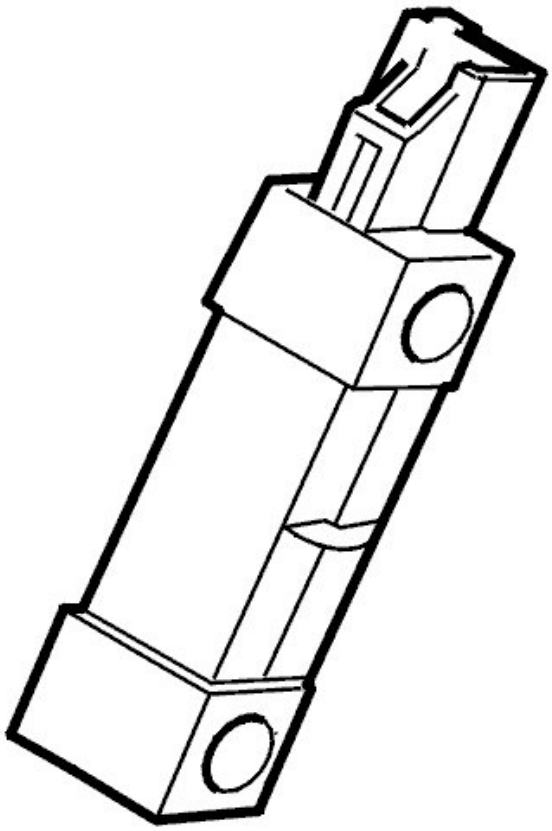
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-00BB Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00BB is displayed.

Substitute value
- Nothing.

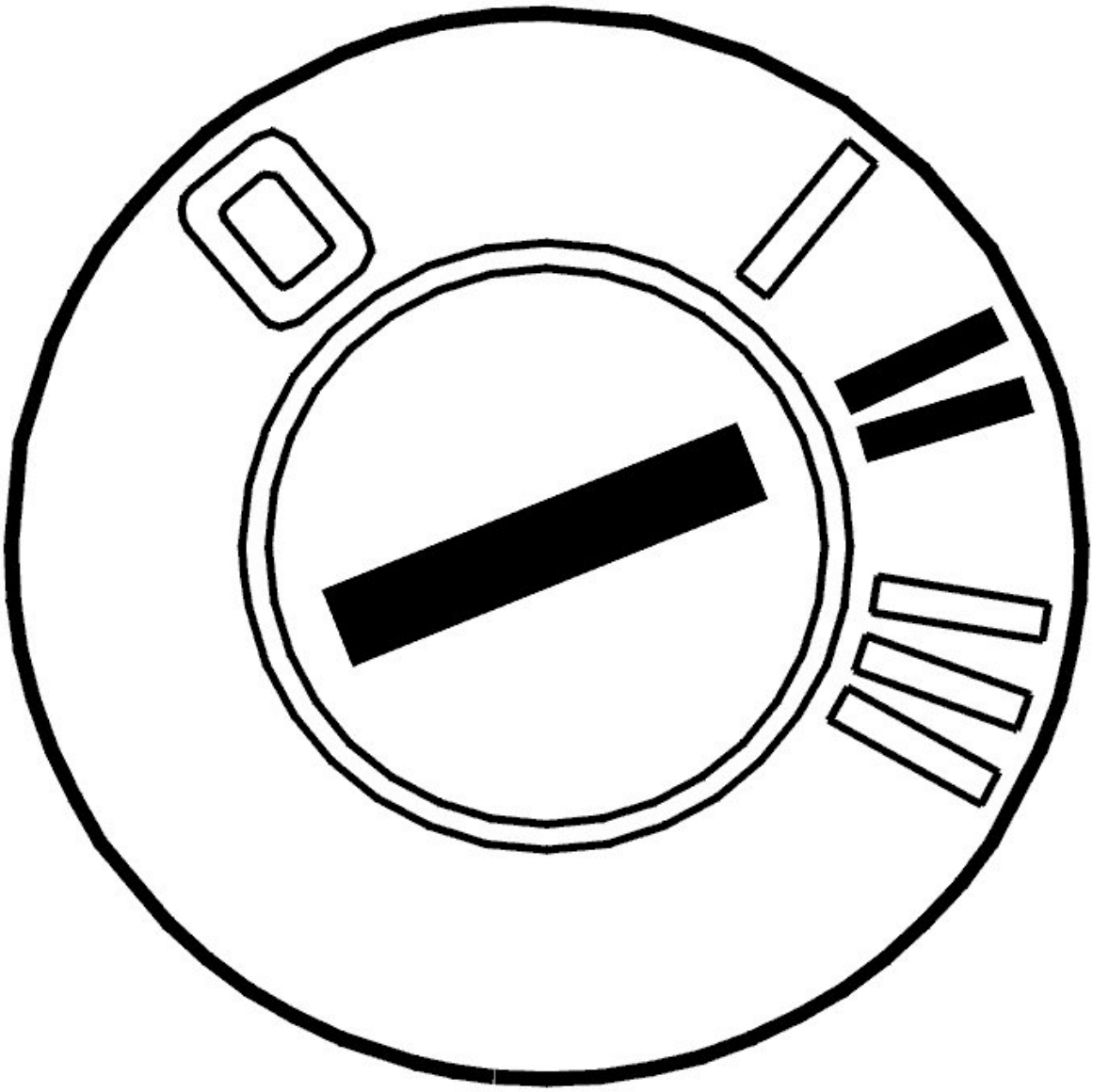
Possible source
- Open circuit in signal wire.

Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Note! Check that the side impact sensor is connected.

Check the cable between the SRS control module and the connector or terminal for the side impact sensor according to the following:

for diagnostic trouble code (DTC) SRS-00B1,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B6,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BB,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00C0,

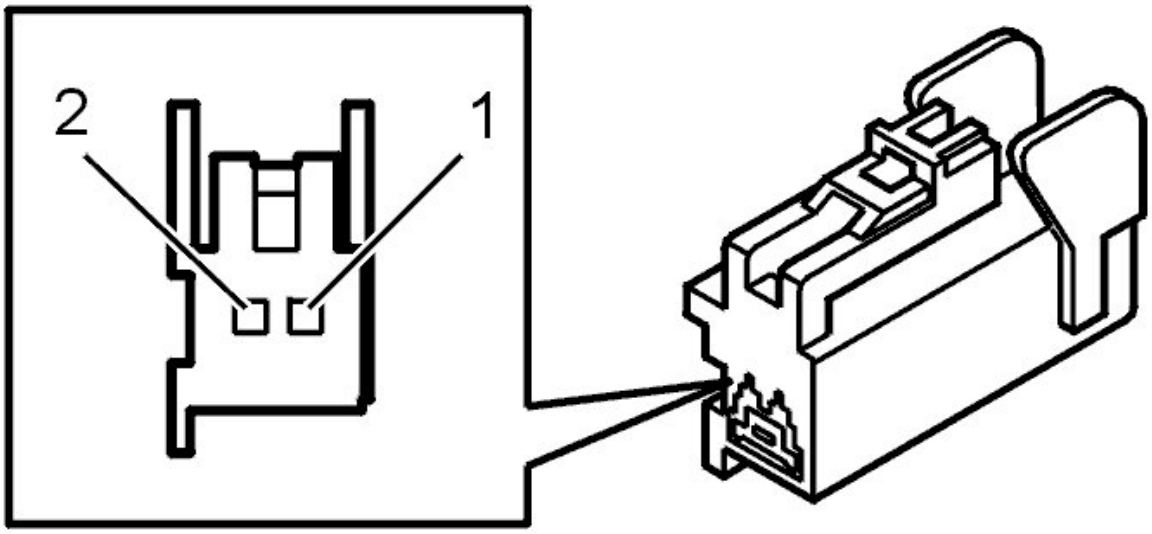
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

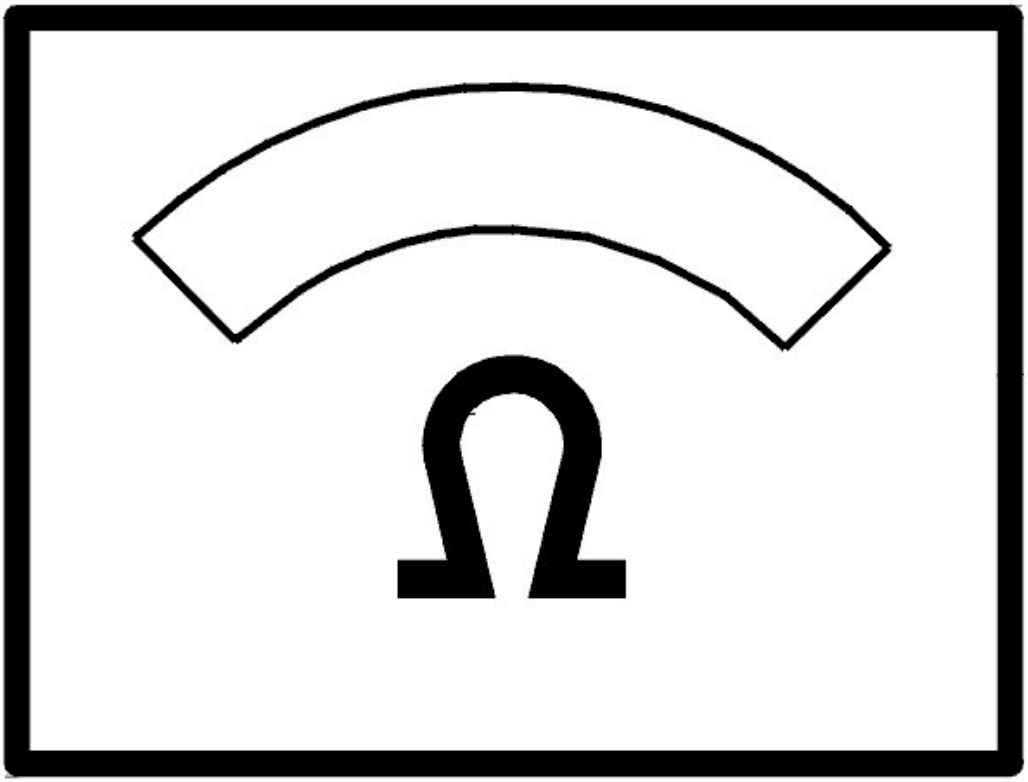
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Was a fault detected?

Yes - Verification

No - Replacing side impact sensor

Replacing side impact sensor

Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

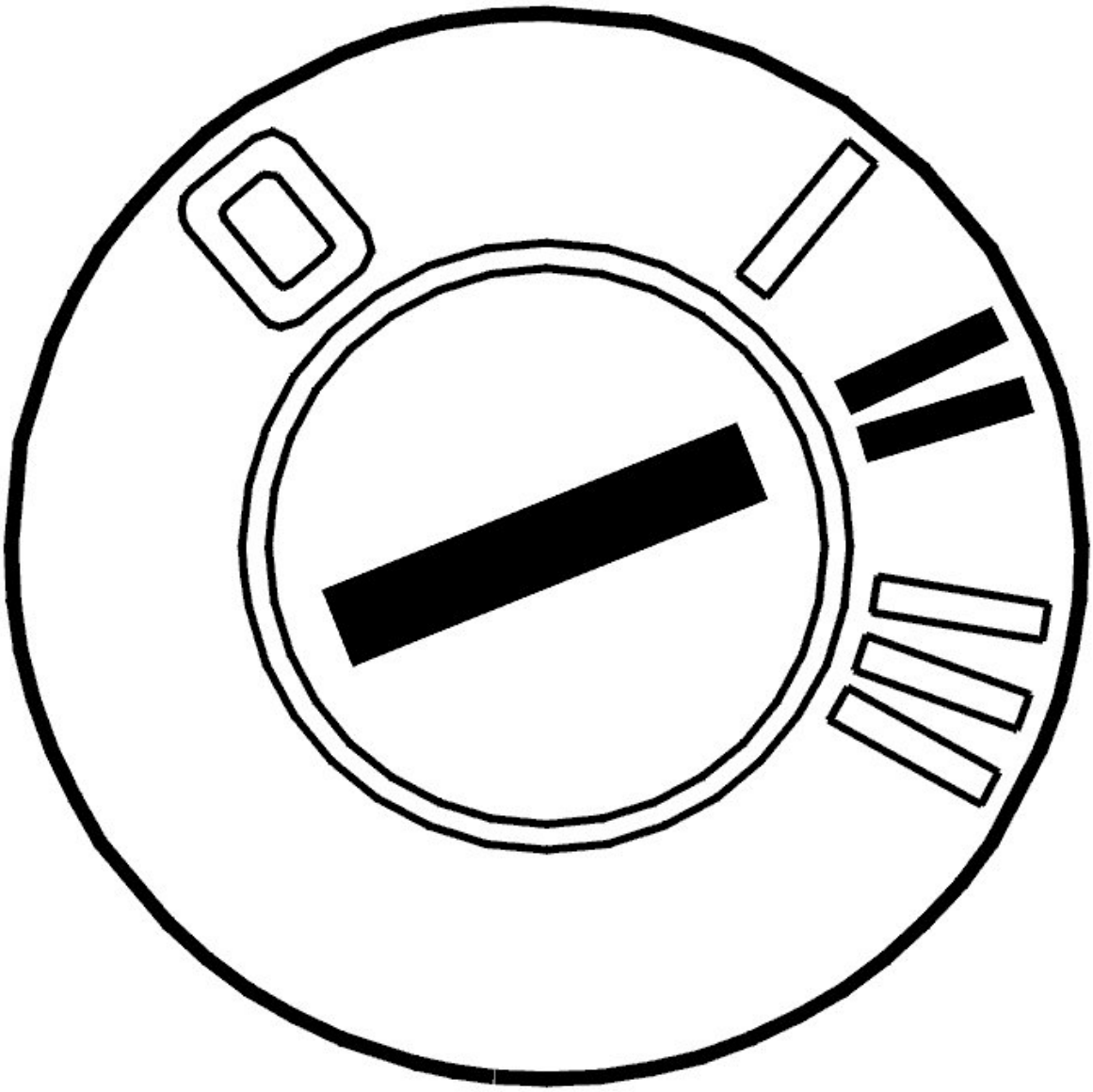
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

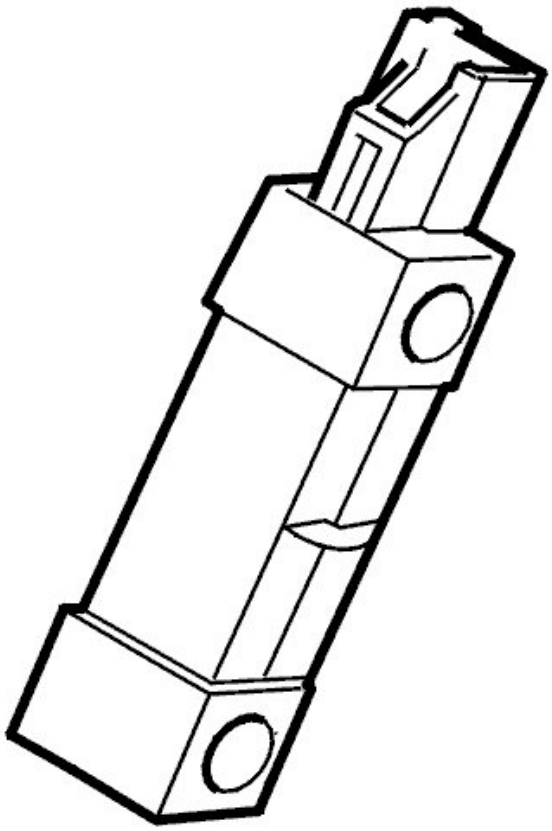
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-00BB Diagnostic trouble code information

Condition



If the supplemental restrain system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00BB is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in signal wire.

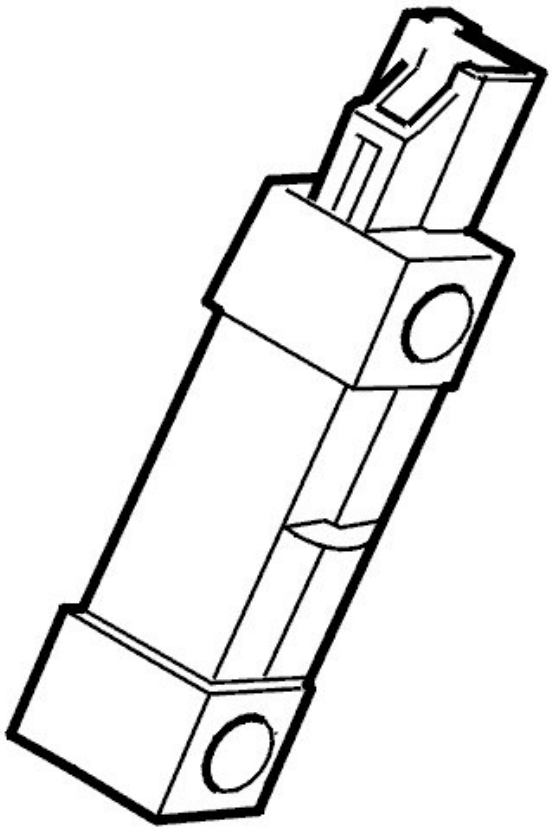
Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

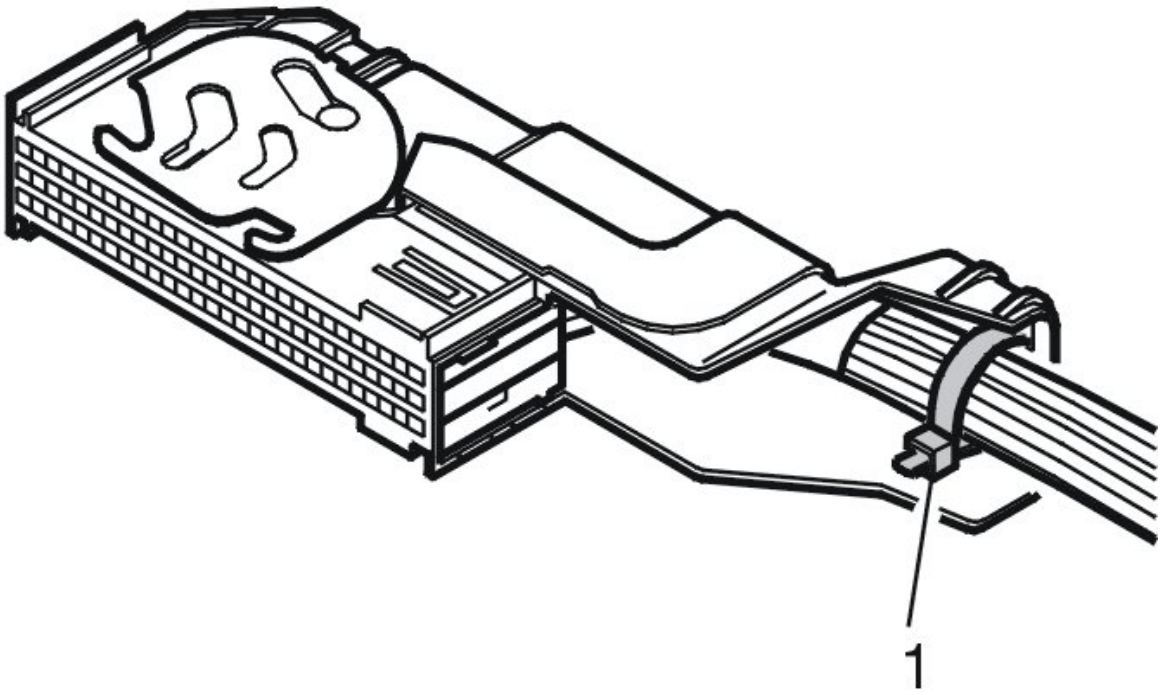
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

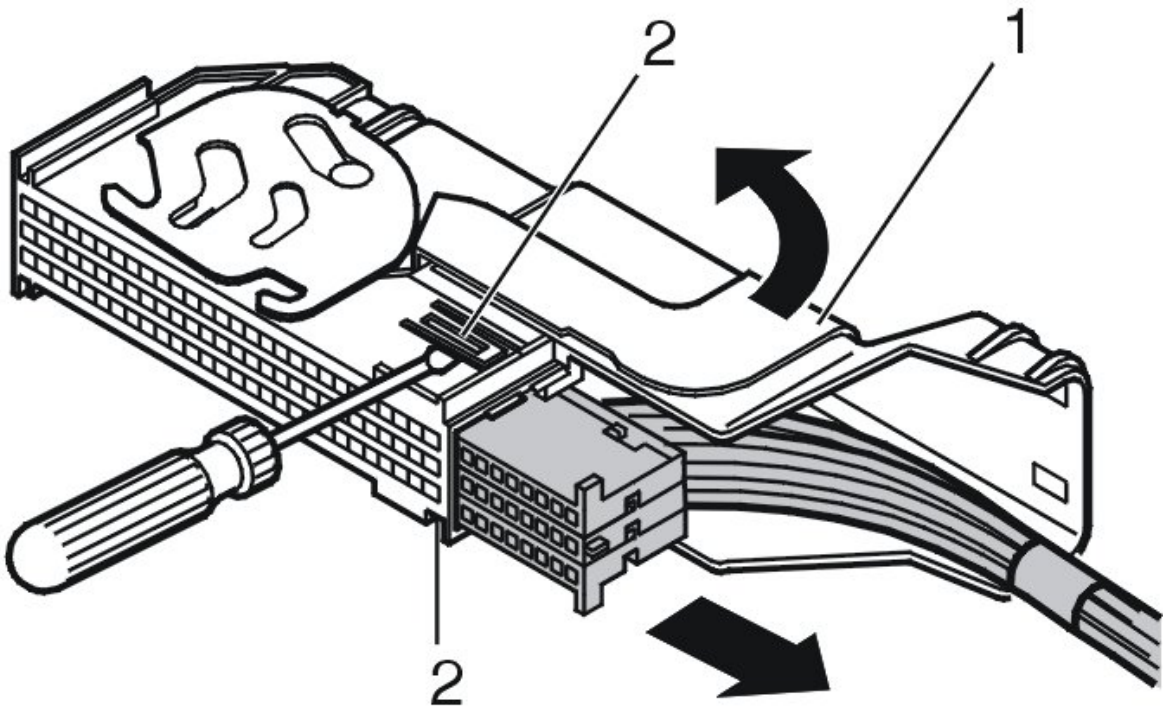
Diagnostic Trouble Codes (DTC) SRS 00BB and 00C0, Fault-Tracing and Repairing

Diagnostic Trouble Codes (DTC) SRS 00BB and 00C0, fault-tracing and repairing

Checking the cable terminals for the SRS sensor



If diagnostic trouble codes (DTC) SRS 00BB and 00C0 occur remove and check the cable terminal in the SRS (supplemental restraint system) sensor connector as follows.
Disconnect the connector for the SRS sensor, see: Removing, replacing and installing Supplemental restraint system (SRS), control module (SRS).
Remove the tie strap (1) around the wiring and connector.



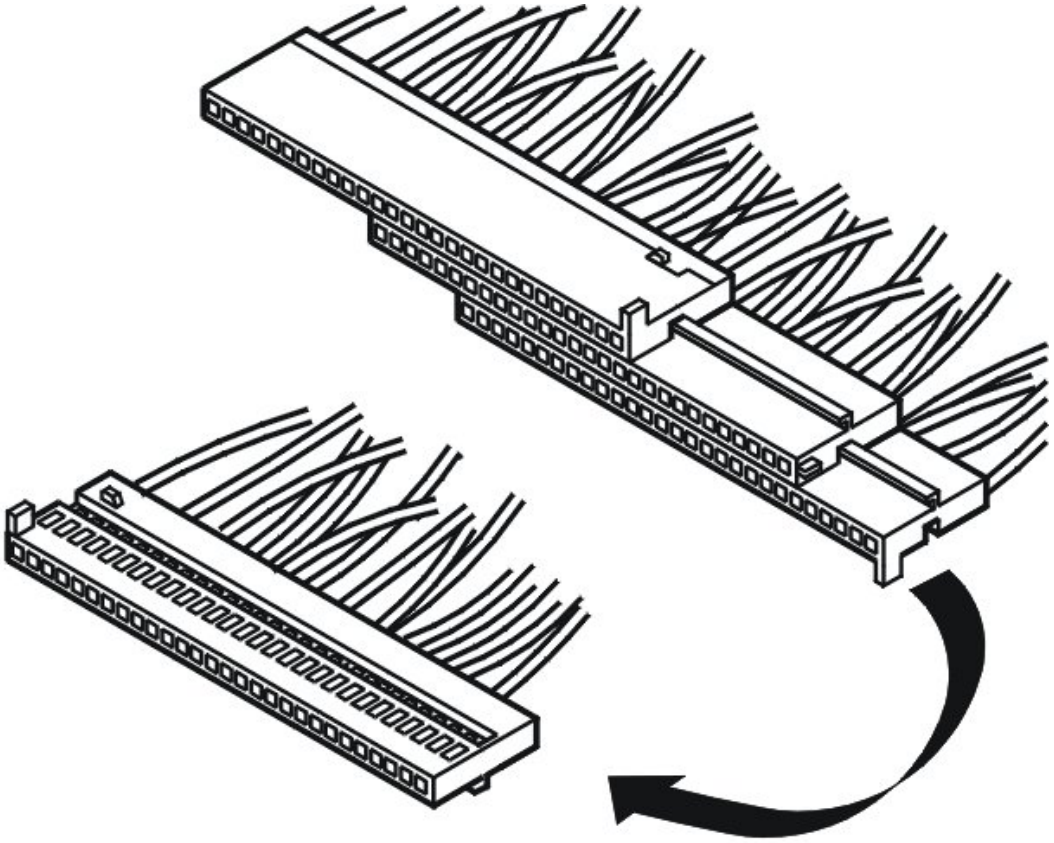
Open the catches (2) on both sides of the connector. Pull the receptacle housings from the casing (1).

Checking the cable terminals

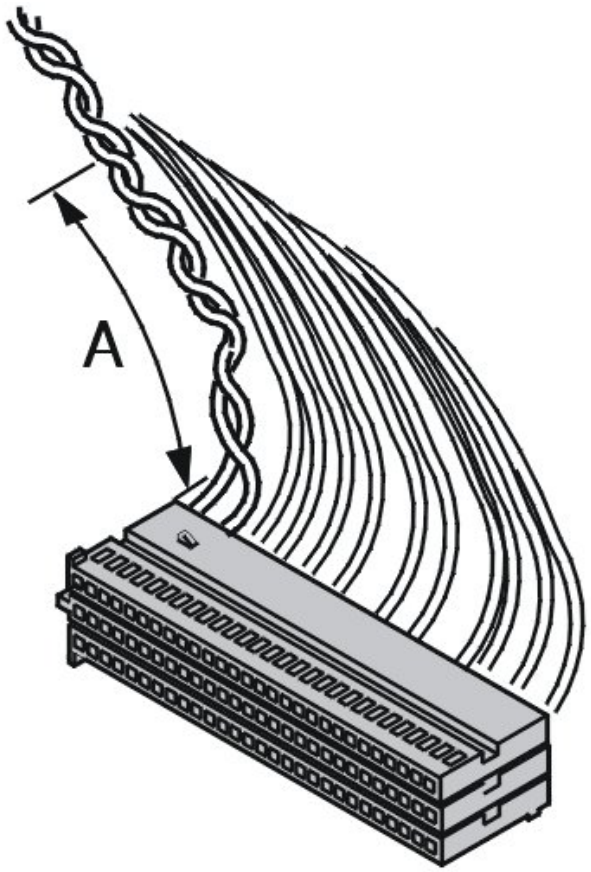
Check the cable terminals in the following terminals:

White receptacle housing terminals A27 and A28.
Blue receptacle housing terminals C27 and C28.
Black receptacle housing terminals B23 B24 B25 B26 B27 and B28.
Check that the cable terminals are not damaged by looking in the cable terminal opening.
The opening must be square, right angled and the cable terminal sides must be align with the receptacle housing.
Damaged receptacle housings are a sign that the cable terminals are also damaged.
If the cable terminals are undamaged, reinstall the connector. See step Installing the connector.
Carry out the final check according to: Removing, replacing and installing Supplemental restraint system (SRS), control module, final check (SRS).
If the cable terminals are damaged, replace the damaged wiring. See step Repairing the wiring.

Repairing the wiring



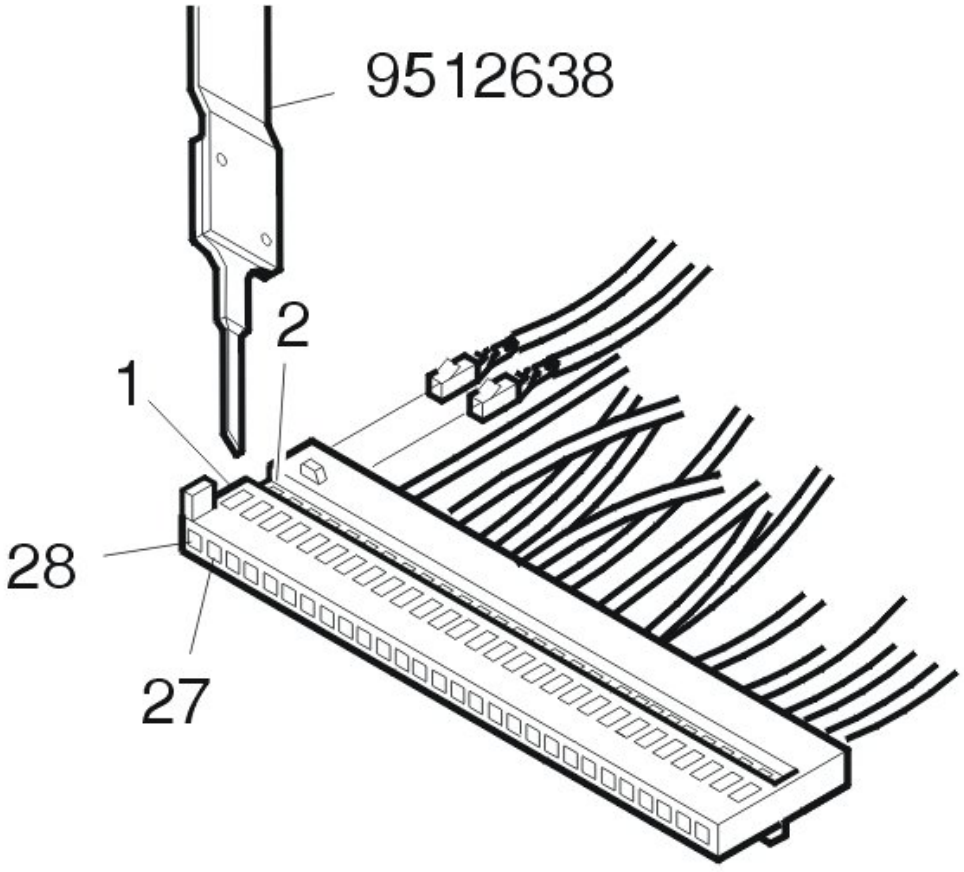
Disconnect the receptacle housings from each other.



Twisted wiring must be replaced in pairs.

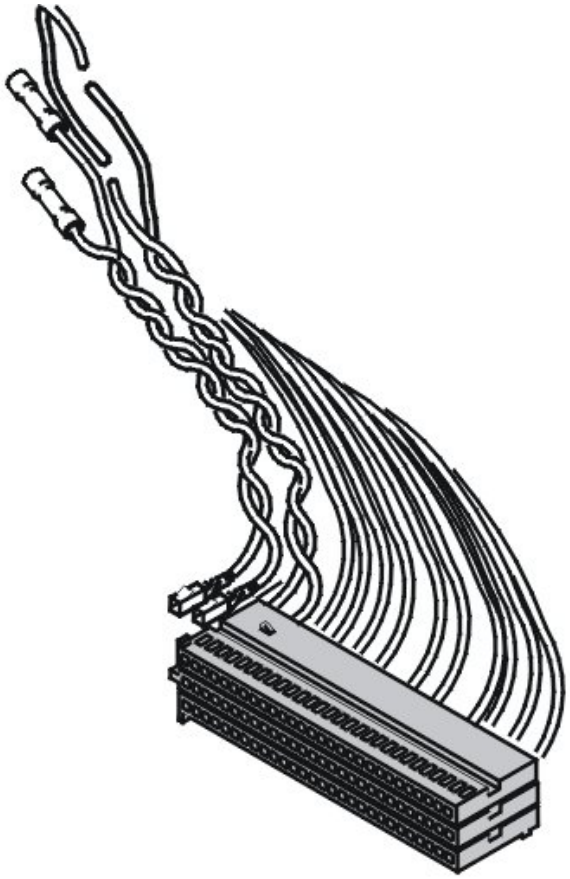
Note! To avoid confusion only replace one pair of cables, or one cable, at a time.

Remove the damaged cable or pair of cables



Note the position of each cable.
Remove the cable terminal by pressing the catch (1). Pull the cable.
Press the catch (2). Pull the cable out.
Use special tool951 2638 Terminal removal tool See: Tools and Equipment/951 2638 Terminal Removal Tool when disconnecting the cable

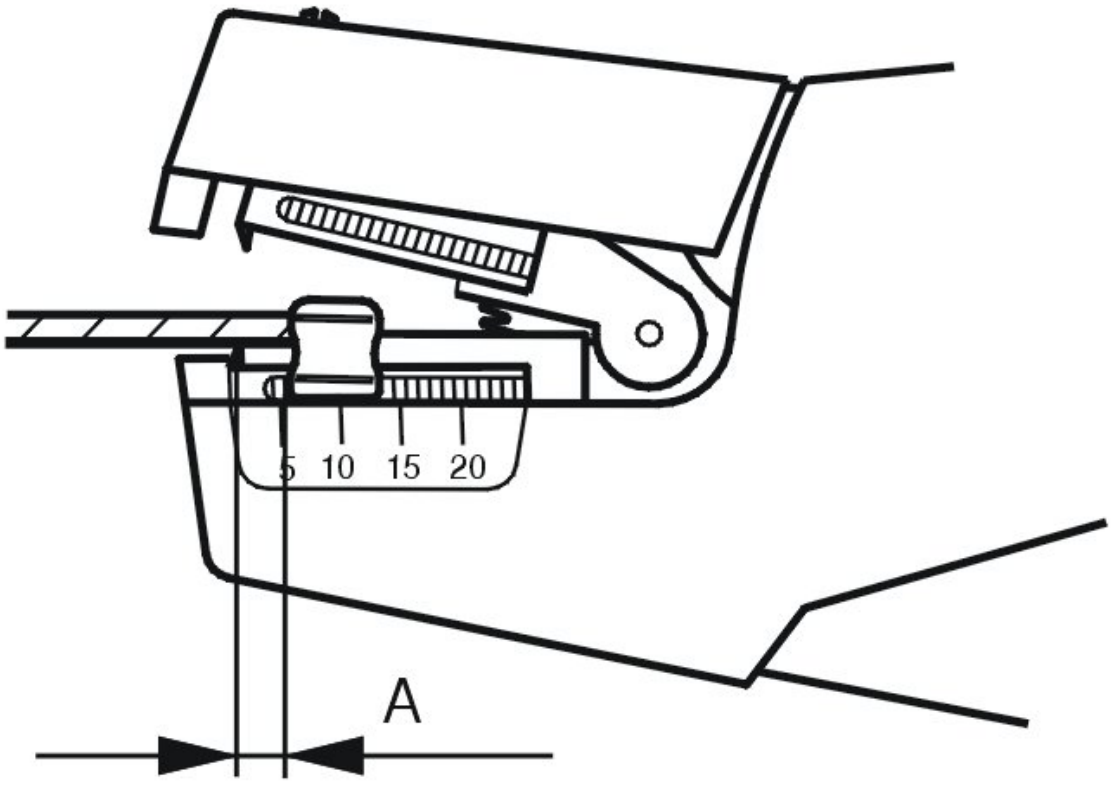
terminals.



Take a**new**cable or pair of cables with the same color markings as the disconnected cables.
Cut off the damaged cable to the same length as the new cable.

Note! The cable lengths are different so that the butt connectors are offset after installation.

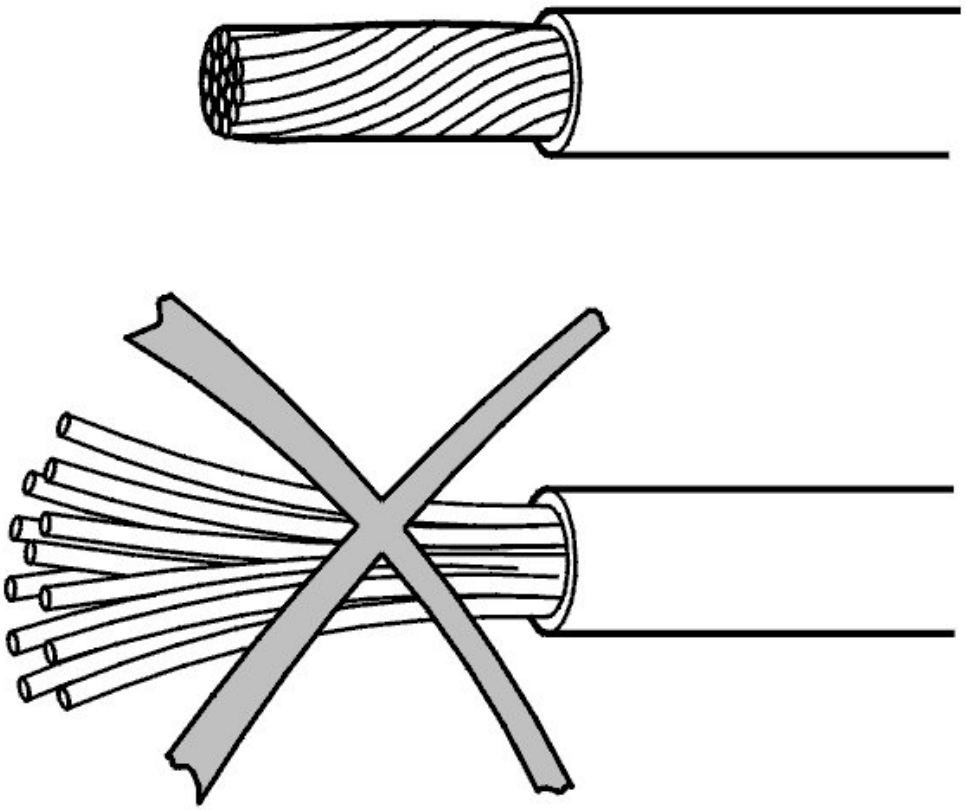
Stripping the cables



Strip**5 mm**(A) off the damaged cable.

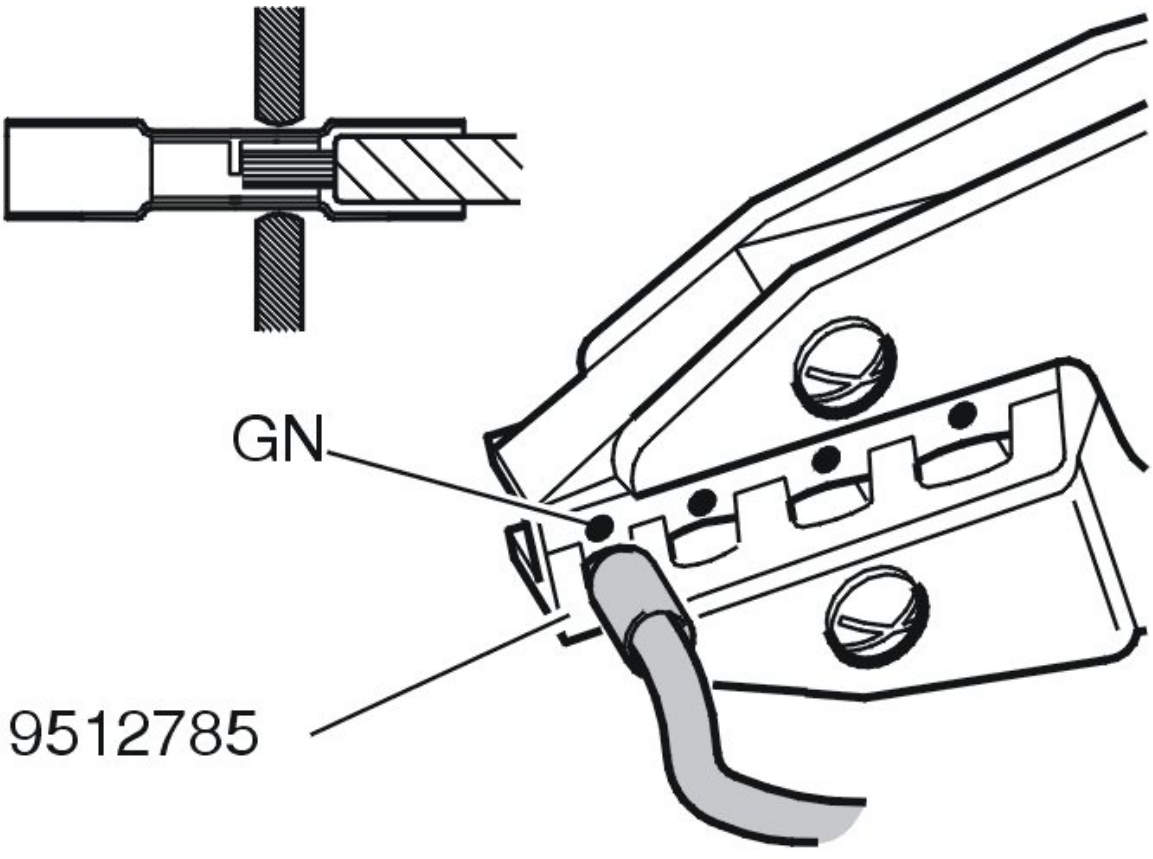
Use cable stripping tool951 2620 Stripping tool See: Tools and Equipment/951 2620 Stripping Tool.

Check the cable ends



Ensure that the cable ends look like the same as in the upper illustration.
It is important to ensure a good result when stripping.

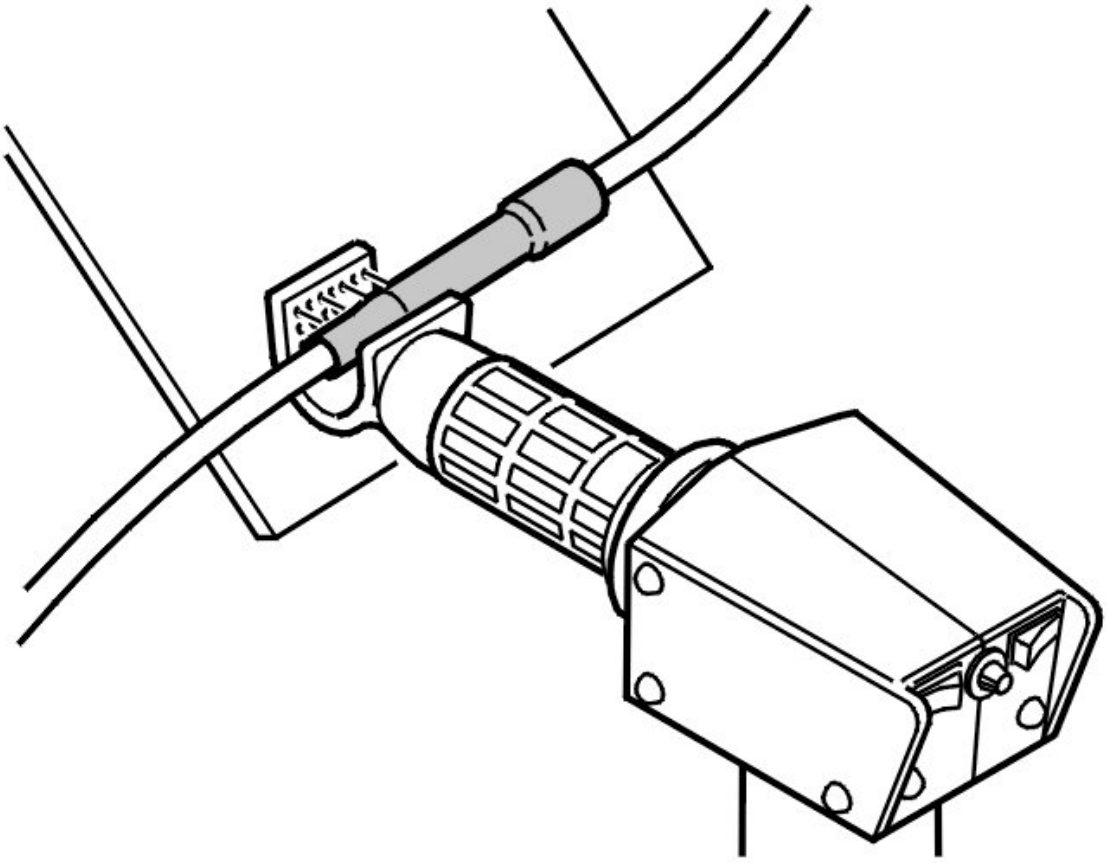
Crimping the butt connector



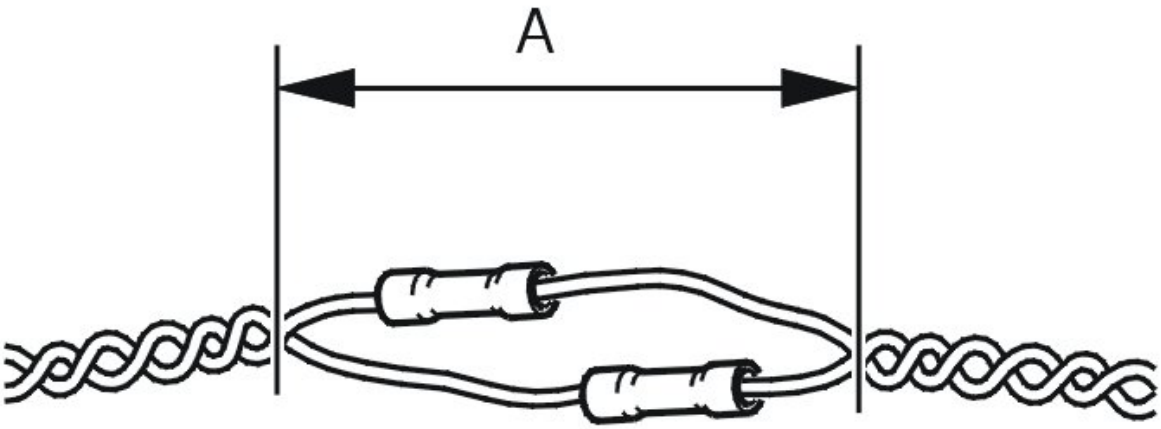
Insert the cable with the same color marking in the butt connector.

Crimp using the green marked cut-out on special tool951 2785 Crimping tool See: Tools and Equipment/951 2785 Crimping Tool.
Check the crimping by looking and feeling that the cable is correctly installed.

Crimping the butt connectors

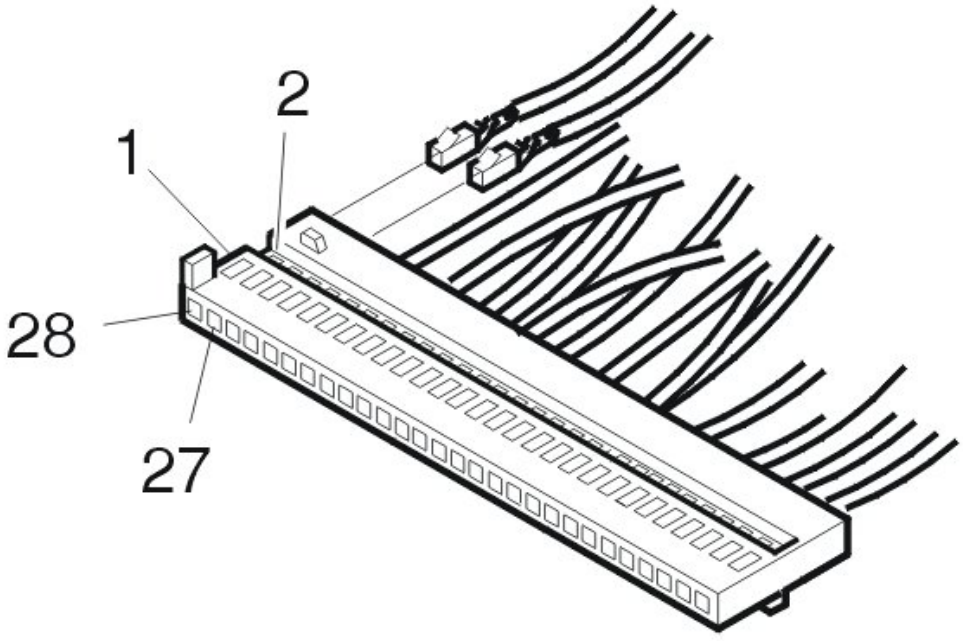


Use hot-air gun951 2777 Hot-air gun See: Tools and Equipment/951 2777 Hot-Air Gun and nozzle951 2778 Nozzle See: Tools and Equipment/951 2778 Nozzle.
Set the hot-air gun to flow 2 and set the temperature between 2 and 3.
Protect surrounding components from heat.
Position the butt connector in the nozzle and heat so that the adhesive forces its ways out of both ends.



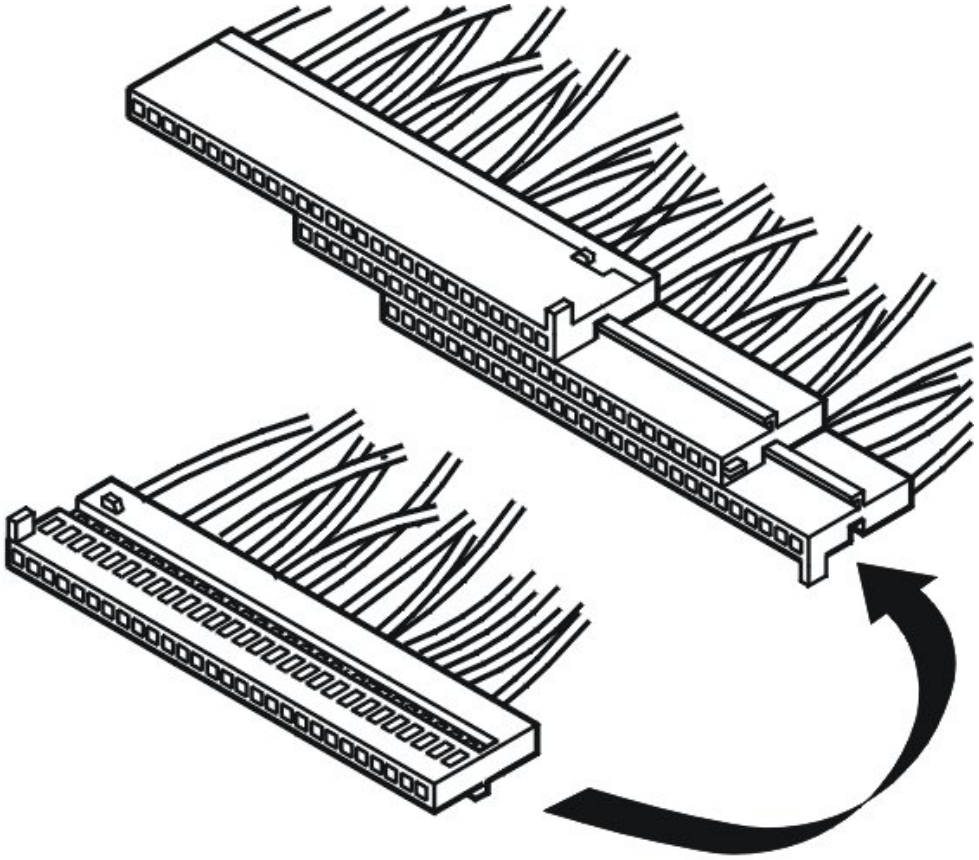
A maximum of**100 mm**(A) of the twisted wiring can be untwisted at the join.

Installing the wiring in the receptacle housing

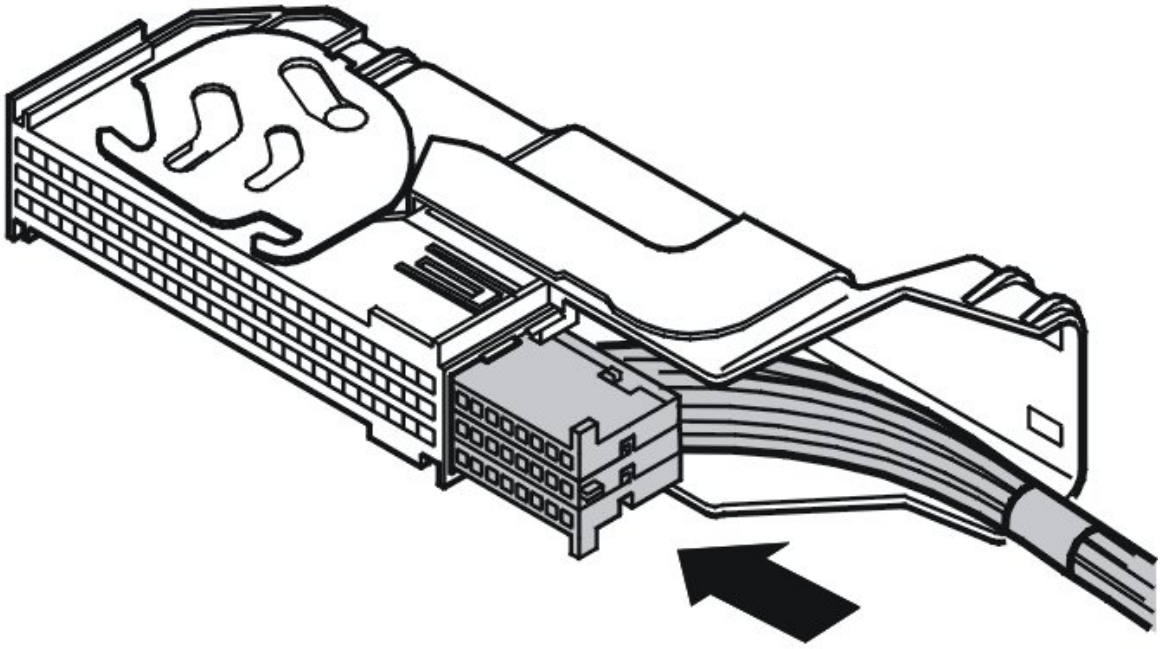


Install the cable terminals in the receptacle housing in the same position as earlier.
Check that the cable terminal is locked in the innermost position.

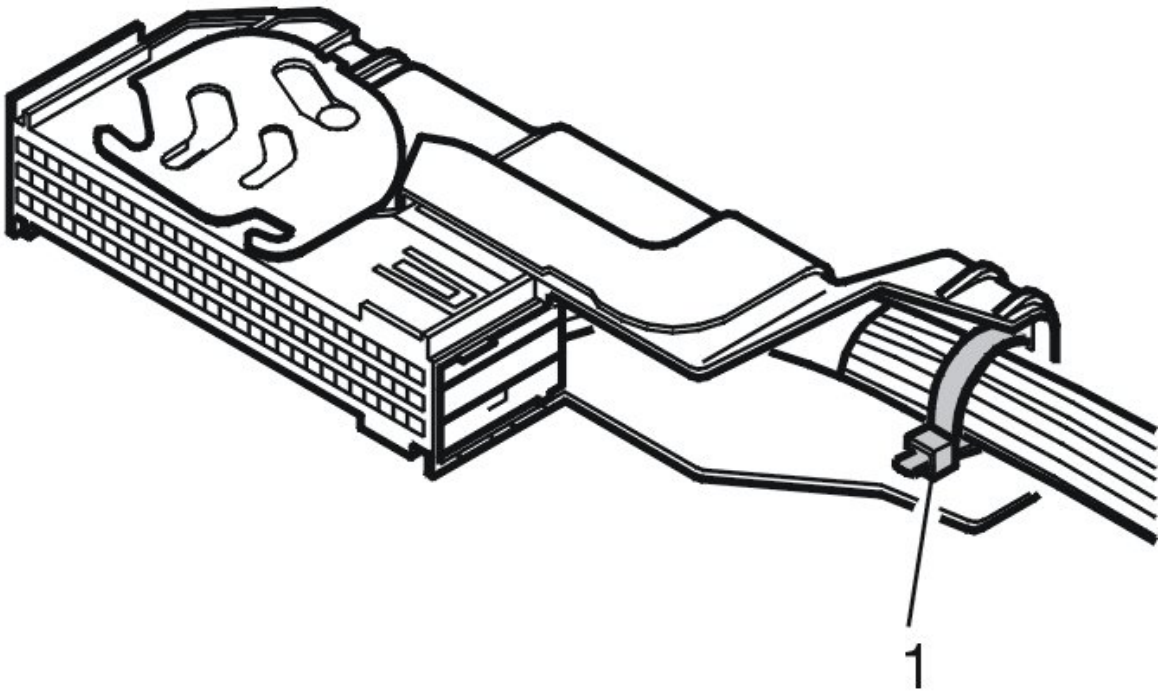
Installing the connector



Assemble the receptacle housings.



Install the receptacle housings in the connector.
Check that the receptacle housings lock in the side of the connector.



Install a new tie strap on the wiring around the cable harness and connector (1).

Installing the connector on the control module

Connect the connector on the control module, see: Removing, replacing and installing Supplemental restraint system (SRS), control module (SRS).

Checking diagnostic trouble code (DTC) 00BB

Check that the rear side impact sensor is correctly connected after finishing the repair.
Remove the connector on the left-hand rear side impact sensor, see: Removing, replacing and installing SRS (supplemental restraint system) Side impact sensor.
Switch the ignition to position II.

- Connect the battery negative lead
- Wait 15 seconds
- Read off diagnostic trouble codes (DTCs).

Diagnostic Trouble Code (DTC) 00BB should now be displayed.
Continue fault-tracing according to the ordinary fault-tracing routine if another diagnostic trouble code (DTC) is displayed.
Switch off the ignition.
Disconnect the battery negative lead.
Connect the cable on the left-hand rear side impact sensor, see: Removing, replacing and installing SRS (supplemental restraint system) Side impact sensor.
Connect the battery negative lead.

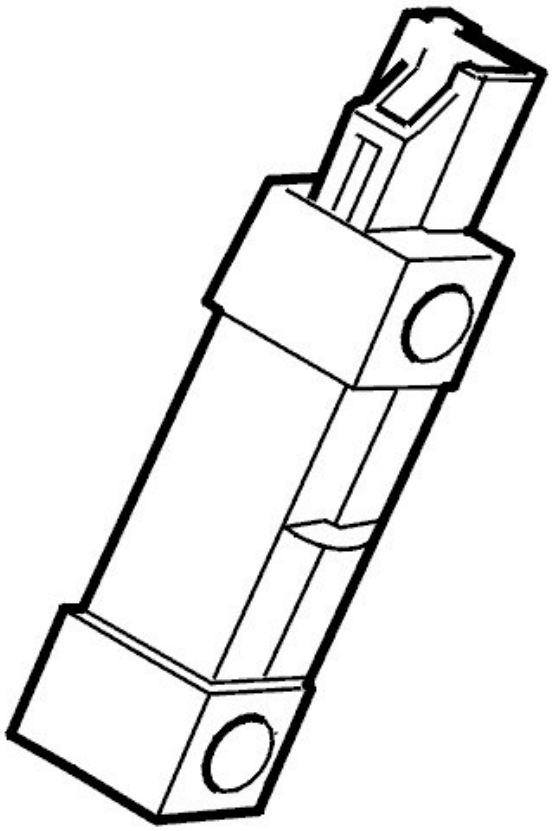
Final check

Carry out the final check according to: Removing, replacing and installing Supplemental restraint system (SRS), control module, final check (SRS).

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BC

Condition



Diagnostic trouble code (DTC) SRS-00BC is stored if the SRS control module identifies an incorrect side impact sensor identity.

Possible source
- Incorrect side impact sensor identity.
- Incorrect side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

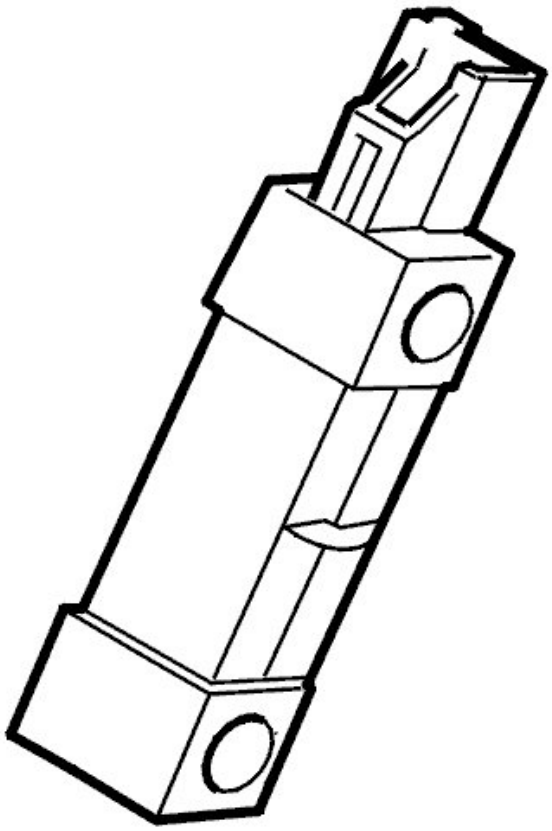
Faulty identity

Faulty identity. Permanent fault

Checking the component

The control module does not recognize the identity of the side impact sensor. Check that the P/N of the side impact sensor is correct.
Ignition on.
Read off the side impact sensor identity by clicking on the VCT2000 symbol.
Replace the side impact sensor if no fault is found.

Other information:
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.



Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

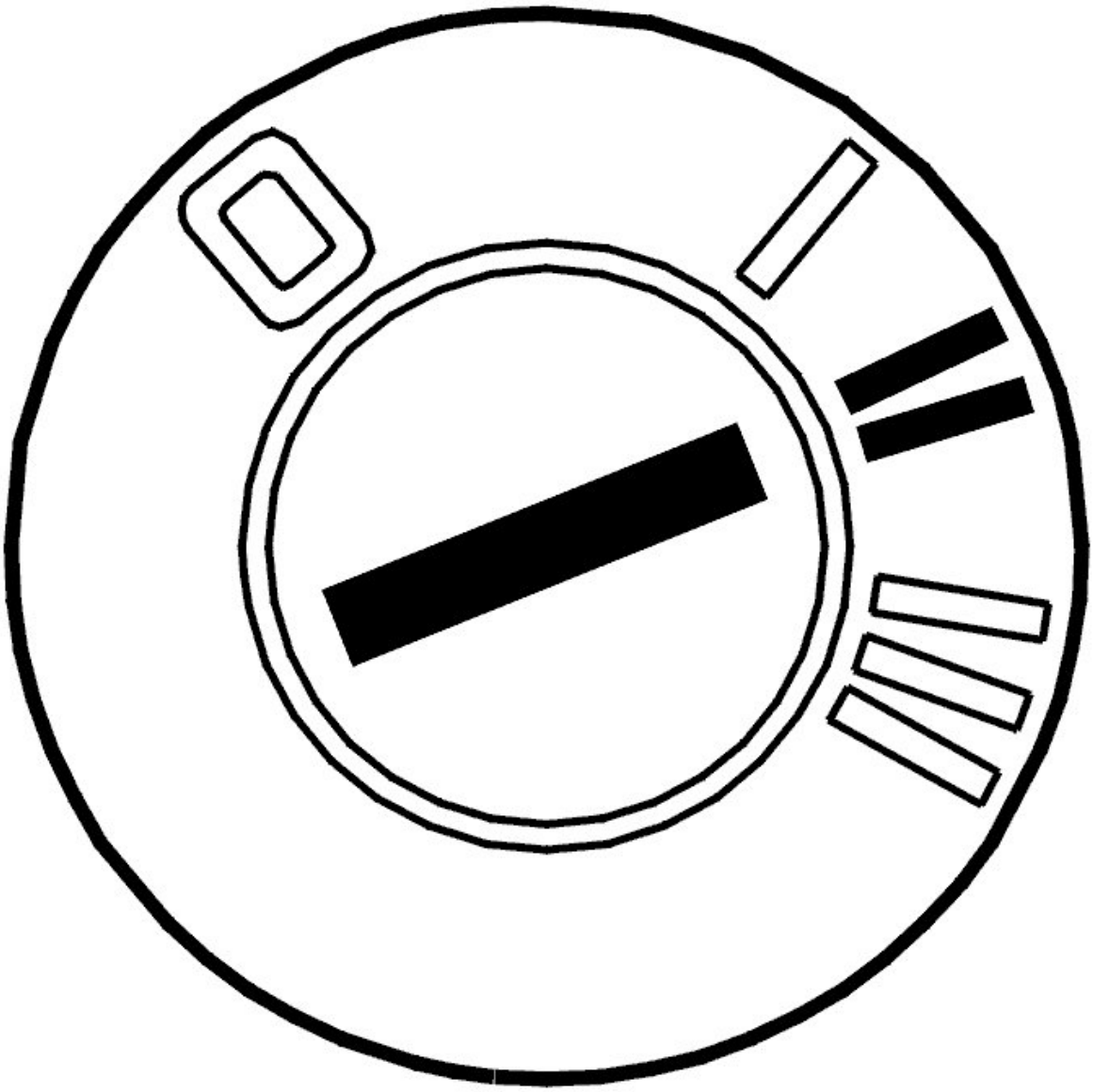
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

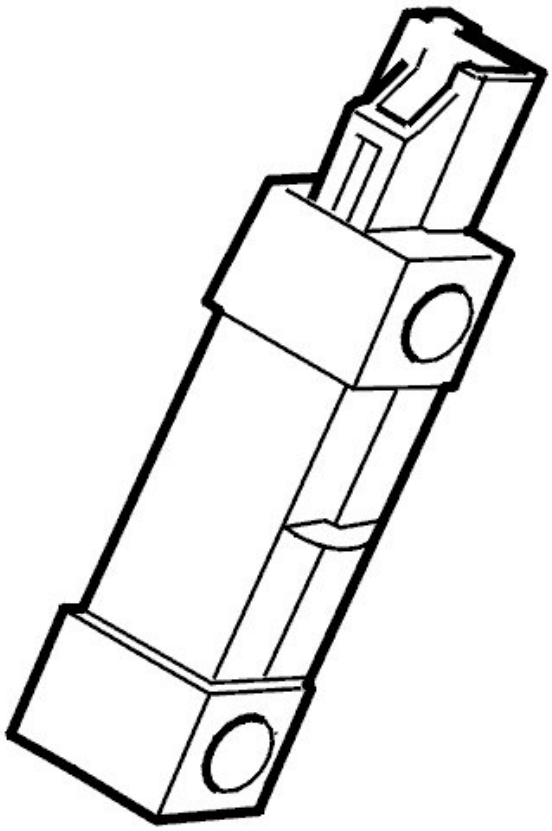
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BC

Condition



Diagnostic trouble code (DTC) SRS-00BC is stored if the SRS control module identifies an incorrect side impact sensor identity.

Possible source

- Incorrect side impact sensor identity.
- Incorrect side impact sensor.

Fault symptom[s]

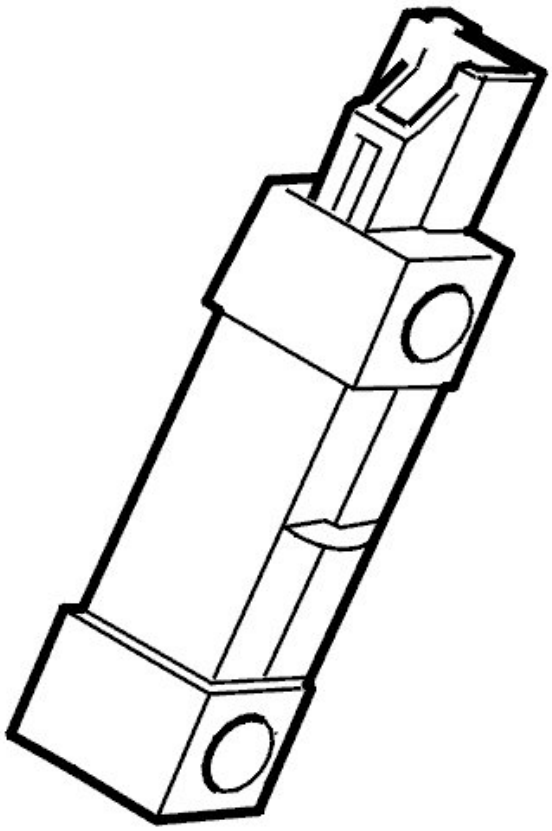
- The SRS indicator lamp is lit.

Faulty identity

Faulty identity. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

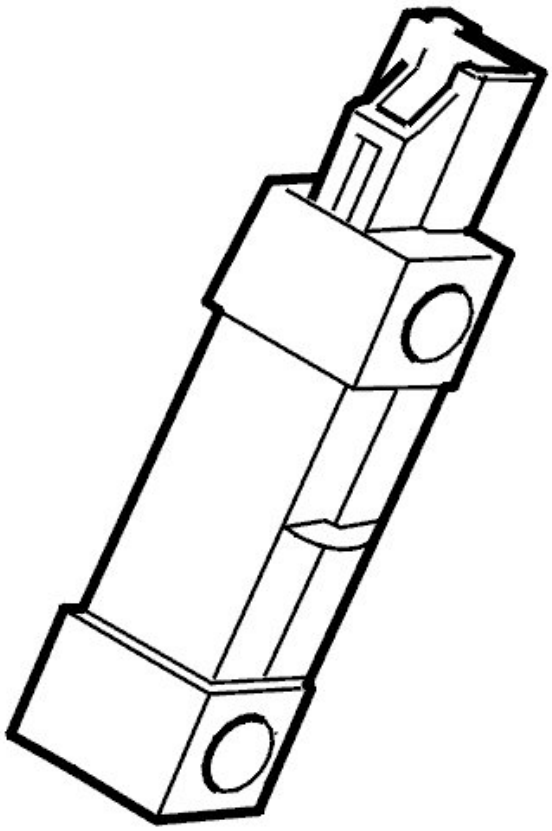
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BD

Condition



Diagnostic trouble code (DTC) SRS-00BD is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

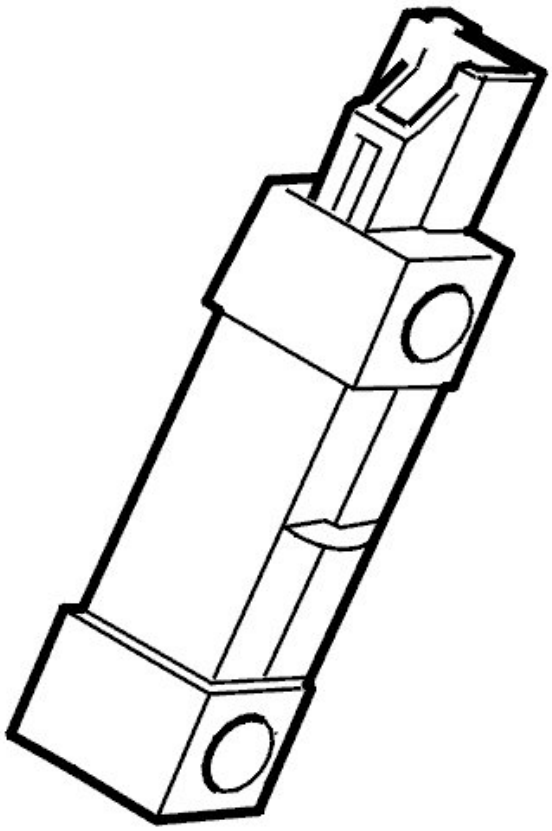
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

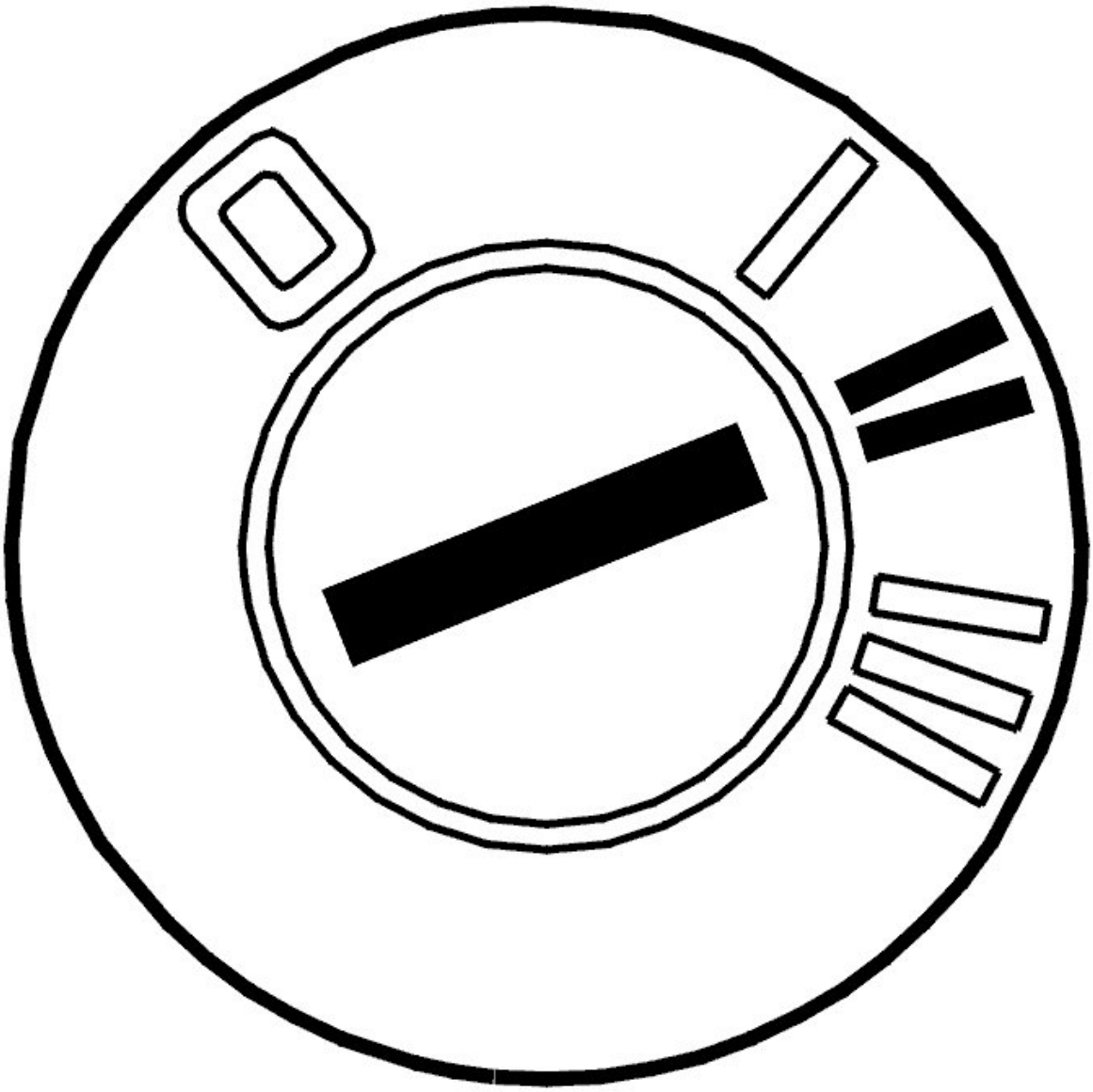
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

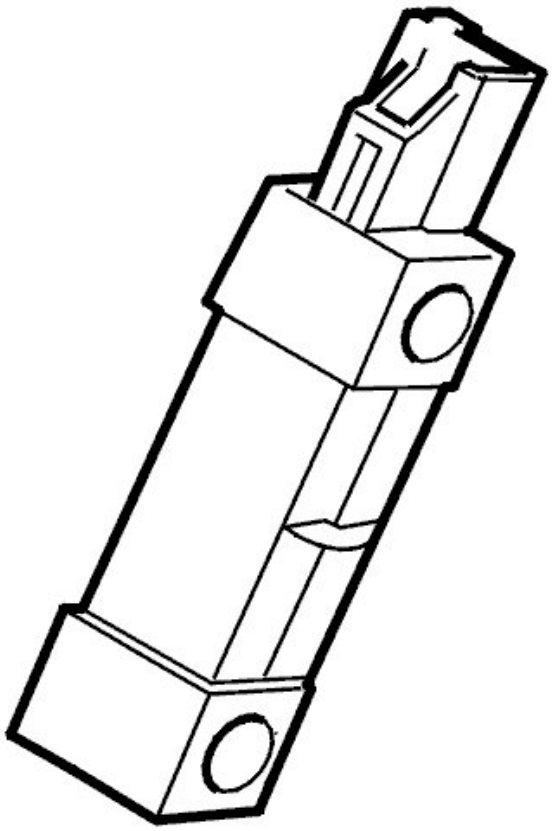
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BD

Condition



Diagnostic trouble code (DTC) SRS-00BD is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

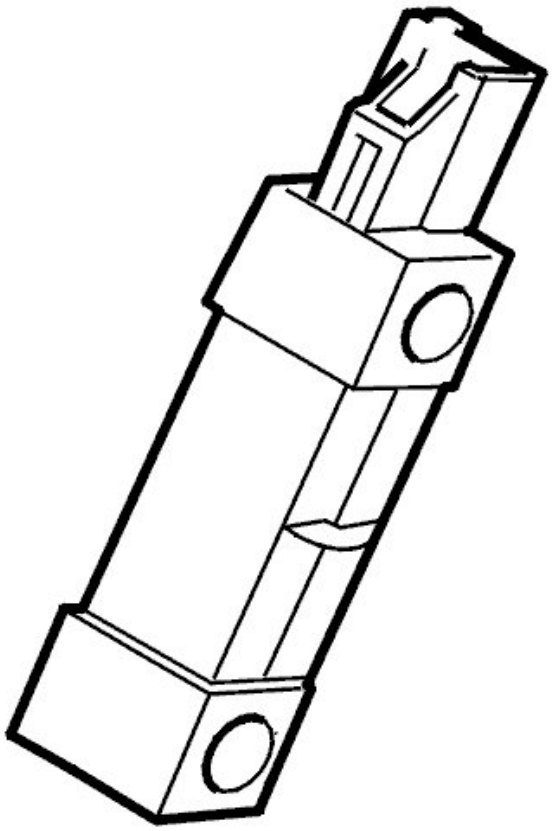
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

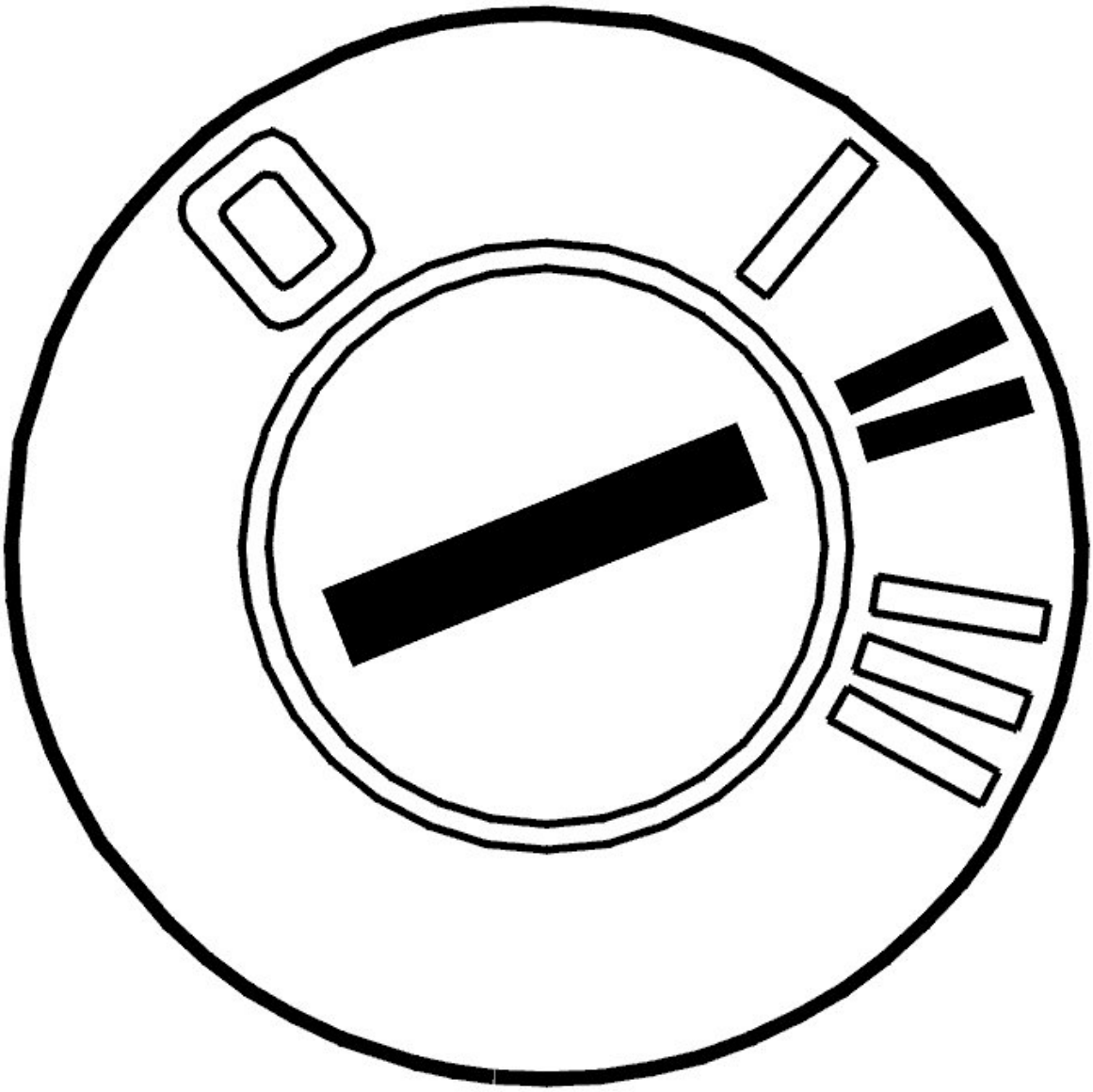
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

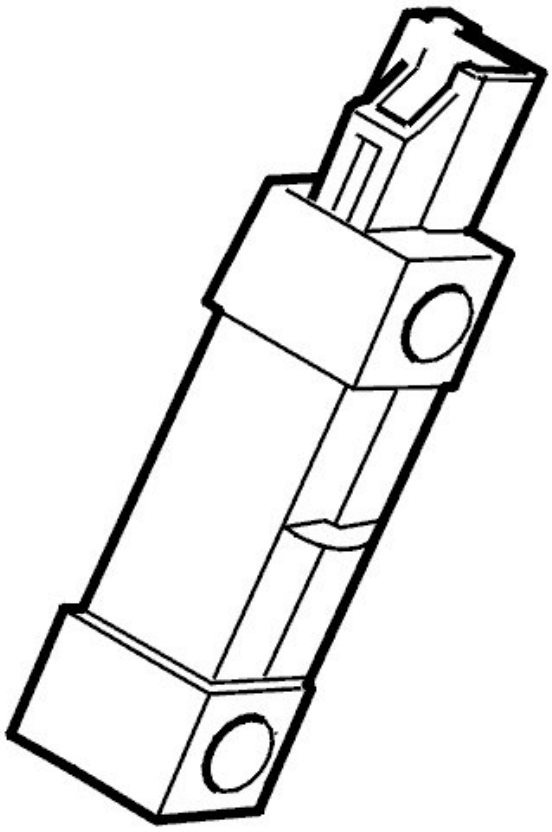
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BE

Condition



Diagnostic trouble code (DTC) SRS-00BE is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Incorrect side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Information

Fault-tracing for this diagnostic trouble code (DTC) will not be forthcoming.
For further information about this diagnostic trouble code (DTC), read the diagnostic trouble code (DTC) information.

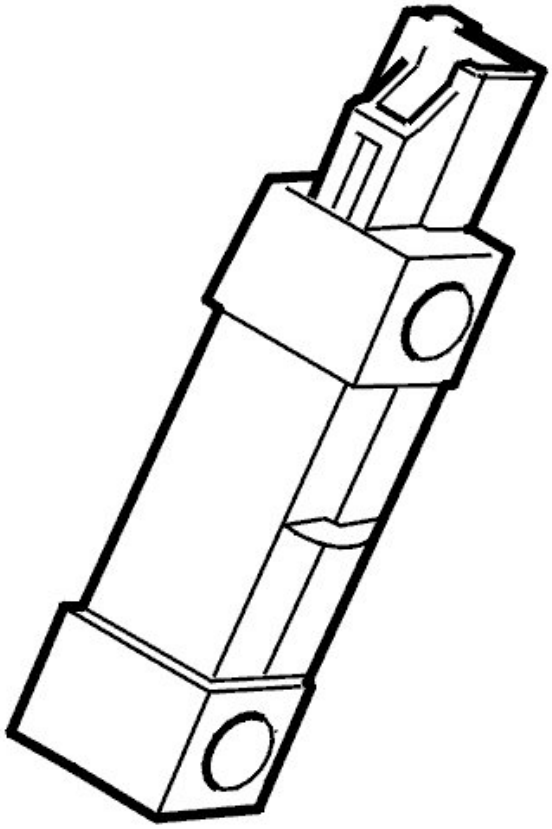
Select "Continue" to finish.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00BE

Condition



Diagnostic trouble code (DTC) SRS-00BE is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Incorrect side impact sensor.

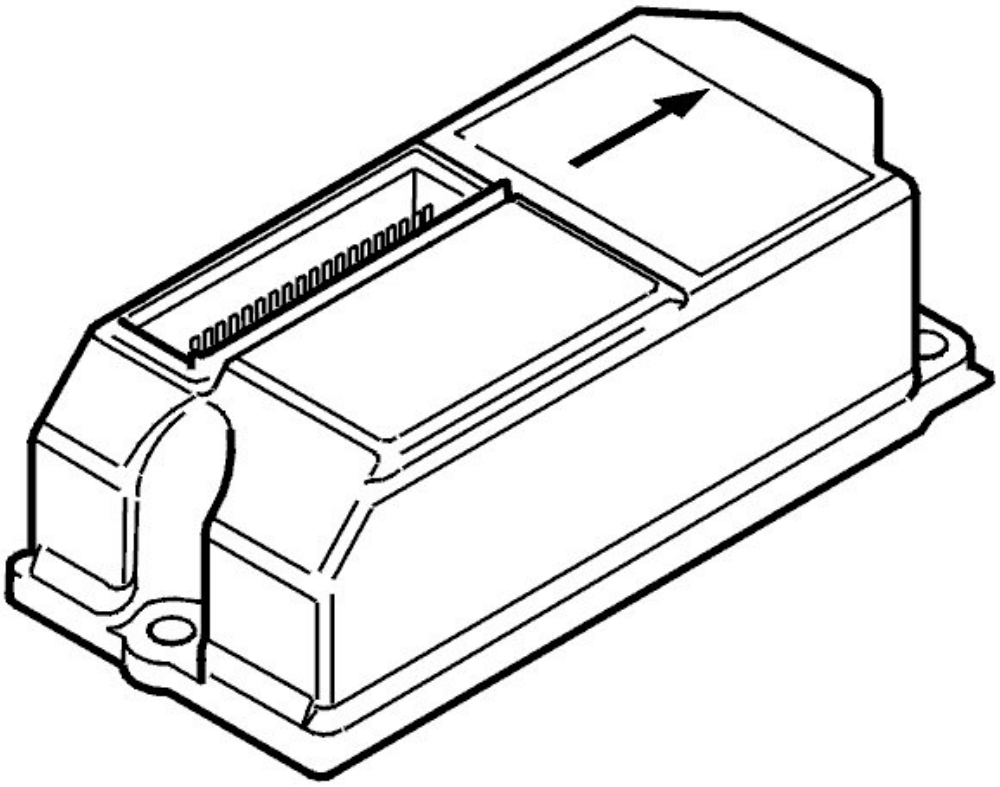
Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

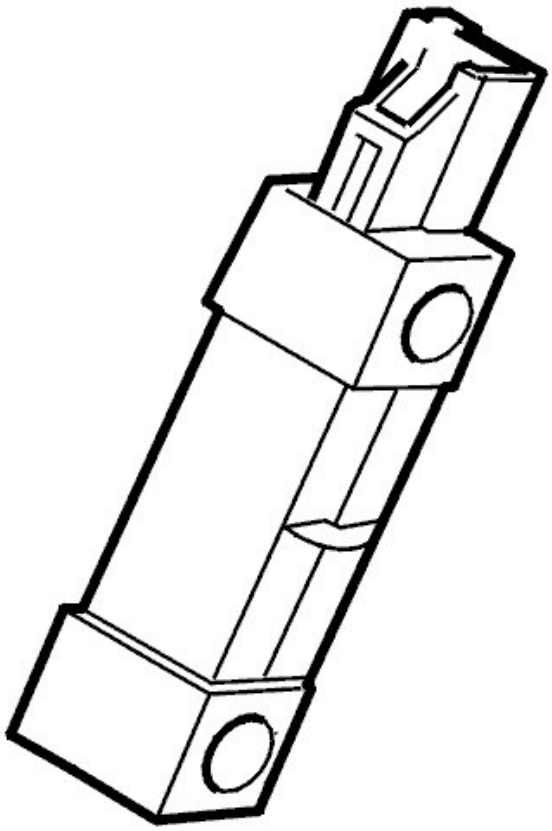
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00BF Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00BF is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

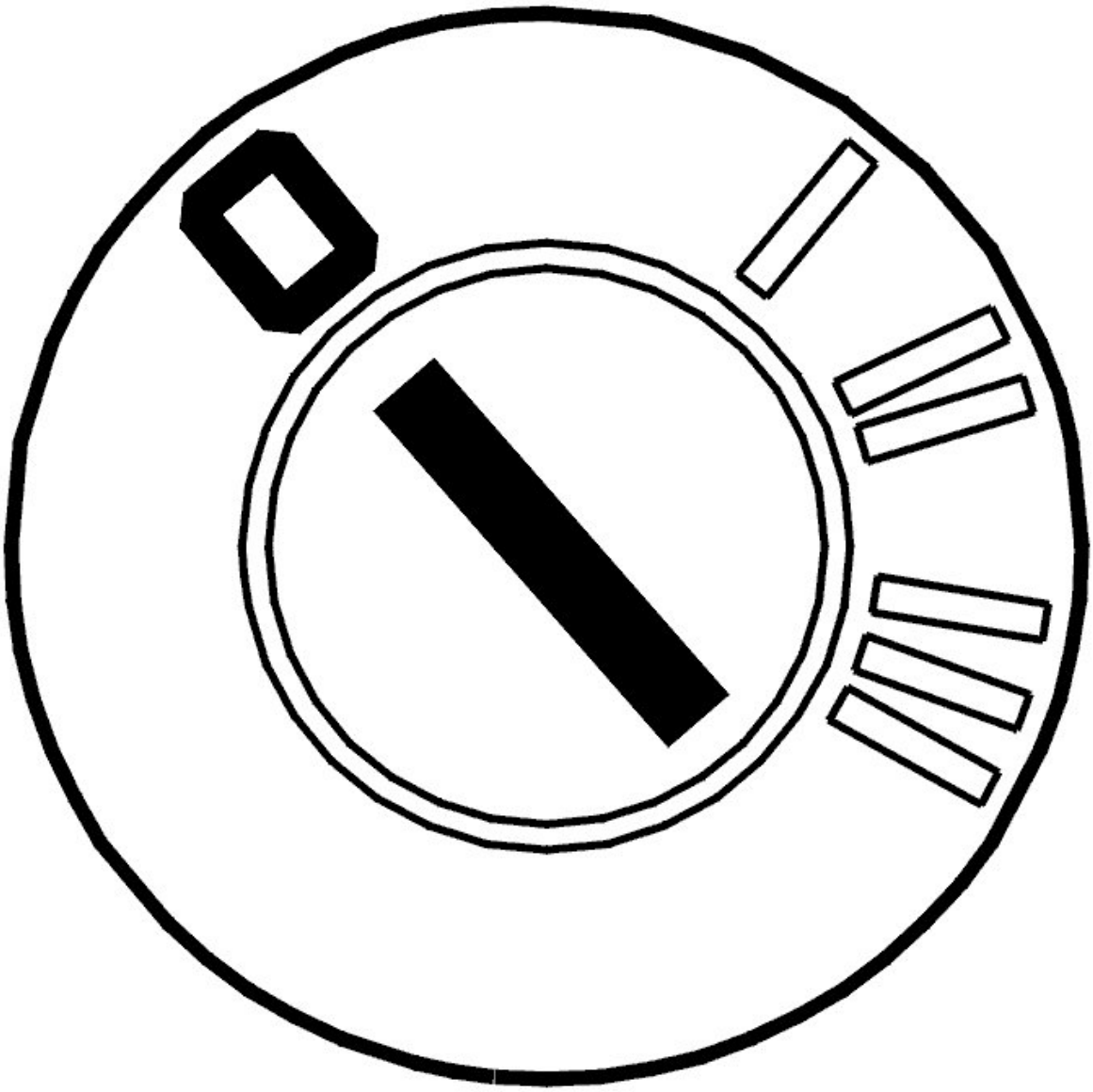
Signal too low:
- Signal wire short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Intermittent fault

Intermittent fault



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the connectors for the supplemental restraint system module (SRS) and side impact sensor. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for loose connections. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

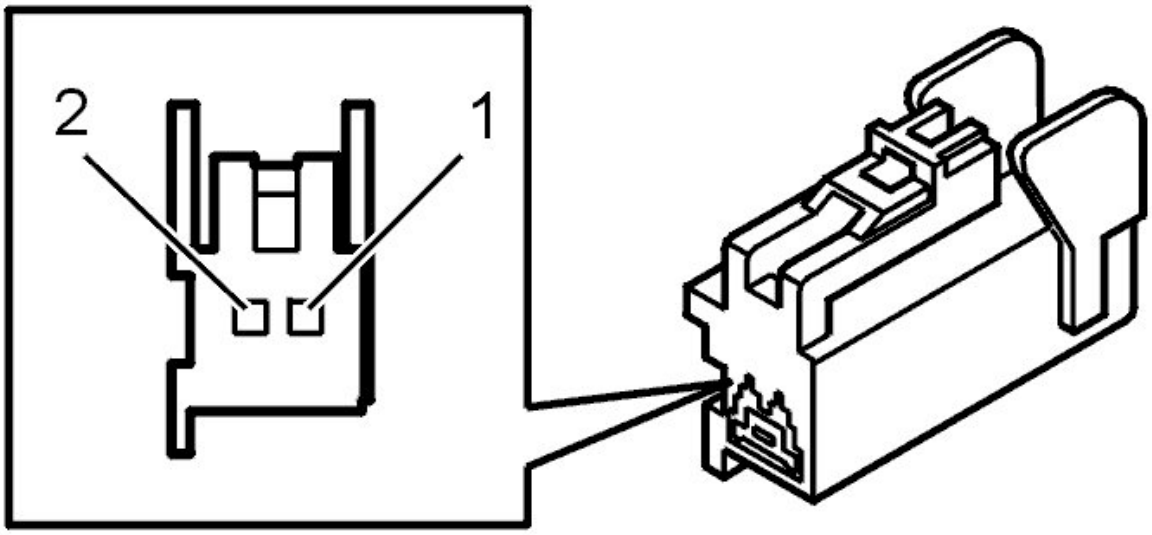
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for an intermittent short-circuit to supply voltage. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and

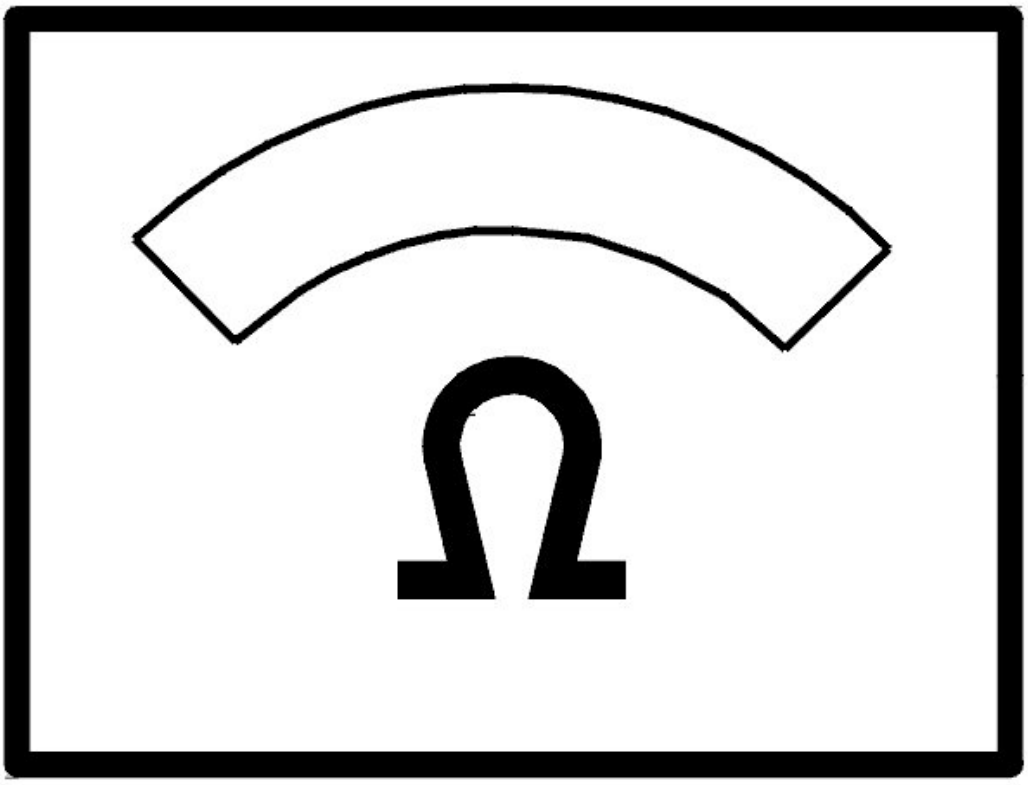
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select Continue.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

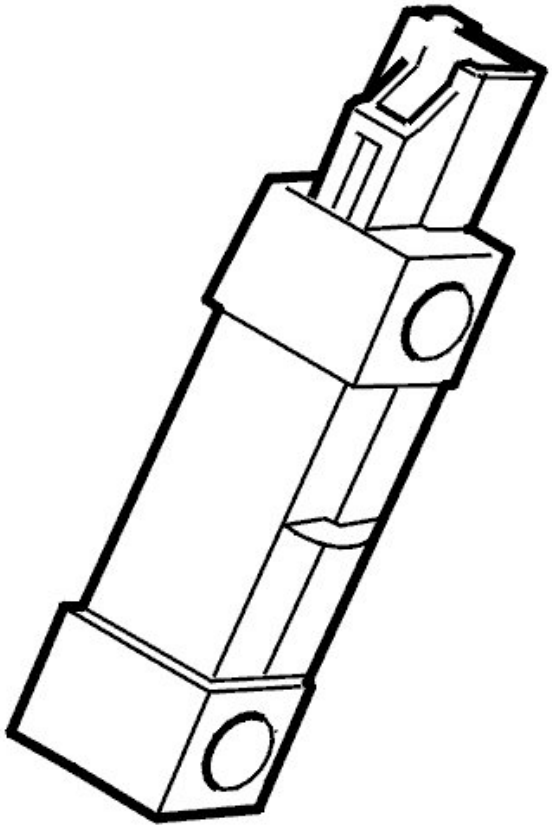
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

SRS-00BF Diagnostic trouble code information

Condition



If the circuit voltage is high or low for more than 10 seconds, diagnostic trouble code SRS-00BF is displayed.

Substitute value
- Nothing.

Possible source

Signal too high:
- Signal wire short circuited to voltage supply
- Faulty side impact sensor.

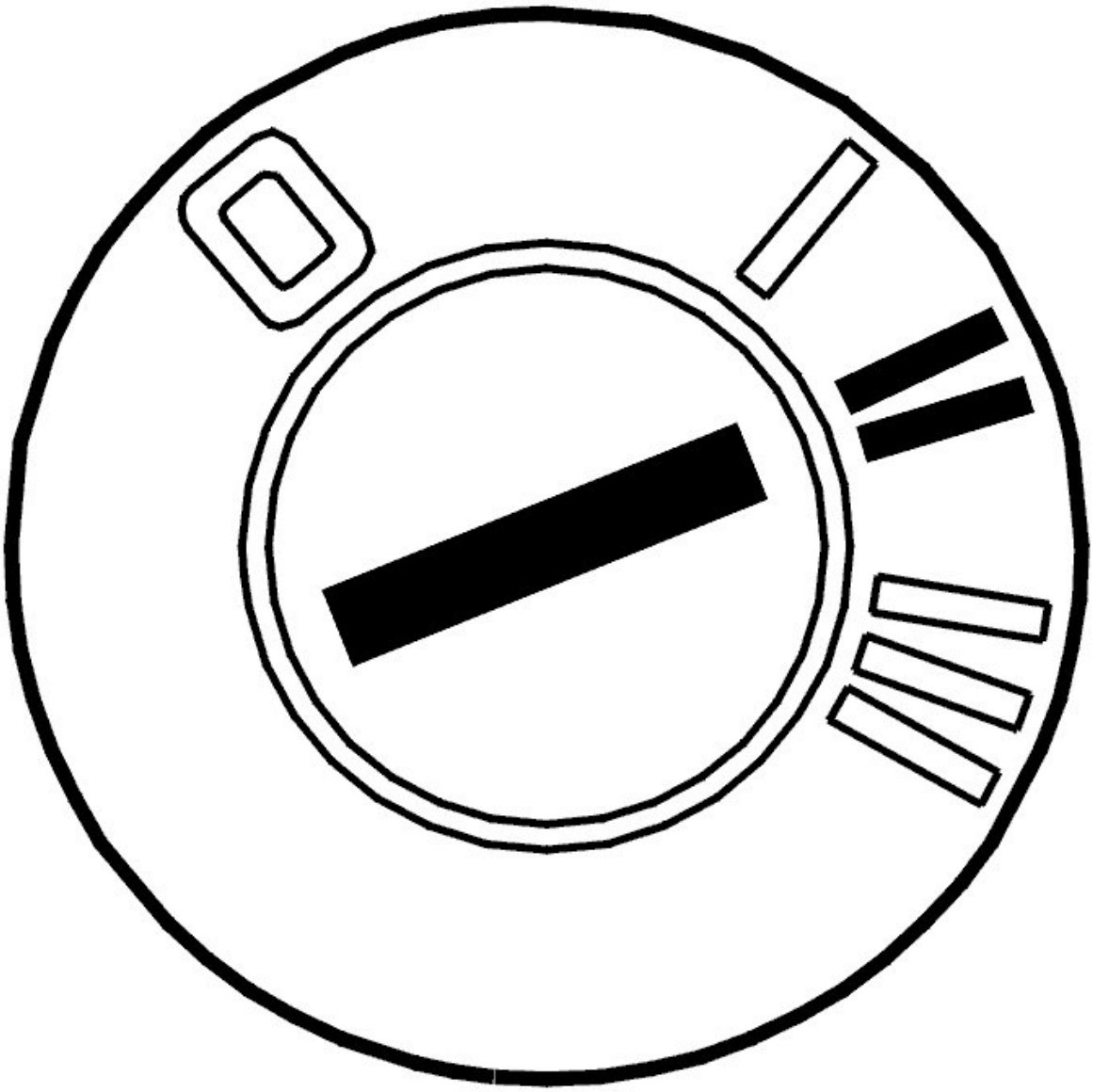
Signal too low:
- Signal wire short circuited to ground
- Faulty side impact sensor.

Fault symptom[s]
- SRS warning lamp on.

Faulty Signal

Faulty signal. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Check the cable between the SRS control module and the terminal on the side impact sensor connector according to the following:

for diagnostic trouble code (DTC) SRS-00B0,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B5,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BA,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BF,

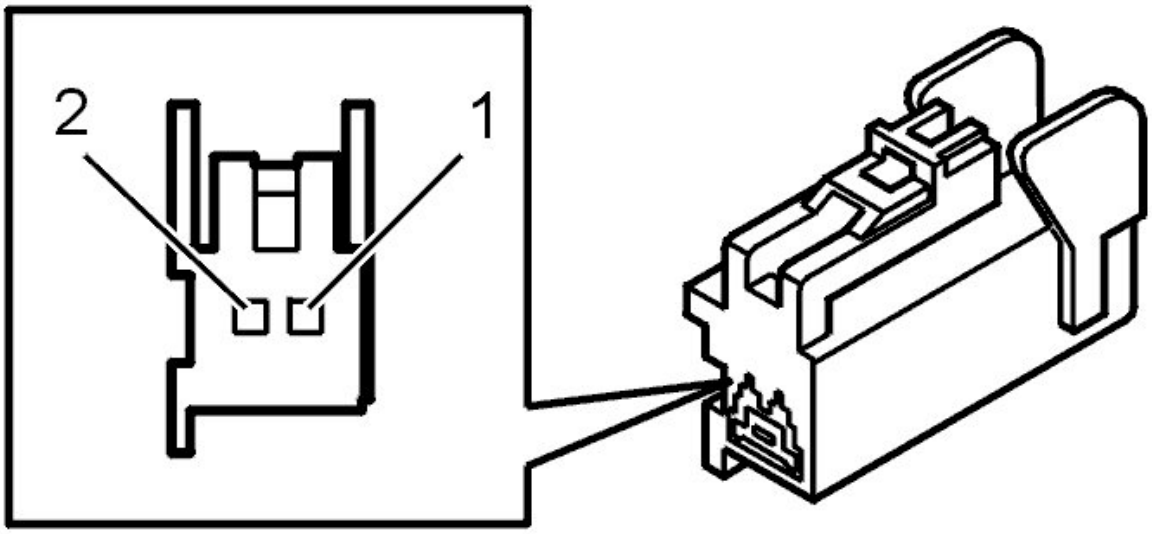
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

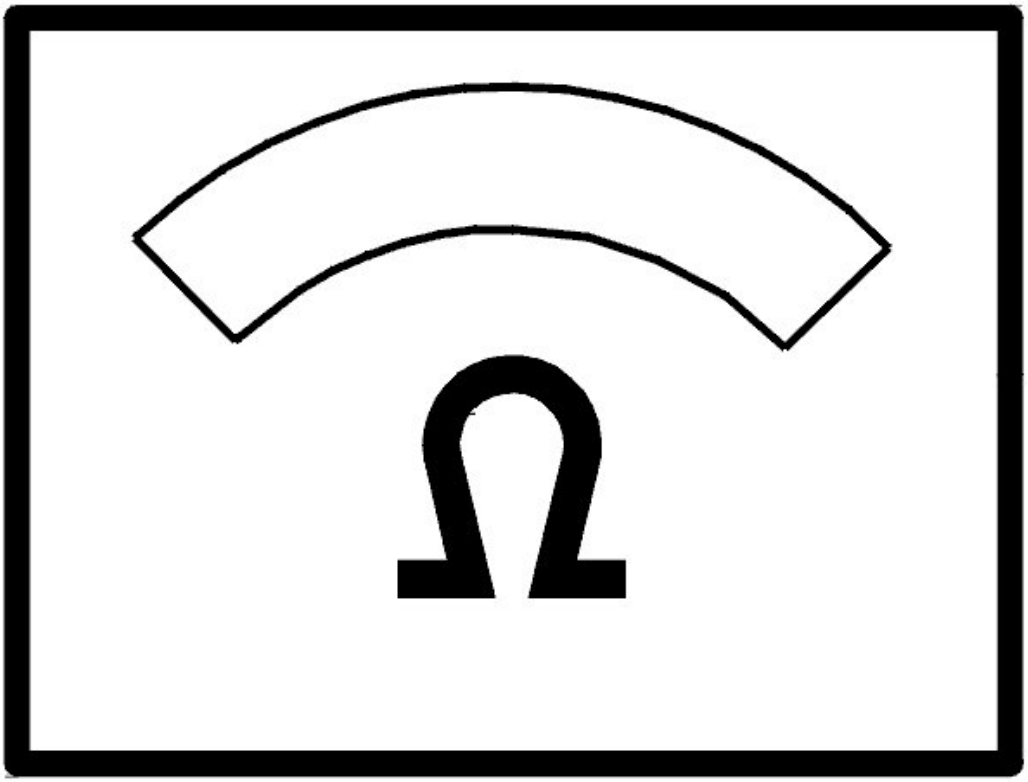
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

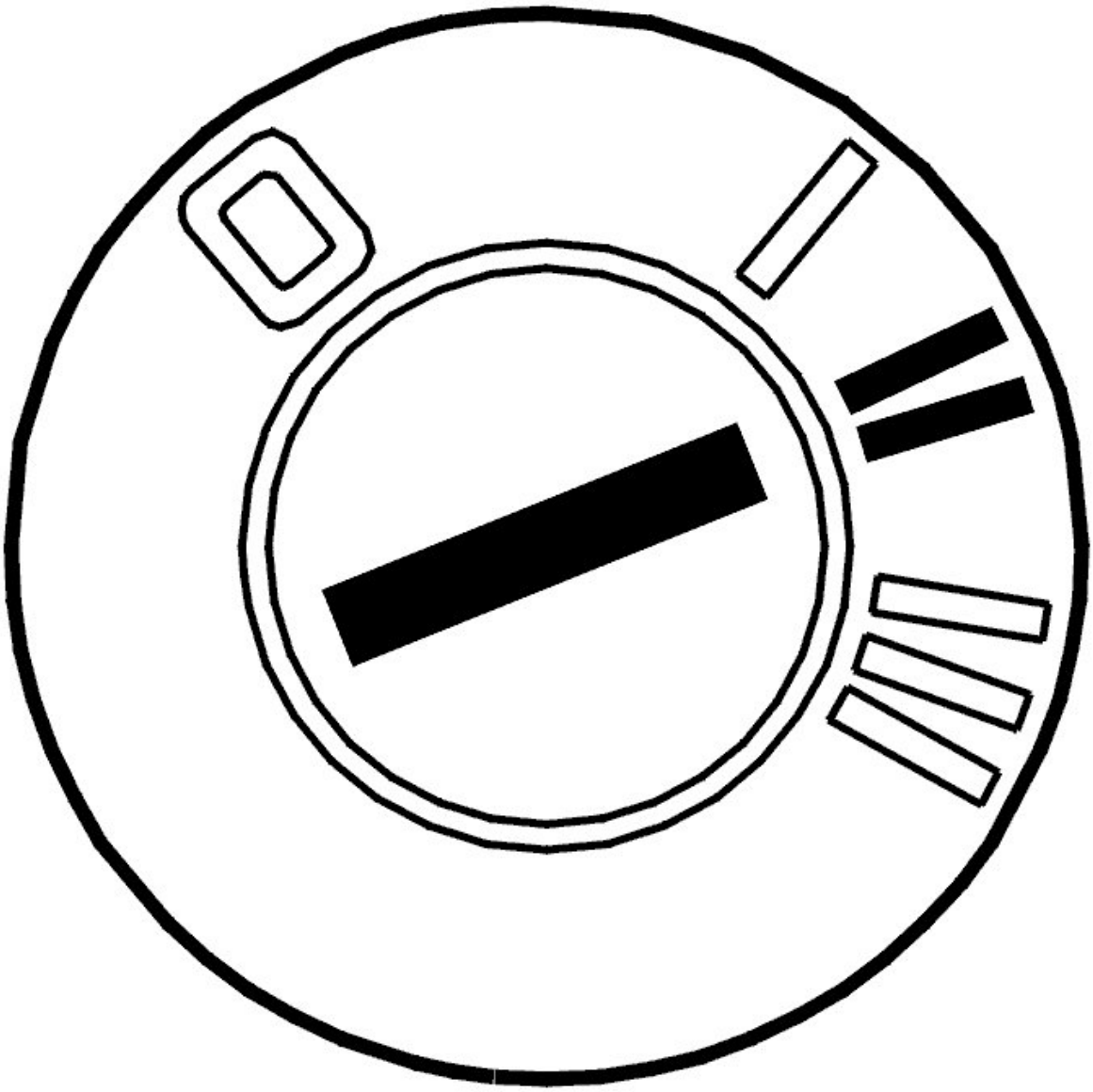
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

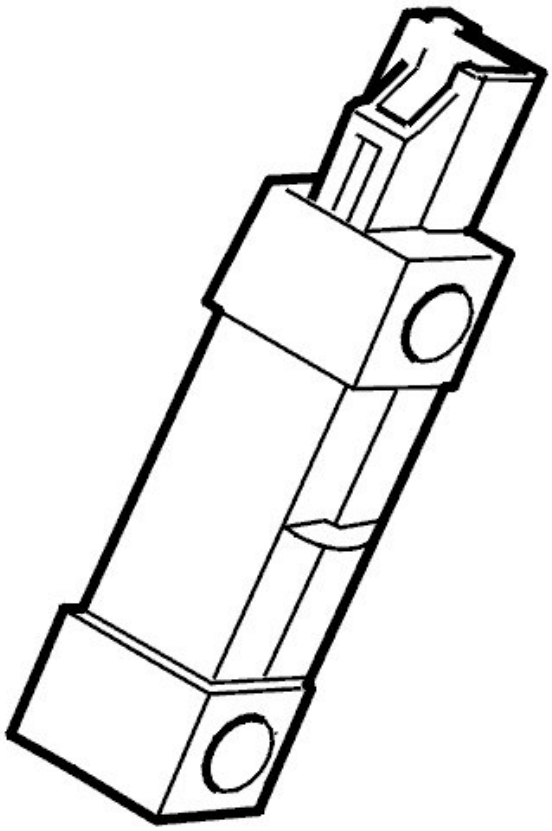
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

SRS-00C0 Diagnostic trouble code information

Condition



If the supplemental restraint system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00C0 is displayed.

Substitute value
- Nothing.

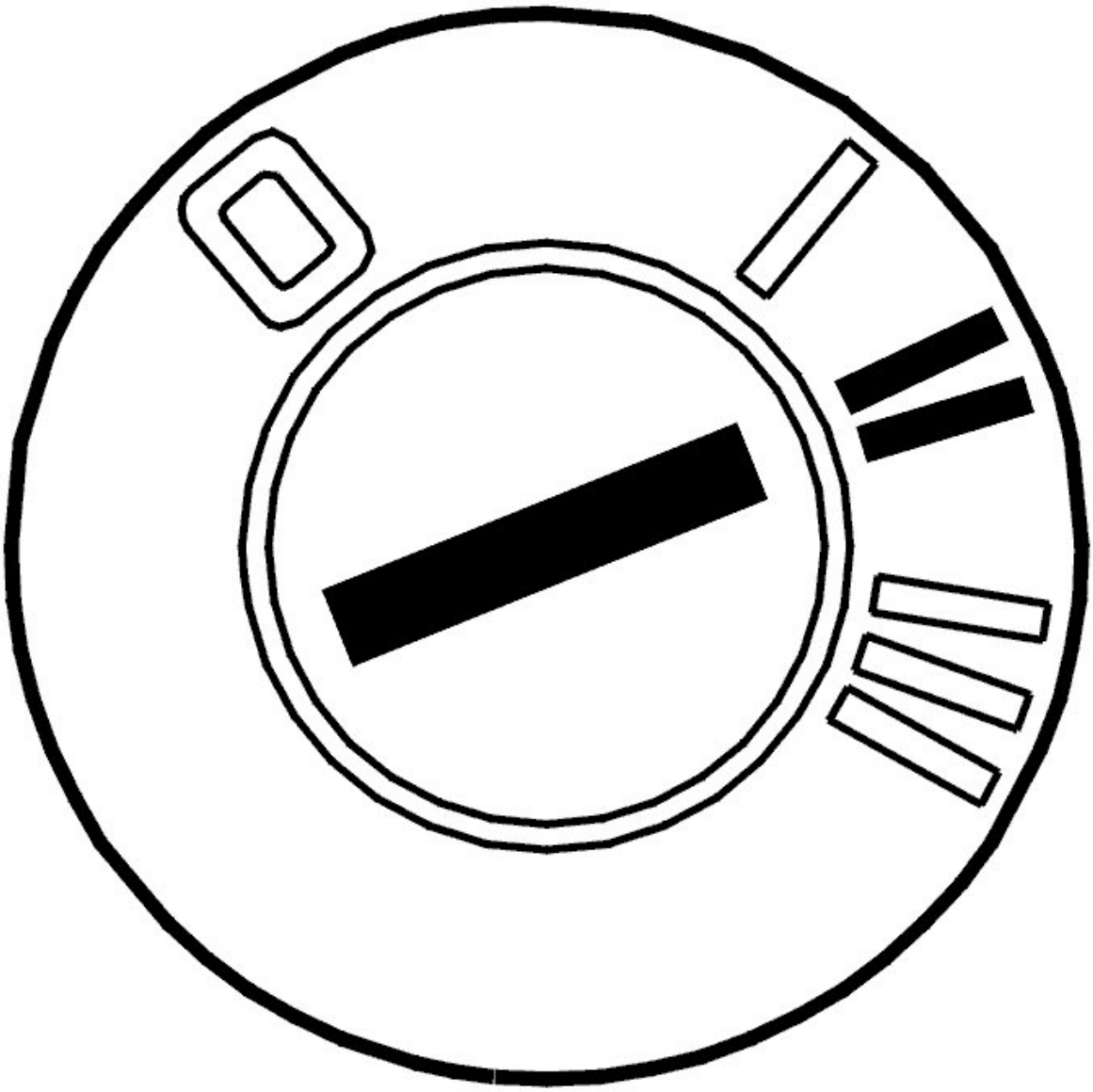
Possible source
- Open circuit in signal wire.

Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Permanent fault

Checking the component and wiring



- Ignition off.

Caution! Do not touch the terminal pins in the SRS control module. There is a risk of static discharge. This could damage the SRS control module.

Note! Check that the side impact sensor is connected.

Check the cable between the SRS control module and the connector or terminal for the side impact sensor according to the following:

for diagnostic trouble code (DTC) SRS-00B1,

front left side impact sensor terminals #8A (8) and #9A (9) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00B6,

front right side impact sensor terminals #8C (4) and #9C (5) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00BB,

rear left side impact sensor terminals #27A (27) and #28A (28) and connector terminals #1 and #2.

for diagnostic trouble code (DTC) SRS-00C0,

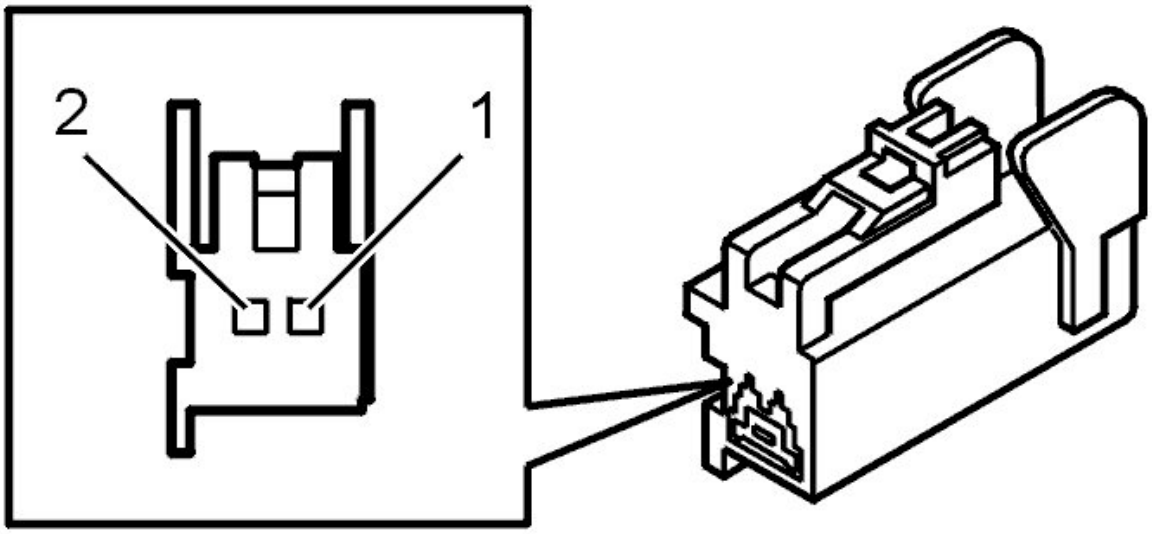
rear right side impact sensor terminals #27C (23) and #28C (24) and connector terminals #1 and #2.
for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

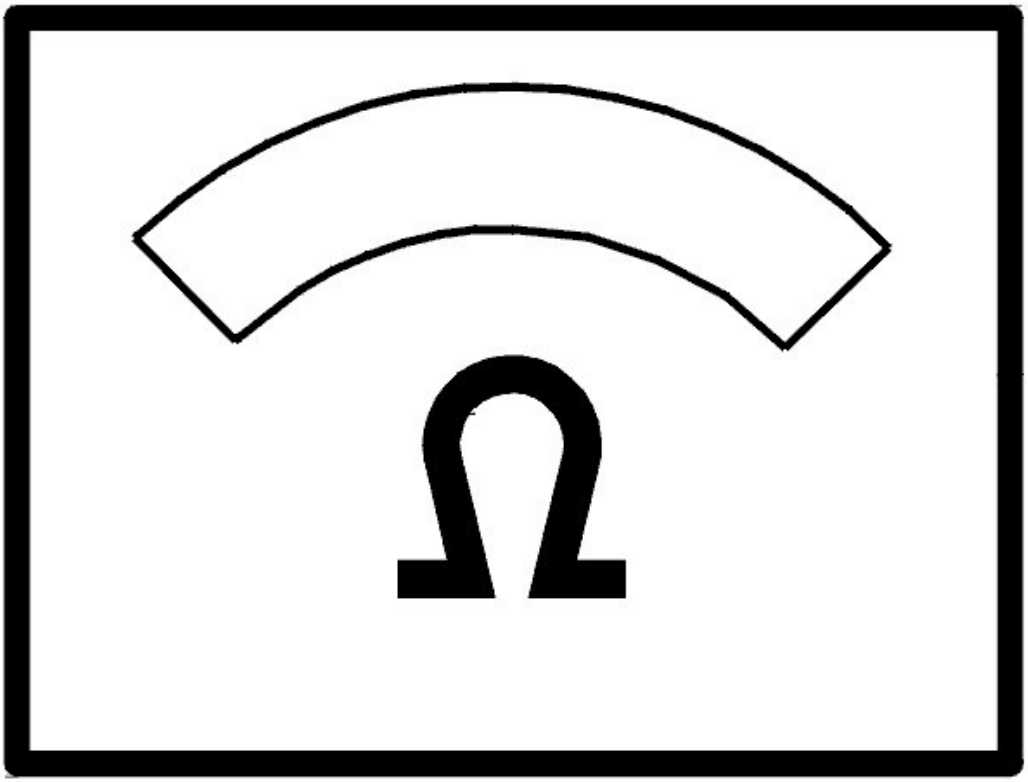
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays

and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For other values, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).





Was a fault detected?

Yes - Verification

No - Replacing side impact sensor

Replacing side impact sensor

Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

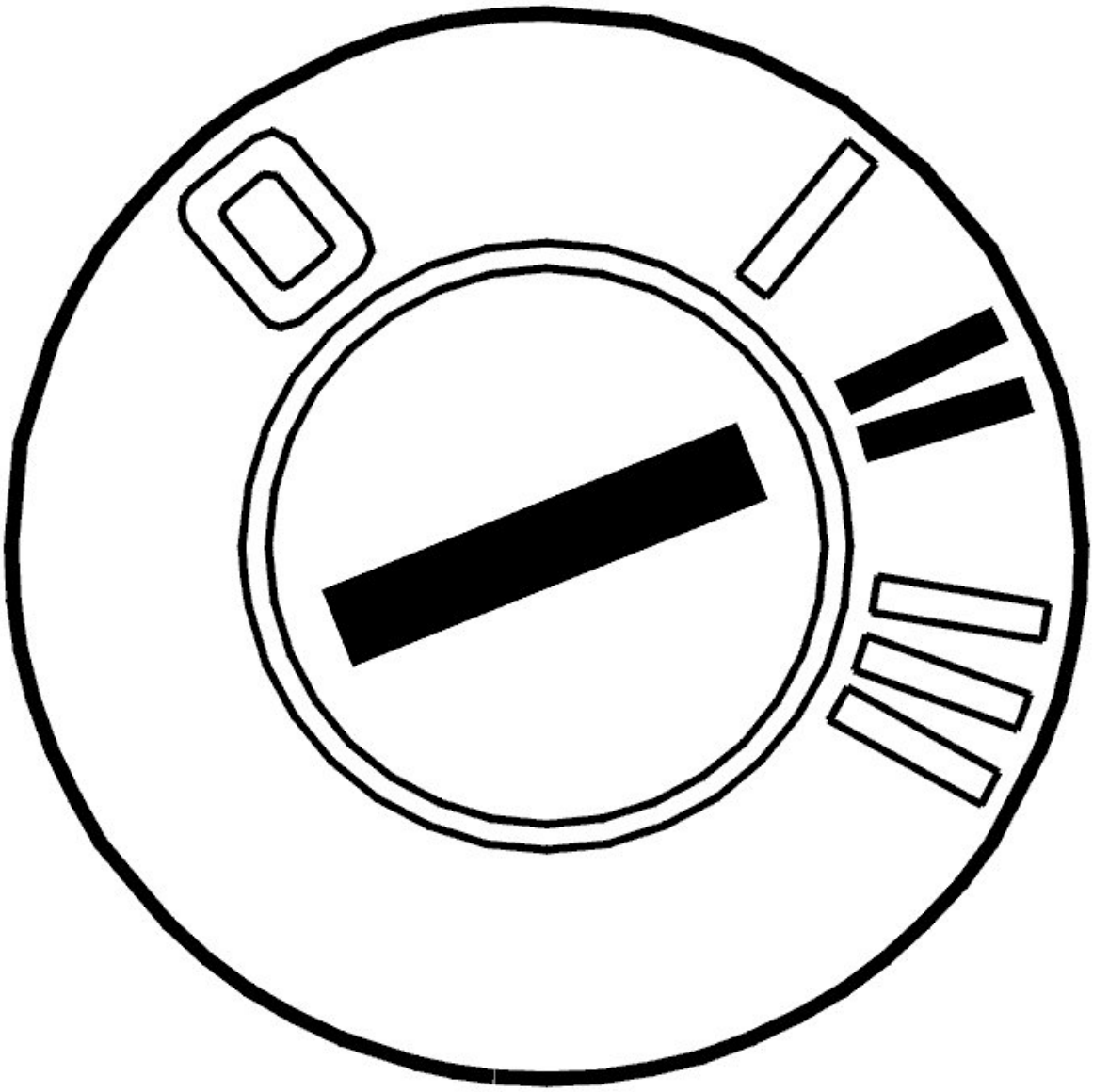
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

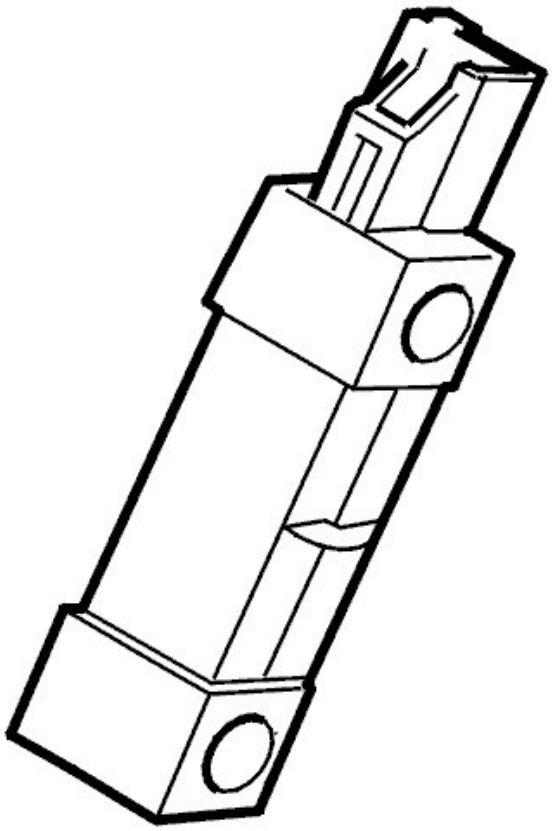
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

SRS-00C0 Diagnostic trouble code information

Condition



If the supplemental restraint system (SRS) control unit cannot communicate with the side impact sensor, diagnostic trouble code SRS-00C0 is displayed.

Substitute value
- Nothing.

Possible source
- Open circuit in signal wire.

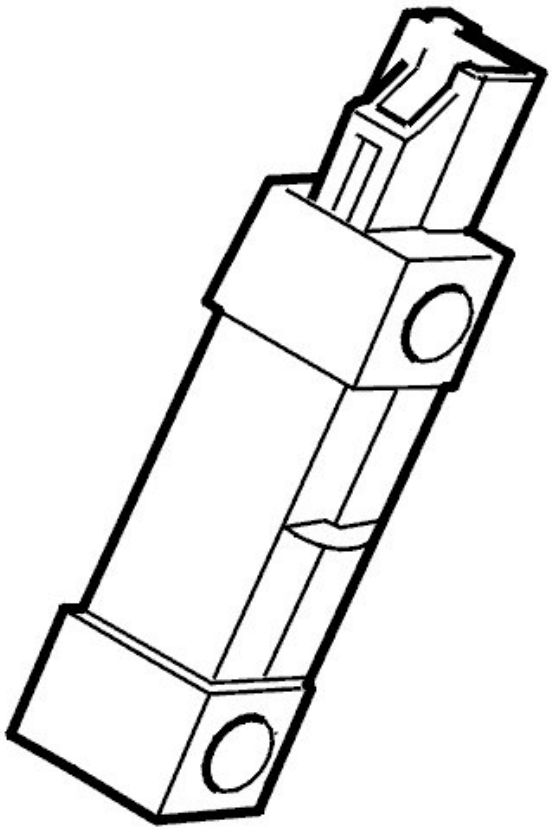
Fault symptom[s]
- SRS warning lamp on.

Communication Fault

Communication fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

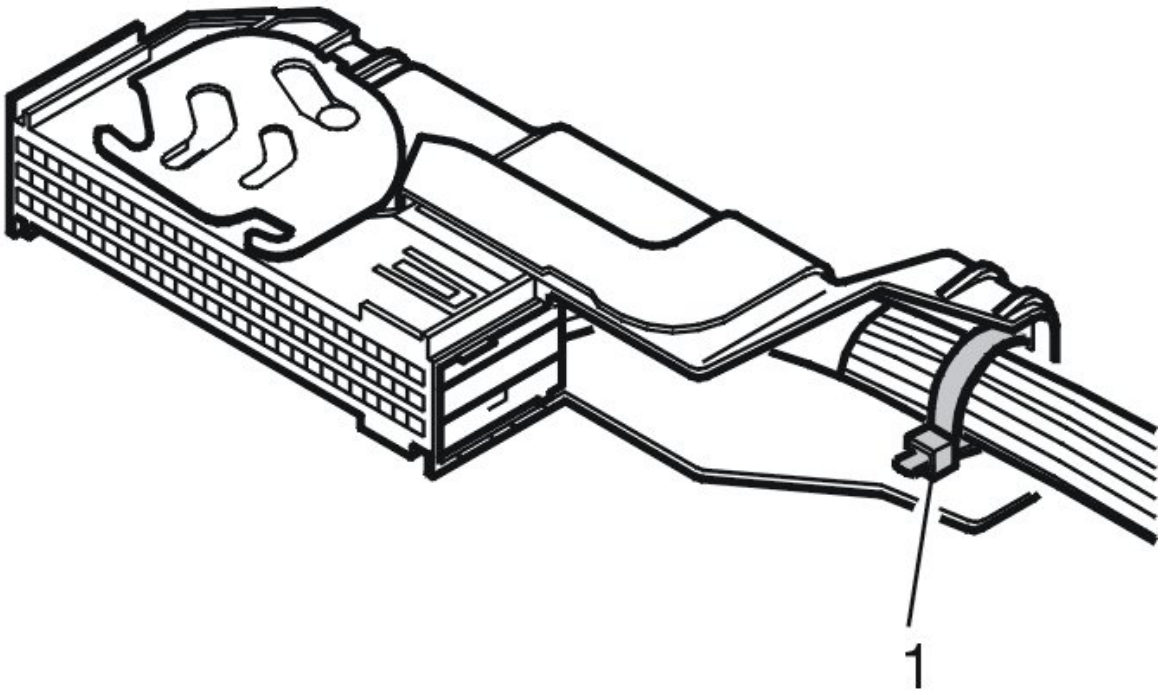
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

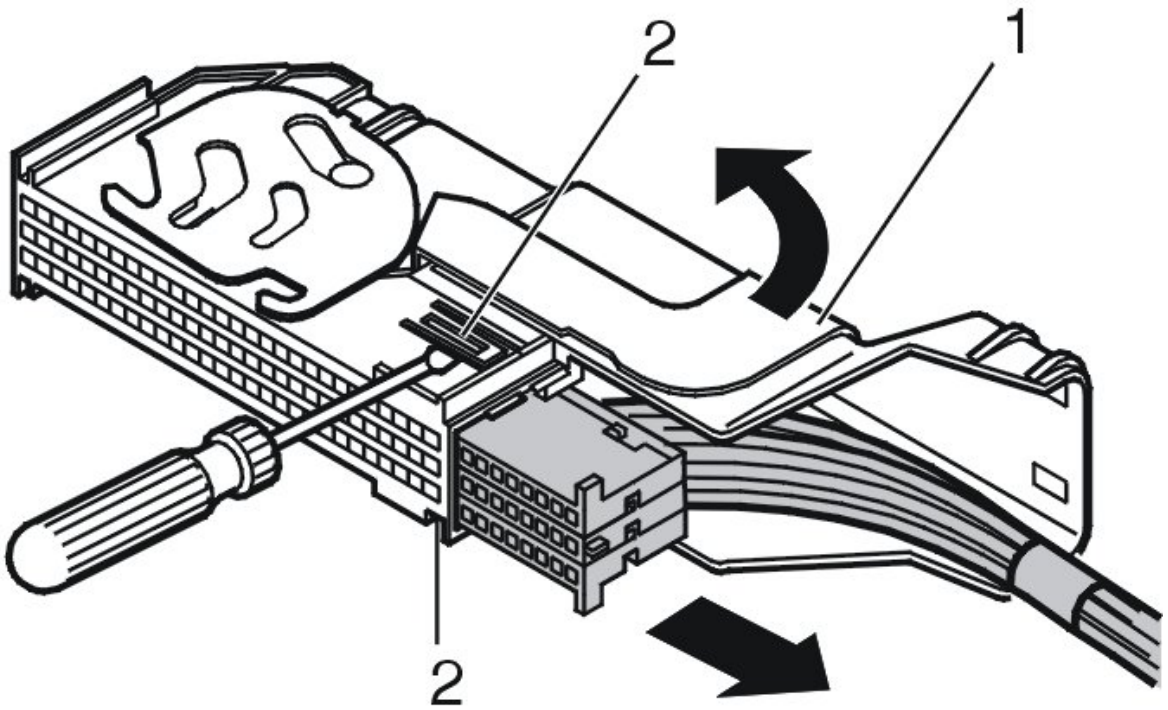
Diagnostic Trouble Codes (DTC) SRS 00BB and 00C0, Fault-tracing and Repairing

Diagnostic Trouble Codes (DTC) SRS 00BB and 00C0, fault-tracing and repairing

Checking the cable terminals for the SRS sensor



If diagnostic trouble codes (DTC) SRS 00BB and 00C0 occur remove and check the cable terminal in the SRS (supplemental restraint system) sensor connector as follows.
Disconnect the connector for the SRS sensor, see: Removing, replacing and installing Supplemental restraint system (SRS), control module (SRS).
Remove the tie strap (1) around the wiring and connector.



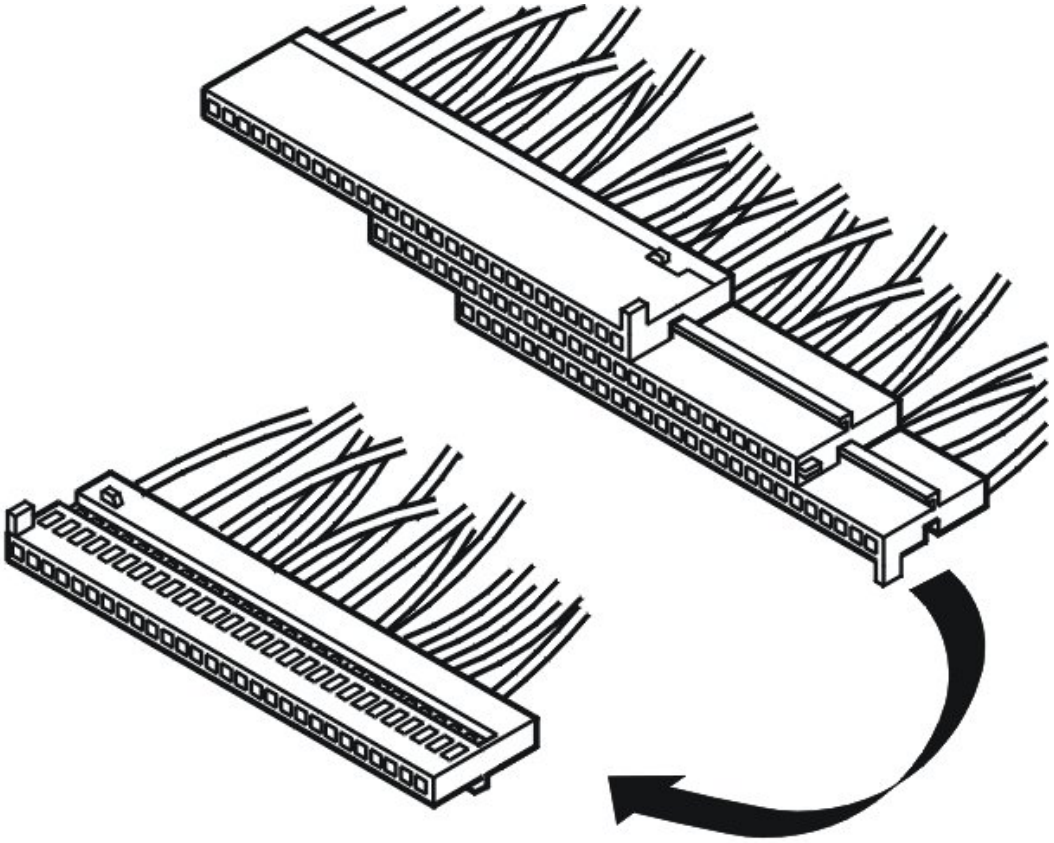
Open the catches (2) on both sides of the connector. Pull the receptacle housings from the casing (1).

Checking the cable terminals

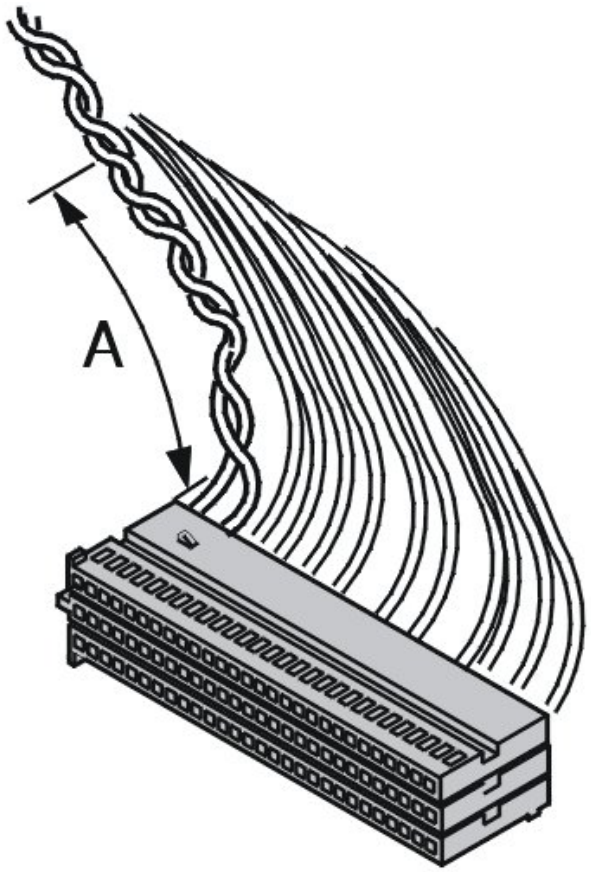
Check the cable terminals in the following terminals:

White receptacle housing terminals A27 and A28.
Blue receptacle housing terminals C27 and C28.
Black receptacle housing terminals B23 B24 B25 B26 B27 and B28.
Check that the cable terminals are not damaged by looking in the cable terminal opening.
The opening must be square, right angled and the cable terminal sides must be align with the receptacle housing.
Damaged receptacle housings are a sign that the cable terminals are also damaged.
If the cable terminals are undamaged, reinstall the connector. See step Installing the connector.
Carry out the final check according to: Removing, replacing and installing Supplemental restraint system (SRS), control module, final check (SRS).
If the cable terminals are damaged, replace the damaged wiring. See step Repairing the wiring.

Repairing the wiring



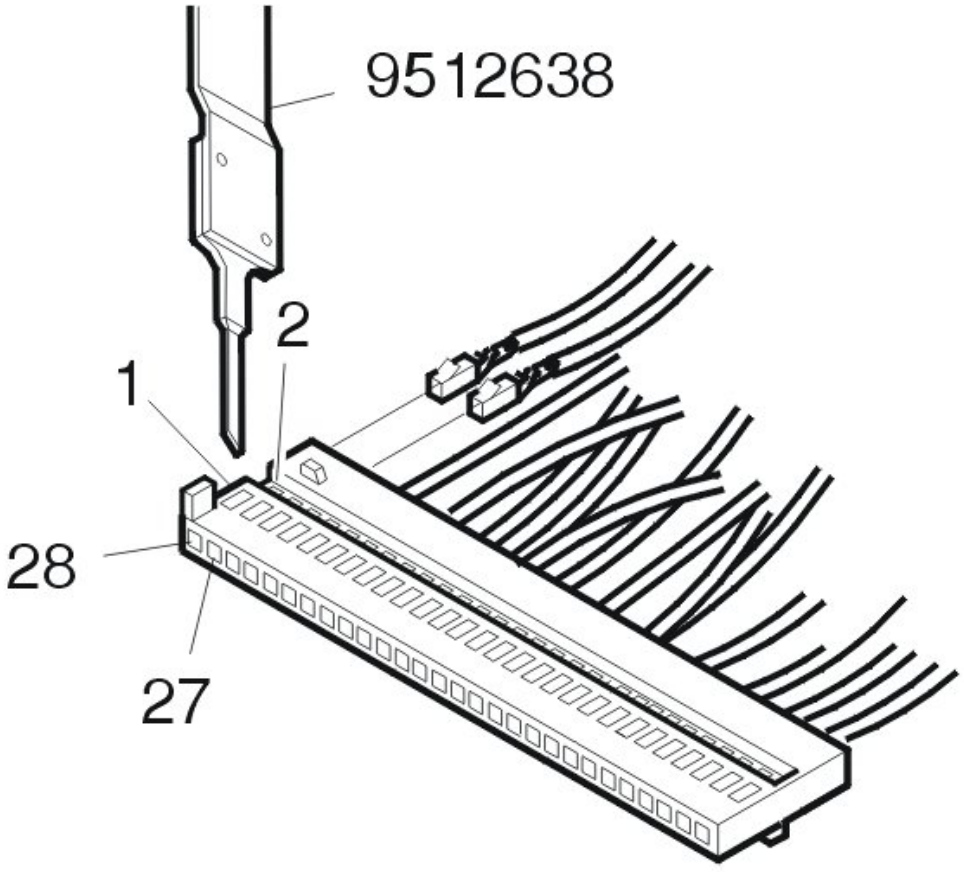
Disconnect the receptacle housings from each other.



Twisted wiring must be replaced in pairs.

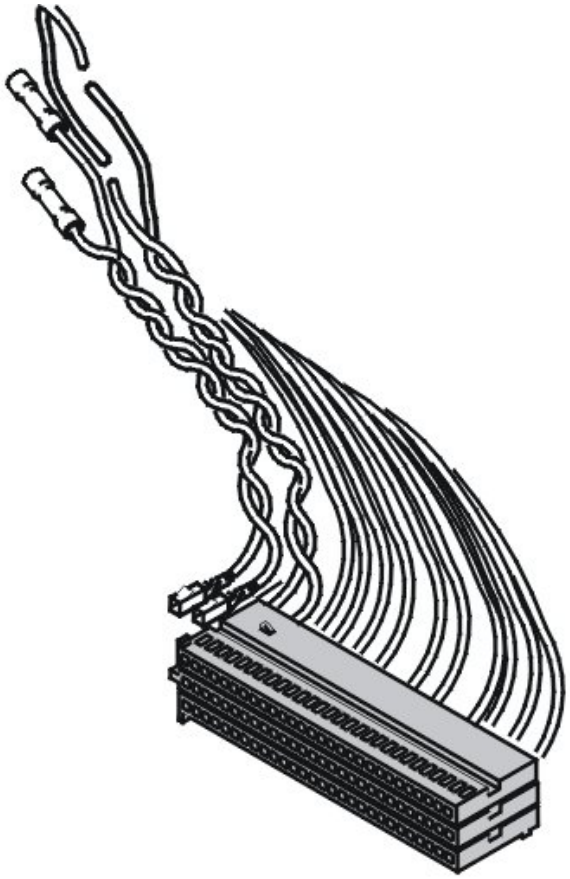
Note! To avoid confusion only replace one pair of cables, or one cable, at a time.

Remove the damaged cable or pair of cables



Note the position of each cable.
Remove the cable terminal by pressing the catch (1). Pull the cable.
Press the catch (2). Pull the cable out.
Use special tool951 2638 Terminal removal tool See: Tools and Equipment/951 2638 Terminal Removal Tool when disconnecting the cable

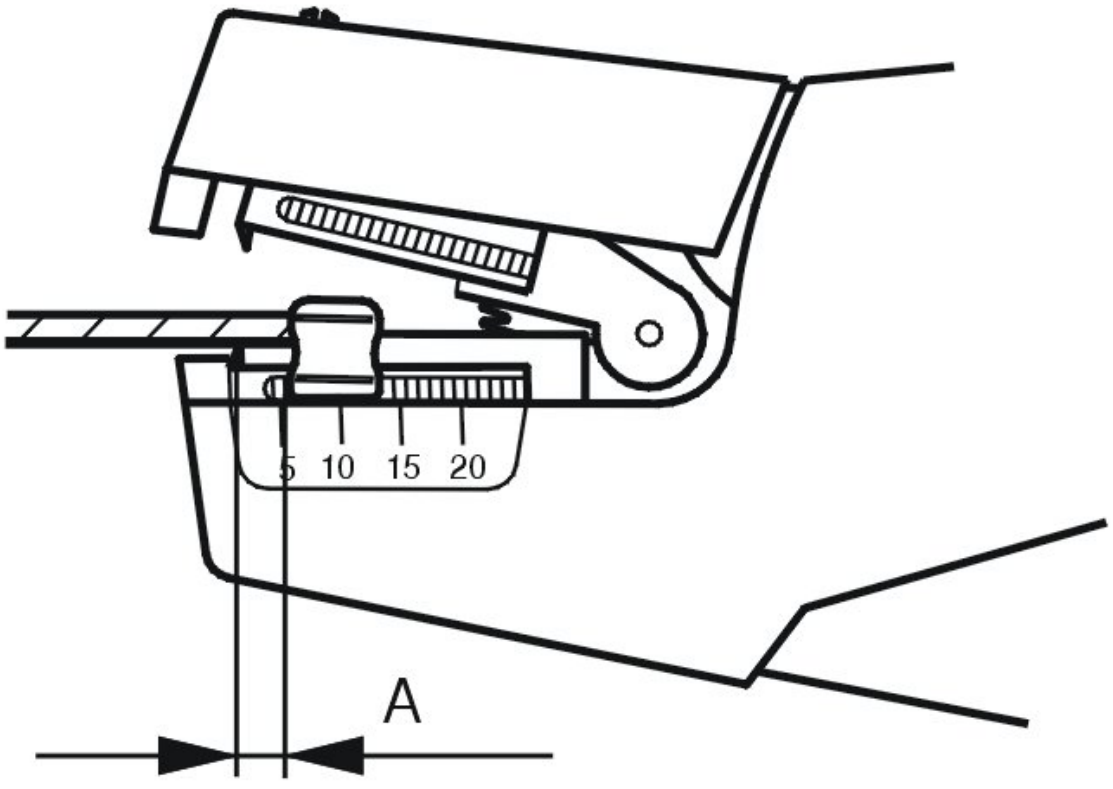
terminals.



Take a**new**cable or pair of cables with the same color markings as the disconnected cables.
Cut off the damaged cable to the same length as the new cable.

Note! The cable lengths are different so that the butt connectors are offset after installation.

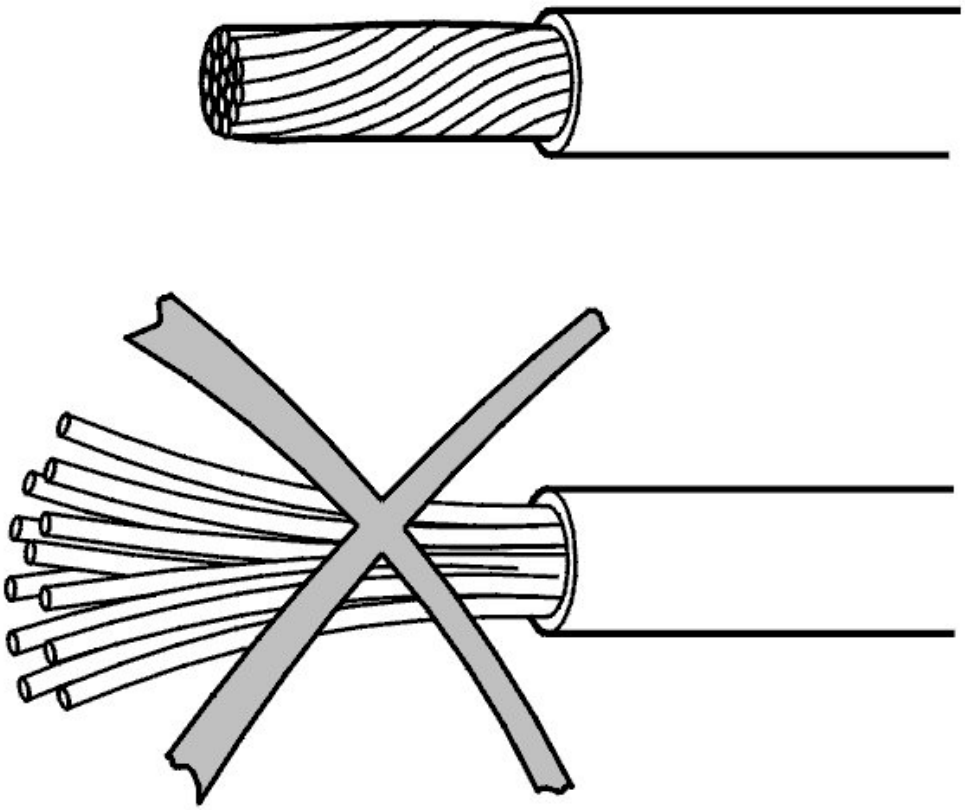
Stripping the cables



Strip**5 mm**(A) off the damaged cable.

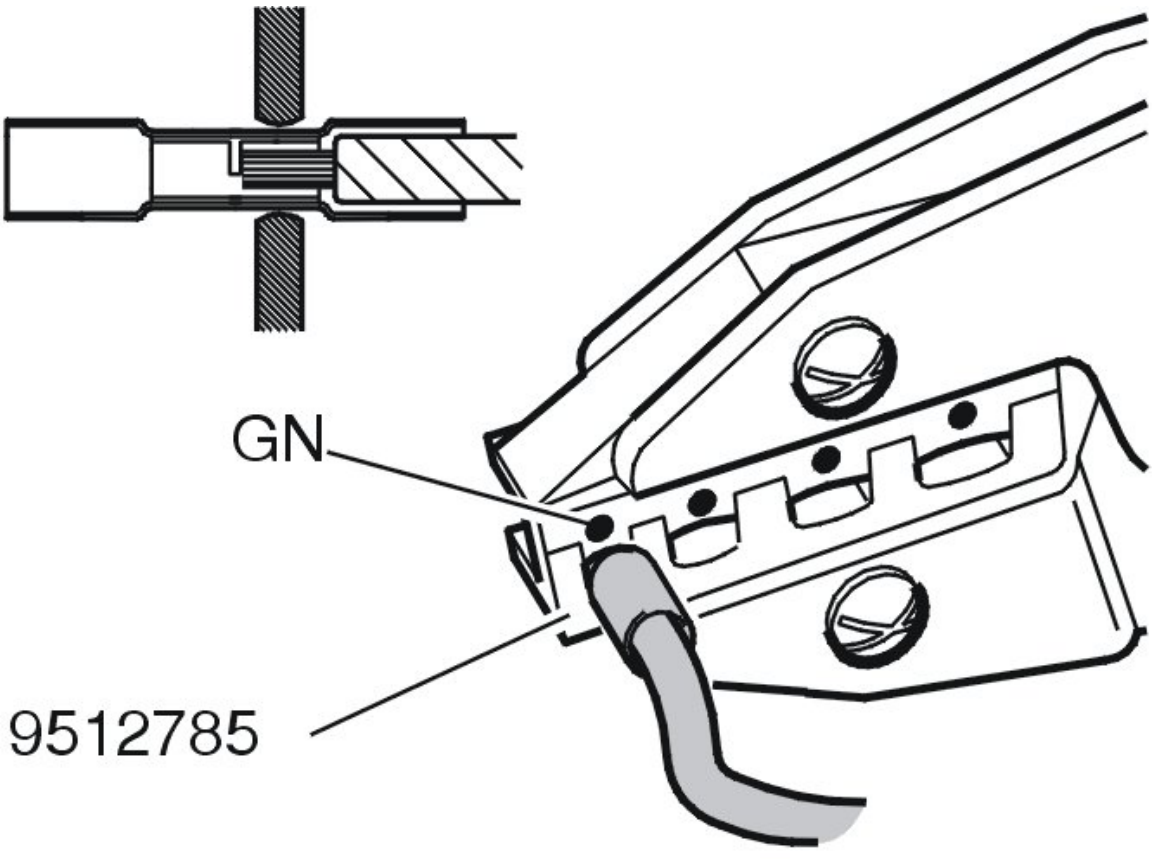
Use cable stripping tool951 2620 Stripping tool See: Tools and Equipment/951 2620 Stripping Tool.

Check the cable ends



Ensure that the cable ends look like the same as in the upper illustration.
It is important to ensure a good result when stripping.

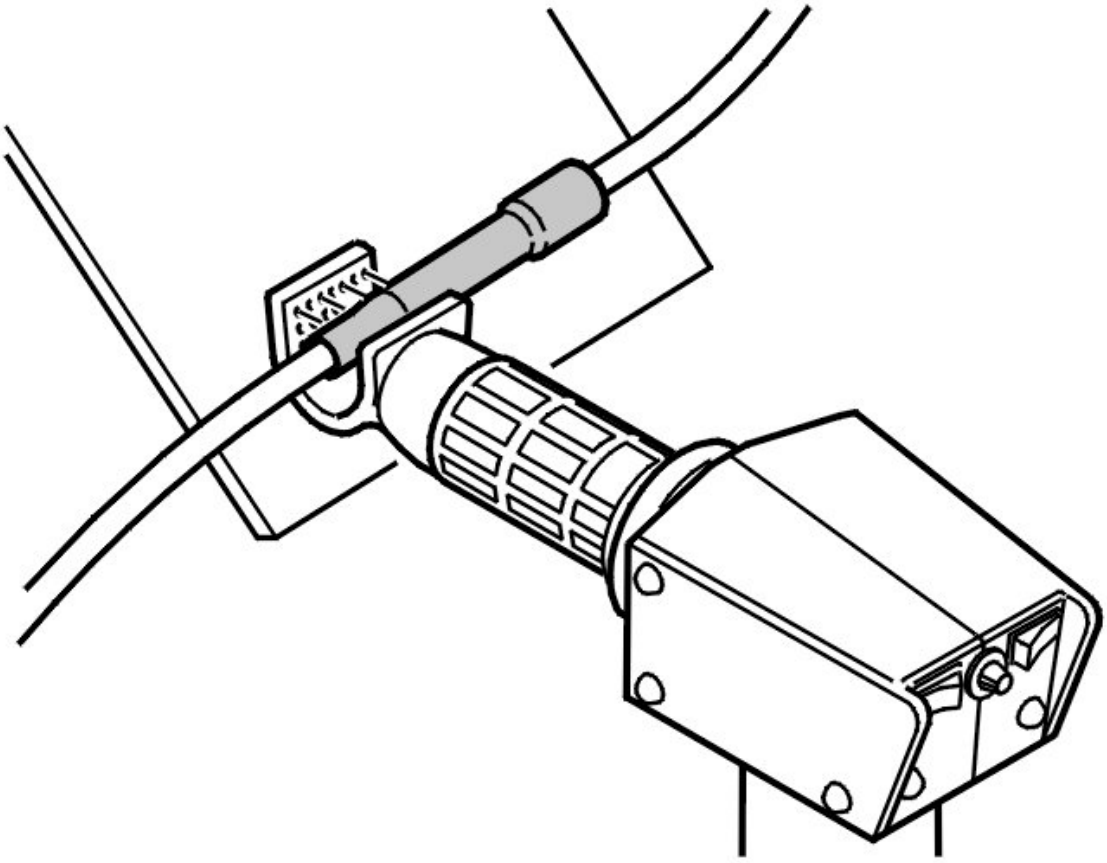
Crimping the butt connector



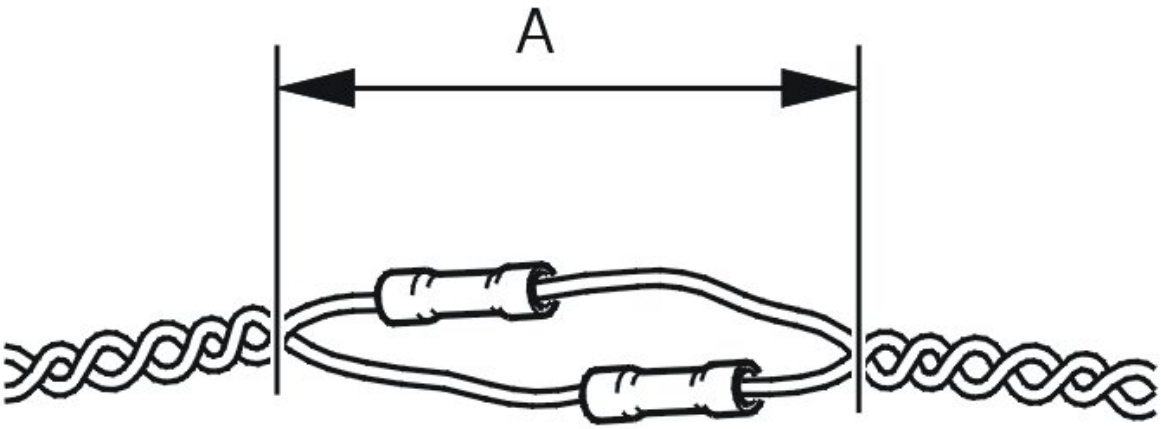
Insert the cable with the same color marking in the butt connector.

Crimp using the green marked cut-out on special tool951 2785 Crimping tool See: Tools and Equipment/951 2785 Crimping Tool.
Check the crimping by looking and feeling that the cable is correctly installed.

Crimping the butt connectors

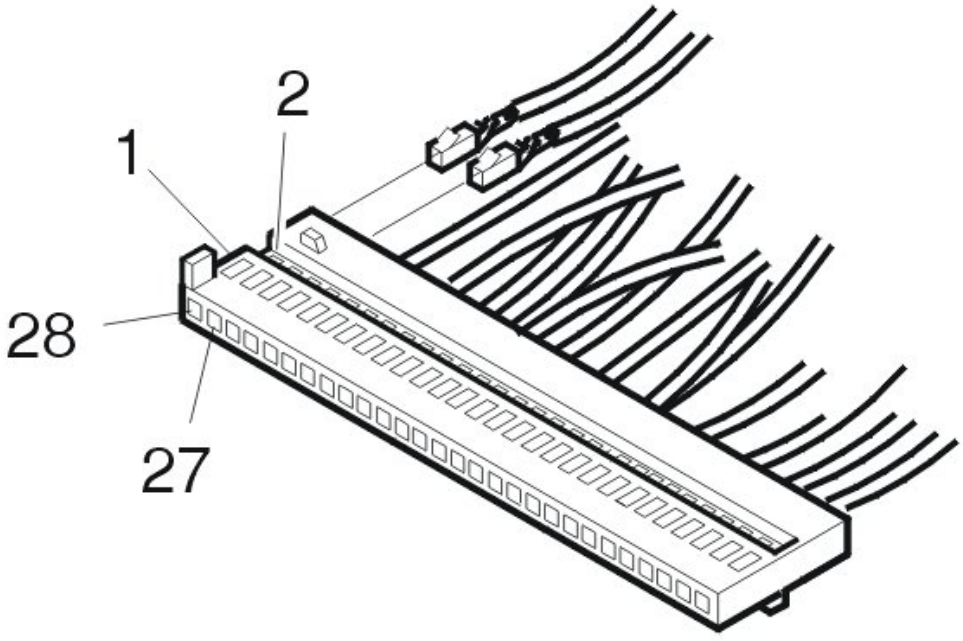


Use hot-air gun951 2777 Hot-air gun See: Tools and Equipment/951 2777 Hot-Air Gun and nozzle951 2778 Nozzle See: Tools and Equipment/951 2778 Nozzle.
Set the hot-air gun to flow 2 and set the temperature between 2 and 3.
Protect surrounding components from heat.
Position the butt connector in the nozzle and heat so that the adhesive forces its ways out of both ends.



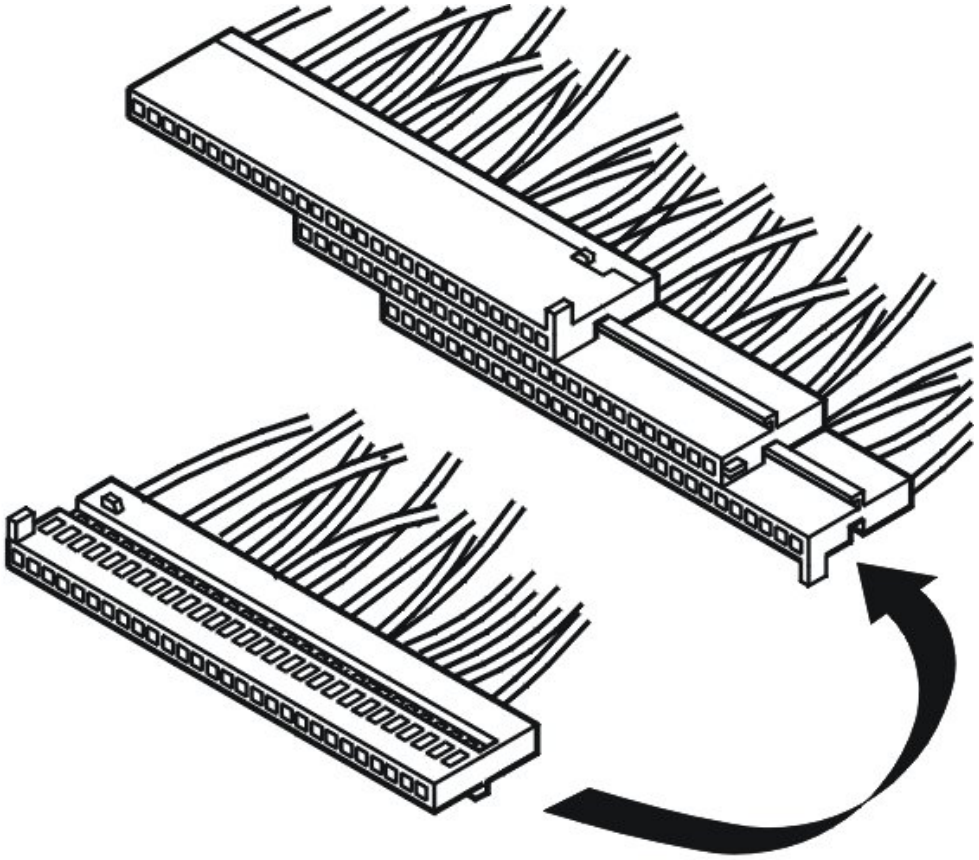
A maximum of**100 mm**(A) of the twisted wiring can be untwisted at the join.

Installing the wiring in the receptacle housing

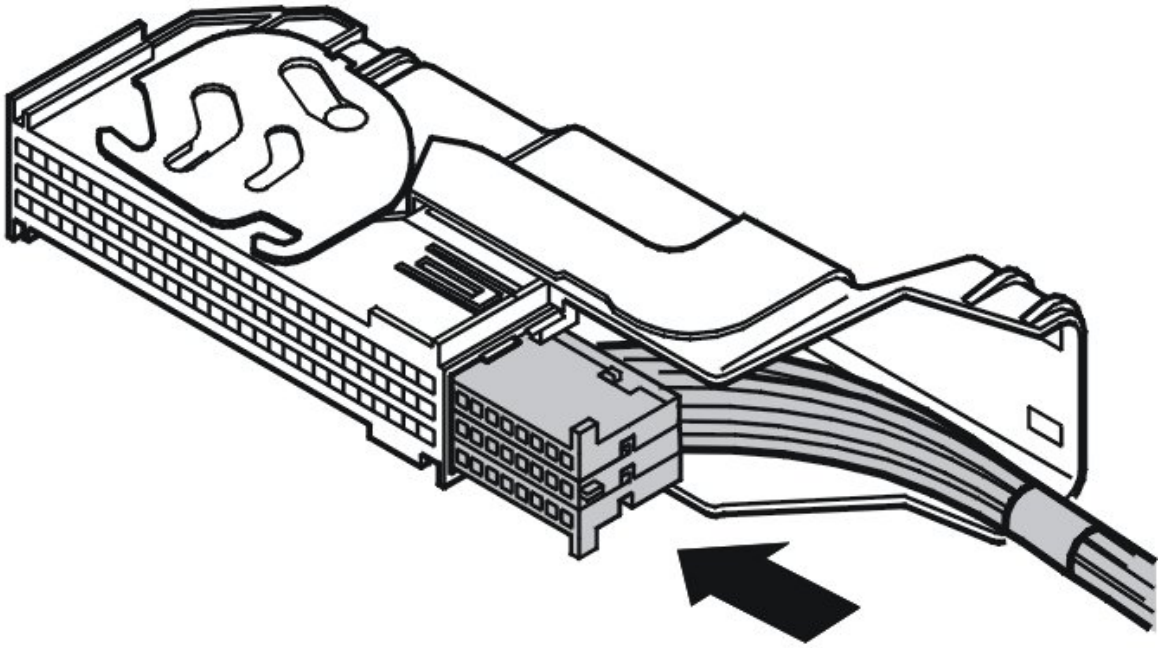


Install the cable terminals in the receptacle housing in the same position as earlier.
Check that the cable terminal is locked in the innermost position.

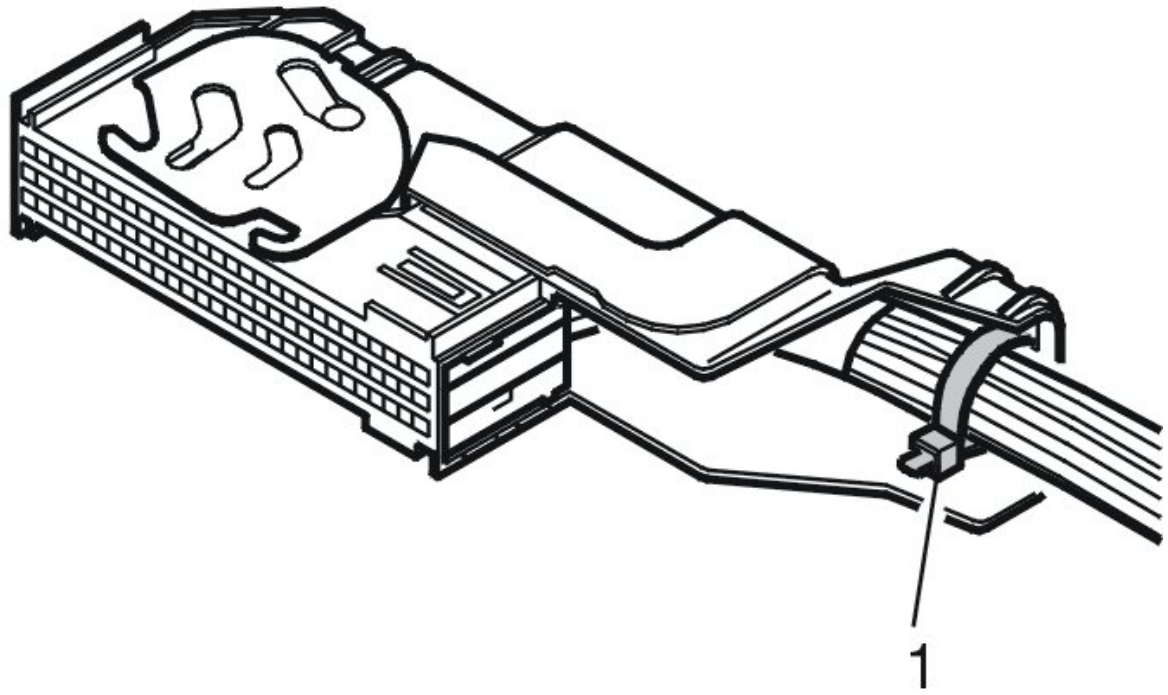
Installing the connector



Assemble the receptacle housings.



Install the receptacle housings in the connector.
Check that the receptacle housings lock in the side of the connector.



Install a new tie strap on the wiring around the cable harness and connector (1).

Installing the connector on the control module

Connect the connector on the control module, see: Removing, replacing and installing Supplemental restraint system (SRS), control module (SRS).

Checking diagnostic trouble code (DTC) 00BB

Check that the rear side impact sensor is correctly connected after finishing the repair.
Remove the connector on the left-hand rear side impact sensor, see: Removing, replacing and installing SRS (supplemental restraint system) Side impact sensor.
Switch the ignition to position II.

- Connect the battery negative lead
- Wait 15 seconds
- Read off diagnostic trouble codes (DTCs).

Diagnostic Trouble Code (DTC) 00BB should now be displayed.
Continue fault-tracing according to the ordinary fault-tracing routine if another diagnostic trouble code (DTC) is displayed.
Switch off the ignition.
Disconnect the battery negative lead.
Connect the cable on the left-hand rear side impact sensor, see: Removing, replacing and installing SRS (supplemental restraint system) Side impact sensor.
Connect the battery negative lead.

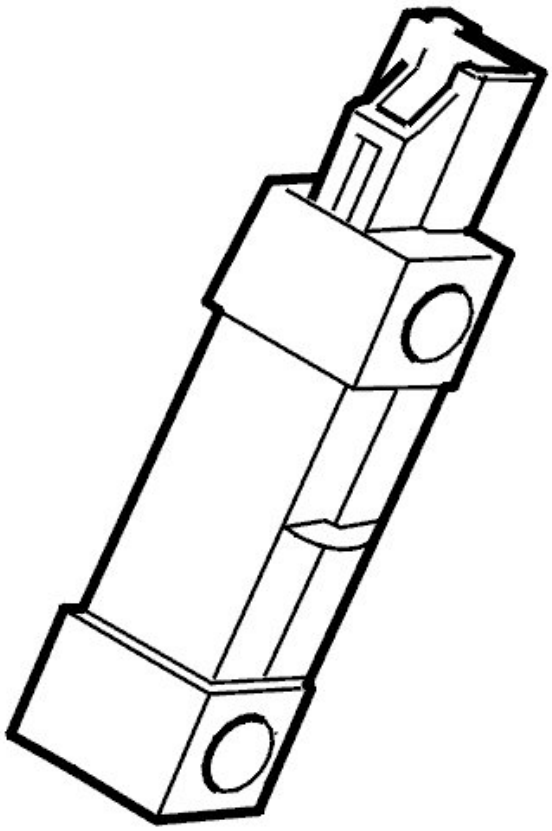
Final check

Carry out the final check according to: Removing, replacing and installing Supplemental restraint system (SRS), control module, final check (SRS).

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C1

Condition



Diagnostic trouble code (DTC) SRS-00C1 is stored if the SRS control module identifies an incorrect side impact sensor identity.

Substitute value
- None.

Possible source
- Faulty side impact sensor identity.
- Faulty side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

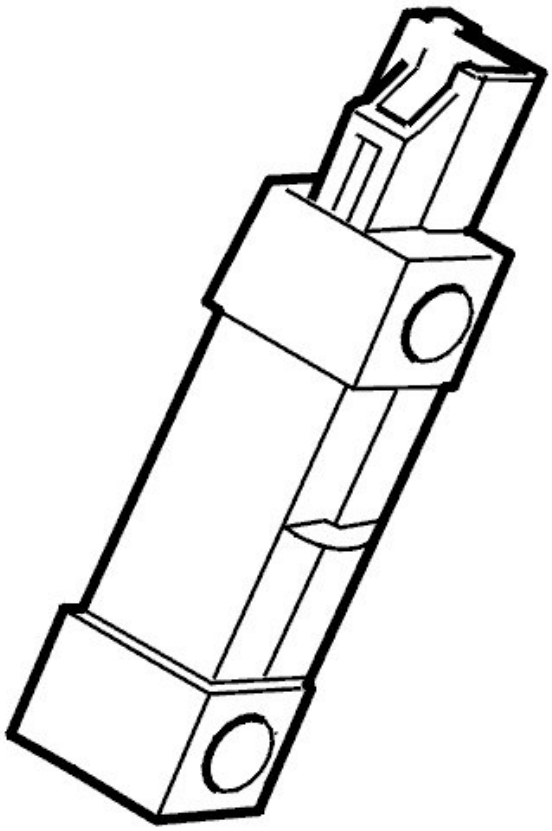
Faulty identity

Faulty identity. Permanent fault

Checking the component

The control module does not recognize the identity of the side impact sensor. Check that the P/N of the side impact sensor is correct.
Ignition on.
Read off the side impact sensor identity by clicking on the VCT2000 symbol.
Replace the side impact sensor if no fault is found.

Other information:
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.



Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

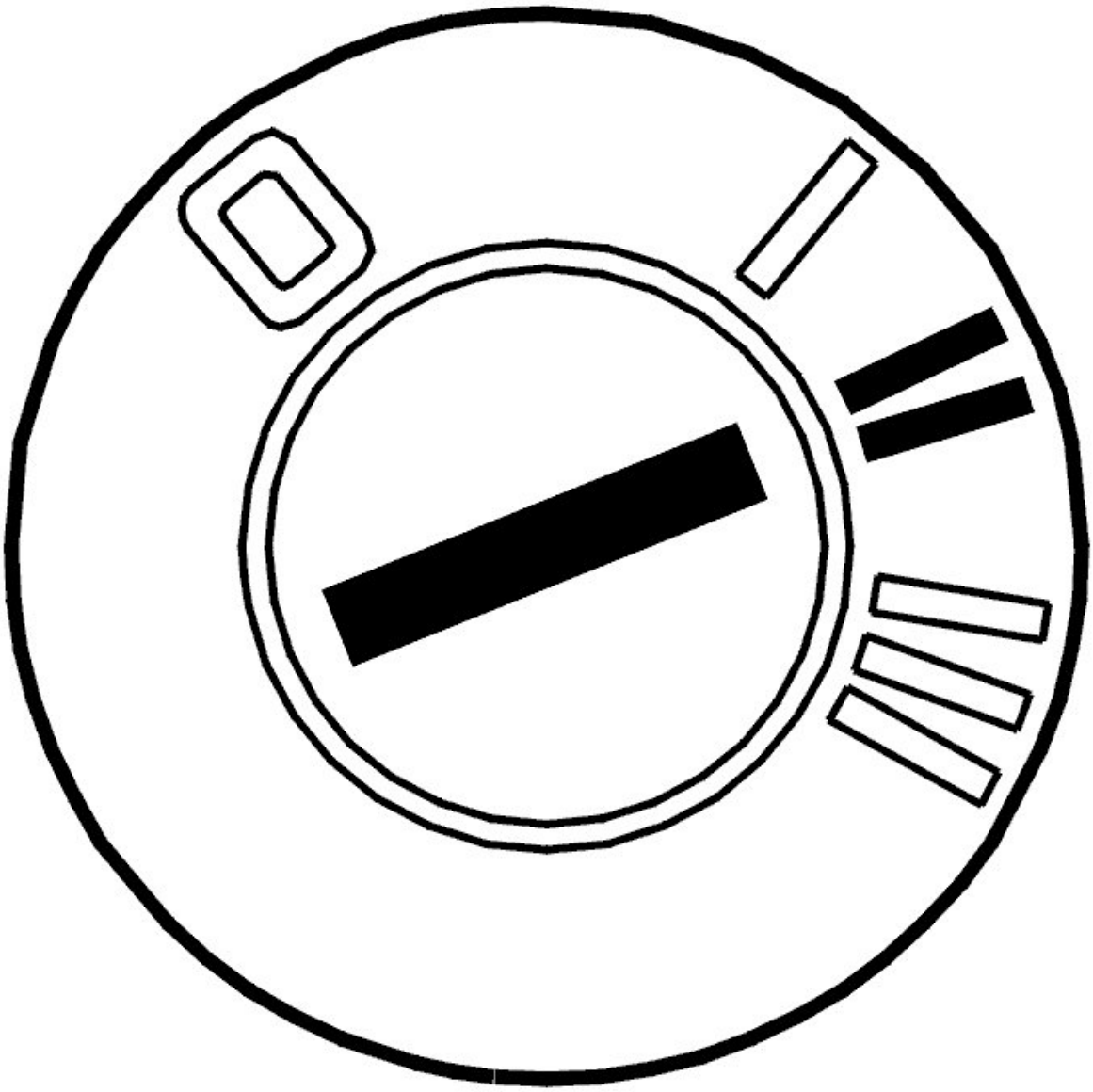
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

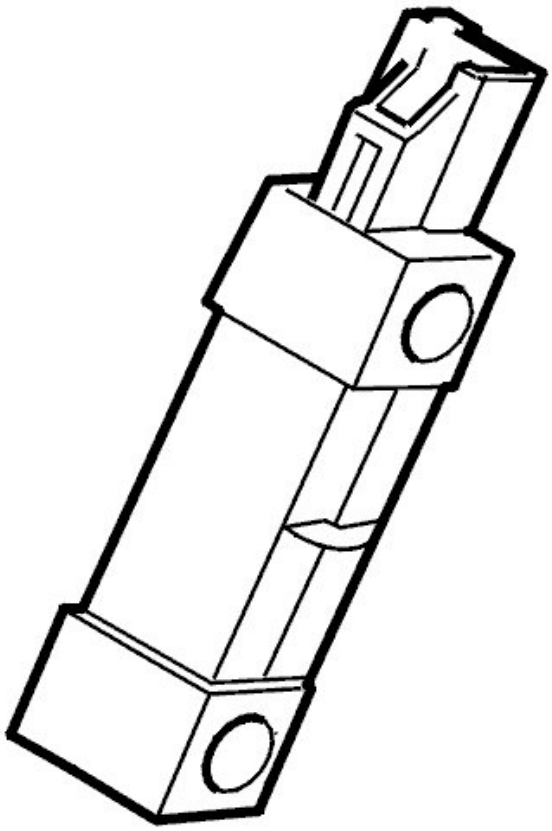
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C1

Condition



Diagnostic trouble code (DTC) SRS-00C1 is stored if the SRS control module identifies an incorrect side impact sensor identity.

Substitute value
- None.

Possible source
- Faulty side impact sensor identity.
- Faulty side impact sensor.

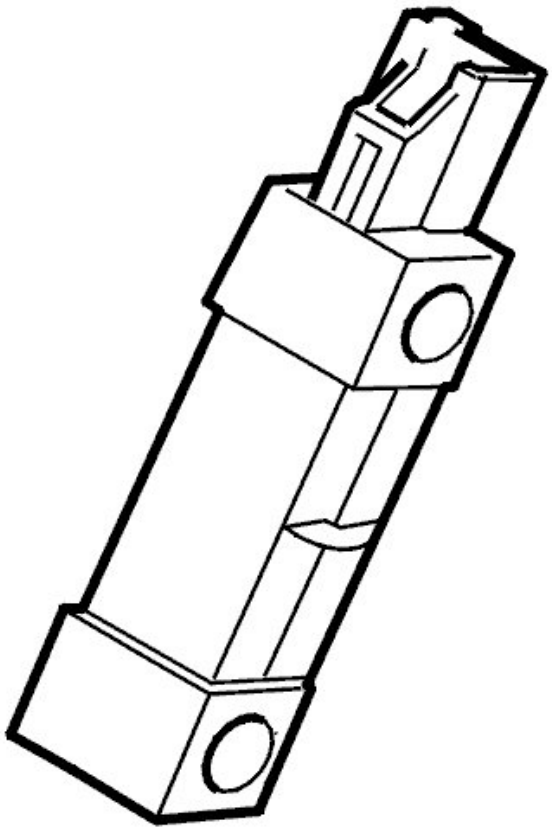
Fault symptom[s]
- The SRS indicator lamp is lit.

Faulty identity

Faulty identity. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

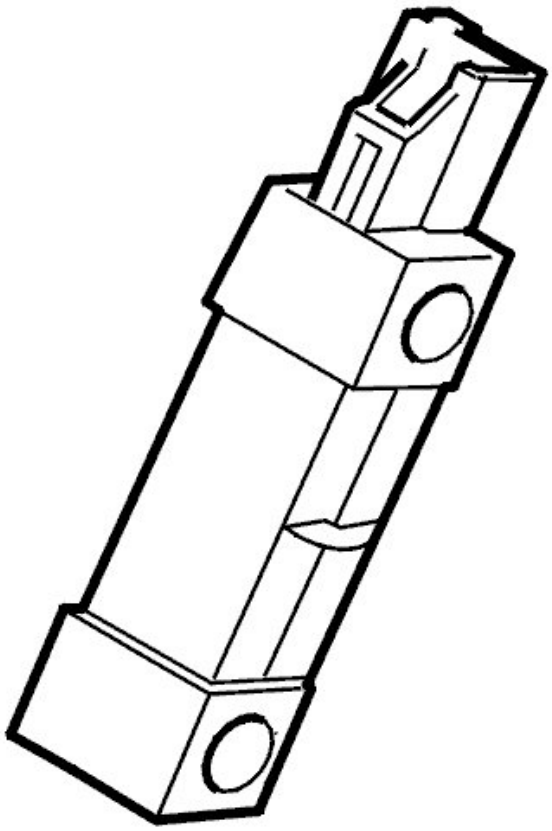
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C2

Condition



Diagnostic trouble code (DTC) SRS-00C2 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

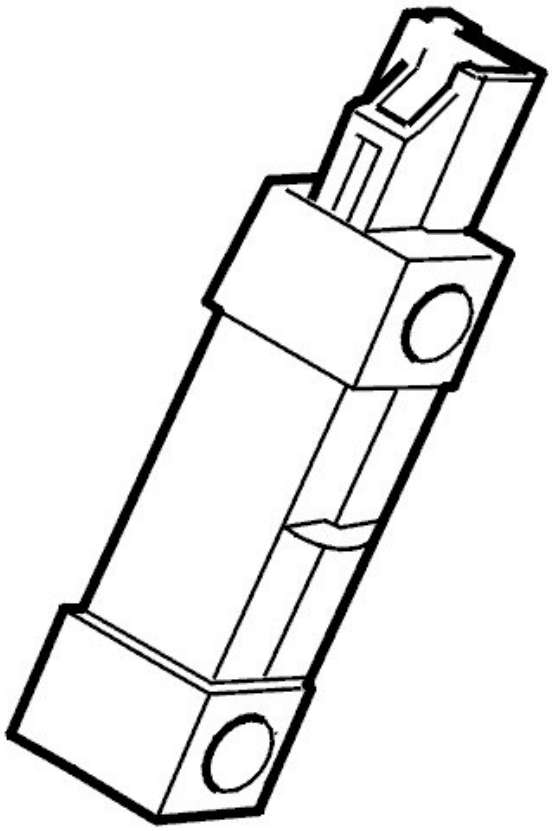
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

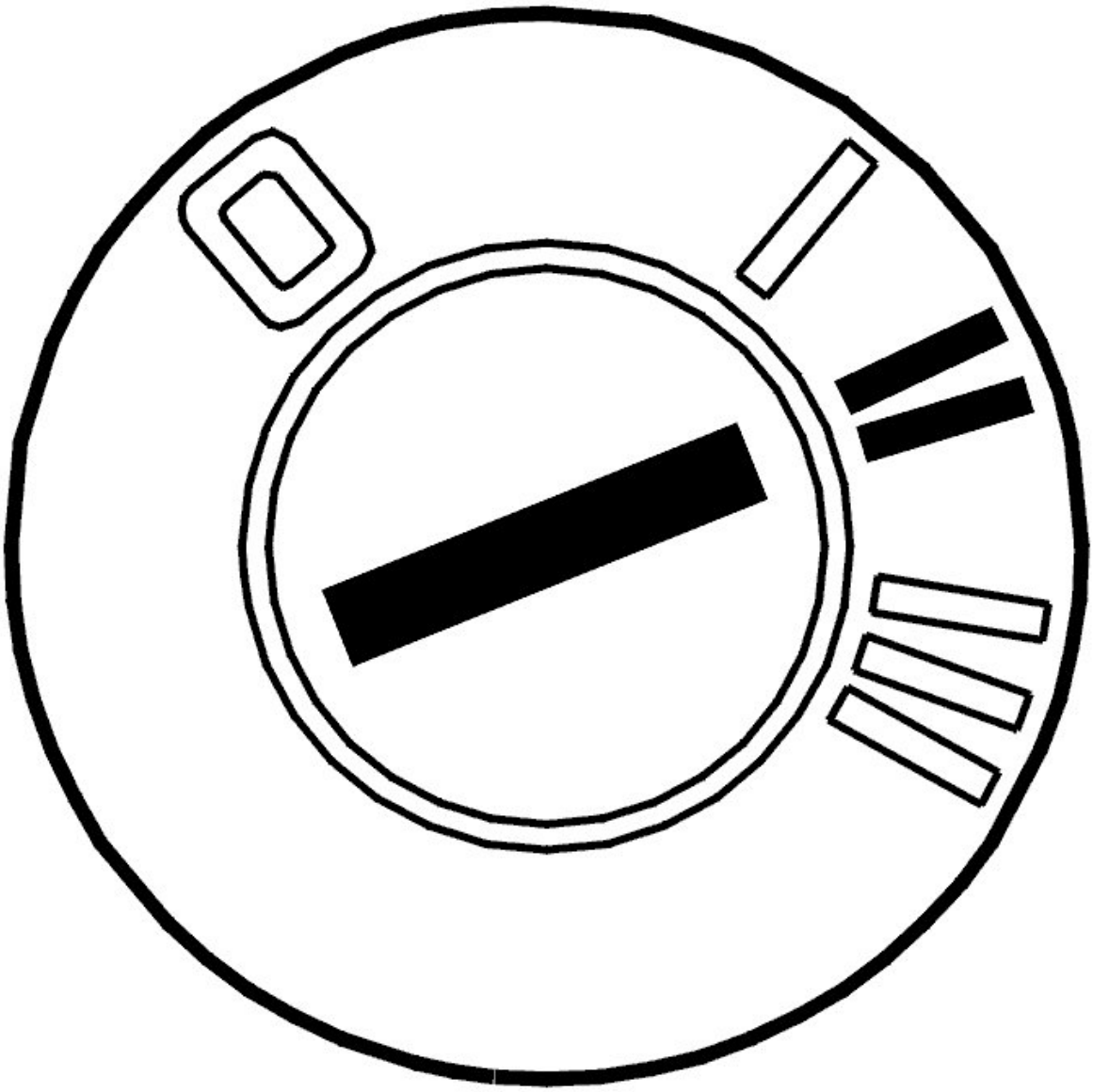
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

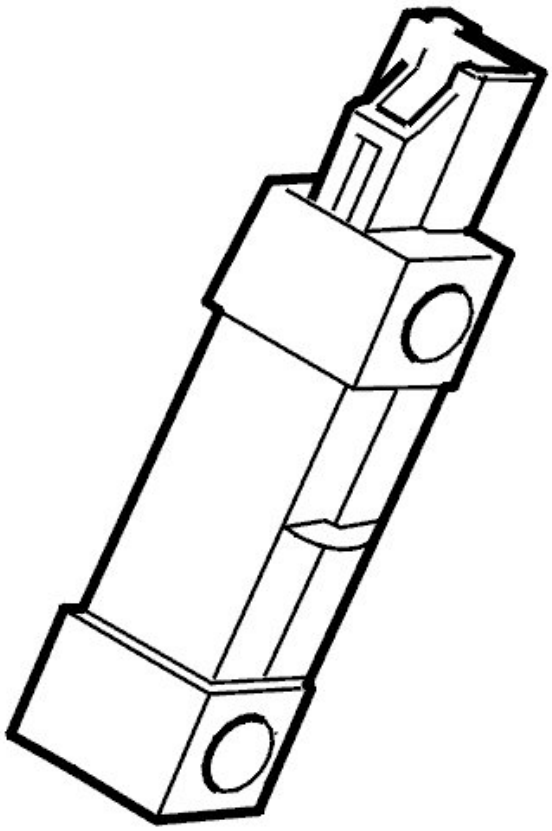
VERIFICATION FAILED - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C2

Condition



Diagnostic trouble code (DTC) SRS-00C2 is stored if the SRS control module registers an internal fault in the side impact sensor.

Substitute value
- None.

Possible source
- Internal fault in the side impact sensor.
- Faulty side impact sensor.

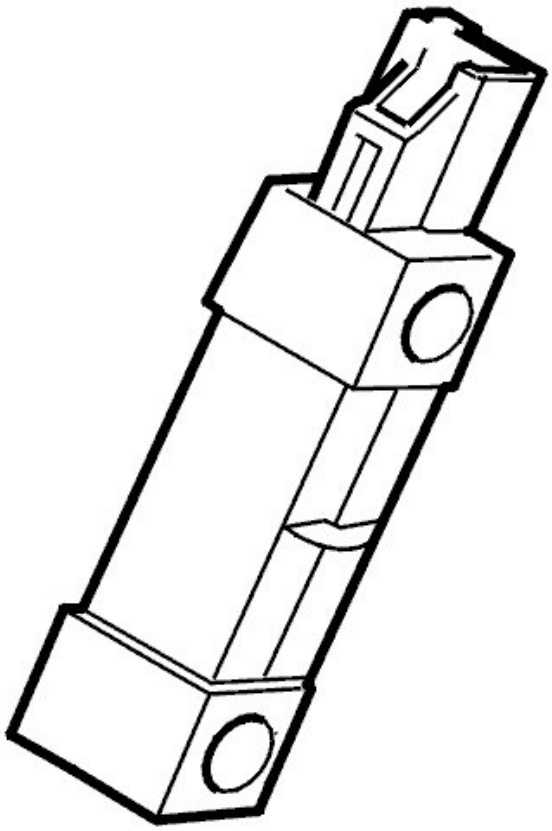
Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

Replacing the side impact sensor



The SRS control module has registered an internal fault in the side impact sensor.
Try a new side impact sensor according to Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

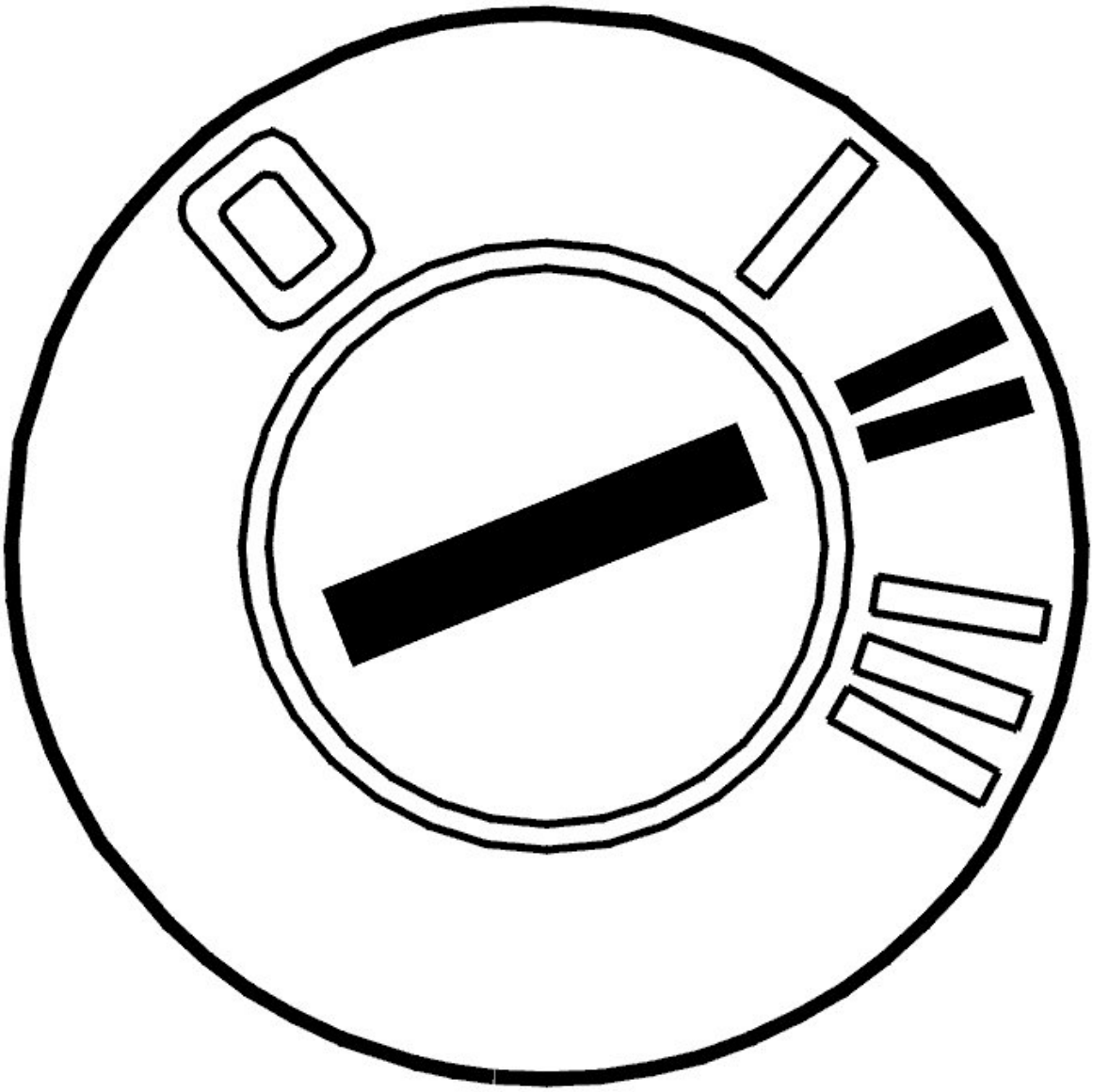
Attempt New Test - Replacing the side impact sensor

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

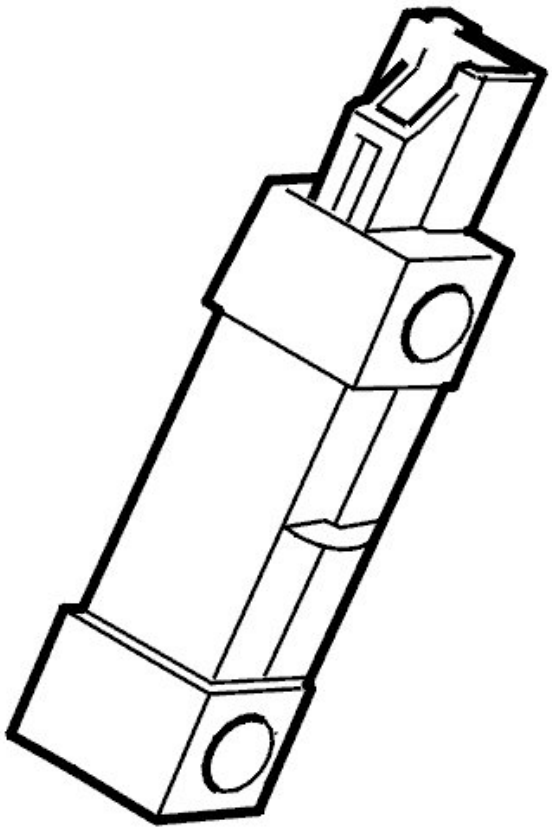
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C3

Condition



Diagnostic trouble code (DTC) SRS-00C3 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Incorrect side impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Permanent fault

Information

Fault-tracing for this diagnostic trouble code (DTC) will not be forthcoming.
For further information about this diagnostic trouble code (DTC), read the diagnostic trouble code (DTC) information.

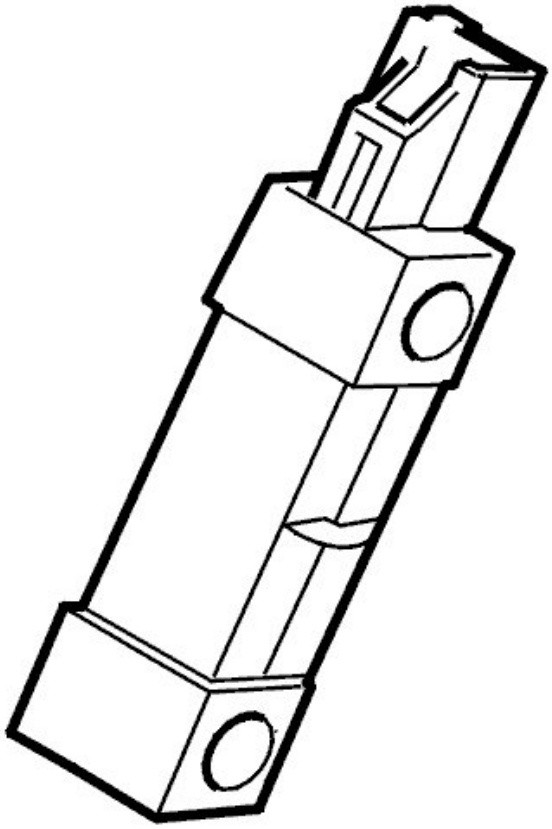
Select "Continue" to finish.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C3

Condition



Diagnostic trouble code (DTC) SRS-00C3 is stored if the SRS control module identifies that there is a side impact sensor, even though it is programmed that there should not be one.

Substitute value
- None.

Possible source
- Incorrect side impact sensor installation.
- Incorrect side impact sensor.

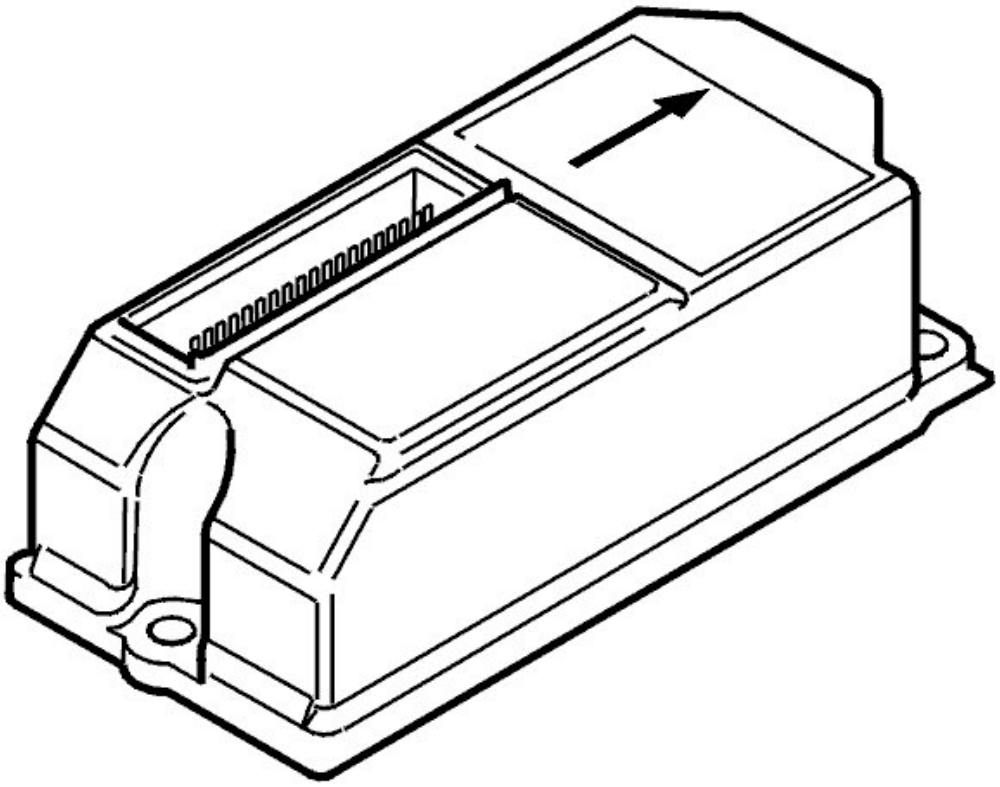
Fault symptom[s]
- The SRS indicator lamp is lit.

Configuration Fault

Configuration fault. Intermittent fault

Fault-tracing information

The control module has previously registered a fault. The fault is now no longer present.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

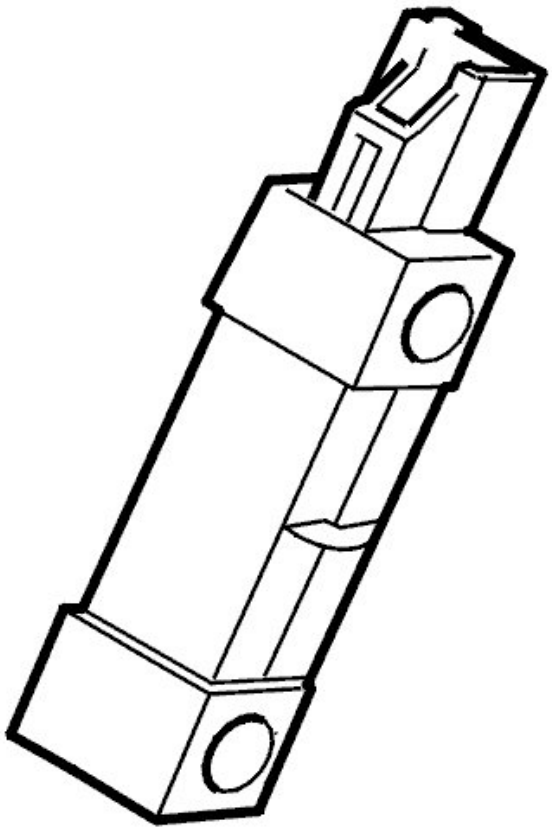
Attempt New Test - Fault-tracing information

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C4

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left side impact sensor.
Diagnostic trouble code (DTC) SRS-00C4 is stored if the control module registers that the signal cable is cross-connected.
Diagnostic trouble code (DTC) SRS-00C4 can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

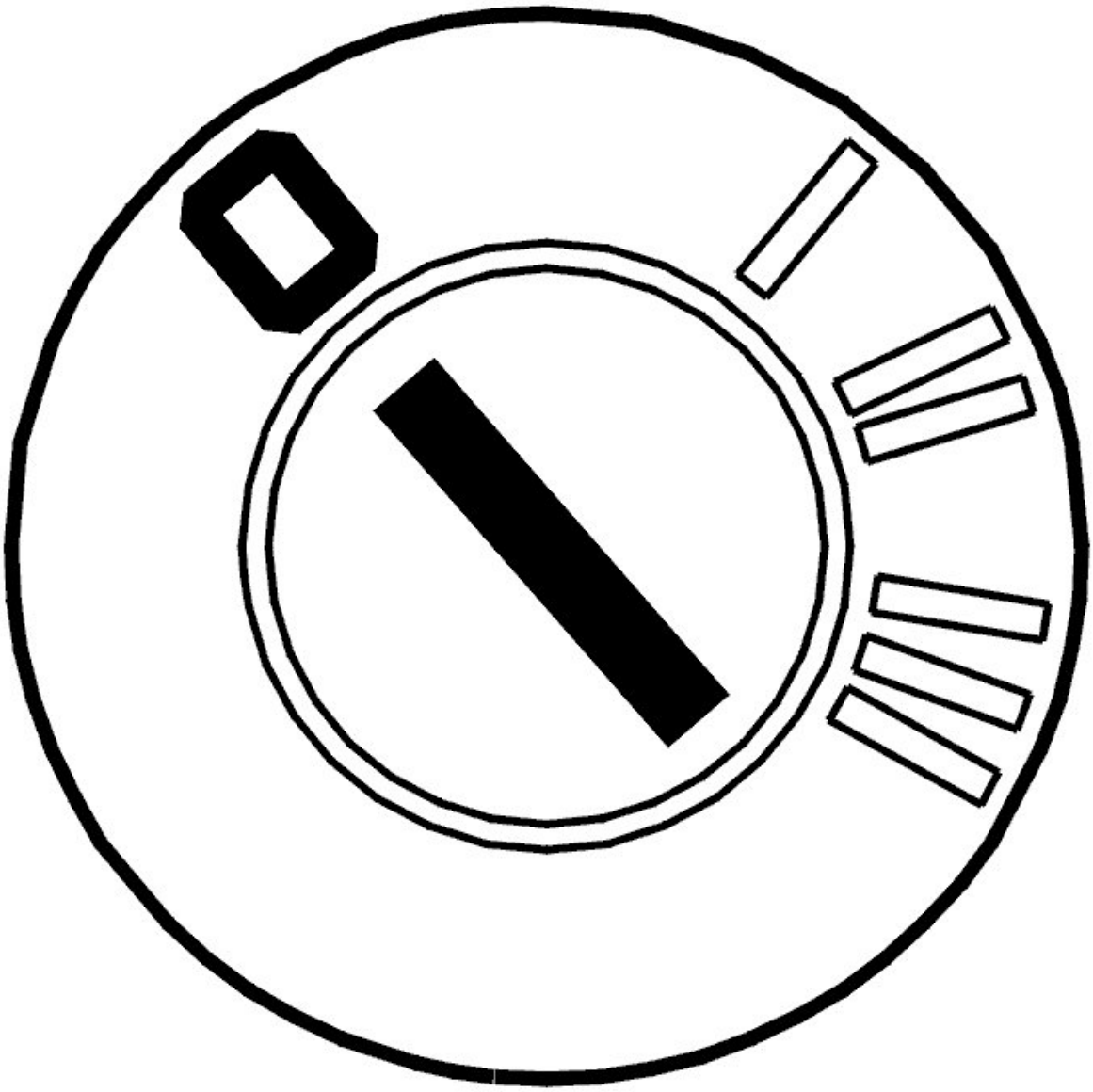
Possible source
- Short-circuit between the signal cables to the front left and right side impact sensors.

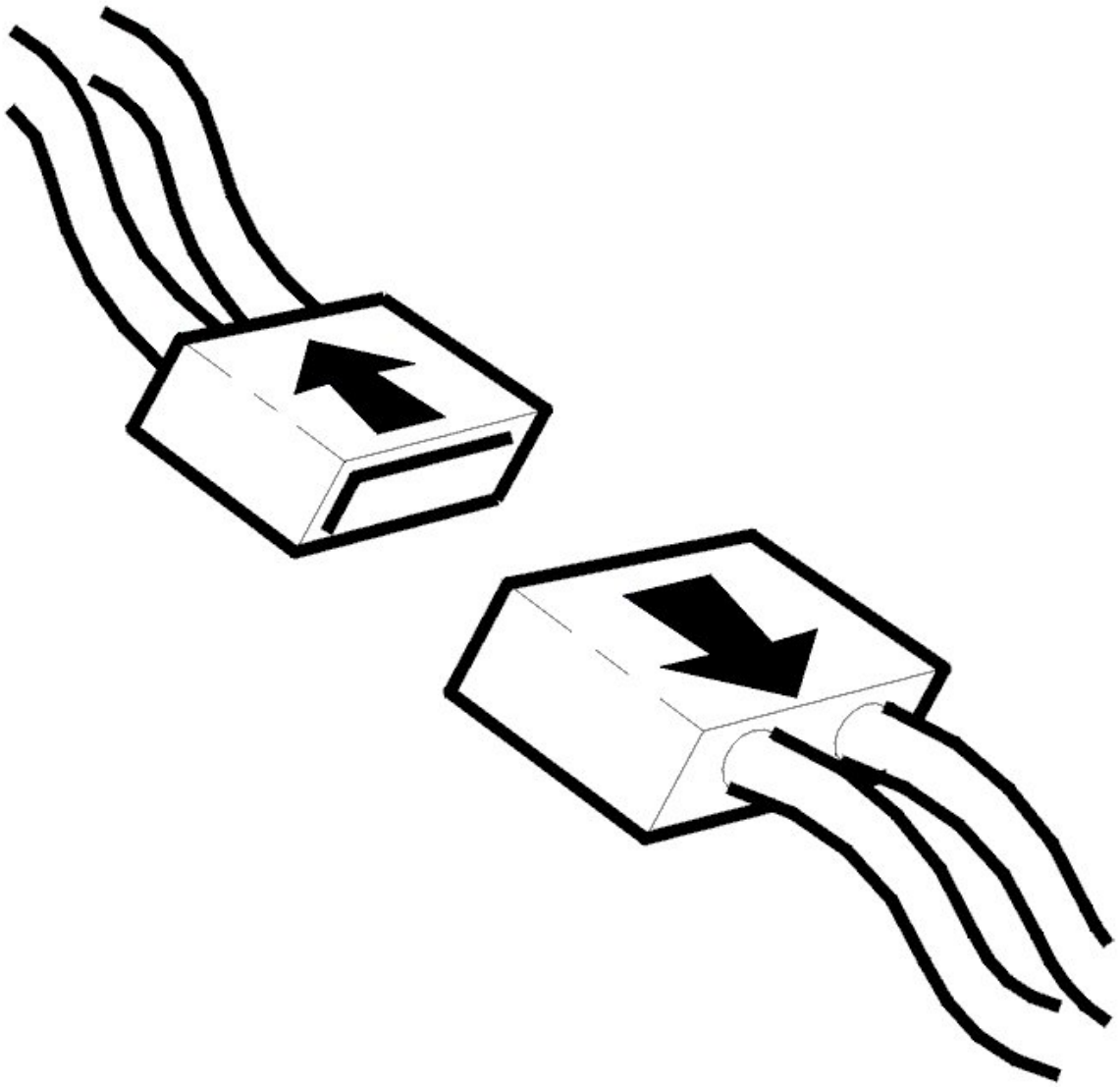
Fault symptom[s]
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring



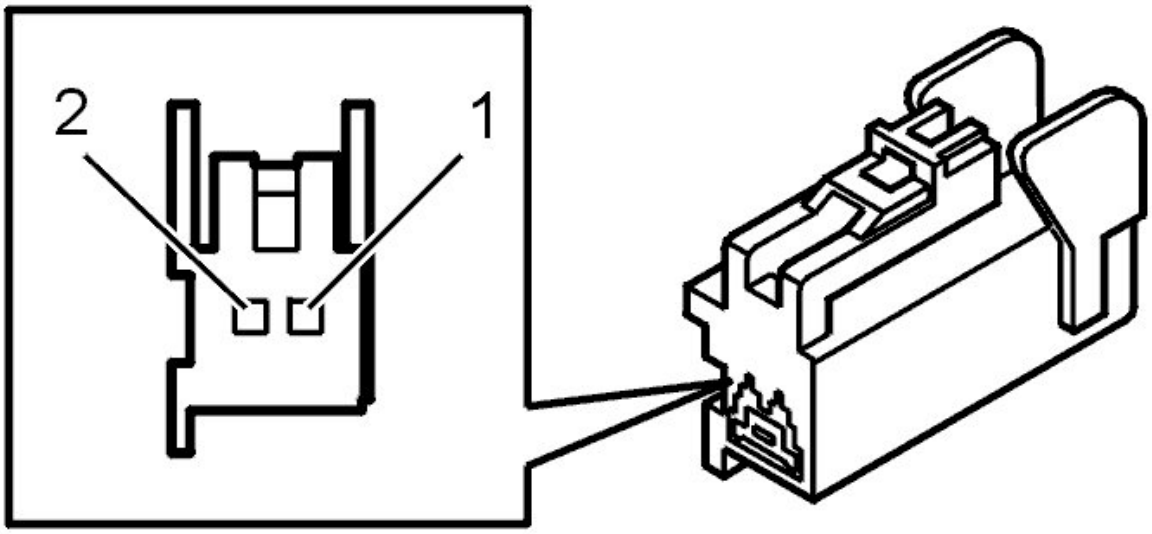


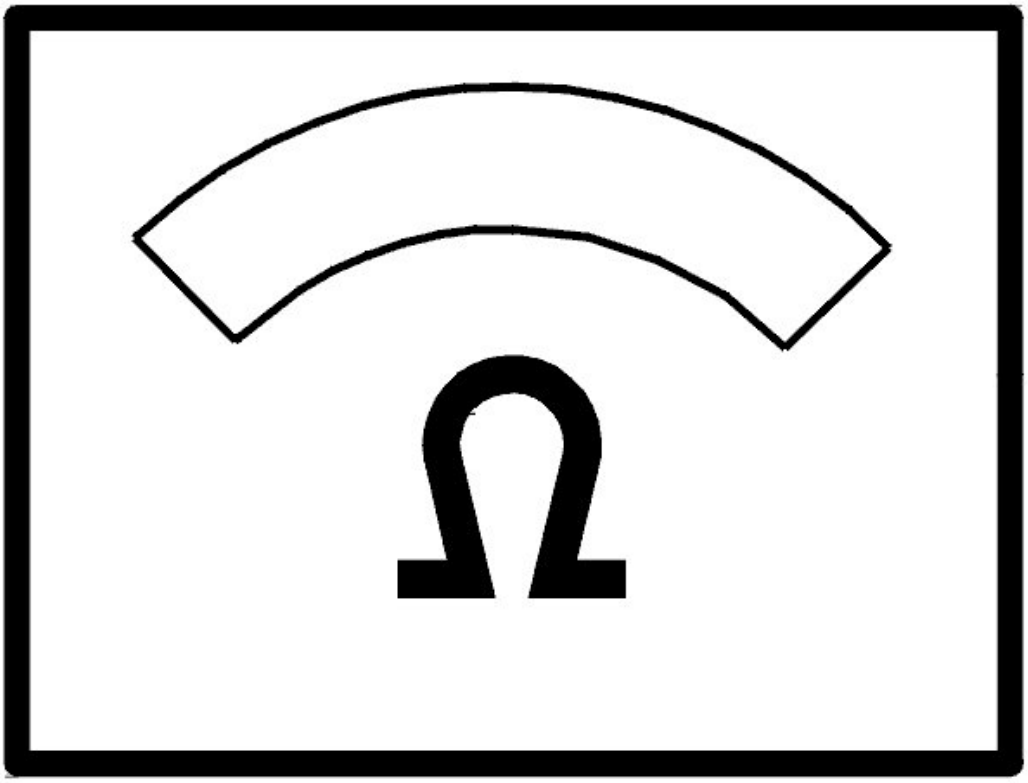
- Ignition off
- Disconnect the connector from the front left side impact sensor
- Disconnect the connector from the front right side impact sensor.

Check the resistance between terminals #8A (8) and #9C (5) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #9A (9) and #9C (5) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #8A (8) and #8C (4) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #9A (9) and #8C (4) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





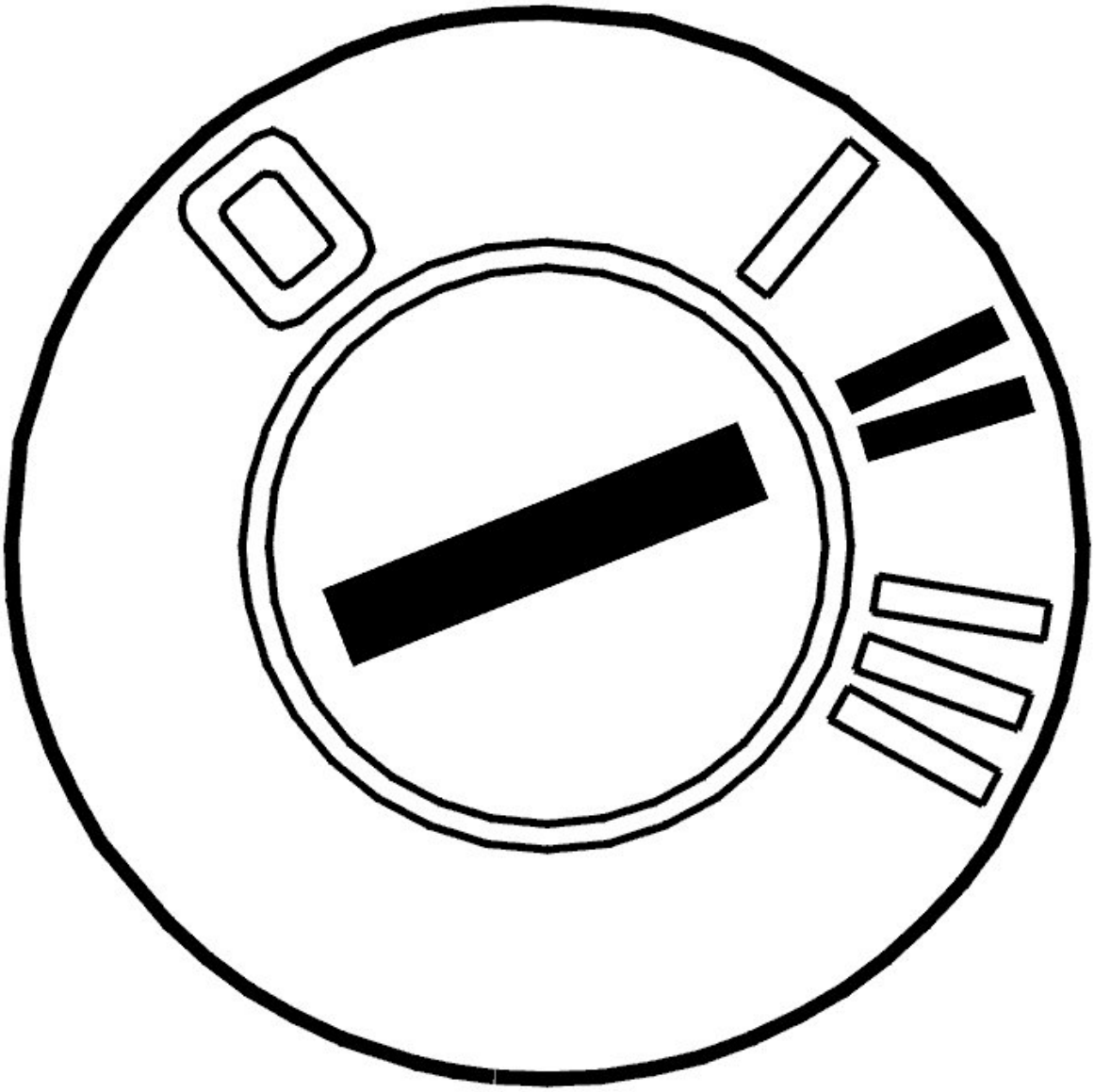
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

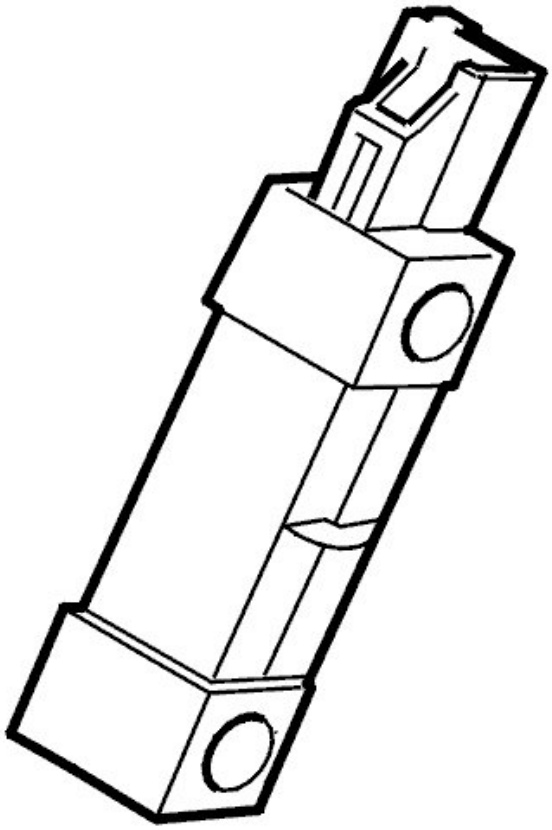
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C5

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right side impact sensor.
Diagnostic trouble code (DTC) SRS-00C5 is stored if the control module registers that the signal cable is cross-connected
Diagnostic trouble code (DTC) SRS-00C5 can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit between the signal cables to the front left and right side impact sensors.

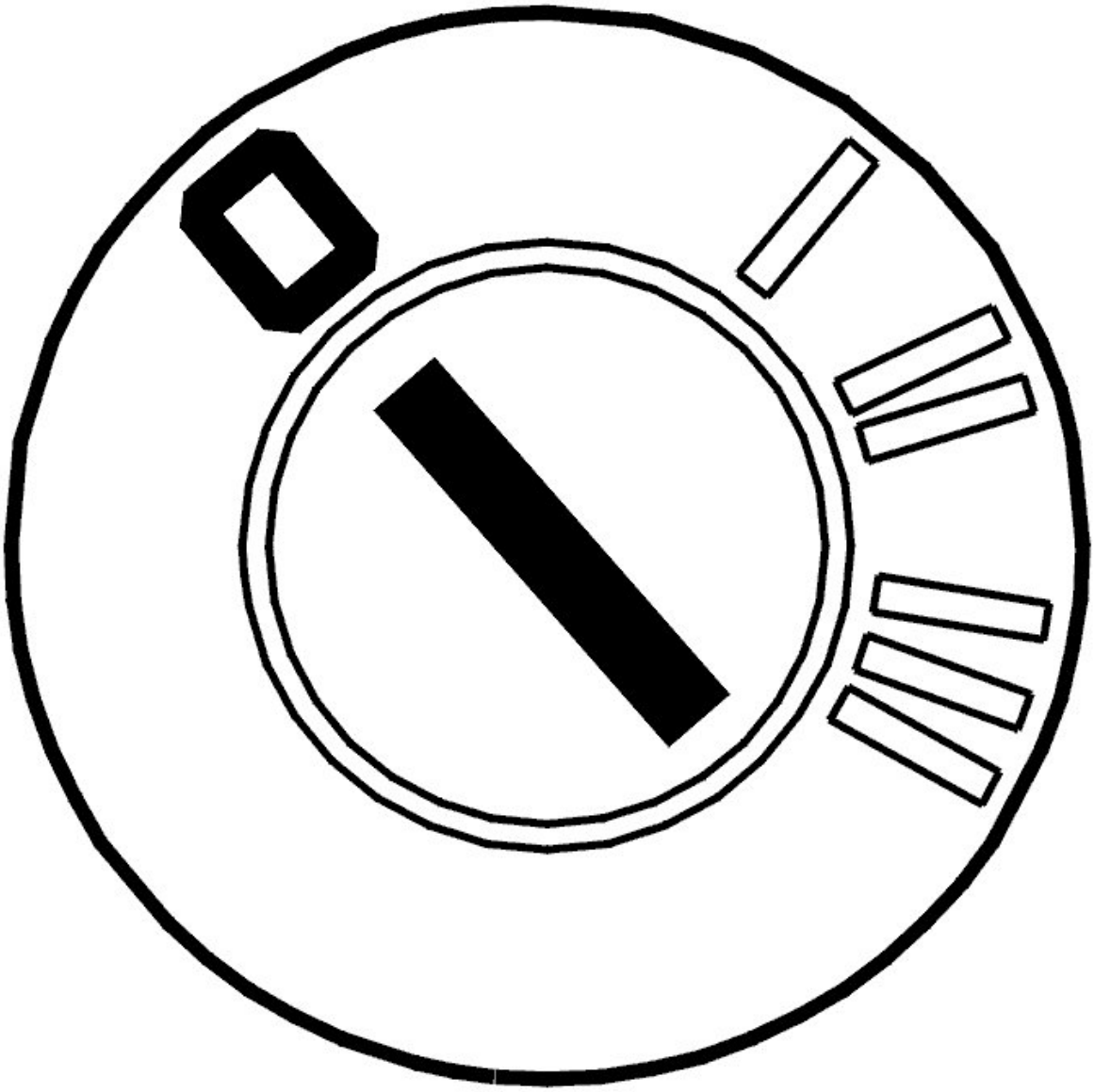
Fault symptom[s]

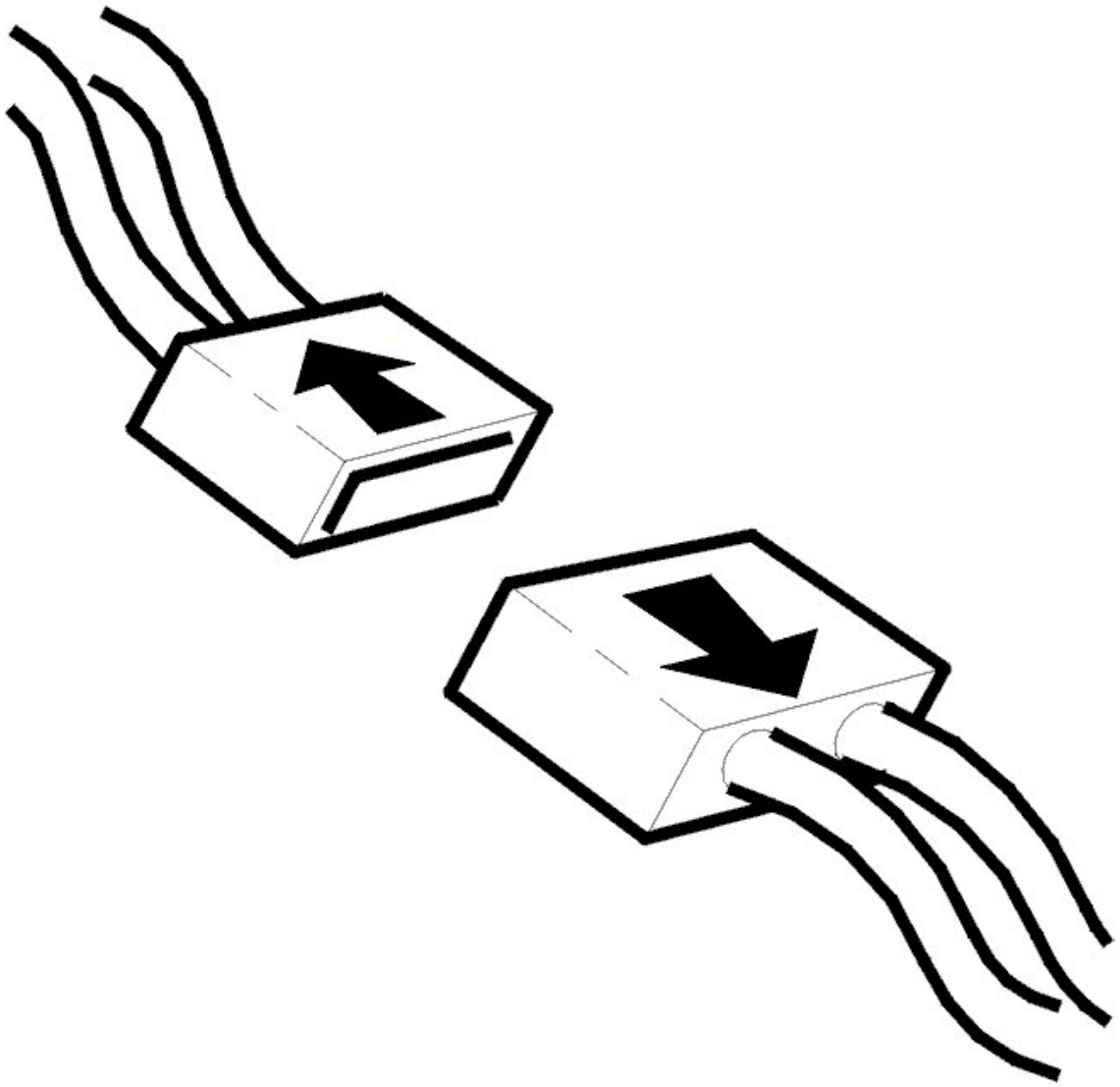
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring



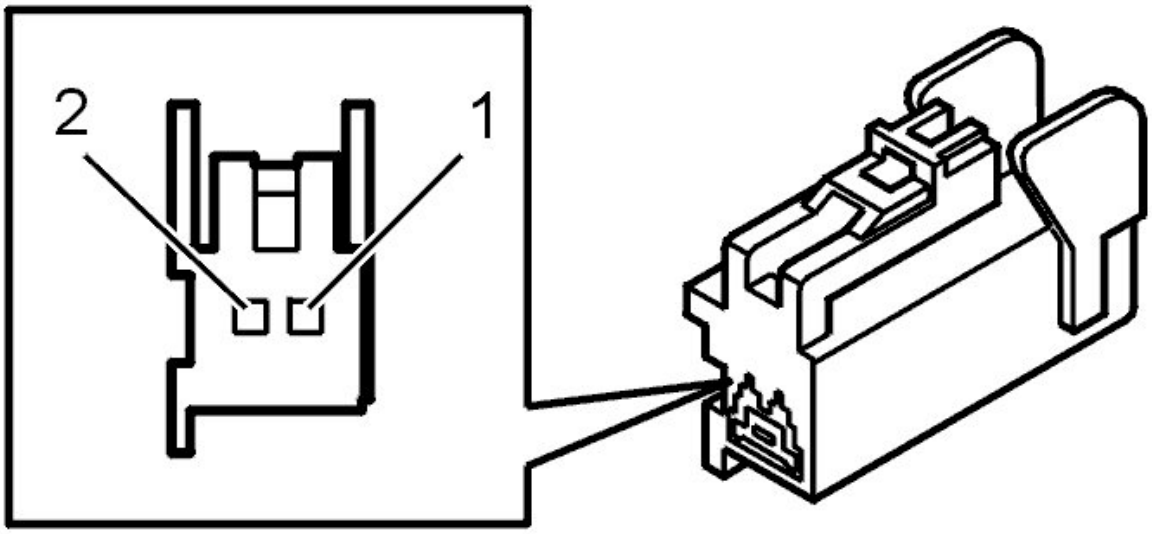


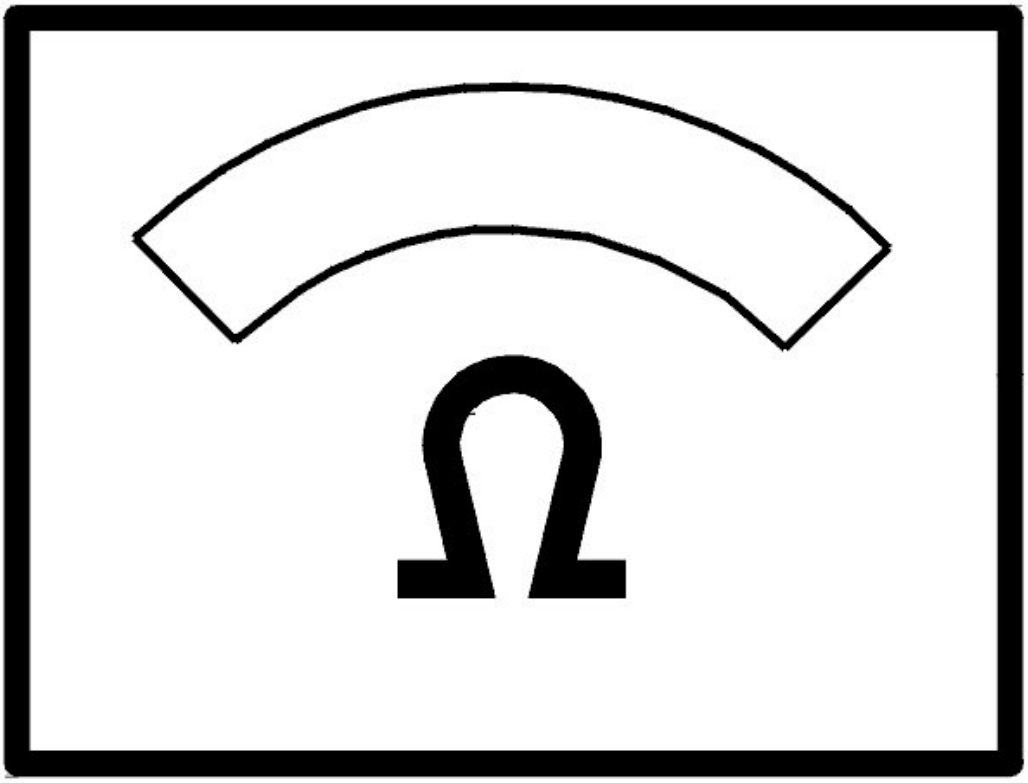
- Ignition off
- Disconnect the connector from the front left side impact sensor
- Disconnect the connector from the front right side impact sensor.

Check the resistance between terminals #8A (8) and #9C (5) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #9A (9) and #9C (5) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #8A (8) and #8C (4) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #9A (9) and #8C (4) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





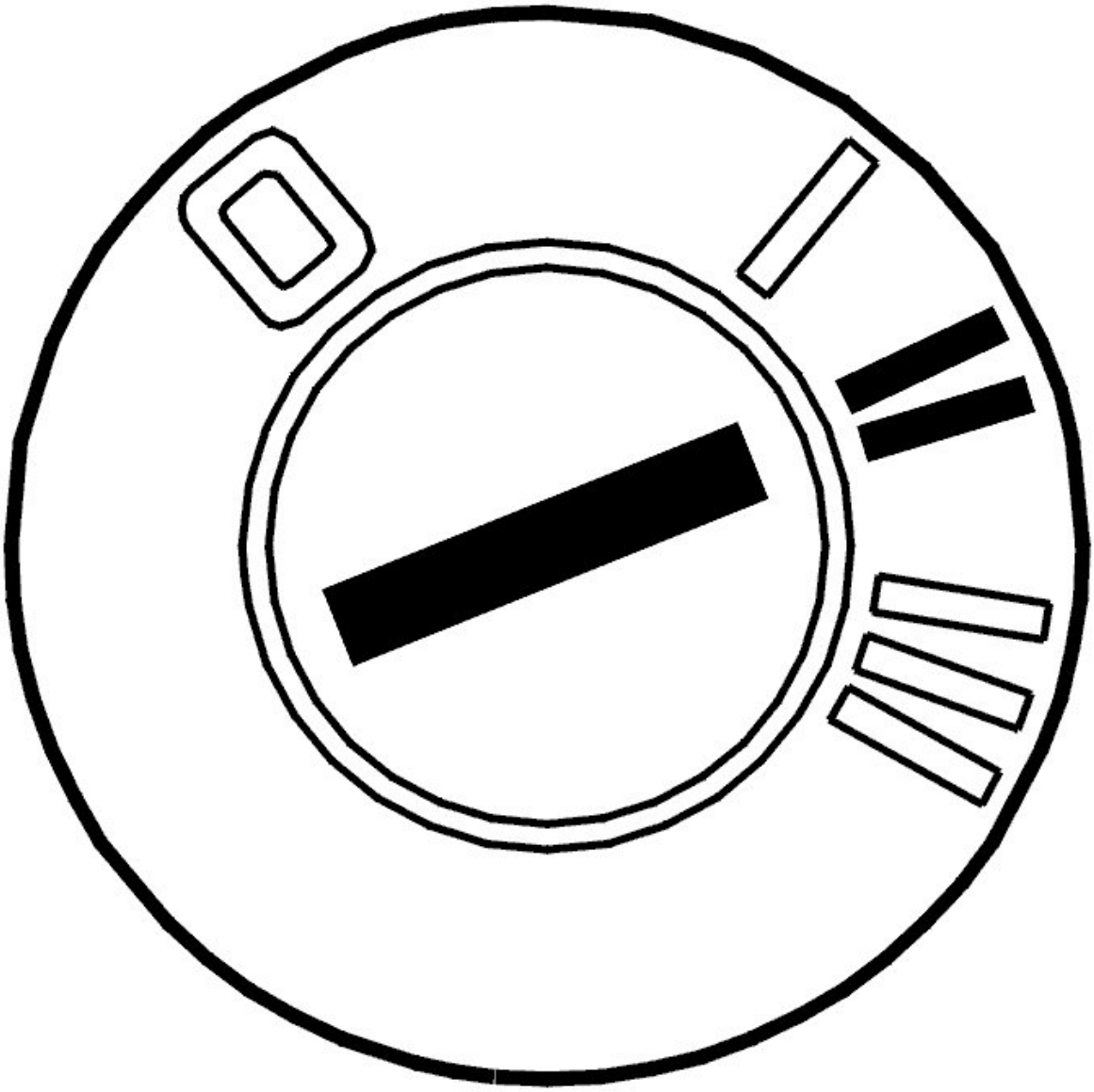
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

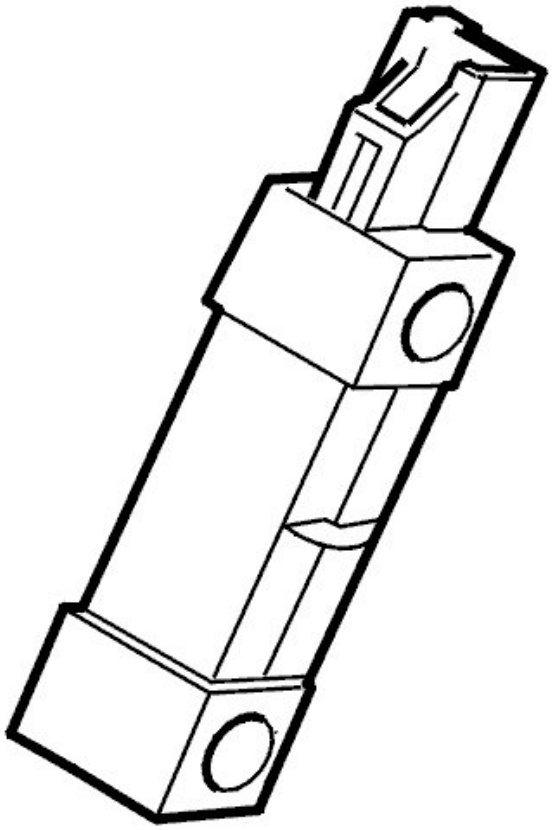
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C6

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the rear left side impact sensor.
Diagnostic trouble code (DTC) SRS-00C6 is stored if the control module registers that the signal cable is cross-connected.
Diagnostic trouble code (DTC) SRS-00C6 can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit between the signal cables to the rear left and right side impact sensors.

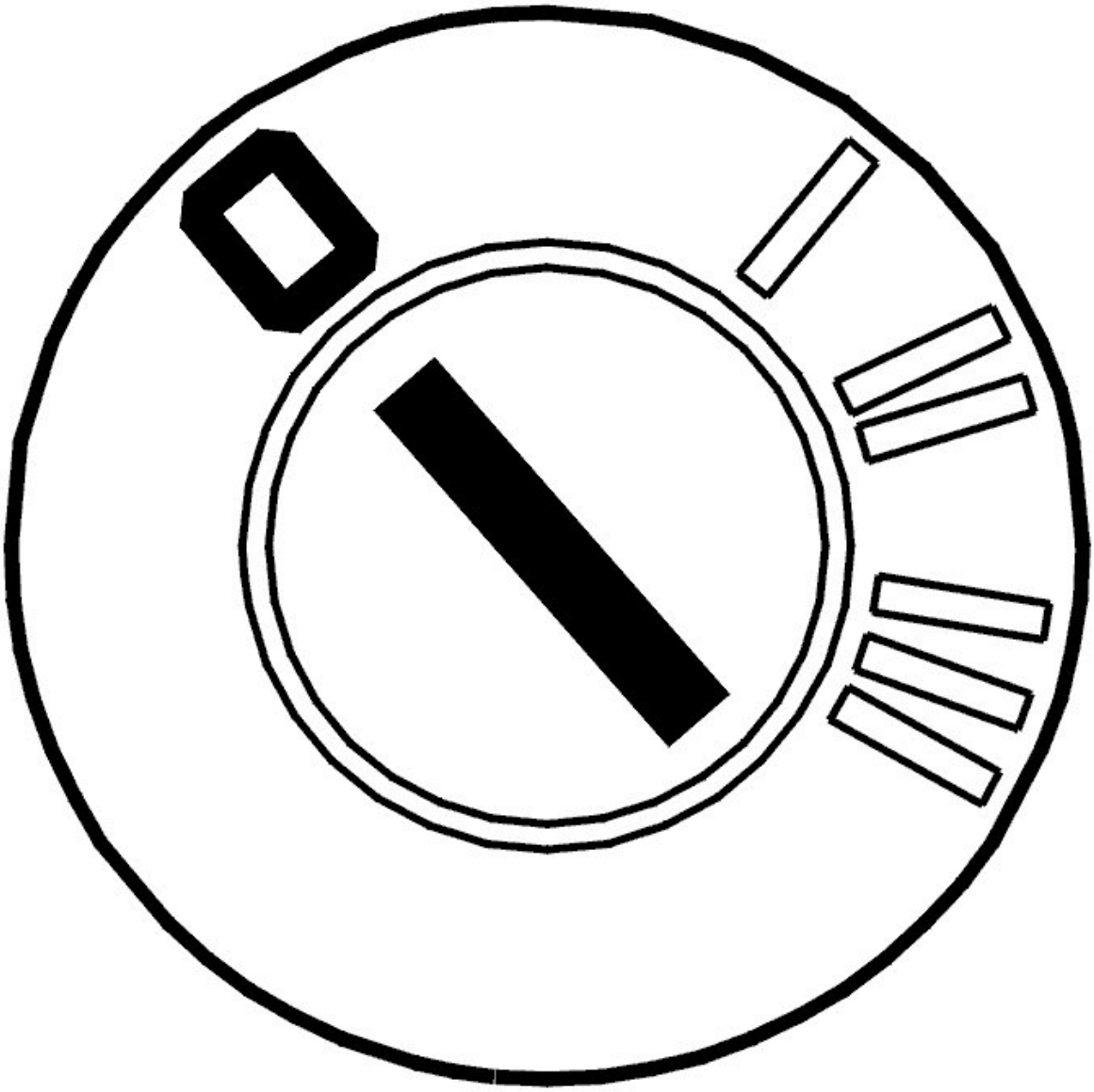
Fault symptom[s]

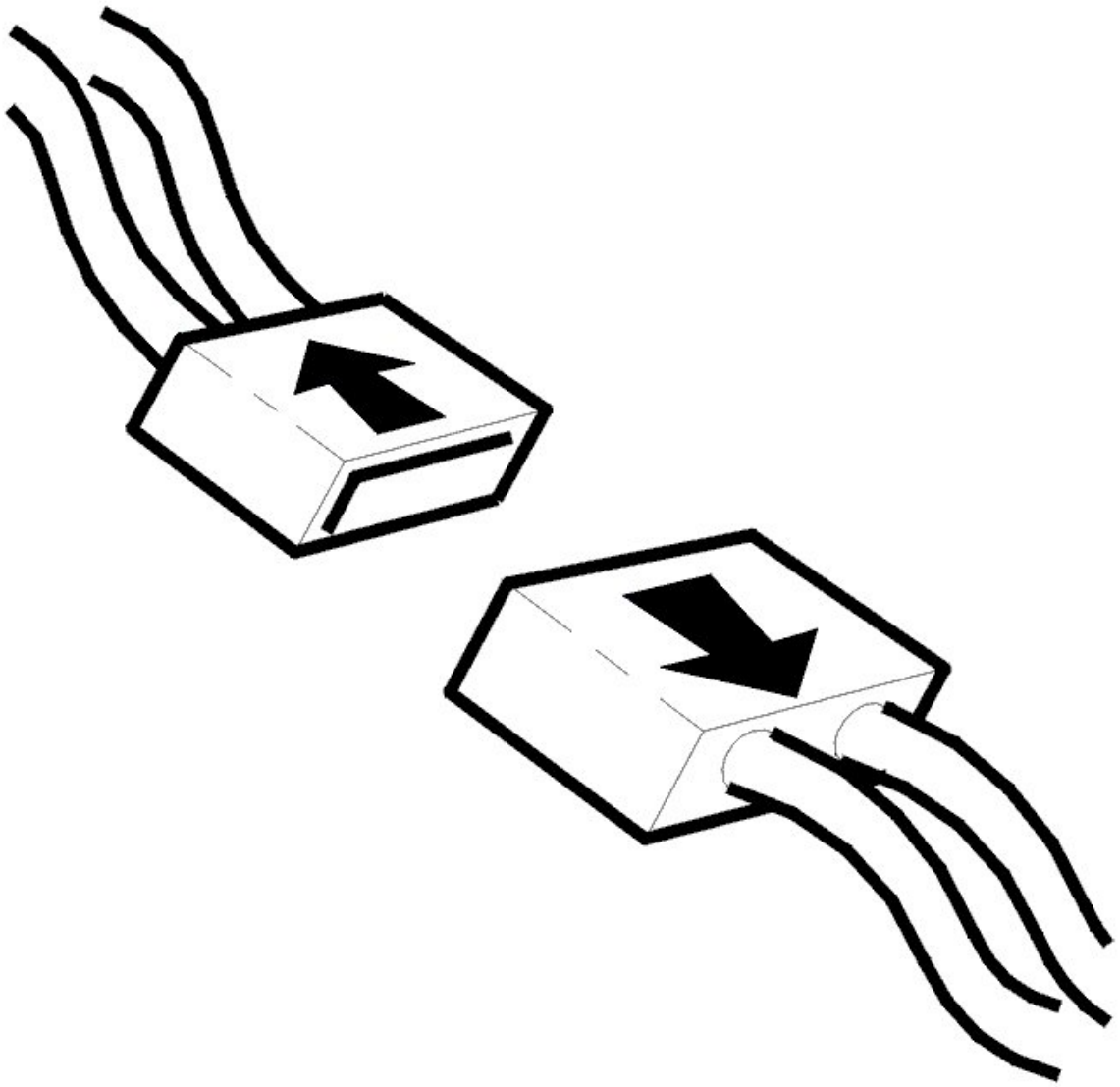
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring



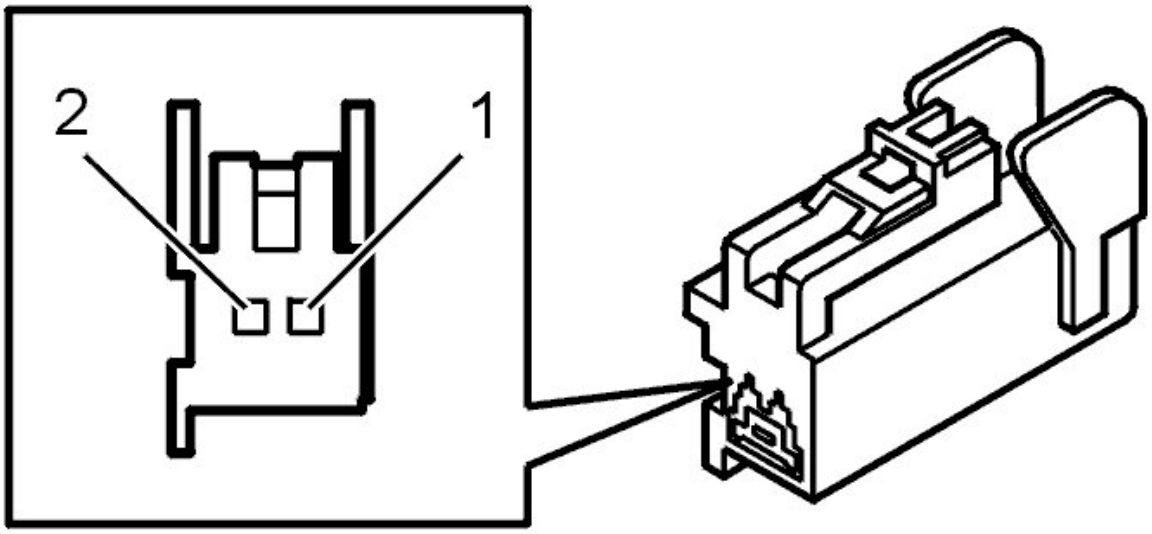


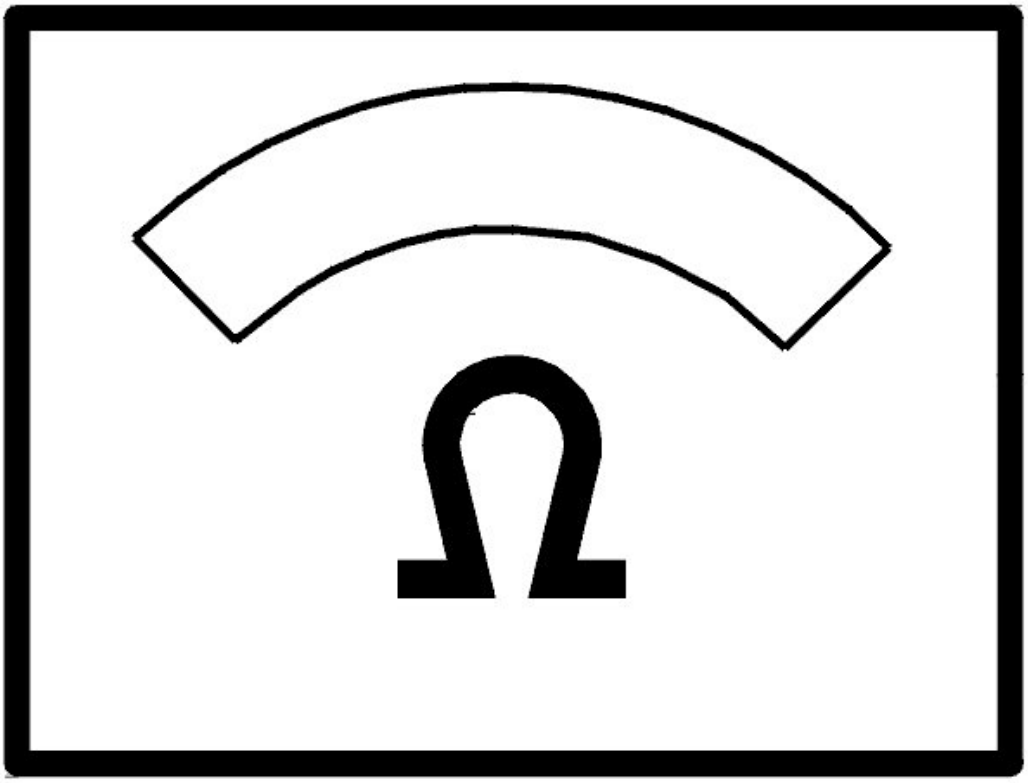
- Ignition off
- Disconnect the connector from the rear left side impact sensor
- Disconnect the connector from the rear right side impact sensor.

Check the resistance between terminals #27A (27) and #27C (23) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #28A (28) and #27C (23) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #27A (27) and #28C (24) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #28A (28) and #28C (24) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





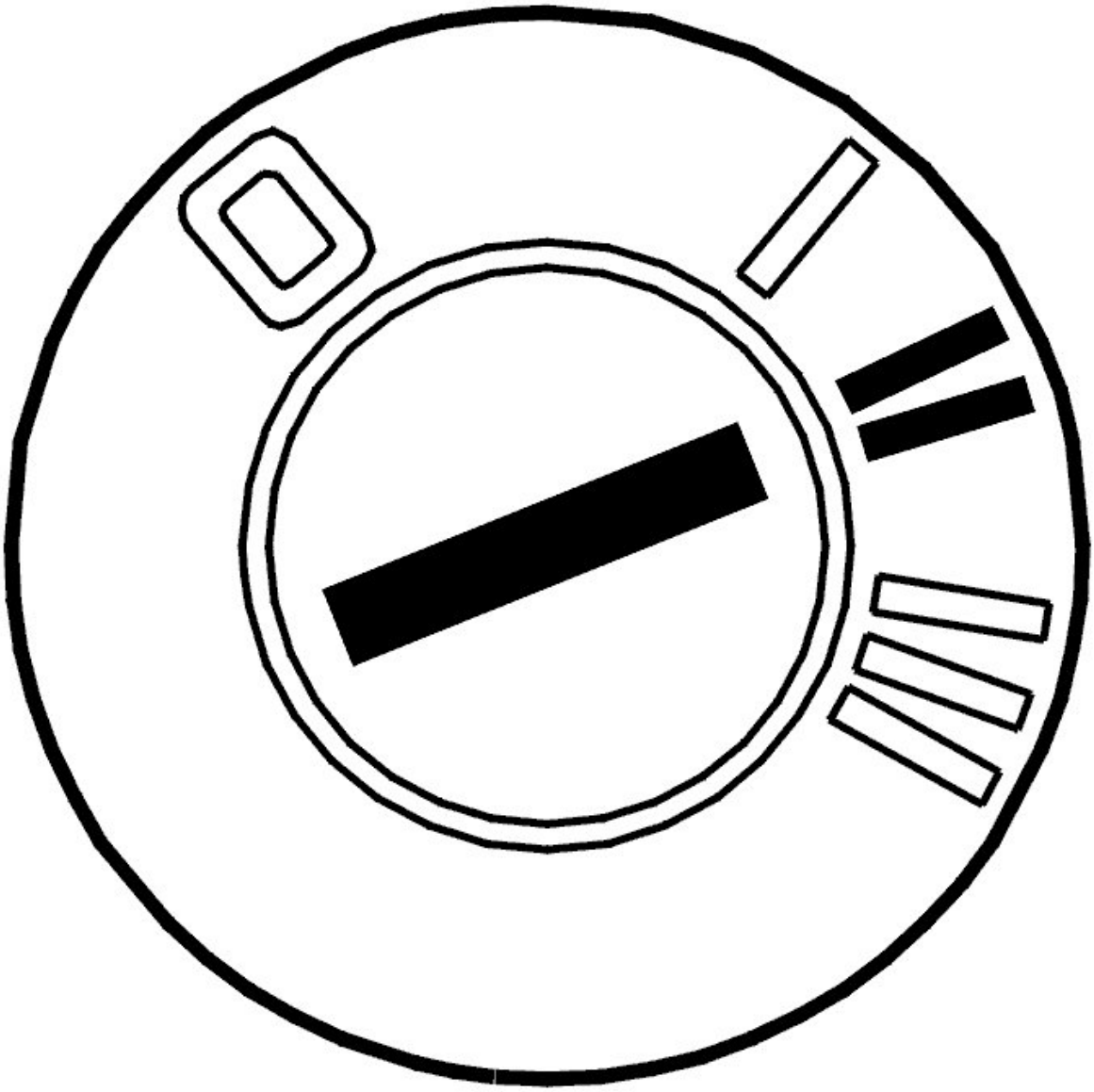
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

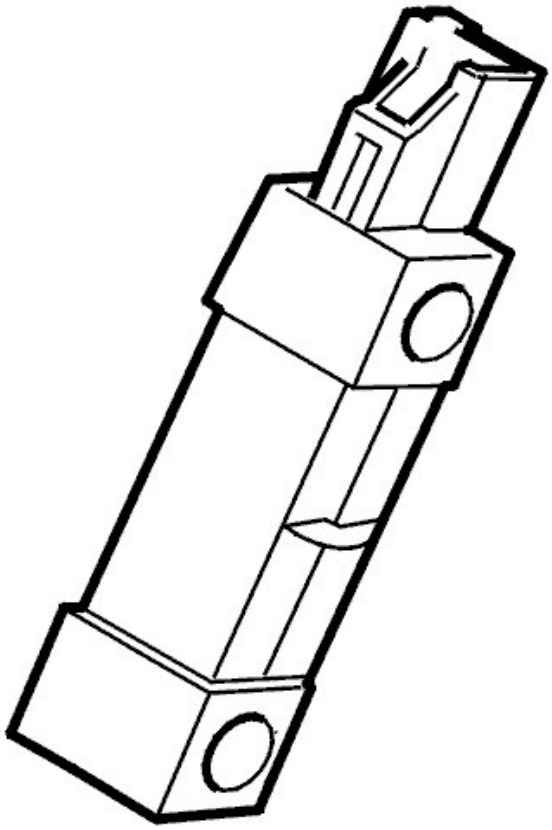
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00C7

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the rear right side impact sensor.
Diagnostic trouble code (DTC) SRS-00C7 is stored if the control module registers that the signal cable is cross-connected.
Diagnostic trouble code (DTC) SRS-00C7 can only be diagnosed when switching on the power (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit between the signal cables to the rear left and right side impact sensors.

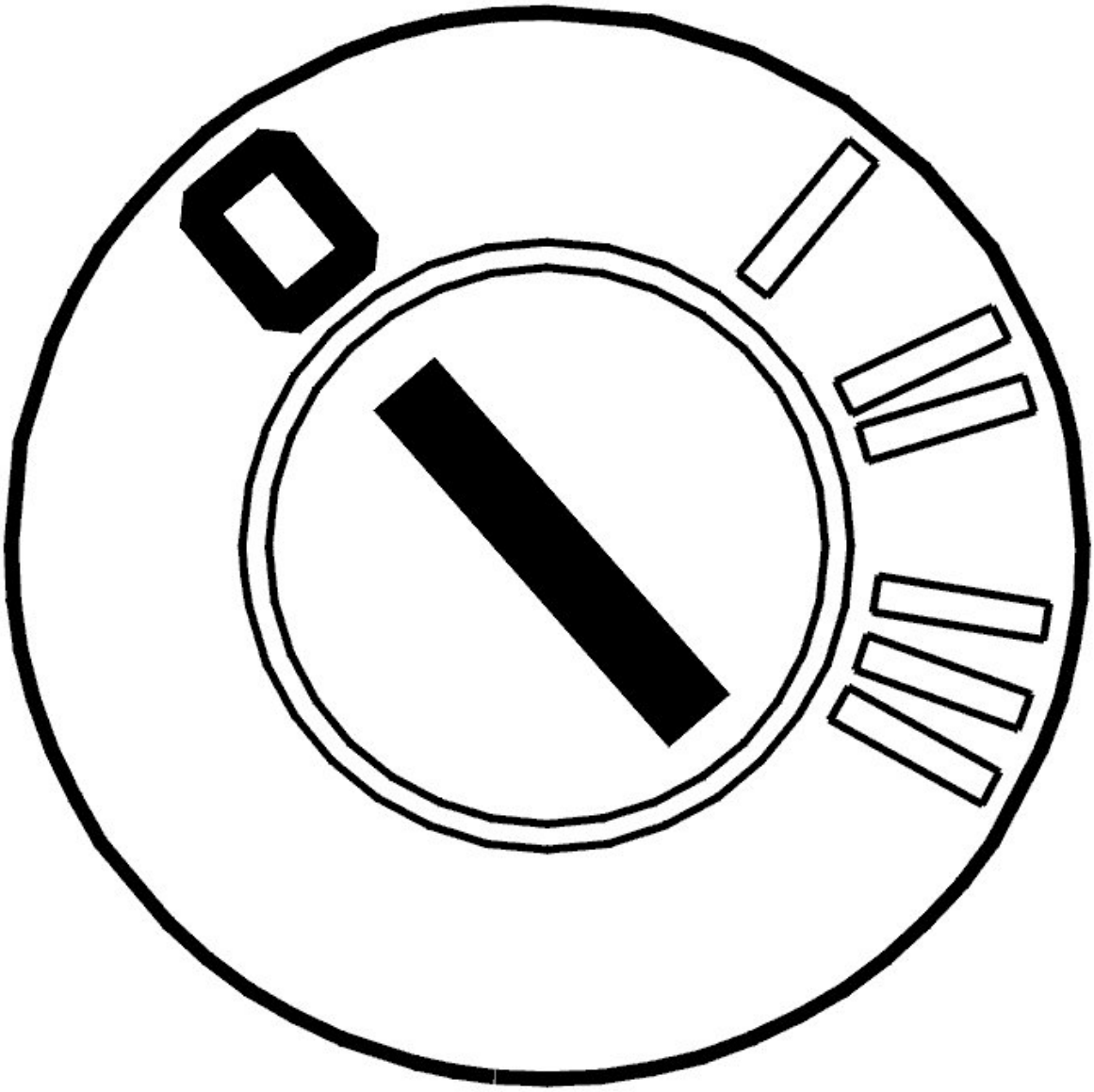
Fault symptom[s]

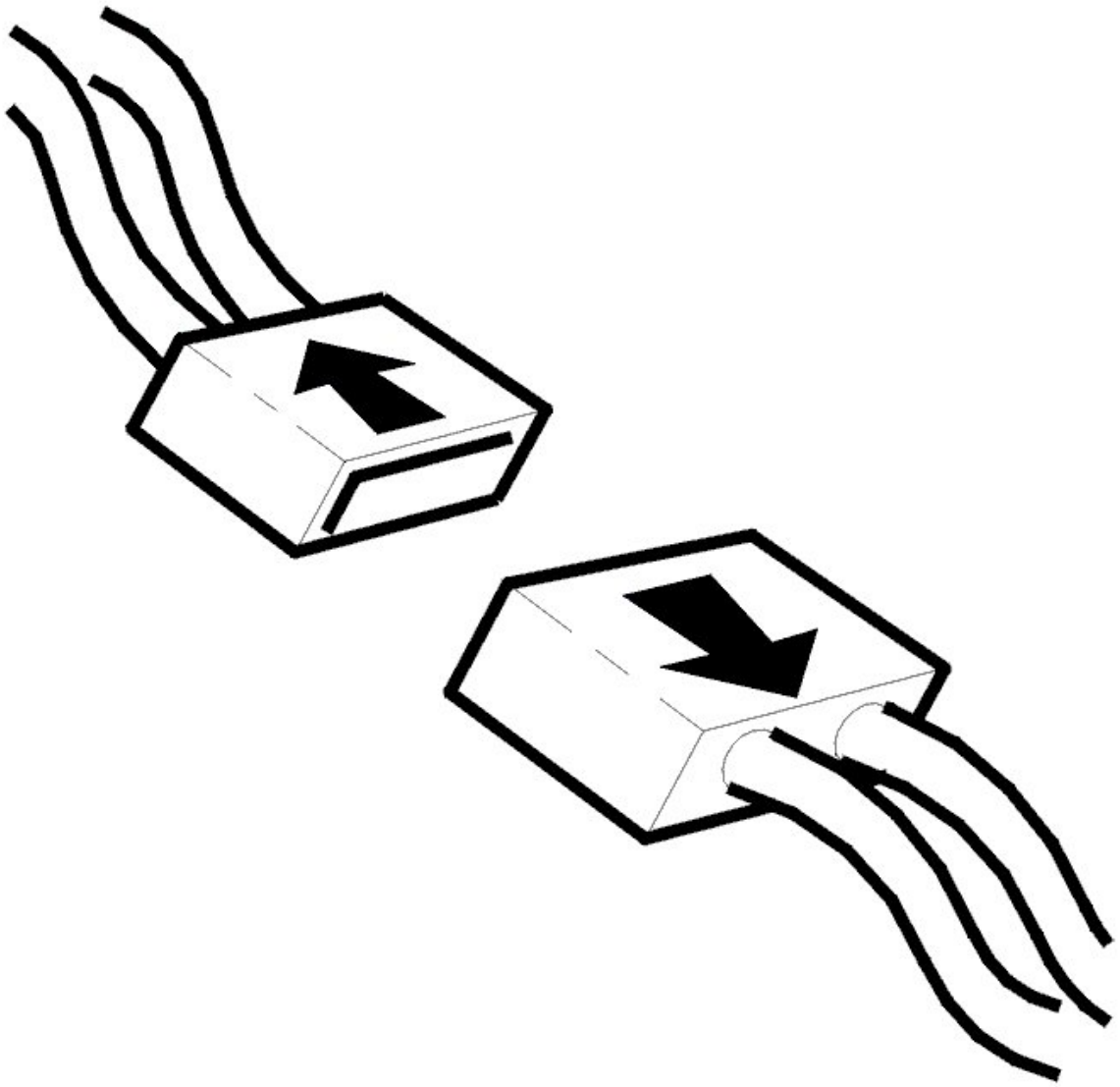
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring



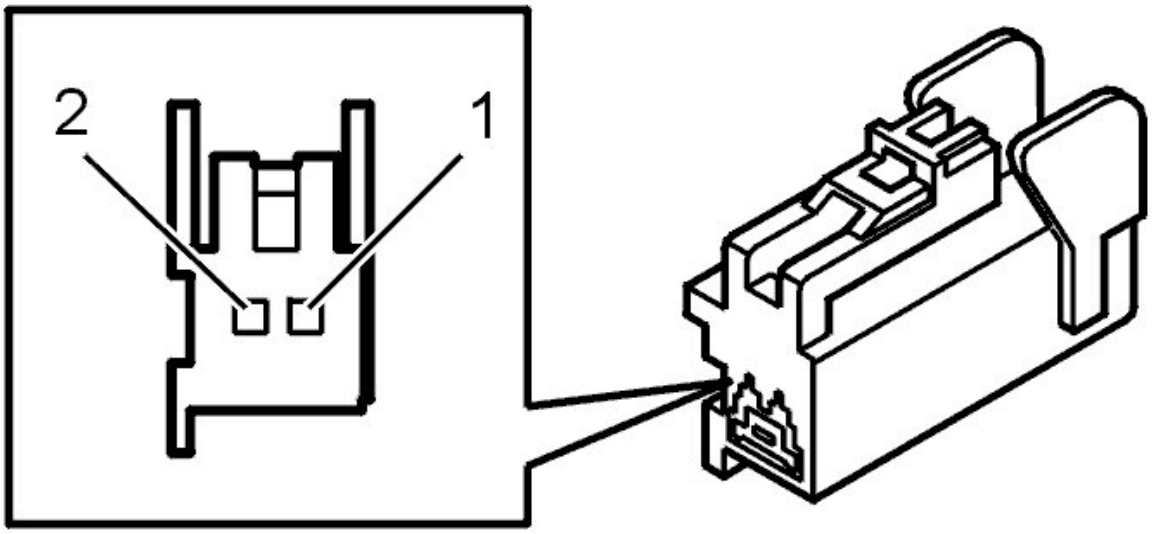


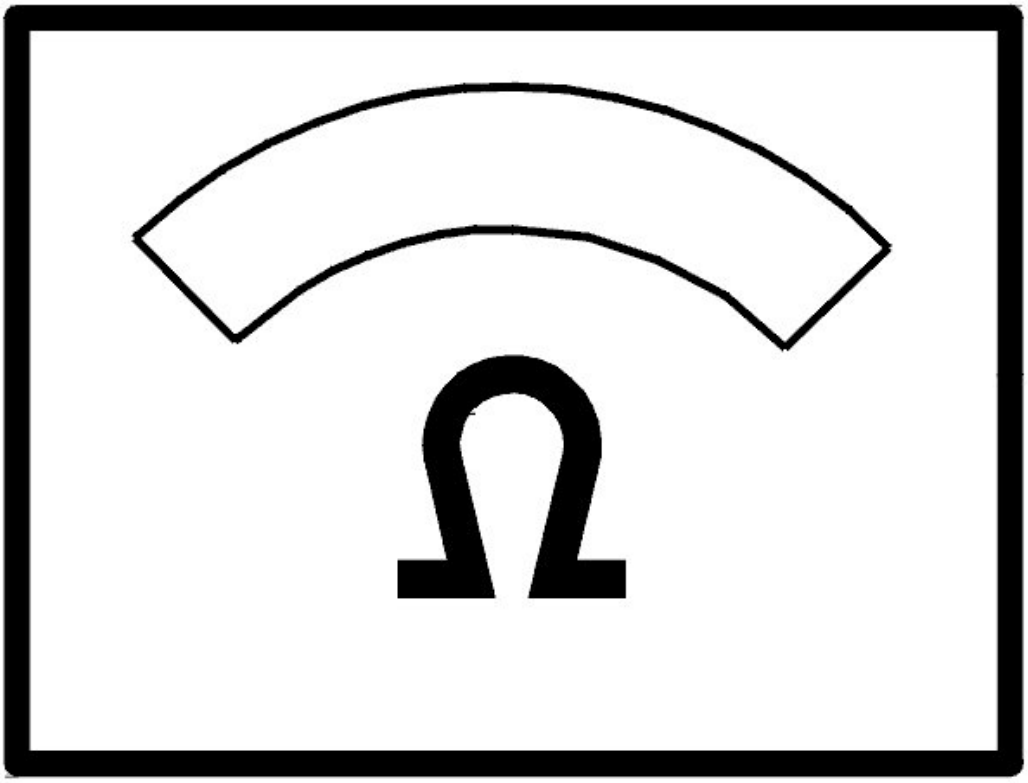
- Ignition off
- Disconnect the connector from the rear left side impact sensor
- Disconnect the connector from the rear right side impact sensor.

Check the resistance between terminals #27A (27) and #27C (23) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #28A (28) and #27C (23) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #27A (27) and #28C (24) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Check the resistance between terminals #28A (28) and #28C (24) in the Supplemental Restraint System Module (SRS) connector. The resistance must be infinite.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the side impact sensor, see Collision sensor B and C-post, replacing See: Restraint Systems/Air Bag Systems/Impact Sensor/Service and Repair/Collision Sensor, Replacing
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





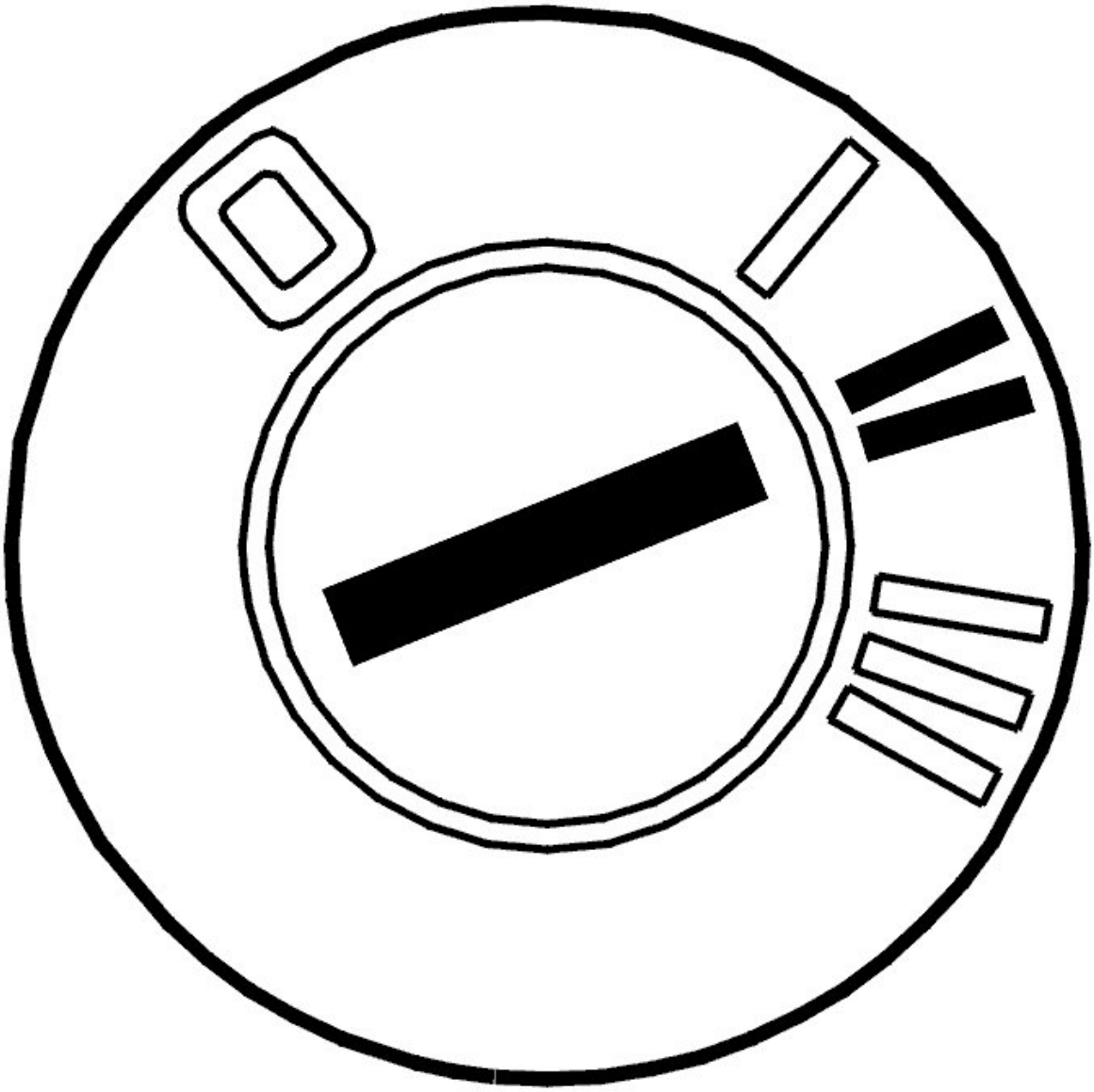
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

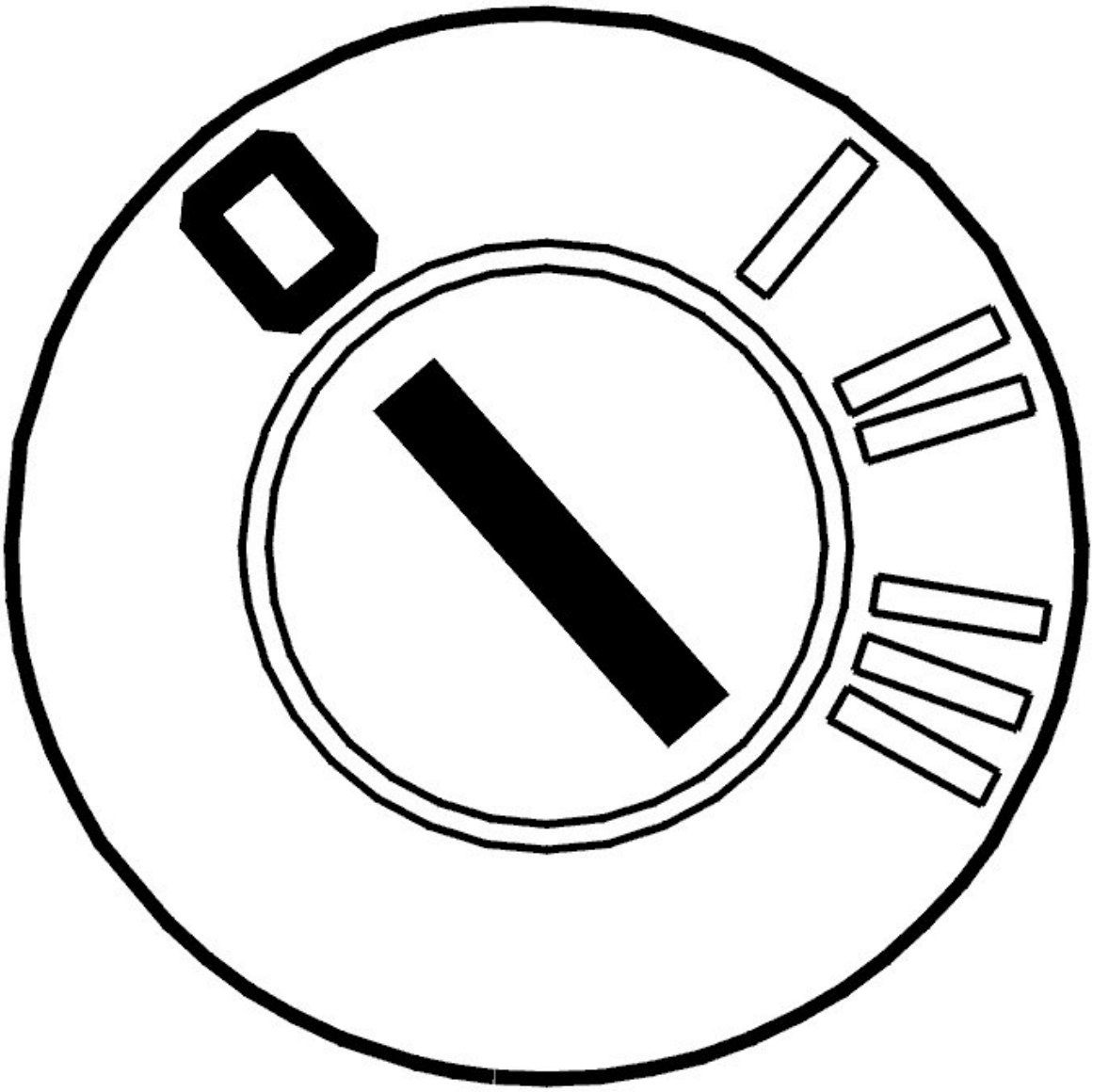
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Signal Too High

Signal too high. Permanent fault

Checking the component and wiring



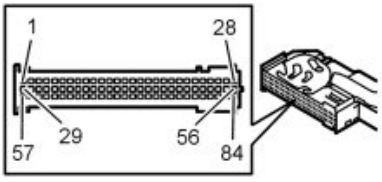
- Ignition off.

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).

Check the cable between supplemental restraint system module (SRS) terminal #30 and central electronic module (CEM) terminal #D20. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To connect the breakout box to the central electronic module (CEM), see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS).



Select "Continue" when the fault has been remedied.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

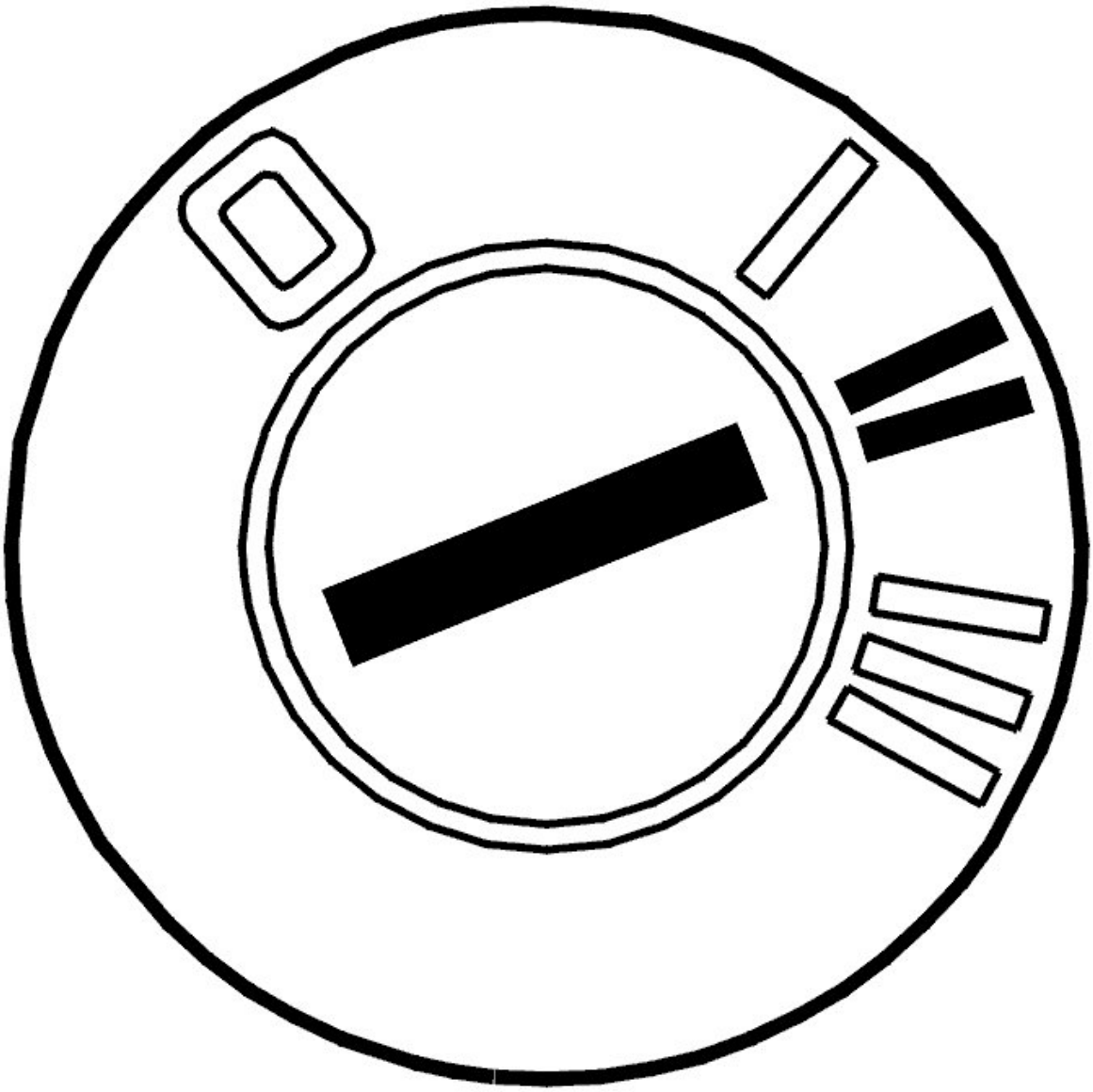
Attempt New Test - Checking the component and wiring

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D3

Condition
- Diagnostic trouble code (DTC) SRS-00D3 is stored if the voltage on the collision signal cable is too high (above 3 V) for longer than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the crash output cable.

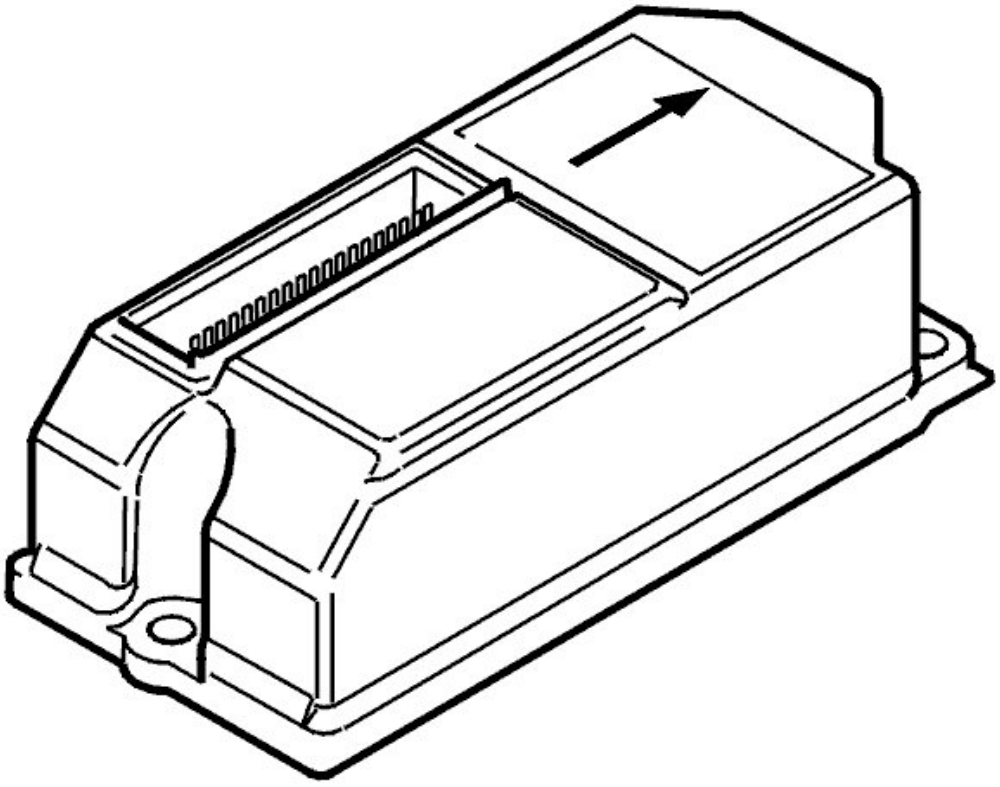
Fault symptom[s]
- General orange warning lamp lit
- The engine fails to start
- The central locking system does not function at all.

Signal Too High

Signal too high. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Signal too high. Intermittent fault

FAULT FOUND - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D3

Condition
- Diagnostic trouble code (DTC) SRS-00D3 is stored if the voltage on the collision signal cable is too high (above 3 V) for longer than 10 seconds.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the crash output cable.

Fault symptom[s]
- General orange warning lamp lit
- The engine fails to start
- The central locking system does not function at all.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D4

Condition

The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) receives a CAN signal indicating that the LED in the combined instrument panel is broken.

Substitute value
- None.

Possible source
- Damaged LED in the driver information module (DIM).

Fault symptom[s]
- The SRS indicator lamp does not light when the ignition is switched on
- General warning lamp lit.

Faulty function

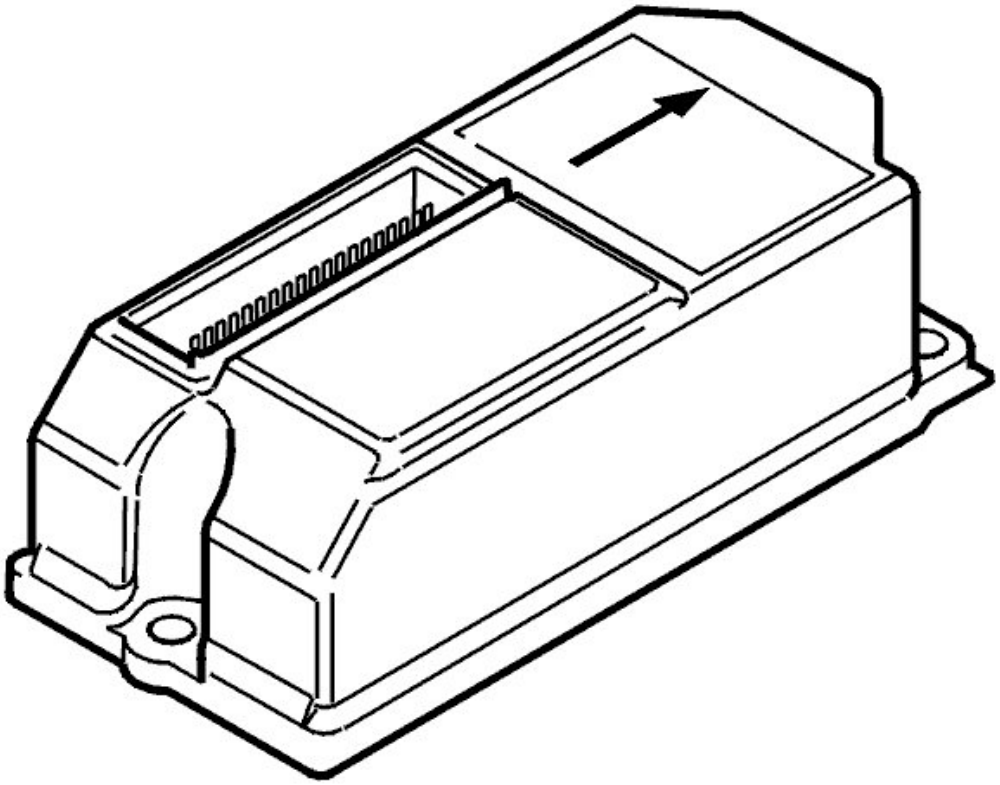
Faulty function. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Faulty function. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D4

Condition

The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) receives a CAN signal indicating that the LED in the combined instrument panel is broken.

Substitute value

- None.

Possible source
- Damaged LED in the driver information module (DIM).

Fault symptom[s]
- The SRS indicator lamp does not light when the ignition is switched on
- General warning lamp lit.

Faulty function

Faulty function. Permanent fault

Fault-tracing information

Fault-trace the driver information module.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D5

Condition
- Diagnostic trouble code (DTC) SRS-00D5 is stored if the SRS control module does not receive a control area network (CAN) signal with the status of the SRS warning lamp from the combined instrument panel (driver information module).

Substitute value
- None.

Possible source
- Open-circuit in the CAN cable.
- Faulty combined instrument panel (driver information module).

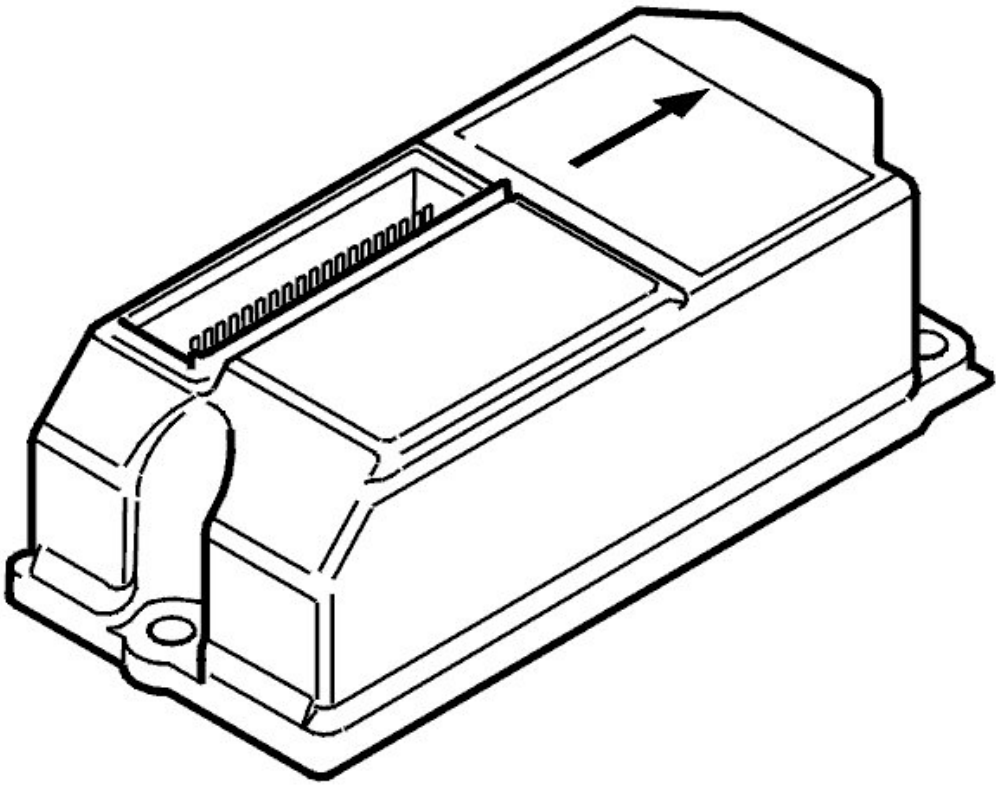
Fault symptom[s]
- General orange warning lamp lit.

Signal Missing

Signal missing. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Signal missing. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D5

Condition
- Diagnostic trouble code (DTC) SRS-00D5 is stored if the SRS control module does not receive a control area network (CAN) signal with the status of the SRS warning lamp from the combined instrument panel (driver information module).

Substitute value
- None.

Possible source

- Open-circuit in the CAN cable.
- Faulty combined instrument panel (driver information module).

Fault symptom[s]
- General orange warning lamp lit.

Signal Missing

Signal missing. Permanent fault

Checking the function of the driver information module (DIM)

Check the power supply for the driver information module (DIM) by switching on the ignition.
Instrument panel illumination should come on.

Does the driver information module (DIM) illumination come on?

Yes - Checking communication with the driver information module (DIM)

No - Checking the power supply and ground for the driver information module (DIM)

Checking communication with the driver information module (DIM)

Hint: The CAN communication with the control module is probably OK if the control module ID can be read off. In that case the fault is probably intermittent and will then be more difficult to trace.

- Try to communicate with the driver information module (DIM) by reading off the control module ID.
- Click the symbol for VCT2000 to begin reading off.

Continue - Checking the power supply and ground for the driver information module (DIM)

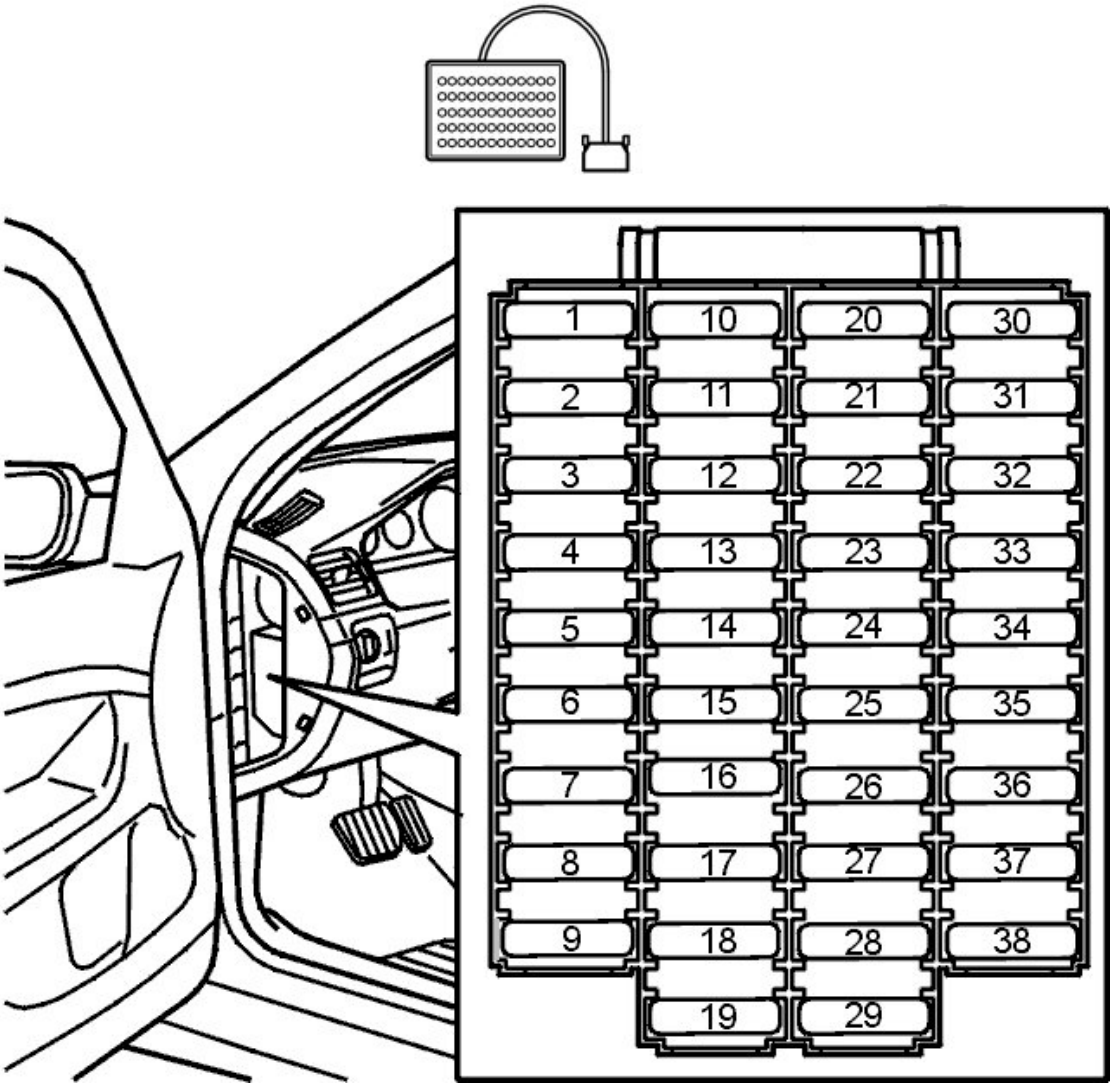
Checking the power supply and ground for the driver information module (DIM)

For information about fuse and terminal numbers, see the relevant Wiring Diagram.
Check the fuse in the passenger compartment fusebox for supply relay to the Driver information module (DIM).

Note! If the fuse has blown, check the circuit after the fuse before replacing the fuse. Check for a short-circuit to ground. Then replace the fuse. For further information about the circuit after the fuse, refer to the appropriate wiring diagram.

Check the cable between the fusebox and the power supply relay for the driver information module (DIM). Check for an open-circuit.
Check the cable between the power supply relay and the driver information module (DIM). Check for an open-circuit.
Check the ground lead between the driver information module (DIM) and the ground terminal. Check for an open-circuit. Also check the ground terminal. Check for contact resistance and oxidation.
Check the connector and wiring harness behind the dashboard for damage.
Remedy as necessary.

Other information
- Driver information module (DIM), replacing See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Service and Repair/Driver Information Module (DIM), Replacing
- Connecting the Driver Information Module (DIM) test box
- Driver Information Module (DIM) signal description See: Instrument Panel, Gauges and Warning Indicators/Instrument Cluster / Carrier/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Driver Information Module (DIM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Was a fault detected?

Yes - Checking the function of the driver information module (DIM)

No - Fault Found

Checking the function of the driver information module (DIM)

Hint: After carrying out the repair, check that the fault has been remedied.

- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check the power supply for the driver information module (DIM) by switching on the ignition.
Instrument panel illumination should come on.
If the above works, start the engine and check that the indicator lamps go out like they are supposed to and that the tachometer reacts to engine speed changes.

Does the combined instrument panel work as it should?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the power supply and ground for the driver information module (DIM)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D7

Condition
- Diagnostic trouble code (DTC) SRS-00D7 is stored if the supplementary restraint system (SRS) registers a collision signal.

Substitute value
- None.

Possible source
- The control module registers a collision signal.

Fault symptom[s]
- The SRS indicator lamp is lit.

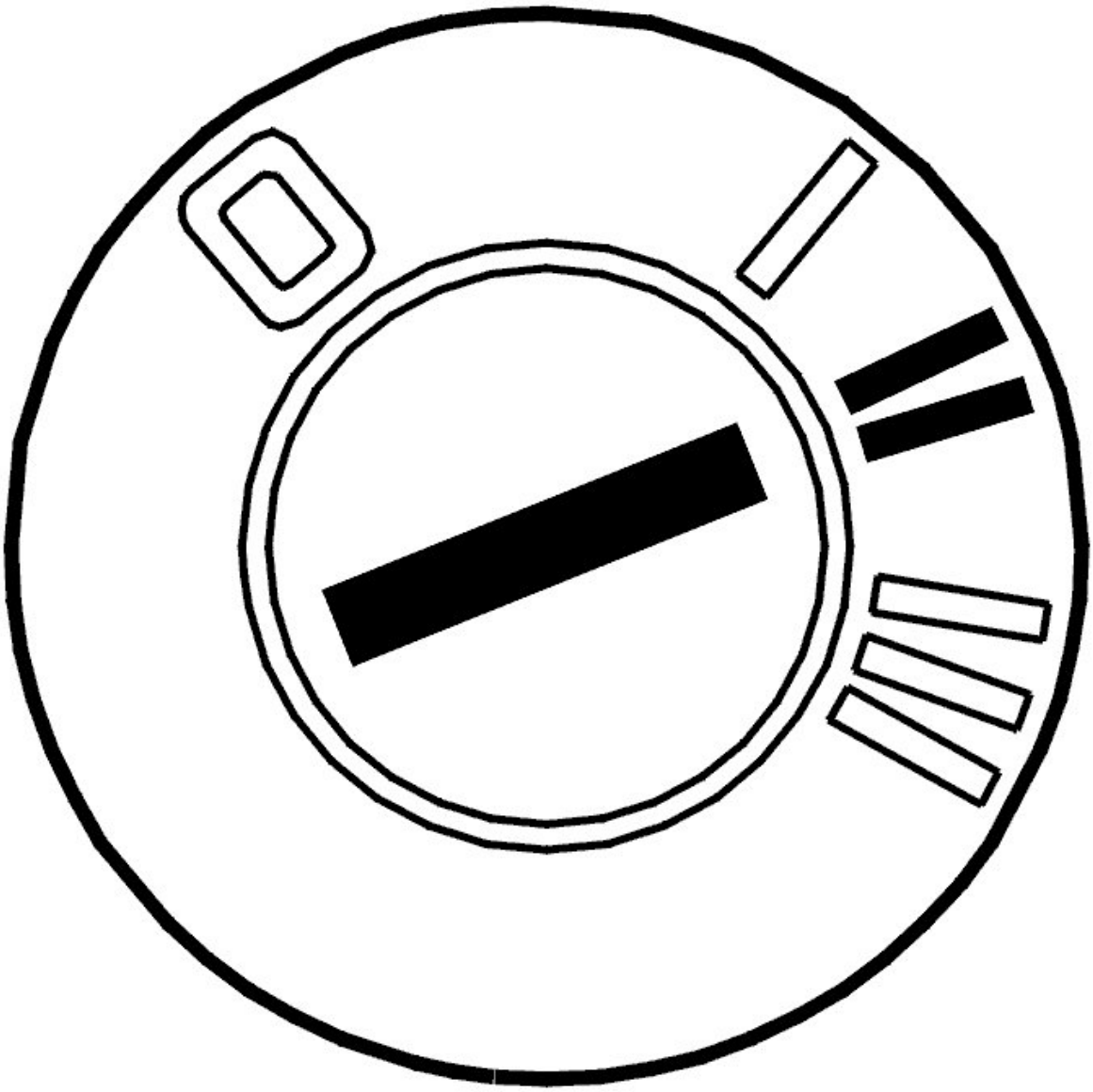
Collision Signal received

Collision signal received. Permanent fault

Checking the SRS indicator lamp

Erasing diagnostic trouble codes (DTCs)

Hint: Sometimes only the SRS indicator lamp may light if the SRS control module has registered a collision.

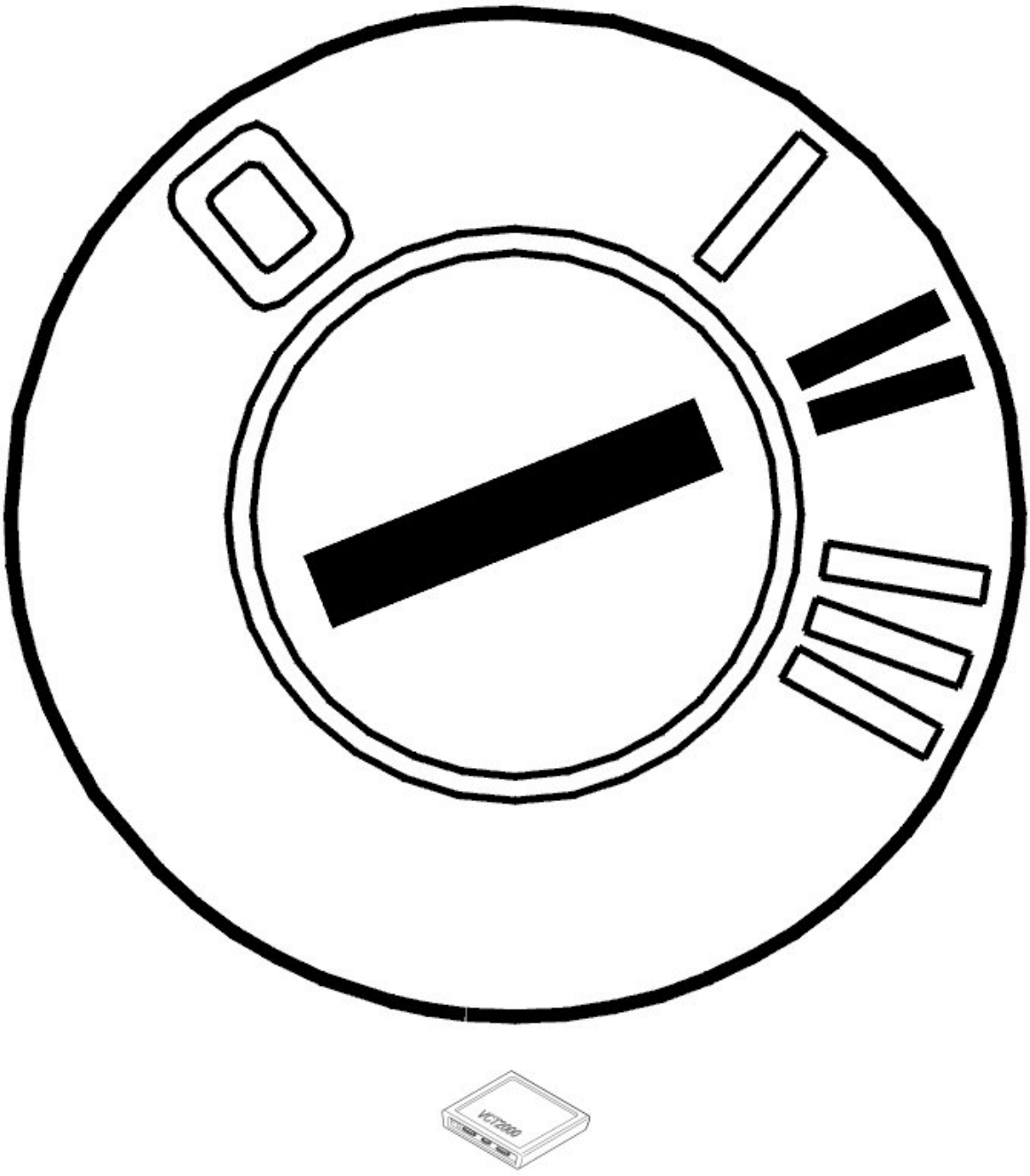


- Ignition on.

- Erase diagnostic trouble codes by clicking the VCT2000 symbol.

This will take at least 20 seconds.

Reading off diagnostic trouble codes (DTCs)



Note! Corrective action must be taken if the battery lead has been disconnected during fault-tracing. See Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting.

- Switch on the ignition. Wait 10 seconds
- Read off the diagnostic trouble codes (DTCs) by clicking on the VCT2000 symbol.
- Note any stored diagnostic trouble codes (DTCs).

No diagnostic trouble codes (DTCs) should be stored. The SRS indicator lamp must be off.

Fault-tracing information

Diagnostic trouble codes (DTCs) not stored earlier

Diagnostic trouble codes (DTCs) have probably been stored during repair work.
Check that all connectors and components have been correctly connected.

Diagnostic trouble codes (DTCs) stored earlier

Diagnostic trouble codes (DTCs) have probably been stored during incorrectly performed repair work
Check that fault-tracing has been carried out correctly according to the relevant fault-tracing instructions.
It is possible to interrupt or make a new attempt to erase diagnostic trouble codes (DTCs).

Do you want to repeat attempt?

Yes - YES

No - NO

NO - NOT ERASED

YES - Erasing diagnostic trouble codes (DTCs)

Information

- Diagnostic trouble codes (DTCs) have been correctly erased and not restored.

Fault-tracing information

Conditions

- A diagnostic trouble code (DTC) is stored if the on-board diagnostic system registers a fault in any of the internal functions of the control modules.

Fault cause

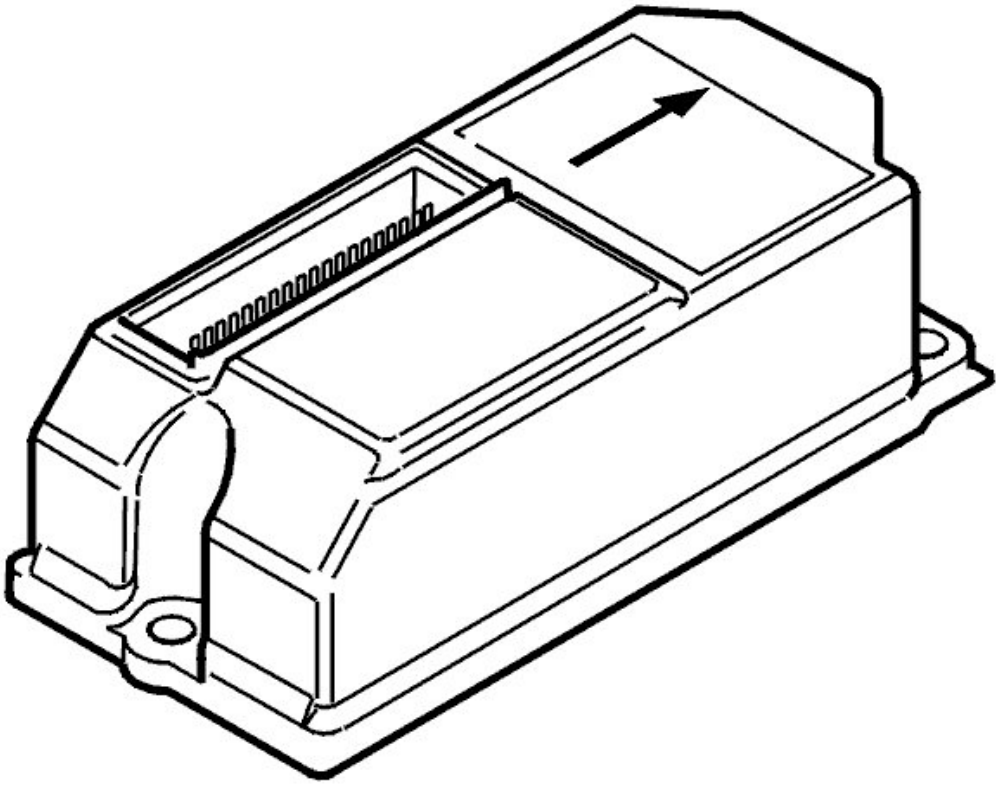
- Internal fault in the SRS control module.

Fault symptom

- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo. See standard procedures.

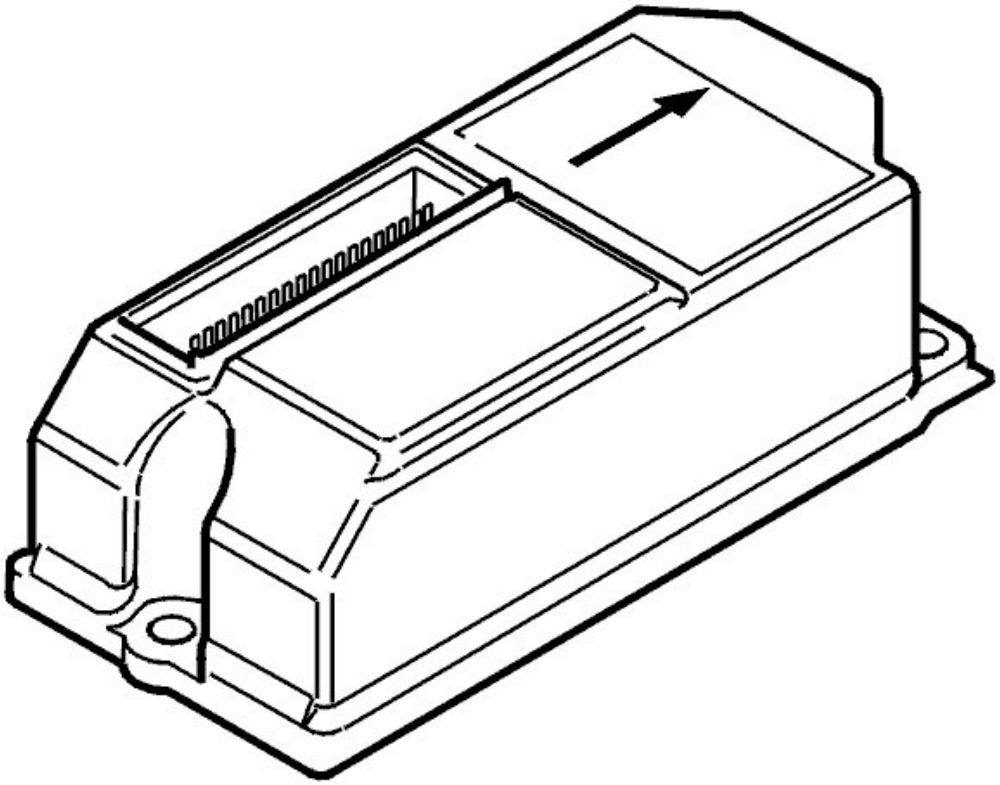


Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Note! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue when the fault has been remedied.

ERASED - Fault Found

NOT ERASED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D7

Condition
- Diagnostic trouble code (DTC) SRS-00D7 is stored if the supplementary restraint system (SRS) registers a collision signal.

Substitute value
- None.

Possible source
- The control module registers a collision signal.

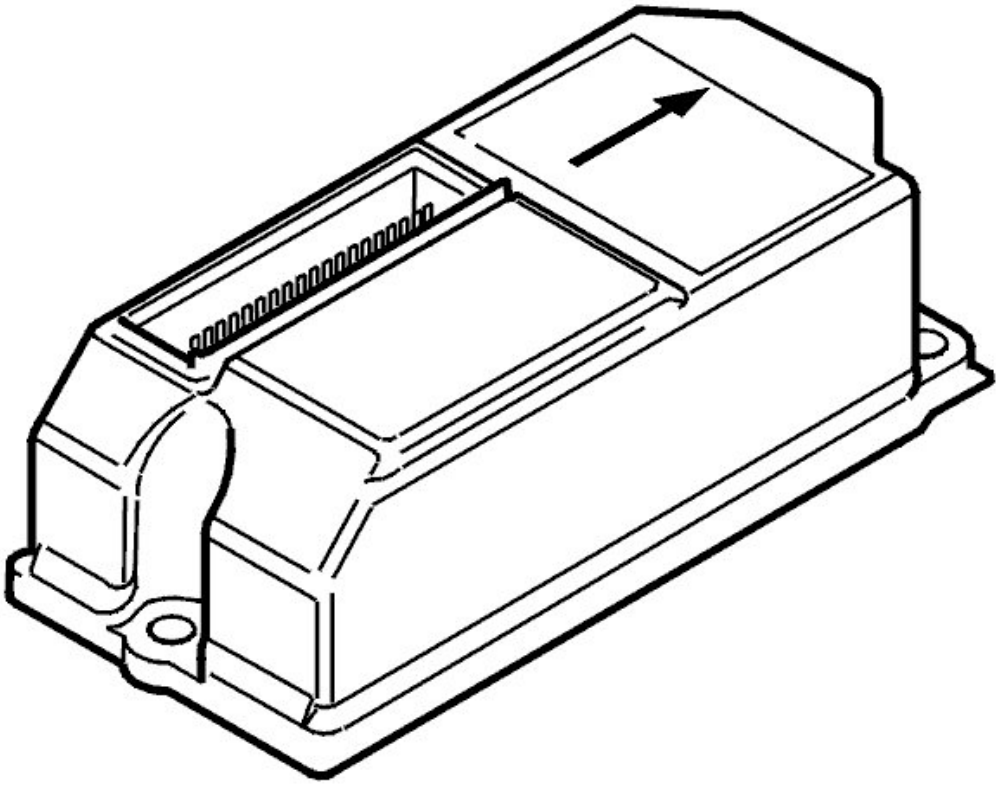
Fault symptom[s]
- The SRS indicator lamp is lit.

Collision Signal received

Collision signal received. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

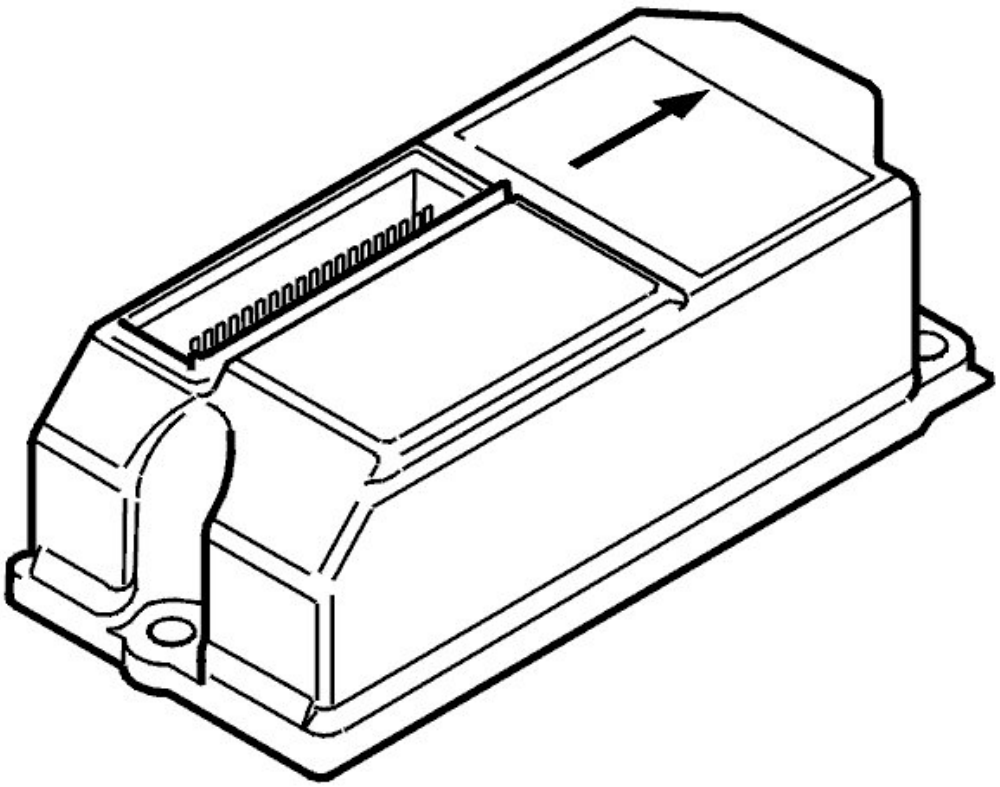
Attempt New Test - Collision signal received. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D8

Condition



Diagnostic trouble code (DTC) SRS-00D8 will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration has been downloaded into the central electronic module (CEM) for left or right-hand drive. Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and the car in which they are installed.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

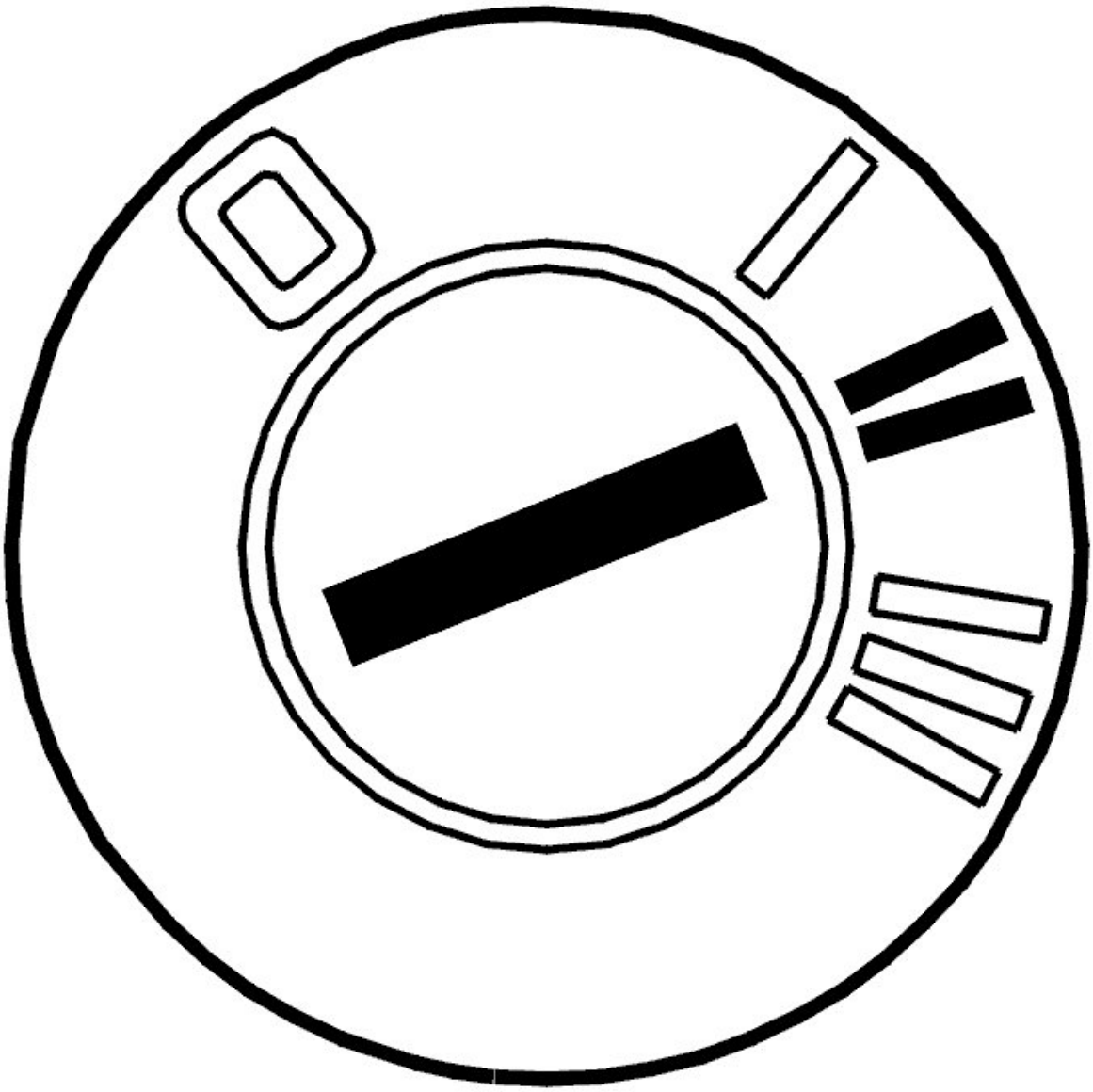
Fault symptom[s]

- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal. Permanent fault

Checking parameters



- Ignition on.

Check visually what type of car it is and read off the parameter "control" for the central electronic module (CEM) and the SRS control module and compare.

Is the parameter "control" the same for the central electronic module (CEM) CEM and SRS module. Does the parameter correspond with the type of car?

Yes - Verification

No - Programming the control module

Programming the control module

Try to reprogram the control modules for:

- the SRS system according to Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- the central electronic module (CEM) according to Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing.

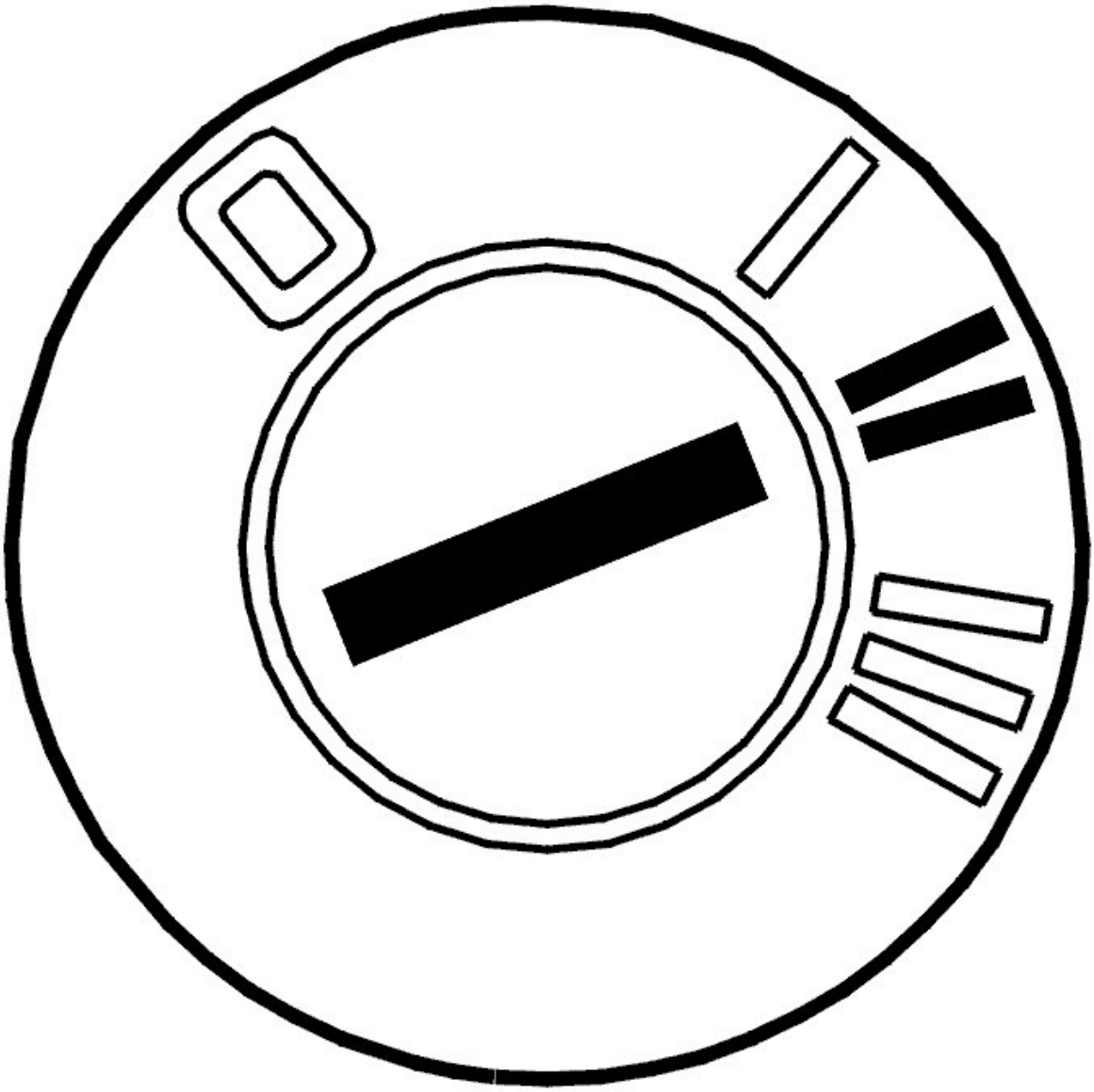
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

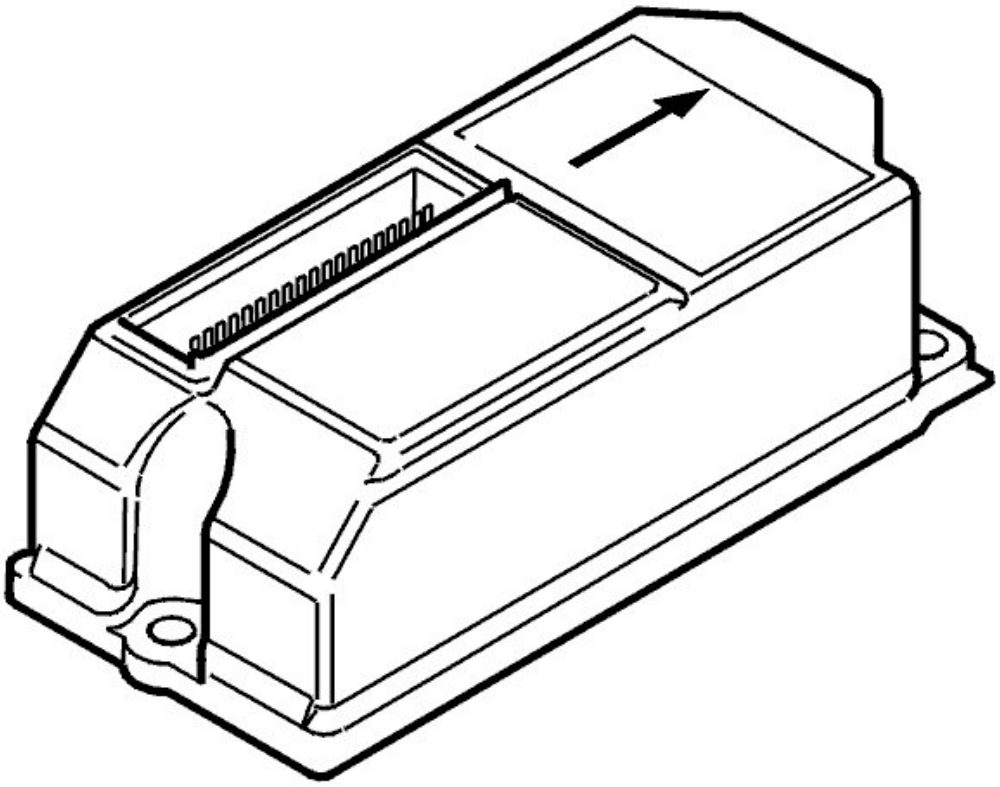
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking parameters

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D8

Condition



Diagnostic trouble code (DTC) SRS-00D8 will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration has been downloaded into the central electronic module (CEM) for left or right-hand drive. Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and the car in which they are installed.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

Fault symptom[s]

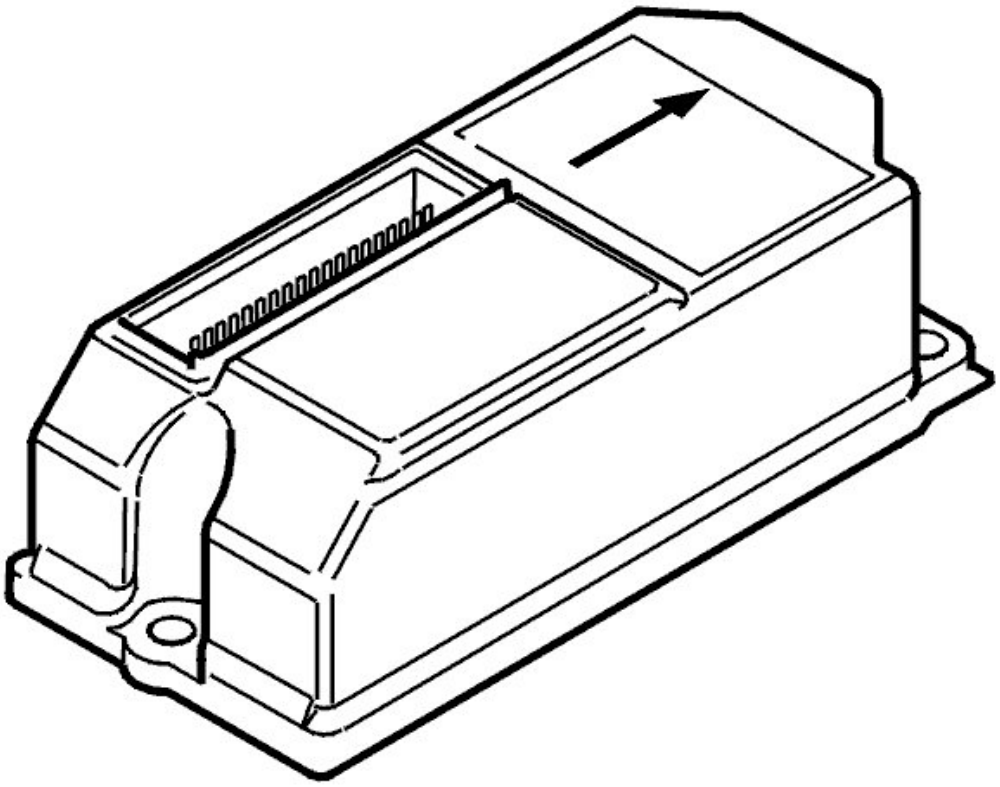
- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

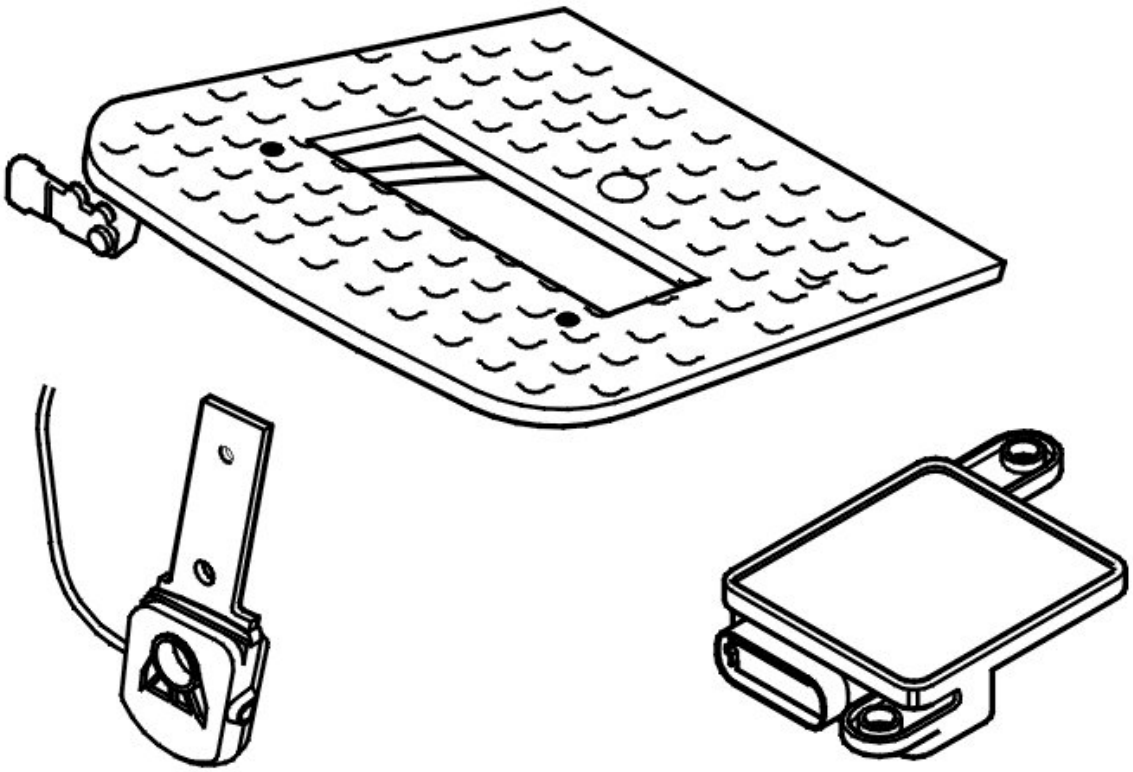
Attempt New Test - Faulty signal. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00D9

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault in the signal cable for longer than 10 seconds.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- The supplemental restraint system module (SRS) identifies that an occupant weight sensor (OWS) is installed, despite the control module being programmed that an occupant weight sensor (OWS) is not installed.

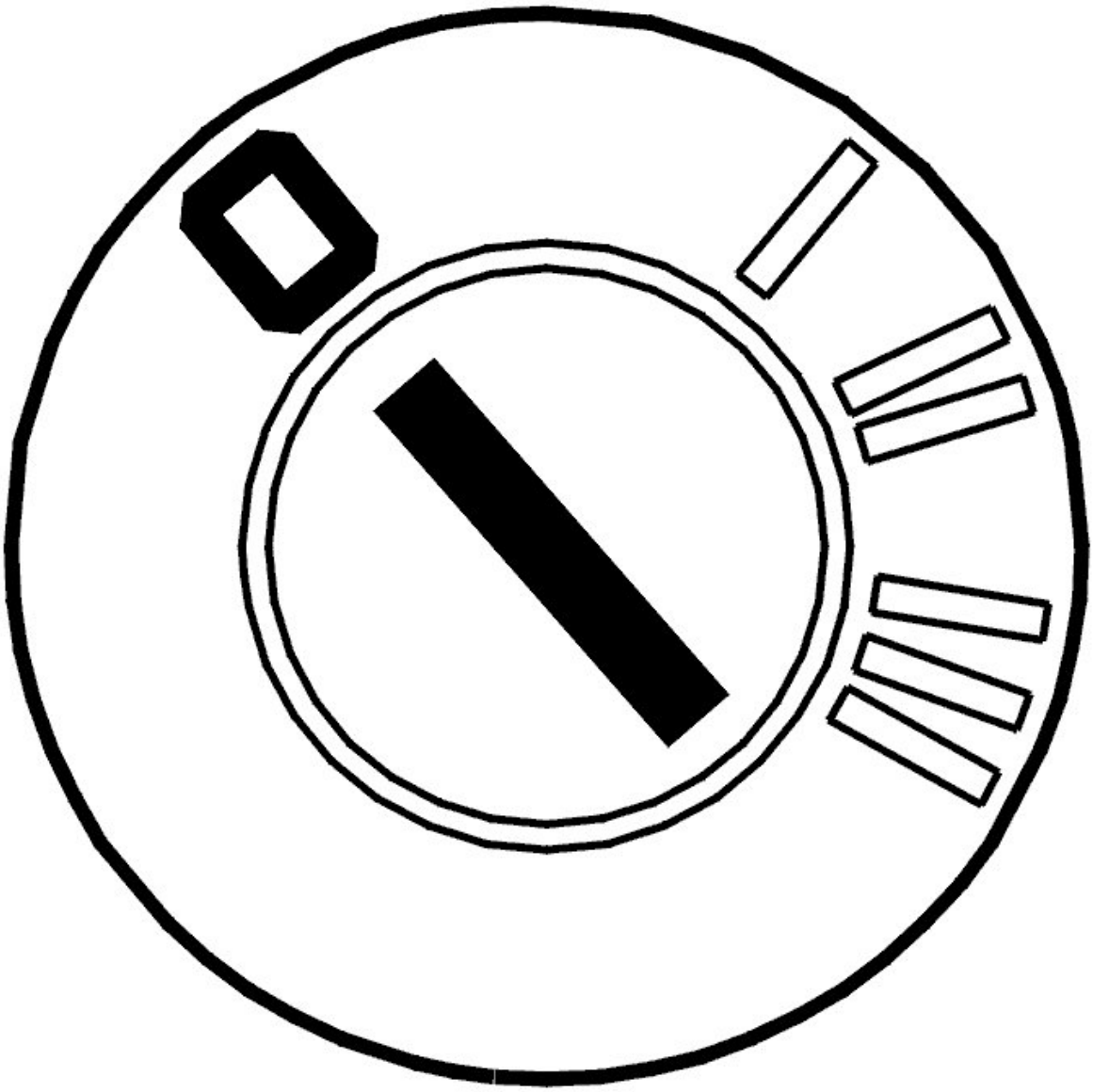
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Configuration Fault

Configuration fault

Checking the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).



- Ignition off.

Check whether the vehicle is to be equipped with an occupant weight sensor (OWS).
If the vehicle has an occupant weight sensor (OWS) even though it should not, the passenger seat must be replaced with one without an occupant weight sensor (OWS).
If the vehicle does not have an occupant weight sensor (OWS) even though it should, the supplemental restraint system module (SRS) must be reprogrammed.
Remedy as necessary.
If no fault is found, replace the supplemental restraint system module (SRS).

Other information

- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- To program the supplemental restraint system module (SRS), see: Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

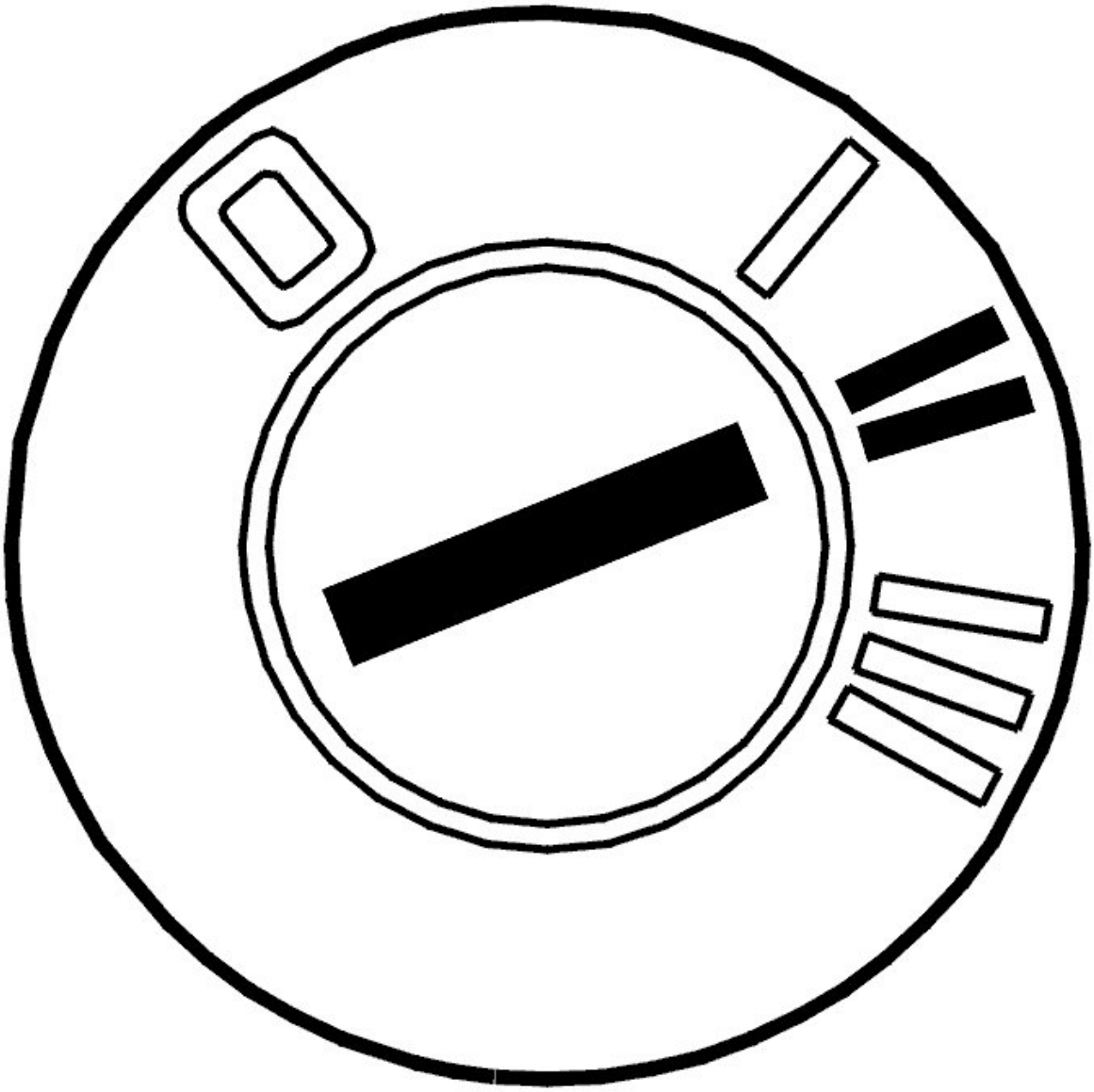
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

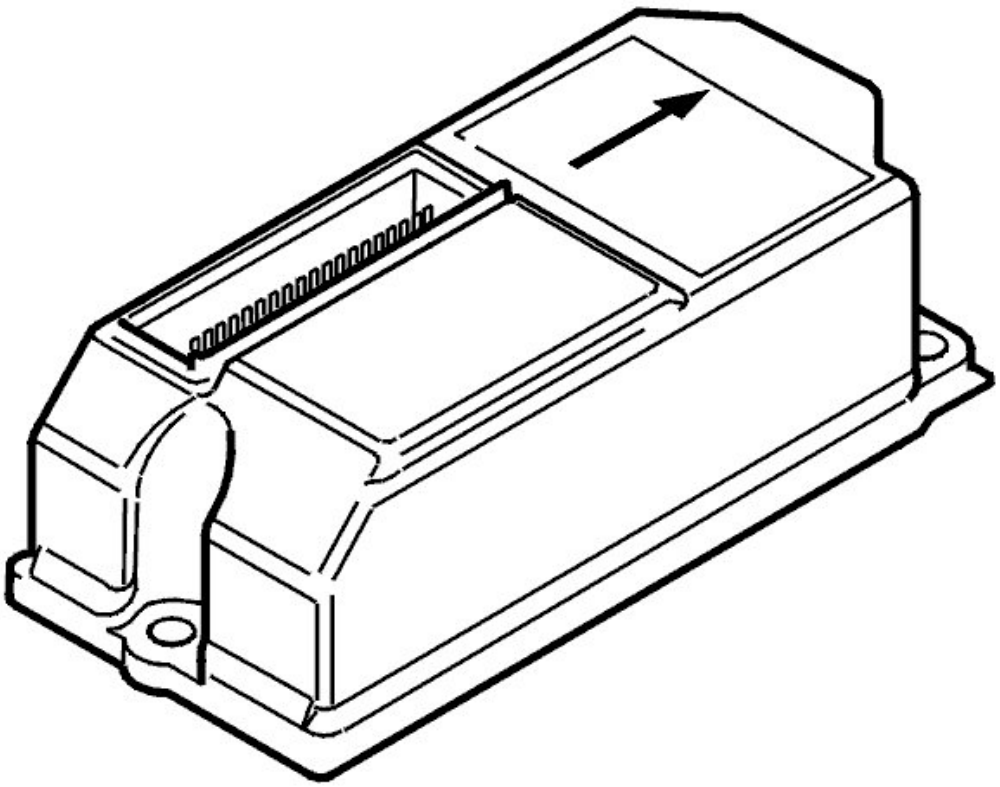
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00DA

Condition



Diagnostic trouble code (DTC) SRS-00DA will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration has been downloaded into the central electronic module (CEM). Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and the car in which they are installed.

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

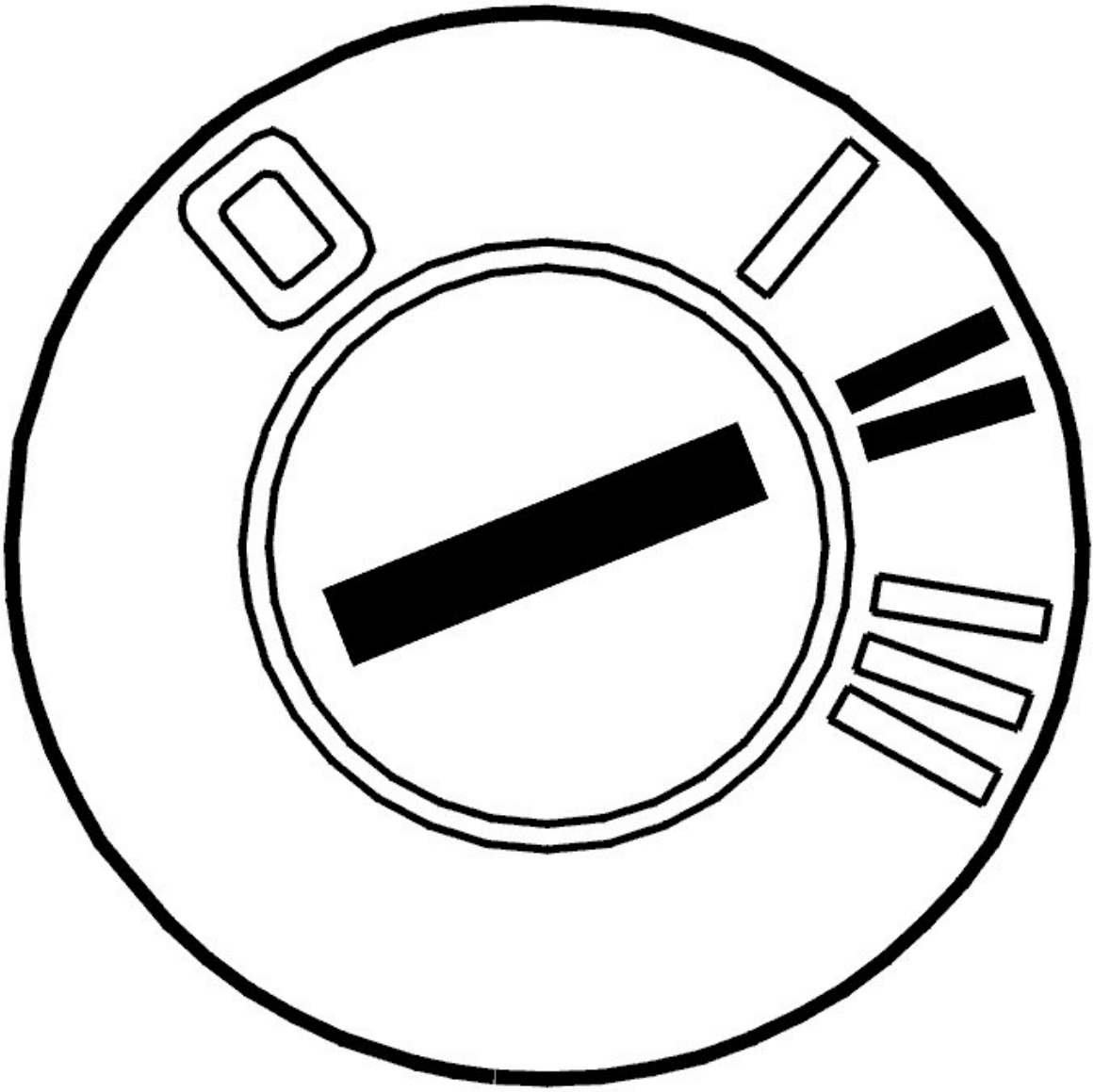
Fault symptom[s]

- The SRS indicator lamp is lit.

Faulty Signal. Permanent Fault

Faulty signal. Permanent fault

Checking parameters



- Ignition on.

Visually check what type the car is and read off the parameter "model" for the central electronic module (CEM) and the SRS control module and compare.

Is the parameter "model" the same for the central electronic module (CEM) CEM and SRS module? Does the parameter correspond with the model?

Yes - Verification

No - Programming the control module

Programming the control module

Try to reprogram the control modules for:

- the SRS system according to Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- the central electronic module (CEM) according to Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing.

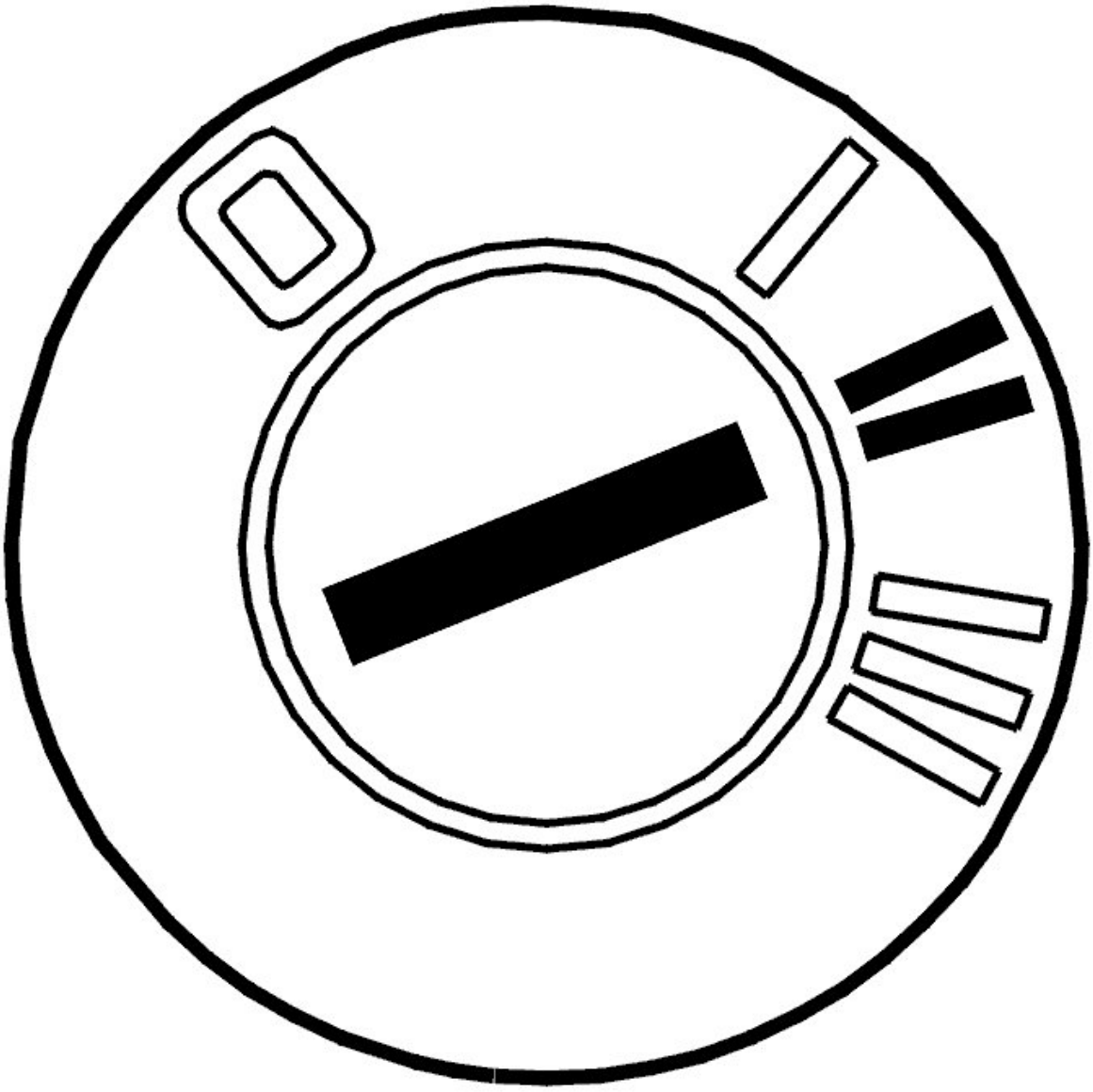
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.

- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

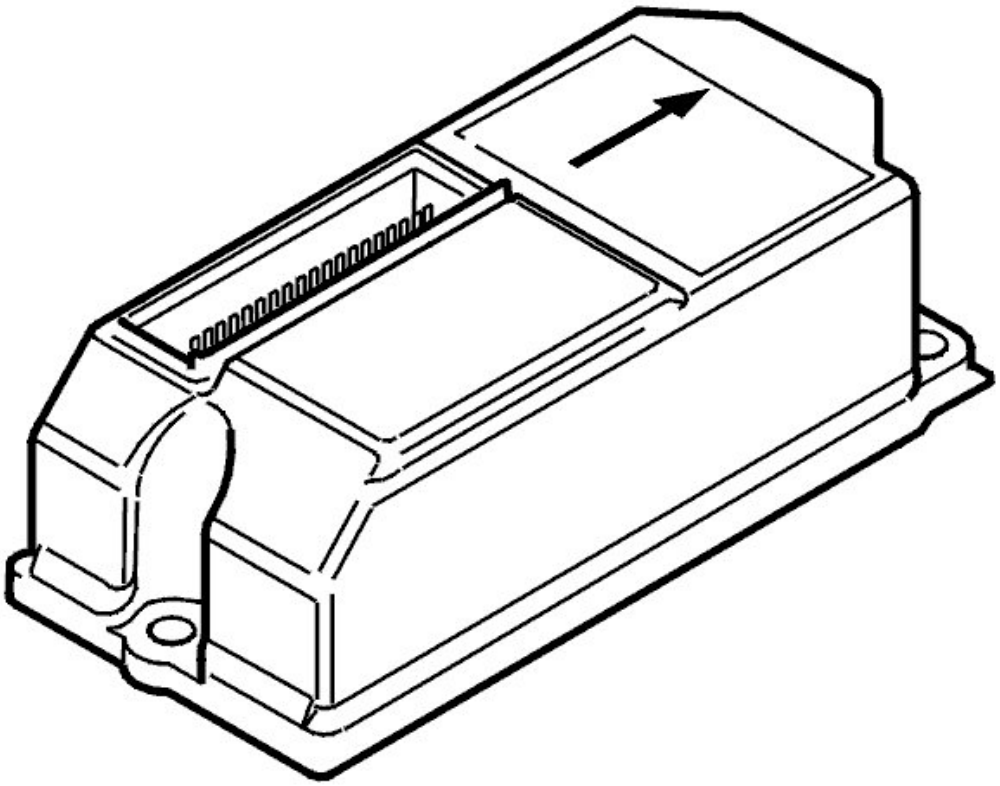
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking parameters

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00DA

Condition



Diagnostic trouble code (DTC) SRS-00DA will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration has been downloaded into the central electronic module (CEM). Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and the car in which they are installed. The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

Fault symptom[s]

- The SRS indicator lamp is lit.

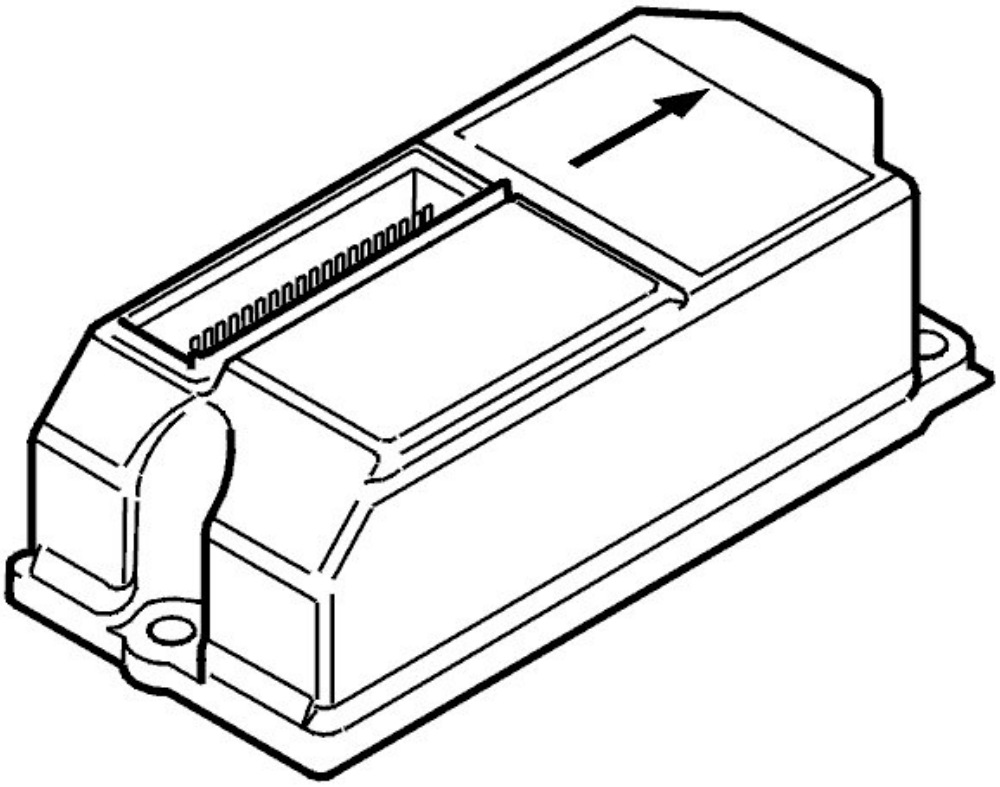
Faulty Signal

Faulty signal. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information

Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

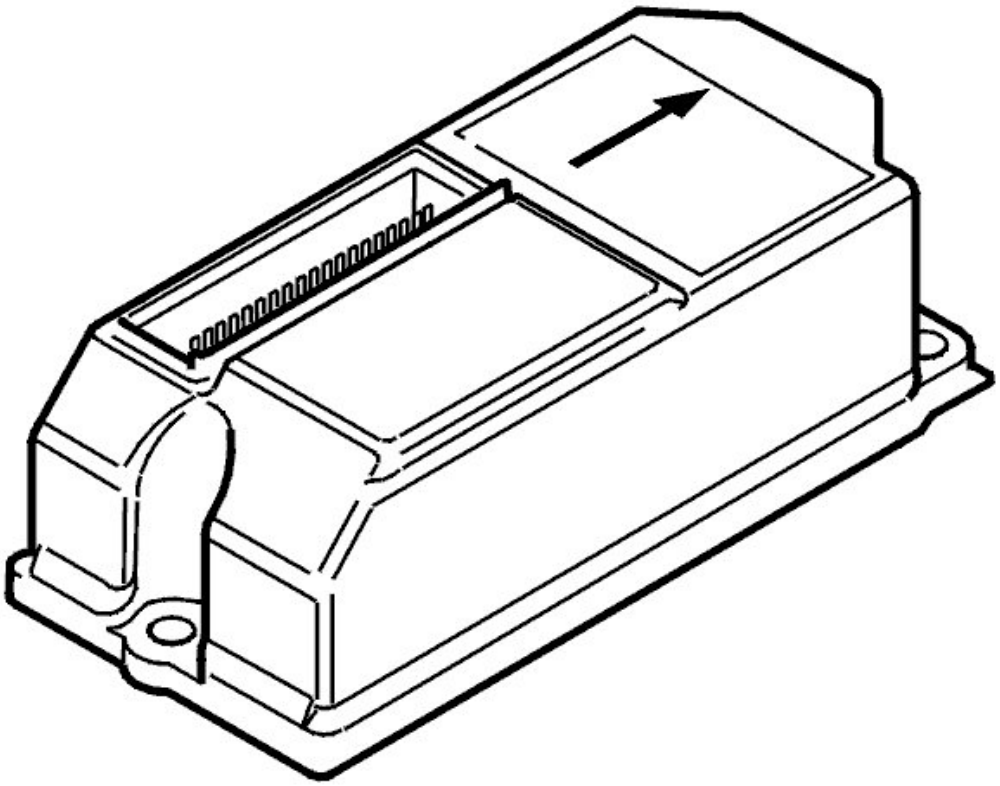
Attempt New Test - Faulty signal. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-00DB will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration as to whether or not the car has a passenger airbag has been downloaded into the central electronic module (CEM). Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and to the model in which they are installed.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

Fault symptom[s]

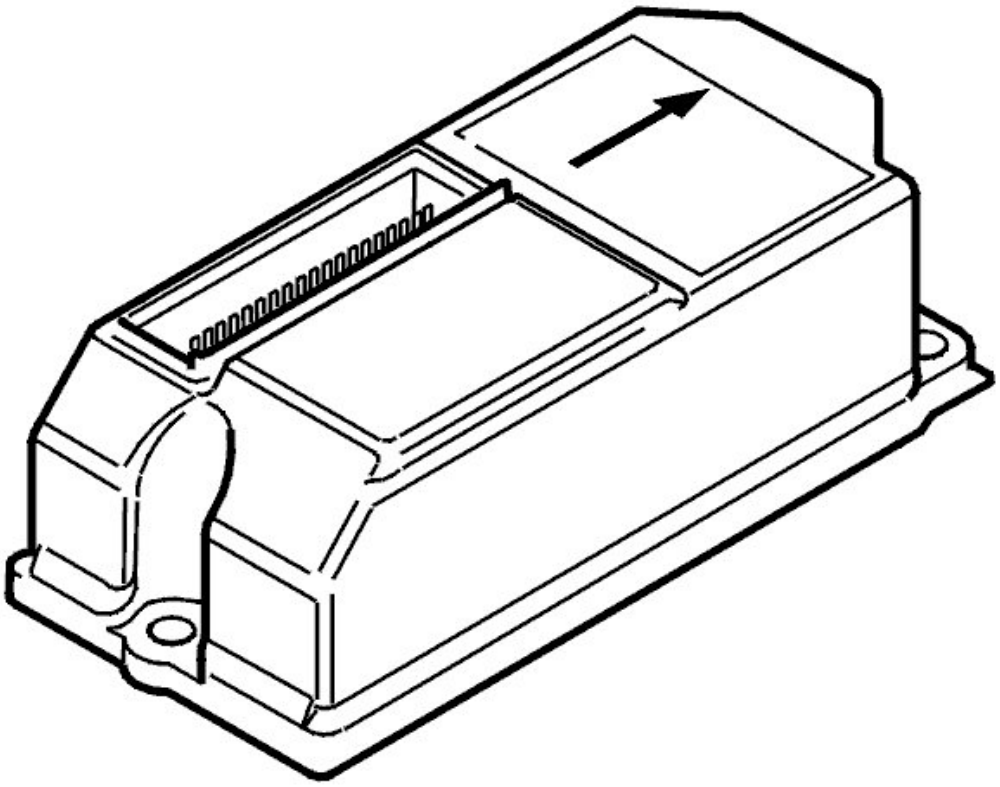
- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal. Intermittent fault

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Faulty signal. Intermittent fault

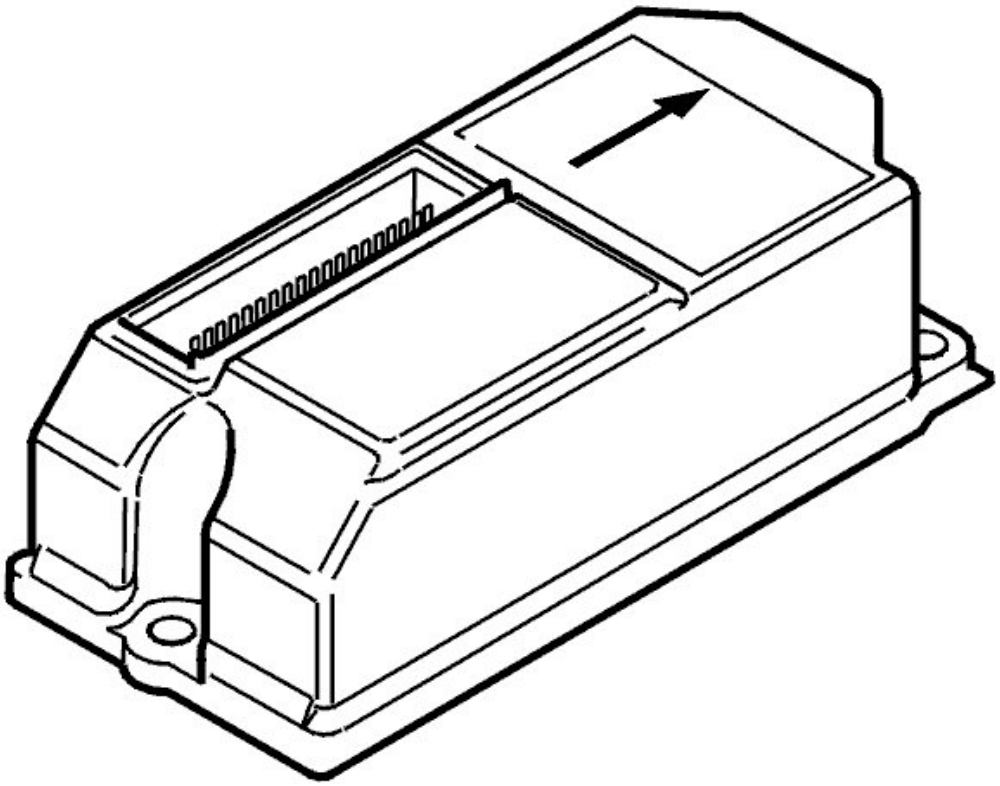
FAULT FOUND - DONE

DONE - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-00DB will be stored in the event of a number of faults. If an incorrect parameter file has been downloaded into the SRS system. If an incorrect car configuration as to whether or not the car has a passenger airbag has been downloaded into the central electronic module (CEM). Or if the car configuration in the central electronic module (CEM) and the parameter file in the SRS system do not correspond to each other and to the model in which they are installed.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Possible source

- Incorrect car configuration in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

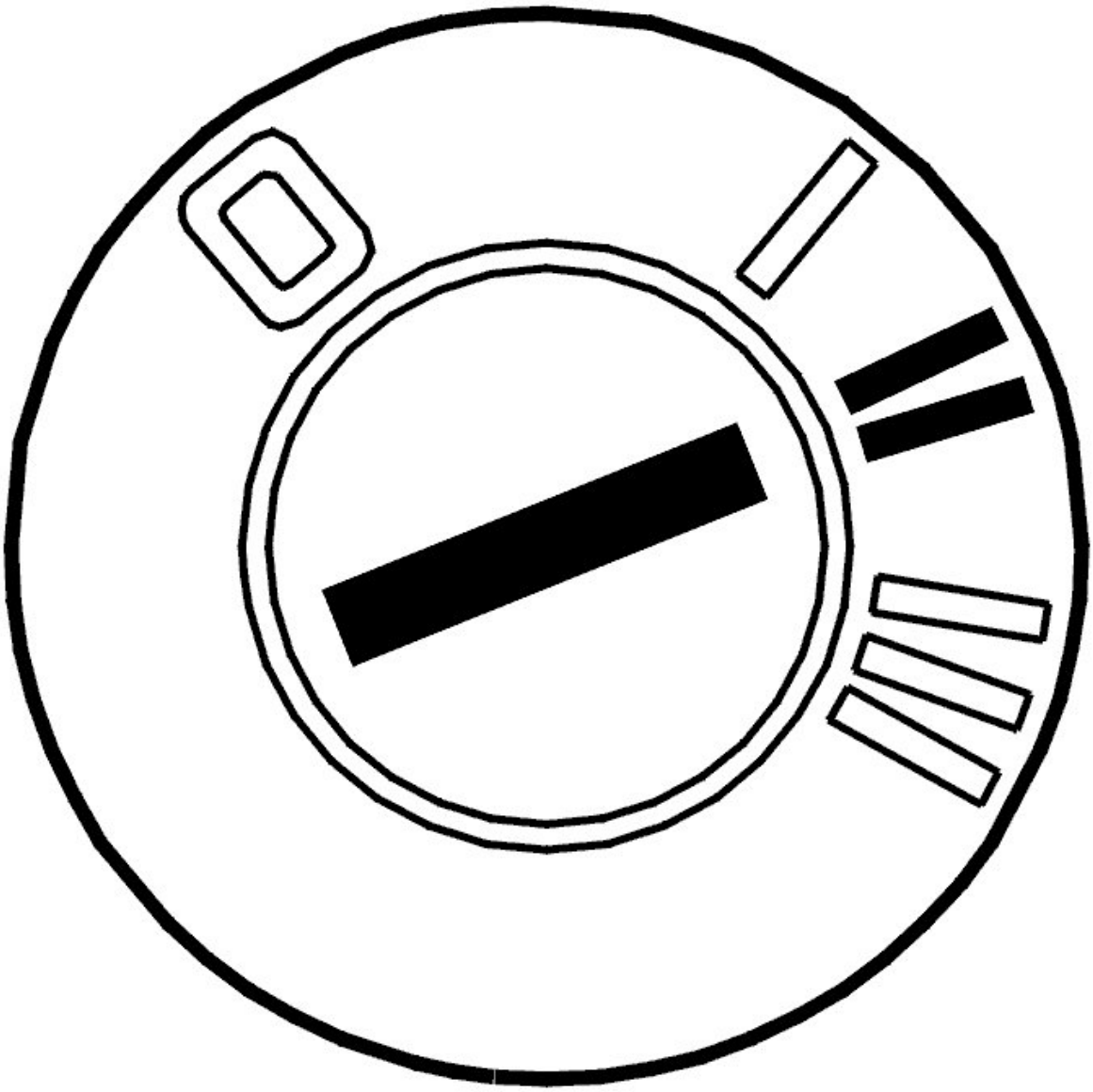
Fault symptom[s]

- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal. Permanent fault

Checking parameters



- Visually check if the vehicle is equipped with a front passenger airbag.
- Ignition on.

Read out and compare the "front passenger airbag" parameter from the supplemental restraint system module (SRS) and the central electronic module (CEM).
Click the VCT2000 symbol to activate the readout.
If the vehicle is equipped with a front passenger airbag:
The supplemental restraint system module (SRS) should respond "With front passenger airbag".
The central electronic module (CEM) should respond "Yes".
If the vehicle is not equipped with a front passenger airbag:
The supplemental restraint system module (SRS) should respond "Without front passenger airbag".
The central electronic module (CEM) should respond "No".

Does the "front passenger airbag" parameter of both SRS and CEM match the equipment of the vehicle?

Yes - Verification

No - Programming the control module

Programming the control module

Try reprogramming the control module that indicates a faulty parameter value.

- Supplemental restraint system module (SRS): Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.
- Central electronic module (CEM): Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing.

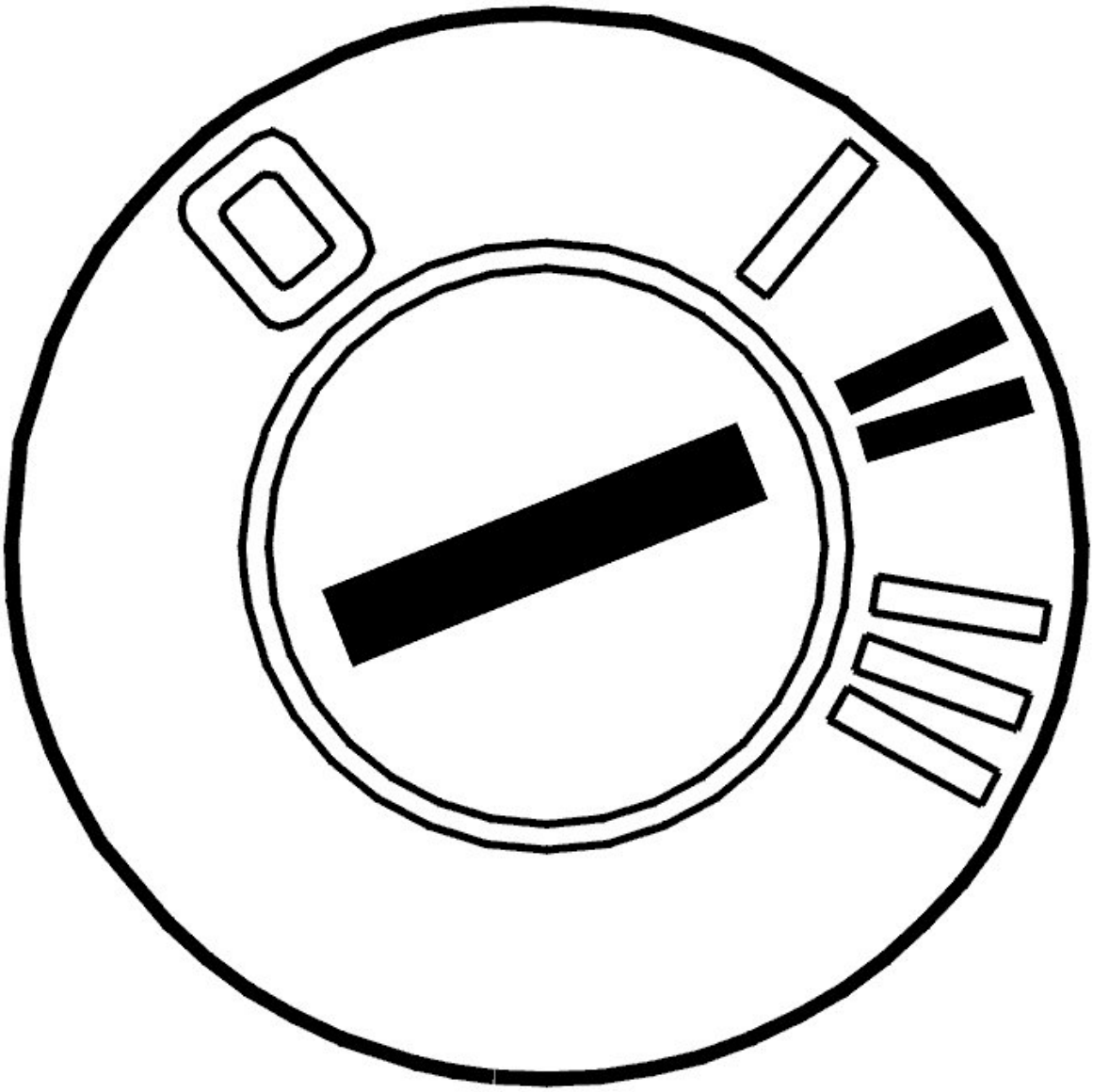
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking parameters

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00DC

Condition

The Supplemental Restraint System Module (SRS) checks the signal in the control area network (CAN) bus.
Diagnostic trouble code (DTC) SRS-00DC is stored if the parameter file in the Supplemental Restraint System Module (SRS) and in the central electronic module (CEM) (car config) for the "seat configuration" parameter are not in accordance.
Diagnostic trouble code (DTC) SRS-00DC can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

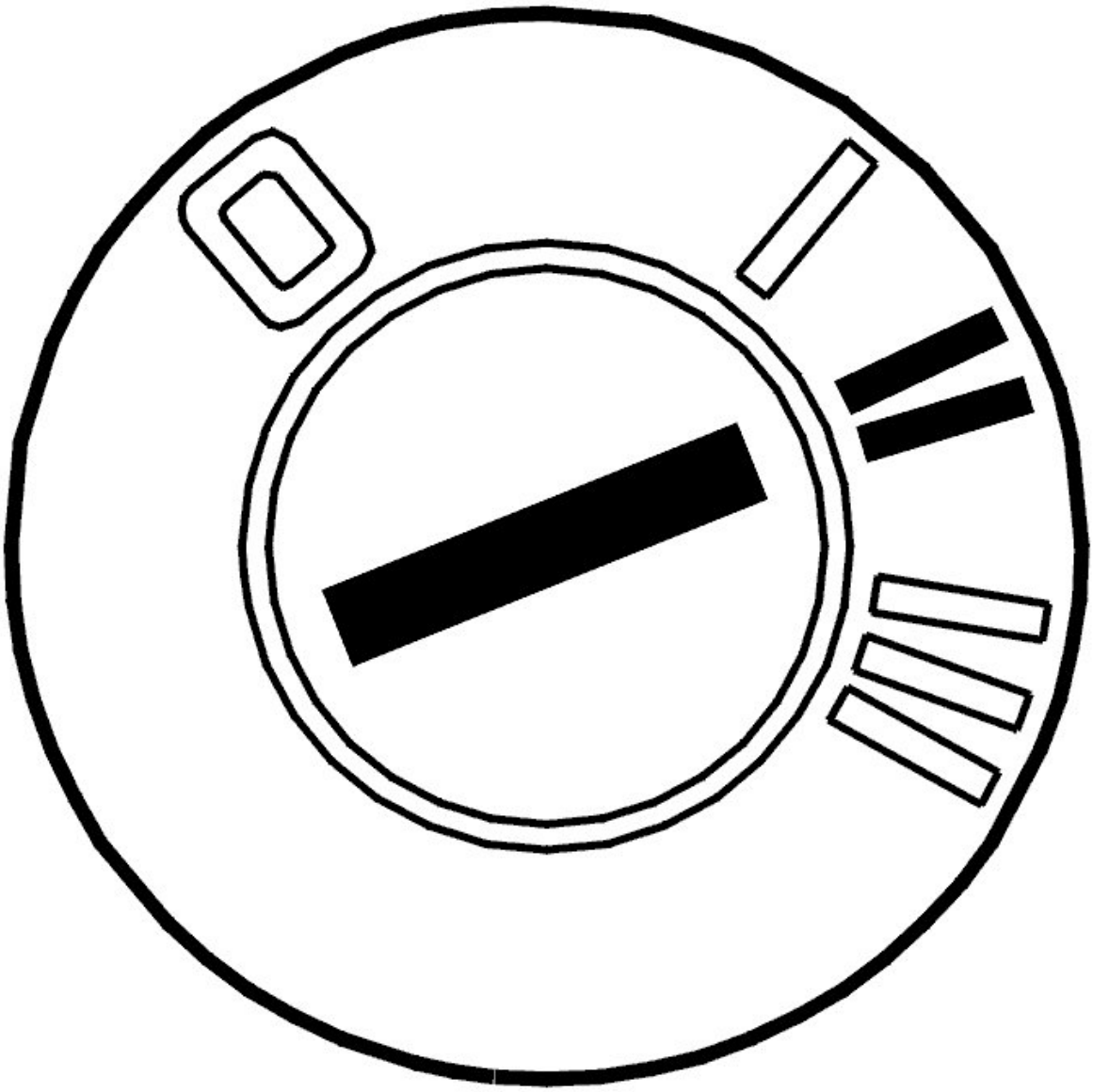
Possible source
- Incorrect car configurations in the central electronic module (CEM) or incorrect parameter files in the SRS system
- The car configuration in the central electronic module (CEM) or the parameter file in the SRS system does not correspond to the car type.

Fault symptom[s]
- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal

Checking the component



- Switch on the ignition. Wait 20 seconds.

Read off the "seat configuration" parameter from the central electronic module (CEM) and the Supplemental Restraint System Module (SRS) by clicking on the VCT2000 symbol.
If the parameter value which is shown in the two columns is not the same in the Supplemental Restraint System Module (SRS) as for the central electronic module (CEM), the "seat configuration" parameter value in the Supplemental Restraint System Module (SRS) must be reprogrammed.
If the value is not the same in the central electronic module (CEM) as in the Supplemental Restraint System Module (SRS), carry out the following:

- If the central electronic module (CEM) shows 7 seats, press the button with the figure 7
- If the central electronic module (CEM) shows 5 seats, press the button with the figure 5.

This reprograms the "seat configuration" parameter value to the same number of seats as entered in the central electronic module (CEM).

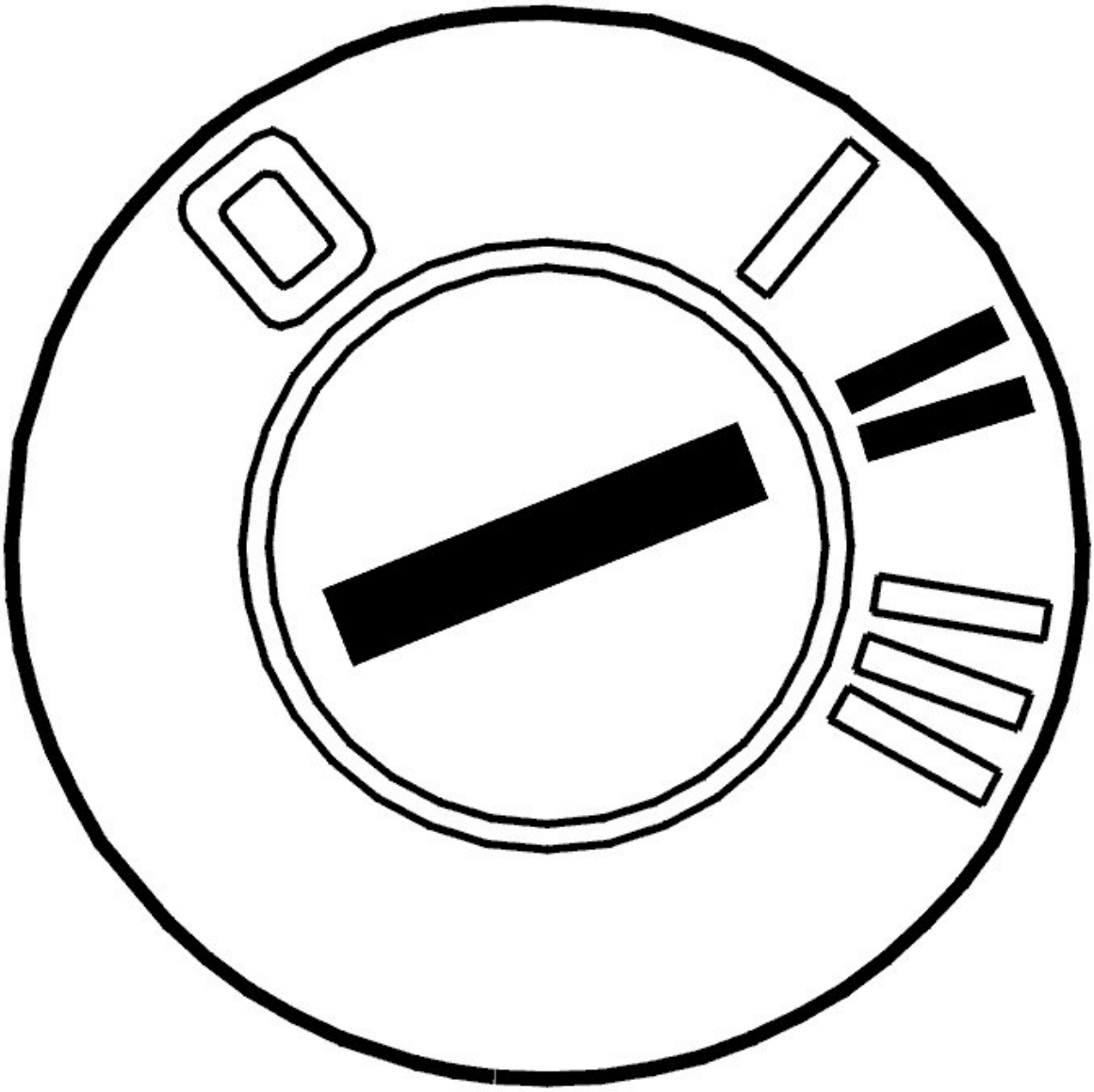
Caution! This diagnostic trouble code (DTC) can also cause diagnostic trouble codes (DTCs) to be stored for the rear inflatable curtains and the seat belt tensioners in the 3rd row of seats. Remedy diagnostic trouble code (DTC) SRS-00DC before continuing with the fault-tracing.

Did the parameter value change?

Yes - Verification

No - DONE

Verification



- Ignition off for at least 10 seconds
- Ignition on. Wait for 20 seconds.

If the diagnostic trouble code (DTC) status is intermittent, the fault has been eliminated.

Is the diagnostic trouble code (DTC) intermittent?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00DD

Condition

The Supplemental Restraint System Module (SRS) checks the signal in the control area network (CAN) bus.
Diagnostic trouble code (DTC) SRS-00DD is stored if the SRS control module does not receive a control area network (CAN) signal "number of seats" in the car from the central electronic module (CEM).
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Defective central electronic module (CEM).

Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Fault-tracing information

Fault-trace the central electronic module (CEM).

Continue - DONE

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Fault-tracing information

Fault-trace the central electronic module (CEM).

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E2

Condition

- Diagnostic trouble code (DTC) SRS-00E2 is stored if the SRS control module does not receive a control area network (CAN) signal for control from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

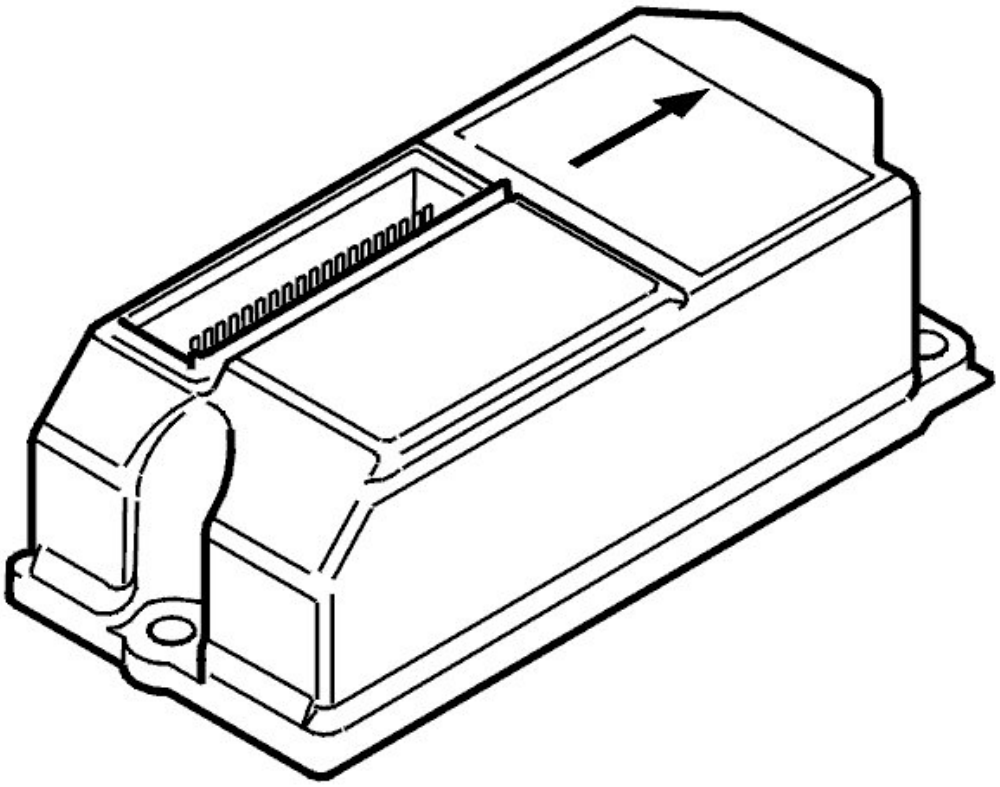
Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Fault-tracing information

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Signal missing. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E2

Condition
- Diagnostic trouble code (DTC) SRS-00E2 is stored if the SRS control module does not receive a control area network (CAN) signal for control from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Fault-tracing information

Fault-trace the central electronic module (CEM).

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E3

Condition
- Diagnostic trouble code (DTC) SRS-00E3 is stored if the SRS control module does not receive a control area network (CAN) signal with the car model from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

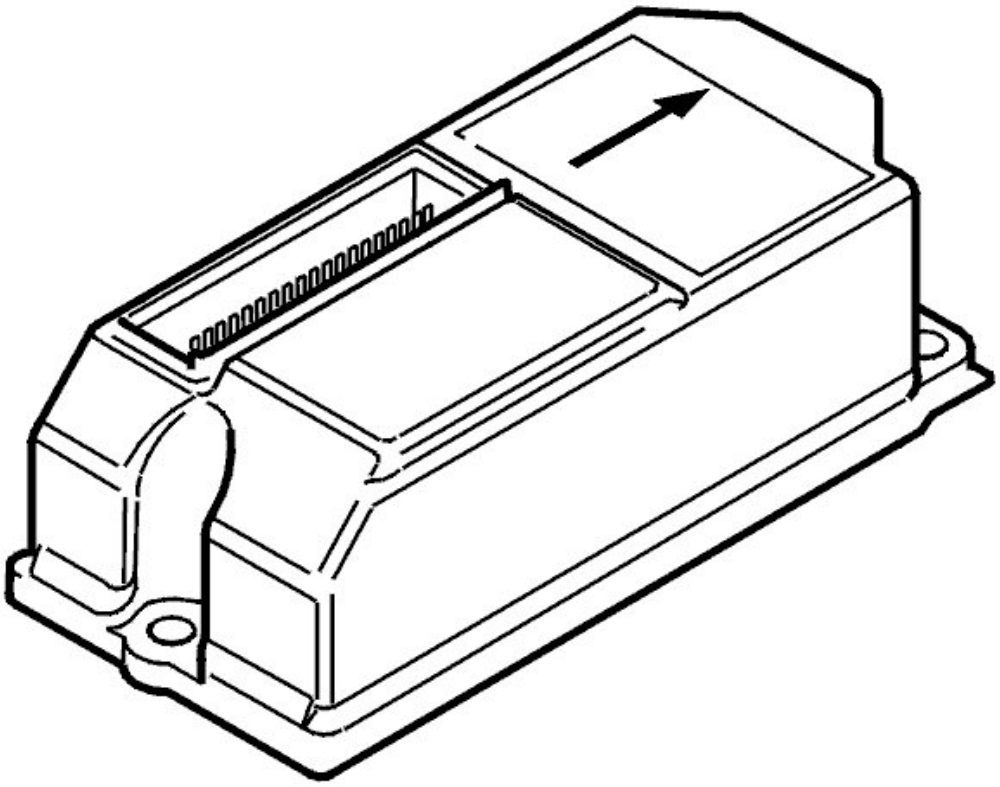
Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Fault-tracing information

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Signal missing. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E3

Condition
- Diagnostic trouble code (DTC) SRS-00E3 is stored if the SRS control module does not receive a control area network (CAN) signal with the car model from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E4

Condition
- Diagnostic trouble code (DTC) SRS-00E4 is stored if the SRS control module does not receive a control area network (CAN) signal for the passenger airbag from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

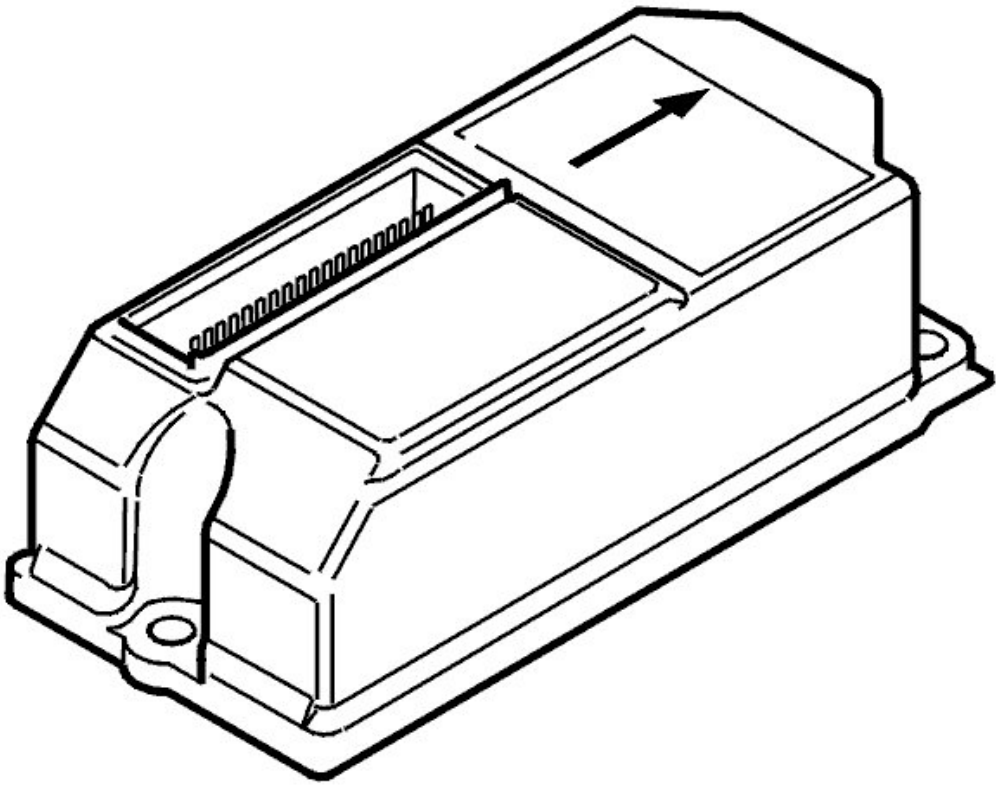
Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Fault-tracing information

Internal fault. Intermittent fault

Trouble-shooting information
Control unit has previously registered a fault but fault no longer exists.



Continue - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Signal missing. Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E4

Condition

- Diagnostic trouble code (DTC) SRS-00E4 is stored if the SRS control module does not receive a control area network (CAN) signal for the passenger airbag from the central electronic module (CEM).

The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value

- None.

Possible source
- Open-circuit in the Controller area network (CAN) cable
- Fault in the central electronic module (CEM).

Fault symptom[s]
- General orange warning lamp lit.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Fault-tracing information

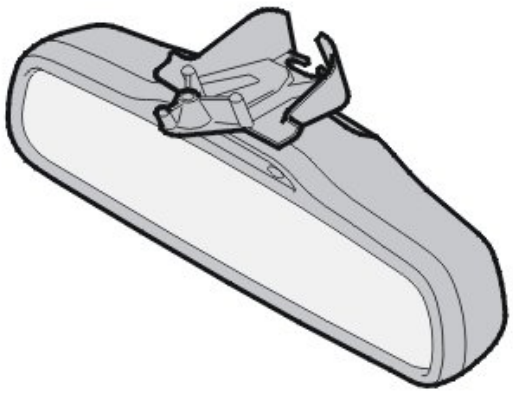
Fault-trace the central electronic module (CEM).

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E5

Condition



The supplemental restraint system module (SRS) checks the signal from the upper electronic module (UEM) on the CAN network.
The diagnostic trouble code is stored if the control module detects:
- Malfunction message regarding PAD-light.

The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Damaged LED in the rear view mirror.
- Open-circuit in the power supply.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- The PAD (passenger airbag disconnected) lamp does not light
- The SRS indicator lamp is lit.

Faulty function

Faulty function

Checking the power supply

- Ignition off.

Ensure that the battery voltage exceeds 12 V.
Connect a battery charger if necessary.
Check the power supply to the Supplemental restraint system module (SRS).
Perform in accordance with:

- Turn the ignition key to position I.

The SRS (supplemental restraint system) indicator lamp in the driver information module (DIM) must come on.
If the power supply (X supply) to the Supplemental restraint system module (SRS) is OK, the SRS warning lamp must go out after a few seconds.
If the SRS warning lamp does not go out, the power supply (X supply) must be checked.
Remedy as necessary.

Other information

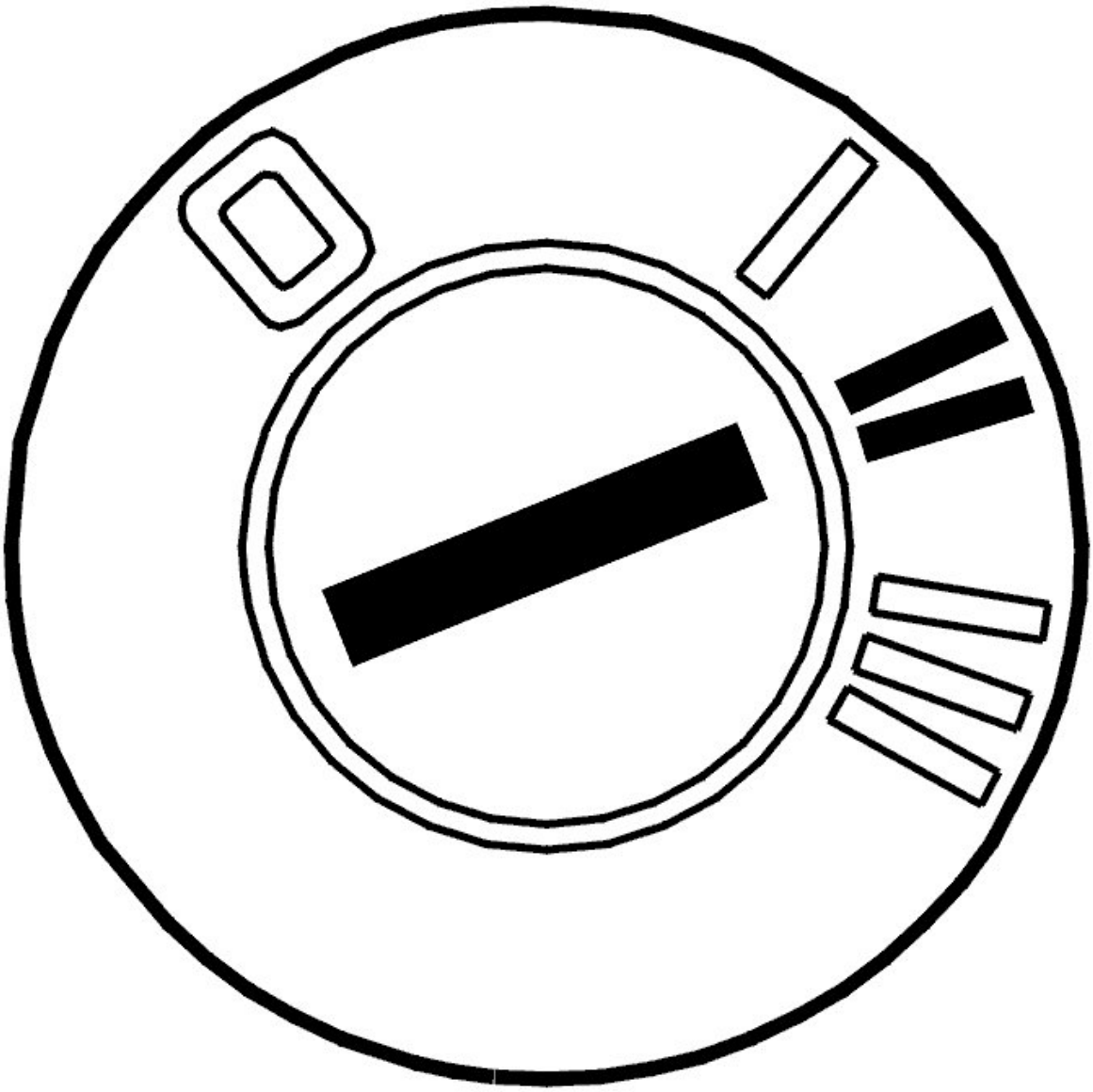
- Checking the supply voltage/ground terminal See: Restraint Systems/Air Bag Systems/Testing and Inspection/Component Tests and General Diagnostics
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.

Was a fault detected?

Yes - Verification

No - Checking communication

Checking communication

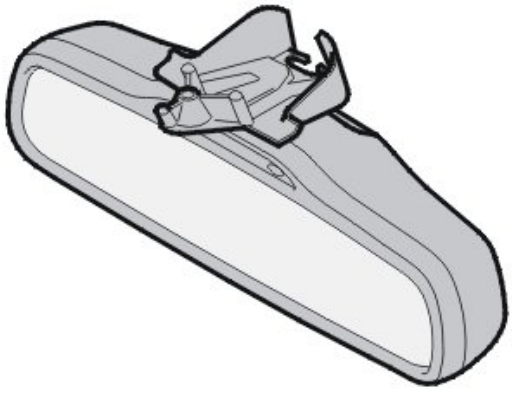


- Ignition off.

Ensure that the battery voltage exceeds 12 V.
Connect a battery charger if necessary.
Check the communication on the CAN network regarding the passenger airbag warning lamp (PAD).
If the Passenger airbag warning lamp (PAD) is OK and the communication on the CAN network functions as it should, the PAD lamp should come on immediately and remain lit for a few seconds to confirm the lamp is working.
Carry out checks according to:

- Note the Passenger airbag warning lamp (PAD).
- Turn the ignition key from position 0 directly to position II.

1. PAD lamp is not lit
2. Passenger airbag warning lamp (PAD) comes on immediately.
3. Passenger airbag warning lamp (PAD) comes on after a delay of 0.5 seconds or more.



Select alternative according to above.

1 - Fault-tracing information

2 - Fault-tracing information

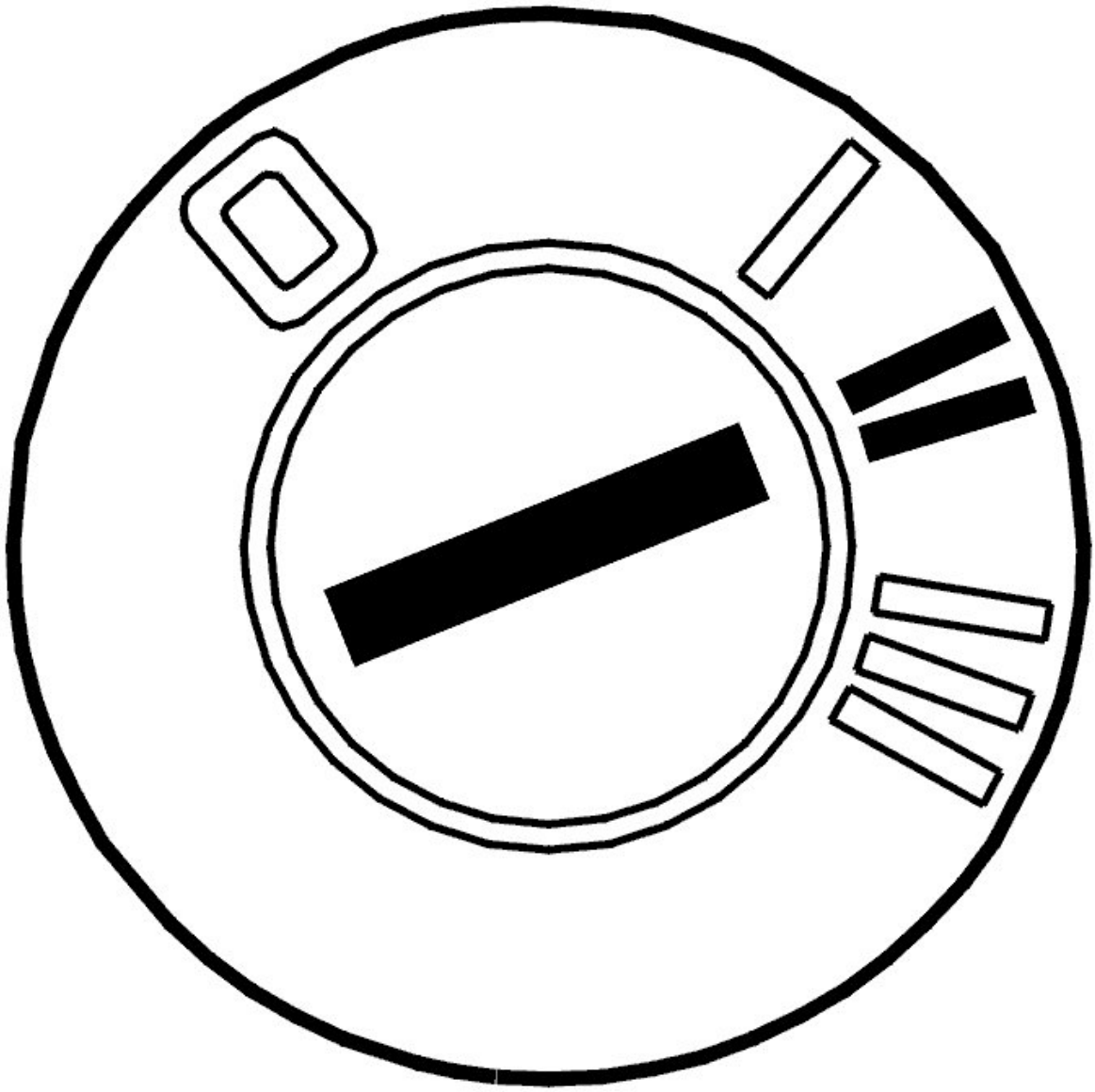
3 - Replacing a component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

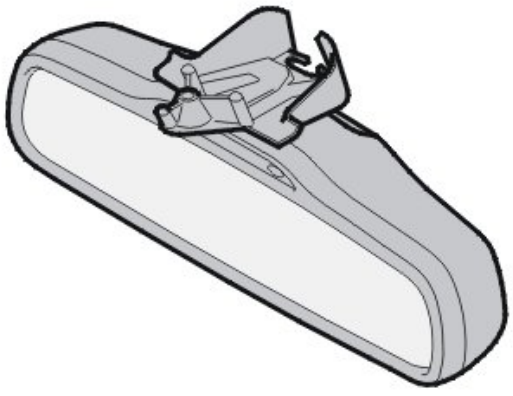
No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the power supply

Fault-tracing information

Continue fault-tracing from the upper electronic module (UEM). Check the function of the PAD lamp.



Select "Continue" to exit.

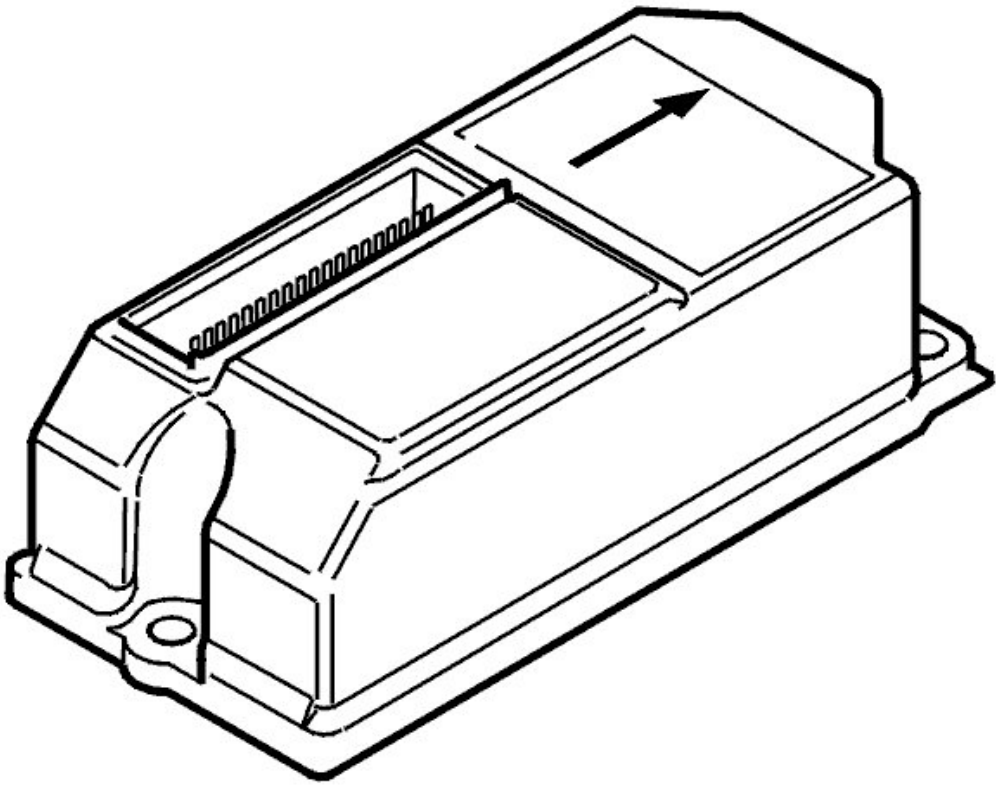
Continue - Fault Found

Replacing a component

- Ignition off.

Replace the supplemental restraint system module (SRS).

Other information
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Then select "Continue".

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E6

Condition

The supplemental restraint system module (SRS) checks messages regarding vehicle configuration on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) registers that the signal on the CAN network is missing for longer than 21 seconds.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

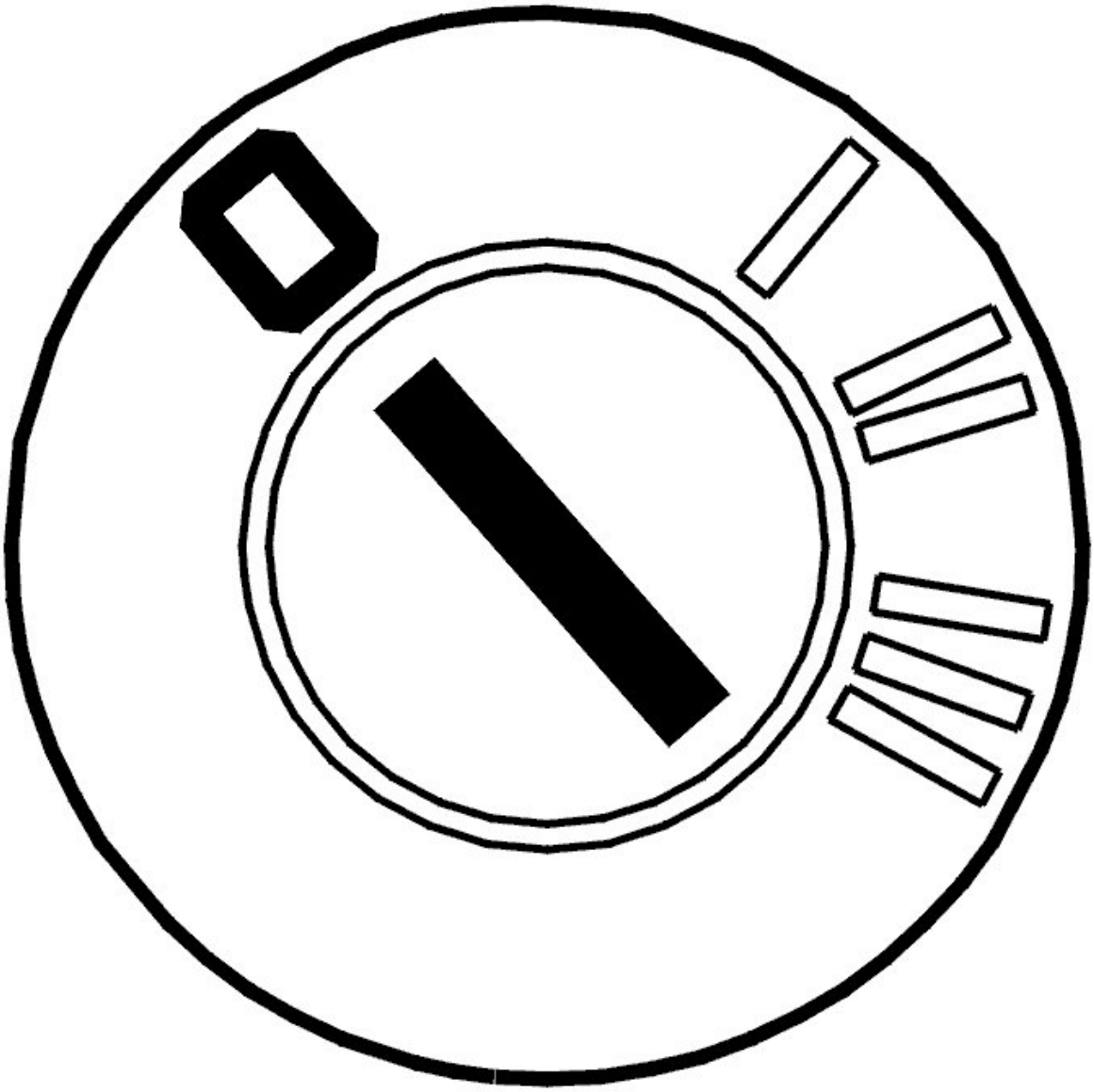
Possible source
- Open-circuit in the control area network (CAN)
- Fault in the central electronic module (CEM).

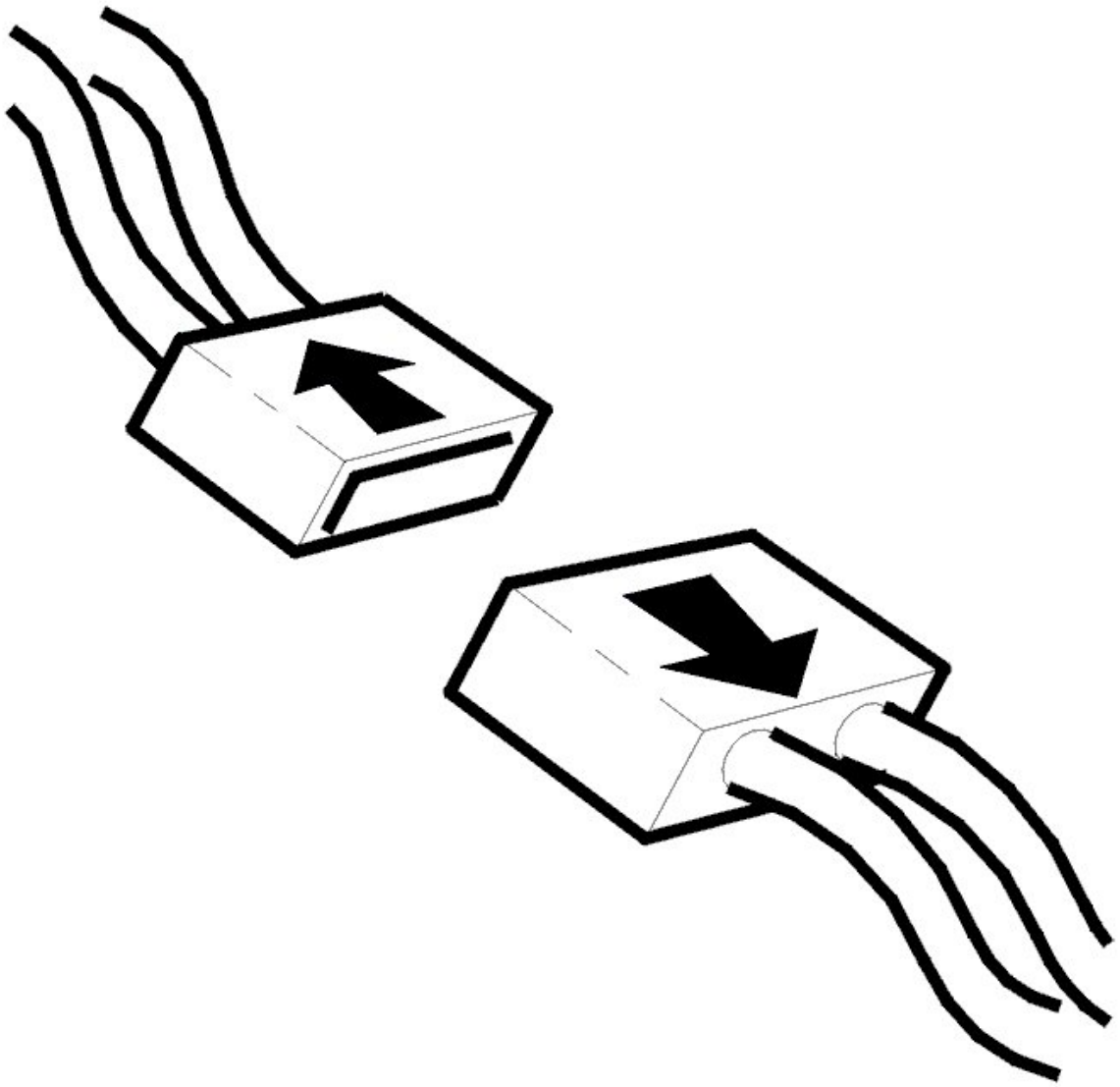
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Checking components and wiring





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect connector D from the central electronic module (CEM).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the central electronic module (CEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the central electronic module (CEM).

Check the connectors for the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the CAN cable between the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for an open-circuit.
Remedy as necessary.
If no fault is found, continue fault-tracing from the central electronic module (CEM).

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the central electronic module (CEM) and the connectors, see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To fault-trace the control area network (CAN), see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

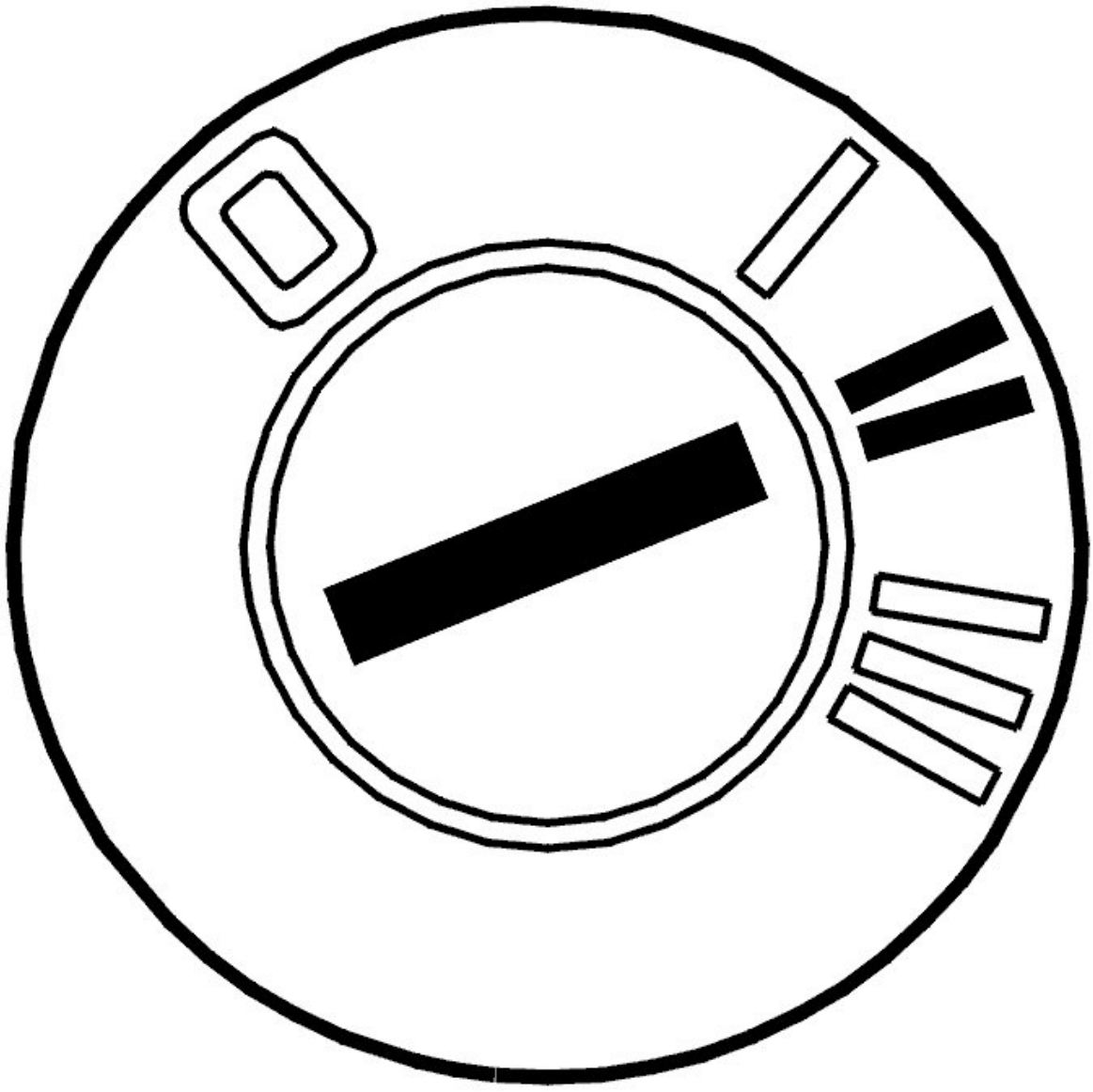
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00E7

Condition

The supplemental restraint system module (SRS) checks the signal from the upper electronic module (UEM) on the CAN network.
The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) registers that the signal on the CAN network is missing for longer than 10 seconds.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

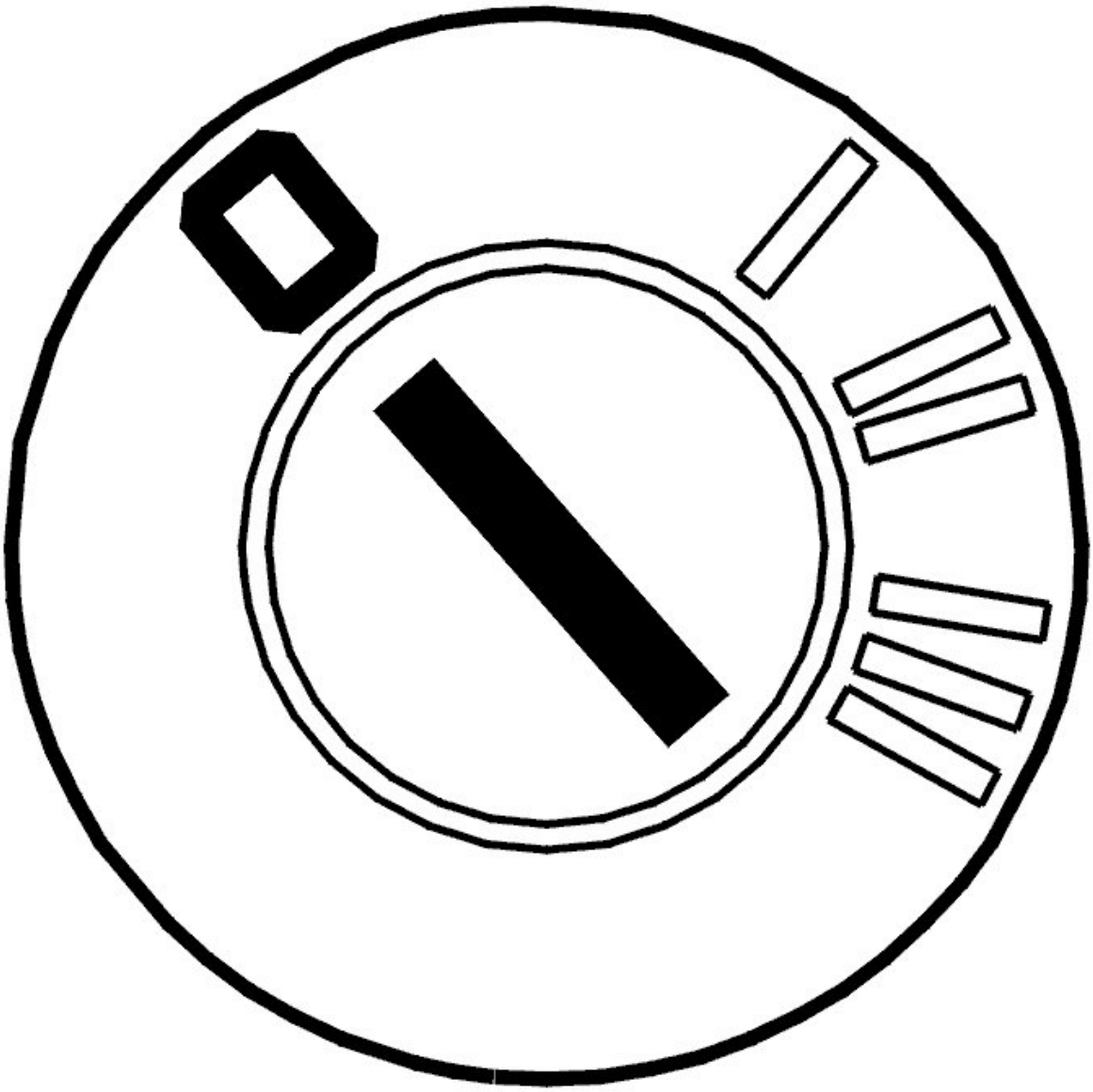
Possible source
- Problem on the CAN network in the form of an open-circuit or a short-circuit in the CAN cables
- Fault in the upper electronic module (UEM).

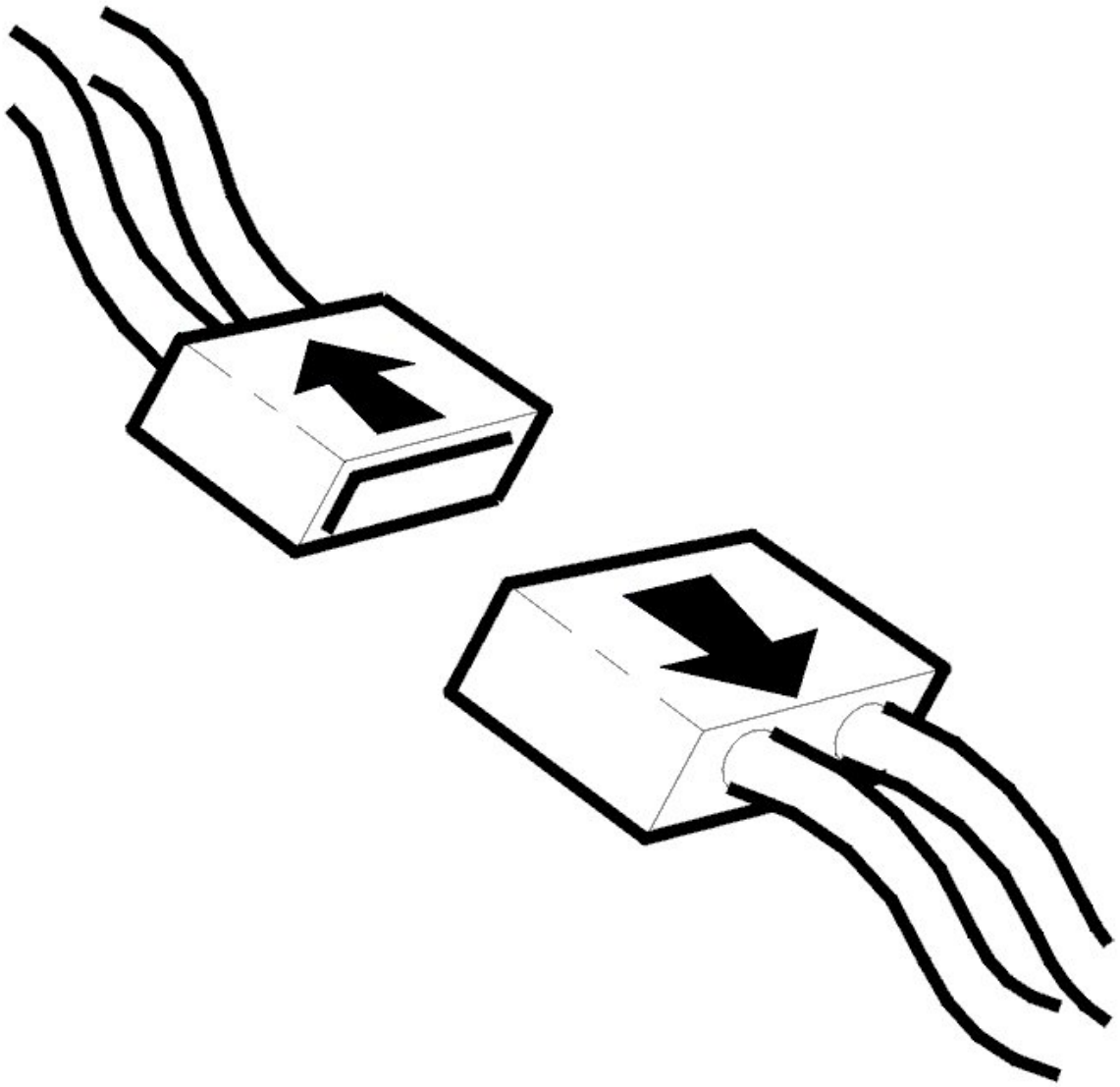
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Checking components and wiring





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect the connector from the upper electronic module (UEM).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the upper electronic module (UEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the upper electronic module (UEM).

Check the connectors for the supplemental restraint system module (SRS) and the upper electronic module (UEM). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Remedy as necessary.
Check the CAN cable between the supplemental restraint system module (SRS) and the upper electronic module (UEM). Check for an open-circuit.
Remedy as necessary.
If no fault is found, continue fault-tracing from the upper electronic module (UEM).

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Upper electronic module (UEM)/rearview mirror, replacing See: Body Control Module/Service and Repair
- To fault-trace the control area network (CAN), see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

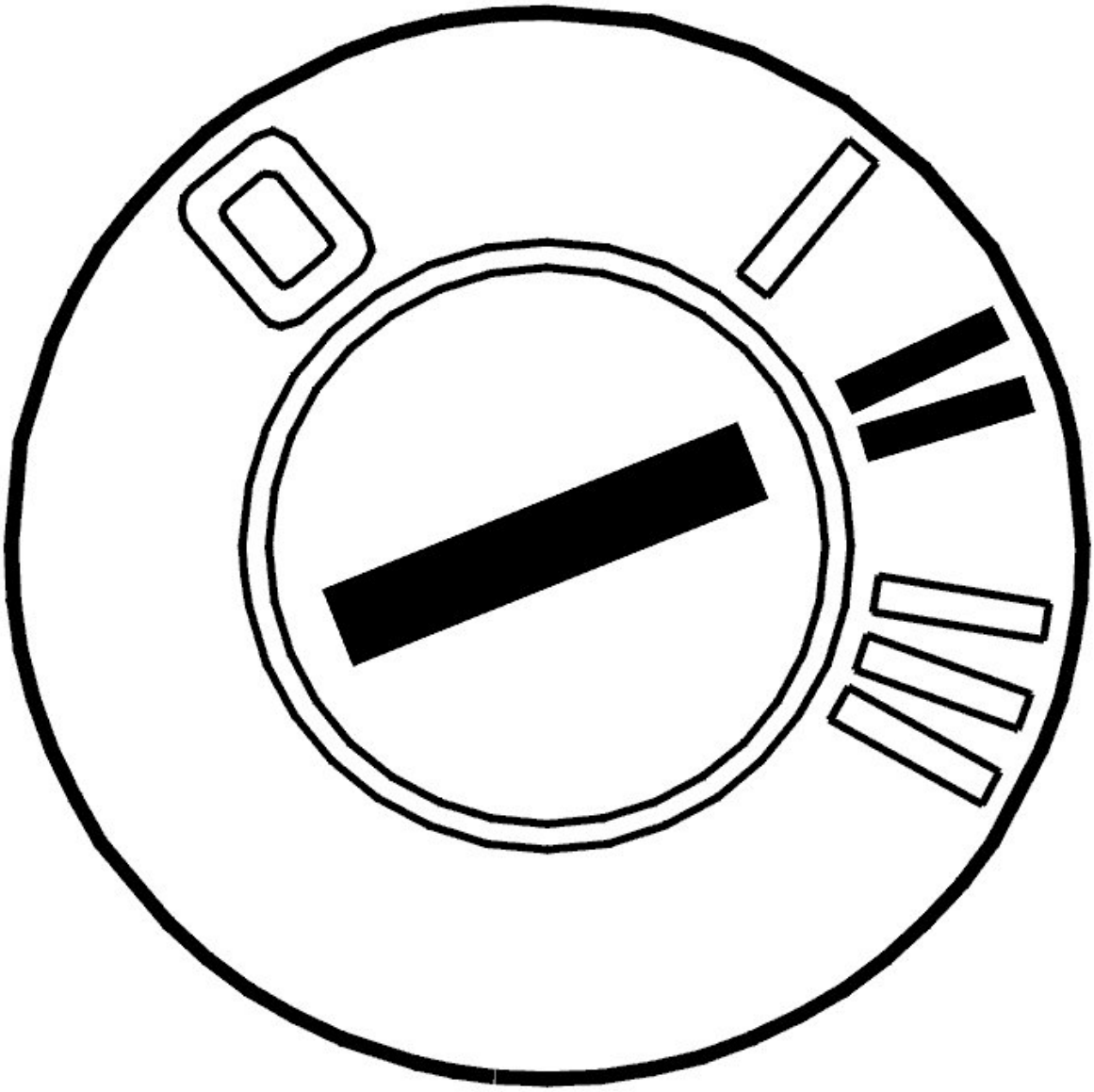
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F0

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F0 is stored if the control module registers that the voltage in the signal cable is too high for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F0 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

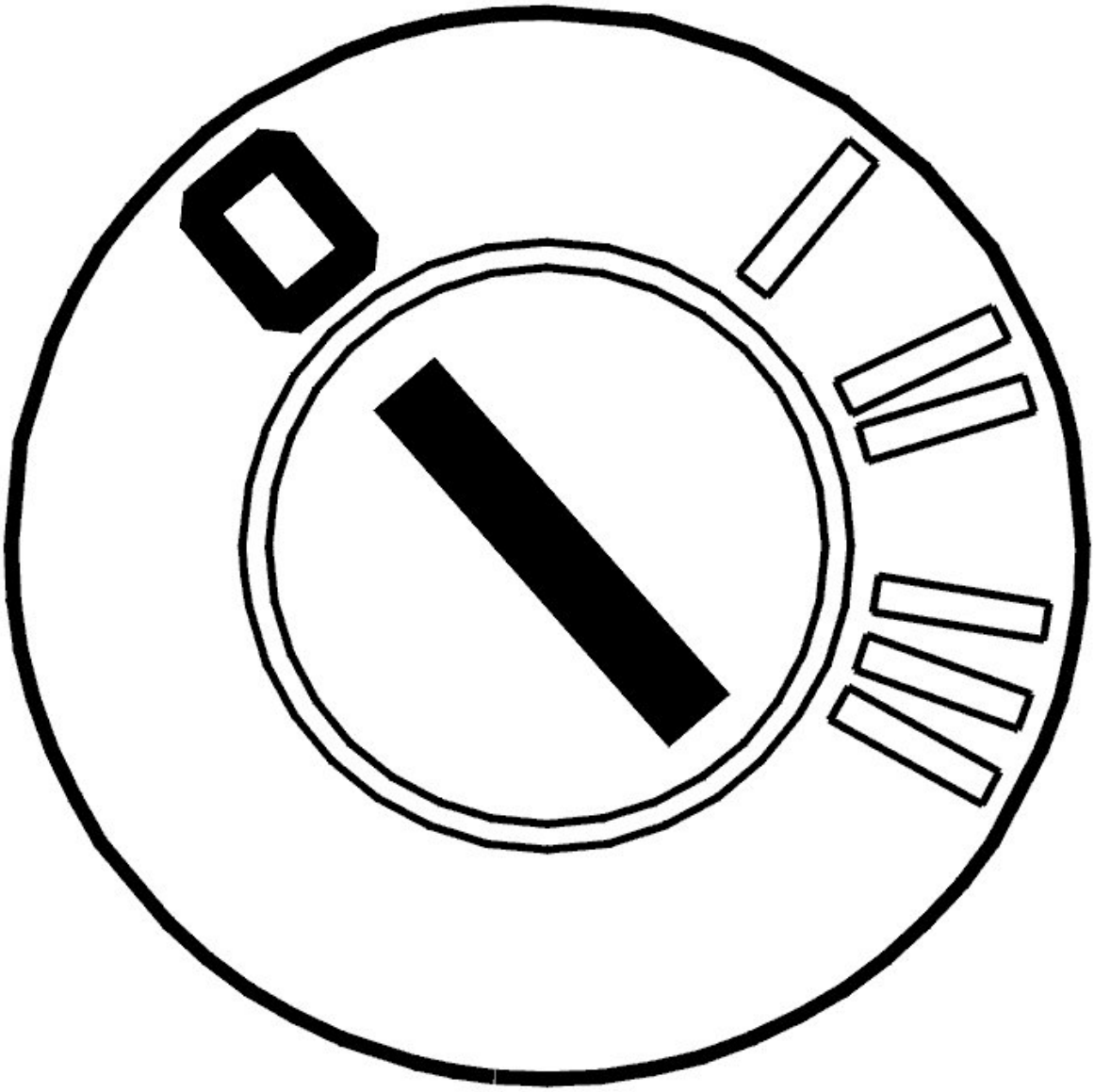
Possible source
- Short-circuit to supply voltage in the signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit in seat belt buckle
- Cross-connection of signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS).

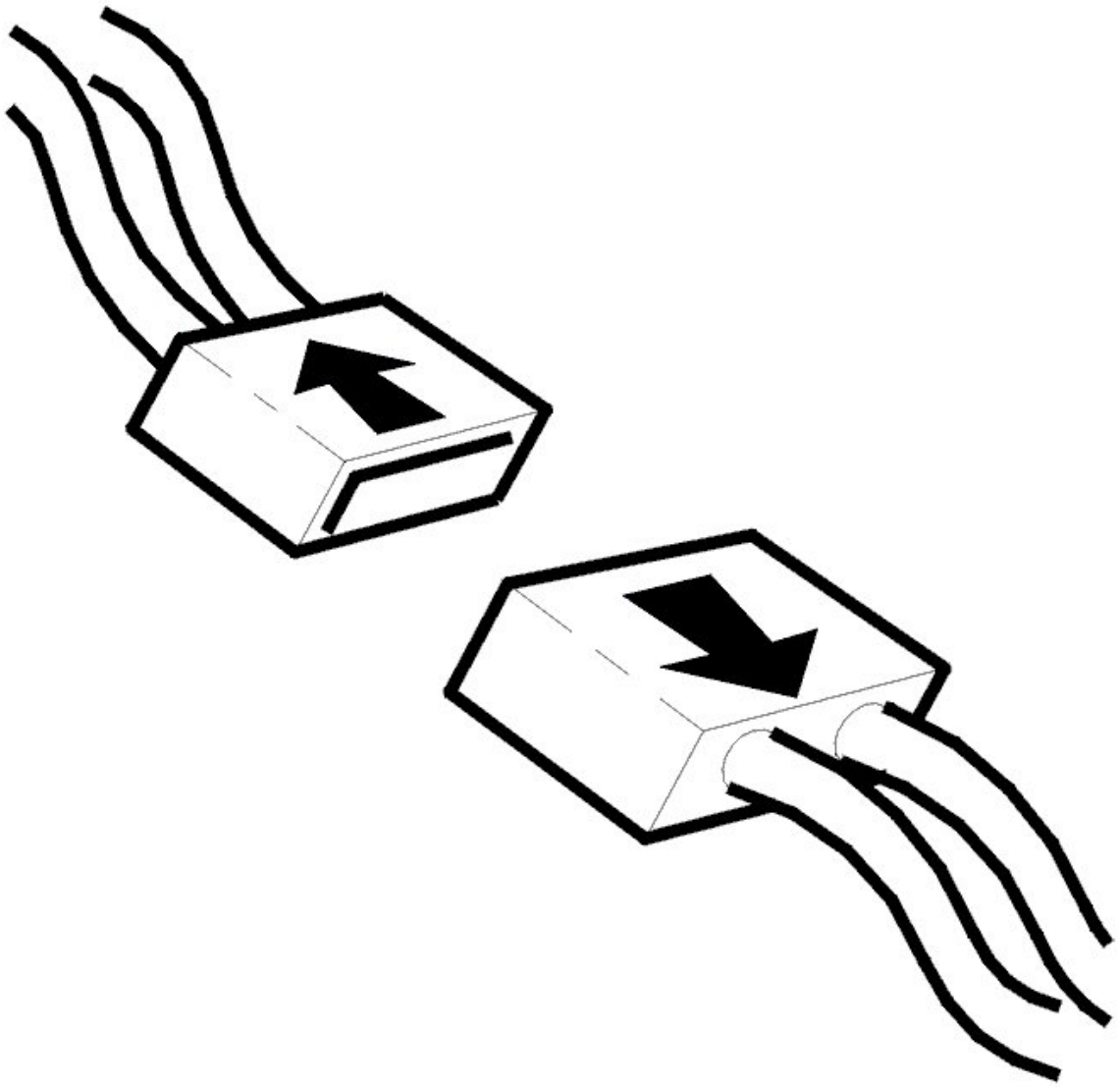
Fault symptom[s]
- General warning lamp lit.

Signal Too High

Signal too high

Checking the component





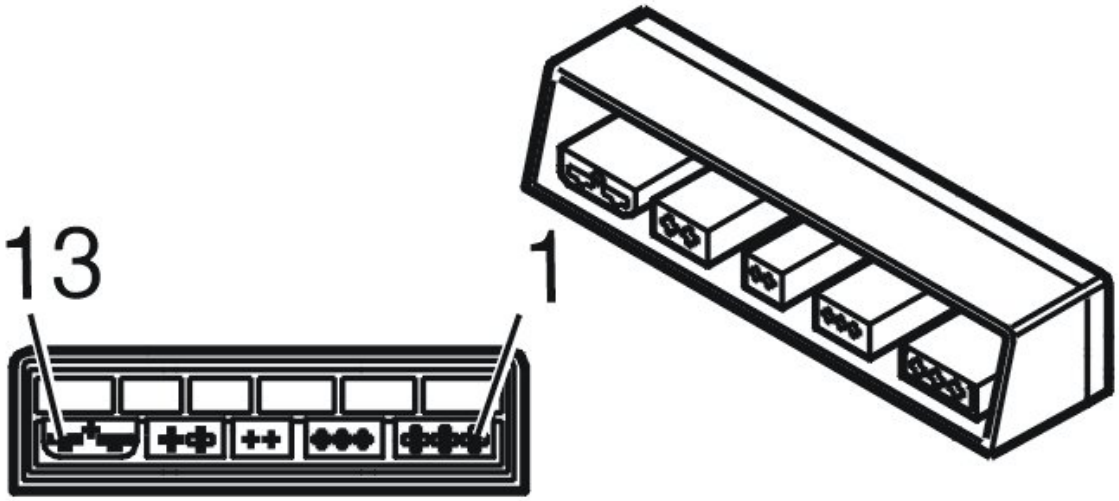
- Ignition off
- Disconnect the 3-pin connector from the left front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

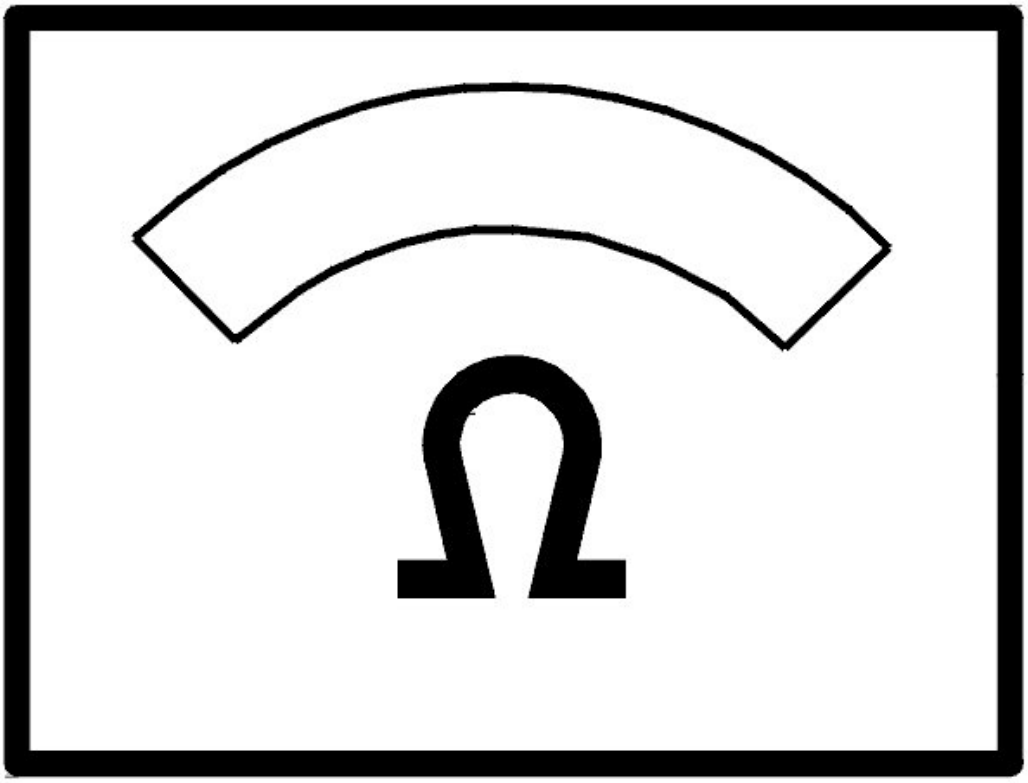
Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26A (26) and the seat belt buckle #54/24:5 left front. Check for a short-circuit to supply voltage.
Check the resistance in the signal cable between the Supplemental Restraint System Module (SRS) terminal #26A (26) and seat belt buckle #54/24:4 left front. The resistance must be infinite.
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

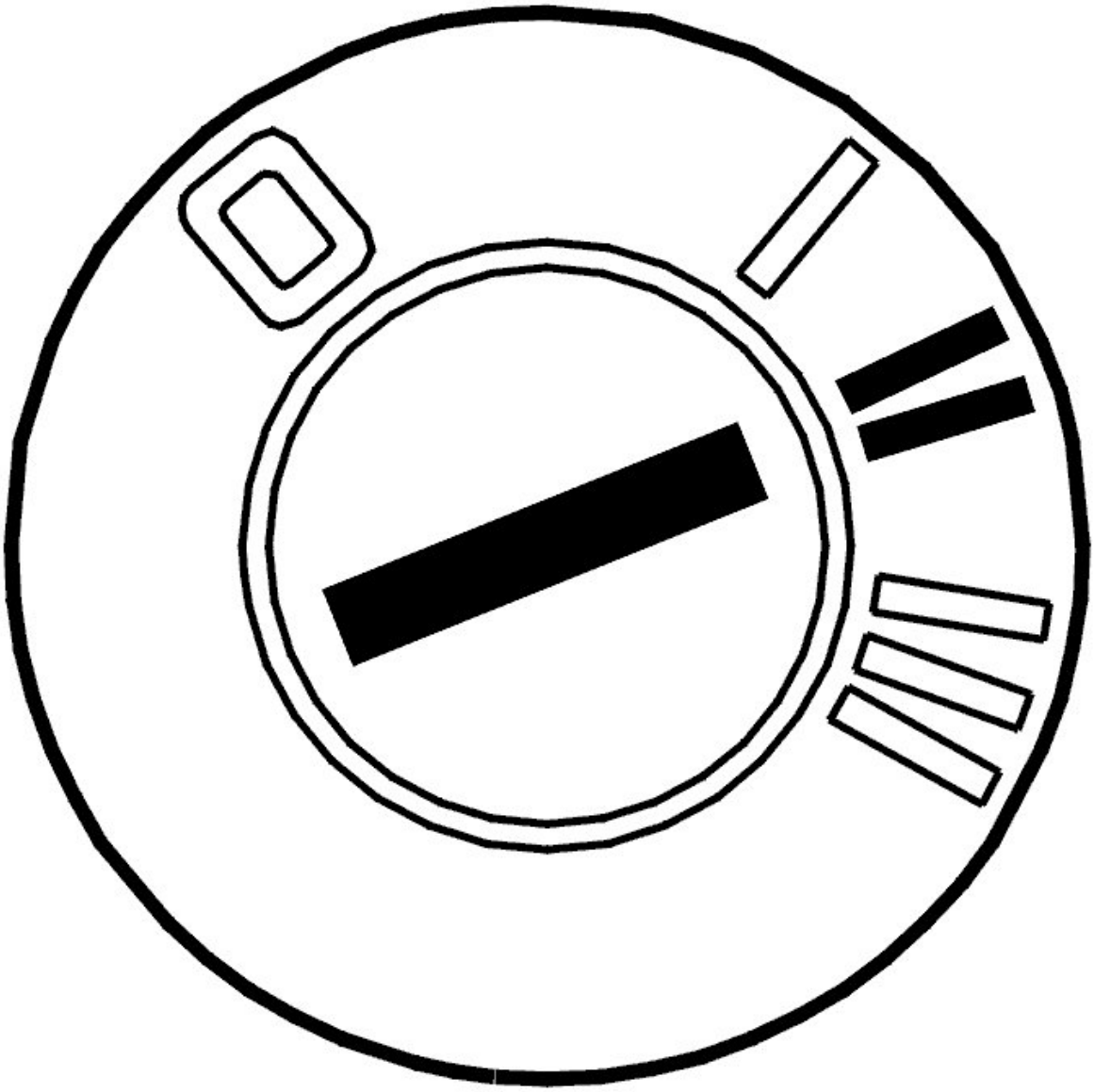
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F1

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F1 is stored if the control module registers that the voltage is too low or that there is an open-circuit in the signal cable for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F1 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

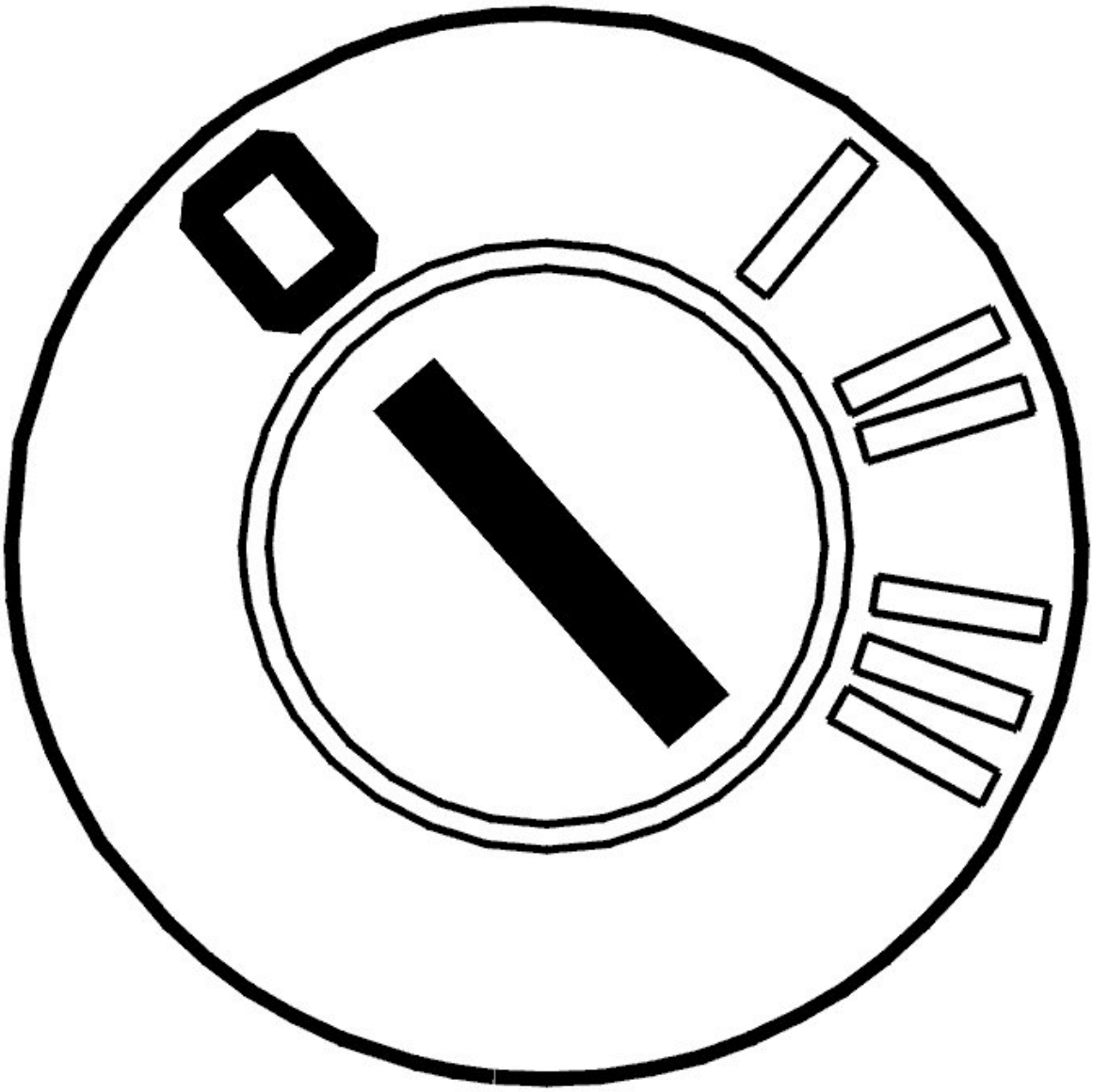
Possible source
- Short-circuit to ground in the signal cable between the left front seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the connector
- Open-circuit in the signal cable in the seat belt buckle
- Open-circuit in the signal cable between the left front seat belt buckle and the SRS system
- Cross-connection of signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS).

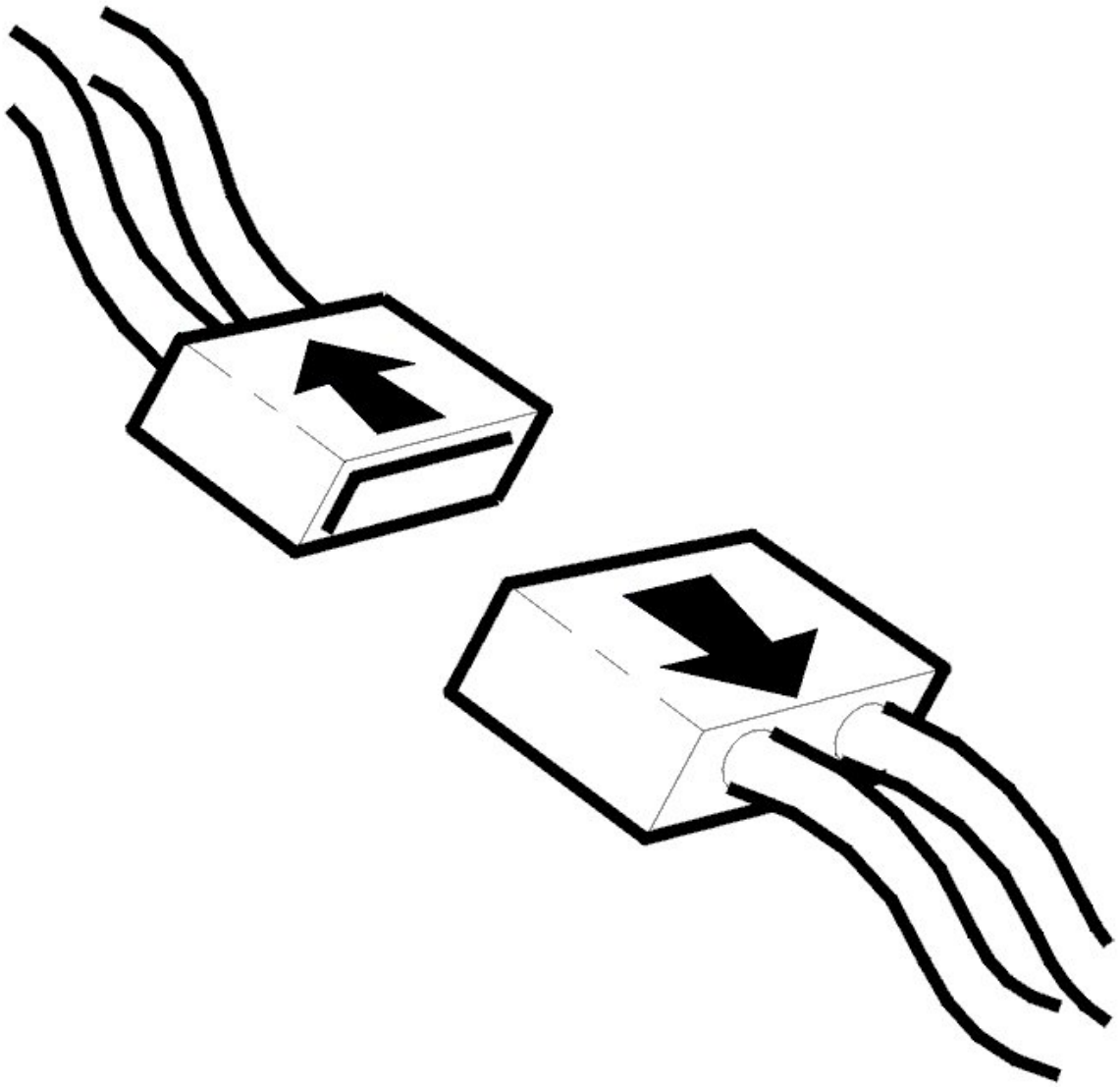
Fault symptom[s]
- General warning lamp lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the component





- Ignition off
- Disconnect the 3-pin connector from the left front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS)

Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26A (26) and the seat belt buckle #54/24:5 left front. Check for a short-circuit to ground. Check for an open-circuit.
Check the resistance in the signal cable between the Supplemental Restraint System Module (SRS) terminal #26A (26) and seat belt buckle #54/24:4 left front. The resistance must be infinite.

Hint: If the signal cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle connector is OK, the seat belt buckle may be damaged. Check the signal cable between the seat belt buckle connector and the seat belt buckle. The signal cable must not be damaged. Check that nothing has become jammed in the seat belt buckle.

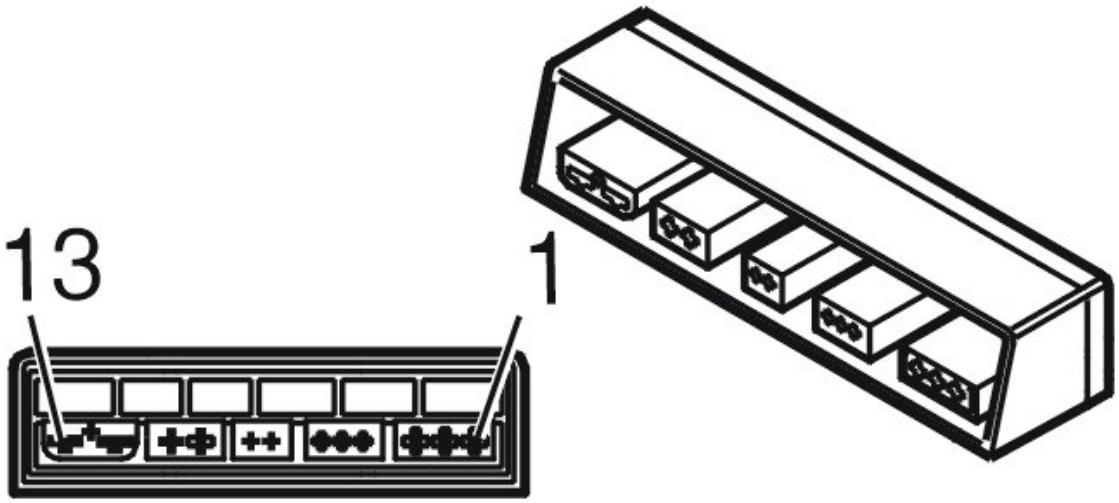
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

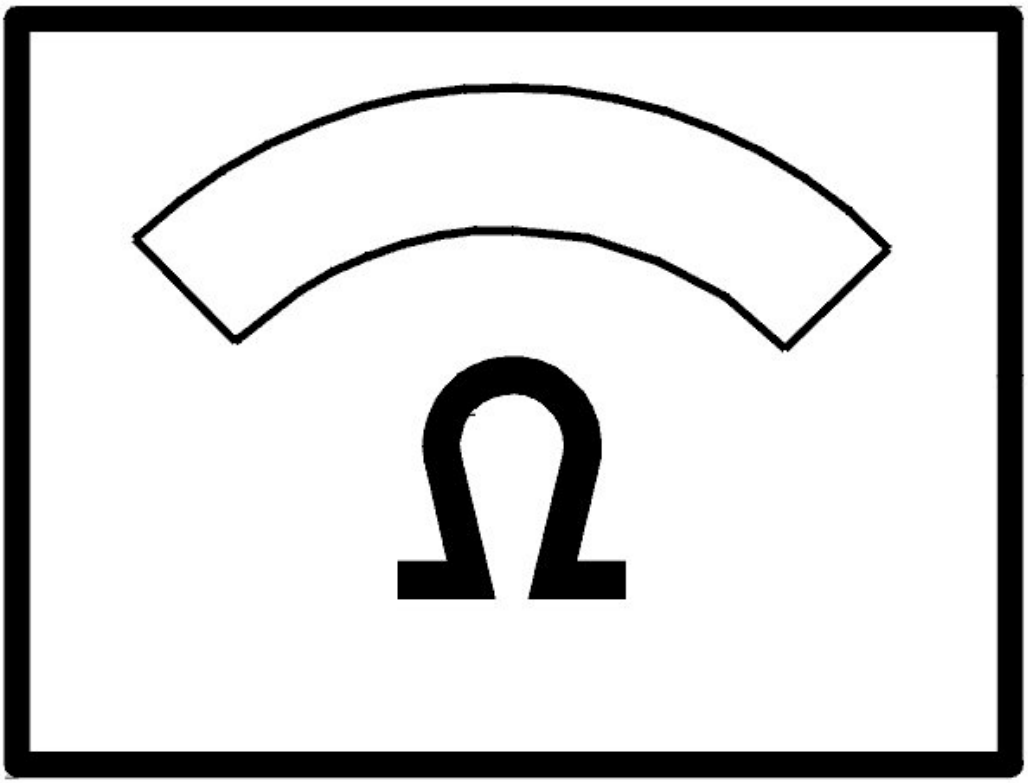
Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

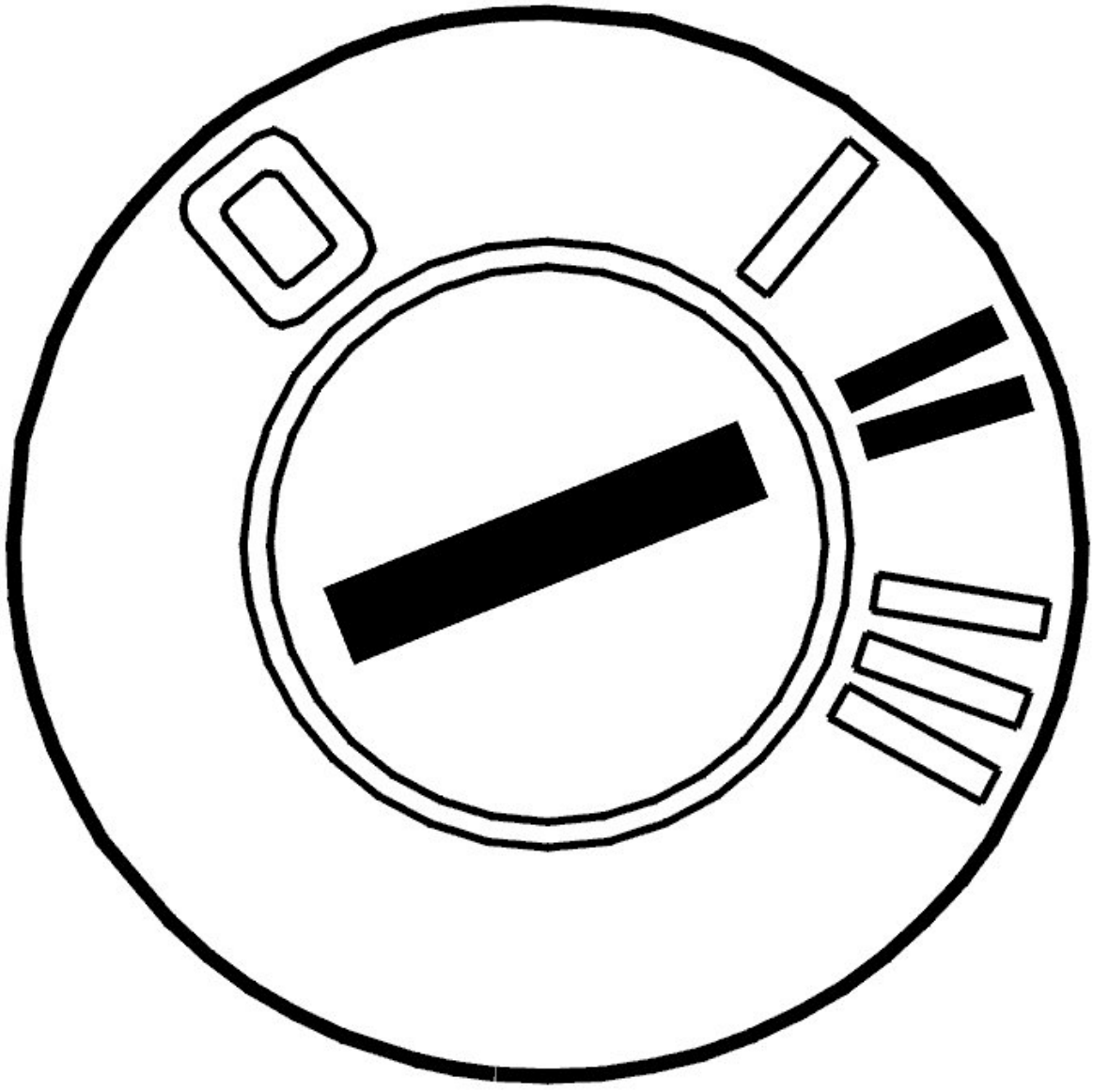
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead

- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F2

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F2 is stored if the control module registers an incorrect signal level in the signal cable for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F2 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

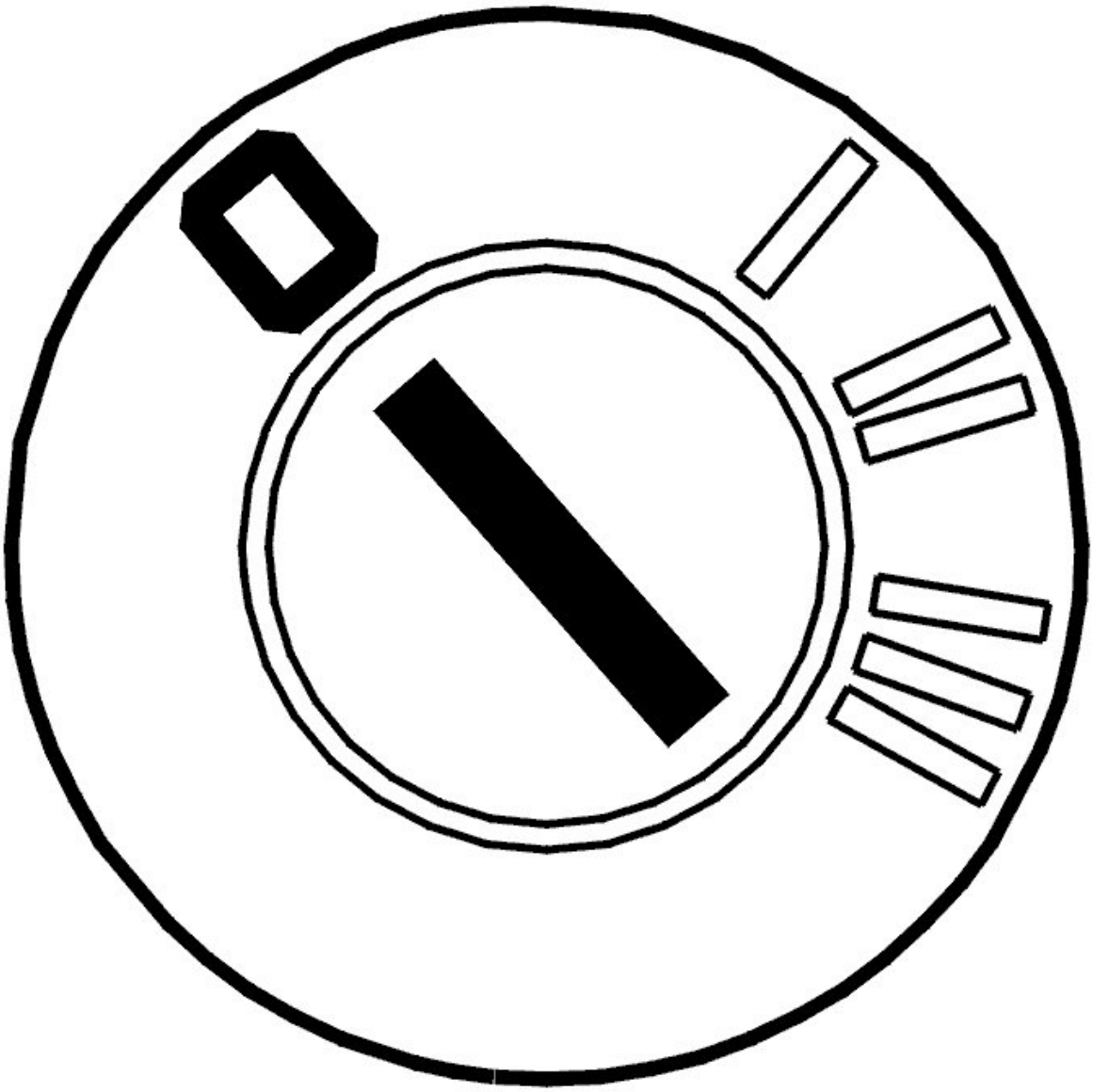
Possible source
- Damaged signal cable between seat belt buckle left front and Supplemental Restraint System Module (SRS)
- Defective seat belt buckle.

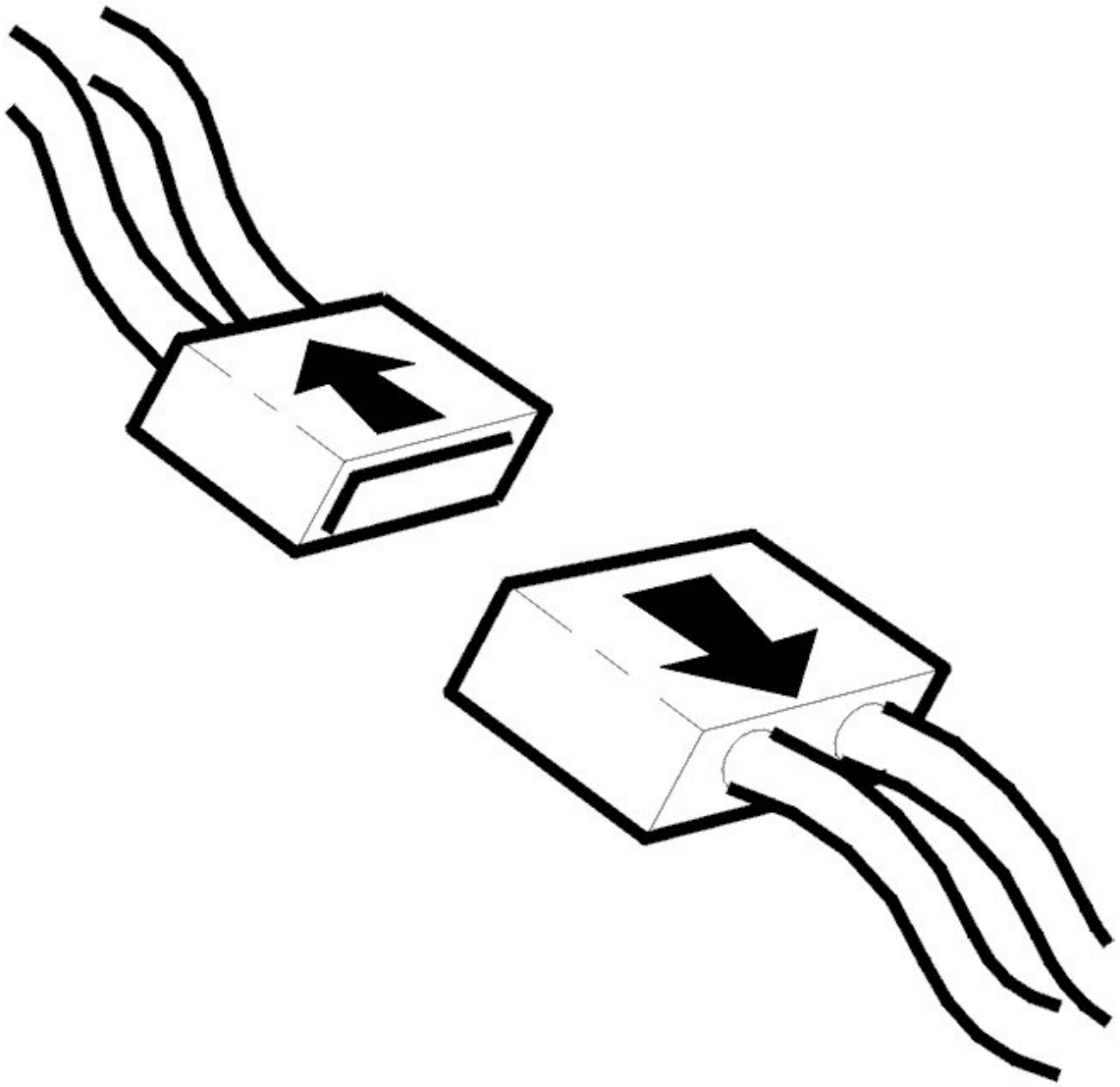
Fault symptom[s]
- General warning lamp lit.

Faulty Signal

Faulty signal

Checking the component





- Ignition off
- Disconnect the 3-pin connector from the left front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle left front. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26A (26) and the seat belt buckle #54/24:5 left front. Check for an open-circuit. Try carefully bending the cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle while checking for an open-circuit to see if the resistance alters.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25A (25) and the seat belt buckle #54/24:4 left front. Check for an open-circuit. Try carefully bending the cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle while checking for an open-circuit to see if the resistance alters.

Hint: Objects that have become jammed in the seat belt buckle and damaged the signal cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle can cause this fault. When the belt is pressed down into the seat belt buckle, check that it locks properly and that a click is heard.

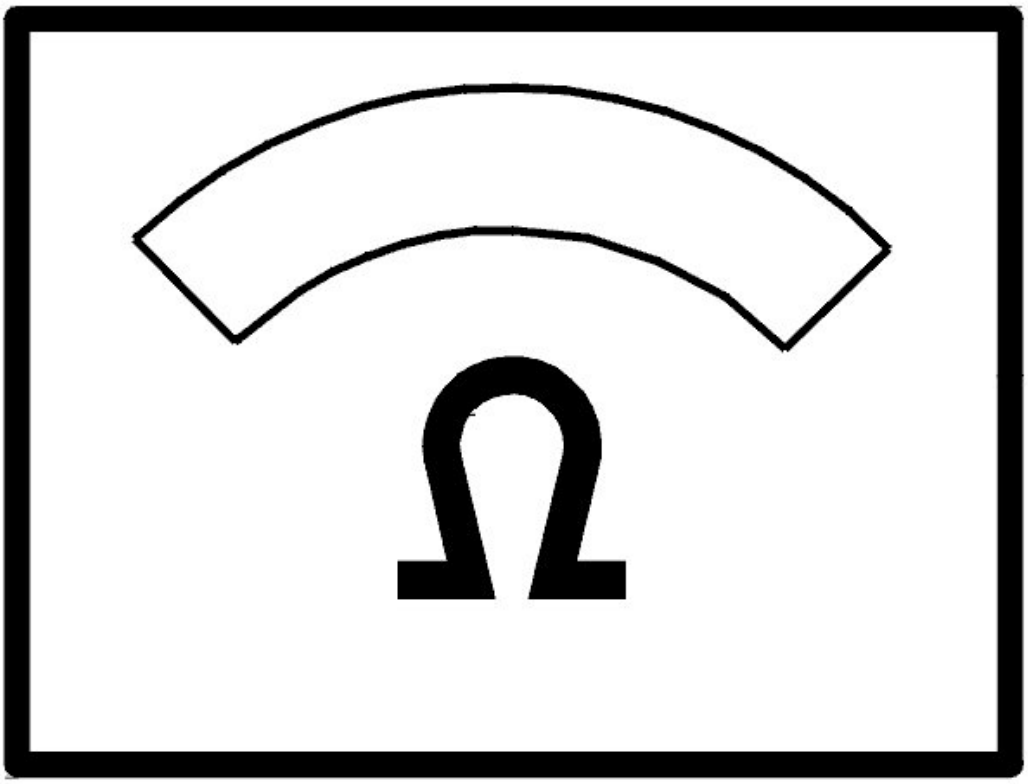
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- to connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and

Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

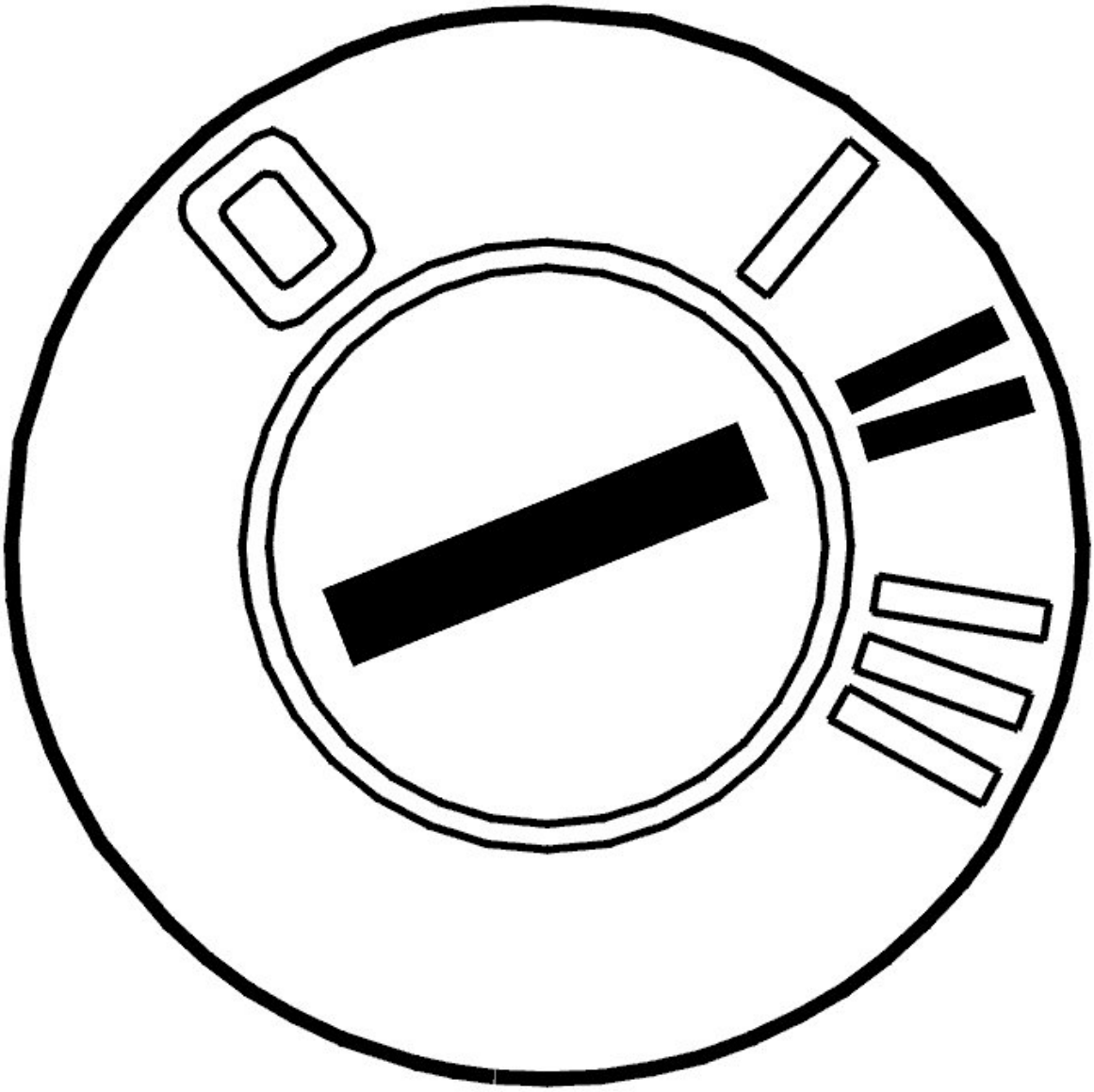
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F3

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F3 is stored if the control module registers that the voltage in the signal cable is too high for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F3 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

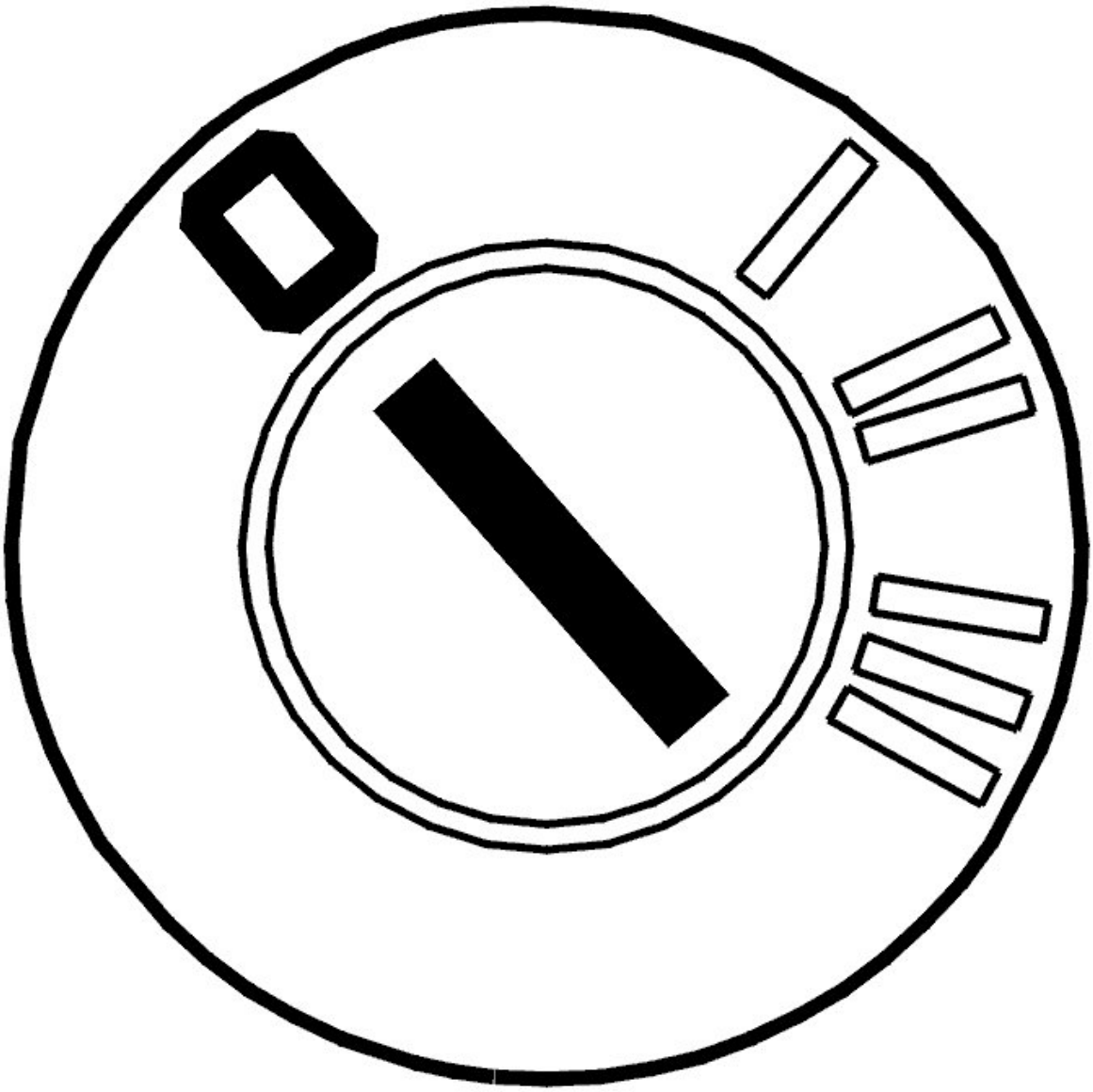
Possible source
- Short-circuit to supply voltage in the signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit in seat belt buckle
- Cross-connection of signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS).

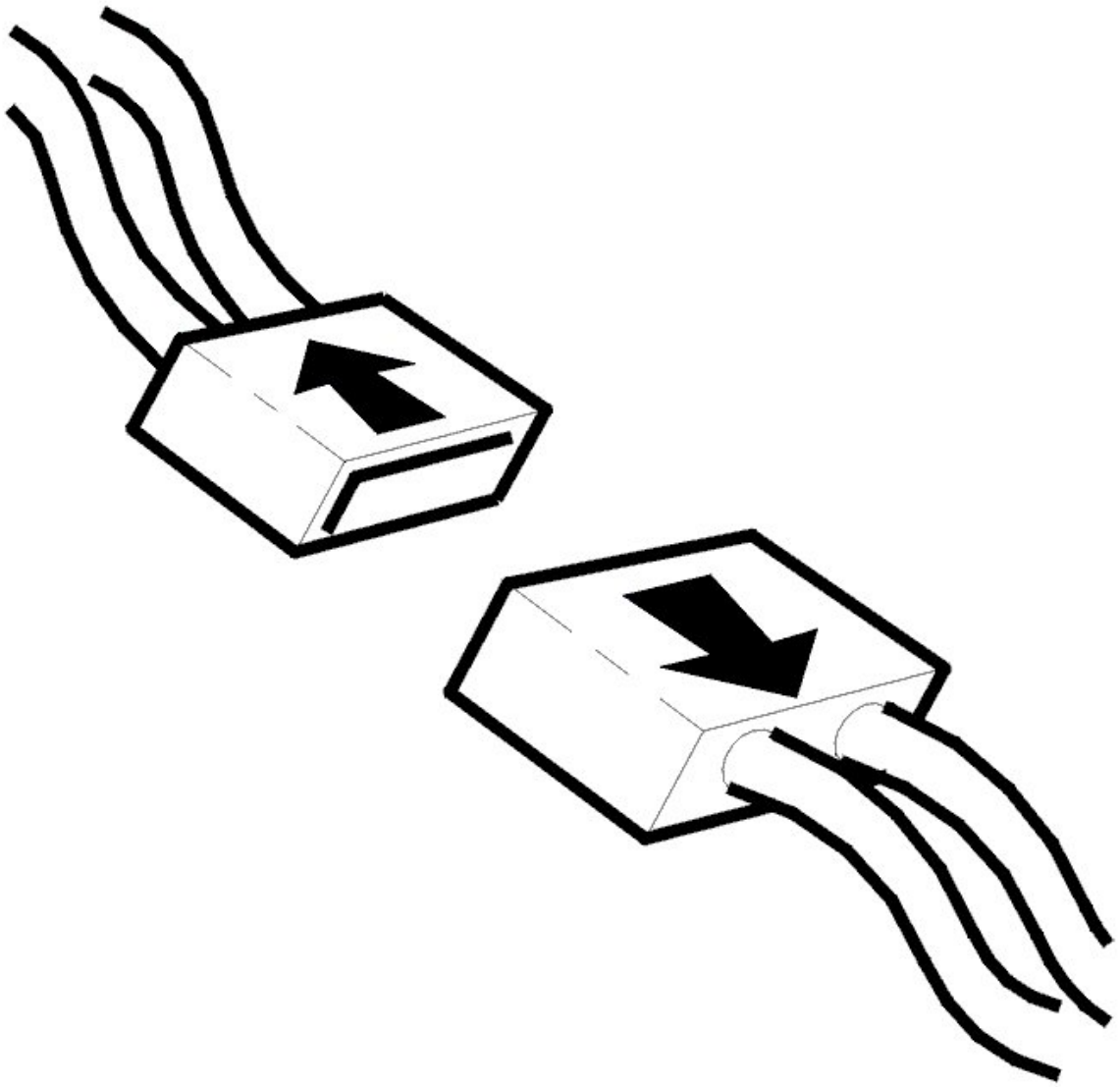
Fault symptom[s]
- General warning lamp lit.

Signal Too High

Signal too high

Checking the component





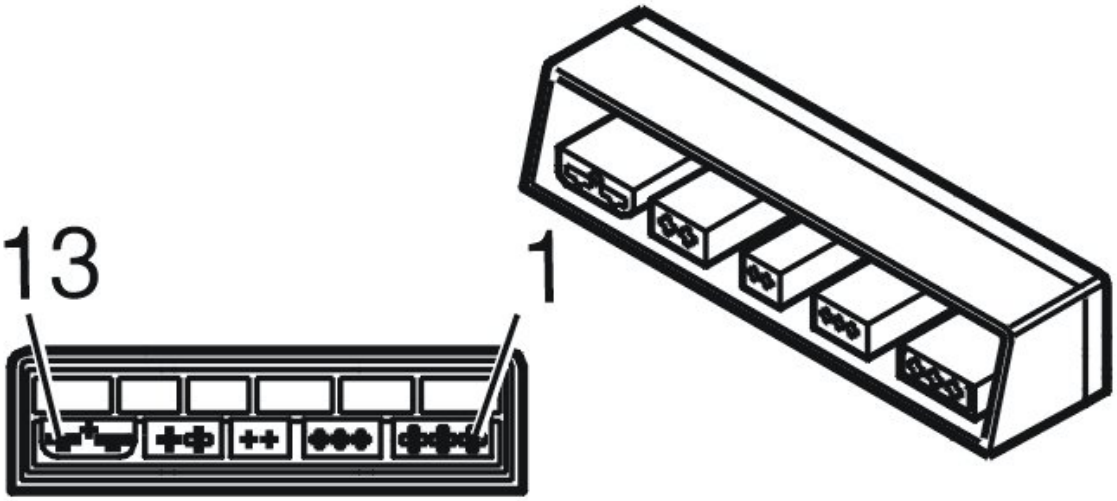
- Ignition off
- Disconnect the 3-pin connector from the right front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

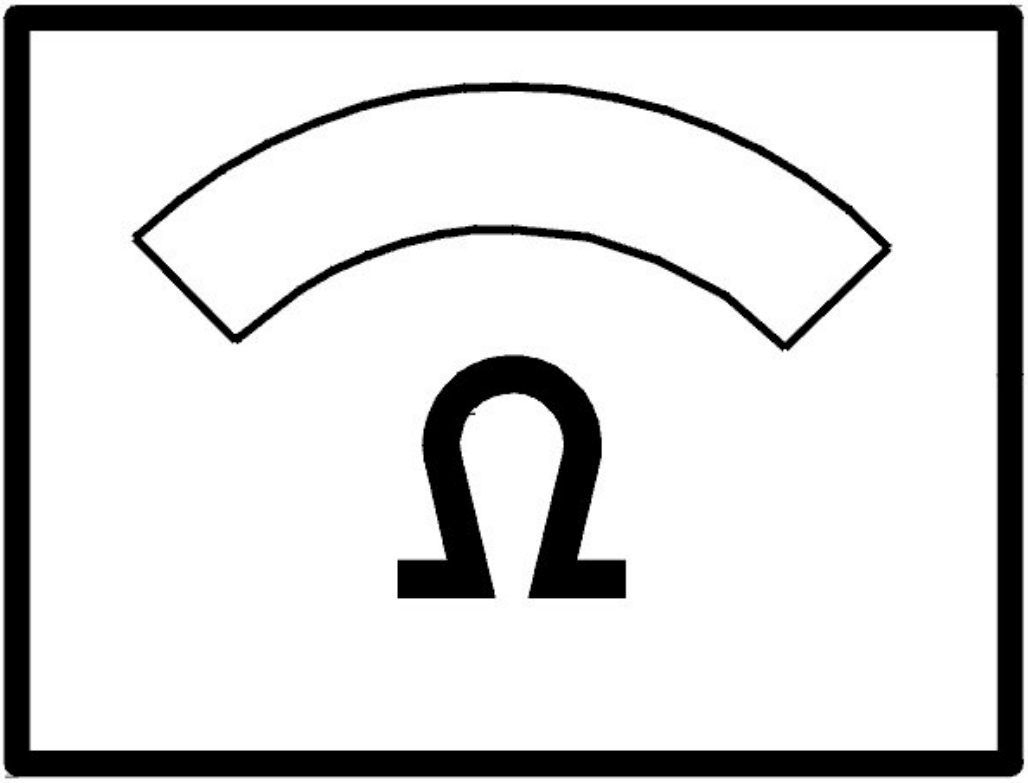
Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26C (22) and the seat belt buckle #54/25:5 right front. Check for a short-circuit to supply voltage.
Check the resistance in the signal cable between the Supplemental Restraint System Module (SRS) terminal #26C (22) and seat belt buckle #54/25:4 right front. The resistance must be infinite.
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

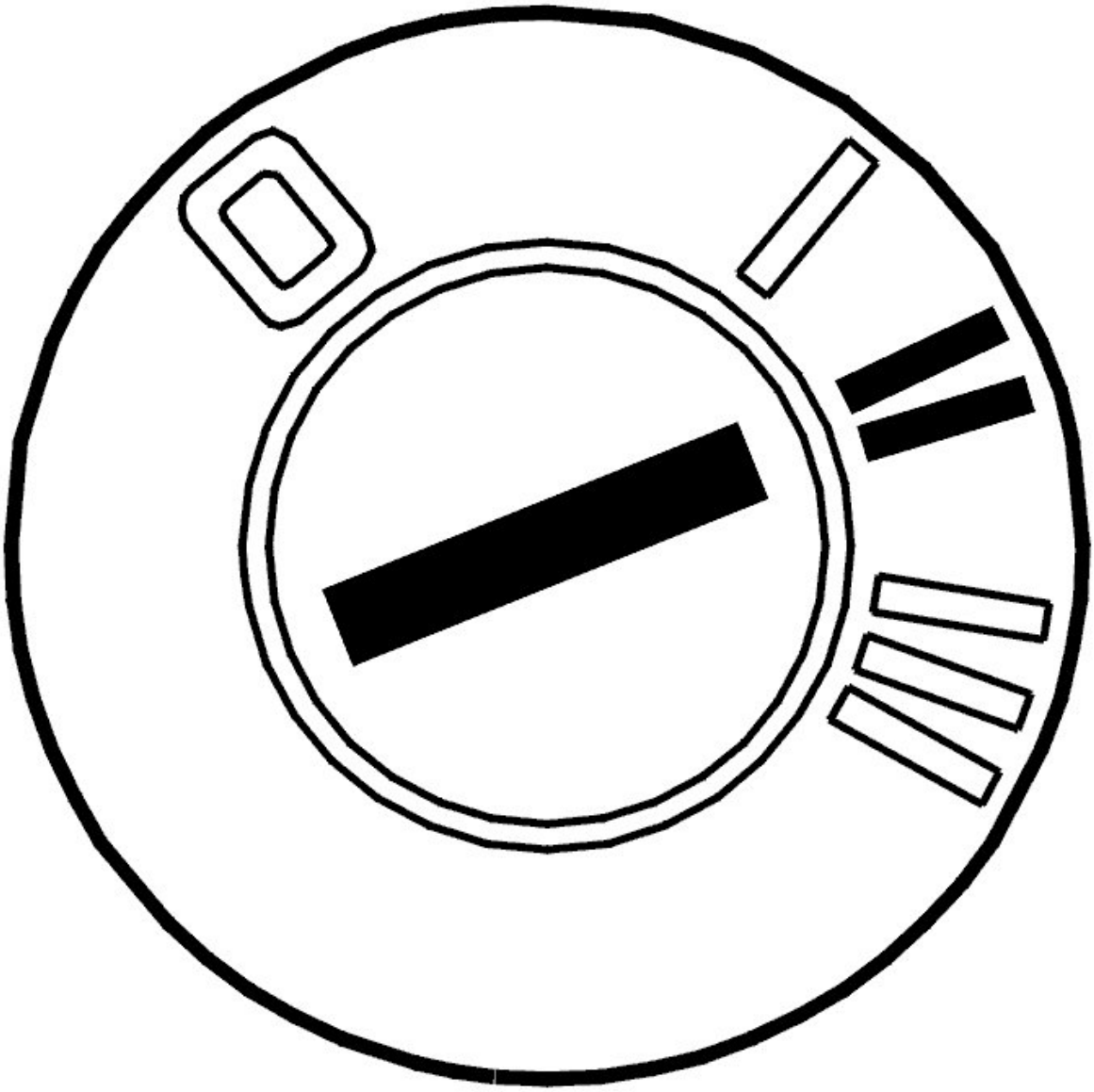
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F4

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F4 is stored if the control module registers that the voltage is too low or that there is an open-circuit in the signal cable for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F4 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

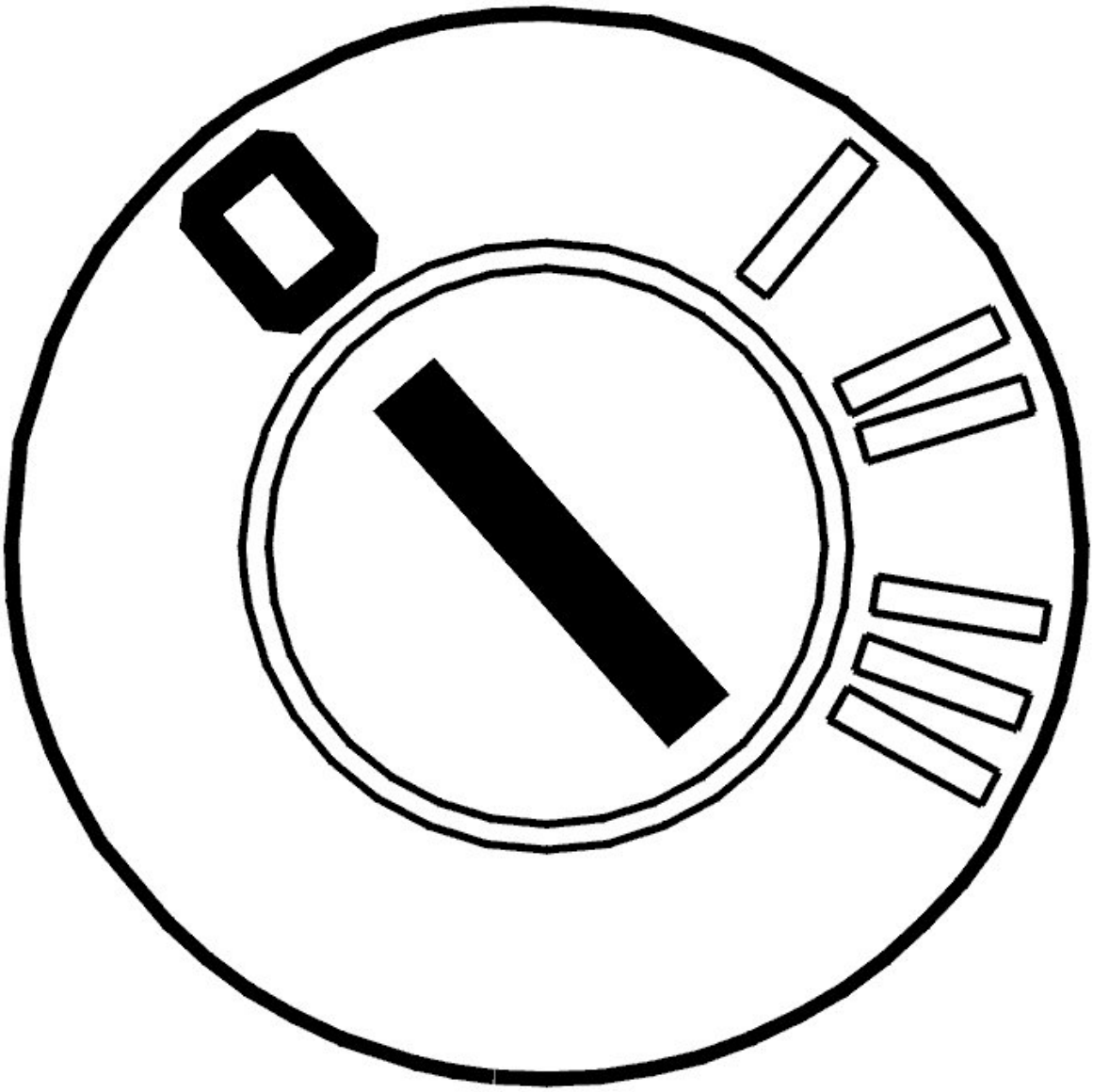
Possible source
- Short-circuit to ground in the signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the connector
- Open-circuit in the signal cable in the seat belt buckle
- Open-circuit in the signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS)
- Cross-connection of signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS).

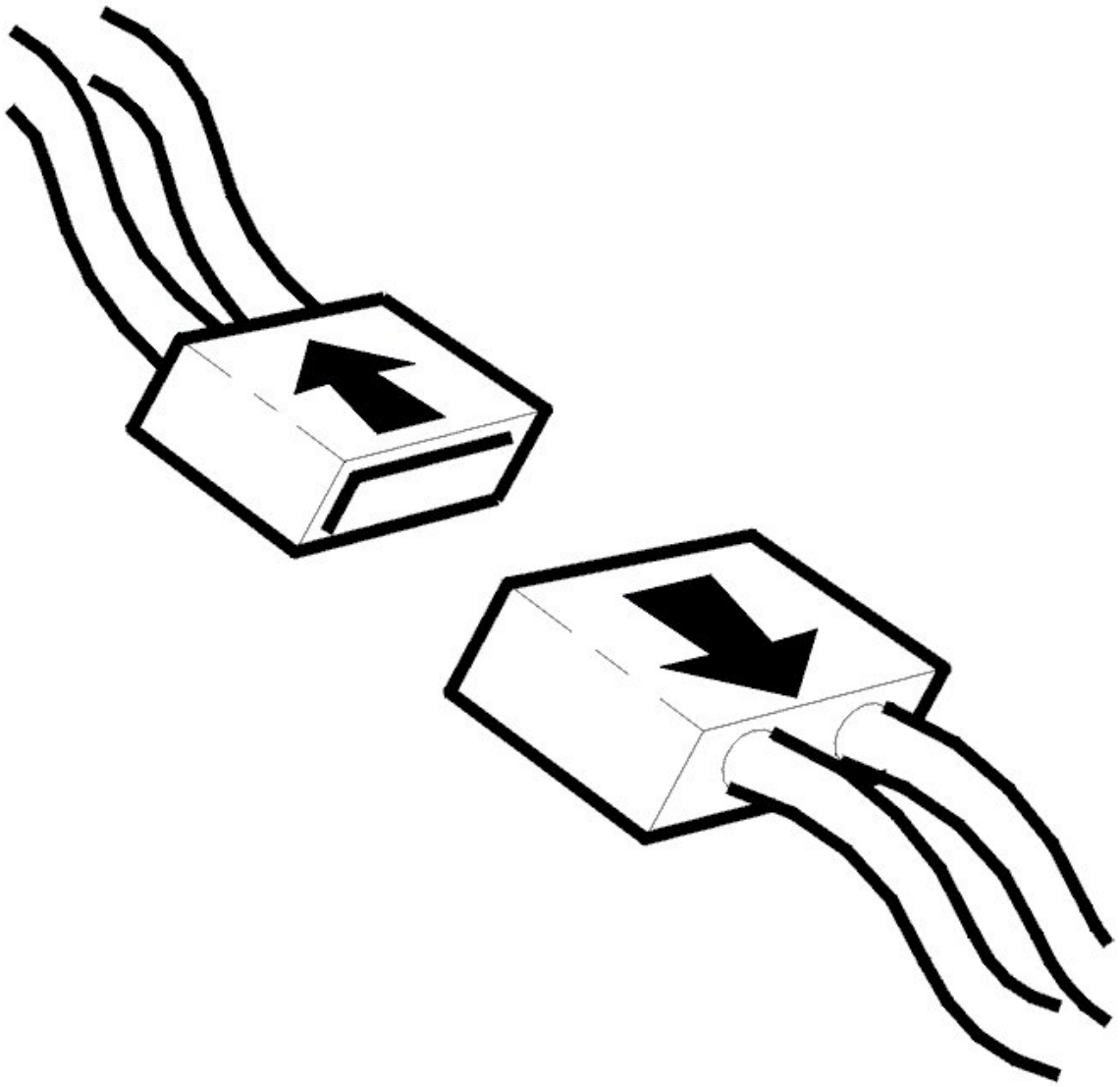
Fault symptom[s]
- General warning lamp lit.

Signal Too Low or Signal Missing

Signal too low or signal missing

Checking the component





- Ignition off
- Disconnect the 3-pin connector from the right front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26C (22) and the seat belt buckle #54/25:5 right front. Check for a short-circuit to ground. Check for an open-circuit.
Check the resistance in the signal cable between the Supplemental Restraint System Module (SRS) terminal #26C (22) and seat belt buckle #54/25:4 right front. The resistance must be infinite.

Hint: If the signal cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle connector is OK, the seat belt buckle may be damaged. Check the signal cable between the seat belt buckle connector and the seat belt buckle. The signal cable must not be damaged. Check that nothing has become jammed in the seat belt buckle.

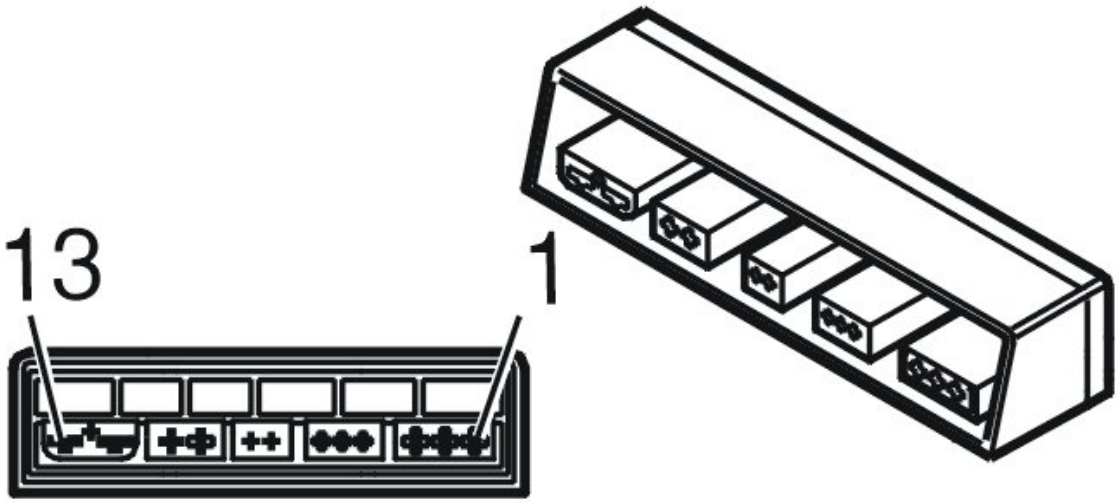
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

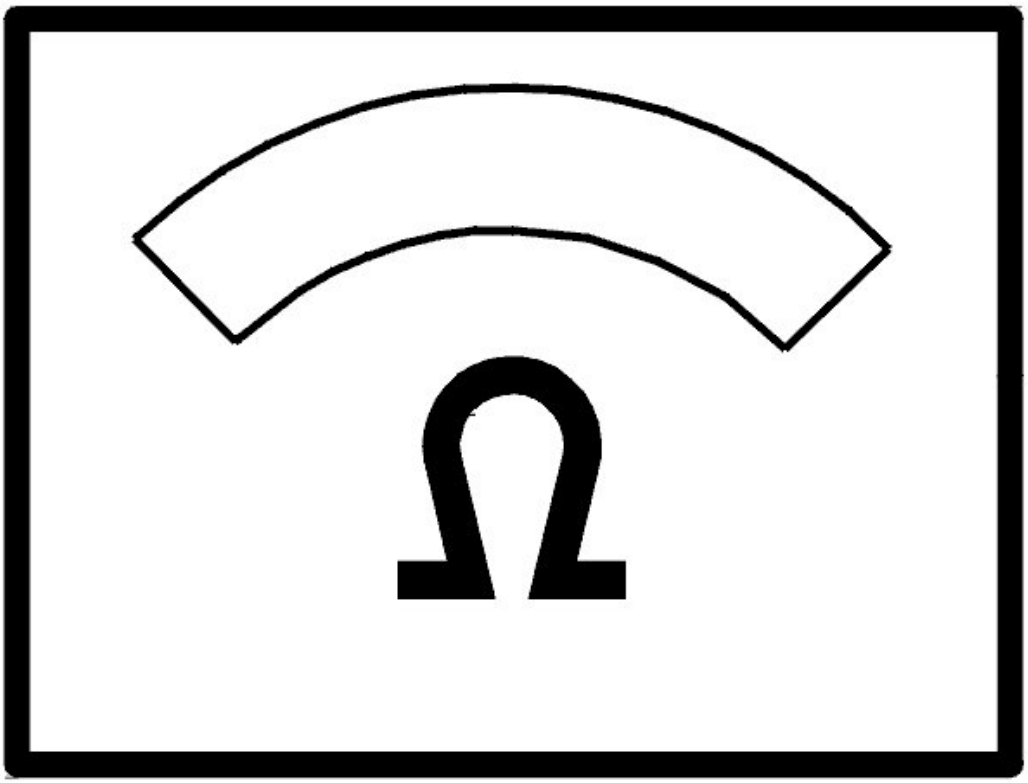
Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air

Bag Harness/Service and Repair/Procedures

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

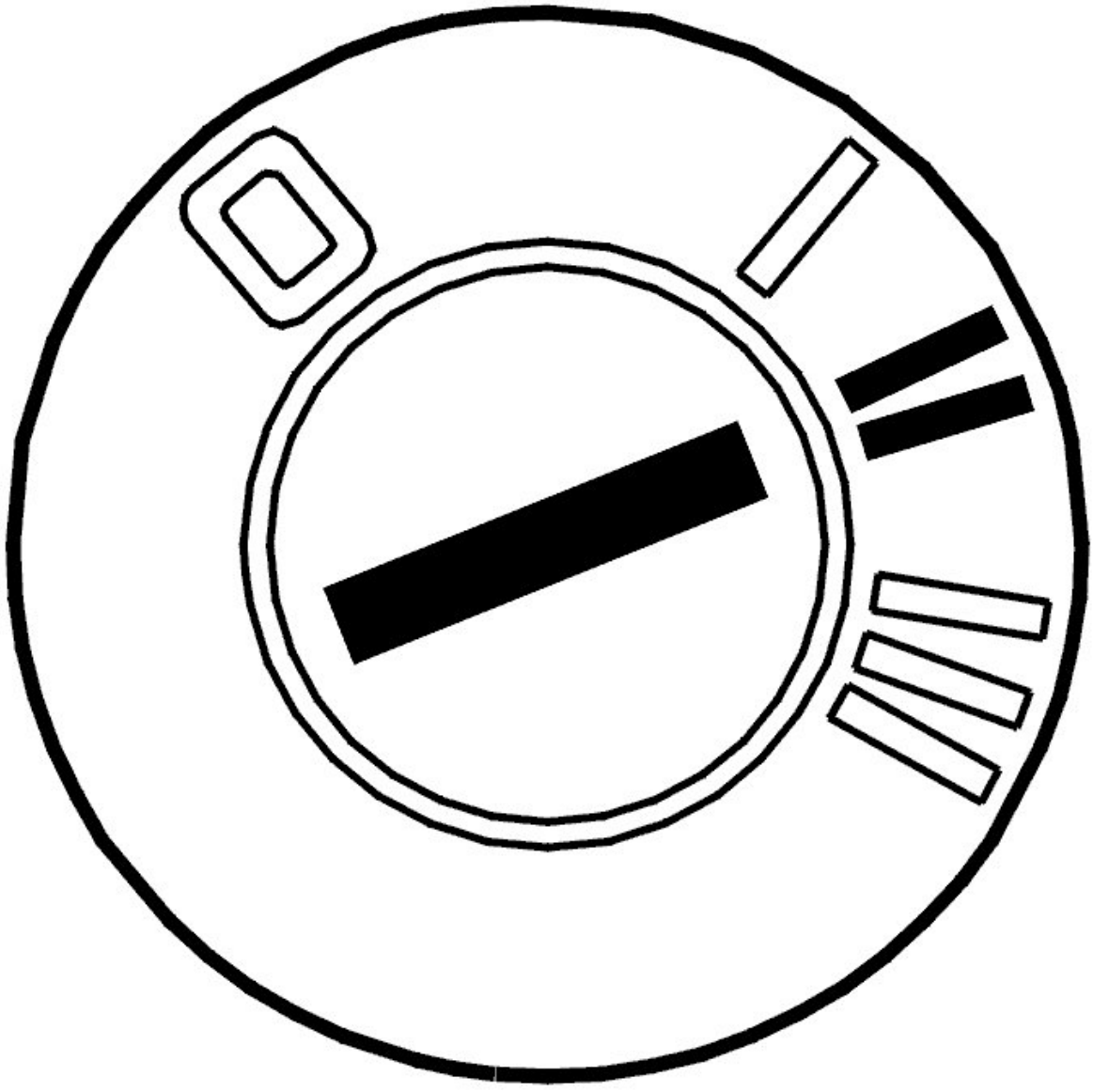
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead

- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F5

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F5 is stored if the control module registers an incorrect signal level in the signal cable for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F5 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

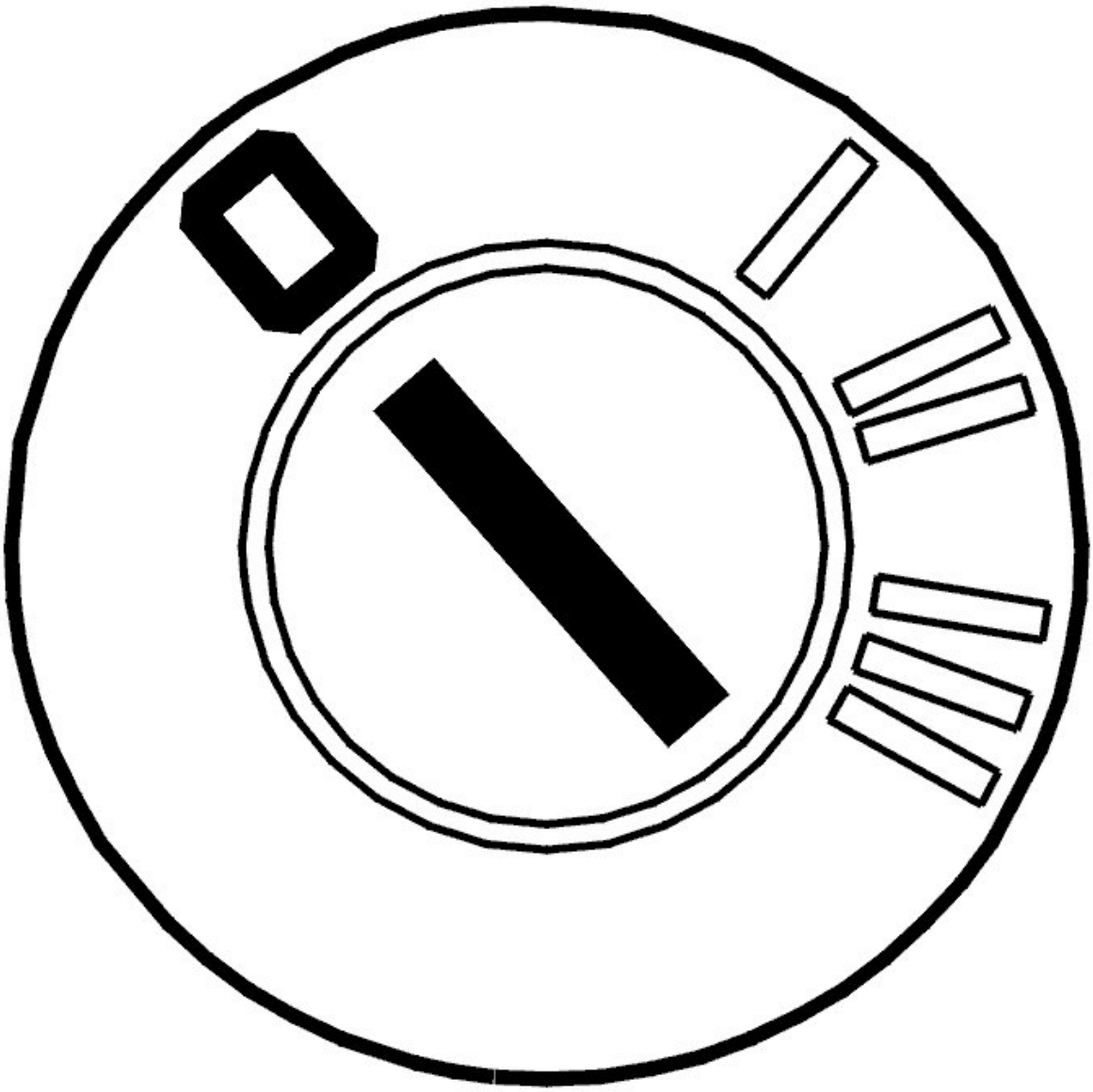
Possible source
- Damaged signal cable between seat belt buckle right front and Supplemental Restraint System Module (SRS)
- Defective seat belt buckle.

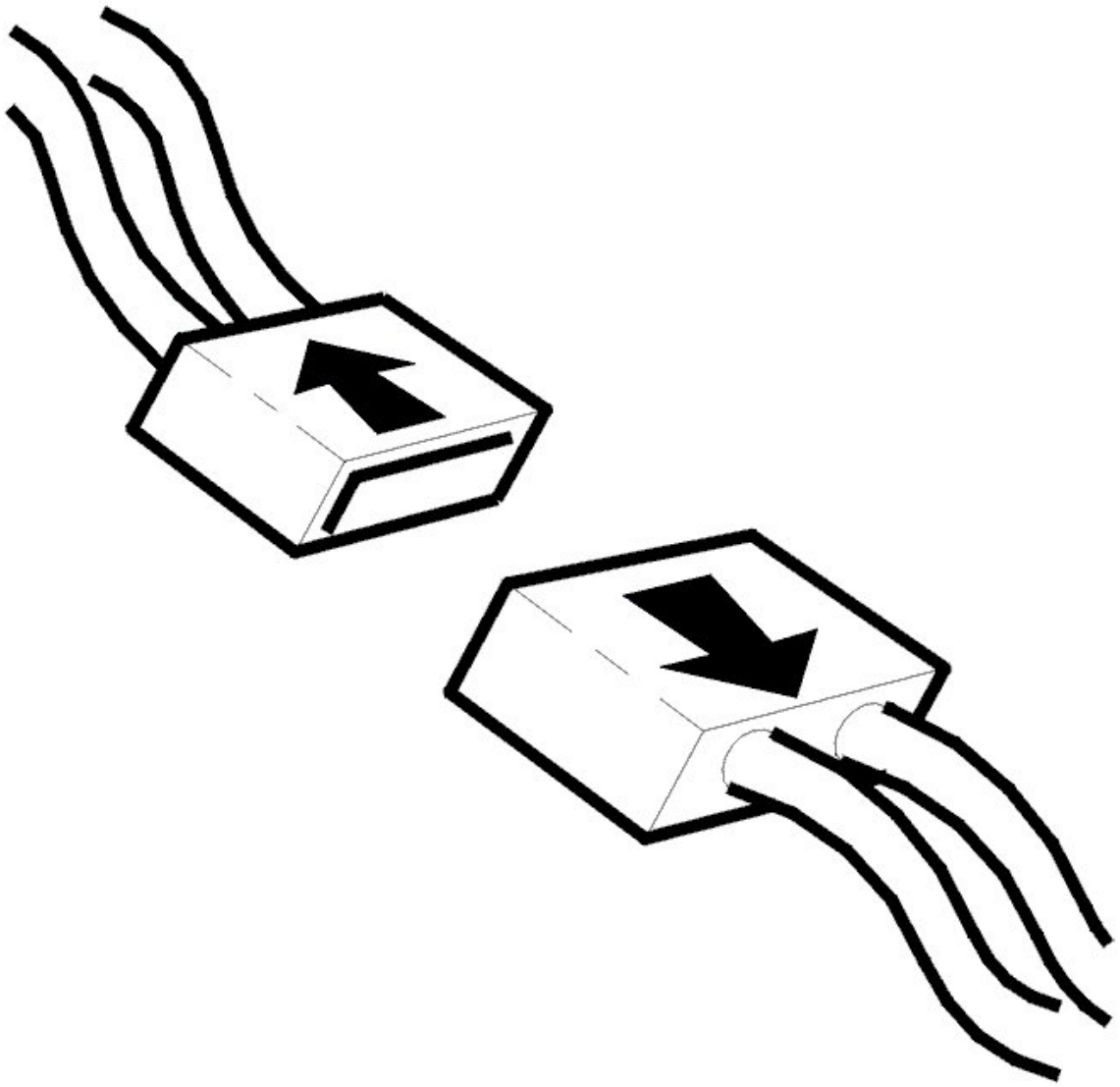
Fault symptom[s]
- General warning lamp lit.

Faulty Signal

Faulty signal

Checking the component





- Ignition off
- Disconnect the 3-pin connector from the right front seat belt buckle
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the right front seat belt buckle. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25C (21) and the seat belt buckle #54/25:4 right front. Check for an open-circuit. Try carefully bending the cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle while checking for an open-circuit to see if the resistance alters.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #26C (22) and the seat belt buckle #54/25:5 right front. Check for an open-circuit. Try carefully bending the cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle while checking for an open-circuit to see if the resistance alters.

Hint: Objects that have become jammed in the seat belt buckle and damaged the signal cable between the Supplemental Restraint System Module (SRS) and the seat belt buckle can cause this fault. When the belt is pressed down into the seat belt buckle, check that it locks properly and that a click is heard.

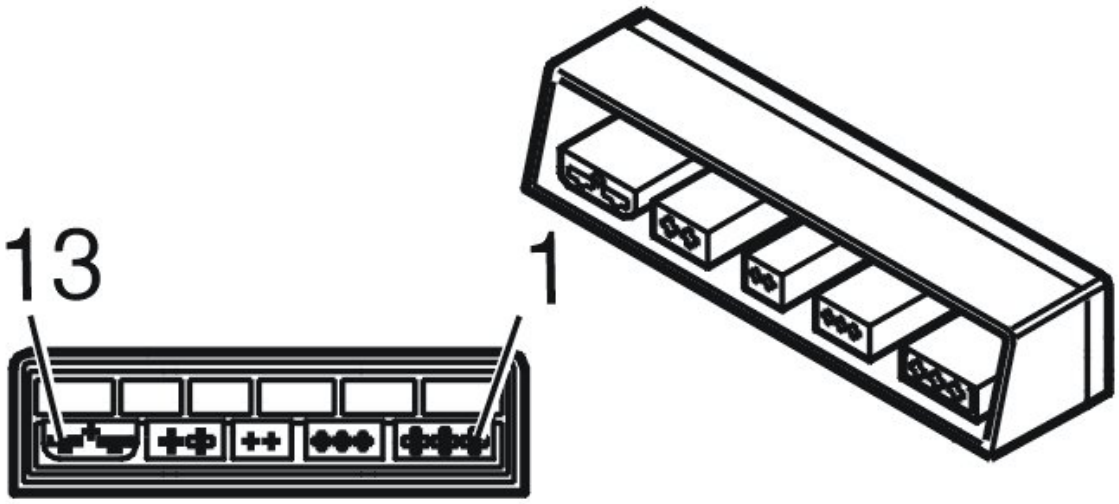
If the fault is permanent and no fault is found, replace the seat belt buckle.
Remedy as necessary.

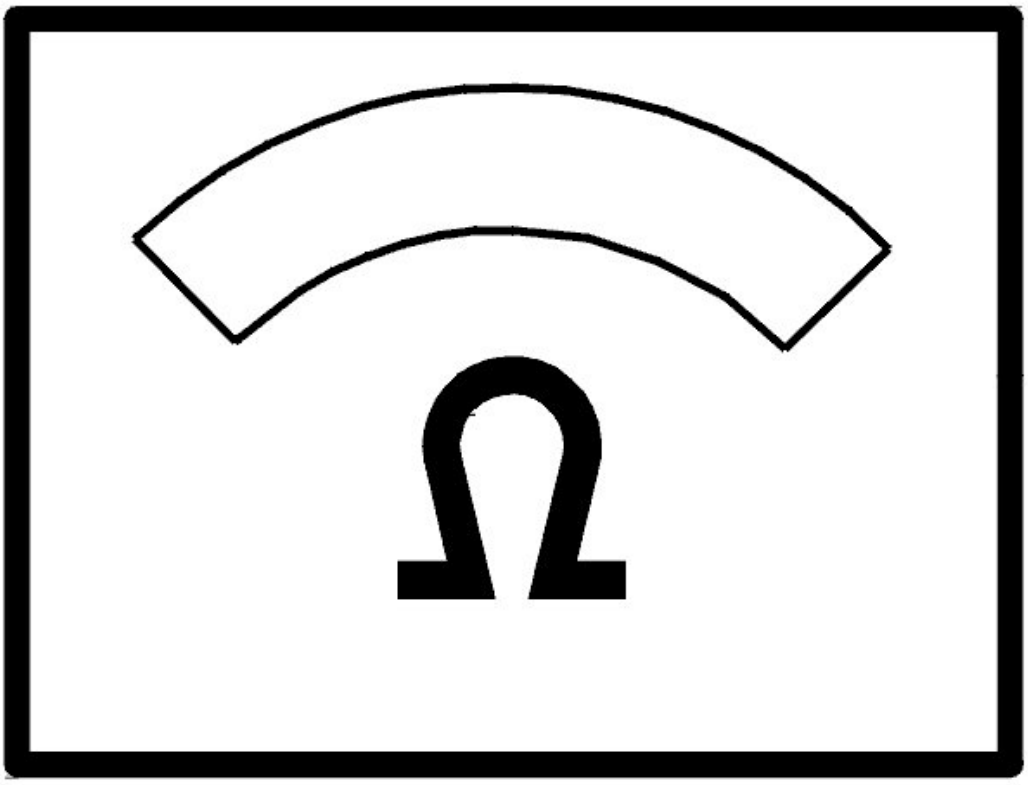
Other information:

- To access and replace the Supplemental Restraint System Module (SRS) and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- to connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and

Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

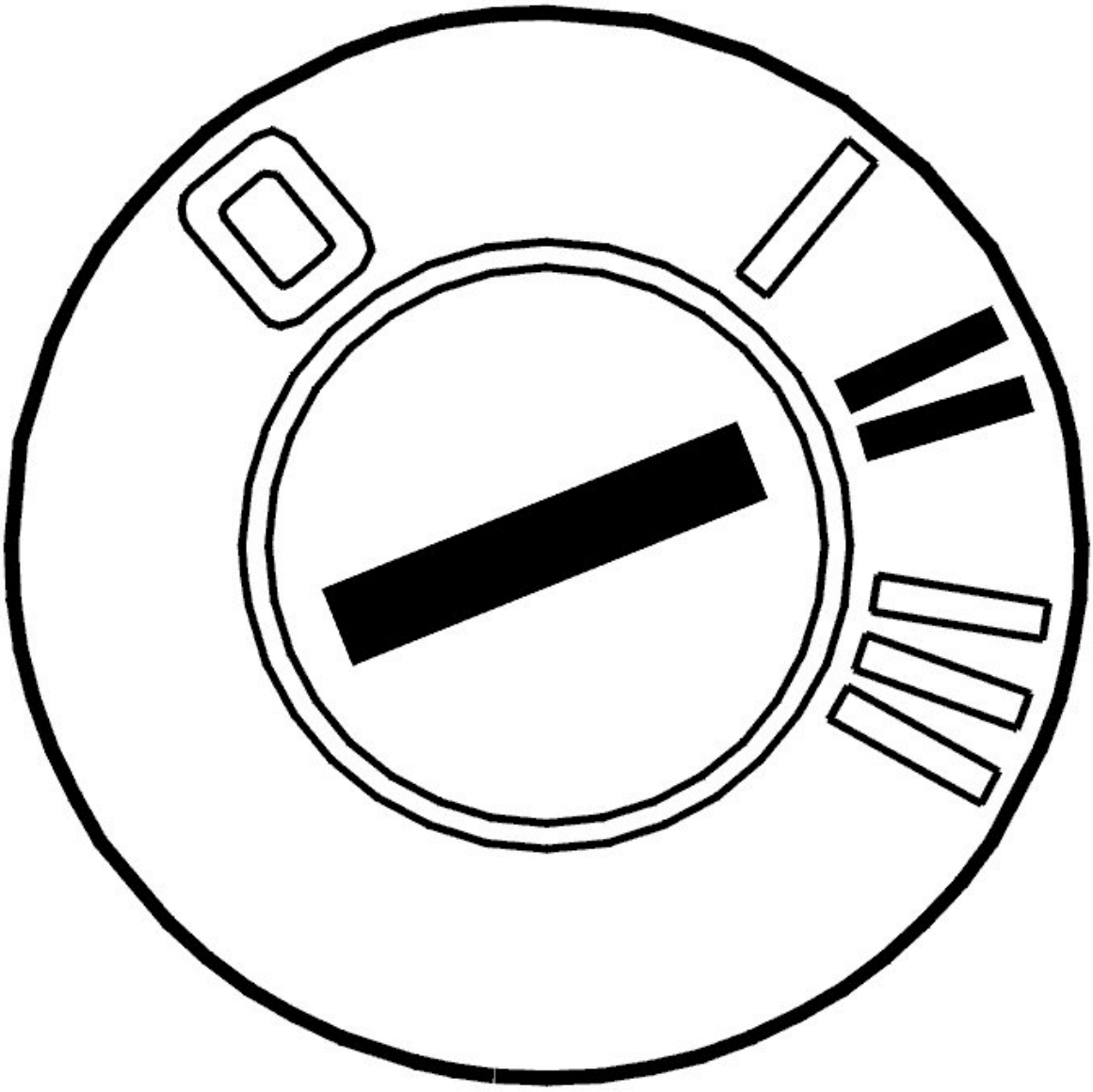
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F6

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F6 is stored if the control module registers that the voltage in the signal cable is too high for longer than 3 minutes
Diagnostic trouble code (DTC) SRS-00F6 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

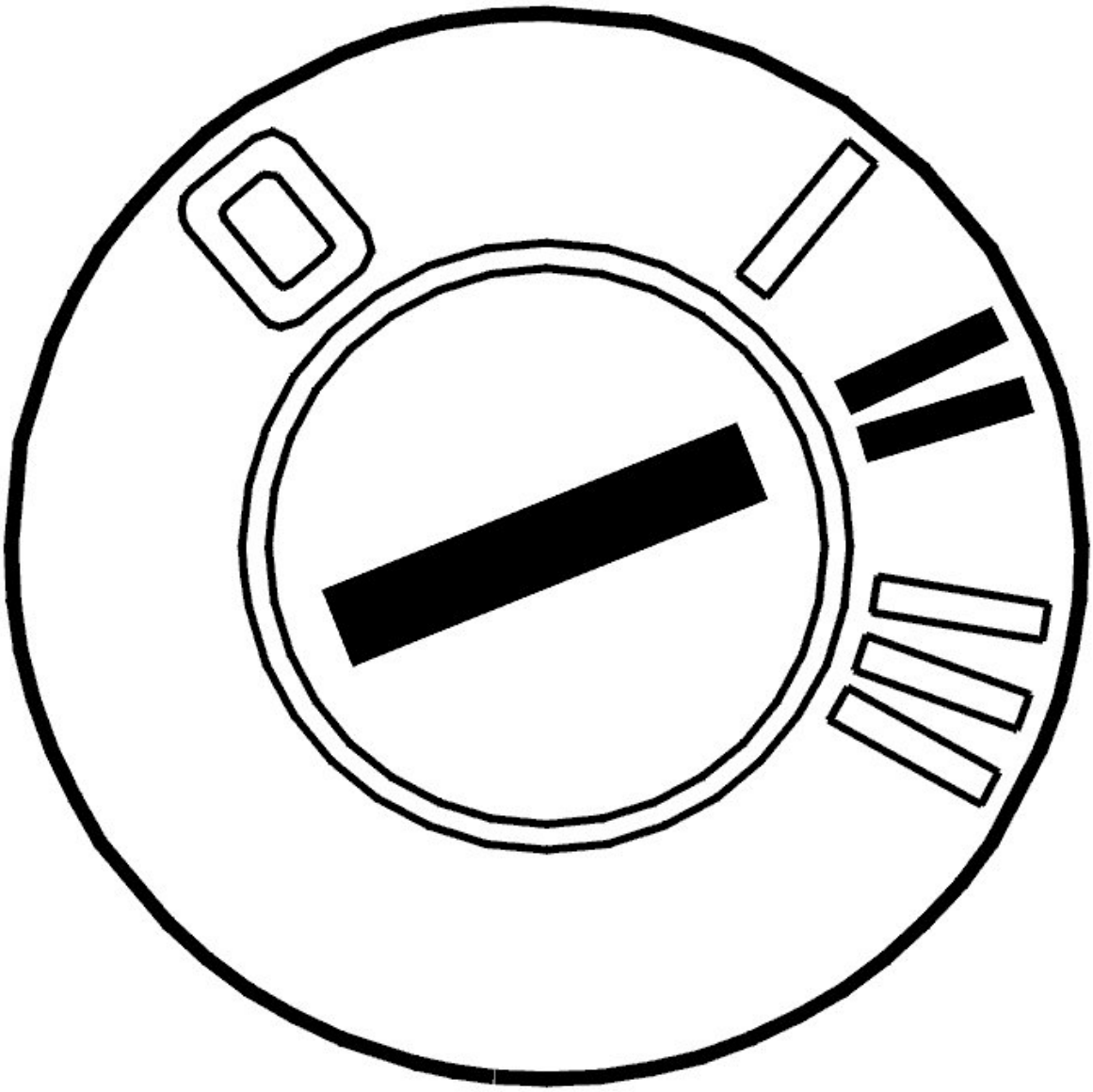
Possible source
- Short-circuit to supply voltage in the signal cable between the right front seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the signal cable between the left front seat belt buckle and the Supplemental Restraint System Module (SRS).

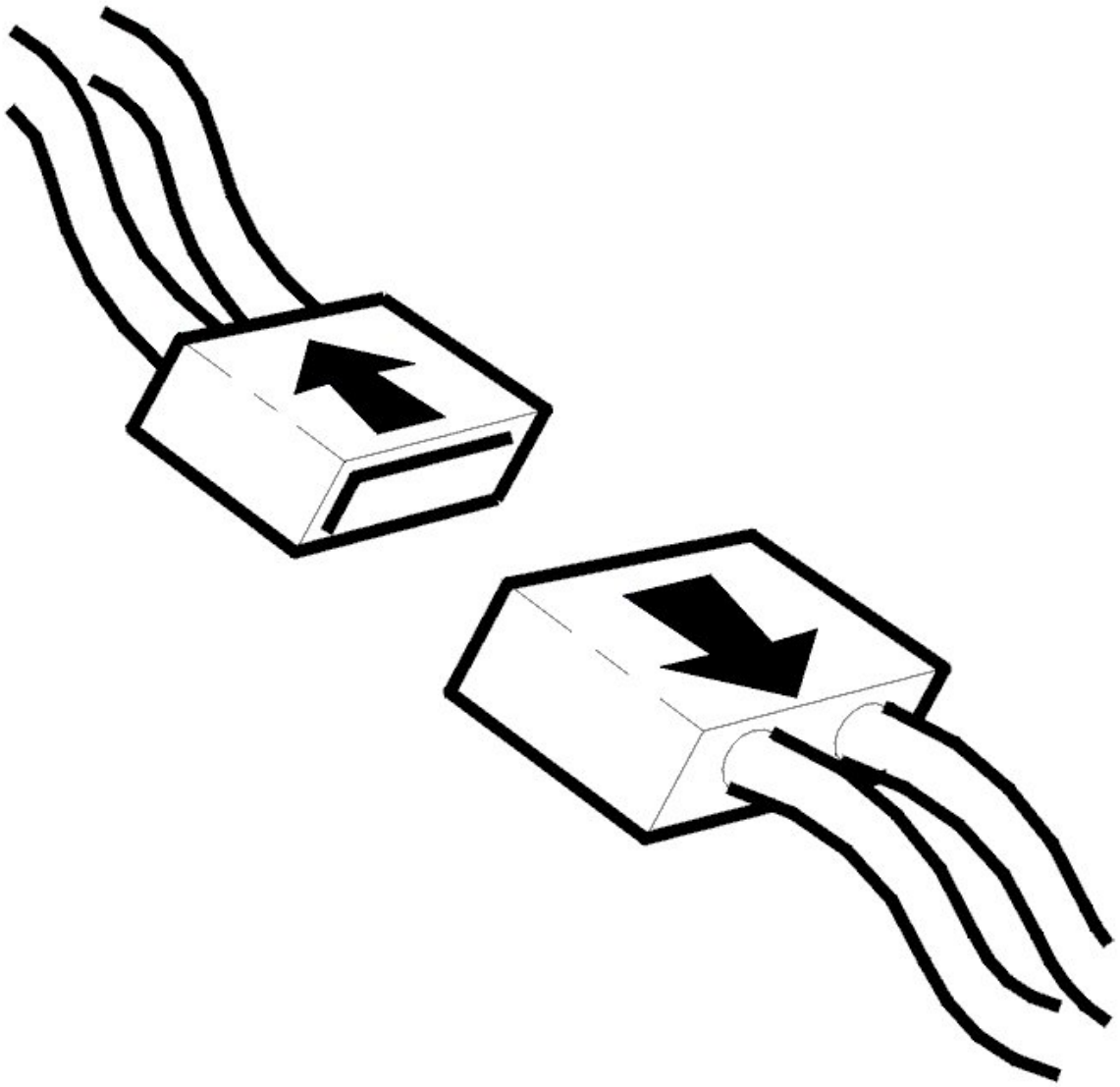
Fault symptom[s]
- General warning lamp lit.

Signal Too High

Signal too high

Checking the component





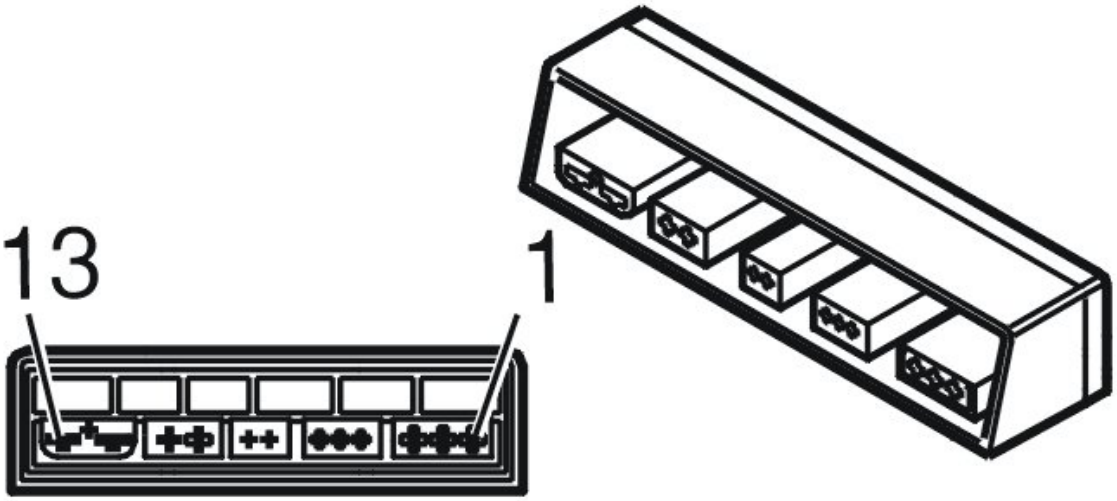
- Ignition off
- Disconnect the 3-pin connector from the right front seat belt buckle
- Disconnect the 3-pin connector from the left front seat belt buckle.
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

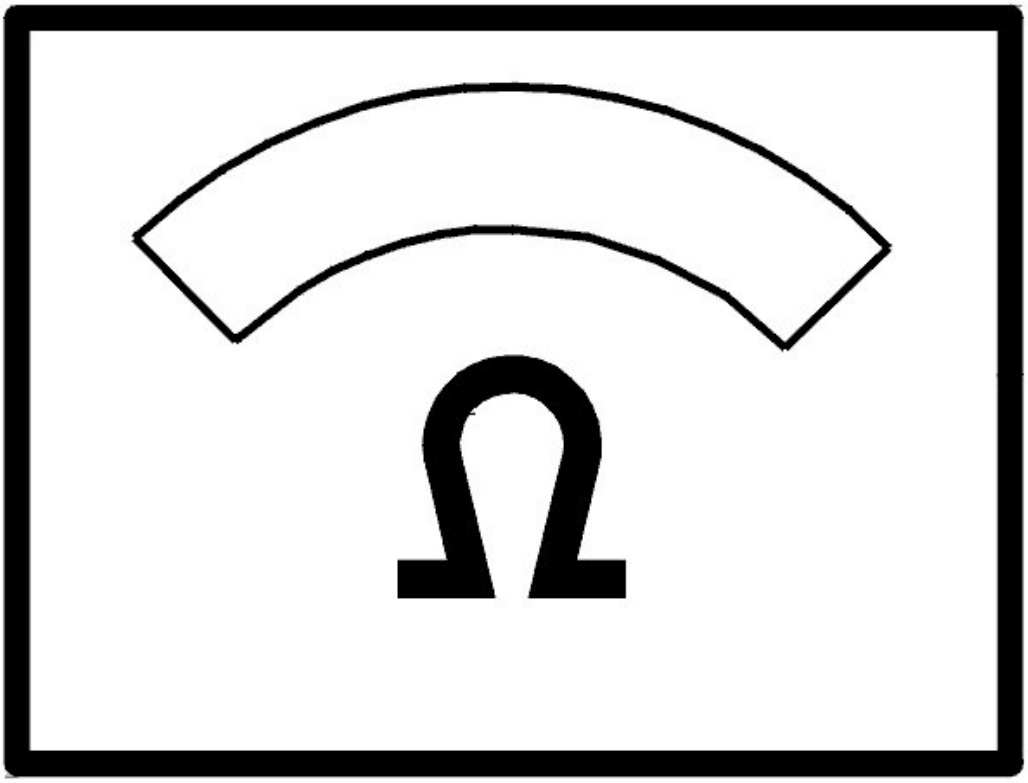
Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25C (21) and the seat belt buckle #54/25:4 right front. Check for a short-circuit to supply voltage.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25A (25) and the seat belt buckle #54/24:4 left front. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

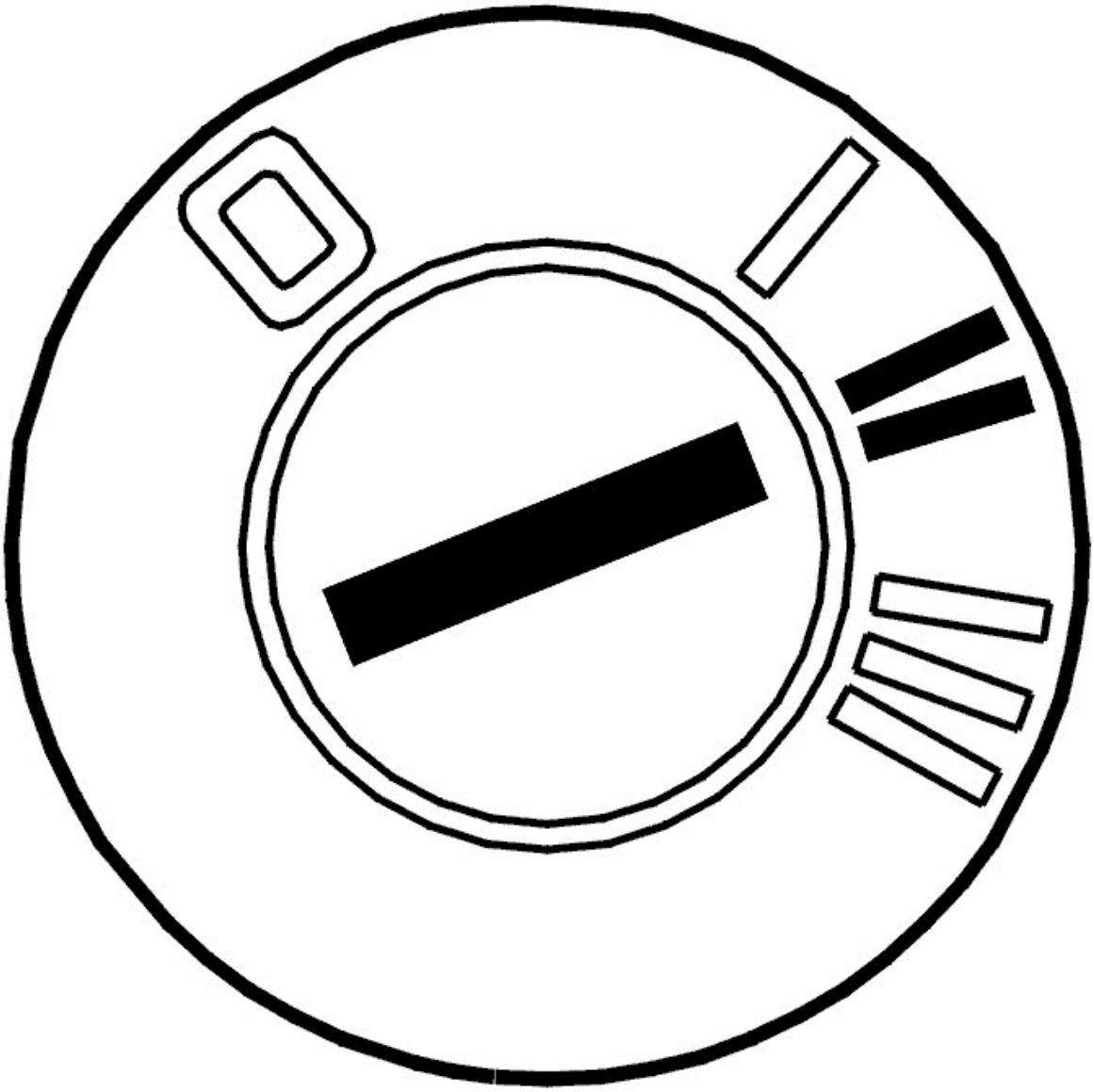
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-00F7

Condition

The Supplemental Restraint System Module (SRS) checks the signal from the seat belt buckle.
Diagnostic trouble code (DTC) SRS-00F7 is stored if the control module registers that the voltage in the signal cable is low for longer than 3 minutes.
Diagnostic trouble code (DTC) SRS-00F7 can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

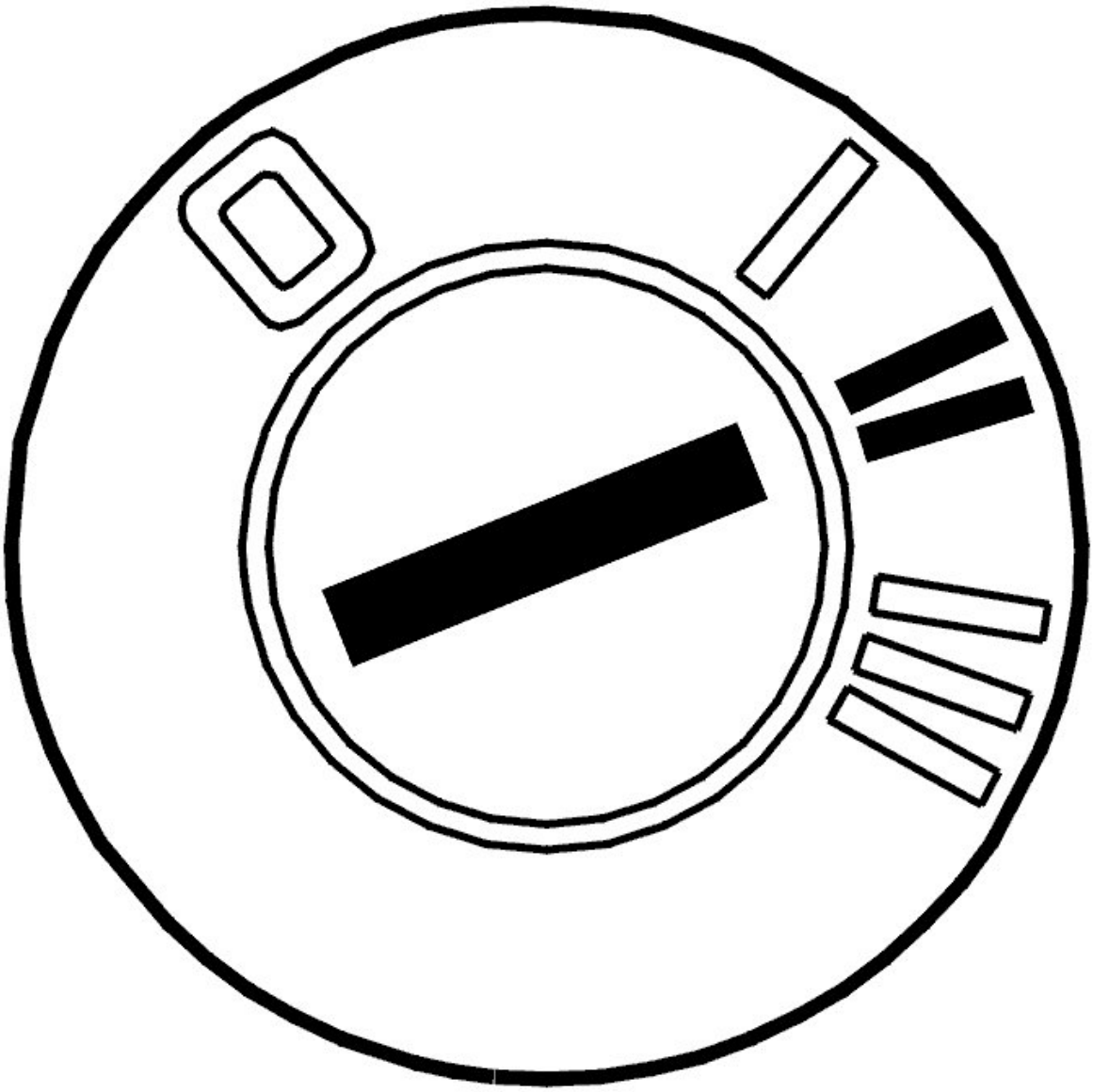
Possible source
- Short-circuit to ground in the signal cable between the seat belt buckle and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the connector.

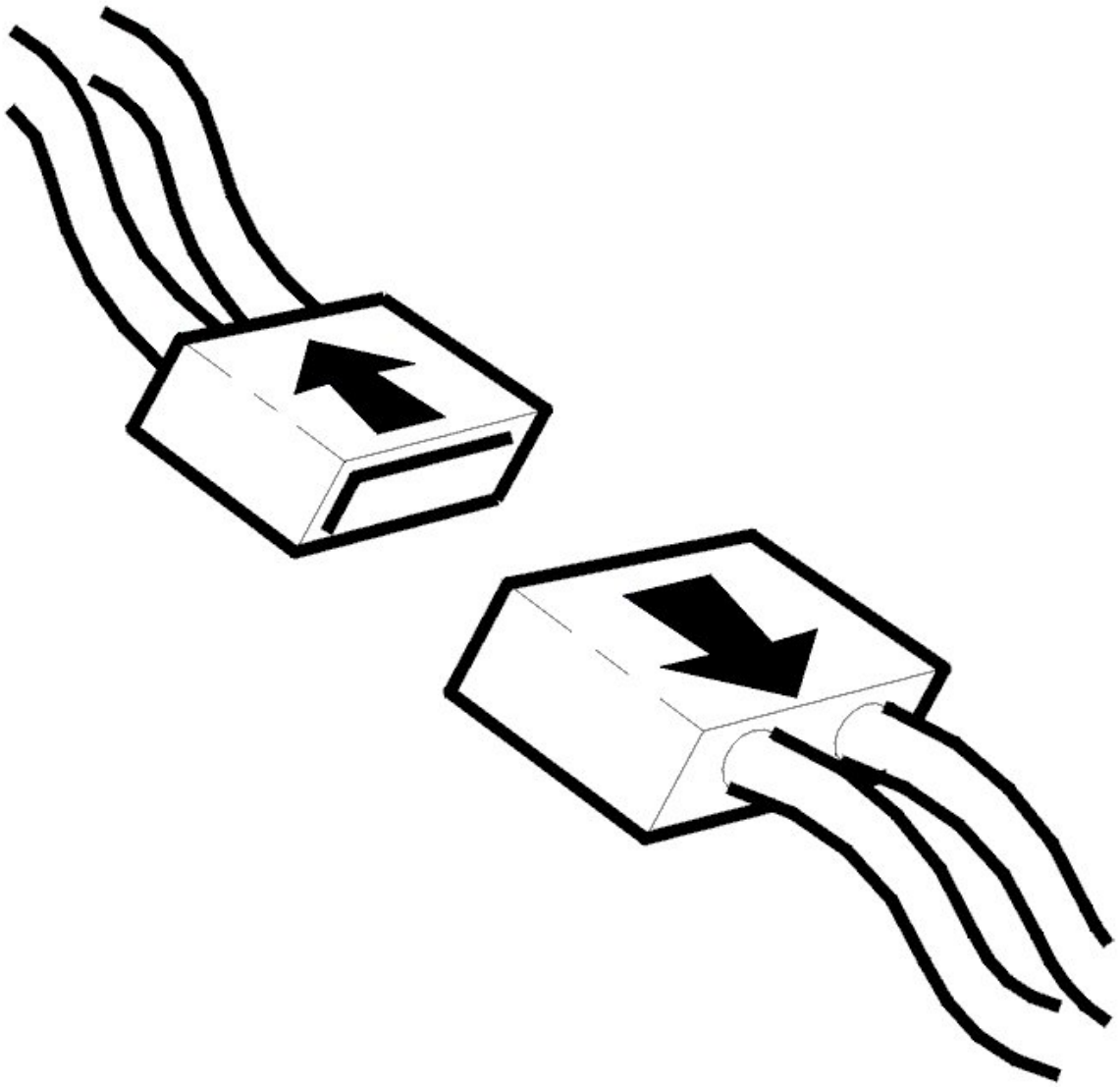
Fault symptom[s]
- General warning lamp lit.

Signal Too Low

Signal too low

Checking the component





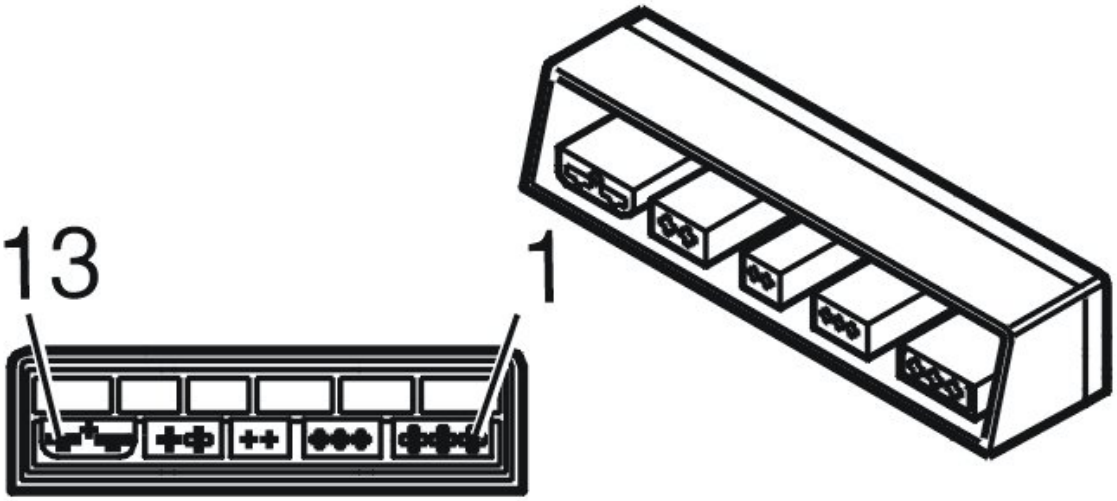
- Ignition off
- Disconnect the 3-pin connector from the right front seat belt buckle
- Disconnect the 3-pin connector from the left front seat belt buckle.
- Disconnect the connector from the Supplemental Restraint System Module (SRS).

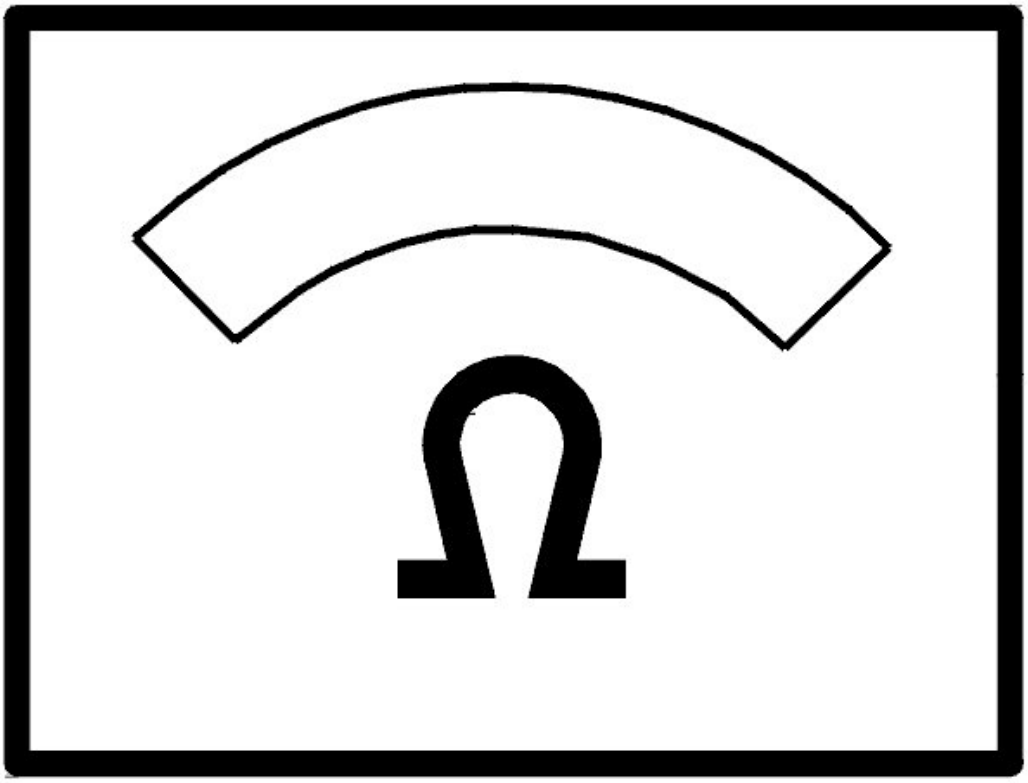
Hint: The diagnostic trouble code (DTC) is not stored until the fault has been present continuously for at least 3 minutes.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the seat belt buckle. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25C (22) and the seat belt buckle #54/25:4 right front. Check for a short-circuit to ground.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #25A (25) and the seat belt buckle #54/24:4 left front. Check for a short-circuit to ground.
Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access and replace the seat belt buckle, see Buckle seat belt front, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Buckle/Service and Repair/Front Seat
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- For information about signals, see Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

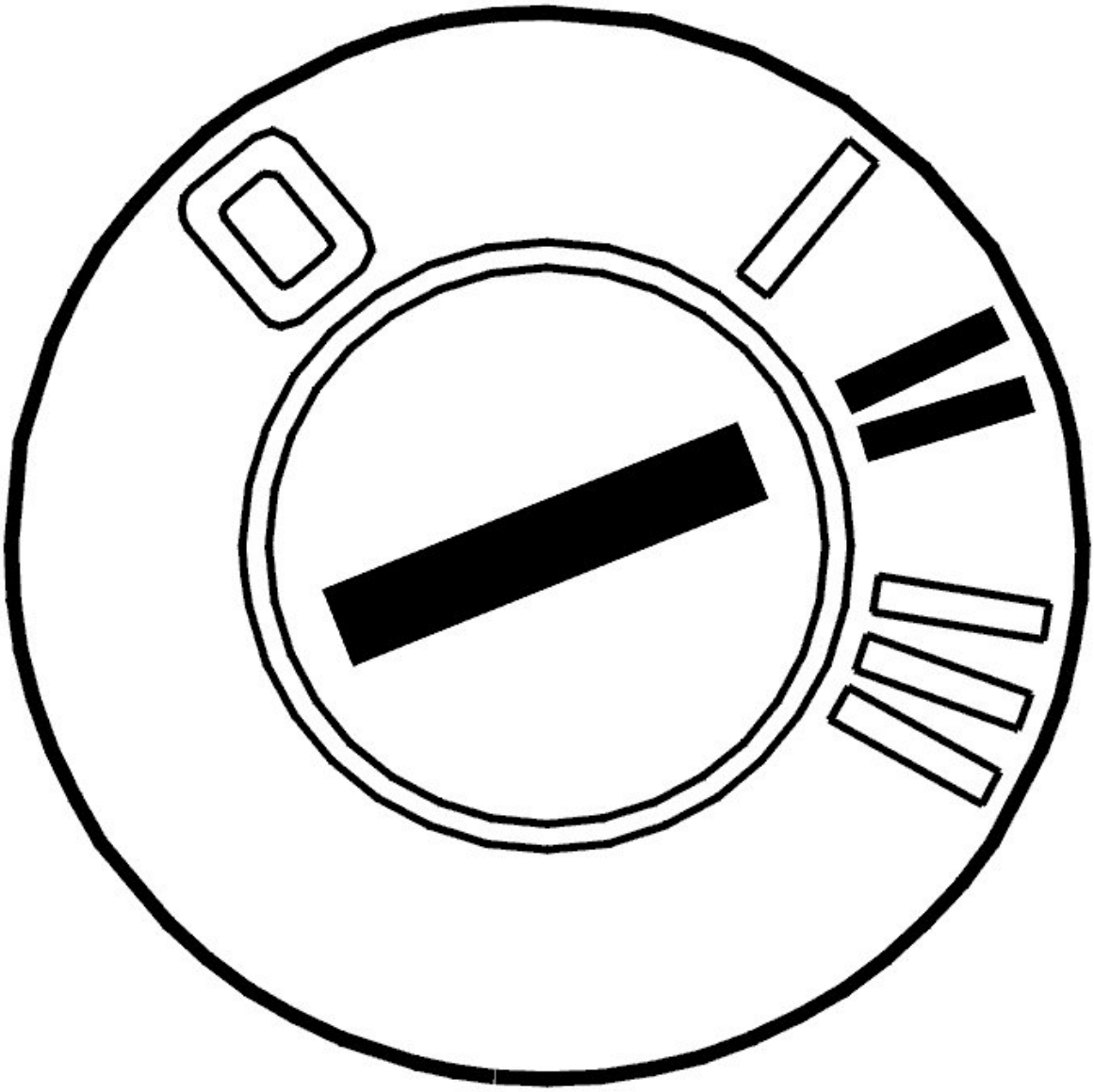
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0101

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

The Supplemental restraint system module (SRS) checks the circuit for the driver's airbag, stage 1.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Substitute value
- None.

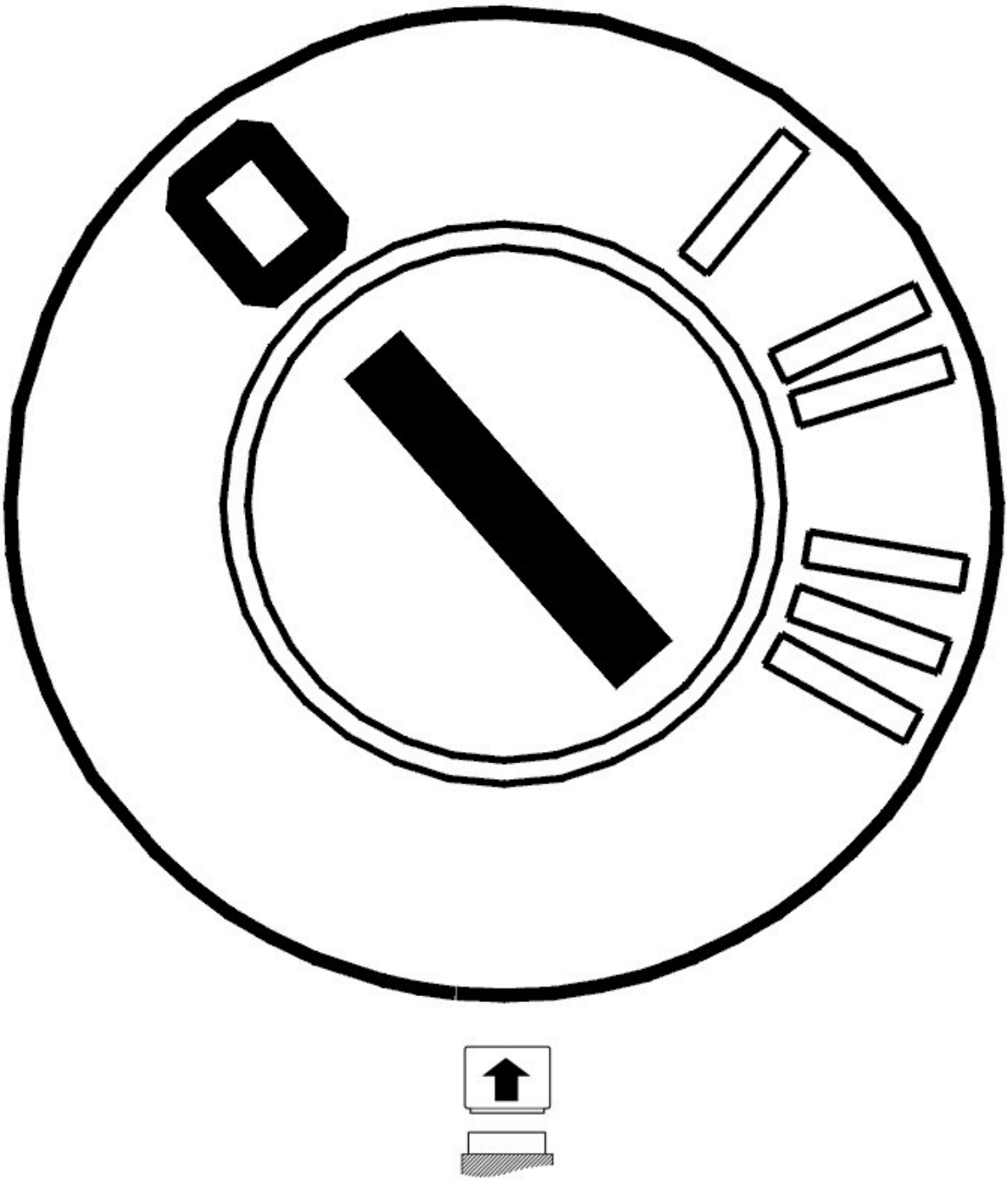
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector for the contact reel.
- Disconnect the green connector from airbag driver stage 1.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Supplemental restraint system module (SRS) #8B/36(36) and connector for contact reel #1.
- Supplemental restraint system module (SRS) #7B/35(35) and connector for contact reel #2.

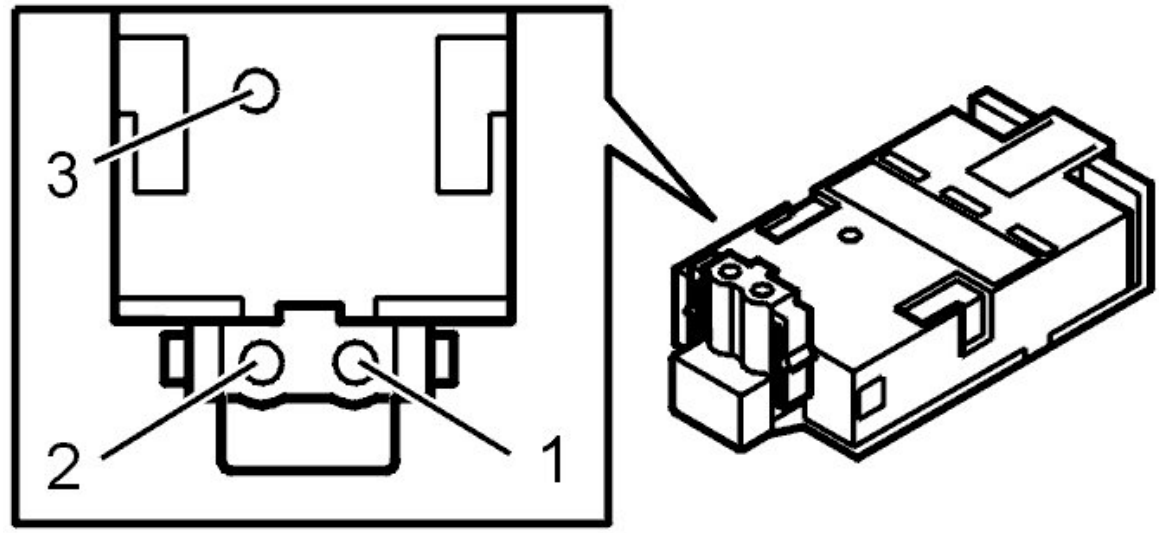
Connect the connector for the contact reel.
Take readings between:

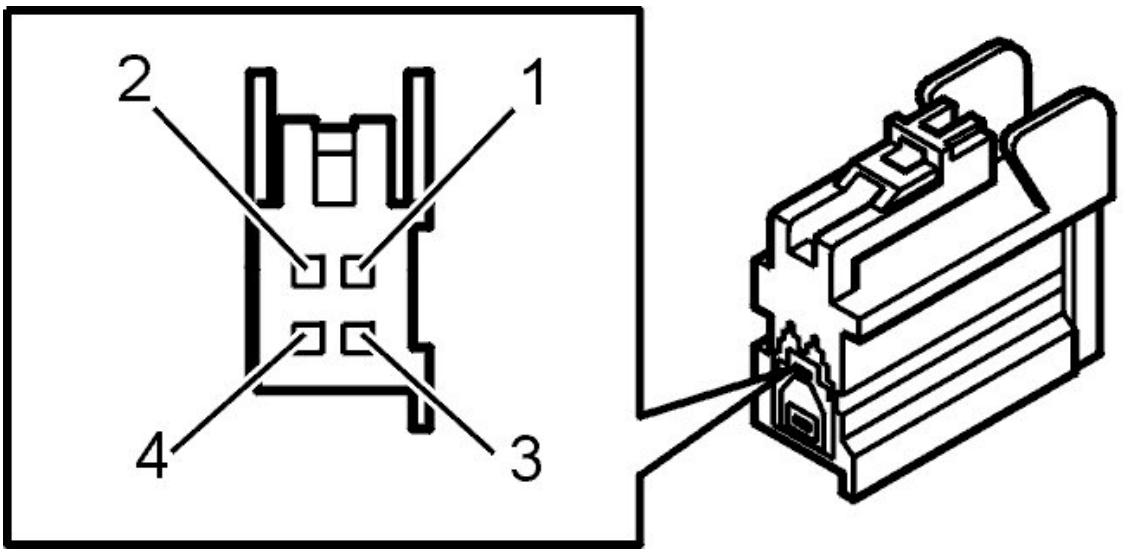
- Supplemental restraint system module (SRS) #8B/36(36) and connector for airbag driver stage 1 #1.
- Supplemental restraint system module (SRS) #7B/35(35)and connector for airbag driver stage 1 #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures





Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

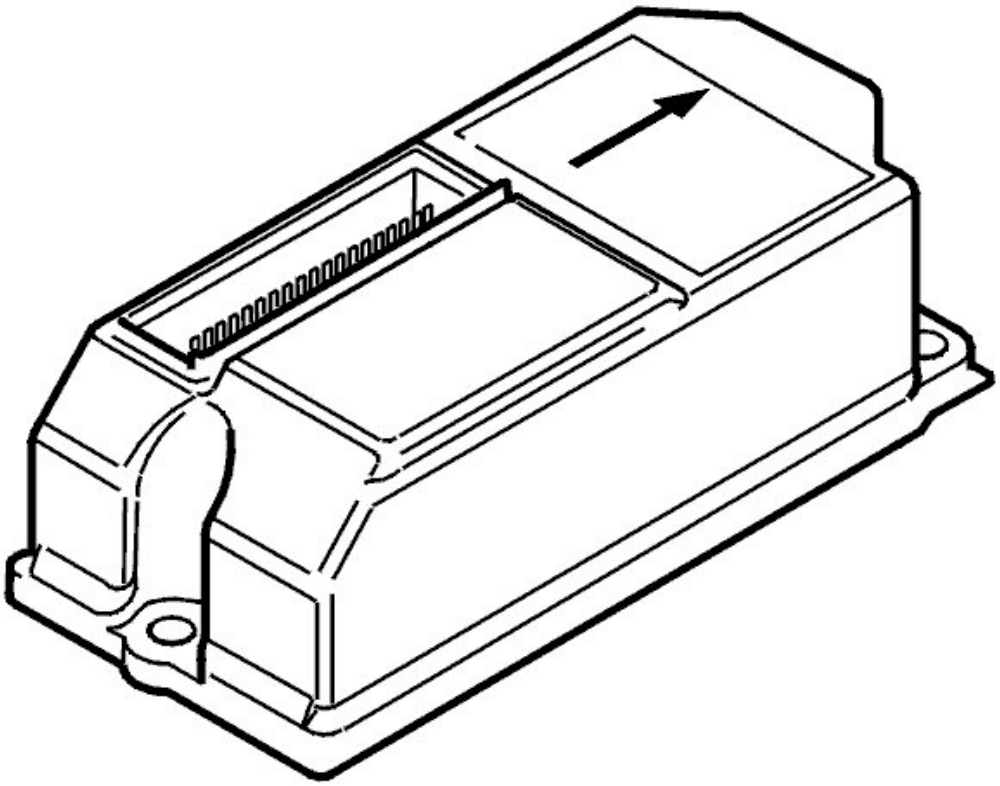
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0102

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

The Supplemental restraint system module (SRS) checks the circuit for the driver's airbag, stage 2.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The control module's test for the diagnostic trouble code (DTC) starts in the event of:
- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.

Substitute value
- None.

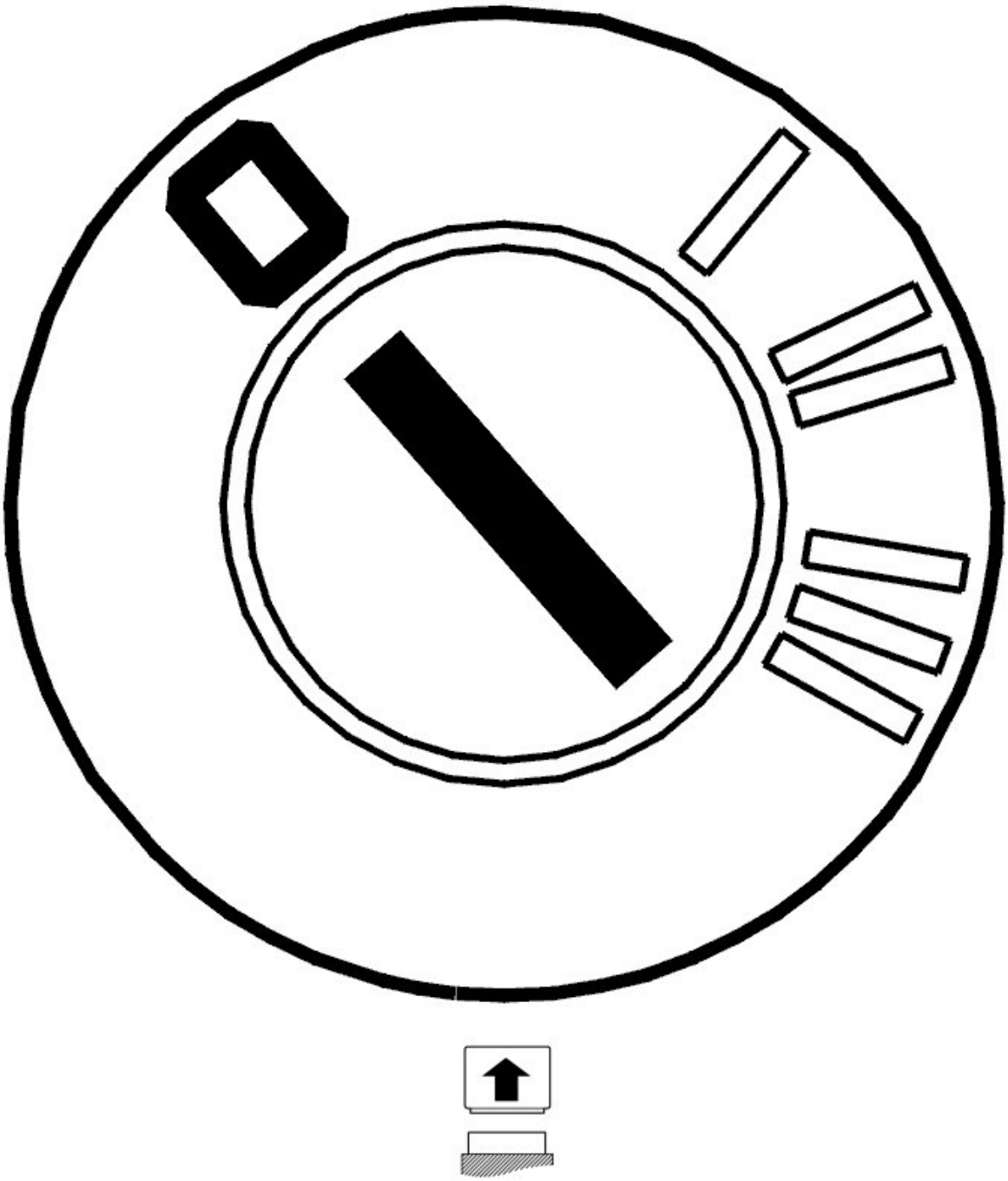
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector for the contact reel.
- Disconnect the purple connector from airbag driver stage 2.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Supplemental restraint system module (SRS) #9B/37(37) and connector for contact reel #3.
- Supplemental restraint system module (SRS) #10B/38(38) and connector for contact reel #4.

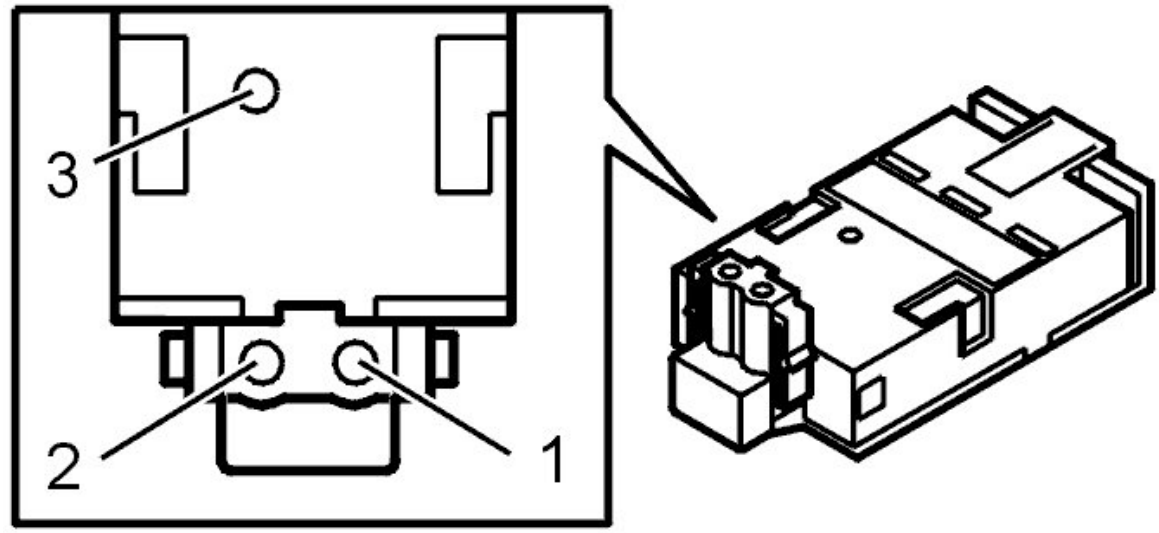
Connect the connector for the contact reel.
Take readings between:

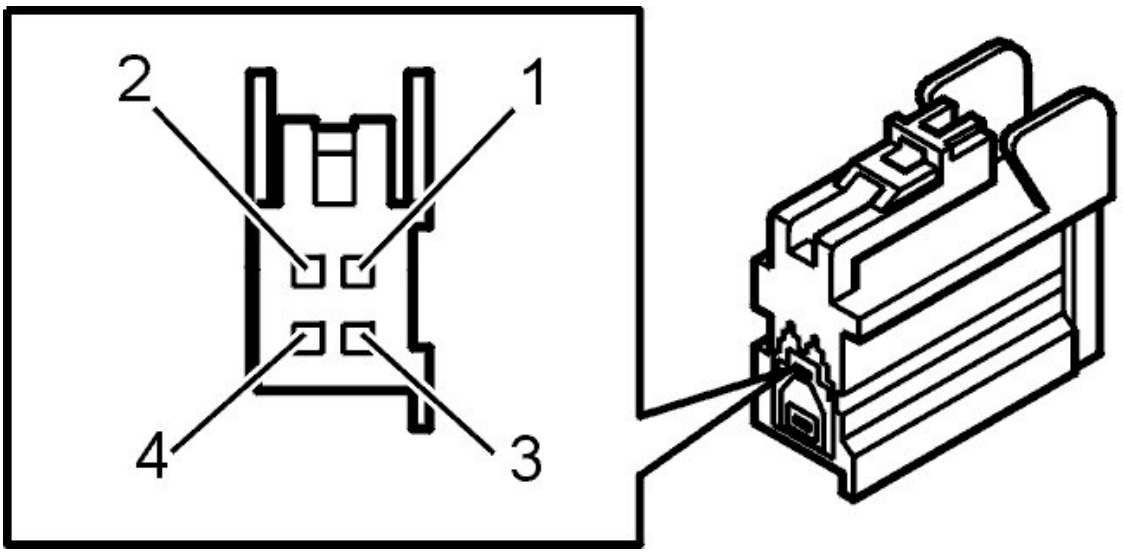
- Supplemental restraint system module (SRS) #9B/37(37) and connector for airbag driver stage 2 #1.
- Supplemental restraint system module (SRS) #10B/38(38) and connector for airbag driver stage 2 #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.
- Contact reel / steering wheel angle sensor, replacing See: Restraint Systems/Air Bag Systems/Clockspring Assembly / Spiral Cable/Service and Repair/Removal and Replacement/Contact Reel / Steering Wheel Angle Sensor, Replacing
- Airbag driver's side (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Driver's Side (SRS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures





Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

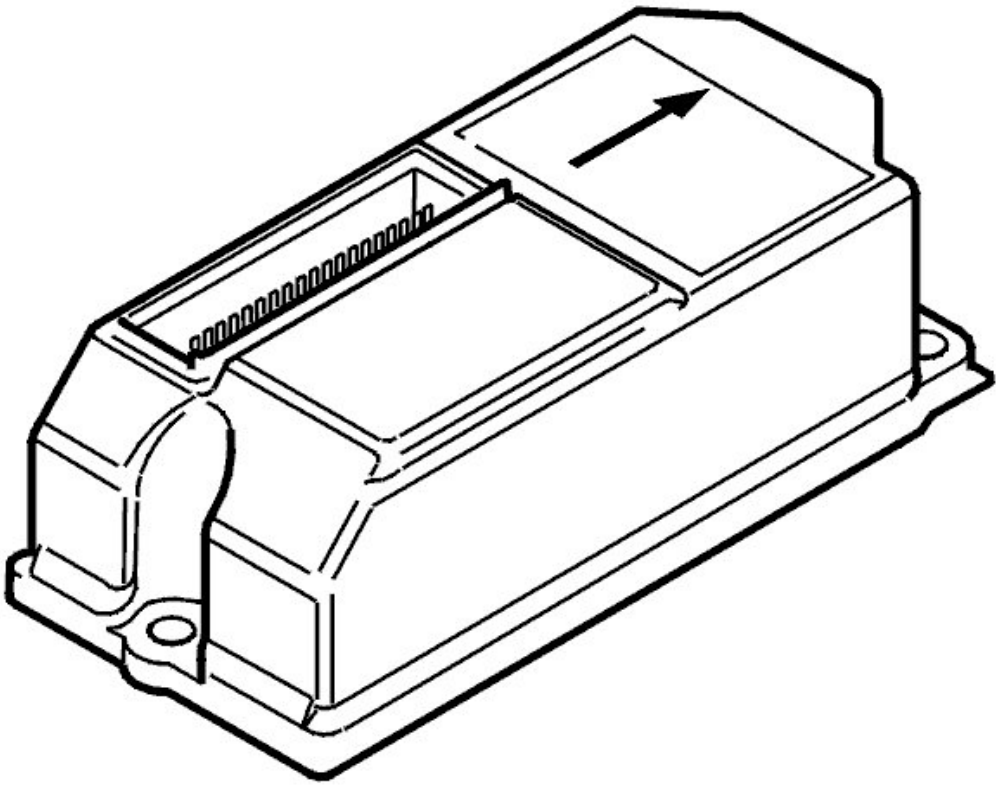
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0103

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

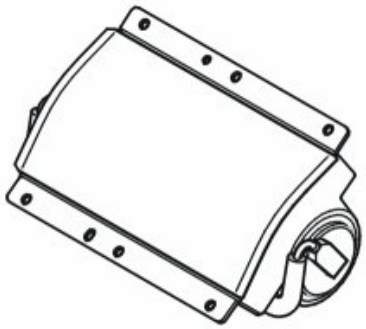
The Supplemental restraint system module (SRS) checks the circuit for the passenger airbag, stage 1.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

The control module's test for the diagnostic trouble code (DTC) starts in the event of:
- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

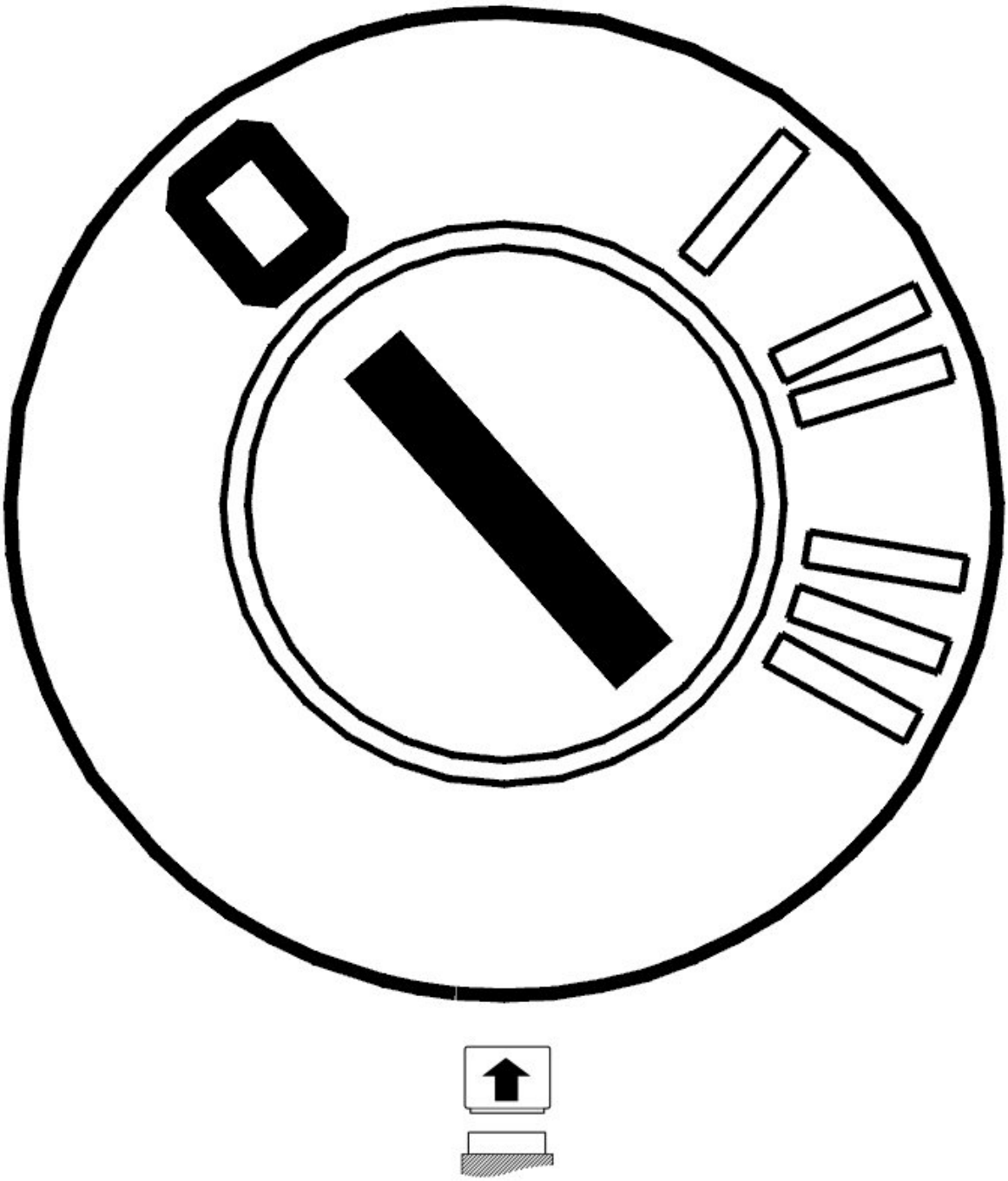
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the green connector from the passenger airbag stage 1.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

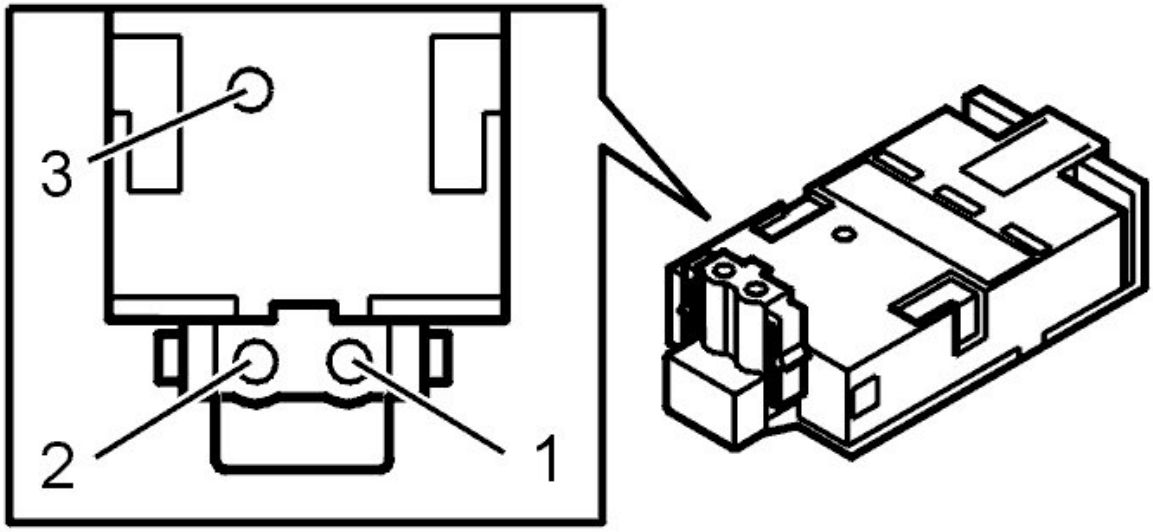
- Supplemental restraint system module (SRS) terminal #12B/40(40) and the connector to passenger airbag stage 1 #1.
- Supplemental restraint system module (SRS) terminal#11B/39(39) and the connector to passenger airbag stage 1 #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.

- Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

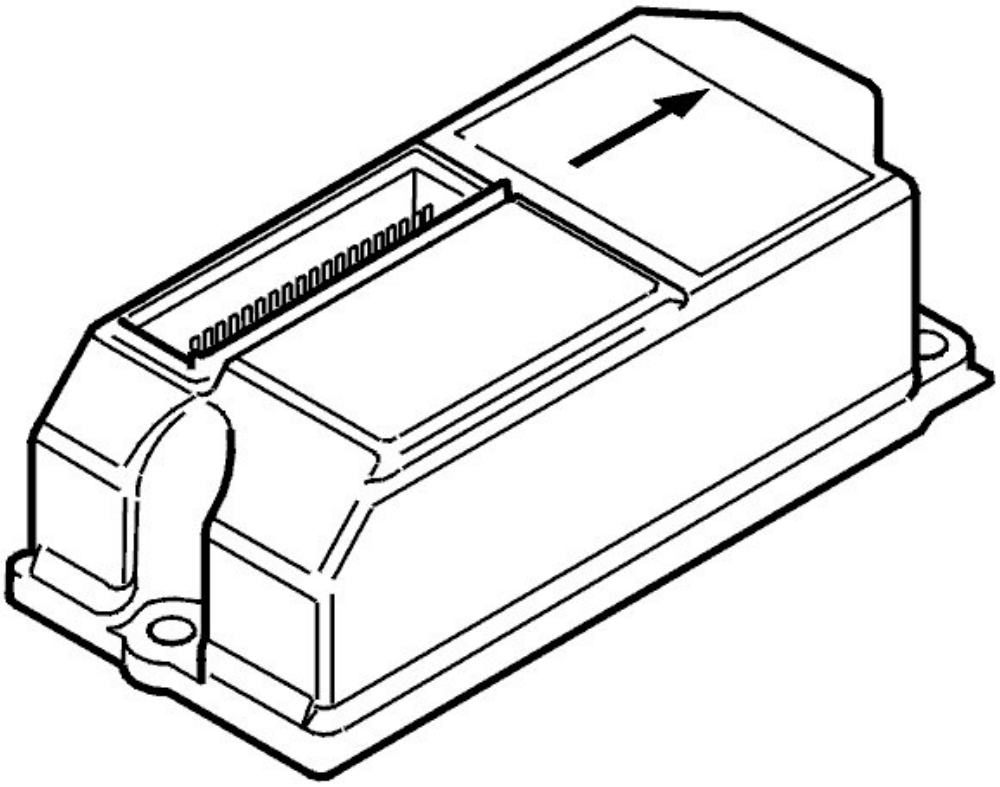
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0104

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

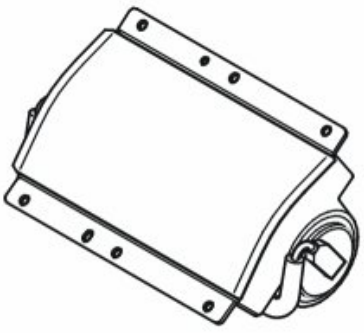
The Supplemental restraint system module (SRS) checks the circuit for the passenger airbag, stage 2.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value

- None.

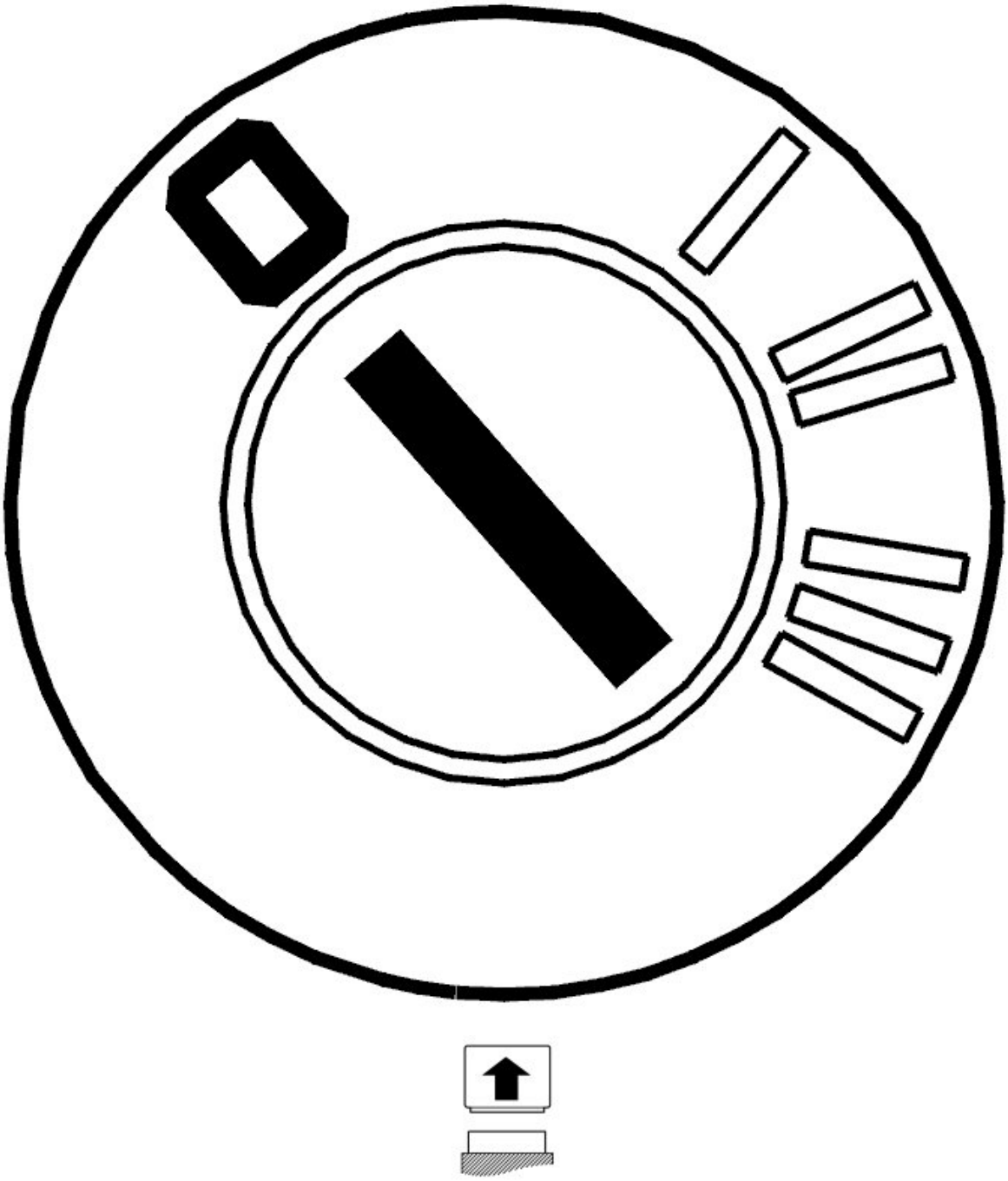
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the purple connector from airbag passenger stage 2.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.

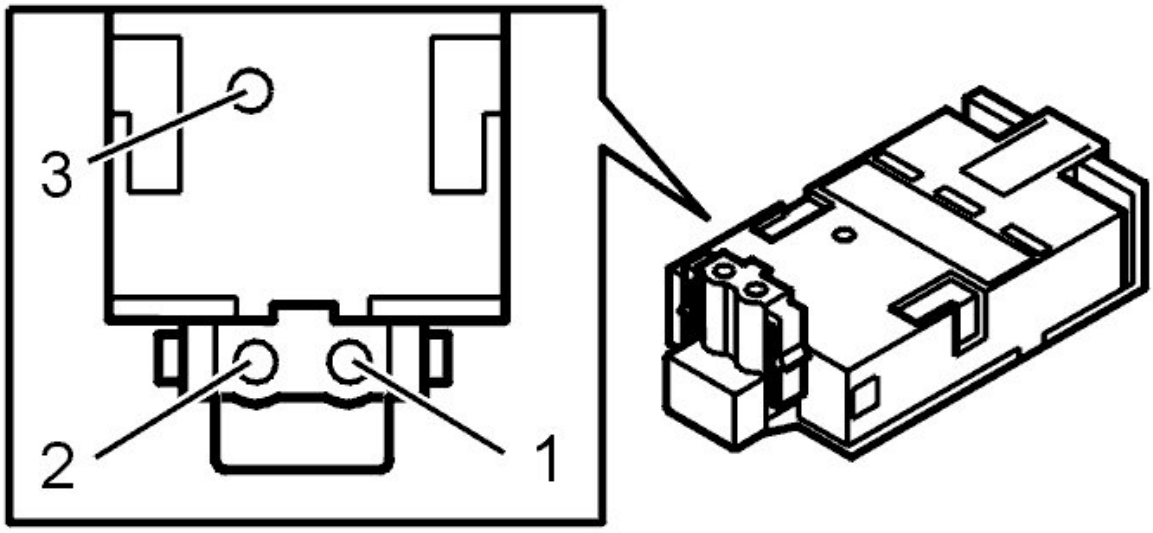
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Supplemental restraint system module (SRS) terminal #13B/41(41) and the connector to passenger airbag stage 2 #1.
- Supplemental restraint system module (SRS) terminal #14B/42(42) and the connector to passenger airbag stage 2 #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.
- Airbag passenger (SRS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Passenger (SRS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

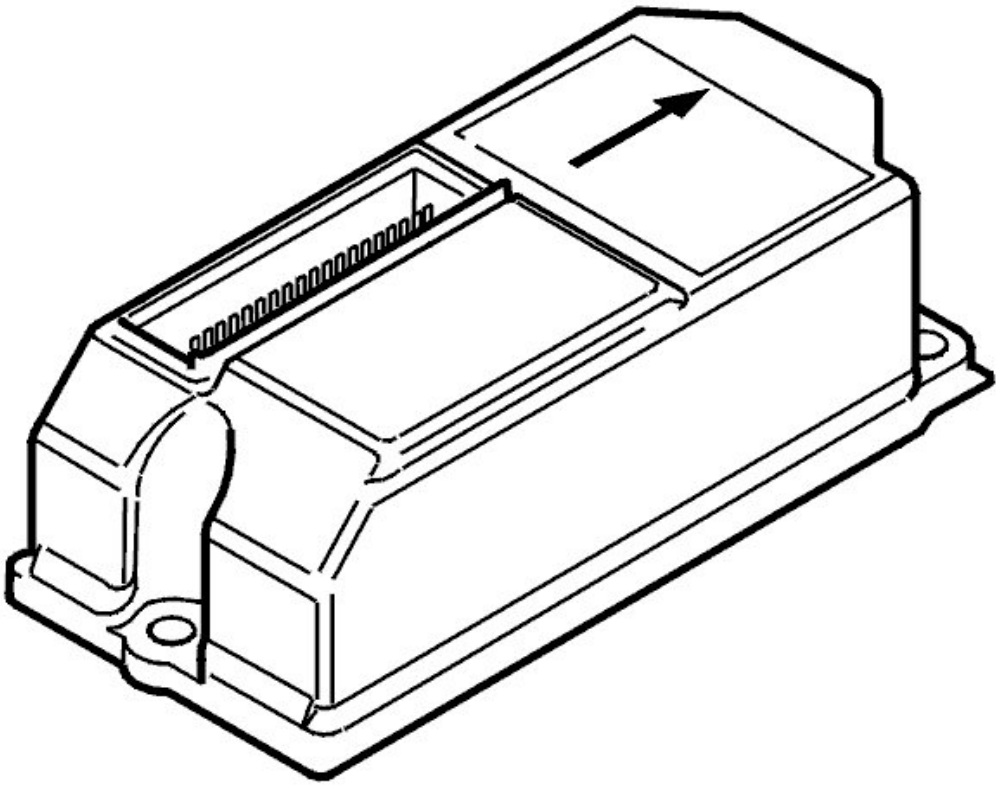
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0105

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

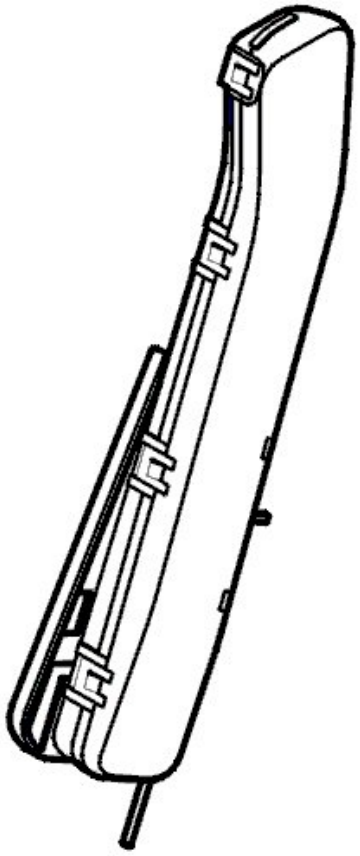
The Supplemental restraint system module (SRS) checks the circuit for the side airbag, left front.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

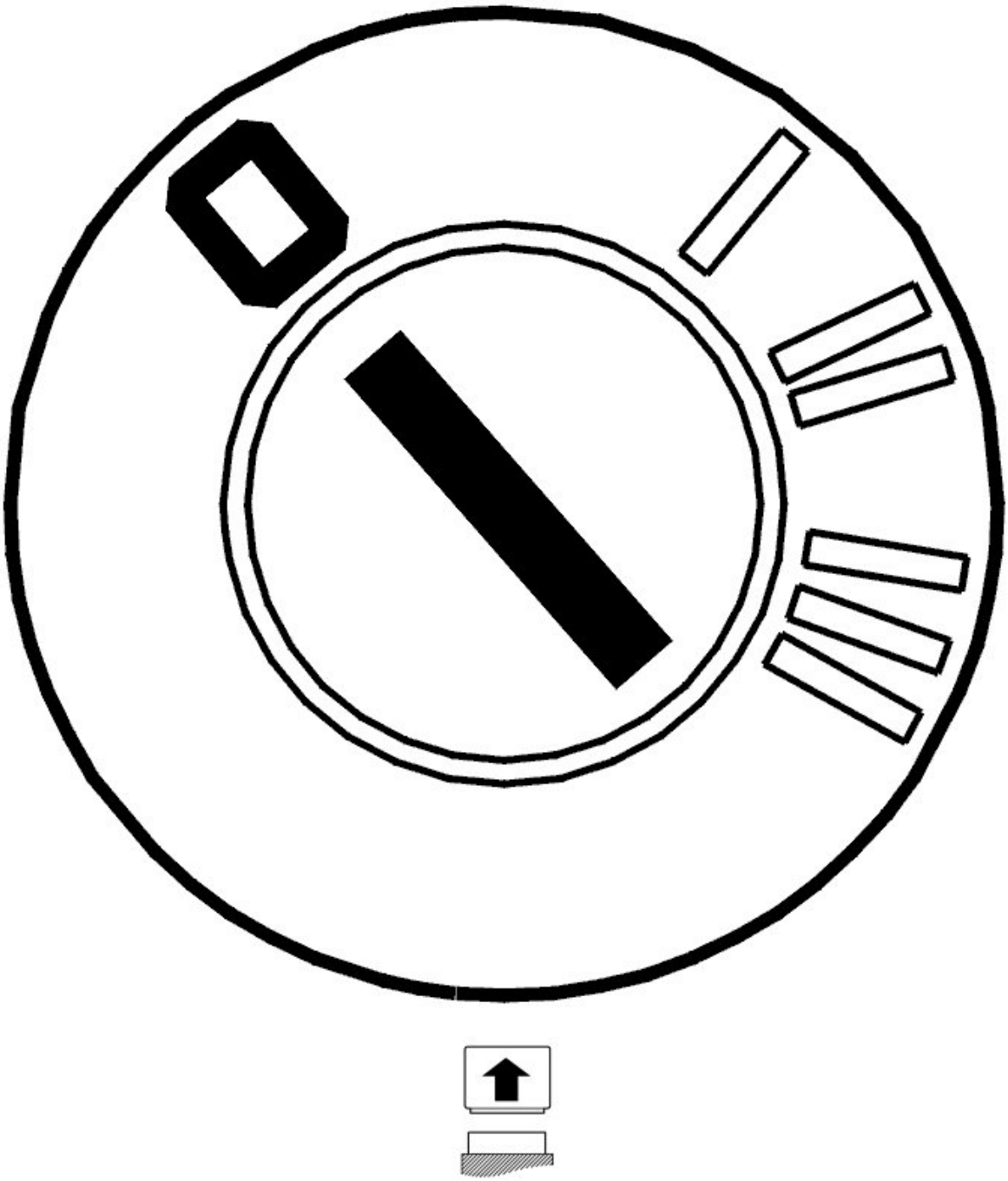
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the front left-hand side airbag.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Supplemental restraint system module (SRS) terminal #4A/4(4) and connector to side airbag, left, front terminal #1.
- Supplemental restraint system module (SRS) terminal #3A/3(3) and connector to side airbag, left, front, terminal #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.

- Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures

Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

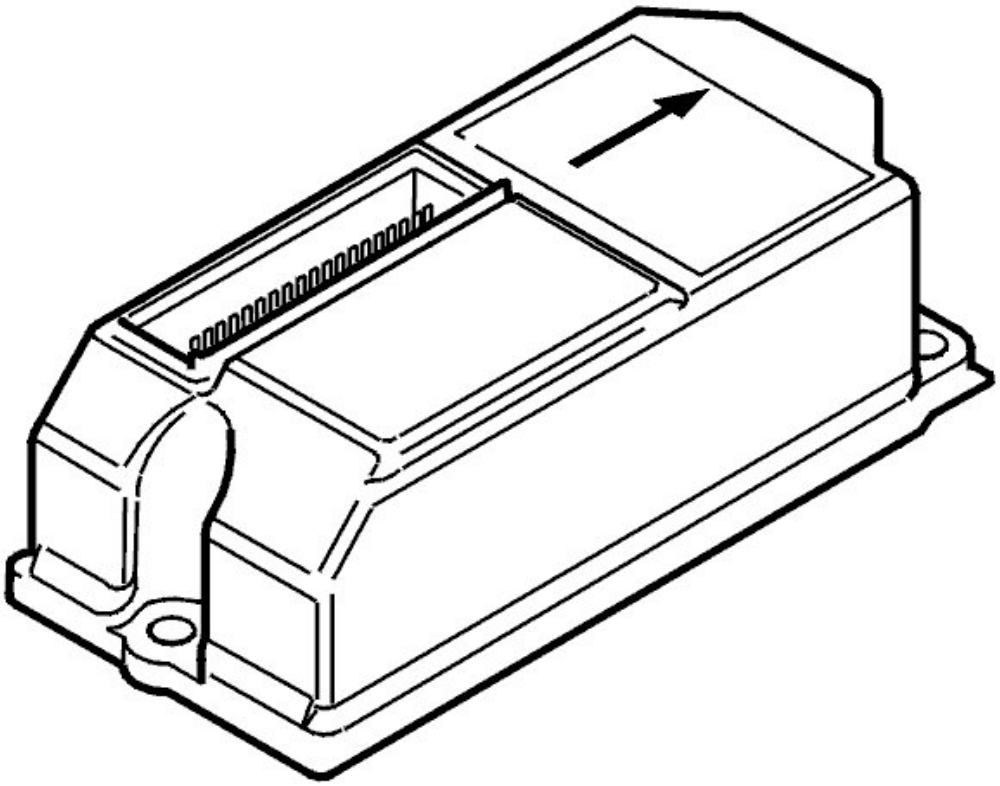
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0106

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

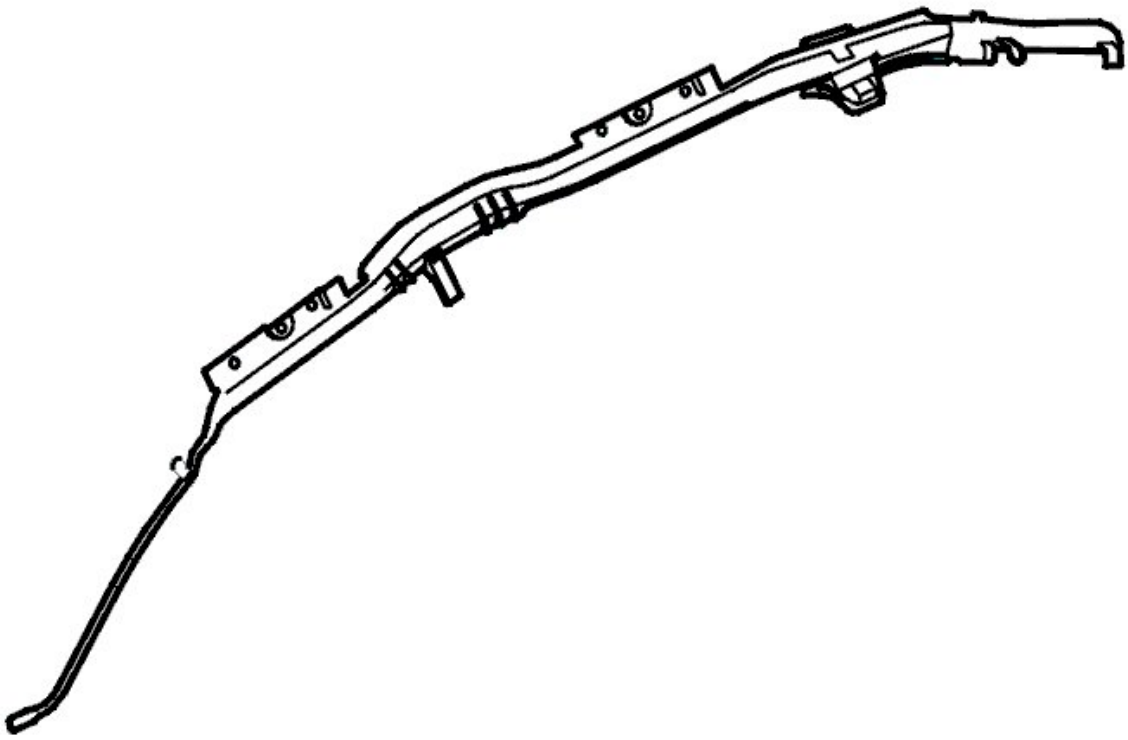
The Supplemental restraint system module (SRS) checks the circuit for the inflatable curtain, left.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

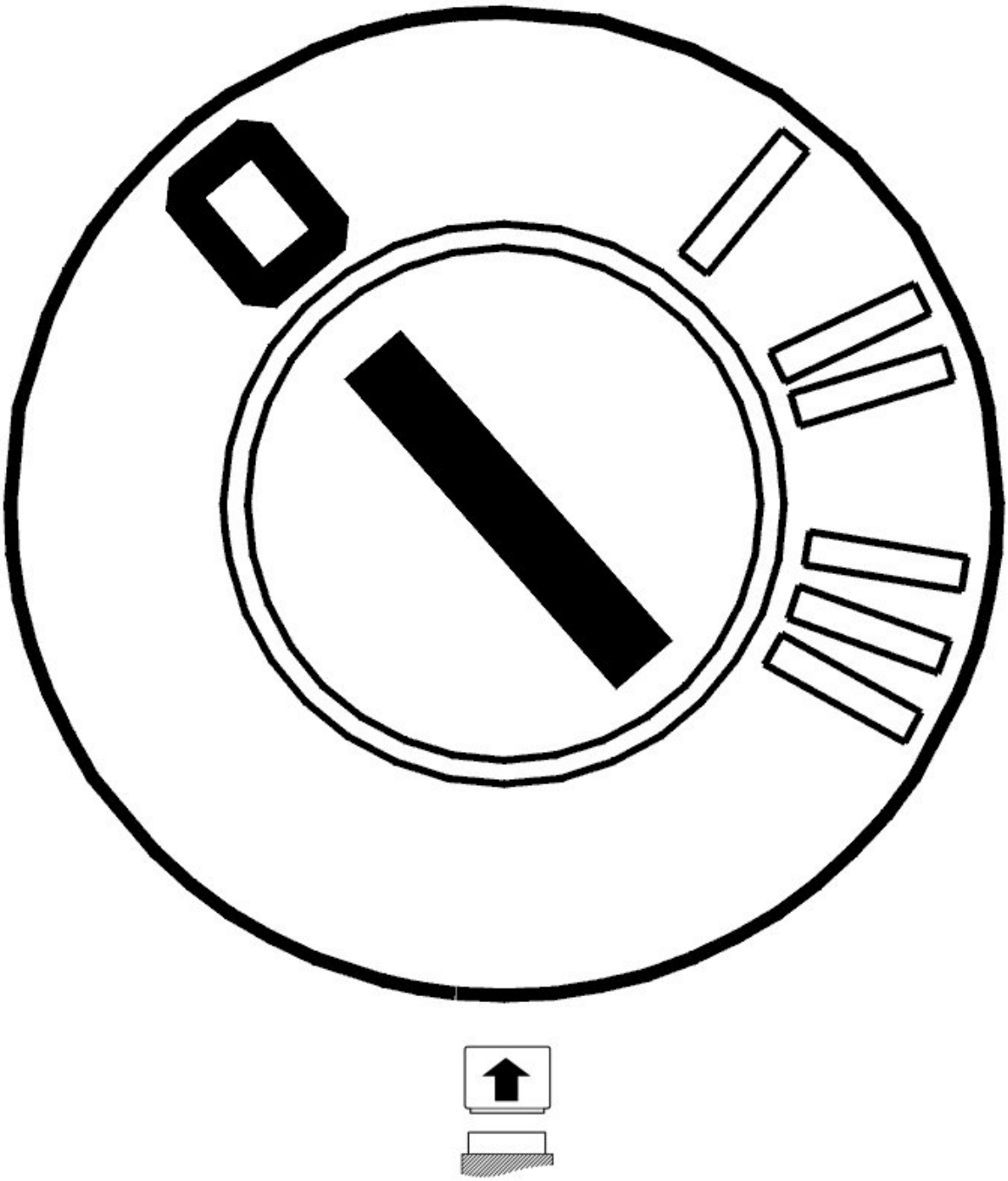
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the left-hand inflatable curtain.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the inflatable curtain.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

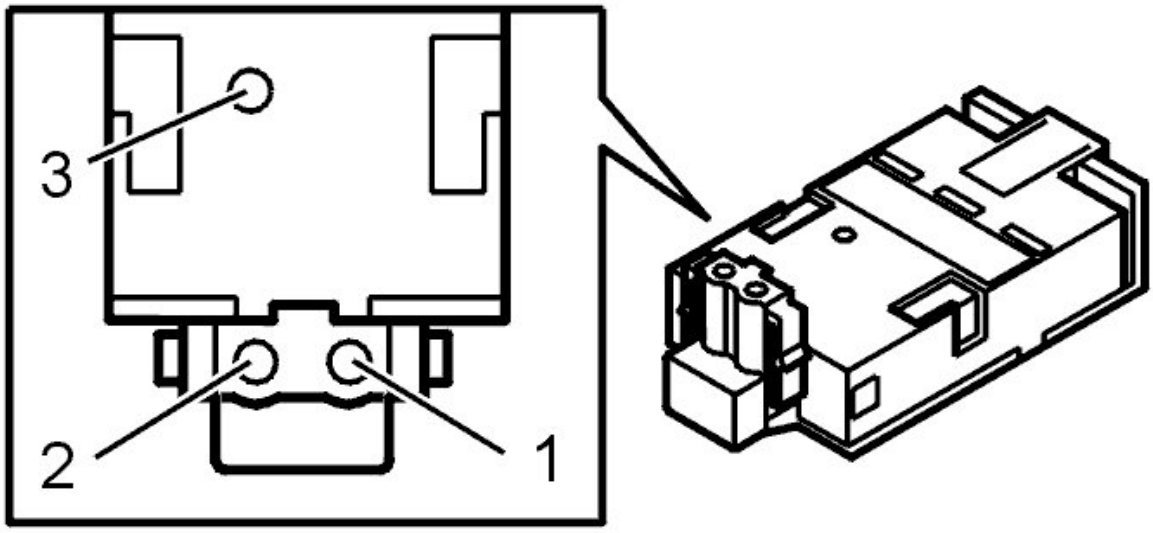
- Supplemental restraint system module (SRS) terminal #21A/21(21) and connector to inflatable curtain, left, terminal #1.
- Supplemental restraint system module (SRS) terminal #22A/22(22) and connector to inflatable curtain, left, front, terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For further information, see the wiring diagram.
- IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

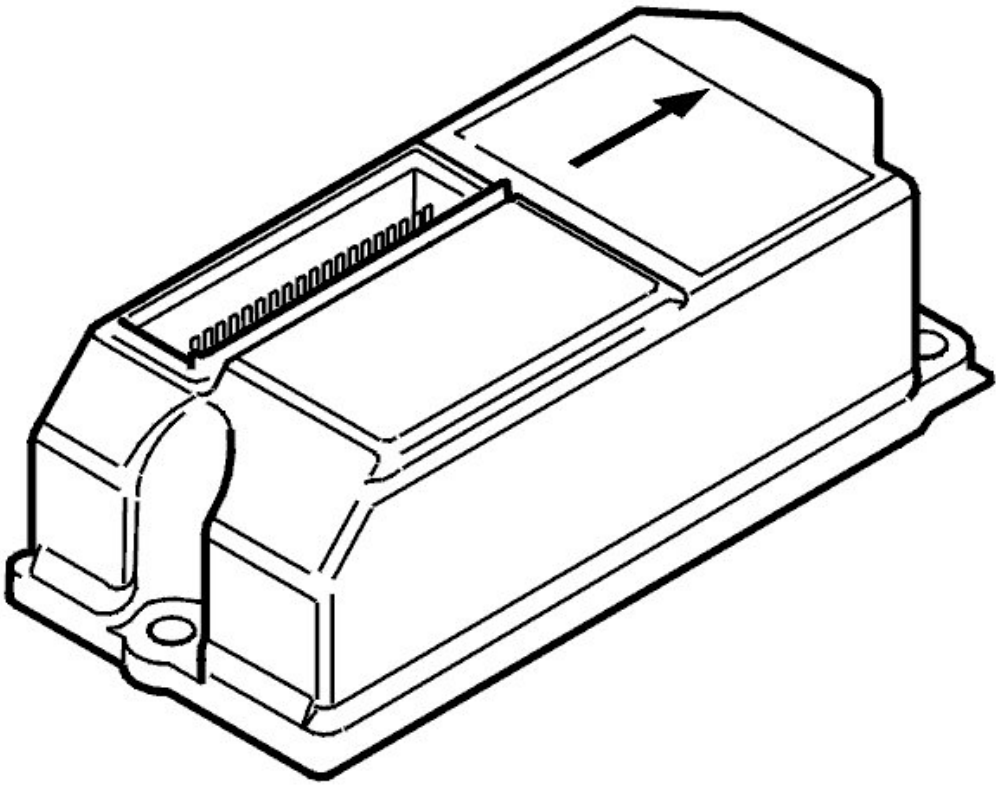
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0107

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

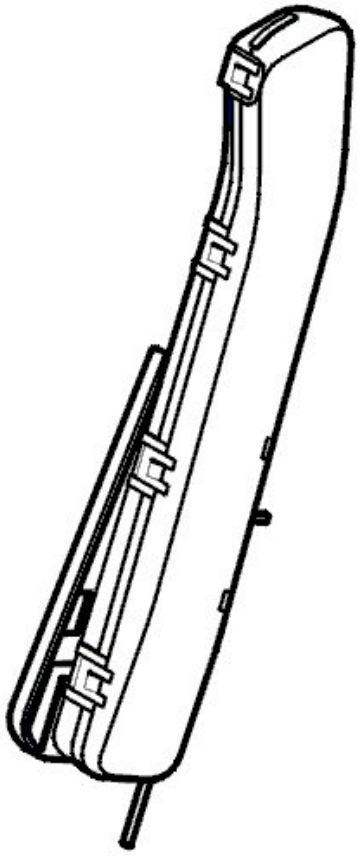
The Supplemental restraint system module (SRS) checks the circuit for the side airbag, right front.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

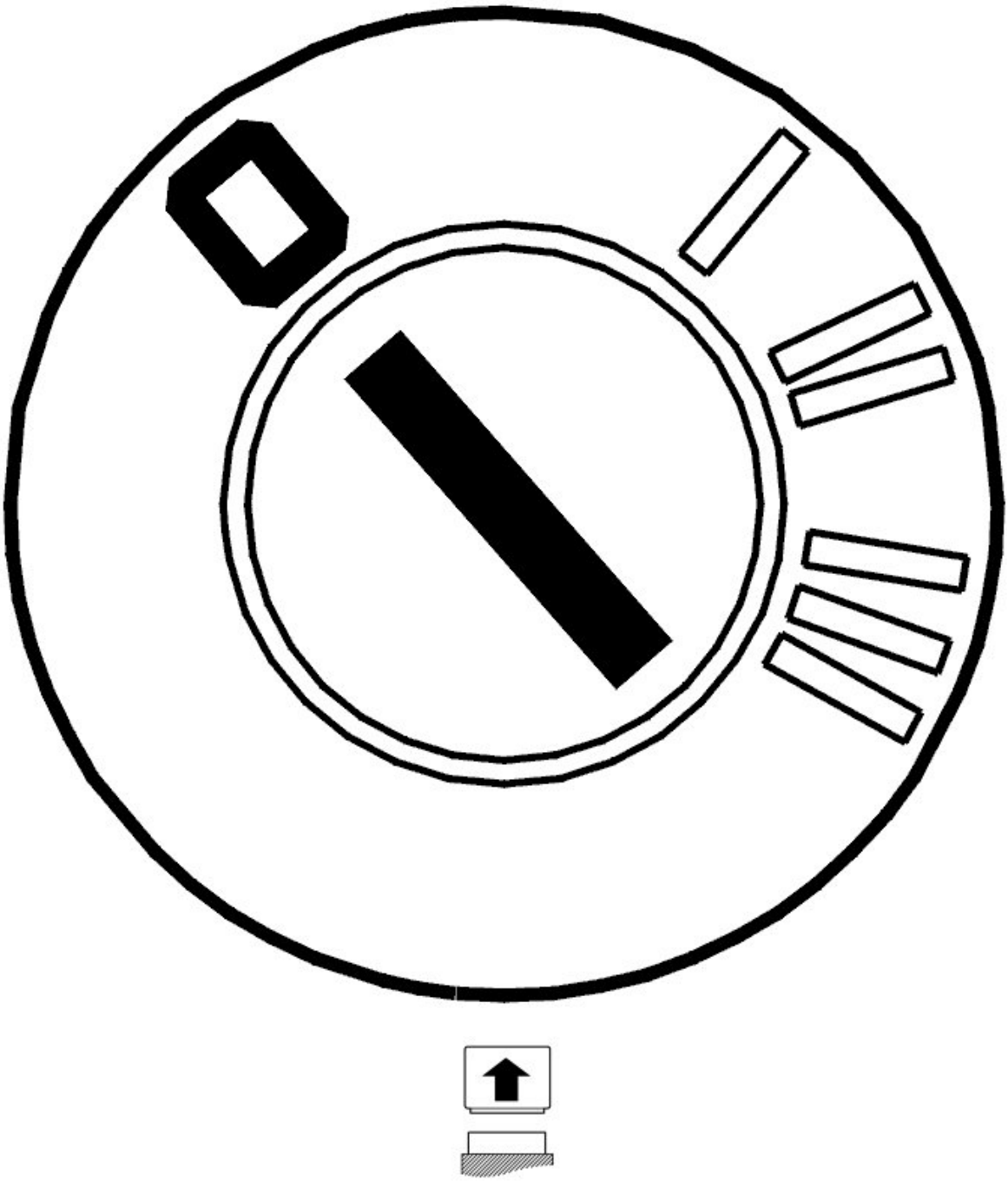
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the front right side impact airbag.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical airbag. This could deploy the airbag!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and connections that connect cables between Supplemental restraint system module (SRS) and the airbag.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- The Supplemental restraint system module (SRS) #4C/60(60) and the connector to the side airbag, right front, #1.
- The Supplemental restraint system module (SRS) #3C/59(59) and the connector to the side airbag, right front, #2.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.

- Airbag module seat (SIPS), replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/Airbag Module Seat (SIPS), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures

Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

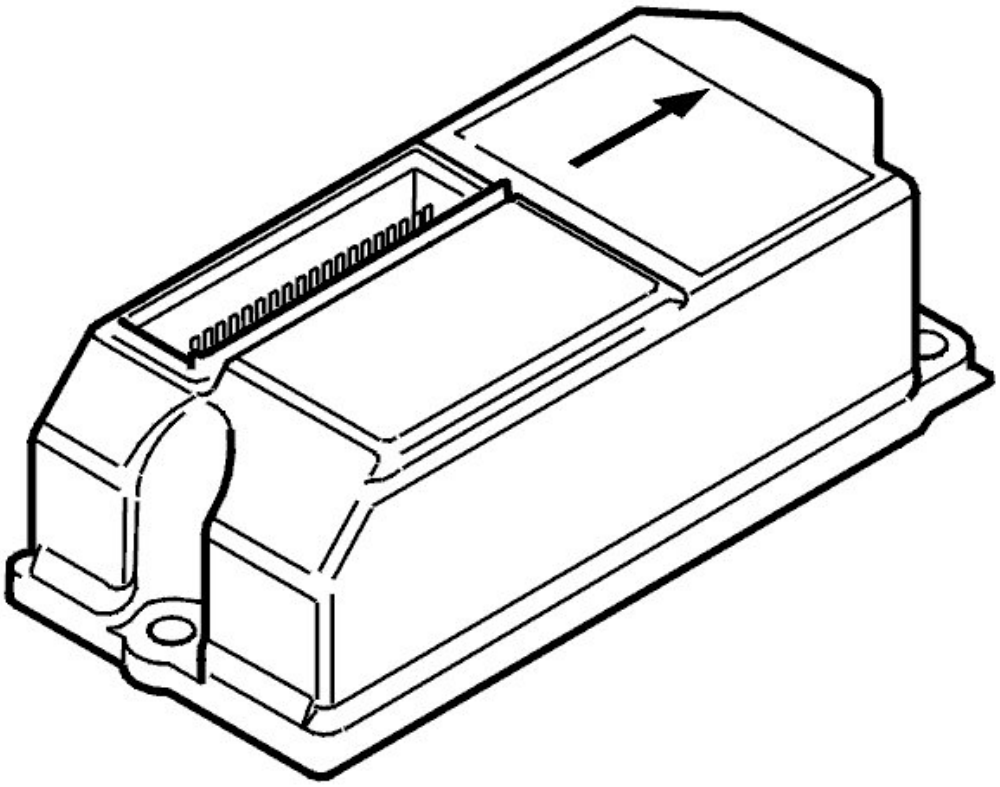
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0108

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

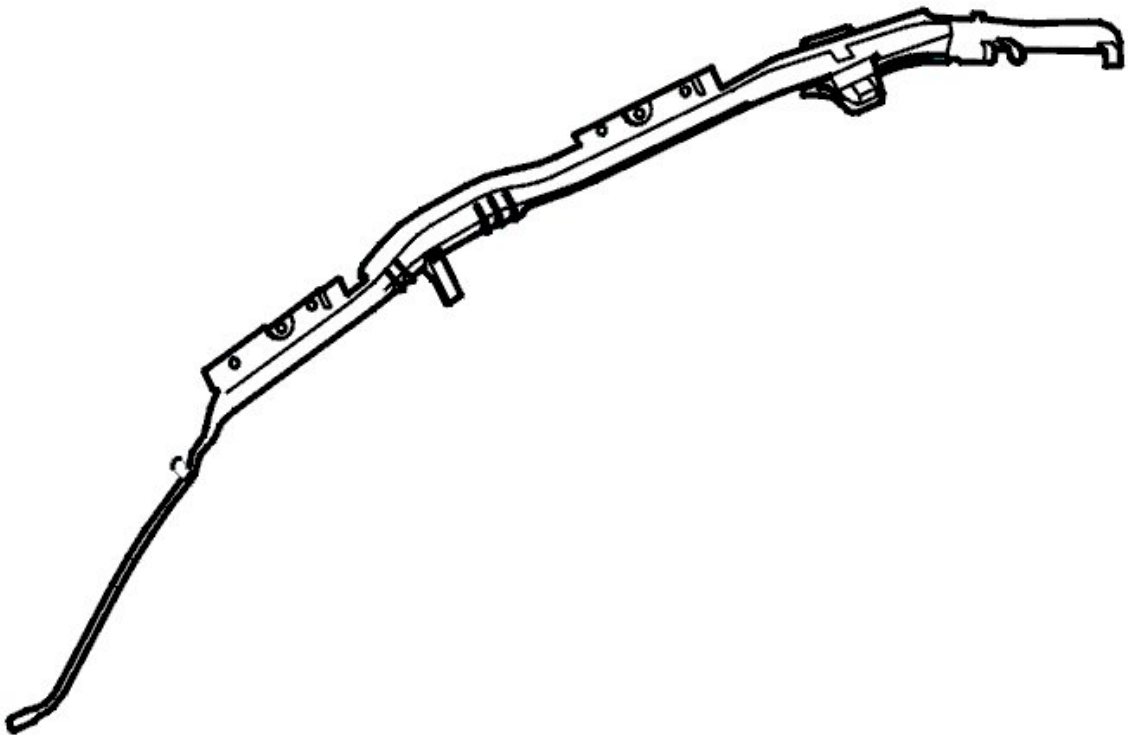
The Supplemental restraint system module (SRS) checks the circuit for the inflatable curtain, right.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

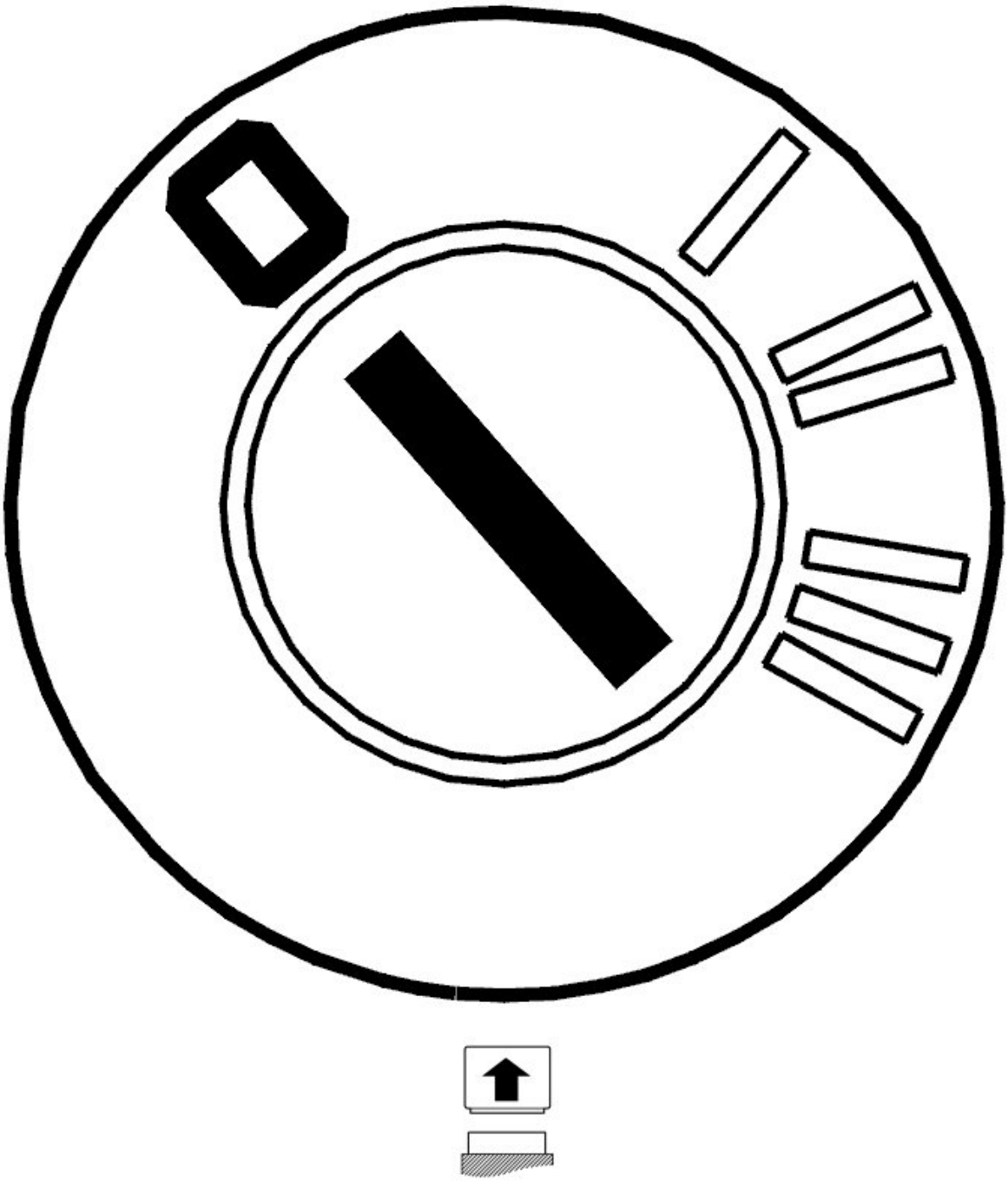
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the right-hand inflatable curtain.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected, non-deployed, pyrotechnical inflatable curtain. This could deploy the inflatable curtain!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the inflatable curtain.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

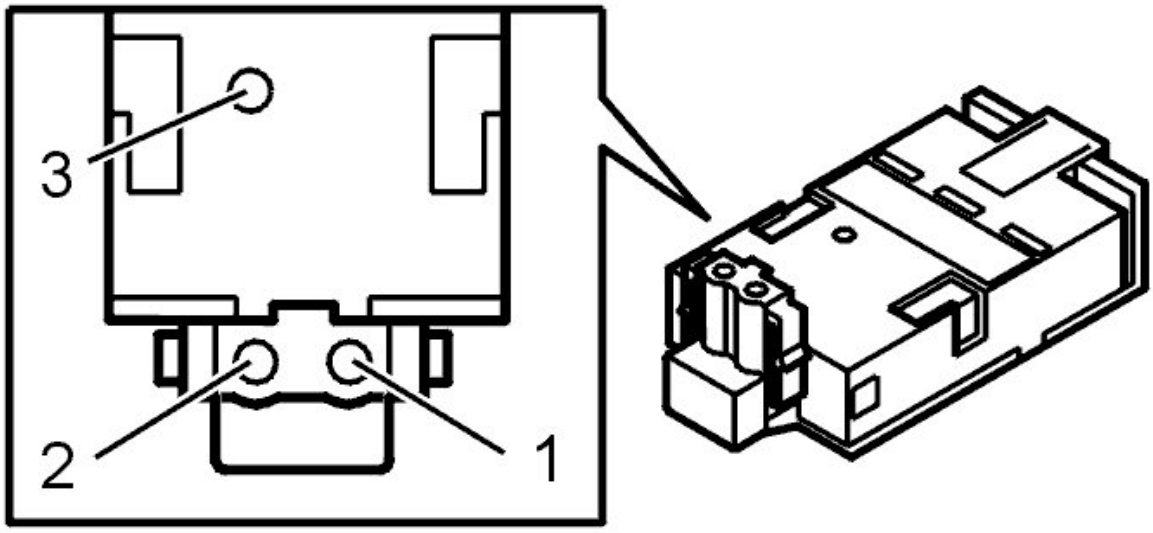
- The Supplemental restraint system module (SRS) terminal #21C/77(17) and the connector to the inflatable curtain, right, terminal #1.
- The Supplemental restraint system module (SRS) terminal #22C/78(18) and the connector to the inflatable curtain, right, terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For further information, see the wiring diagram.
- IC (inflatable curtain) module, replacing See: Restraint Systems/Air Bag Systems/Air Bag/Service and Repair/IC (Inflatable Curtain) Module, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

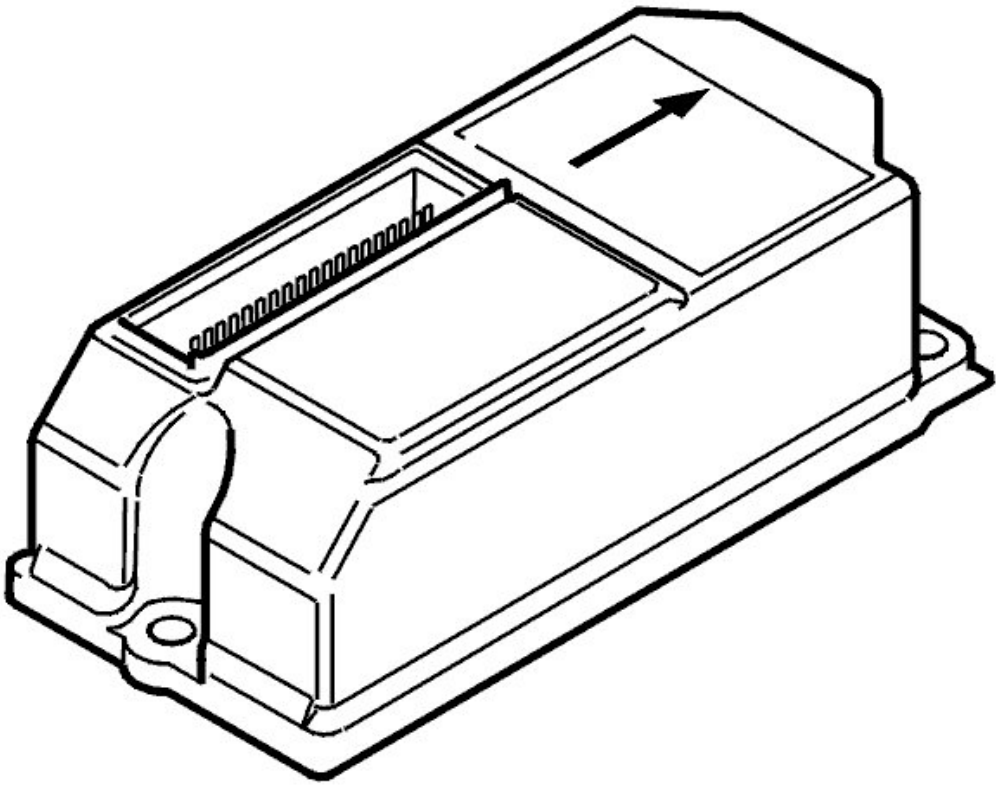
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-010B

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

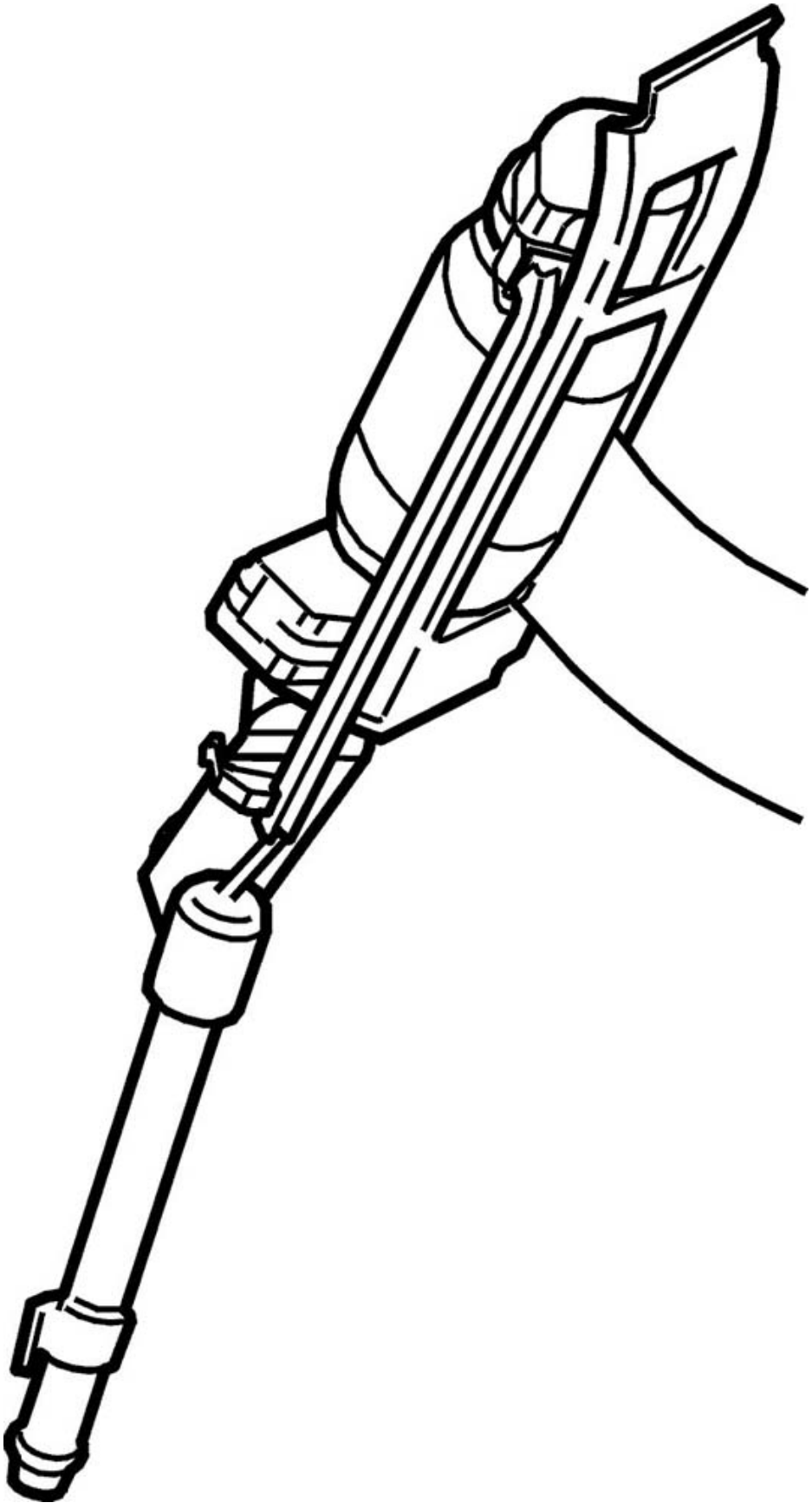
The Supplemental restraint system module (SRS) checks the circuit for the side airbag, left front.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

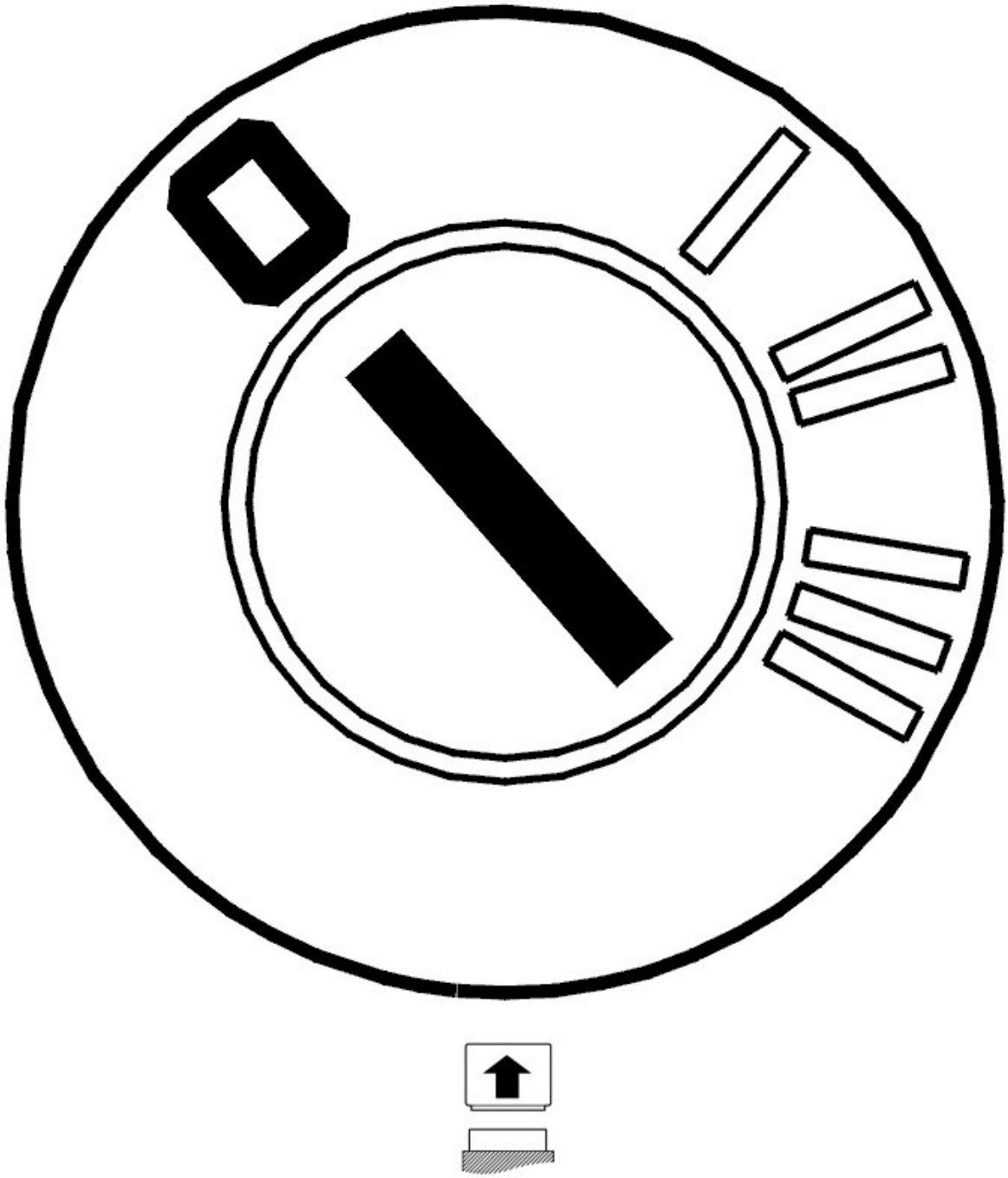
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the front left-hand seat belt tensioner.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected non-deployed seat belt tensioner. This could deploy the seat belt tensioner!

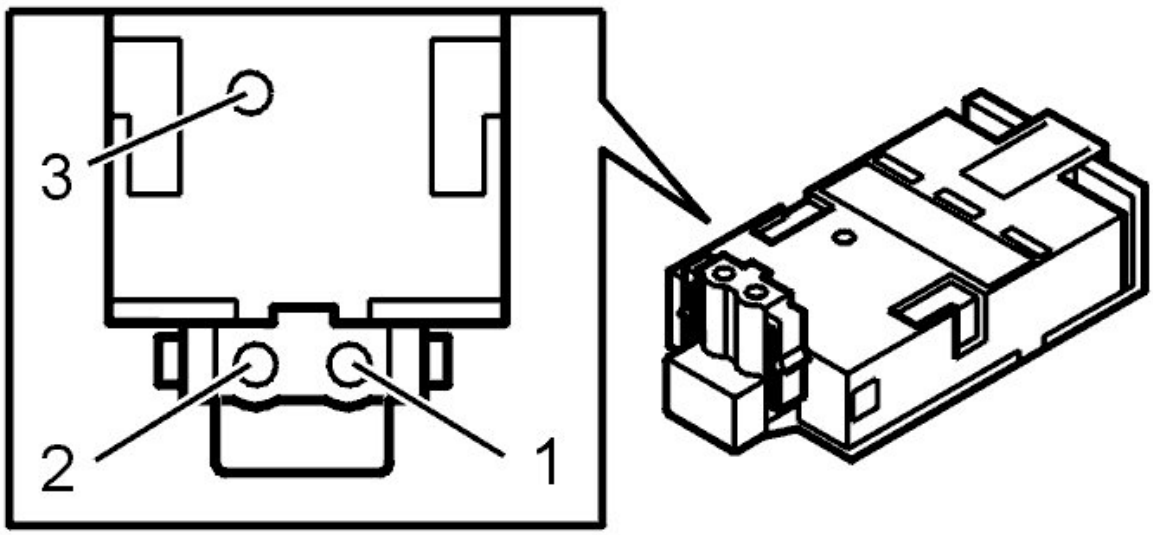
Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the seat belt tensioner.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- Supplemental restraint system module (SRS) terminal #5A/5(5) and the connector to seat belt tensioner, left, front, terminal #1.
- Supplemental restraint system module (SRS) #6A/6(6) and the connector to seat belt tensioner, left, front, #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.
- Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

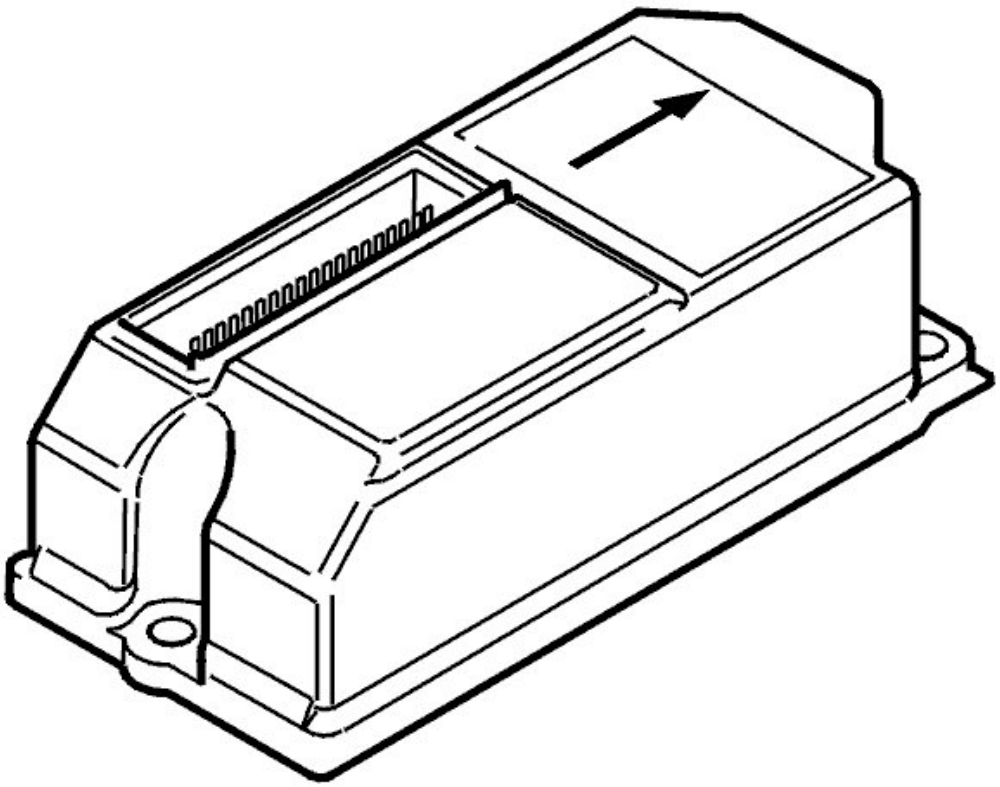
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-010C

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

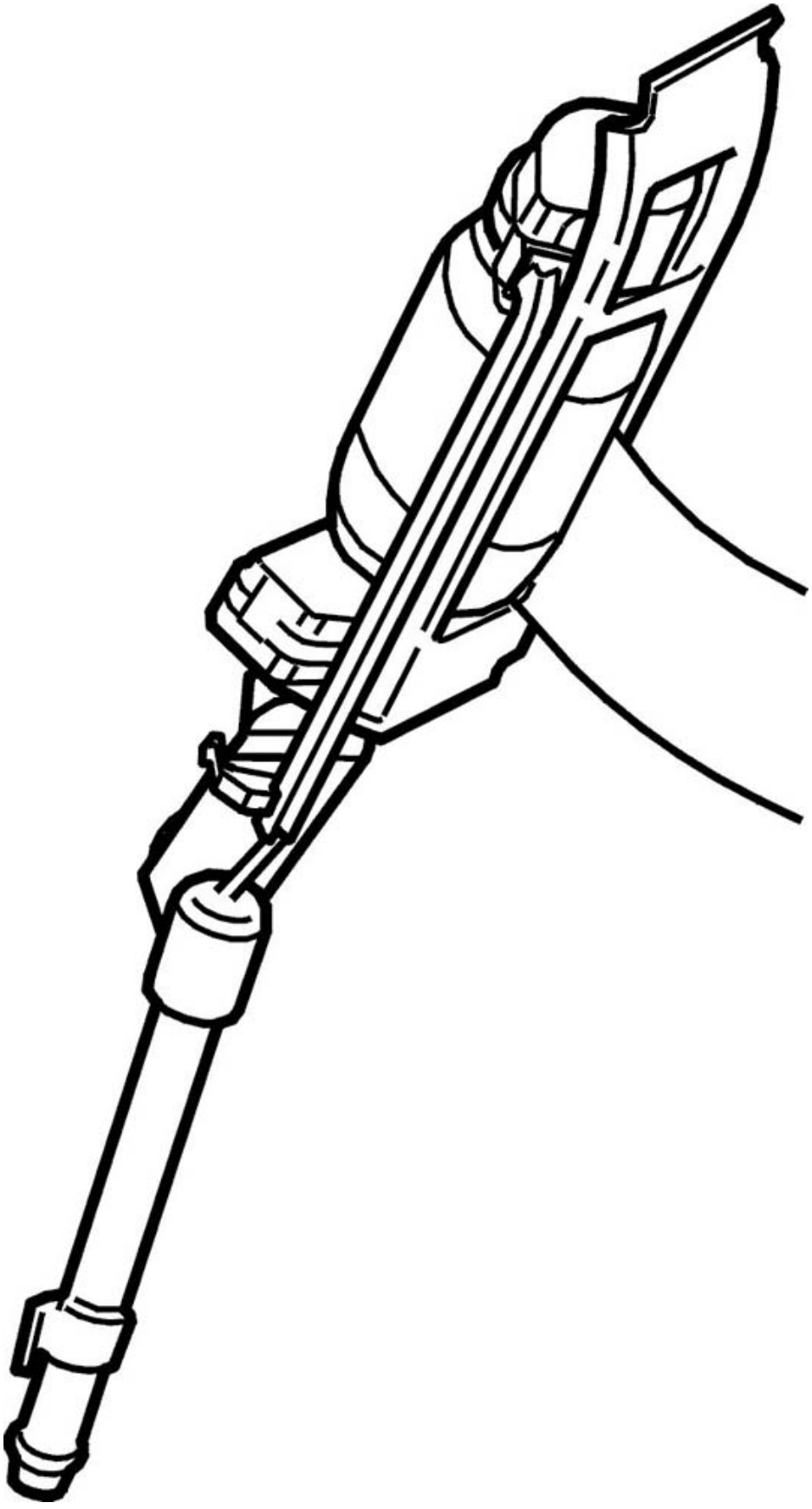
The Supplemental restraint system module (SRS) checks the circuit for the seat belt tensioner, right front.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

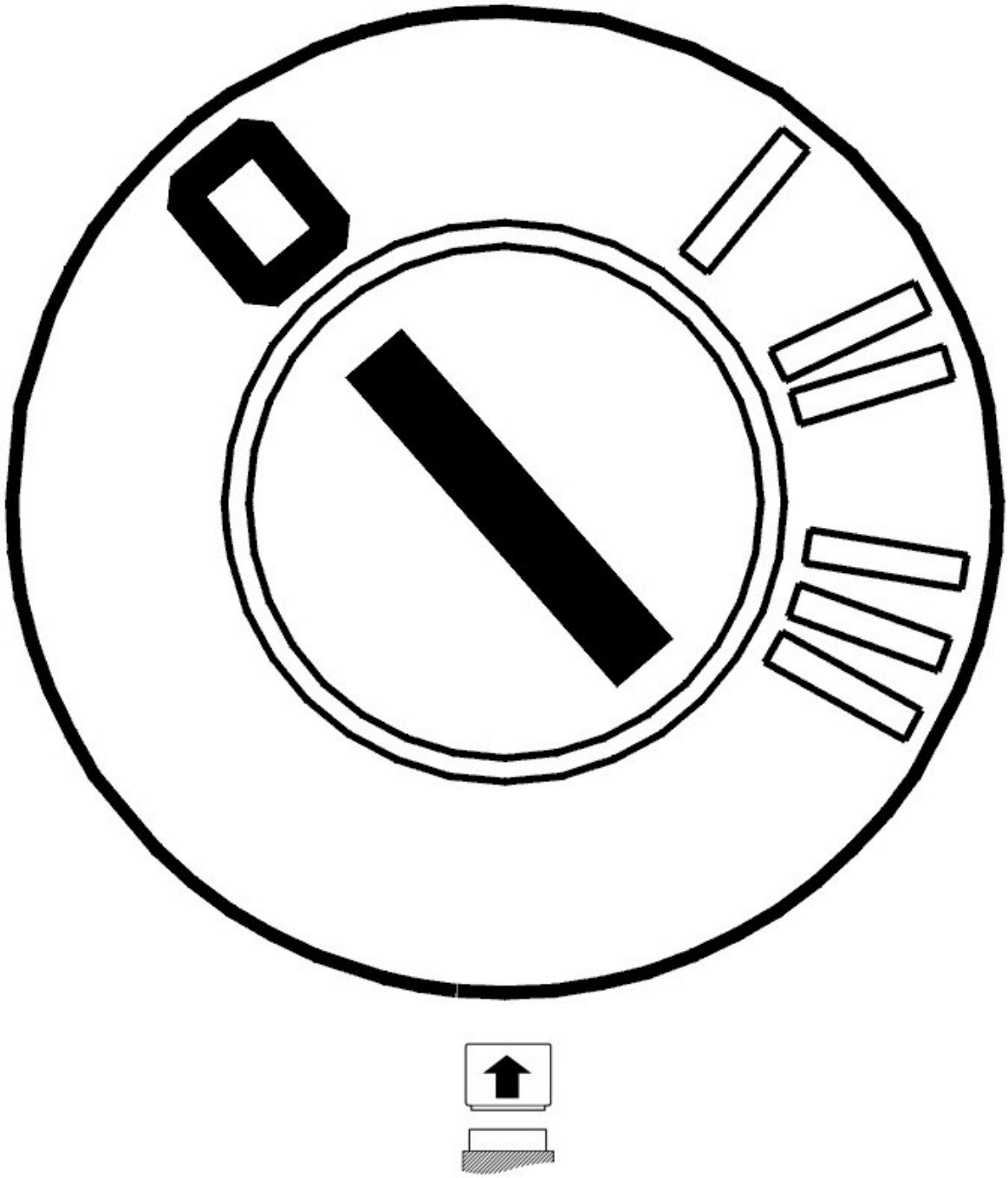
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the front right-hand seat belt tensioner.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected non-deployed seat belt tensioner. This could deploy the seat belt tensioner!

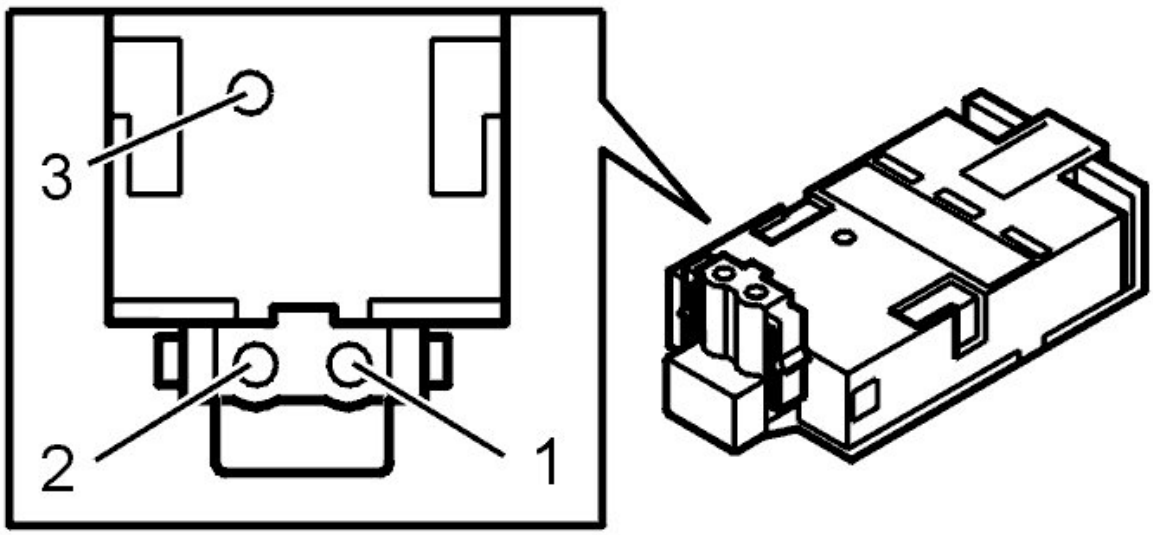
Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the seat belt tensioner.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

- The Supplemental restraint system module (SRS) terminal #5C/61 (1) and the connector to the seat belt tensioner, right front, terminal #1.
- The Supplemental restraint system module (SRS) terminal #6C/62(2) and the connector to the seat belt tensioner, right front, terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information, see the wiring diagram.
- Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

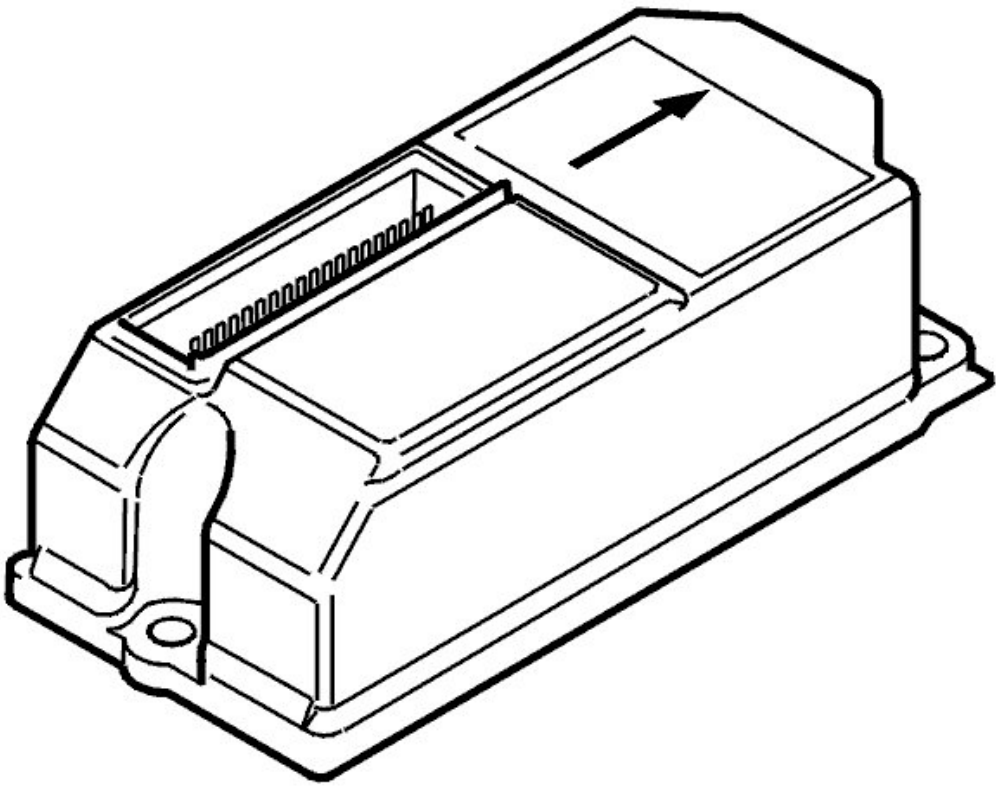
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-010D

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

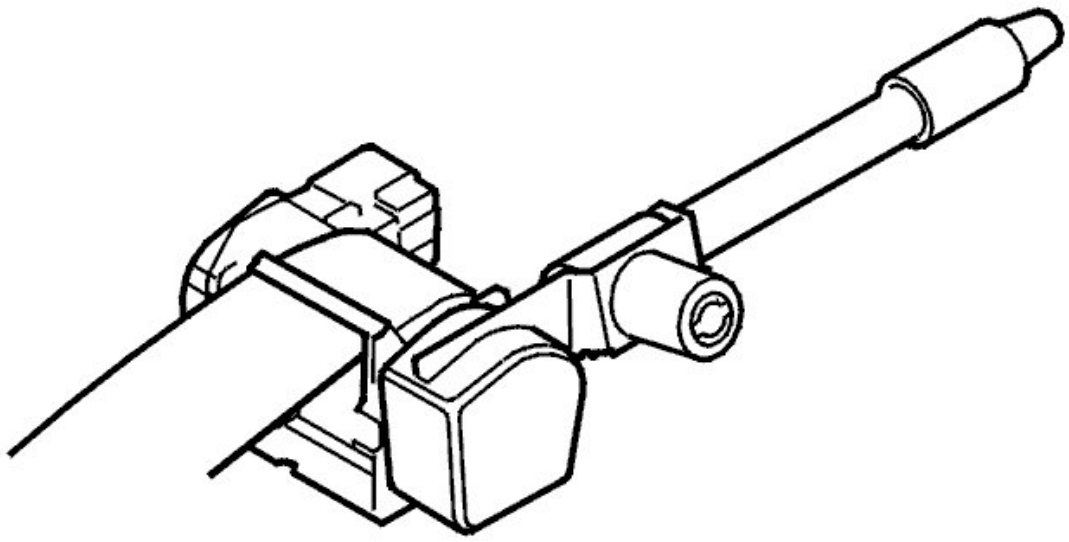
The Supplemental restraint system module (SRS) checks the circuit to the seat belt tensioner, left, rear.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

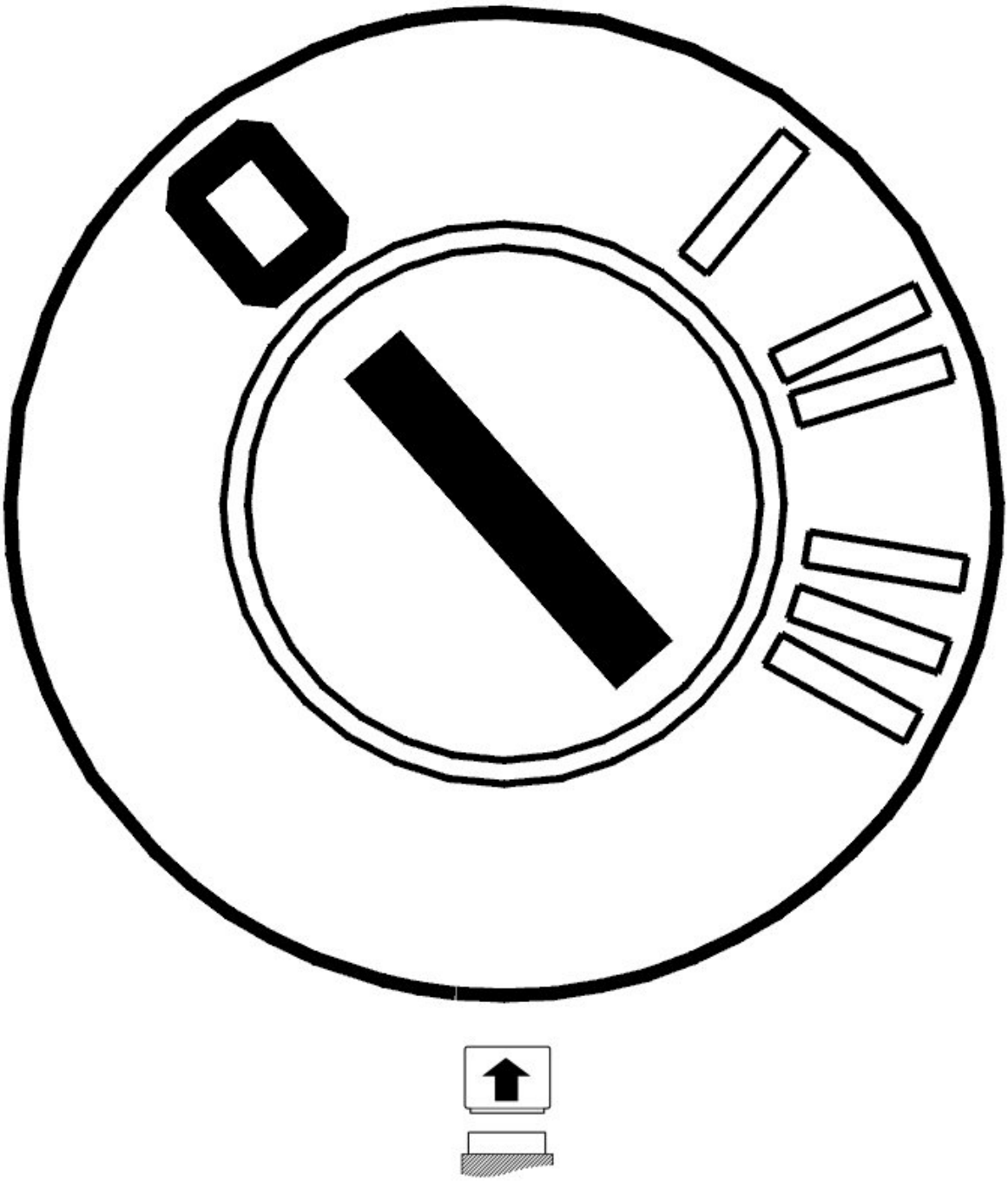
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the rear left-hand seat belt tensioner.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected non-deployed seat belt tensioner. This could deploy the seat belt tensioner!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the seat belt tensioner.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

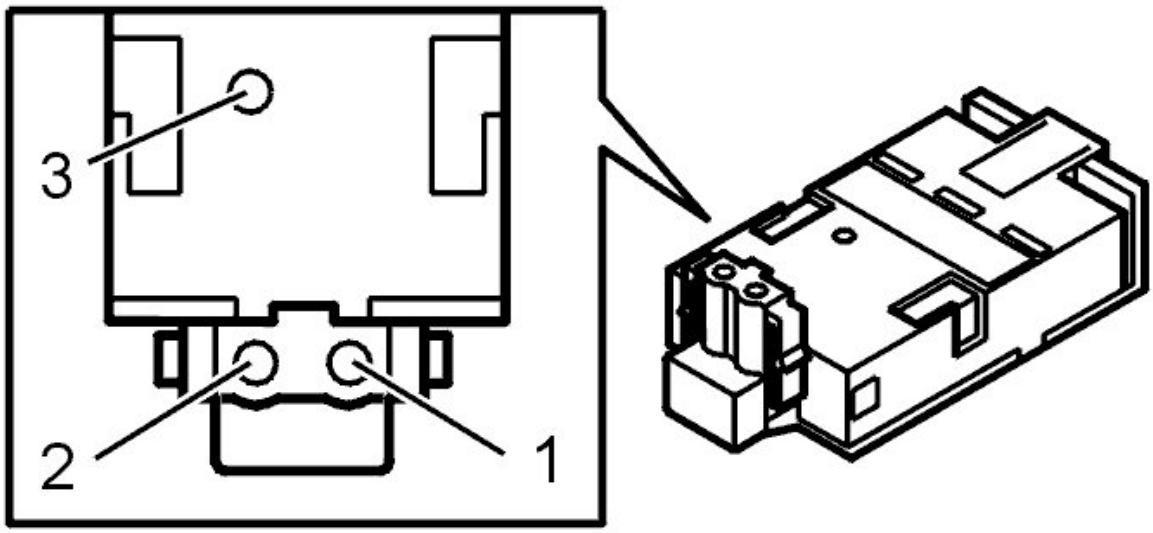
- Supplemental restraint system module (SRS) terminal #16A/16(16) and the connector to seat belt tensioner, left, rear, terminal #1.
- Supplemental restraint system module (SRS) terminal #15A/15(15) and the connector to seat belt tensioner, left, rear, terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For further information, see the wiring diagram.
- Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

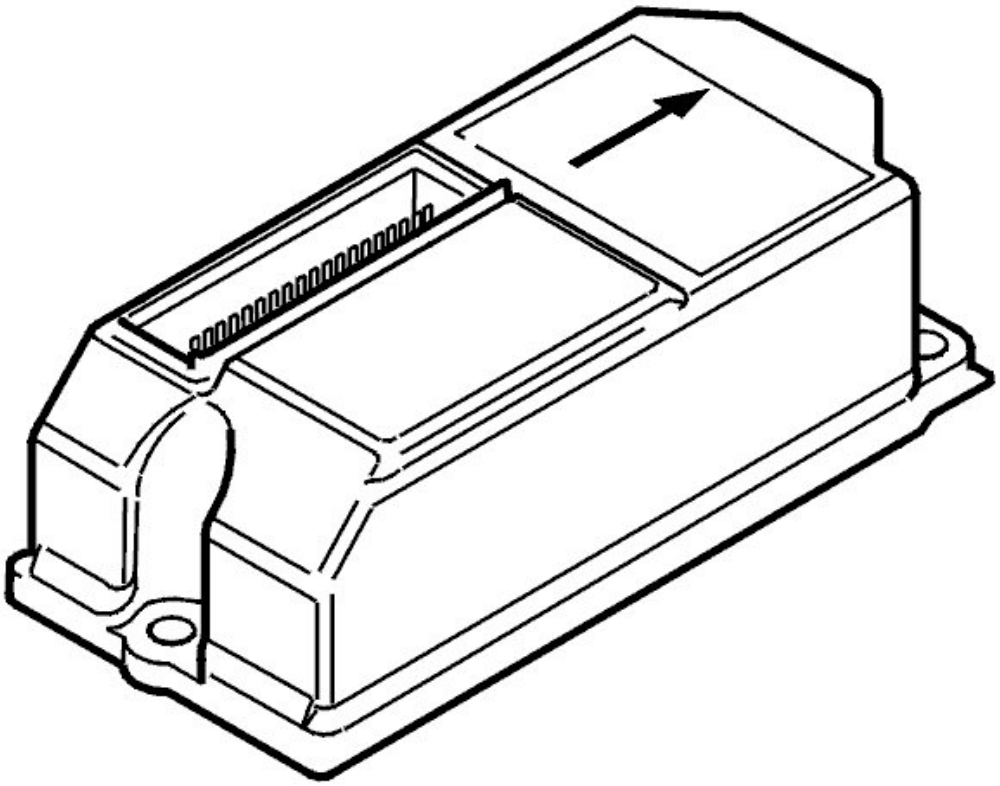
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-010E

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

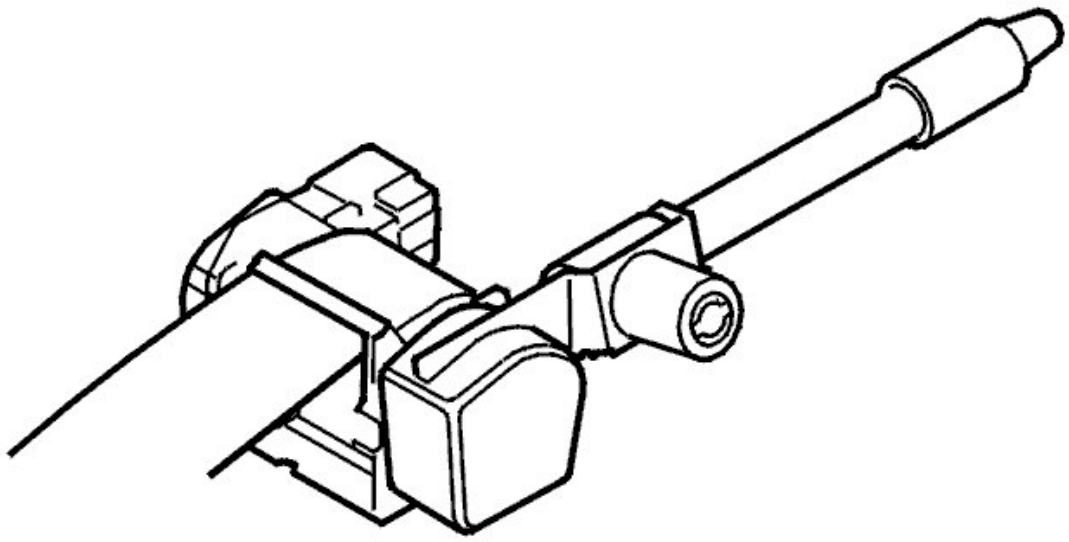
The Supplemental restraint system module (SRS) checks the circuit to the seat belt tensioner, center seat, rear.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

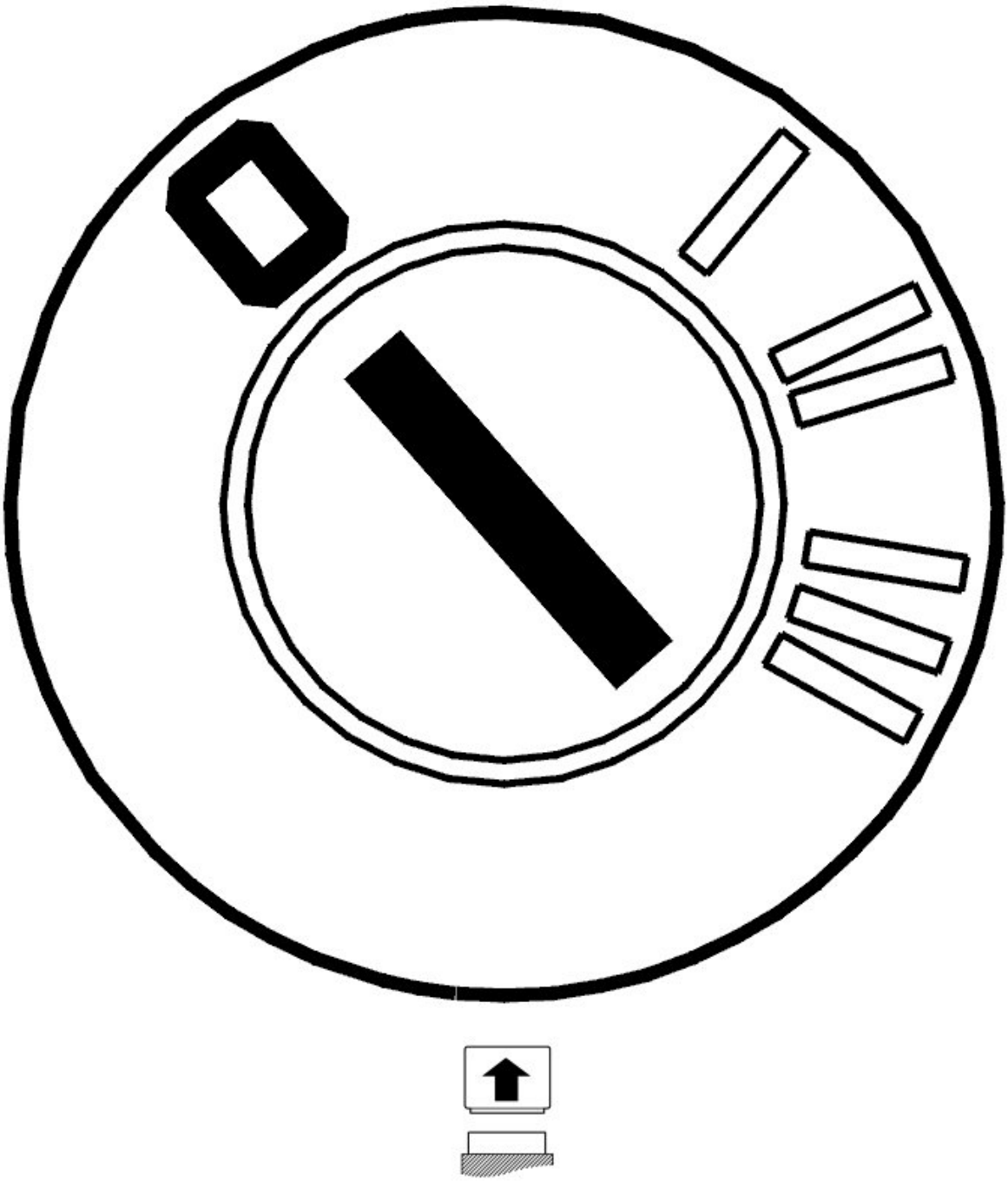
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the rear center seat belt tensioner.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected non-deployed seat belt tensioner. This could deploy the seat belt tensioner!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the seat belt tensioner.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

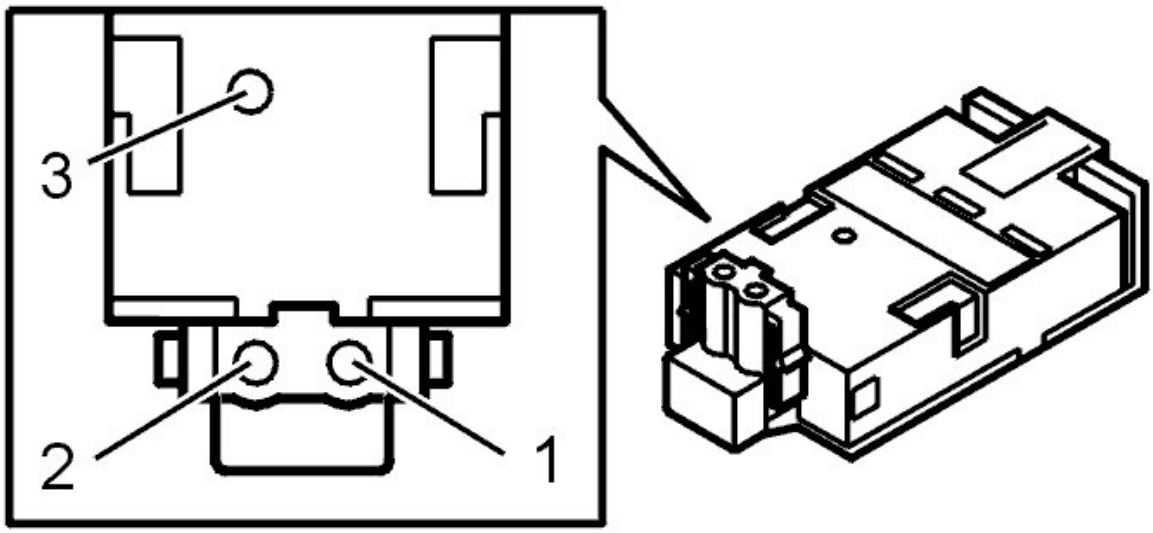
- The Supplemental restraint system module (SRS) #24C/80(20) and the connector to the seat belt tensioner, center seat, rear, #1.
- The Supplemental restraint system module (SRS) #23C/79(19) and the connector to the seat belt tensioner, center seat, rear, #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For further information, see the wiring diagram.
- Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

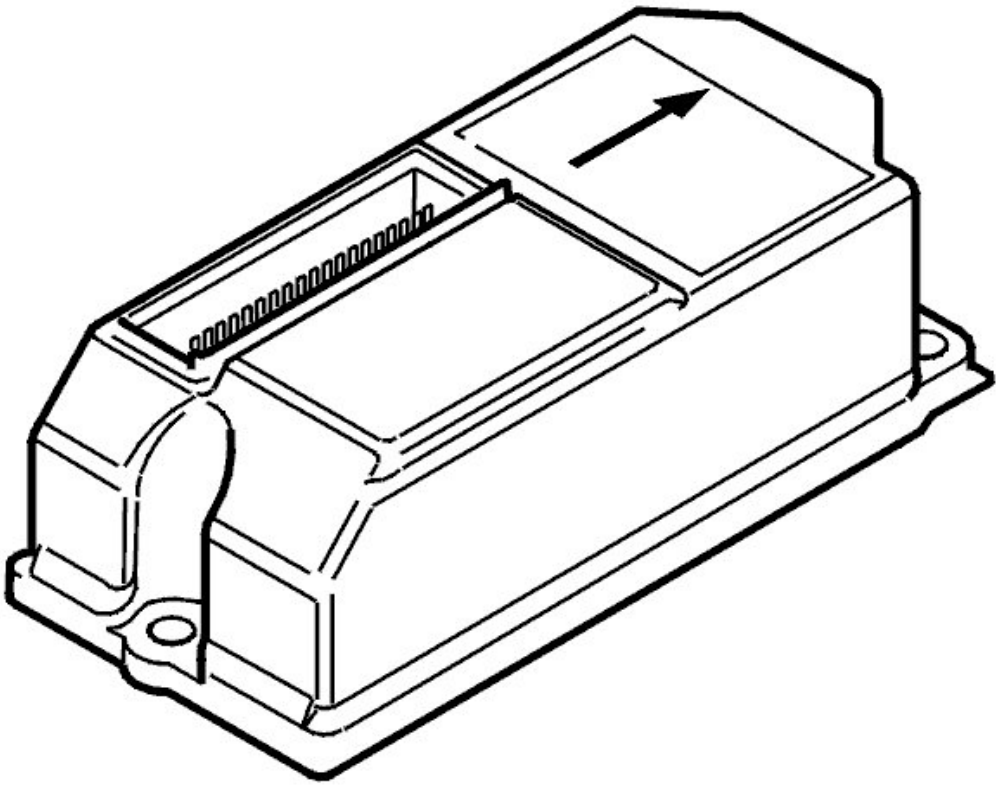
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-010F

Condition

Note! If there are other diagnostic trouble codes, that indicate the same component, stored in the Supplemental restraint system module (SRS) then these shall be taken care of first.

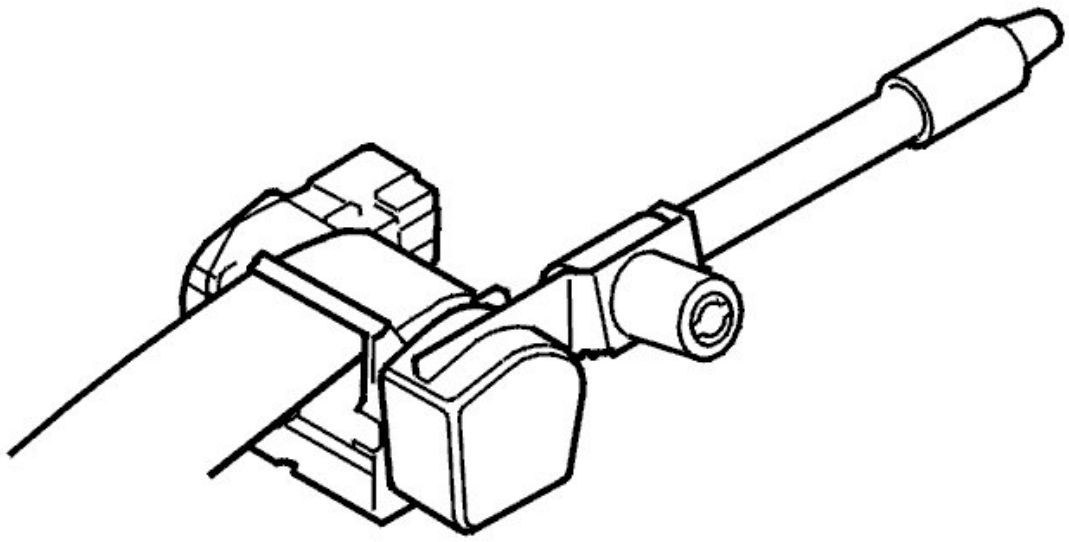
The Supplemental restraint system module (SRS) checks the circuit to the seat belt tensioner, right, rear.
The diagnostic trouble code (DTC) is stored if the control module detects that:

- There is interference in the circuit.
- Contact with the impact protection's ignition part is interrupted.

The control module's test for the diagnostic trouble code (DTC) starts in the event of:

- Ignition position I, II and III. Only during start-up of the supplemental restraint system.

Note! The control module can only detect the fault once the test has been started and the diagnostic trouble code (DTC) is stored when the conditions are met.



Substitute value
- None.

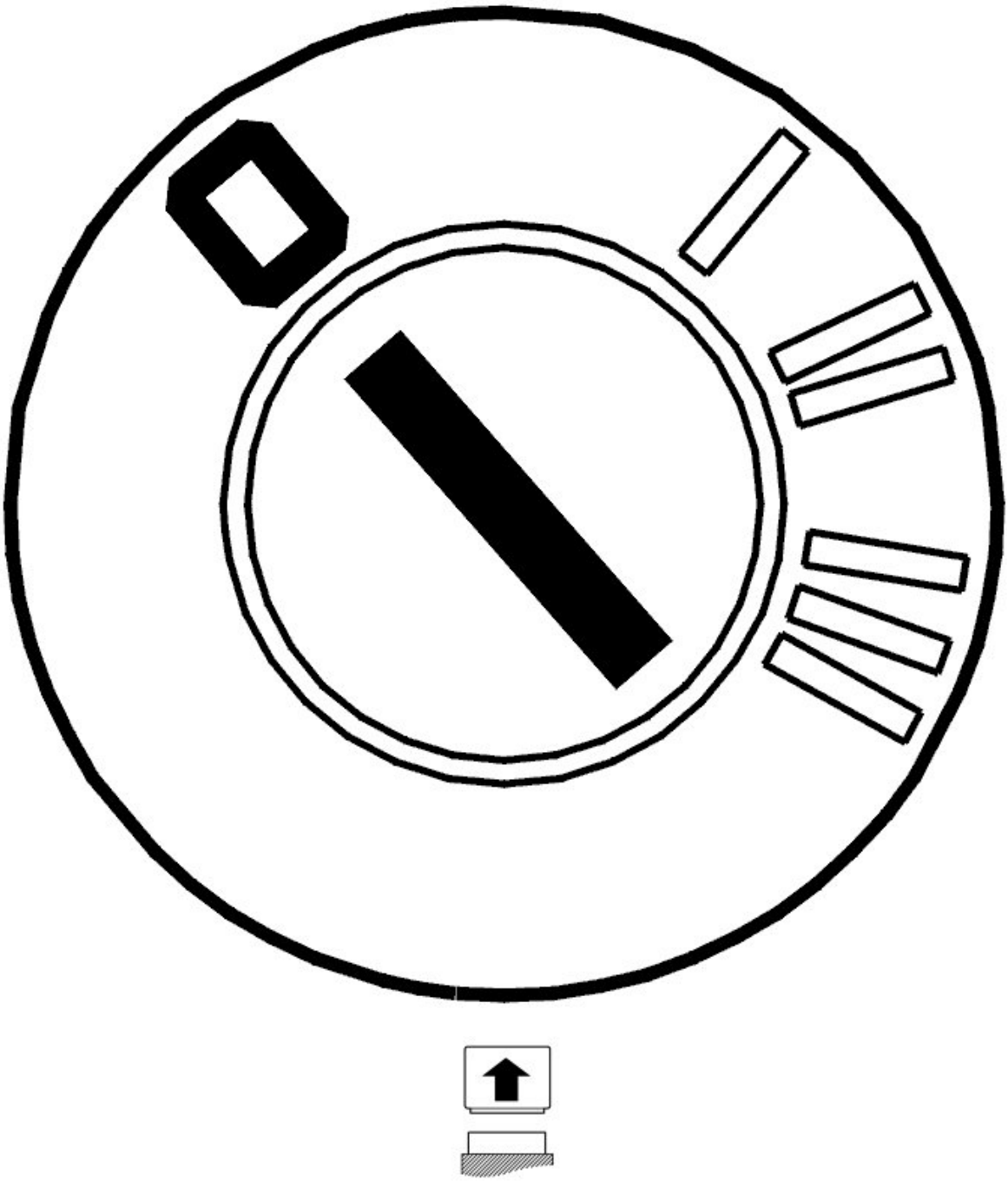
Possible source
- Contact resistance, oxidation or poor contact in connections.
- Damaged supplemental restraint system module (SRS).

Fault symptom[s]
- SRS warning light on

Circuit Error

Circuit error

Checking the wiring



- Ignition off, wait for 10 seconds.
- Disconnect the connector from the rear right-hand seat belt tensioner.
- Disconnect the connector for Supplemental restraint system module (SRS).

Warning! Under no circumstances use an ohmmeter or other live measuring instrument to take readings on a disconnected non-deployed seat belt tensioner. This could deploy the seat belt tensioner!

Check connectors for damage to pins and connections.
Check the connectors. Check for loose connections. Check for contact resistance. Check for oxidation.
Also check other connectors and terminals that connect the wiring between the Supplemental restraint system module (SRS) and the seat belt tensioner.
Check the cable. Check for loose connections. Check for an open-circuit. Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Take readings between:

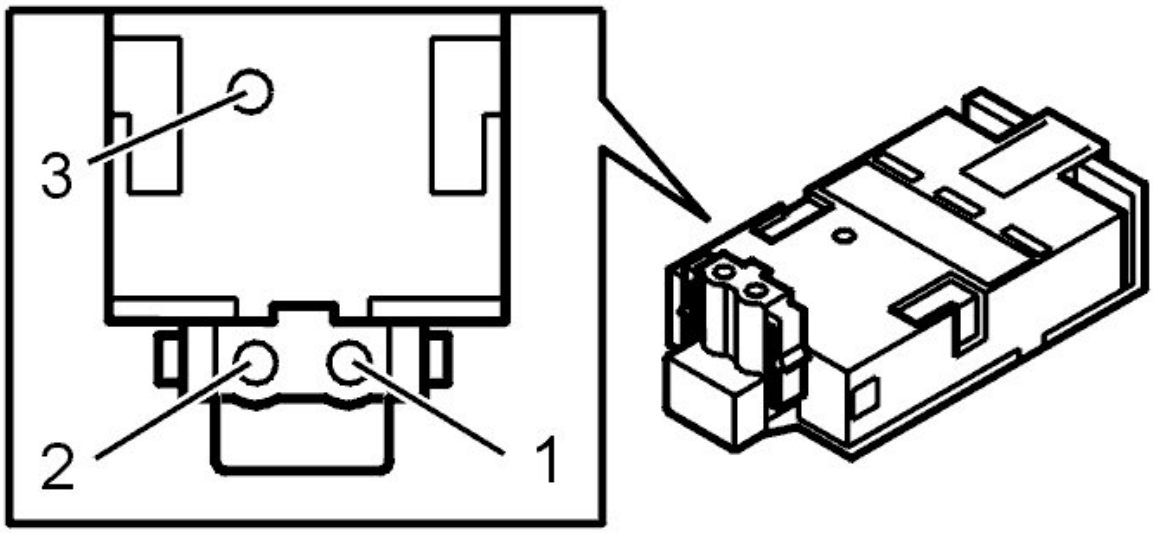
- The Supplemental restraint system module (SRS) terminal #16C/72(12) and the connector to the seat belt tensioner, right rear, terminal #1.
- The Supplemental restraint system module (SRS) terminal #15C/71(11) and the connector to the seat belt tensioner, right rear, terminal #3.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)

- For further information, see the wiring diagram.
- Seat belts, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt/Service and Repair/Seat Belts, Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures



Continue - Replacing the control module

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the wiring

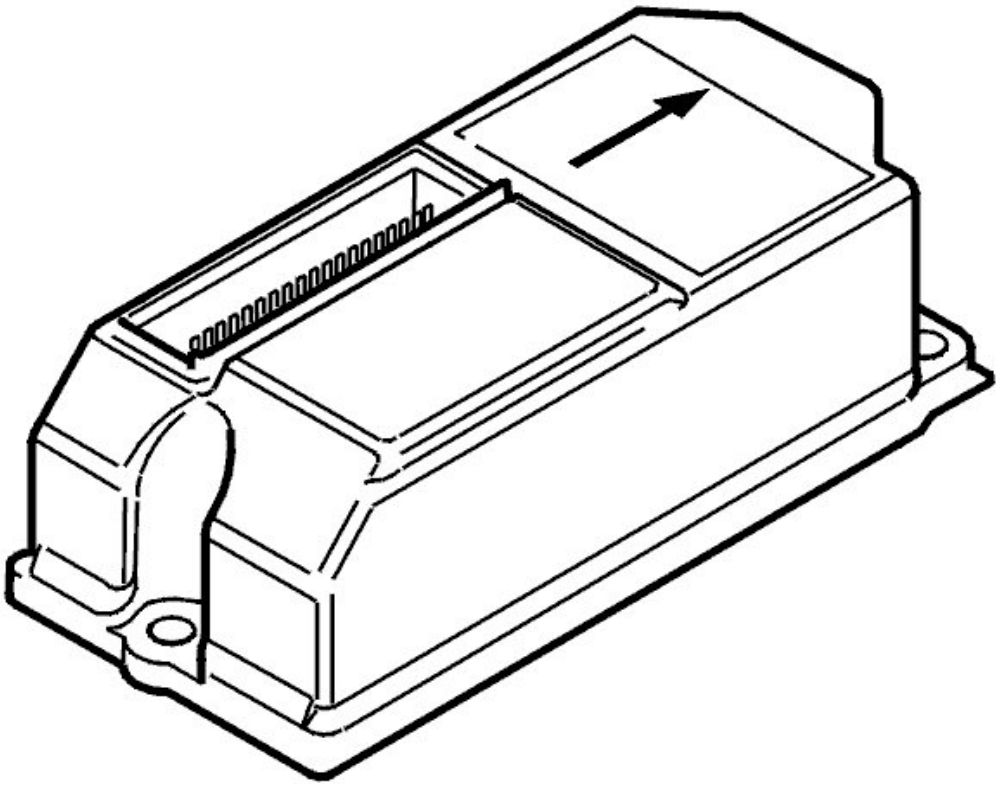
Replacing the control module

Note! Troubleshooting on connectors and wiring must be done before the control module may be replaced.

Since the malfunction may result in internal functions in the Supplemental restraint system module (SRS) not working, the control module must be replaced.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

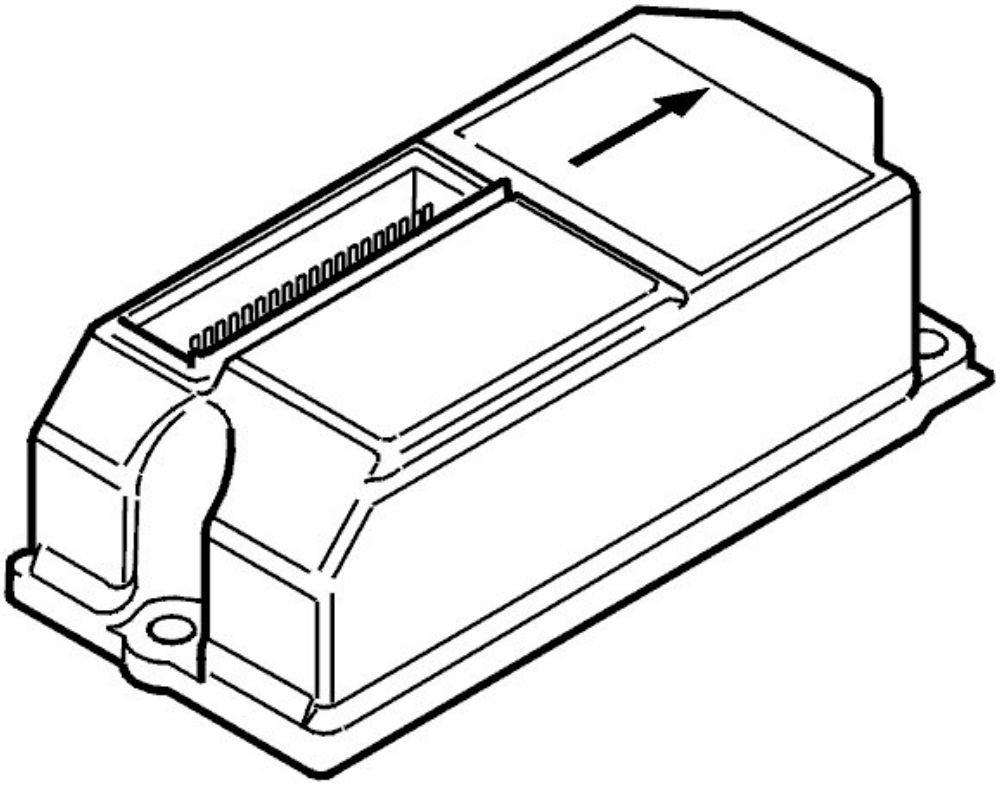


Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

SRS-0110 Diagnostic trouble code information

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0110 is displayed.

Possible source
- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]
- SRS warning lamp on.

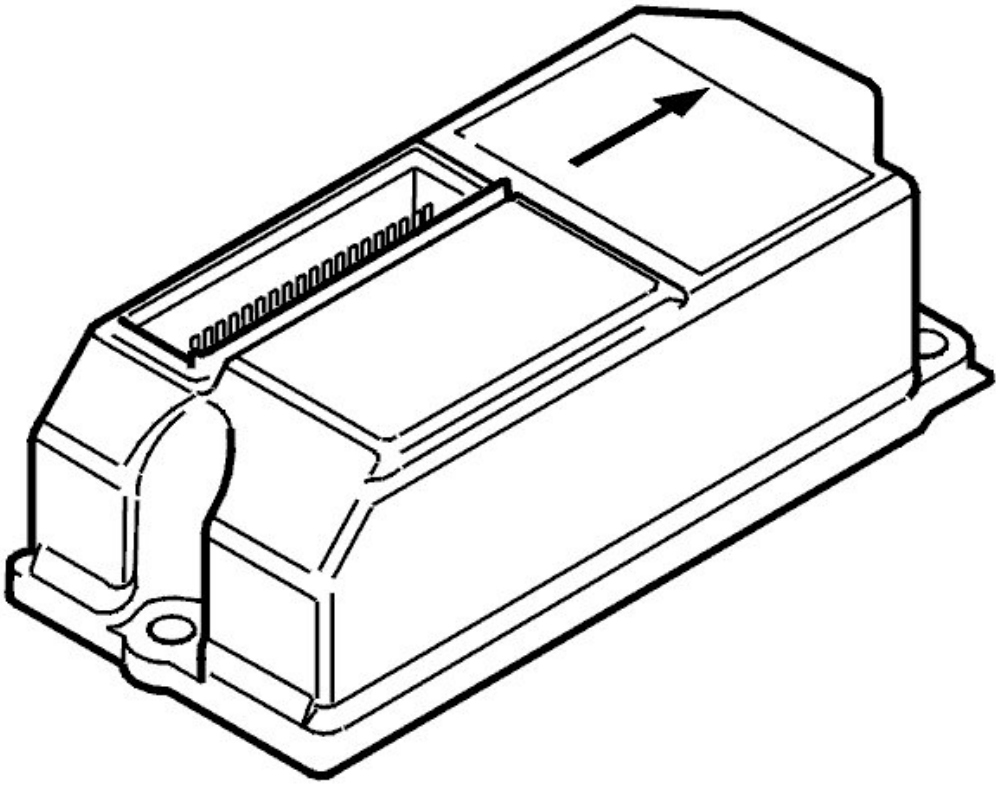
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

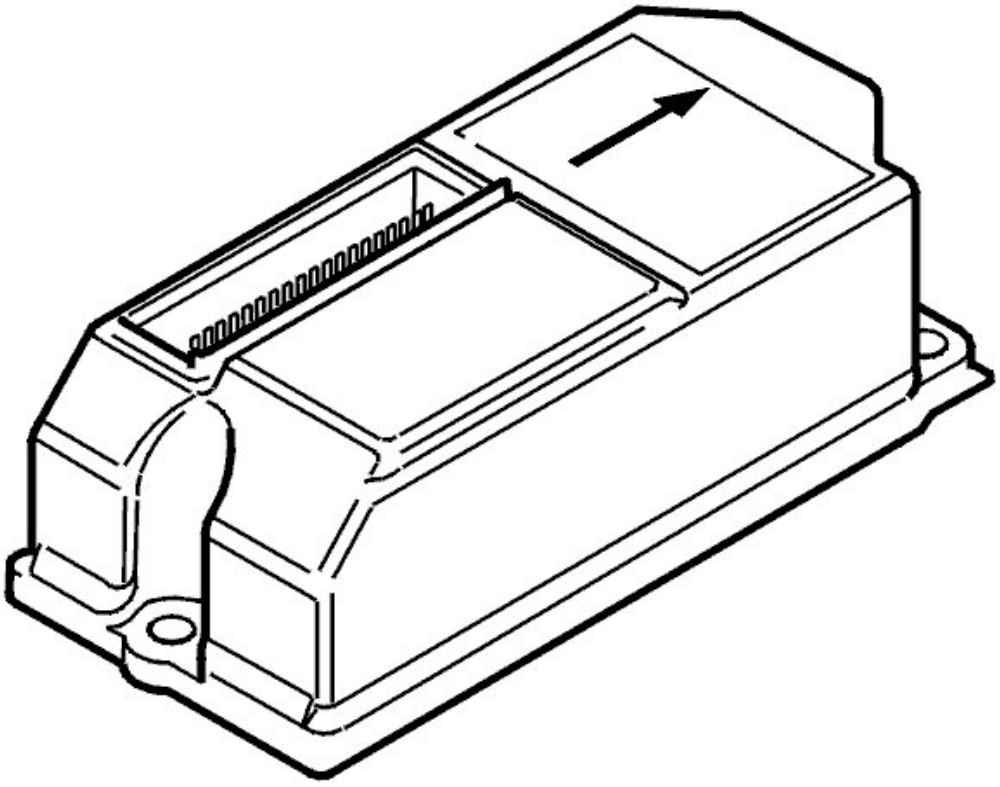
Attempt New Test - Replacing and programming the SRS control module

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0110 Diagnostic trouble code information

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0110 is displayed.

Possible source
- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]
- SRS warning lamp on.

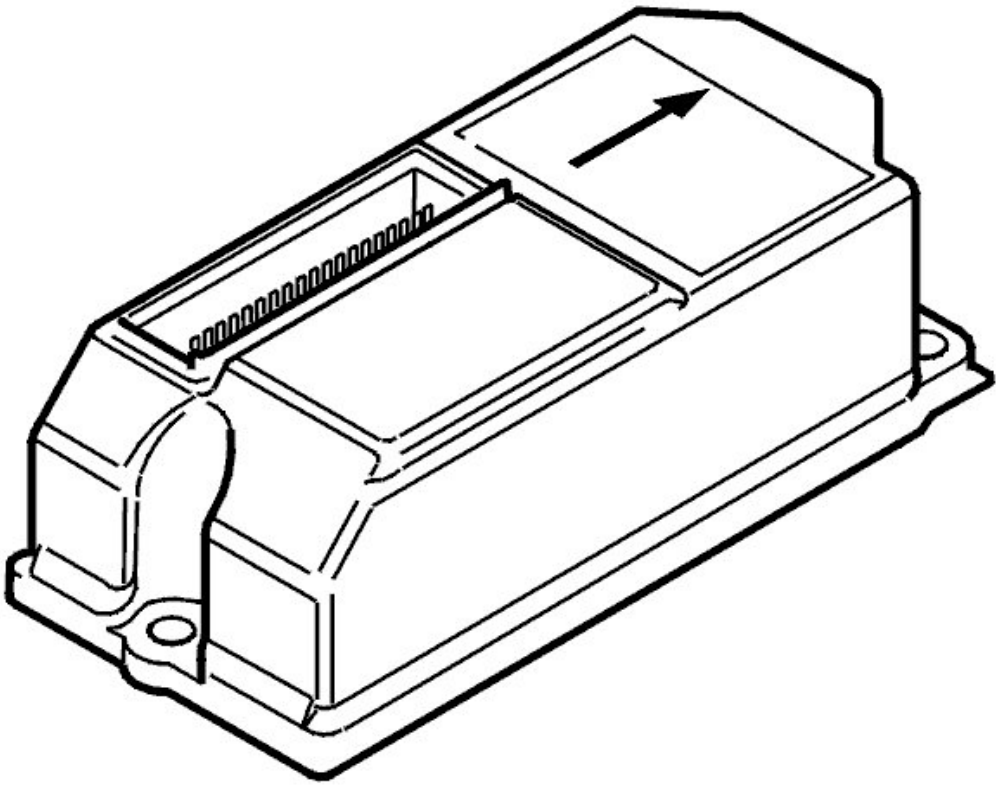
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

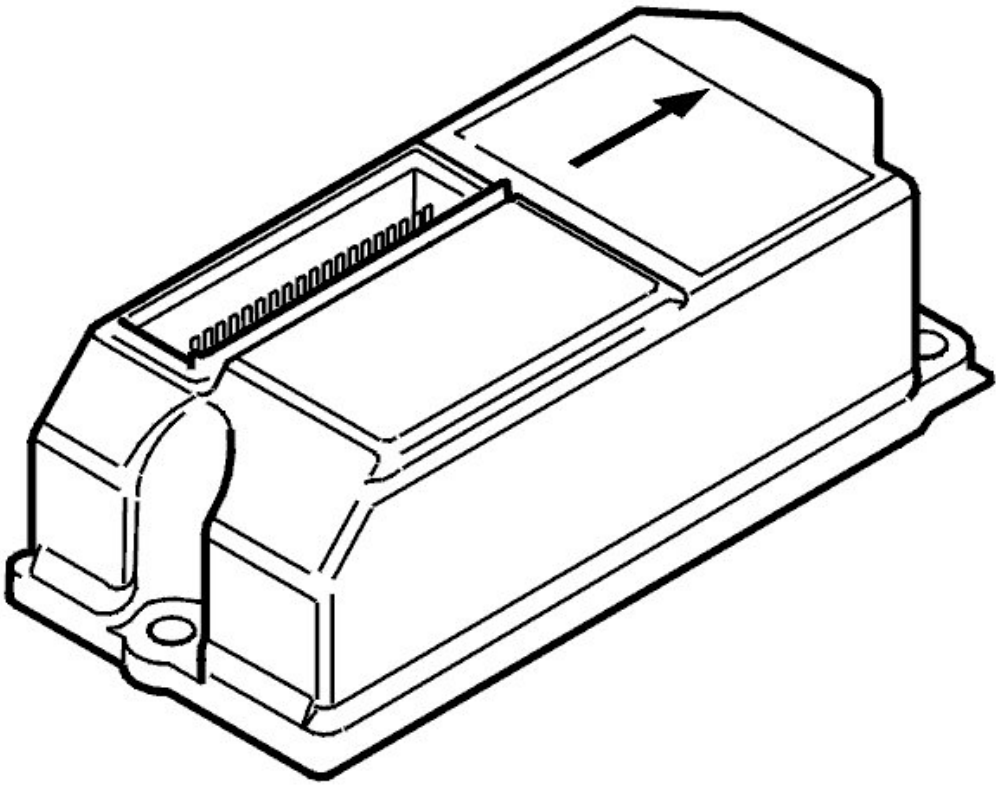
Attempt New Test - Replacing and programming the SRS control module

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0111 Diagnostic trouble code information

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0111 is displayed.

Possible source
- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]
- SRS warning lamp on.

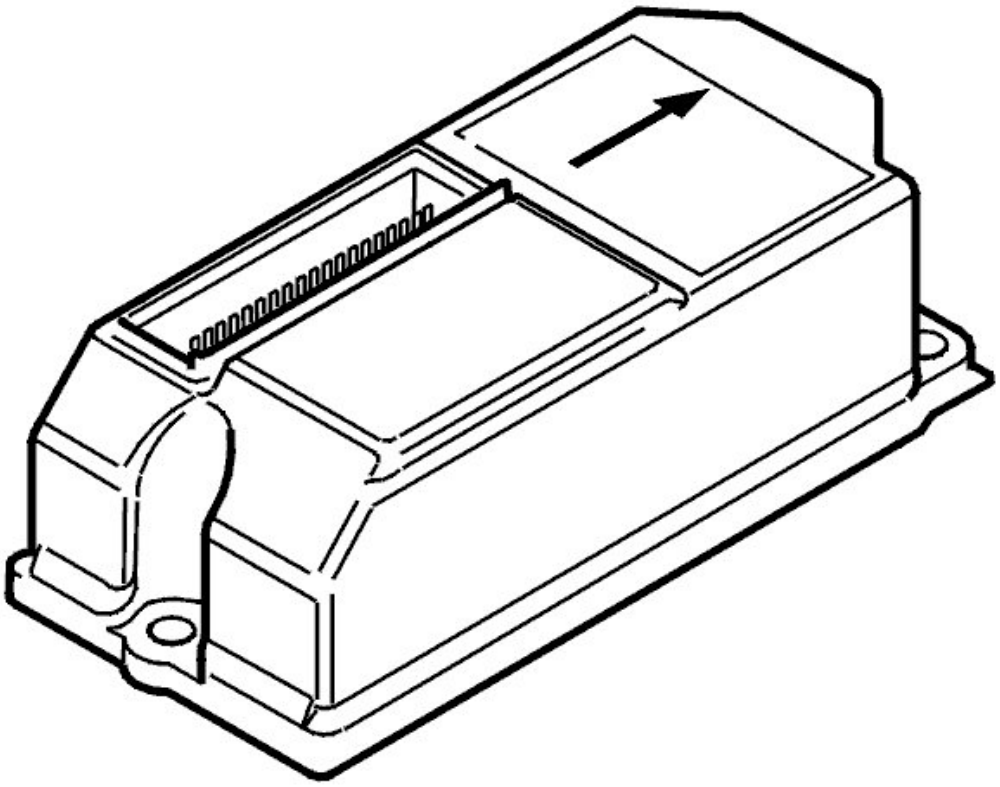
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

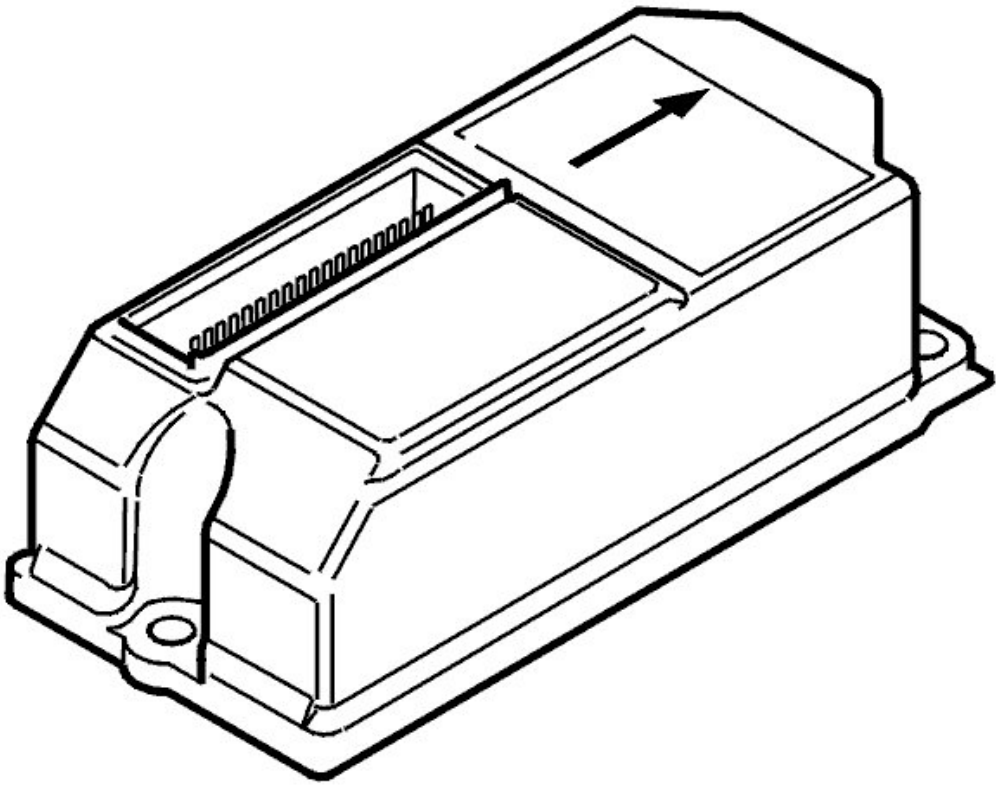
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0111 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0111 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

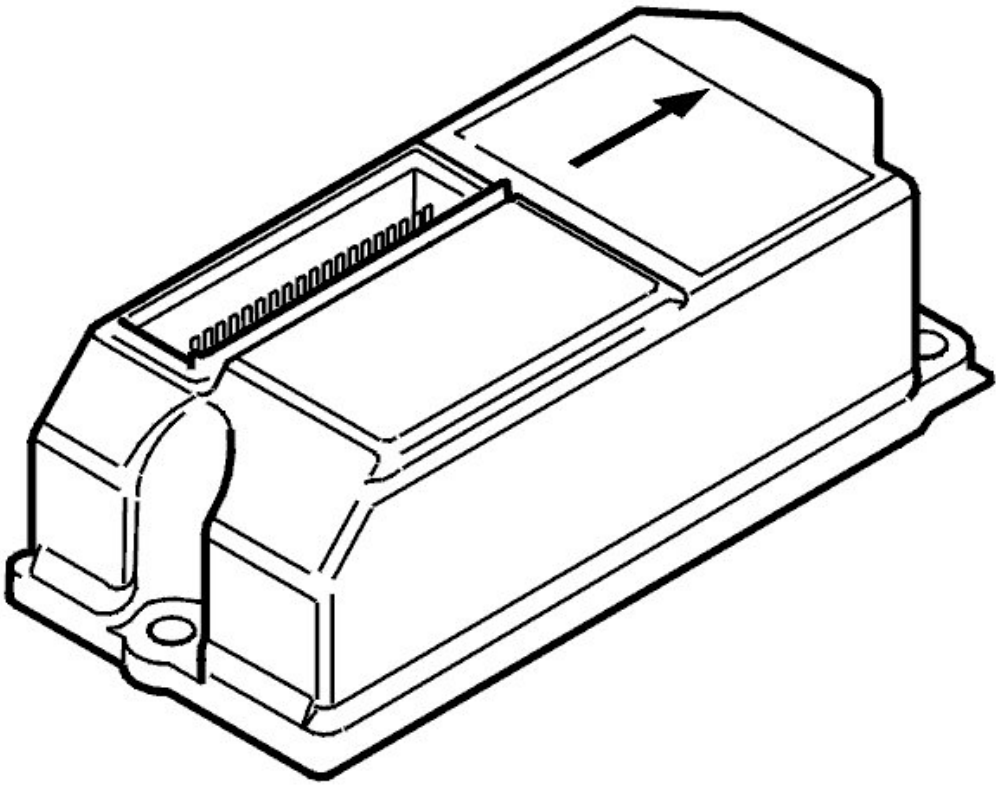
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

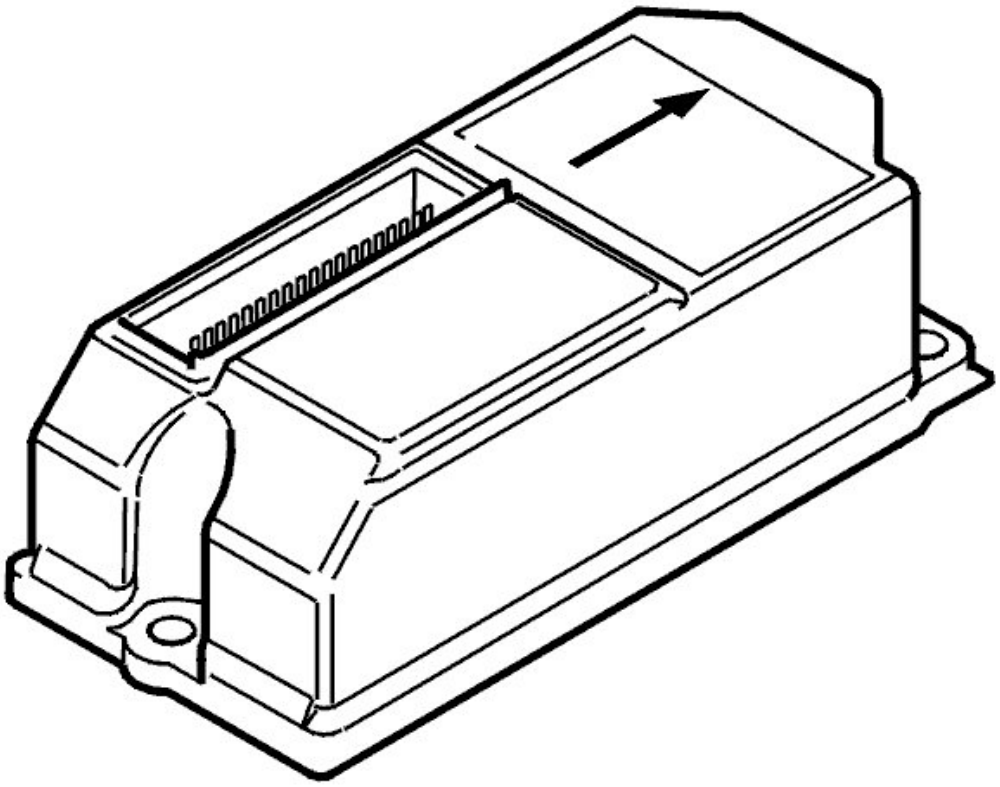
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0112 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0112 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

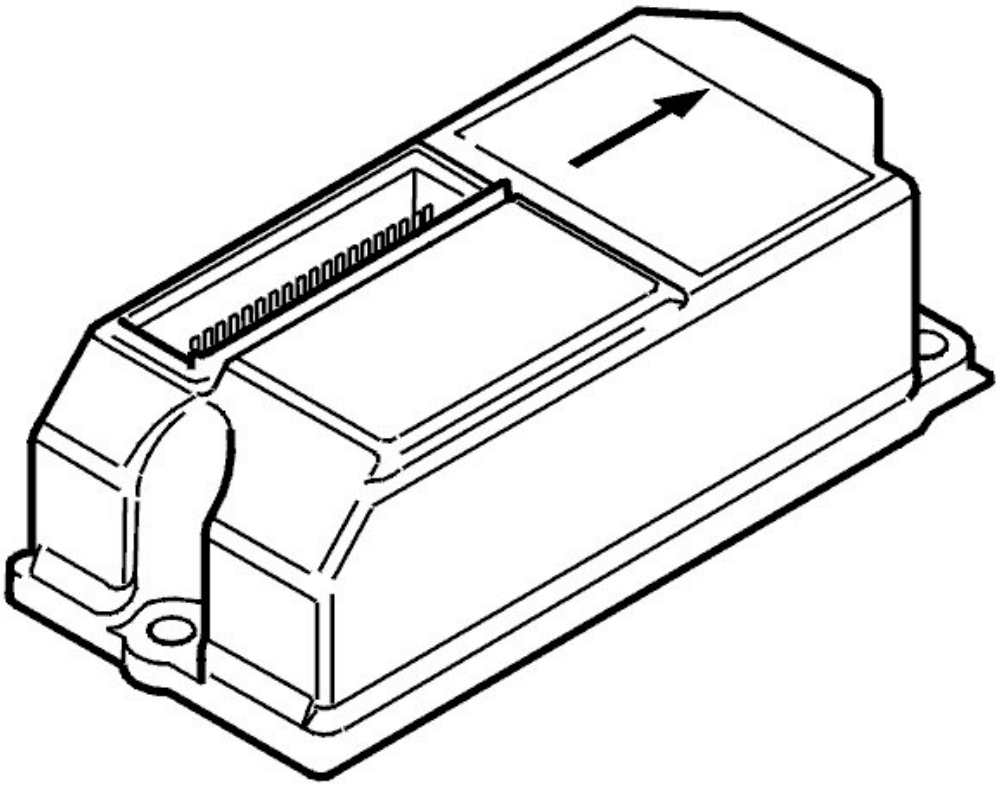
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

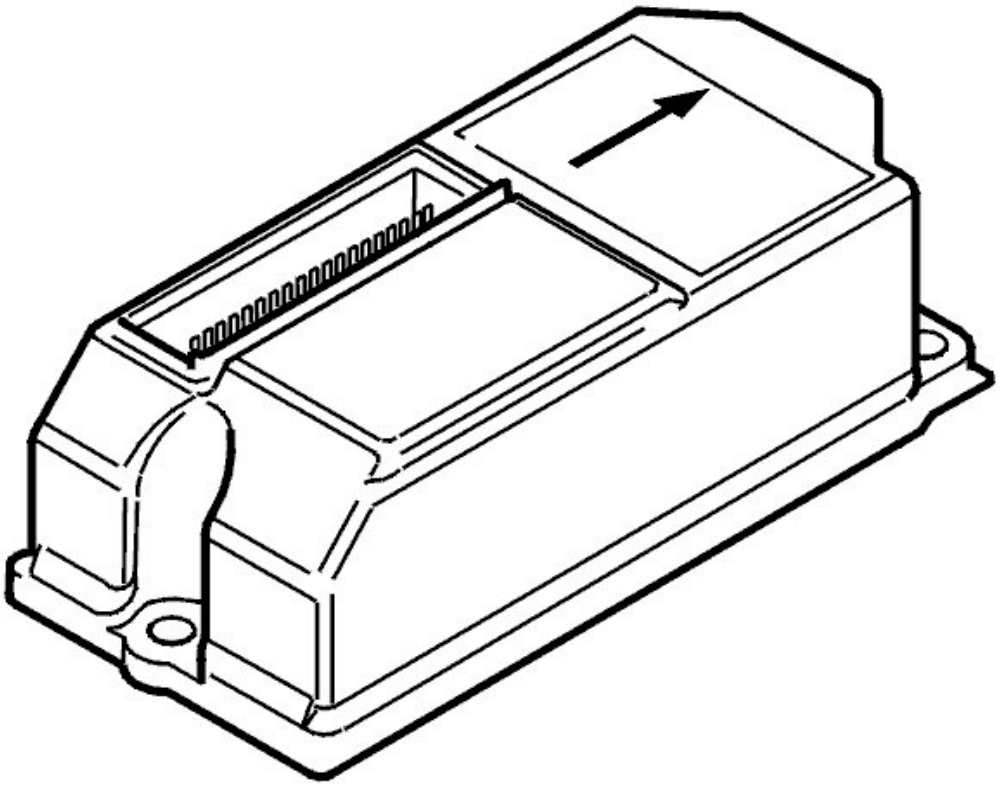
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0112 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0112 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

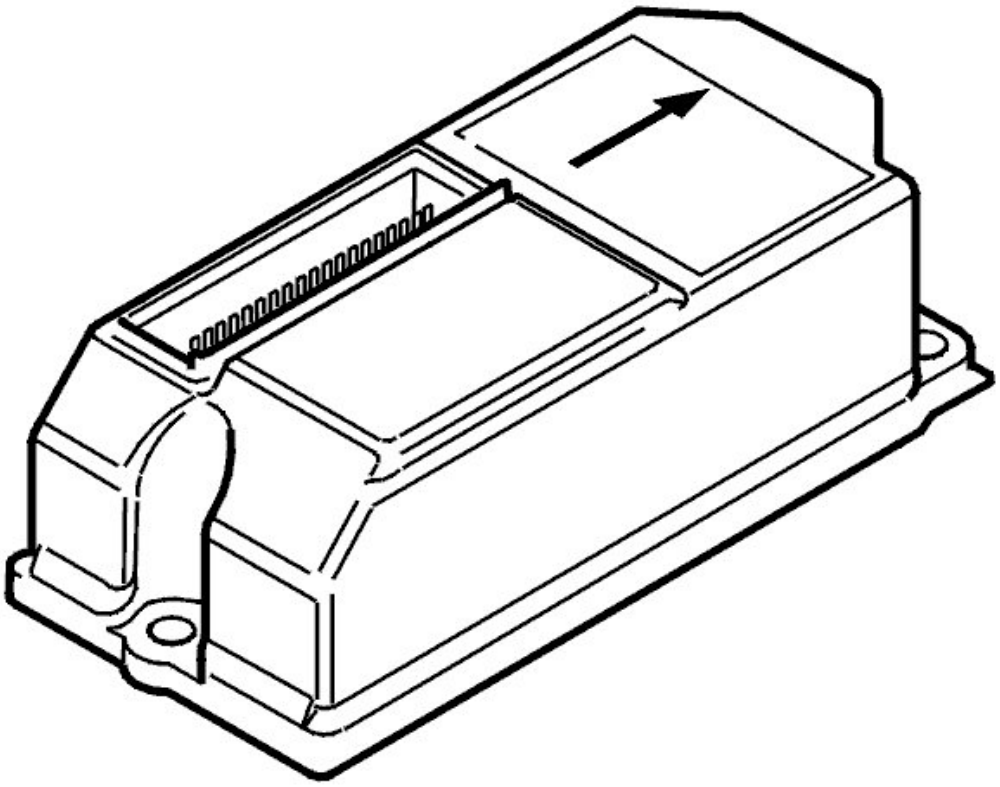
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

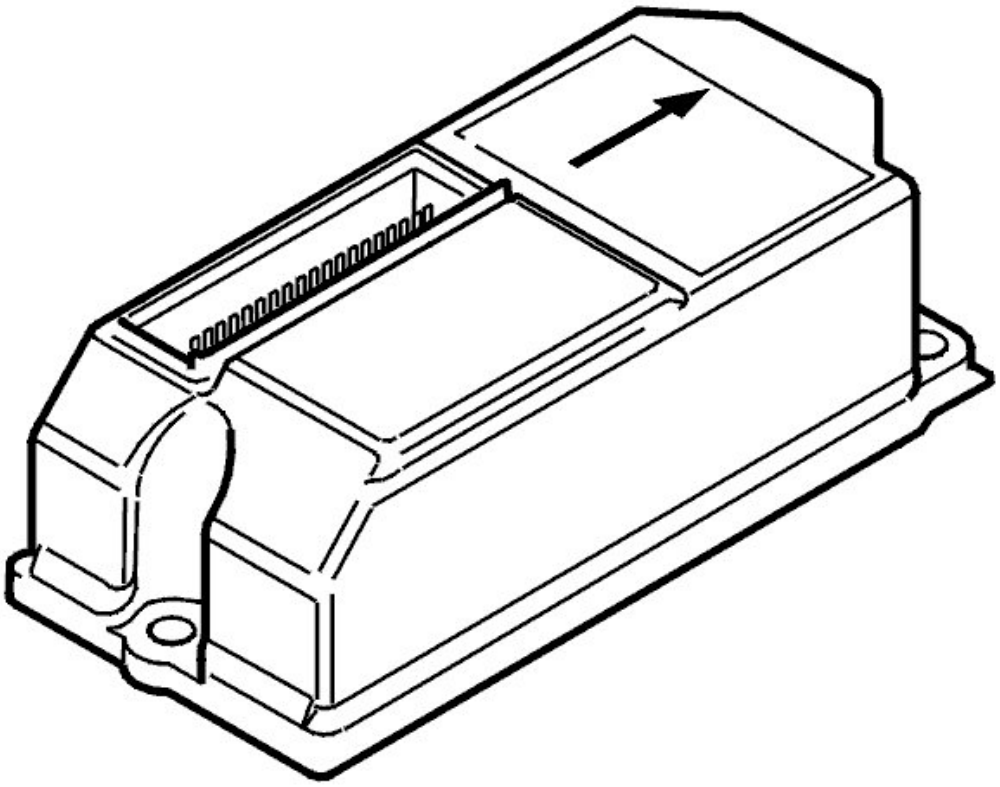
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0113 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0113 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

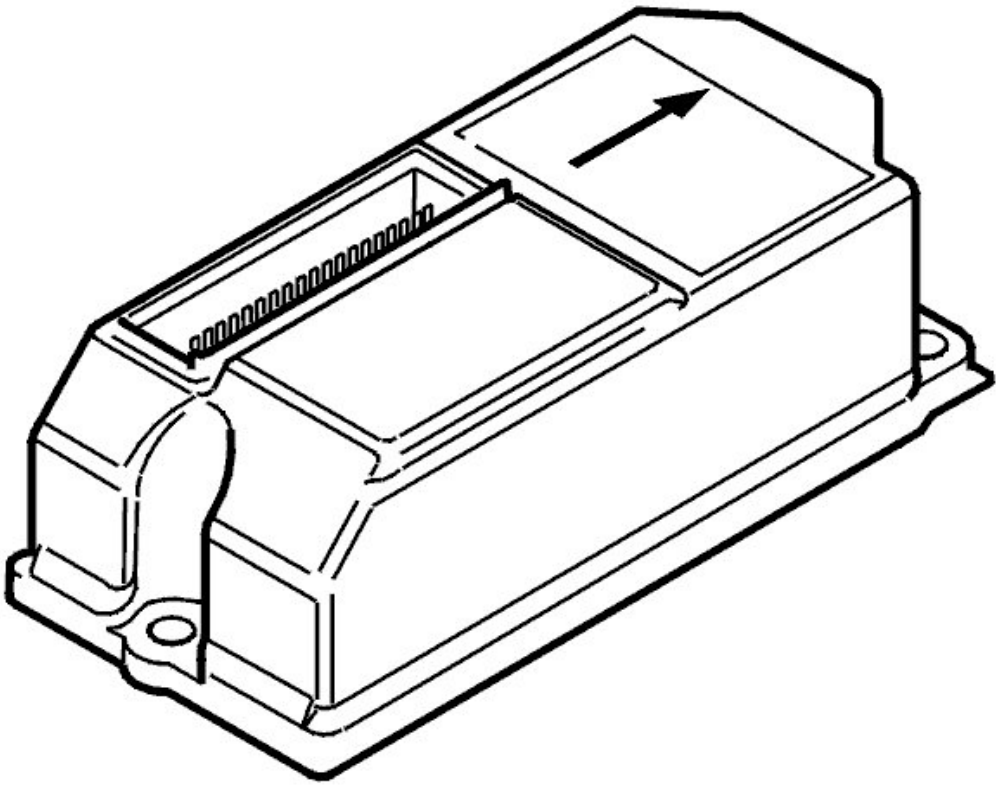
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

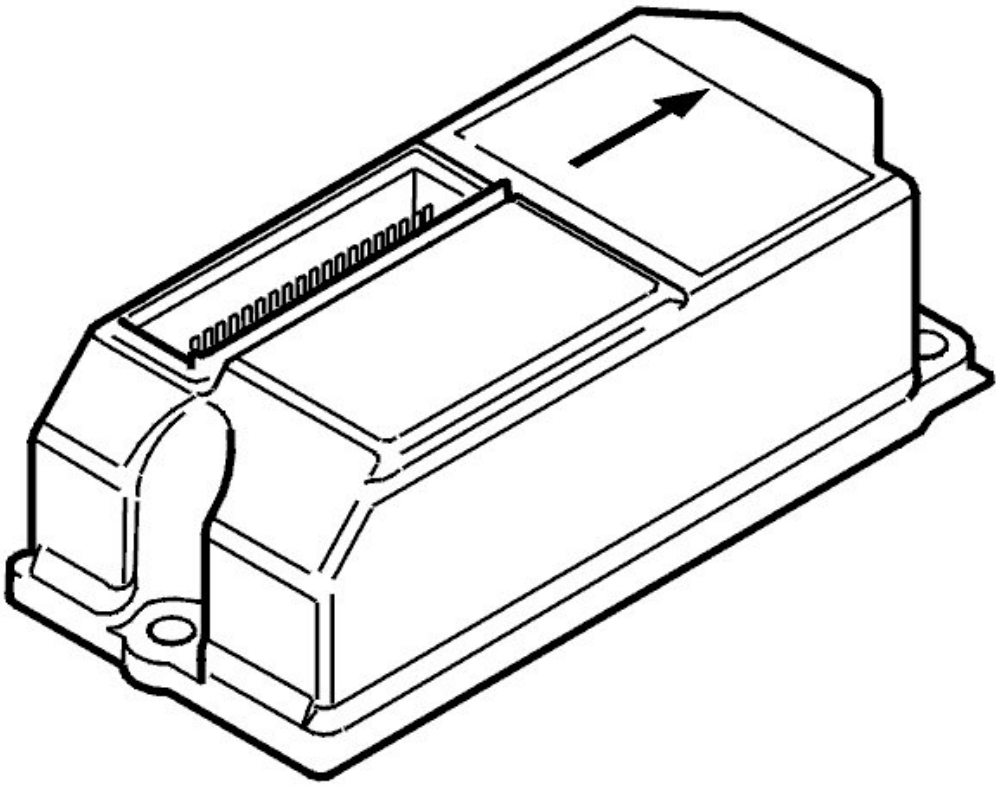
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0113 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0113 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

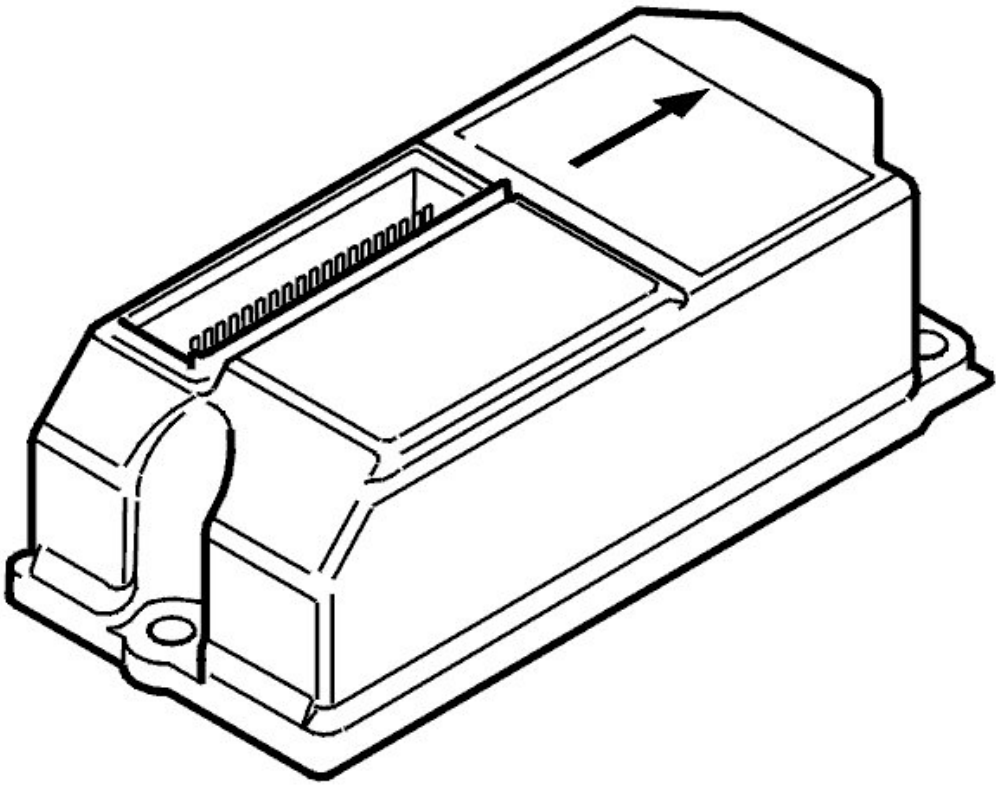
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

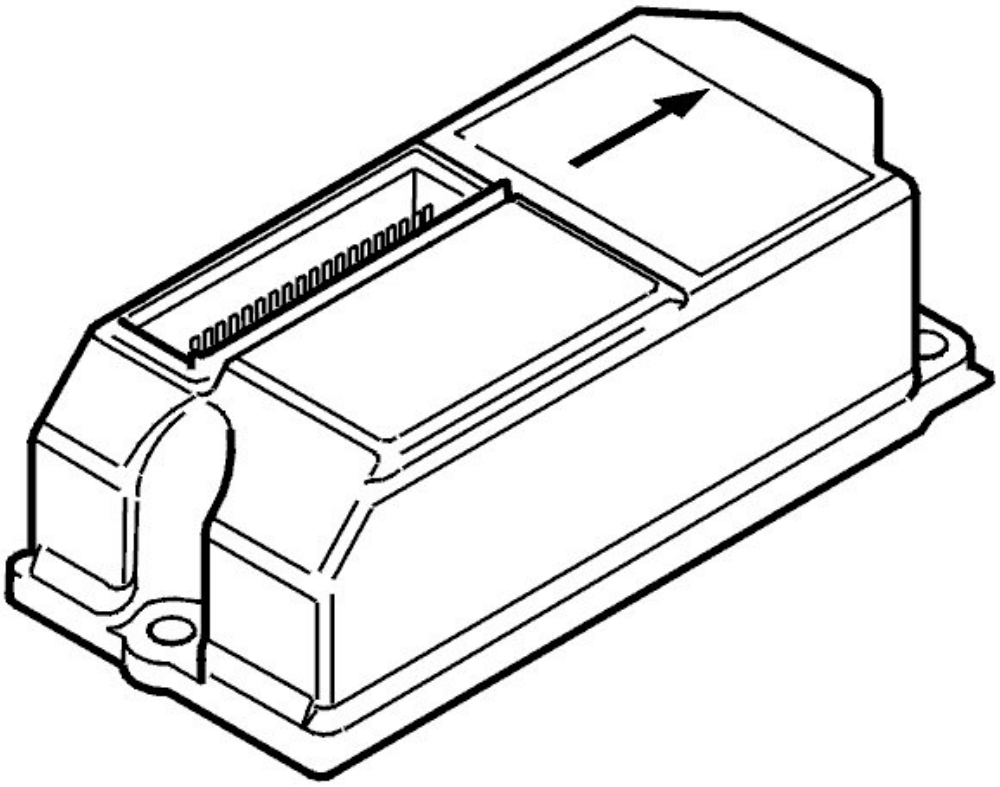
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0114 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0114 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

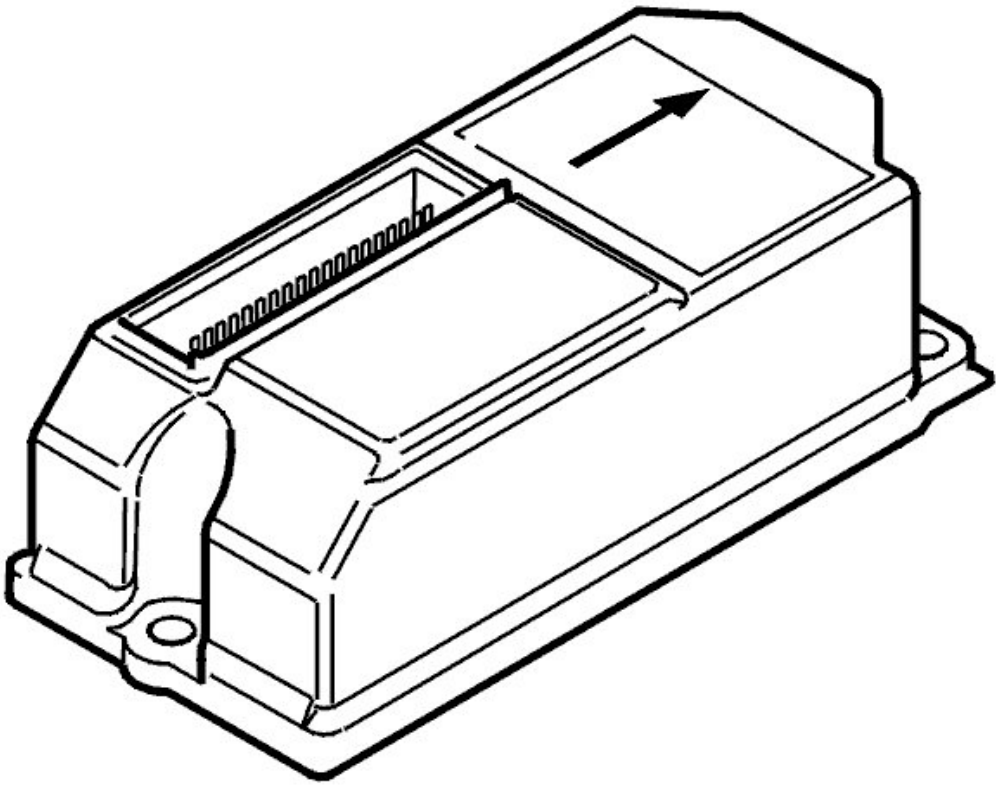
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

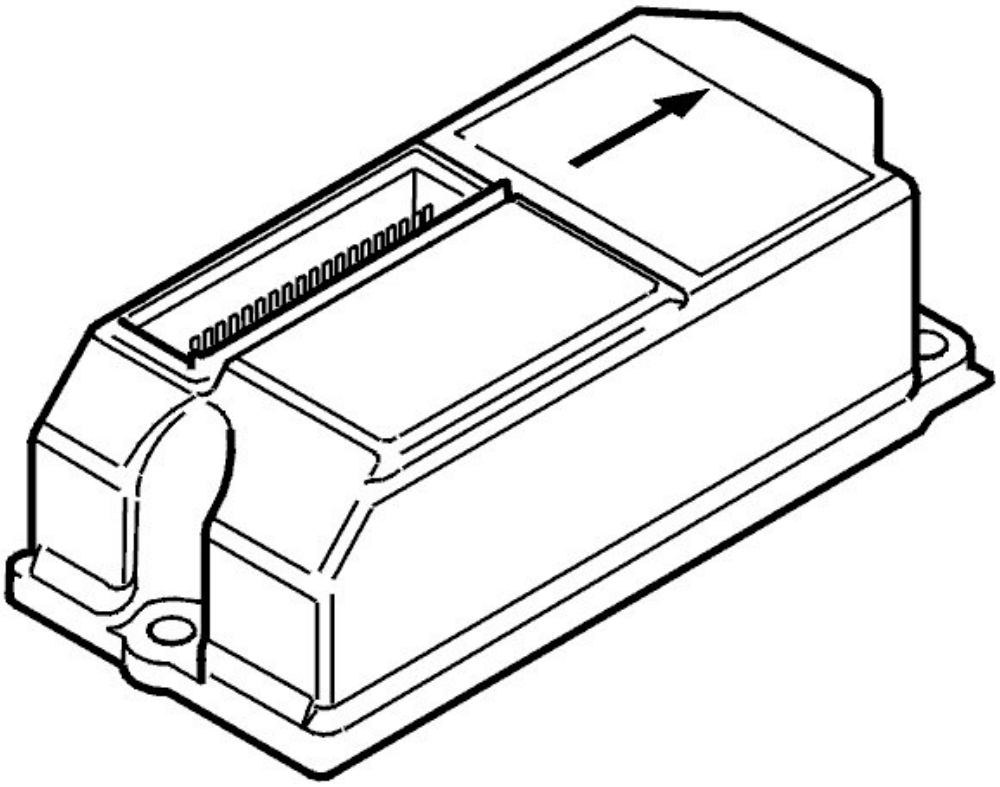
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0114 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0114 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

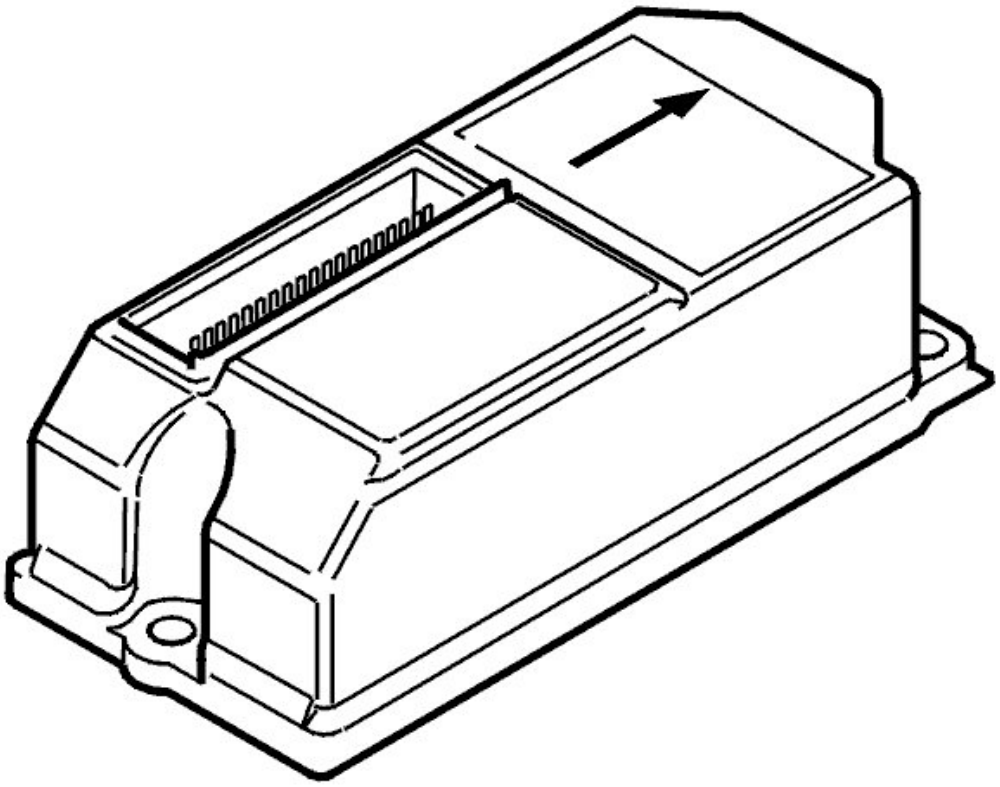
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

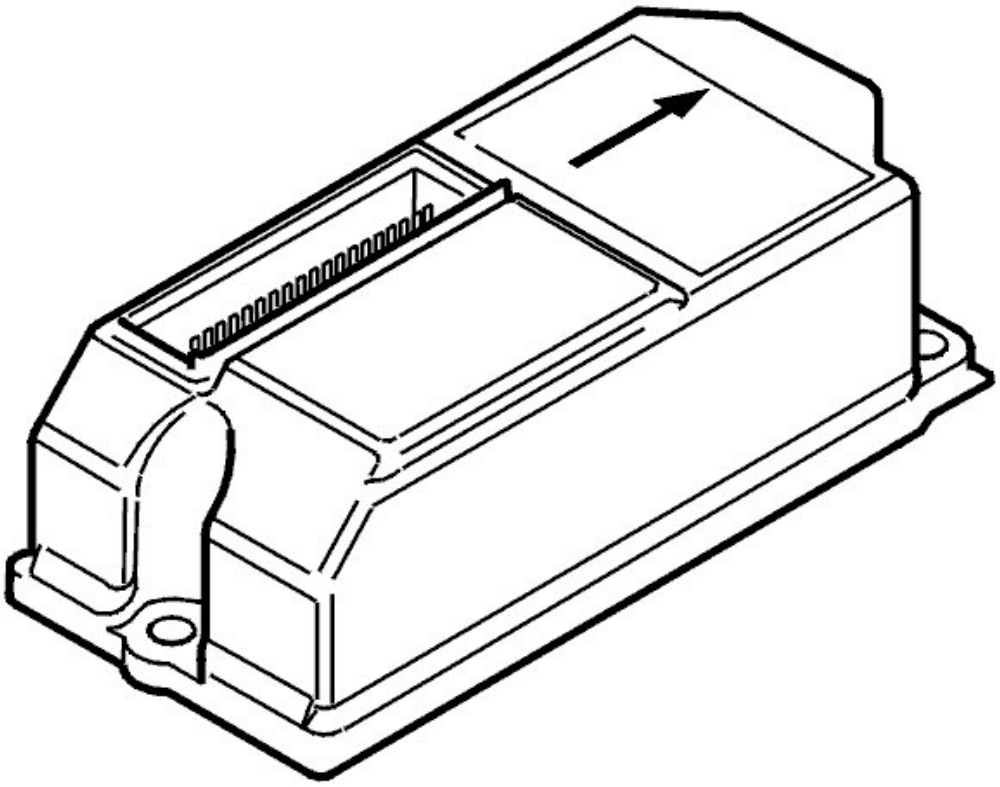
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0115 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0115 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

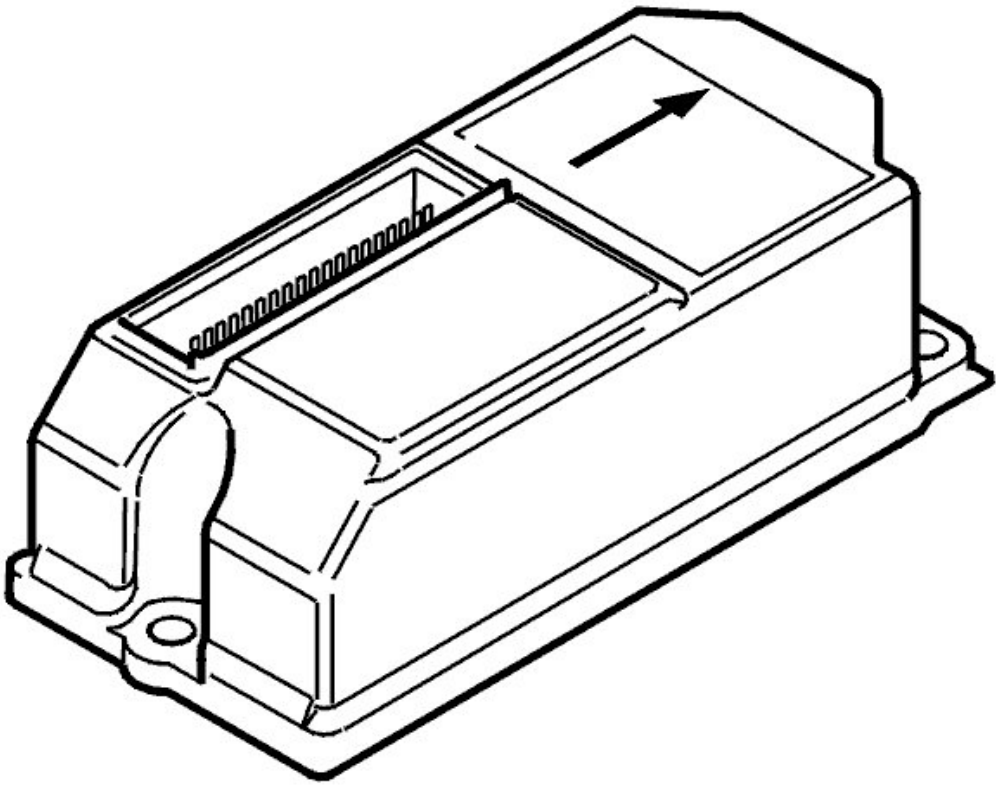
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

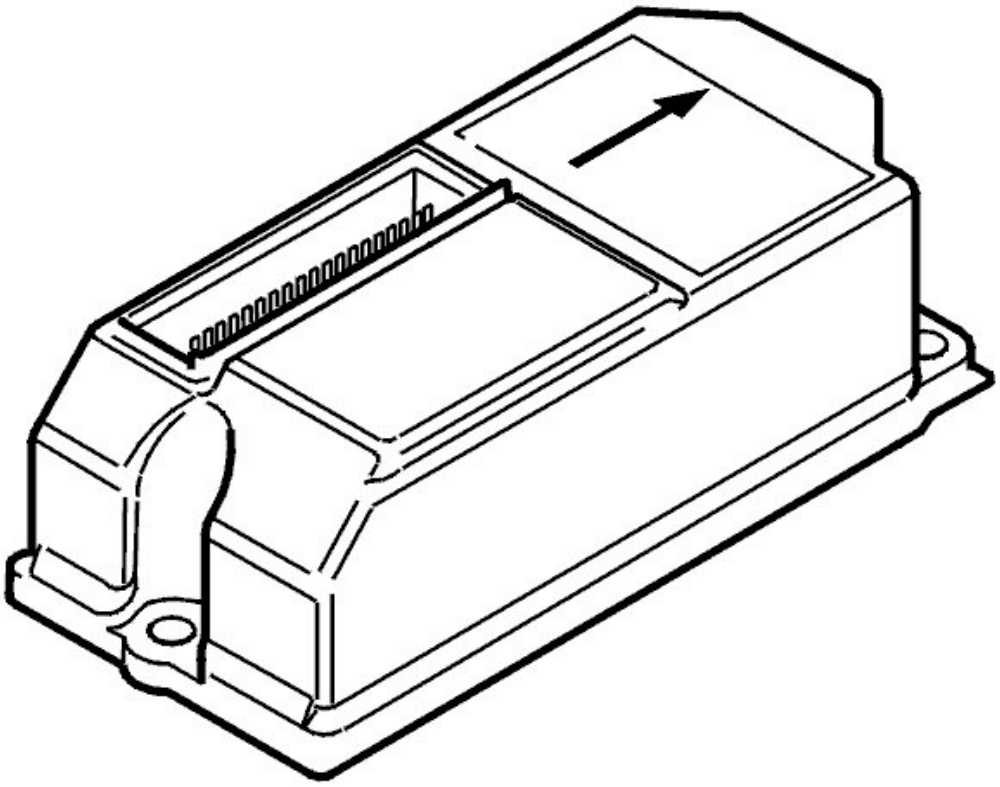
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0115 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0115 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

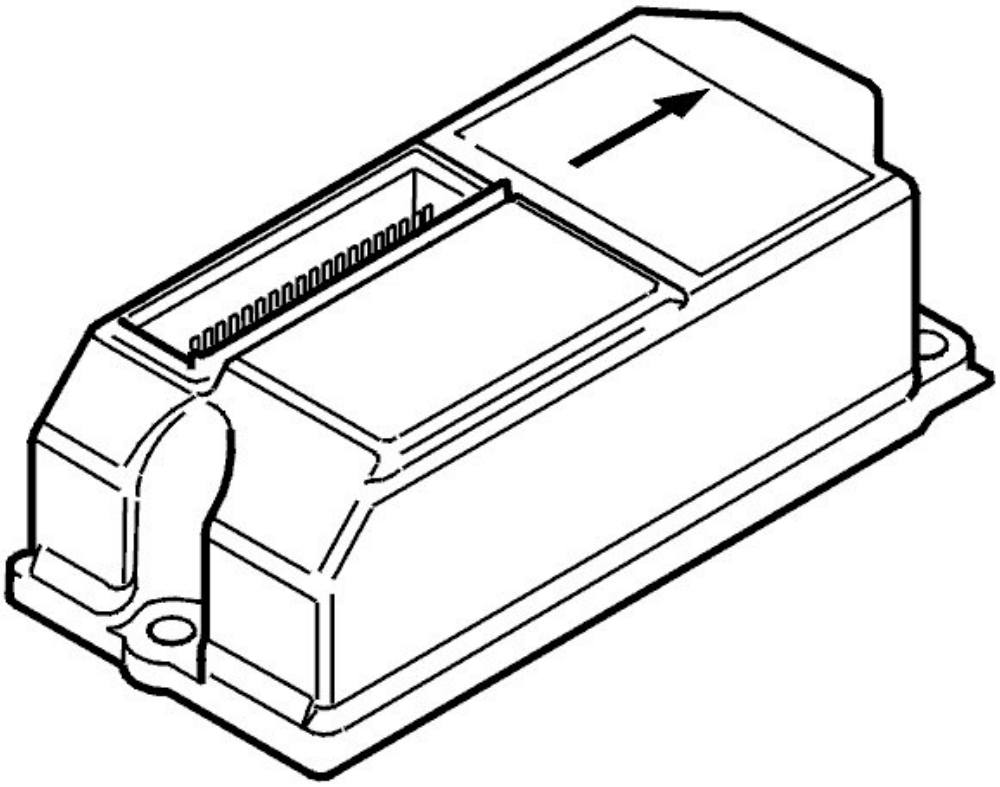
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

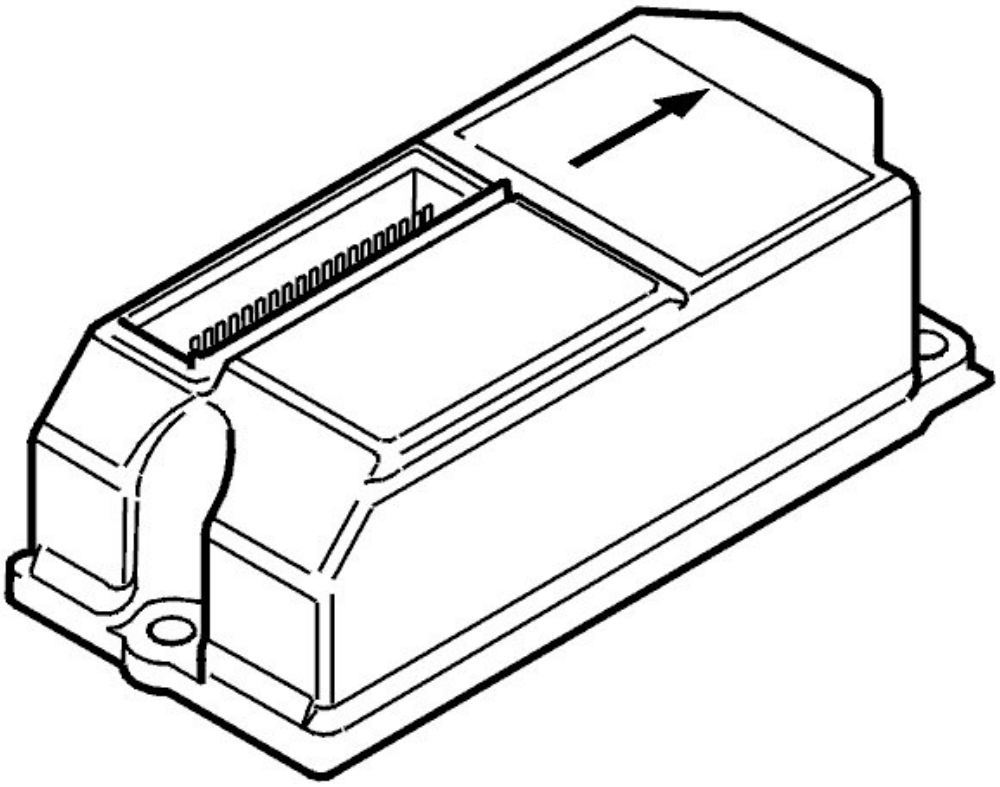
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-011A Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011A is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

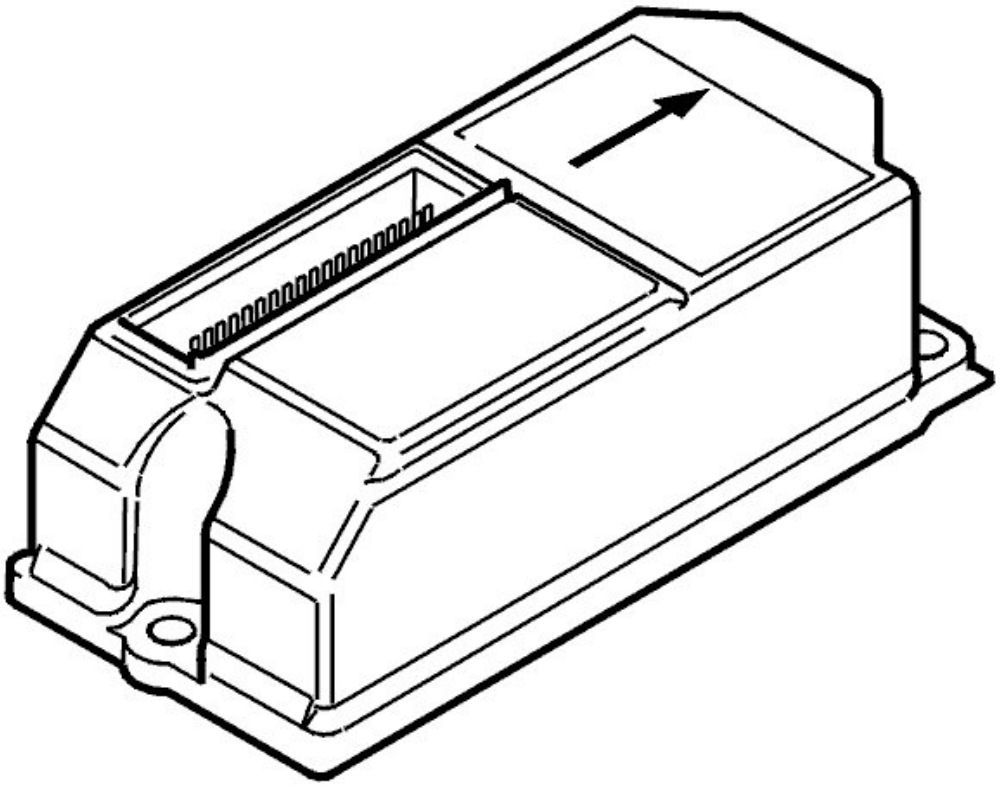
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

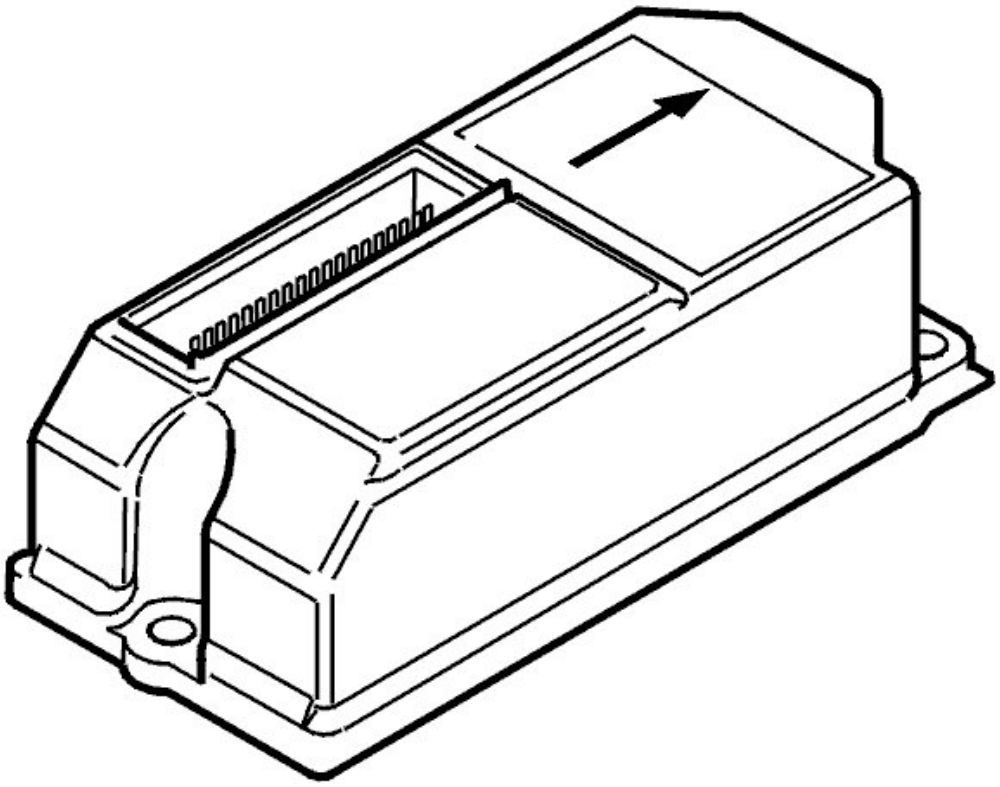
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-011A Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011A is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

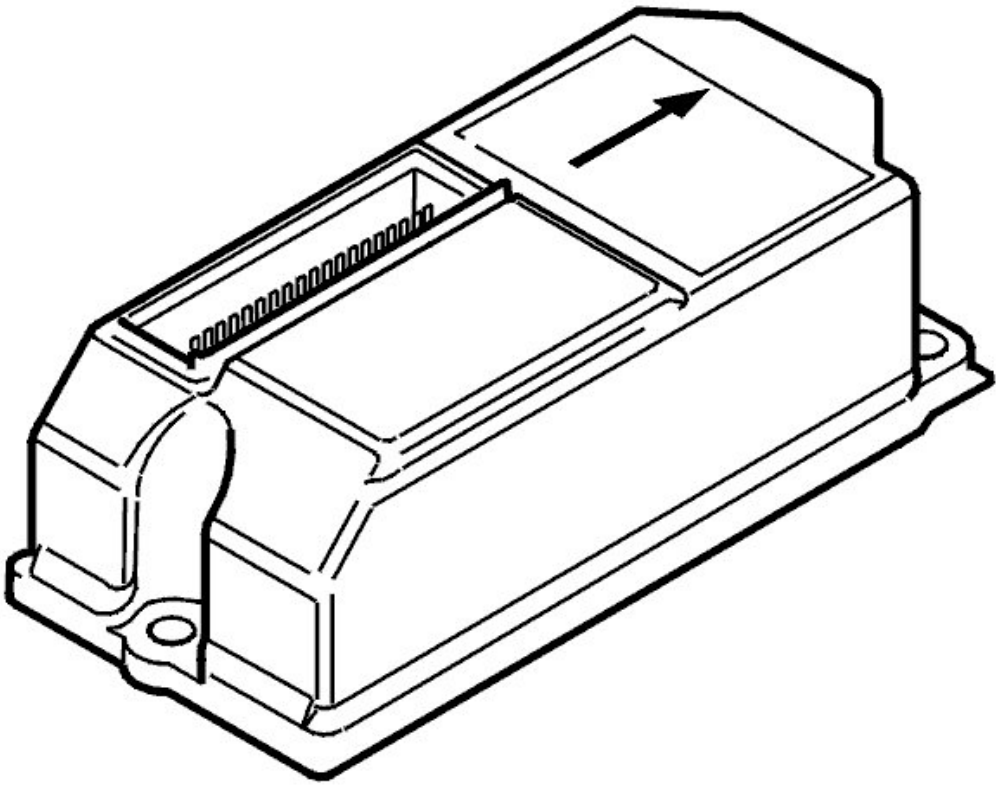
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

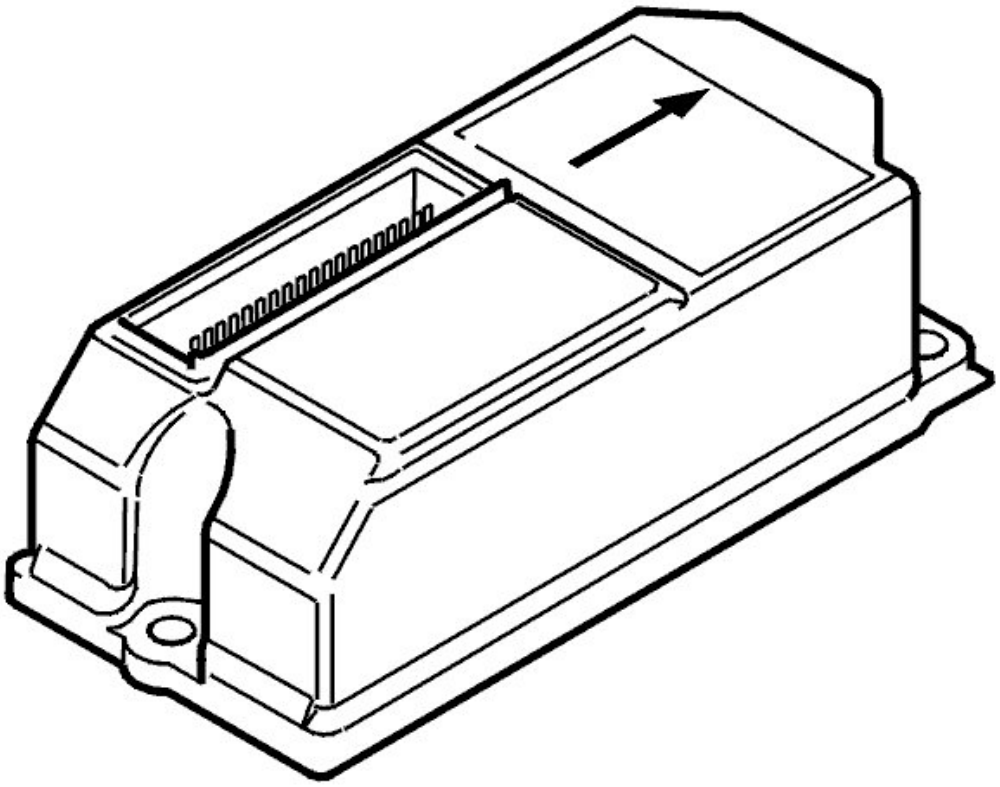
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011B Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011B is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

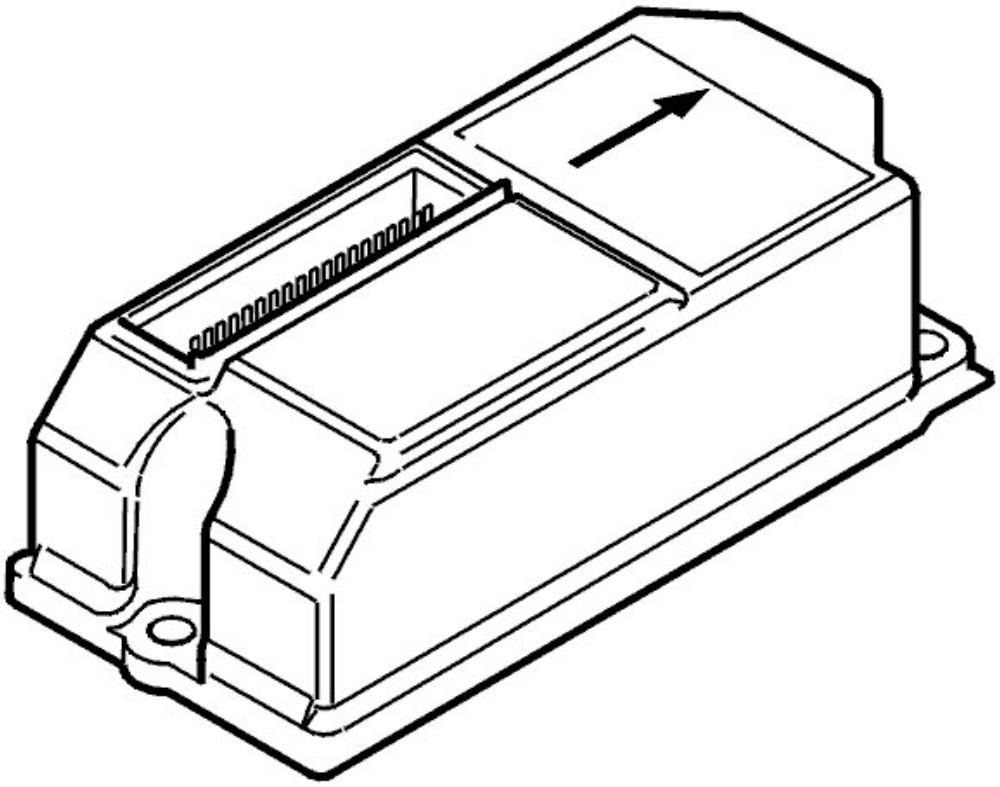
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

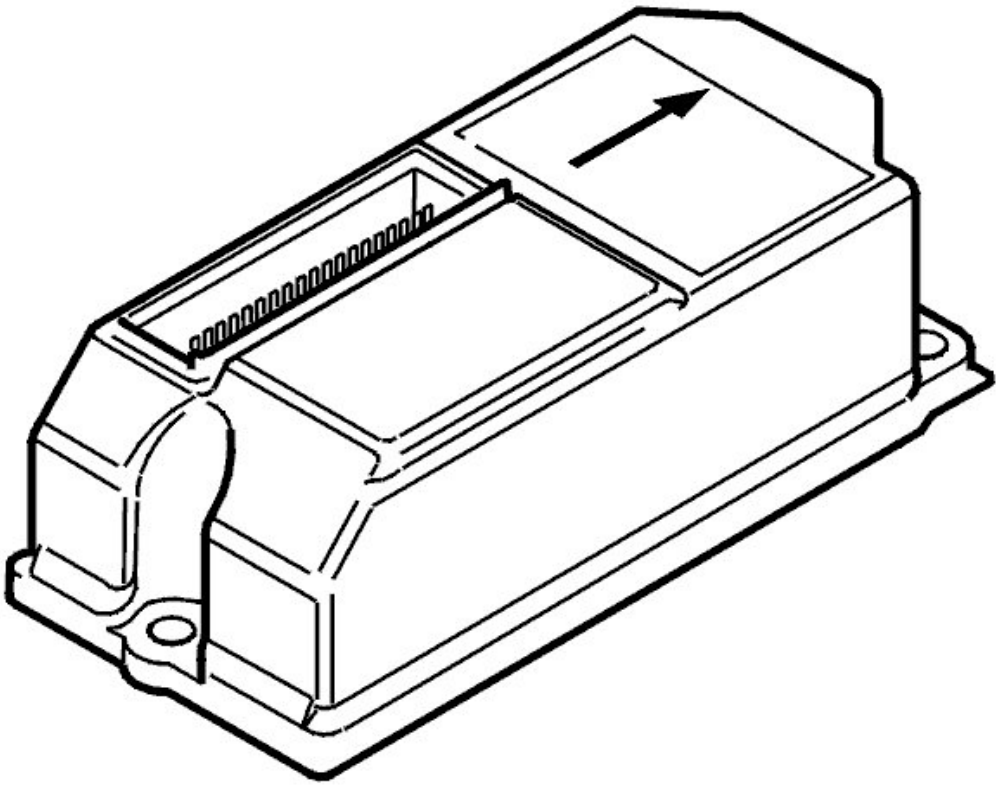
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011B Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011B is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

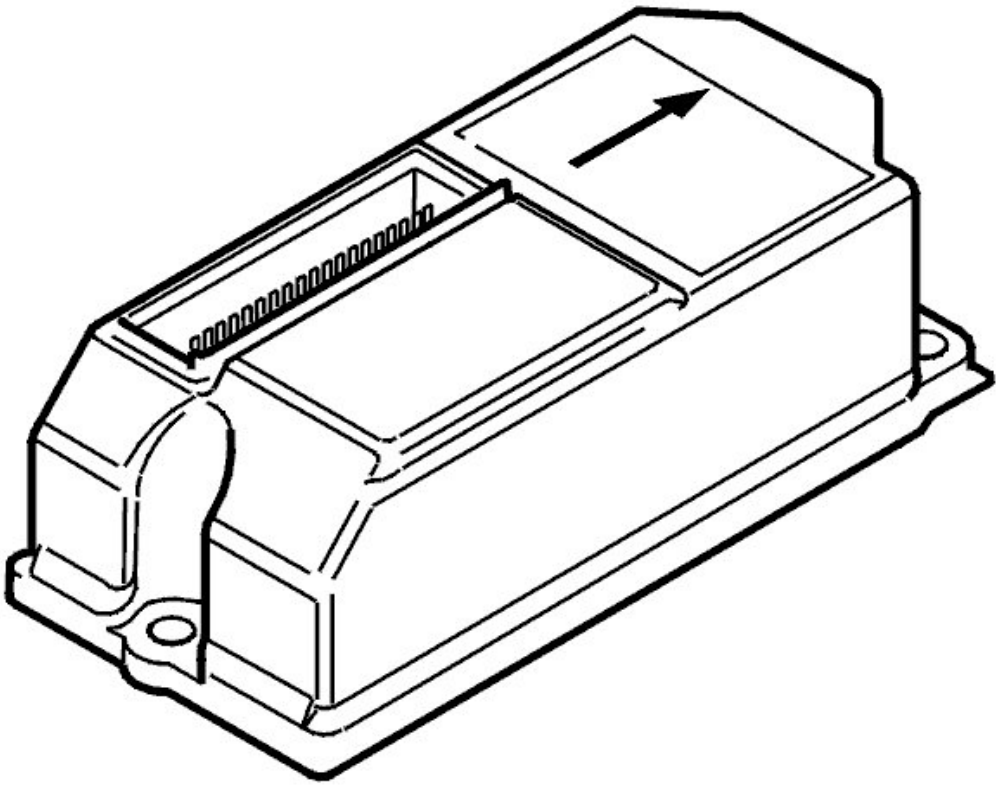
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

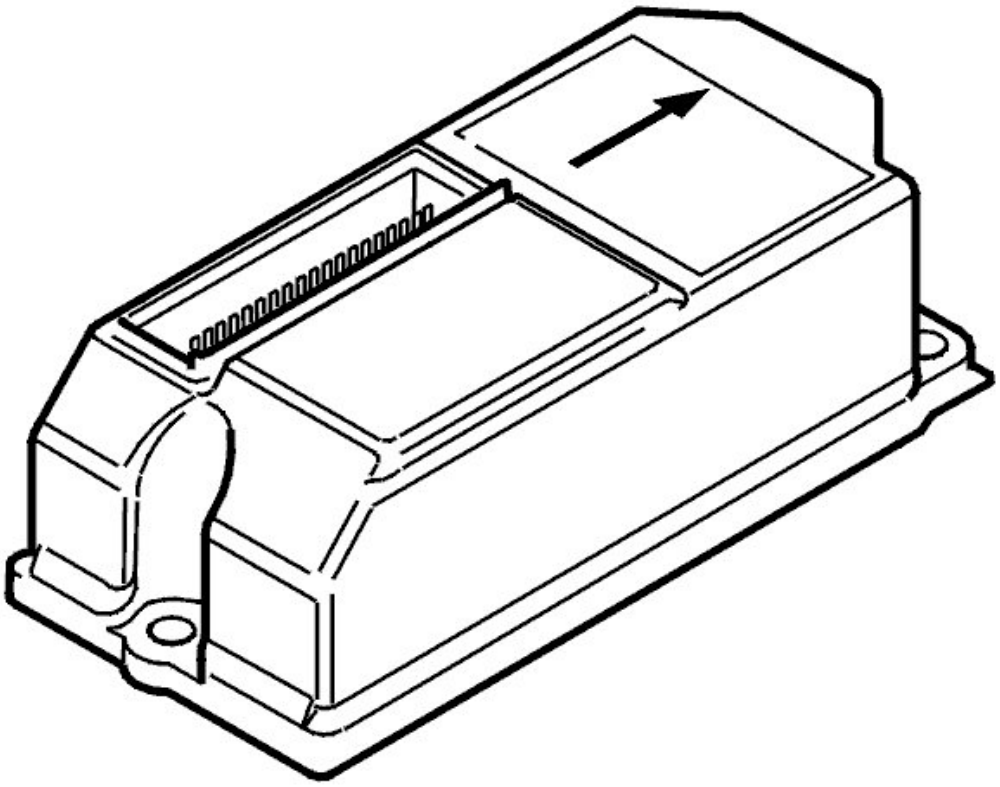
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011C Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011C is displayed.

Possible source
- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]
- SRS warning lamp on.

Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Note! The hardware P/N for the supplemental restraint system module (SRS) must be checked if this diagnostic trouble code (DTC) is stored immediately after another control module has been programmed.

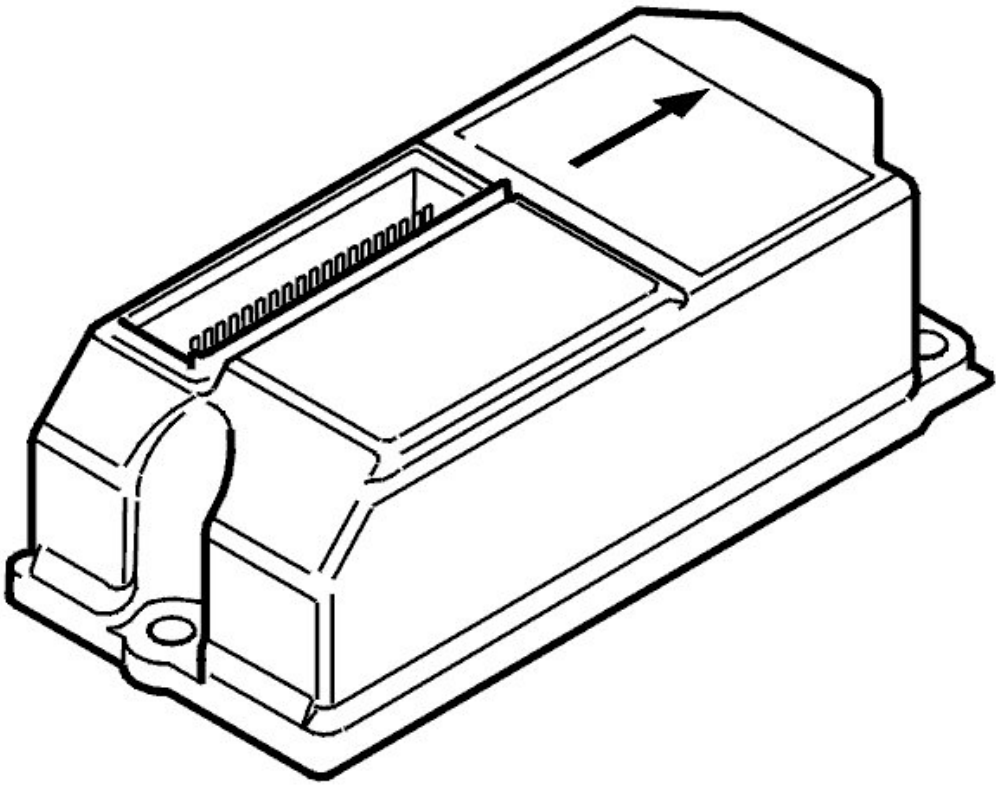
Read off ECU, hardware P/N by clicking on the VCT2000 symbol.
If the number is one of those shown below, the supplemental restraint system module (SRS) must only be reprogrammed using new software.
- 8651514
- 8651515
- 8696027
- 9467815.

If the diagnostic trouble code (DTC) is stored on another occasion or for a different type of vehicle, the supplemental restraint system module (SRS) assembly must be replaced.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information

- For further information about programming and replacing the SRS control module, see: Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

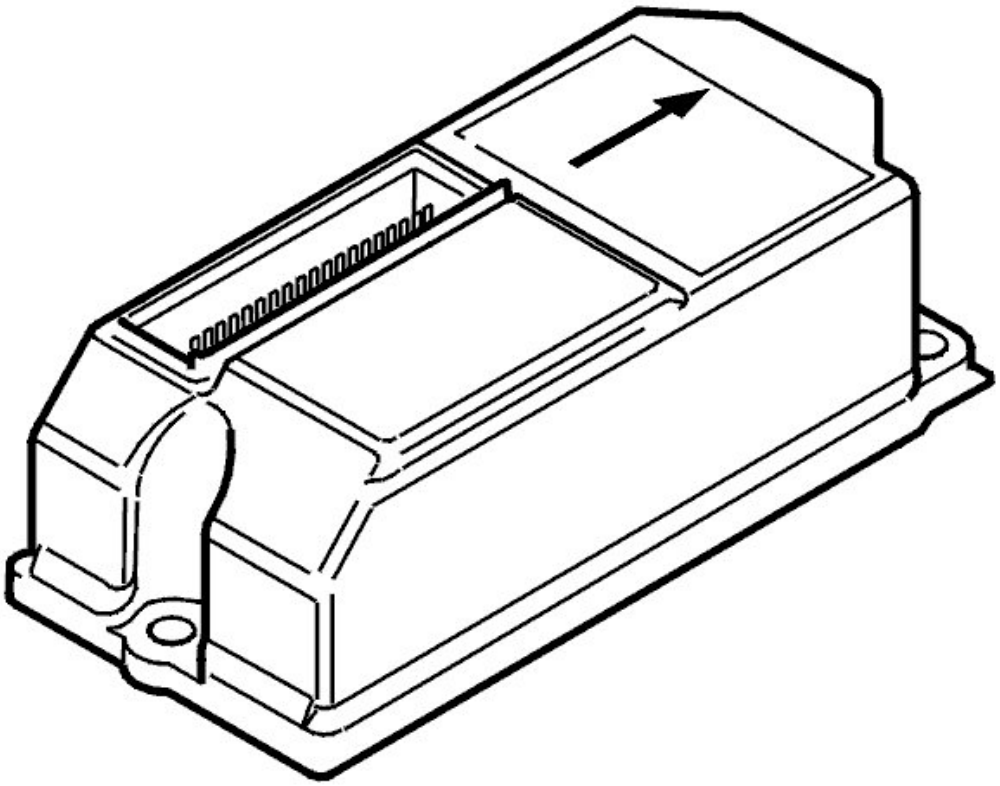
Attempt New Test - Replacing and programming the SRS control module

FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011D Diagnostic trouble code information

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011D is displayed.

Possible source
- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]
- SRS warning lamp on.

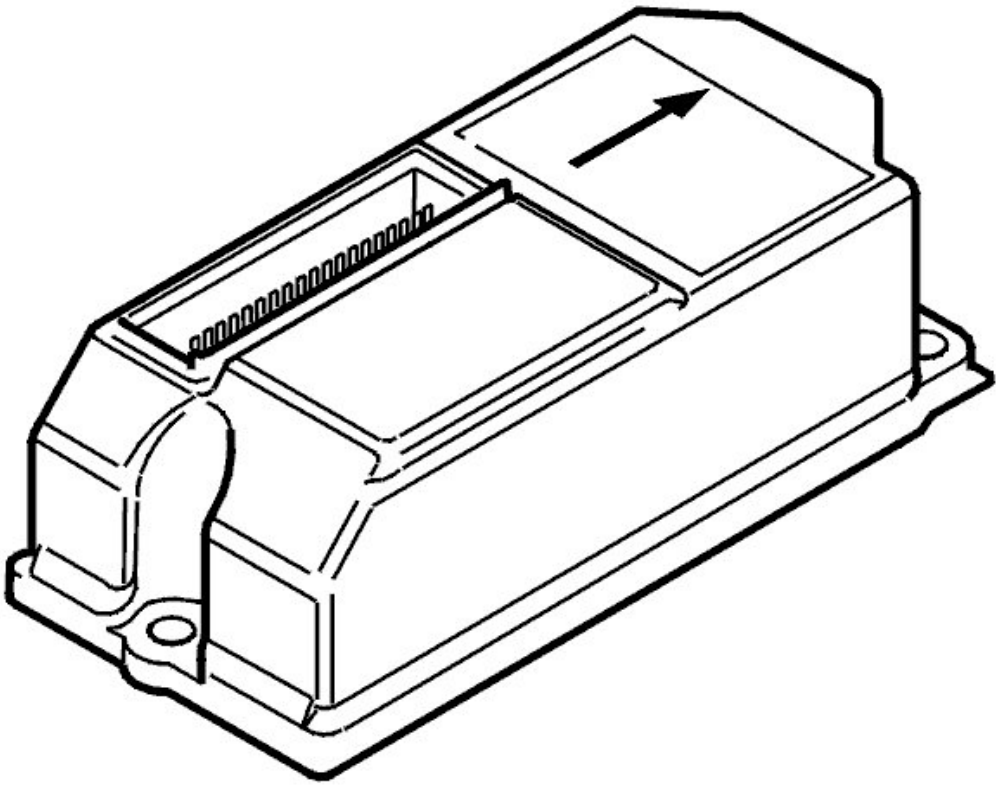
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

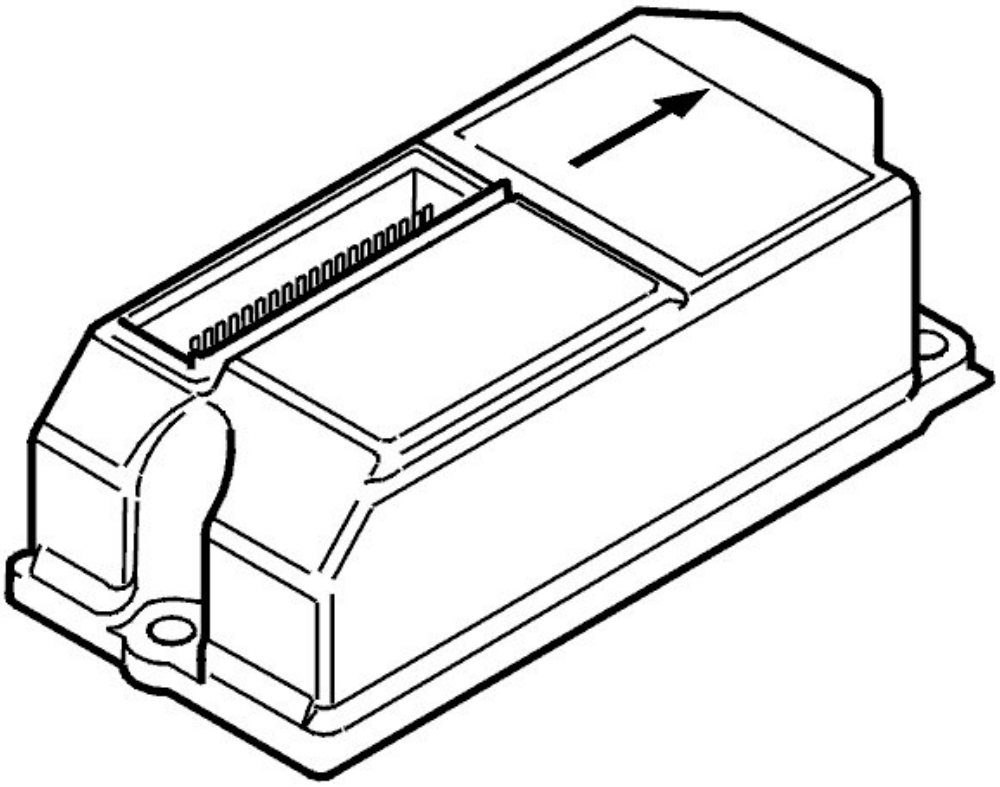
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011D Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011D is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

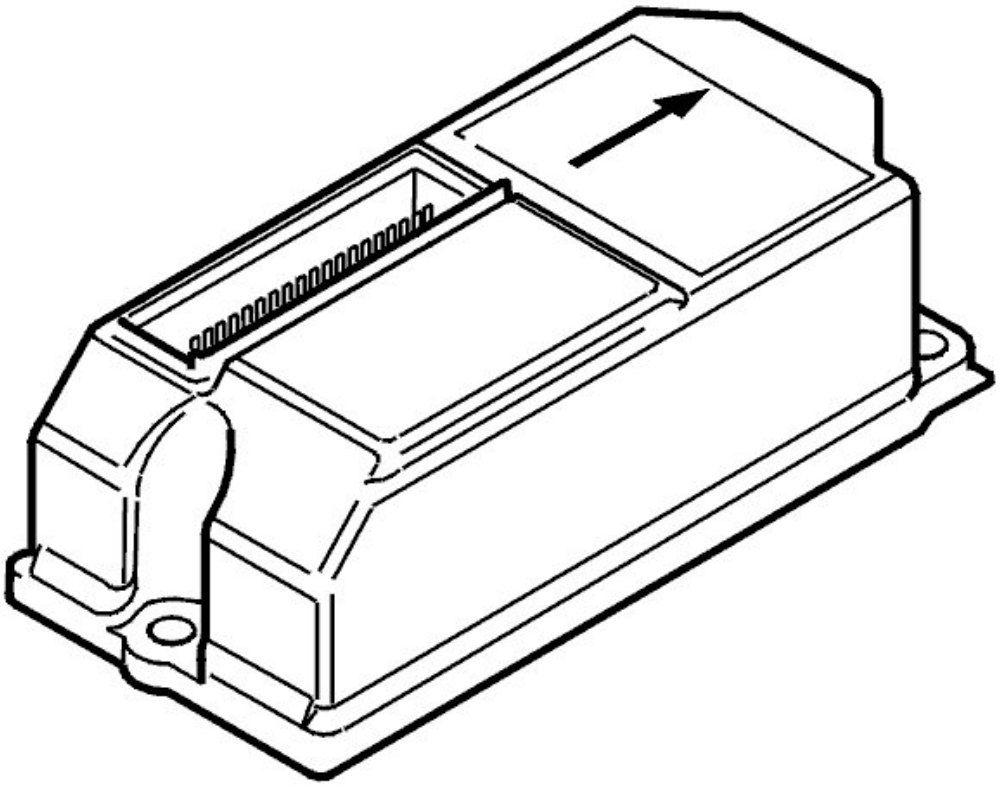
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

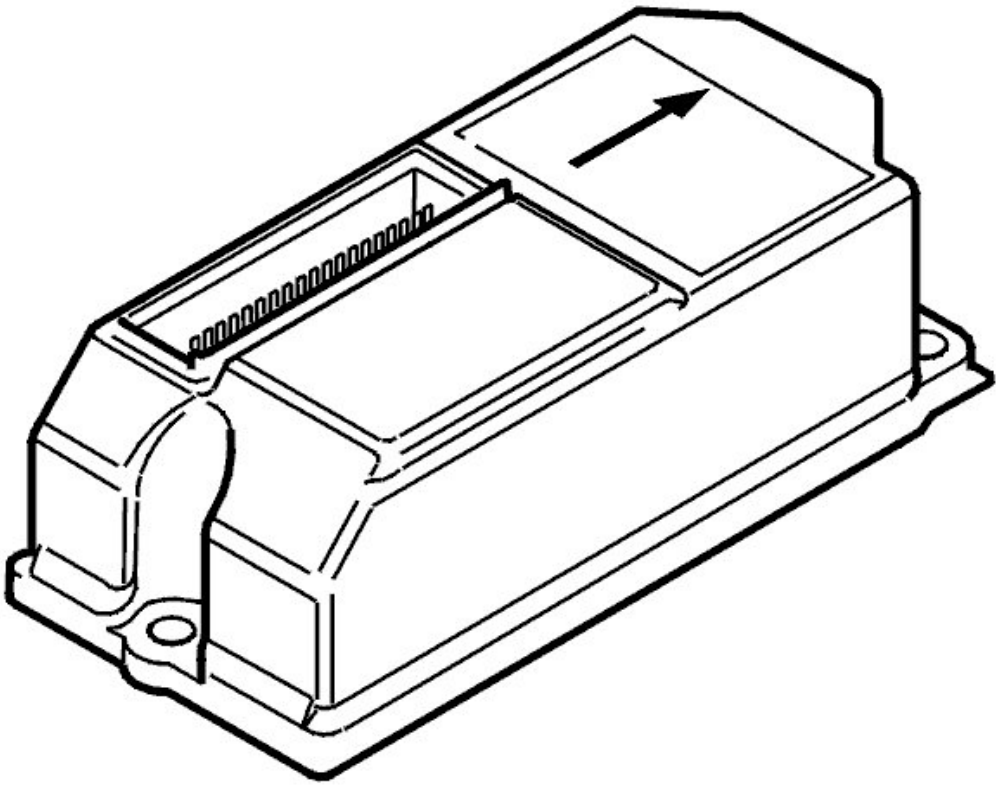
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011E Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011E is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

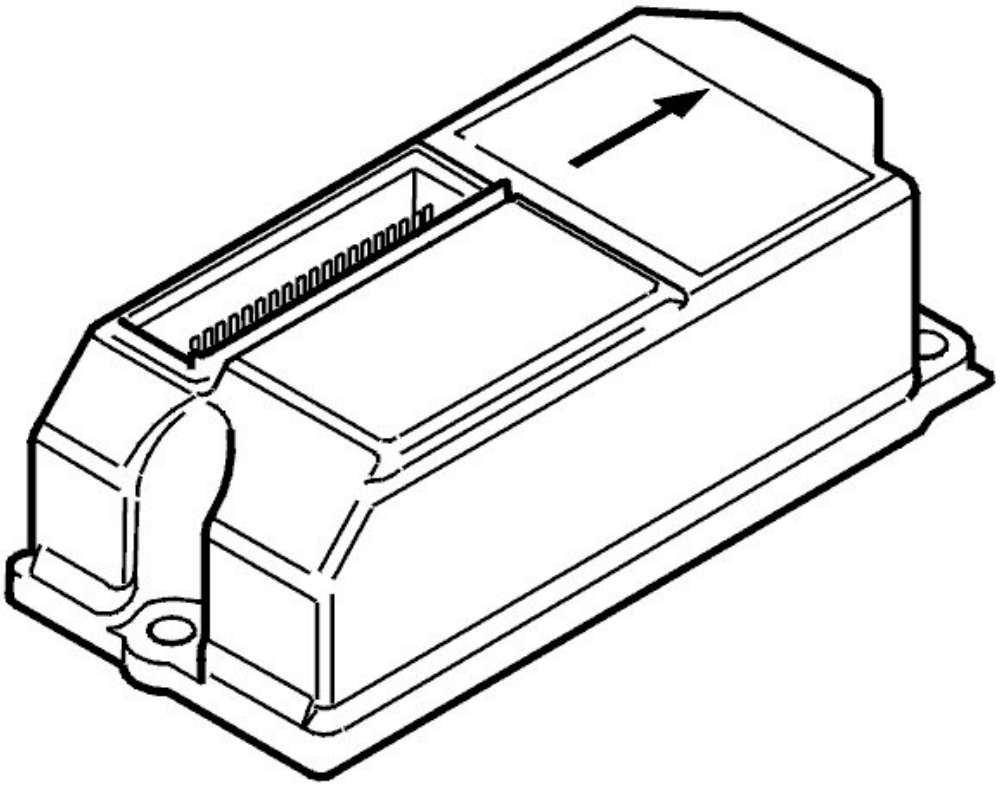
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

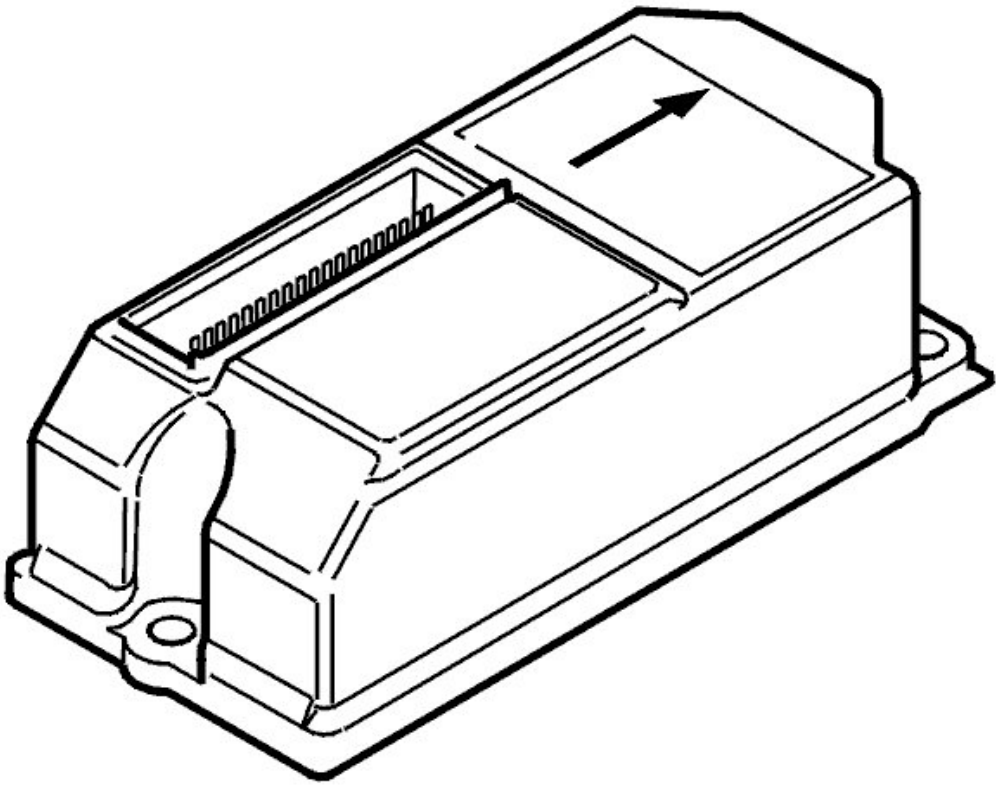
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011E Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011E is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

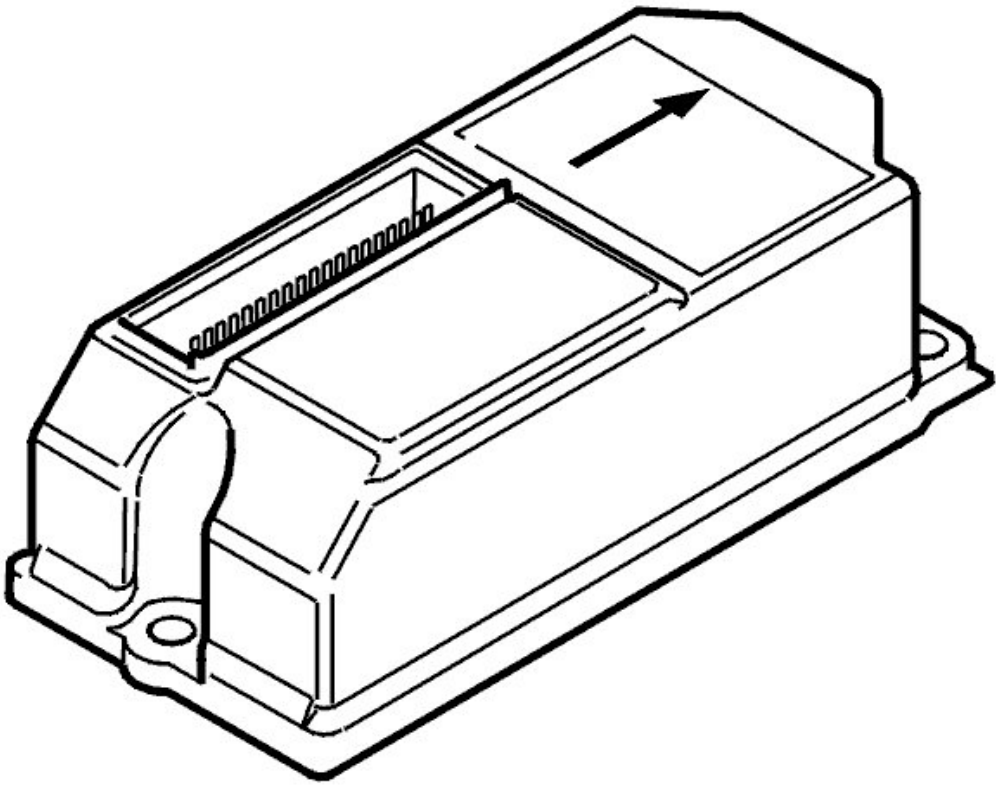
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

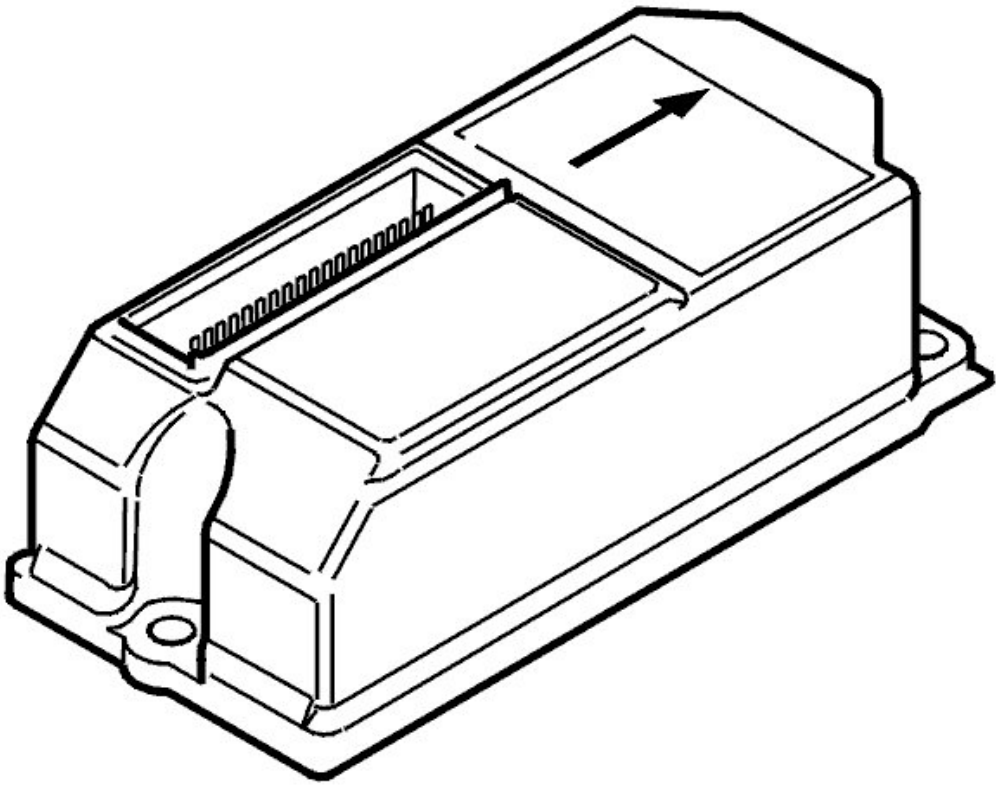
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011F Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011F is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

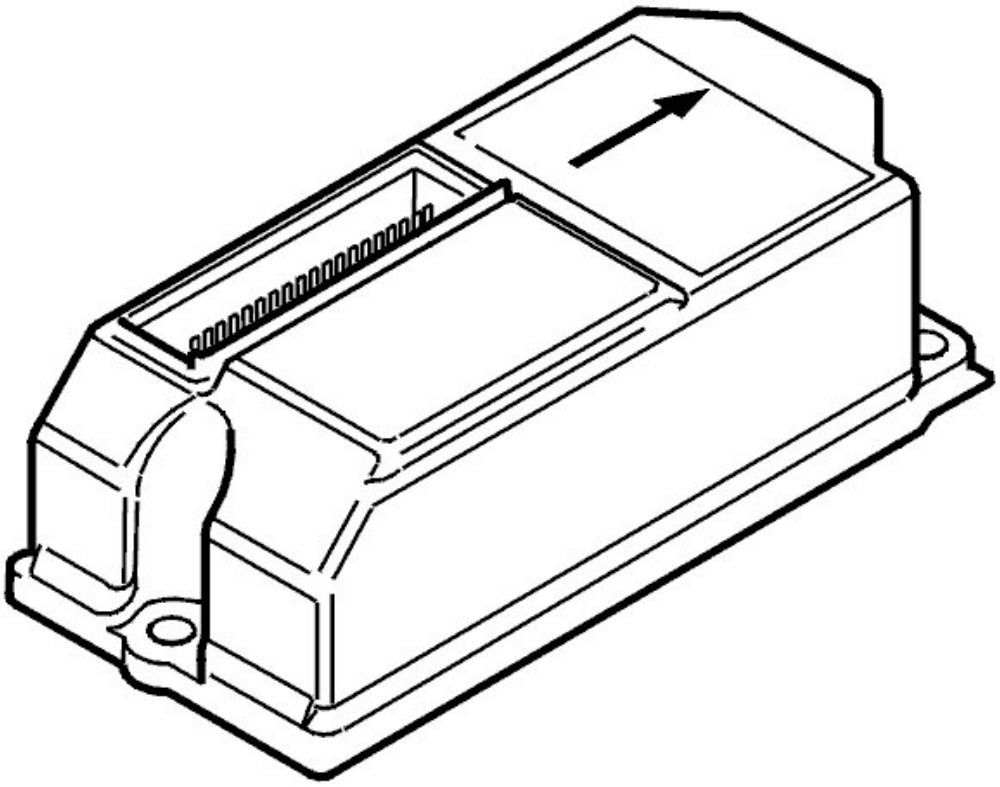
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

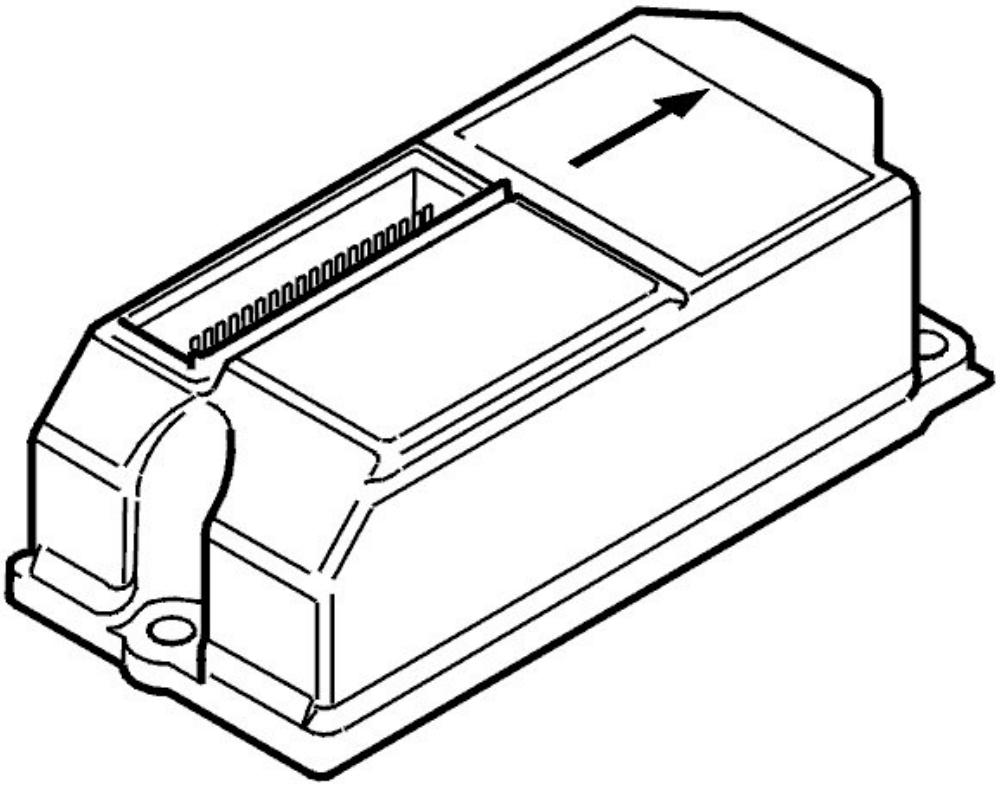
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-011F Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-011F is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

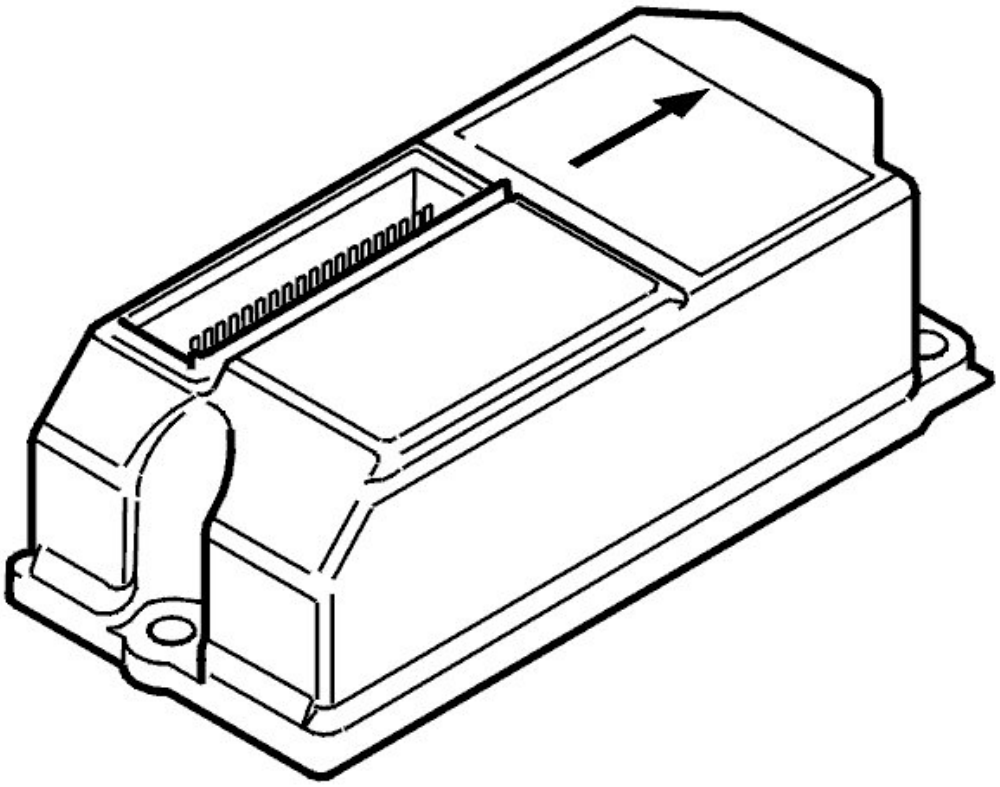
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

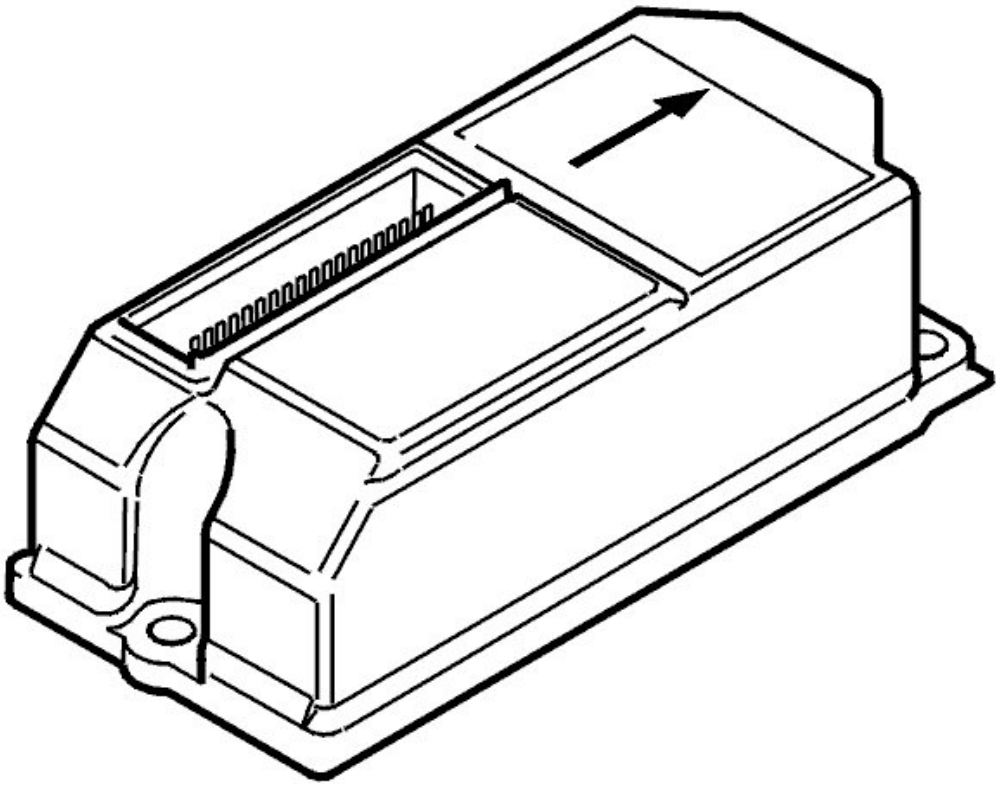
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0120 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0120 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

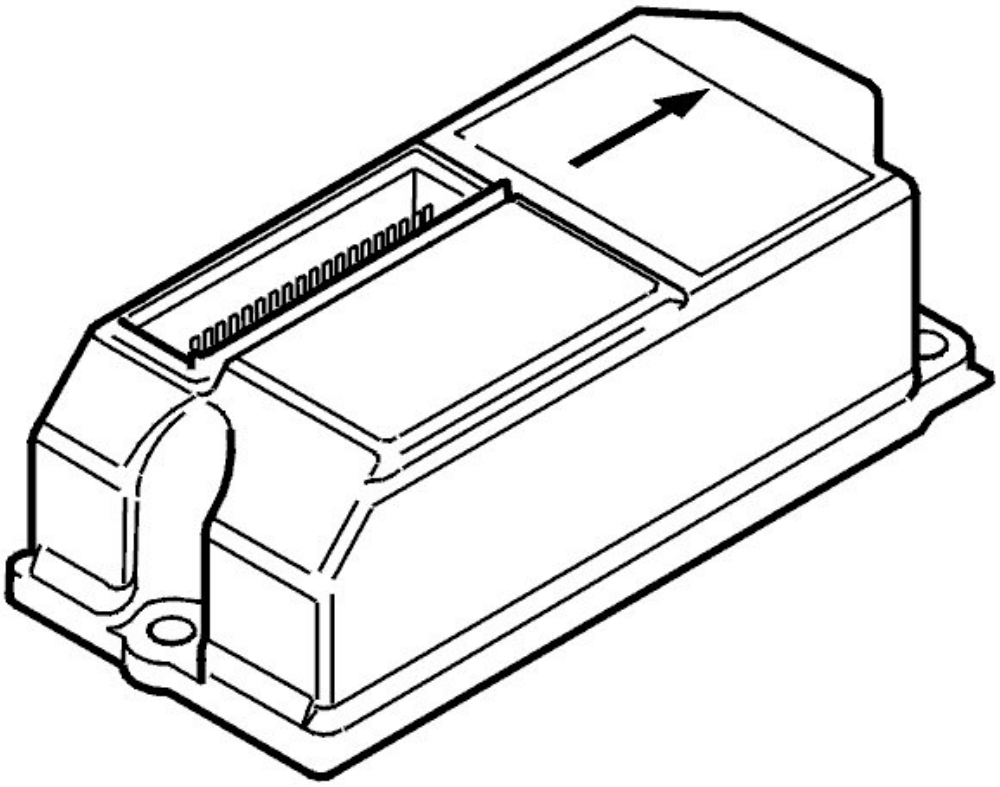
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

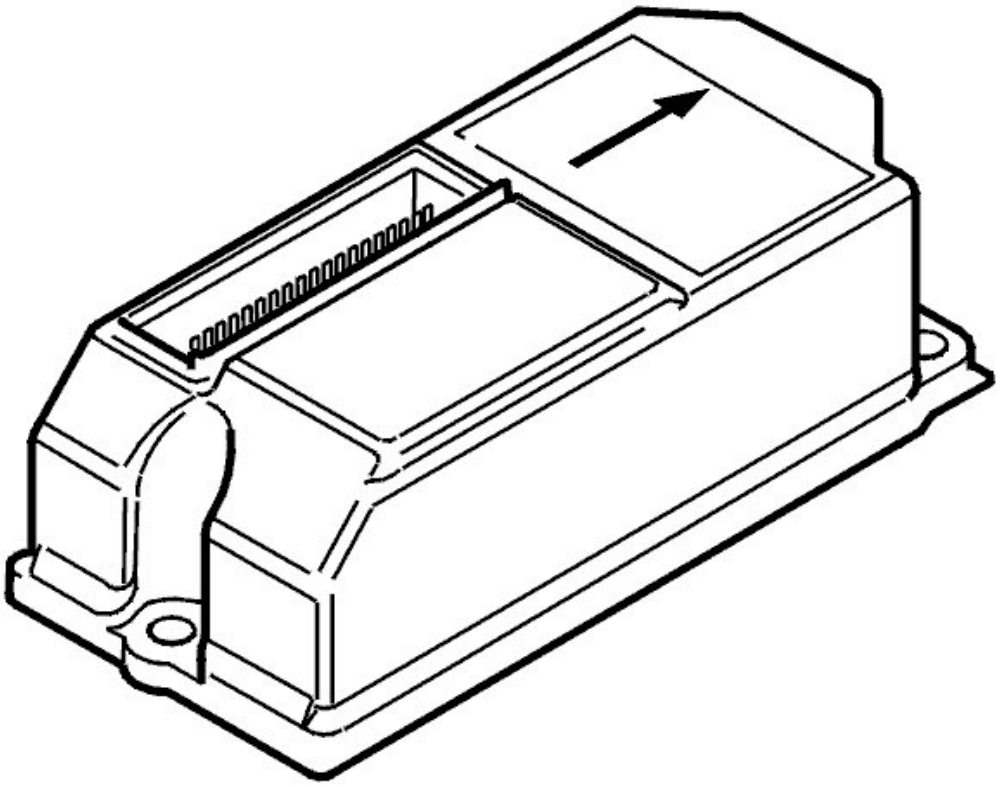
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0120 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0120 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

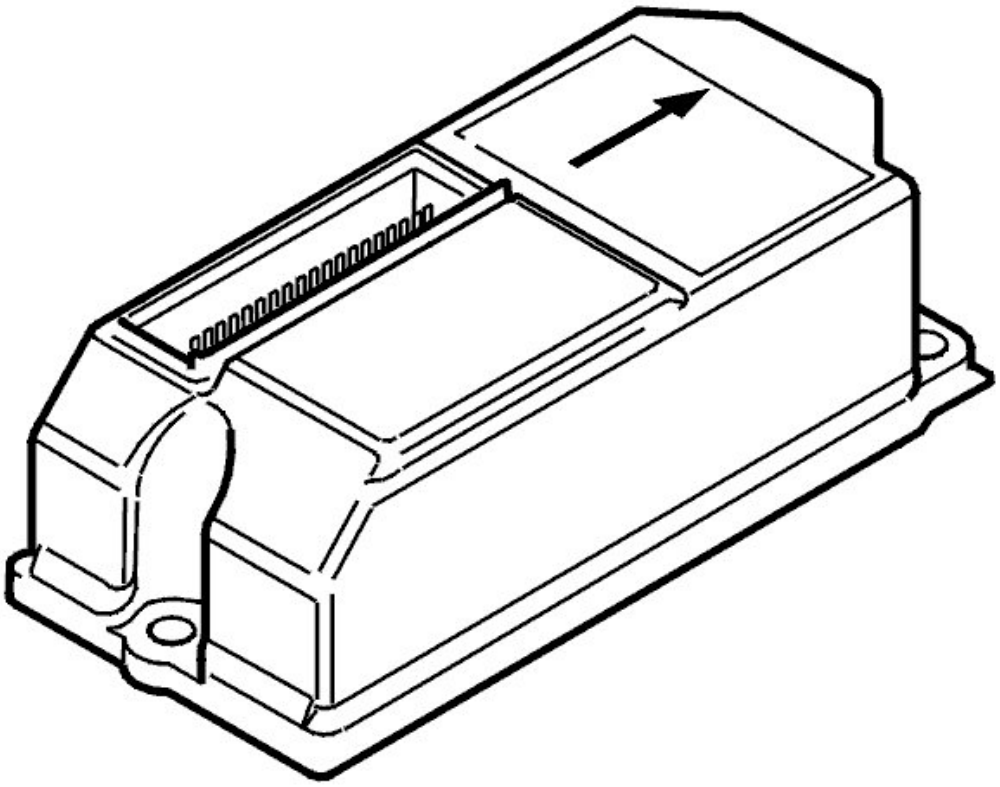
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

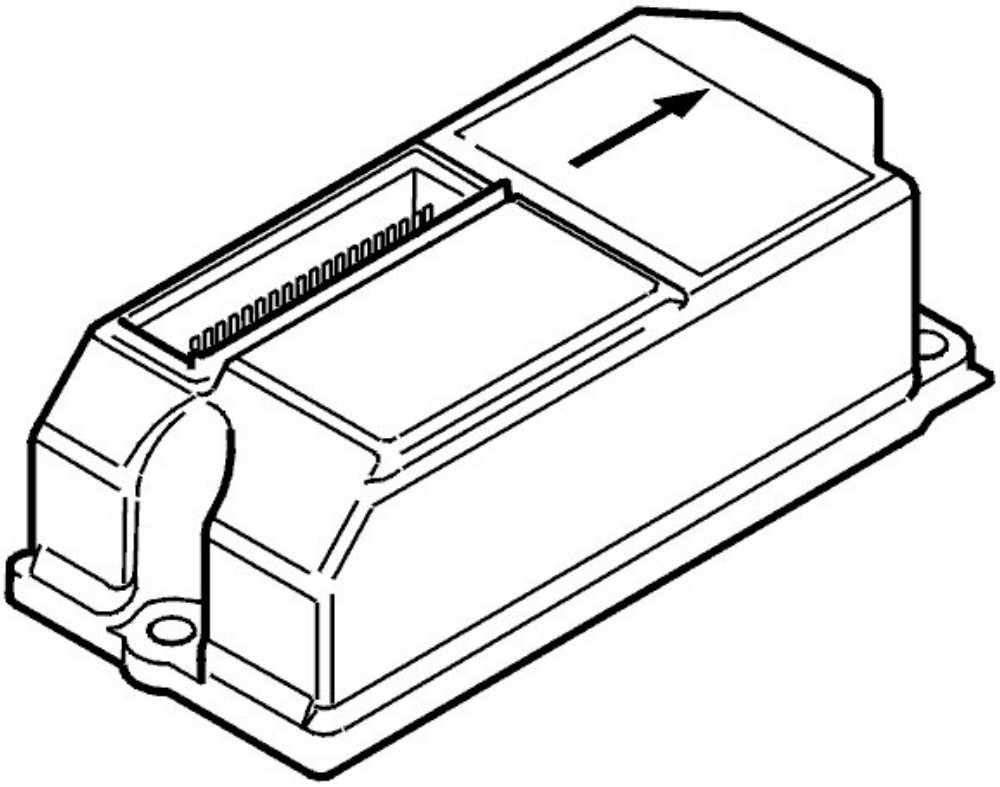
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0121 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0121 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

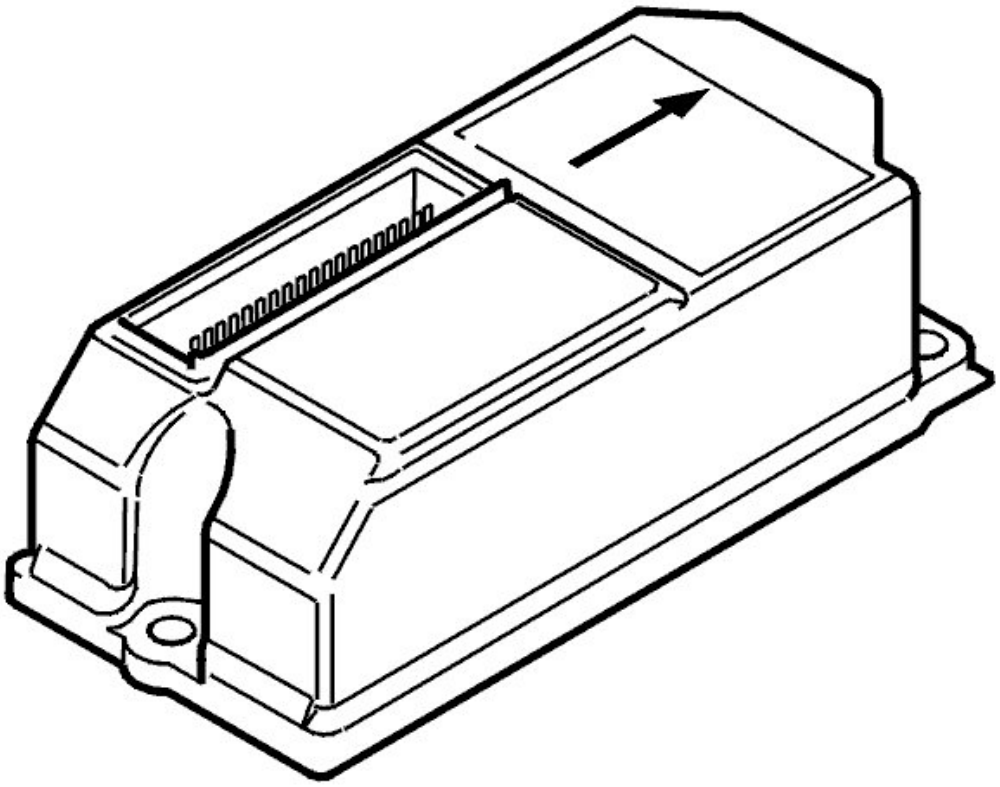
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

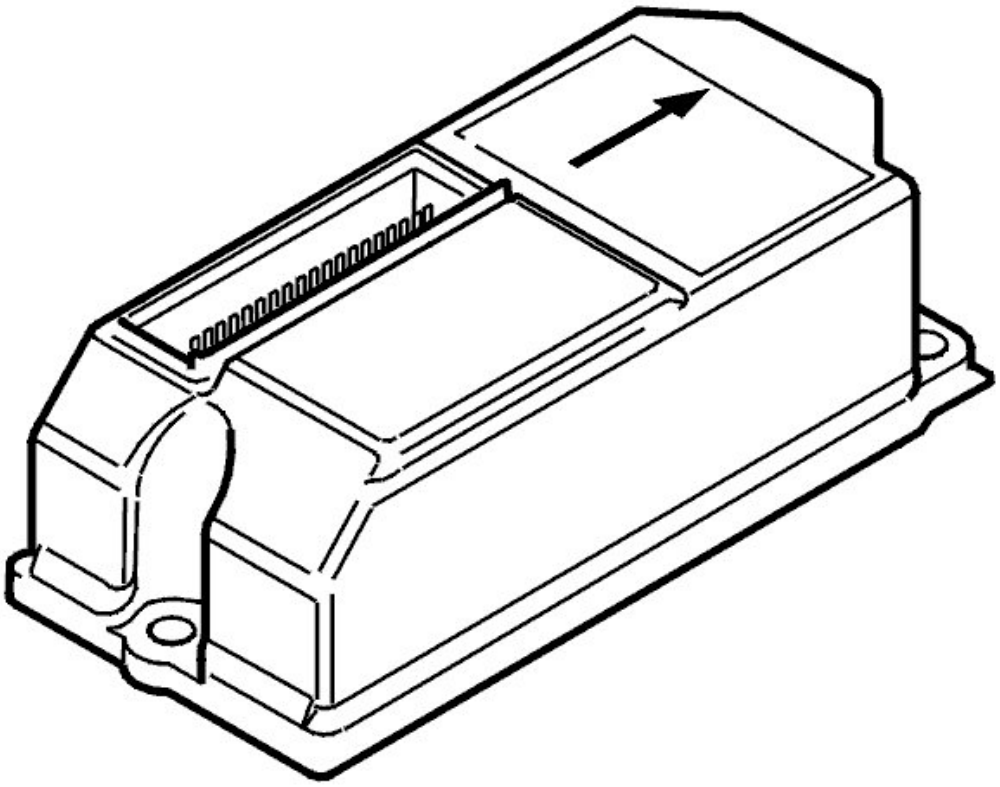
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0121 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0121 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

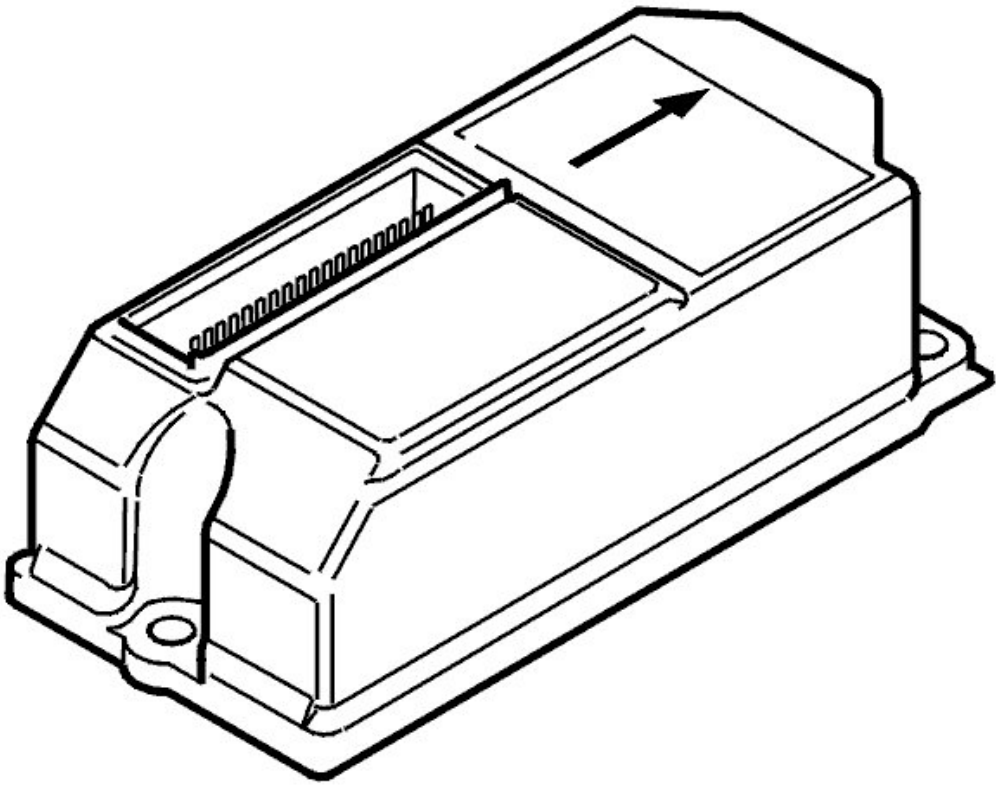
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

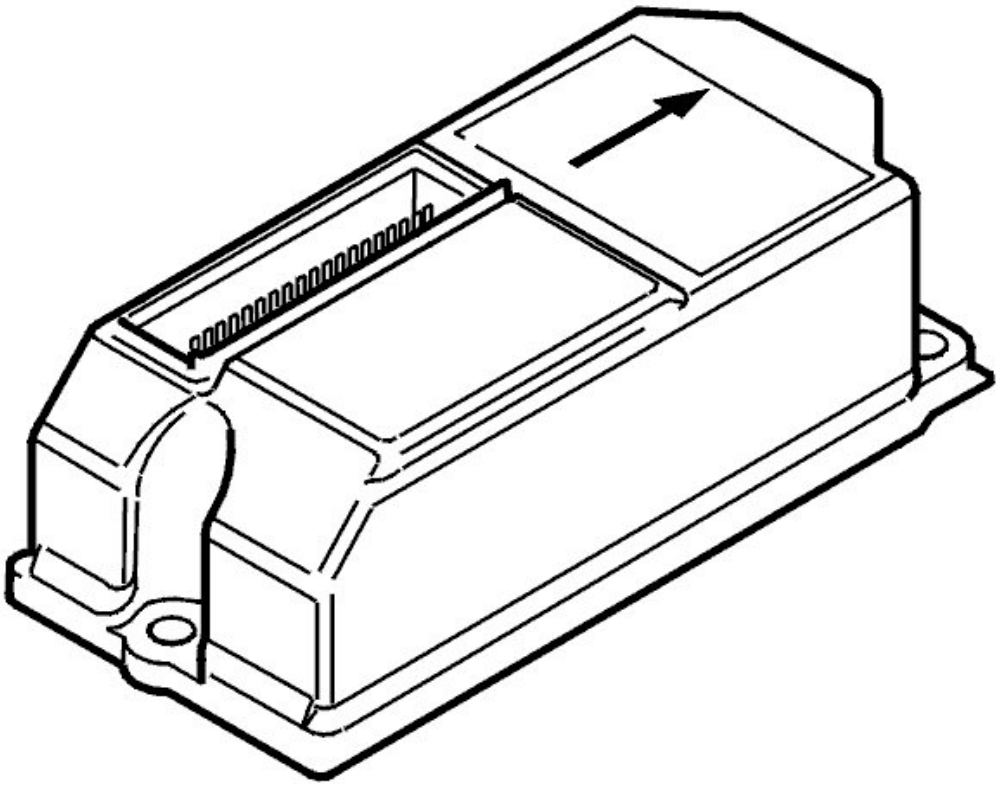
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0122 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0122 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS) control unit.

Fault symptom[s]

- SRS warning lamp on.

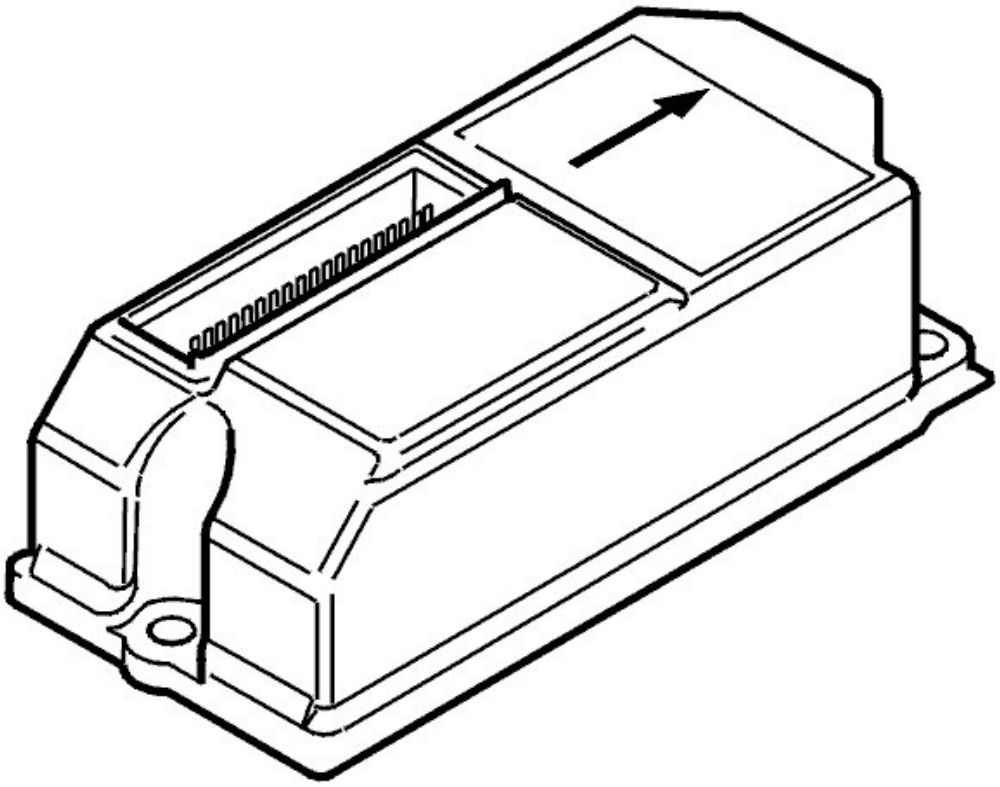
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

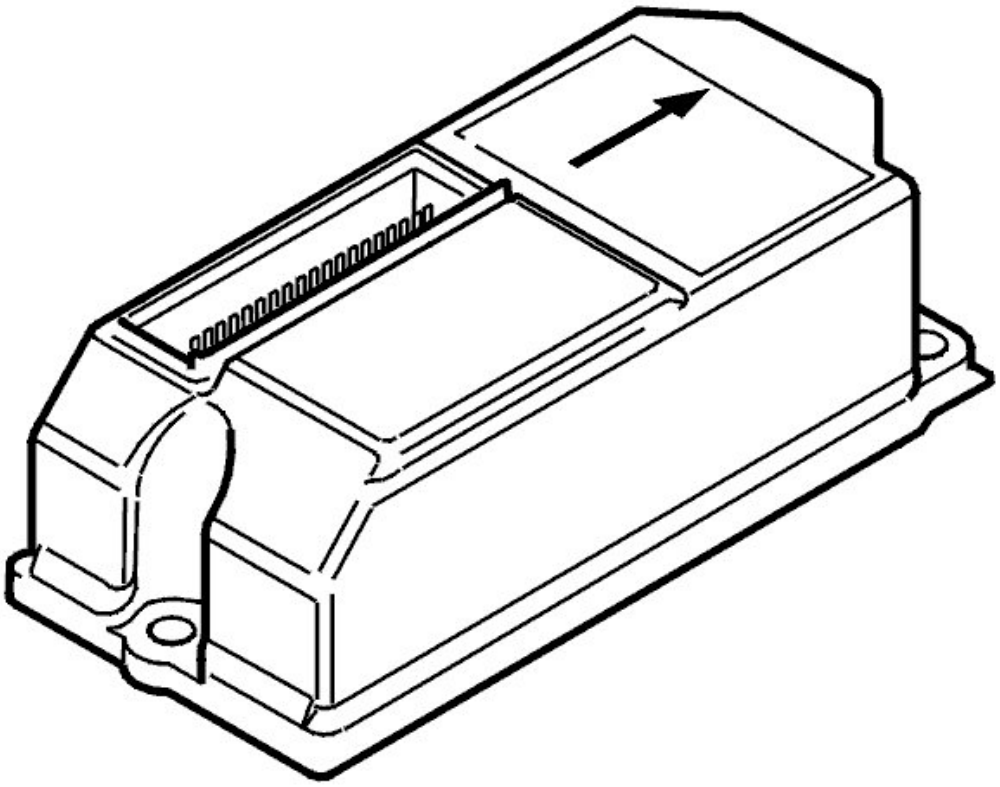
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0122 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0122 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS) control unit.

Fault symptom[s]

- SRS warning lamp on.

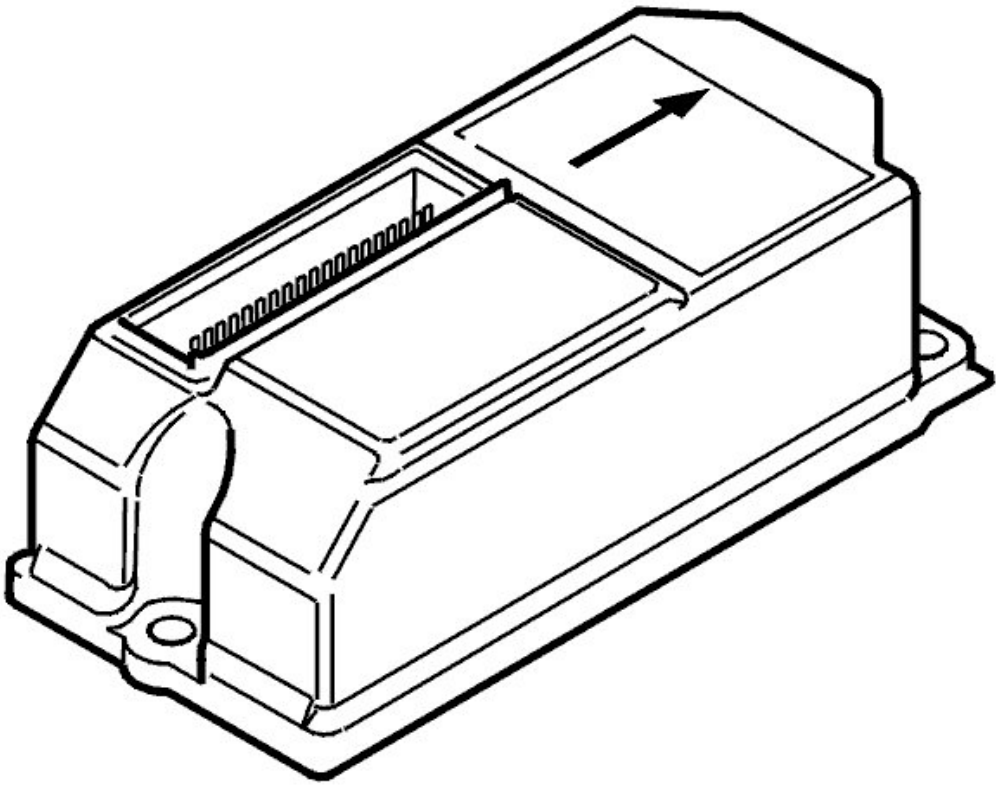
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

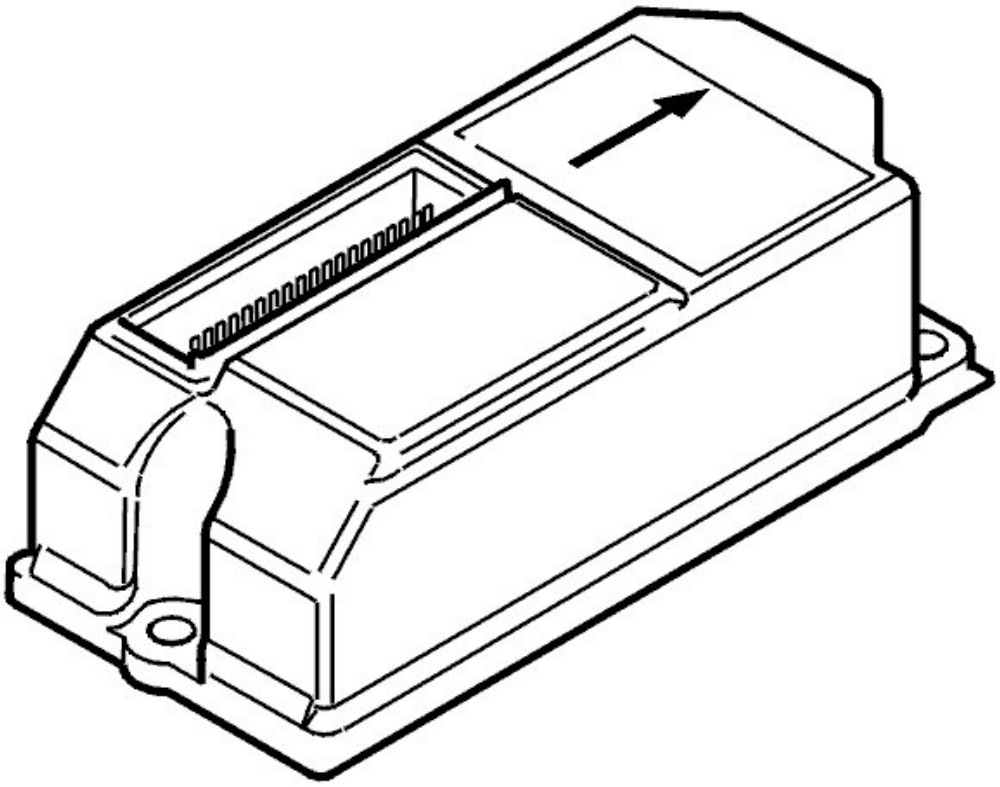
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0123 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0123 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

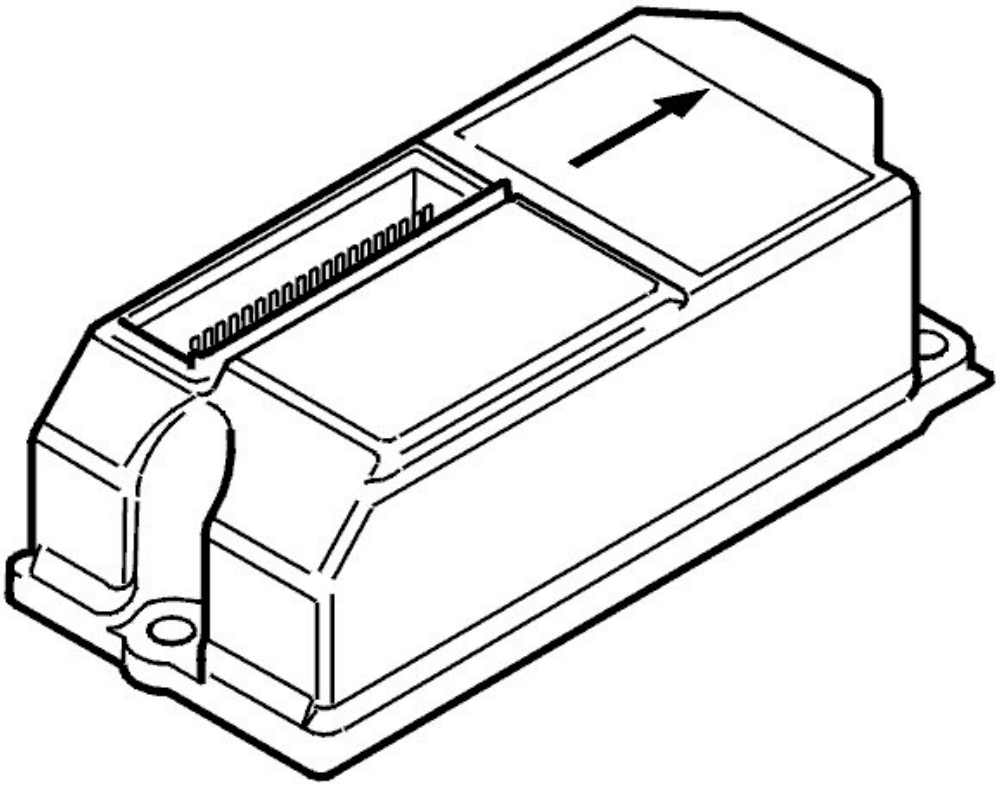
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

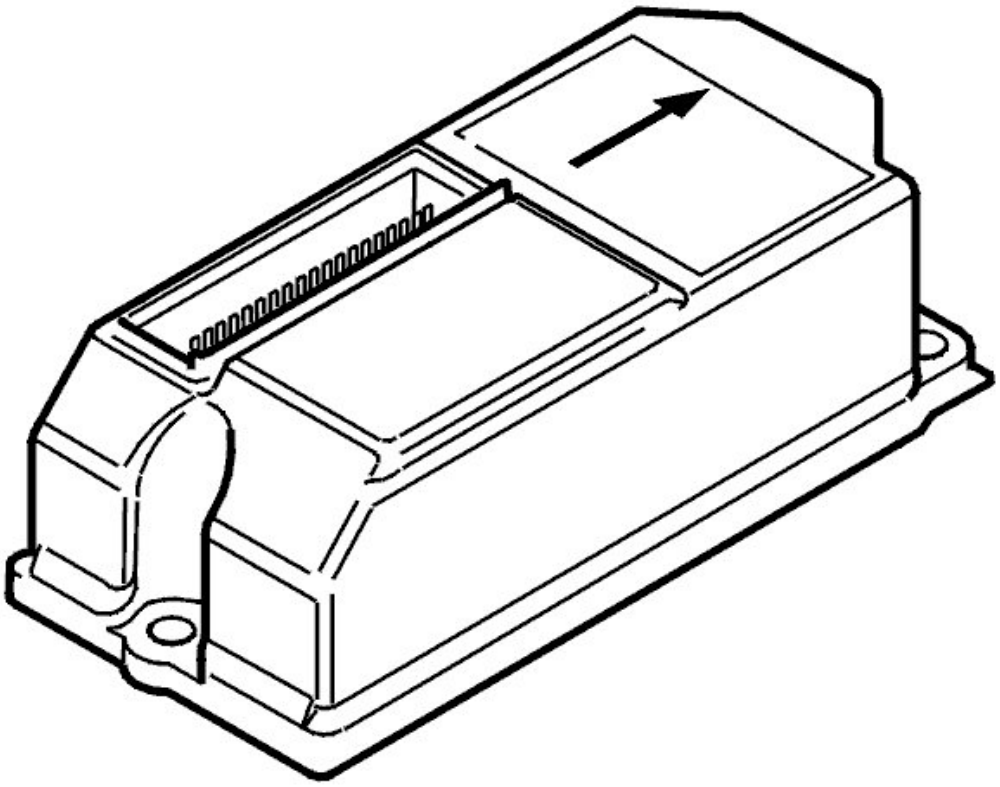
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0123 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0123 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

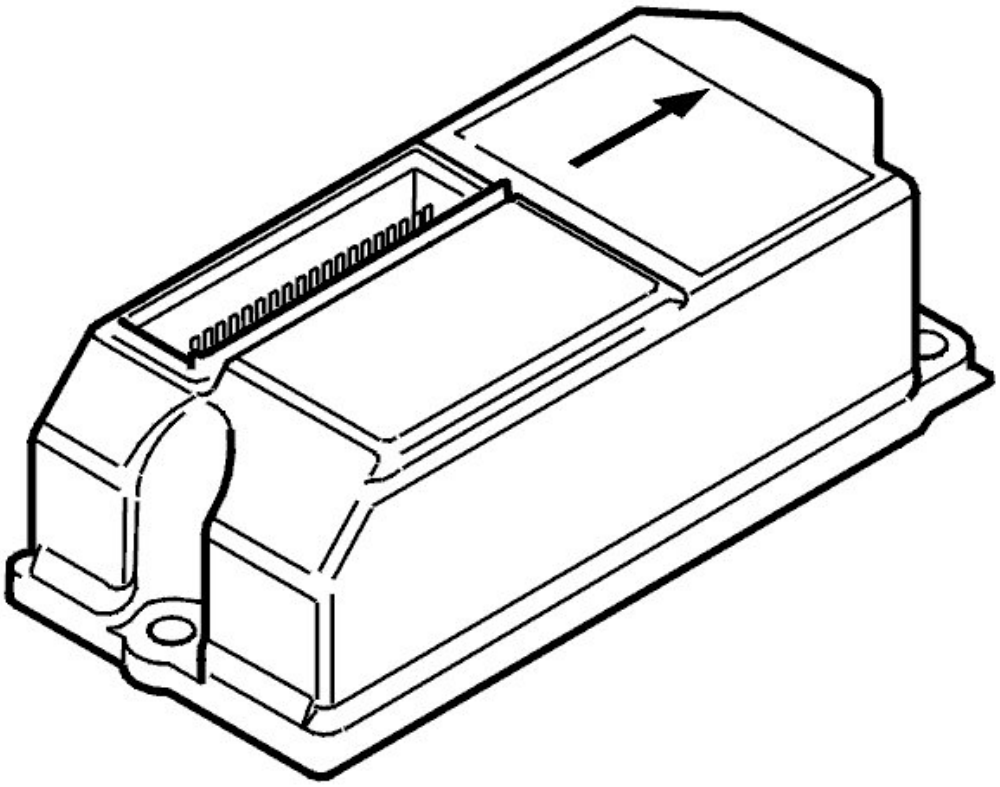
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

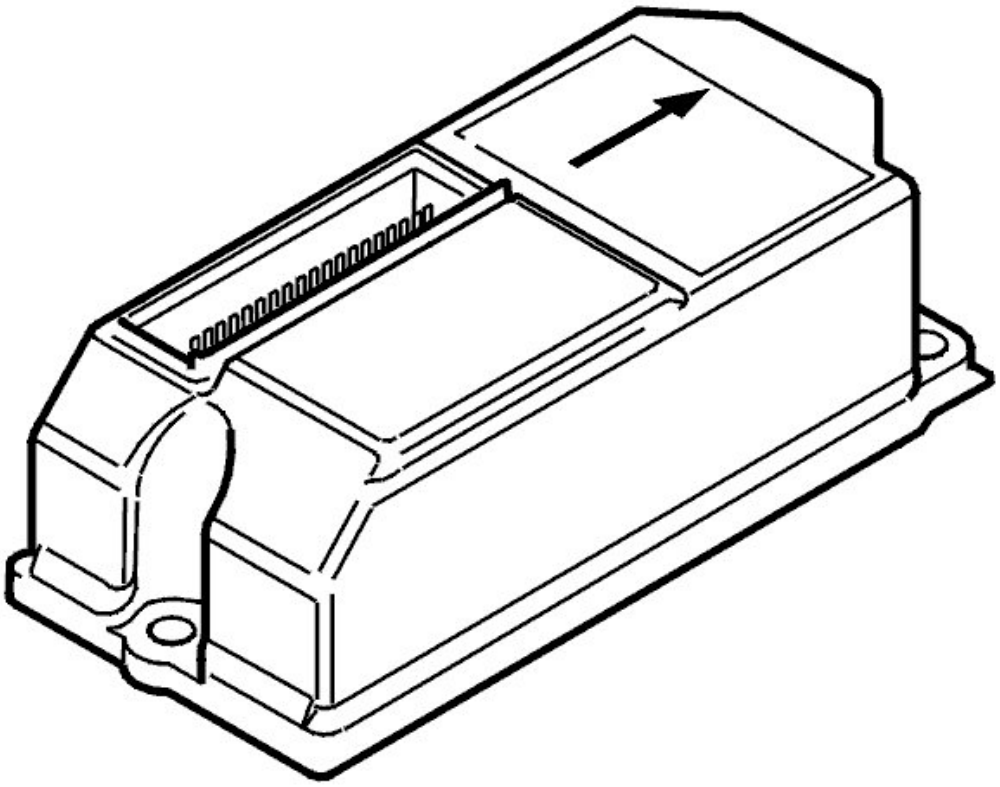
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0124 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0124 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

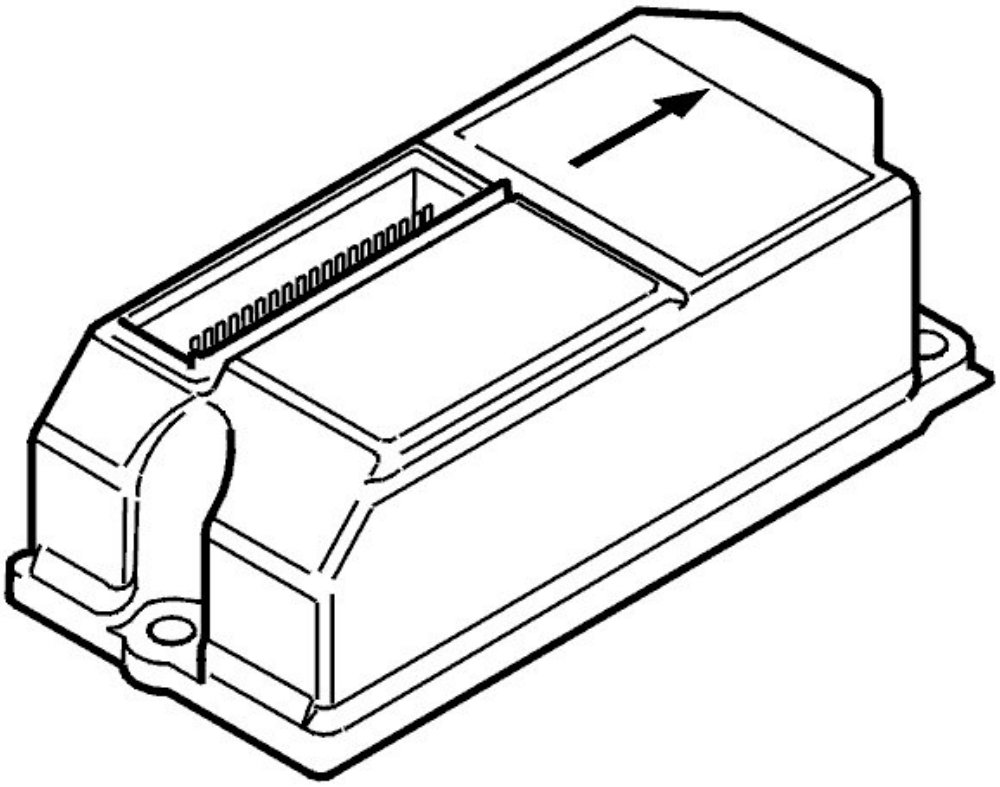
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

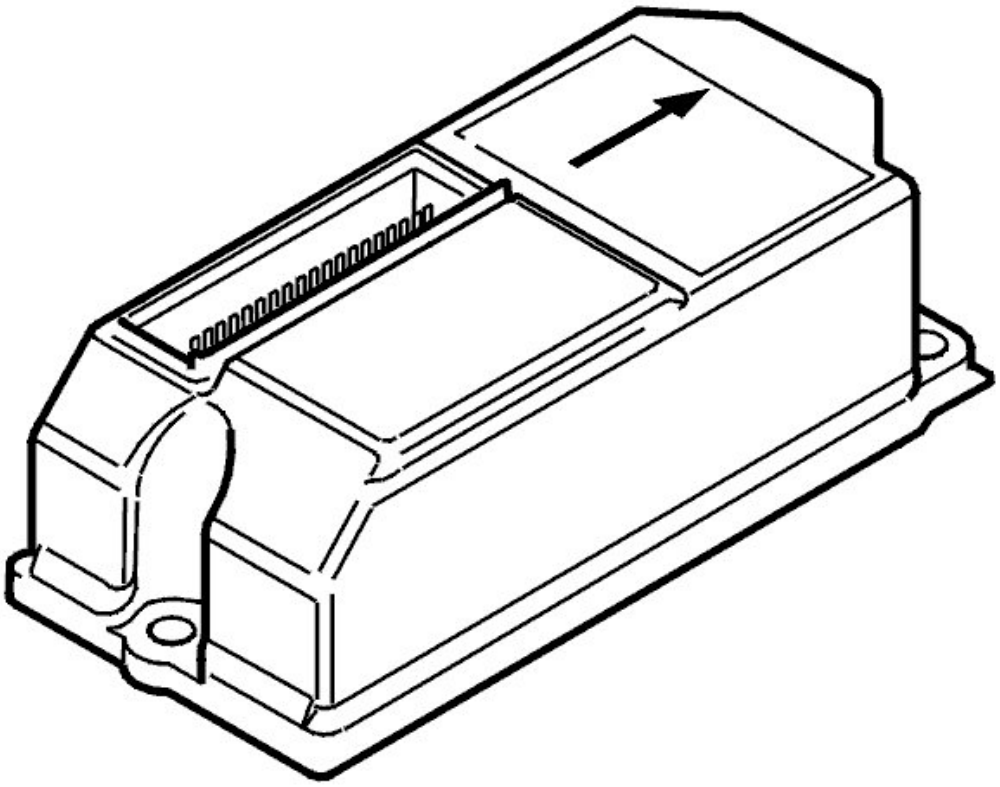
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0124 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0124 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

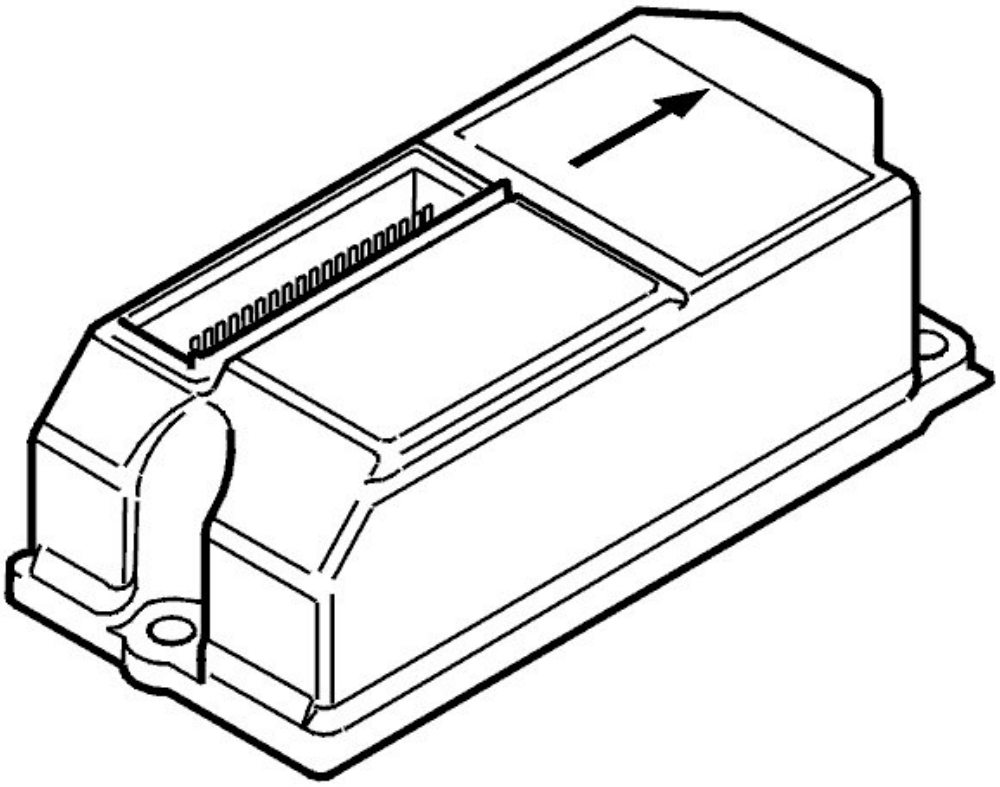
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

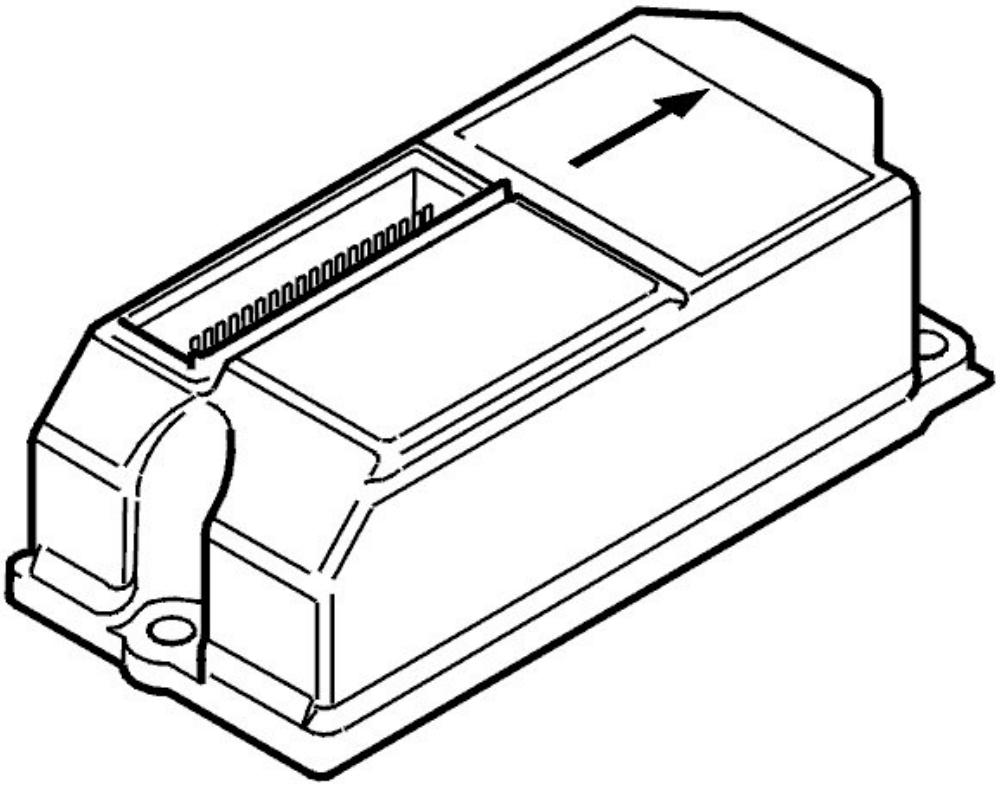
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0125 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0125 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

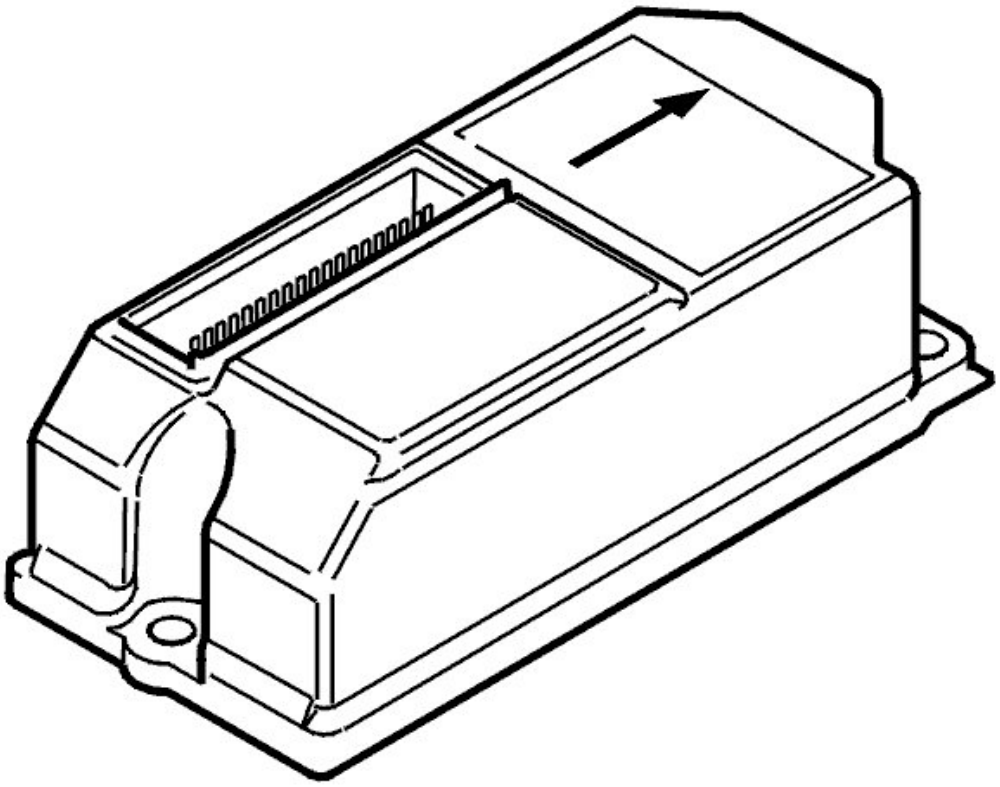
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

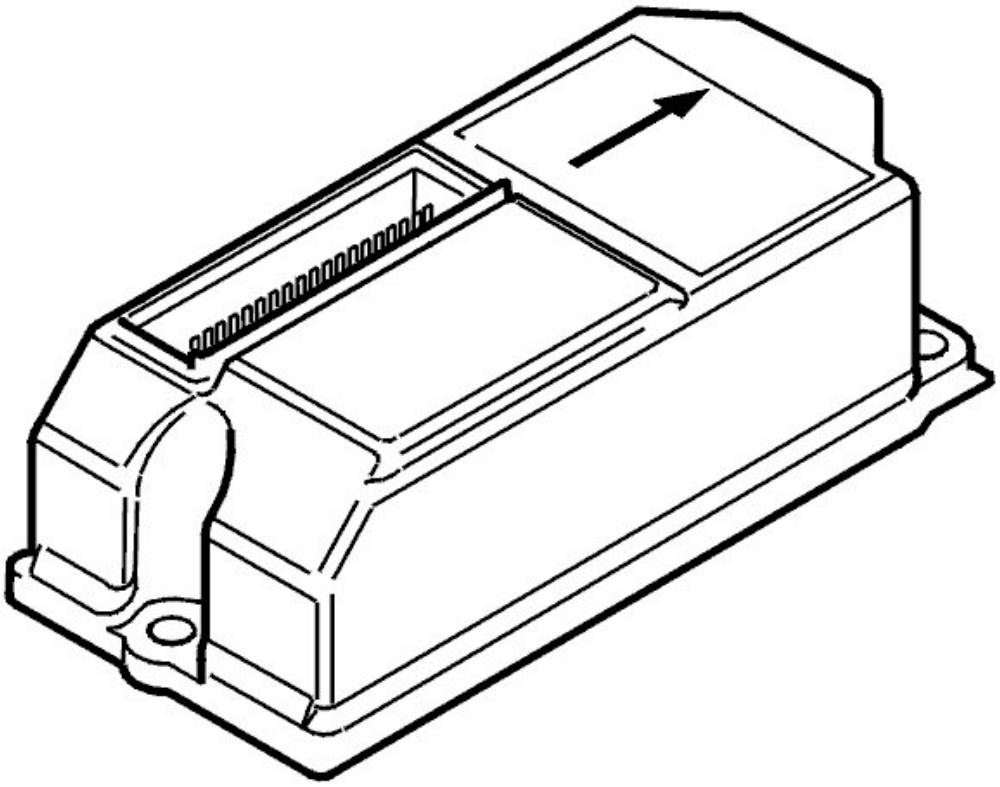
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0125 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0125 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

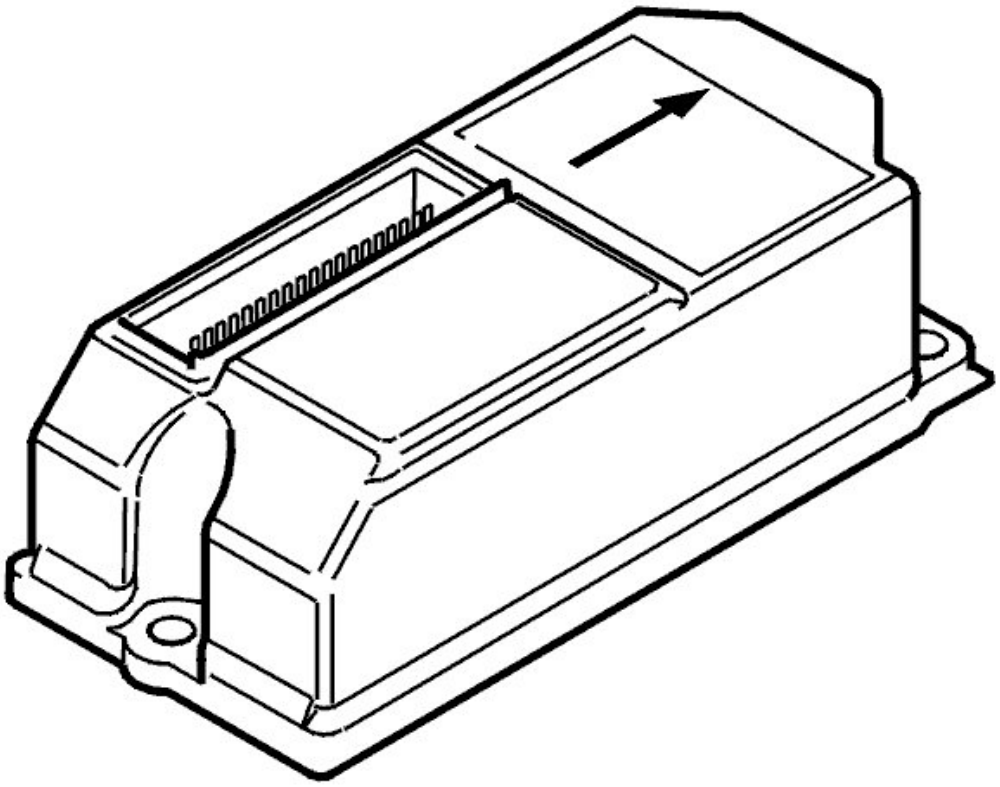
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

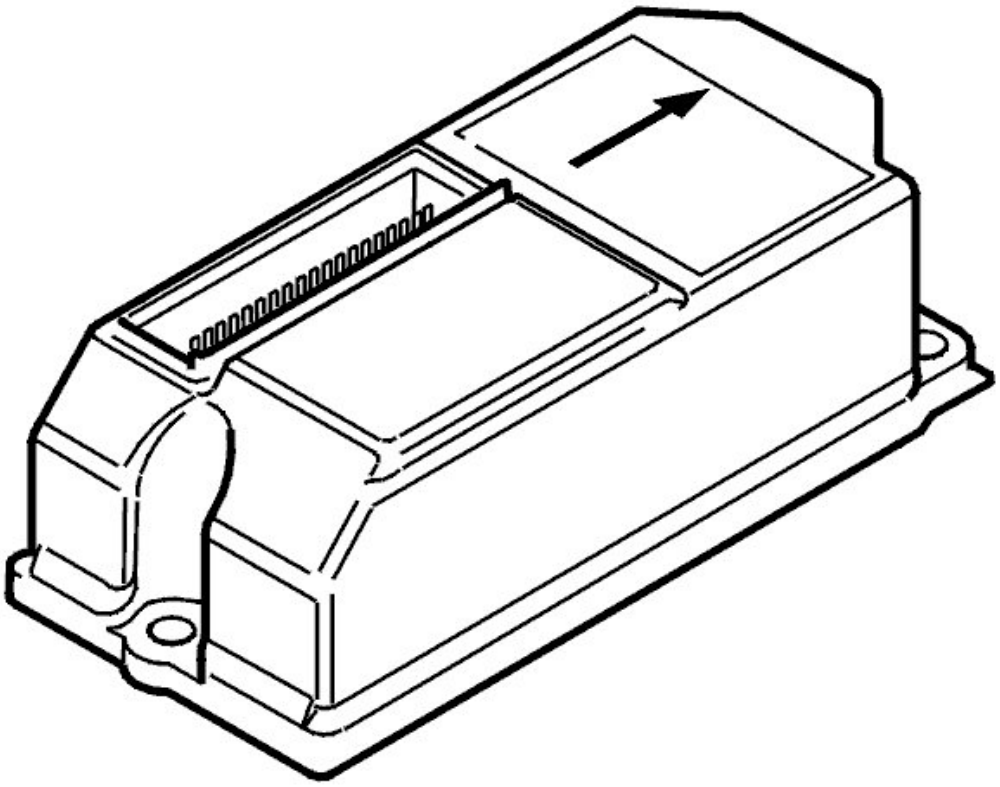
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0126 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0126 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

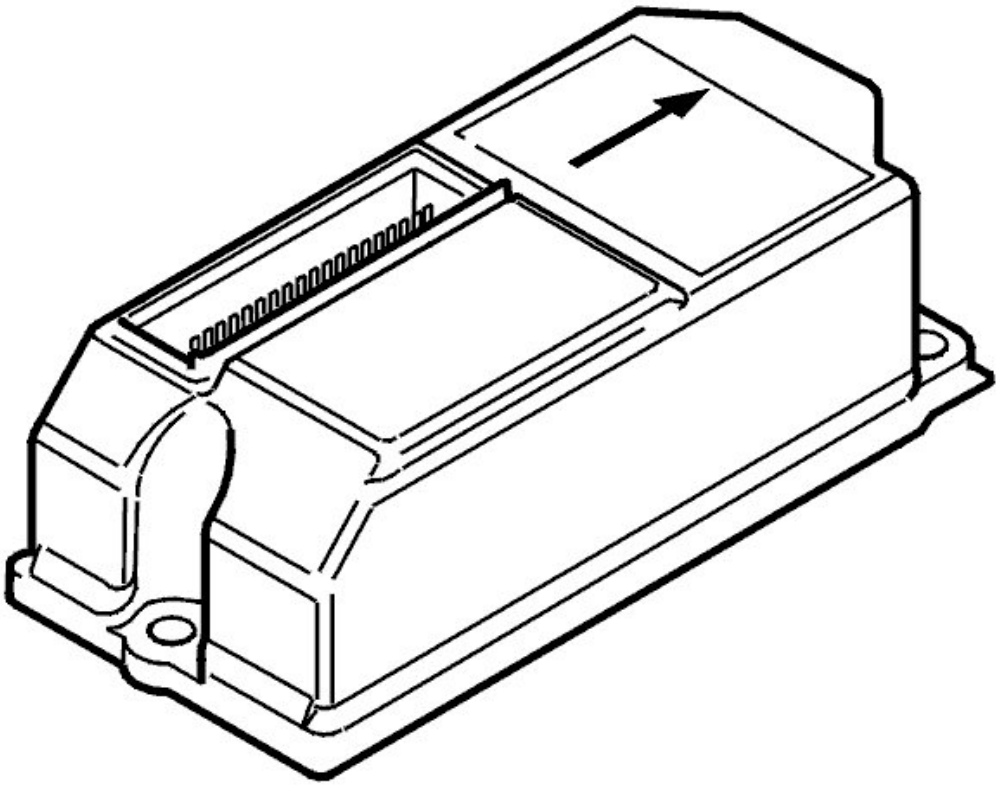
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

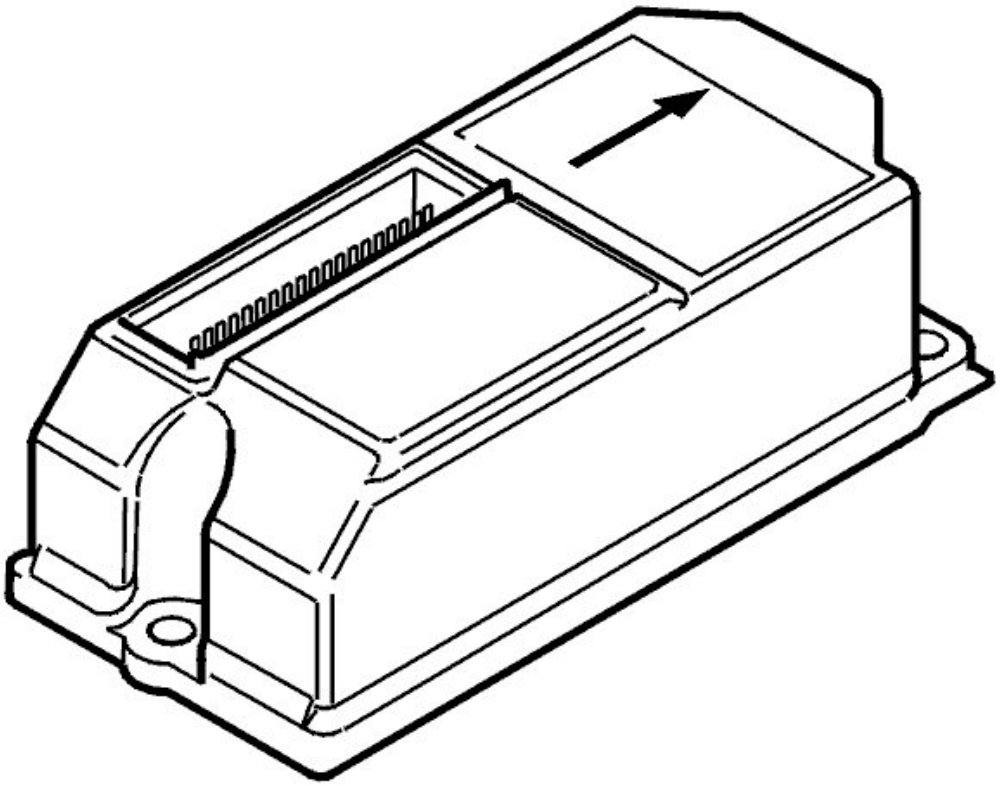
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0126 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0126 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

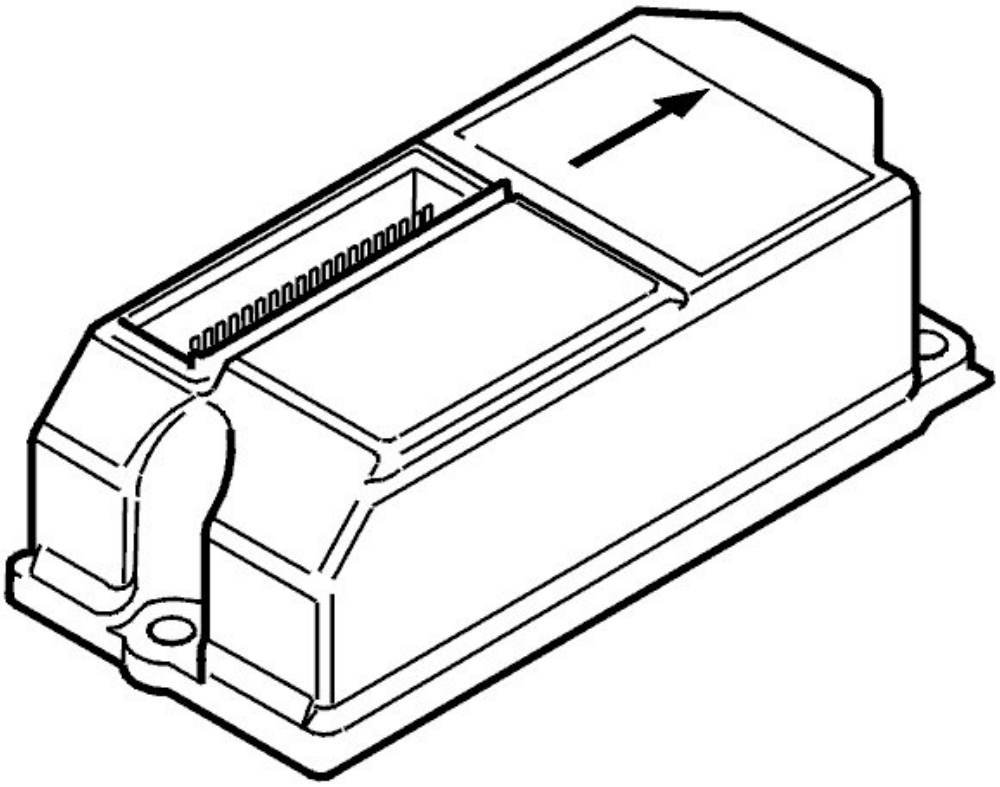
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

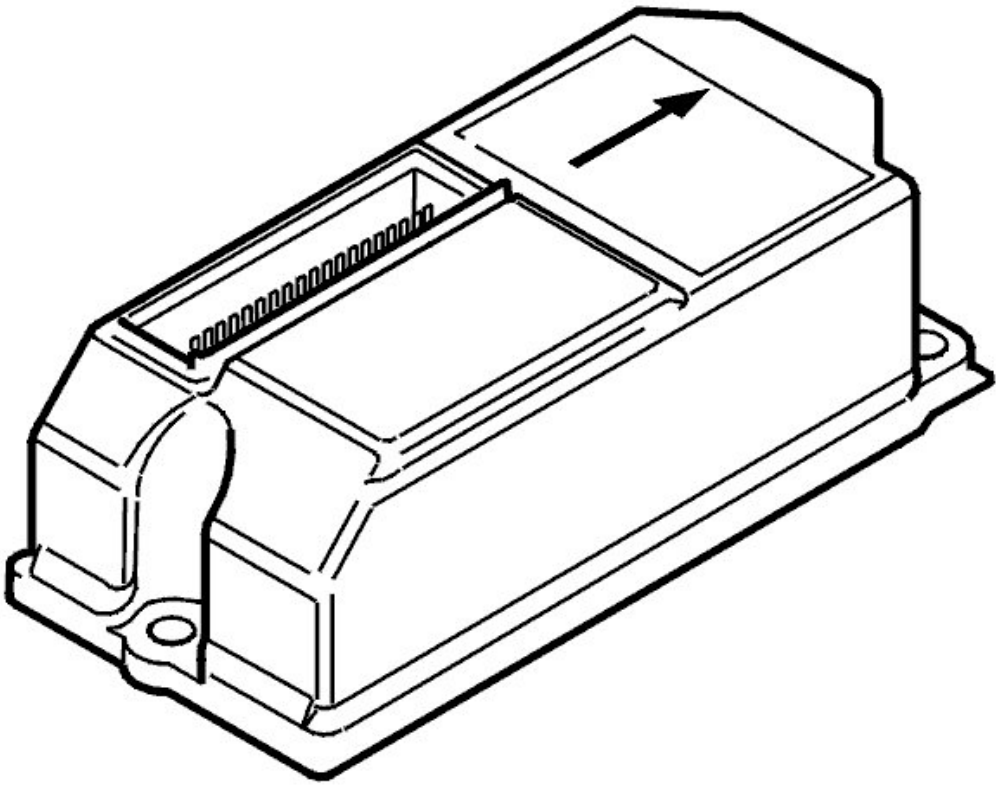
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0127 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0127 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

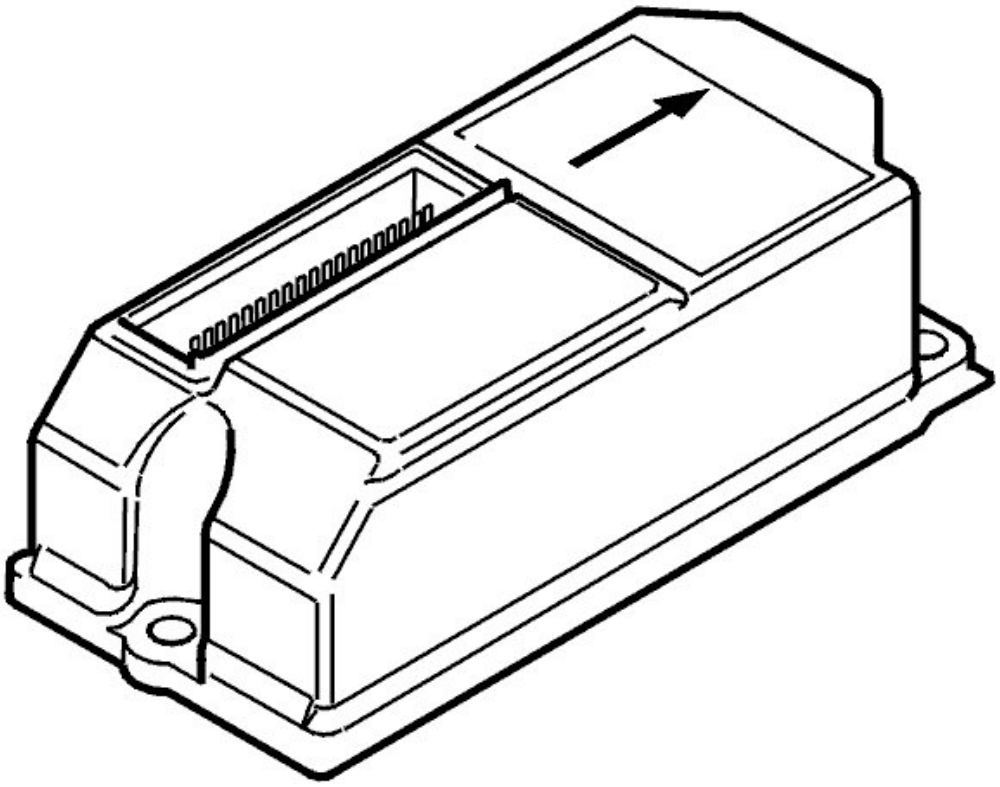
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

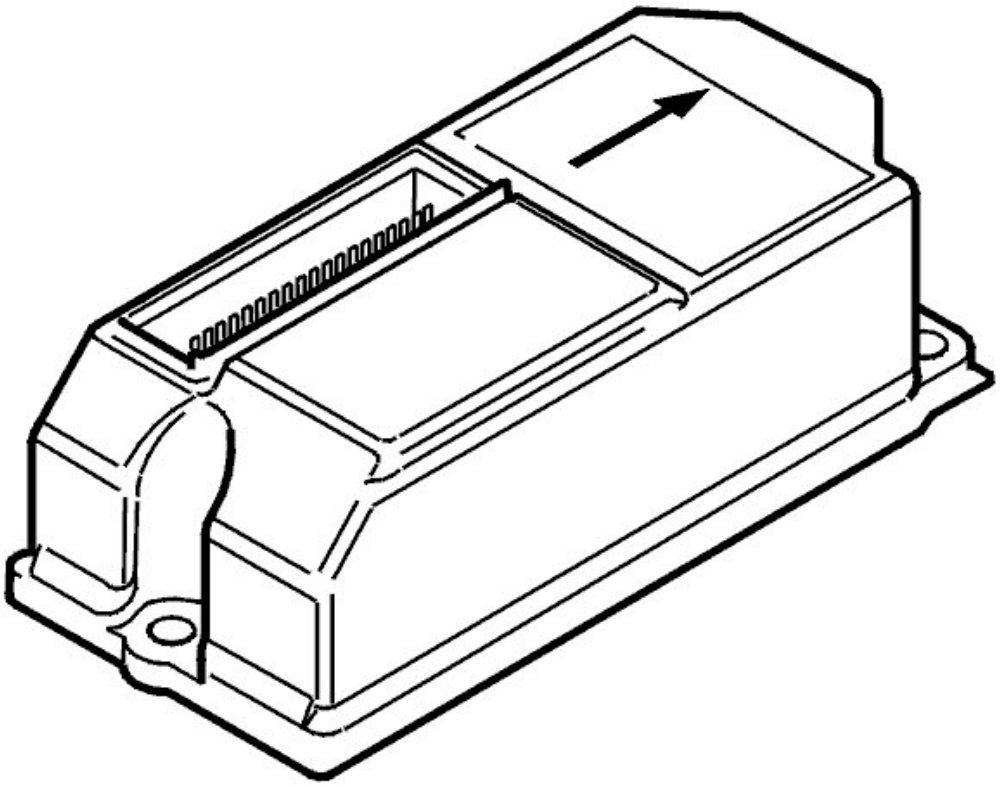
FAULT FOUND - Fault Found

Diagnostic trouble code (DTC) information

SRS-0127 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0127 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

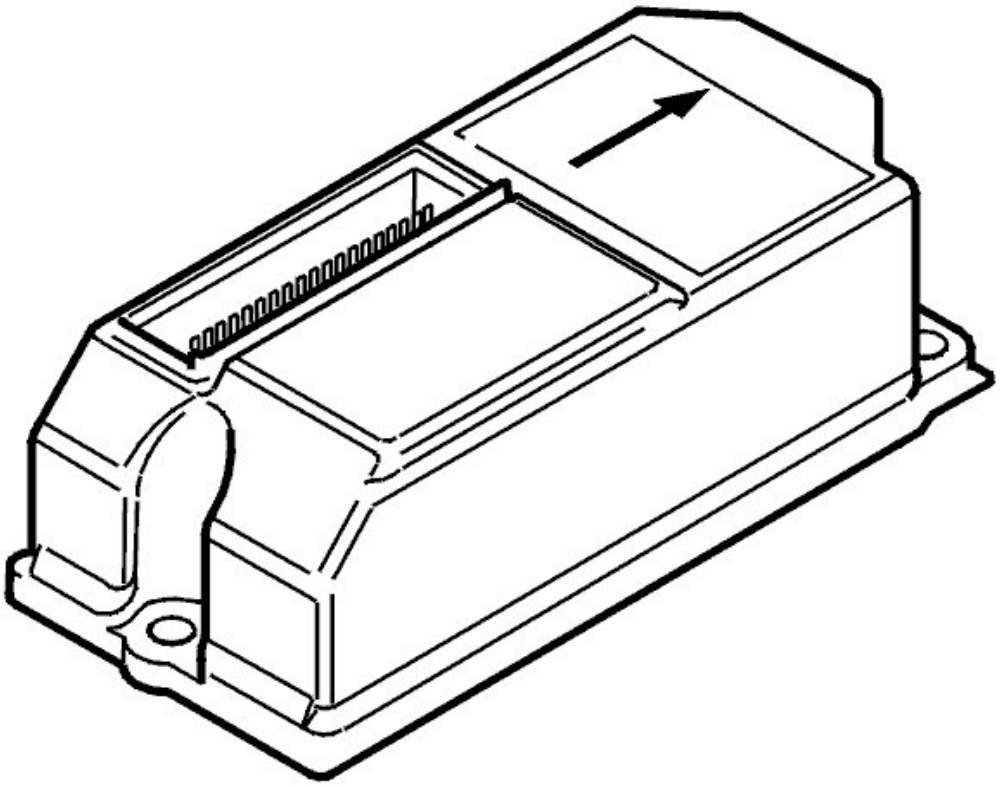
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

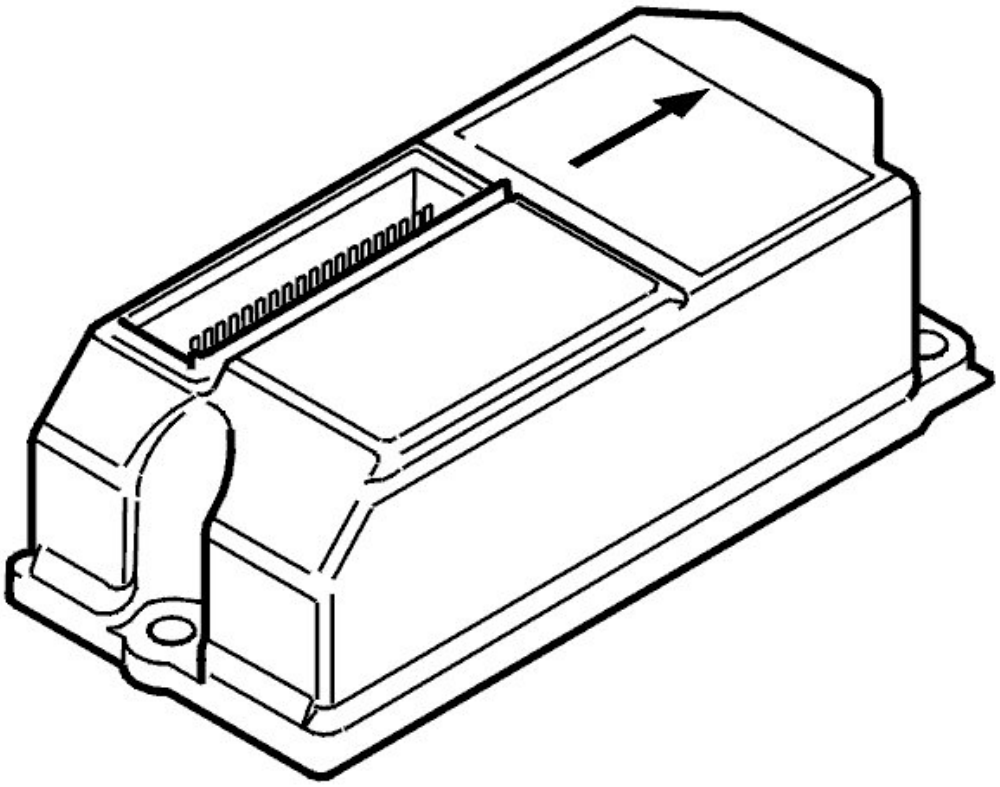
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0128 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0128 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

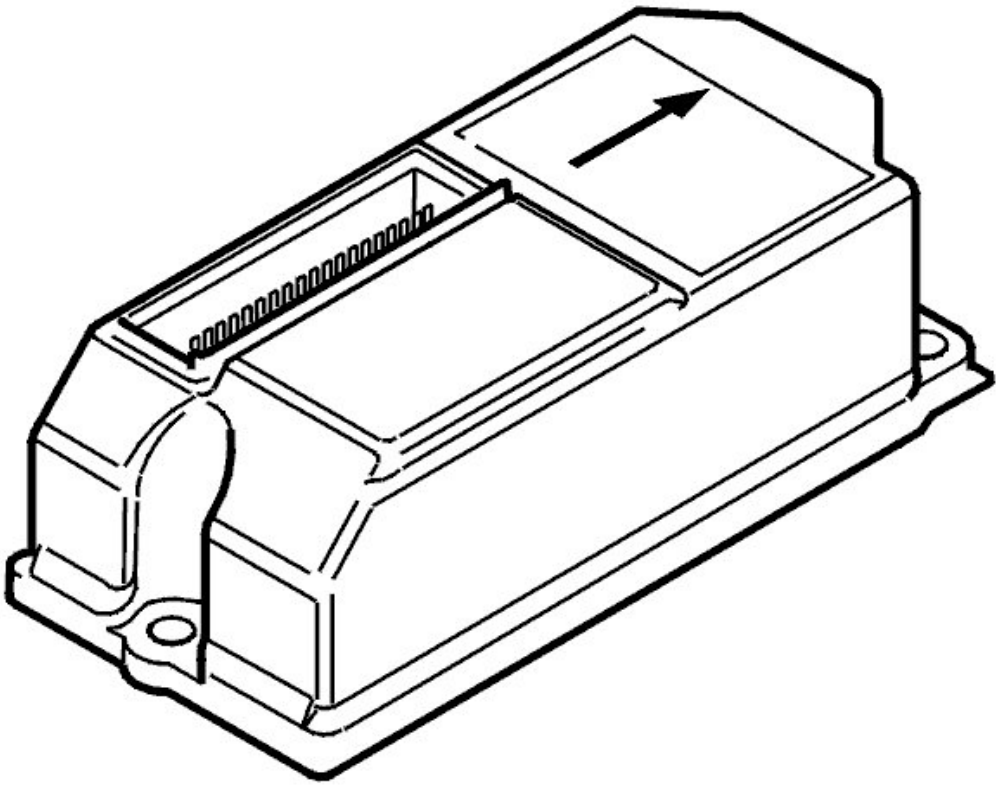
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

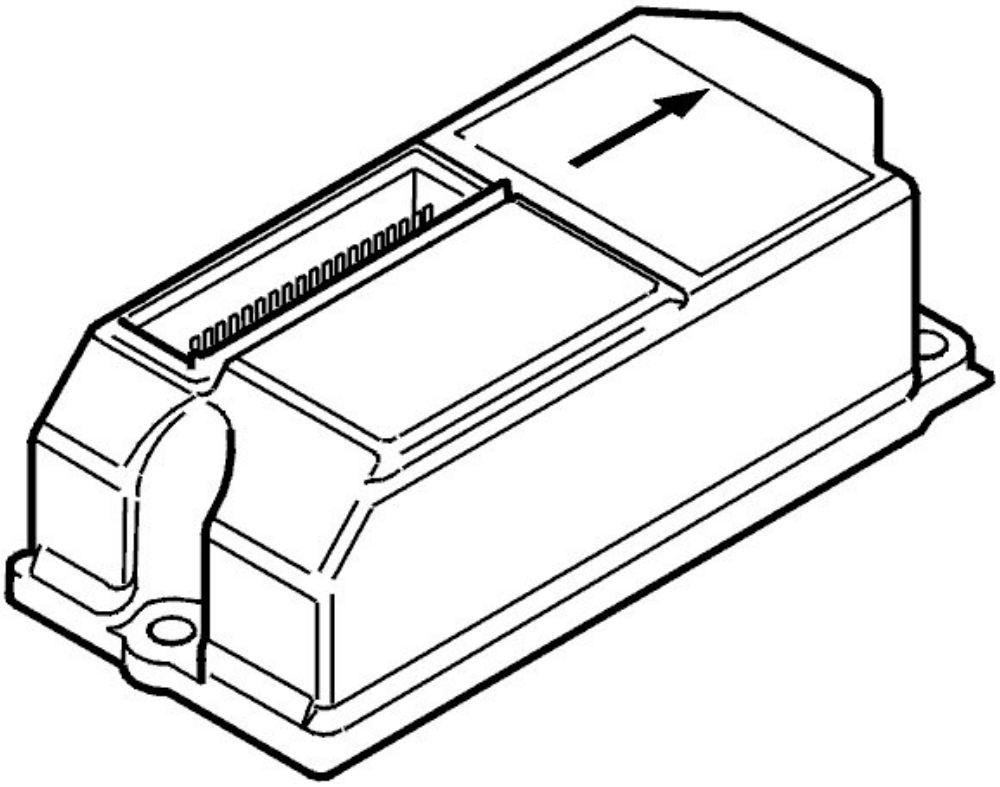
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0128 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0128 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

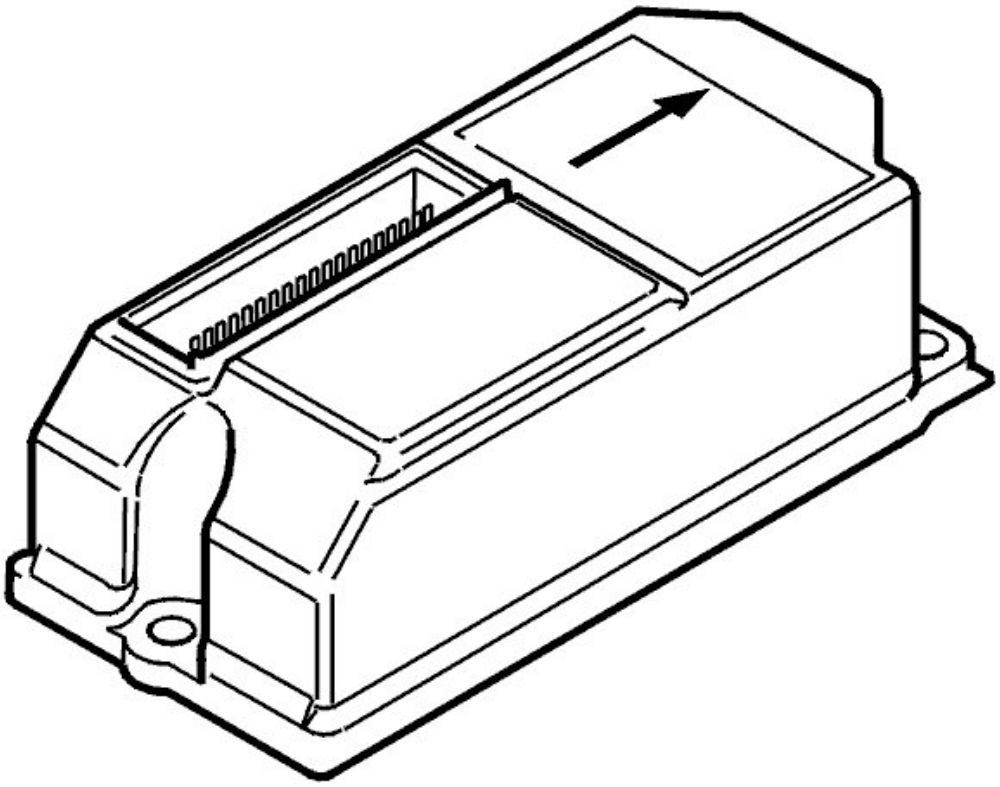
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

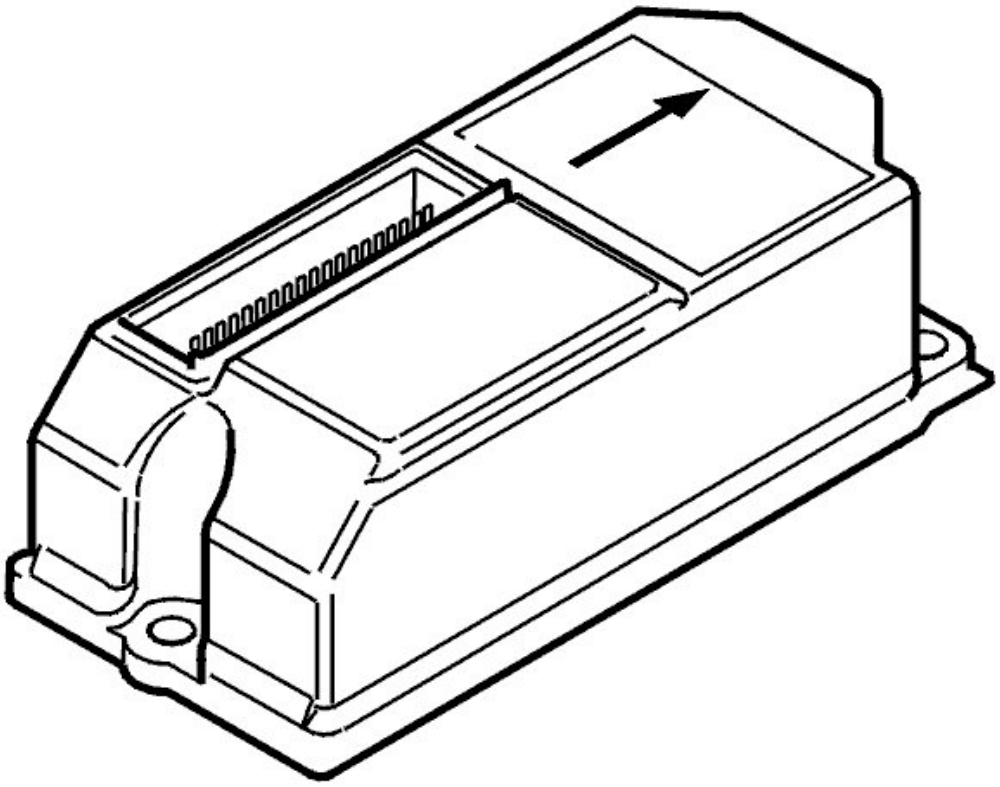
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0129 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0129 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

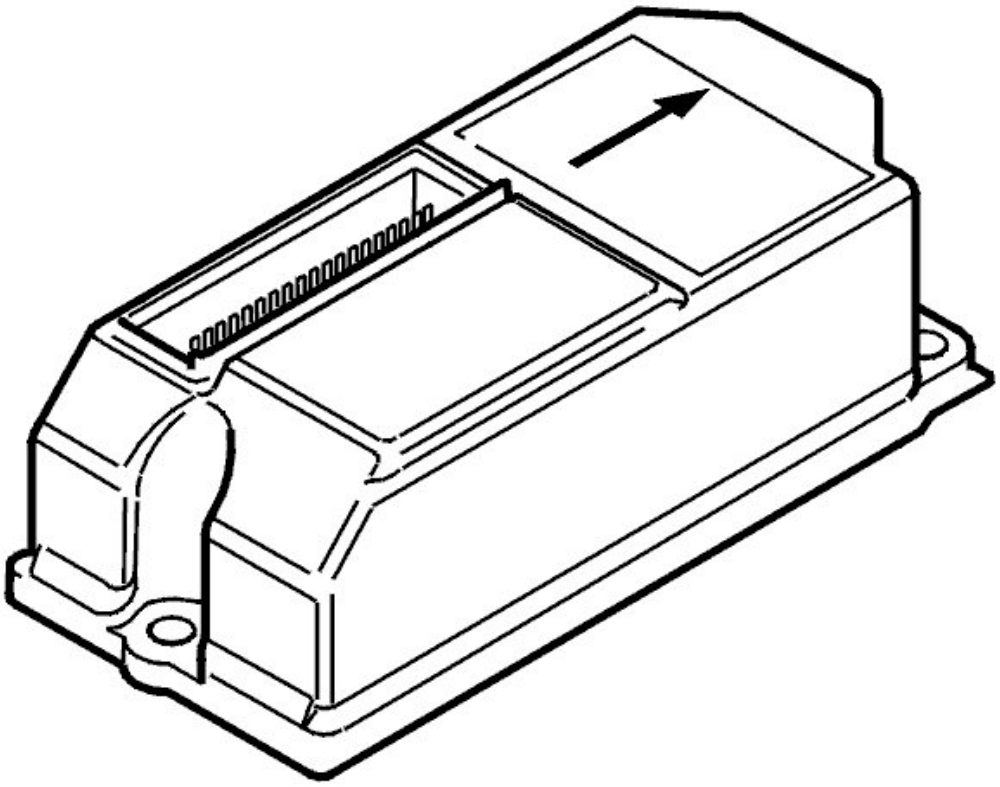
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

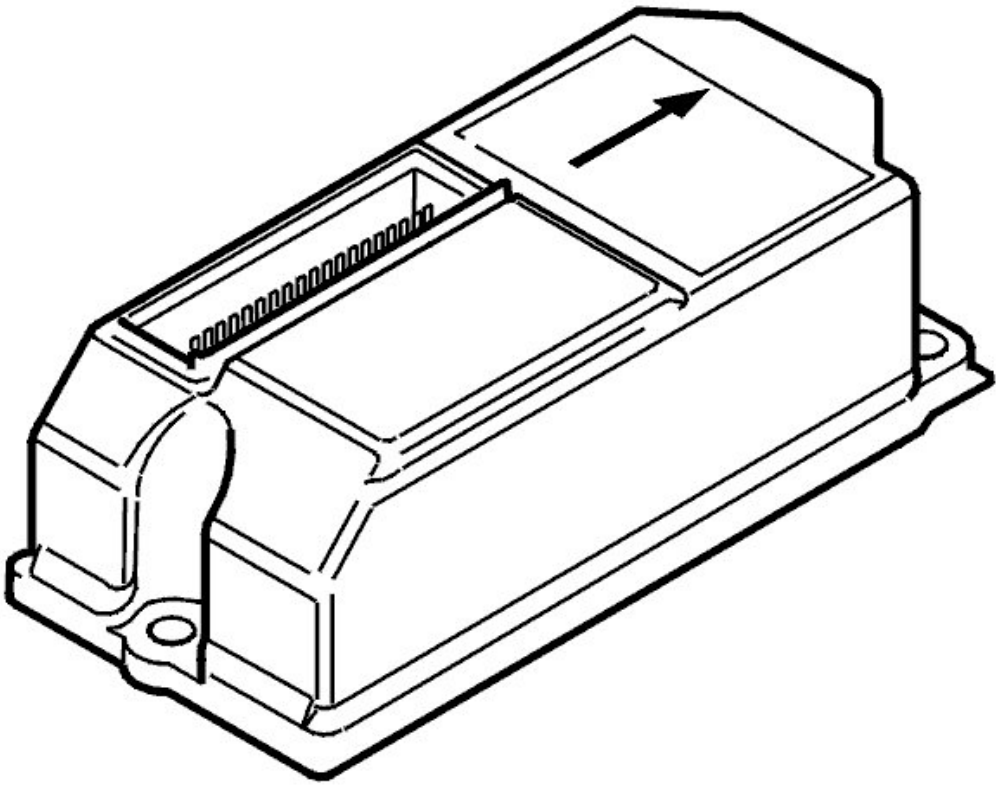
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

SRS-0129 Diagnostic trouble code information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



If the self-diagnosis registers a fault in one of the internal functions of the control unit, diagnostic trouble code SRS-0129 is displayed.

Possible source

- Internal fault in the supplemental restraint system (SRS).

Fault symptom[s]

- SRS warning lamp on.

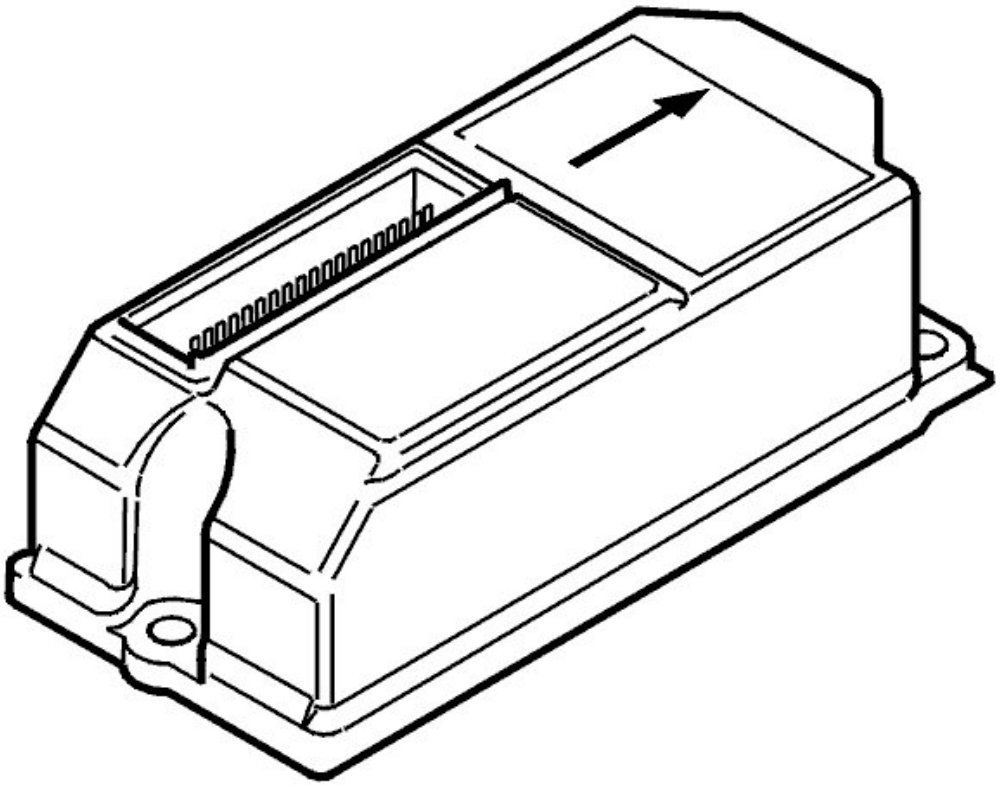
Warning! There is a risk that the supplemental restraint system (SRS) will not function if this diagnostic trouble code occurs.

Note! If there is an internal fault the diagnostic trouble code should not be erased but the supplemental restraint system (SRS) control unit should be returned to Volvo.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

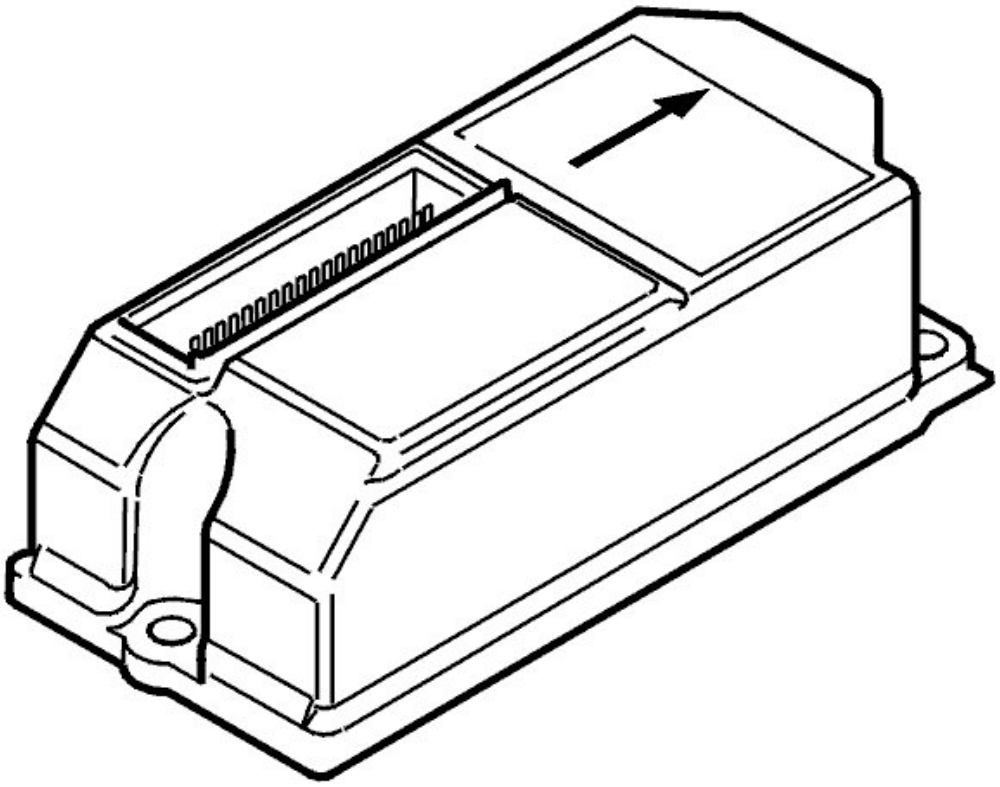
Attempt New Test - Replacing and programming the SRS control module

FAULT FOUND - Fault Found

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

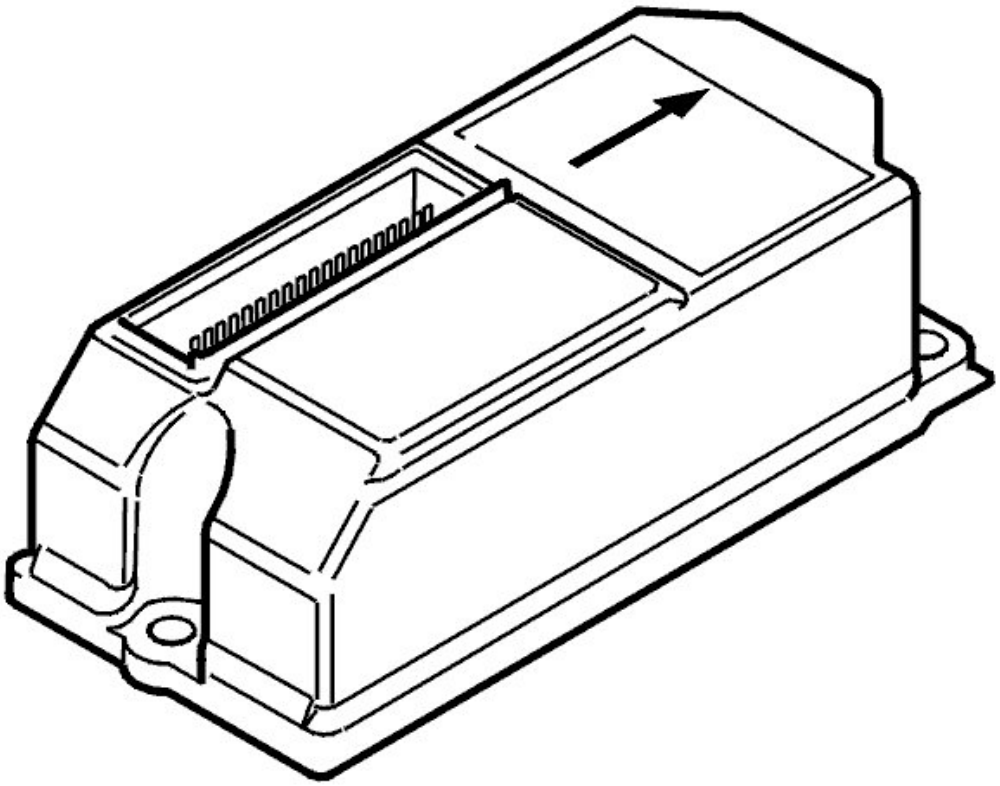
Attempt New Test - Replacing and programming the SRS control module

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-012B

Condition



Diagnostic trouble code (DTC) SRS-012B is stored if the on-board diagnostic system has registered a fault in any of the internal control module functions.

Possible source

- Internal fault in the SRS control module.

Fault symptom[s]

- The SRS indicator lamp is lit.

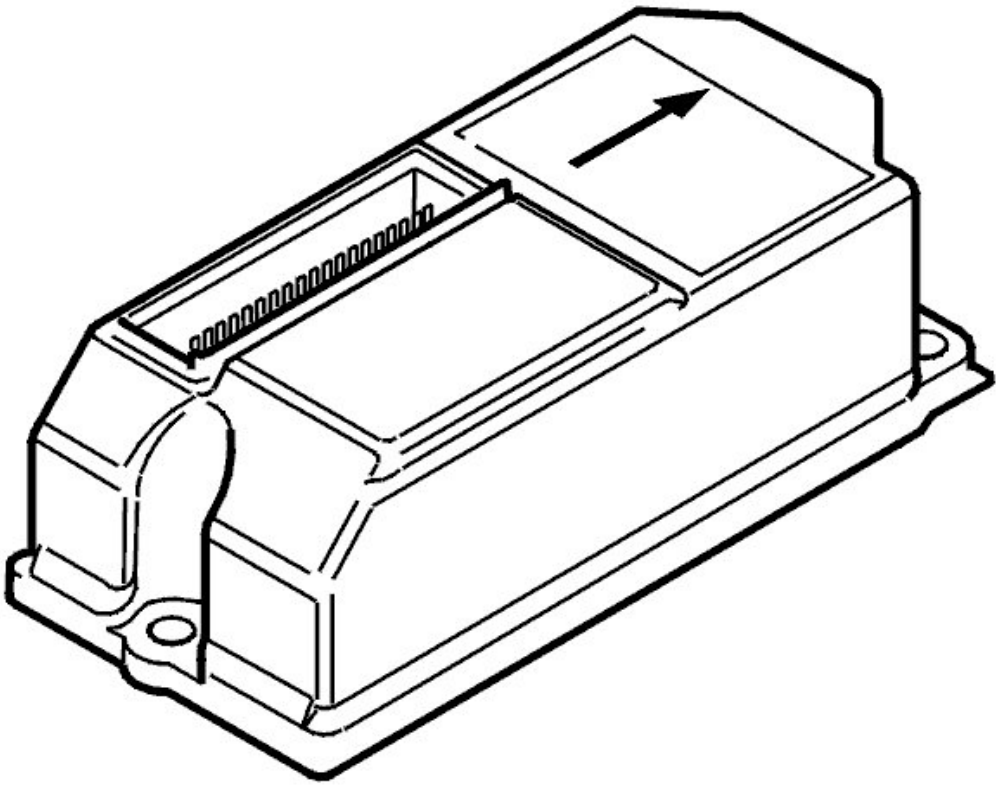
Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

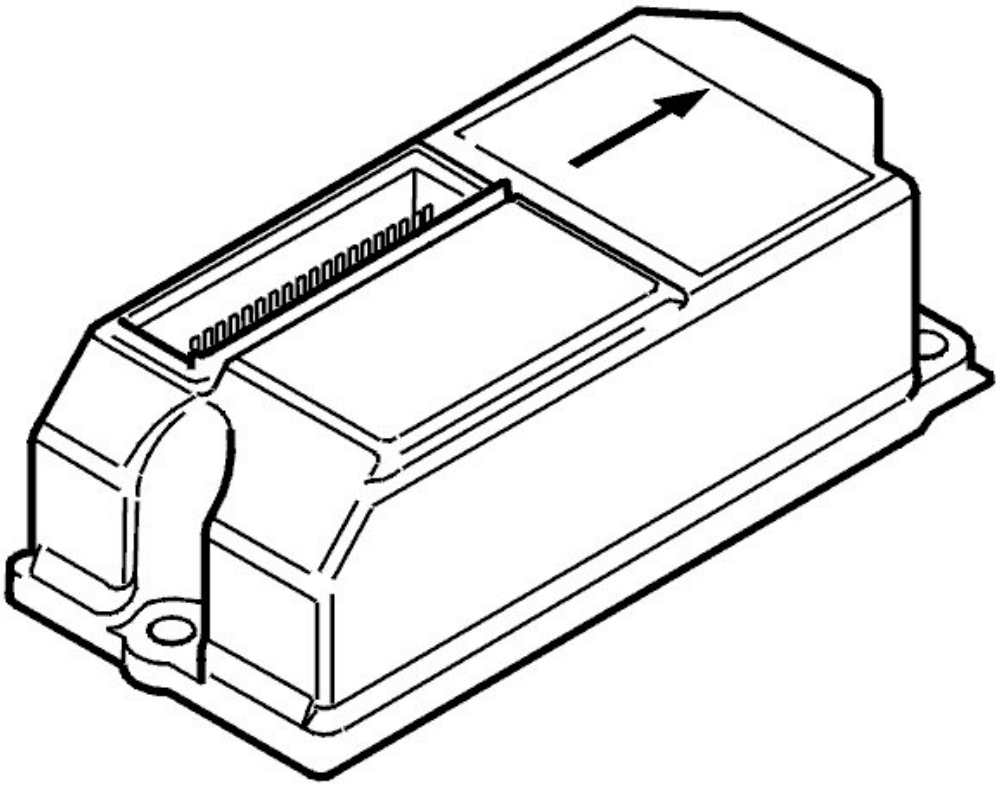
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-012B

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Diagnostic trouble code (DTC) SRS-012B is stored if the on-board diagnostic system has registered a fault in any of the internal control module functions.

Possible source

- Internal fault in the SRS control module.

Fault symptom[s]

- The SRS indicator lamp is lit.

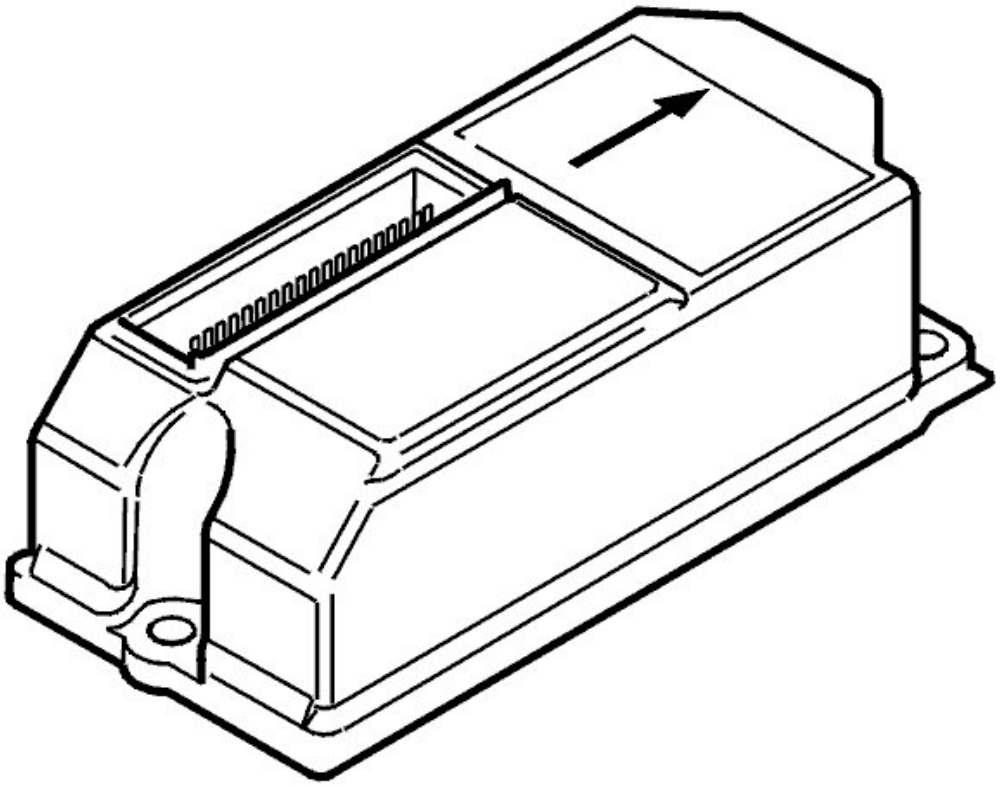
Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

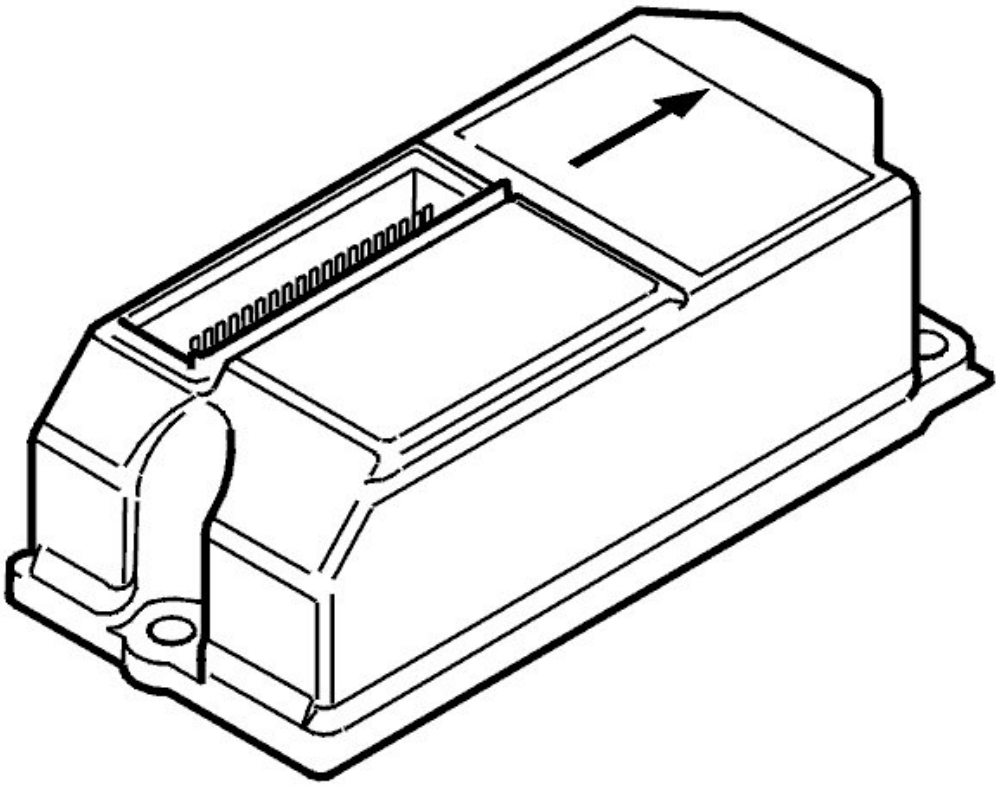
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-012C

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Diagnostic trouble code (DTC) SRS-012C is stored if the on-board diagnostic system has registered a fault in any of the internal control module functions.

Possible source

- Internal fault in the SRS control module.

Fault symptom[s]

- The SRS indicator lamp is lit.

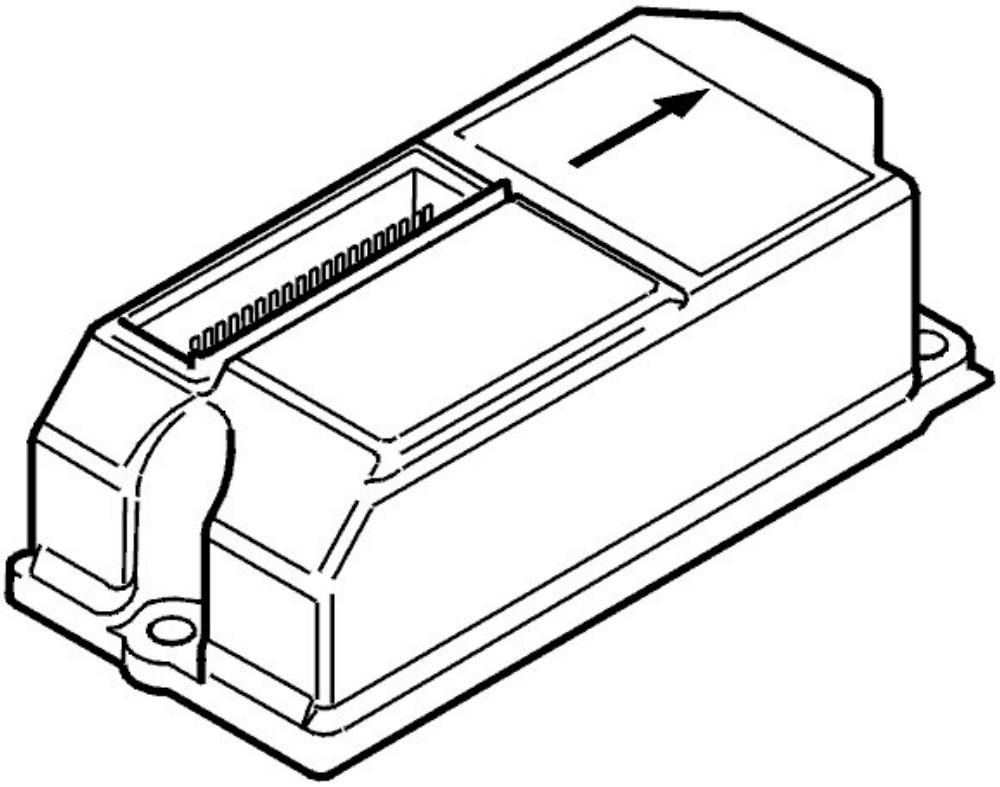
Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

Internal fault

Replacing and programming the SRS control module



The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Replacing and programming the SRS control module

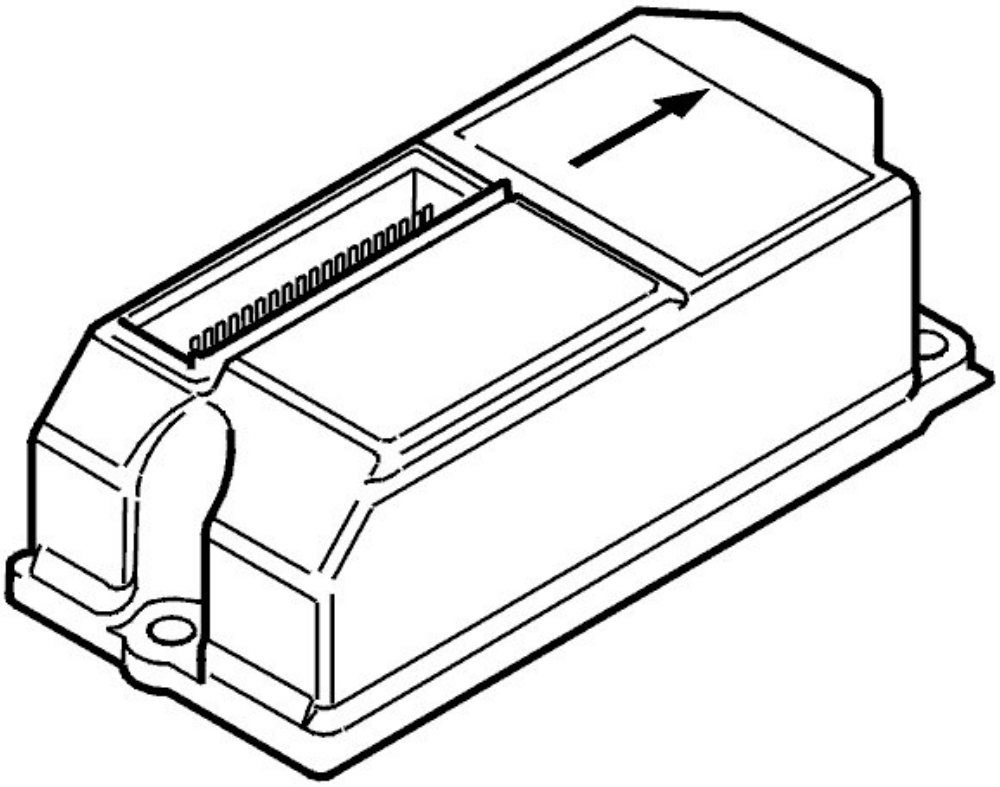
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-012C

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Diagnostic trouble code (DTC) SRS-012C is stored if the on-board diagnostic system has registered a fault in any of the internal control module functions.

Possible source

- Internal fault in the SRS control module.

Fault symptom[s]

- The SRS indicator lamp is lit.

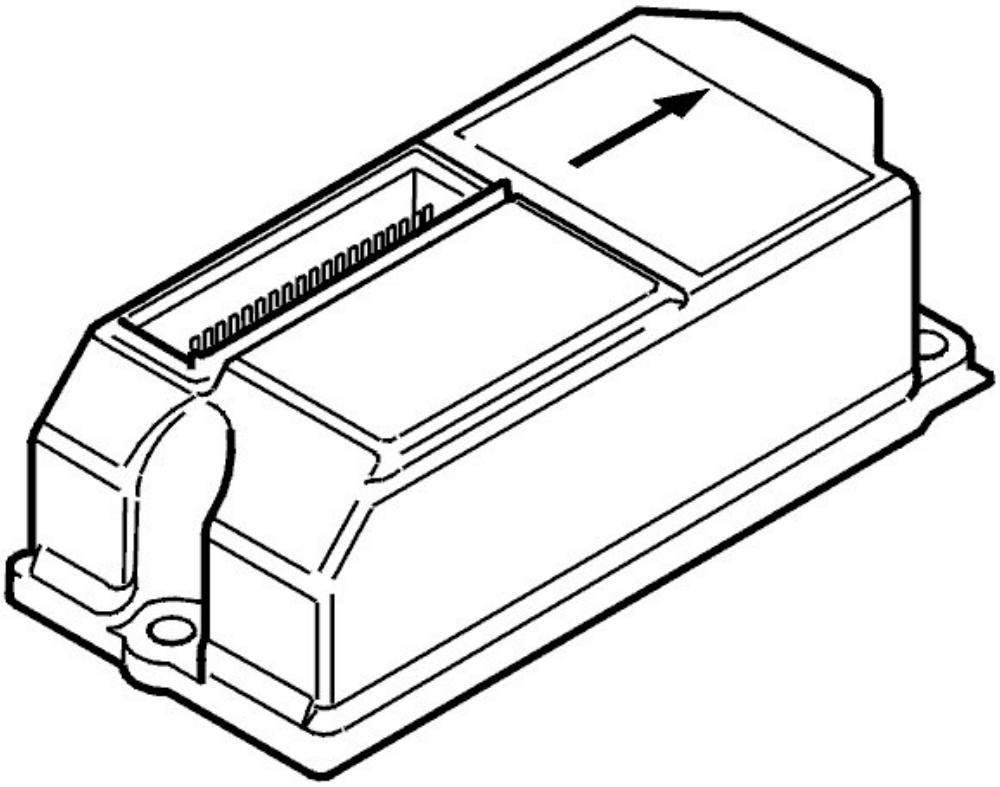
Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

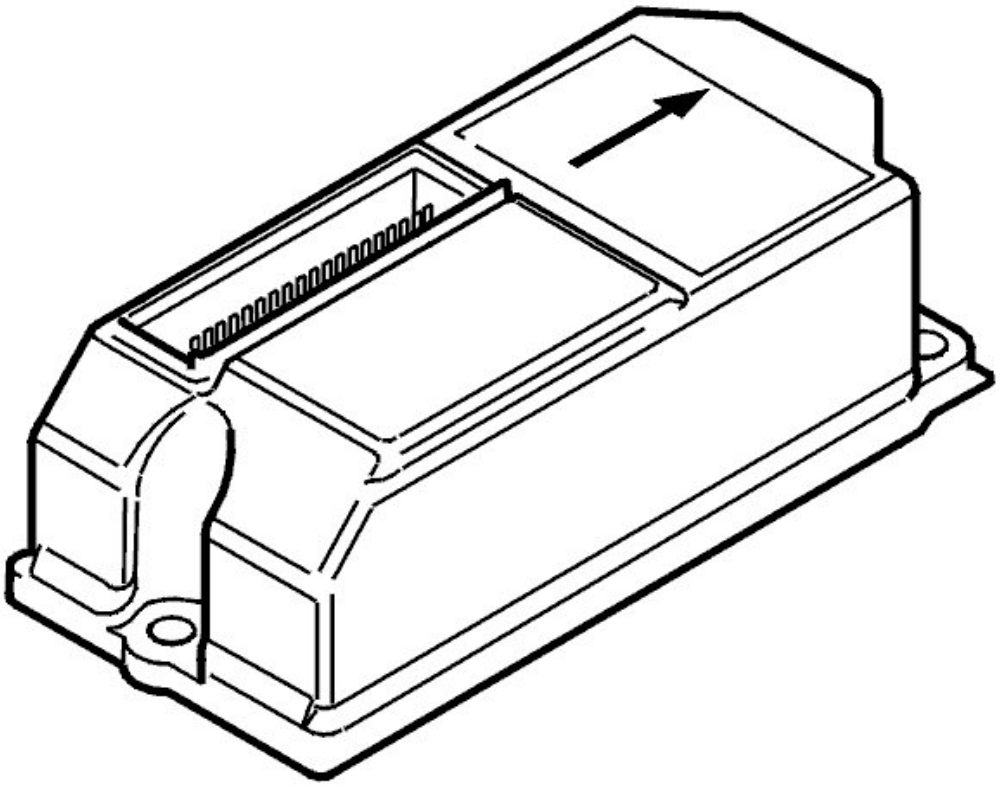
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

Attempt New Test - Replacing and programming the SRS control module

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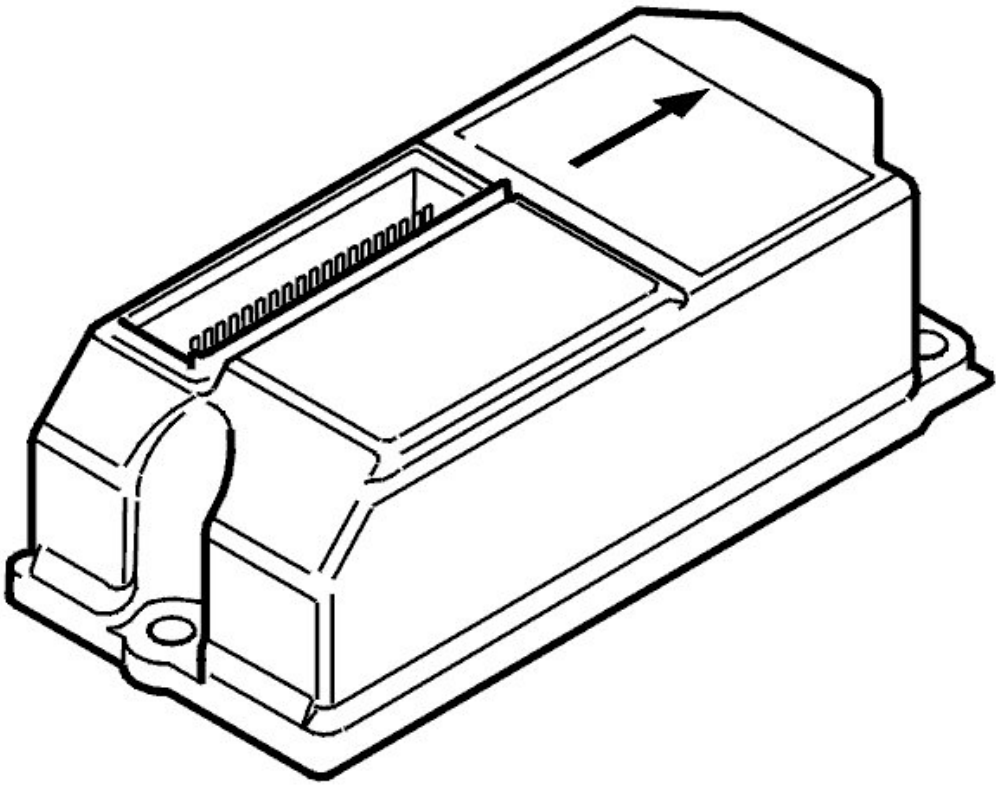
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

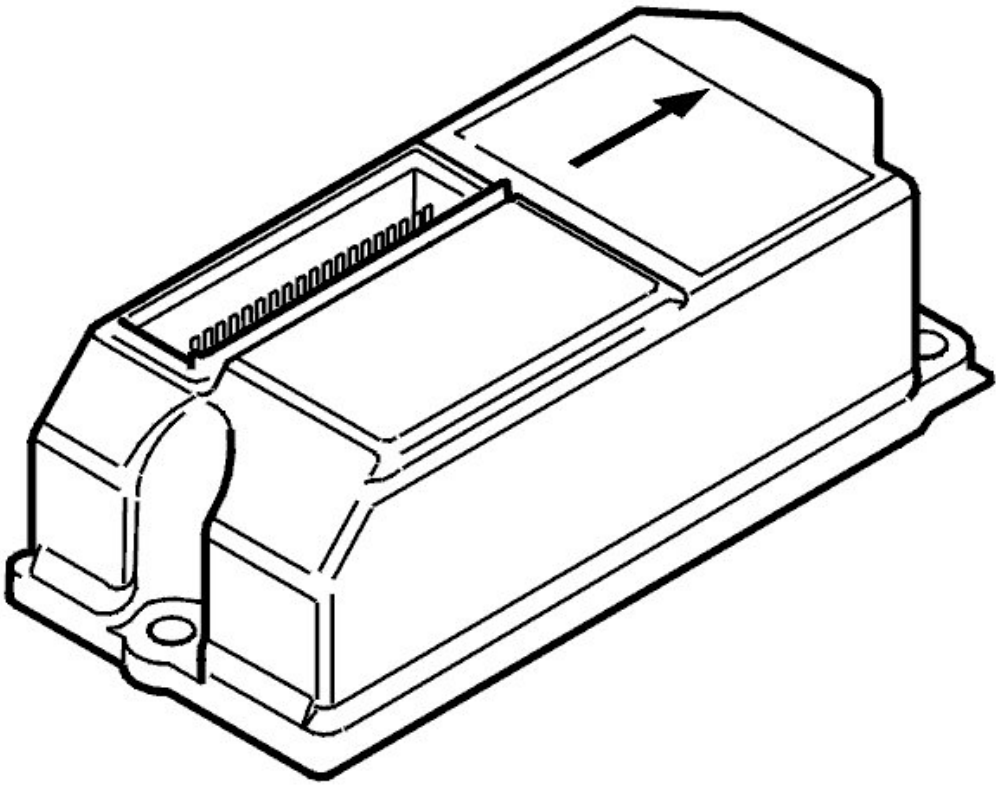
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

Attempt New Test - Replacing and programming the SRS control module

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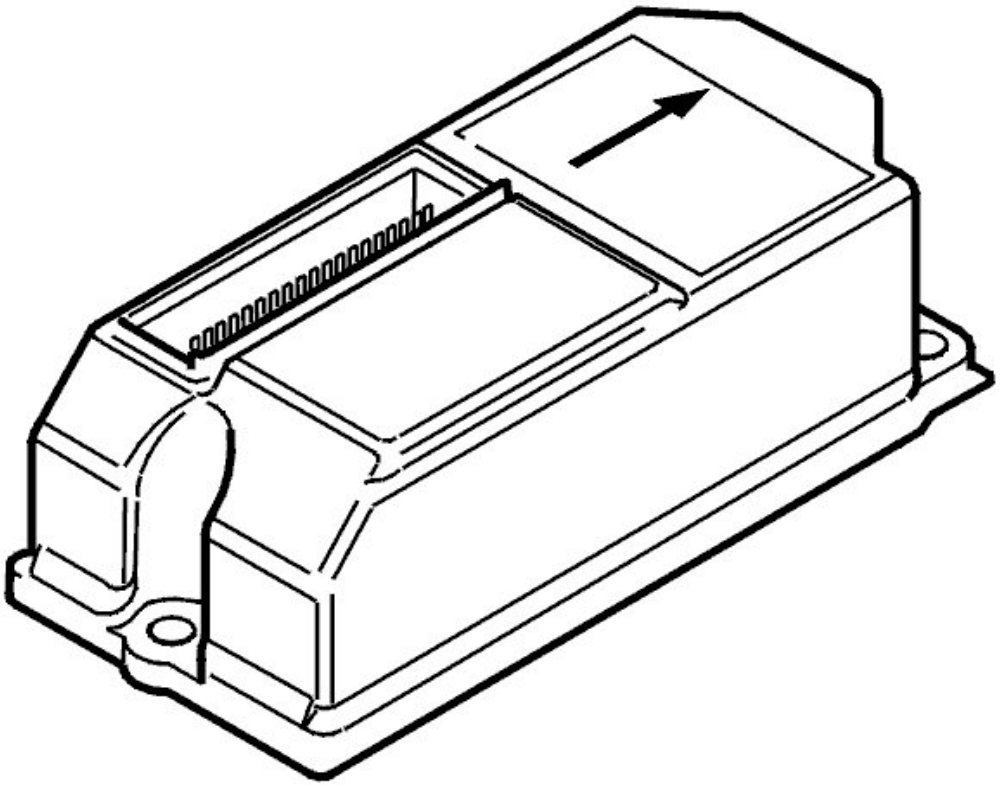
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

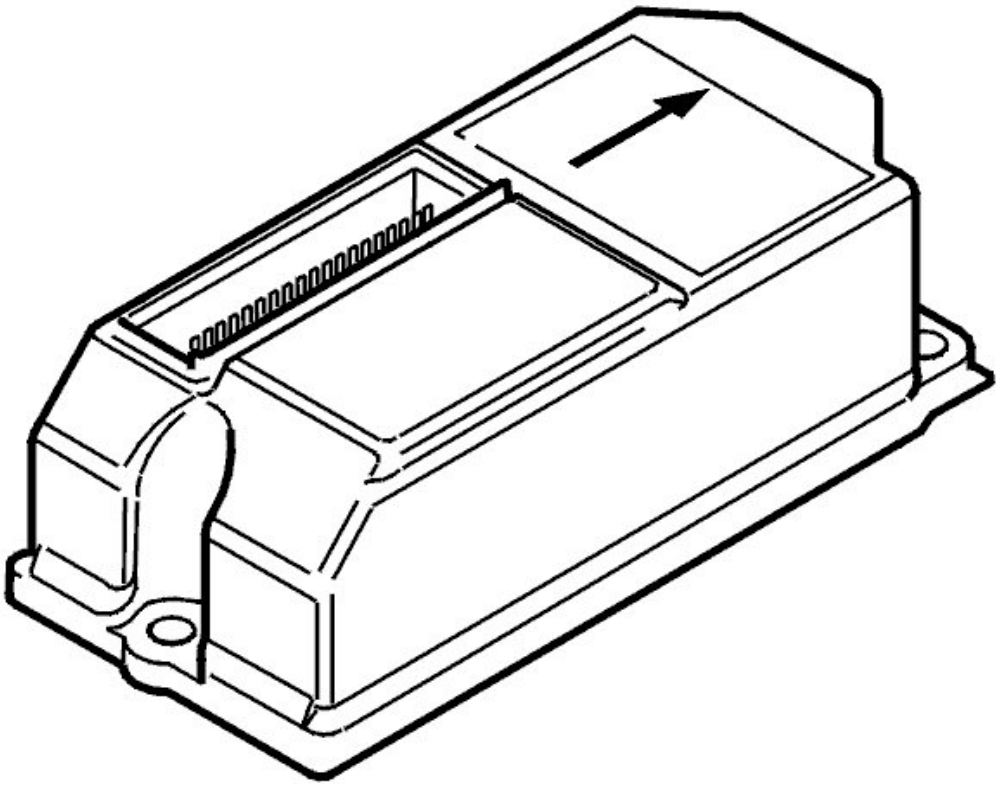
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

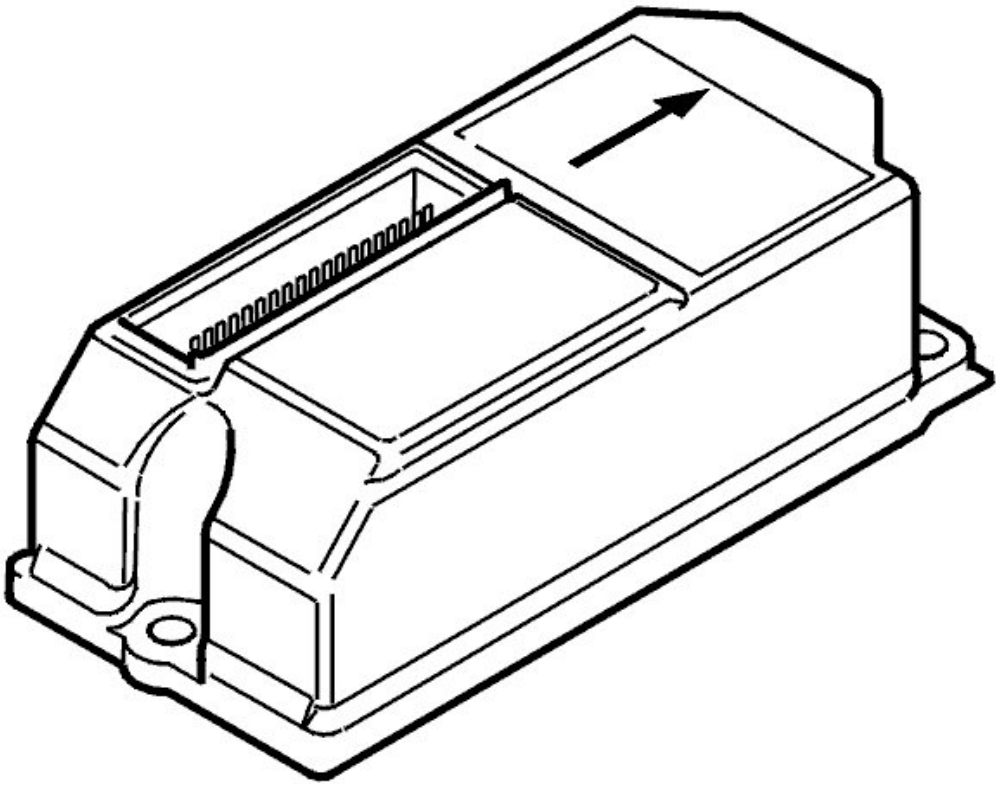
Attempt New Test - Replacing and programming the SRS control module

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

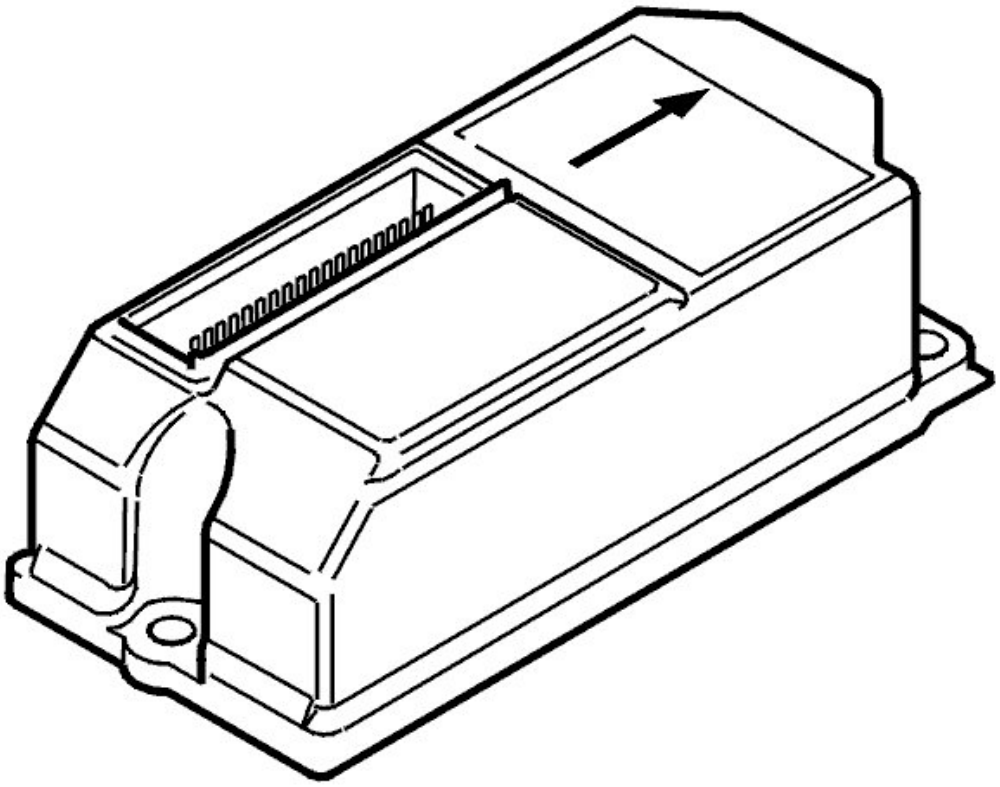
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

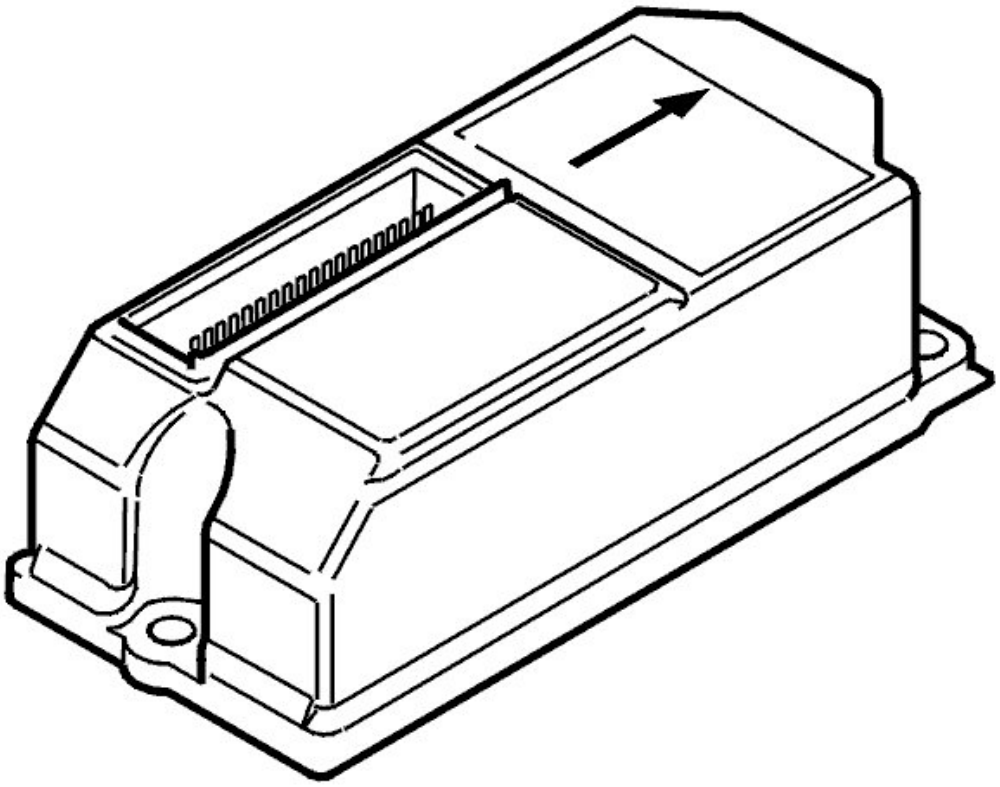
Attempt New Test - Replacing and programming the SRS control module

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

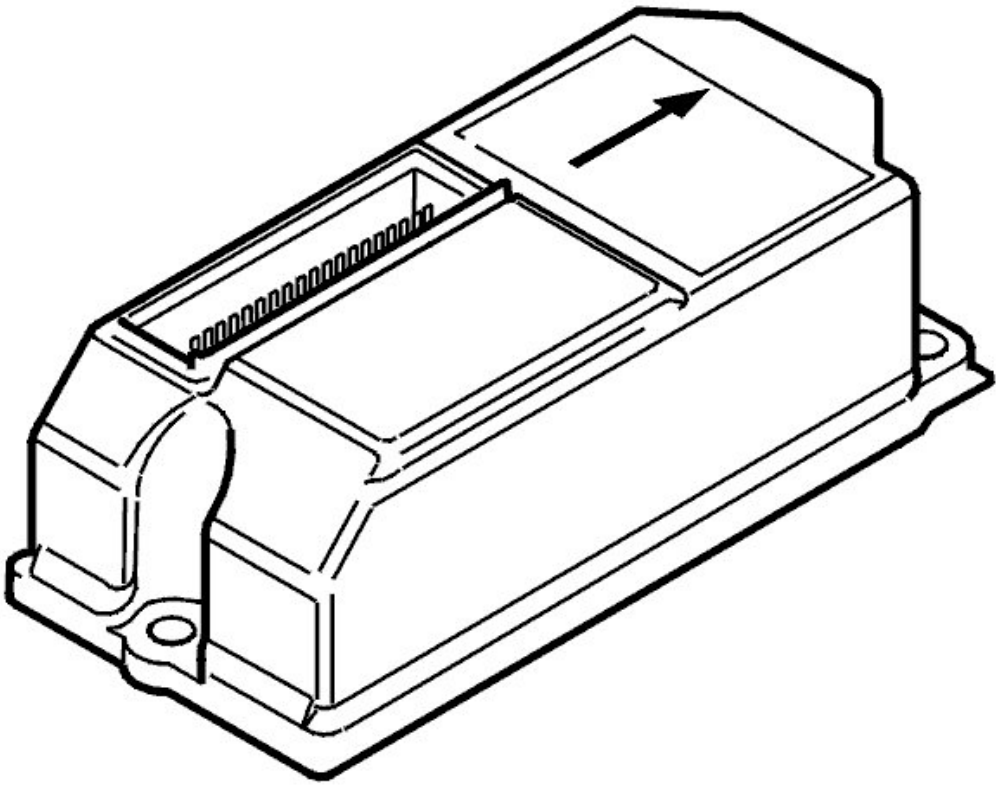
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

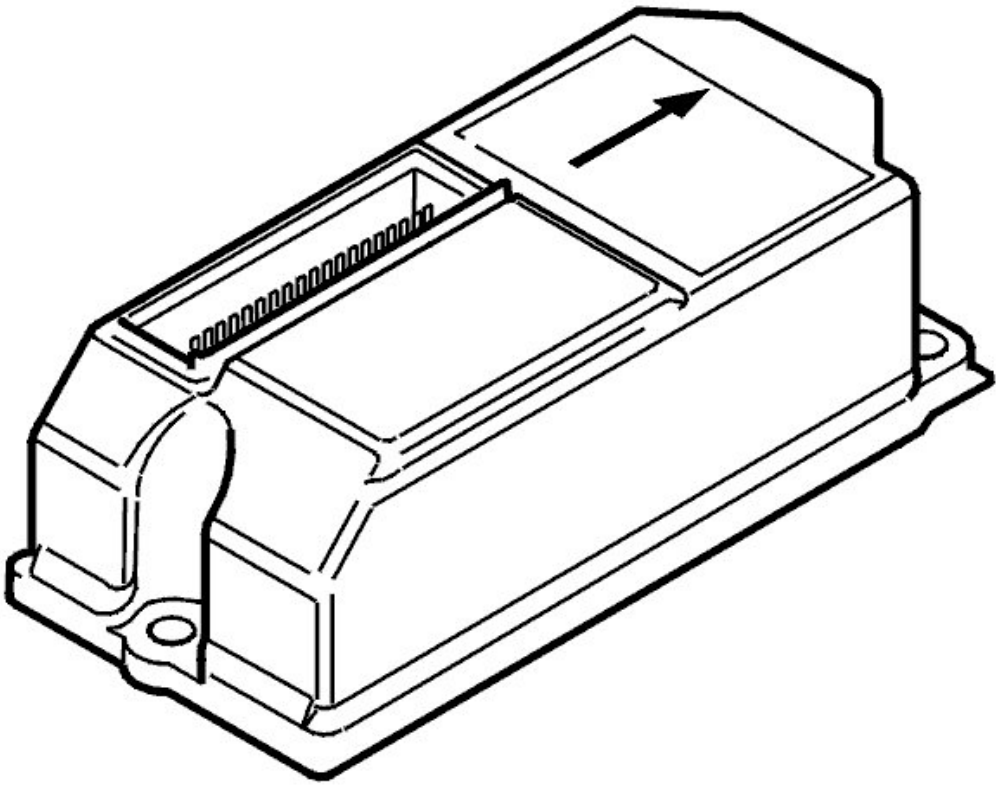
Attempt New Test - Replacing and programming the SRS control module

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SRS-0130, SRS-0131, SRS-0132 or SRS-0133 is stored (depending on the fault) if the self-diagnostic registers a fault in one of the internal functions in the control module.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

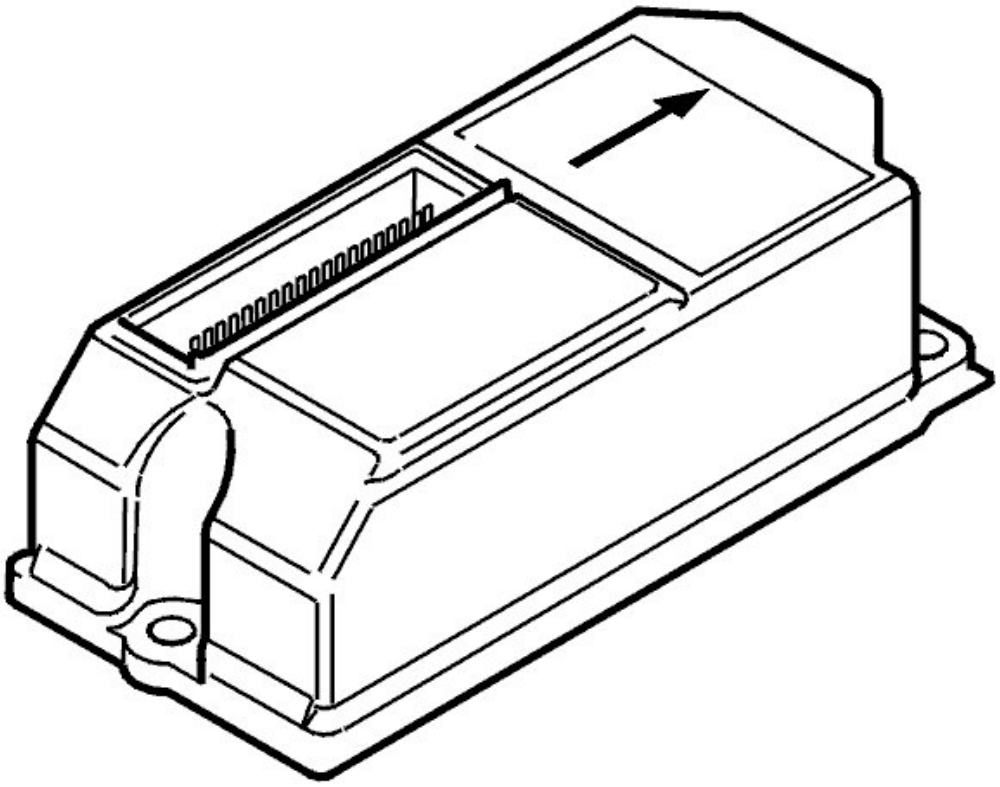
Internal fault

Replacing and programming the SRS control module

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.



Continue - Information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Troubleshooting has been completed

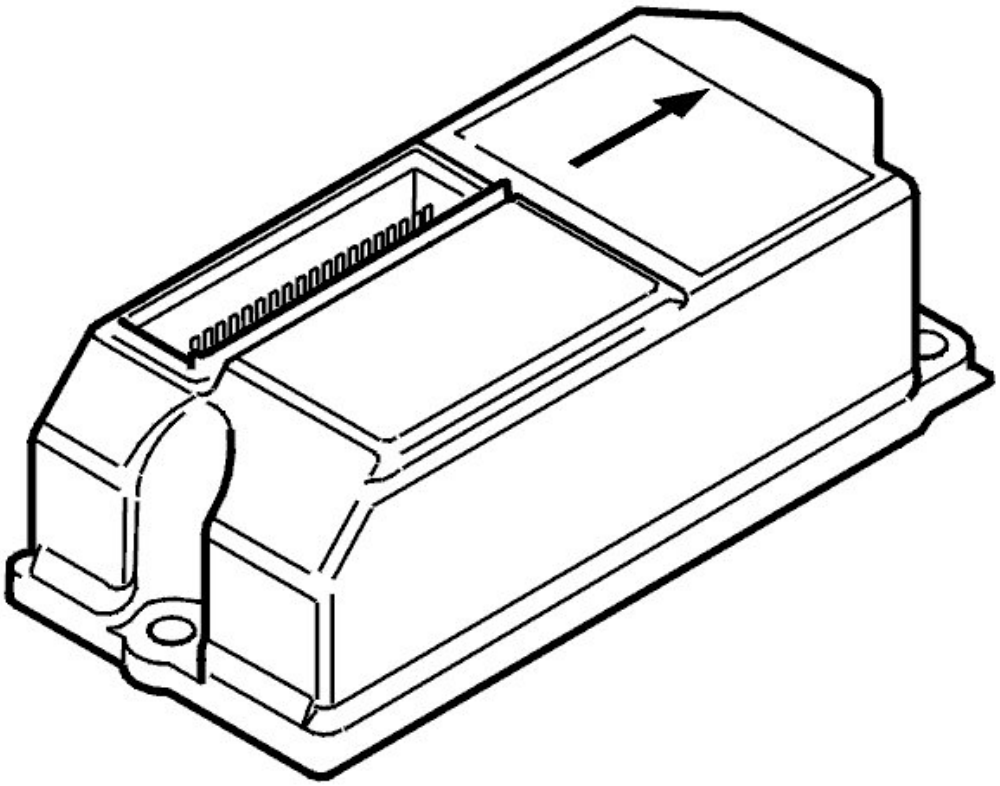
Attempt New Test - Replacing and programming the SRS control module

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-013A

Condition



Diagnostic trouble code (DTC) SRS-013A is stored if the Supplemental Restraint System Module (SRS) registers an internal fault.
Diagnostic trouble code (DTC) SRS-013A can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

Possible source
- Internal fault in the SRS control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Note! In the event of an internal fault, the diagnostic trouble code (DTC) must not be erased. The SRS control module must be returned to Volvo according to standard procedures.

Internal Fault

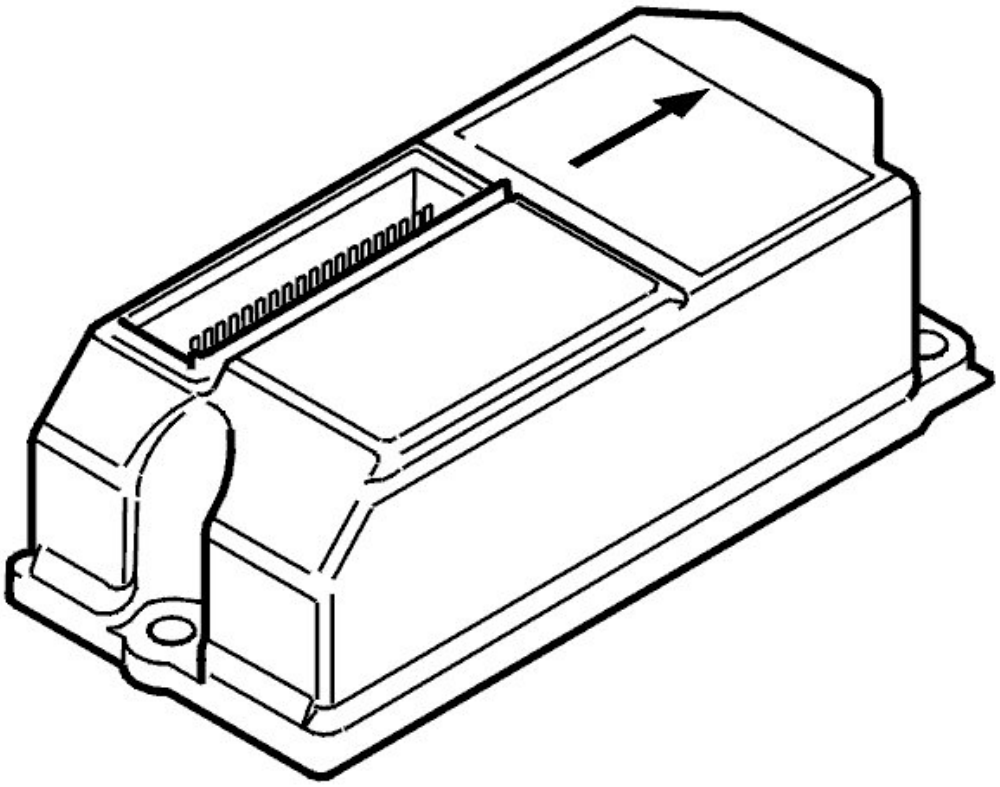
Internal fault

Internal fault

The SRS control module has registered an internal fault.

Caution! A new SRS control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the SRS control module, see Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair.

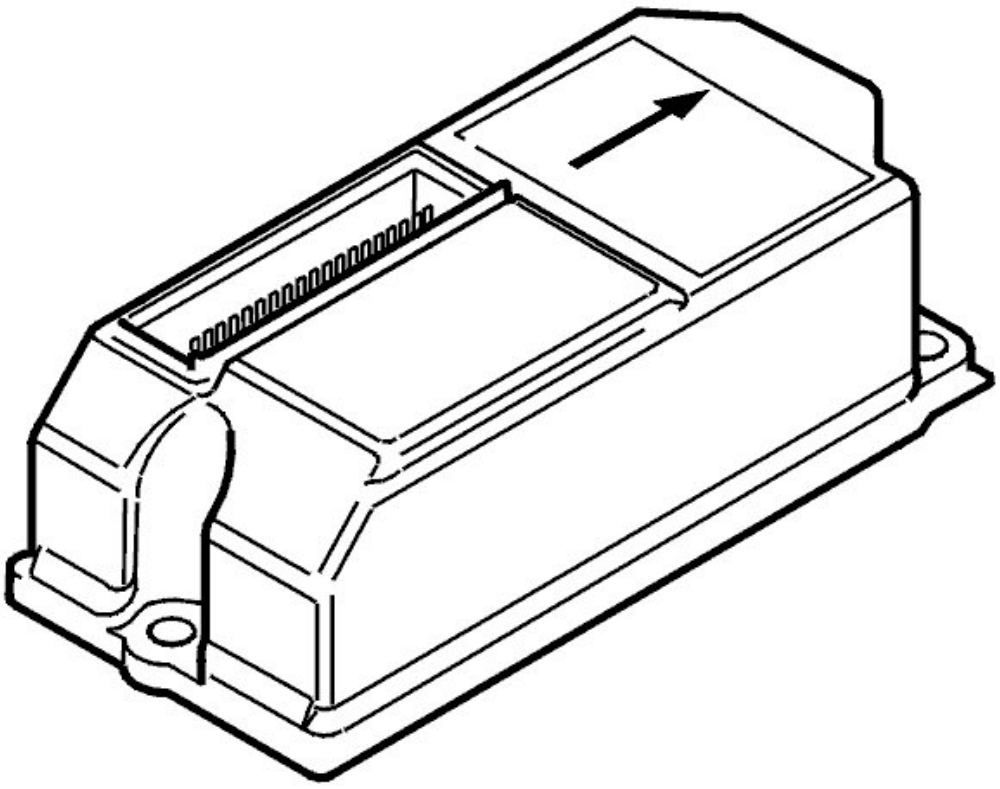


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-013B

Condition



Diagnostic trouble code (DTC) SRS-013B is stored if the Supplemental Restraint System Module (SRS) registers an internal fault.
Diagnostic trouble code (DTC) SRS-013B can only be diagnosed when you switch from ignition position 0 to ignition positions I, II or III.

Substitute value
- None.

Possible source
- Internal fault in the supplemental restraint system module (SRS)
- Weak battery in the vehicle when programming a control module.

Fault symptom[s]
- The SRS indicator lamp is lit.

Warning! There is a risk that the SRS system will not function if this diagnostic trouble code (DTC) is stored.

Internal Fault

Internal fault

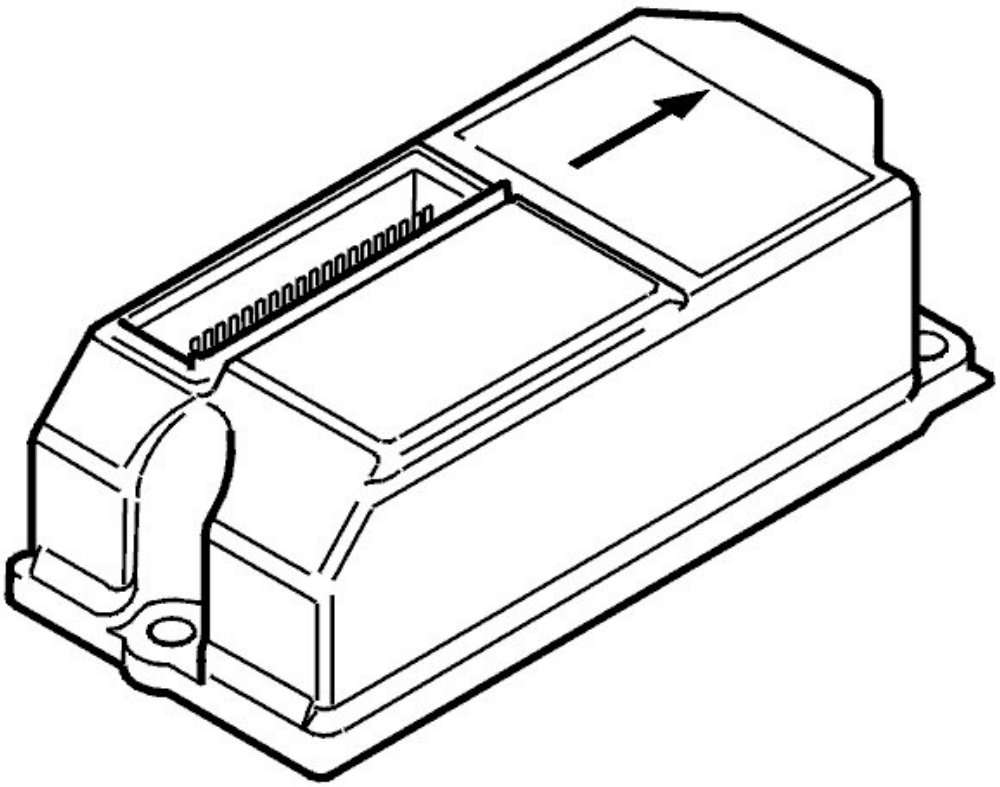
Internal fault

Note! This diagnostic trouble code (DTC) may be stored after programming one of the vehicle control modules. If this has occurred, the control module must only be reprogrammed. The control module must not be replaced.The battery must be fully charged before reprogramming is carried out!If the diagnostic trouble code (DTC) has been stored previously, the entire control module must be replaced.

The supplemental restraint system module (SRS) has registered an internal fault.

Caution! A new supplemental restraint system module (SRS) is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the supplemental restraint system module (SRS): Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

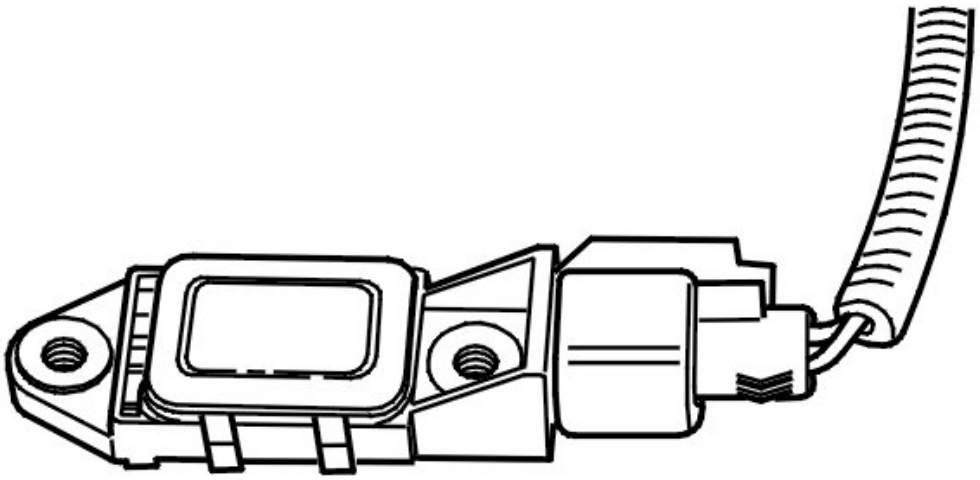


Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0210

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0210 is stored if the control module registers an incorrect signal, i.e. that the signal in the signal cable is too low or too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0210 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

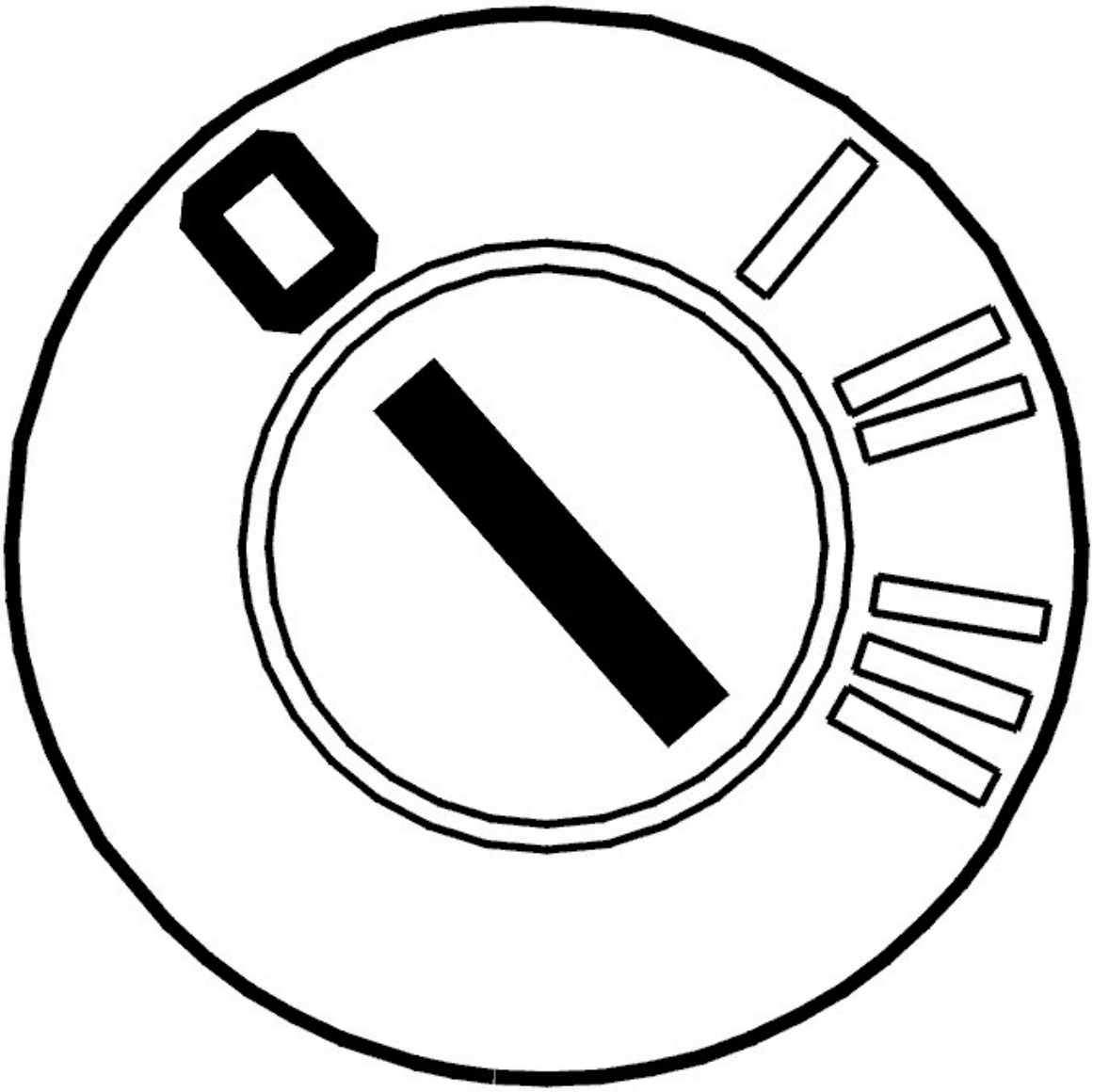
Possible source
- Short-circuit to supply voltage in the signal cable between the front right front impact sensor and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the signal cable between the front right front impact sensor and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit to ground in the connector
- Short-circuit to ground in the connector
- Short-circuit between signal cables to the front impact sensor from the Supplemental Restraint System Module (SRS)
- Short-circuit in the front impact sensor (defective front impact sensor).

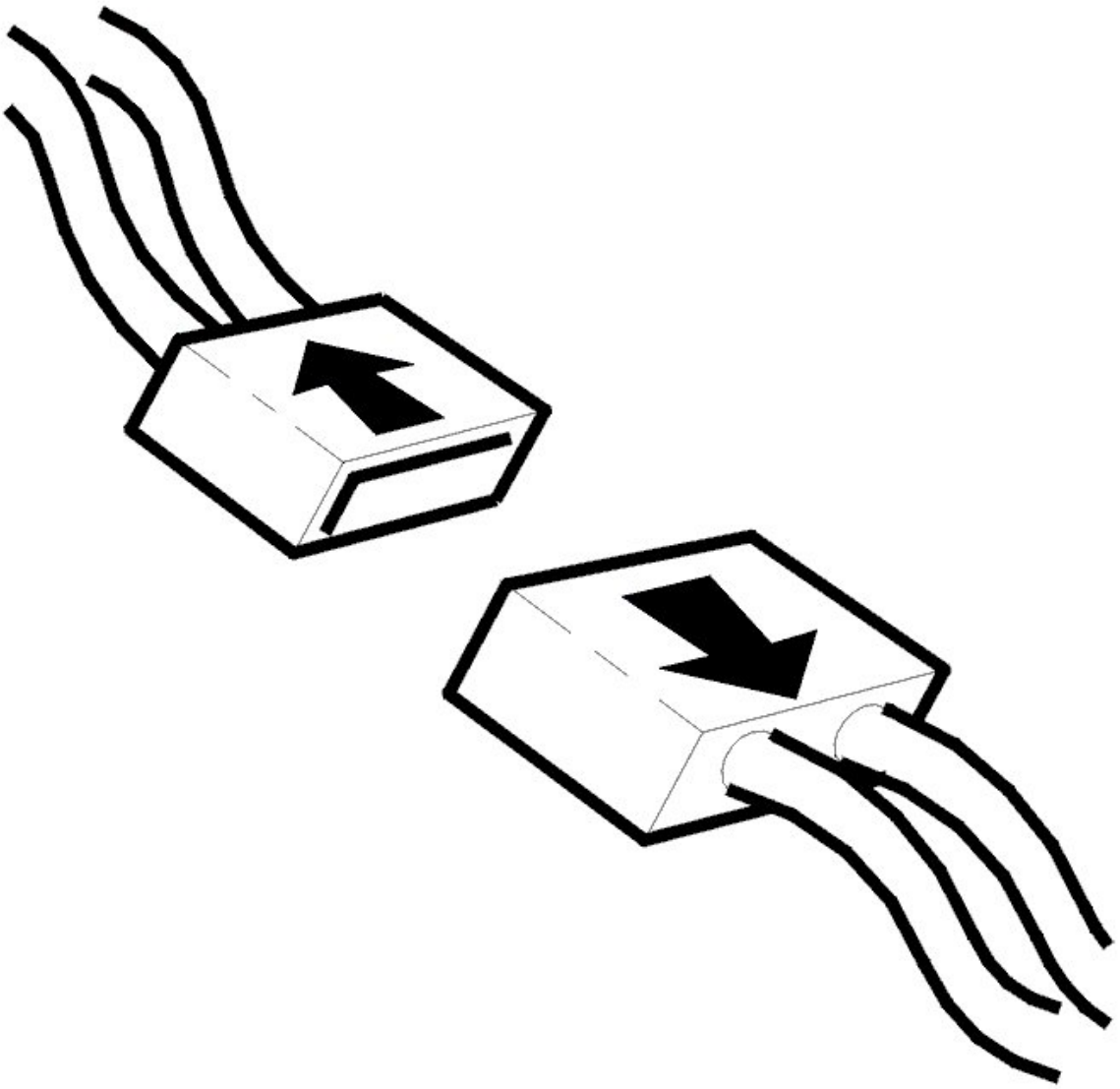
Fault symptom[s]
- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal

Checking the component



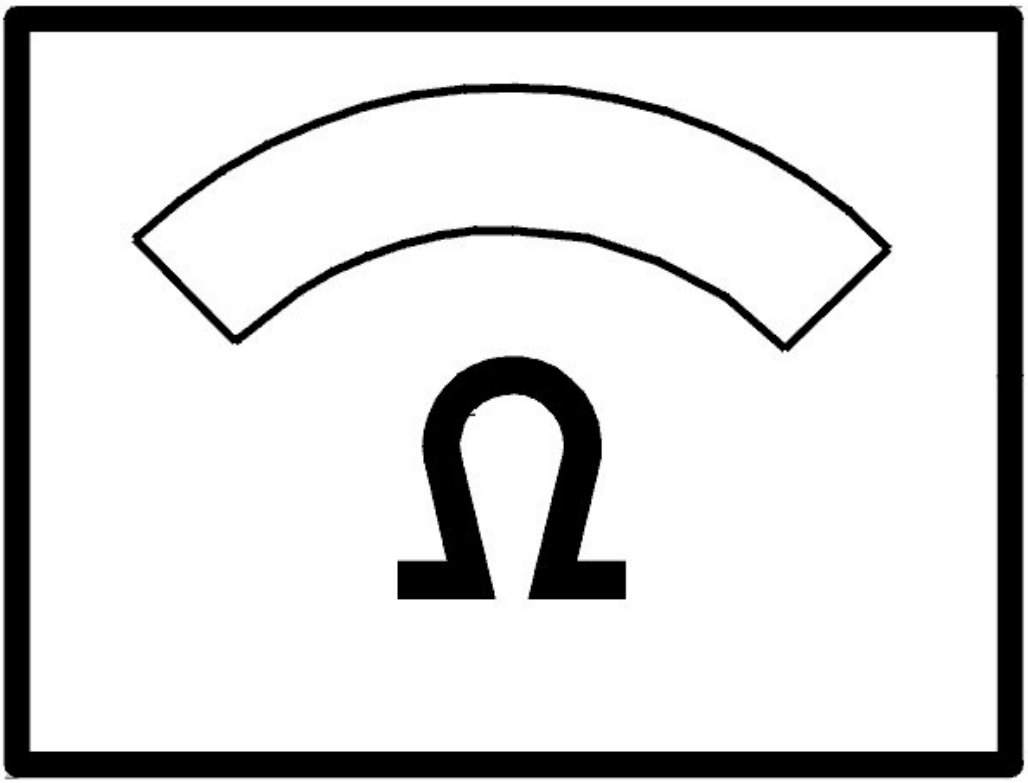


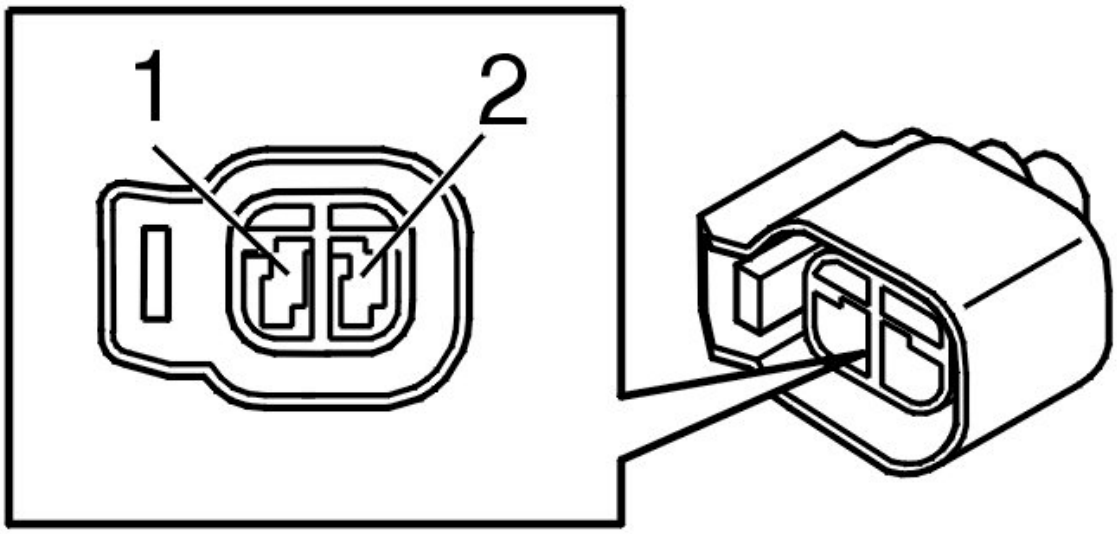
- Ignition off
- Disconnect the connector from the front right front impact sensor.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged or pressed back.
Check the signal cable between the Supplemental Restraint System Module (SRS) terminals #21B (49), #20B (48) and terminals #1 and #2 on the front impact sensor. Check for a short-circuit to supply voltage. Check for a short-circuit to ground
Check the resistance in the signal cable between terminals #21B (49) and #20B (48) for the Supplemental Restraint System Module (SRS). The resistance must be infinite.
If no fault is found, replace the front collision sensor.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

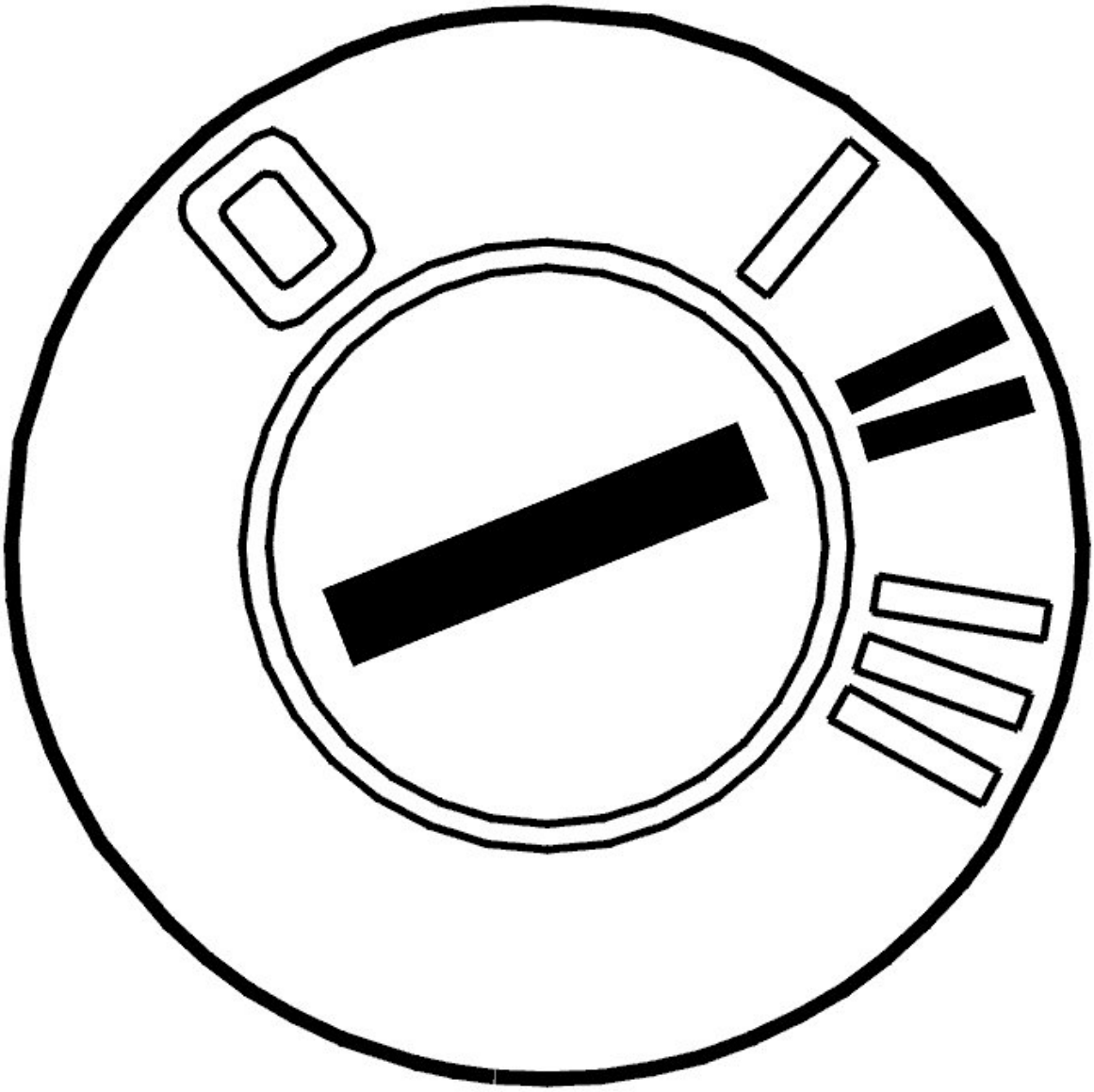
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

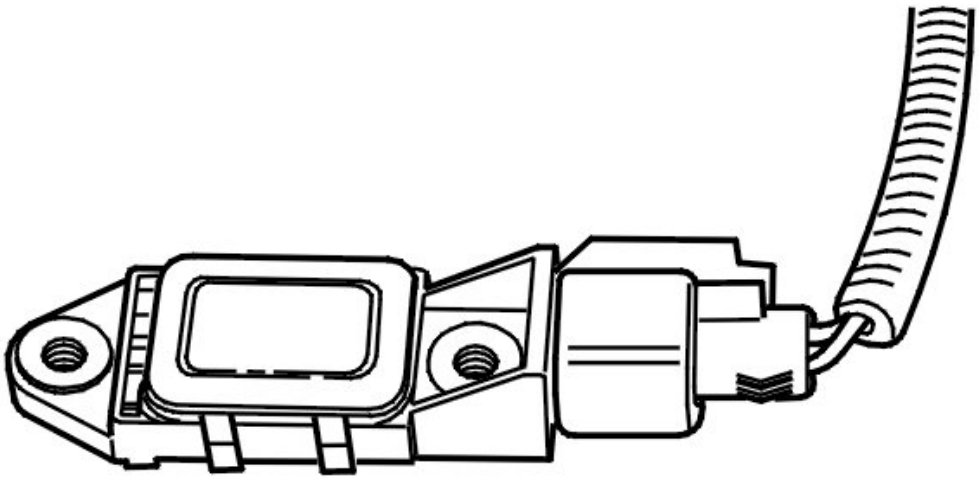
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0211

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0211 is stored if the control module registers a communication fault in the signal cable for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0211 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

- Contact resistance or open-circuit in the signal cable between the front right front impact sensor and the Supplemental Restraint System Module (SRS)
- Open-circuit in the front impact sensor (defective front impact sensor).

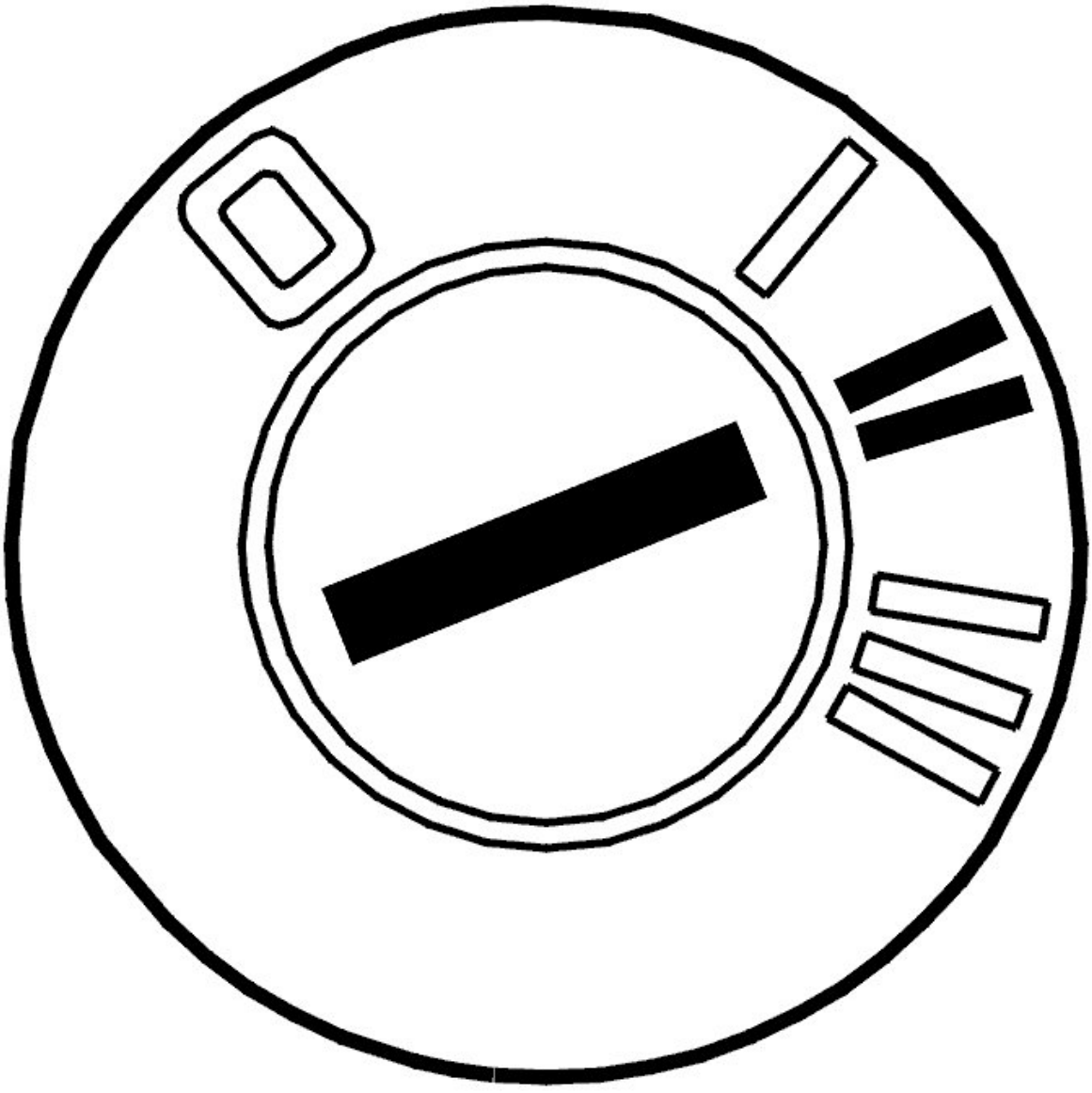
Fault symptom[s]

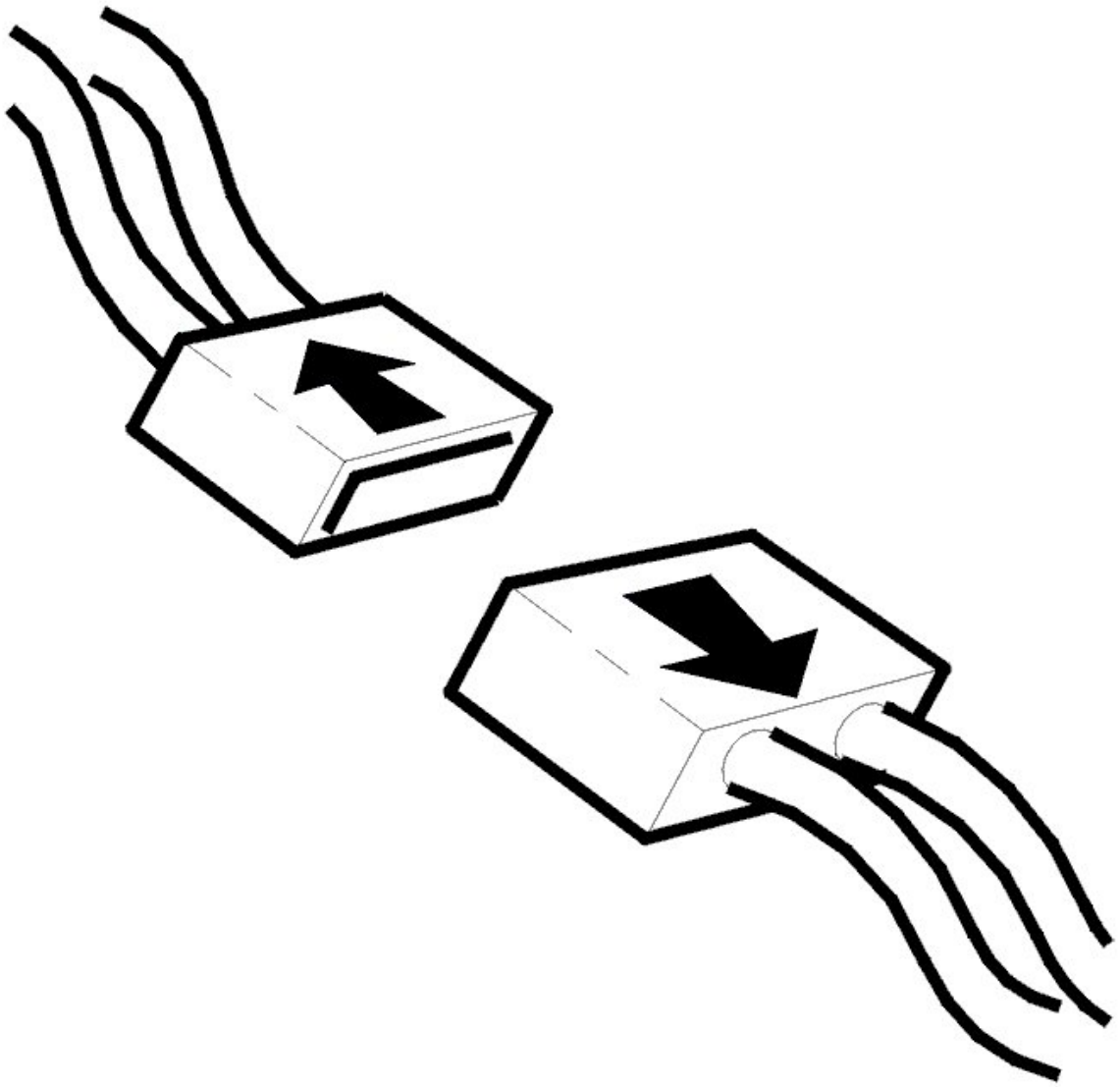
- The SRS indicator lamp is lit.

Communication Fault

Communication fault

Checking the component



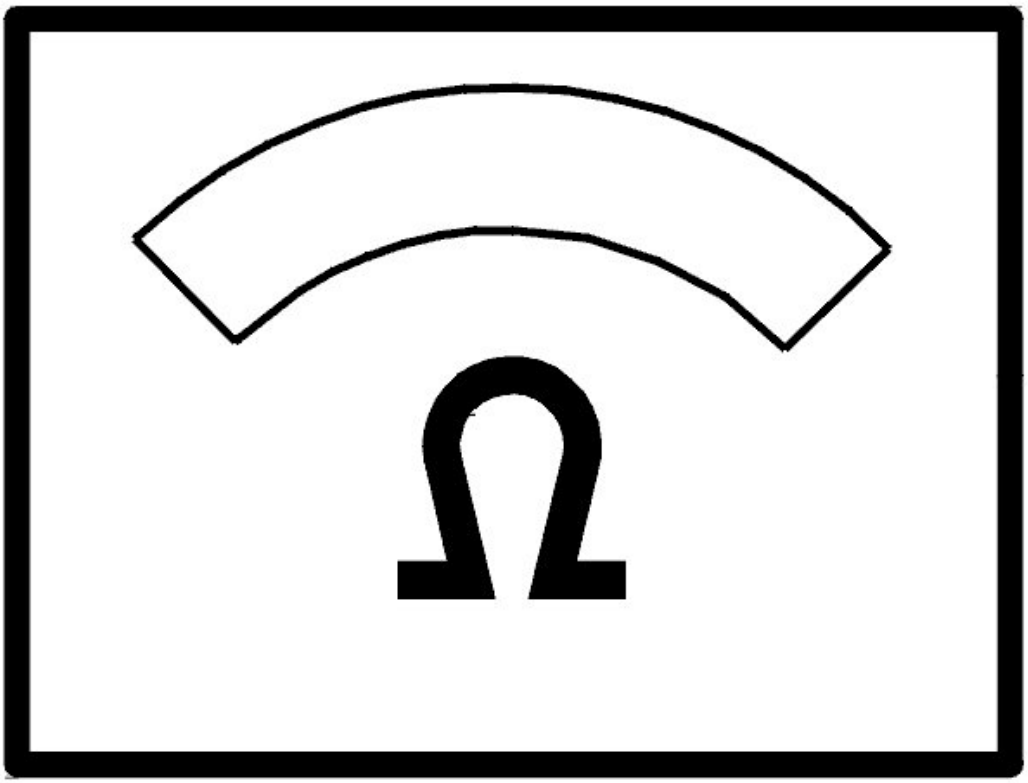


- Ignition off
- Disconnect the connector from the front right front impact sensor.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged, pressed back or oxidized.
Connect special tool951 2887 UFS test tool See: Tools and Equipment/951 2887 UFS Test Tool to the front impact sensor.
Check the resistance between terminal #21B (49) and #20B(48) on the Supplemental Restraint System Module (SRS). The resistance should be 10Kohms.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Is the correct resistance value displayed?

No - Checking the component

Yes - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

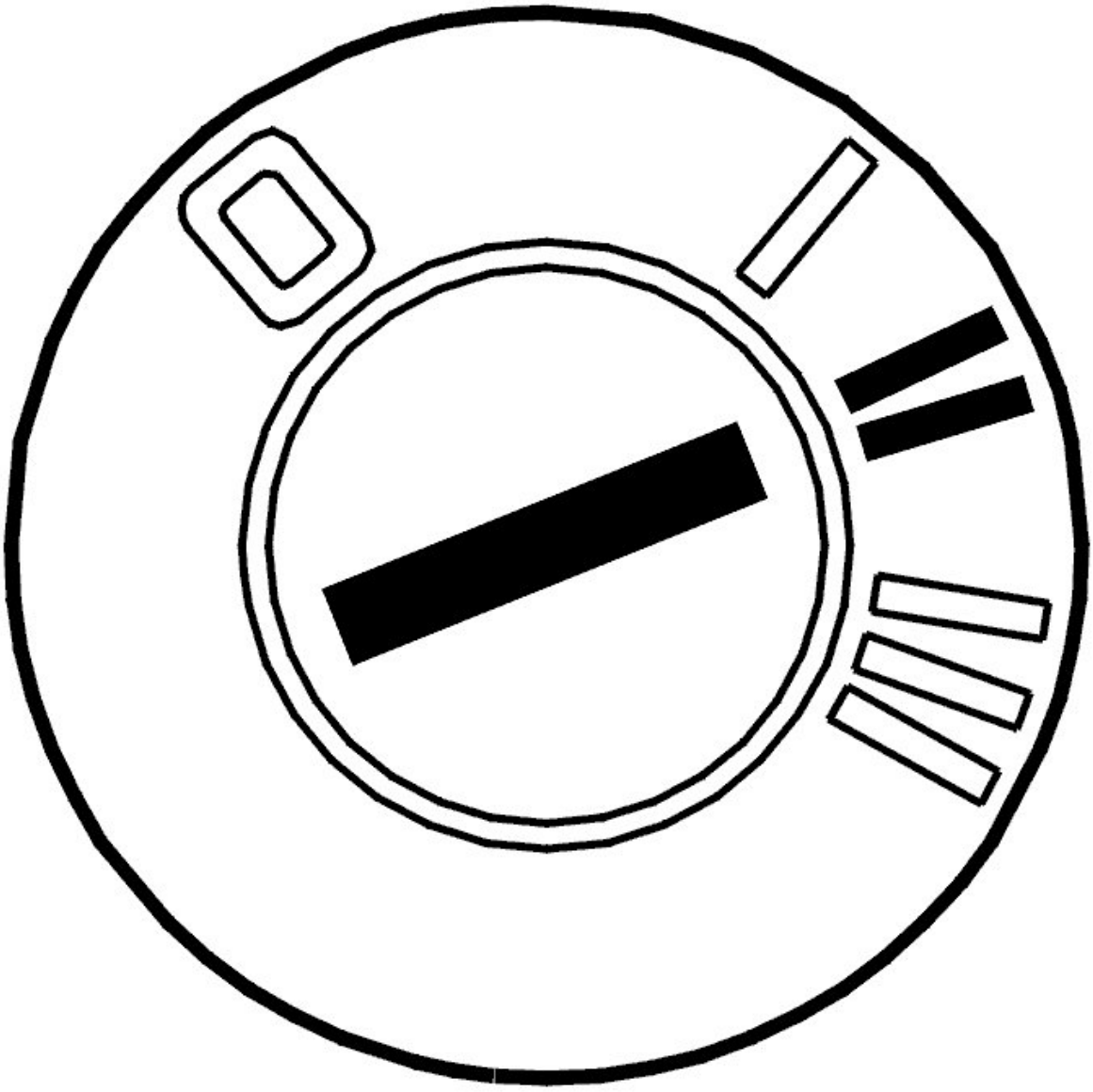
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

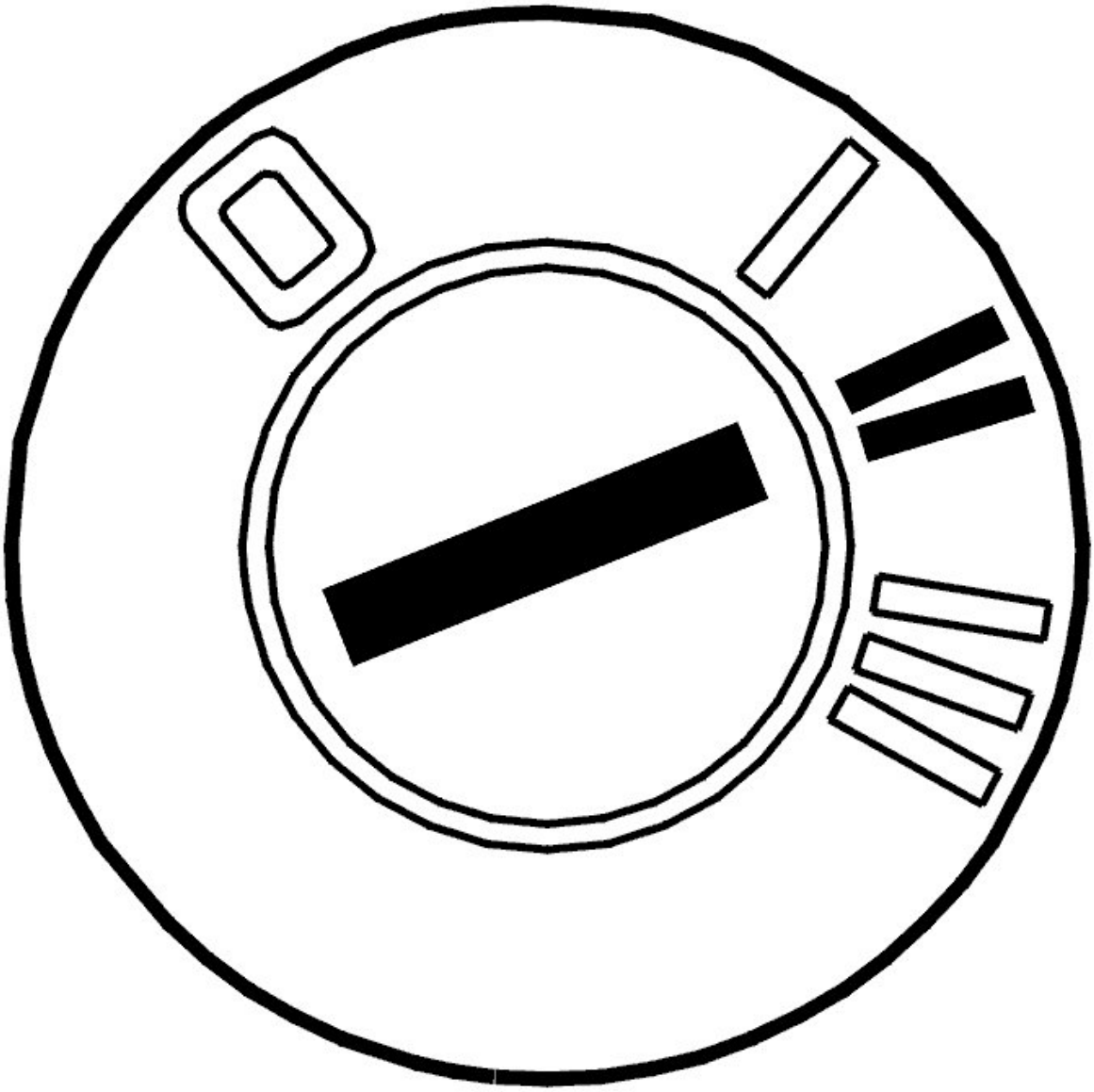
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

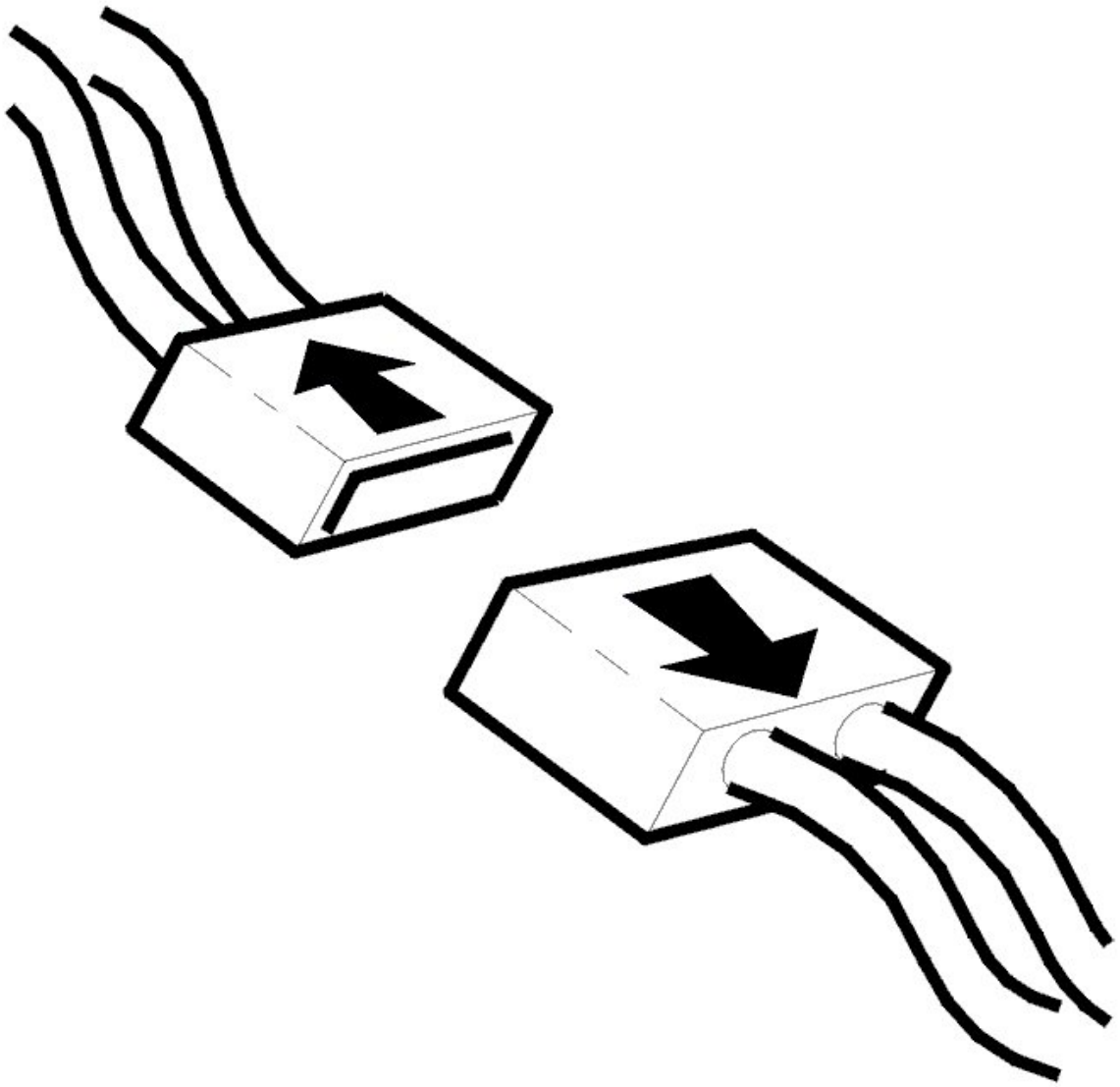
No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Checking the component



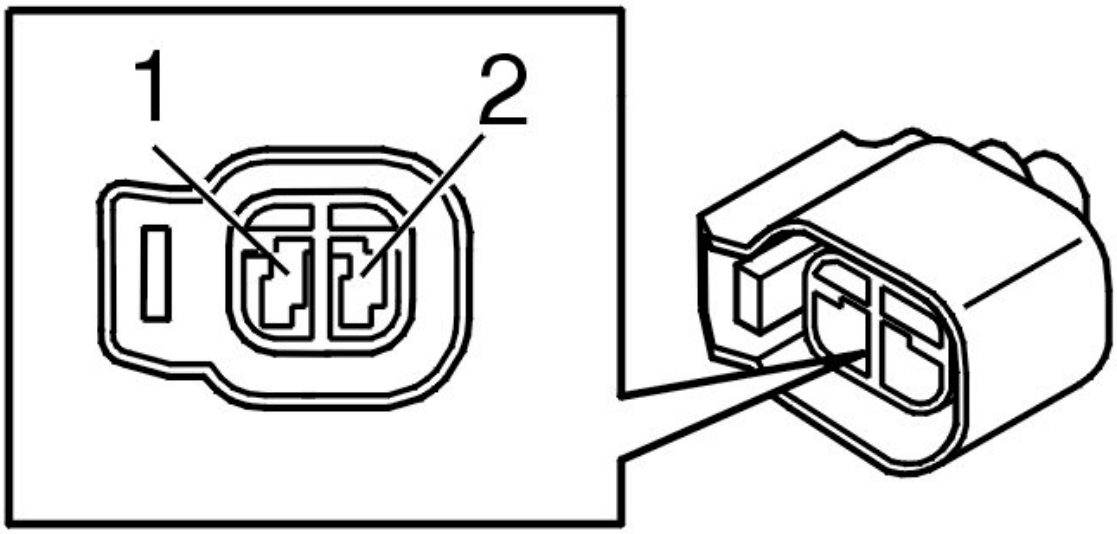


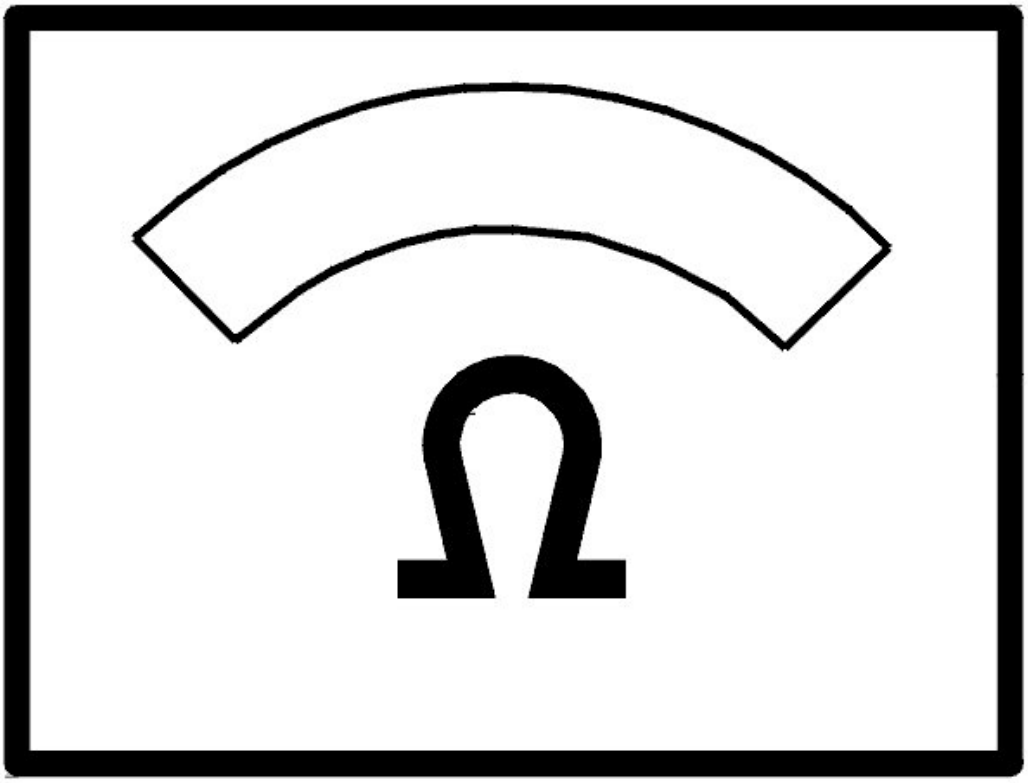
- Ignition off
- Disconnect special tool951 2887 UFS test tool See: Tools and Equipment/951 2887 UFS Test Tool from the front impact sensor.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #21B (49) and front right front impact sensor #1. Check for an open-circuit.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #20B (48) and front right front impact sensor #2. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



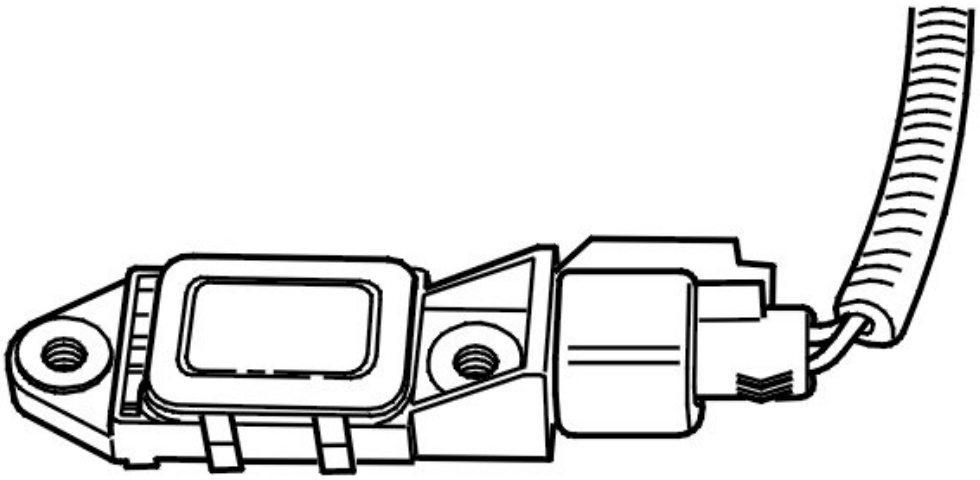


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0212

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-00212 is stored if the control module registers an incorrect identification of signal in the signal cable for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0212 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Faulty front impact sensor installed in the Supplemental Restraint System Module (SRS)
- The signal between the front impact sensor and the Supplemental Restraint System Module (SRS) has been affected by electrical interference. This causes the front impact sensor to respond with an incorrect identification signal.

Fault symptom[s]
- The SRS indicator lamp is lit.

Incorrect identification

Incorrect identification

Replacing the component

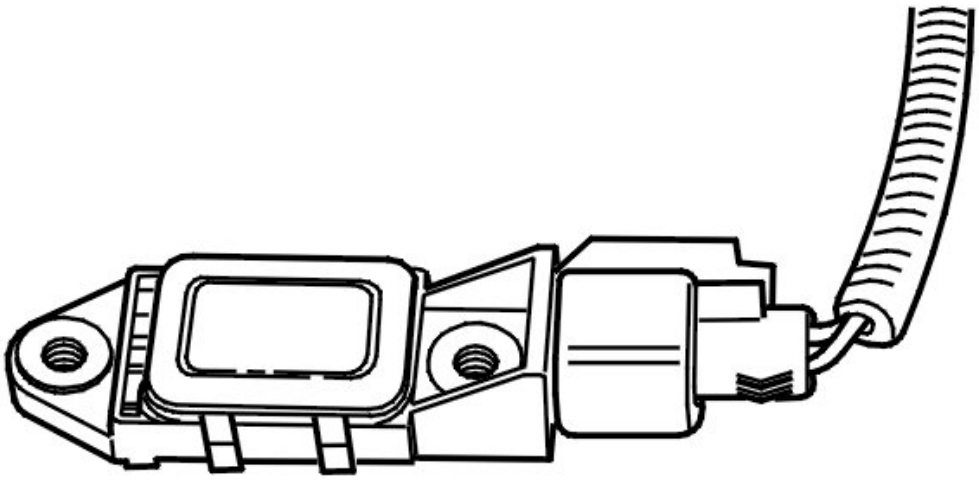
Supplemental Restraint System Module (SRS) has registered that an incorrect front impact sensor model has been installed.
If this fault occurs, replace the front right front impact sensor. Check against the replacement parts catalogue which front impact sensor model is used in the relevant Supplemental Restraint System Module (SRS).
In the event of a permanent fault, replace the front impact sensor. see the relevant service procedure.
Remedy as necessary.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0213

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0213 is stored if the control module registers an internal fault in the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0213 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Internal fault in the front right front impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Internal Fault

Internal fault

Internal fault

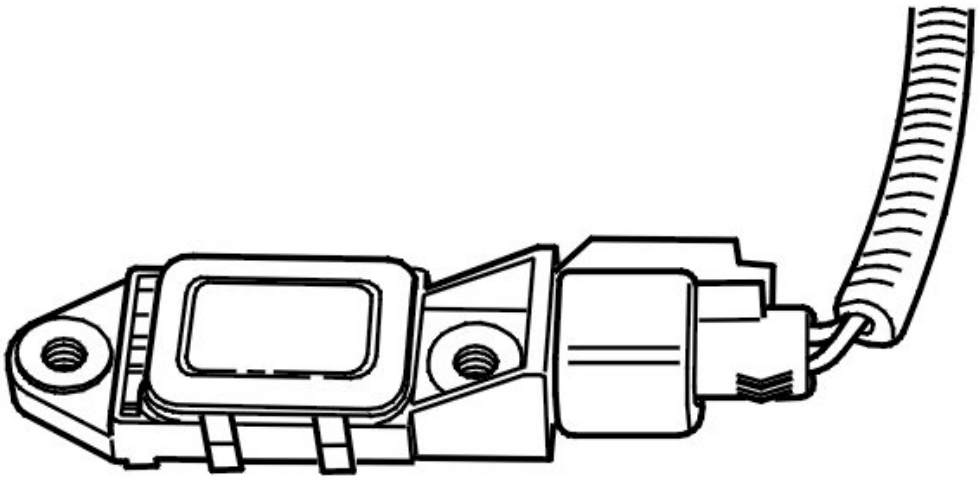
The control module has registered an internal fault in the front right front impact sensor.
In the event of a permanent and intermittent fault, replace the front impact sensor. See the relevant service procedure.
Remedy as necessary.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0214

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0214 is stored if the resistance in the signal cable wiring circuit is lower than 10 ohms for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0214 can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- If the Supplemental Restraint System Module (SRS) identifies that a front right front impact sensor is installed, despite the control module being programmed that a front impact sensor is not installed.

Fault symptom[s]
- The SRS indicator lamp is lit.

Fault-tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information about this diagnostic trouble code (DTC), select Information, then DTC information.

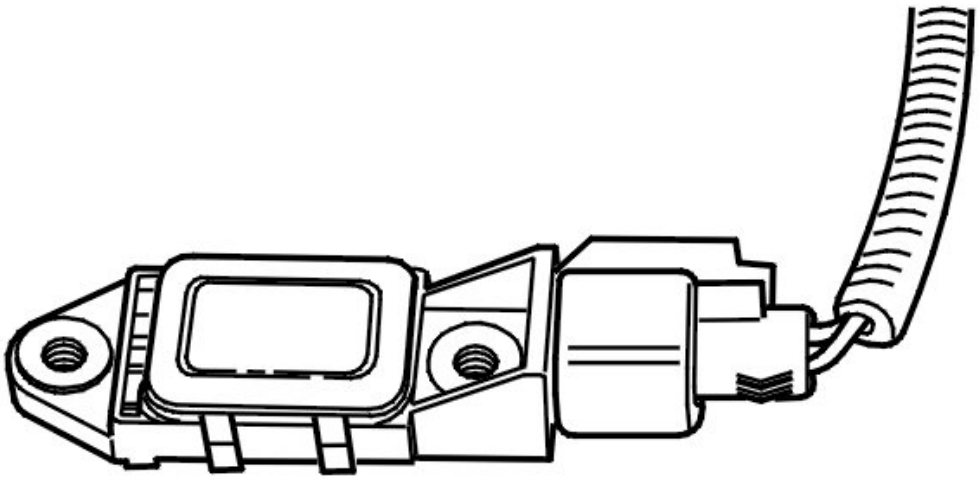
Select "Continue" to exit.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0215

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front right front impact sensor.
Diagnostic trouble code (DTC) SRS-0215 is stored if the control module registers that the signal cable is cross-connected.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

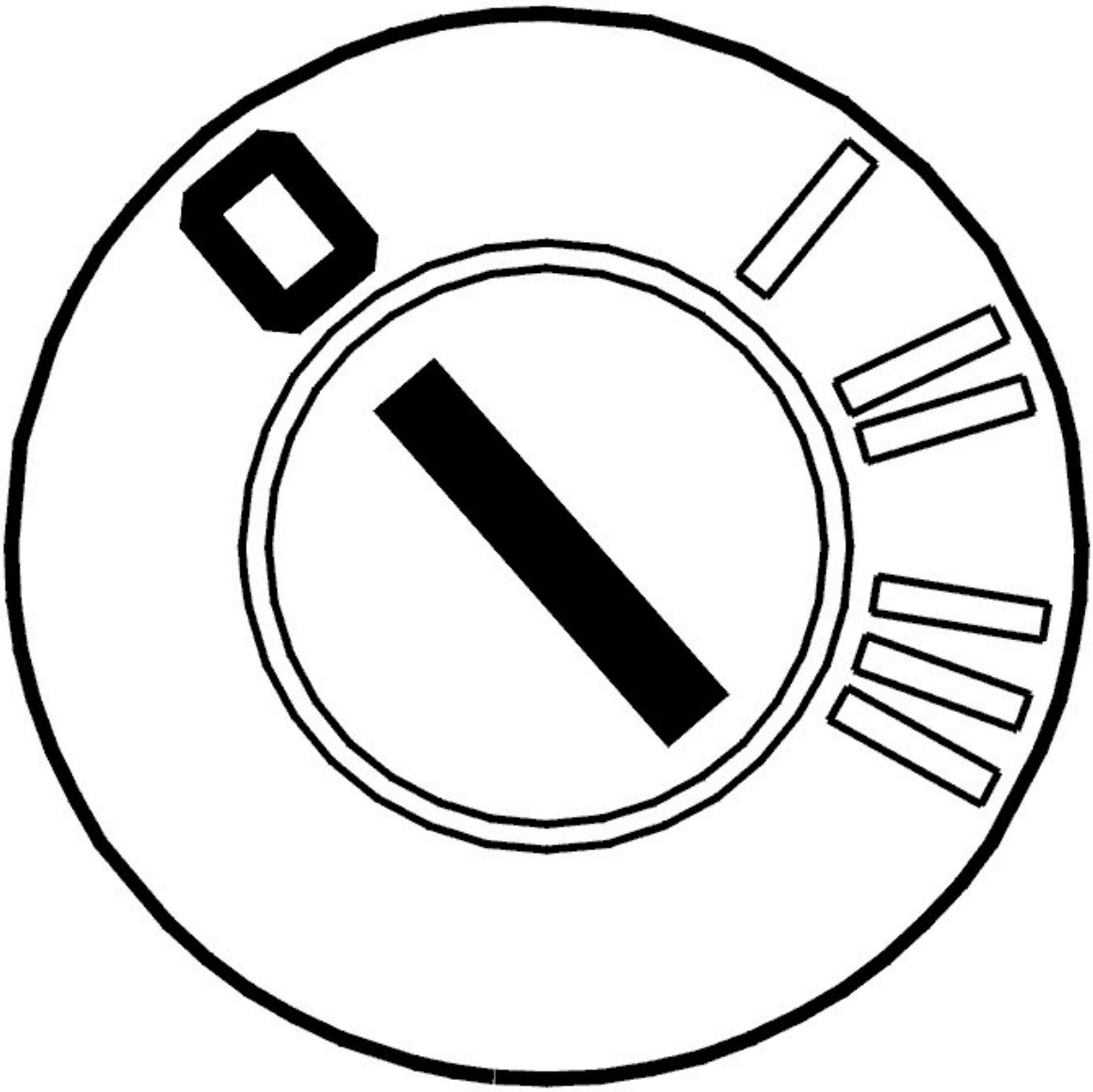
Possible source
- Incorrect connection of the signal cables between the front right front impact sensor and the Supplemental Restraint System Module (SRS). The signal cables are reversed between the two terminal pins in the front impact sensor or in the Supplemental Restraint System Module (SRS)
- Incorrect repair of SRS wiring. The signal cables to the two terminal pins on the front impact sensor have been reversed.

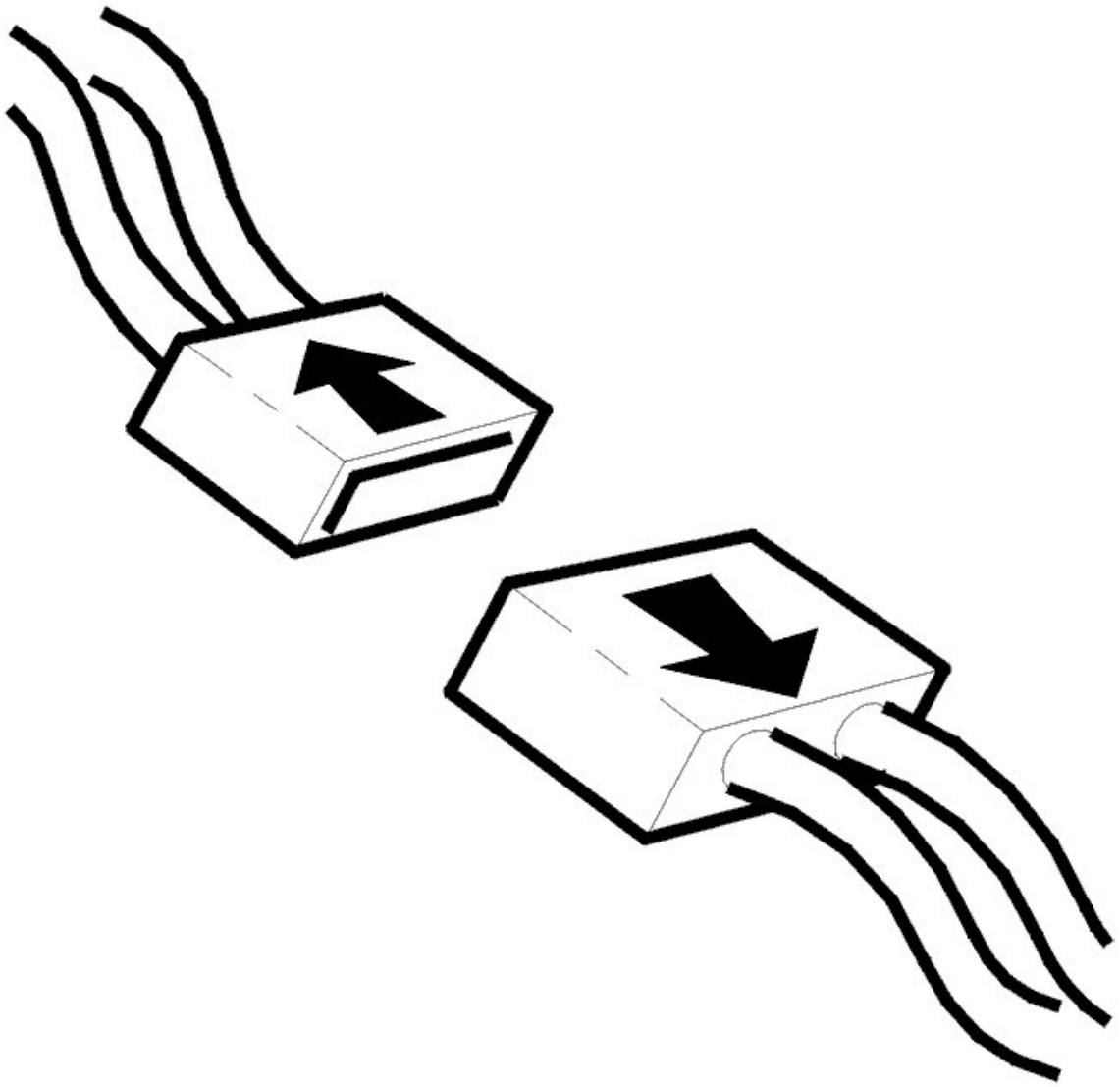
Fault symptom[s]
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring





- Ignition off
- Disconnect the connector from the front right front impact sensor.

Check the signal cable between the Supplemental Restraint System Module (SRS) terminal #21B (49) and the front impact sensor #1. Check for an open-circuit.
Check the signal cable between the Supplemental Restraint System Module (SRS) terminal #20B (48) and the front impact sensor #2. Check for an open-circuit.
Check the resistance between the Supplemental Restraint System Module (SRS) terminal #21B (49) and the front impact sensor #2. The resistance should be infinite.

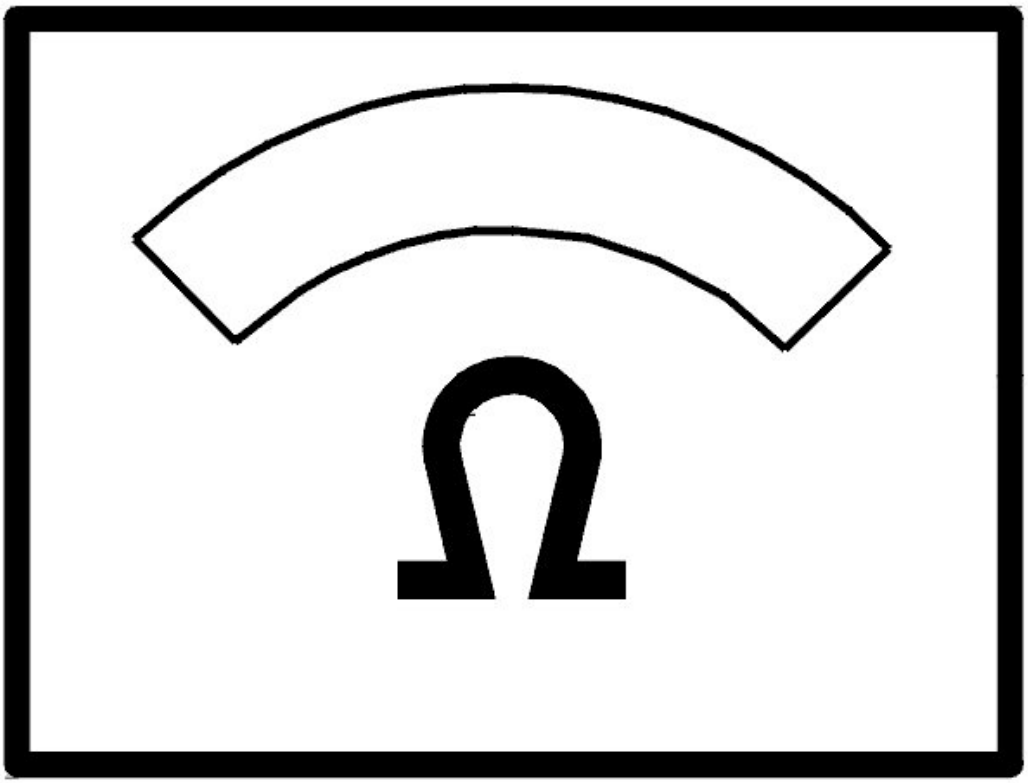
Check the resistance between the Supplemental Restraint System Module (SRS) terminal #20B (48) and the front impact sensor #1. The resistance should be infinite.

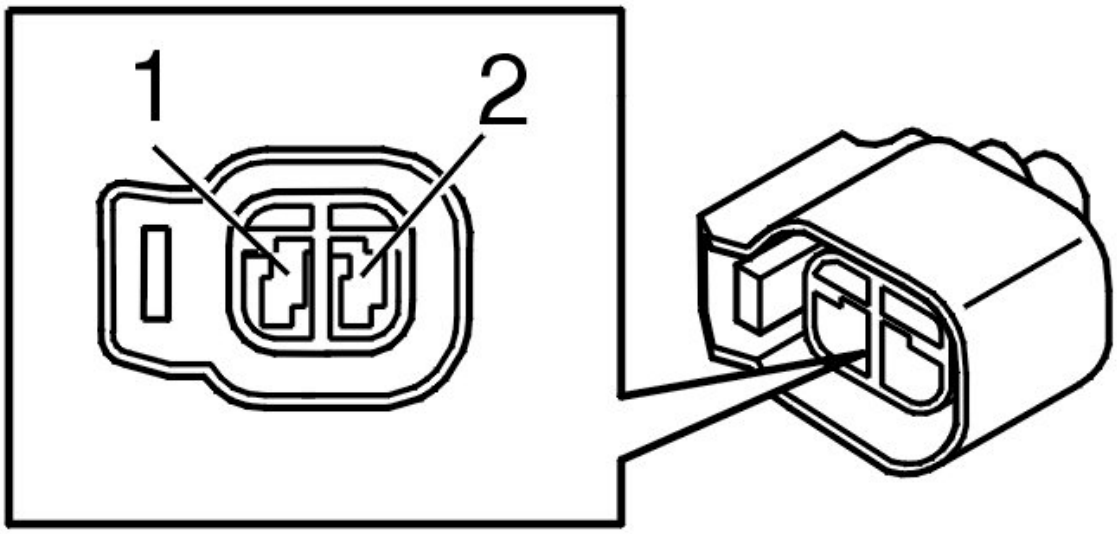
Hint: If repairs have been carried out on the wiring, these signal cables may have been reversed. Check that connections between the Supplemental Restraint System Module (SRS) and the front impact sensor are correct.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the front right front impact sensor, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





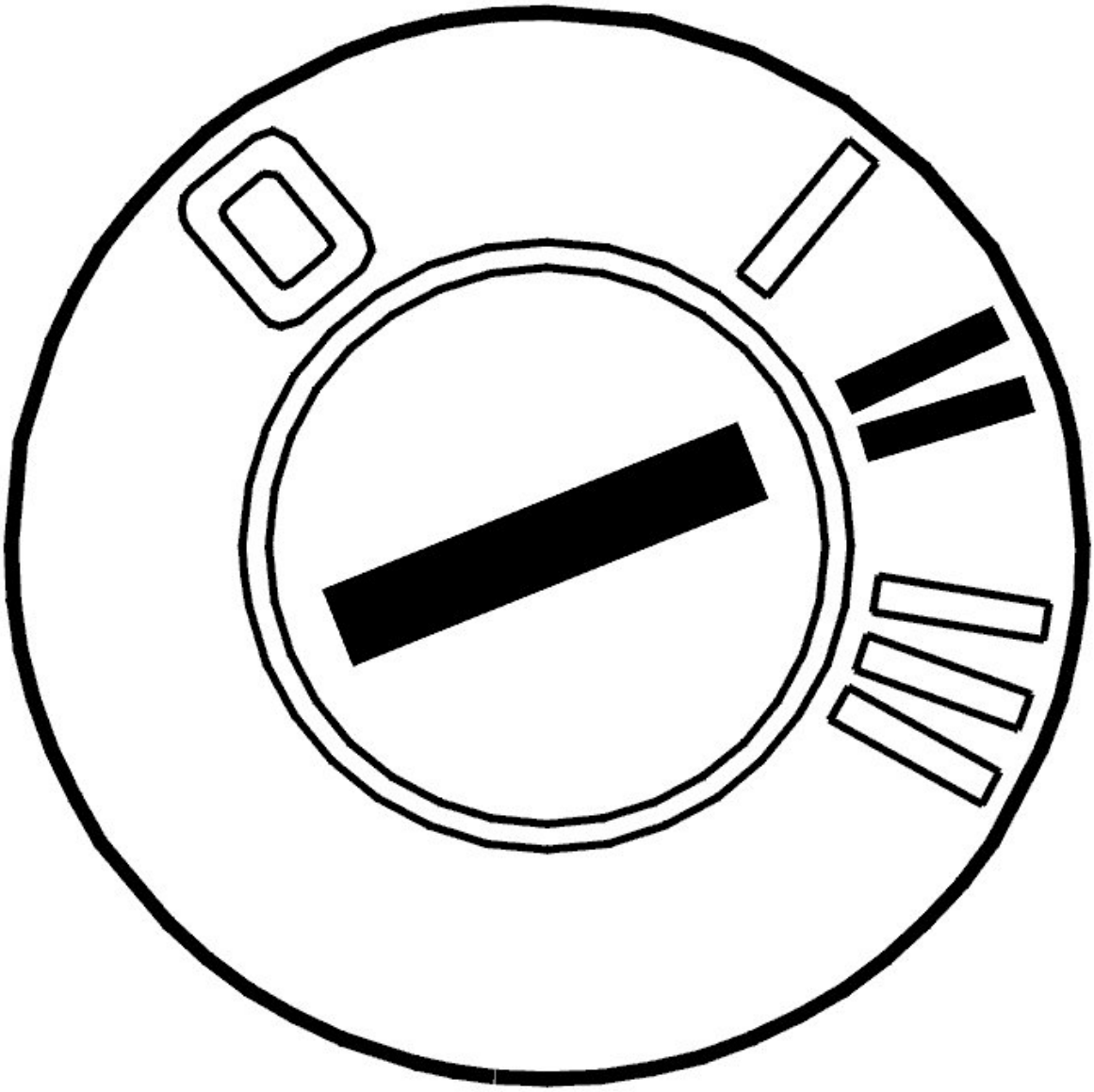
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

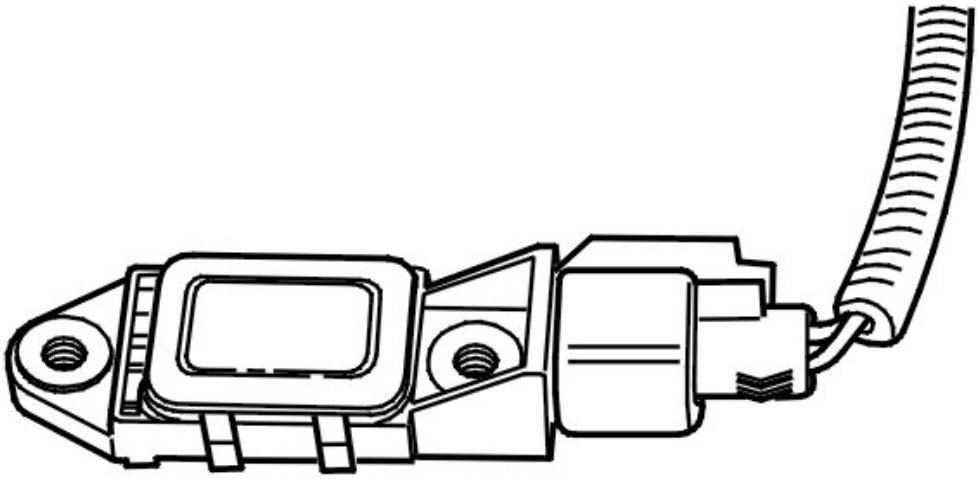
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0218

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-0218 is stored if the control module registers an incorrect signal, i.e. that the signal in the signal cable is too low or too high for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0218 can be diagnosed in ignition positions I, II or III.

Substitute value

- None.

Possible source

- Short-circuit to supply voltage in the signal cable between the front left front impact sensor and the Supplemental Restraint System Module (SRS)
- Short-circuit to ground in the signal cable between the front impact sensor and the Supplemental Restraint System Module (SRS)
- Short-circuit to supply voltage in the connector
- Short-circuit to ground in the connector
- Short-circuit between signal cables to the front impact sensor from the Supplemental Restraint System Module (SRS)
- Short-circuit in the front impact sensor (defective front impact sensor).

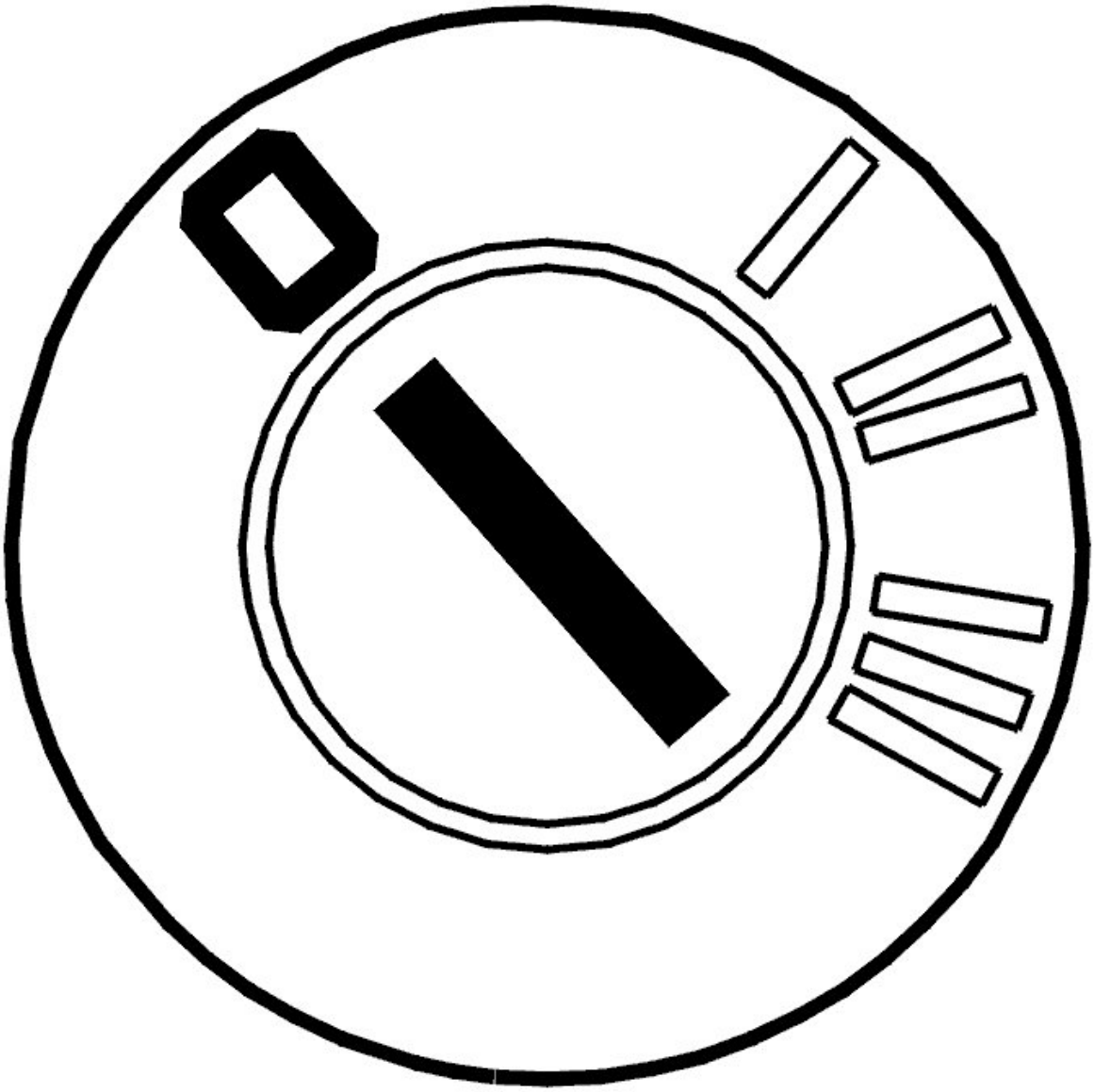
Fault symptom[s]

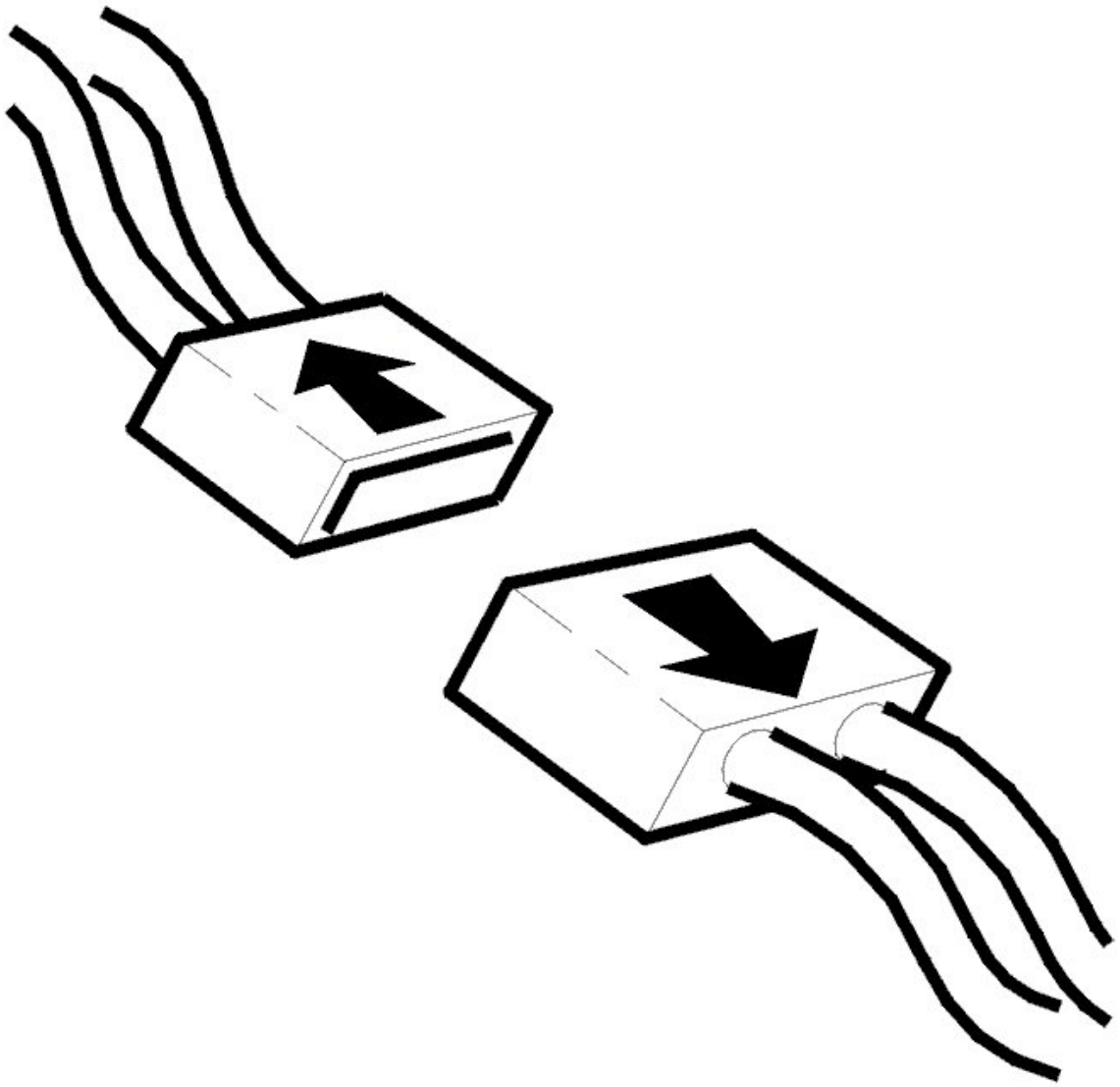
- The SRS indicator lamp is lit.

Faulty Signal

Faulty signal

Checking the component



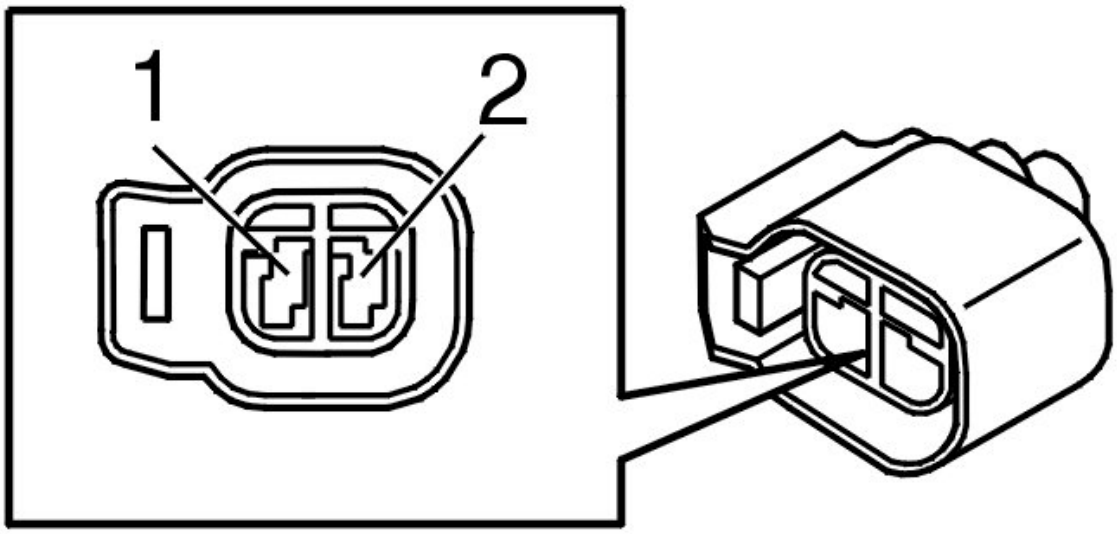


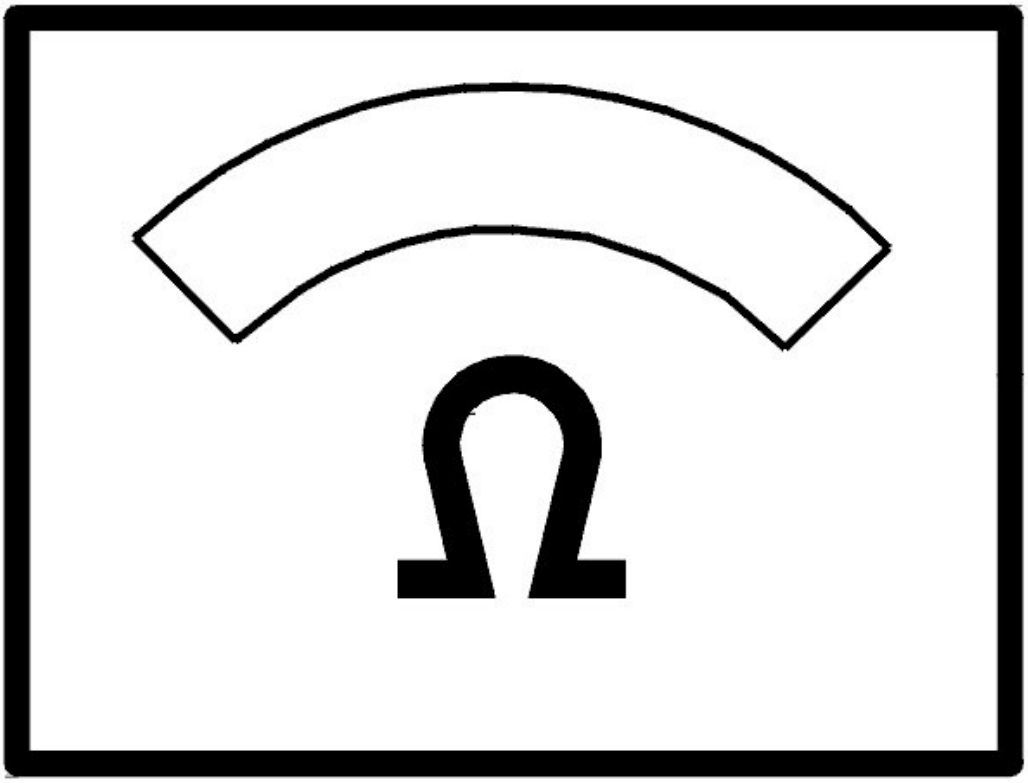
- Ignition off
- Disconnect the connector from the front left front impact sensor.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged or pressed back.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #19B (47), #18B(46) and connector terminals #2 and #1 on the front left front impact sensor. Check for a short-circuit to supply voltage. Check for a short-circuit to ground.
Check the resistance in the signal cable between terminals #19B (47) and #18B (46) for the Supplemental Restraint System Module (SRS). The resistance must be infinite.
If no fault is found, replace the front collision sensor.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

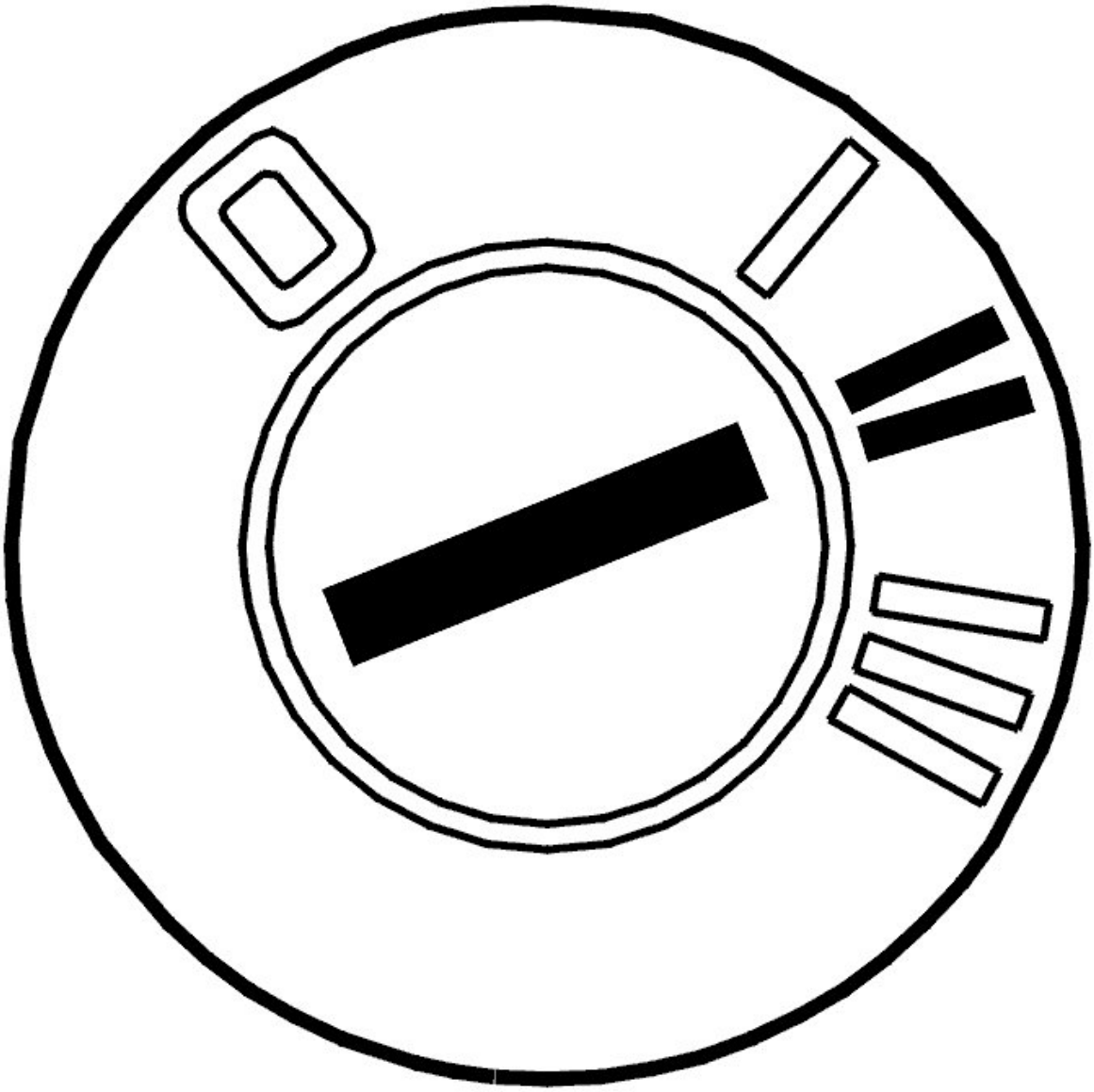
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

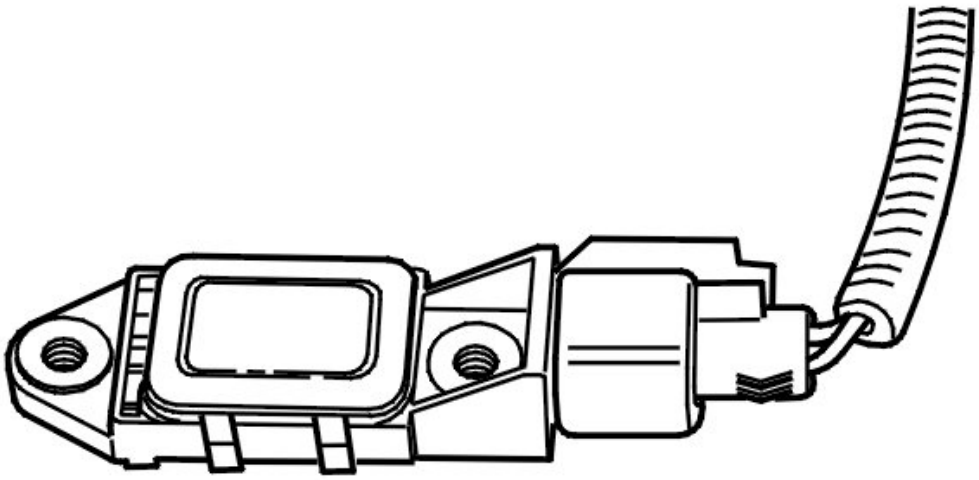
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0219

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-0219 is stored if the control module registers a communication fault in the signal cable for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-0219 can be diagnosed when the ignition is on.

Substitute value

- None.

Possible source

- Contact resistance or open-circuit in the signal cable between the front left front impact sensor and the Supplemental Restraint System Module (SRS)
- Open-circuit in the front impact sensor (defective front impact sensor).

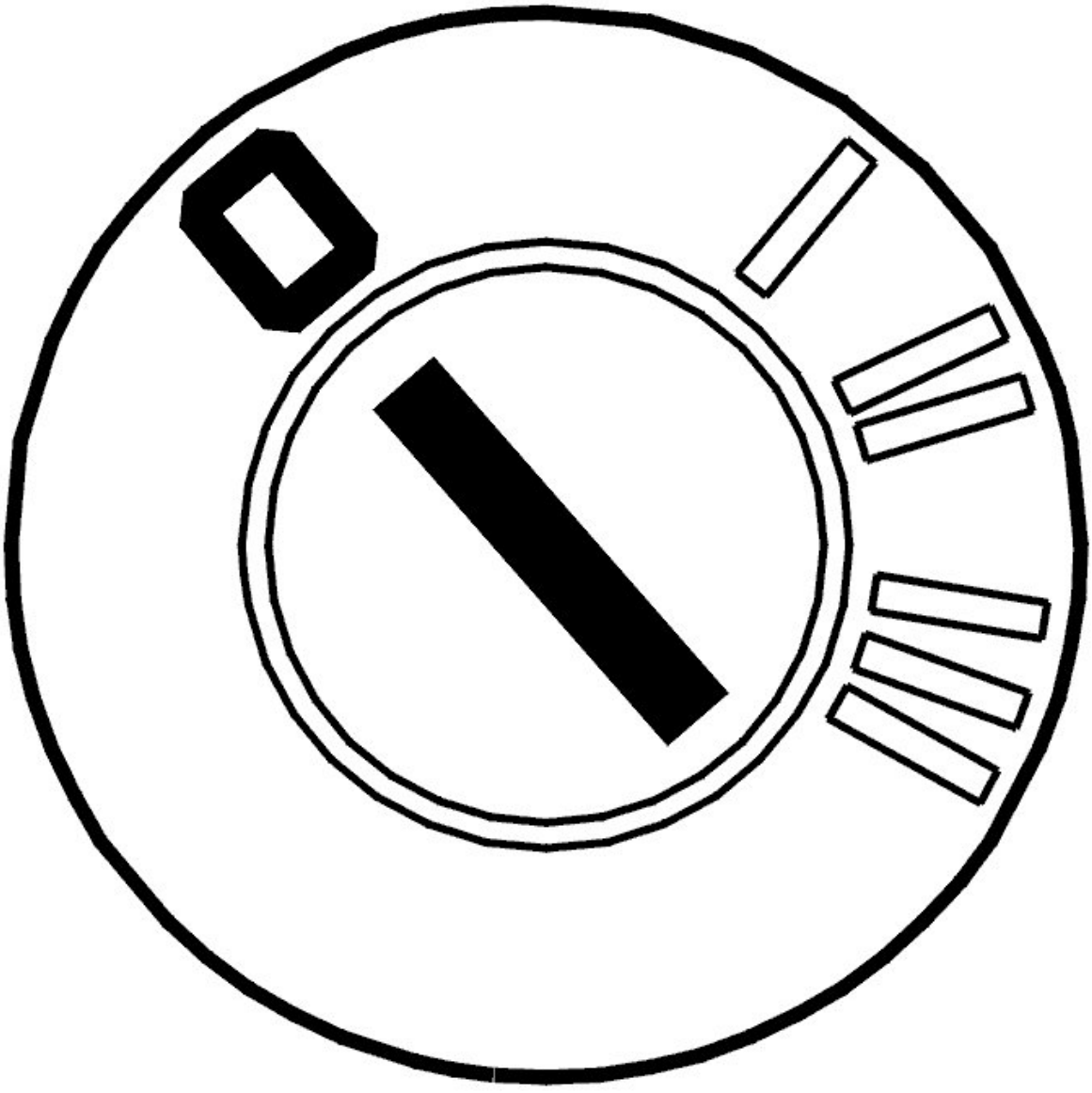
Fault symptom[s]

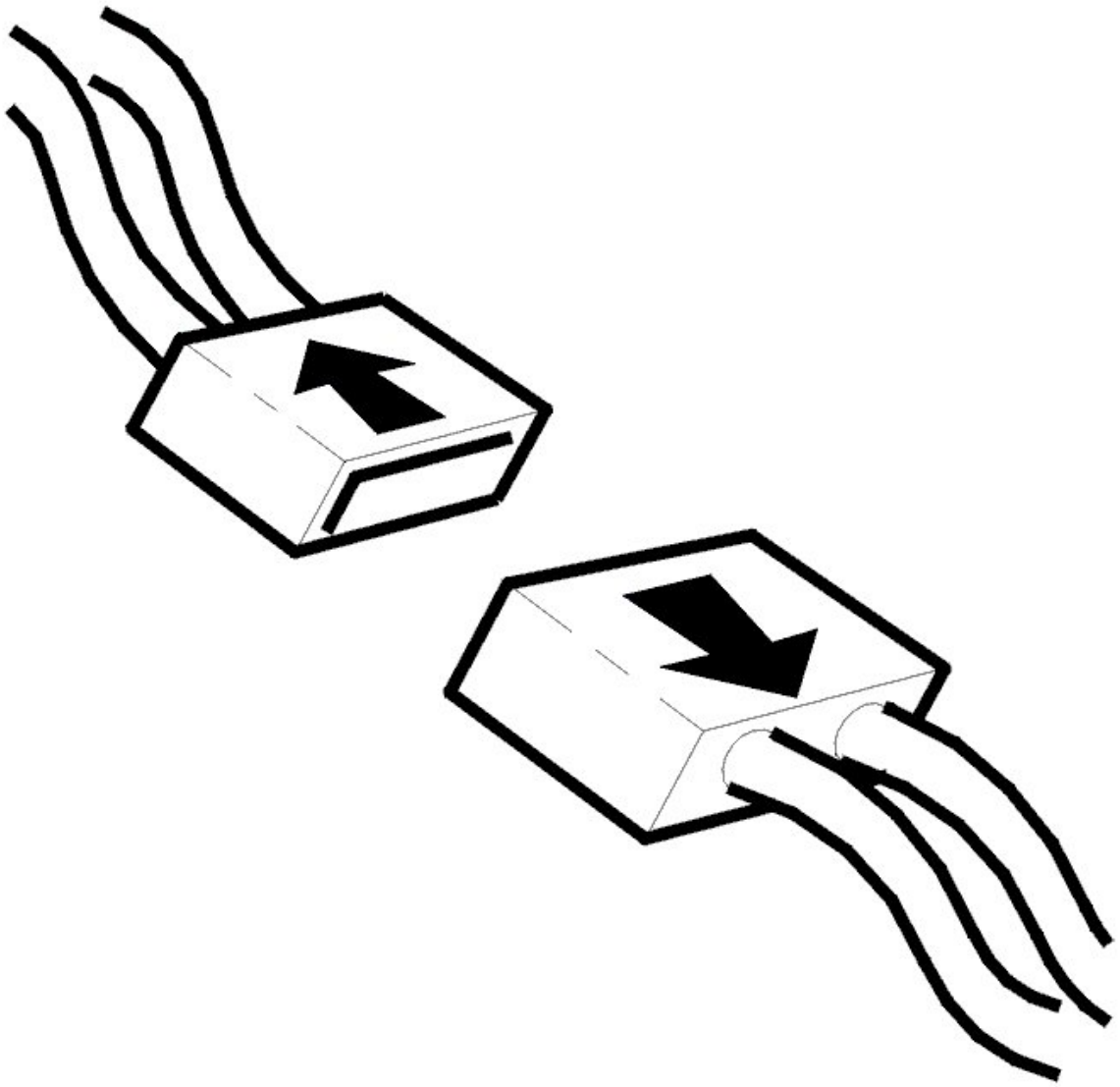
- The SRS indicator lamp is lit.

Communication Fault

Communication fault

Checking the component





- Ignition off
- Disconnect the connector from the front left front impact sensor.

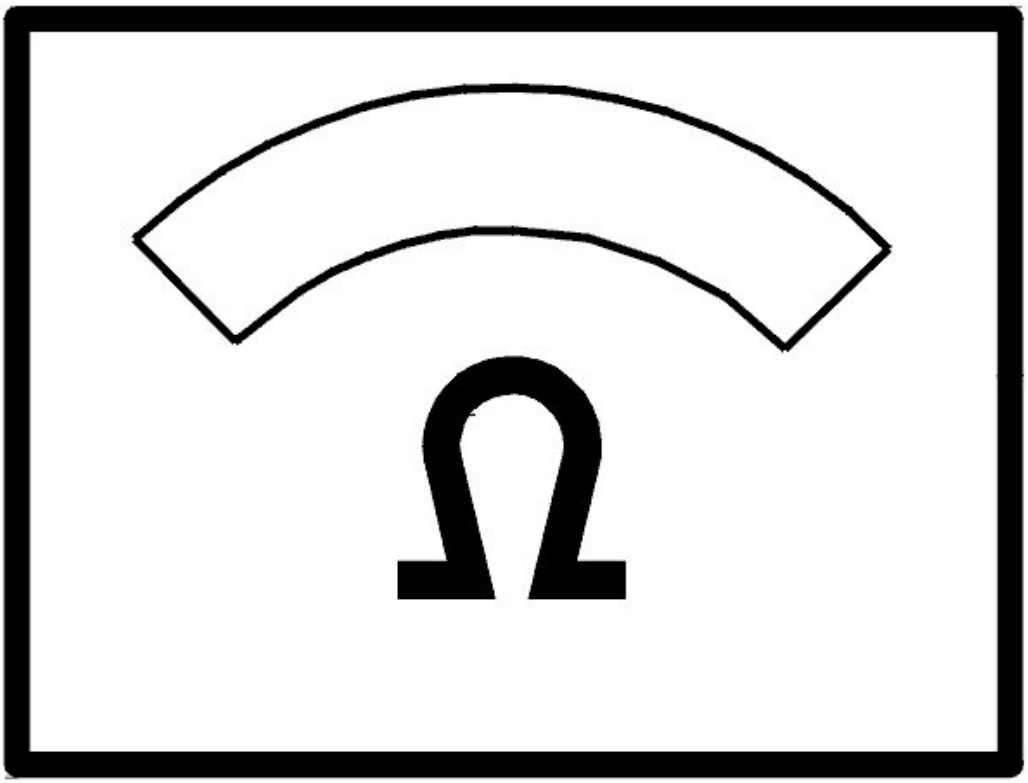
Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged, pressed back or oxidized.
Connect special tool951 2887 UFS test tool See: Tools and Equipment/951 2887 UFS Test Tool to the front impact sensor.
Check the resistance between terminal #19B (47) and #18B(46) on the Supplemental Restraint System Module (SRS). The resistance should be 10Kohms.

Hint: If the fault is permanent and no fault is found, replace the front impact sensor.

Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Is the correct resistance value displayed?

Yes - Verification

No - Checking the component

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

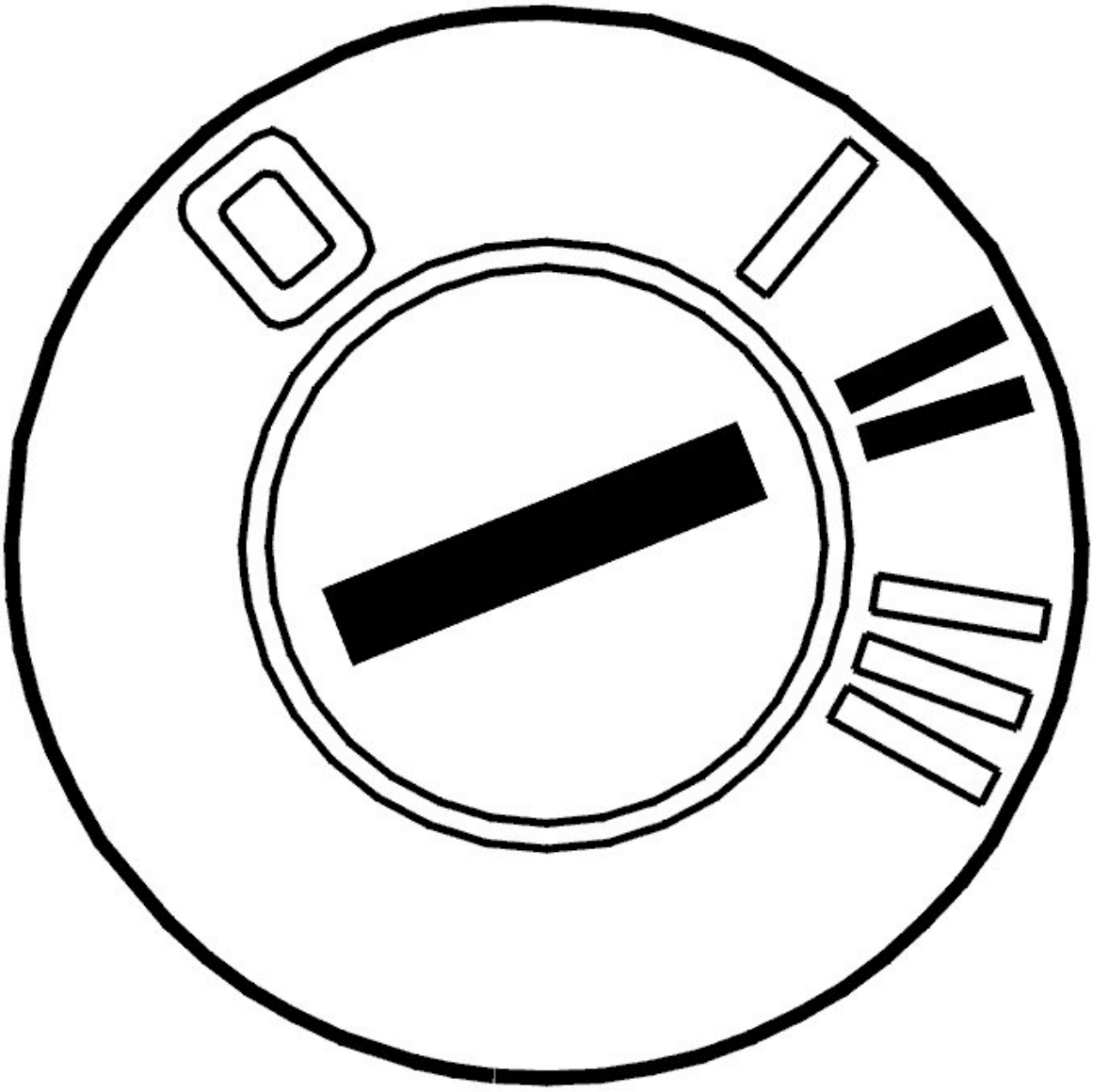
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

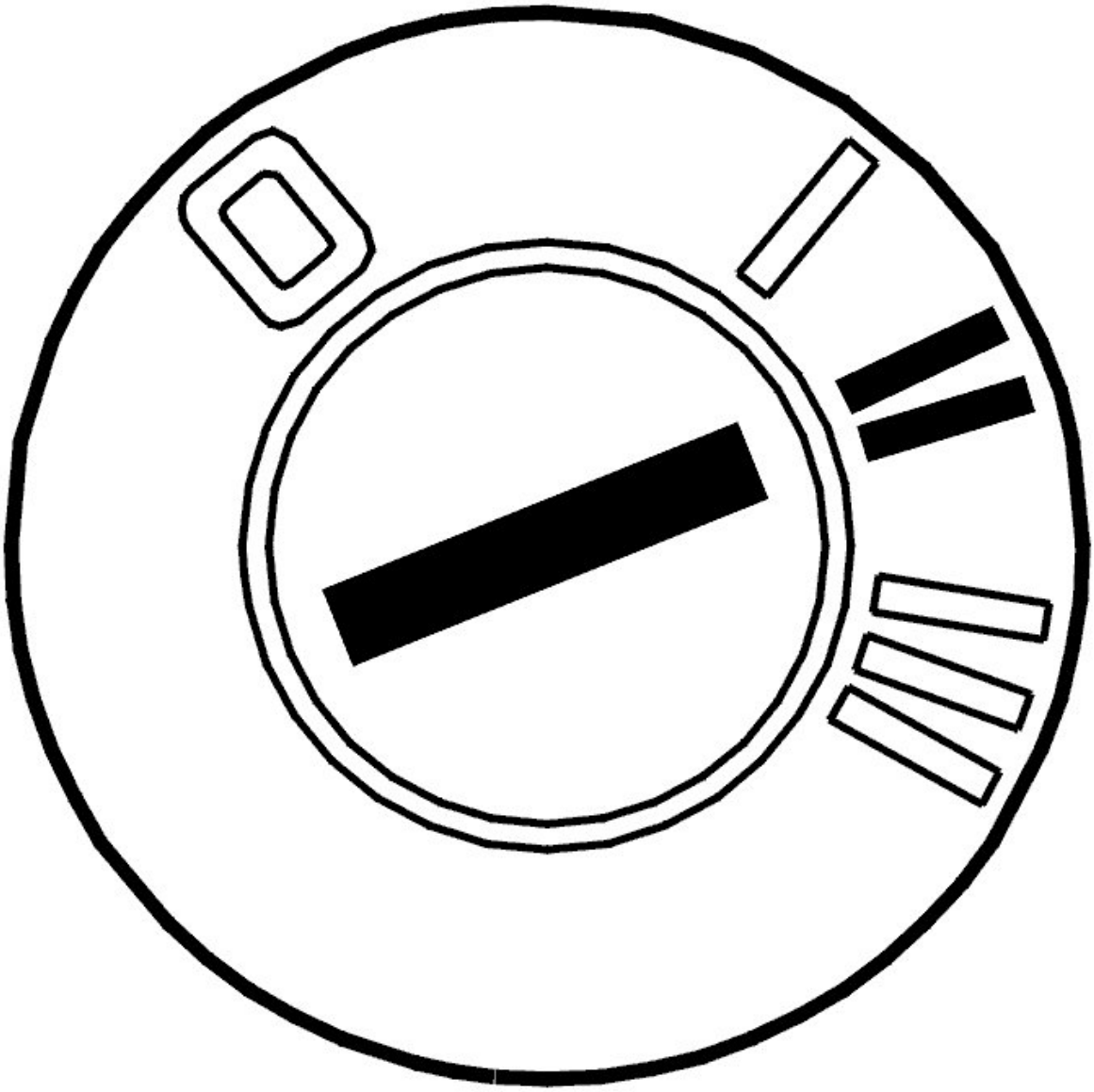
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

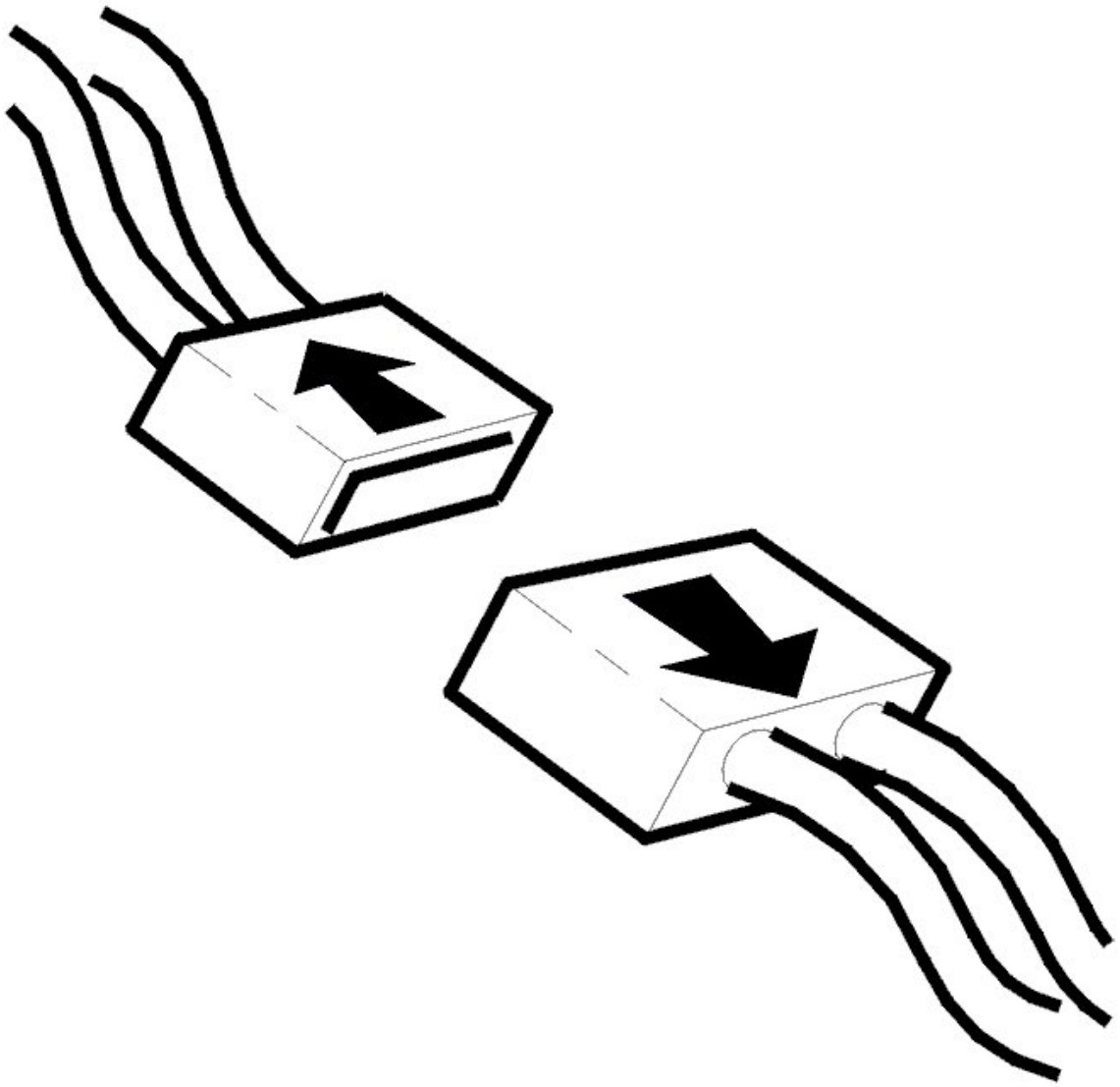
No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Checking the component



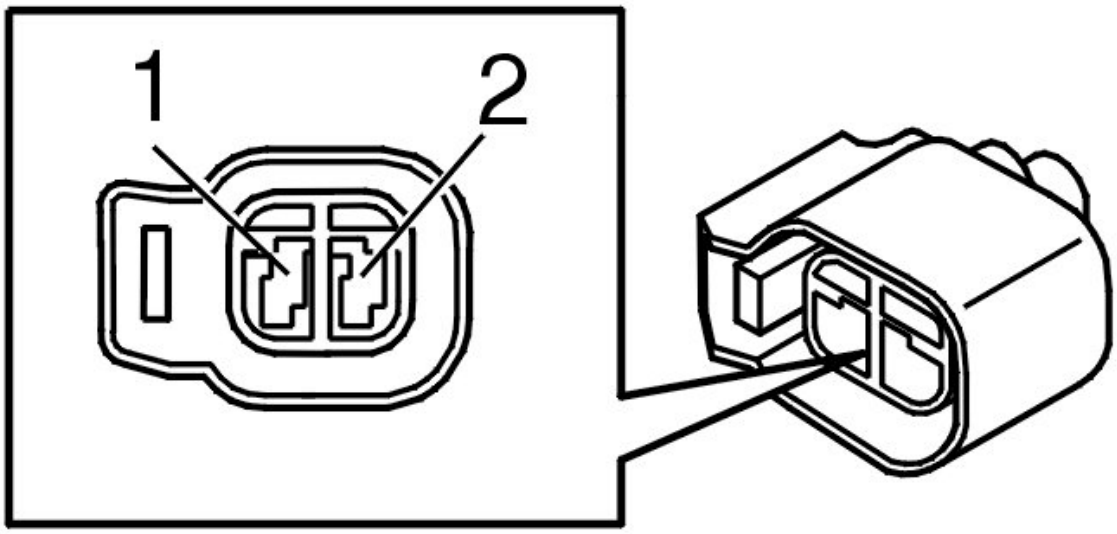


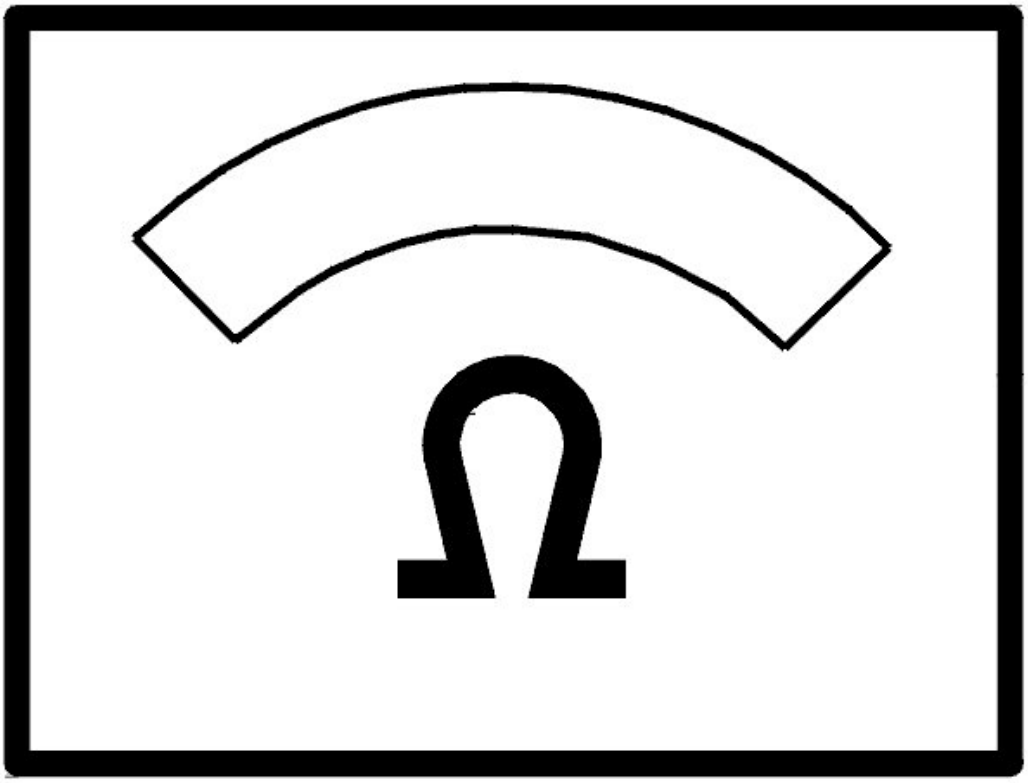
- Ignition off
- Disconnect the special tool951 2887 UFS test tool See: Tools and Equipment/951 2887 UFS Test Tool from the front left front impact sensor.

Check the female and male parts of the connectors for the Supplemental Restraint System Module (SRS) and the front impact sensor. The cable terminals must not be damaged, pressed back or oxidized.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #19B (47) and front impact sensor #2 left front. Check for an open-circuit.
Check the cable between the Supplemental Restraint System Module (SRS) terminal #18B (46) and front impact sensor #1 left front. Check for an open-circuit.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see
- For information about signals, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



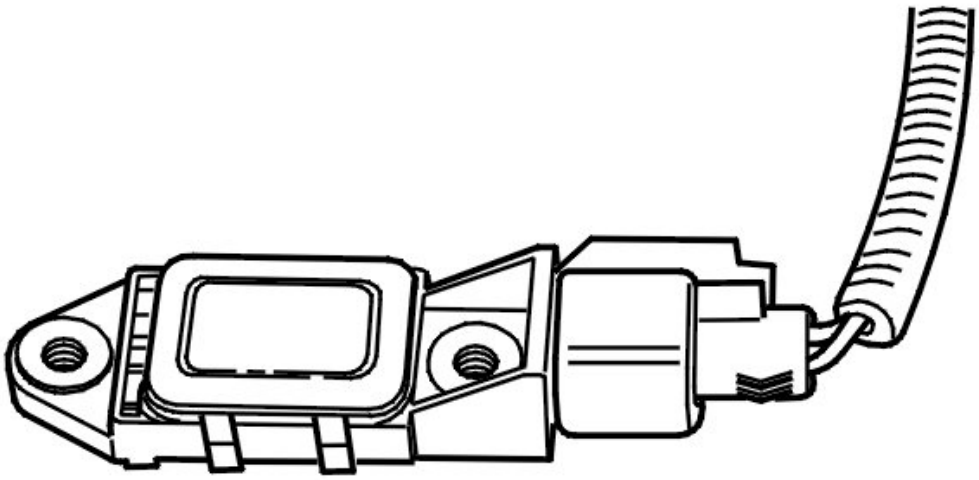


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-021A

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-0021A is stored if the control module registers an incorrect identification signal in the signal cable for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-021A can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

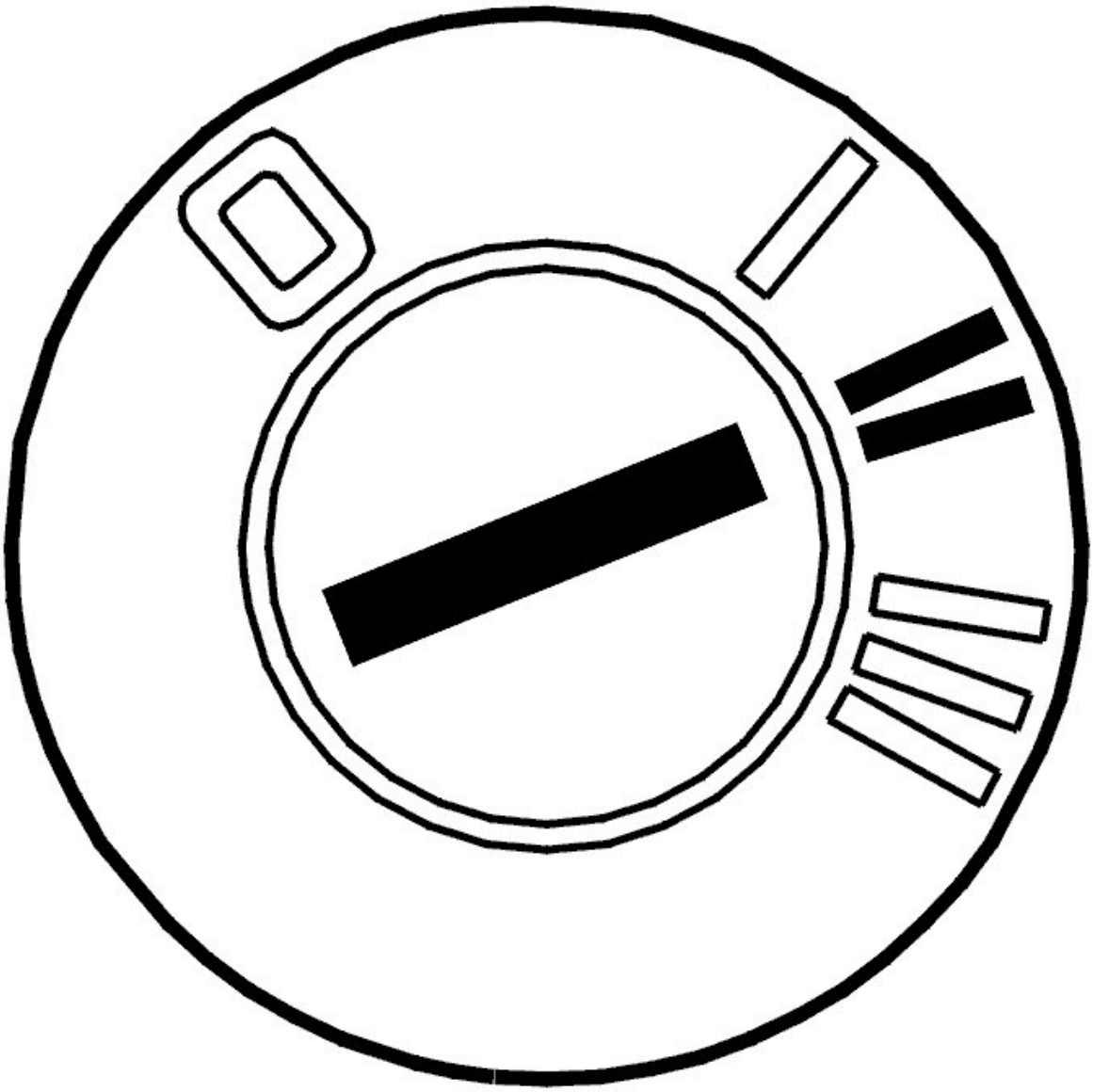
Possible source
- Faulty front impact sensor installed in the Supplemental Restraint System Module (SRS)
- The signal between the front impact sensor and the Supplemental Restraint System Module (SRS) has been affected by electrical interference. This causes the front impact sensor to respond with an incorrect identification signal.

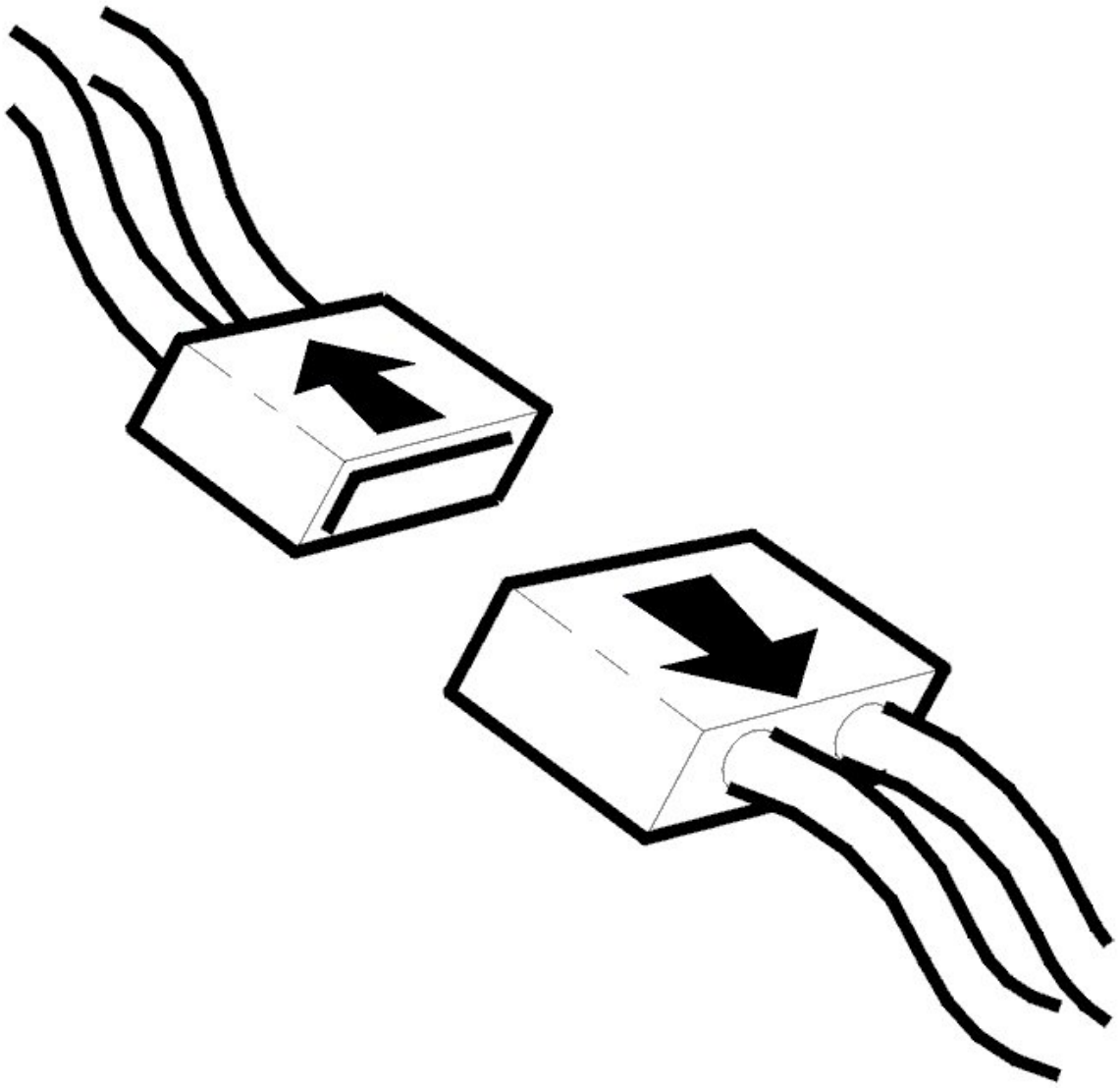
Fault symptom[s]
- The SRS indicator lamp is lit.

Faulty identification

Faulty identification

Checking the component





- Ignition off for 10 seconds
- Switch on the ignition. Wait 10 seconds.

Read off diagnostic trouble codes (DTCs).
If the diagnostic trouble code (DTC) is intermittent, the fault has been eliminated.

Other information:

- To access or replace the front impact sensor, see the relevant service procedure.

Is the diagnostic trouble code (DTC) intermittent?

No - Checking the component

Yes - **Fault Found**

Checking the component

Supplemental Restraint System Module (SRS) has registered that an incorrect front impact sensor model has been installed.
If this fault occurs, replace the front left front impact sensor. Check against the replacement parts catalogue which front impact sensor model is used in the relevant Supplemental Restraint System Module (SRS)
In the event of a permanent fault, replace the front impact sensor.
Remedy as necessary.

Other information:

- To access or replace the front impact sensor, see the relevant service procedure.

Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - **FAULT-TRACING FAILED**

No - **Attempt New Test**

FAULT-TRACING FAILED - **No Fault Found**

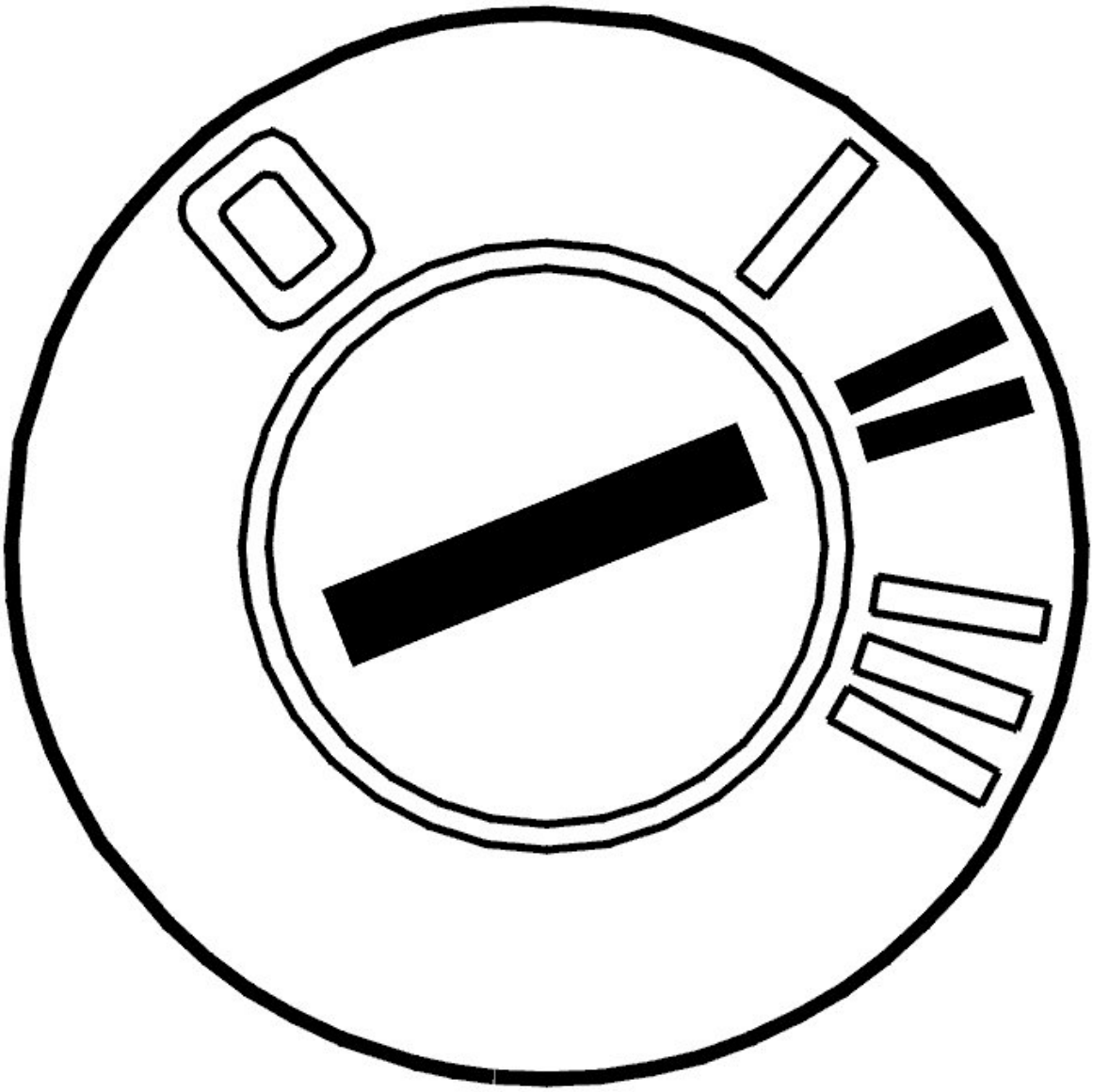
Attempt New Test - Checking the component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

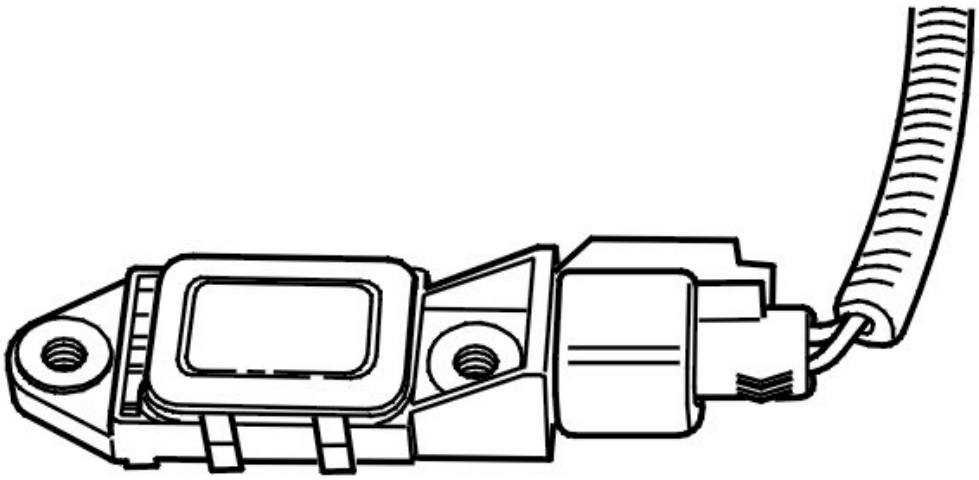
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-021B

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-021B is stored if the control module registers an internal fault in the front impact sensor.
Diagnostic trouble code (DTC) SRS-021B can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- Internal fault in the front impact sensor.

Fault symptom[s]
- The SRS indicator lamp is lit.

Internal Fault

Internal fault

Internal fault

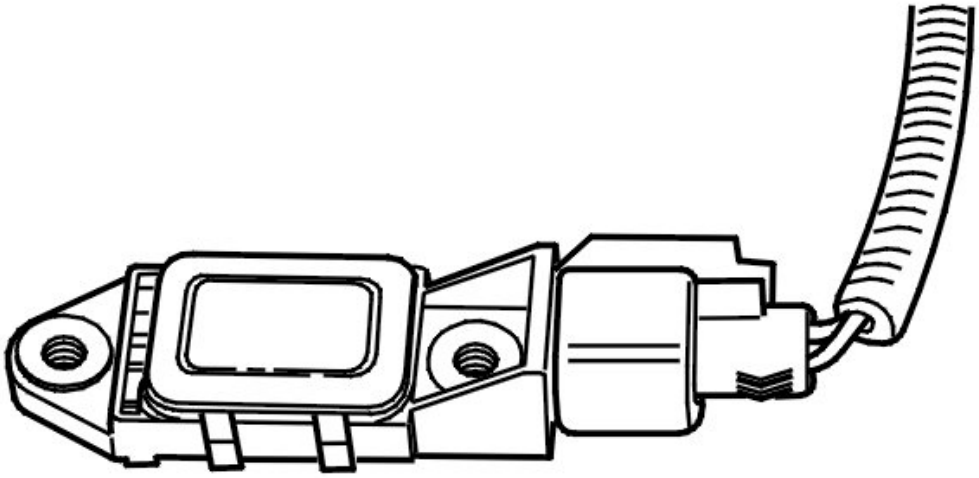
An internal fault has been registered in the front left front impact sensor.
In the event of permanent and intermittent faults, replace the front left front impact sensor. see the relevant service procedure.
Remedy as necessary.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-021C

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-021C is stored if the resistance in the signal cable wiring circuit is lower than 10 ohms for longer than 10 seconds.
Diagnostic trouble code (DTC) SRS-021C can be diagnosed in ignition positions I, II or III.

Substitute value
- None.

Possible source
- If the Supplemental Restraint System Module (SRS) identifies that a front impact sensor is installed, despite the control module being programmed that a front left front impact sensor is not installed.

Fault symptom[s]
- The SRS indicator lamp is lit.

Fault-tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information about this diagnostic trouble code (DTC), select Information, then DTC information.

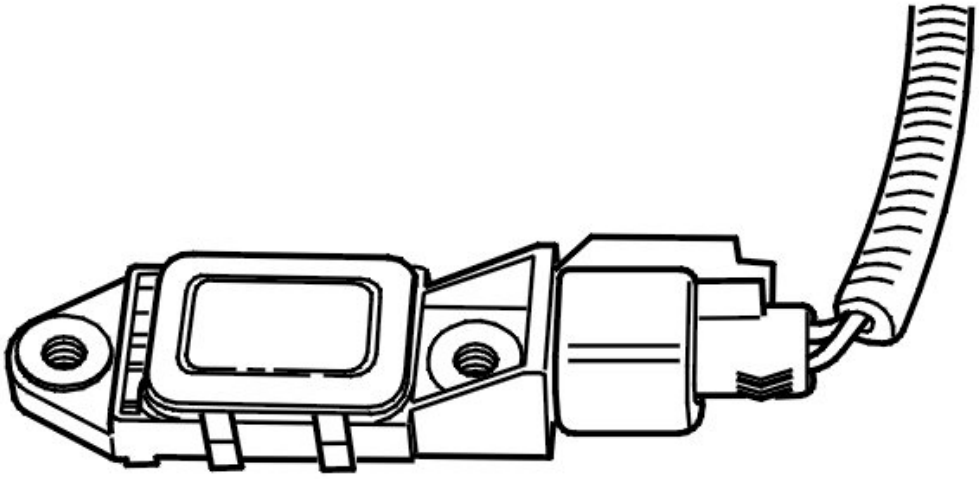
Select "Continue" to exit.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-021D

Condition



The Supplemental Restraint System Module (SRS) checks the signal from the front left front impact sensor.
Diagnostic trouble code (DTC) SRS-021D is stored if the Supplemental Restraint System Module (SRS) registers that the signal cable is cross-connected
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

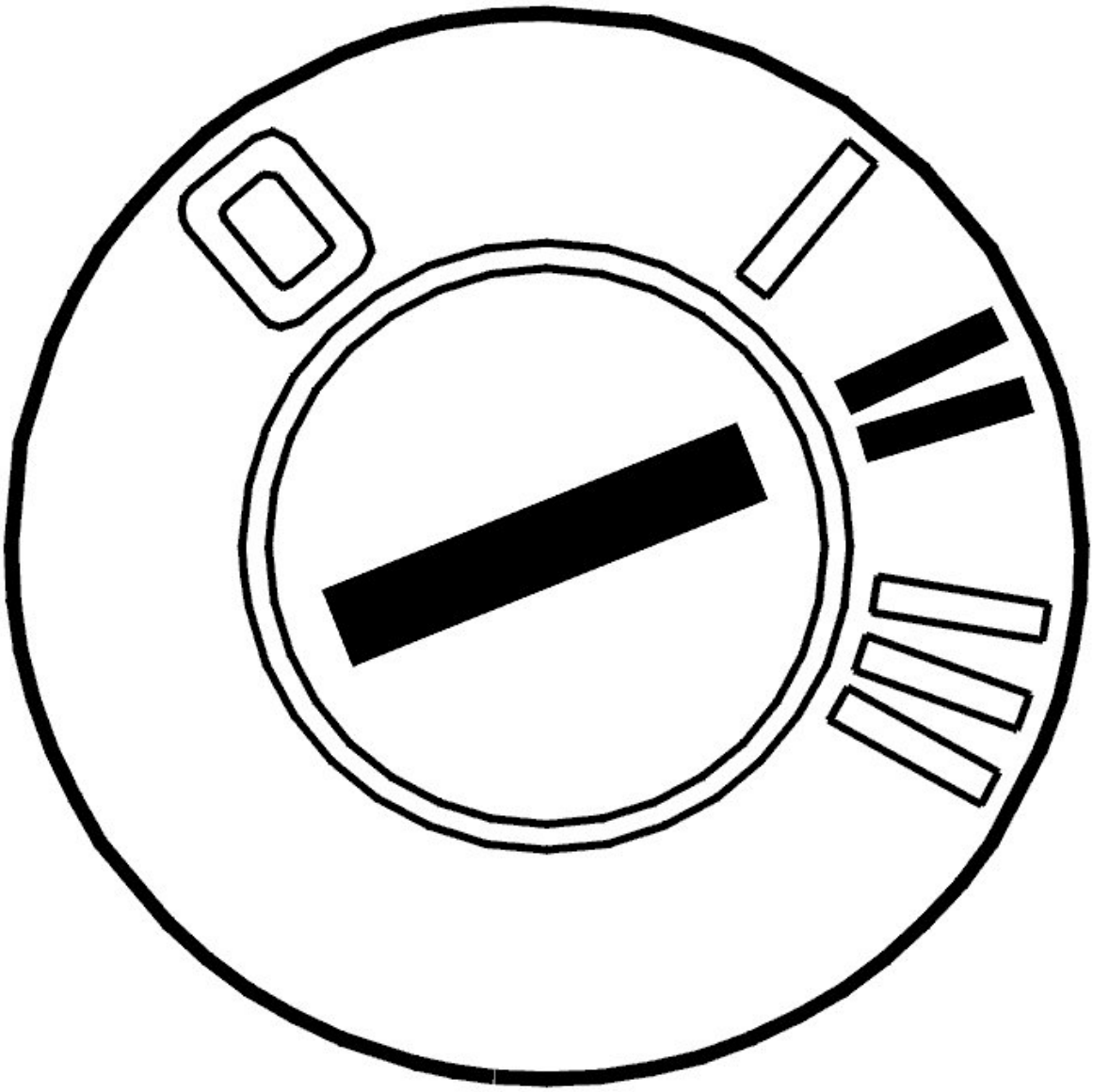
Possible source
- Incorrect connection of the signal cables between the front left front impact sensor and the Supplemental Restraint System Module (SRS). The signal cables are reversed between the two terminal pins in the side impact sensor or in the Supplemental Restraint System Module (SRS)
- Incorrect repair of SRS wiring. The signal cables to the two terminal pins on the front impact sensor have been reversed.

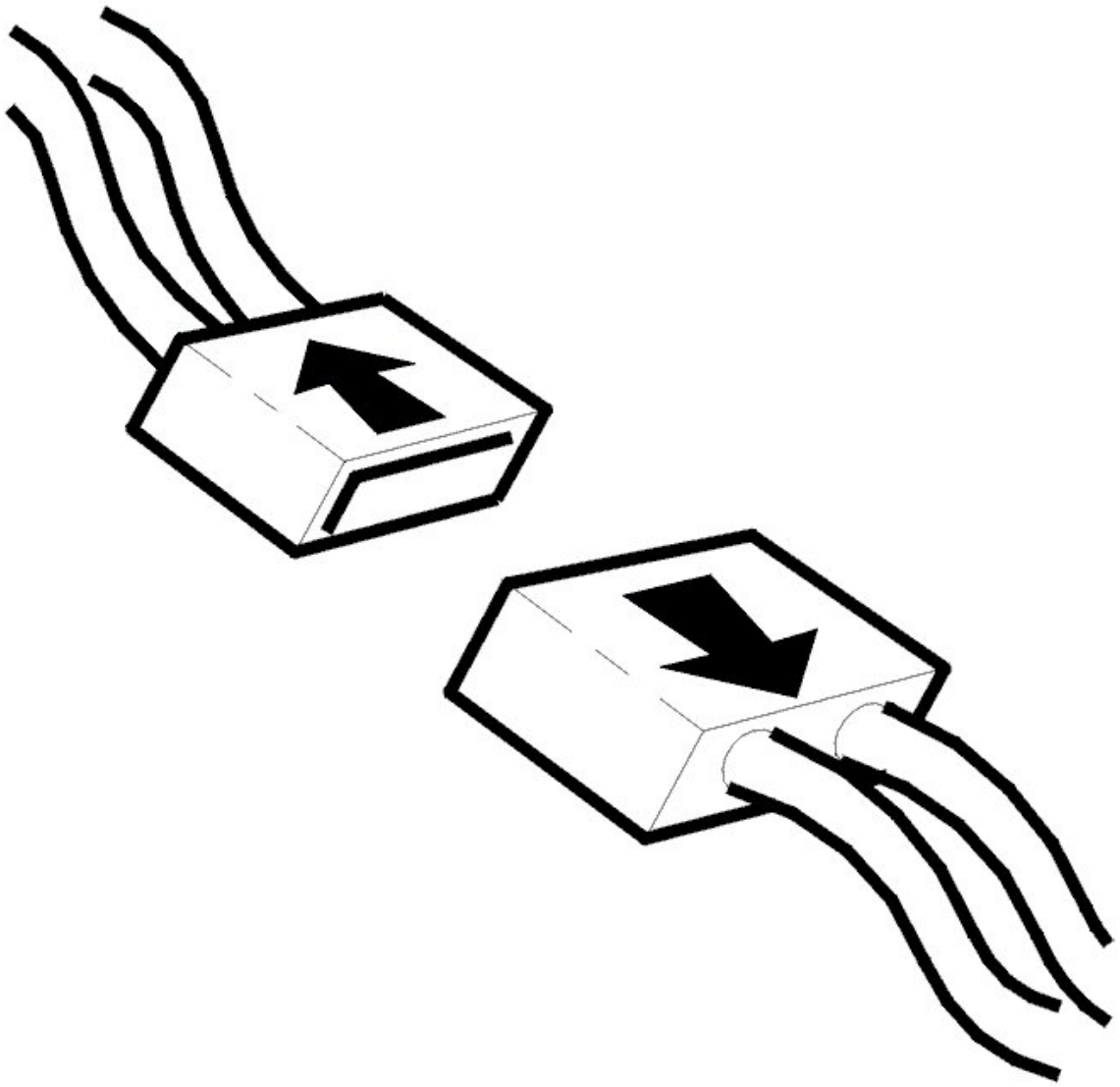
Fault symptom[s]
- The SRS indicator lamp is lit.

Cross-connected

Cross-connected

Checking components and wiring





- Ignition off
- Disconnect the connector from the front left front impact sensor.

Check the signal cable between the Supplemental Restraint System Module (SRS) terminal #19B (47) and the front impact sensor #2. Check for an open-circuit

Check the signal cable between the Supplemental Restraint System Module (SRS) terminal #18B (46) and the front impact sensor #1. Check for an open-circuit.

Check the resistance between the Supplemental Restraint System Module (SRS) terminal #19B (47) and the front impact sensor #1. The resistance should be infinite.

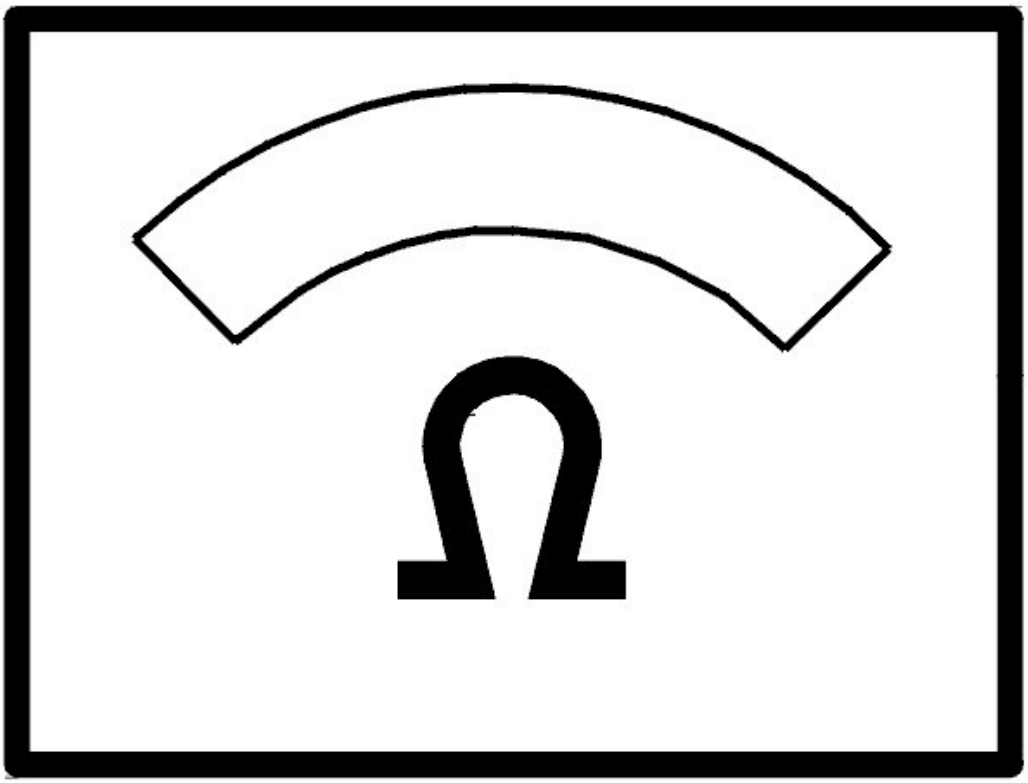
Check the resistance between the Supplemental Restraint System Module (SRS) terminal #18B (46) and the front impact sensor #2. The resistance should be infinite.

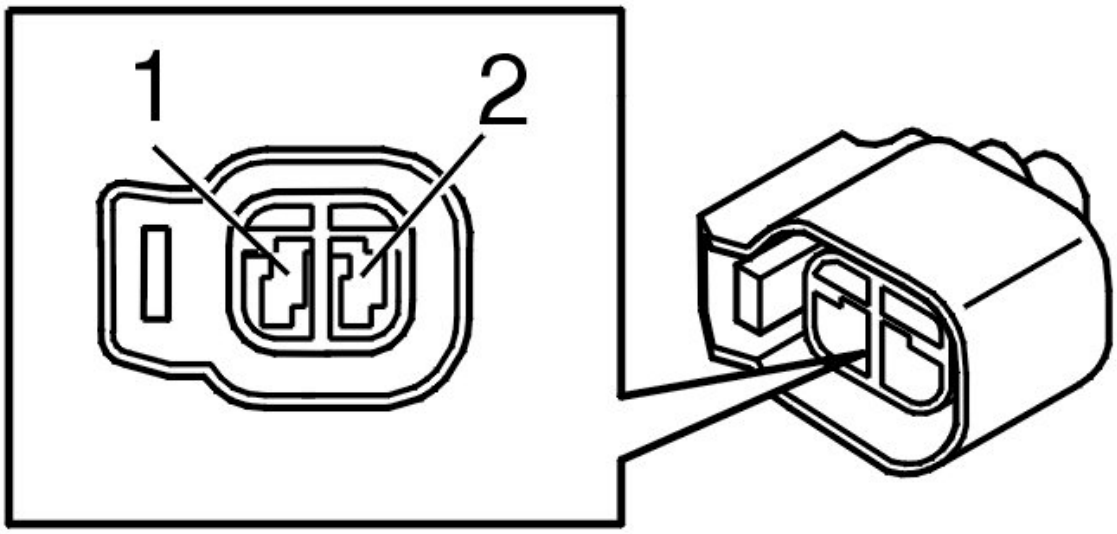
Hint: If repairs have been carried out on the wiring, these signal cables may have been reversed. Check that connections between the Supplemental Restraint System Module (SRS) and the front impact sensor are correct.

Remedy as necessary.

Other information:

- To access and replace the SRS control module and connector, see
- To connect the breakout box, see Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- To access or replace the front impact sensor, see
- For information about the repair of SRS wiring, see Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- For information about signals, see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





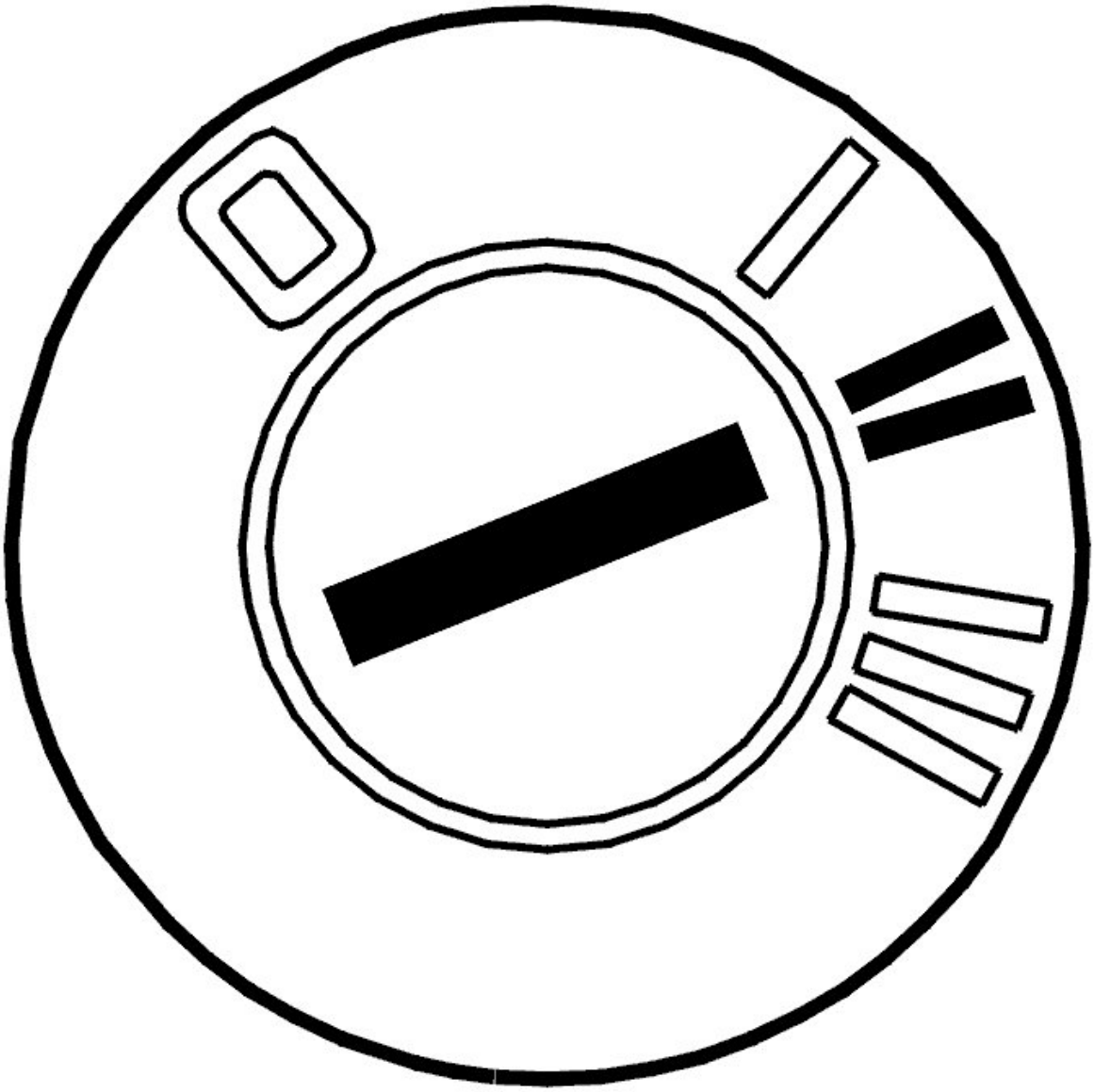
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0220

Condition

The supplemental restraint system module (SRS) checks signals on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the control module registers that there is no signal about the position of the front seats on the CAN network.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

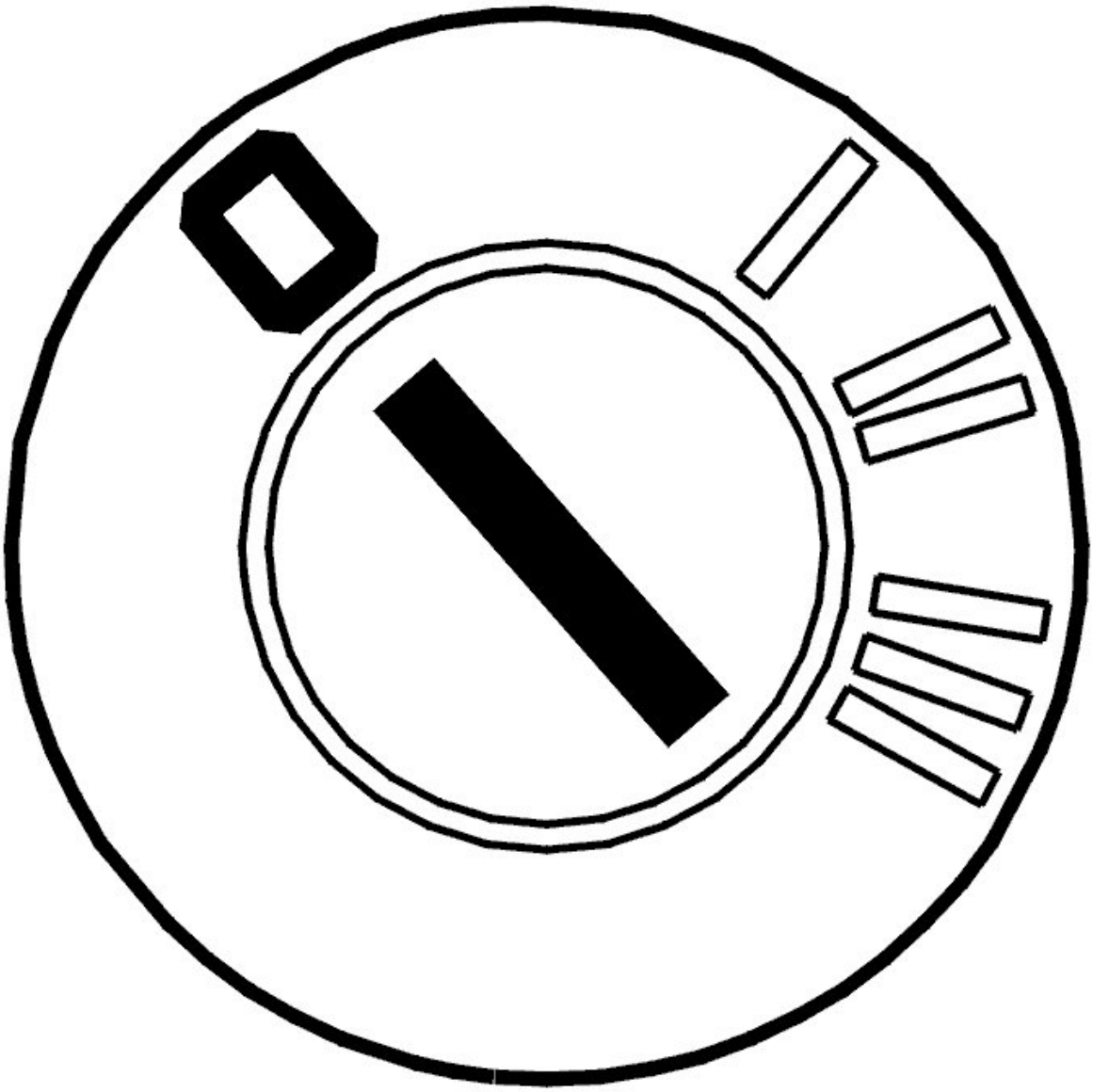
Possible source
- Open-circuit in the control area network (CAN)
- Fault in the central electronic module (CEM)
- Fault in the seat position sensor.

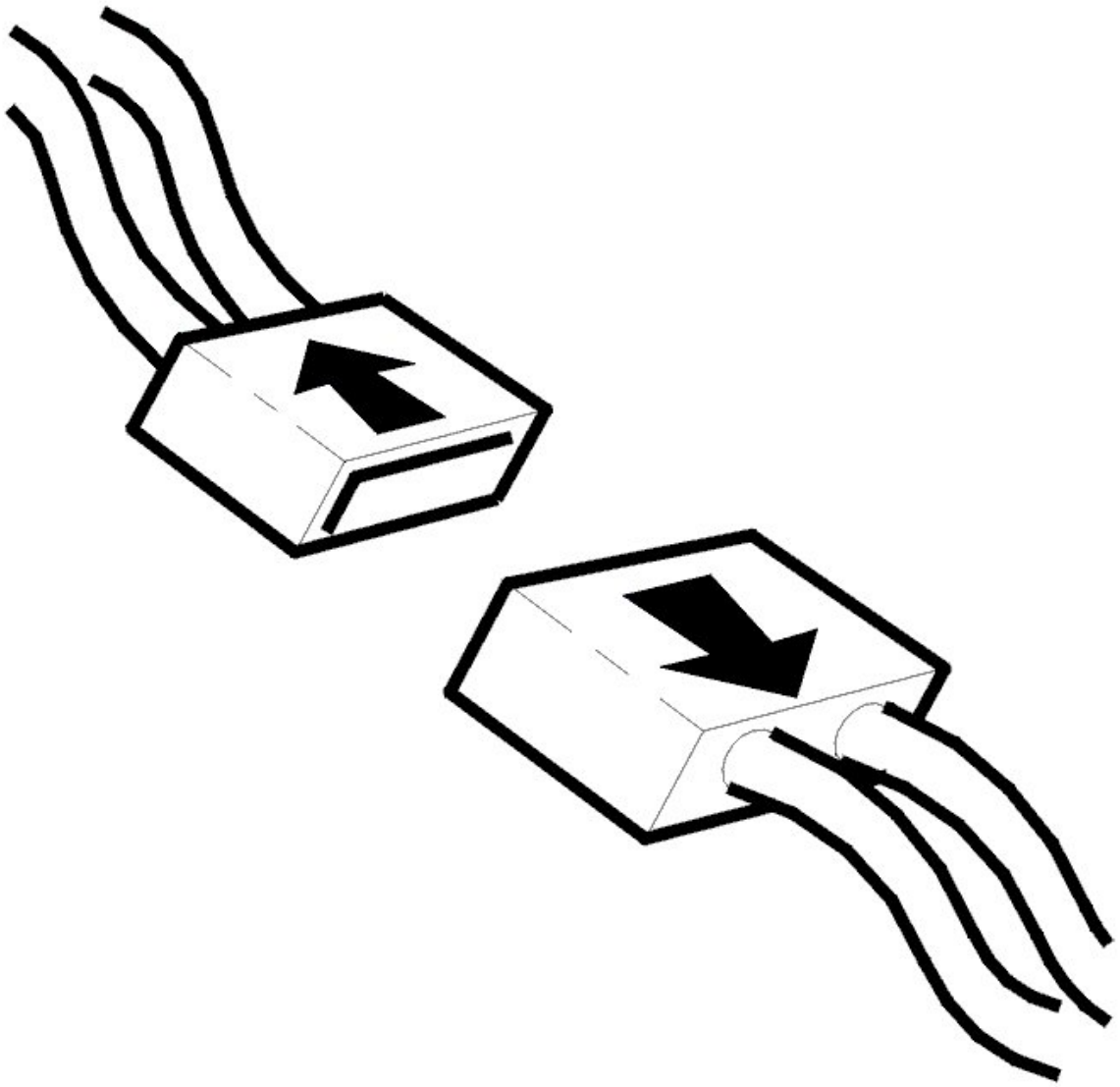
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Checking components and wiring





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect connector D from the central electronic module (CEM).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the central electronic module (CEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the central electronic module (CEM).

Check the connectors for the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Remedy as necessary.
Check the CAN cable between the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for an open-circuit.
Remedy as necessary.
If no fault is found, continue fault-tracing from the central electronic module (CEM).

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the central electronic module (CEM) and the connectors, see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To fault-trace the control area network (CAN), see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

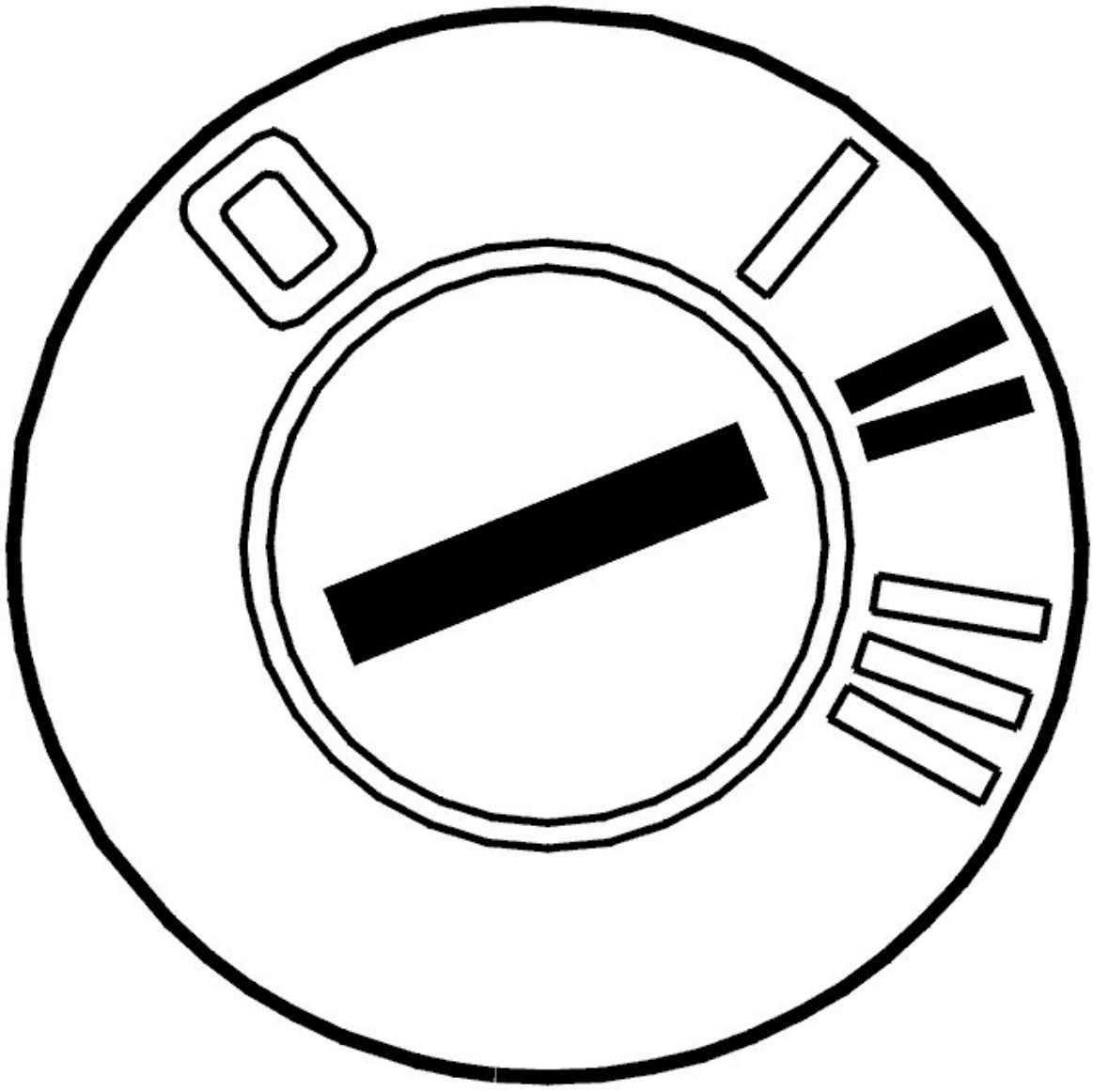
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0221

Condition

The supplemental restraint system module (SRS) checks signals on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) receives a signal indicating that a diagnostic trouble code (DTC) for the SRS system has been stored in the central electronic module (CEM).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- A diagnostic trouble code (DTC) for the seat position sensor has been stored in the central electronic module (CEM).

Fault symptom[s]
- The SRS indicator lamp is lit.

Diagnostic trouble code (DTC) in the Central Electronic Module (CEM)

Diagnostic trouble code (DTC) in the central electronic module (CEM)

Fault-tracing information

Fault-trace the central electronic module (CEM) to check the driver's seat position sensor.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0222

Condition

The supplemental restraint system module (SRS) checks signals on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the supplemental restraint system module (SRS) receives a signal indicating that a diagnostic trouble code (DTC) for the SRS system has been stored in the central electronic module (CEM).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- A diagnostic trouble code (DTC) for the passenger seat position sensor has been stored in the central electronic module (CEM).

Fault symptom[s]
- The SRS indicator lamp is lit.

Diagnostic trouble code (DTC) in the Central Electronic Module (CEM)

Diagnostic trouble code (DTC) in the central electronic module (CEM)

Fault-tracing information

Fault-trace the central electronic module (CEM) to check the passenger seat position sensor.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0223

Condition

The supplemental restraint system module (SRS) checks signals on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the control module registers that there is no signal for the configuration of the switch for the passenger airbag.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

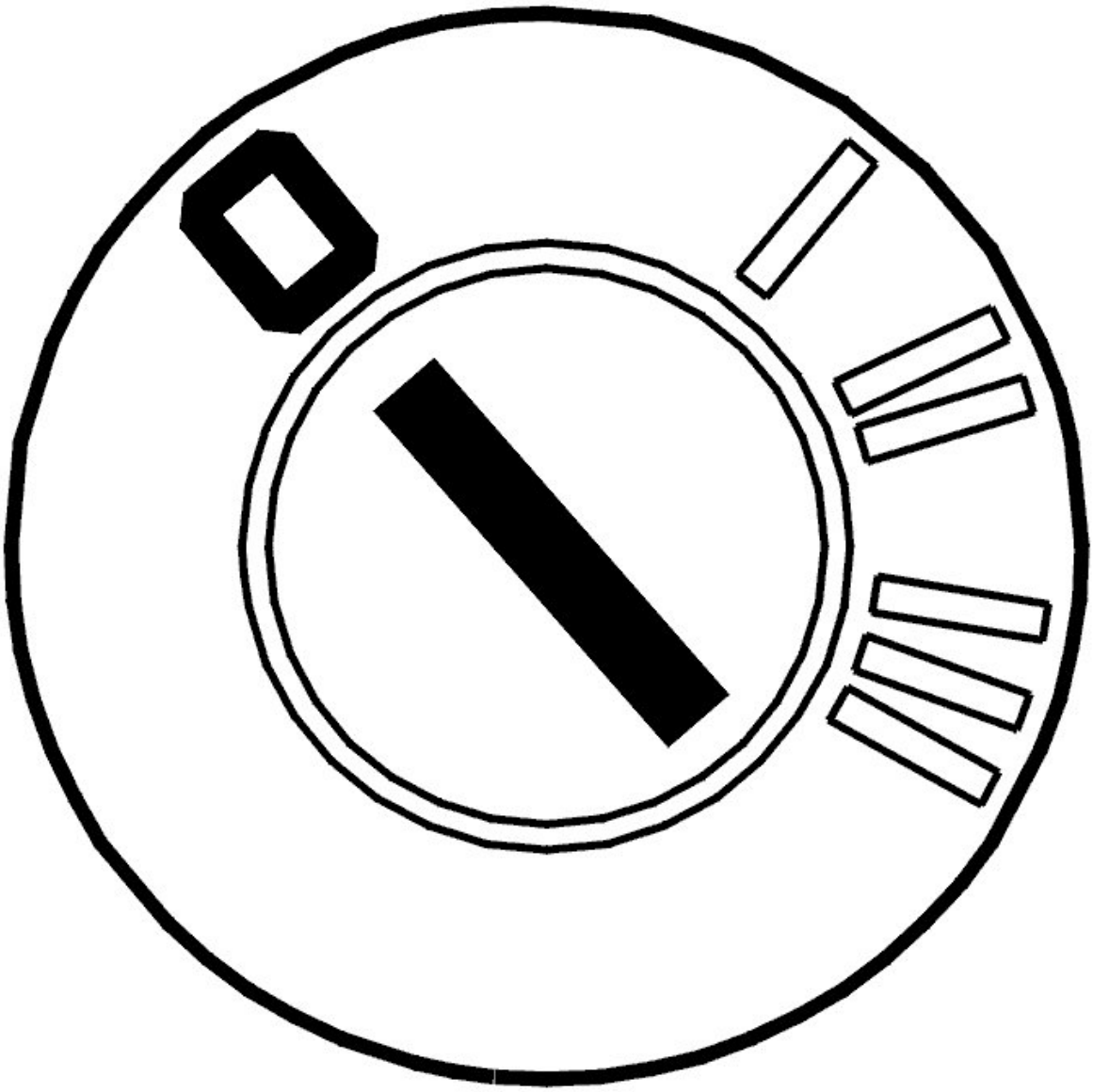
Possible source
- Open-circuit in the control area network (CAN)
- Fault in the central electronic module (CEM).

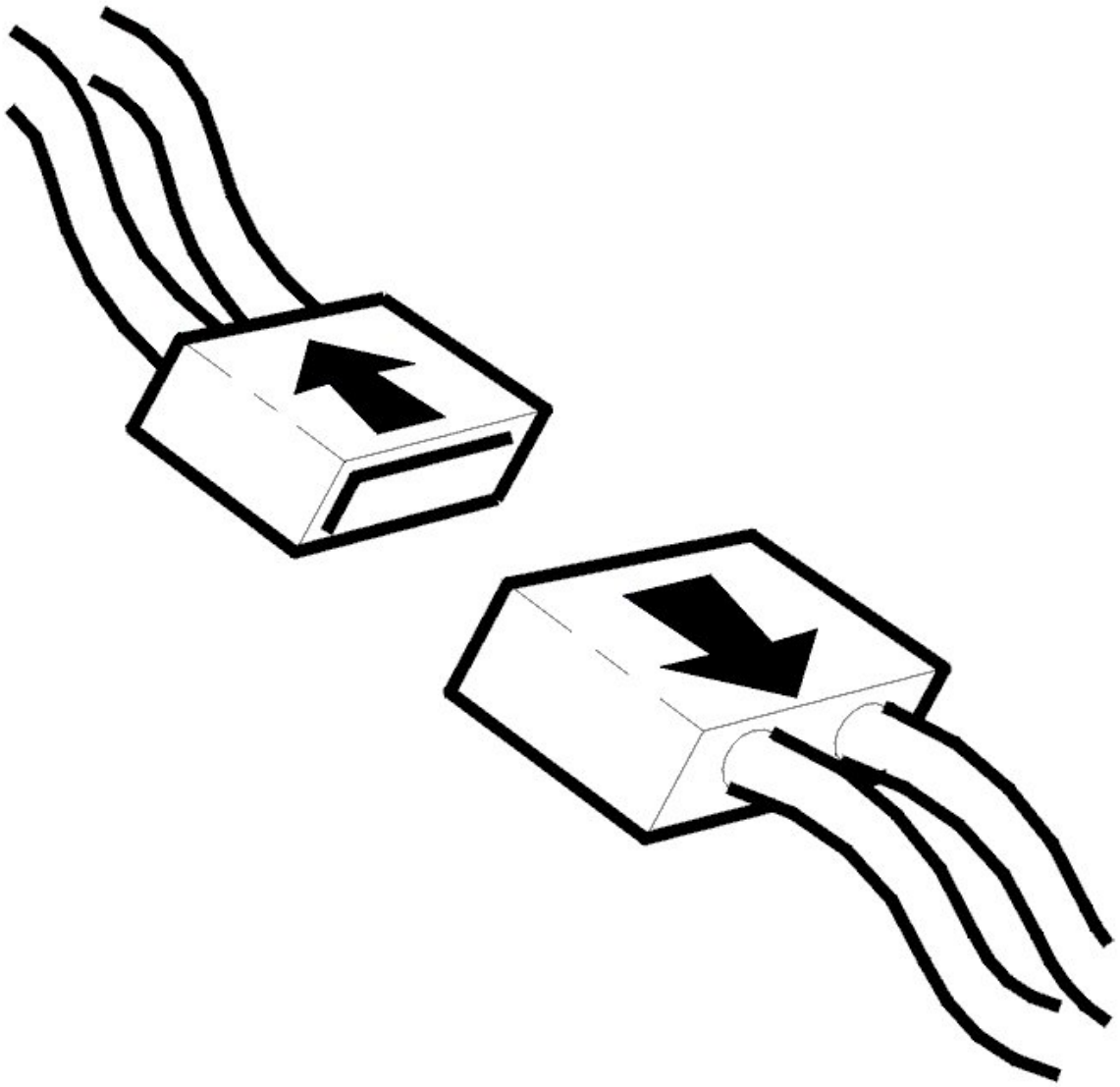
Fault symptom[s]
- The SRS indicator lamp is lit.

Signal Missing

Signal missing

Checking components and wiring





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect connector D from the central electronic module (CEM).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the central electronic module (CEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the central electronic module (CEM).

Check the connectors for the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Remedy as necessary.
Check the CAN cable between the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for an open-circuit.
Remedy as necessary.
If no fault is found, continue fault-tracing from the central electronic module (CEM).

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- To fault-trace the control area network (CAN), see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

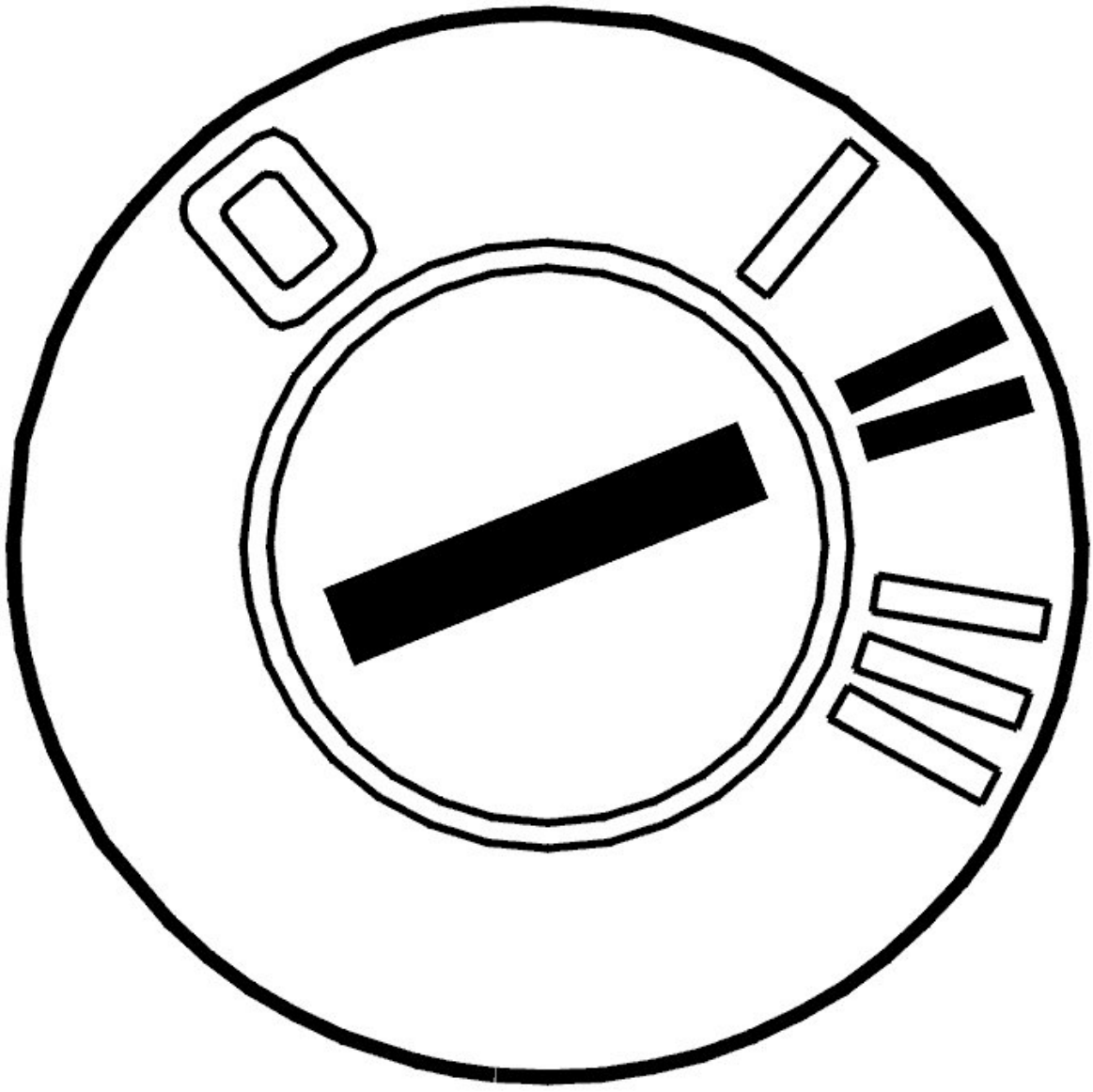
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0224

Condition

The supplemental restraint system module (SRS) checks messages regarding vehicle configuration on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault for the switch for the passenger airbag.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

Possible source
- The supplemental restraint system module (SRS) and the central electronic module (CEM) have different configurations for the switch for the passenger airbag.

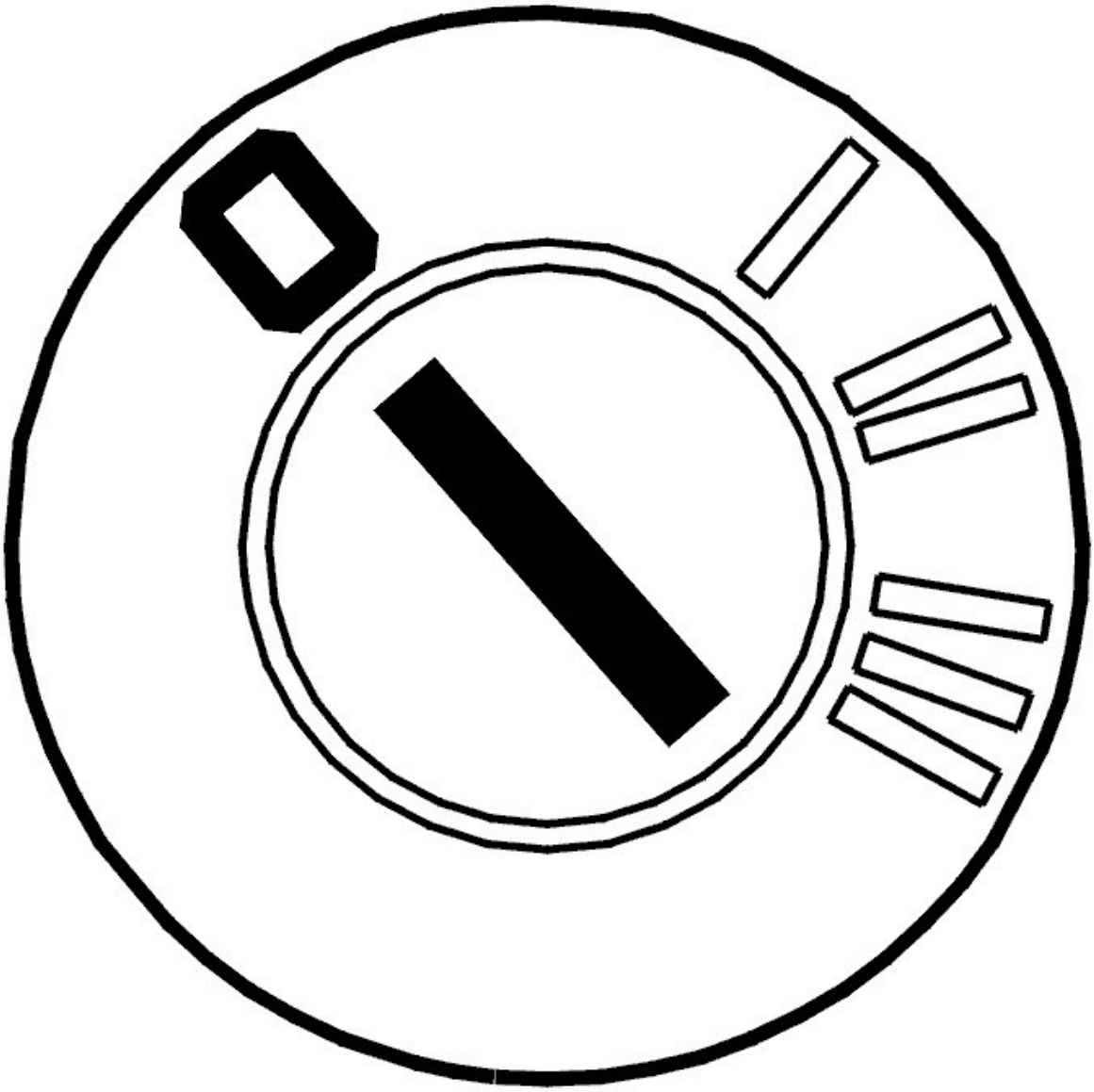
Fault symptom[s]
- The SRS indicator lamp is lit.

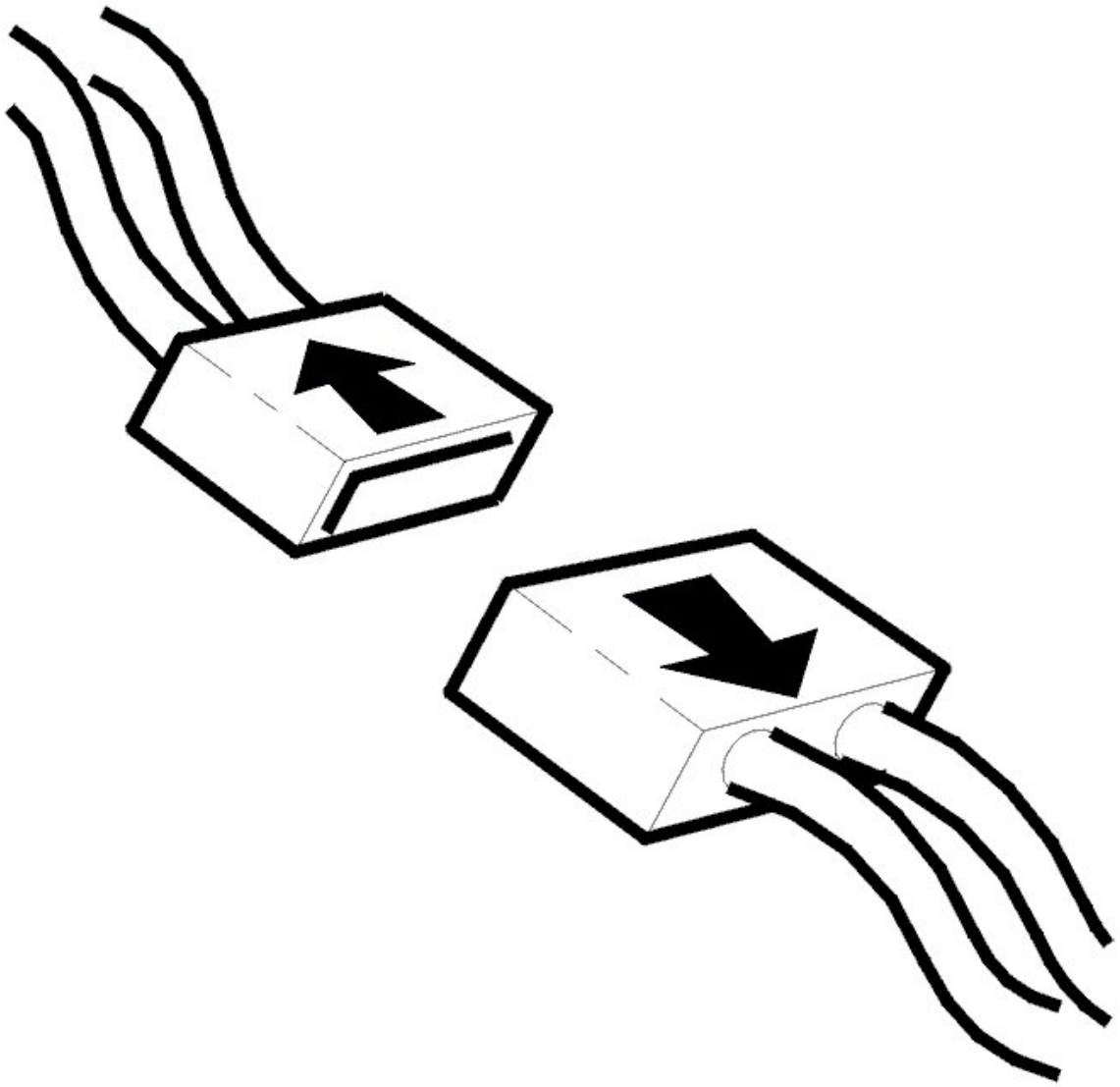
Configuration Fault

Configuration fault

Checking the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the central electronic module (CEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the central electronic module (CEM).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect connector D from the central electronic module (CEM).

Check the connectors for the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for damage to pins and terminals in the connectors. Also check the wiring.
Remedy as necessary.
Check what type of crash safety equipment the central electronic module (CEM) and the supplemental restraint system module (SRS) are programmed for.

- Connect the connector for the supplemental restraint system module (SRS)
- Connect the connector for the central electronic module (CEM)
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

As part of the check, a comparison is performed regarding whether the control modules are programmed for the following:

- Switch for passenger airbag.

If the control modules are programmed for different types of crash safety equipment:
Check whether the crash safety equipment that does not correspond in the comparison between the control modules is installed in the vehicle.
Remedy faulty equipment and/or download new software into the incorrectly programmed control module.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- In order to access or replace the supplemental restraint system module (SRS) and the connectors, or to download new software in the supplemental restraint system module (SRS), see: Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- In order to access or replace the central electronic module (CEM) and the connectors, or to download new software in the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

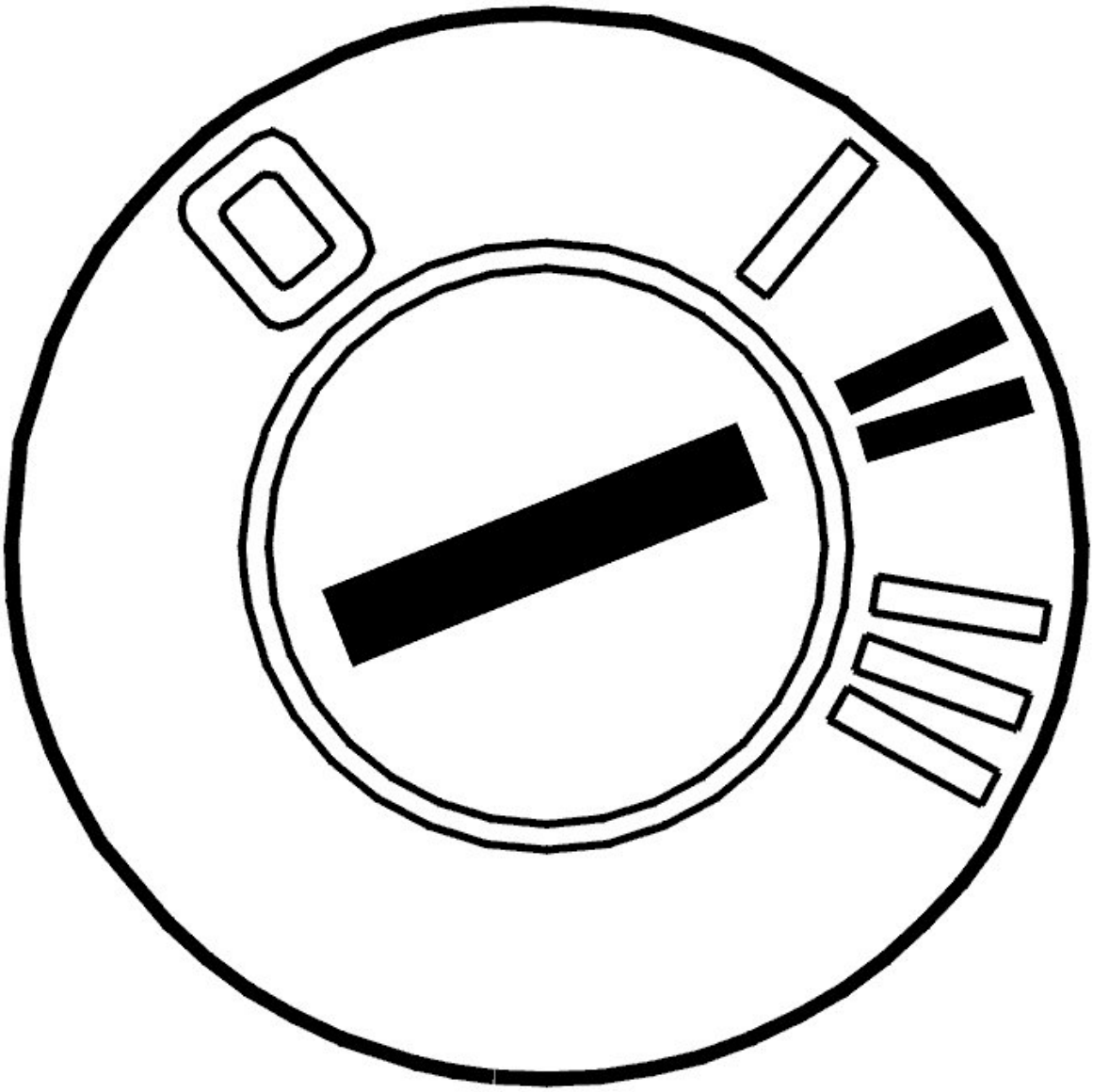
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0225

Condition

The supplemental restraint system module (SRS) checks messages regarding vehicle configuration on the CAN network between the supplemental restraint system module (SRS) and the central electronic module (CEM).
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault for the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value

- None.

Possible source

- The supplemental restraint system module (SRS) and the central electronic module (CEM) have different configurations for the occupant weight sensor (OWS).

Fault symptom[s]

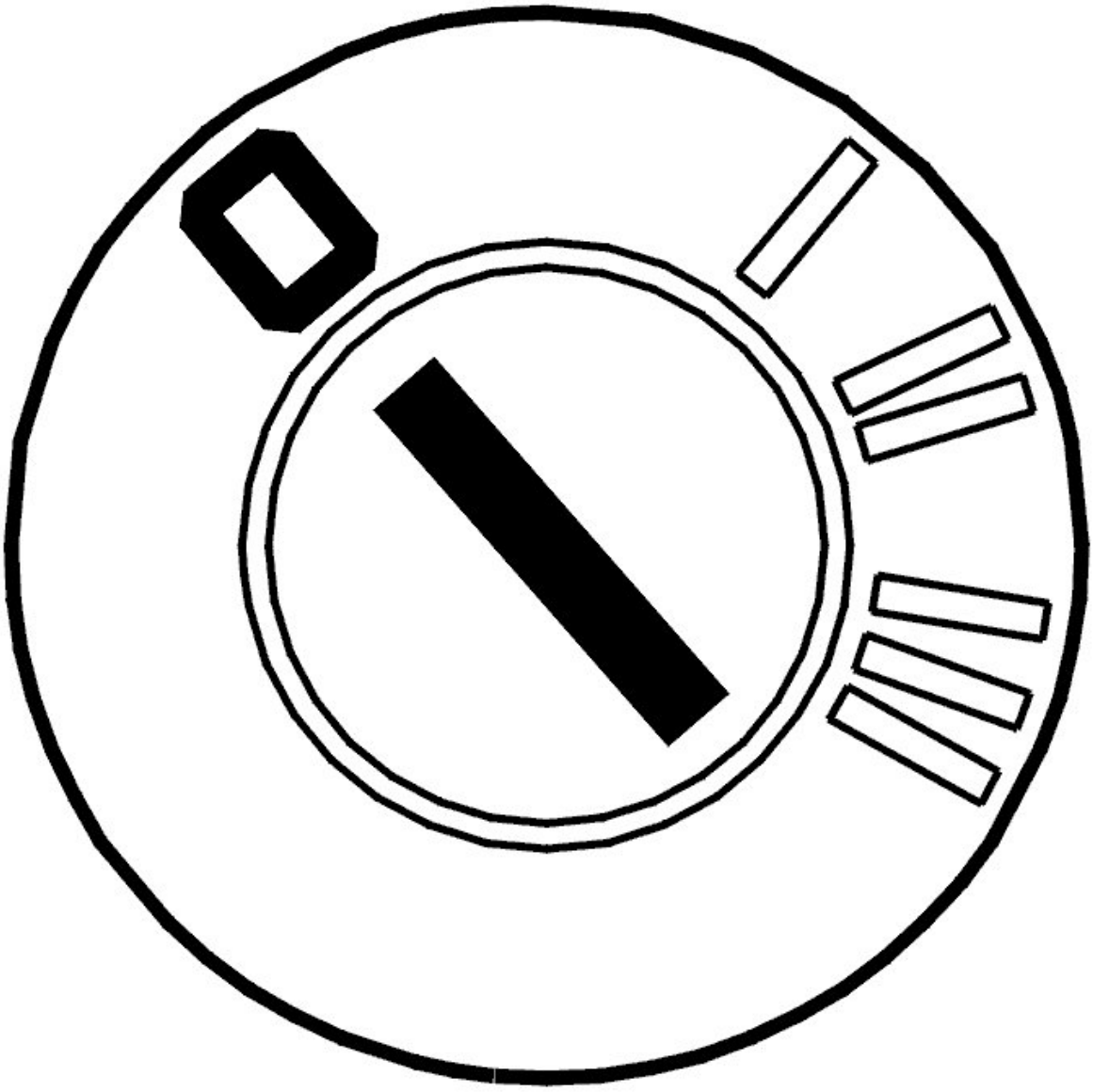
- The SRS indicator lamp is lit.

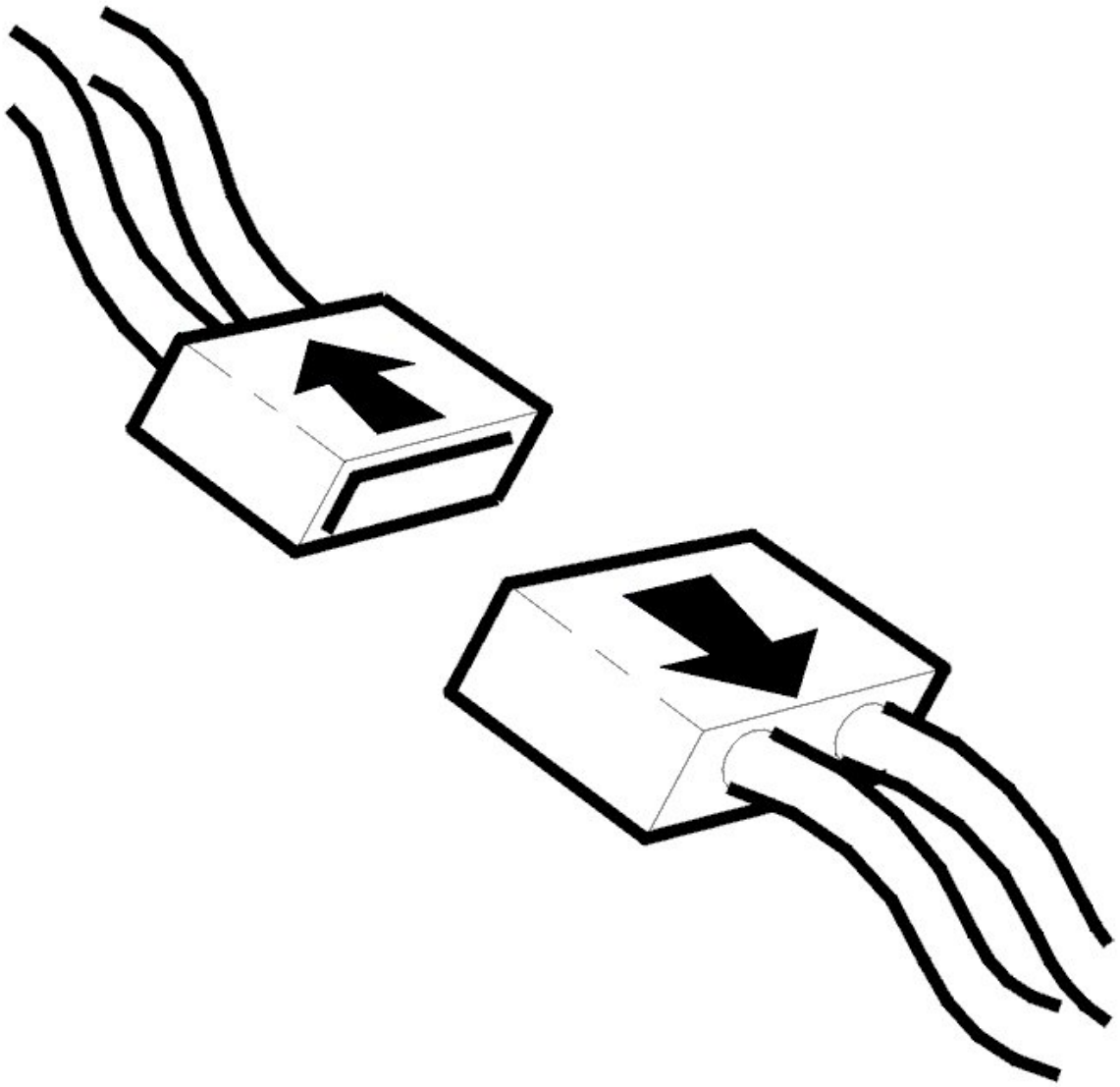
Configuration Fault

Configuration fault

Checking the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the central electronic module (CEM). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the central electronic module (CEM).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the supplemental restraint system module (SRS)
- Disconnect connector D from the central electronic module (CEM).

Check the connectors for the supplemental restraint system module (SRS) and the central electronic module (CEM). Check for damage to pins and terminals in the connectors. Also check the wiring.
Remedy as necessary.
Check what type of crash safety equipment the central electronic module (CEM) and the supplemental restraint system module (SRS) are programmed for.

- Connect the connector for the supplemental restraint system module (SRS)
- Connect the connector for the central electronic module (CEM)
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

As part of the check, a comparison is performed regarding whether the control modules are programmed for the following:

- Occupant weight sensor (OWS).

If the control modules are programmed for different types of crash safety equipment:
Check whether the crash safety equipment that does not correspond in the comparison between the control modules is installed in the vehicle.
Remedy faulty equipment and/or download new software into the incorrectly programmed control module.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- In order to access or replace the central electronic module (CEM) and the connectors, or to download new software in the central electronic module (CEM), see: Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

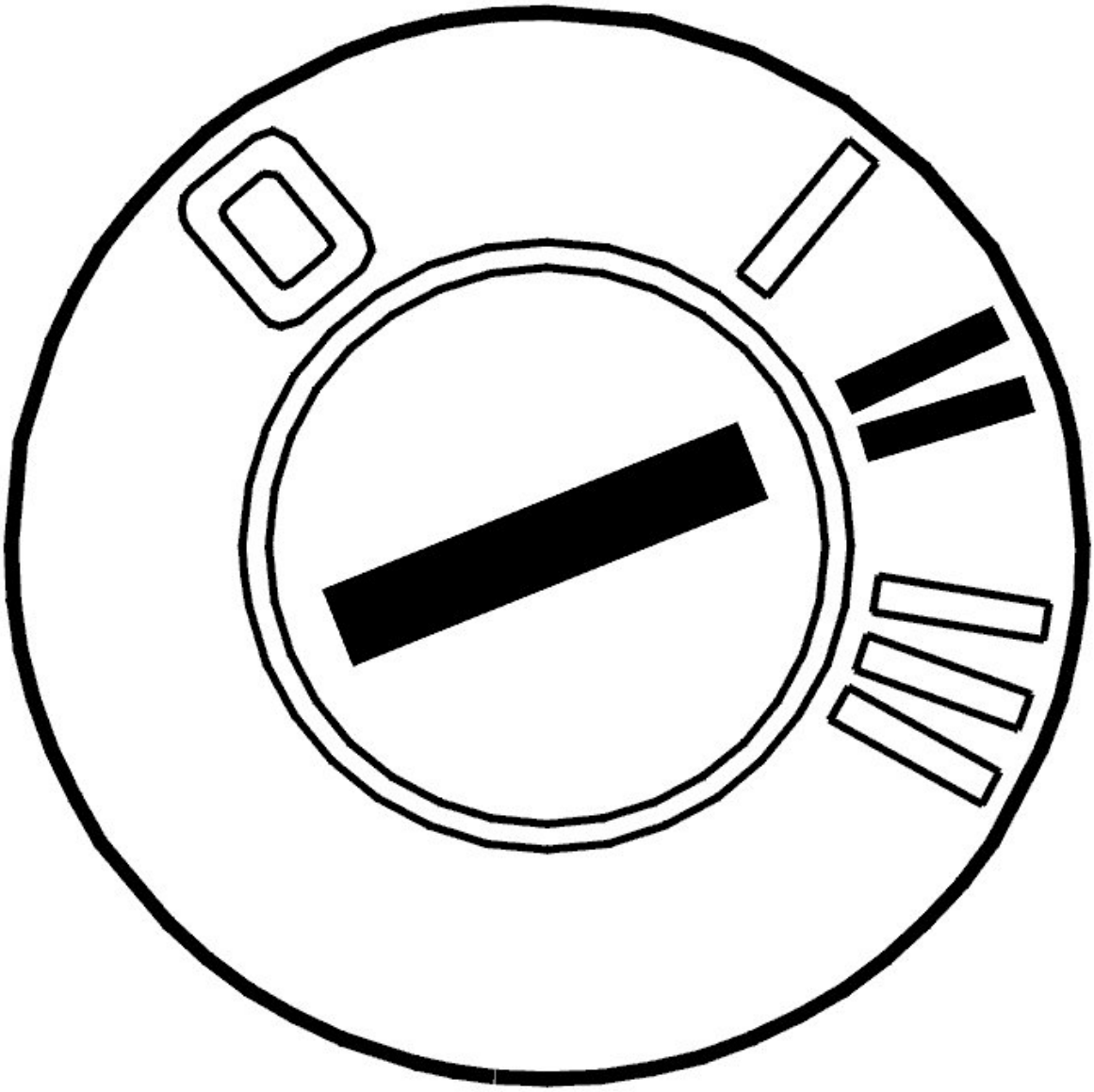
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

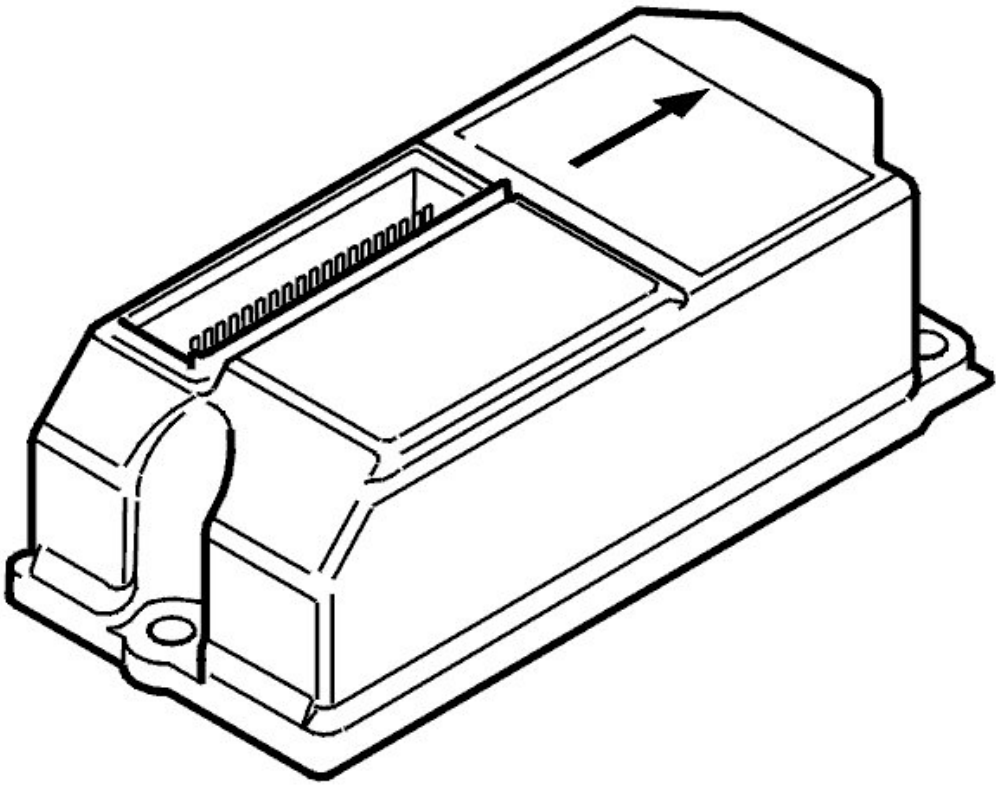
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0228

Condition



The supplemental restraint system module (SRS) checks internal functions in the control module.
The diagnostic trouble code (DTC) is stored if the control module registers a programming fault.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- None.

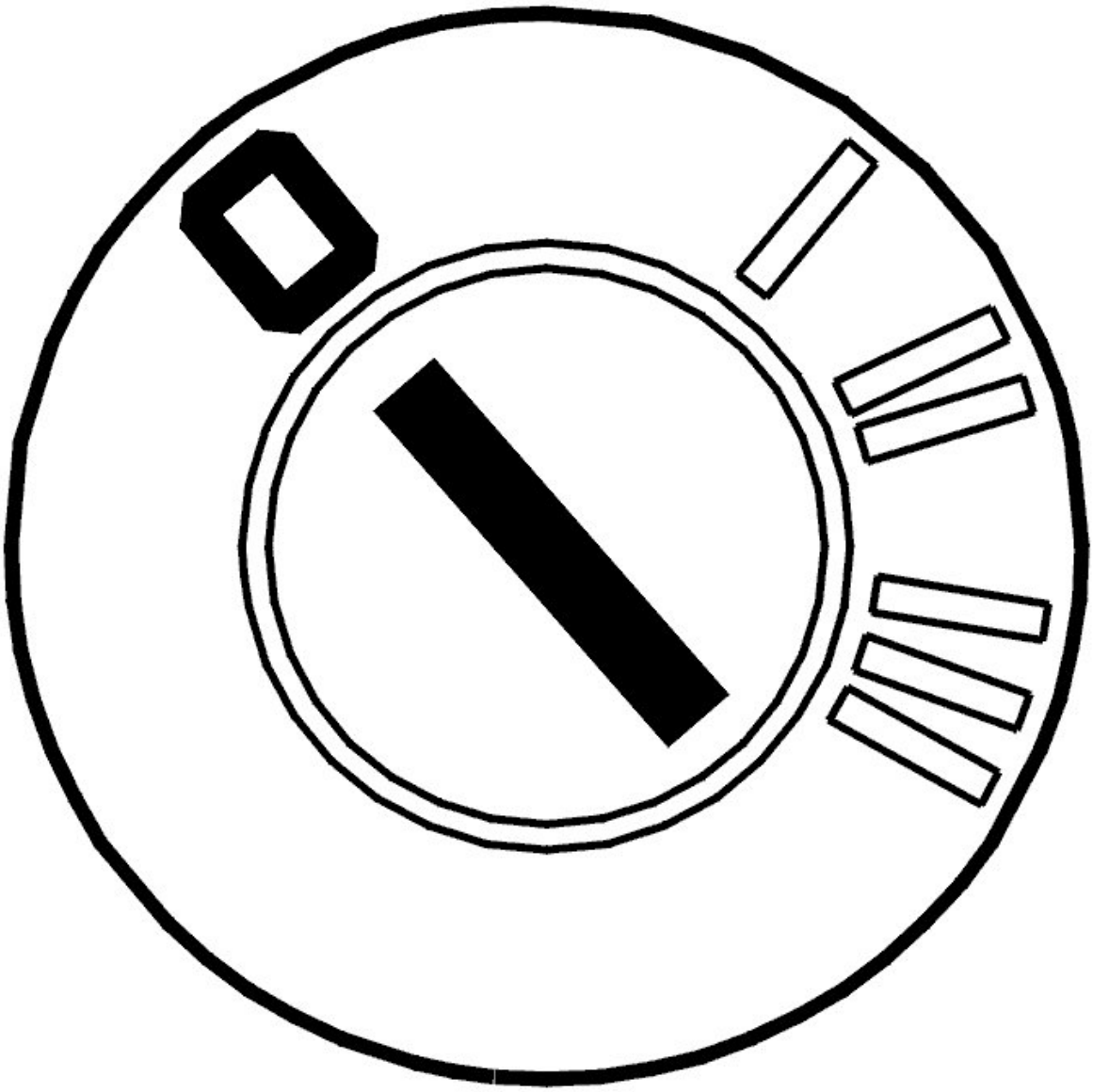
Possible source
- Programming fault in the supplemental restraint system module (SRS)
- Incorrect control module installed in the vehicle. The control module is not intended for this model.

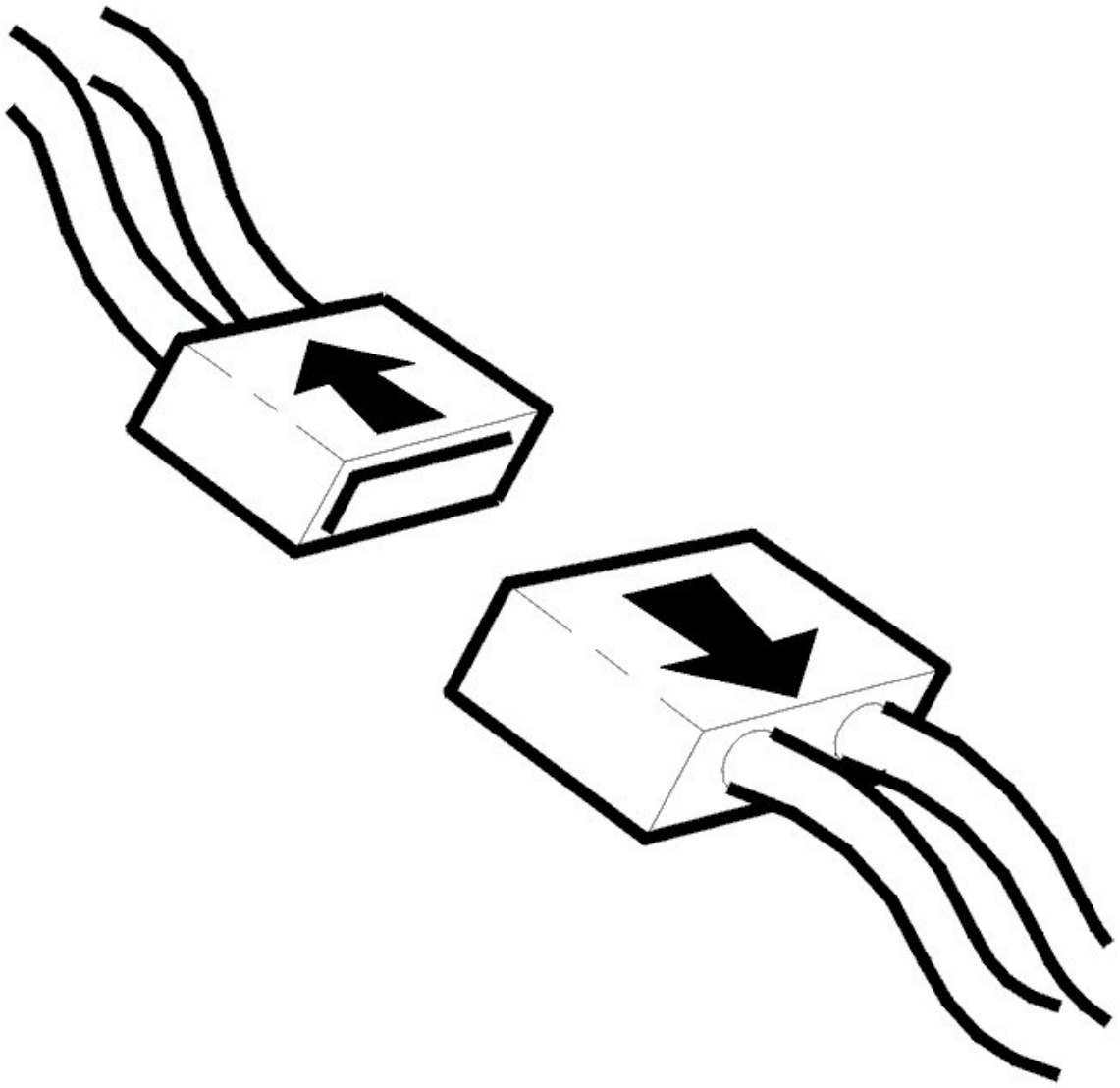
Fault symptom[s]
- The SRS indicator lamp is lit.

Programming Error

Programming error

Checking the component





- Ignition off. Wait for 1 minute
- Switch on the ignition. Wait 10 seconds.

Try to reprogram the supplemental restraint system module (SRS).
Replace the supplemental restraint system module (SRS) if it cannot be reprogrammed.

Other information

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

Select "Continue" when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Attempt New Test - Checking the component

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0230

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is too low.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag
- Open-circuit in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag.

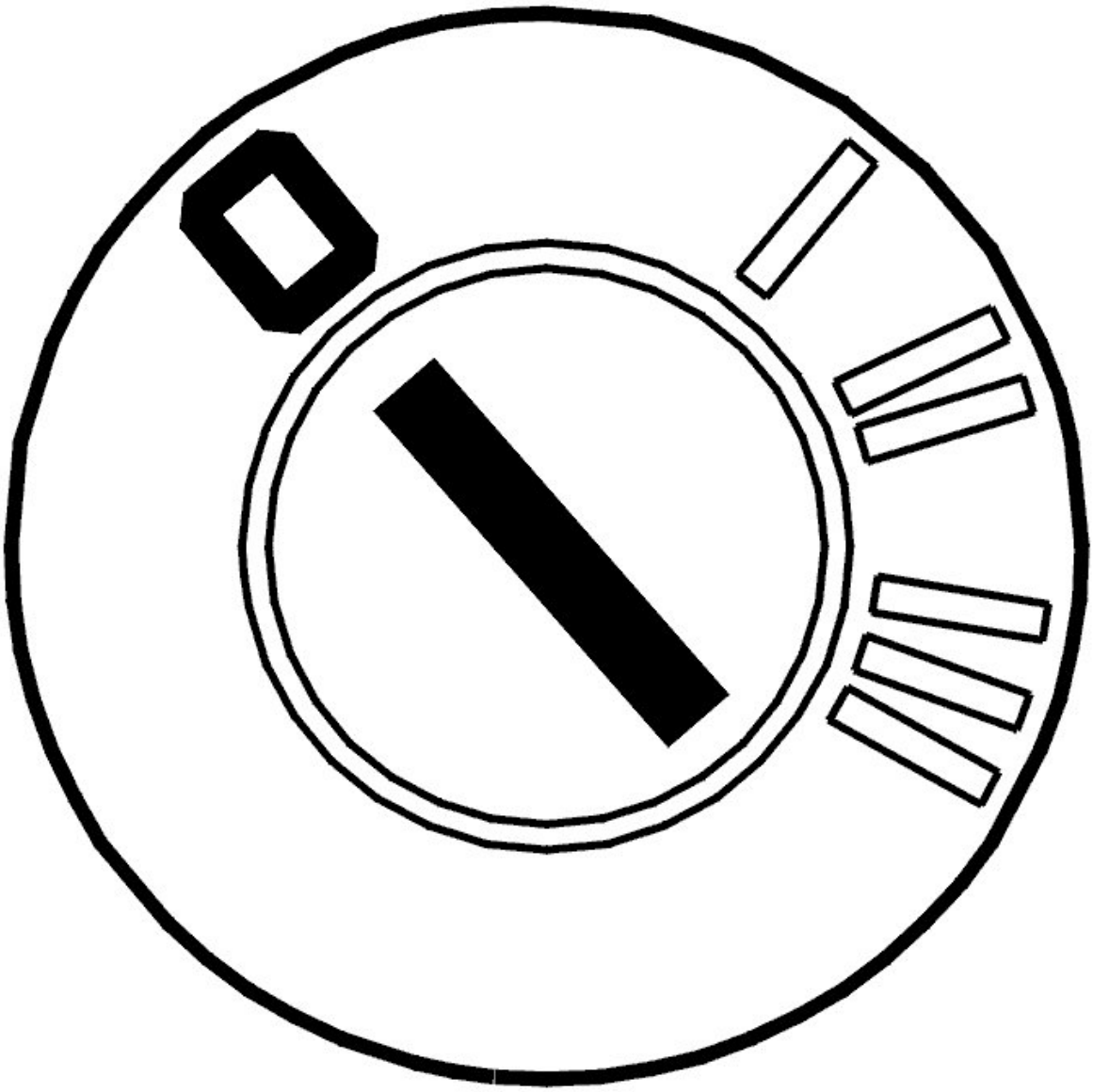
Fault symptom[s]
- The SRS indicator lamp is lit.

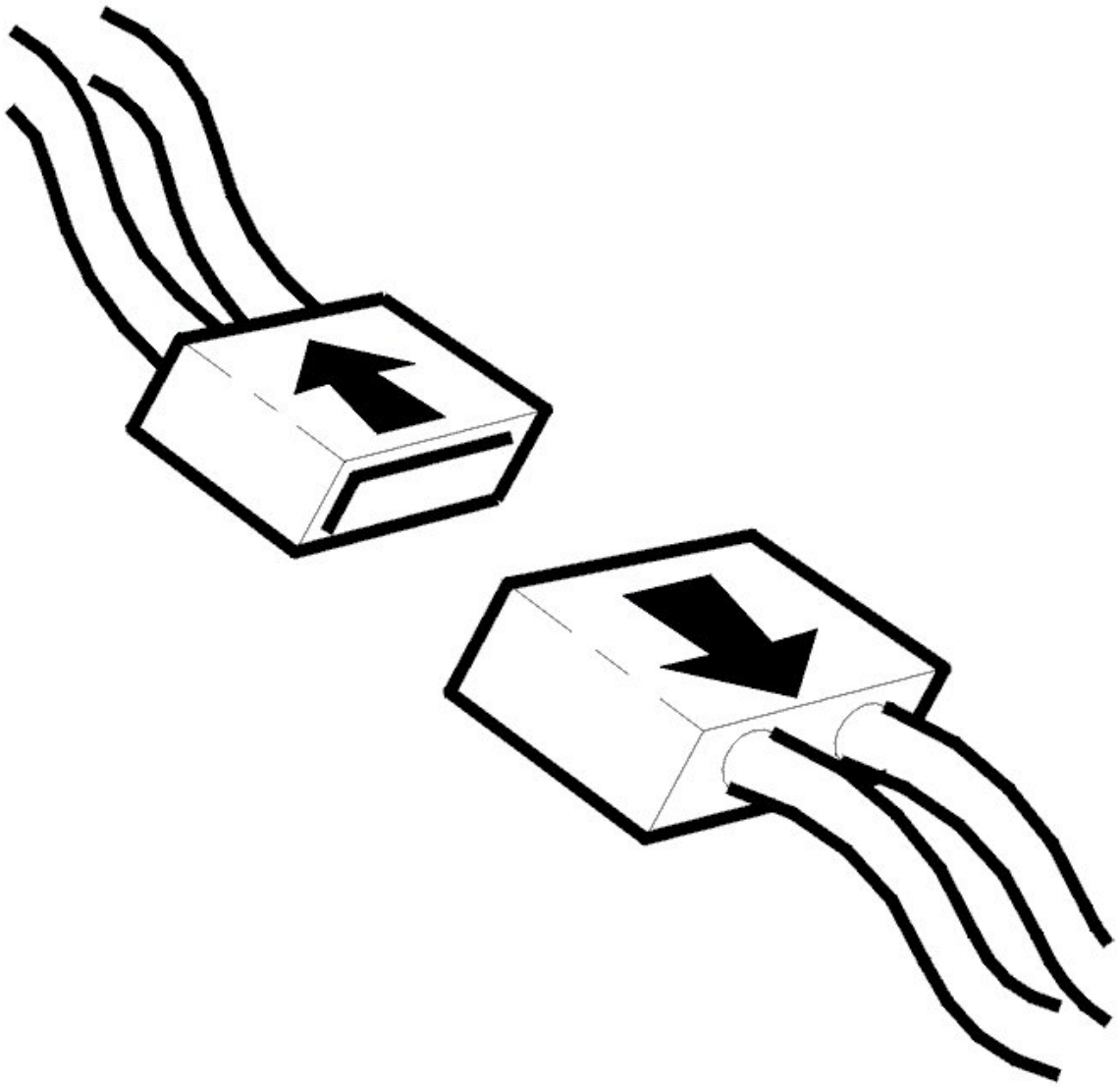
Signal Too Low or Signal Missing

Signal too low or signal missing

Checking components and wiring

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the switch for the passenger airbag
- Disconnect the connector from the supplemental restraint system module (SRS).

Check the connectors for the switch and the supplemental restraint system module (SRS). Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the cable between the supplemental restraint system module (SRS) and the switch connector. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between:

- Supplemental restraint system module (SRS) terminal #45 and switch connector terminal #4
- Supplemental restraint system module (SRS) terminal #50 and switch connector terminal #5.

Remedy as necessary.
Check the power supply cables between the ignition switch and the switch. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between:

- Ignition switch connector terminal #6 (X-supply) and terminal #1 on the switch connector
- Ignition switch connector terminal #1 (15-supply) and terminal #2 on the switch connector.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the switch for the passenger airbag and the connectors, see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

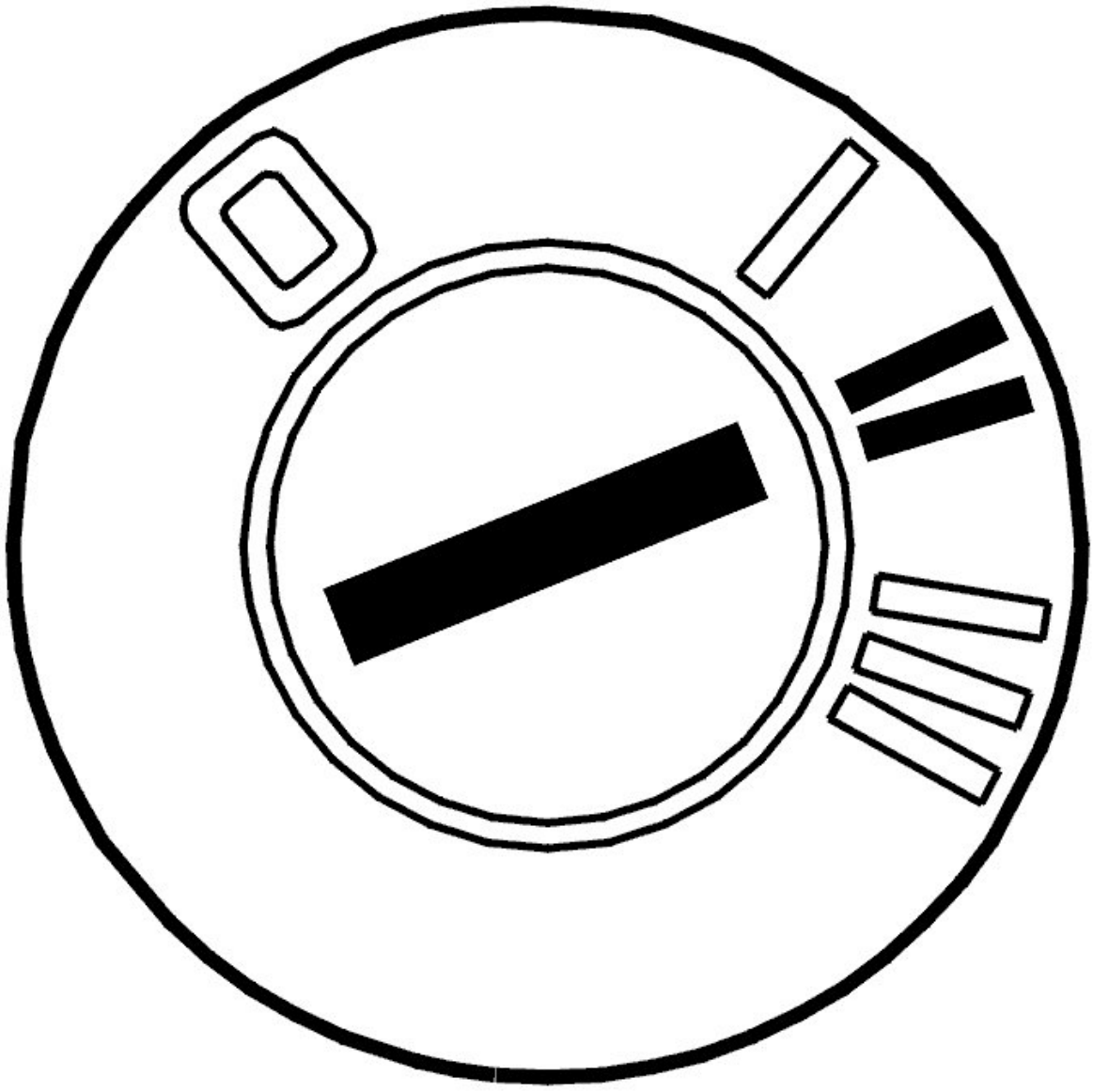
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0231

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is too low.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag
- Open-circuit in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag.

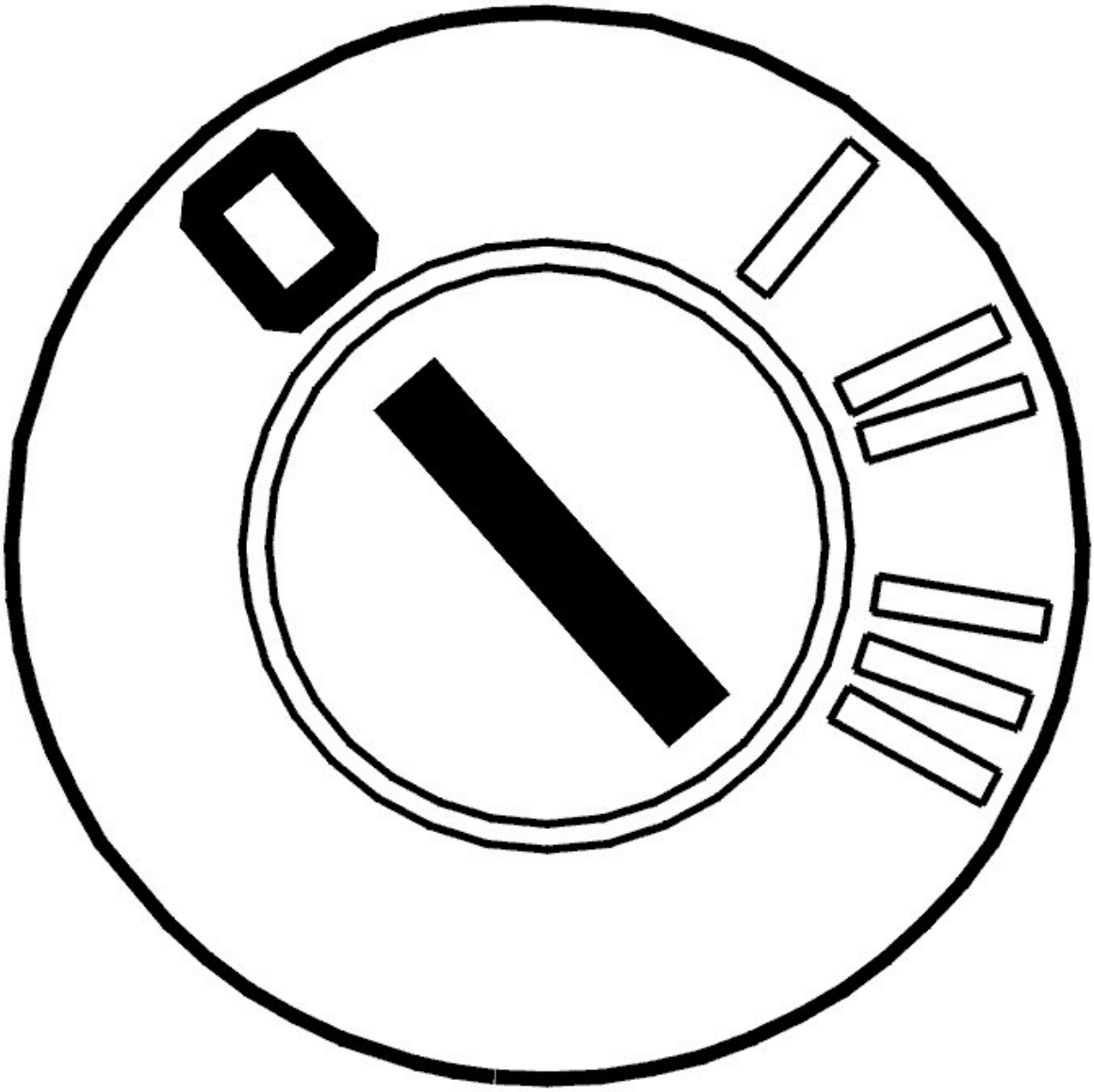
Fault symptom[s]
- The SRS indicator lamp is lit.

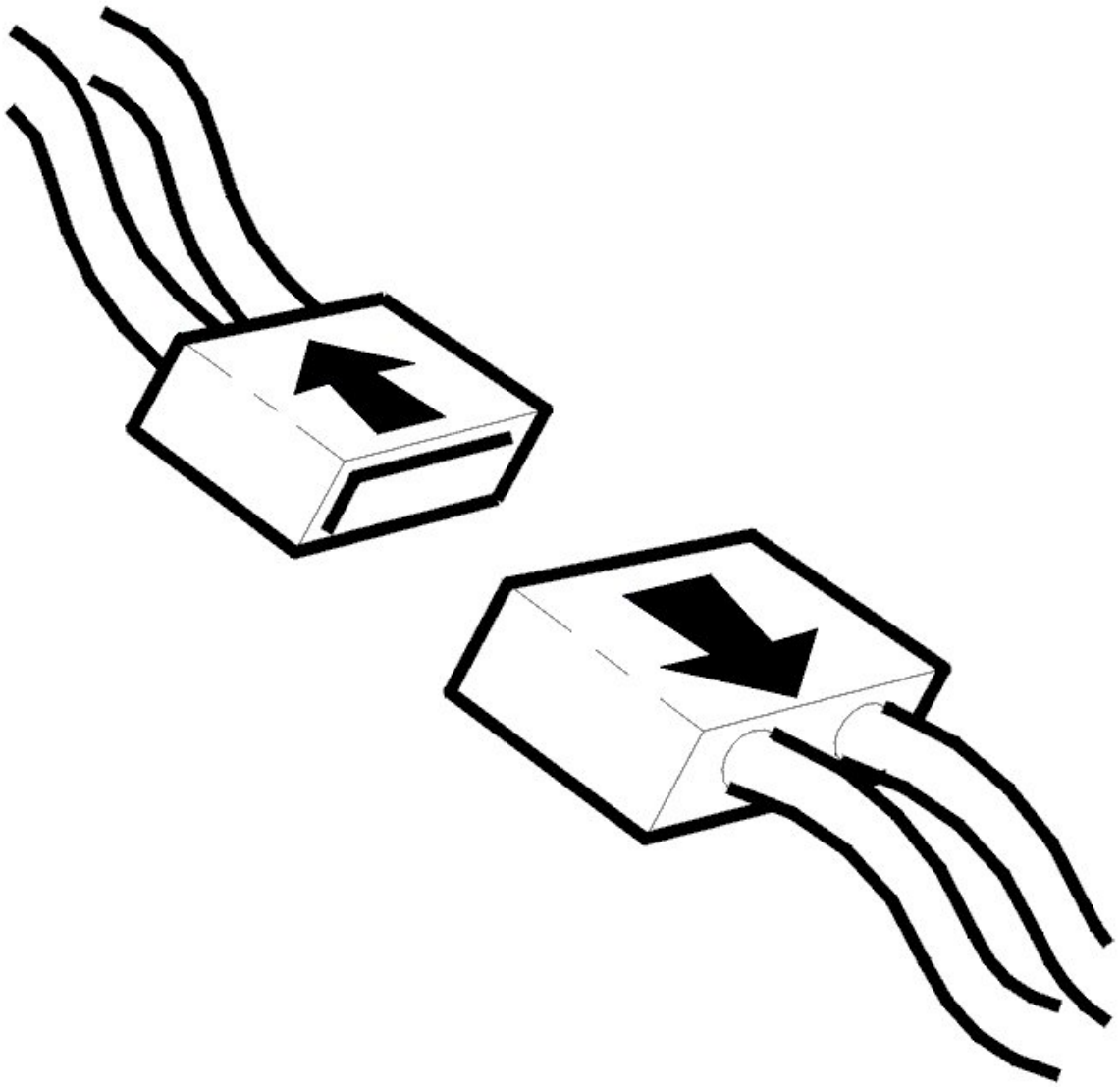
Signal Too Low or Signal Missing

Signal too low or signal missing

Checking components and wiring

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the switch for the passenger airbag
- Disconnect the connector from the supplemental restraint system module (SRS).

Check the connectors for the switch and the supplemental restraint system module (SRS). Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the cable between the supplemental restraint system module (SRS) and the switch connector. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between:

- Supplemental restraint system module (SRS) terminal #45 and switch connector terminal #4
- Supplemental restraint system module (SRS) terminal #50 and switch connector terminal #5.

Remedy as necessary.
Check the power supply cables between the ignition switch and the switch. Check for an open-circuit. Check for a short-circuit to ground.
Check the cable between:

- Ignition switch connector terminal #6 (X-supply) and terminal #1 on the switch connector
- Ignition switch connector terminal #1 (15-supply) and terminal #2 on the switch connector.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the switch for the passenger airbag and the connectors, see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

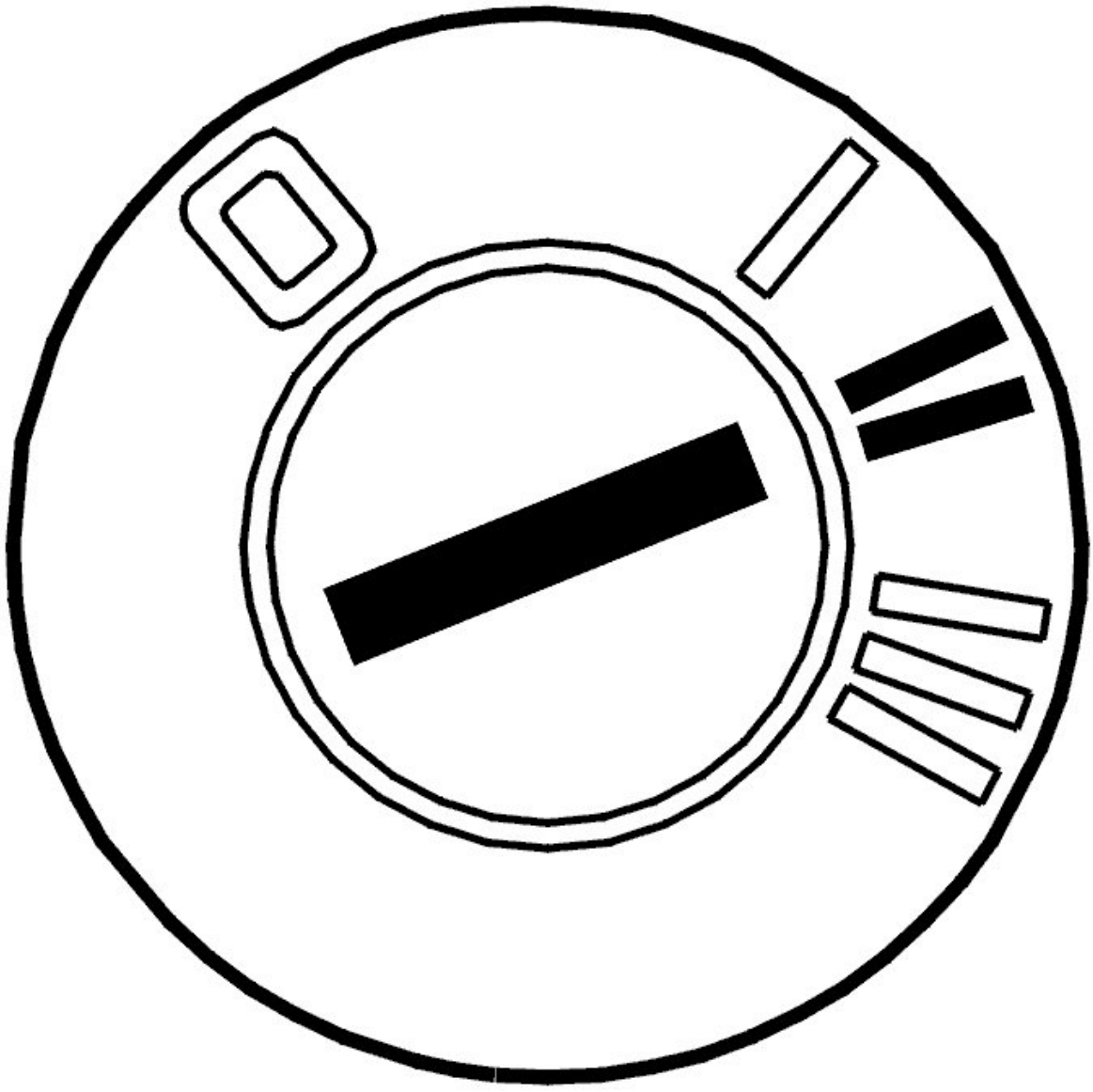
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0232

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is outside the measurement range.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

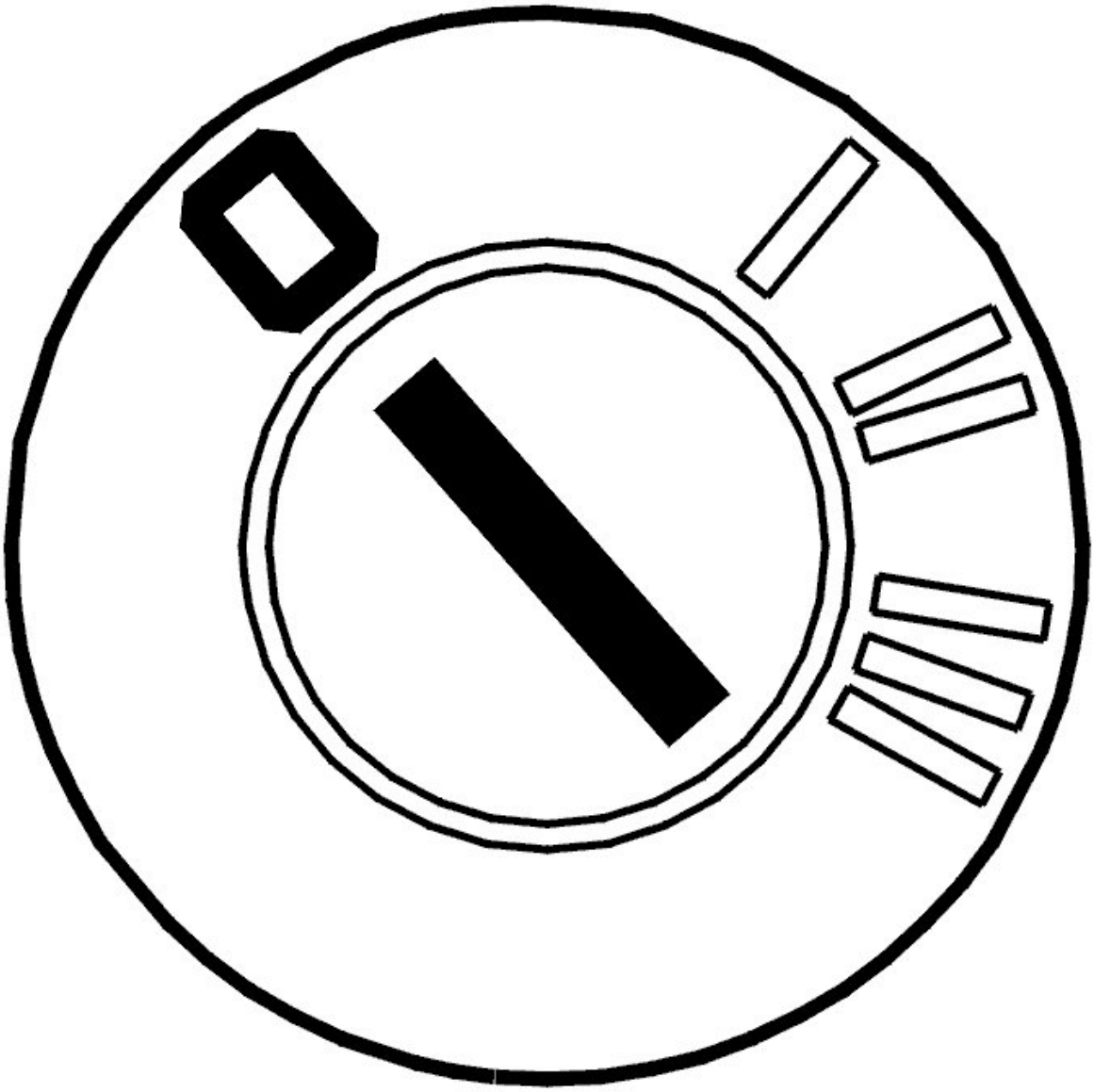
Possible source
- Incorrect voltage level in the signal cable between the supplemental restraint system module (SRS) and the switch for the passenger airbag.

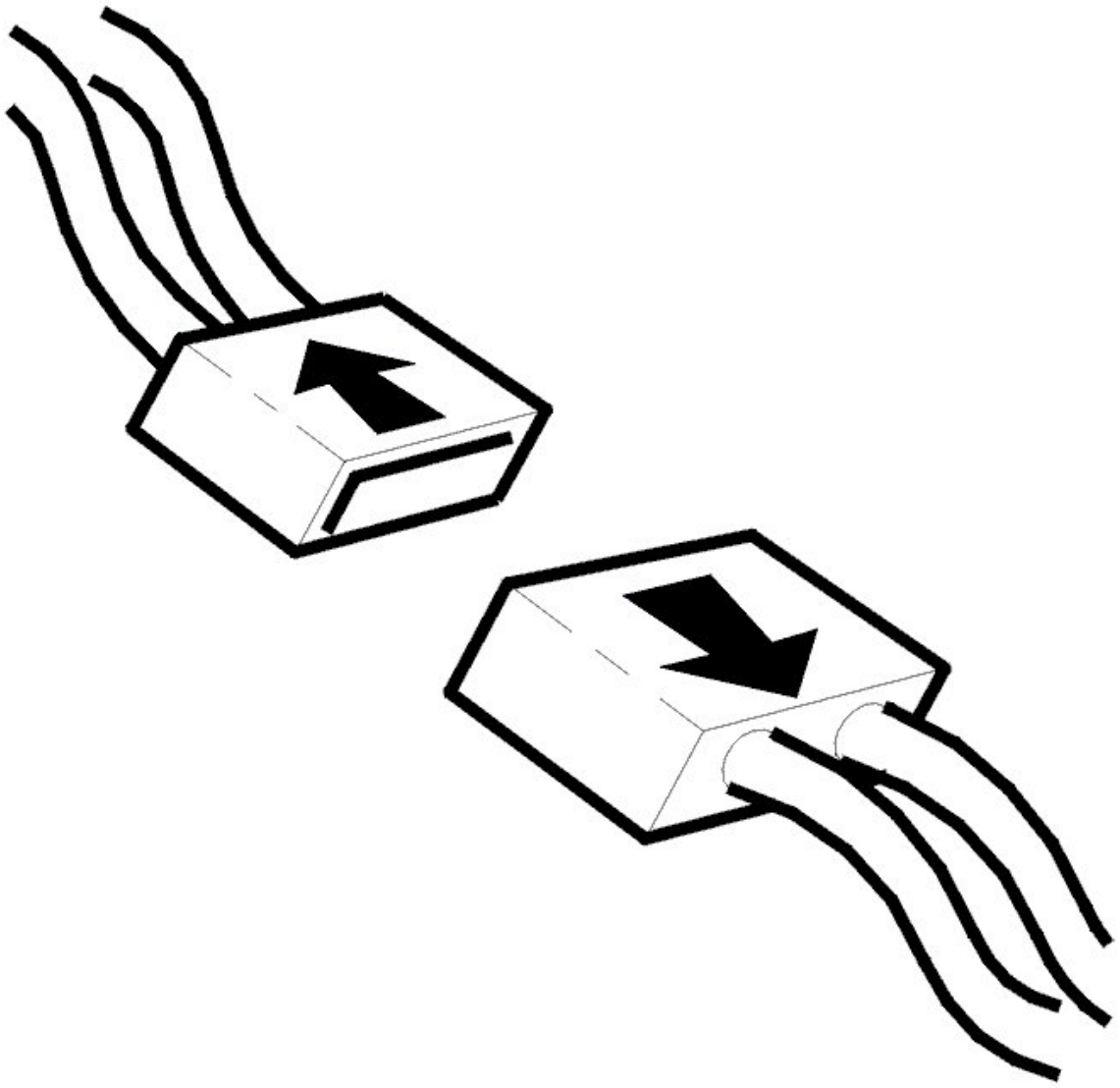
Fault symptom[s]
- The SRS indicator lamp is lit.

Incorrect Measurement Range

Incorrect measurement range

Replacing the component





- Ignition off.

Replace the switch for the passenger airbag.

Other information

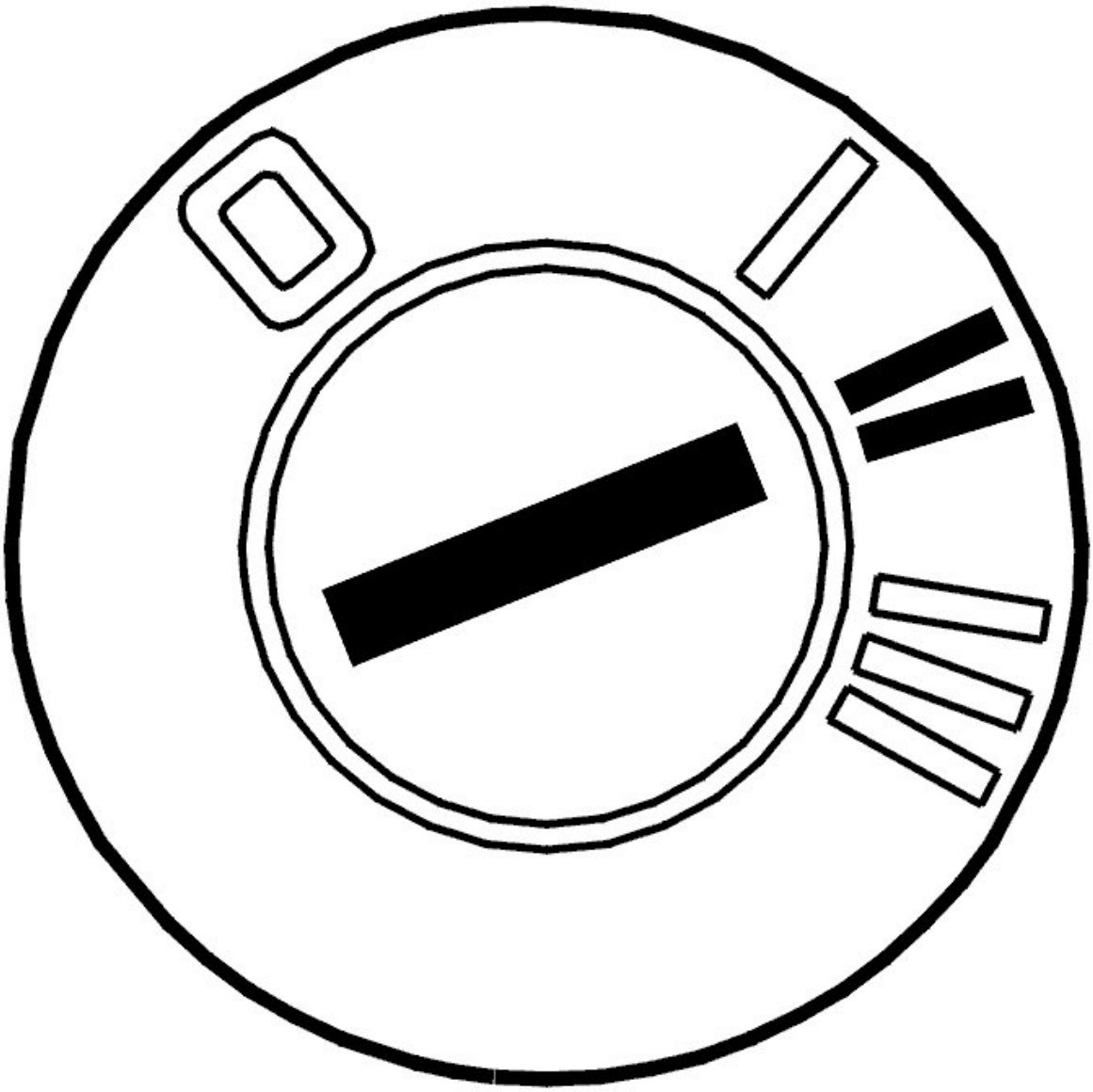
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

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Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0233

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is outside the measurement range.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

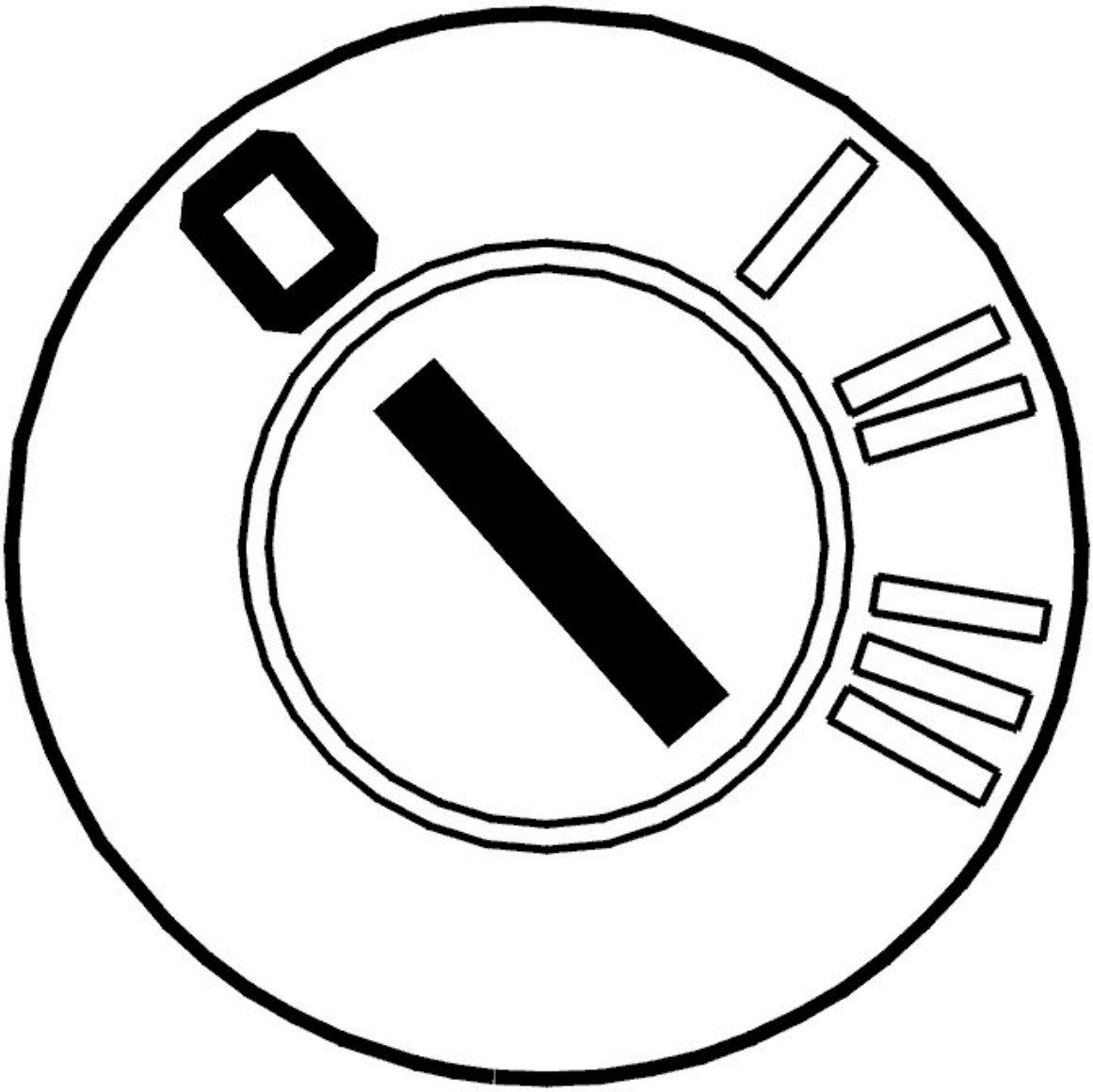
Possible source
- Incorrect voltage level in the signal cable between the supplemental restraint system module (SRS) and the switch for the passenger airbag.

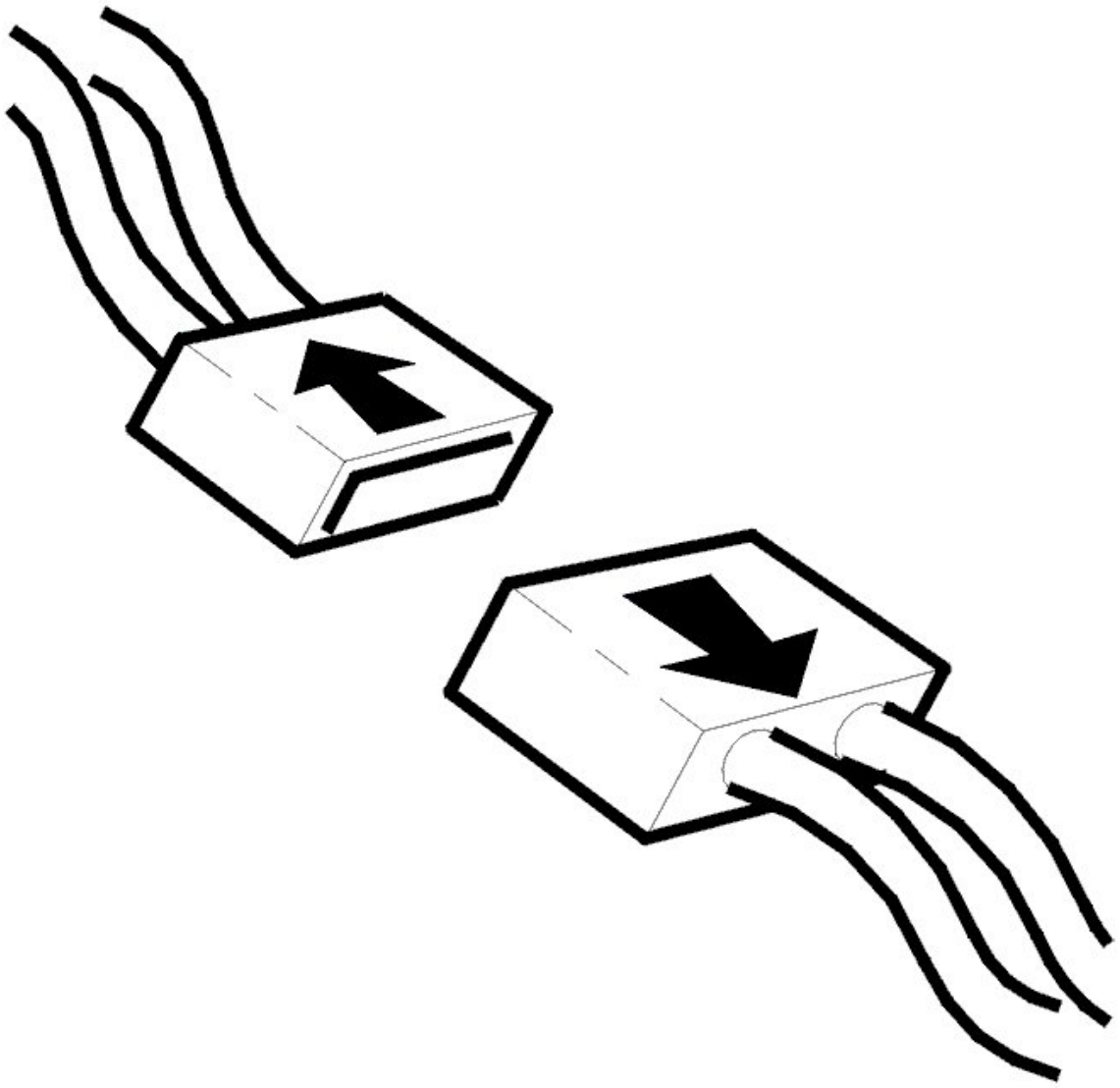
Fault symptom[s]
- The SRS indicator lamp is lit.

Incorrect Measurement Range

Incorrect measurement range

Replacing the component





- Ignition off.

Replace the switch for the passenger airbag.

Other information

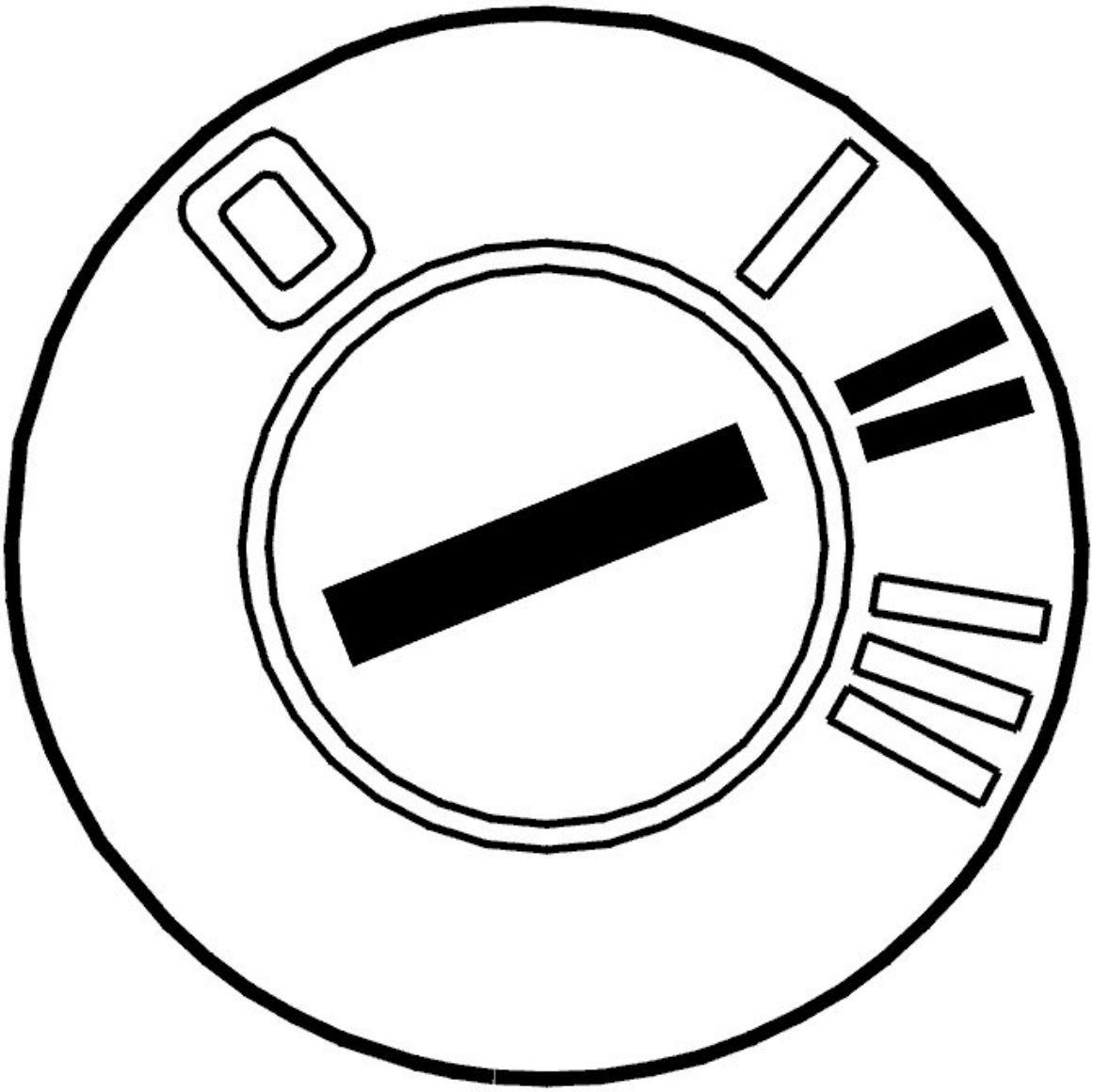
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0234

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is too high.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag
- Short-circuit to supply voltage in the switch for the passenger airbag.

Fault symptom[s]
- The SRS indicator lamp is lit.

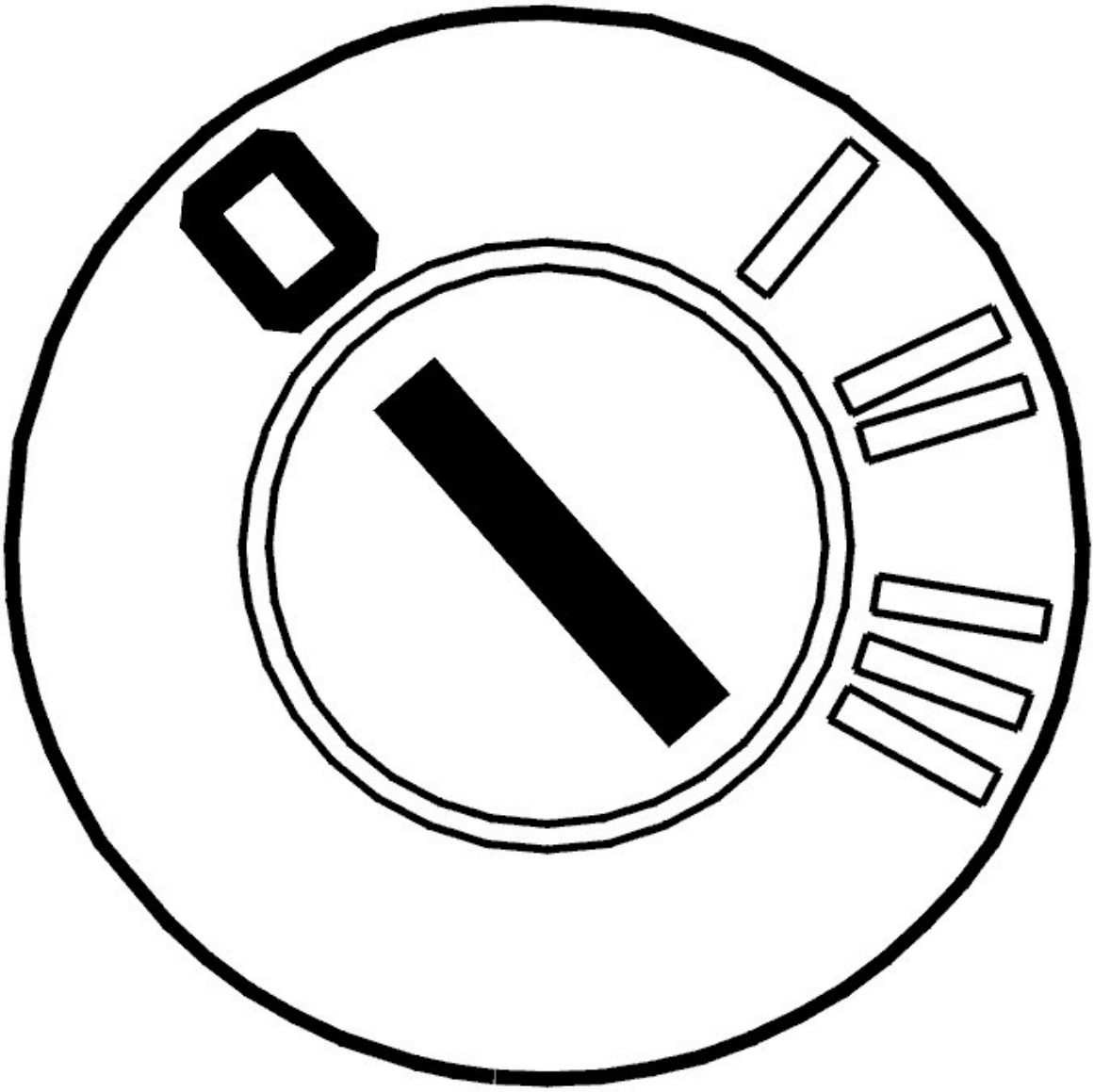
Signal Too High

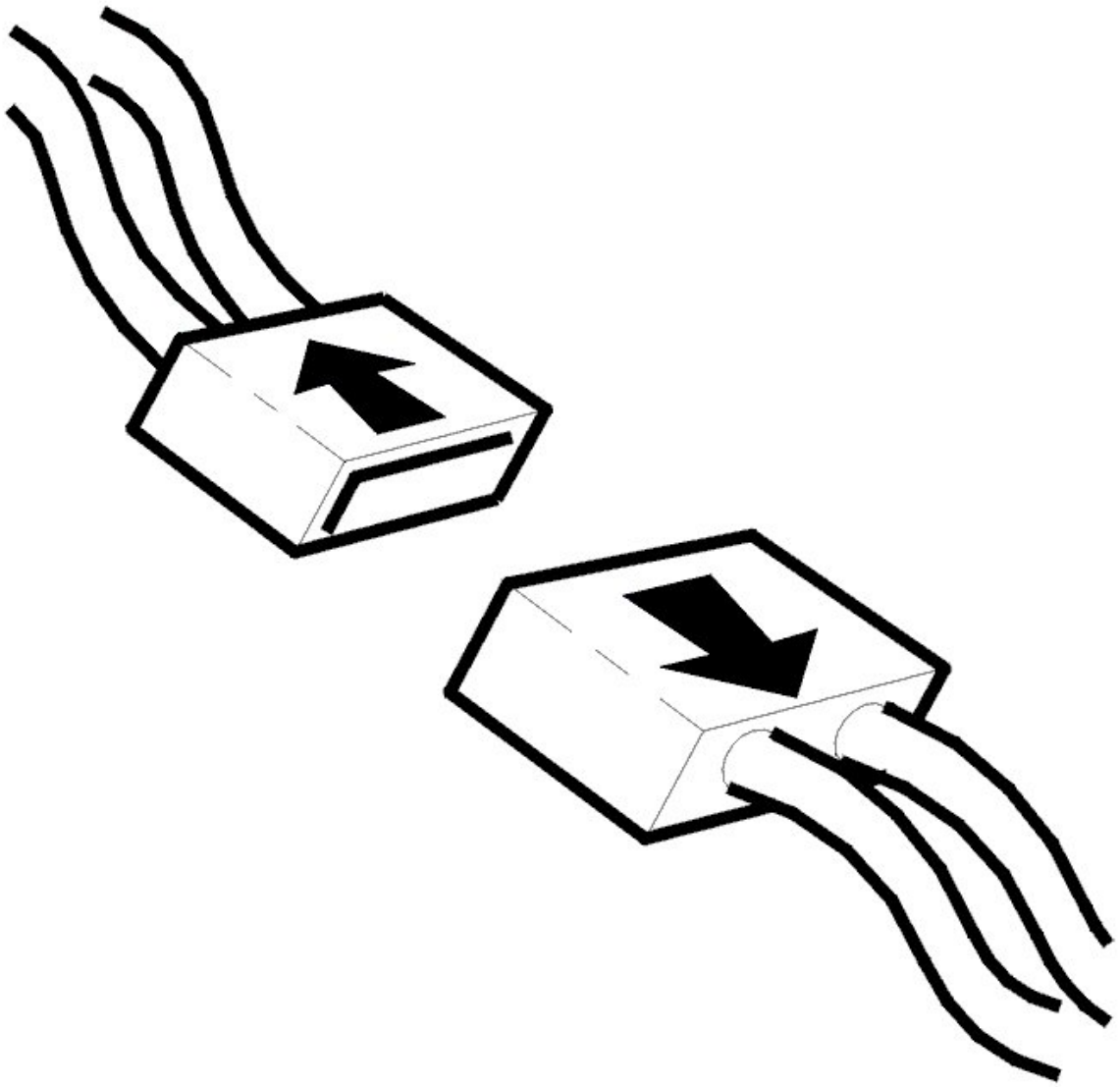
Signal too high

Checking components and wiring

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could

damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the switch for the passenger airbag
- Disconnect the connector from the supplemental restraint system module (SRS).

Check the connectors for the switch and the supplemental restraint system module (SRS). Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the cable between the supplemental restraint system module (SRS) and the switch connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Supplemental restraint system module (SRS) terminal #45 and switch connector terminal #4
- Supplemental restraint system module (SRS) terminal #50 and switch connector terminal #5.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the switch for the passenger airbag and the connectors, see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

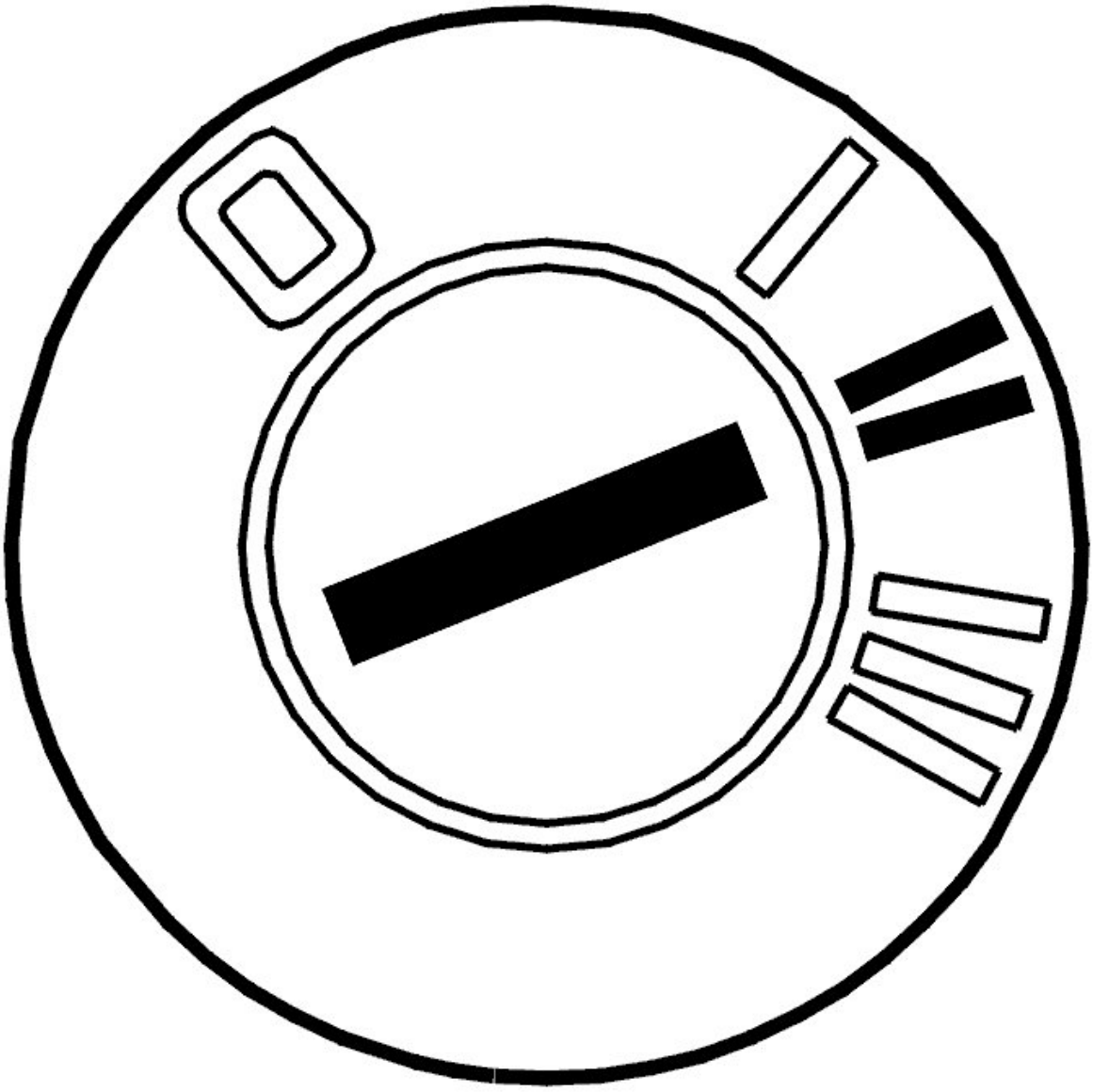
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0235

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the voltage in the signal cable is too low.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- Short-circuit to ground in the signal cable or in the connectors between the supplemental restraint system module (SRS) and the switch for the passenger airbag
- Short-circuit to ground in the switch for the passenger airbag.

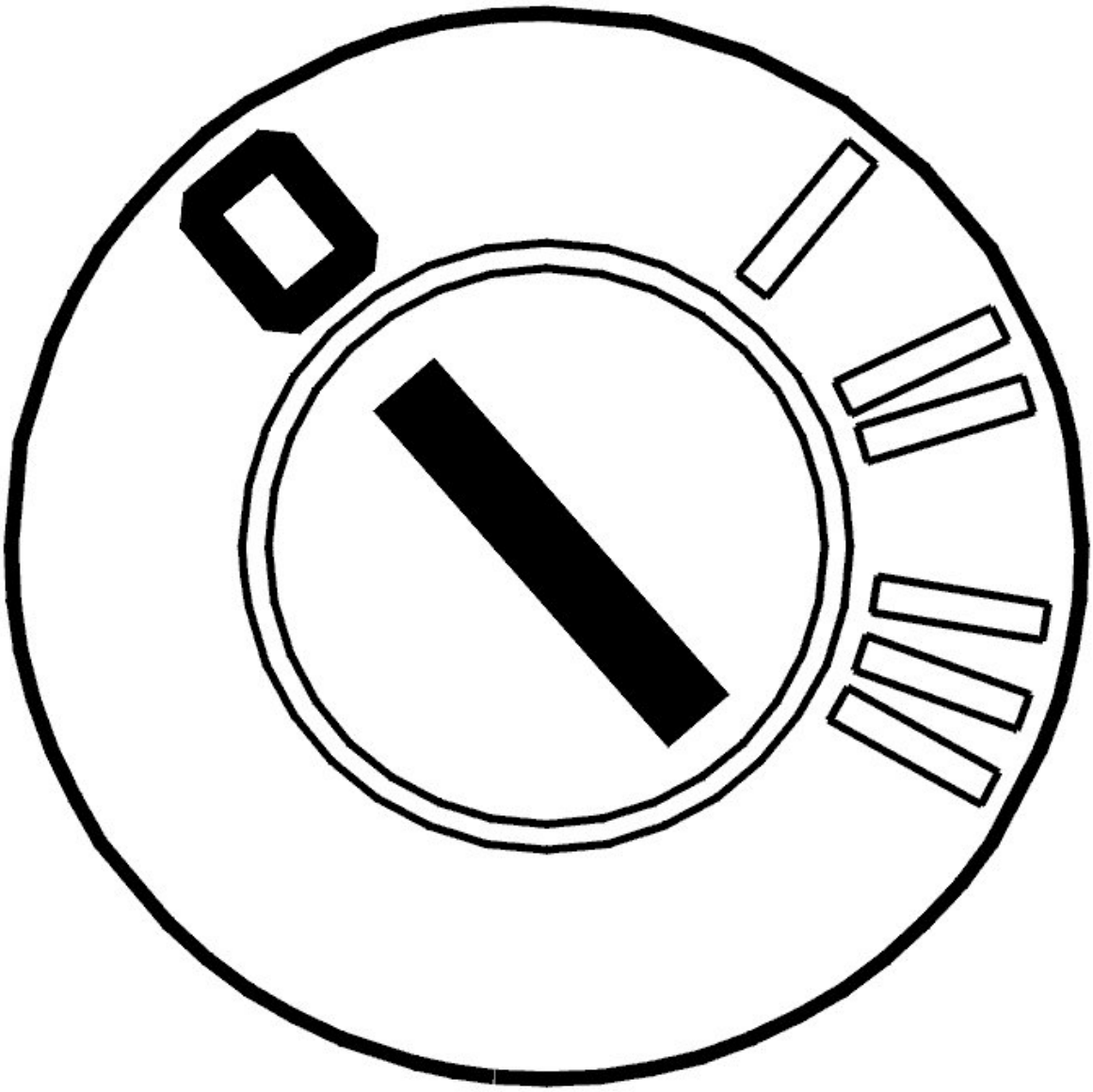
Fault symptom[s]
- The SRS indicator lamp is lit.

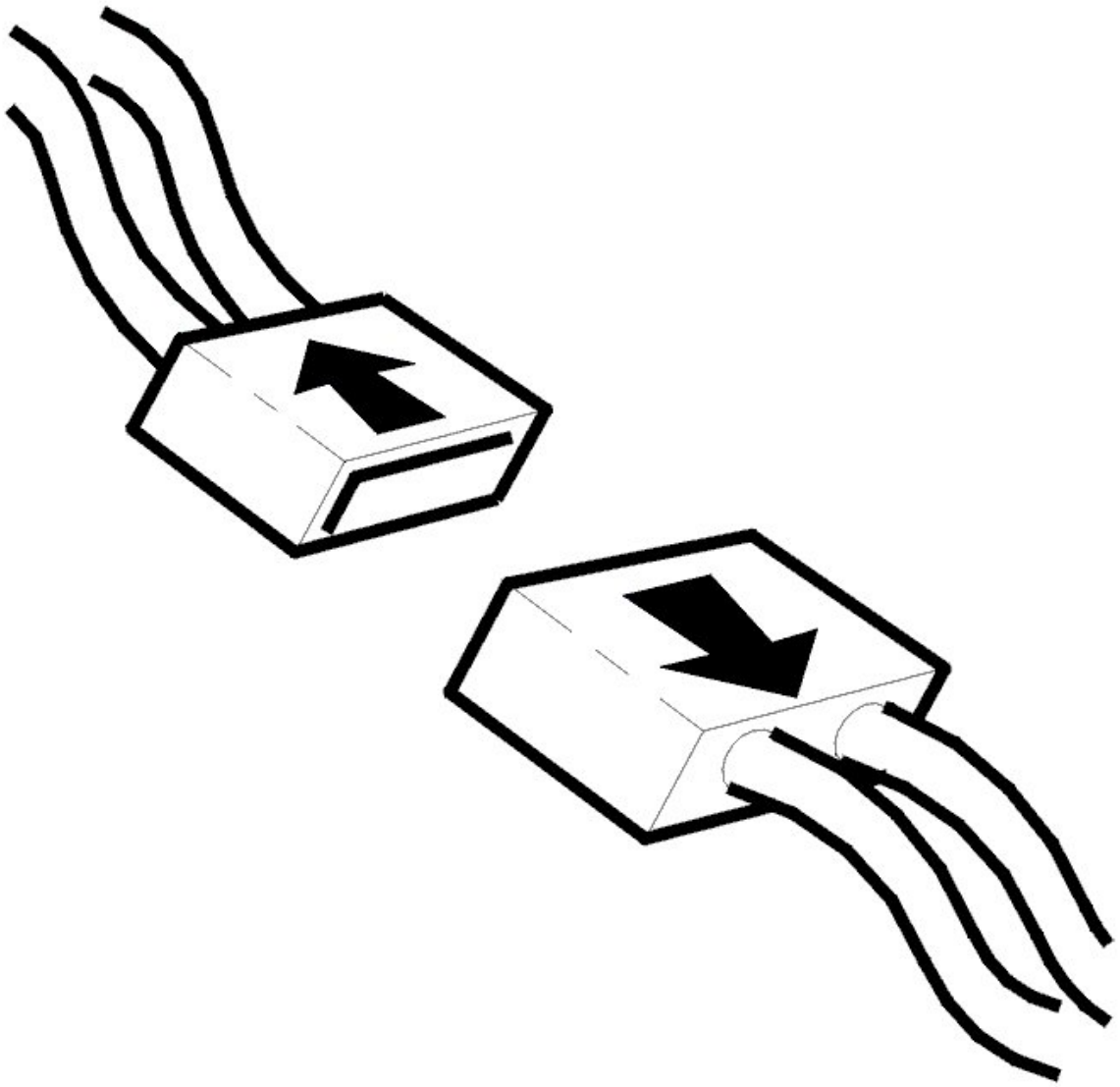
Signal Too High

Signal too high

Checking components and wiring

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Disconnect the connector from the switch for the passenger airbag
- Disconnect the connector from the supplemental restraint system module (SRS).

Check the connectors for the switch and the supplemental restraint system module (SRS). Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the cable between the supplemental restraint system module (SRS) and the switch connector. Check for a short-circuit to supply voltage.
Check the cable between:

- Supplemental restraint system module (SRS) terminal #45 and switch connector terminal #4
- Supplemental restraint system module (SRS) terminal #50 and switch connector terminal #5.

Remedy as necessary.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- To access or replace the switch for the passenger airbag and the connectors, see:
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Select "Continue" when the fault has been remedied.

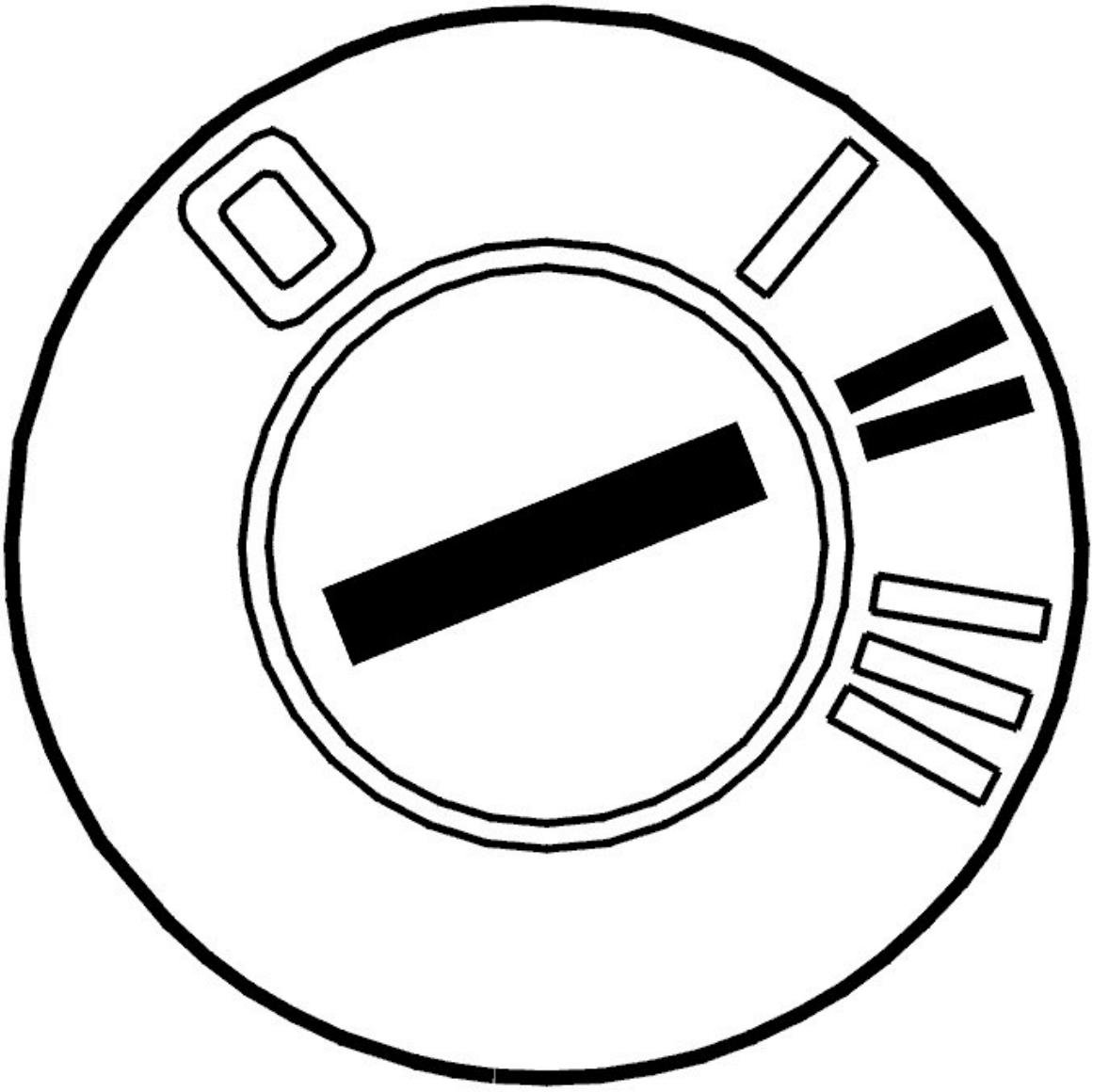
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0236

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers that the switch has an internal fault which causes incorrect operation.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

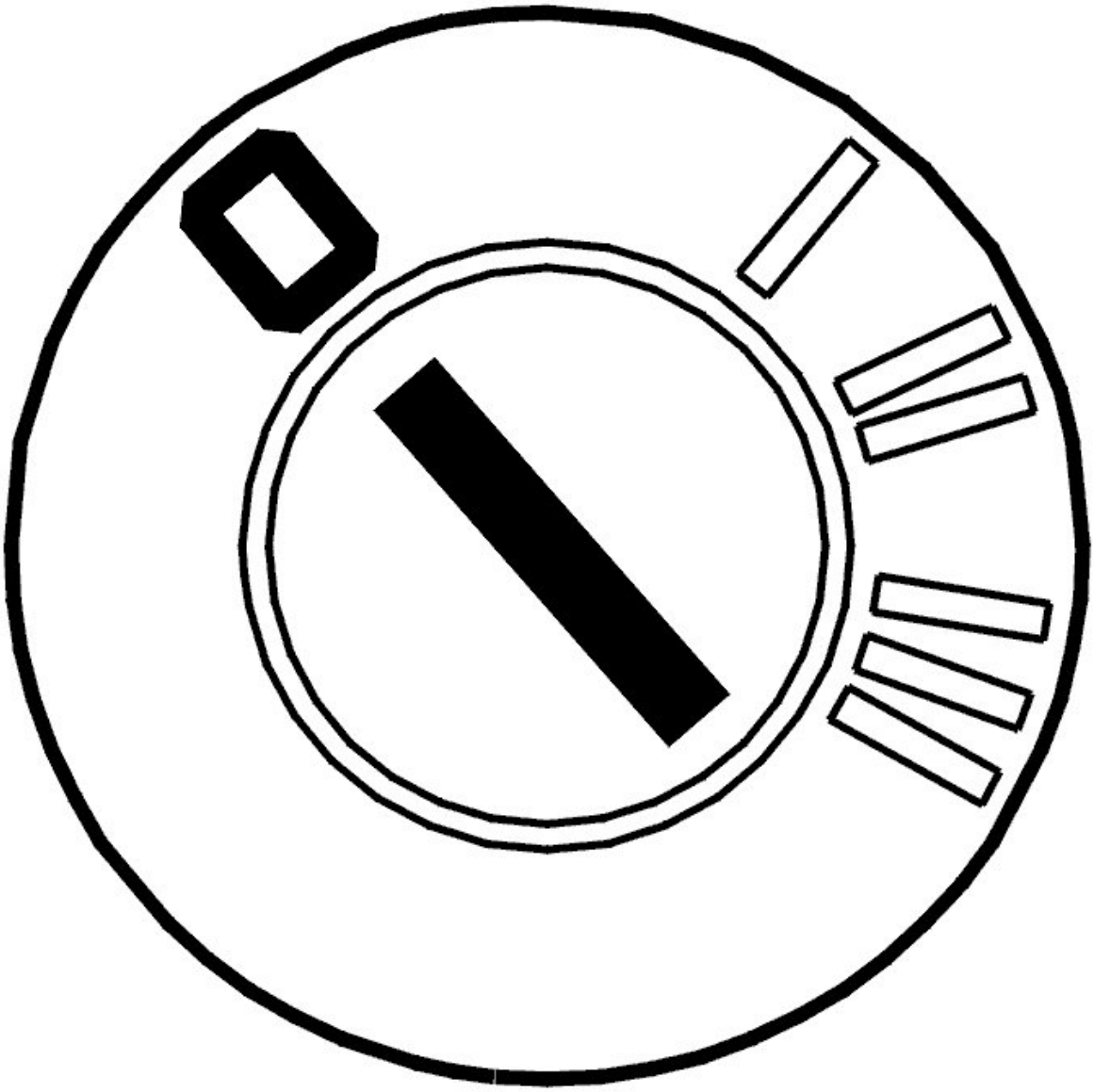
Possible source
- Fault in the switch for the passenger airbag.

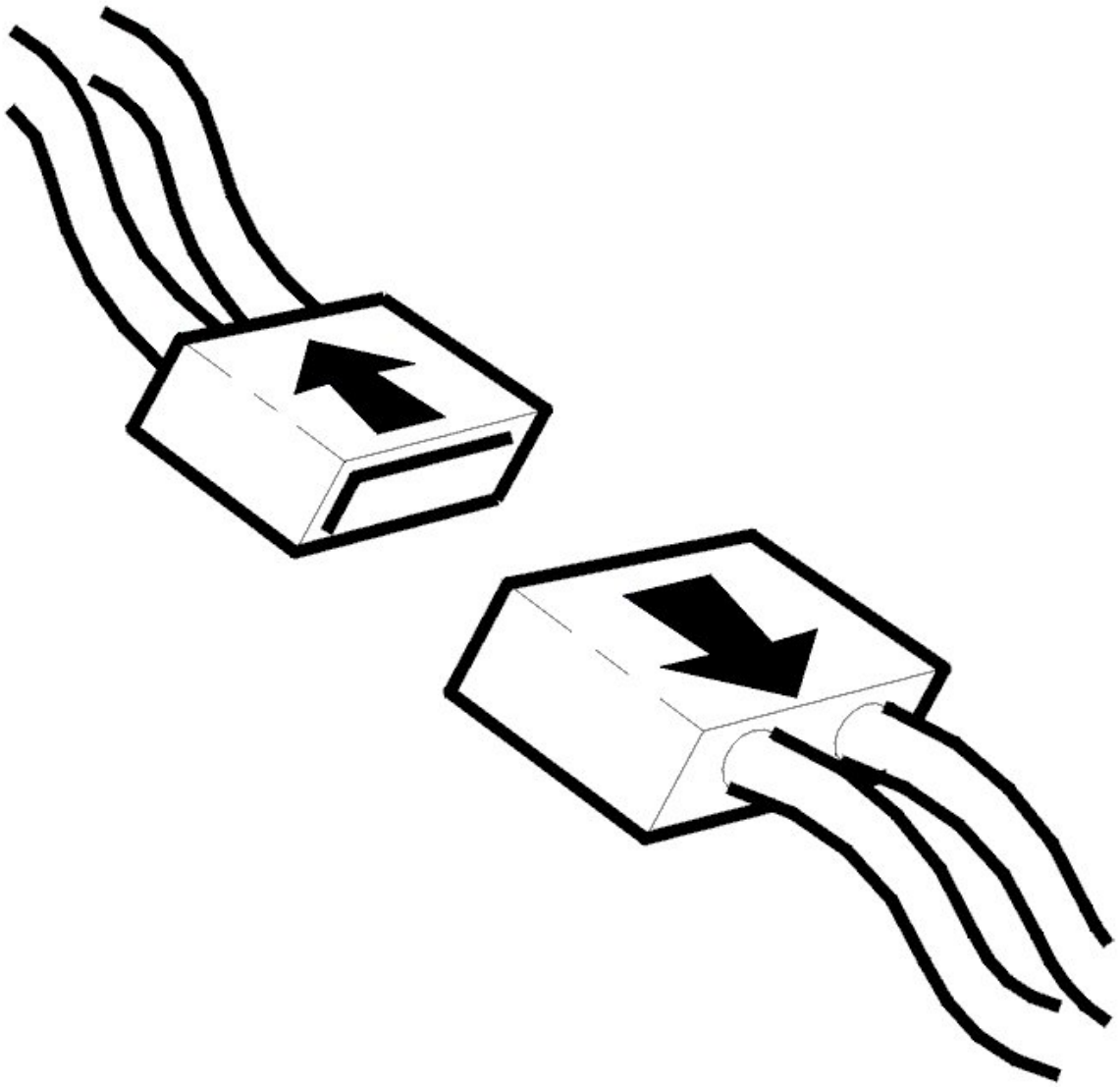
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Faulty function

Faulty function

Checking the component





- Switch off the ignition. Wait 10 seconds
- Set the switch to the**ON**position
- Switch on the ignition. Wait 10 seconds.

Check the current running through sensors A and B in the switch.
When the switch is in the**ON**position, the current level in sensor A must be in the range of 1.6-6.4 mA and the current level in sensor B must be in the range of 12.8-20.1 mA.
Click on the VCT2000 symbol to read off the current level.
Replace the switch if any of the current levels are outside the listed ranges.

- Switch off the ignition. Wait 10 seconds
- Set the switch to the**OFF**position
- Switch on the ignition. Wait 10 seconds.

Check the current running through sensors A and B in the switch.
When the switch is in the**OFF**position, the current level in sensor A must be in the range of 12.8-20.1 mA and the current level in sensor B must be in the range of 1.6-6.4 mA.
Click on the VCT2000 symbol to read off the current level.
Replace the switch if any of the current levels are outside the listed ranges.
Select**Continue**to erase the diagnostic trouble code (DTC) if not fault is found.

Other information

- .

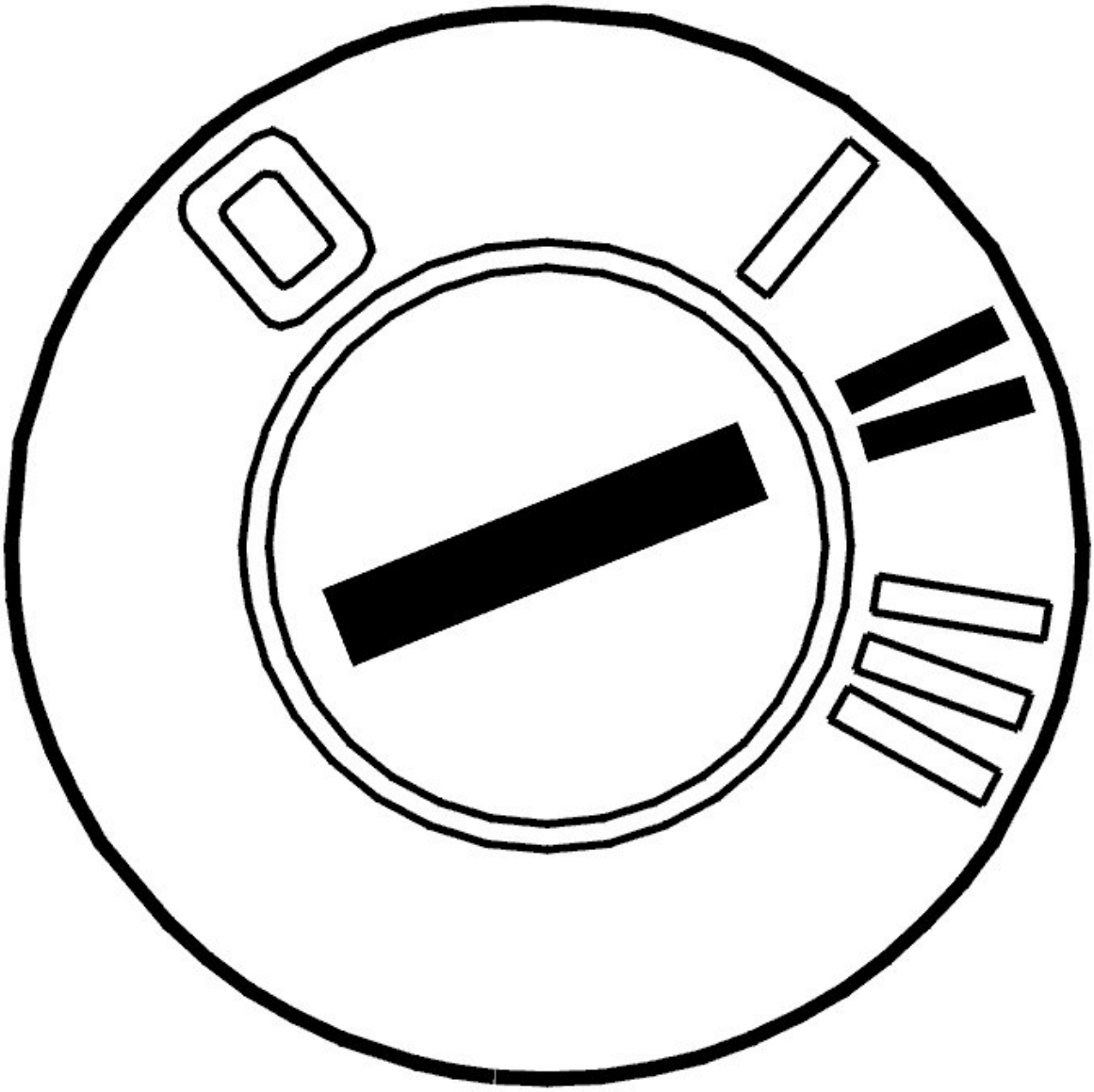
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0237

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

Possible source
- Incorrect switch installed
- Faulty software in the supplemental restraint system module (SRS).

Fault symptom[s]

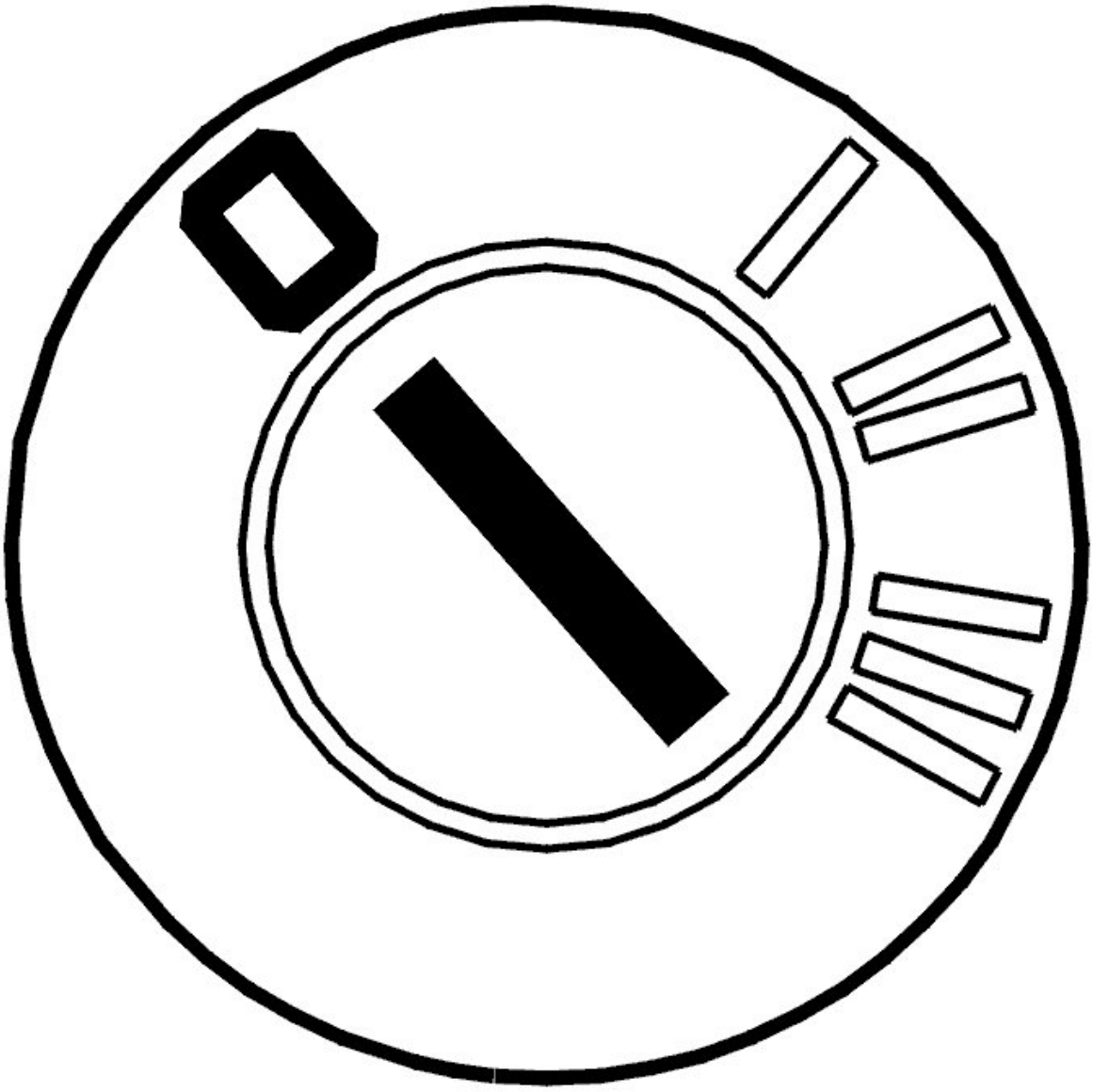
- SRS indicator lamp lit
- PAD lamp lit.

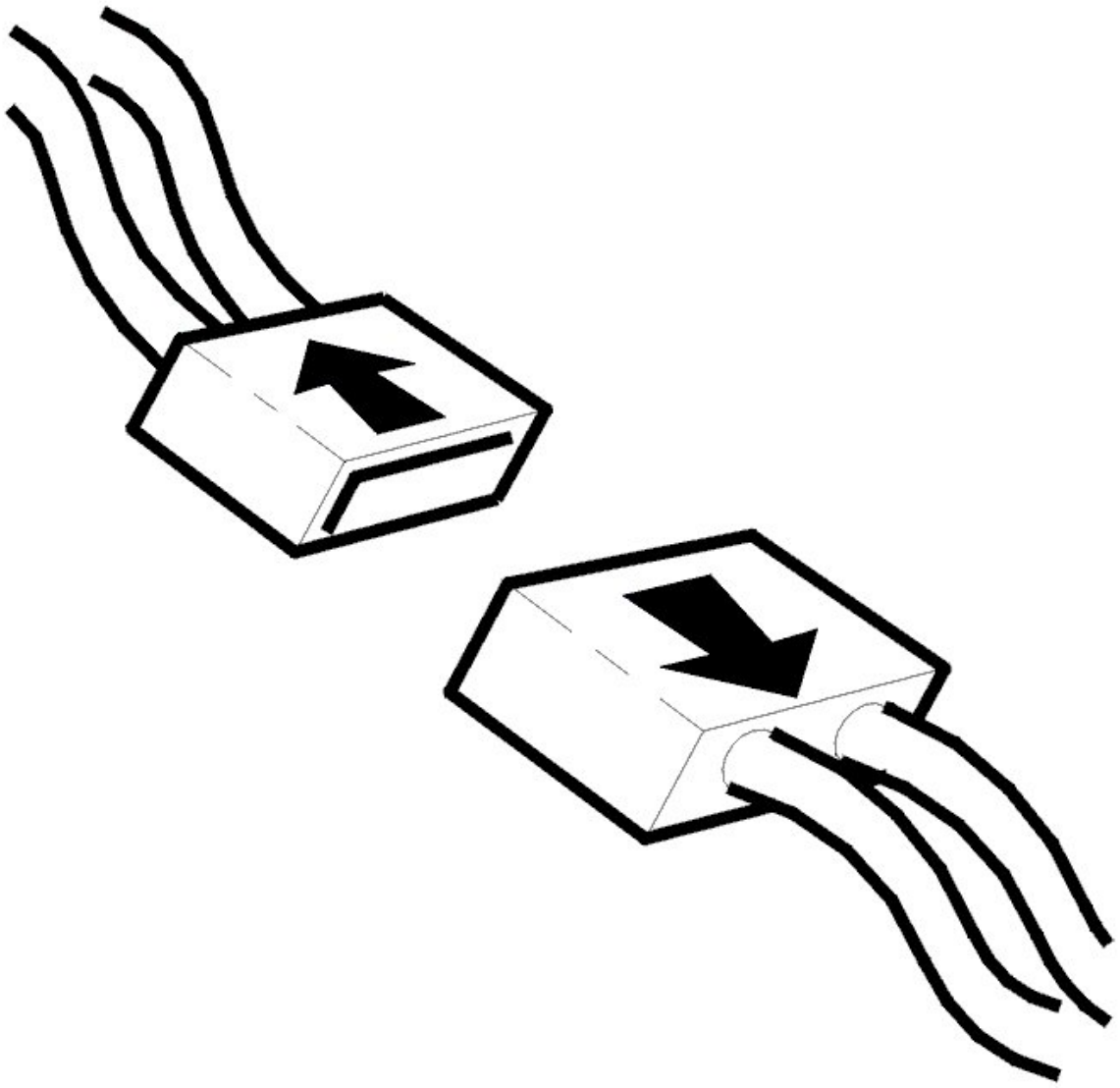
Faulty Signal

Faulty signal

Replacing the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Replace the switch for the passenger airbag.

Check the status of the diagnostic trouble code (DTC).

- Reinstall the connectors, components etc.
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

Read off the status of the diagnostic trouble code (DTC) by clicking on the VCT2000 symbol.
The fault has been remedied if the diagnostic trouble code (DTC) is intermittent.
If the fault is still permanent, replace the supplemental restraint system module (SRS).
Remedy as necessary.

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

Select "Continue" when the fault has been remedied.

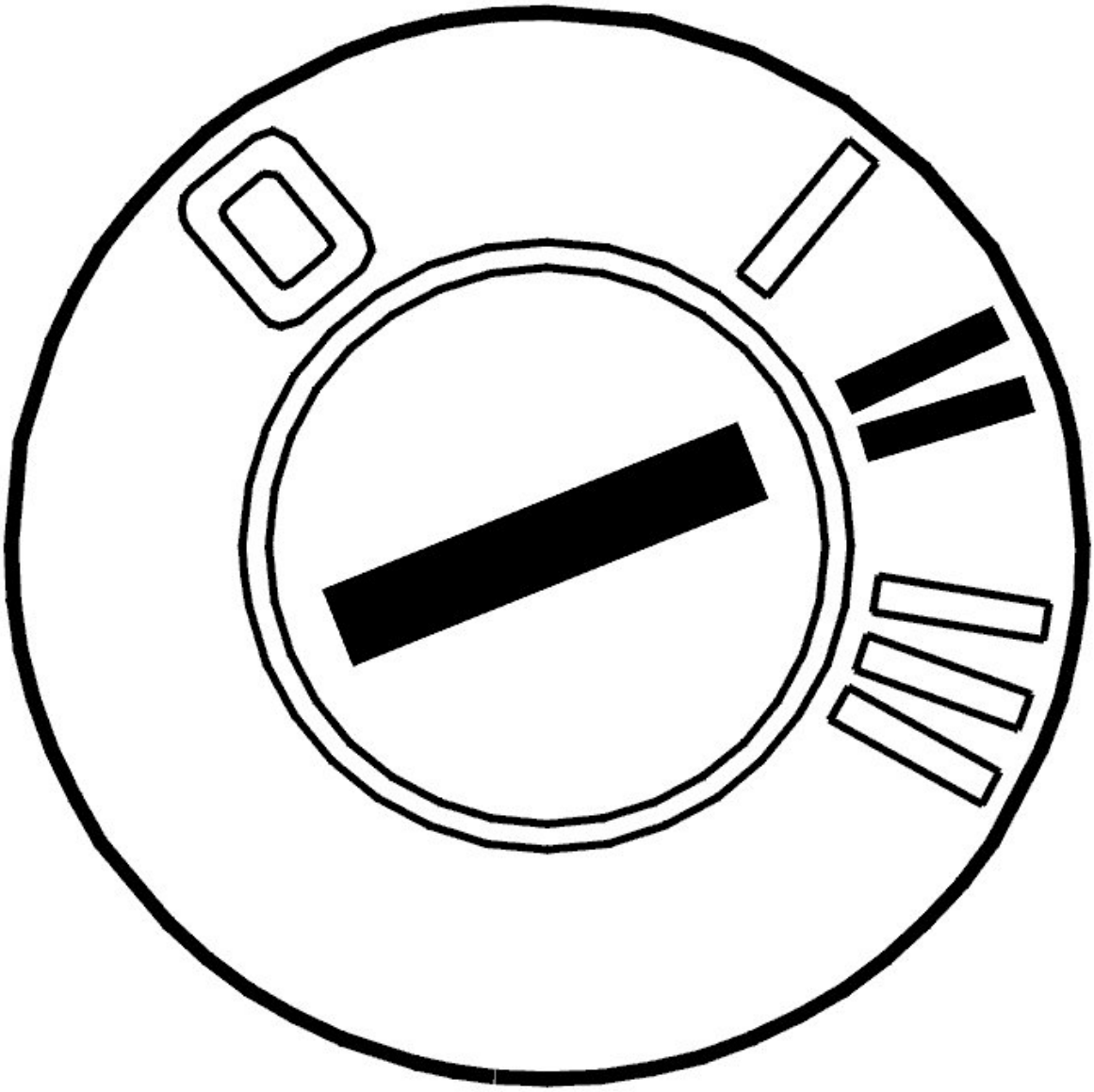
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

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VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0238

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers a faulty status signal.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

Possible source
- Fault in the switch for the passenger airbag
- Internal fault in the supplemental restraint system module (SRS).

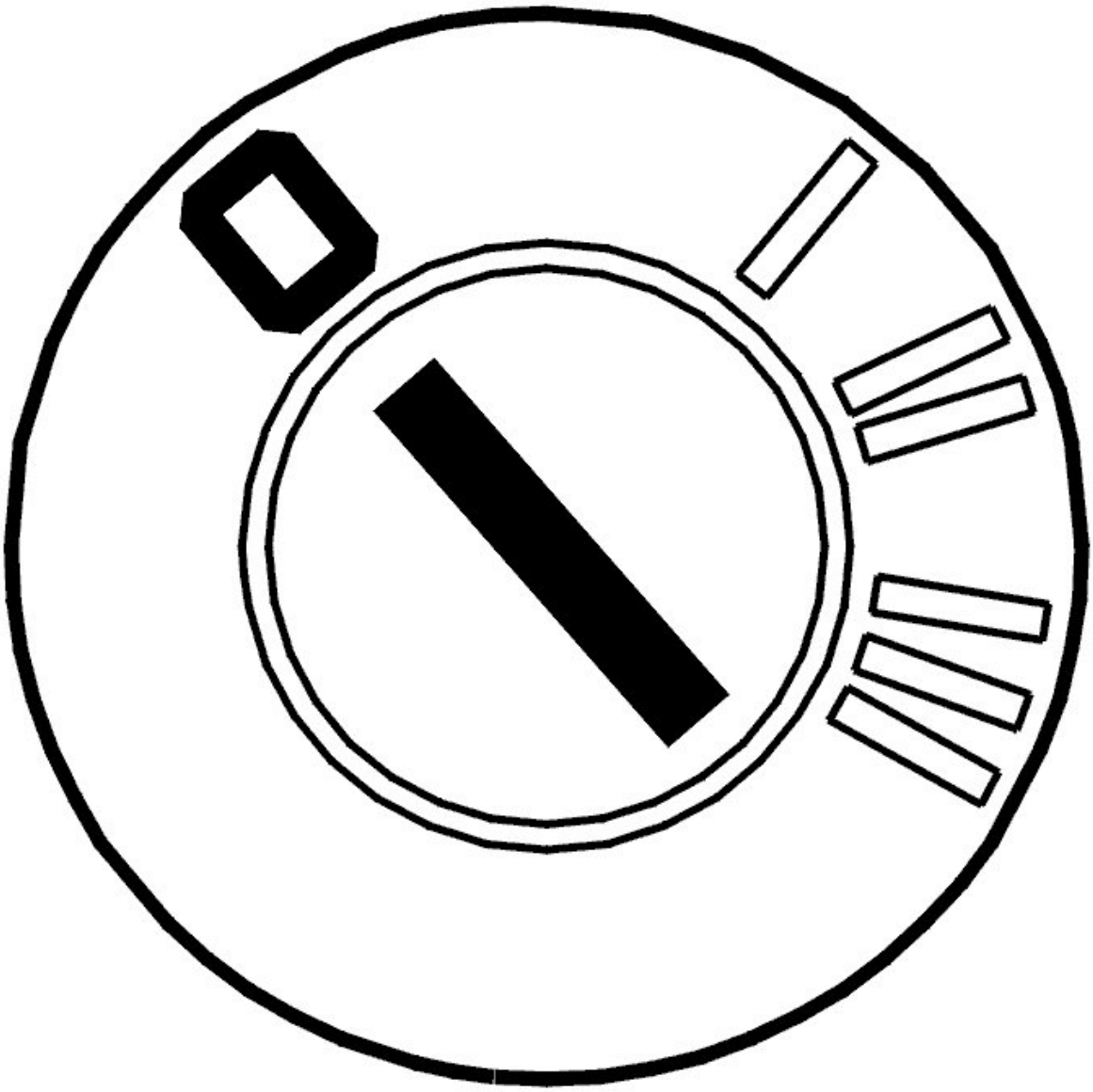
Fault symptom[s]
- The SRS indicator lamp is lit
- PAD lamp lit.

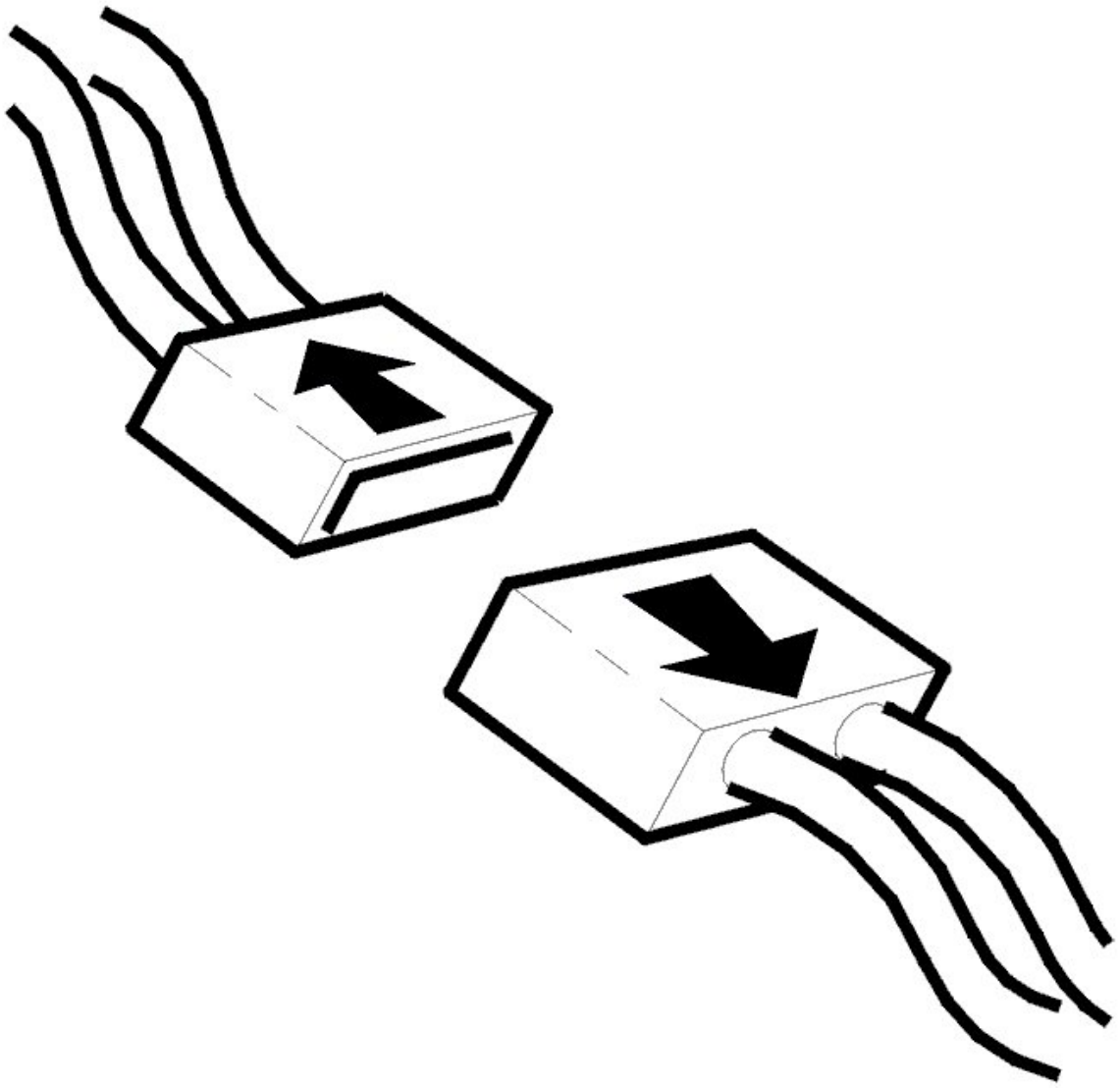
Faulty Signal

Faulty signal

Replacing the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds
- Replace the switch for the passenger airbag.

Check the status of the diagnostic trouble code (DTC).

- Reinstall the connectors, components etc.
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

Read off the status of the diagnostic trouble code (DTC) by clicking on the VCT2000 symbol.
The fault has been remedied if the diagnostic trouble code (DTC) is intermittent.
If the fault is still permanent, replace the supplemental restraint system module (SRS).
Remedy as necessary.

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

Select "Continue" when the fault has been remedied.

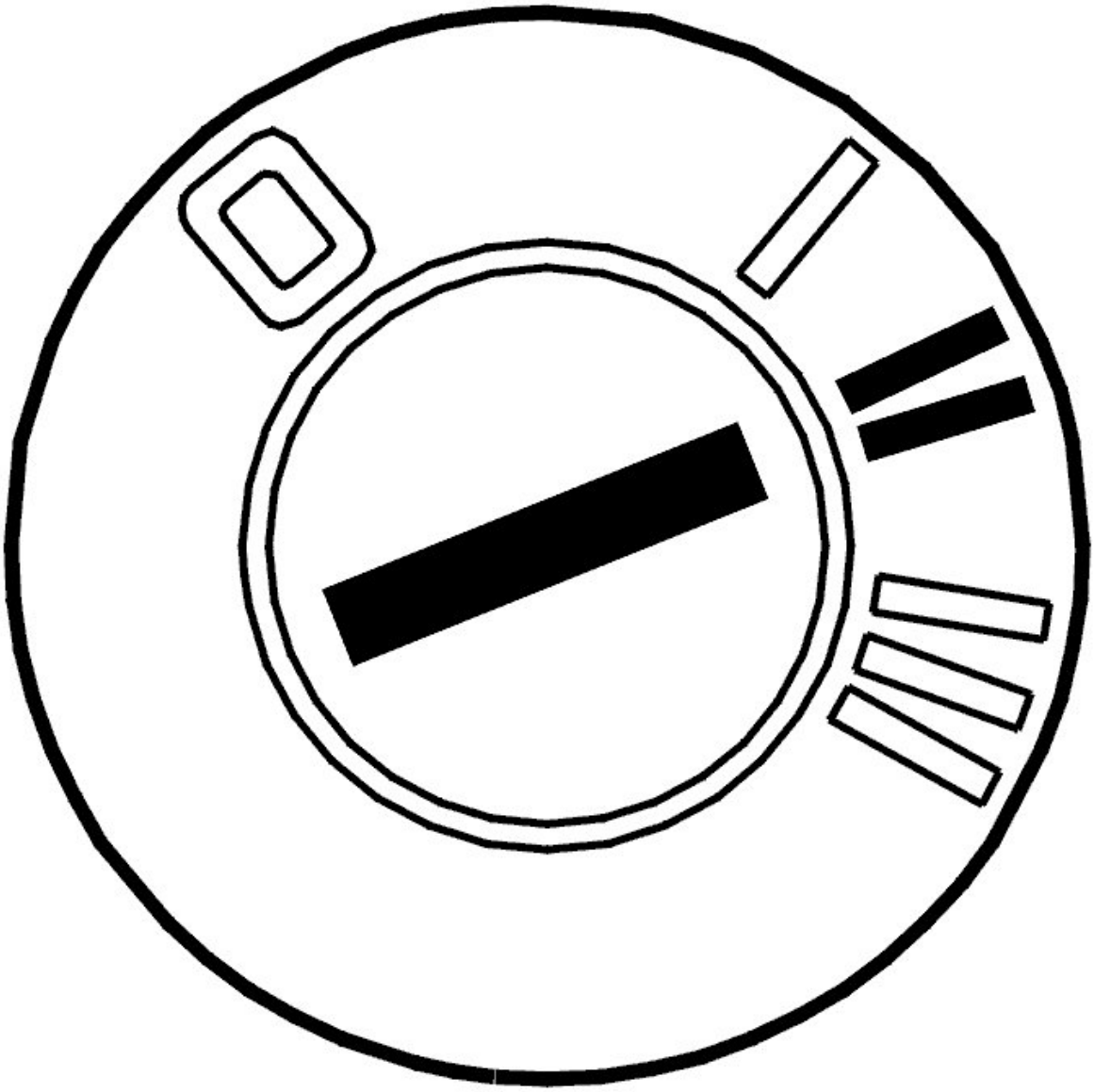
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0239

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module receives a signal to deactivate the passenger airbag.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

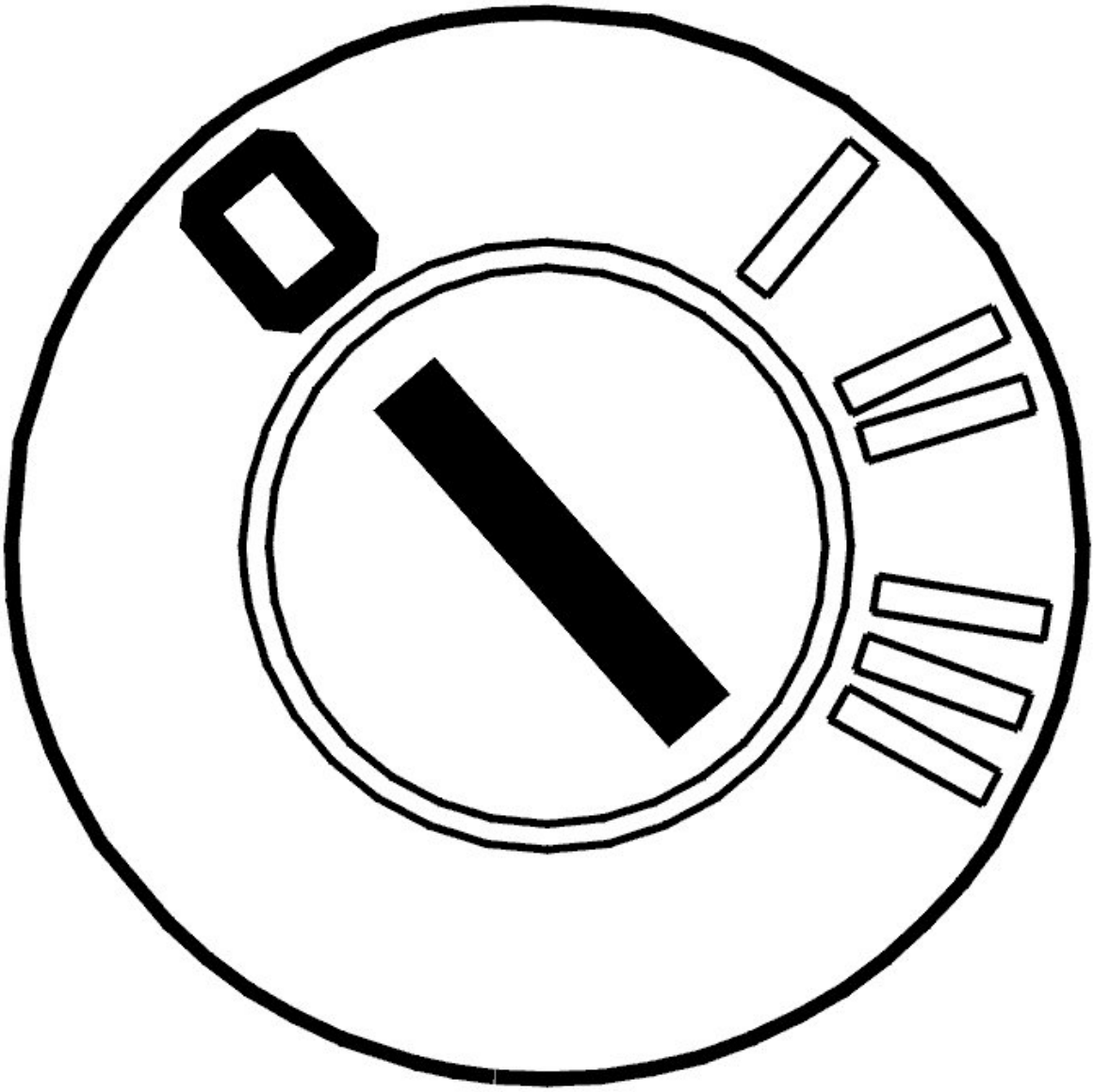
Possible source
- The supplemental restraint system module (SRS) receives a signal from the switch requesting deactivation of the passenger airbag, even though the control module is programmed that there is no switch for the passenger airbag installed.

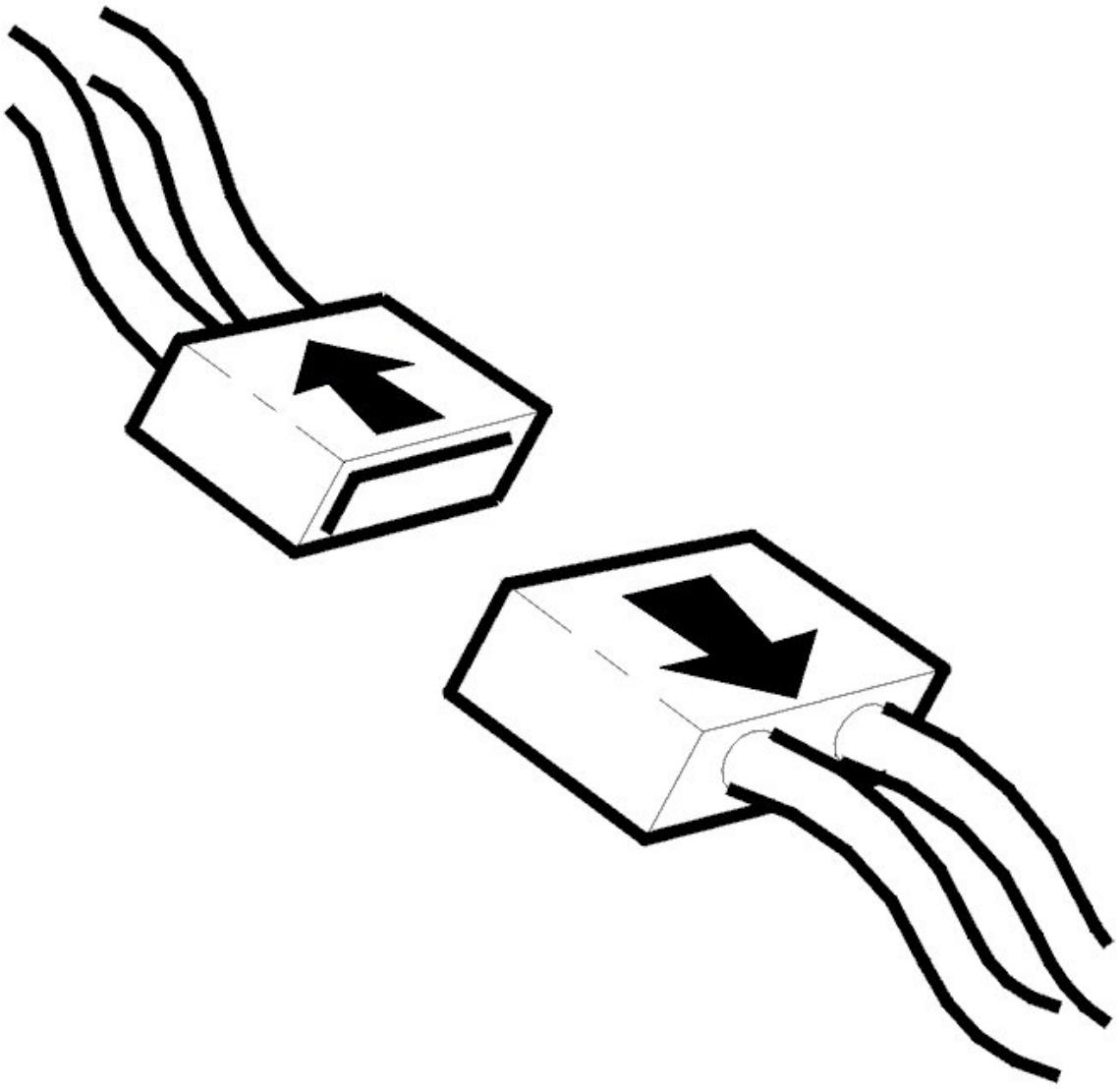
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Configuration Fault

Configuration fault

Remove the component





- Switch off the ignition. Wait 10 seconds.

There must not be any switch installed in the car.
Remove the switch.

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:

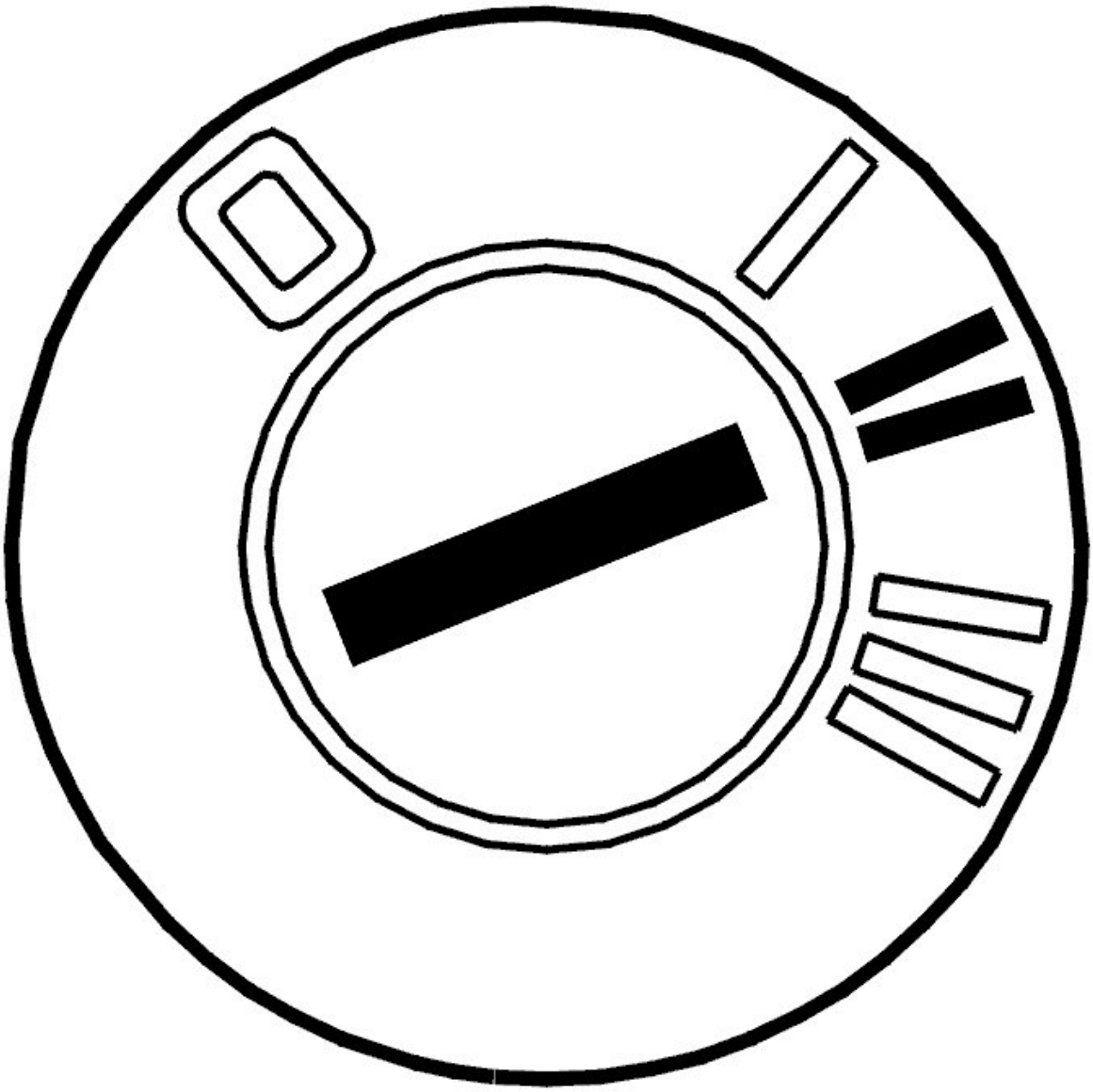
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Remove the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-023A

Condition

The supplemental restraint system module (SRS) checks the signal from the switch for the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault in the signal cable.
The diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched on (12 V). In other words, the diagnostic trouble code (DTC) can only be diagnosed when the ignition is switched from position 0 to positions I, II or III.

Substitute value
- Passenger airbag is deactivated.

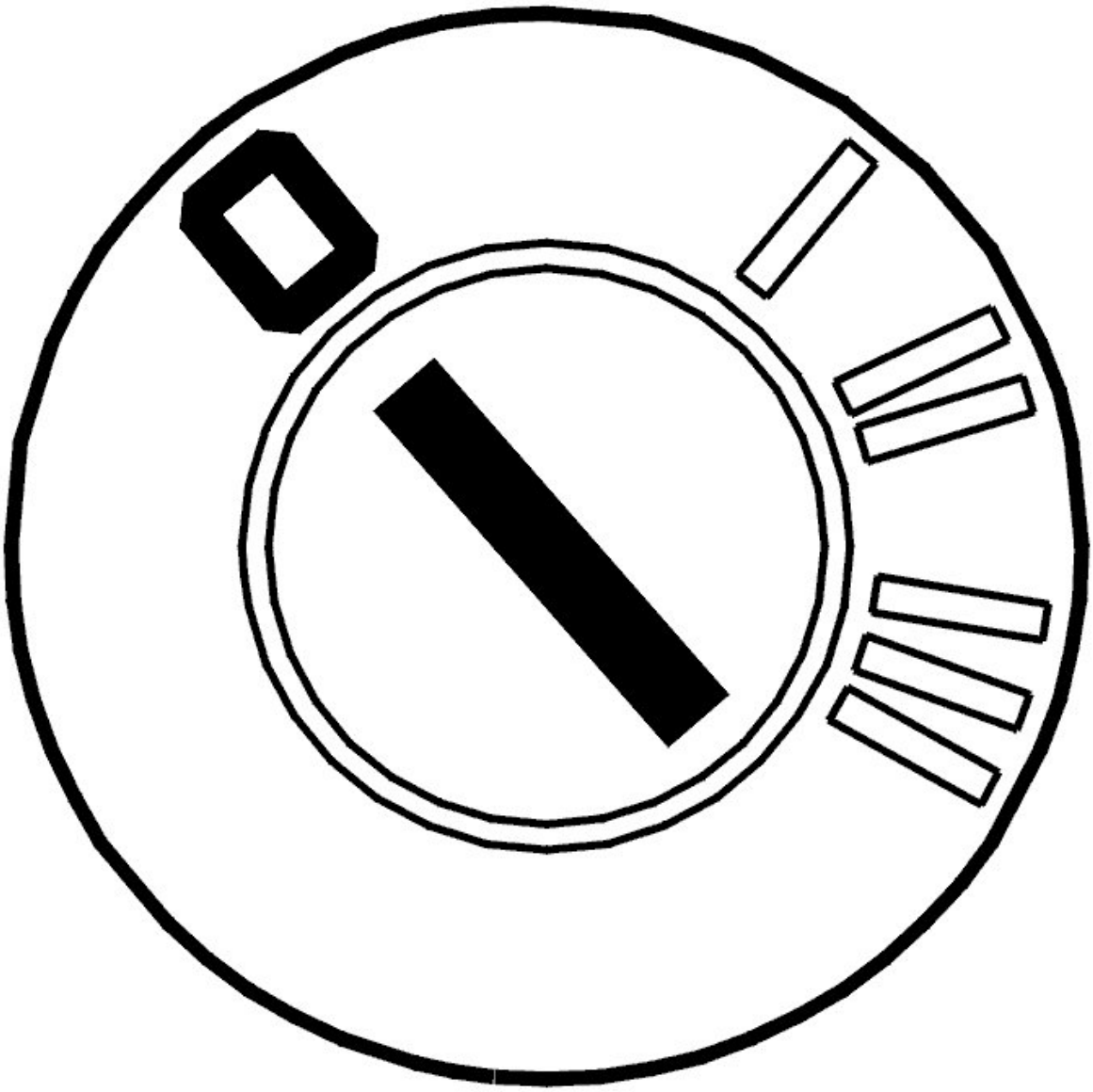
Possible source
- The supplemental restraint system module (SRS) identifies that the switch for the passenger airbag is installed, despite the control module being programmed that it should not be installed.

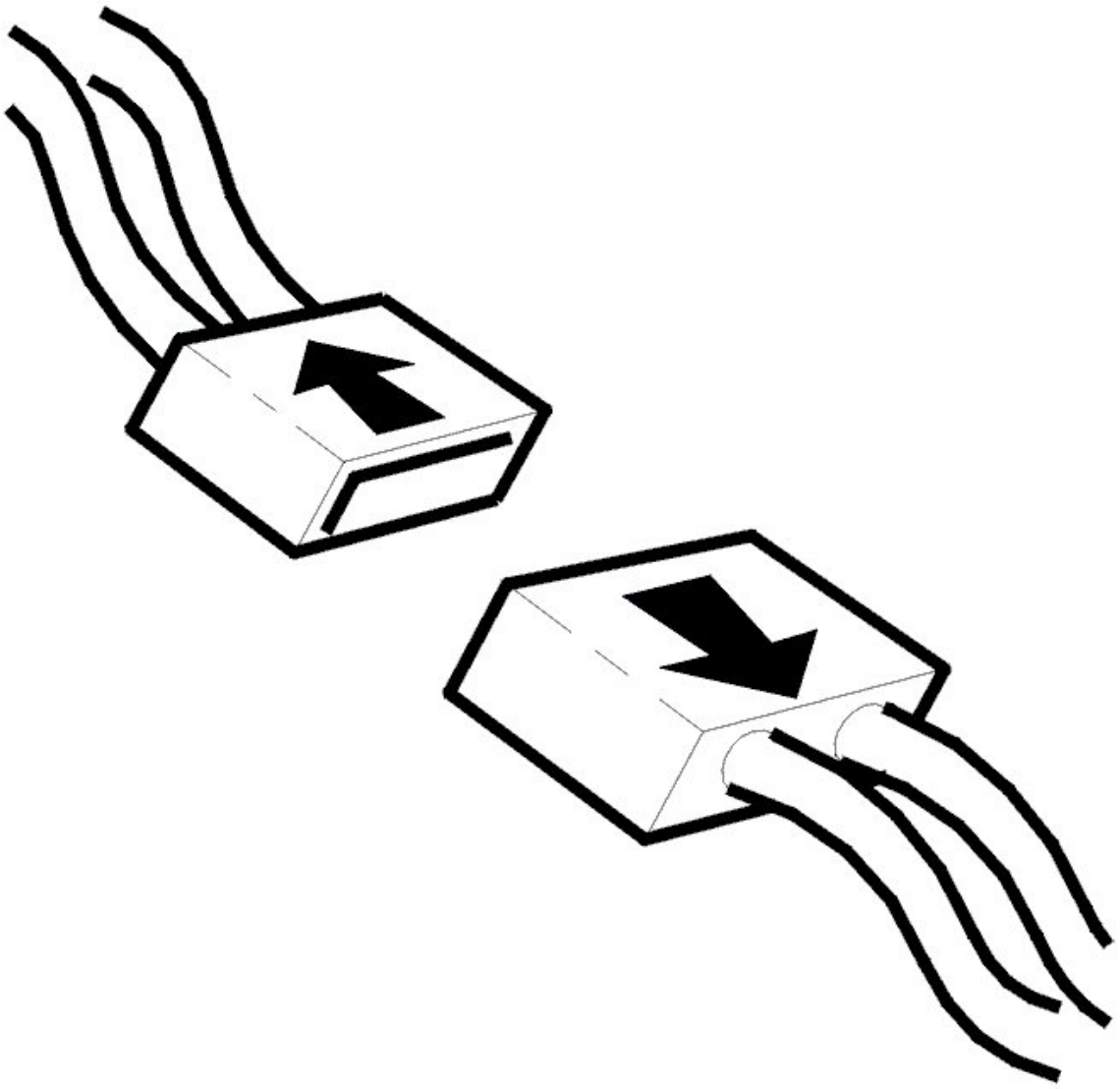
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Configuration Fault

Configuration fault

Remove the component





- Switch off the ignition. Wait 10 seconds.

There must not be any switch installed in the car.
Remove the switch.

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:

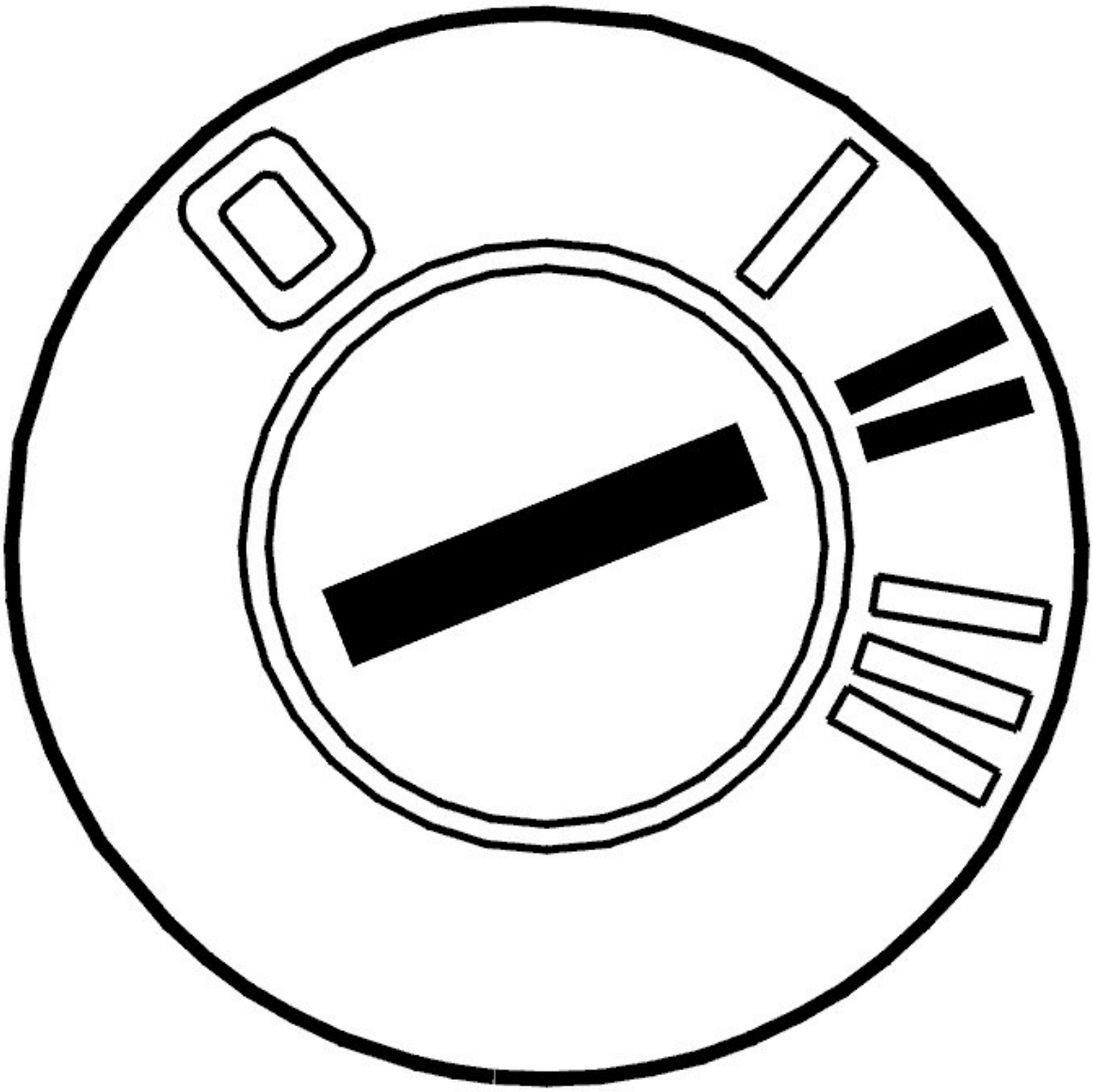
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Remove the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0240

Condition

The supplemental restraint system module (SRS) checks the activation signal to the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers a fault in the activation signal.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

Possible source
- The supplemental restraint system module (SRS) identifies that the passenger airbag cannot be activated.

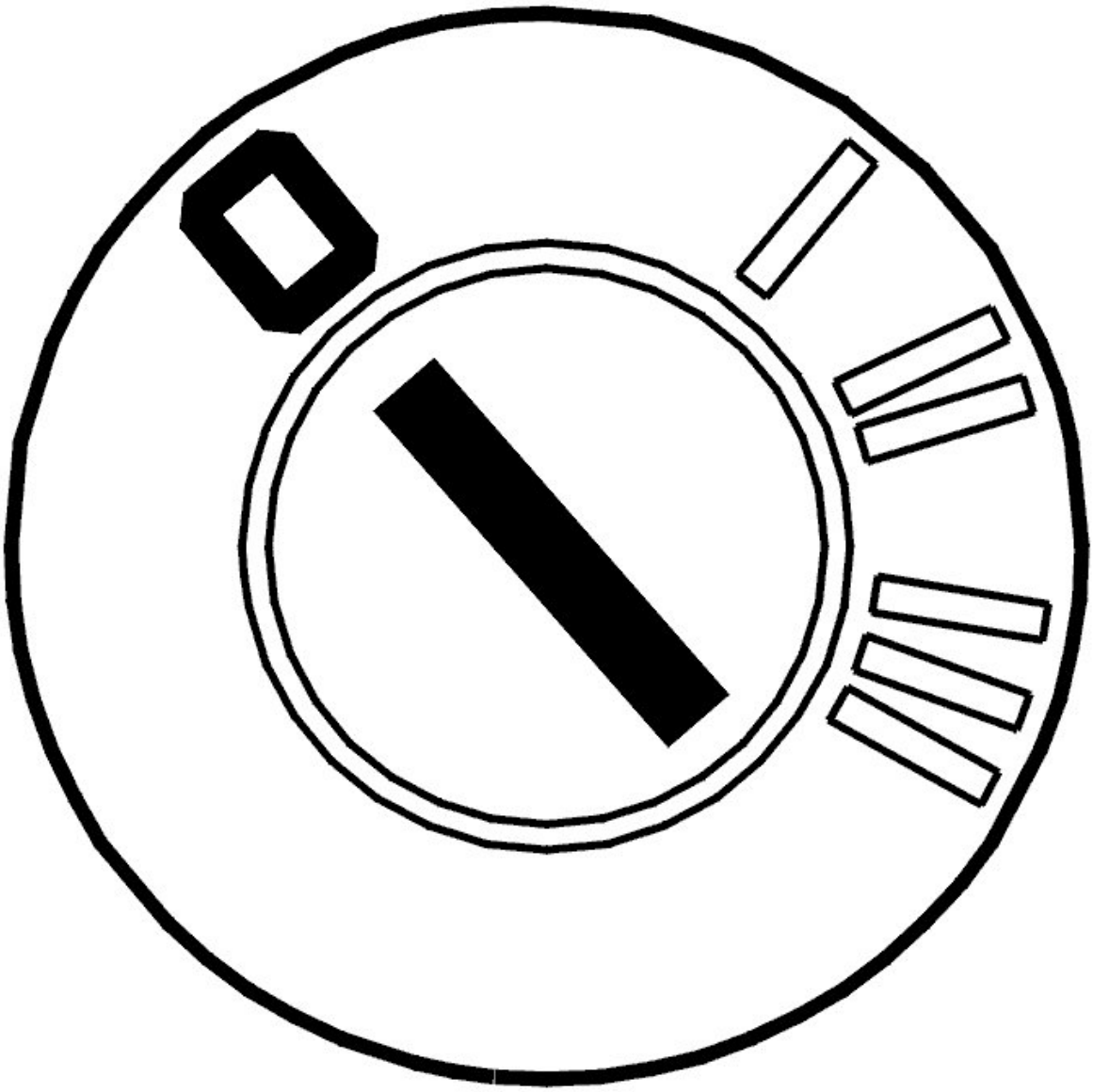
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

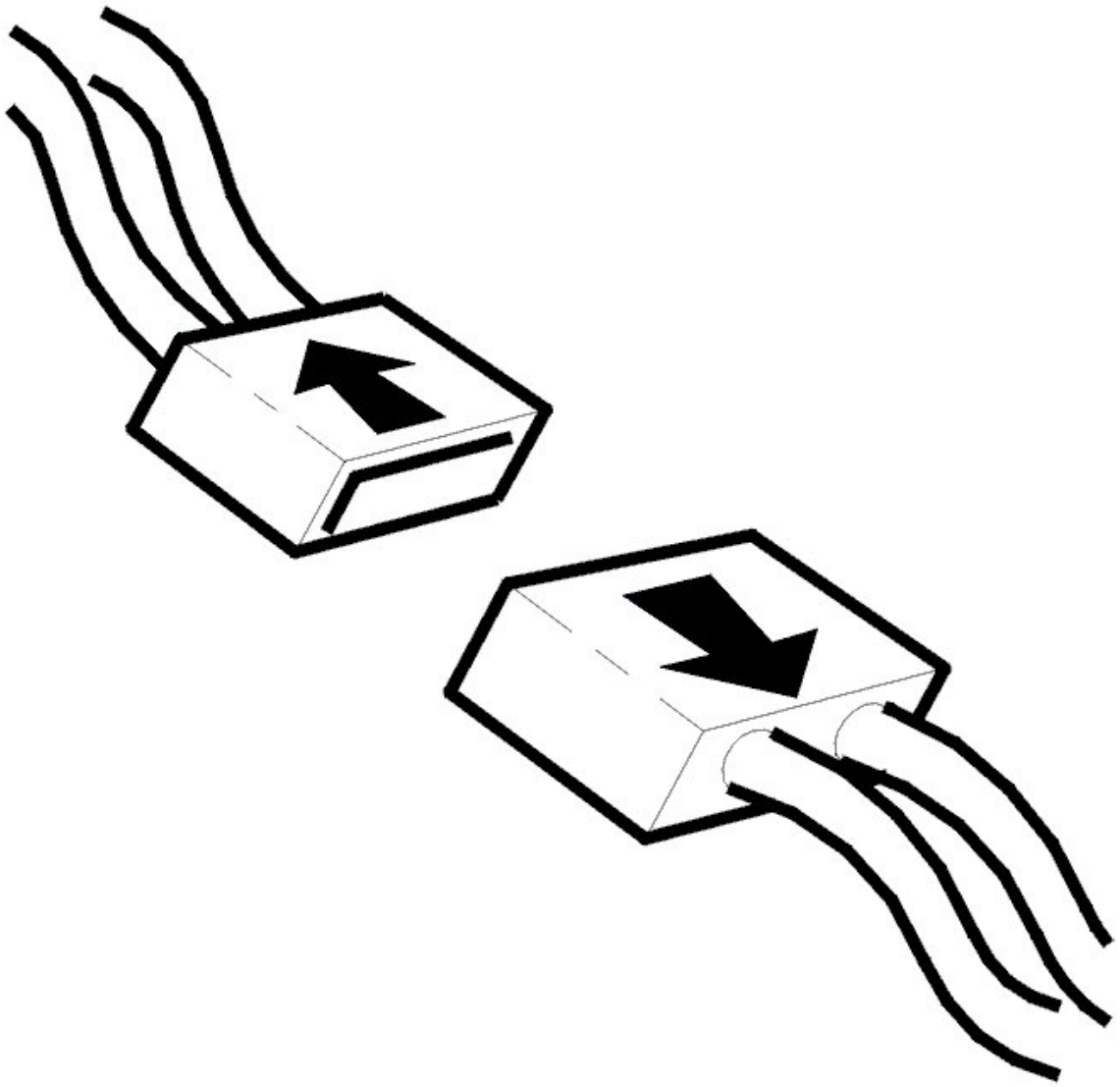
Activation

Activation

Replacing the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds.

For vehicles with a switch for the passenger airbag:

- Replace the switch for the passenger airbag.

Then check the status of the diagnostic trouble code (DTC).

- Reinstall the connectors, components etc.
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

Read off the status of the diagnostic trouble code (DTC) by clicking on the VCT2000 symbol.
The fault has been remedied if the diagnostic trouble code (DTC) is intermittent.
If the fault is still permanent, replace the supplemental restraint system module (SRS).
Remedy as necessary.
On vehicles that do not have a switch for the passenger airbag, replace the supplemental restraint system module (SRS).

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

Select "Continue" when the fault has been remedied.

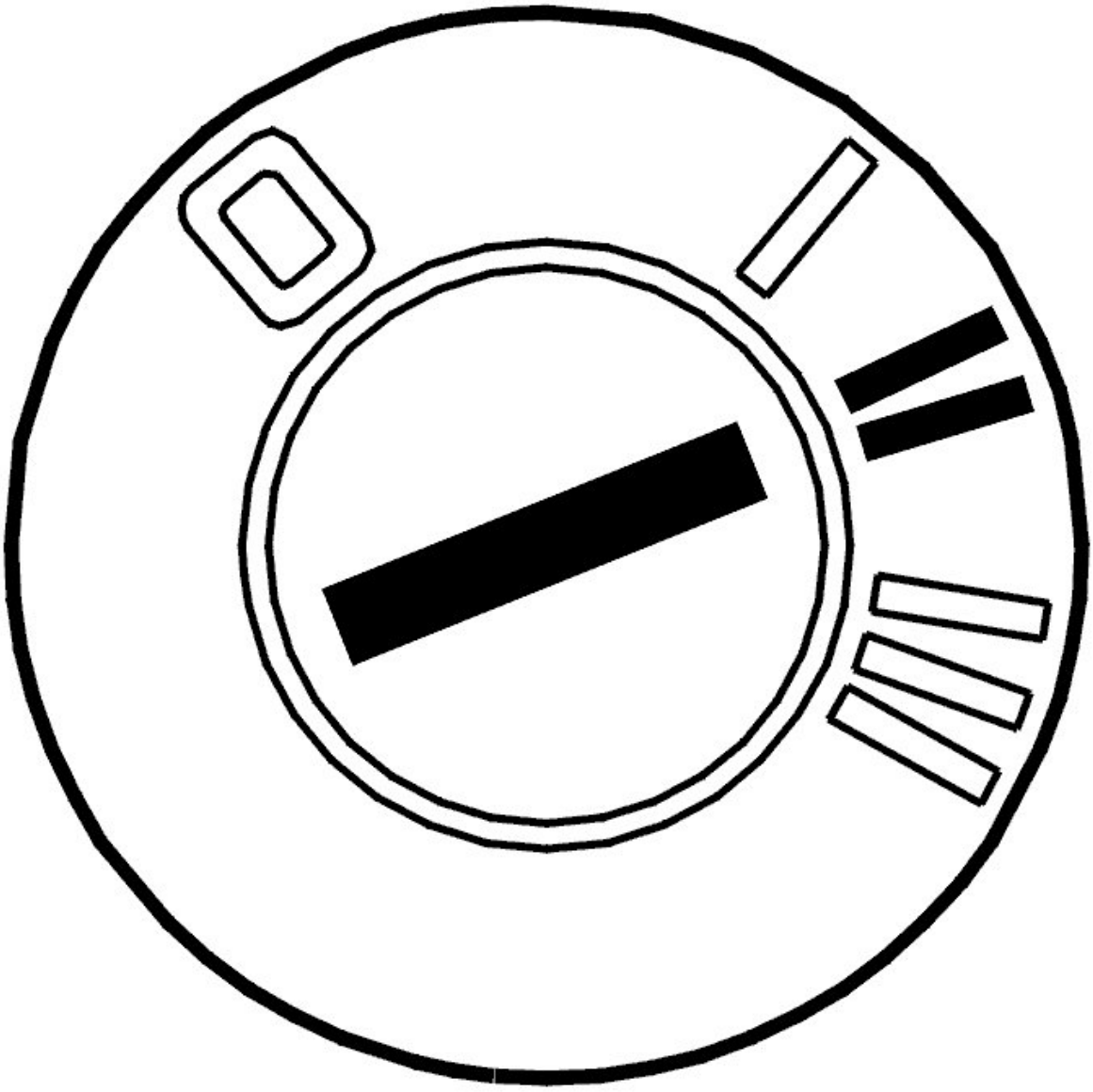
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0241

Condition

The supplemental restraint system module (SRS) checks the deactivation signal to the passenger airbag.
The diagnostic trouble code (DTC) is stored if the control module registers a fault in the deactivation signal.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- None.

Possible source
- The supplemental restraint system module (SRS) identifies that the passenger airbag cannot be deactivated.

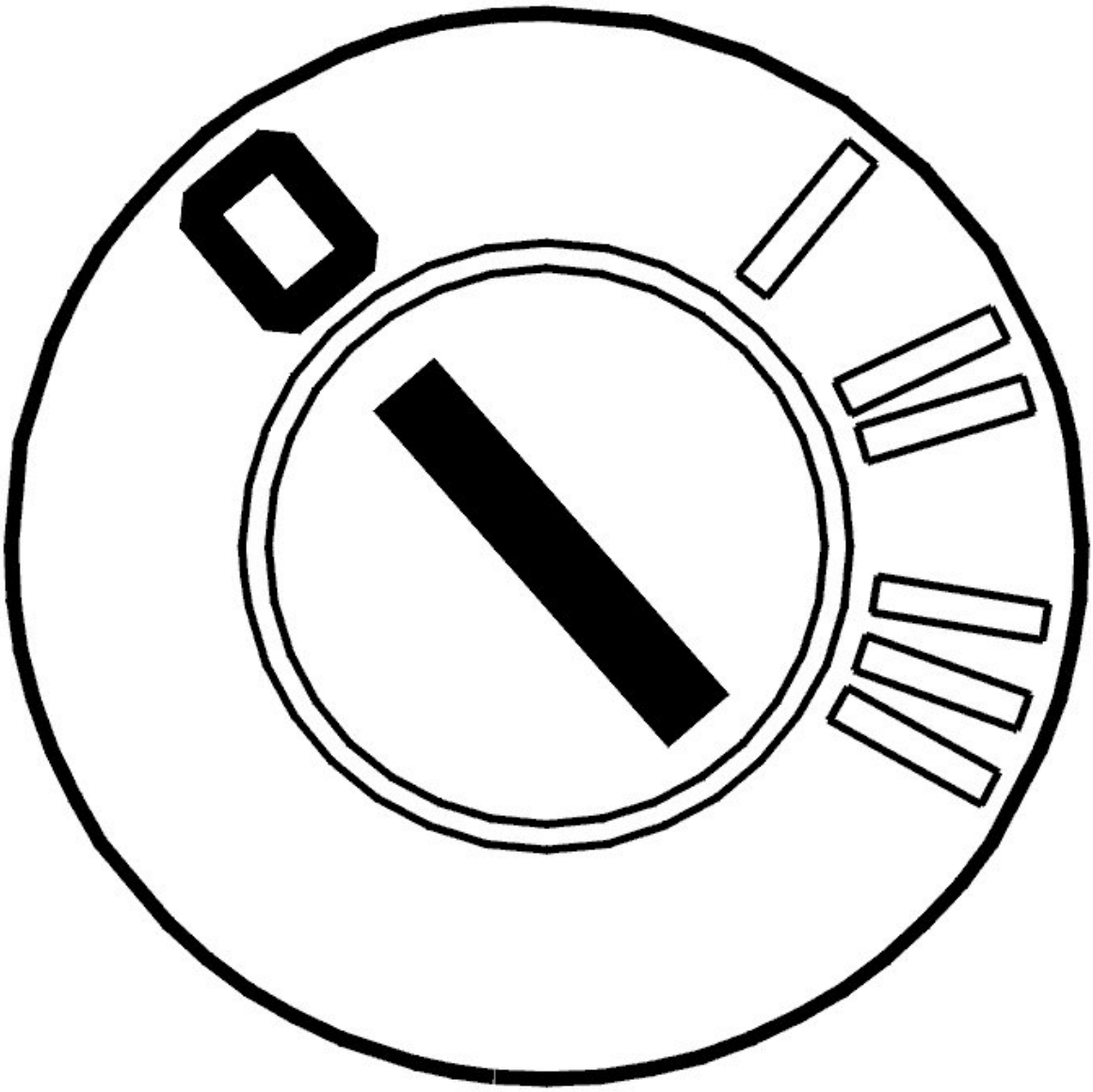
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

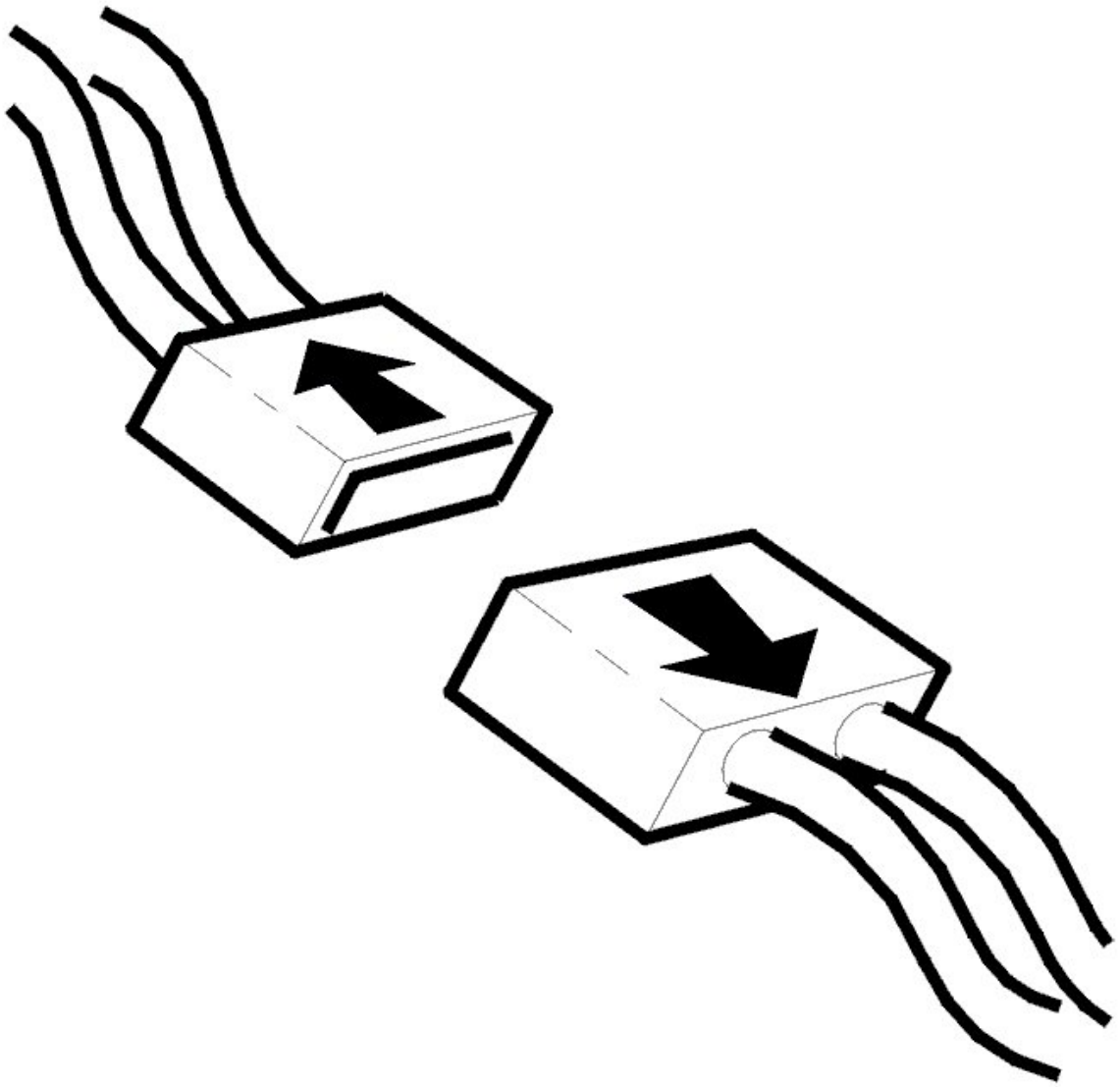
Deactivation

Deactivation

Replacing the component

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS).





- Switch off the ignition. Wait 10 seconds.

For vehicles with a switch for the passenger airbag:

- Replace the switch for the passenger airbag.

Then check the status of the diagnostic trouble code (DTC).

- Reinstall the connectors, components etc.
- Switch on the ignition. Wait 10 seconds
- Read off by clicking the VCT2000 symbol.

Read off the status of the diagnostic trouble code (DTC) by clicking on the VCT2000 symbol.
The fault has been remedied if the diagnostic trouble code (DTC) is intermittent.
If the fault is still permanent, replace the supplemental restraint system module (SRS).
Remedy as necessary.
On vehicles that do not have a switch for the passenger airbag, replace the supplemental restraint system module (SRS).

Other information

- To access or replace the switch for the passenger airbag and the connectors, see:
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair

Select "Continue" when the fault has been remedied.

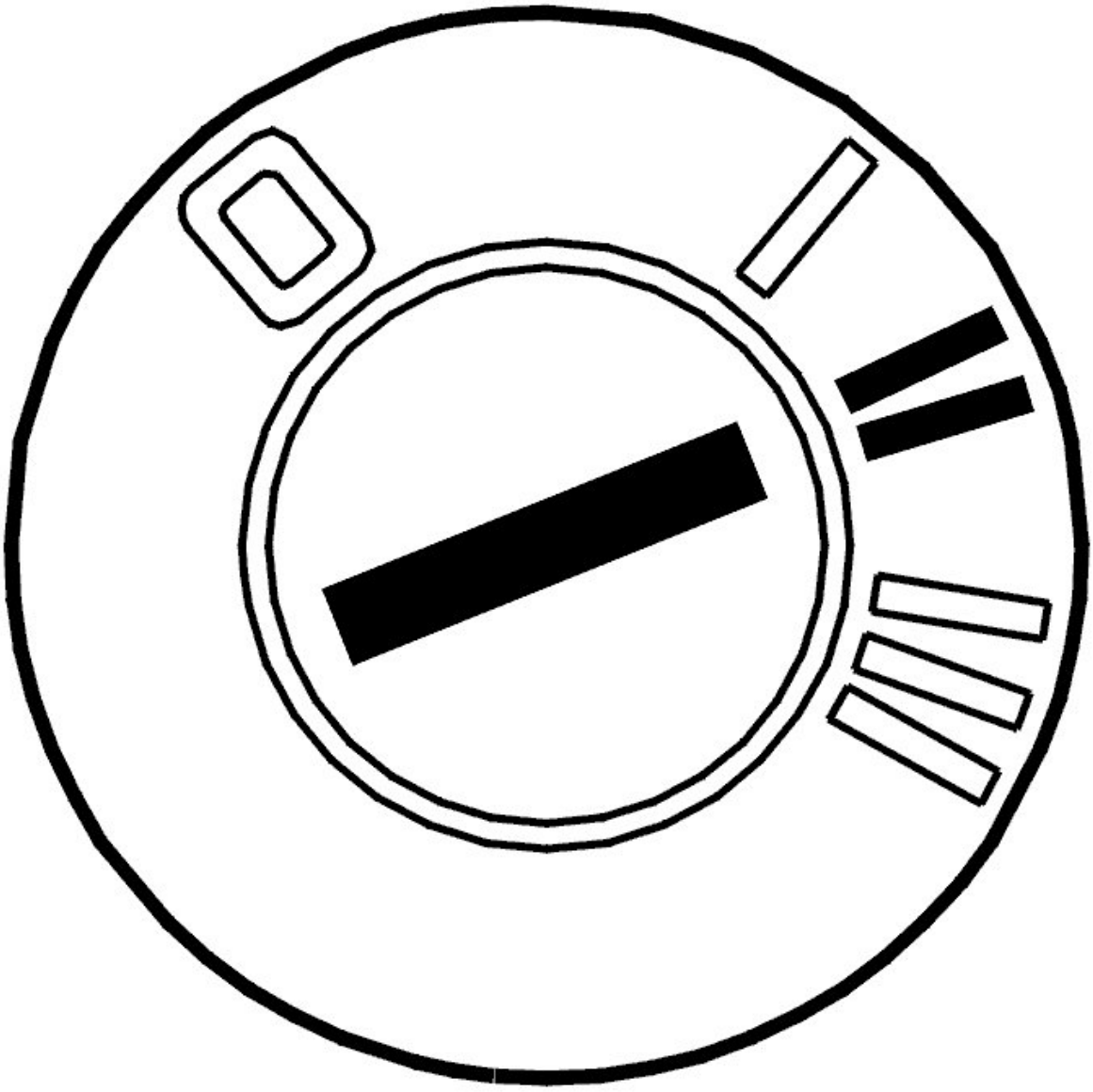
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

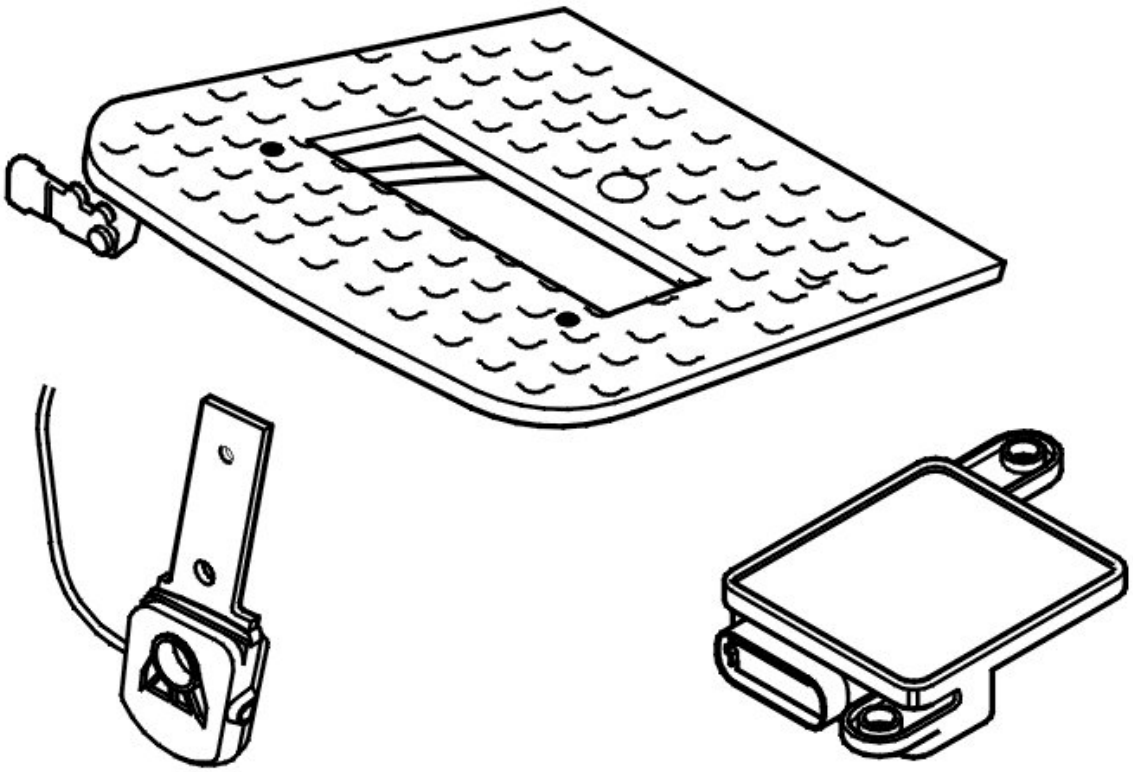
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0250

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a calibration fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

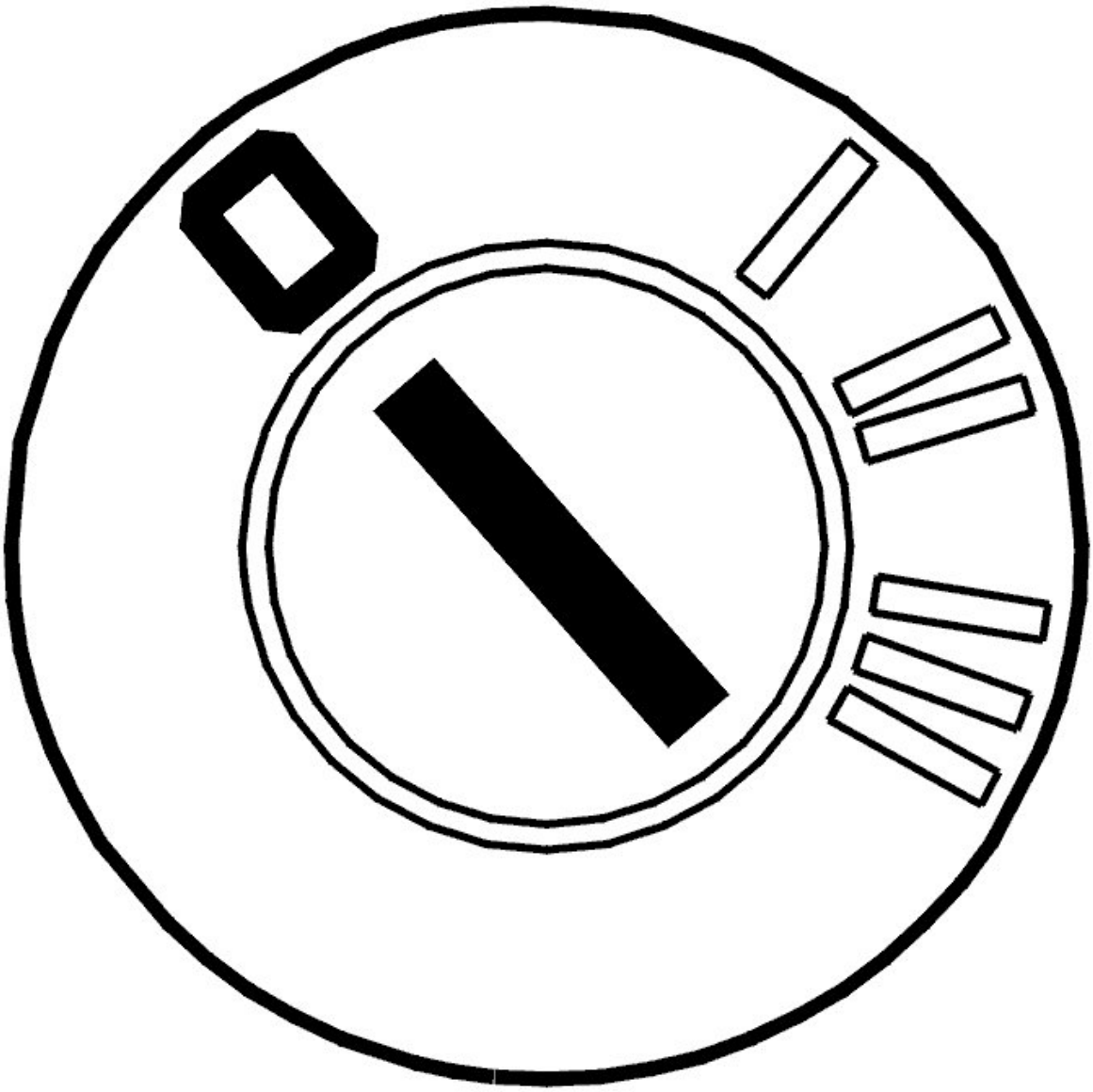
Possible source
- Incorrect calibration of the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Calibration Fault

Calibration fault

Calibrating the component



- Switch off the ignition. Wait 10 seconds.

Calibrate the occupant weight sensor (OWS).

Other information

- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

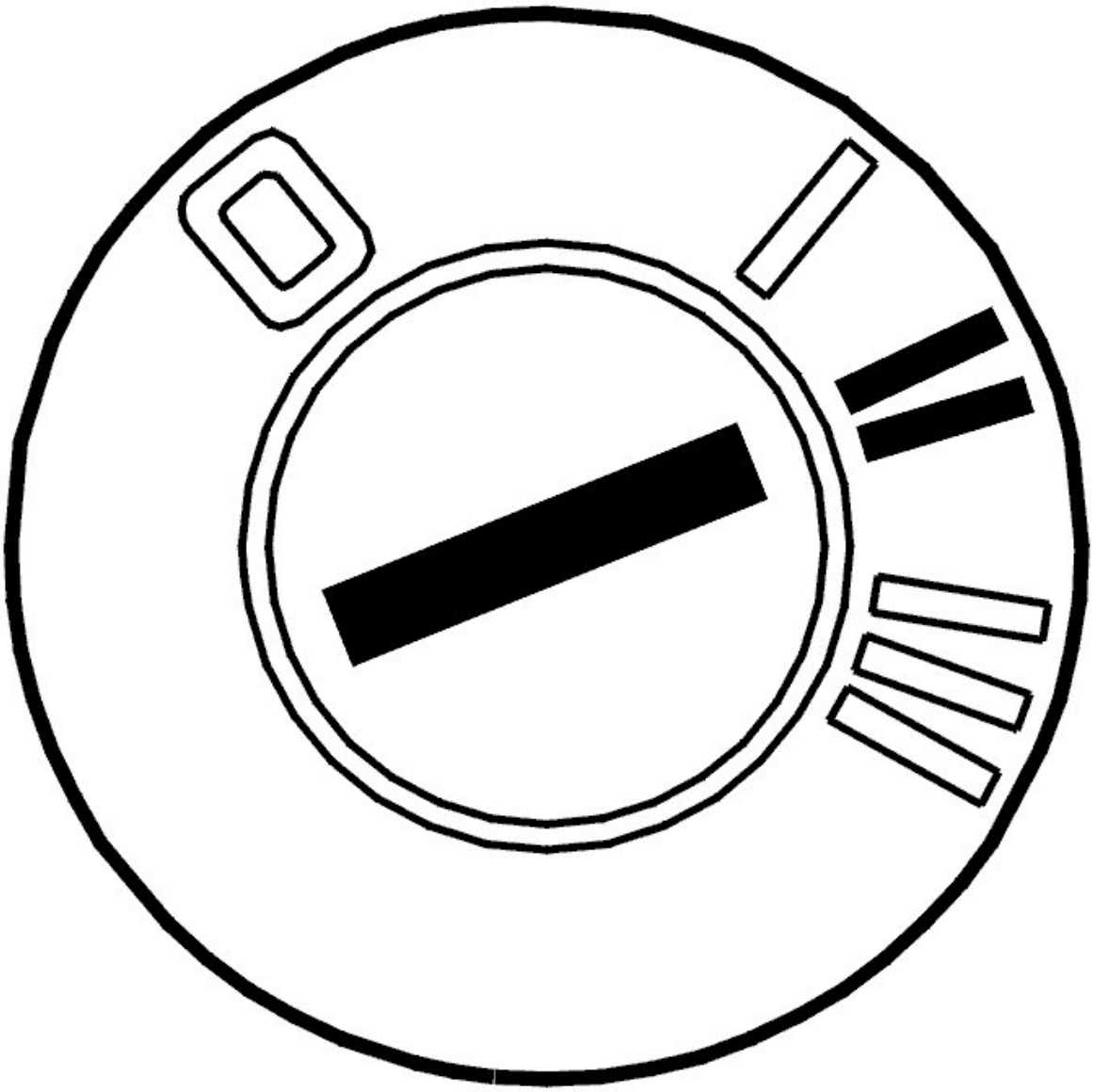
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

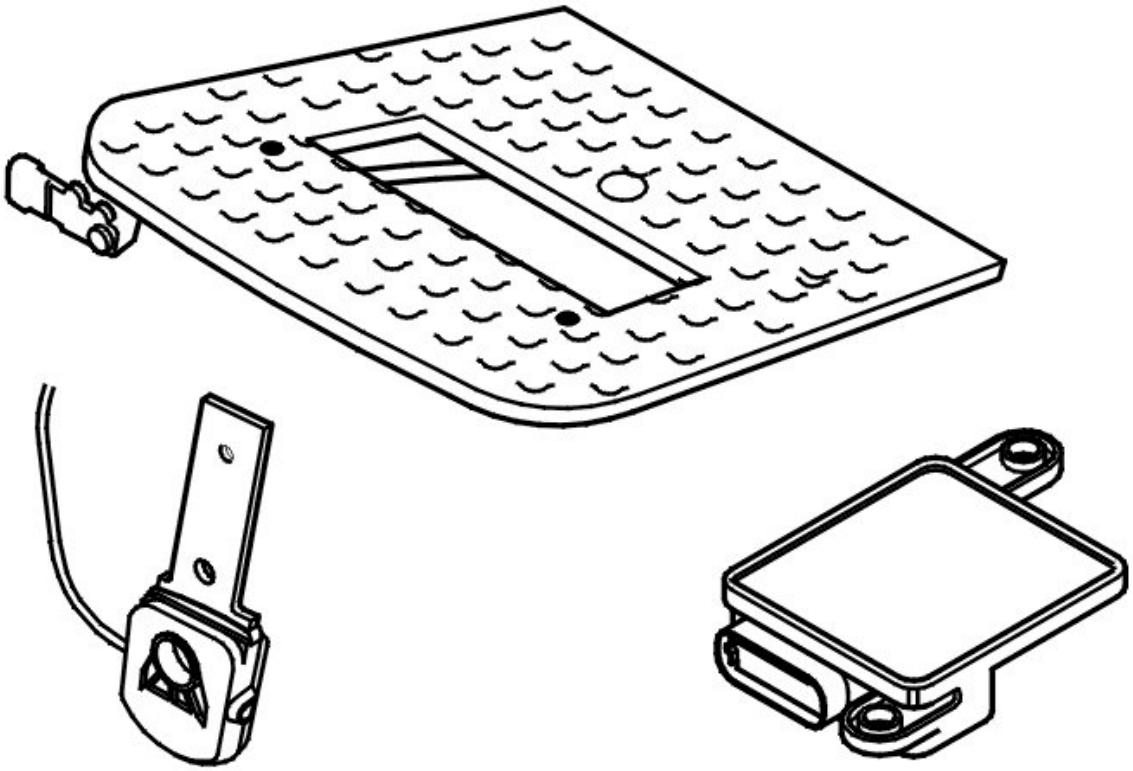
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Calibrating the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0251

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a configuration fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value

- Passenger airbag is deactivated.

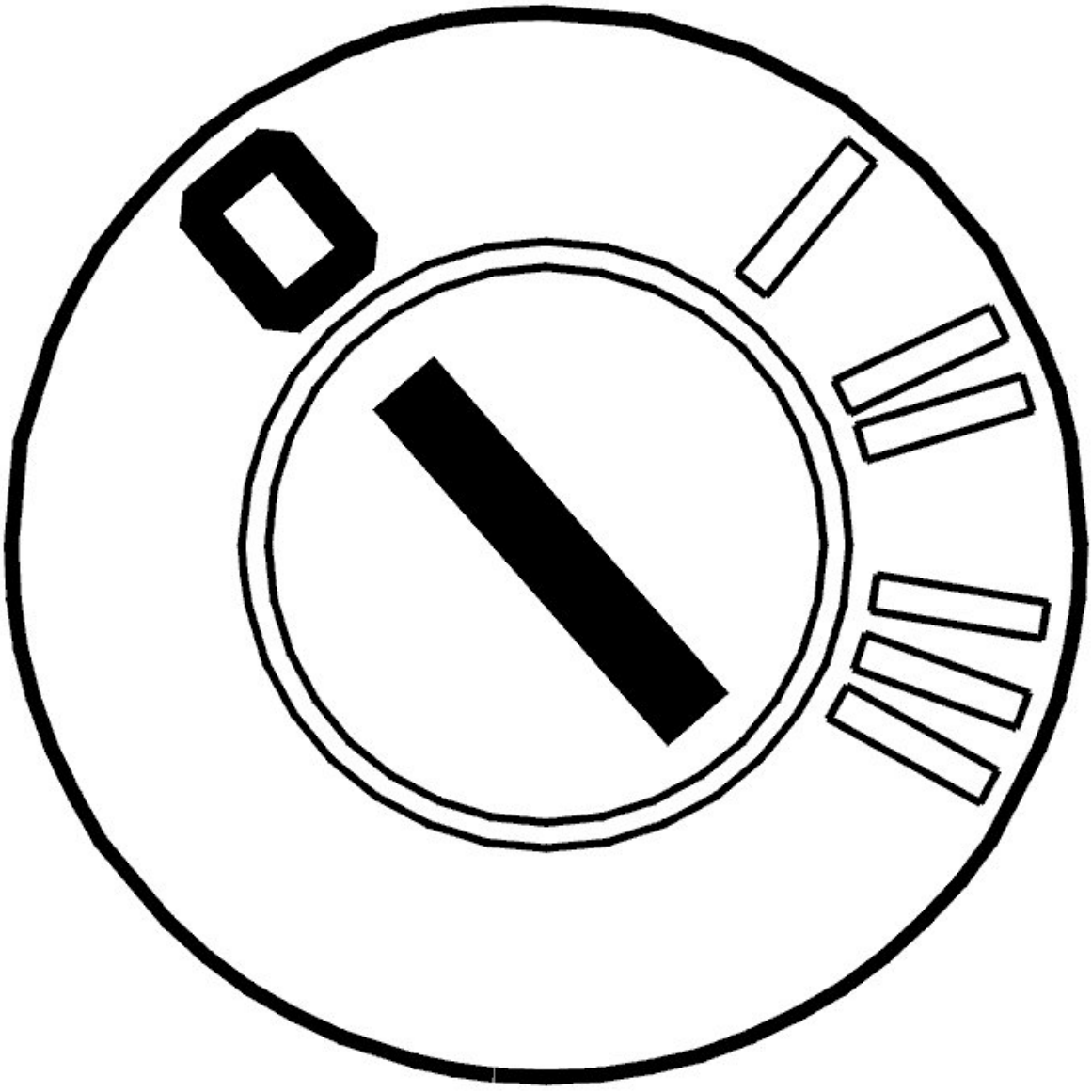
Possible source
- Incorrect configuration of the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Configuration Fault

Configuration fault

Configuring the component



- Switch off the ignition. Wait 10 seconds.

Configure the supplemental restraint system module (SRS) by storing the ID number for the occupant weight sensor (OWS).

Other information
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data

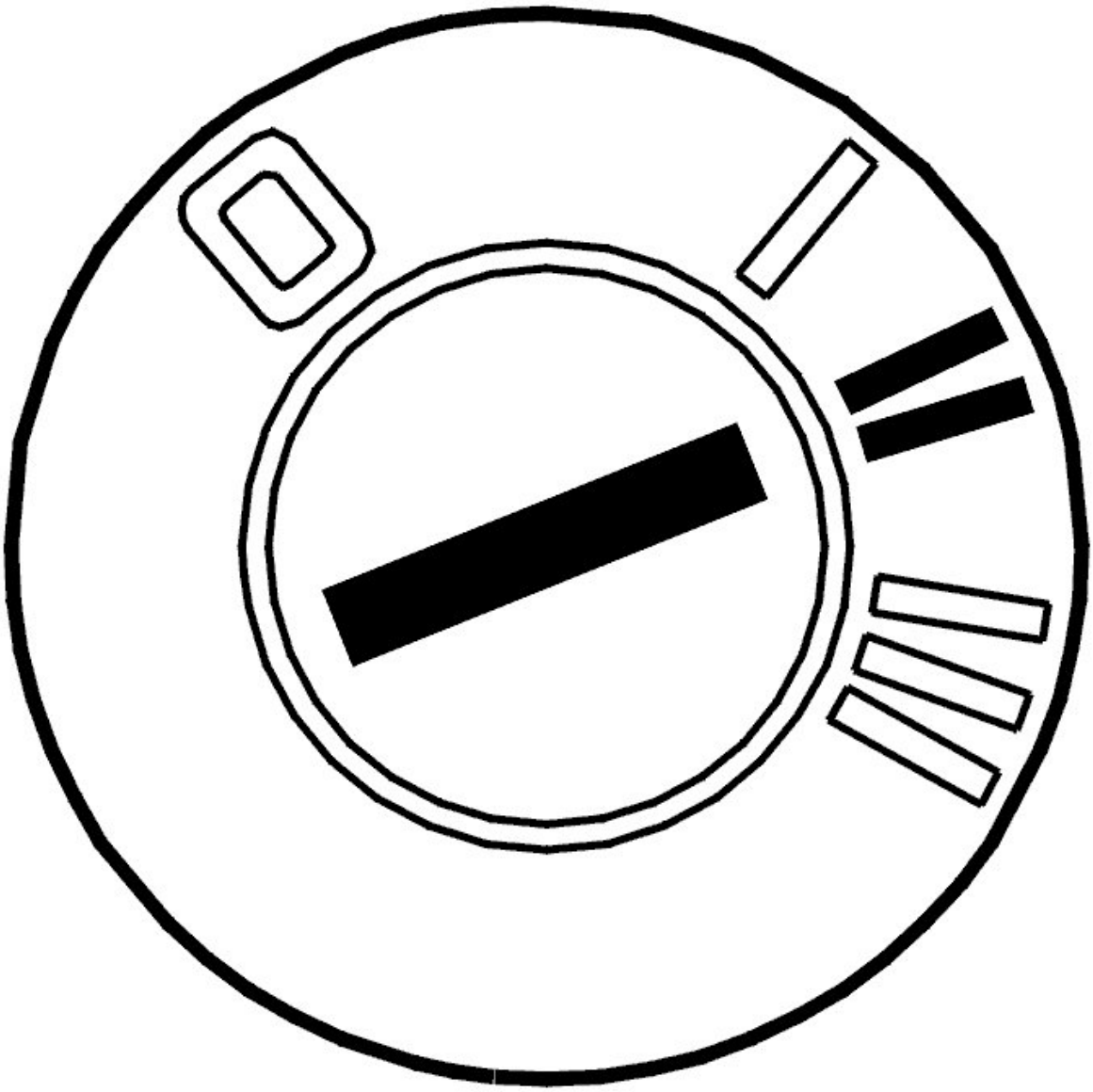
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

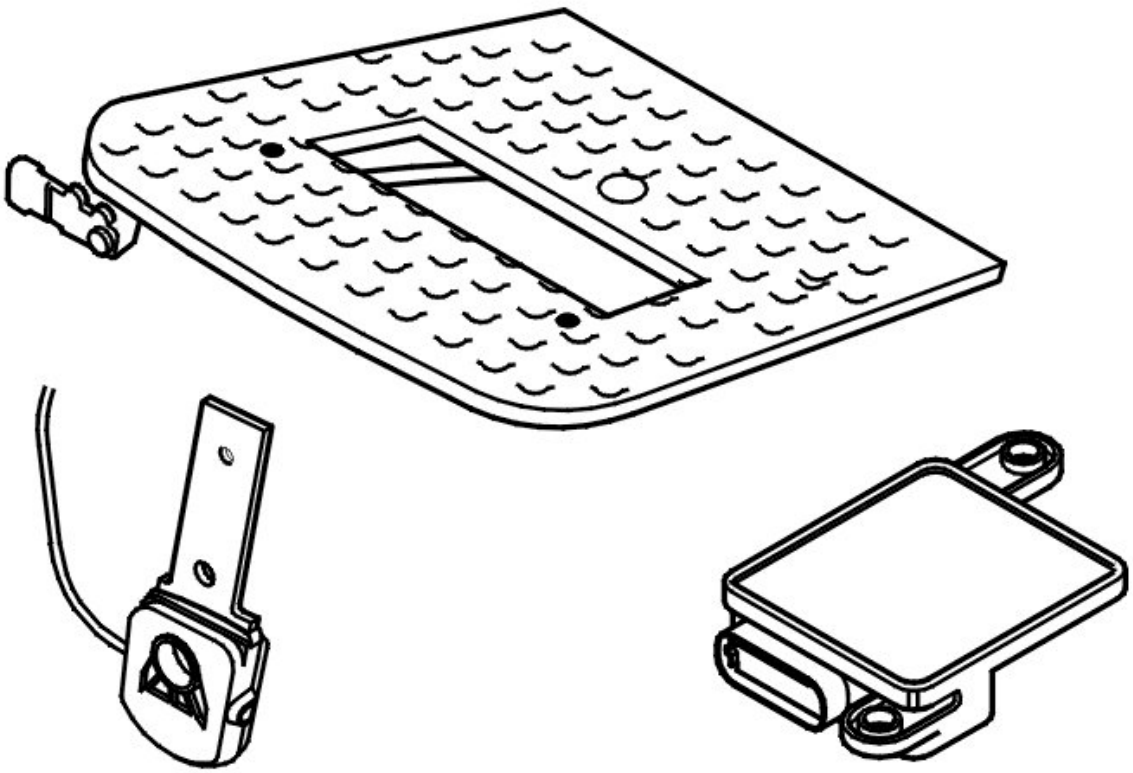
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Configuring the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0252

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers an internal fault in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value

- Passenger airbag is deactivated.

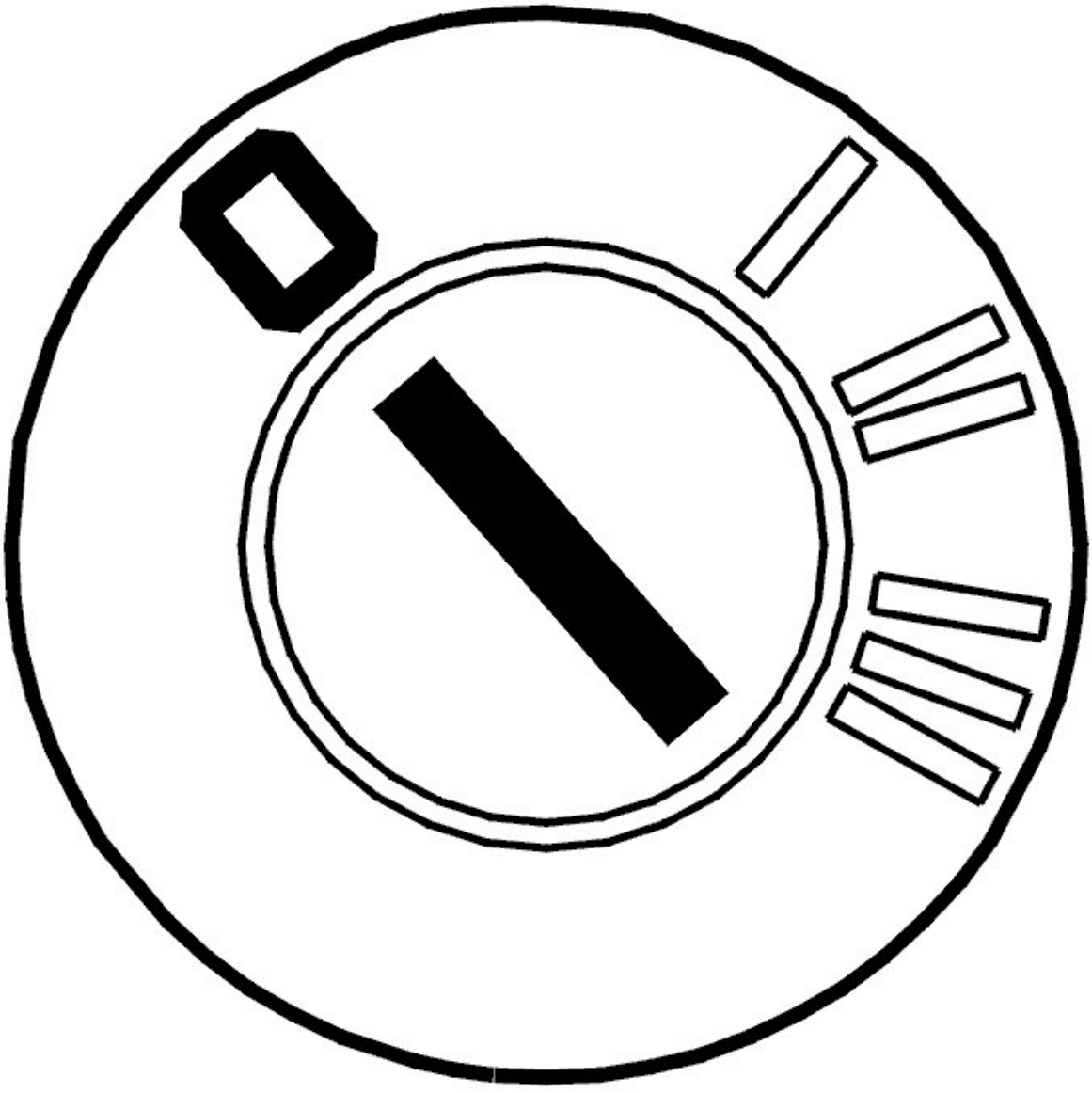
Possible source
- Internal fault in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Internal Fault

Internal fault

Replacing the component



- Switch off the ignition. Wait 10 seconds.

Replace the pressure sensor and the occupant weight sensor (OWS) module. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be calibrated. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

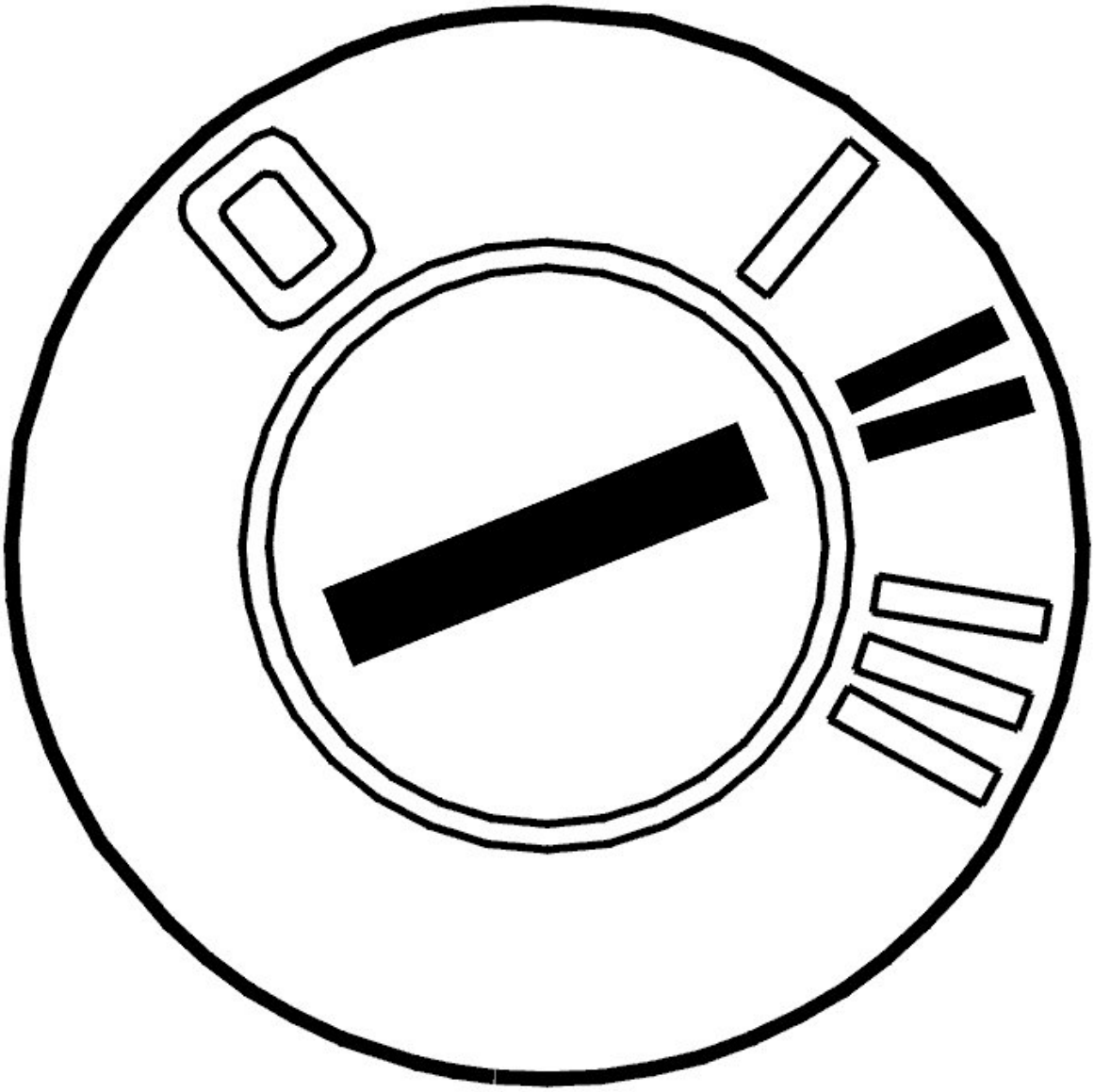
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

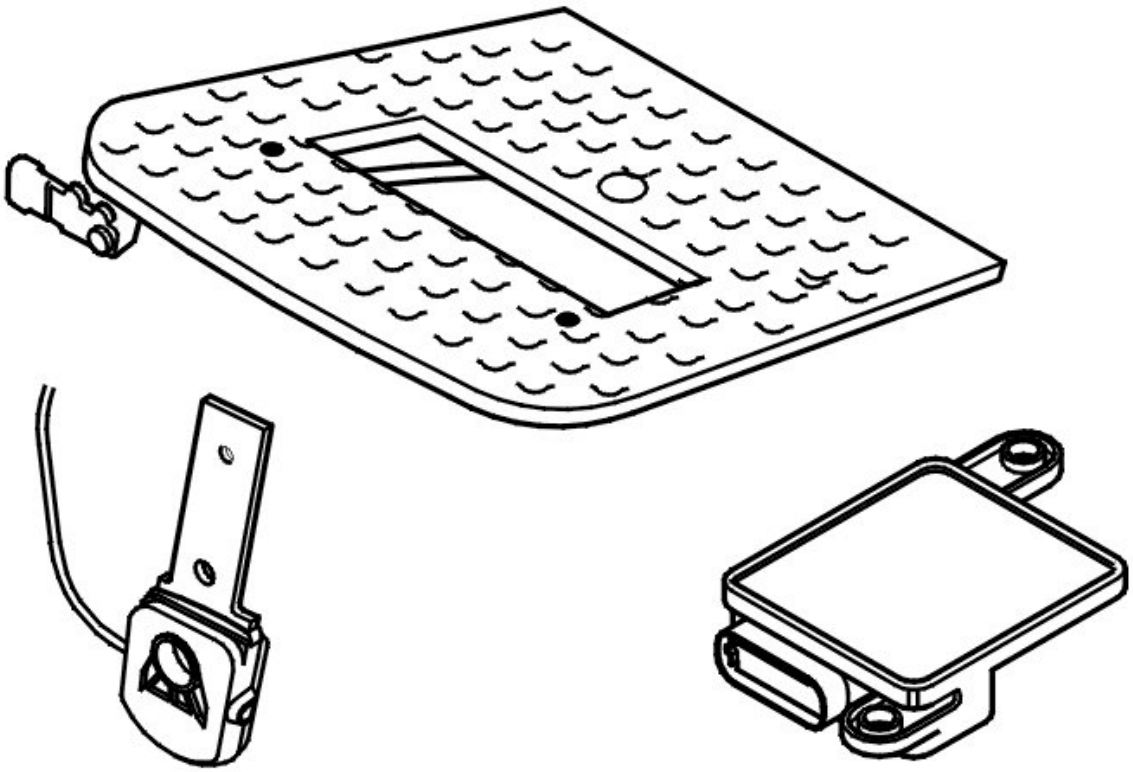
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0253

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

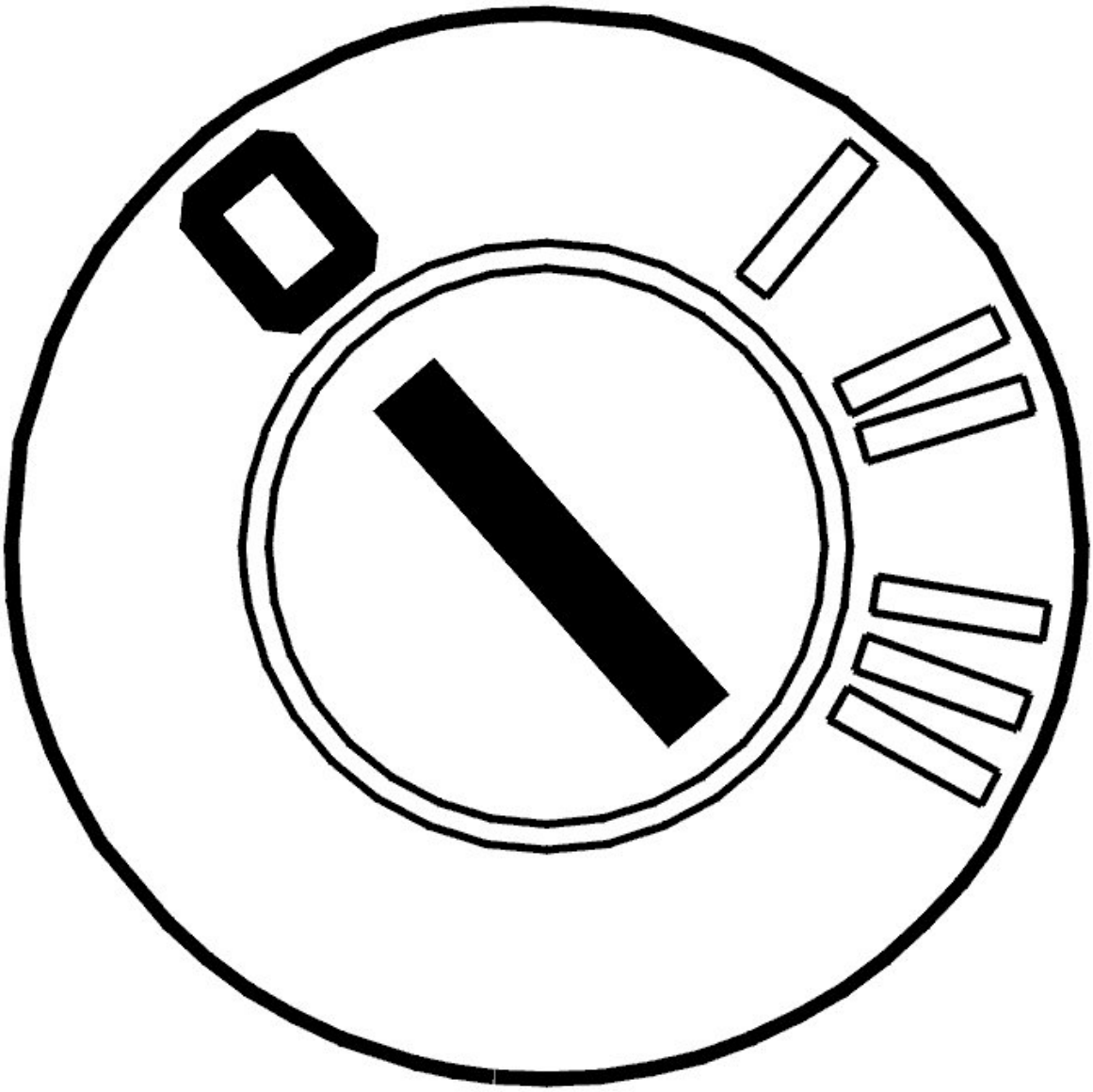
Possible source
- Open-circuit in the signal cable or in the connectors between the occupant weight sensor (OWS) and supplemental restraint system module (SRS)
- Damaged occupant weight sensor (OWS).

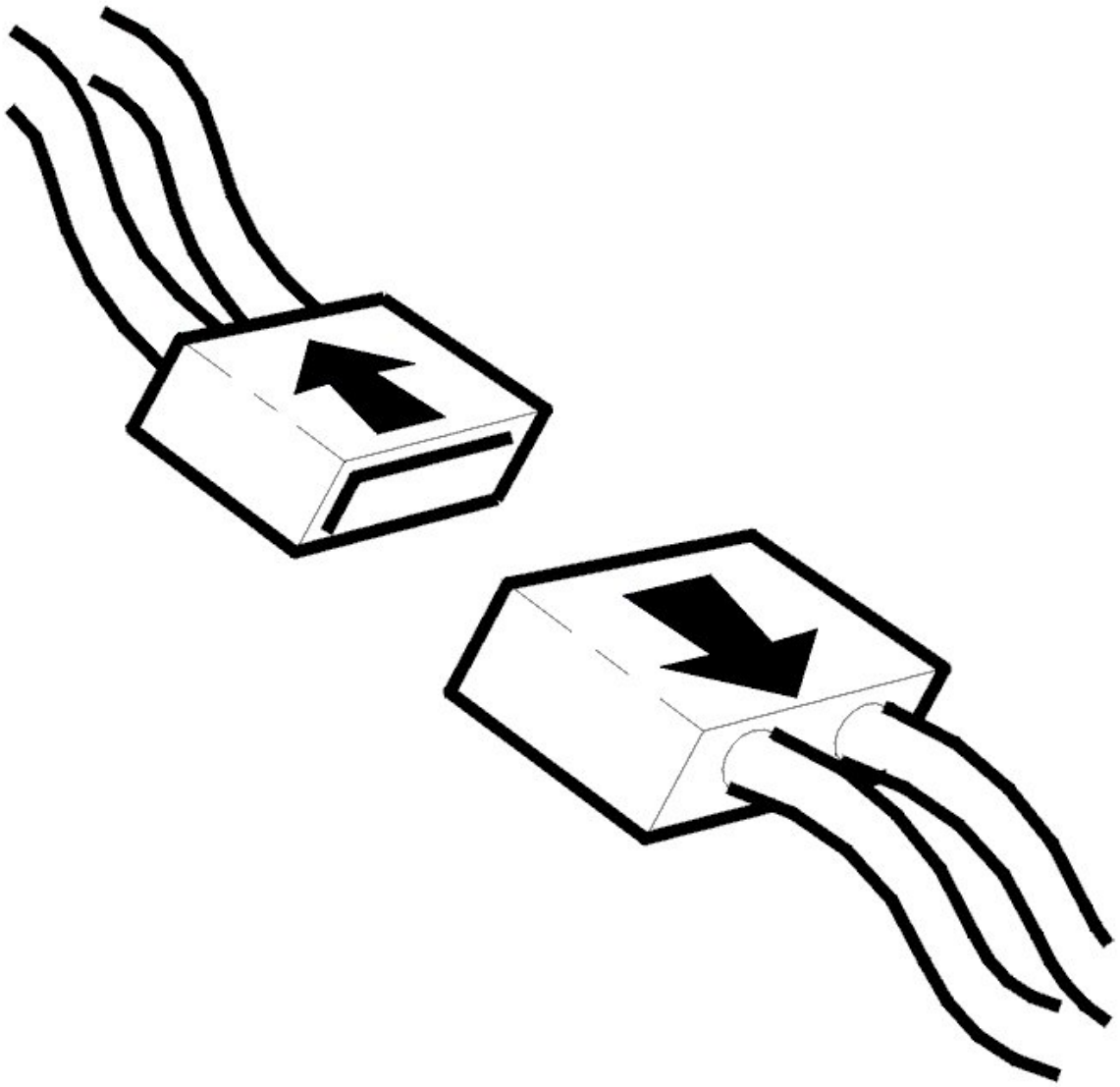
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Communication Fault

Communication fault

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect the connector from the supplemental restraint system module (SRS).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). There is a risk of static discharge. This could damage the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).

Check the connectors for the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Also check the other connectors that connect the communication cable between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for an open-circuit.
Check the cable between supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if no fault is detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

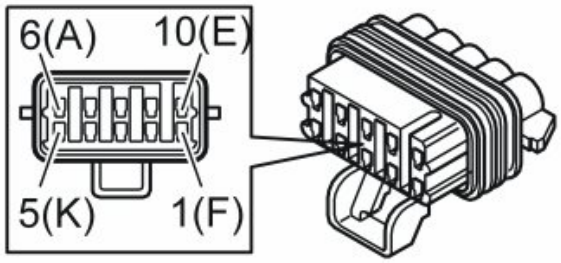
Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification, supplemental restraint system module (SRS): Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Signal specification, occupant weight sensor (OWS): Signal specification See: Restraint Systems/Air Bag Systems/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)

- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

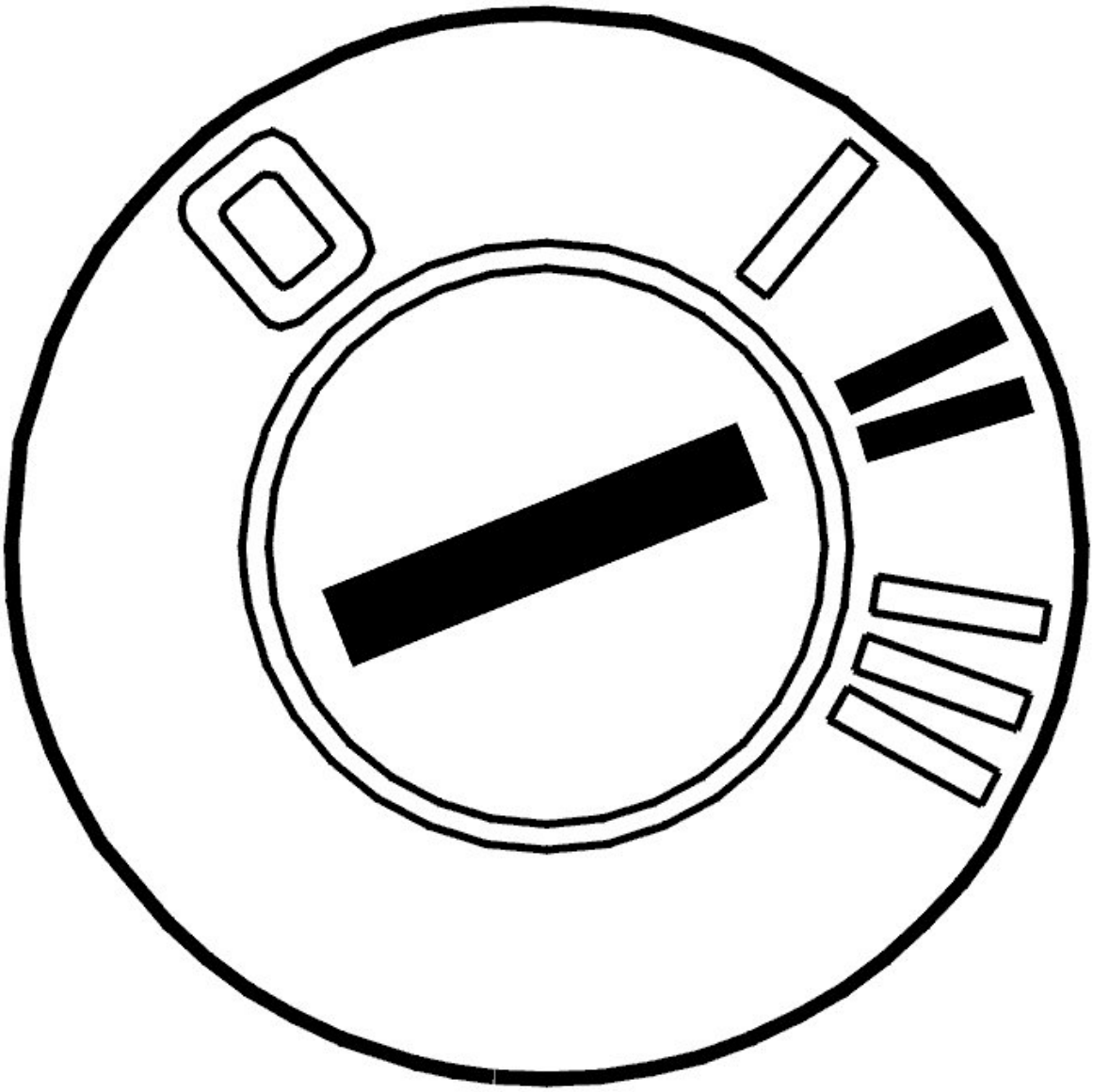
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

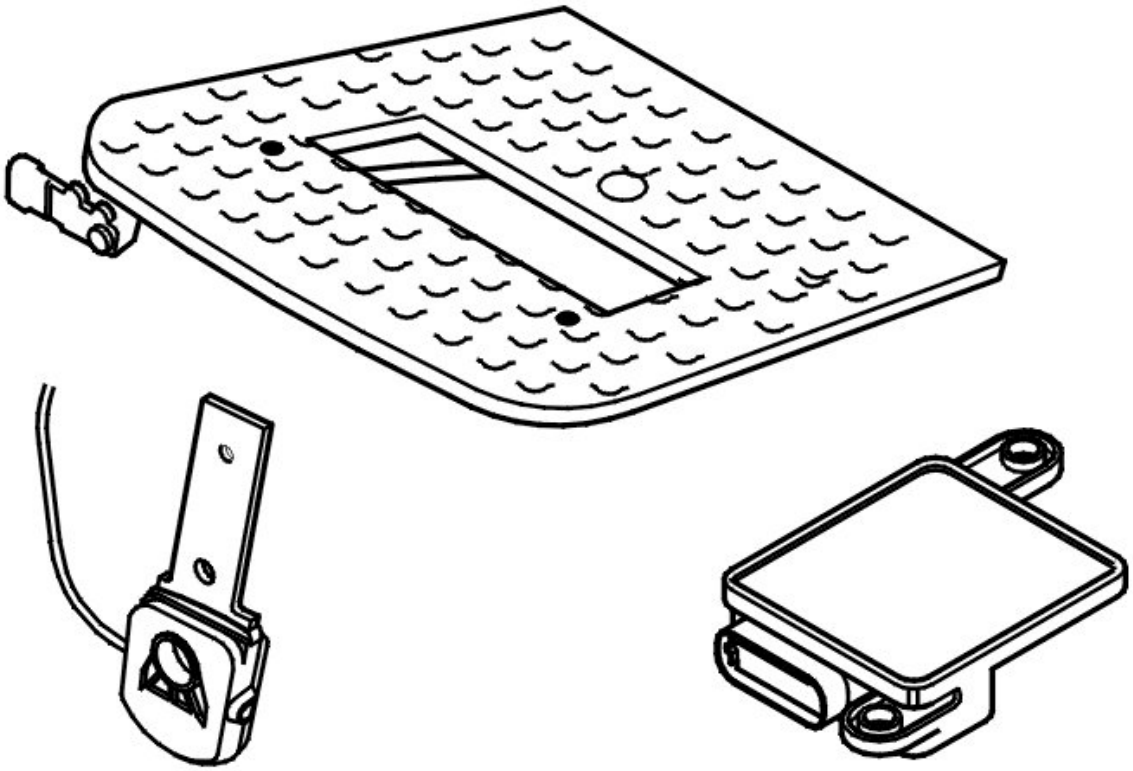
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0254

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value

- Passenger airbag is deactivated.

Possible source

- Open-circuit in the signal cable or in the connectors between the occupant weight sensor (OWS) and supplemental restraint system module (SRS)
- Damaged occupant weight sensor (OWS).

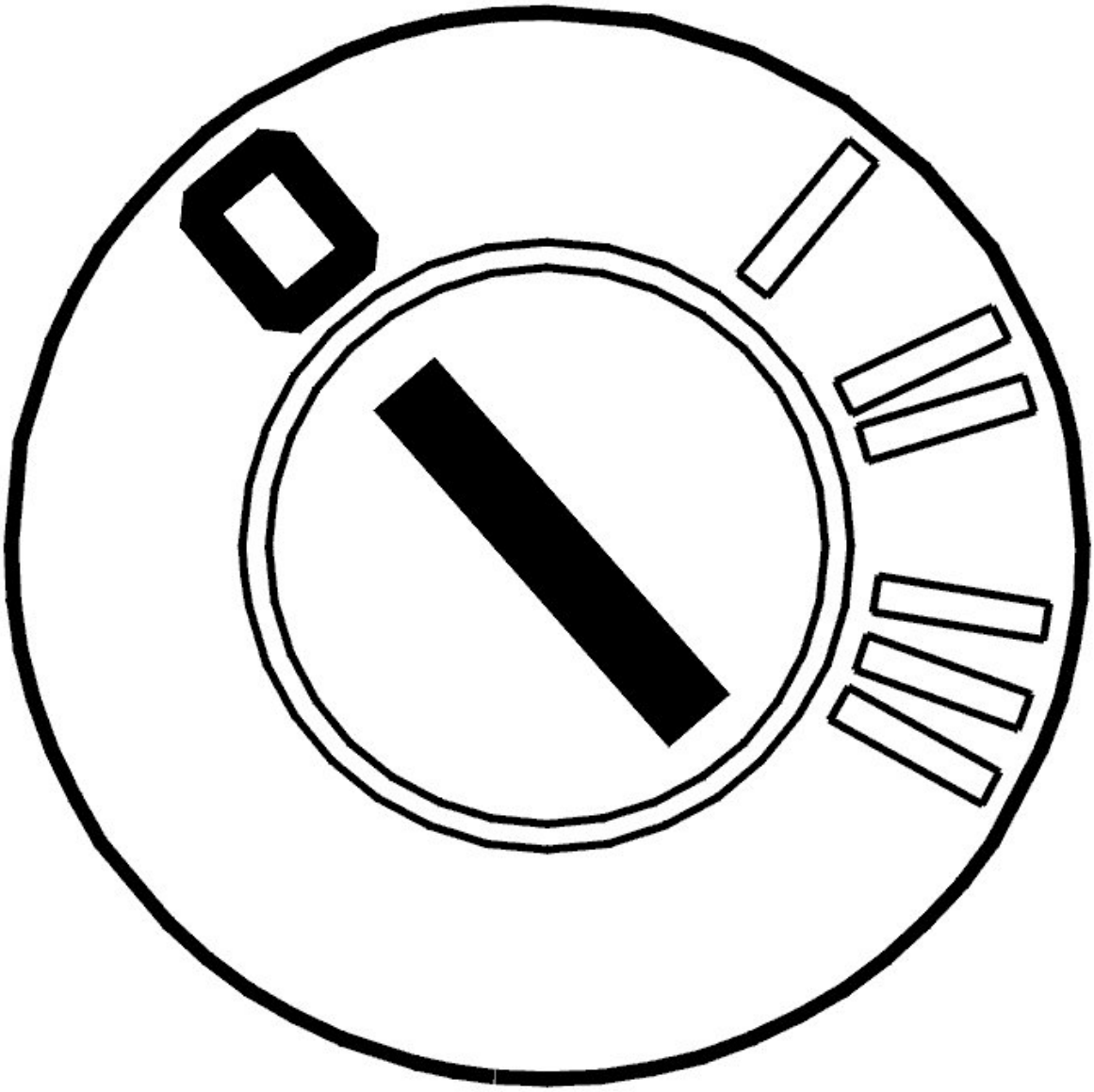
Fault symptom[s]

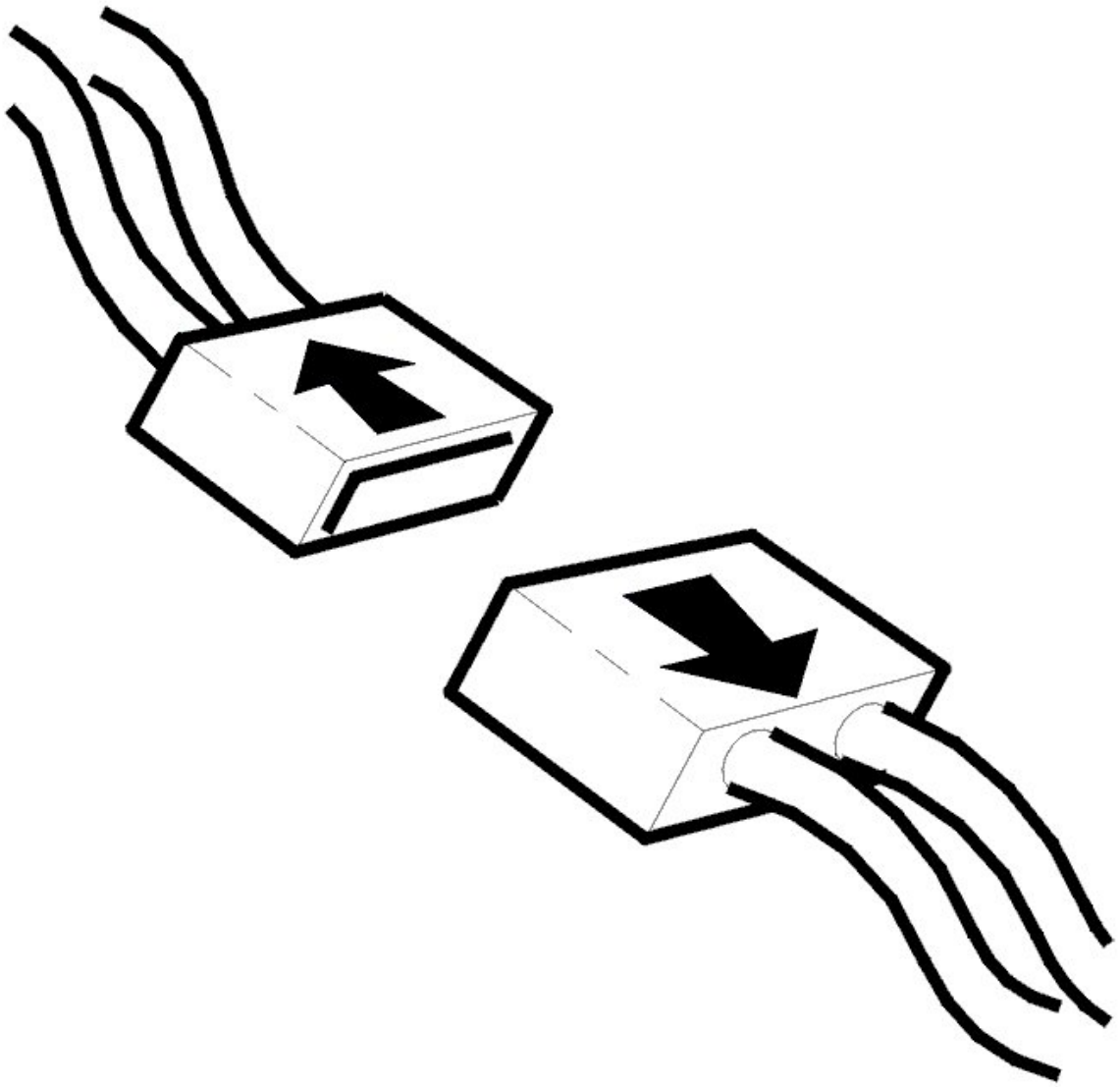
- SRS indicator lamp lit
- PAD lamp lit.

Communication Fault

Communication fault

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect the connector from the supplemental restraint system module (SRS).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). There is a risk of static discharge which could damage the control modules.

Check the connectors for the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Also check the other connectors that connect the communication cable between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for an open-circuit.
Check the cable between supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if no fault is detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

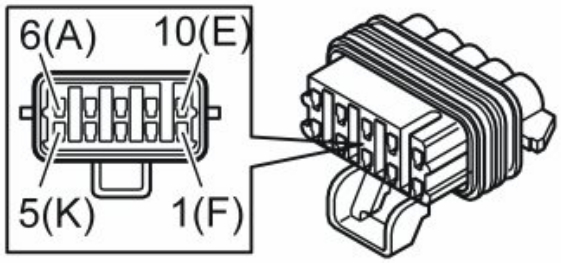
Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification, supplemental restraint system module (SRS): Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- Signal specification, occupant weight sensor (OWS): Signal specification See: Restraint Systems/Air Bag Systems/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)

- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

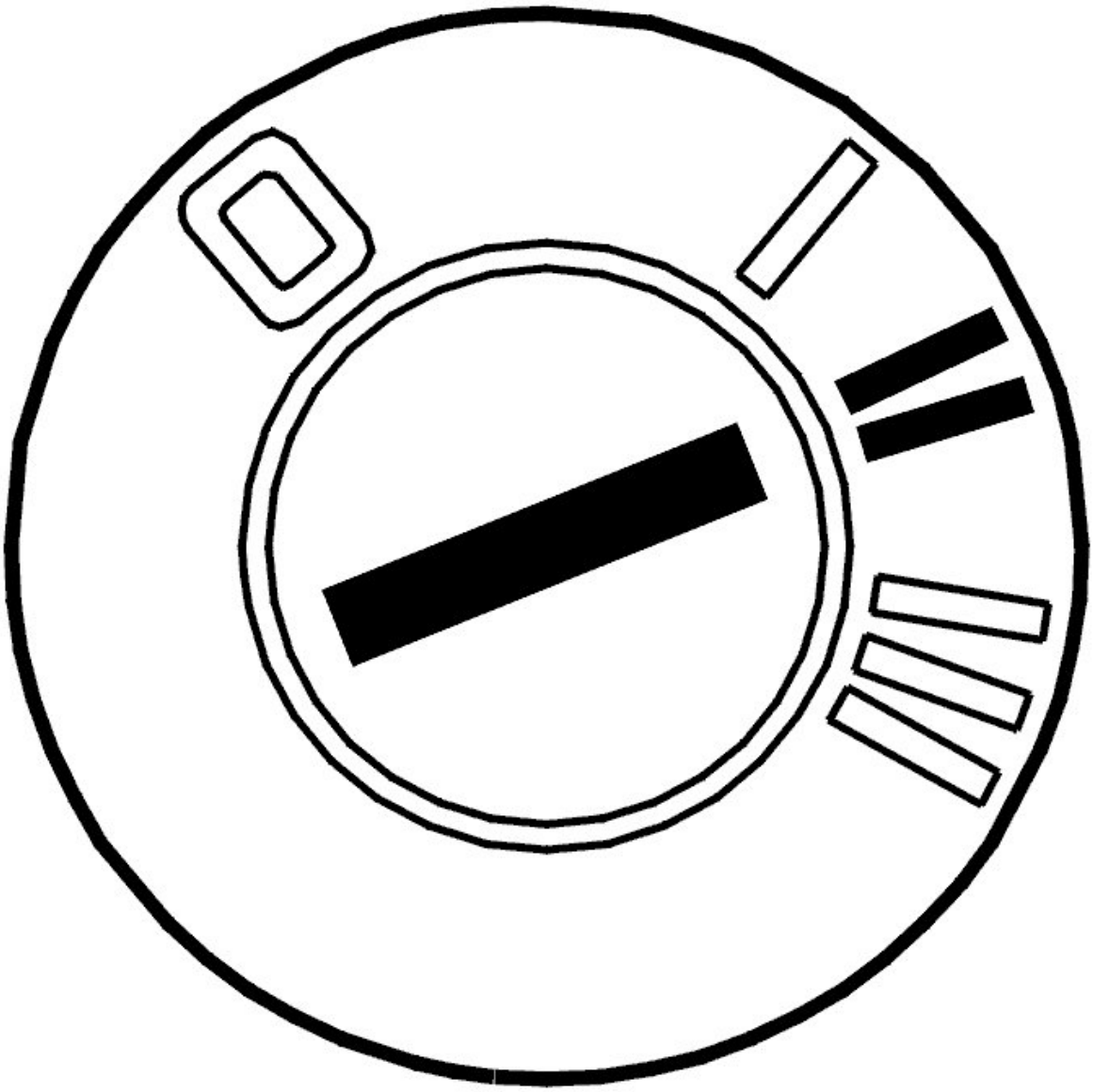
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

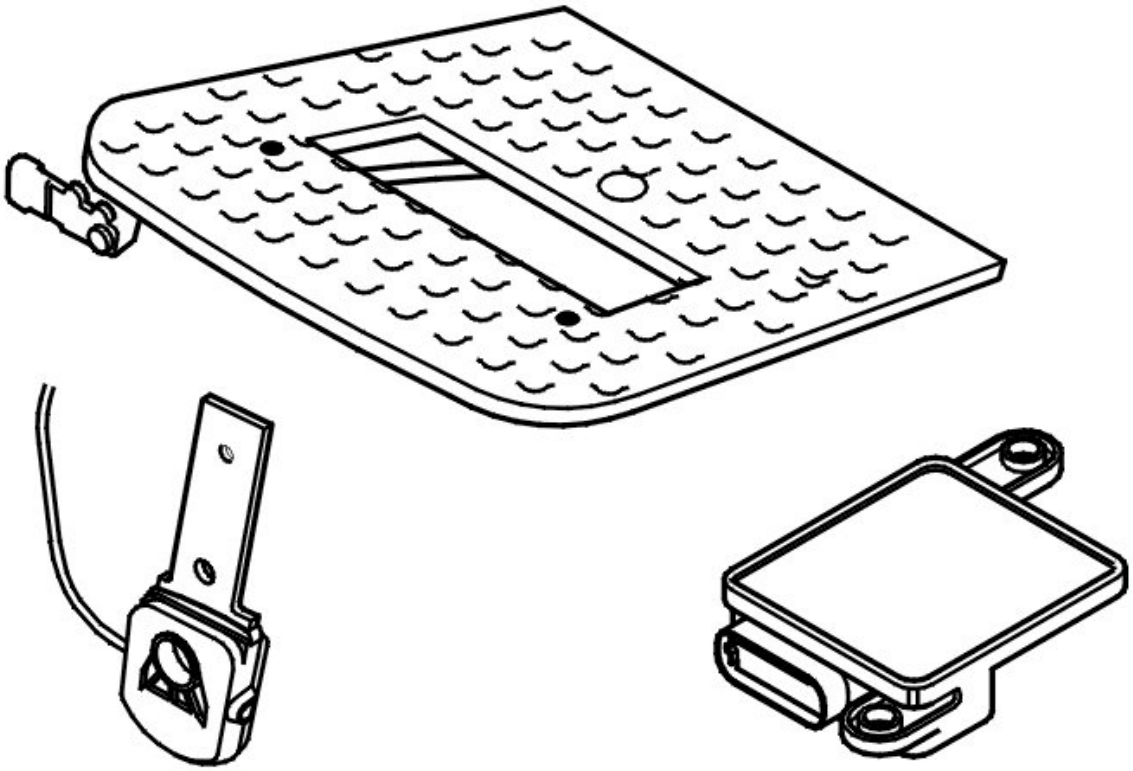
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0256

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers an internal fault in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value

- Passenger airbag is deactivated.

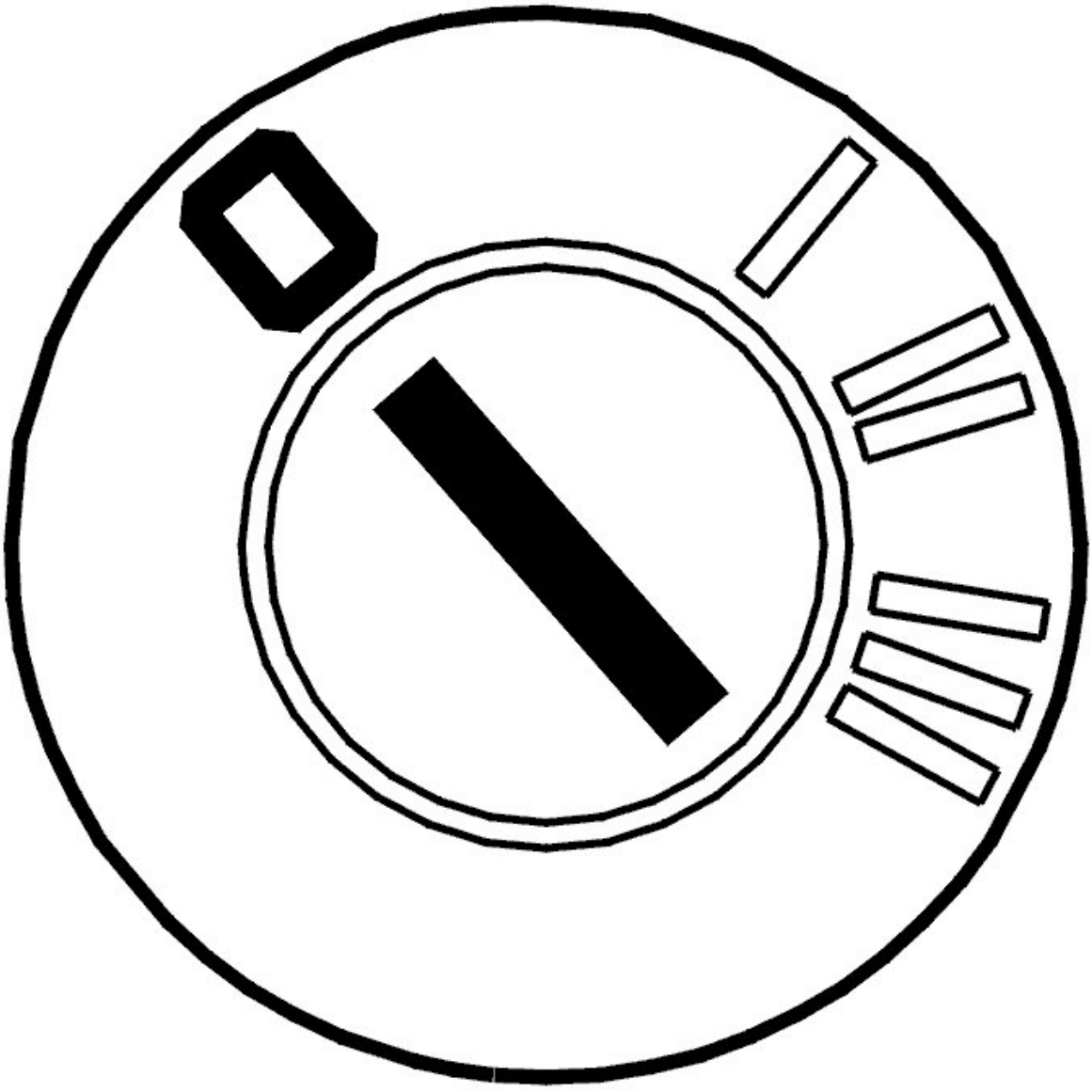
Possible source
- Internal fault in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Internal Fault

Internal fault

Replacing the component



- Switch off the ignition. Wait 10 seconds.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Replace the pressure sensor and the occupant weight sensor (OWS) module. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool

Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

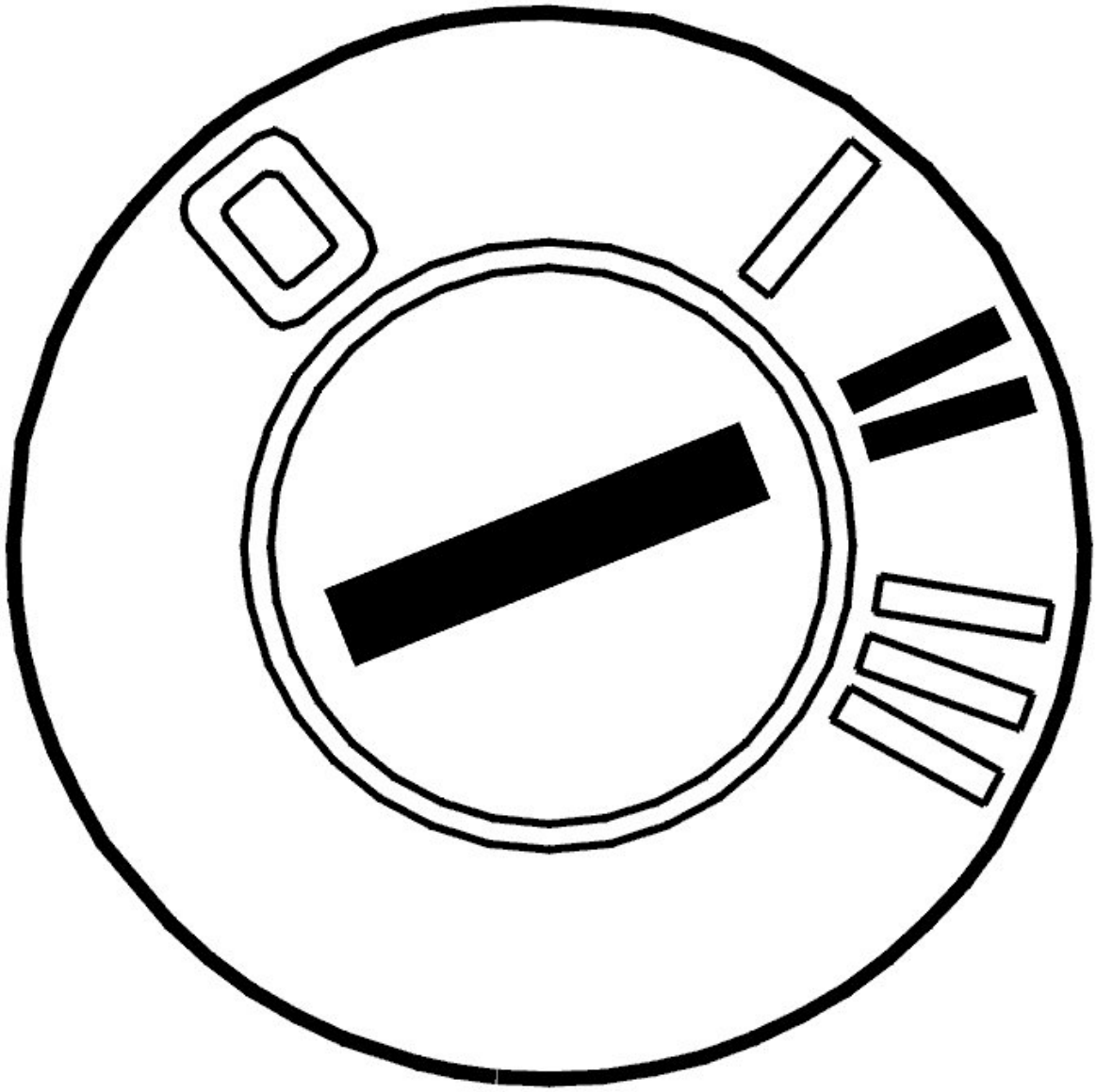
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

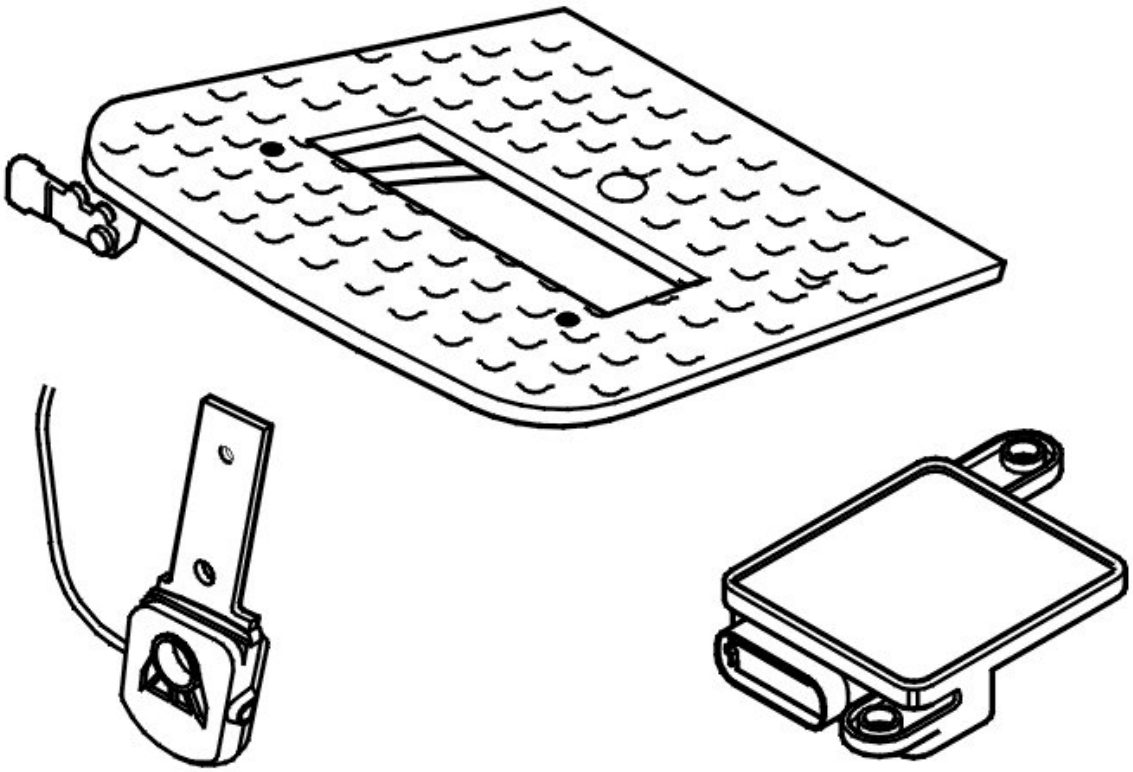
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0258

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a calibration fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

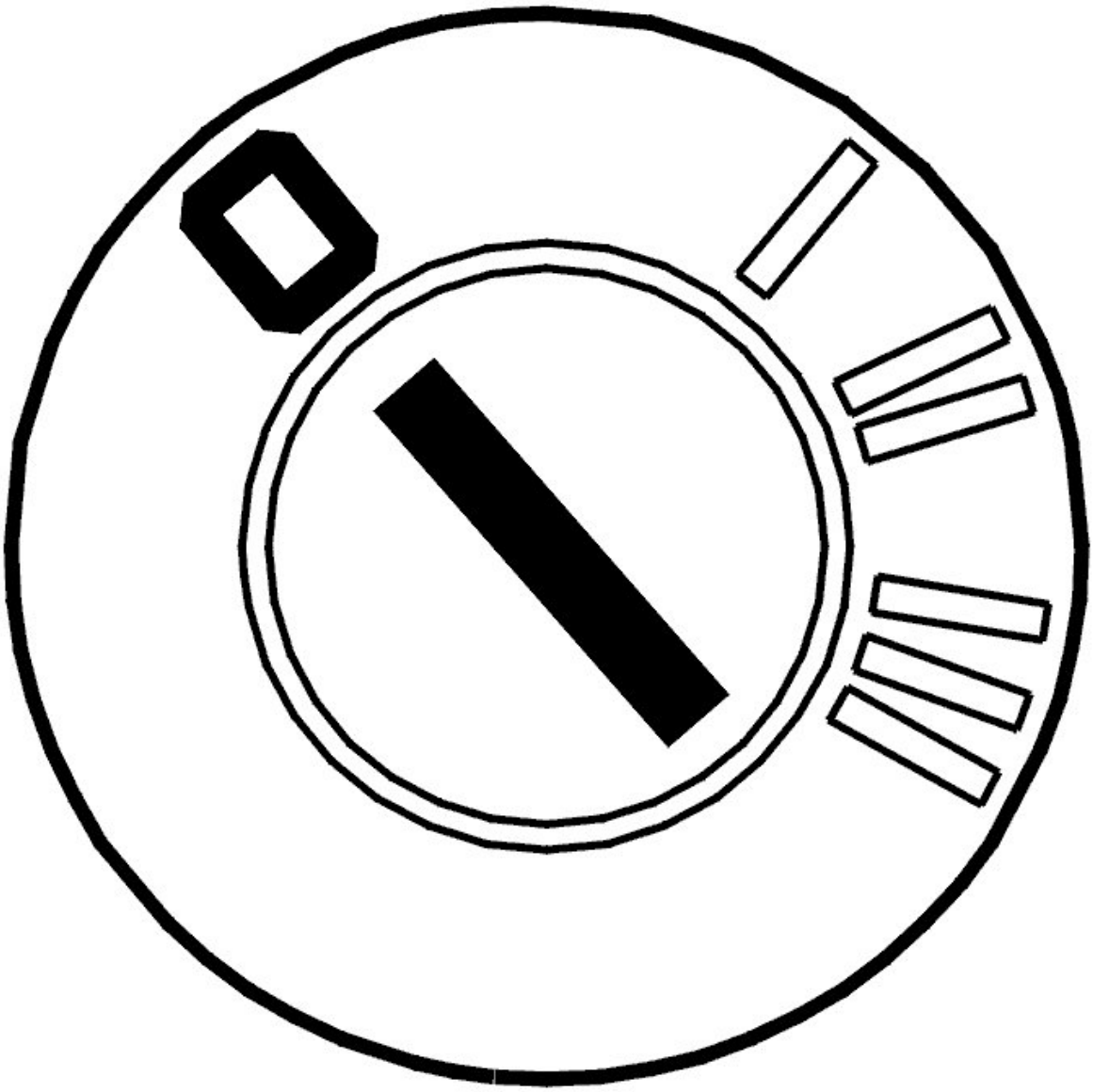
Possible source
- Incorrect calibration of the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Calibration Fault

Calibration fault

Replacing the component



- Switch off the ignition. Wait 10 seconds

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

If this diagnostic trouble code (DTC) is generated after unsuccessful calibration of the occupant weight sensor (OWS):
- Recalibrate the occupant weight sensor (OWS).

If the diagnostic trouble code (DTC) was set at another point:
- Replace the pressure sensor and the occupant weight sensor (OWS) module. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

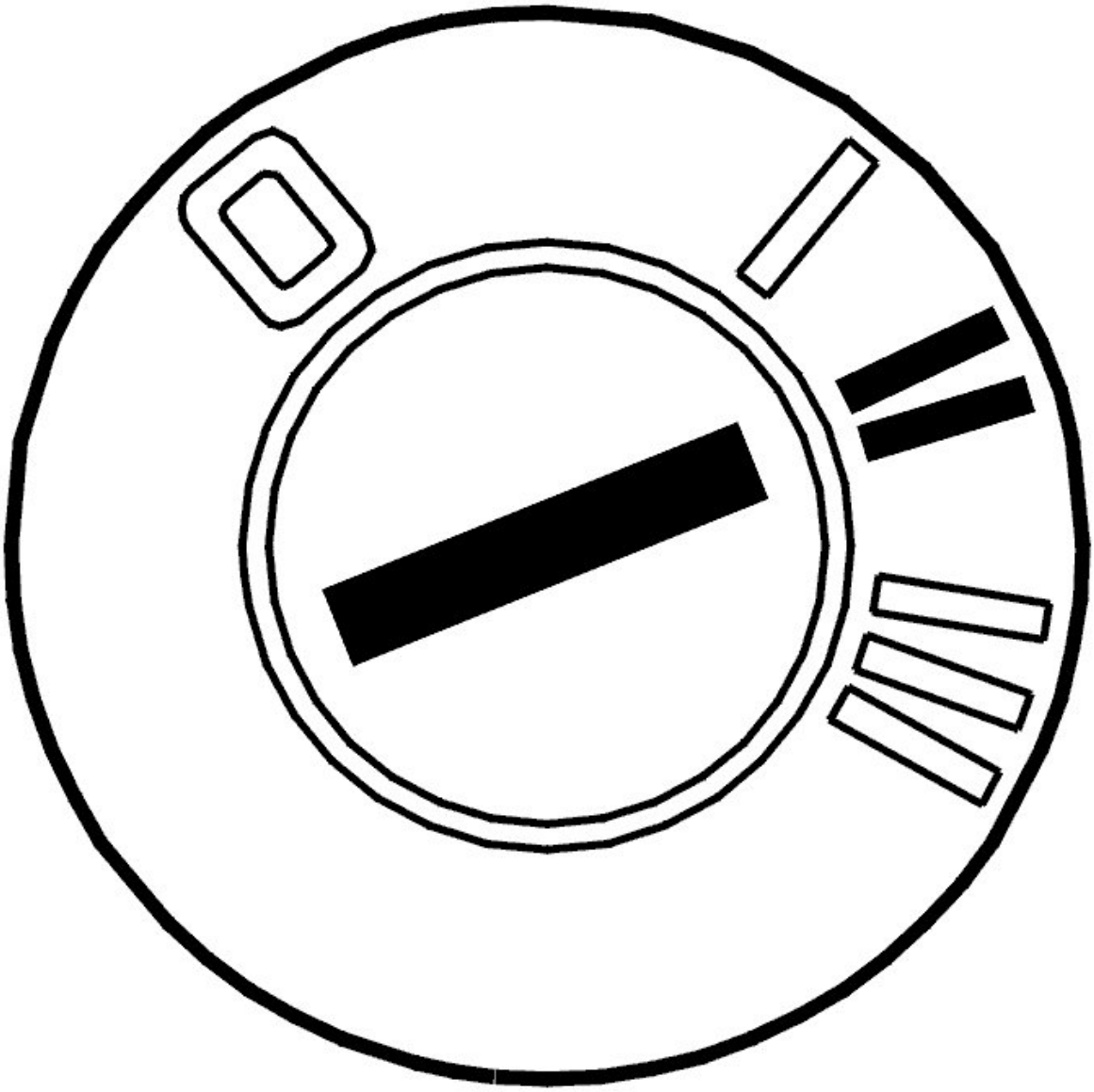
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

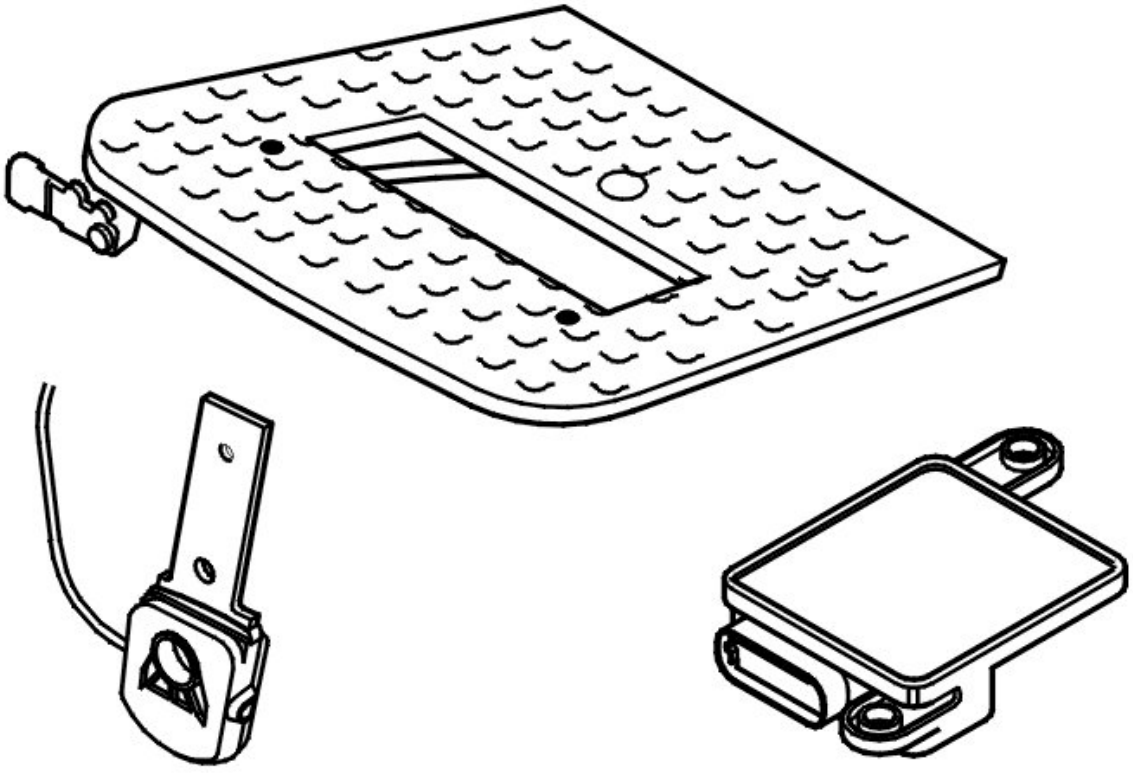
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025A

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers an internal fault in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

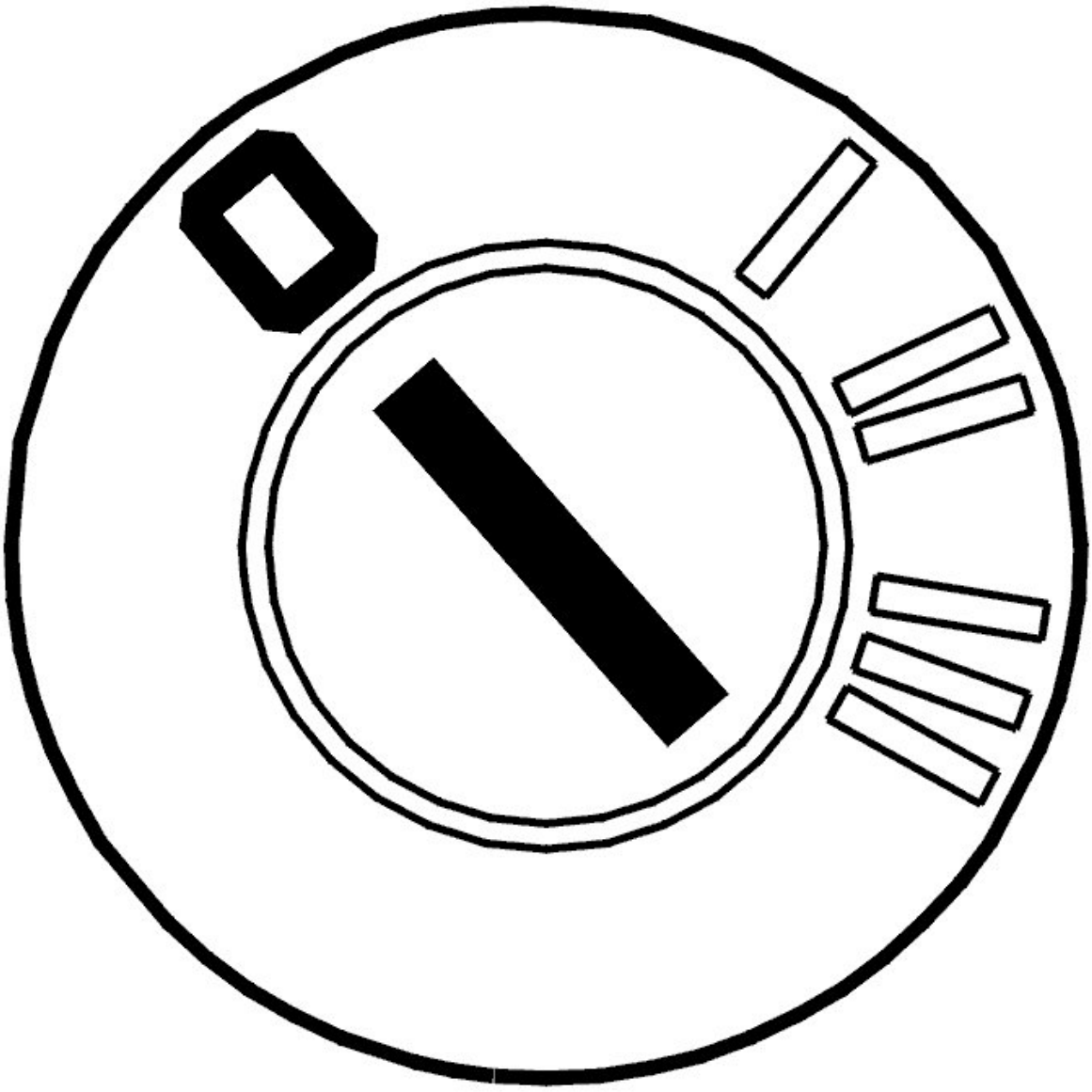
Possible source
- Internal fault in the occupant weight sensor (OWS).

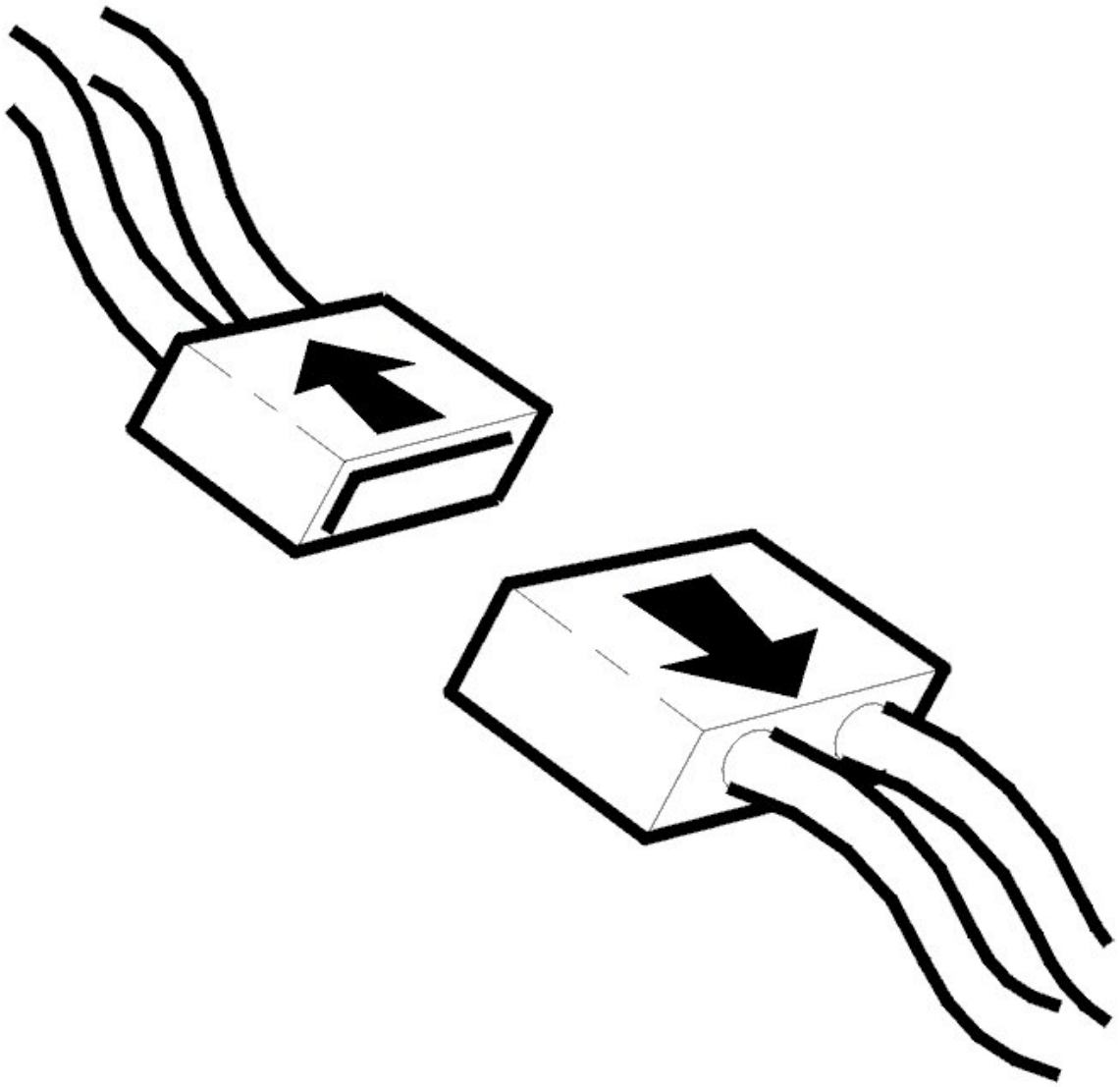
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Internal Fault

Internal fault

Checking the component and wiring





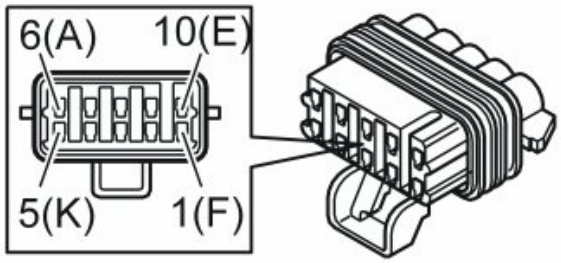
- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS) module
- Disconnect the connector from the seat belt force sensor.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Check the connectors for the seat belt force sensor and the occupant weight sensor (OWS) module. Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the wiring between the occupant weight sensor (OWS) module and the seat belt force sensor. Check for damage.
Remedy as necessary.
If no malfunction is found: Replace the seat belt force limiter.

Other information

- For further information about cable routing and terminals, see the wiring diagram
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)
- For replacement of seatbelt force sensor: Force limiter mechanical/belt tension sensor, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Tension Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

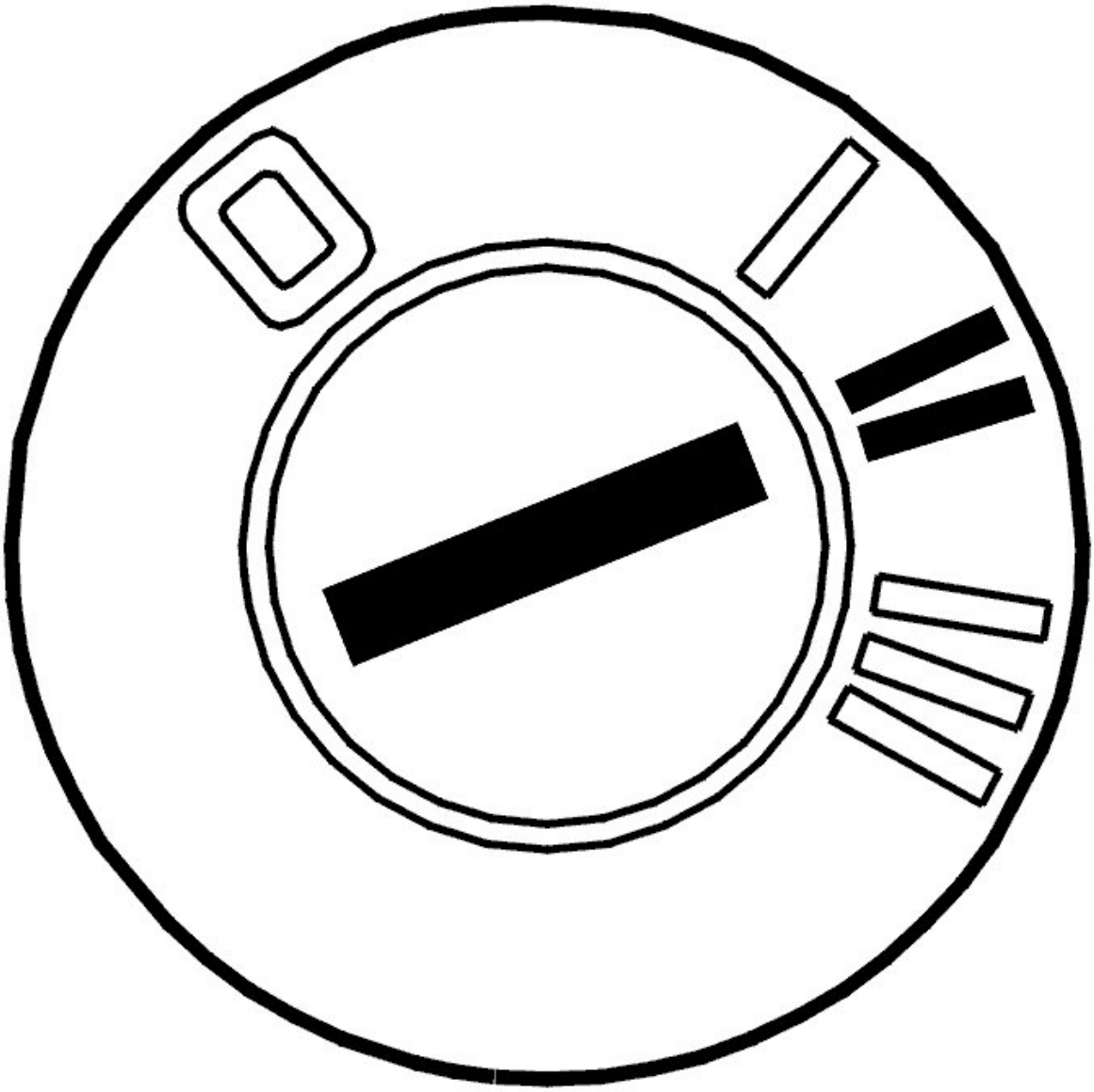
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off

- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

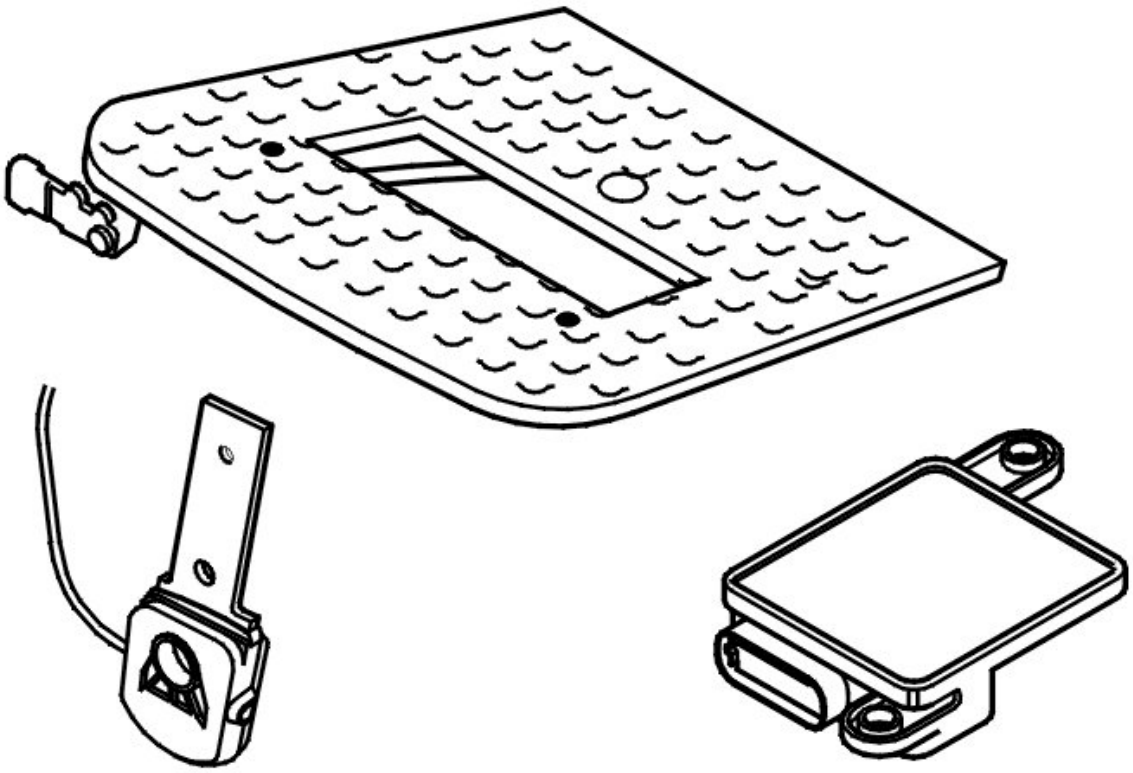
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025B

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message indicating that the voltage is too low in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

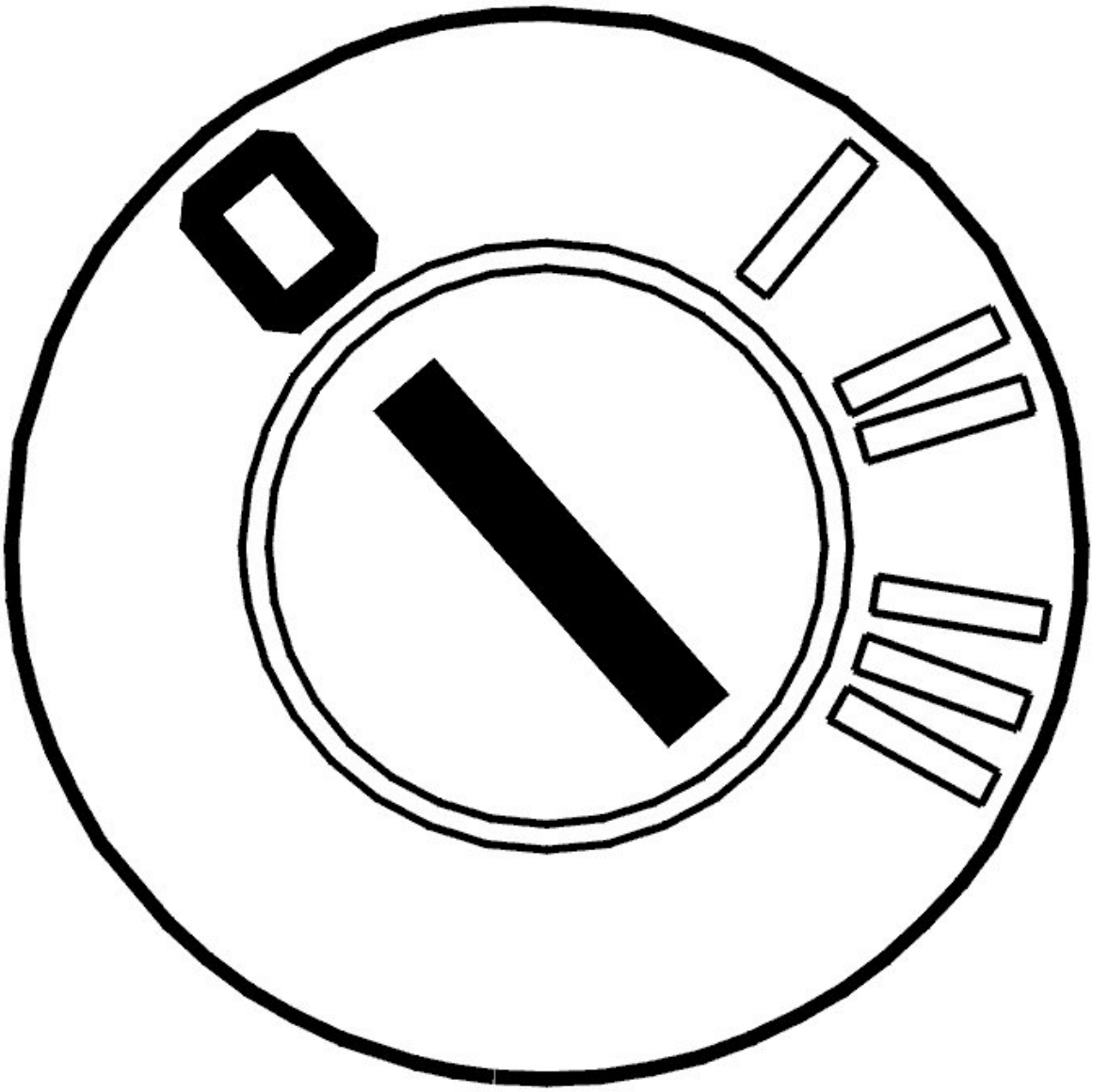
Possible source
- Short-circuit to ground in the signal cable or in the connectors between the components in the occupant weight sensor (OWS).
- Damaged belt tension sensor.

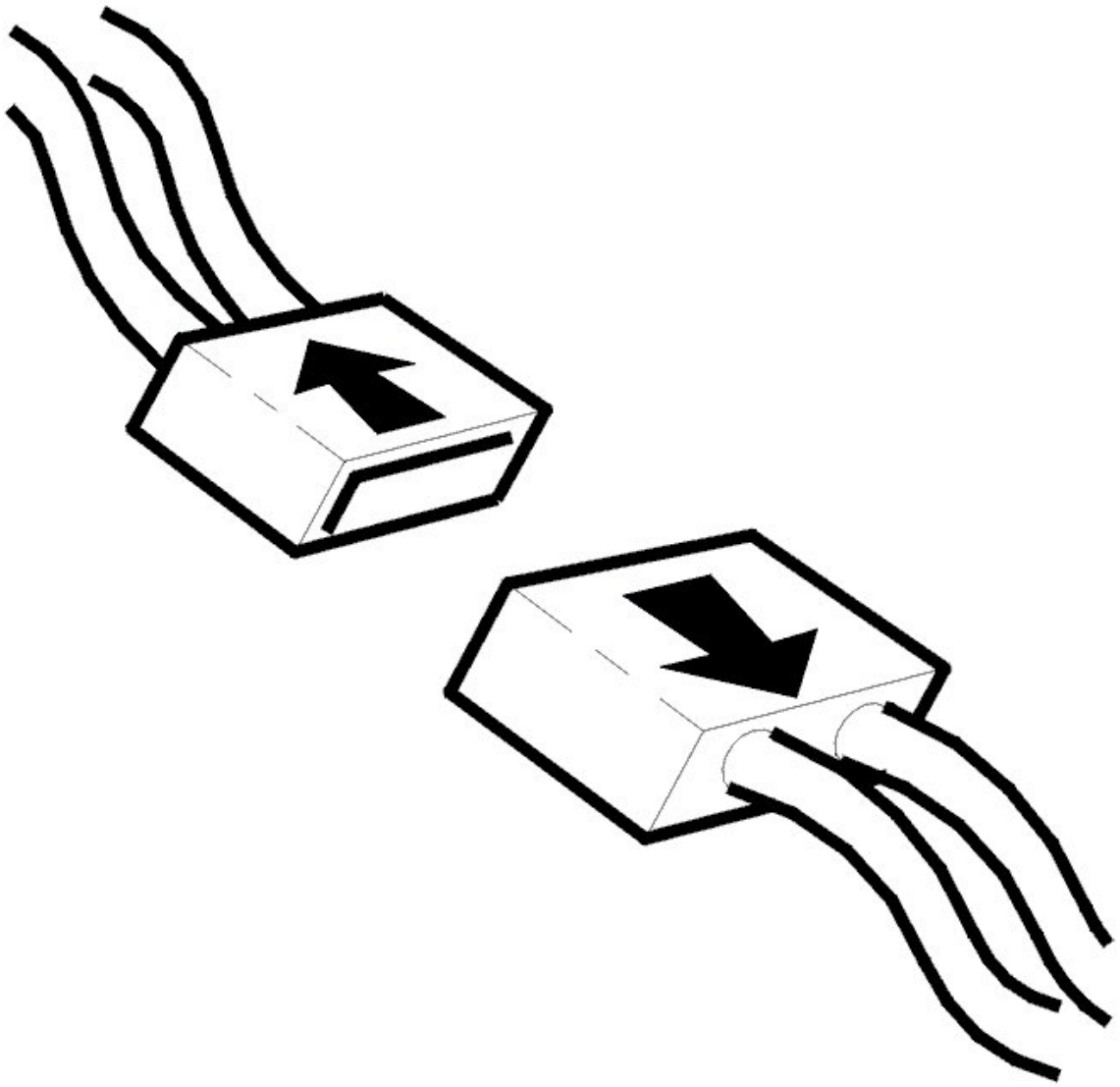
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Too Low

Signal too low

Checking the component and wiring





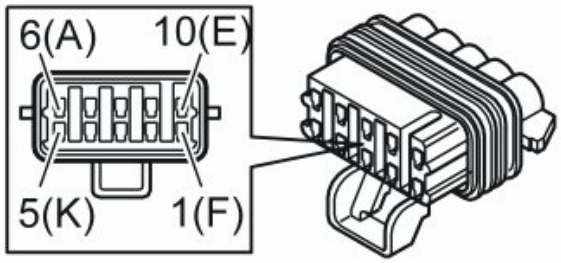
- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS) module
- Disconnect the connector from the seat belt force sensor.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Check the connectors for the seat belt force sensor and the occupant weight sensor (OWS) module. Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the wiring between the occupant weight sensor (OWS) module and the seat belt force sensor. Check for a short-circuit to ground.
Remedy as necessary.
If no malfunction is found: Replace the seat belt force limiter.

Other information

- For further information about cable routing and terminals, see the wiring diagram
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)
- For replacement of seatbelt force sensor: Force limiter mechanical/belt tension sensor, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Tension Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

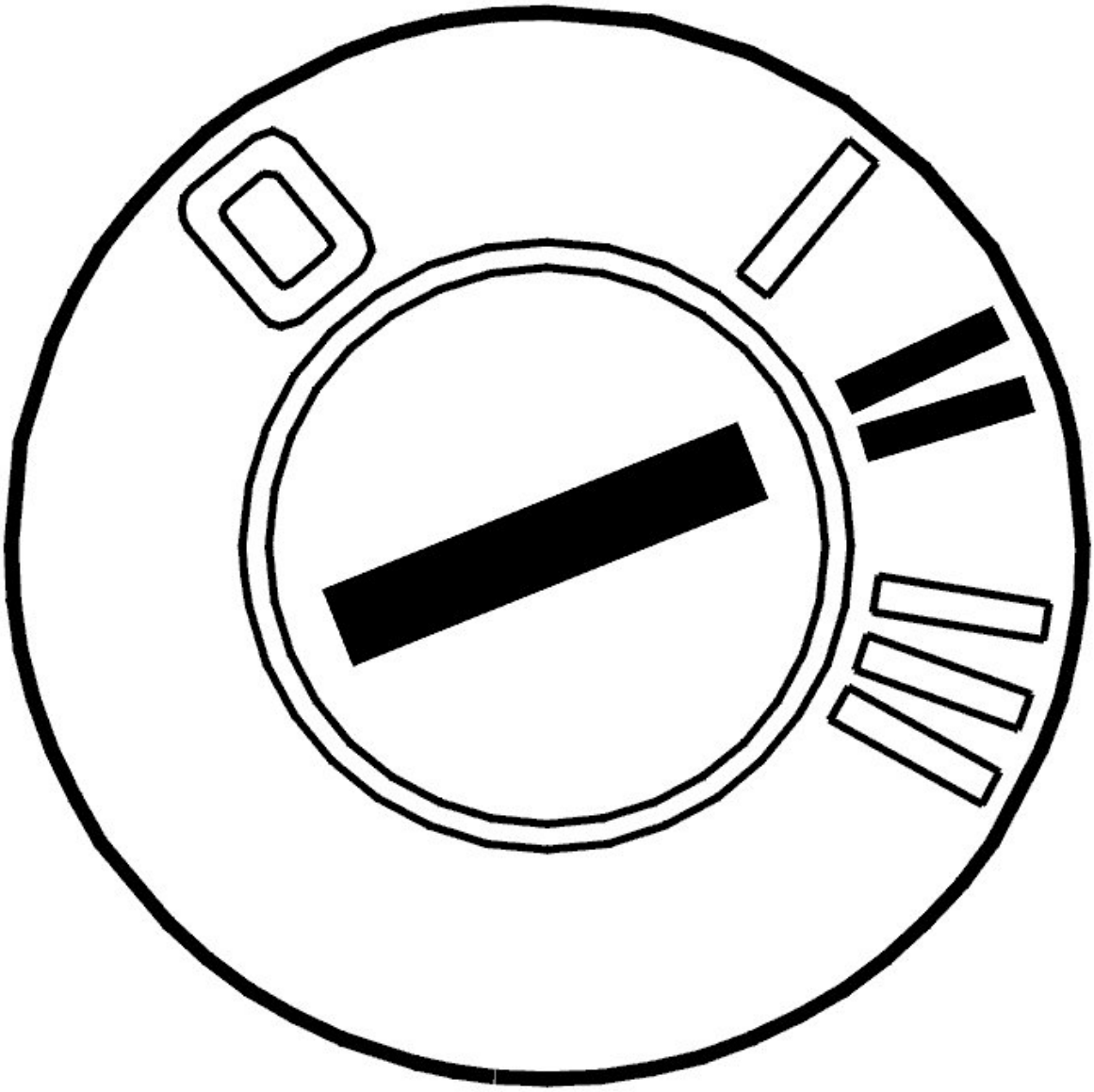
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off

- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

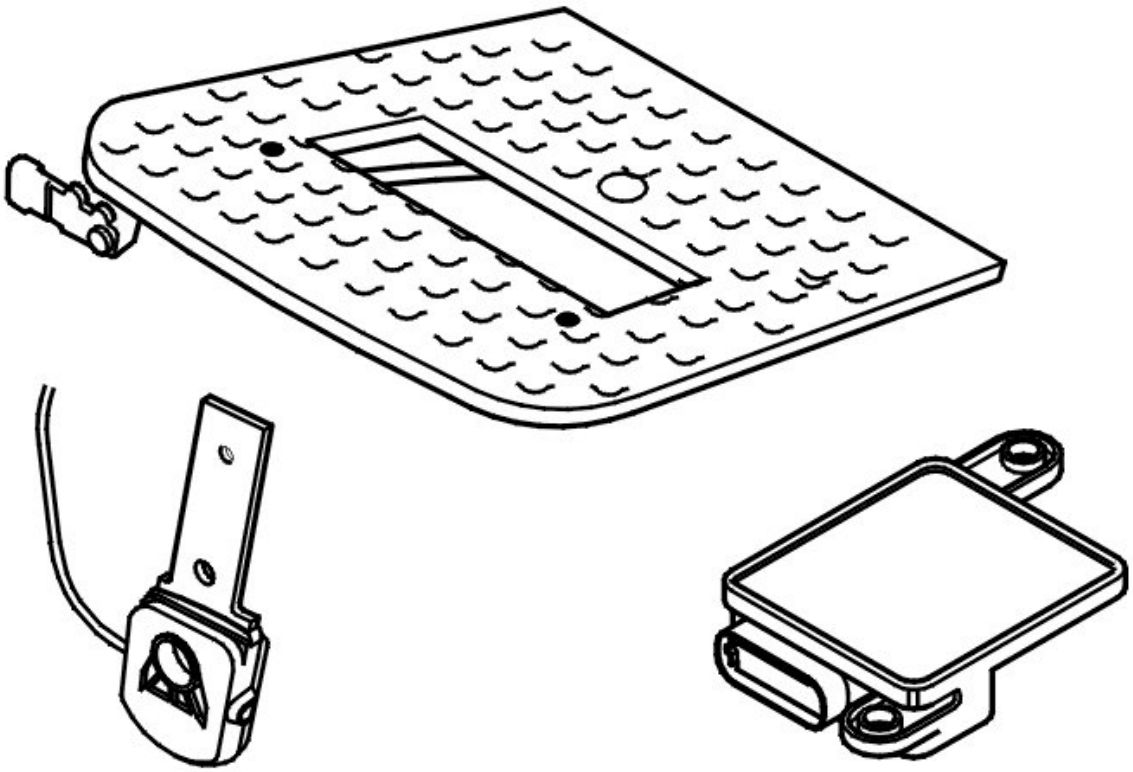
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025C

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message indicating that the voltage is too high in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

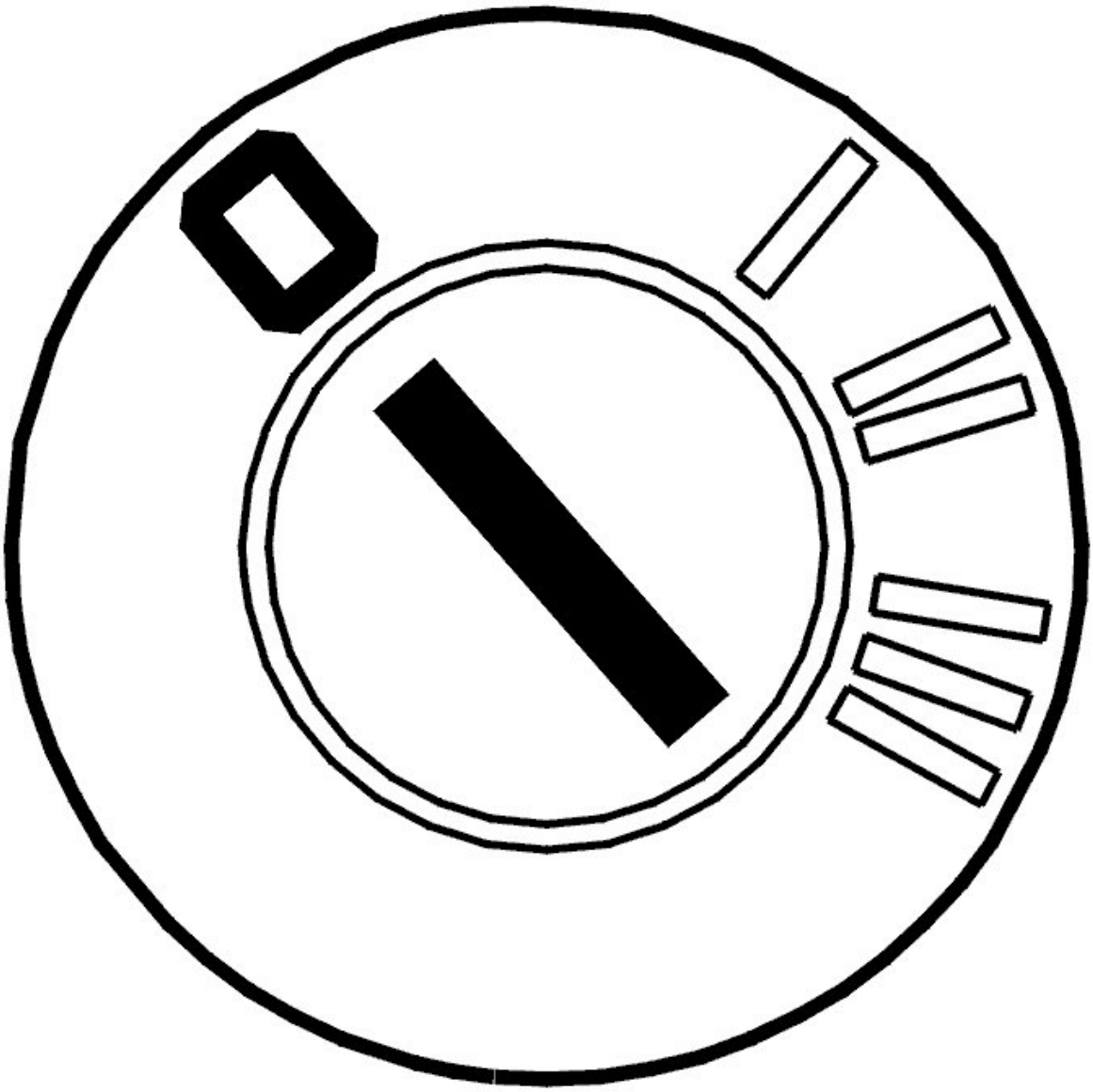
Possible source
- Short-circuit to supply voltage in the signal cable or in the connectors between the components in the occupant weight sensor (OWS).
- Damaged belt tension sensor.

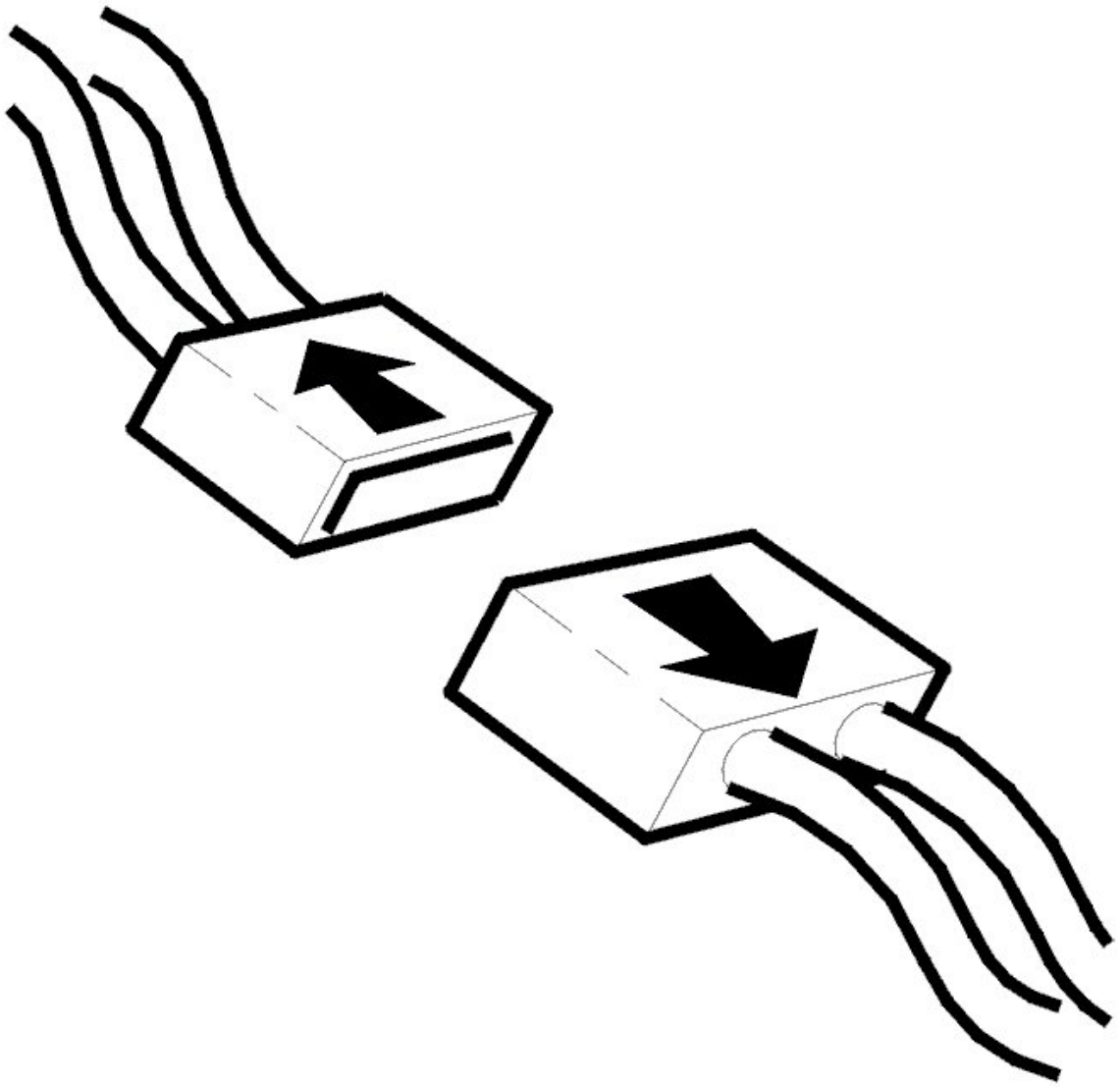
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Too High

Signal too high

Checking the component and wiring





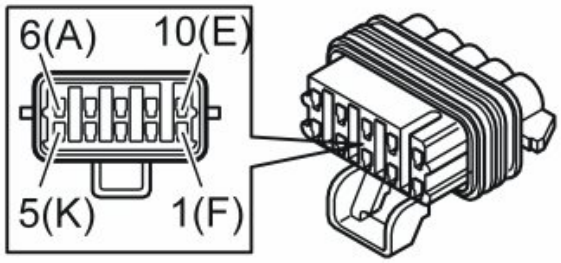
- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS) module
- Disconnect the connector from the seat belt force sensor.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Check the connectors for the seat belt force sensor and the occupant weight sensor (OWS) module. Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the wiring between the occupant weight sensor (OWS) module and the seat belt force sensor. Check for a short-circuit to supply voltage.
Remedy as necessary.
If no malfunction is found: Replace the seat belt force limiter.

Other information

- For further information about cable routing and terminals, see the wiring diagram
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)
- For replacement of seatbelt force sensor: Force limiter mechanical/belt tension sensor, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Tension Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

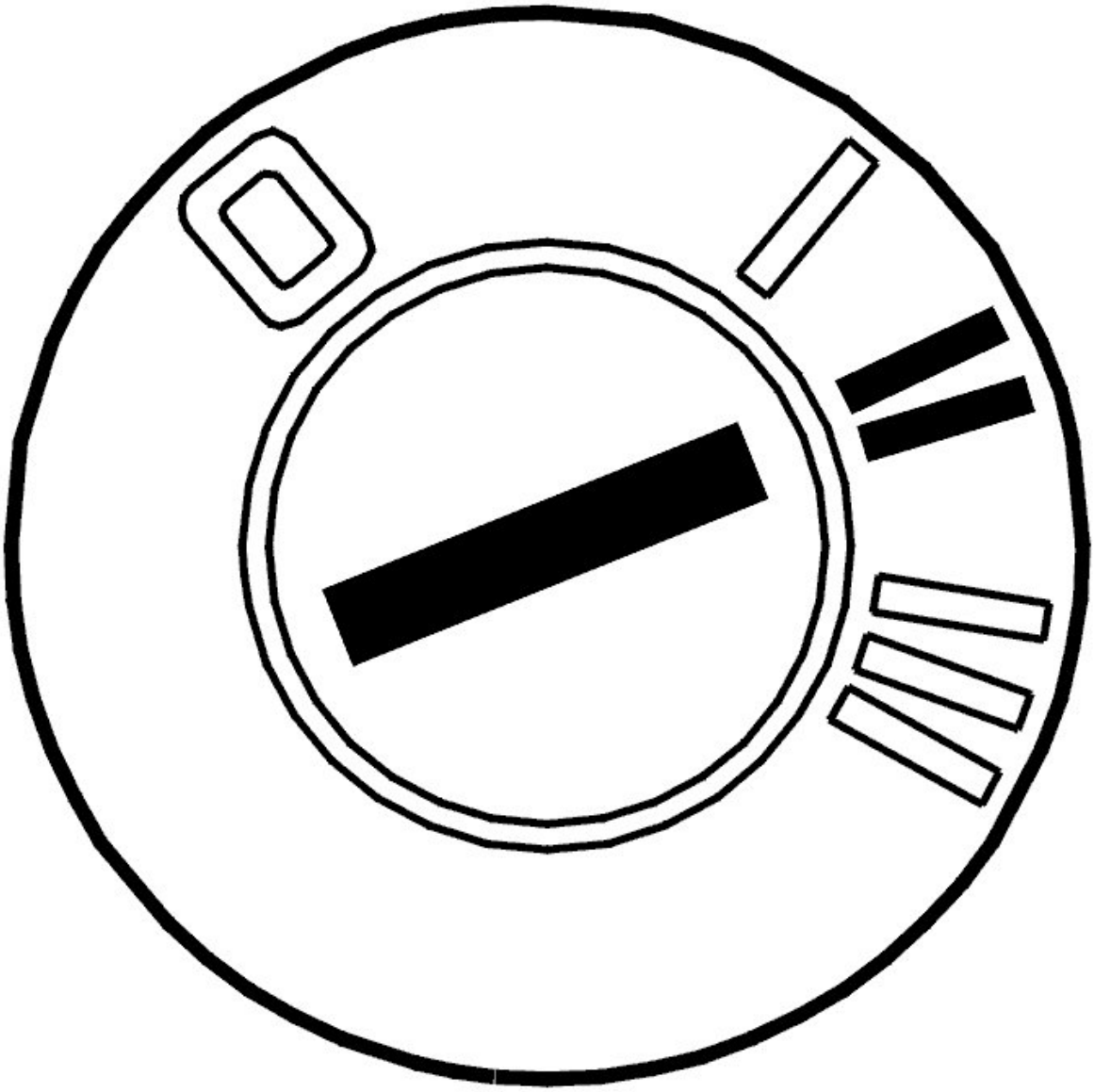
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off

- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

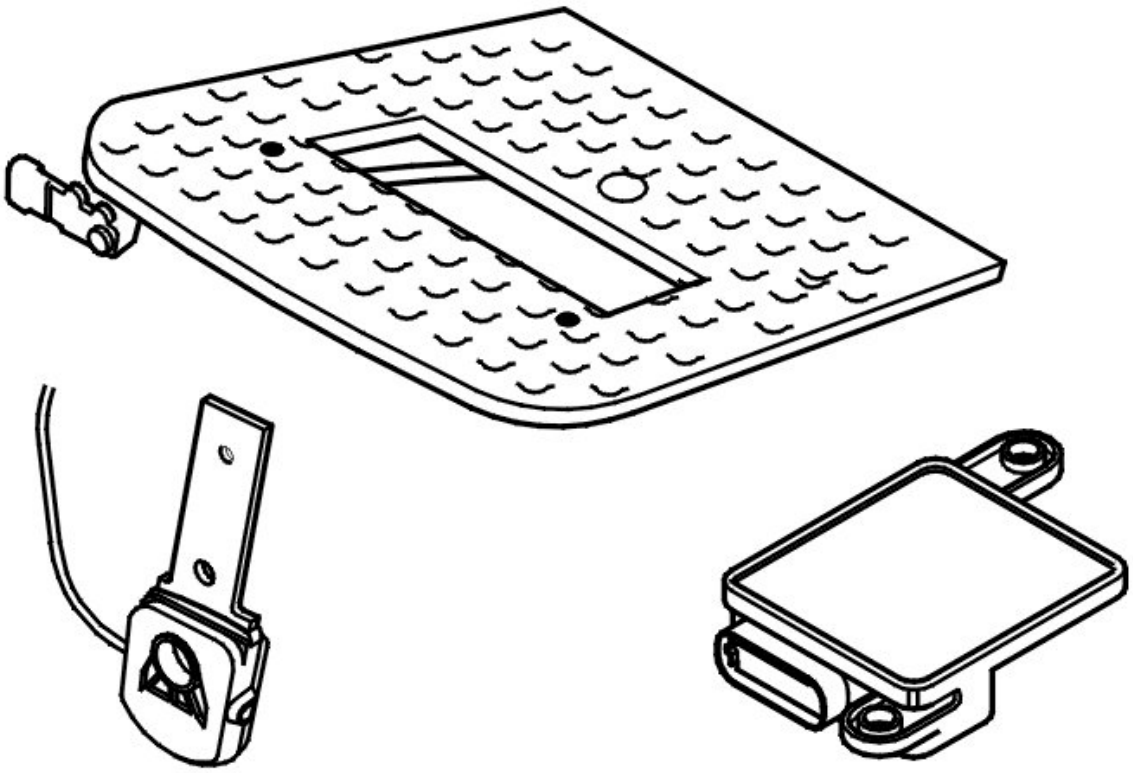
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025D

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message indicating that there is no signal in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

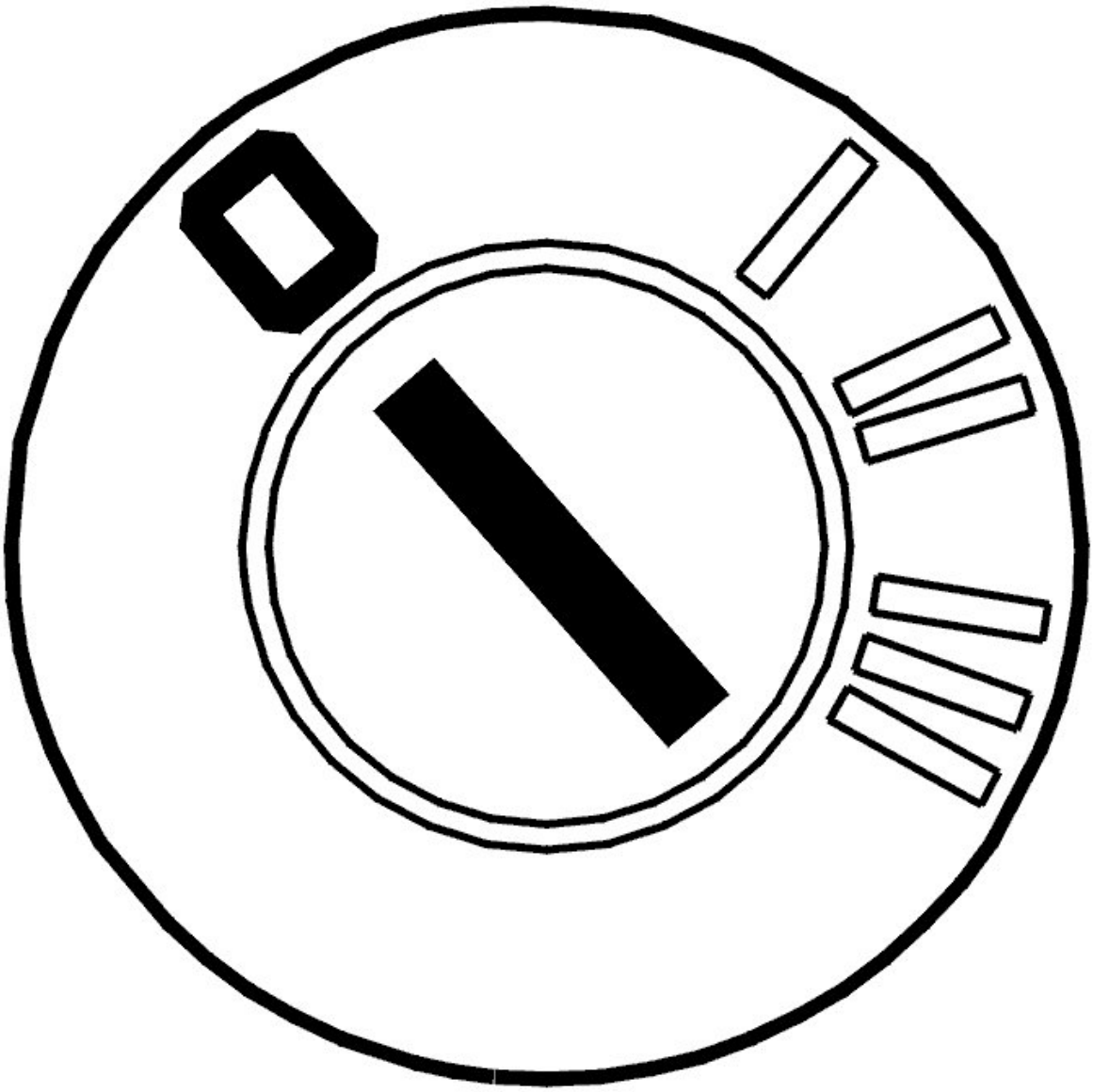
Possible source
- Open circuit in signal line or in connectors between BTS and the occupant weight sensor (OWS).
- Damaged belt tension sensor.

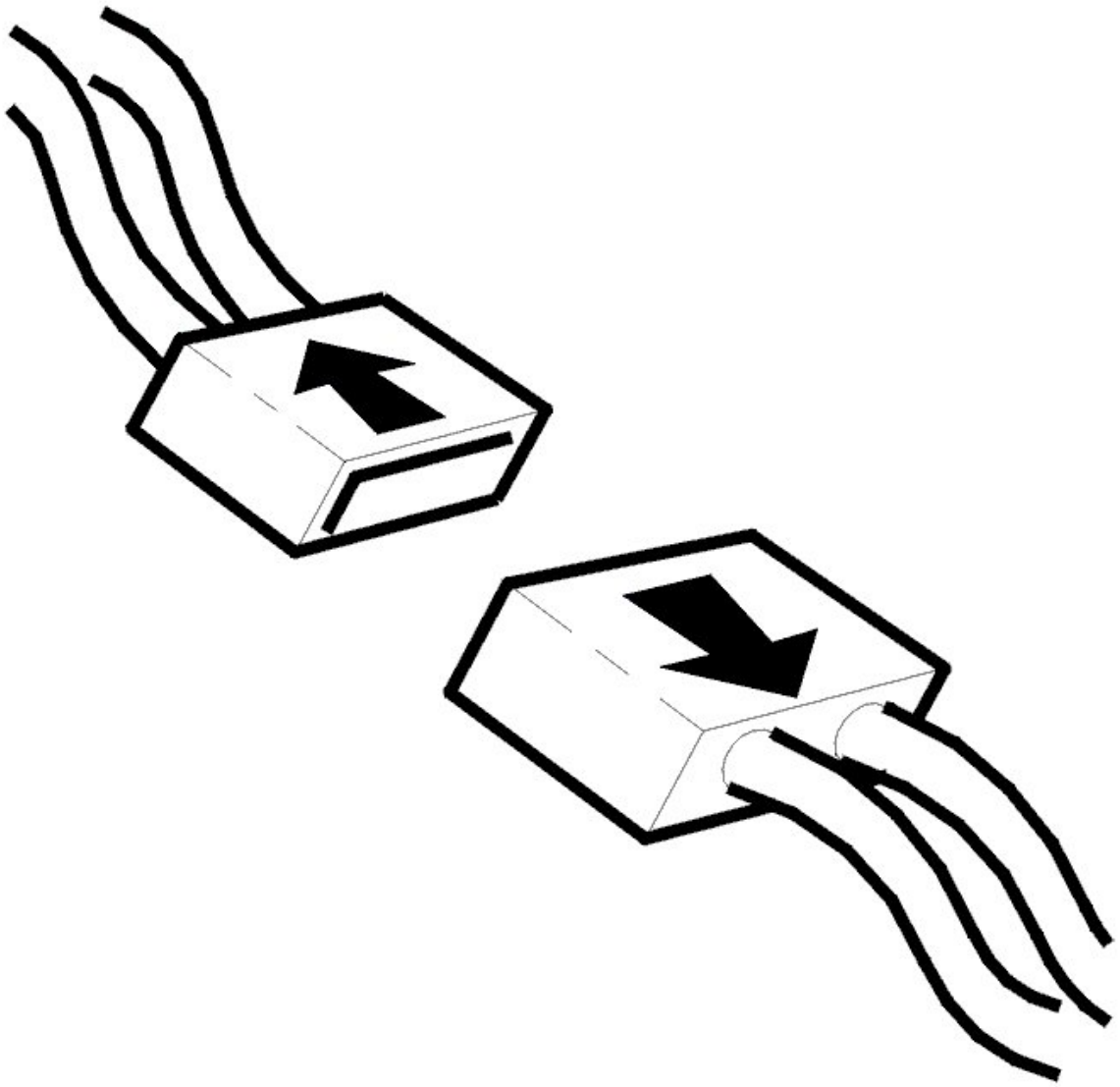
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Missing

Signal missing

Checking the component and wiring





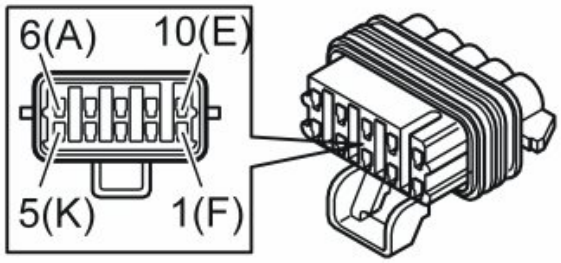
- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS) module
- Disconnect the connector from the seat belt force sensor.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Check the connectors for the seat belt force sensor and the occupant weight sensor (OWS) module. Check for damage to pins and terminals in the connectors.
Remedy as necessary.
Check the wiring between the occupant weight sensor (OWS) module and the seat belt force sensor. Check for an open-circuit.
Remedy as necessary.
If no malfunction is found: Replace the seat belt force limiter.

Other information

- For further information about cable routing and terminals, see the wiring diagram
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)
- For replacement of seatbelt force sensor: Force limiter mechanical/belt tension sensor, replacing See: Restraint Systems/Seat Belt Systems/Seat Belt Tension Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

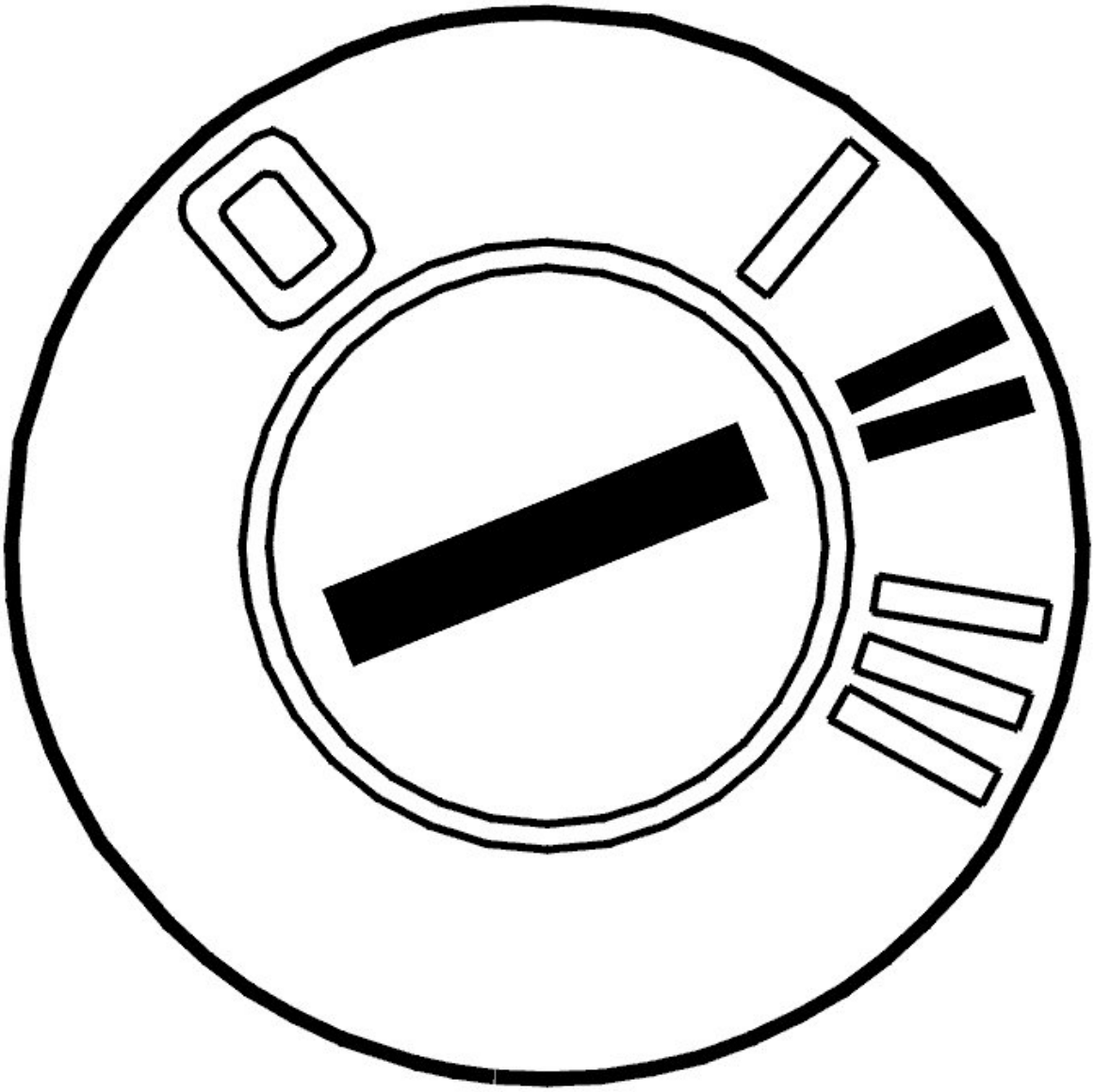
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off

- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

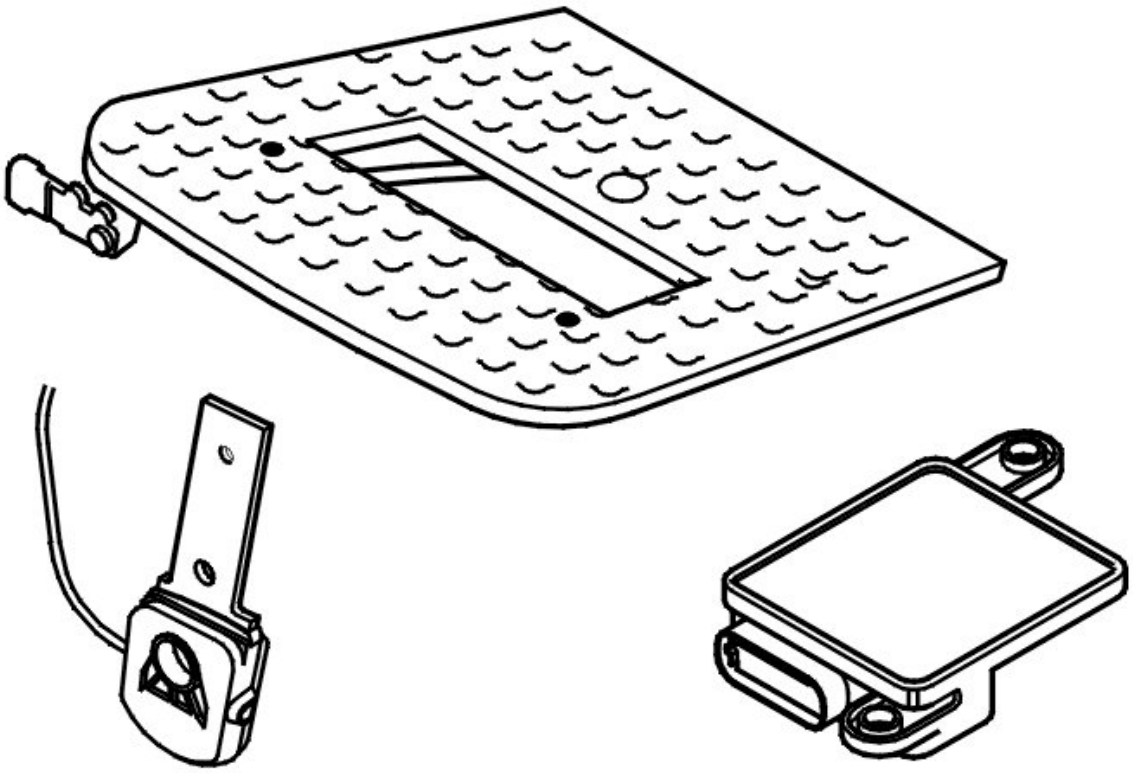
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025E

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers an internal fault in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

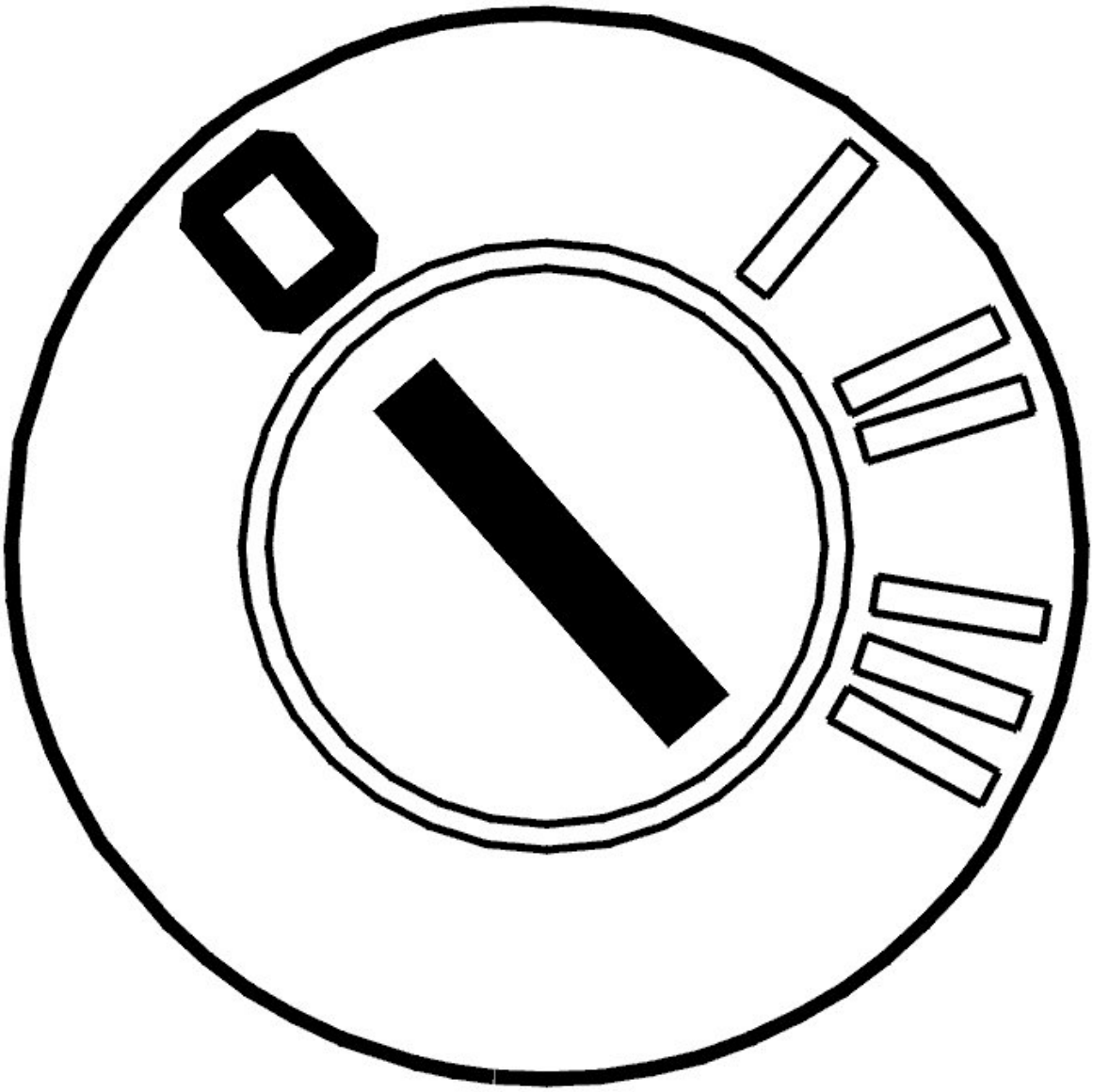
Possible source
- Internal fault in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Internal Fault

Internal fault

Replacing the component



- Switch off the ignition. Wait 10 seconds.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Replace the pressure sensor and the occupant weight sensor (OWS) module. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

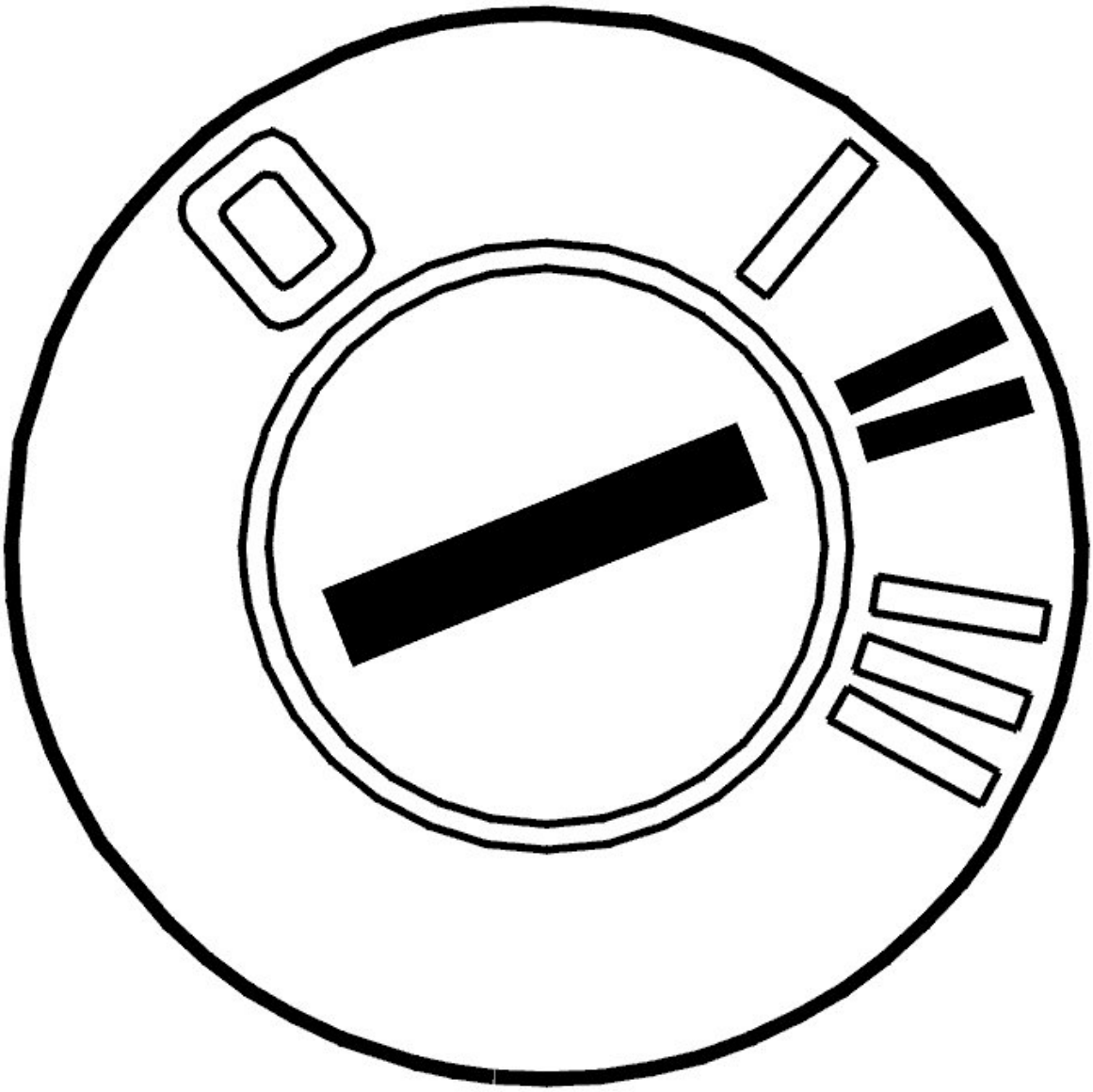
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

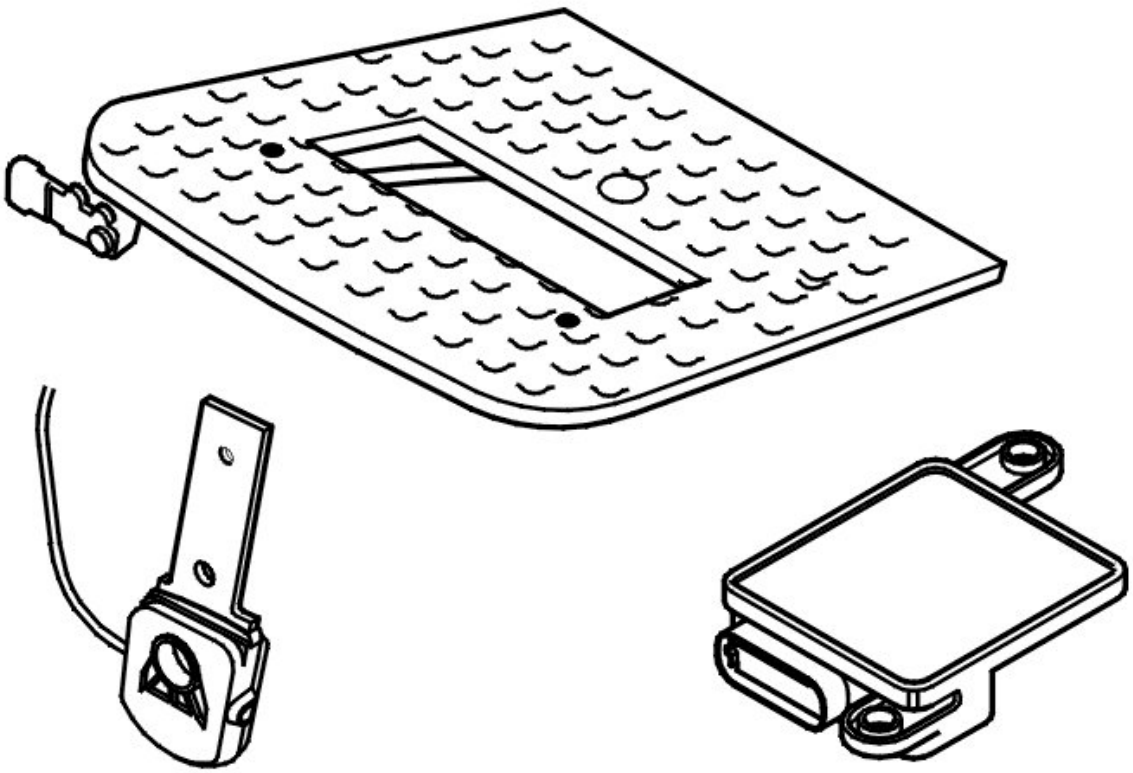
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-025F

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message indicating that the voltage is too low in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

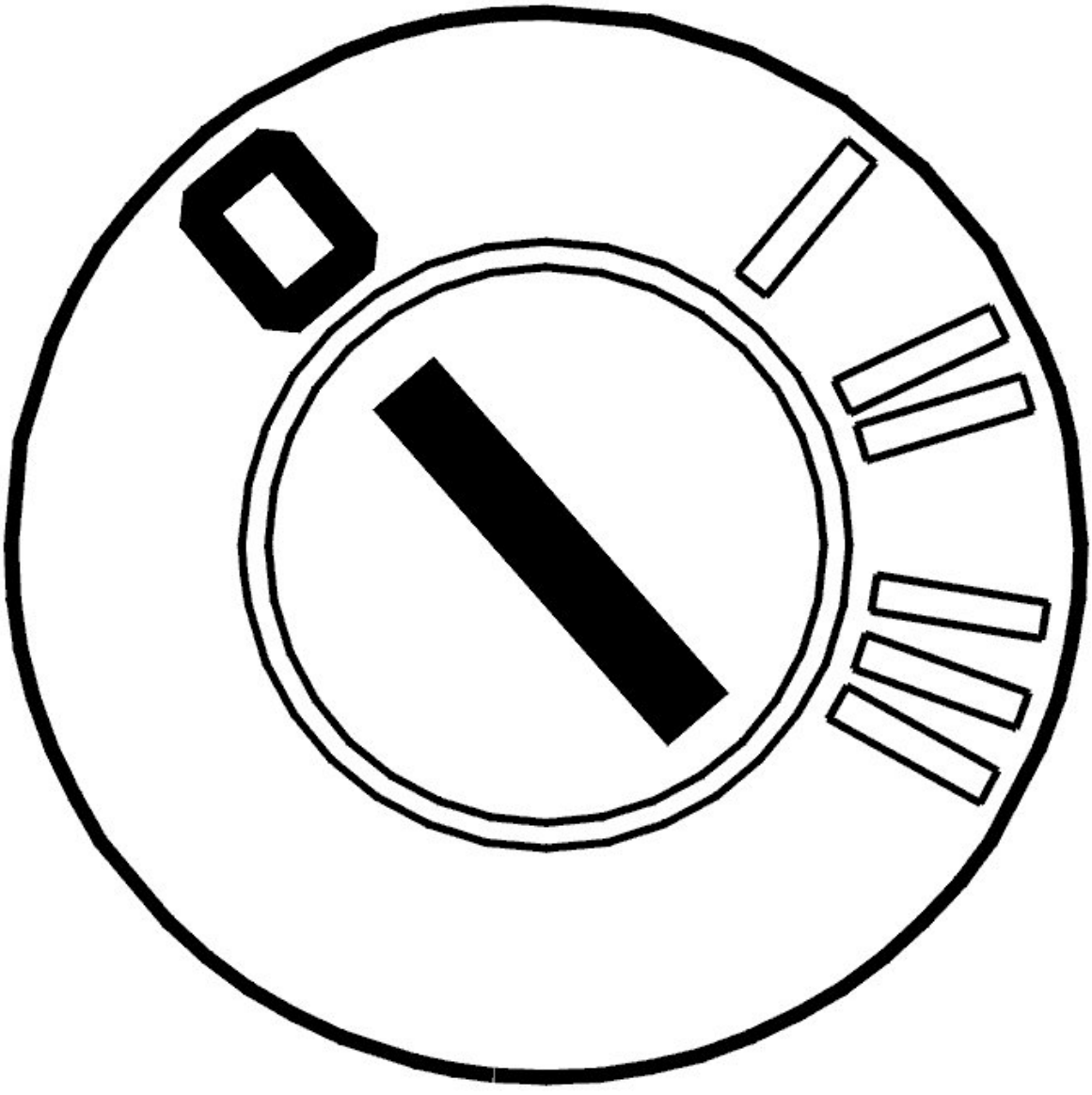
Possible source
- Damaged occupant weight sensor (OWS).
- Short-circuit to ground in the signal cable or in the connectors between the components in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Too Low

Signal too low

Checking the component and wiring



- Switch off the ignition. Wait 10 seconds.
- Unplug the 10-pin connector from the occupant weight sensor (OWS).
- Unplug the 3-pin connector from the pressure sensor.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Check the connectors between the pressure sensor and the occupant weight sensor (OWS) for damaged pins and connections.
Remedy as necessary.
Check the leads between pressure sensor and the occupant weight sensor (OWS) for short-circuiting to voltage/ground and open circuit.
Remedy as necessary.

Other information

- For further information about cable routing and terminals, see the wiring diagram
- Signal description occupant weight sensor (OWS): Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)

Has the fault been remedied?

Yes - Verification

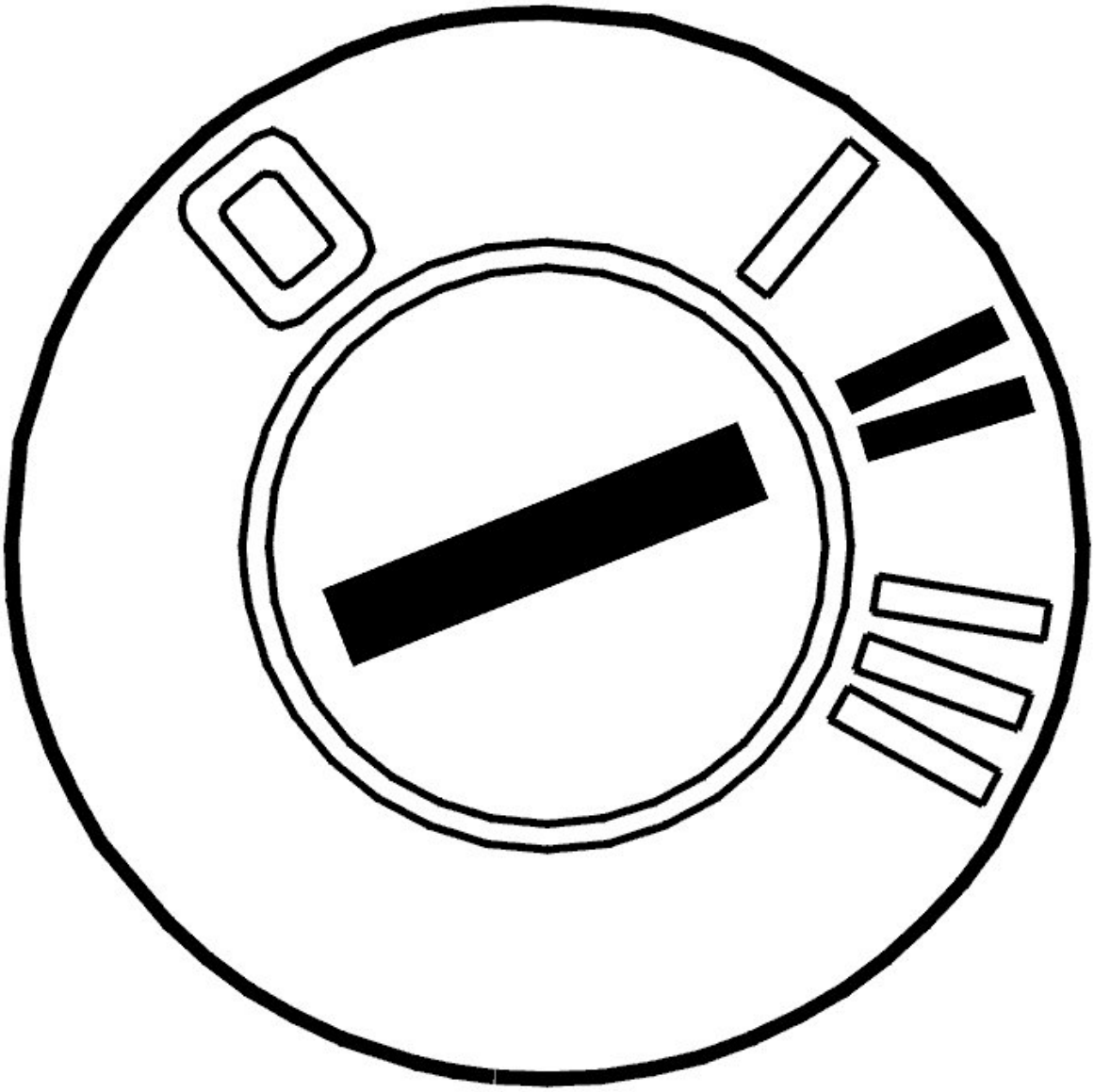
No - Replacing a component

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component and wiring

Replacing a component

- Ignition off, wait for 10 seconds.

Caution! Avoid touching the contact pin of the occupant weight sensor (OWS). Risk of electrostatic discharge that may cause damage in occupant weight sensor (OWS).

Change pressure sensor and occupant weight sensor (OWS). Pressure sensor included in system occupant weight sensor (OWS).

Note! After change of pressure sensor and occupant weight sensor (OWS) then the supplemental restraint system module (SRS) must be configured. This is done by storing ID-number for occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

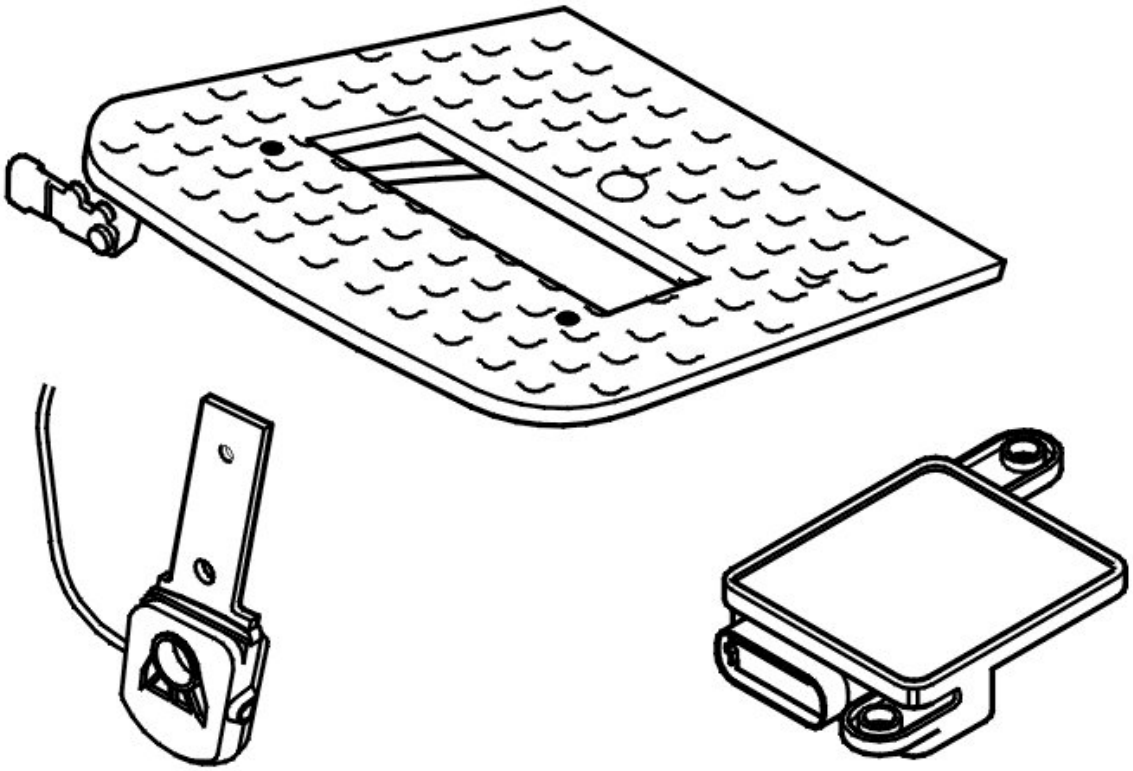
Select continue when the defect has been remedied.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0260

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message indicating that the voltage is too high in the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

Possible source
- Damaged occupant weight sensor (OWS).
- Short-circuit to supply voltage in the signal cable or in the connectors between the components in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Too High

Signal too high

Checking the wiring and terminals
- Ignition off, wait for 10 seconds.
- Unplug the 10-pin connector from the occupant weight sensor (OWS).
- Unplug the 3-pin connector from the pressure sensor.

Caution! Avoid touching the contact pin of the occupant weight sensor (OWS). Risk of electrostatic discharge that may cause damage in occupant weight sensor (OWS).

Check the connectors between the pressure sensor and the occupant weight sensor (OWS) for damaged pins and connections.
Remedy as necessary.
Check the leads between pressure sensor and the occupant weight sensor (OWS) for short-circuiting to voltage/ground and open circuit.
Remedy as necessary.

Other information

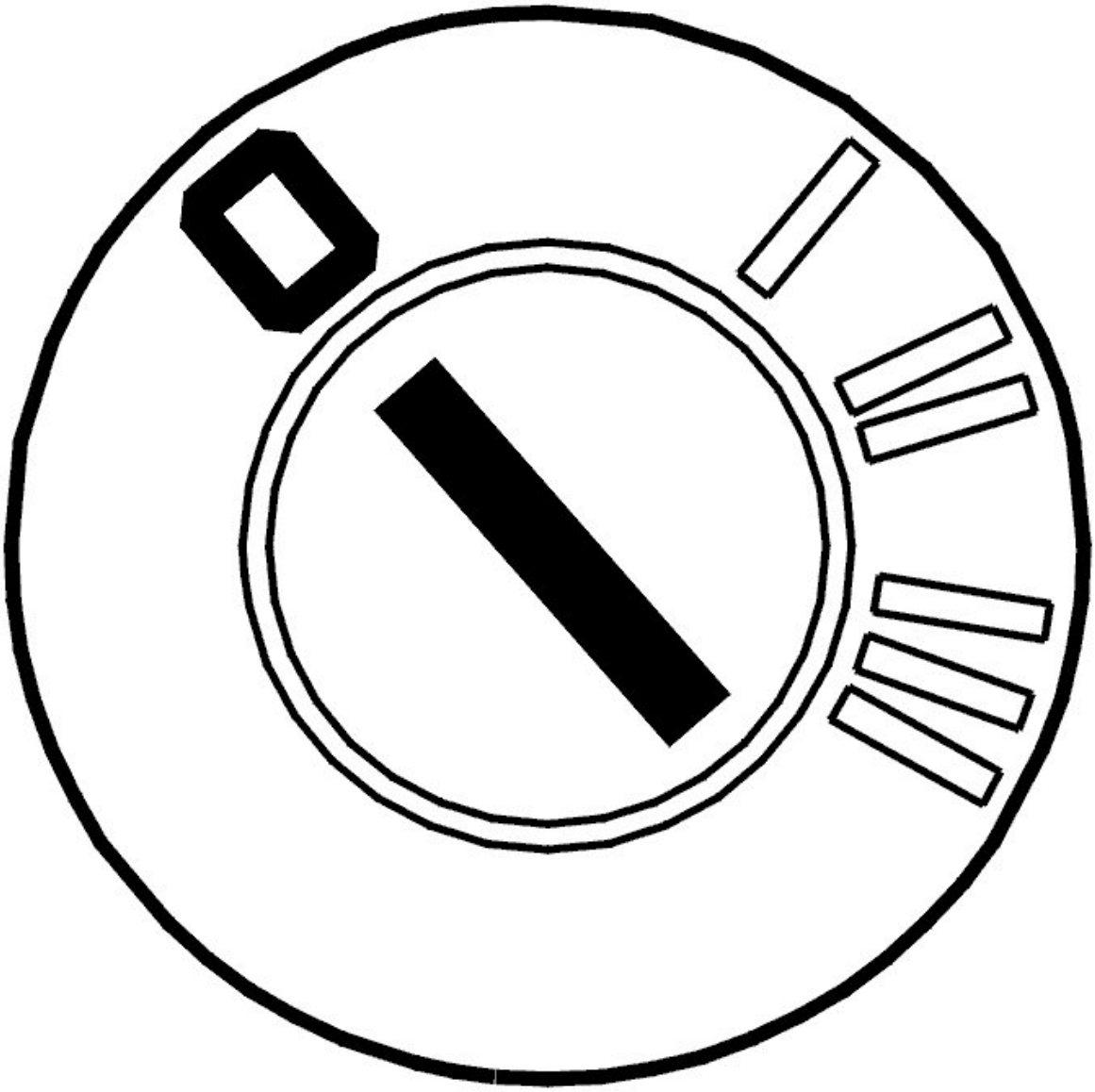
- For further information about cable routing and terminals, see the wiring diagram
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Occupant Weight Sensor (OWS)

Has the fault been remedied?

Yes - Verification

No - Replacing the component

Replacing the component



- Switch off the ignition. Wait 10 seconds.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Change pressure sensor and occupant weight sensor (OWS). Pressure sensor included in system occupant weight sensor (OWS).

Note! After change of pressure sensor and occupant weight sensor (OWS) then the supplemental restraint system module (SRS) must be configured. This is done by storing ID-number for occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be

calibrated.

Other information

- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

Select "Continue" when the fault has been remedied.

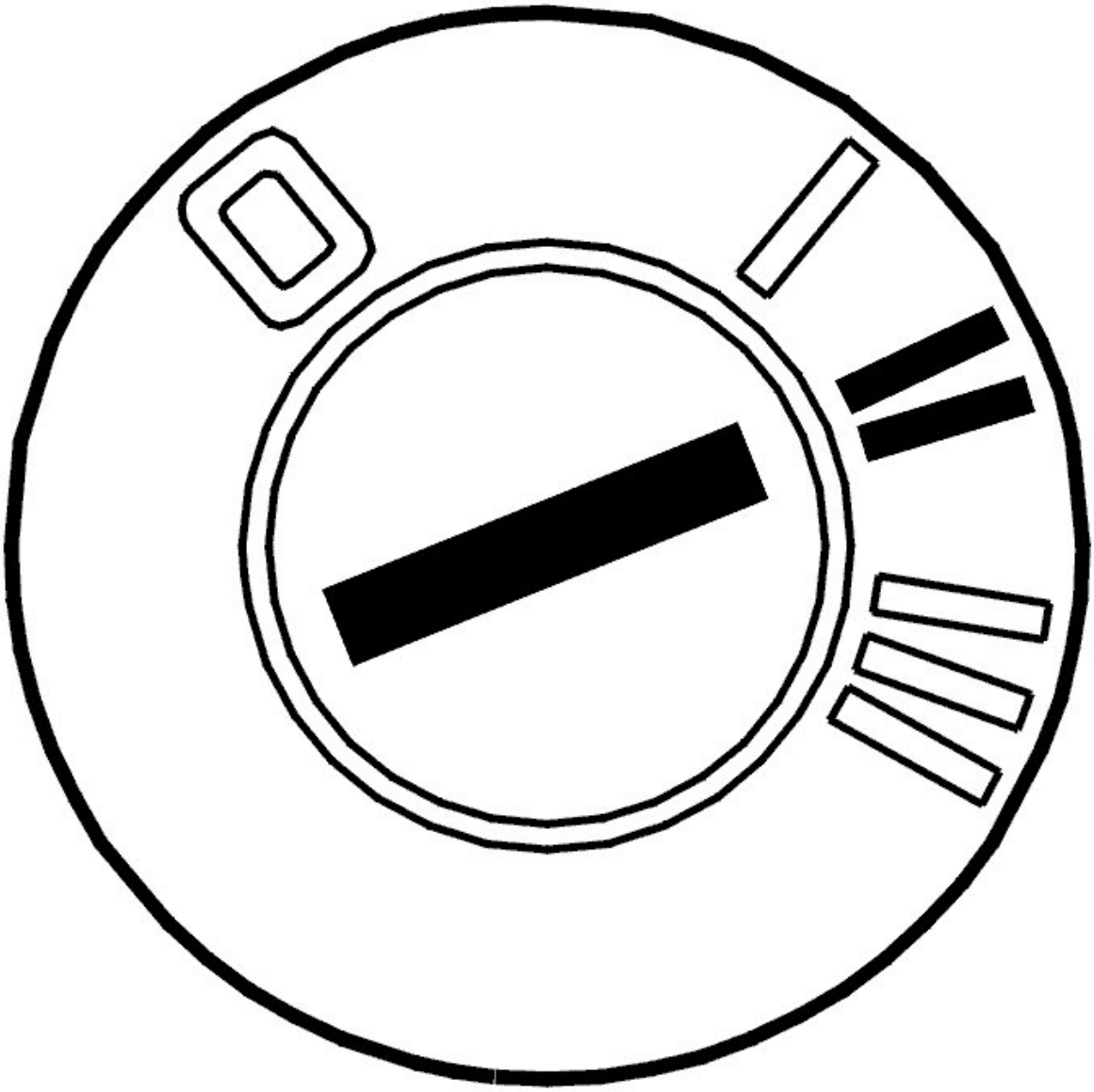
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

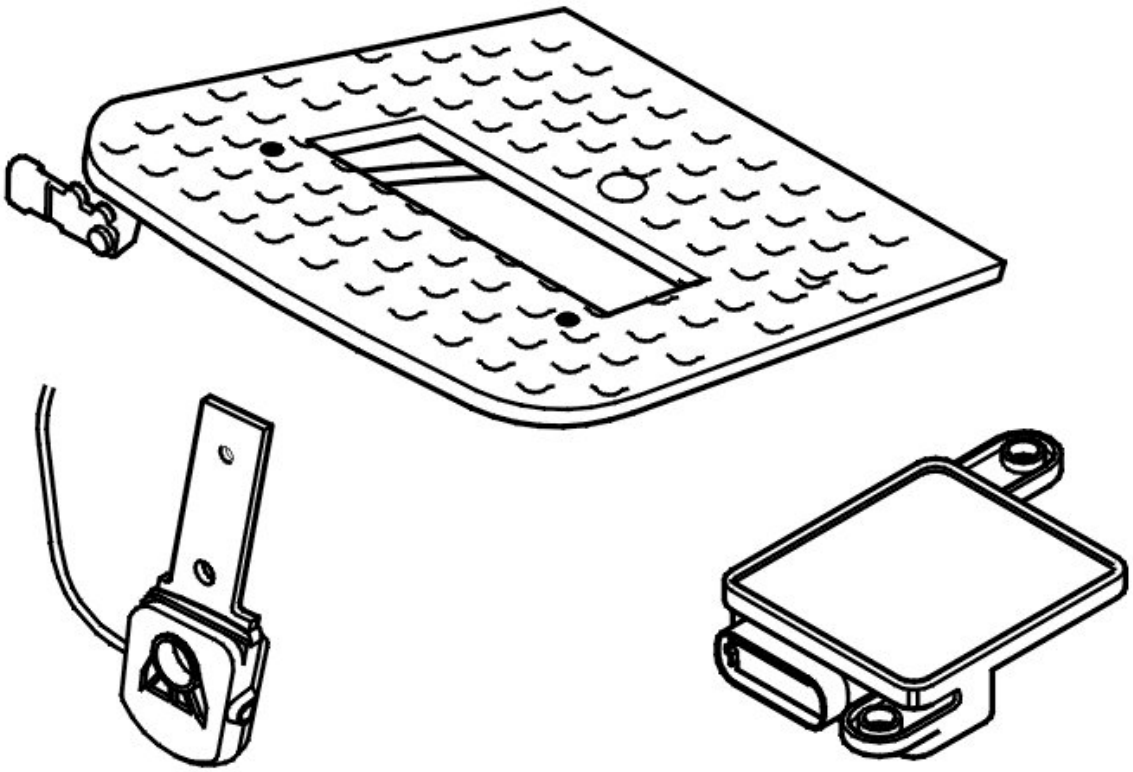
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the wiring and terminals

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-0262

Condition



The supplemental restraint system module (SRS) checks the signal from the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module receives a message containing incorrect data.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

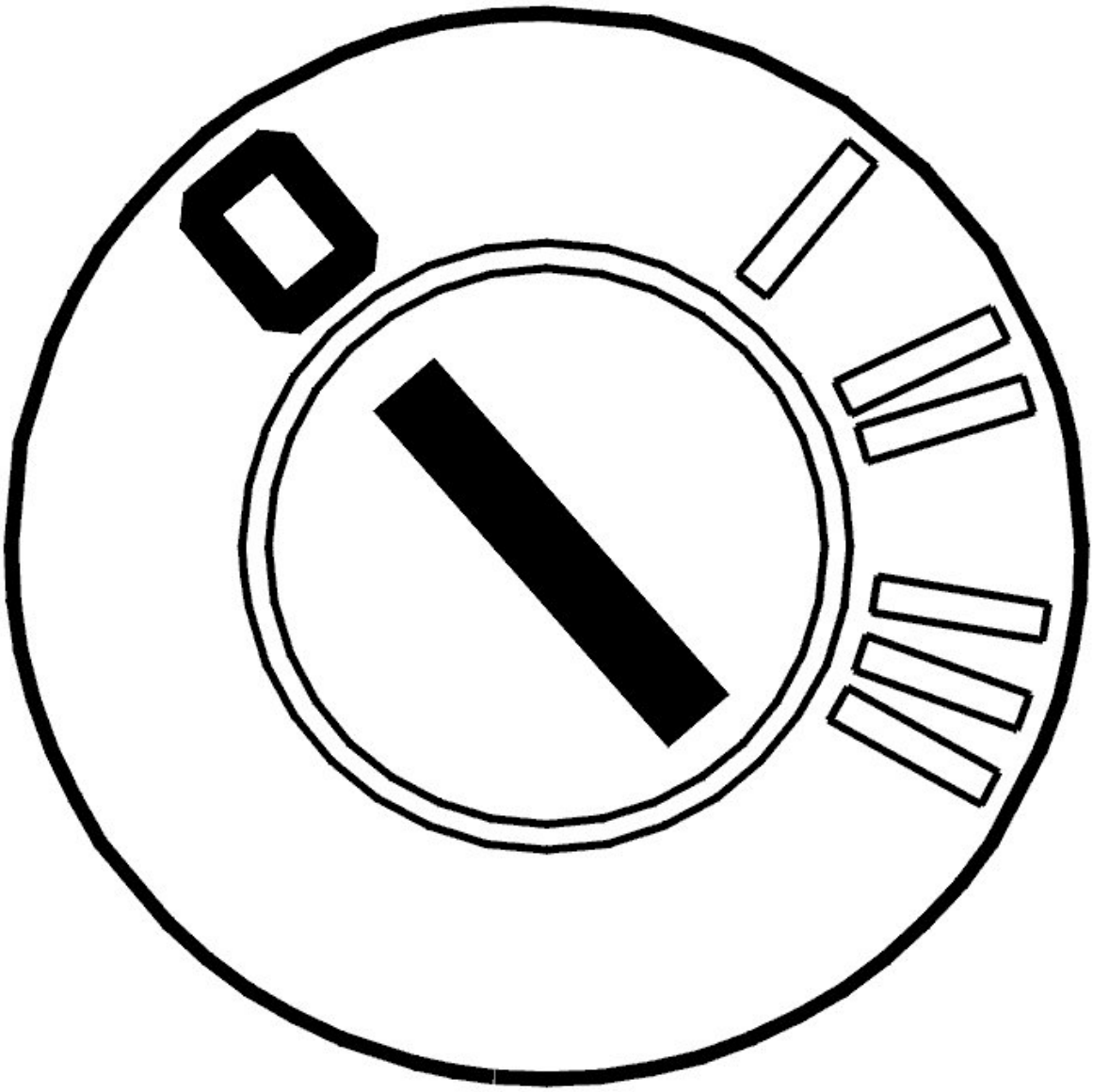
Possible source
- Damaged component in the occupant weight sensor (OWS).

Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Incorrect data

Incorrect data

Replacing the component



- Switch off the ignition. Wait 10 seconds.

Caution! Avoid touching the terminal pins in the occupant weight sensor (OWS). There is a risk of static discharge which could damage the occupant weight sensor (OWS).

Replace the pressure sensor and the occupant weight sensor (OWS) module. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)

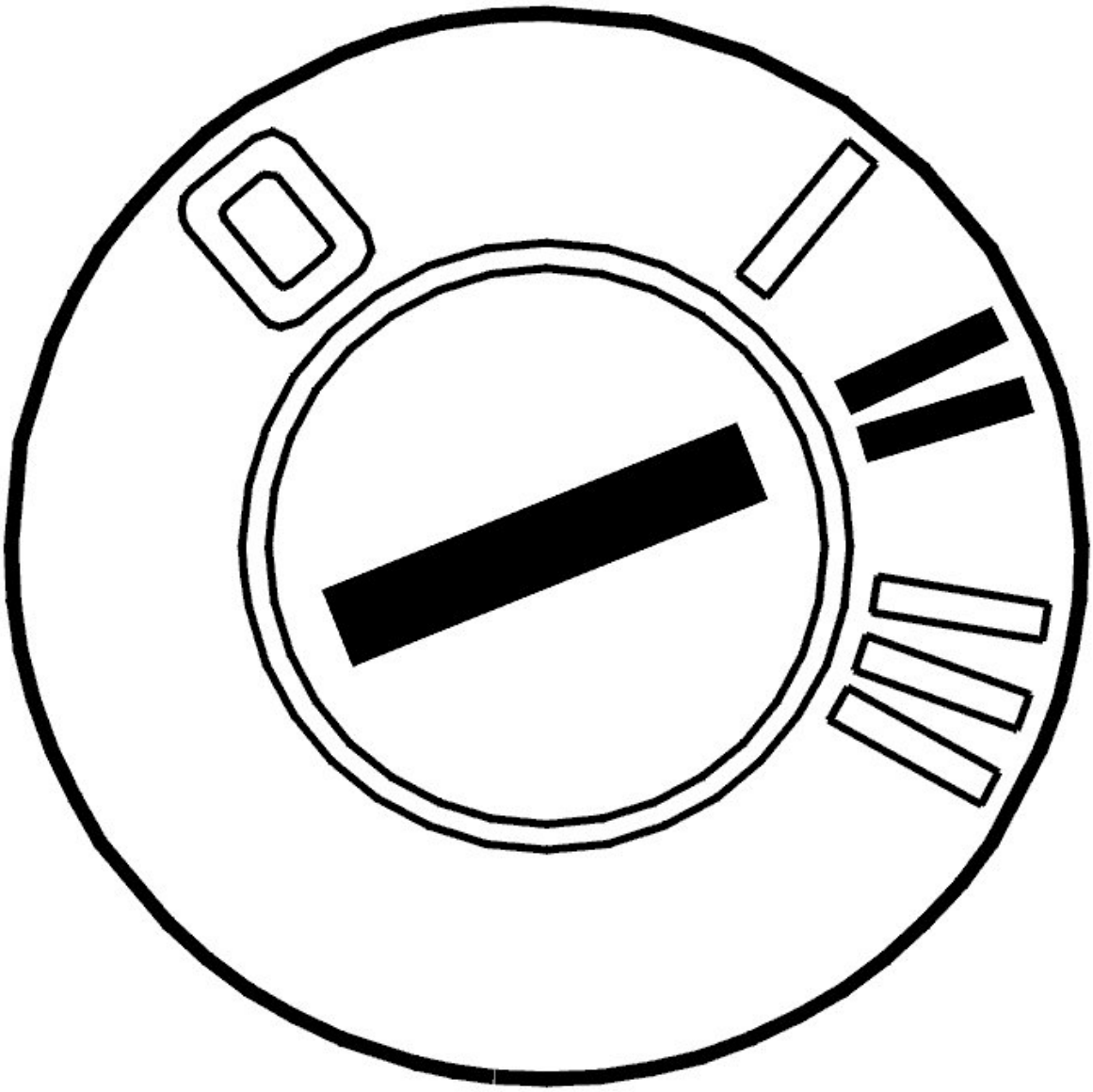
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Replacing the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-DD00

Condition

The supplemental restraint system module (SRS) checks communication between the control module and the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

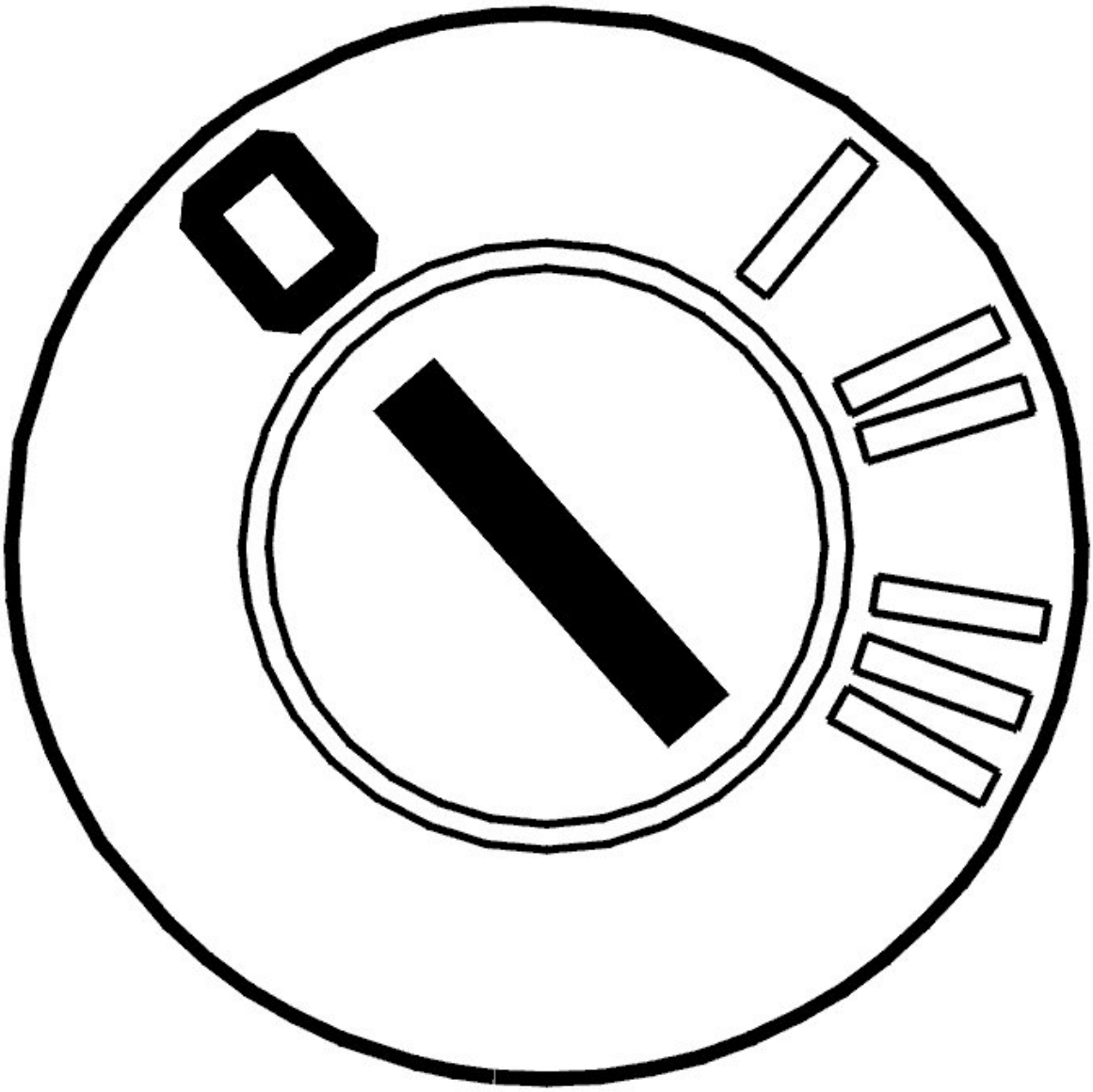
Possible source
- Damage to the signal cable (LIN-bus) or in the connectors between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS)
- Damaged occupant weight sensor (OWS).

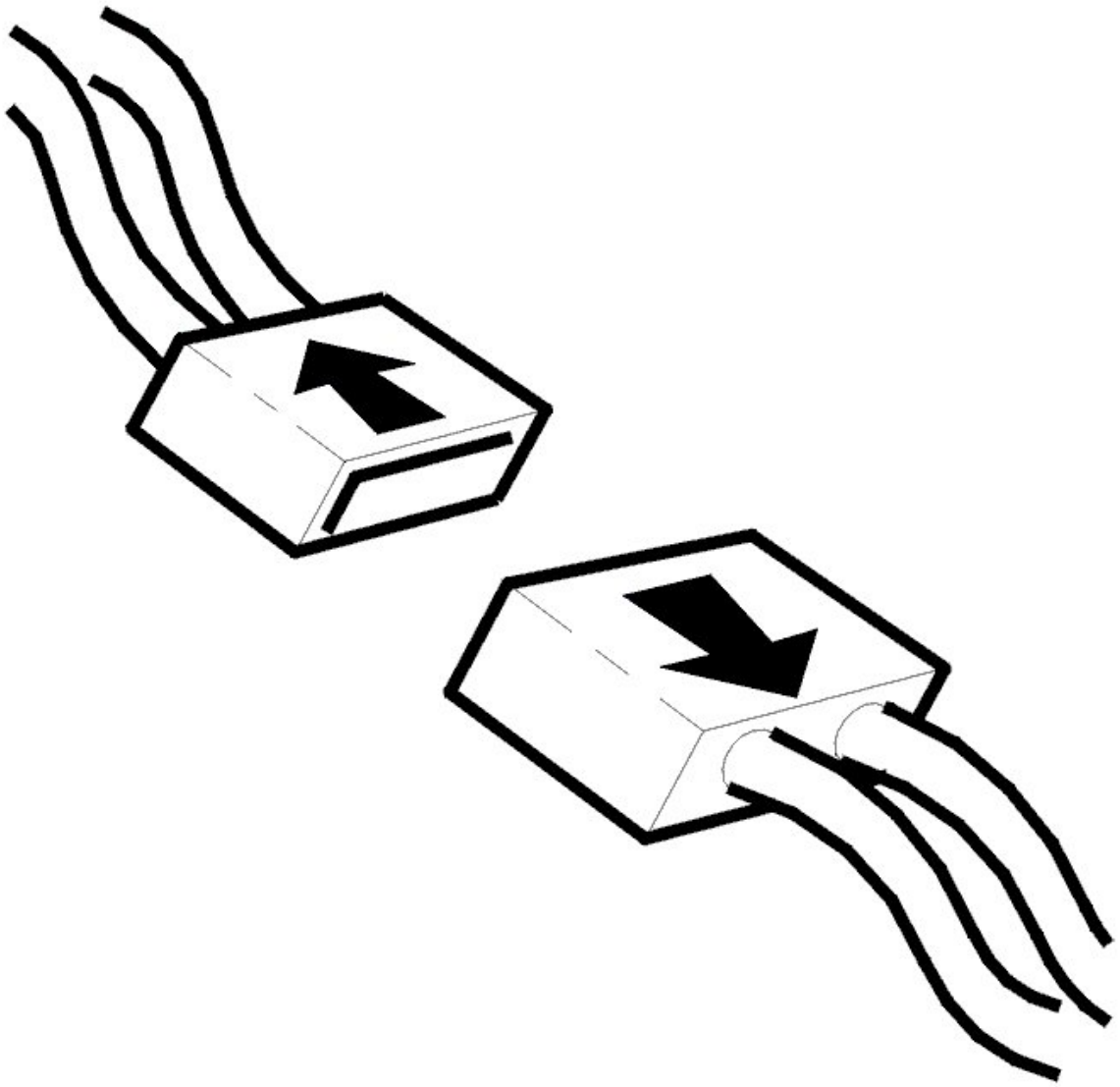
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Faulty Communication

Faulty communication

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect the connector from the supplemental restraint system module (SRS).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). There is a risk of static discharge which could damage the control modules.

Check the connectors for the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Also check the other connectors that connect the communication cable between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for an open-circuit.
Check the cable between supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.
Remedy as necessary.
If no fault is found, replace the supplemental restraint system module (SRS).
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if a fault is still not detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

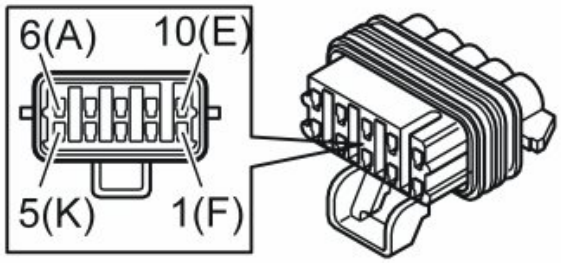
Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal

Specification, Supplemental Restraint System Module (SRS)

- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

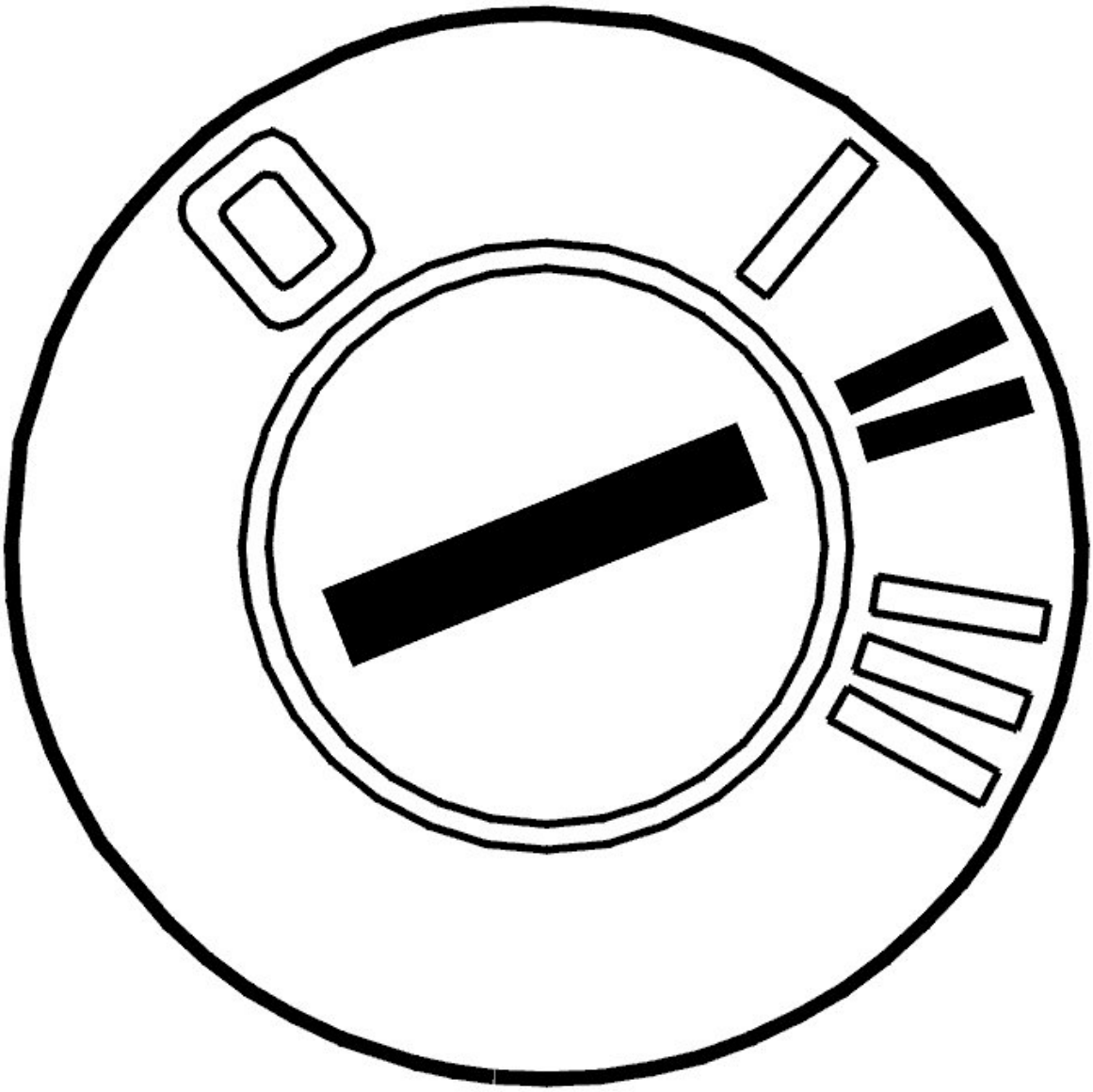
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-DD01

Condition

The supplemental restraint system module (SRS) checks communication between the control module and the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

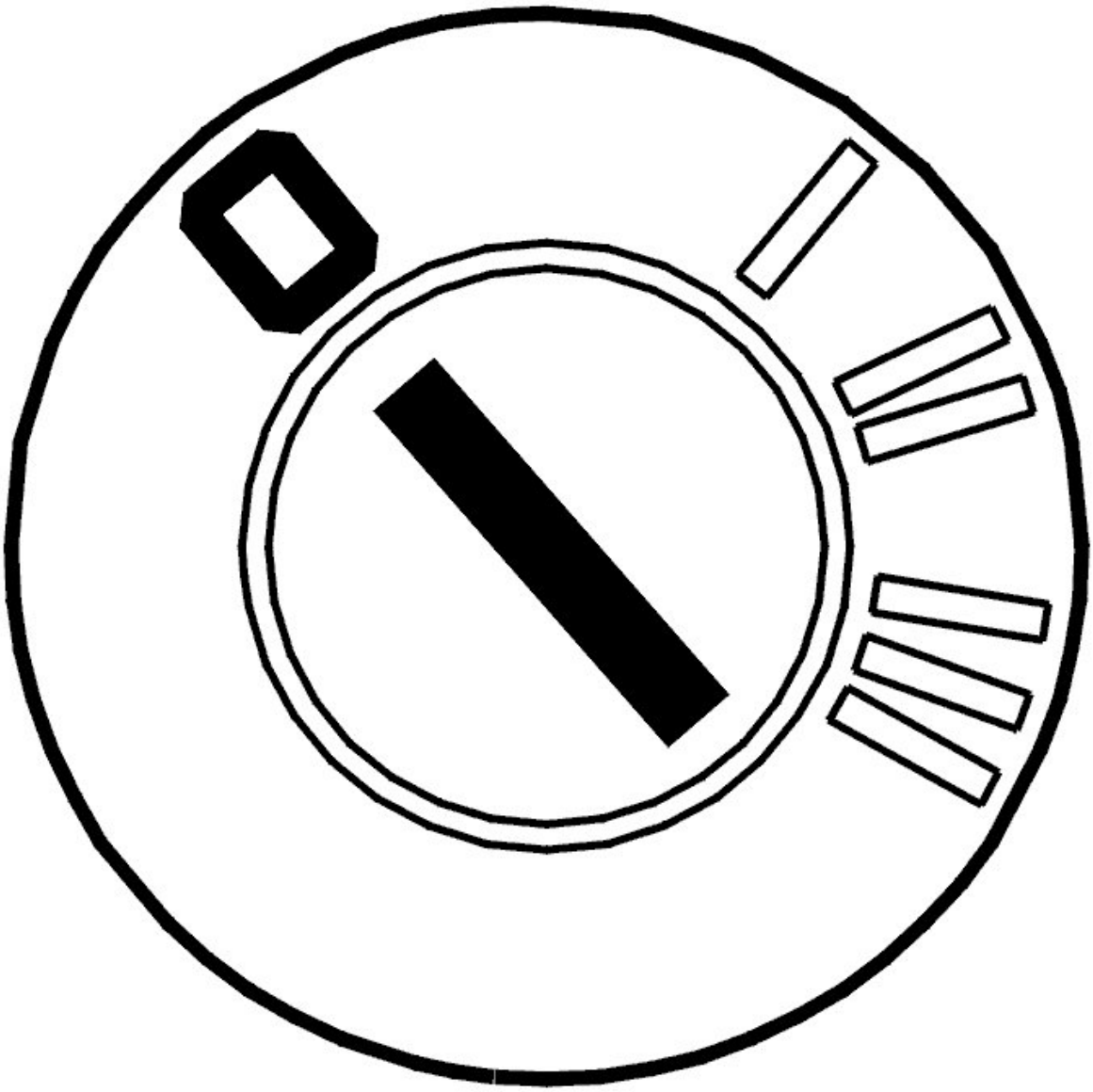
Possible source
- Short-circuit to supply voltage or ground in the signal cable (LIN-bus) or in the connectors between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).

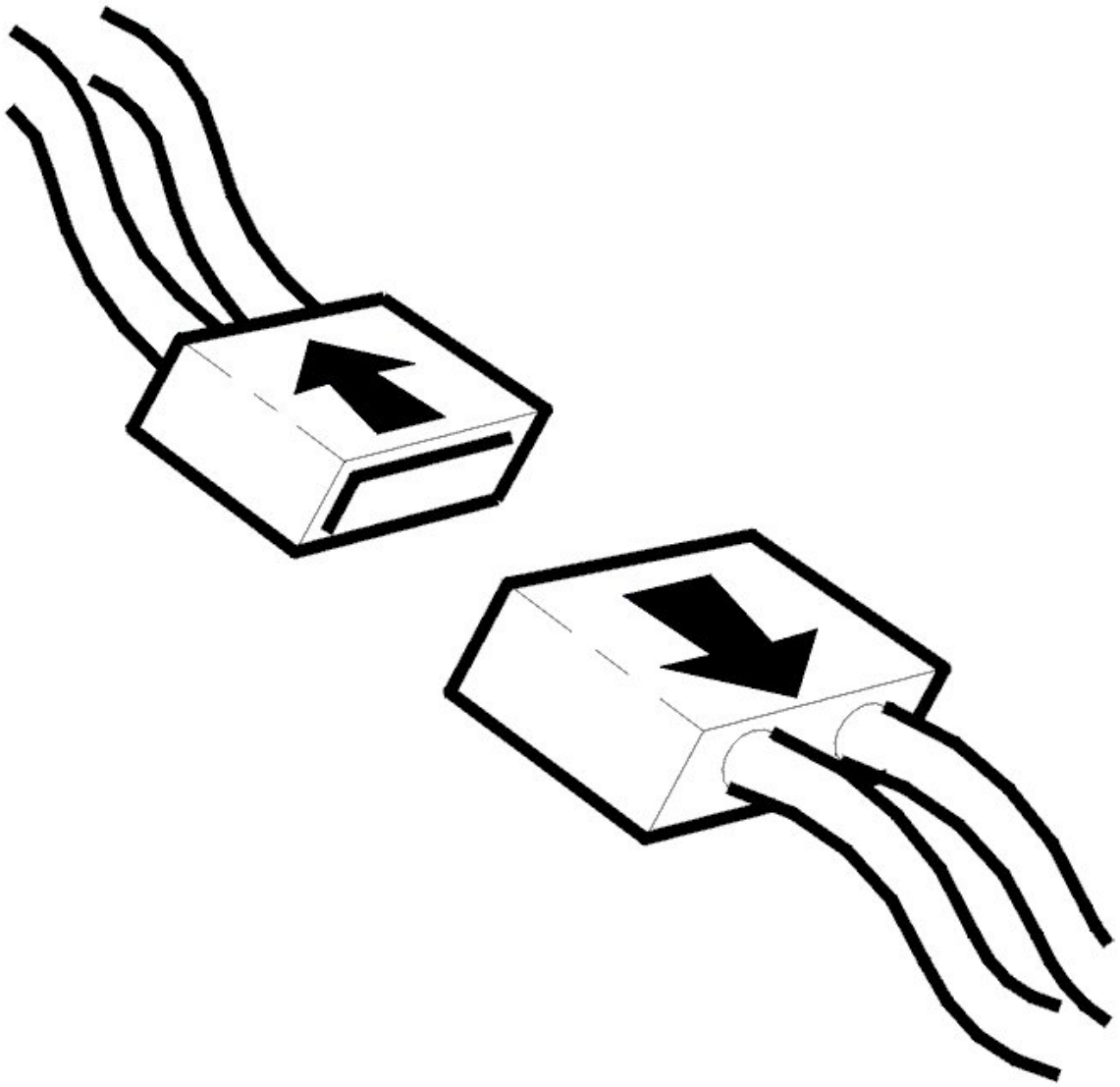
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Signal Too High / Signal Too Low

Signal too high / signal too low

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect the connector from the supplemental restraint system module (SRS).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). There is a risk of static discharge which could damage the control modules.

Check the connectors for the occupant weight sensor (OWS) and the supplemental restraint system module (SRS). Check for damage to pins and terminals in the connectors.
Also check the other connectors that connect the communication cable between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for a short-circuit to ground. Check for a short-circuit to supply voltage.
Check the cable between supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.
Remedy as necessary.
If no fault is found, replace the supplemental restraint system module (SRS).
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if a fault is still not detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

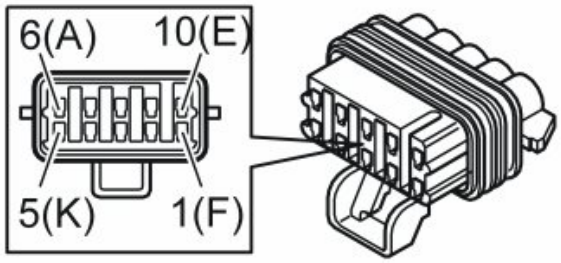
Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal

Specification, Supplemental Restraint System Module (SRS)

- For further information about cable routing and terminals, see the wiring diagram
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

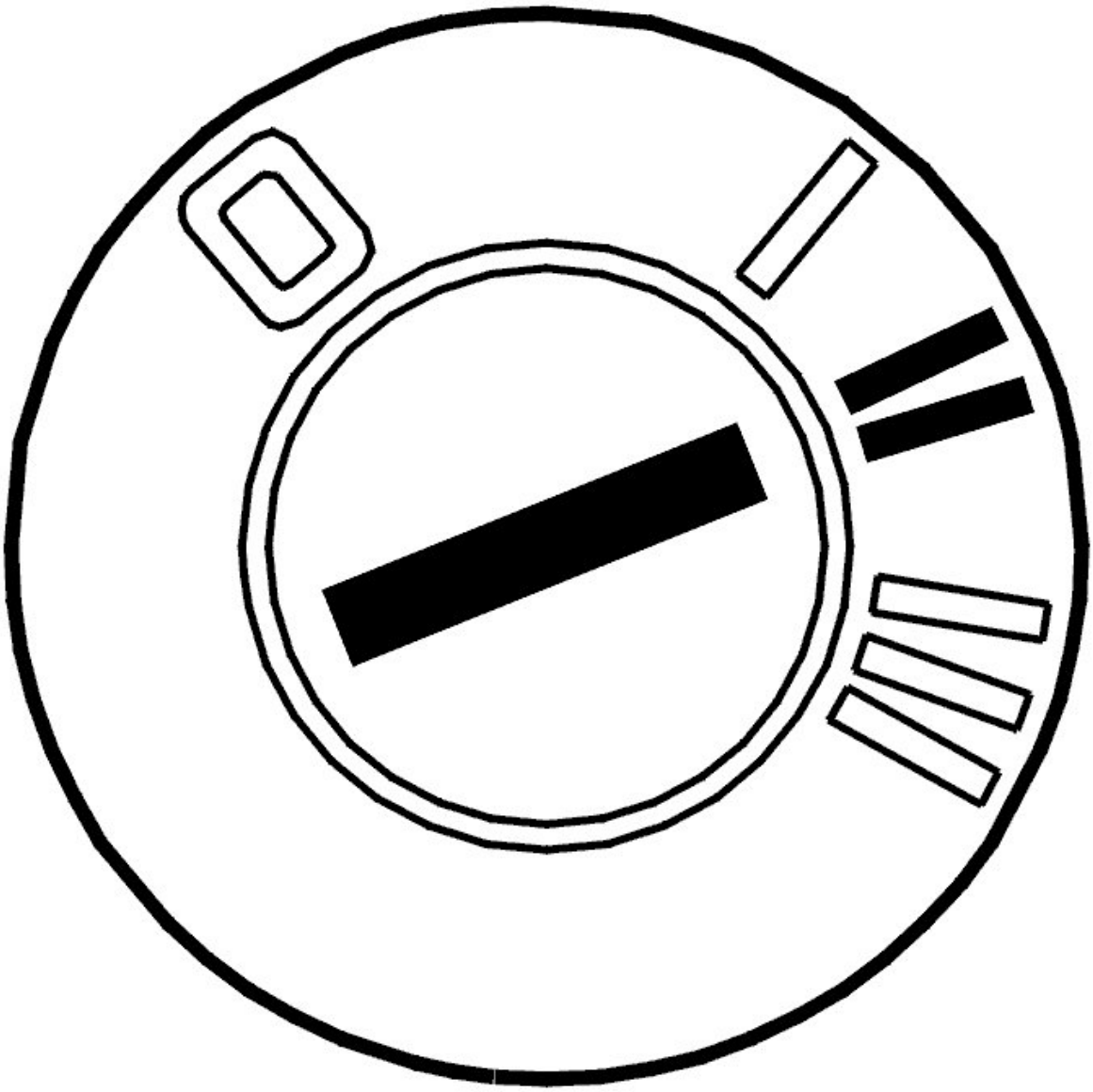
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-DD02

Condition

The supplemental restraint system module (SRS) checks communication between the control module and the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

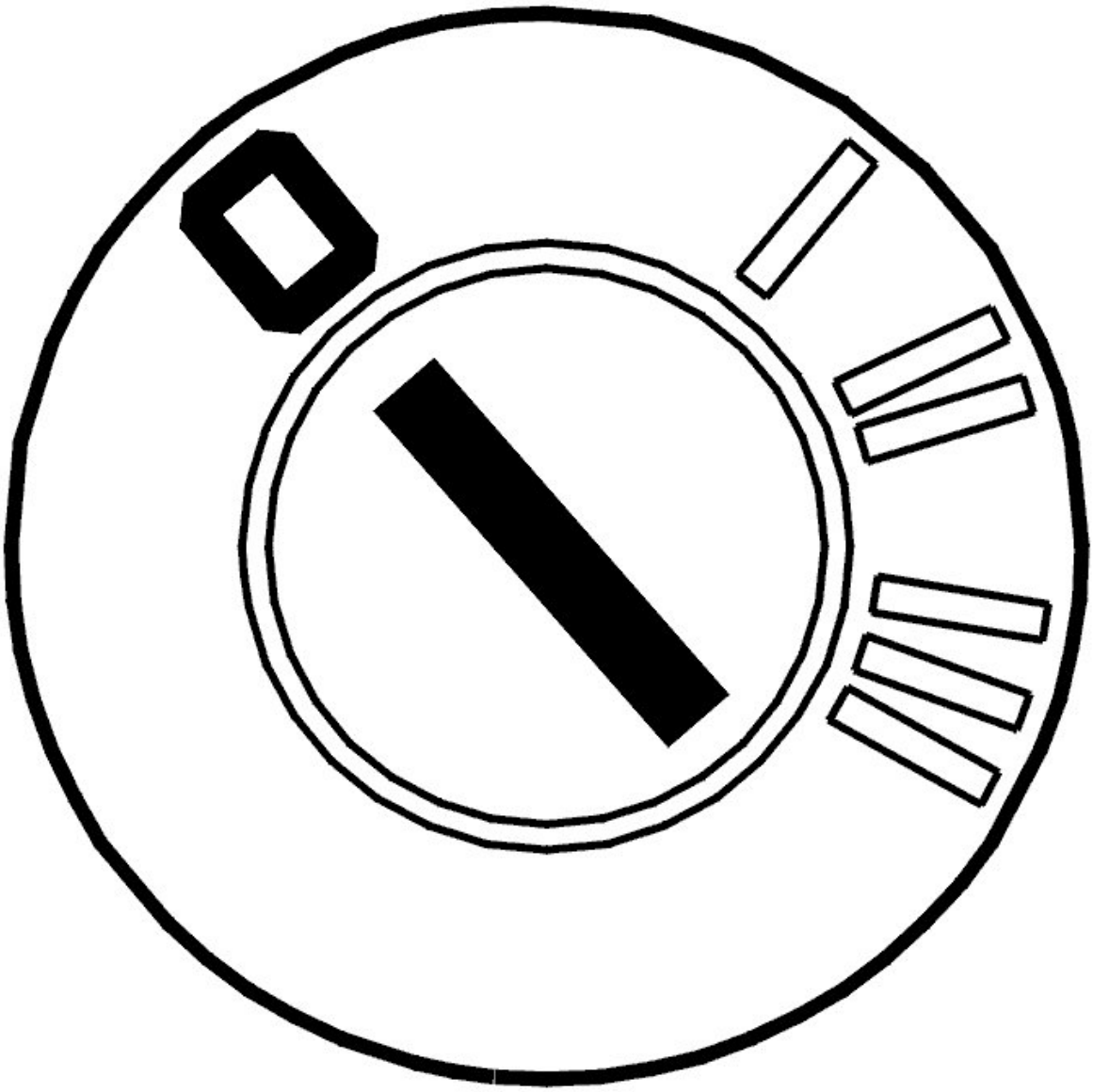
Possible source
- Damage to the signal cable (LIN-bus) or in the connectors between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS)
- Damaged occupant weight sensor (OWS).

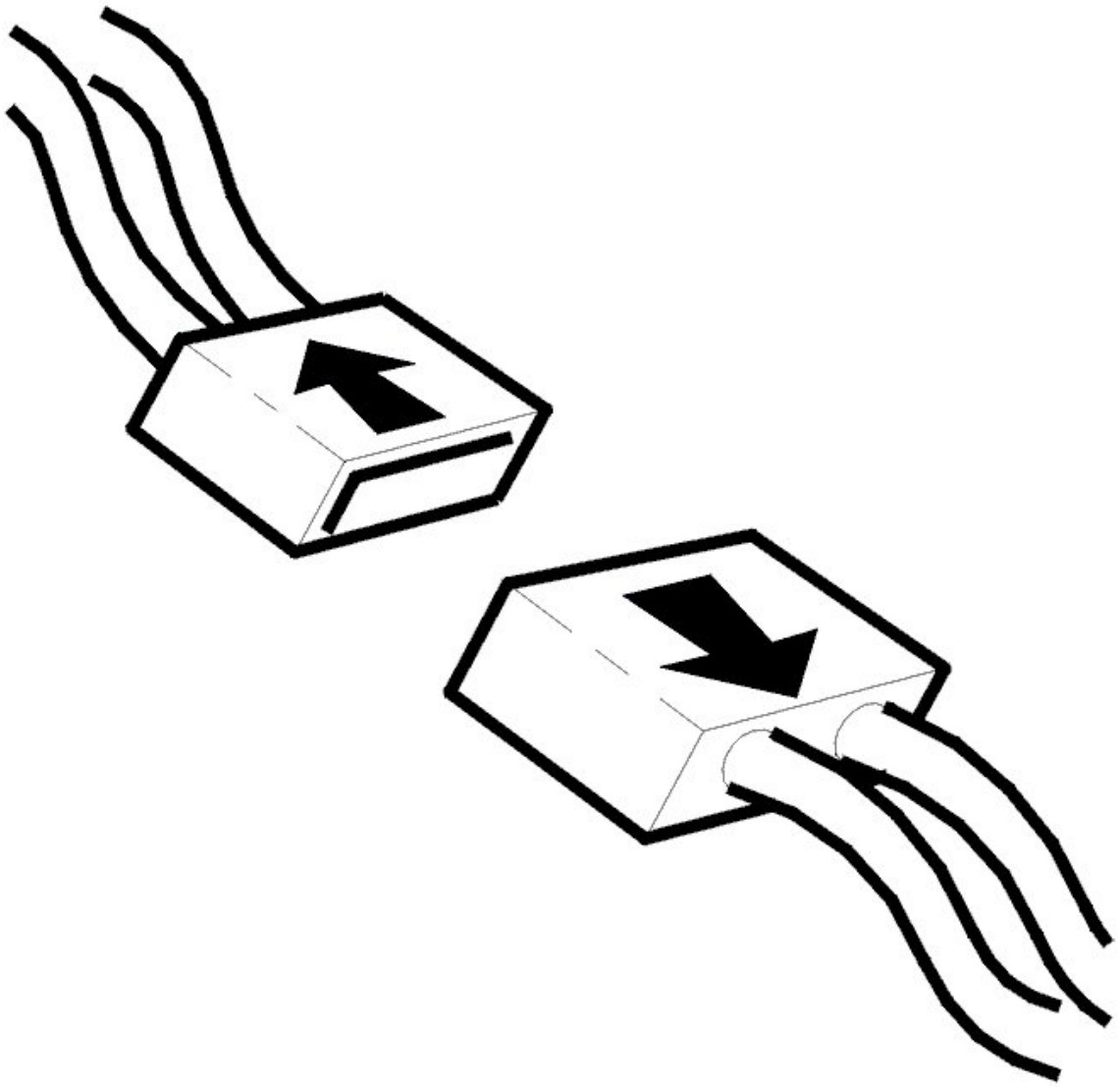
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Faulty Communication

Faulty communication

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect the connector from the supplemental restraint system module (SRS).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). There is a risk of static discharge which could damage the control modules.

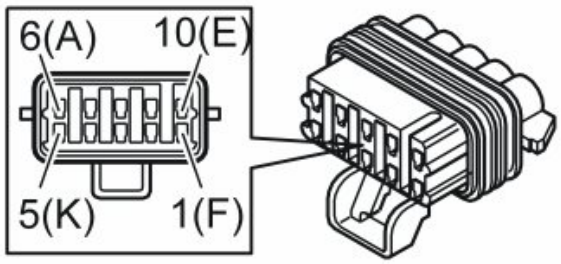
Check the connectors for the supplemental restraint system module (SRS) and the occupant weight sensor (OWS). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Also check the other connectors that connect the communication cable between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for an open-circuit.
Check the cable between supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if no fault is detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor (OWS).The occupant weight sensor (OWS) must also be calibrated.

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram

- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

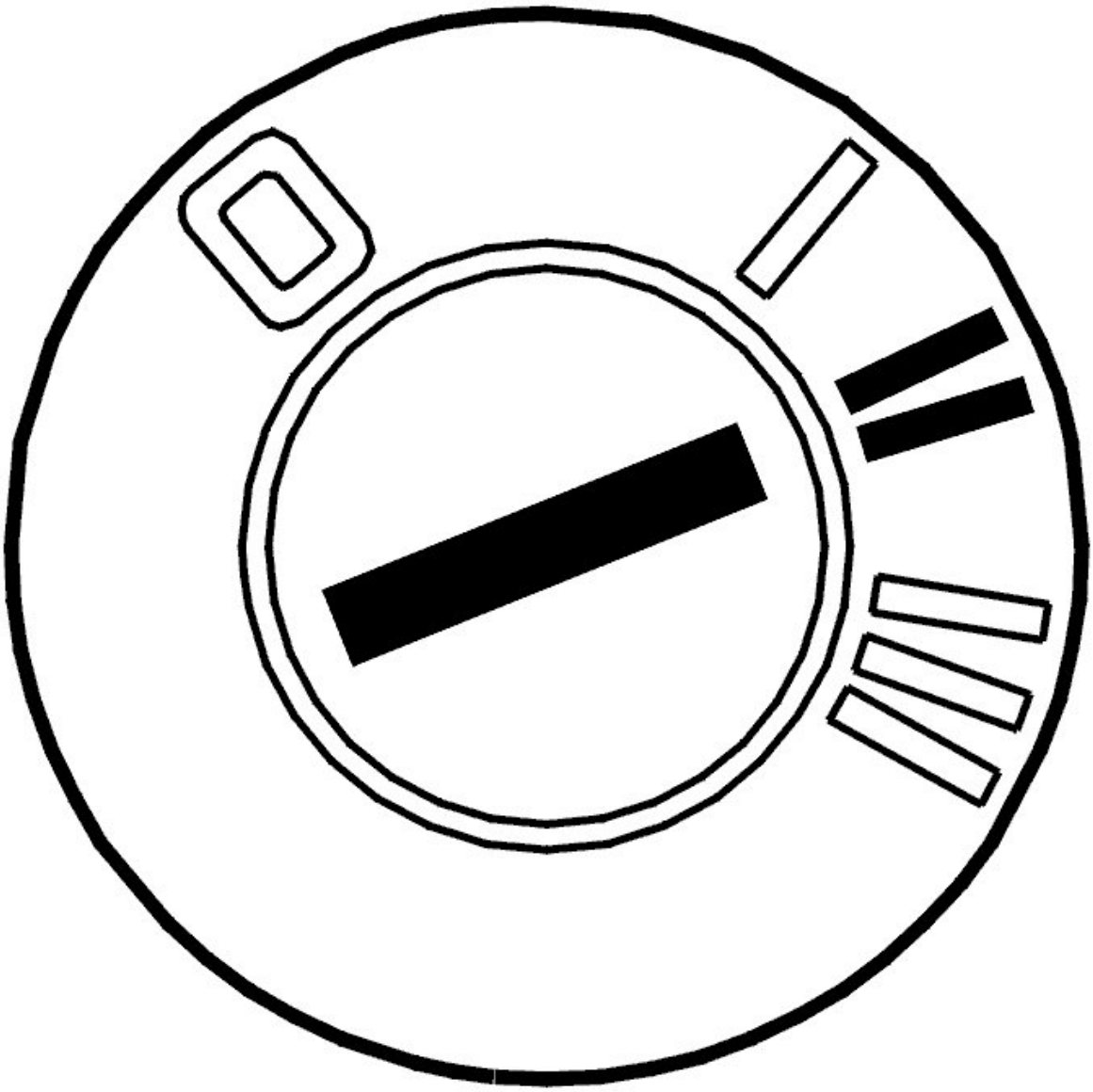
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information SRS-DD10

Condition

The supplemental restraint system module (SRS) checks communication between the control module and the occupant weight sensor (OWS).
The diagnostic trouble code (DTC) is stored if the control module registers a communication fault.
The diagnostic trouble code (DTC) can be diagnosed in ignition positions I, II and III.

Substitute value
- Passenger airbag is deactivated.

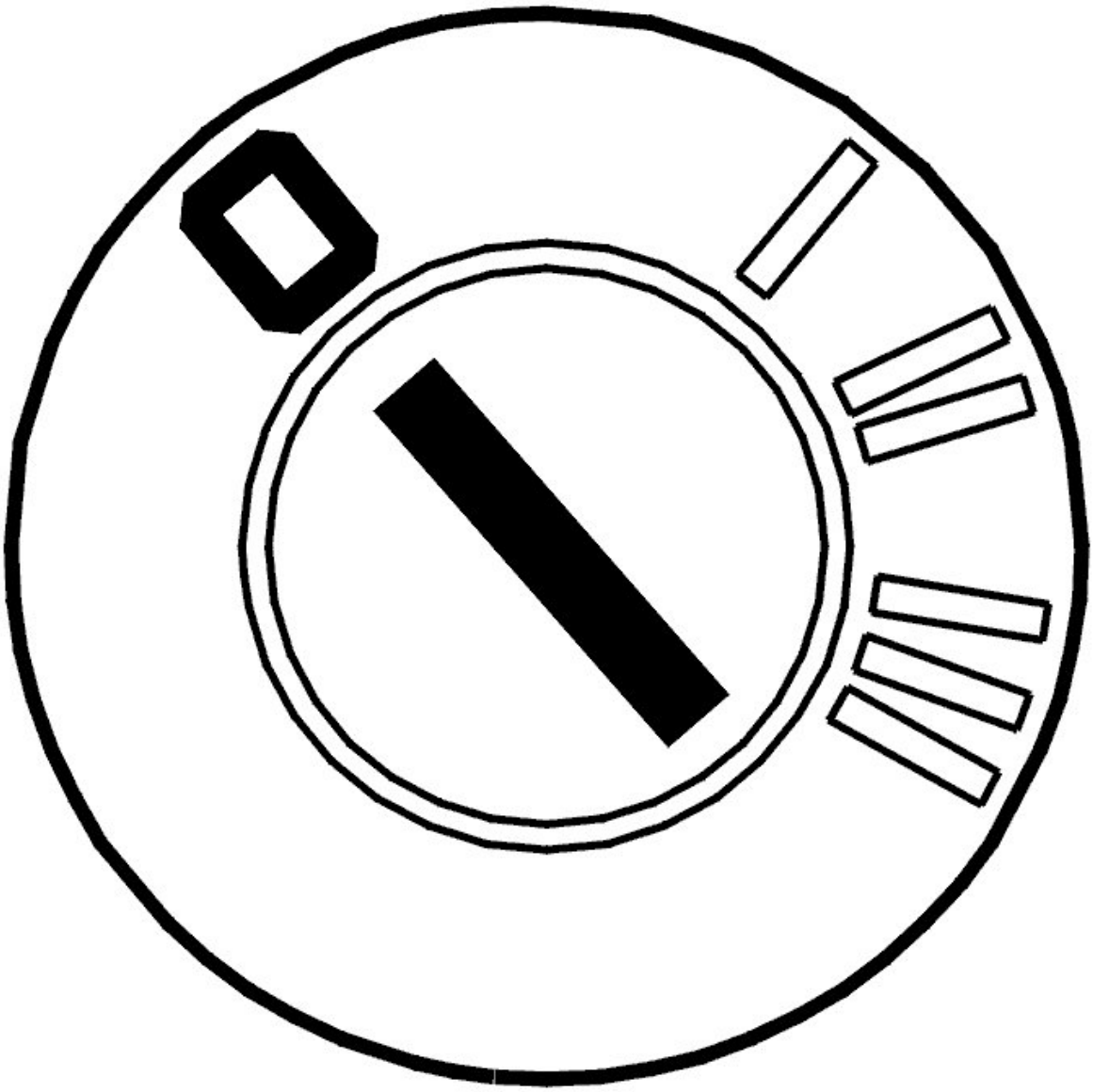
Possible source
- Open-circuit in the signal cable (LIN-bus) or in the connectors between the supplemental restraint system module (SRS) and the occupant weight sensor (OWS).

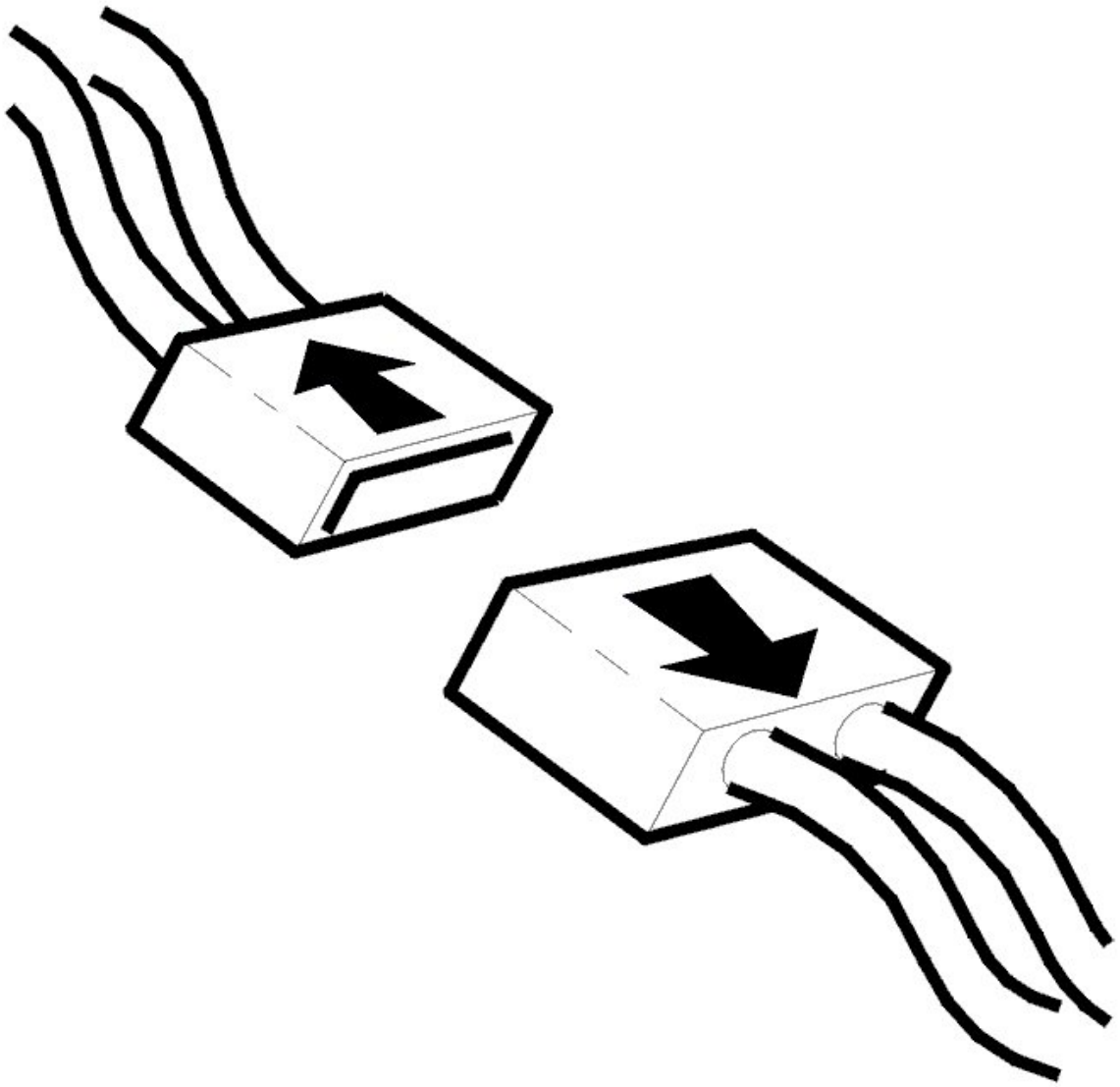
Fault symptom[s]
- SRS indicator lamp lit
- PAD lamp lit.

Faulty Communication

Faulty communication

Checking the component





- Switch off the ignition. Wait 10 seconds
- Disconnect the 10-pin connector from the occupant weight sensor (OWS)
- Disconnect connector A from the central electronic module (CEM).

Caution! Do not touch the terminal pins in the supplemental restraint system module (SRS), the central electronic module (CEM) and the occupant weight sensor (OWS). There is a risk of static discharge which could damage the control modules.

Check the connectors for the central electronic module (CEM) and the occupant weight sensor (OWS). Check for damage to pins and terminals in the connectors. Check for contact resistance.
Also check the other connectors that connect the power supply cable between the central electronic module (CEM) and the occupant weight sensor (OWS).
Remedy as necessary.
Check the power supply cable between the central electronic module (CEM) and the connector for the occupant weight sensor (OWS). Check for an open-circuit. Check the fuse.
Check the cable between:

- Central electronic module (CEM) terminal #A10 and the 10-pin connector for occupant weight sensor (OWS) terminal #2.

Remedy as necessary.
Check the ground connection for the occupant weight sensor (OWS). Check for an open-circuit. Check for contact resistance.
Check the cable between the 10-pin connector for the occupant weight sensor (OWS) terminal #9 and the ground terminal.
Remedy as necessary.
Disconnect the connector from the supplemental restraint system module (SRS). Check the communication cable (LIN-bus) between the supplemental restraint system module (SRS) and the 10-pin connector for the occupant weight sensor (OWS). Check for an open-circuit.
Check the cable between:

- Supplemental restraint system module (SRS) terminal #57 and the 10-pin connector for occupant weight sensor (OWS) terminal #10.

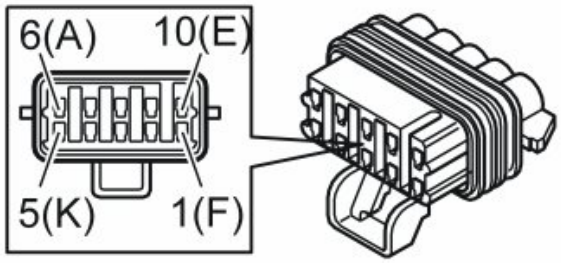
Remedy as necessary.
Replace the pressure sensor and the occupant weight sensor module (OWS) if no fault is detected. The pressure sensor and occupant weight sensor (OWS) module are included in the occupant weight sensor (OWS) system.

Note! After replacing the pressure sensor and the occupant weight sensor (OWS) module in the occupant weight sensor (OWS) system, the supplemental restraint system module (SRS) must be configured. This is done by storing the ID number for the occupant weight sensor

(OWS).**The occupant weight sensor (OWS) must also be calibrated.**

Other information

- Connecting the breakout box See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Supplemental Restraint System Module (SRS)
- Signal specification See: Restraint Systems/Air Bag Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Supplemental Restraint System Module (SRS)
- For further information about cable routing and terminals, see the wiring diagram
- Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Control module SRS (supplemental restraint system), replacing See: Relays and Modules/Relays and Modules - Restraint Systems/Air Bag Control Module/Service and Repair
- Occupant weight sensor (OWS), replacing See: Restraint Systems/Air Bag Systems/Seat Occupant Sensor/Service and Repair/Removal and Replacement
- Storing the ID number for the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Scan Tool Testing and Procedures/Logging Detailed Diagnostics Data
- Calibrating the occupant weight sensor (OWS) See: Restraint Systems/Air Bag Systems/Testing and Inspection/Programming and Relearning/Calibrating the Occupant Weight Sensor (OWS)
- Cable harness SRS system, repair See: Restraint Systems/Air Bag Systems/Air Bag/Air Bag Harness/Service and Repair/Procedures
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Select "Continue" when the fault has been remedied.

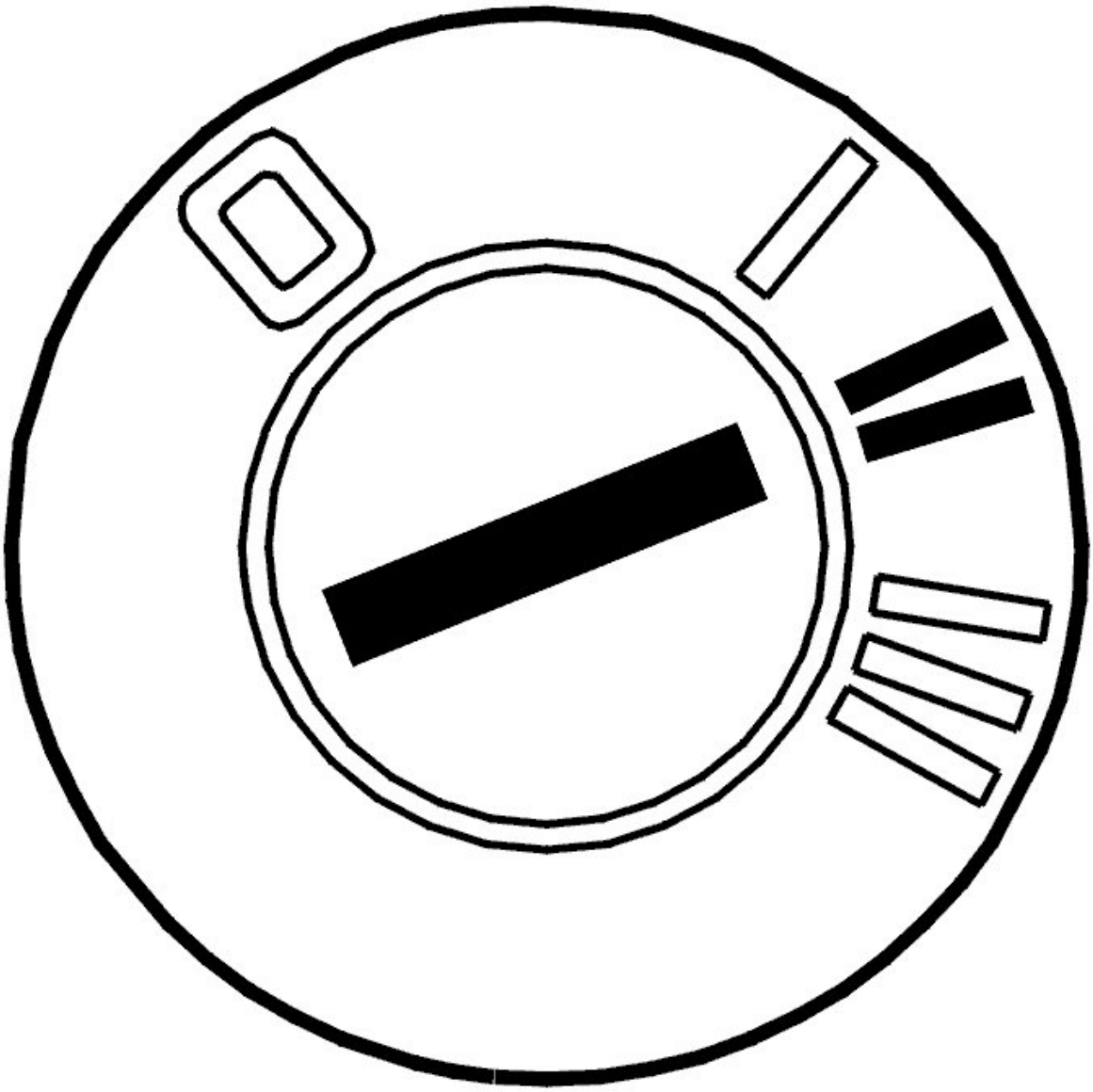
Continue - Verification

Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition off
- Disconnect the battery negative lead
- Reinstall the connectors, components etc.
- Ignition on
- Connect the battery negative lead.

Warning! There must not be anyone inside the passenger compartment when the battery is connected.

- Read off diagnostic trouble codes (DTCs).

The fault is no longer present if the diagnostic trouble code (DTC) status is intermittent.

Is the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

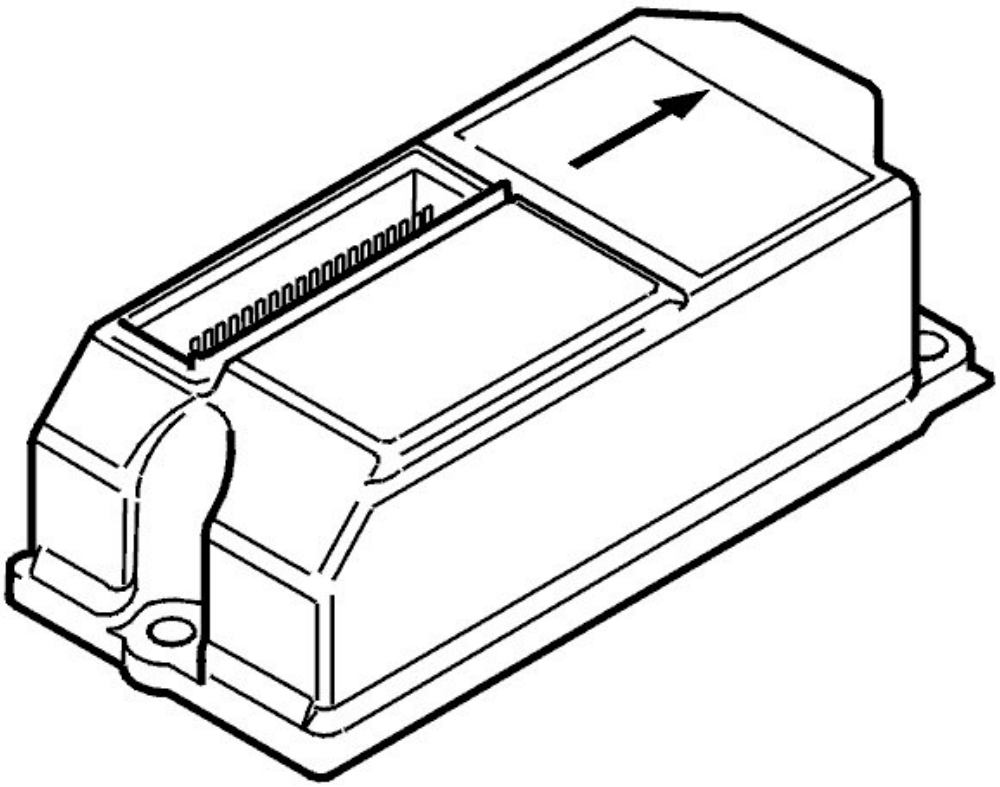
FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the component

SRS-E001

Diagnostic trouble code (DTC) information SRS-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value

- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

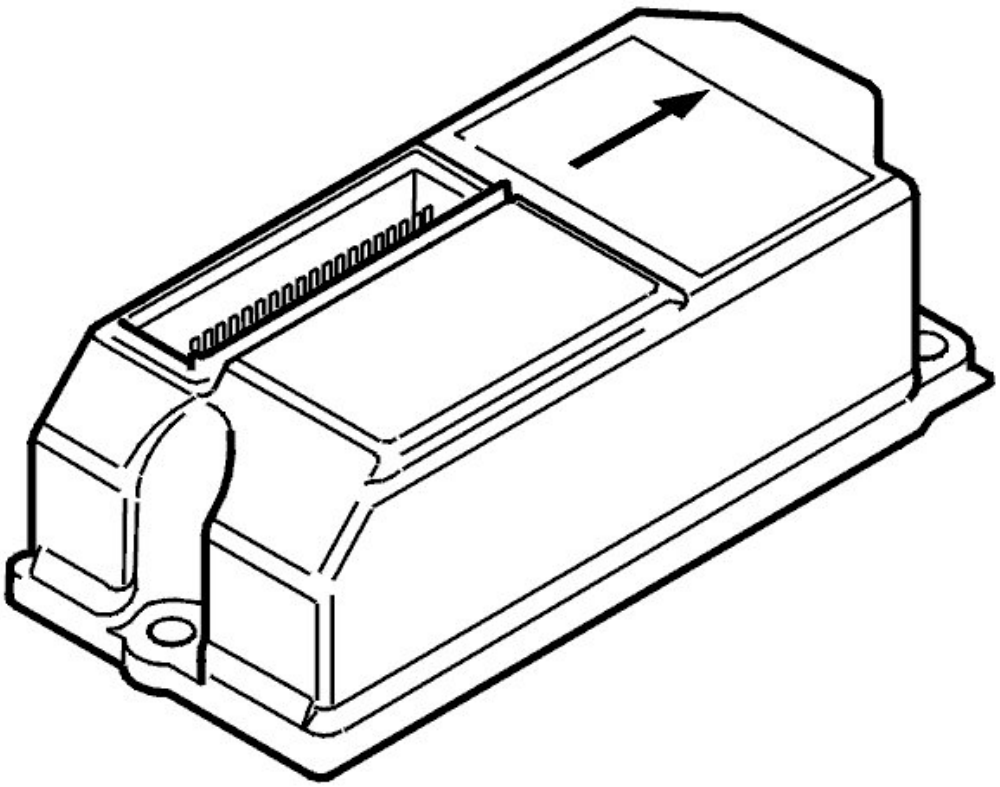
Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- The SRS indicator lamp is lit.

SRS-E003

Diagnostic trouble code (DTC) information SRS-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

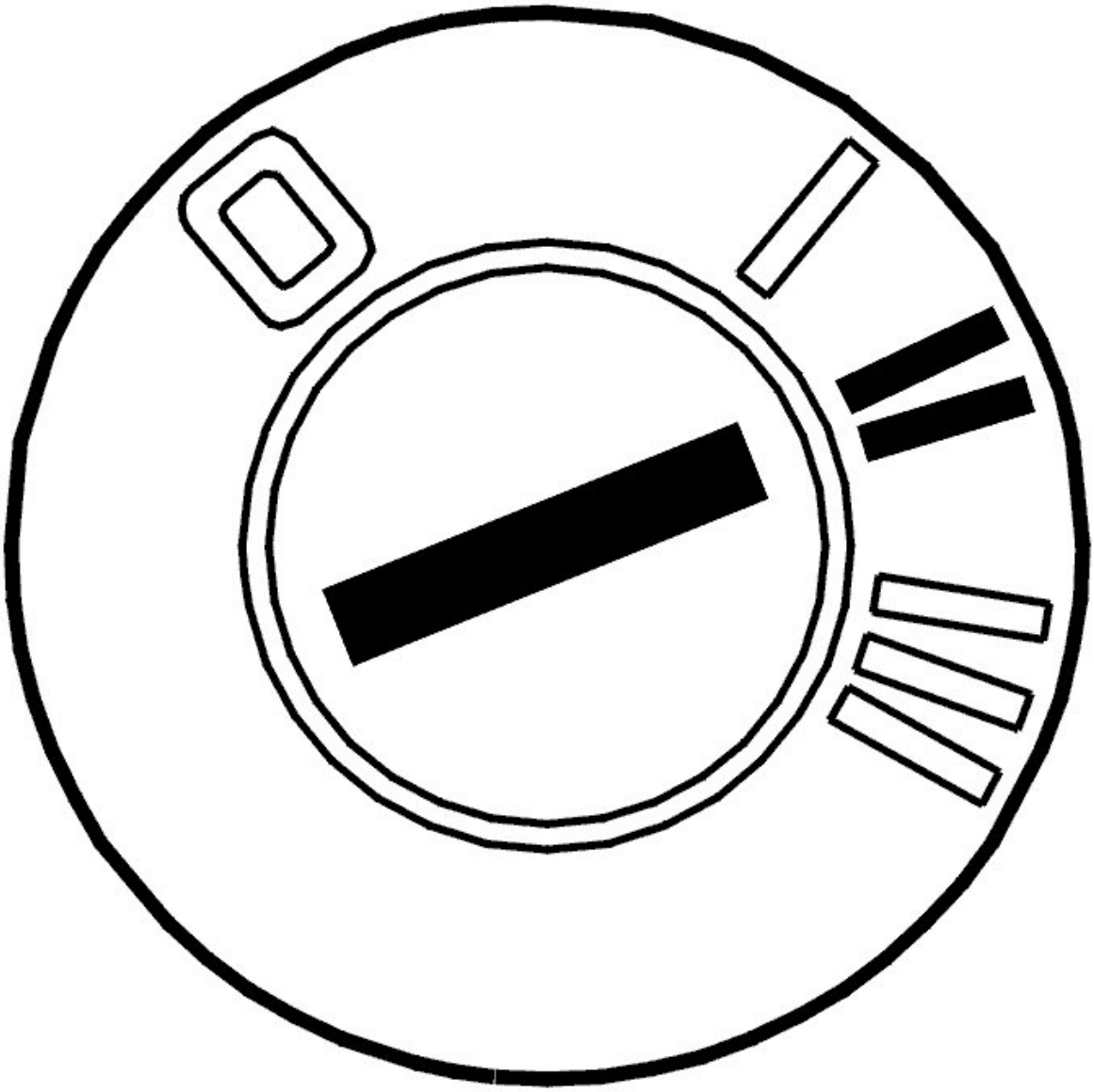
Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- The SRS indicator lamp is lit.

SRS-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

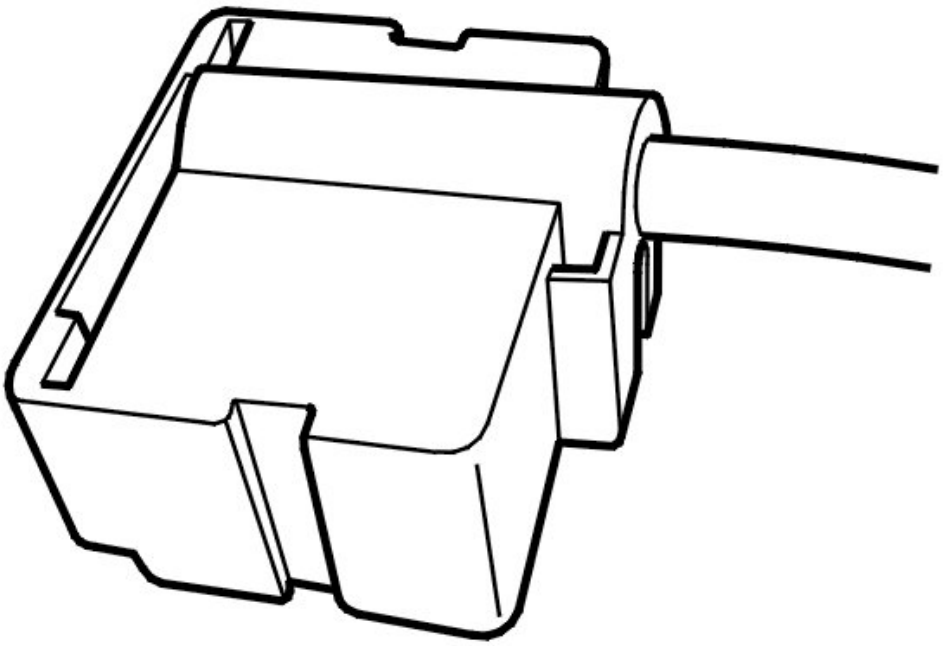
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0011 or SUM-0021 is stored if the control module registers that the signal from one of the acceleration sensors is too low when the ignition is switched on.

- SUM-0011: Left front acceleration sensor
- SUM-0021: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable from the acceleration sensor
- Open-circuit or short-circuit to ground in the power supply to the acceleration sensor
- Contact resistance in the terminals
- Defective acceleration sensor.

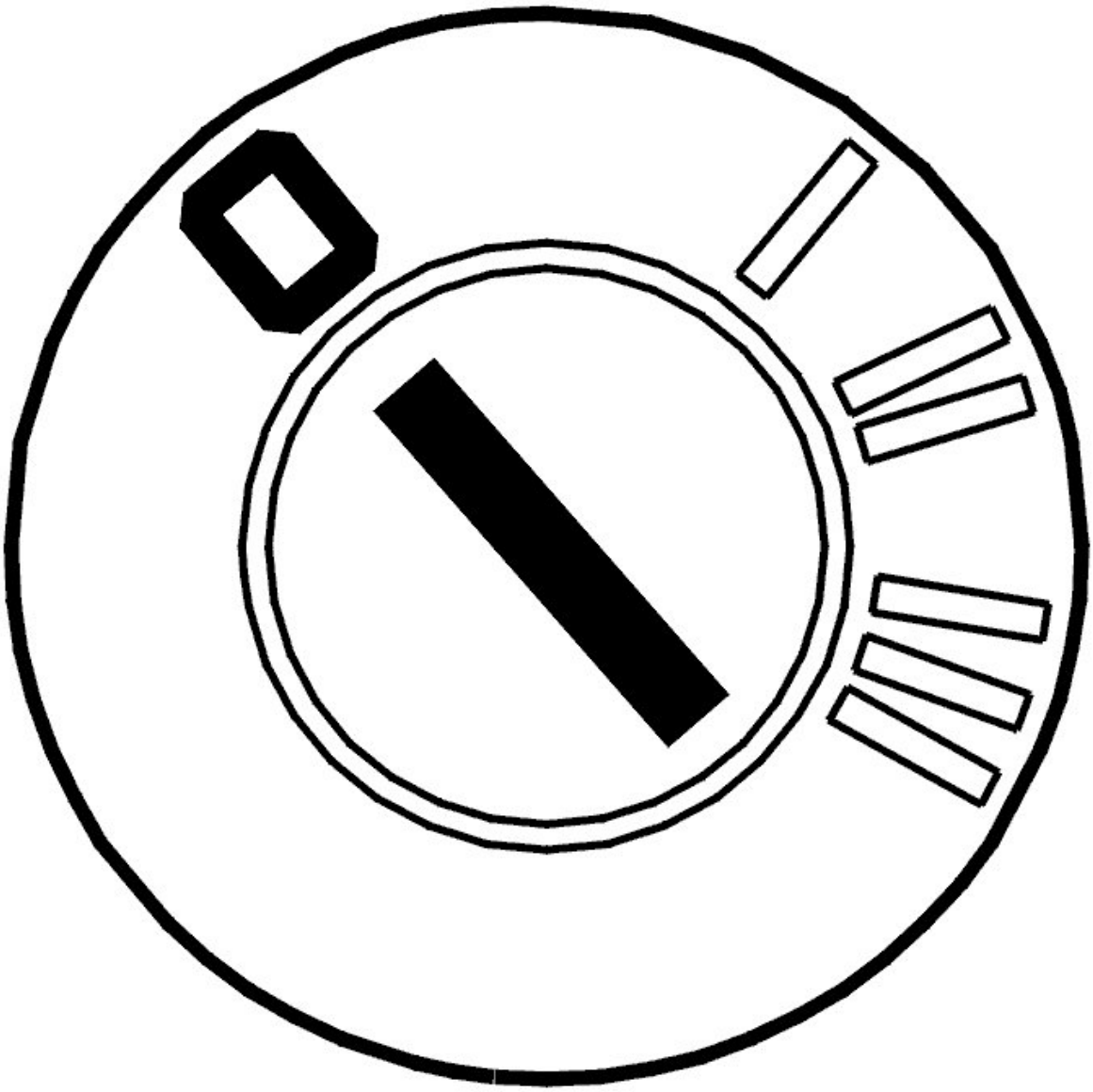
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0011, front left acceleration sensor:

- Check the signal cable between control module terminal #A12 and acceleration sensor terminal #2. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0021, front right acceleration sensor:

- Check the signal cable between control module terminal #A27 and acceleration sensor terminal #2. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

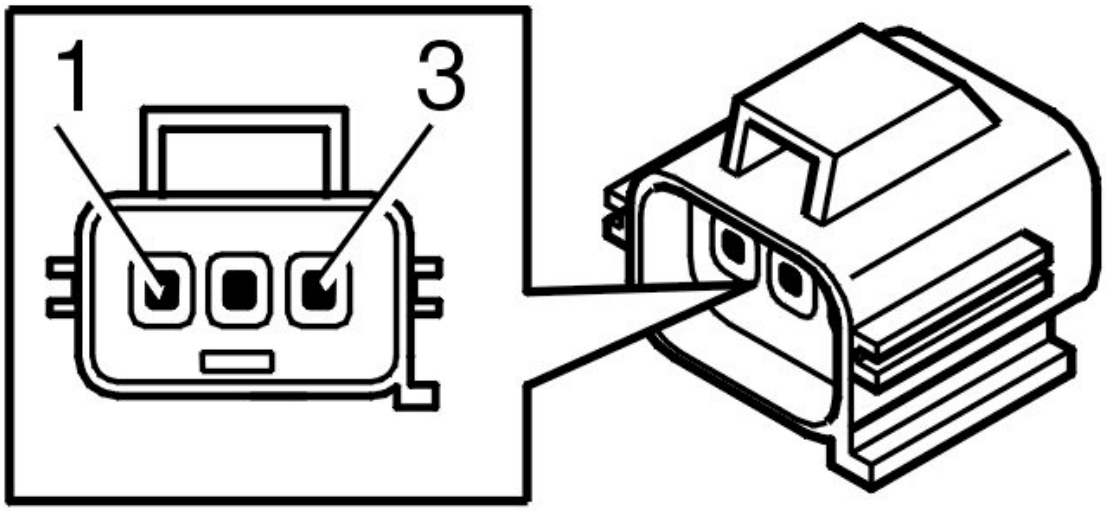
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

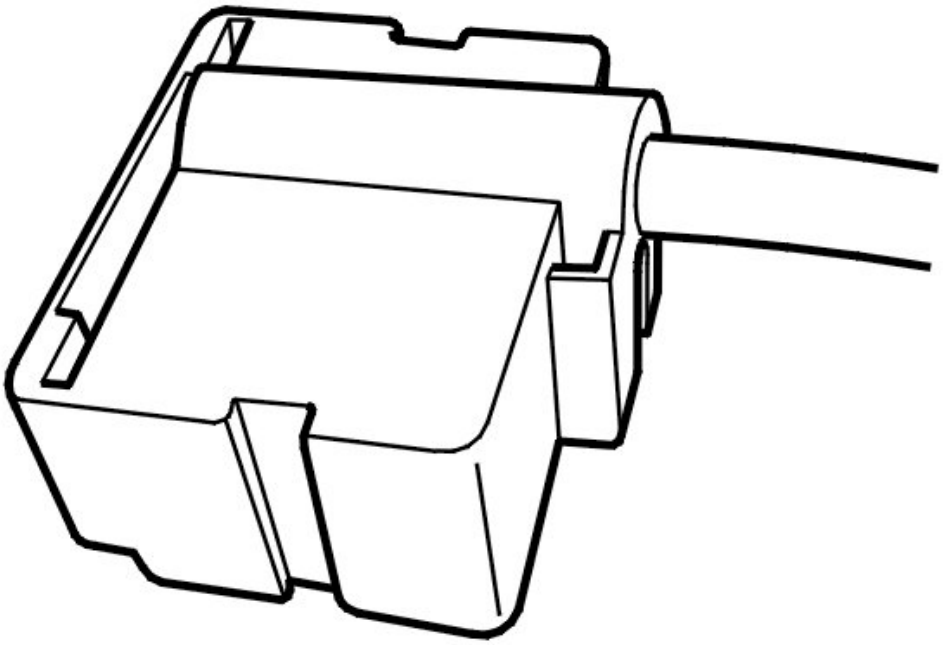
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the acceleration sensor, see Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and

Terminals/Checking Wiring And Terminals.





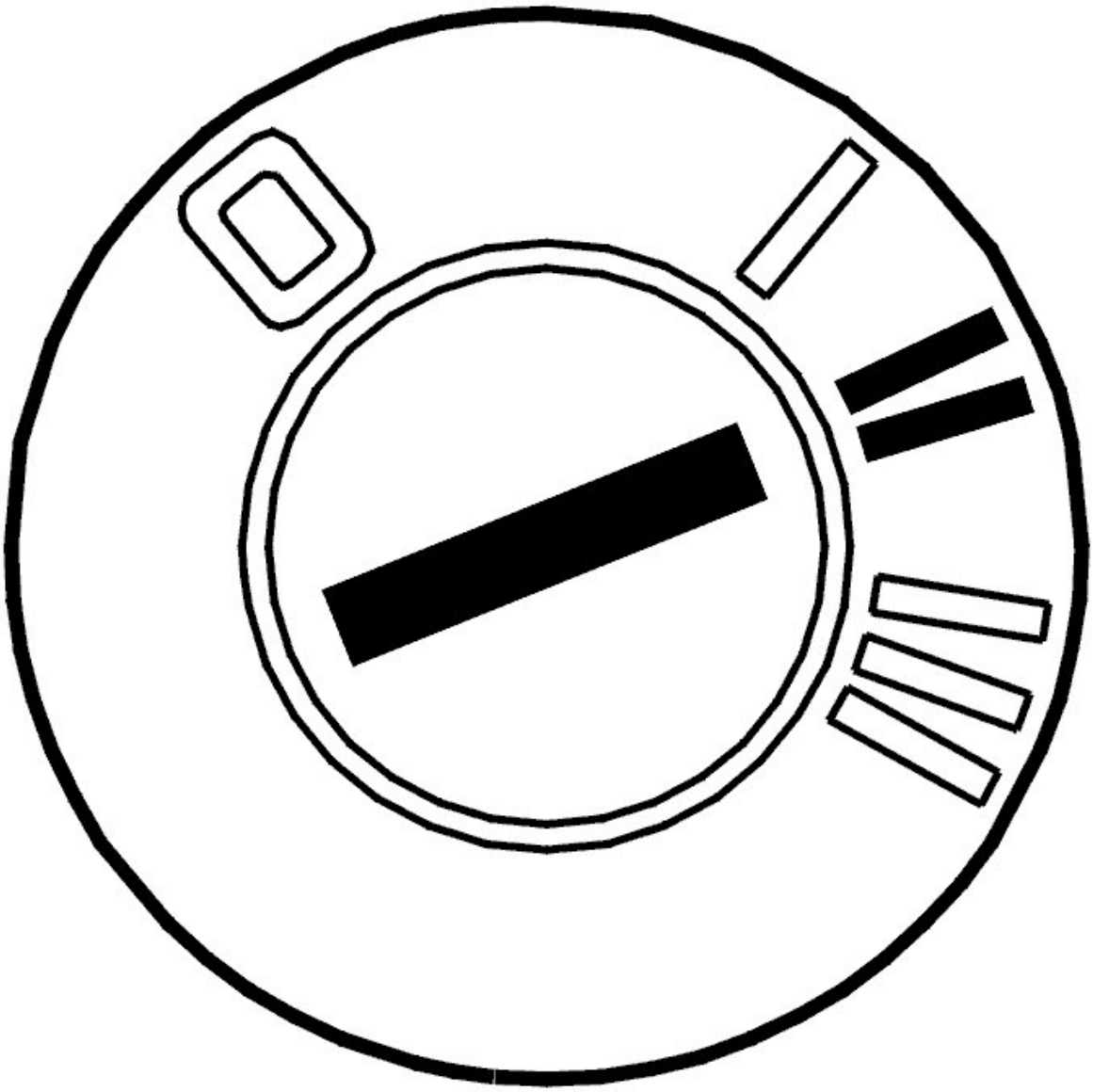
Continue - Verification

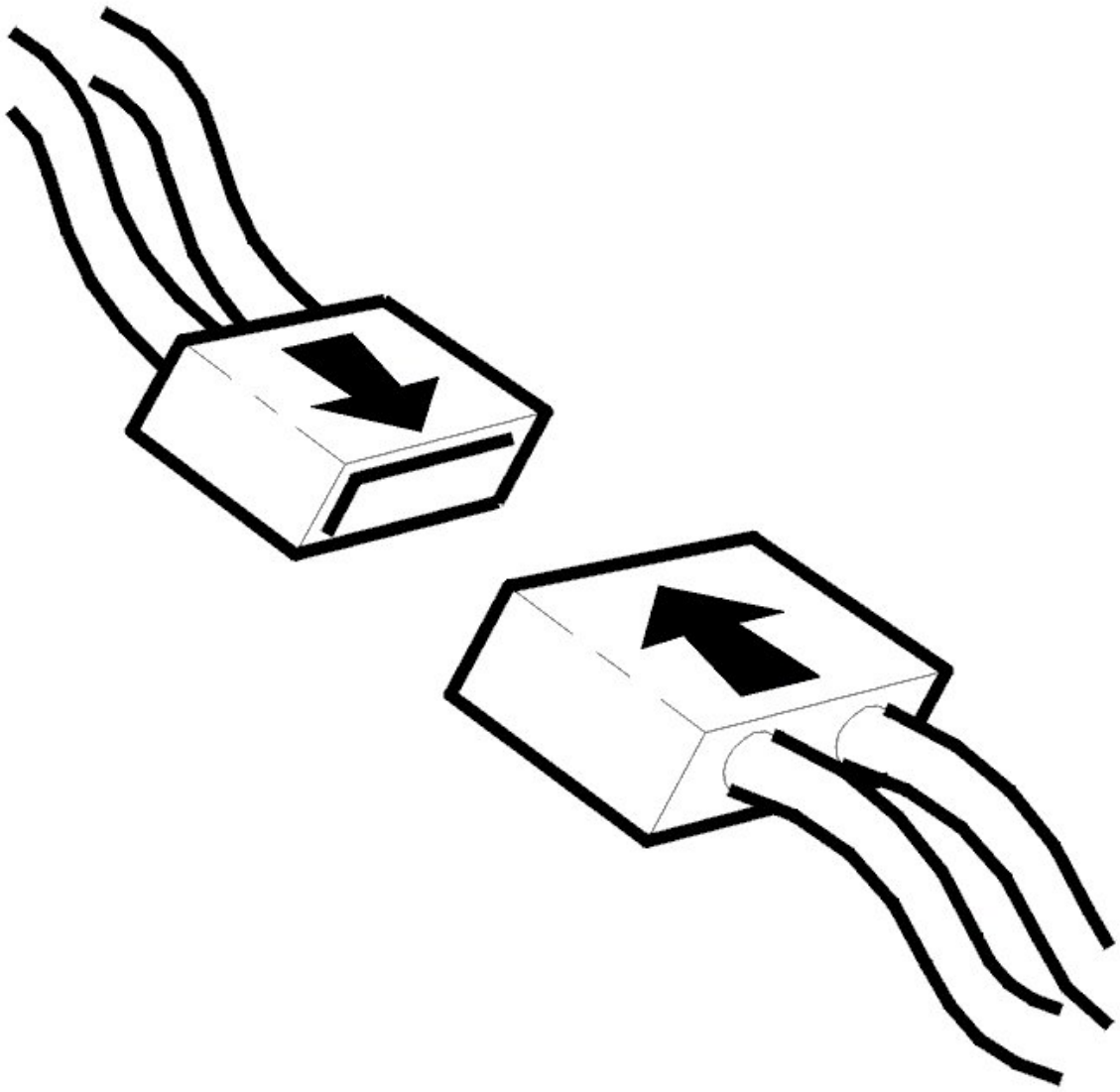
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

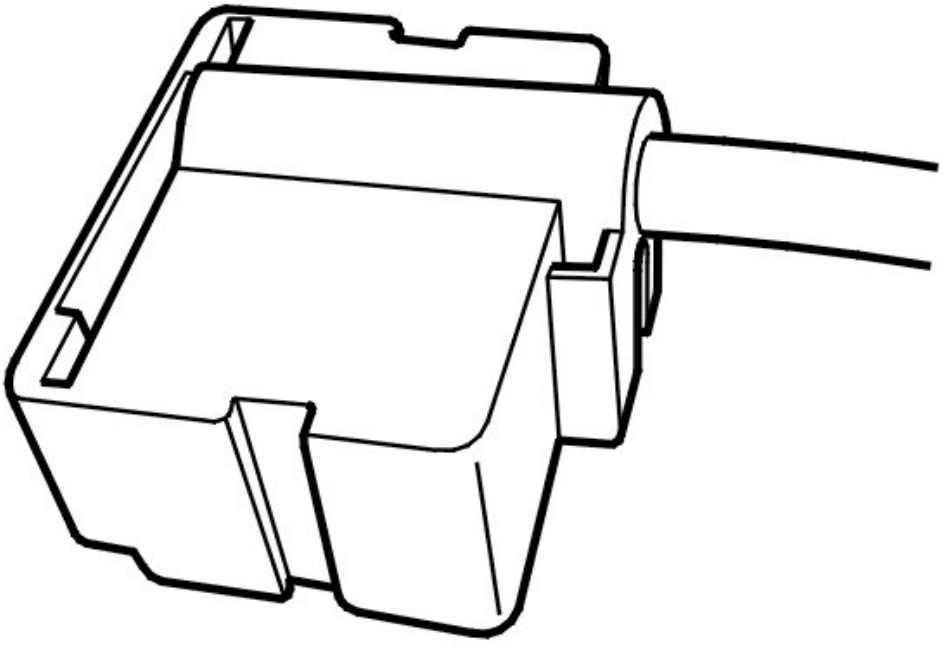
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0012 or SUM-0022 is stored if the control module registers that the signal from one of the acceleration sensors is too high when the ignition is switched on.

- SUM-0012: Left front acceleration sensor
- SUM-0022: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and

Suspension/Suspension/Description and Operation.

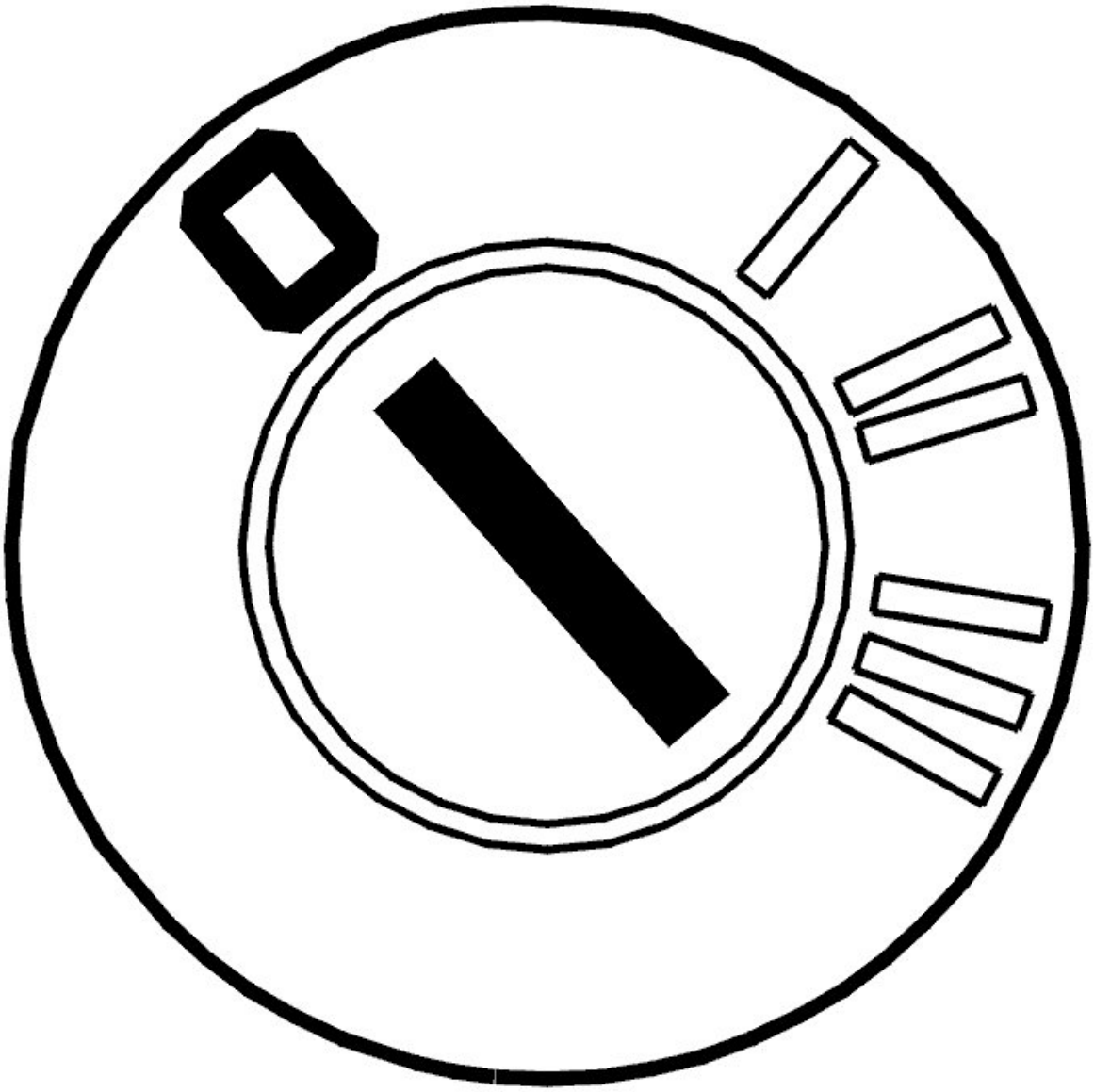
Possible source
- Short-circuit to supply voltage in the signal cable
- Defective acceleration sensor.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0012, front left acceleration sensor
- Check the signal cable between Suspension module (SUM) #A12 and acceleration sensor #2 for short-circuiting to voltage.

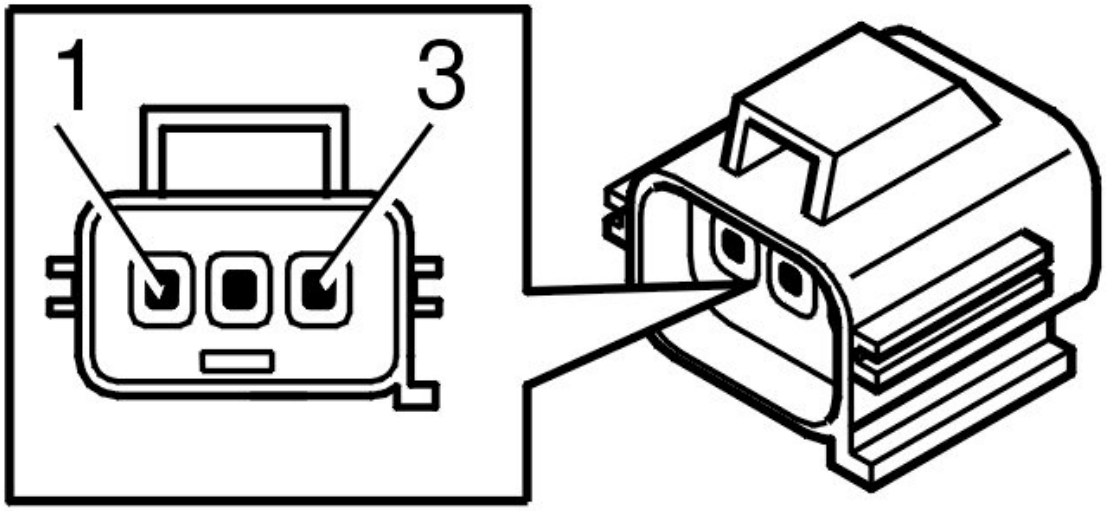
For diagnostic trouble code (DTC) SUM-0022, front right acceleration sensor
- Check the signal cable between Suspension module (SUM) #A27 and acceleration sensor #2 for short-circuiting to voltage.

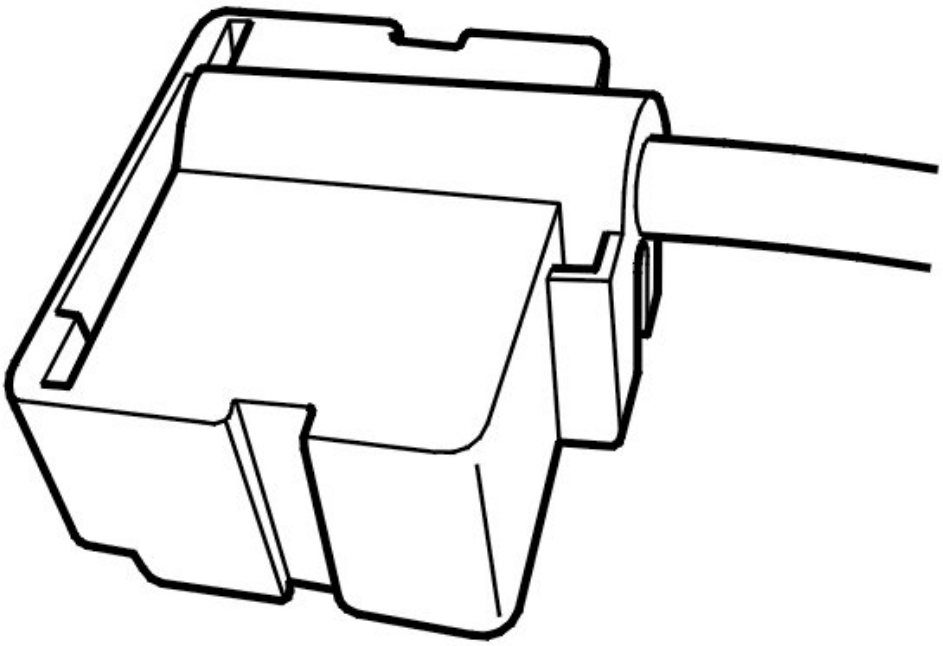
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information

- Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





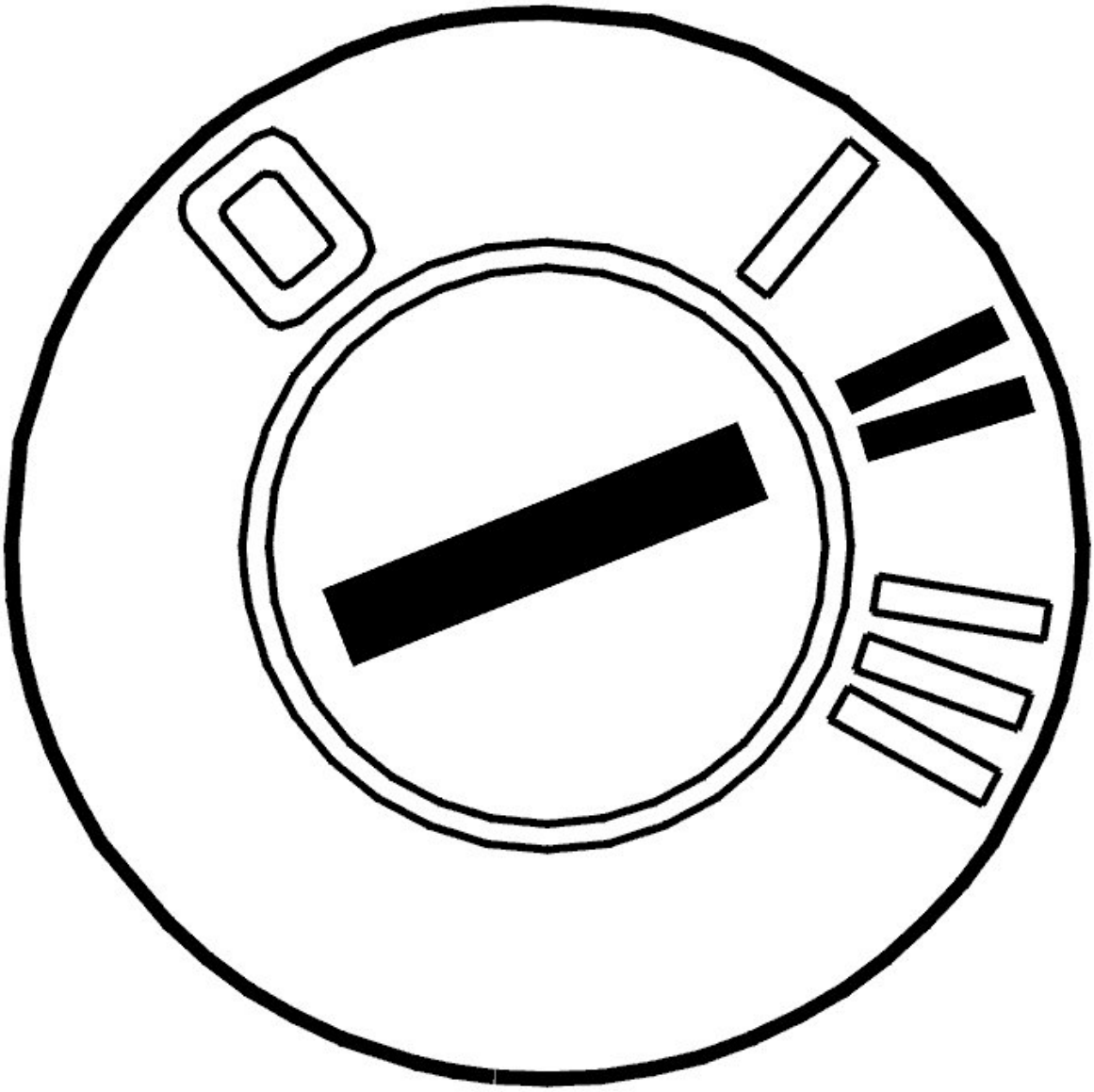
Continue - Verification

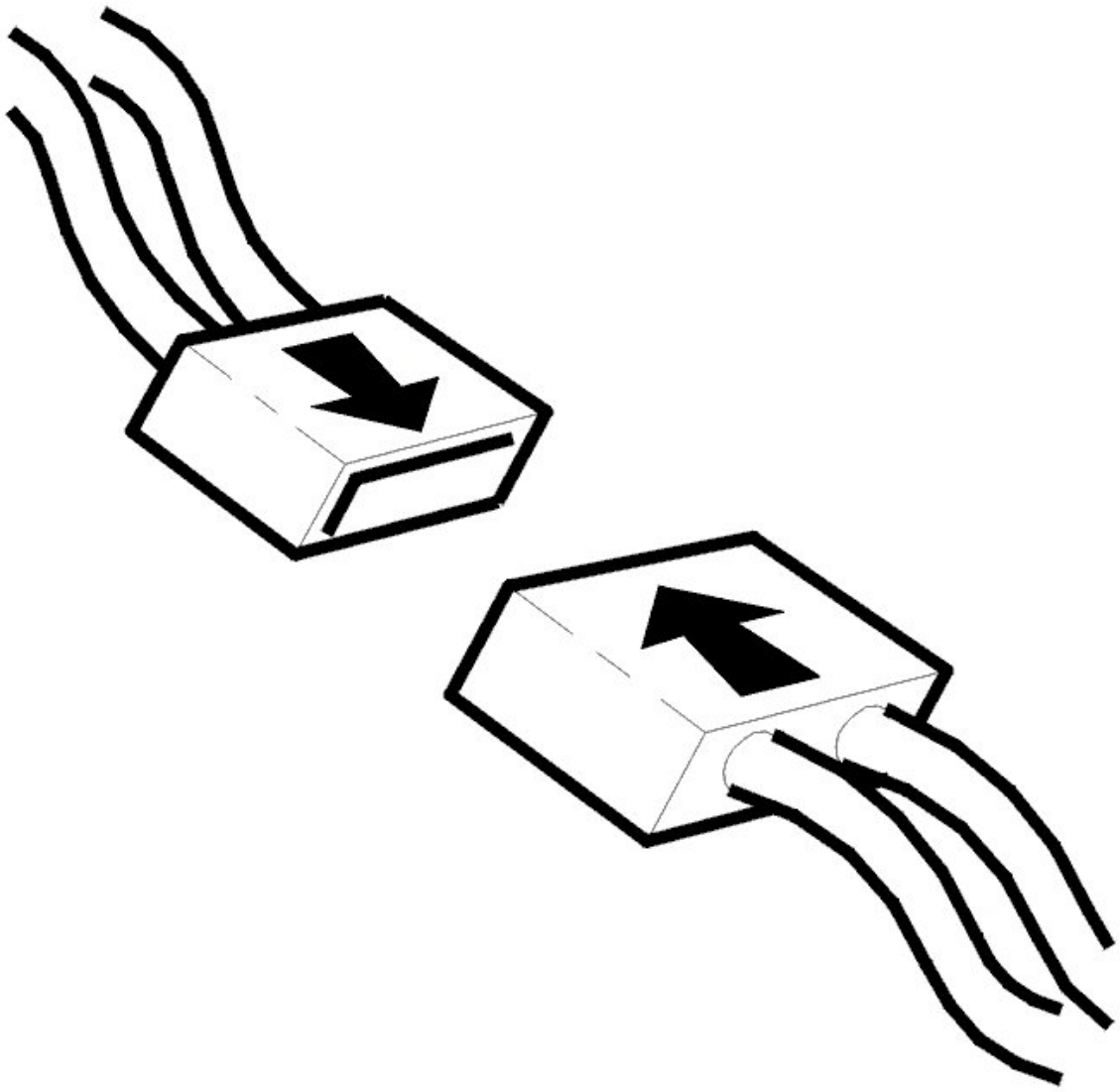
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

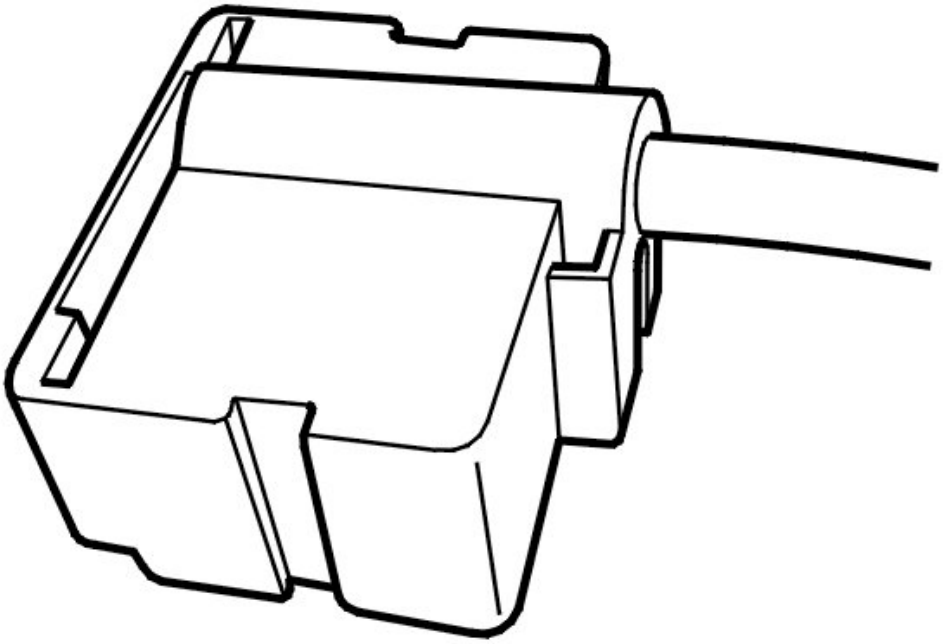
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0013 or SUM-0023 is stored if the control module registers that there is no signal from one of the acceleration sensors when the ignition is switched on.

- SUM-0013: Left front acceleration sensor
- SUM-0023: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and

Suspension/Suspension/Description and Operation.

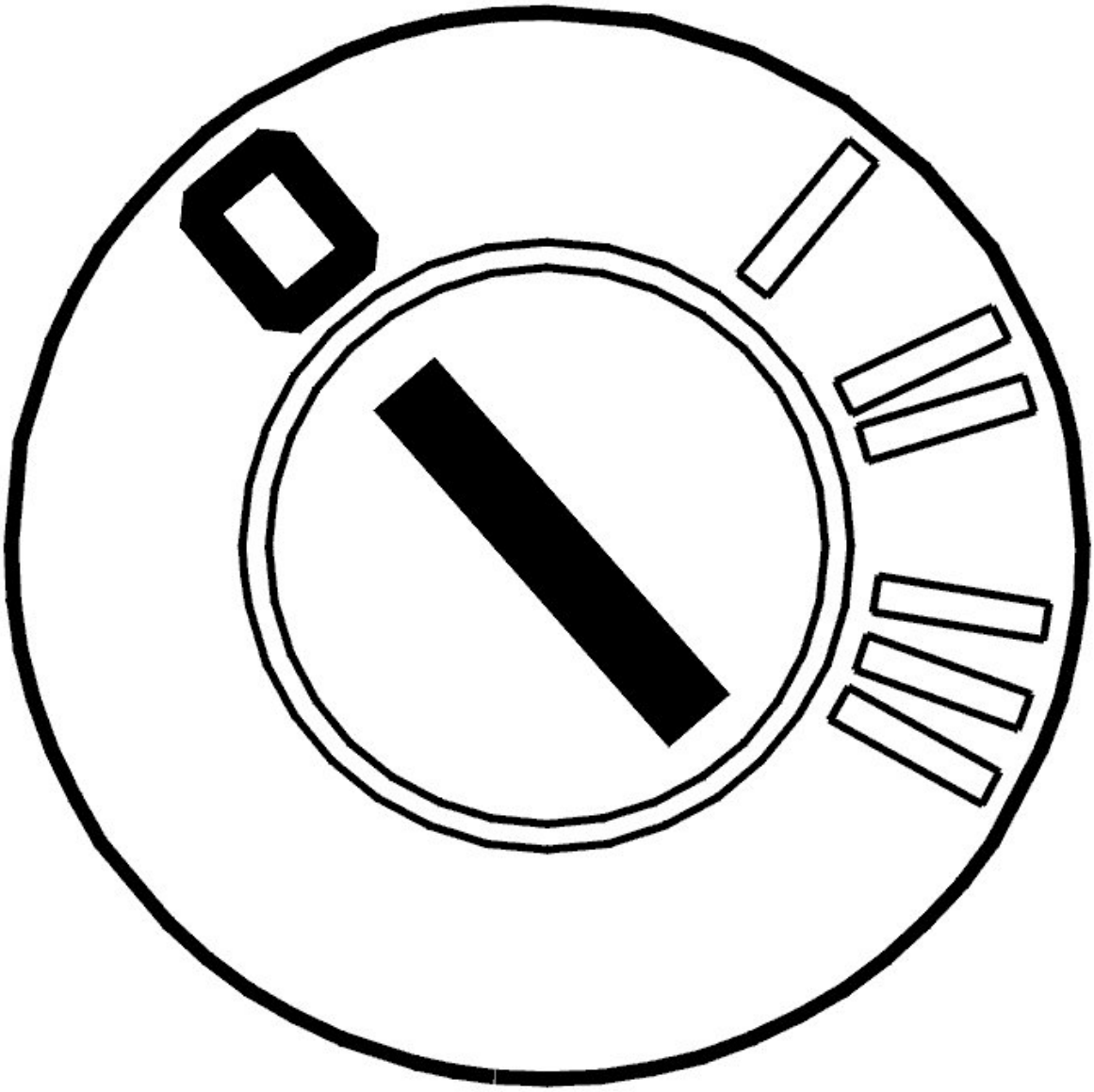
Possible source
- Open-circuit in the signal cable
- Open-circuit in the ground lead
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective acceleration sensor.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0013, front left acceleration sensor:
- Check the signal cable between control module terminal #A12 and acceleration sensor terminal #2. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between Suspension Module (SUM) terminal #A19 and acceleration sensor terminal #3. Check for an open-circuit.

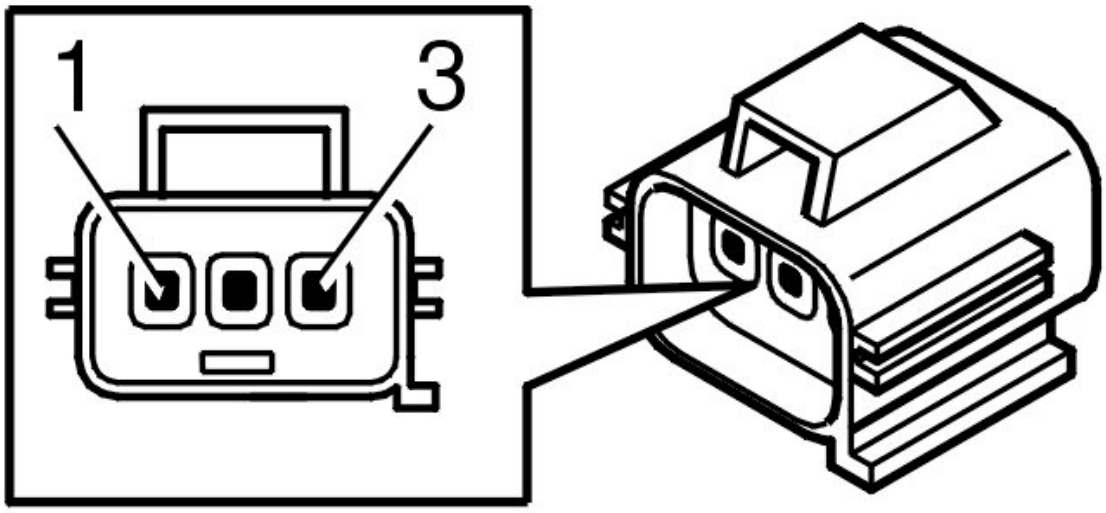
For diagnostic trouble code (DTC) SUM-0023, front right acceleration sensor:
- Check the signal cable between control module terminal #A27 and acceleration sensor terminal #2. Check for an open-circuit or a

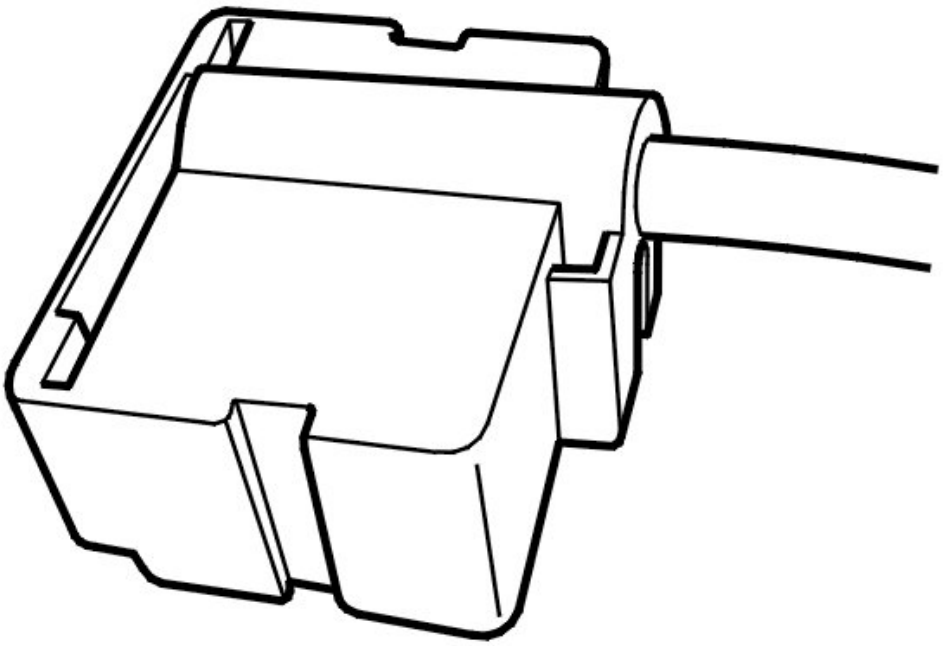
short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #3. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:
- Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





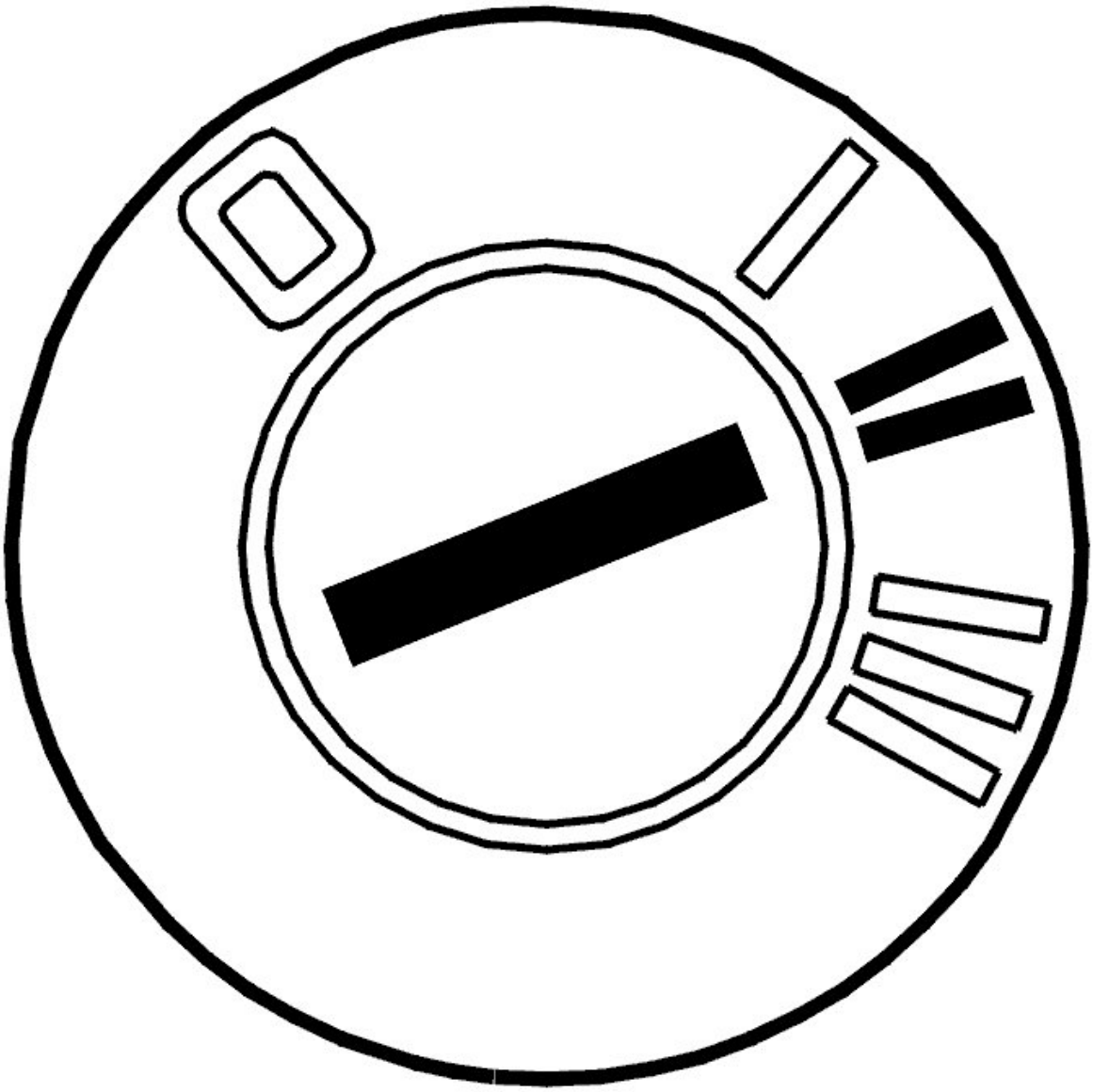
Continue - Verification

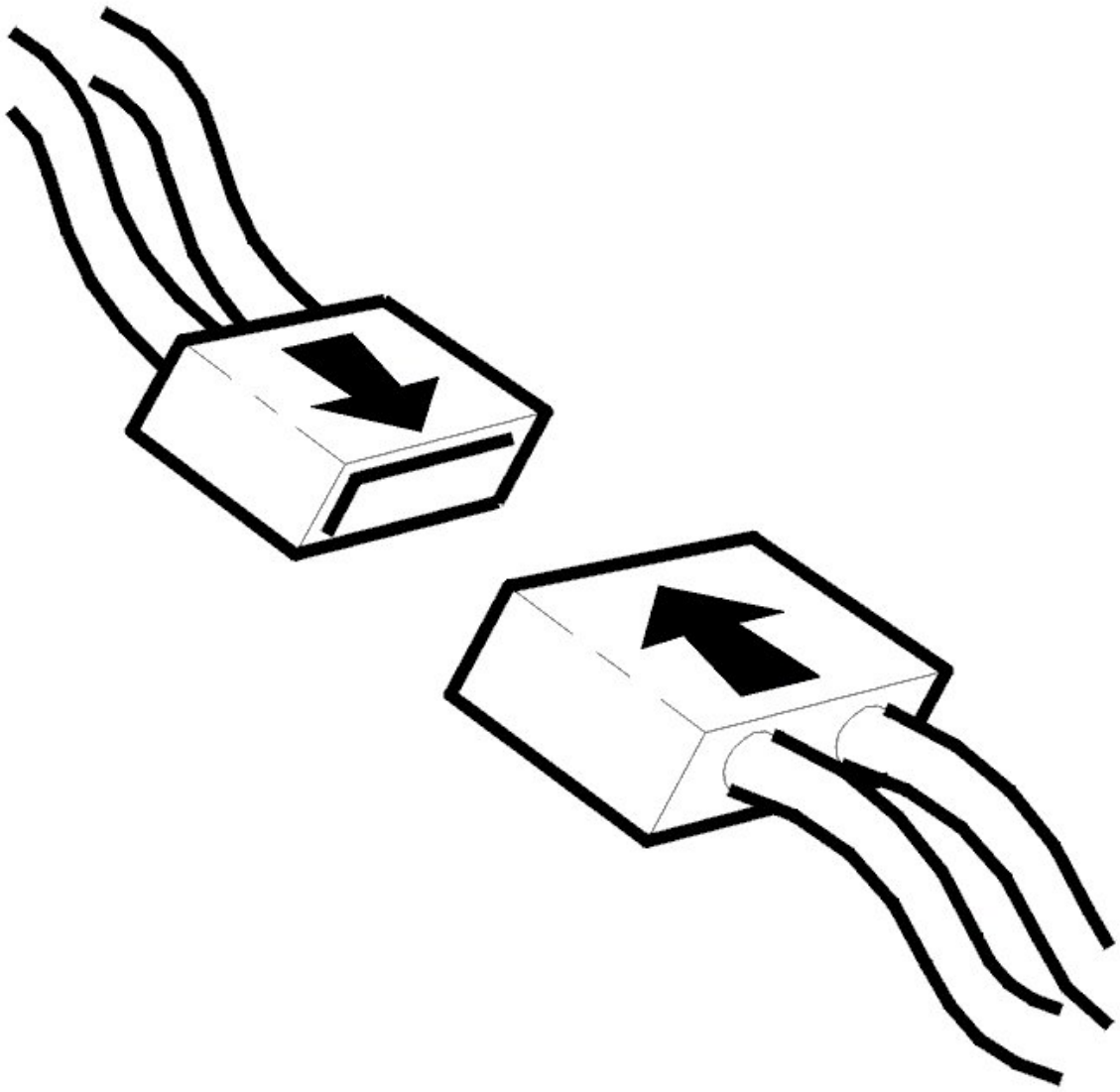
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

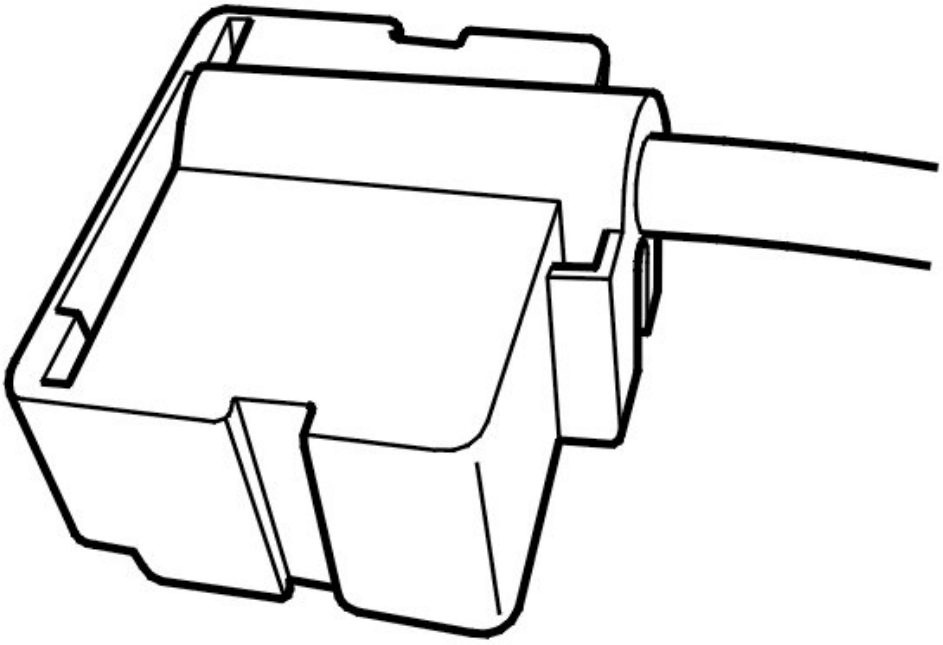
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0011 or SUM-0021 is stored if the control module registers that the signal from one of the acceleration sensors is too low when the ignition is switched on.

- SUM-0011: Left front acceleration sensor
- SUM-0021: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and

Suspension/Suspension/Description and Operation.

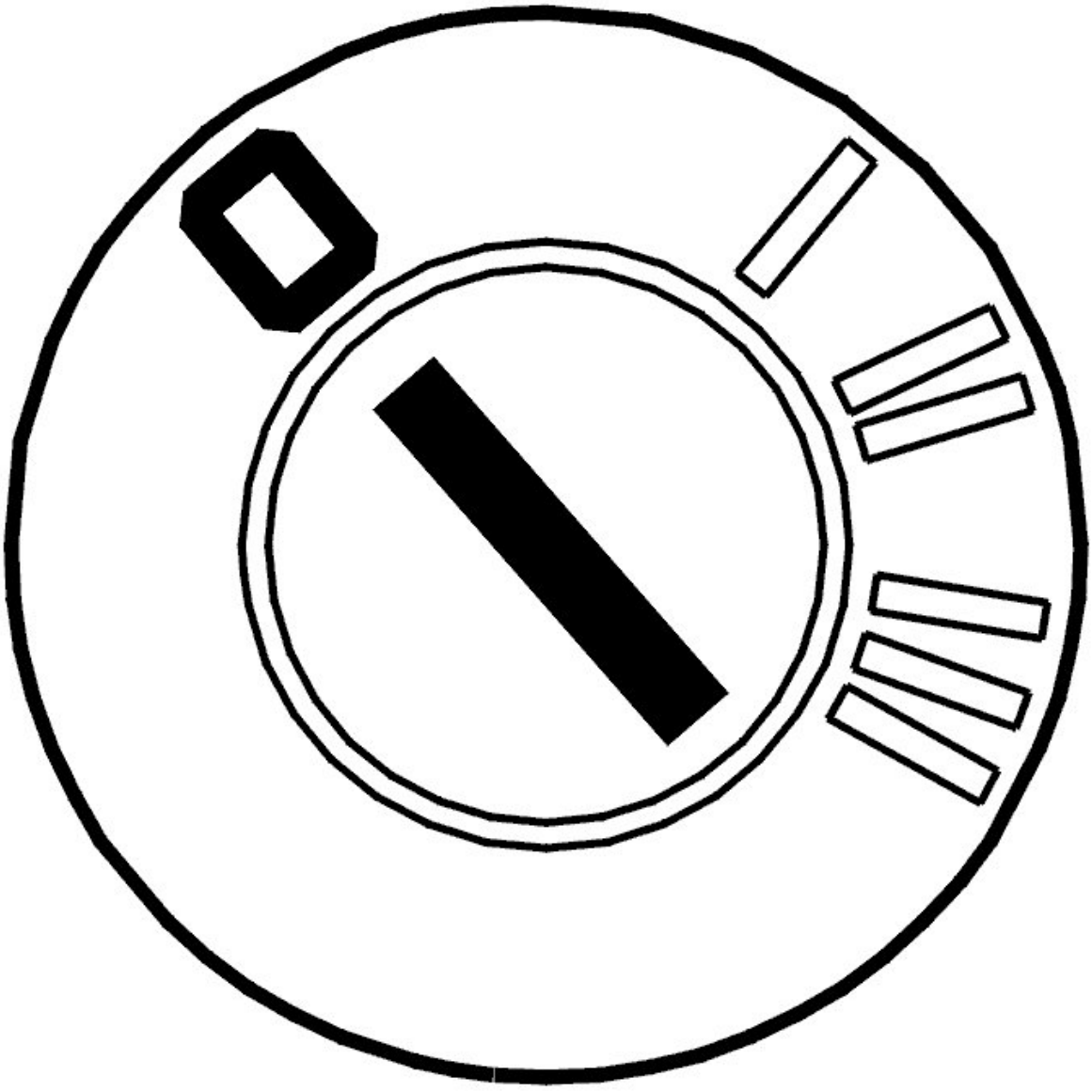
Possible source
- Short-circuit to ground in the signal cable from the acceleration sensor
- Open-circuit or short-circuit to ground in the power supply to the acceleration sensor
- Contact resistance in the terminals
- Defective acceleration sensor.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0011, front left acceleration sensor:
- Check the signal cable between control module terminal #A12 and acceleration sensor terminal #2. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0021, front right acceleration sensor:
- Check the signal cable between control module terminal #A27 and acceleration sensor terminal #2. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #1. Check for an open-circuit.

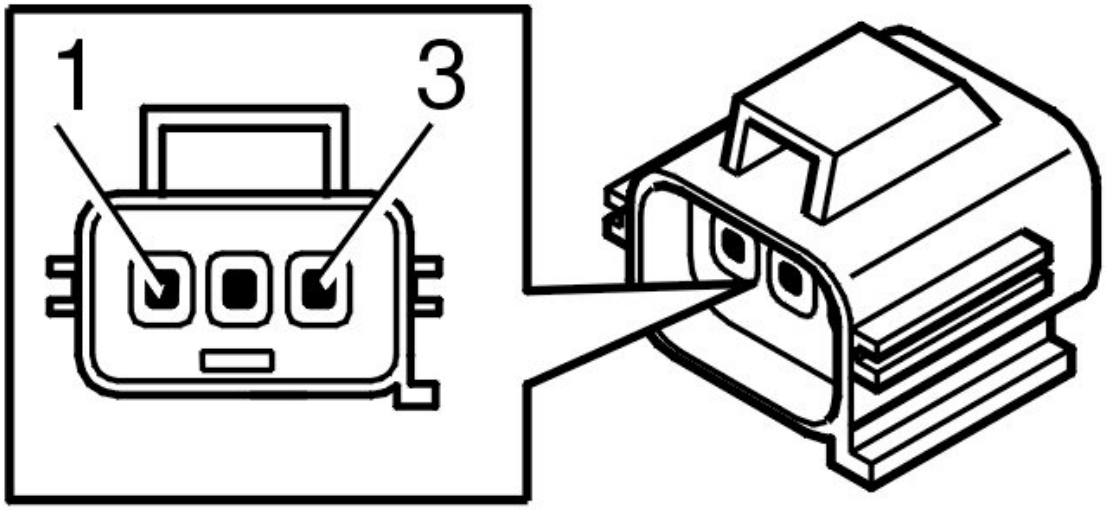
Check for a short-circuit to ground.

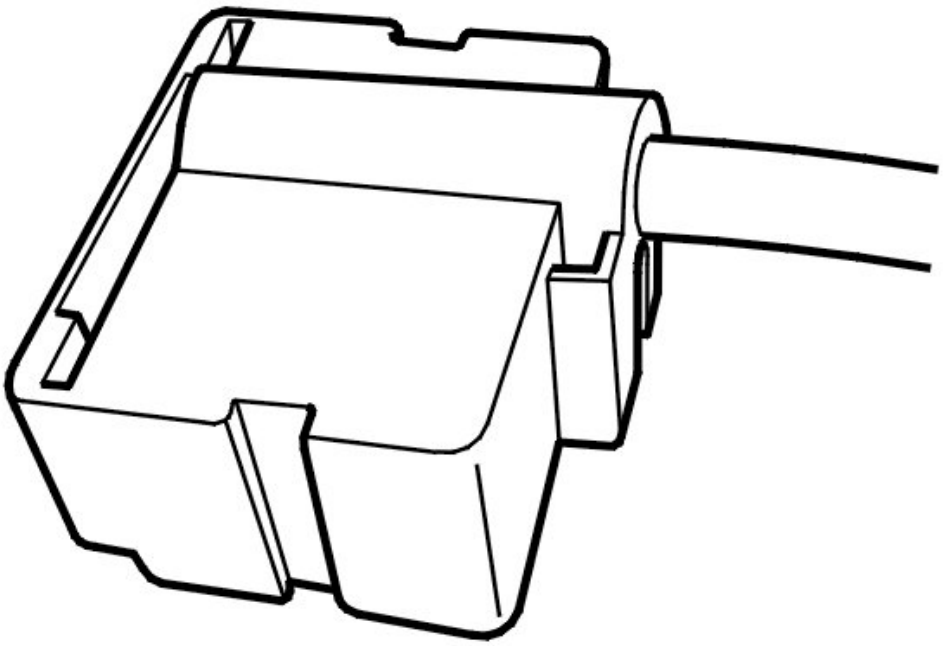
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the acceleration sensor, see Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





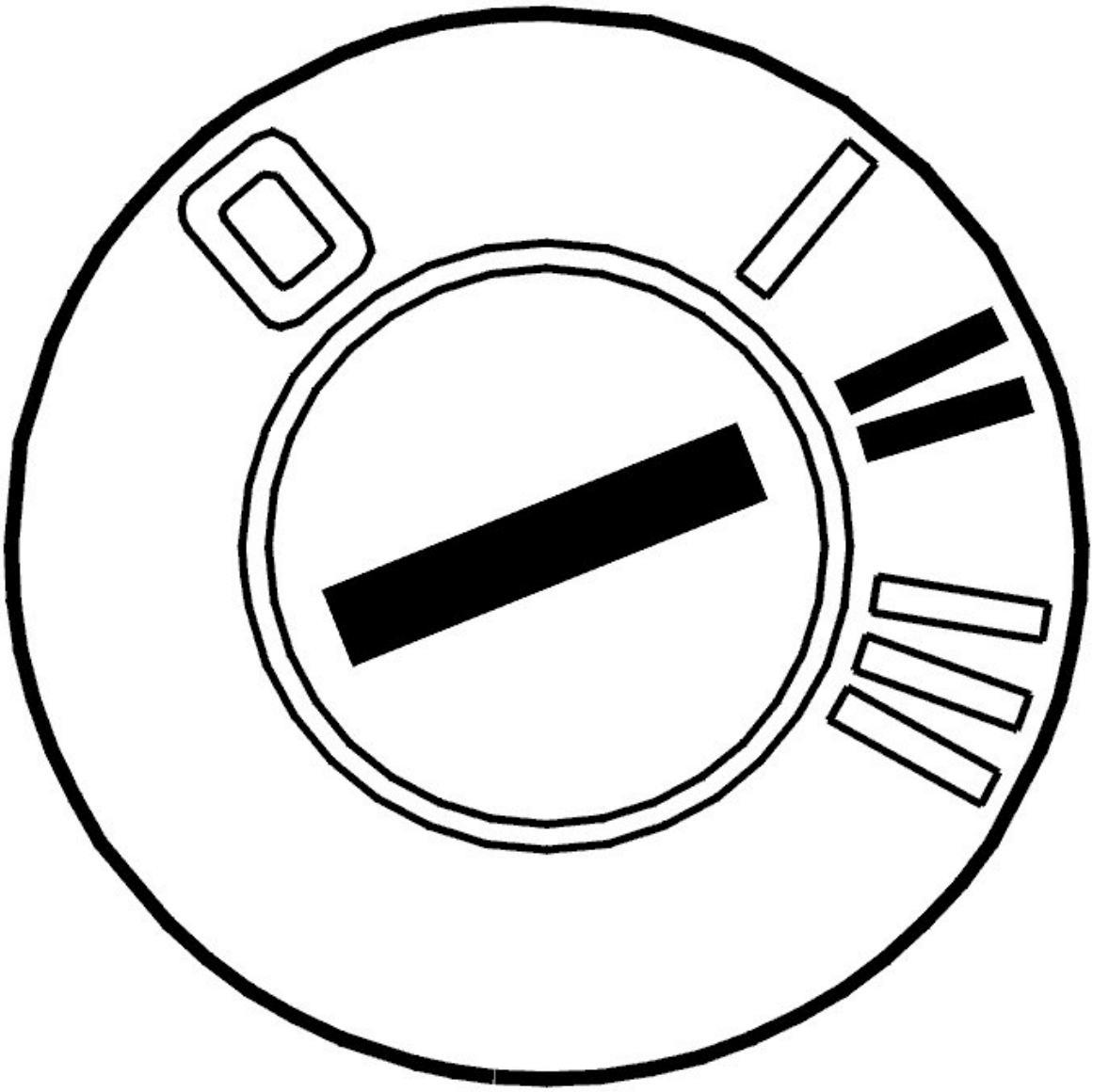
Continue - Verification

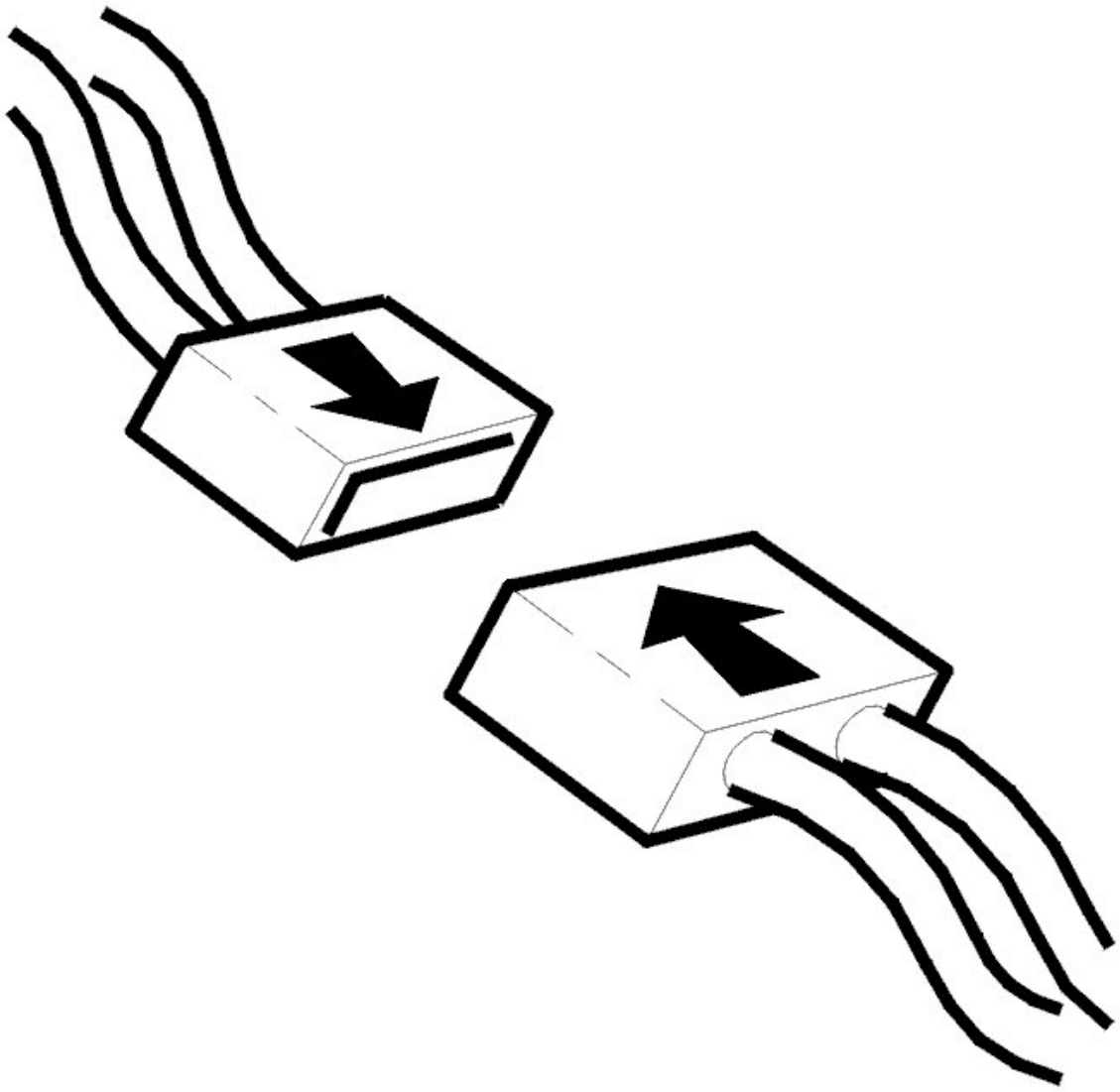
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

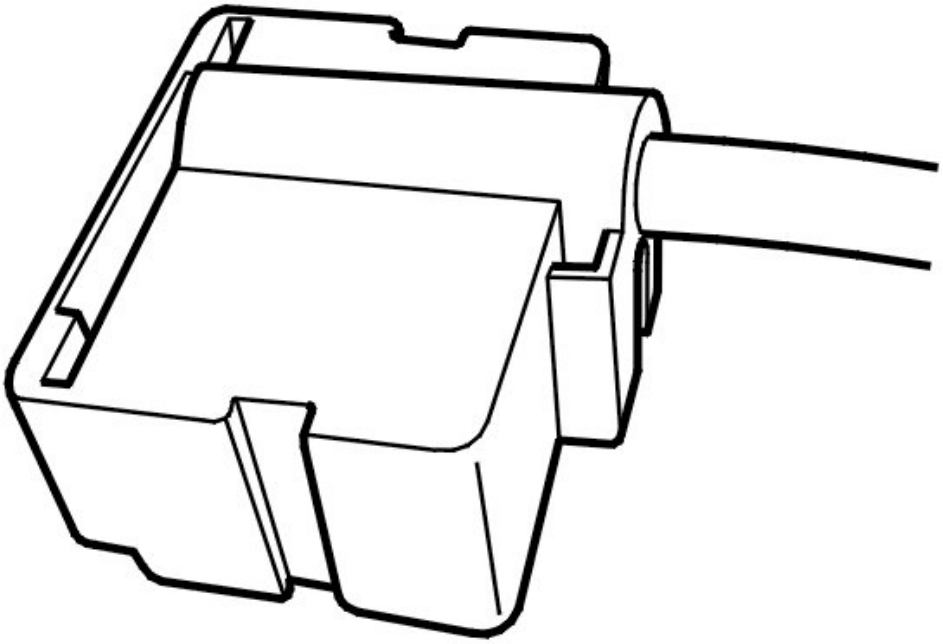
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0012 or SUM-0022 is stored if the control module registers that the signal from one of the acceleration sensors is too high when the ignition is switched on.

- SUM-0012: Left front acceleration sensor
- SUM-0022: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and

Suspension/Suspension/Description and Operation.

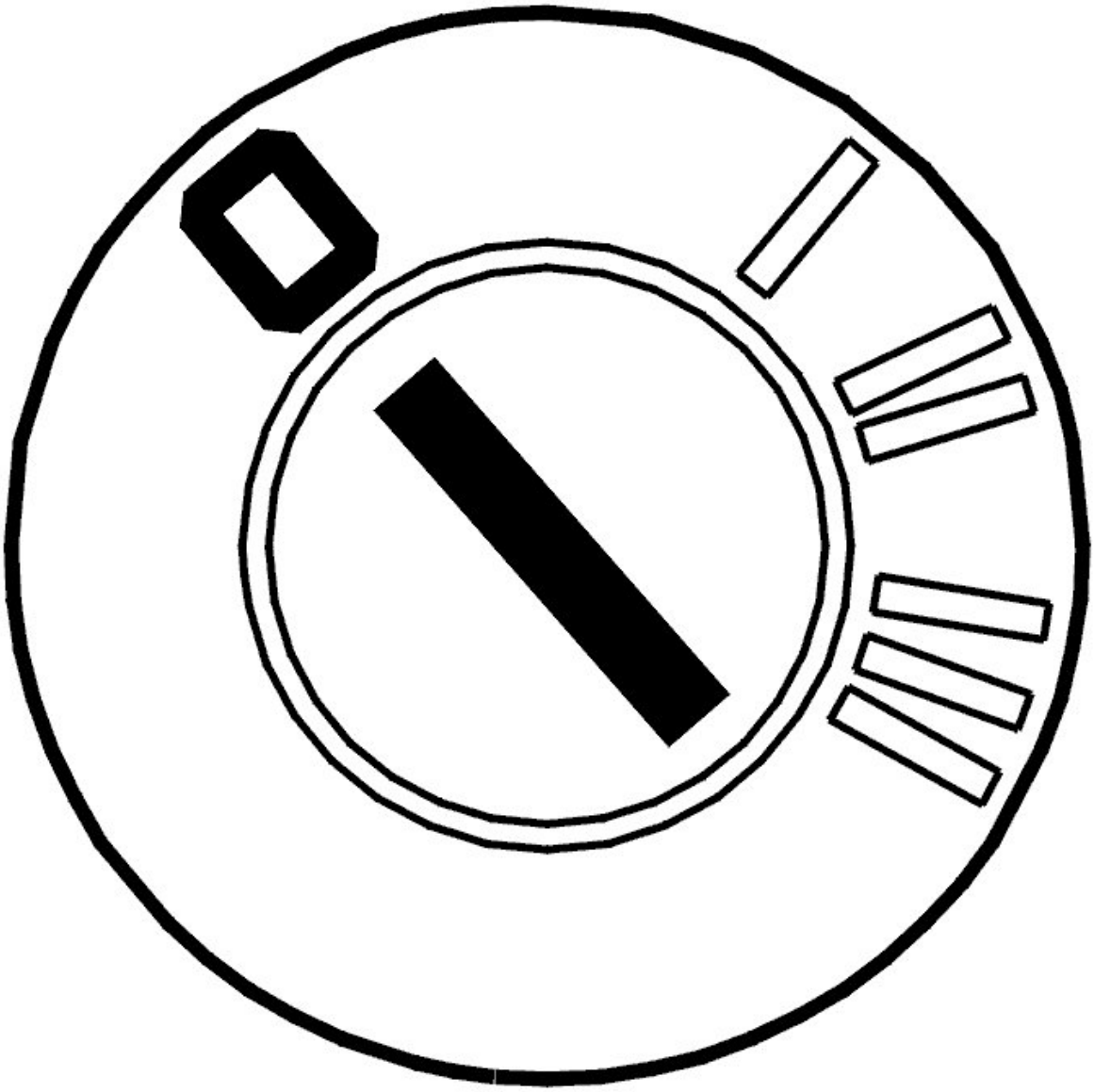
Possible source
- Short-circuit to supply voltage in the signal cable
- Defective acceleration sensor.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0012, front left acceleration sensor
- Check the signal cable between Suspension module (SUM) #A12 and acceleration sensor #2 for short-circuiting to voltage.

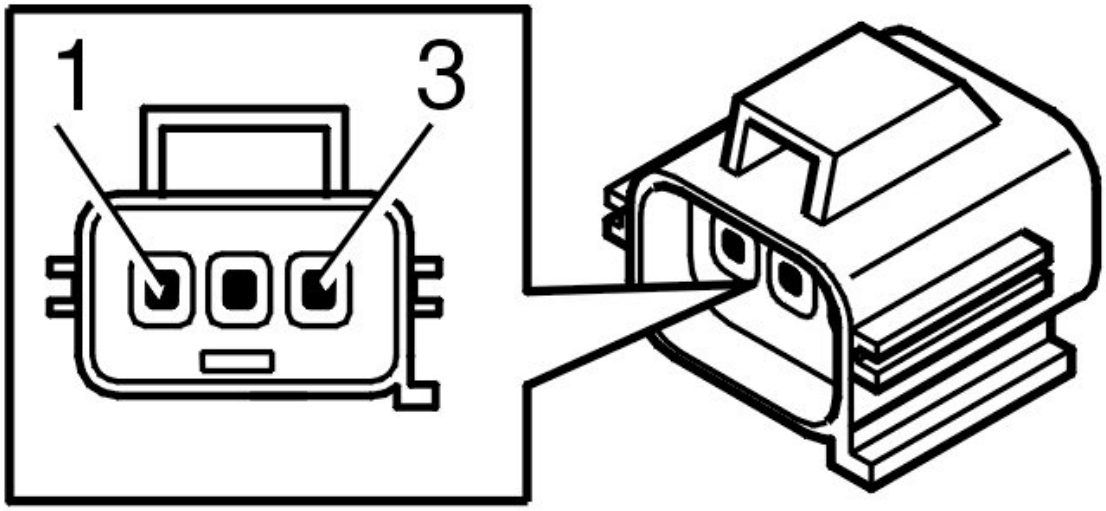
For diagnostic trouble code (DTC) SUM-0022, front right acceleration sensor
- Check the signal cable between Suspension module (SUM) #A27 and acceleration sensor #2 for short-circuiting to voltage.

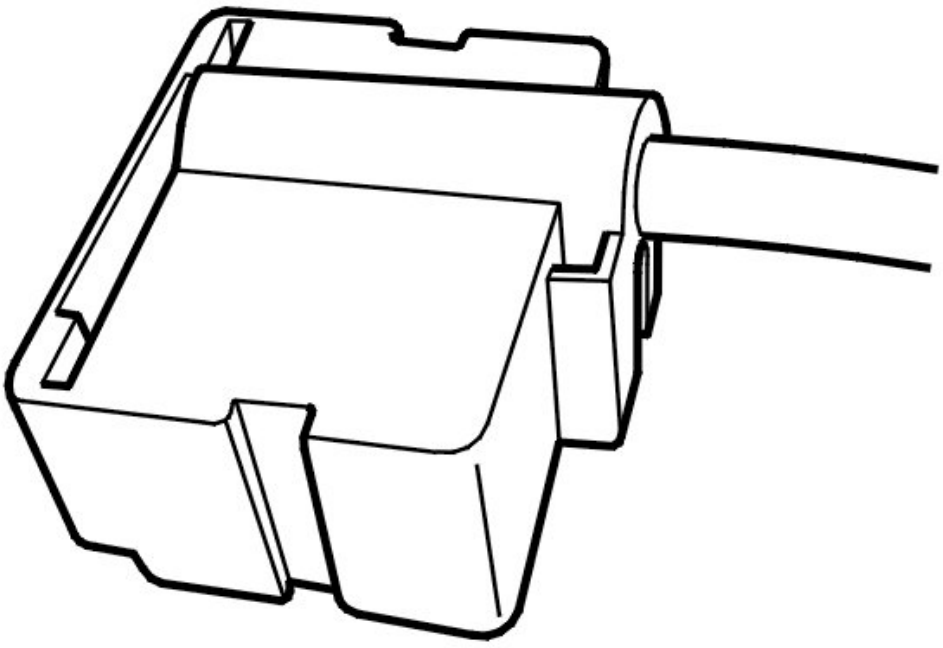
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information

- Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





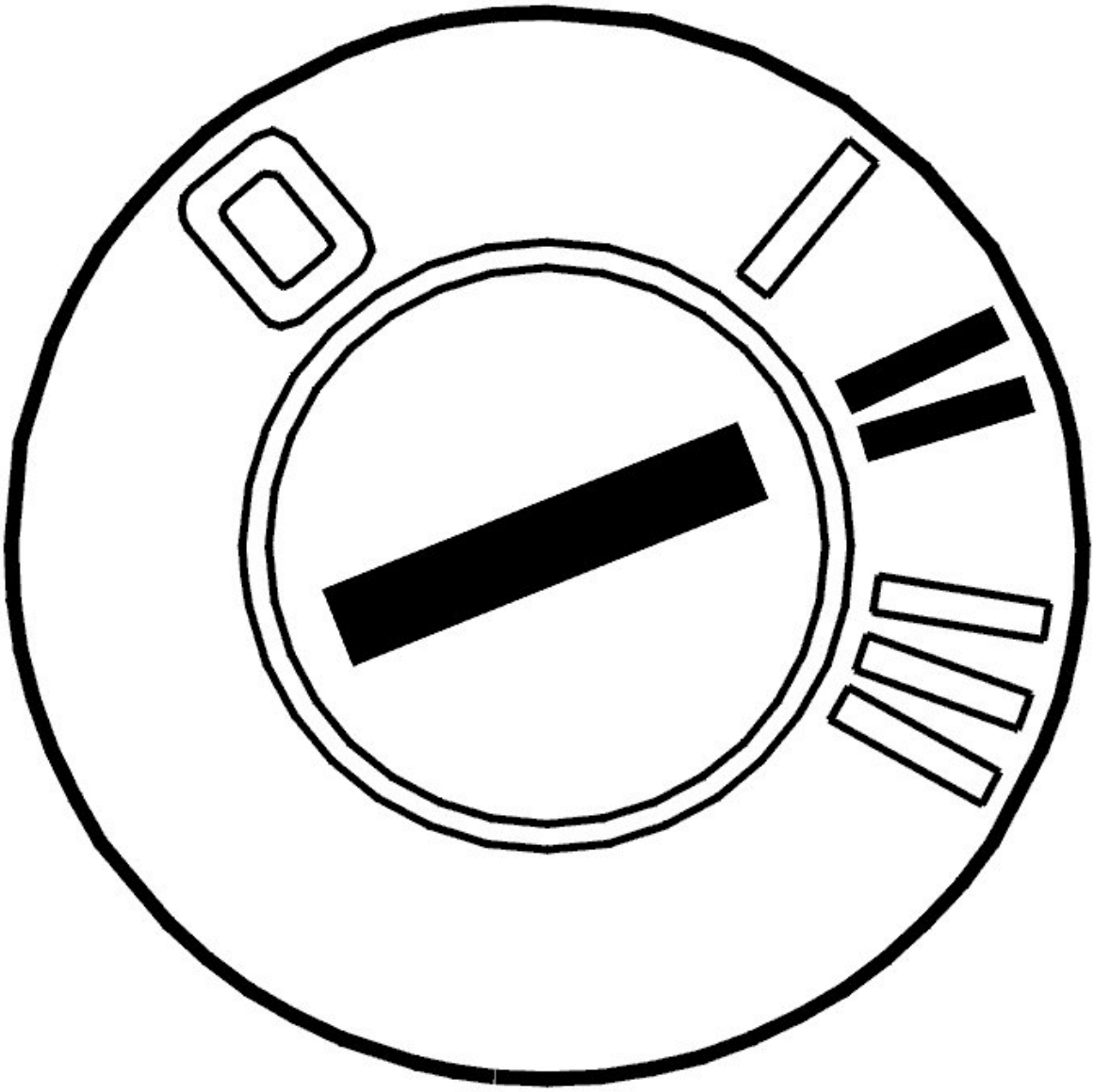
Continue - Verification

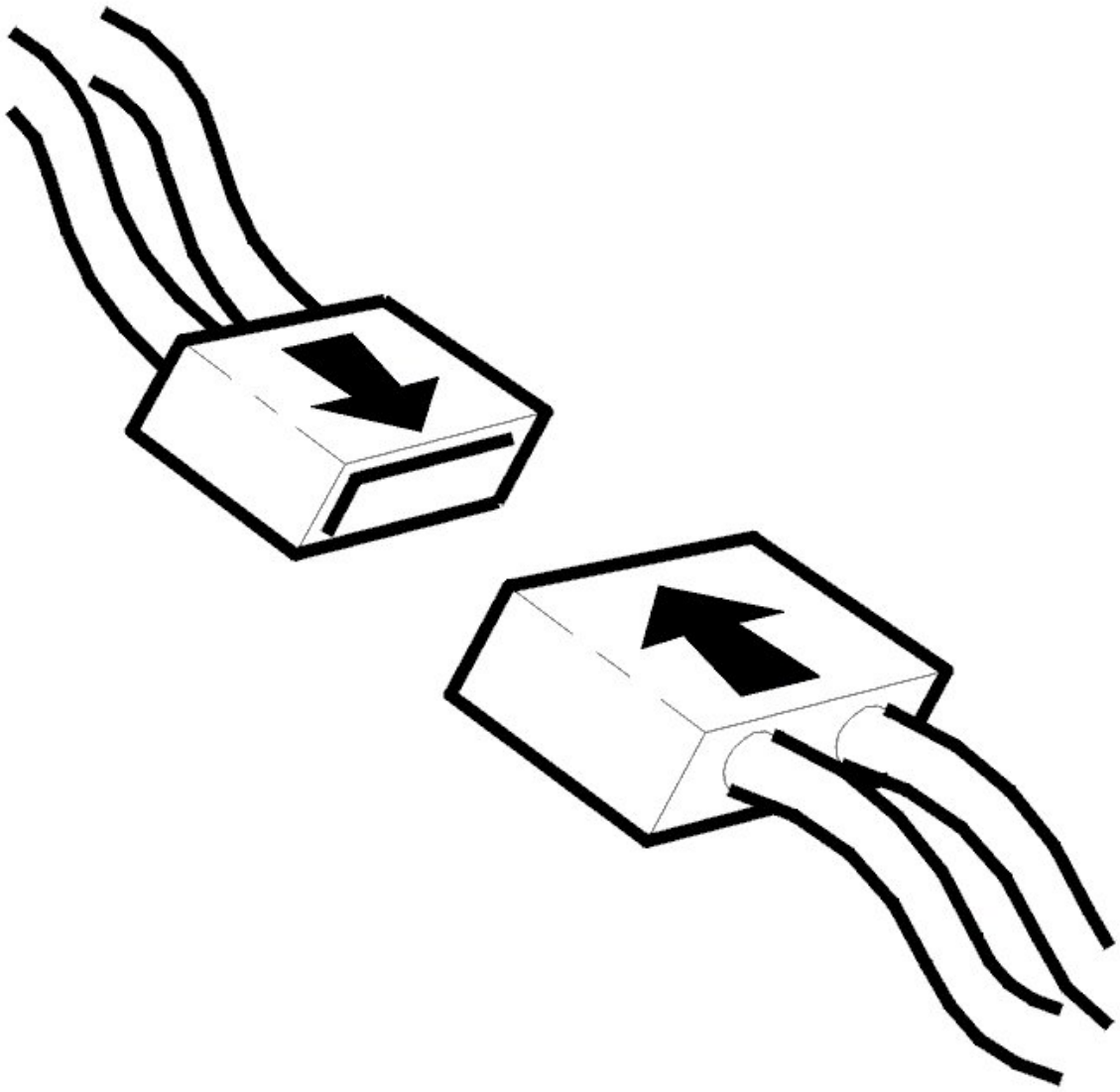
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

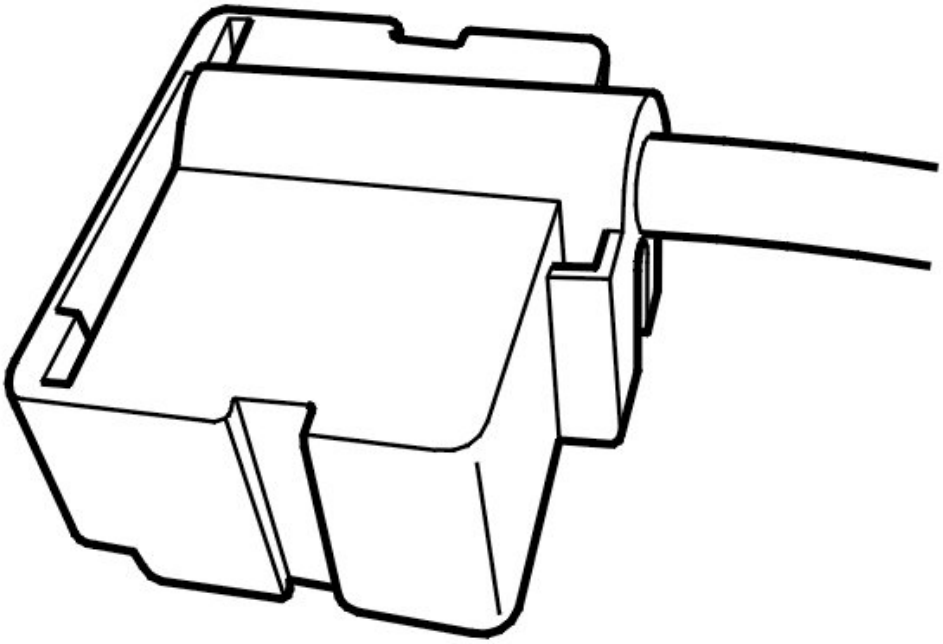
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the front wheels from the acceleration sensors on the shock absorbers. Diagnostic trouble code (DTC) SUM-0013 or SUM-0023 is stored if the control module registers that there is no signal from one of the acceleration sensors when the ignition is switched on.

- SUM-0013: Left front acceleration sensor
- SUM-0023: Right front acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and

Suspension/Suspension/Description and Operation.

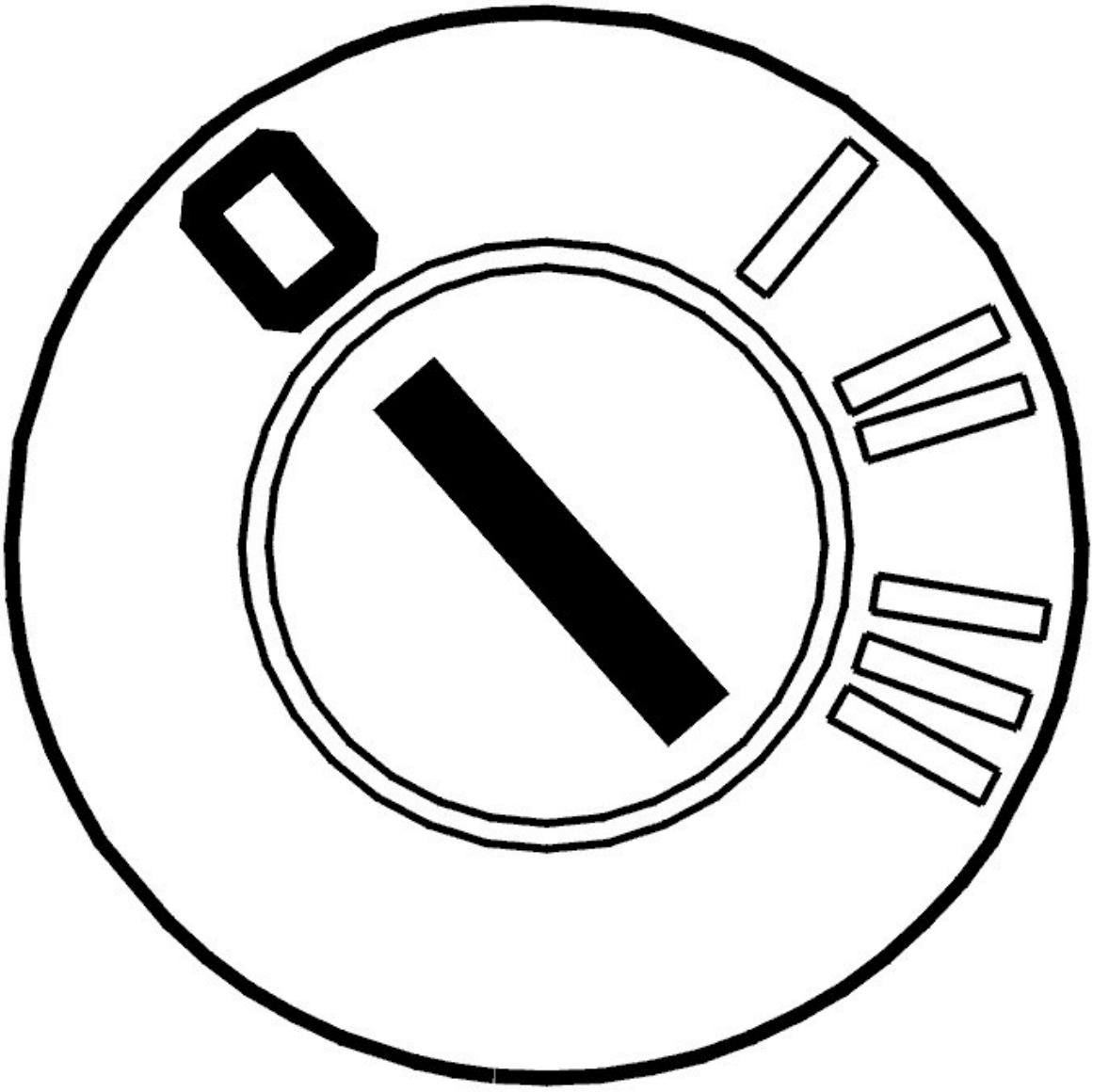
Possible source
- Open-circuit in the signal cable
- Open-circuit in the ground lead
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective acceleration sensor.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0013, front left acceleration sensor:
- Check the signal cable between control module terminal #A12 and acceleration sensor terminal #2. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between Suspension Module (SUM) terminal #A19 and acceleration sensor terminal #3. Check for an open-circuit.

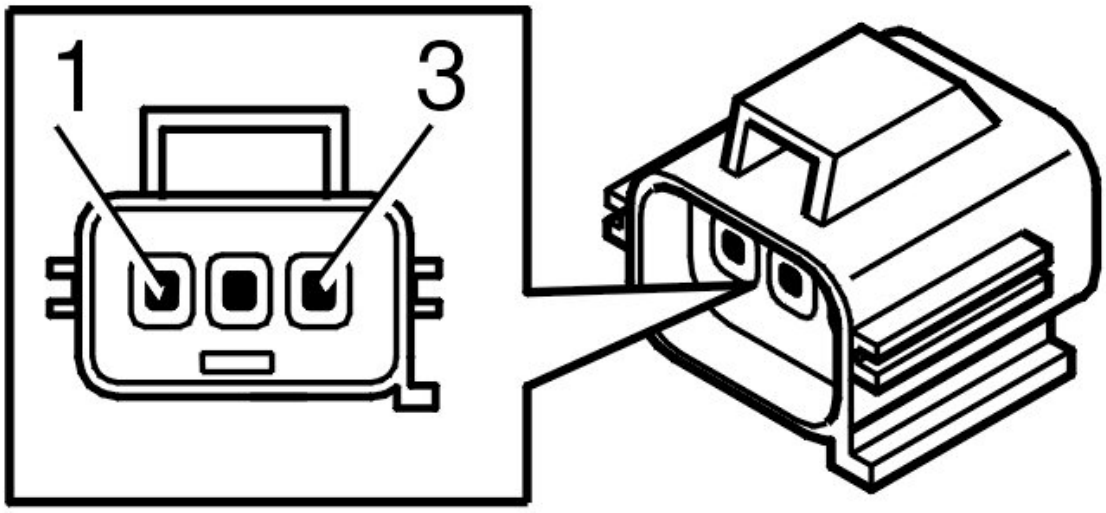
For diagnostic trouble code (DTC) SUM-0023, front right acceleration sensor:
- Check the signal cable between control module terminal #A27 and acceleration sensor terminal #2. Check for an open-circuit or a

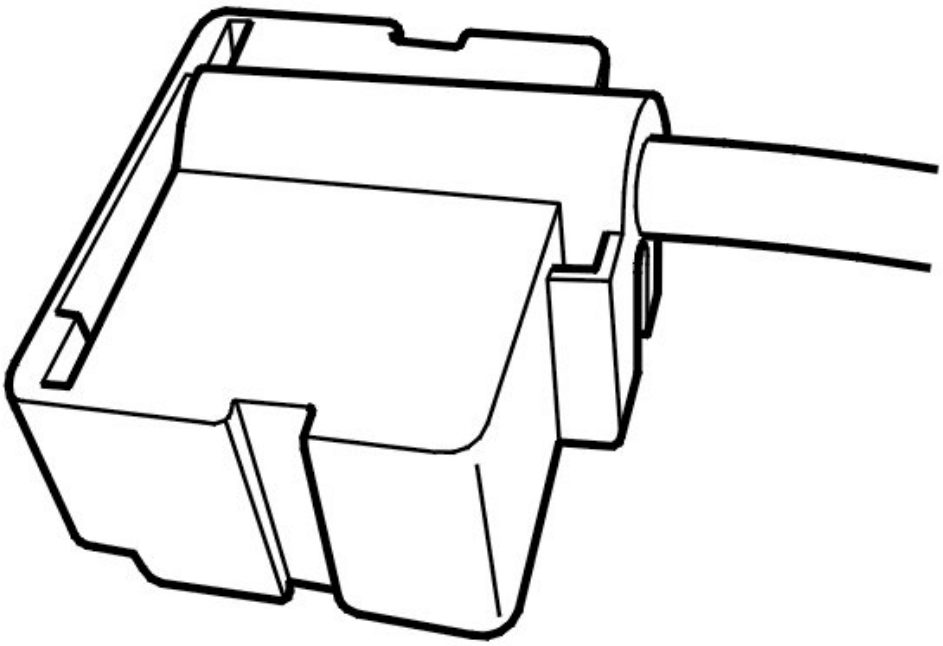
short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #3. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:
- Acceleration sensor suspension front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Suspension Front (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





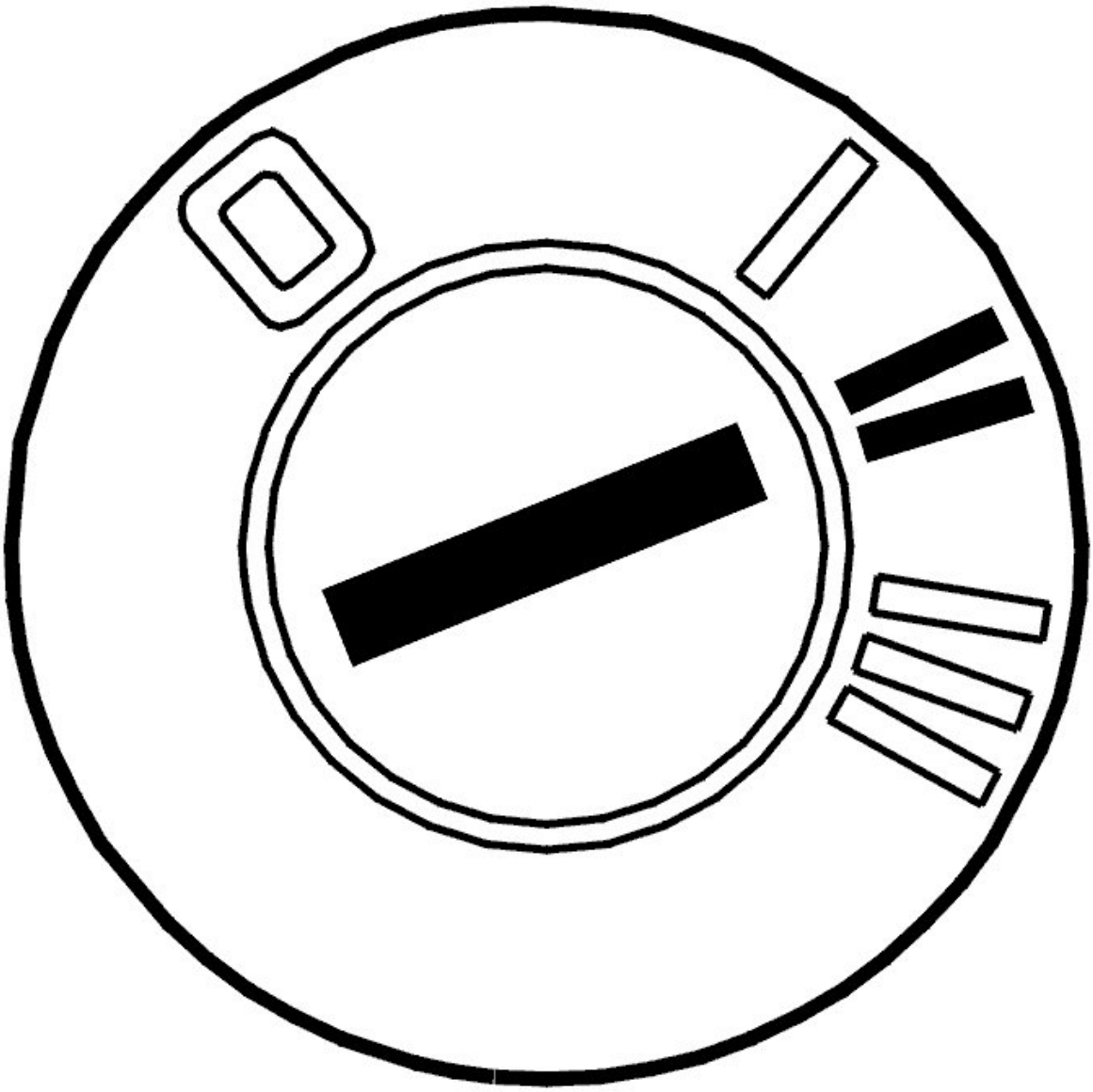
Continue - Verification

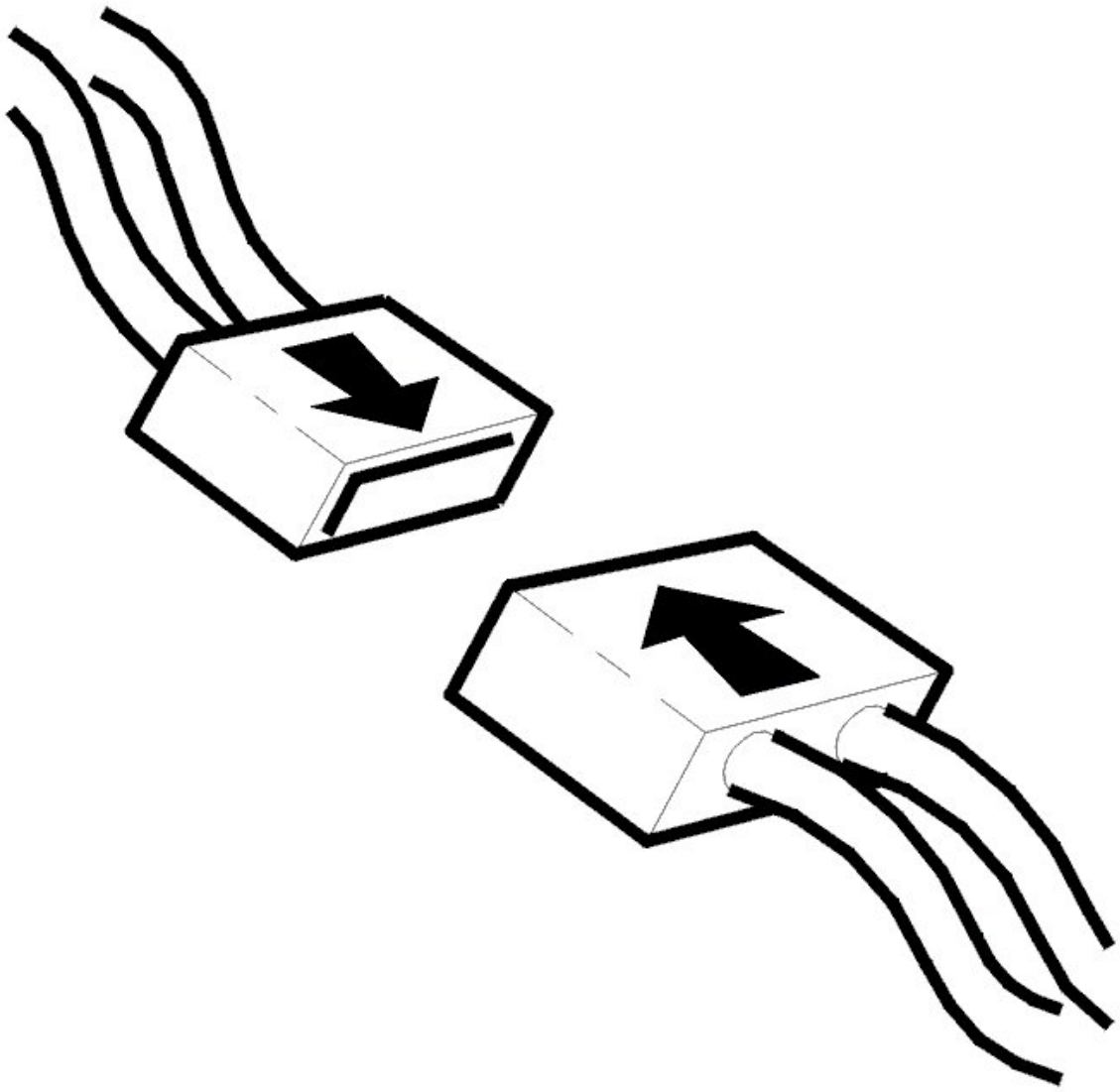
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensor. The value must be approximately 2.5 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

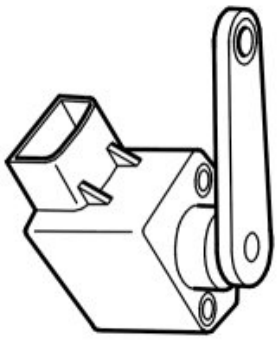
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0031 or SUM-0041 is stored if the control module registers that the signal from one of the position sensors is too low when the ignition is switched on.

- SUM-0031: Left rear position sensor
- SUM-0041: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable from the position sensor
- Open-circuit or short-circuit to ground in the power supply to the position sensor
- Contact resistance in the terminals
- Defective position sensor.

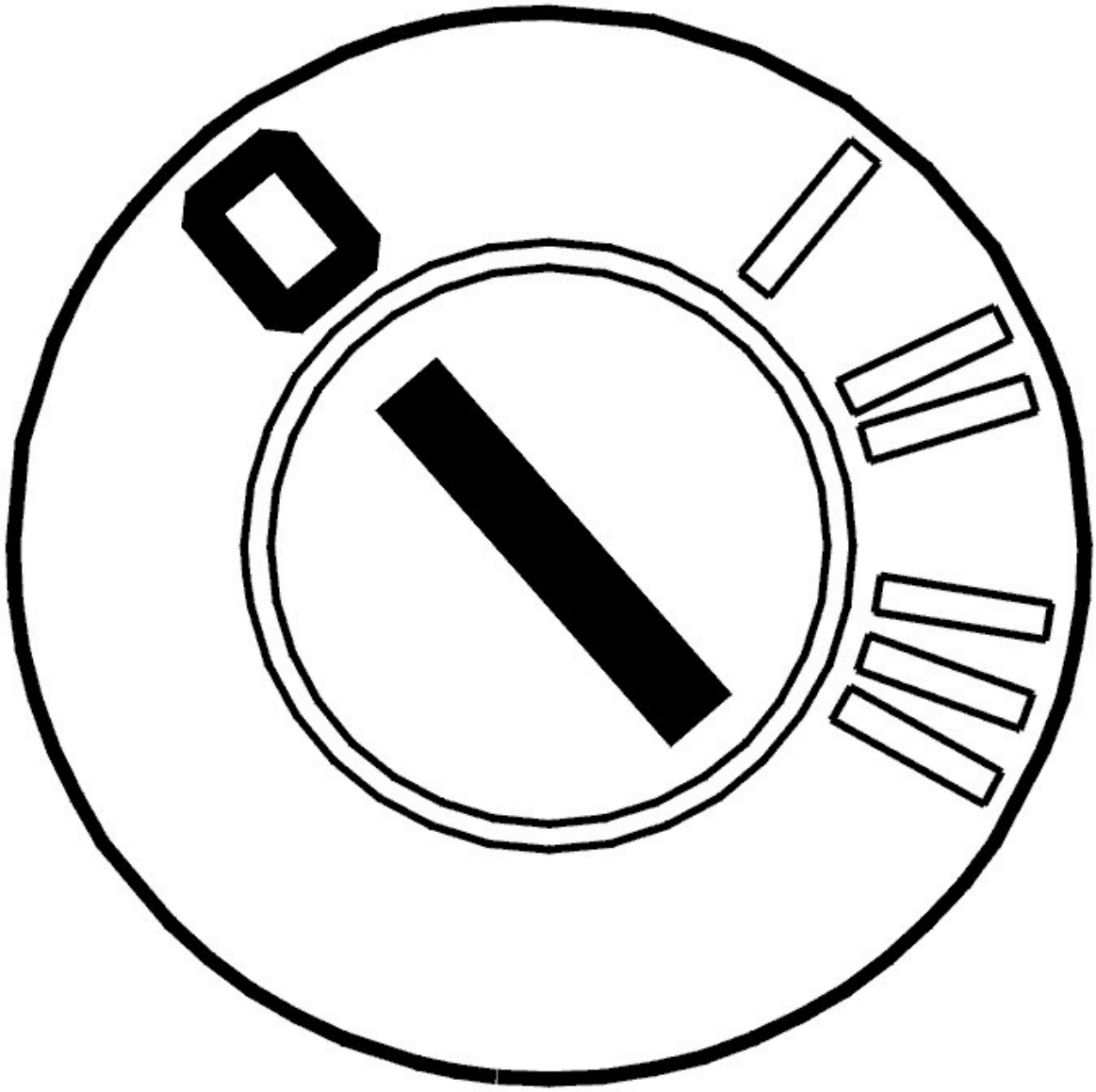
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0031, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A25 and position sensor terminal #5. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0041, rear right position sensor:

- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and position sensor terminal #5. Check for an open-circuit. Check for a short-circuit to ground.

Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

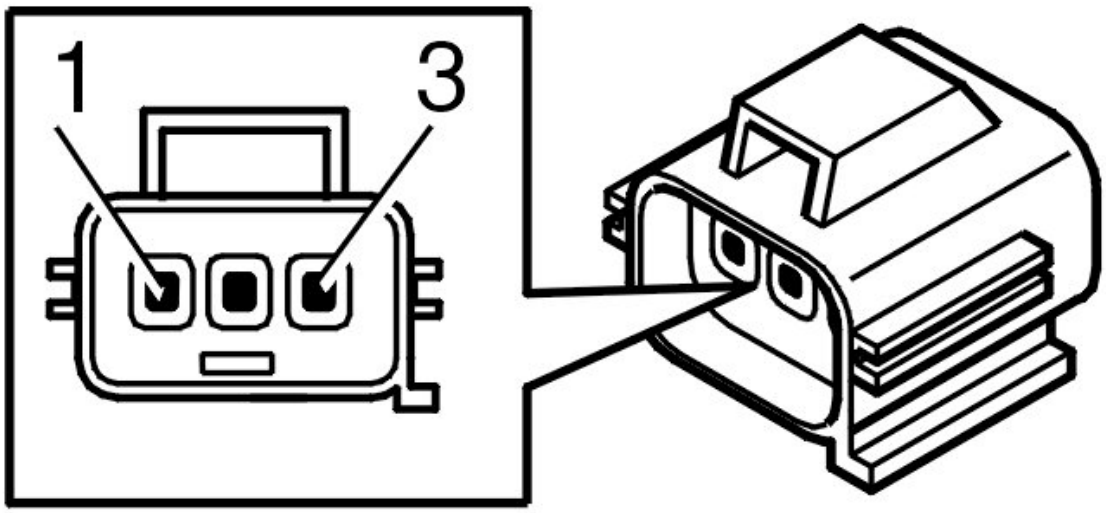
Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

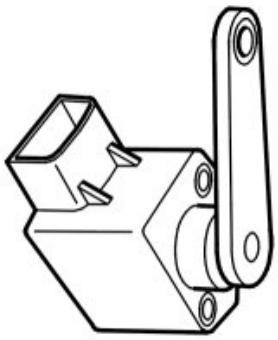
Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





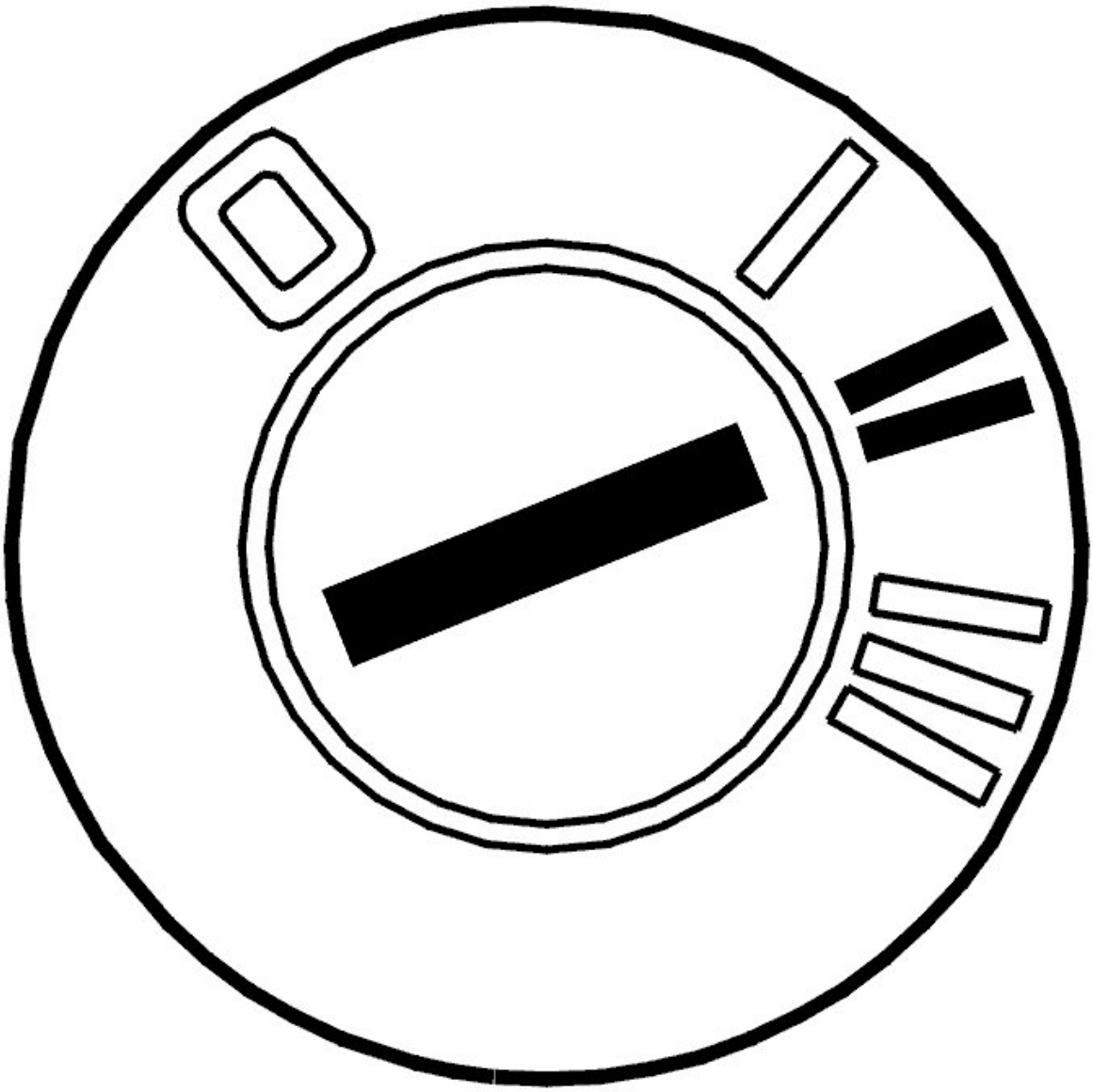
Continue - Verification

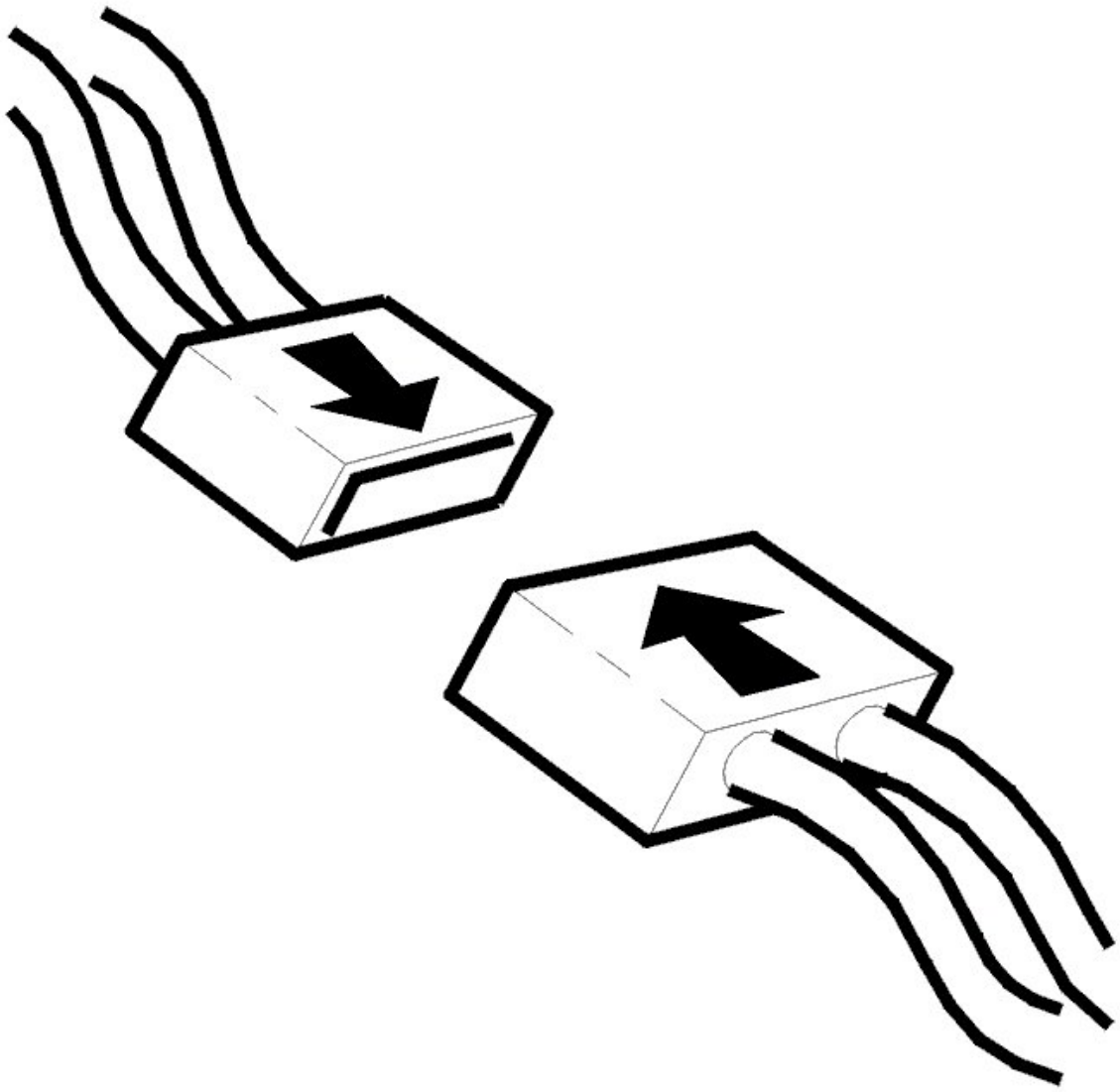
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

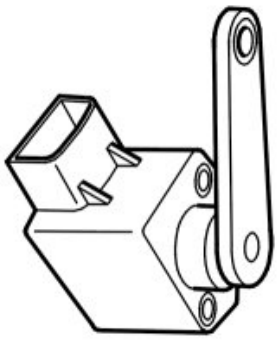
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0032 or SUM-0042 is stored if the control module registers that the signal from one of the position sensors is too high when the ignition is switched on.

- SUM-0032: Left rear position sensor
- SUM-0042: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable
- Defective position sensor.

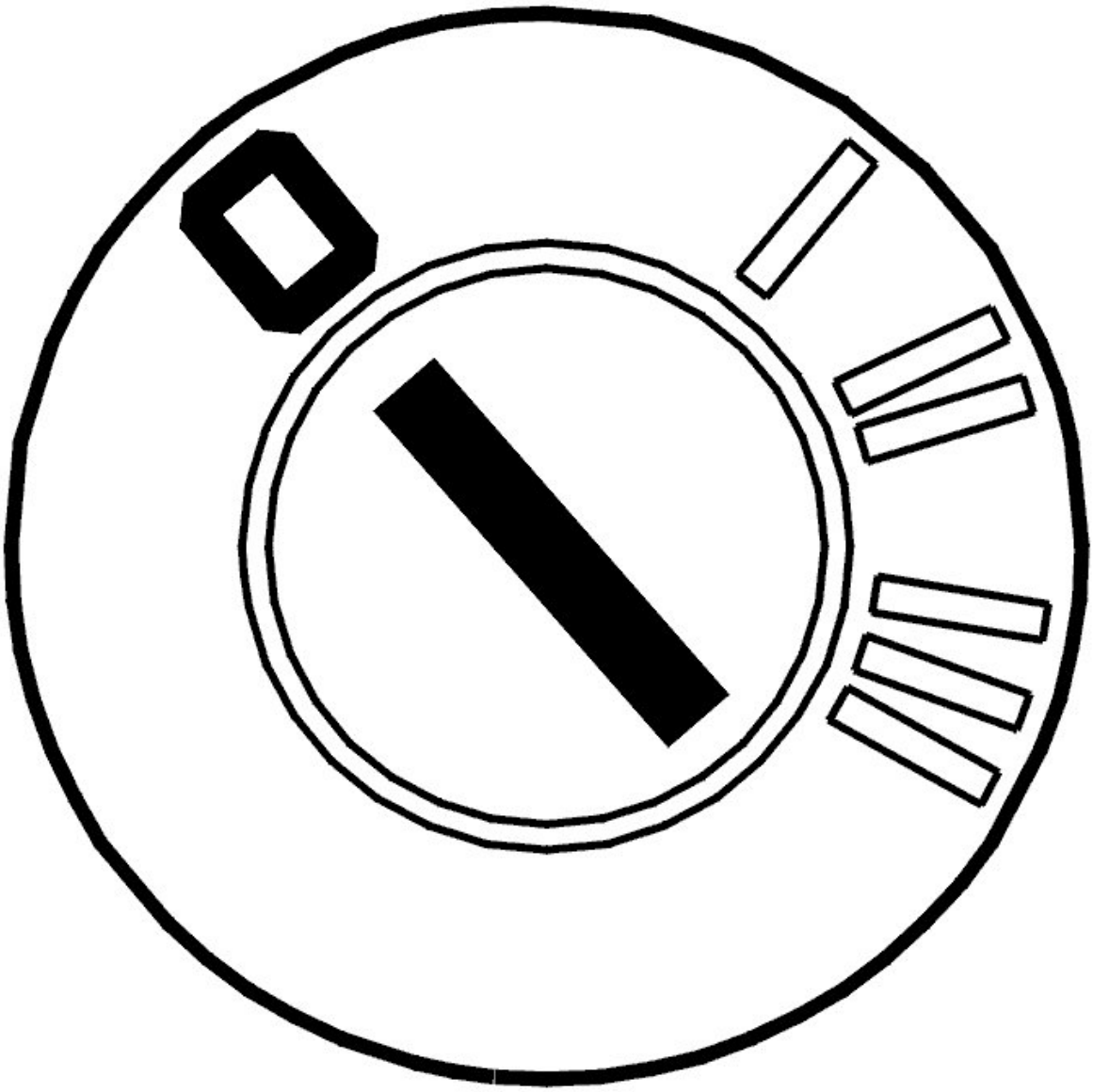
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0032, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for a short-circuit to voltage.

For diagnostic trouble code (DTC) SUM-0042, rear right position sensor:

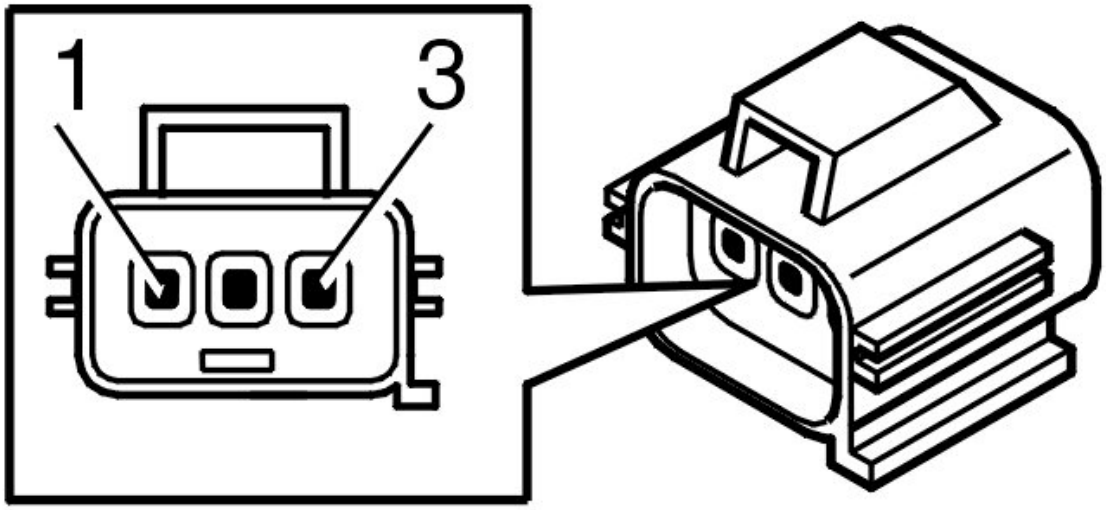
- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for a short-circuit to voltage.

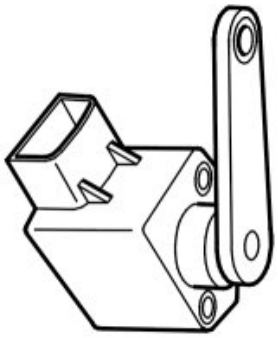
Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





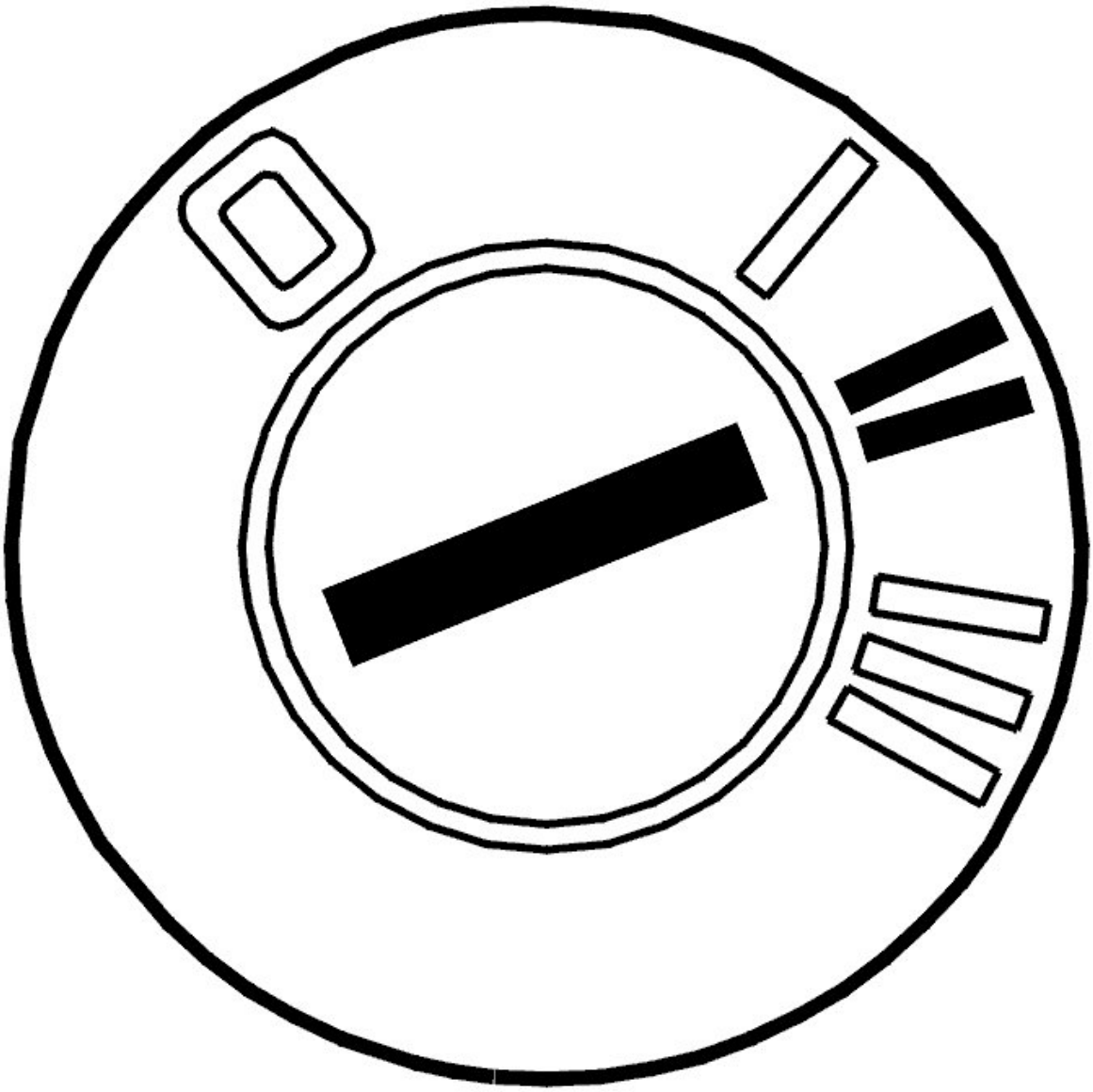
Continue - Verification

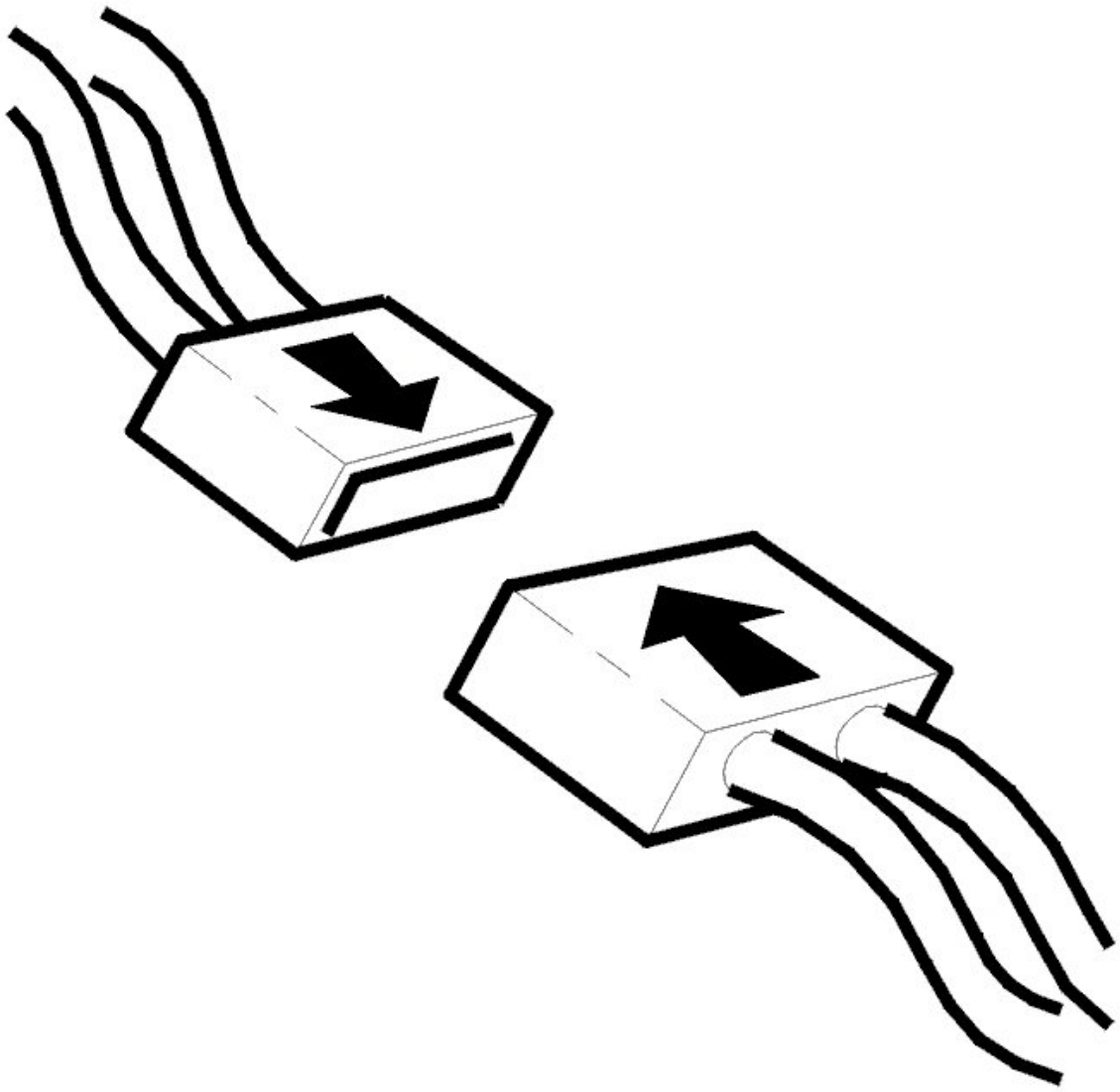
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

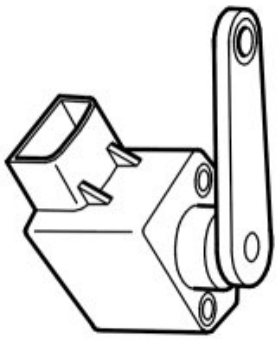
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0033 or SUM-0043 is stored if the control module registers that there is no signal from one of the position sensors when the ignition is switched on.

- SUM-0033: Left rear position sensor
- SUM-0043: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the signal cable
- Open-circuit in the ground lead
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective position sensor.

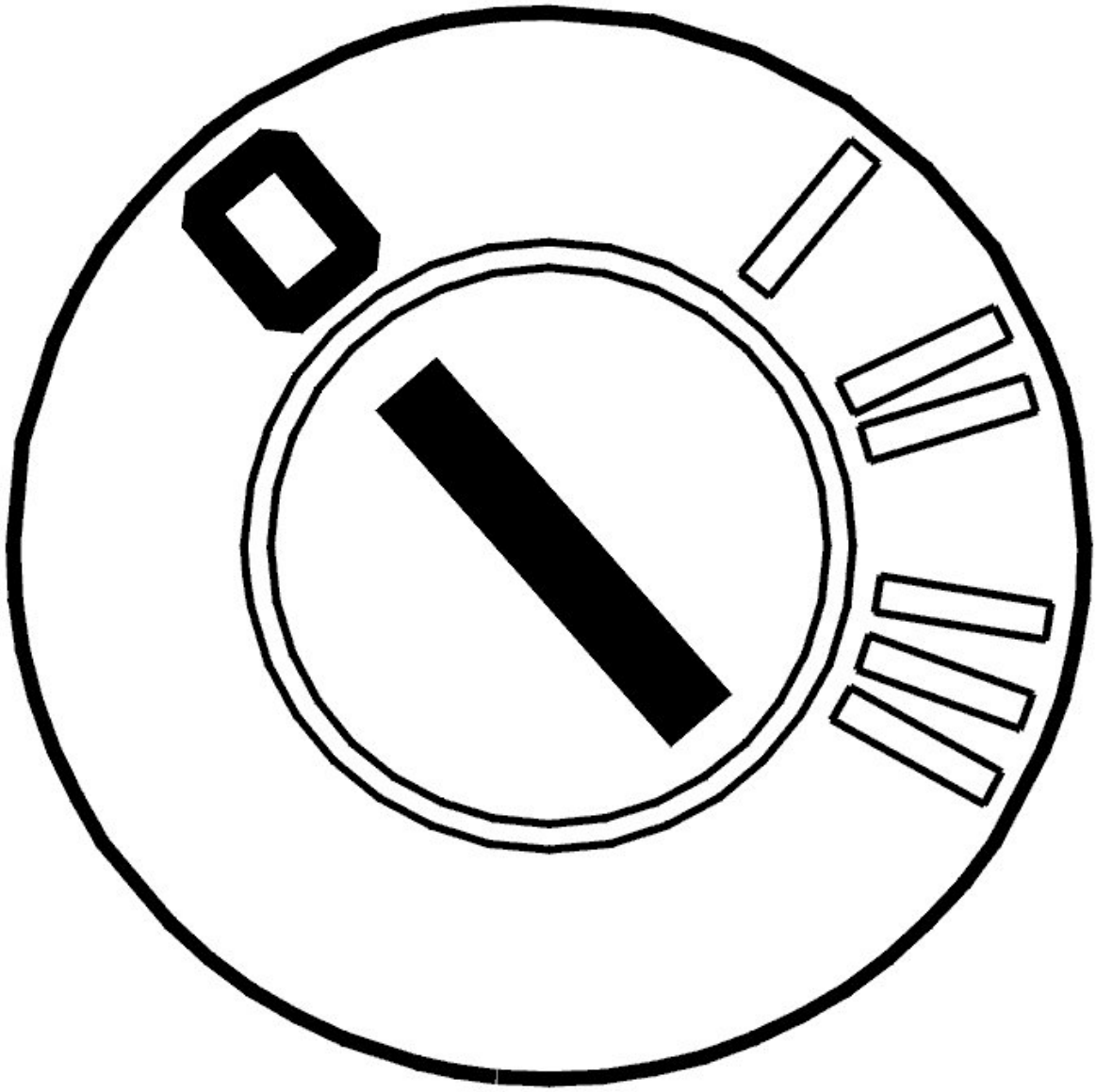
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0033, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A23 and position sensor terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0043, rear right position sensor:

- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A23 and position sensor terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

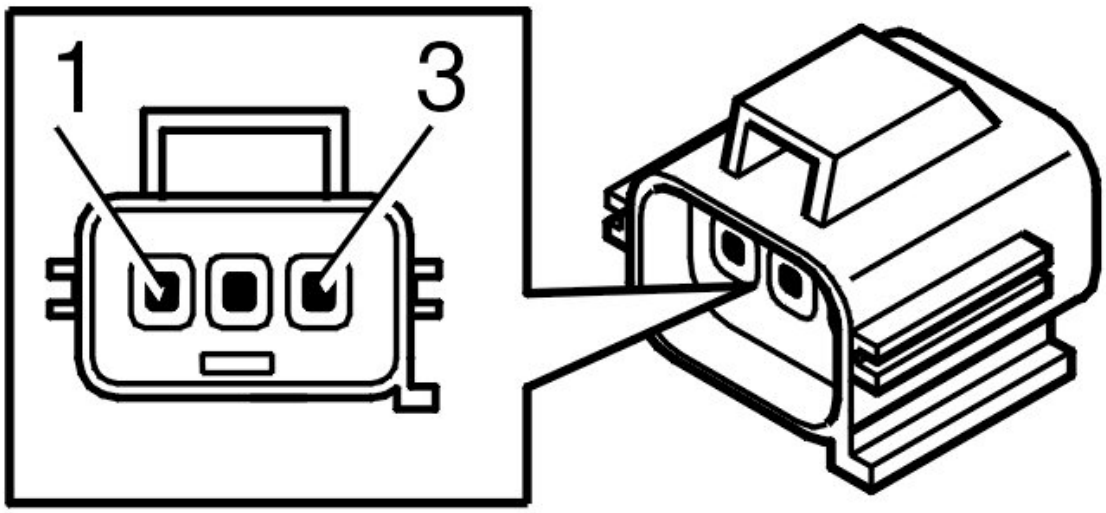
Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

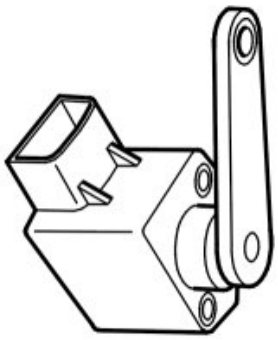
Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





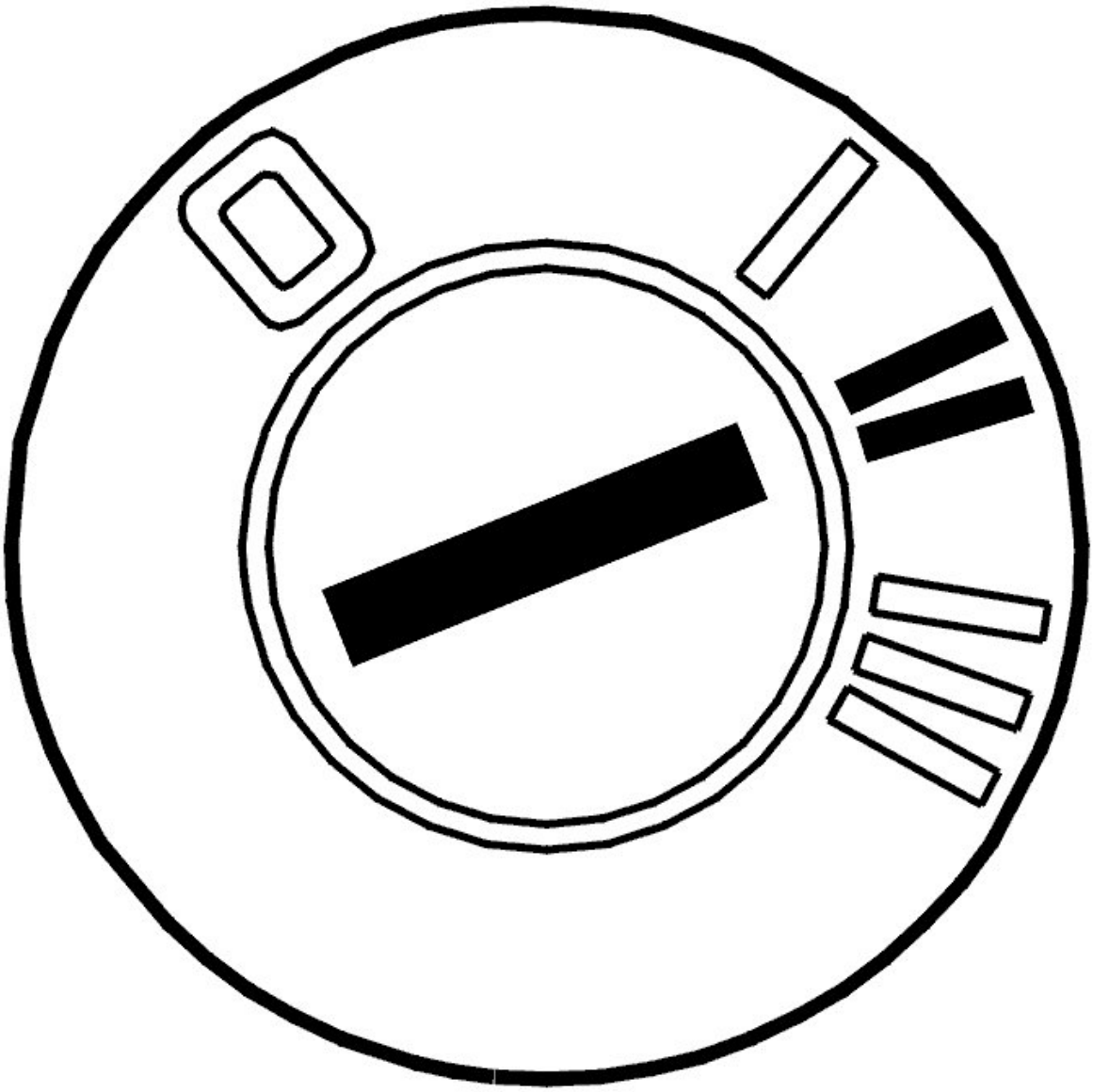
Continue - Verification

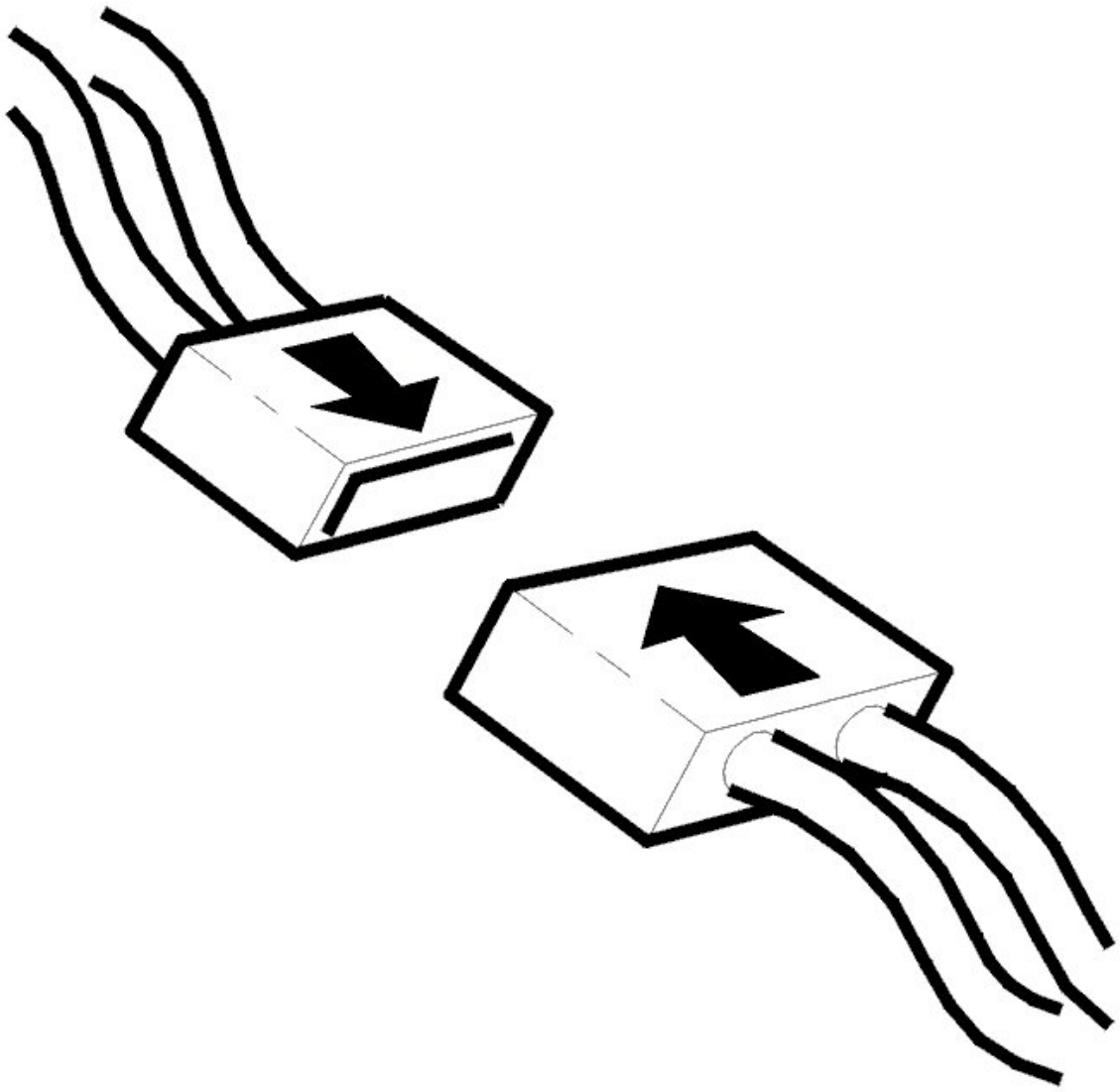
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

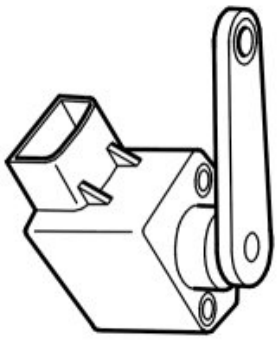
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0031 or SUM-0041 is stored if the control module registers that the signal from one of the position sensors is too low when the ignition is switched on.

- SUM-0031: Left rear position sensor
- SUM-0041: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable from the position sensor
- Open-circuit or short-circuit to ground in the power supply to the position sensor
- Contact resistance in the terminals
- Defective position sensor.

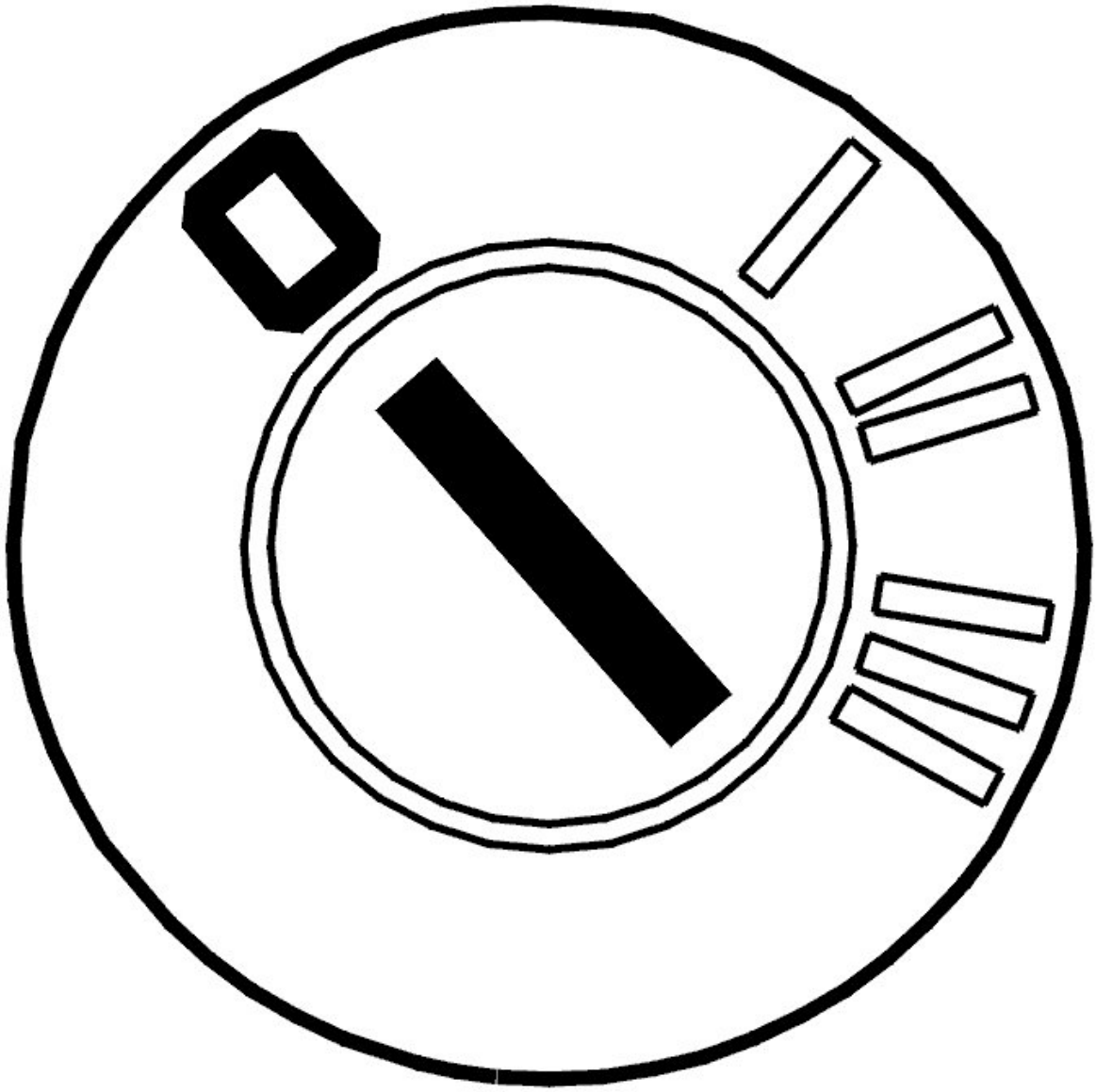
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0031, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A25 and position sensor terminal #5. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0041, rear right position sensor:

- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and position sensor terminal #5. Check for an open-circuit. Check for a short-circuit to ground.

Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

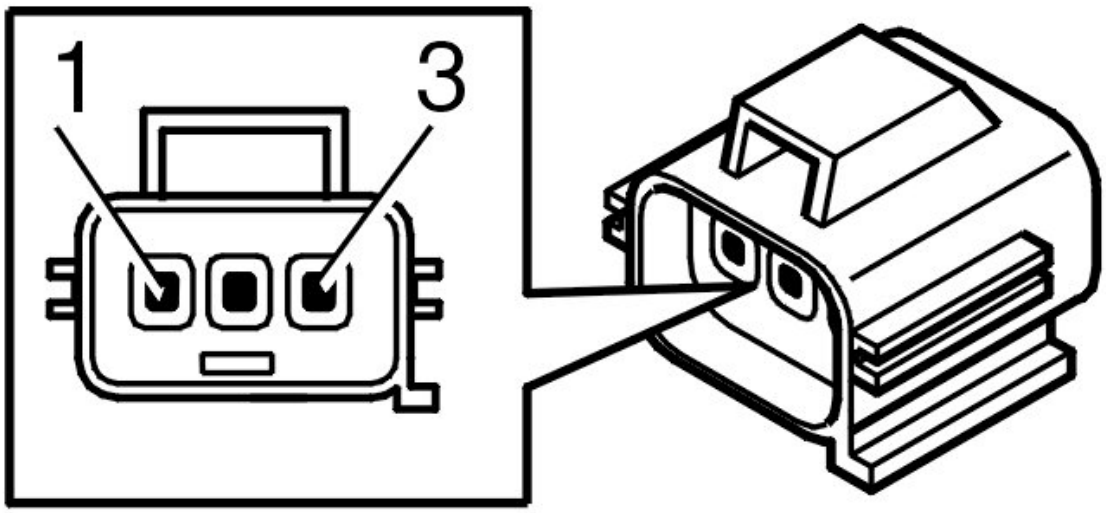
Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

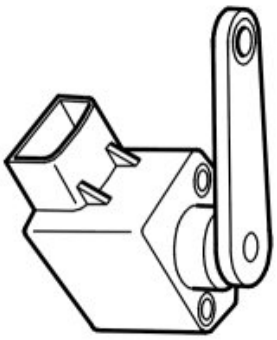
Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





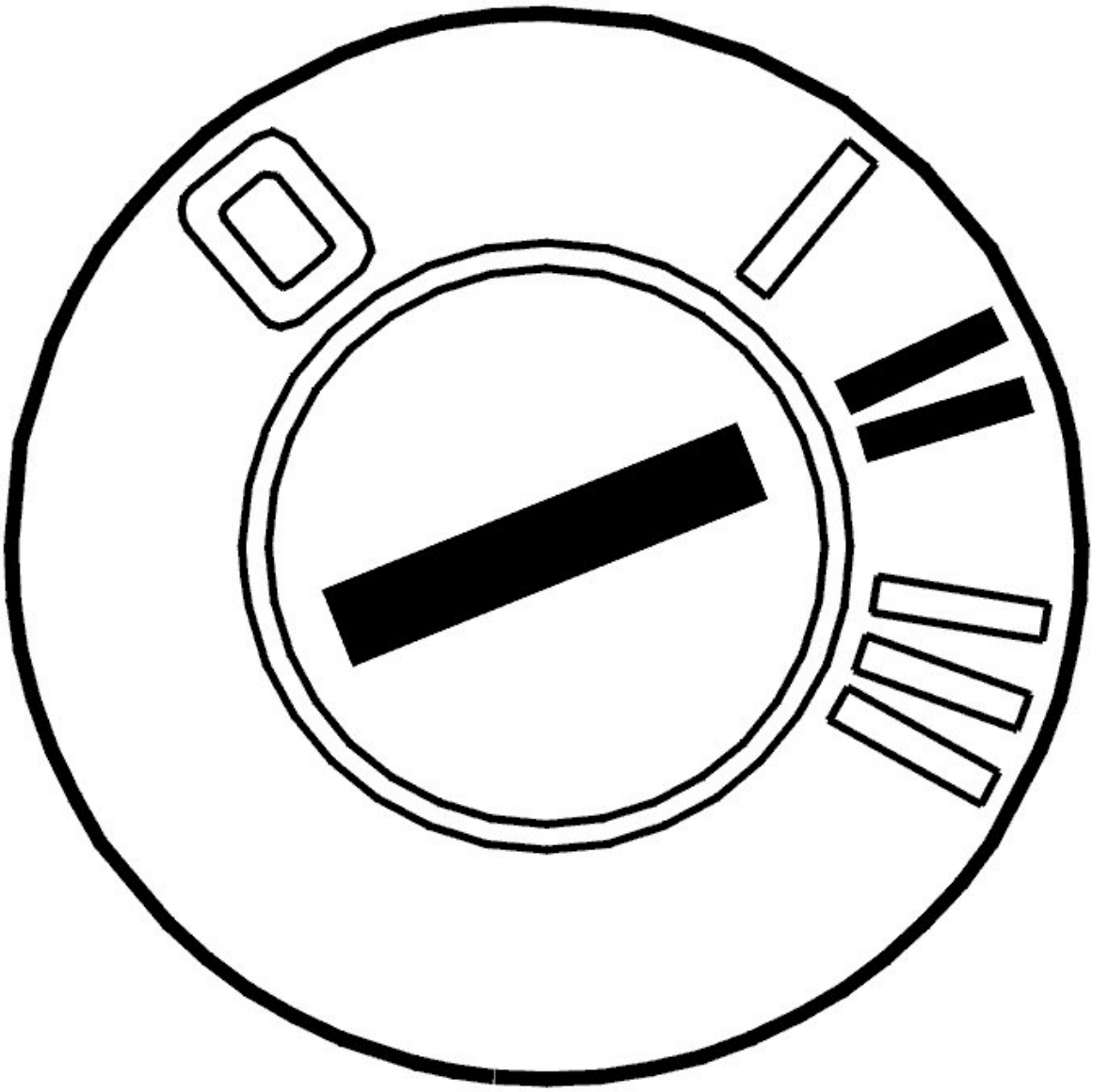
Continue - Verification

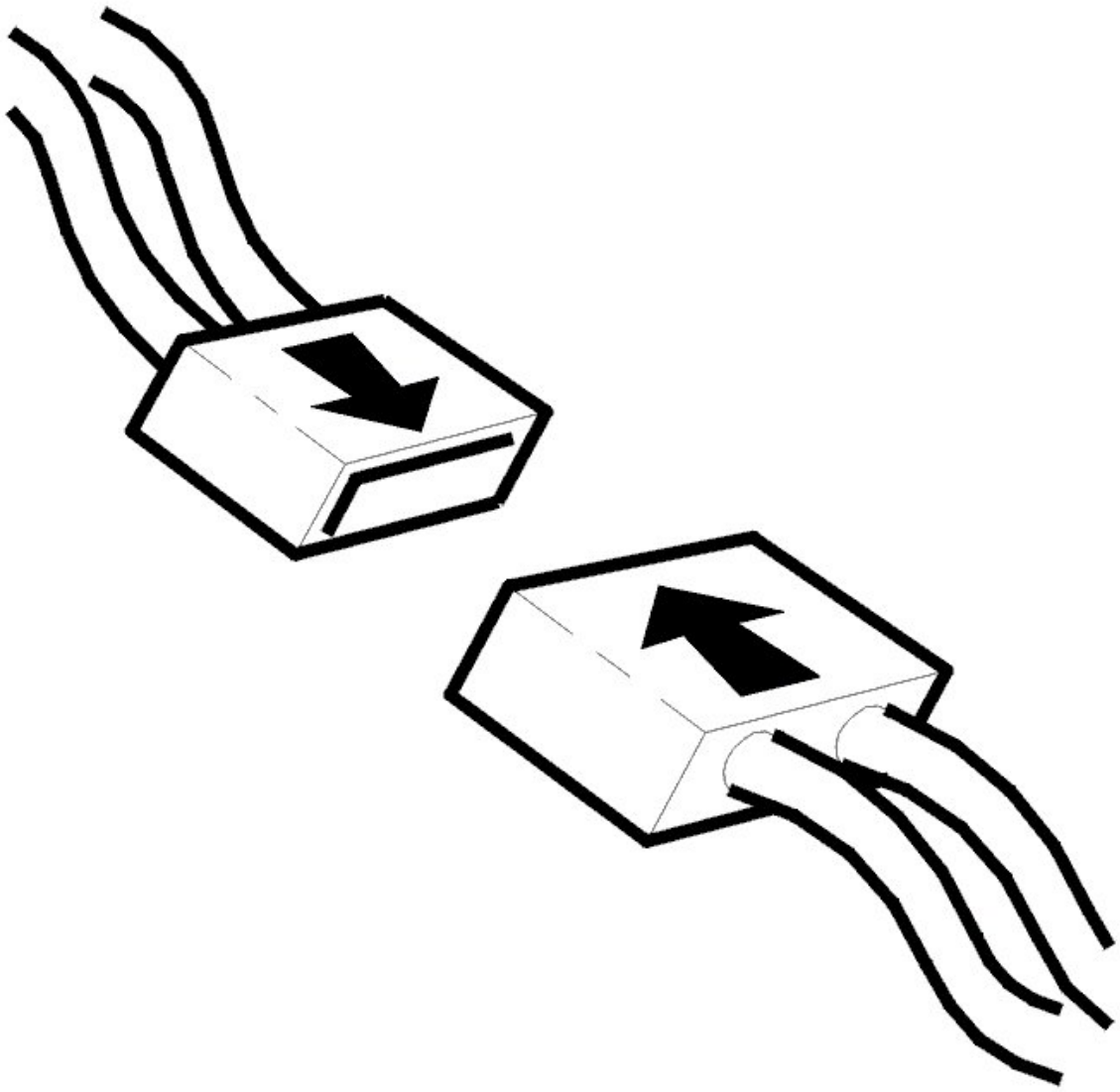
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

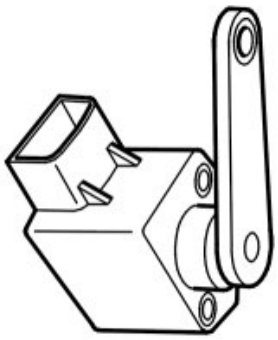
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0032 or SUM-0042 is stored if the control module registers that the signal from one of the position sensors is too high when the ignition is switched on.

- SUM-0032: Left rear position sensor
- SUM-0042: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable
- Defective position sensor.

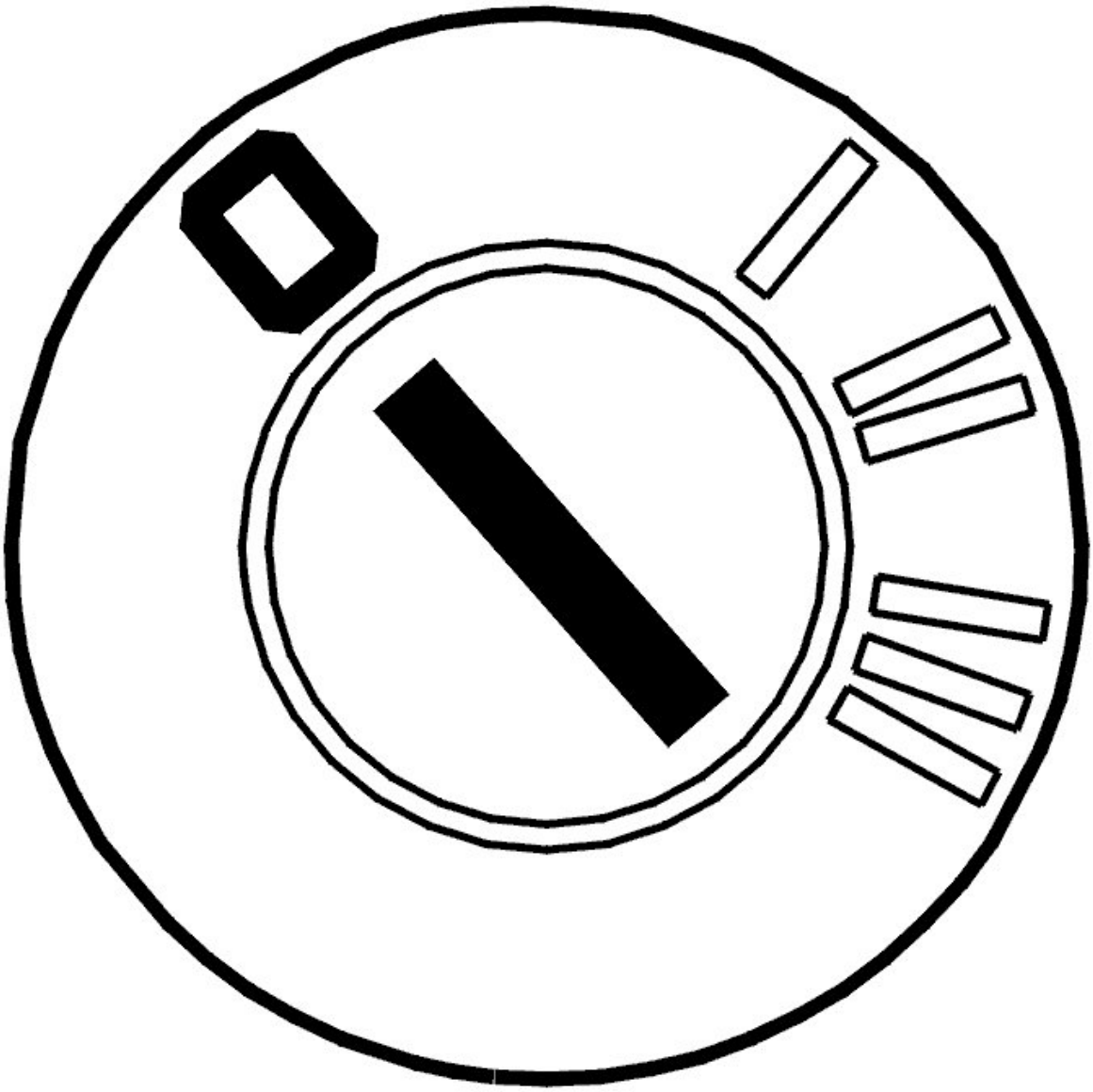
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0032, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for a short-circuit to voltage.

For diagnostic trouble code (DTC) SUM-0042, rear right position sensor:

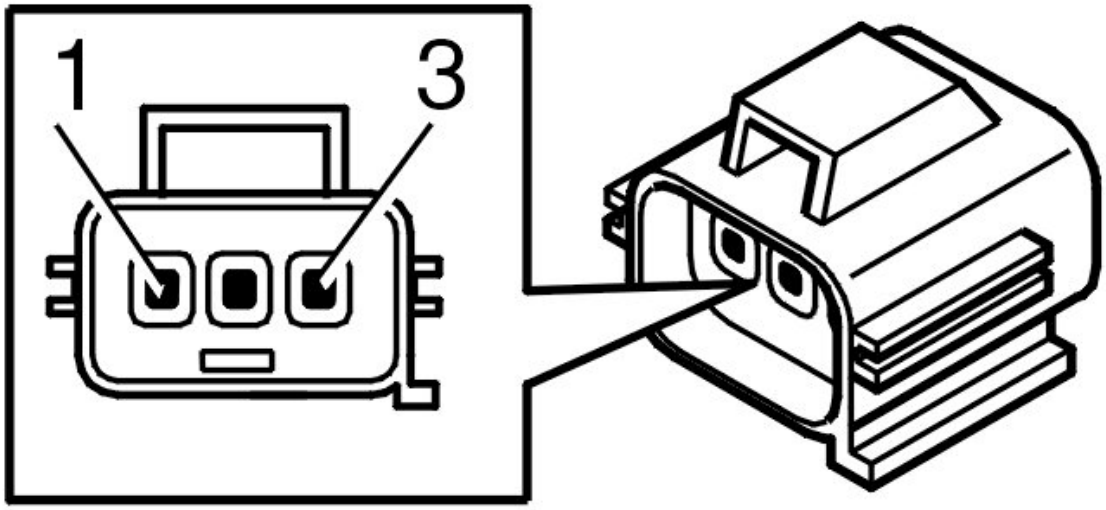
- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for a short-circuit to voltage.

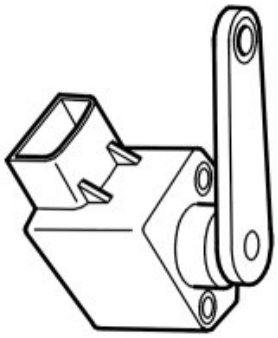
Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





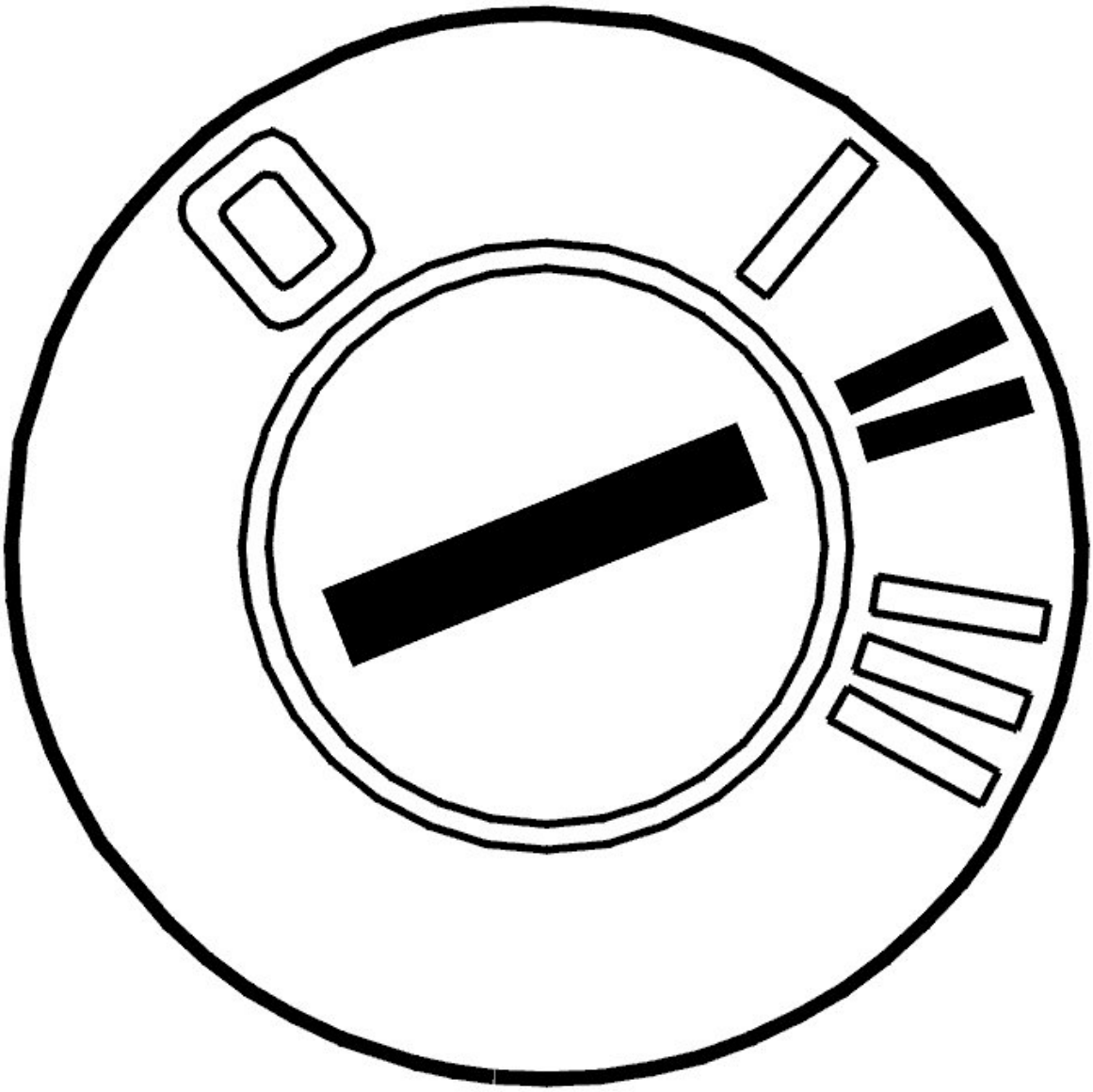
Continue - Verification

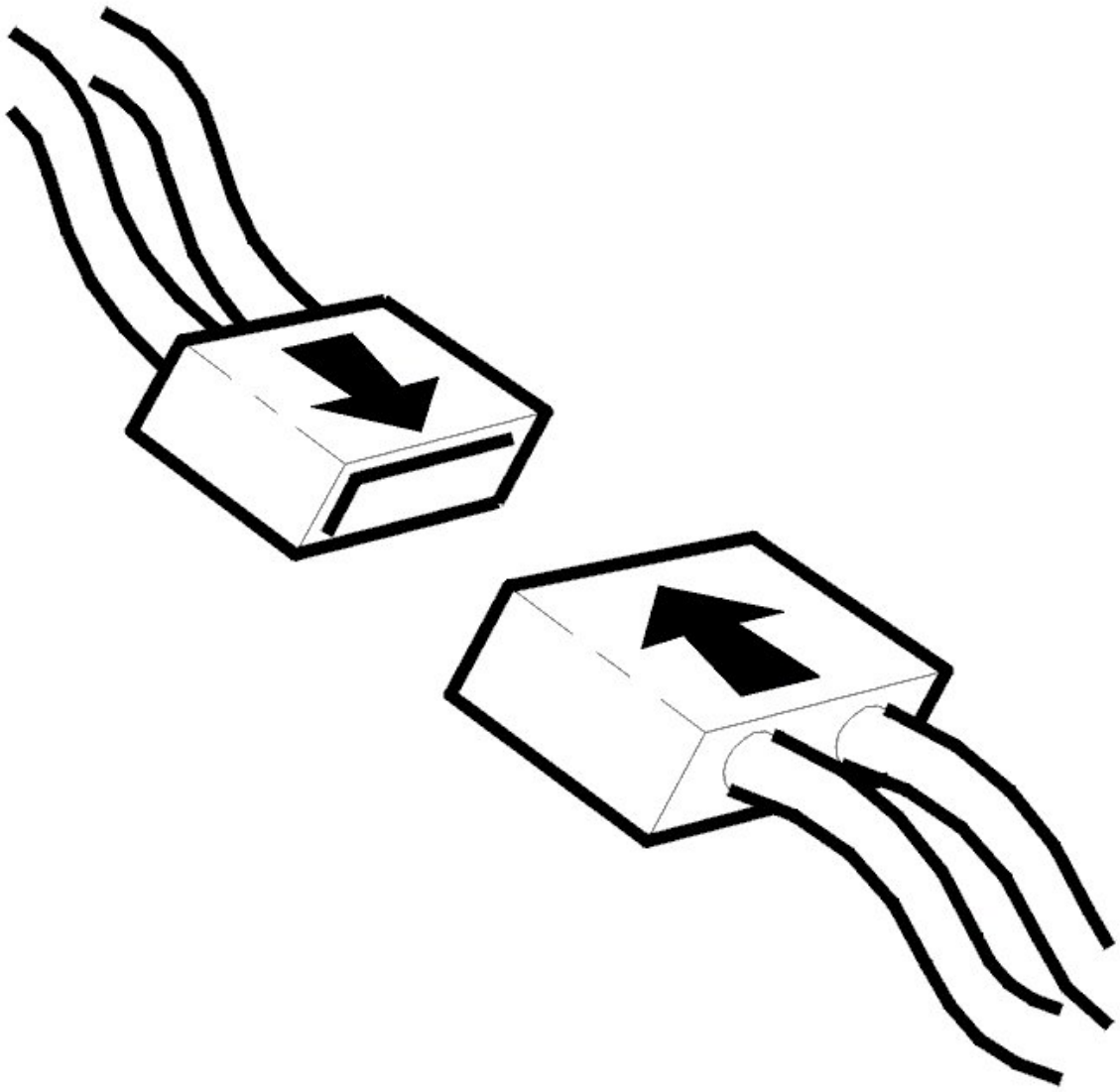
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

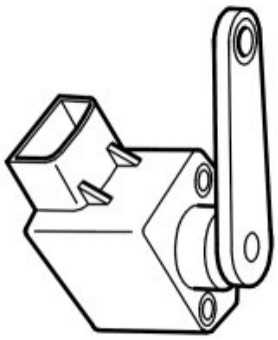
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical position of the rear wheels from the position sensors mounted on a bracket in the body. Diagnostic trouble code (DTC) SUM-0033 or SUM-0043 is stored if the control module registers that there is no signal from one of the position sensors when the ignition is switched on.

- SUM-0033: Left rear position sensor
- SUM-0043: Right rear position sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the signal cable
- Open-circuit in the ground lead
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective position sensor.

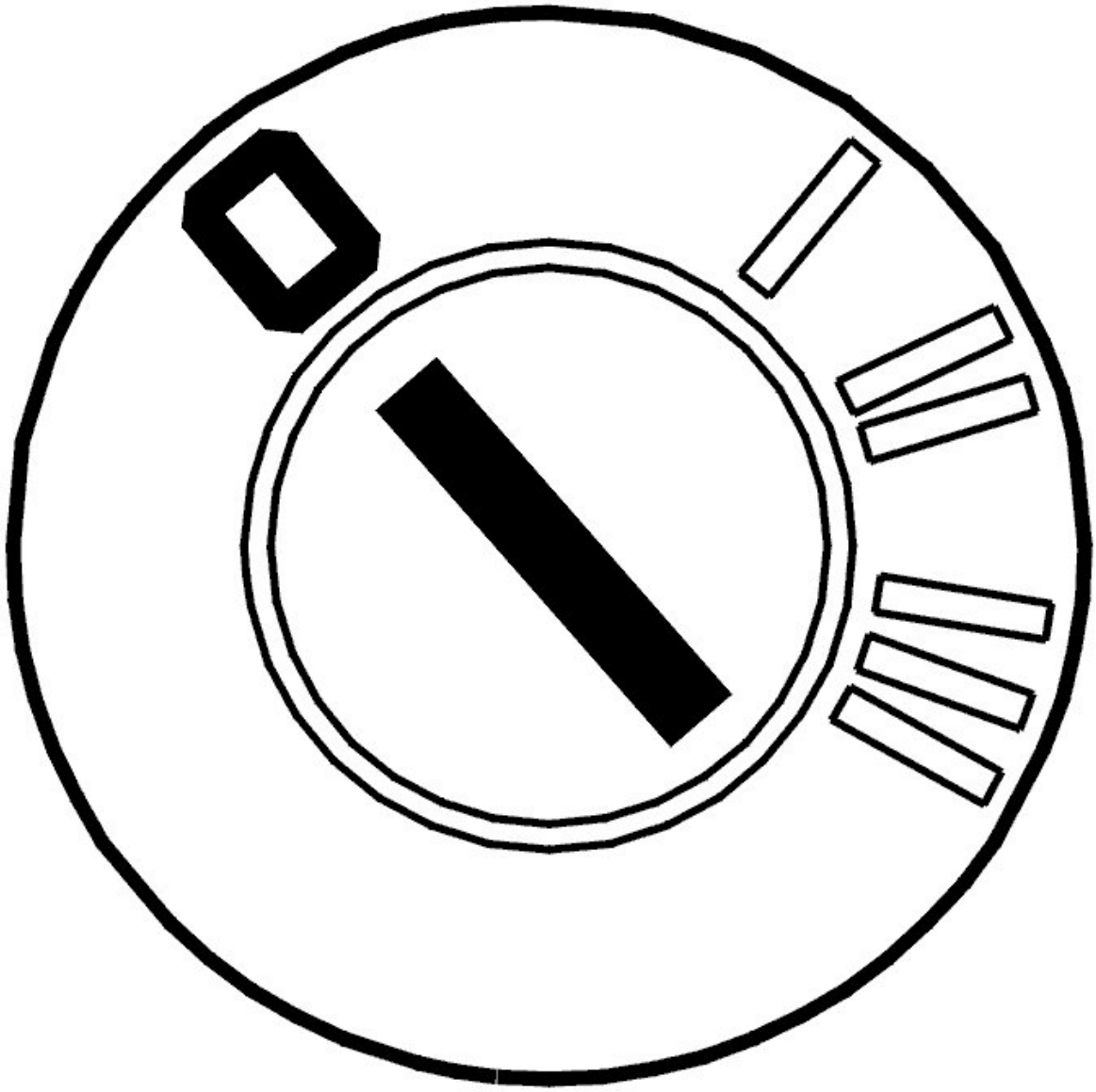
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0033, rear left position sensor:

- Check the signal cable between control module terminal #A28 and position sensor terminal #4. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A23 and position sensor terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0043, rear right position sensor:

- Check the signal cable between control module terminal #A14 and position sensor terminal #4. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A23 and position sensor terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

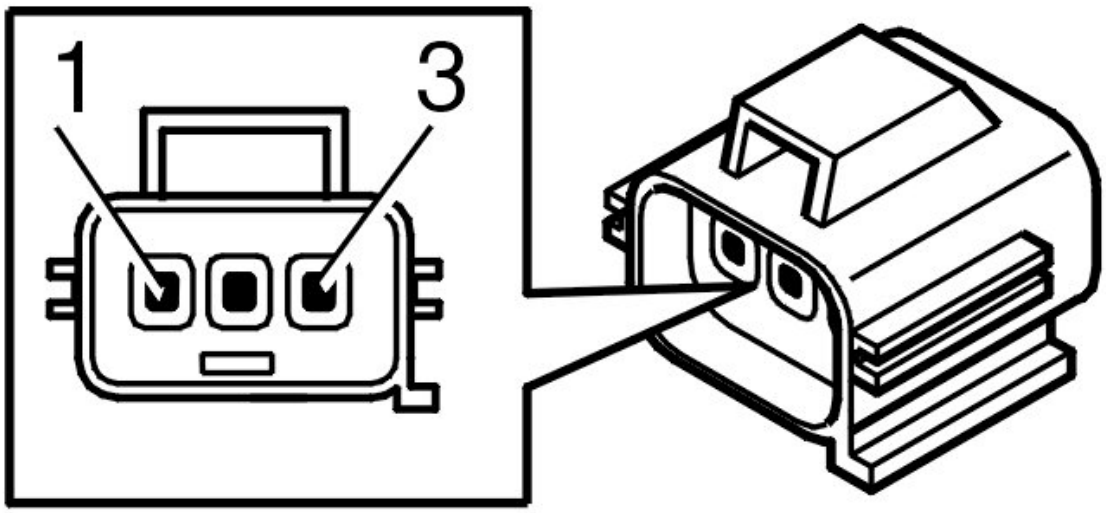
Try a new position sensor if no fault is found in the wiring.
Remedy as necessary.

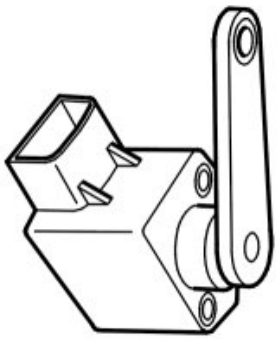
Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





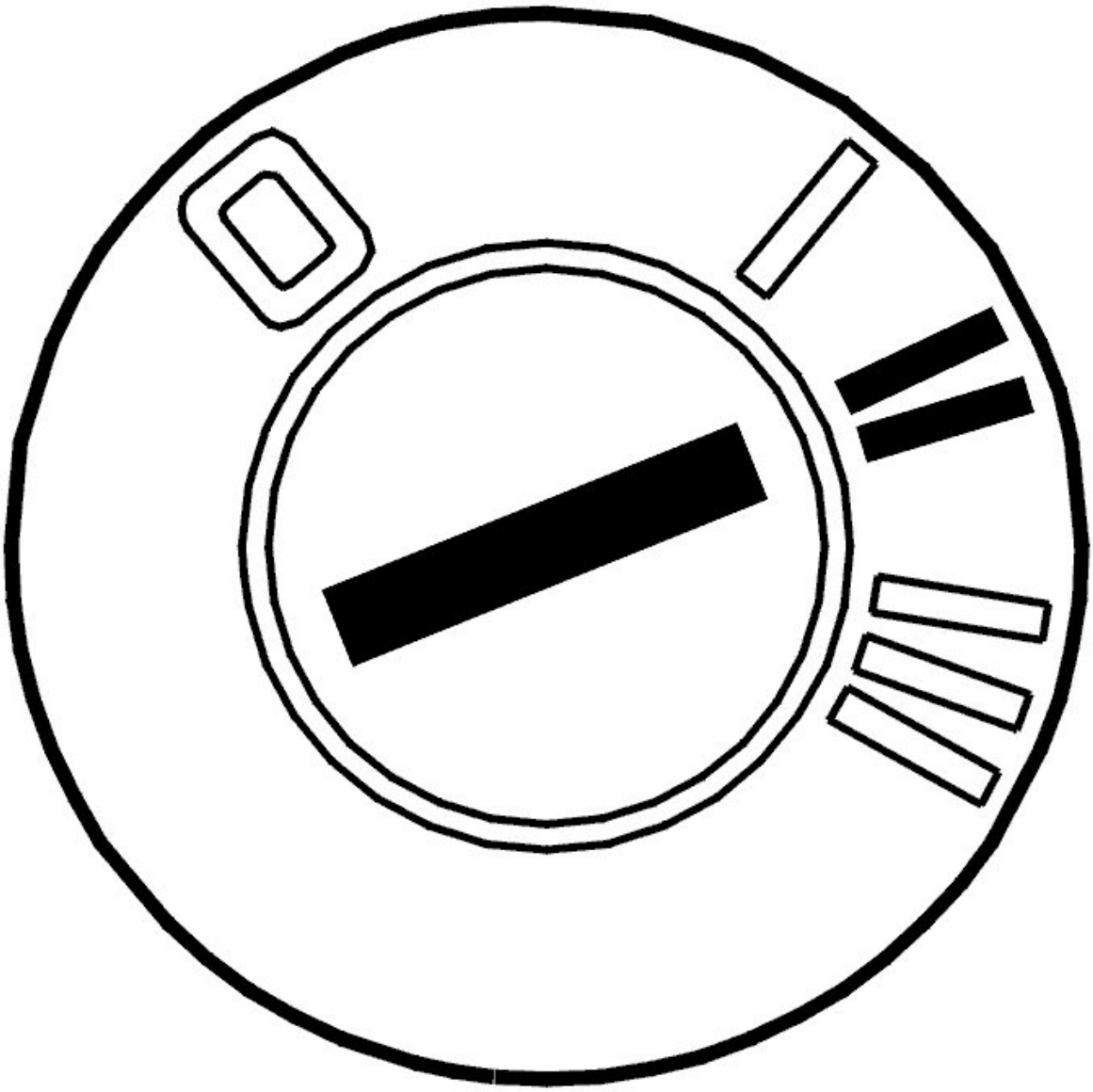
Continue - Verification

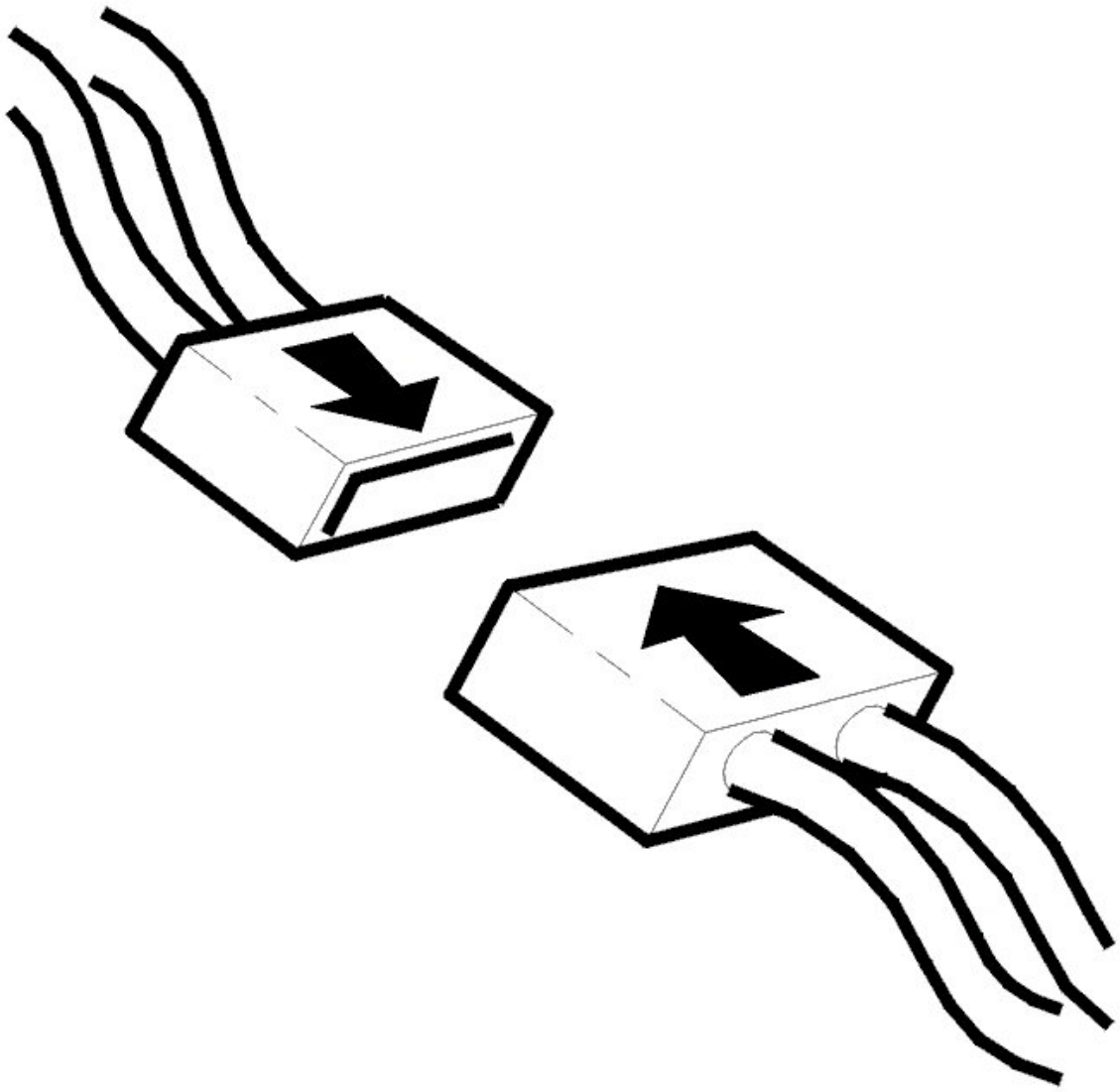
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check the signal from the position sensor by clicking on the VCT2000 symbol. The value varies between 0.5-4.5 V depending on the degree of lean of the car.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

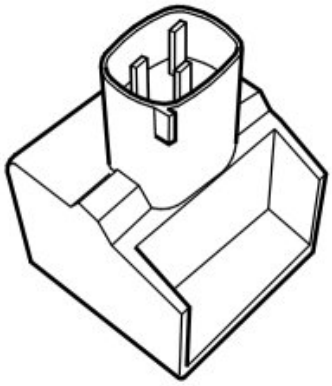
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0051, SUM-0061 or SUM-0071 is stored if the control module registers that the signal from one of the acceleration sensors is too low when the ignition is switched on.

- SUM-0051: Left front bodywork acceleration sensor
- SUM-0061: Left front bodywork acceleration sensor
- SUM-0071: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable
- Open-circuit or short-circuit to ground in the power supply to the acceleration sensor
- Contact resistance in the terminals
- Defective acceleration sensor.

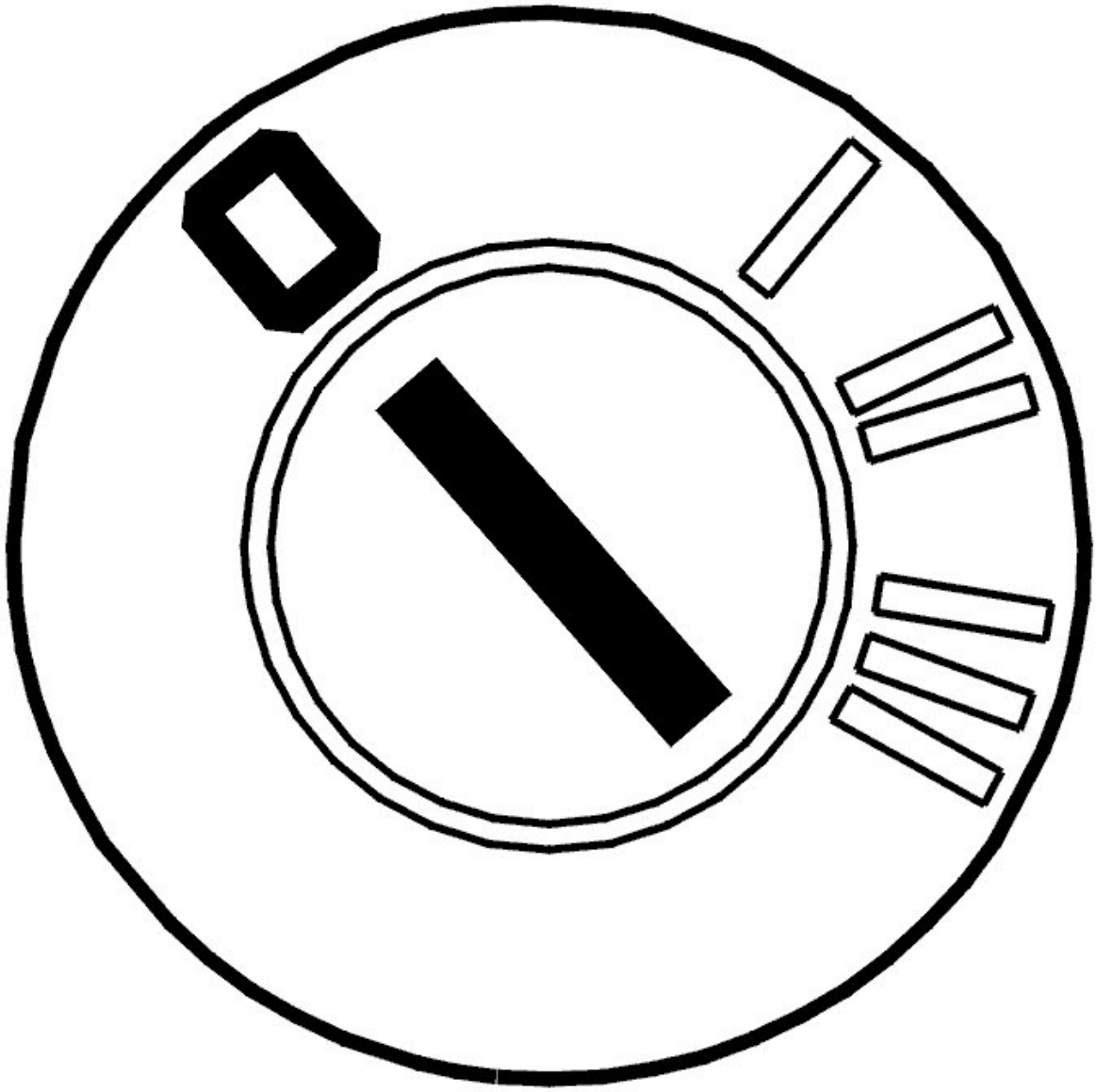
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0051, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0061, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0071, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

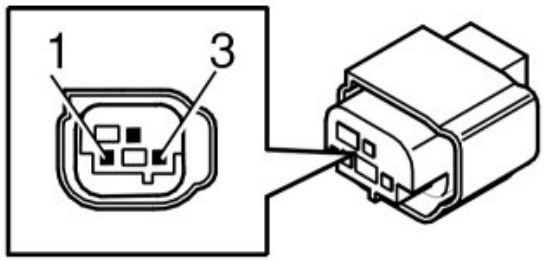
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

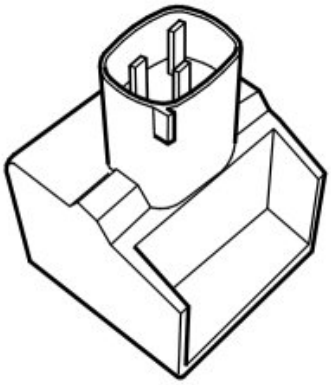
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and

Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing

- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





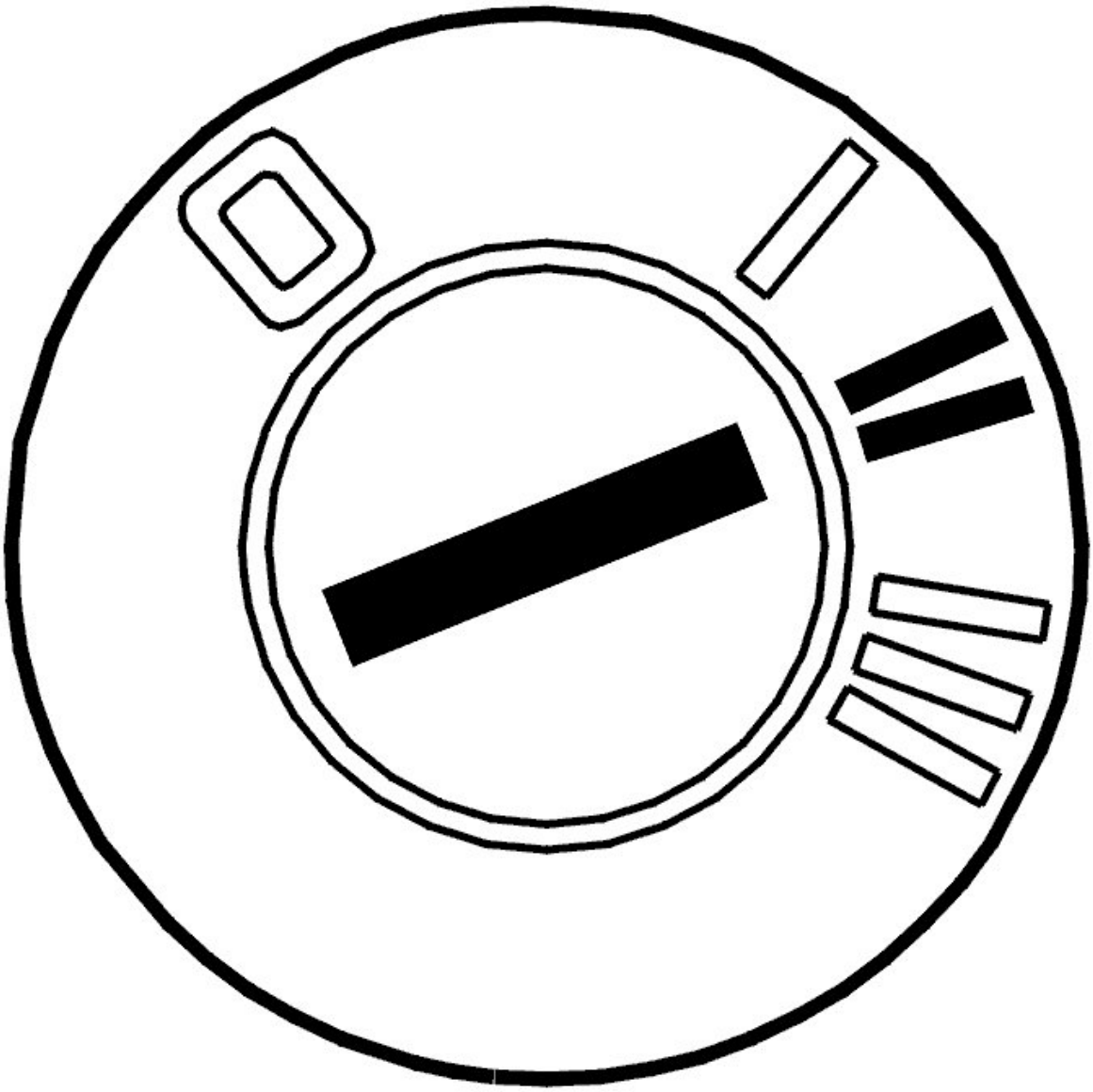
Continue - Verification

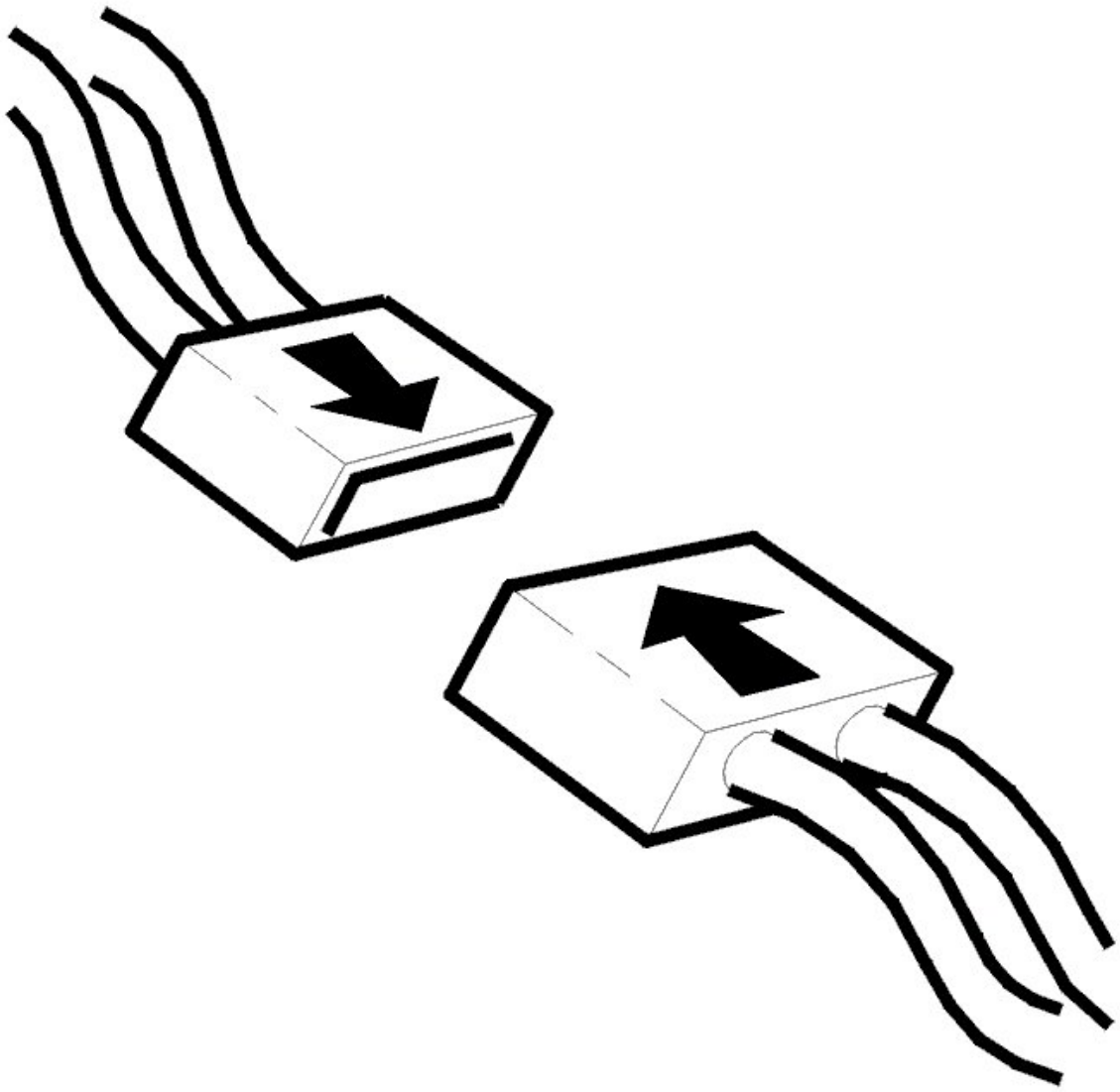
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

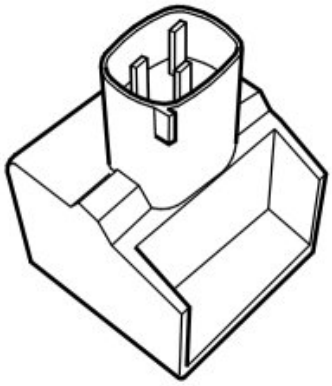
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0052, SUM-0062 or SUM-0072 is stored if the control module registers that the signal from one of the acceleration sensors is too high when the ignition is switched on.

- SUM-0052: Left front bodywork acceleration sensor
- SUM-0062: Right front bodywork acceleration sensor
- SUM-0072: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable
- Defective acceleration sensor.

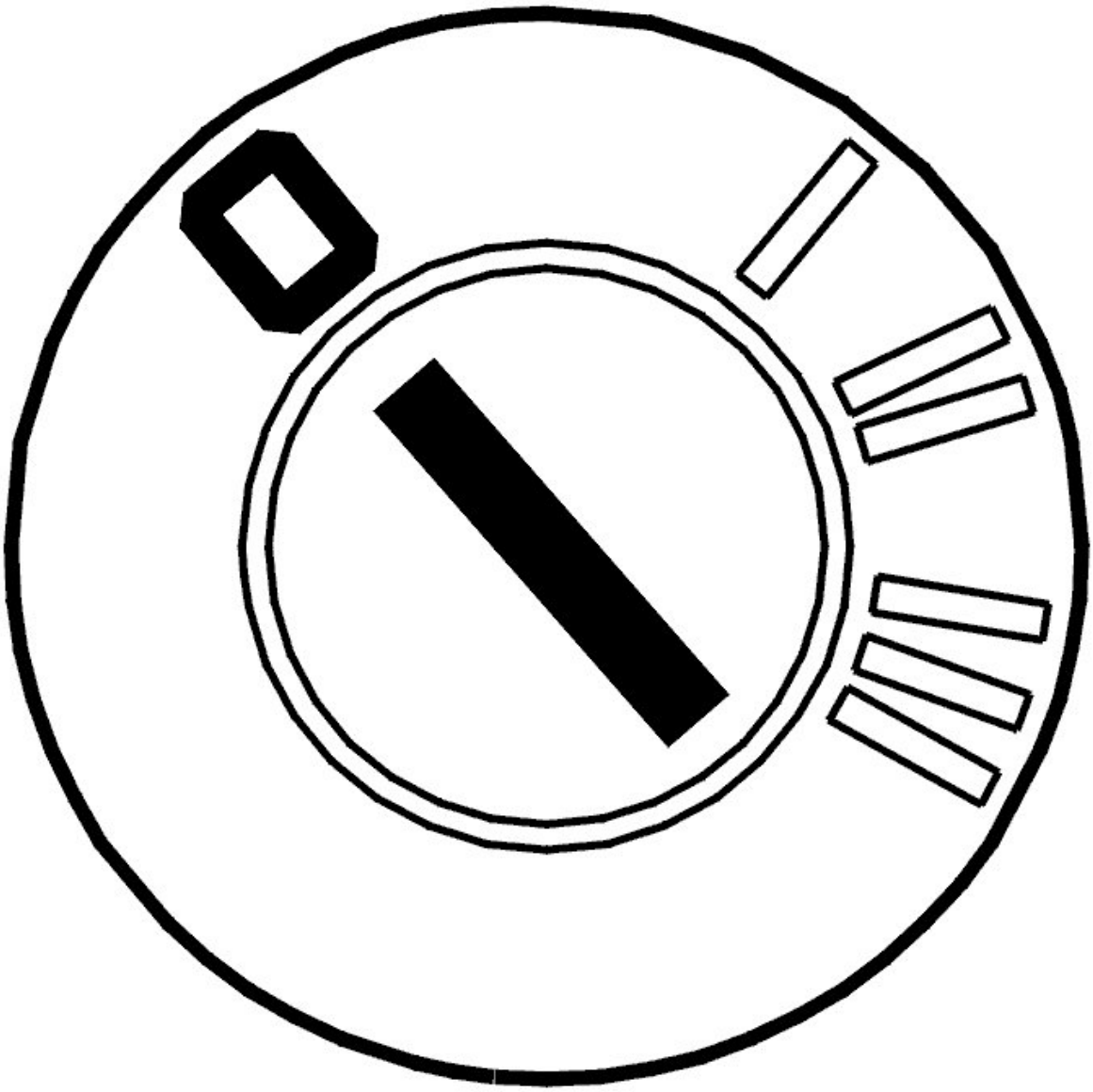
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0052, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0062, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0072, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #4. Check for a short-circuit to voltage.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

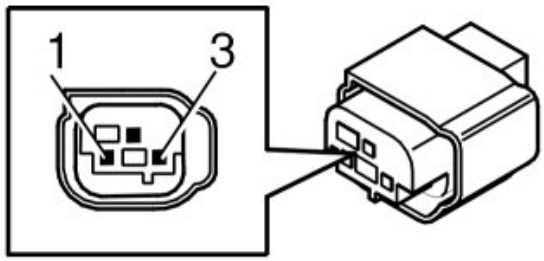
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

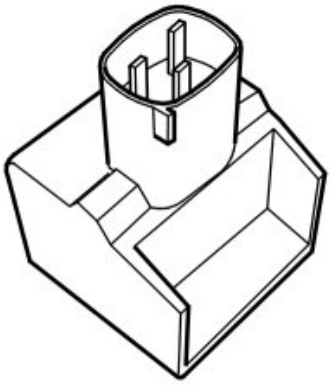
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (

Automatic - Electronic Level)

- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





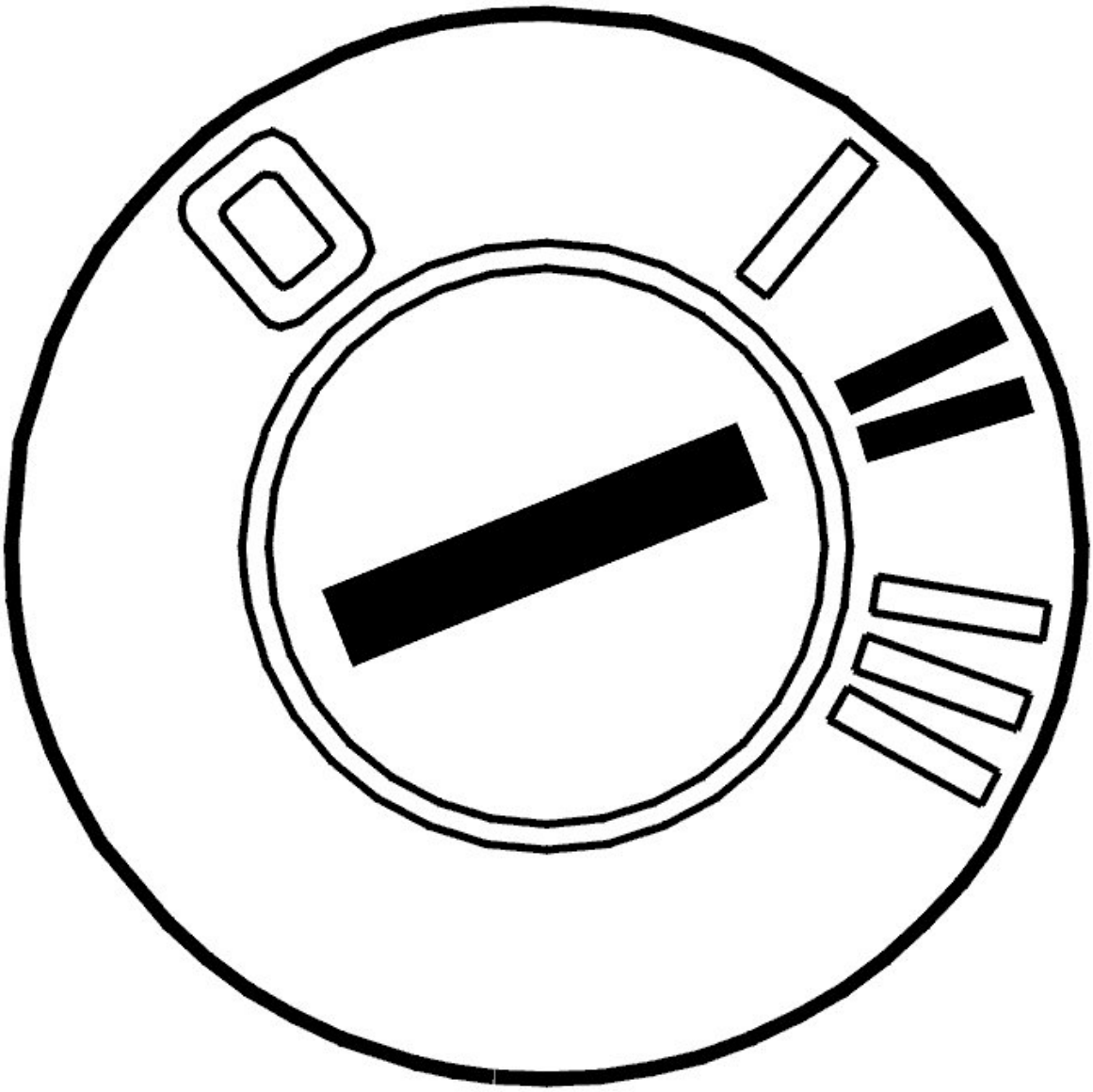
Continue - Verification

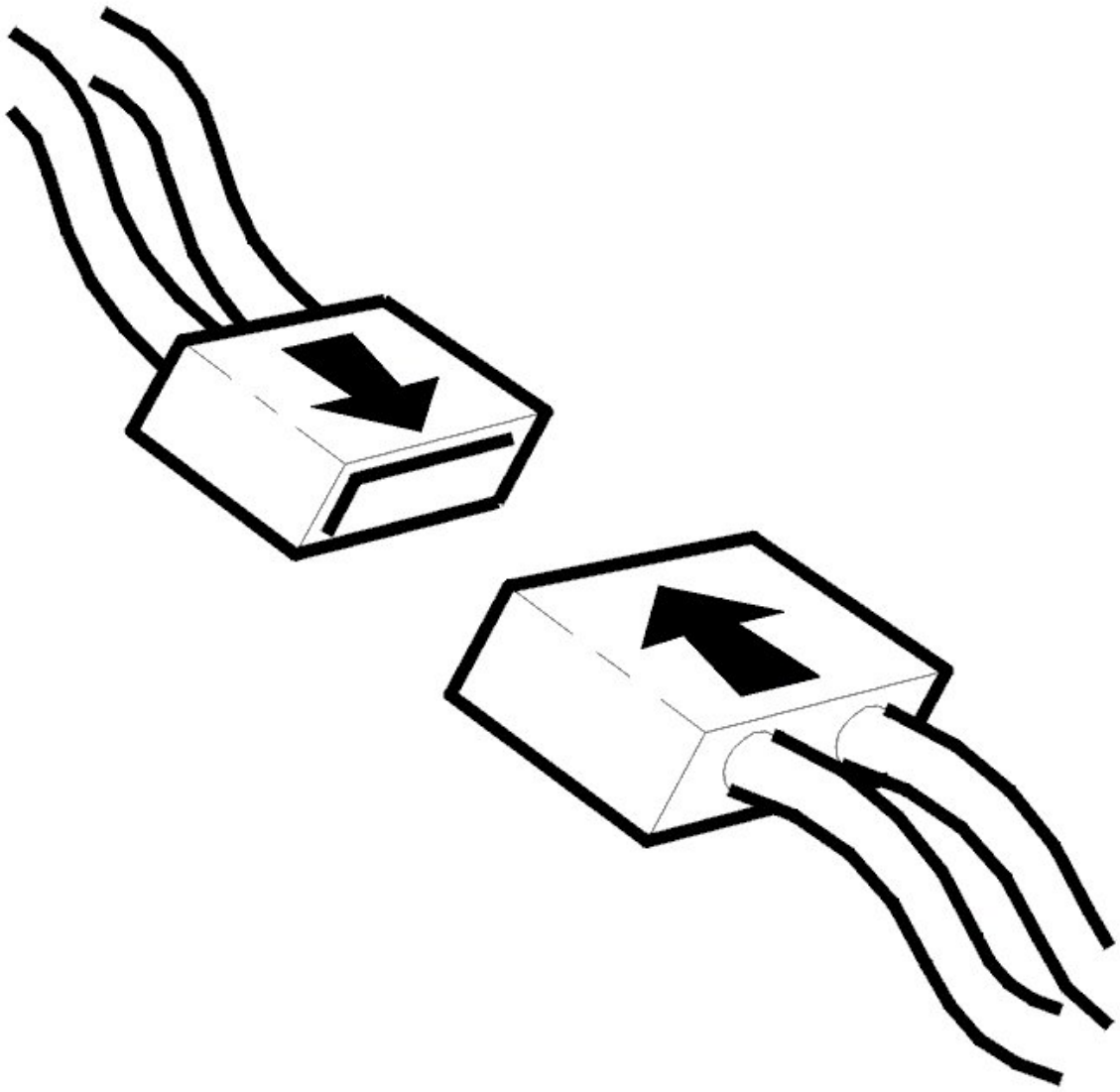
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

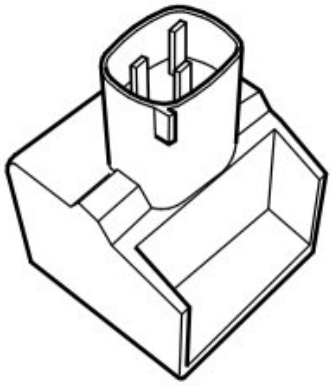
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0053, SUM-0063 or SUM-0073 is stored if the control module registers that there is no signal from one of the acceleration sensors when the ignition is switched on.

- SUM-0053: Left front bodywork acceleration sensor
- SUM-0063: Right front bodywork acceleration sensor
- SUM-0073: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the ground lead
- Open-circuit in the signal cable
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective acceleration sensor.

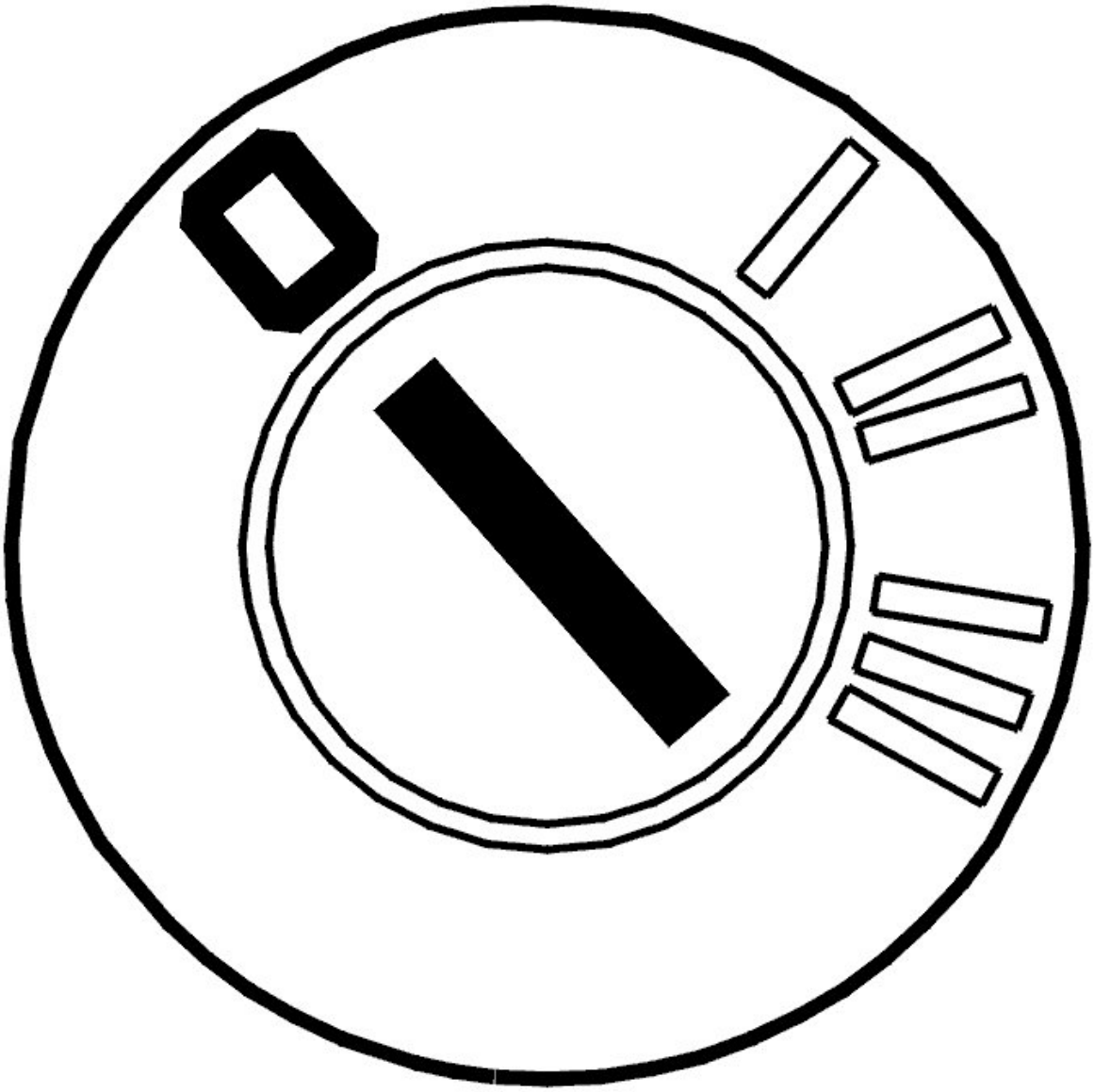
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0053, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0063, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0073, rear left bodywork acceleration sensor:

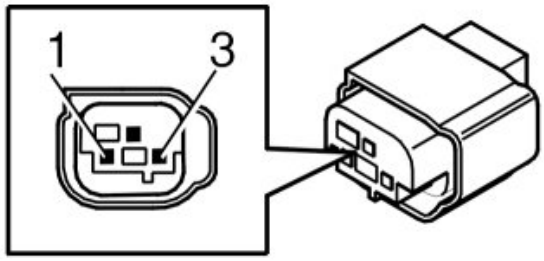
- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

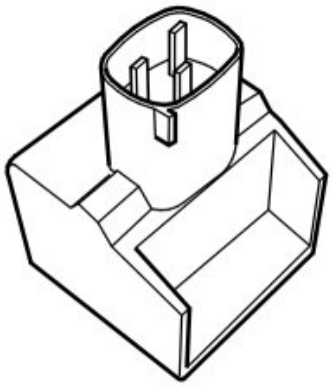
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





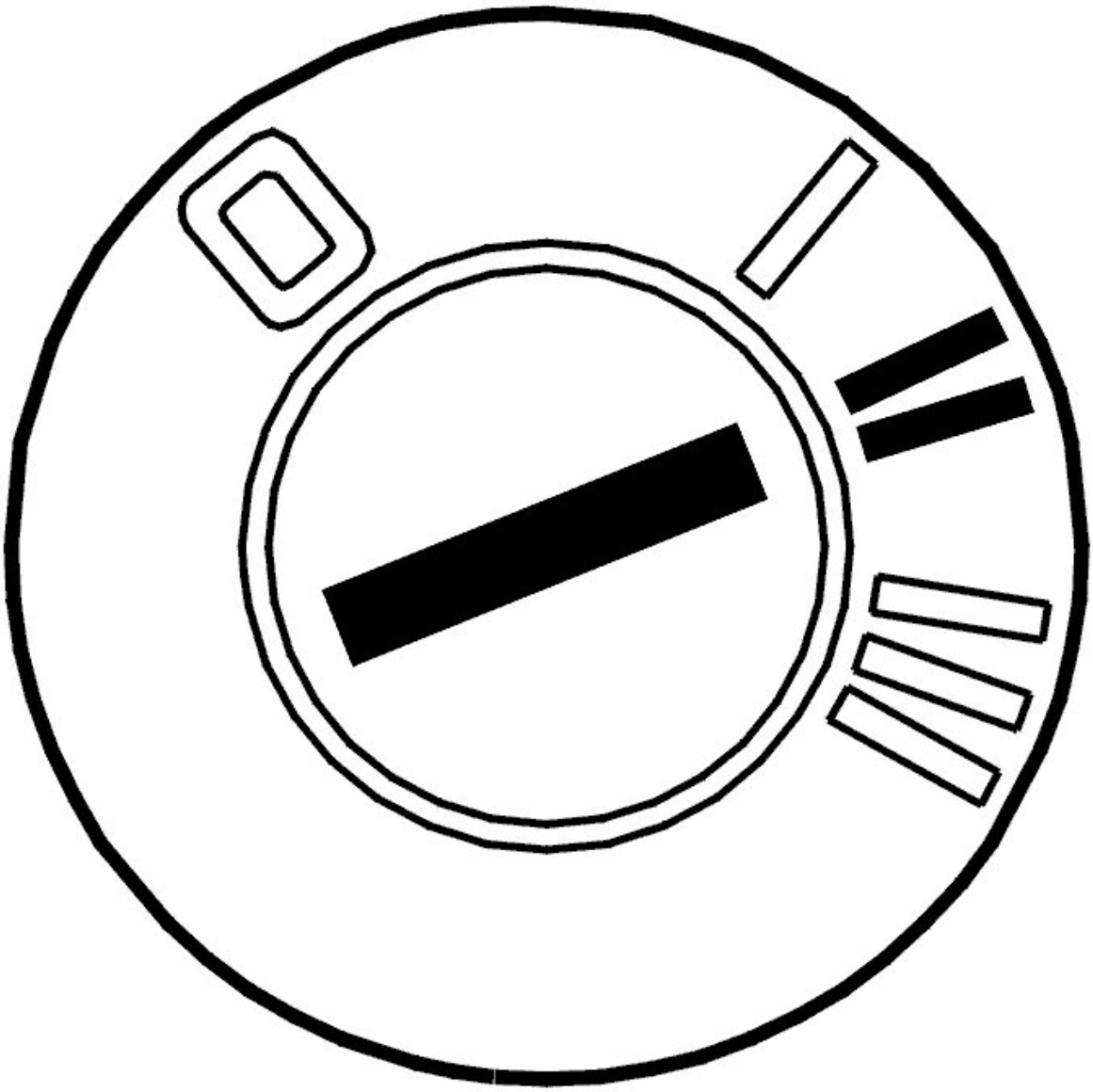
Continue - Verification

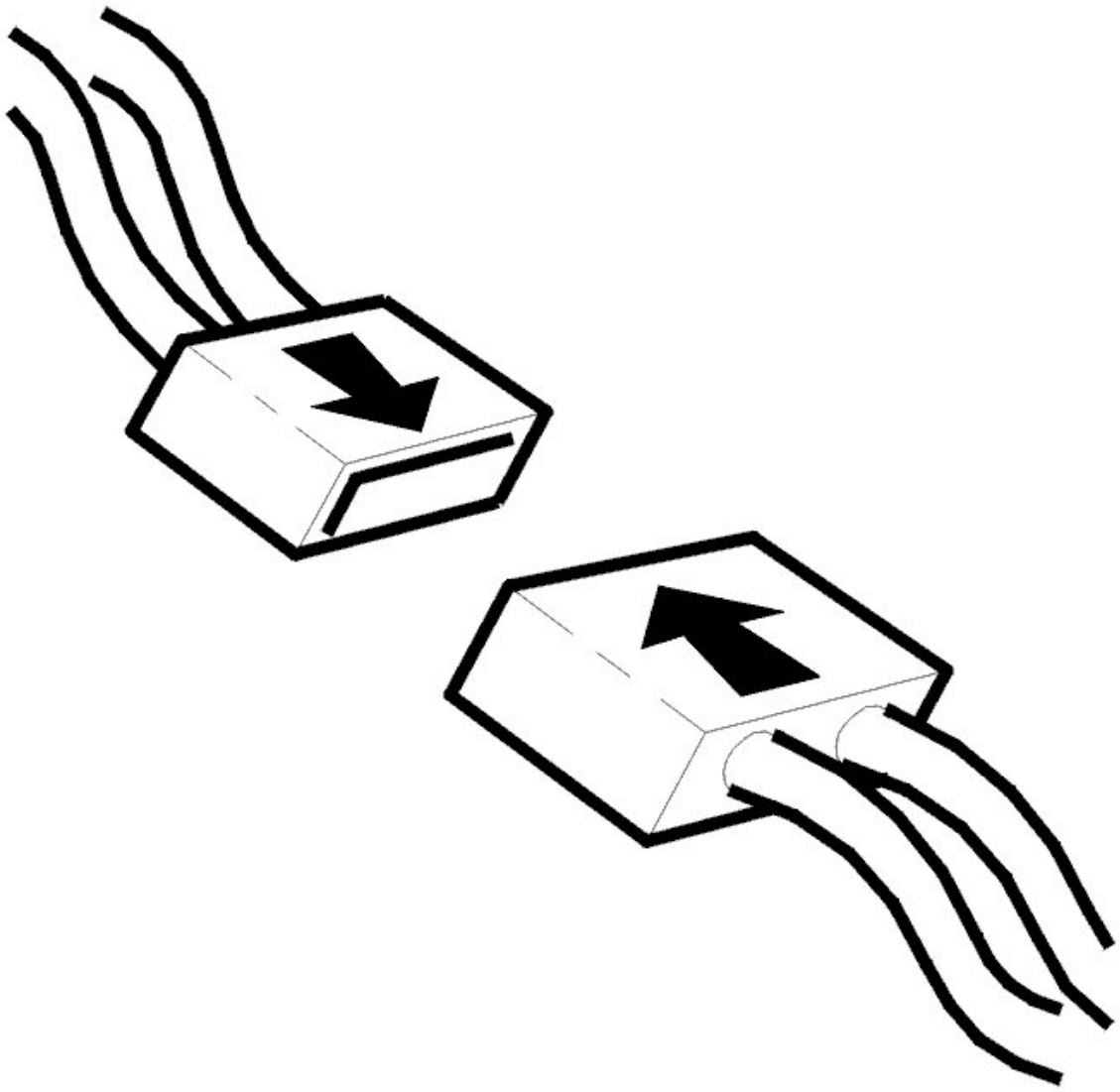
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

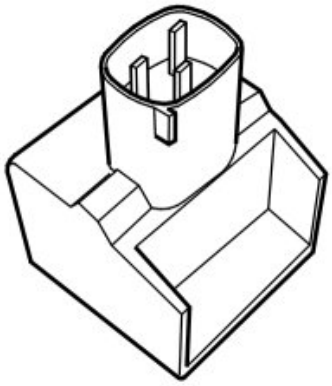
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0051, SUM-0061 or SUM-0071 is stored if the control module registers that the signal from one of the acceleration sensors is too low when the ignition is switched on.

- SUM-0051: Left front bodywork acceleration sensor
- SUM-0061: Left front bodywork acceleration sensor
- SUM-0071: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable
- Open-circuit or short-circuit to ground in the power supply to the acceleration sensor
- Contact resistance in the terminals
- Defective acceleration sensor.

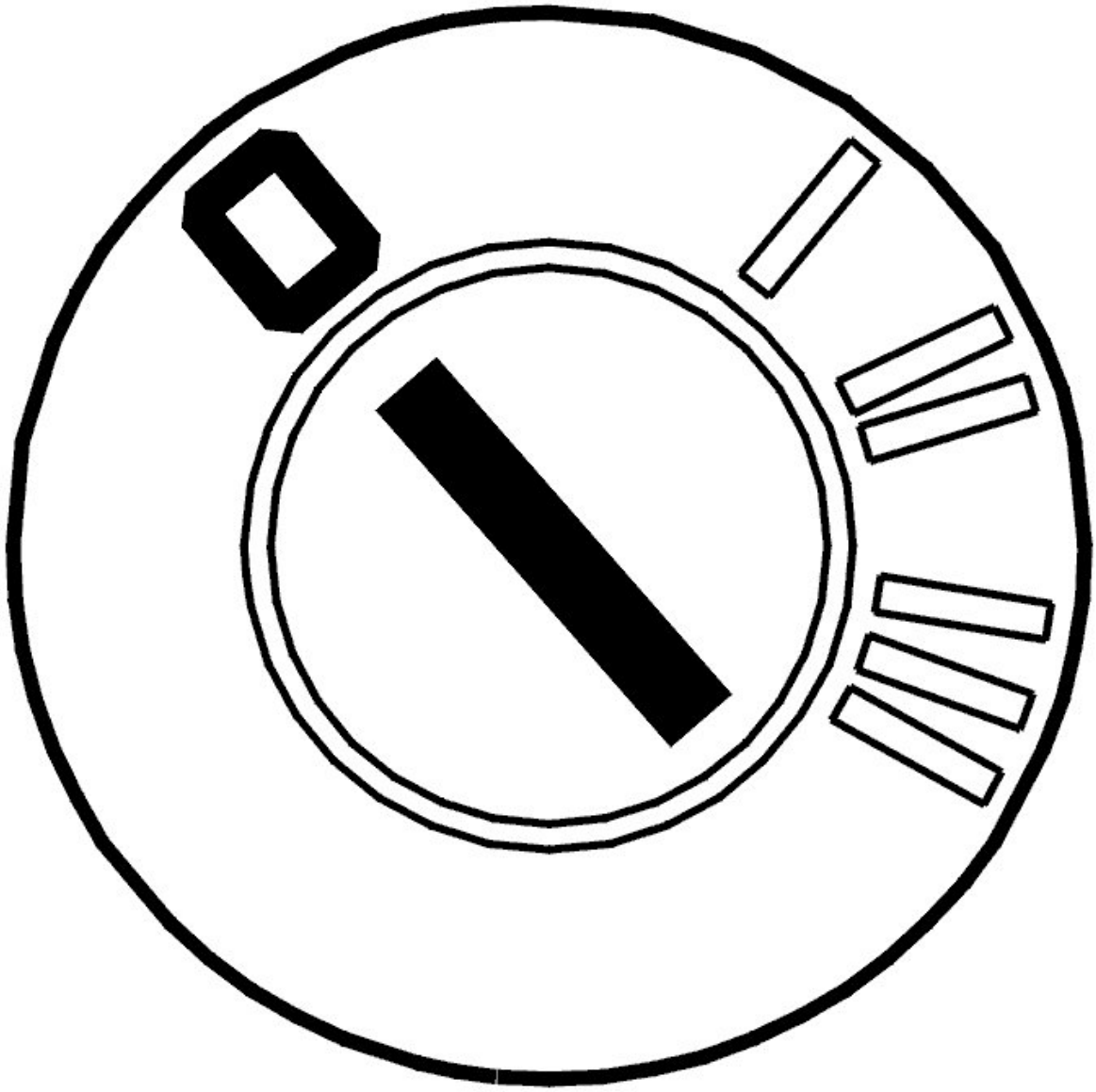
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0051, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0061, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0071, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

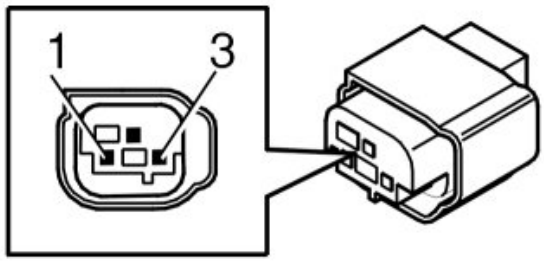
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

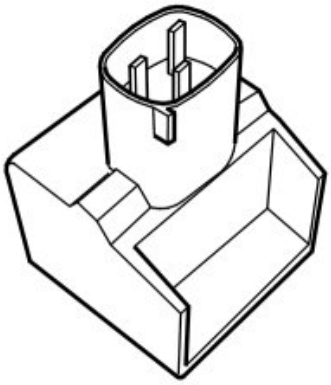
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and

Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing

- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





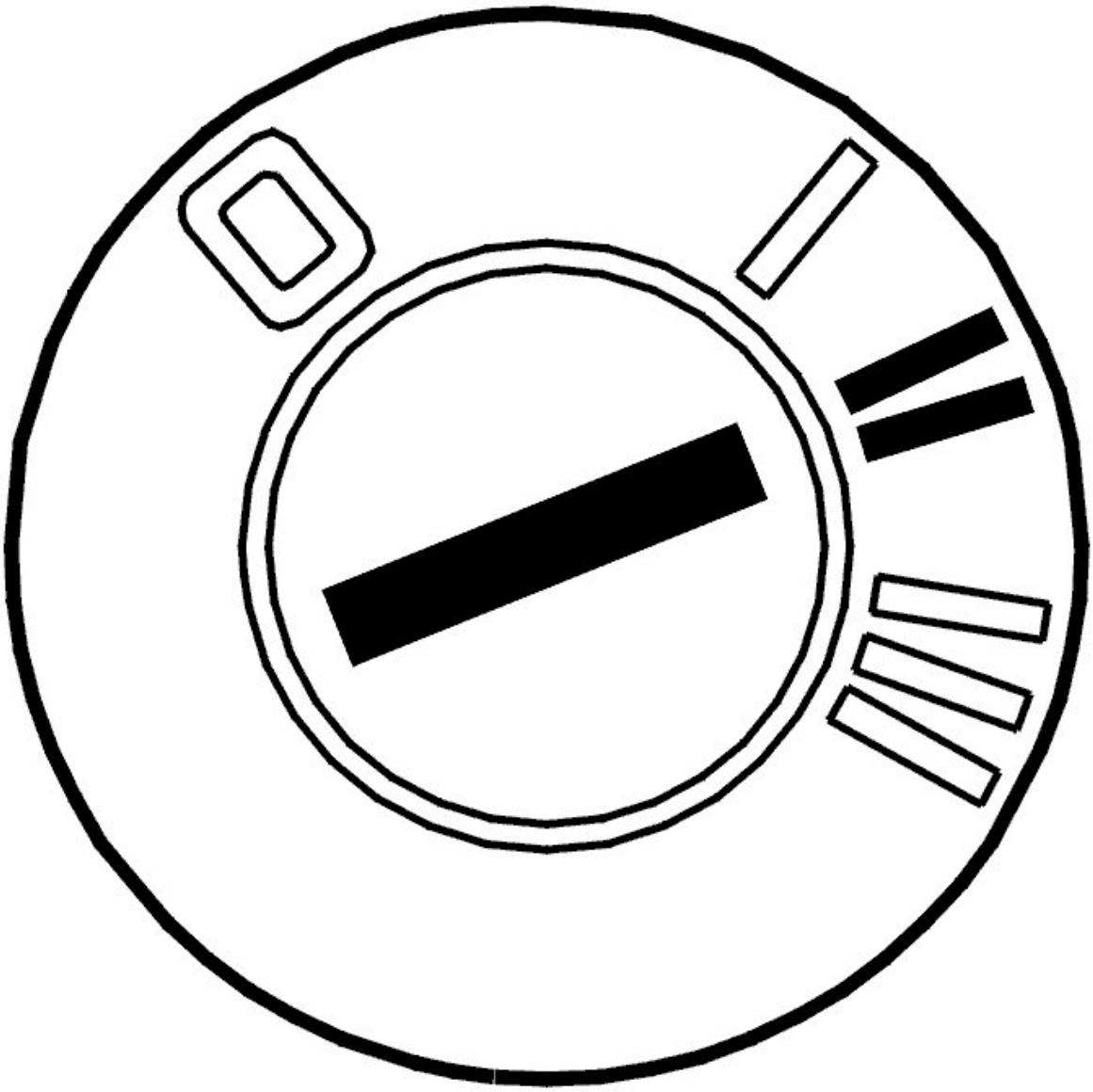
Continue - Verification

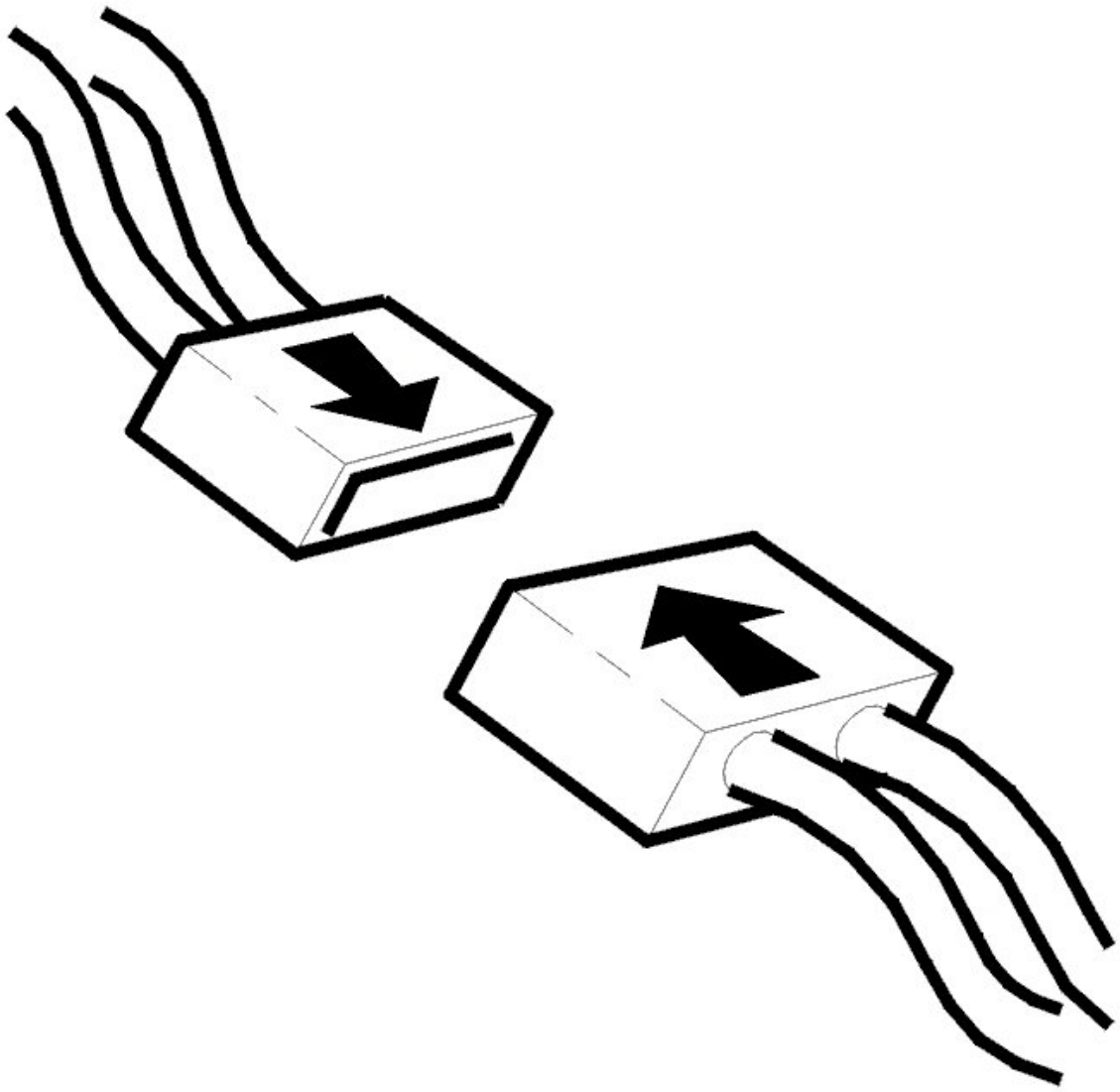
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

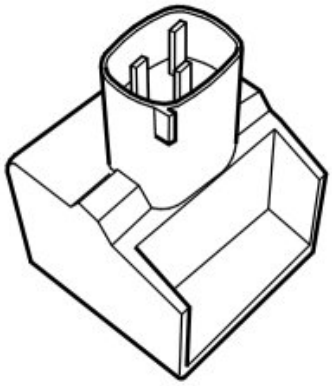
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0052, SUM-0062 or SUM-0072 is stored if the control module registers that the signal from one of the acceleration sensors is too high when the ignition is switched on.

- SUM-0052: Left front bodywork acceleration sensor
- SUM-0062: Right front bodywork acceleration sensor
- SUM-0072: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable
- Defective acceleration sensor.

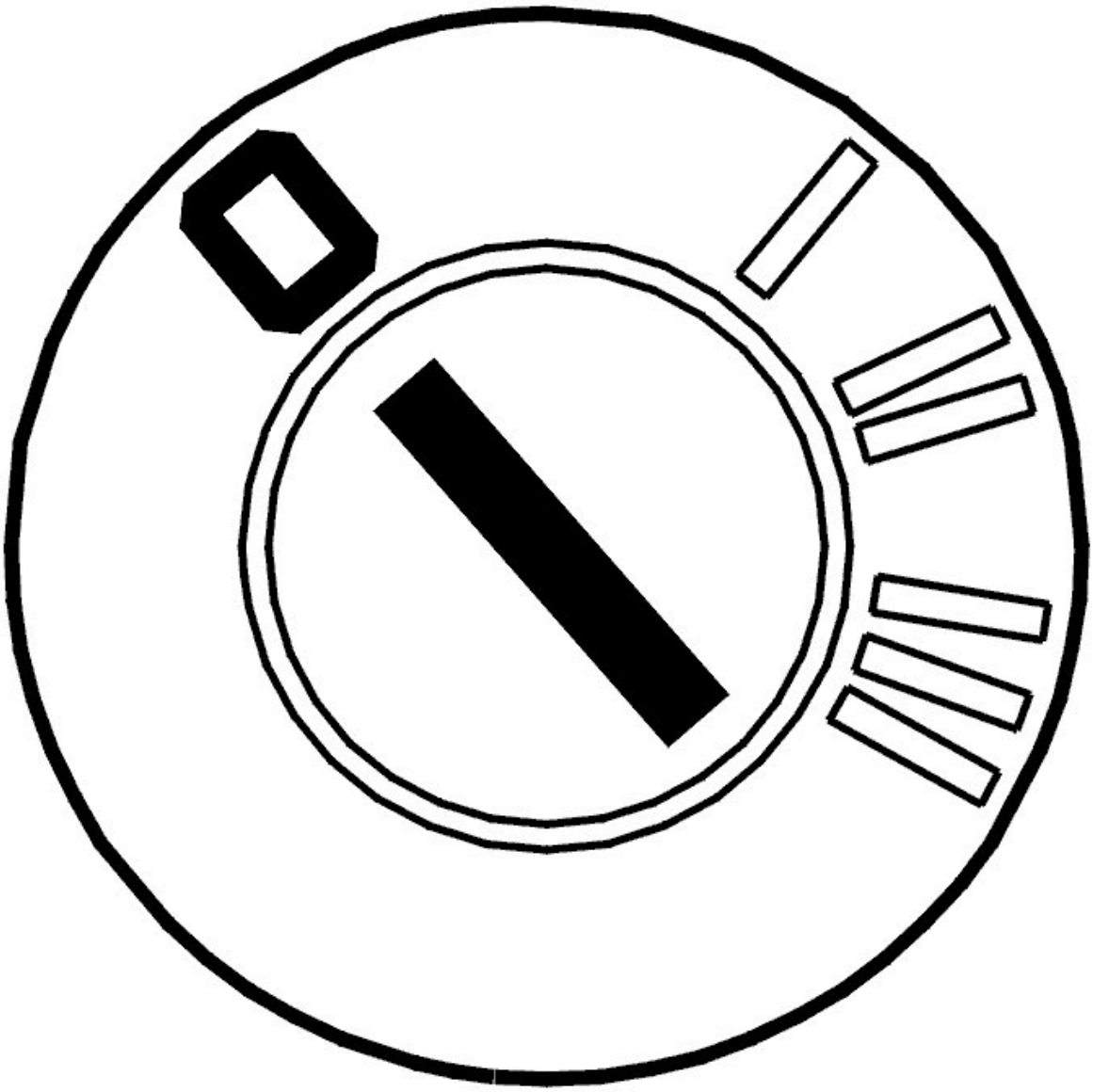
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0052, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0062, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0072, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #4. Check for a short-circuit to voltage.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

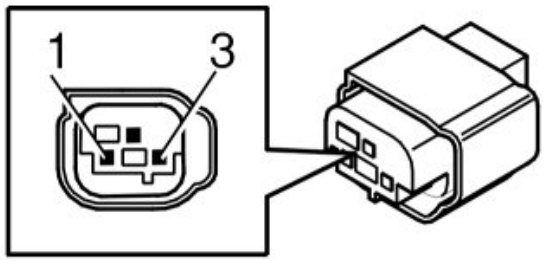
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

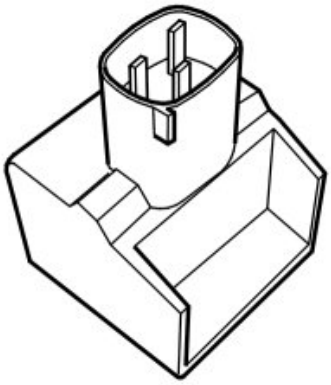
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (

Automatic - Electronic Level)

- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





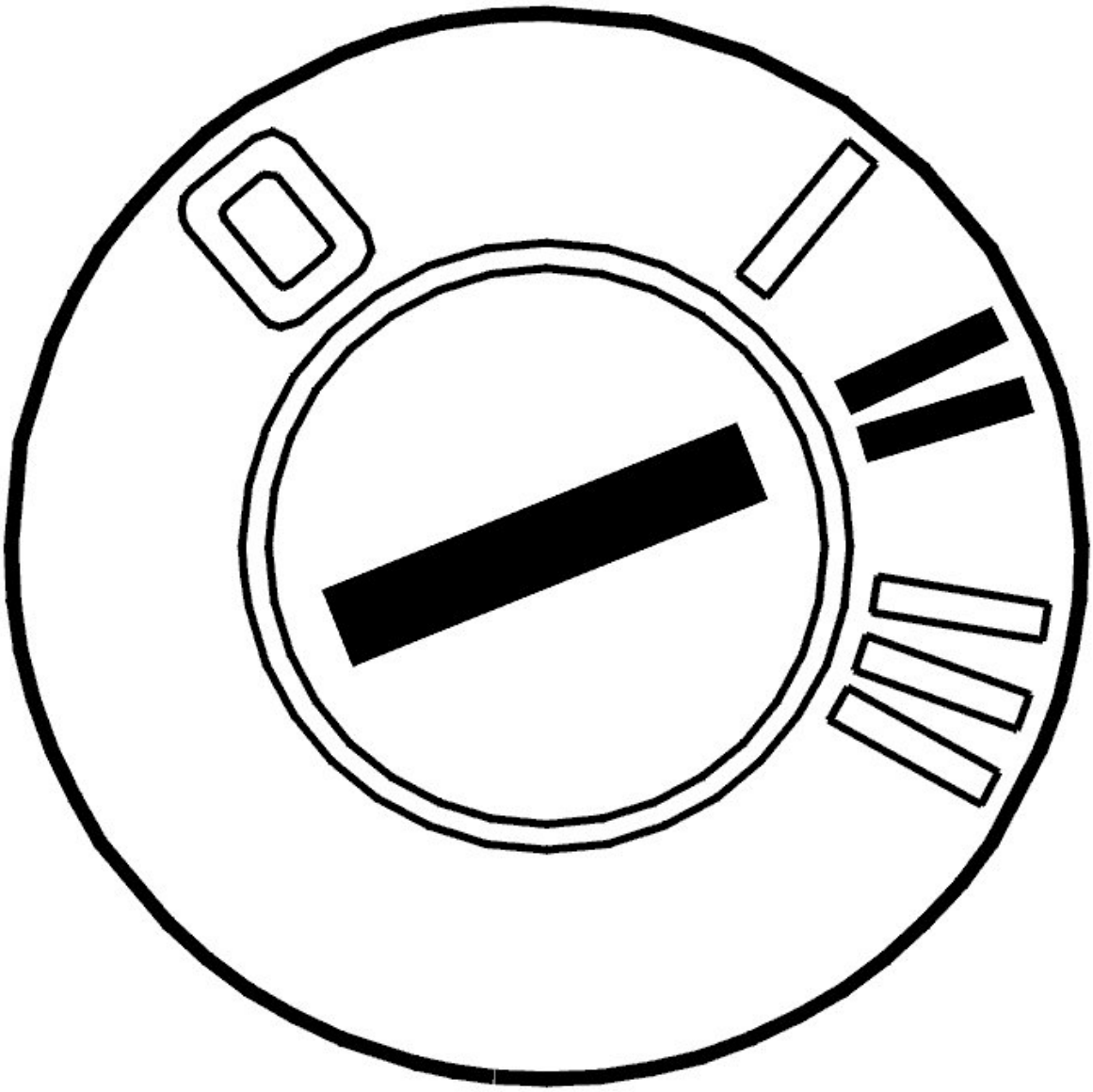
Continue - Verification

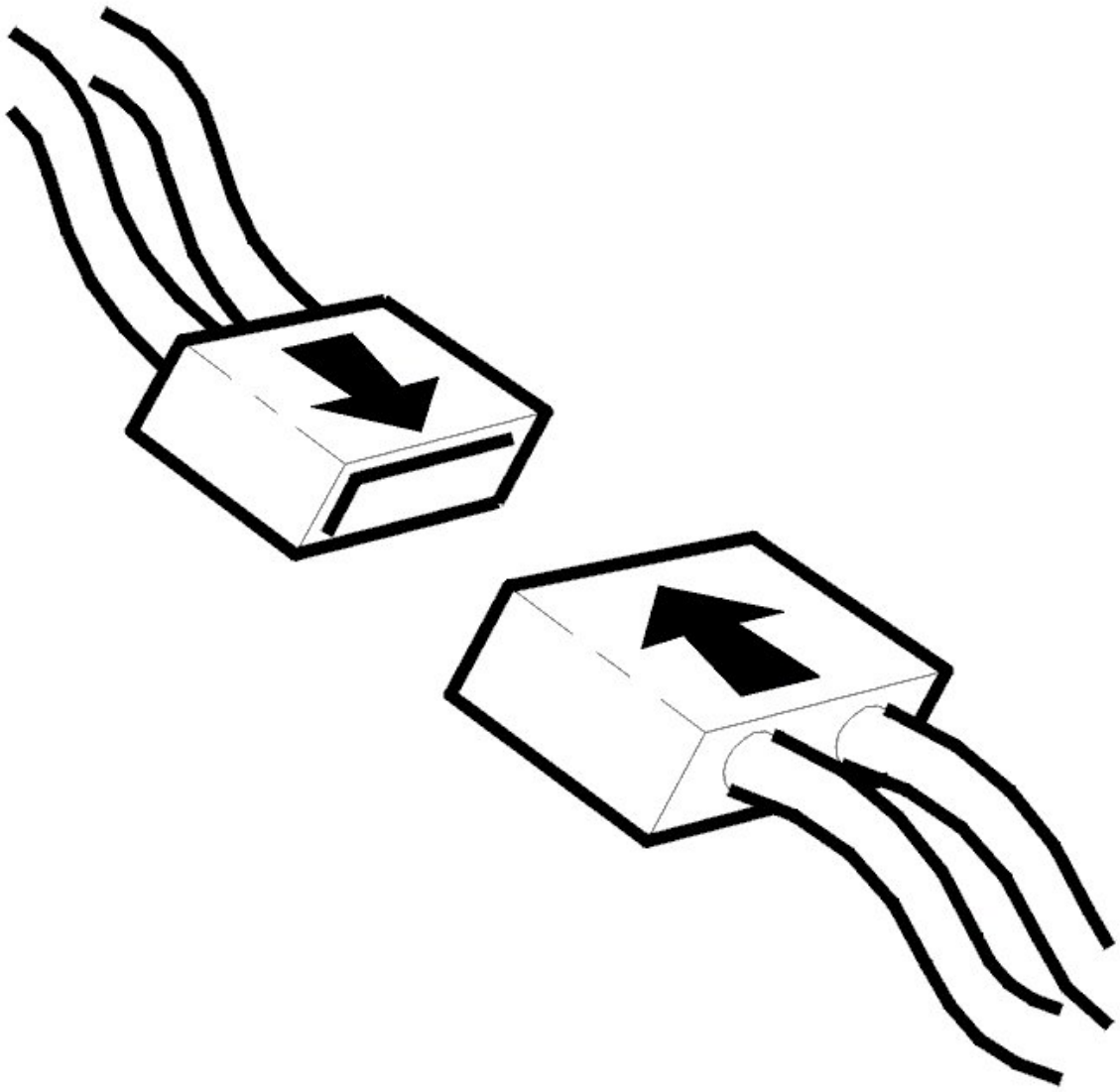
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

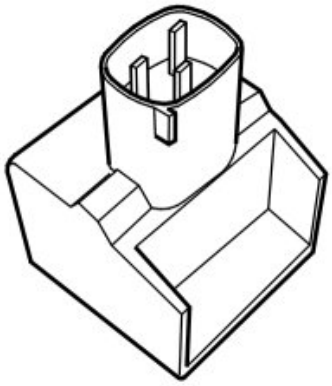
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0053, SUM-0063 or SUM-0073 is stored if the control module registers that there is no signal from one of the acceleration sensors when the ignition is switched on.

- SUM-0053: Left front bodywork acceleration sensor
- SUM-0063: Right front bodywork acceleration sensor
- SUM-0073: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the ground lead
- Open-circuit in the signal cable
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective acceleration sensor.

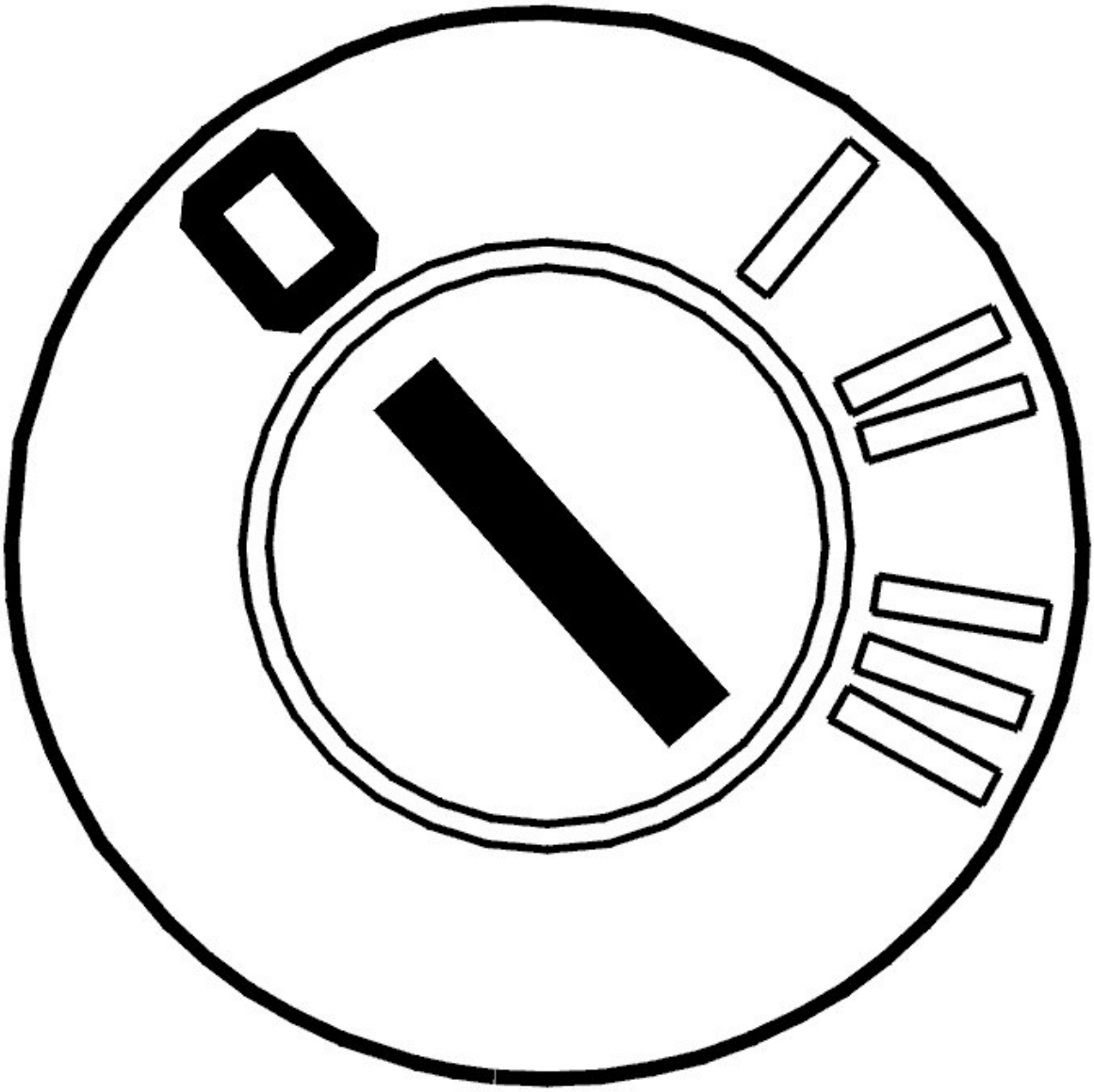
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0053, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0063, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0073, rear left bodywork acceleration sensor:

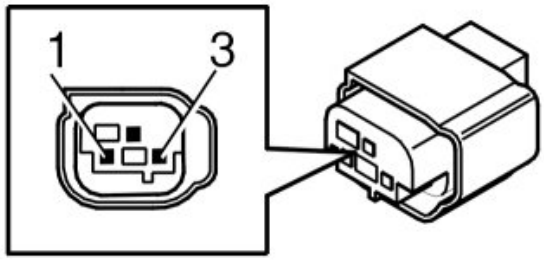
- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

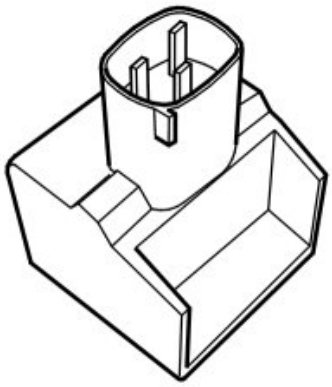
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





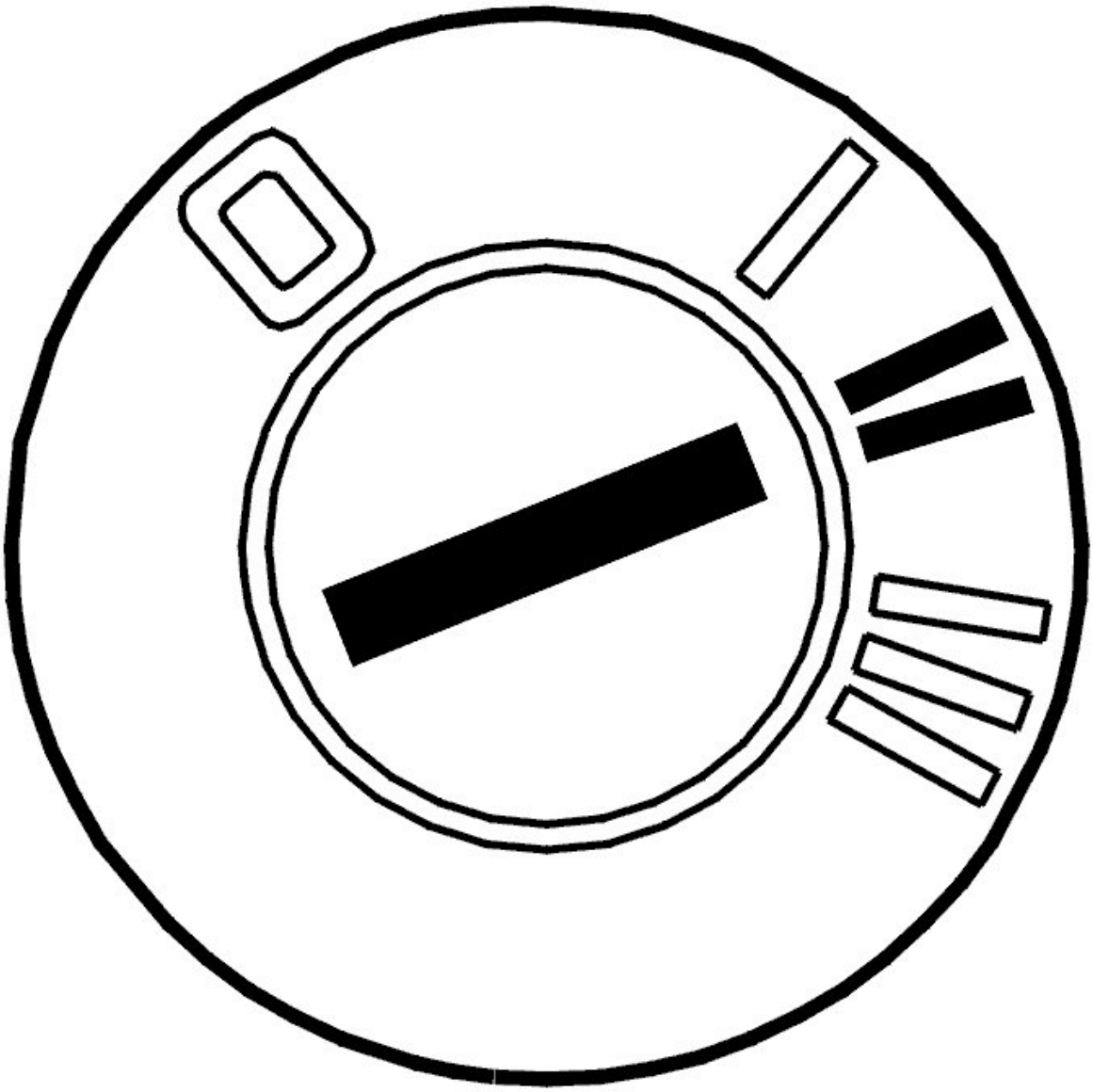
Continue - Verification

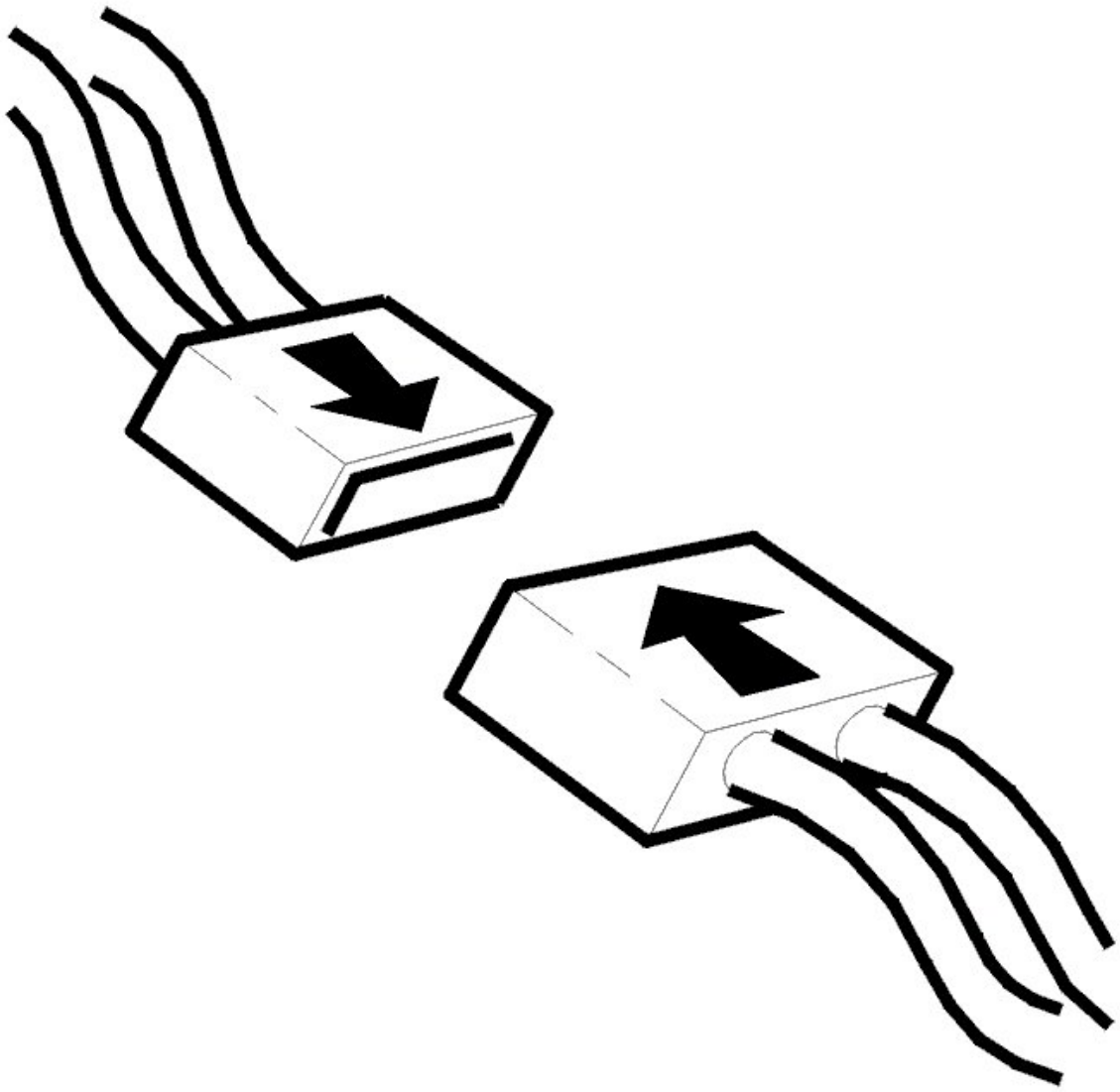
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

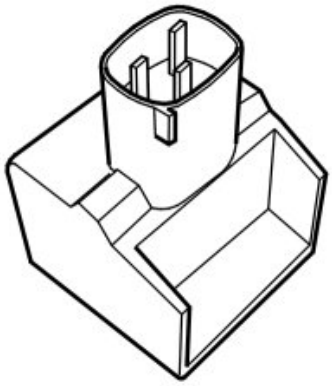
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0051, SUM-0061 or SUM-0071 is stored if the control module registers that the signal from one of the acceleration sensors is too low when the ignition is switched on.

- SUM-0051: Left front bodywork acceleration sensor
- SUM-0061: Left front bodywork acceleration sensor
- SUM-0071: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the signal cable
- Open-circuit or short-circuit to ground in the power supply to the acceleration sensor
- Contact resistance in the terminals
- Defective acceleration sensor.

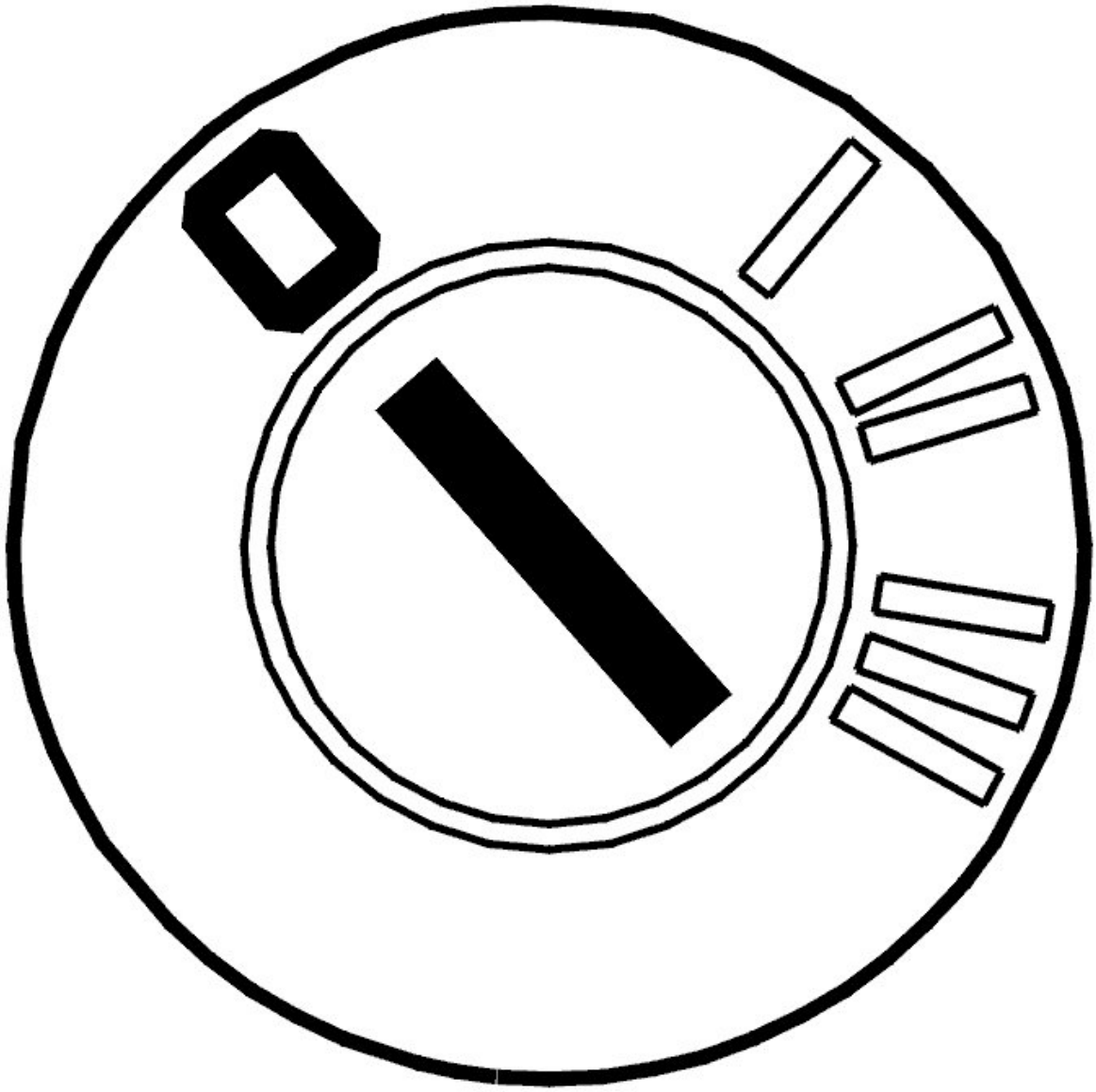
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0051, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0061, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0071, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and acceleration sensor terminal #3. Check for an open-circuit. Check for a short-circuit to ground.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

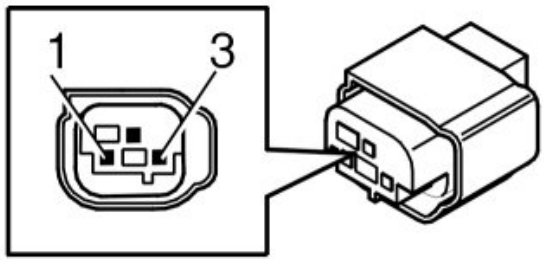
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

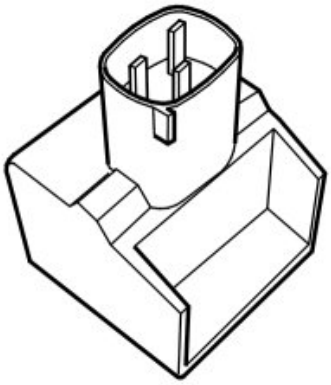
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and

Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing

- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





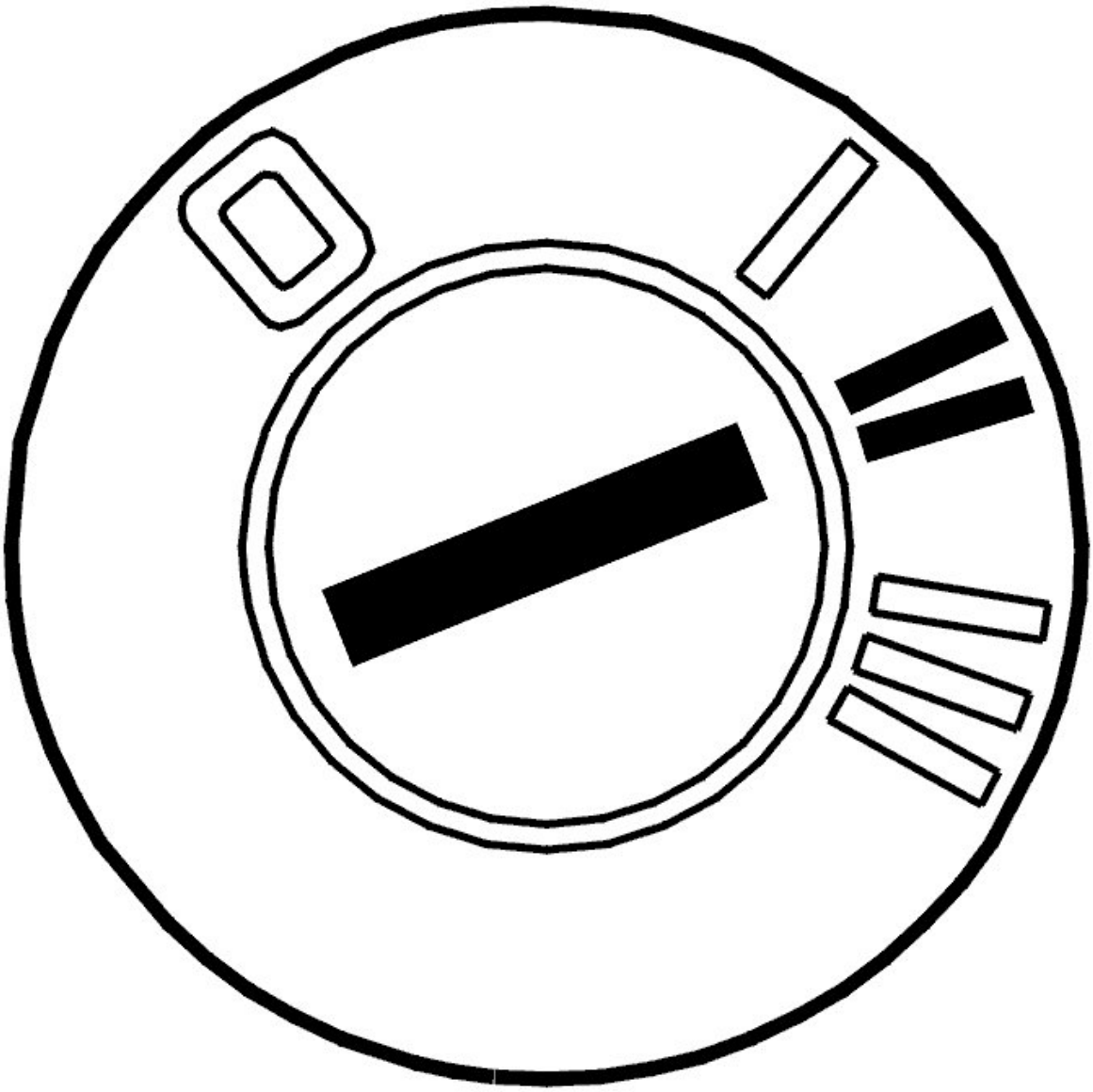
Continue - Verification

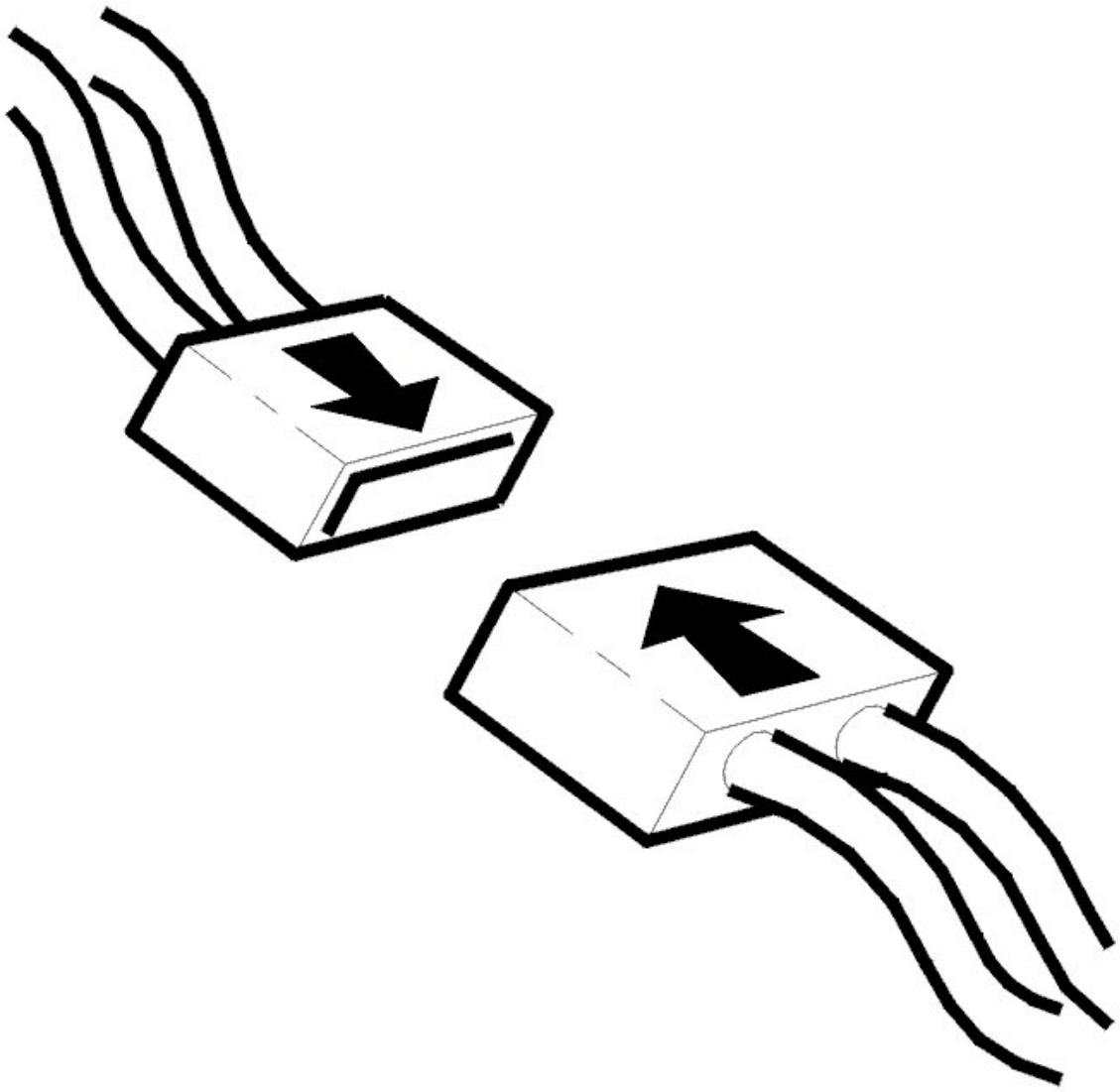
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

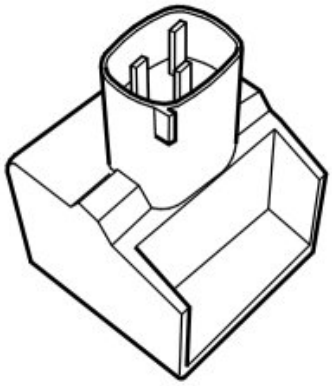
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0052, SUM-0062 or SUM-0072 is stored if the control module registers that the signal from one of the acceleration sensors is too high when the ignition is switched on.

- SUM-0052: Left front bodywork acceleration sensor
- SUM-0062: Right front bodywork acceleration sensor
- SUM-0072: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable
- Defective acceleration sensor.

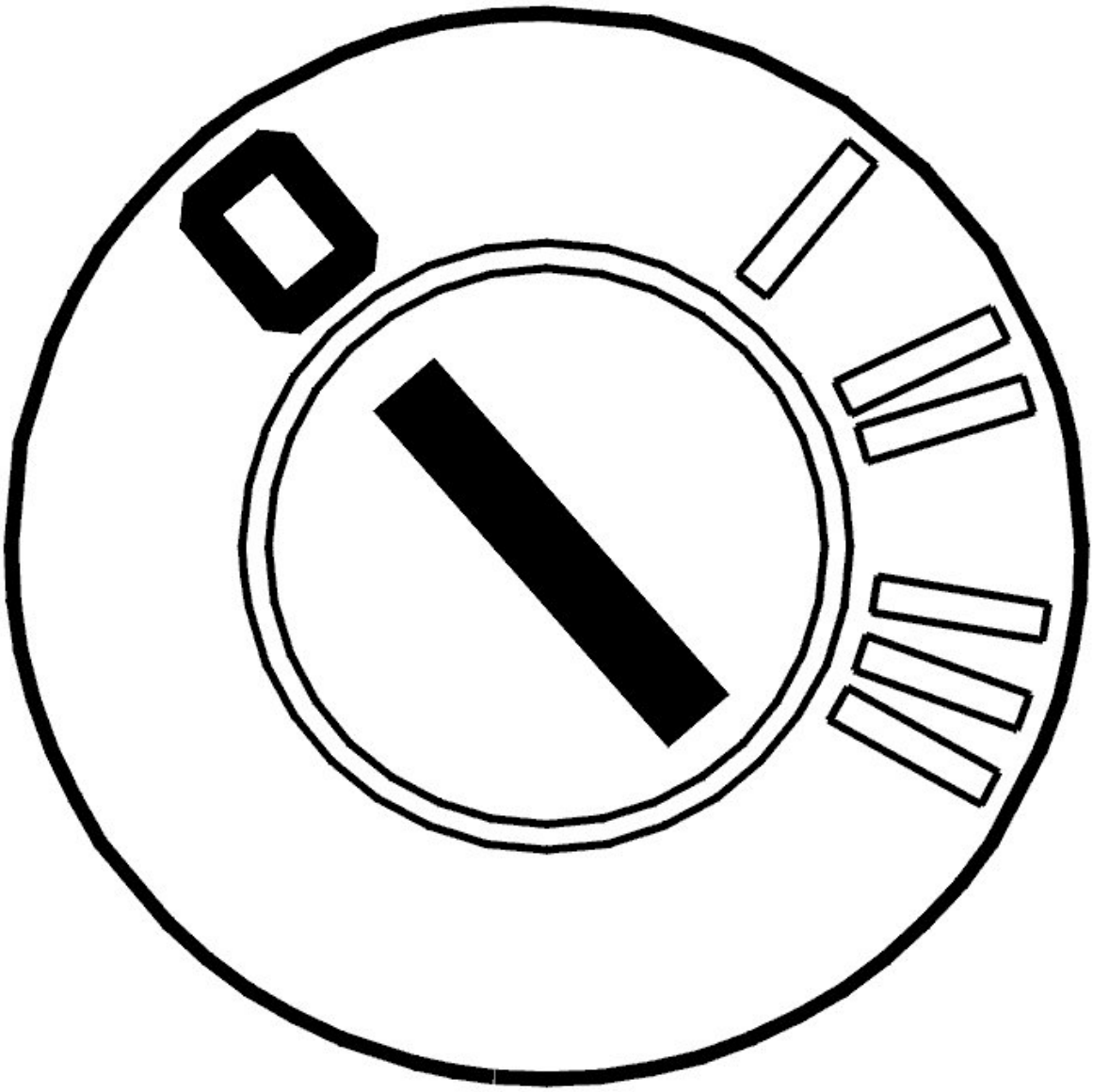
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0052, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0062, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0072, rear left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #4. Check for a short-circuit to voltage.

Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

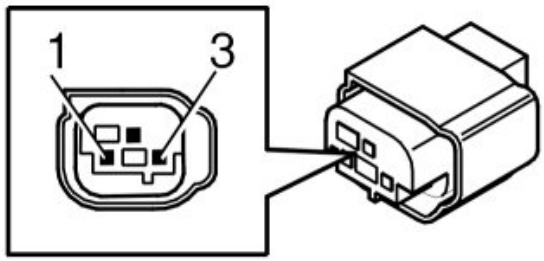
Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

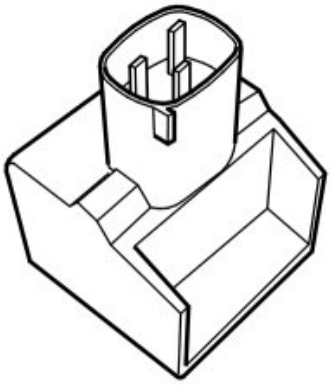
Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (

Automatic - Electronic Level)

- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





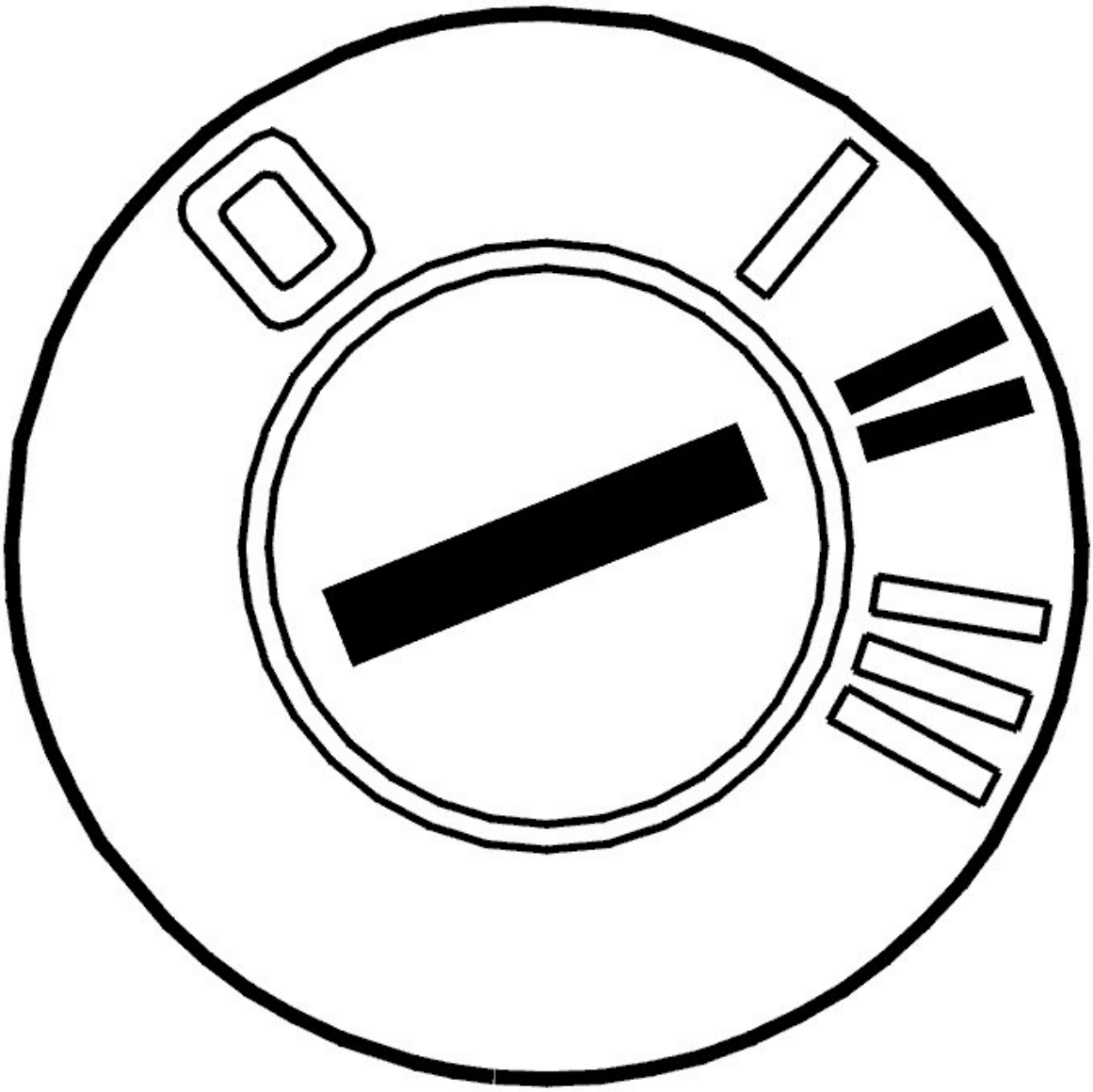
Continue - Verification

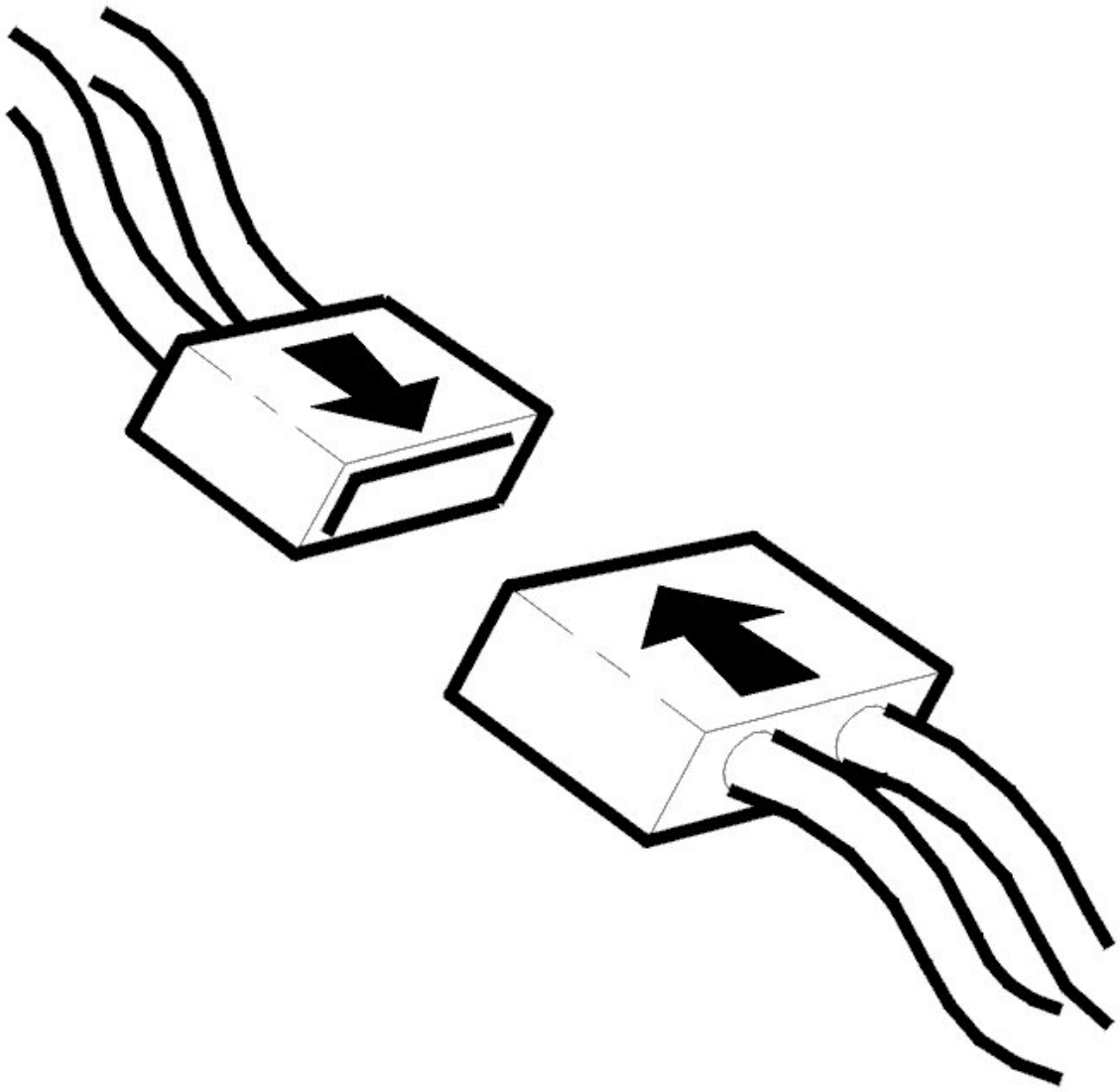
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

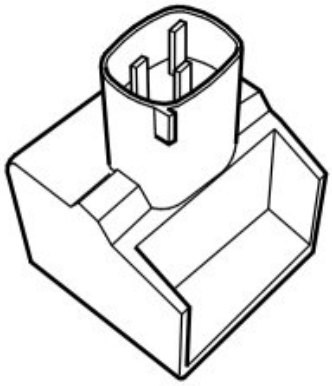
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information about the vertical movement of the car body from three acceleration sensors mounted at the corners of the car body. Diagnostic trouble code (DTC) SUM-0053, SUM-0063 or SUM-0073 is stored if the control module registers that there is no signal from one of the acceleration sensors when the ignition is switched on.

- SUM-0053: Left front bodywork acceleration sensor
- SUM-0063: Right front bodywork acceleration sensor
- SUM-0073: Left rear bodywork acceleration sensor.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the ground lead
- Open-circuit in the signal cable
- Short-circuit between the signal cable and the power supply cable
- Contact resistance in the terminals
- Defective acceleration sensor.

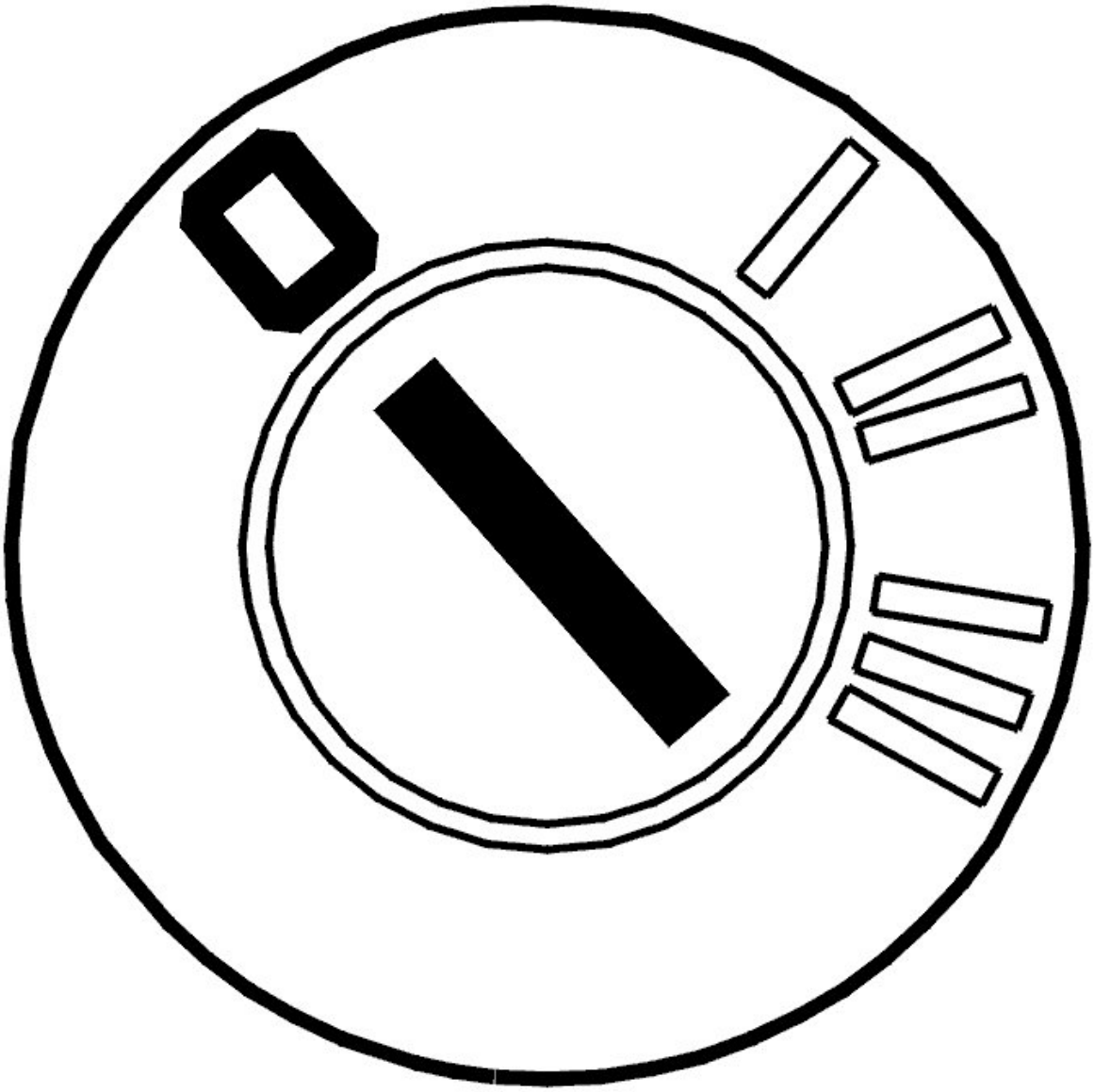
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0053, front left bodywork acceleration sensor:

- Check the signal cable between control module terminal #A10 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0063, front right bodywork acceleration sensor:

- Check the signal cable between control module terminal #A22 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0073, rear left bodywork acceleration sensor:

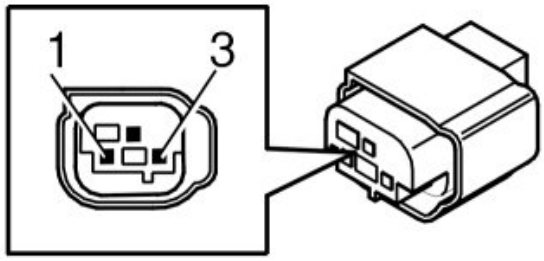
- Check the signal cable between control module terminal #A28 and acceleration sensor terminal #1. Check for an open-circuit or a short-circuit to the power supply cable
- Check the ground lead between control module terminal #A19 and acceleration sensor terminal #2. Check for an open-circuit.

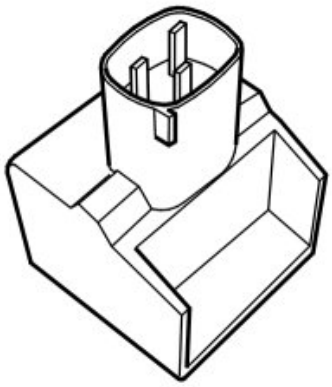
Hint: Click on the VCT2000 symbol to check the signal from the acceleration sensors.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





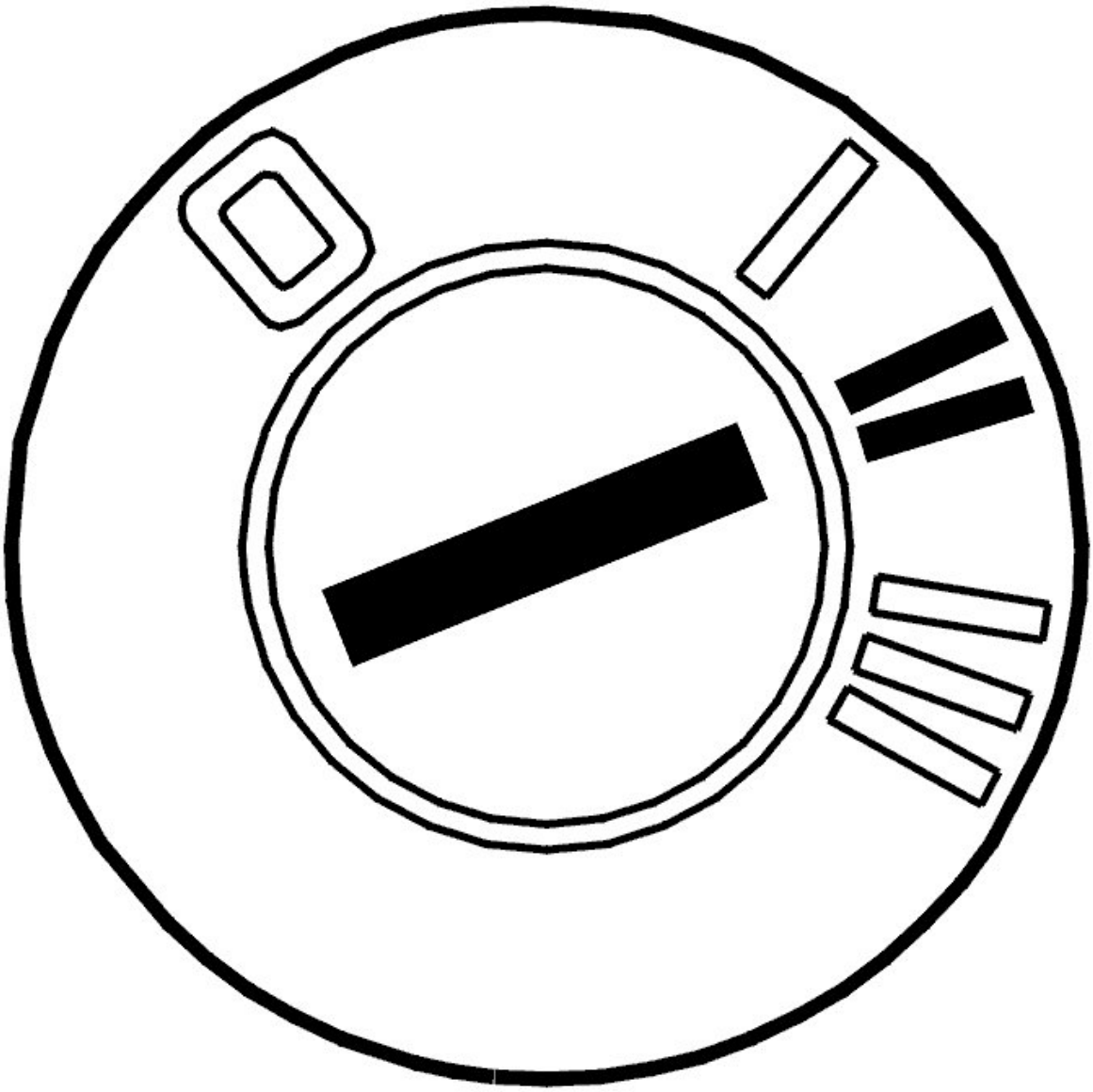
Continue - Verification

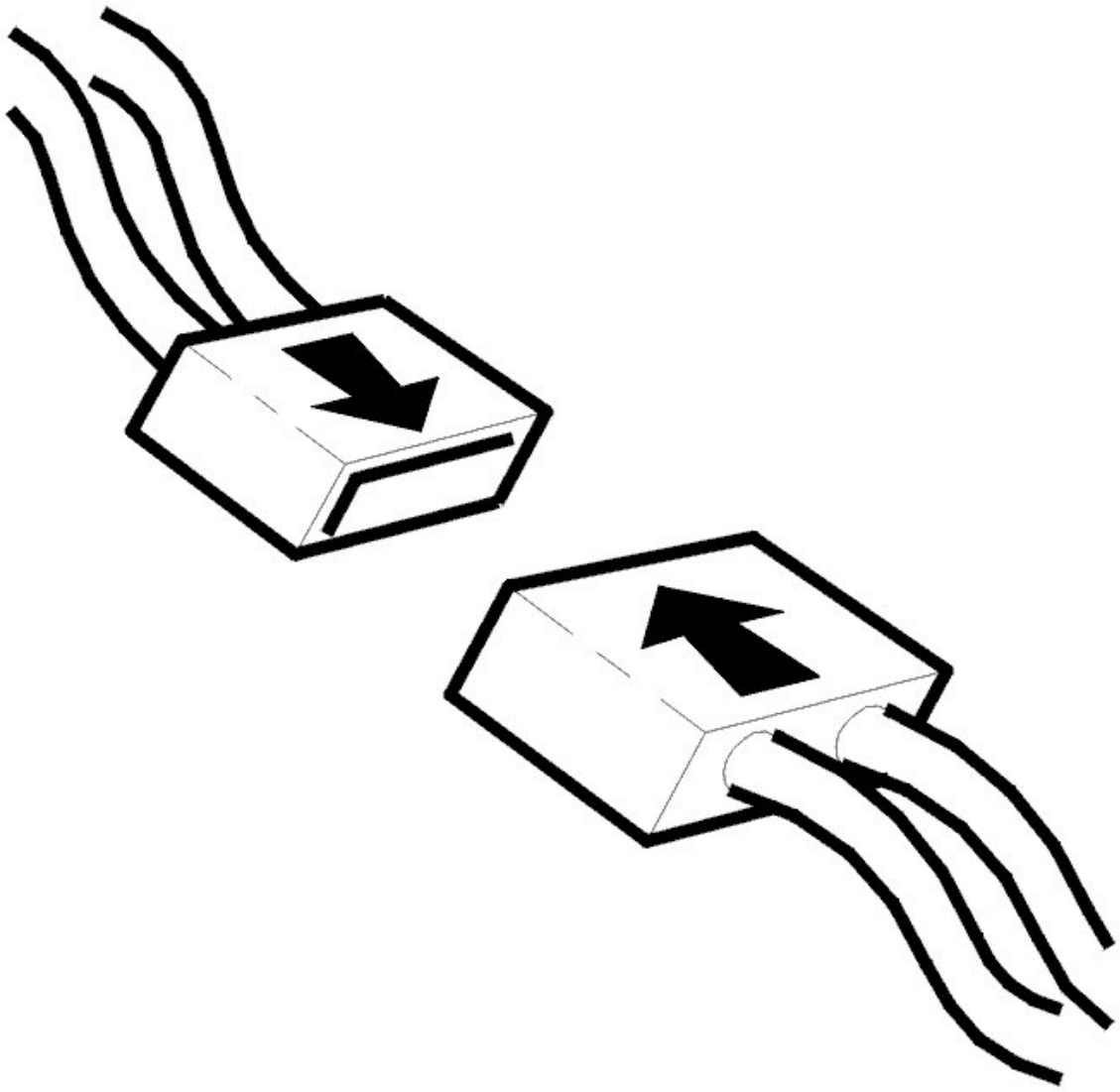
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the acceleration sensors. The value must be approximately 2 V
Rock the car. Check that the value changes.

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

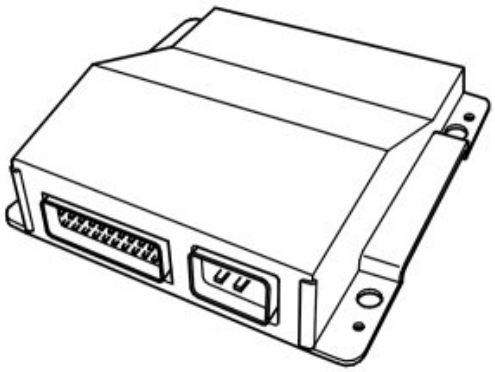
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The acceleration and position sensors for the right-hand rear suspension have a common power supply internally in the control module. Diagnostic trouble code (DTC) SUM-0081 is stored if the Suspension Module detects that the power supply to one of the sensors is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0081: The acceleration sensors for the front suspension, the position sensor for the right-hand rear suspension and the acceleration sensors on the car body.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the power supply to one of the sensors
- Contact resistance in the terminals
- Defective acceleration or position sensor
- Defective control module.

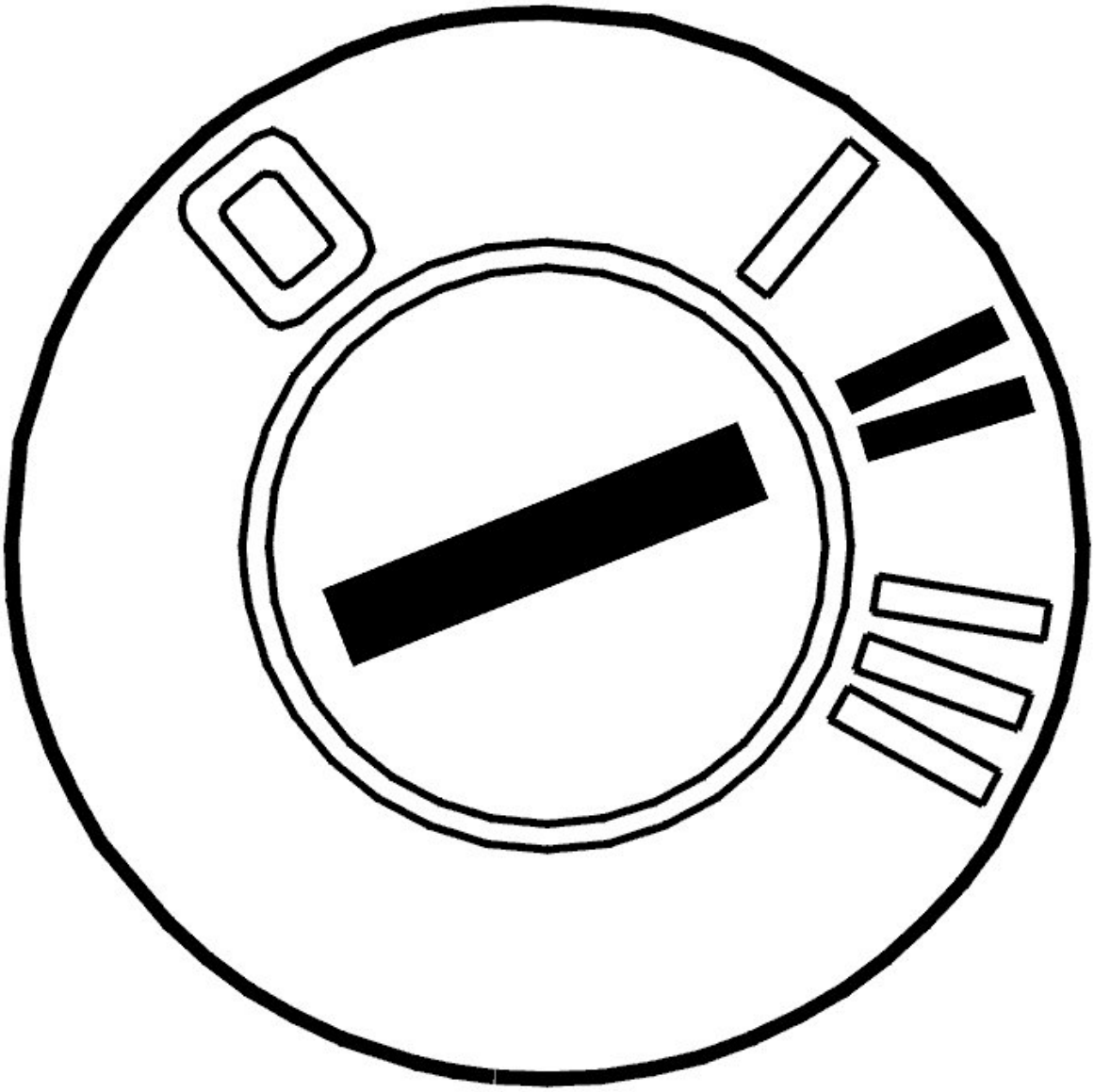
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking other diagnostic trouble codes (DTCs)



Note! The diagnostic trouble code (DTC) may be the result of defective acceleration and/or position sensors. If any diagnostic trouble code (DTC) is stored in the Suspension Module (SUM) for these sensors, these must be fault-traced first. Check that no diagnostic trouble code (DTC) is stored.

- Ignition on
- Read off diagnostic trouble codes (DTCs).

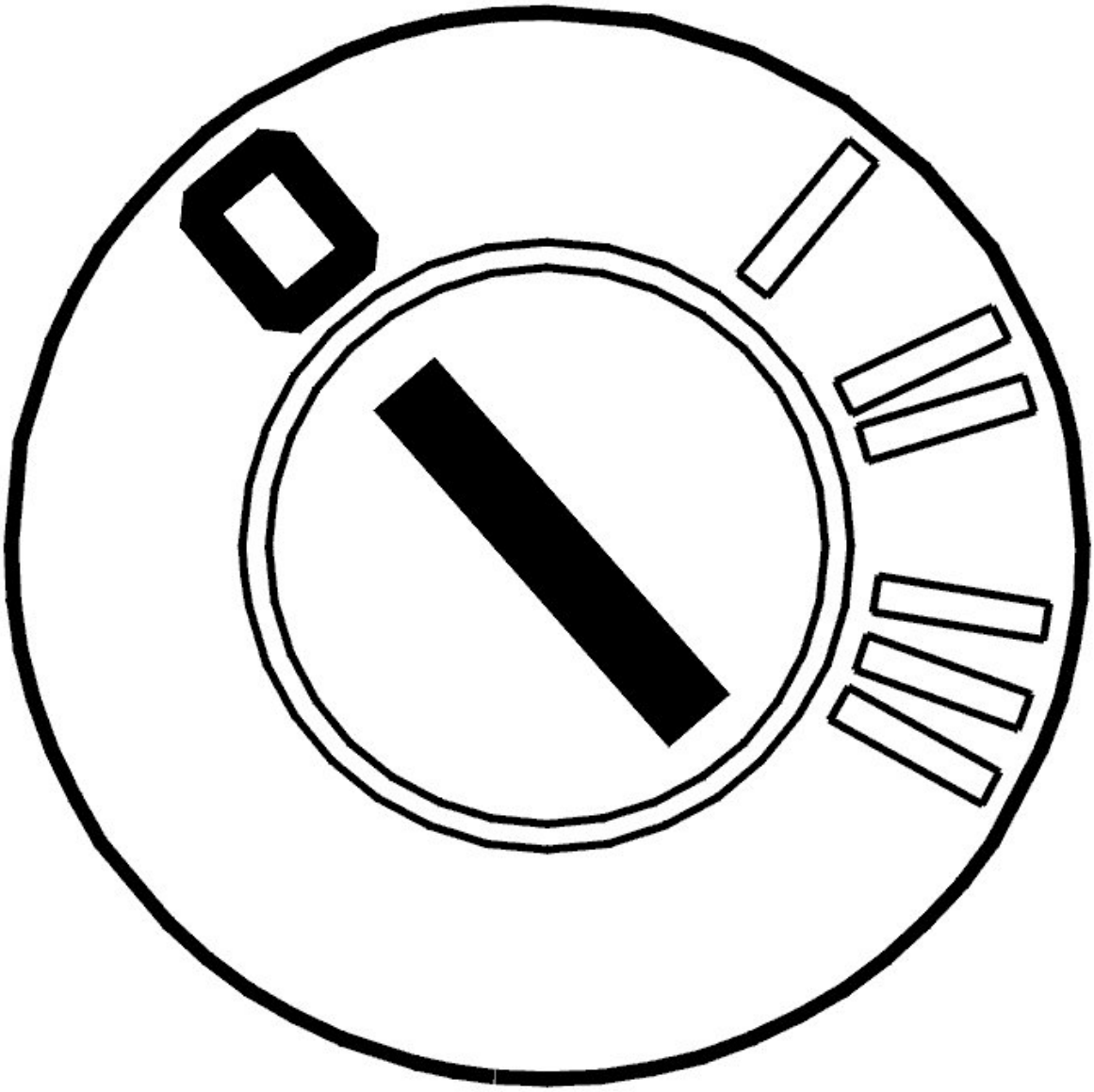
Any stored diagnostic trouble code (DTC) for the acceleration or position sensors must be remedied and erased first.

Has a diagnostic trouble code (DTC) been stored for any of the acceleration or position sensors?

Yes - No Fault Found

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the position sensor. Check for contact resistance and oxidation.

- Check the cable for power supply between control module terminal #A13 and the acceleration sensors for the front suspension terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and the position sensors for the right rear suspension terminal #5. Check for a short-circuit to ground
- Check the cable for power supply between control module terminal #A13 and the acceleration sensors on the bodywork terminal #3. Check for a short-circuit to ground.

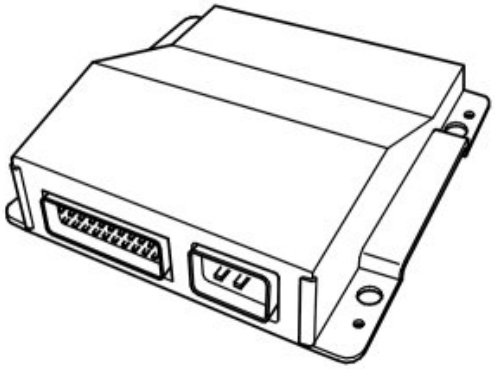
Hint: The sensors are usually supplied with 5 V from control module terminal #13 when the ignition is on. There is no power supply if a diagnostic trouble code (DTC) is stored. Click on the VCT2000 symbol to activate the power supply. This will make fault-tracing easier.

Try a new control module if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



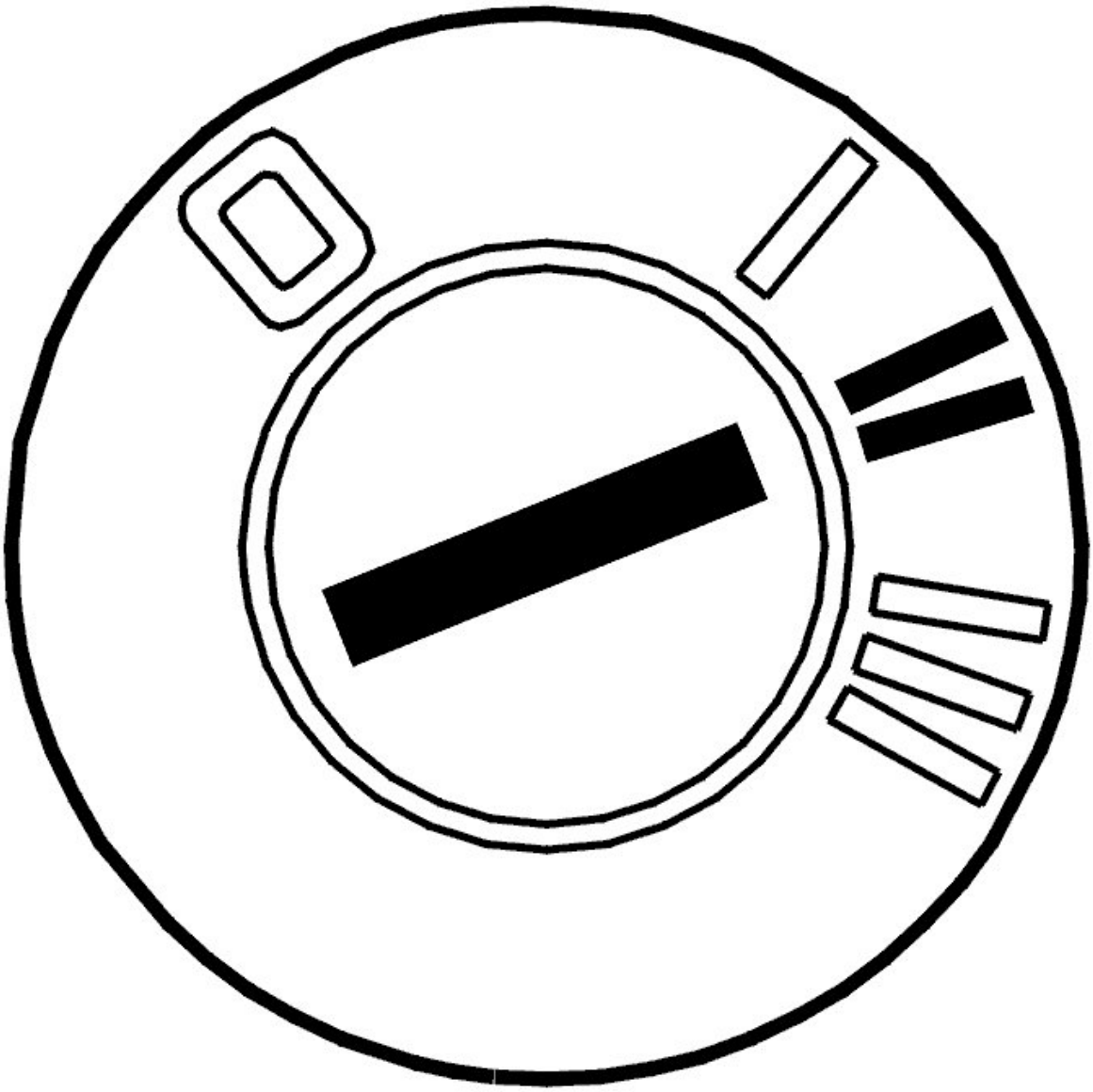
Continue - Verification

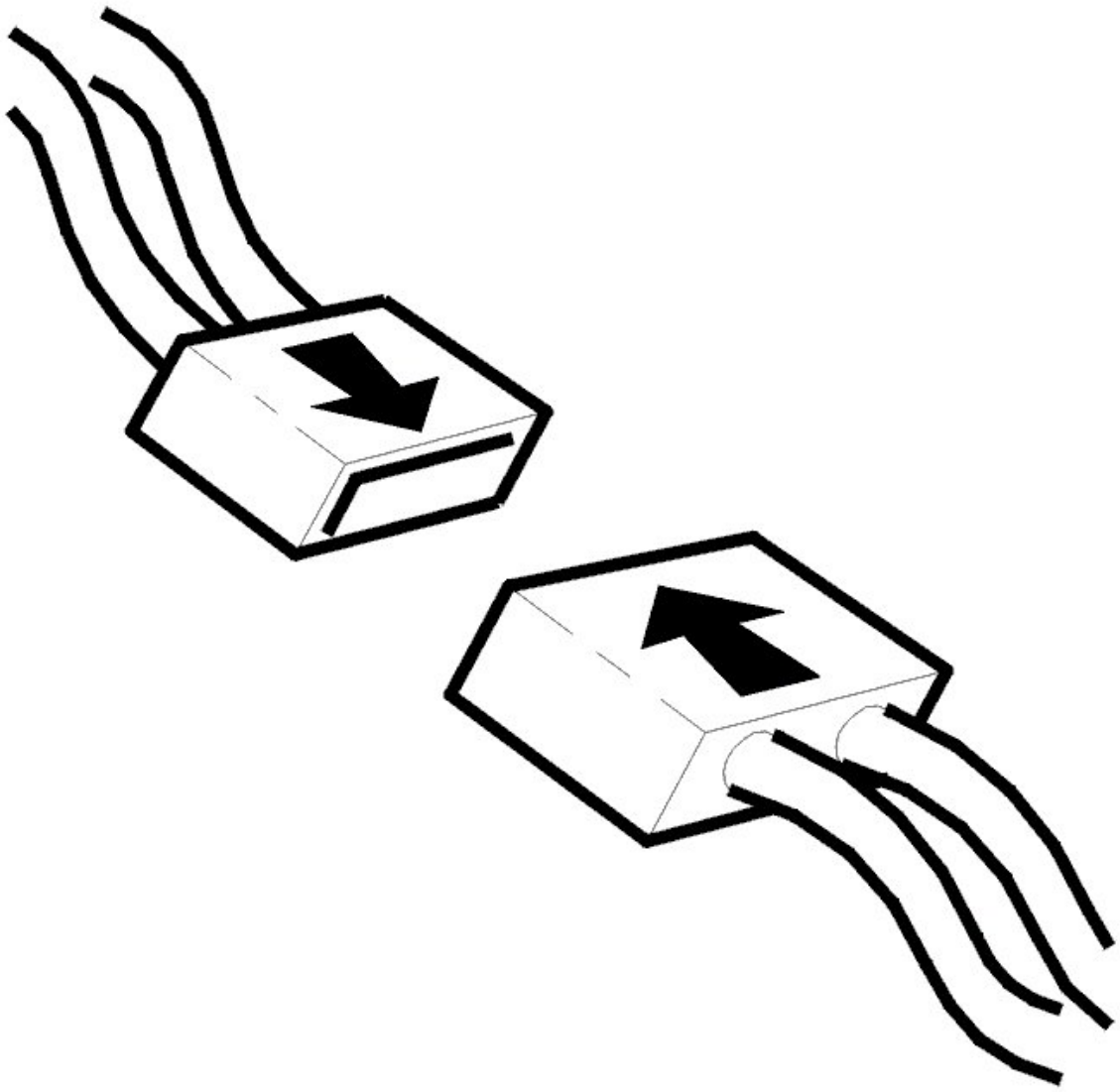
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the power supply to the sensors. The value must be approximately 5 V

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

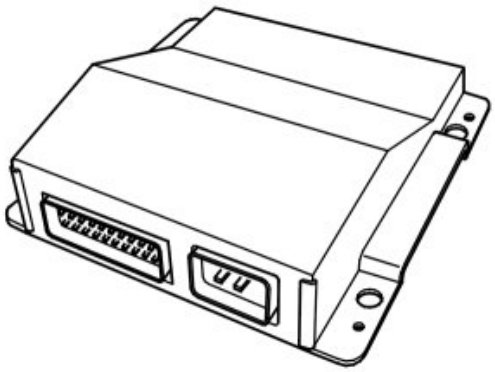
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking other diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The acceleration and position sensors for the right-hand rear suspension have a common power supply internally in the control module. Diagnostic trouble code (DTC) SUM-0082 is stored if the Suspension Module detects that the power supply to one of the sensors is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0082: The acceleration sensors for the front suspension, the position sensor for the right-hand rear suspension and the acceleration sensors on the car body.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply to one of the sensors
- Open-circuit in the signal cable from one of the sensors
- Defective acceleration or position sensor
- Defective control module.

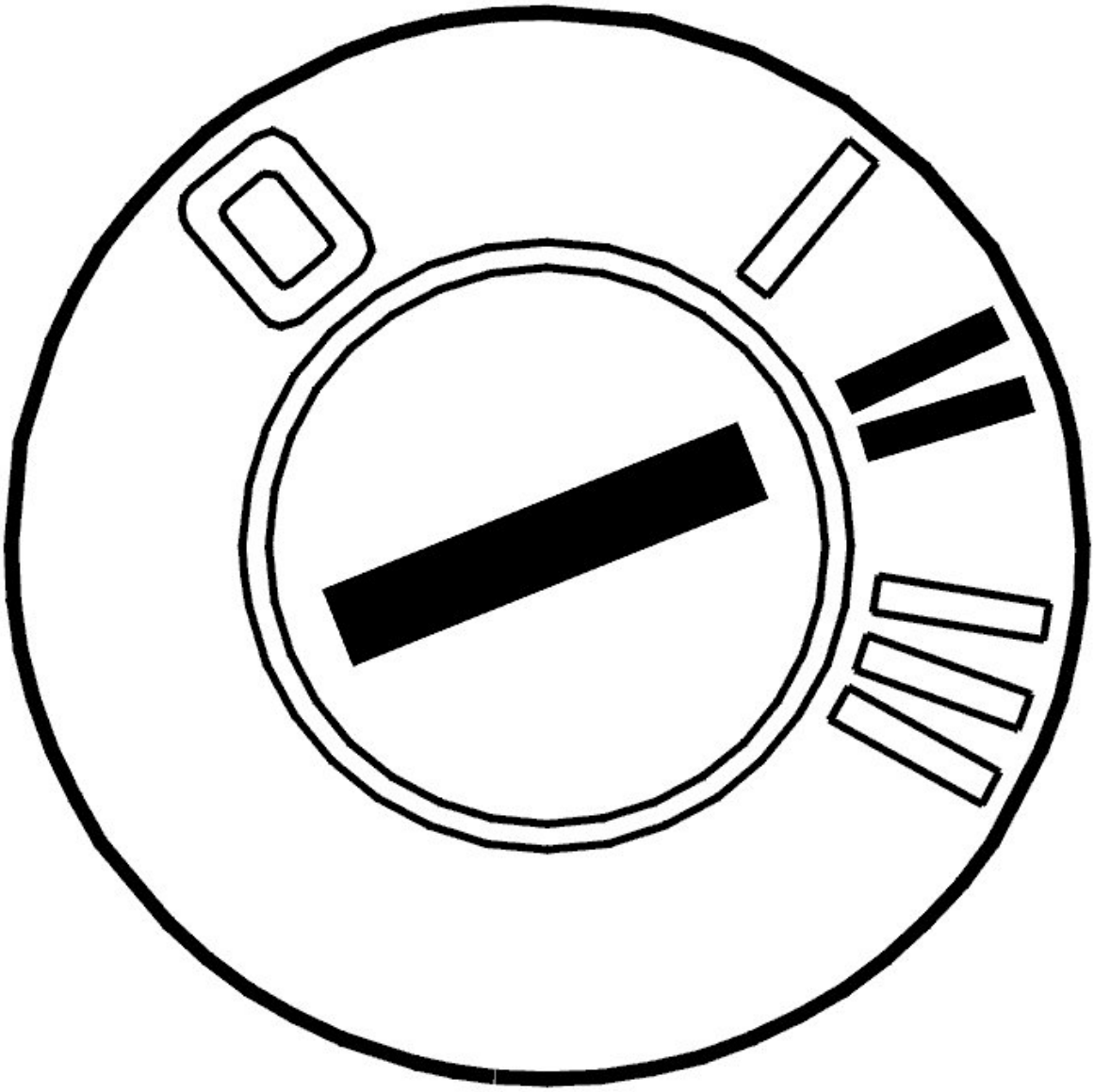
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking other diagnostic trouble codes (DTCs)



Note! The diagnostic trouble code (DTC) may be the result of defective acceleration and/or position sensors. If any diagnostic trouble code (DTC) is stored in the Suspension Module (SUM) for these sensors, these must be fault-traced first. Check that no diagnostic trouble code (DTC) is stored.

- Ignition on
- Read off diagnostic trouble codes (DTCs).

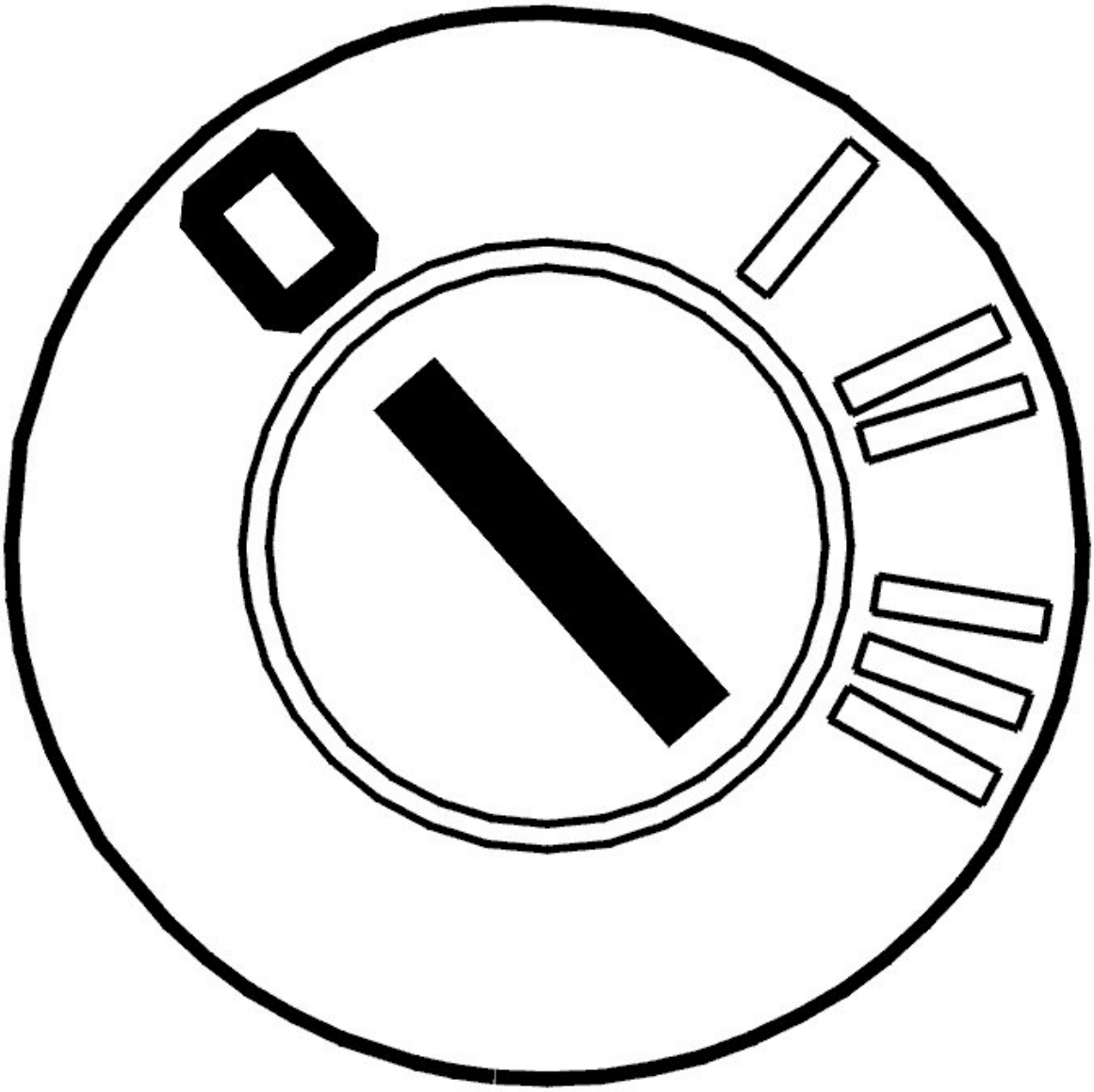
Any stored diagnostic trouble code (DTC) for the acceleration or position sensors must be remedied and erased first.

Has a diagnostic trouble code (DTC) been stored for any of the acceleration or position sensors?

Yes - No Fault Found

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the connectors for the control module and sensors. Check for oxidation.

- Check the cable for power supply between control module terminal #A13 and the acceleration sensors for the front suspension terminal #1. Check for a short-circuit to supply voltage
- Check the cable for power supply between control module terminal #A13 and the position sensors for the rear suspension terminal #5. Check for a short-circuit to supply voltage
- Check the cable for power supply between control module terminal #A13 and the acceleration sensors on the bodywork terminal #3. Check for a short-circuit to supply voltage.

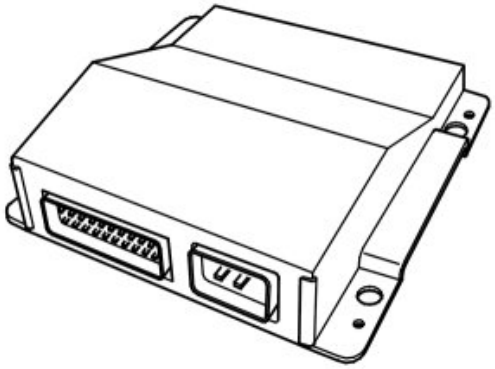
Hint: The sensors are usually supplied with 5 V from control module terminal #13 when the ignition is on. There is no power supply if a diagnostic trouble code (DTC) is stored. Click on the VCT2000 symbol to activate the power supply. This will make fault-tracing easier.

Try a new control module if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



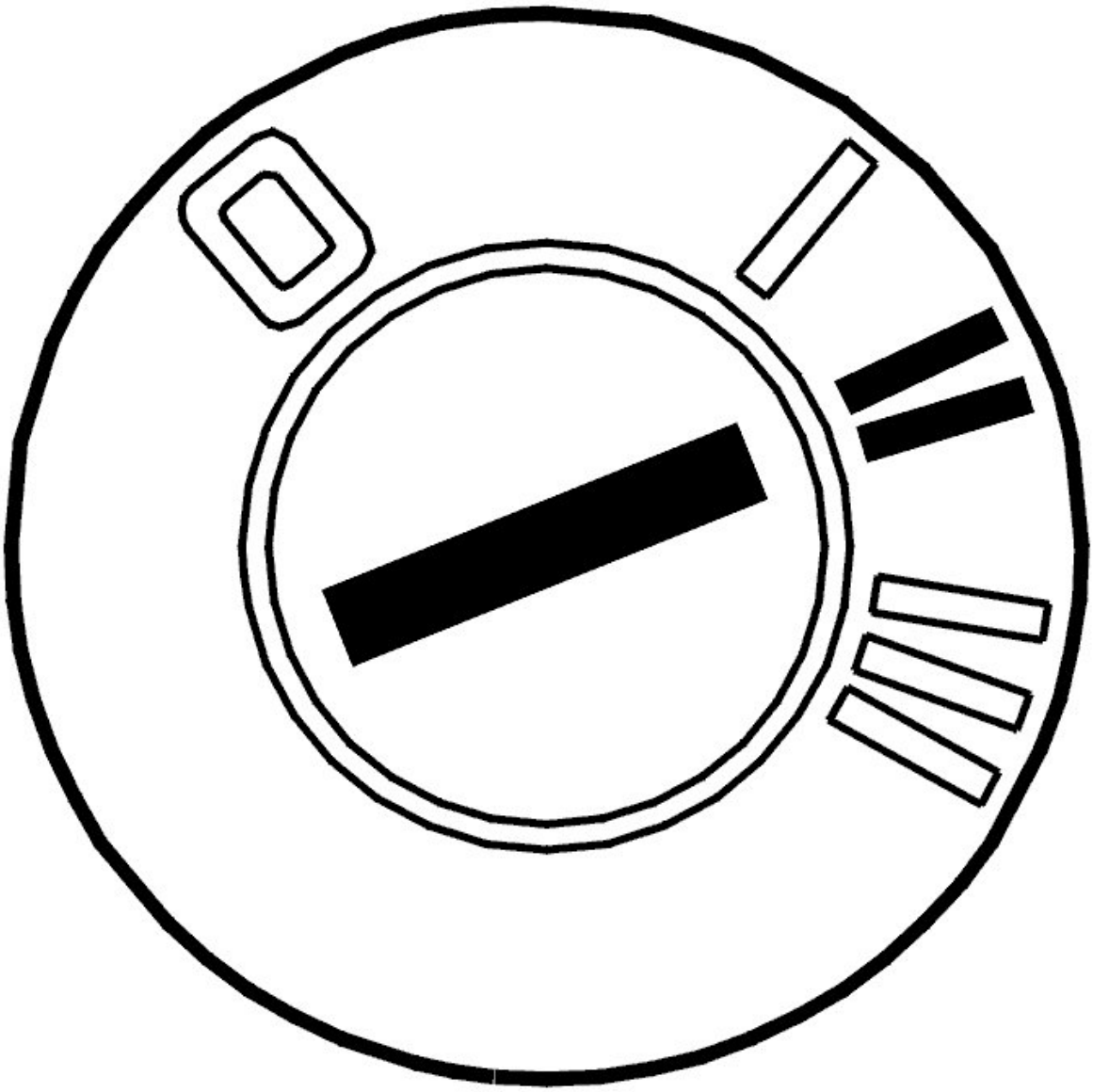
Continue - Verification

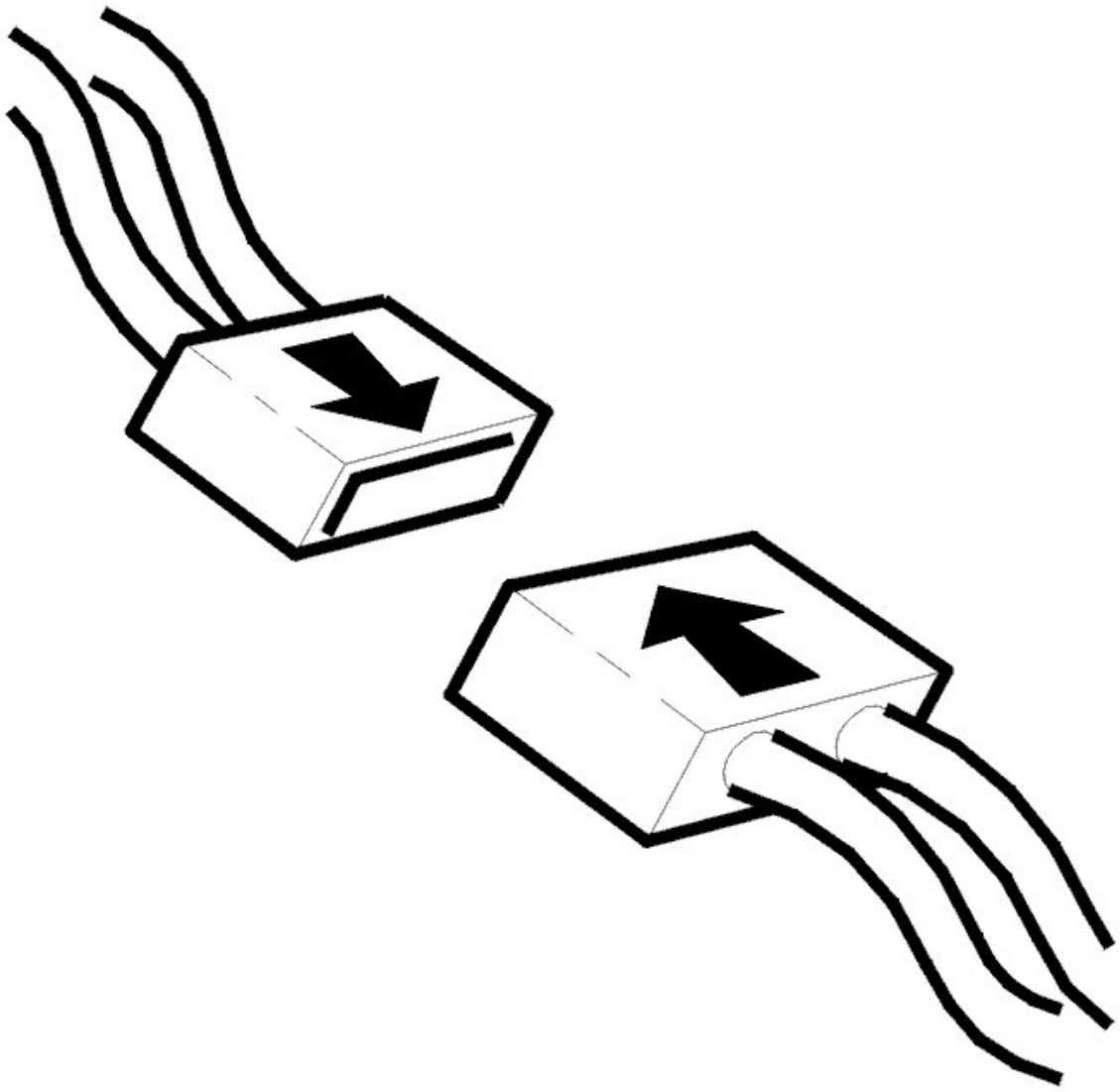
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the power supply to the sensors. The value must be approximately 5 V

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

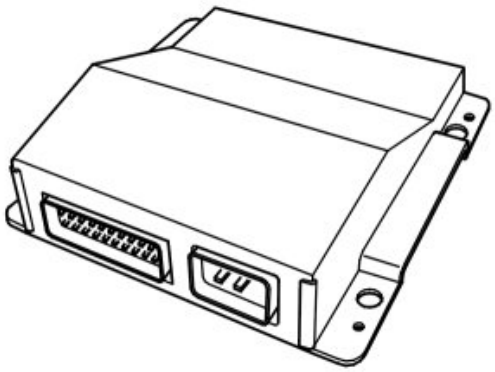
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking other diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The position sensor for the left rear suspension is powered from the control module. Diagnostic trouble code (DTC) SUM-0091 is stored if the Suspension Module detects that the power supply to the sensor is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0091: Position sensor for the rear suspension.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to ground in the power supply to the sensor
- Contact resistance in the terminals
- Defective position sensor
- Defective control module.

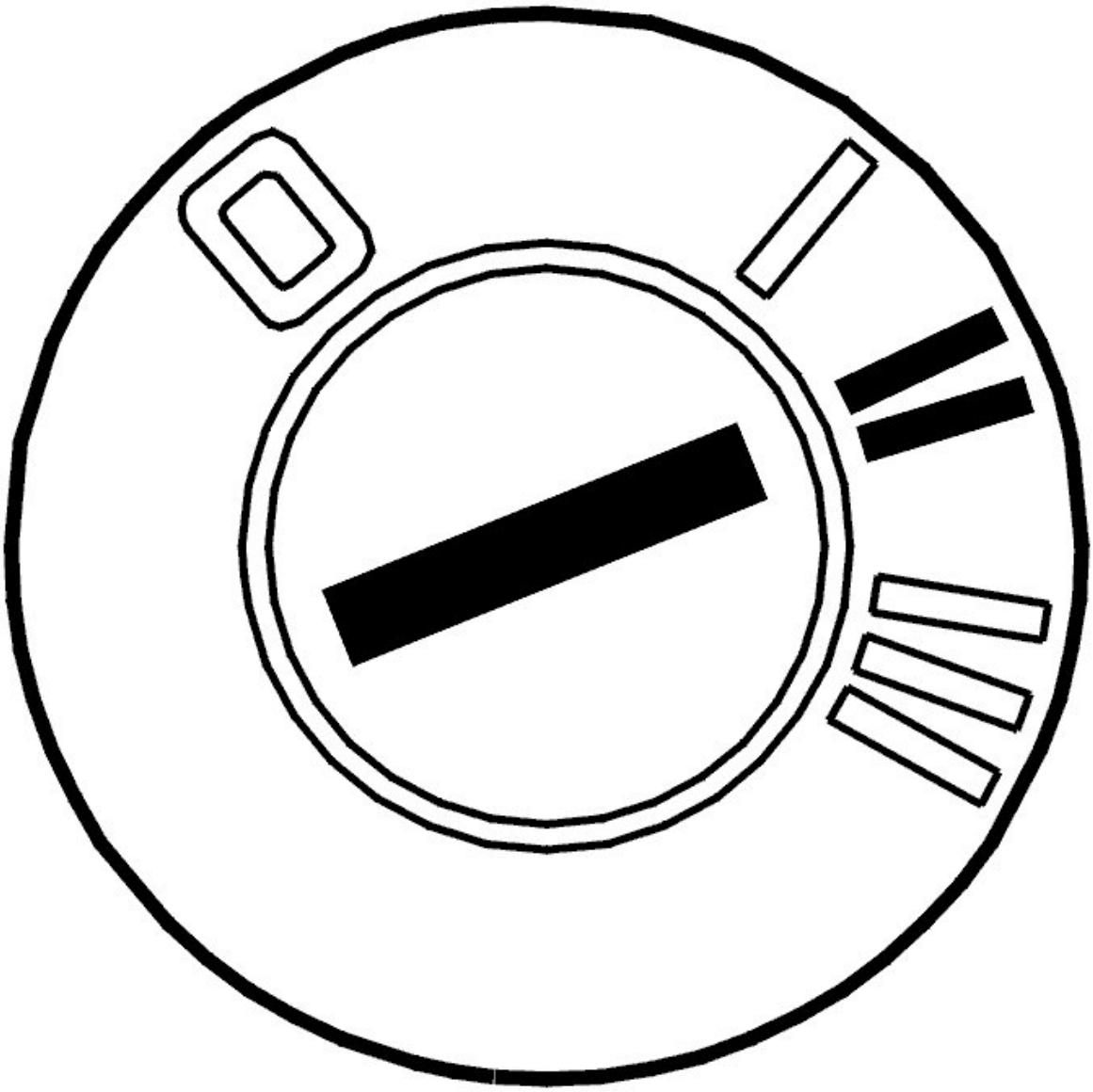
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking other diagnostic trouble codes (DTCs)



Note! The diagnostic trouble code (DTC) may be the result of a defective position sensor. If any diagnostic trouble code (DTC) is stored in the Suspension Module (SUM) for this sensor, this must be fault-traced first. Check that no diagnostic trouble code (DTC) is stored.

- Ignition on
- Read off diagnostic trouble codes (DTCs).

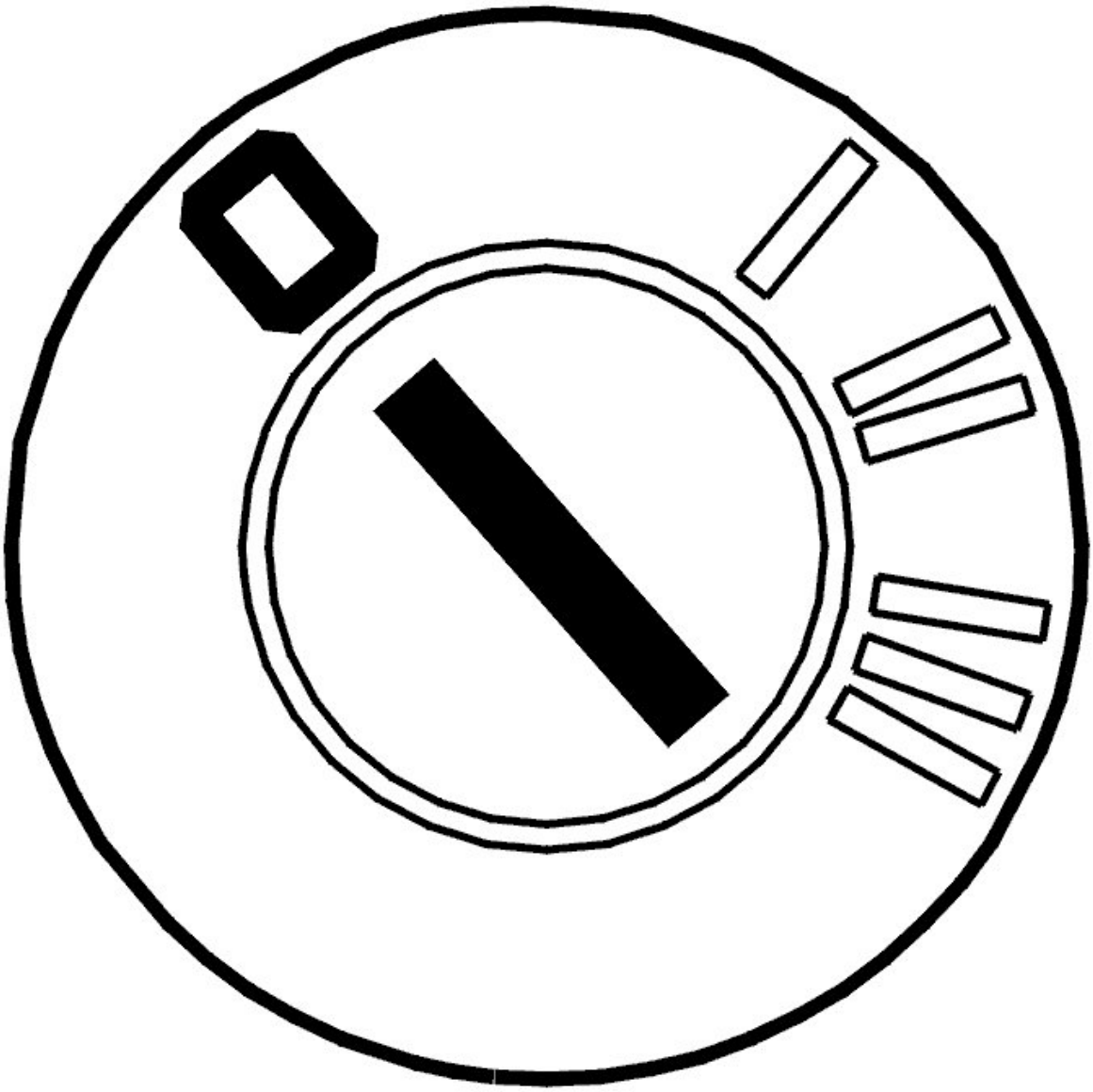
Any stored diagnostic trouble code (DTC) for the position sensor must be remedied and erased first.

Is there a diagnostic trouble code (DTC) stored for the position sensor?

Yes - No Fault Found

No - Checking components and wiring

Checking components and wiring



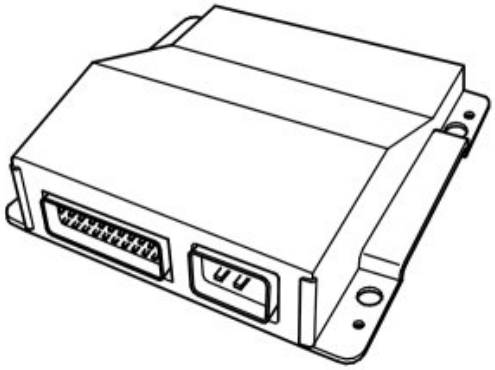
- Ignition off.
- Check the connectors for the control module and sensors. Check for contact resistance and oxidation
- Check the cable for power supply between control module terminal #A25 and the position sensors for the left rear suspension terminal #5. Check for a short-circuit to ground.

Hint: The sensor is usually supplied with 5 V from control module terminal #25 when the ignition is on. There is no power supply if a diagnostic trouble code (DTC) is stored. Click on the VCT2000 symbol to activate the power supply. This will make fault-tracing easier.

Try a new control module if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



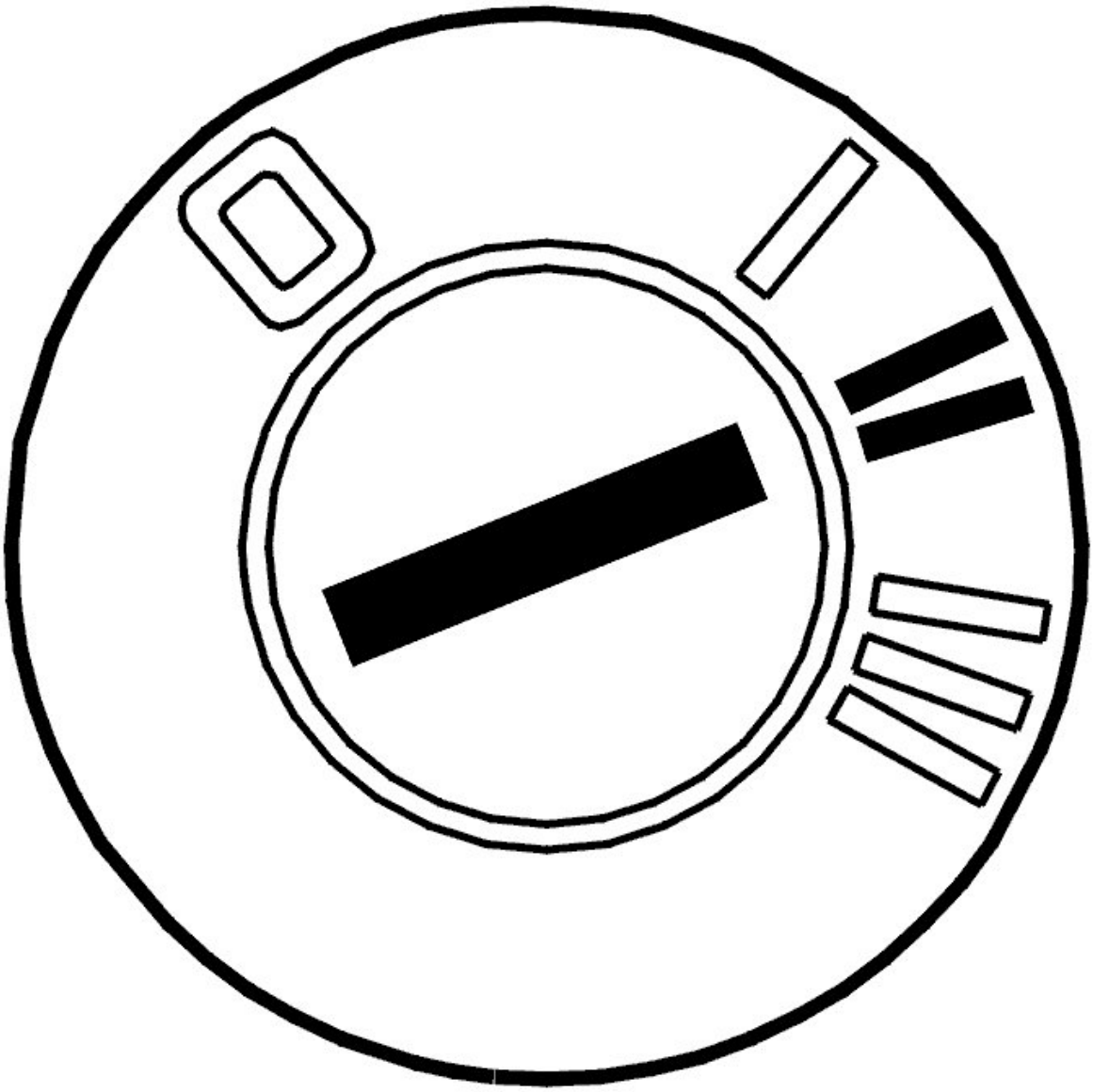
Continue - Verification

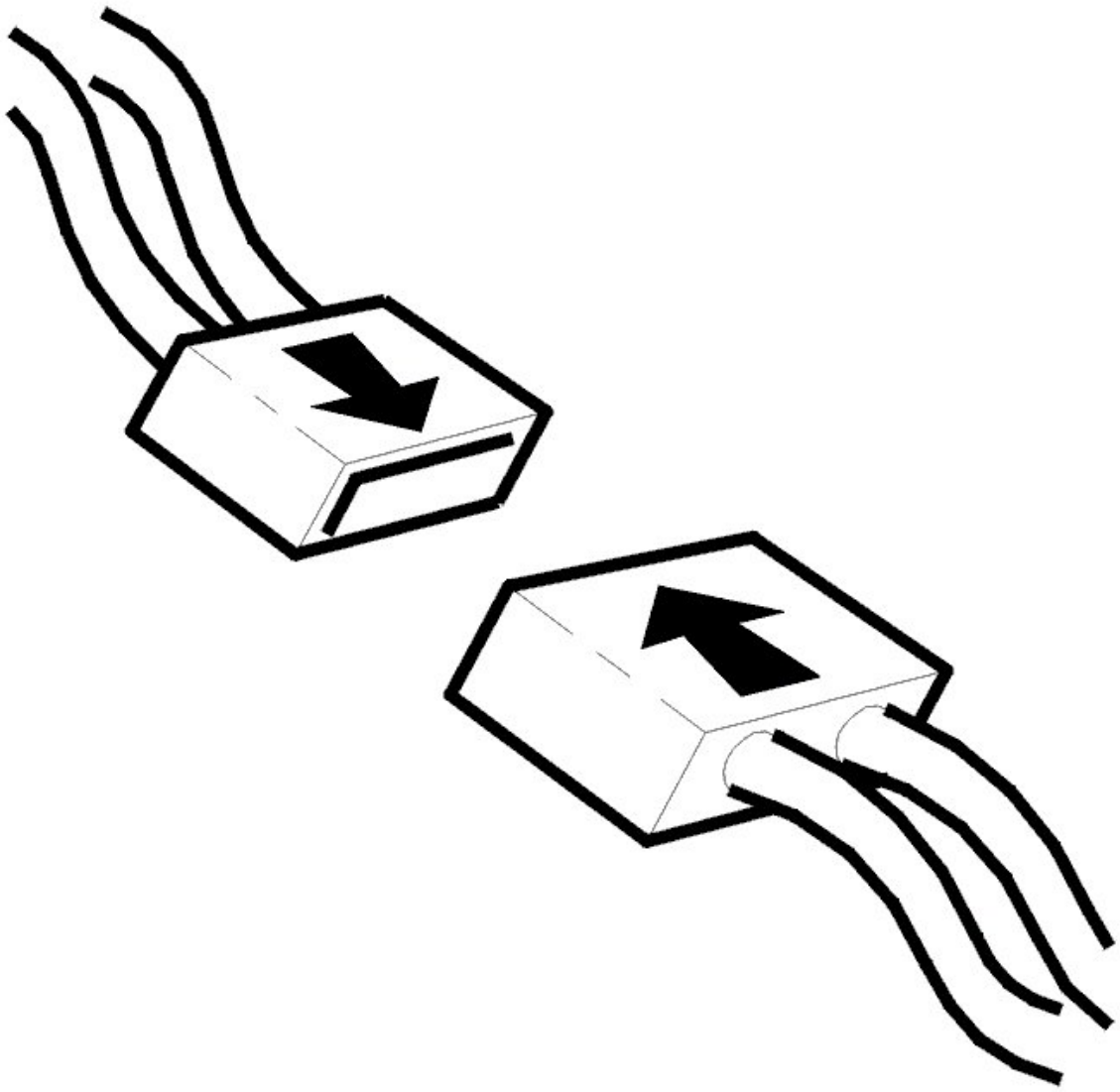
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the power supply to the sensors. The value must be approximately 5 V

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

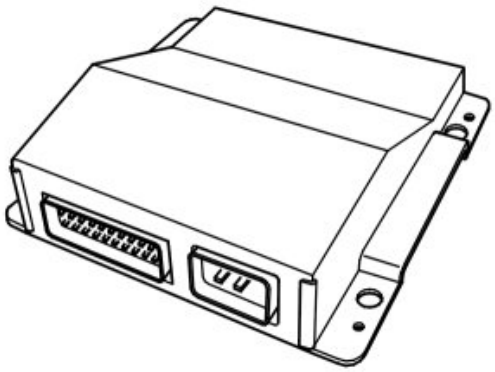
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking other diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The position sensor for the left rear suspension is powered from the Suspension Module (SUM). Diagnostic trouble code (DTC) SUM-0092 is stored if the control module detects that the power supply to the sensor is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0092: Position sensor for the rear suspension.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply to the sensor
- Open-circuit in the signal cable from the sensor
- Defective position sensor
- Defective control module.

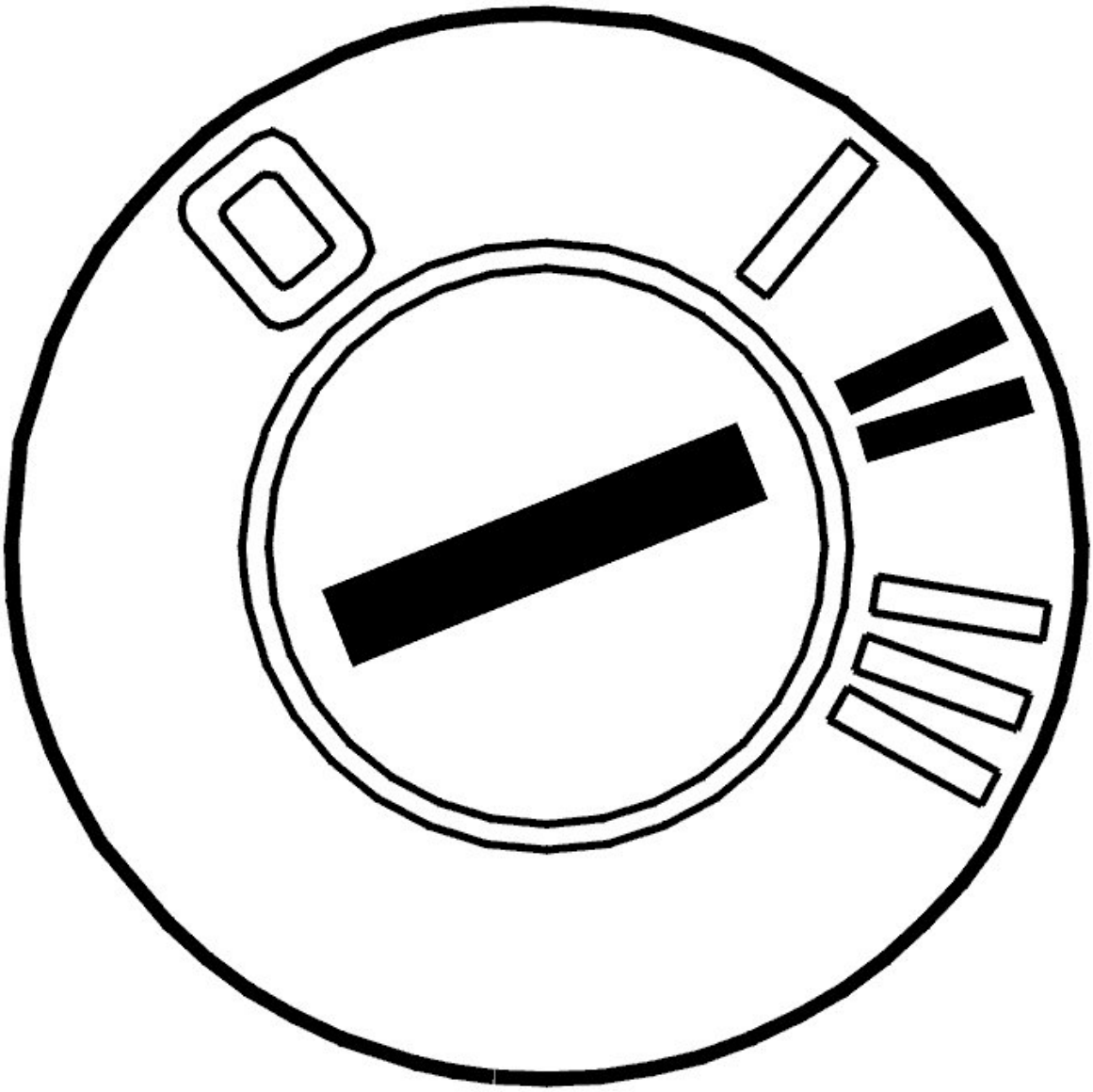
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking other diagnostic trouble codes (DTCs)



Note! The diagnostic trouble code (DTC) may be the result of a defective position sensor. If any diagnostic trouble code (DTC) is stored in the Suspension Module (SUM) for this sensor, this must be fault-traced first. Check that no diagnostic trouble code (DTC) is stored.

- Ignition on
- Read off diagnostic trouble codes (DTCs).

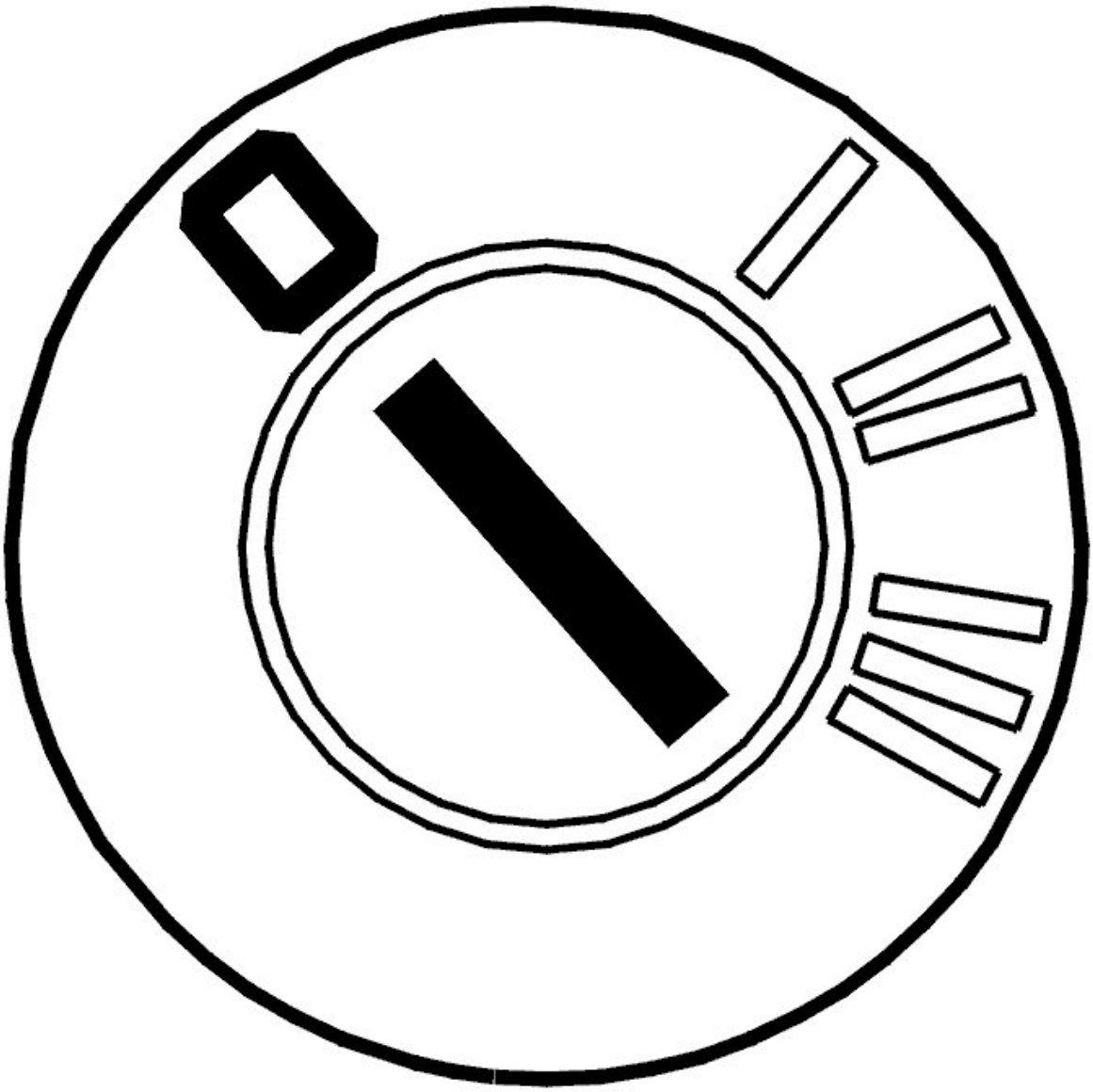
Any stored diagnostic trouble code (DTC) for the position sensor must be remedied and erased first.

Is there a diagnostic trouble code (DTC) stored for the position sensor?

Yes - No Fault Found

No - Checking components and wiring

Checking components and wiring



- Ignition off.

Check the connectors for the control module and sensors. Check for oxidation.

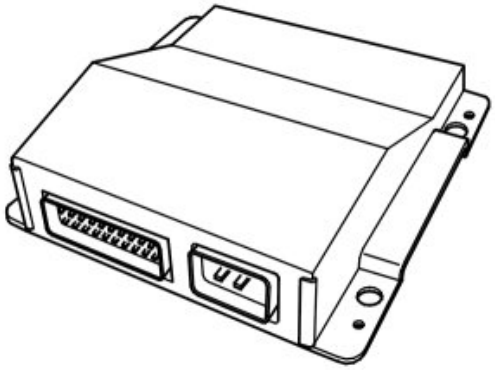
- Check the cable for power supply between control module terminal #A25 and the position sensors for the left rear suspension terminal #5. Check for a short-circuit to supply voltage.

Hint: The sensor is usually supplied with 5 V from control module terminal #25 when the ignition is on. There is no power supply if a diagnostic trouble code (DTC) is stored. Click on the VCT2000 symbol to activate the power supply. This will make fault-tracing easier.

Try a new control module if no fault is found in the wiring.
Remedy as necessary.

Other information:

- To access or replace the front bodywork acceleration sensor, see Acceleration sensor bodywork front (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Front (Four-C), Replacing
- To access or replace the rear bodywork acceleration sensor, see Acceleration sensor bodywork rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Acceleration Sensor/Service and Repair/Acceleration Sensor Bodywork Rear (Four-C), Replacing
- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



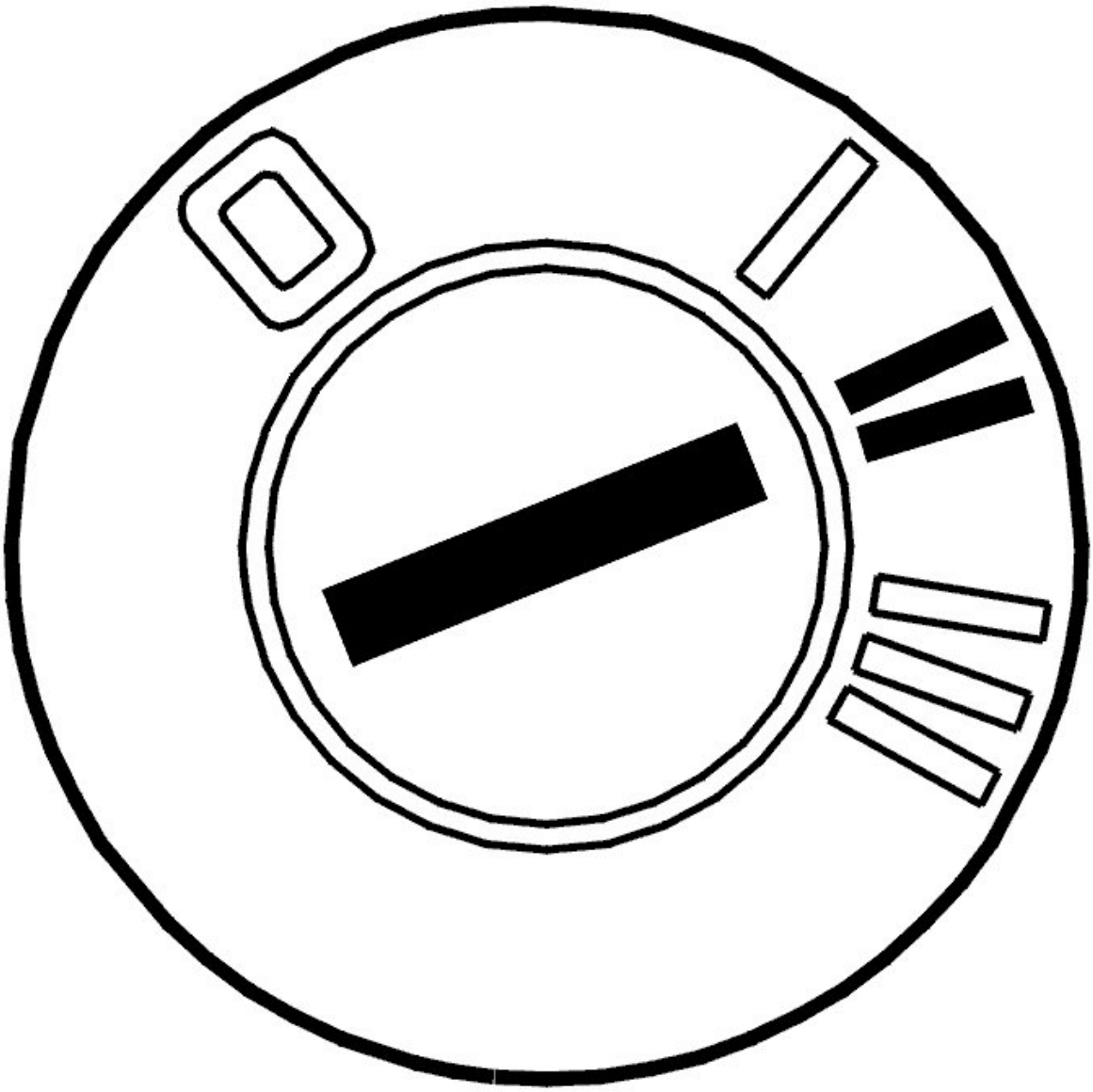
Continue - Verification

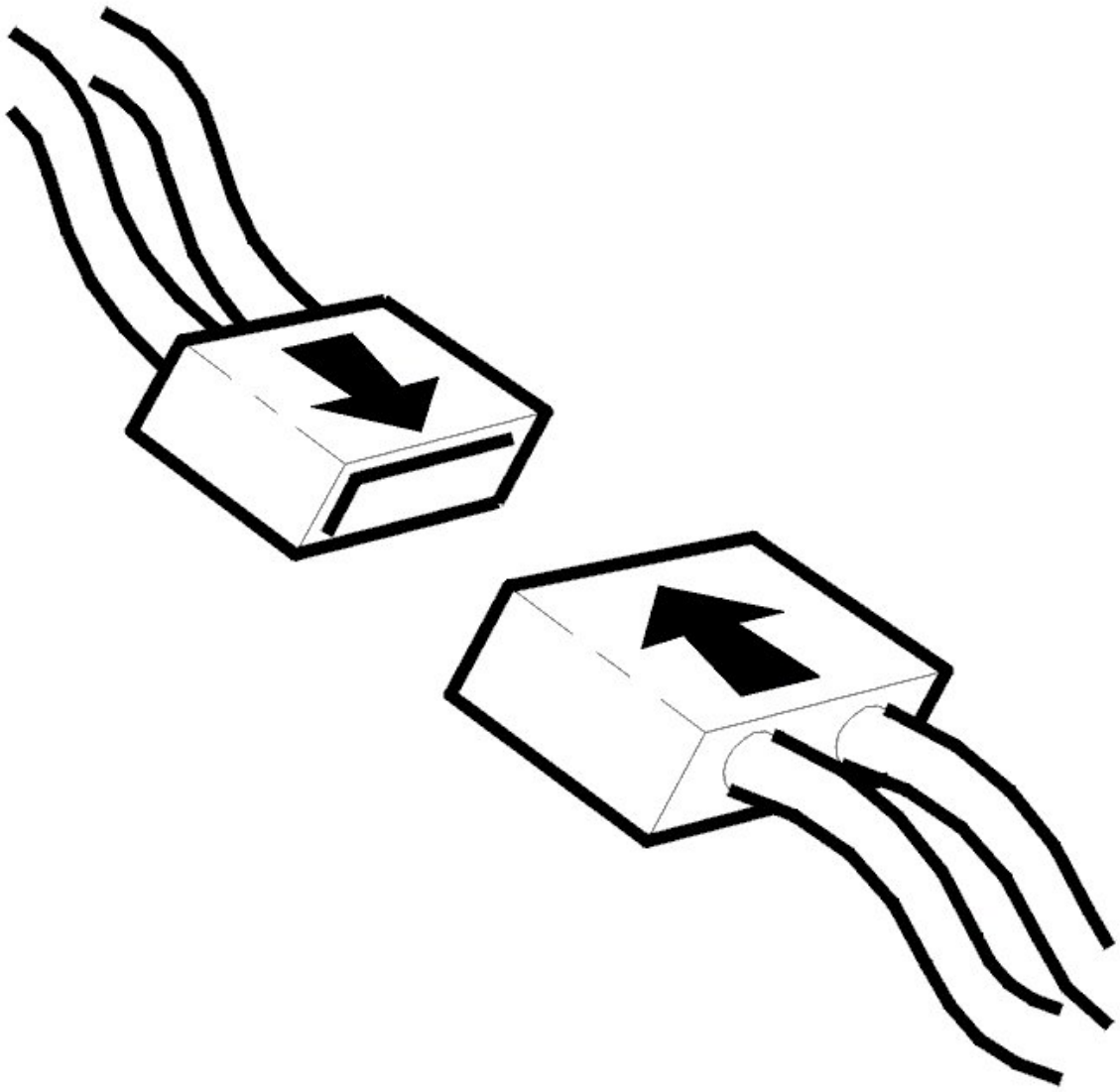
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Click on the VCT2000 symbol to read off the present value of the power supply to the sensors. The value must be approximately 5 V

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

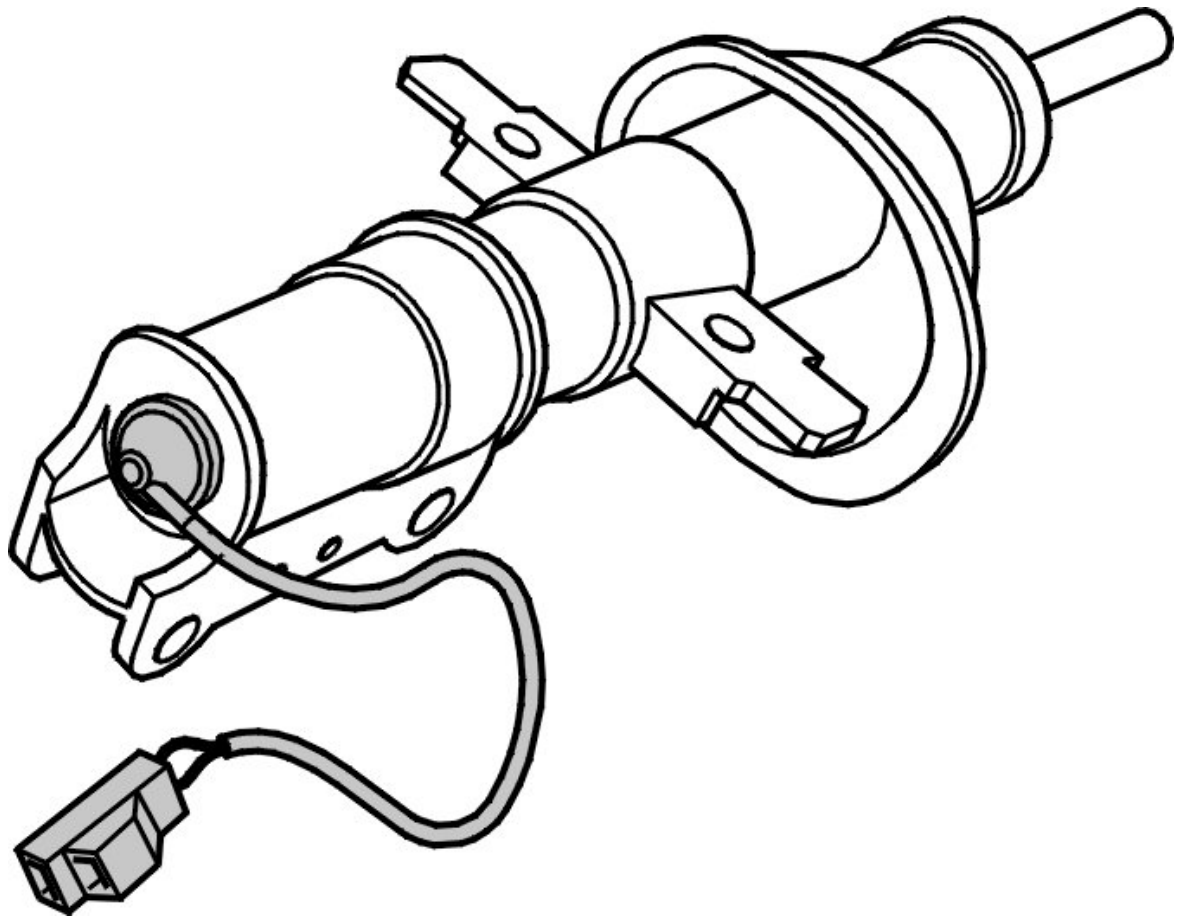
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking other diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0111: Solenoid, left front
- SUM-0121: Solenoid, right front
- SUM-0131: Solenoid, left rear
- SUM-0141: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

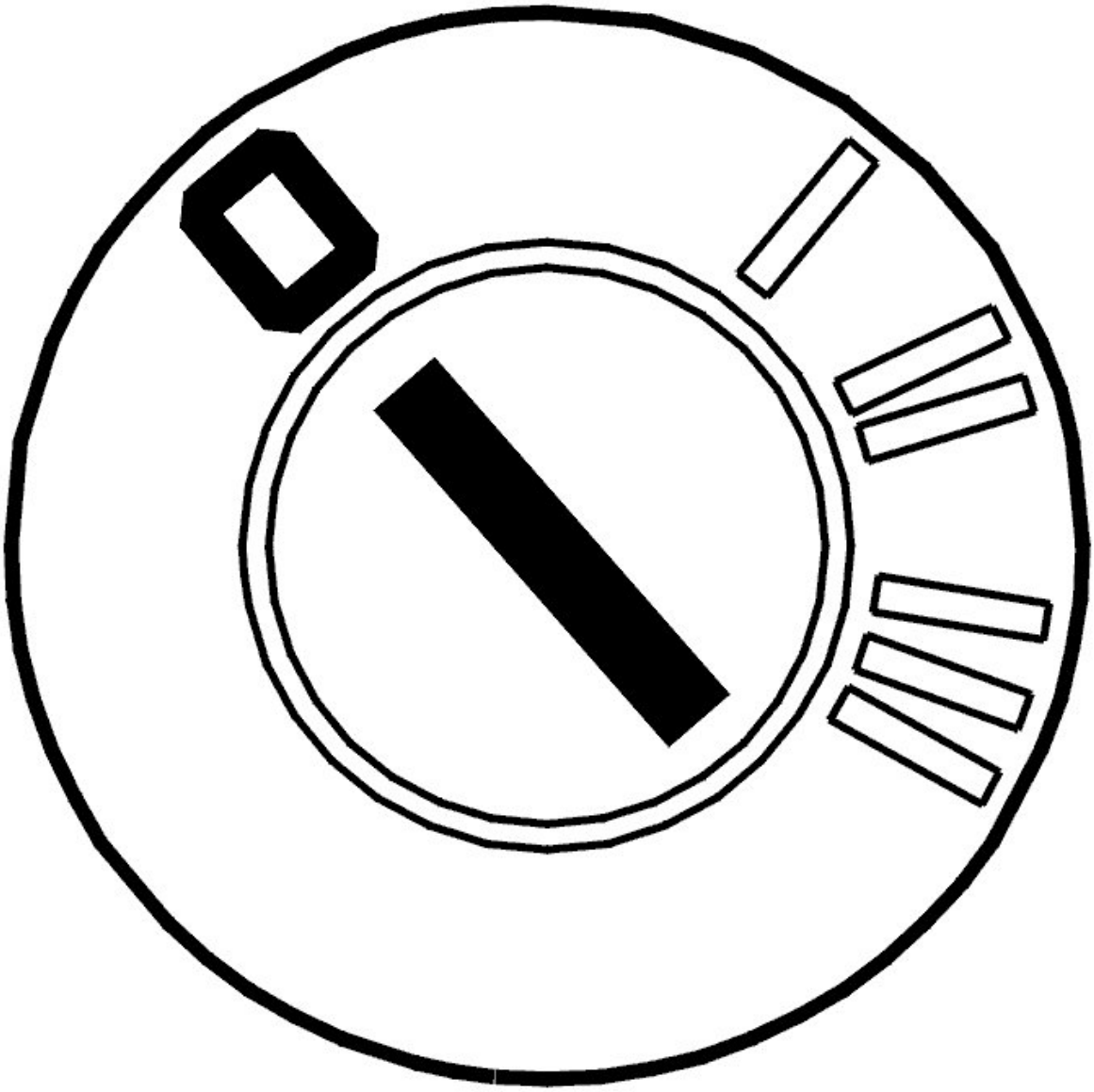
Possible source
- Contact resistance in the terminals
- Short-circuit to ground in the power supply to the solenoid
- Damaged solenoid.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too Low

Signal too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0111, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0121, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0131, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to ground.

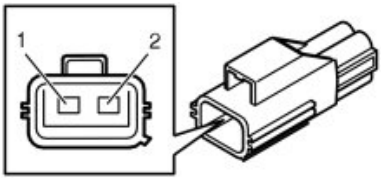
For diagnostic trouble code (DTC) SUM-0141, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to ground.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

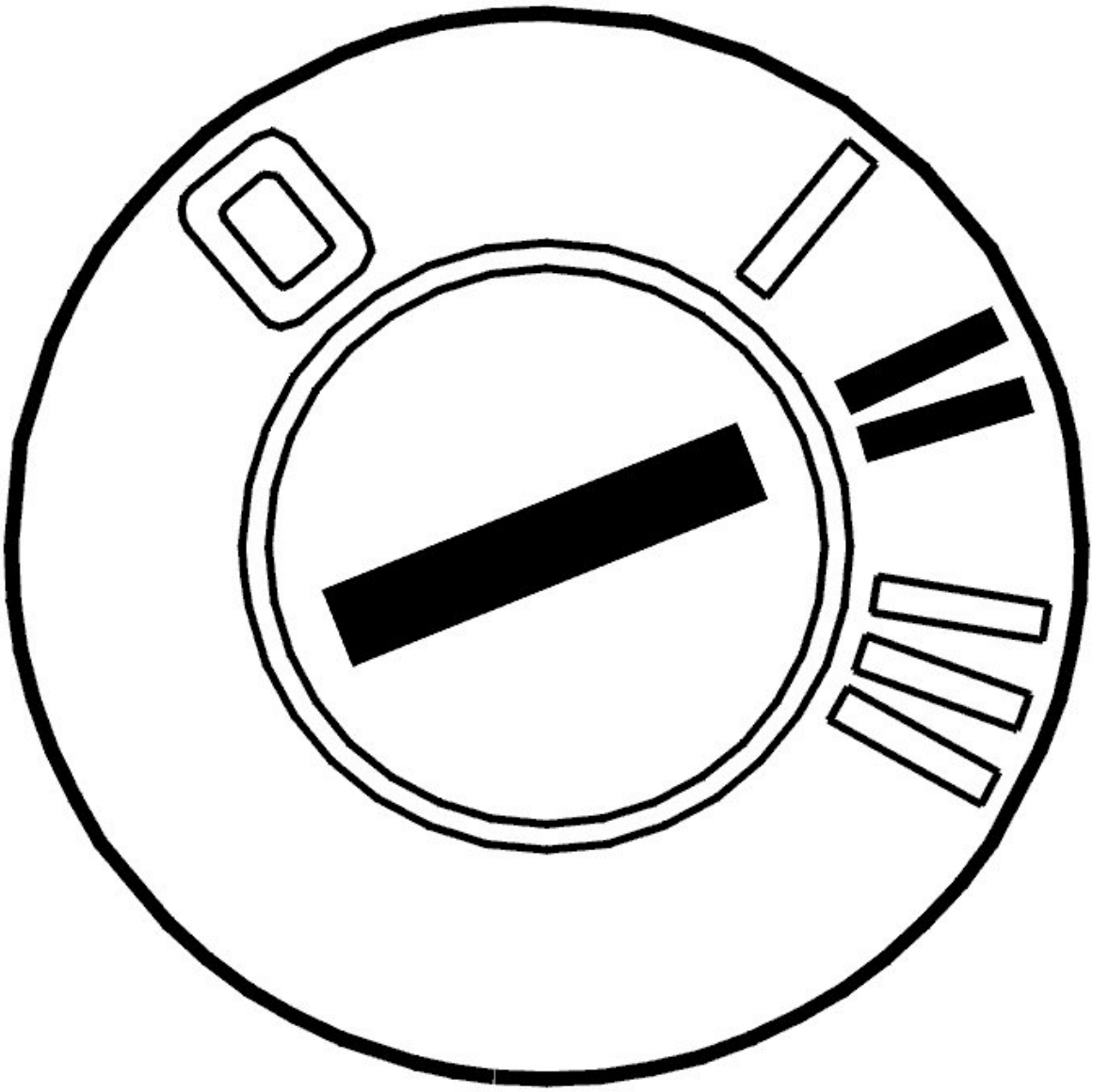
Verification

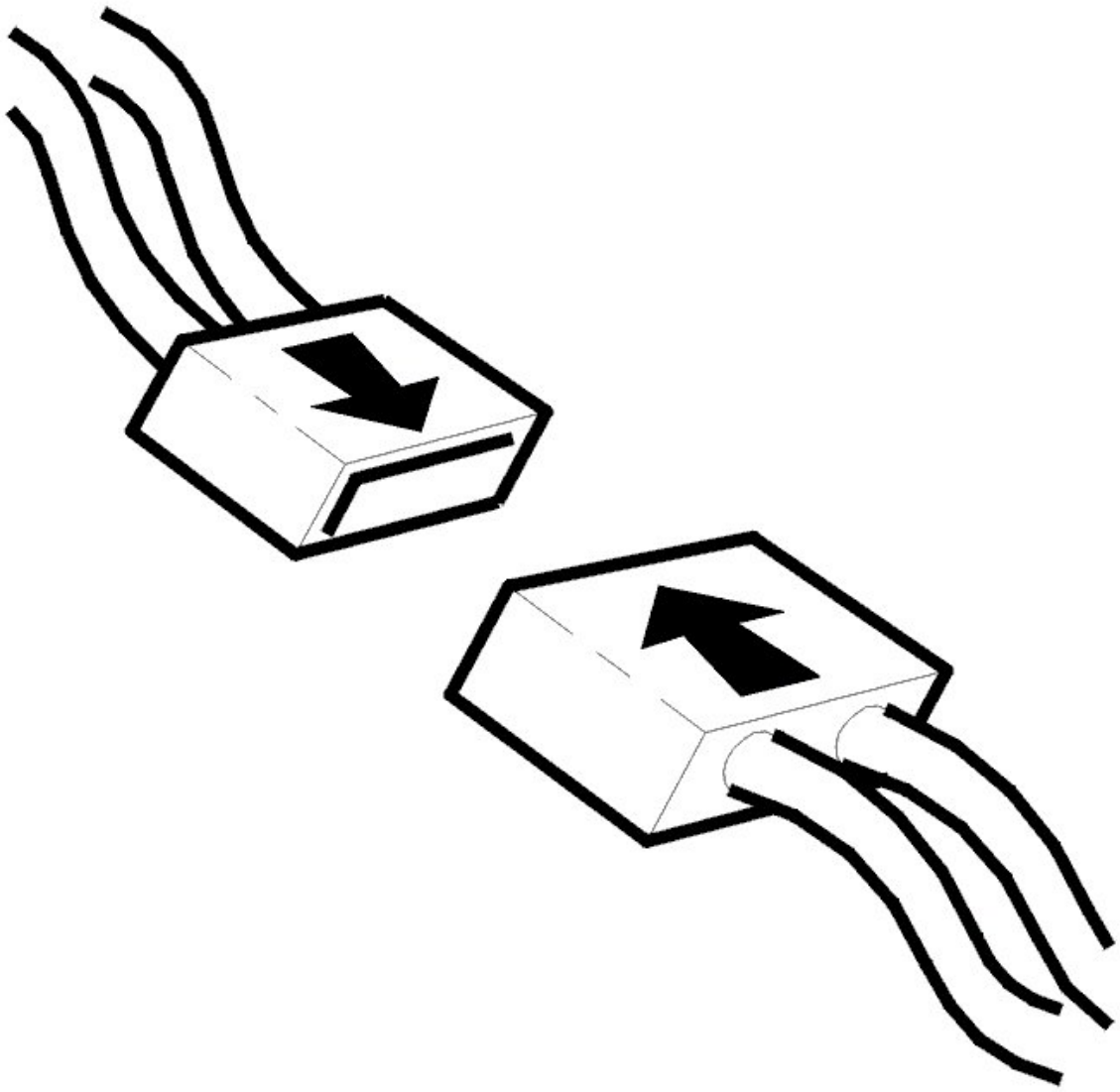
Verification

Verification

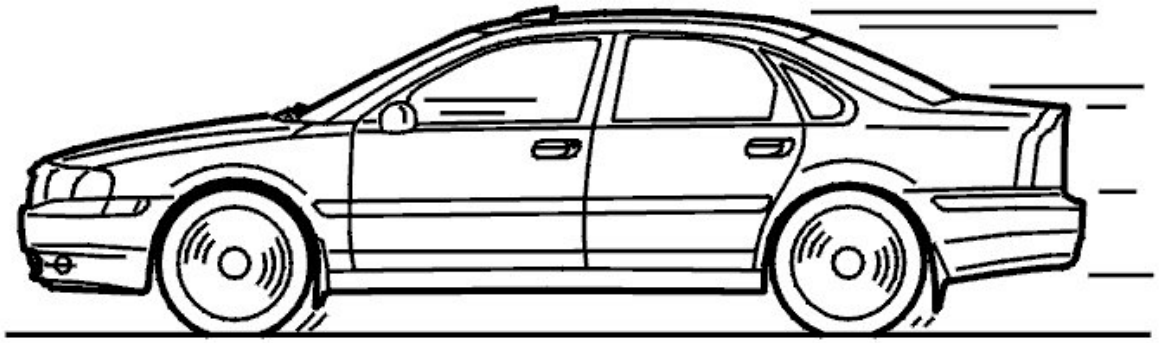
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

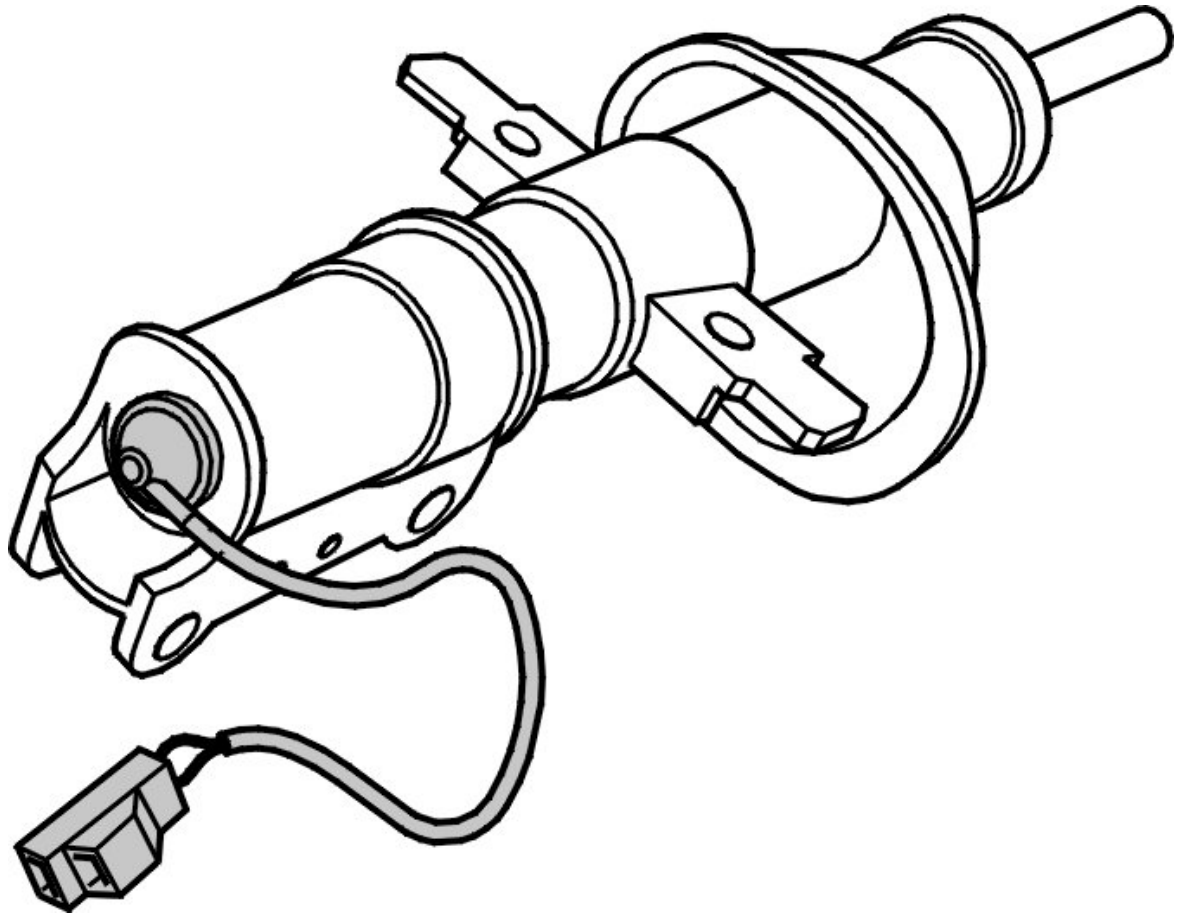
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0112: Solenoid, left front
- SUM-0122: Solenoid, right front
- SUM-0132: Solenoid, left rear
- SUM-0142: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable or power supply cable
- Damaged solenoid.

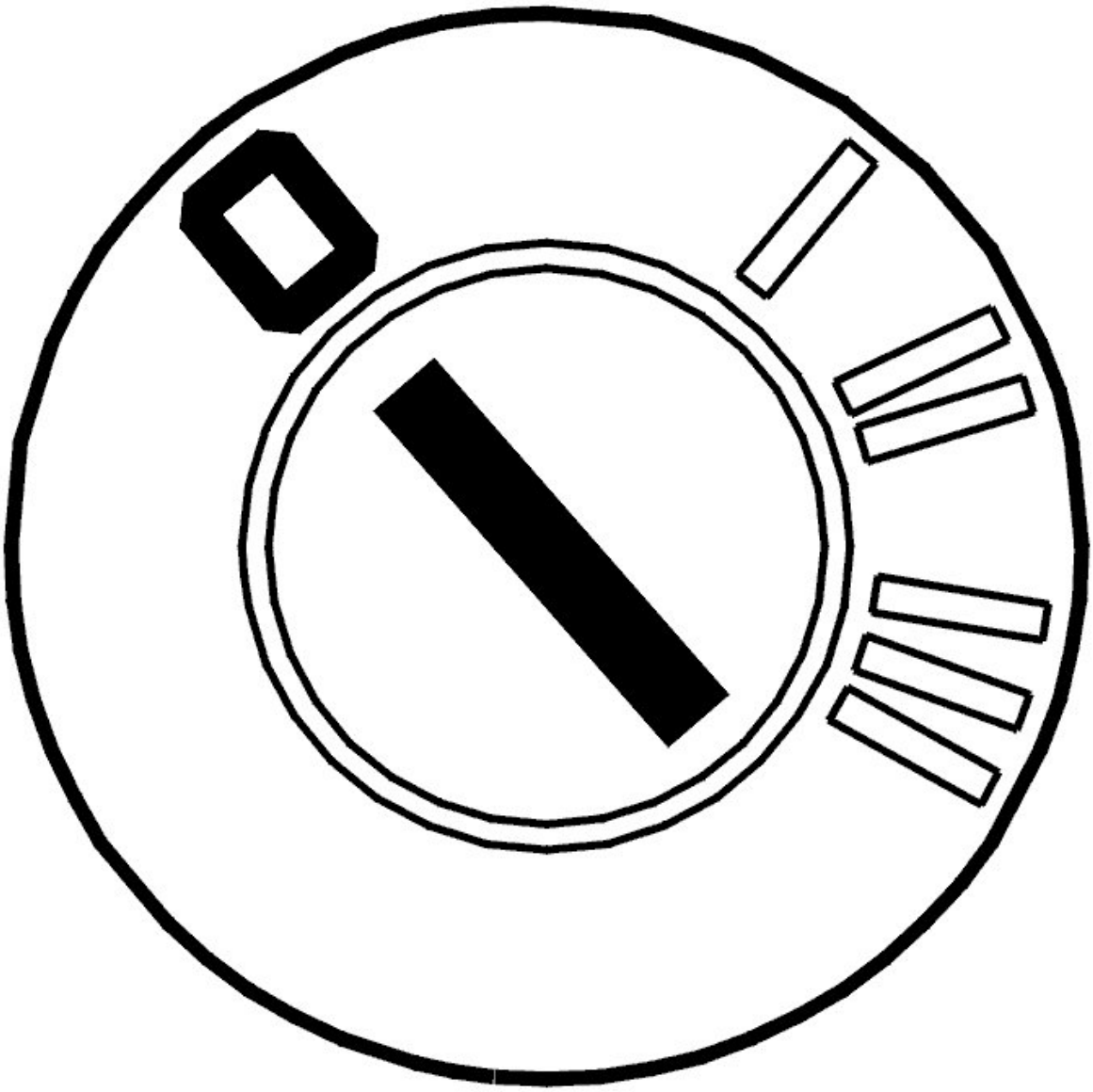
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

For diagnostic trouble code (DTC) SUM-0112, front left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0122, front right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0132, rear left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0142, rear right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage.

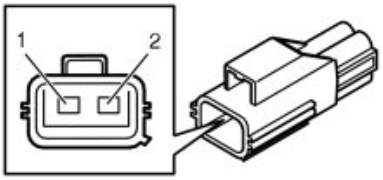
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and

Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

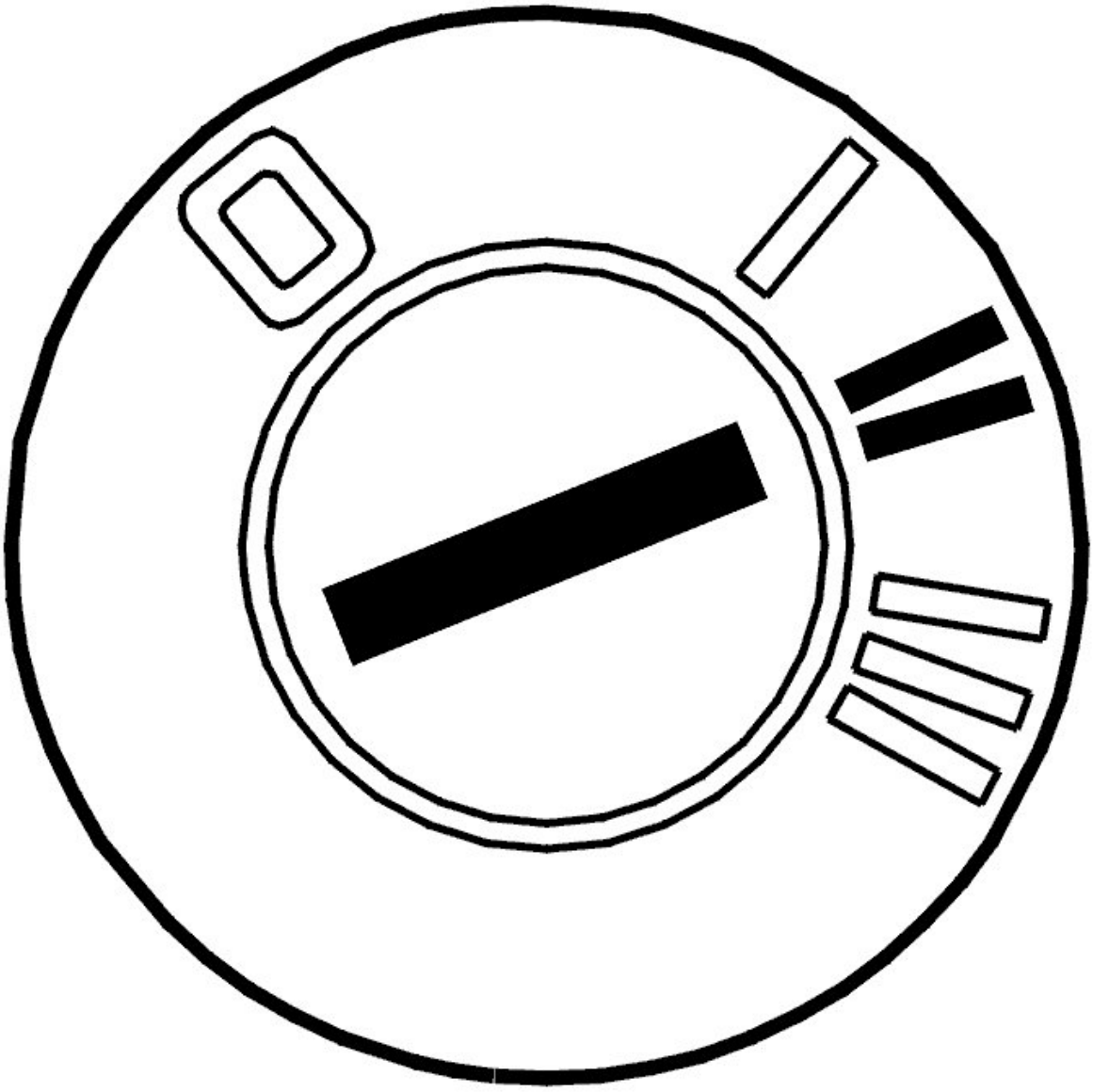
Verification

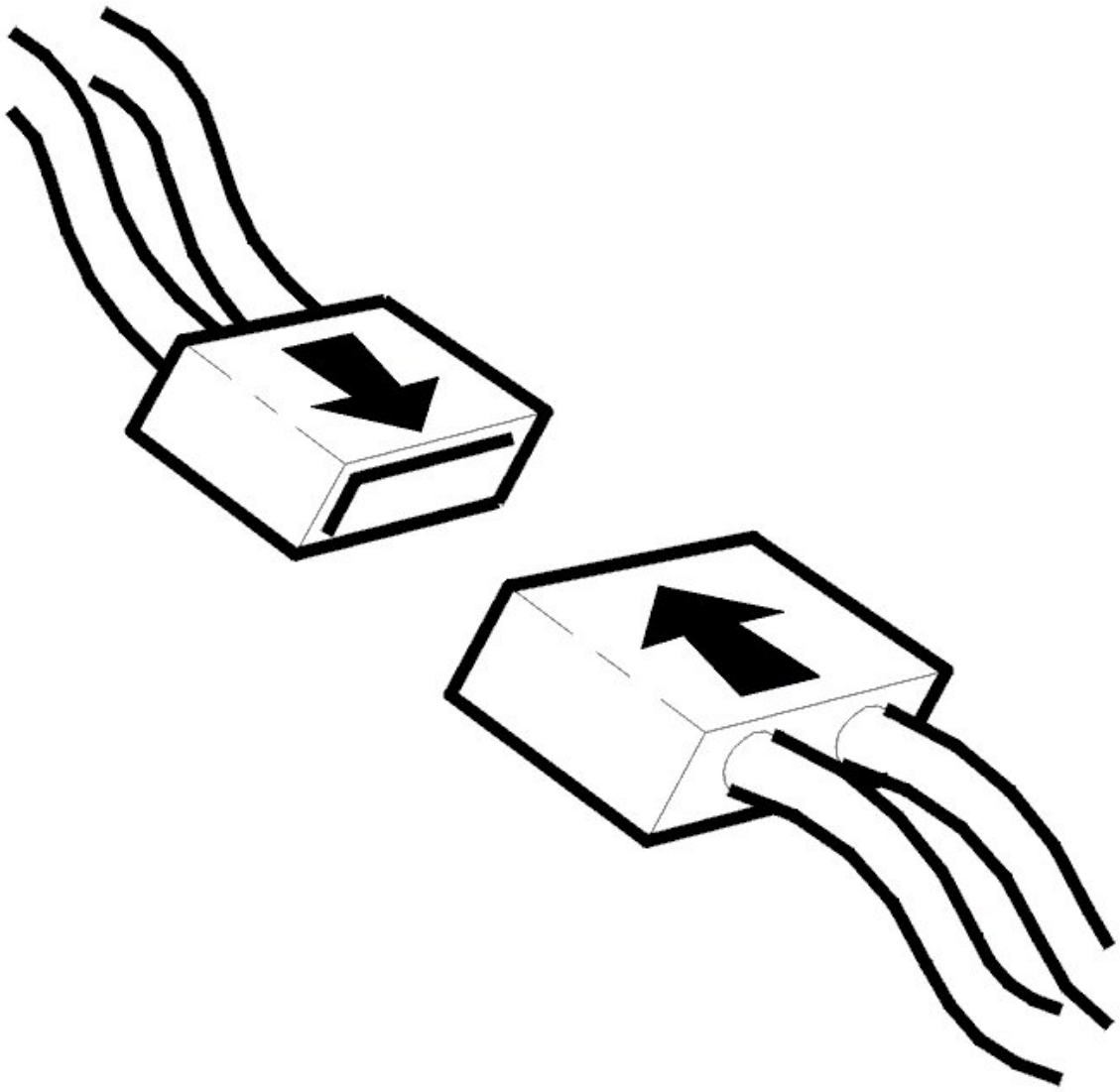
Verification

Verification

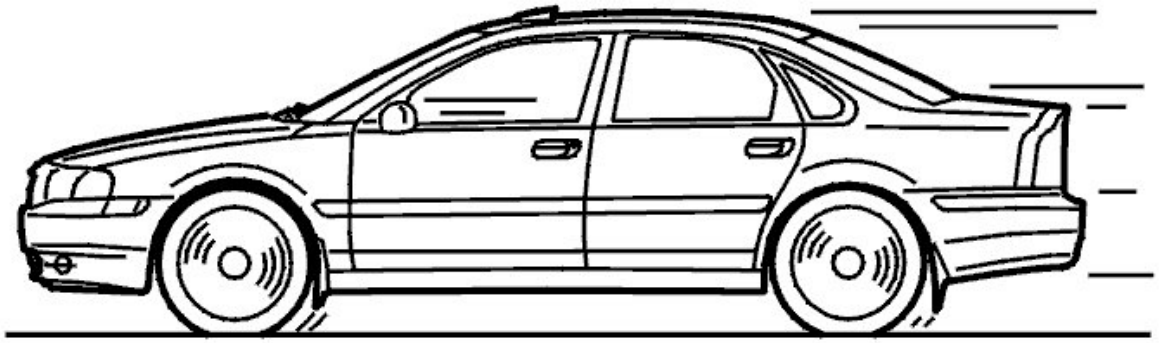
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

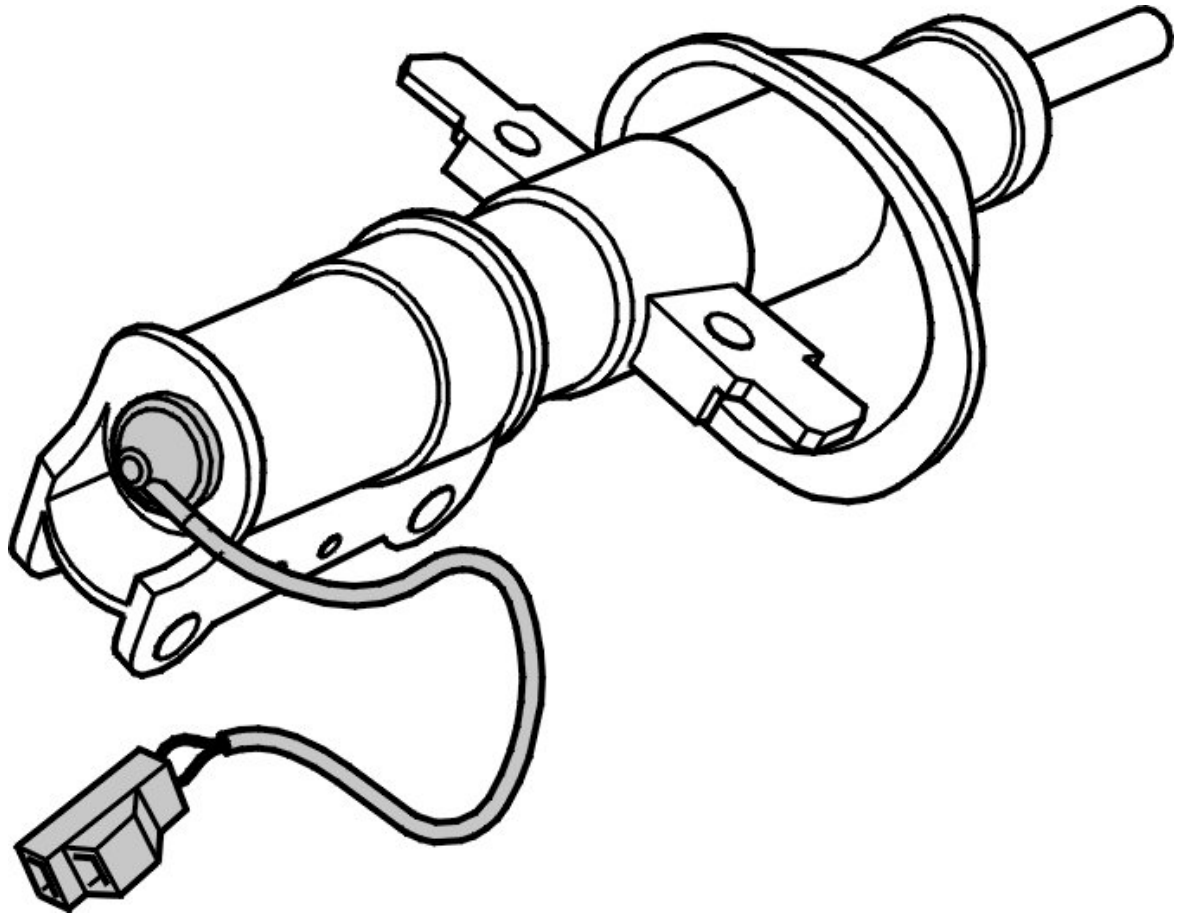
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is missing. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0113: Solenoid, left front
- SUM-0123: Solenoid, right front
- SUM-0133: Solenoid, left rear
- SUM-0143: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance or loose connections in the terminals
- Open-circuit in the power supply to the solenoid
- Open-circuit in the signal cable
- Damaged solenoid.

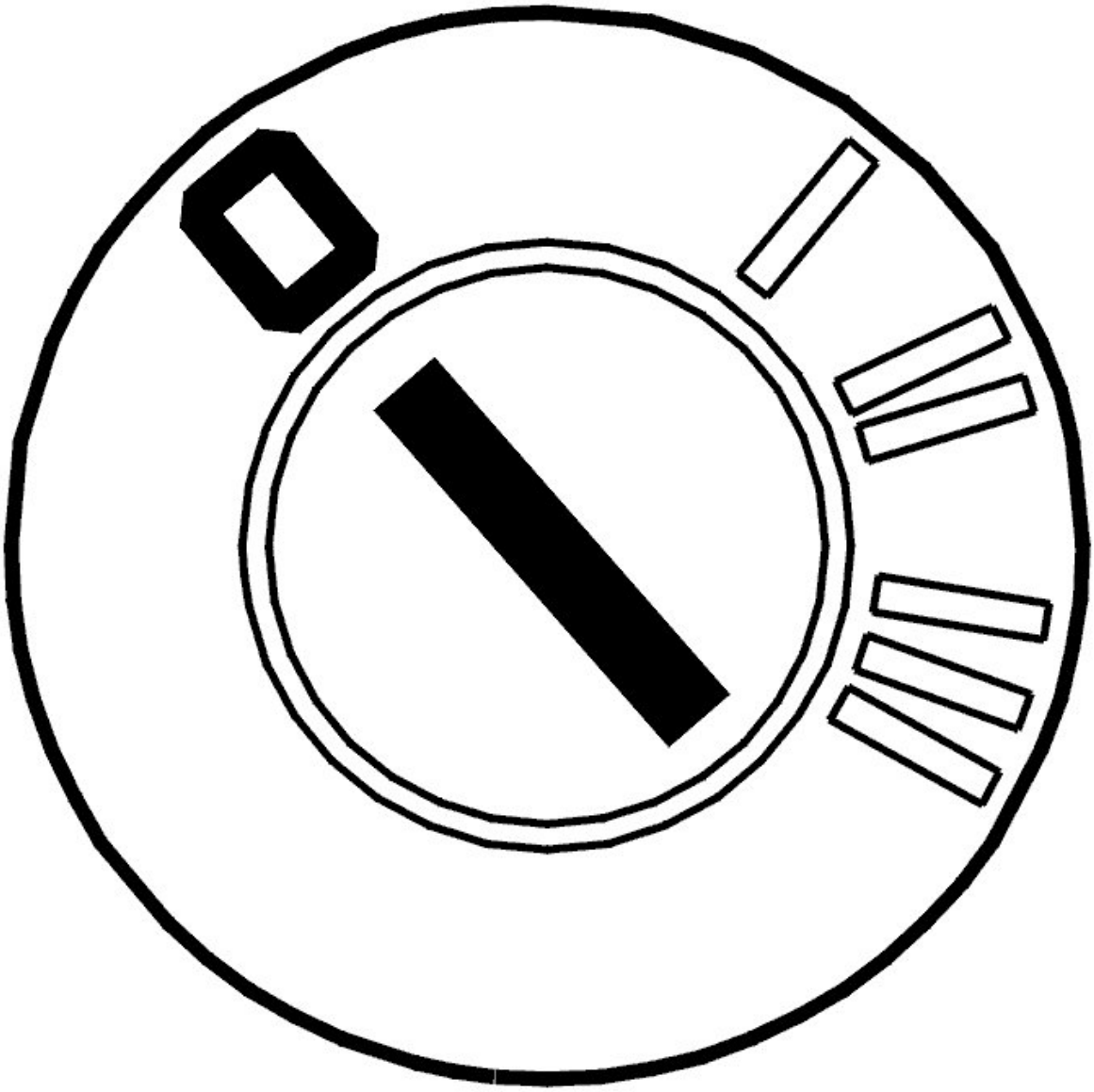
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Missing

Signal missing

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the suspension module (SUM) and the solenoids. Check for oxidation. Check for loose connections.

For diagnostic trouble code (DTC) SUM-0113, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0123, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A8 and solenoid terminal #2. Check for an open-circuit.

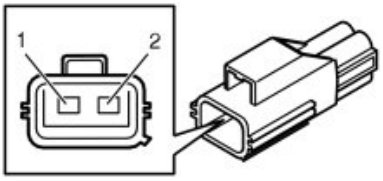
For diagnostic trouble code (DTC) SUM-0133, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A1 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0143, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A4 and solenoid terminal #2. Check for an open-circuit.

Remedy as necessary.

Other information:
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

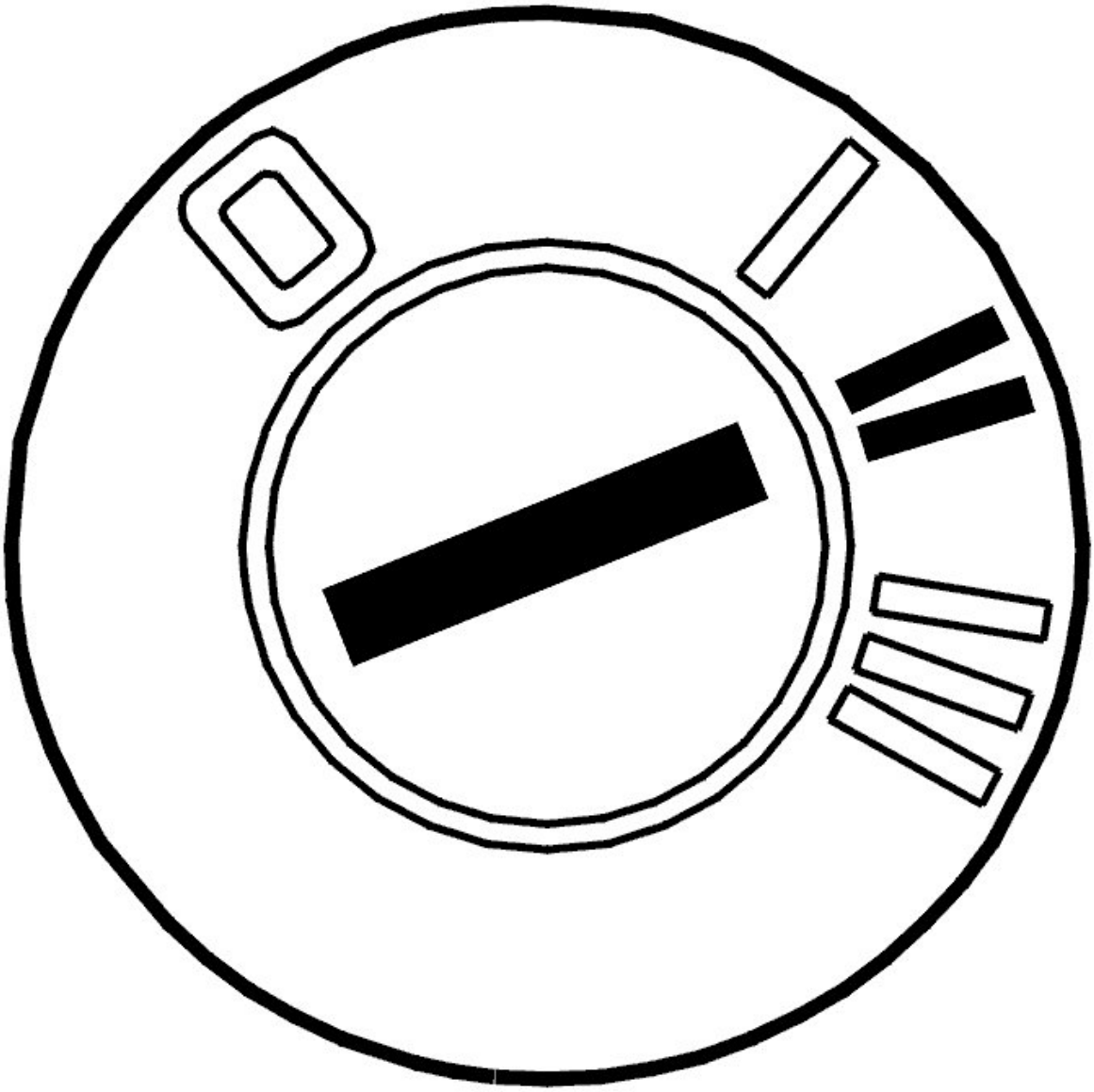
Verification

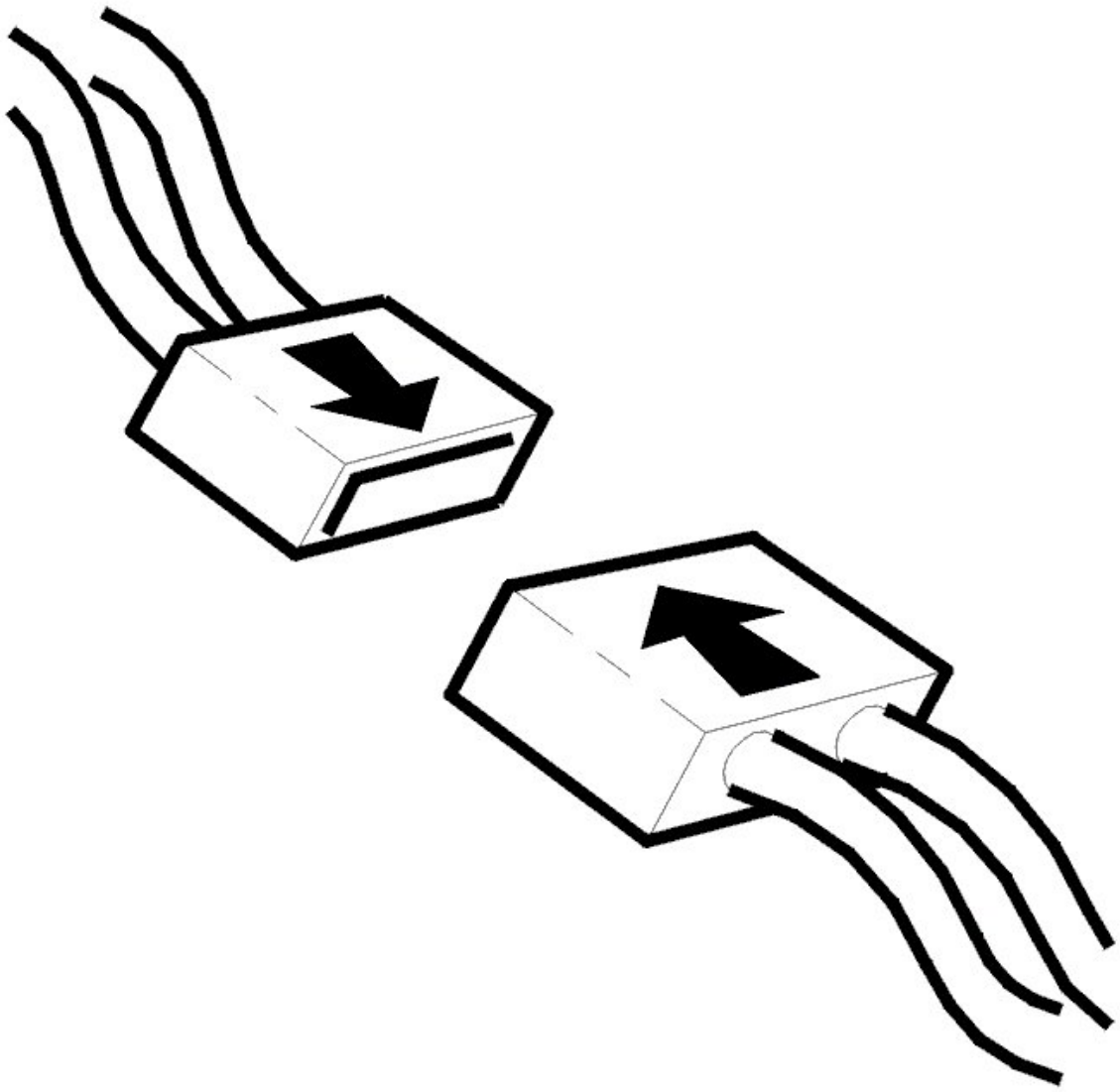
Verification

Verification

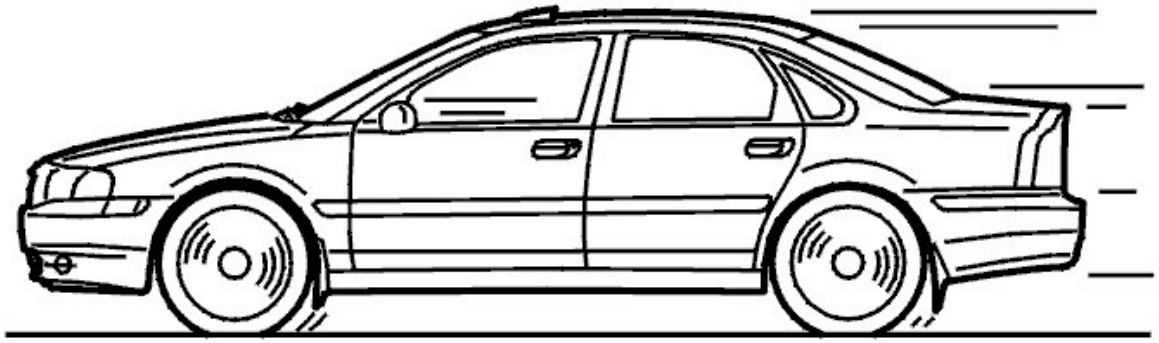
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

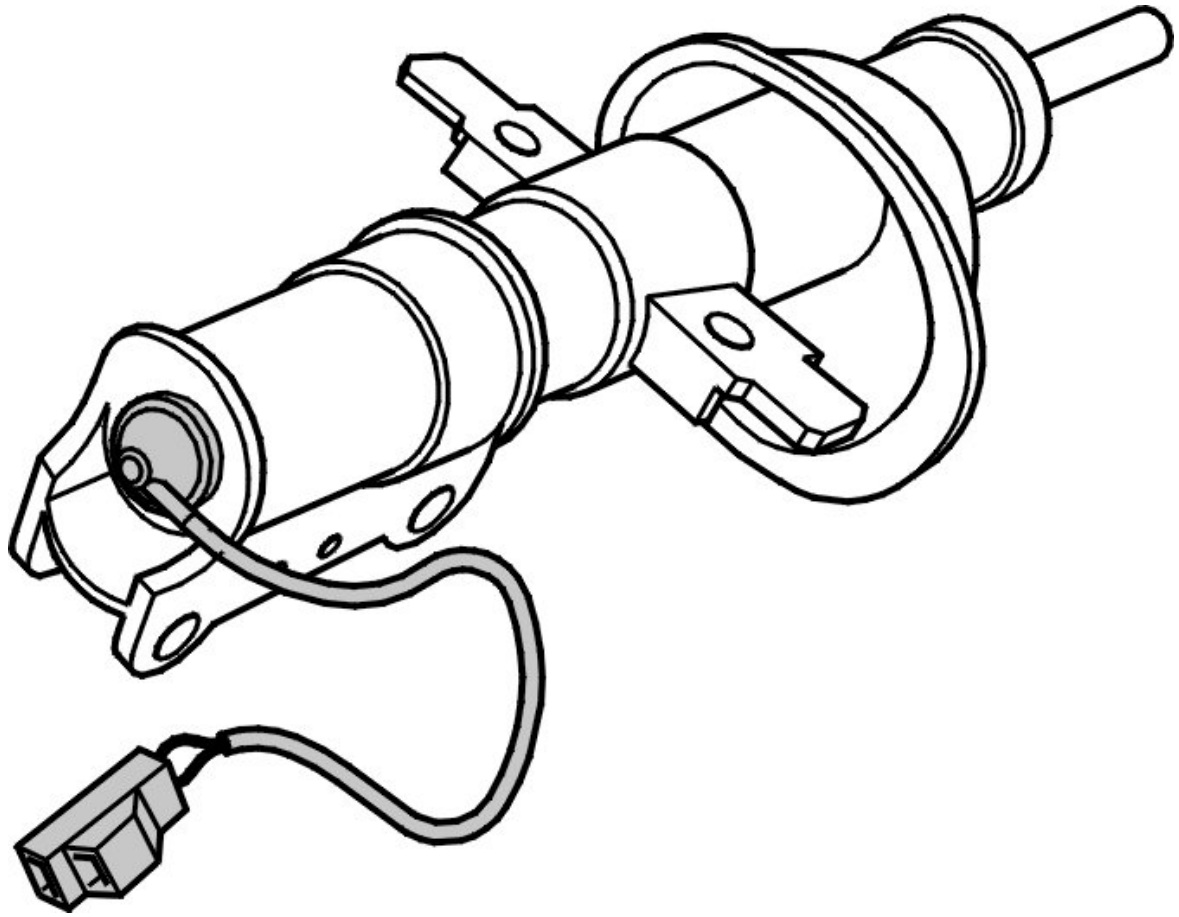
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0115, SUM-00125, SUM-0135 or SUM-0145 is stored if the control module registers that the current from one of the solenoids is too low when the ignition is switched on.

- SUM-0115: Solenoid, left front
- SUM-0125: Solenoid, right front
- SUM-0135: Solenoid, left rear
- SUM-0145: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Open-circuit in the power supply cable to the solenoid
- Open-circuit or short-circuit to ground in the signal cable from the solenoid
- Defective solenoid.

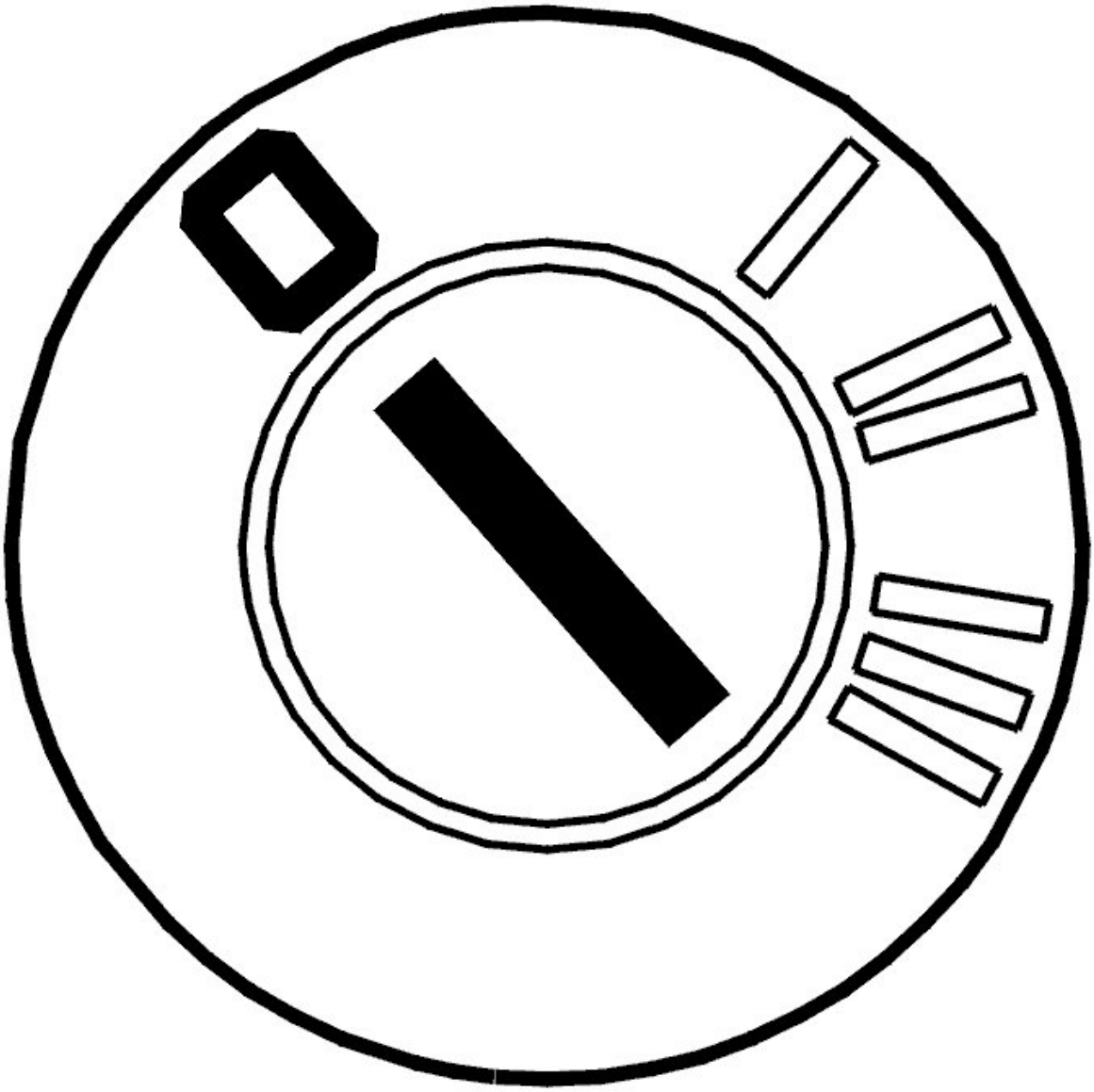
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too Low

Current too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0115, front left solenoid:

- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0125, front right solenoid:

- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0135, rear left solenoid:

- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0145, rear right solenoid:

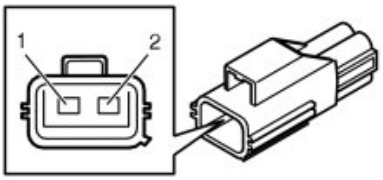
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

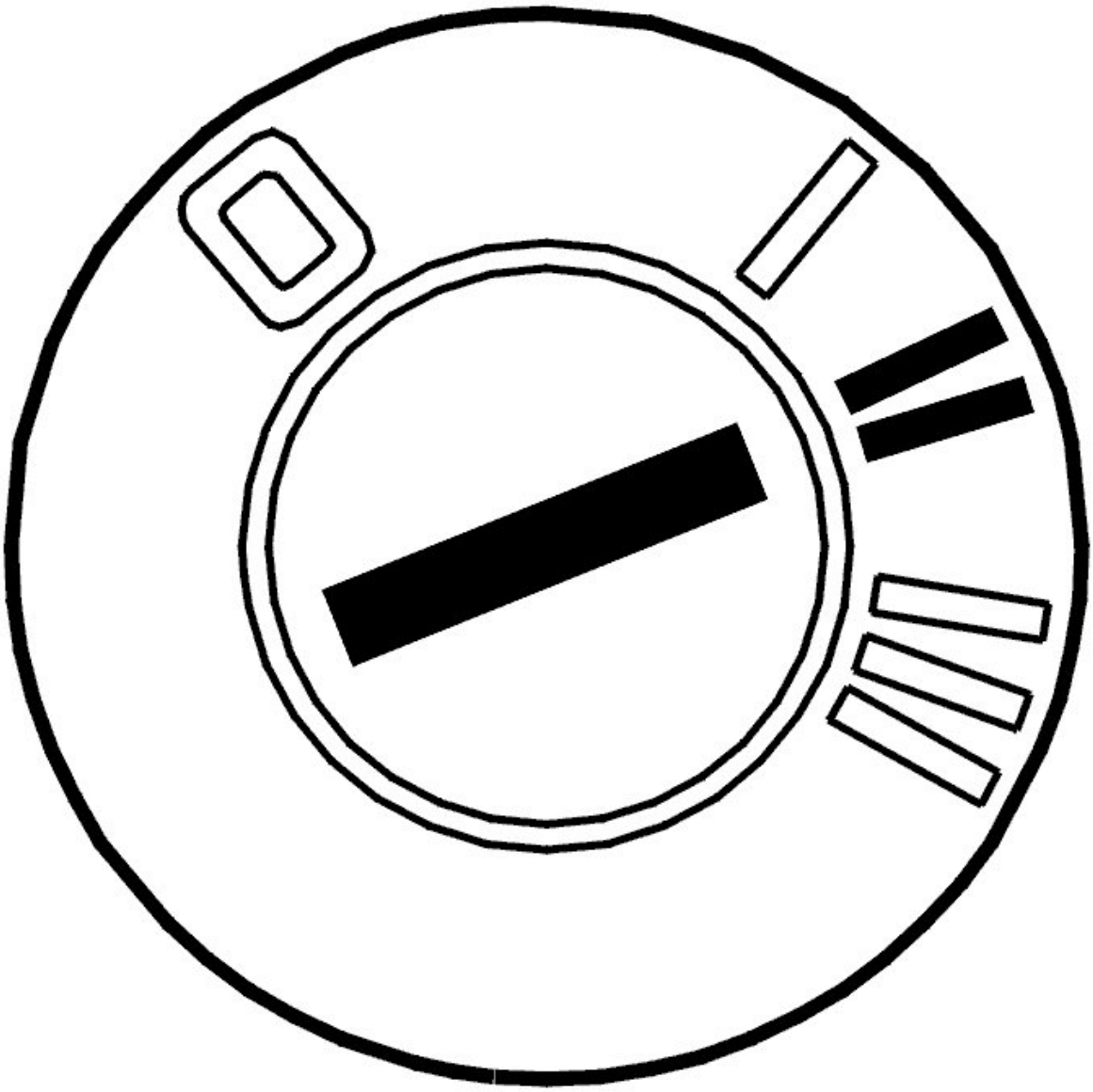
Verification

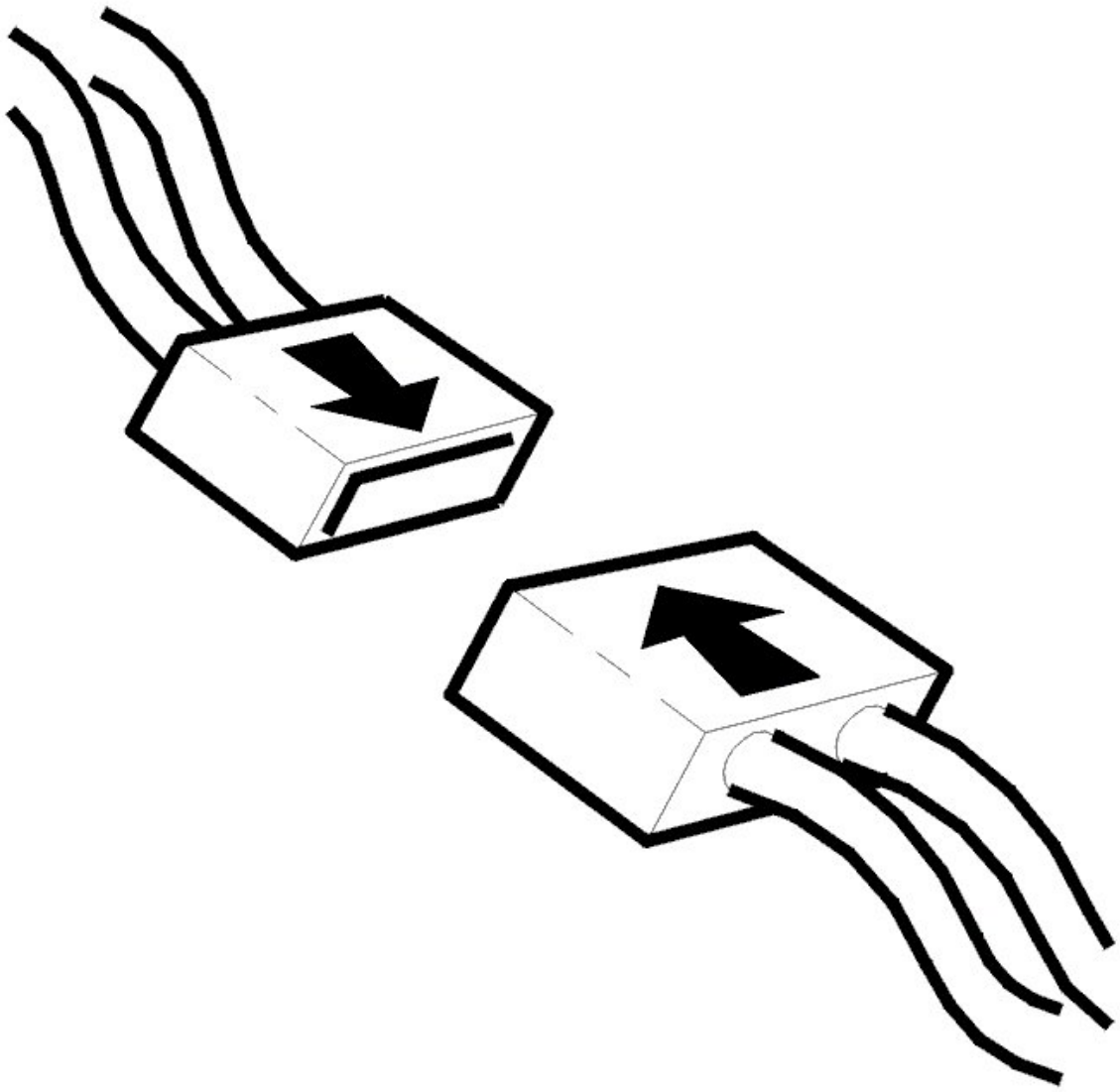
Verification

Verification

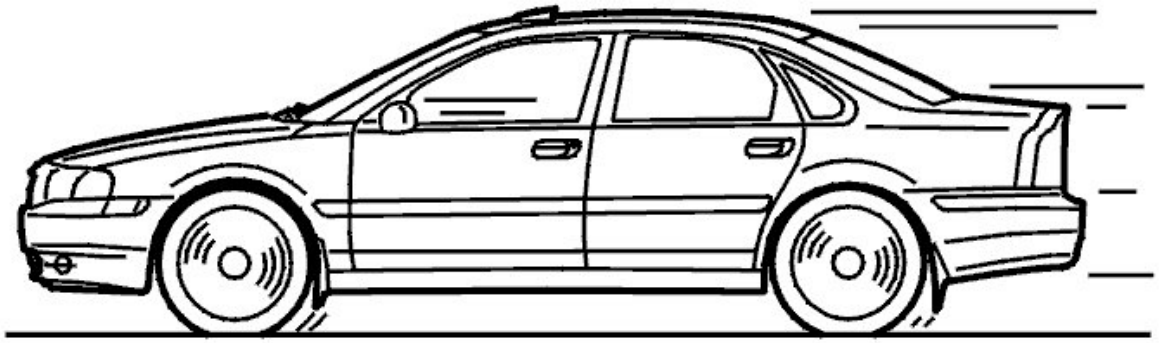
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

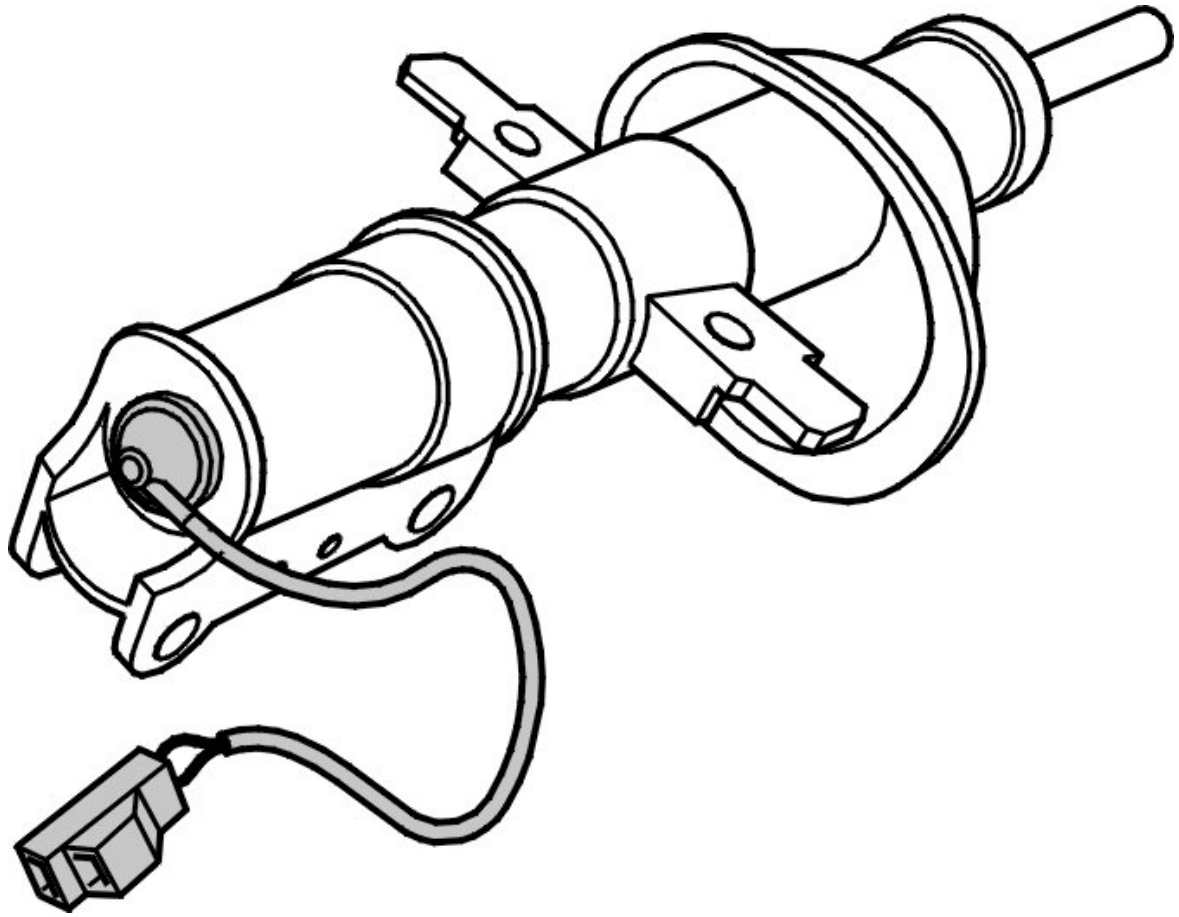
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0116, 0126, 0136 or SUM-0146 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0116: Solenoid, left front
- SUM-0126: Solenoid, right front
- SUM-0136: Solenoid, left rear
- SUM-0146: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply cable for the solenoid
- Defective solenoid.

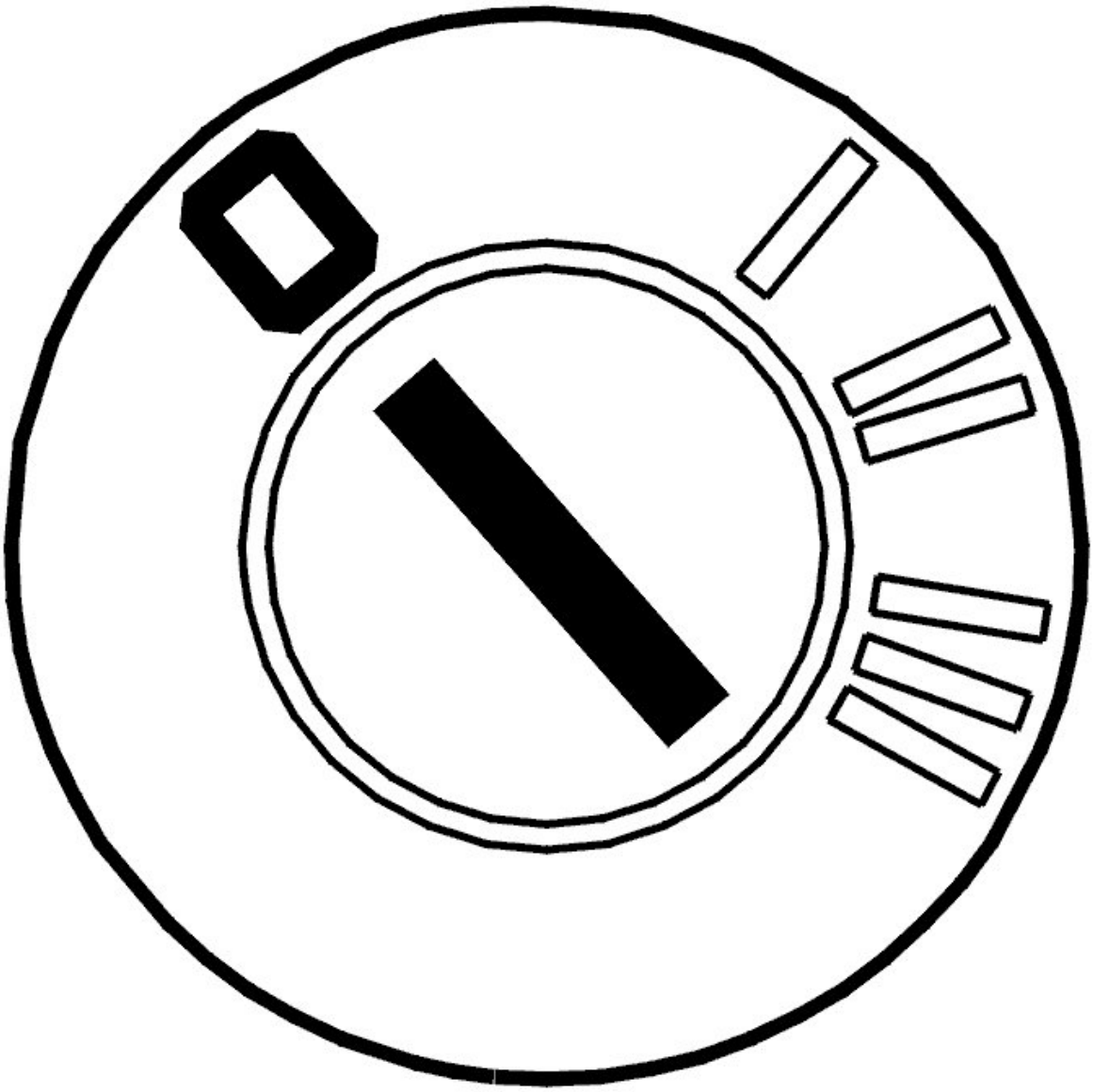
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0116, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0126, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0136, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0146, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

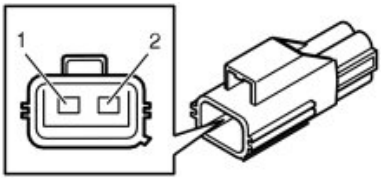
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

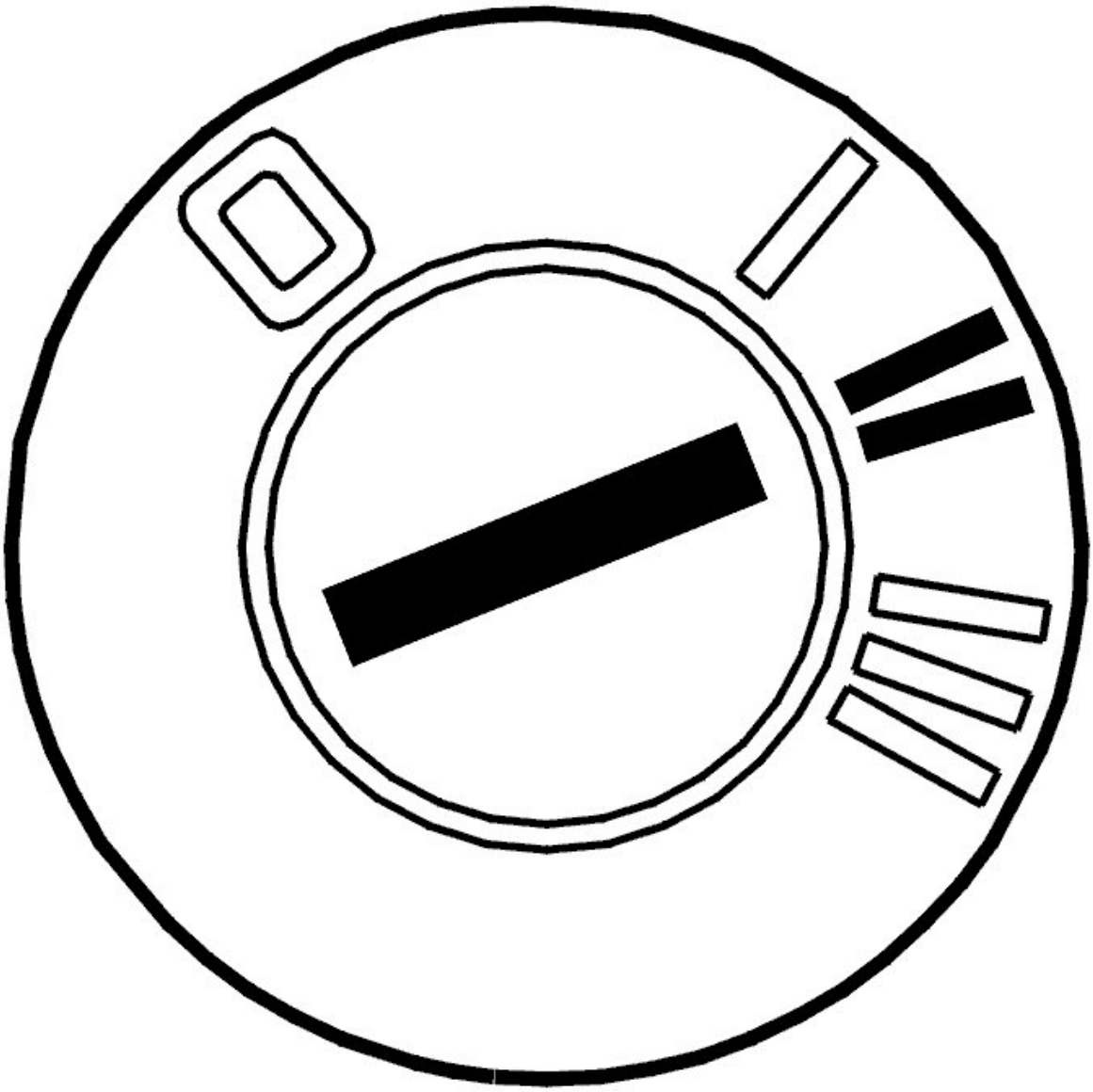
Verification

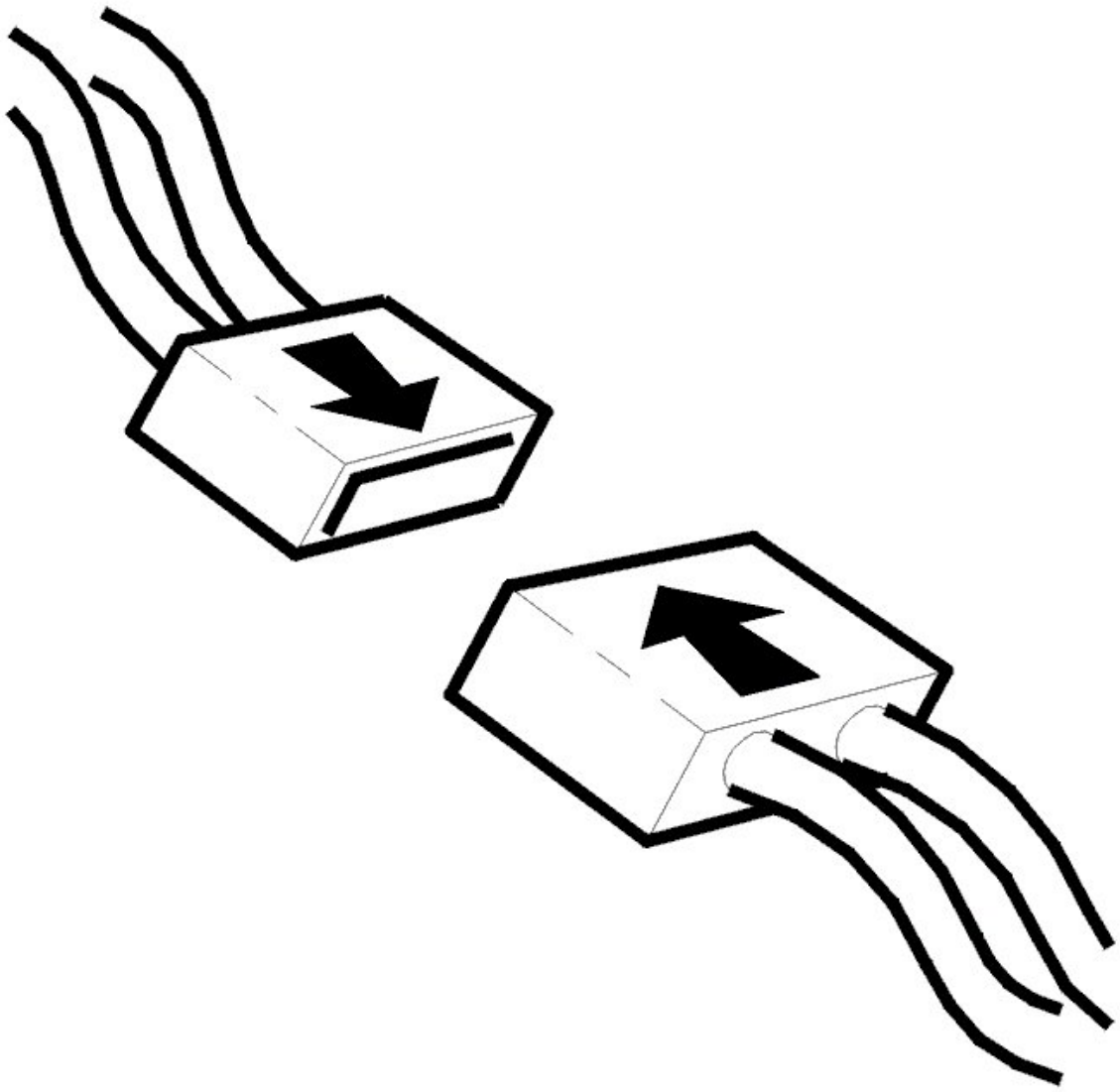
Verification

Verification

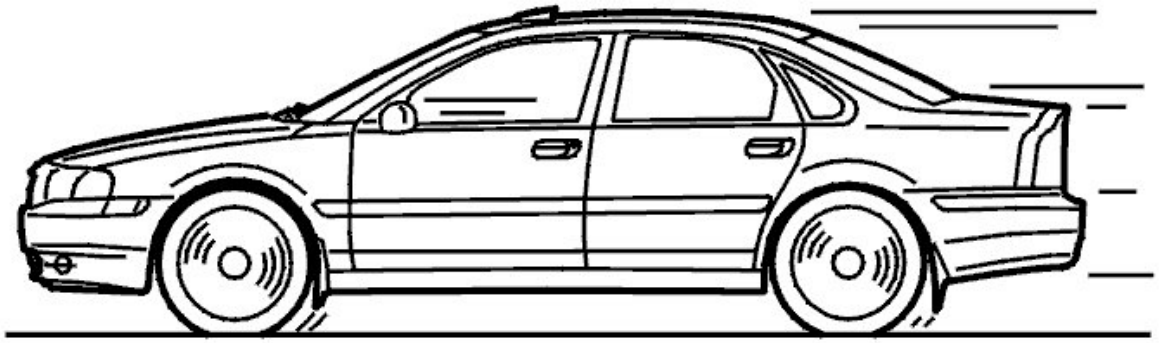
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

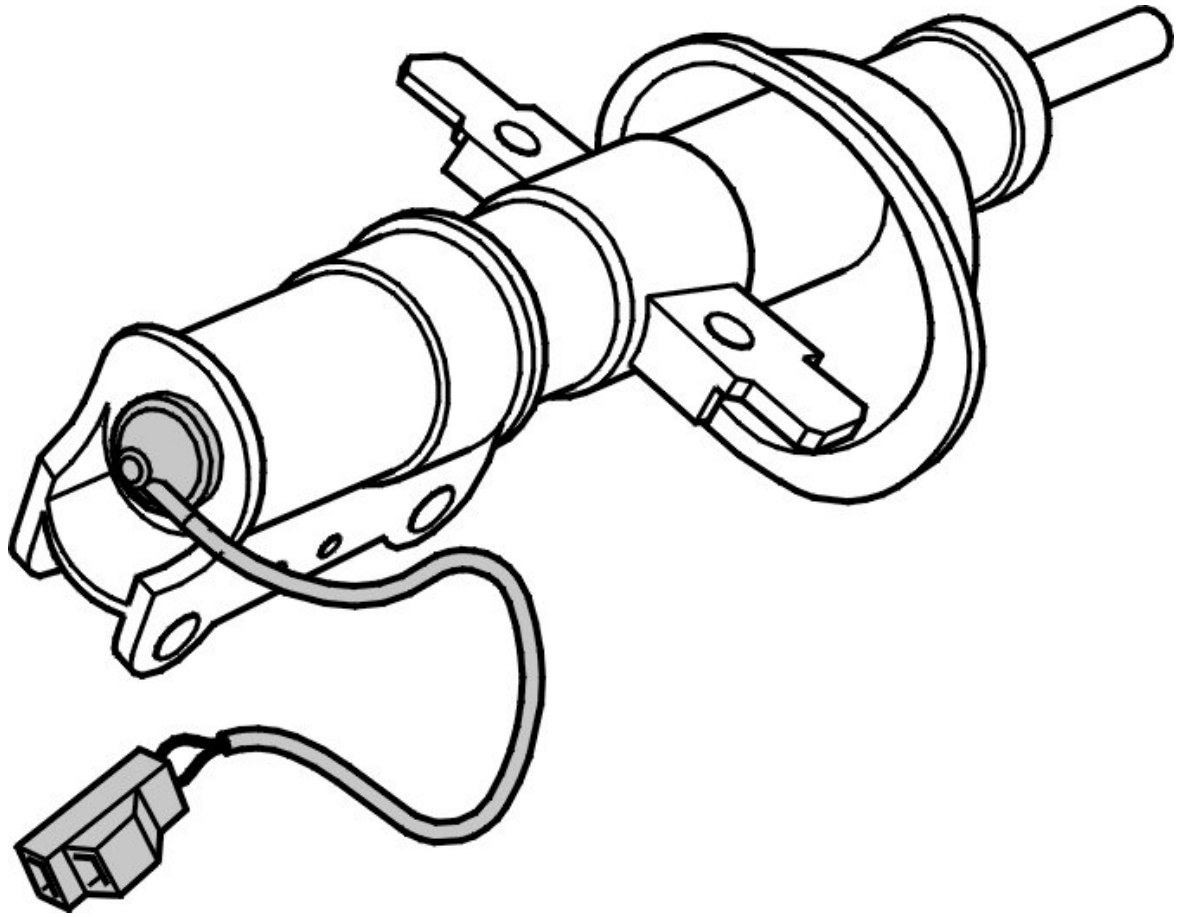
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0117, SUM-00127, SUM-0137 or SUM-0147 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0117: Solenoid, left front
- SUM-0127: Solenoid, right front
- SUM-0137: Solenoid, left rear
- SUM-0147: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to signal cable from the solenoid in the power supply cable for the solenoid
- Short-circuit to supply voltage in the signal cable from the solenoid
- Defective solenoid.

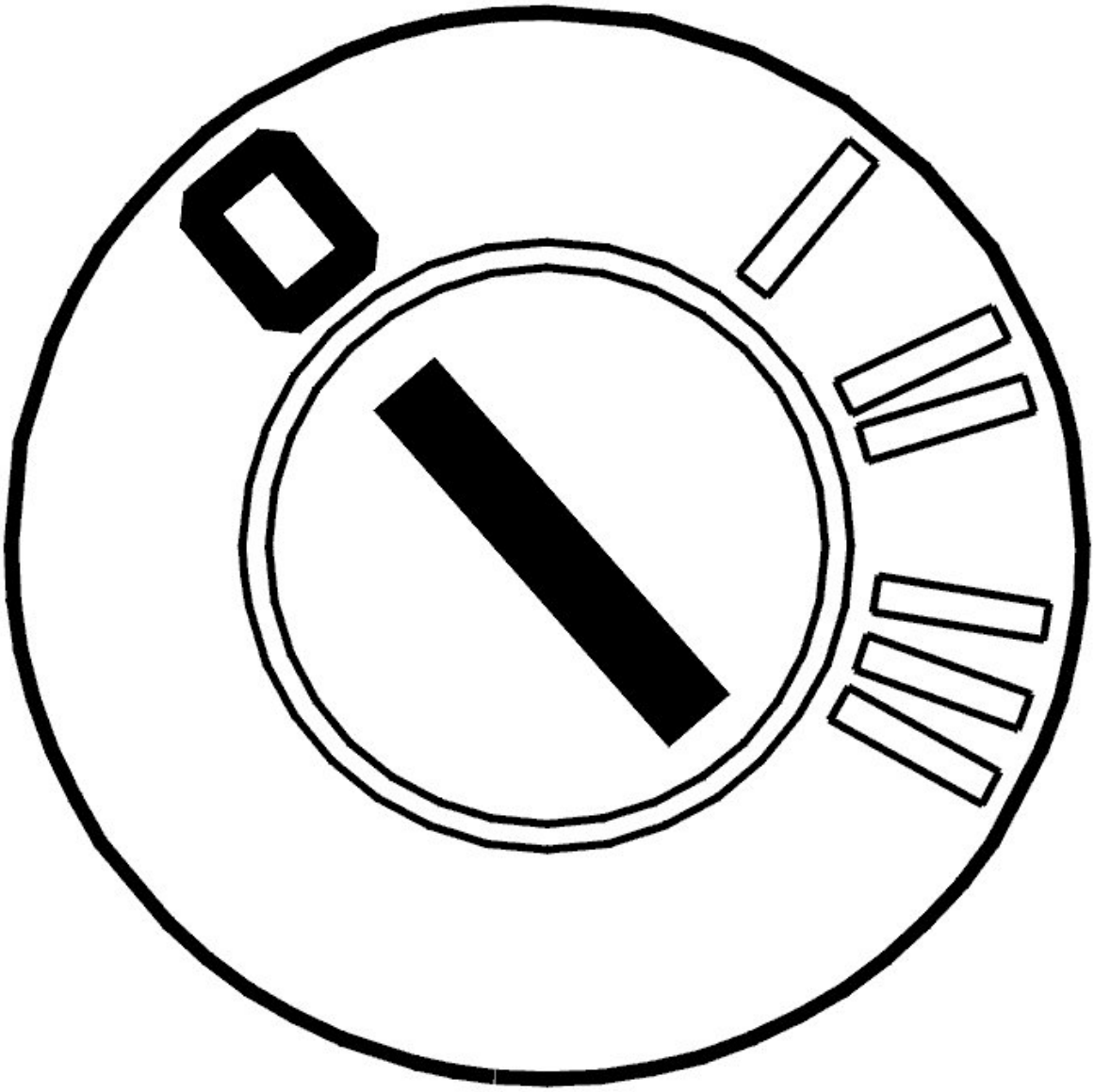
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking components and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0117, front left solenoid:
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0127, front right solenoid:
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0137, rear left solenoid:
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0147, rear right solenoid:
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

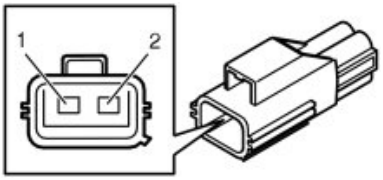
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

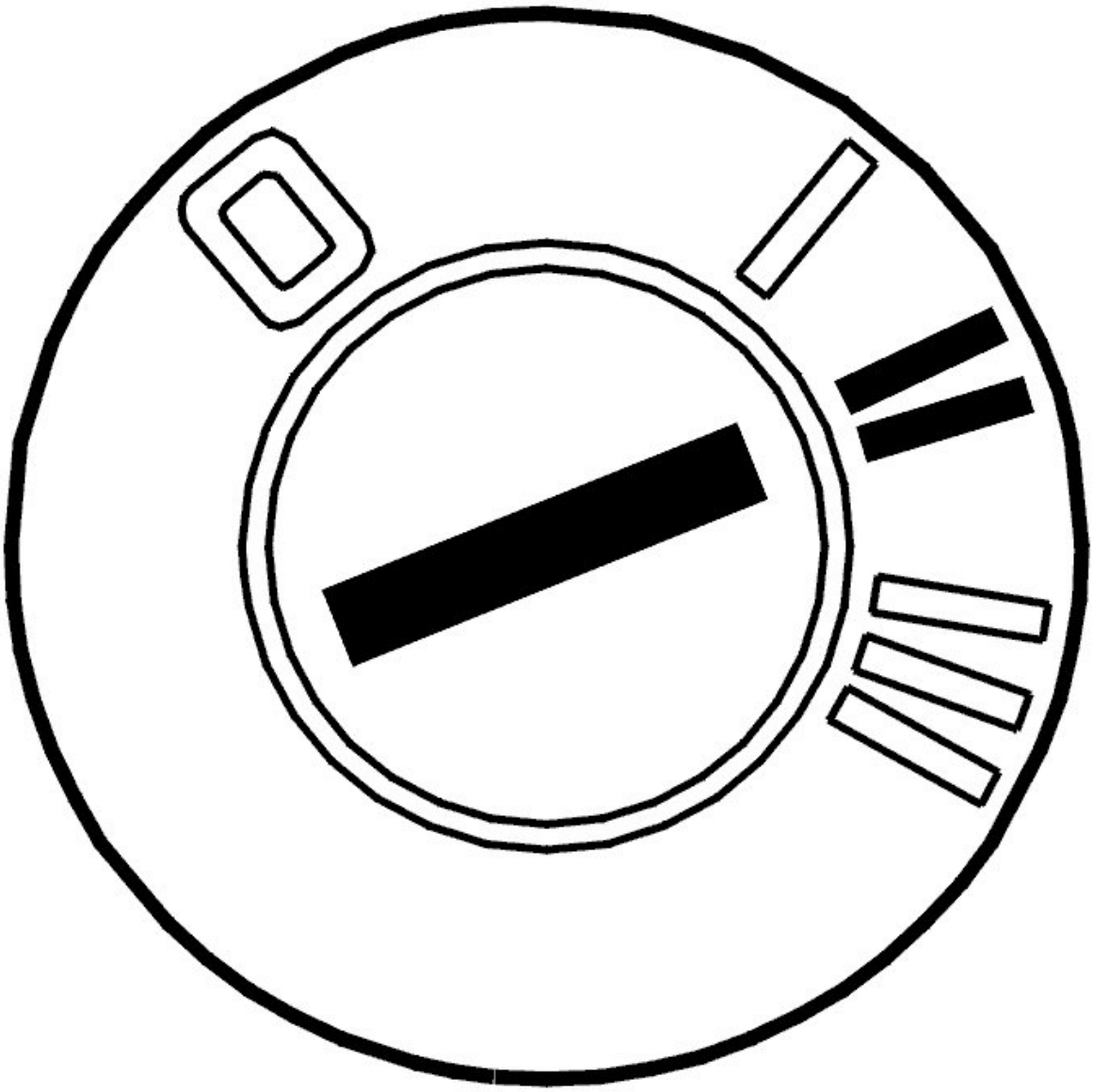
Verification

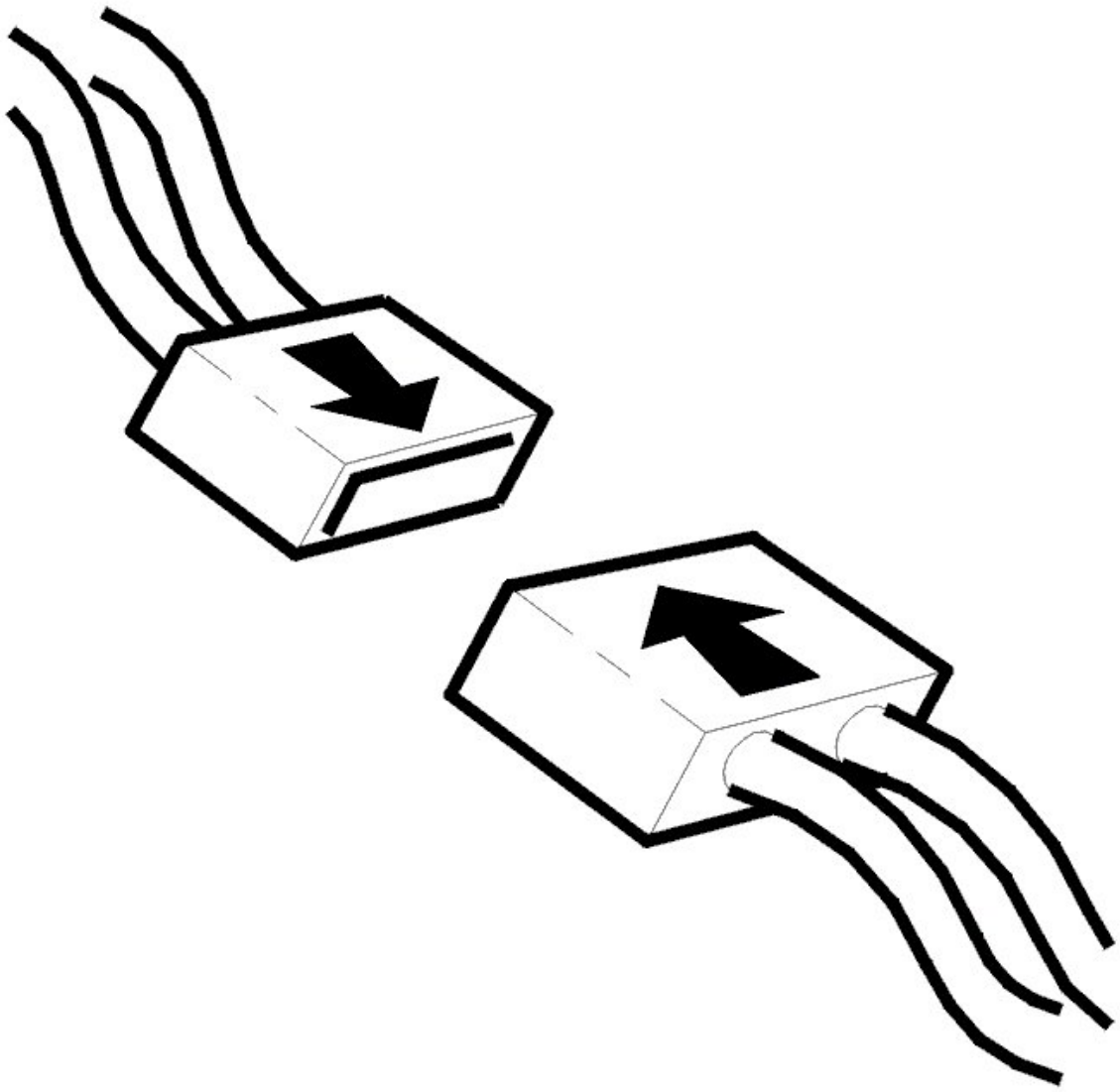
Verification

Verification

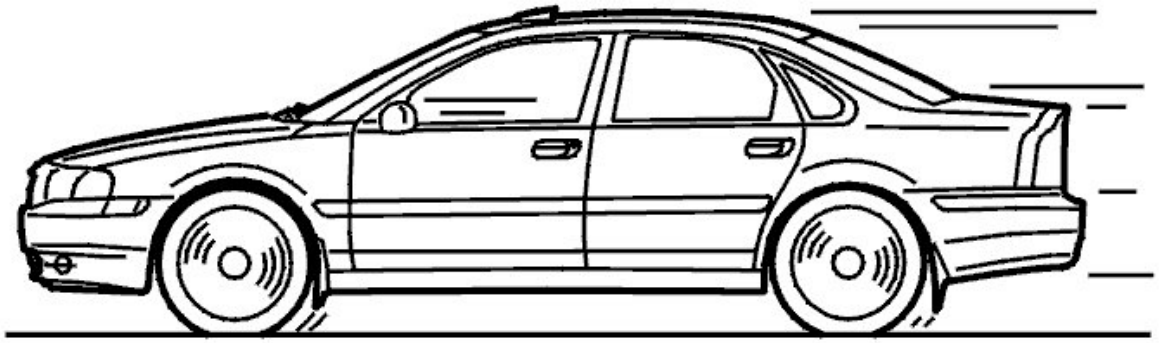
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

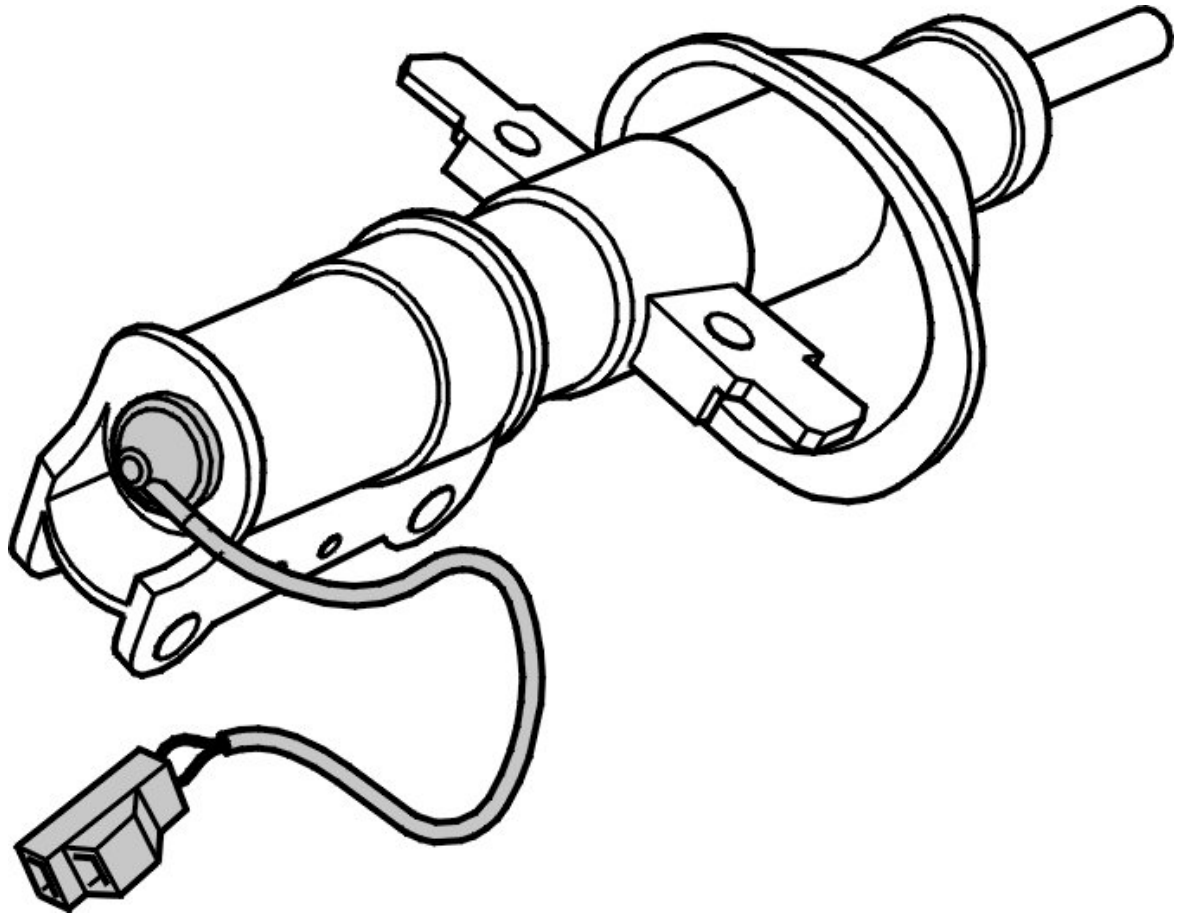
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the temperature of any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0118: Solenoid, left front
- SUM-0128: Solenoid, right front
- SUM-0138: Solenoid, left rear
- SUM-0148: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is limited.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Hard driving.

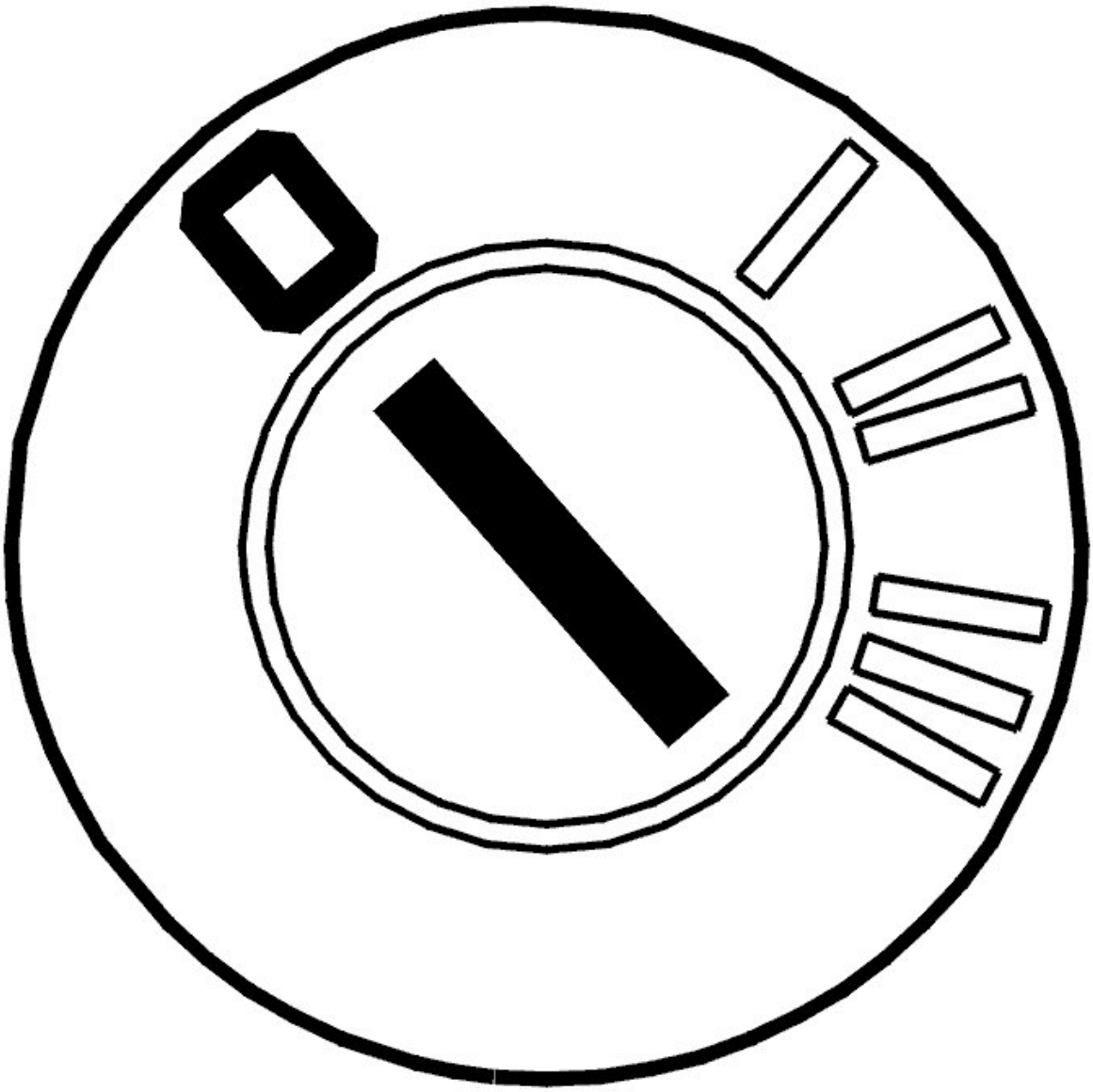
Fault symptom[s]

- None.

Temperature Too High

Temperature too high

Checking the component and wiring



- Ignition off.

Check the solenoids and connectors for the Suspension Module (SUM). Check for contact resistance. Check for oxidation.
Check the resistance of the solenoids.

For diagnostic trouble code (DTC) SUM-0118, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0128, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0138, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

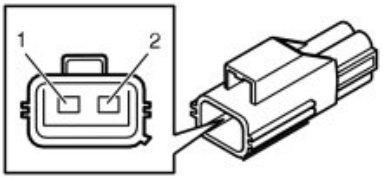
For diagnostic trouble code (DTC) SUM-0148, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

Remedy as necessary.

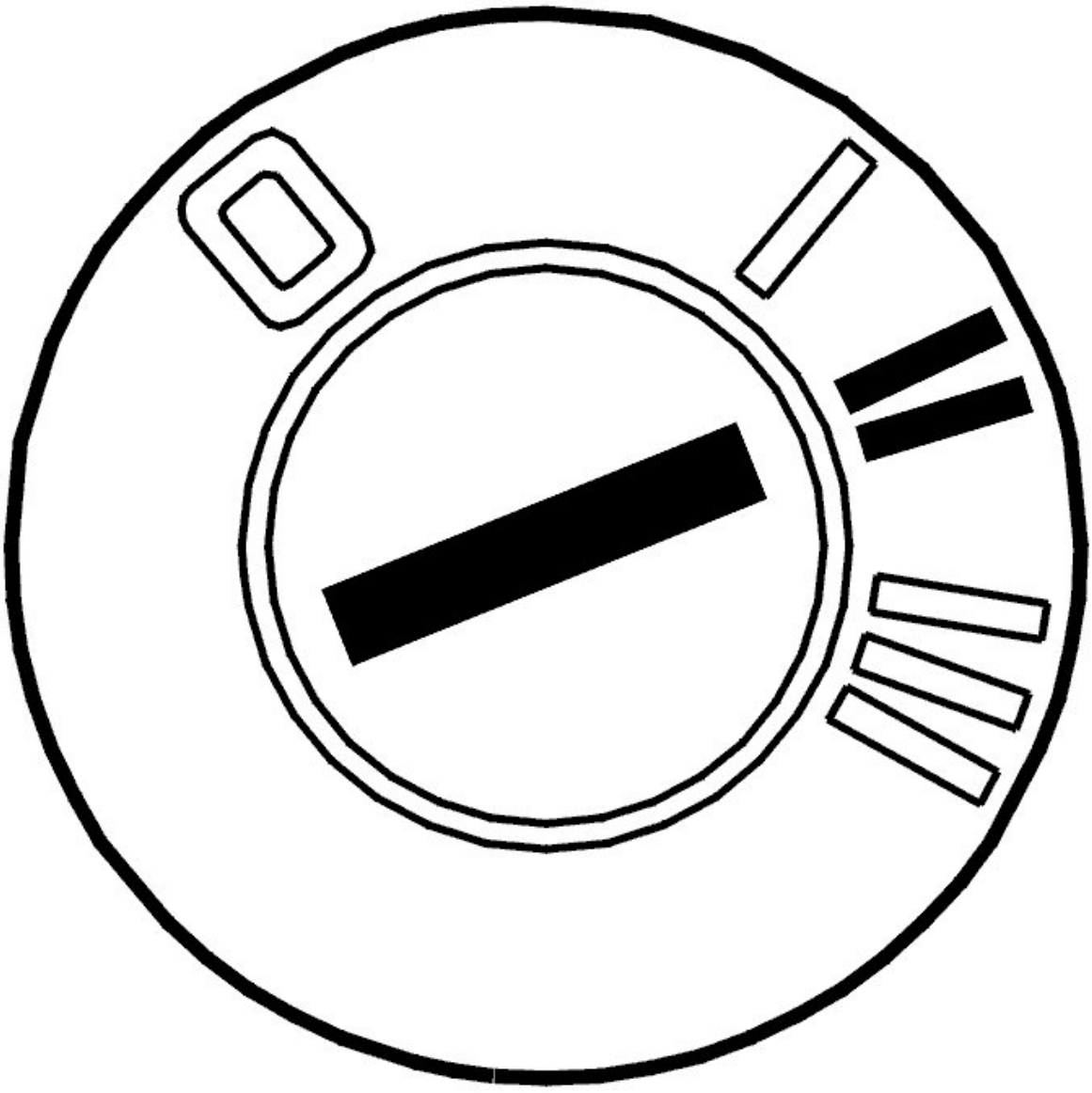
Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Calibrating the control module

Calibrating the control module

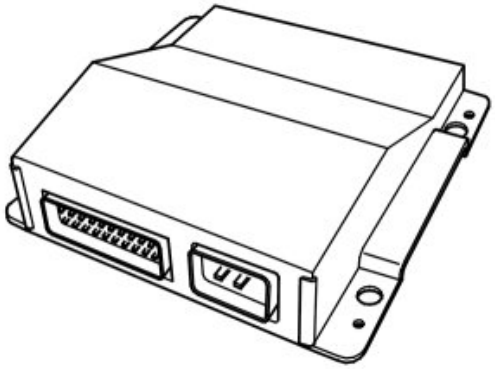


Note! In order for the Four-C (Continuously Controlled Chassis Concept) function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be calibrated.

- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is unloaded and on a flat surface with the wheels pointing straight ahead

- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.



Continue - Verification

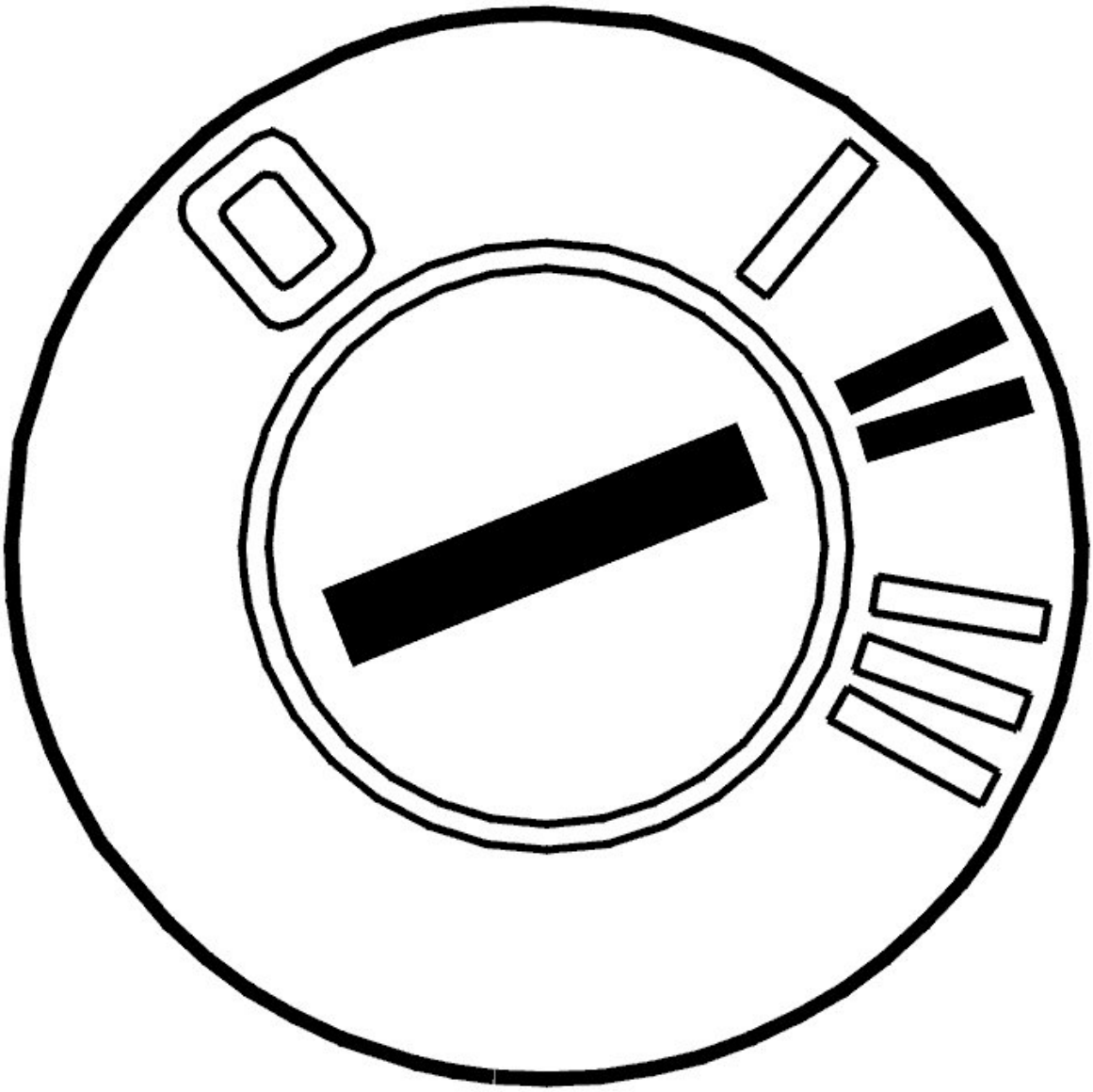
Verification

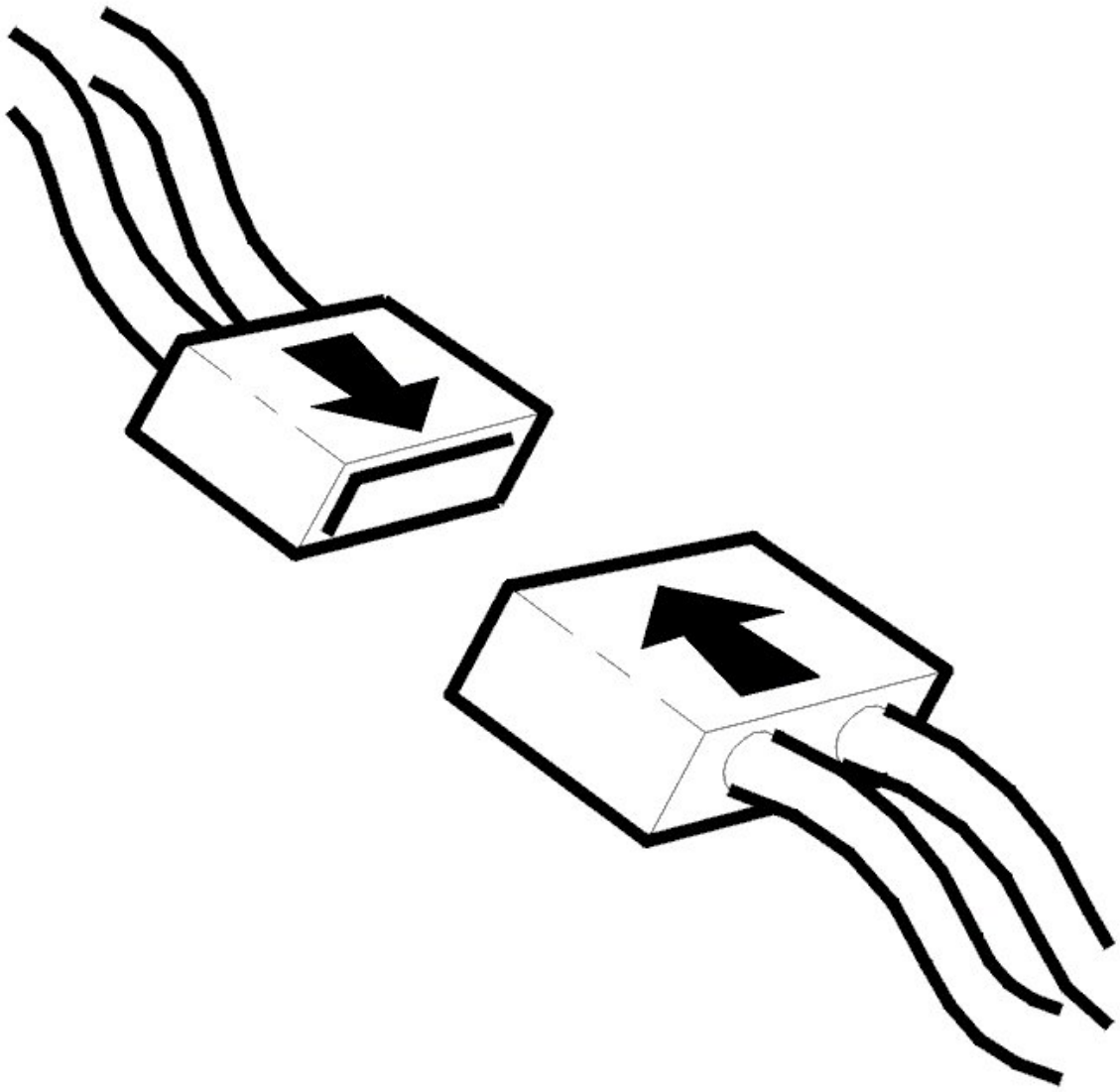
Verification

Verification

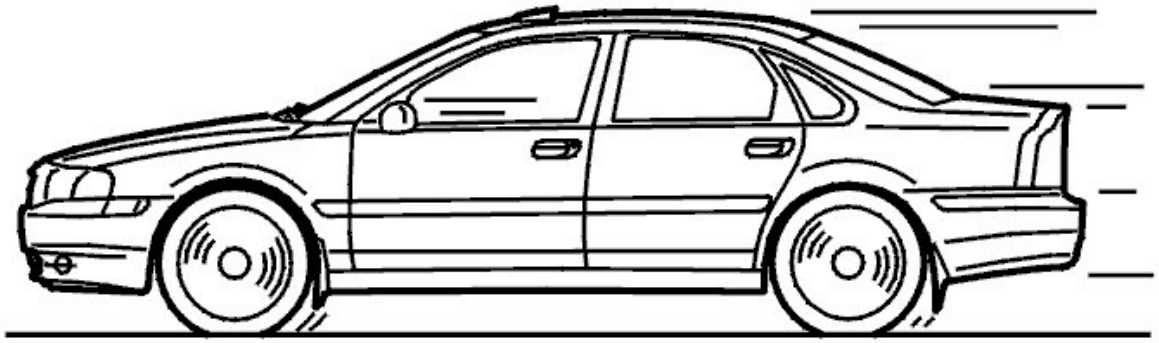
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

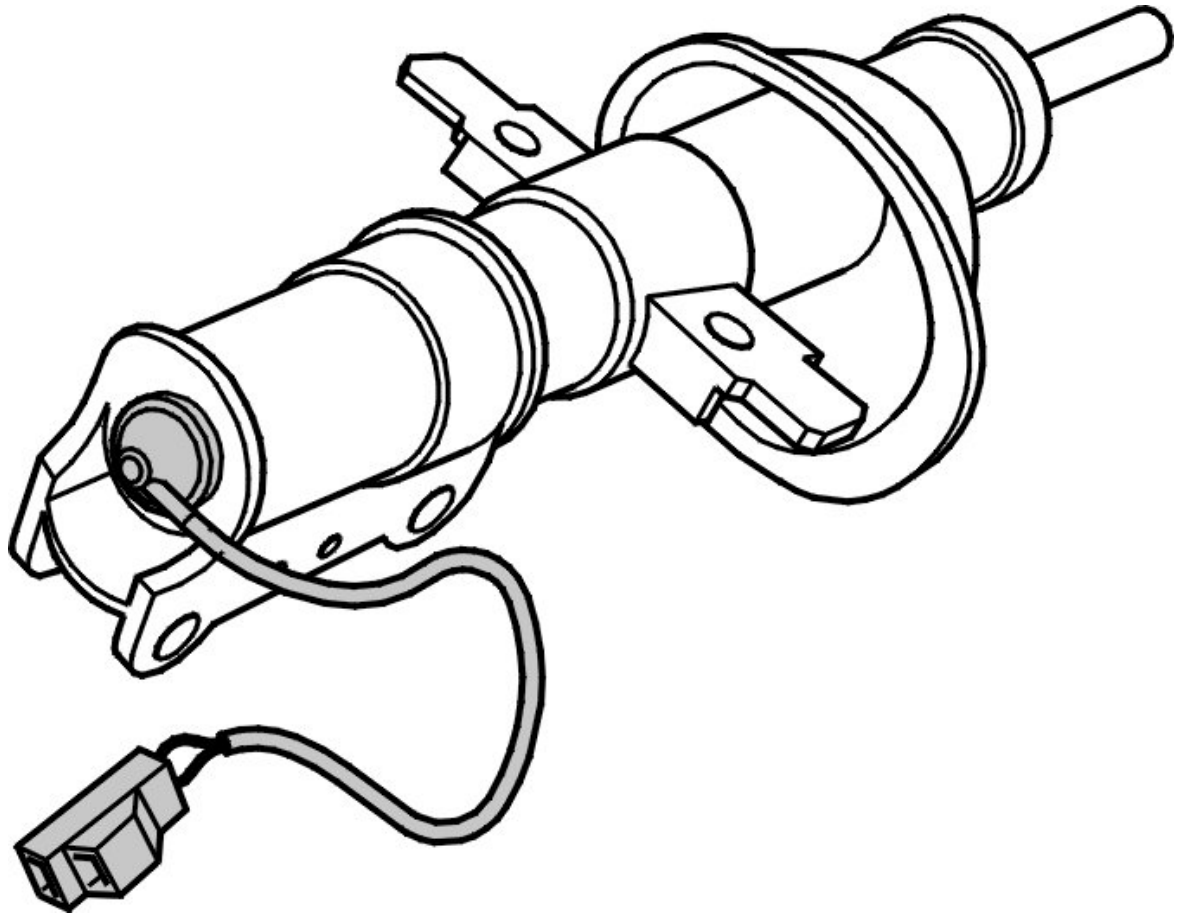
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0111: Solenoid, left front
- SUM-0121: Solenoid, right front
- SUM-0131: Solenoid, left rear
- SUM-0141: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply to the solenoid
- Damaged solenoid.

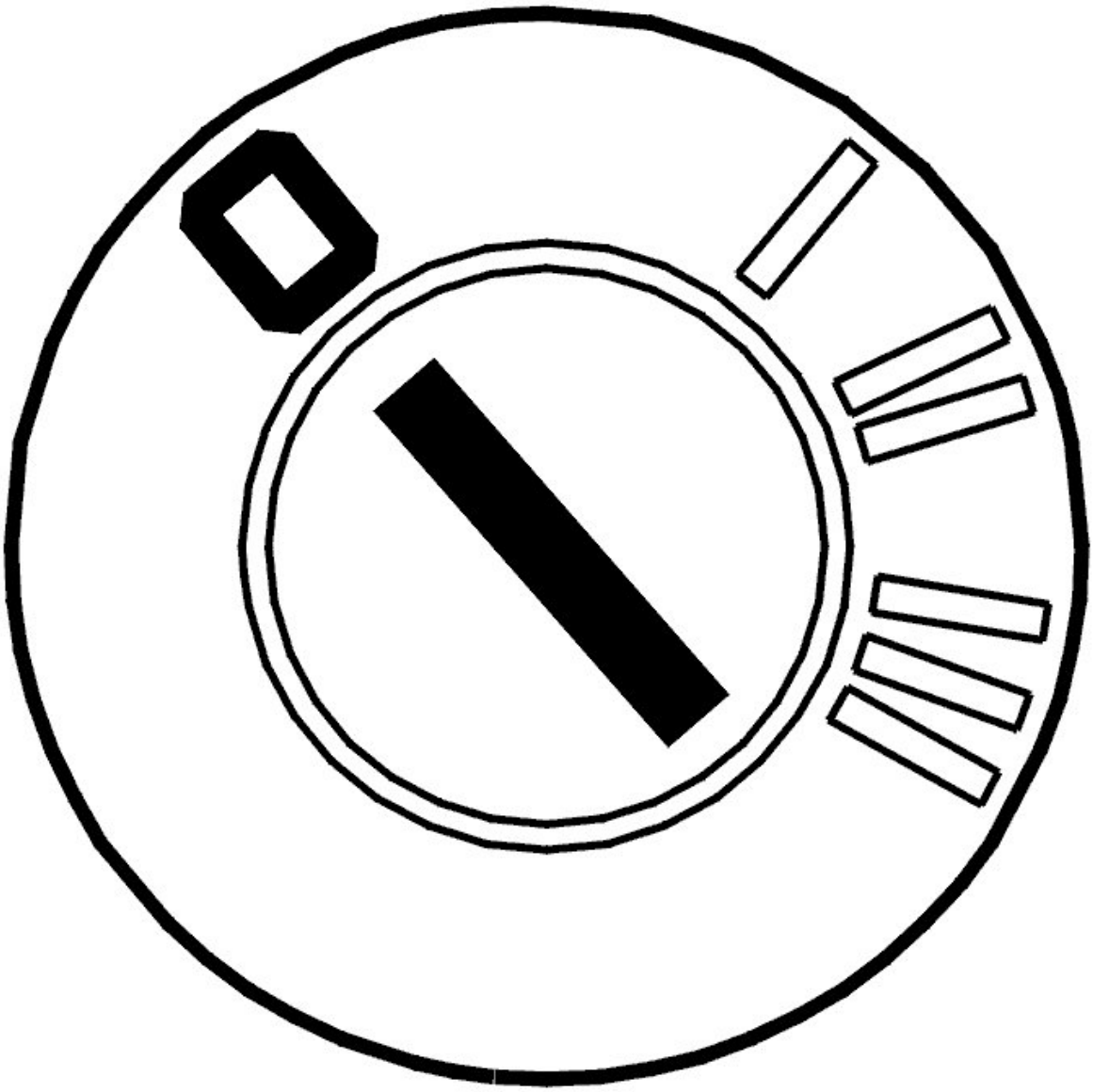
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too Low

Signal too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0111, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0121, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0131, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to ground.

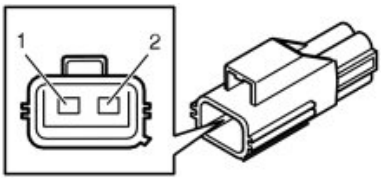
For diagnostic trouble code (DTC) SUM-0141, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to ground.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

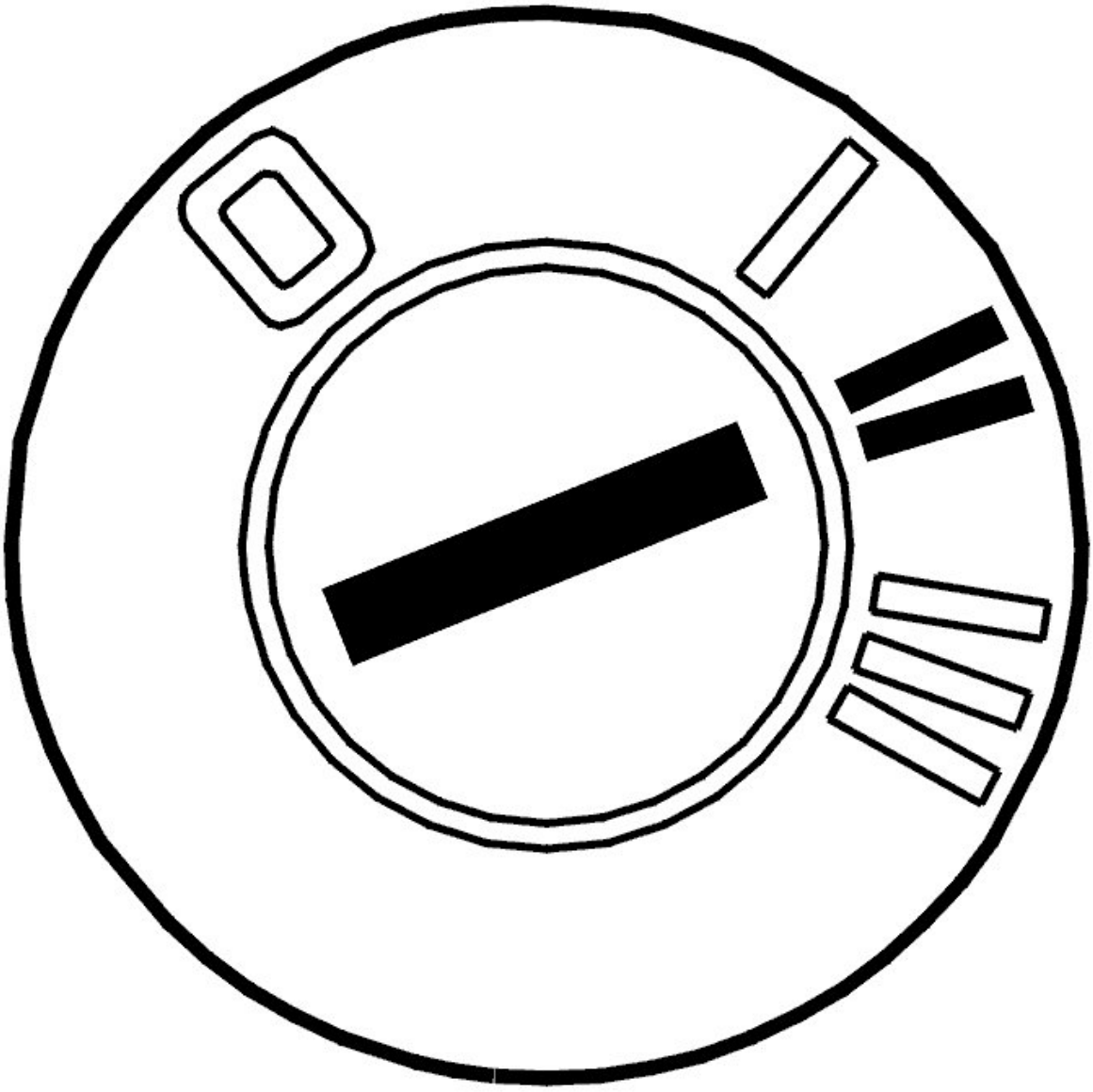
Verification

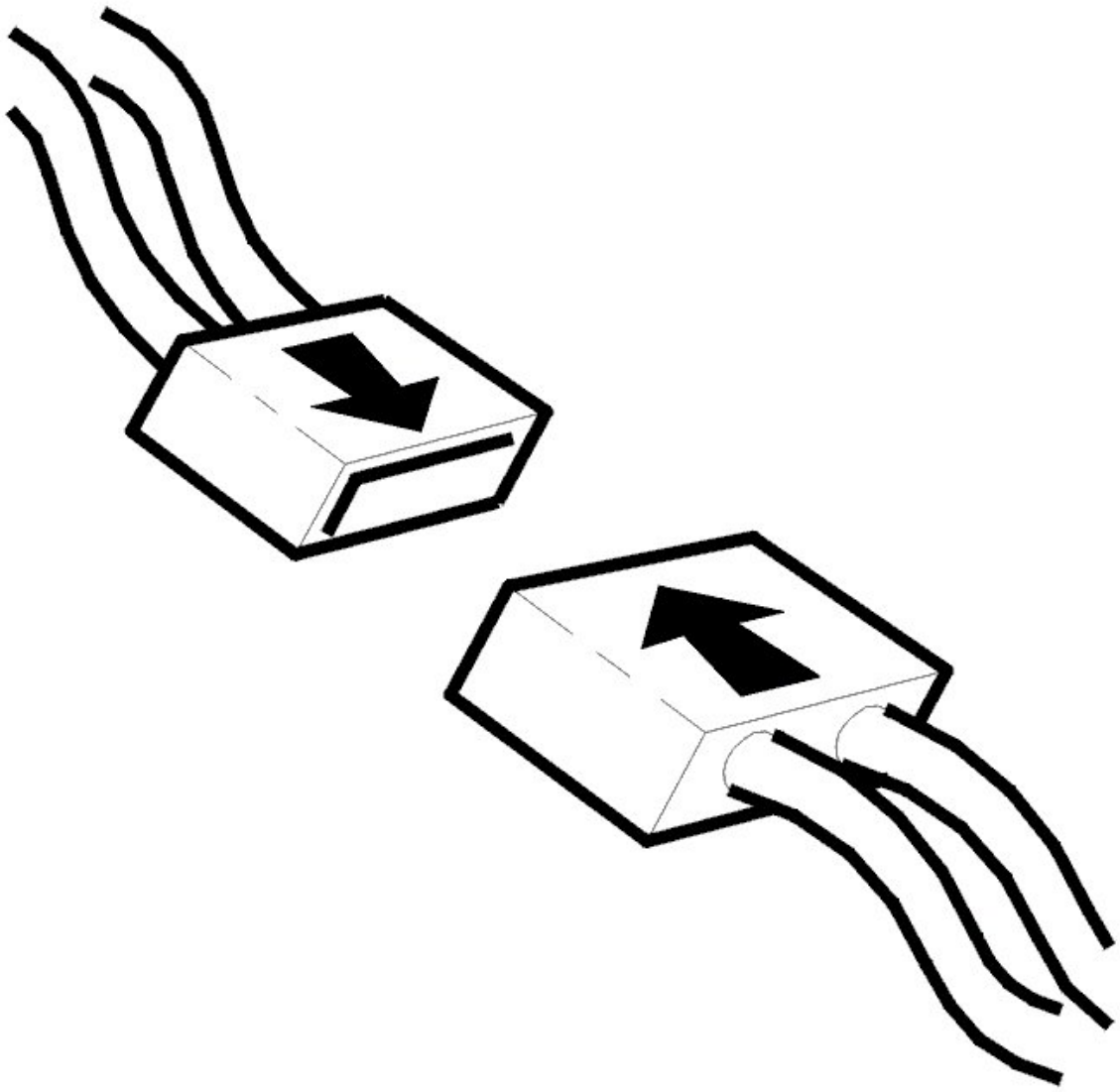
Verification

Verification

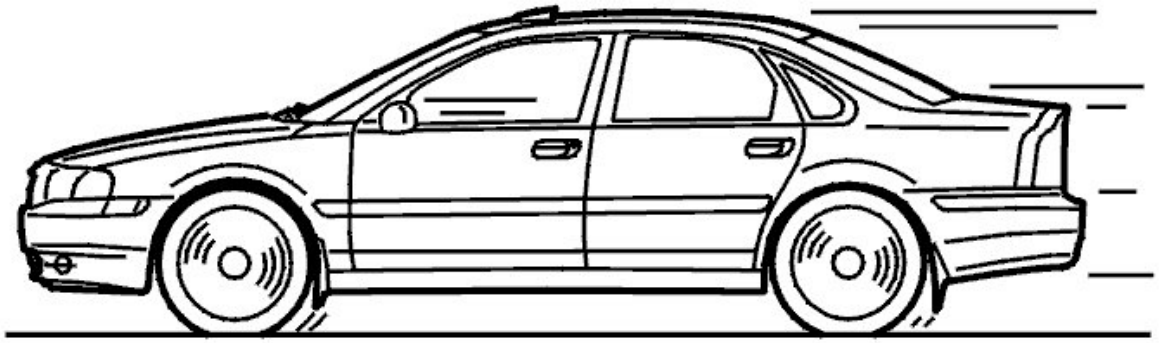
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

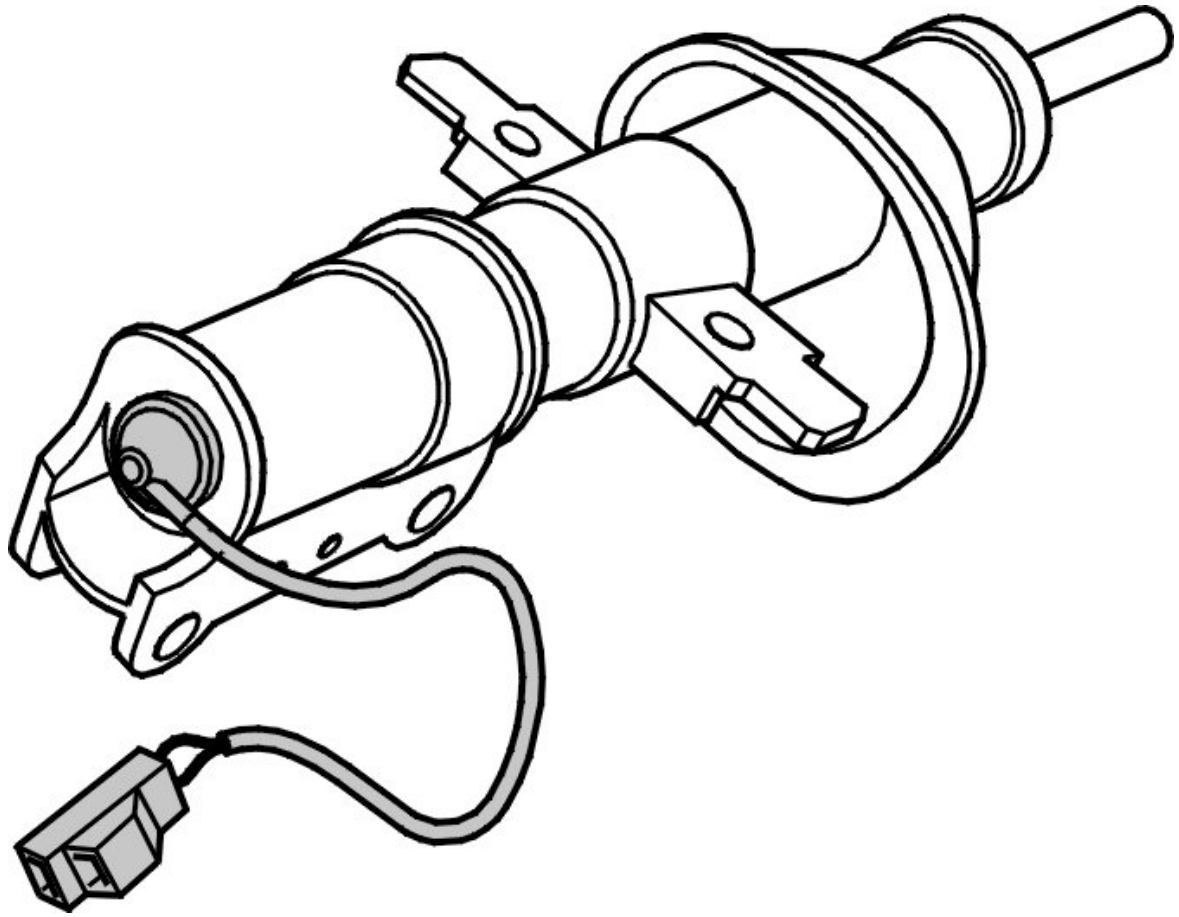
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0112: Solenoid, left front
- SUM-0122: Solenoid, right front
- SUM-0132: Solenoid, left rear
- SUM-0142: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable or power supply cable
- Damaged solenoid.

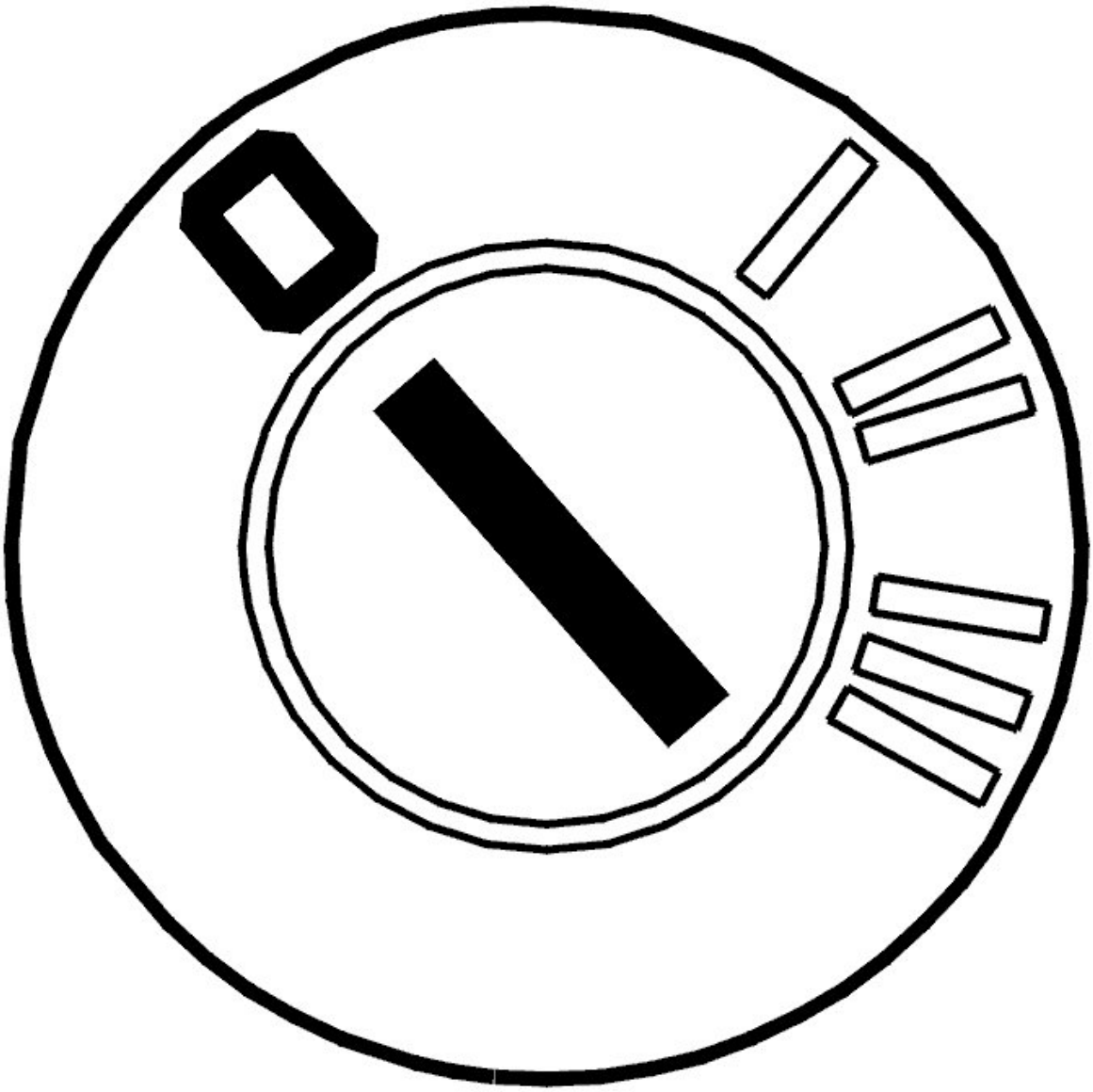
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

For diagnostic trouble code (DTC) SUM-0112, front left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0122, front right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0132, rear left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0142, rear right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage.

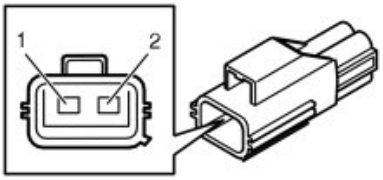
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and

Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

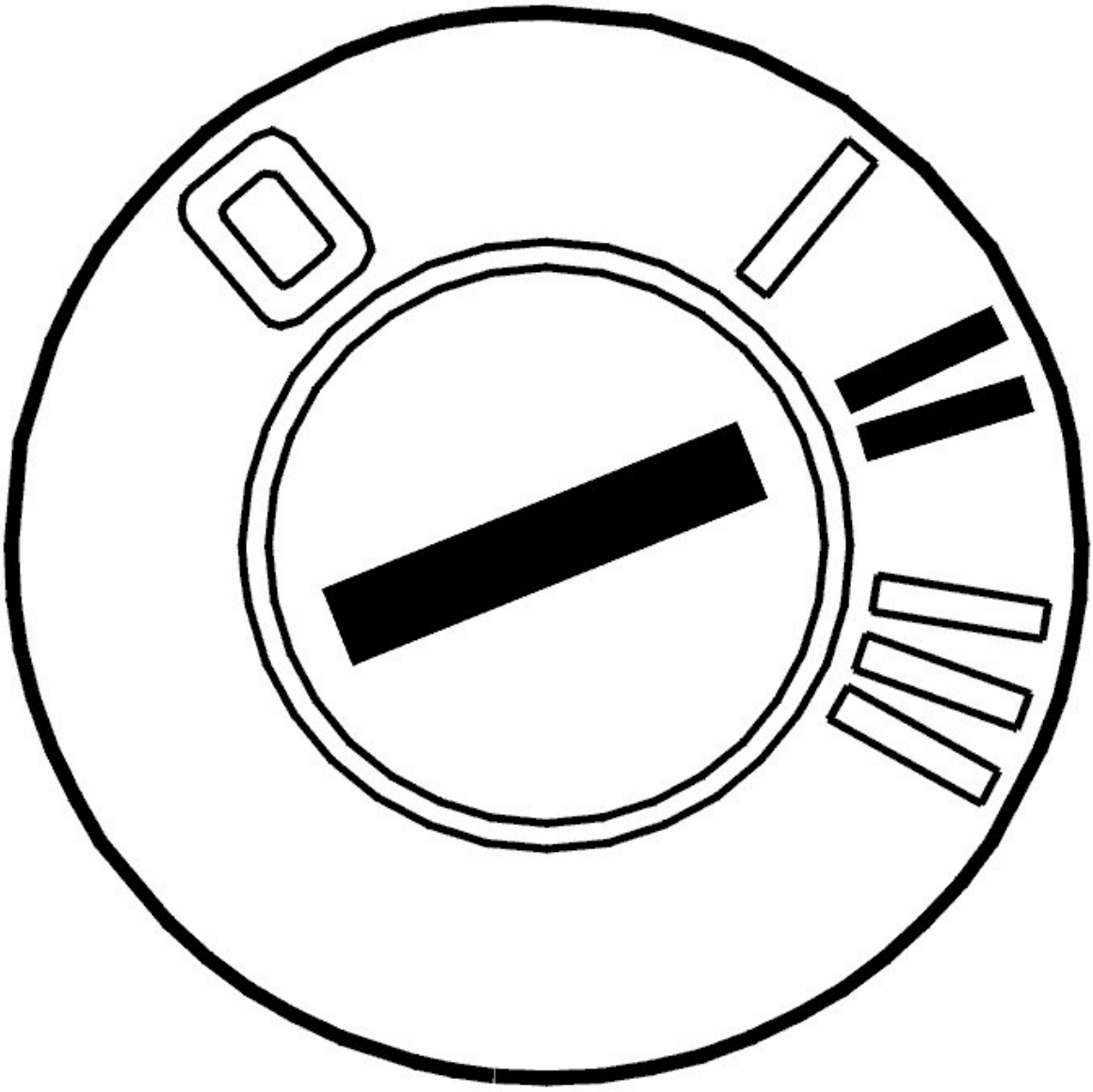
Verification

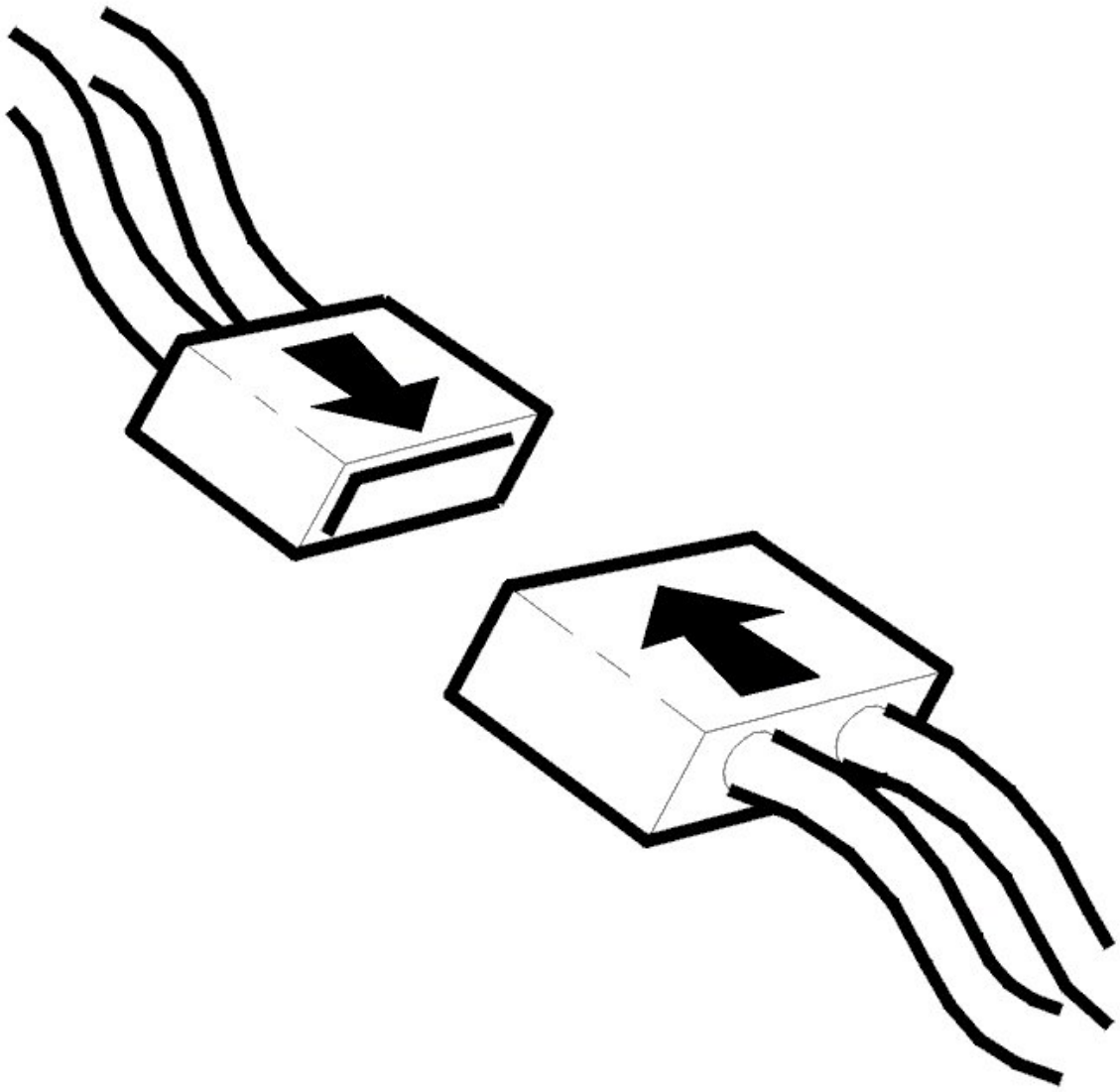
Verification

Verification

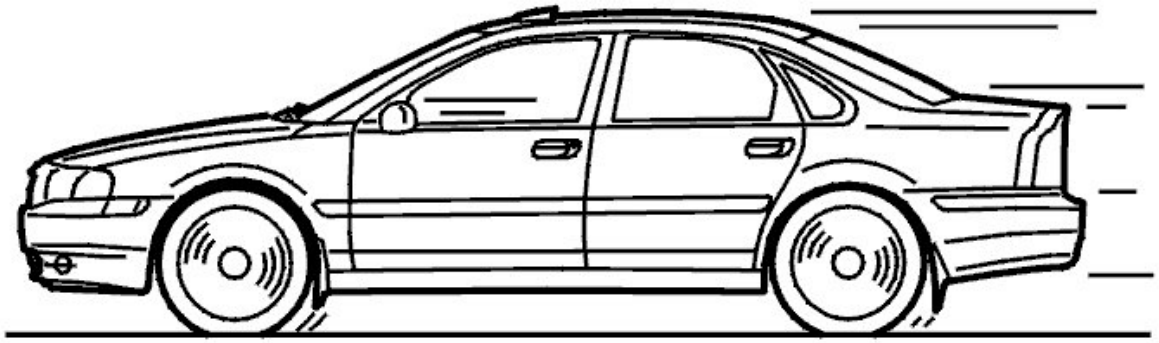
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

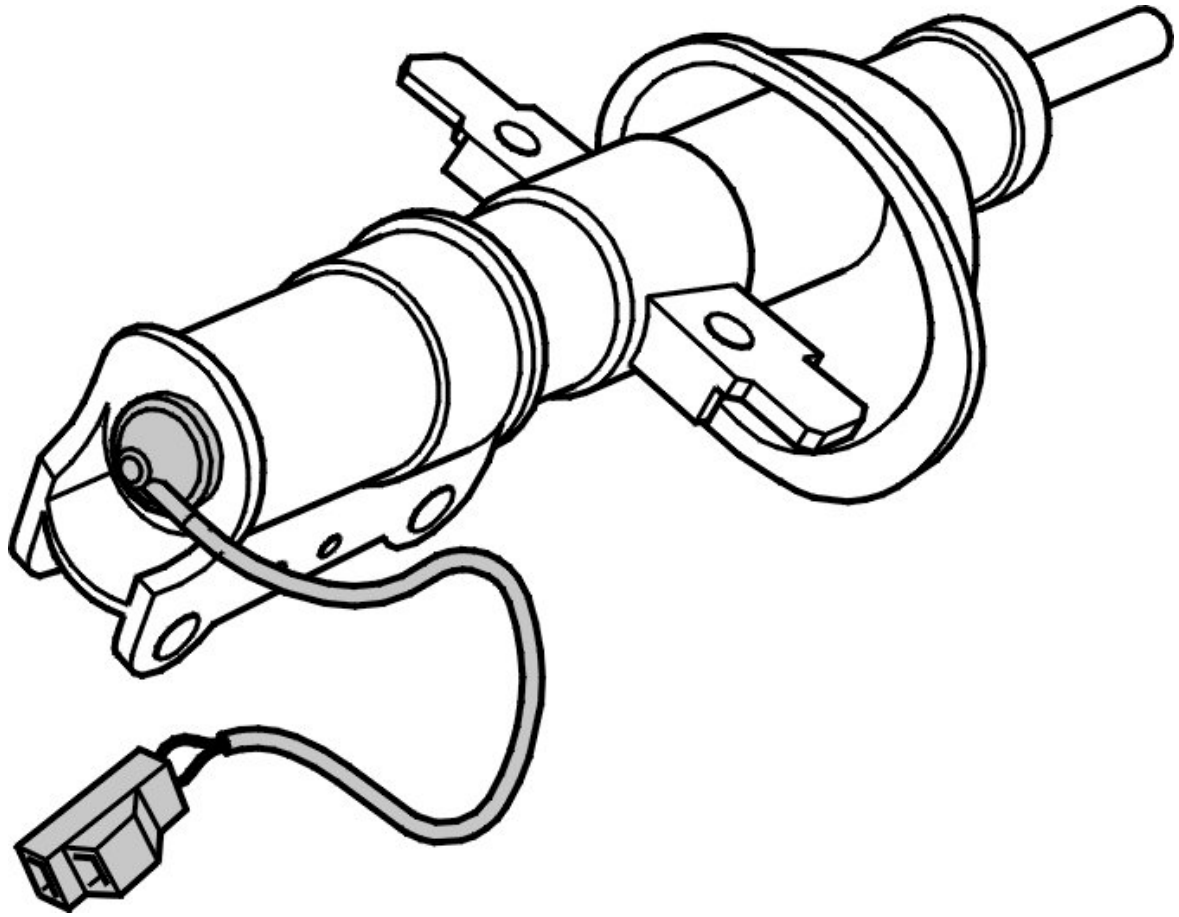
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is missing. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0113: Solenoid, left front
- SUM-0123: Solenoid, right front
- SUM-0133: Solenoid, left rear
- SUM-0143: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance or loose connections in the terminals
- Open-circuit in the power supply to the solenoid
- Open-circuit in the signal cable
- Damaged solenoid.

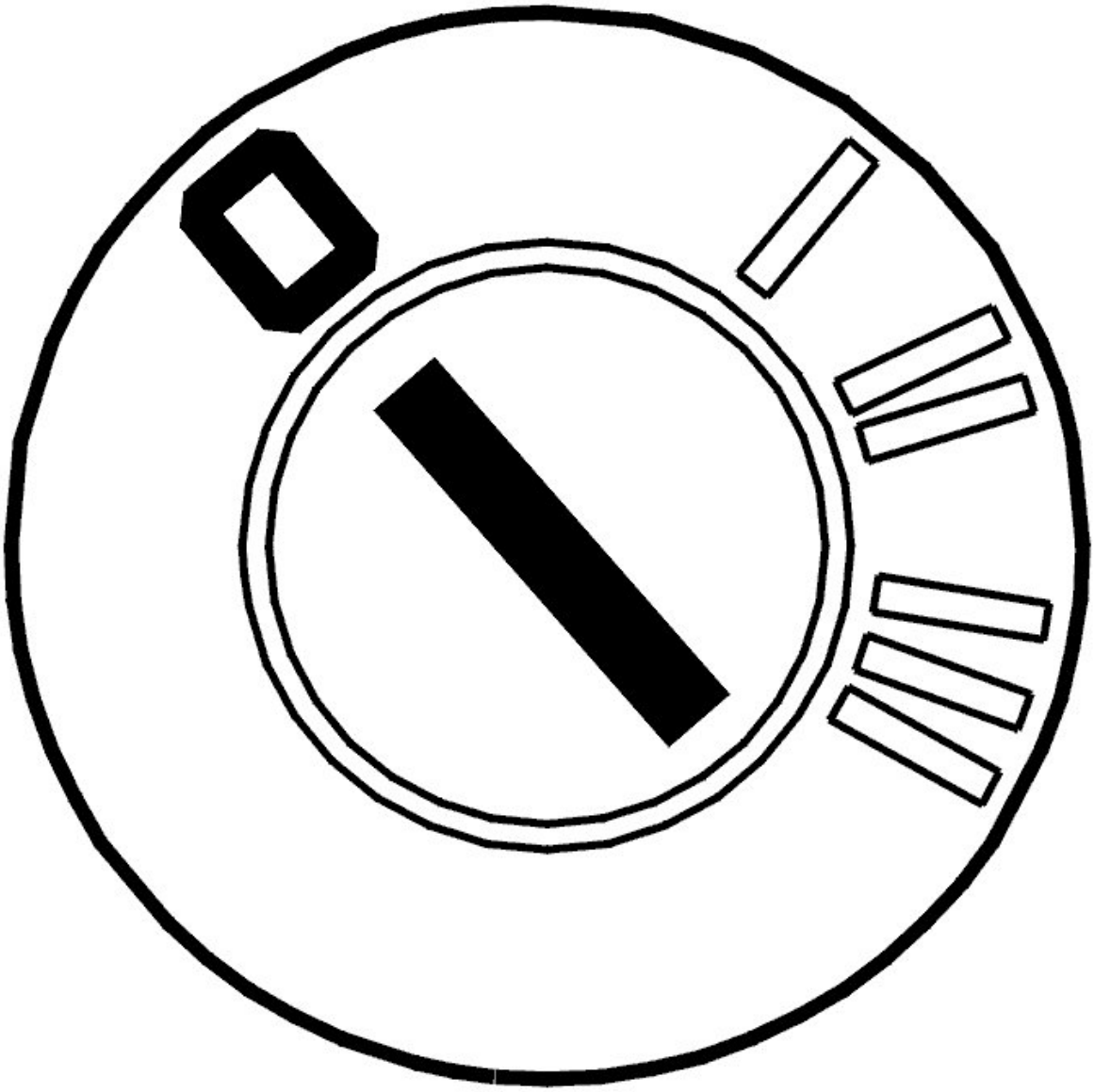
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Missing

Signal missing

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the suspension module (SUM) and the solenoids. Check for oxidation. Check for loose connections.

For diagnostic trouble code (DTC) SUM-0113, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0123, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A8 and solenoid terminal #2. Check for an open-circuit.

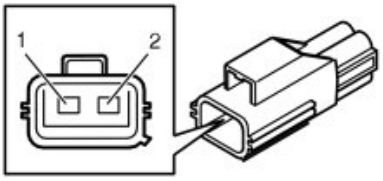
For diagnostic trouble code (DTC) SUM-0133, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A1 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0143, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A4 and solenoid terminal #2. Check for an open-circuit.

Remedy as necessary.

Other information:
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

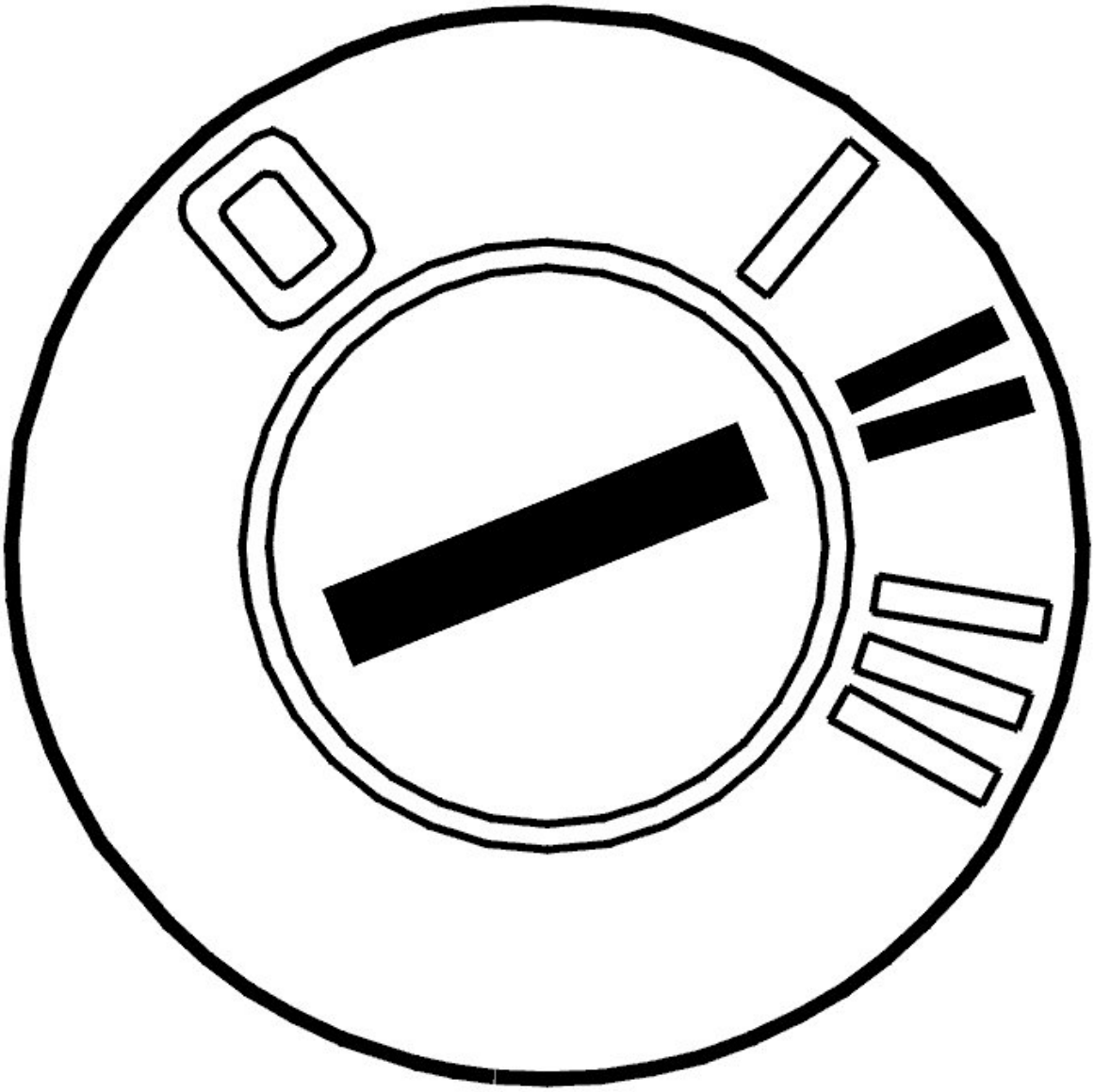
Verification

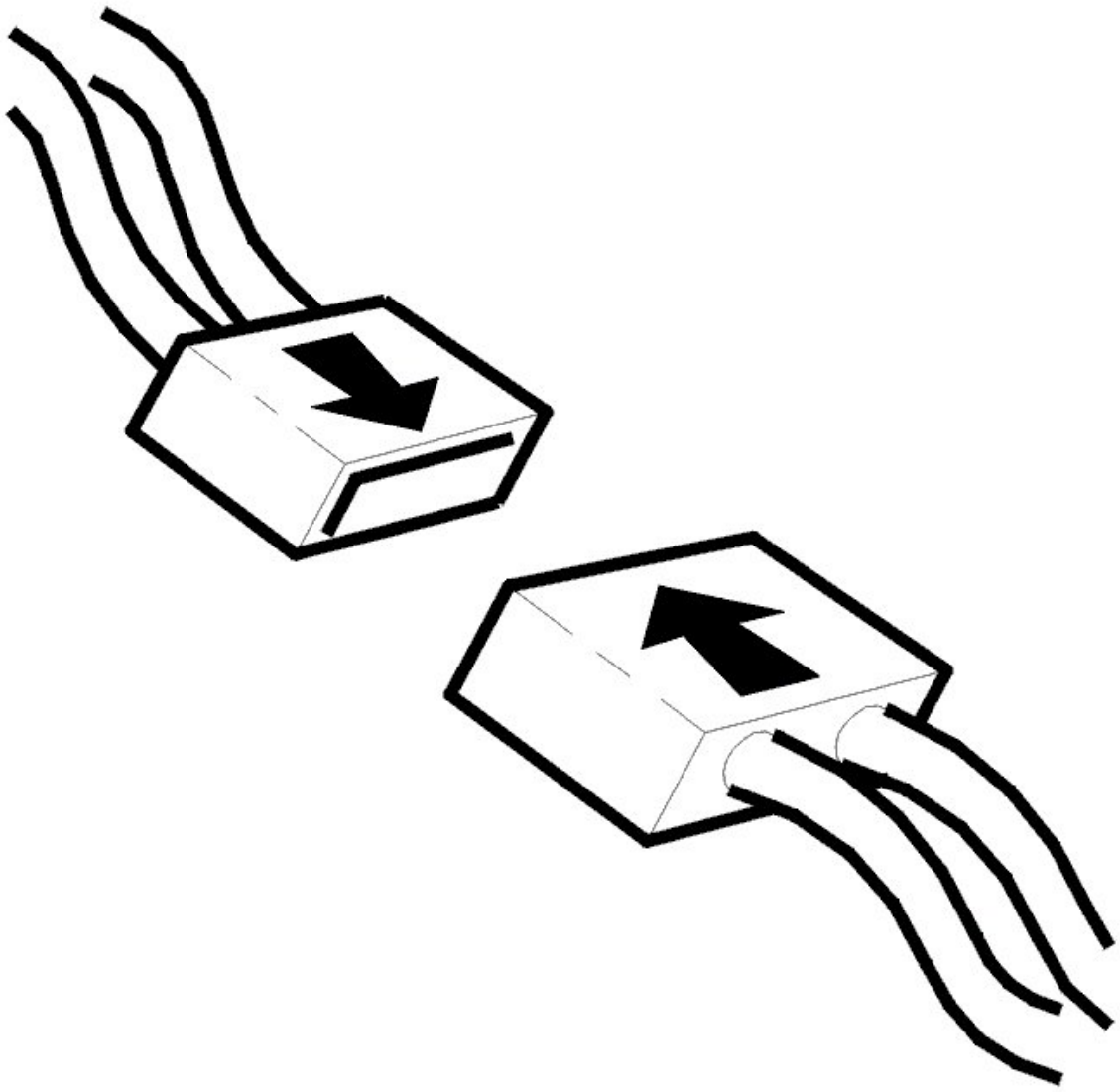
Verification

Verification

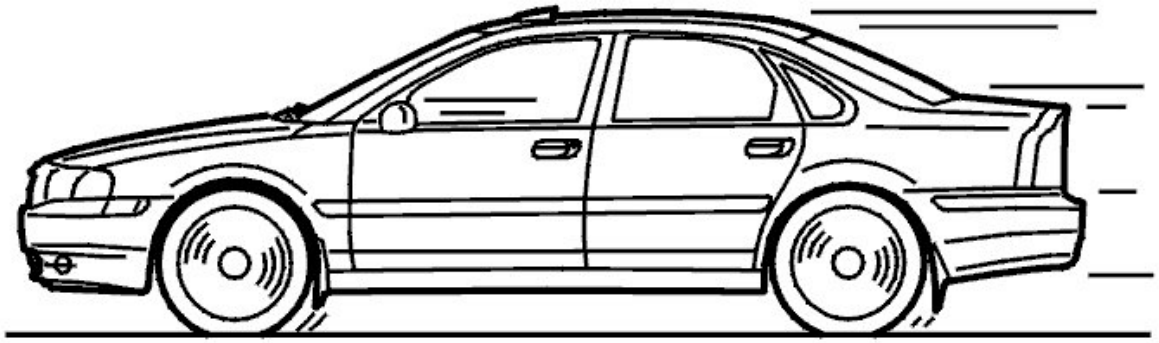
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

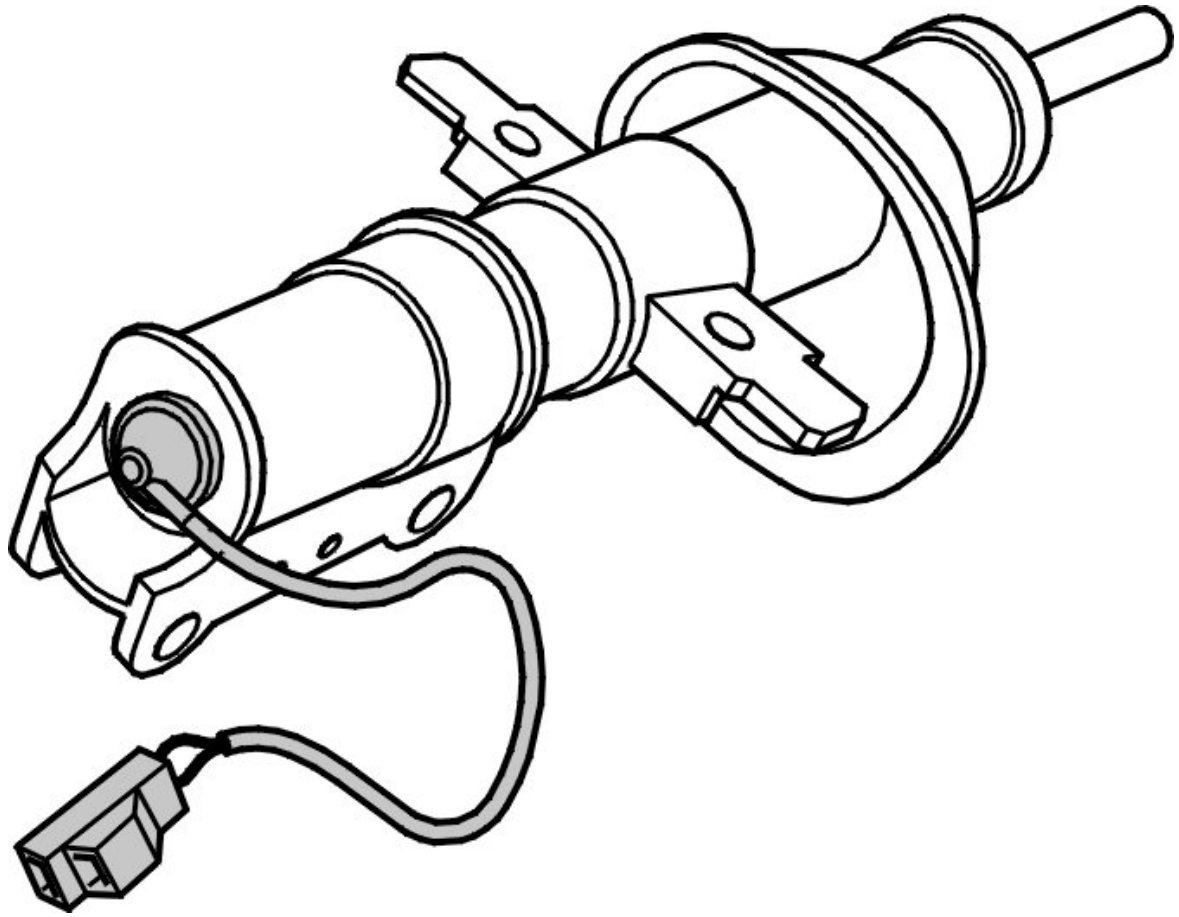
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0115, SUM-00125, SUM-0135 or SUM-0145 is stored if the control module registers that the current from one of the solenoids is too low when the ignition is switched on.

- SUM-0115: Solenoid, left front
- SUM-0125: Solenoid, right front
- SUM-0135: Solenoid, left rear
- SUM-0145: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Open-circuit in the power supply cable to the solenoid
- Open-circuit or short-circuit to ground in the signal cable from the solenoid
- Defective solenoid.

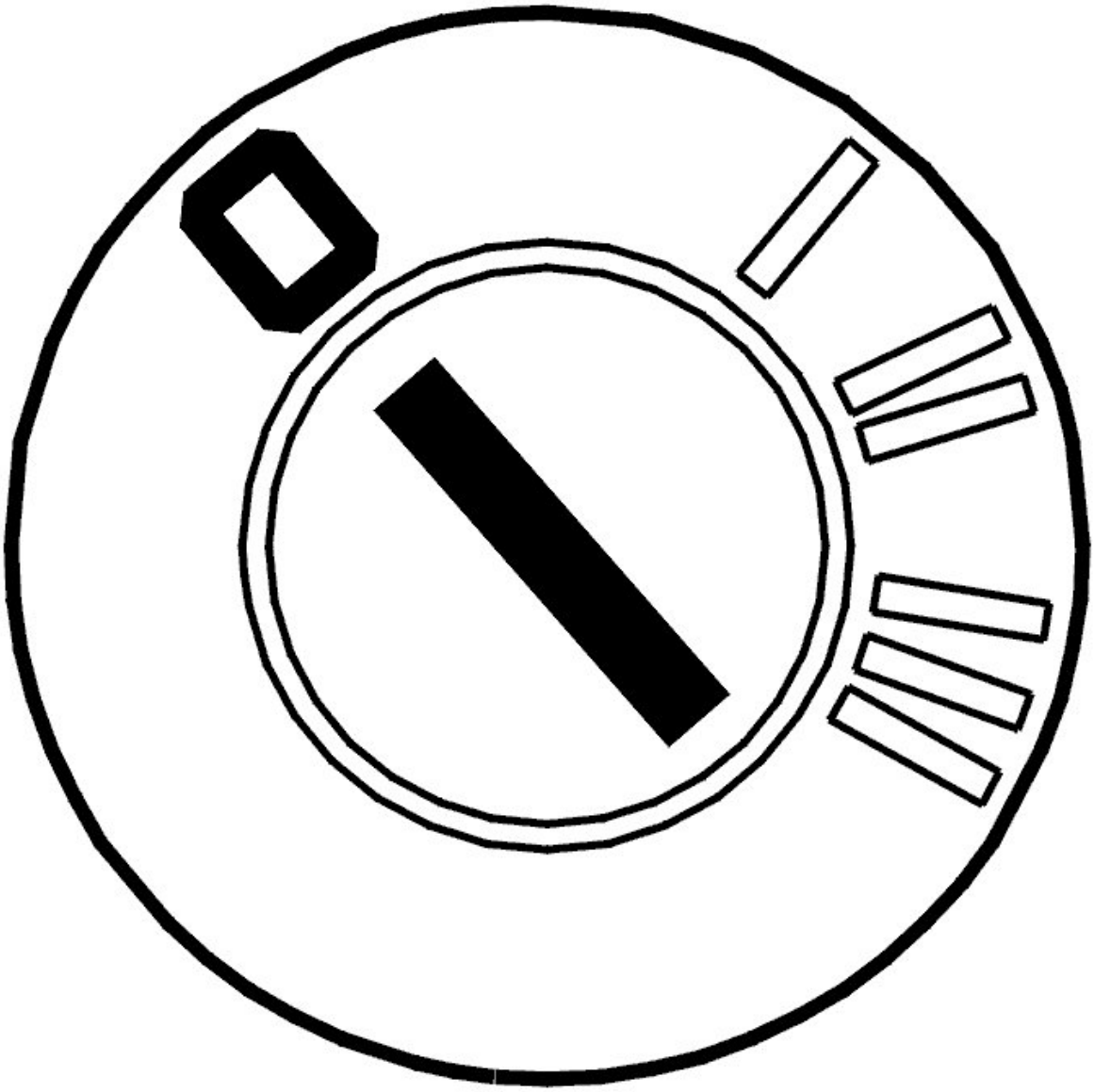
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too Low

Current too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0115, front left solenoid:

- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0125, front right solenoid:

- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0135, rear left solenoid:

- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0145, rear right solenoid:

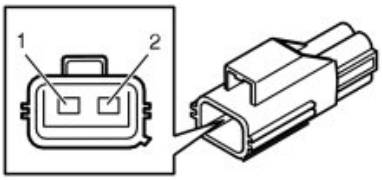
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

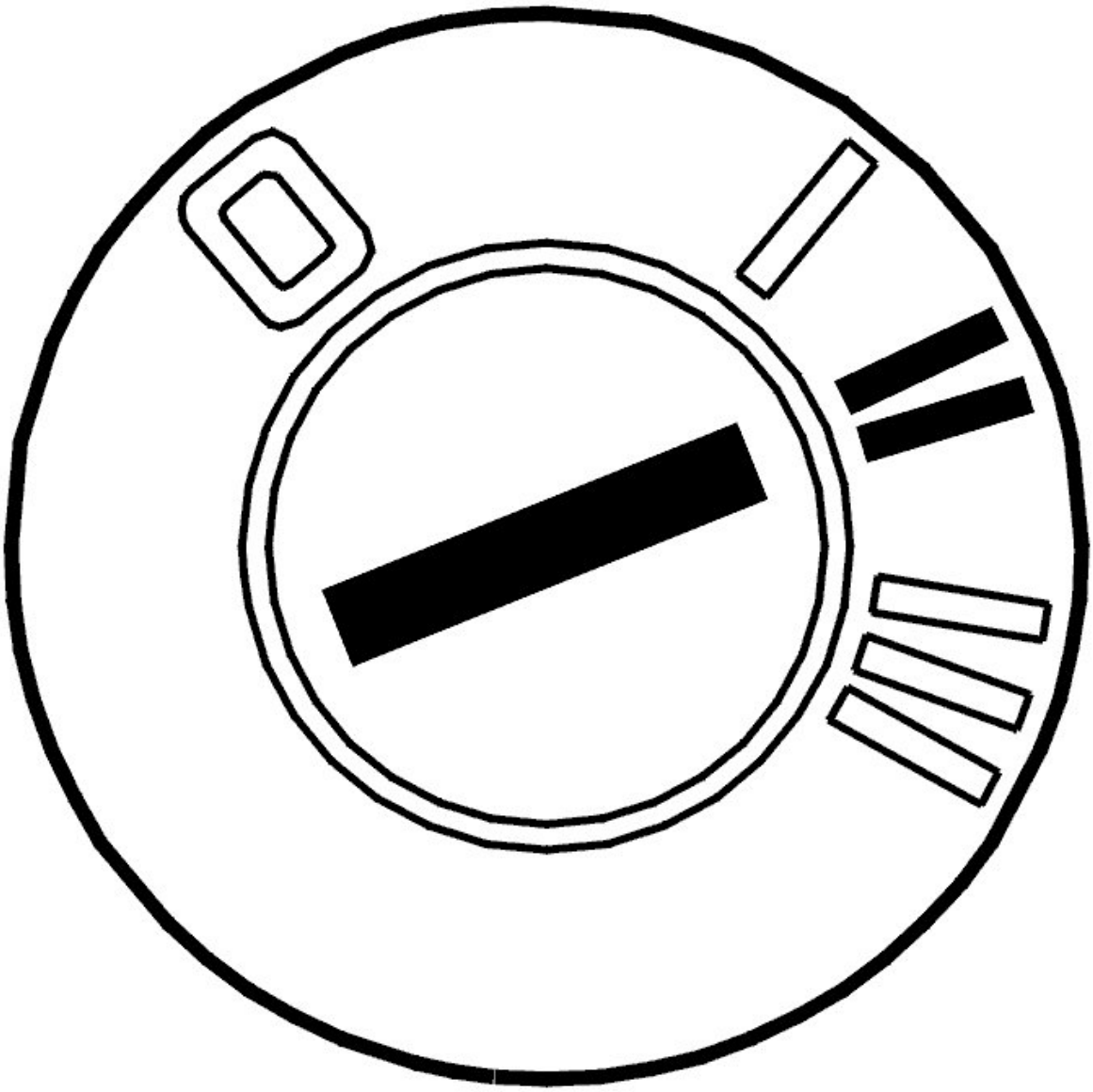
Verification

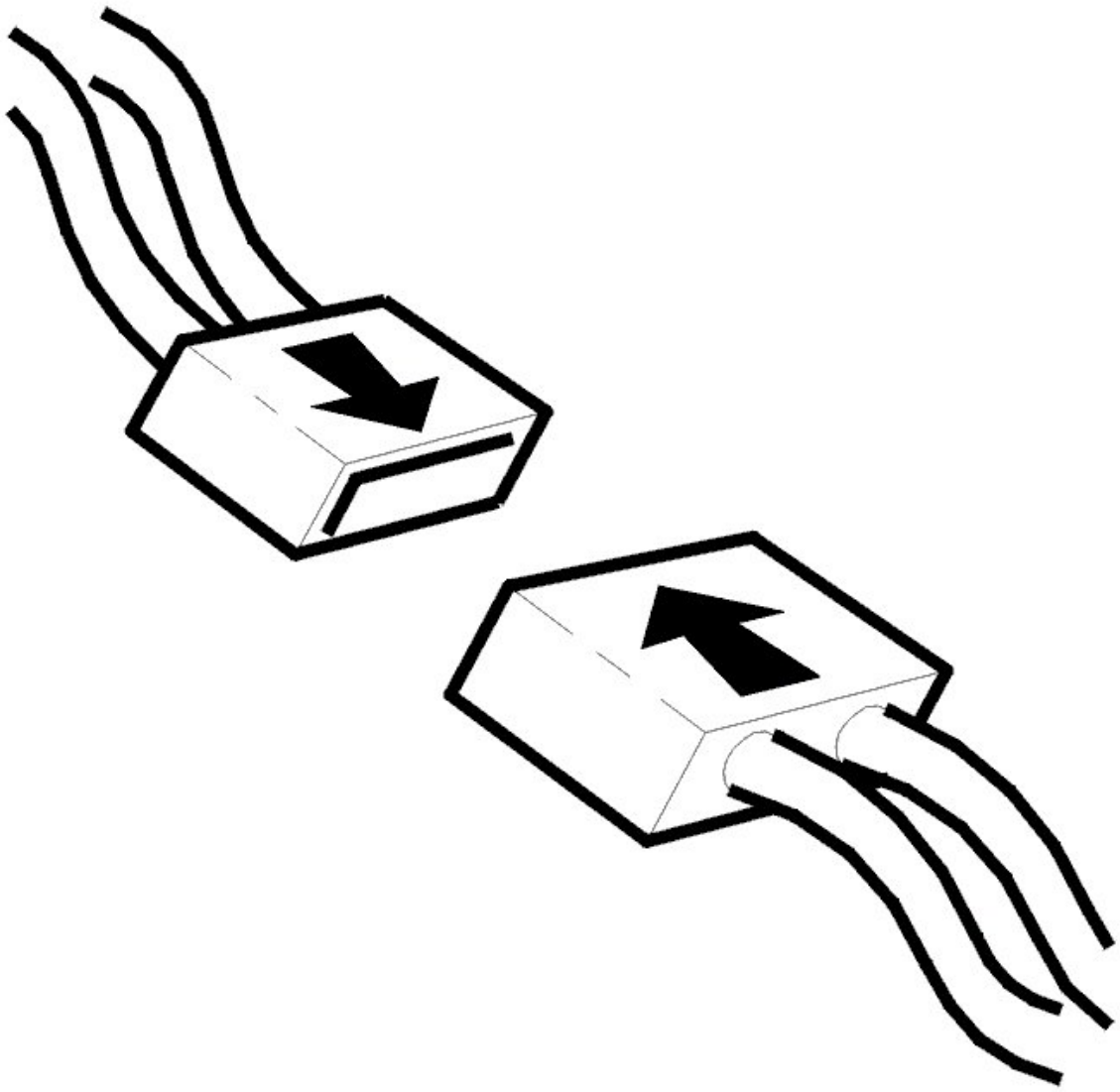
Verification

Verification

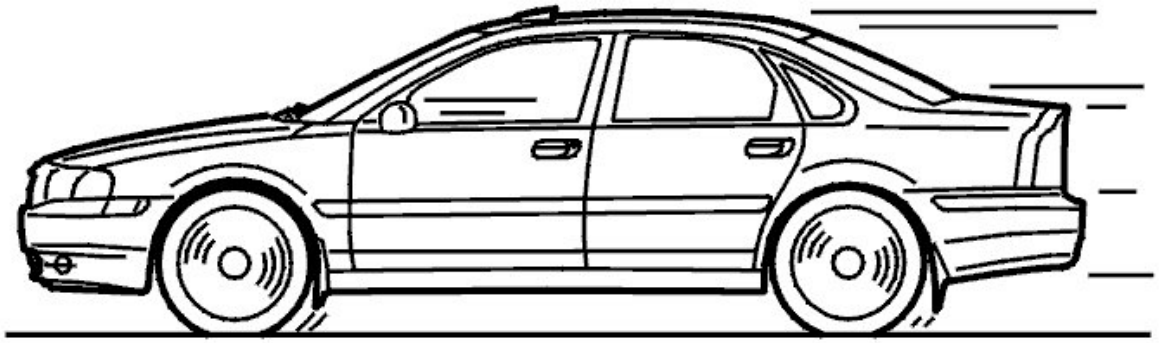
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

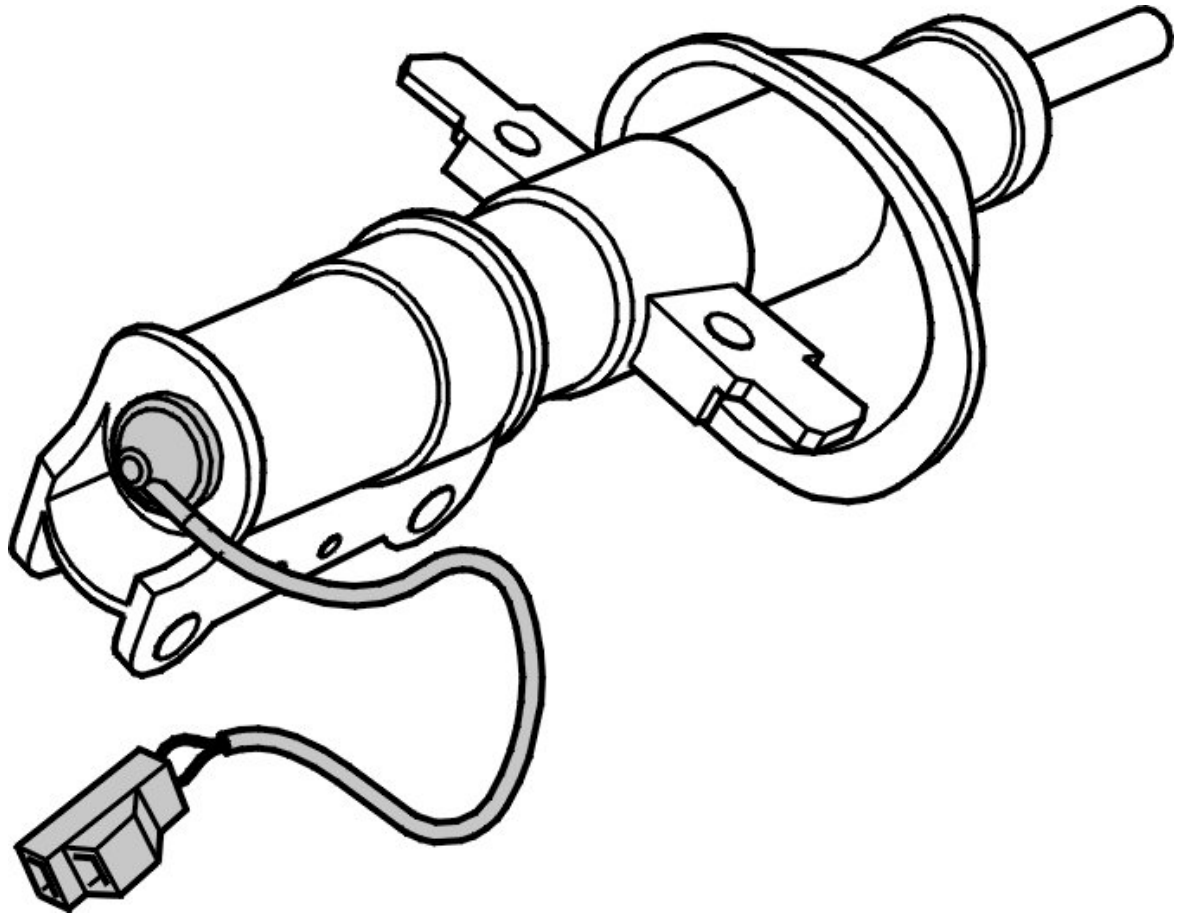
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0116, 0126, 0136 or SUM-0146 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0116: Solenoid, left front
- SUM-0126: Solenoid, right front
- SUM-0136: Solenoid, left rear
- SUM-0146: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply cable for the solenoid
- Defective solenoid.

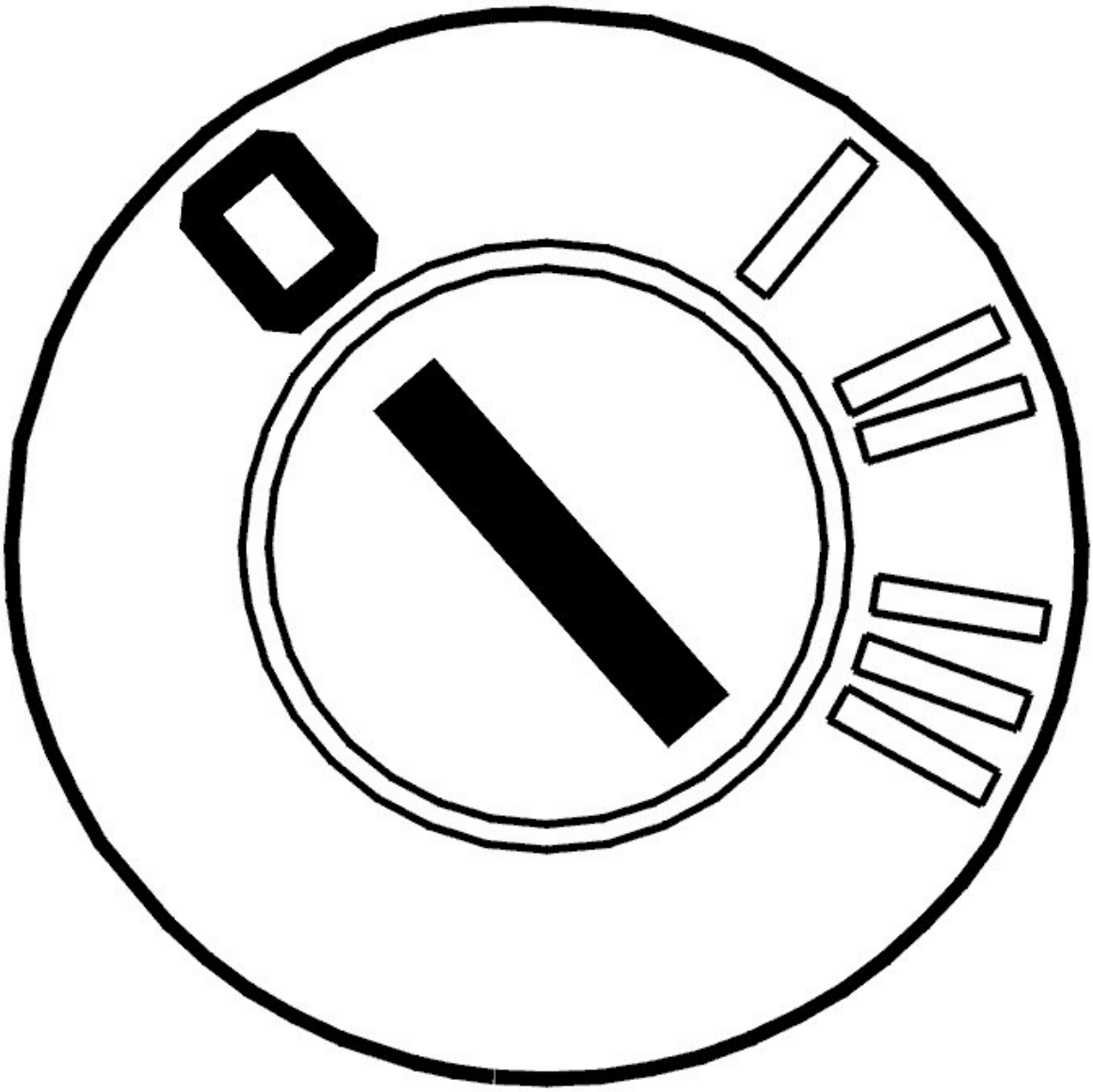
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0116, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0126, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0136, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0146, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

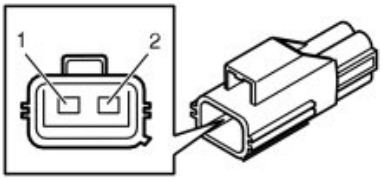
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

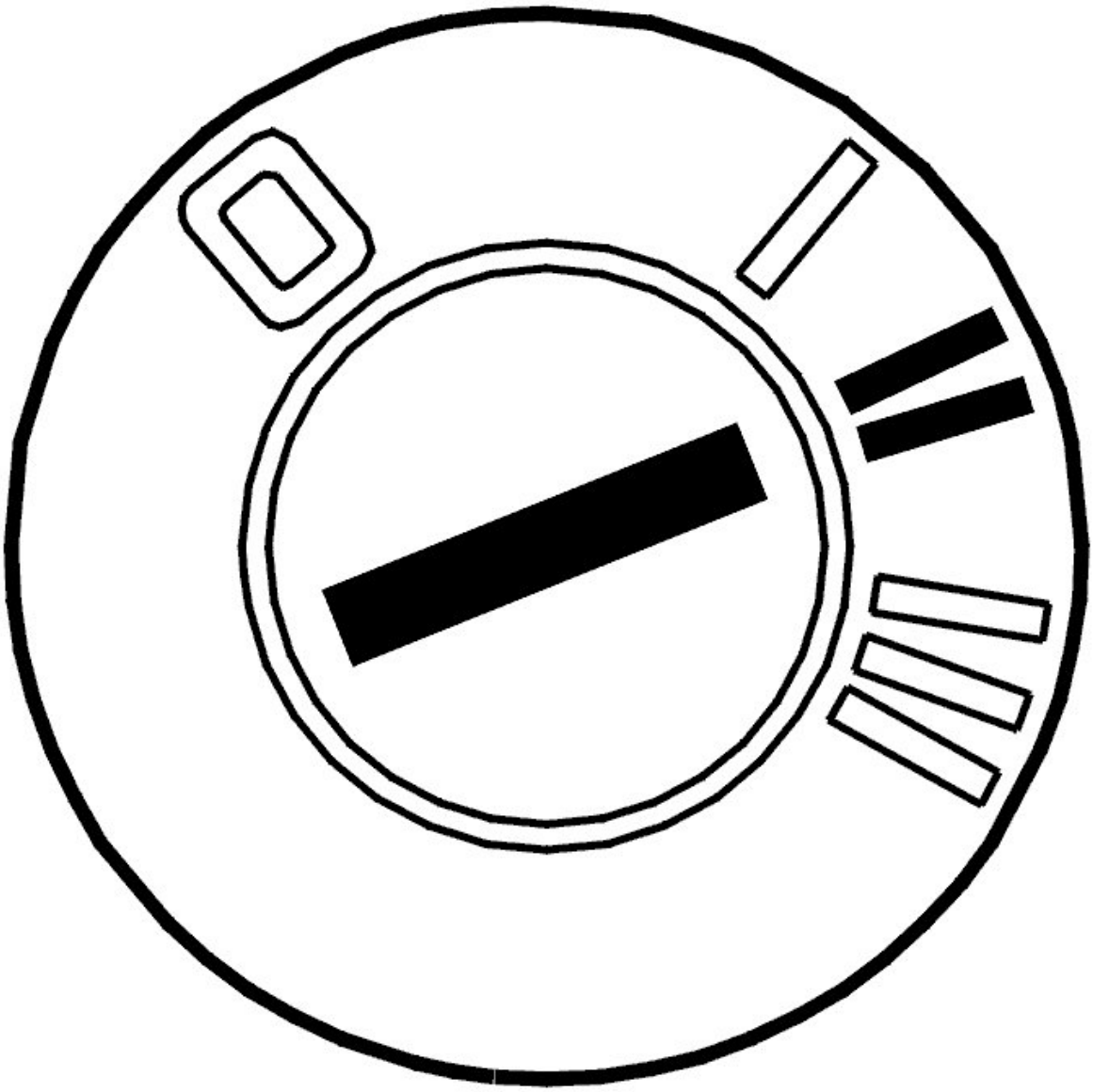
Verification

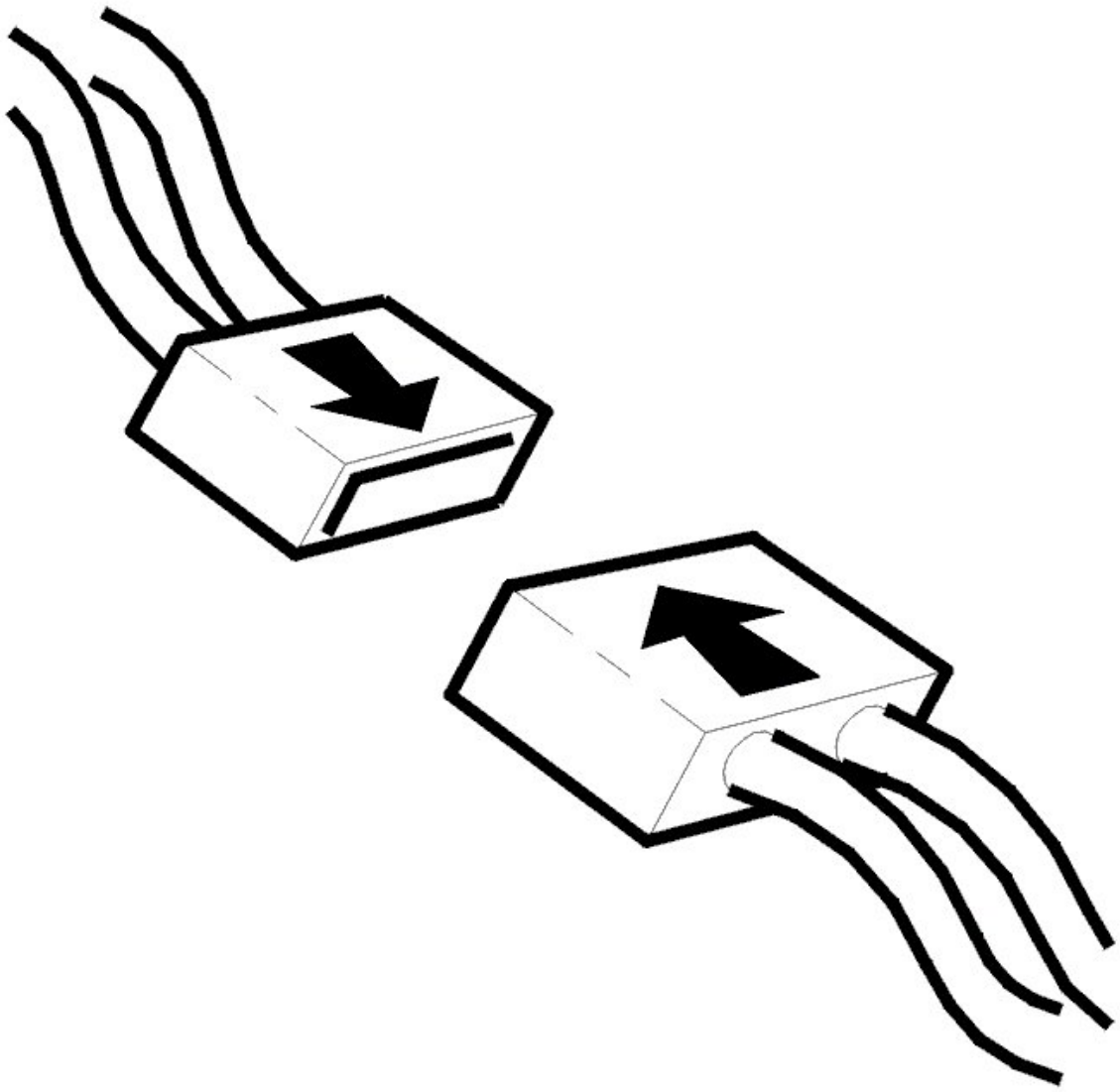
Verification

Verification

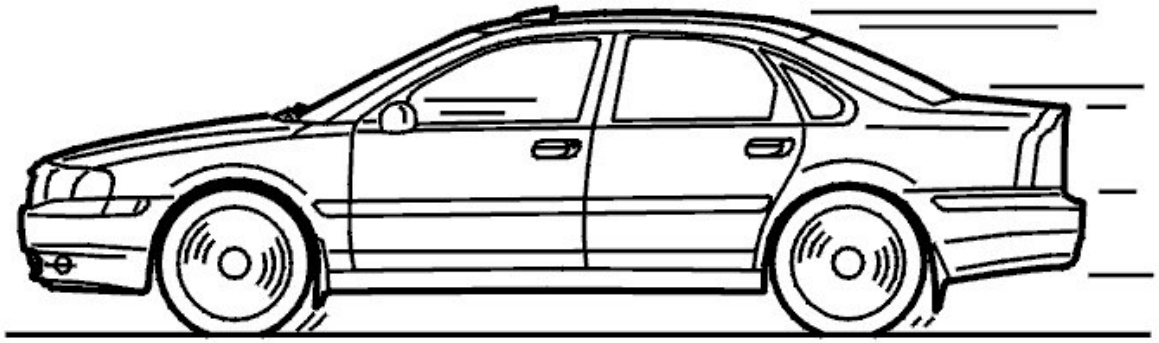
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

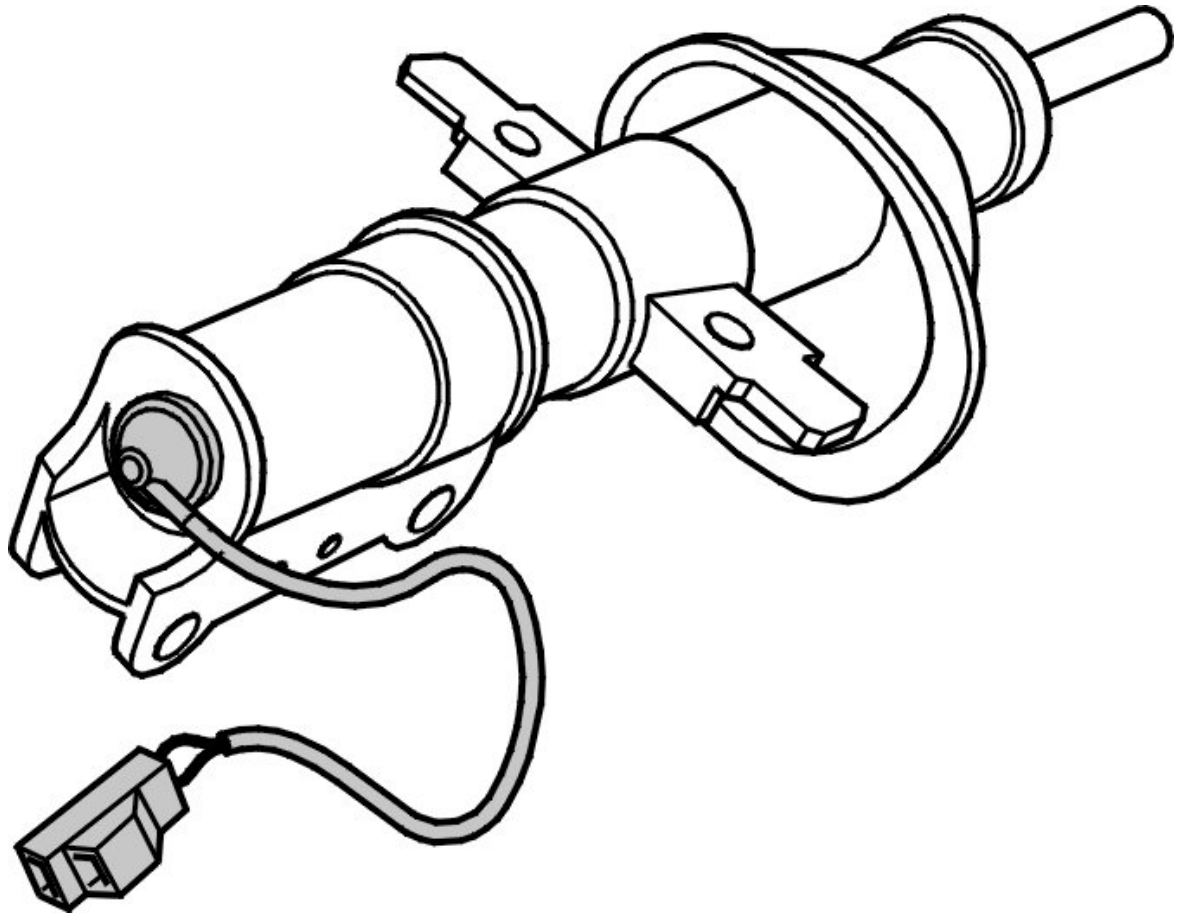
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0117, SUM-00127, SUM-0137 or SUM-0147 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0117: Solenoid, left front
- SUM-0127: Solenoid, right front
- SUM-0137: Solenoid, left rear
- SUM-0147: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to signal cable from the solenoid in the power supply cable for the solenoid
- Short-circuit to supply voltage in the signal cable from the solenoid
- Defective solenoid.

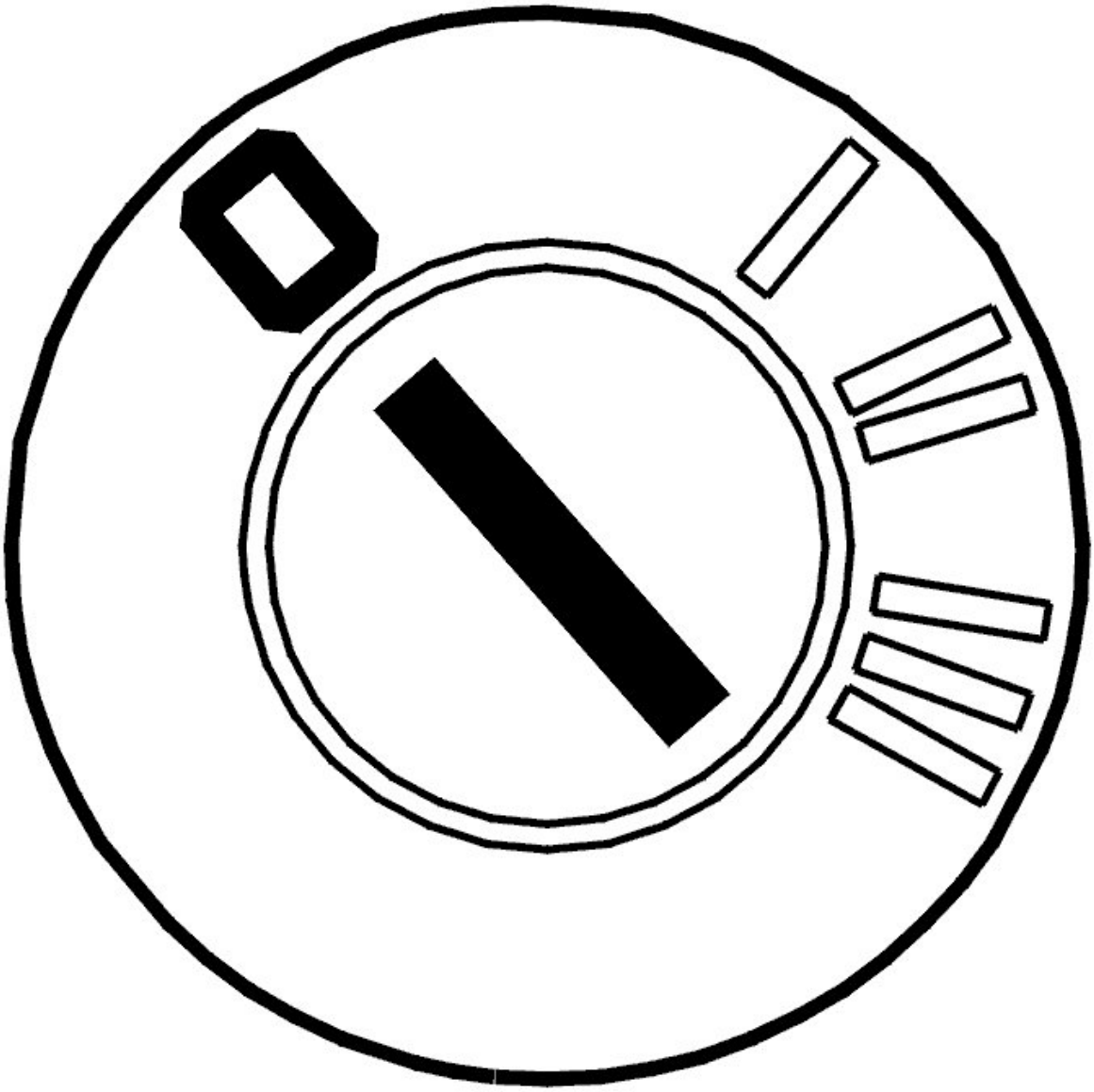
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking components and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0117, front left solenoid:
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0127, front right solenoid:
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0137, rear left solenoid:
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0147, rear right solenoid:
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

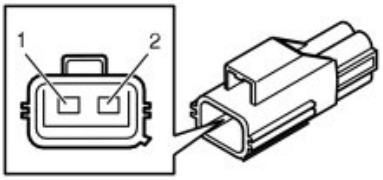
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

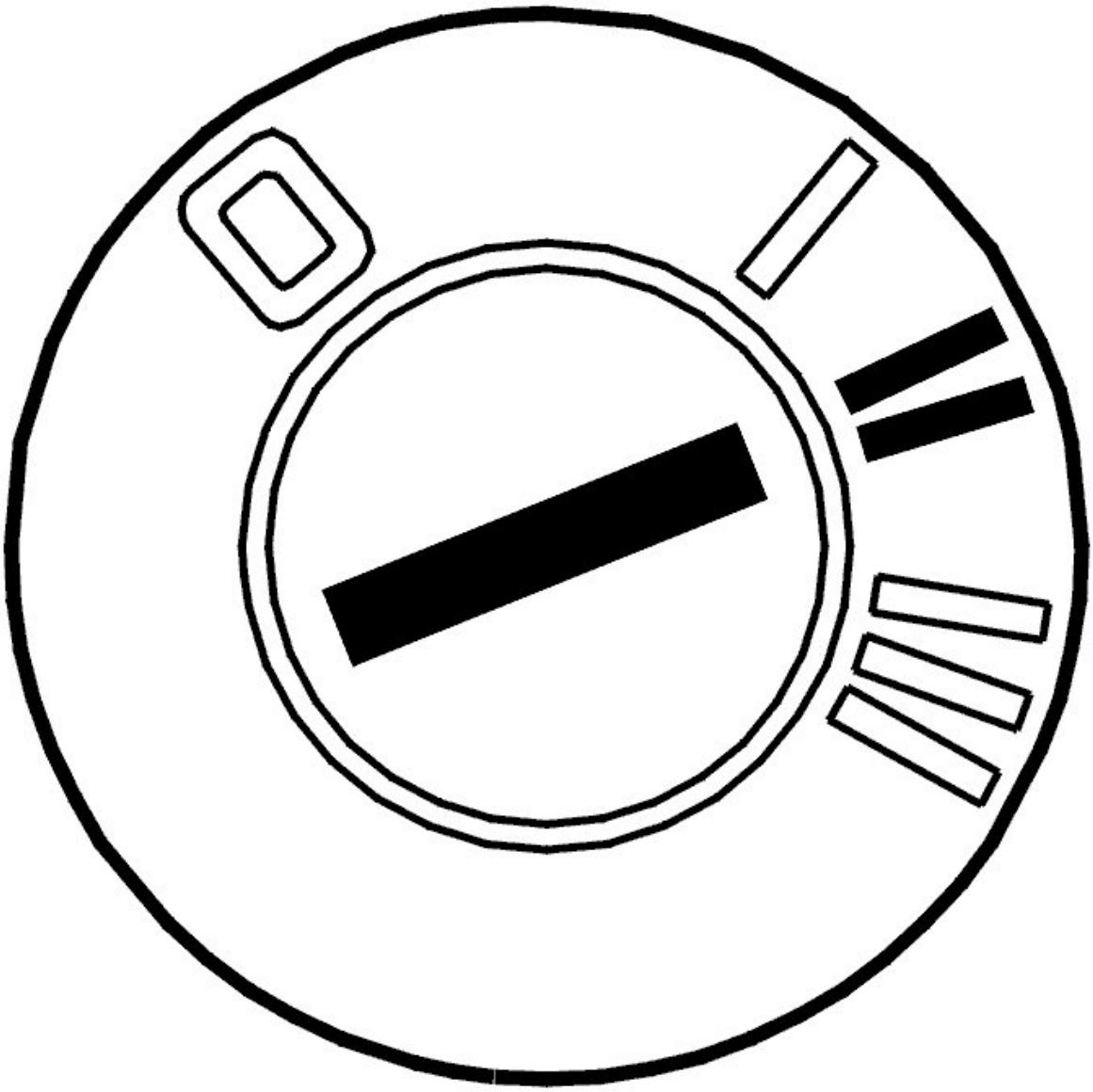
Verification

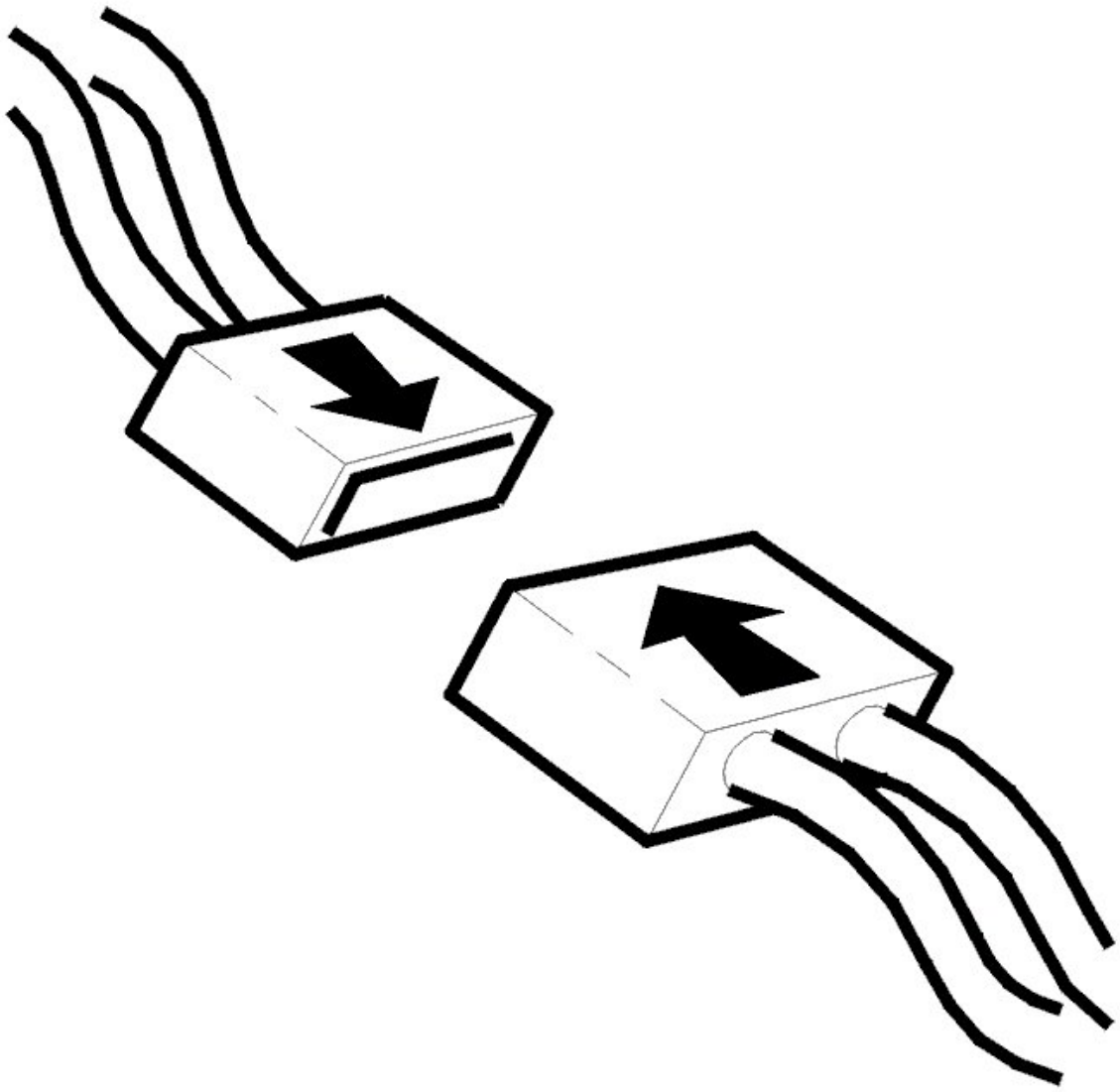
Verification

Verification

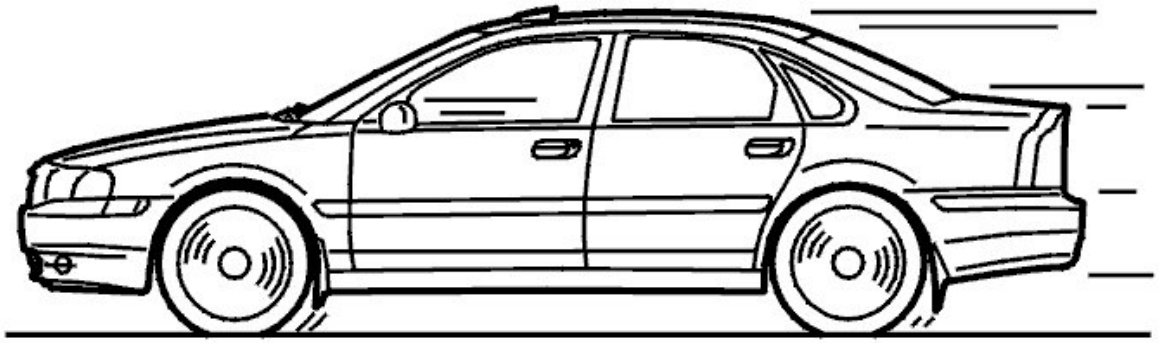
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

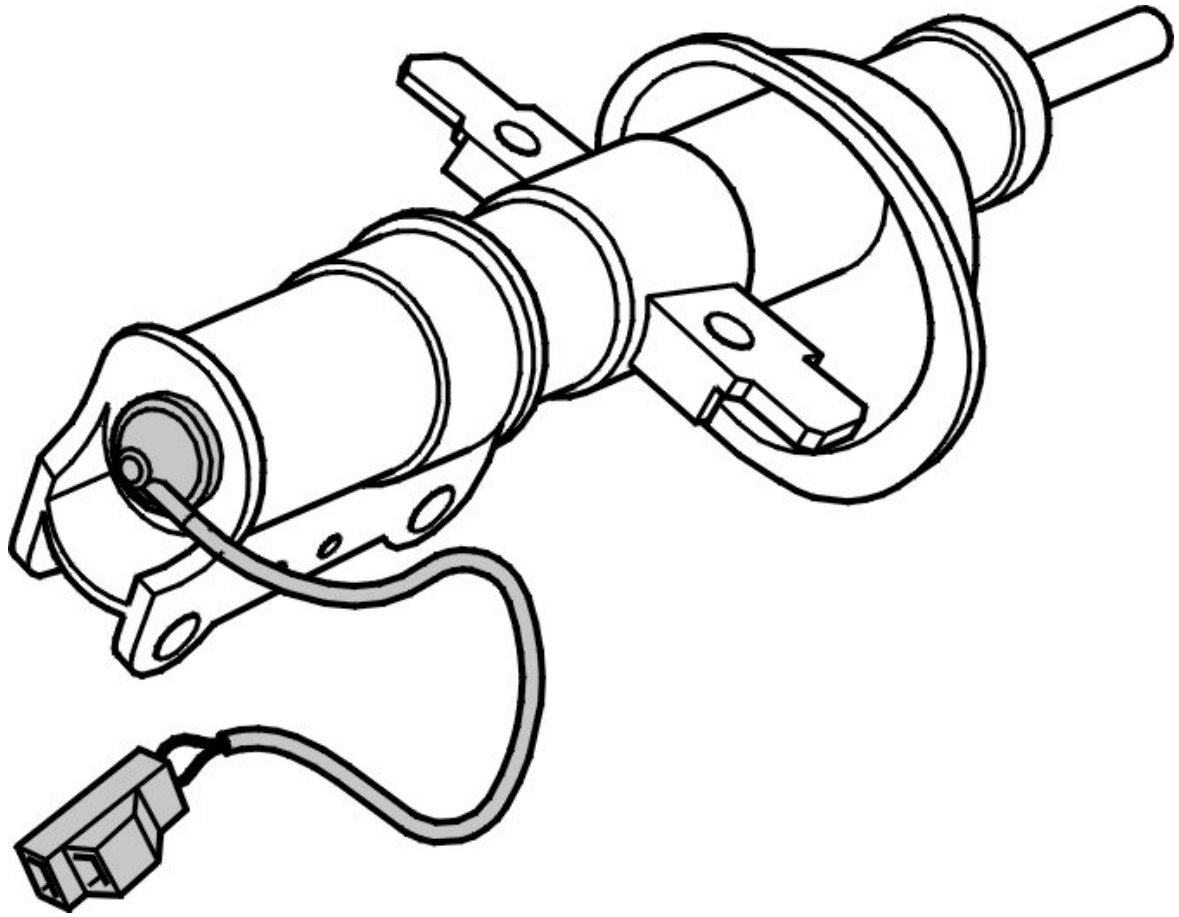
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the temperature of any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0118: Solenoid, left front
- SUM-0128: Solenoid, right front
- SUM-0138: Solenoid, left rear
- SUM-0148: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is limited.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Hard driving.

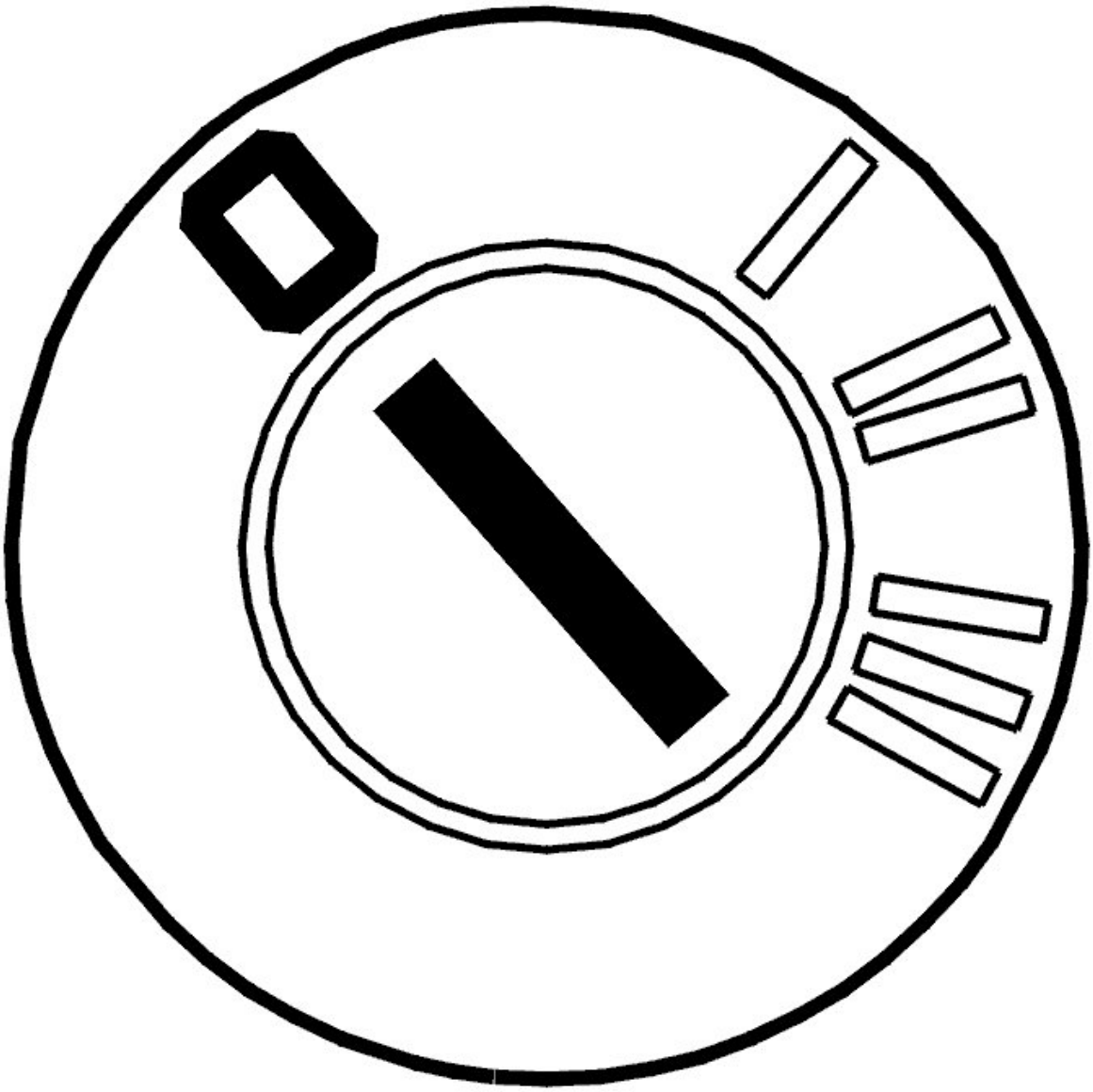
Fault symptom[s]

- None.

Temperature Too High

Temperature too high

Checking the component and wiring



- Ignition off.

Check the solenoids and connectors for the Suspension Module (SUM). Check for contact resistance. Check for oxidation.
Check the resistance of the solenoids.

For diagnostic trouble code (DTC) SUM-0118, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0128, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0138, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

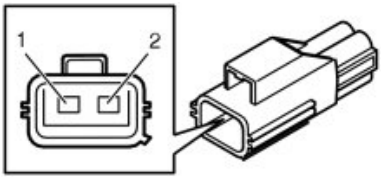
For diagnostic trouble code (DTC) SUM-0148, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

Remedy as necessary.

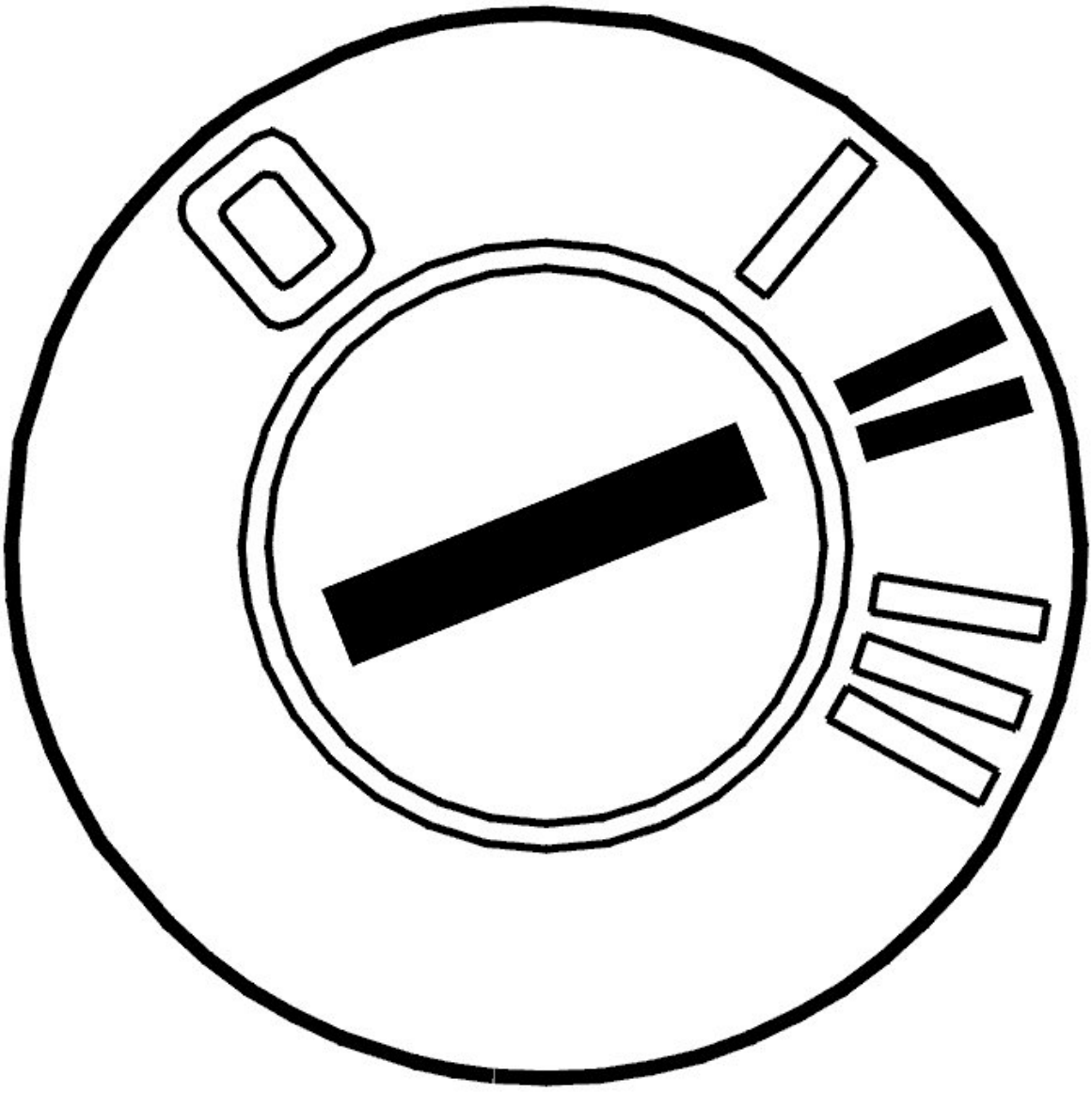
Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Calibrating the control module

Calibrating the control module

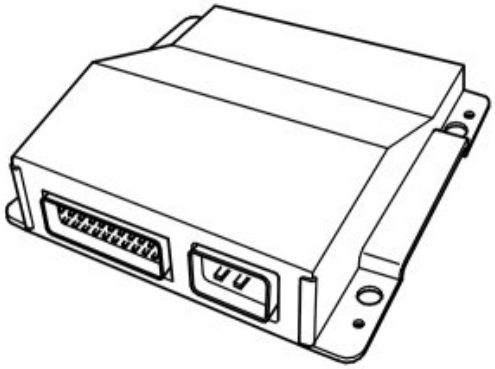


Note! In order for the Four-C (Continuously Controlled Chassis Concept) function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be calibrated.

- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is unloaded and on a flat surface with the wheels pointing straight ahead

- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.



Continue - Verification

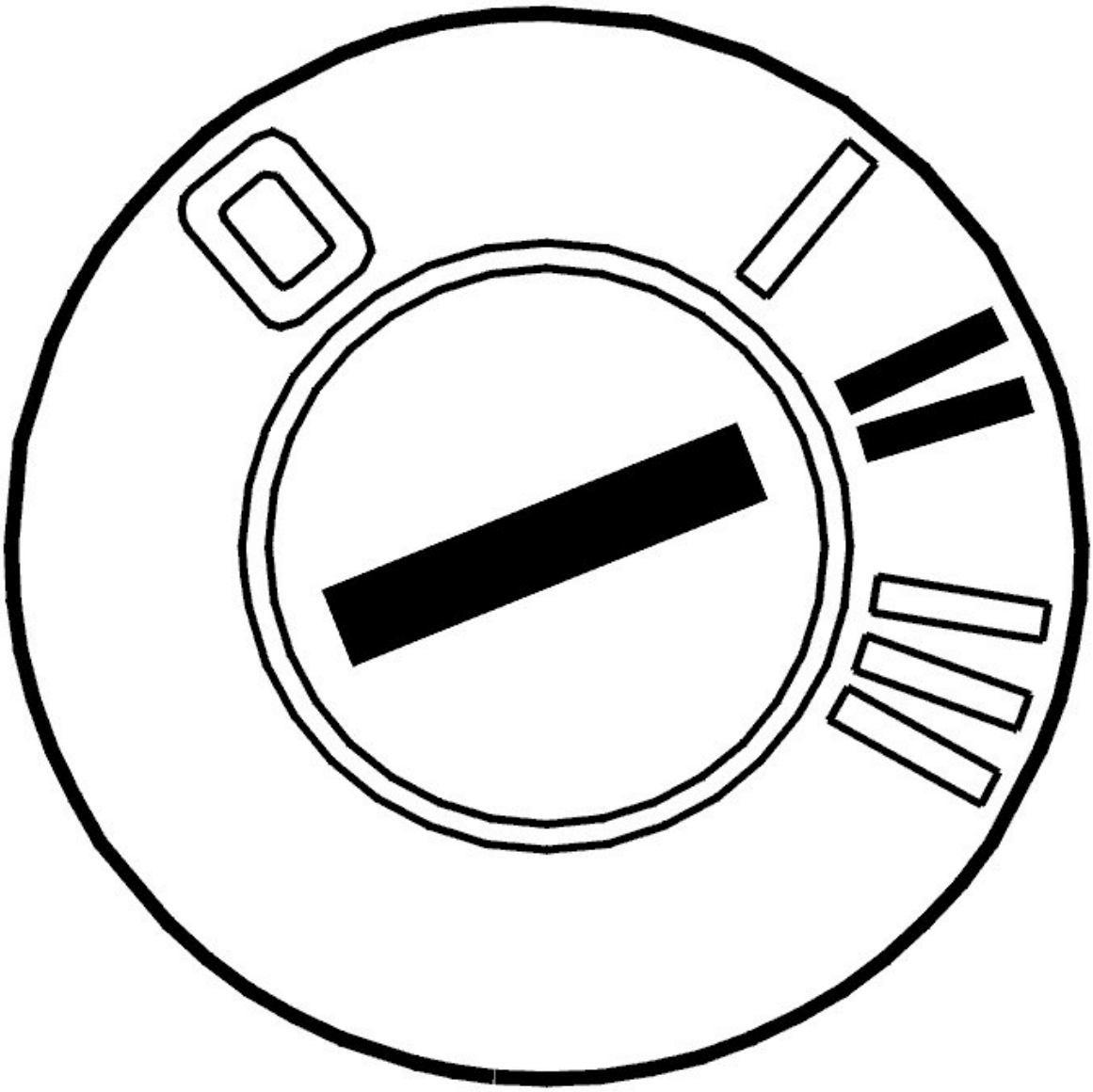
Verification

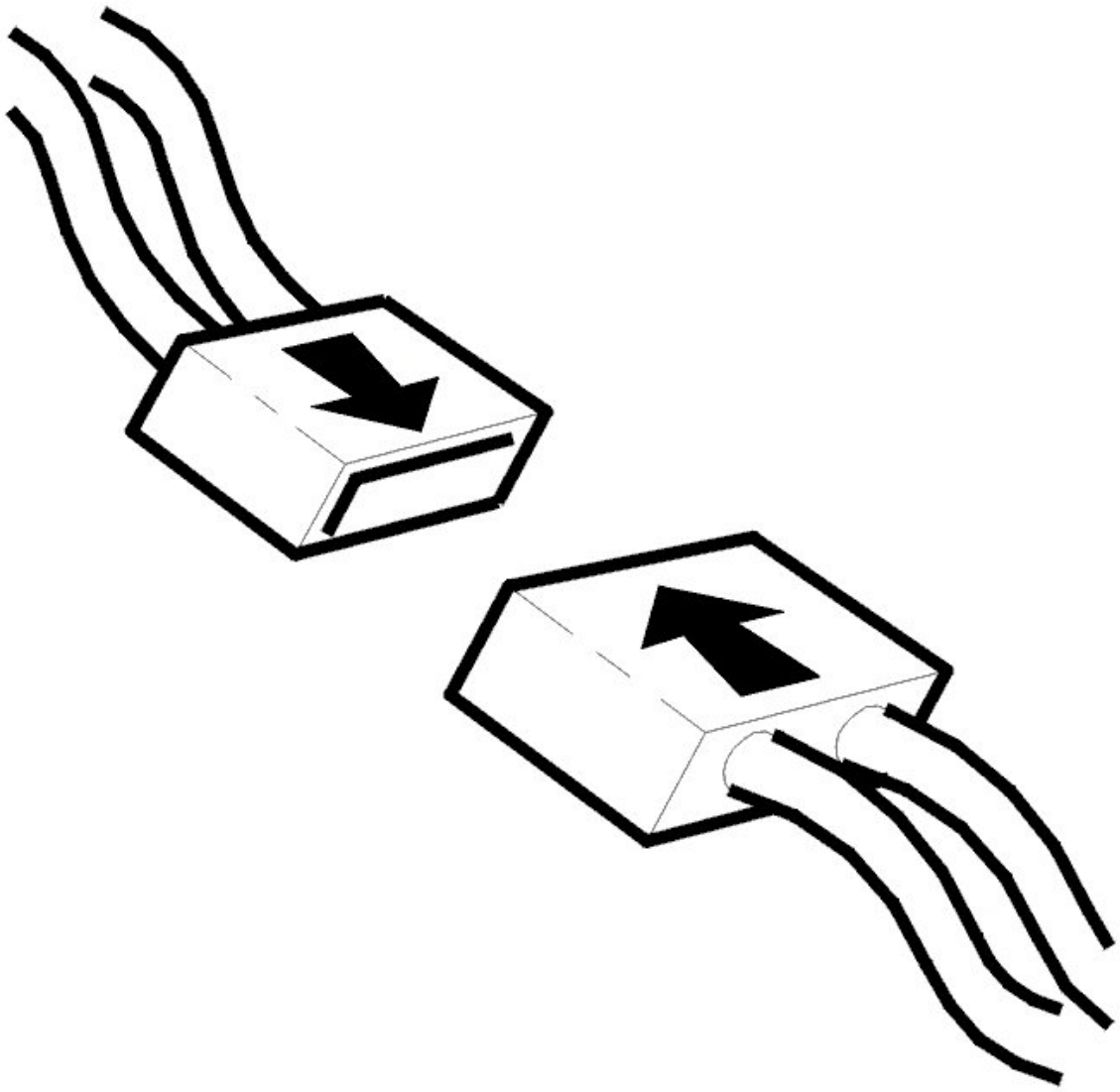
Verification

Verification

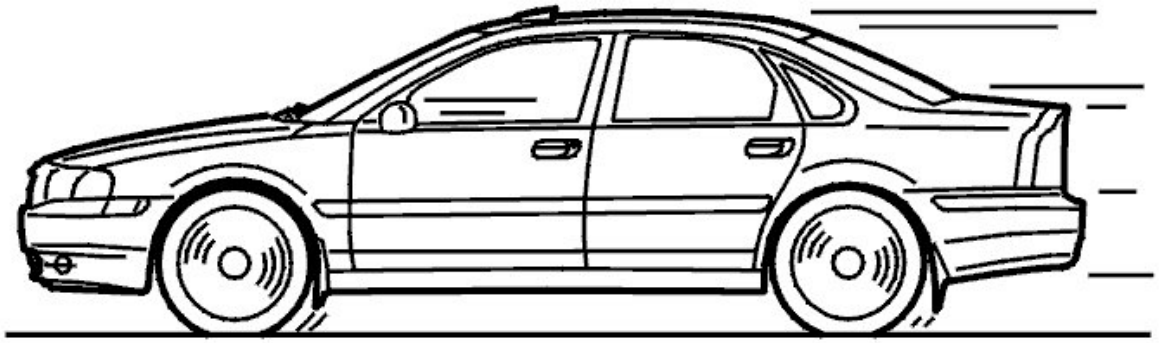
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

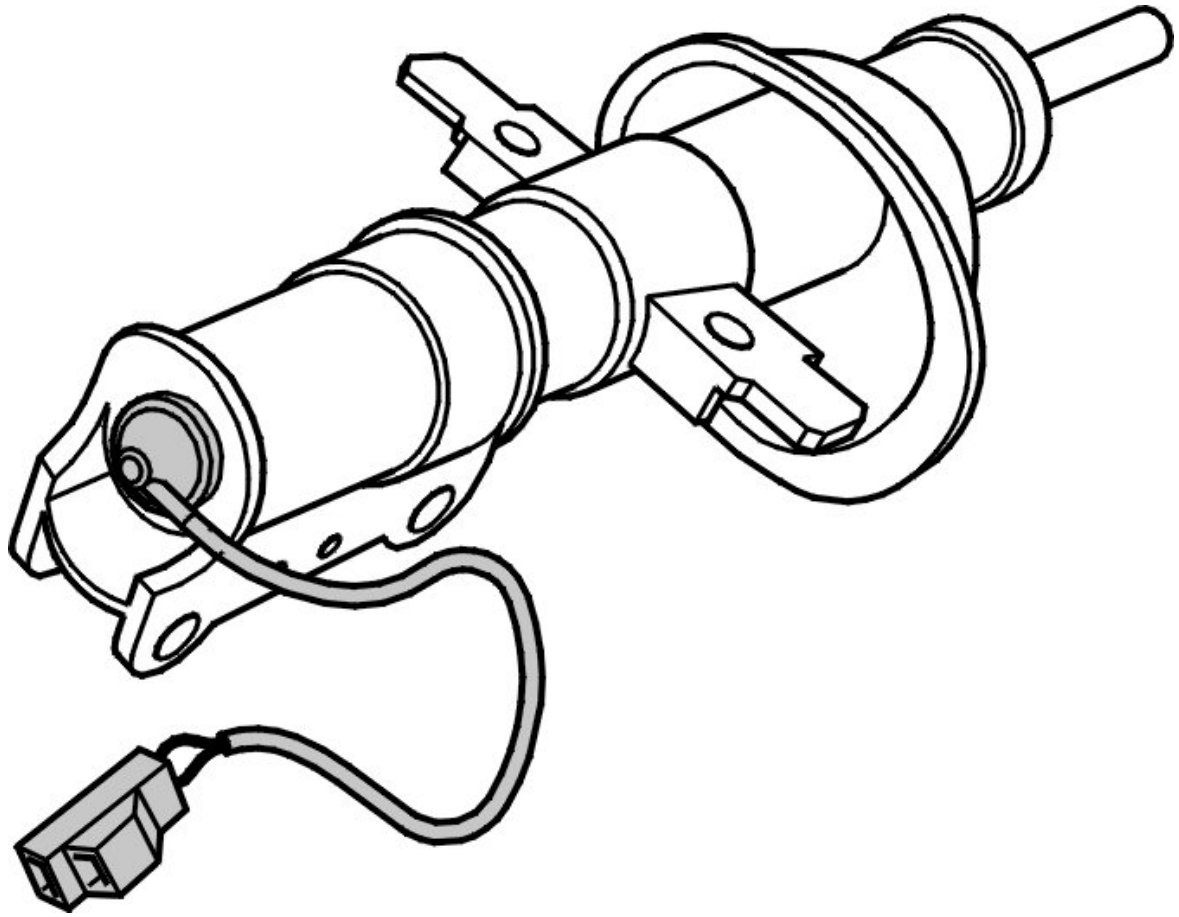
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0111: Solenoid, left front
- SUM-0121: Solenoid, right front
- SUM-0131: Solenoid, left rear
- SUM-0141: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply to the solenoid
- Damaged solenoid.

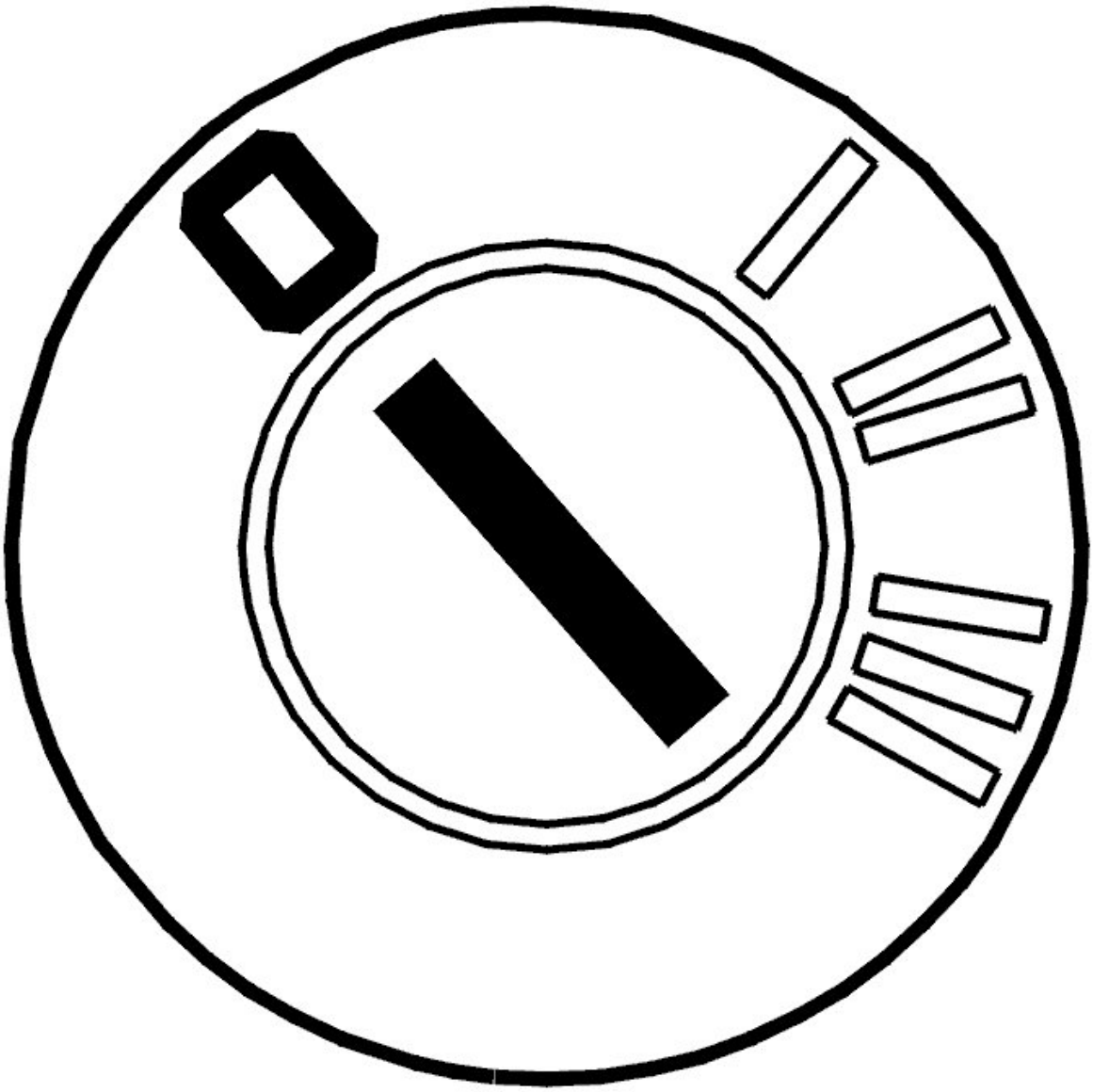
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too Low

Signal too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0111, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0121, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0131, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to ground.

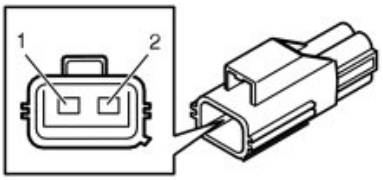
For diagnostic trouble code (DTC) SUM-0141, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to ground.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

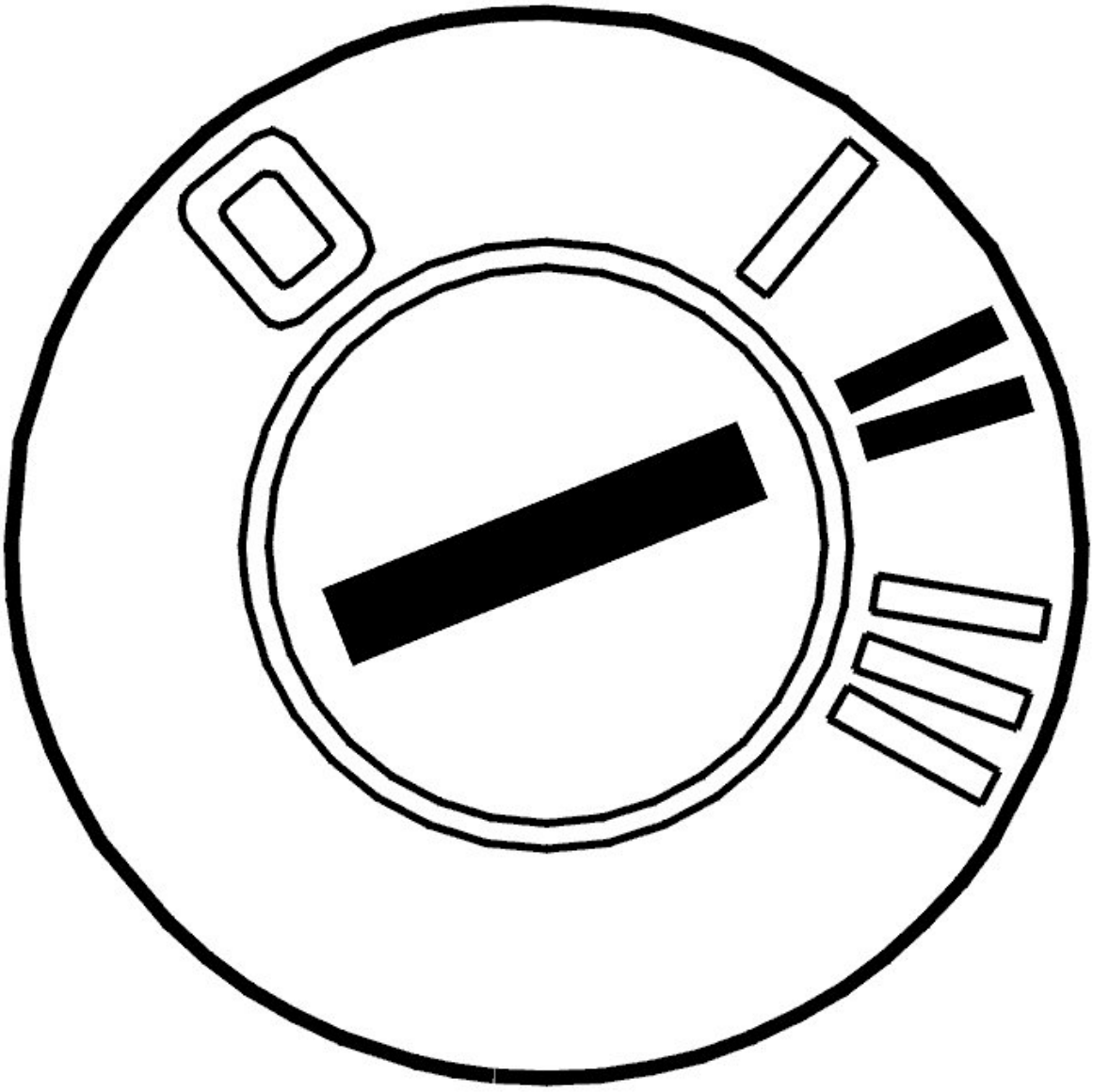
Verification

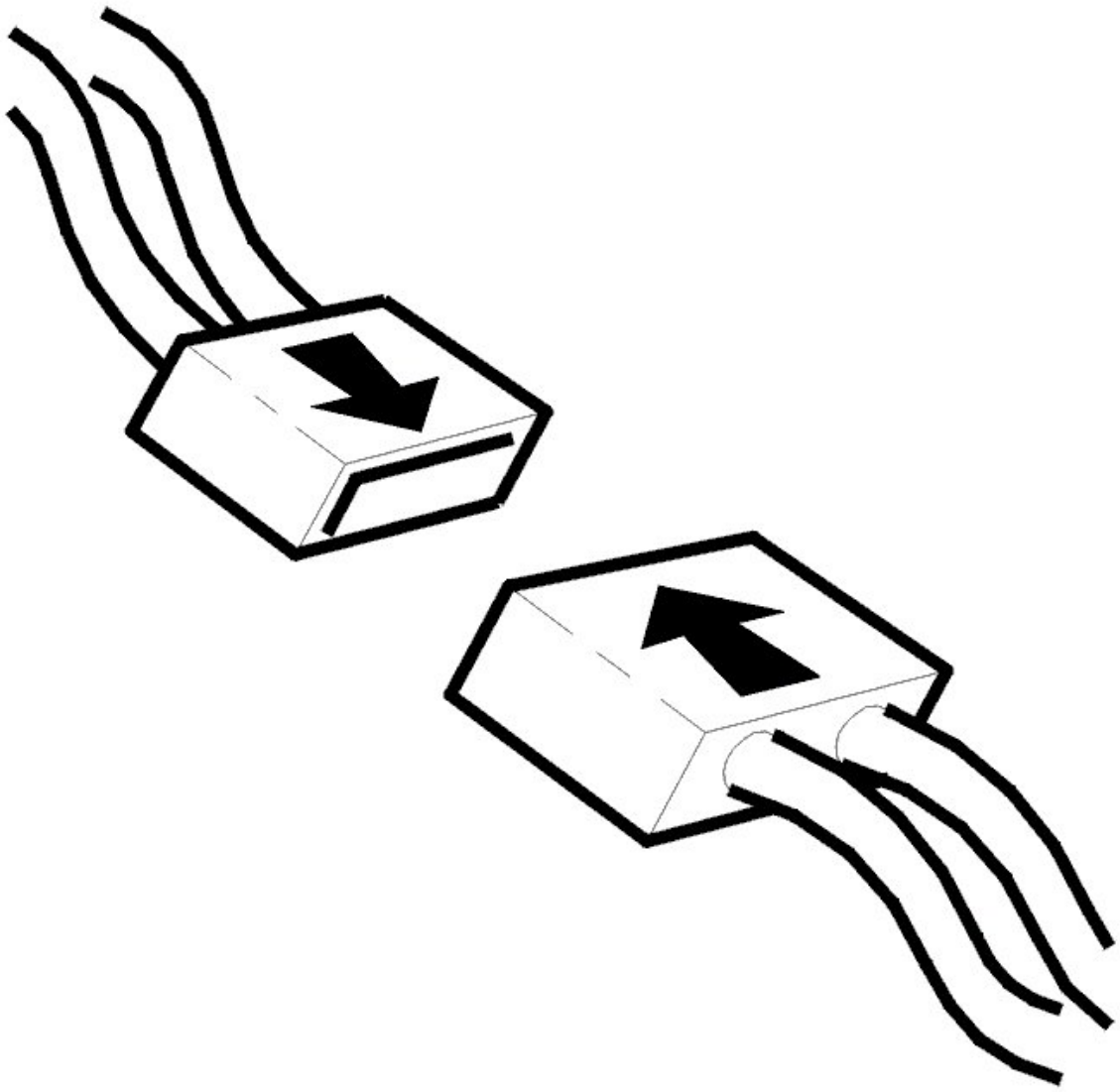
Verification

Verification

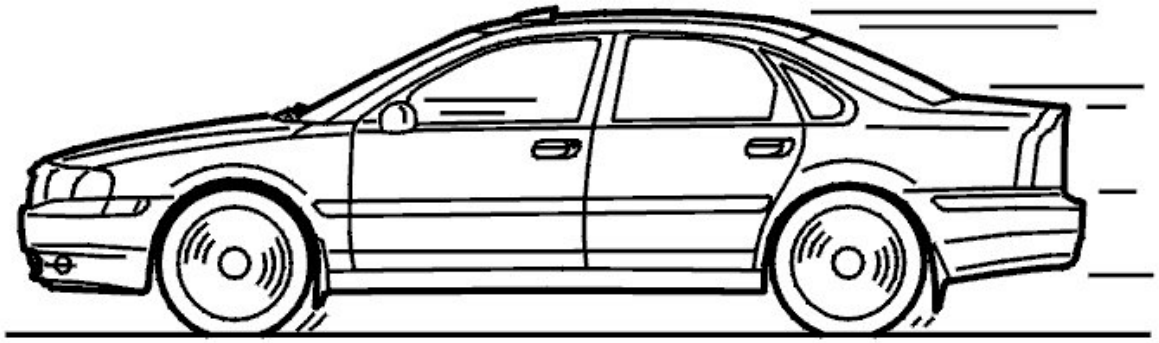
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

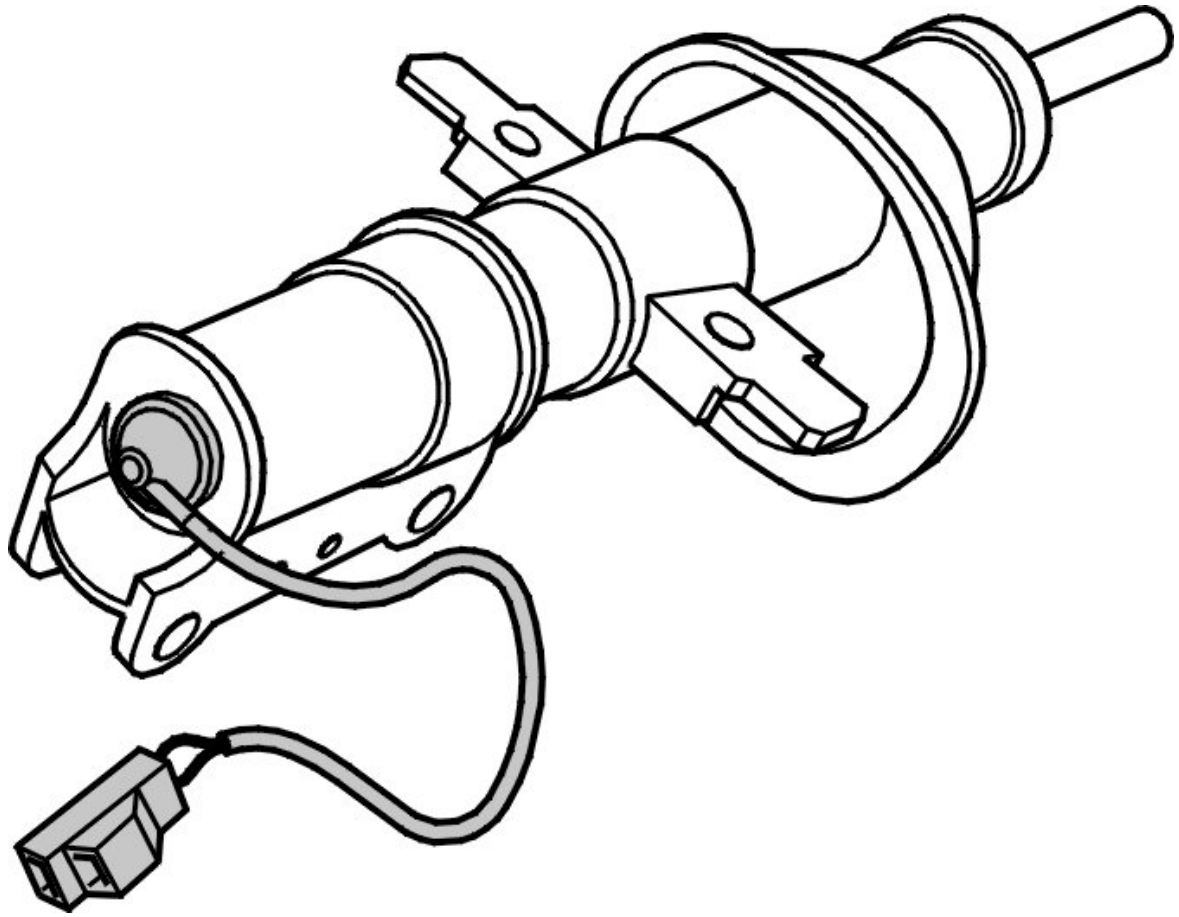
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0112: Solenoid, left front
- SUM-0122: Solenoid, right front
- SUM-0132: Solenoid, left rear
- SUM-0142: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable or power supply cable
- Damaged solenoid.

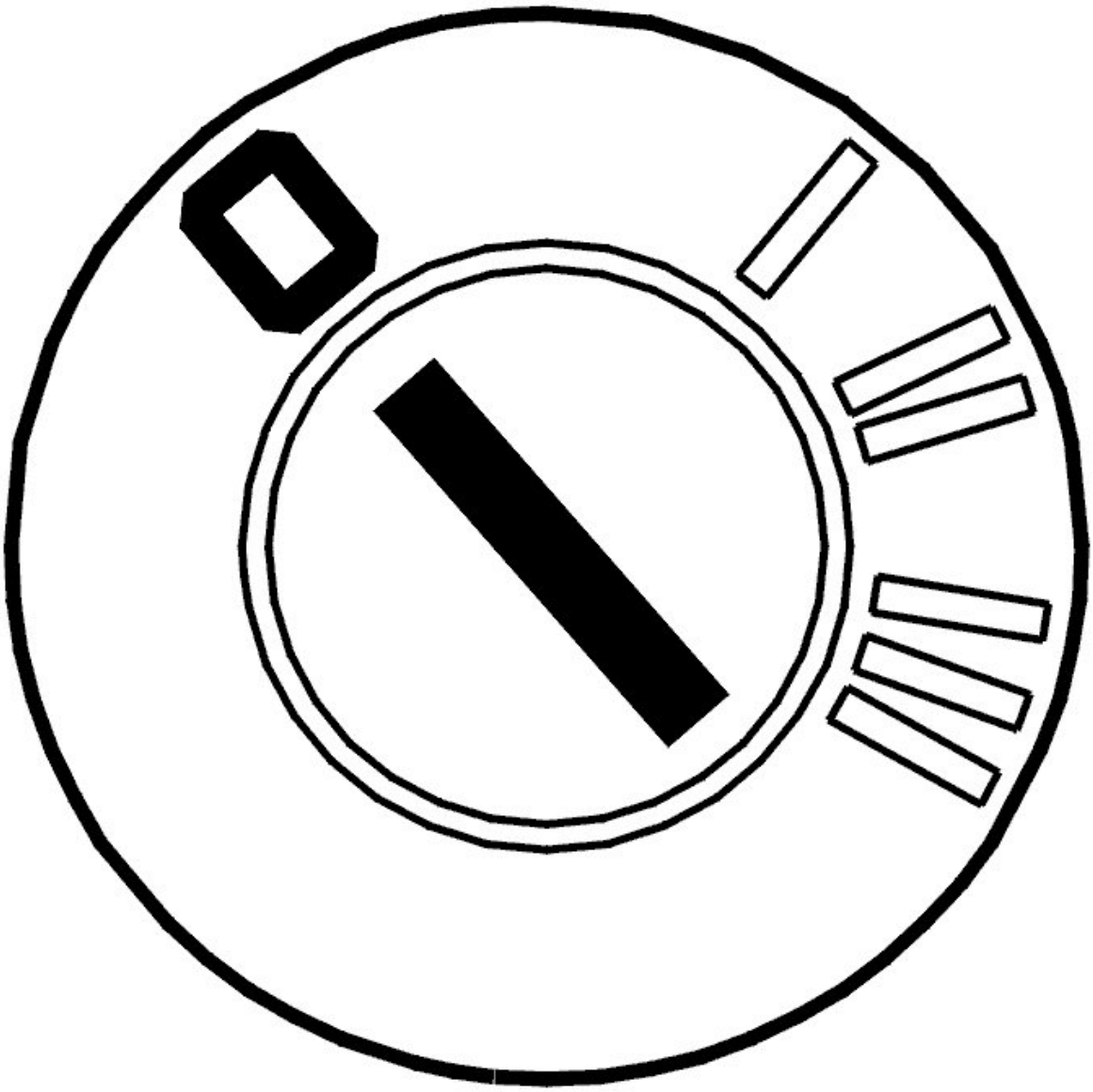
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

For diagnostic trouble code (DTC) SUM-0112, front left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0122, front right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0132, rear left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0142, rear right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage.

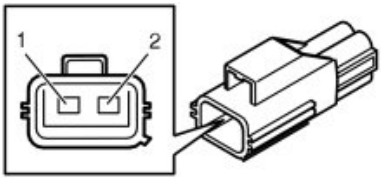
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and

Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

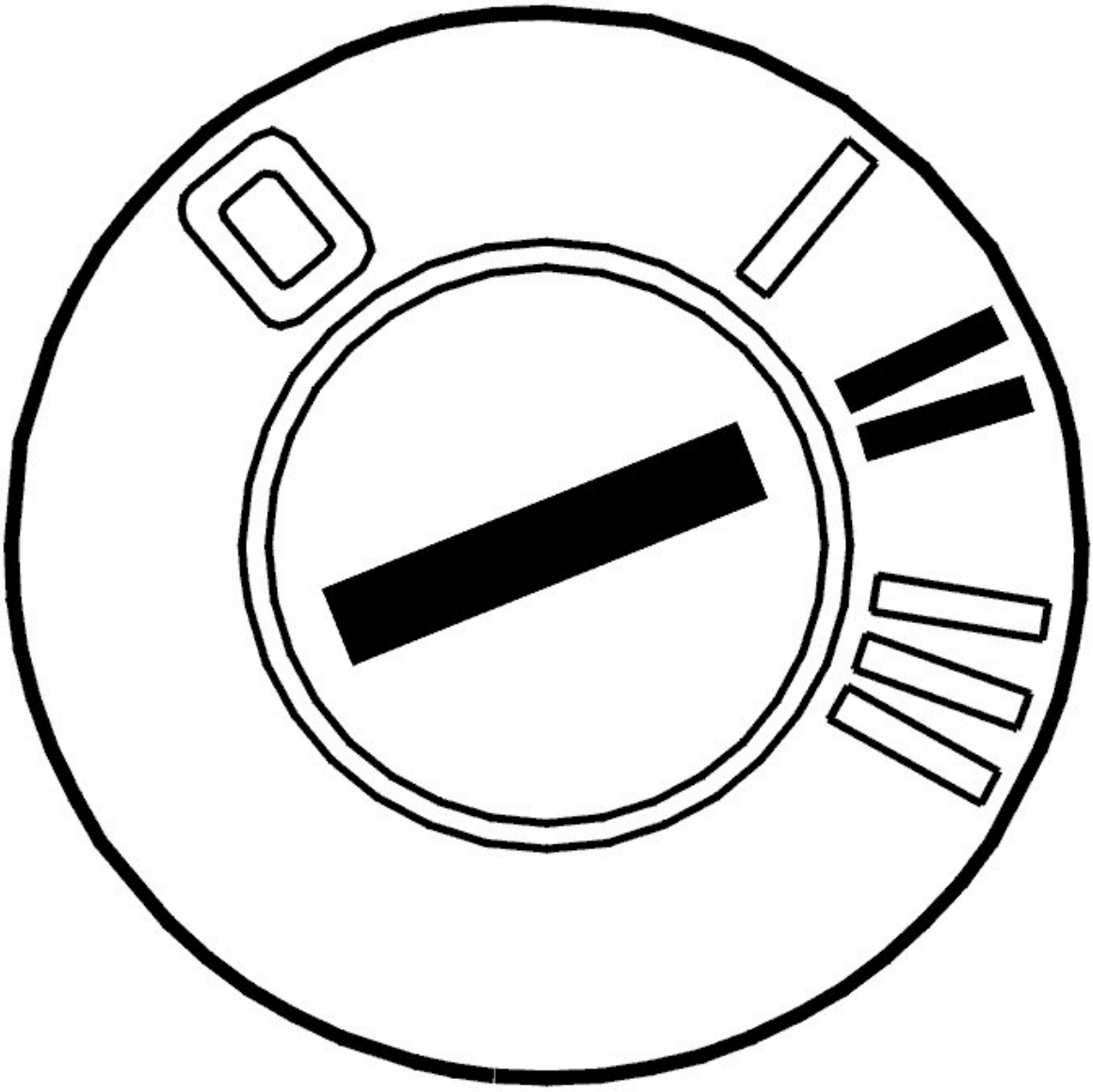
Verification

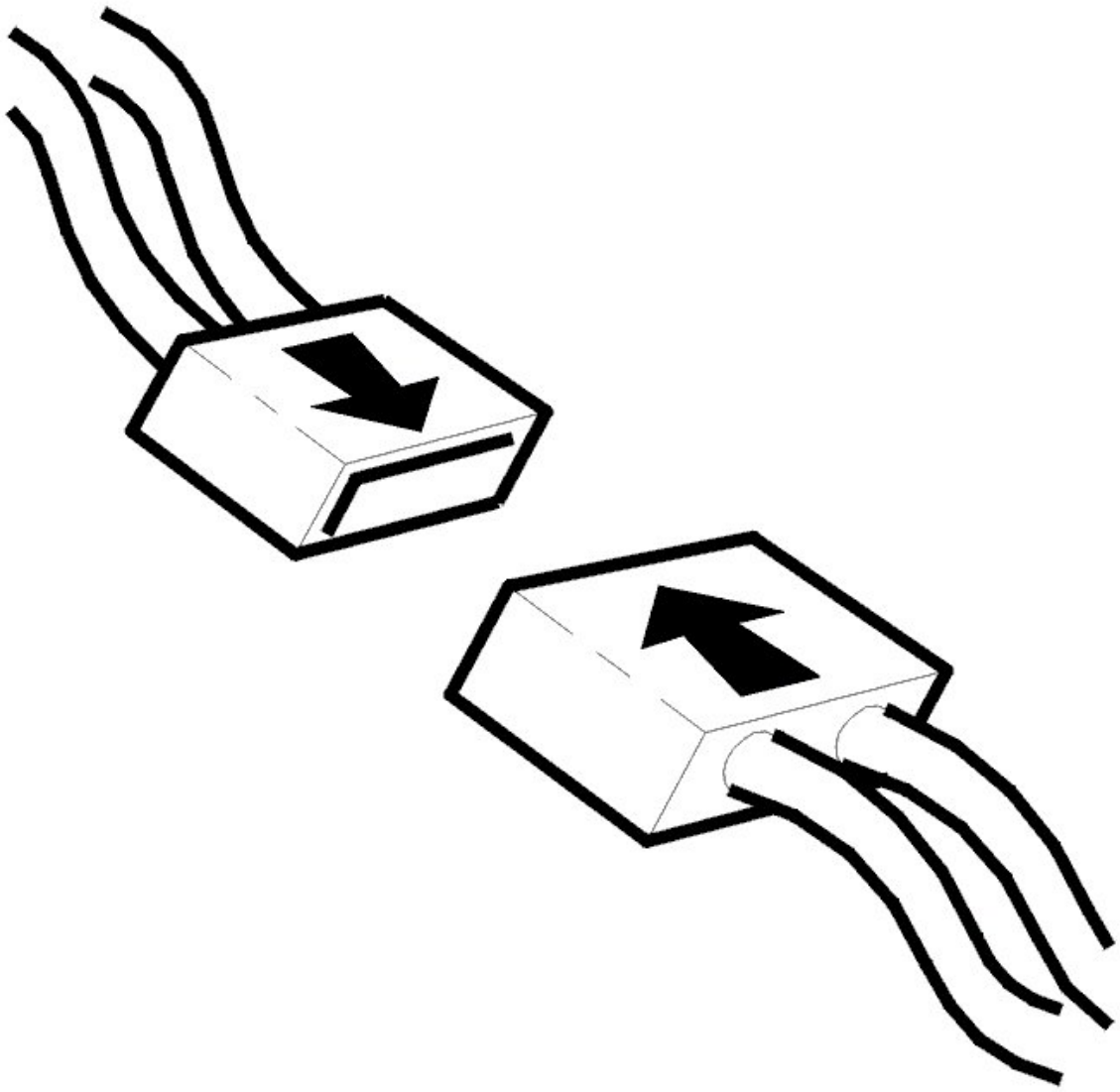
Verification

Verification

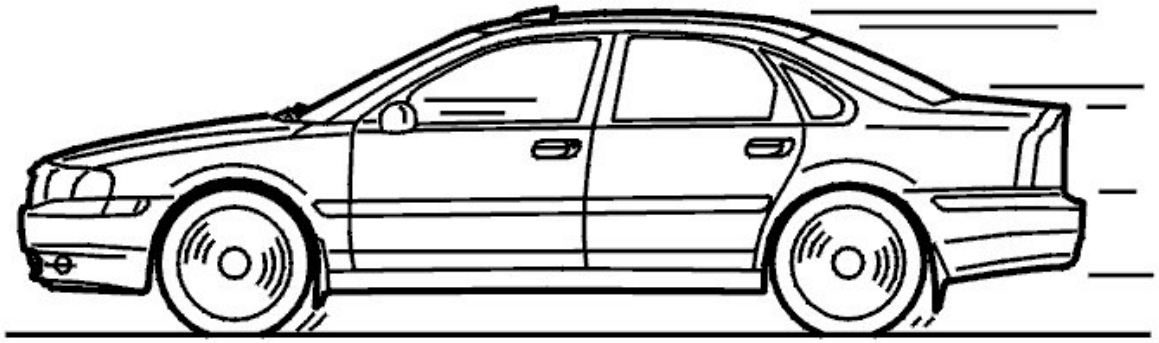
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

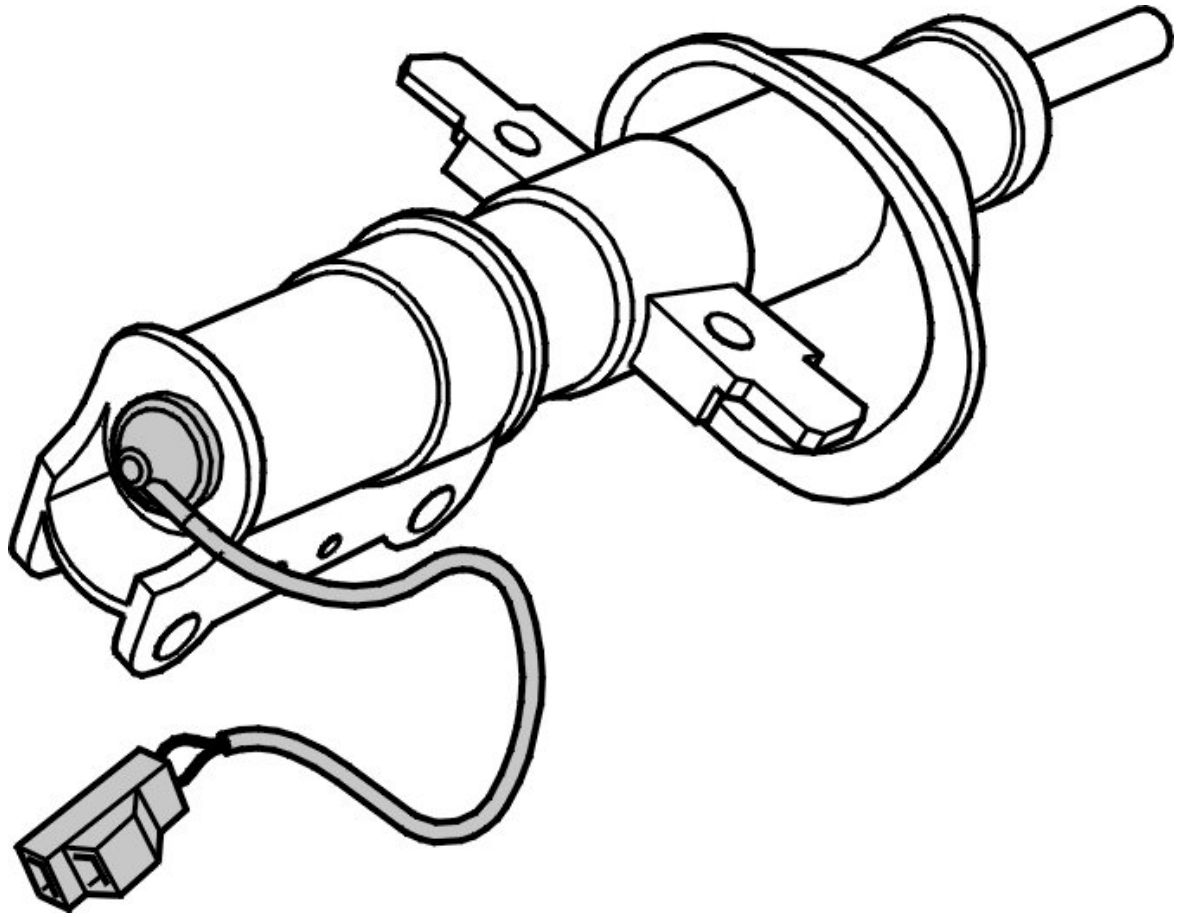
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is missing. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0113: Solenoid, left front
- SUM-0123: Solenoid, right front
- SUM-0133: Solenoid, left rear
- SUM-0143: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance or loose connections in the terminals
- Open-circuit in the power supply to the solenoid
- Open-circuit in the signal cable
- Damaged solenoid.

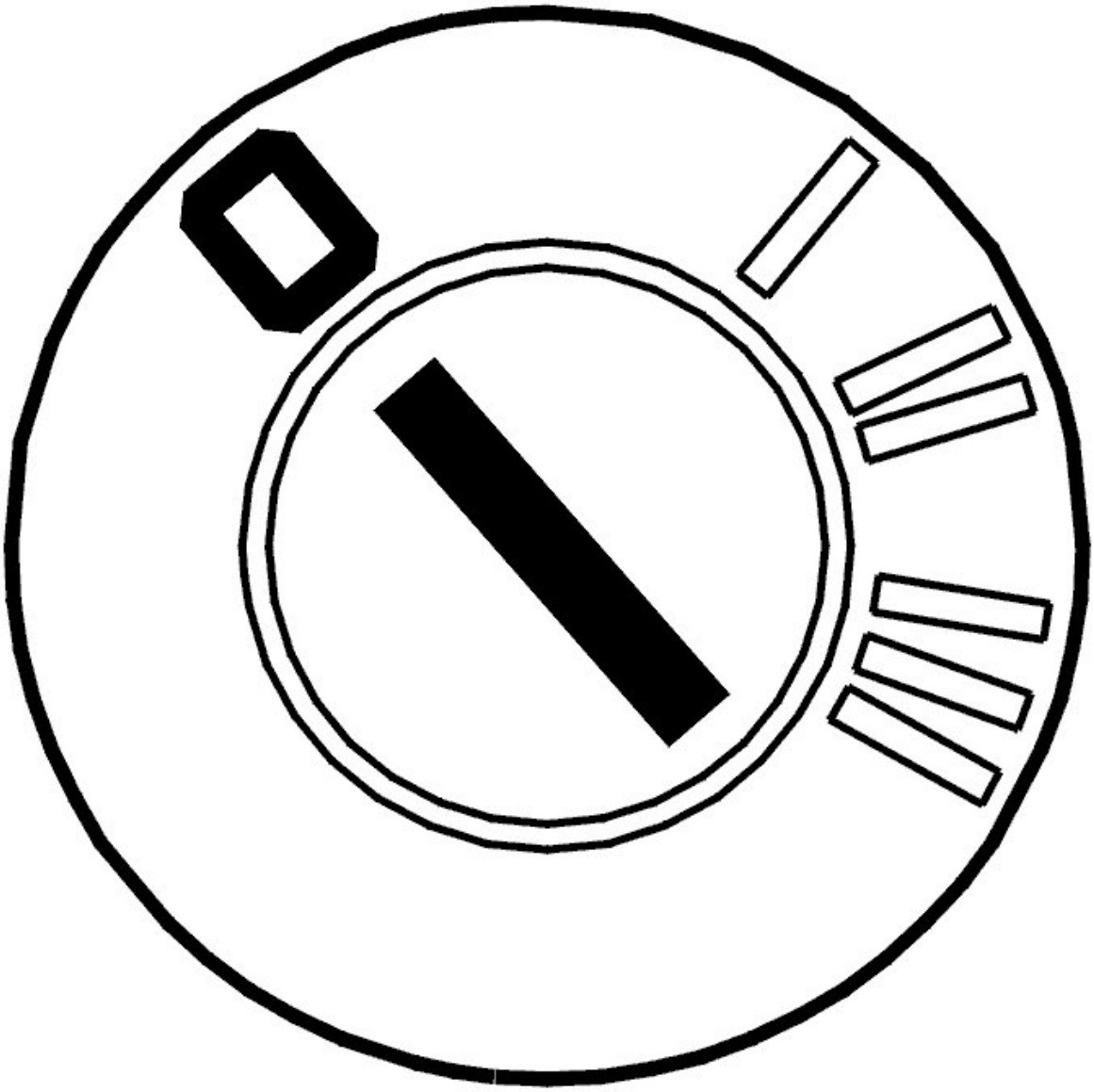
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Missing

Signal missing

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the suspension module (SUM) and the solenoids. Check for oxidation. Check for loose connections.

For diagnostic trouble code (DTC) SUM-0113, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0123, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A8 and solenoid terminal #2. Check for an open-circuit.

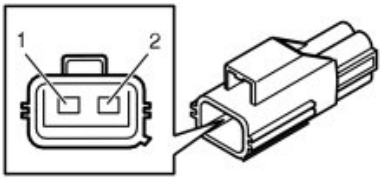
For diagnostic trouble code (DTC) SUM-0133, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A1 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0143, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A4 and solenoid terminal #2. Check for an open-circuit.

Remedy as necessary.

Other information:
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

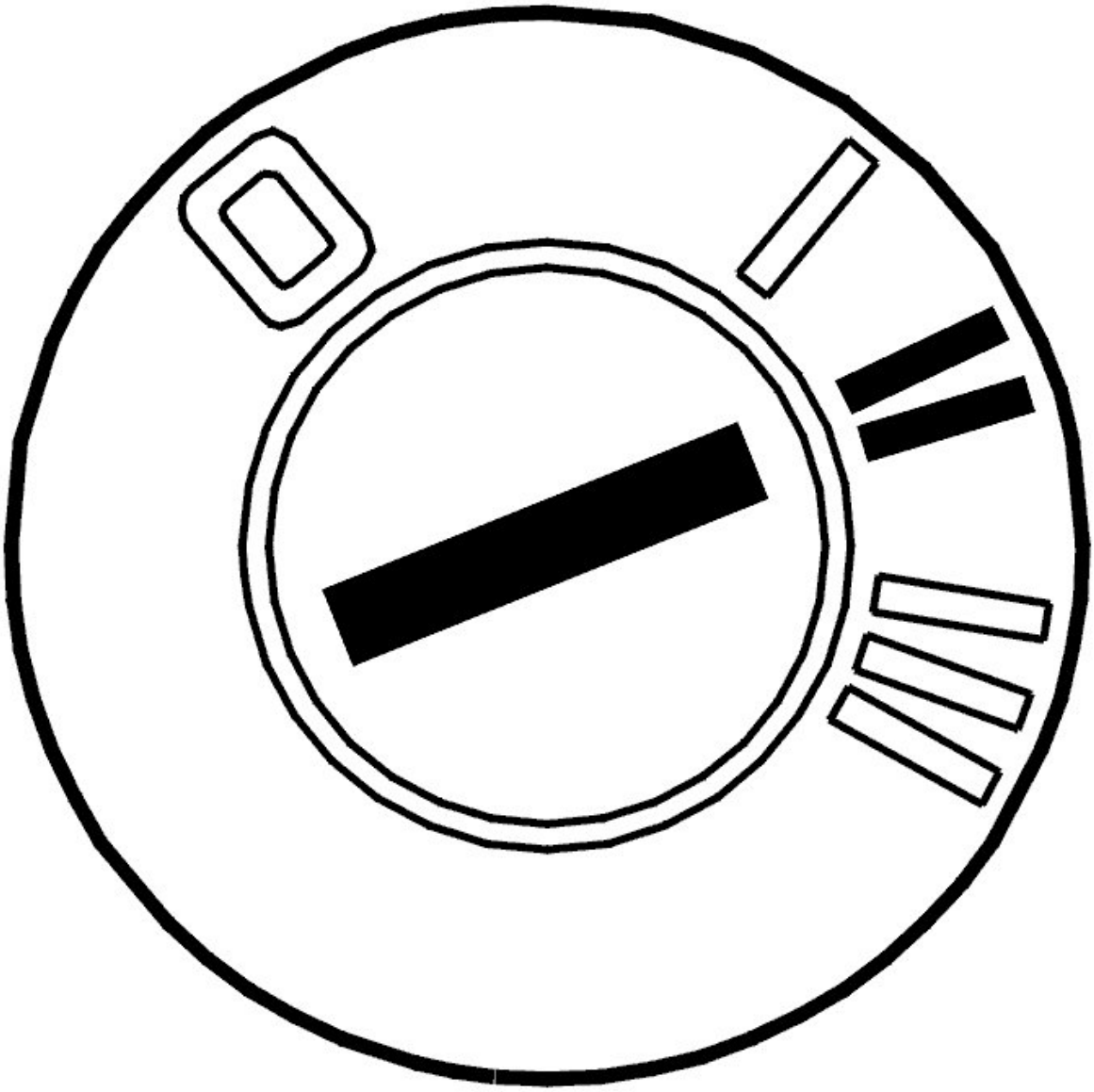
Verification

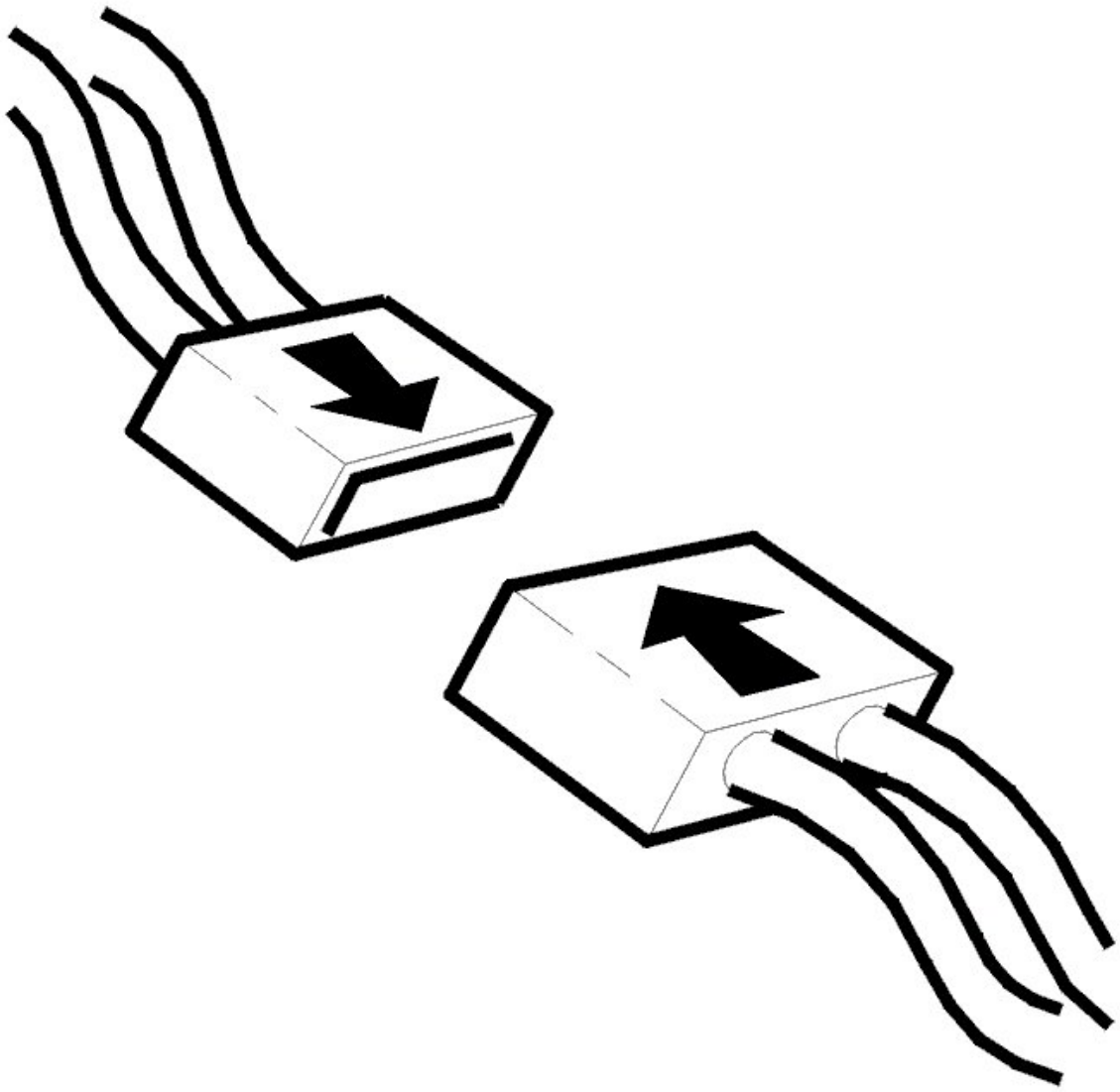
Verification

Verification

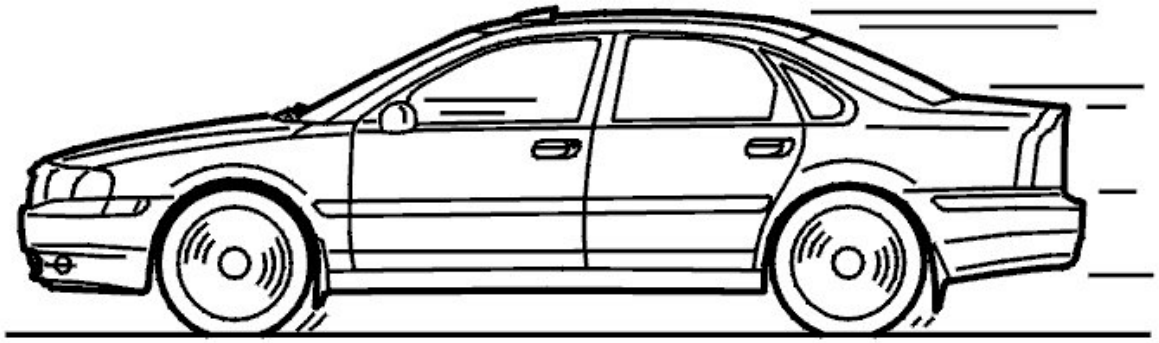
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

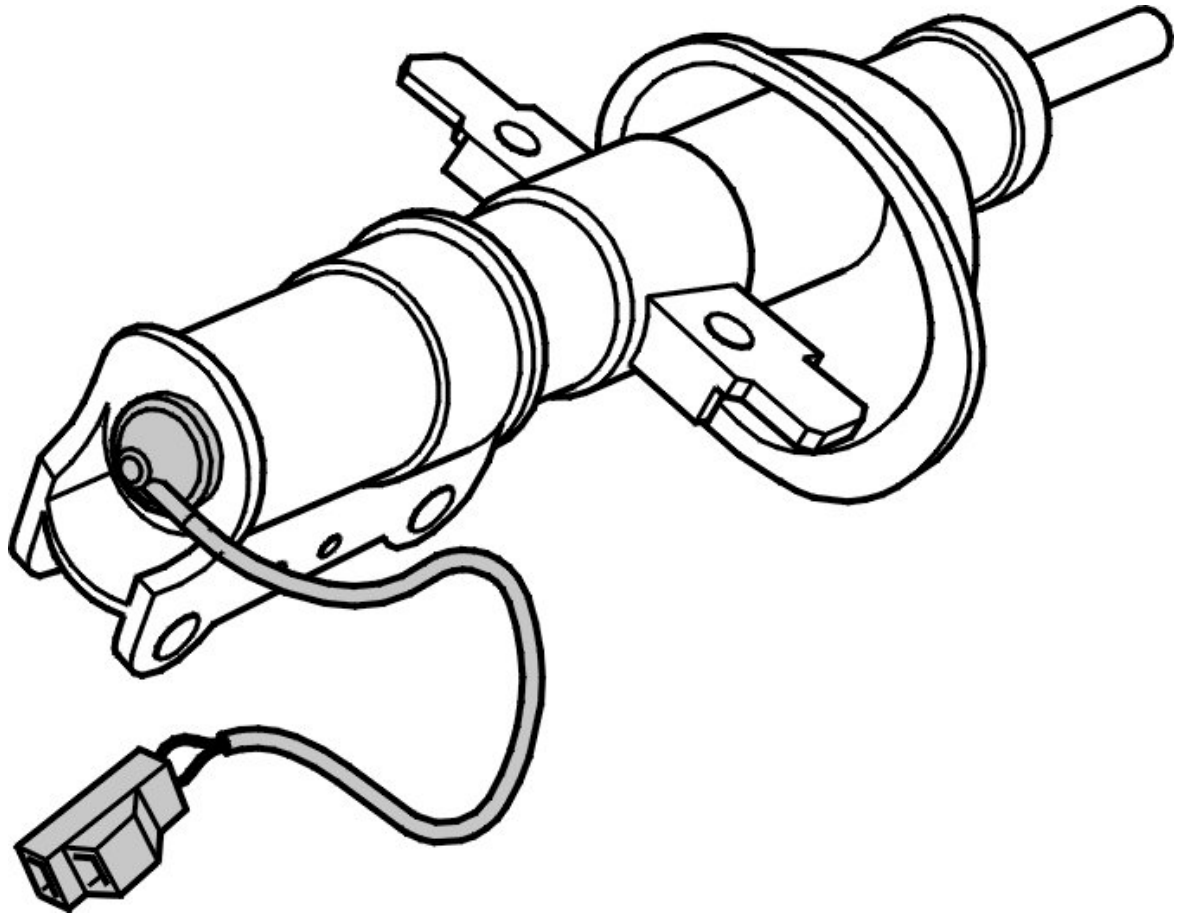
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0115, SUM-00125, SUM-0135 or SUM-0145 is stored if the control module registers that the current from one of the solenoids is too low when the ignition is switched on.

- SUM-0115: Solenoid, left front
- SUM-0125: Solenoid, right front
- SUM-0135: Solenoid, left rear
- SUM-0145: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Open-circuit in the power supply cable to the solenoid
- Open-circuit or short-circuit to ground in the signal cable from the solenoid
- Defective solenoid.

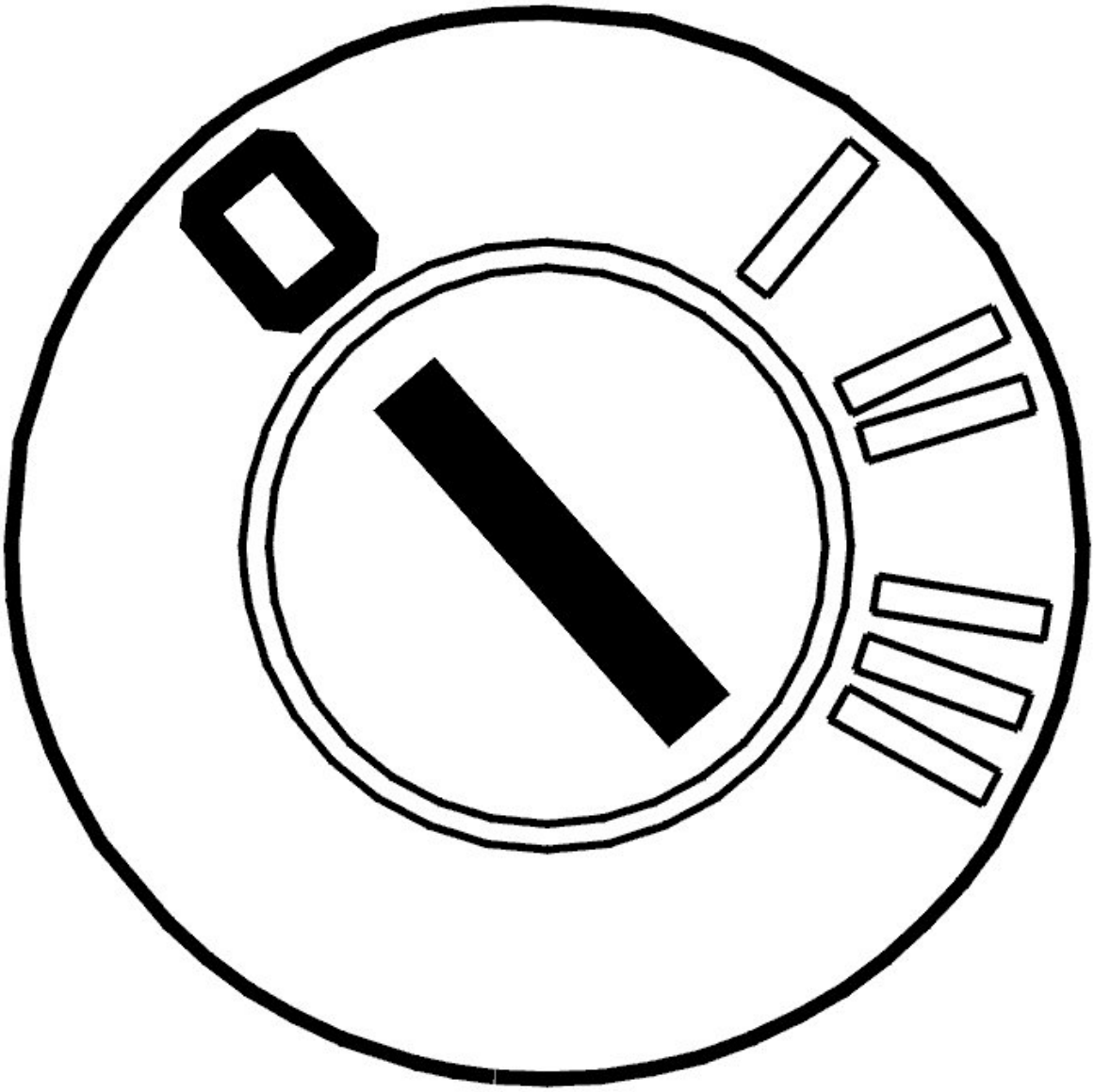
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too Low

Current too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0115, front left solenoid:

- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0125, front right solenoid:

- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0135, rear left solenoid:

- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0145, rear right solenoid:

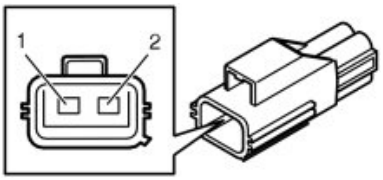
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

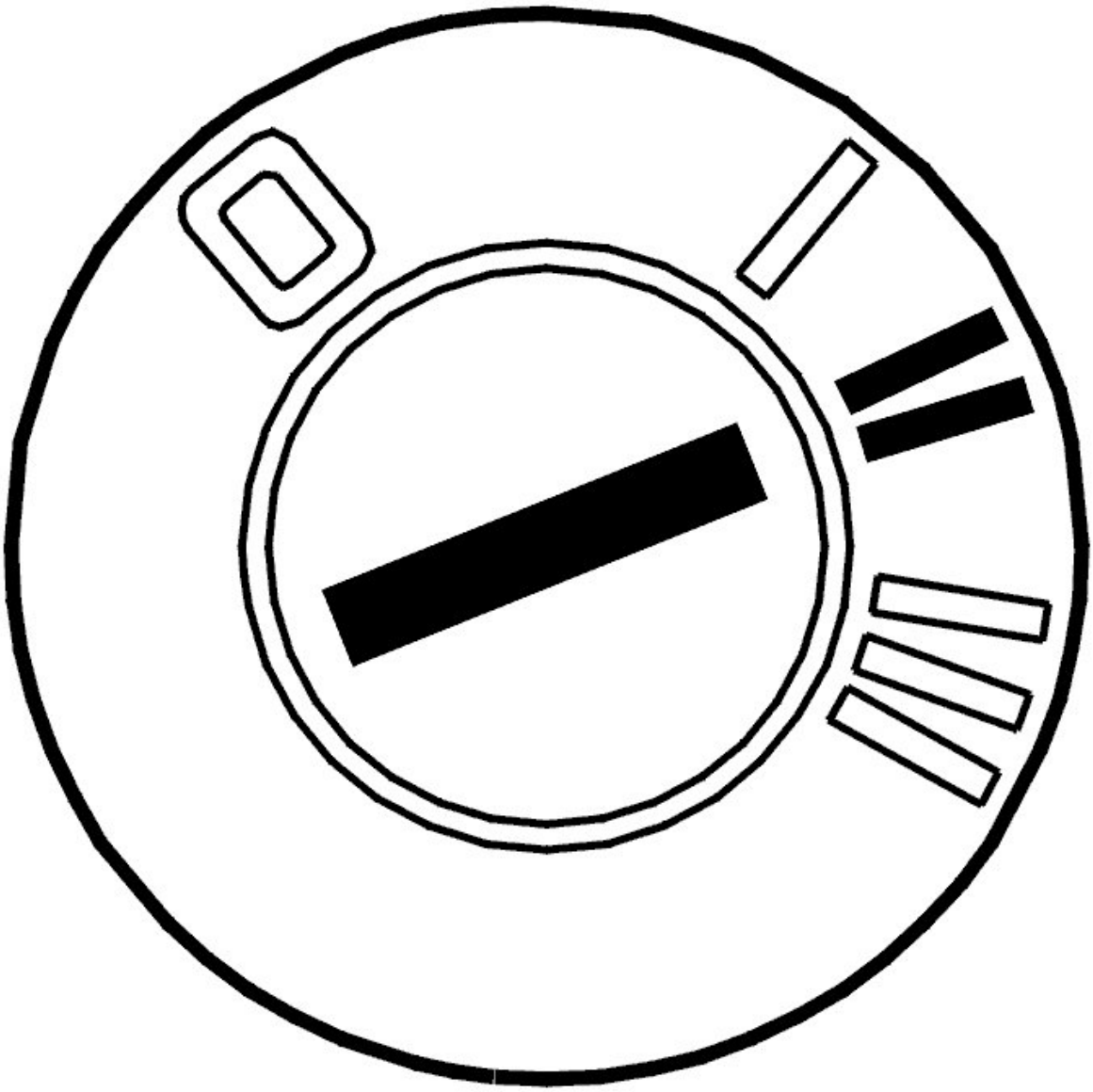
Verification

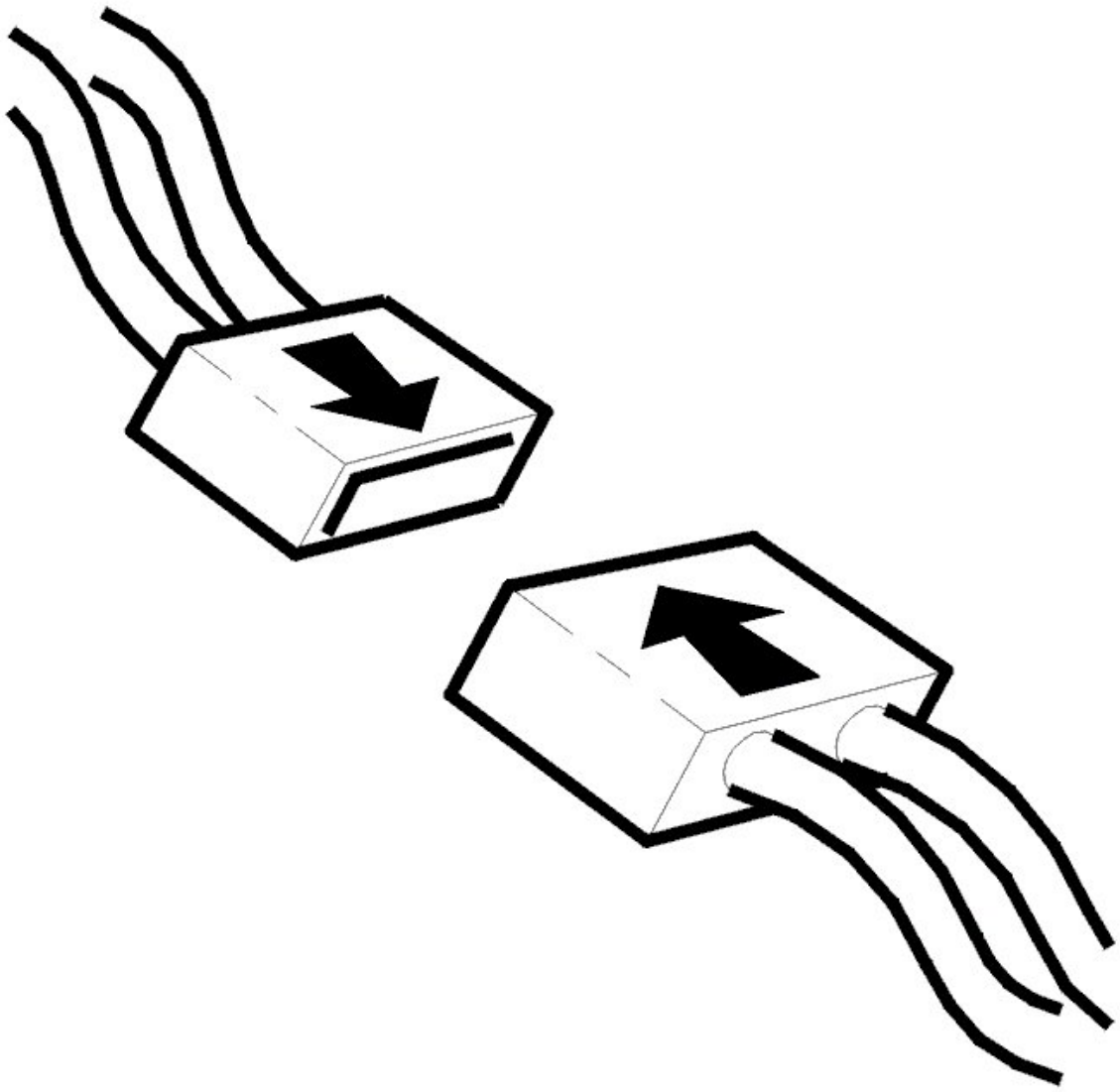
Verification

Verification

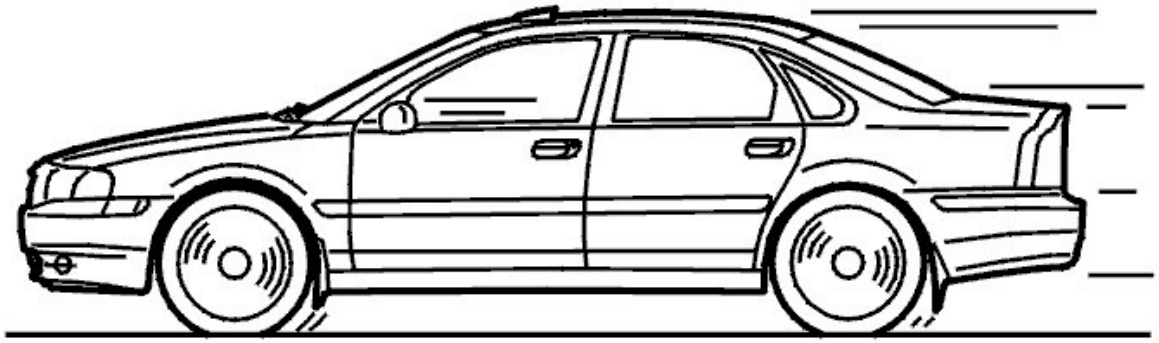
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

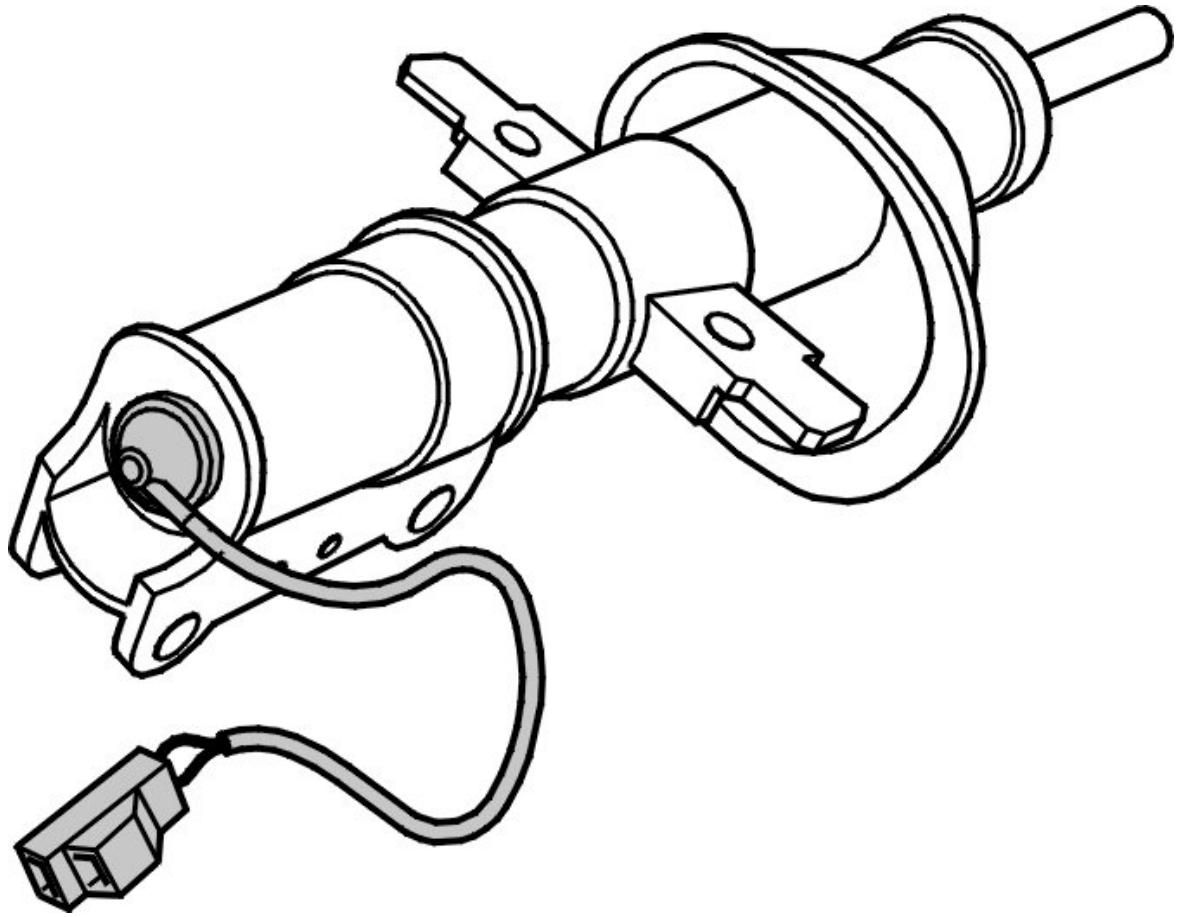
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0116, 0126, 0136 or SUM-0146 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0116: Solenoid, left front
- SUM-0126: Solenoid, right front
- SUM-0136: Solenoid, left rear
- SUM-0146: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply cable for the solenoid
- Defective solenoid.

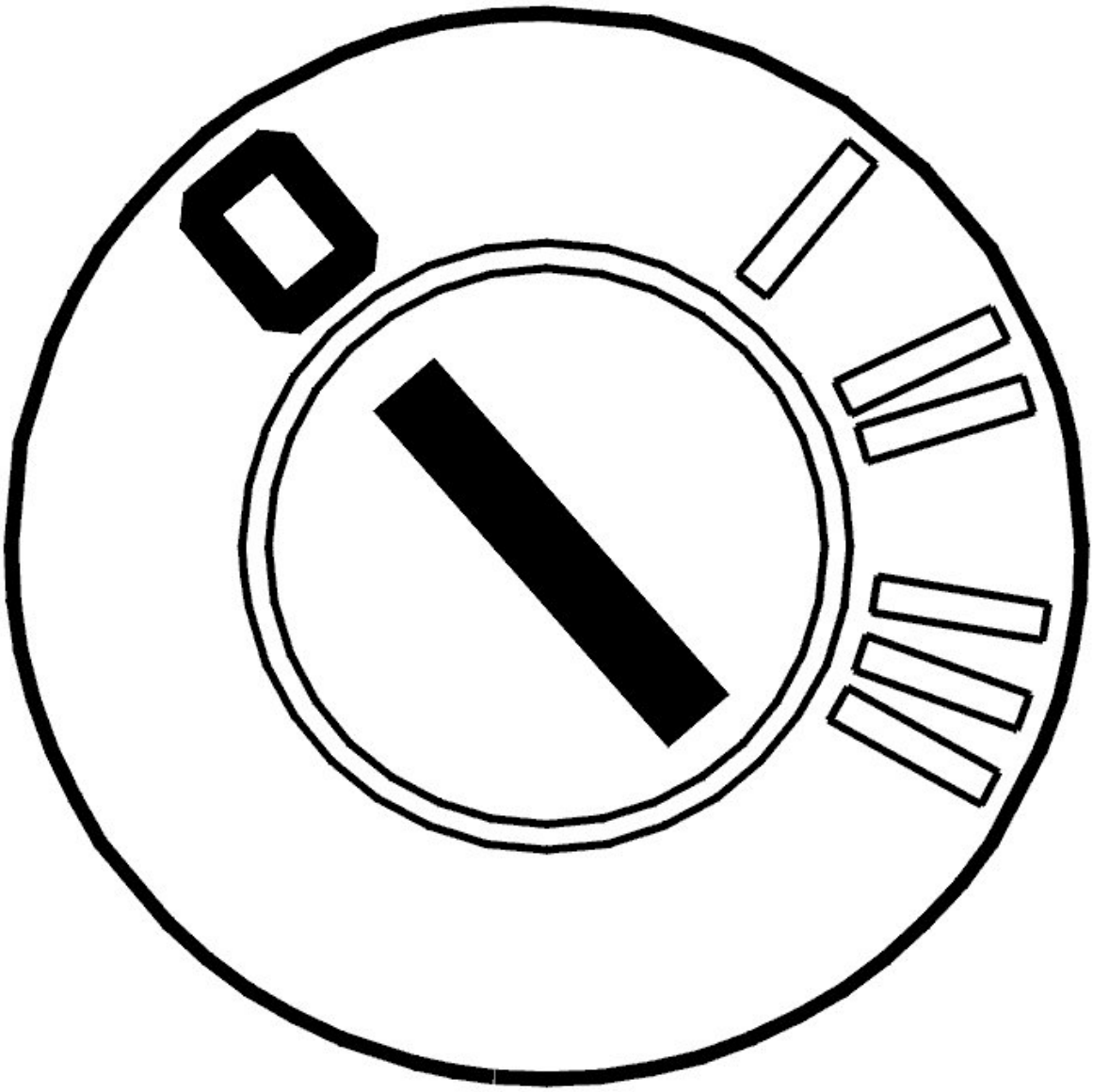
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0116, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0126, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0136, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0146, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

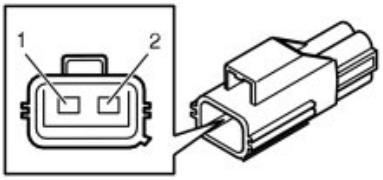
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

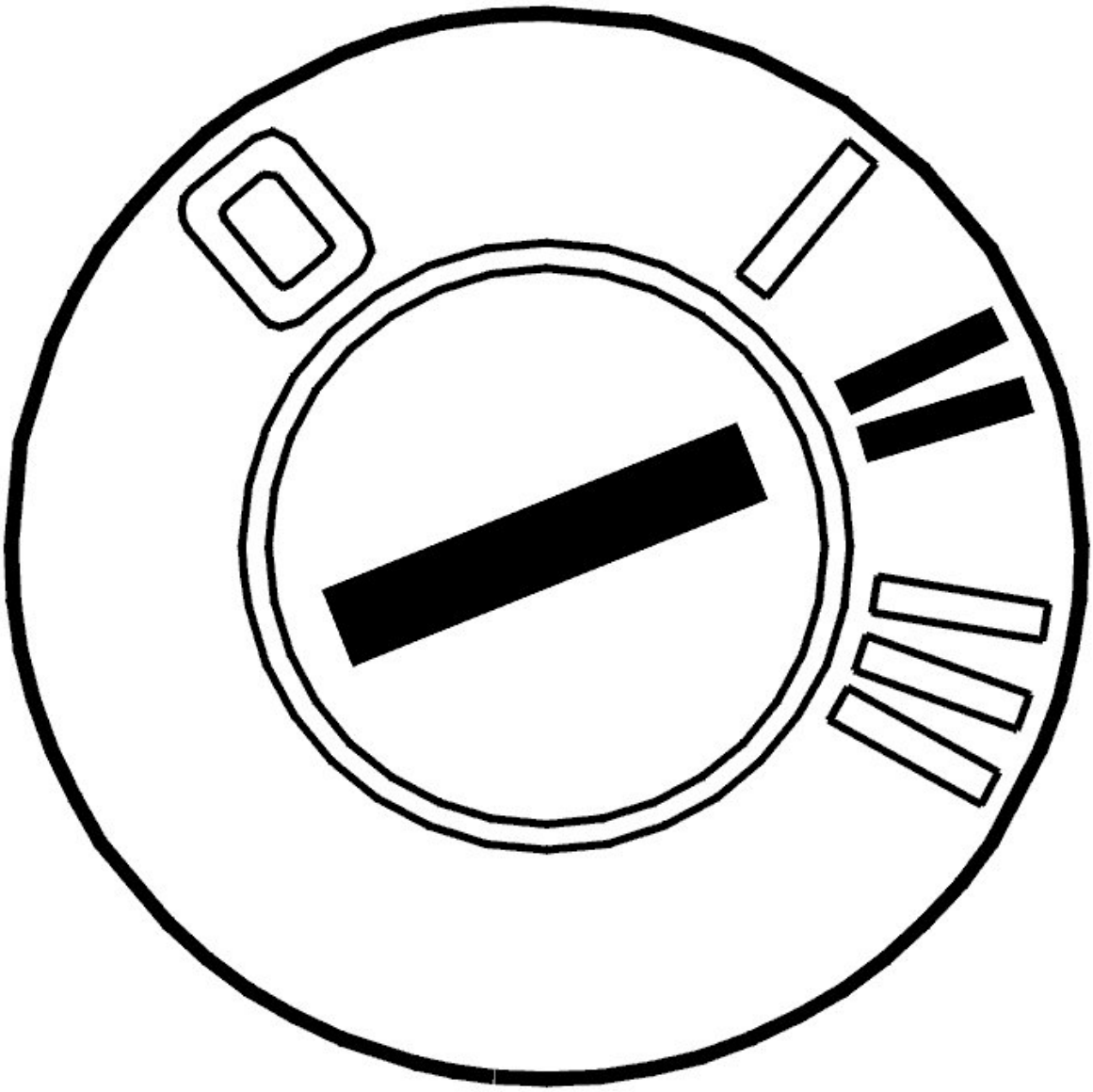
Verification

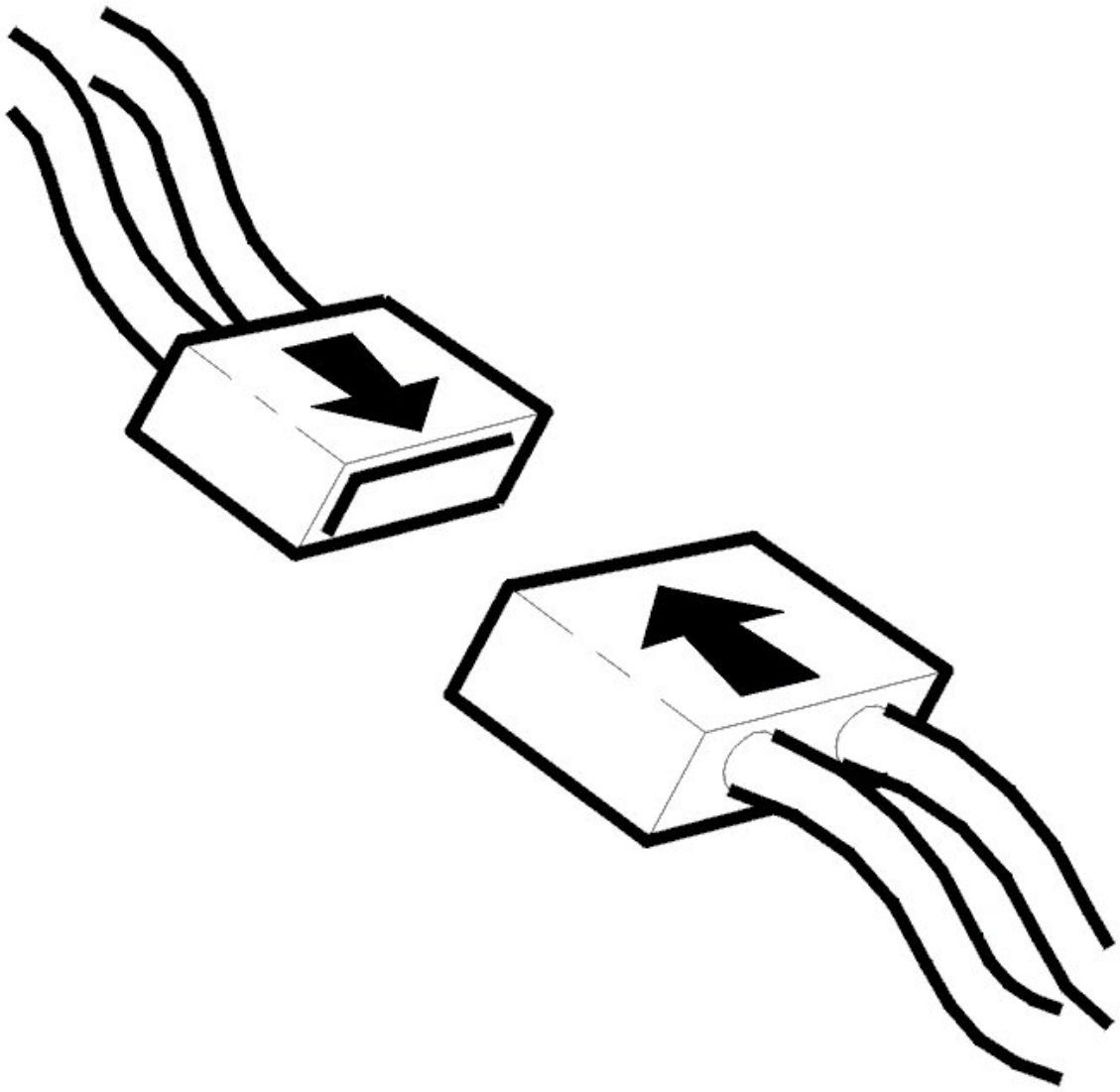
Verification

Verification

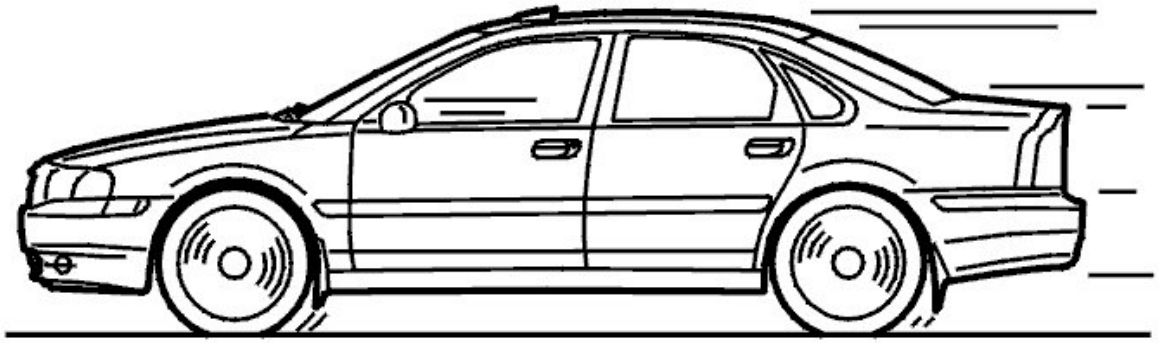
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

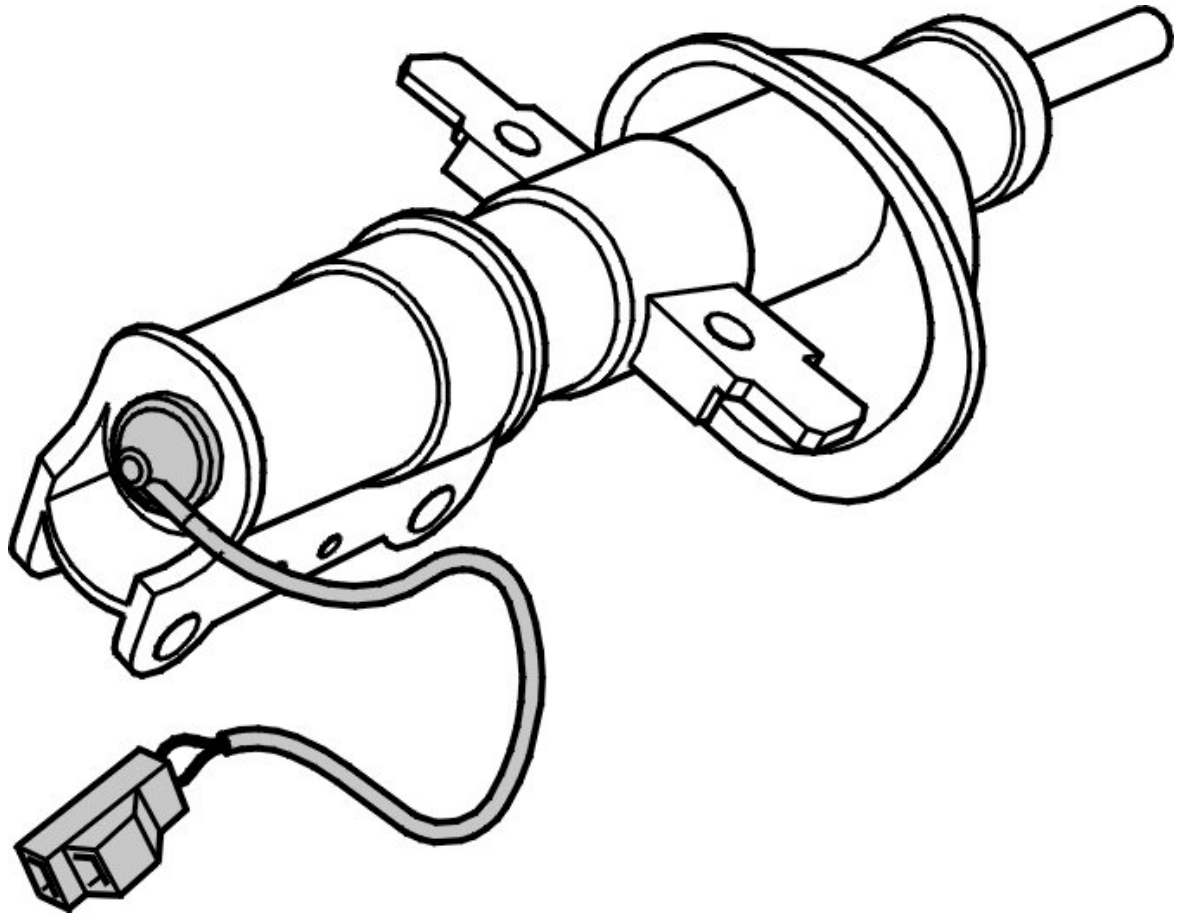
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0117, SUM-00127, SUM-0137 or SUM-0147 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0117: Solenoid, left front
- SUM-0127: Solenoid, right front
- SUM-0137: Solenoid, left rear
- SUM-0147: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to signal cable from the solenoid in the power supply cable for the solenoid
- Short-circuit to supply voltage in the signal cable from the solenoid
- Defective solenoid.

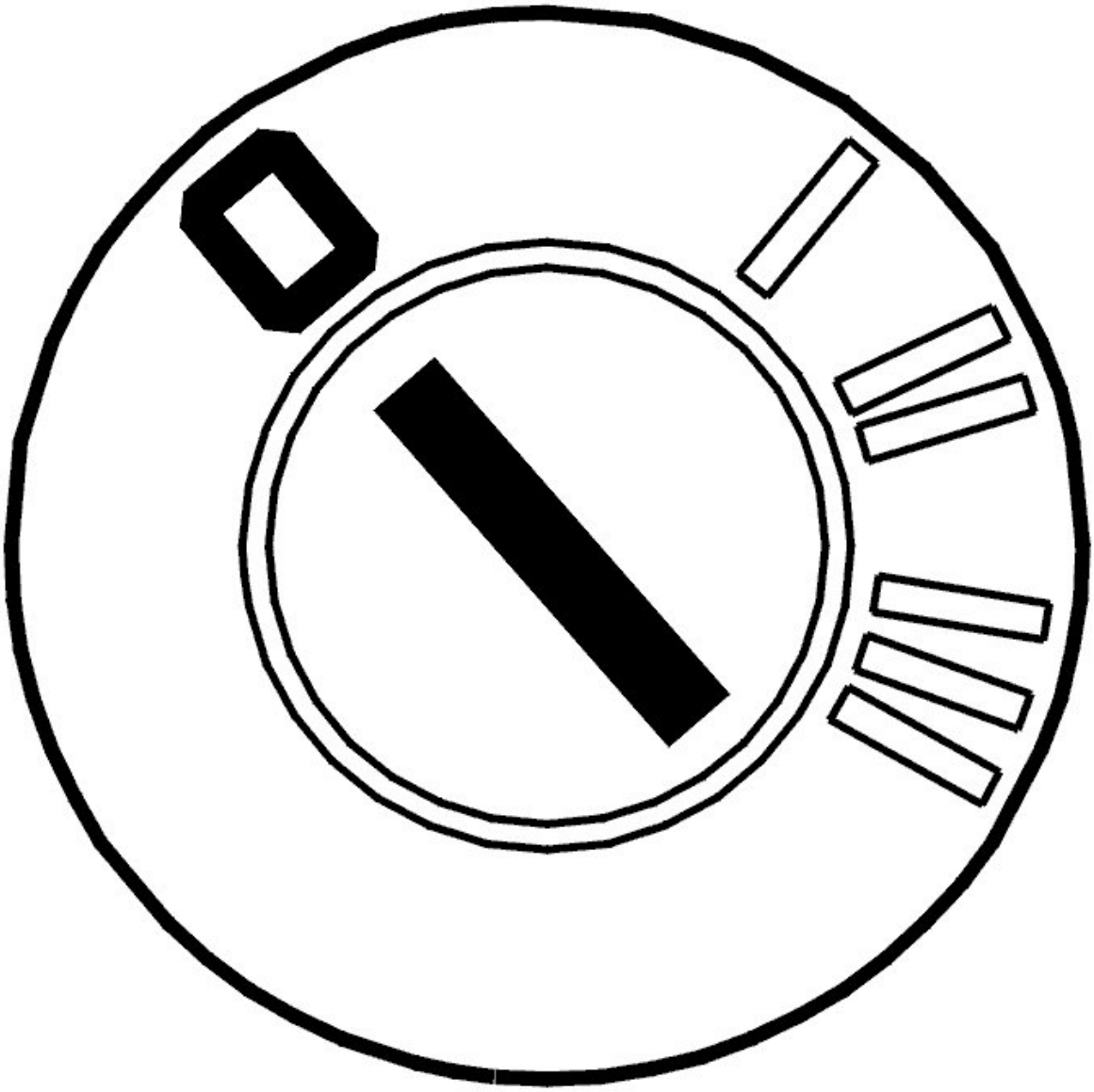
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking components and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0117, front left solenoid:
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0127, front right solenoid:
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0137, rear left solenoid:
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0147, rear right solenoid:
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

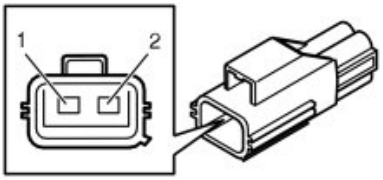
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

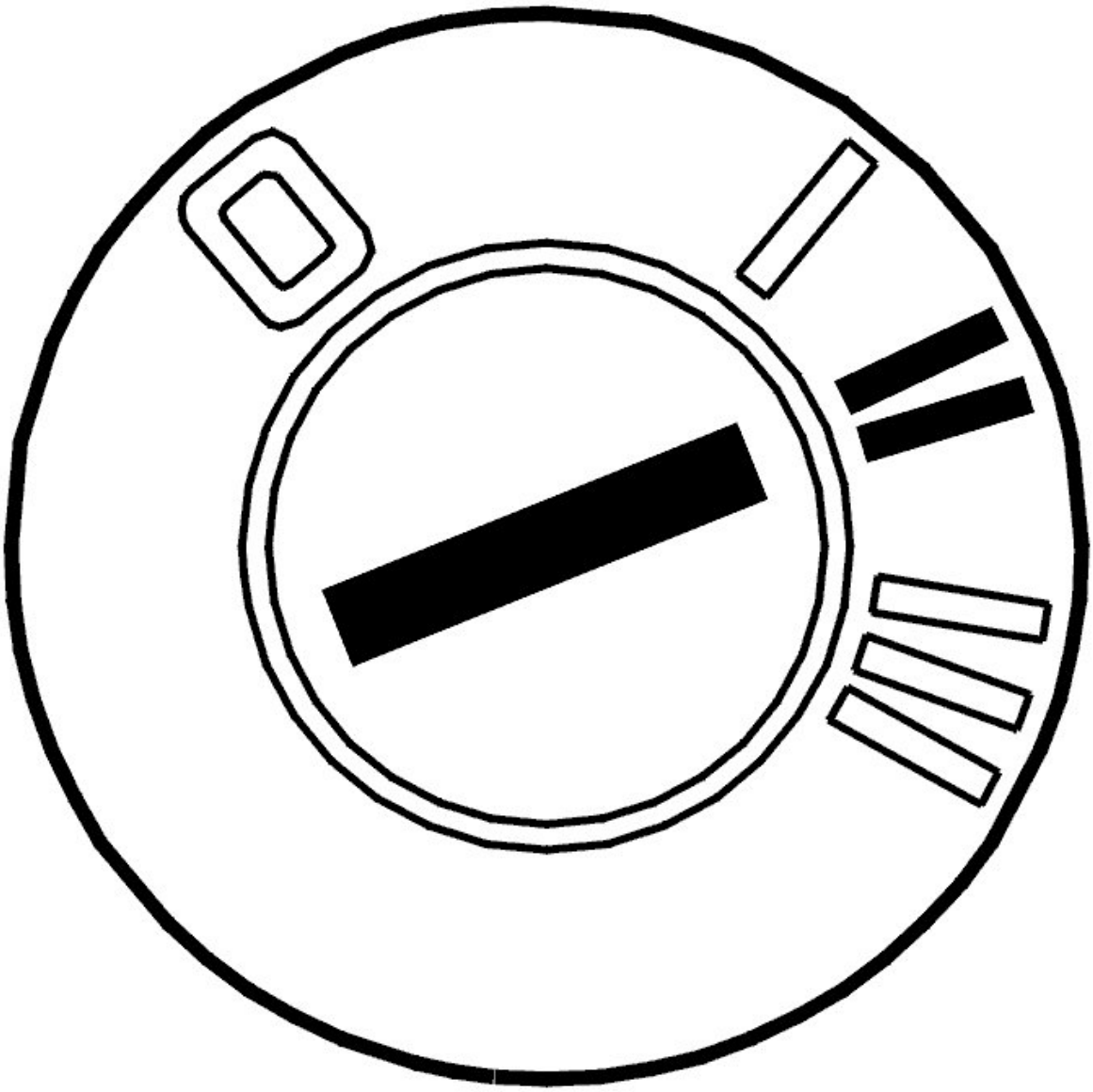
Verification

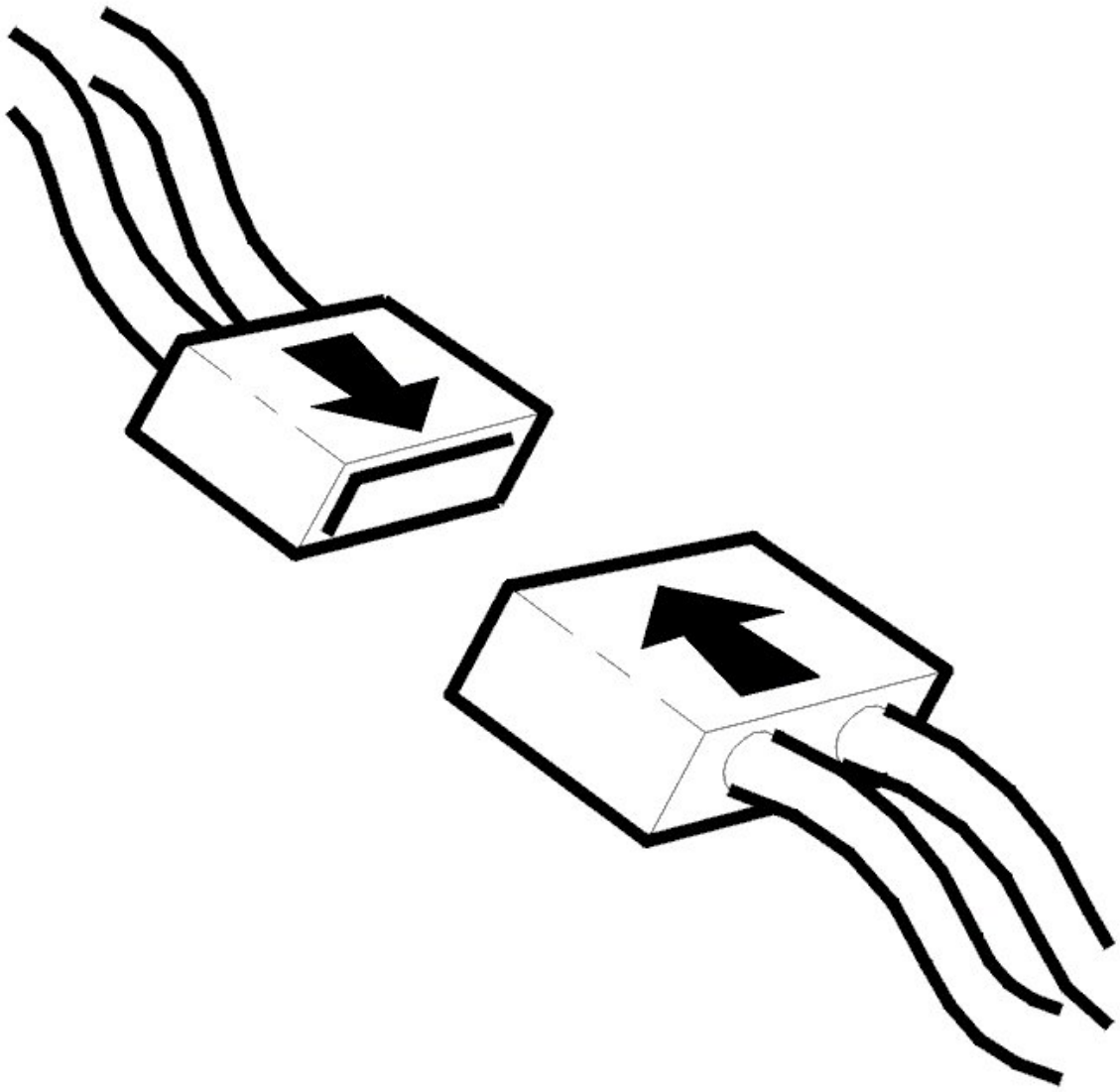
Verification

Verification

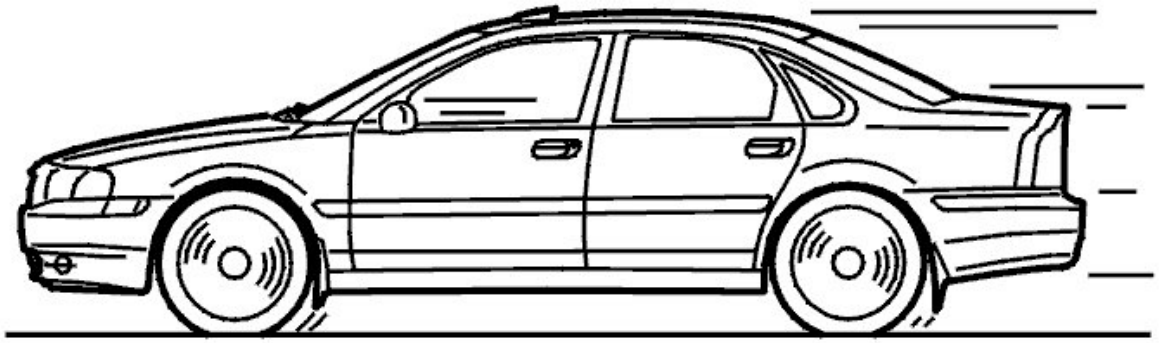
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

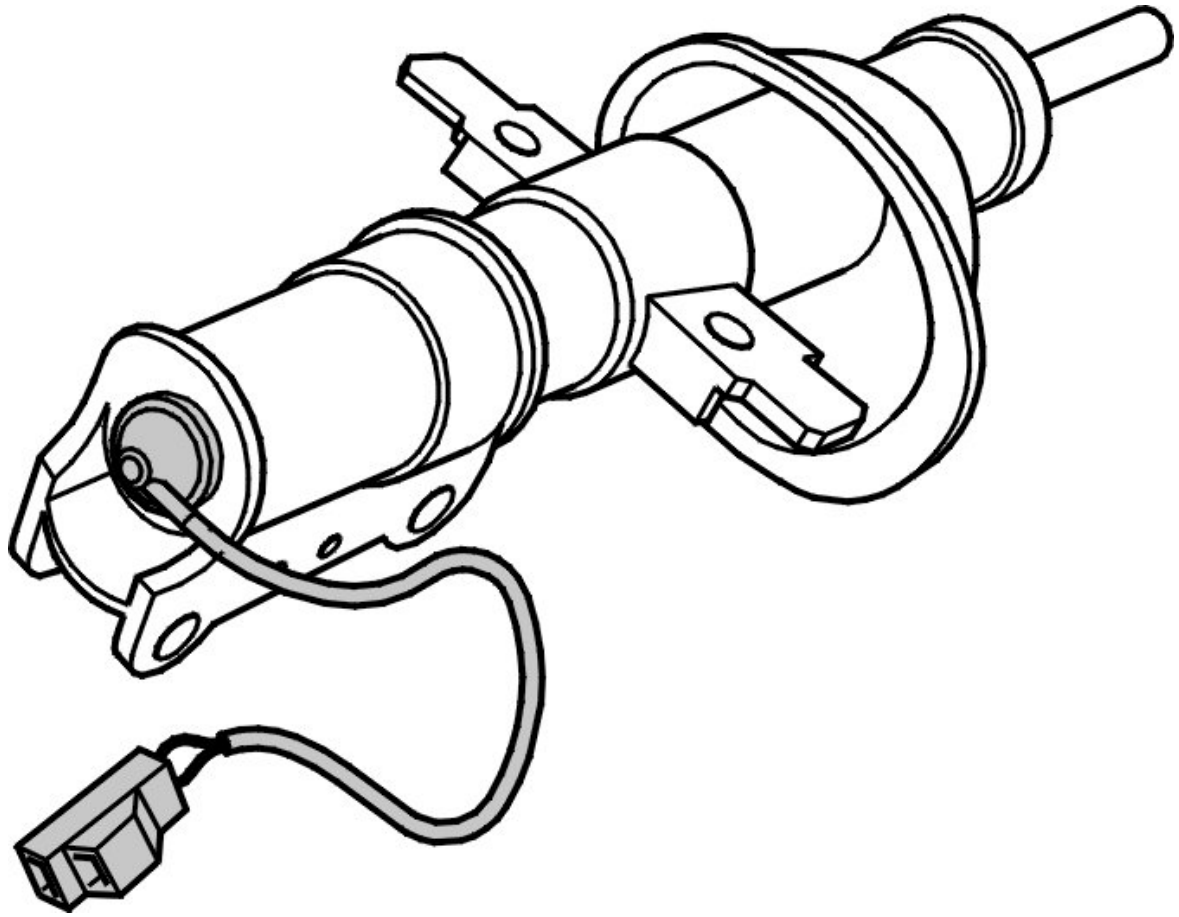
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the temperature of any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0118: Solenoid, left front
- SUM-0128: Solenoid, right front
- SUM-0138: Solenoid, left rear
- SUM-0148: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is limited.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Hard driving.

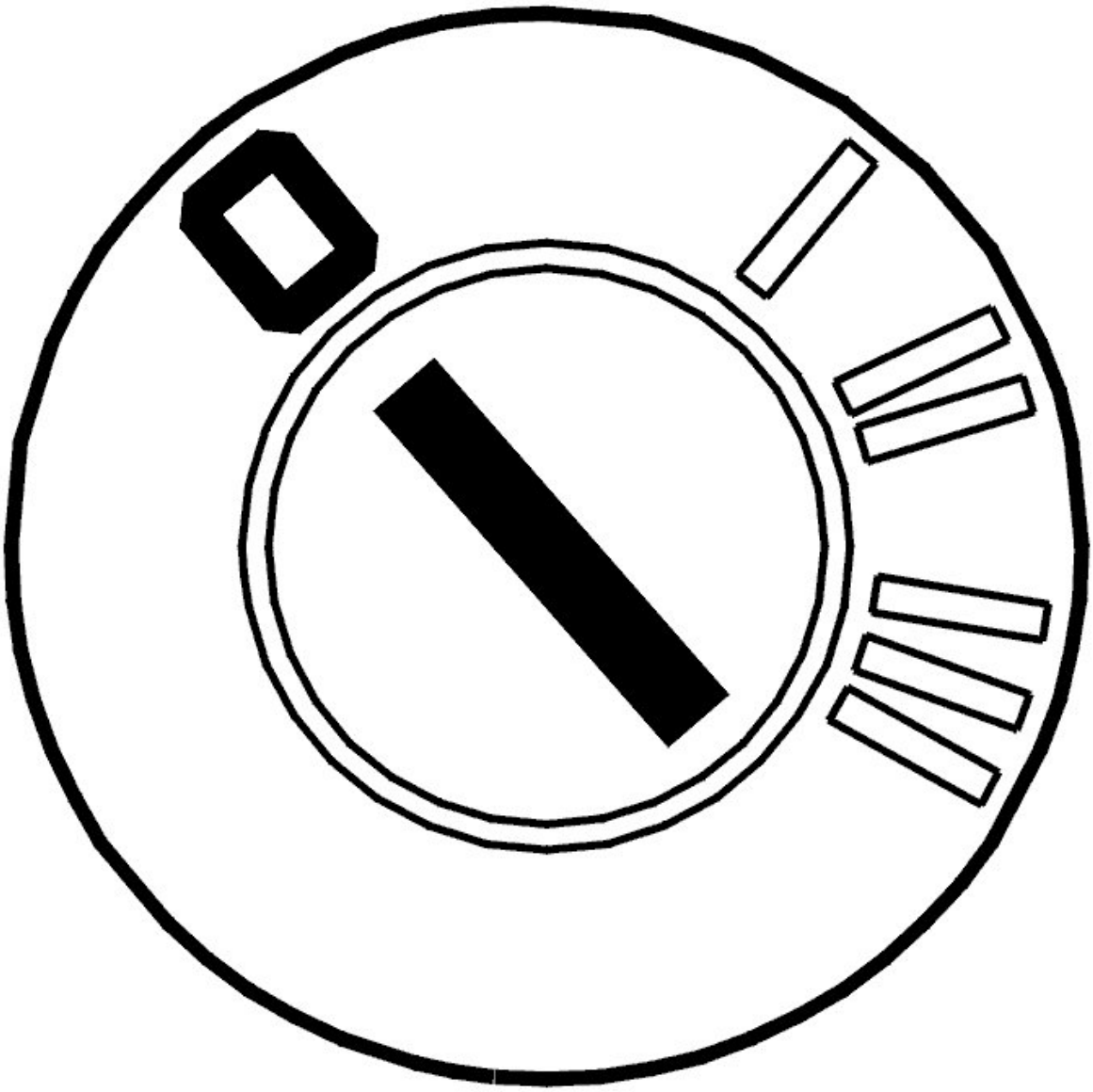
Fault symptom[s]

- None.

Temperature Too High

Temperature too high

Checking the component and wiring



- Ignition off.

Check the solenoids and connectors for the Suspension Module (SUM). Check for contact resistance. Check for oxidation.
Check the resistance of the solenoids.

For diagnostic trouble code (DTC) SUM-0118, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0128, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0138, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

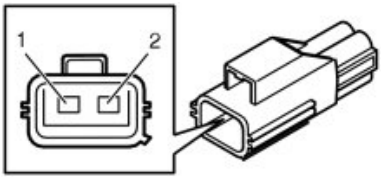
For diagnostic trouble code (DTC) SUM-0148, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

Remedy as necessary.

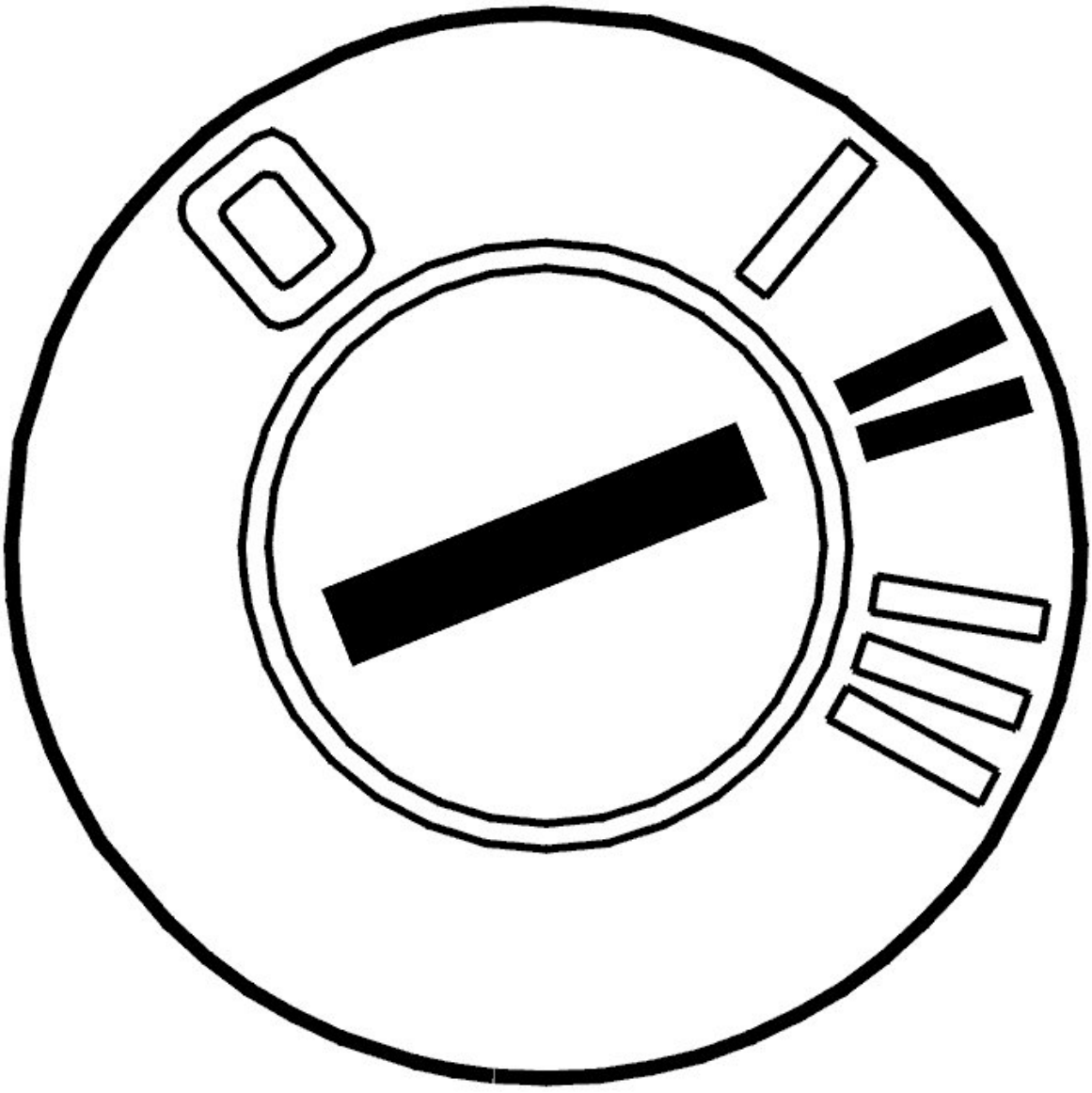
Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Calibrating the control module

Calibrating the control module

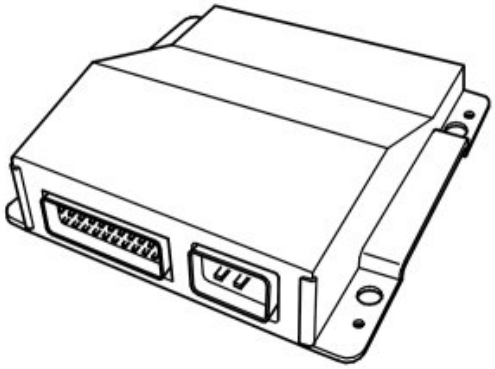


Note! In order for the Four-C (Continuously Controlled Chassis Concept) function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be calibrated.

- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is unloaded and on a flat surface with the wheels pointing straight ahead

- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.



Continue - Verification

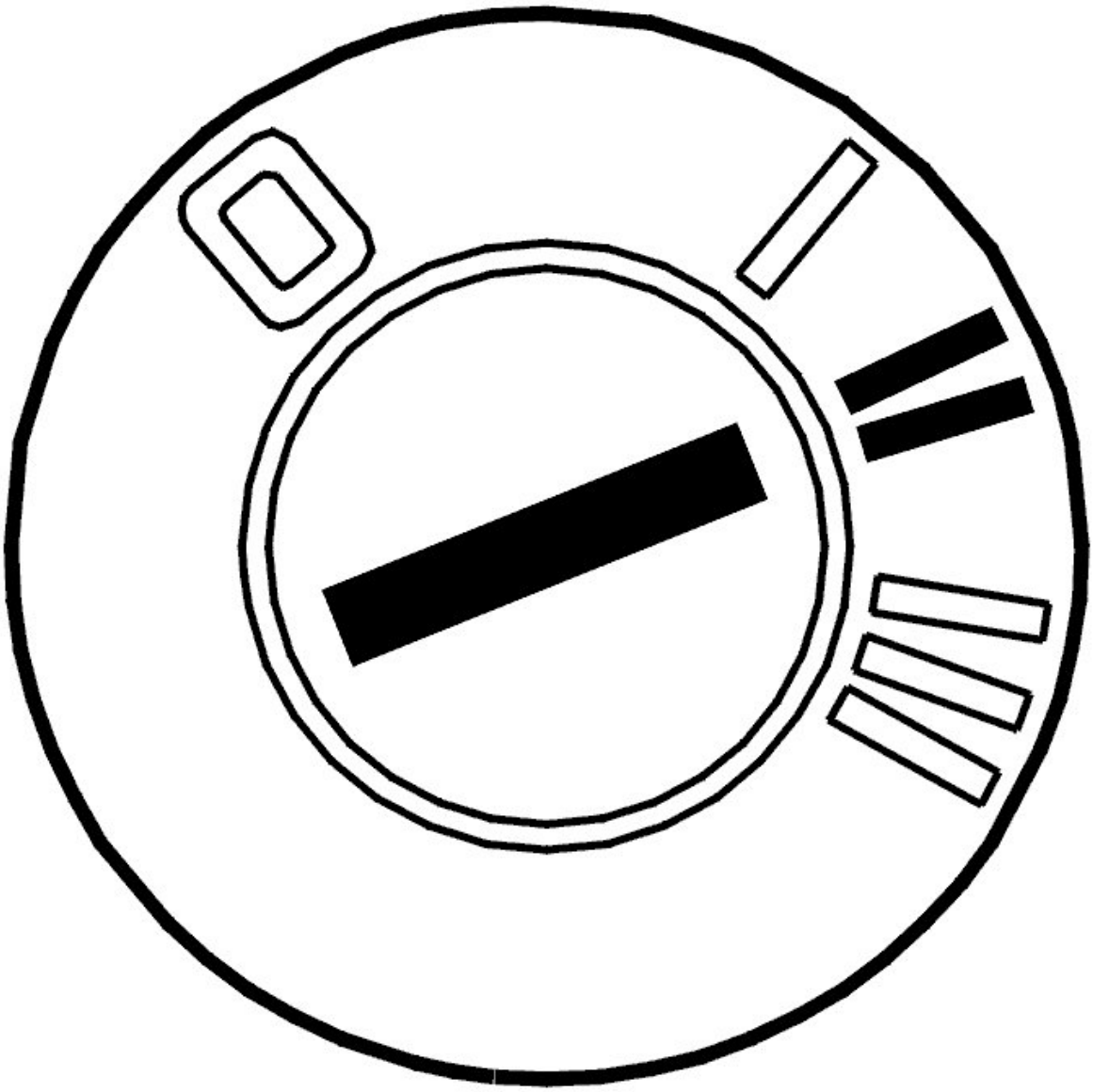
Verification

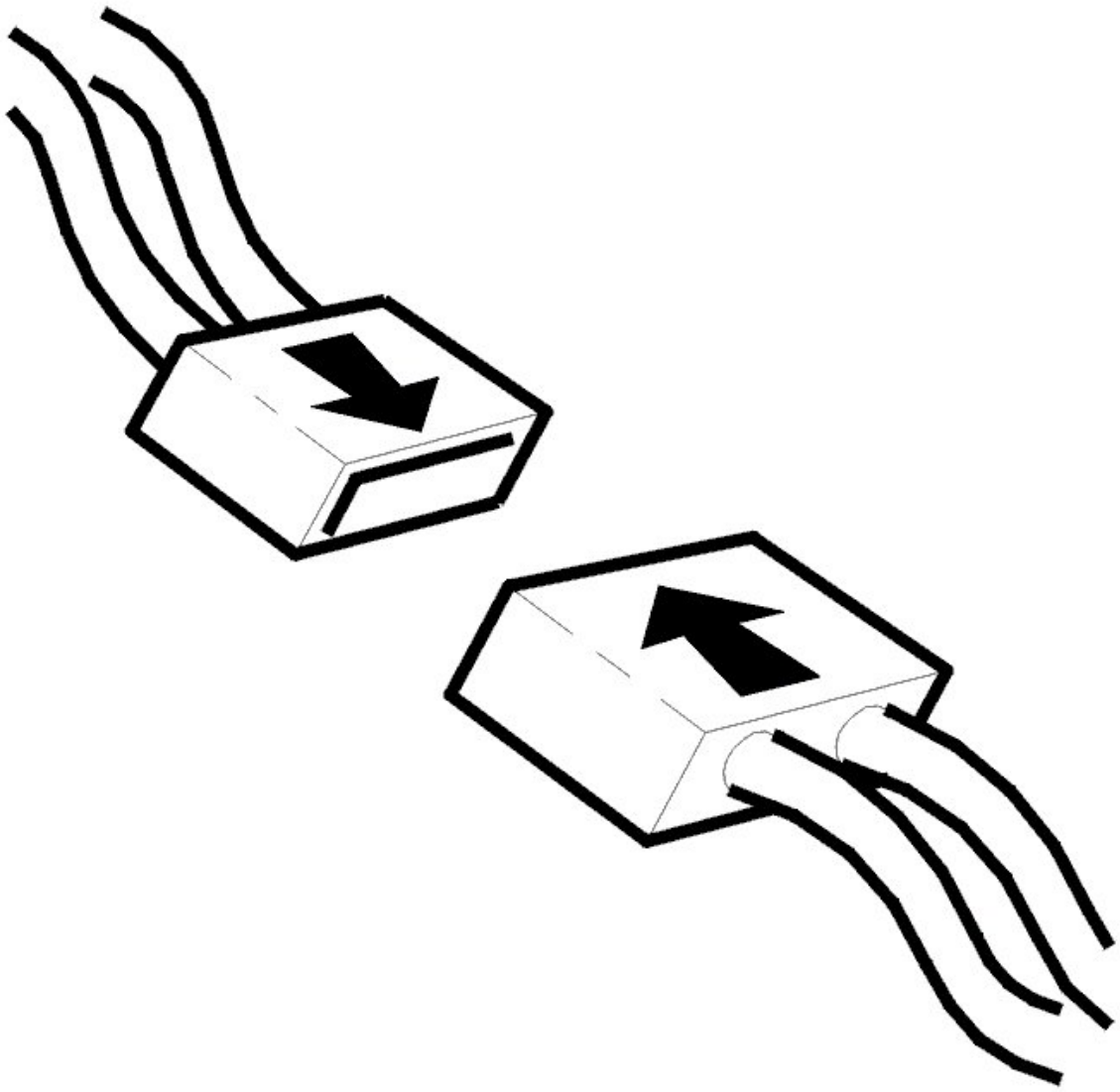
Verification

Verification

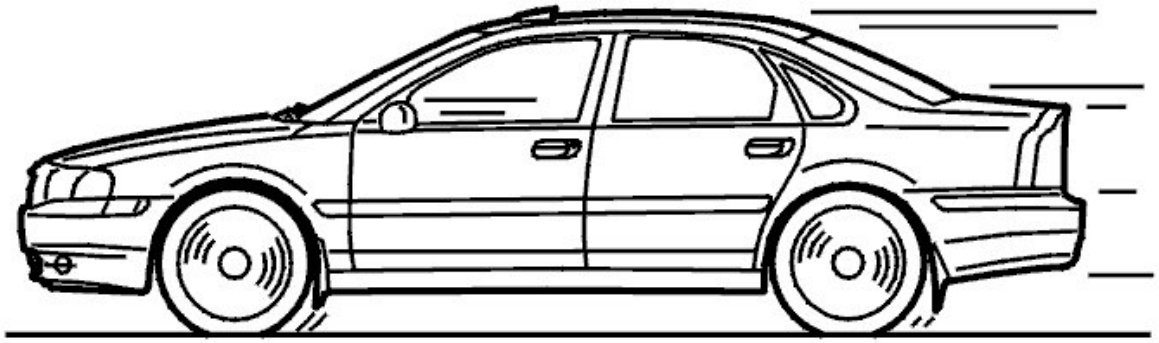
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

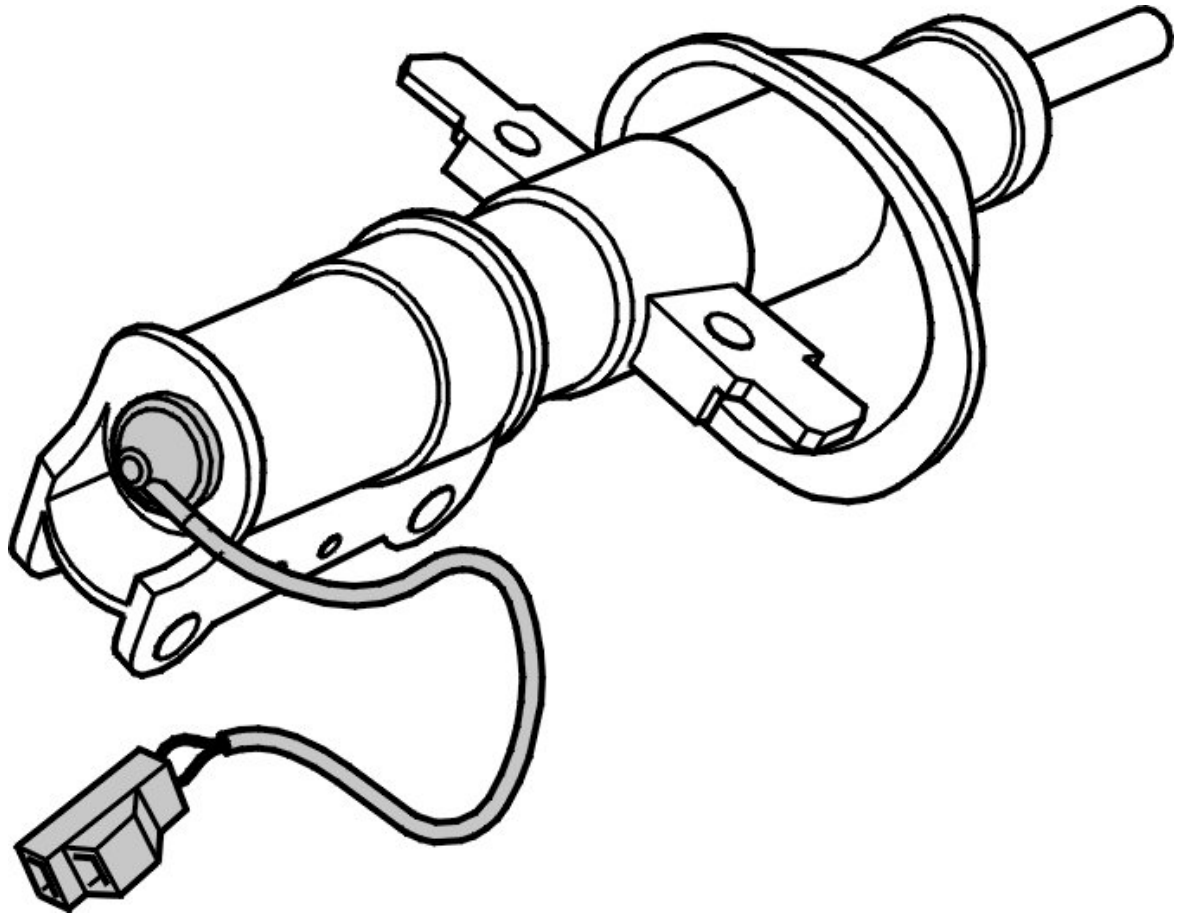
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too low. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0111: Solenoid, left front
- SUM-0121: Solenoid, right front
- SUM-0131: Solenoid, left rear
- SUM-0141: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply to the solenoid
- Damaged solenoid.

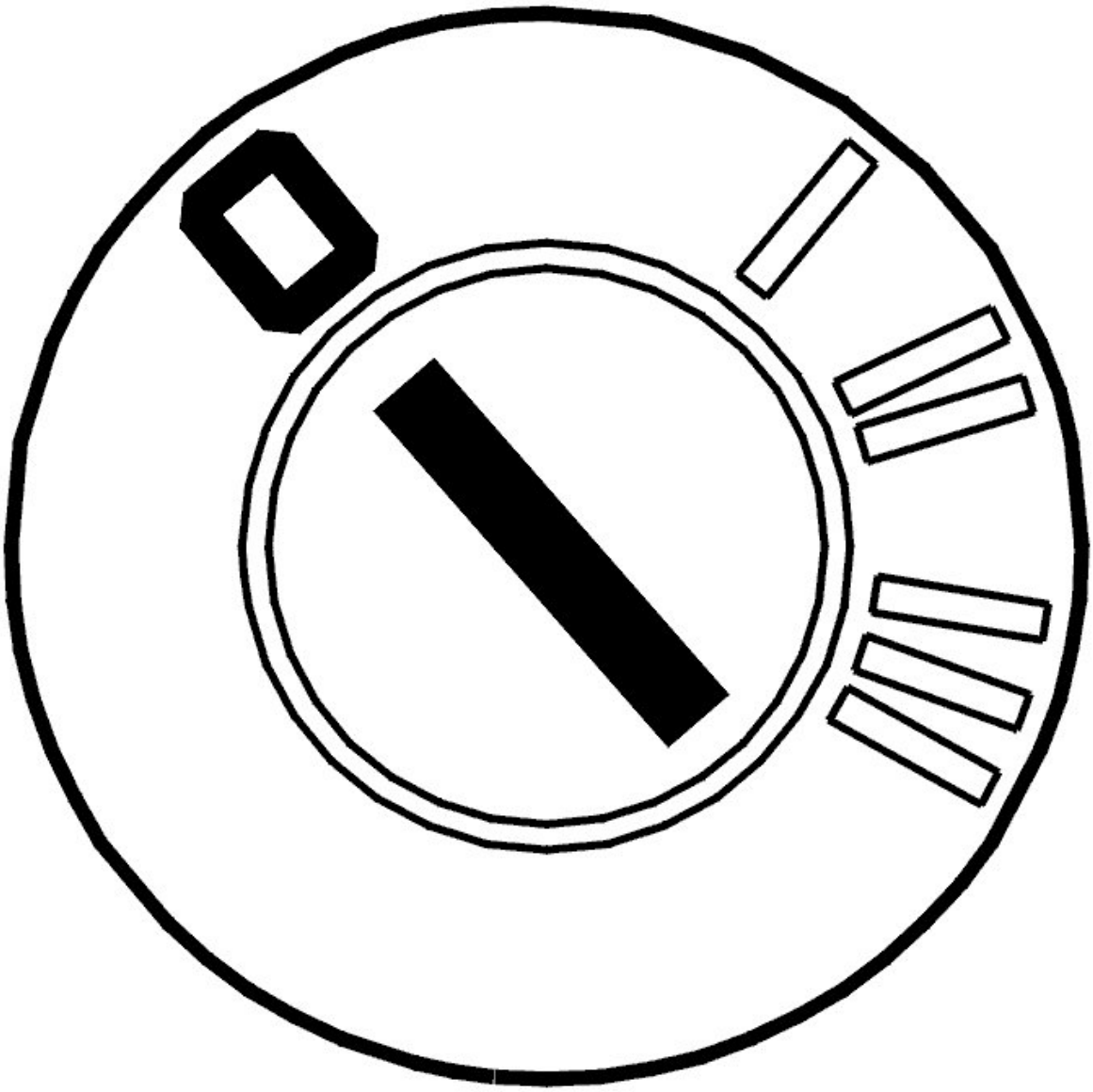
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too Low

Signal too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0111, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0121, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0131, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to ground.

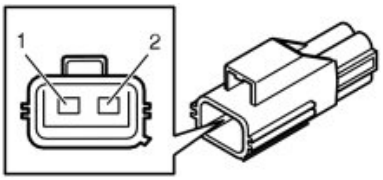
For diagnostic trouble code (DTC) SUM-0141, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to ground.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

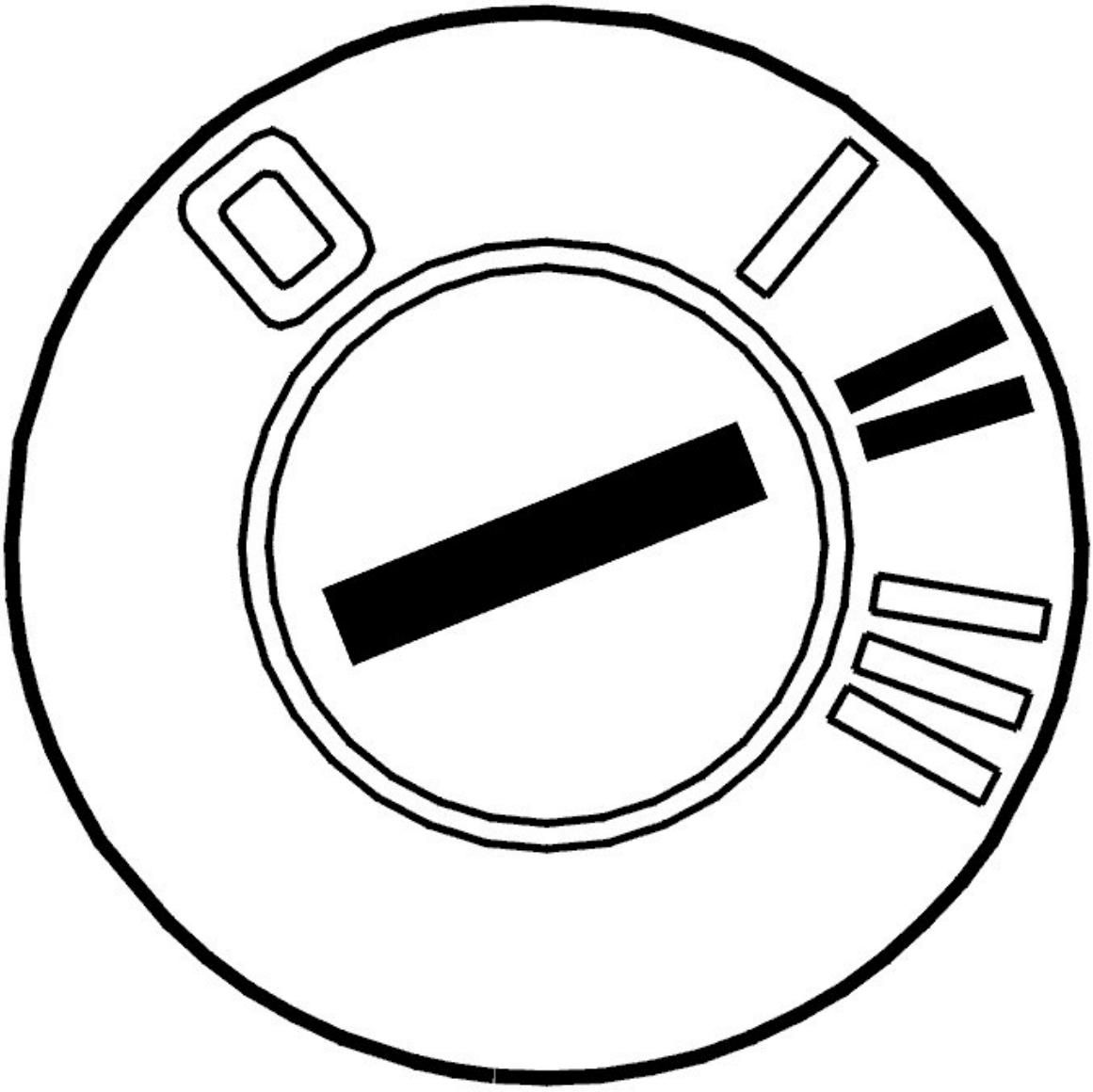
Verification

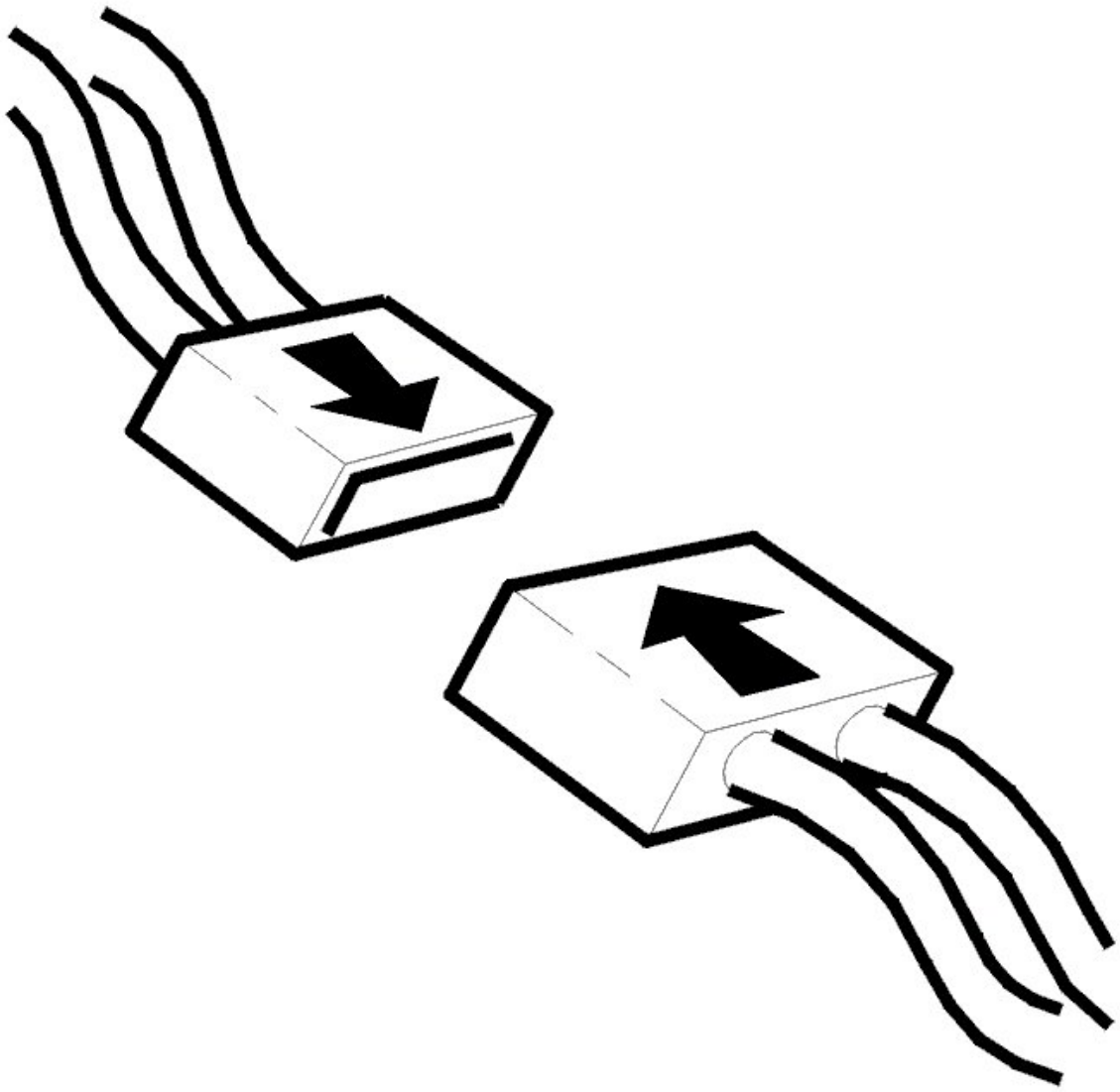
Verification

Verification

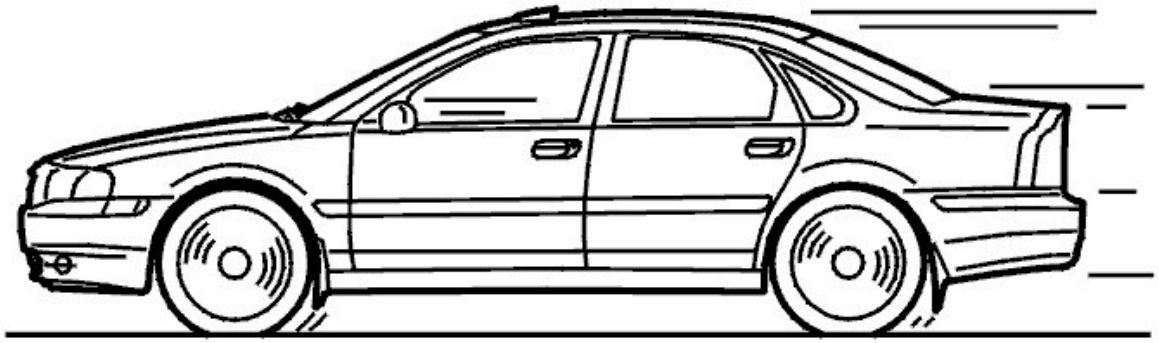
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

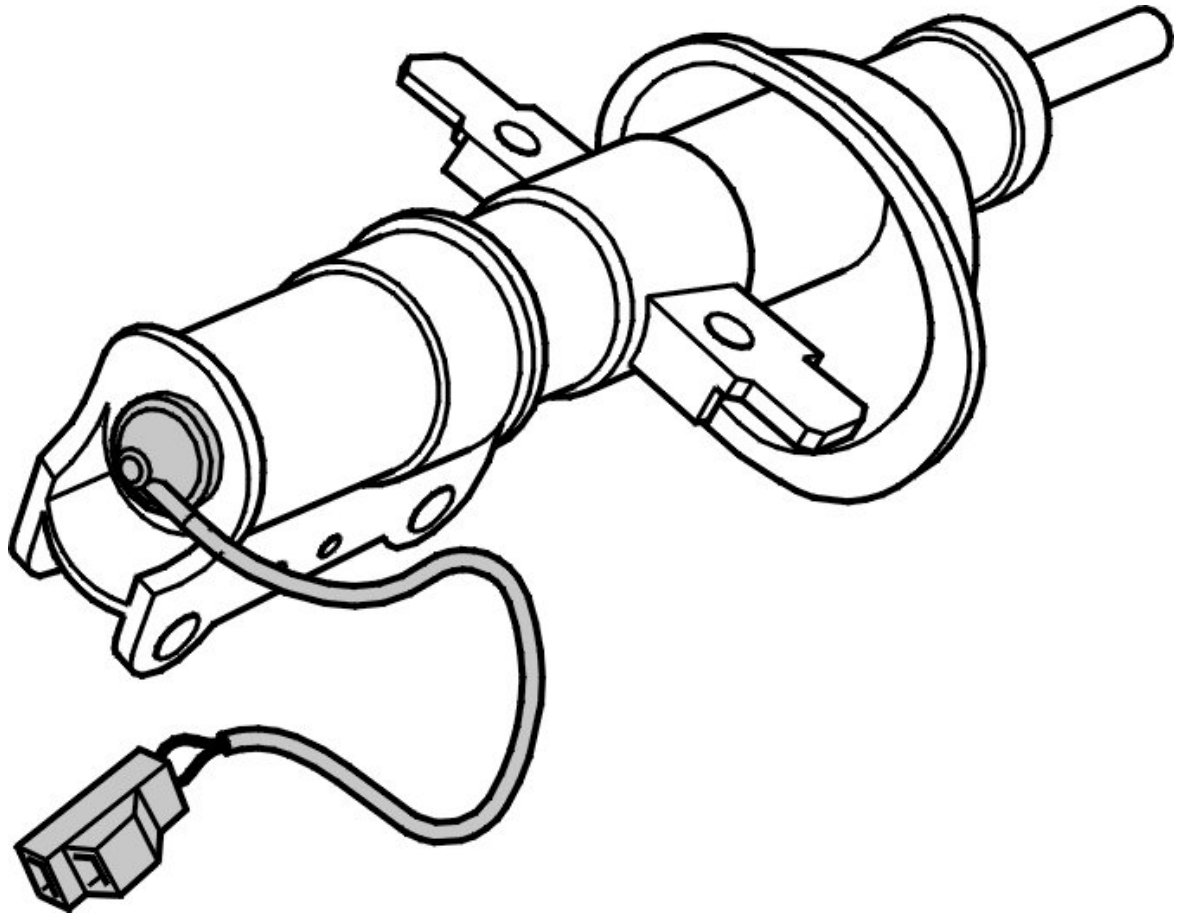
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0112: Solenoid, left front
- SUM-0122: Solenoid, right front
- SUM-0132: Solenoid, left rear
- SUM-0142: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the signal cable or power supply cable
- Damaged solenoid.

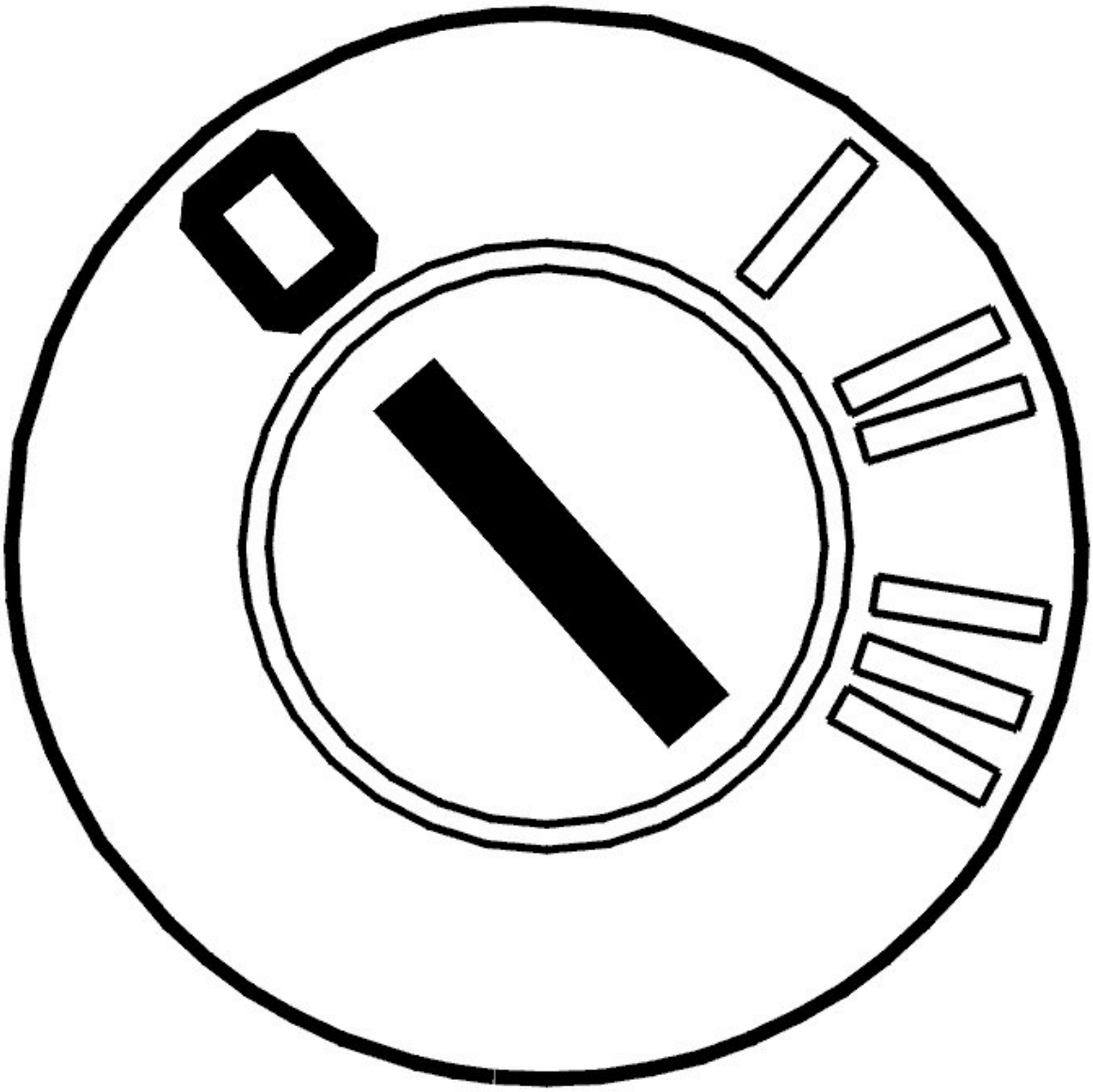
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Too High

Signal too high

Checking the component and wiring



- Ignition off.

For diagnostic trouble code (DTC) SUM-0112, front left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0122, front right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0132, rear left solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0142, rear right solenoid:

- Check the power supply cable between suspension module (SUM) terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage
- Check the signal cable between suspension module (SUM) #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage.

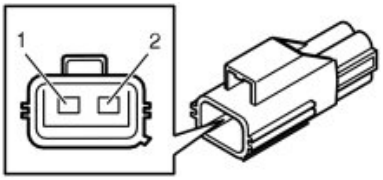
Remedy as necessary.

Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and

Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

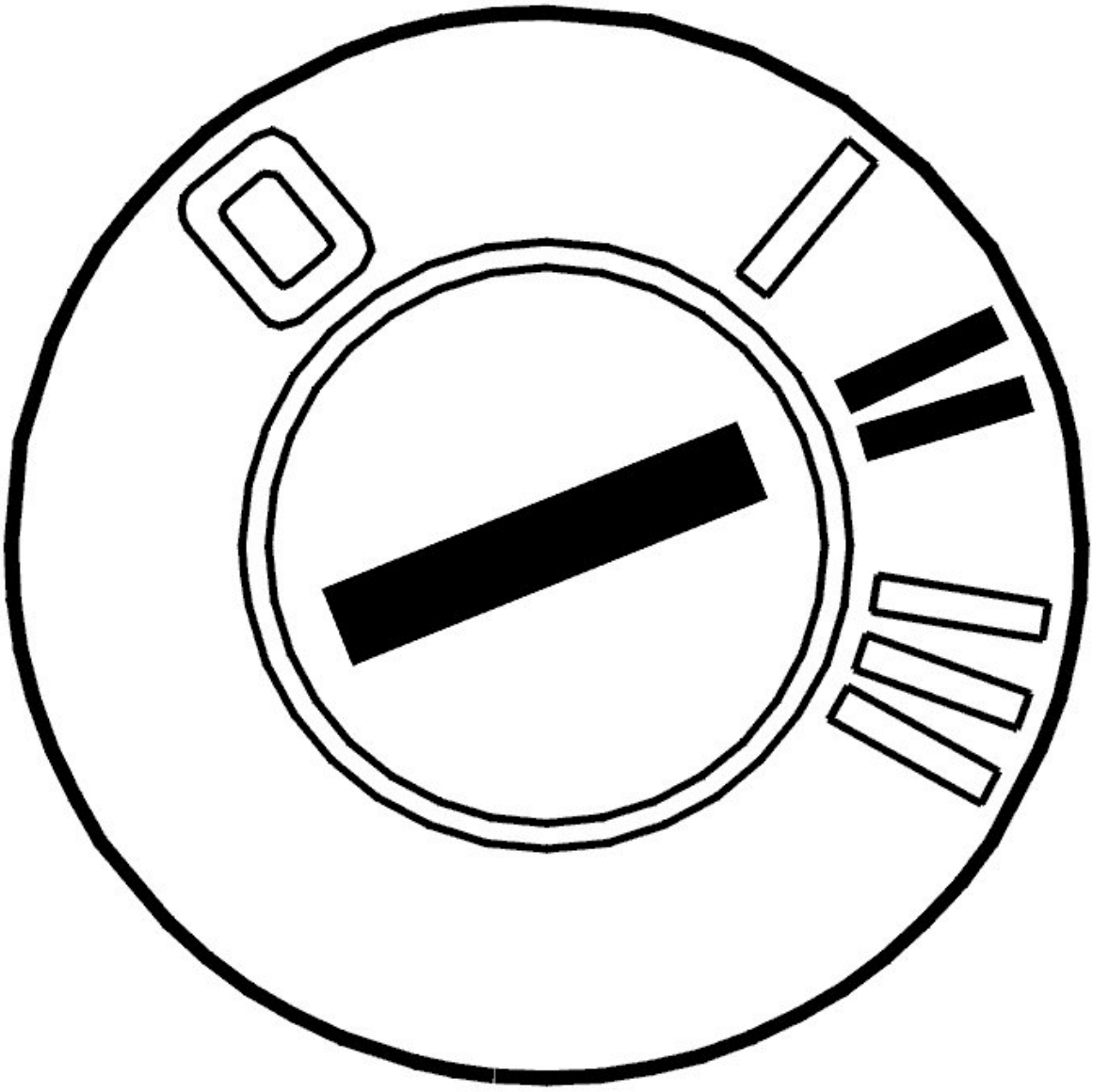
Verification

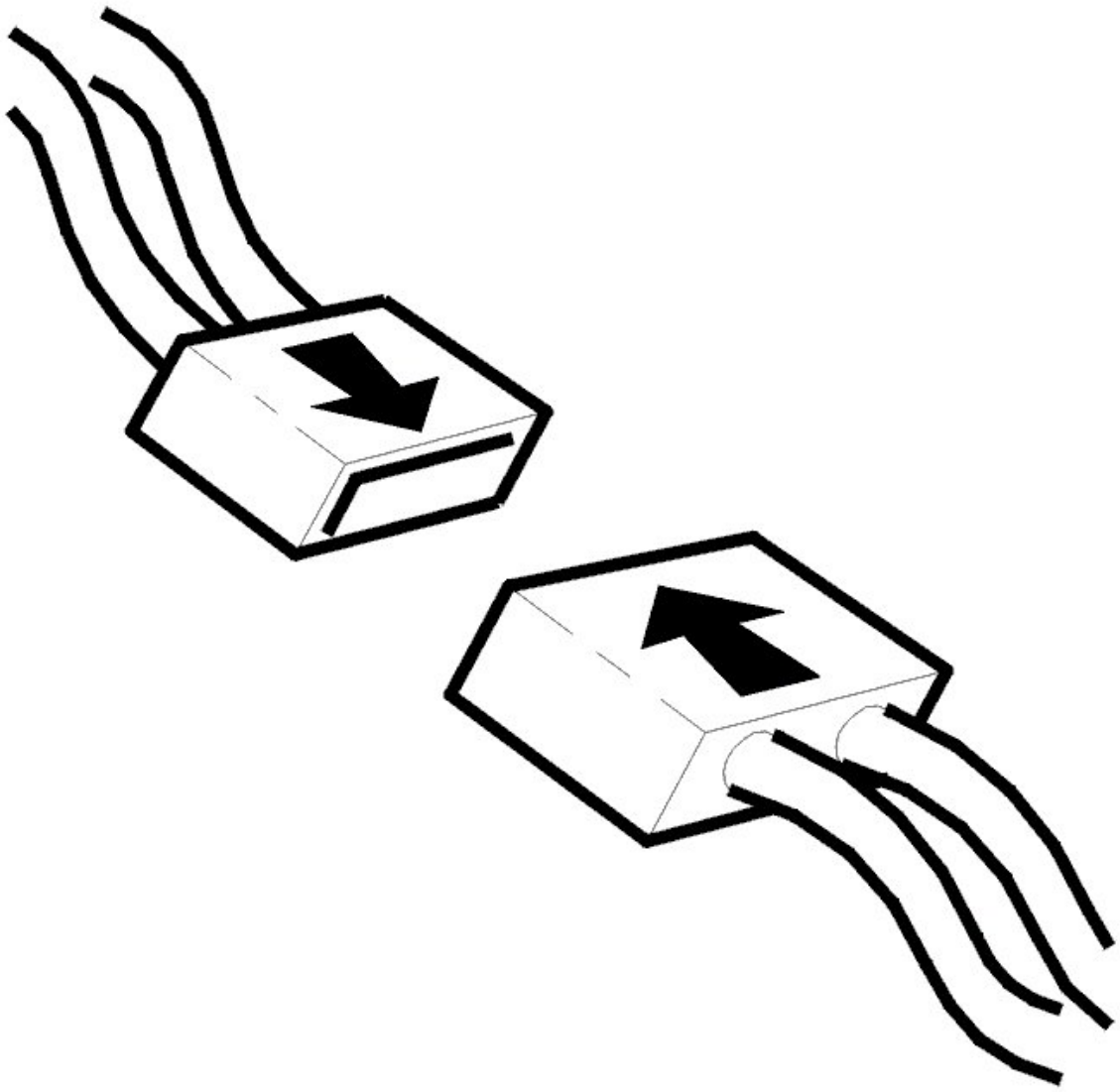
Verification

Verification

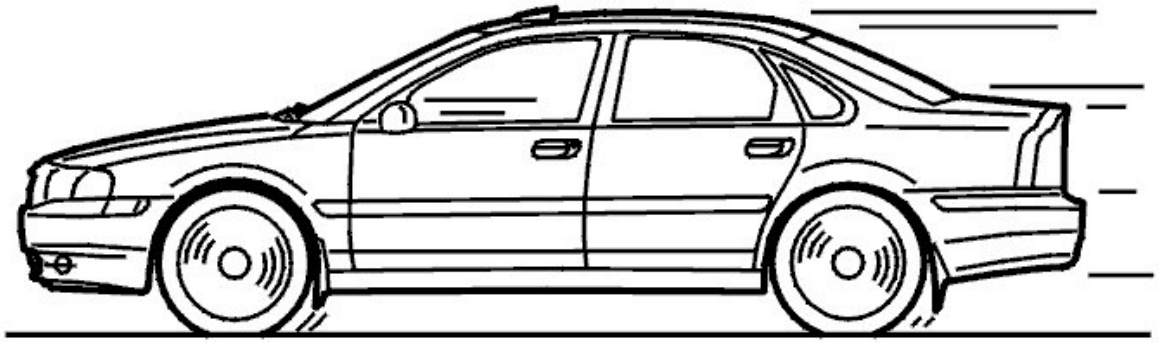
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

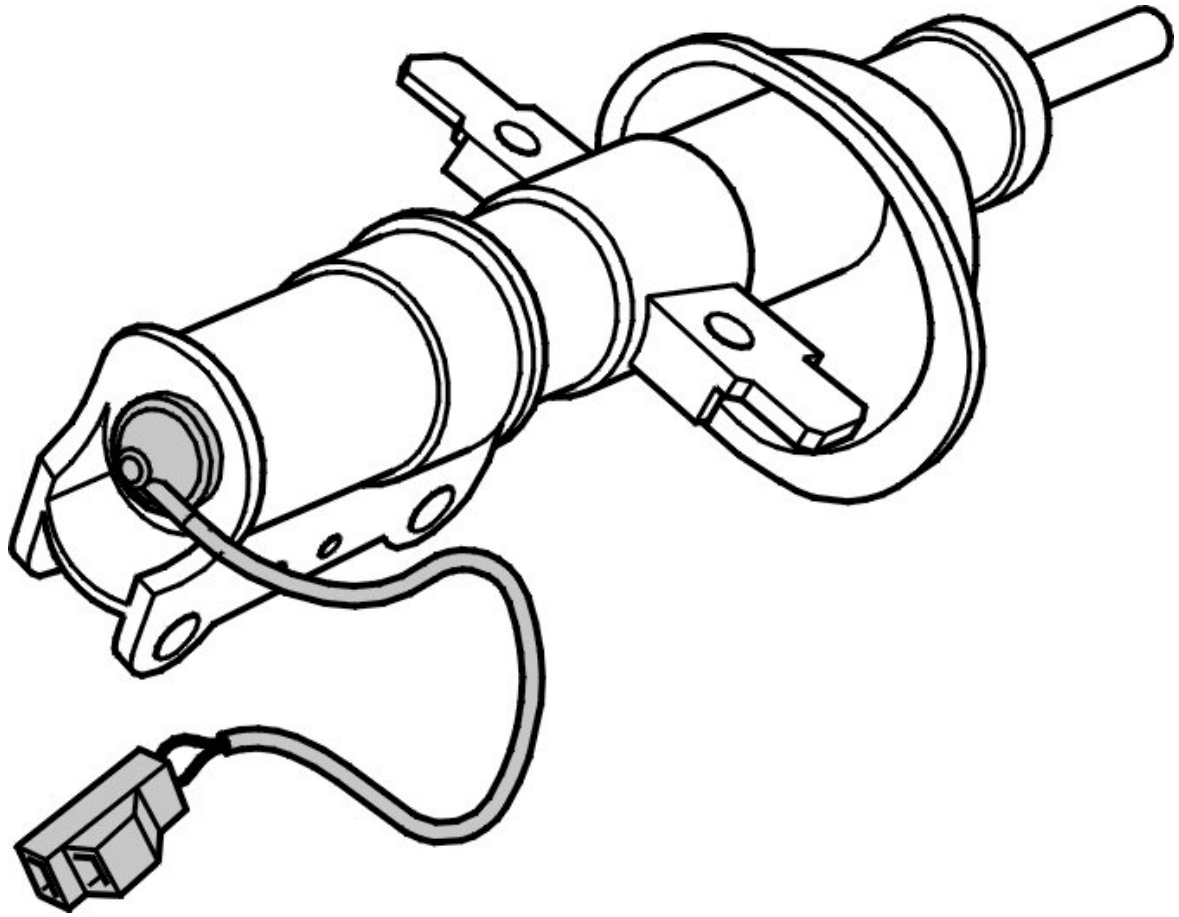
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the voltage to any of the solenoids is missing. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0113: Solenoid, left front
- SUM-0123: Solenoid, right front
- SUM-0133: Solenoid, left rear
- SUM-0143: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance or loose connections in the terminals
- Open-circuit in the power supply to the solenoid
- Open-circuit in the signal cable
- Damaged solenoid.

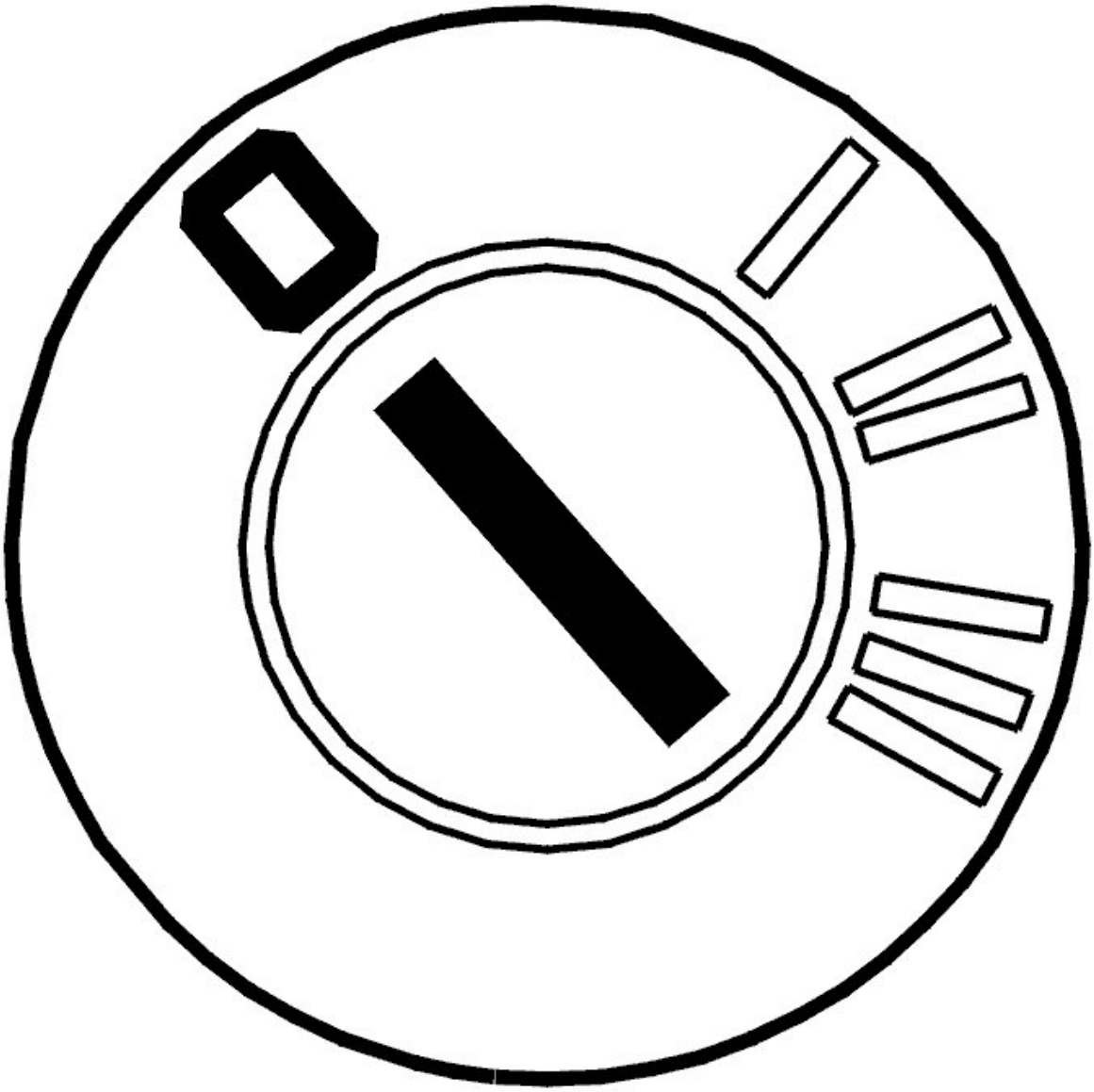
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Signal Missing

Signal missing

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the suspension module (SUM) and the solenoids. Check for oxidation. Check for loose connections.

For diagnostic trouble code (DTC) SUM-0113, front left solenoid:
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0123, front right solenoid:
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A8 and solenoid terminal #2. Check for an open-circuit.

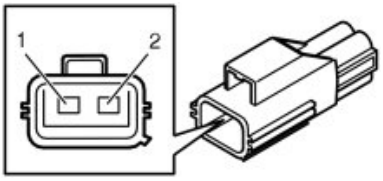
For diagnostic trouble code (DTC) SUM-0133, rear left solenoid:
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A1 and solenoid terminal #2. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0143, rear right solenoid:
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit
- Check the signal cable between control module #A4 and solenoid terminal #2. Check for an open-circuit.

Remedy as necessary.

Other information:
- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing

- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

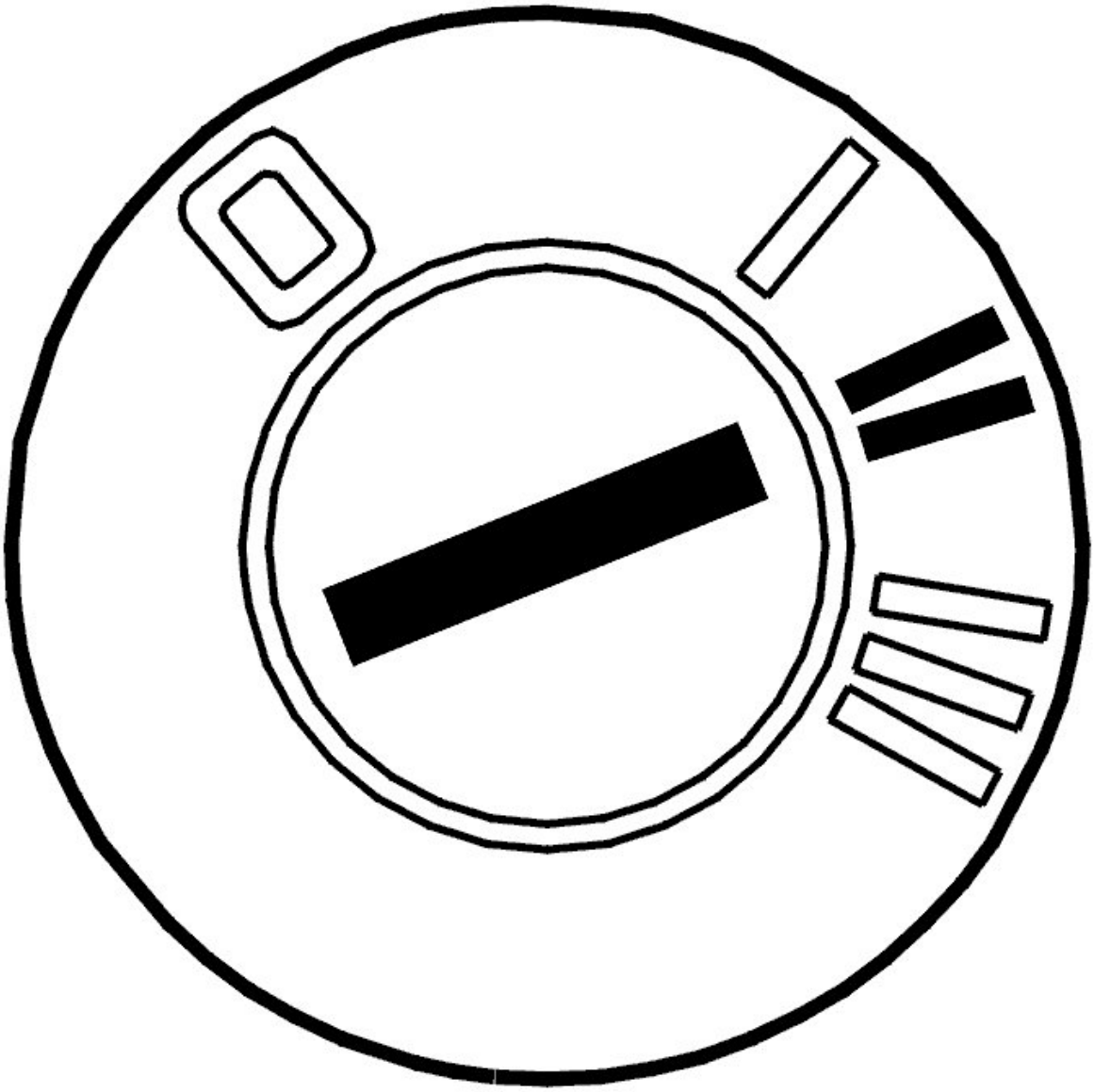
Verification

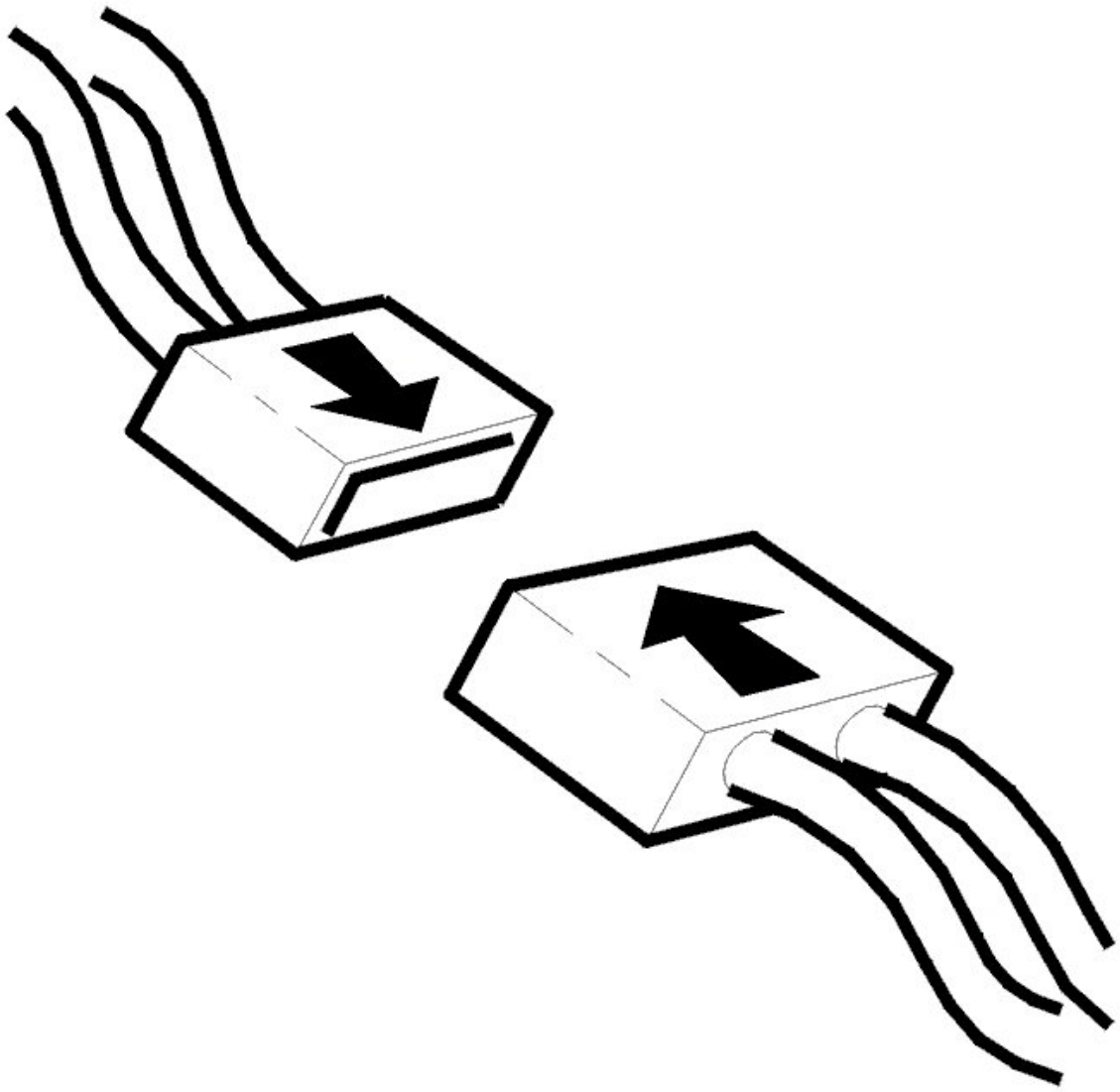
Verification

Verification

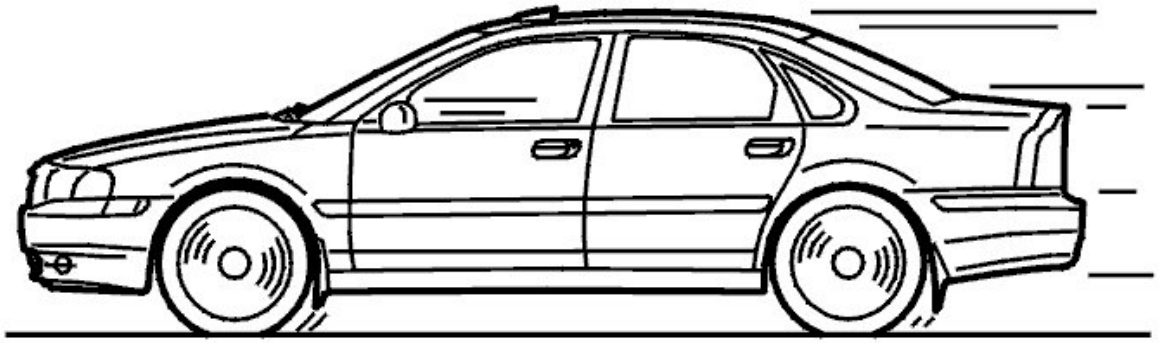
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

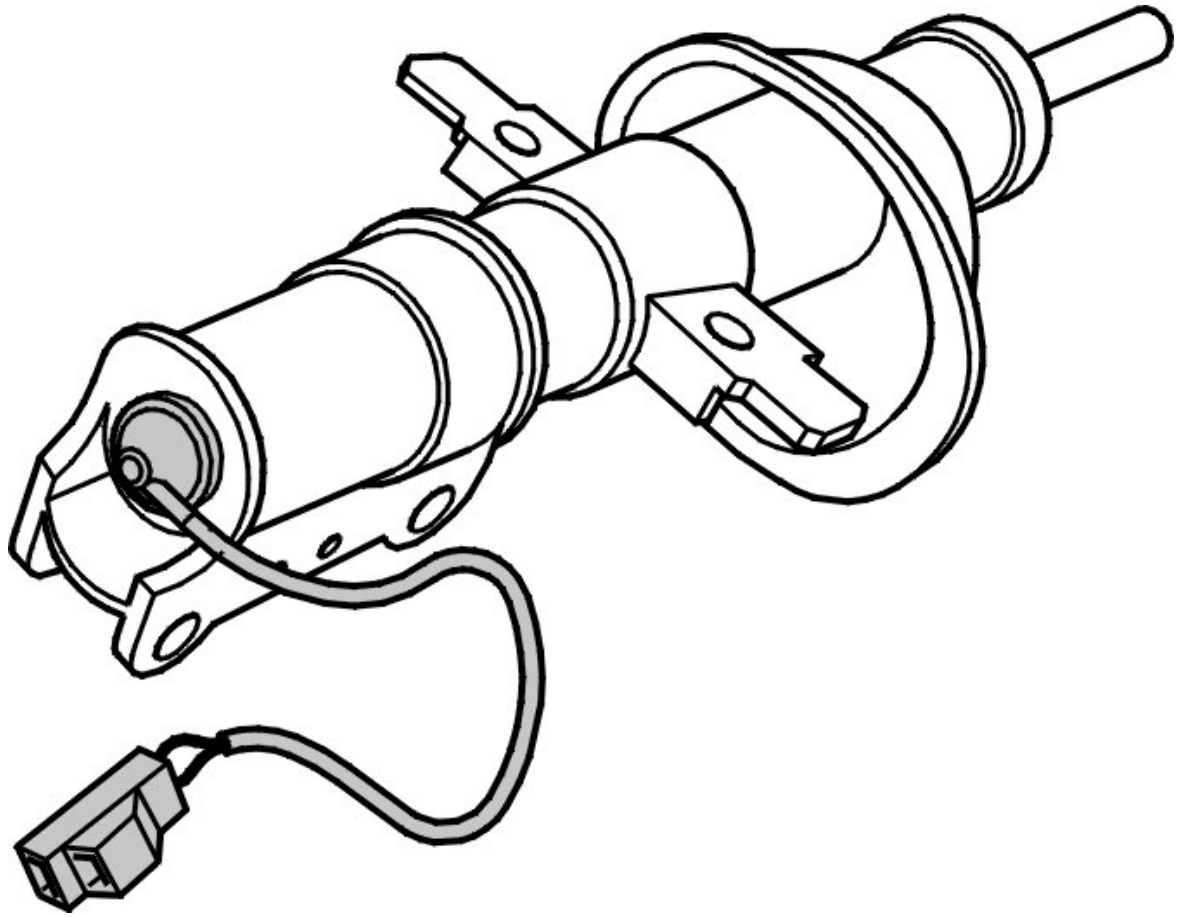
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0115, SUM-00125, SUM-0135 or SUM-0145 is stored if the control module registers that the current from one of the solenoids is too low when the ignition is switched on.

- SUM-0115: Solenoid, left front
- SUM-0125: Solenoid, right front
- SUM-0135: Solenoid, left rear
- SUM-0145: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Open-circuit in the power supply cable to the solenoid
- Open-circuit or short-circuit to ground in the signal cable from the solenoid
- Defective solenoid.

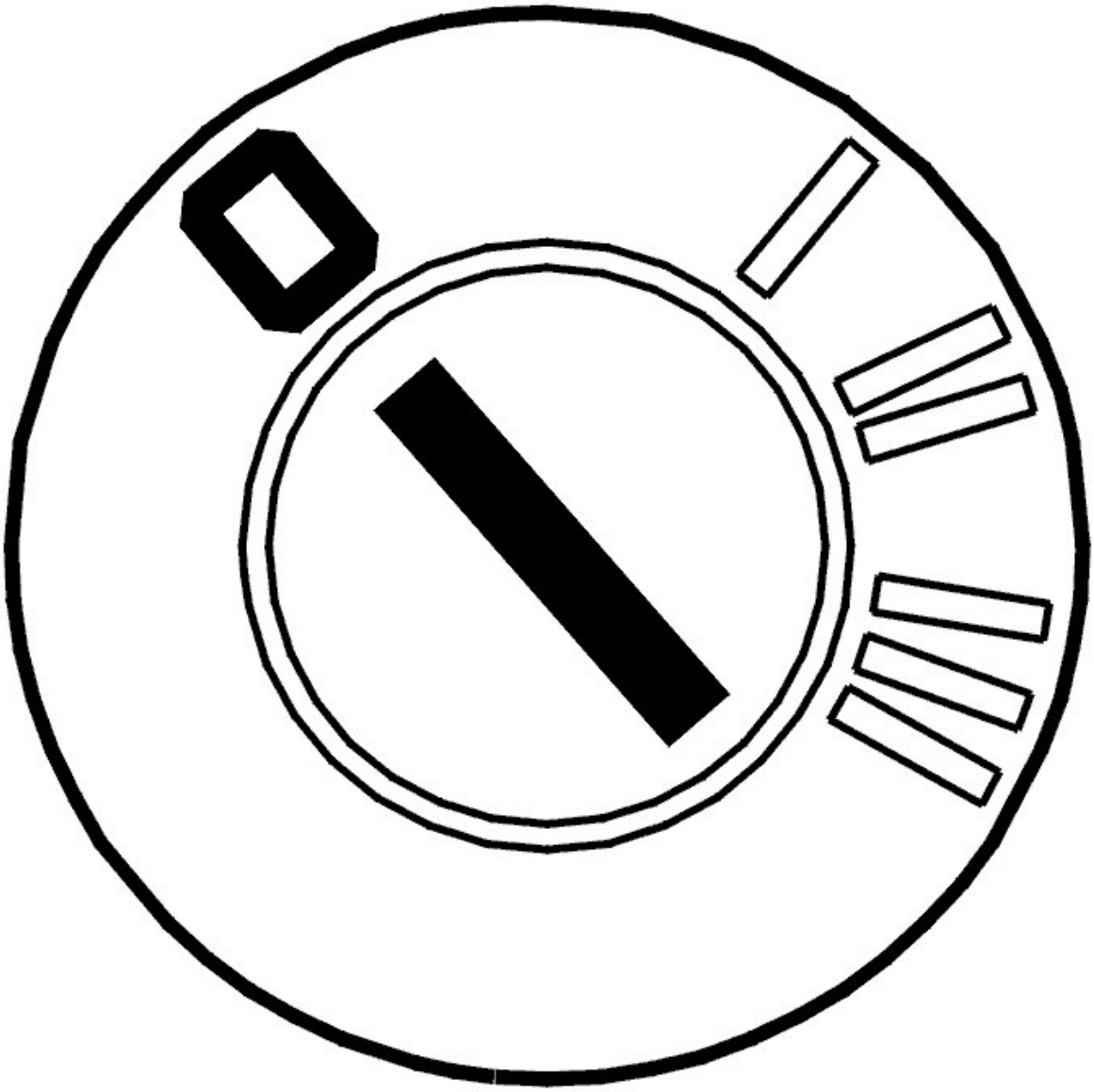
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too Low

Current too low

Checking the component and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.
Check that the solenoids on the spring struts are correctly installed.

For diagnostic trouble code (DTC) SUM-0115, front left solenoid:

- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A6 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0125, front right solenoid:

- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A9 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0135, rear left solenoid:

- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A2 and solenoid terminal #1. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0145, rear right solenoid:

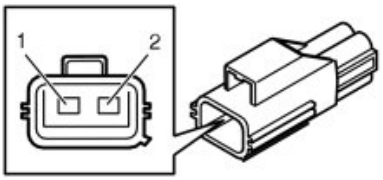
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit
- Check the power supply cable between control module terminal #A5 and solenoid terminal #1. Check for an open-circuit.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Check the resistance of the solenoids.
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

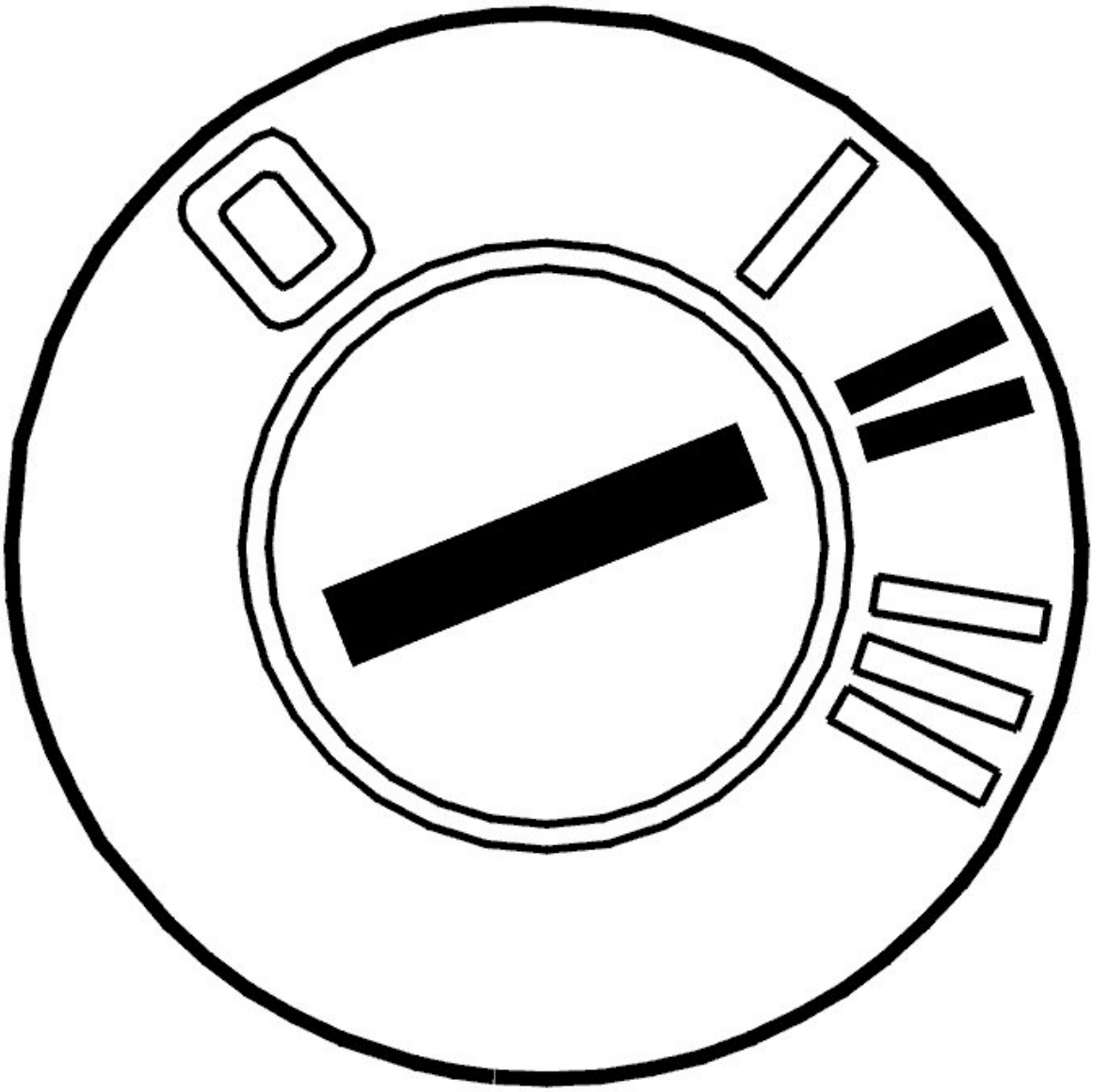
Verification

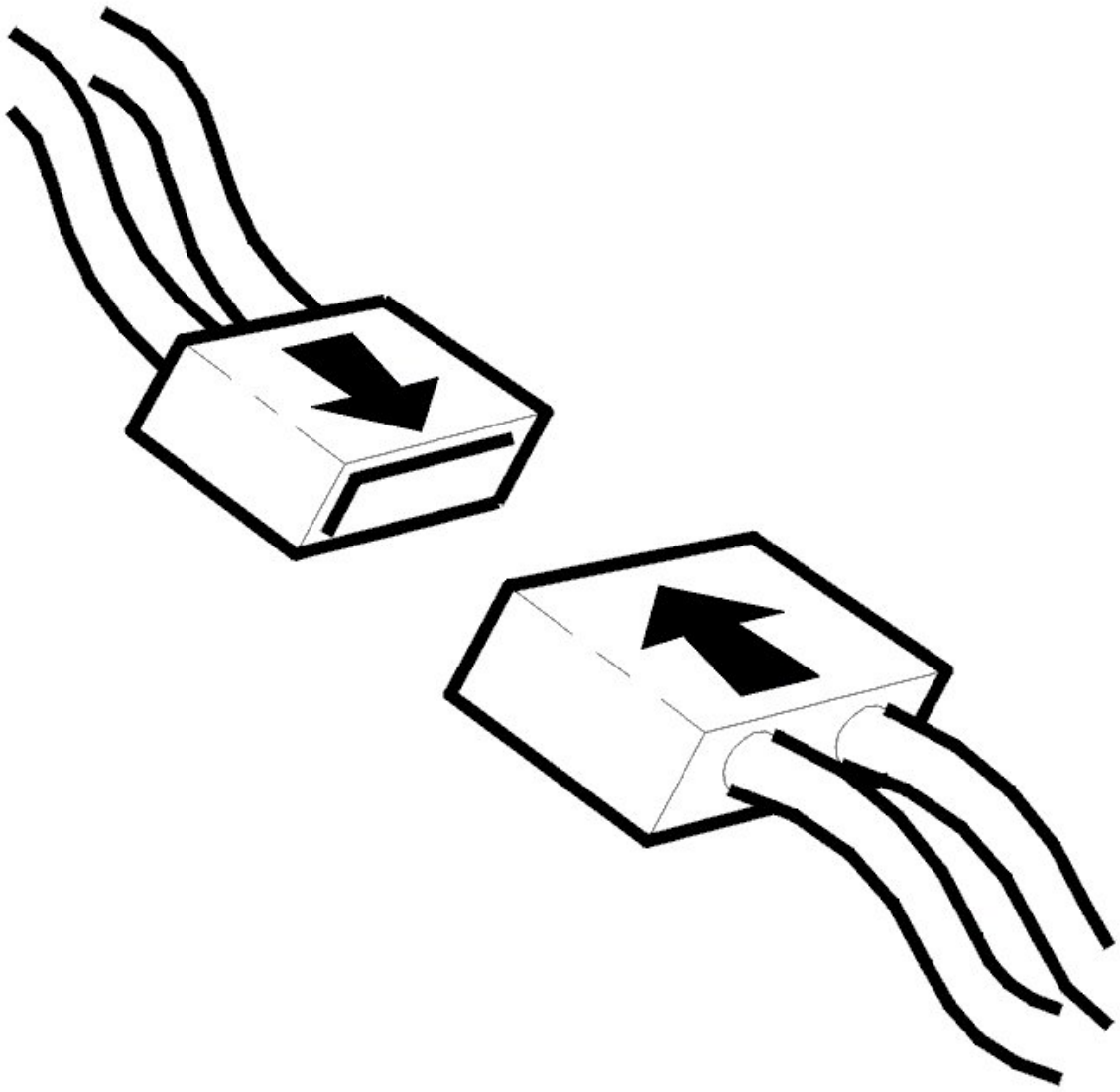
Verification

Verification

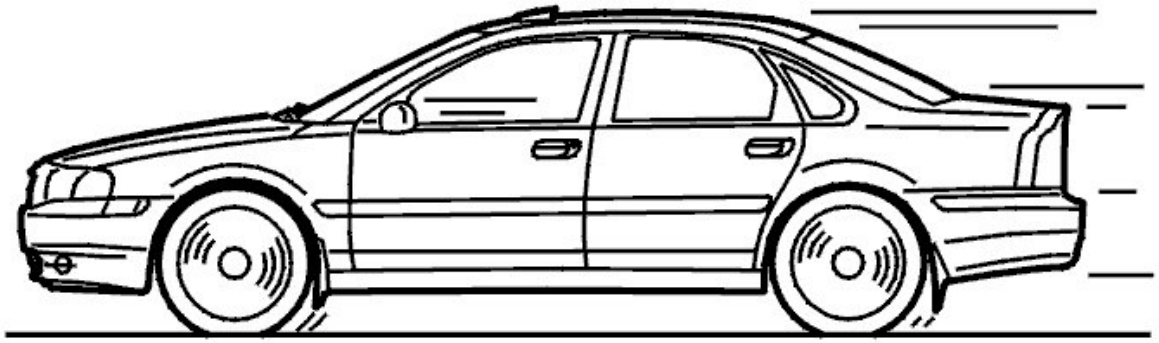
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

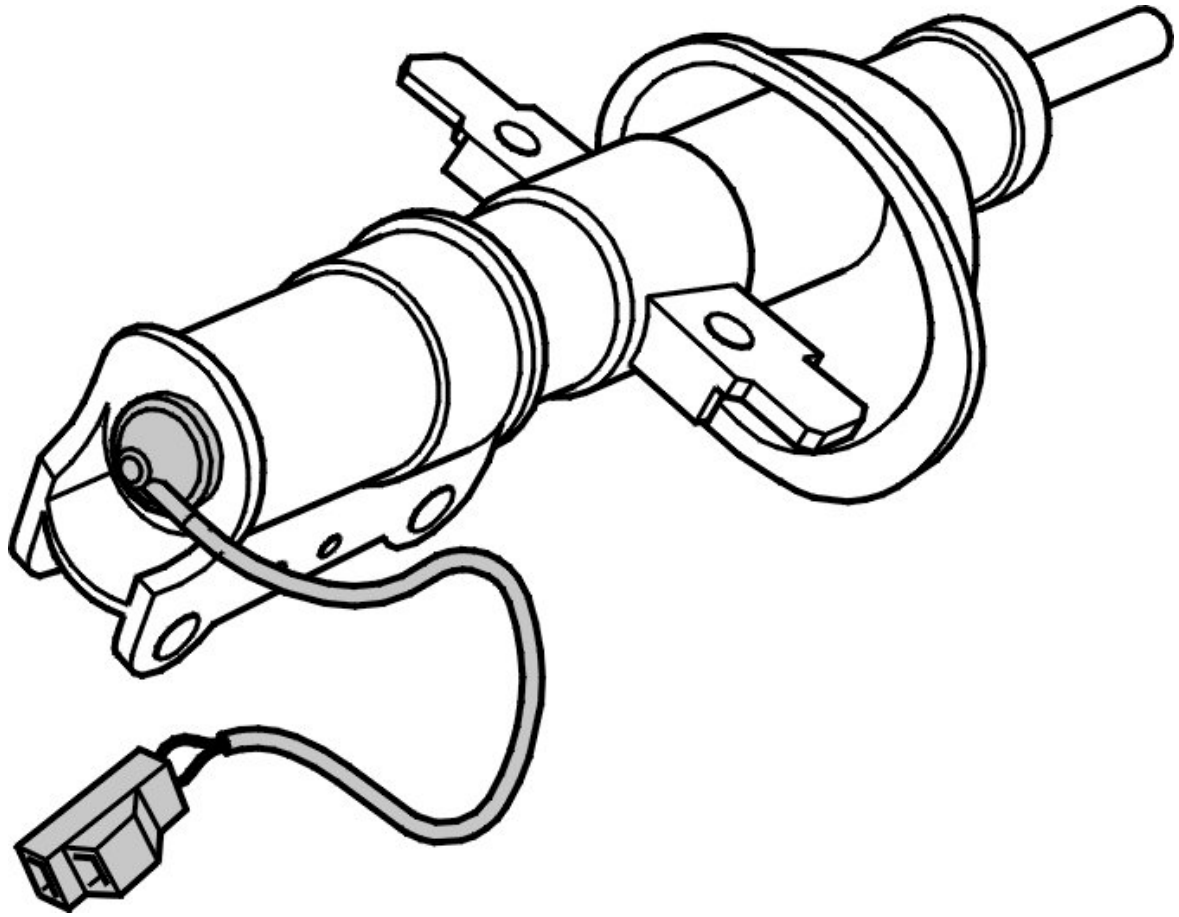
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0116, 0126, 0136 or SUM-0146 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0116: Solenoid, left front
- SUM-0126: Solenoid, right front
- SUM-0136: Solenoid, left rear
- SUM-0146: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to supply voltage in the power supply cable for the solenoid
- Defective solenoid.

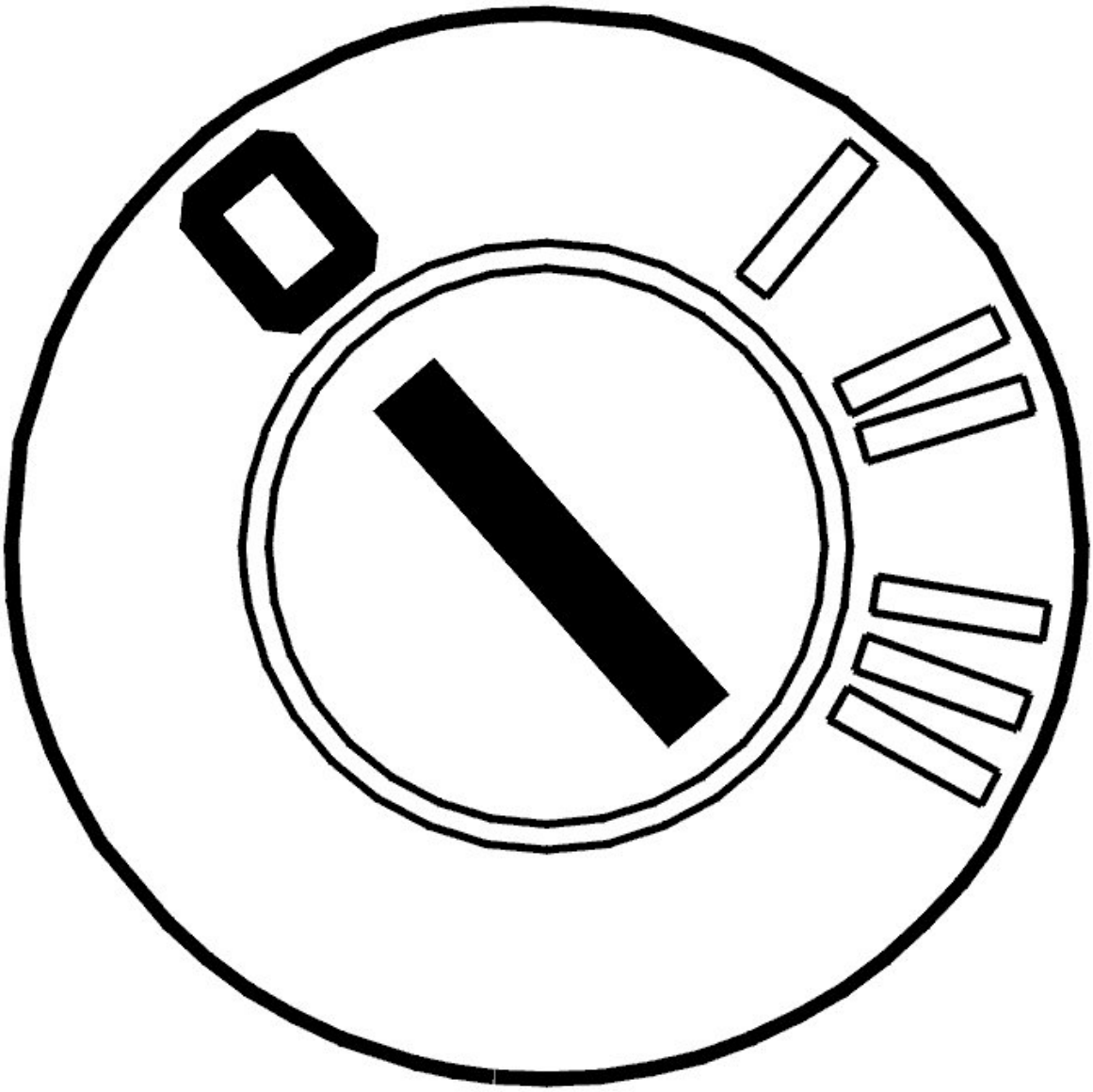
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking the component and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0116, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0126, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0136, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0146, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for a short-circuit to supply voltage.

Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

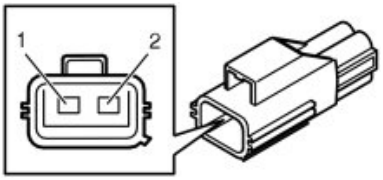
Remedy as necessary.

Other information:

- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

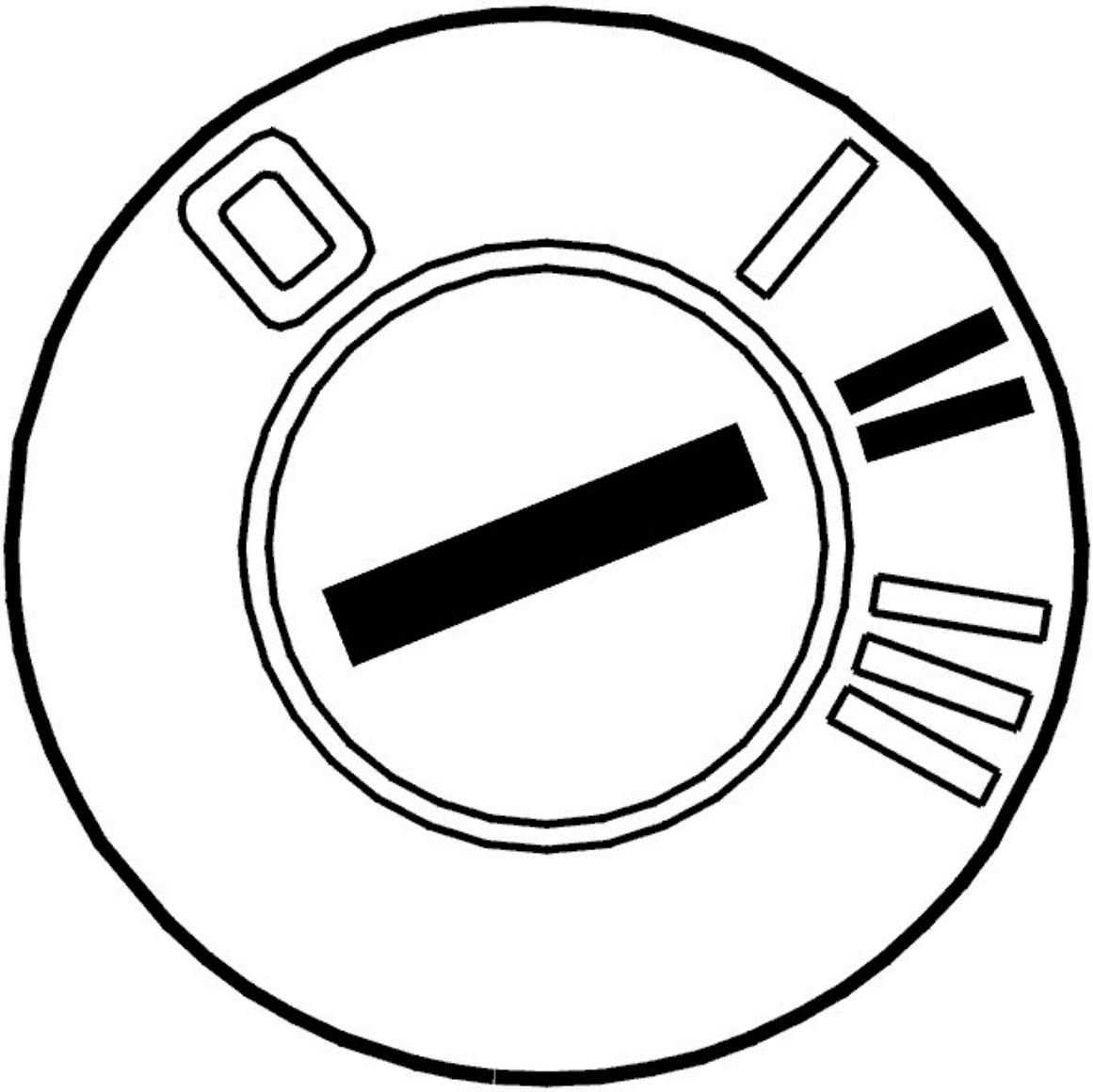
Verification

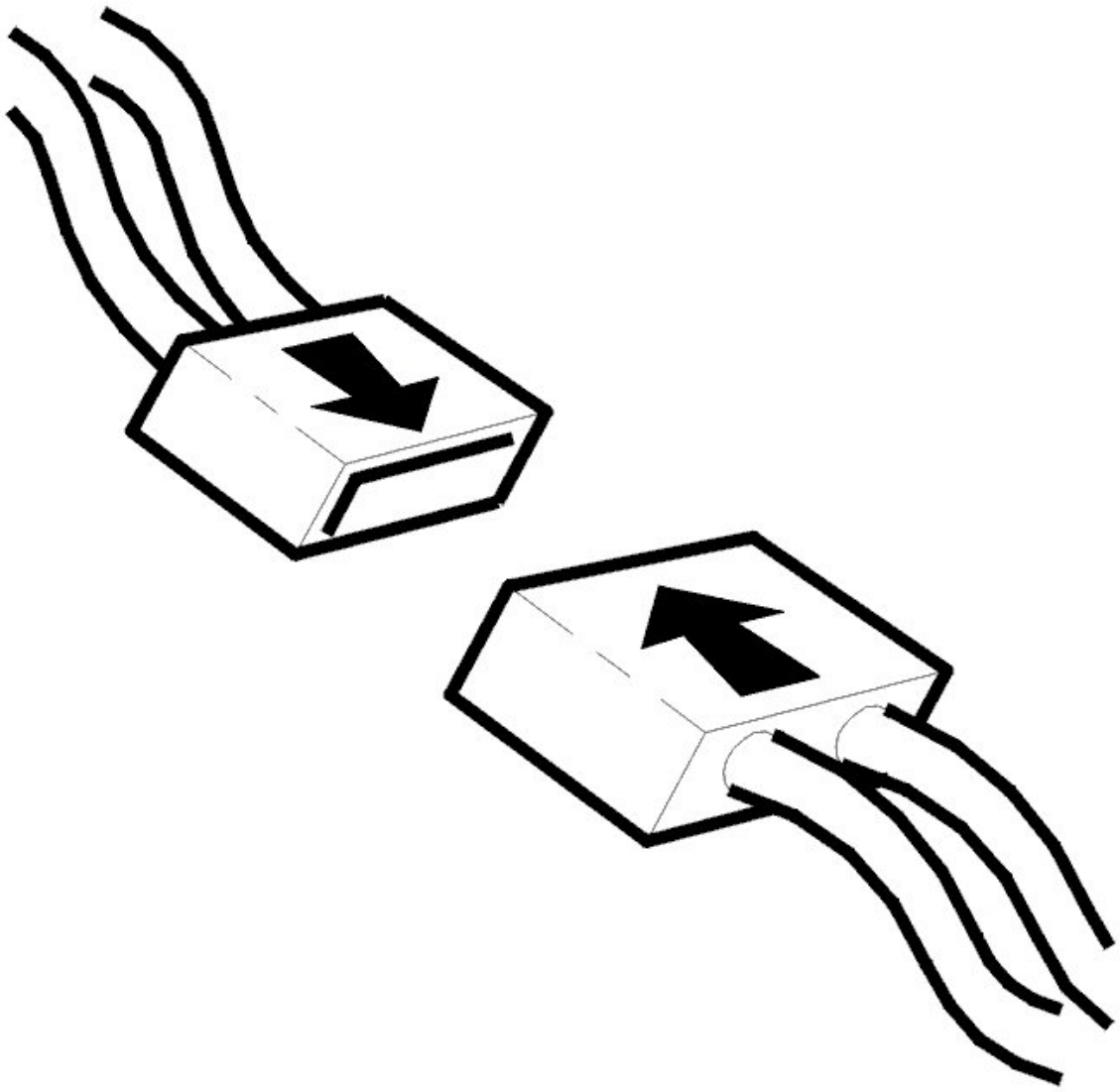
Verification

Verification

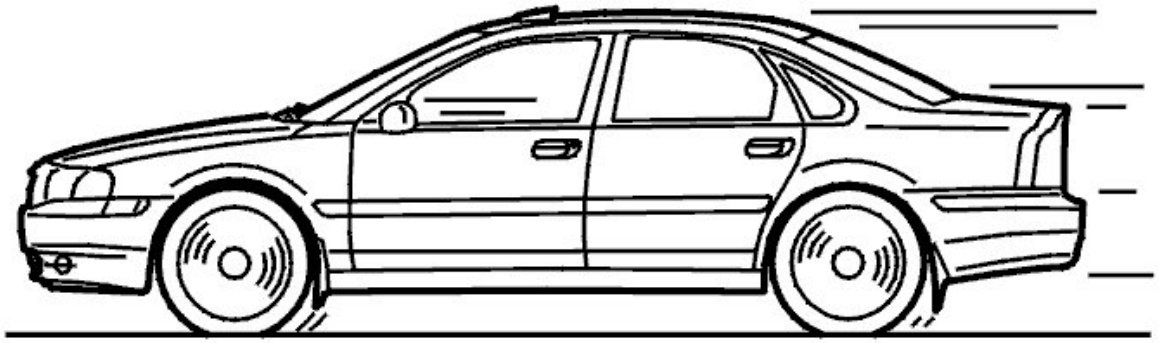
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

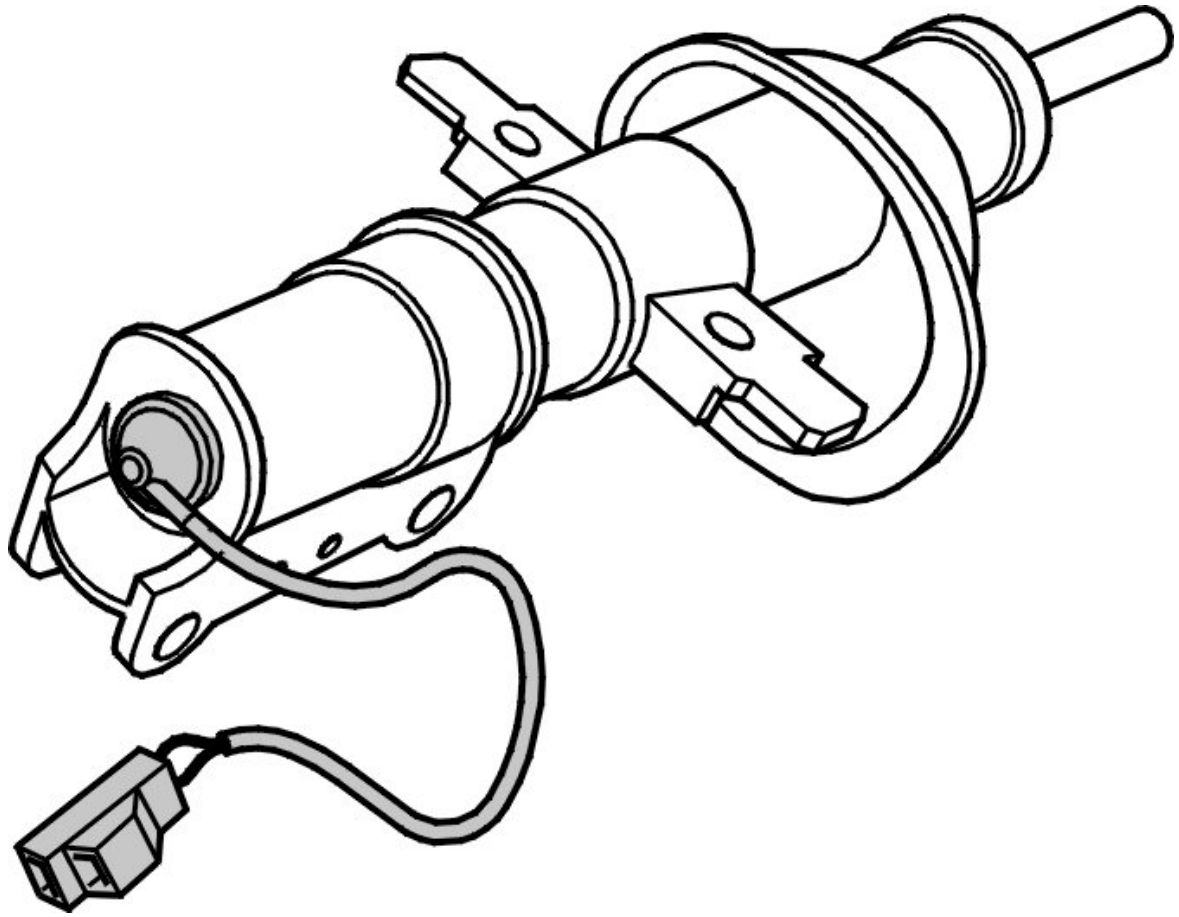
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the solenoids on each suspension unit. Diagnostic trouble code (DTC) SUM-0117, SUM-00127, SUM-0137 or SUM-0147 is stored if the control module registers that the current from one of the solenoids is too high when the ignition is switched on.

- SUM-0117: Solenoid, left front
- SUM-0127: Solenoid, right front
- SUM-0137: Solenoid, left rear
- SUM-0147: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Short-circuit to signal cable from the solenoid in the power supply cable for the solenoid
- Short-circuit to supply voltage in the signal cable from the solenoid
- Defective solenoid.

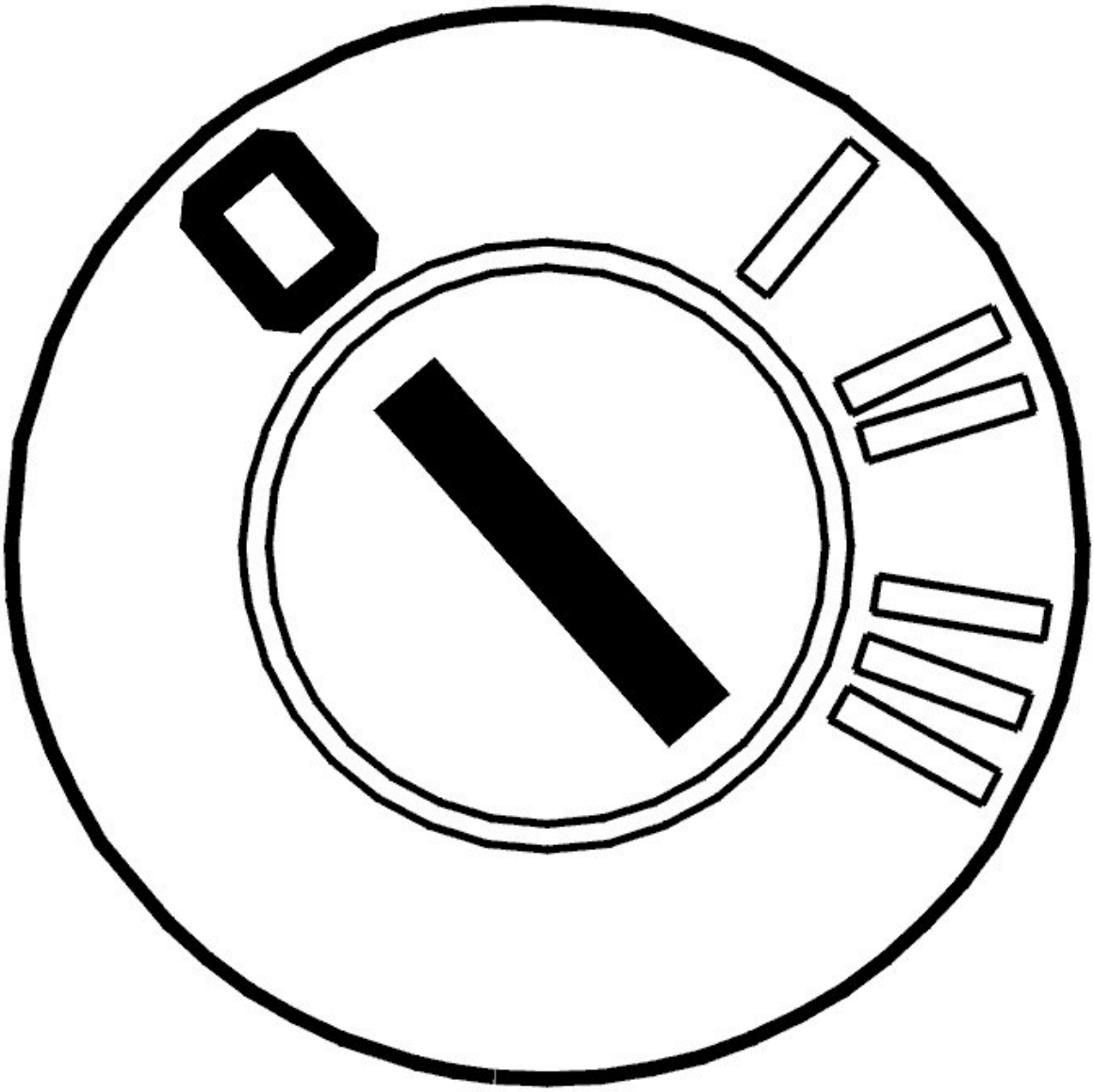
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Current Too High

Current too high

Checking components and wiring



- Ignition off.

Check the resistance of the solenoids.
Check the connectors for the Suspension Module (SUM) and the solenoids. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0117, front left solenoid:
- Check the signal cable between control module #A7 and solenoid terminal #2. Check for a short-circuit to supply voltage.

For diagnostic trouble code (DTC) SUM-0127, front right solenoid:
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0137, rear left solenoid:
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

For diagnostic trouble code (DTC) SUM-0147, rear right solenoid:
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to supply voltage or to the power supply cable for the solenoid.

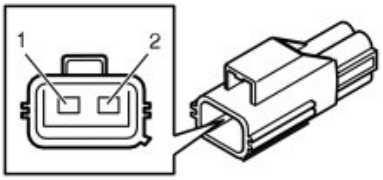
Hint: Click on the VCT2000 symbol to activate the power supply to the solenoids. This will make fault-tracing easier. Measure the current on the signal cable. The value must be approximately 0.5 A.

Remedy as necessary.

Other information:
- For information about component specifications, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Verification

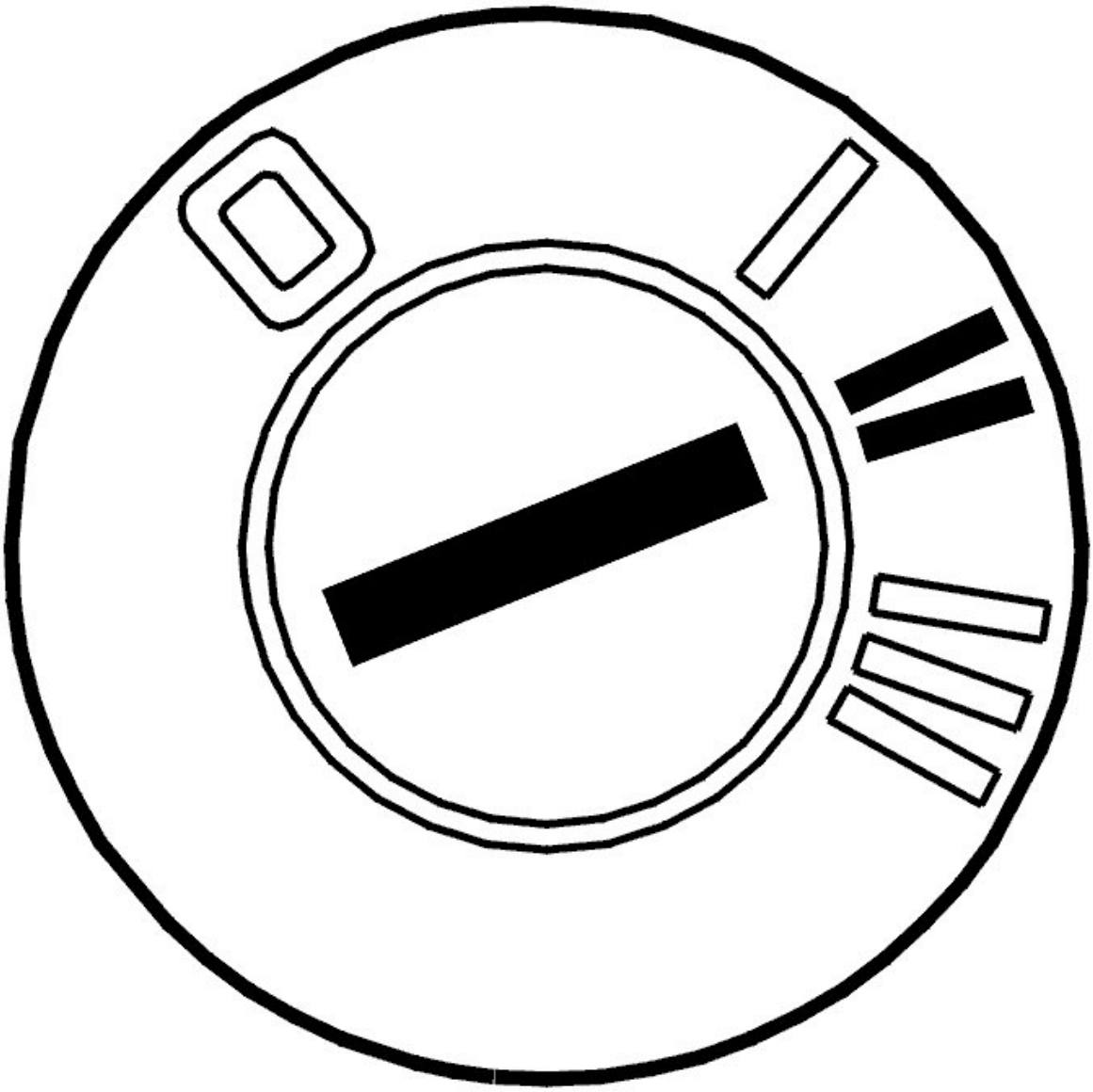
Verification

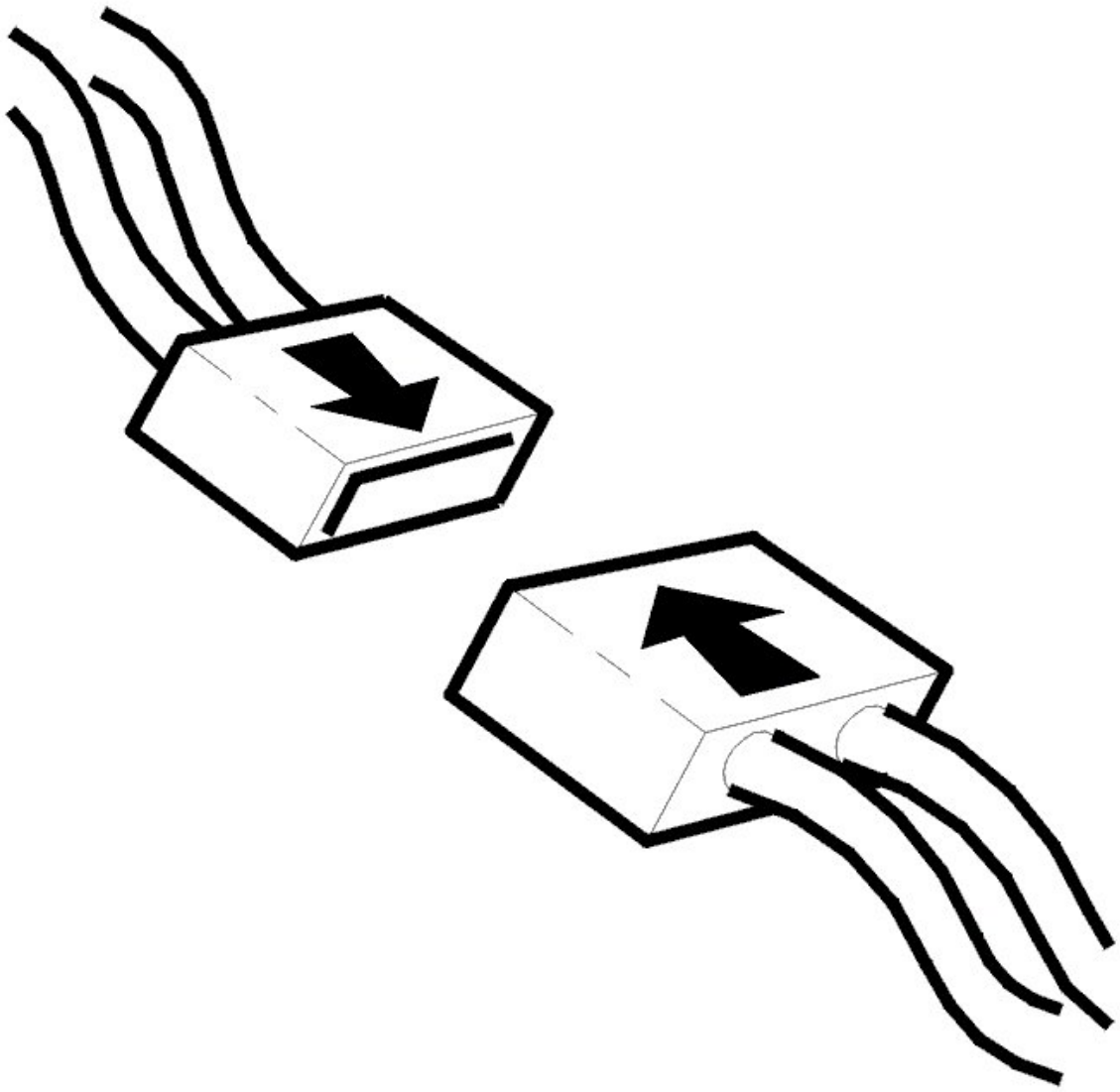
Verification

Verification

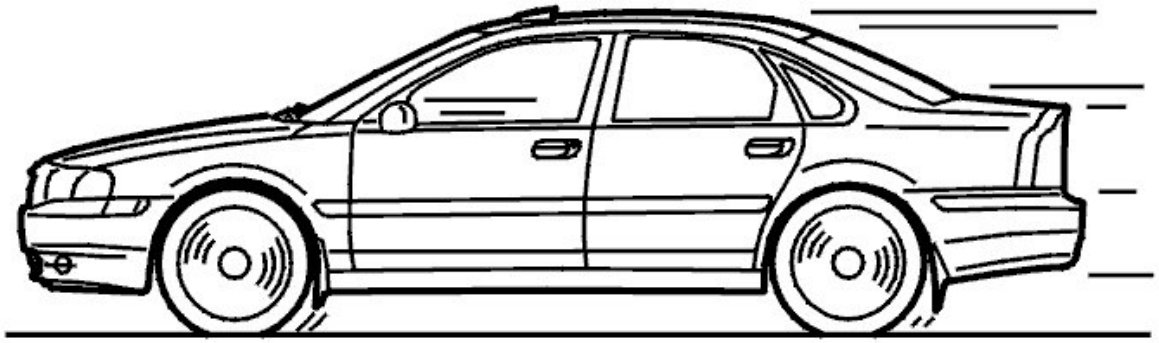
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

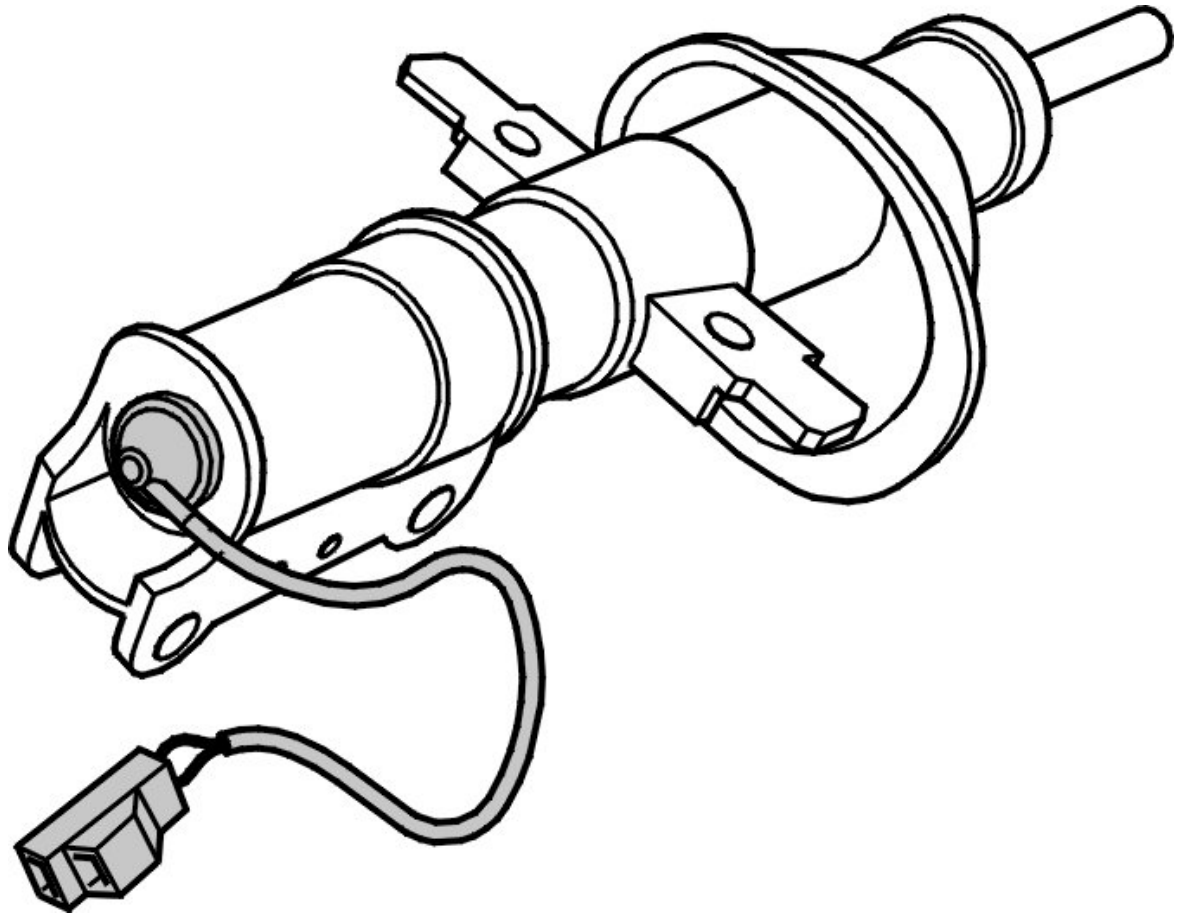
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the temperature of any of the solenoids is too high. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0118: Solenoid, left front
- SUM-0128: Solenoid, right front
- SUM-0138: Solenoid, left rear
- SUM-0148: Solenoid, right rear.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C (Continuously Controlled Chassis Concept) function is limited.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Hard driving.

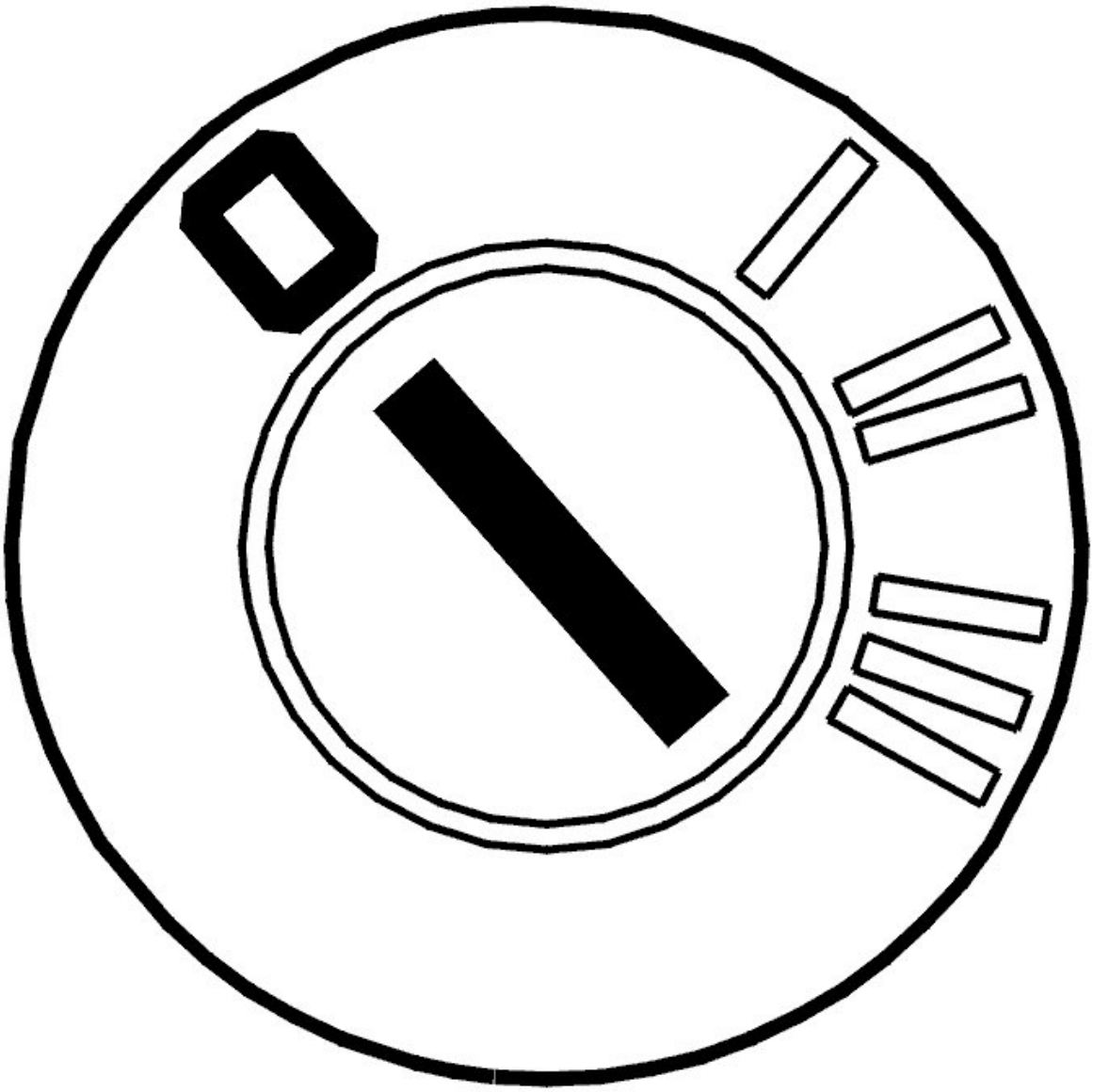
Fault symptom[s]

- None.

Temperature Too High

Temperature too high

Checking the component and wiring



- Ignition off.

Check the solenoids and connectors for the Suspension Module (SUM). Check for contact resistance. Check for oxidation.
Check the resistance of the solenoids.

For diagnostic trouble code (DTC) SUM-0118, front left solenoid:

- Check the power supply cable between control module terminal #A6 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A7 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0128, front right solenoid:

- Check the power supply cable between control module terminal #A9 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A8 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0138, rear left solenoid:

- Check the power supply cable between control module terminal #A2 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A1 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

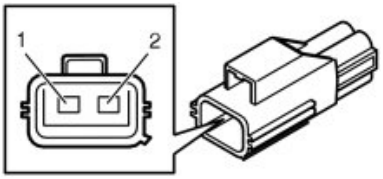
For diagnostic trouble code (DTC) SUM-0148, rear right solenoid:

- Check the power supply cable between control module terminal #A5 and solenoid connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground
- Check the signal cable between control module terminal #A4 and solenoid terminal #2. Check for a short-circuit to ground. Check for an open-circuit.

Remedy as necessary.

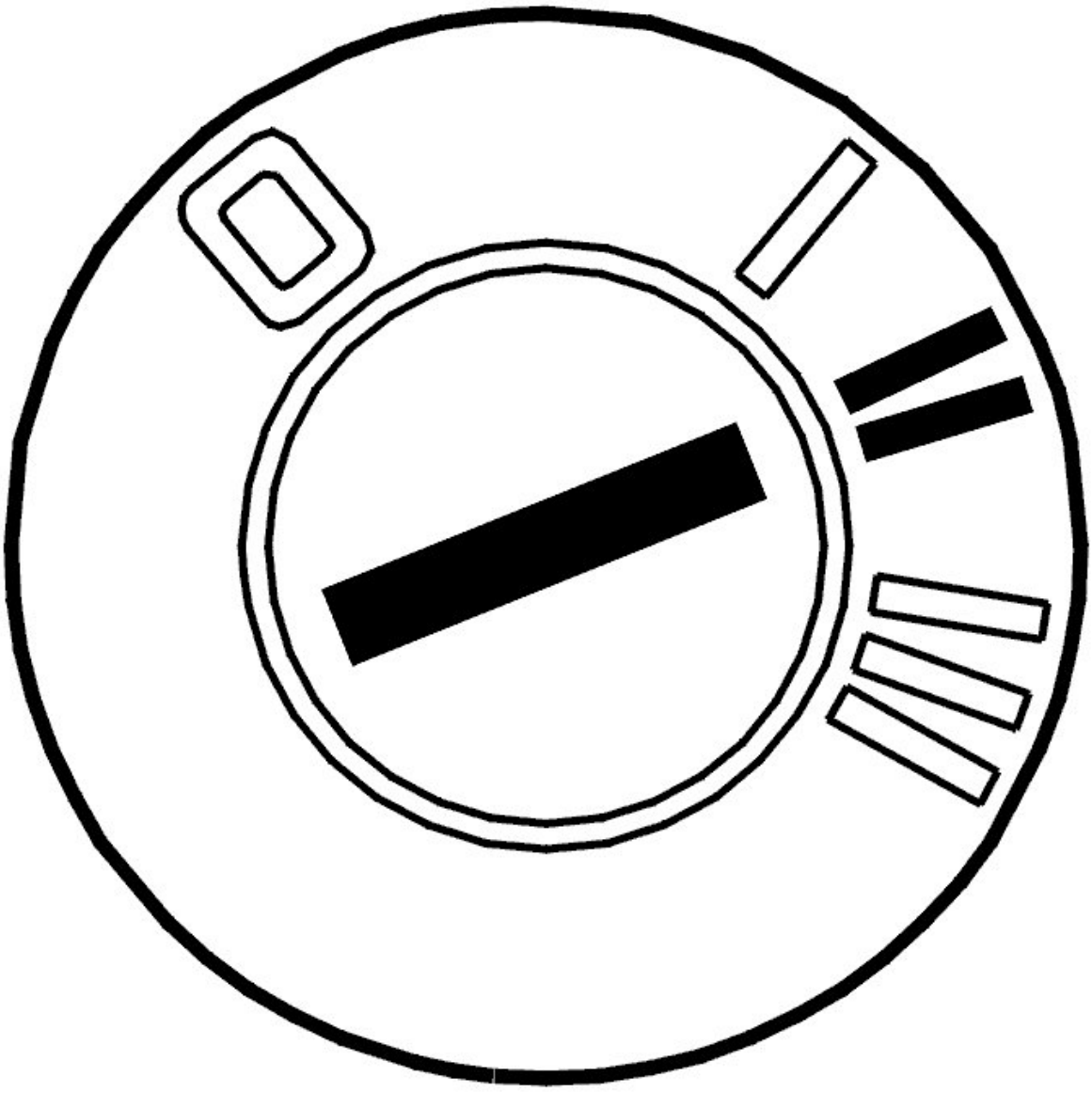
Other information:

- Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Calibrating the control module

Calibrating the control module

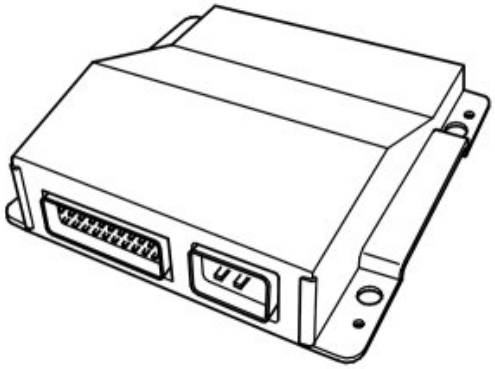


Note! In order for the Four-C (Continuously Controlled Chassis Concept) function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be calibrated.

- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is unloaded and on a flat surface with the wheels pointing straight ahead

- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.



Continue - Verification

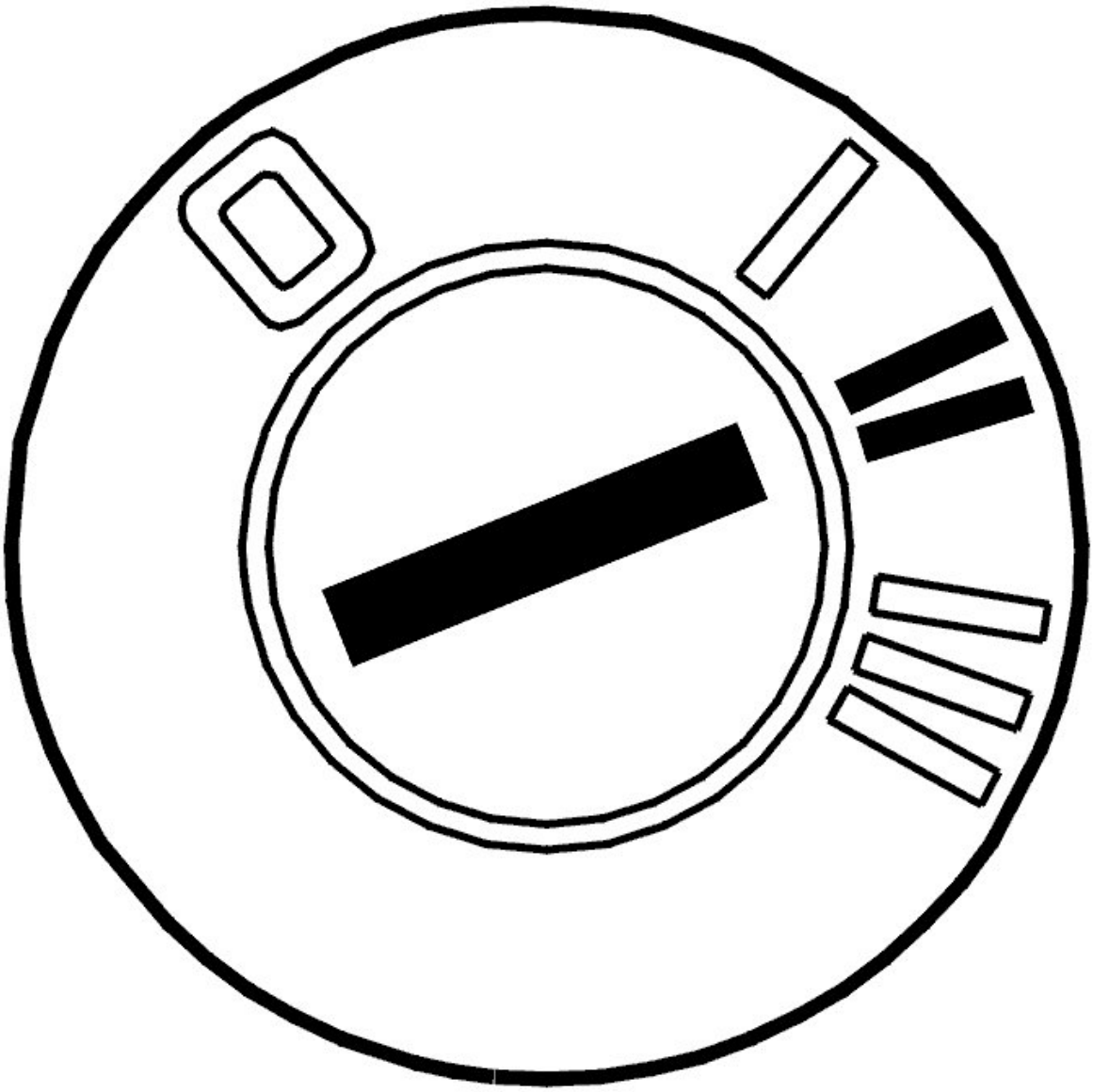
Verification

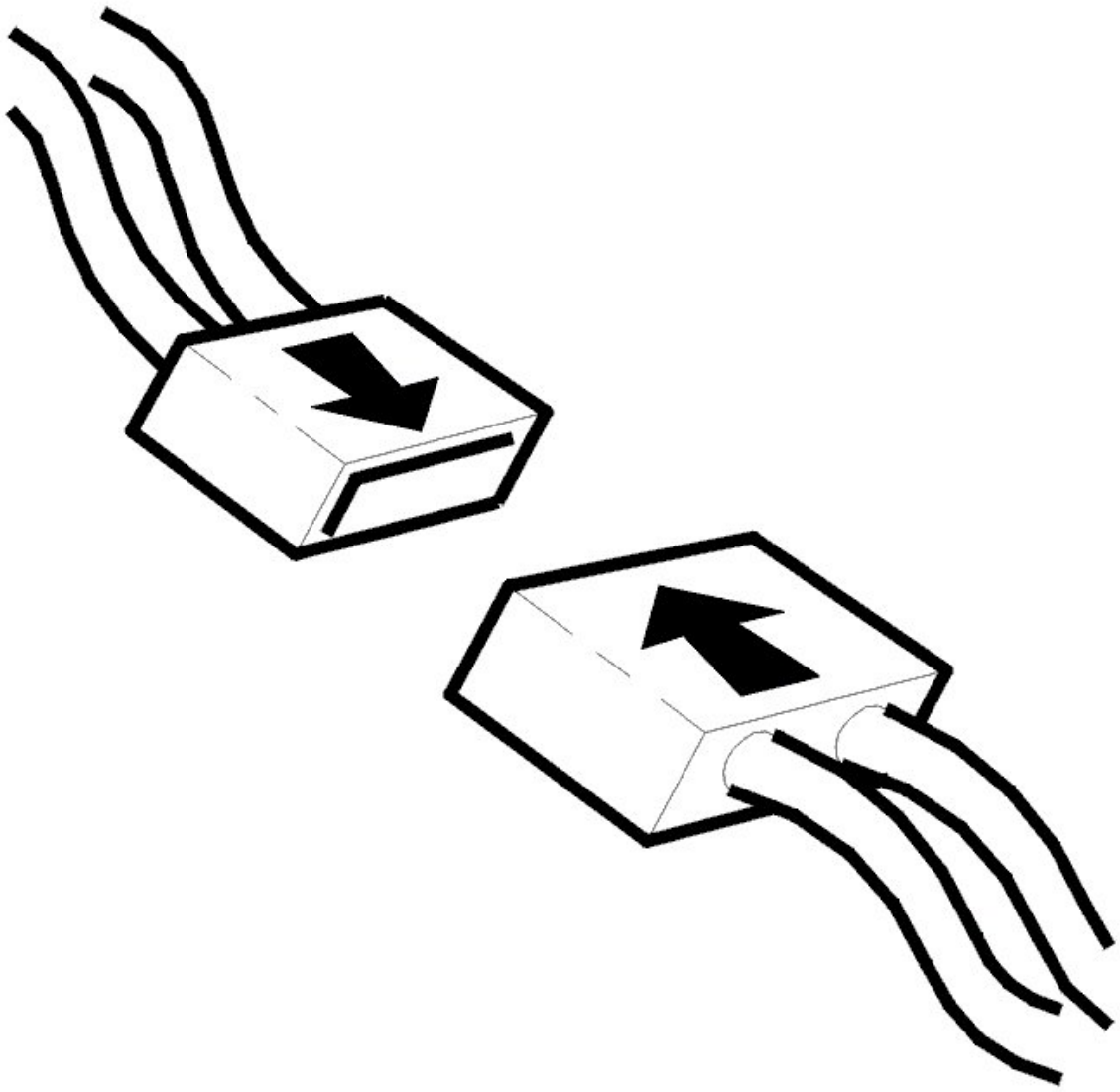
Verification

Verification

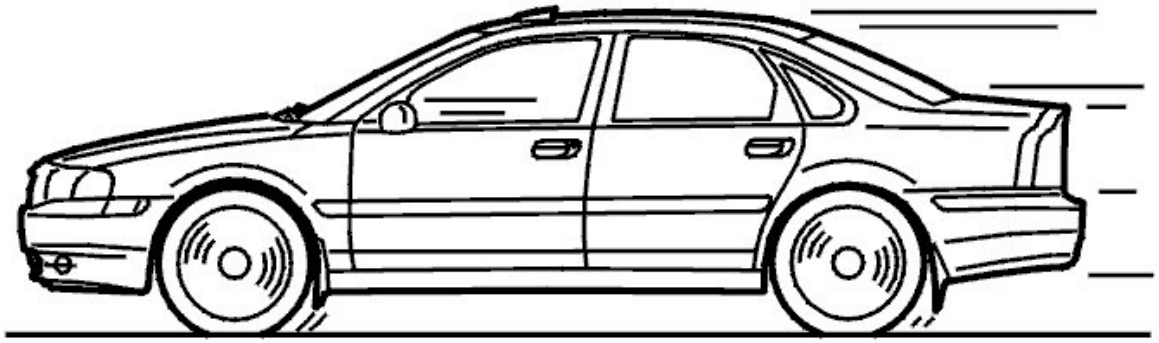
Warning! Always test drive cars under safe, controlled conditions. Follow the appropriate traffic and speed regulations.

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Test drive the car. The driving mode must be changed during the test drive
- Ignition on
- Click on the VCT2000 symbol to read off the present value on the signal cable from the solenoids. The value must be approximately 0.5 A.



Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

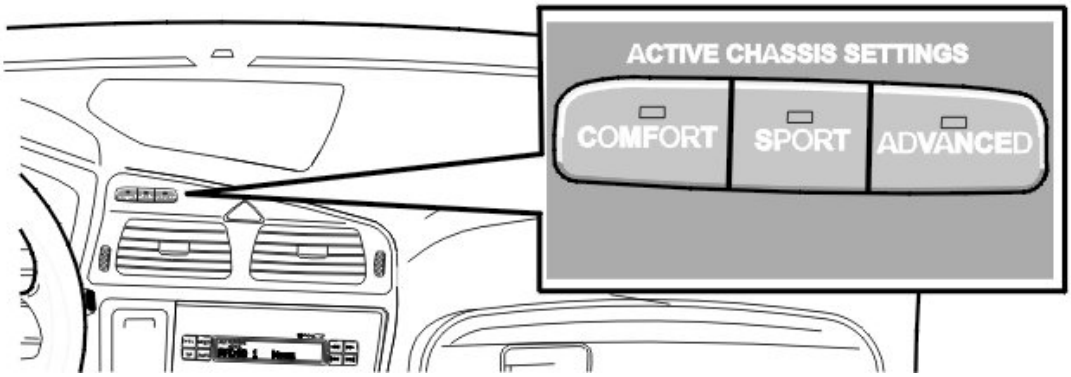
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the component and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0151 is stored if the control module registers that the voltage is too low when a button is pressed. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0151: Keypad. Signal too low.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply to the keypad
- Defective keypad.

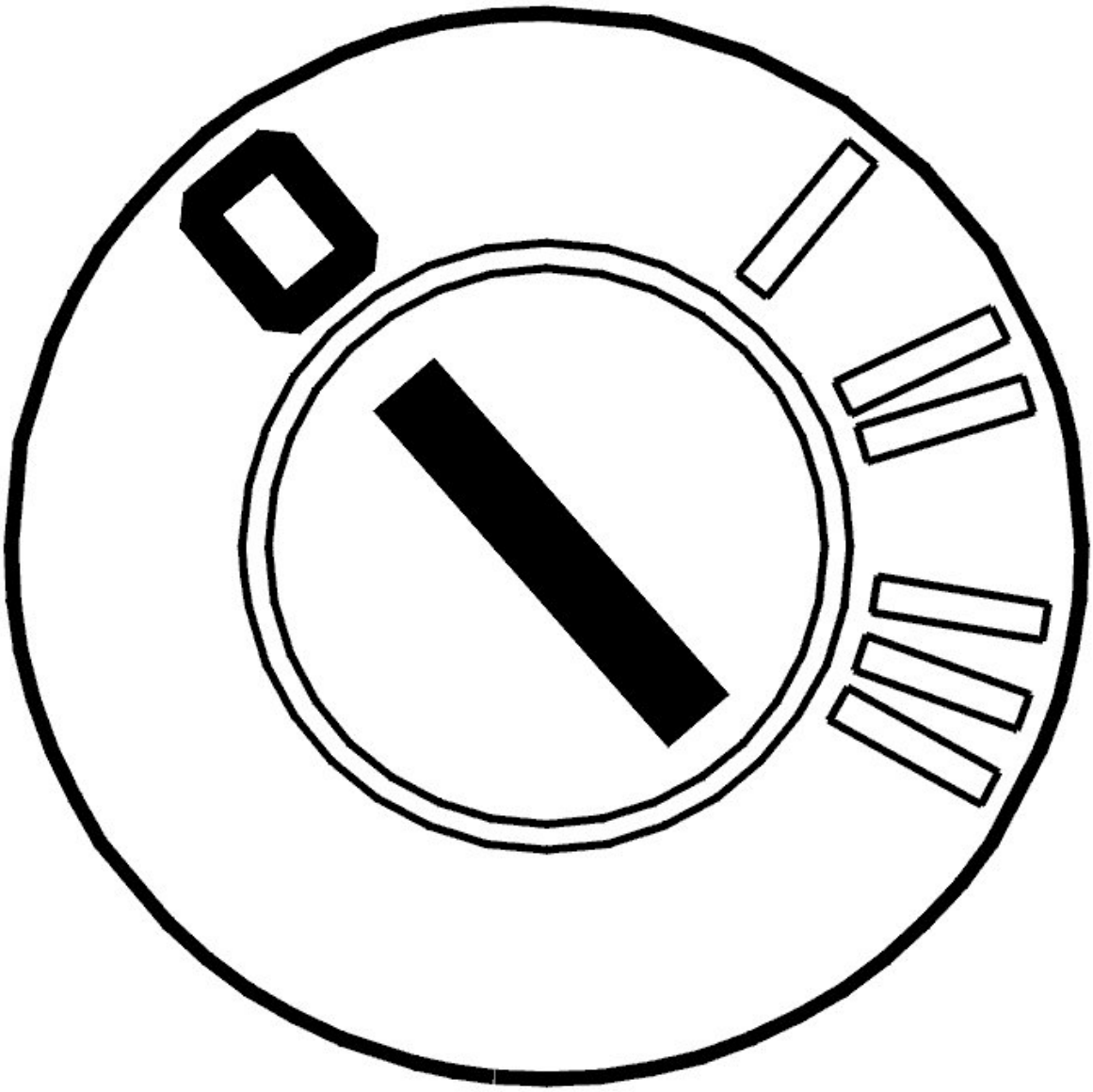
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for contact resistance and oxidation.

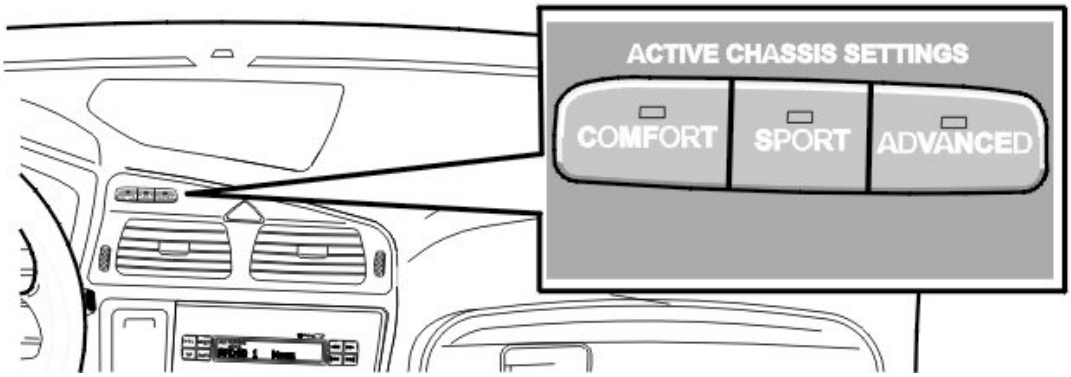
For diagnostic trouble code (DTC) SUM-0151, keypad:

- Check the signal cable between control module terminal #A24 and keypad terminal #1. Check for a short-circuit to ground.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

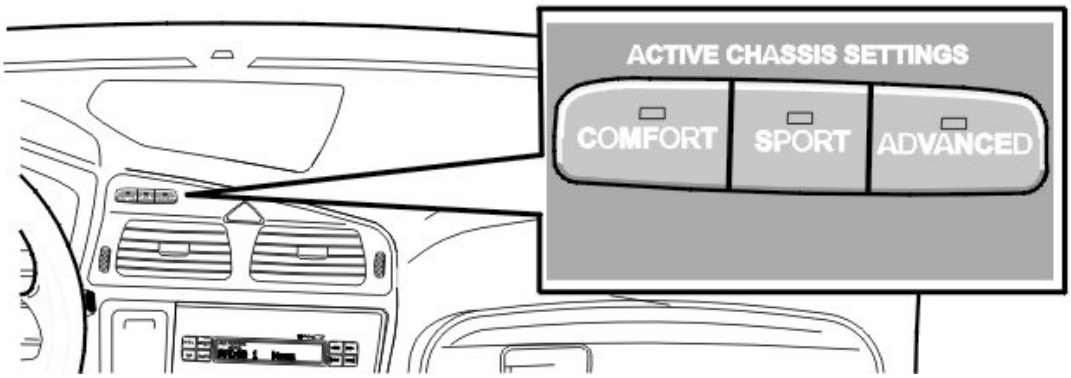
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0152 is stored if the control module registers that the voltage is too high when a button is pressed. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0152: Keypad, Signal too high.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

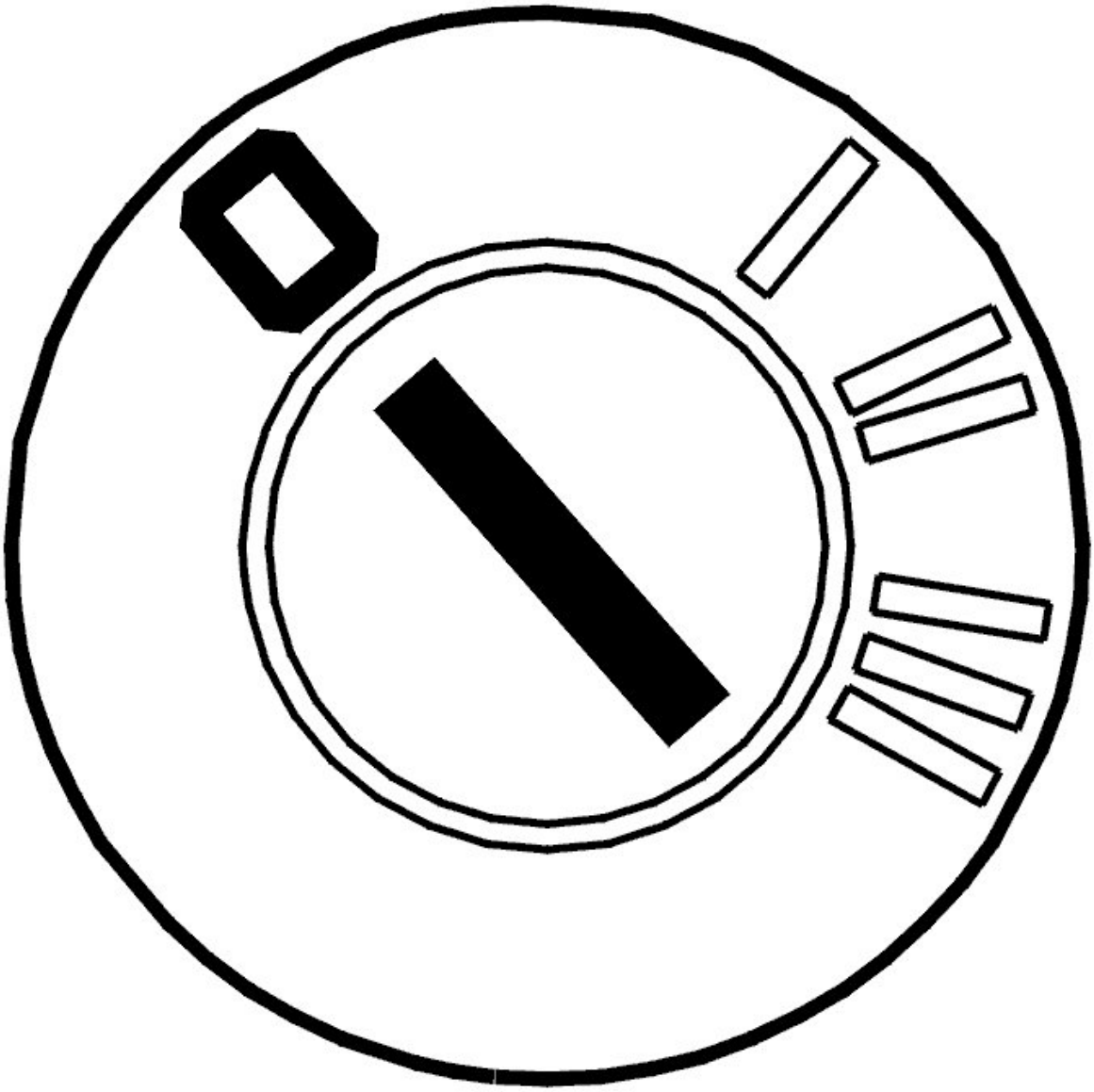
Possible source
- Short-circuit to supply voltage in the power supply to the keypad
- Defective keypad.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for oxidation.

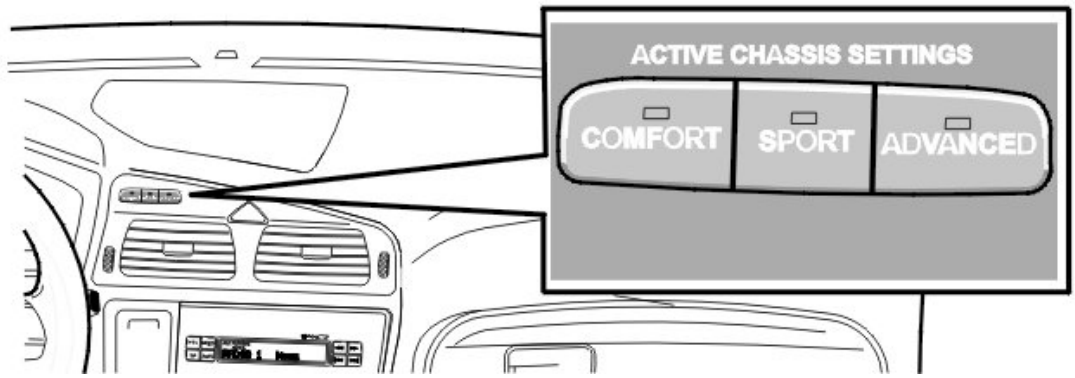
For diagnostic trouble code (DTC) SUM-0152, keypad:
- Check the signal cable between control module terminal #A24 and keypad terminal #1. Check for a short-circuit to supply voltage.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (

Automatic - Electronic Level)

- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

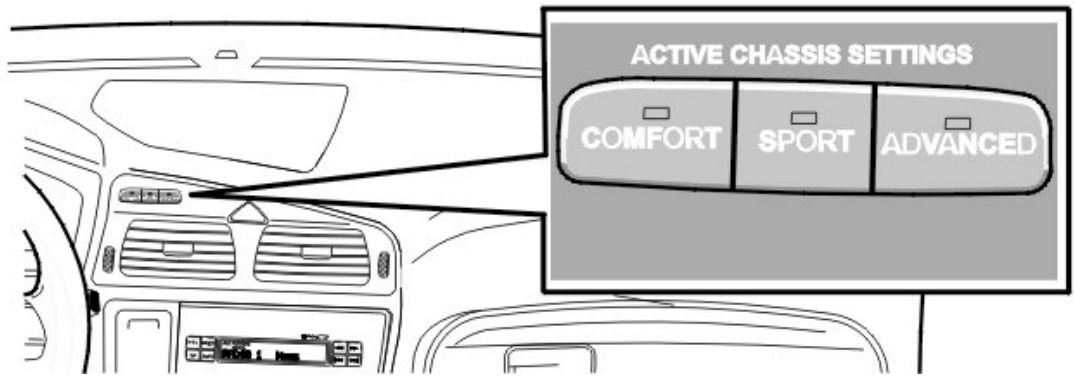
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0153 is stored if the control module registers that there is no signal when a button is pressed. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

- SUM-0153: Keypad, Signal missing.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Open-circuit in the power supply cable to the keypad
- Defective keypad.

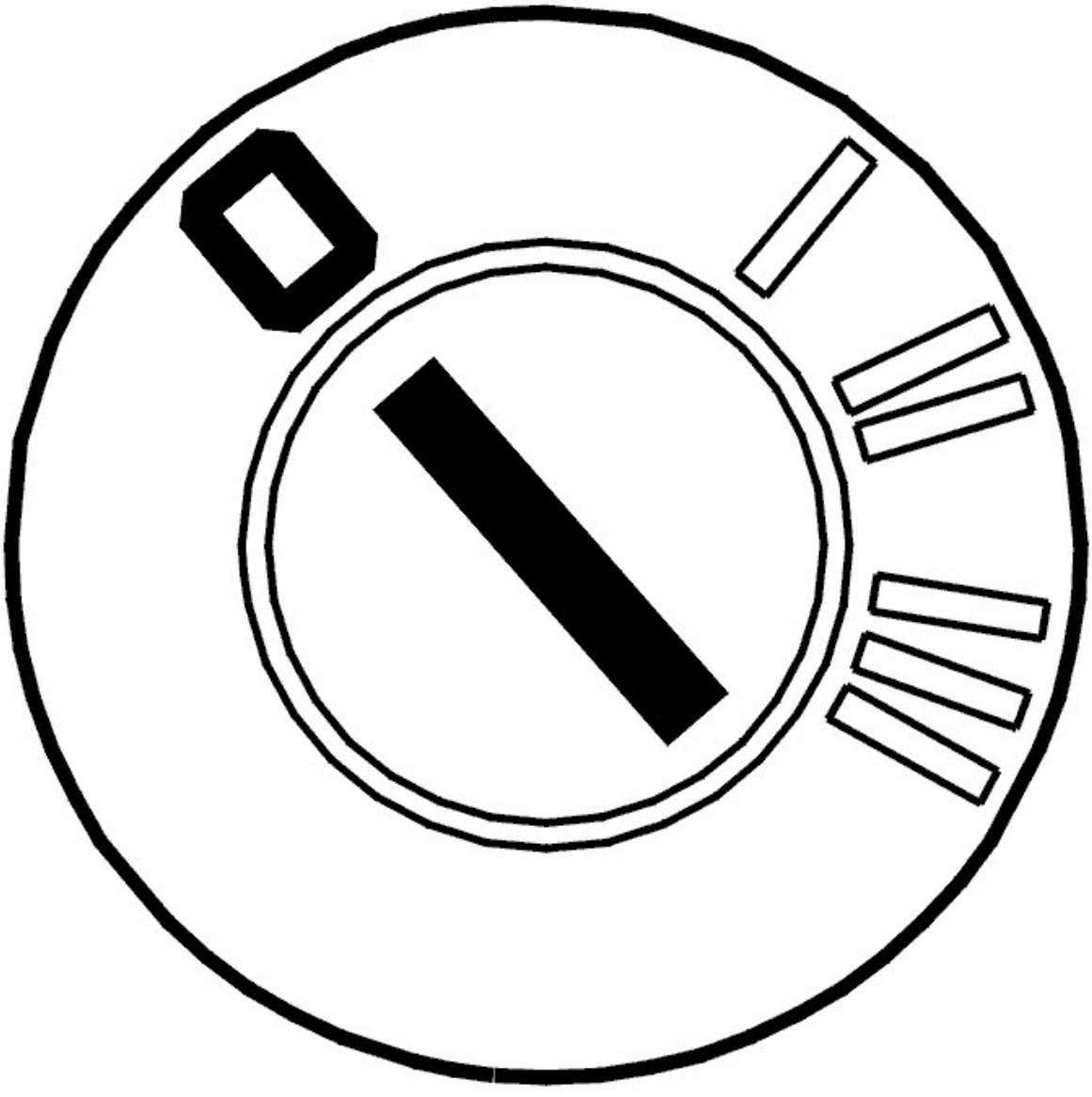
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for oxidation.

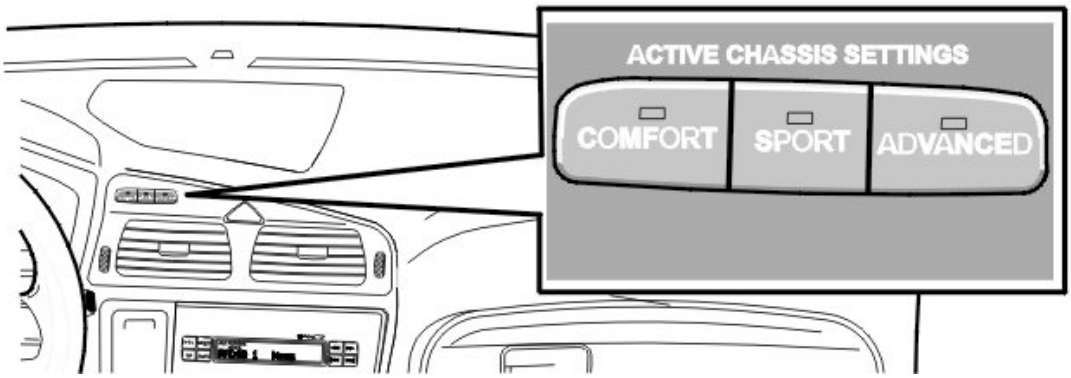
For diagnostic trouble code (DTC) SUM-0152, keypad:

- Check the signal cable between control module terminal #A24 and keypad terminal #1. Check for an open-circuit.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

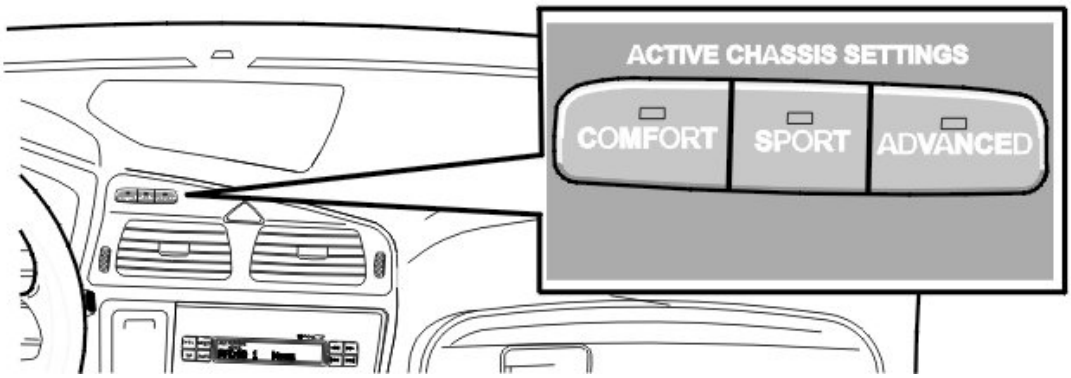
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0171, SUM-0181 or SUM-0191 is stored if the control module registers that the signal for indication in the keypad is too low when the ignition is switched on.

- SUM-0171: Keypad, COMFORT indication. Signal too low
- SUM-0181: Keypad, SPORT indication. Signal too low
- SUM-0191: Keypad, ADVANCED indication. Signal too low.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply cable for indication
- Defective keypad.

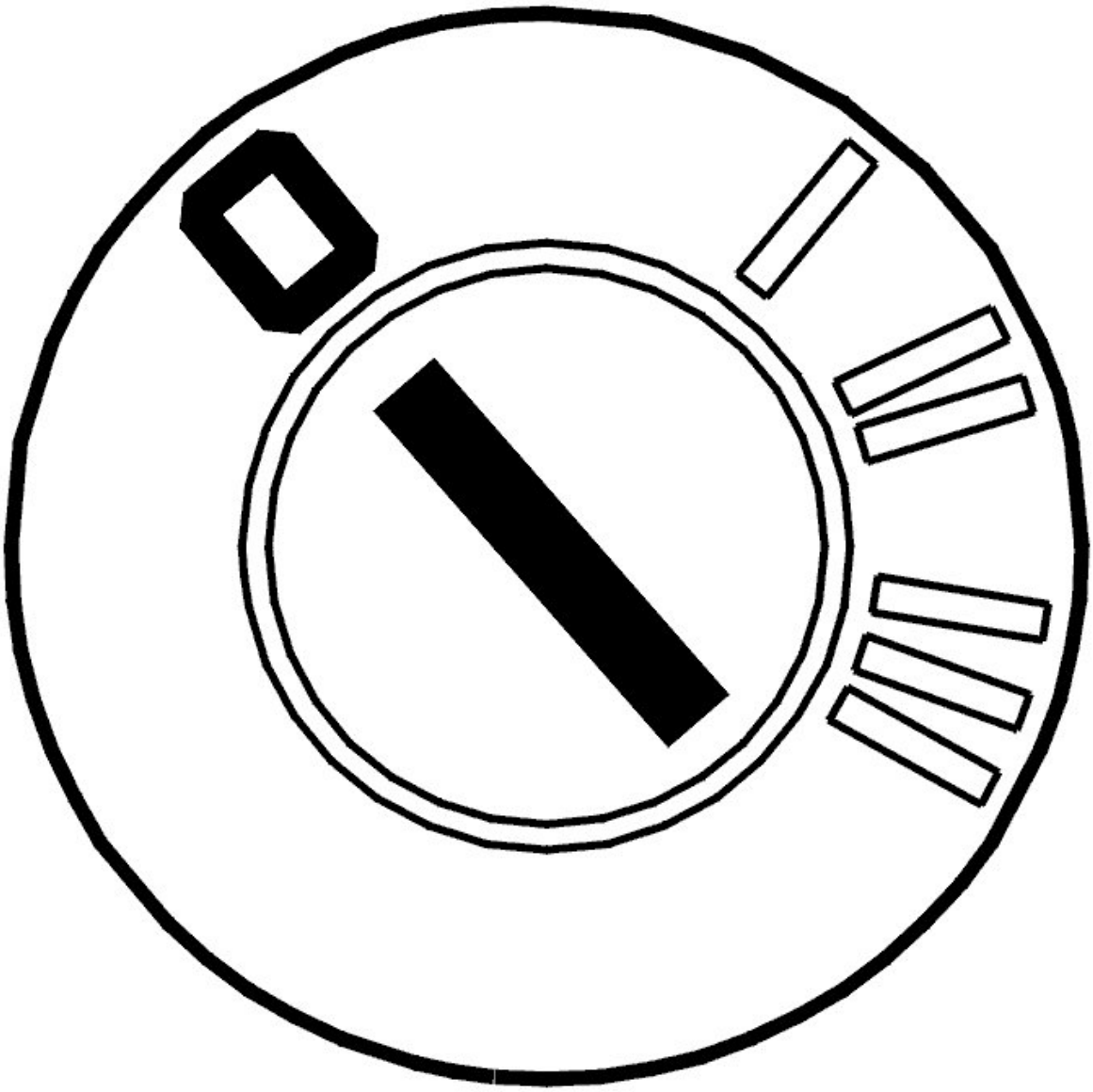
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0171, COMFORT indication:

- Check the cable between control module terminal #A26 and keypad terminal #2. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0181, SPORT indication:

- Check the cable between control module terminal #A11 and keypad terminal #3. Check for a short-circuit to ground.

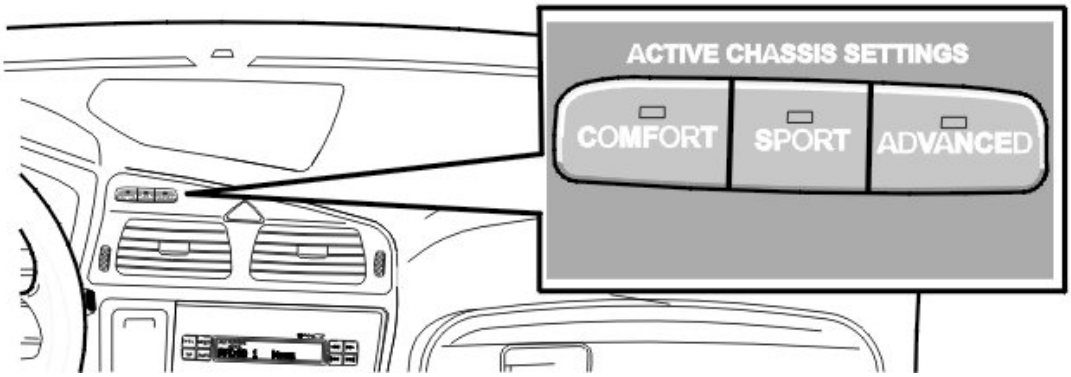
For diagnostic trouble code (DTC) SUM-0191, ADVANCED indication:

- Check the cable between control module terminal #A29 and acceleration sensor terminal #4. Check for a short-circuit to ground.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

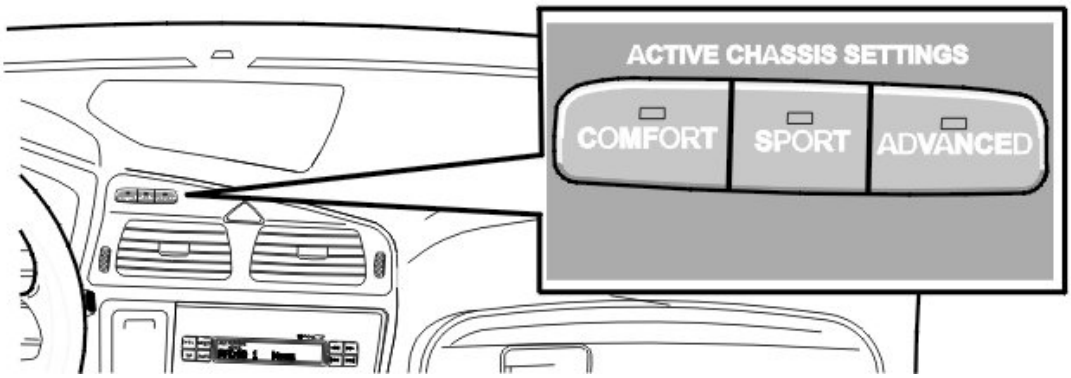
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0172, SUM-0182 or SUM-0192 is stored if the control module registers that the signal for indication in the keypad is too high when the ignition is switched on.

- SUM-0172: Keypad, COMFORT indication. Signal too high
- SUM-0182: Keypad, SPORT indication. Signal too high
- SUM-0192: Keypad, ADVANCED indication. Signal too high.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

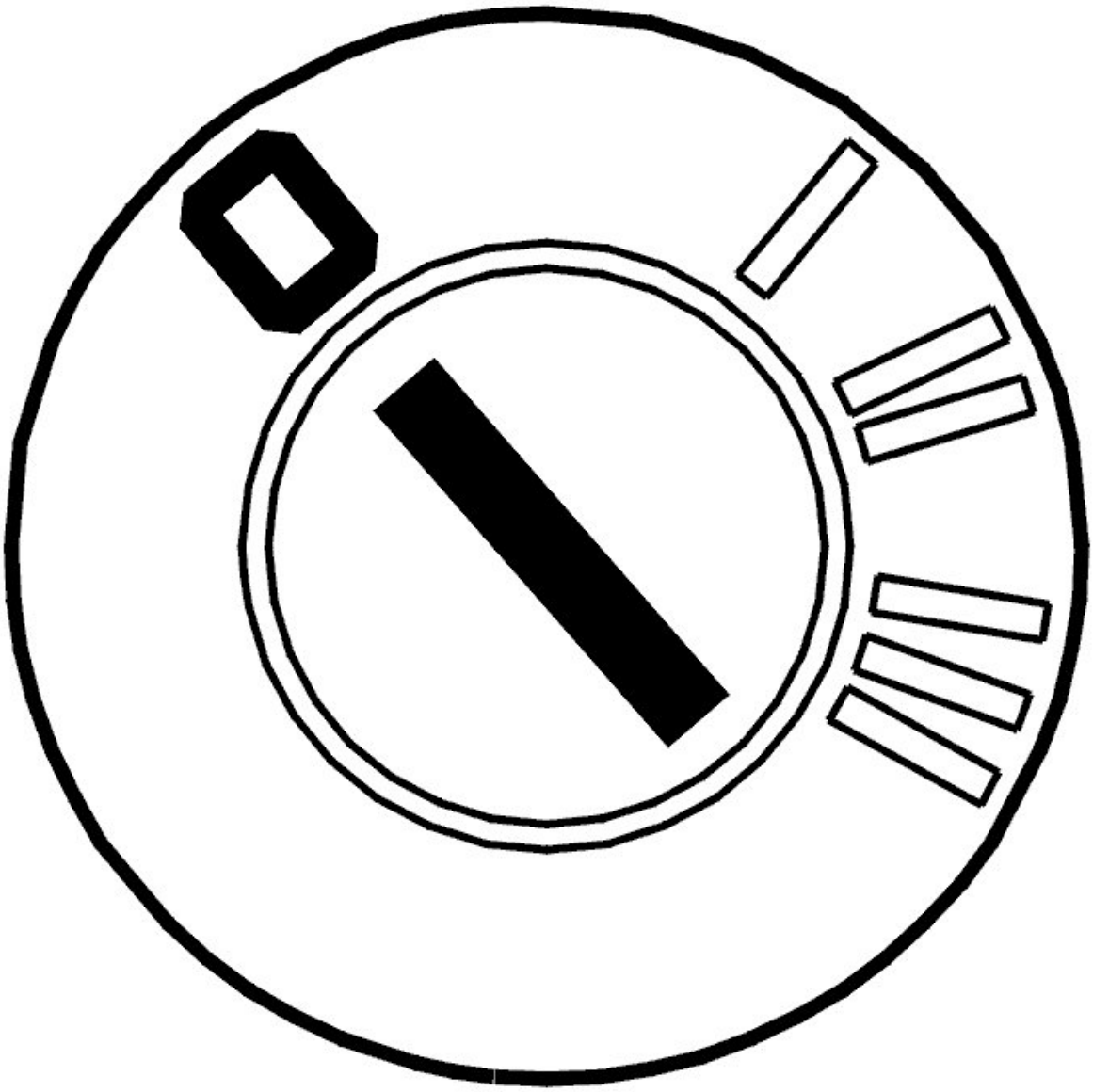
Possible source
- Open-circuit in the cable for indication in the keypad
- Open-circuit in the ground lead for indication in the keypad
- Short-circuit to supply voltage in the cable for indication in the keypad
- Defective keypad.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0172, COMFORT indication:
- Check the power supply cable between control module terminal #A26 and keypad terminal #2. Check for an open-circuit. Check for a short-circuit to supply voltage

- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0182, SPORT indication:

- Check the power supply cable between control module terminal #A11 and keypad terminal #3. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

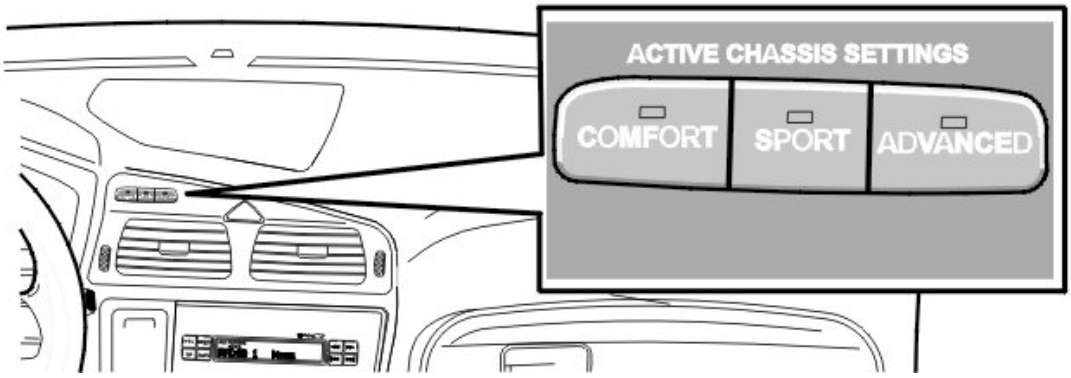
For diagnostic trouble code (DTC) SUM-0192, ADVANCED indication:

- Check the power supply cable between control module terminal #A29 and keypad terminal #4. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

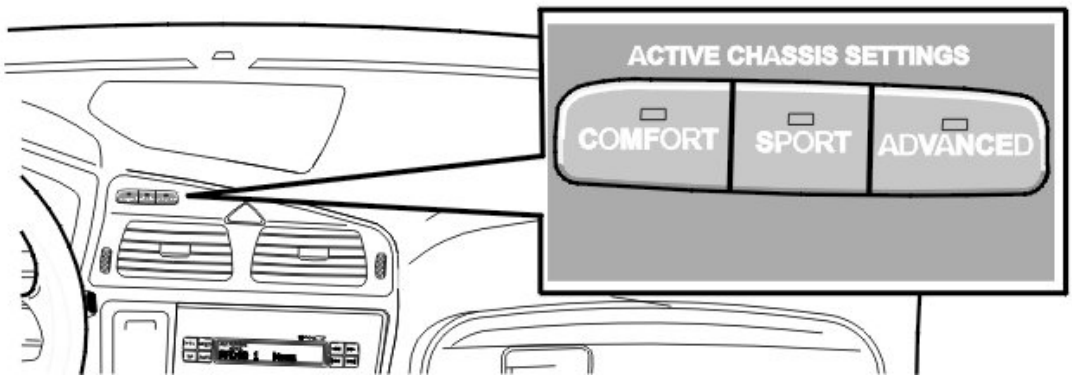
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0171, SUM-0181 or SUM-0191 is stored if the control module registers that the signal for indication in the keypad is too low when the ignition is switched on.

- SUM-0171: Keypad, COMFORT indication. Signal too low
- SUM-0181: Keypad, SPORT indication. Signal too low
- SUM-0191: Keypad, ADVANCED indication. Signal too low.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply cable for indication
- Defective keypad.

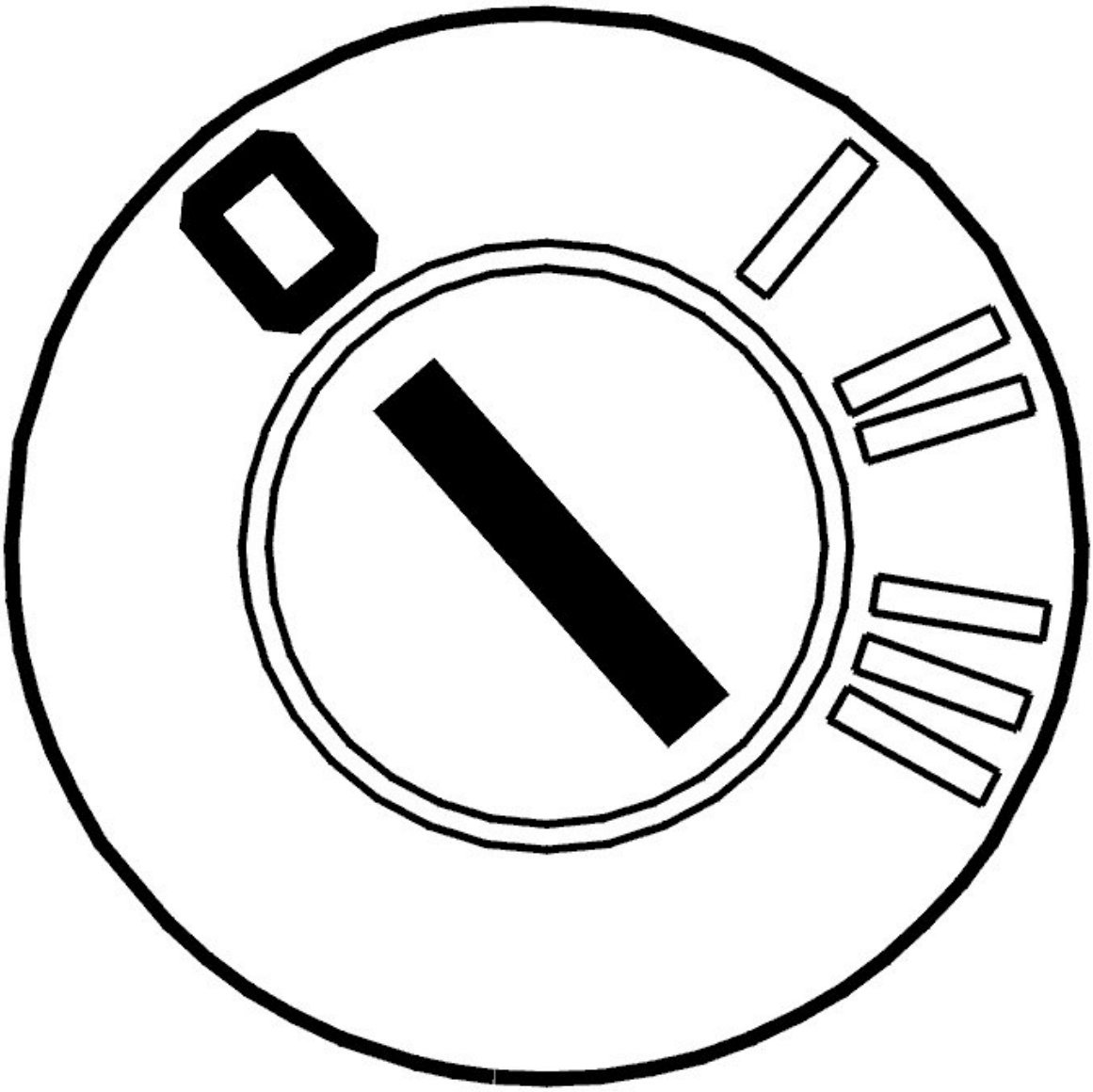
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0171, COMFORT indication:

- Check the cable between control module terminal #A26 and keypad terminal #2. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0181, SPORT indication:

- Check the cable between control module terminal #A11 and keypad terminal #3. Check for a short-circuit to ground.

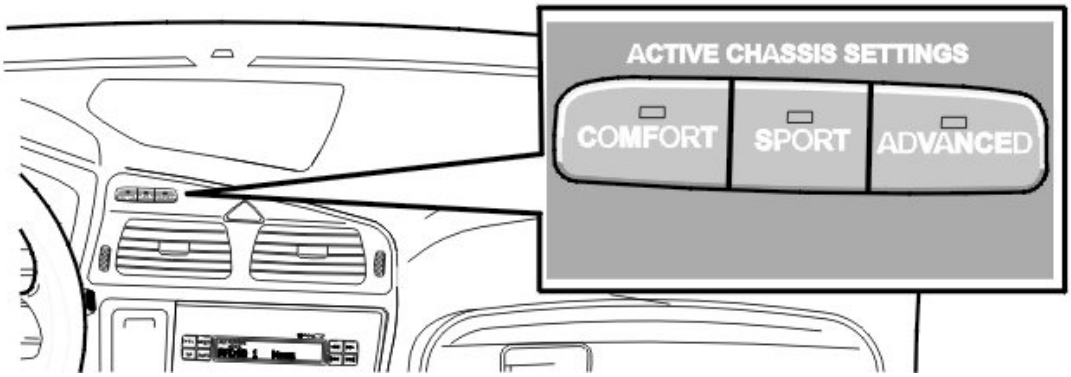
For diagnostic trouble code (DTC) SUM-0191, ADVANCED indication:

- Check the cable between control module terminal #A29 and acceleration sensor terminal #4. Check for a short-circuit to ground.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

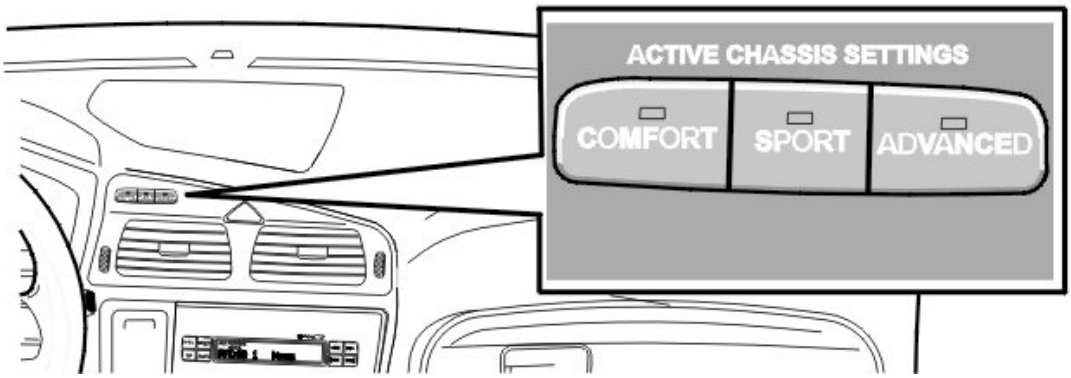
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0172, SUM-0182 or SUM-0192 is stored if the control module registers that the signal for indication in the keypad is too high when the ignition is switched on.

- SUM-0172: Keypad, COMFORT indication. Signal too high
- SUM-0182: Keypad, SPORT indication. Signal too high
- SUM-0192: Keypad, ADVANCED indication. Signal too high.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

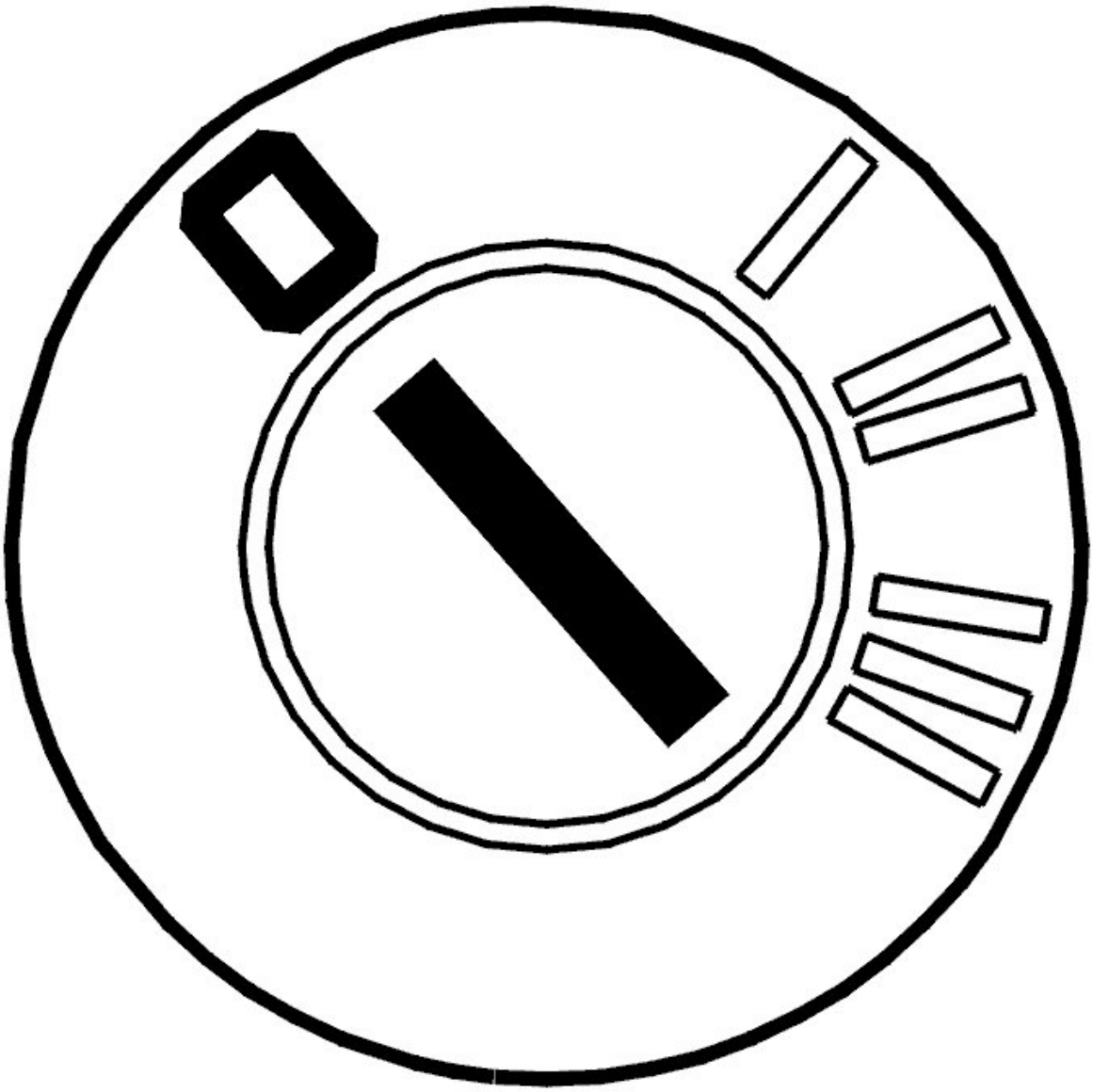
Possible source
- Open-circuit in the cable for indication in the keypad
- Open-circuit in the ground lead for indication in the keypad
- Short-circuit to supply voltage in the cable for indication in the keypad
- Defective keypad.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0172, COMFORT indication:
- Check the power supply cable between control module terminal #A26 and keypad terminal #2. Check for an open-circuit. Check for a short-circuit to supply voltage

- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0182, SPORT indication:

- Check the power supply cable between control module terminal #A11 and keypad terminal #3. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

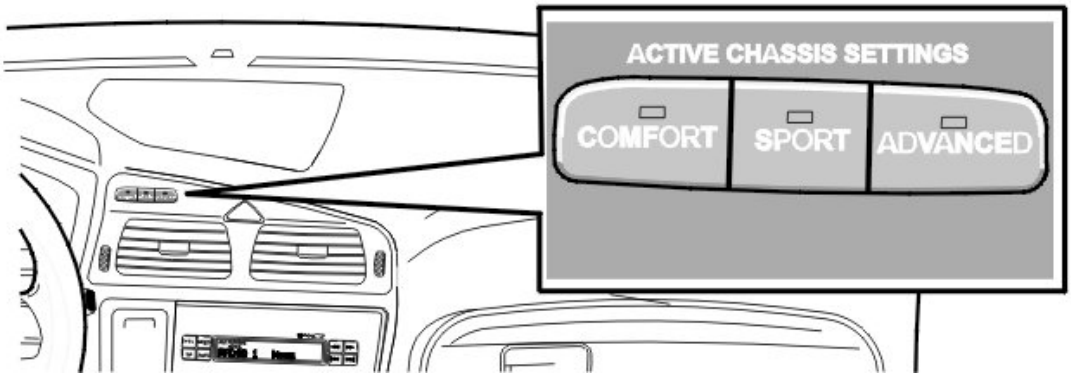
For diagnostic trouble code (DTC) SUM-0192, ADVANCED indication:

- Check the power supply cable between control module terminal #A29 and keypad terminal #4. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

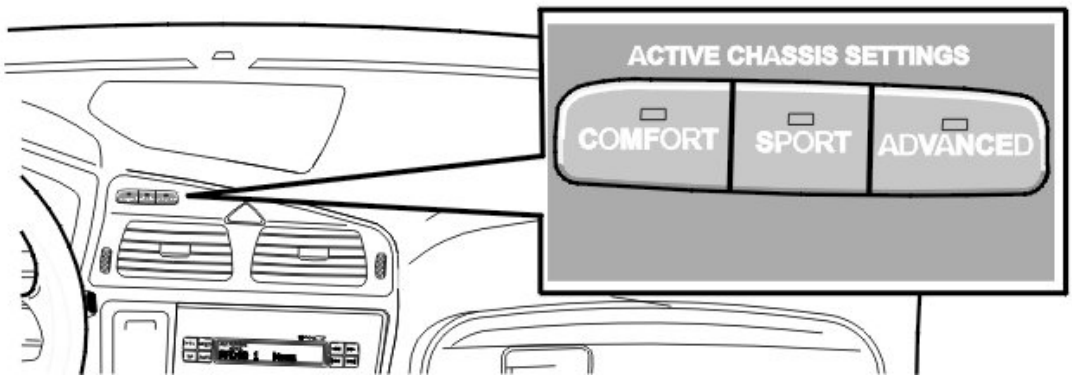
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0171, SUM-0181 or SUM-0191 is stored if the control module registers that the signal for indication in the keypad is too low when the ignition is switched on.

- SUM-0171: Keypad, COMFORT indication. Signal too low
- SUM-0181: Keypad, SPORT indication. Signal too low
- SUM-0191: Keypad, ADVANCED indication. Signal too low.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- Contact resistance in the terminals
- Short-circuit to ground in the power supply cable for indication
- Defective keypad.

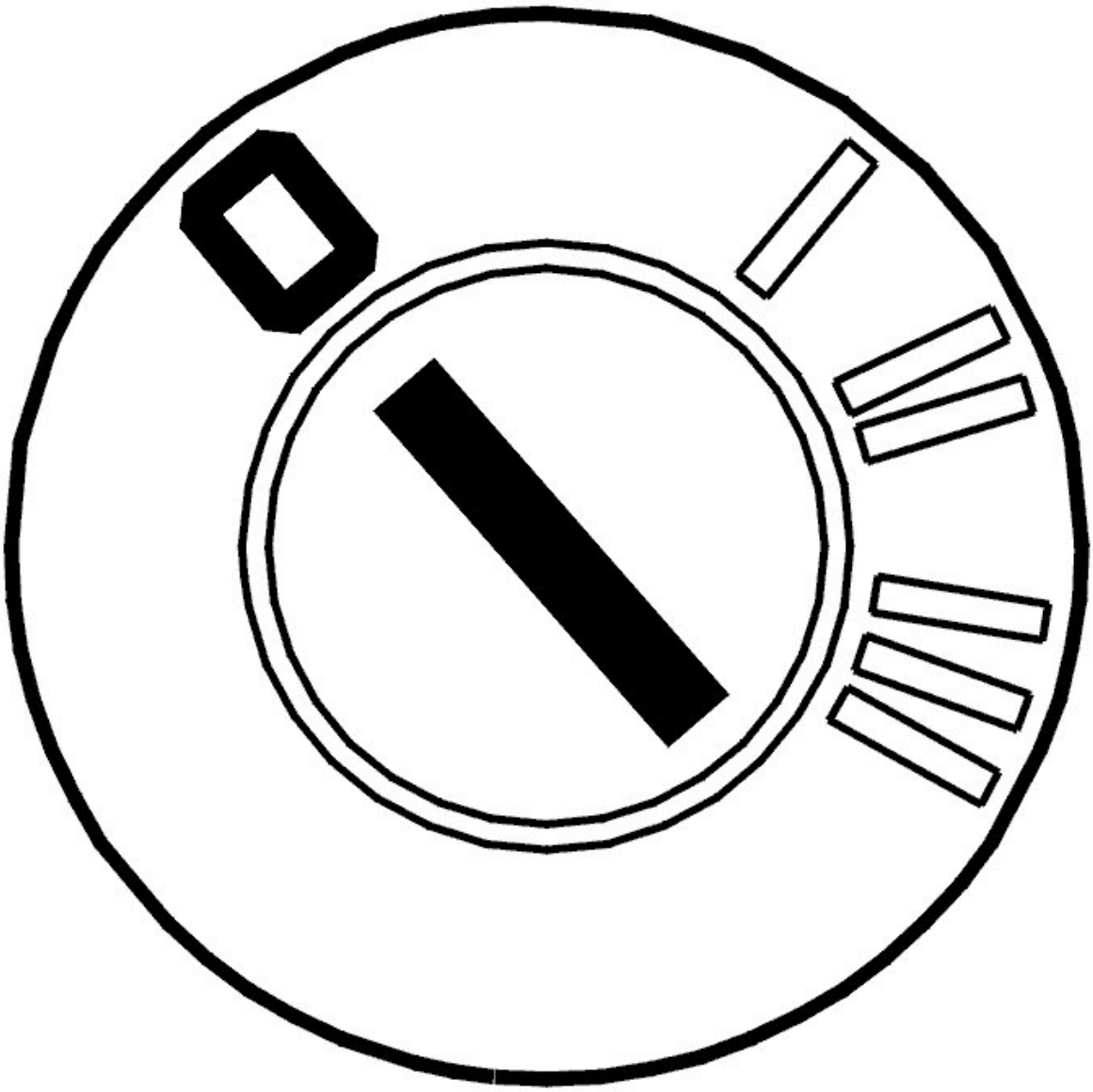
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too Low

Signal too low

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the keypad. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0171, COMFORT indication:

- Check the cable between control module terminal #A26 and keypad terminal #2. Check for a short-circuit to ground.

For diagnostic trouble code (DTC) SUM-0181, SPORT indication:

- Check the cable between control module terminal #A11 and keypad terminal #3. Check for a short-circuit to ground.

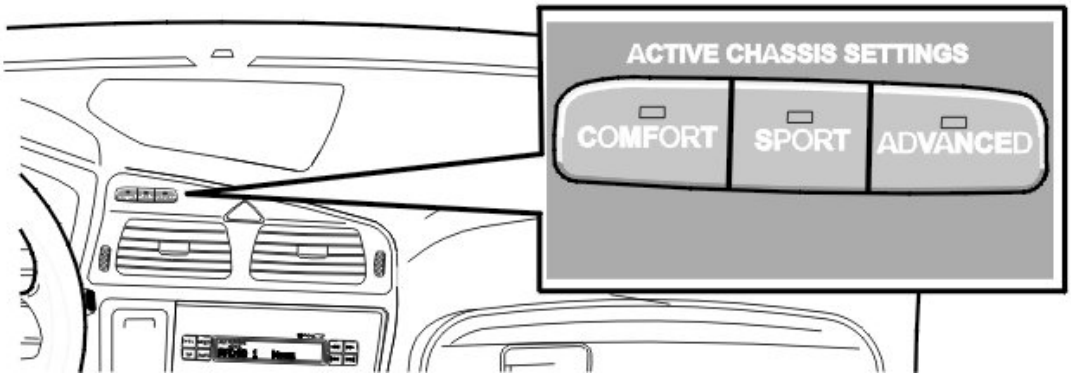
For diagnostic trouble code (DTC) SUM-0191, ADVANCED indication:

- Check the cable between control module terminal #A29 and acceleration sensor terminal #4. Check for a short-circuit to ground.

Try a new keypad if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

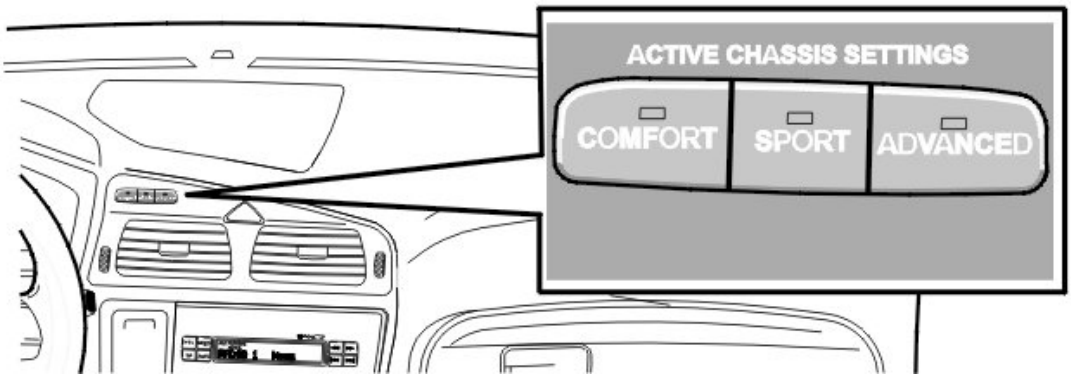
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) receives information from the keypad unit. Diagnostic trouble code (DTC) SUM-0172, SUM-0182 or SUM-0192 is stored if the control module registers that the signal for indication in the keypad is too high when the ignition is switched on.

- SUM-0172: Keypad, COMFORT indication. Signal too high
- SUM-0182: Keypad, SPORT indication. Signal too high
- SUM-0192: Keypad, ADVANCED indication. Signal too high.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

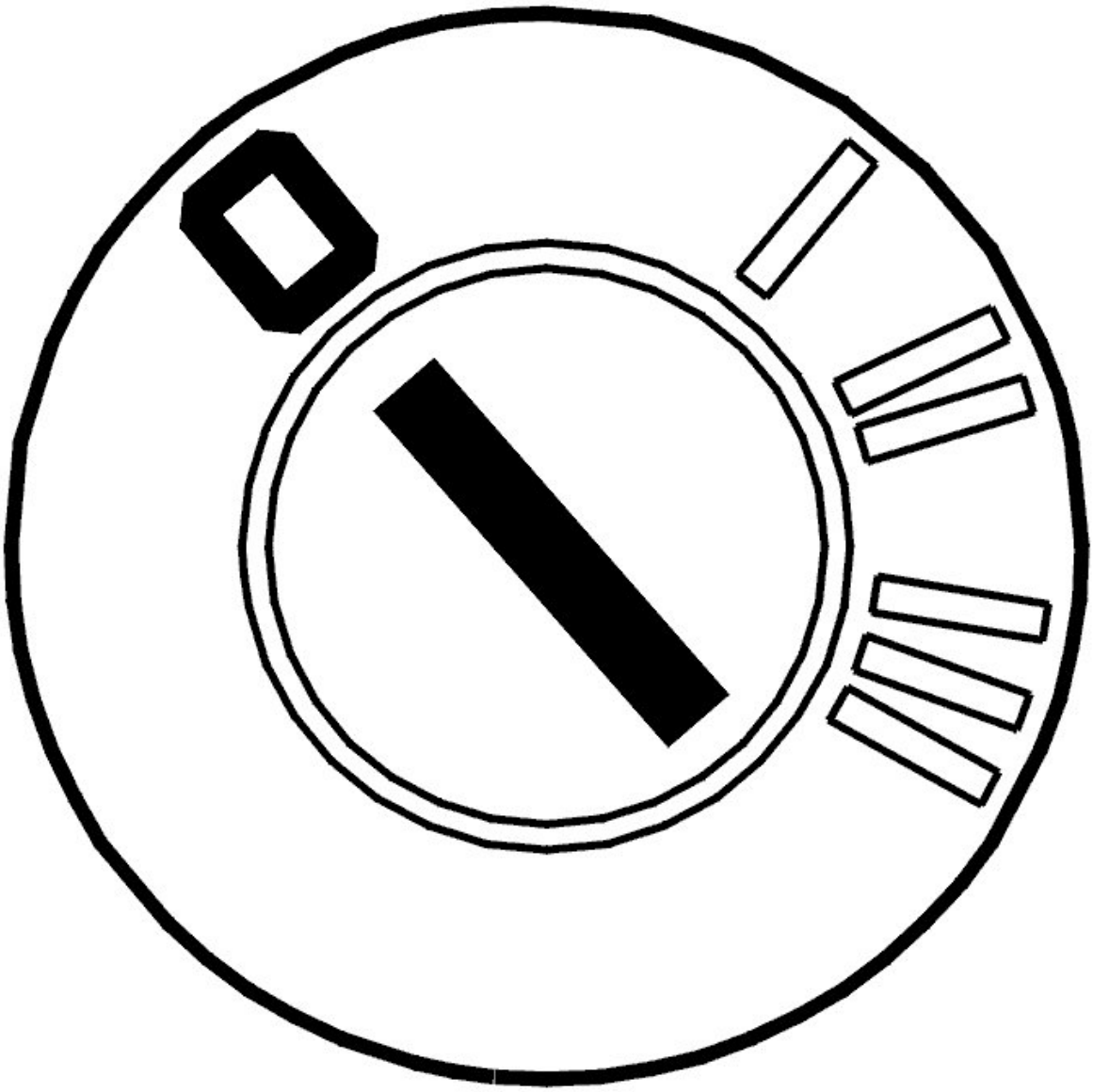
Possible source
- Open-circuit in the cable for indication in the keypad
- Open-circuit in the ground lead for indication in the keypad
- Short-circuit to supply voltage in the cable for indication in the keypad
- Defective keypad.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Too High

Signal too high

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the acceleration sensor. Check for oxidation.

For diagnostic trouble code (DTC) SUM-0172, COMFORT indication:
- Check the power supply cable between control module terminal #A26 and keypad terminal #2. Check for an open-circuit. Check for a short-circuit to supply voltage

- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

For diagnostic trouble code (DTC) SUM-0182, SPORT indication:

- Check the power supply cable between control module terminal #A11 and keypad terminal #3. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

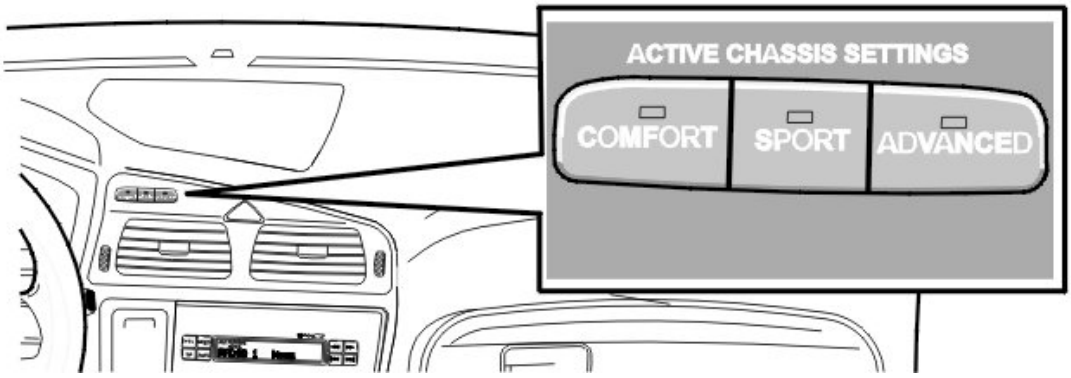
For diagnostic trouble code (DTC) SUM-0192, ADVANCED indication:

- Check the power supply cable between control module terminal #A29 and keypad terminal #4. Check for an open-circuit. Check for a short-circuit to supply voltage
- Check the ground lead between control module terminal #A21 and keypad terminal #6. Check for an open-circuit.

Try a new acceleration sensor if no fault is found in the wiring.
Remedy as necessary.

Other information:

- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition

Diagnostic trouble code (DTC) SUM-0201 is stored if the Suspension Module (SUM) registers that the battery voltage is too low when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

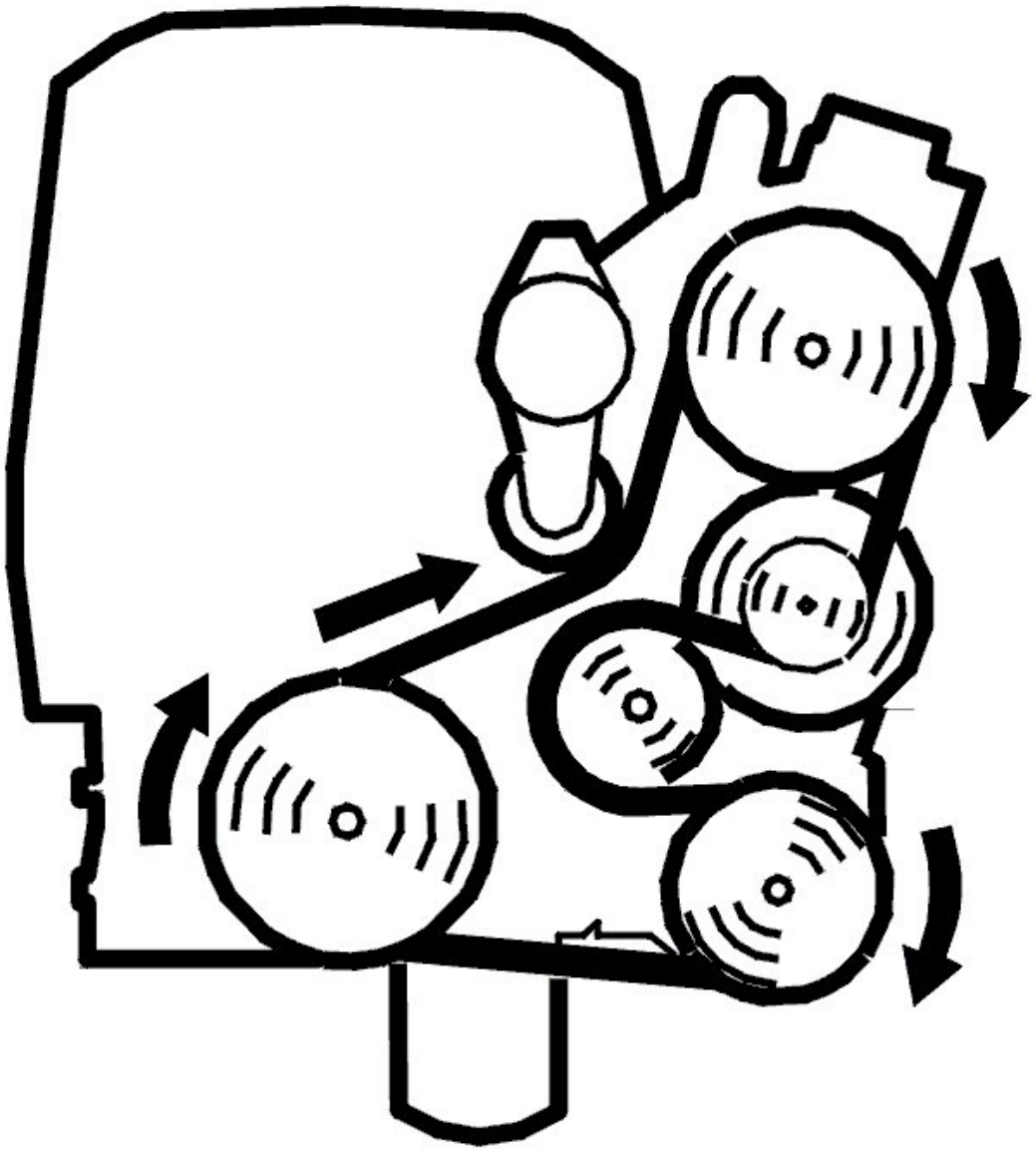
Possible source
- Battery voltage too low
- Contact resistance in the terminals
- Open-circuit or short-circuit to ground in the power supply to the Suspension Module (SUM)
- Defective Suspension Module (SUM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Voltage Too Low

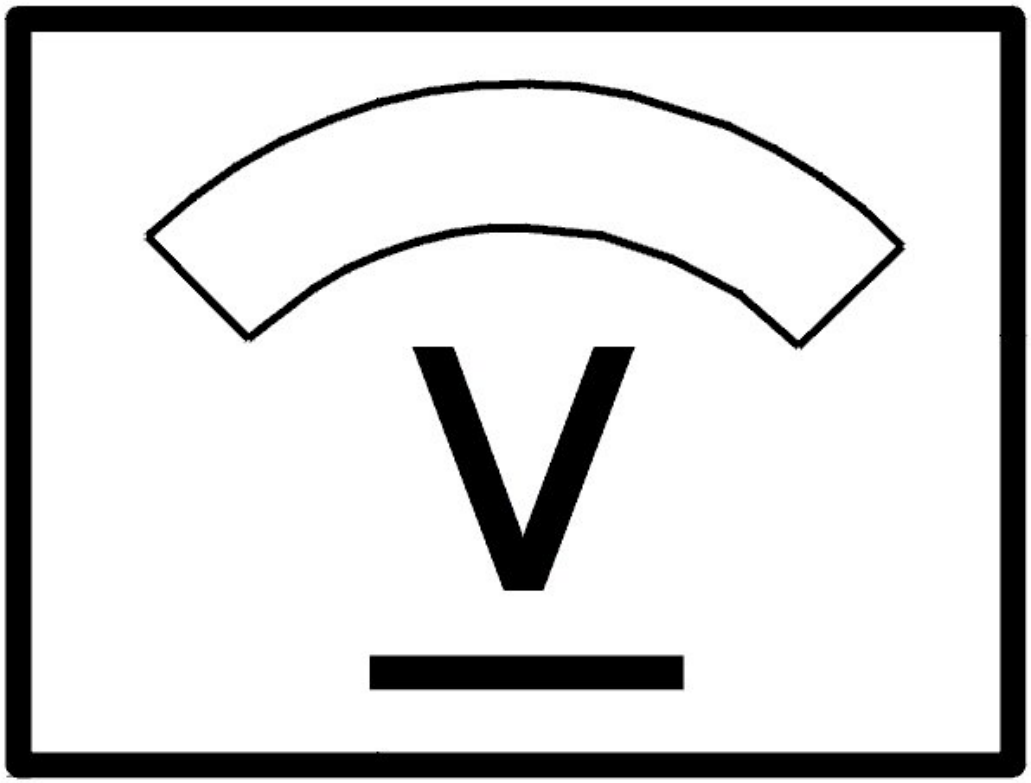
Voltage too low

Checking the battery voltage



- Start the engine. Allow the engine to idle
- Connect a voltmeter between the battery positive and negative terminals.

The voltage must be normal system voltage.
If the voltage is too low, check the charging system according to the relevant information.

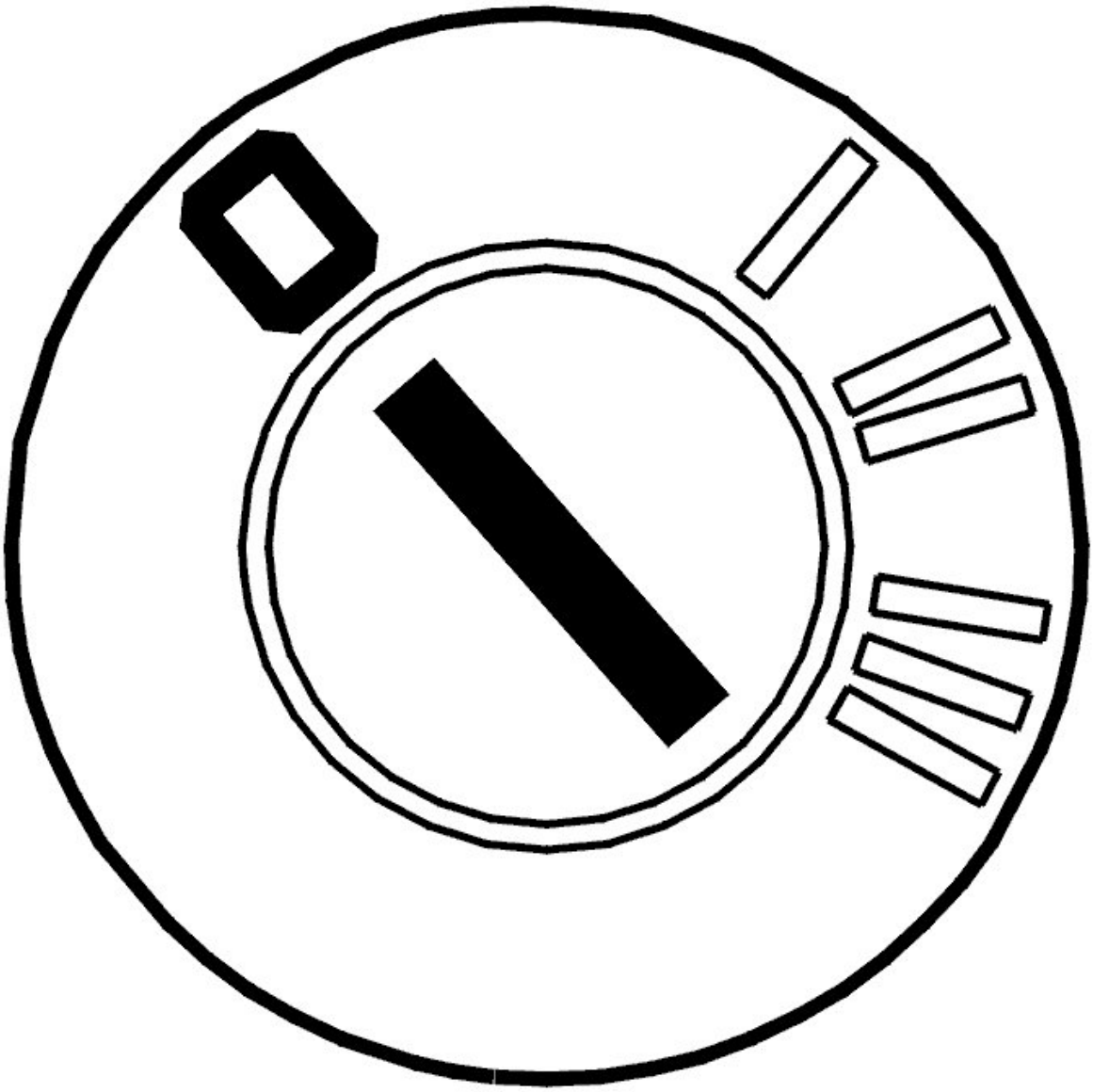


Was the voltage too low?

Yes - DONE

No - Checking the power supply

Checking the power supply



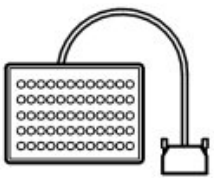
- Ignition off.

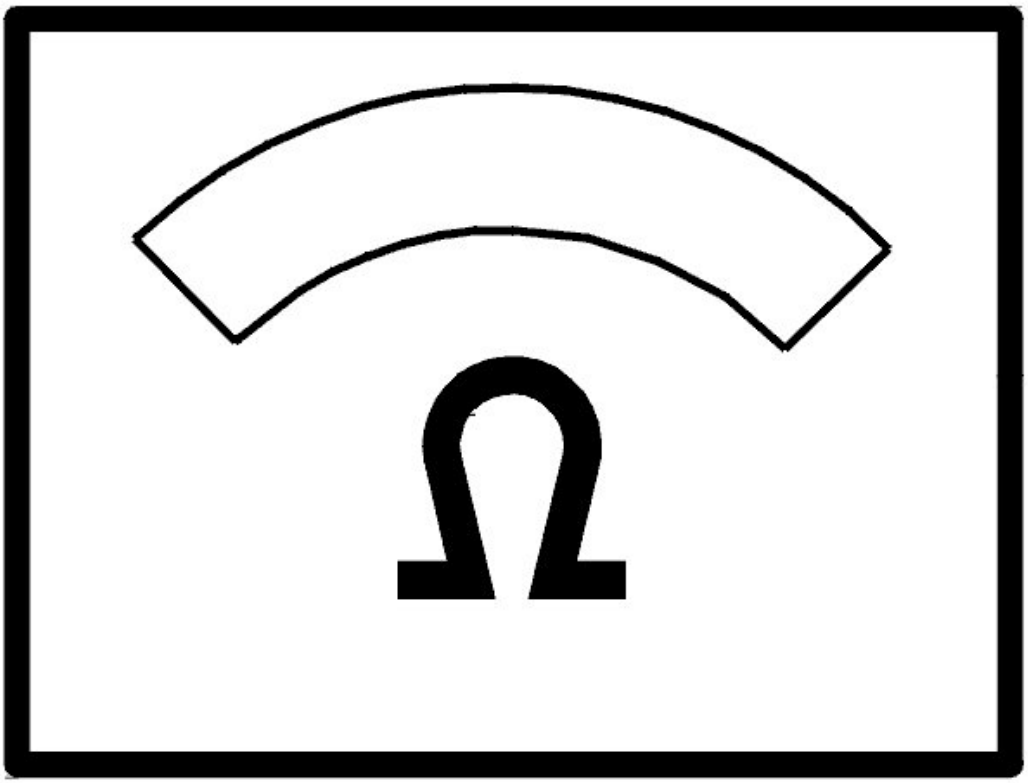
Check the connector on the Suspension Module (SUM). Check for contact resistance and oxidation.
Check the power supply cable between the fuse for the Suspension Module (SUM) and the integrated relay/fusebox in the engine compartment.
Also check the connector on Suspension Module (SUM) terminal #C1 (#31). Check for a short-circuit to ground.

Hint: With the ignition on and the voltmeter connected between terminals #C1 (#31) and #C2 (#32) on the breakout box, the voltmeter should read battery voltage.

Other information

- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals
- For further information about the fuses and relays, see the Wiring Diagram.



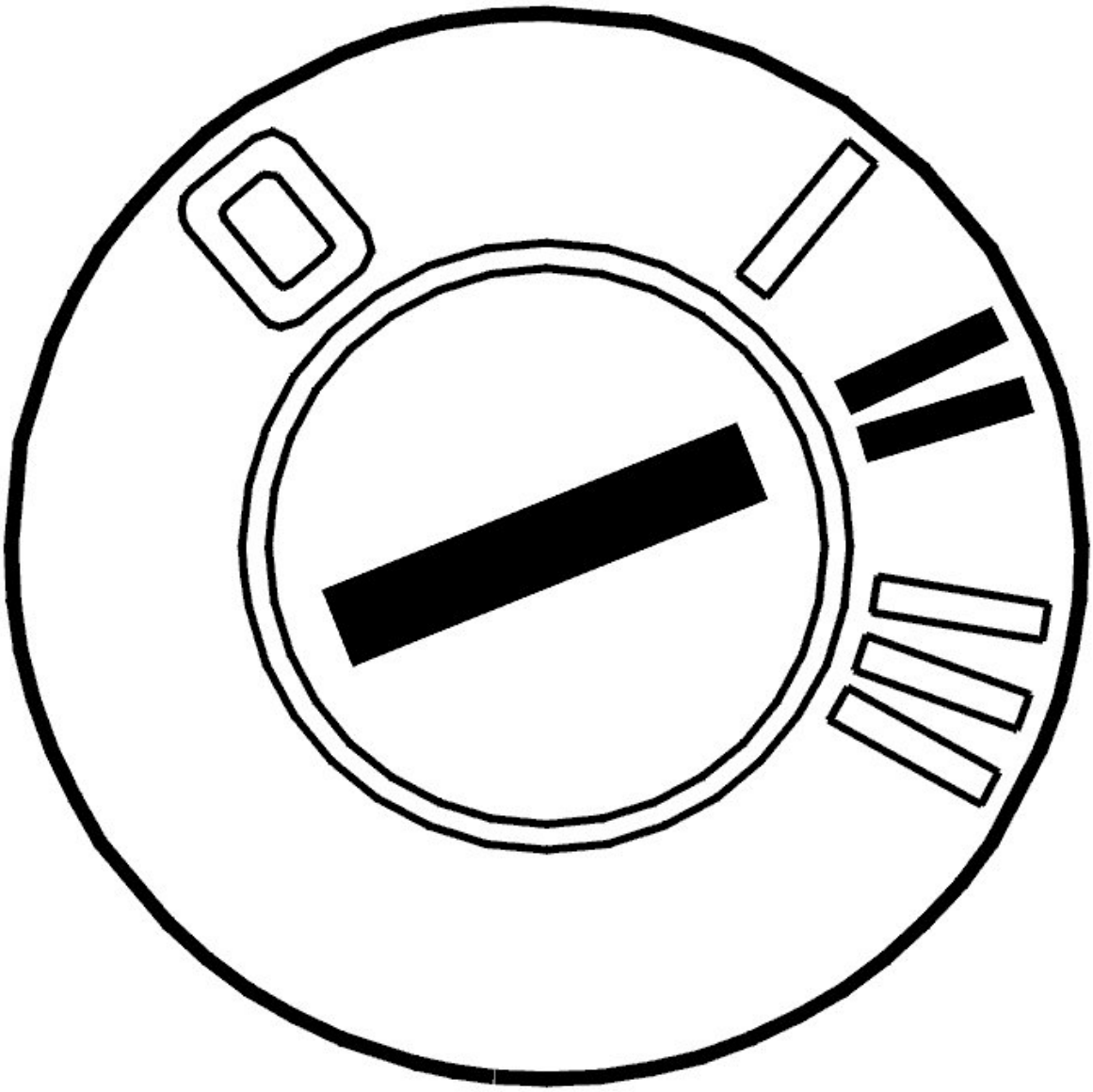


Was a fault detected?

Yes - Verification

No - Checking the supply voltage to the system

Checking the supply voltage to the system



- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Read off the power supply to the Suspension Module (SUM).

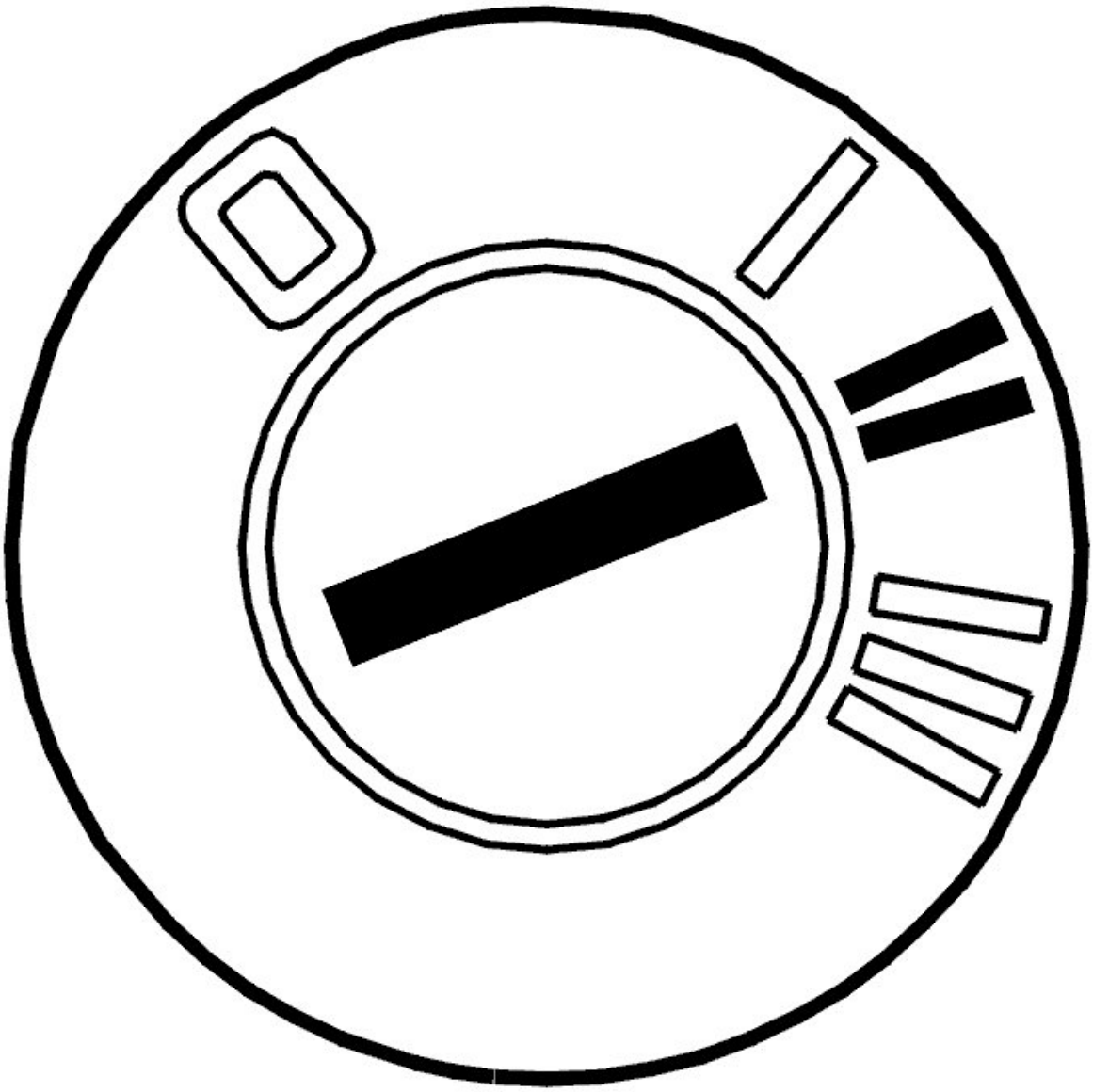
The voltage must be normal system voltage.

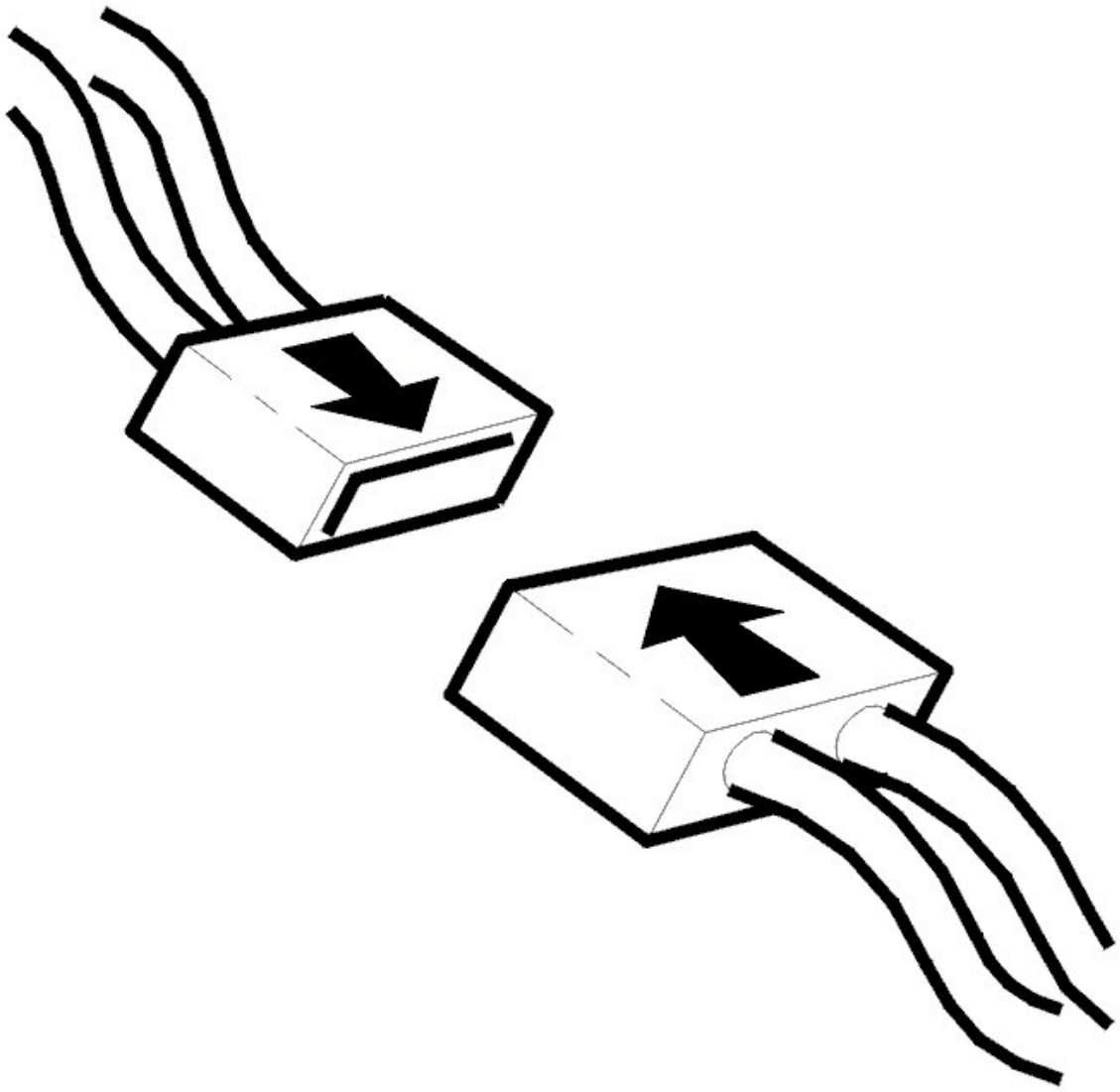
OK - **Fault Found**

Not OK - Fault-tracing information

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage to the Suspension Module (SUM).

The voltage should be battery voltage.

OK - Fault Found

Not OK - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the battery voltage

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0202 is stored if the Suspension Module (SUM) registers that the battery voltage is too high when the ignition is switched on. The diagnostic trouble code (DTC) can be diagnosed when the ignition is on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- The Four-C function is blocked.

Hint: For information about abbreviations for the suspension system, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Fault in the charging system
- Defective control module.

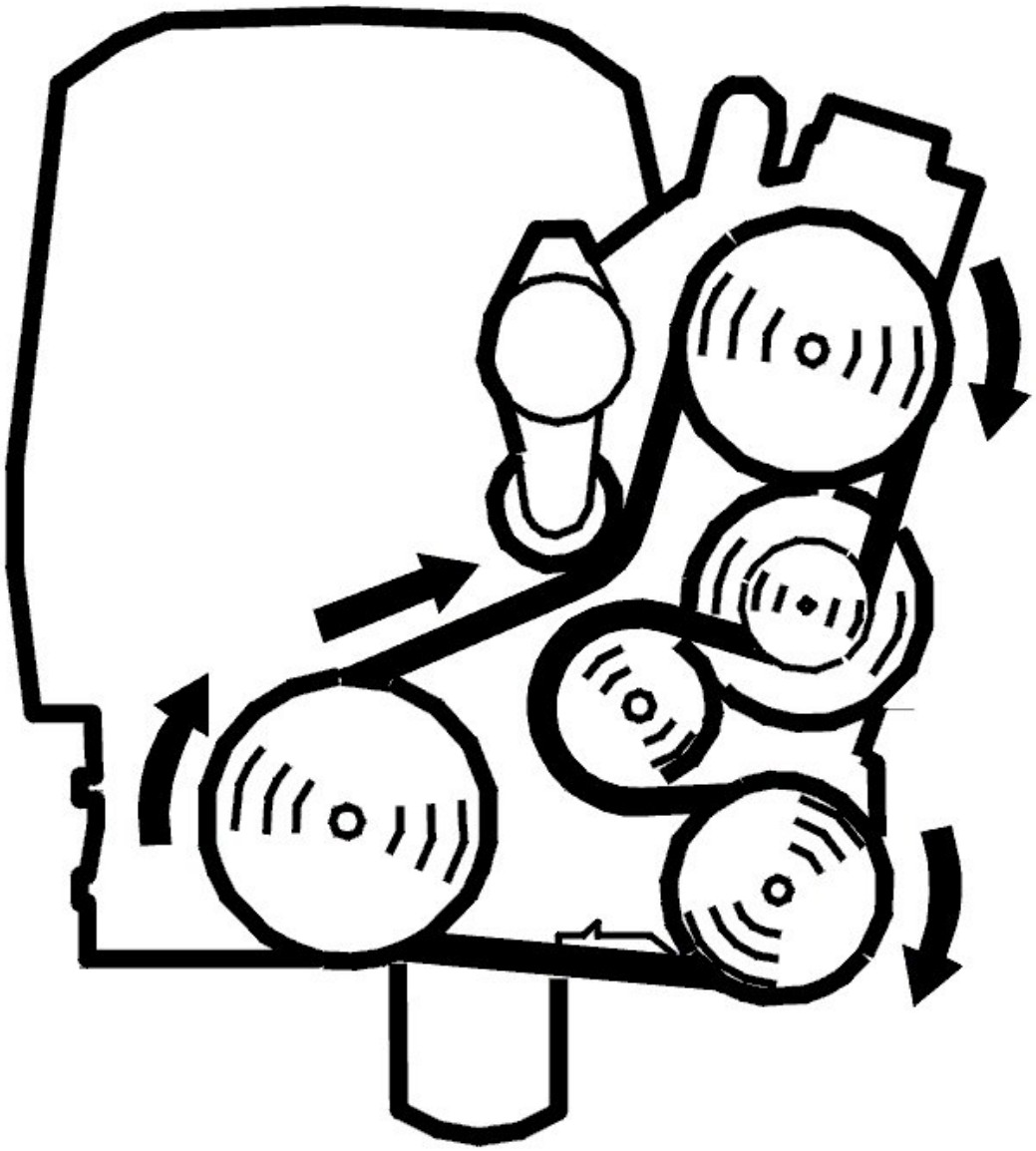
Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Note! If the fault is intermittent the ABS warning lamp will not go out until the vehicle speed exceeds 10 km/h in the next operating cycle.

Voltage Too High

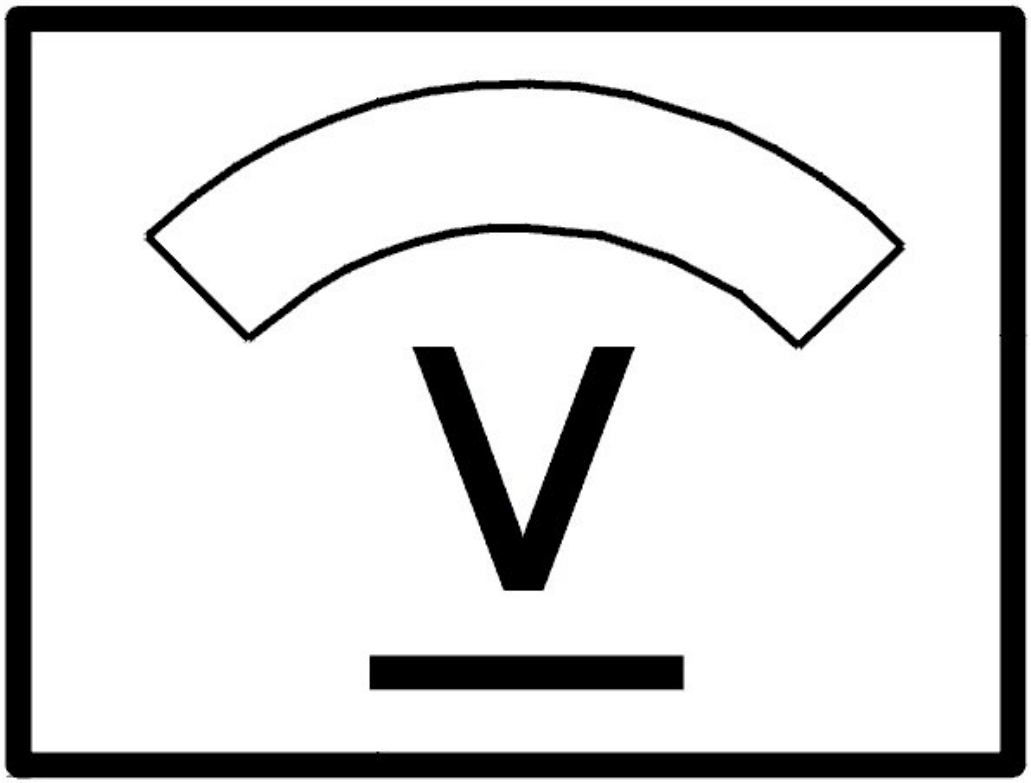
Voltage too high

Checking the battery voltage



- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

The voltage must be normal system voltage.
If the voltage is too high, check the charging system according to the relevant information.



Was the voltage too high?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

The fault-tracing indicates that the control module has previously registered a fault but that the fault is no longer active.

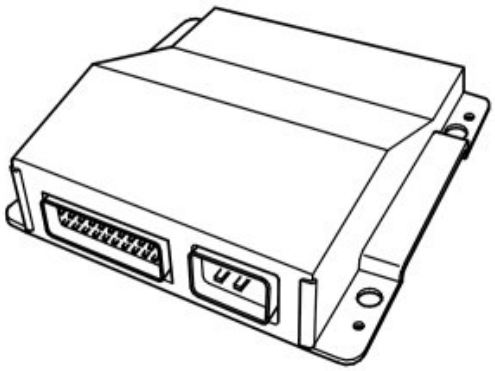
Continue - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Diagnostic trouble code (DTC) SUM-0203 is stored if the suspension module (SUM) registers that the difference in voltage between the central electronic module (CEM) and the suspension module (SUM) is greater than 2 V.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is switched off.

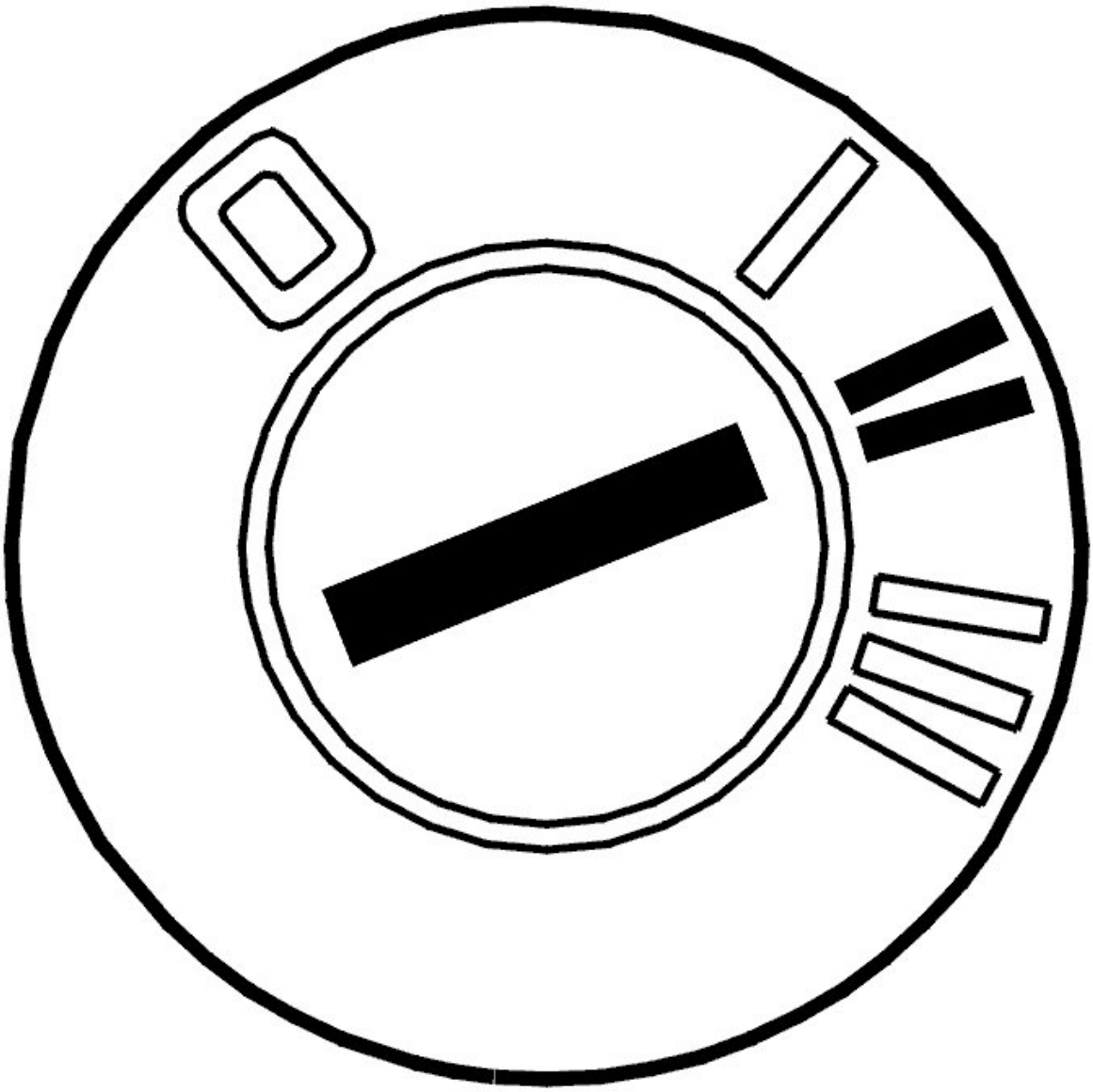
Possible source
- Contact resistance or oxidation in the connectors on the suspension module (SUM) or central electronic module (CEM)
- Internal fault in the control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Faulty Signal

Faulty signal

Checking the voltage



- Ignition off
- Disconnect the connector for the suspension module (SUM)
- Disconnect the connector for the central electronic module (CEM)
- Check these connectors. Check for contact resistance and oxidation
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Read off the voltage for the suspension module (SUM) and the central electronic module (CEM).

The voltage must be approximately 12 V.

Other information:

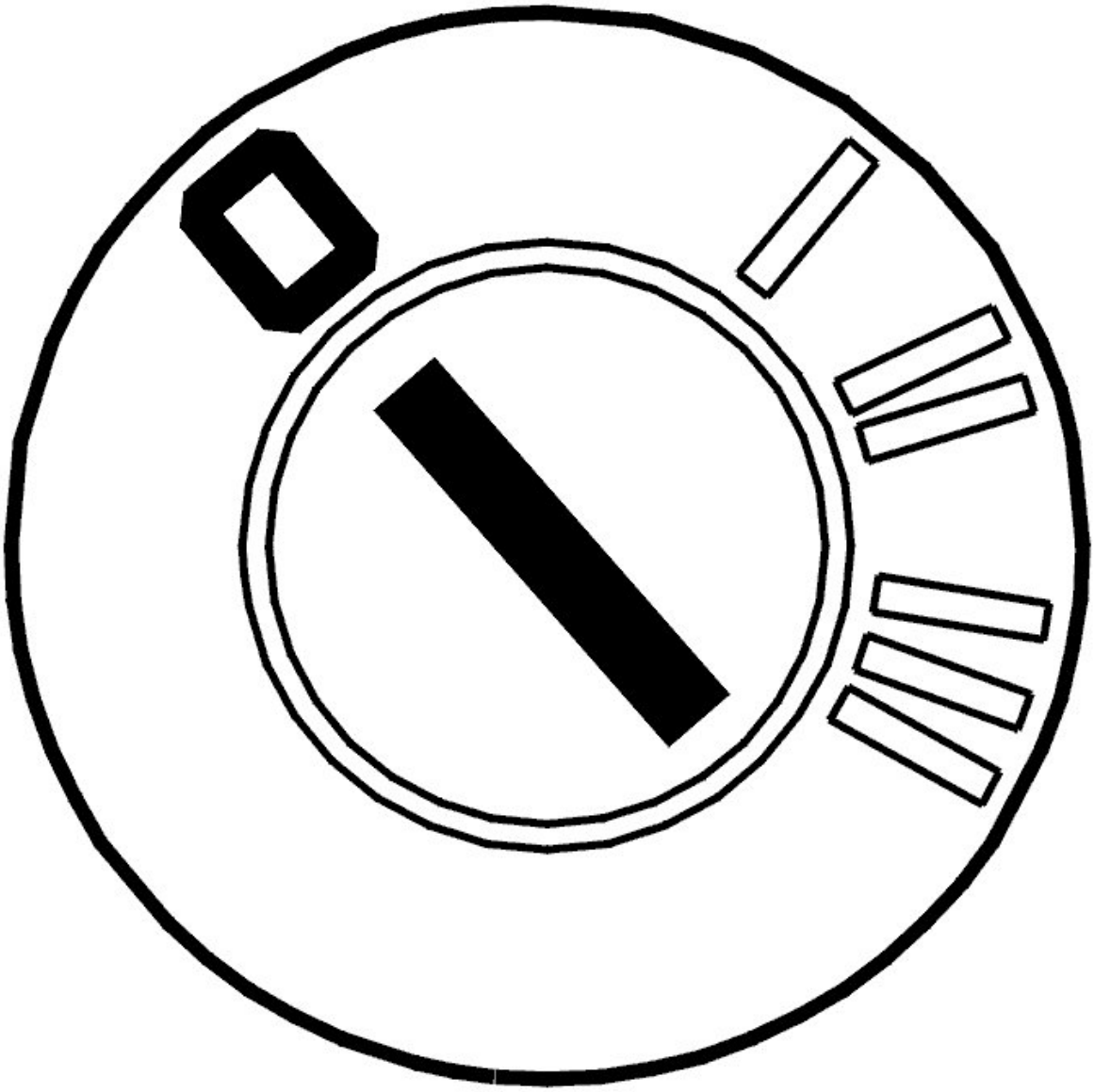
- To disconnect the connector for the suspension module (SUM), see Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair
- To disconnect the connector for the central electronic module (CEM), see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

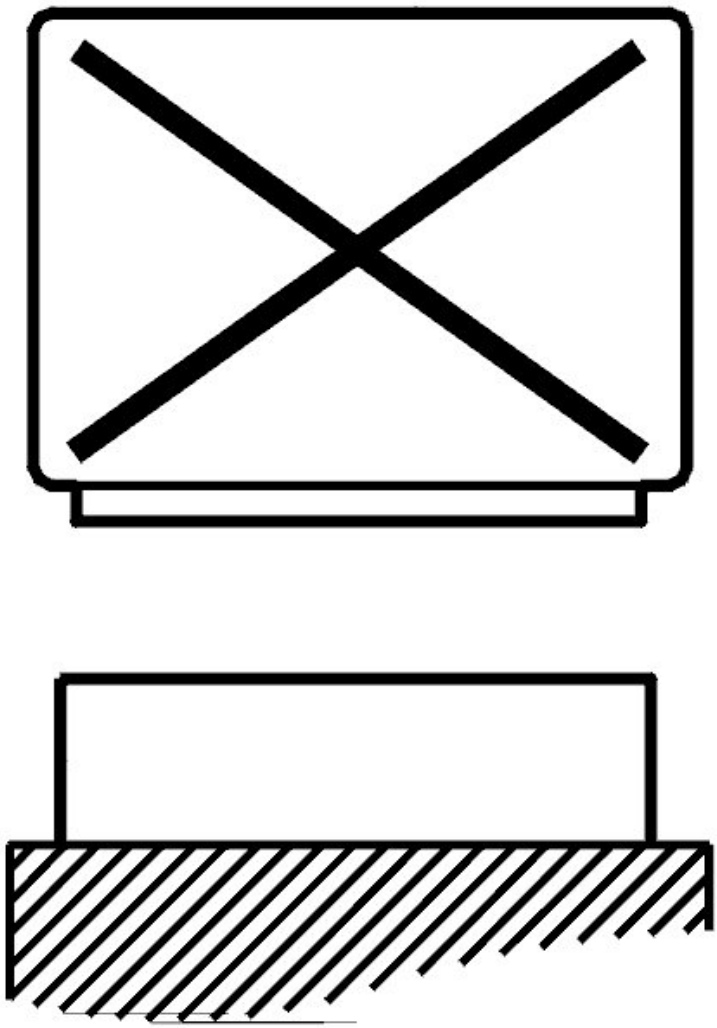
Was the voltage OK?

Yes - Fault Found

No - Checking the wiring

Checking the wiring



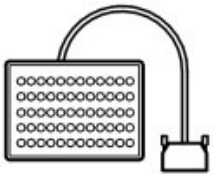


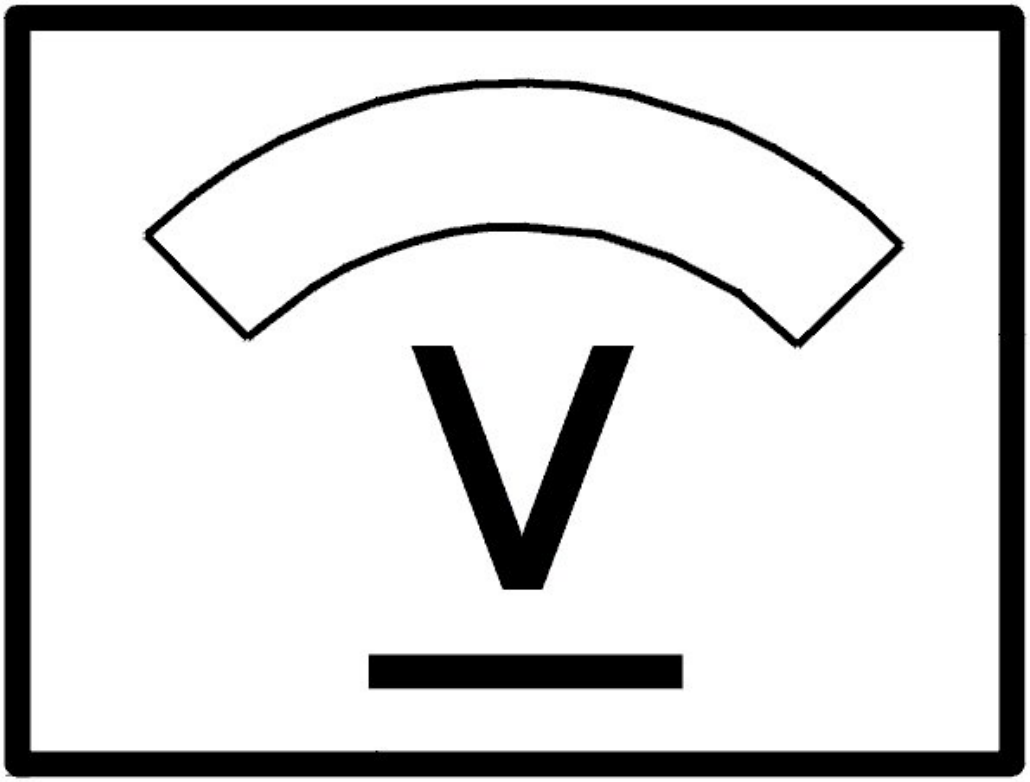
- Ignition off
- Suspension module (SUM) disconnected
- Central electronic module (CEM) disconnected
- Connect a breakout box to the suspension module (SUM) and a breakout box to the central electronic module (CEM).

Check the cable for power supply between suspension module (SUM) terminal #C1 (31) and the system relay.
Check the power supply wiring for the central electronic module (CEM). See the Service Manual, Section 3, Wiring diagram.
Remedy as necessary.

Other information:

- To connect the breakout box to the suspension module (SUM), see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- To connect the breakout box to the central electronic module (CEM), see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box/Connecting the Breakout Box, Central Electronic Module (CEM)
- For information about signals for the suspension module (SUM), see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- For information about signals for the central electronic module (CEM), see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Description, Central Electronic Module (CEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





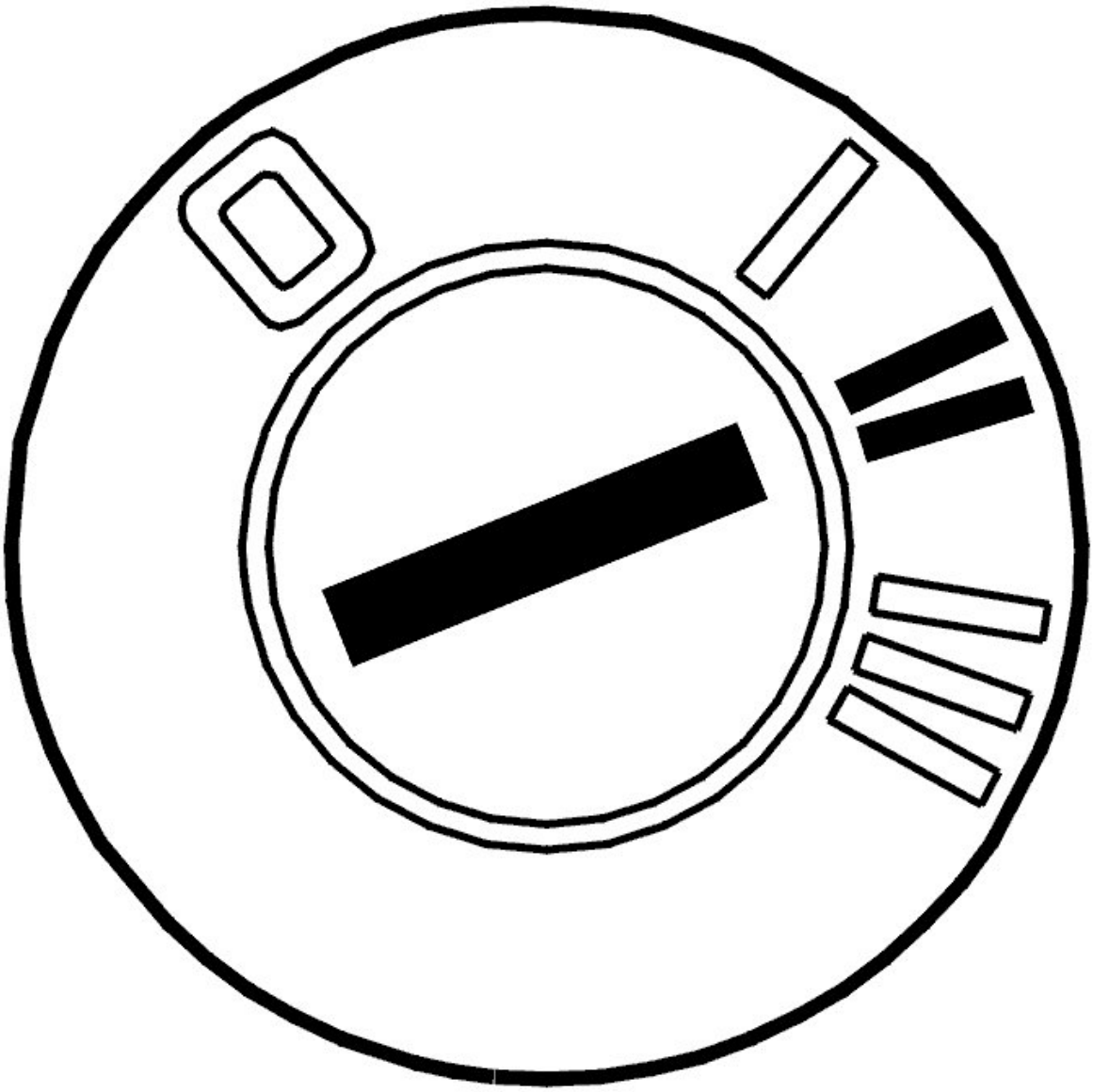
Continue - Verification

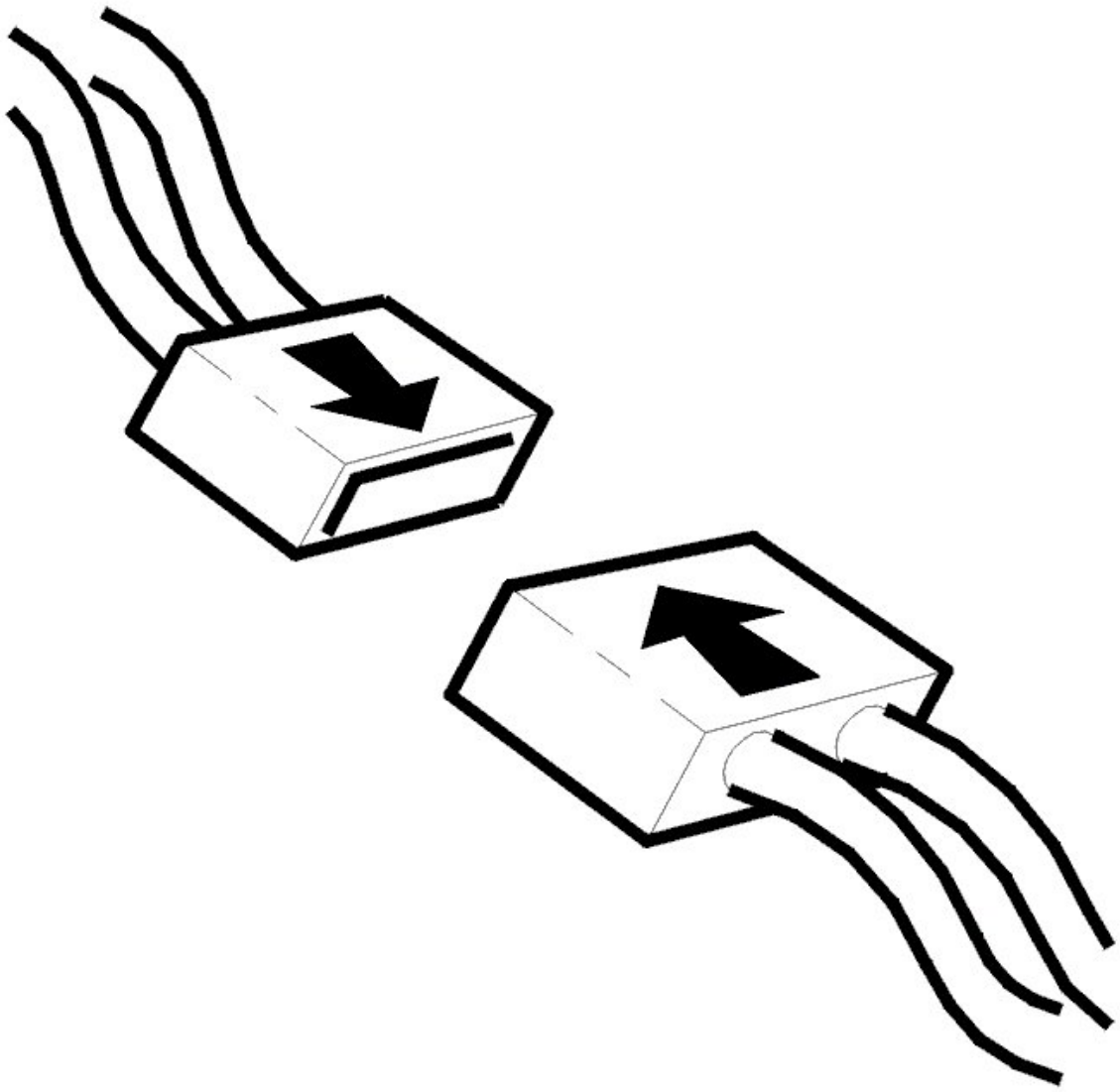
Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read off the voltage for the suspension module (SUM) and the central electronic module (CEM).
The voltage must be approximately 12 V for both the suspension module (SUM) and the central electronic module (CEM)

Is the value OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Diagnostic trouble code (DTC) information

---

Diagnostic trouble code (DTC) information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

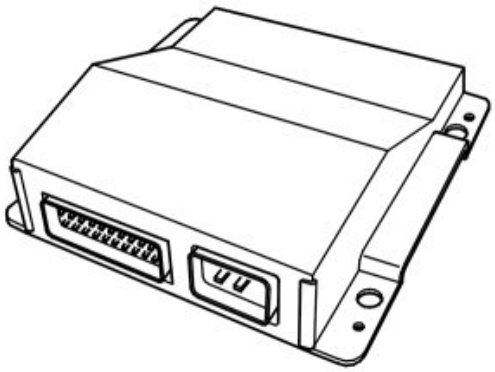
Attempt New Test - Checking the voltage

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SUM-0204, SUM-0205 or SUM-0206 is stored if the suspension module (SUM) registers that internal circuits in the suspension module (SUM) are not working.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

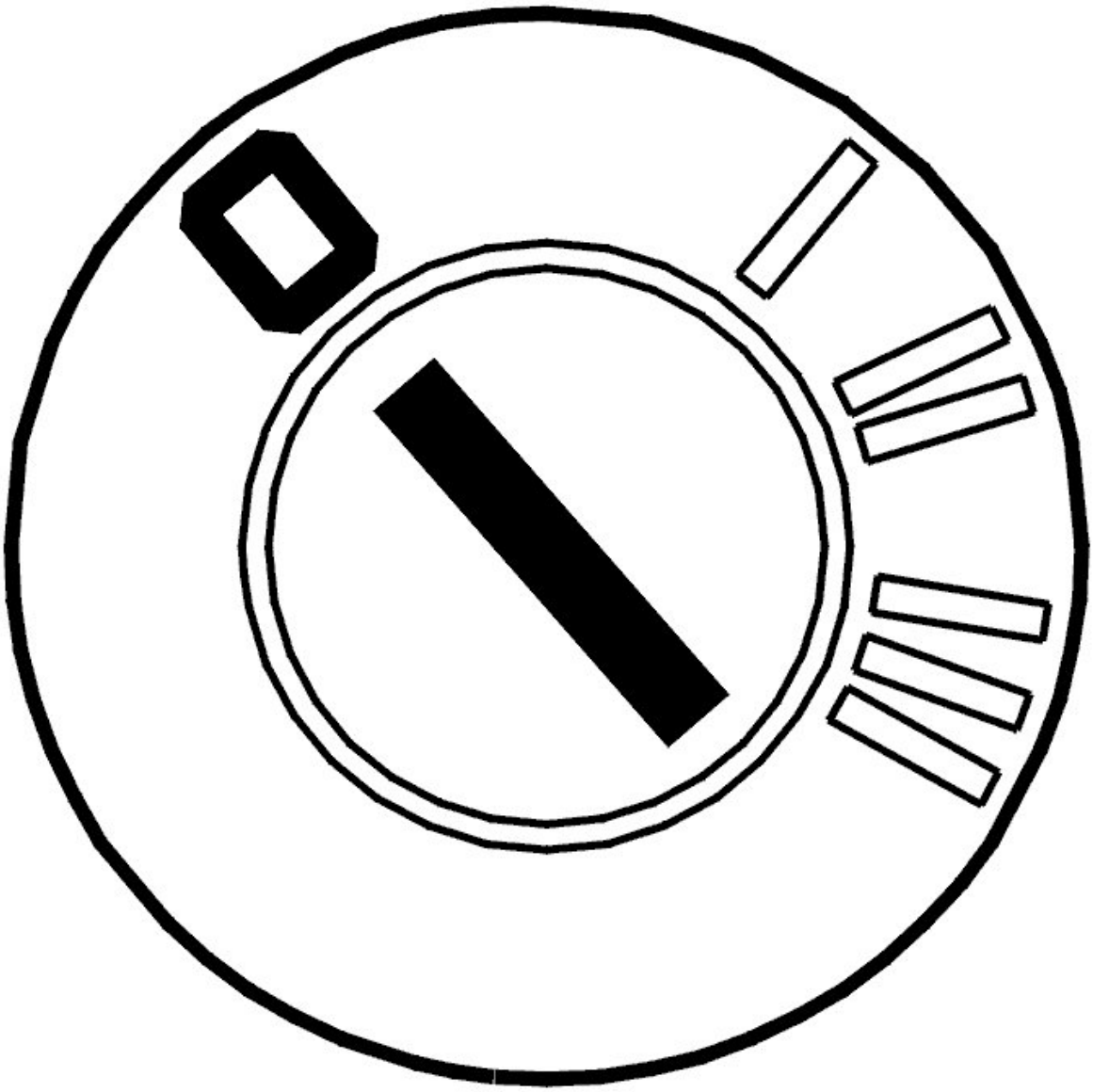
Possible source
- Defective control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Internal Fault

Internal fault

Replacing the control module and programming



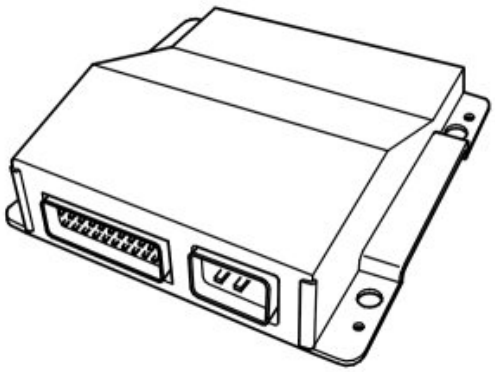
- Ignition off.

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed and calibrated in order to function after replacement.

Other information:

- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

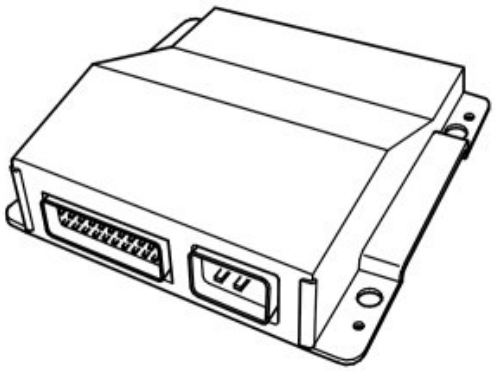
Attempt New Test - Replacing the control module and programming

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SUM-0204, SUM-0205 or SUM-0206 is stored if the suspension module (SUM) registers that internal circuits in the suspension module (SUM) are not working.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

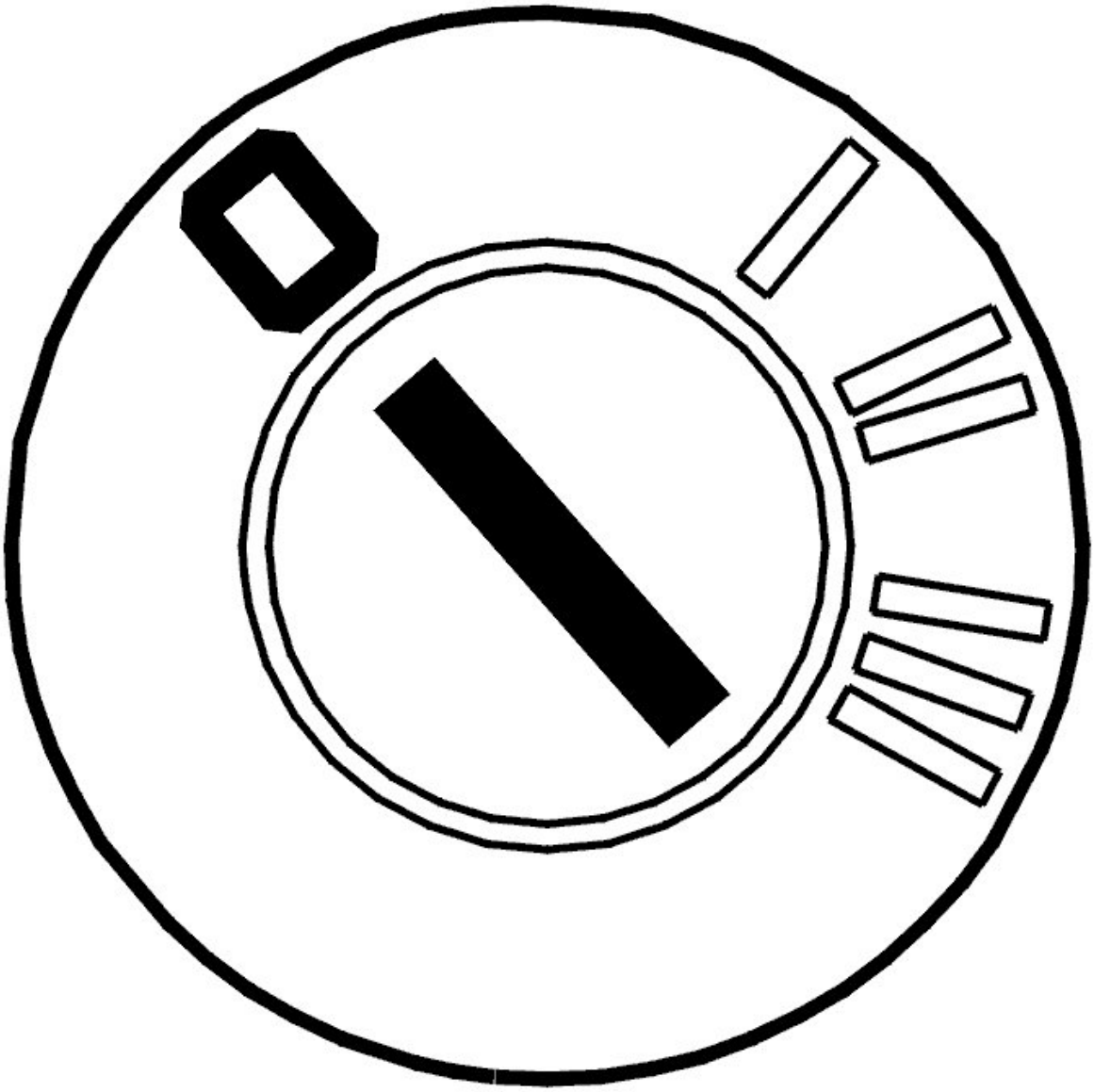
Possible source
- Defective control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Internal Fault

Internal fault

Replacing the control module and programming



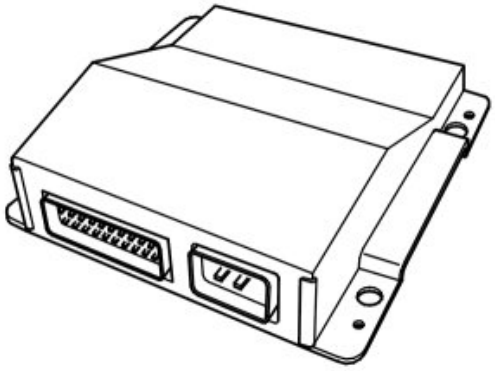
- Ignition off.

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed and calibrated in order to function after replacement.

Other information:

- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

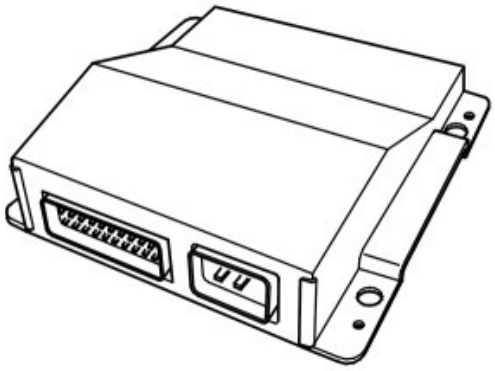
Attempt New Test - Replacing the control module and programming

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SUM-0204, SUM-0205 or SUM-0206 is stored if the suspension module (SUM) registers that internal circuits in the suspension module (SUM) are not working.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

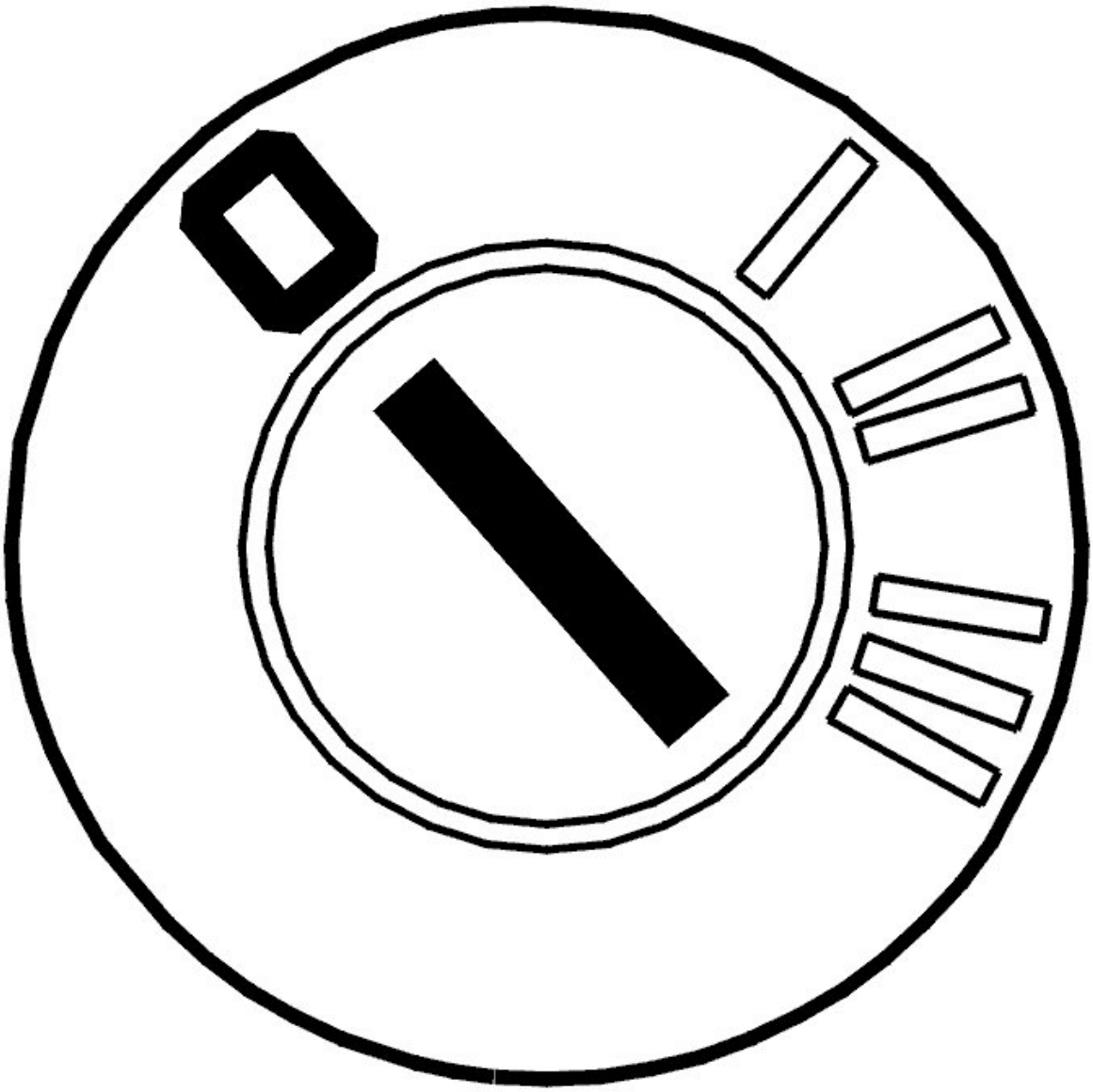
Possible source
- Defective control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Internal Fault

Internal fault

Replacing the control module and programming



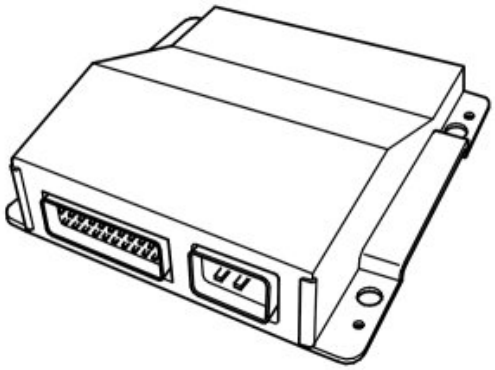
- Ignition off.

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed and calibrated in order to function after replacement.

Other information:

- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair.



Continue - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

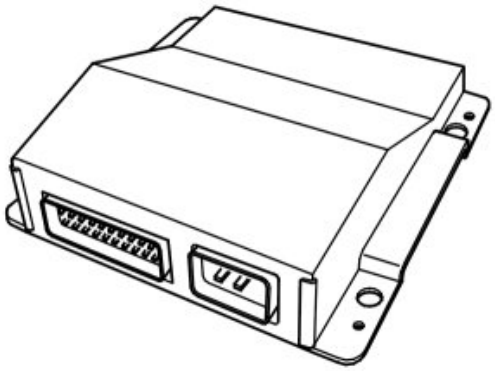
Attempt New Test - Replacing the control module and programming

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that there is no control of the circuit for power supply to the solenoids. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

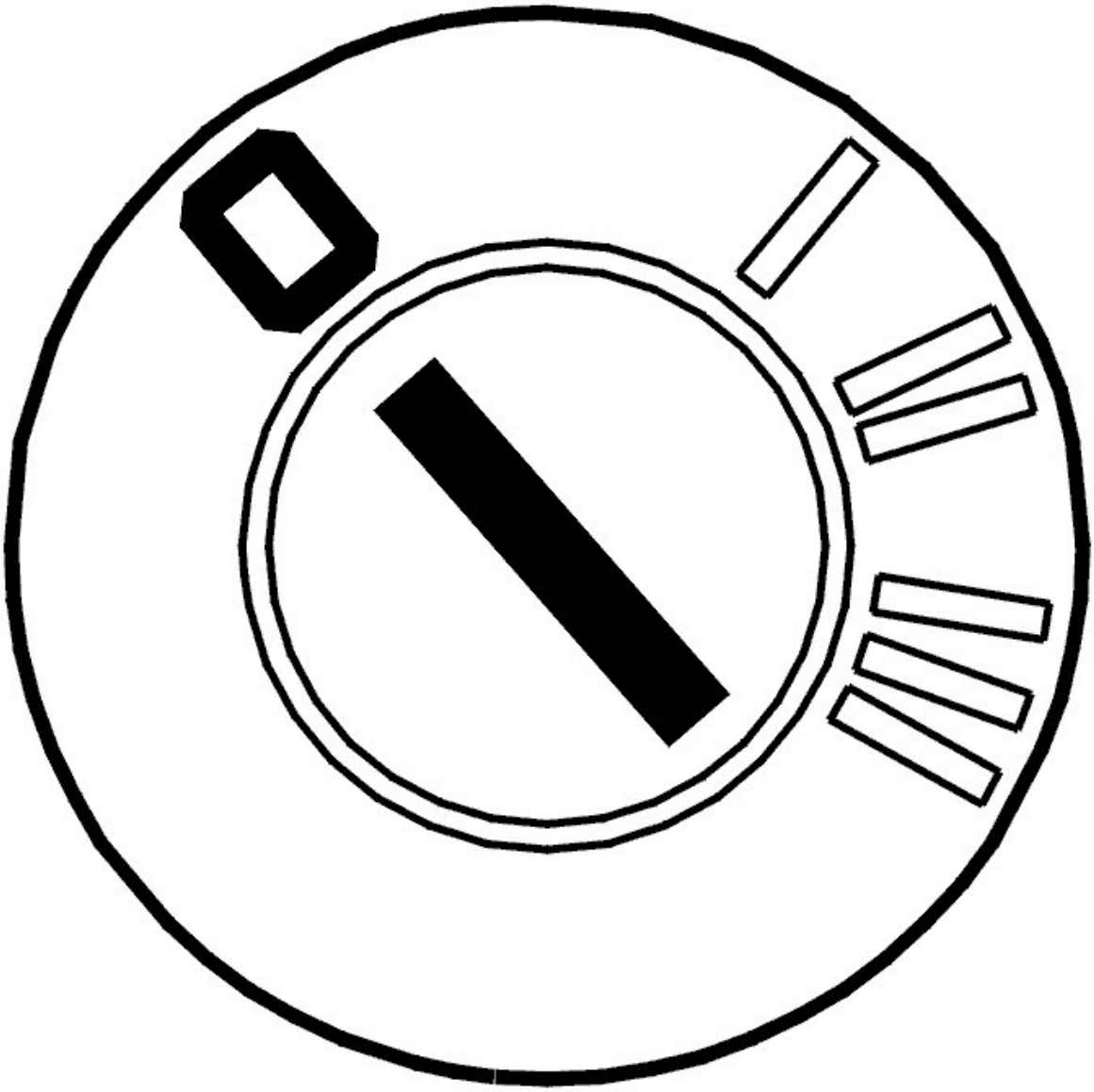
Possible source
- Short-circuit to ground in the power supply cable for one of the solenoids
- Short-circuit to ground in one of the solenoids
- Damaged control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Internal Fault

Internal fault

Checking components and wiring



- Ignition off.

Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation.

For diagnostic trouble code (DTC) SUM-0207, control module, internal fault:

- Check the cable for power supply between suspension module (SUM) terminal #A6 and front left solenoid terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between suspension module (SUM) terminal #A9 and front right solenoid terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between suspension module (SUM) terminal #A2 and rear left solenoid terminal #1. Check for a short-circuit to ground
- Check the cable for power supply between suspension module (SUM) terminal #A5 and rear right solenoid terminal #1. Check for a short-circuit to ground.

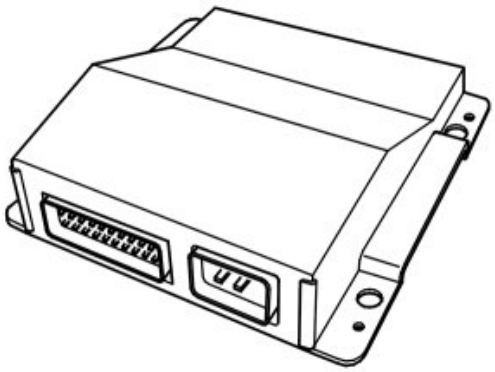
Check all the solenoids by measuring the resistance between terminals #1 and #2. Check for a short-circuit.
Try a new control module if no fault is found in the wiring or solenoids.
Remedy as necessary.

Other information:

- To access or replace the Suspension Module (SUM), see Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module

(SUM)

- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

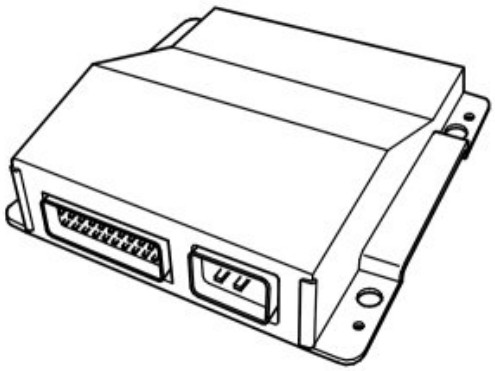
Attempt New Test - Checking components and wiring

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) SUM-0208 is stored if the suspension module (SUM) registers that the internal communication for the storage of data to the control module EEPROM memory is not correctly completed.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Low battery voltage
- Fault in the software.

Fault symptom[s]
- General warning lamp lit
- Message in the display.

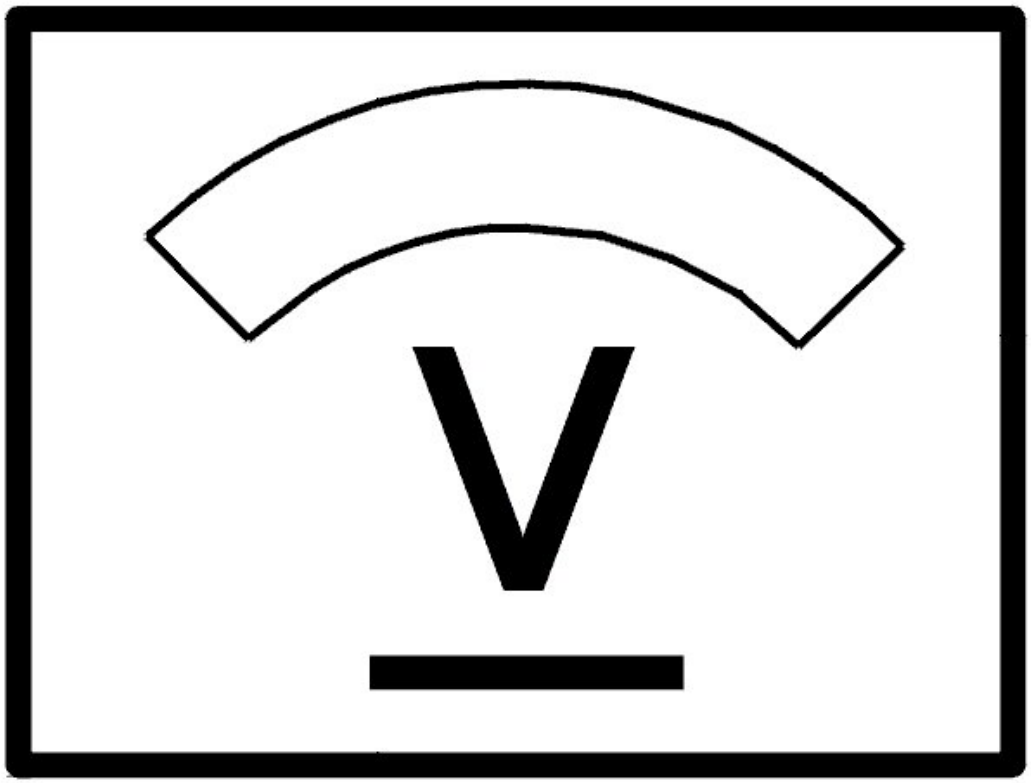
Internal Fault

Internal fault

Reloading software

Check that the battery voltage is OK.
The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults can be caused by interference at start up of the control module or by the battery voltage being too low. As the suspension module (SUM) has registered this internal fault, the software must be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT-TRACING FAILED - FAULT-TRACING FAILED

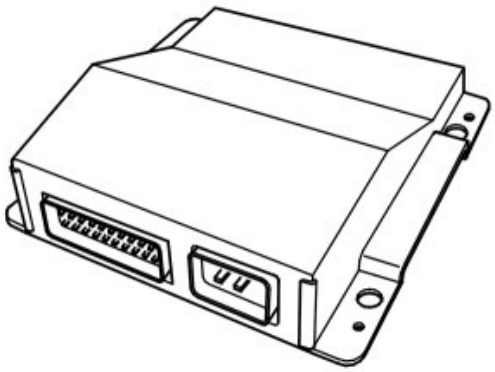
Attempt New Test - Reloading software

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Diagnostic trouble code (DTC) SUM-0209 is stored if the Suspension Module (SUM) registers that the storage of data to the control module EEPROM memory is not correctly completed.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Voltage drop in the power supply to the Suspension Module (SUM) at the same time as the control module is storing diagnostic trouble codes (DTCs) internally. This may occur when the starter motor is activated
- Defective EEPROM memory.

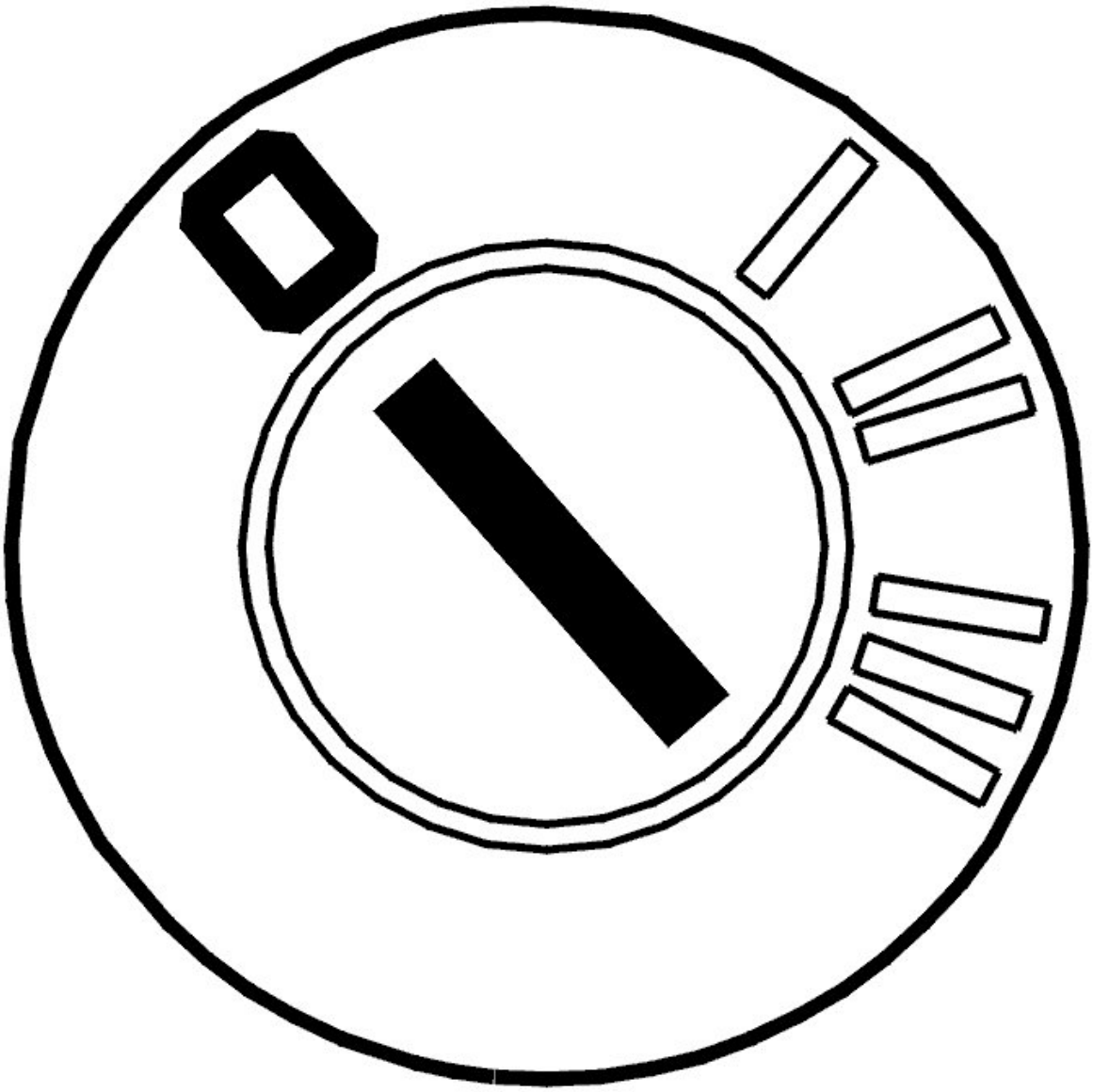
Fault symptom[s]
- General warning lamp lit
- Message in the display.

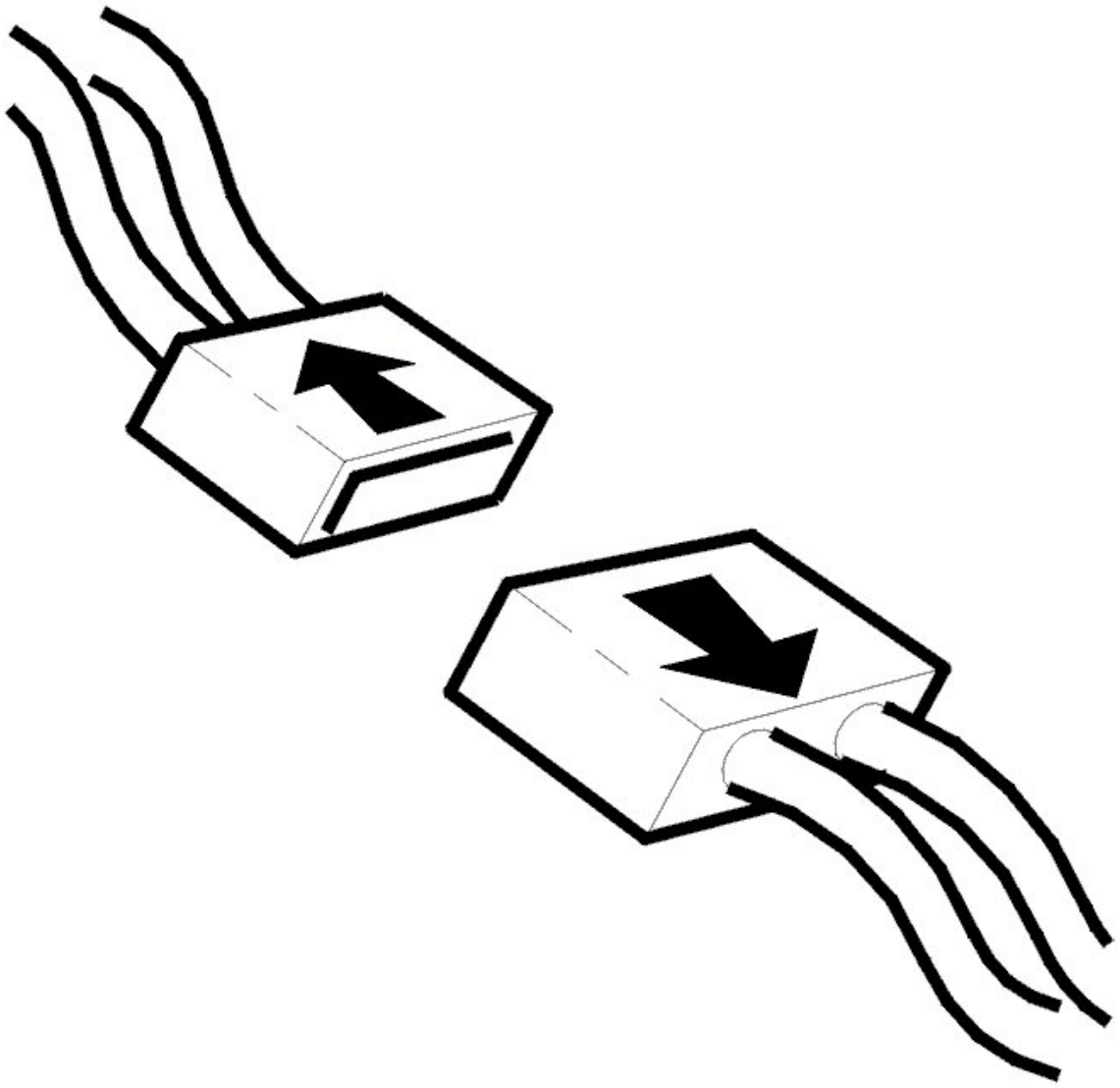
Internal Memory Fault

Internal memory fault

Checking diagnostic trouble codes (DTCs)

Hint: To determine whether the Suspension Module (SUM) is defective, create a fault and then read off the diagnostic trouble code (DTC).



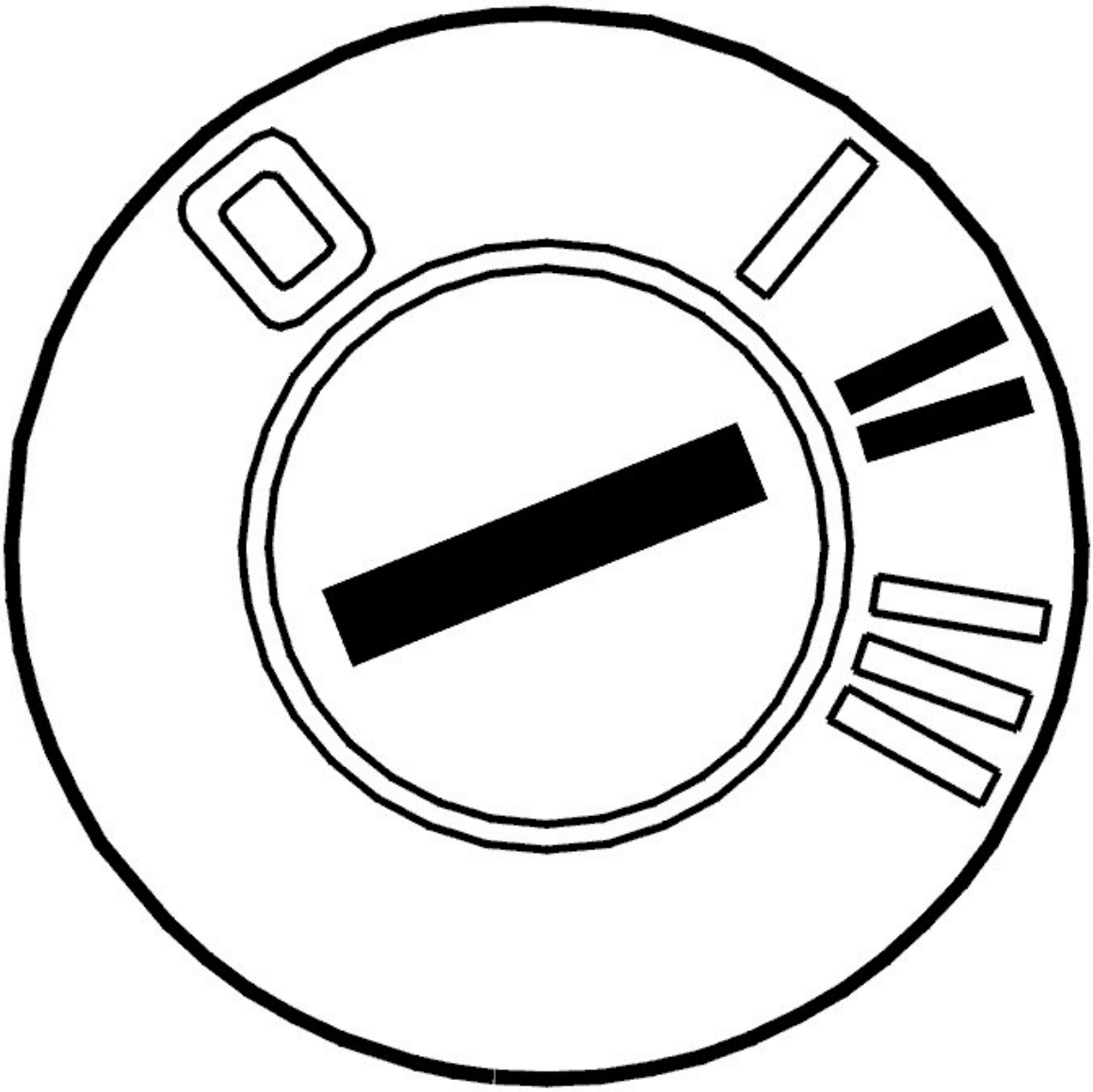


- Ignition off
- Disconnect the connector for the acceleration sensor on the front suspension. Then switch on the ignition.

Select "Continue".

Continue - Checking diagnostic trouble codes (DTCs)

Checking diagnostic trouble codes (DTCs)

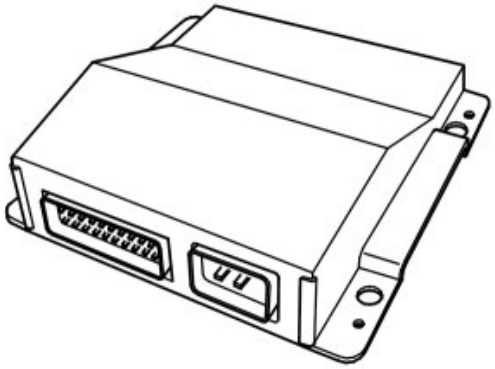


- Switch off the ignition. Wait a few seconds
- Ignition on
- Read off diagnostic trouble codes (DTCs).

Note! The Suspension Module (SUM) must be replaced if only diagnostic trouble code (DTC) SUM-0209 is stored. If there are new diagnostic trouble codes (DTCs) for the acceleration sensor on the front suspension, there has been a temporary write fault in the internal memory.

Other information

- To access or replace the Suspension Module (SUM), see Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



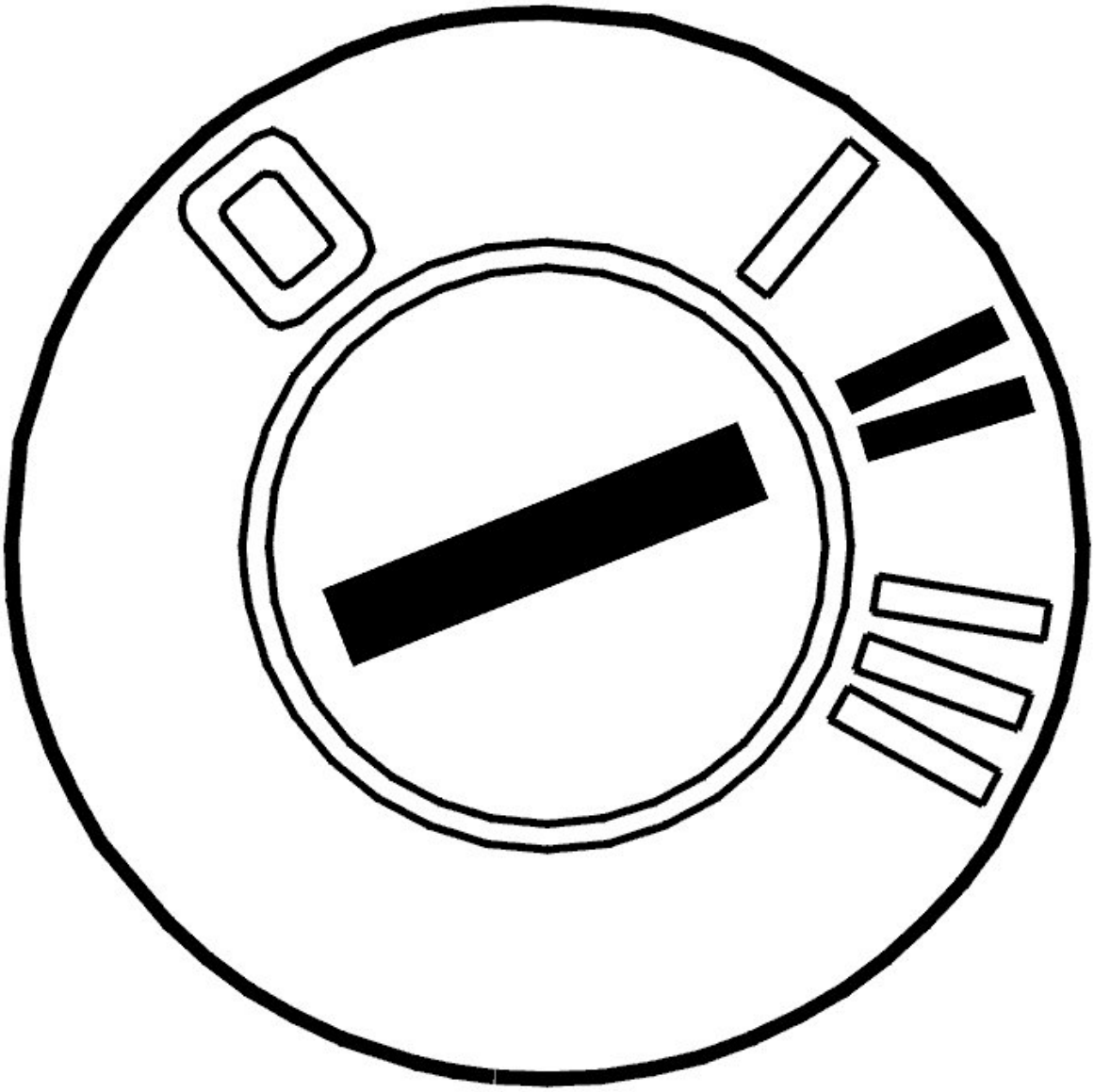
Continue - Verification

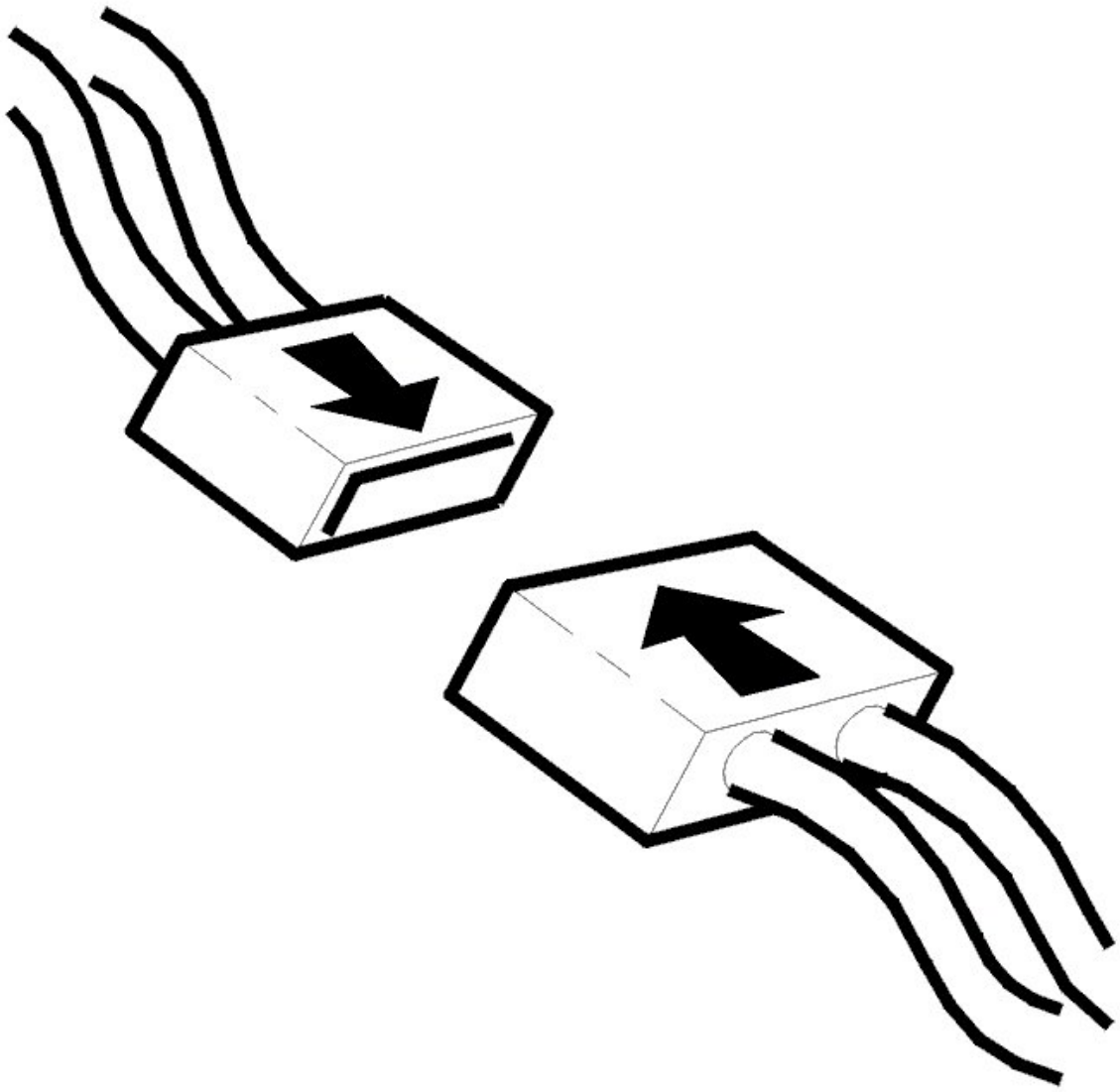
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

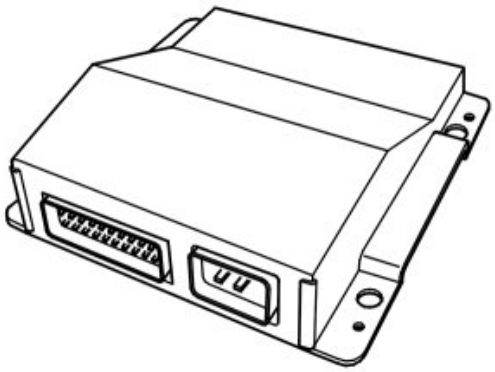
Attempt New Test - Checking diagnostic trouble codes (DTCs)

FAULT-TRACING FAILED - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The control module must contain a compatible software version in order for the Four-C function to work satisfactorily. Diagnostic trouble code (DTC) SUM-0211 is stored if the suspension module (SUM) detects that the software is not compatible with the control module.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Software not compatible with the suspension module (SUM)
- Defective control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Faulty Software

Faulty software

Reloading software

The suspension module (SUM) has registered a fault in the software. If the fault is intermittent, the fault has been registered on a previous occasion.

As the suspension module (SUM) has registered that the software is defective, the software must be reloaded. Intermittent faults may be caused by interference at start up of the control module. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

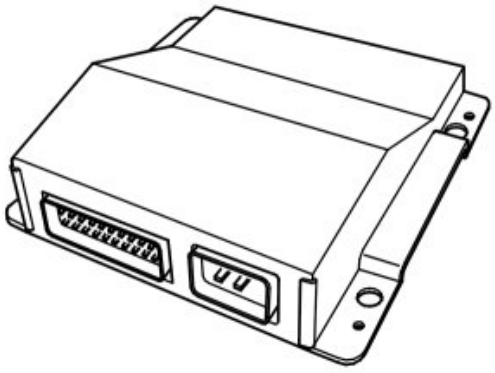
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) discovers that the internal calibration does not contain the correct information. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Damaged control module.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

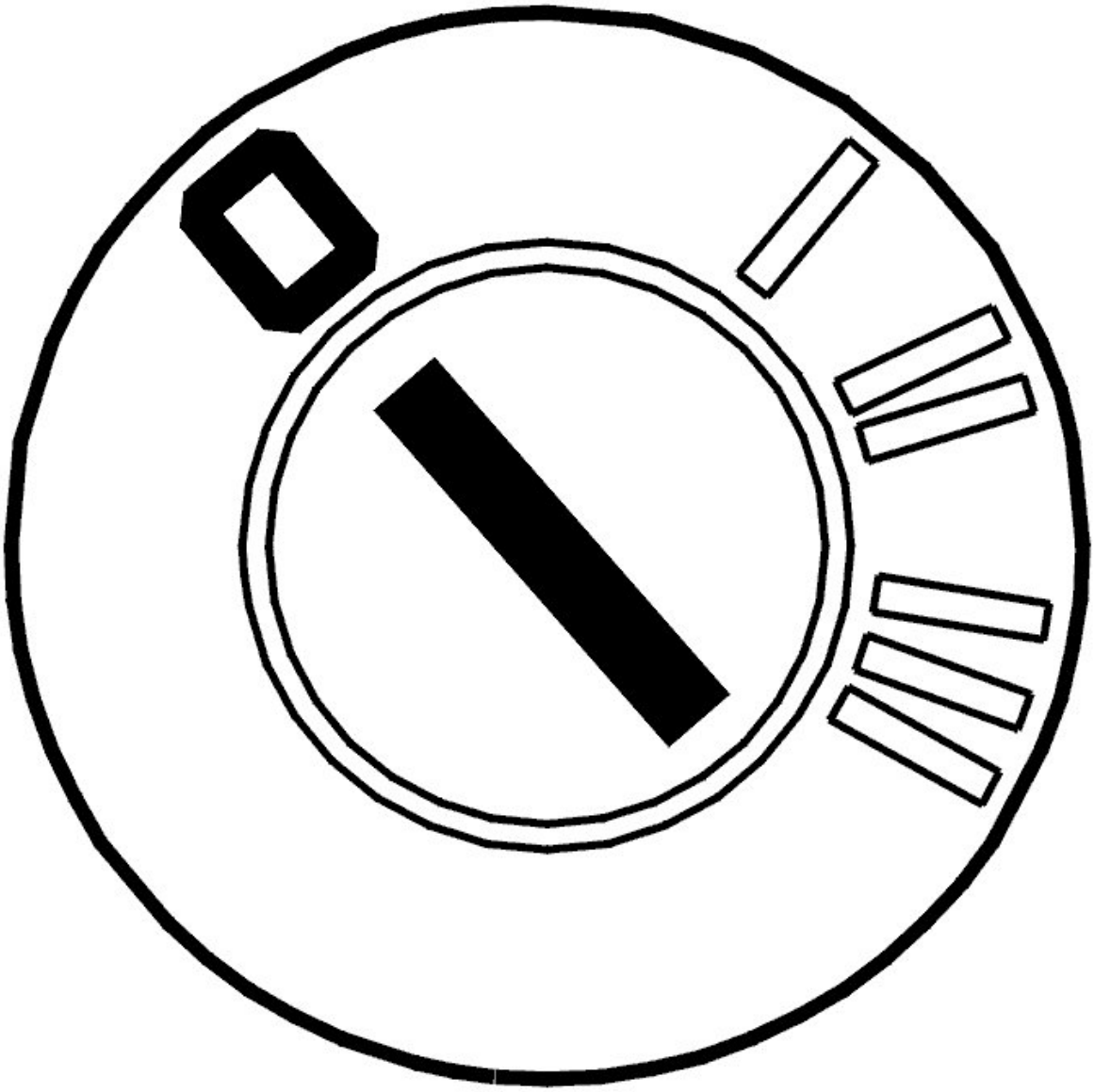
Fault symptom[s]

- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Internal Fault

Internal fault

Replacing the control module and programming



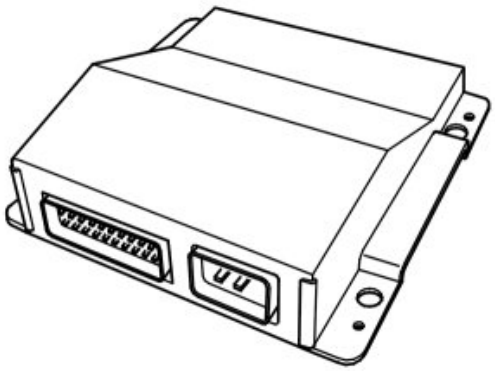
- Ignition off.

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed and calibrated in order to function after replacement.

Other information:

- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

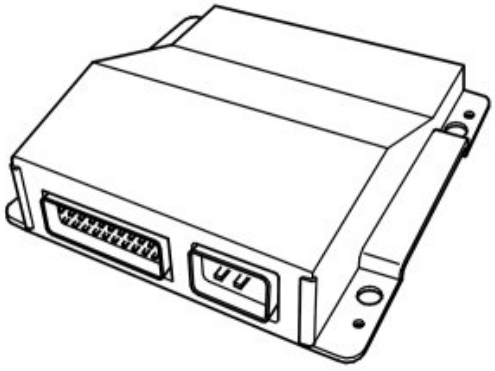
Attempt New Test - Replacing the control module and programming

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) discovers that the internal calibration does not contain the correct information. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

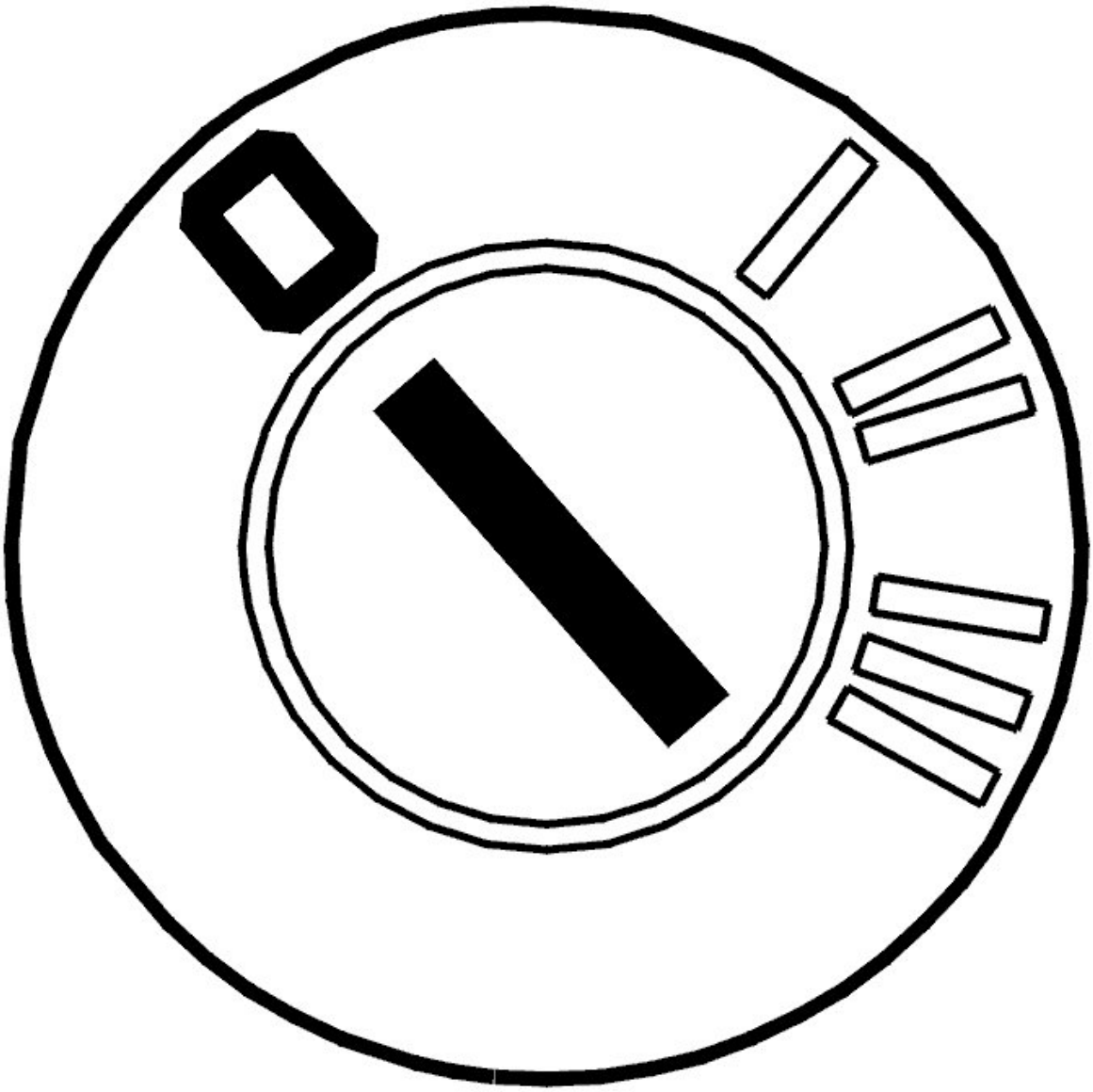
Possible source
- Damaged control module.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Internal Fault

Internal fault

Replacing the control module and programming

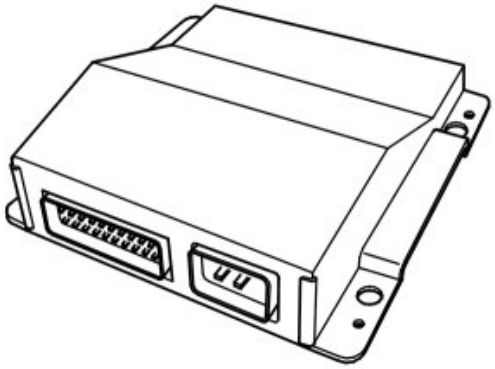


- Ignition off.

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed and calibrated in order to function after replacement.

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair.



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

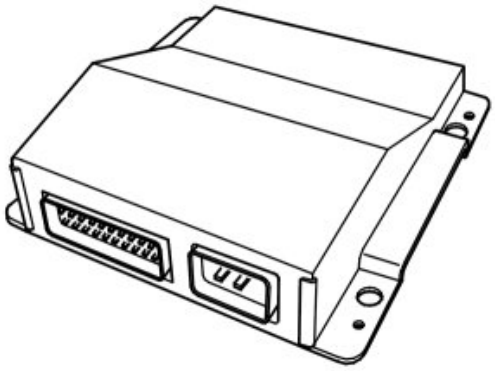
Attempt New Test - Replacing the control module and programming

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) must be calibrated after new software is downloaded. Diagnostic trouble code (DTC) SUM-0220 is stored if the rear position sensor is not calibrated. The diagnostic trouble code (DTC) is erased automatically after calibration.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Calibration not completed.

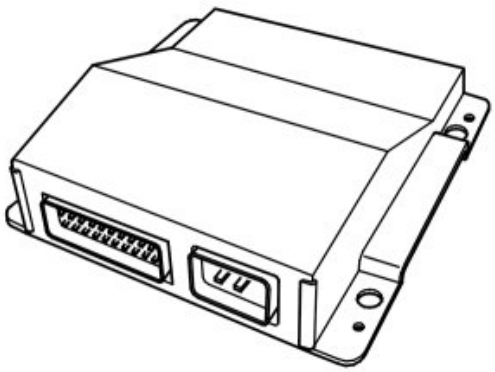
Fault symptom[s]
- General warning lamp lit
- Message in the display.

Not Completed

Not completed

Checking the control module

Hint: Diagnostic trouble codes (DTC) SUM-0220 and SUM-0222 were stored after programming the Suspension Module (SUM) and are erased automatically after calibration.



Select "Continue" to calibrate the control module.

Continue - Calibrating the System

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control module

Reading off diagnostic trouble codes (DTCs)

Click on the VCT2000 symbol to read off the diagnostic trouble codes (DTCs).
Diagnostic trouble code (DTC) SUM-0220/SUM-0222 must have been erased if the calibration was successful.

Is the diagnostic trouble code (DTC) erased?

Yes - **Fault Found**

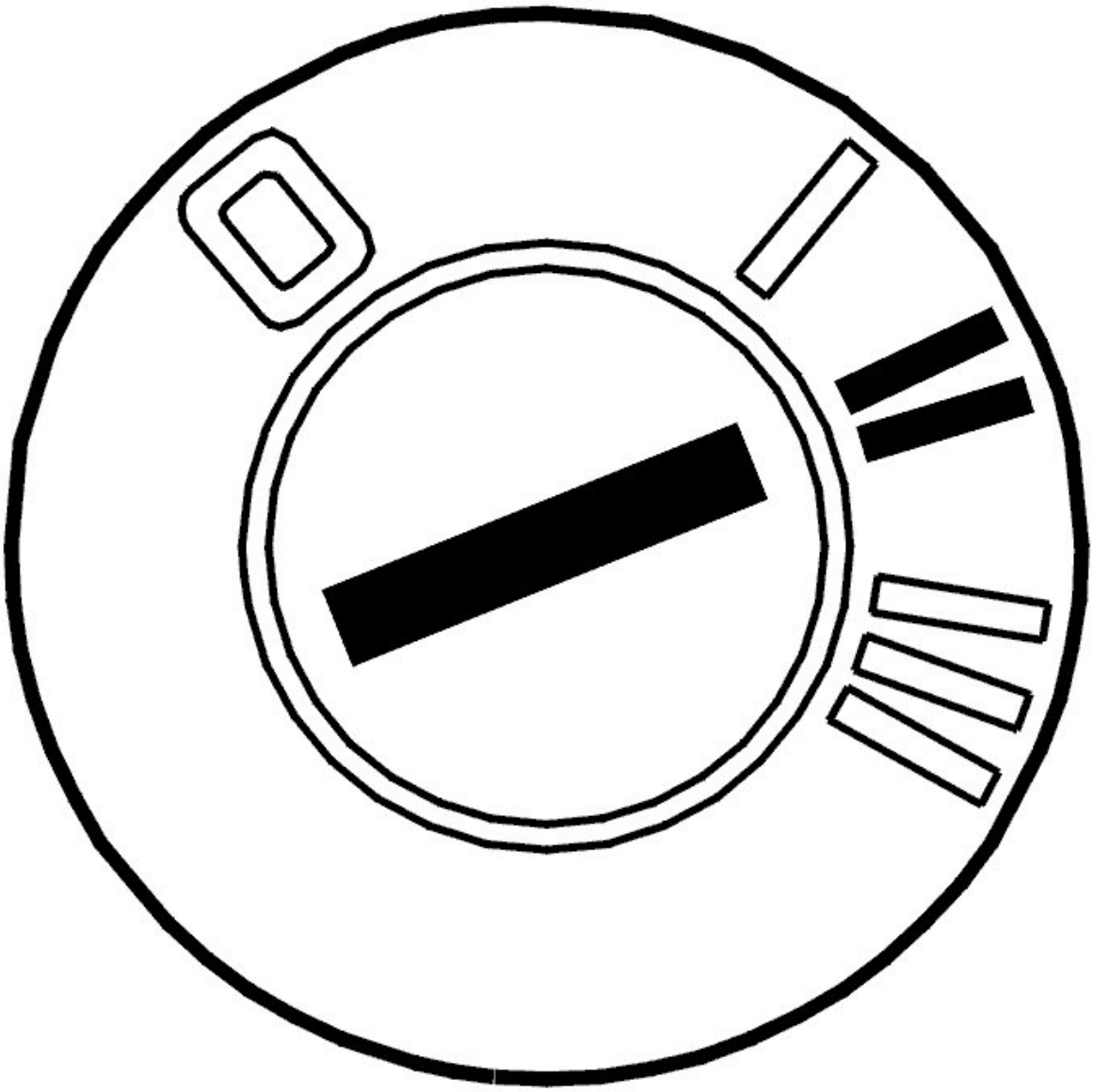
No - Fault-tracing information

Calibrating the system

Calibration

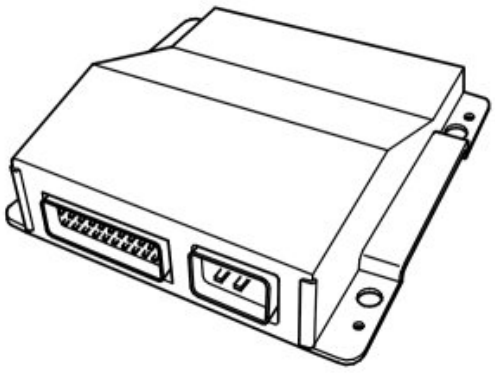
Note! In order for the Four-C function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be calibrated after replacing:

- control module
- the shock absorber
- the position sensor for the rear suspension.



- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is not loaded and on a flat surface with the wheels pointing straight ahead
- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.



Continue - **DONE**

Numeric Result 0 - Communication fault

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Calibration

2 - Checking communication

3 - **FAILED**

Checking communication

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

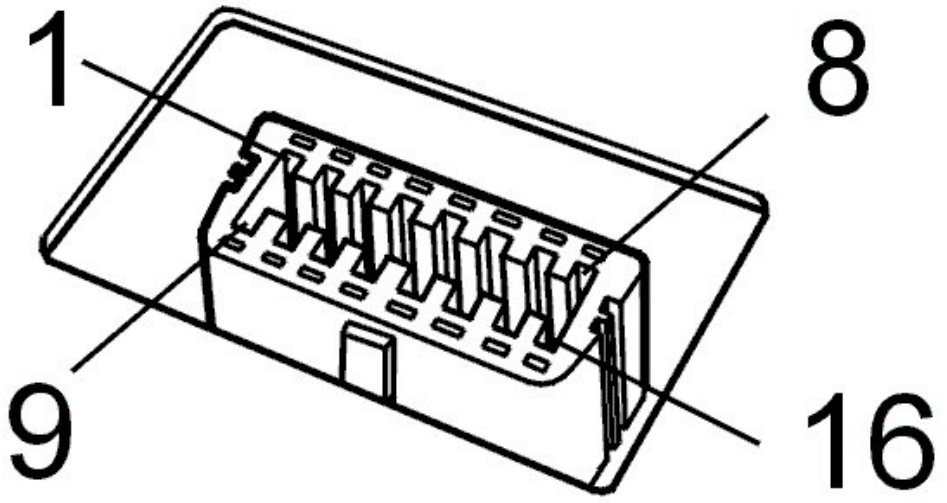
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.
- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:
- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

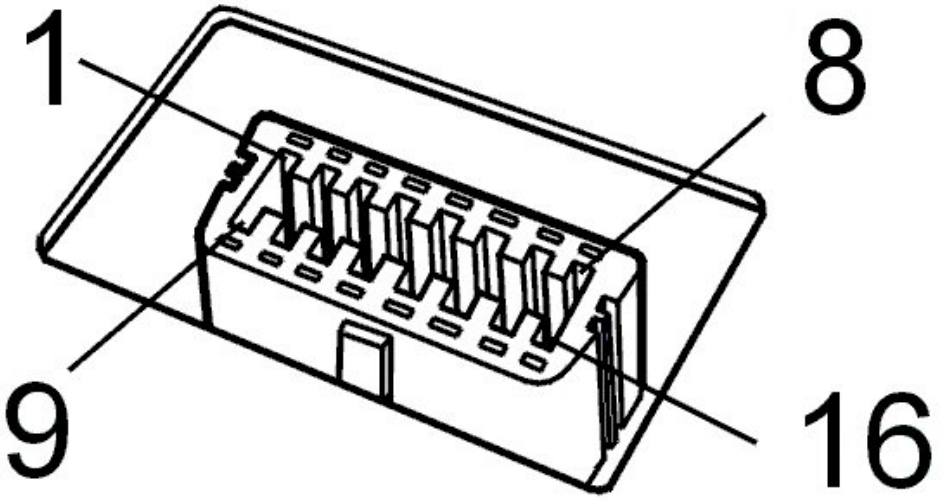
Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates

a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

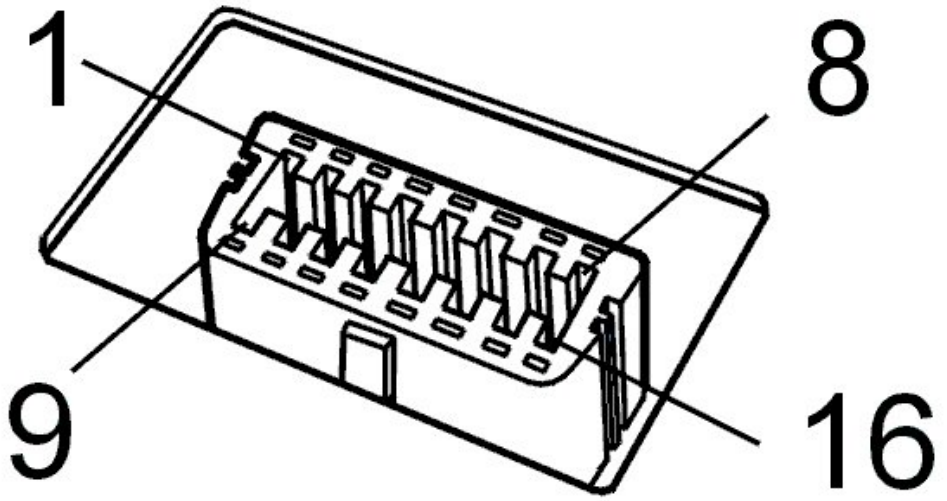
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

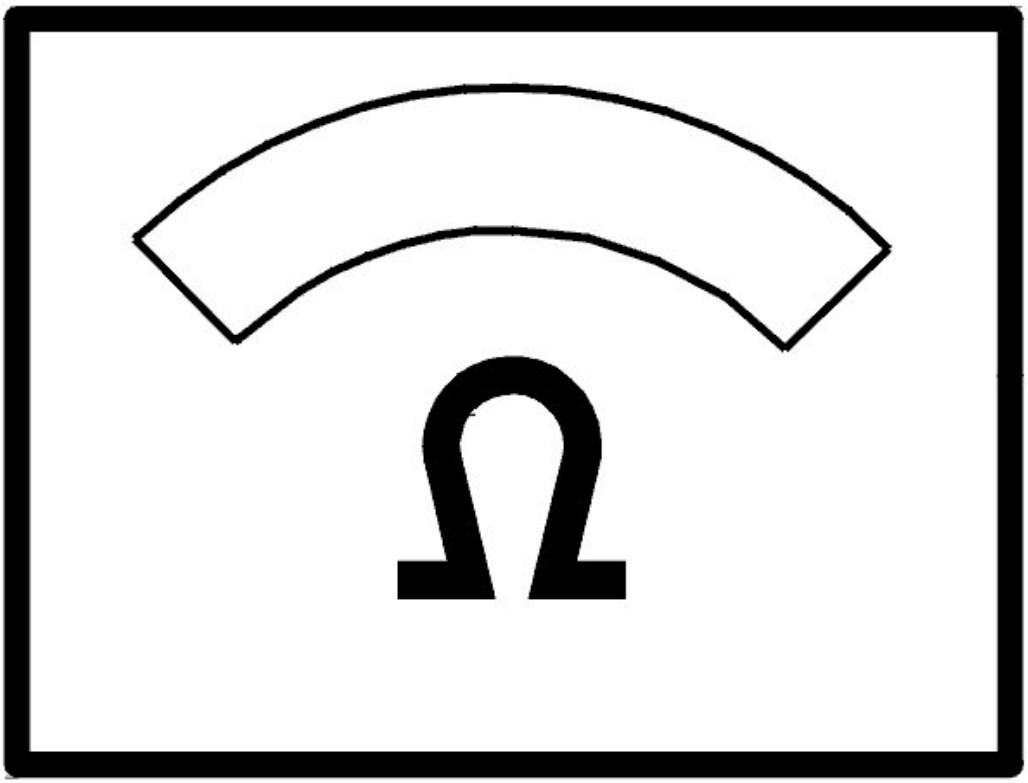
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

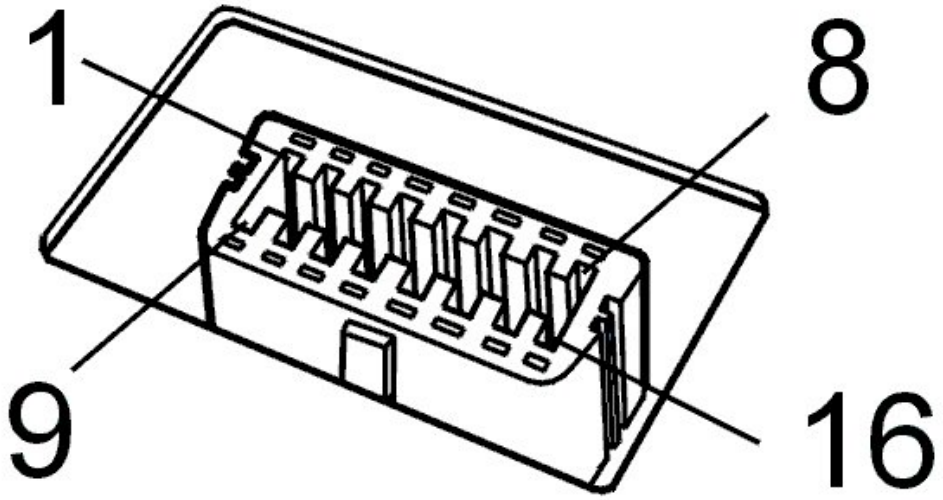
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

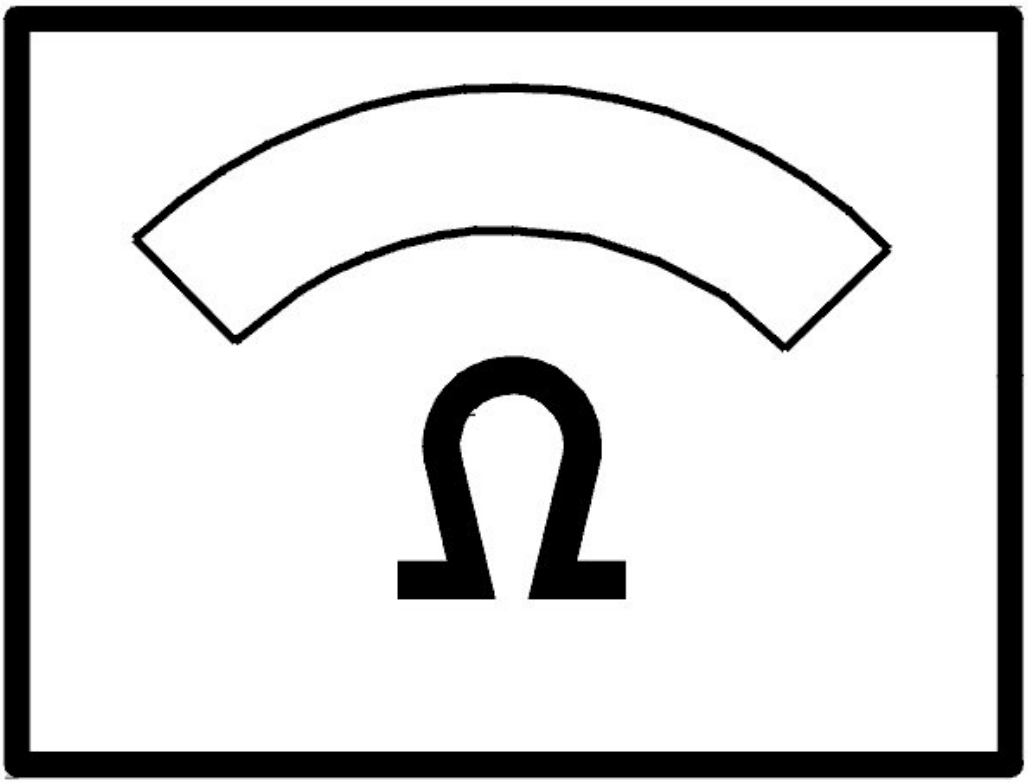
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - Calibration

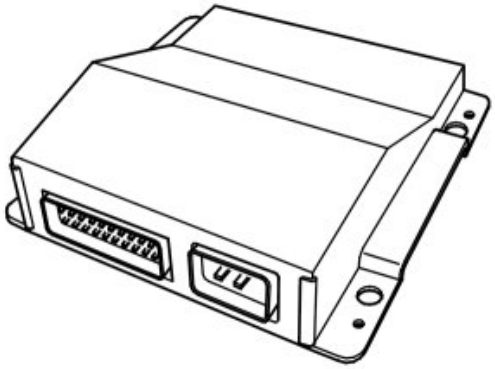
NO - FAILED

DONE - Reading off diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) must be calibrated after repair or after new software is downloaded. Diagnostic trouble code (DTC) SUM-0221 is stored if a value is incorrect when calibrating the rear position sensors.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

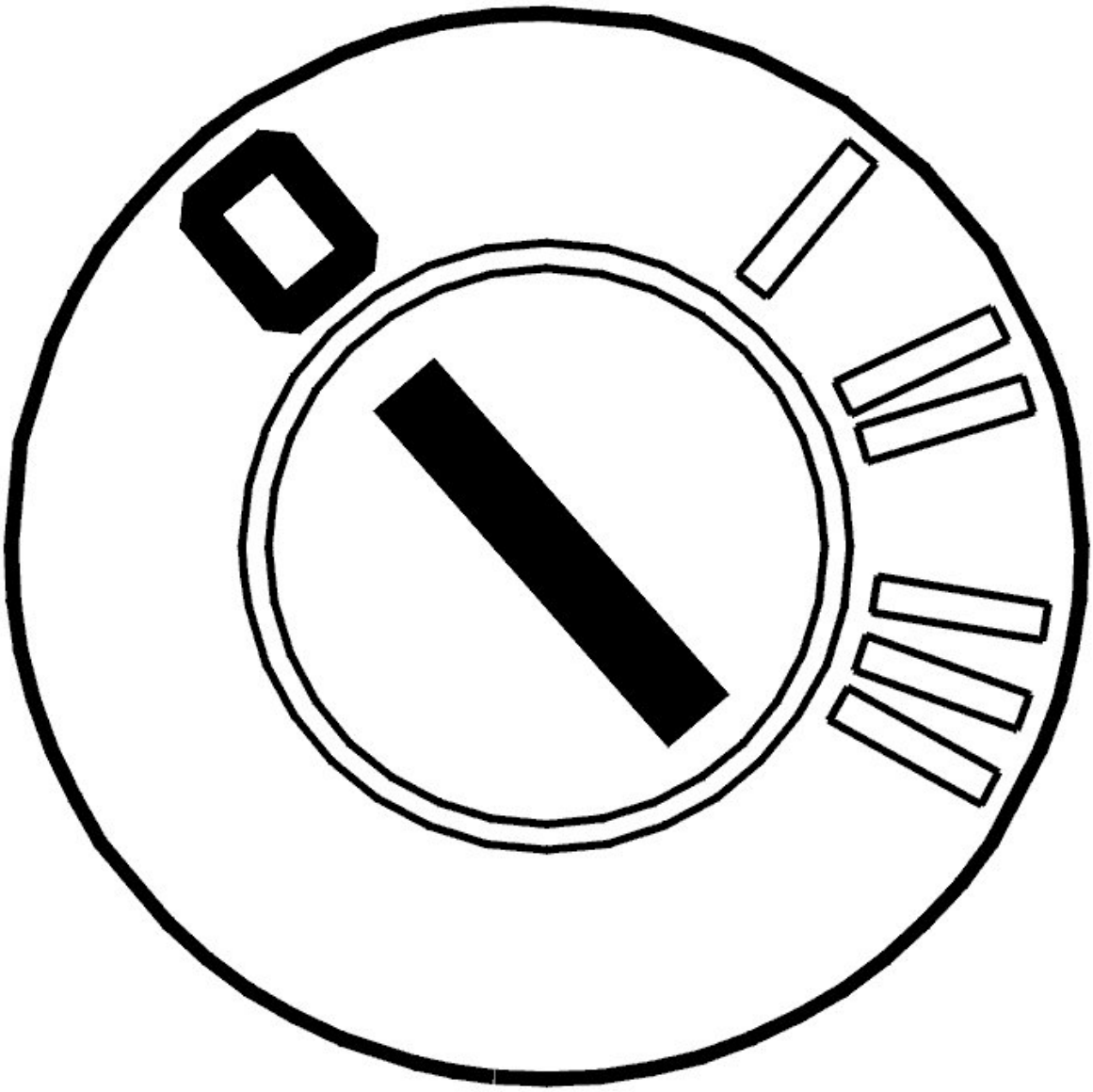
Possible source
- The car is loaded or lifted from the ground
- Open-circuit in the cable for the position sensor
- Incorrectly installed position sensor
- Defective position sensor
- Internal fault in the Suspension Module (SUM).

Fault symptom[s]
- General warning lamp lit
- Message in the display.

Non-Approved Value

Non-approved value

Checking components and wiring



- Ignition off.

Hint: Check that the car is not loaded. The car must be fully fuelled and on a flat surface. There must not be passengers or baggage in the car.

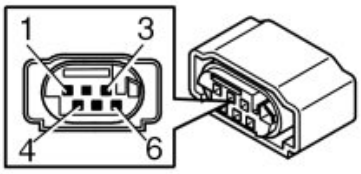
- Check the connectors for the Suspension Module (SUM) and the position sensors. Check for contact resistance and oxidation
- Check the signal cable between control module terminal #A14 and rear right position sensor terminal #4 and between control module terminal #A28 and rear left position sensor terminal #4. Check for an open-circuit
- Check that the rear right and left position sensors are correctly installed.

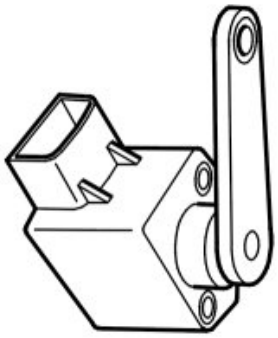
Hint: Click on the VCT2000 symbol to check the signal from the position sensors.

Try a new position sensor if no fault is found in the wiring.
After this fault-tracing, the control module must be calibrated according to VIDA vehicle communication. Select Pause. Then save a bookmark so that the fault-tracing can be resumed from this point.

Other information:

- To access or replace the position sensor, see Position sensor suspension rear (Four-C), replacing See: Sensors and Switches/Sensors and Switches - Steering and Suspension/Sensors and Switches - Suspension/Ride Height Sensor/Service and Repair
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





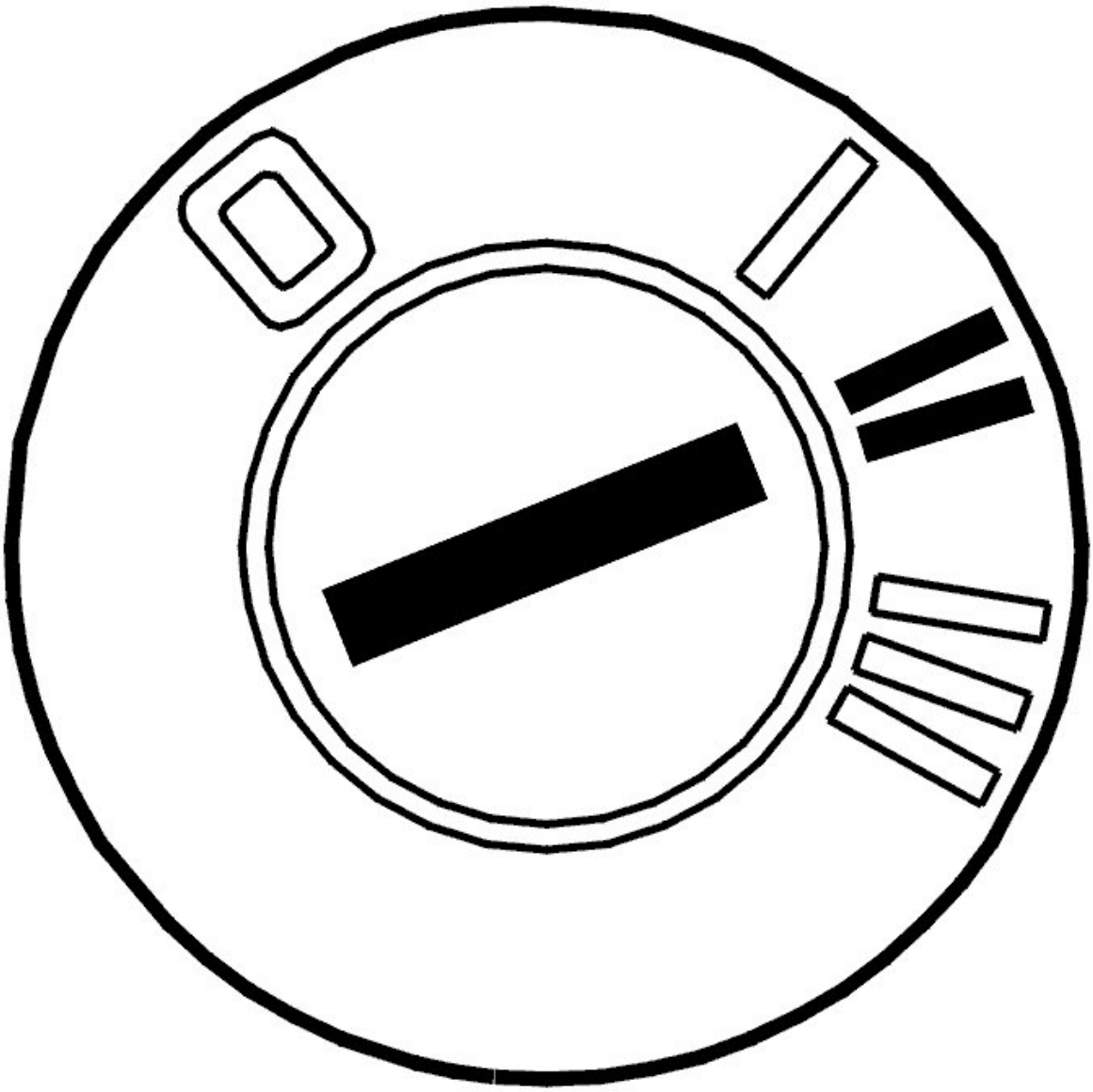
Continue - Verification

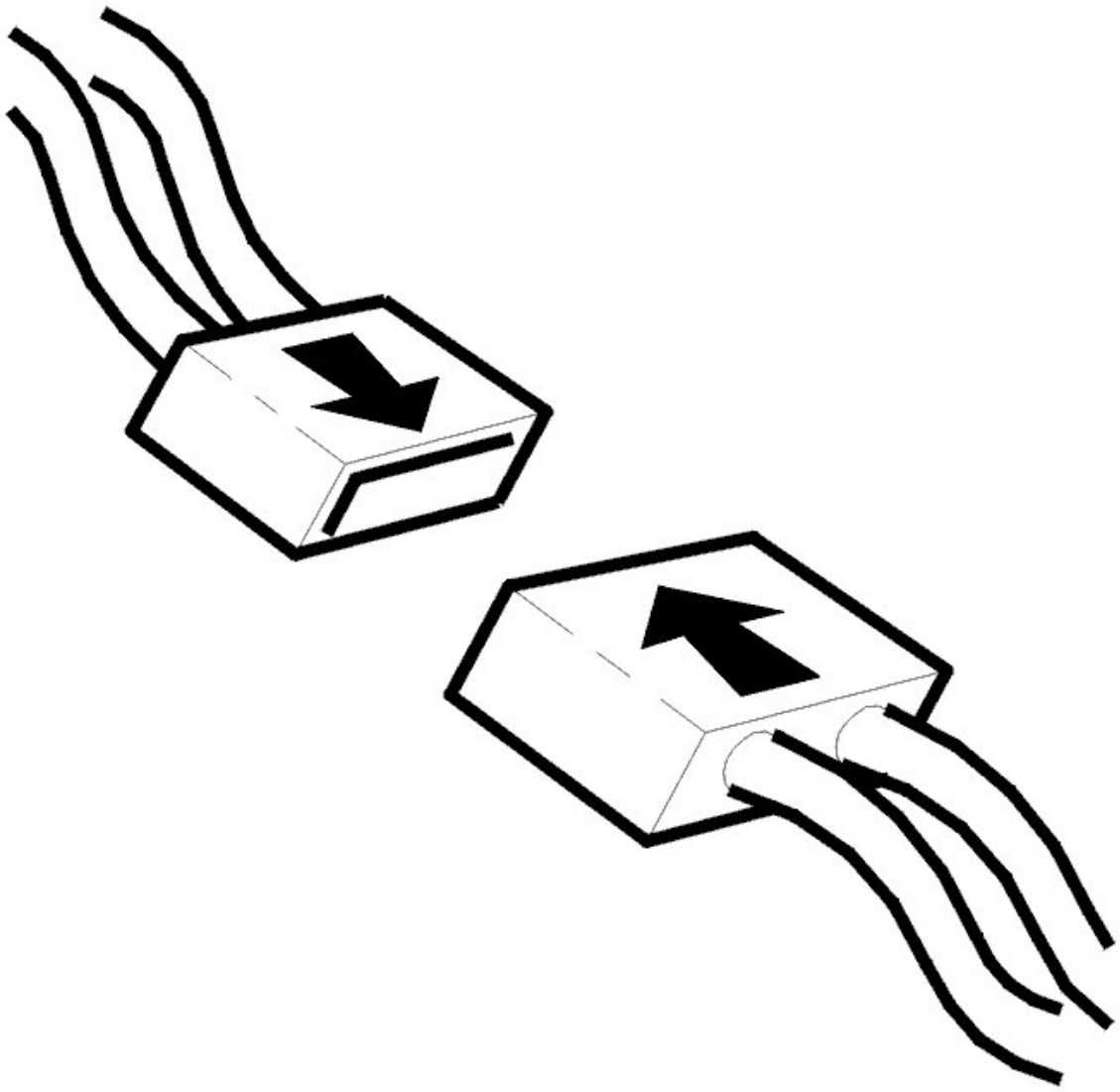
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

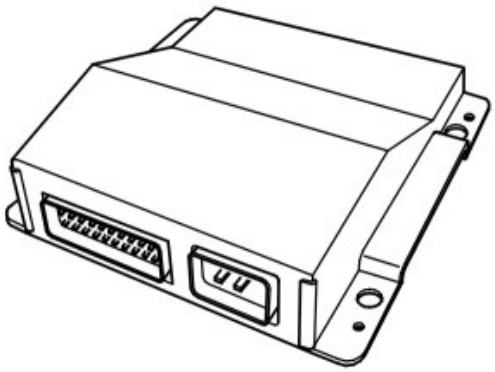
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) must be calibrated after new software is downloaded. Diagnostic trouble code (DTC) SUM-0222 is stored if the solenoids have not been calibrated. The diagnostic trouble code (DTC) is erased automatically after calibration
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Calibration not carried out.

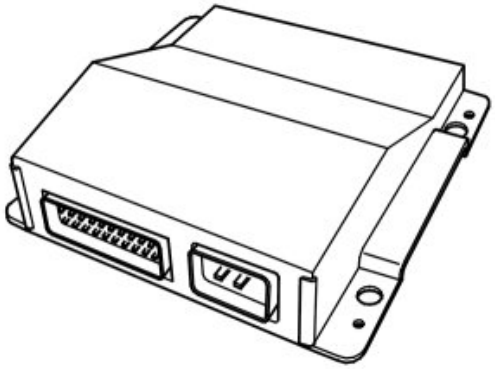
Fault symptom[s]
- General warning lamp lit
- Message in the display.

Not completed

Not completed

Checking the control module

Hint: Diagnostic trouble codes (DTC) SUM-0220 and SUM-0222 were stored after programming the Suspension Module (SUM) and are erased automatically after calibration.



Select "Continue" to calibrate the control module.

Continue - Calibrating the System

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the control module

Reading off diagnostic trouble codes (DTCs)

Click on the VCT2000 symbol to read off the diagnostic trouble codes (DTCs).
Diagnostic trouble code (DTC) SUM-0220/SUM-0222 must have been erased if the calibration was successful.

Is the diagnostic trouble code (DTC) erased?

Yes - Fault Found

No - Fault-tracing information

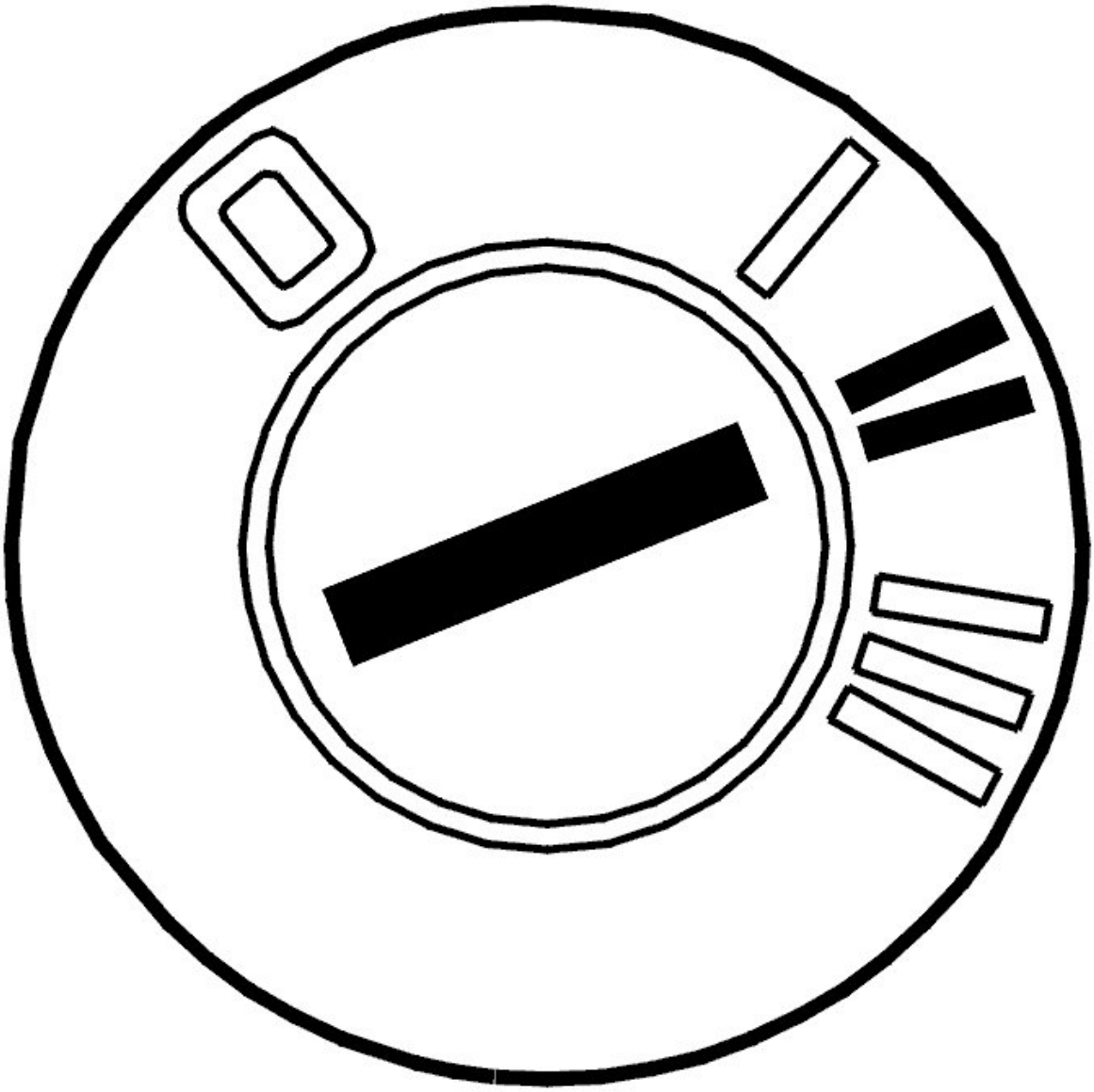
Calibrating the system

Calibration

Note! In order for the Four-C function to work correctly after repair, the adaptive data in the Suspension Module (SUM) must be

calibrated after replacing:

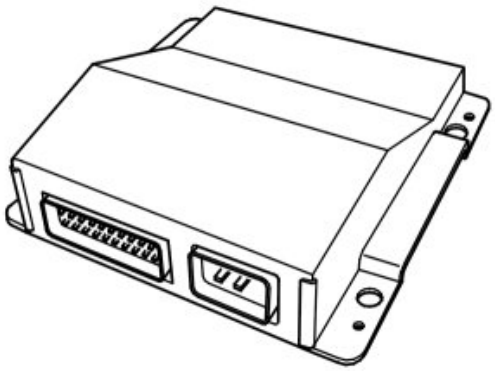
- control module
- the shock absorber
- the position sensor for the rear suspension.



- The car and its components must be kept at room temperature if the calibration is to be correct
- Ensure that the car is not loaded and on a flat surface with the wheels pointing straight ahead
- Ignition on.

Calibrate the control module by clicking the VCT2000 symbol.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - **DONE**

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Calibration

2 - Checking communication

3 - **FAILED**

Checking communication

Checking communication errors

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives

1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

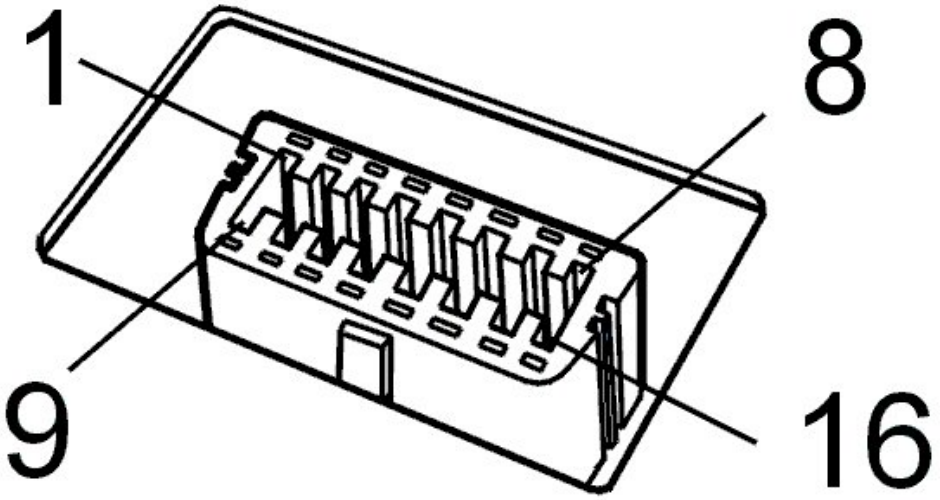
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.
- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:
- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

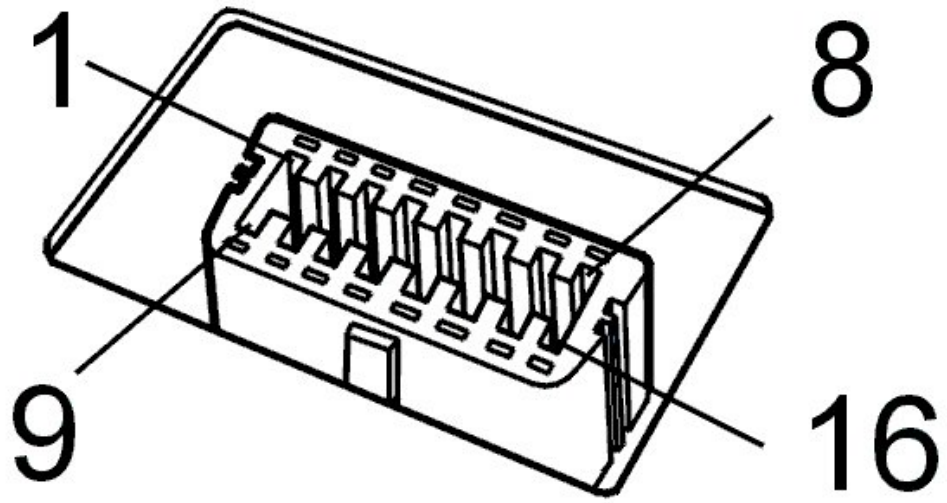
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2

- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

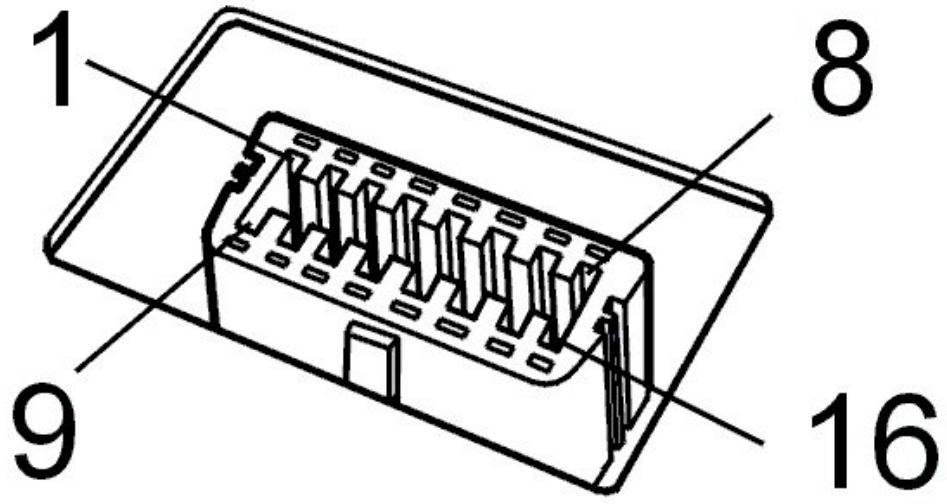
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

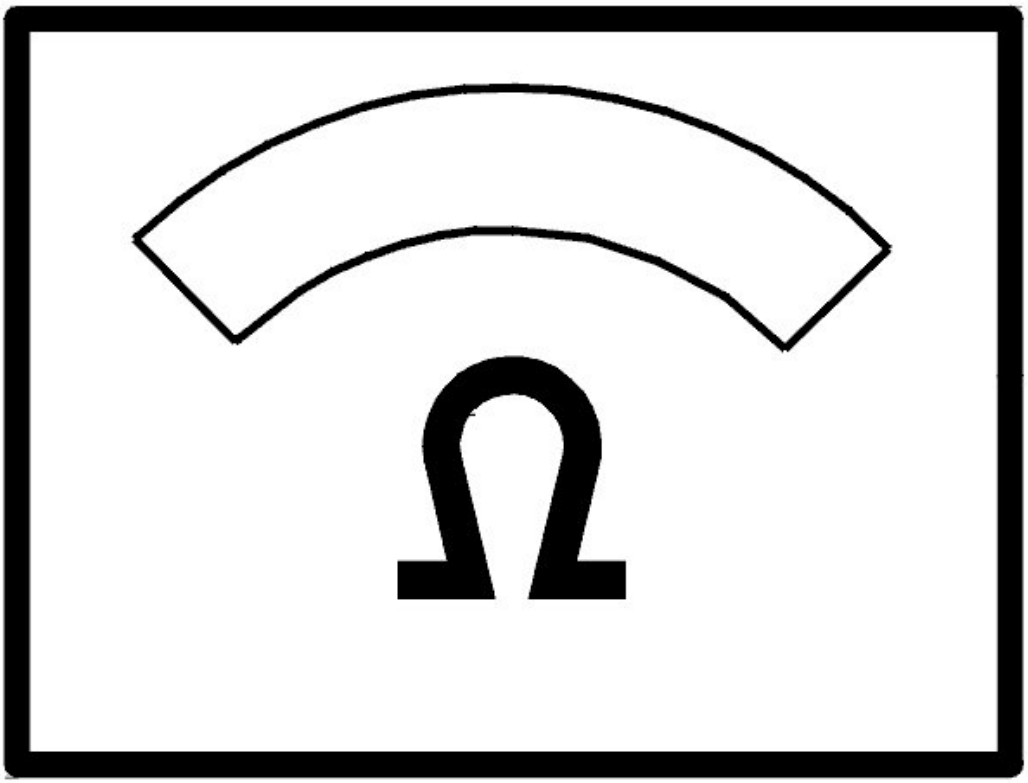
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

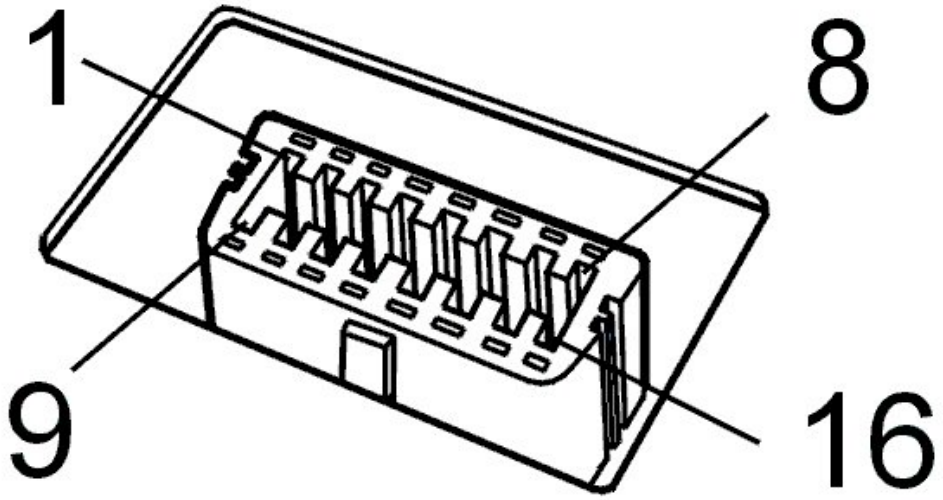
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

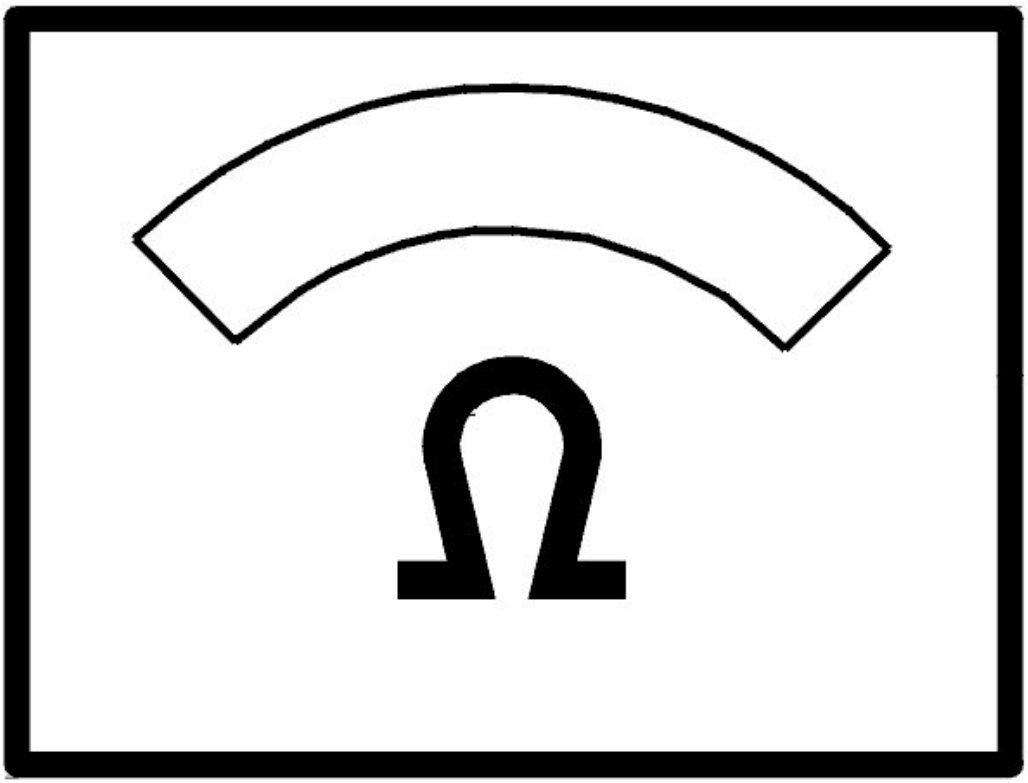
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - Calibration

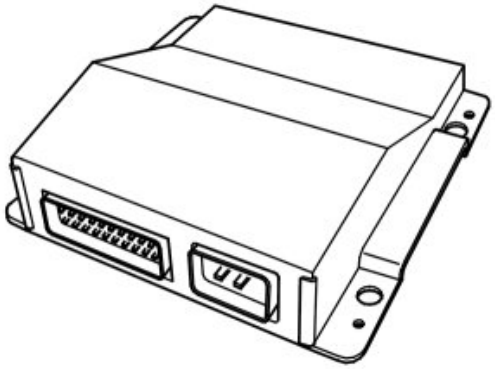
NO - FAILED

DONE - Reading off diagnostic trouble codes (DTCs)

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The Suspension Module (SUM) must be calibrated after repair or after new software is downloaded. Diagnostic trouble code (DTC) SUM-0223 is stored if a value is incorrect when calibrating the solenoids on the shock absorbers.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- None.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

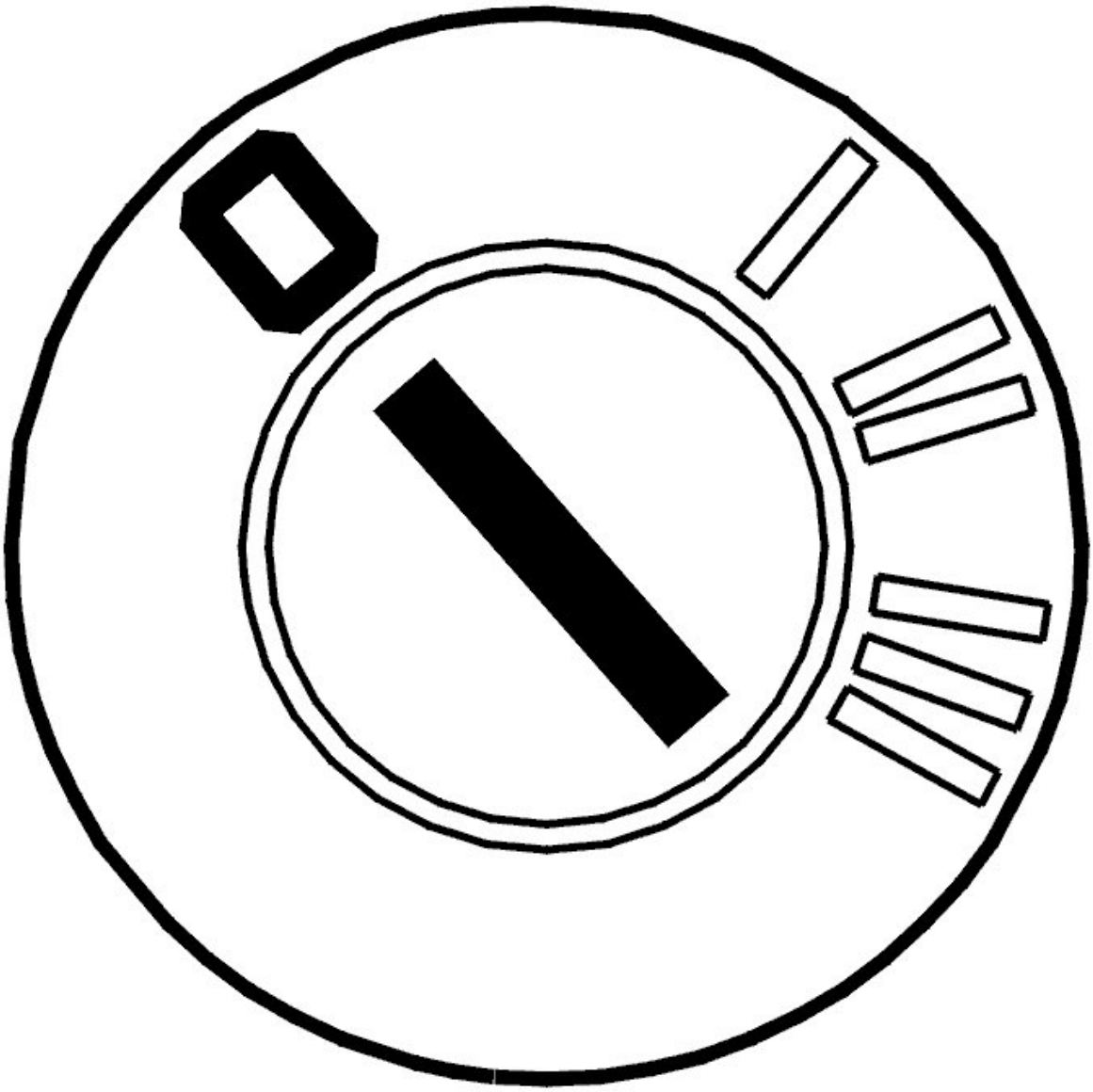
Possible source
- Open-circuit in the cable for the shock absorber
- Fault in one of the solenoids
- Internal fault in the Suspension Module (SUM).

Fault symptom[s]
- General warning lamp lit
- Message in the display.

Non-Approved Value

Non-approved value

Checking components and wiring



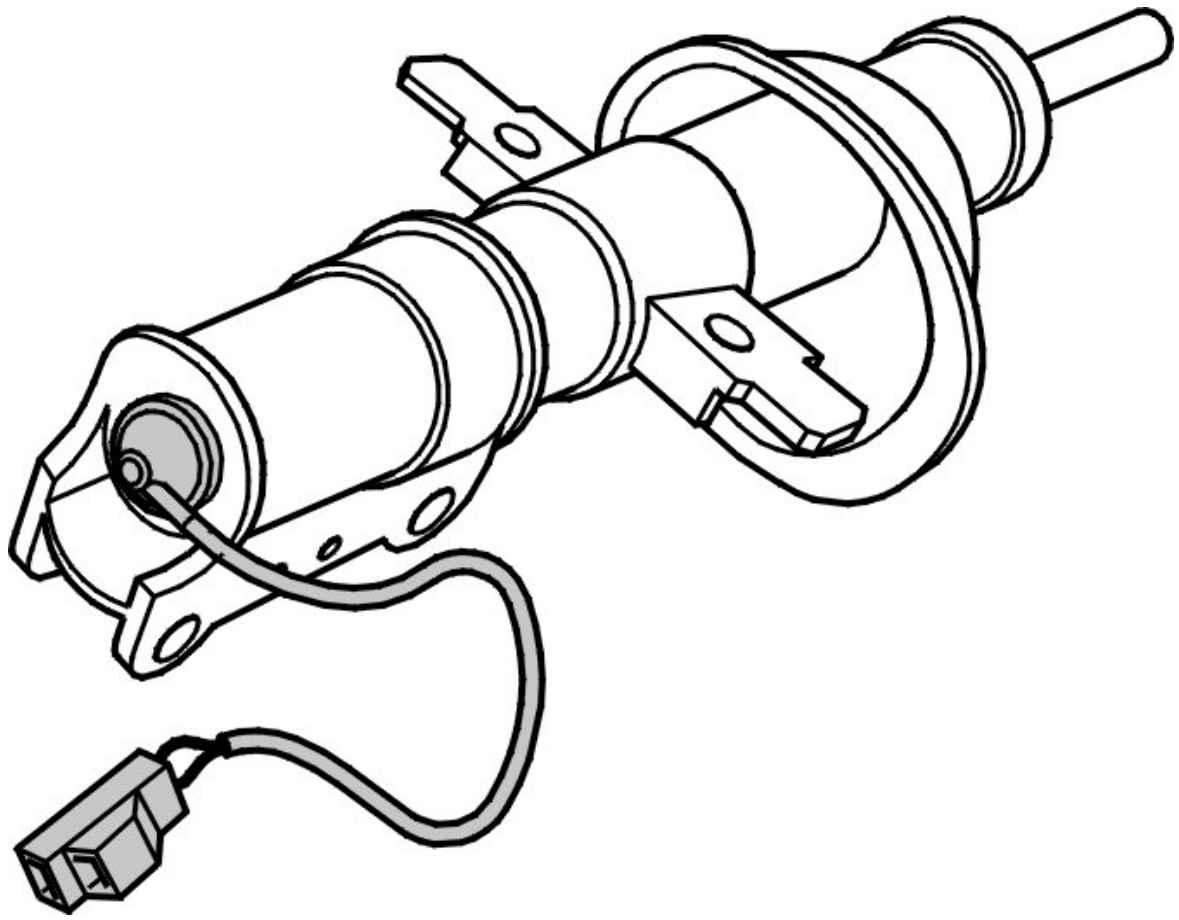
- Ignition off.
- Check the connectors for the Suspension Module (SUM) and the solenoids. Check for contact resistance and oxidation
- Check the wiring between the control module and the solenoids. Check for an open-circuit
- Check that the solenoids are correctly installed.

Remedy as necessary.

After this fault-tracing, the control module must be calibrated according to VIDA vehicle communication. Select Pause. Then save a bookmark so that the fault-tracing can be resumed from this point.

Other information:

- To replace the front solenoid/shock absorber, see Shock absorber front, replacing, M58, M66 AWD, AW50/51 AWD See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Front Suspension/Shock Absorber Front, Replacing
- To replace the rear solenoid/shock absorber, see Spring/shock absorber rear, replacing See: Steering and Suspension/Suspension/Shock Absorber/Service and Repair/Rear Suspension/Spring/Shock Absorber Rear, Replacing
- For information about components, see Component specifications See: Specifications/Electrical Specifications/Suspension Control (Automatic - Electronic Level)
- To connect the breakout box, see Connecting the breakout box See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box, Suspension Module (SUM)
- For information about signals, see Signal specification See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Specification, Suspension Module (SUM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



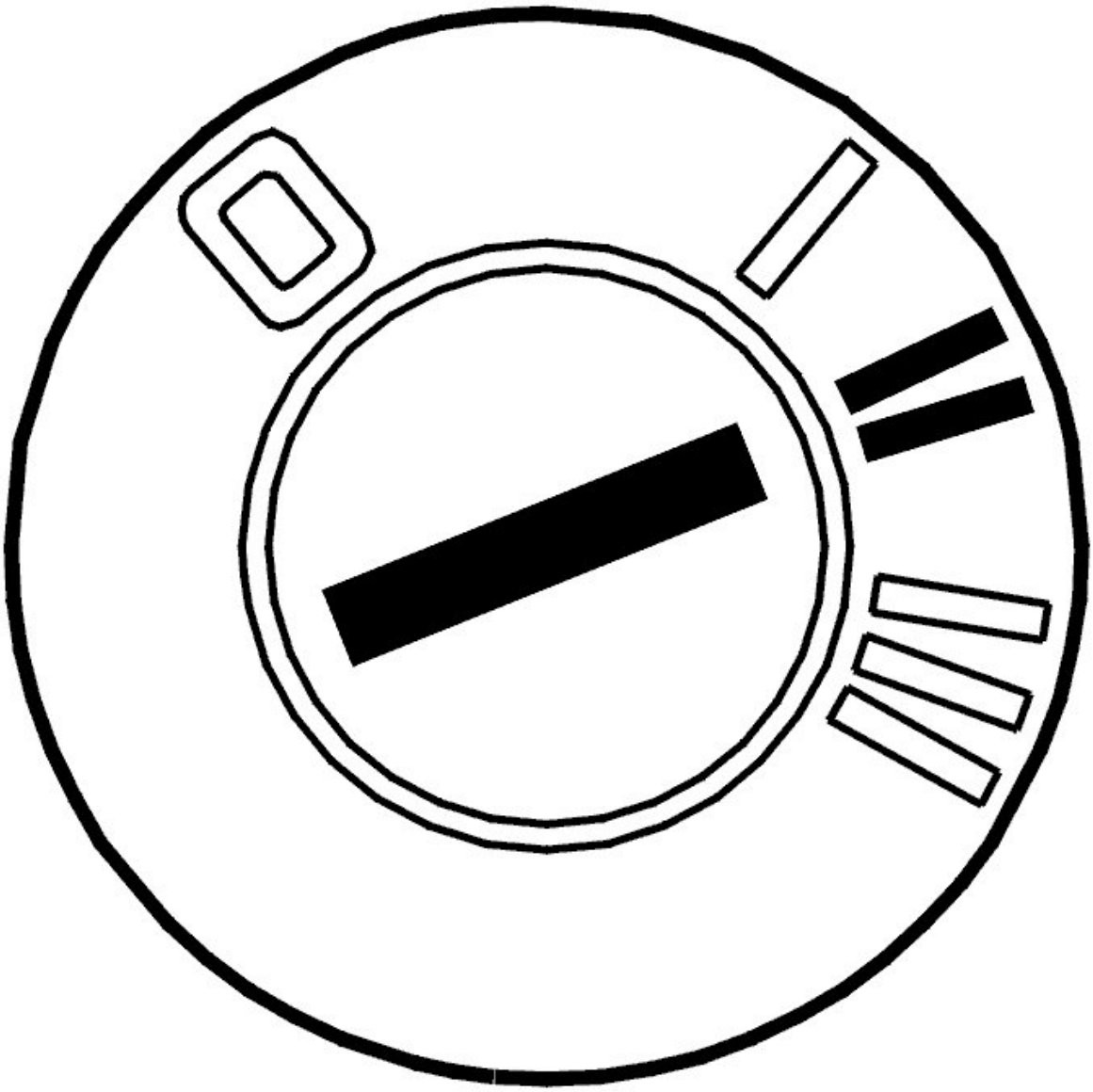
Continue - Verification

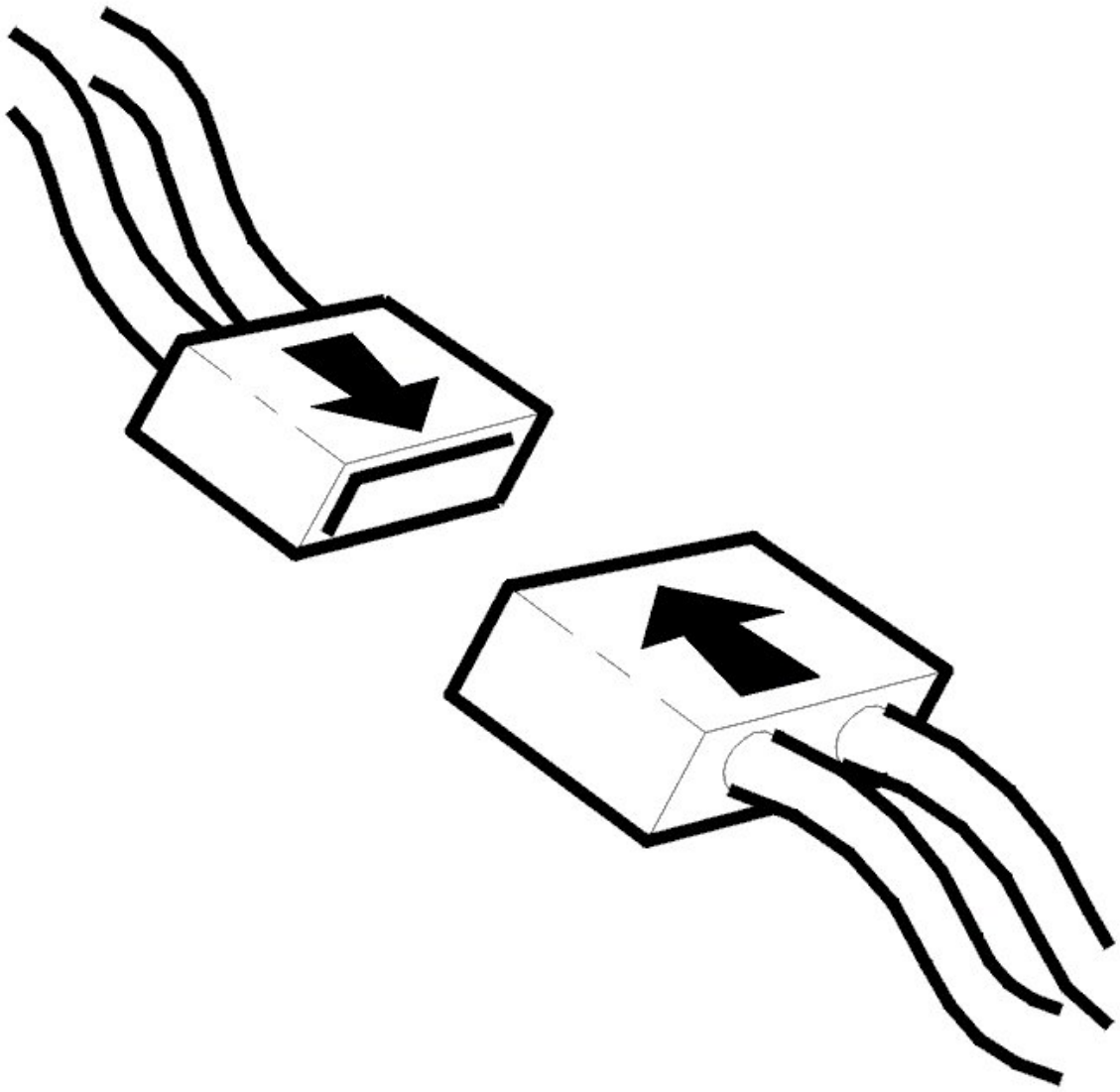
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Read off the status of the diagnostic trouble code (DTC).

Is the status of the diagnostic trouble code (DTC) intermittent?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

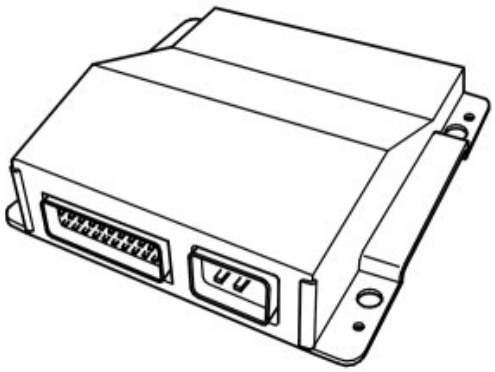
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking components and wiring

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that control module configuration does not correspond to car configuration. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Configuration in the suspension module (SUM) does not correspond to car configuration
- Configuration in the suspension module (SUM) is tailored for another type of vehicle.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Faulty Configuration

Faulty configuration

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion.

Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

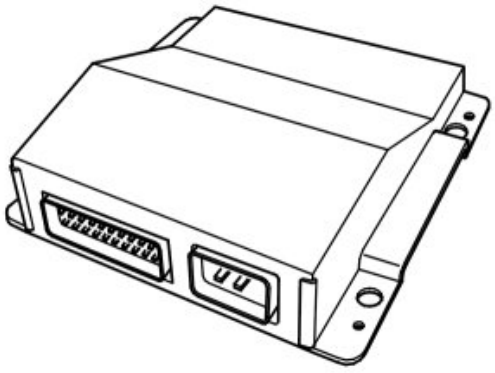
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers an internal software fault. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Software fault.

Fault symptom[s]
- None.

Internal Fault

Internal fault

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

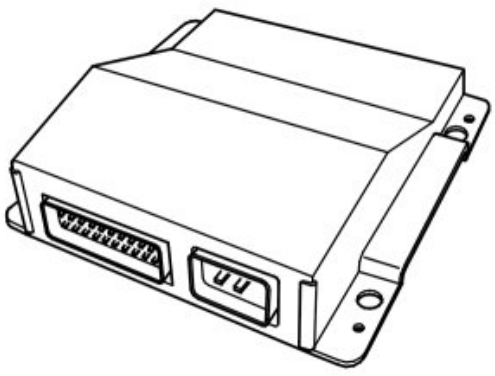
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers an internal software fault. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Software fault.

Fault symptom[s]
- None.

Internal Fault

Internal fault

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

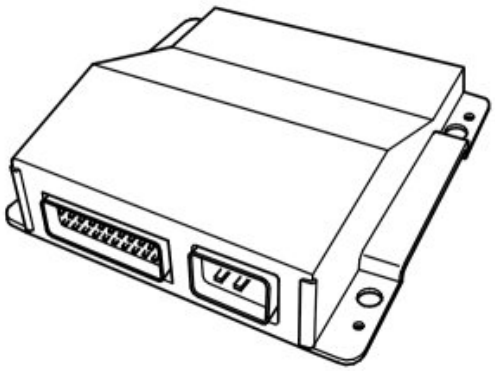
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers an internal software fault. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Software fault.

Fault symptom[s]
- None.

Internal Fault

Internal fault

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Reloading software

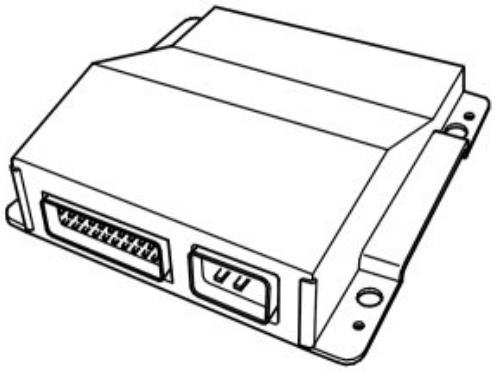
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers an internal software fault. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Software fault.

Fault symptom[s]
- None.

Internal Fault

Internal fault

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.

The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

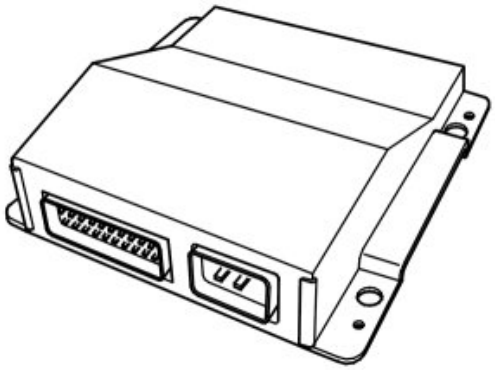
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the software and control module are not compatible. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- The software and suspension module (SUM) are not compatible.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Faulty Configuration

Faulty configuration

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules -

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

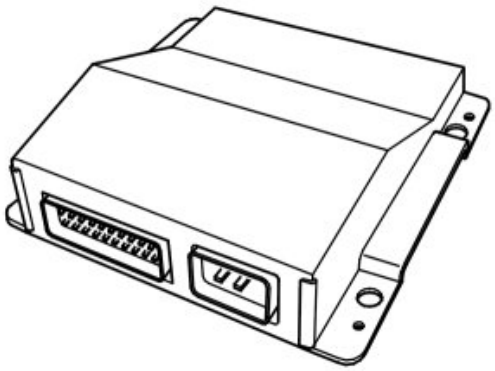
Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the software and control module are not compatible. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- The software and suspension module (SUM) are not compatible.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

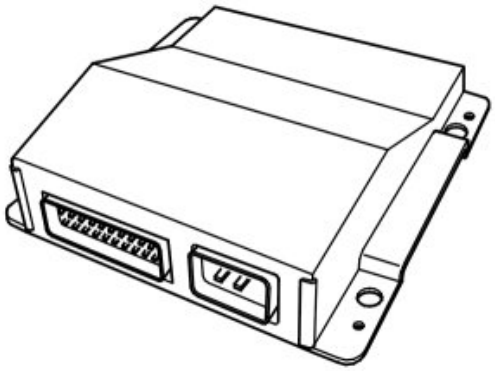
Configuration Fault

Configuration fault

Downloading software

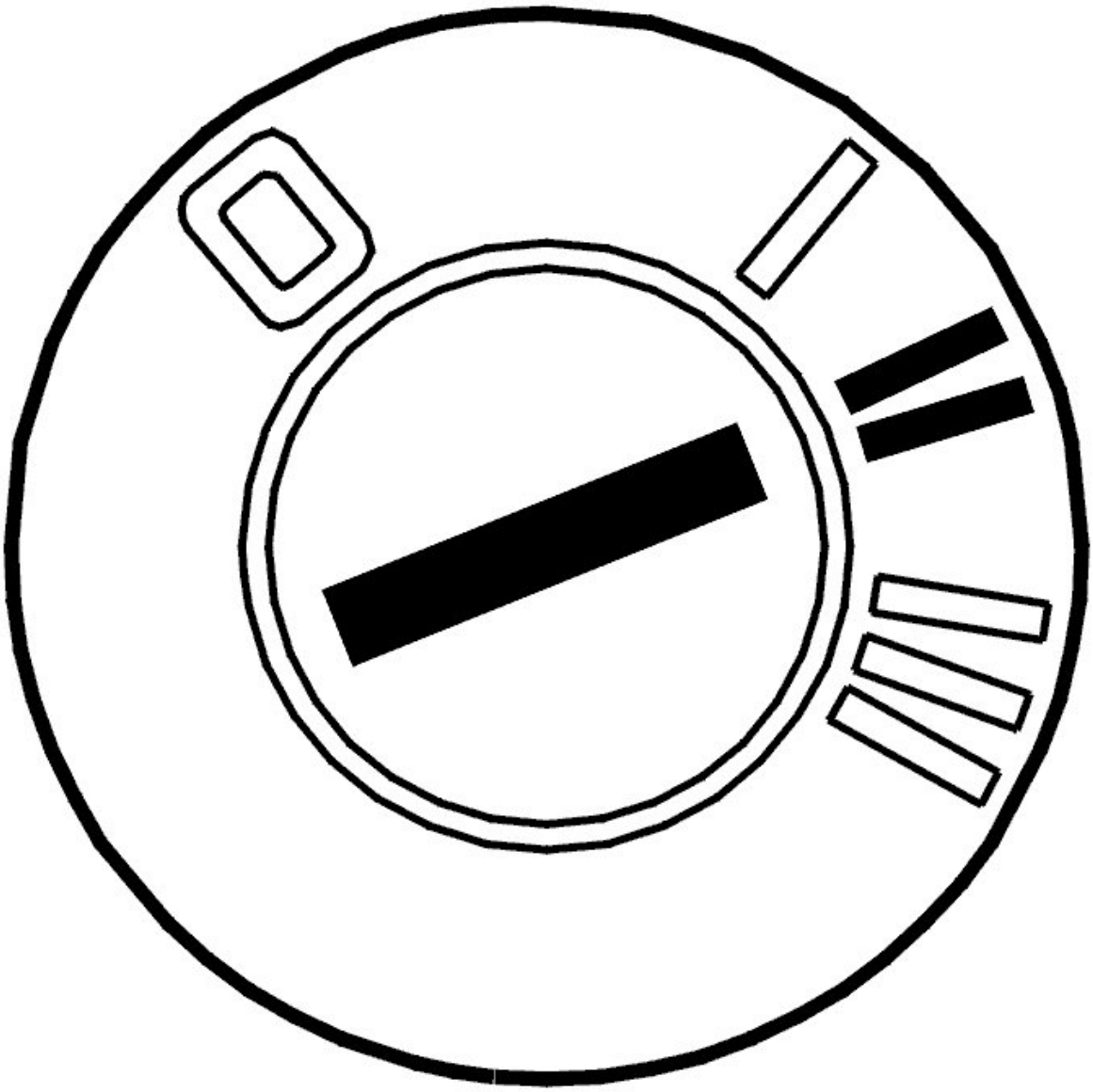
- Save a bookmark and cancel the fault-tracing. Then go to the software manager and download the correct software. Then resume the fault-tracing.

Note! After downloading the software, the Suspension Module (SUM) must be calibrated according to VIDA vehicle communication.

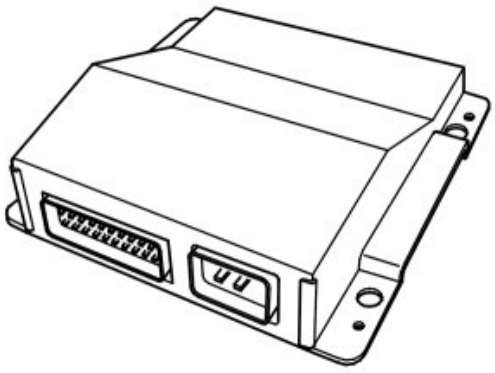


Continue - Reading off diagnostic trouble codes (DTCs)

Reading off diagnostic trouble codes (DTCs)



- Ignition off
- Wait approximately 15 seconds
- Ignition on
- Read off diagnostic trouble codes (DTCs).



Is diagnostic trouble code (DTC) SUM-0261 stored?

Yes - Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

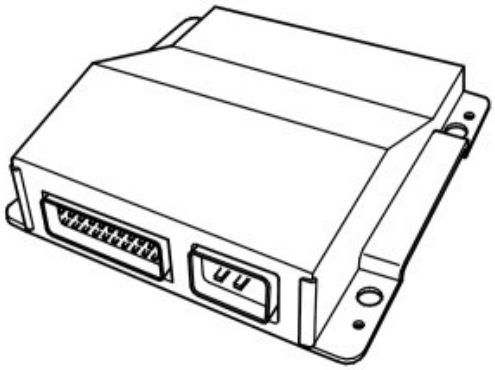
Attempt New Test - Downloading software

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



During the first ignition cycle, the Suspension Module (SUM) reads the vehicle configuration data from the central electronic module (CEM). Diagnostic trouble code (DTC) SUM-0262 may be stored if:

- a control module is installed that has previously been used in another car
- software for another model has been downloaded into the Suspension Module (SUM)
- a central electronic module (CEM) is installed that has previously been used in another car.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source

- A Suspension Module (SUM) from another model has been installed
- Software for another model has been downloaded into the Suspension Module (SUM)
- A central electronic module (CEM) from another model has been installed.

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Fault symptom[s]

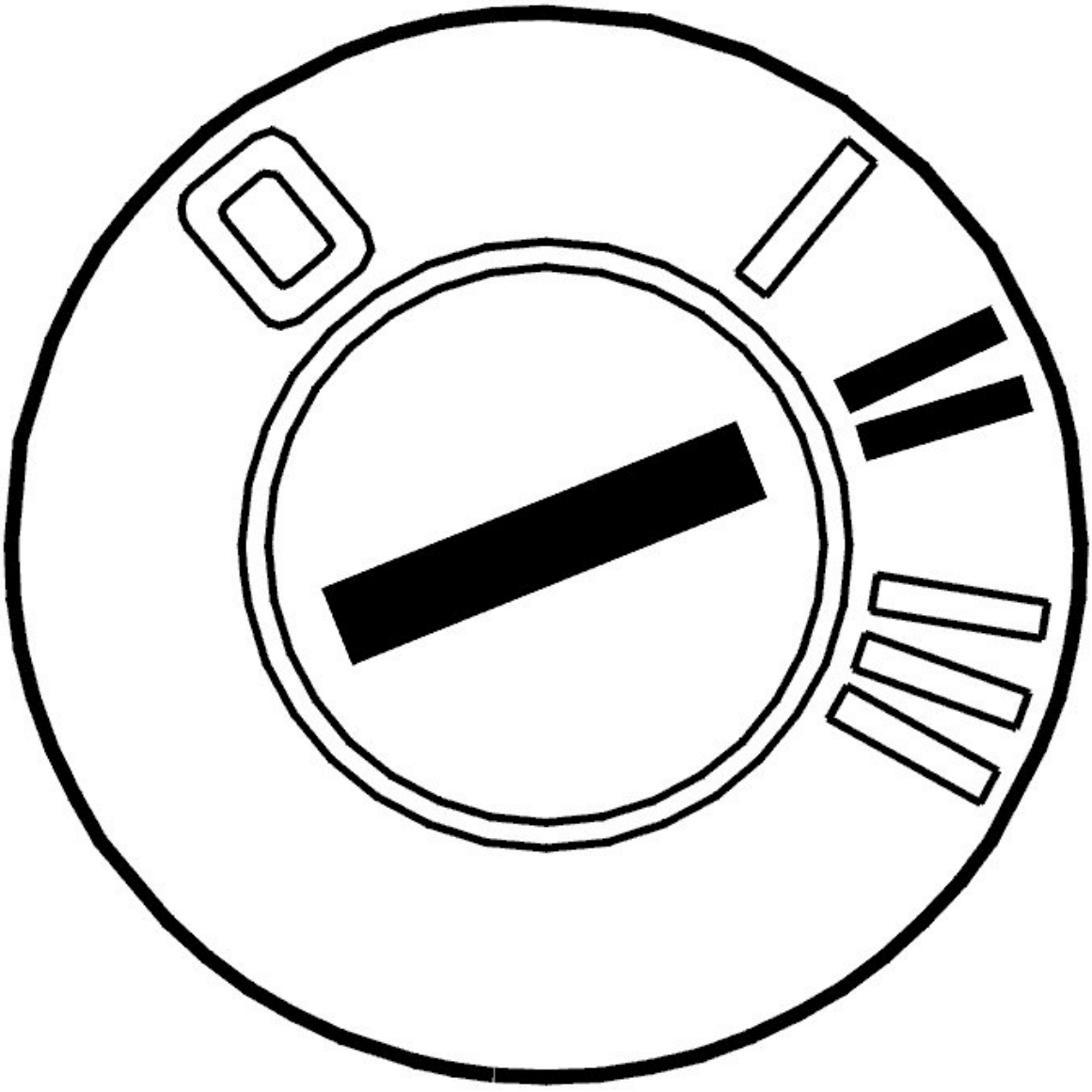
- General warning lamp lit
- Message in the display.

Configuration Fault

Configuration fault

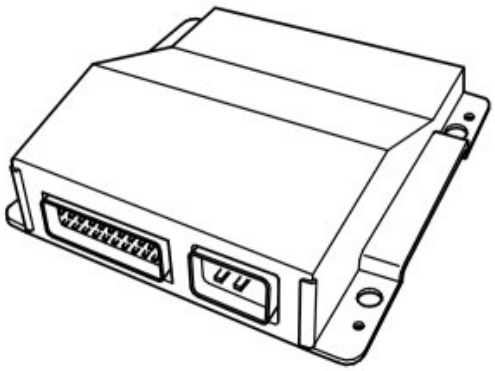
Checking diagnostic trouble codes (DTCs) in the central electronic module (CEM)

Note! If the central electronic module (CEM) is incorrectly configured, it may affect the Suspension Module (SUM). If diagnostic trouble codes (DTCs) are stored in the central electronic module (CEM), the central electronic module (CEM) must be fault-traced first.



- Ignition on
- Read off diagnostic trouble codes (DTCs) from the Central Electronic Module (CEM).

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

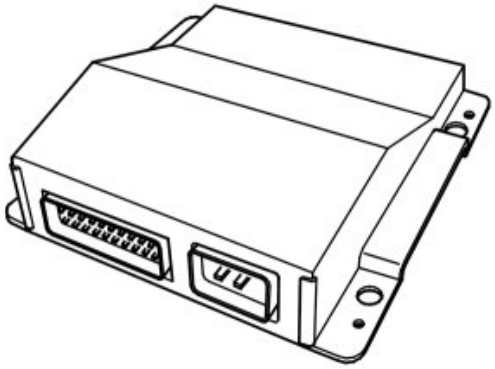


Are diagnostic trouble codes (DTCs) stored in the central electronic module (CEM)?

Yes - DONE

No - Checking the control module

Checking the control module



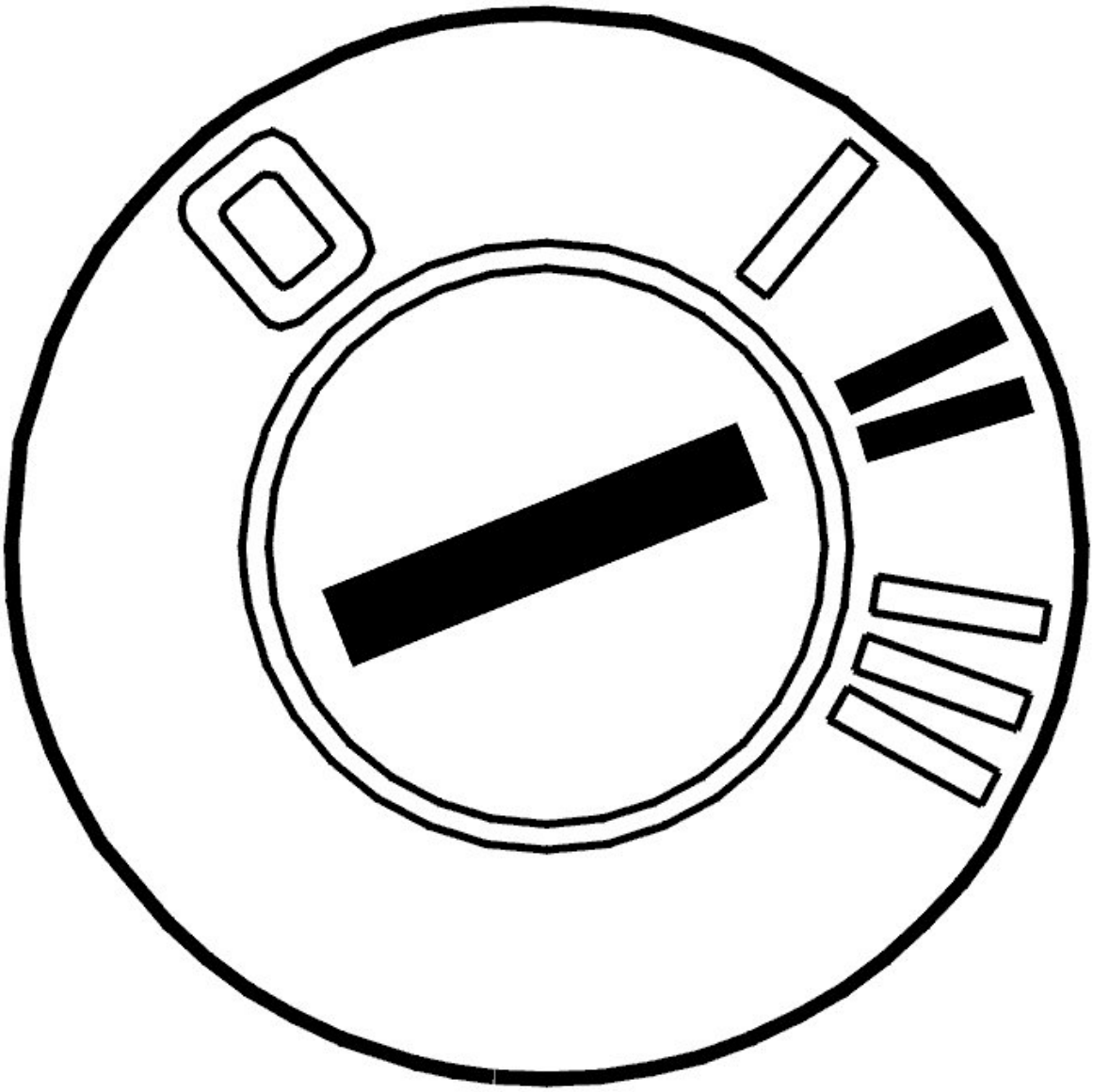
Note! Diagnostic trouble code (DTC) SUM-0262 may be stored if the Suspension Module (SUM) has previously been installed in another car.

Was the Suspension Module (SUM) previously installed in another car?

Yes - Checking the control module

No - Downloading software

Checking the control module

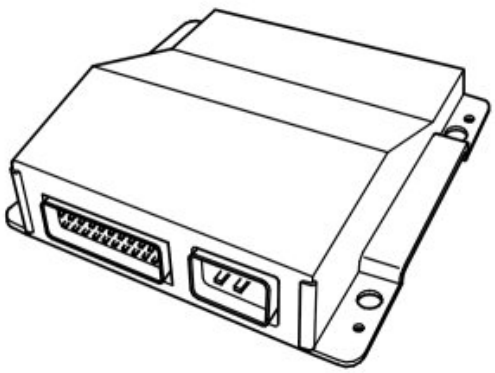


- Check that the P/N of the control module corresponds to the number in the replacement parts catalogue. If the P/N does not match the replacement parts catalogue, replace the control module. Download new software into the control module if the P/N matches the replacement parts catalogue. Select Pause. Save this page as a bookmark and cancel the fault-tracing. Then go to the software manager and download the correct software. Then resume the fault-tracing

Note! After downloading the software, the Suspension Module (SUM) must be calibrated according to VIDA vehicle communication.

Select an option:

1. Incorrect control module P/N
2. New software downloaded.



1 - **DONE**

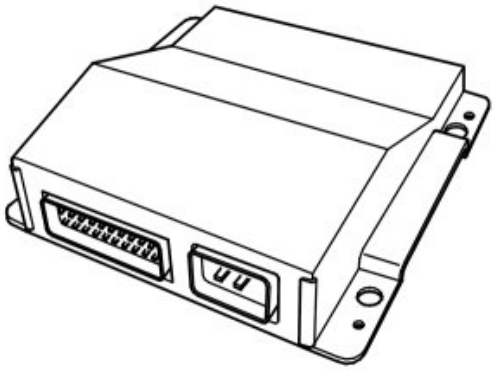
2 - Reading off diagnostic trouble codes (DTCs)

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Downloading software

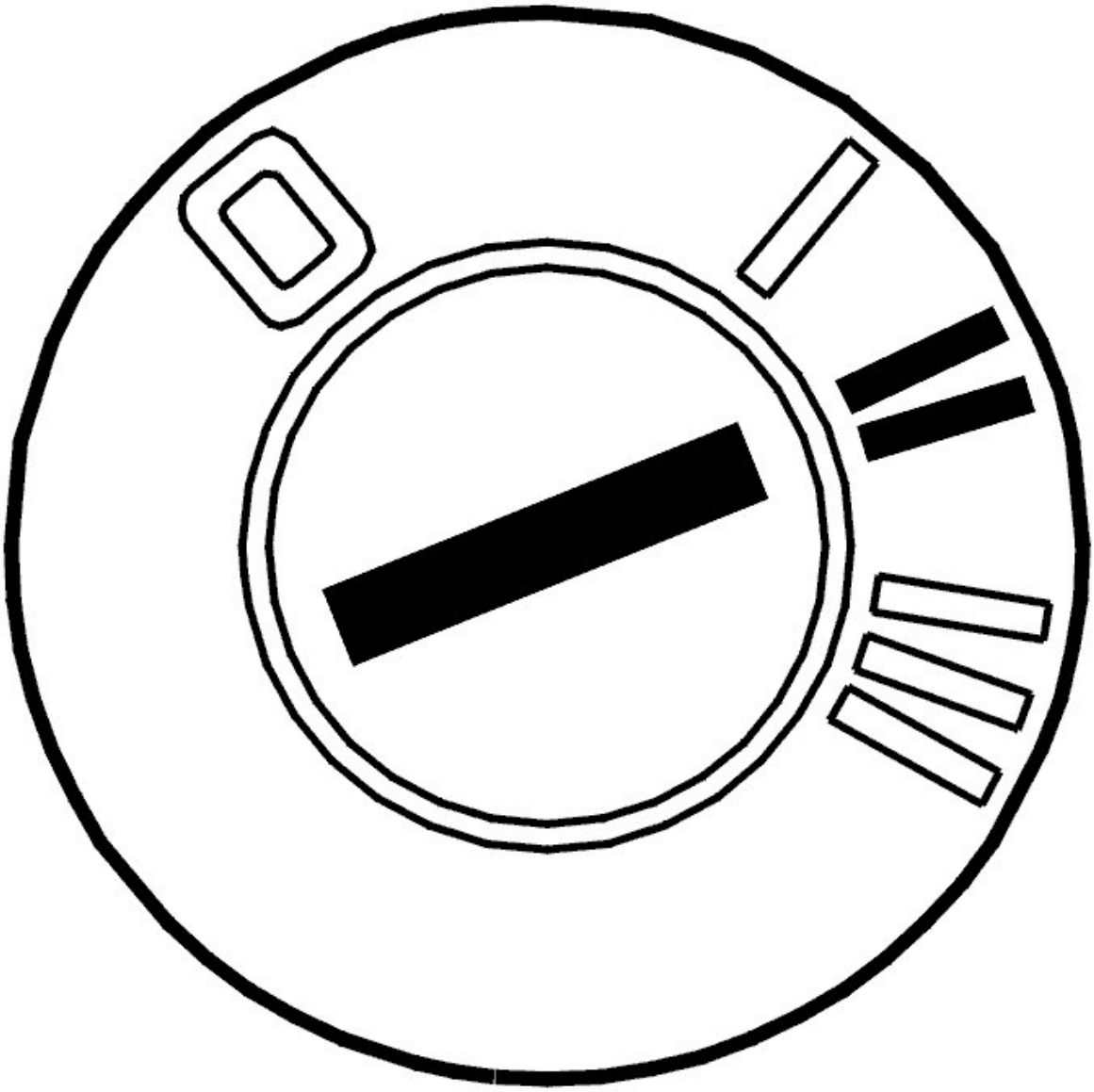
- Save a bookmark and cancel the fault-tracing. Then go to the software manager and download the correct software. Then resume the fault-tracing

Note! After downloading the software, the Suspension Module (SUM) must be calibrated according to VIDA vehicle communication.



Continue - Reading off diagnostic trouble codes (DTCs)

Reading off diagnostic trouble codes (DTCs)



- Ignition off
- Wait approximately 15 seconds
- Ignition on

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- Read off diagnostic trouble codes (DTCs).

Is diagnostic trouble code (DTC) SUM-0262 stored?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

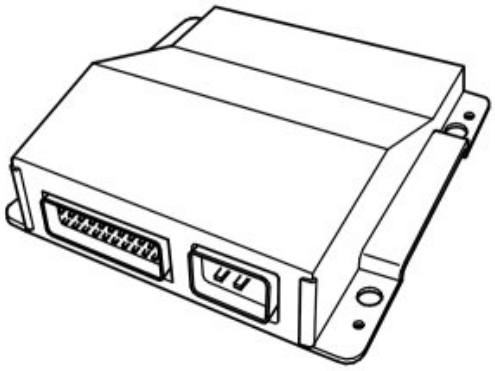
Attempt New Test - Checking diagnostic trouble codes (DTCs) in the central electronic module (CEM)

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the suspension module (SUM) registers that the software and control module are not compatible. The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

- Four-C (Continuously Controlled Chassis Concept) control is switched off.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- The software and suspension module (SUM) are not compatible.

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C (Continuously Controlled Chassis Concept) does not work.

Faulty Configuration

Faulty configuration

Reloading software

The suspension module (SUM) has registered an internal fault. If the fault is intermittent, the fault has been registered on a previous occasion. Intermittent faults may be caused by interference at start up of the control module.
The fault can occur on different occasions. The software may need to be reloaded. To reload software, see "Suspension module (SUM), replacing".

Other information:
- Suspension module (SUM), replacing See: Relays and Modules/Relays and Modules - Steering and Suspension/Relays and Modules - Suspension/Suspension Control Module/Service and Repair

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Reloading software

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0322 is stored if there is a fault in the communication between the Suspension Module (SUM) and the central electronic module (CEM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective central electronic module (CEM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0324 is stored if there is a fault in the communication between the Suspension Module (SUM) and the brake control module (BCM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective brake control module (BCM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0326 is stored if there is a fault in the communication between the Suspension Module (SUM) and the Engine Control Module (ECM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective engine control module (ECM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0327 is stored if there is a fault in the communication between the Suspension Module (SUM) and the Steering Wheel Angle Sensor Module (SAS).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective Steering Wheel Angle Sensor Module (SAS).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0328 is stored if there is a fault in the communication between the Suspension Module (SUM) and the Climate Control Module (CCM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective climate control module (CCM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0332 is stored if there is a fault in the communication between the Suspension Module (SUM) and the central electronic module (CEM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective central electronic module (CEM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).

For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0334 is stored if there is a fault in the communication between the Suspension Module (SUM) and the brake control module (BCM).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective brake control module (BCM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0336 is stored if there is a fault in the communication between the Suspension Module (SUM) and the Engine Control Module (ECM)

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective engine control module (ECM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) SUM-0337 is stored if there is a fault in the communication between the Suspension Module (SUM) and the Steering Wheel Angle Sensor Module (SAS).

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value

Four-C control is switched off.

Possible source
- Communication problems in the CAN network
- Defective Suspension Module (SUM)
- Defective Steering Wheel Angle Sensor Module (SAS).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Fault-Tracing Information

Fault-tracing information

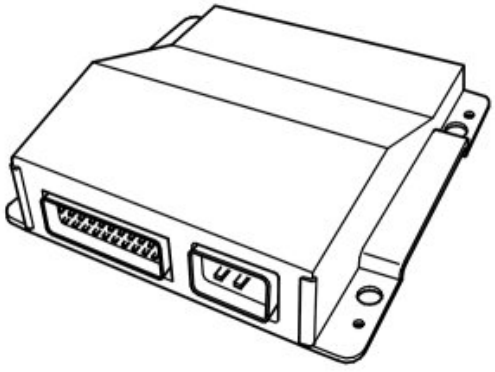
Information

There is no fault-tracing for this diagnostic fault code (DTC).
For further information on this diagnostic trouble code, see Diagnostic trouble code (DTC) information.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The control modules in the car communicate with each other in a network via a standardized serial communication interface - Controller Area Network (CAN) - to exchange information. Diagnostic trouble code (DTC) SUM-E000 is stored if the Suspension Module (SUM) registers that there is no CAN communication.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- CAN communication is disabled
- Four-C control is blocked.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Contact resistance in the terminals
- Open-circuit in one or both signal cables
- Short-circuit to ground, voltage or each other in one or both signal cables
- Defective Suspension Module (SUM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

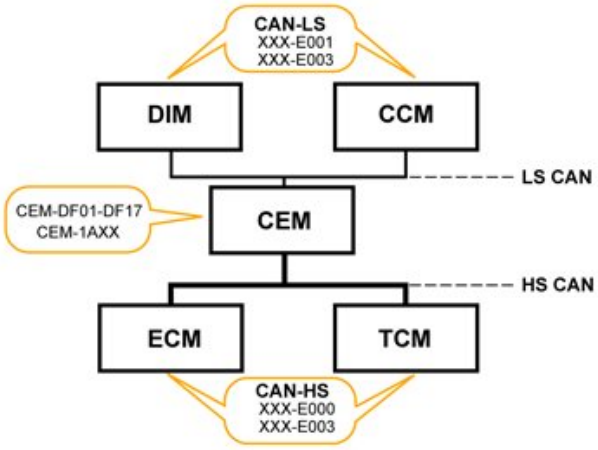
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

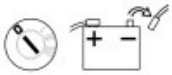
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

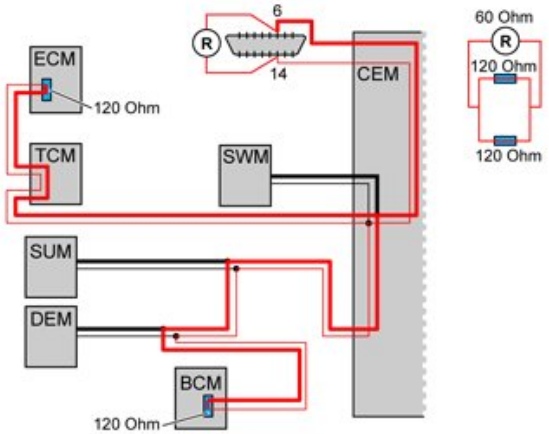
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

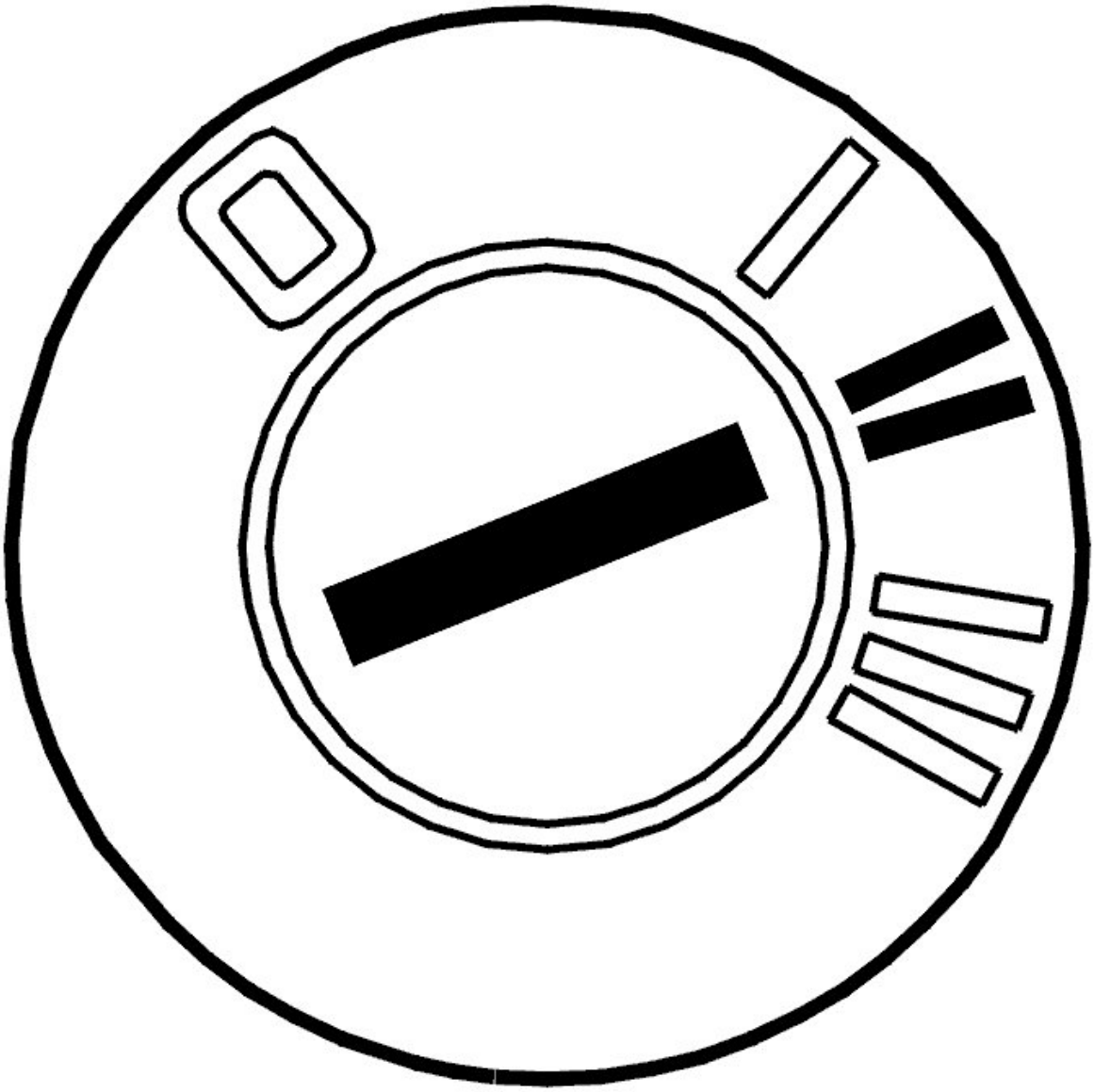


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

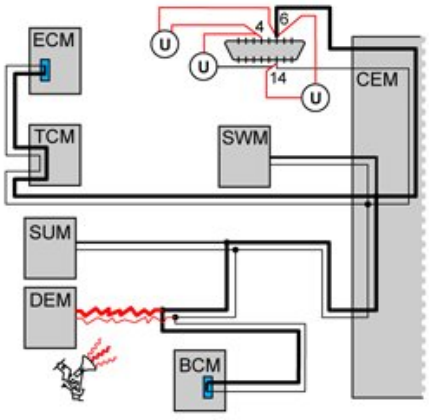
Note! Certain interference may occur without any real fault!

Cable fault
- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

"Chatting" control modules
- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



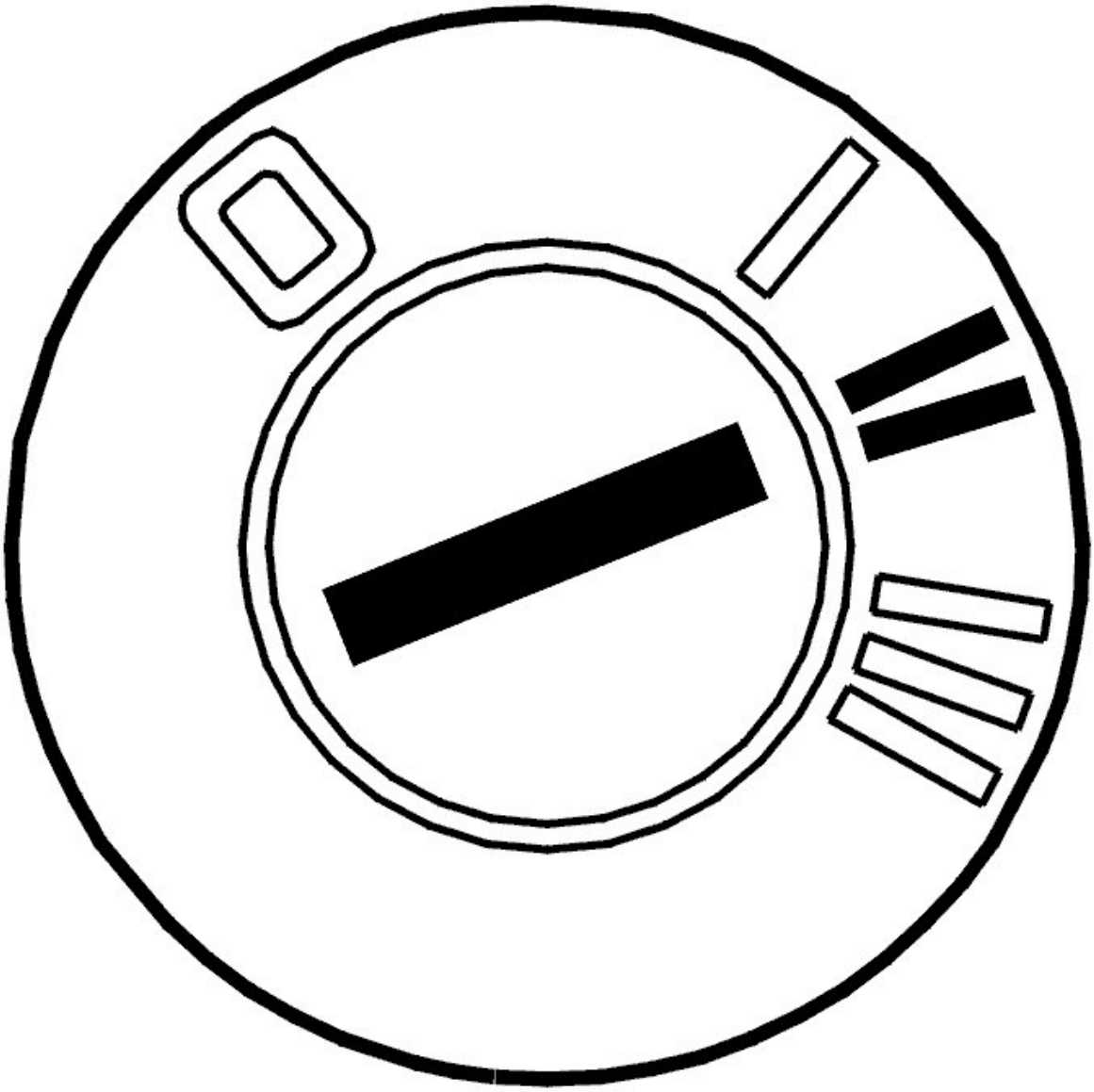
Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections

on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

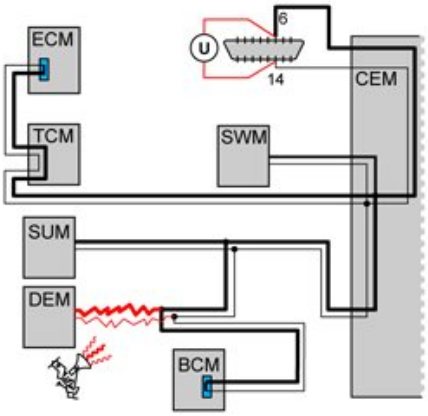
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

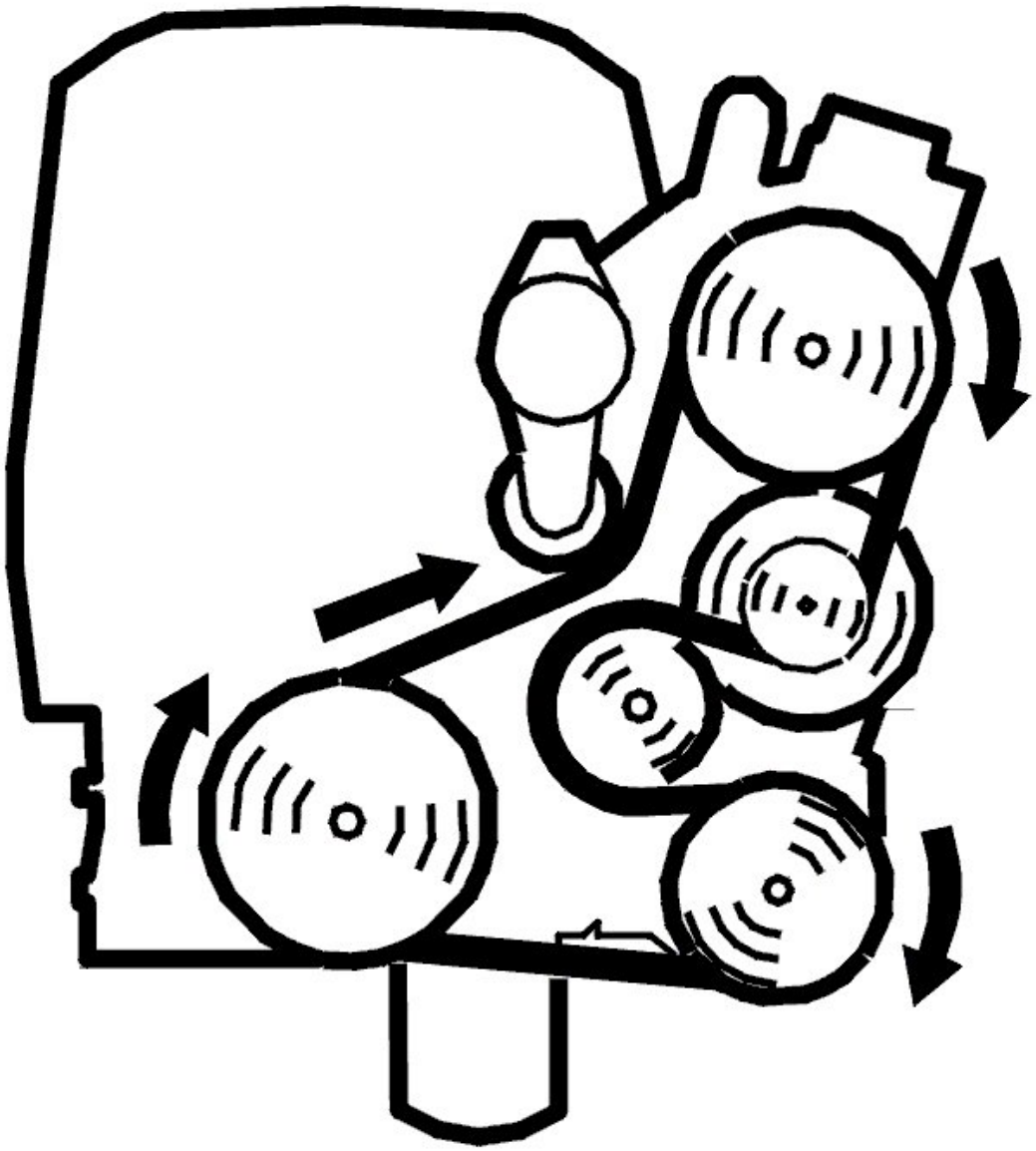
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

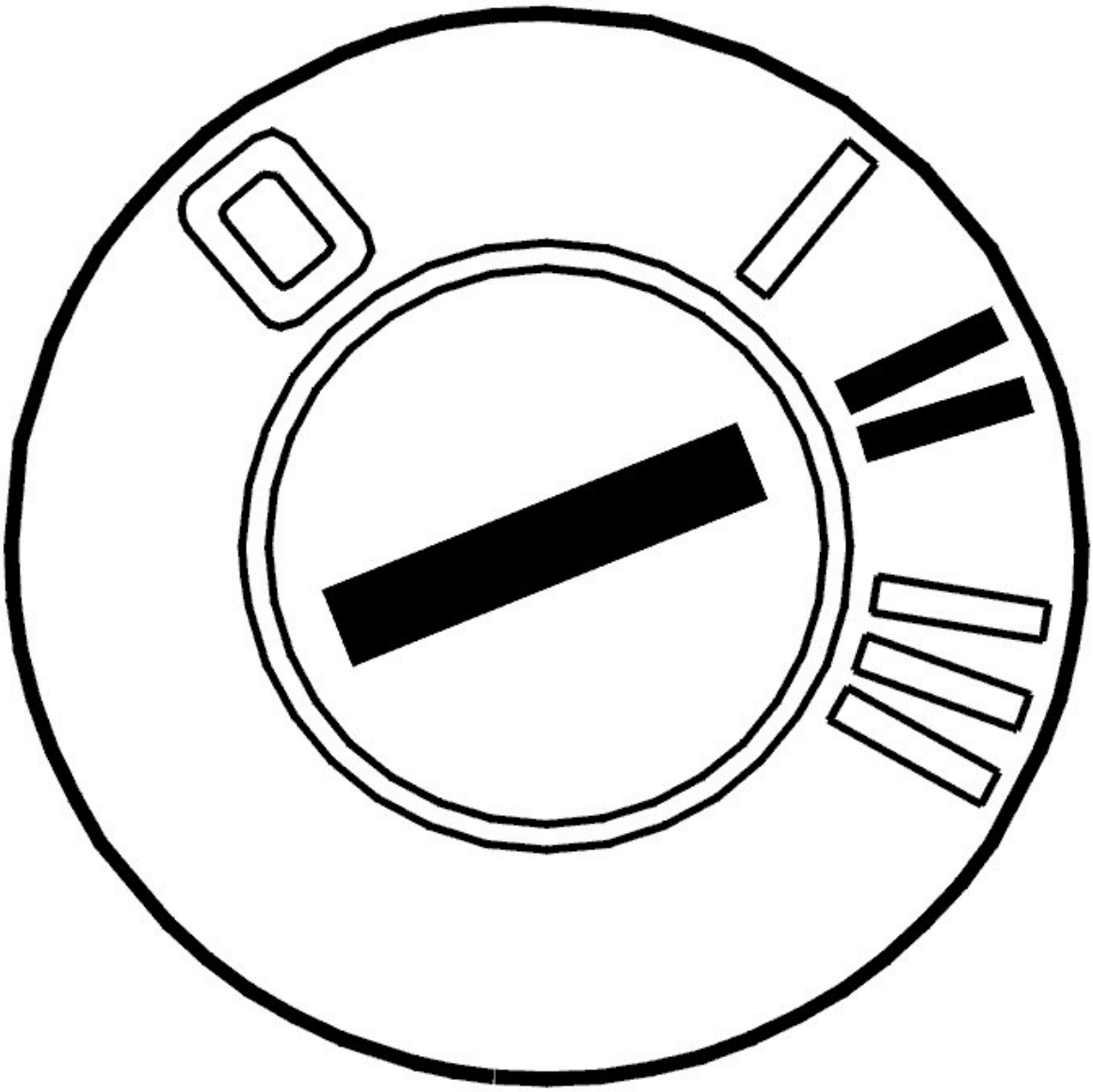


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

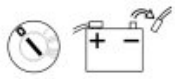
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

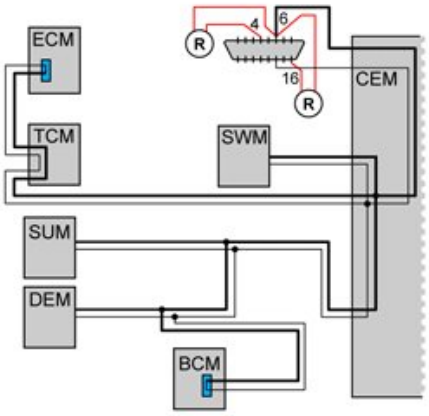
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

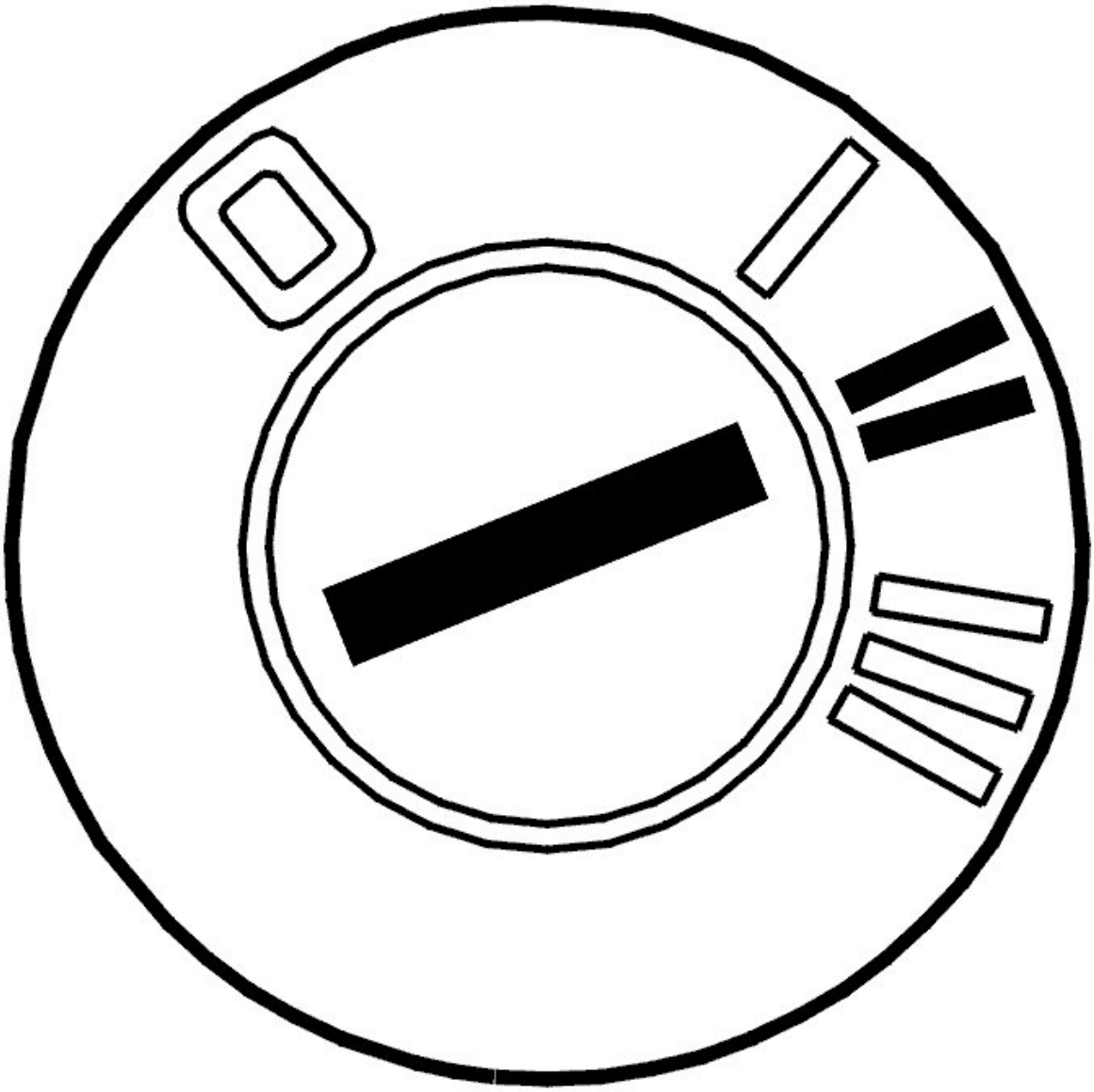


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

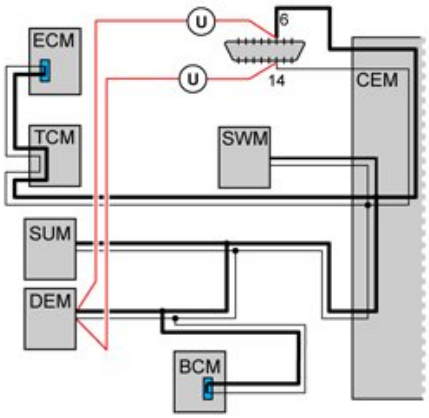
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



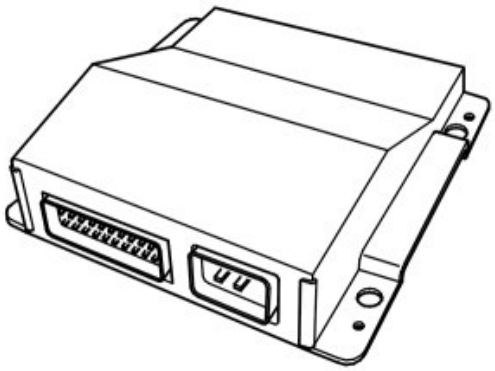
Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



The control modules in the car continually transmit and receive information over the CAN (Controller Area Network) data network. Diagnostic trouble code (DTC) SUM-E003 is stored if the Suspension Module (SUM) registers that the network configuration ID is incorrect.

Note! The test is carried out every other operating cycle. The Suspension module (SUM) defines an operating cycle as ignition on and ignition off.

Substitute value
- Four-C control is blocked.

Hint: For information about abbreviations, see Suspension system, abbreviations See: Steering and Suspension/Suspension/Description and Operation.

Possible source
- Fault in the signal database between the Suspension Module (SUM) and the Central Electronic Module (CEM).

Fault symptom[s]
- General warning lamp lit
- Message in the display
- Four-C does not work.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

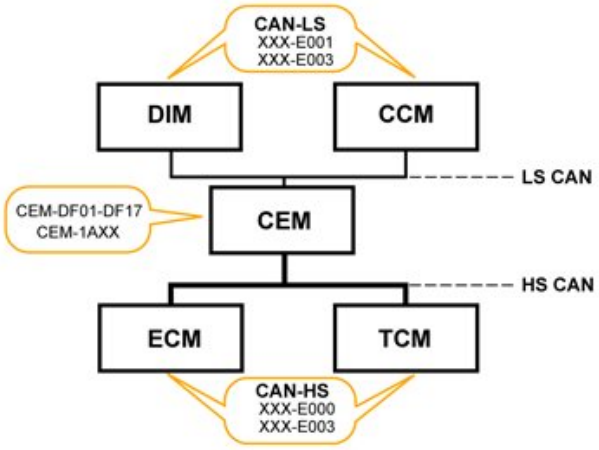
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module

cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

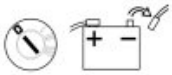
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

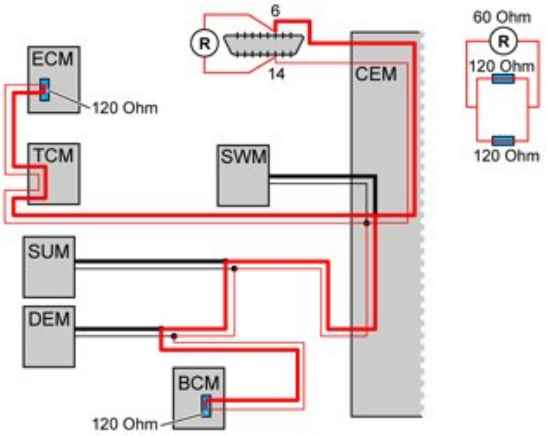
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

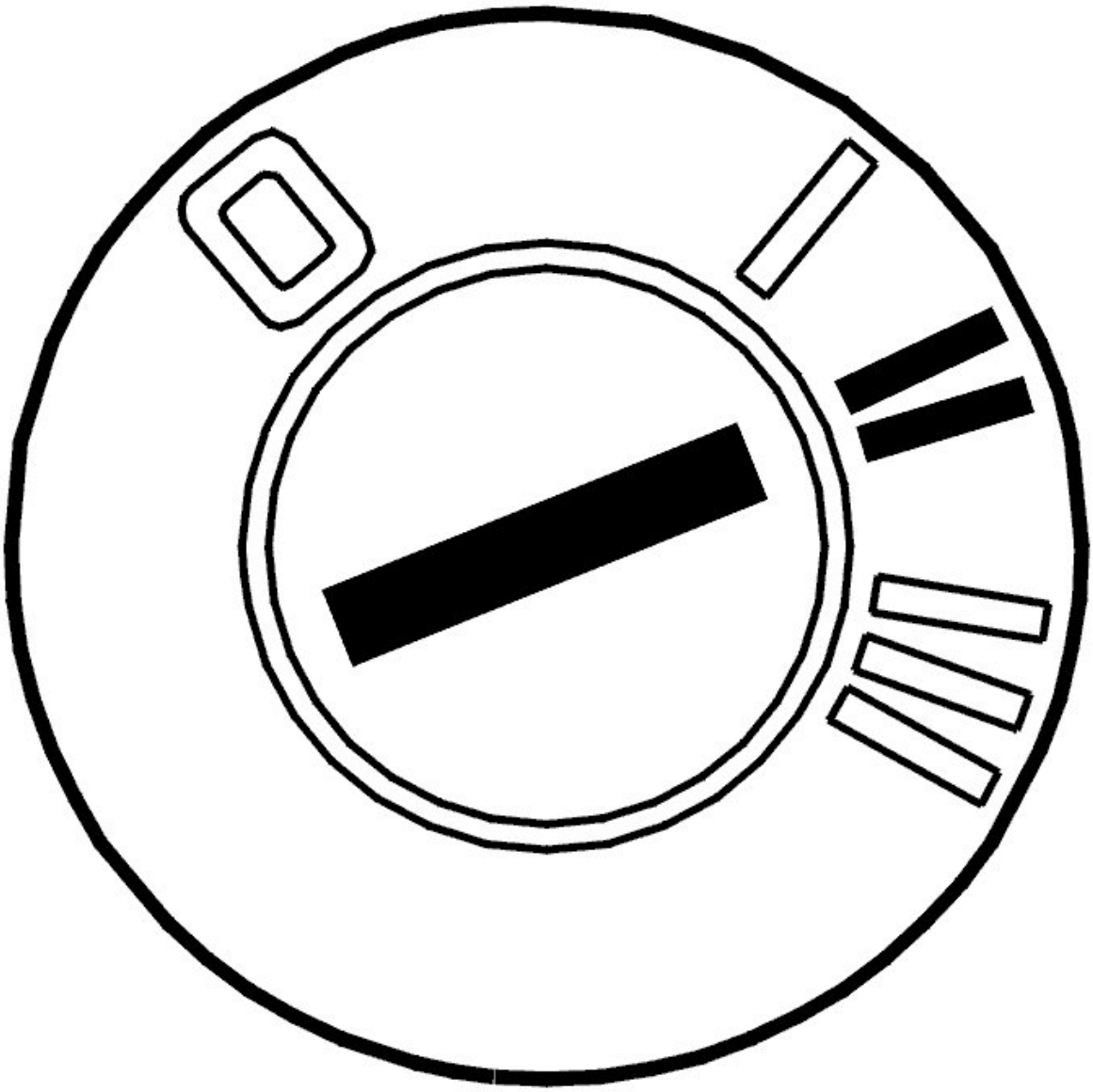


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

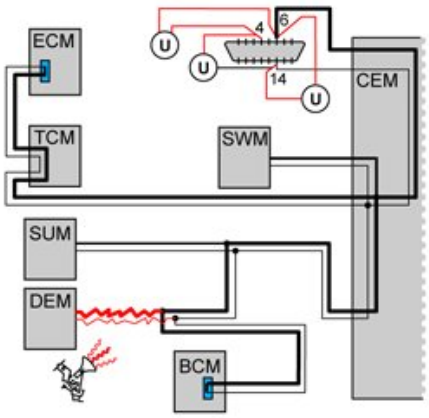
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

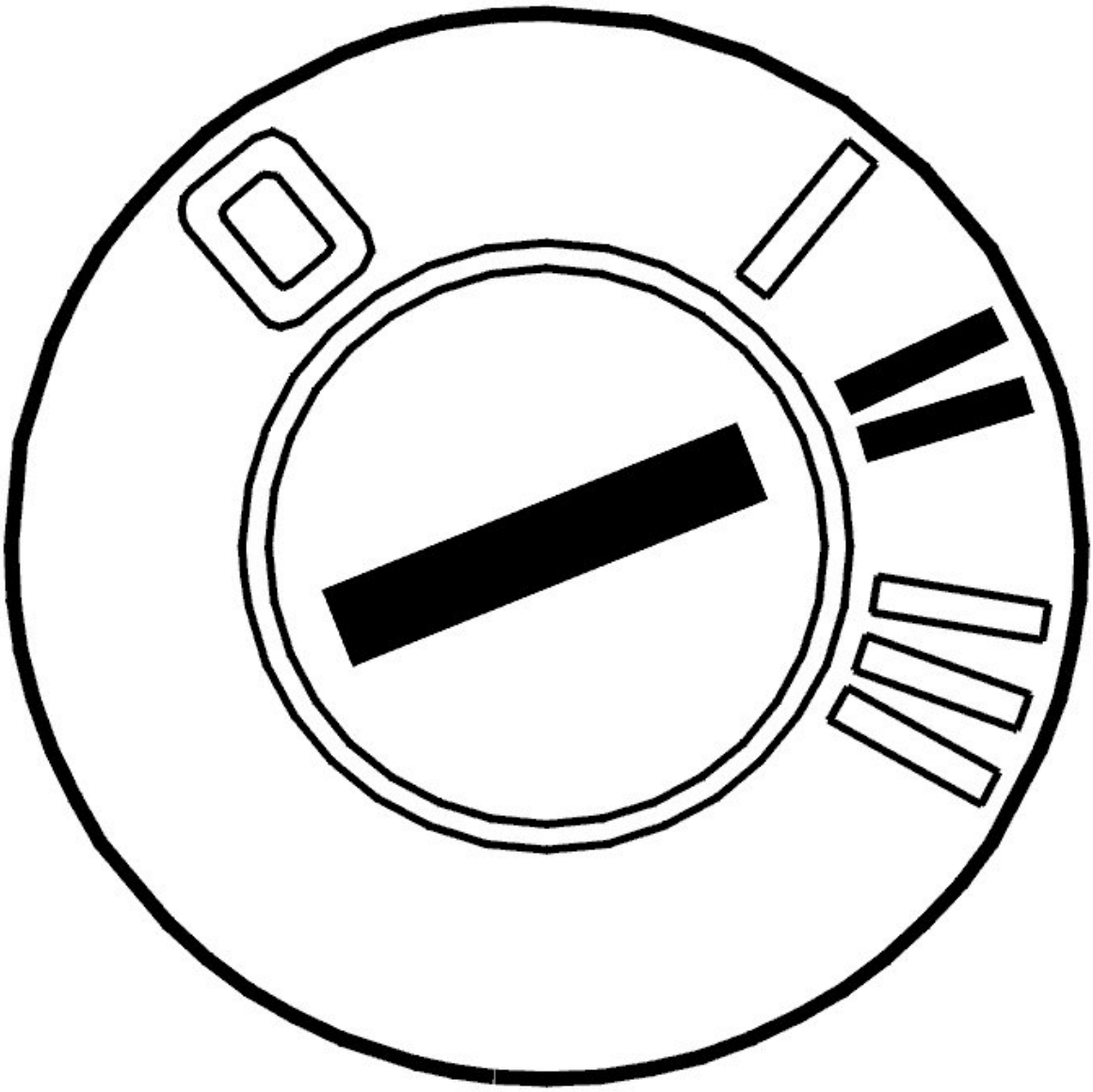


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

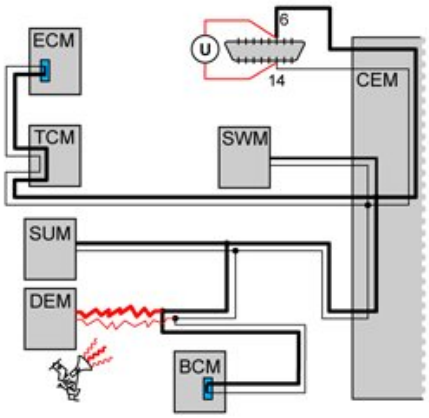
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

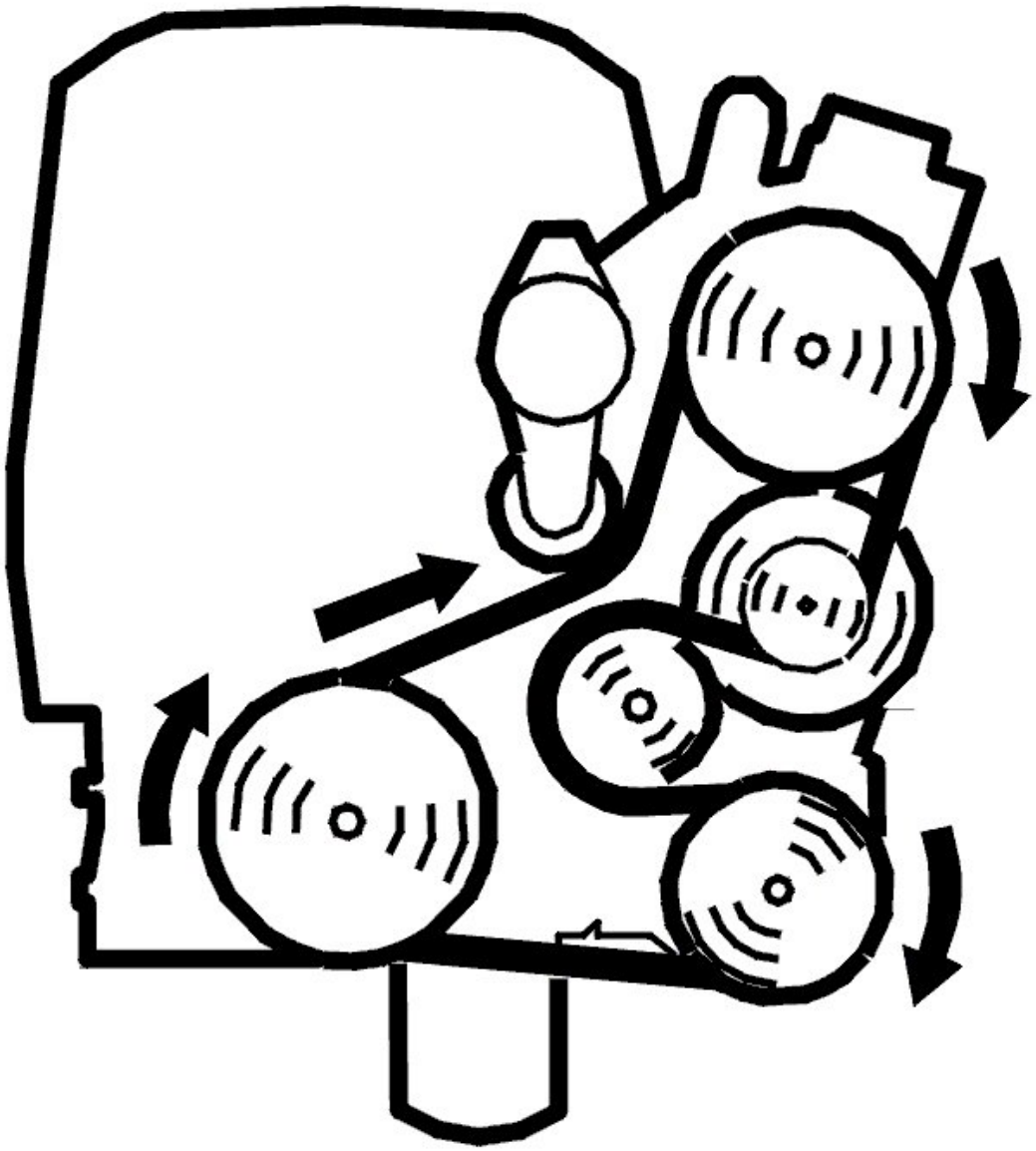
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

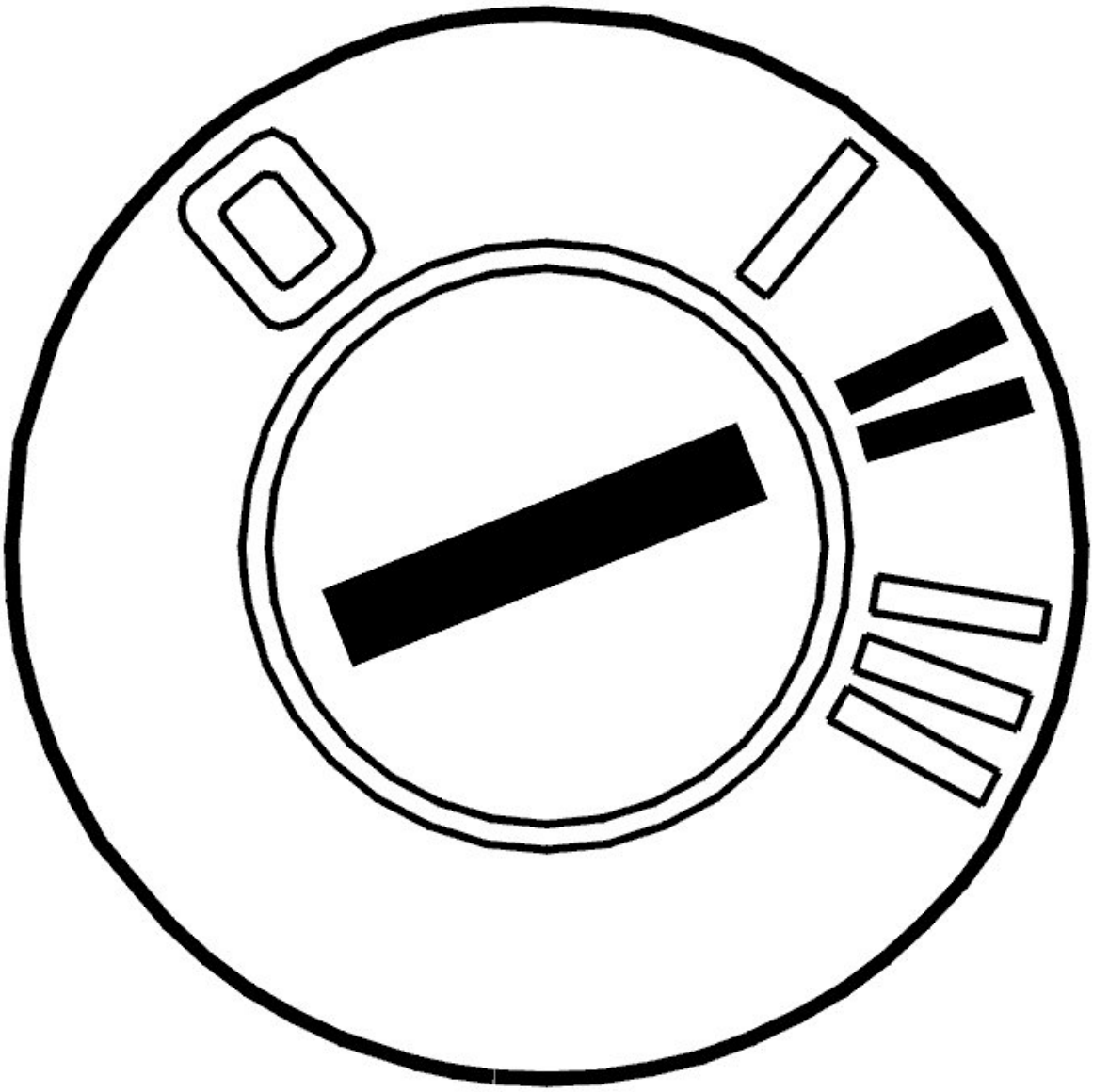


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

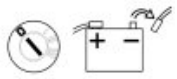
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

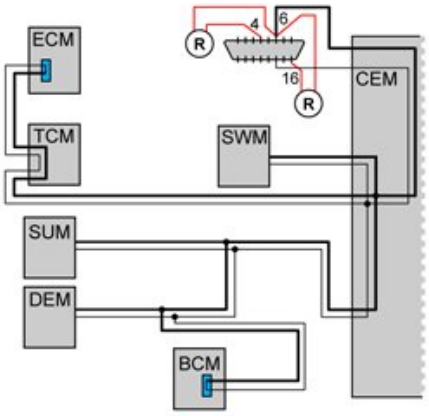
Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

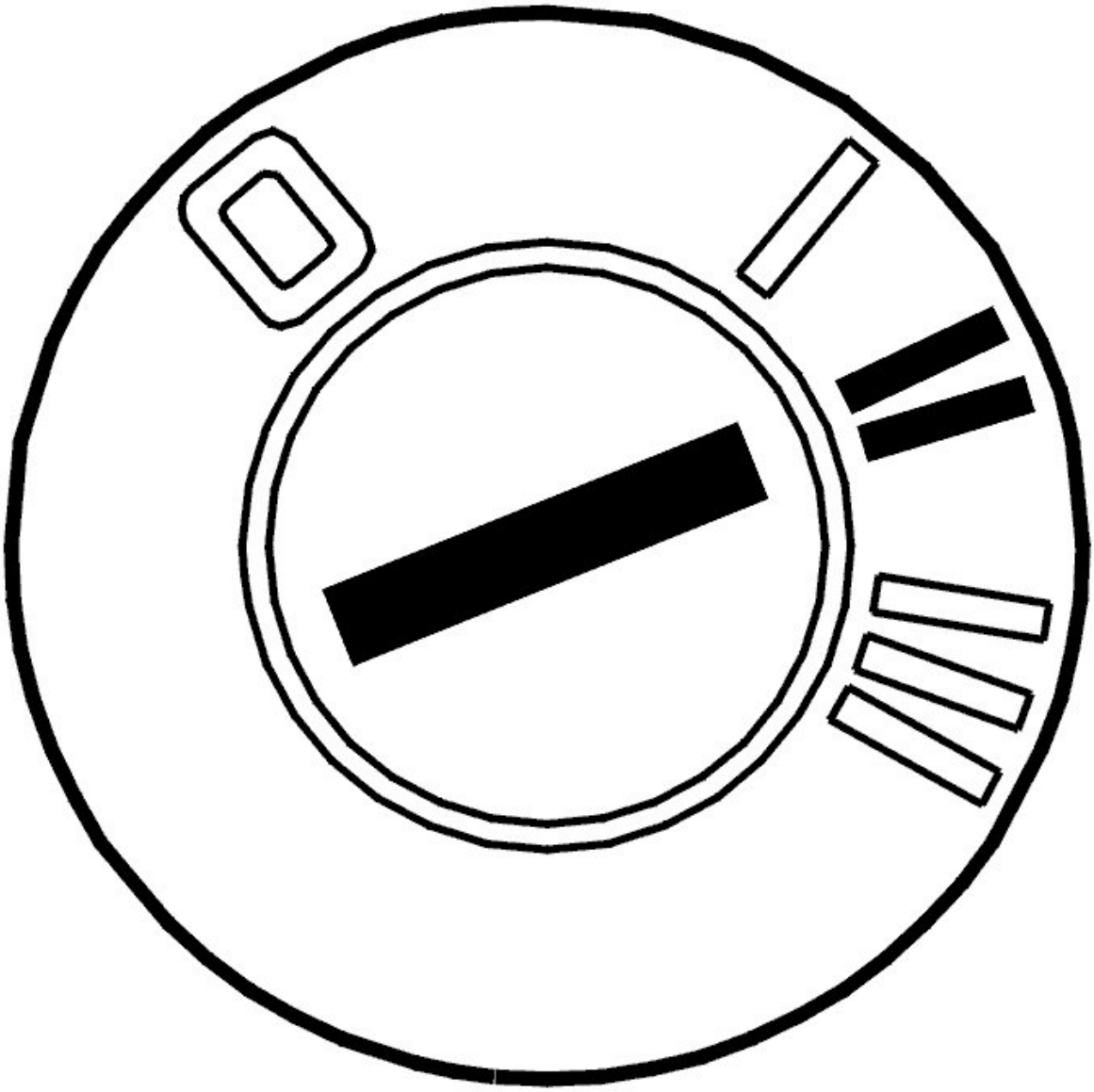


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

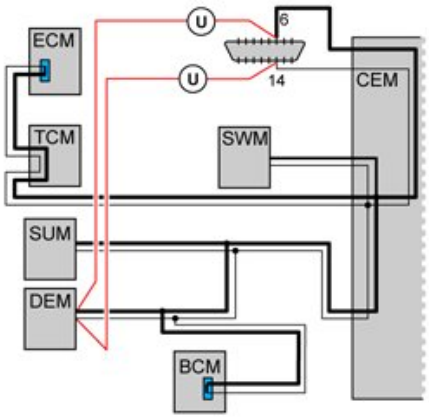
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

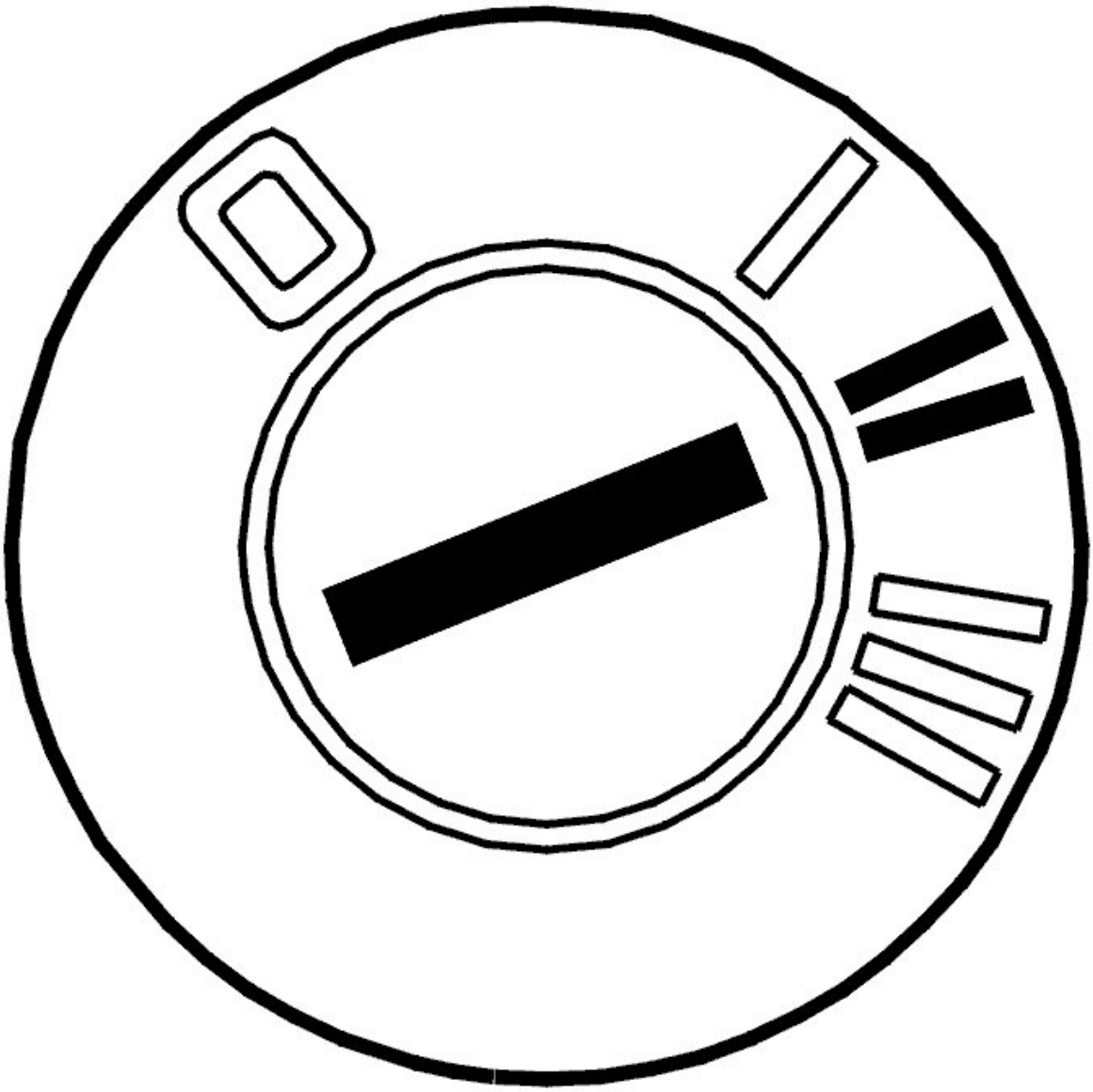


Continue - Verification

SUM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTC)



- Ignition on.

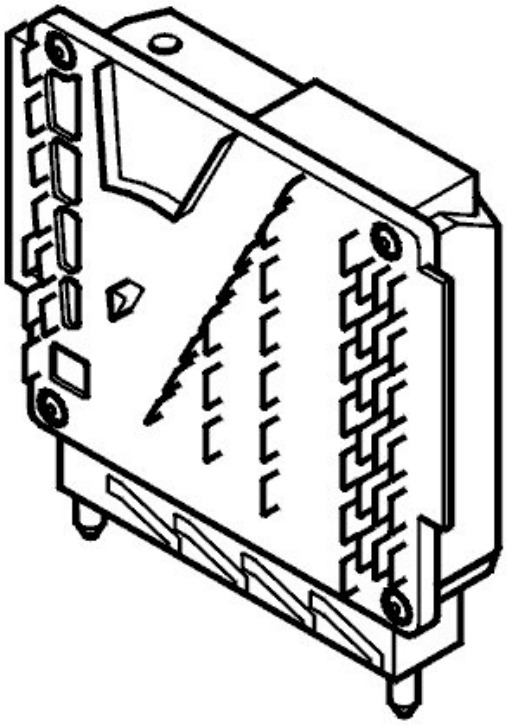
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid)if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

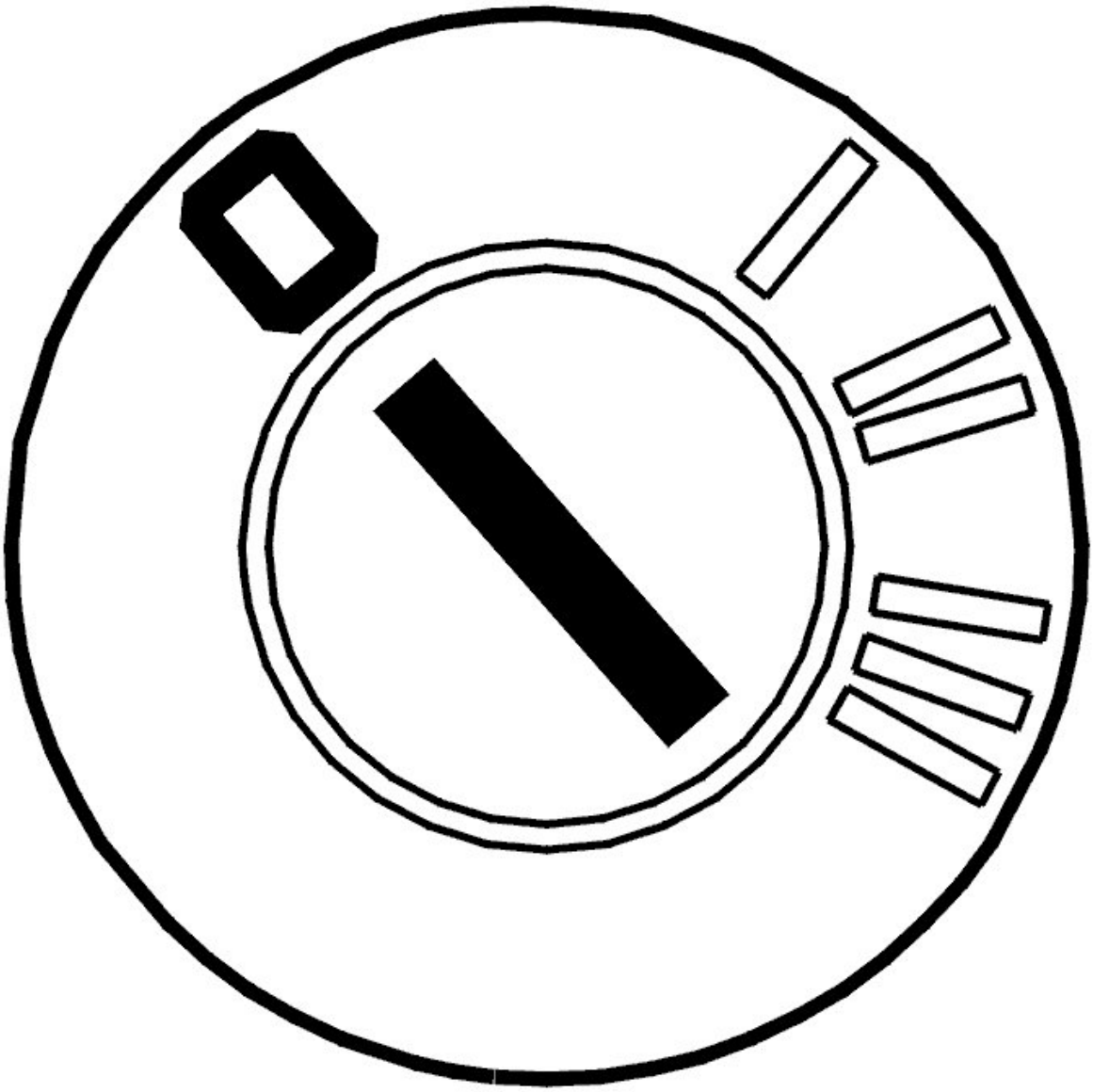
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Too High

Signal too high

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

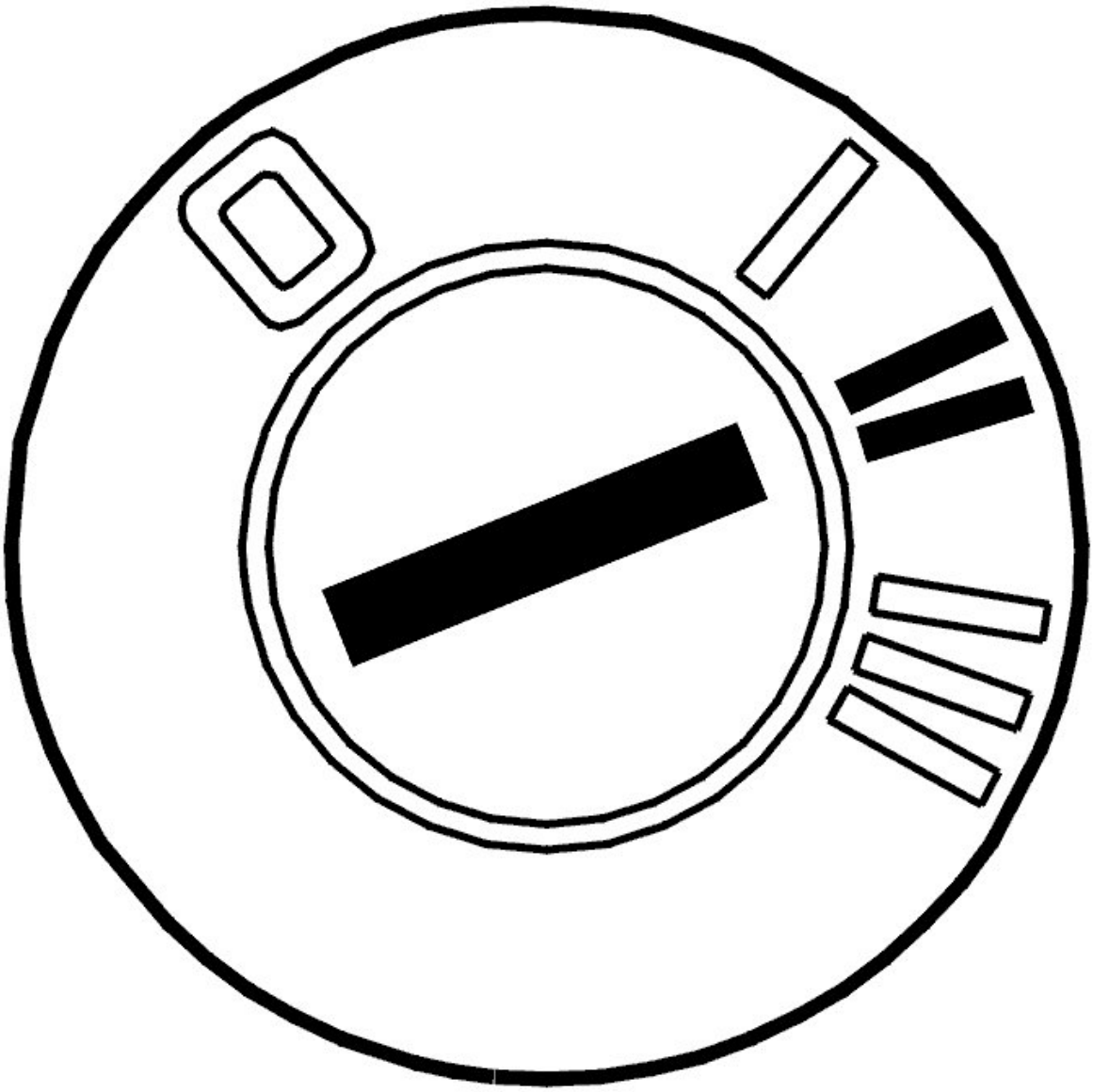
Note! If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S1

No - Checking transmission fluid temperature sensor

Checking shift solenoid S1



- Ignition on
- Gear selector in position P
- Activate solenoid S1.

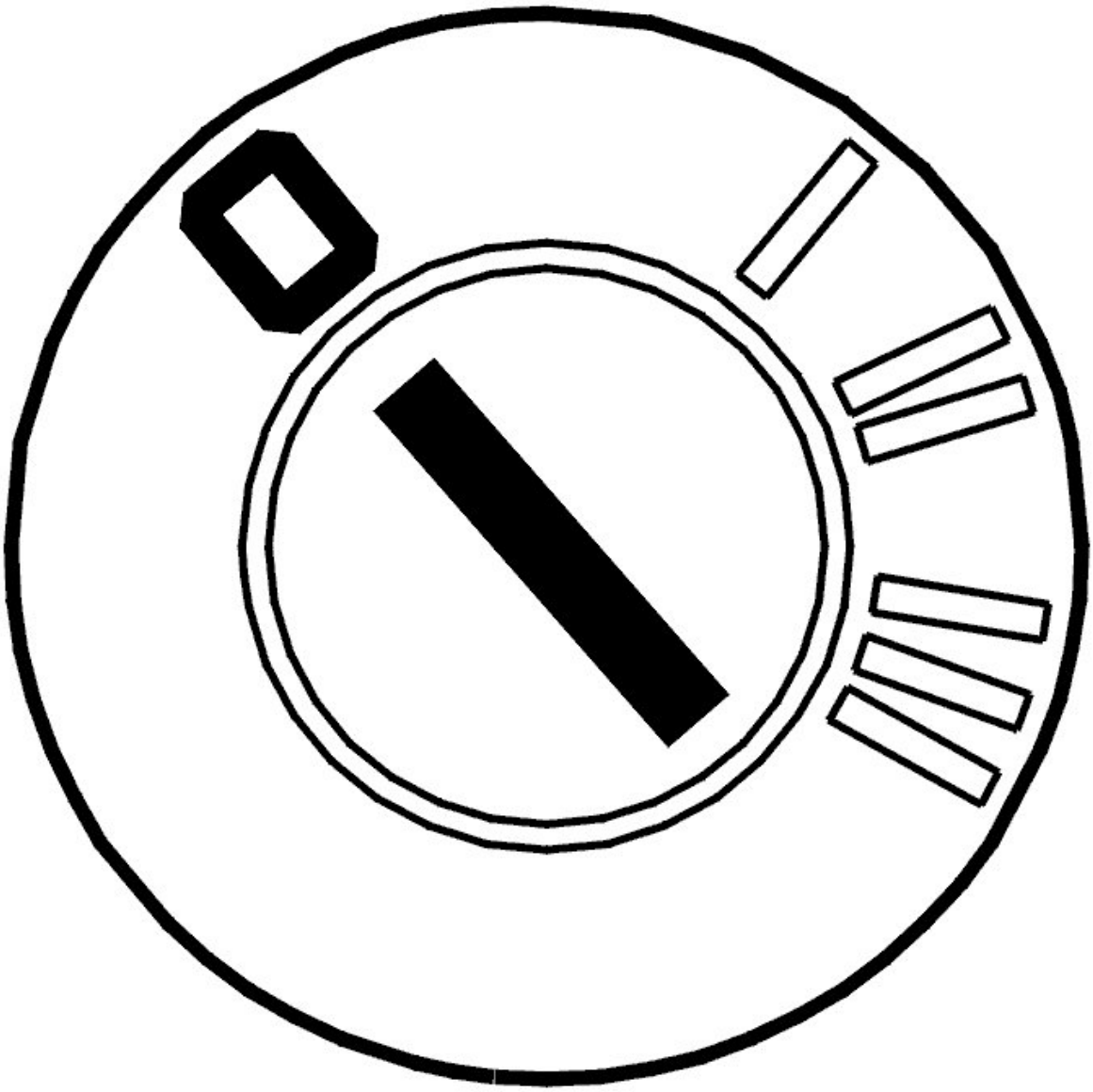
The value must change between OFF and ON.

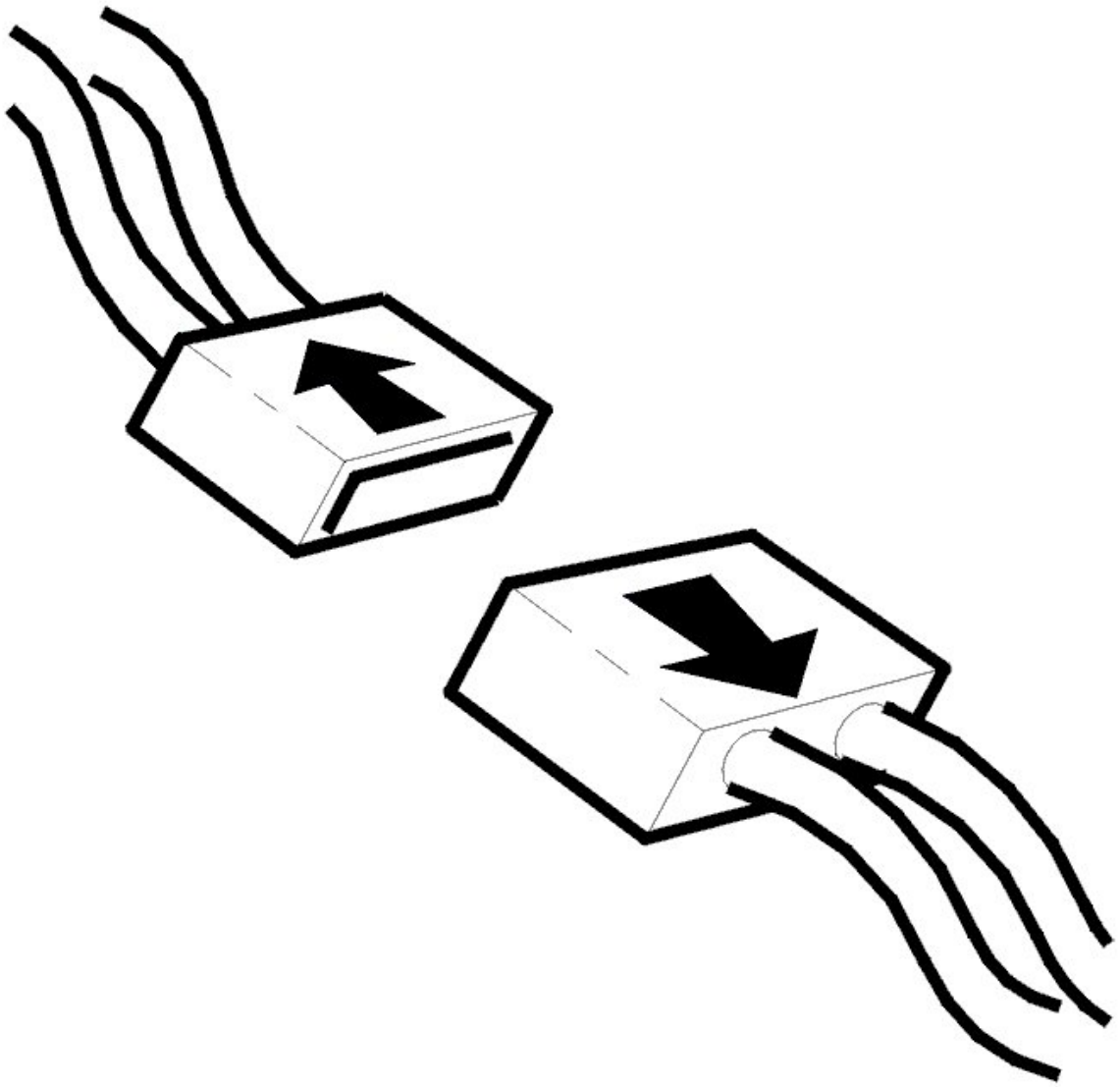
Does the value change?

Yes - Intermittent fault

No - Checking the wiring

Checking the wiring



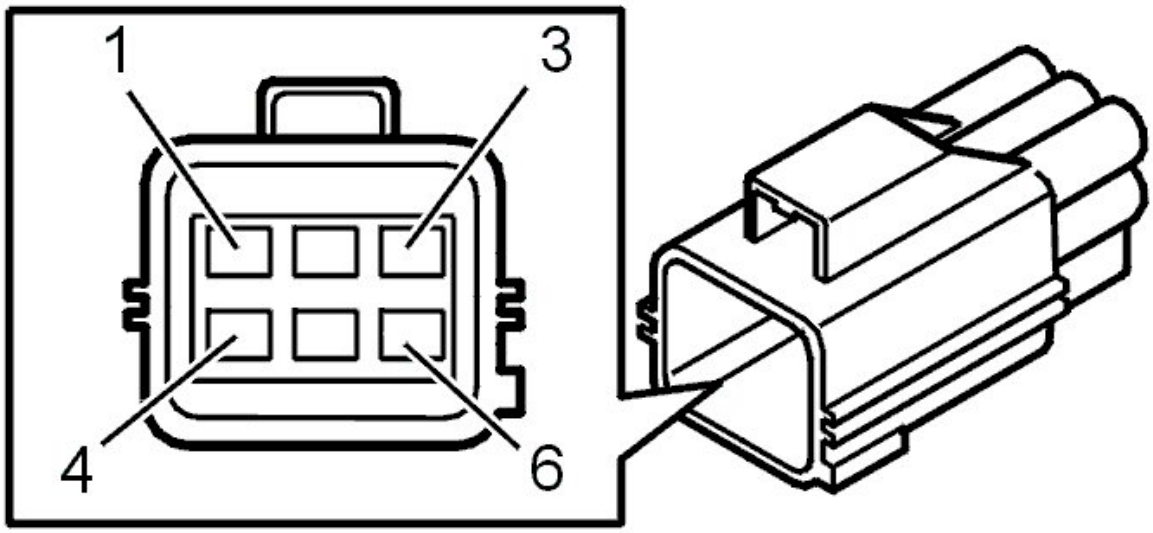


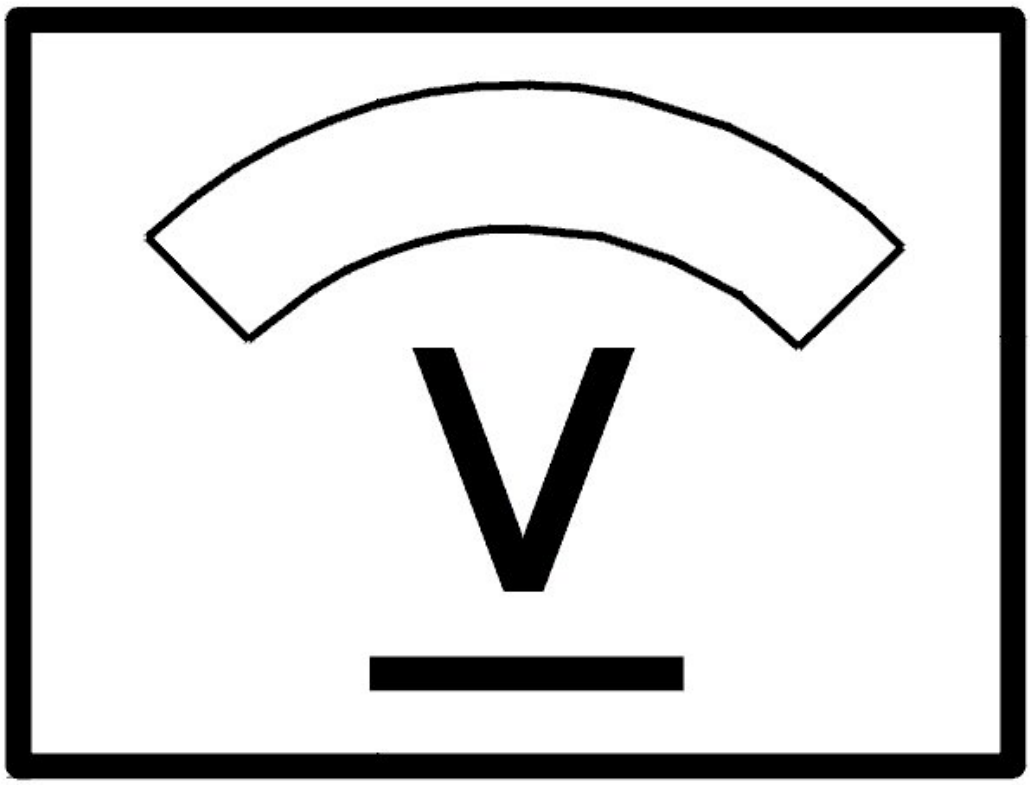
- Ignition off
- Disconnect transmission connector C.

Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



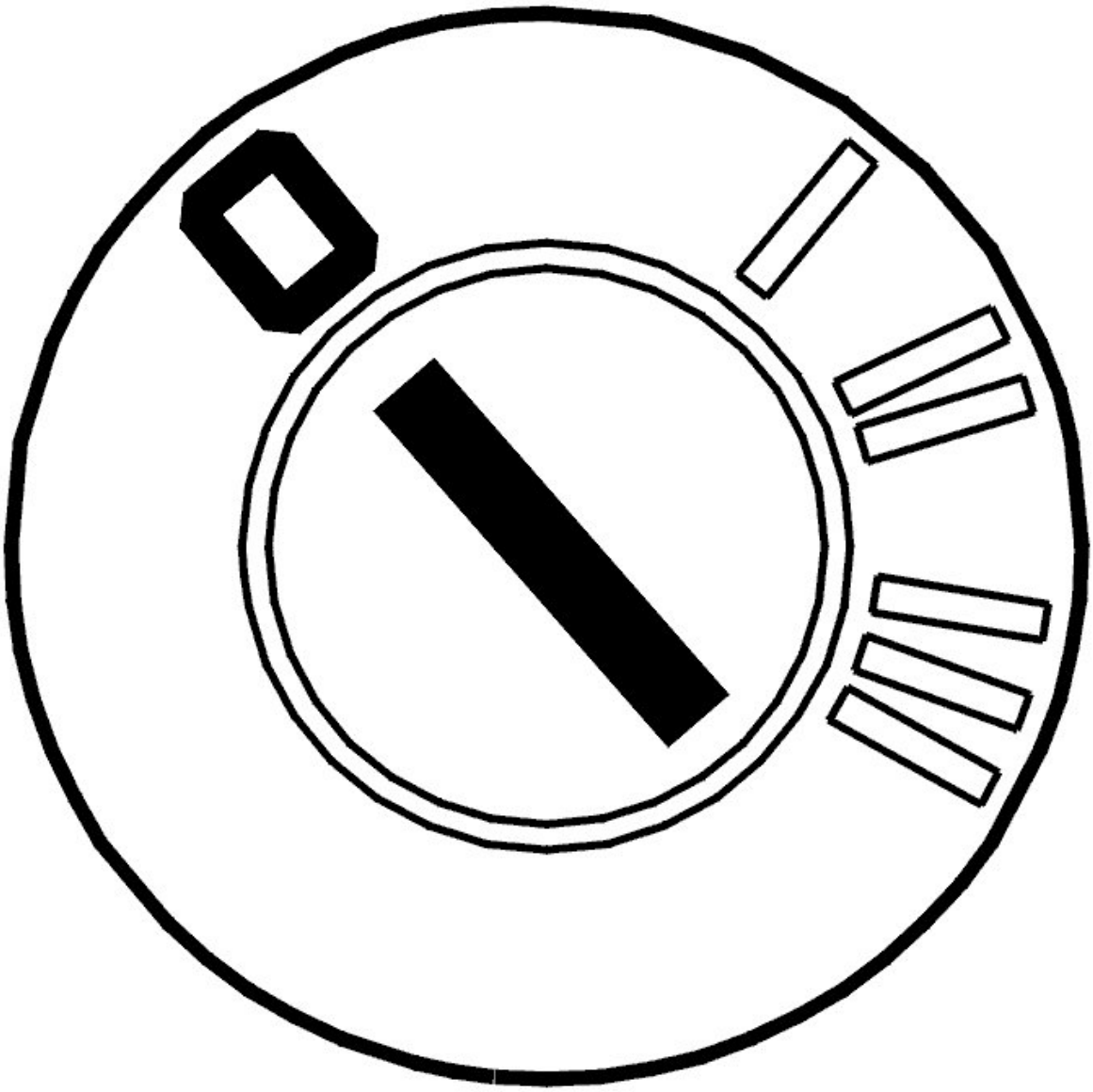


Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component

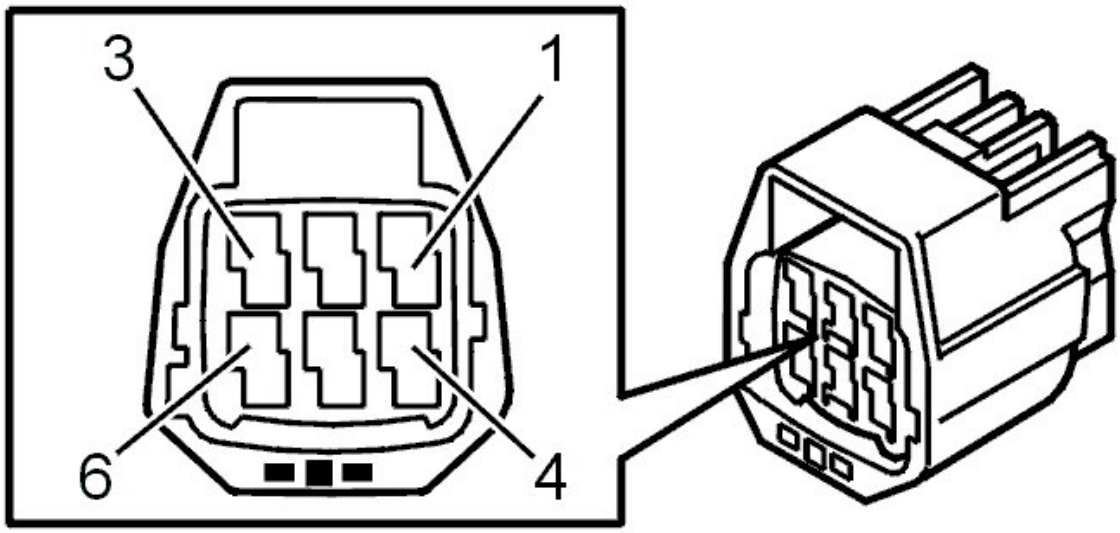


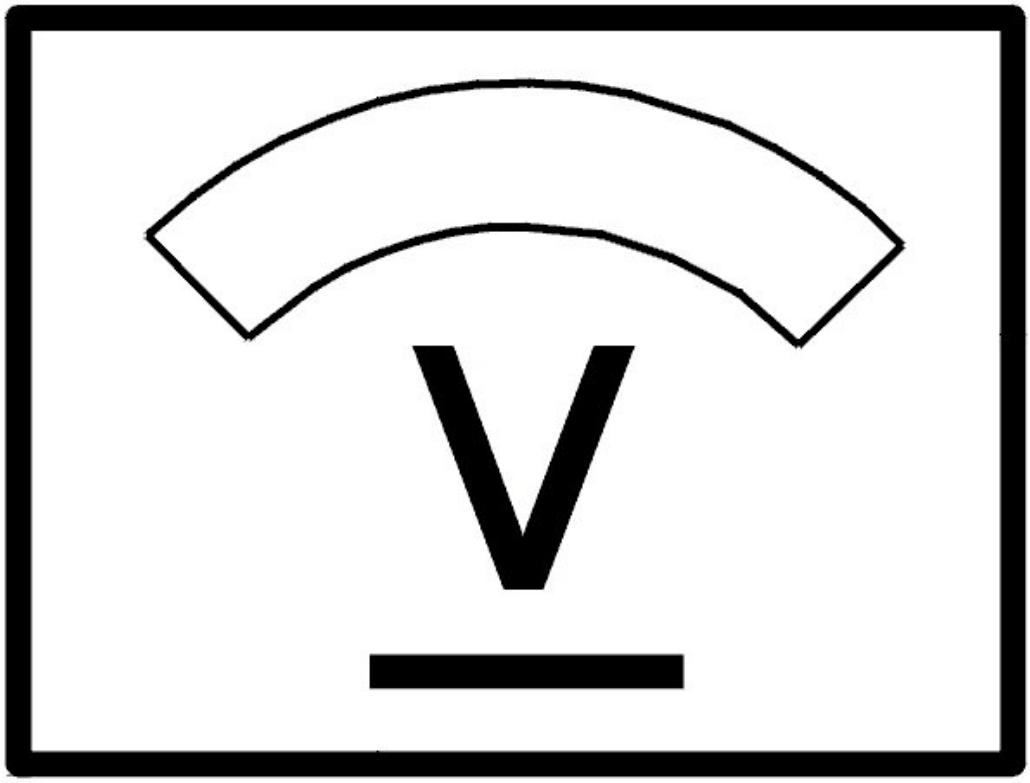
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Replace solenoid S1 if no faults are found in the cable.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To open the control system and to check or replace solenoid S1, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

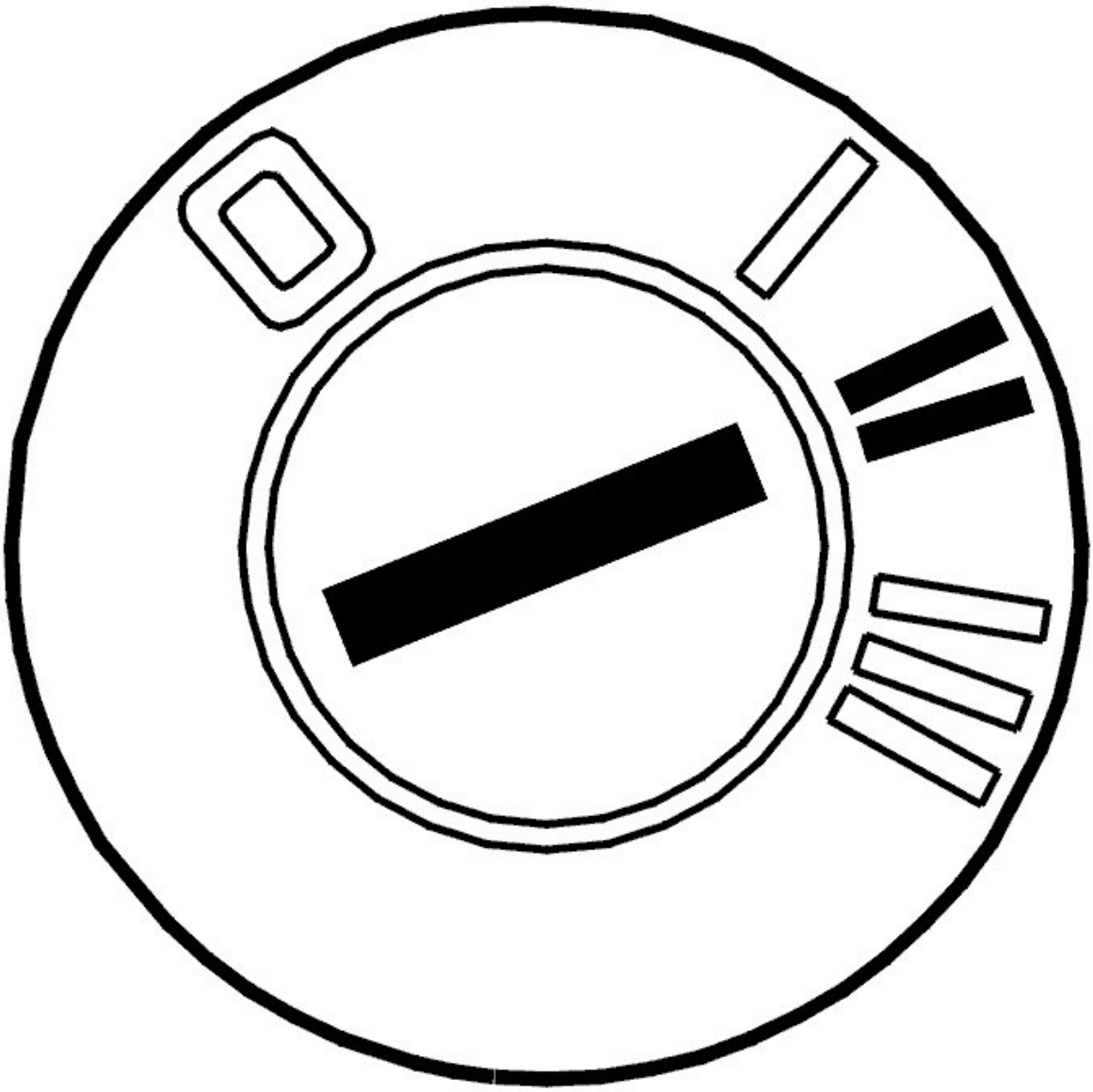
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



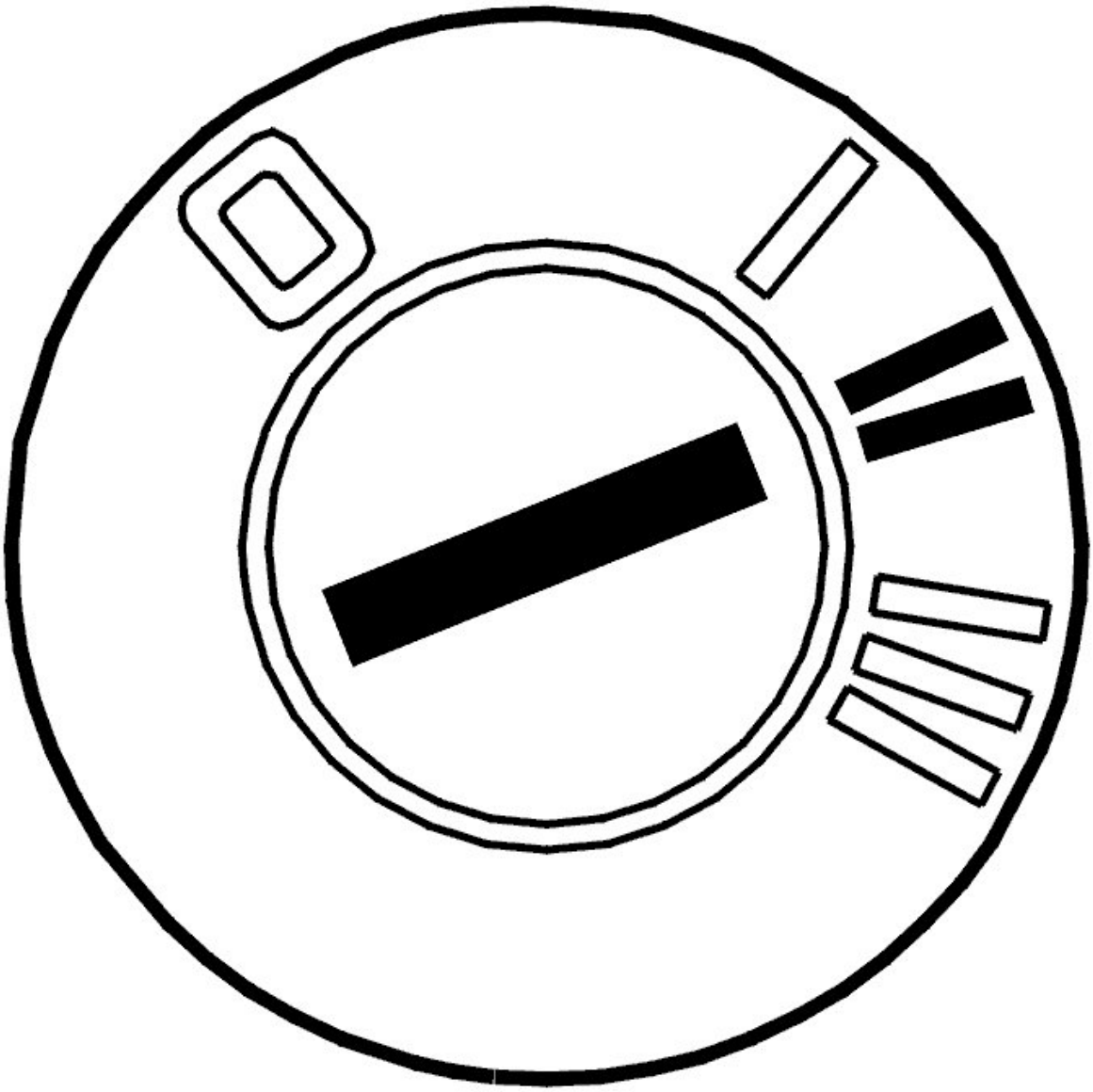
- Ignition on.

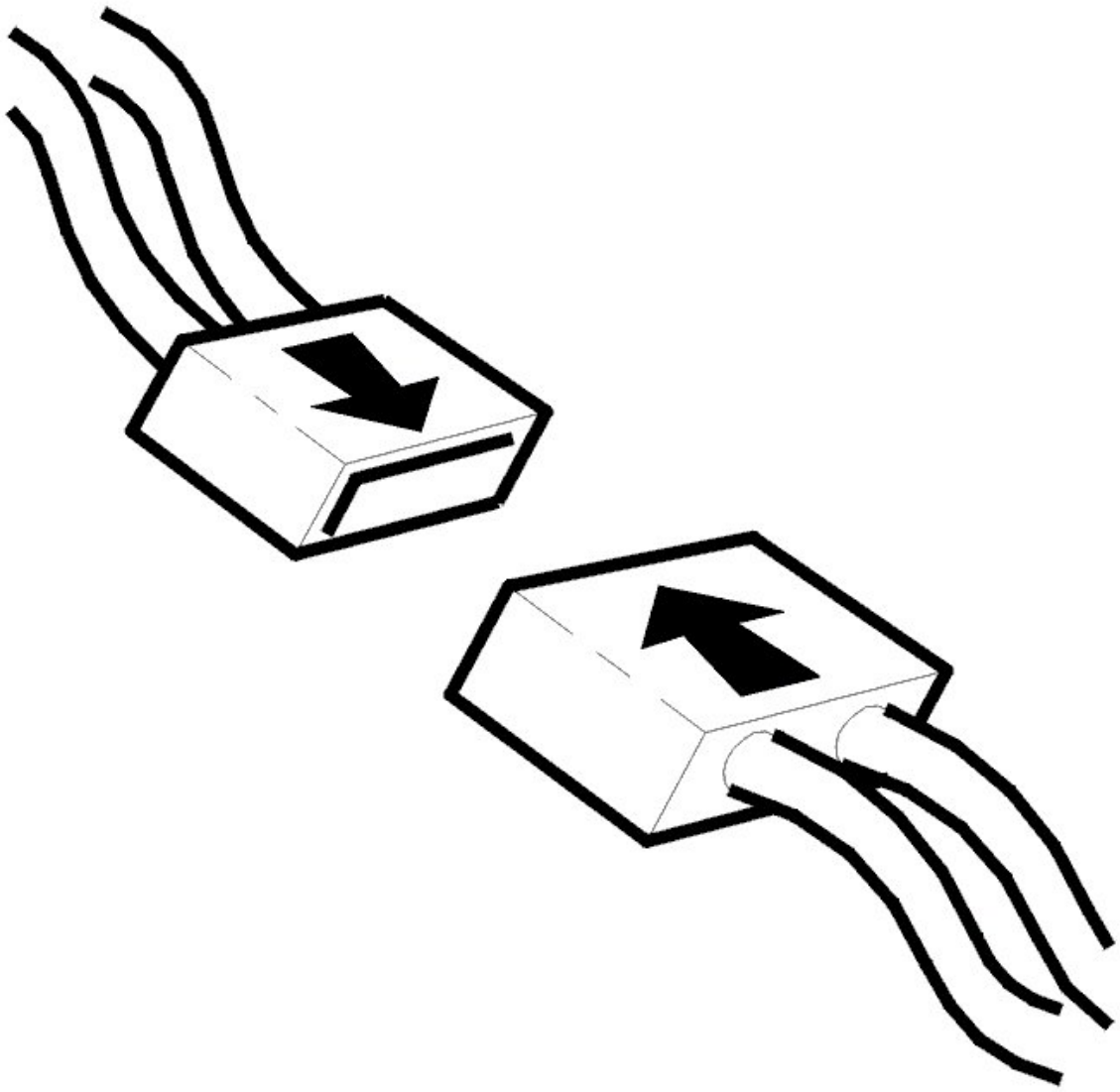
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

Does the value change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

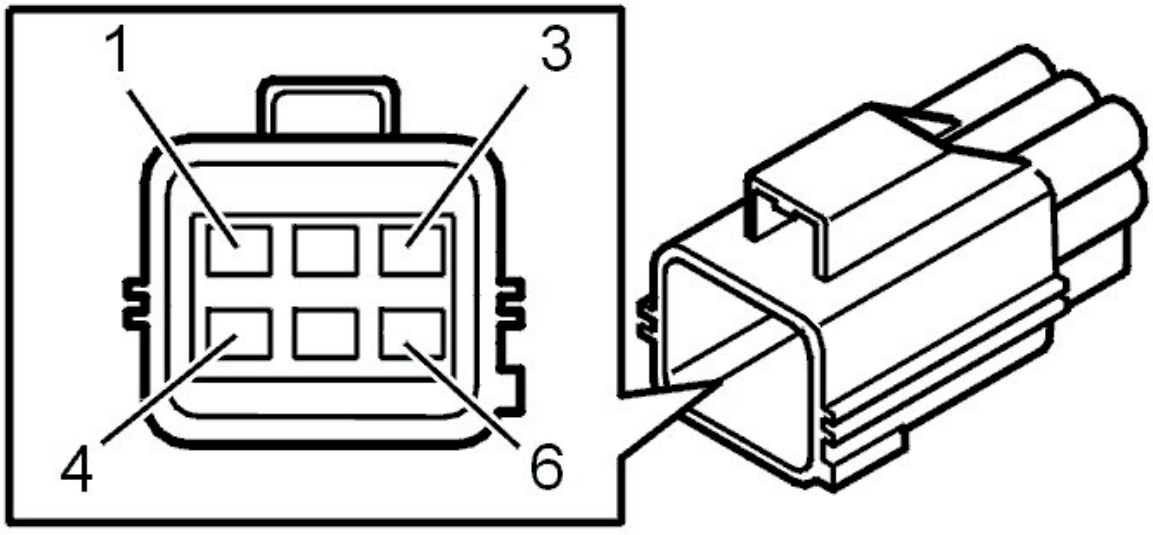
Attempt New Test - Checking the temperature sensor

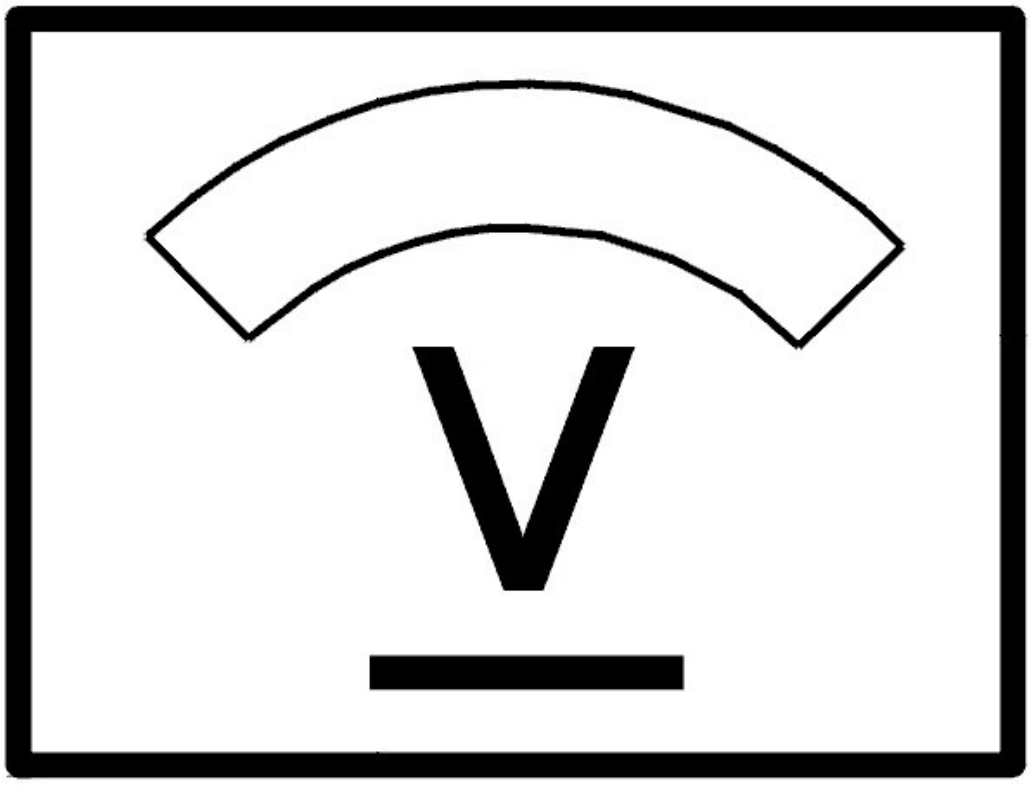
Intermittent fault

Check the cable between control module terminal #A50 (#A50)and transmission connector terminal #C1. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

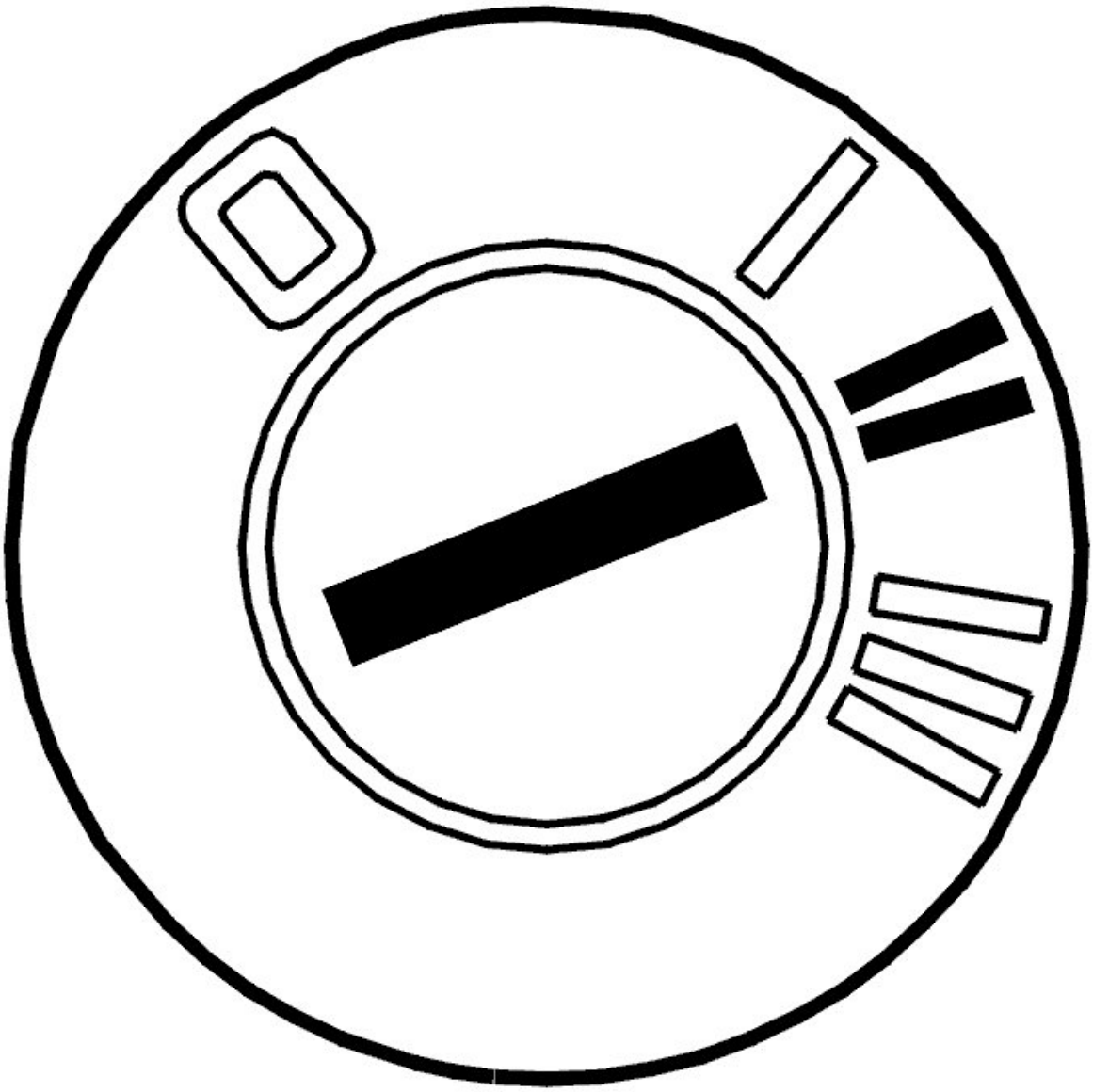
No - Fault Found

Attempt New Test - Checking the temperature sensor

DONE - DONE

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

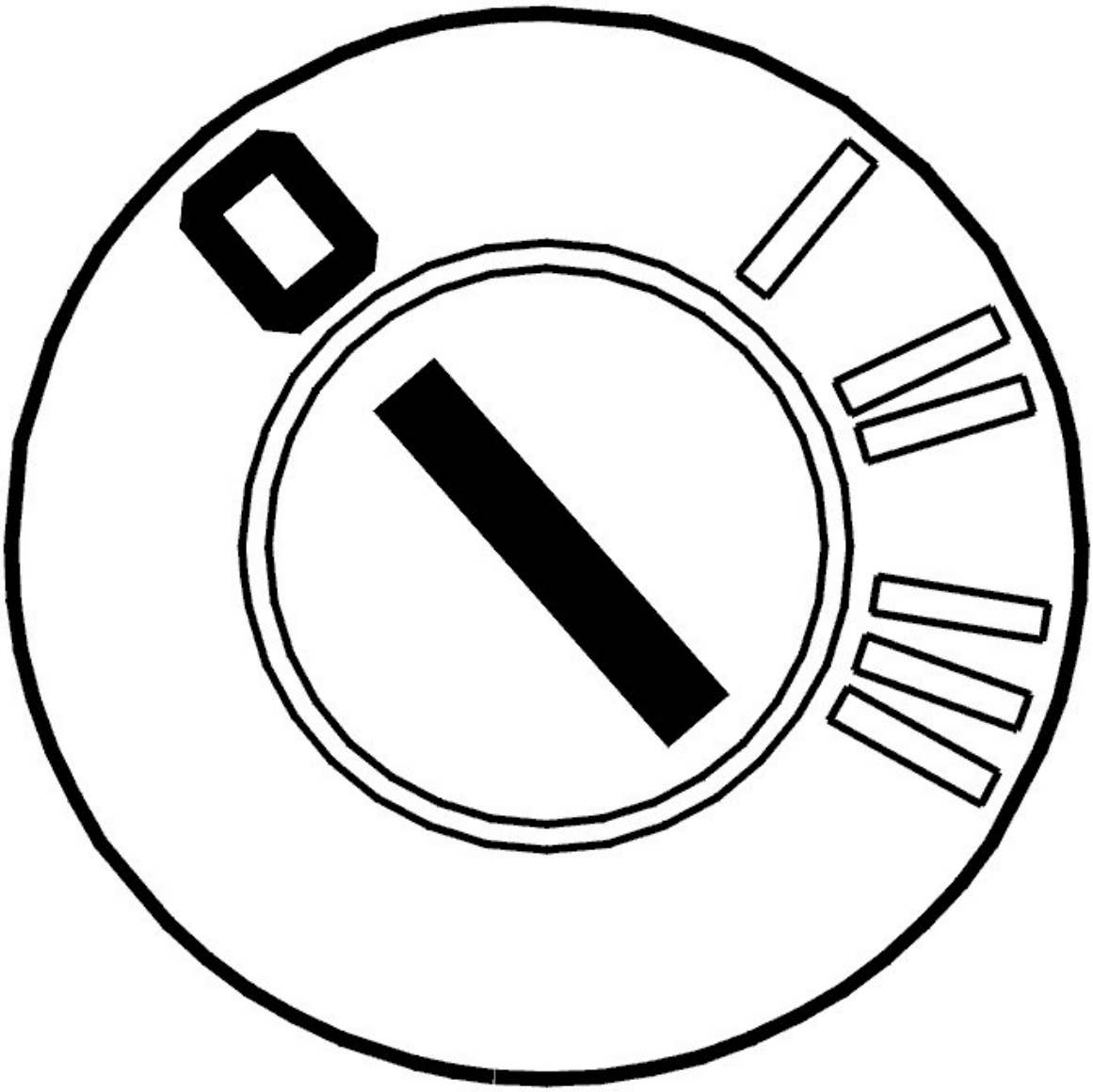
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

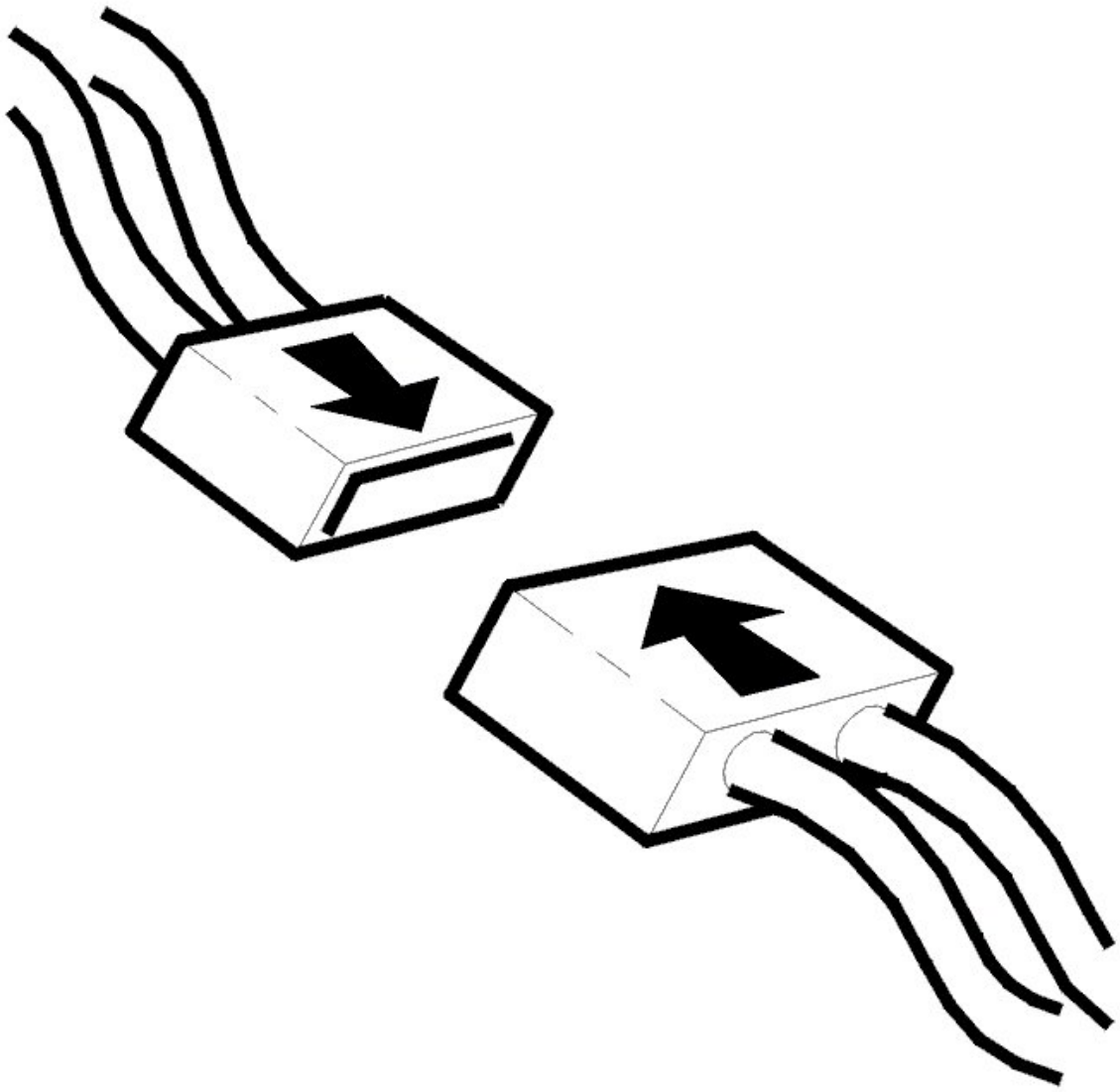
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

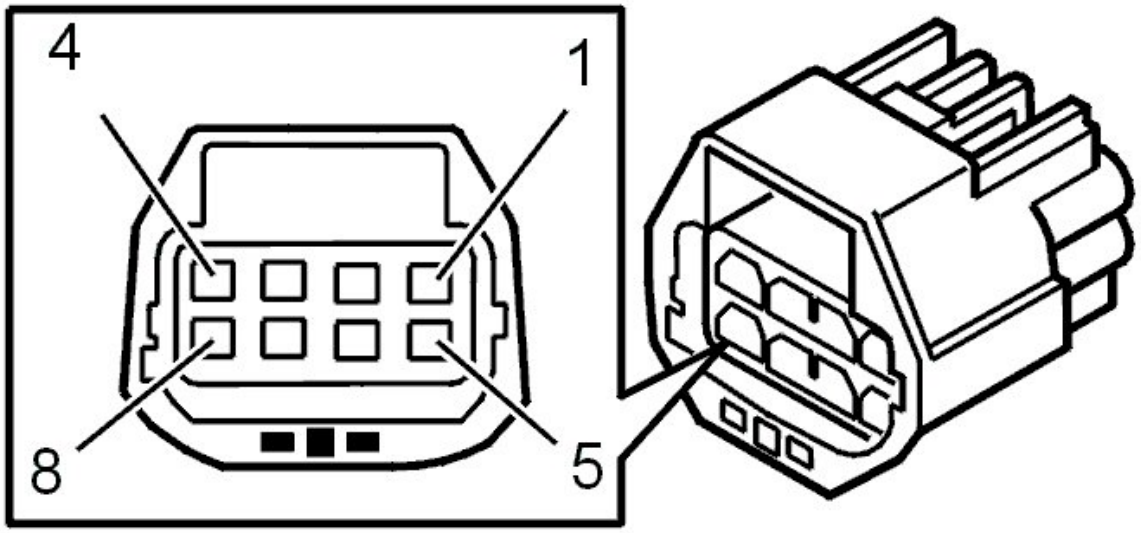
Checking transmission fluid temperature sensor

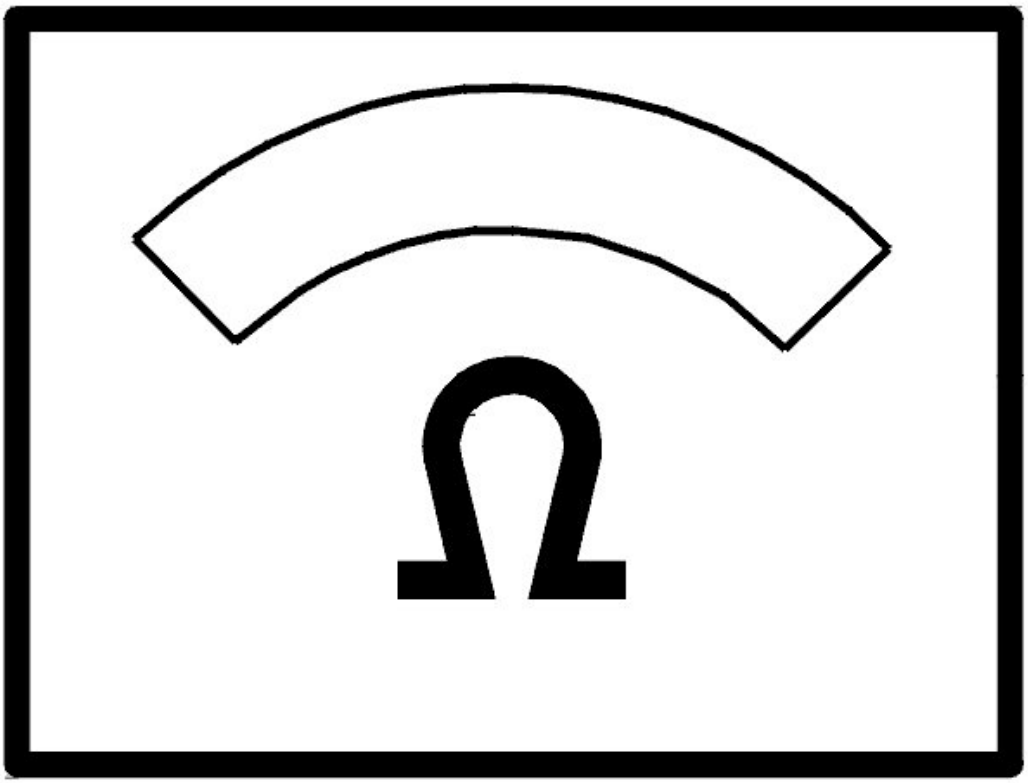




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

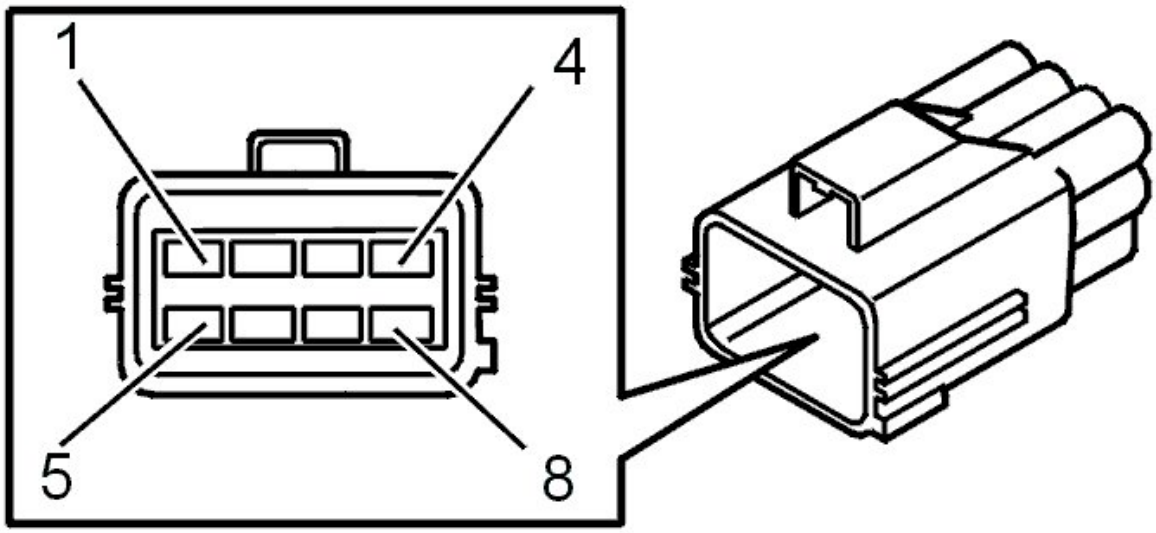
No - Checking the cable and component

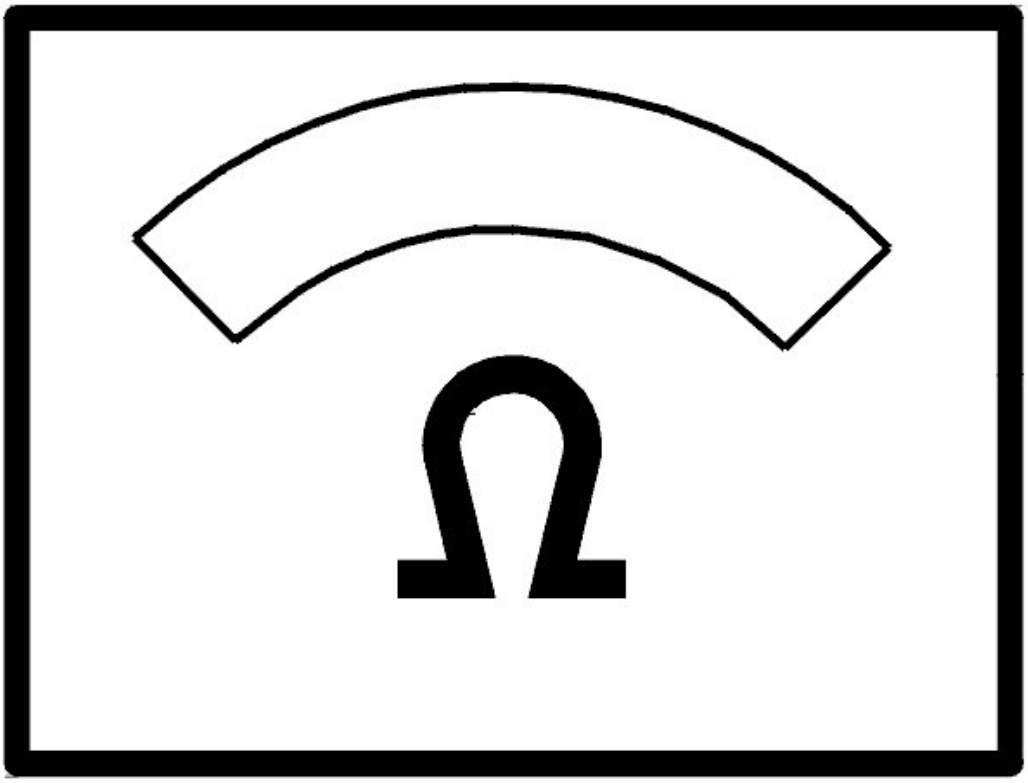
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



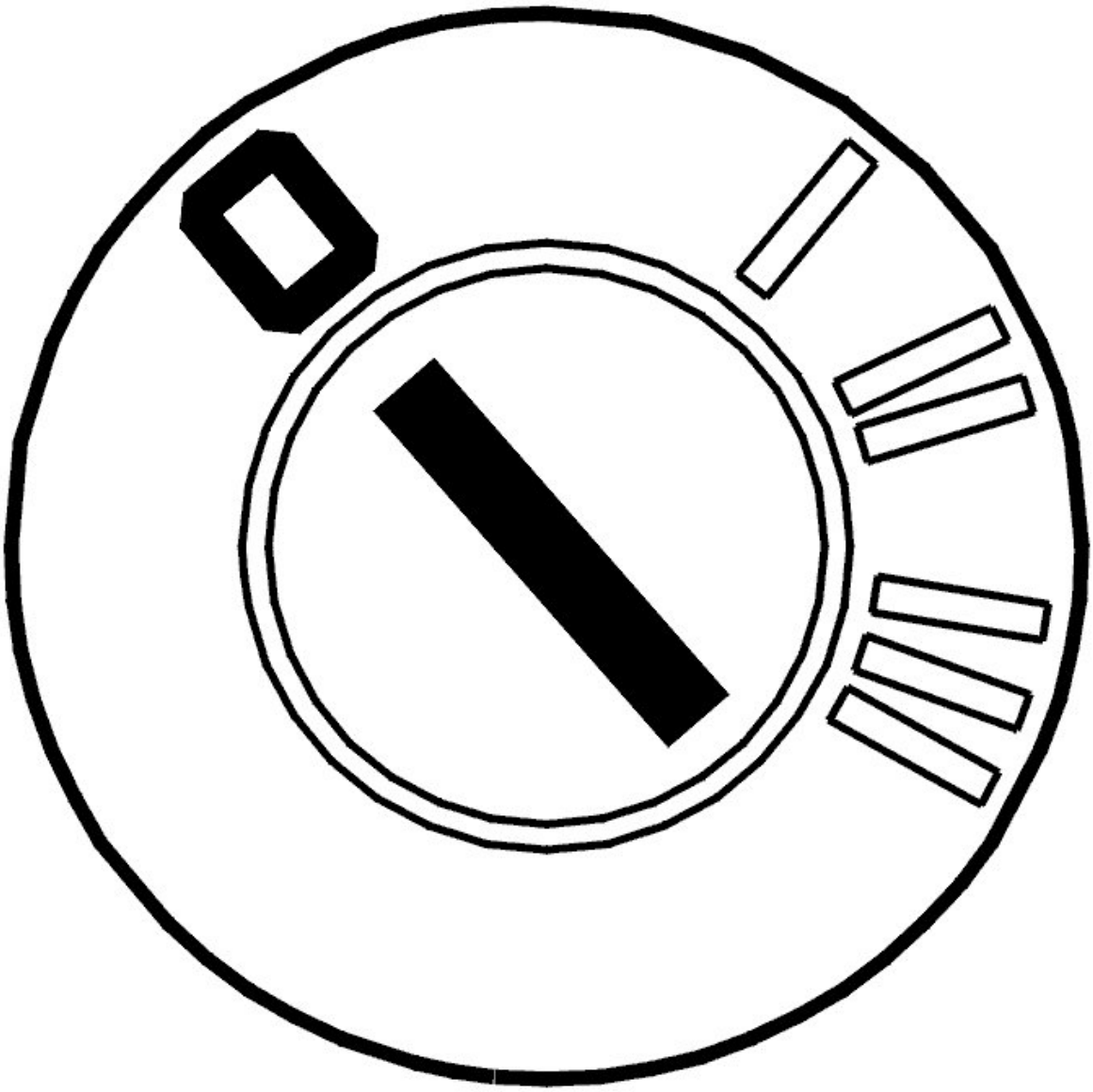


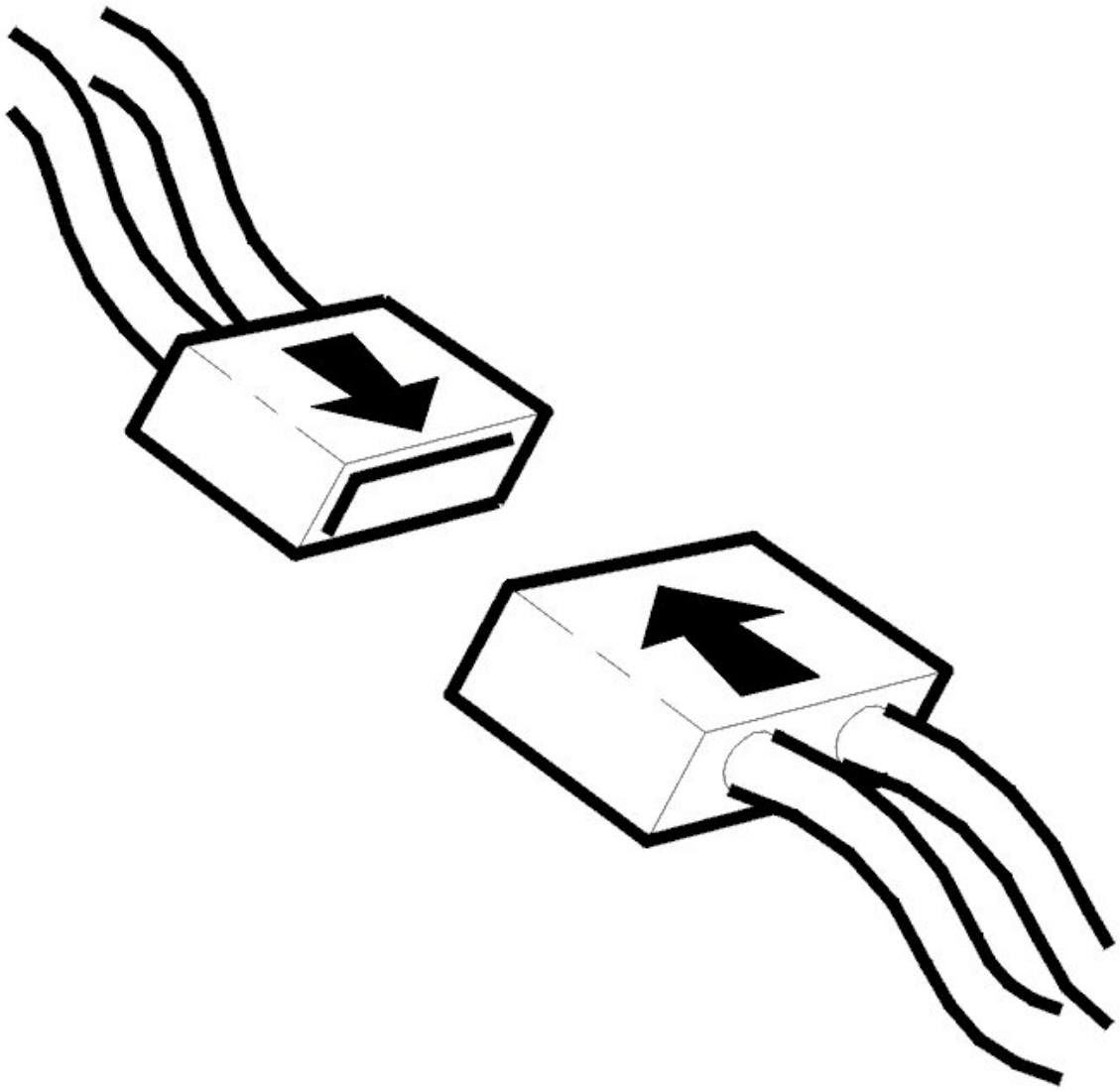
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

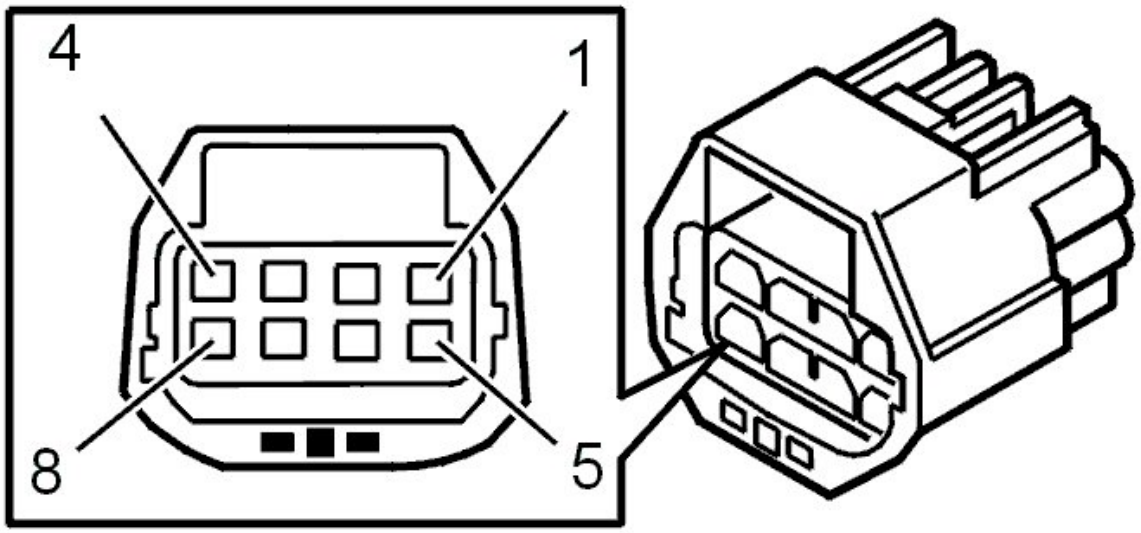
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

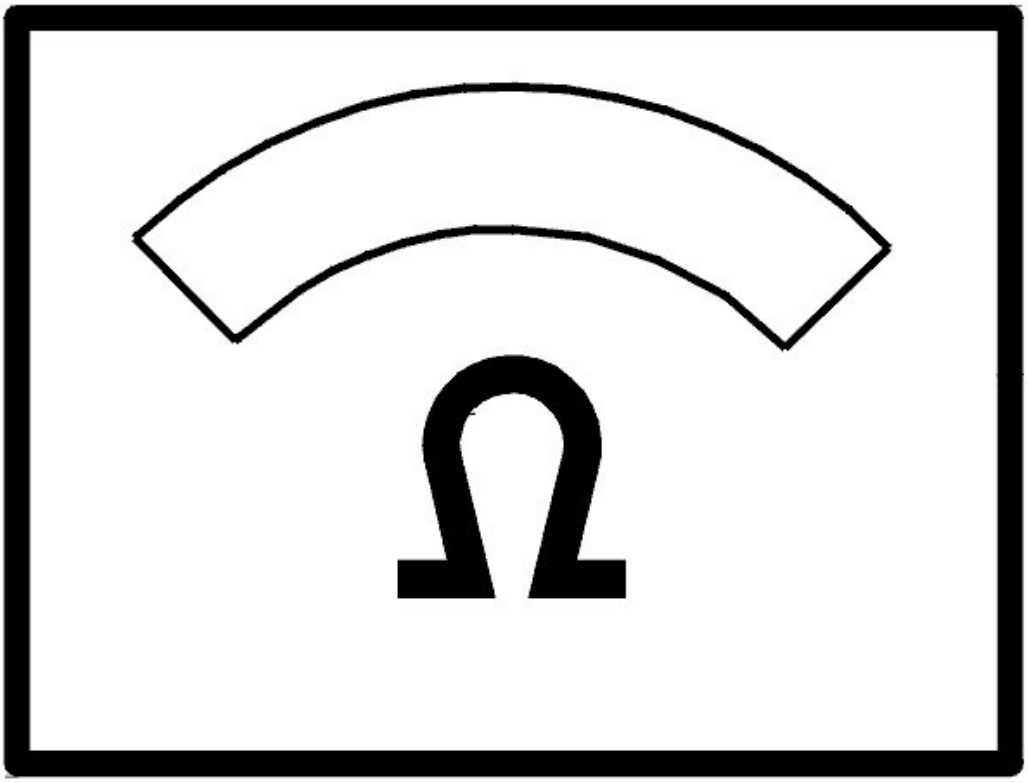
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





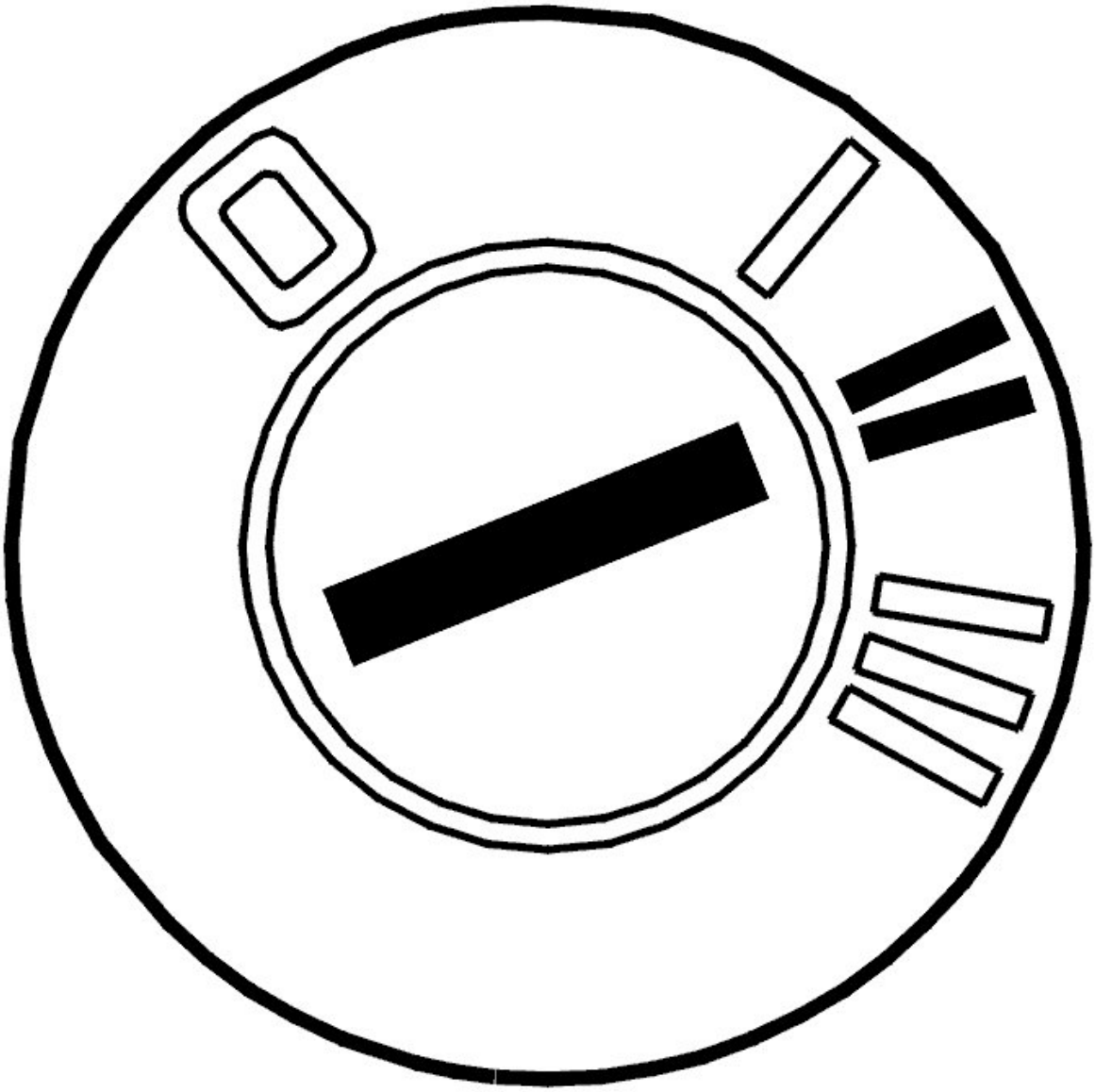
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



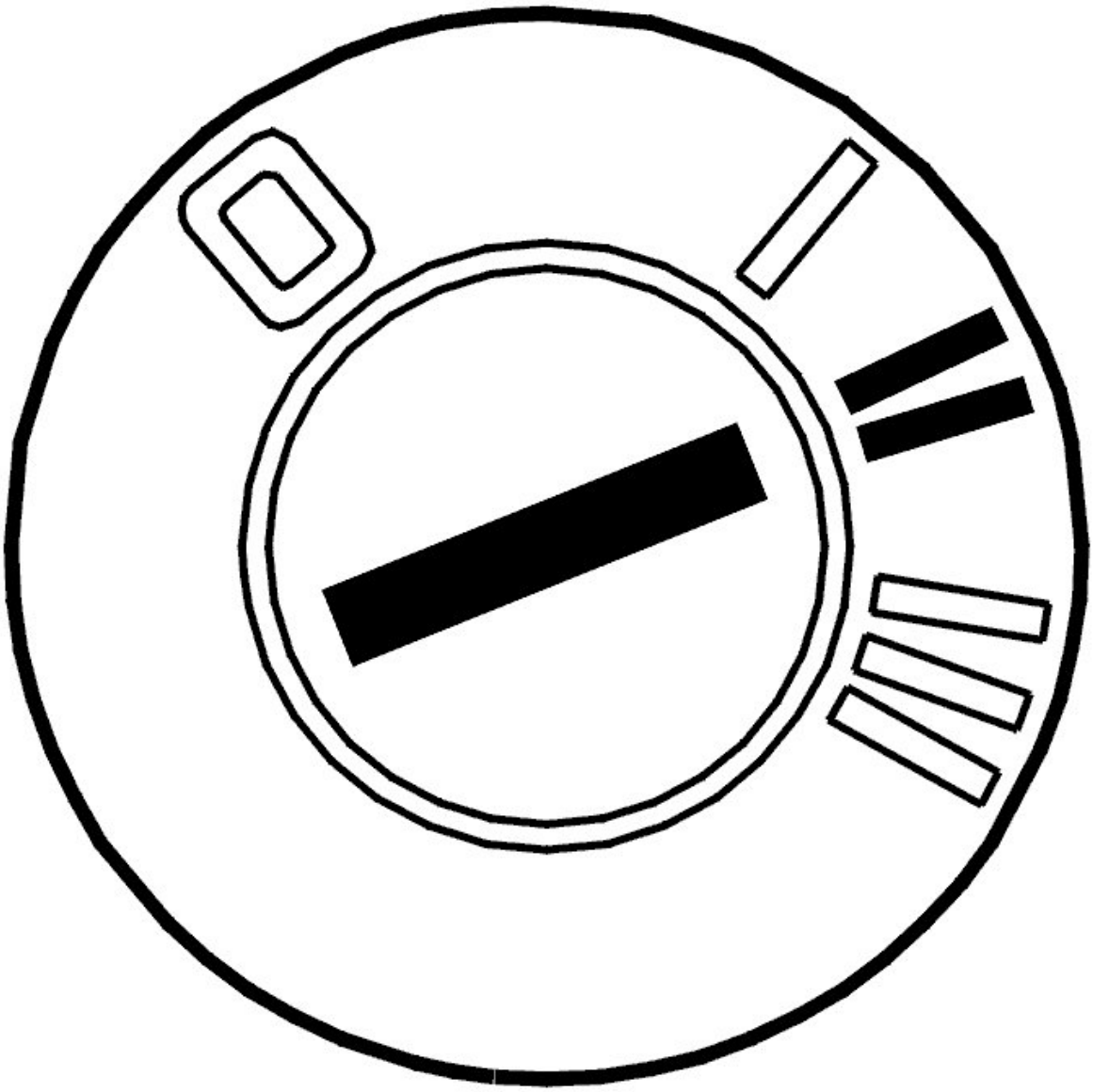
- Ignition on.

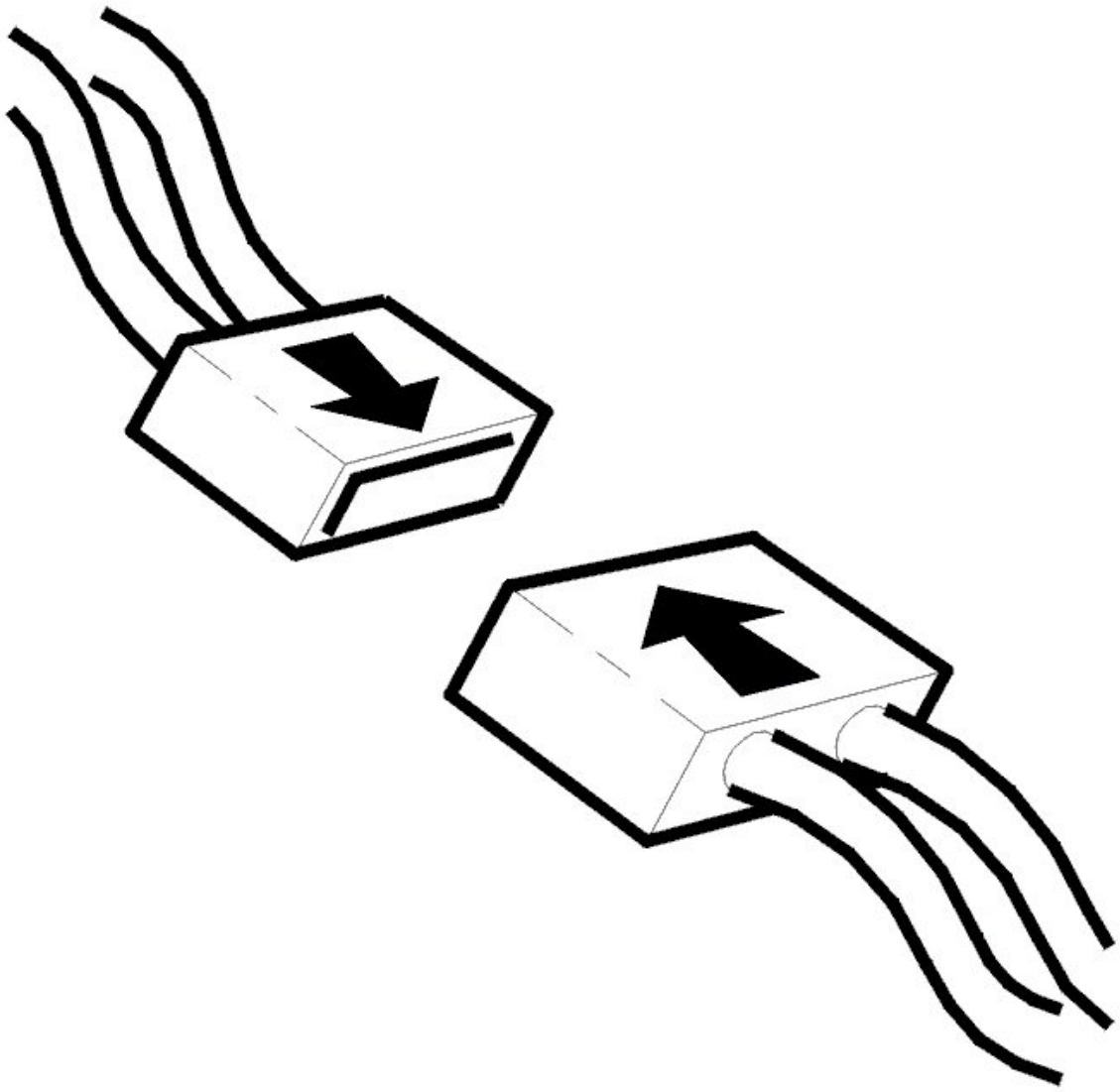
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

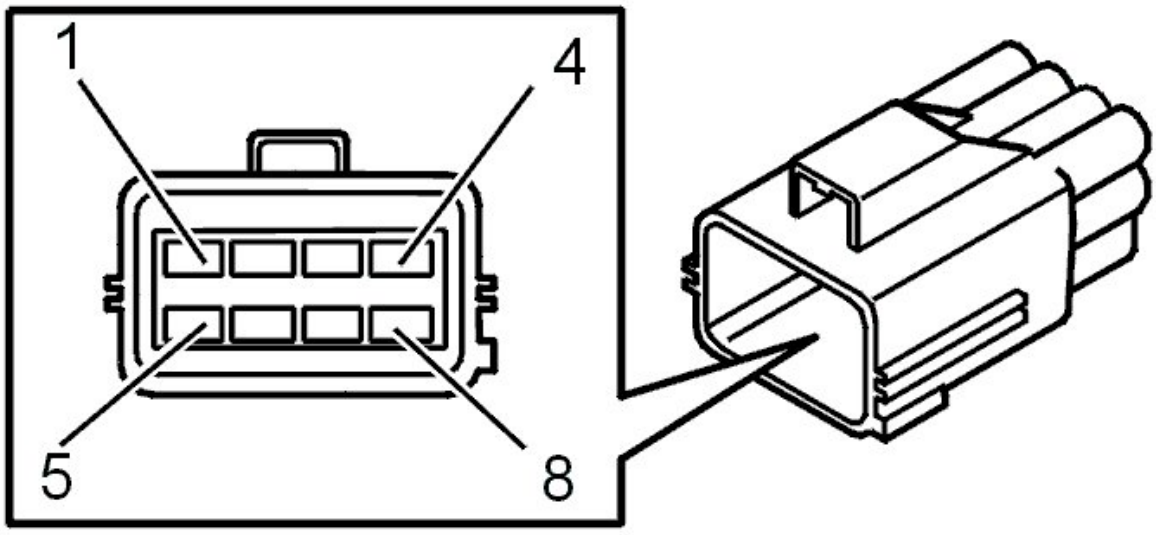
Attempt New Test - Checking the temperature sensor

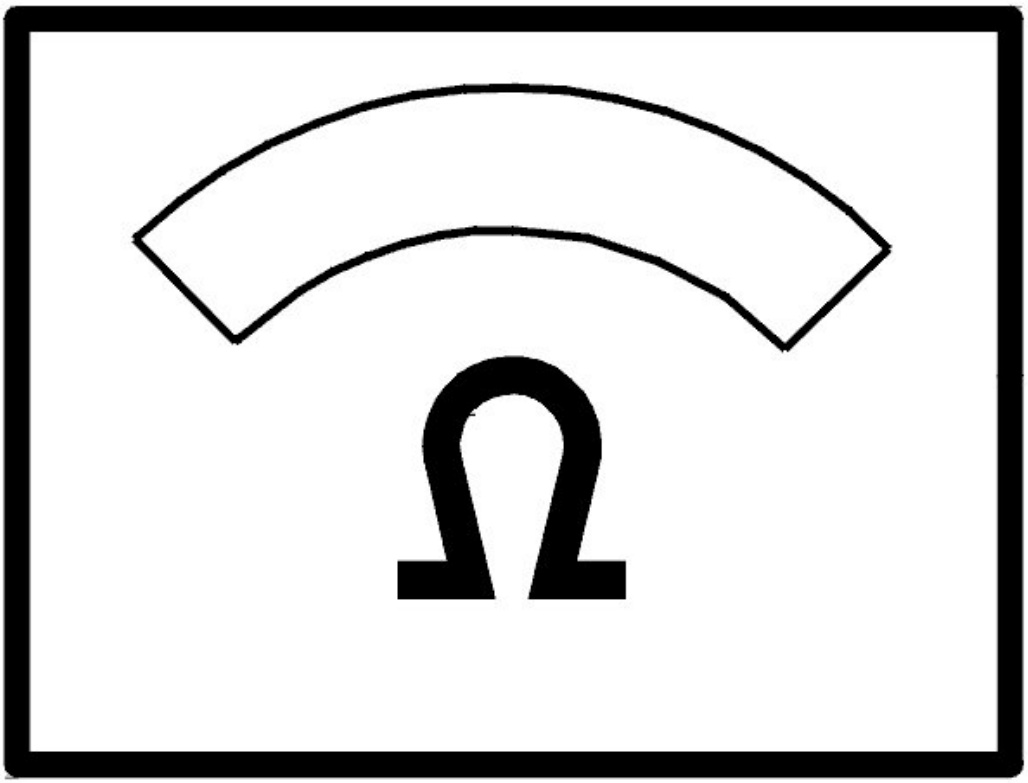
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

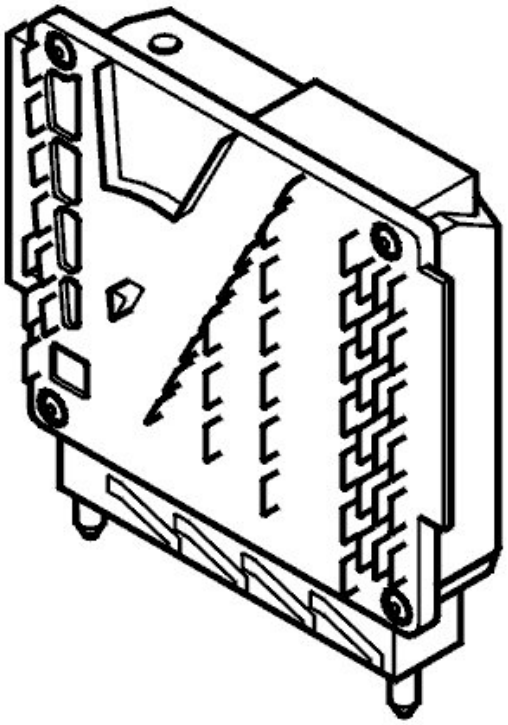
Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

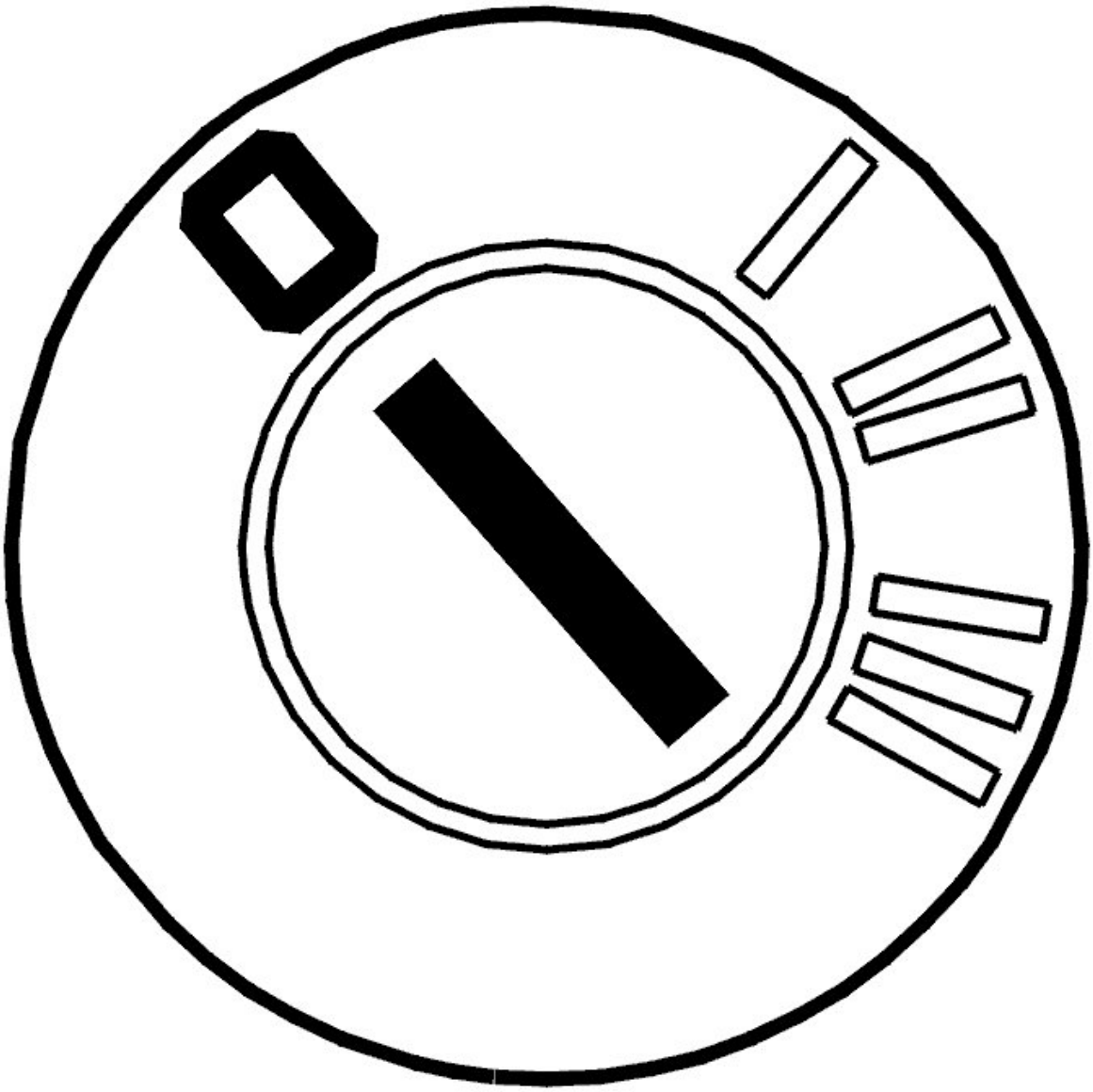
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Missing

Signal missing

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

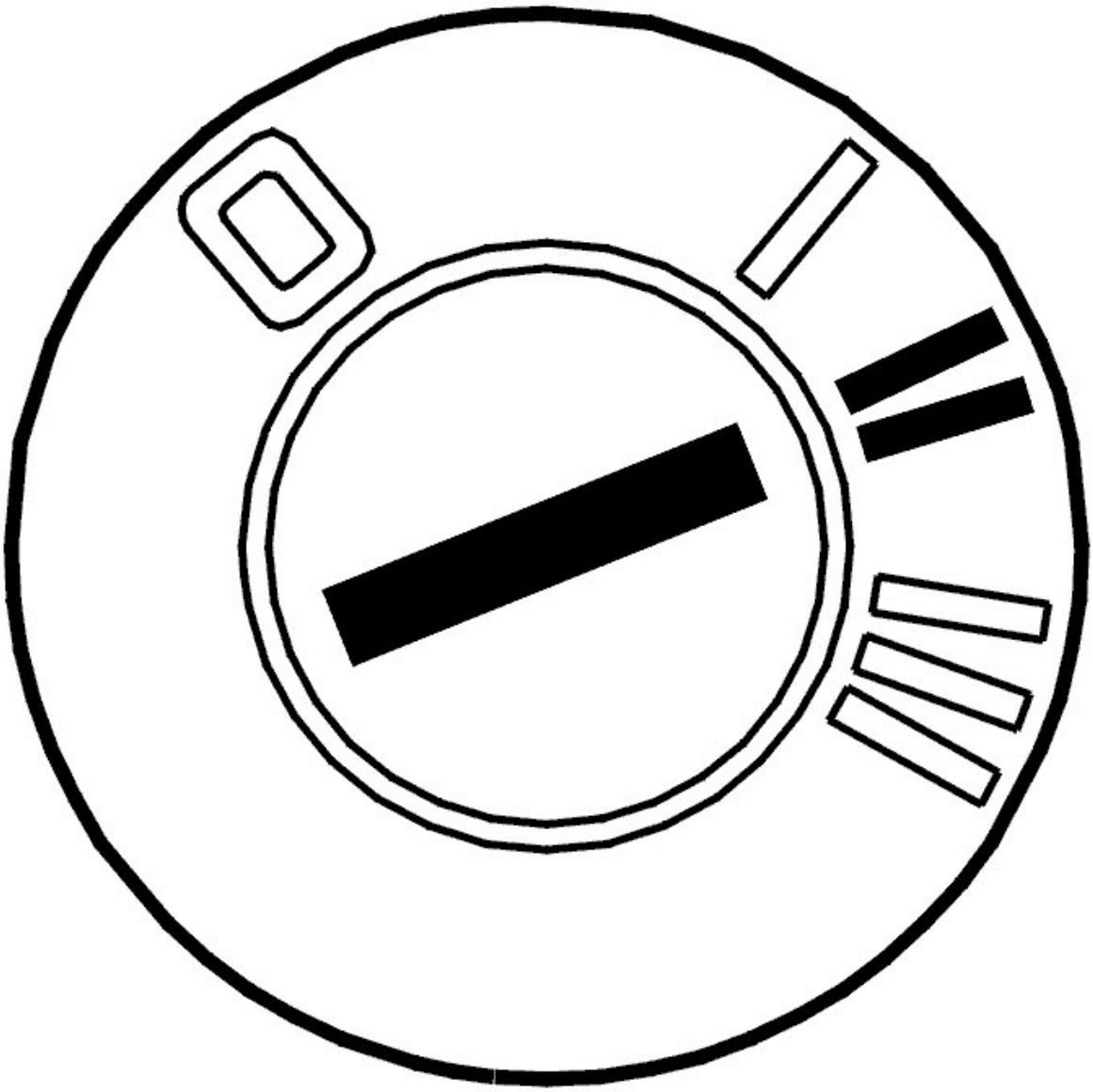
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S1

No - Checking transmission fluid temperature sensor

Checking shift solenoid S1



- Ignition on
- Gear selector in position P
- Activate solenoid S1.

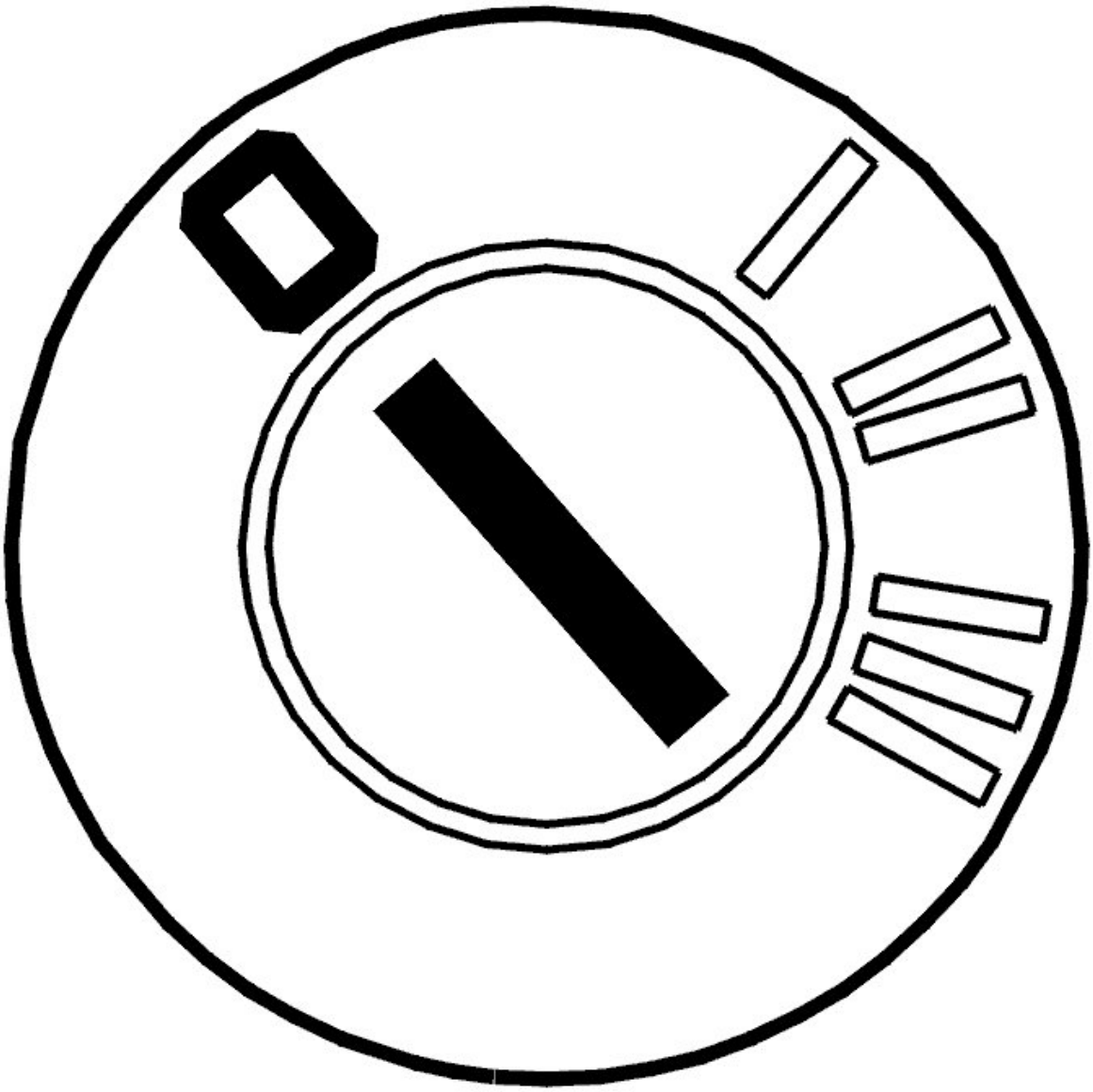
The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - Intermittent fault

No - Checking resistance

Checking resistance

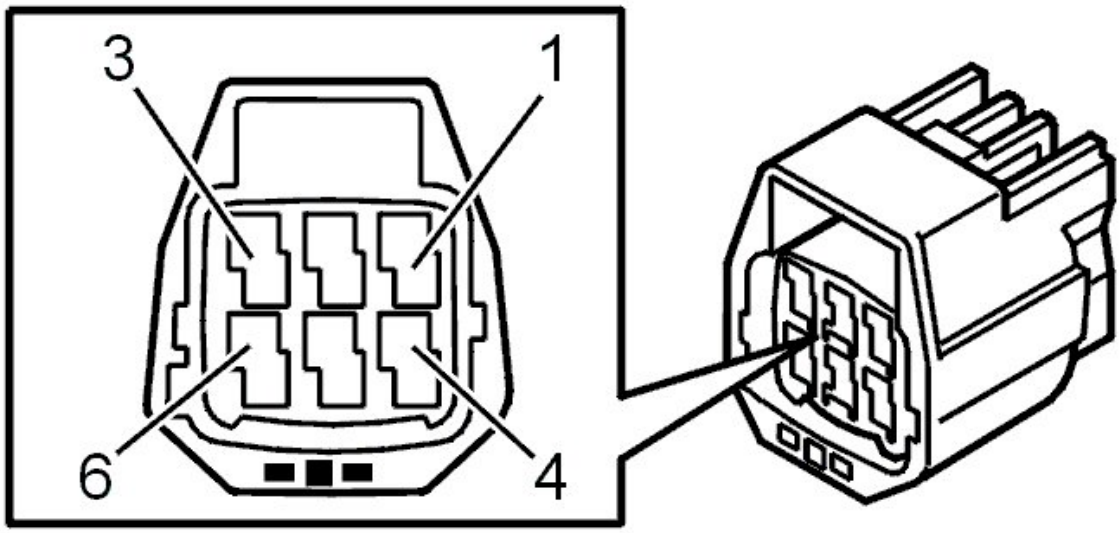


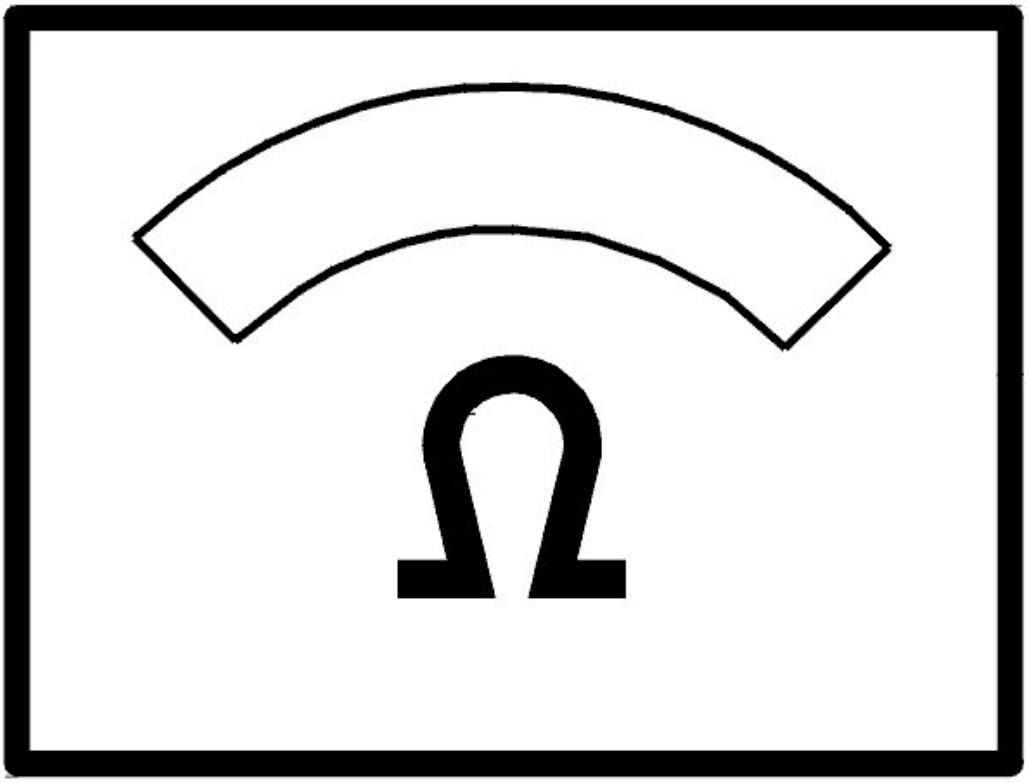
- Ignition off
- Disconnect the transmission connector.

Check solenoid S1 by measuring the resistance between transmission connector terminal #C1 and the transmission housing. The resistance must be 12-16 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



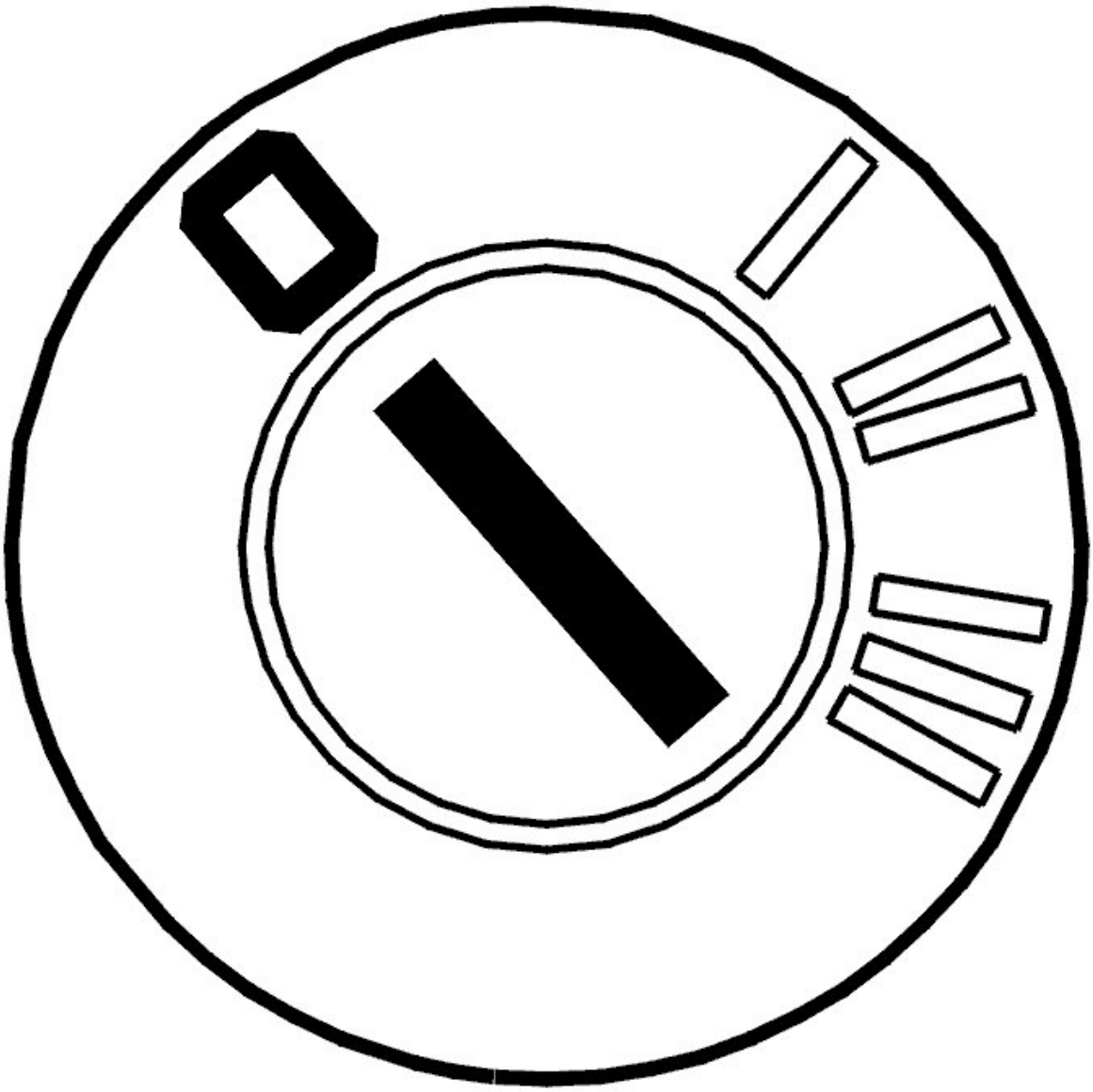


Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring

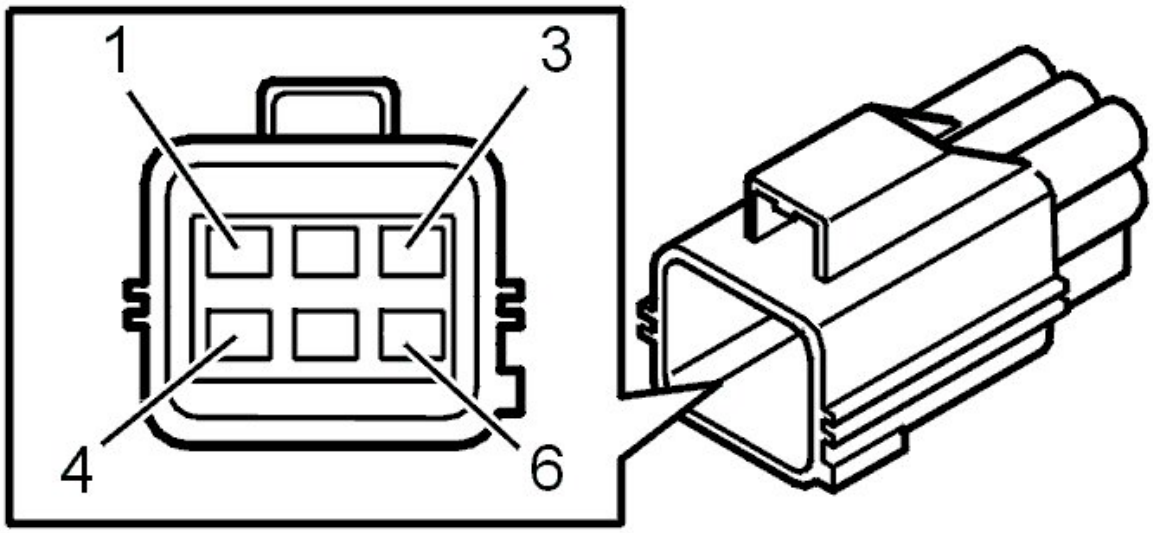


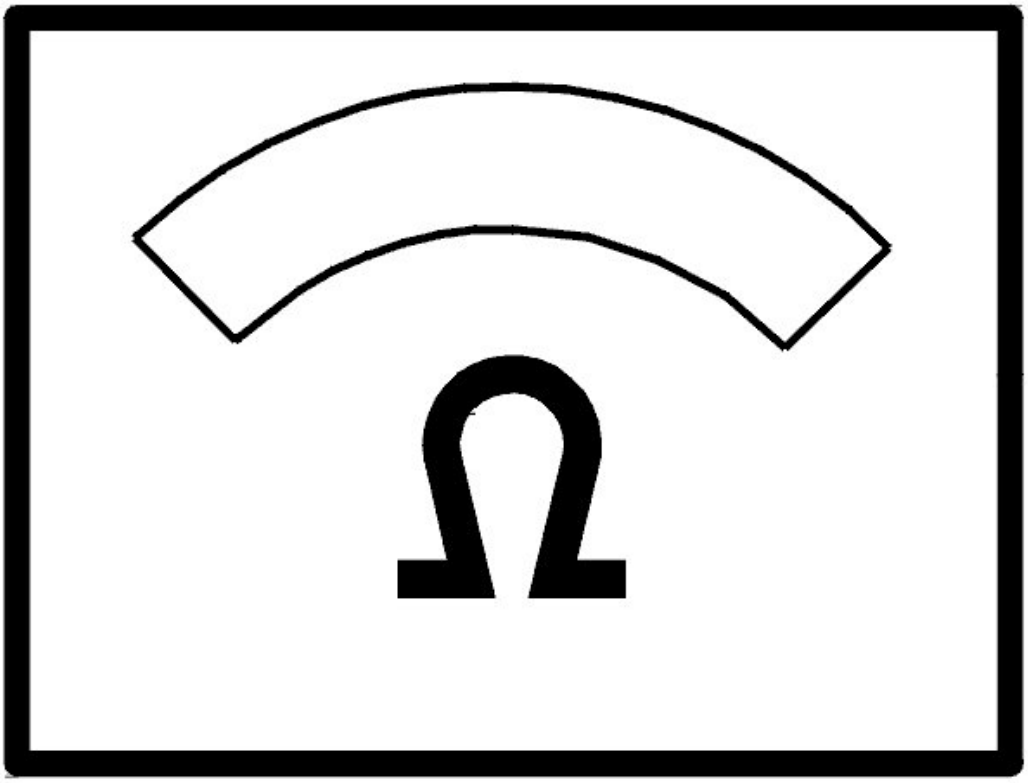
- Ignition off.

Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



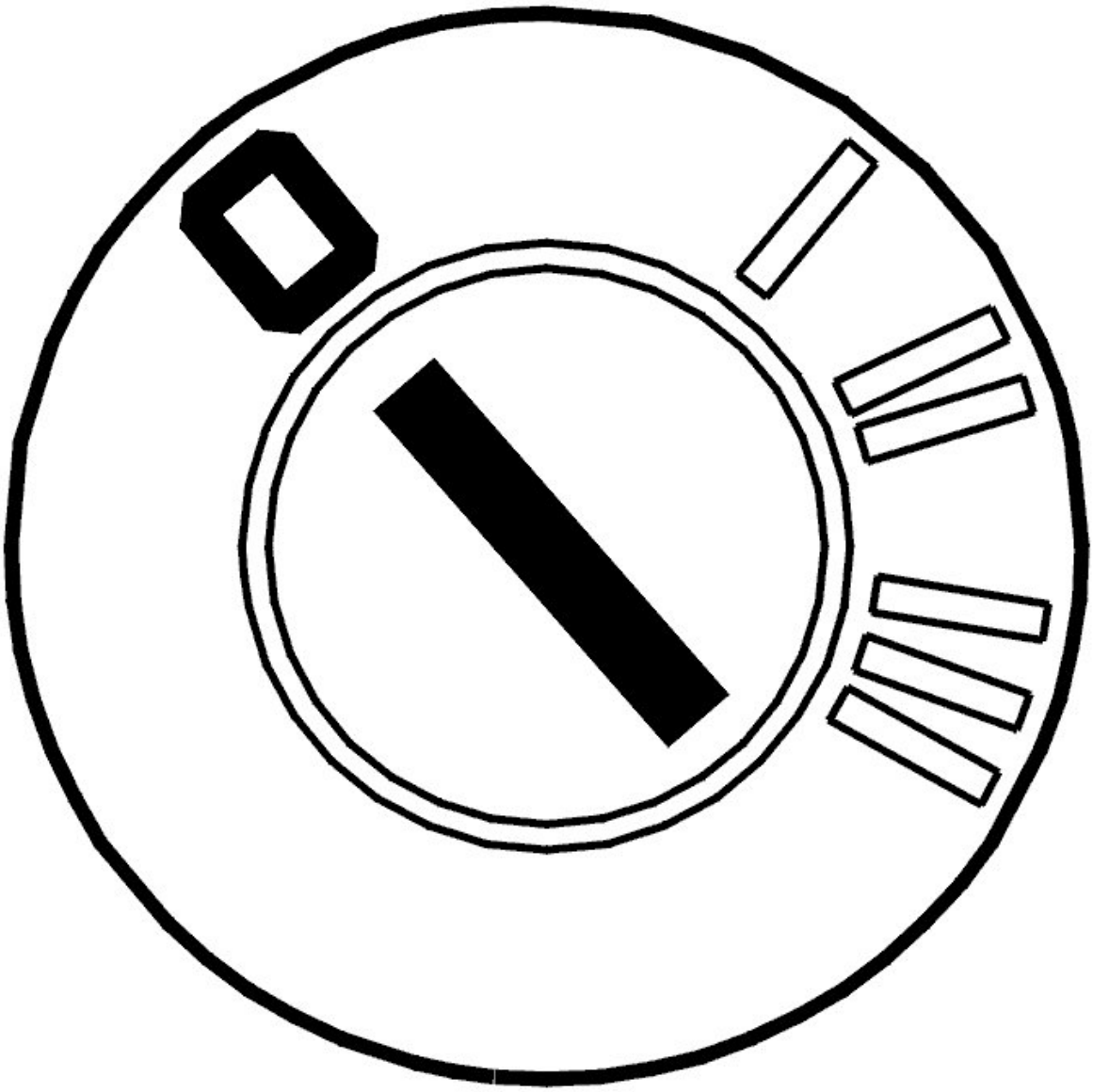


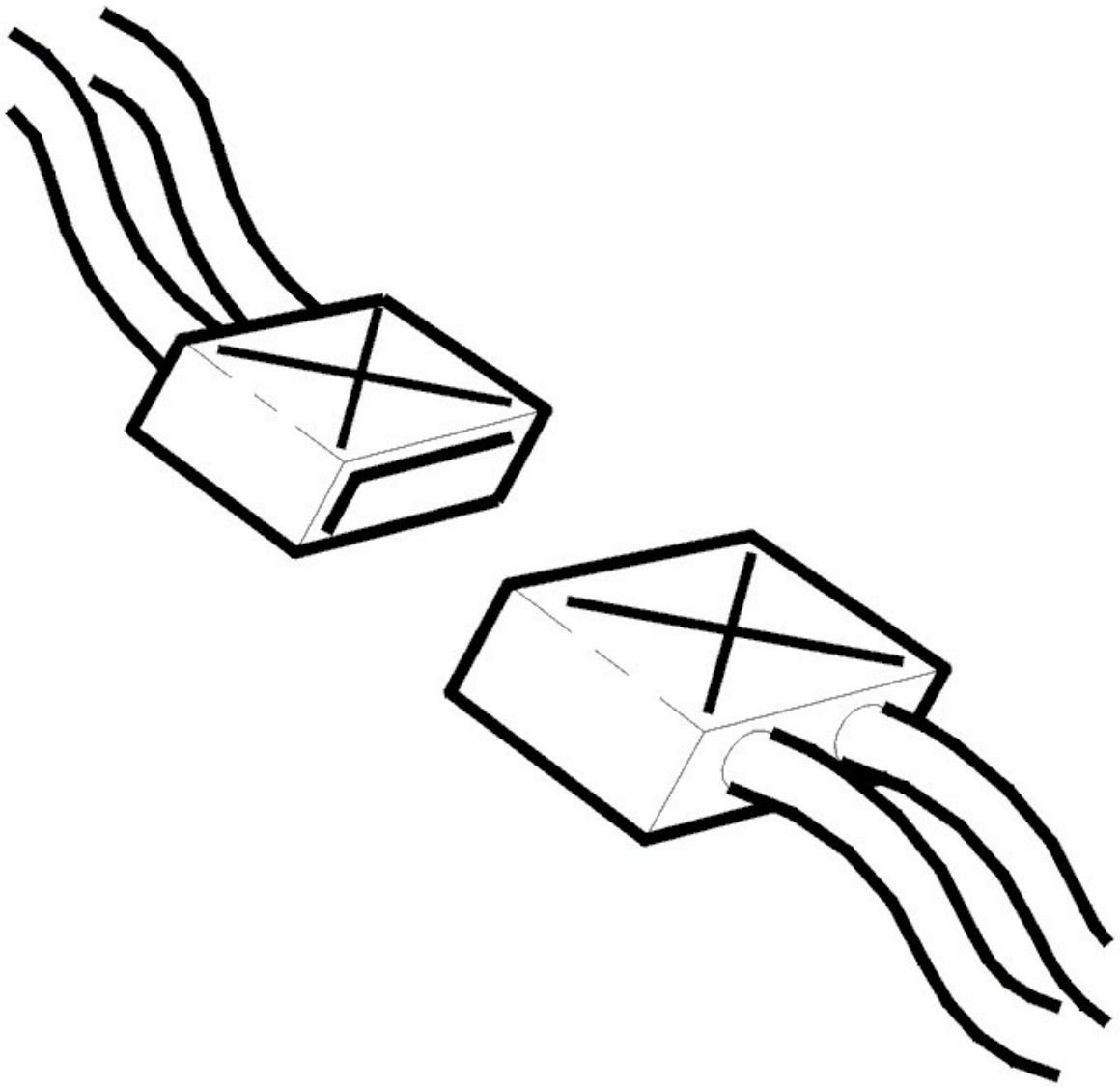
Was a fault detected?

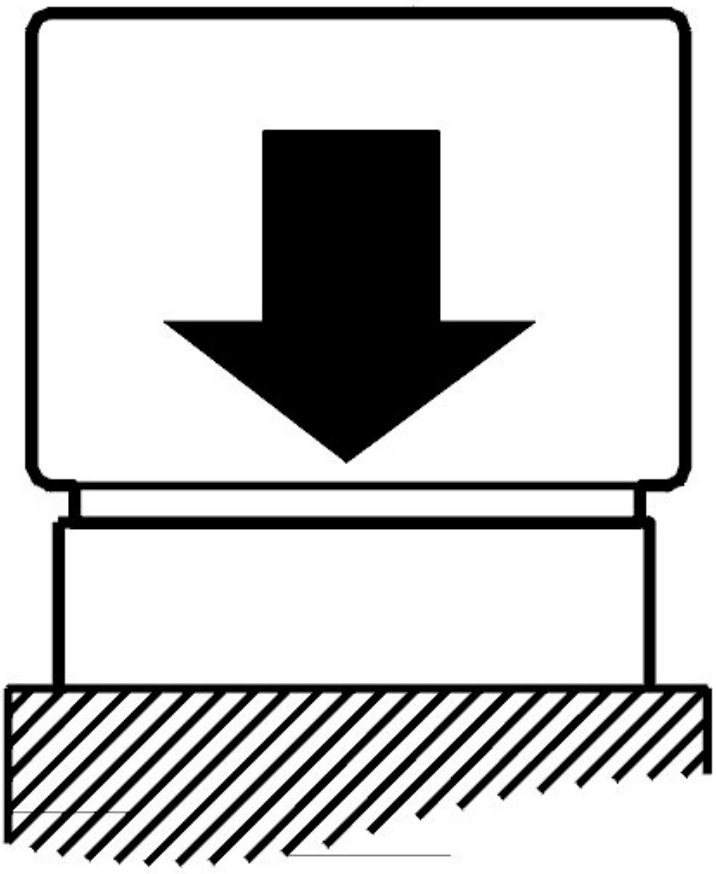
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

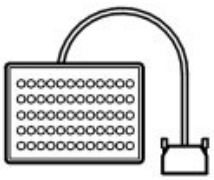
Check the transmission control module (TCM) by measuring the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

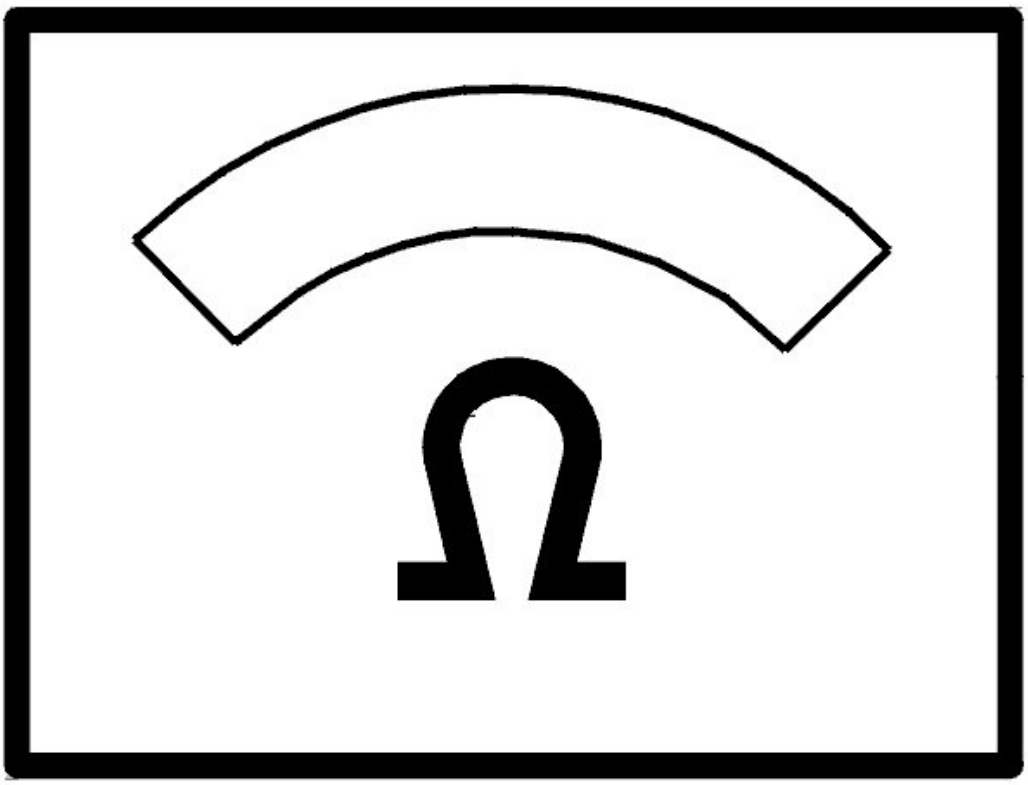
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



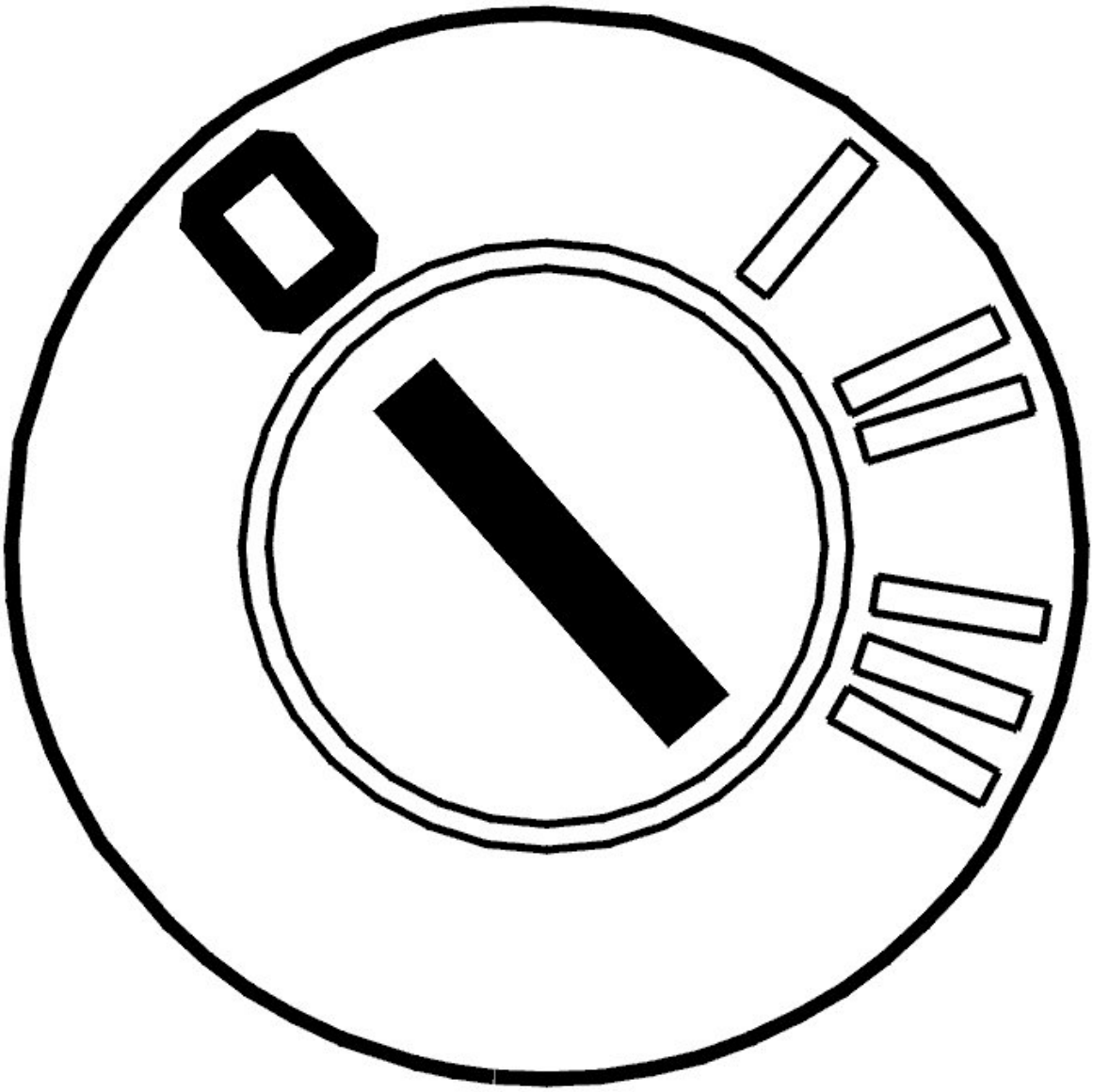


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

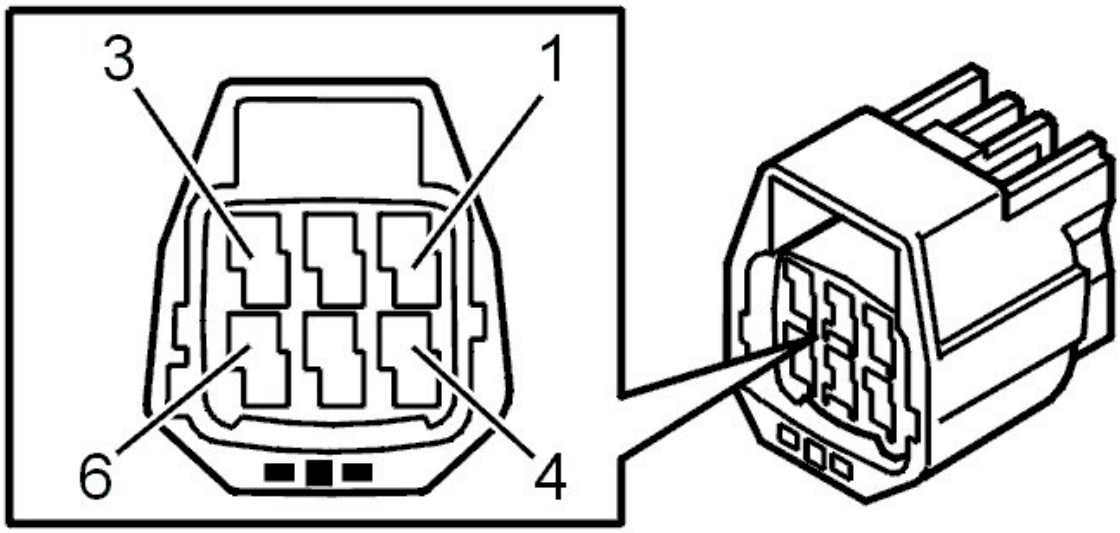
Hint:

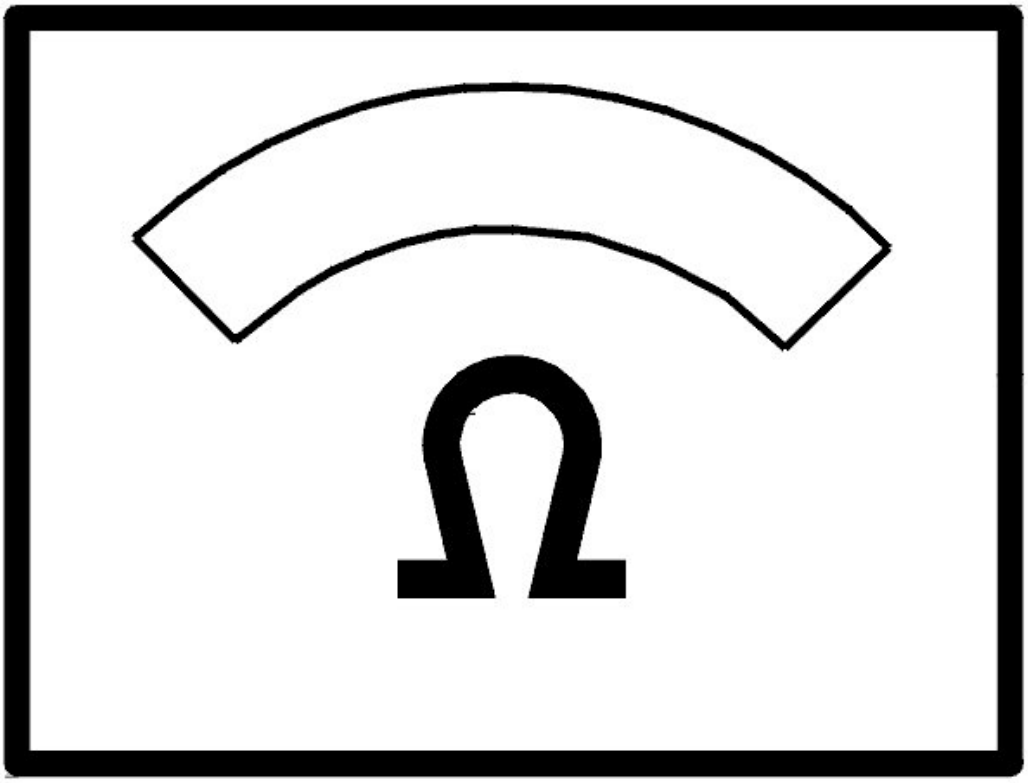
- Check solenoid S1. Measure the resistance between the terminal on solenoid S1 and the transmission housing. The resistance must be 12-16 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To open the control system and to check or replace solenoid S1, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

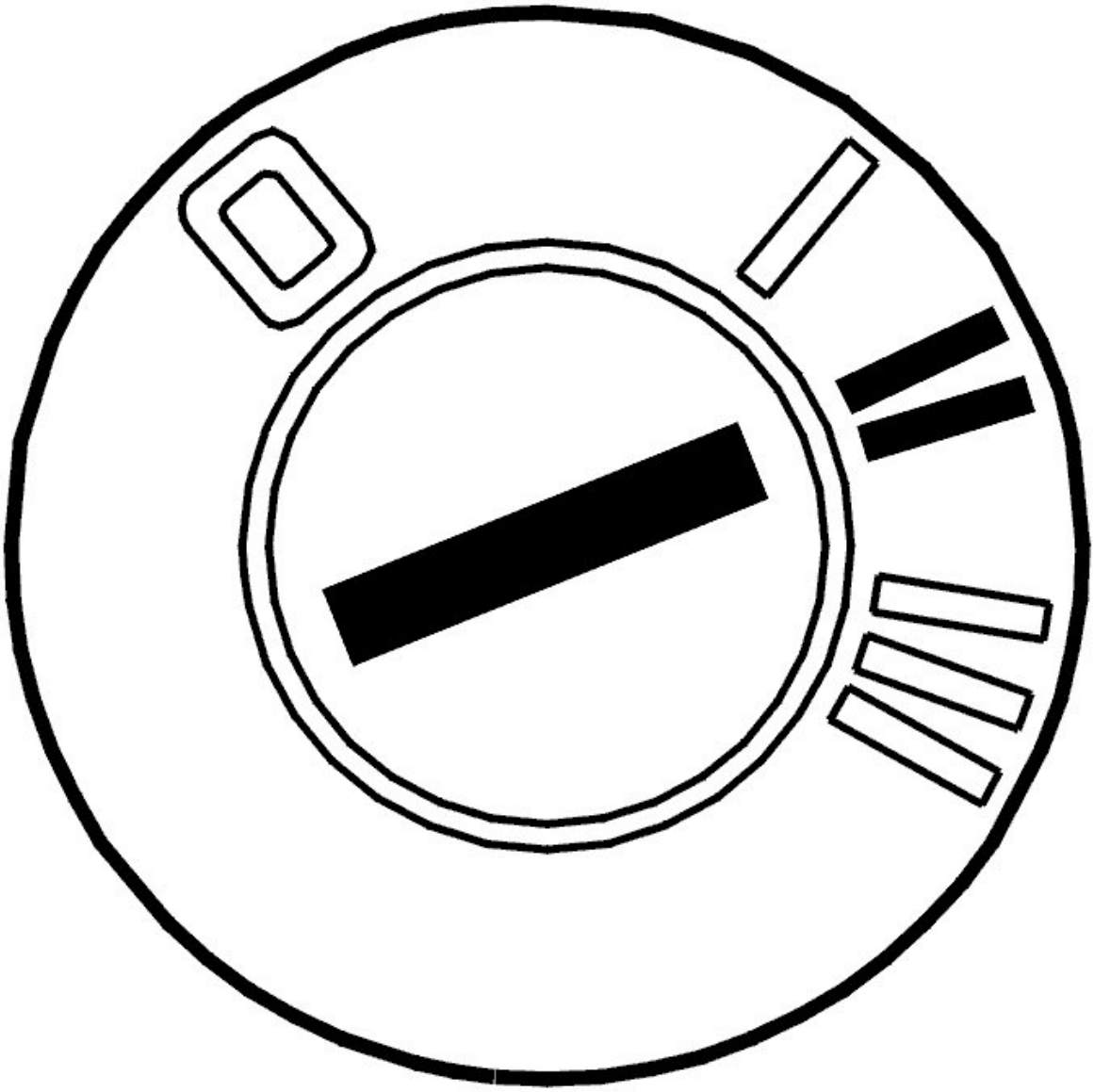
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



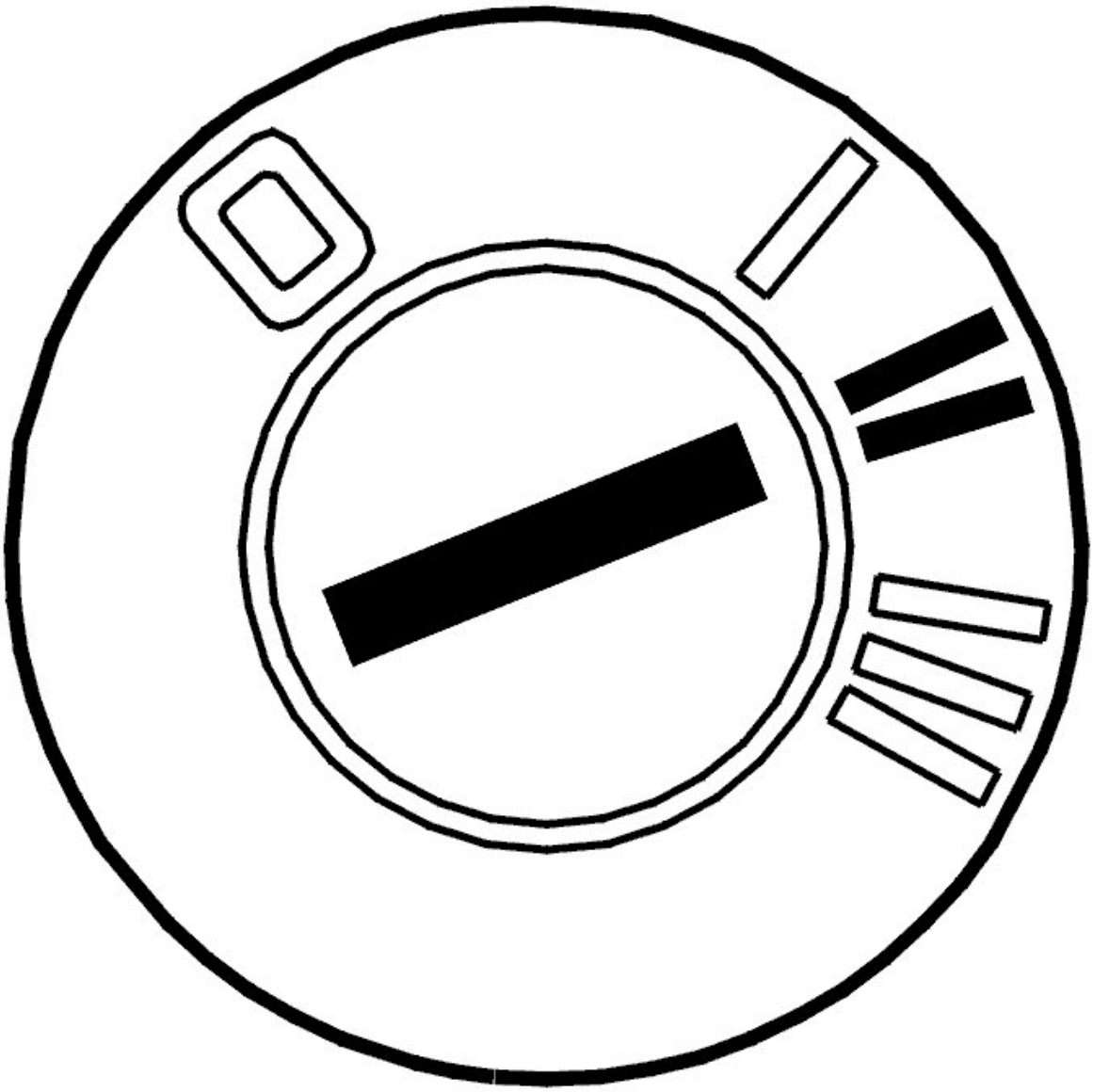
- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Gear selector in position P
- Activate solenoid S1.

The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - **Fault Found**

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the control module and transmission connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults
Check the cable between control module terminal #50 (#A50) and transmission connector terminal #C1. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

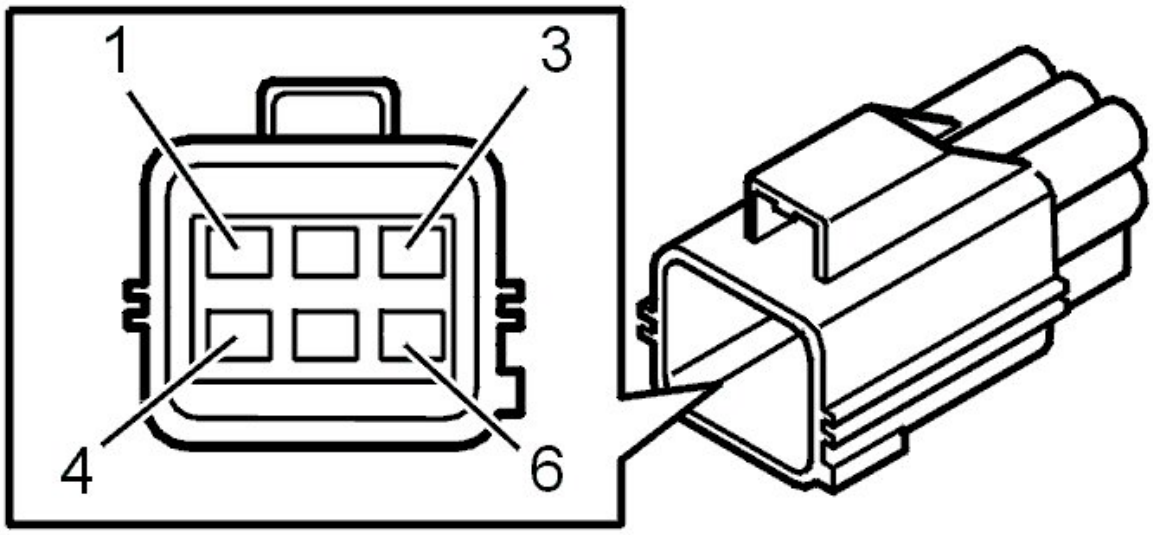
Hint:

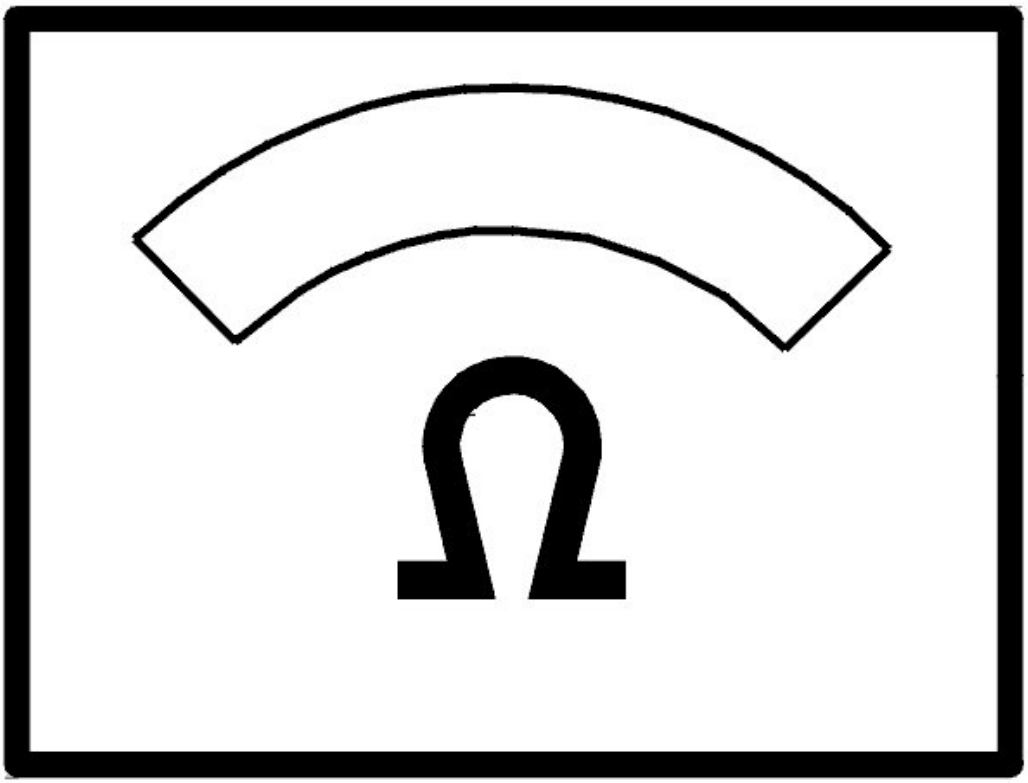
- Check the circuit for solenoid S1: Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be 12-16 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

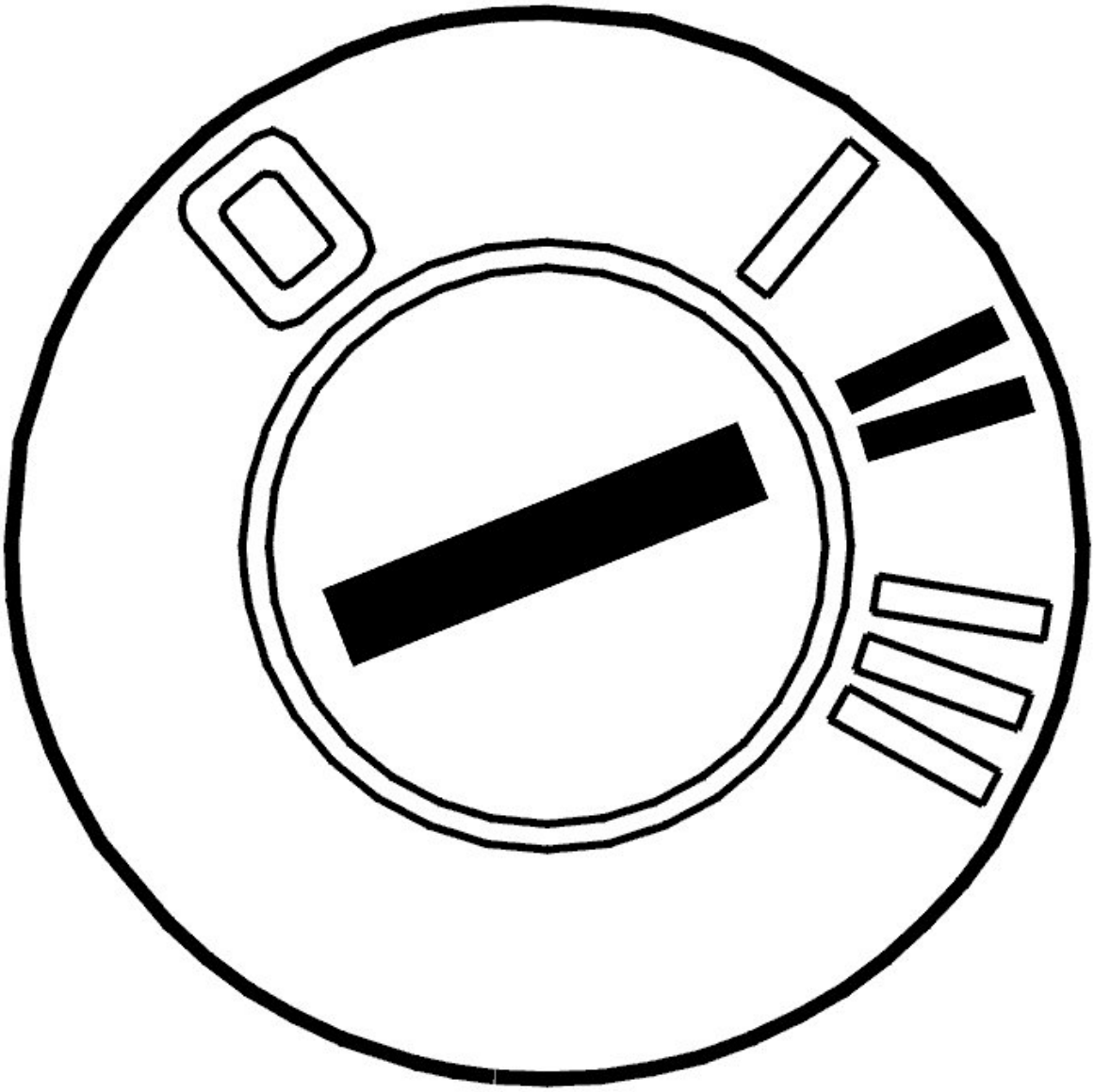
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

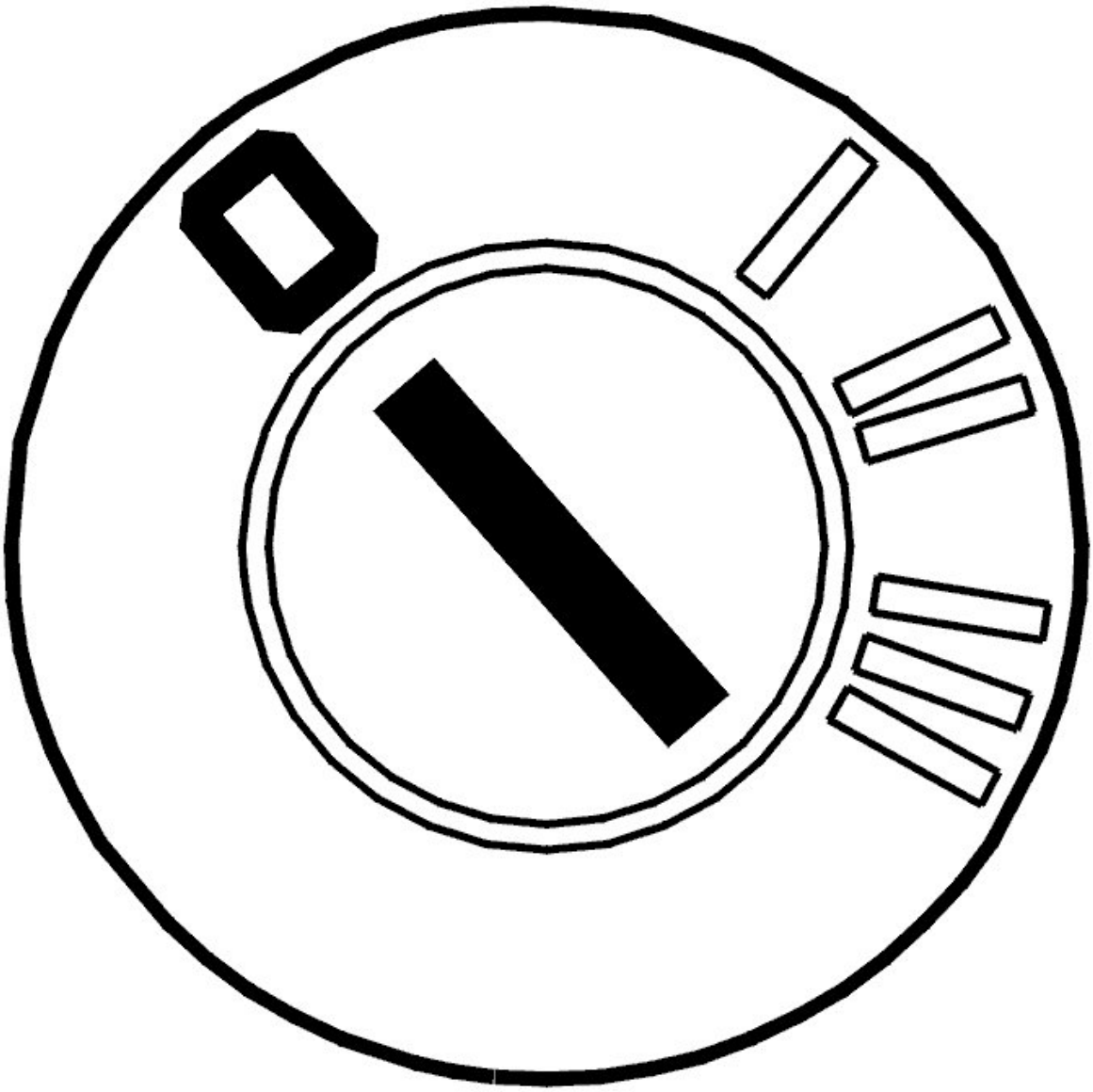
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

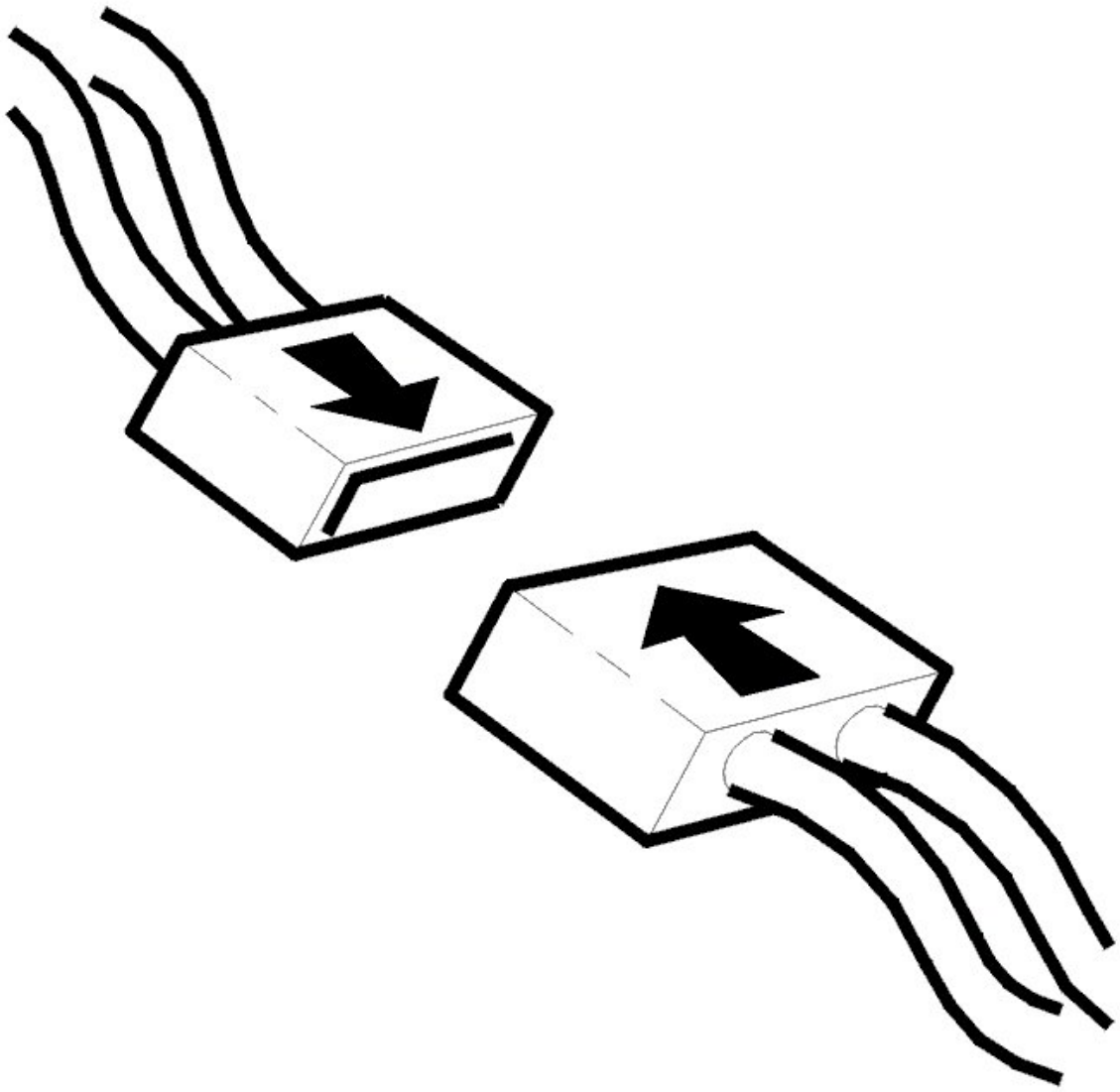
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

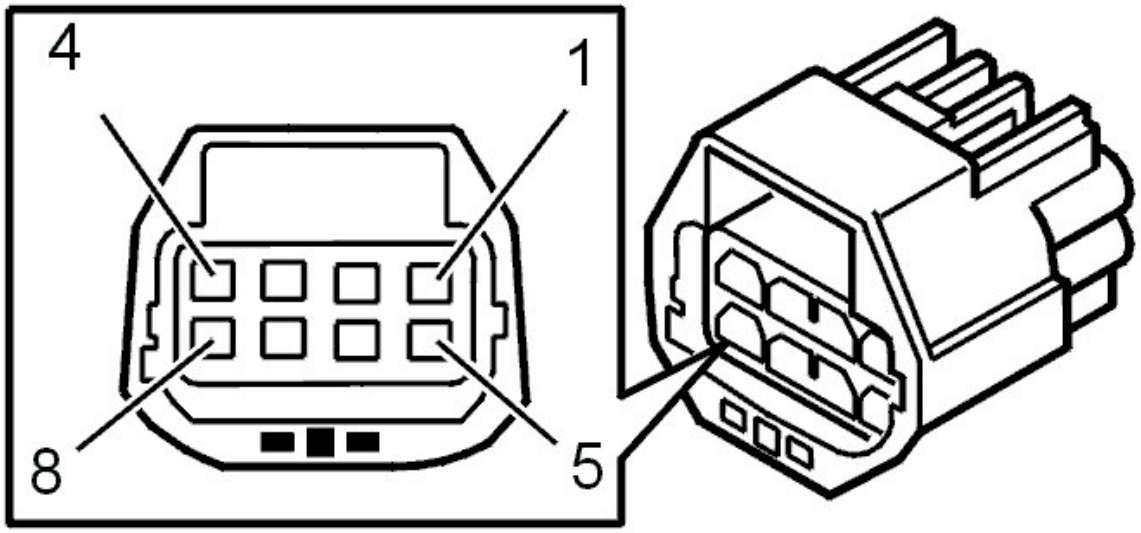
Checking transmission fluid temperature sensor

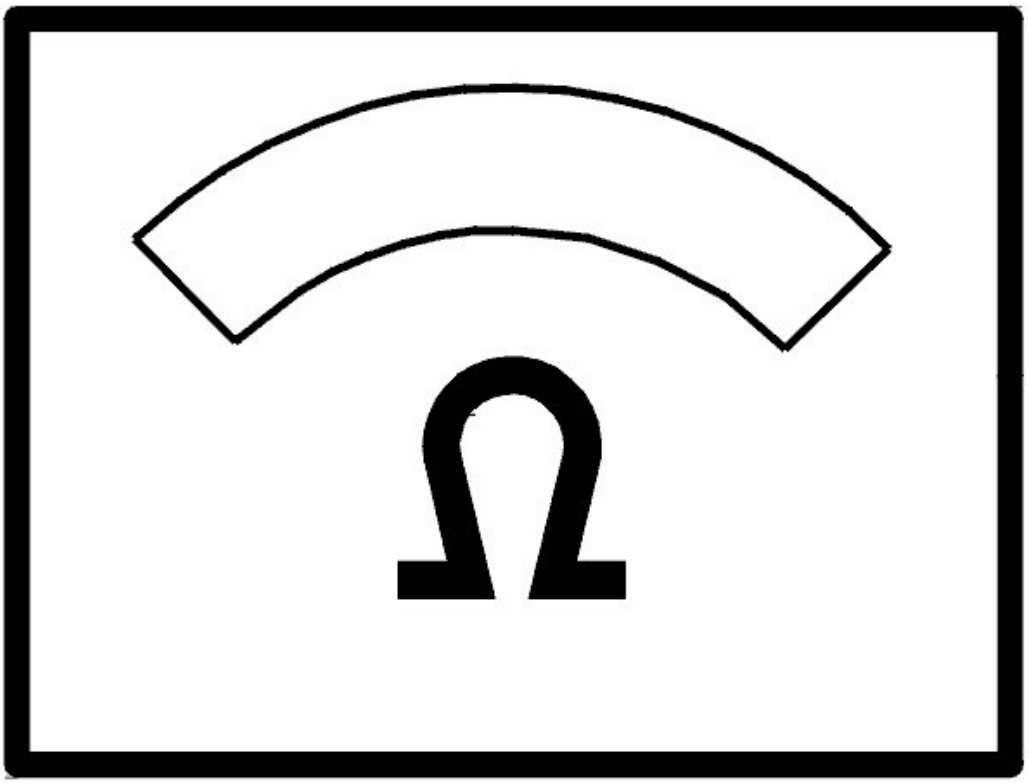




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

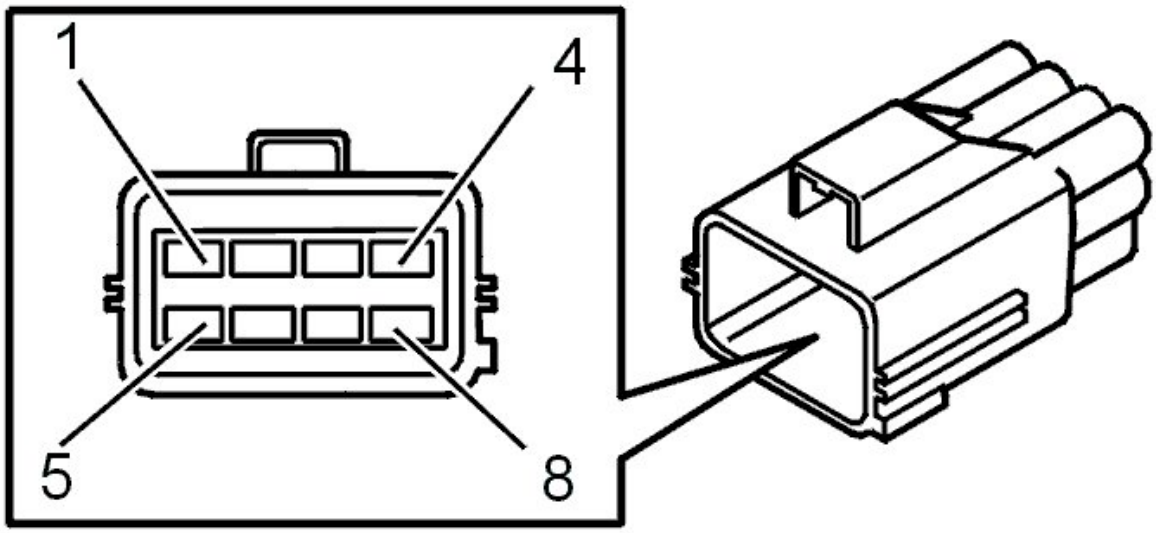
No - Checking the cable and component

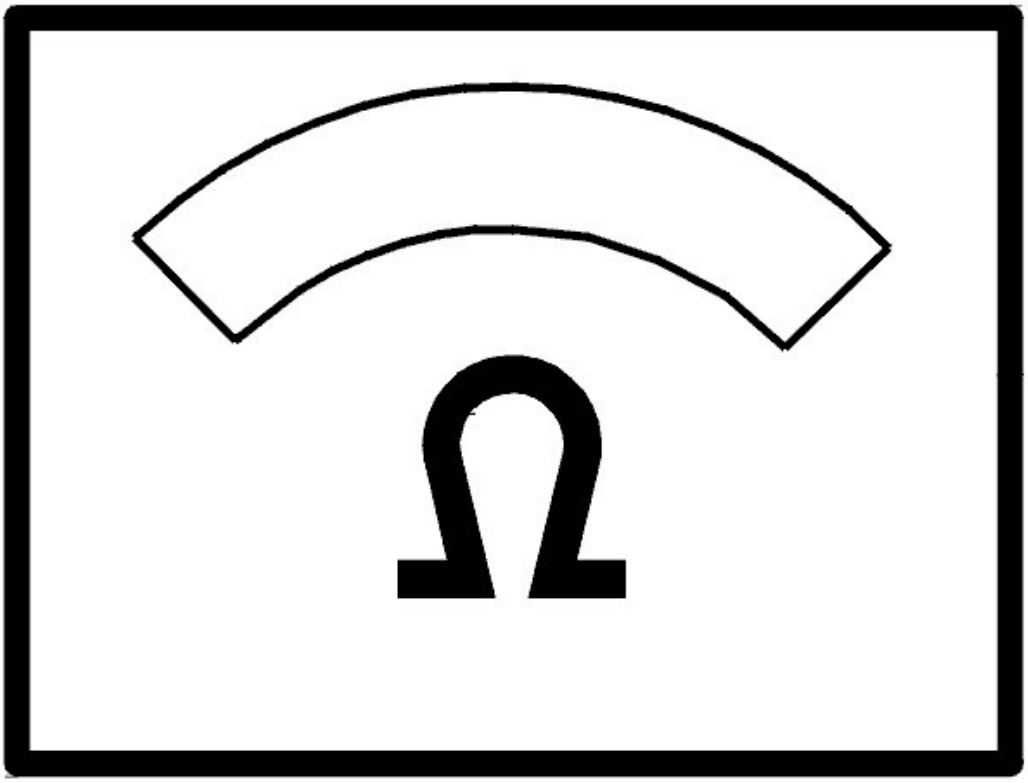
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



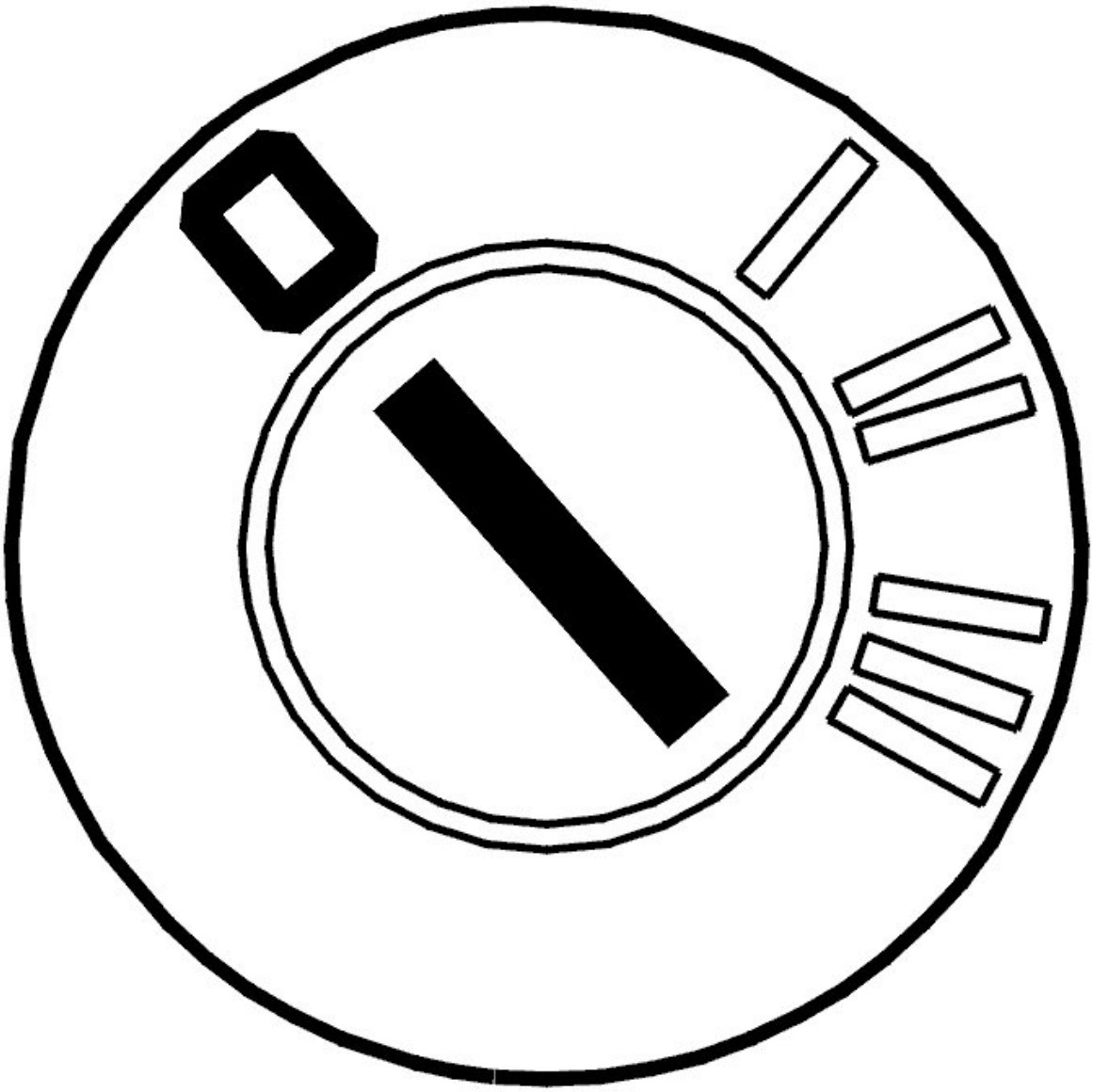


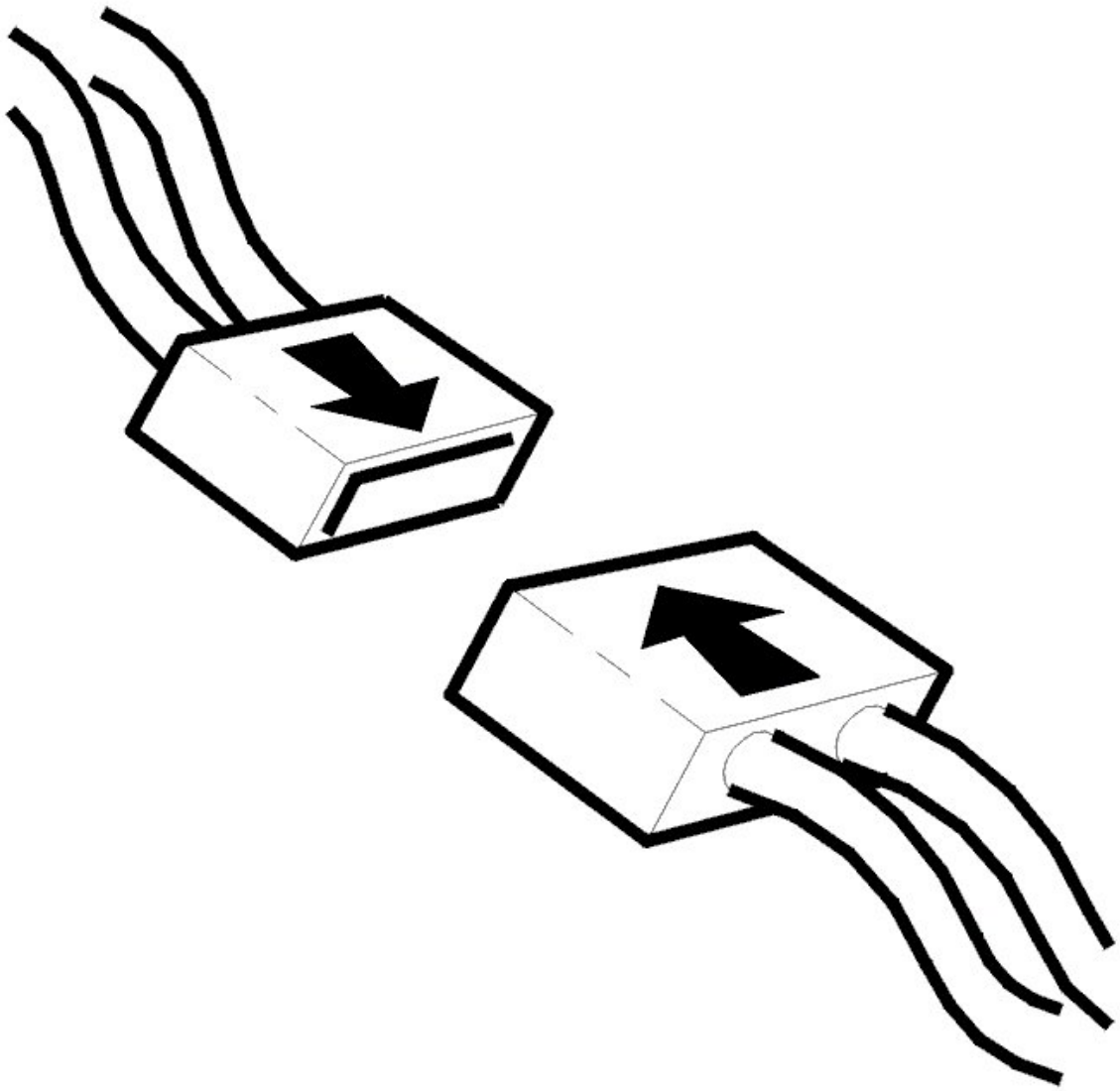
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

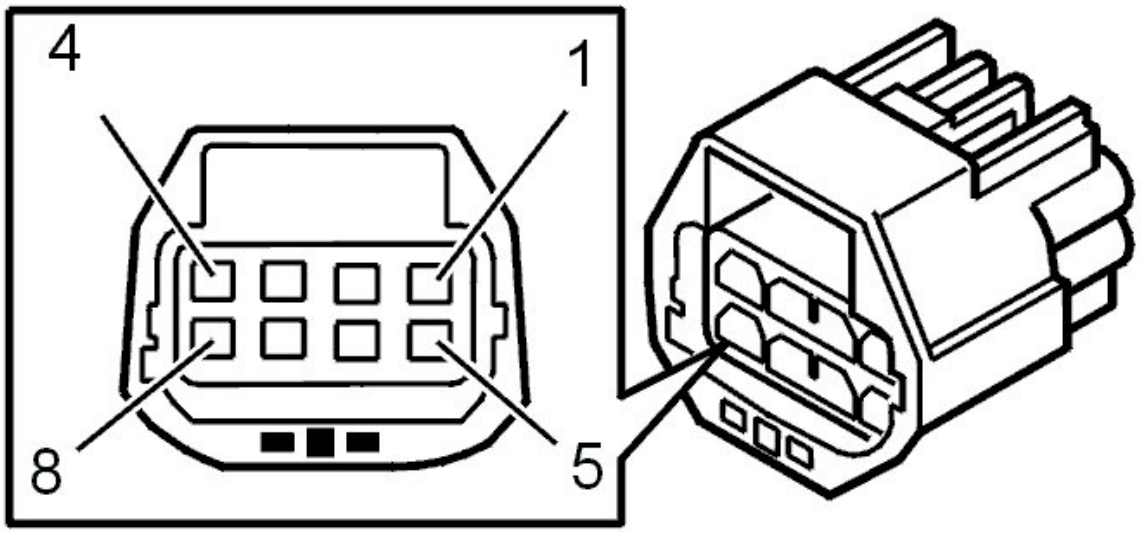
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

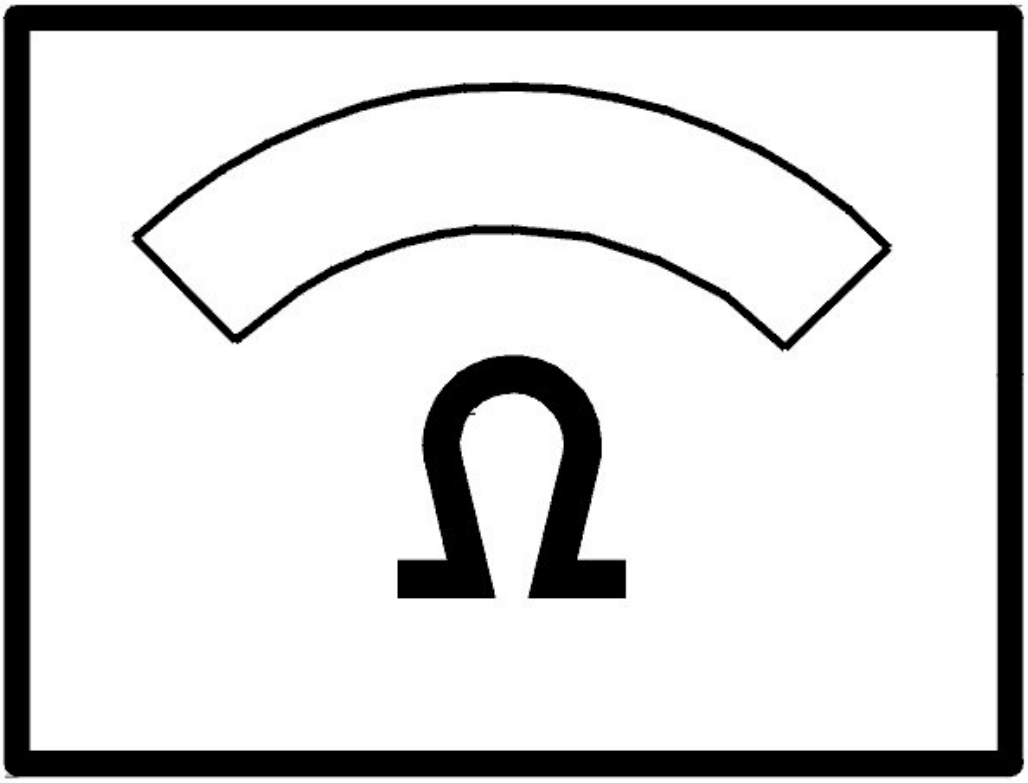
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





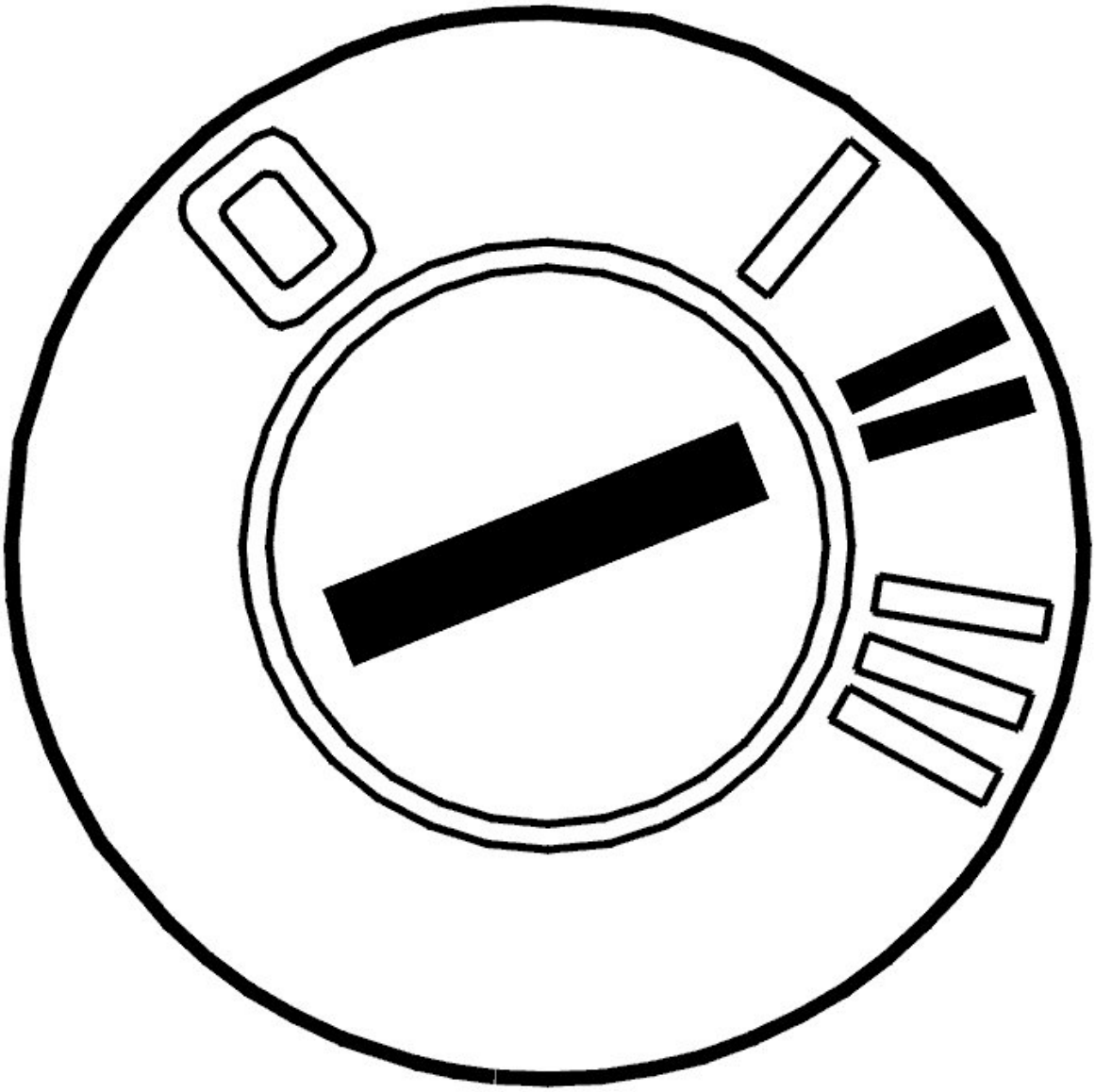
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

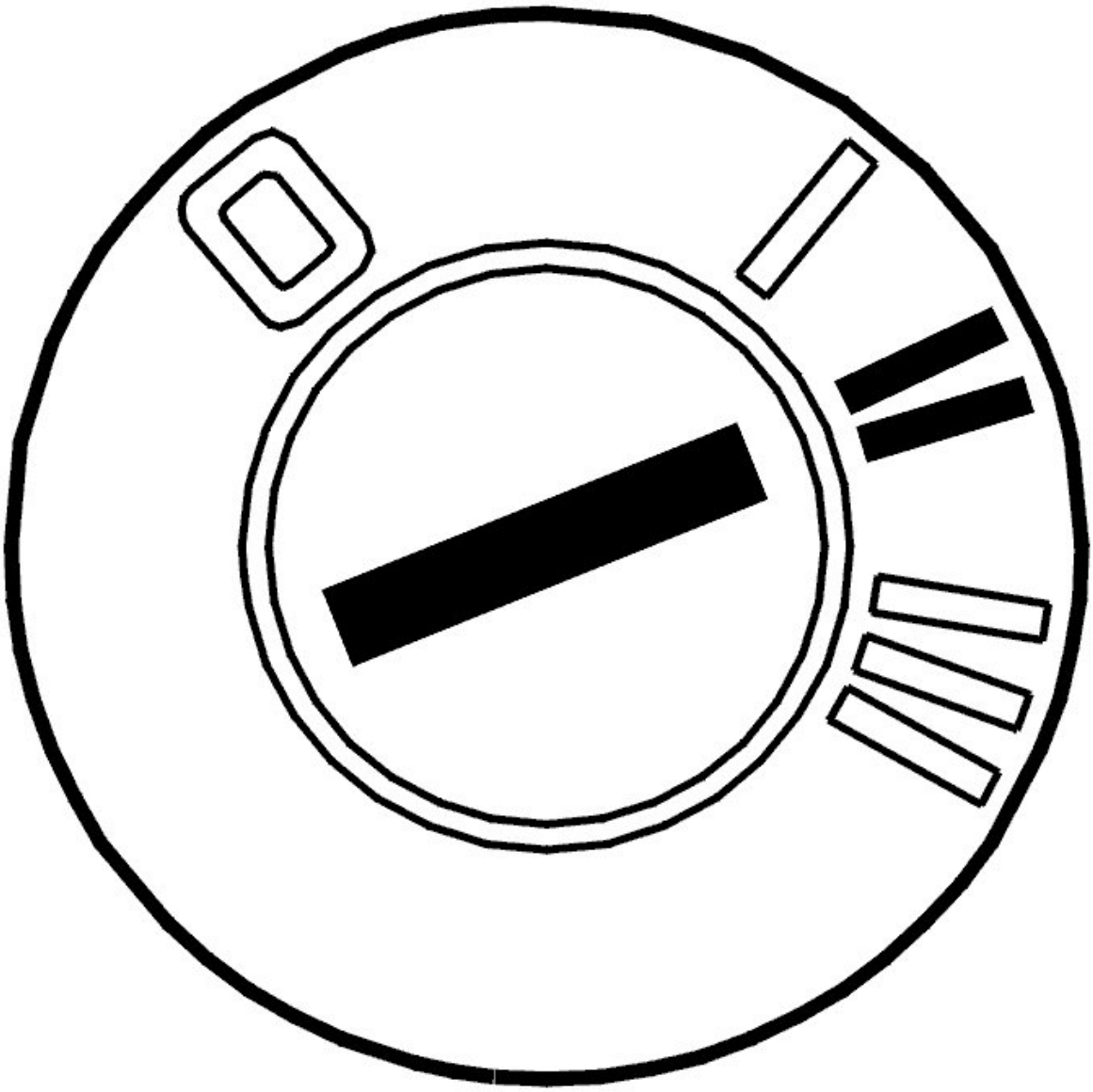
Continue - **DONE**

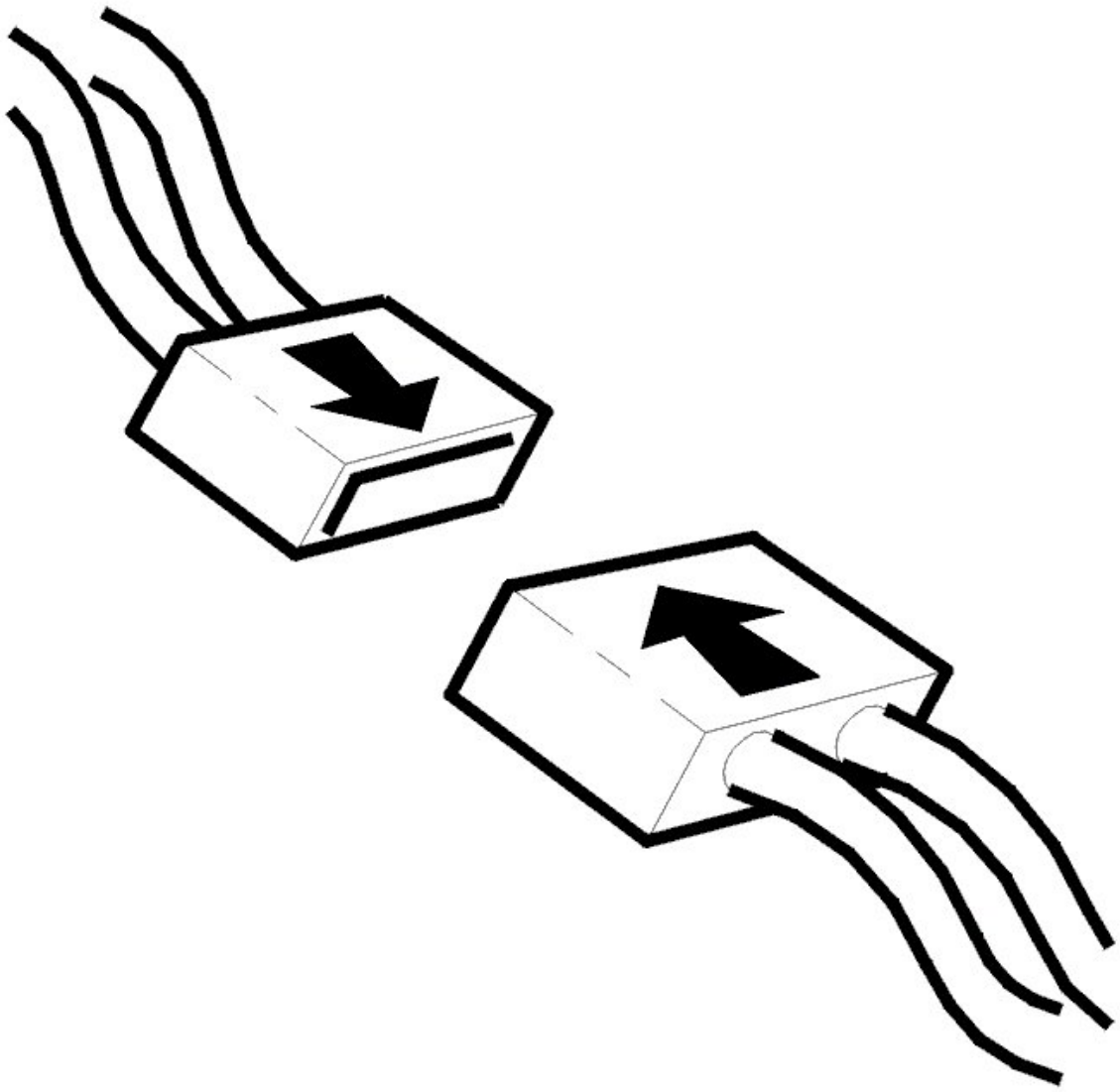
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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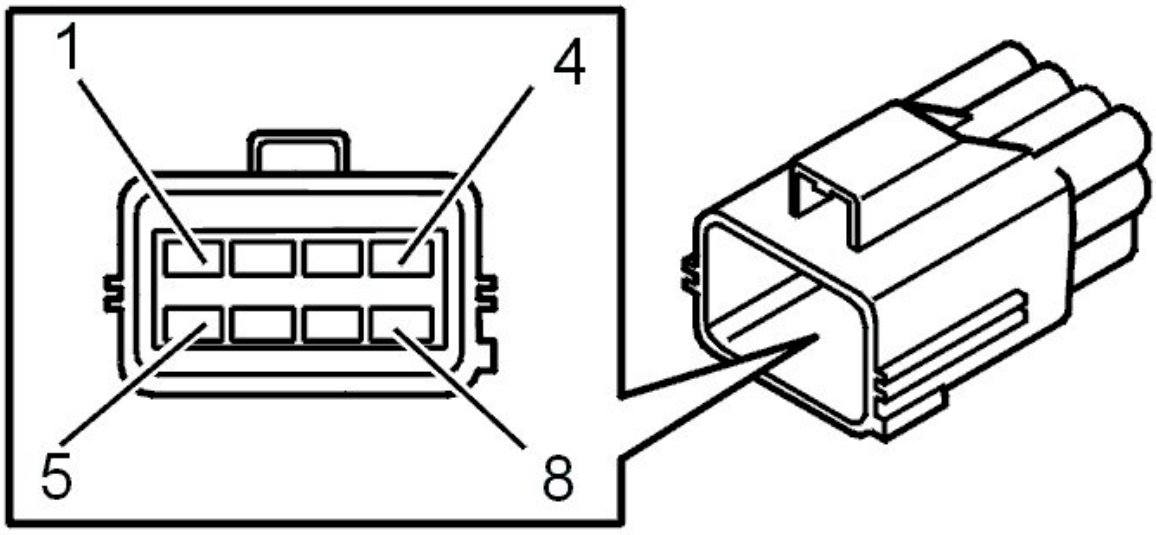
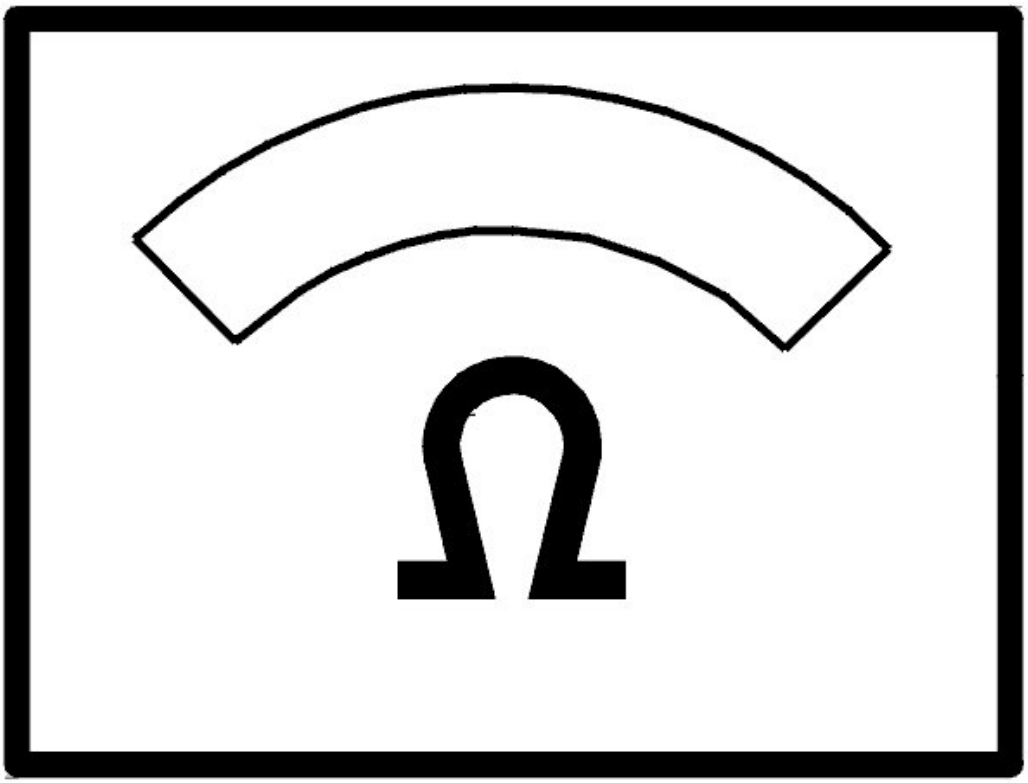
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition
Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid should be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

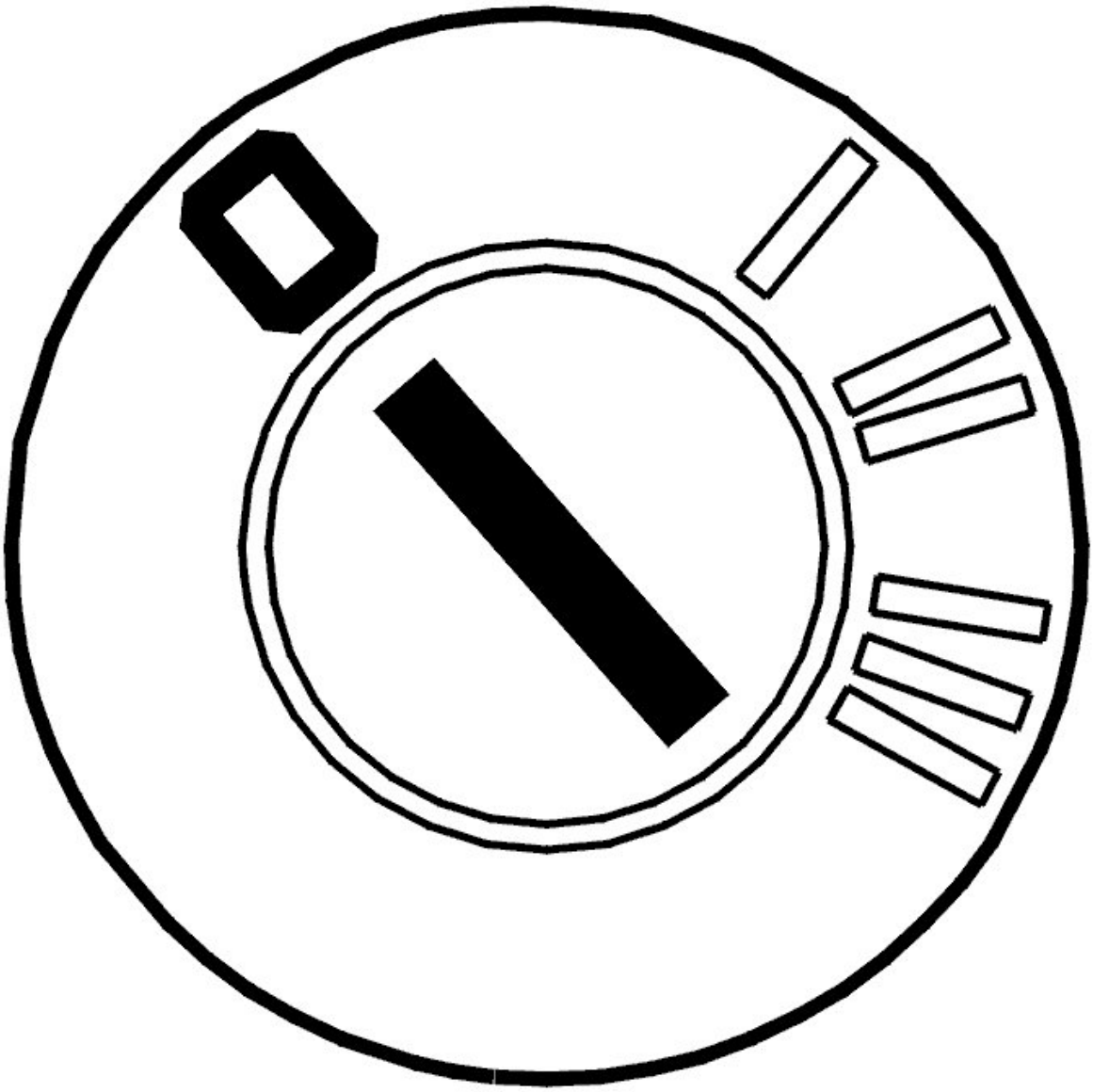
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Signal Too Low

Signal too low

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

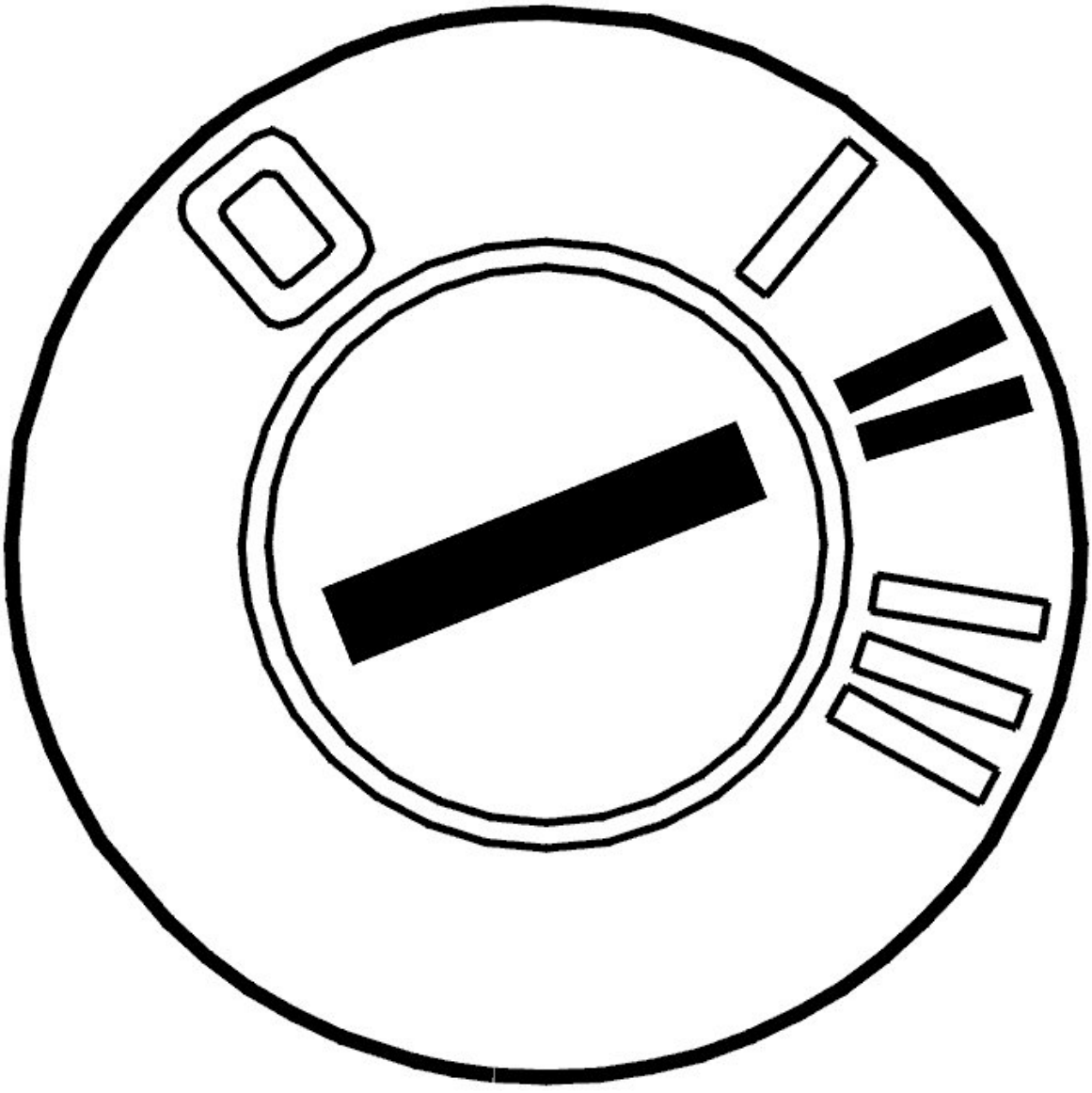
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S1

No - Checking transmission fluid temperature sensor

Checking shift solenoid S1



- Ignition on
- Gear selector in position P
- Activate solenoid S1.

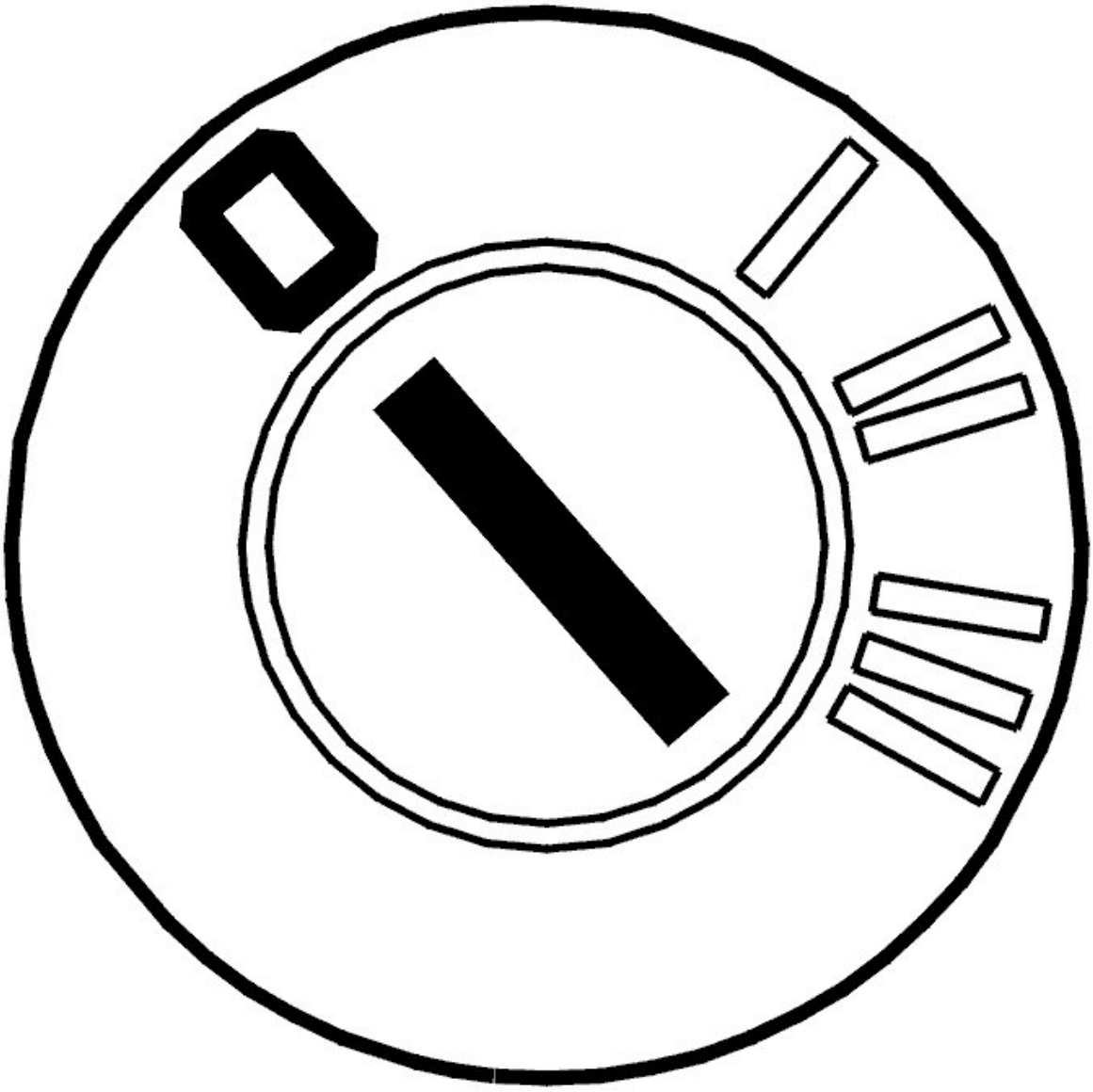
The value must change between OFF and ON.

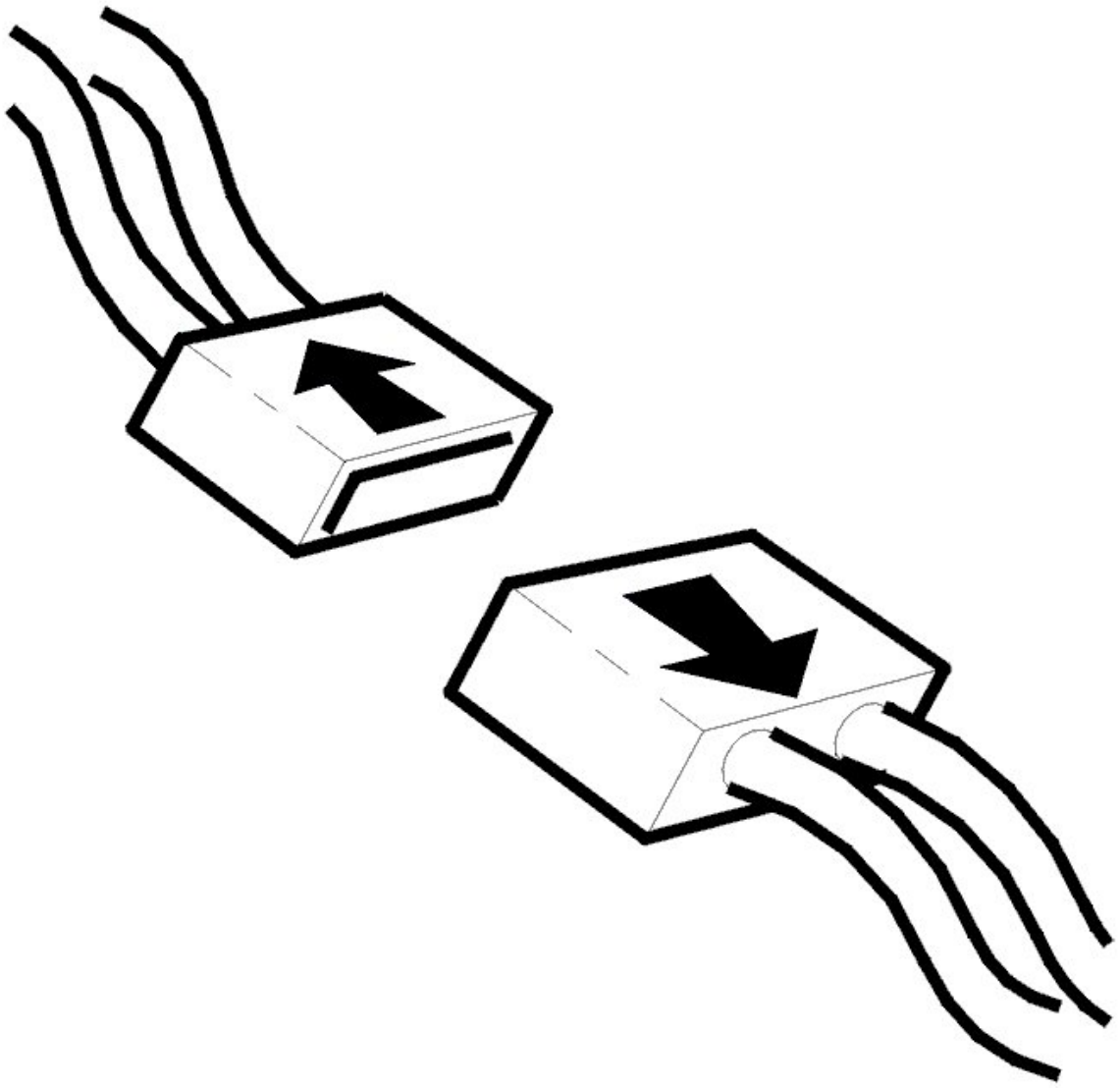
Does the value change?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



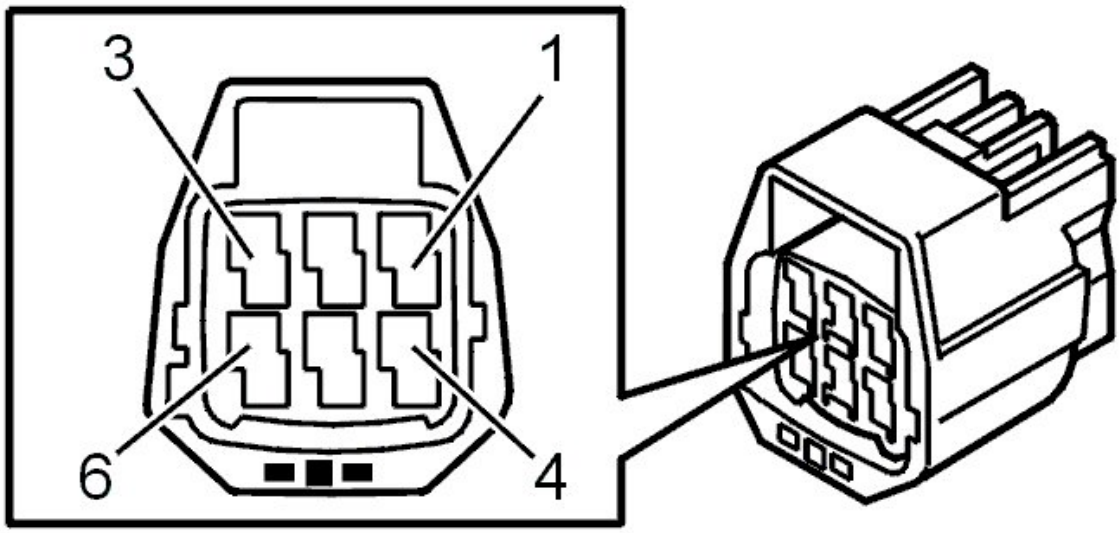


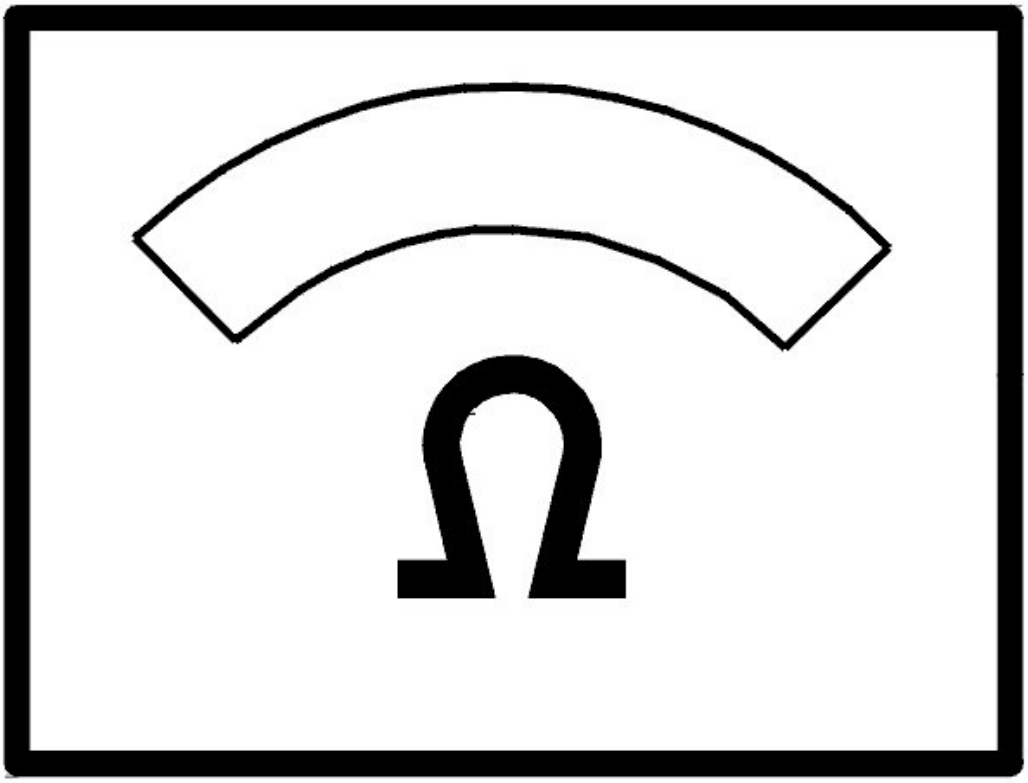
- Ignition off
- Disconnect transmission connector C.

Check solenoid S1 by measuring the resistance between transmission connector terminal #C1 and the transmission housing. The resistance must be 12-16 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



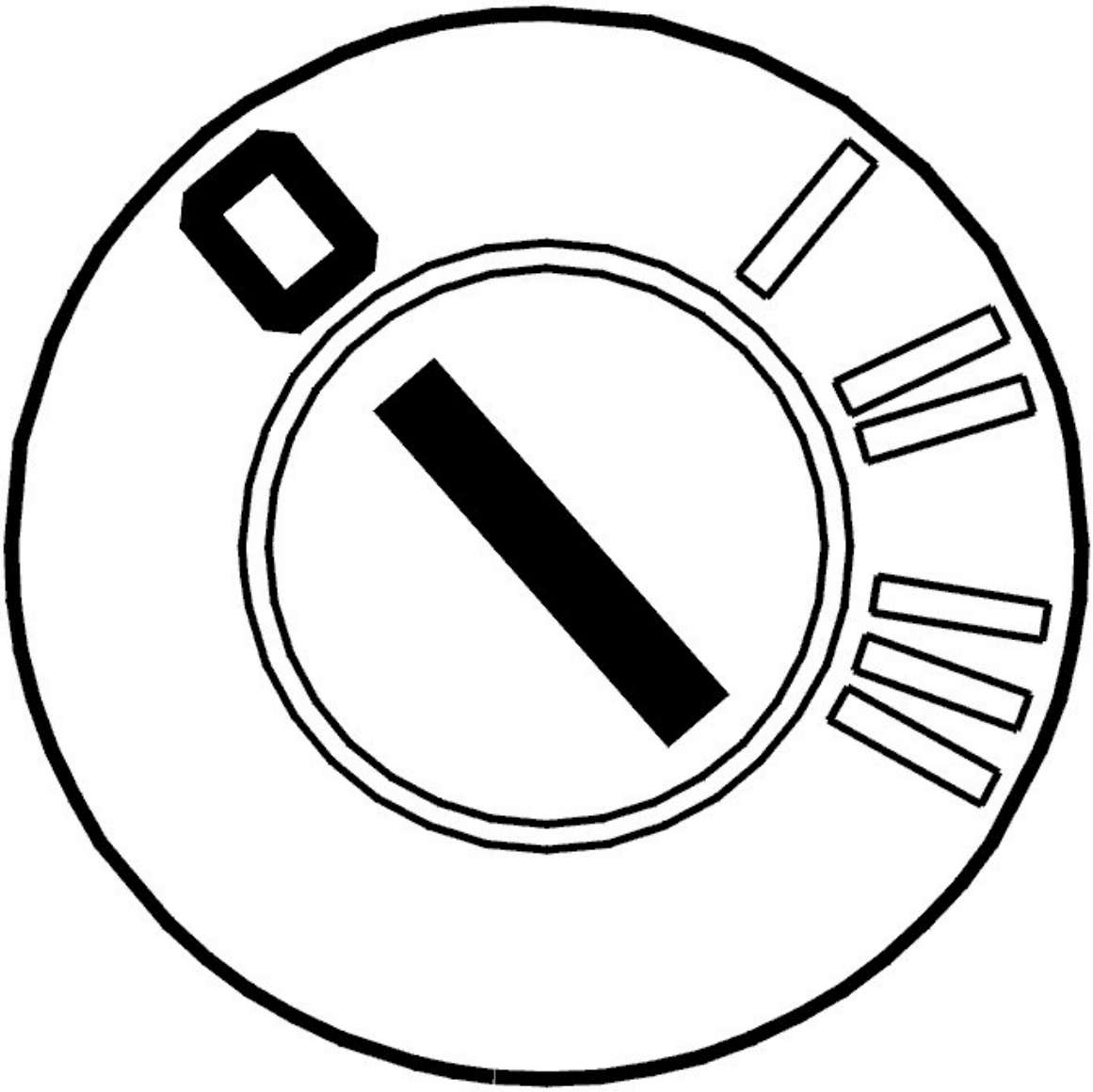


Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring

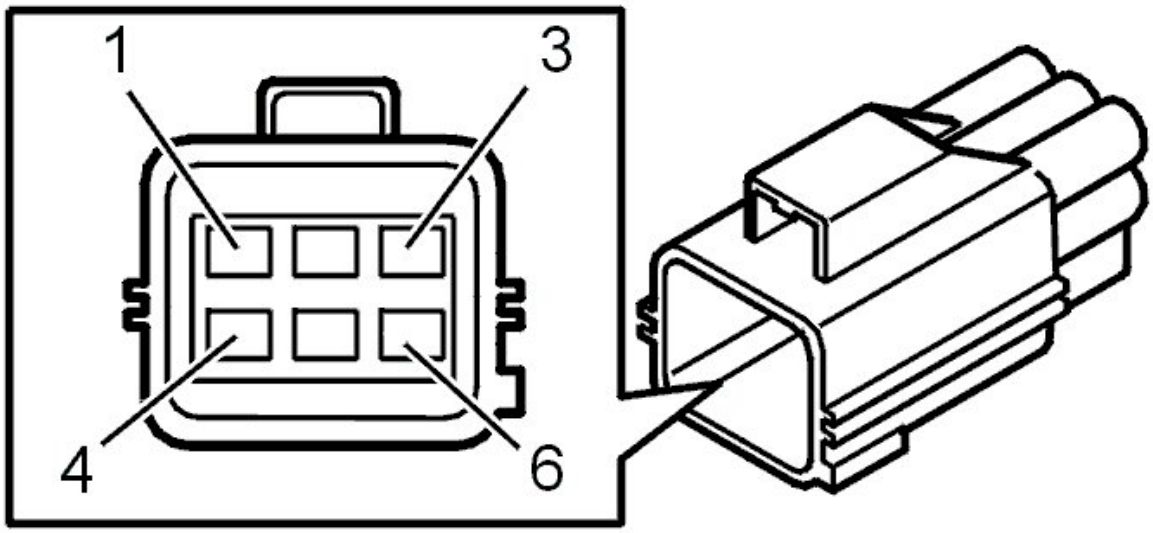


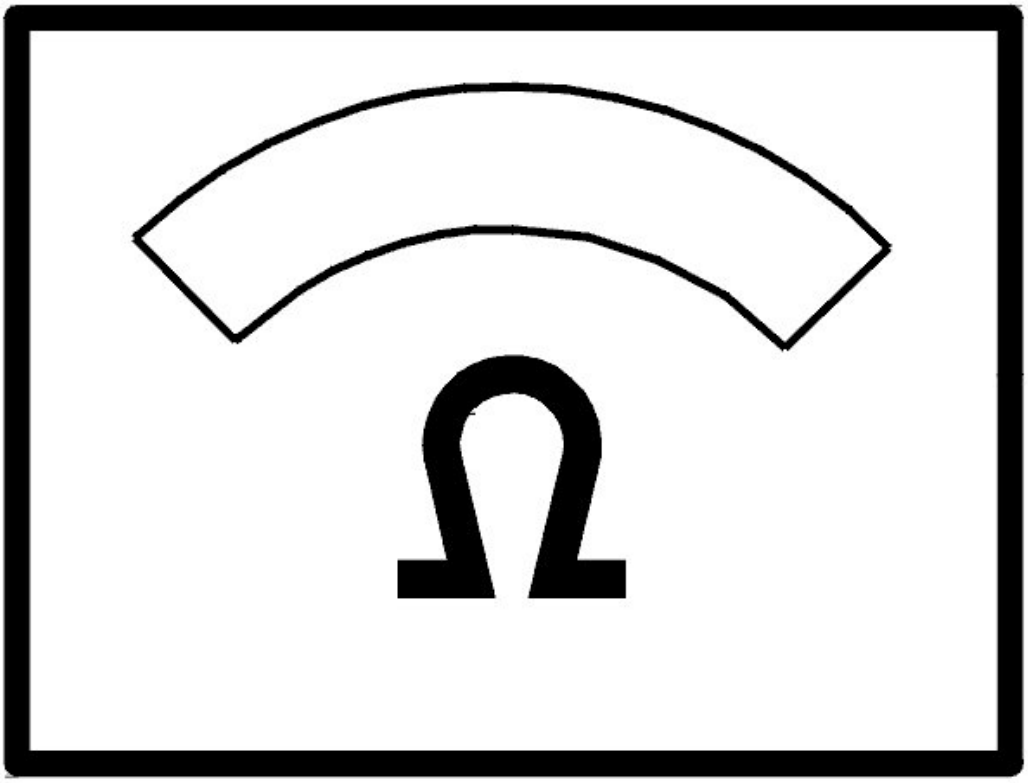
- Ignition off.

Check the cable between control module terminal #A50 (#A50) and transmission connector terminal #C1 (control module side). Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



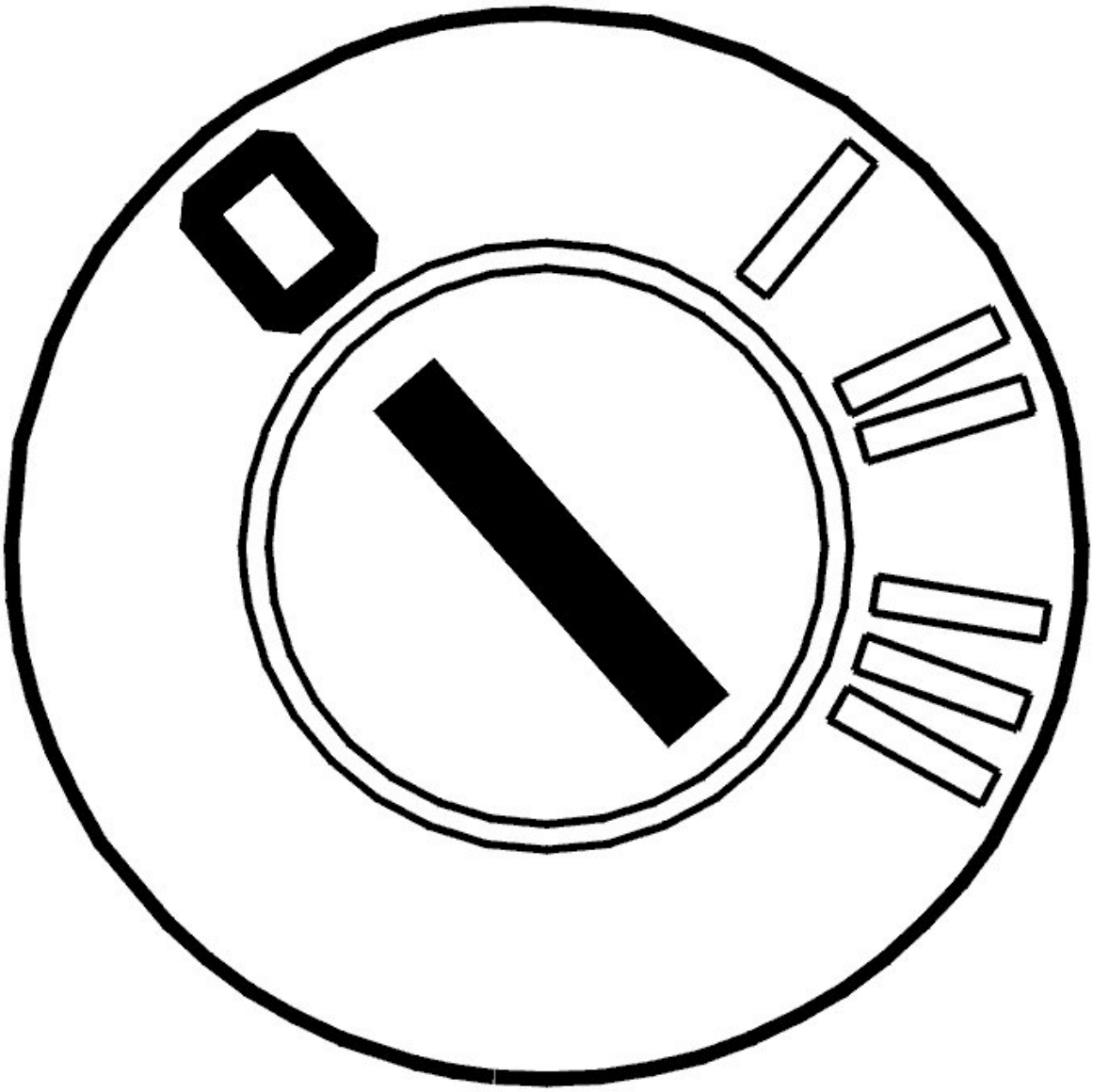


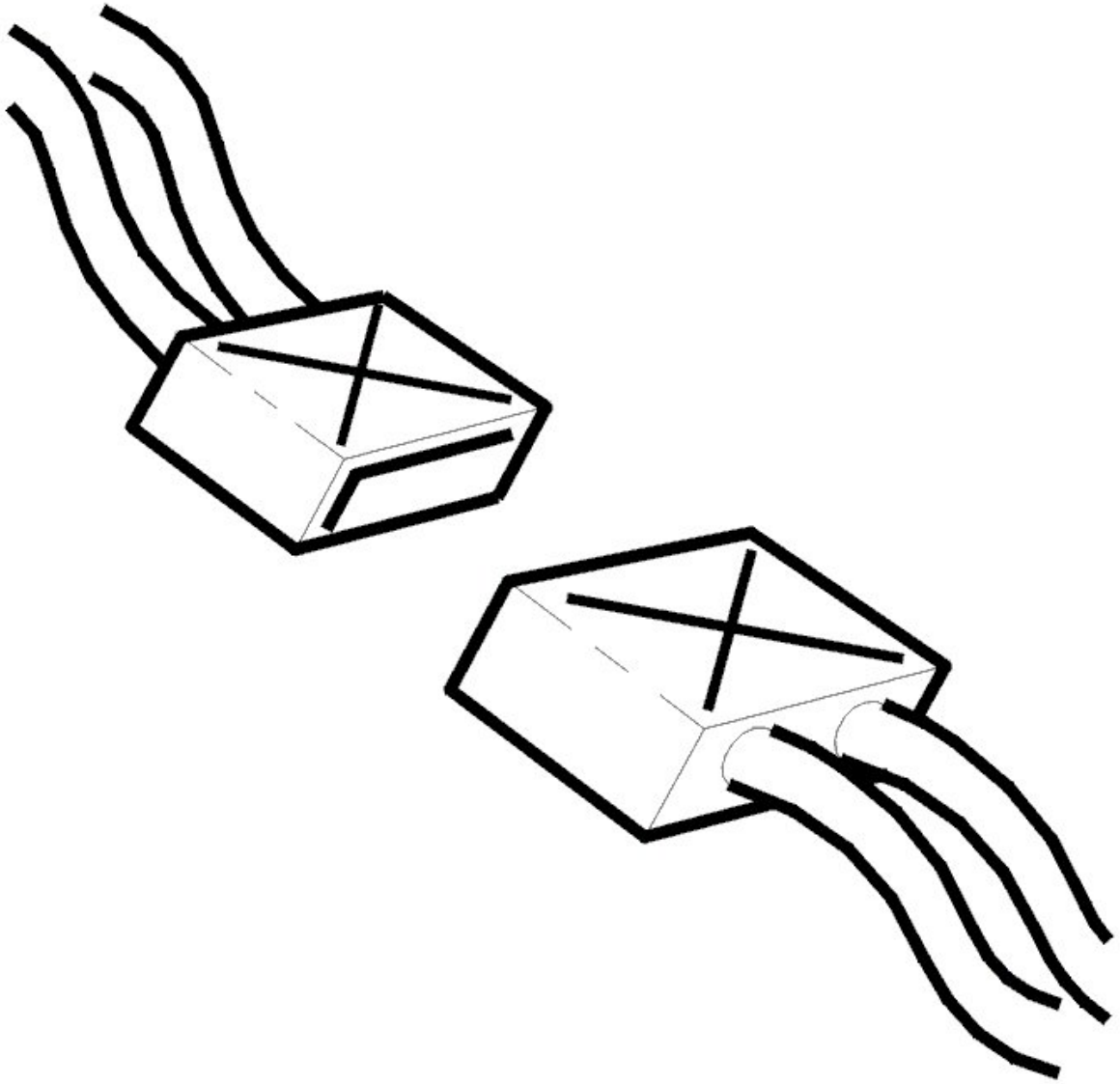
Was a fault detected?

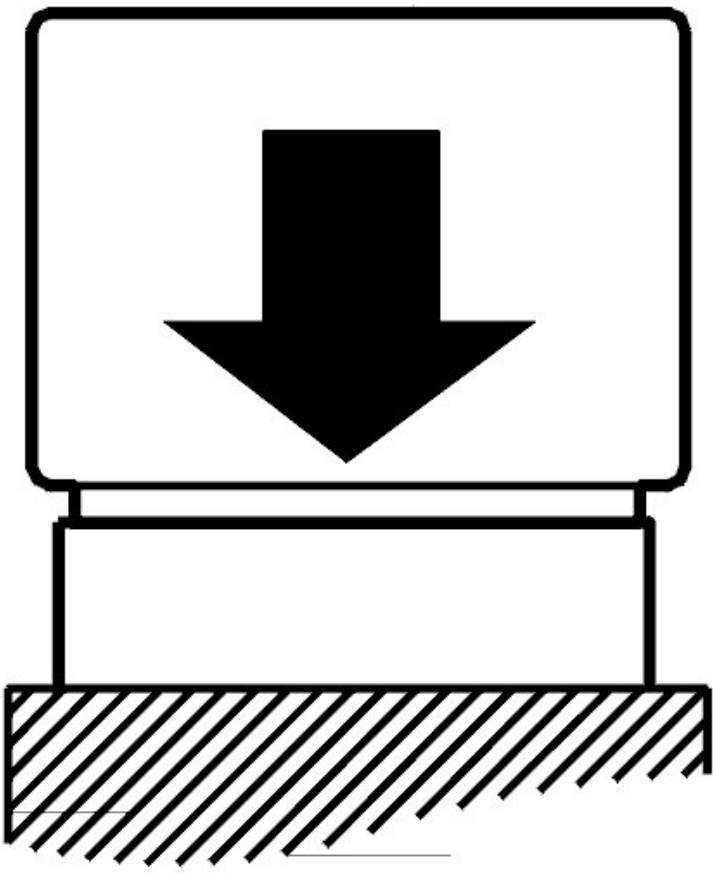
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

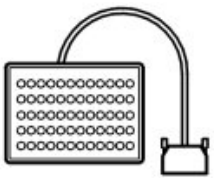
Check the transmission control module (TCM) by measuring the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

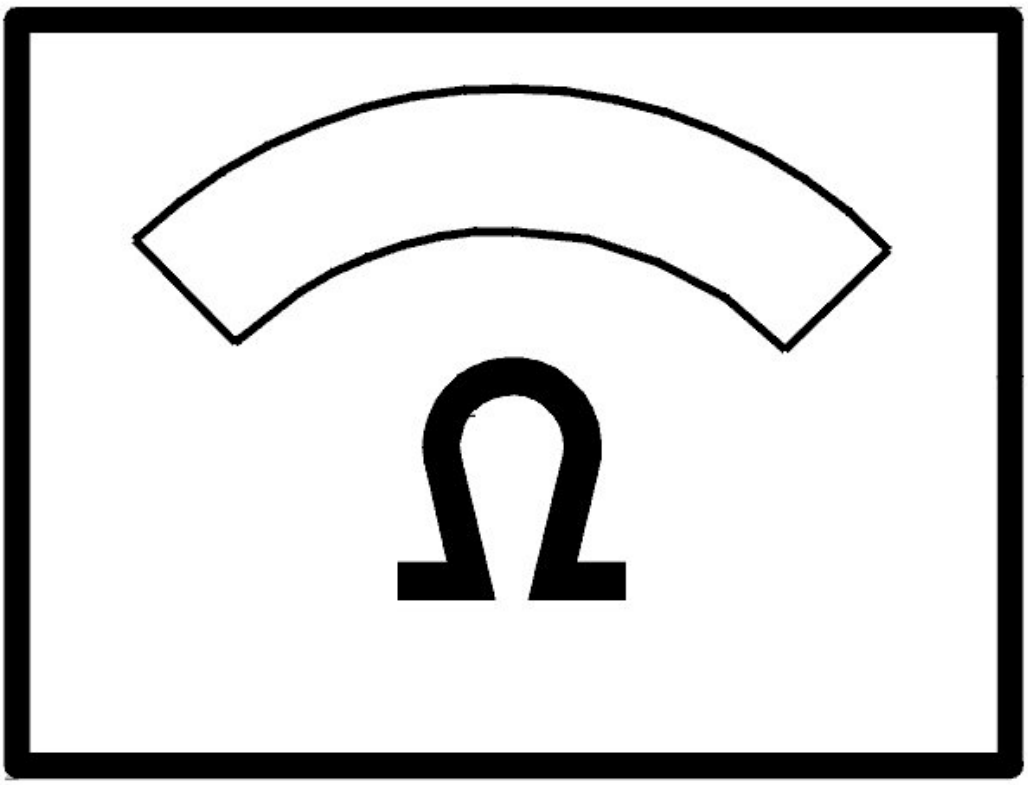
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



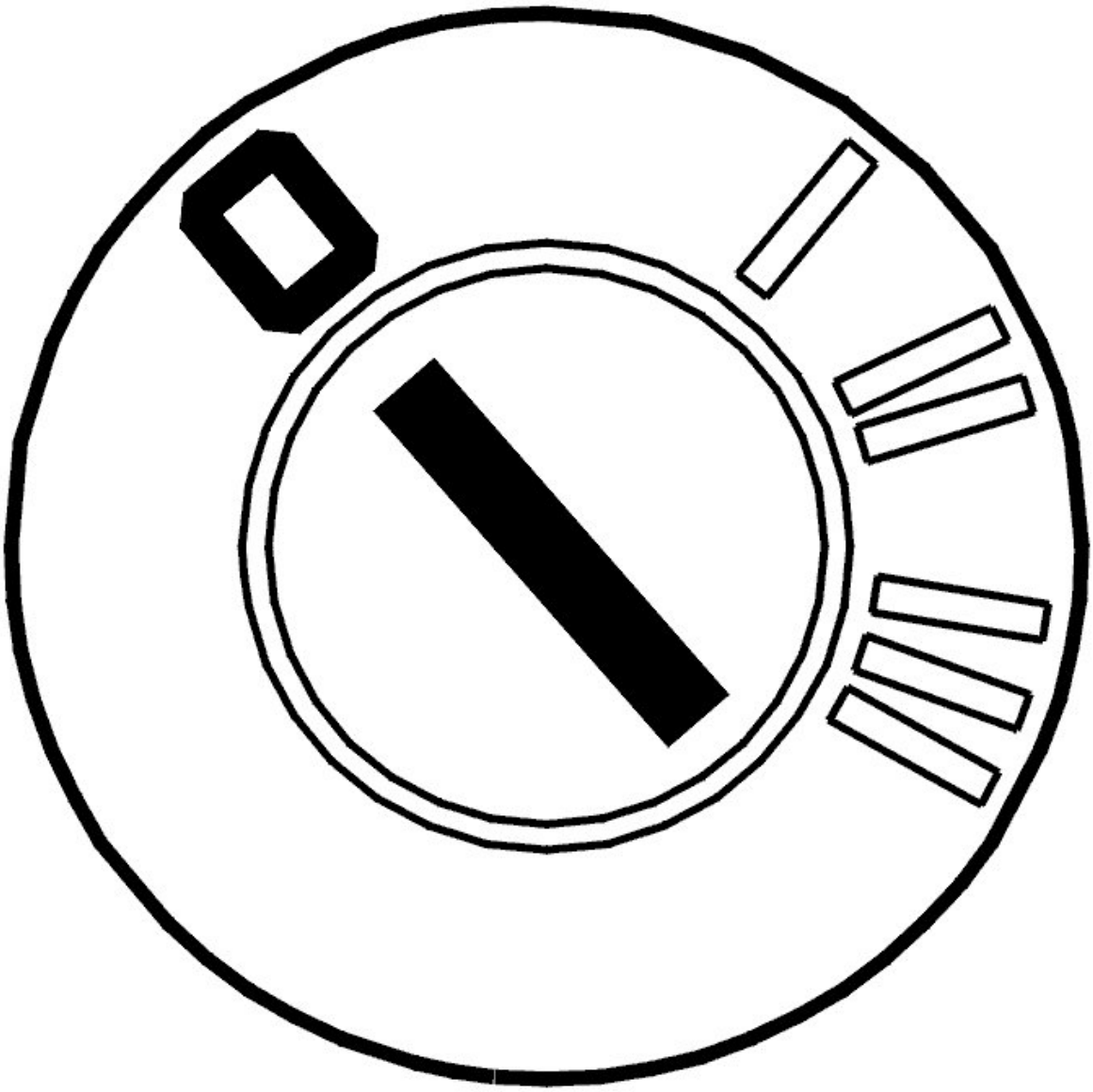


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

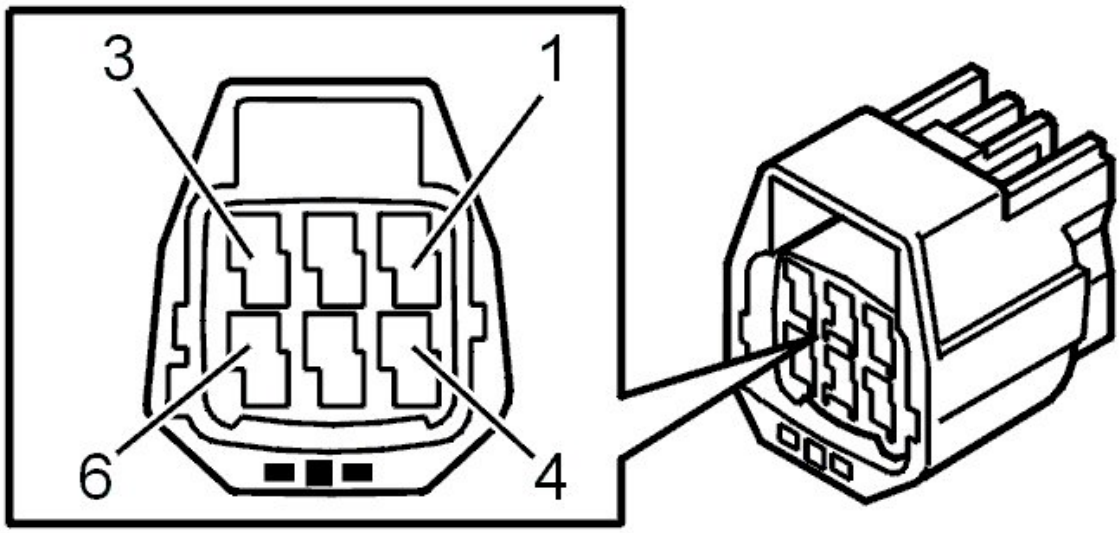


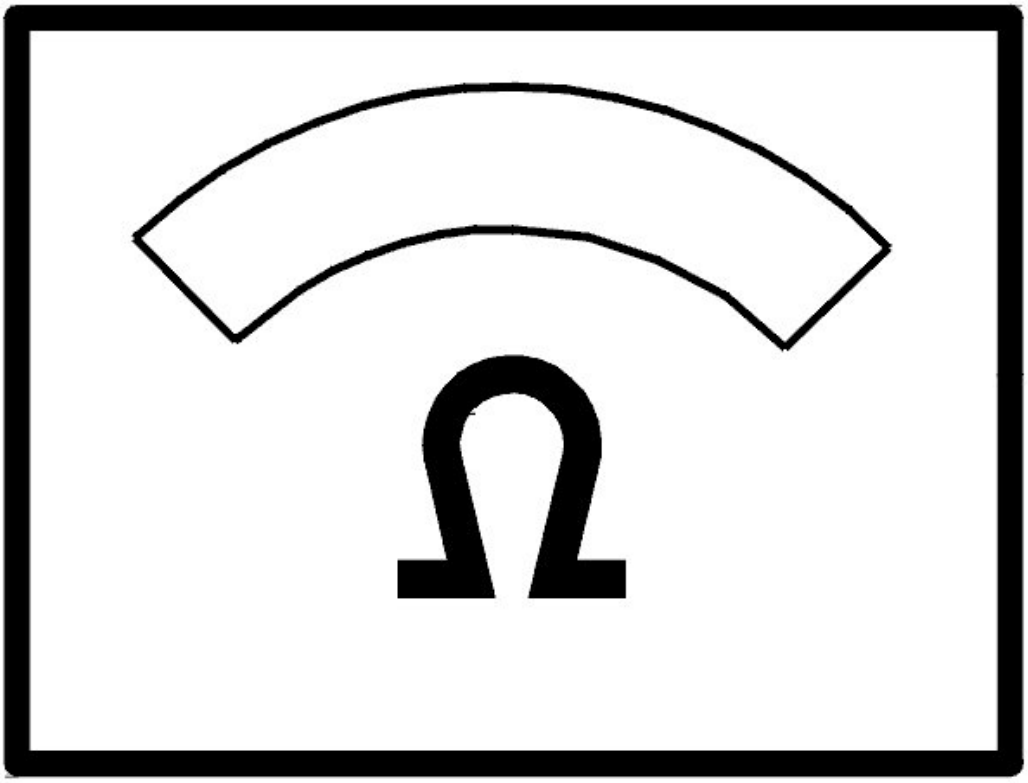
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C1 (transmission side) and the connector for solenoid S1. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S1 by measuring the resistance between the terminal pin on solenoid S1 and the transmission housing. The resistance must be 12-16 ohms. Replace solenoid S1 if the resistance is incorrect.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To open the control system and to check or replace solenoid S1, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

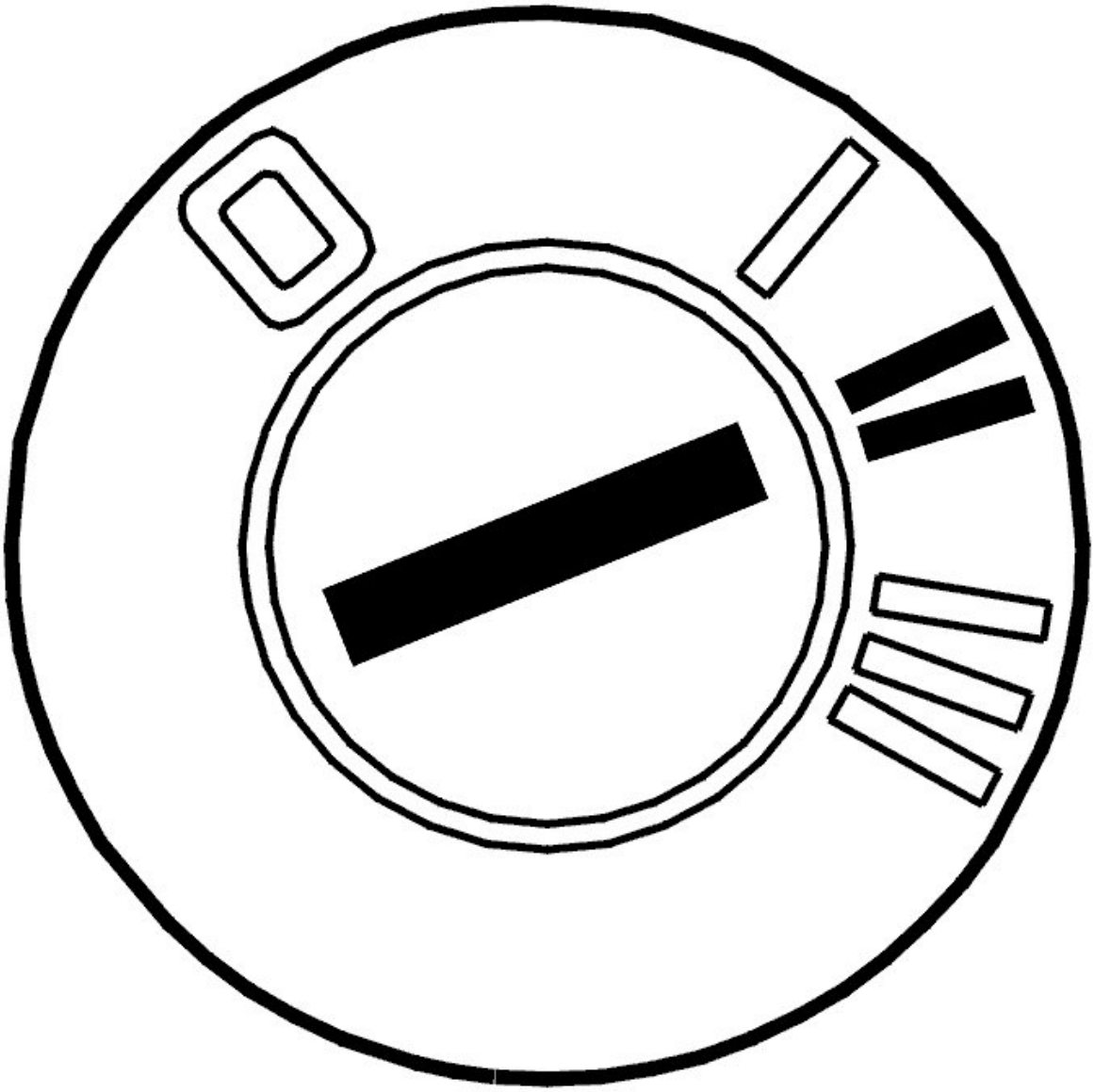
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



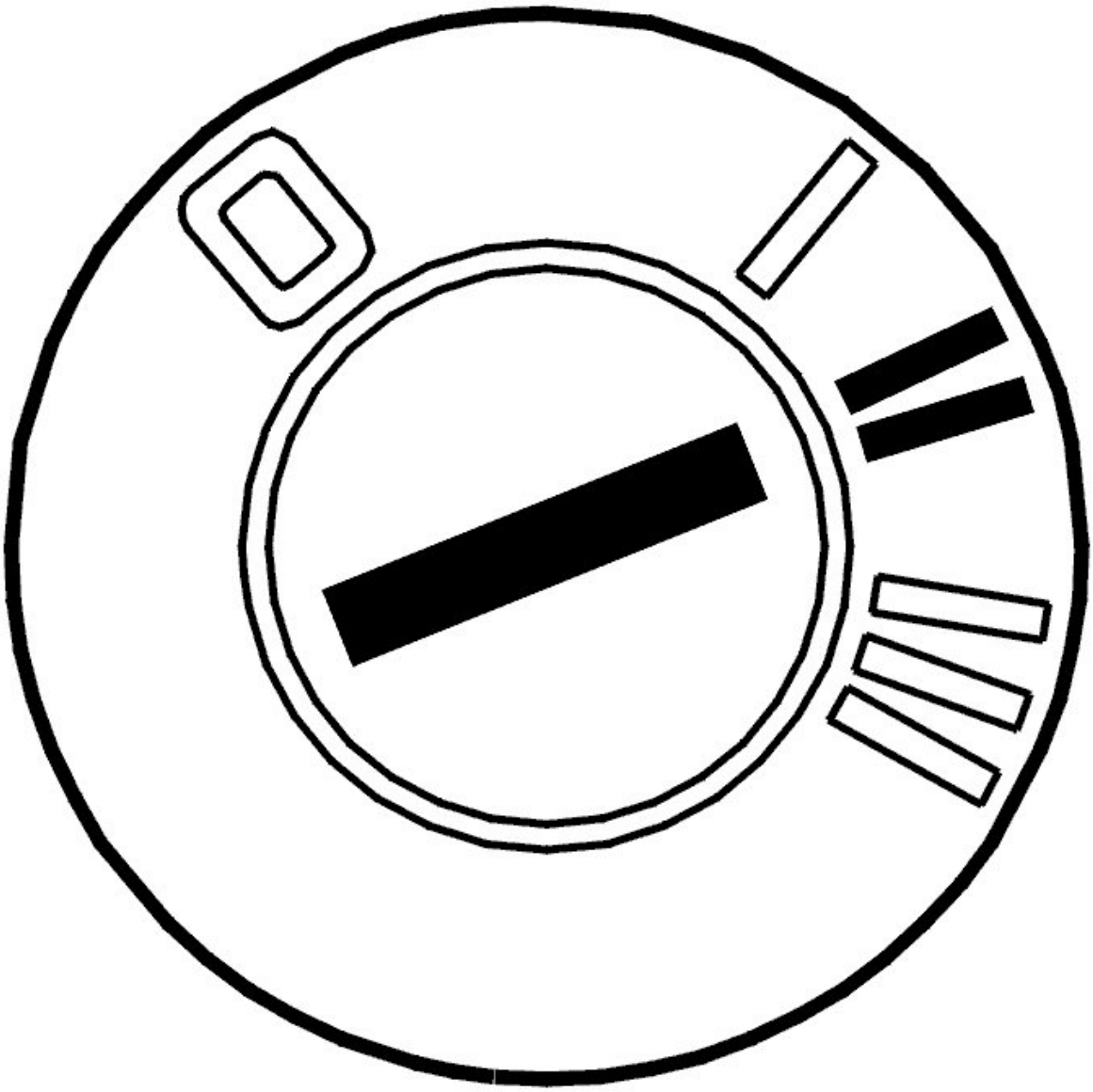
- Ignition on.

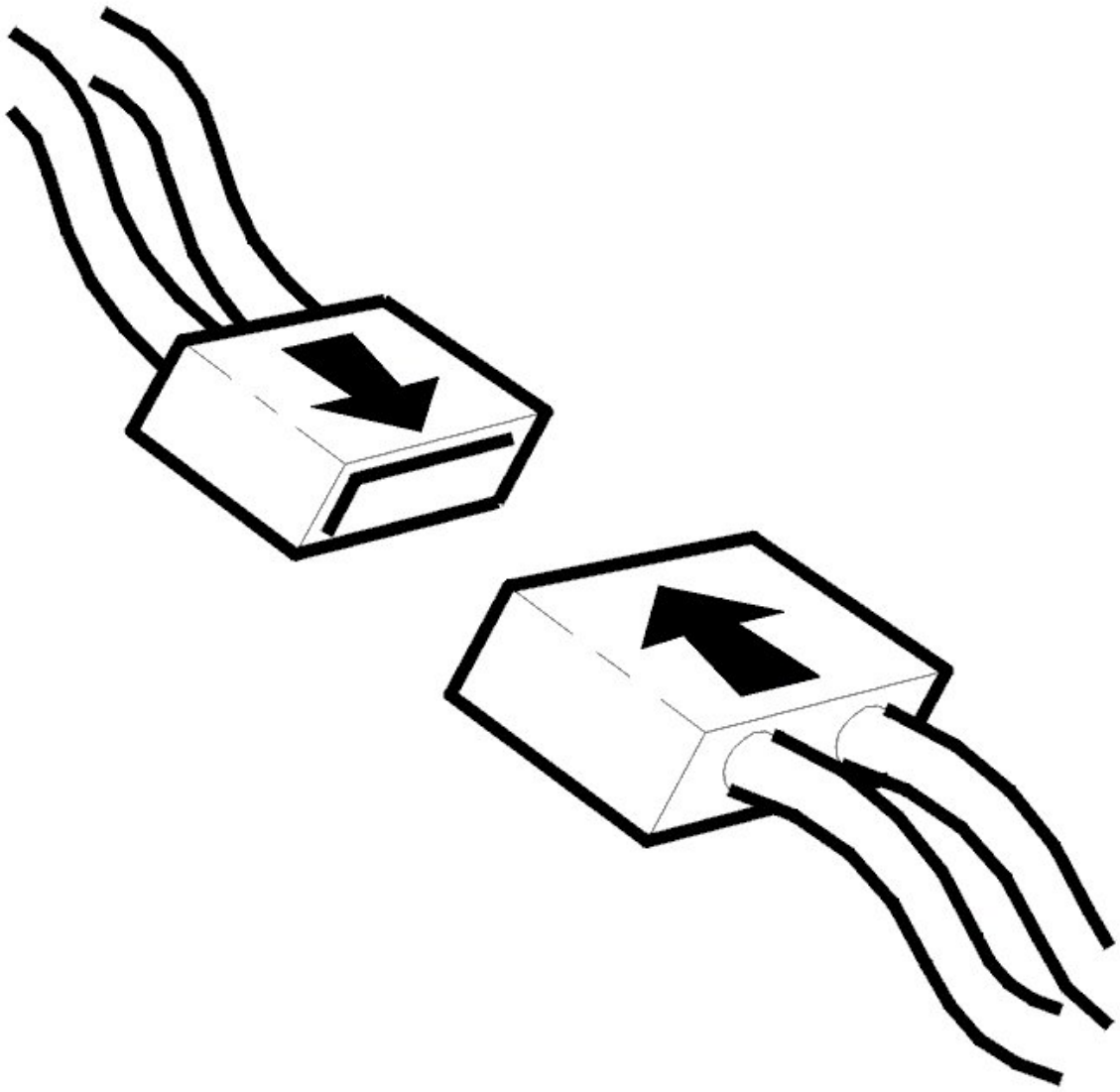
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S1.

The value should change between OFF and ON.

Does the value change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the control module and transmission connectors for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check the cable between control module terminal #A50 (#A50)and transmission connector terminal #C1. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

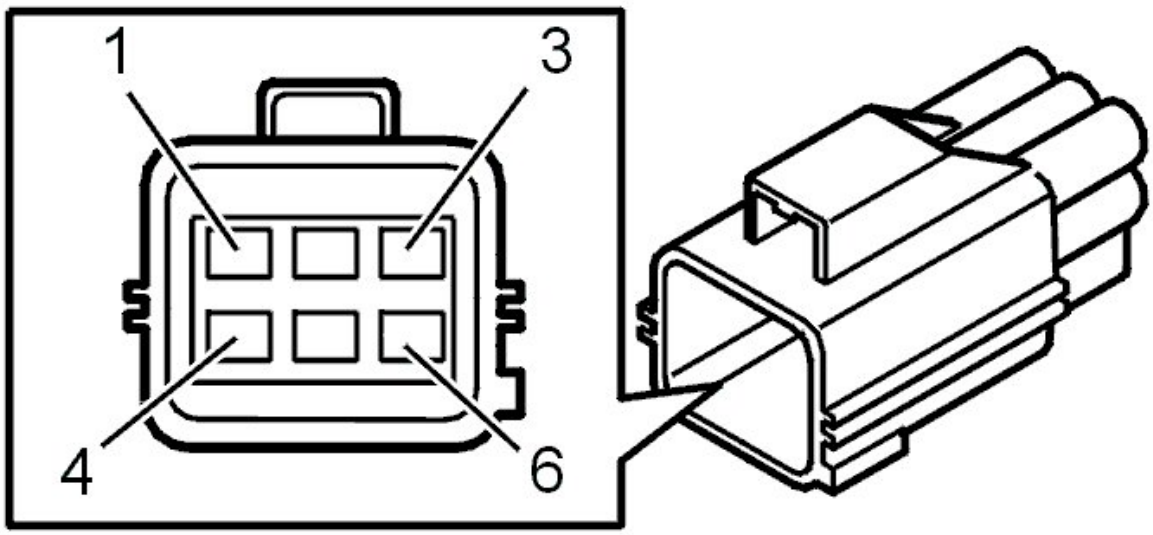
Hint:

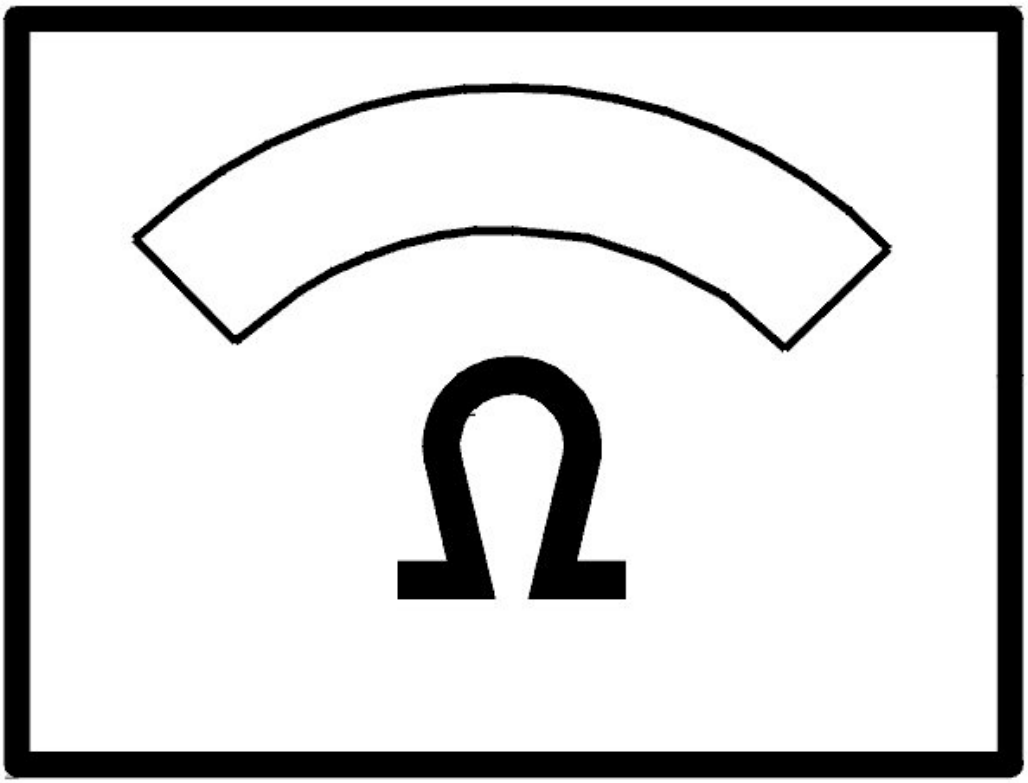
- Check the circuit for solenoid S1: Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A50 (#A50) and #A53 (#A53) on the breakout box. The resistance must be 12-16 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

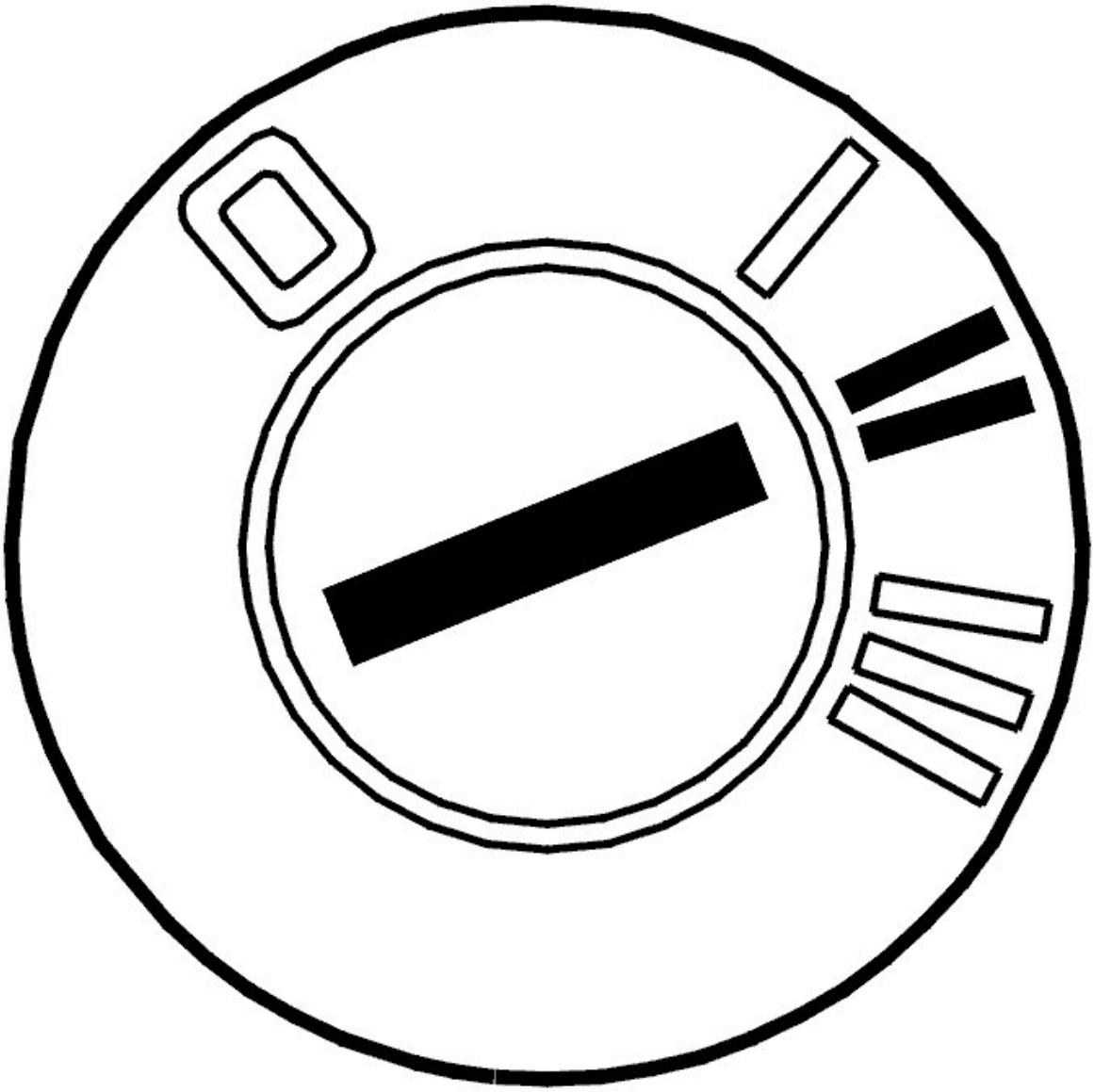
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

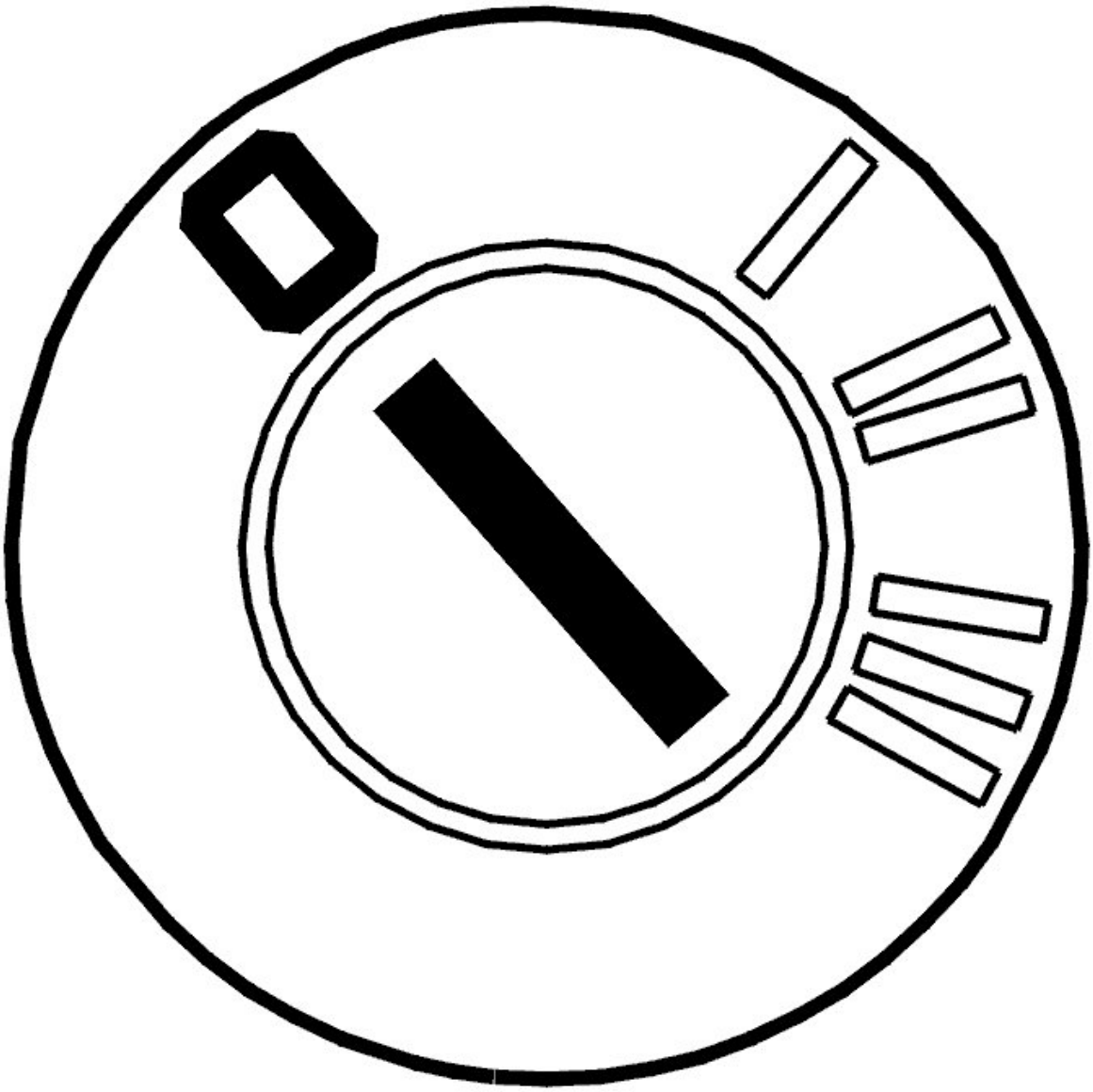
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

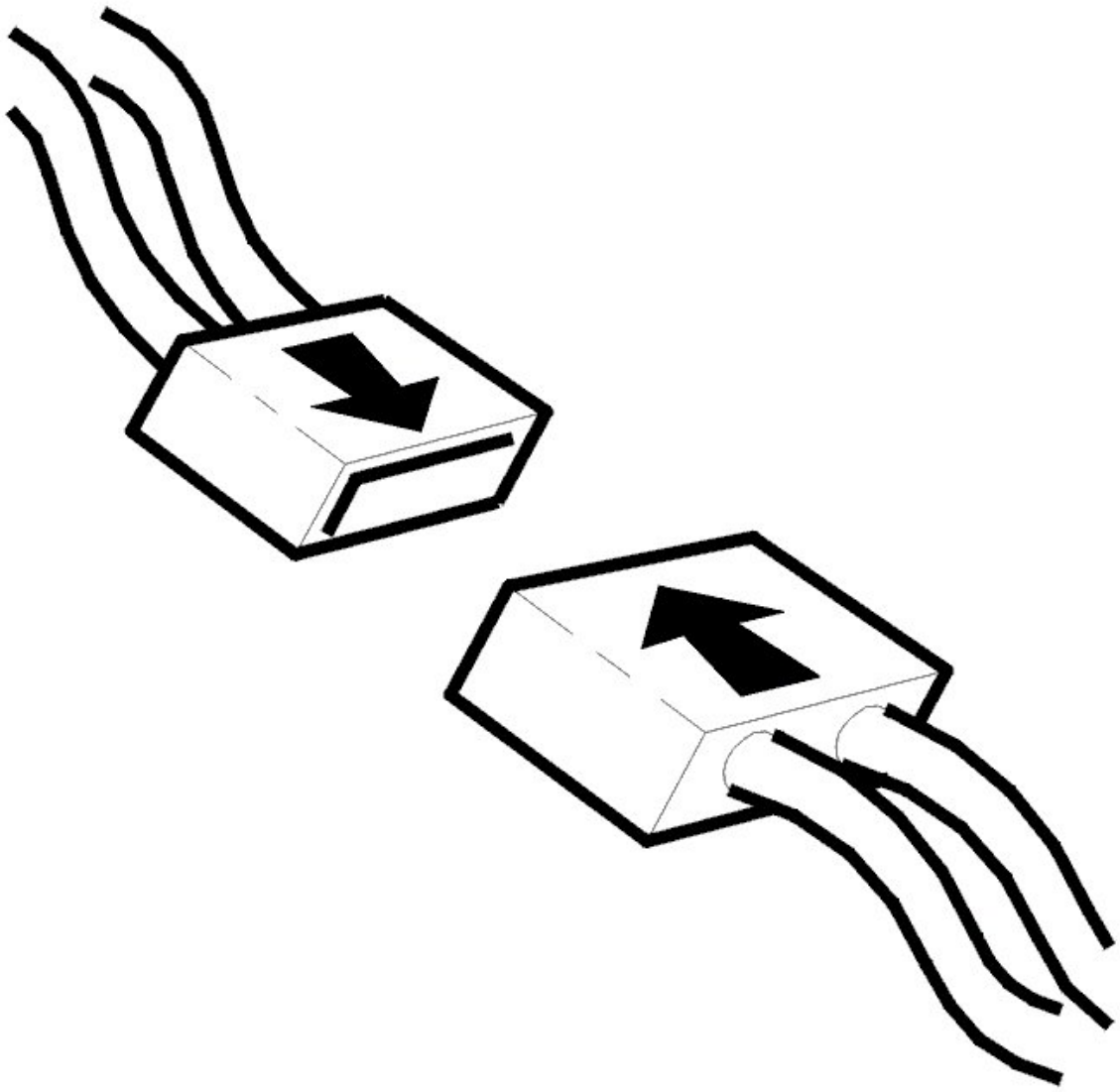
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

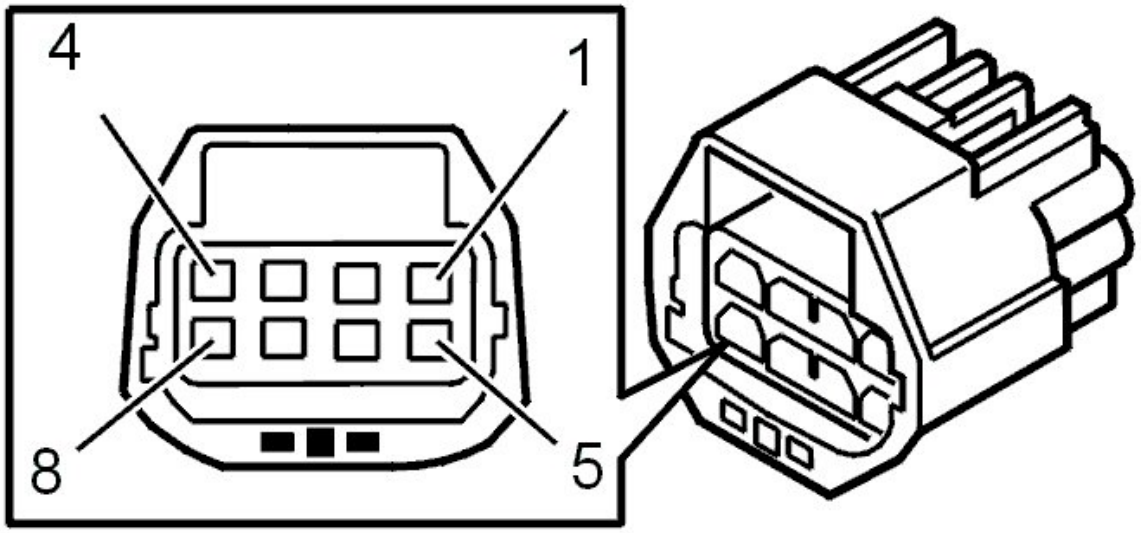
Checking transmission fluid temperature sensor

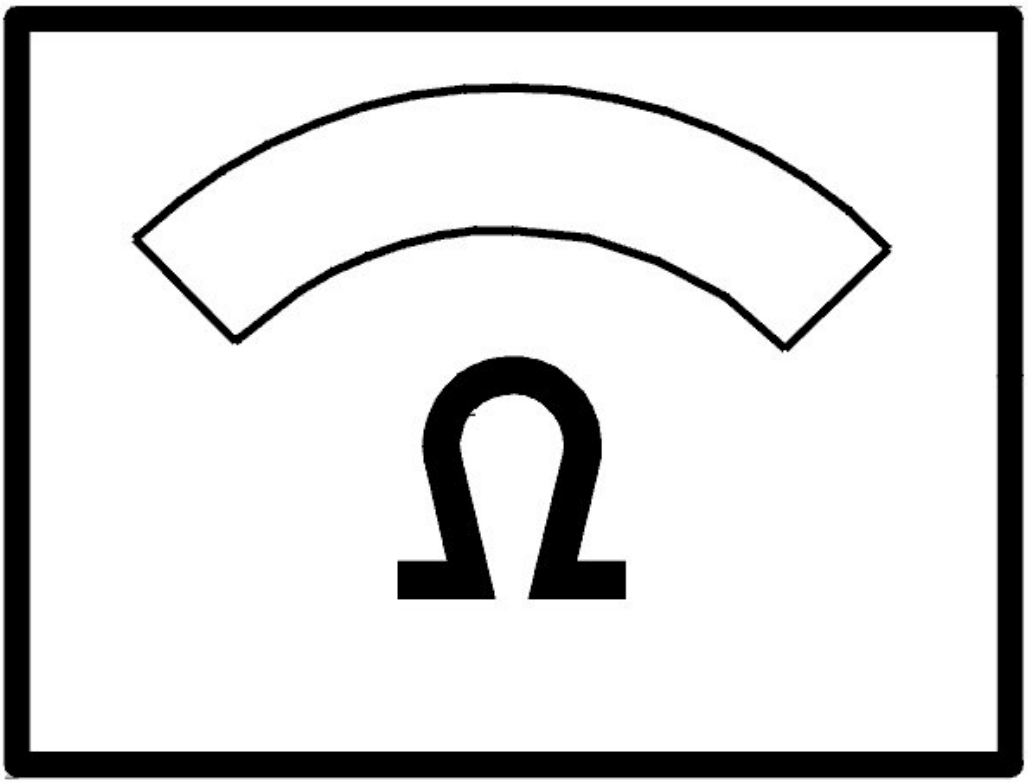




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

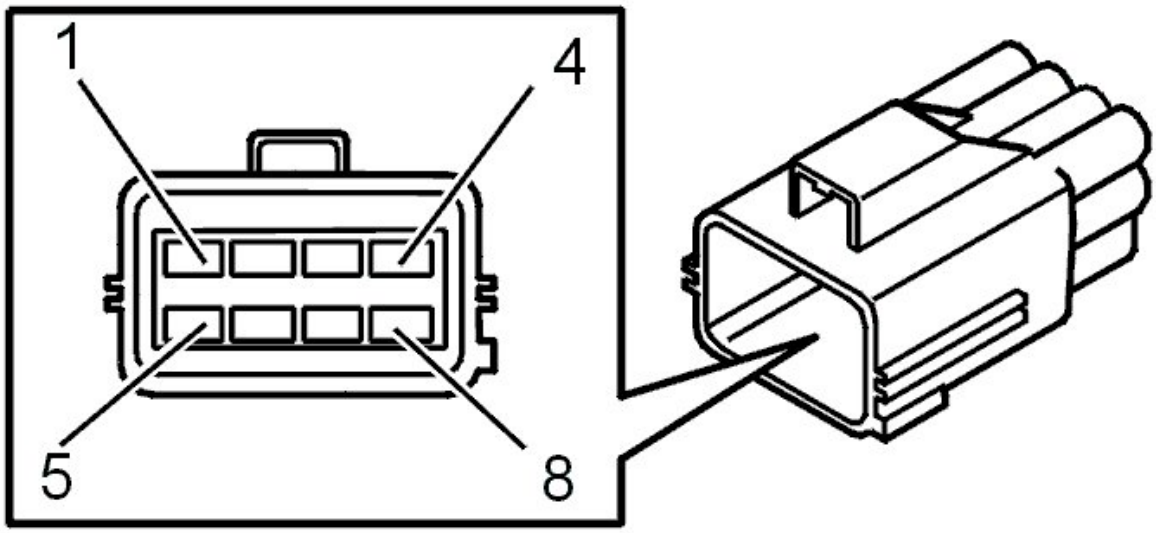
No - Checking the cable and component

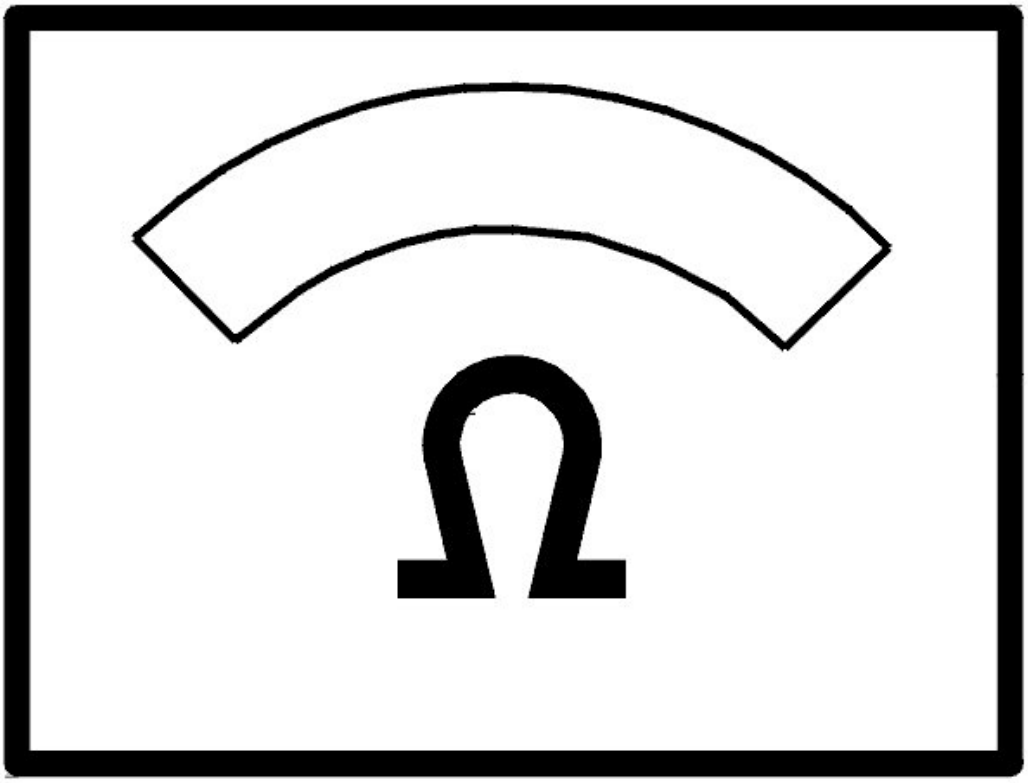
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



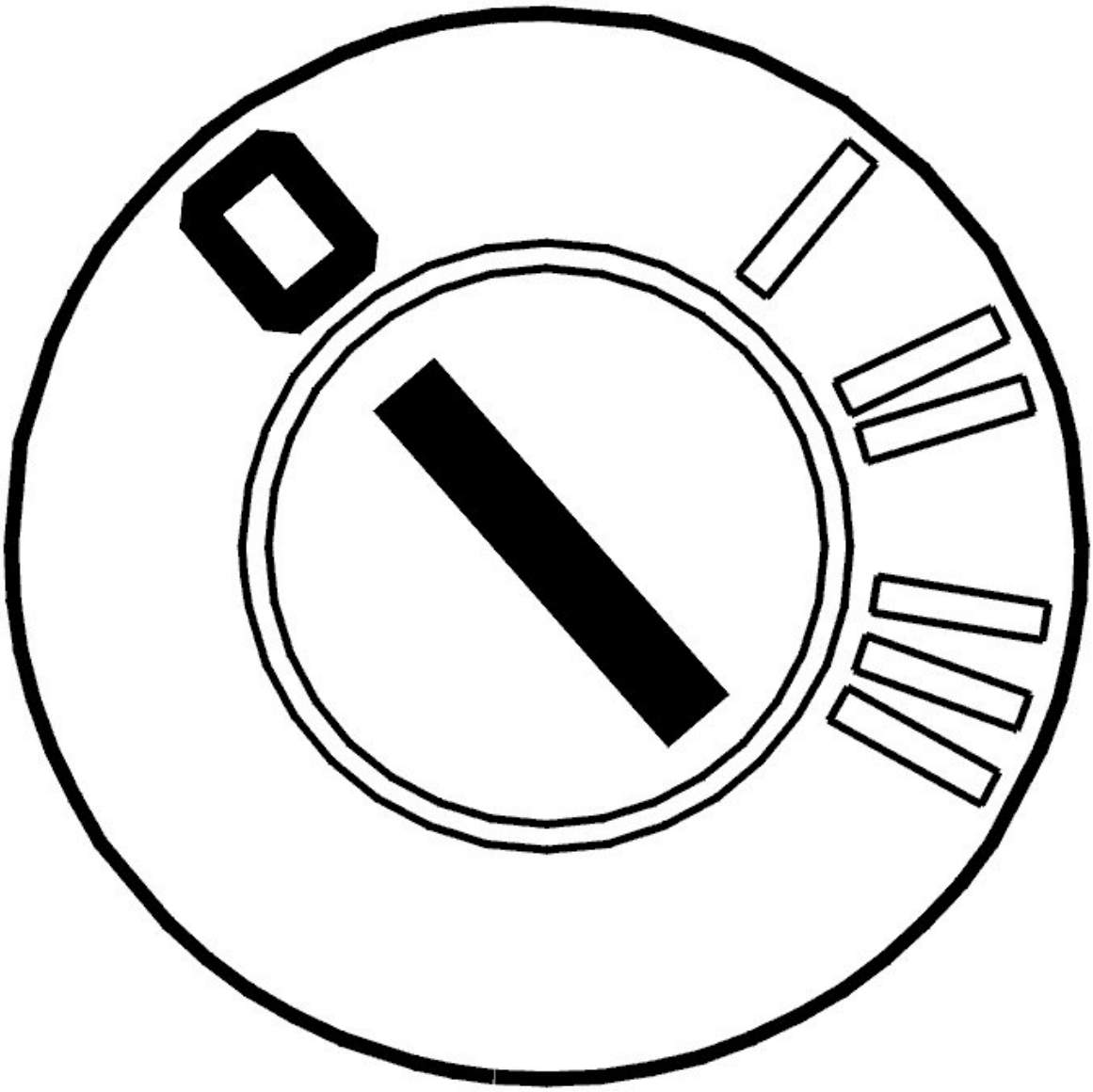


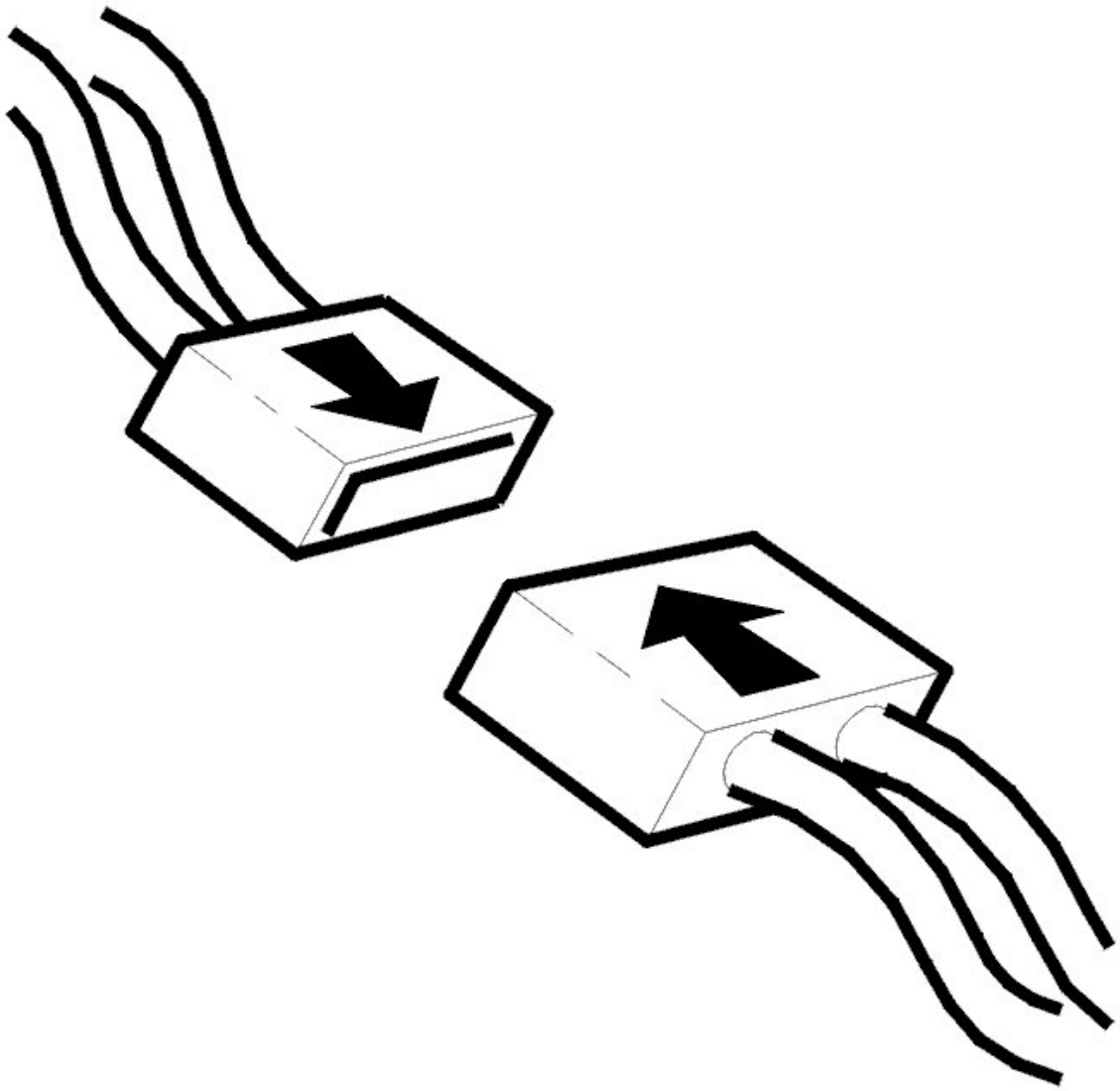
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

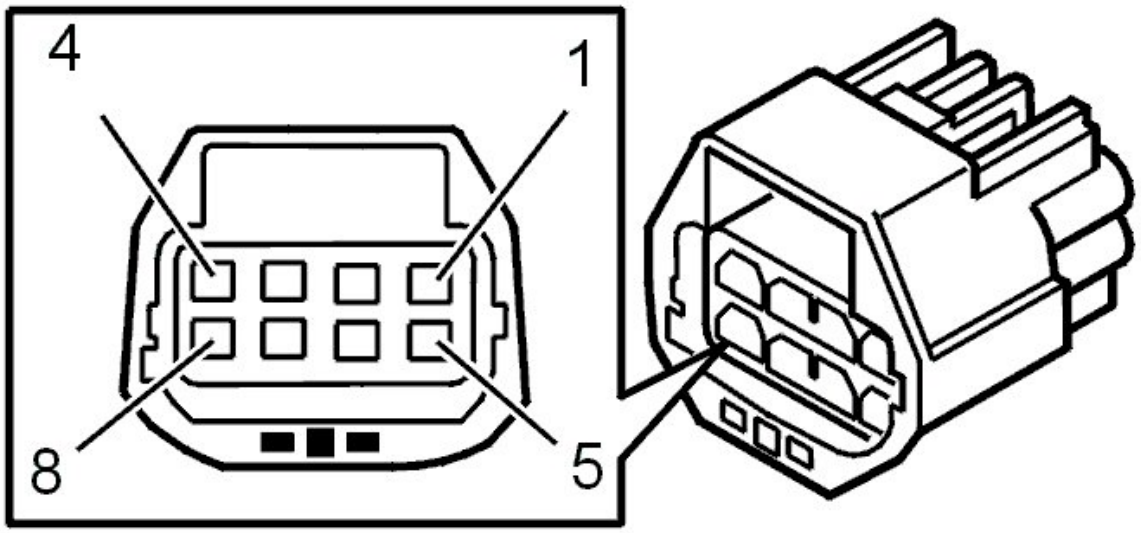
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

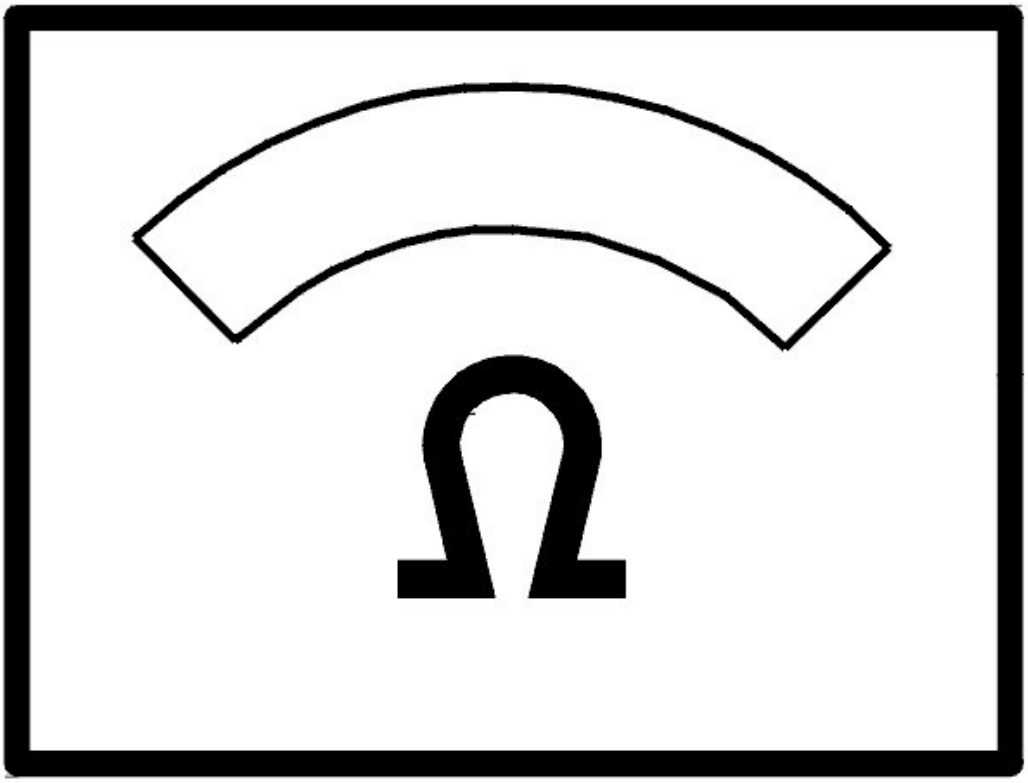
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





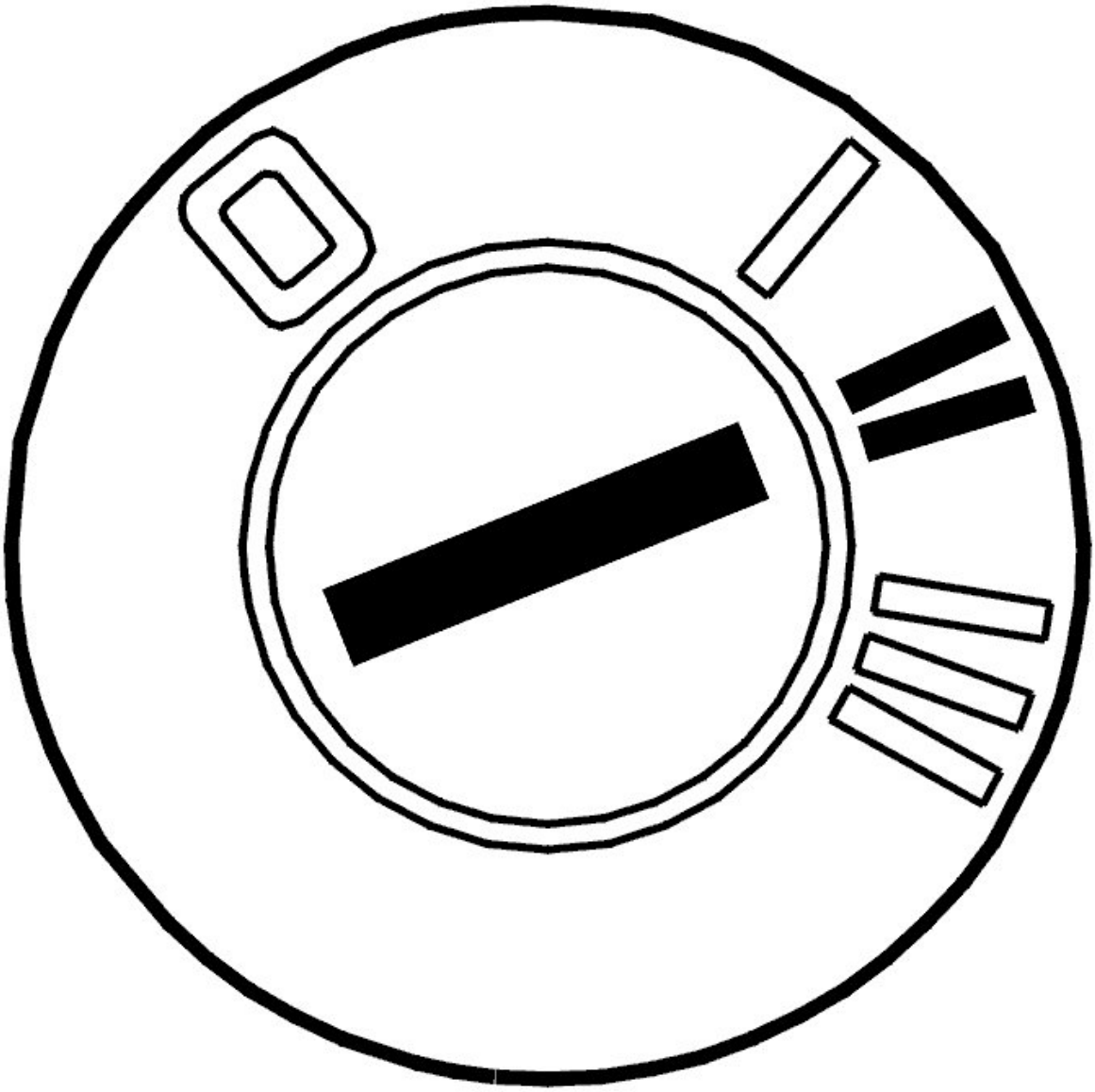
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



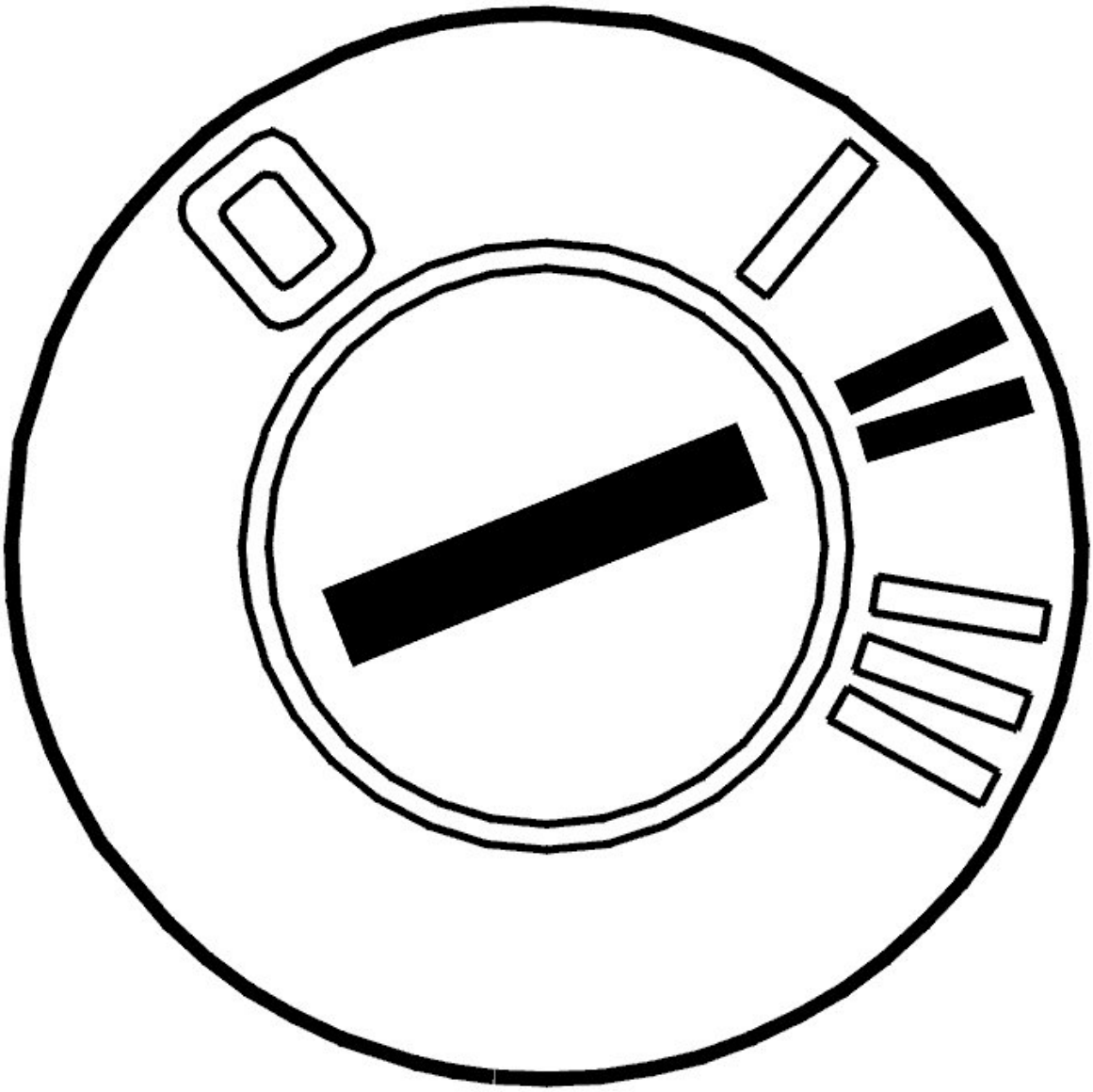
- Ignition on.

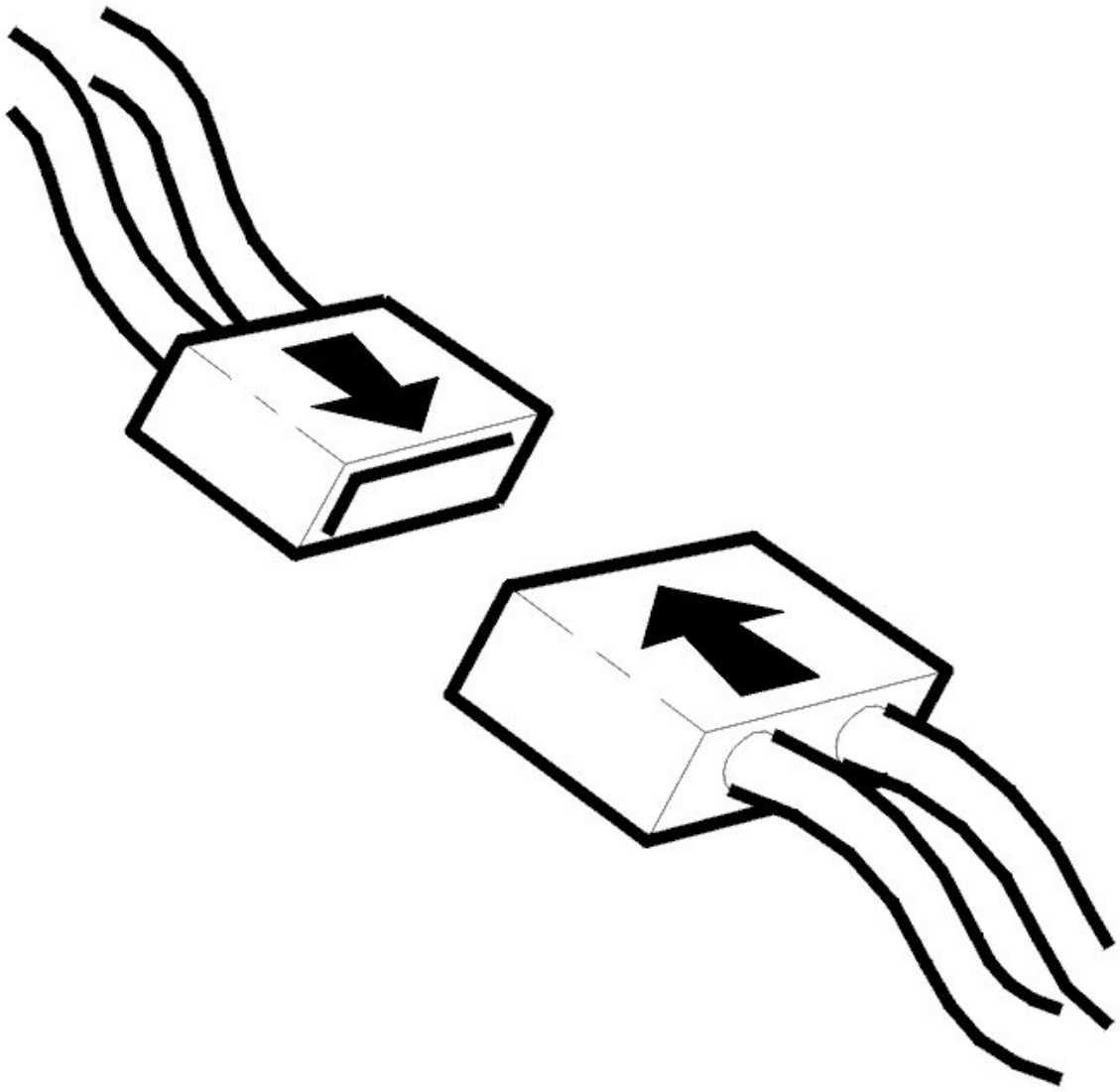
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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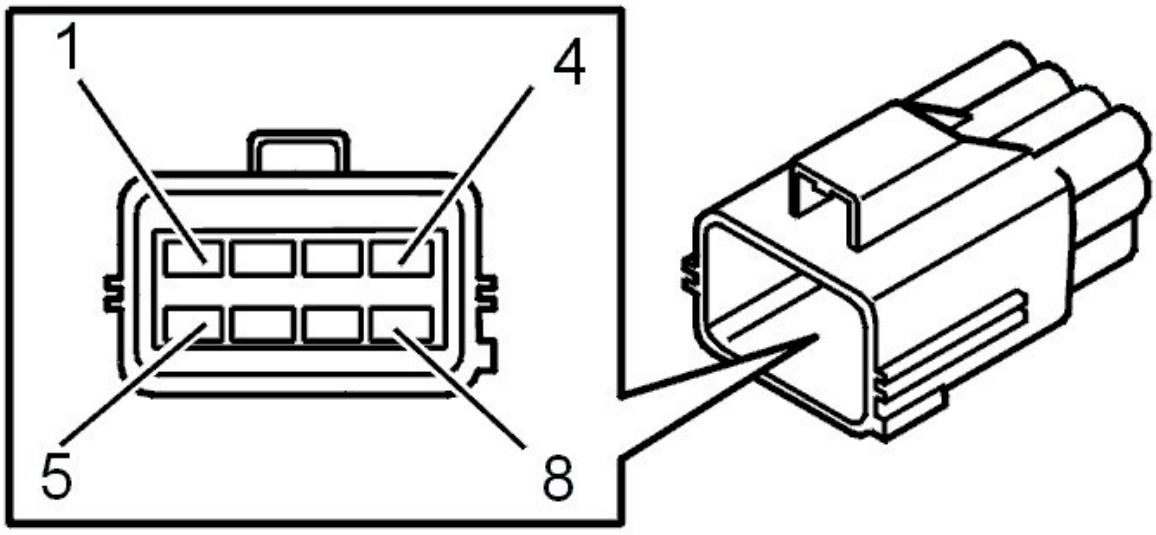
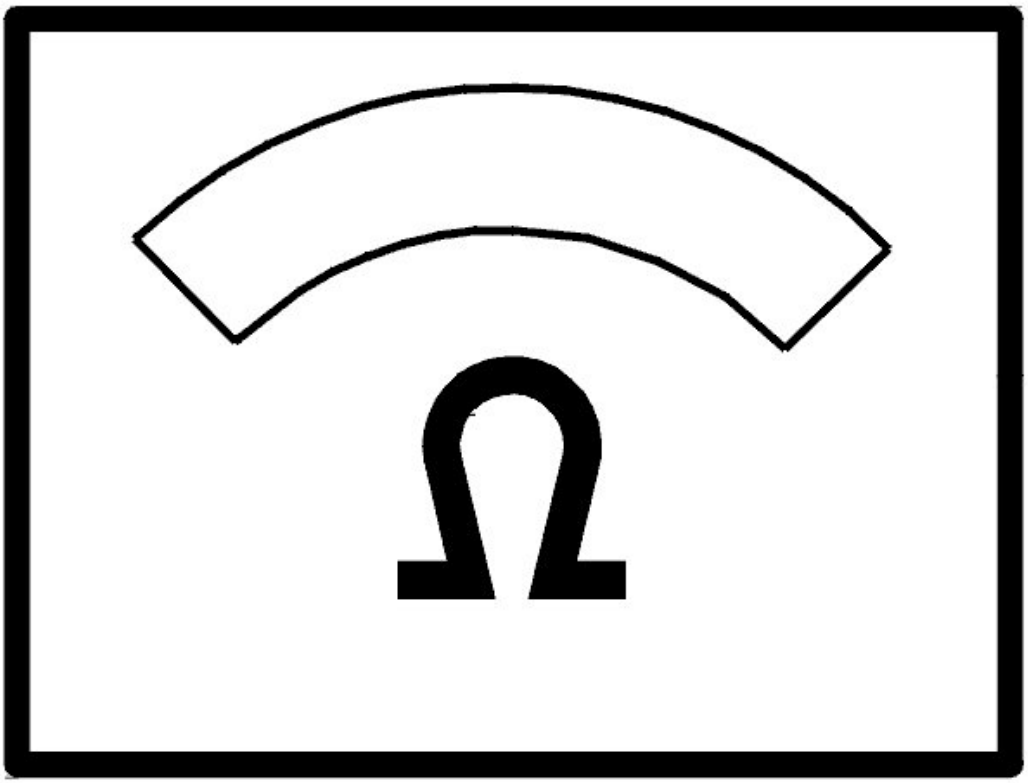
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

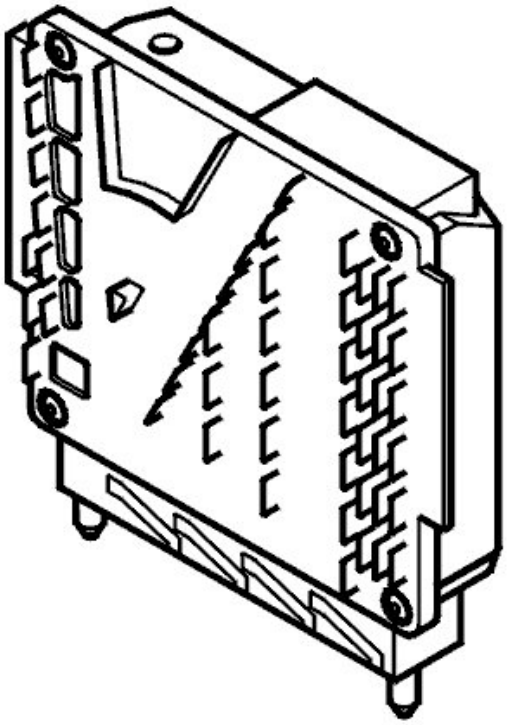
Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid)if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

Fault symptom[s]

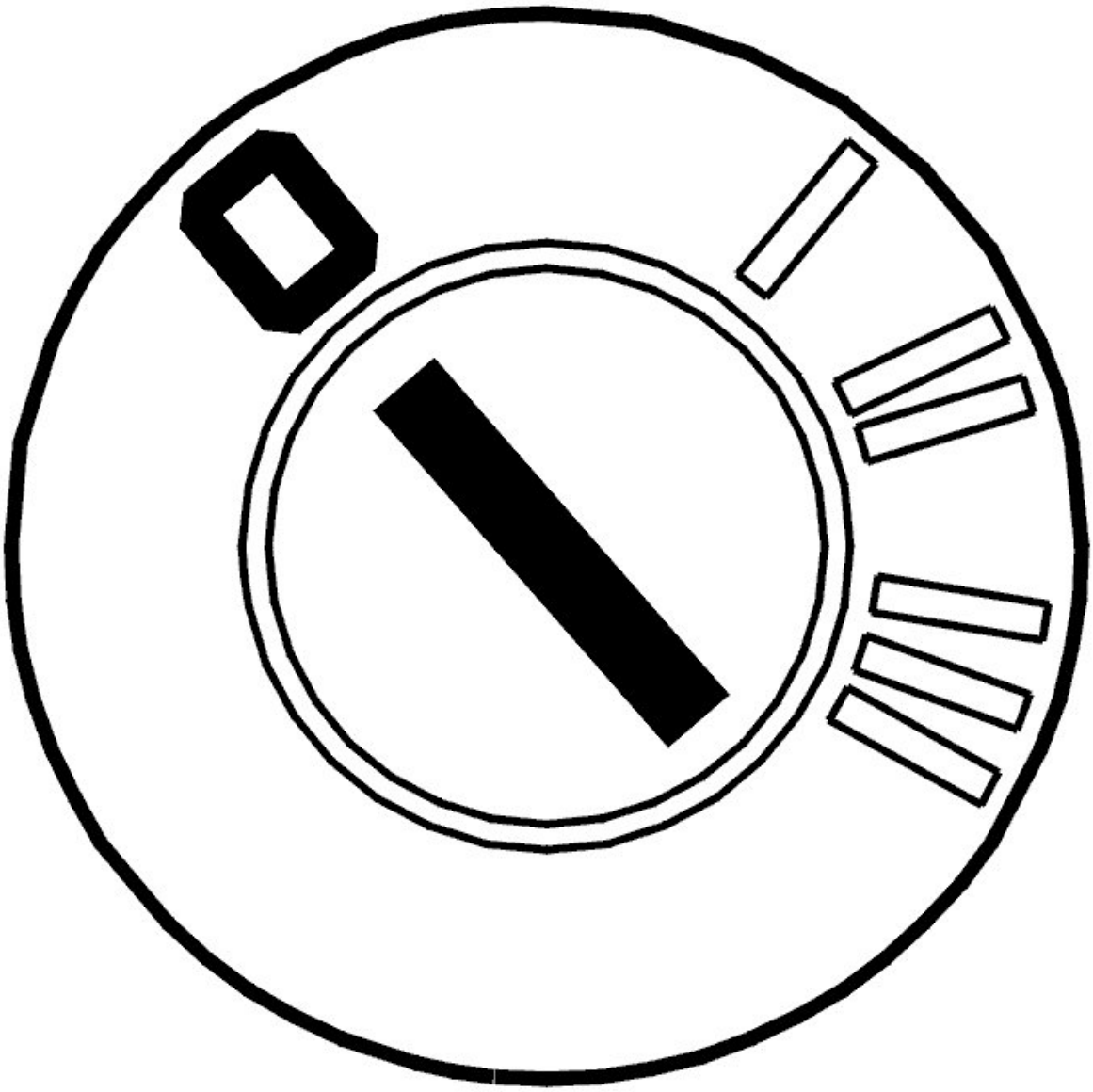
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Too High

Signal too high

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

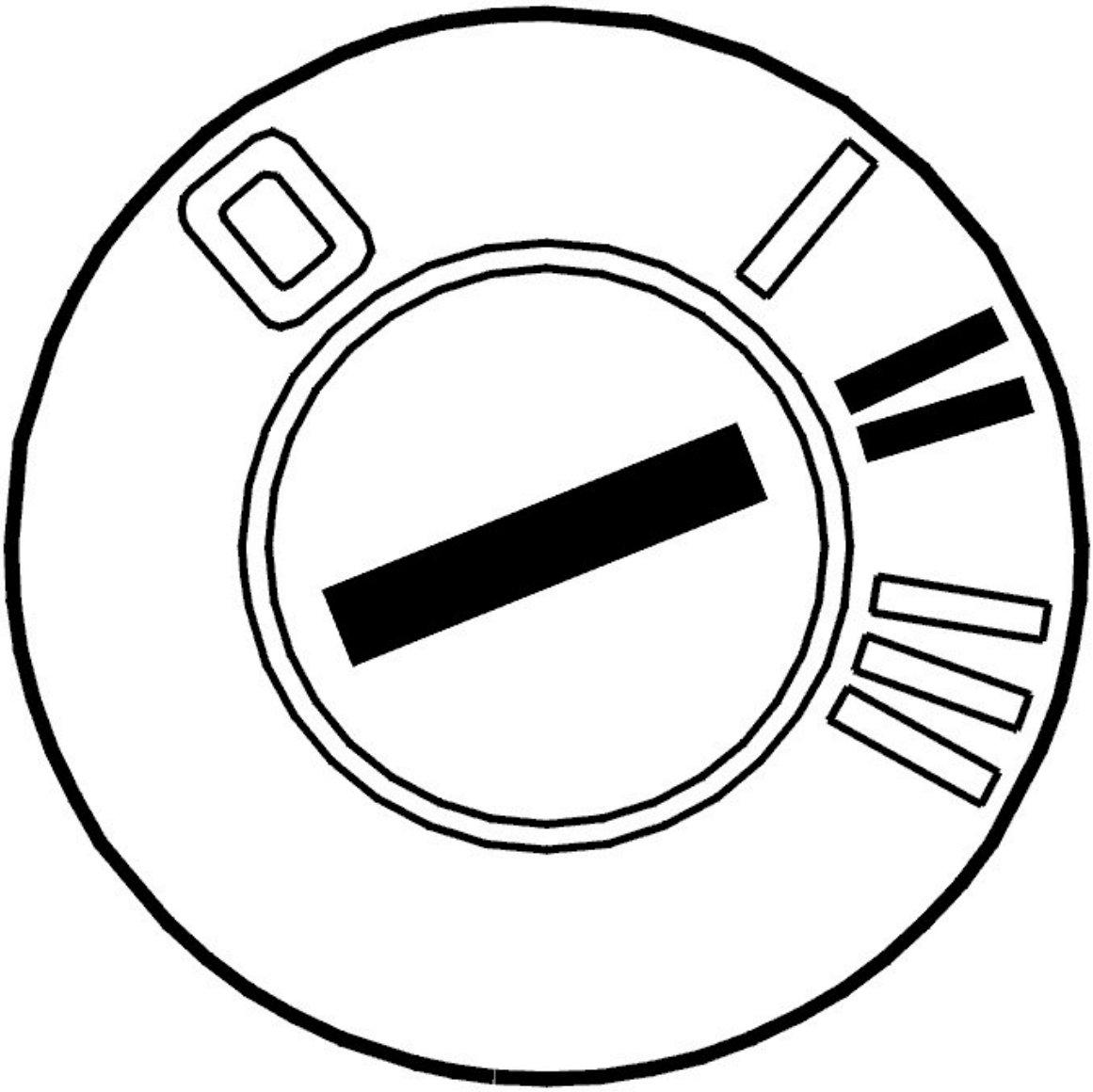
Note! If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S2

No - Checking transmission fluid temperature sensor

Checking shift solenoid S2



- Ignition on
- Gear selector in position P
- Activate solenoid S2.

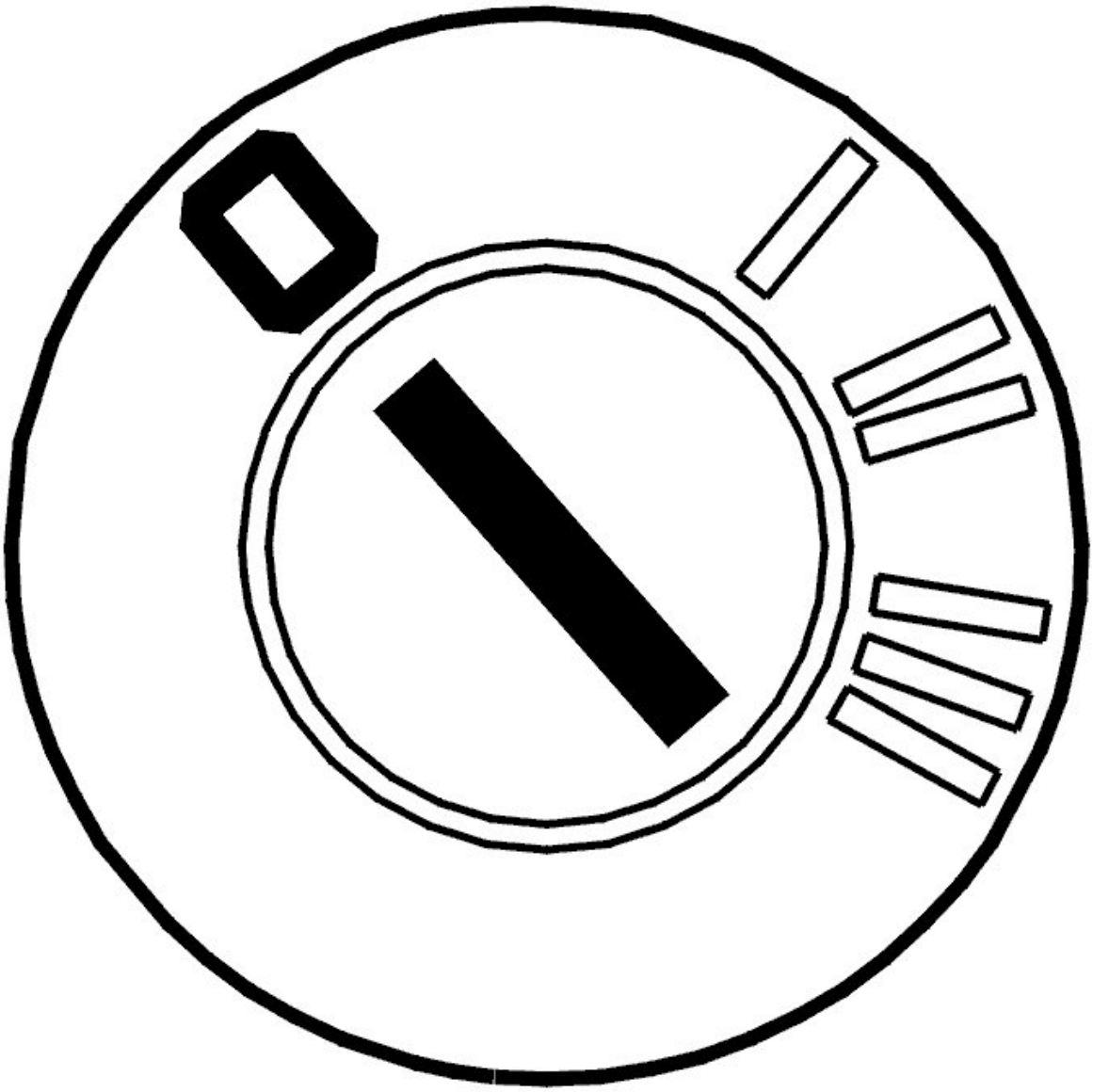
The value must change between OFF and ON.

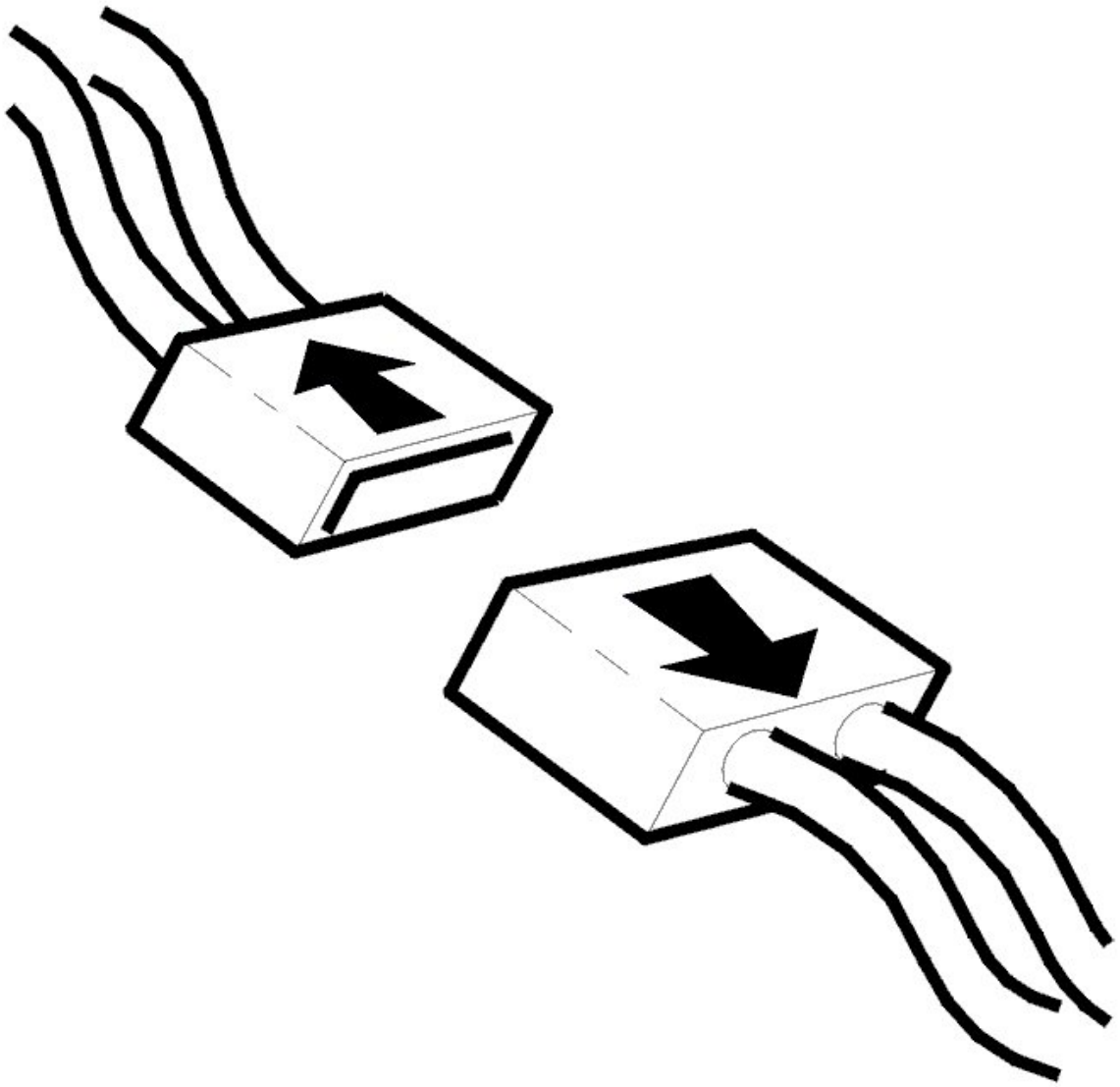
Does the value change?

Yes - Intermittent fault

No - Checking the wiring

Checking the wiring



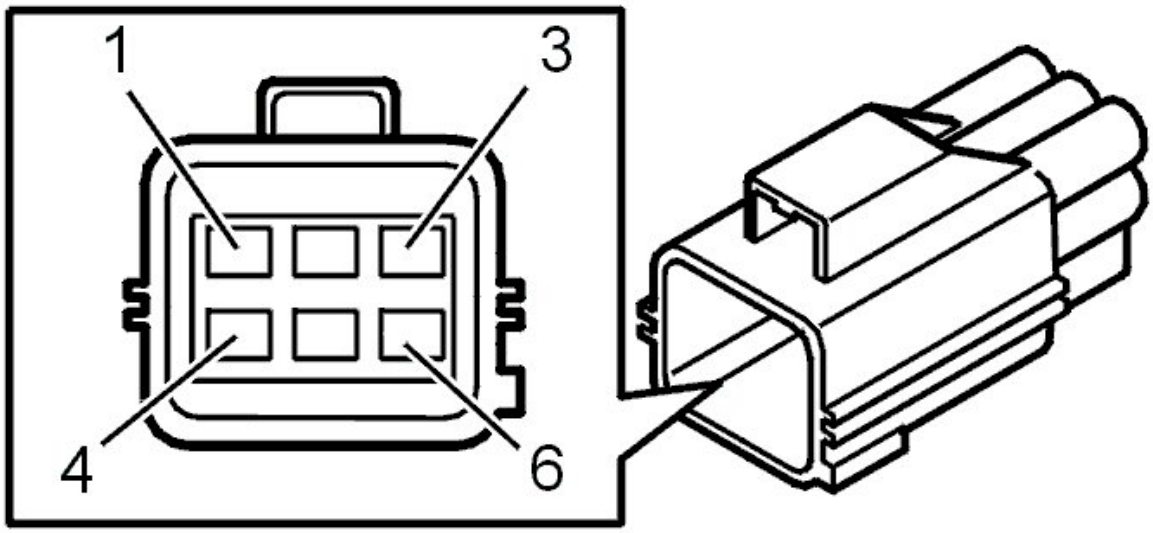


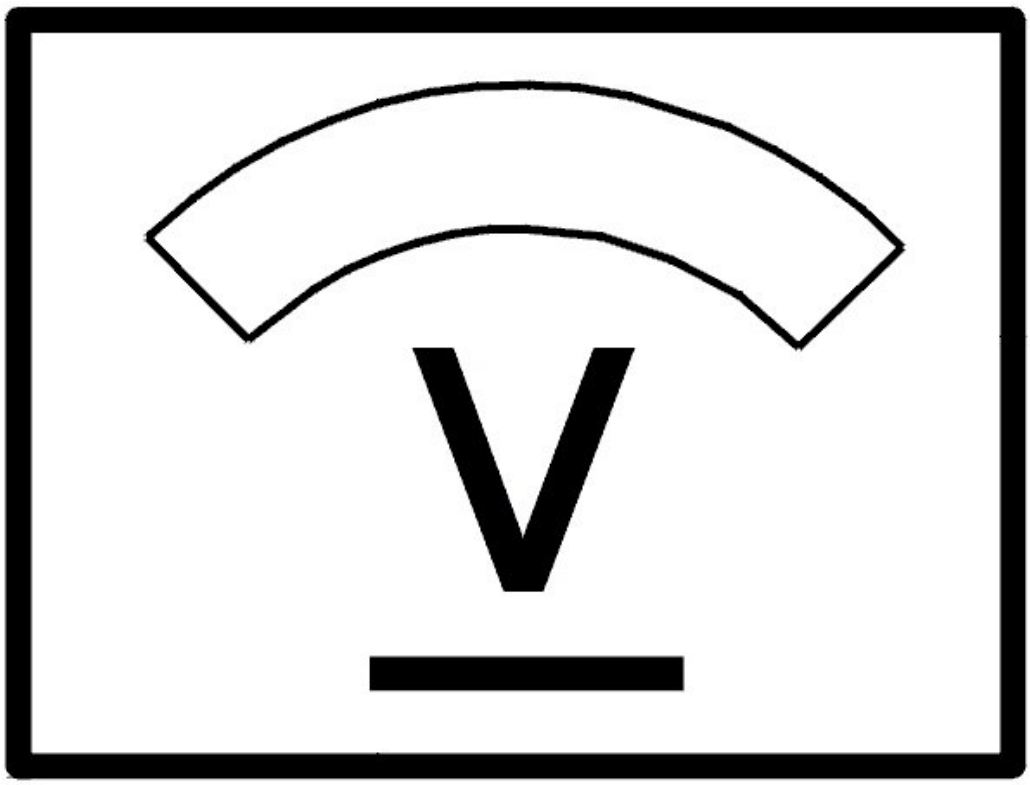
- Ignition off
- Disconnect transmission connector C.

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2 (control module side). Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



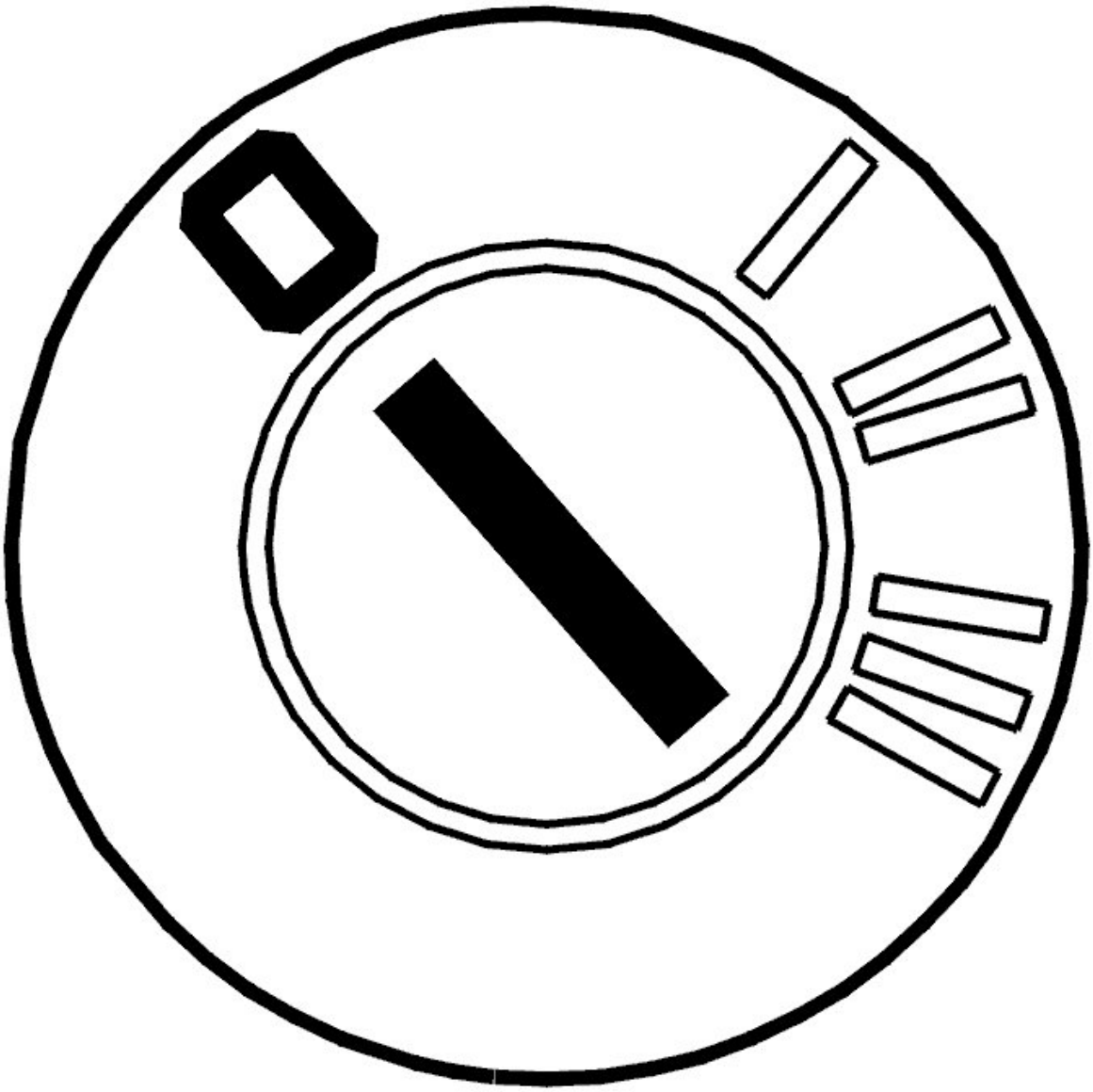


Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component

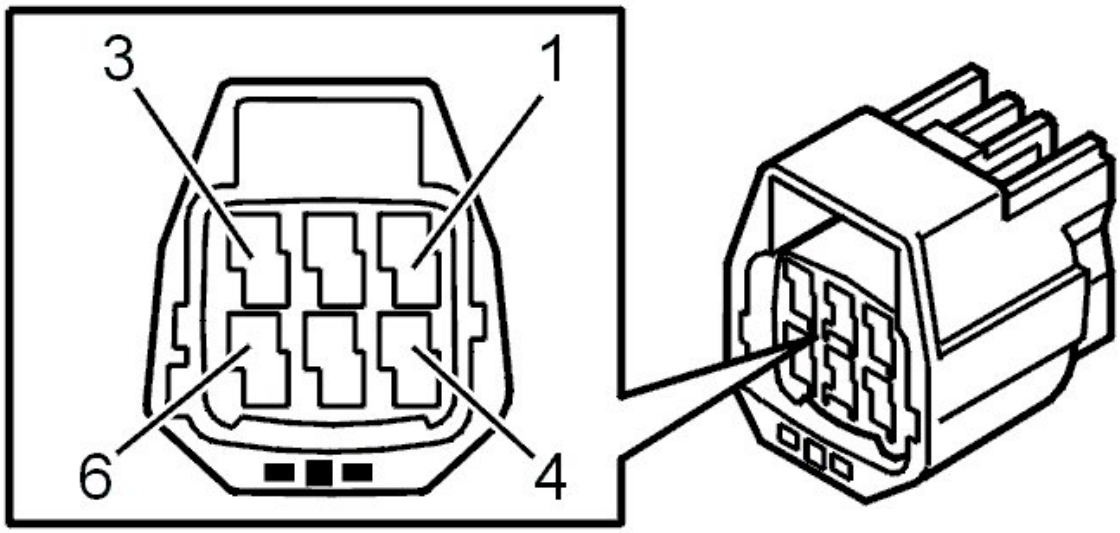


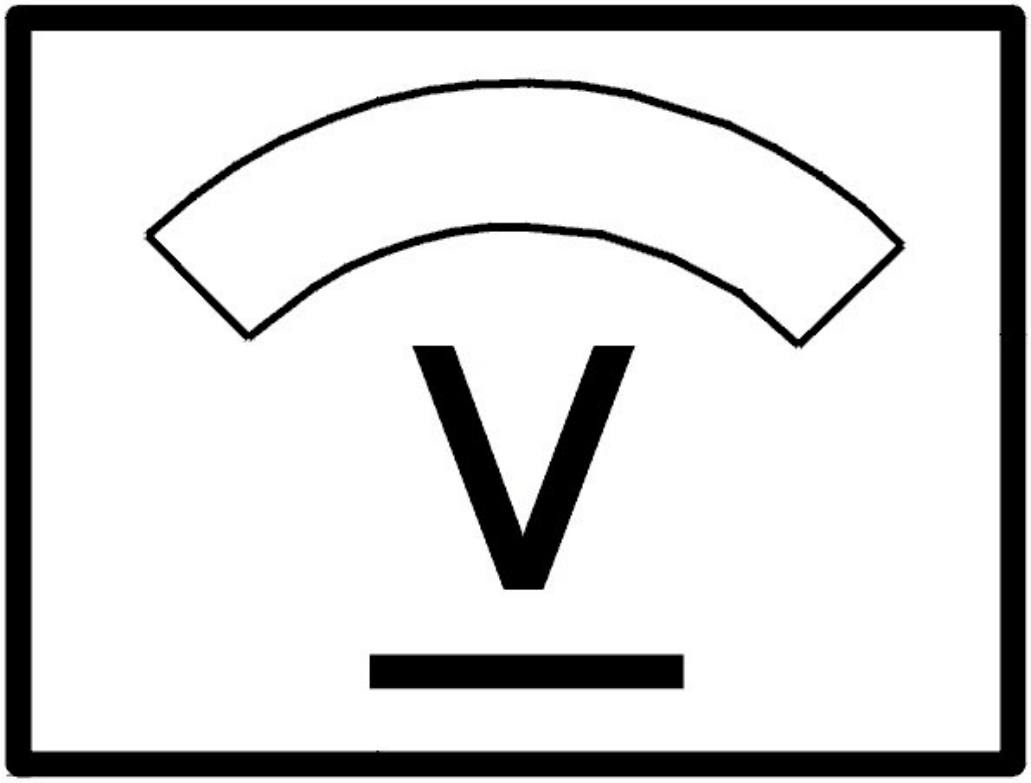
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Replace solenoid S2 if no faults are found in the cable.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To open the control system and to check or replace solenoid S2, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

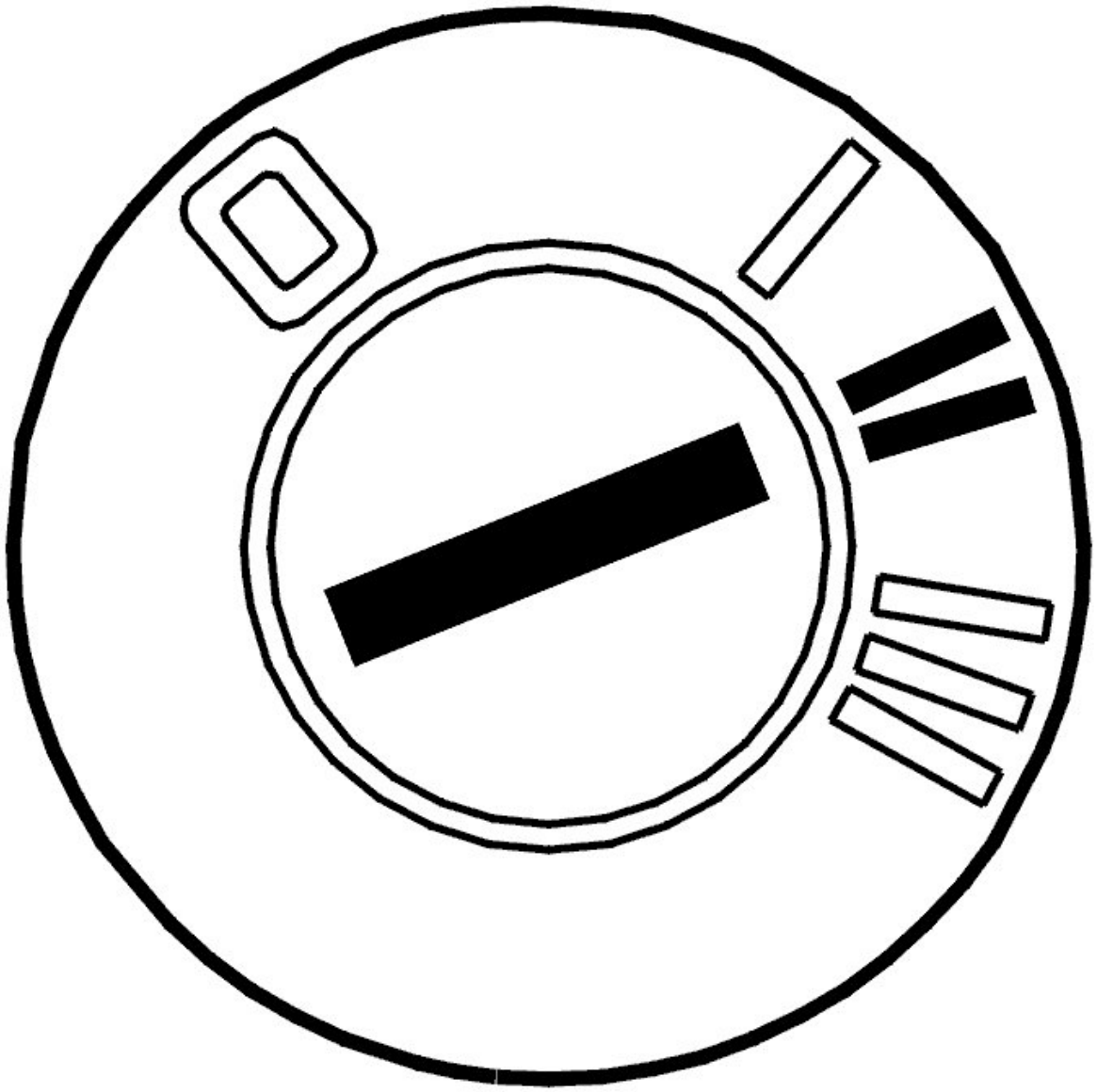
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



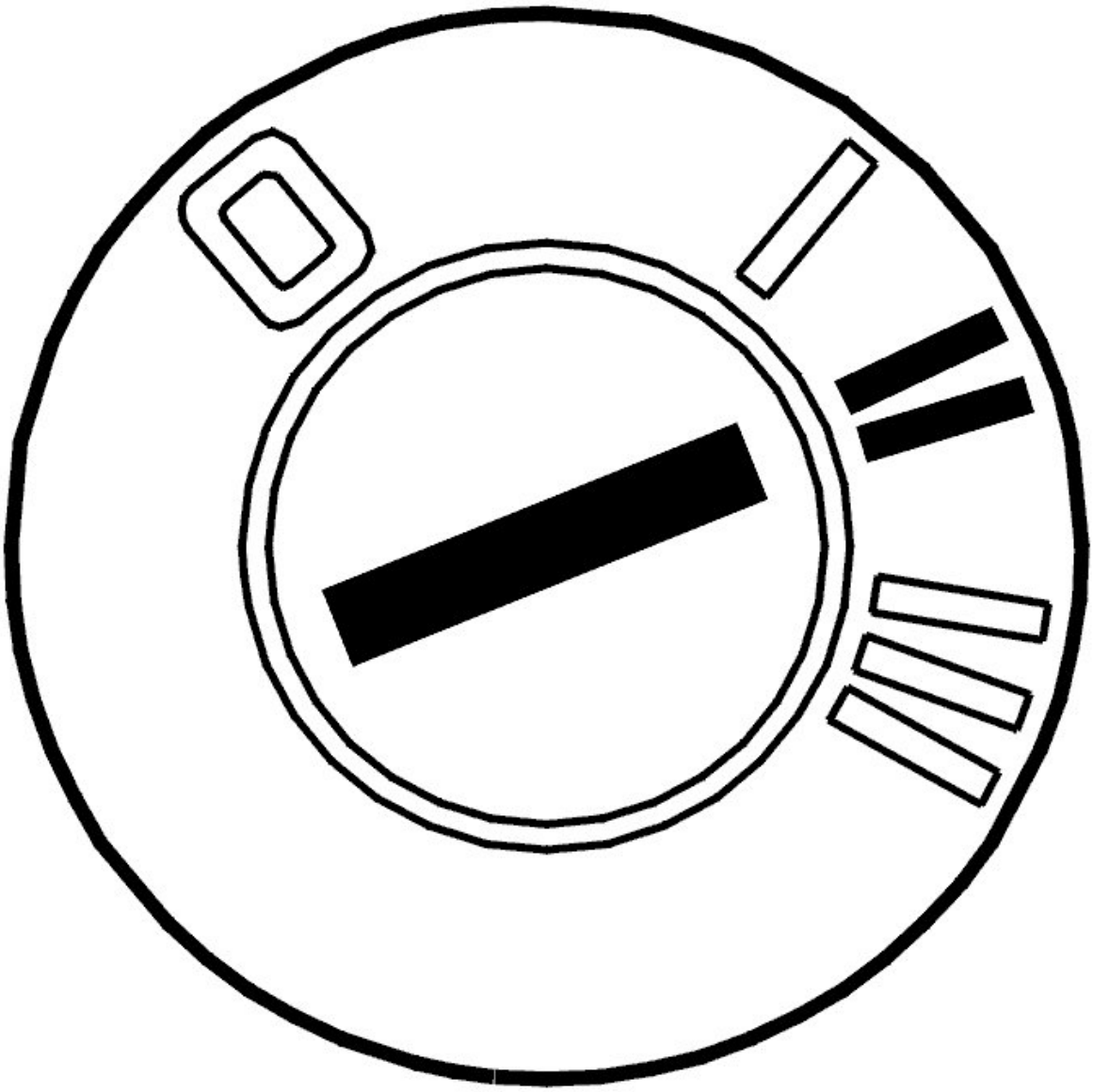
- Ignition on.

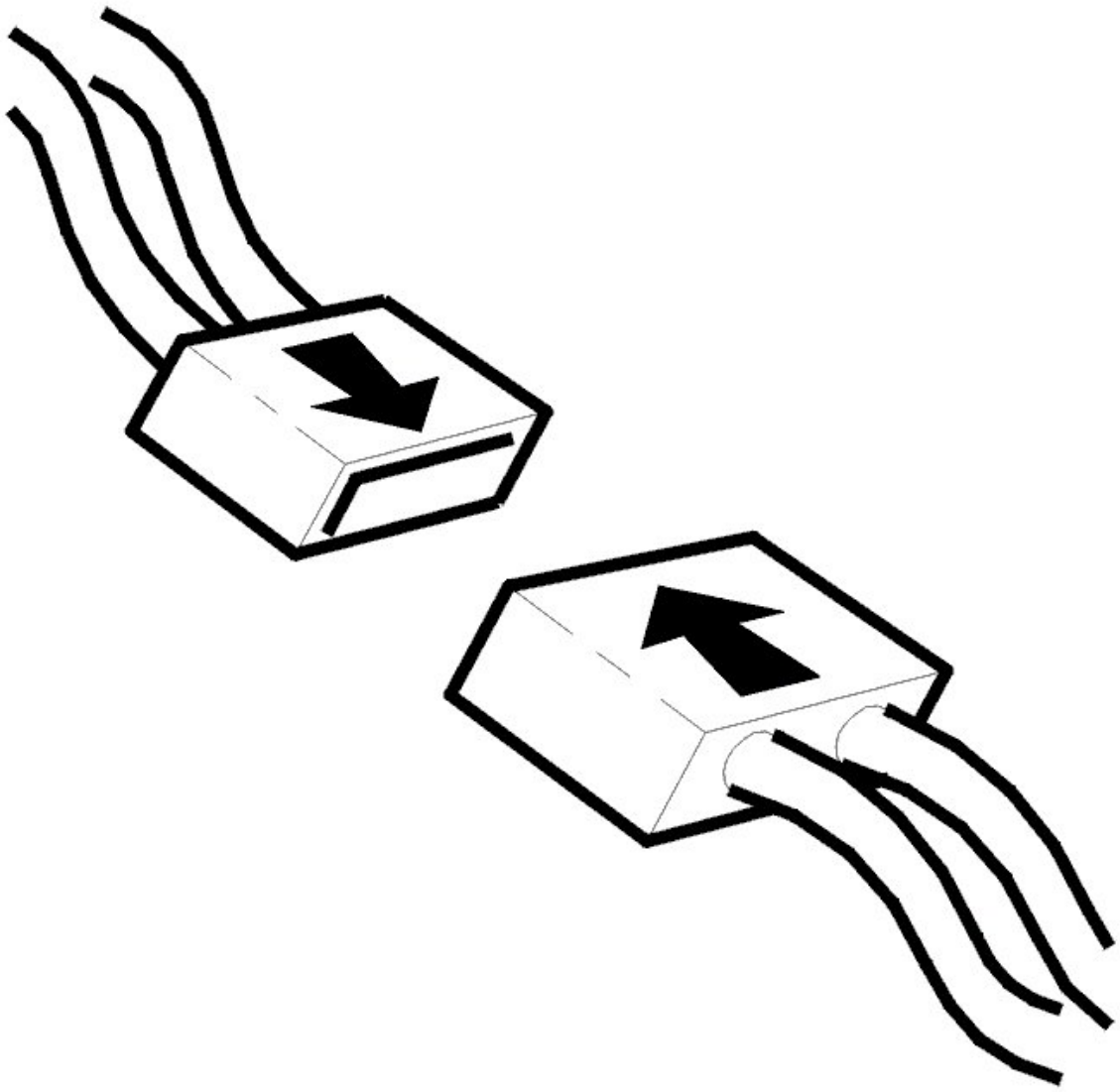
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Wait for at least 90 seconds.
- Connect the connectors, install the components etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

The value should change between OFF and ON.

Does the value change?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

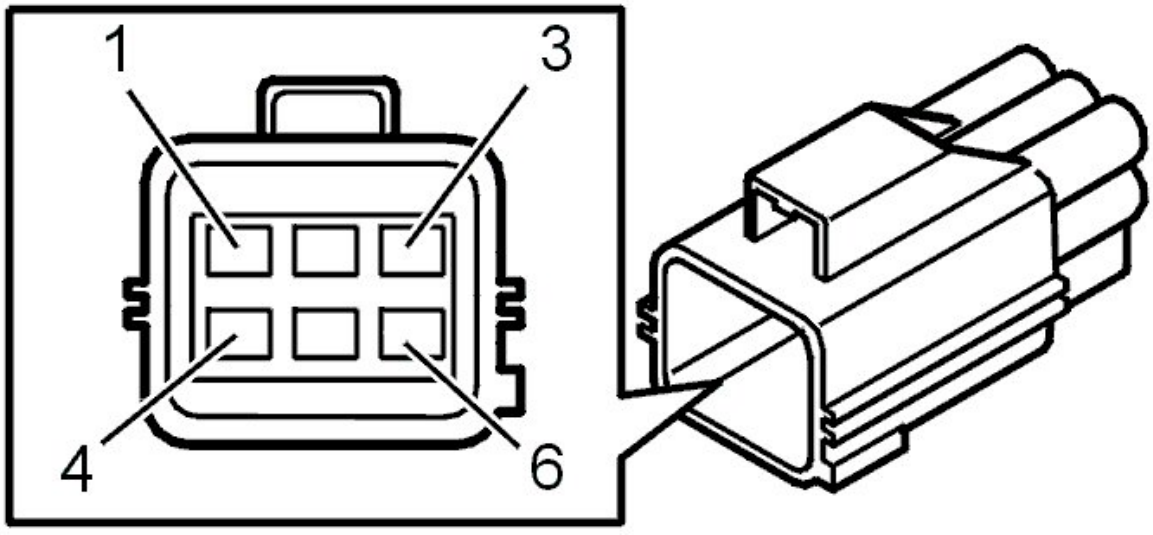
Attempt New Test - Checking the temperature sensor

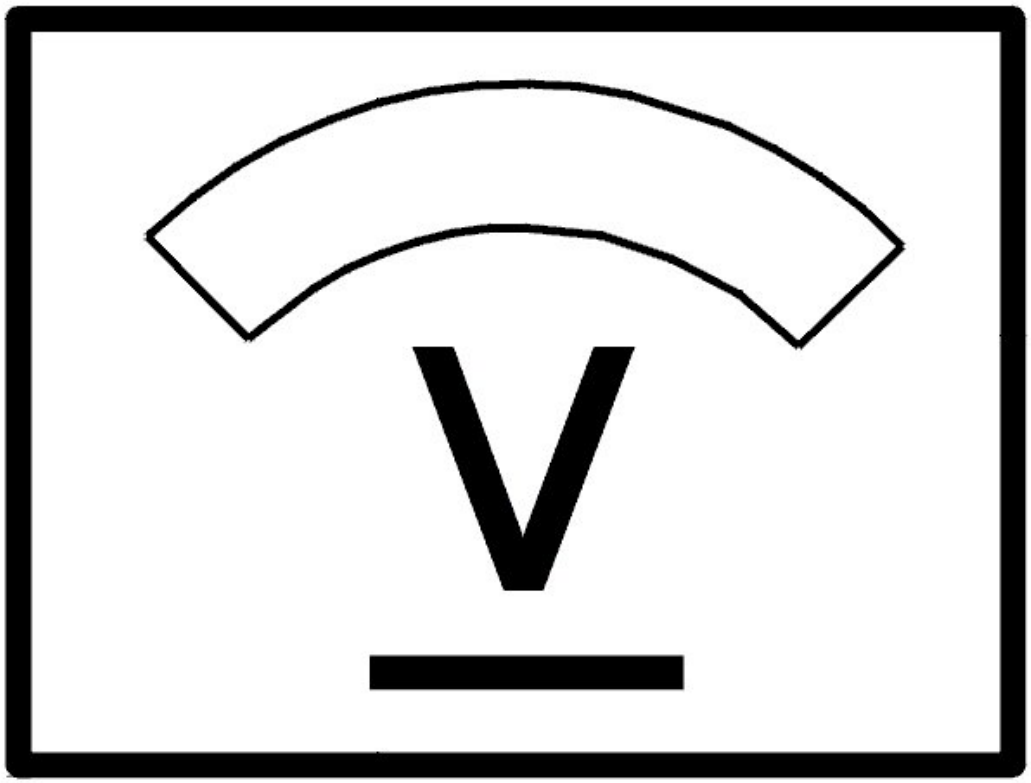
Intermittent fault

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

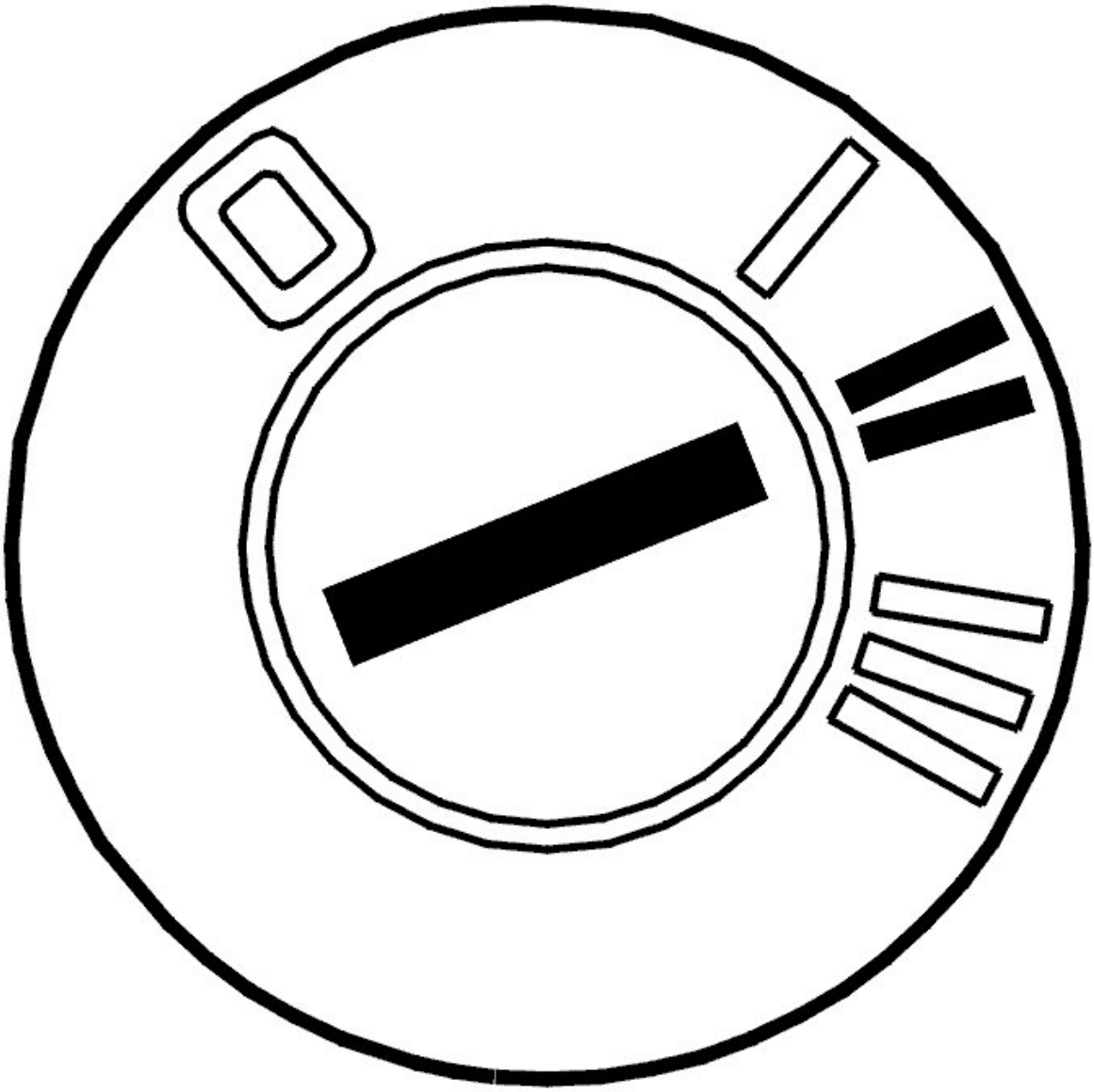
FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking the temperature sensor

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

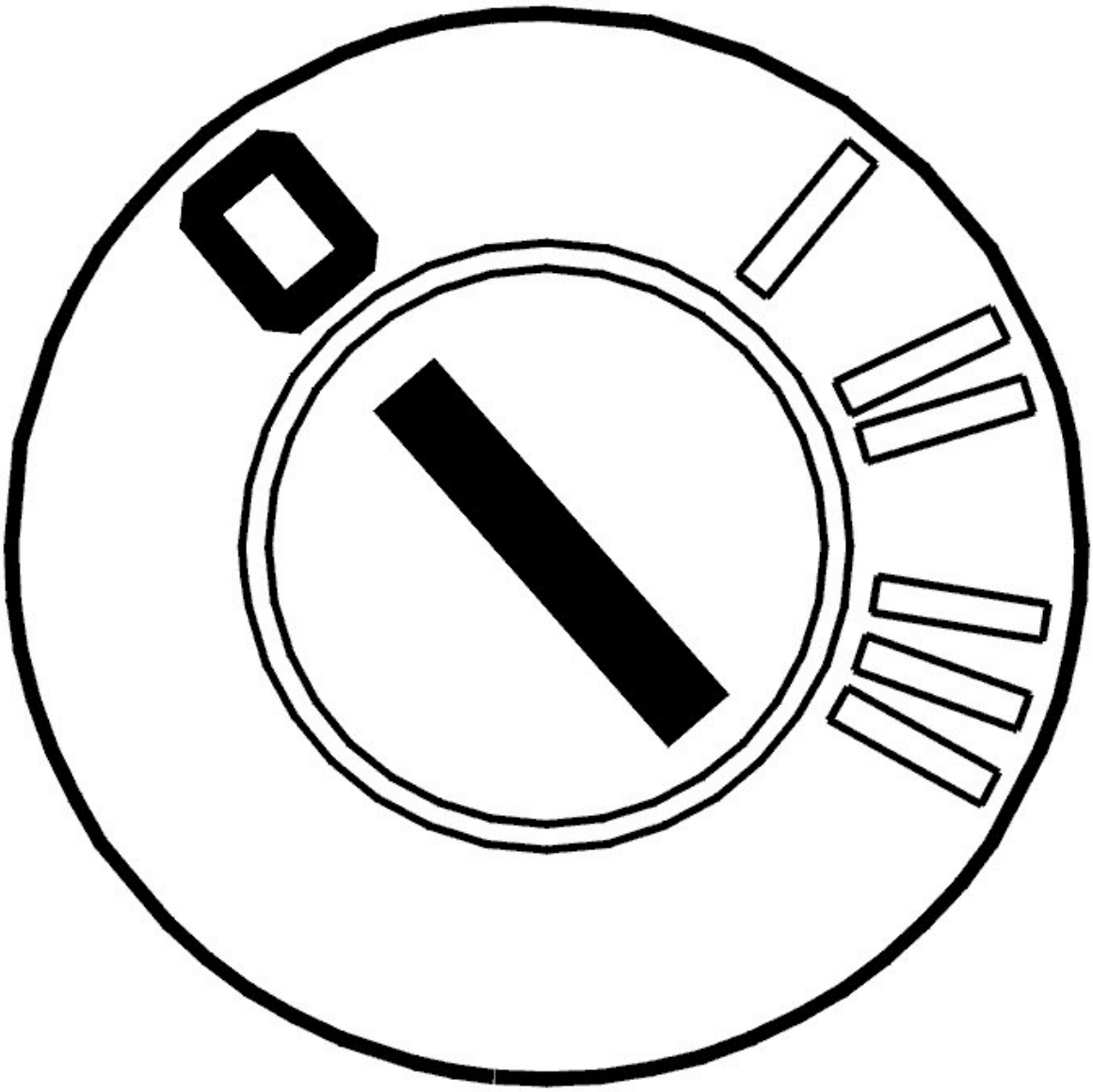
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

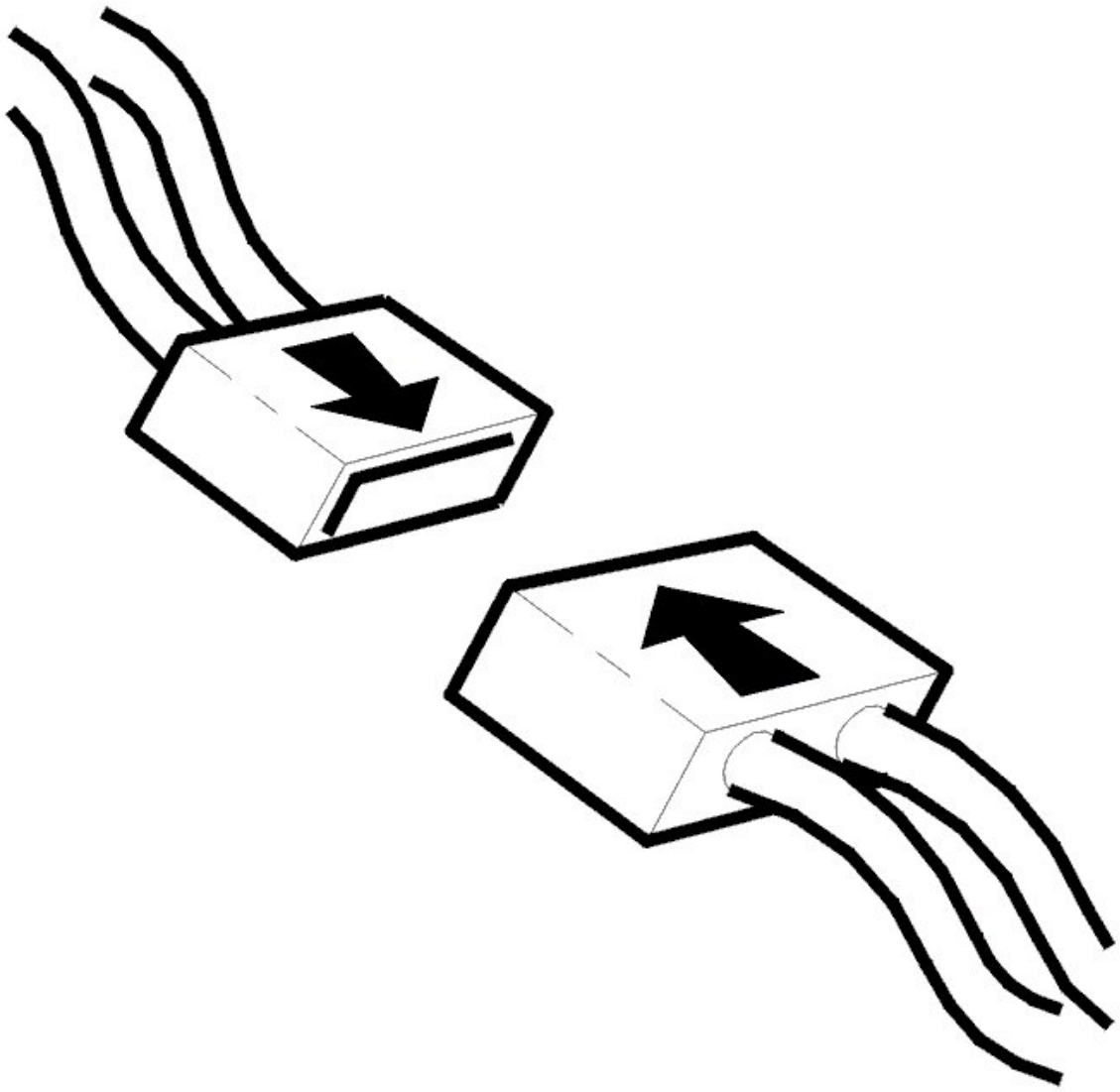
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

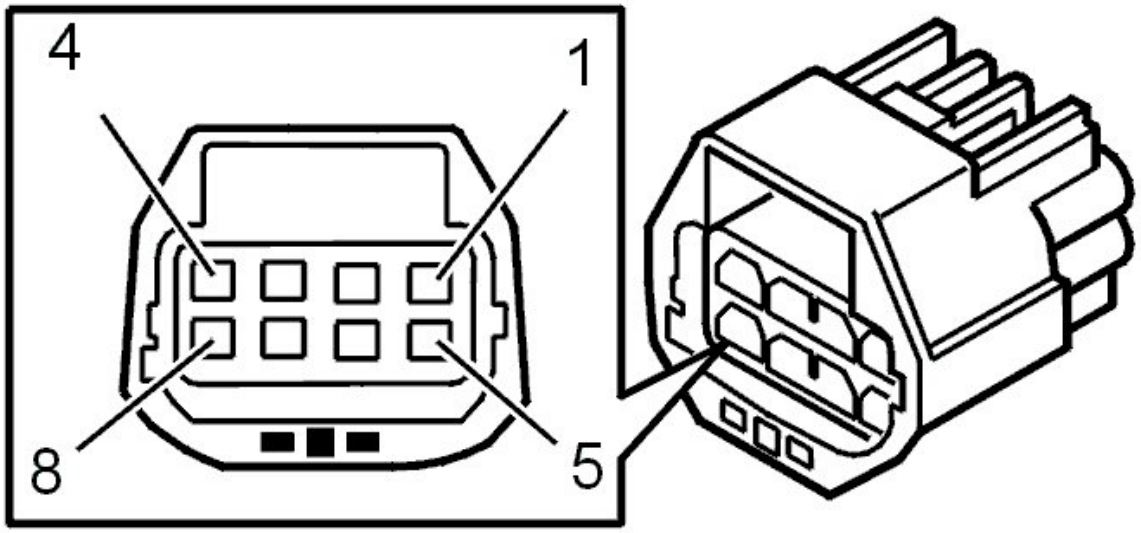
Checking transmission fluid temperature sensor

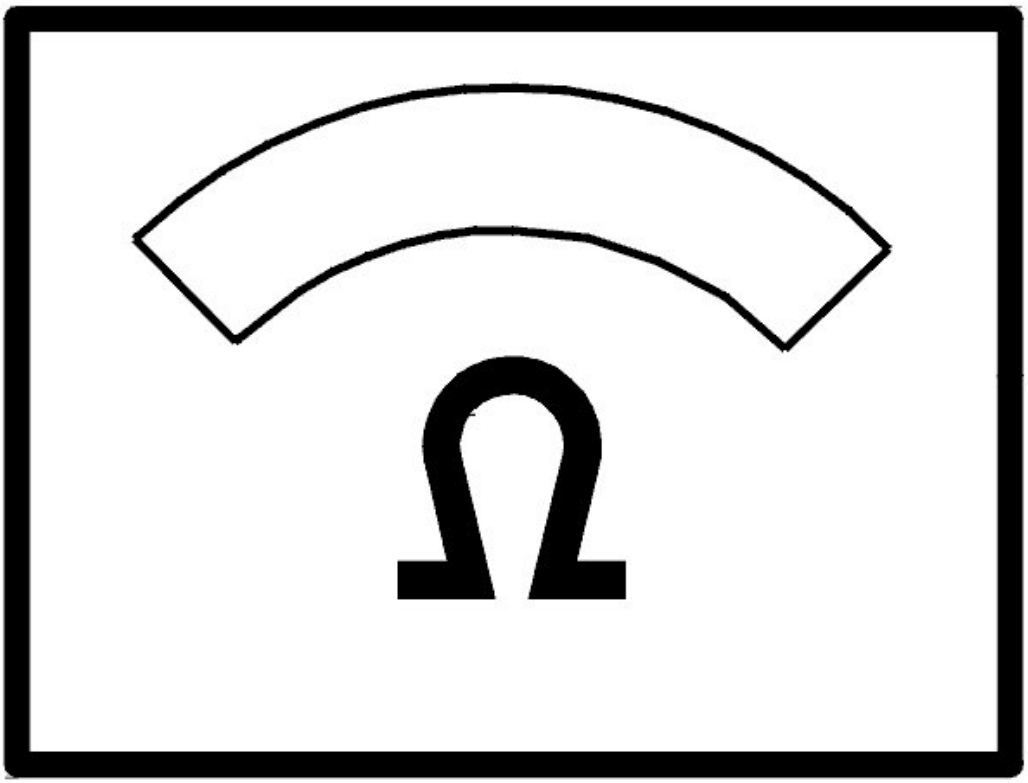




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

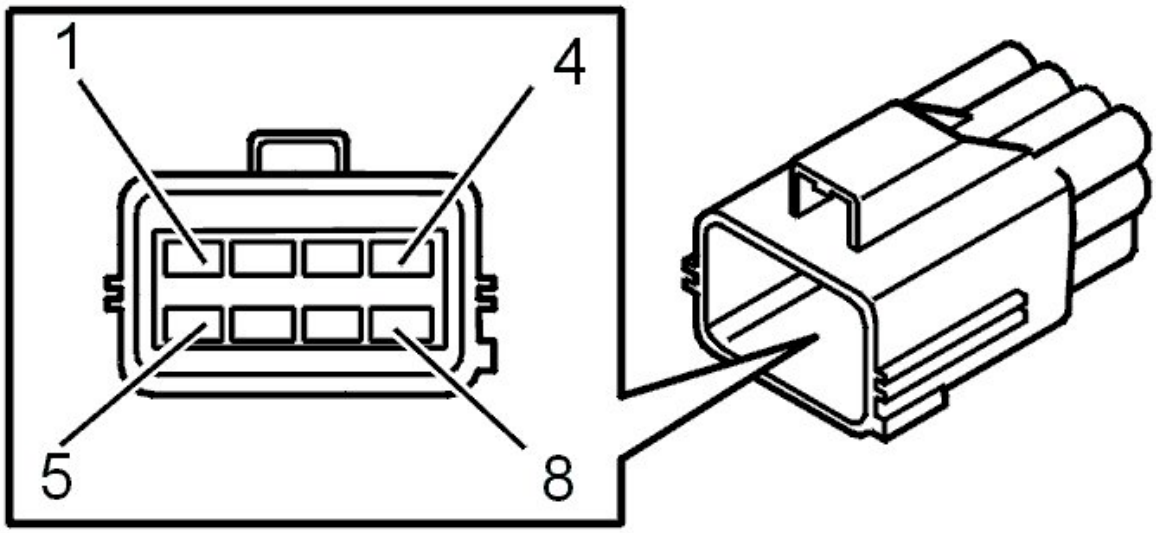
No - Checking the cable and component

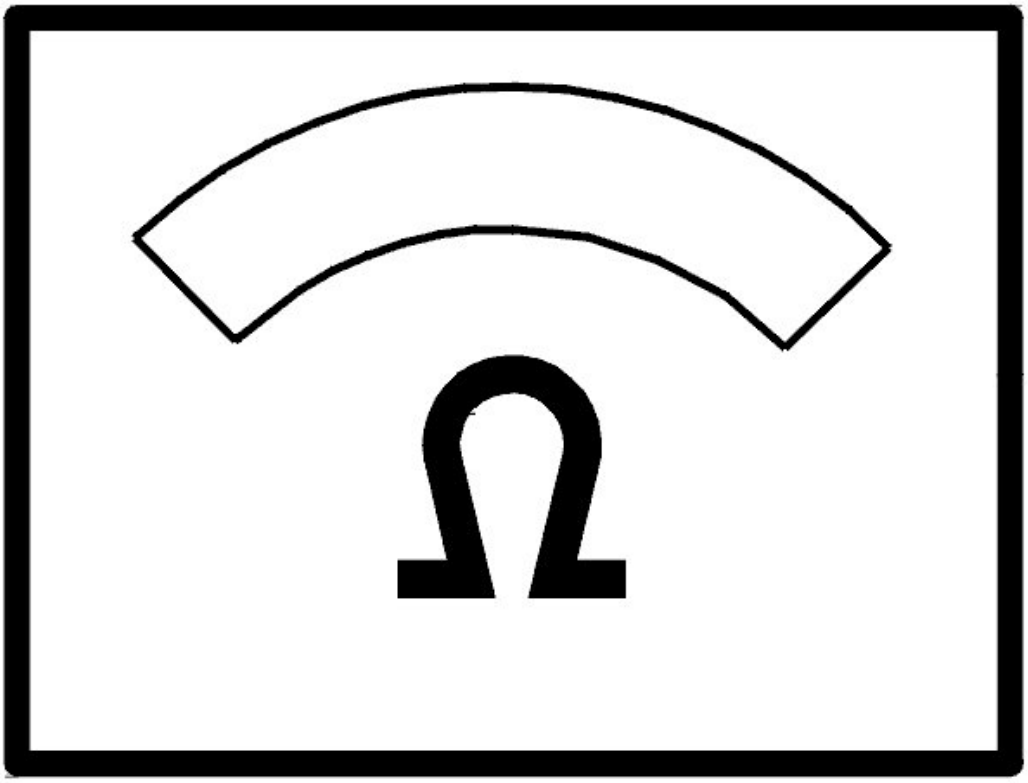
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



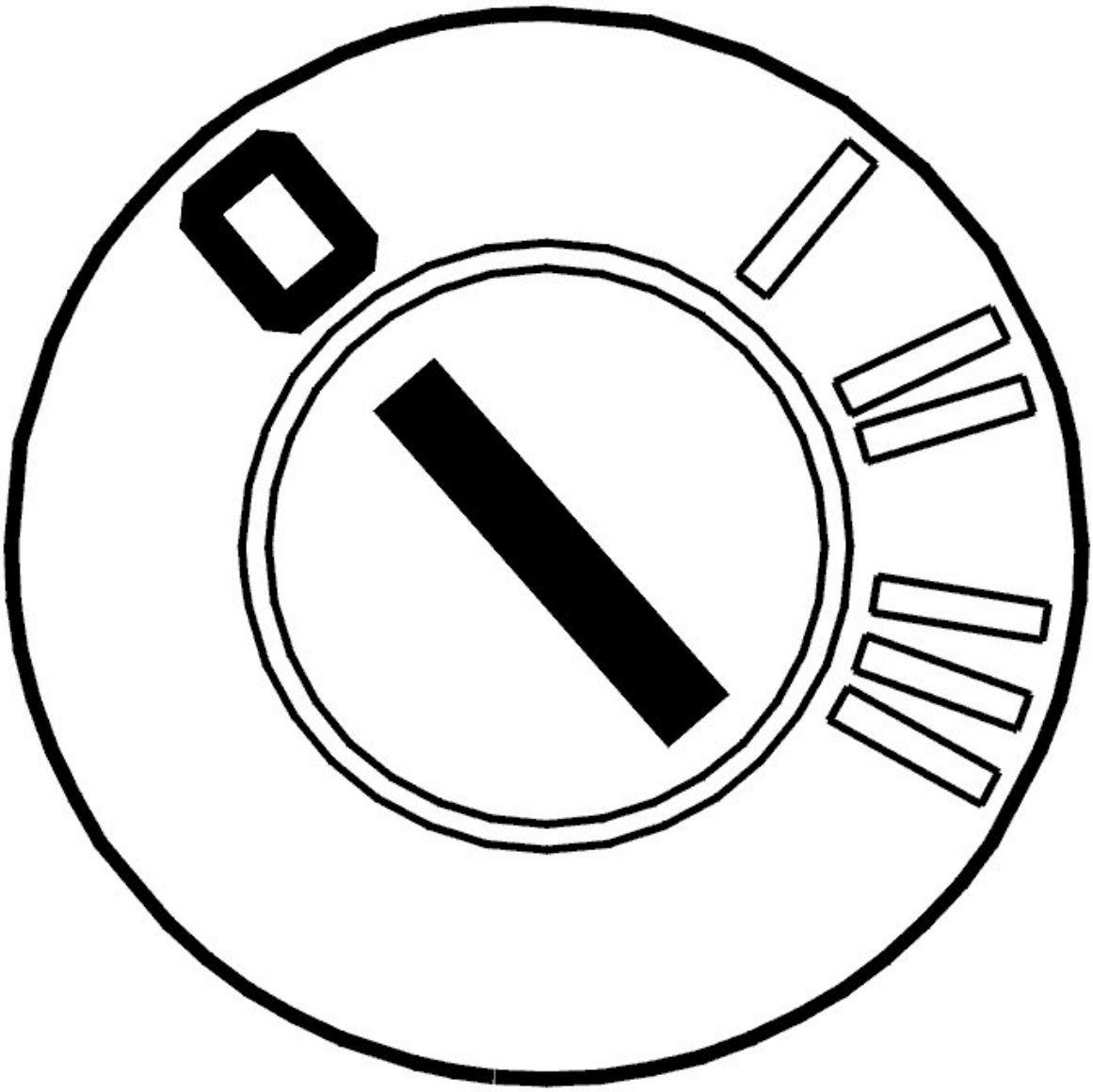


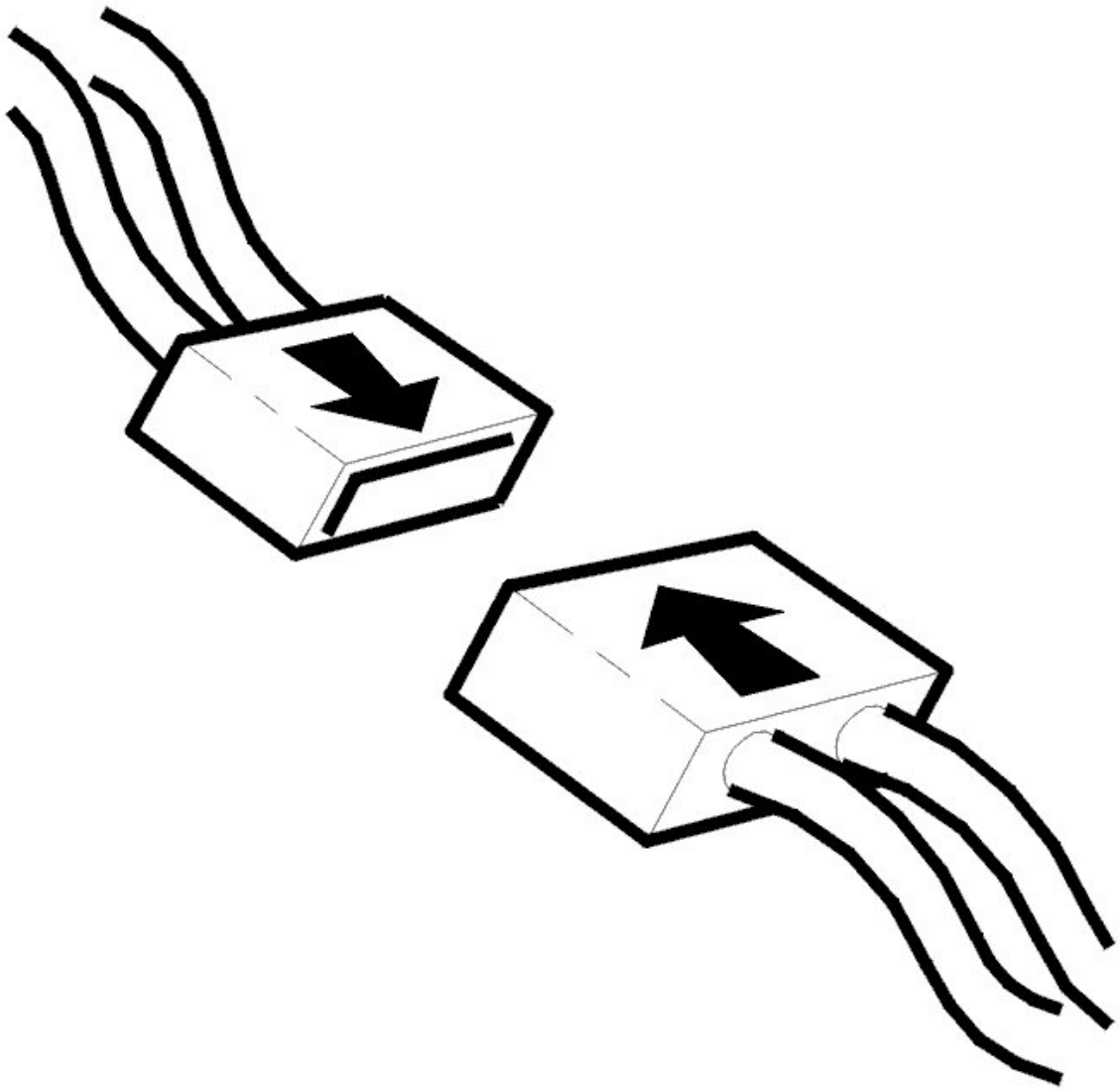
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

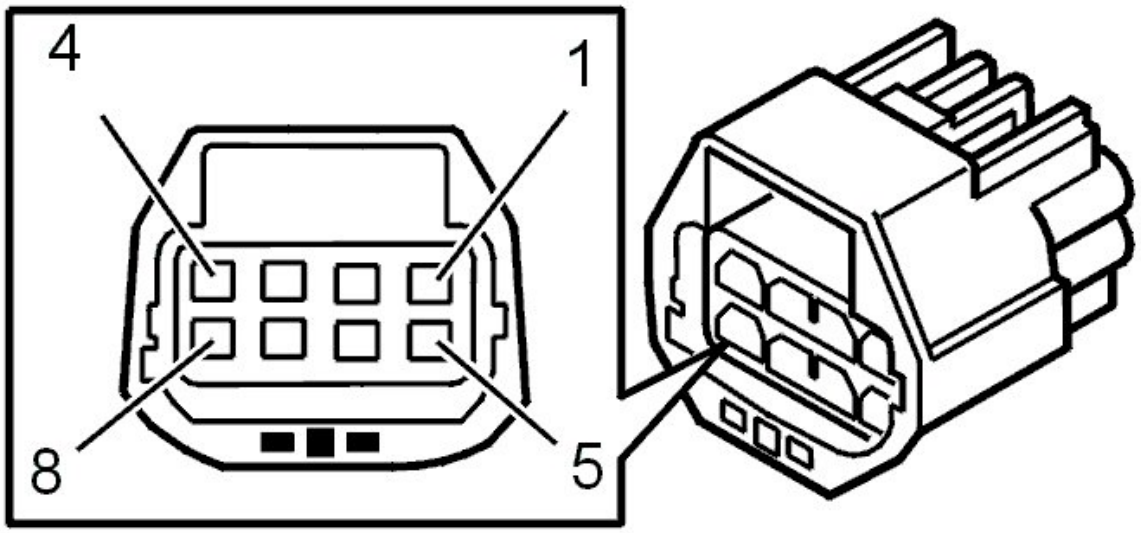
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

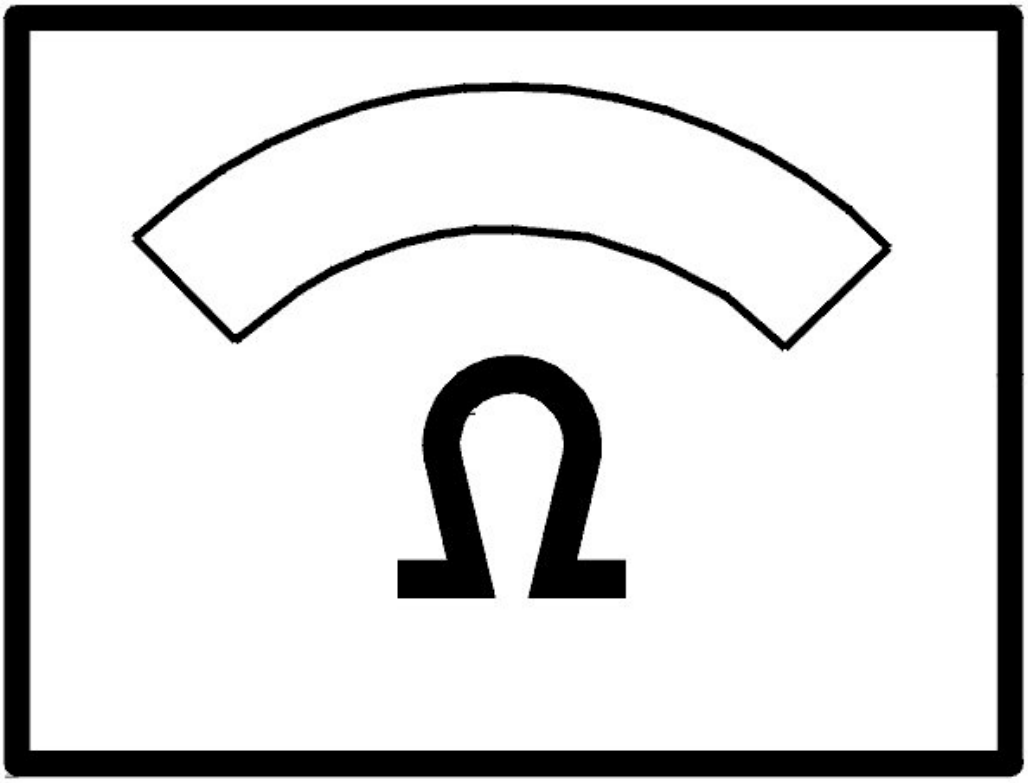
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





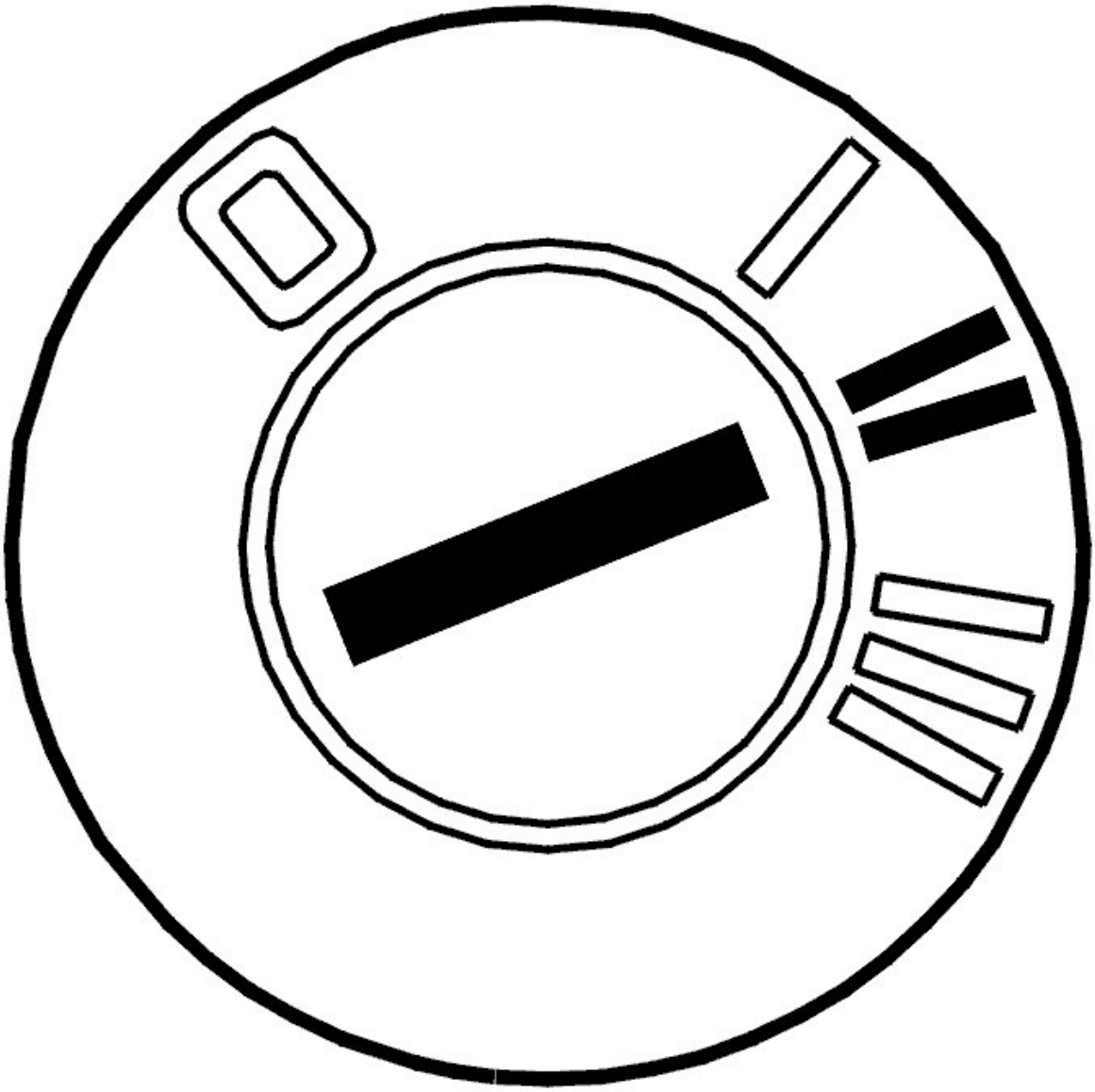
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



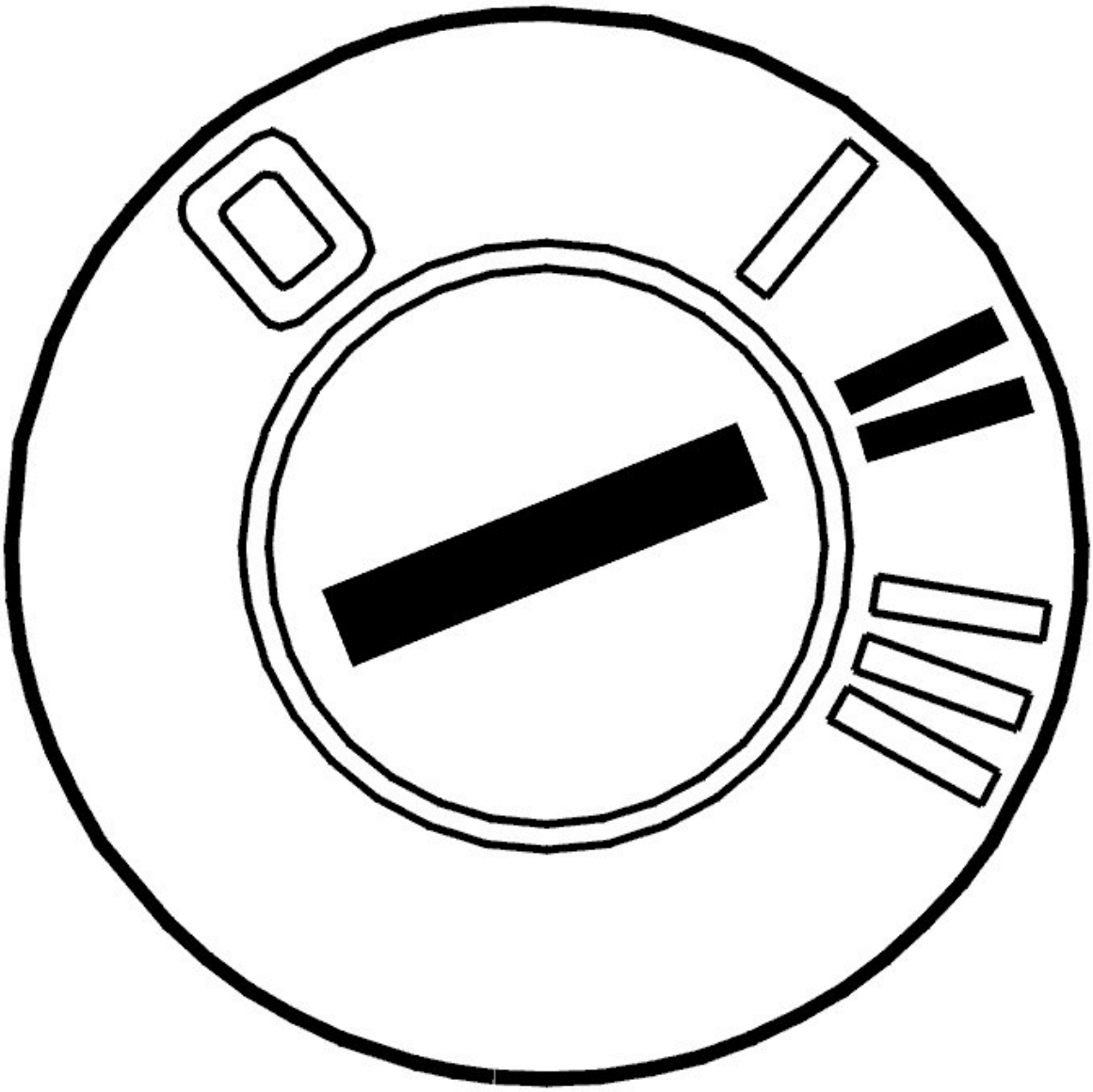
- Ignition on.

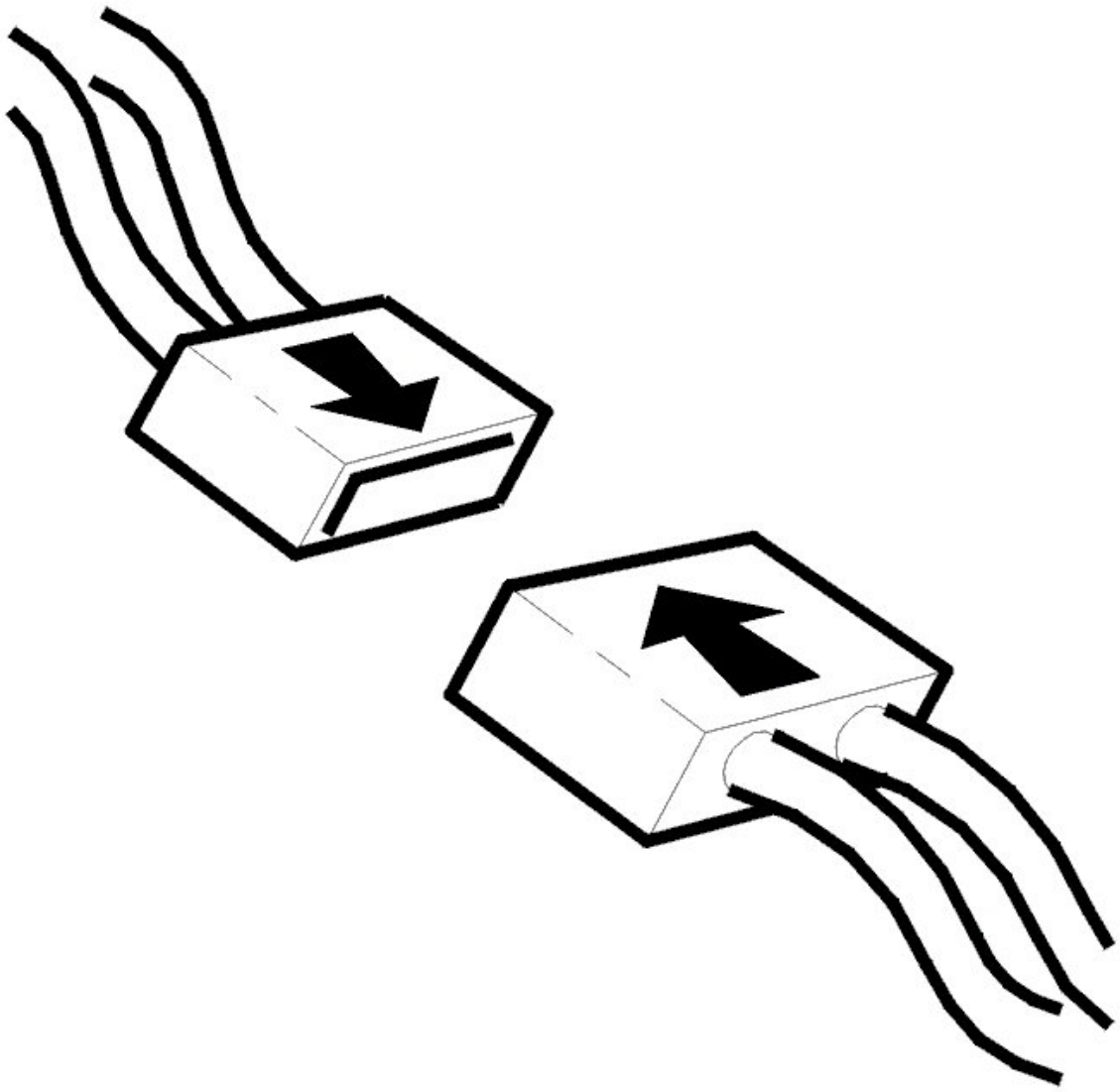
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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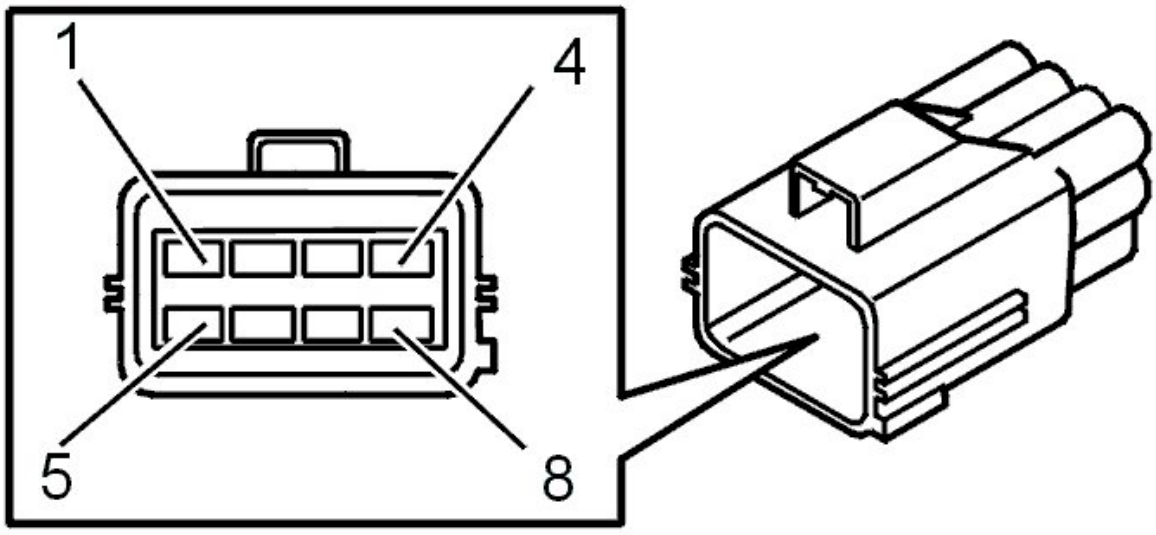
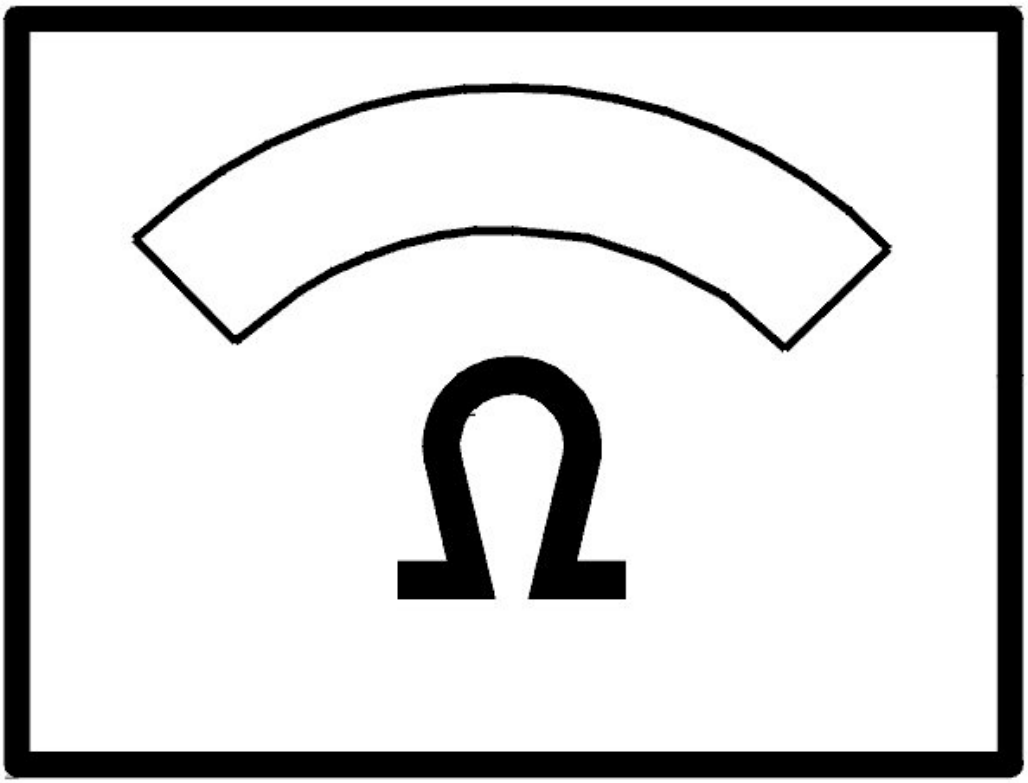
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

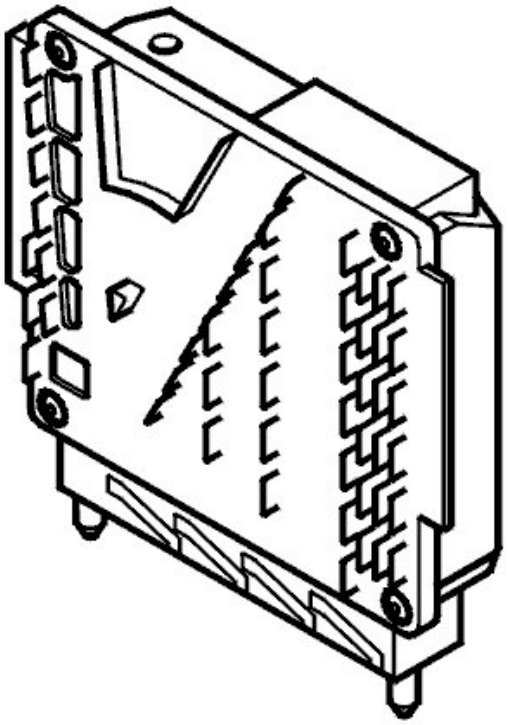
Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

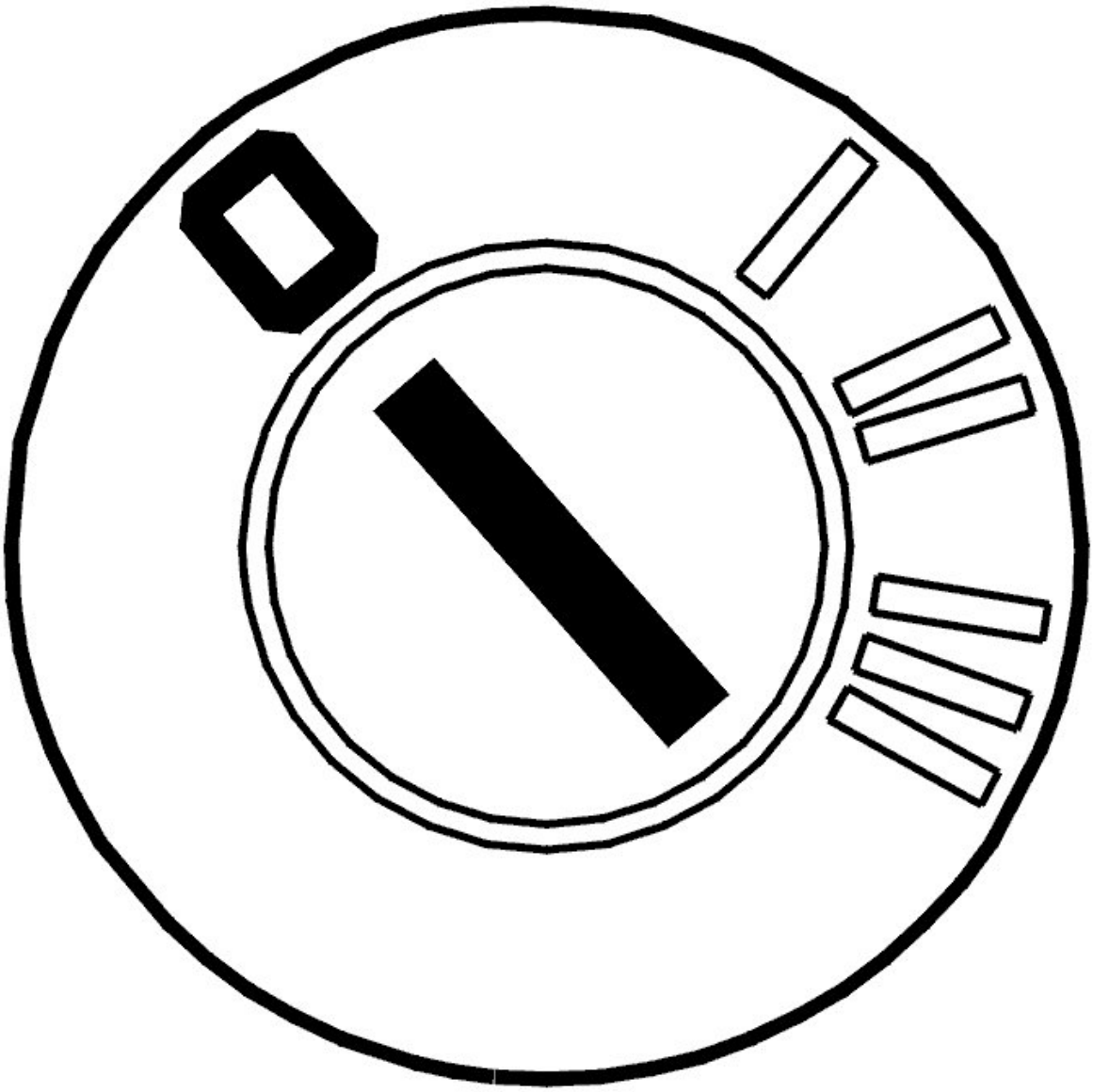
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Missing

Signal missing

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

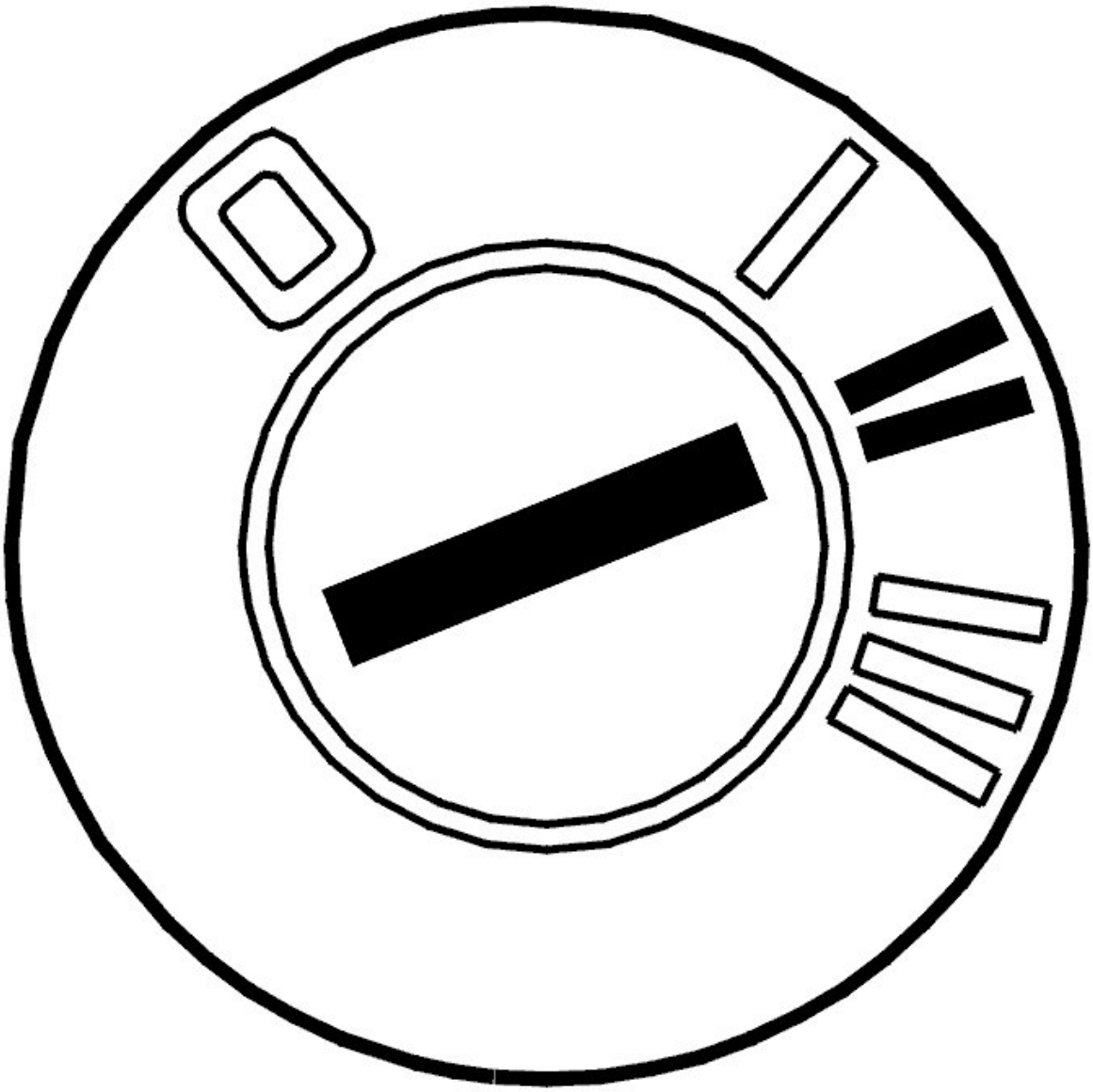
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S2

No - Checking transmission fluid temperature sensor

Checking shift solenoid S2



- Ignition on
- Gear selector in position P
- Activate solenoid S2.

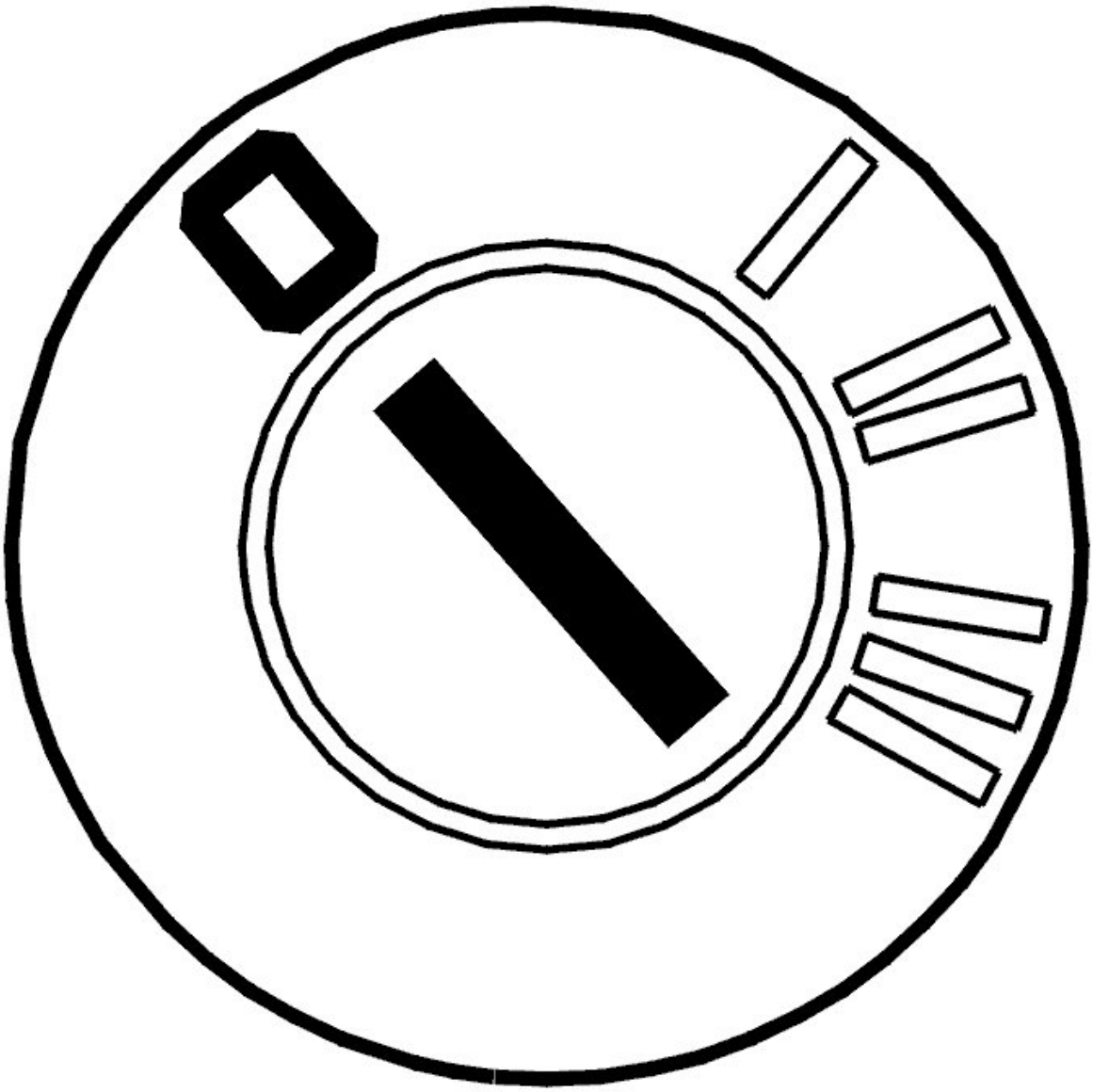
The current should oscillate between 0 and approximately 1.5 A.

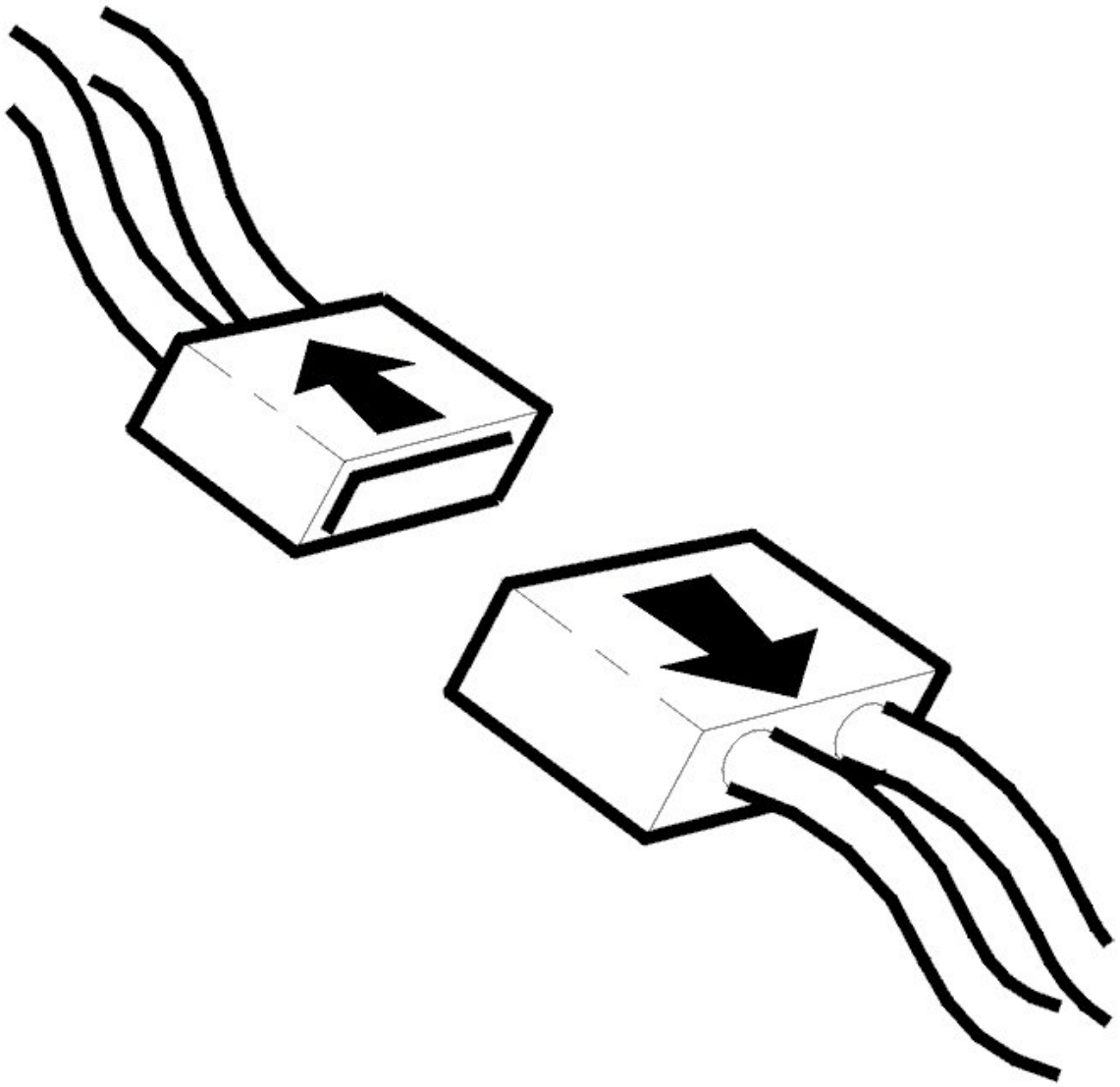
Does the current oscillate?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



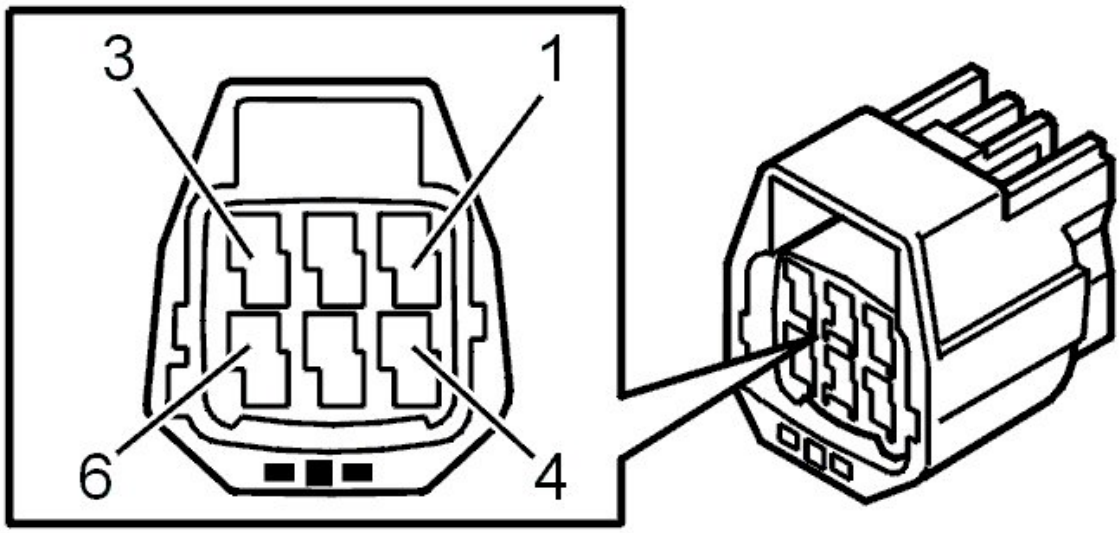


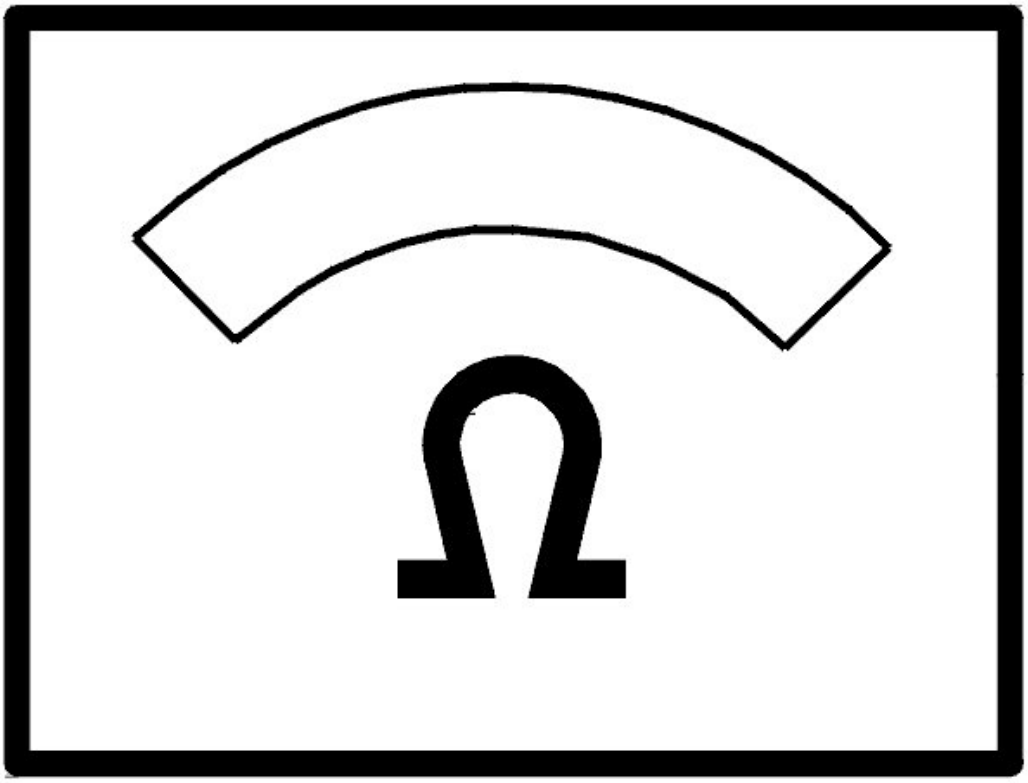
- Ignition off
- Disconnect transmission connector C.

Check solenoid S2. Measure the resistance between transmission connector terminal #C2 and the transmission housing. The resistance should be 11-15 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



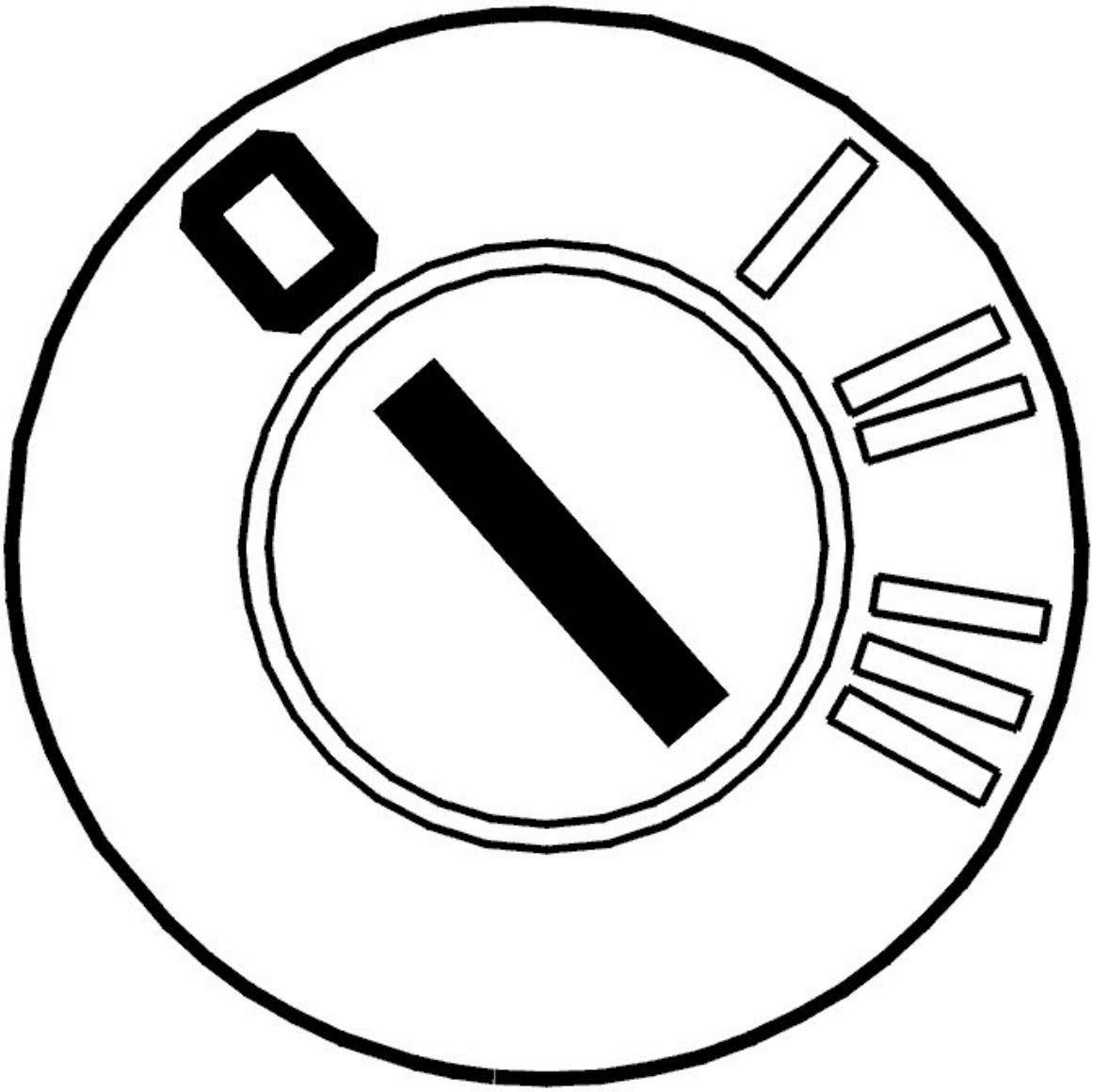


Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring

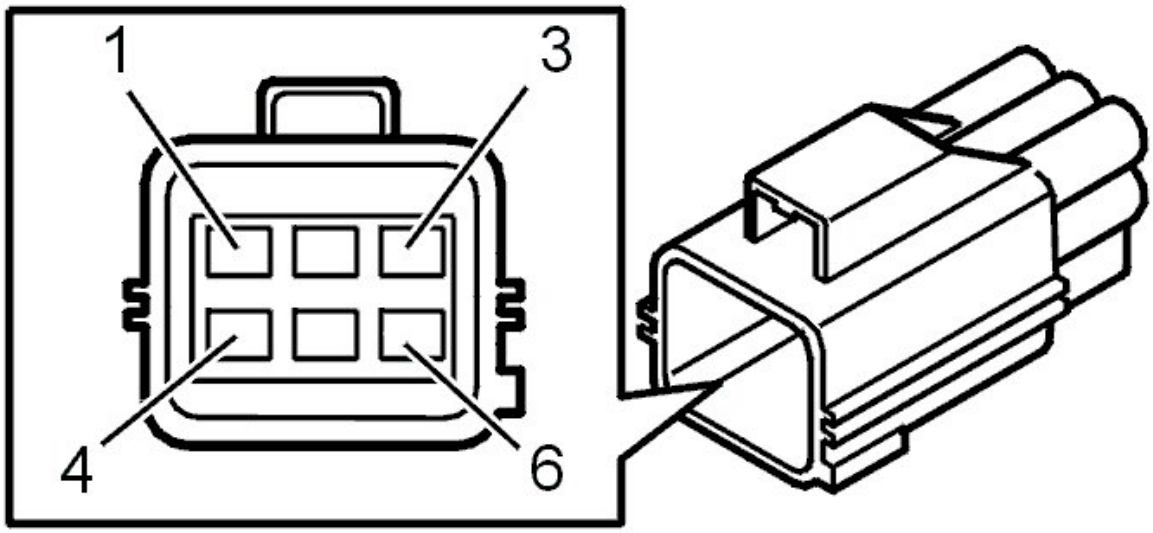


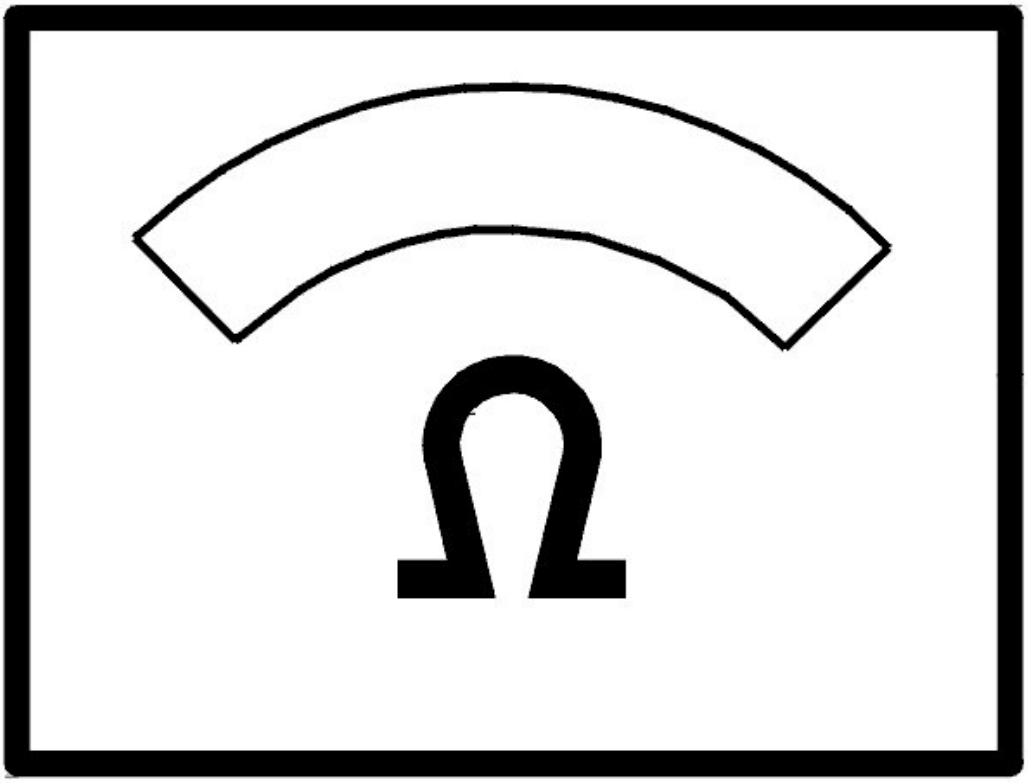
- Ignition off.

Check the cable between control module terminal #B8 (#A68) and transmission connector #C2 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



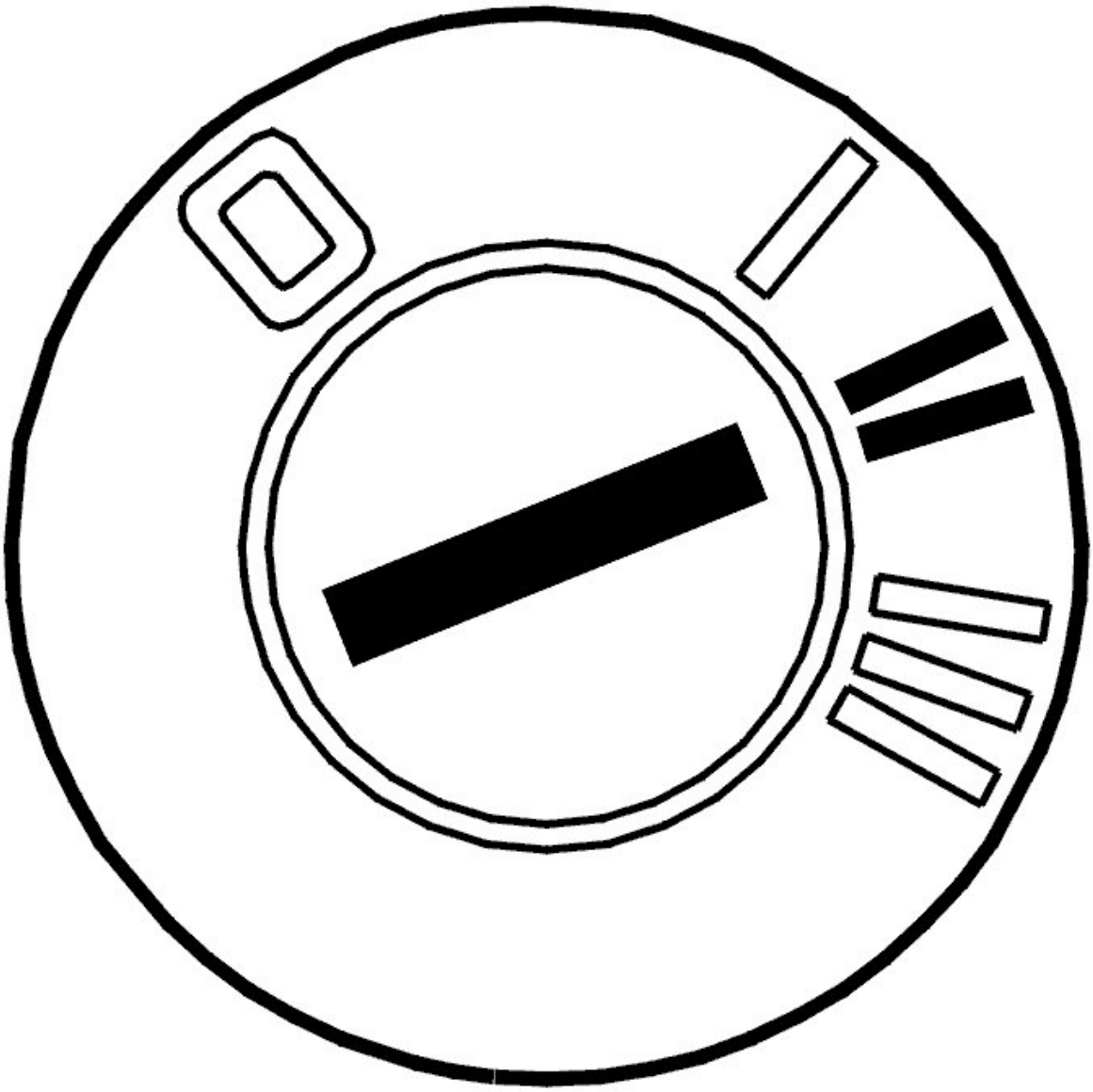


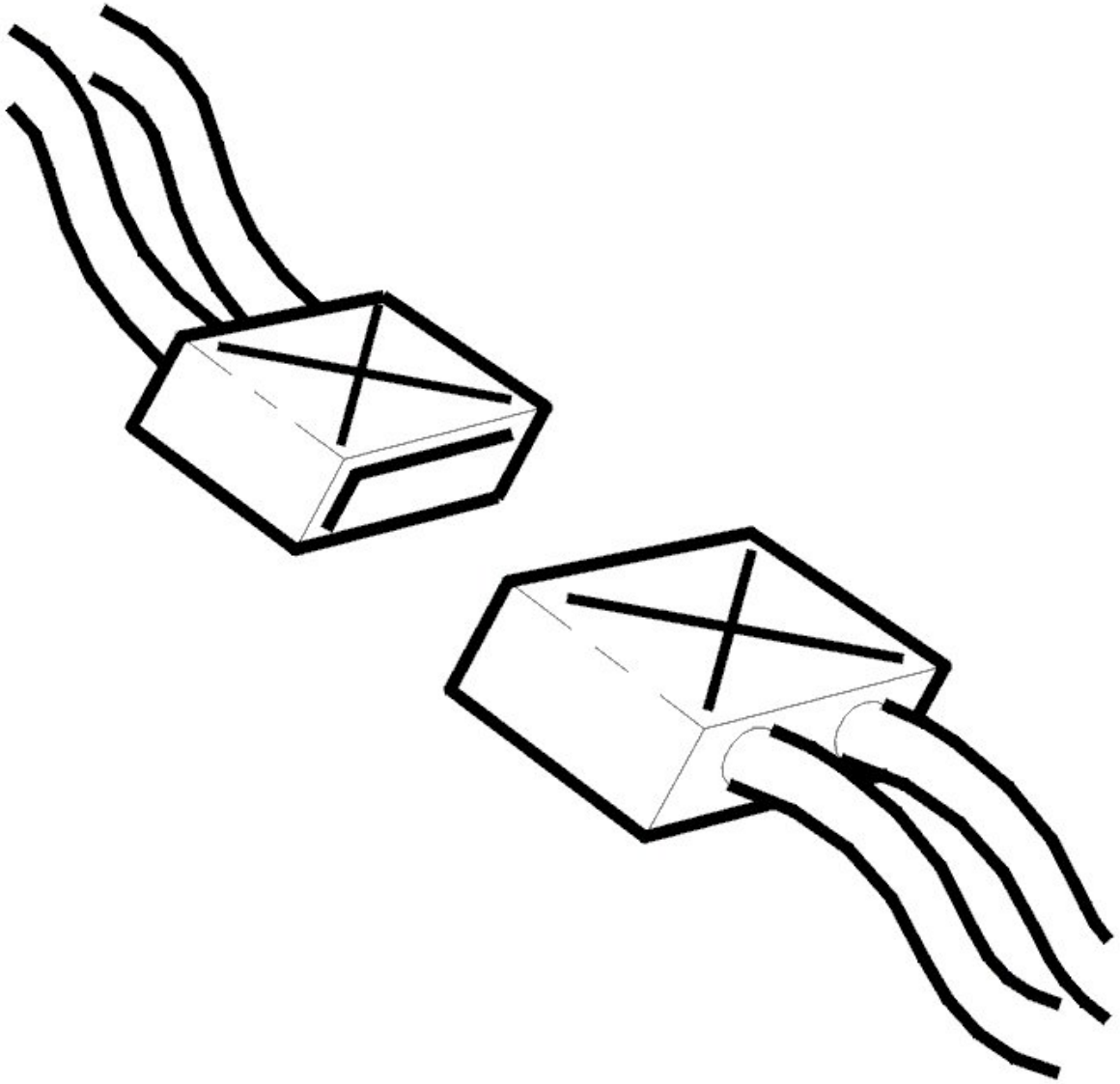
Was a fault detected?

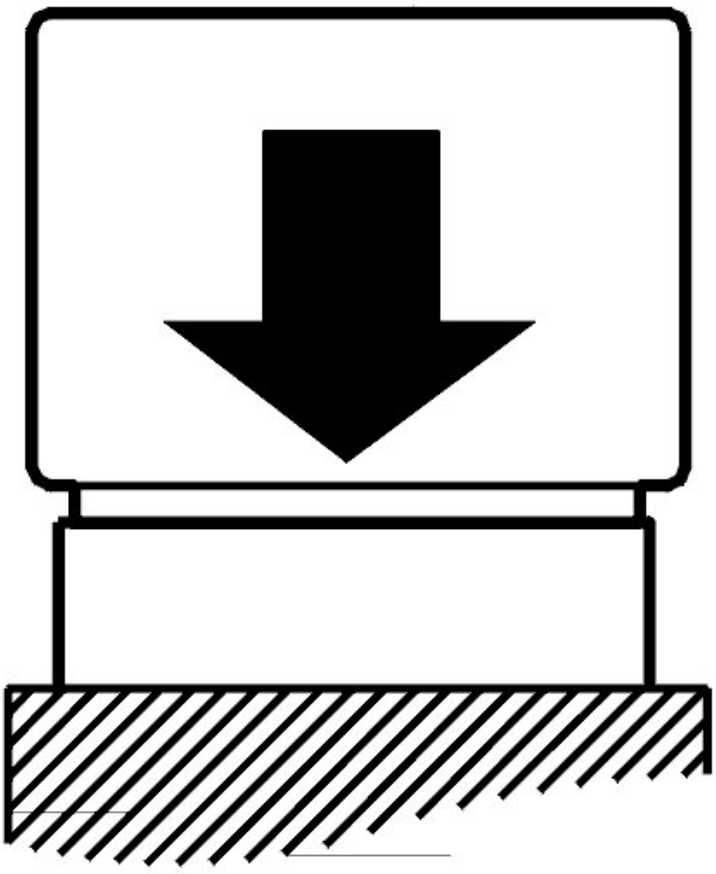
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

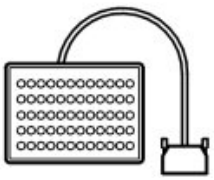
Check the transmission control module (TCM) by measuring the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

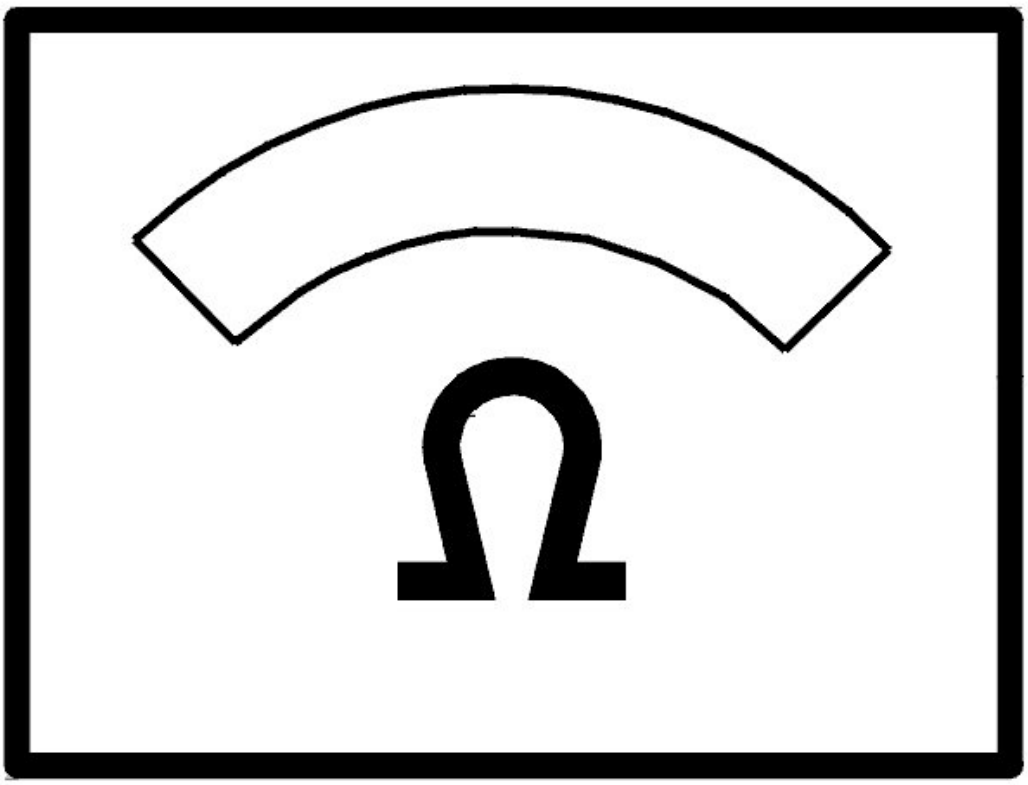
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



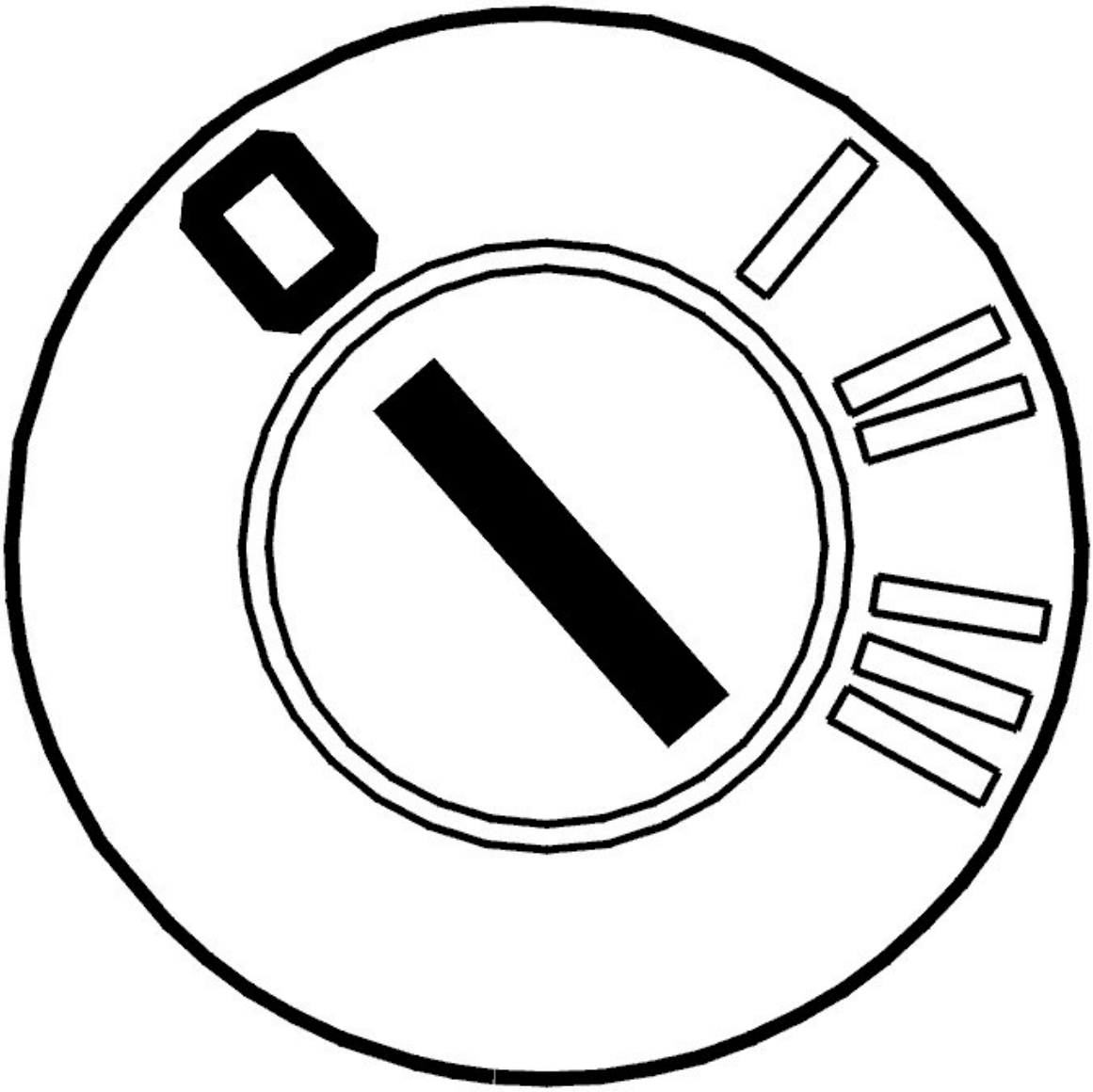


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

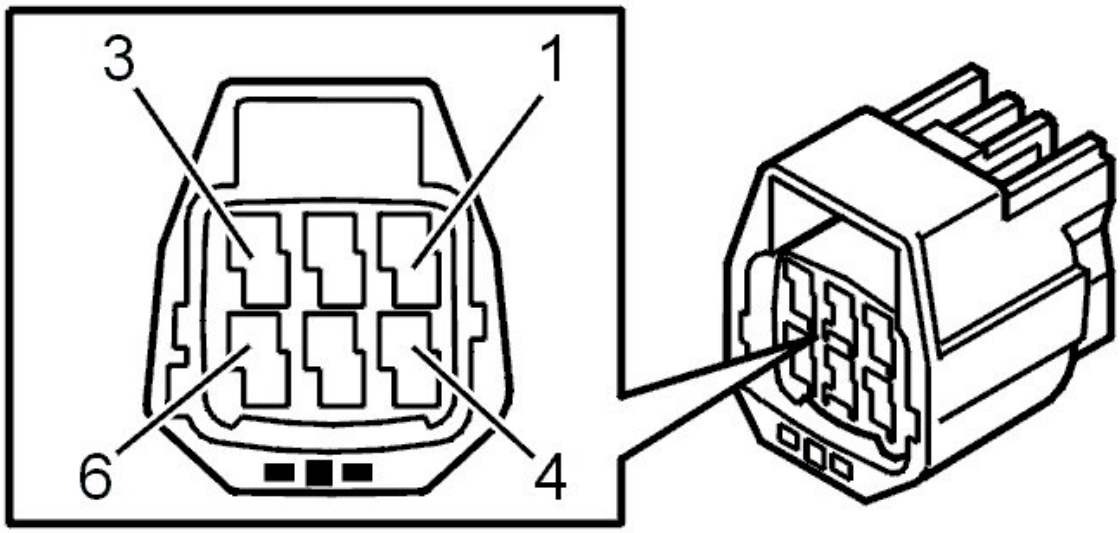
Hint:

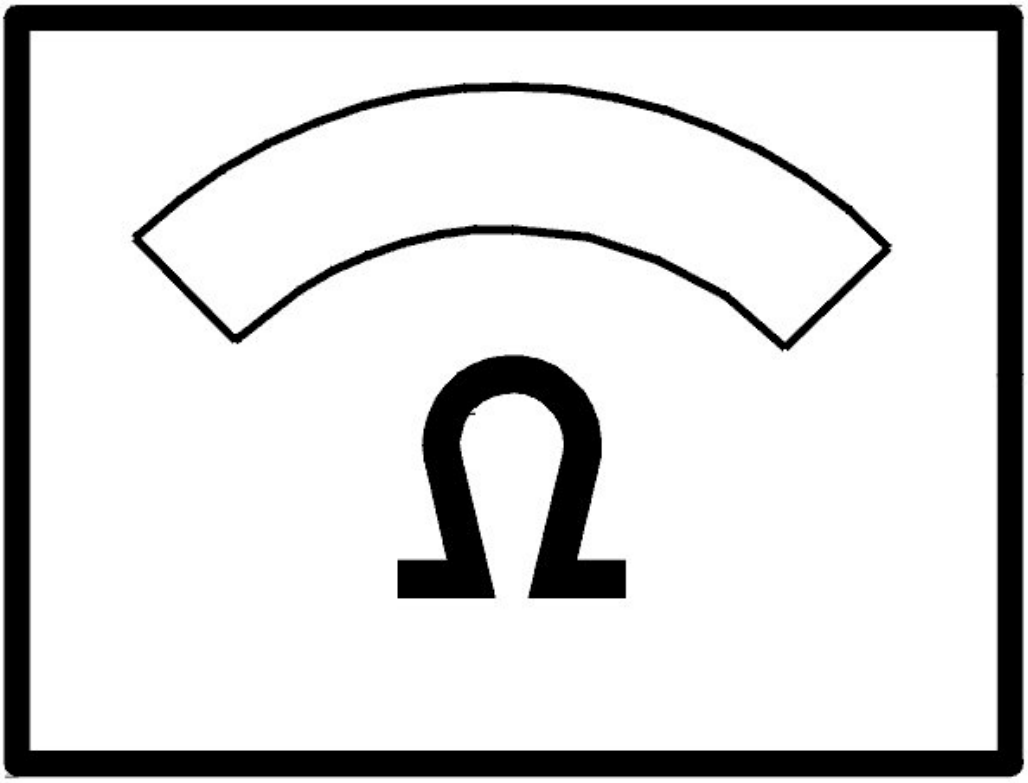
- Check solenoid S2 by measuring the resistance between the terminal pin on solenoid S2 and the transmission housing. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To open the control system and to check or replace solenoid S2, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

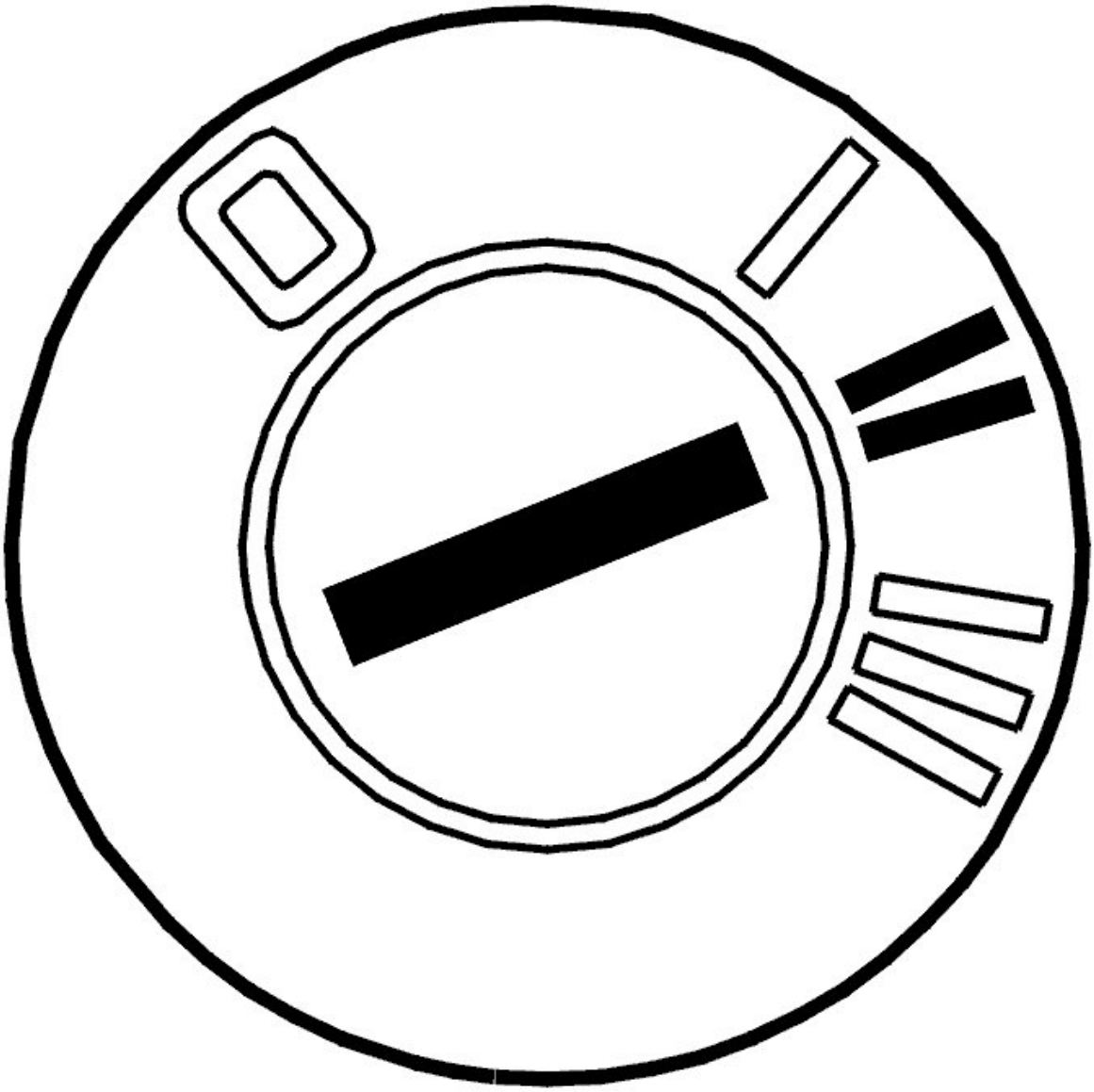
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



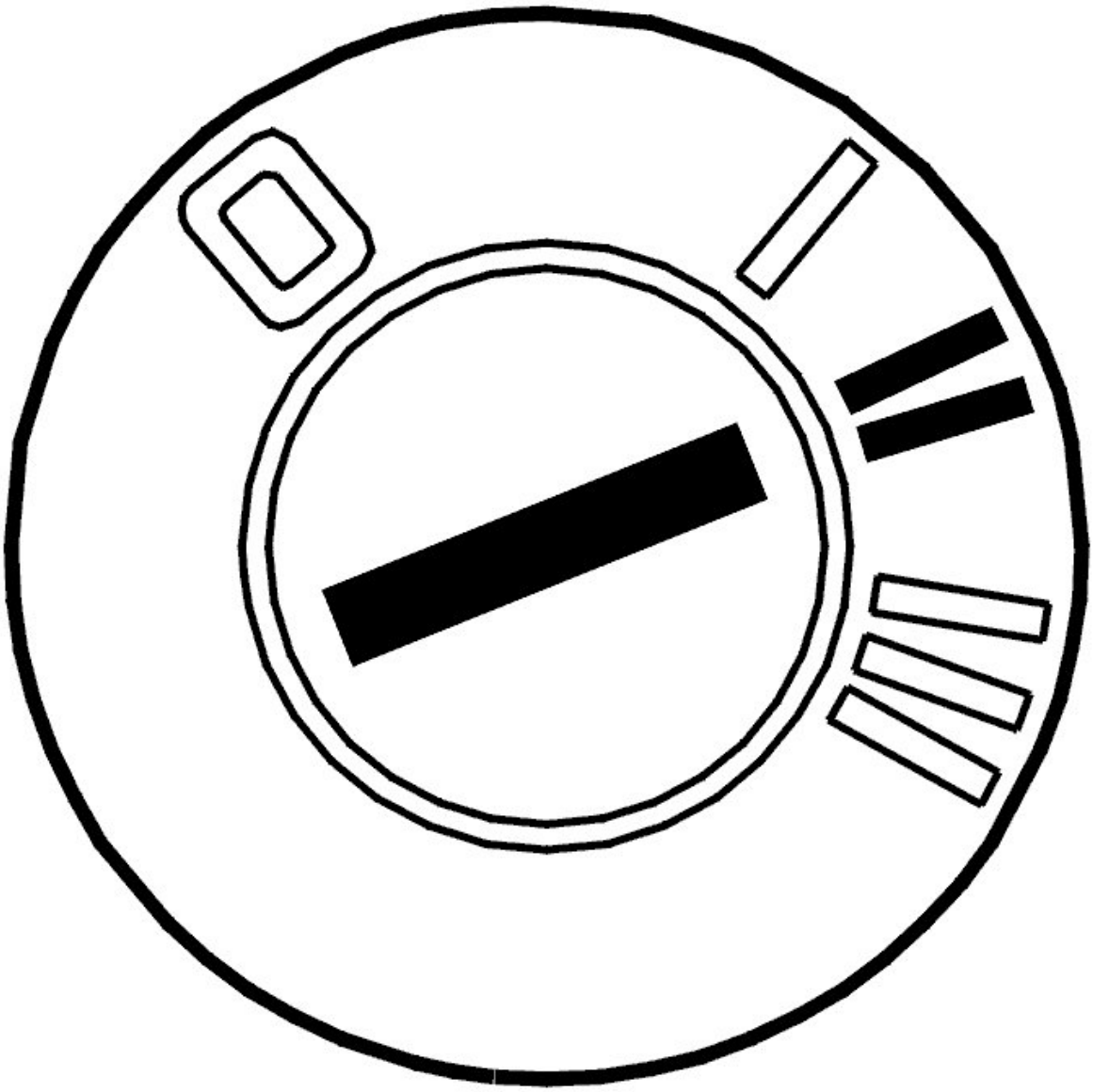
- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Gear selector in position P
- Activate solenoid S2.

The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - **Fault Found**

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the control module and transmission connectors. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

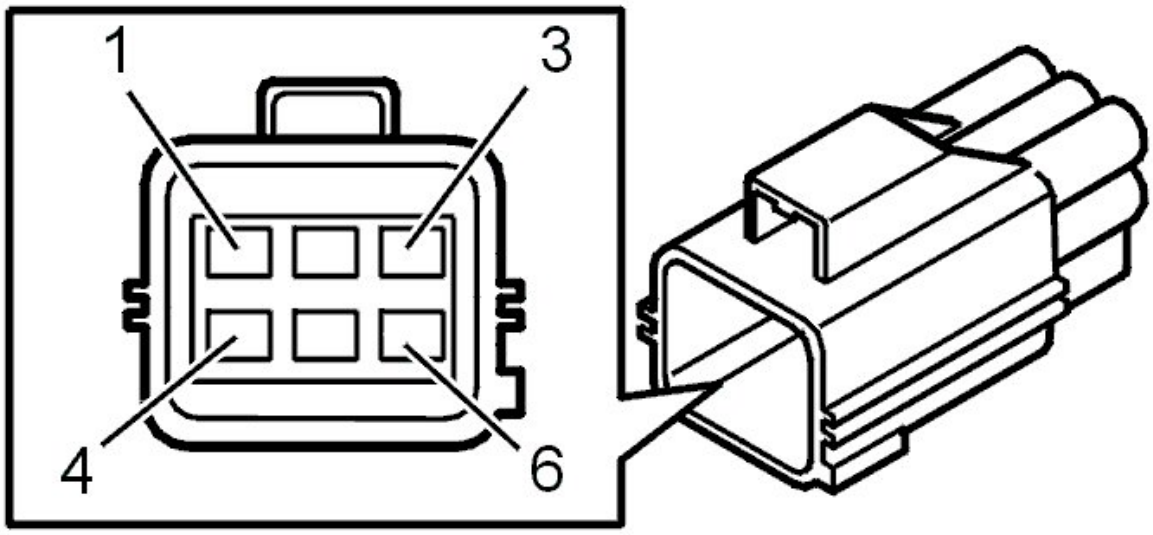
Hint:

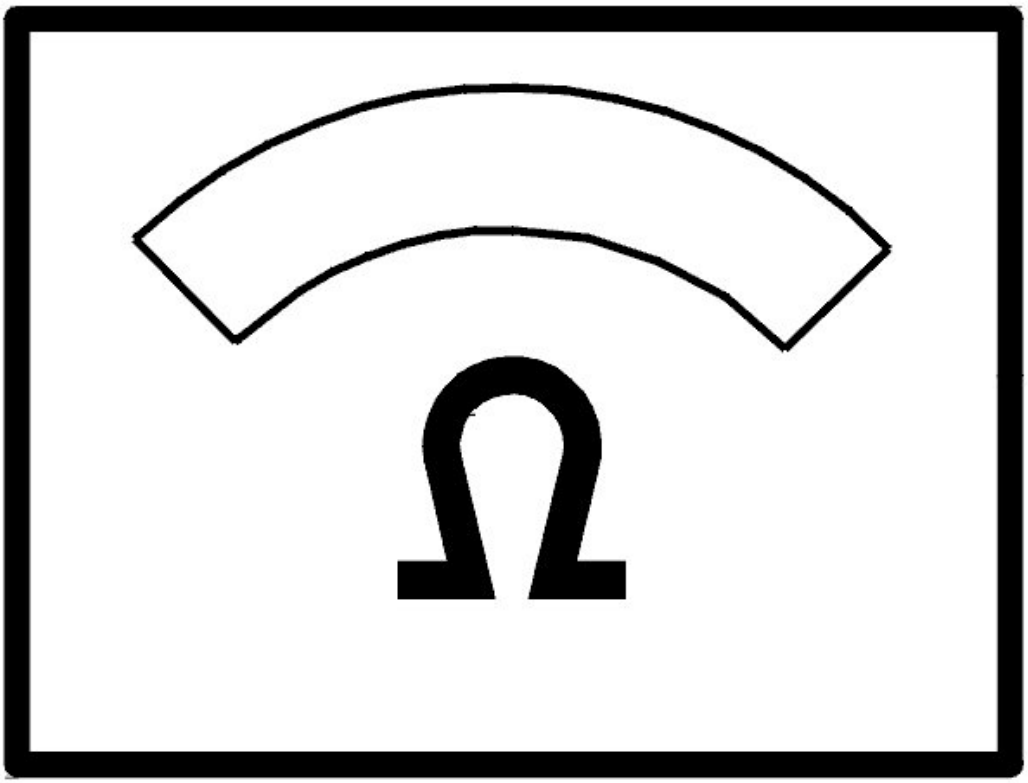
- Check the circuit for solenoid S2. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

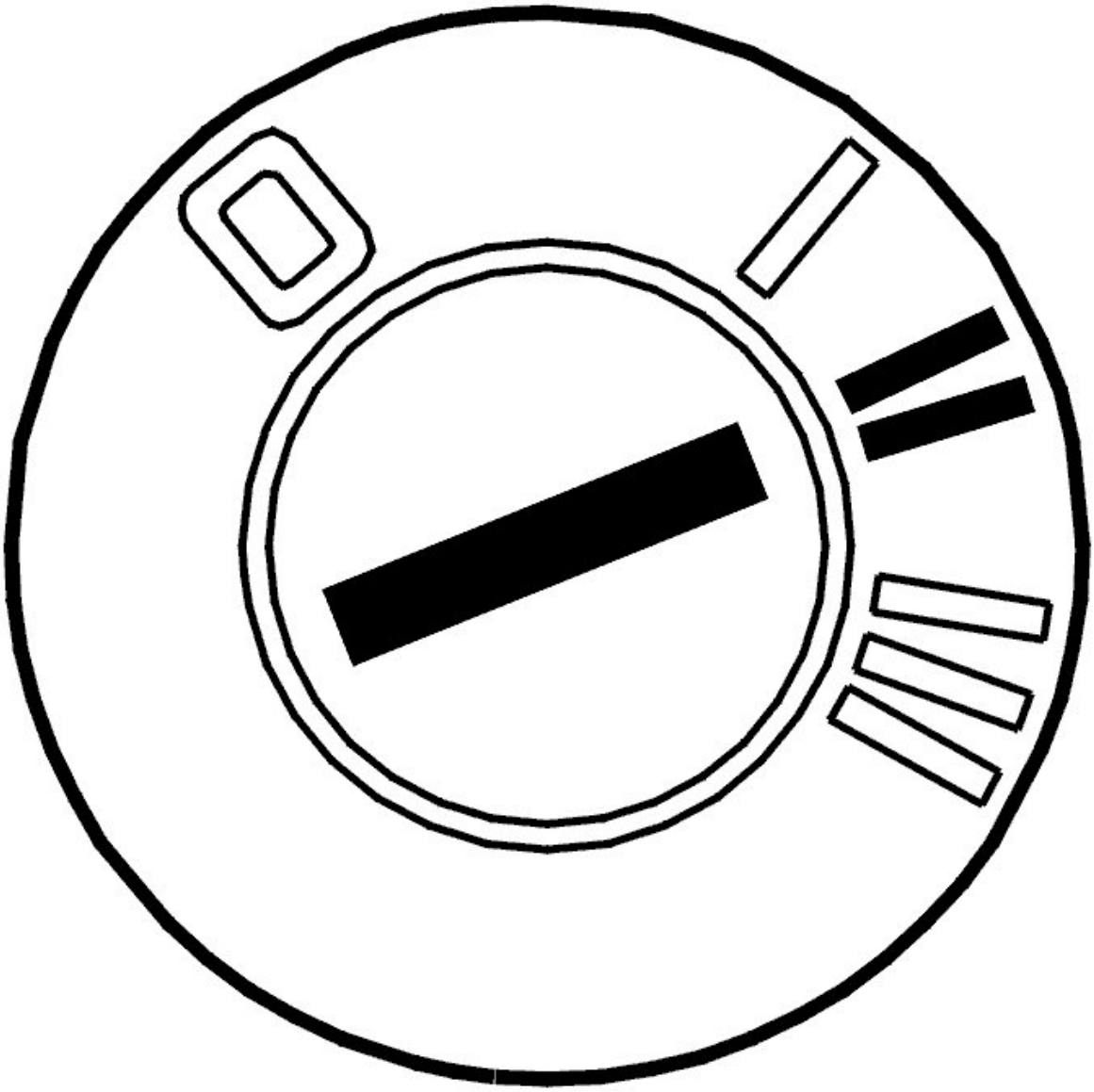
Attempt New Test - Checking the temperature sensor

DONE - DONE

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

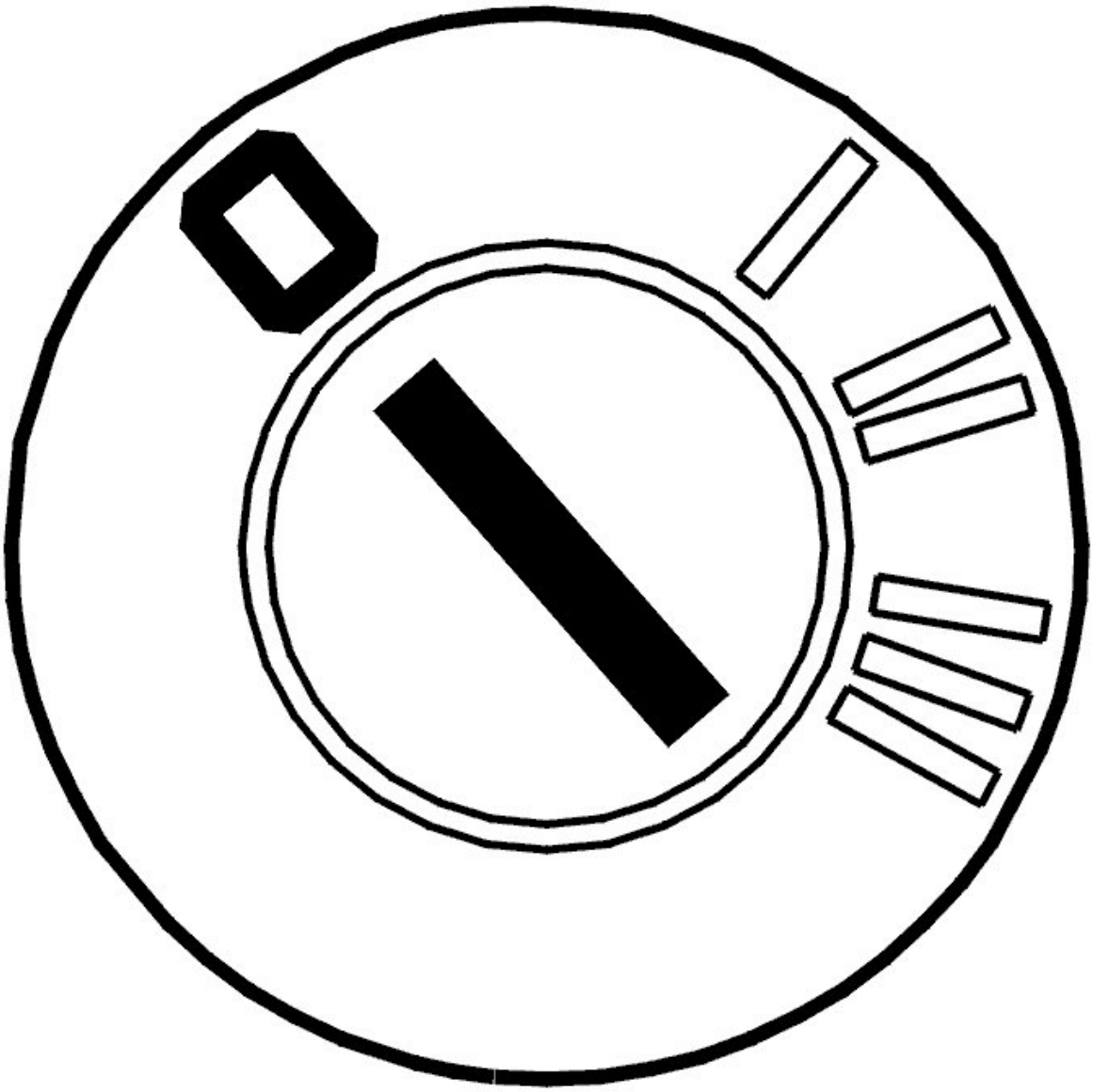
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

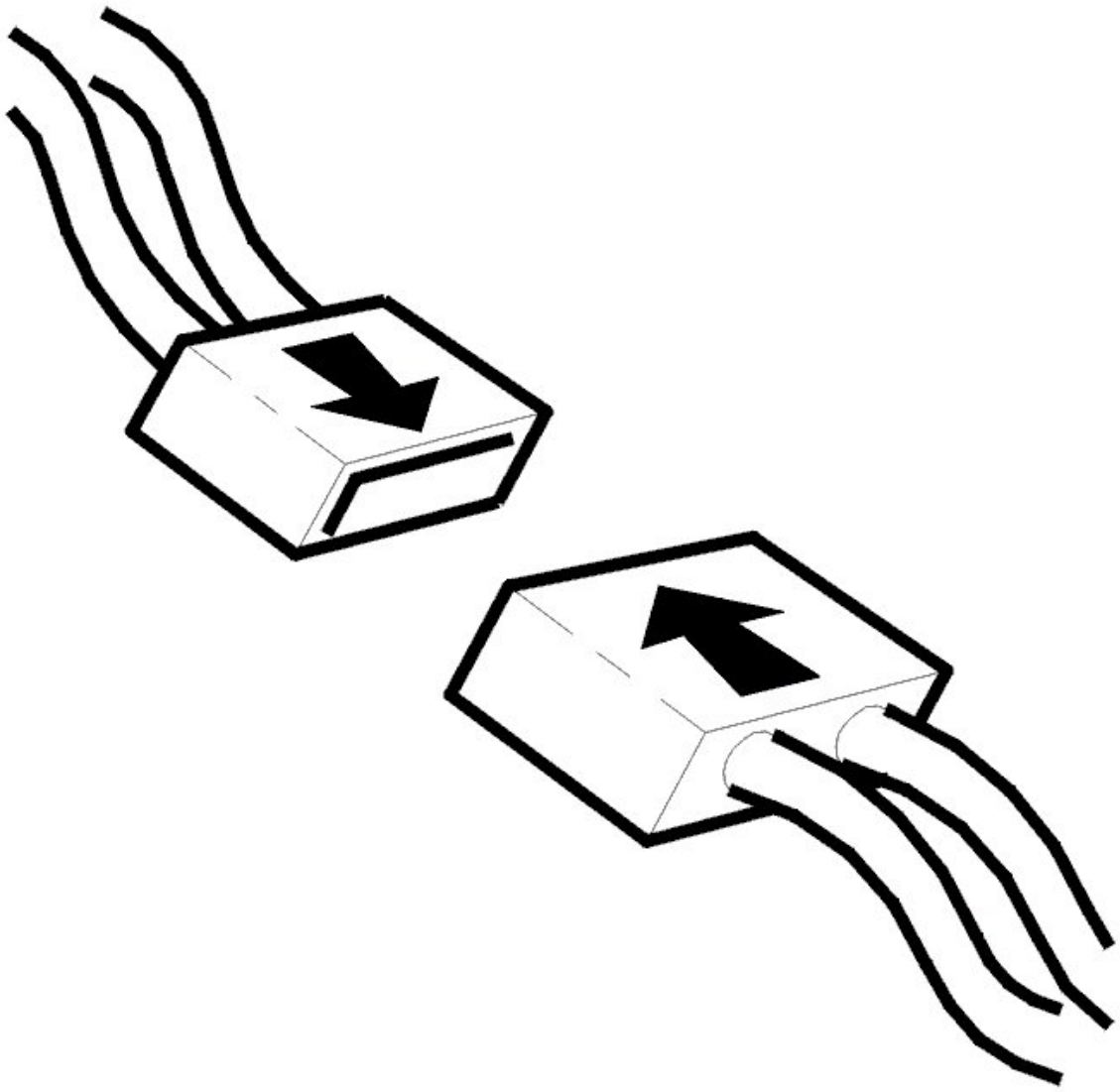
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

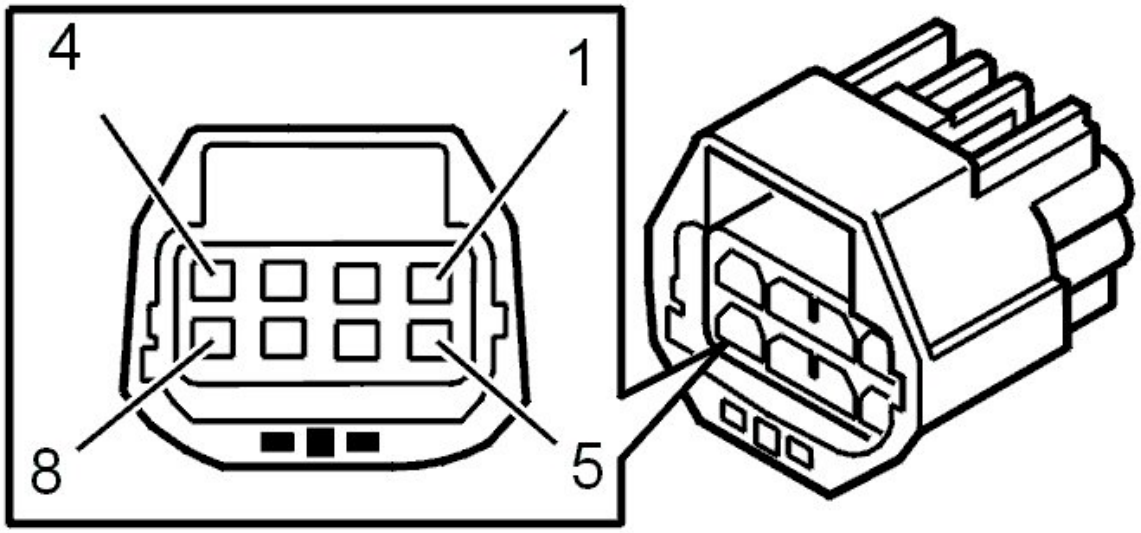
Checking transmission fluid temperature sensor

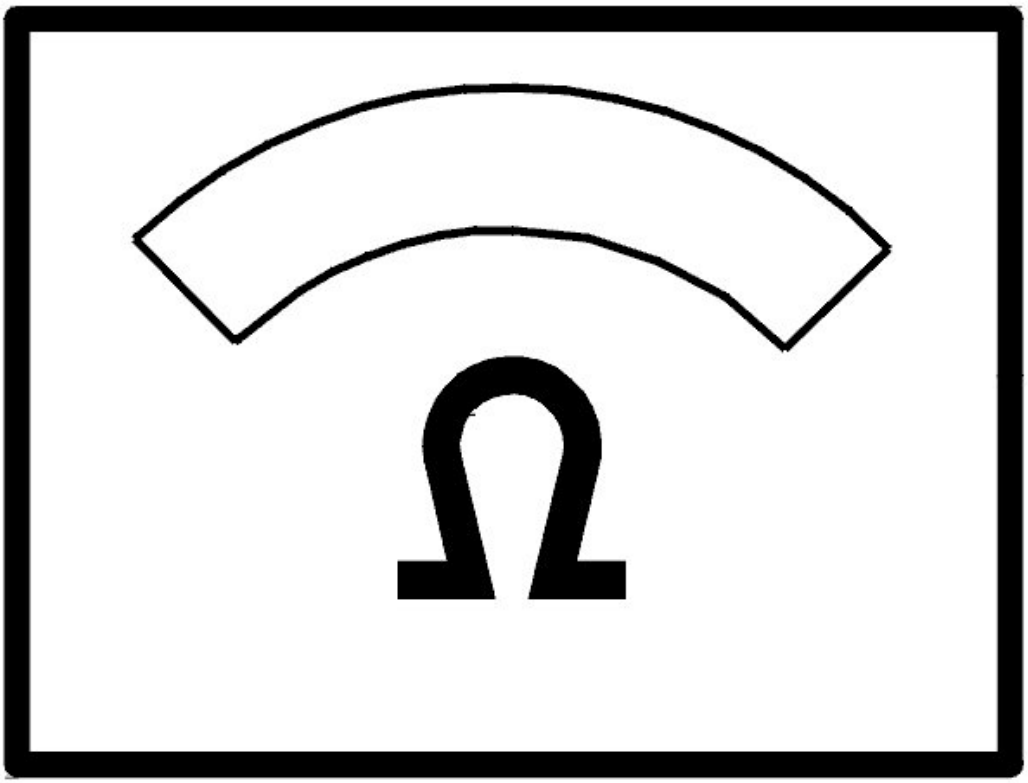




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

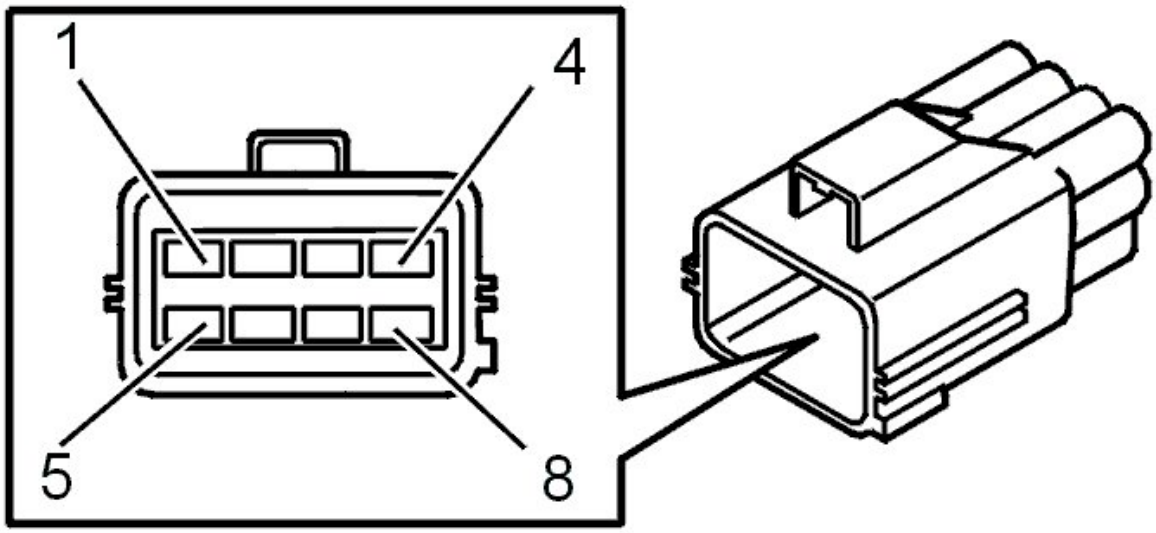
No - Checking the cable and component

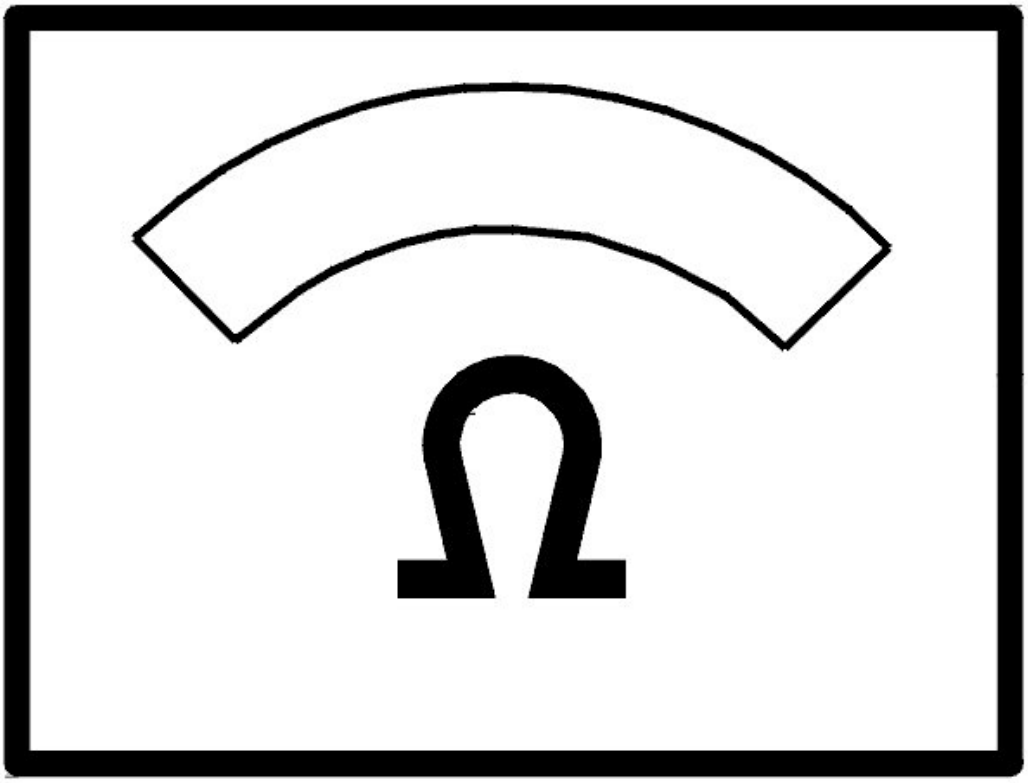
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



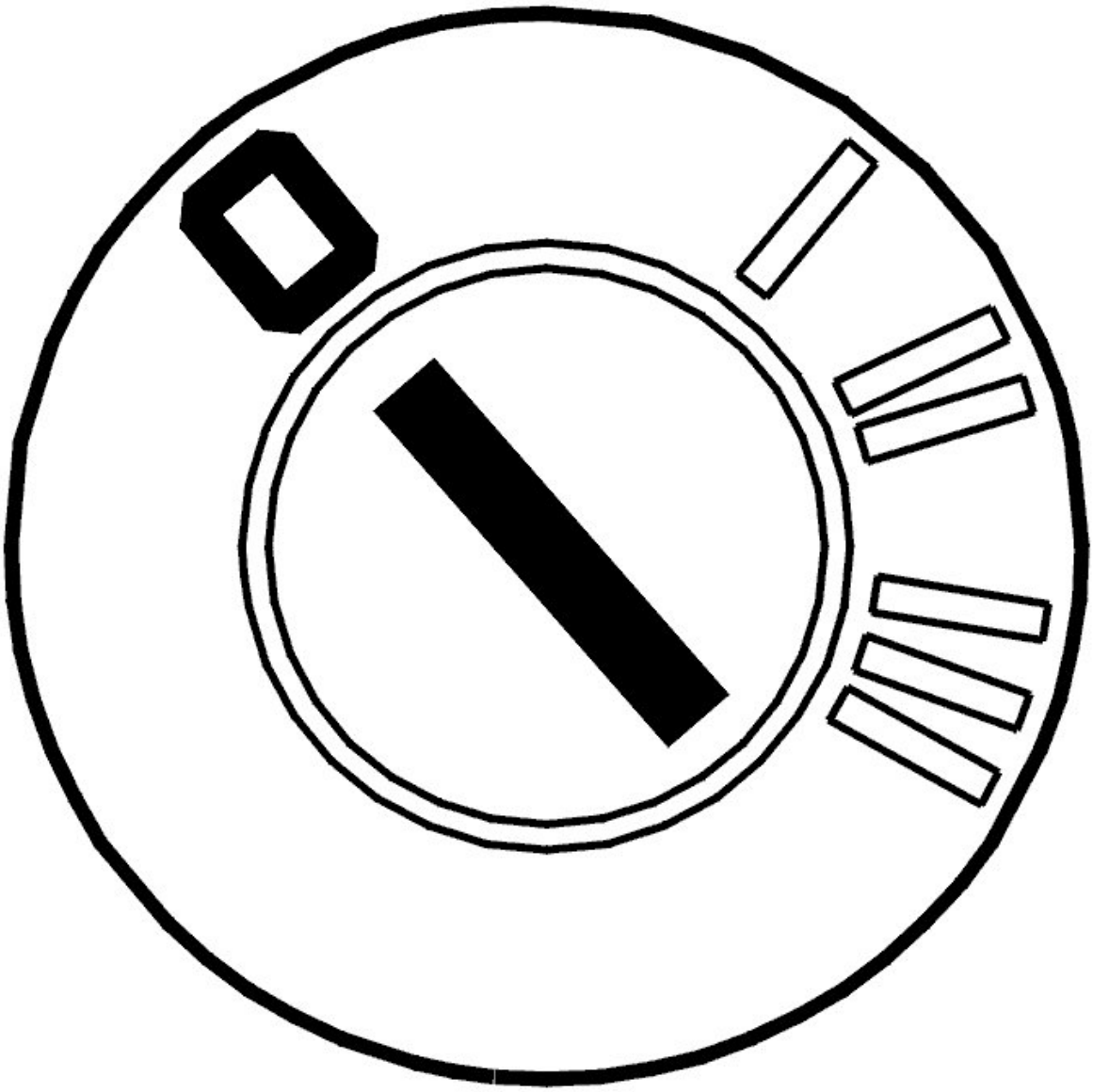


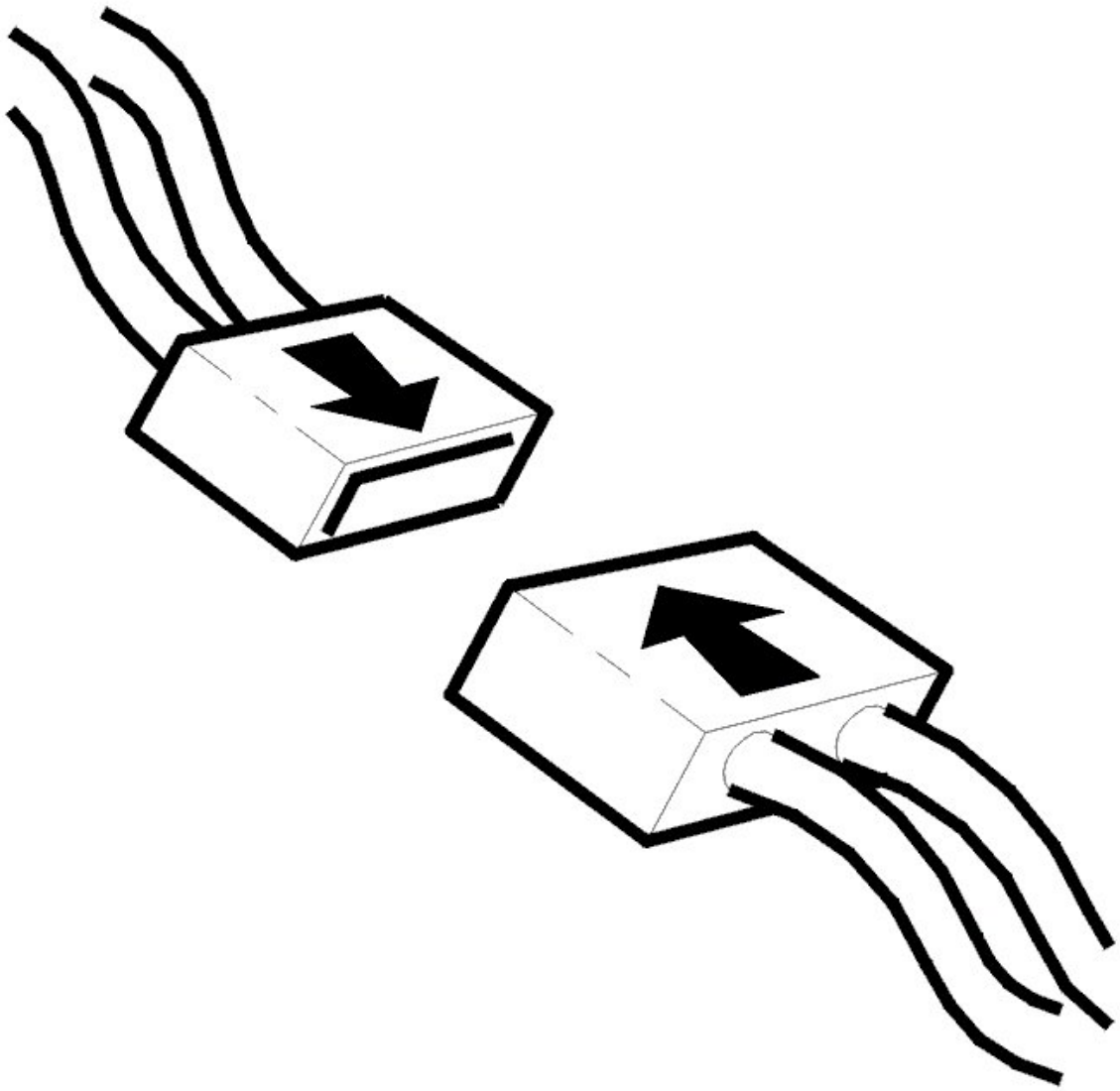
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

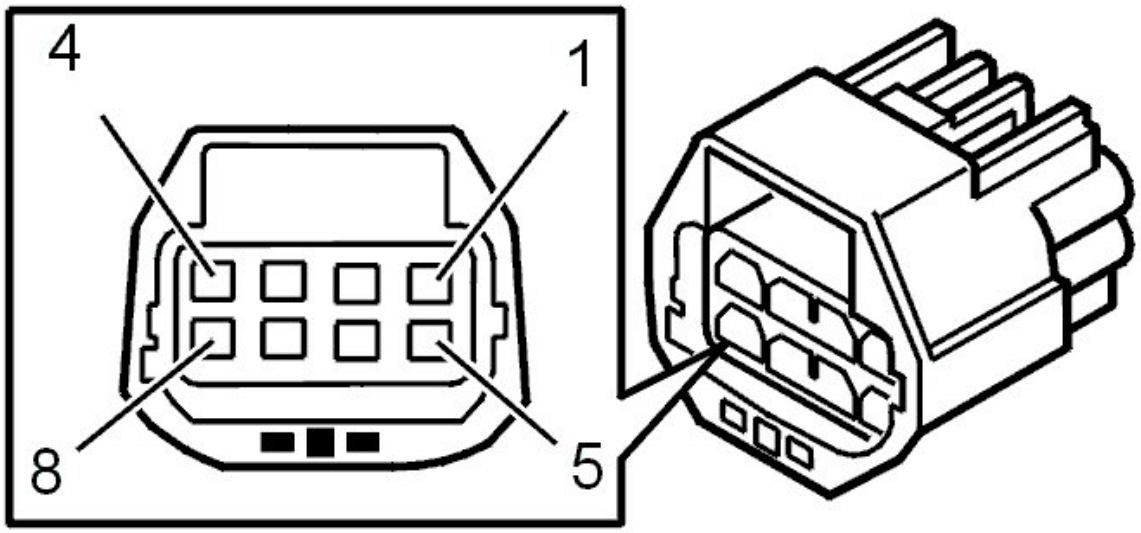
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

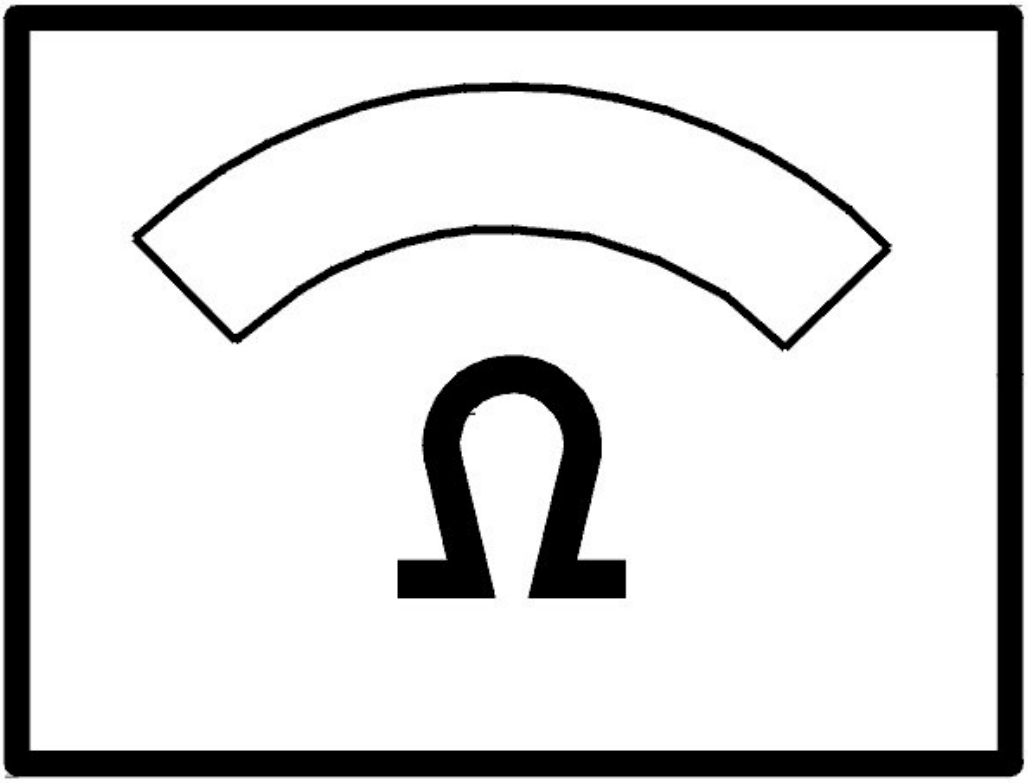
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





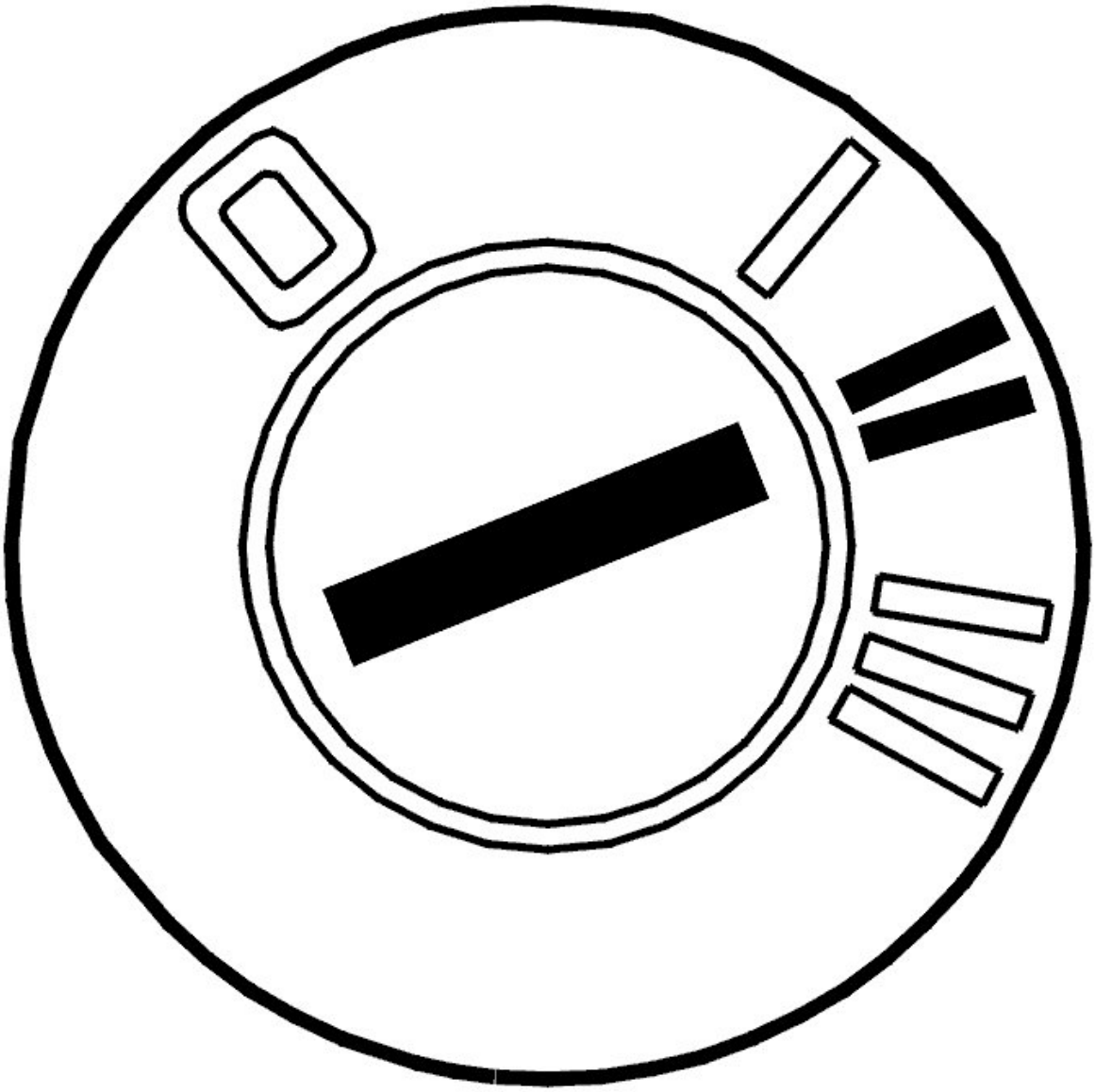
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



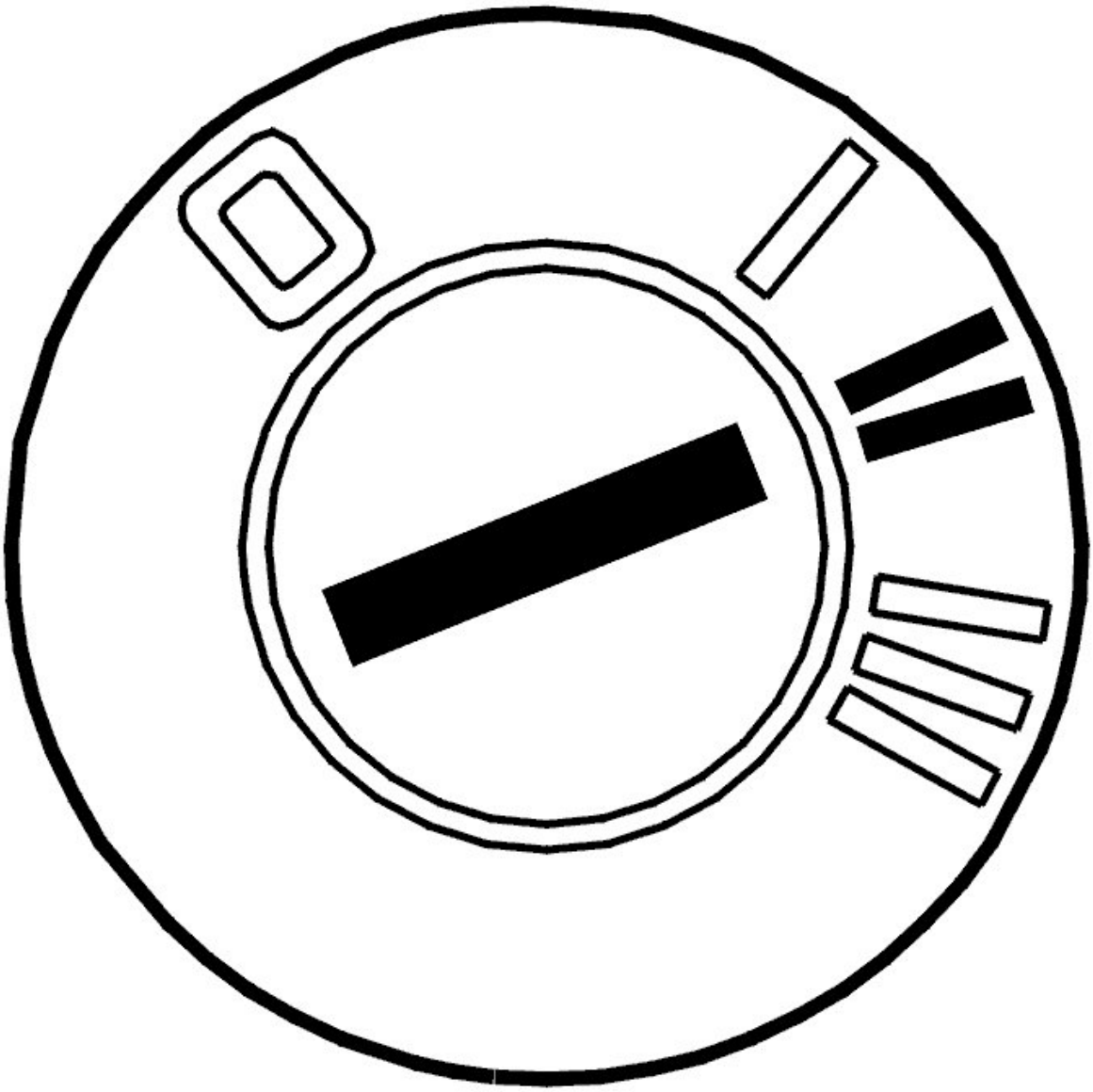
- Ignition on.

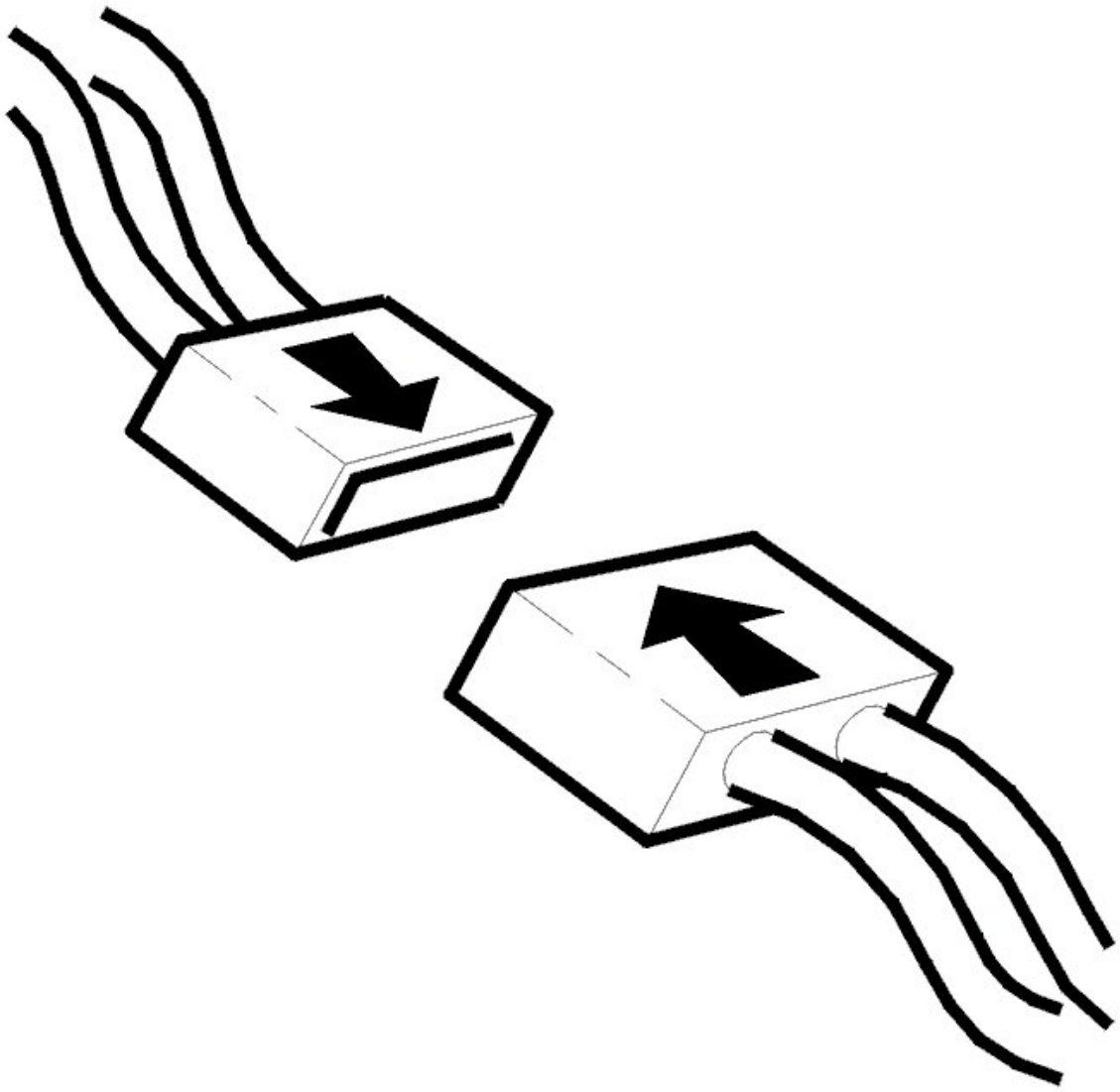
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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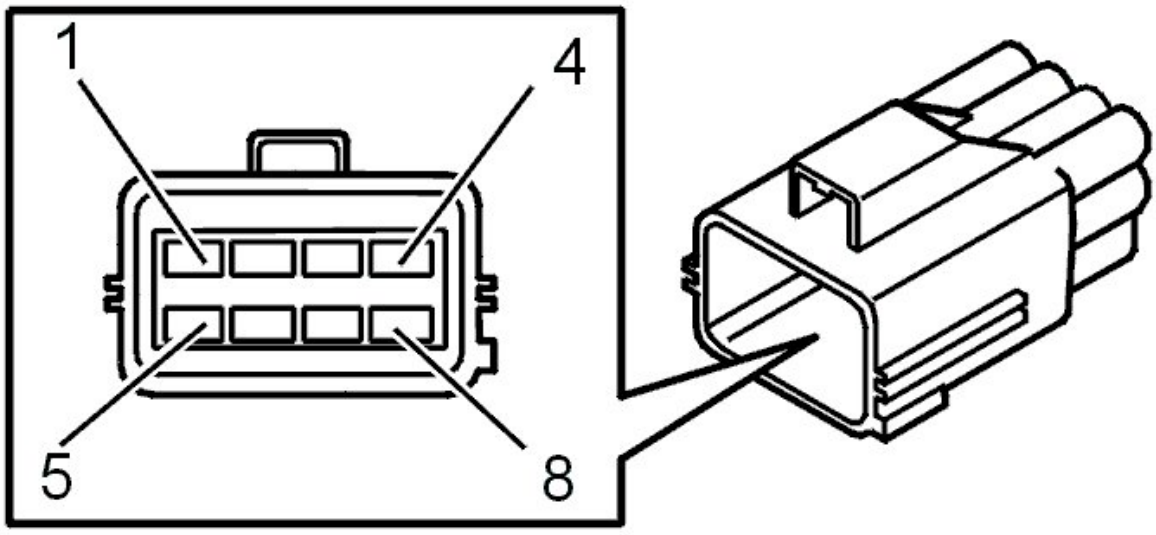
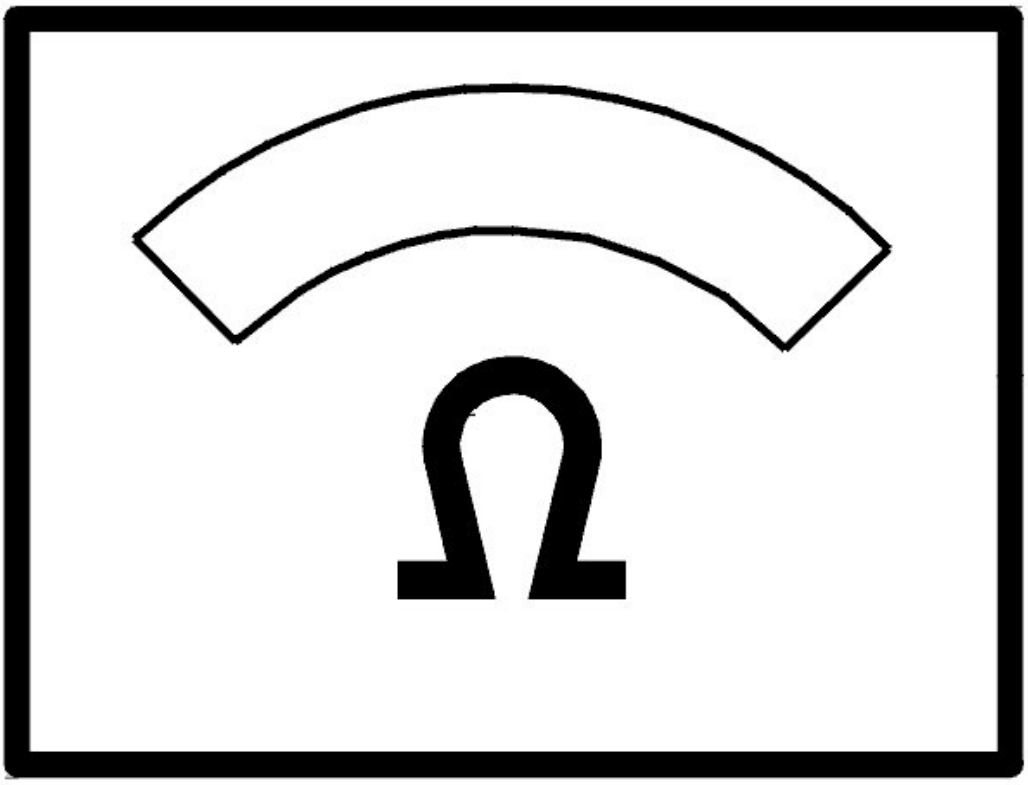
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition
Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid should be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

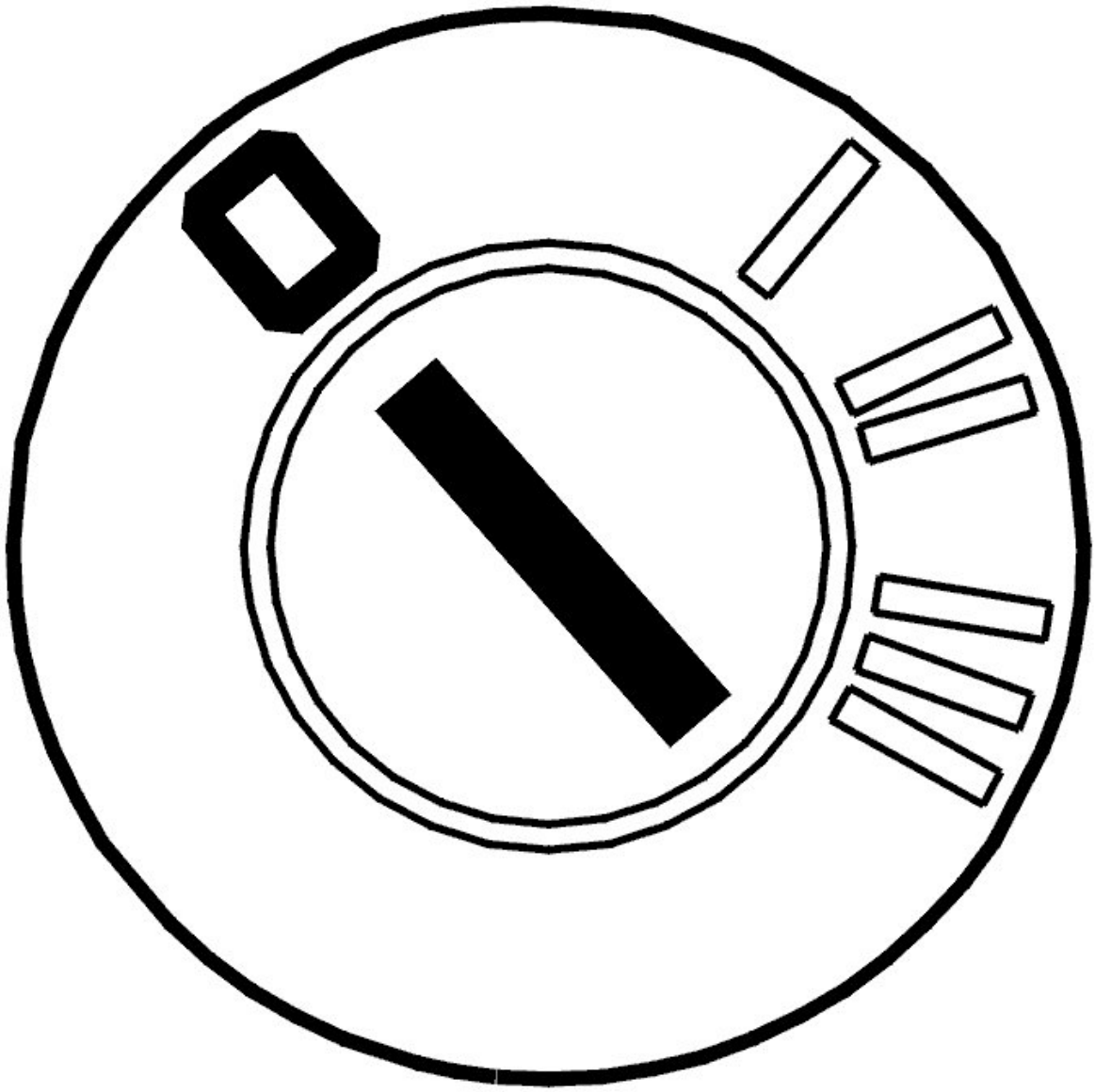
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Signal Too Low

Signal too low

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

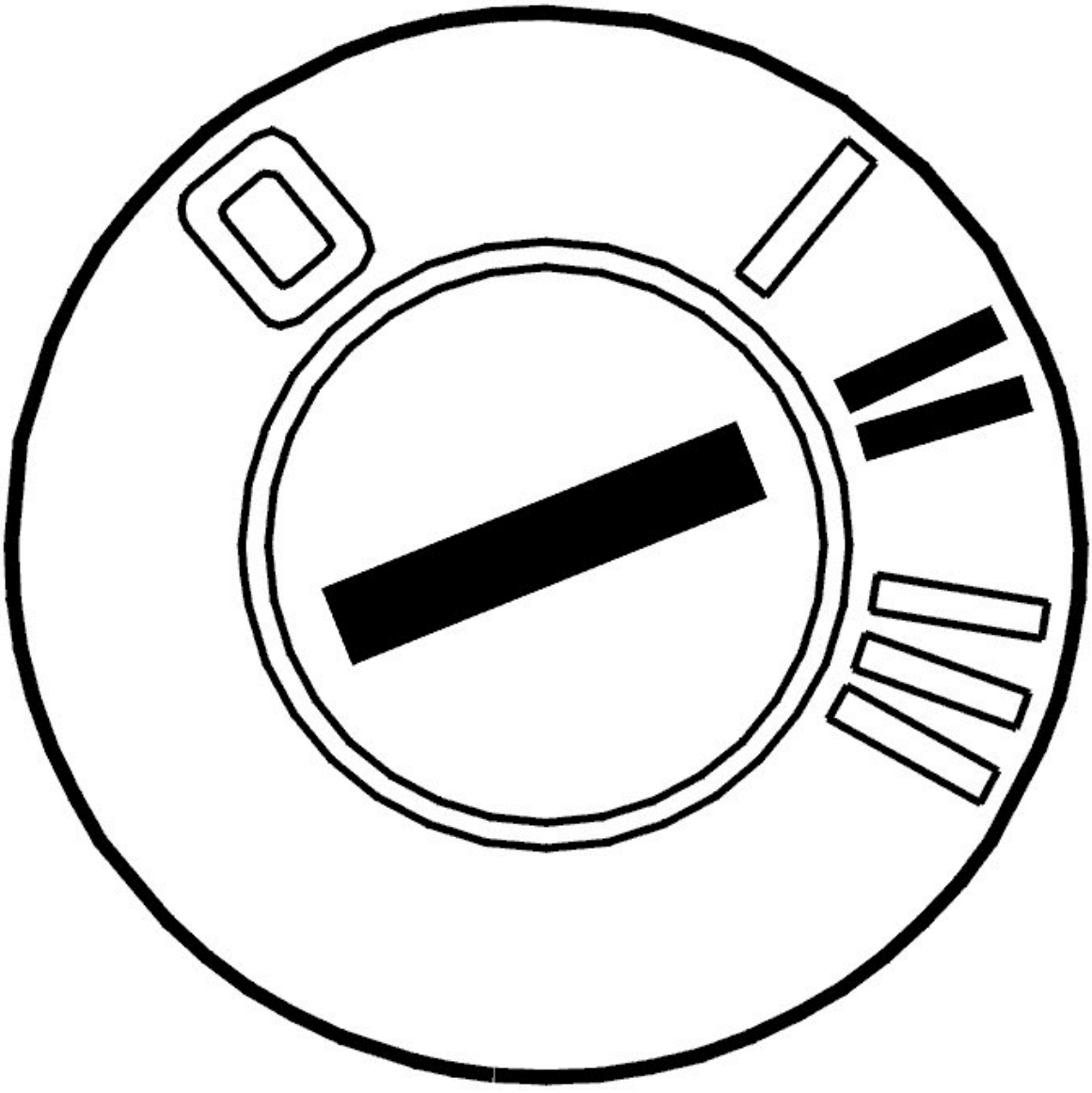
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S2

No - Checking transmission fluid temperature sensor

Checking shift solenoid S2



- Ignition on
- Gear selector in position P
- Activate solenoid S2.

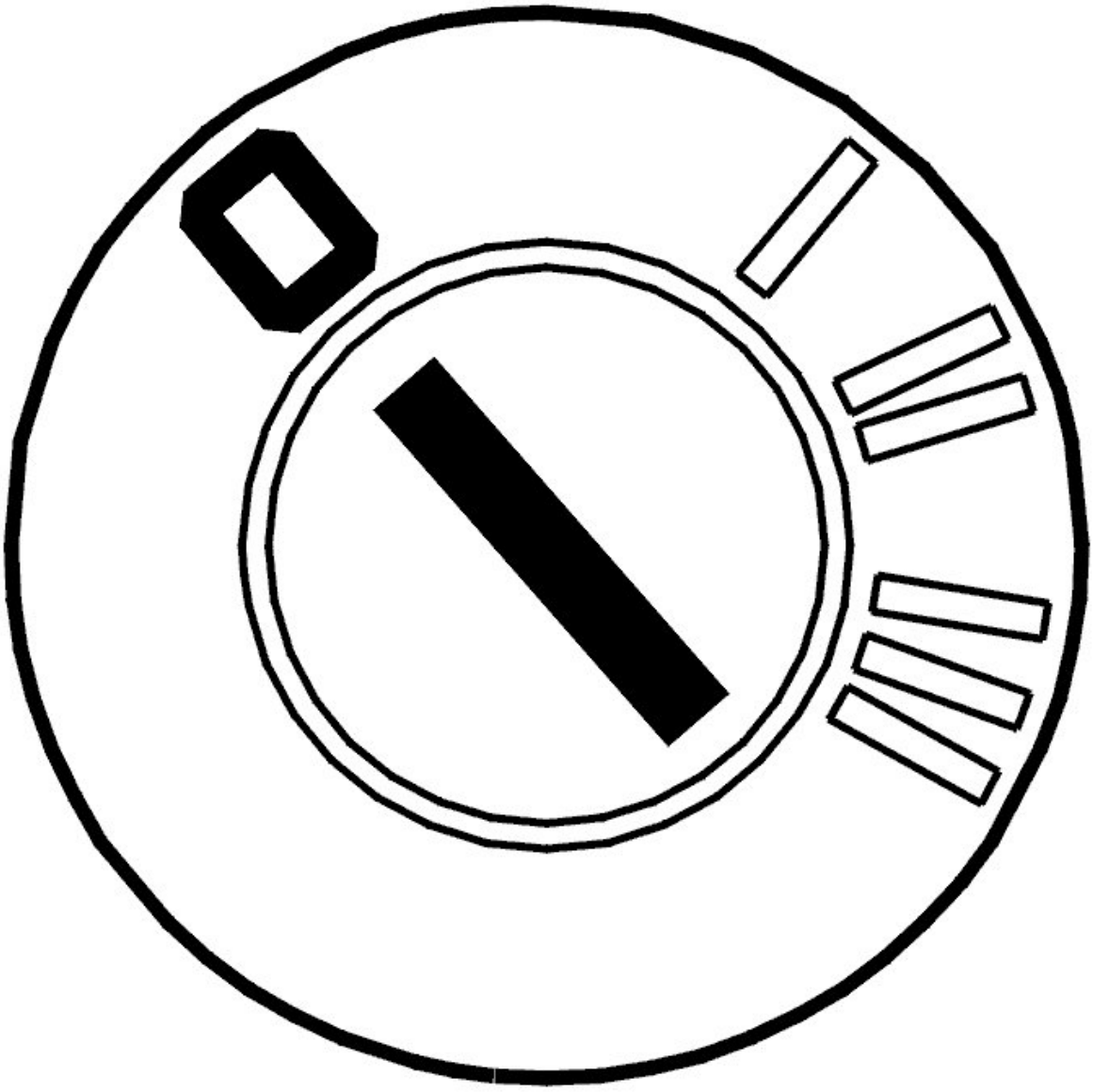
The value must change between OFF and ON.

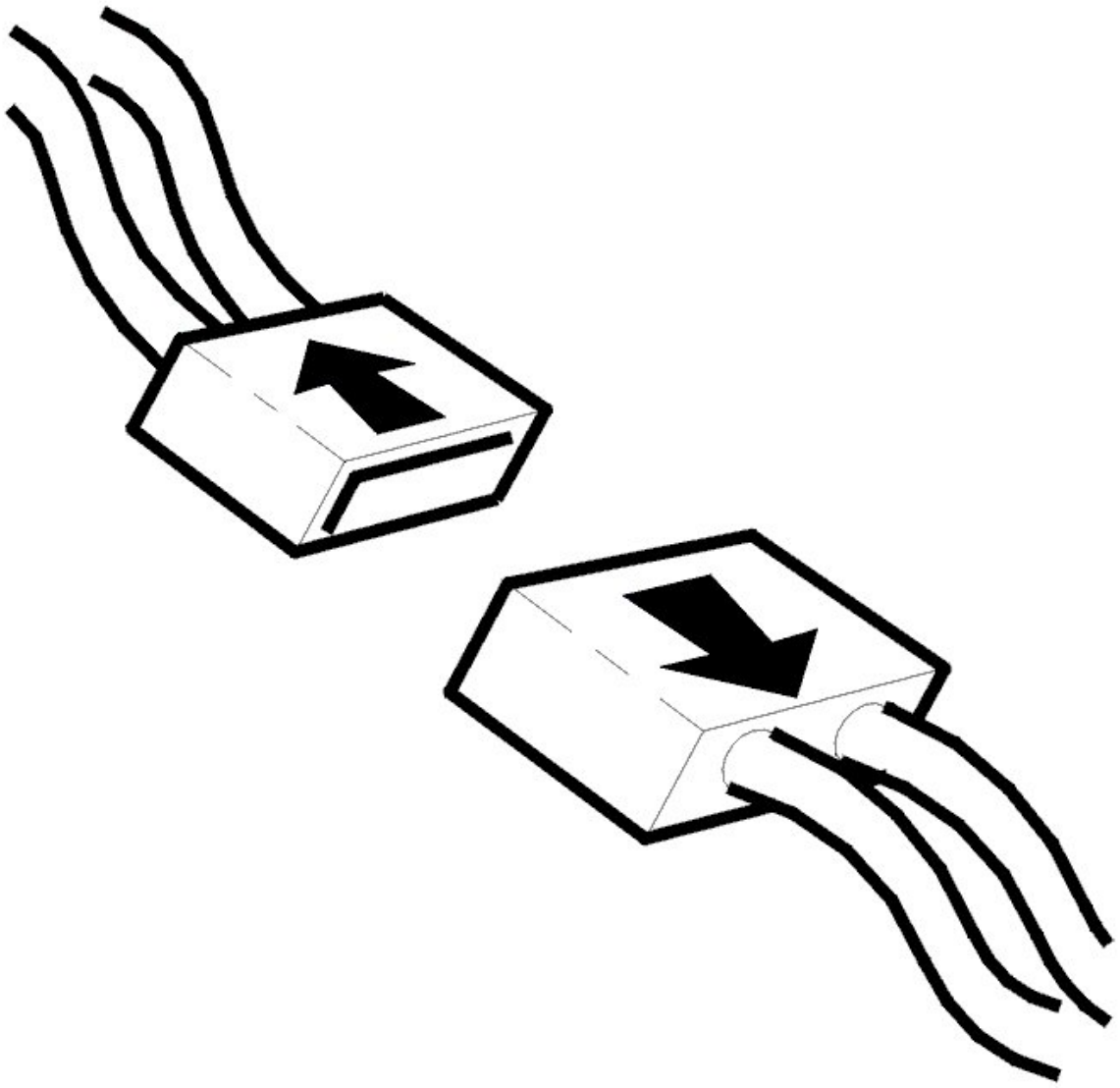
Does the value change?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



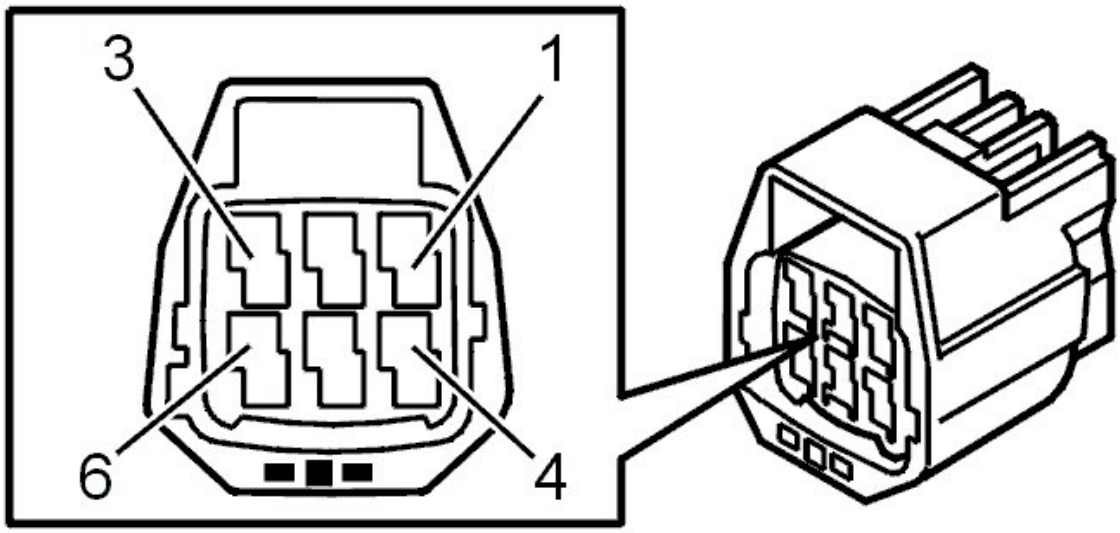


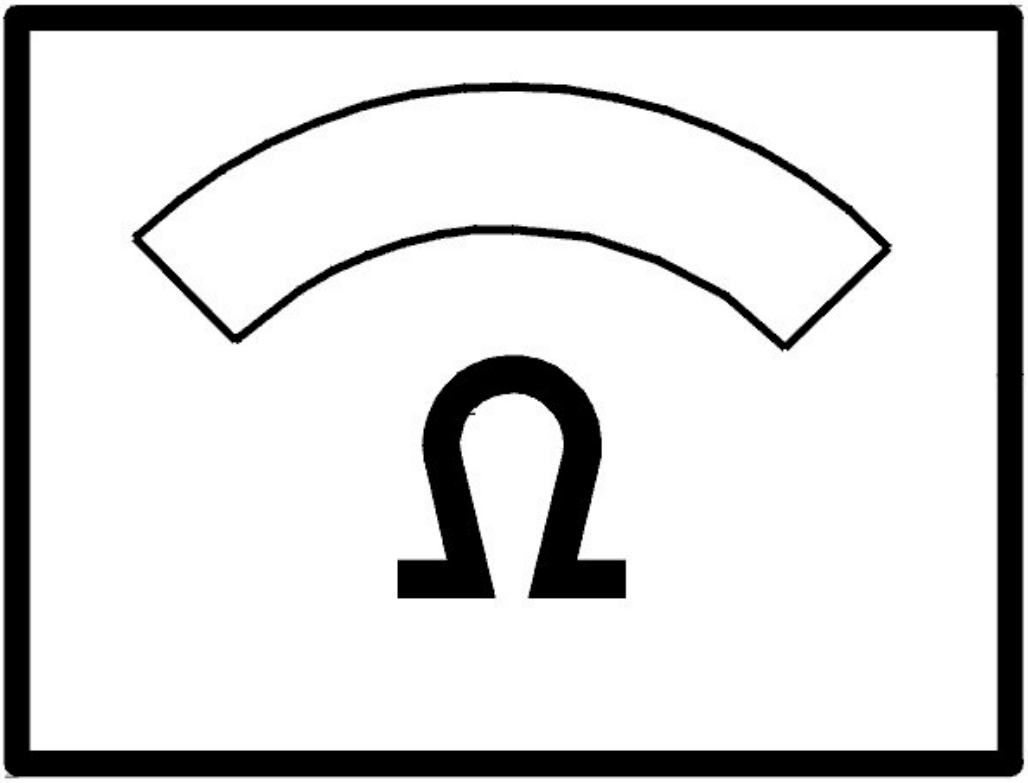
- Ignition off
- Disconnect transmission connector C.

Check solenoid S2. Measure the resistance between transmission connector terminal #C2 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



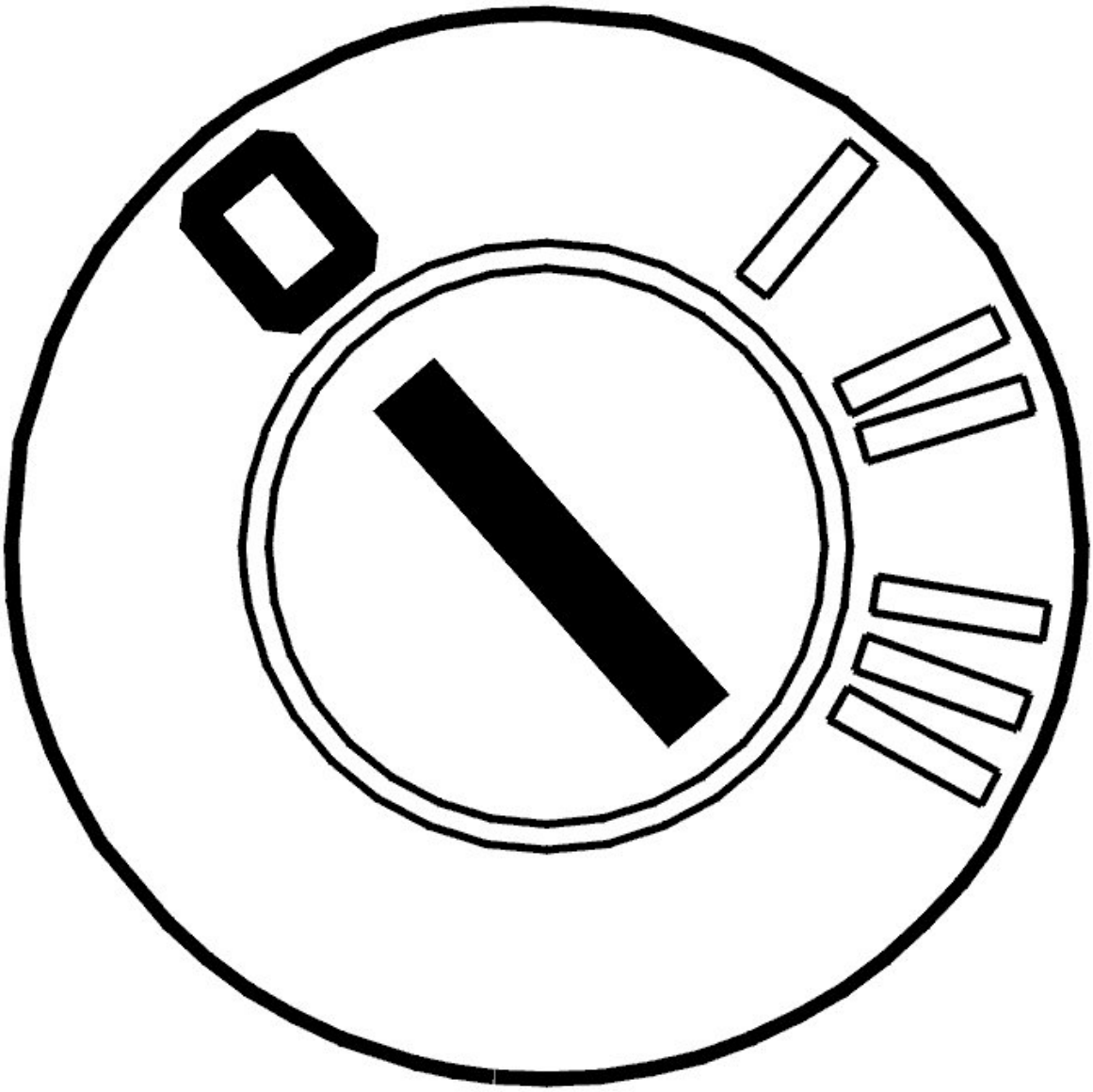


Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring

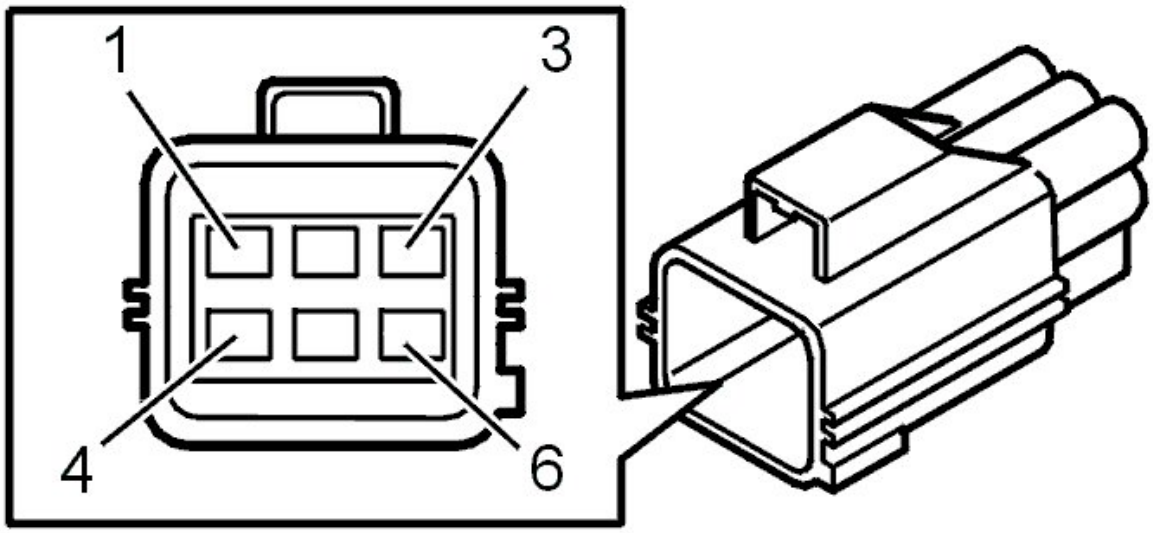


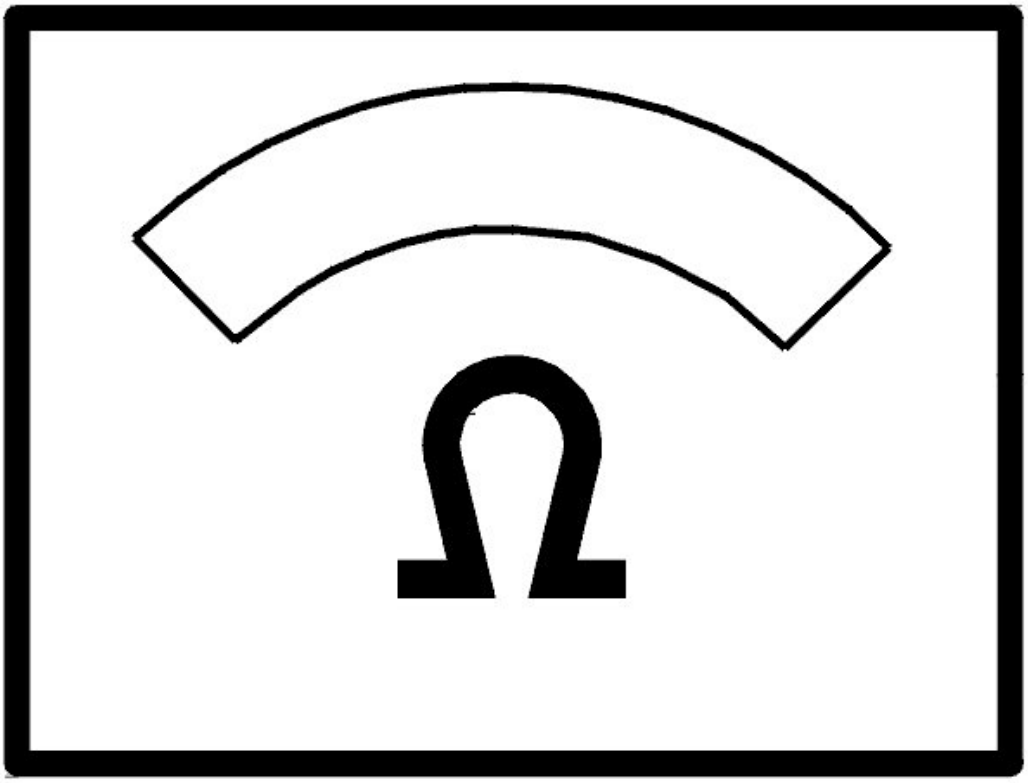
- Ignition off.

Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2 (control module side). Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connector, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



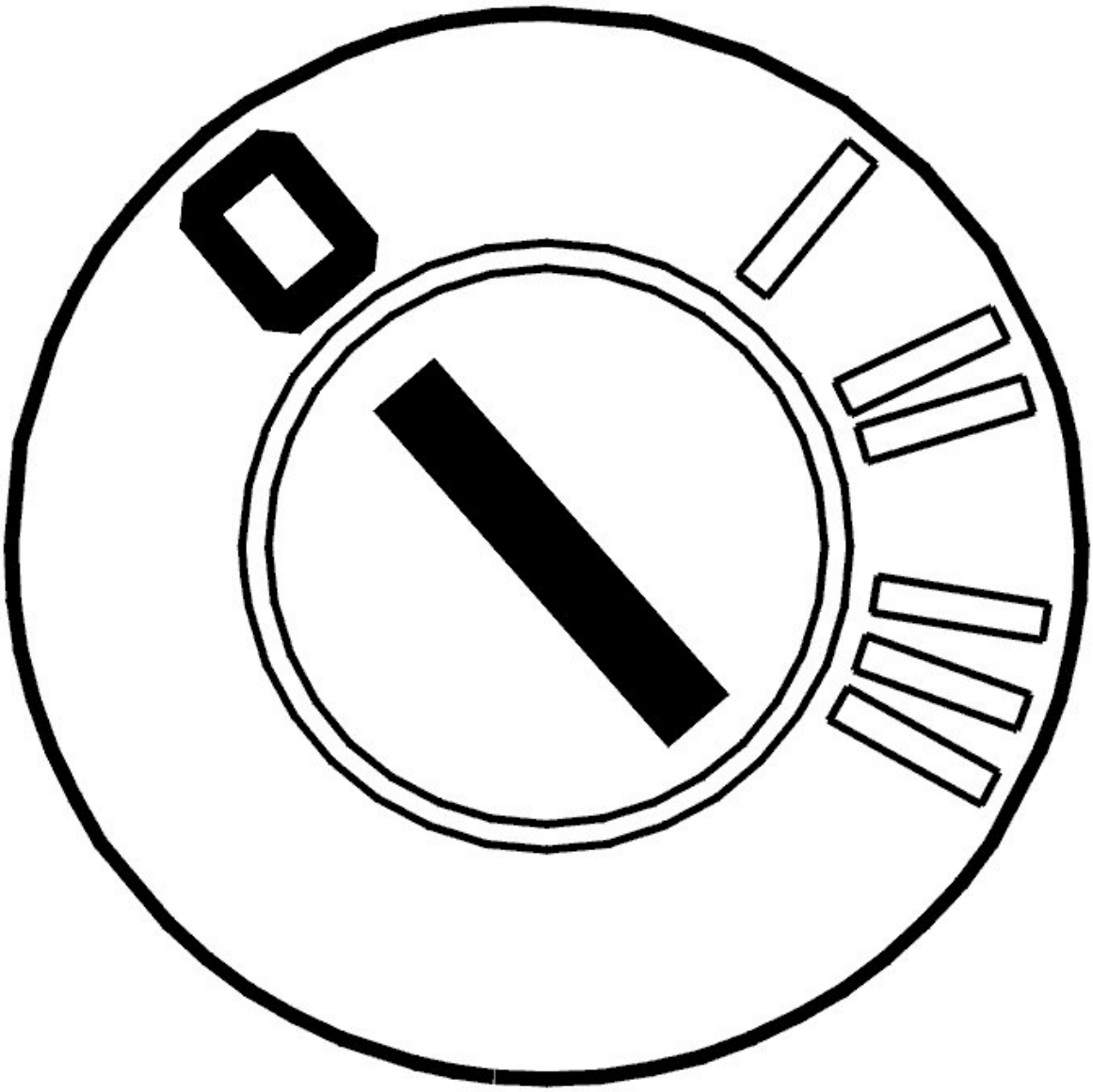


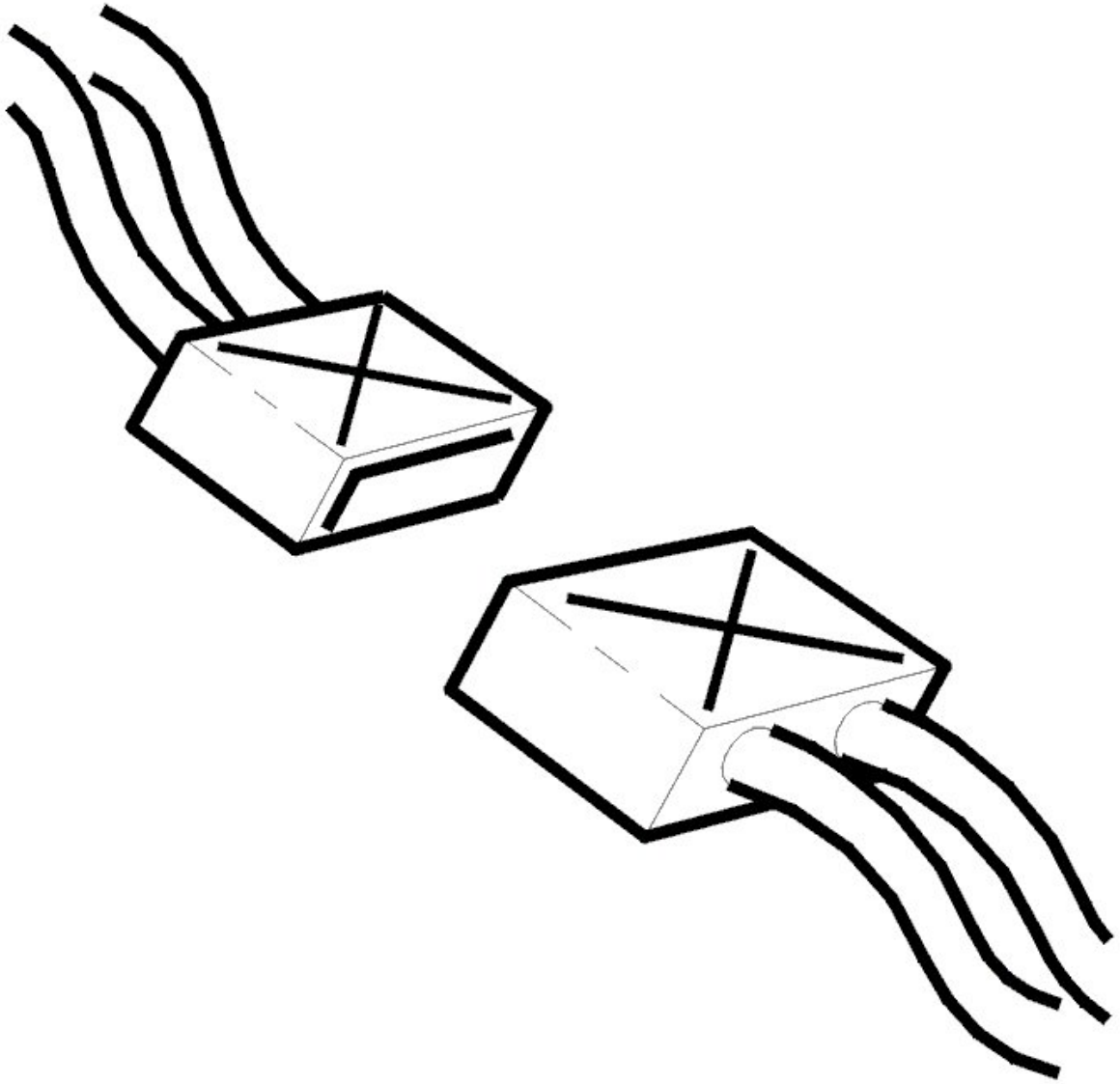
Was a fault detected?

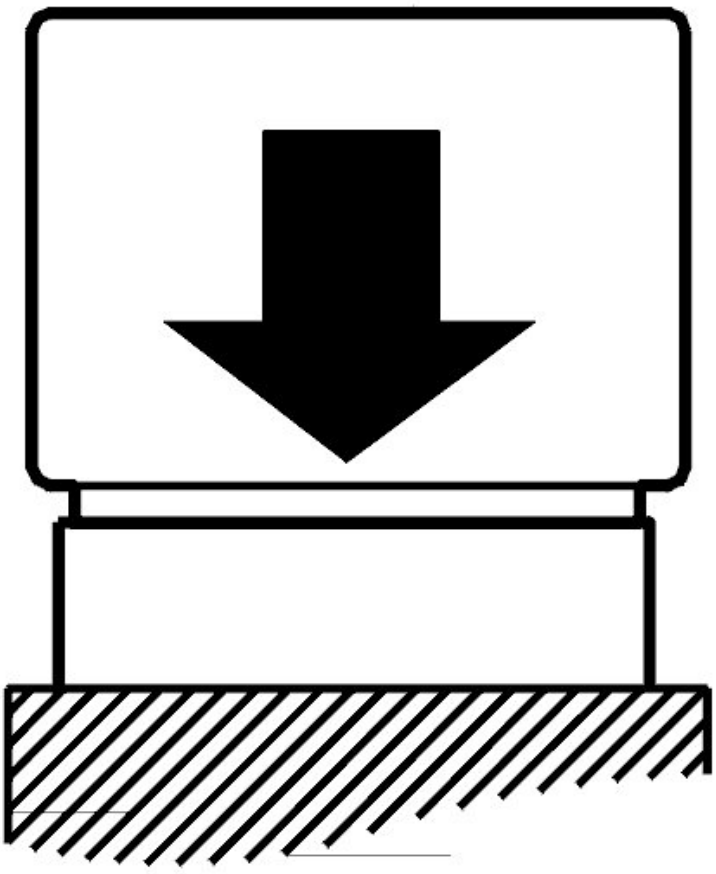
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

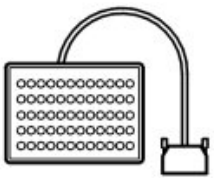
Check the transmission control module (TCM) by measuring the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

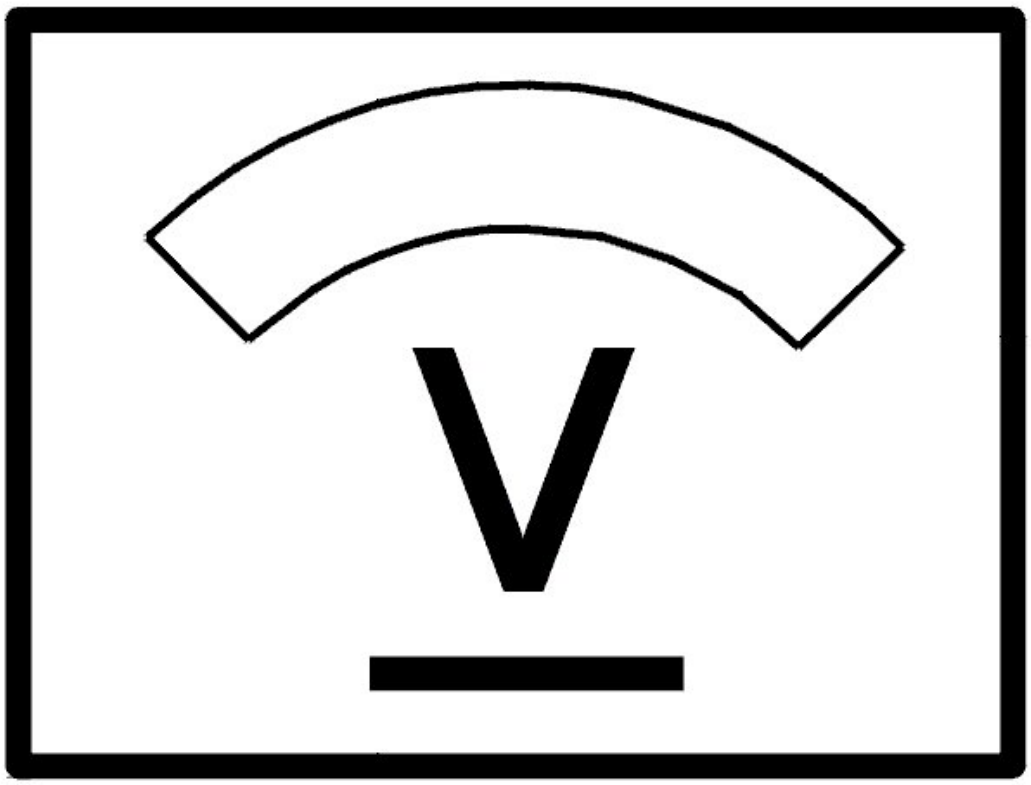
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



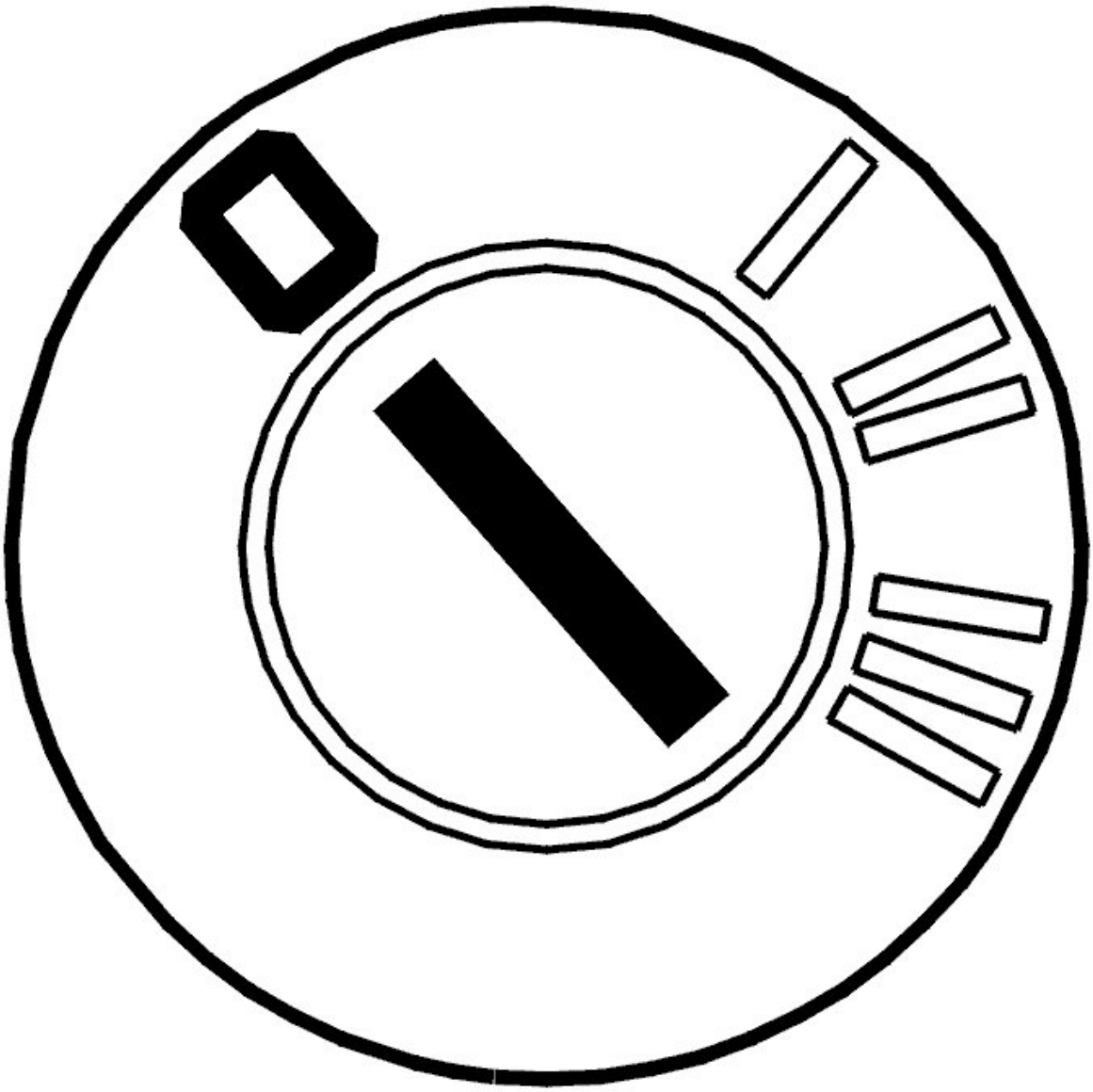


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

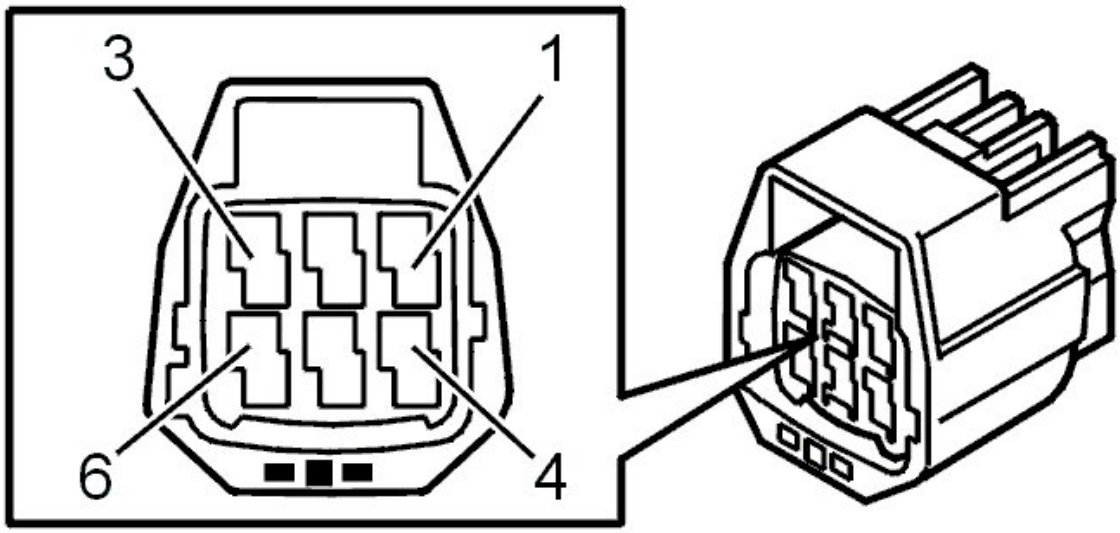


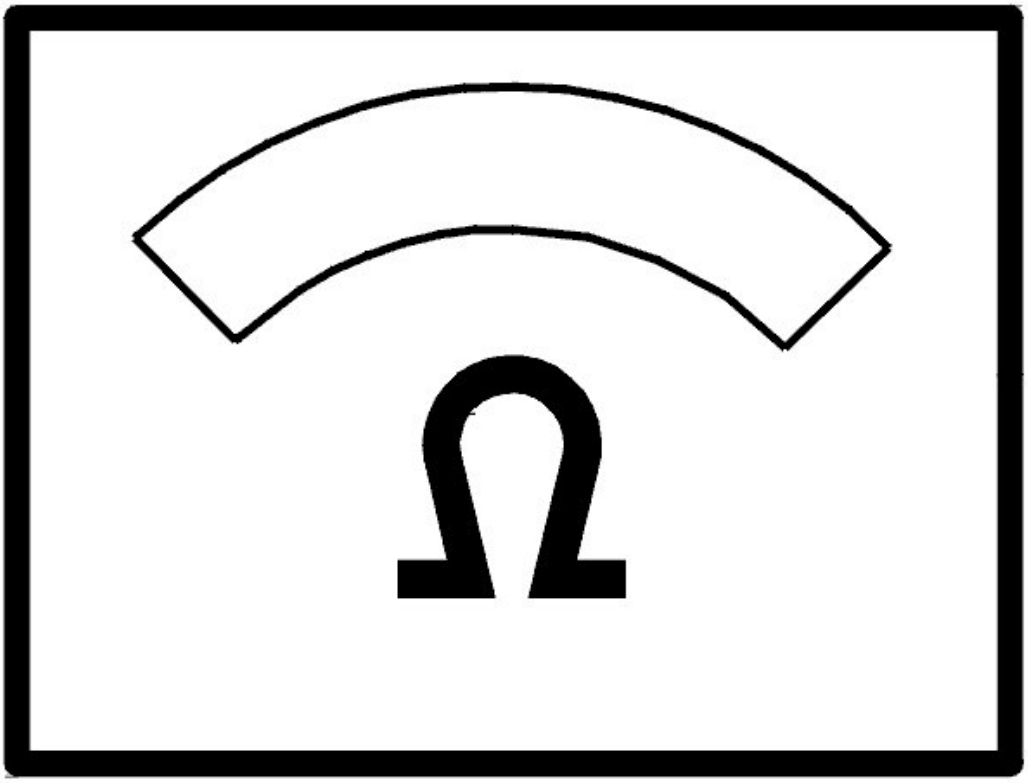
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C2 (transmission side) and the connector for solenoid S2. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S2 by measuring the resistance between the terminal pin on solenoid S2 and the transmission housing. The resistance should be 11-15 ohms at 20°C.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S2, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

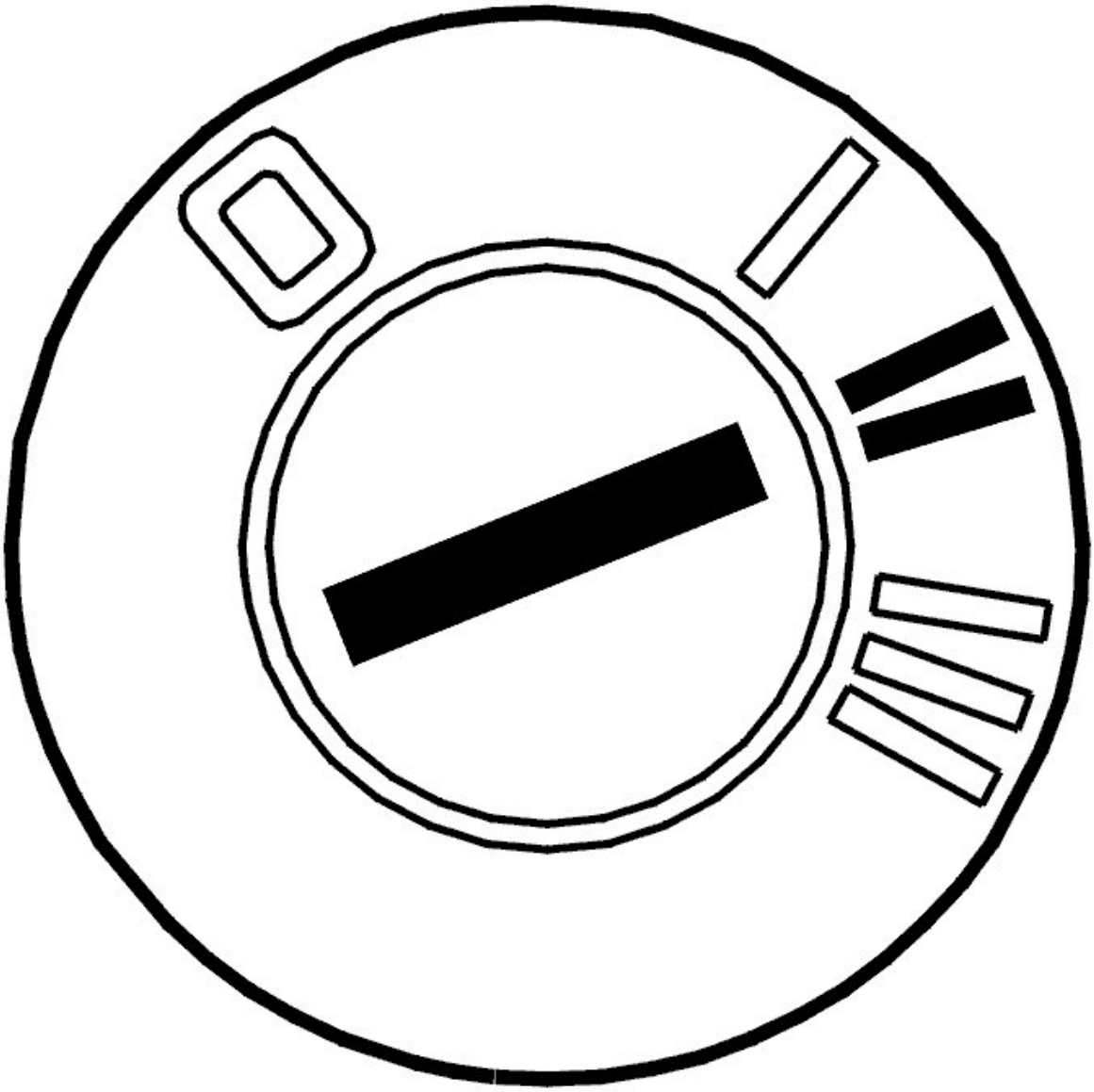
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

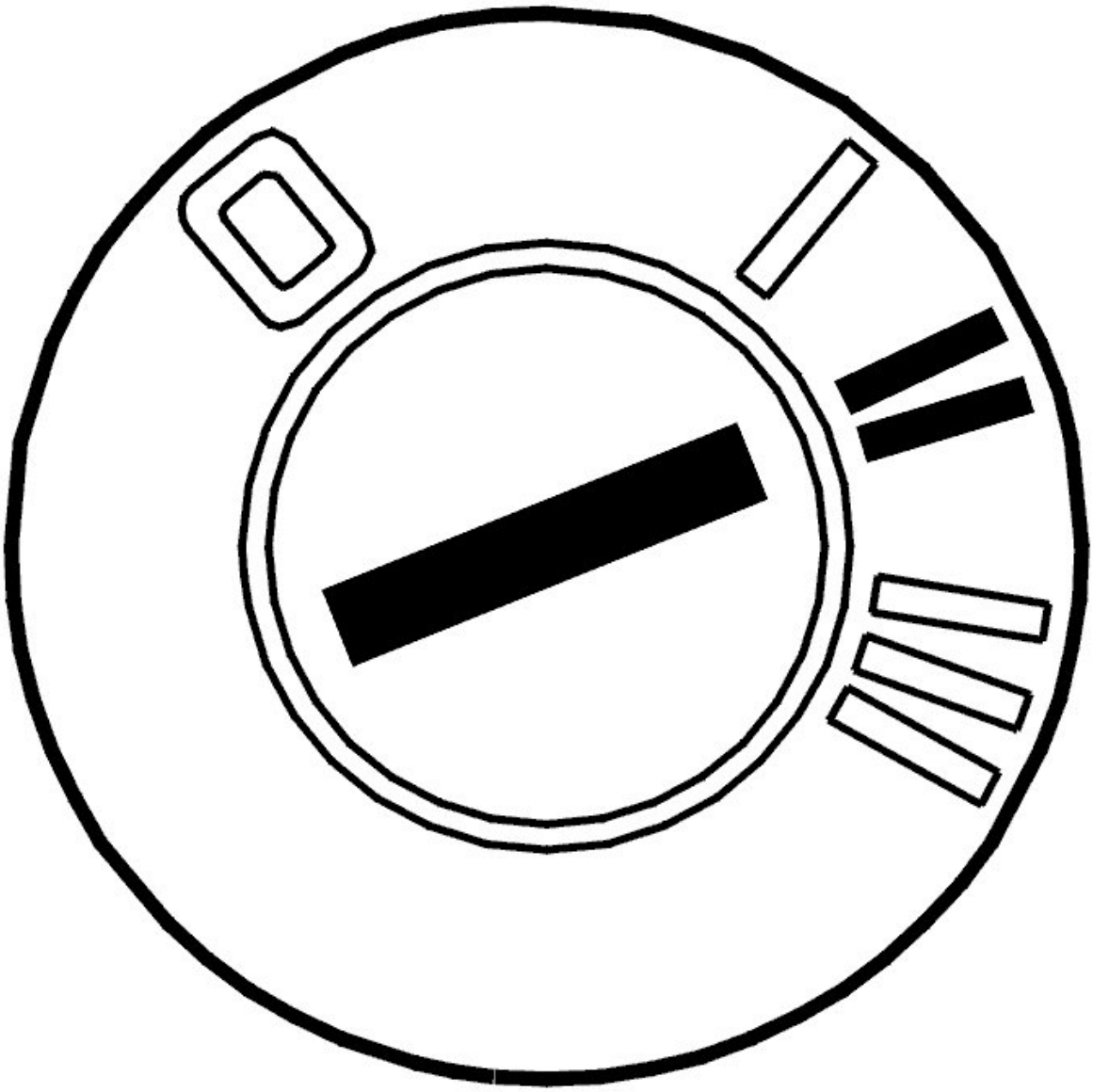
Click on the VCT2000 symbol to reset the adaptation and counter.

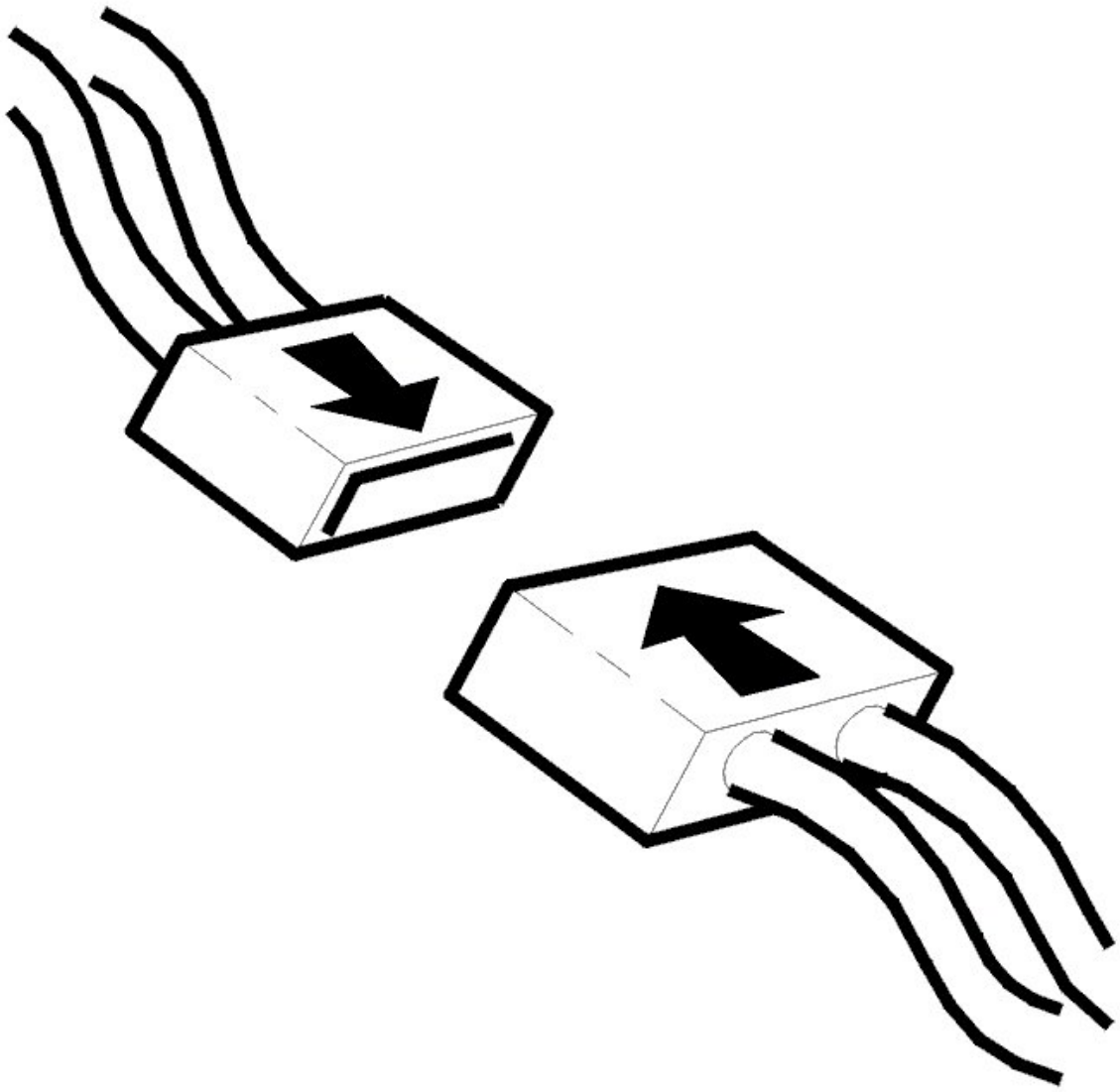
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S2.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the control module and transmission connectors. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #B8 (#A68) and transmission connector terminal #C2. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults

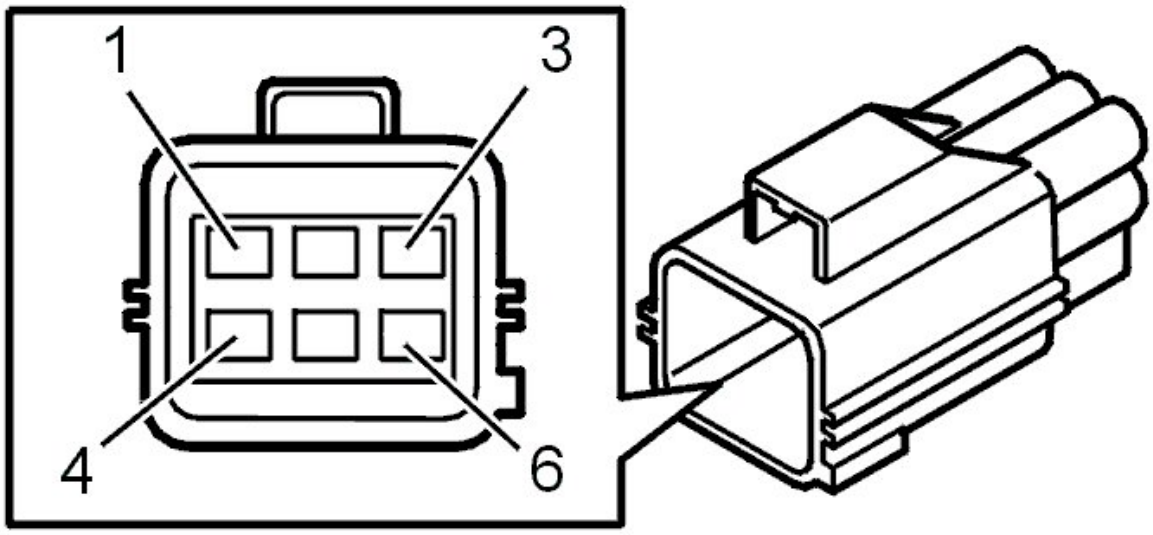
Hint:

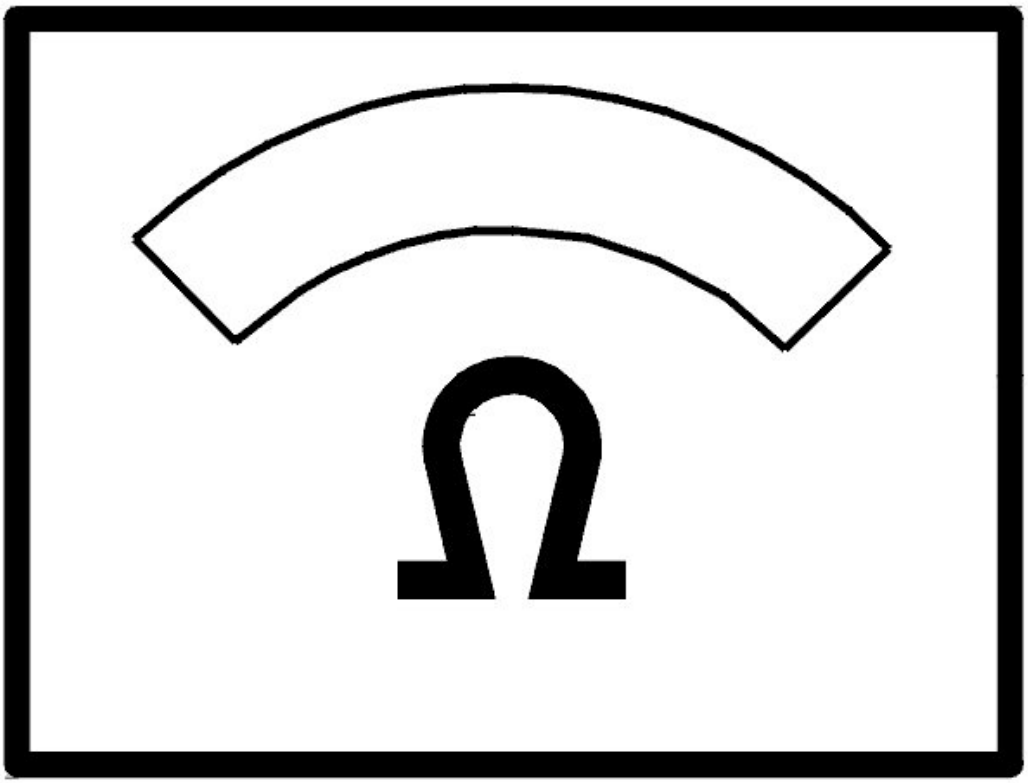
- Check the circuit for solenoid S2. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B8 (#A68) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For other values, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

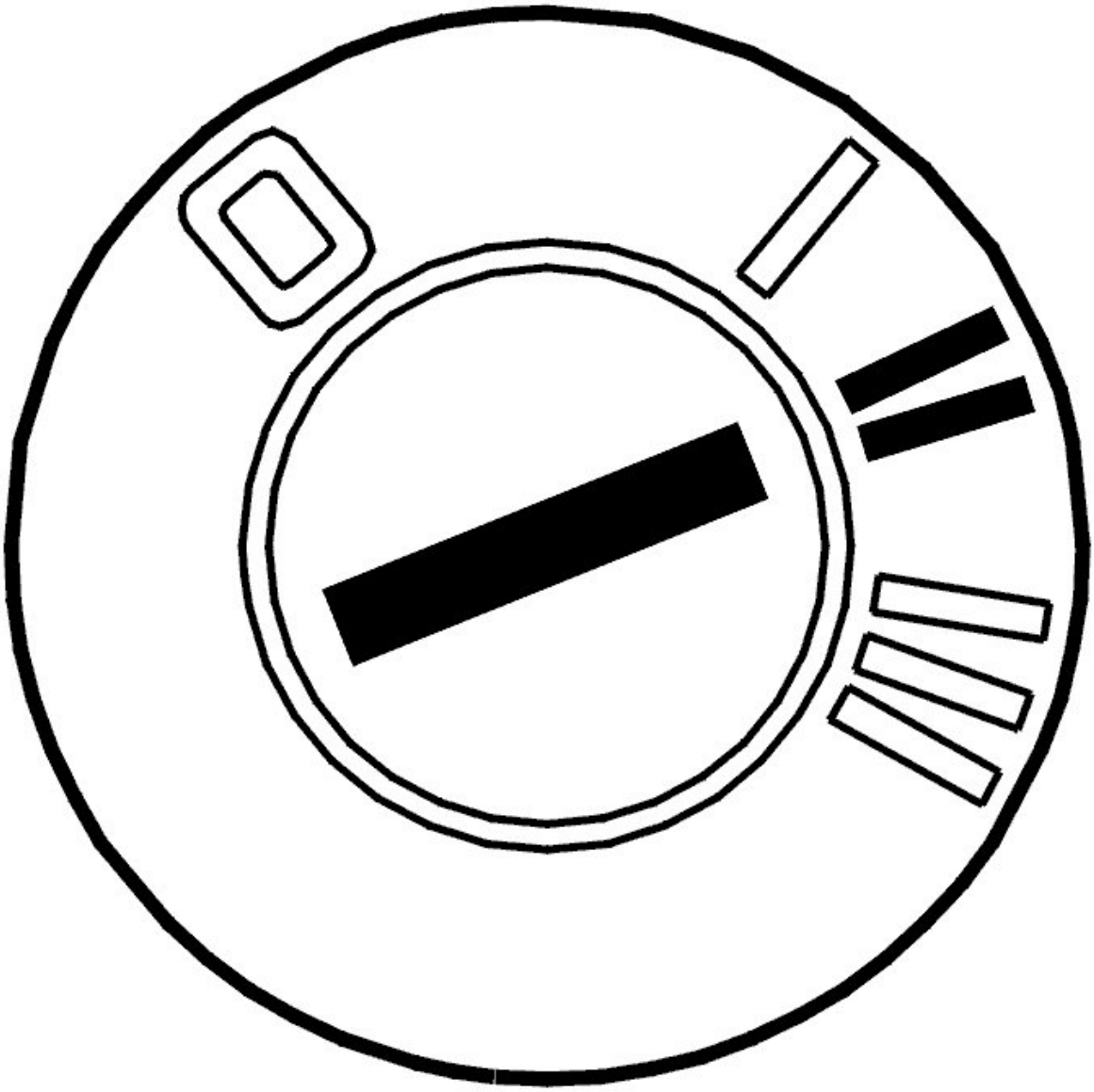
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

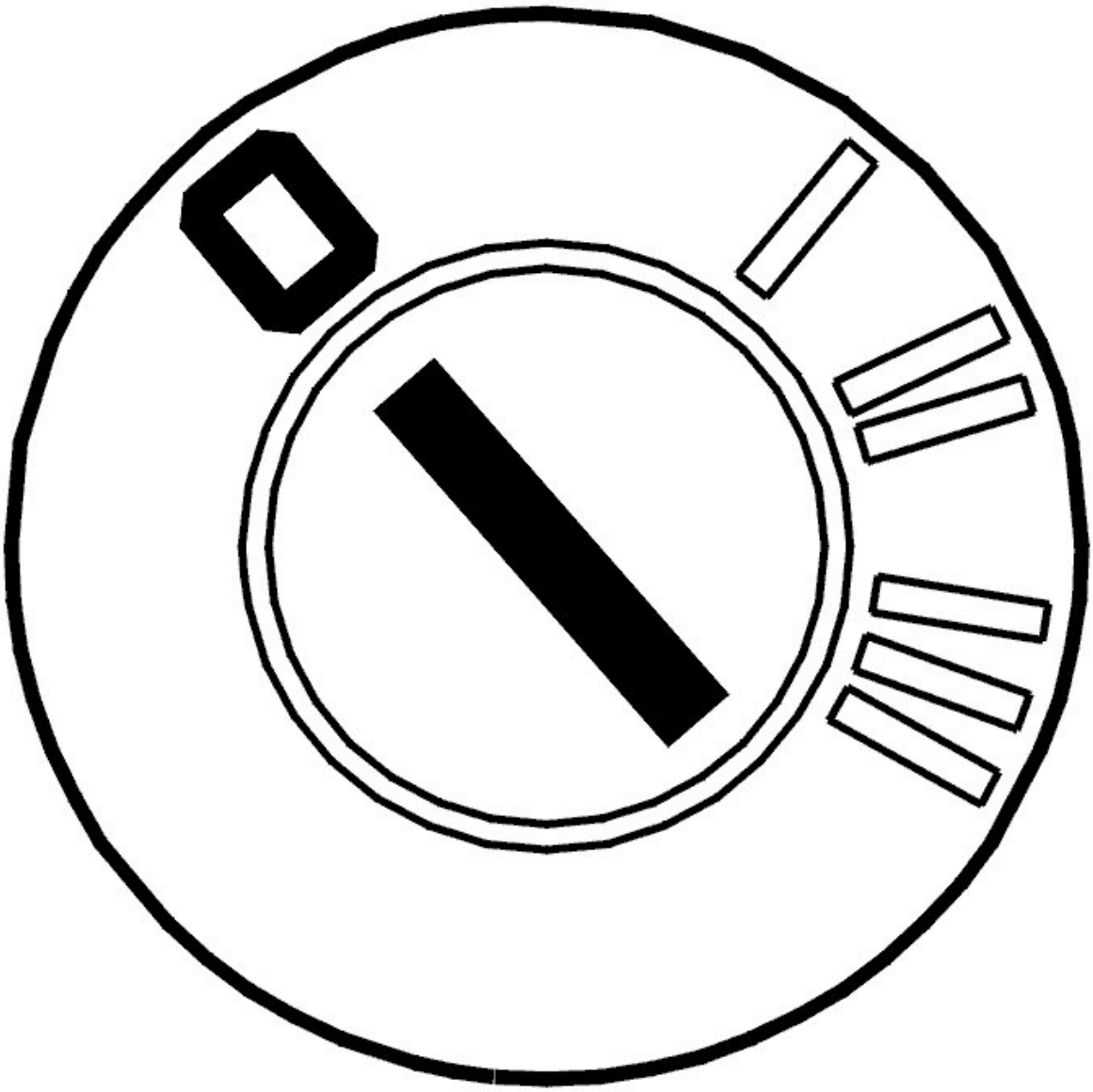
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

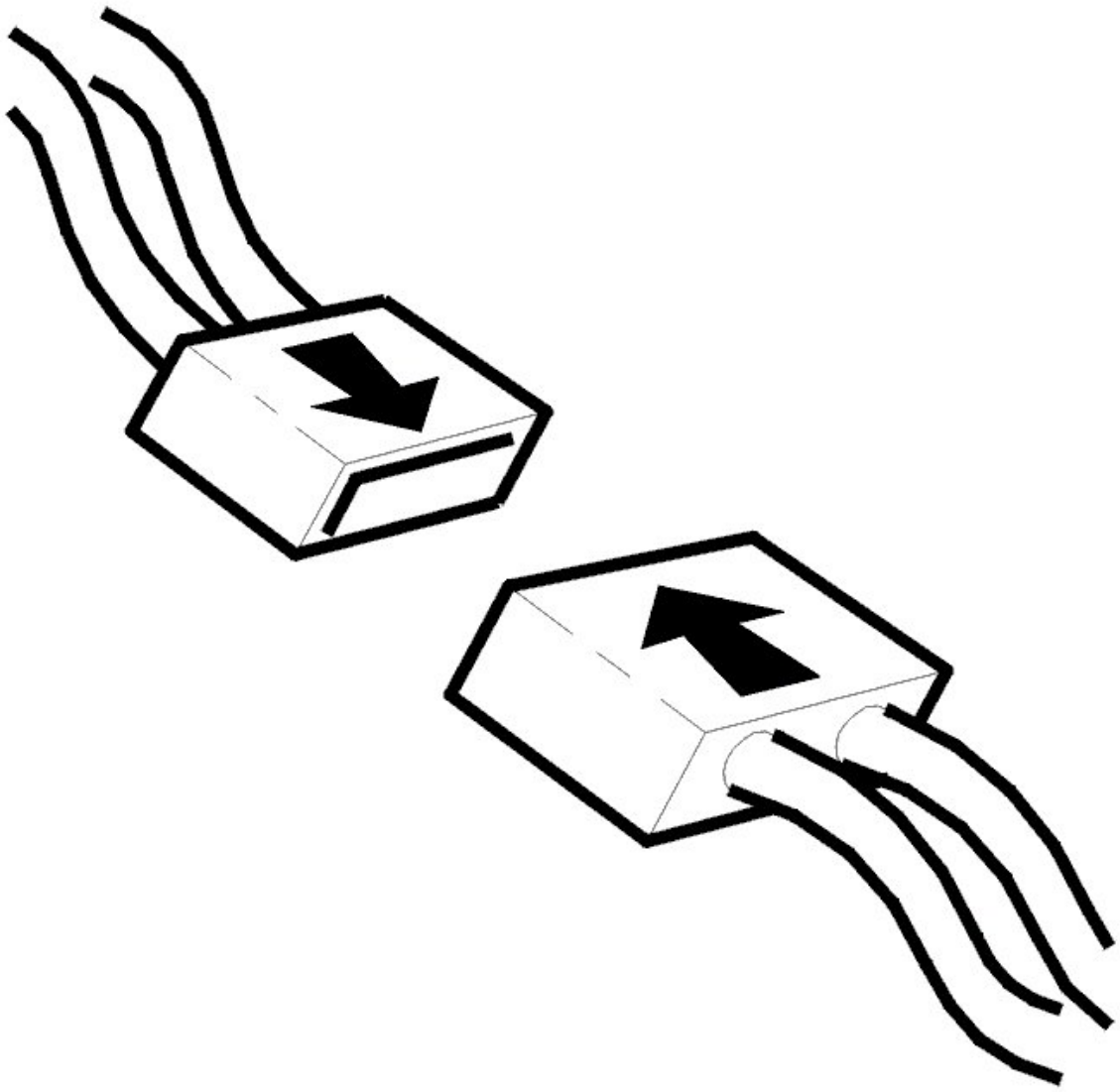
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

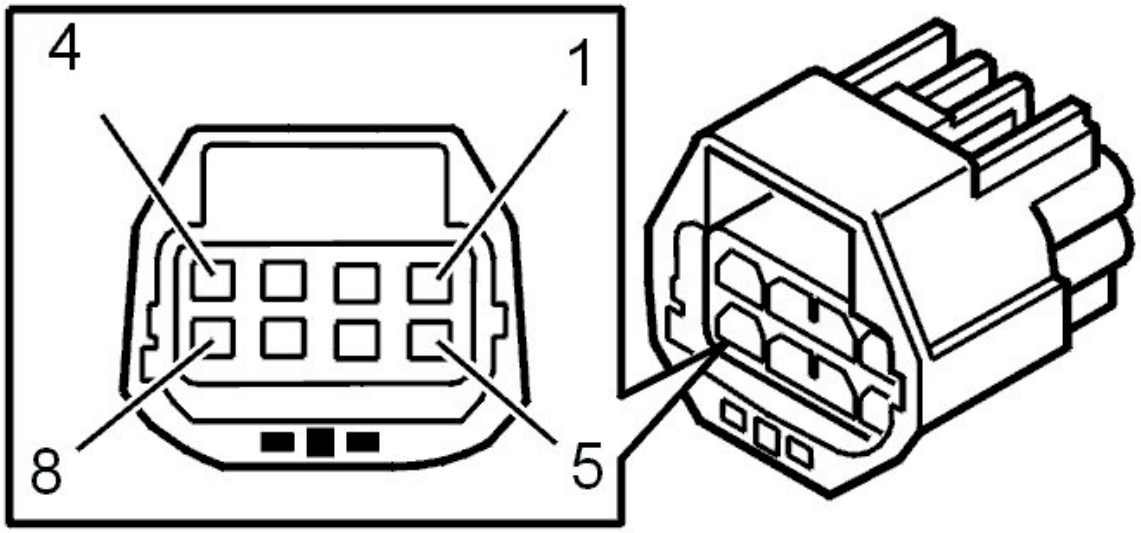
Checking transmission fluid temperature sensor

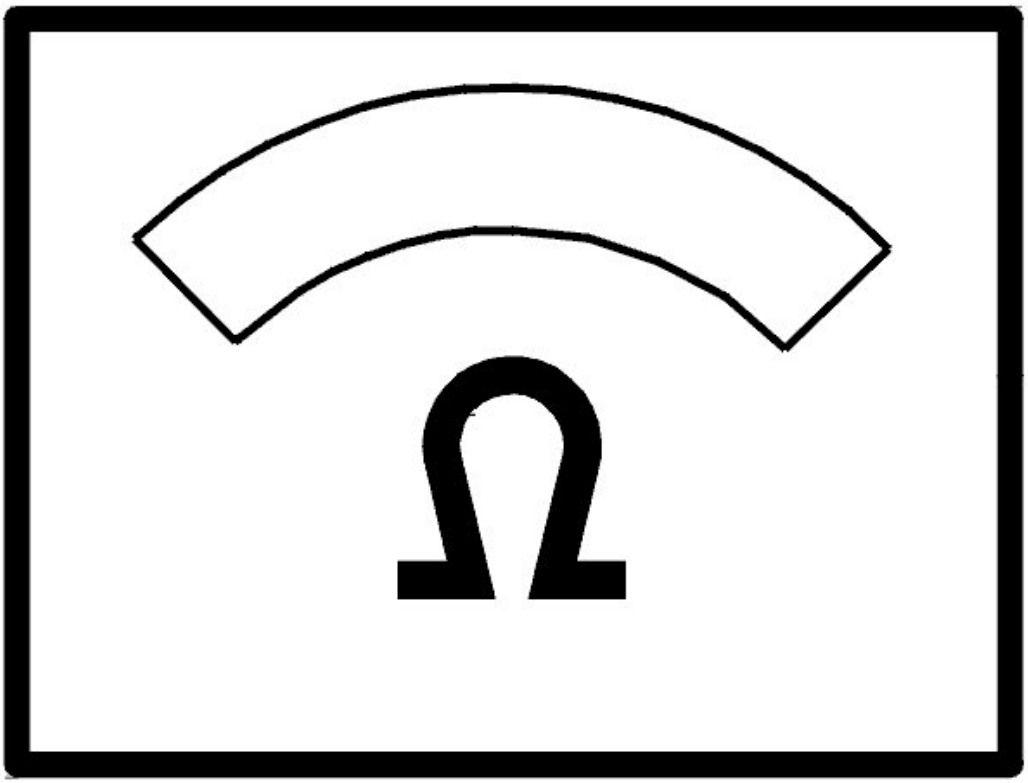




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

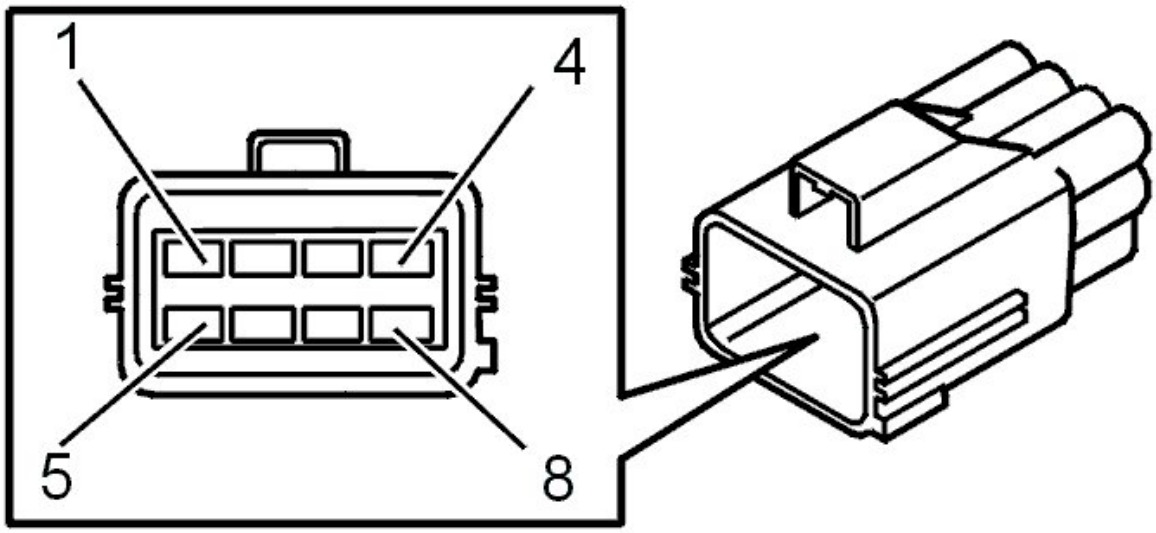
No - Checking the cable and component

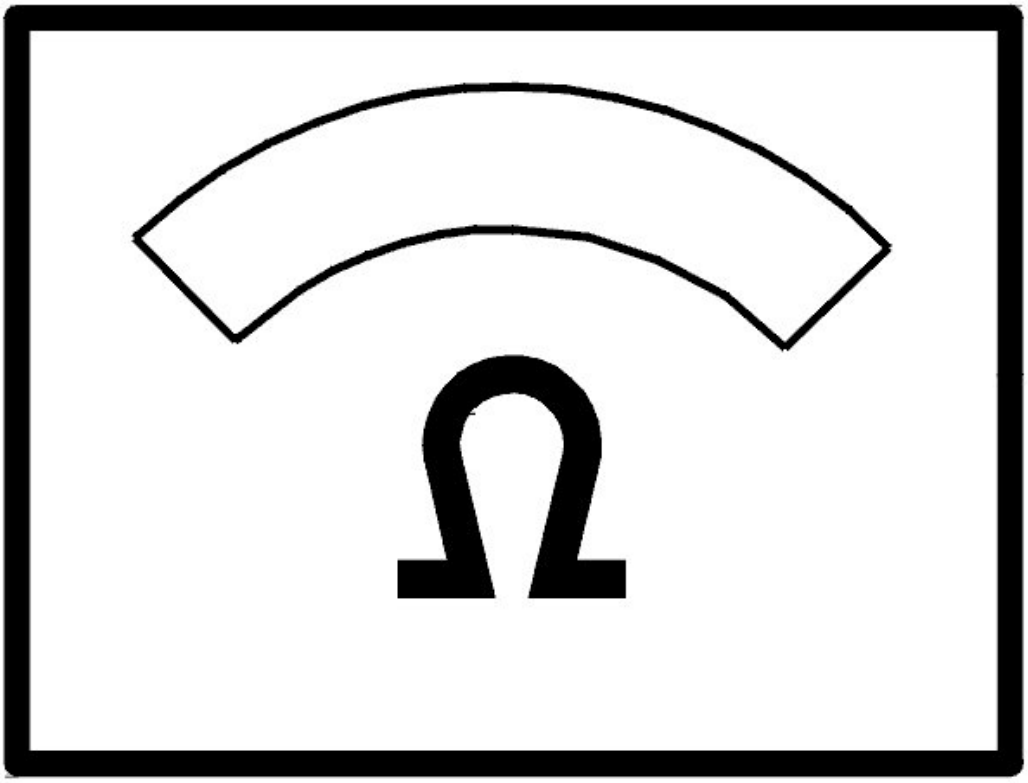
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



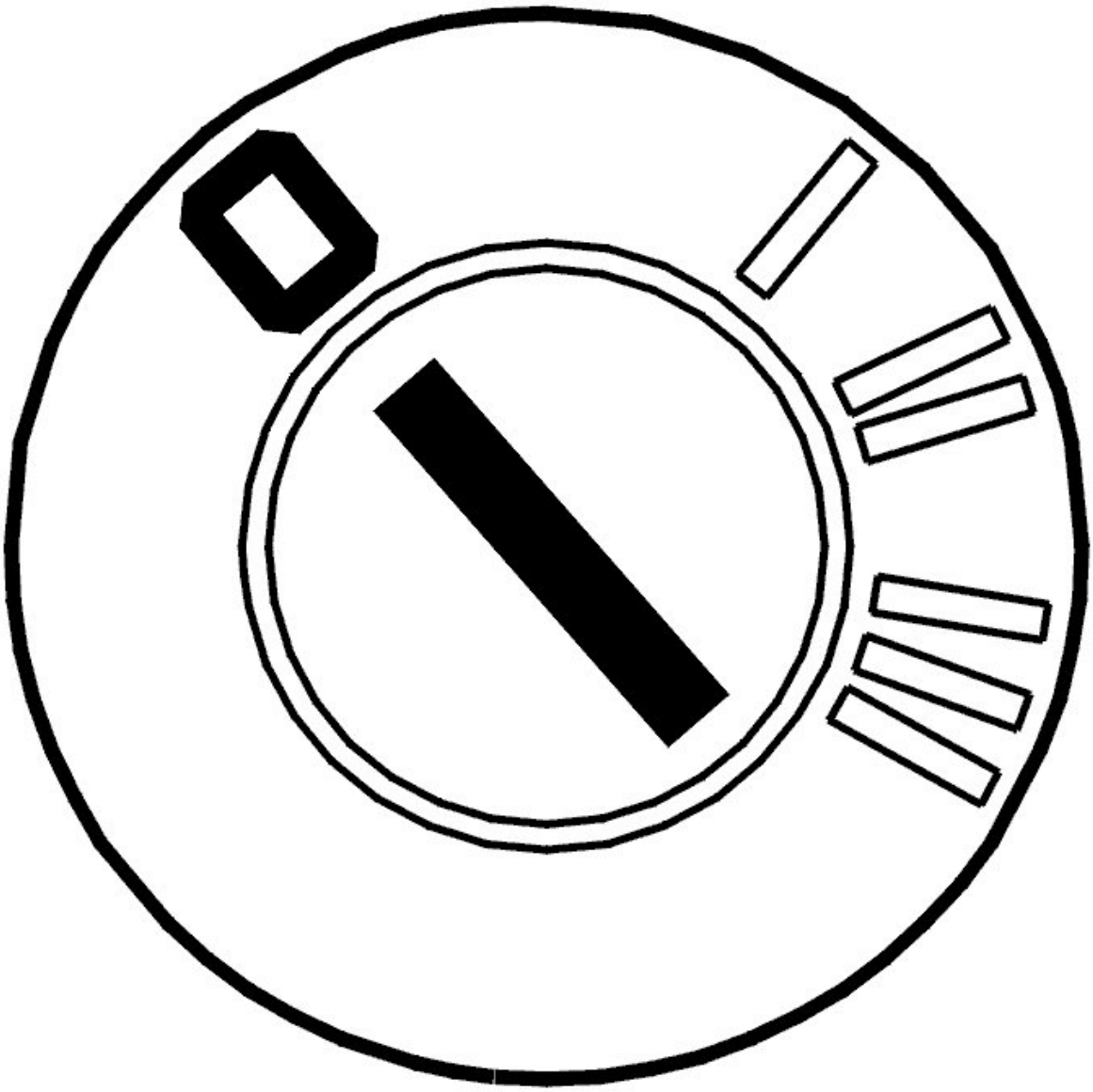


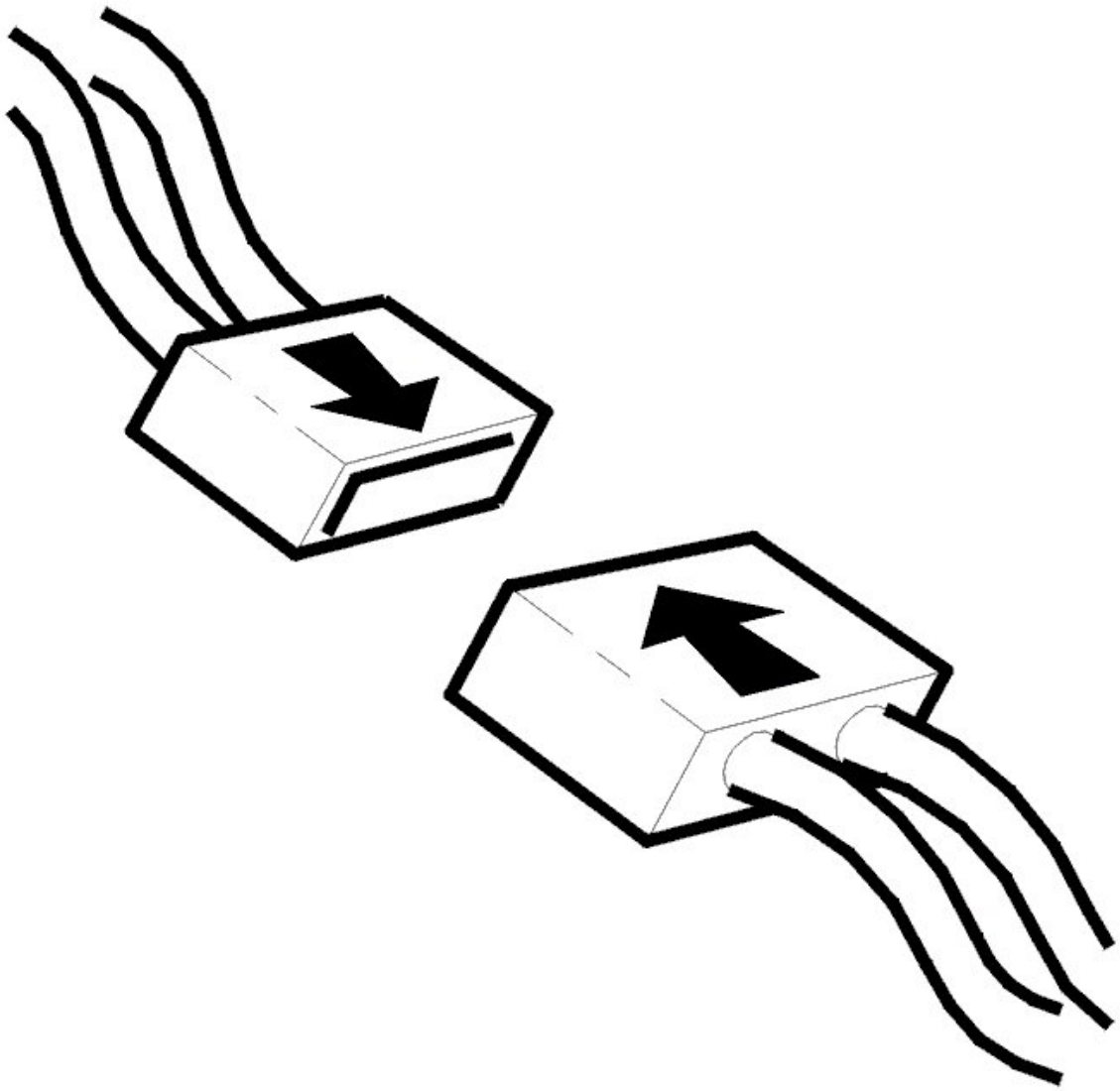
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

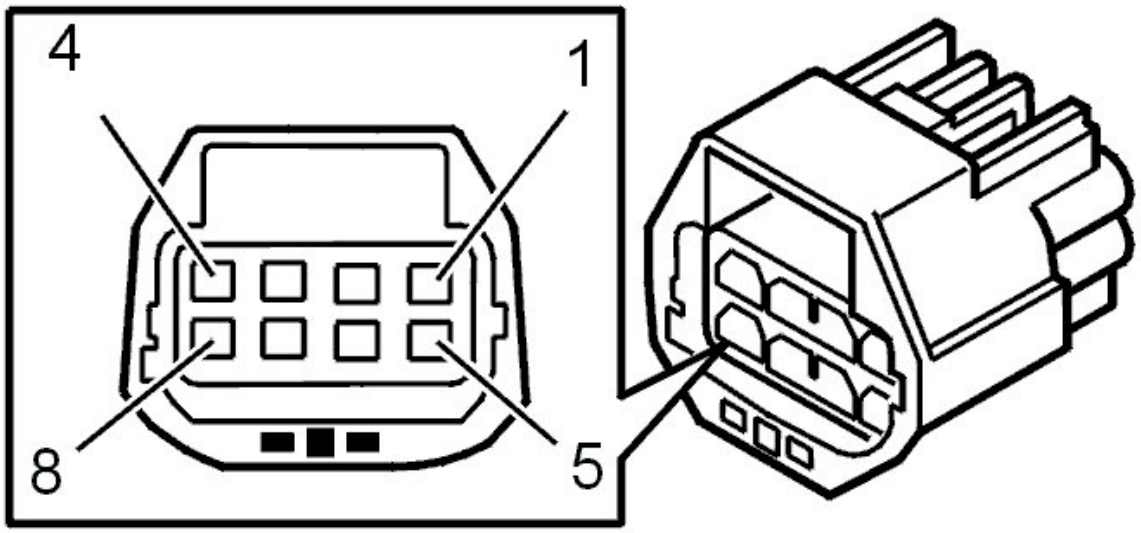
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

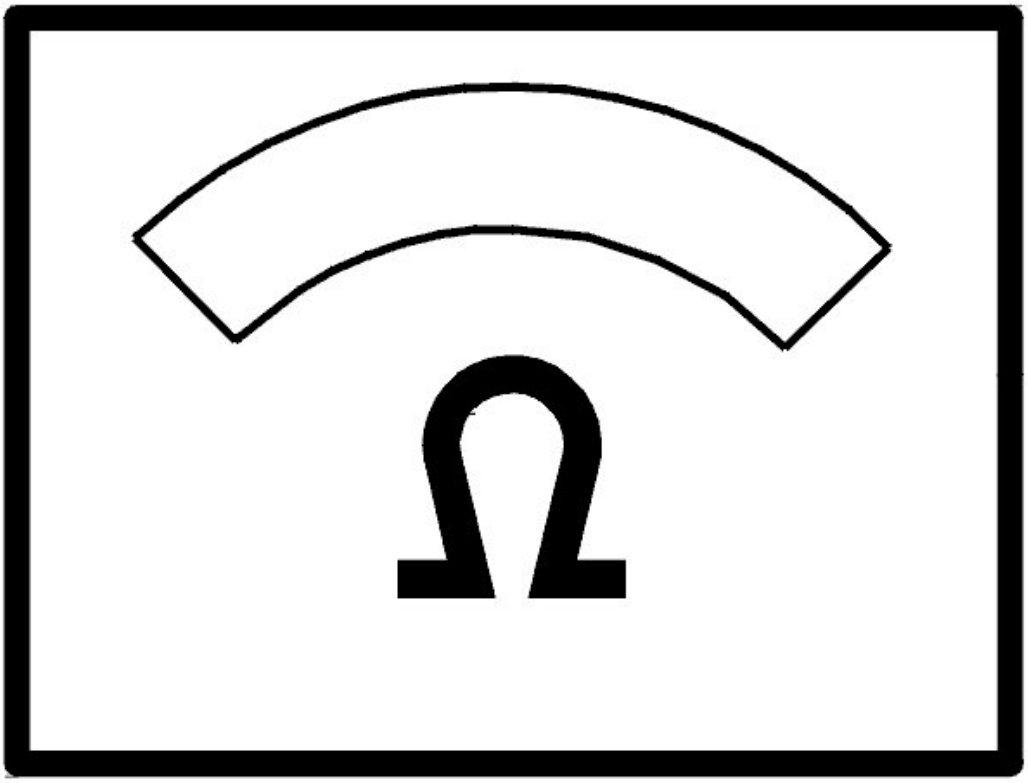
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





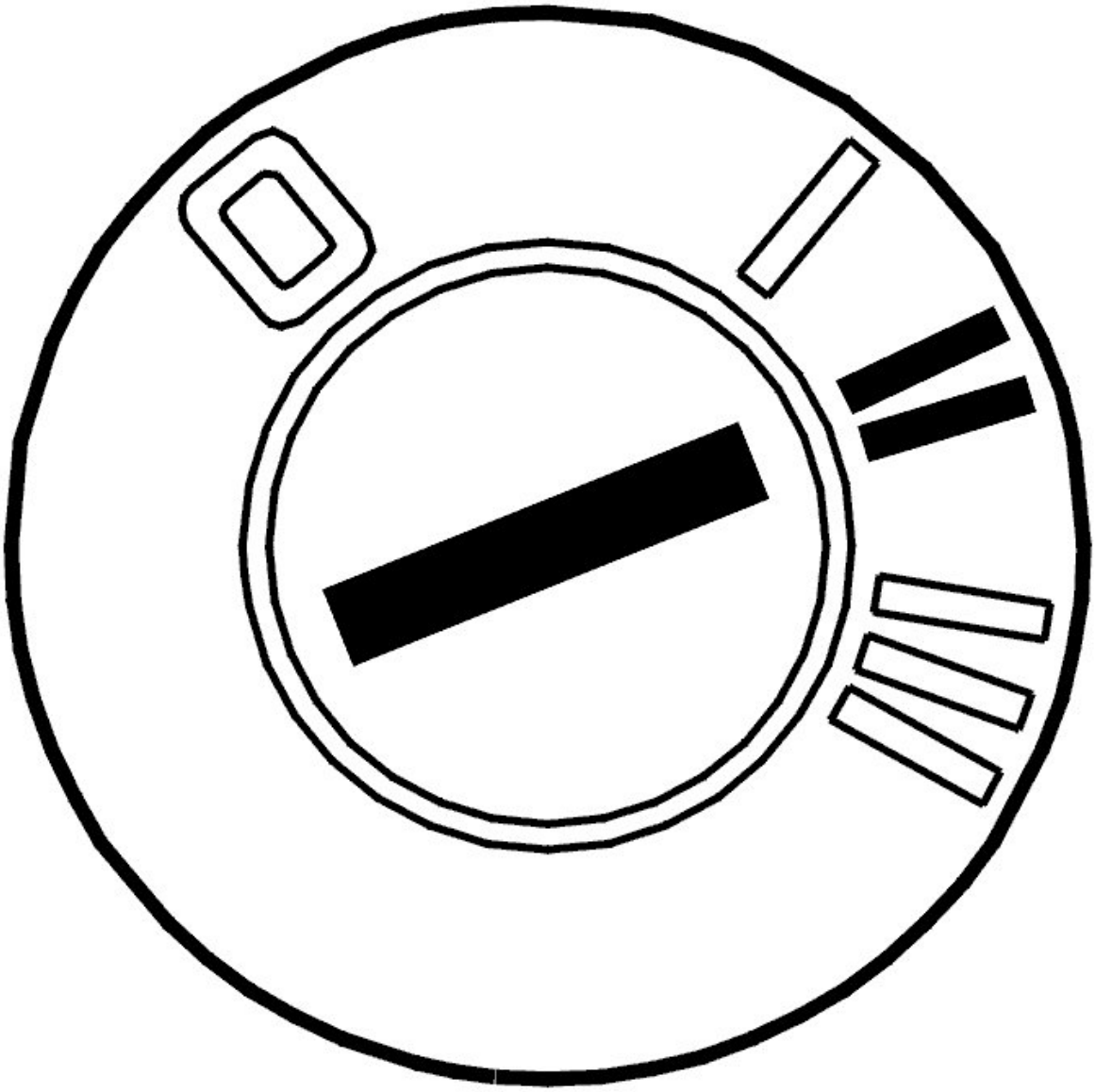
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



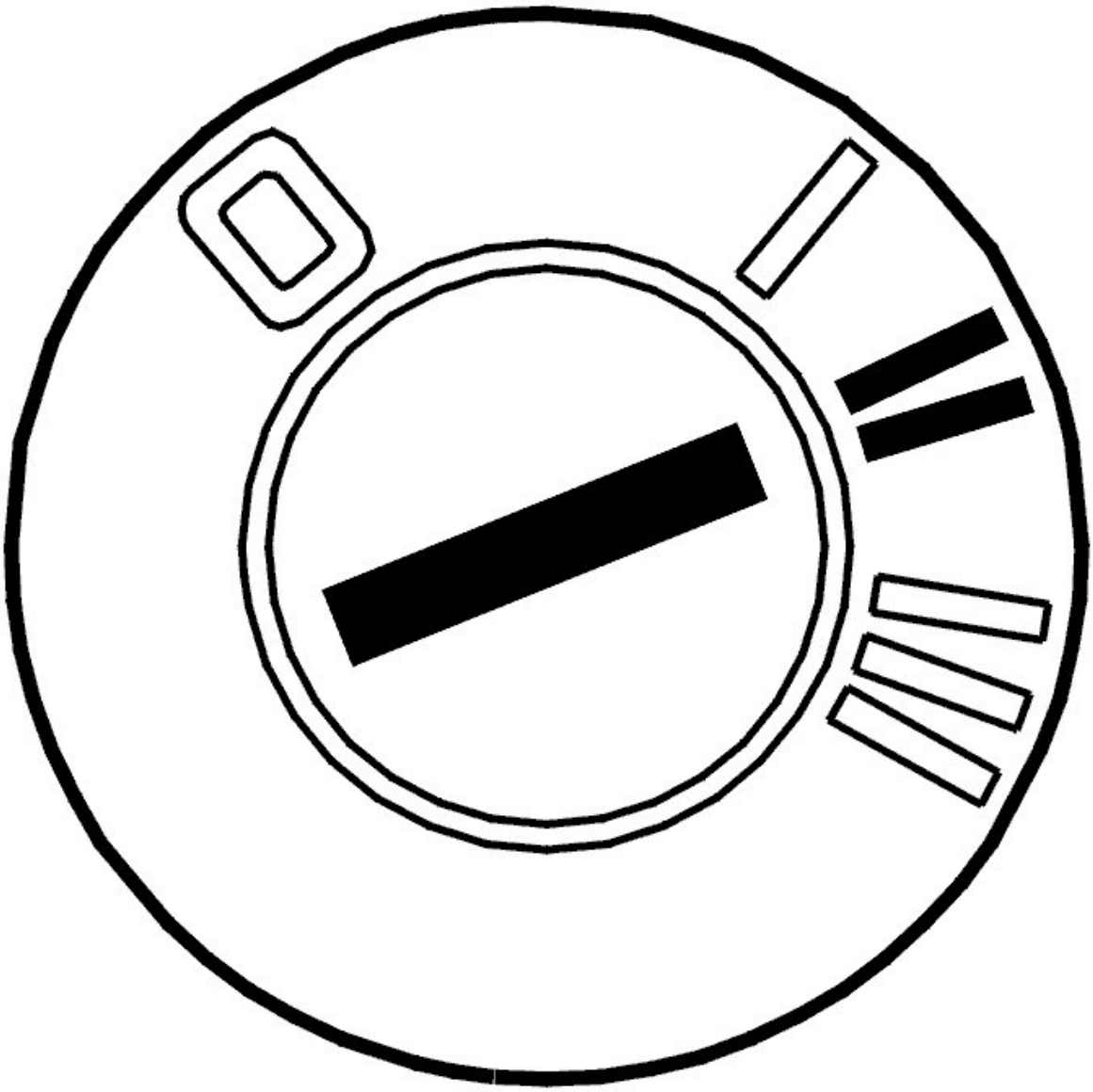
- Ignition on.

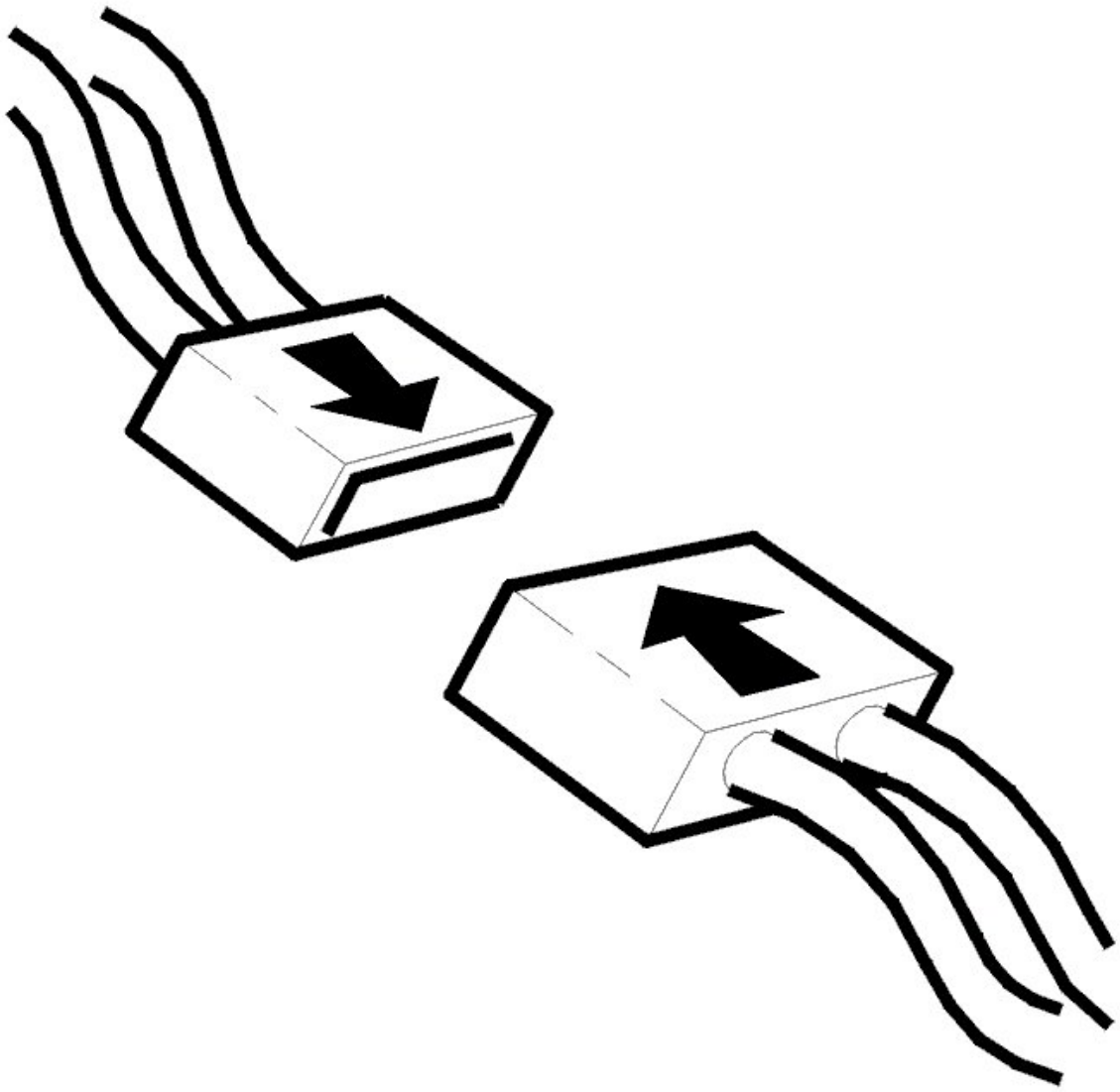
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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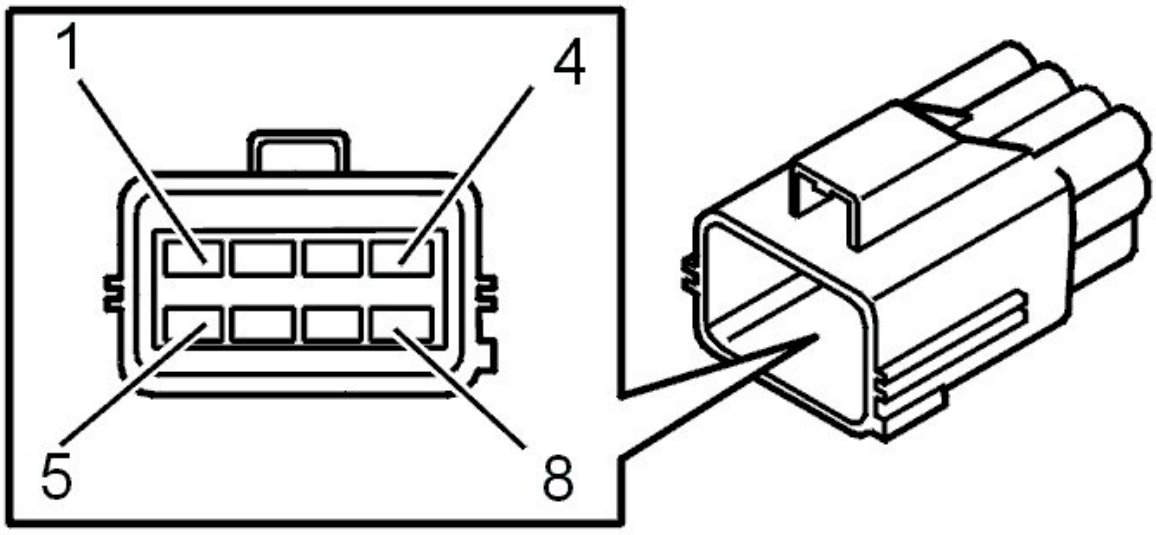
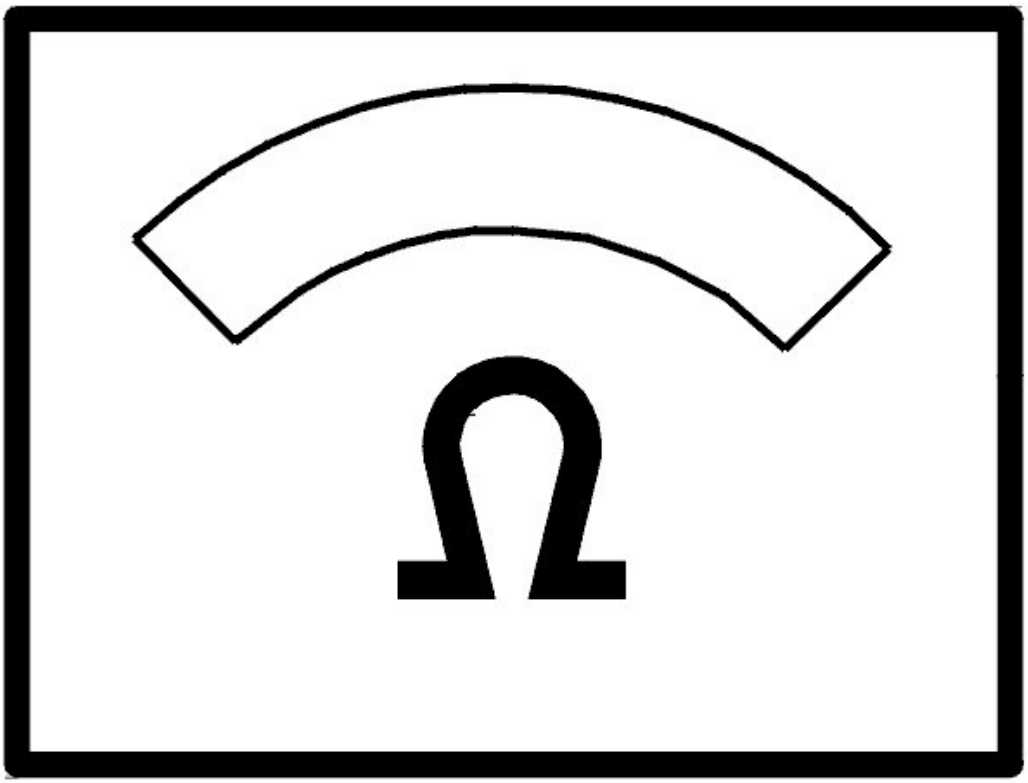
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

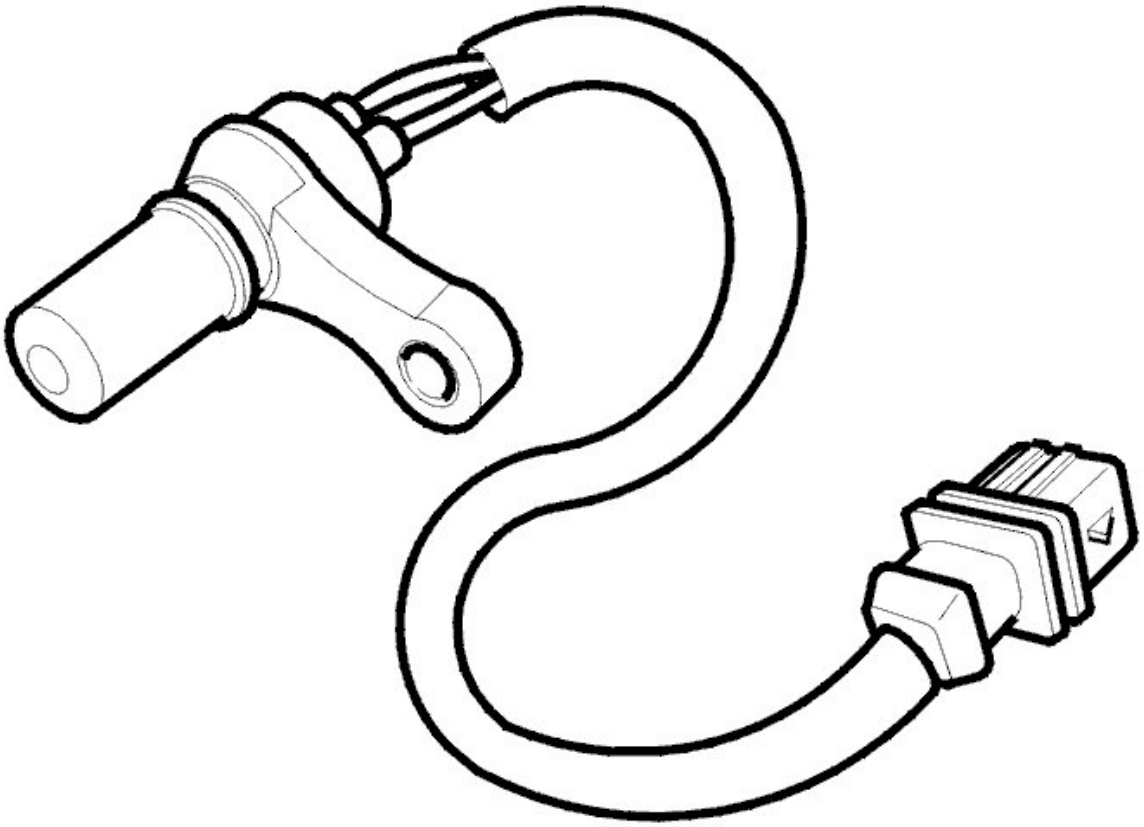
Yes - Attempt New Test

No - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) TCM-001F is stored if the control module registers that the signal from the speed sensor is missing.

Substitute value
- None.

Possible source
- Contact resistance in the terminals.
- Open-circuit in the power supply.
- Open-circuit in the signal cable.
- Defective speed sensor.

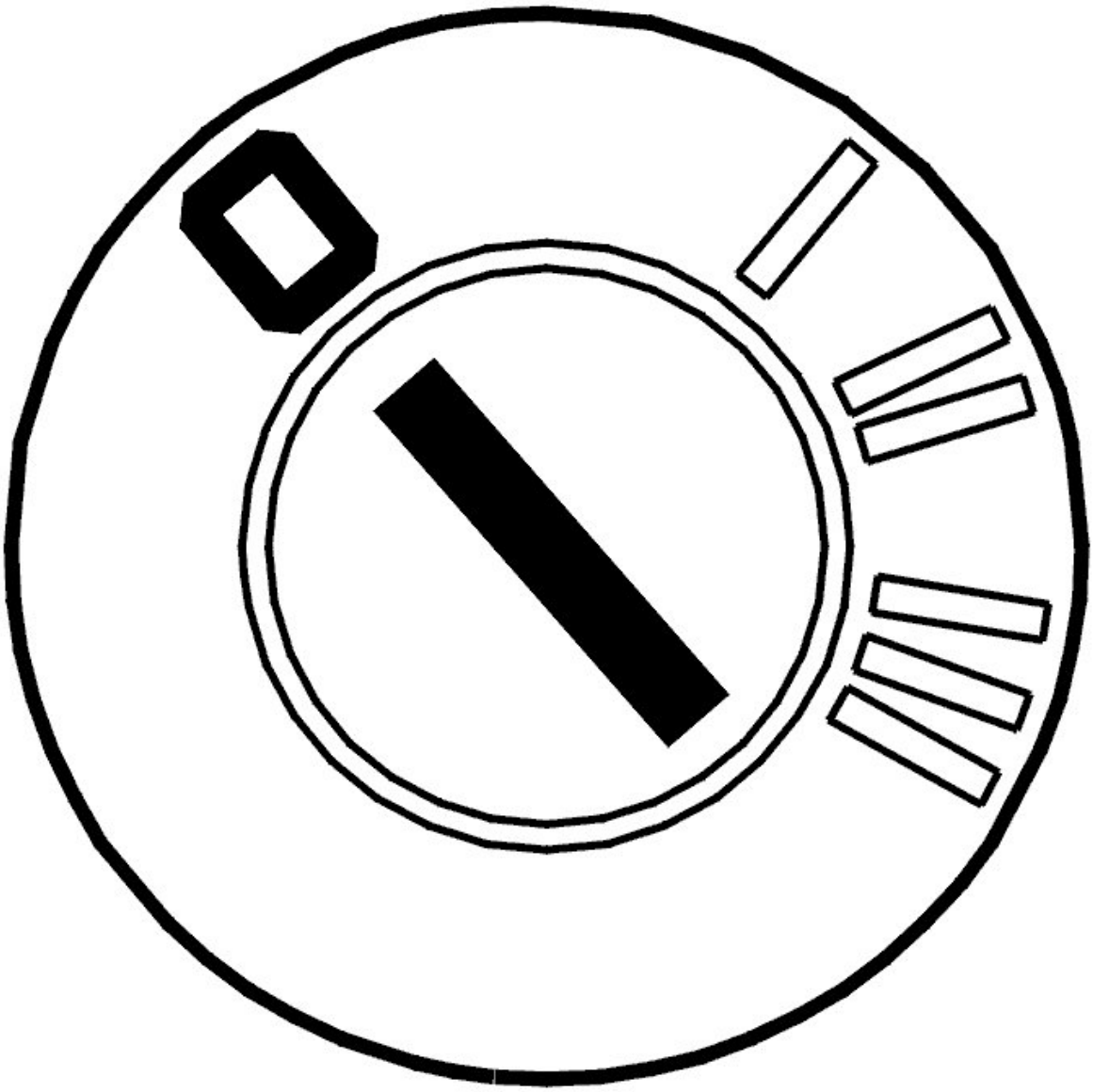
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Intermittent fault

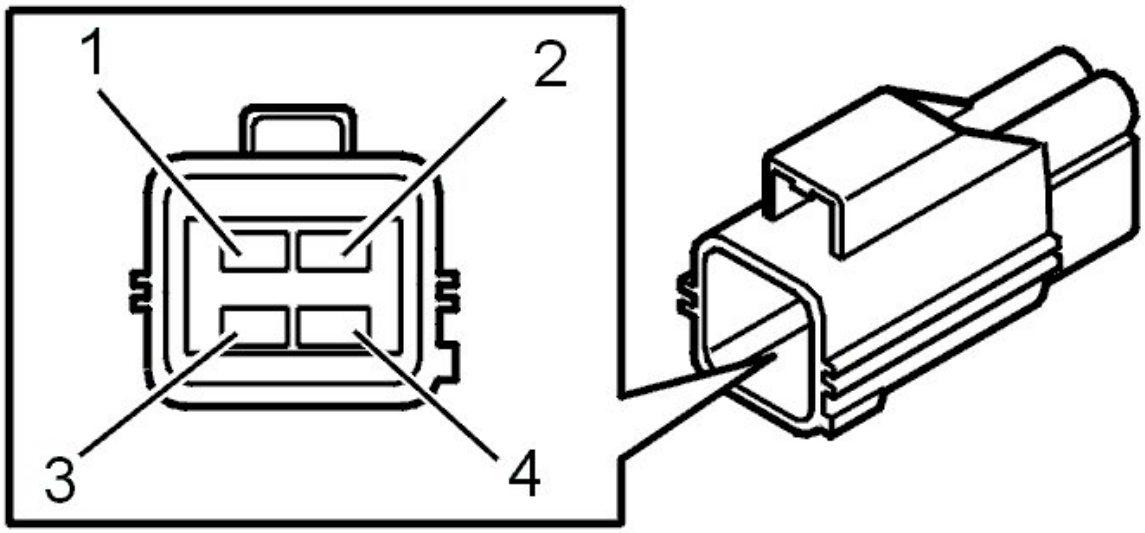


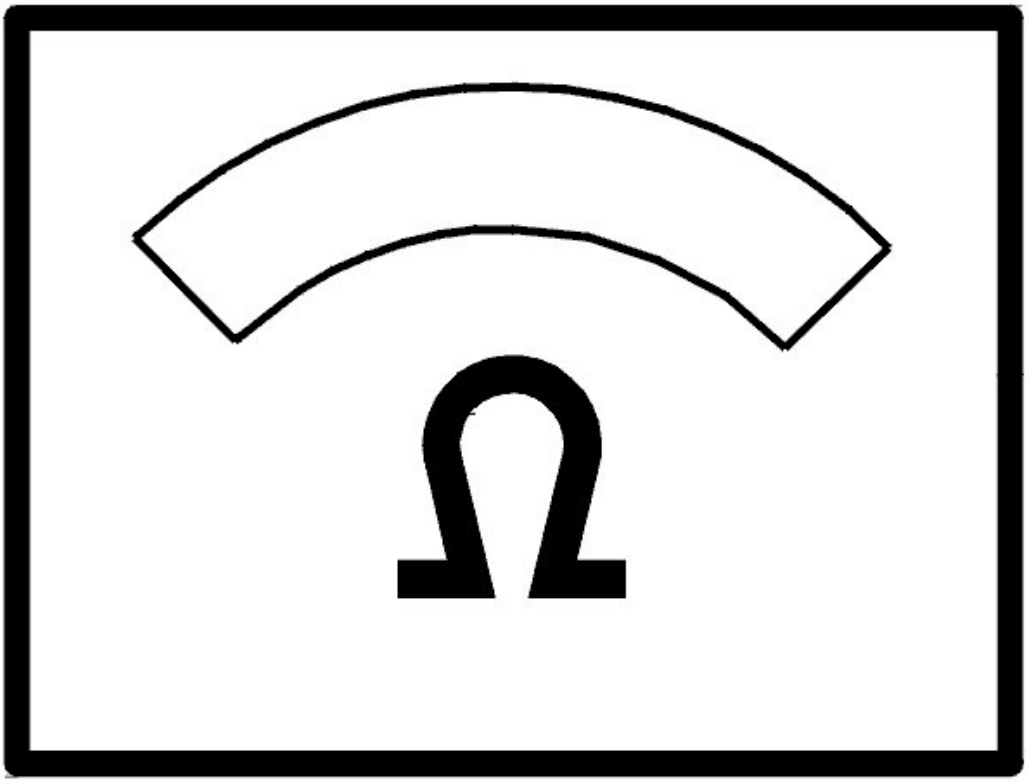
- Ignition off.

Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the power supply cable between transmission control module (TCM) terminal #57 (#A57) and transmission output speed sensor connector terminal #A4. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the signal cable between transmission control module (TCM) terminal #39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check and replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

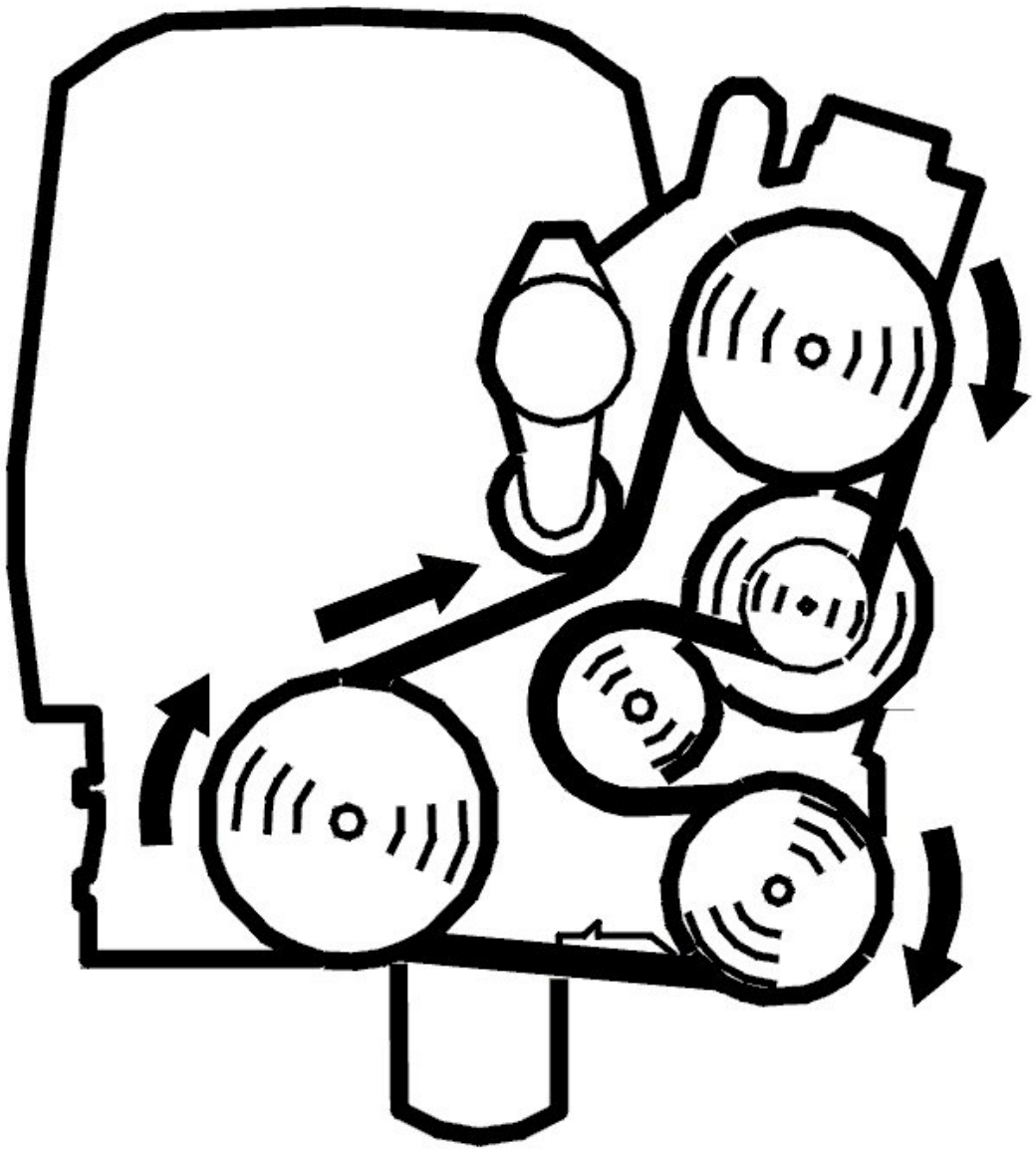
FAULT FOUND - Fault Found

Attempt New Test - Intermittent fault

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking the vehicle speed sensor (VSS) signal



- Ignition off
- Check the transmission control module (TCM) and speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Move the gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Note! Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

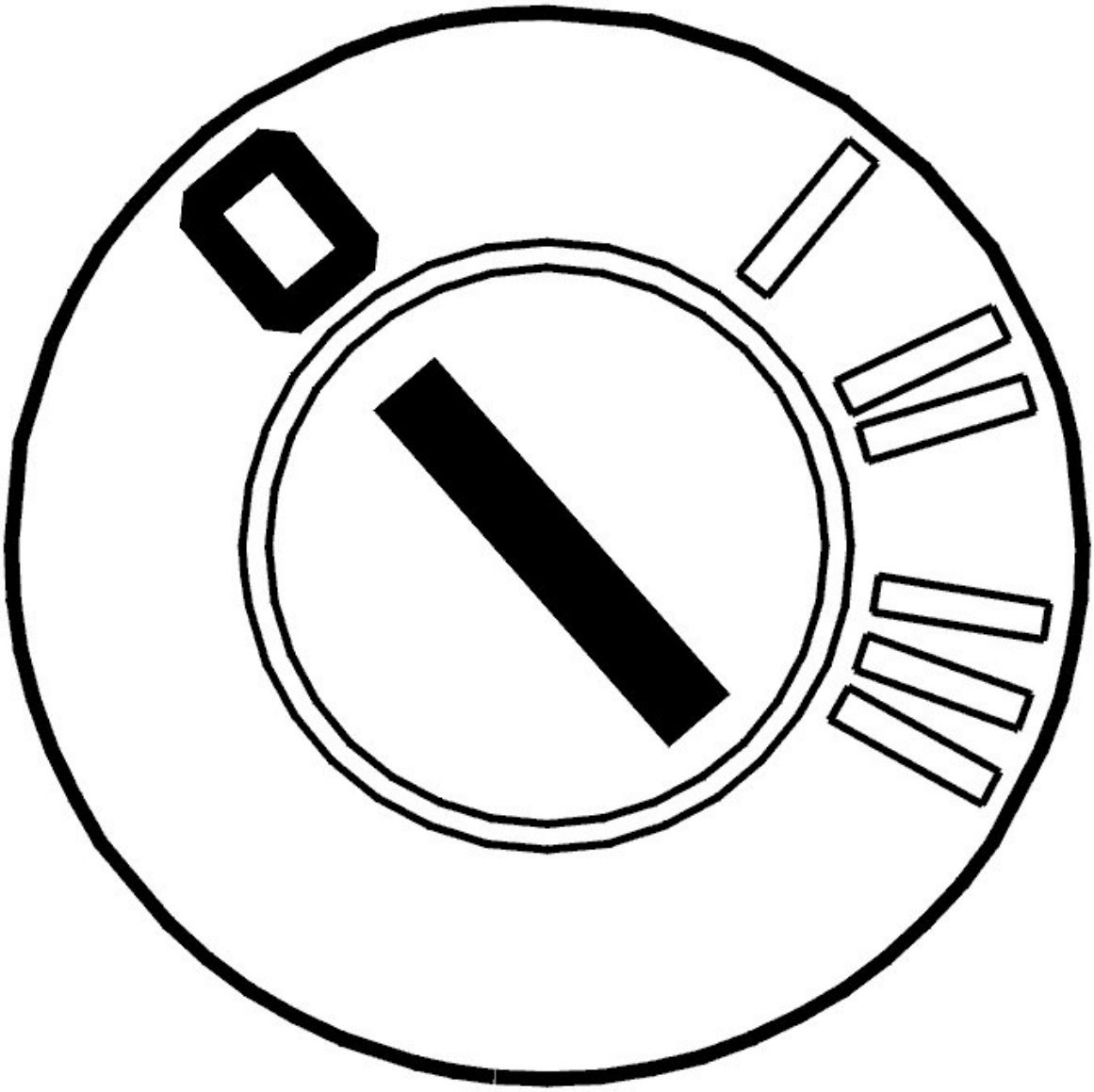
If the speed is updated, the cause of the fault was probably contact resistance or oxidation in the control module or vehicle speed sensor (VSS) connectors.

Was the speed updated?

Yes - No Fault Found

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission control module (TCM) terminal #A57 (#A57) and transmission output speed sensor connector

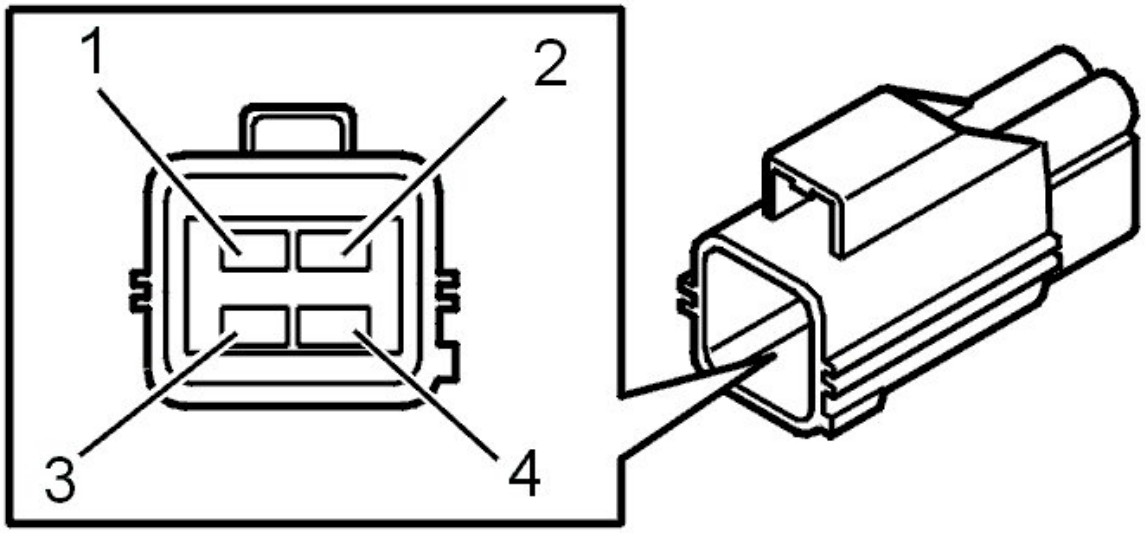
terminal #A4. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the signal cable between transmission control module (TCM) terminal #A39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

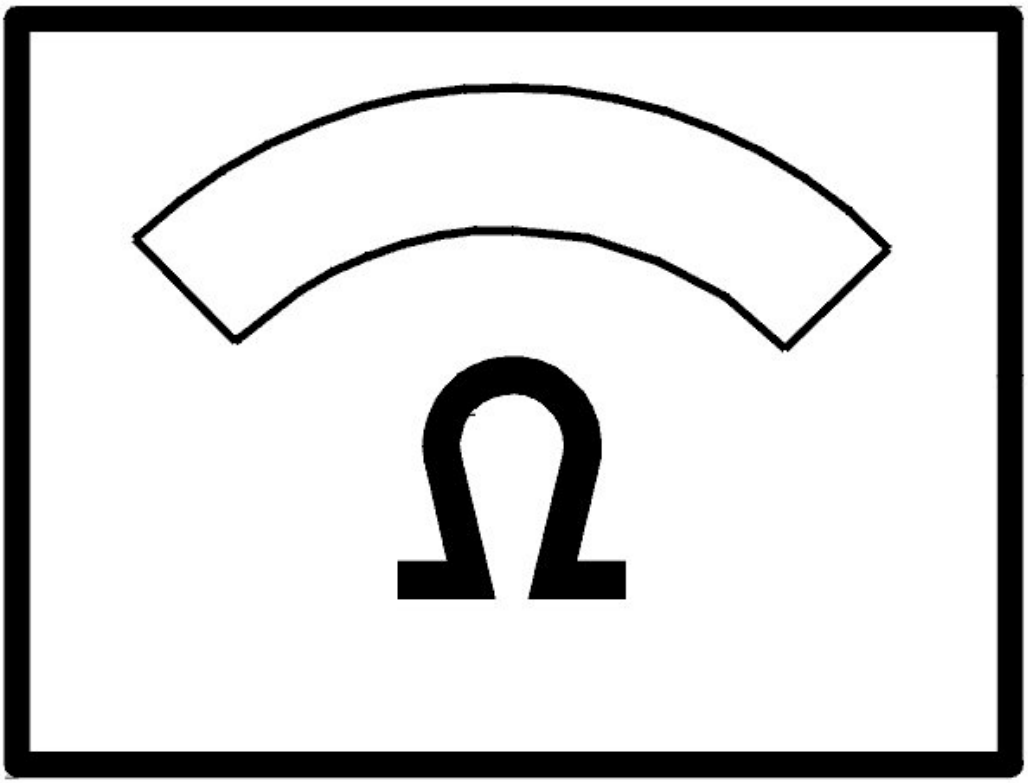
Hint: With the control module connected, the ignition on and a voltmeter connected between transmission output speed sensor connector terminals #A3 and #A4 (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To check or replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



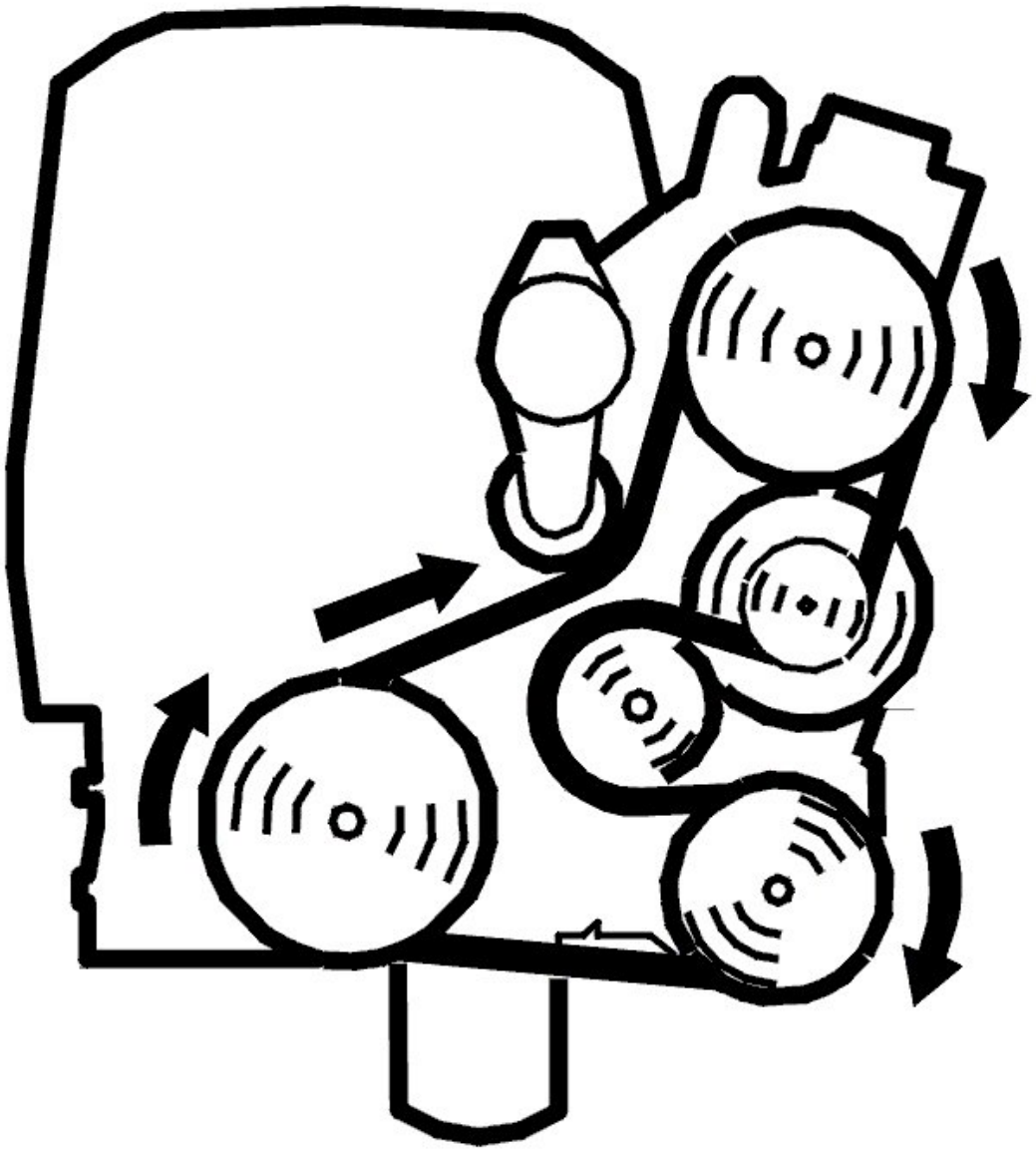


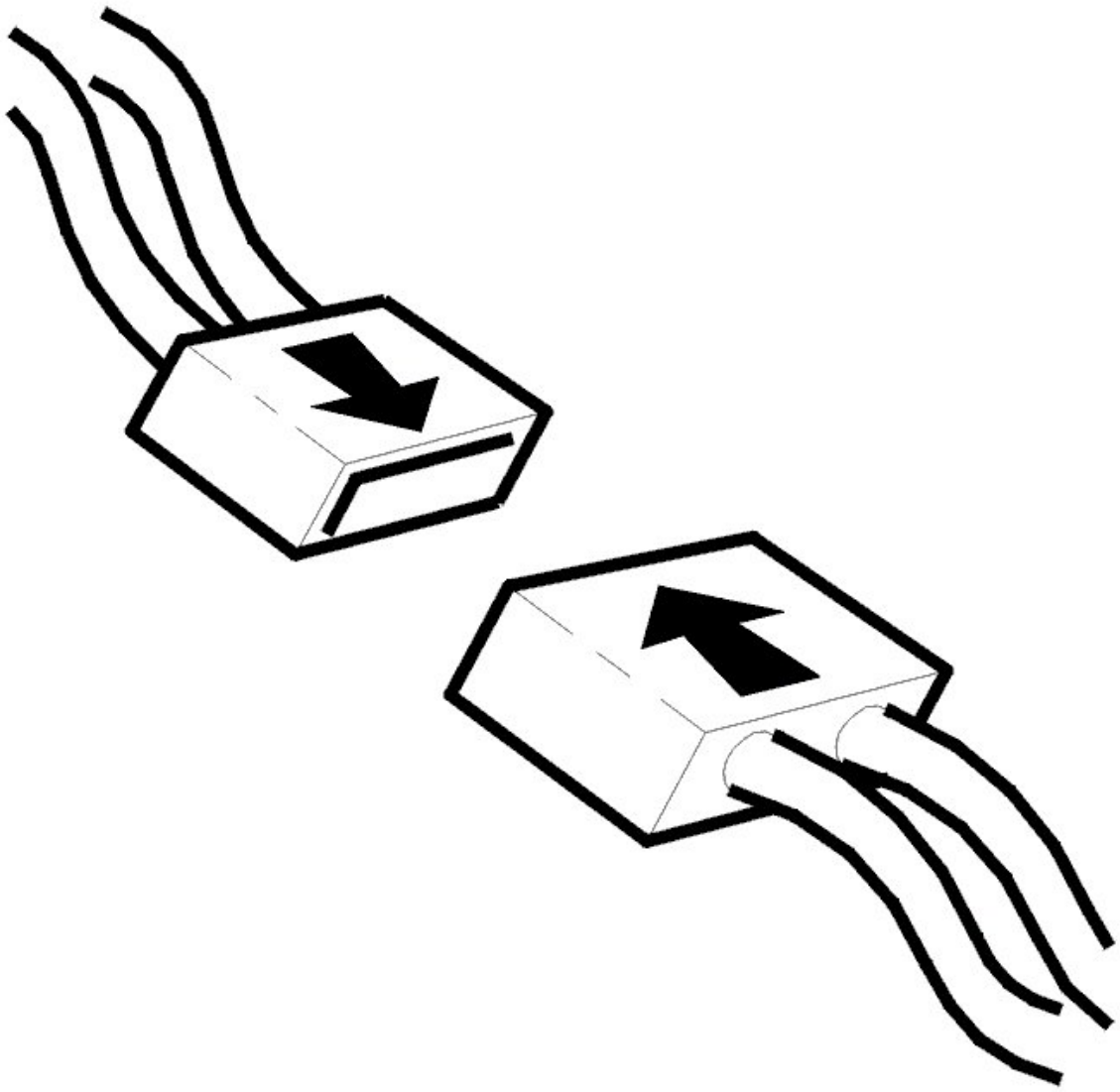
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

Note! When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Was speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the vehicle speed sensor (VSS) signal

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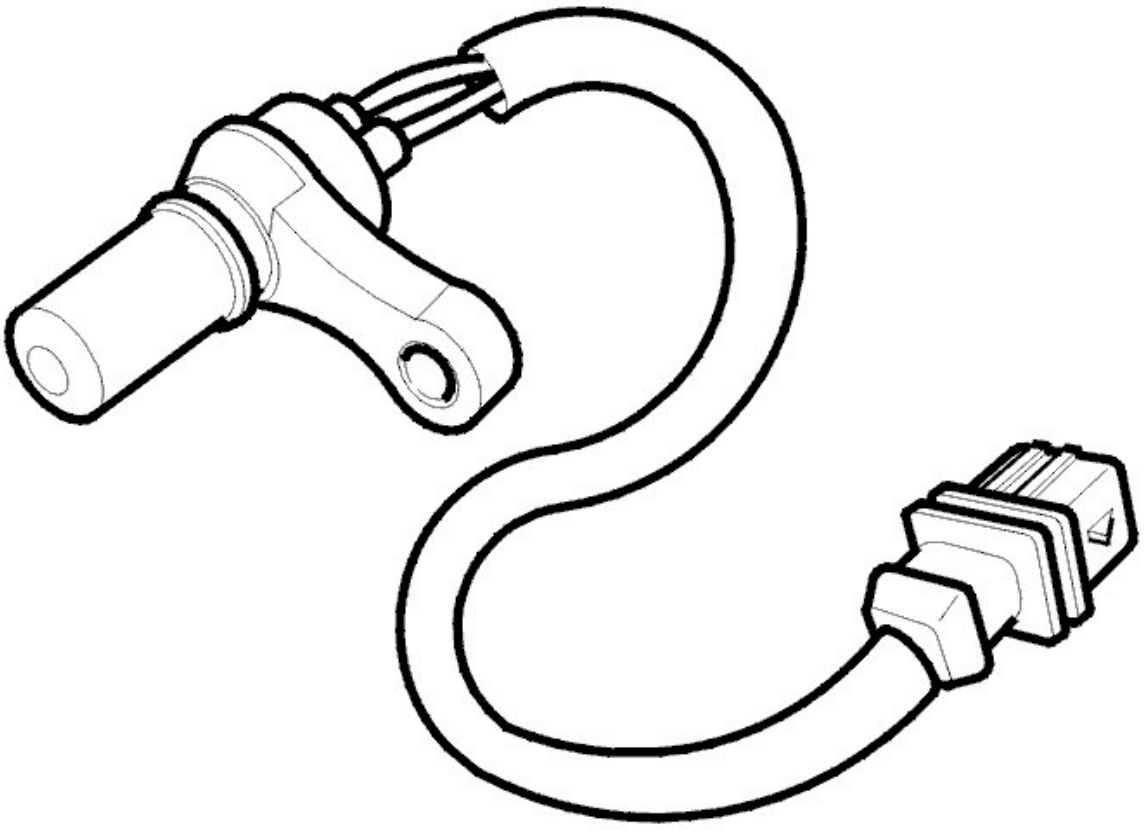
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The automatic transmission control module (TCM) receives speed signals from the ABS control module and from the the speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the speed signal from the ABS system with the transmission speed and the engine speed (RPM) at the transmission. Diagnostic trouble code (DTC)

TCM-0020 is stored if the control module registers that the speed signal from the ABS system does not correspond with the transmission speed or the engine speed (RPM).

Substitute value
- None.

Possible source
- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective speed sensor.

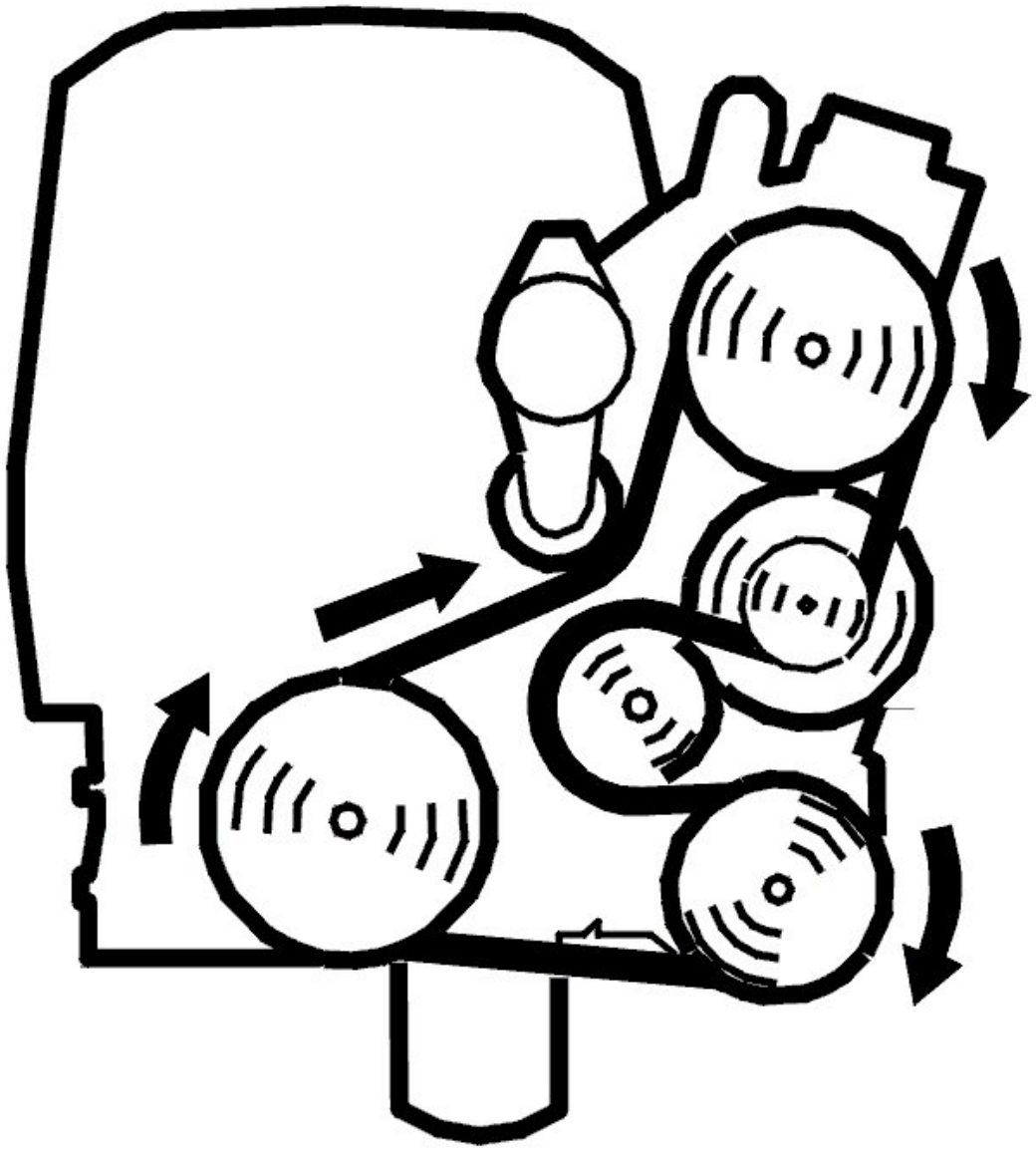
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

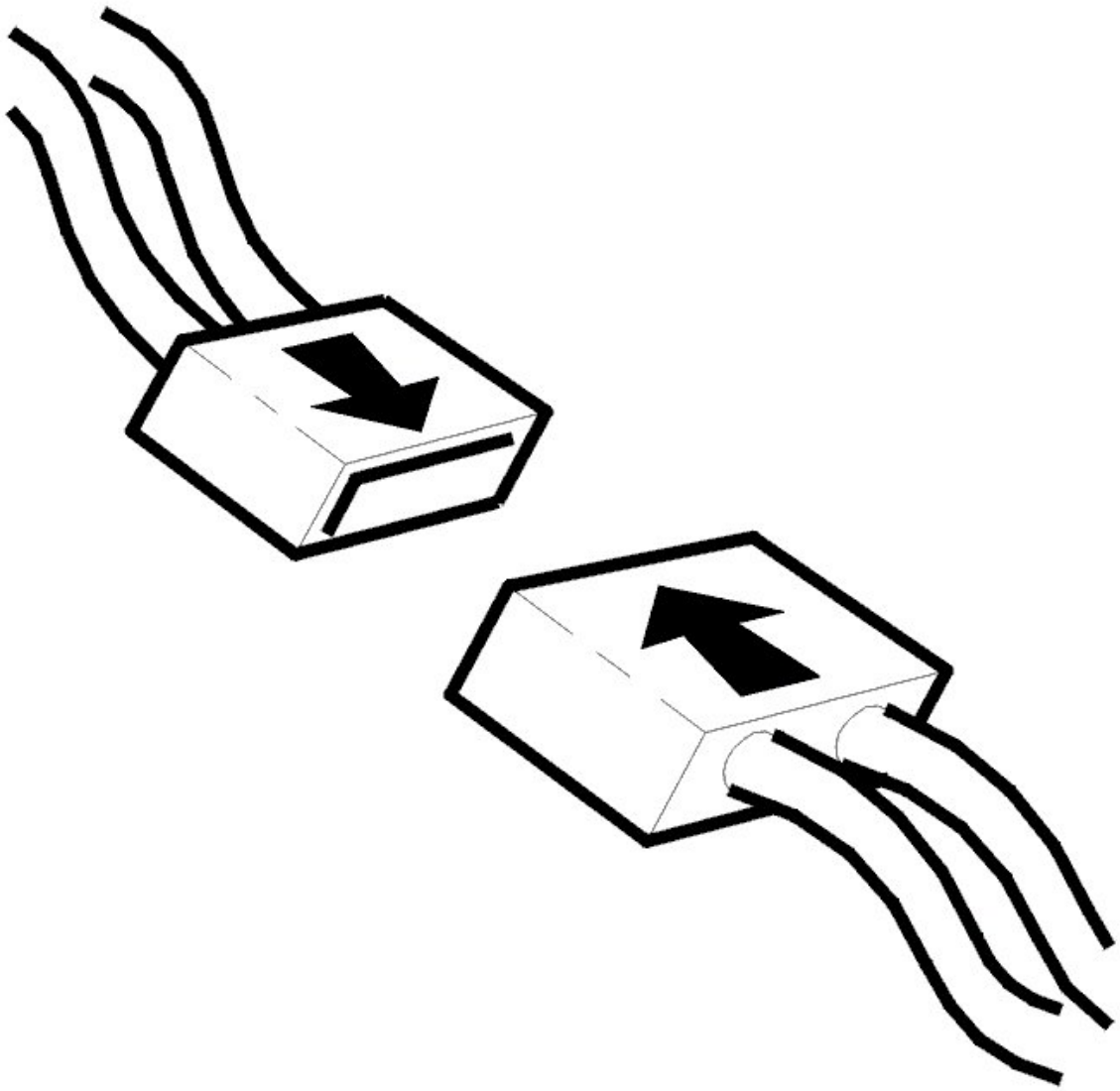
Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Faulty Signal. Permanent Fault

Faulty signal. Permanent fault

Checking the transmission output speed sensor signal





- Ignition off
- Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Reinstall the components, reconnect the connectors etc.
- Raise the car so that the drive wheels can rotate freely
- Engine idling
- Gear selector in position D
- Read off the transmission output speed signal.

Check that the speed increases with engine speed (RPM). If the speed is updated, the cause of the fault was loose connections in the control module or vehicle speed sensor (VSS) connectors.

Note! A diagnostic trouble code (DTC) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) in the ABS system after completing fault-tracing.

Other information:

- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

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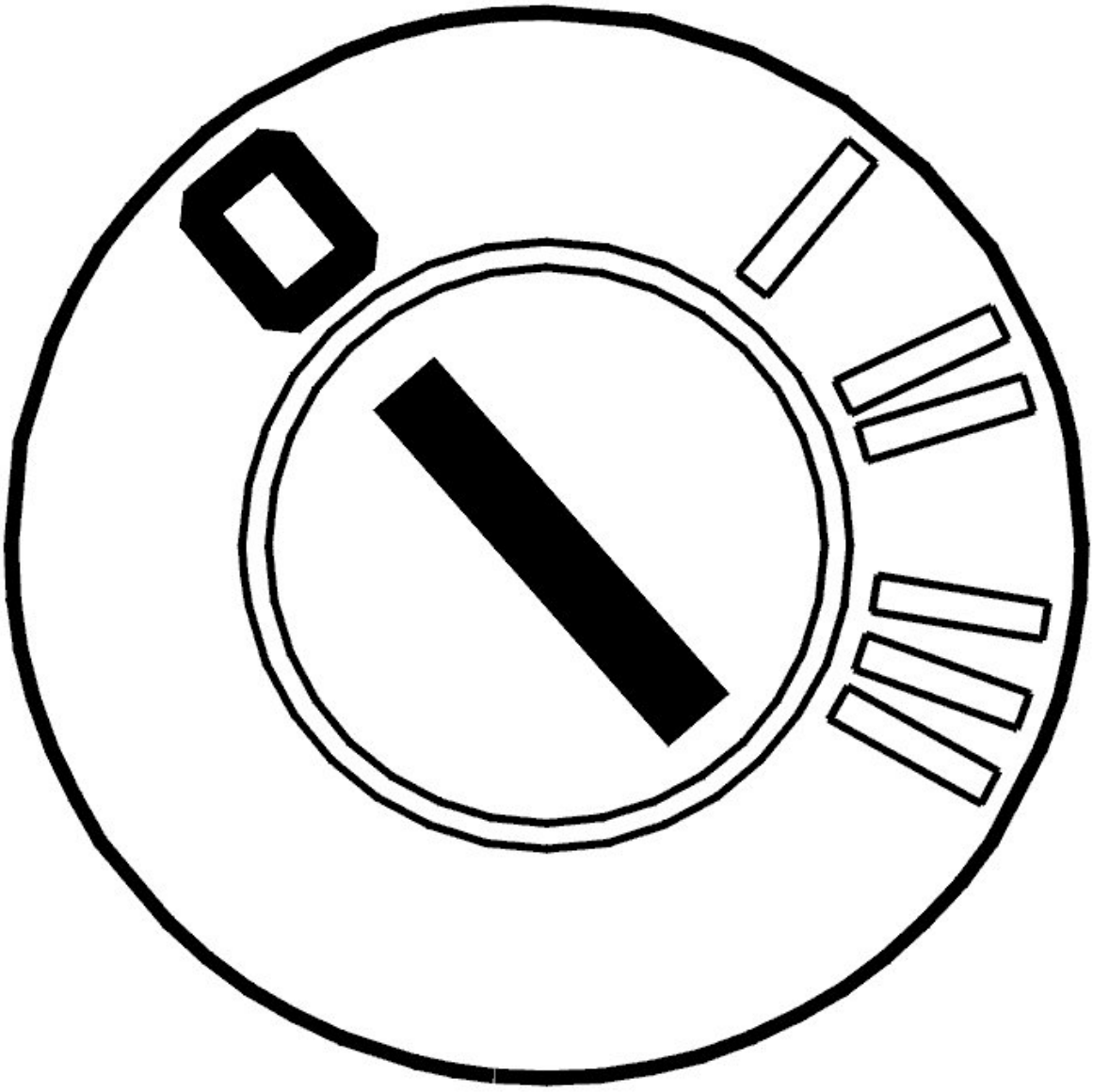
Does the speed increase with engine speed (RPM)?

Yes - **Fault Found**

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission output speed sensor connector terminal #A4 (control module side) and control module terminal #57 (#A57). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Check the signal cable between transmission output speed sensor connector terminal #A3 (control module side) and control module terminal #39 (#A39). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking

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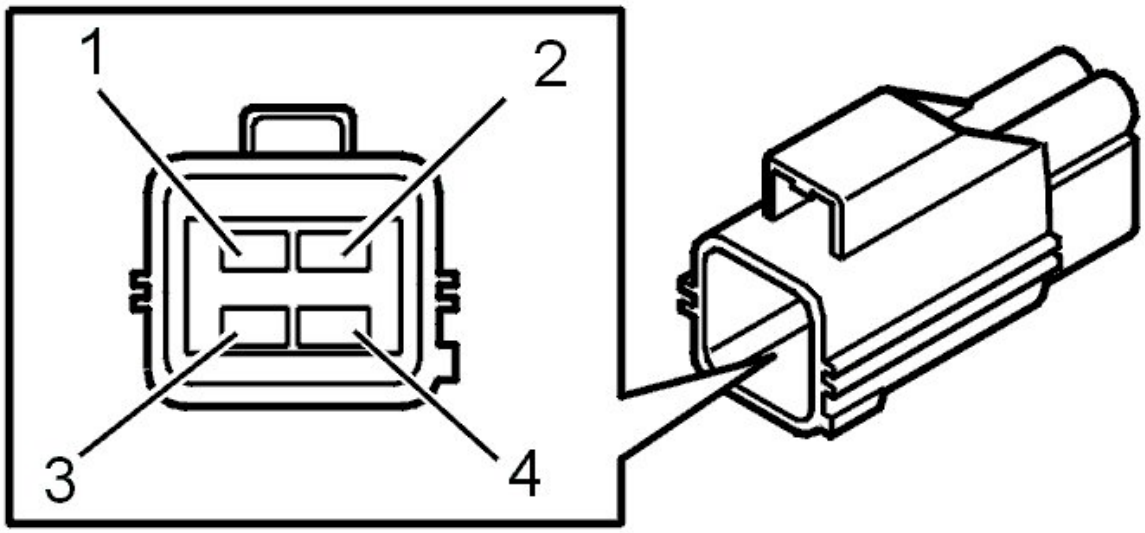
Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

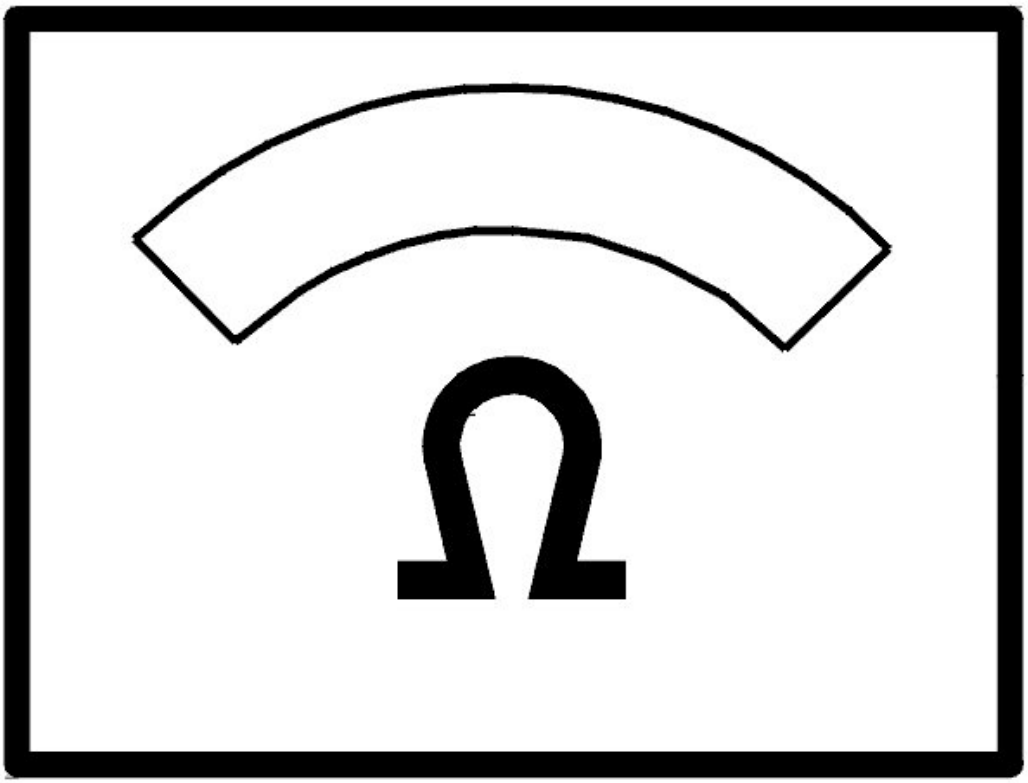
Hint: With the control module connected, the transmission output speed sensor disconnected and the ignition on, the voltage between transmission output speed sensor connector terminals #A3 and #A4 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Was a fault detected?

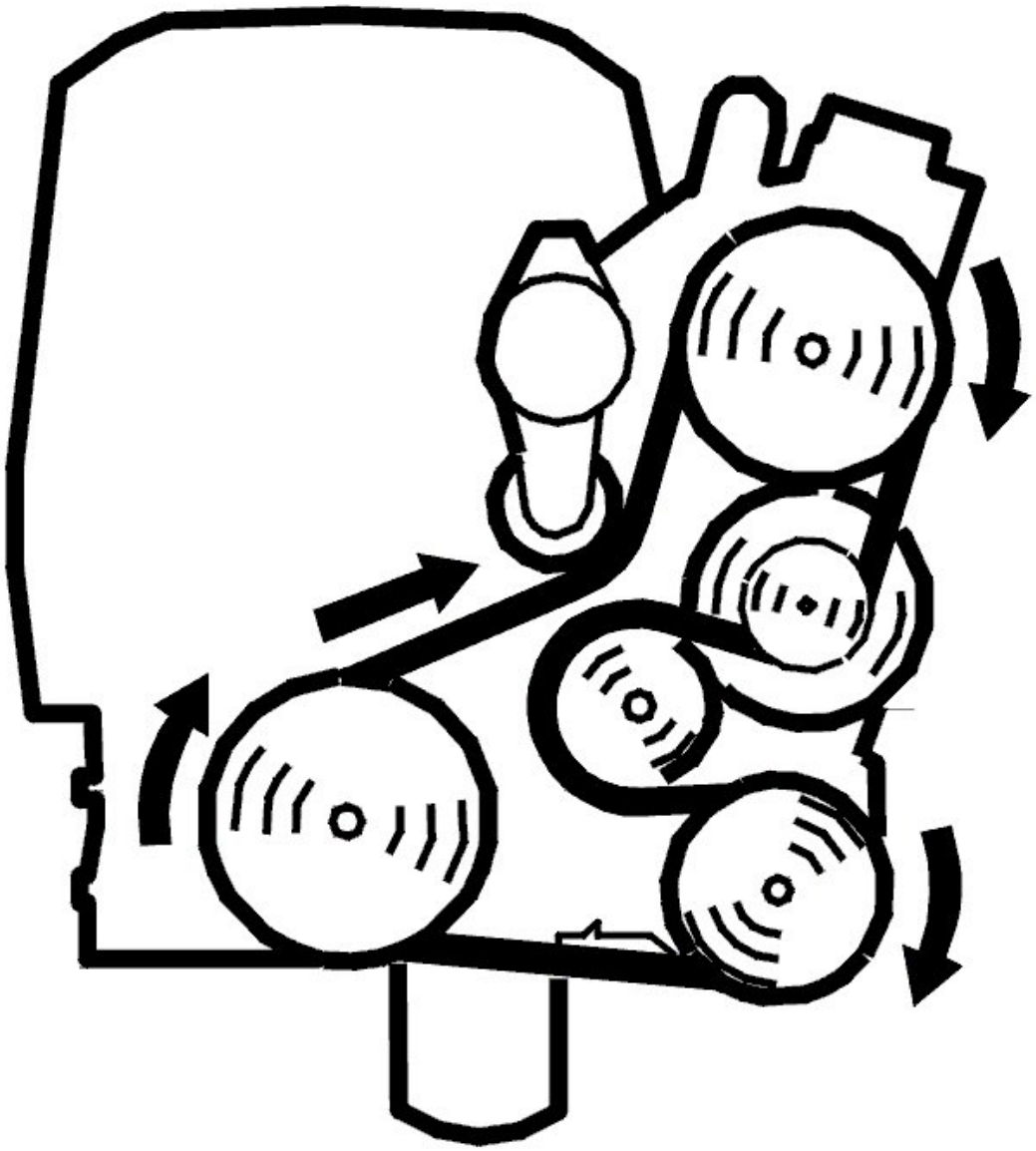
Yes - Verification

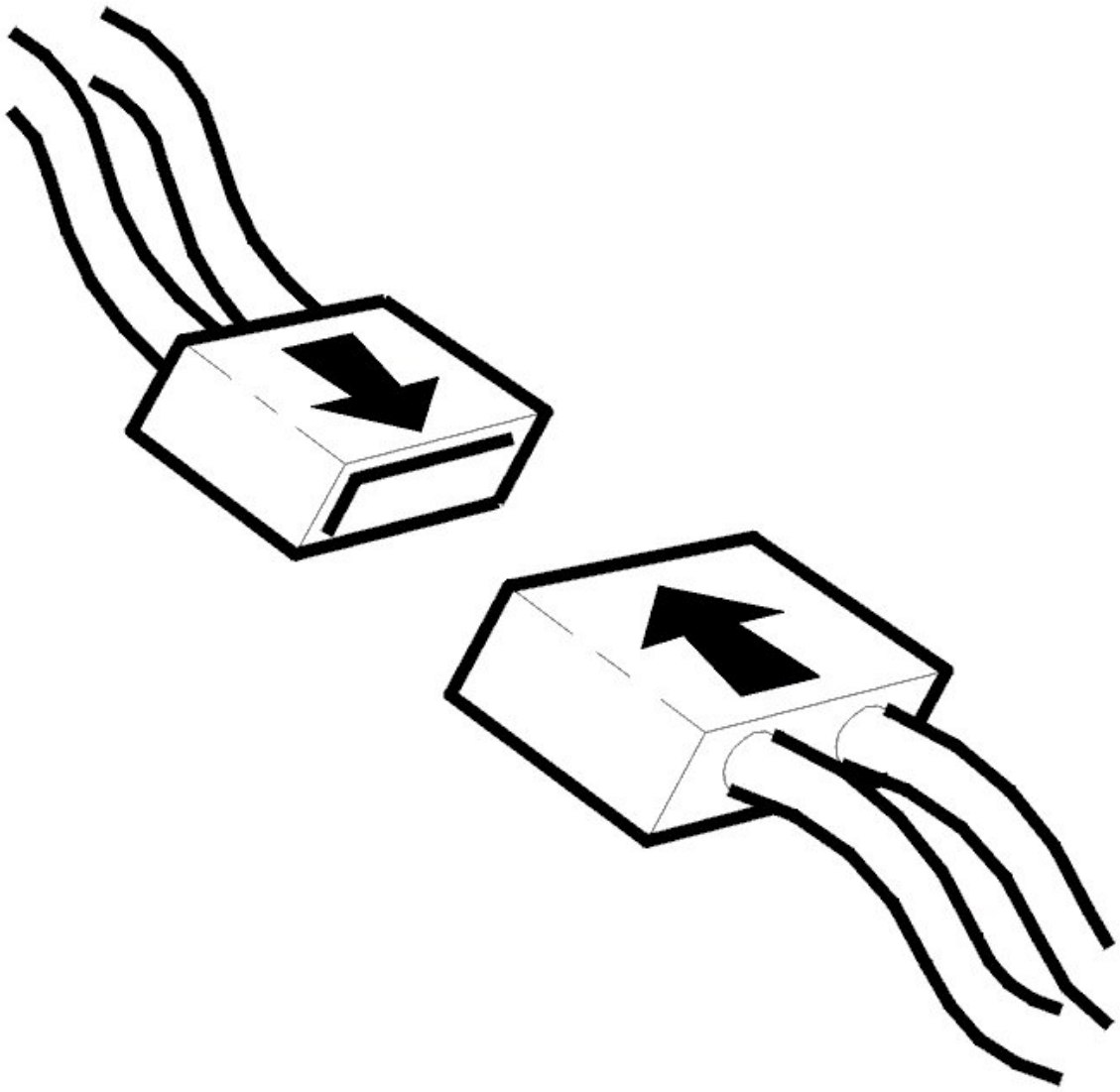
No - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

Note! When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Was speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission output speed sensor signal

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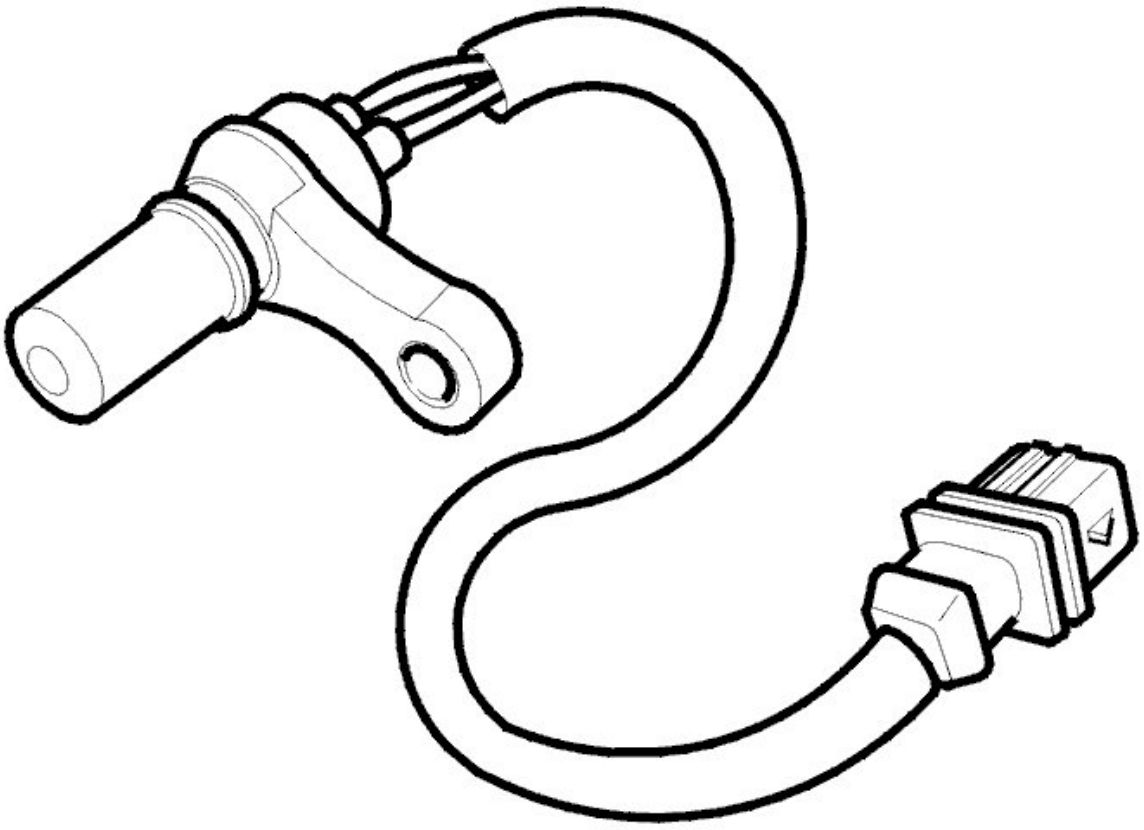
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The automatic transmission control module (TCM) receives speed signals from the ABS control module and from the the speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the speed signal from the ABS system with the transmission speed and the engine speed (RPM) at the transmission. Diagnostic trouble code (DTC)

TCM-0020 is stored if the control module registers that the speed signal from the ABS system does not correspond with the transmission speed or the engine speed (RPM).

Substitute value
- None.

Possible source
- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective speed sensor.

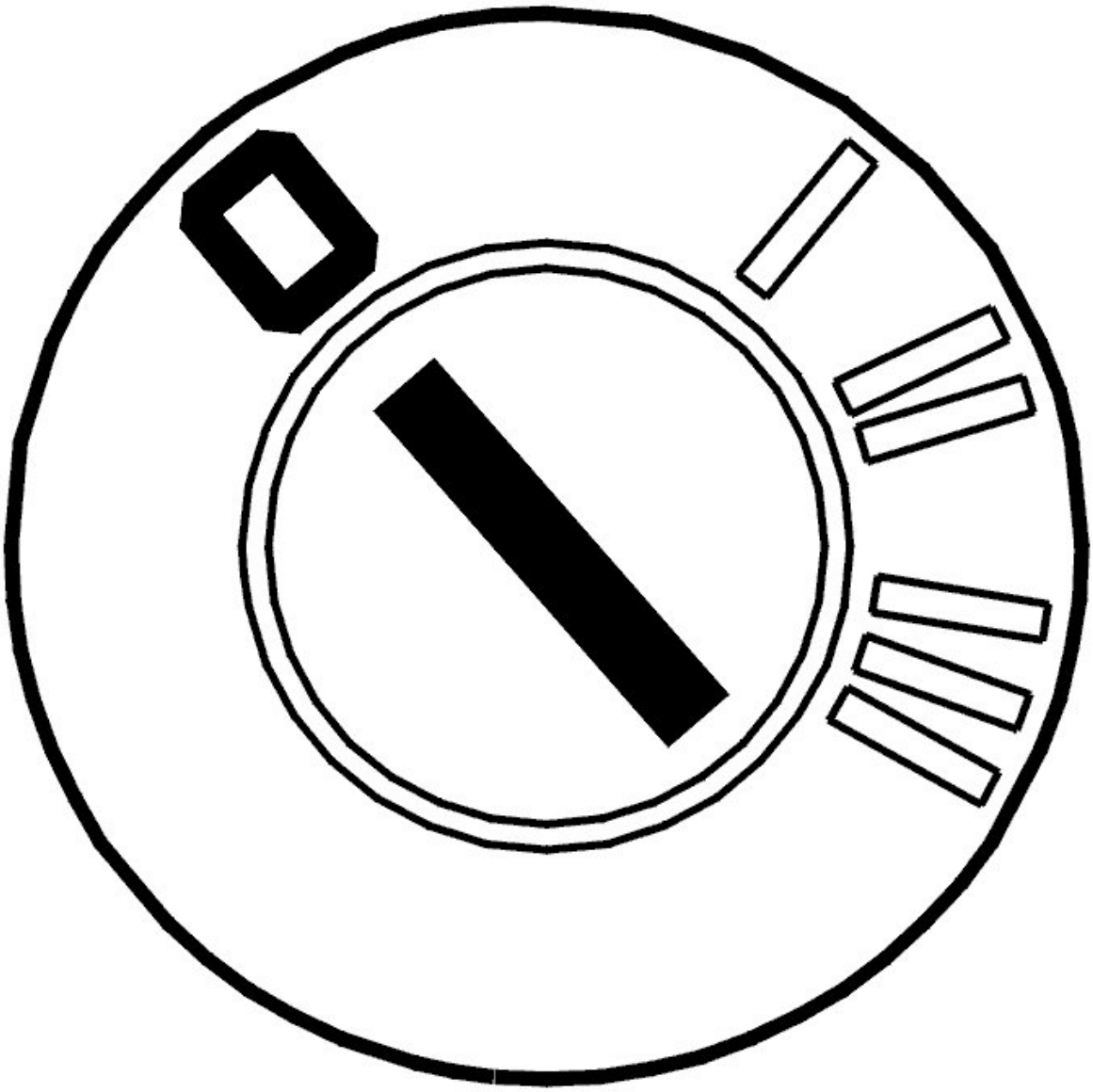
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Faulty Signal. Intermittent Fault

Faulty signal. Intermittent fault

Intermittent fault

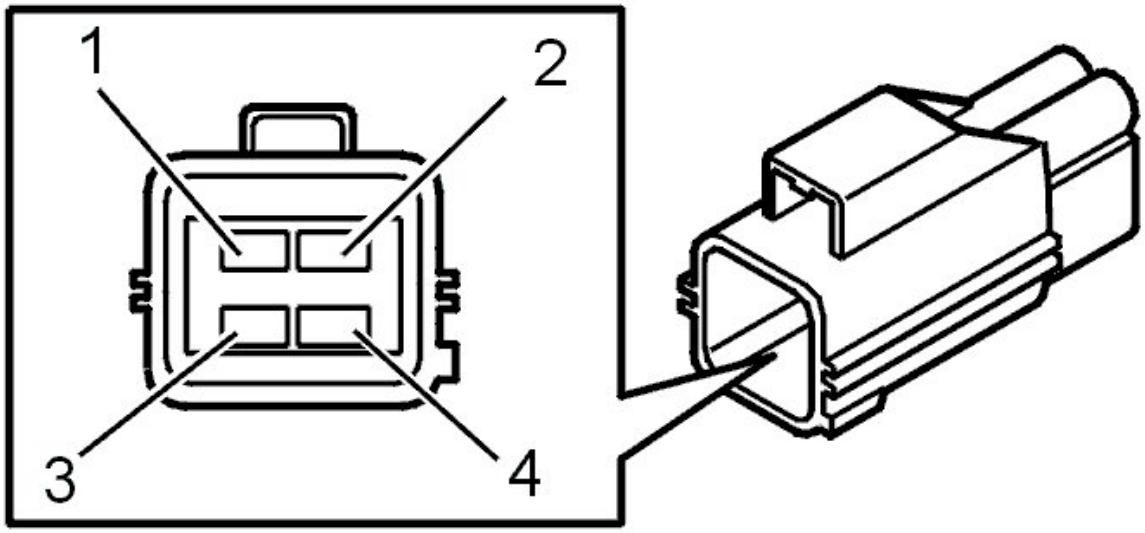


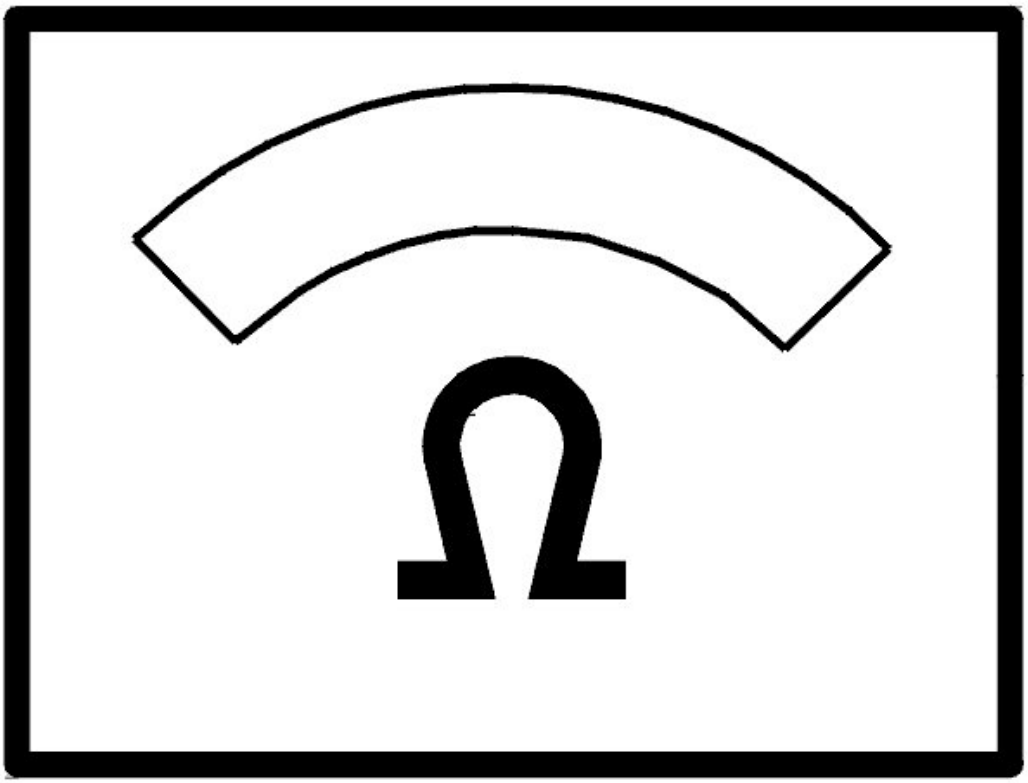
- Ignition off.

Check the control module and transmission output speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between control module terminal #A57 (#A57) and transmission output speed sensor connector terminal #A4. Check the wiring between control module terminal #A39 (#A39) and transmission output speed sensor connector terminal #A3. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

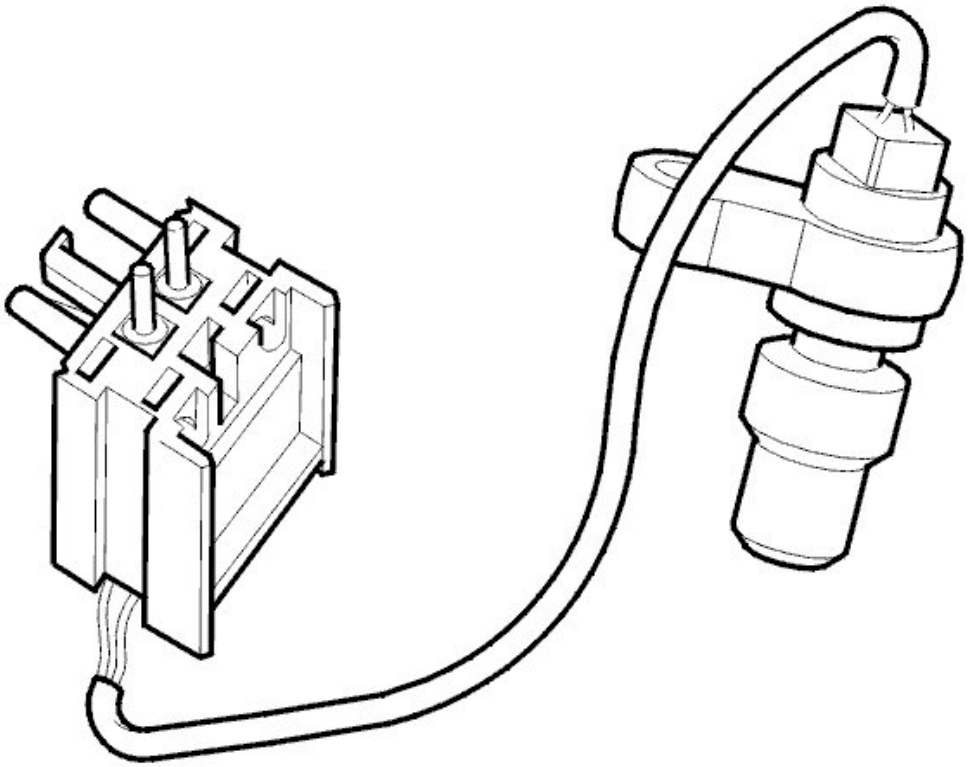
Attempt New Test - Intermittent fault

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, engine speed (RPM) and speed at the transmission. Diagnostic trouble code (DTC) TCM-0023 is stored if the control module registers that the speed (RPM) signal is missing.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in the terminals.
- Open-circuit on power supply.
- Open-circuit in signal cable.
- Defective input speed sensor.

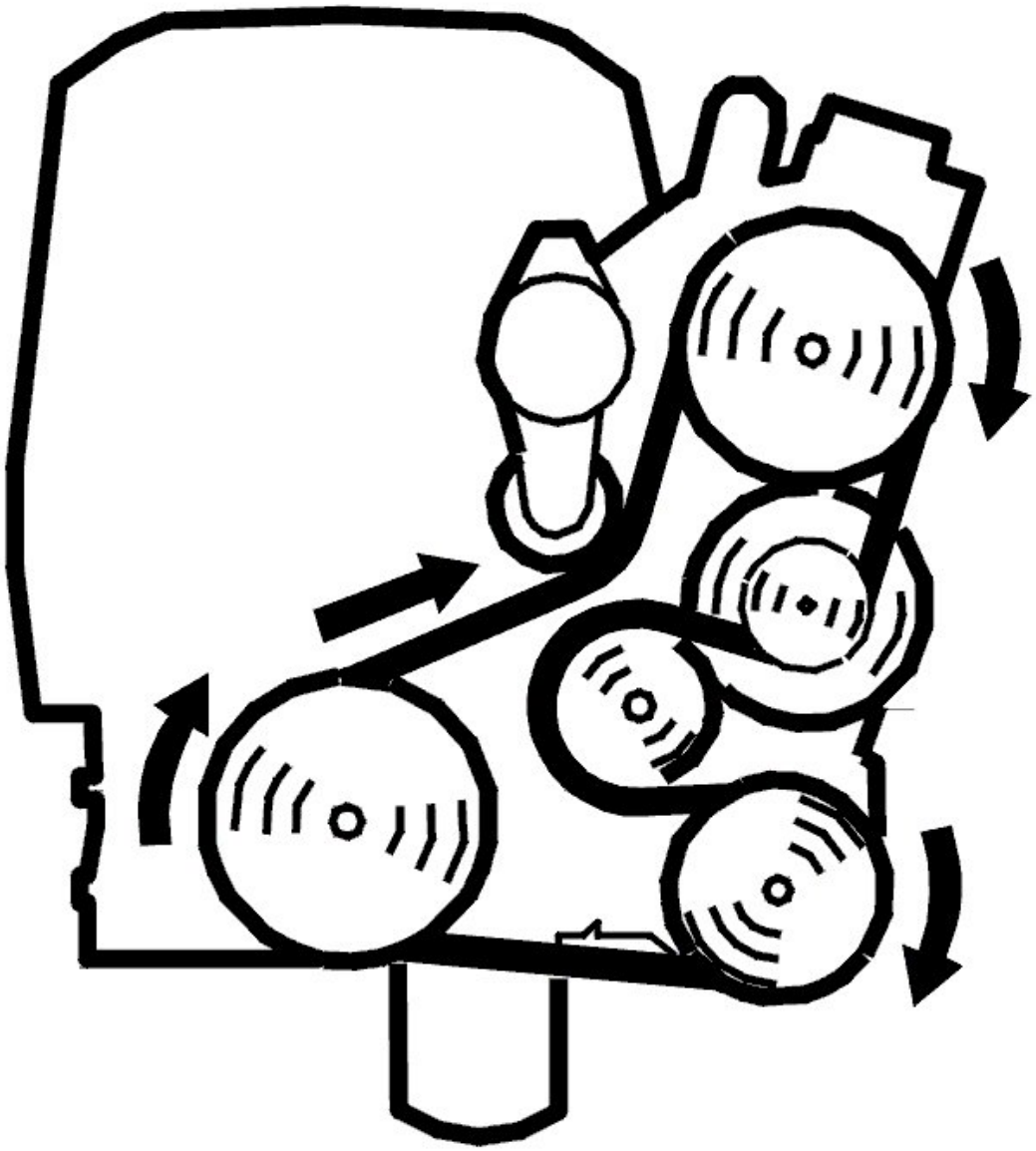
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking the transmission input speed sensor signal



- Gear selector in position P
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

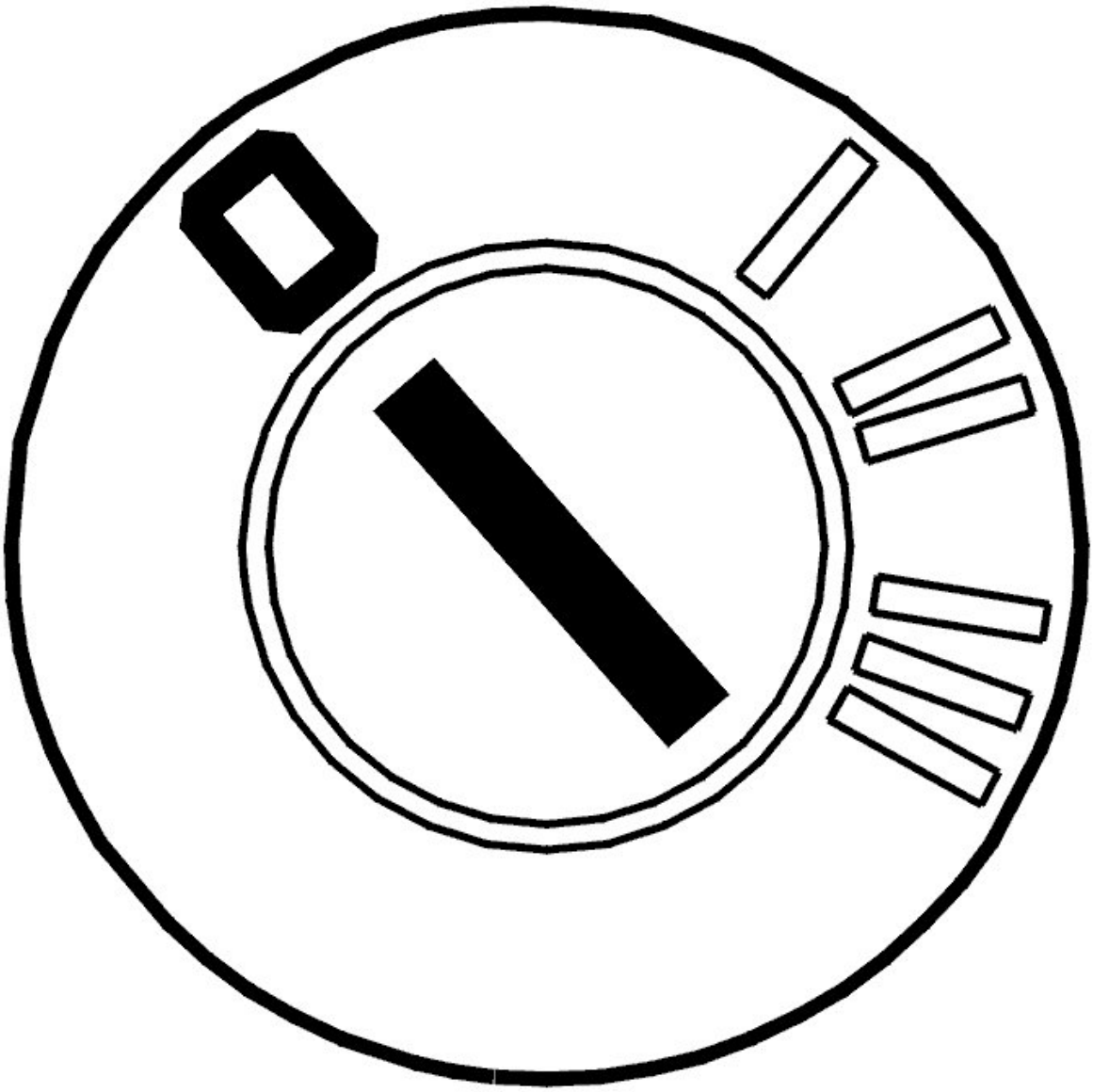
Check that the transmission speed is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - No Fault Found

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off.

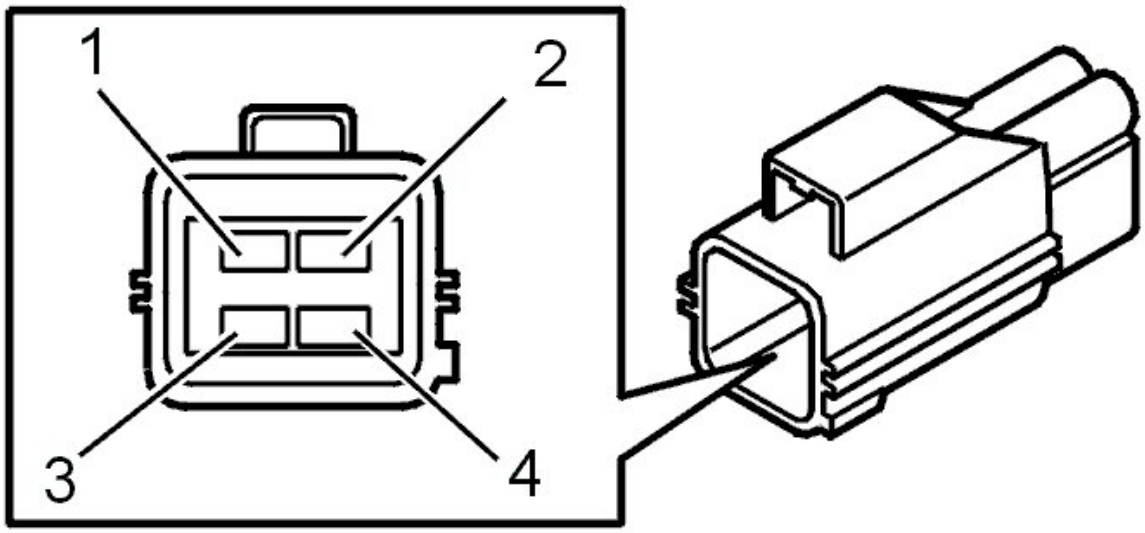
Check the transmission connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the power supply cable between transmission control module (TCM) terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the signal cable between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

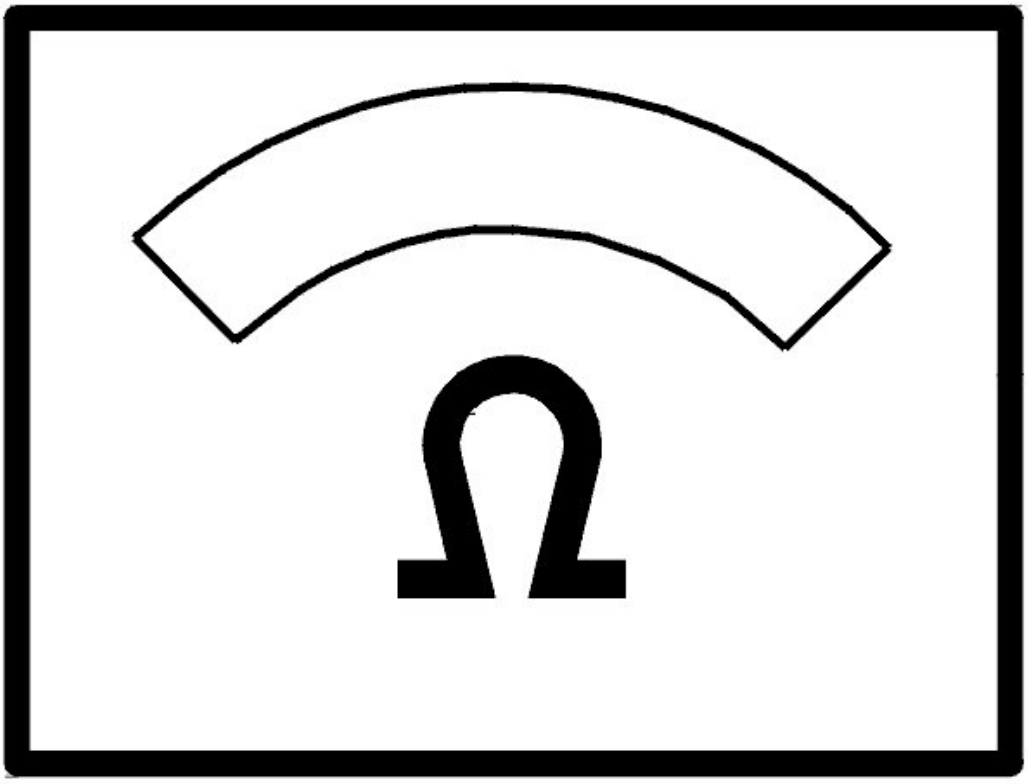
Hint: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A1 and #A2 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the transmission speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



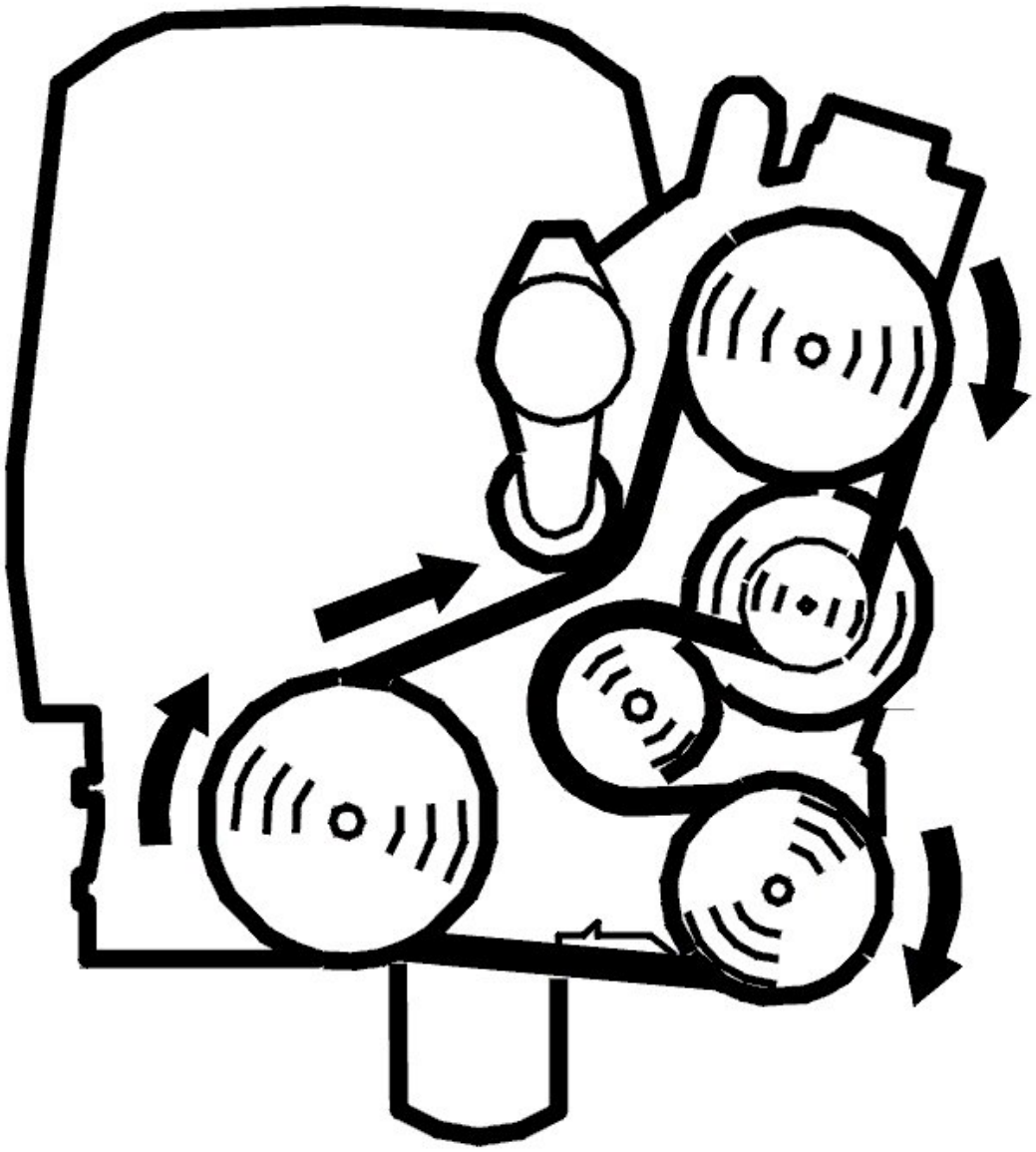


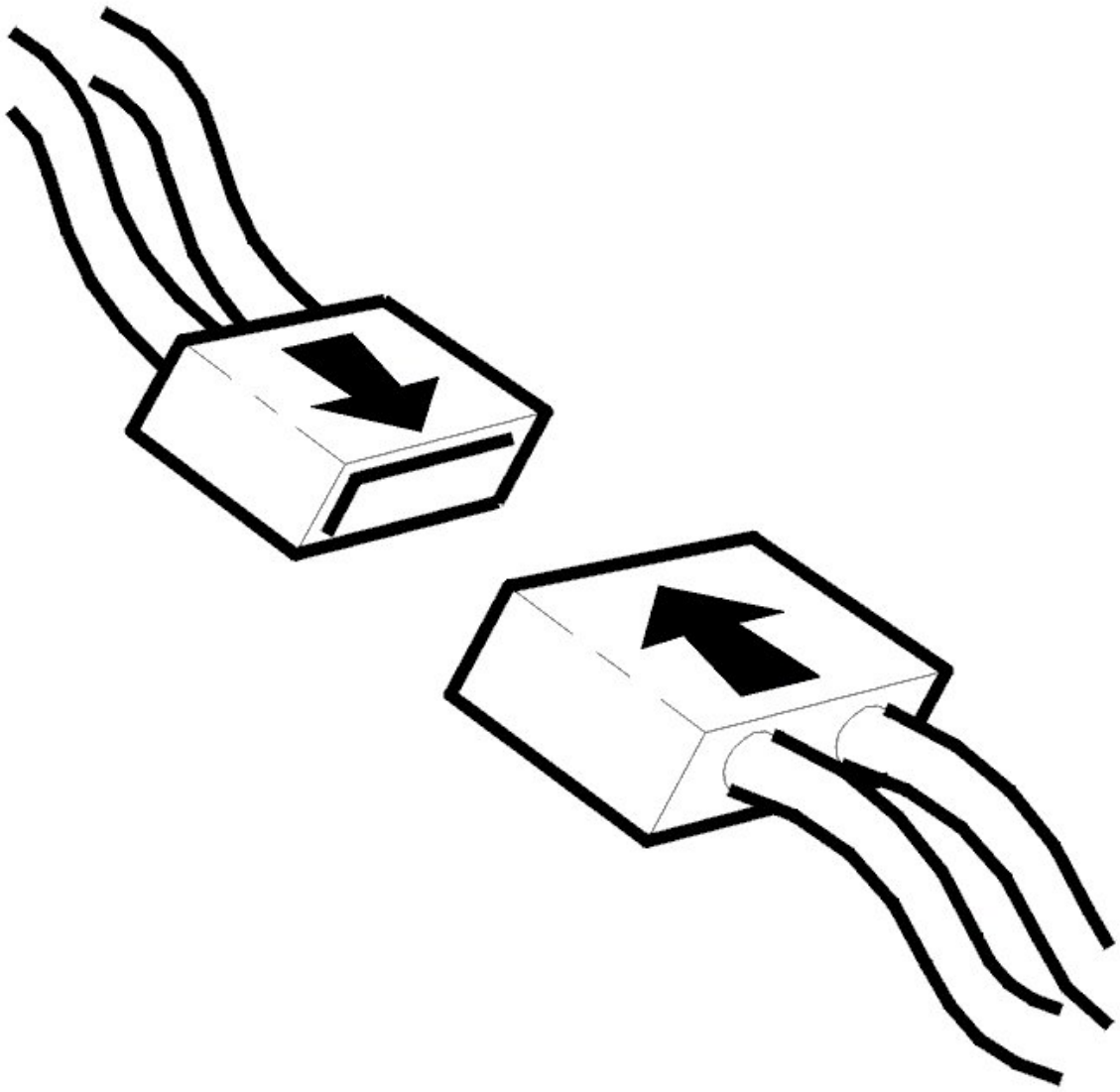
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission input speed sensor signal

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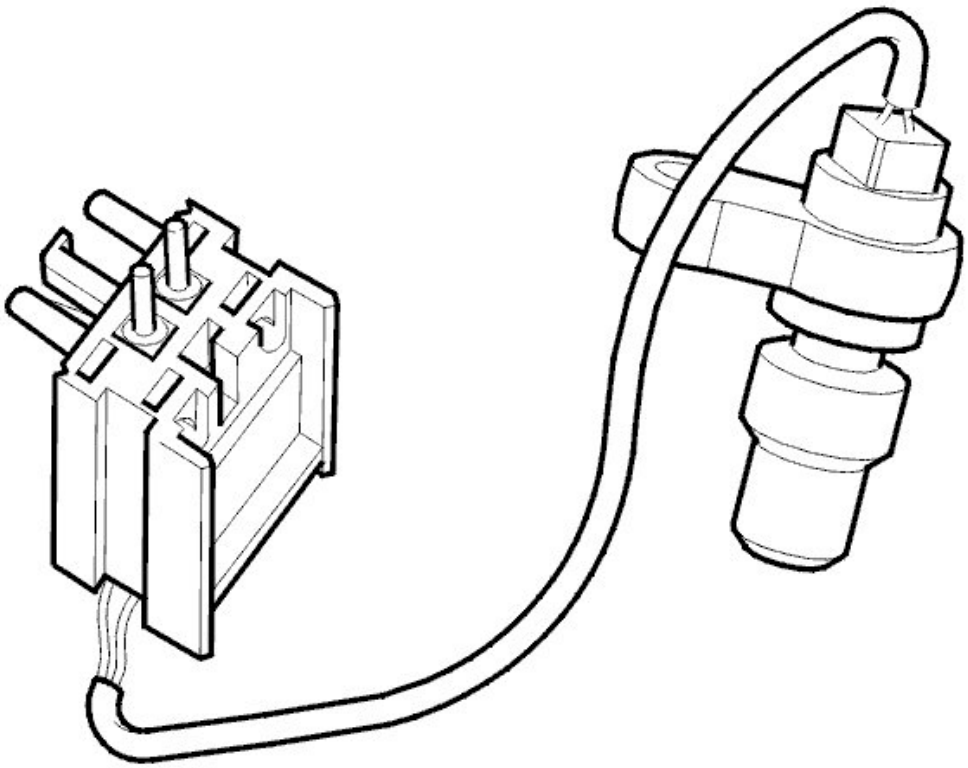
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, engine speed (RPM) and speed at the transmission. Diagnostic trouble code (DTC) TCM-0023 is stored if the control module registers that the speed (RPM) signal is missing.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in the terminals.
- Open-circuit on power supply.
- Open-circuit in signal cable.
- Defective input speed sensor.

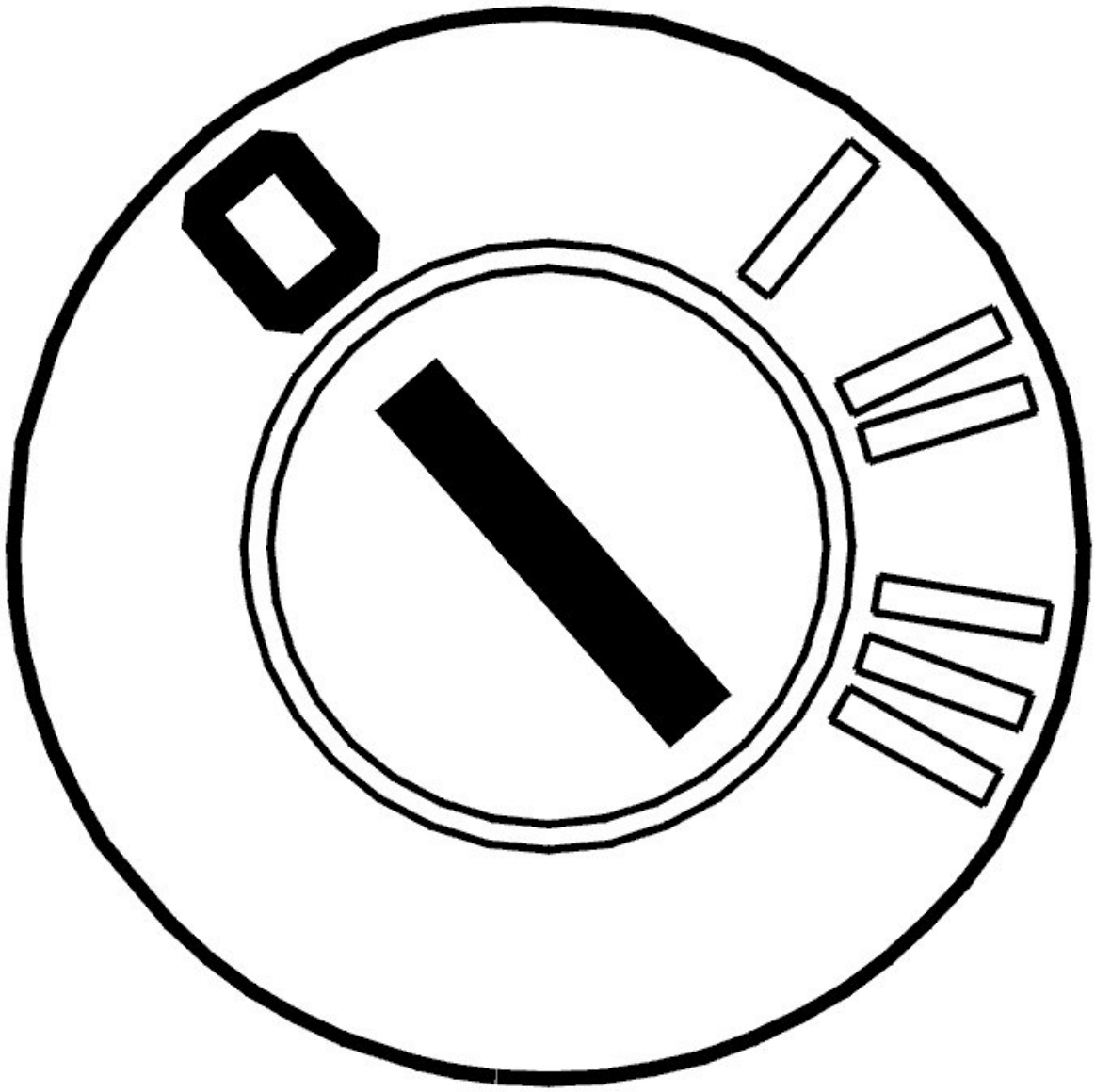
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Intermittent fault



- Ignition off.

Check the transmission connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the power supply cable between transmission control module (TCM) terminal #A59 (#A59) and transmission connector terminal #A2.
Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

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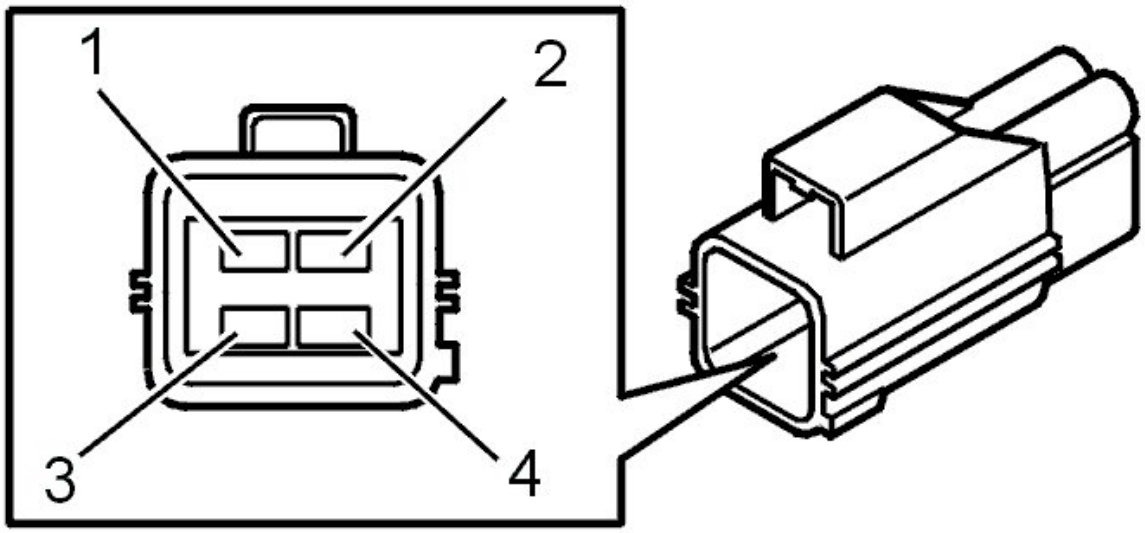
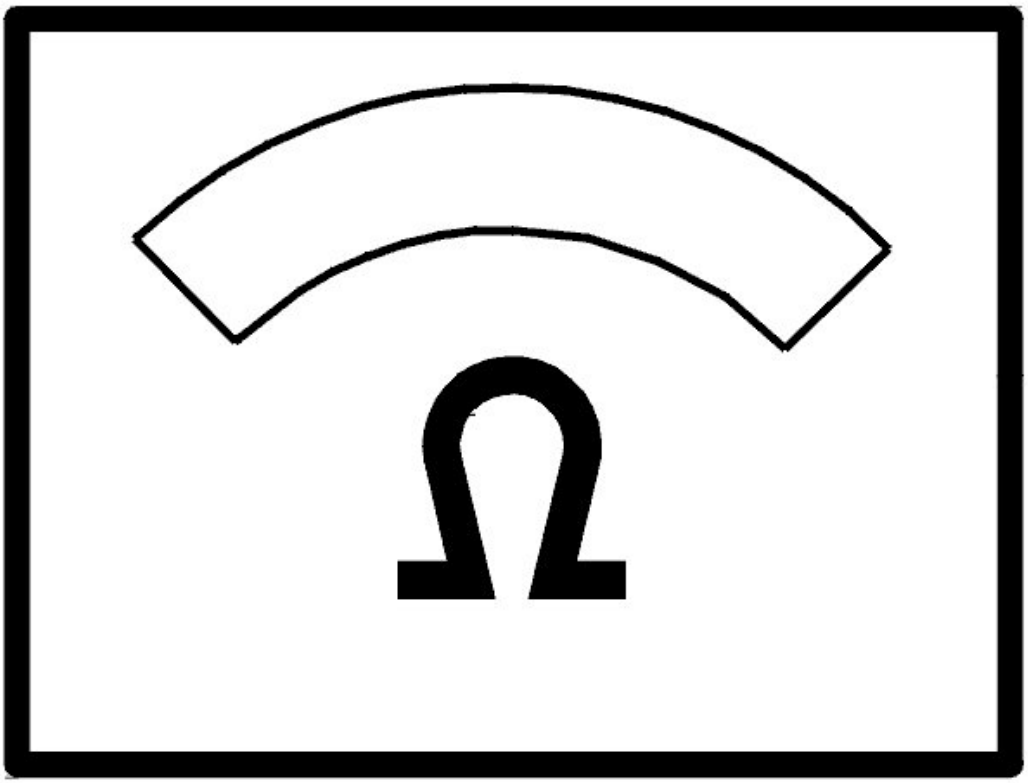
Check the signal cable between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

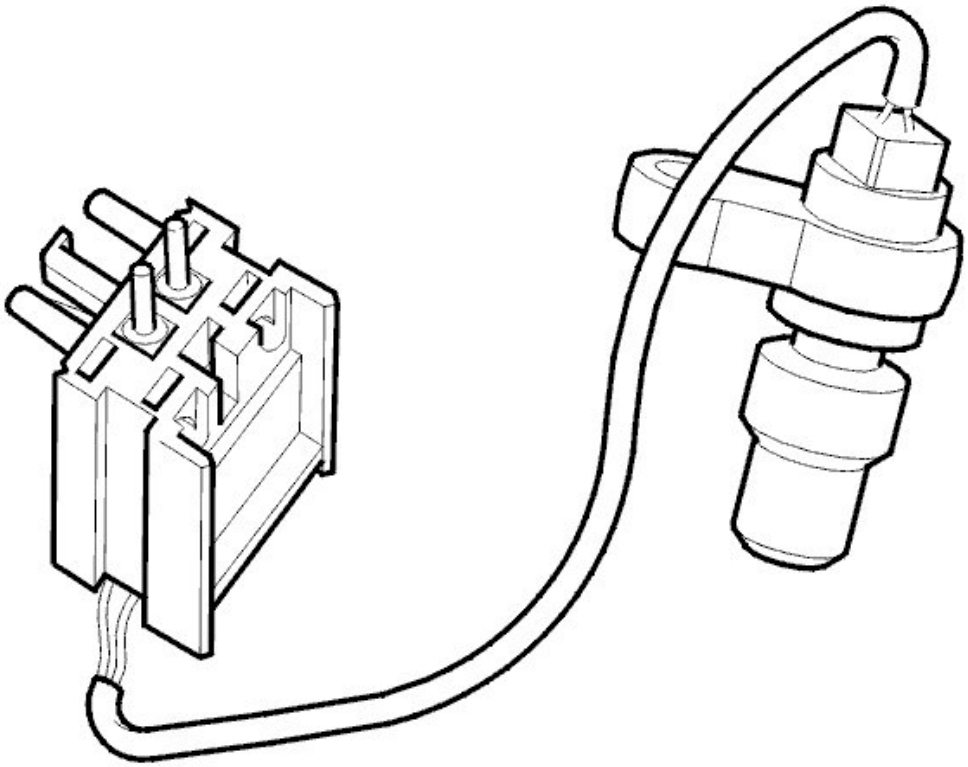
Attempt New Test - Intermittent fault

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and the vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, the engine speed (RPM) and the speed at the transmission. Diagnostic trouble code (DTC) TCM-0024 is stored if the control module registers a faulty signal when vehicle speed is above approximately 25 km/h.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective engine speed (RPM) sensor.

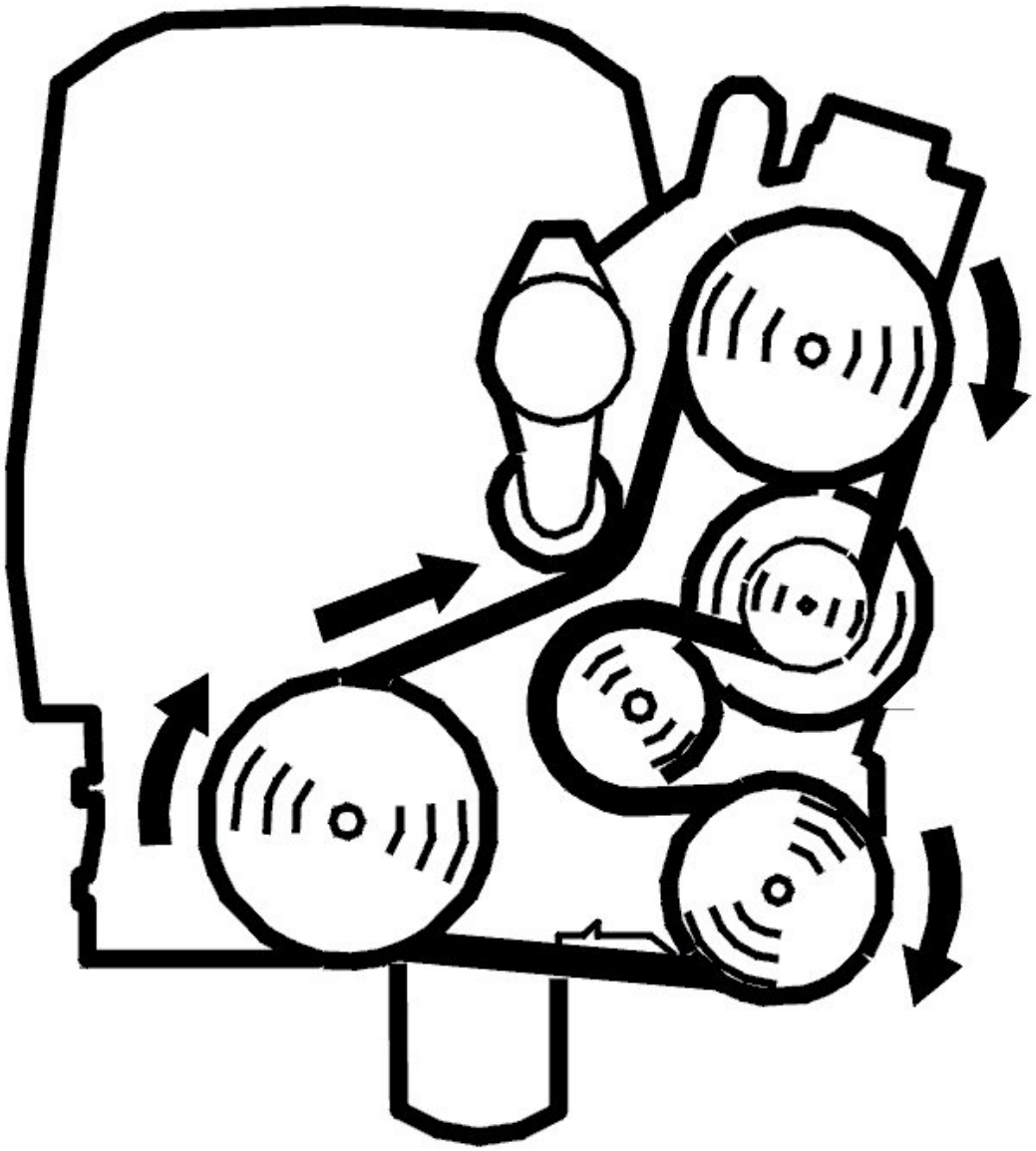
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

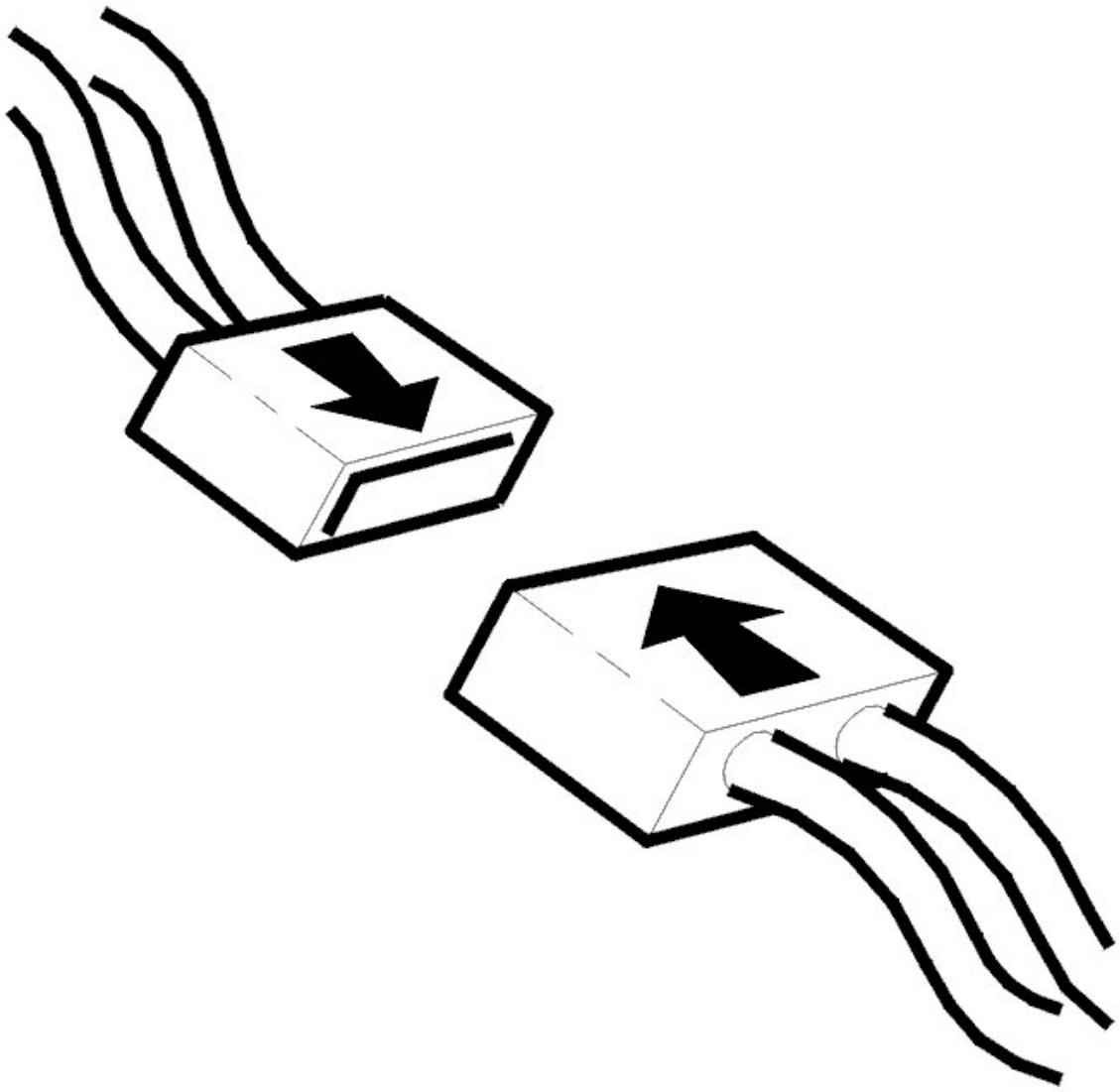
Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Faulty Signal. Permanent Fault

Faulty signal. Permanent fault

Checking the transmission input speed sensor signal





- Ignition off
- Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Gear selector in position P
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

Check that the transmission input speed is updated.
Compare with the engine speed (RPM).
If the transmission speed increases, the cause of the fault was loose connections in the control module or transmission speed sensor connectors.

Other information:

- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the automatic transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

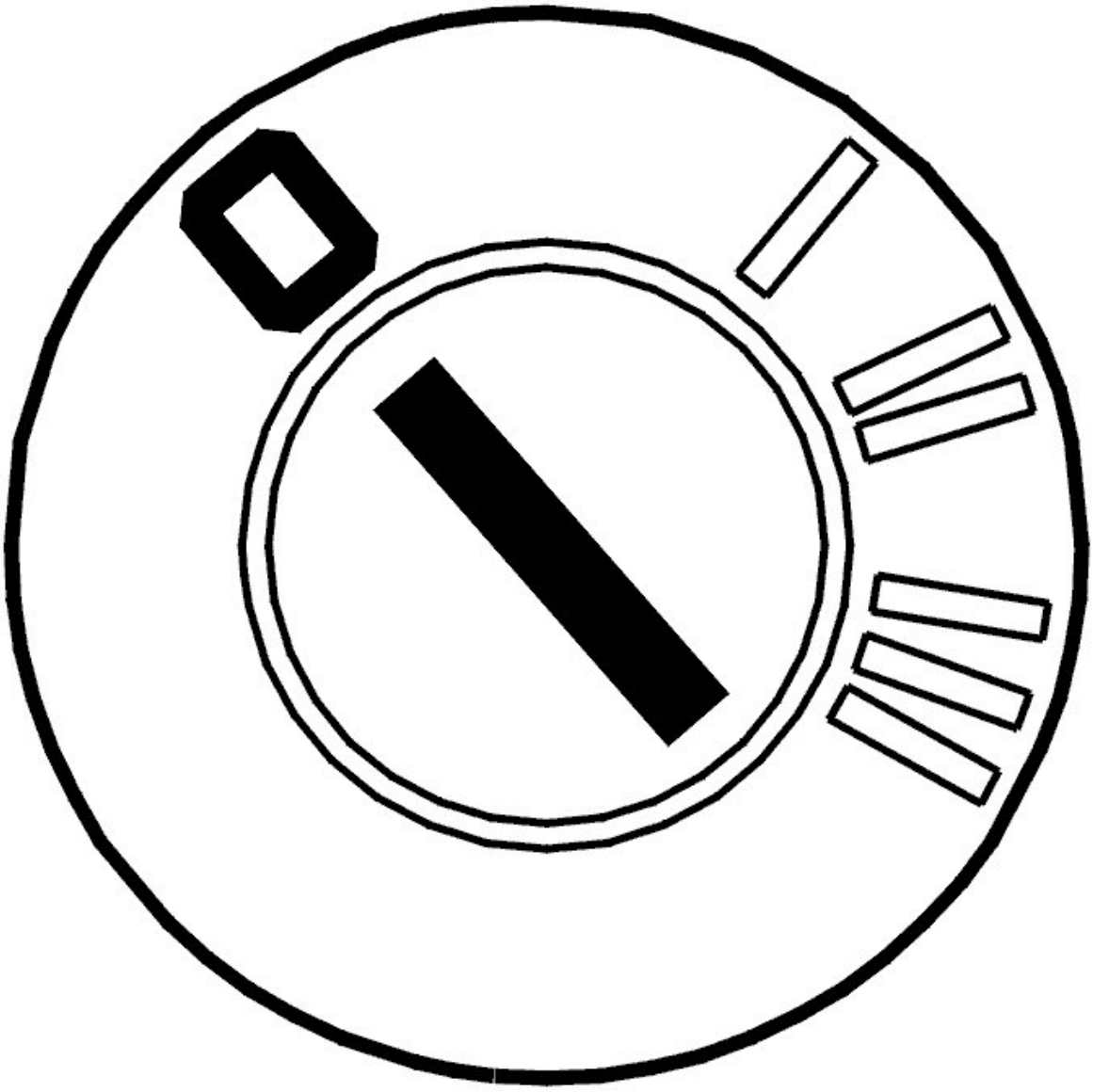
Does the transmission input speed increase with engine speed (RPM)?

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - Fault Found

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable for the transmission input speed sensor between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

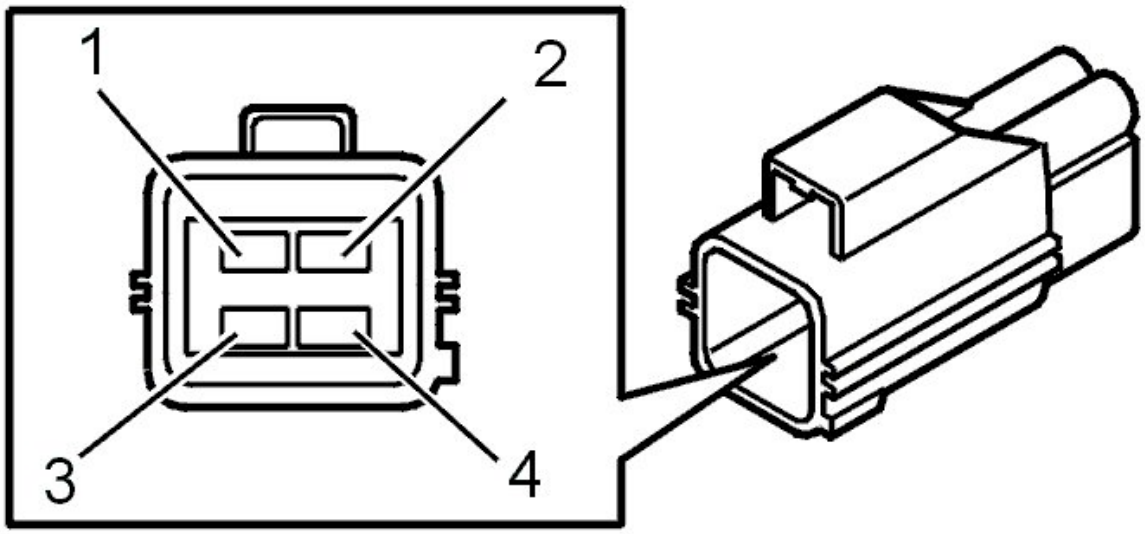
Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

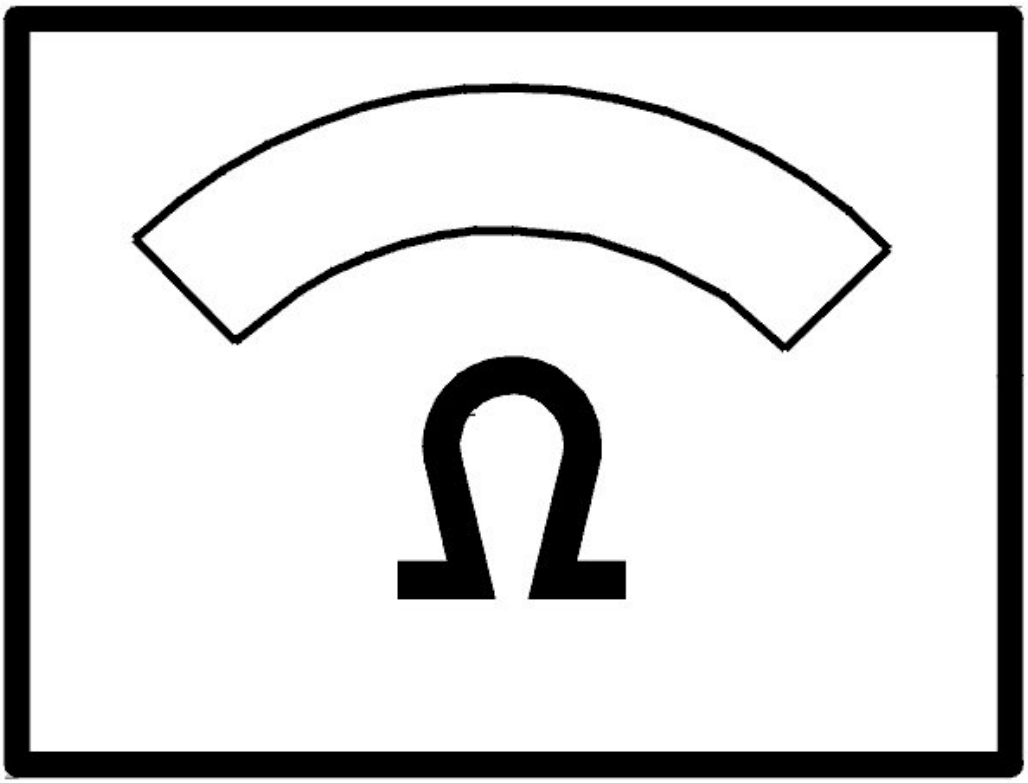
Hint: With the control module connected and the ignition on, the voltage between transmission output speed sensor connector terminals #A1 and #A2 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the automatic transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the transmission input speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Was a fault detected?

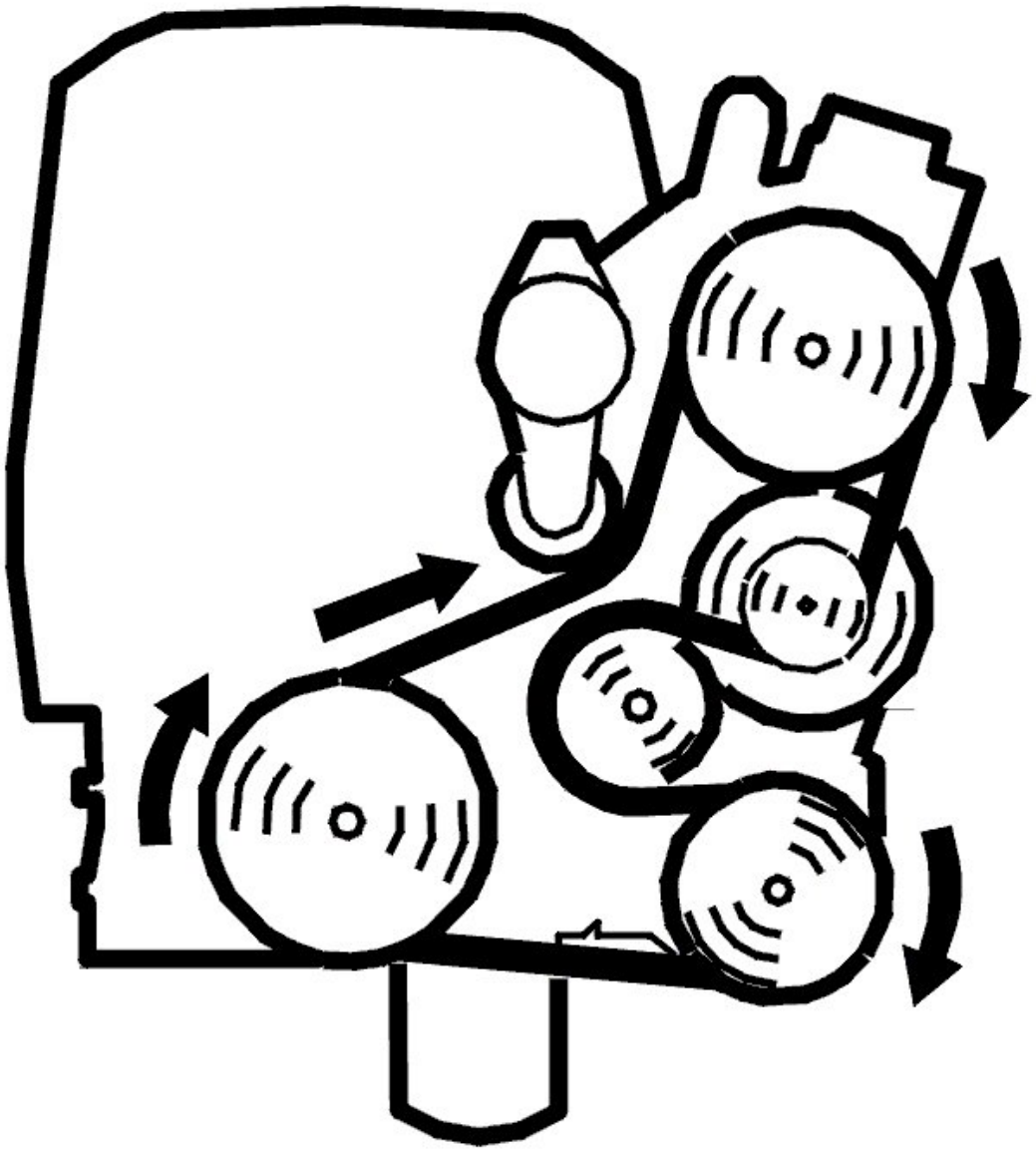
Yes - Verification

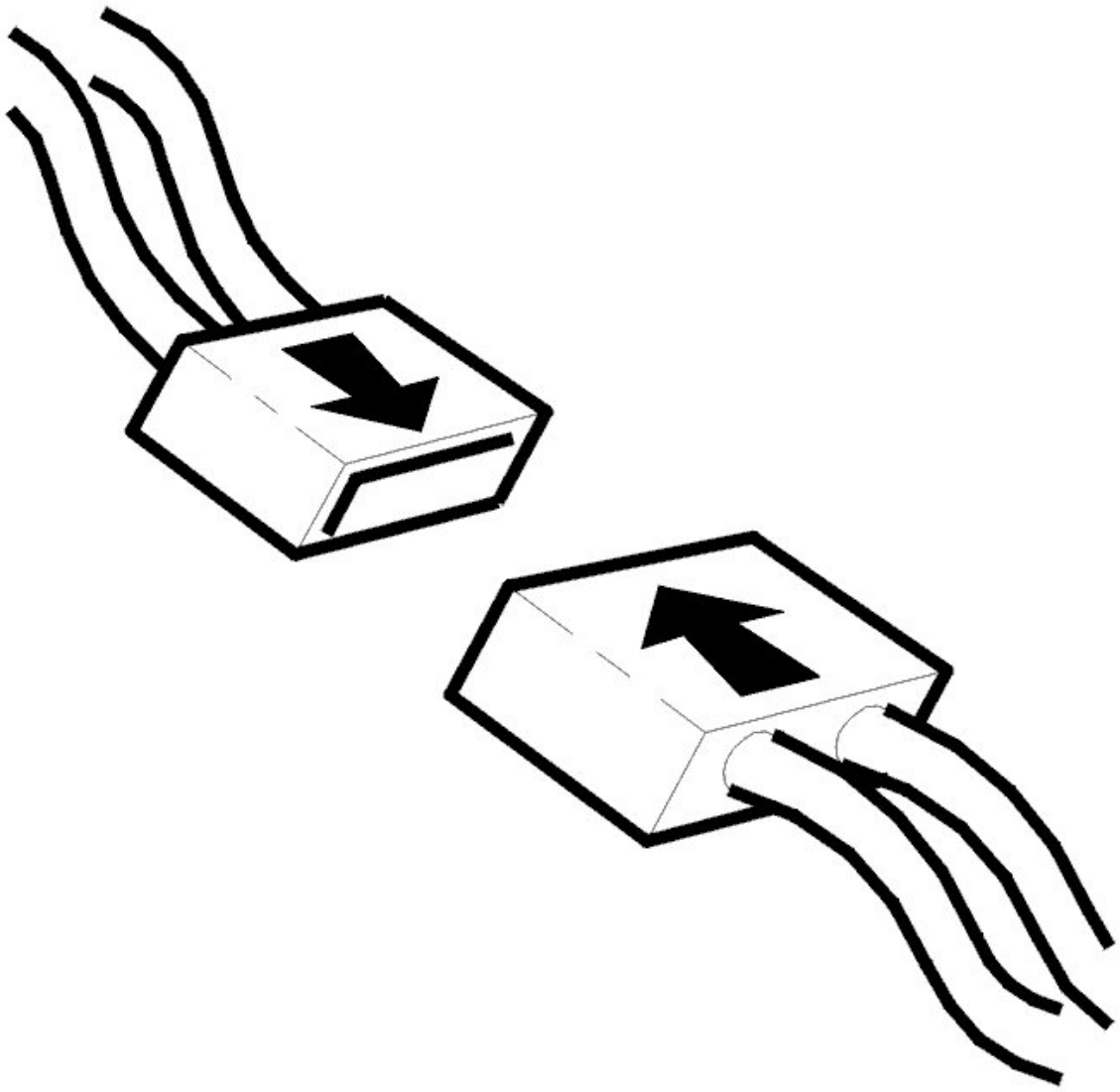
No - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission input speed sensor signal

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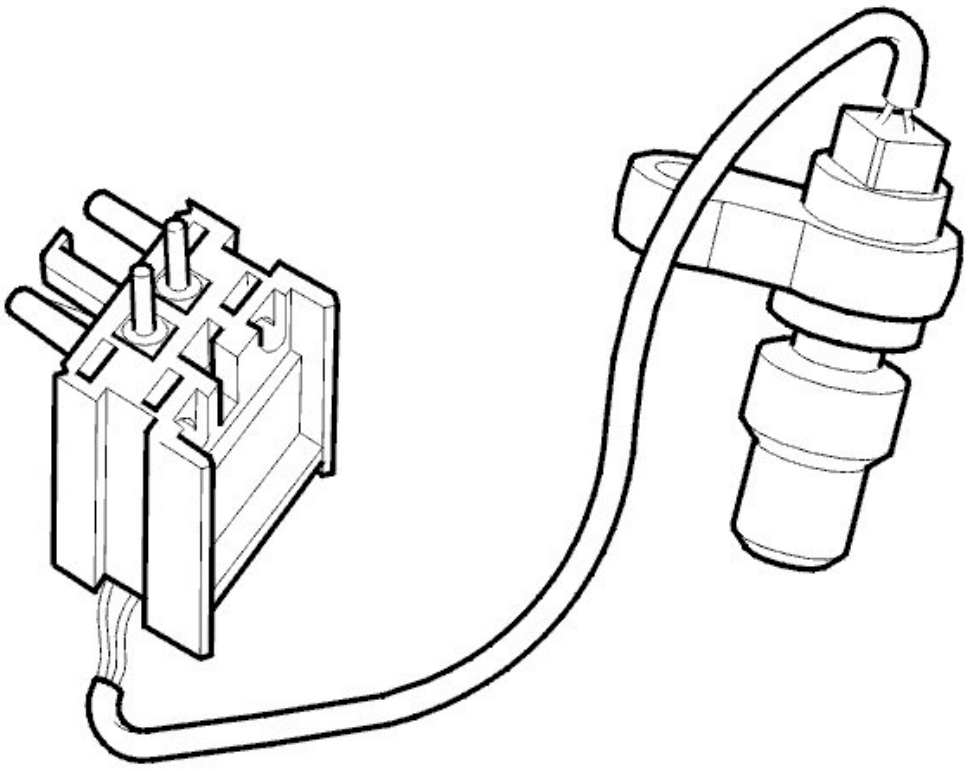
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed and the vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The control module calculates and compares the transmission speed, the engine speed (RPM) and the speed at the transmission. Diagnostic trouble code (DTC) TCM-0024 is stored if the control module registers a faulty signal when vehicle speed is above approximately 25 km/h.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in the terminals.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the power supply.
- Open-circuit, short-circuit to ground or short-circuit to supply voltage in the signal cable.
- Defective engine speed (RPM) sensor.

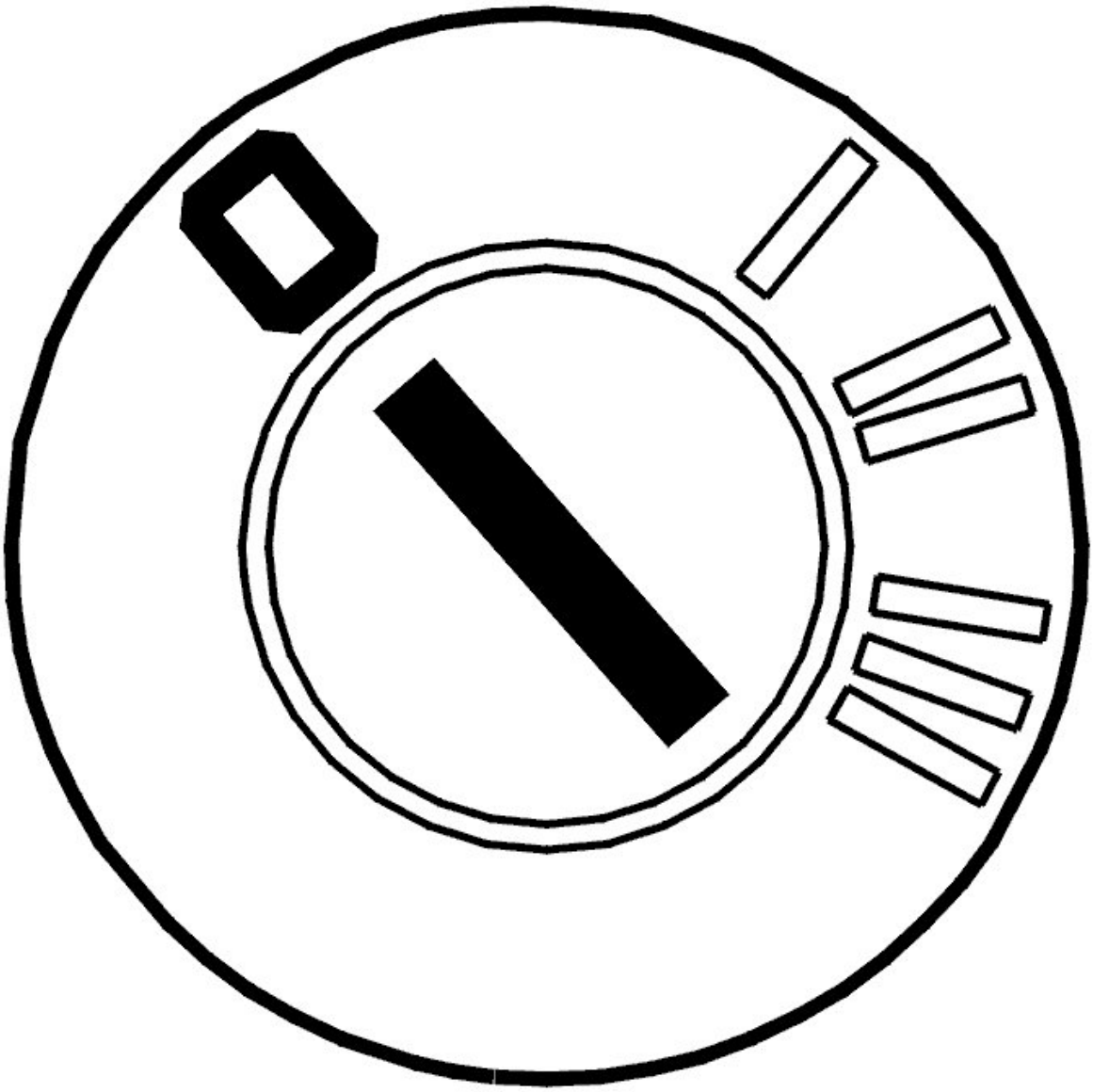
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Faulty Signal. Intermittent Fault

Faulty signal. Intermittent fault

Intermittent fault



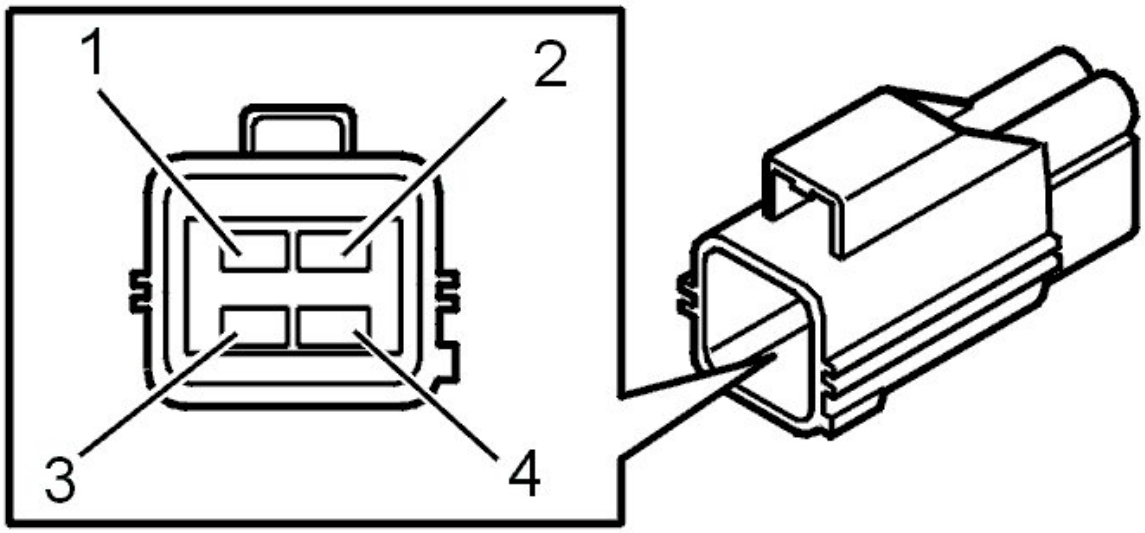
- Ignition off.

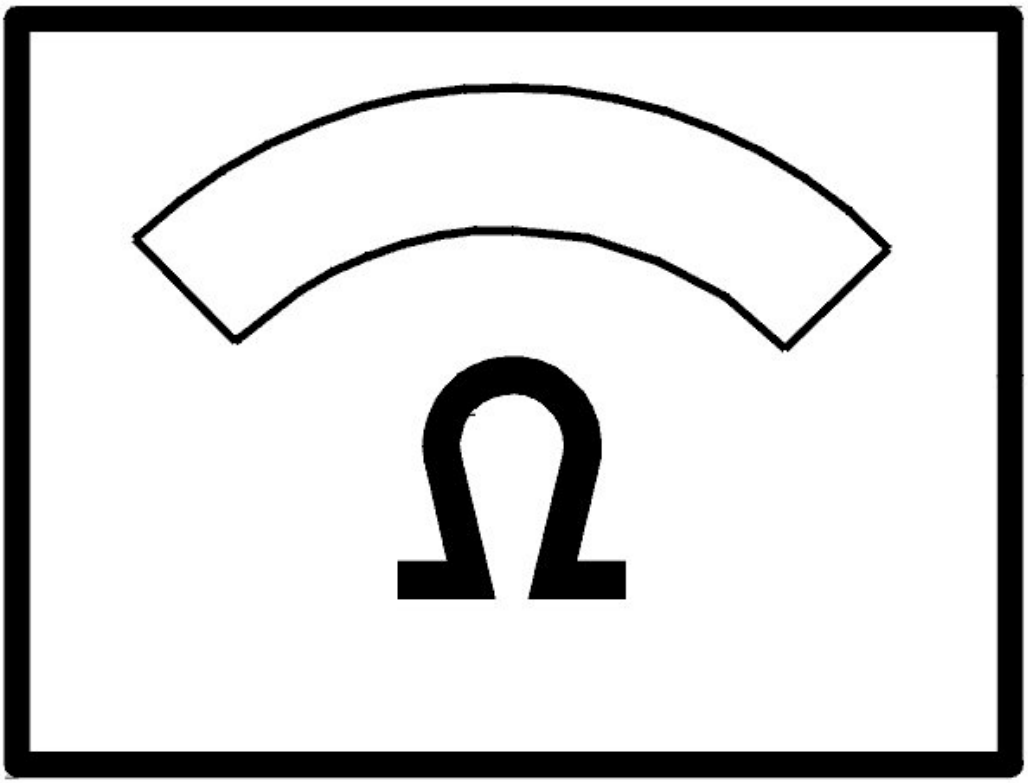
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between transmission control module (TCM) terminal #A41 (#A41) and transmission connector terminal #A1. Check the wiring between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent open-circuit according to

Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the automatic transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Intermittent fault

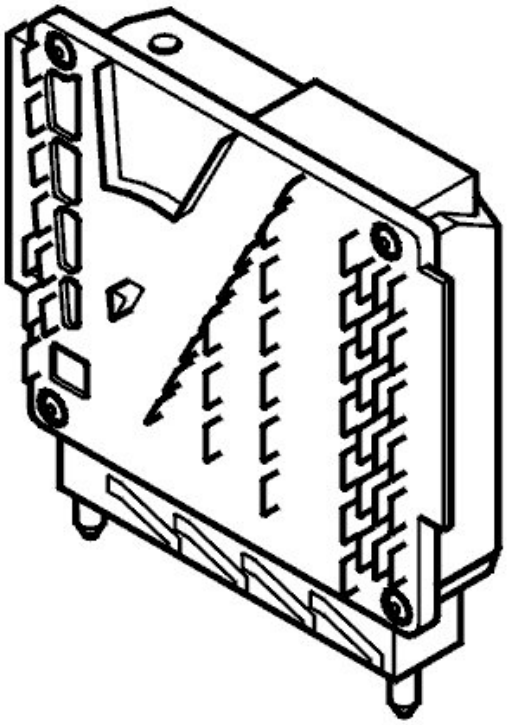
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0027 is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C and throttle opening exceeds 3 %.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

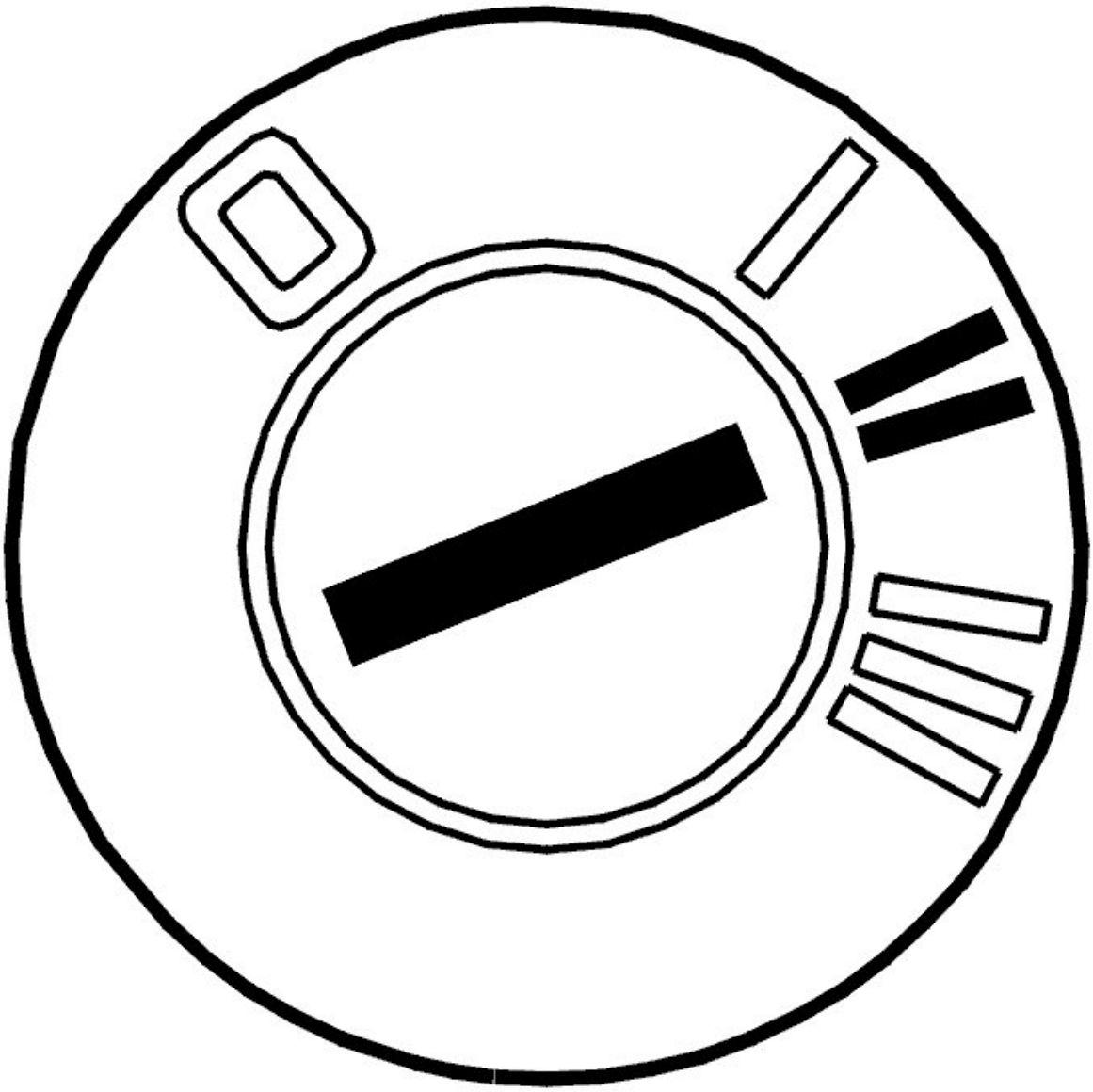
Possible source
- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S4 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- No shifting.
- Harsh gear shifting.

Incorrect Gear Ratio

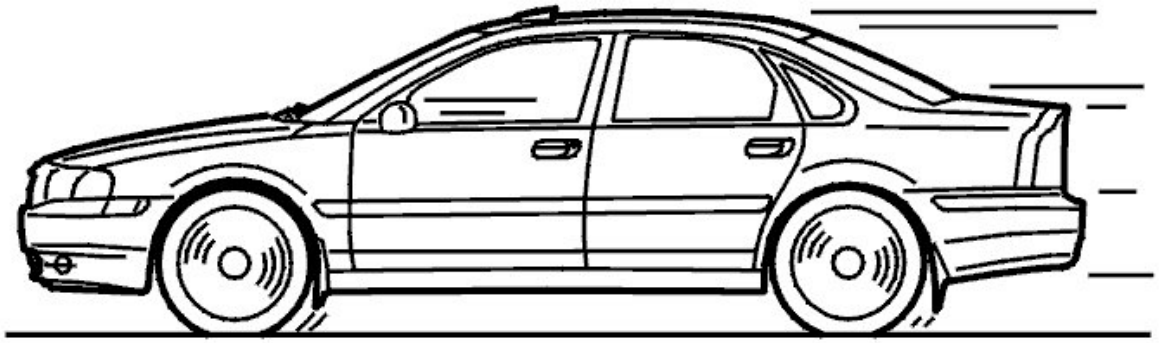
Incorrect gear ratio

Checking for contact resistance and oxidation



- Ignition off
- Check the transmission control module (TCM), transmission output speed sensor and transmission connectors. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.
When test driving, the oil temperature must be above 20°C. Check for transmission malfunction. Listen for mechanical noise from the transmission.



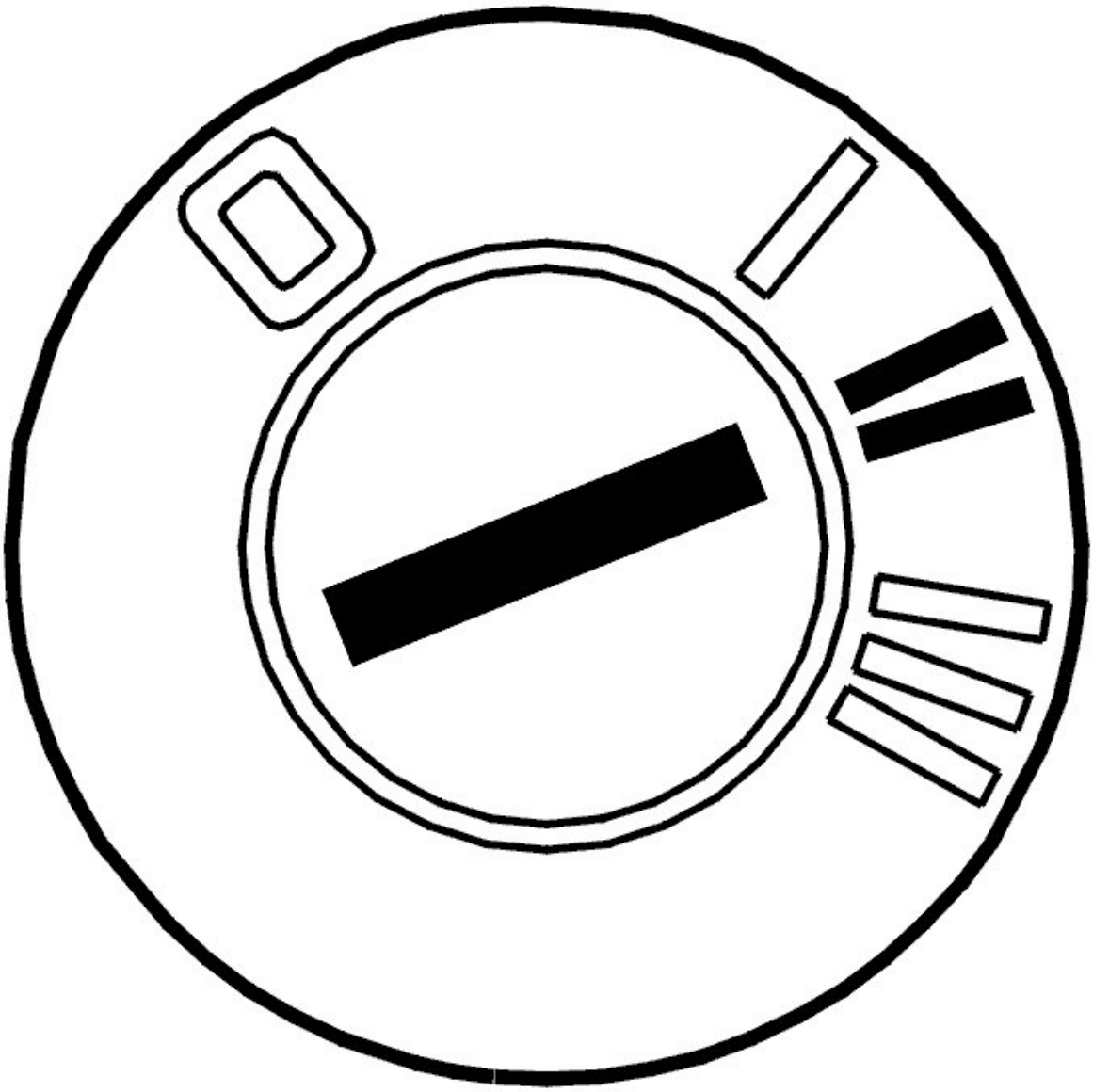
Is the function of the transmission OK?

Yes - Checking the oil quality and the oil level in the transmission

No - Replacing the transmission

Checking the oil quality and the oil level in the transmission

Note! Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.



- Ignition on
- Read off the oil temperature.

Check the oil level. If the oil level is low check for leakage. Top up with oil.
Check the quality of the oil.
Replace the transmission fluid if the fluid smells burnt.
Check the transmission fluid for metal swarf. Take a sample using the dip stick.
Replace the transmission if the transmission fluid contains metal swarf.

Other information:

- To replace the transmission fluid, see Transmission fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing
- To check the level, see Oil level, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Transmission Oil Level - Checking
- To check the quality of the transmission fluid, see the relevant service procedure.

Select an alternative below:

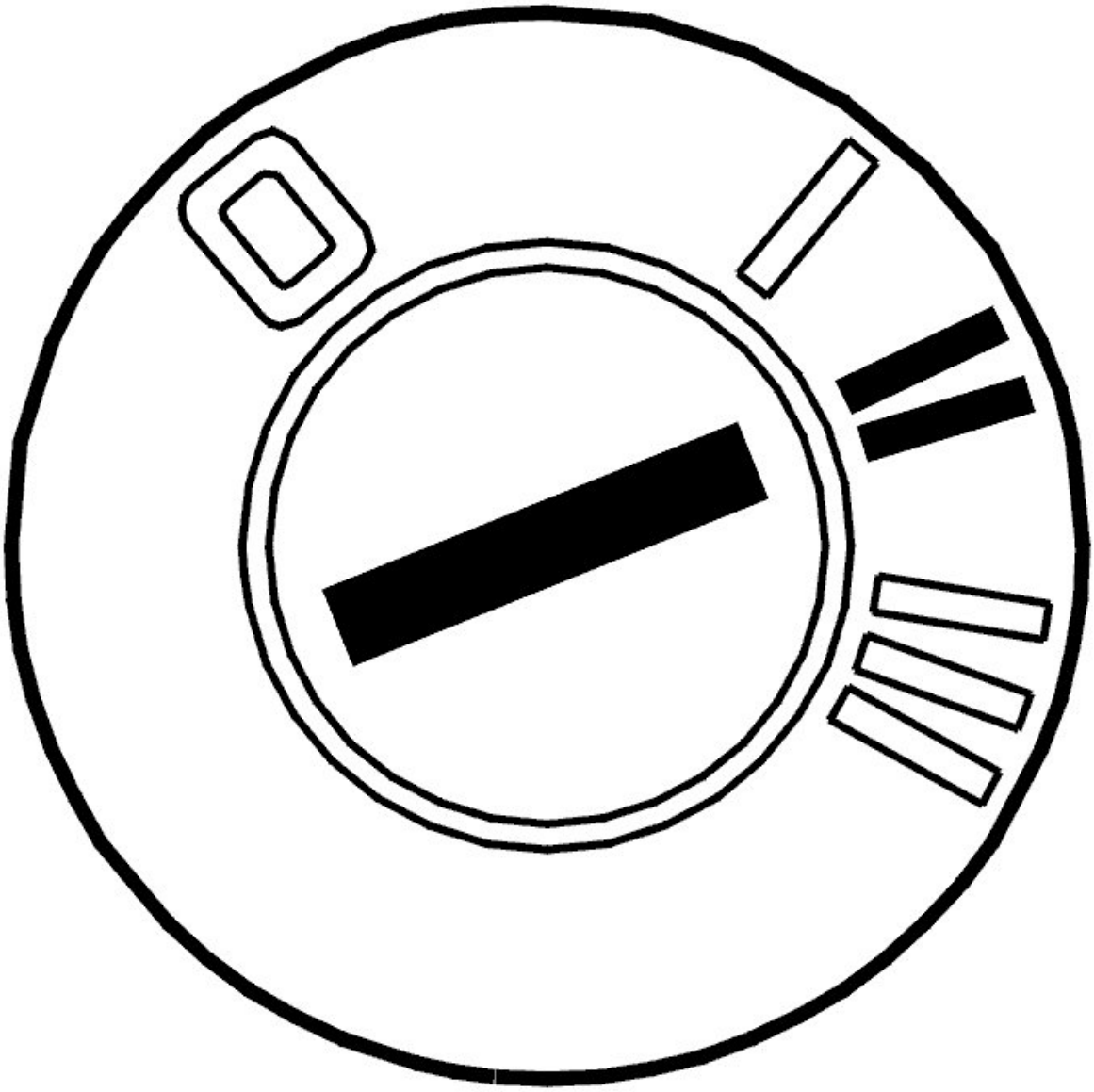
1. No fault detected
2. Transmission fluid replaced, the level was low or quality was poor
3. The transmission fluid contains metal swarf.

1 - Checking the adjustment of the gear-shift position sensor

2 - Resetting the oil quality counter

3 - Replacing the transmission

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear-shift position sensor.

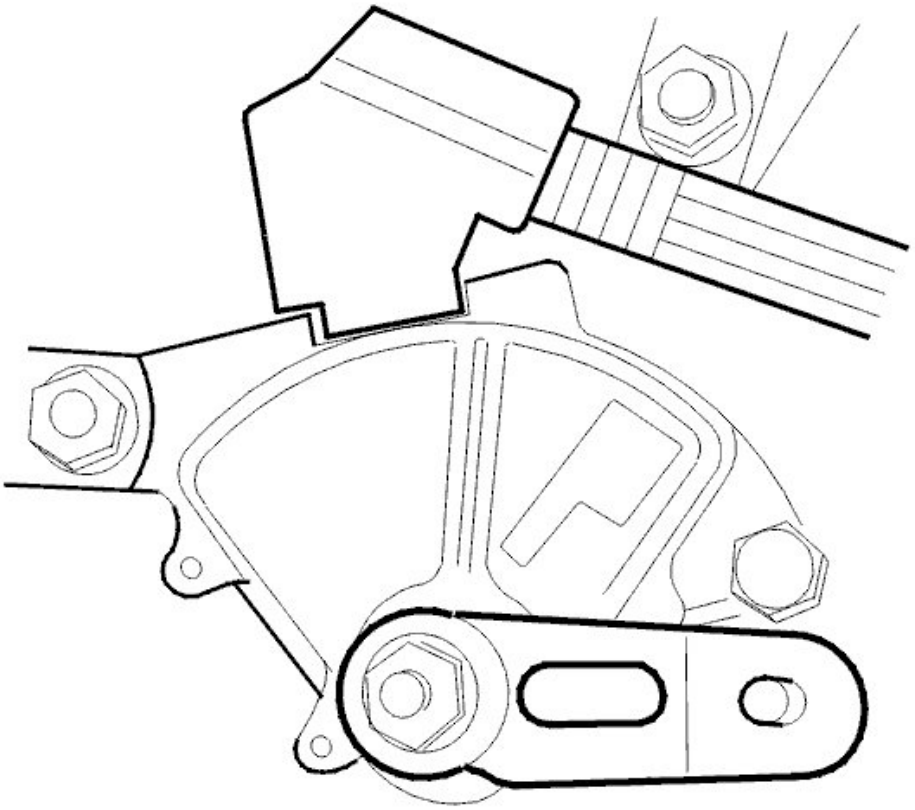
Move the gear selector around the different gear positions a number of times. Check that the gear position is updated. The selected position must be the same as that displayed in VIDA. If the display shows an undefined position (OR for example) the transmission cable needs adjusting.

Note! An undefined position may be displayed between the fixed gear positions. This is not a fault.

Remedy as necessary.

Other information

- To adjust the mechanical transmission cable, see the relevant service procedure.



Is the gear-shift position sensor incorrectly adjusted?

Yes - Verification

No - Checking the transmission output speed sensor signal

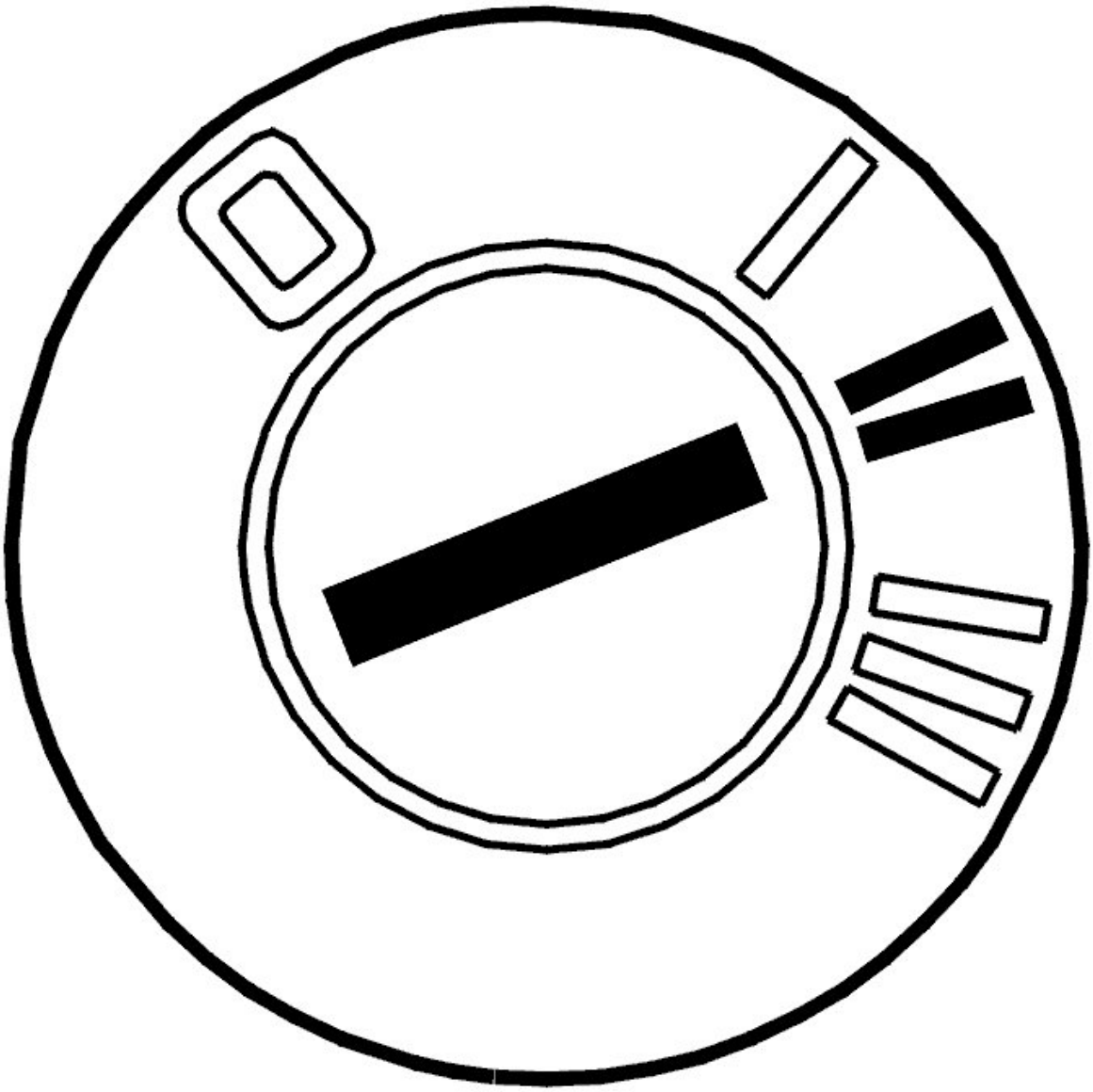
Resetting the oil quality counter

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



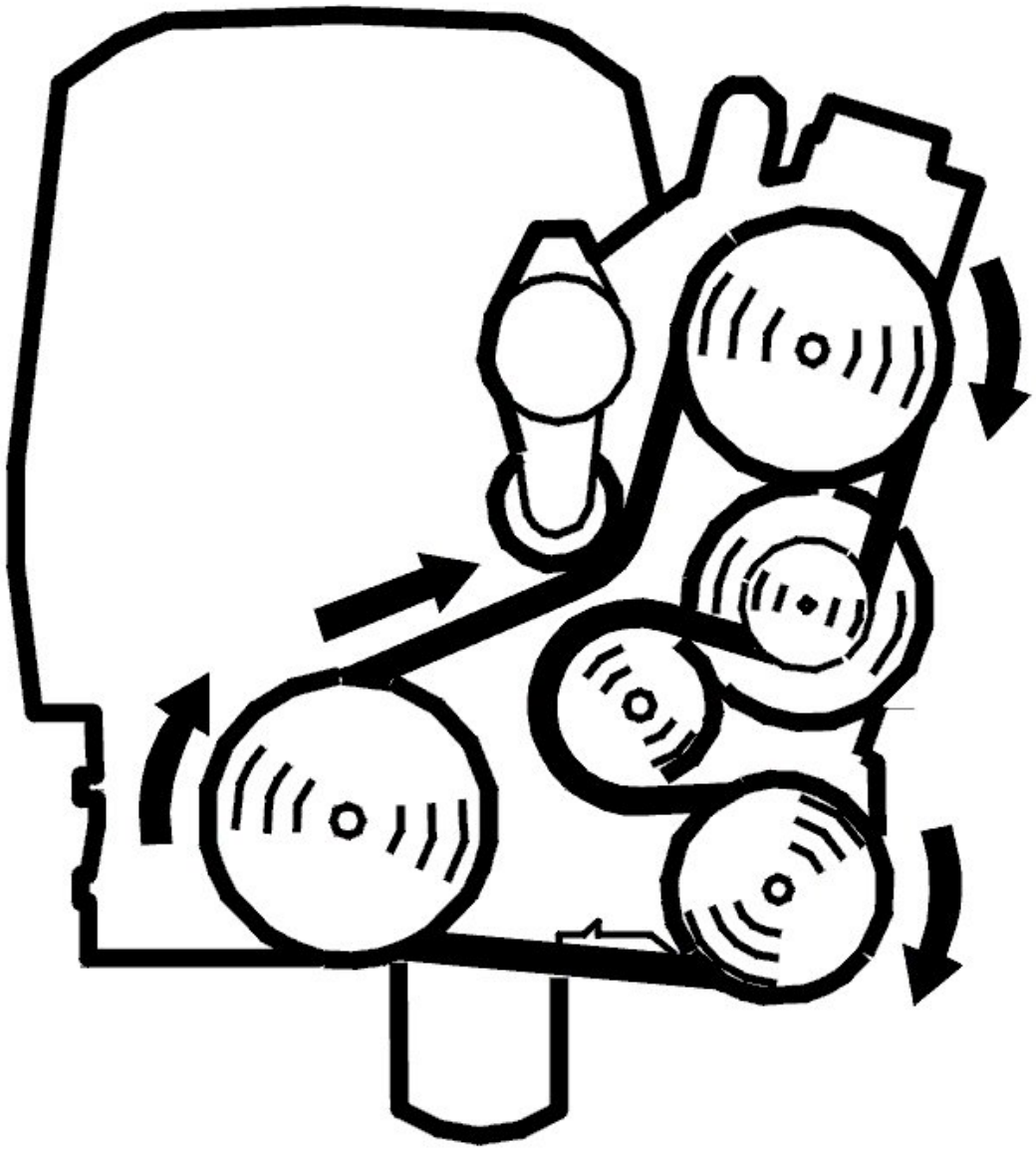
- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

Continue - **DONE**

DONE - Verification

Checking the transmission output speed sensor signal



- Ignition off
- Raise the car so that the drive wheels can rotate freely
- Start the engine and let it run at idle speed
- Gear selector in position D
- Read off the transmission output speed signal.

Check that the speed increases with engine speed (RPM).

Note! A diagnostic trouble code (DTC) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) in the ABS system after completing fault-tracing.

Other information:

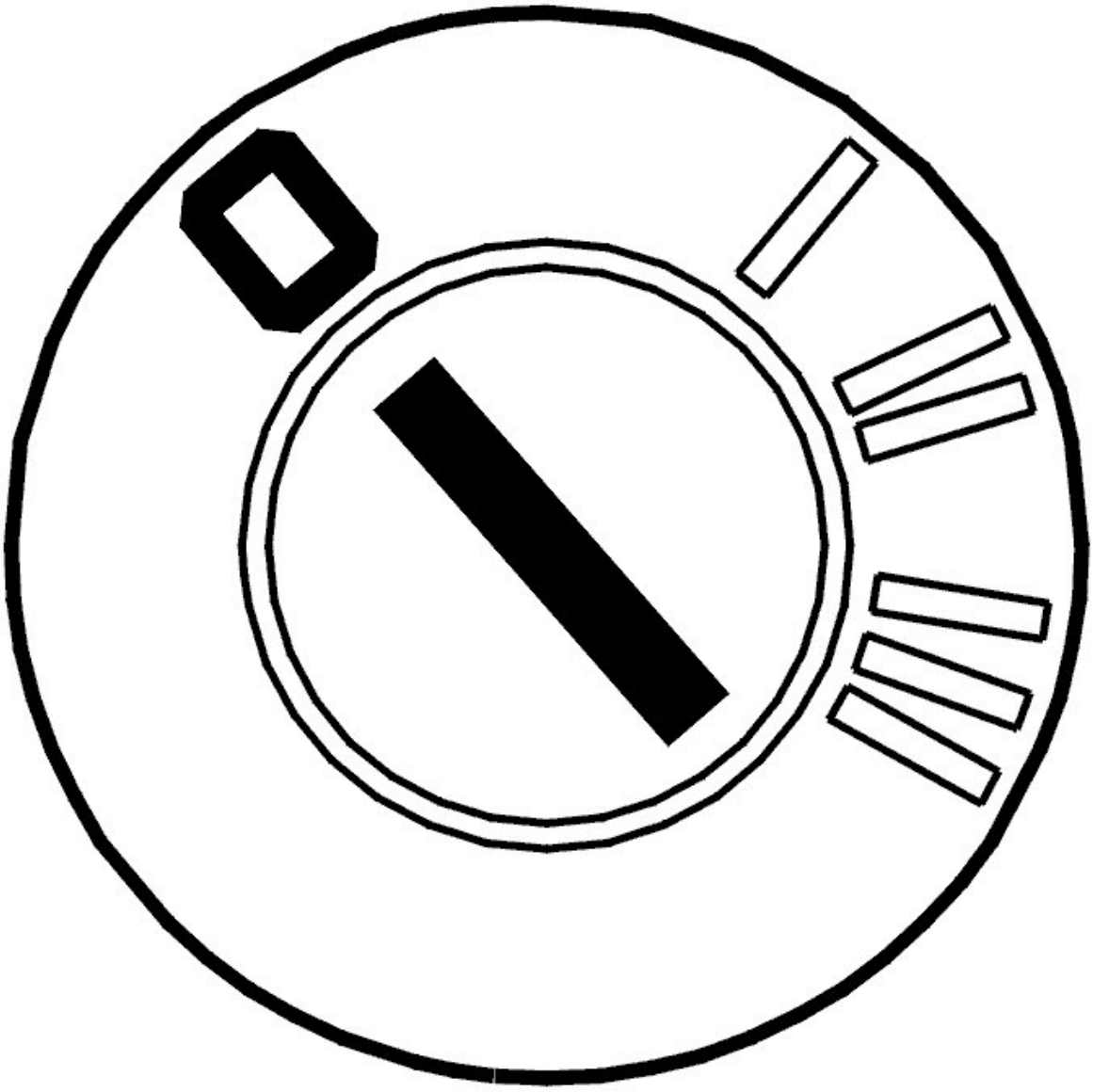
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

Does the speed increase with engine speed (RPM)?

Yes - Checking the transmission input speed sensor signal

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission output speed sensor connector terminal #A4 (control module side) and control module terminal #A57 (#A57). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

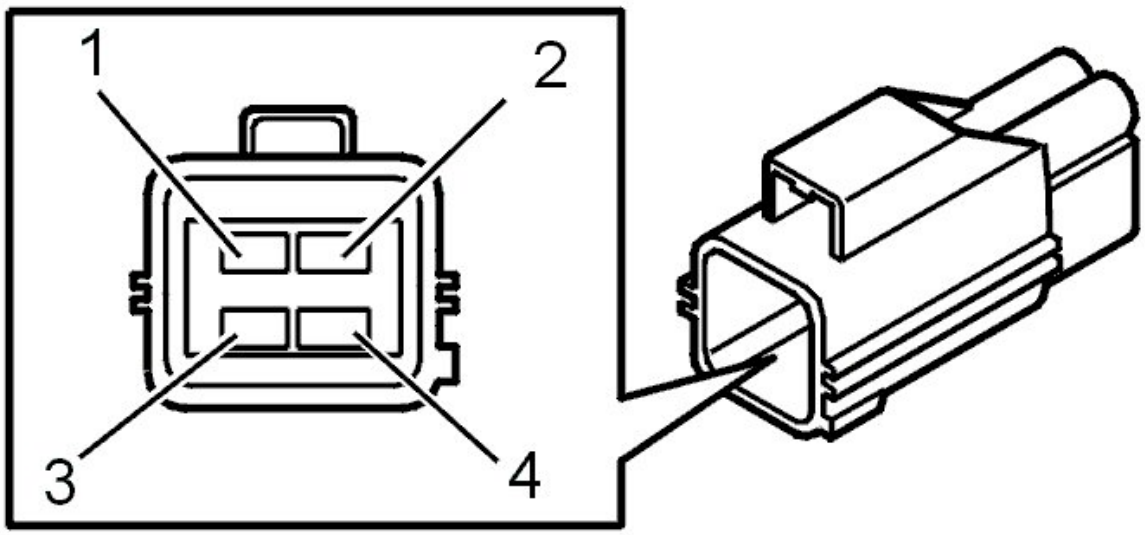
Check the signal cable between transmission output speed sensor connector terminal #A3 (control module side) and control module terminal #A39 (#A39). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

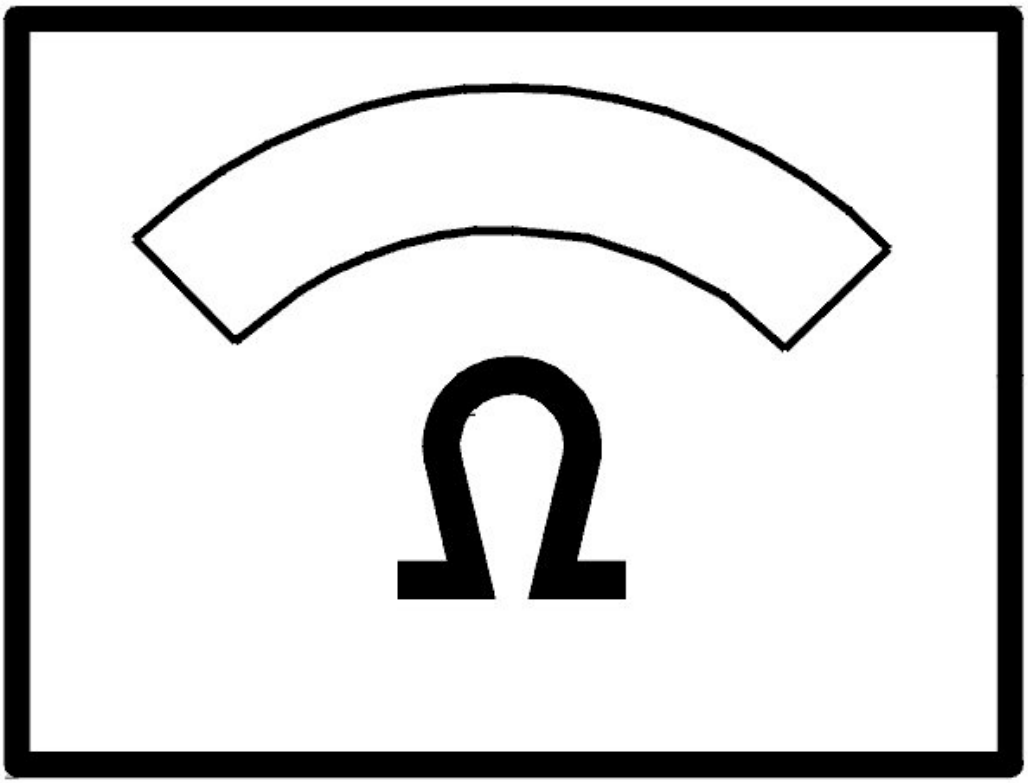
Hint: With the control module connected, the transmission output speed sensor disconnected and the ignition on, the voltage between transmission output speed sensor connector terminals #A3 and #A4 must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

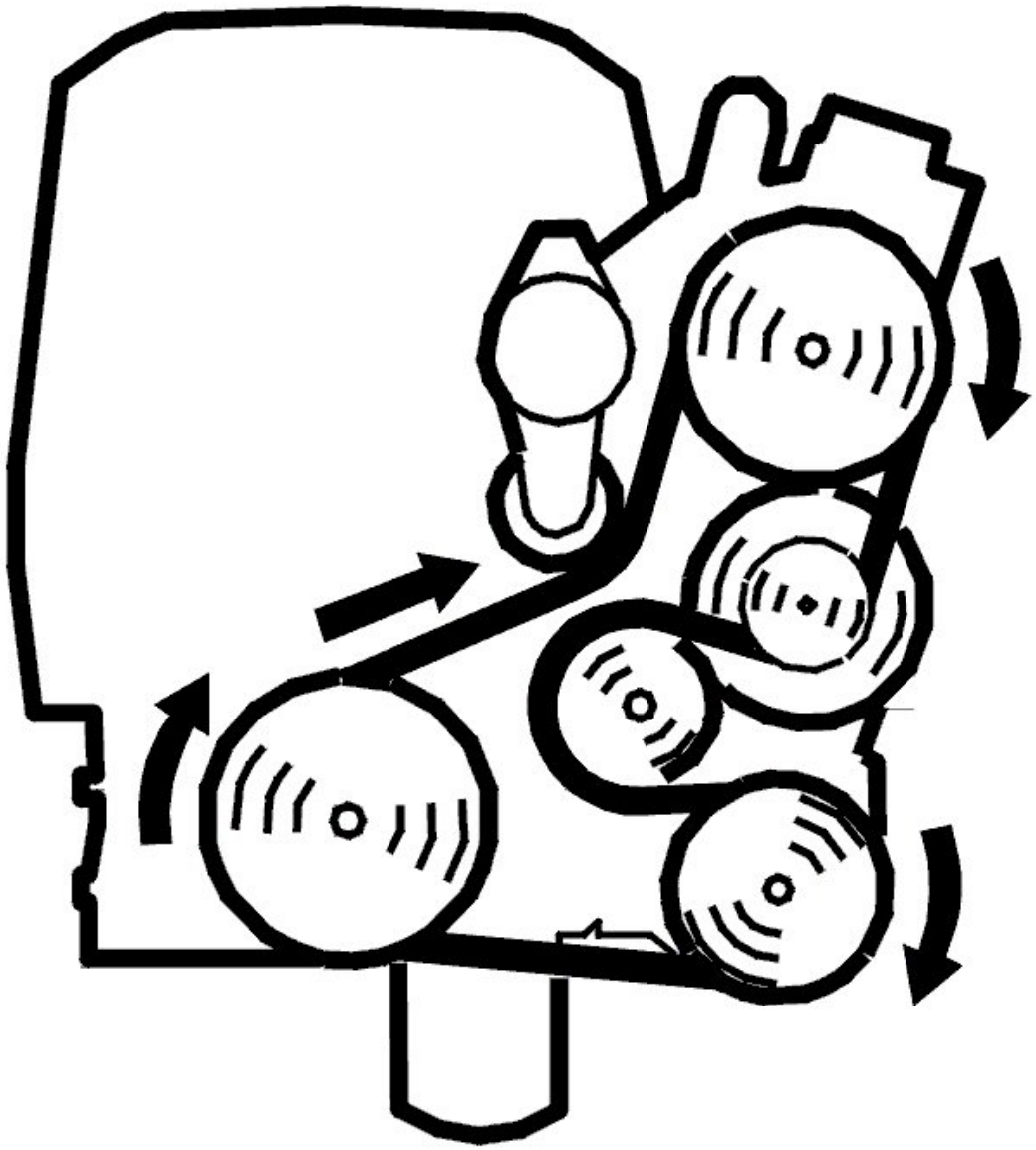
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission output speed sensor, see Replacing the transmission input speed sensor and the transmission output speed sensor See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Verification

Checking the transmission input speed sensor signal



- Ignition off
- Gear selector in position P
- Start the engine and let it run at idle speed
- Read off the transmission input speed.

Check that the transmission input speed is updated.
Compare with the engine speed (RPM).

Other information:

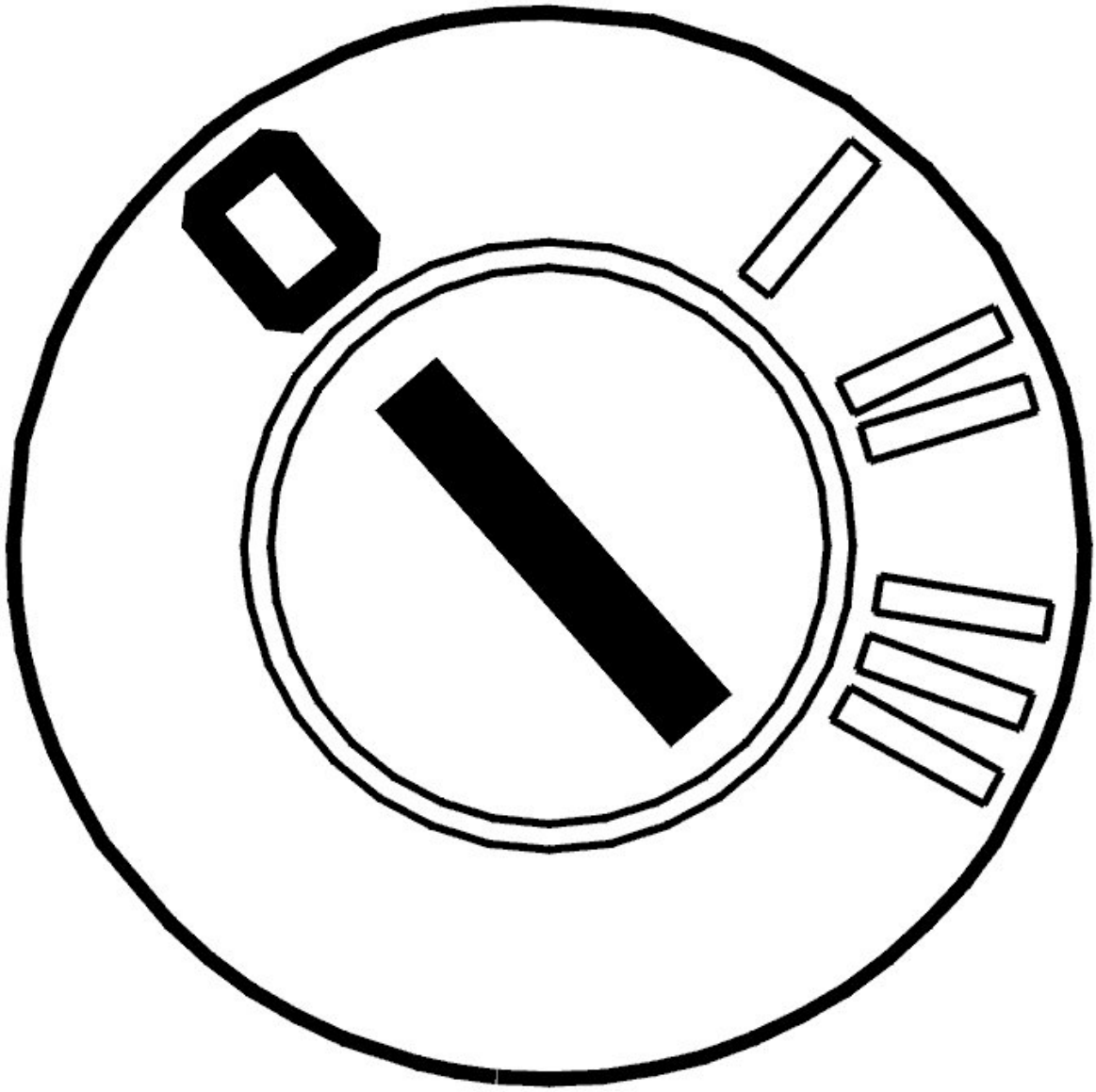
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the automatic transmission connectors, see Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

Does the transmission input speed increase with engine speed (RPM)?

Yes - Test driving the transmission

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable for the transmission input speed sensor between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Hint: With the control module connected and the ignition on, the voltage between transmission output speed sensor connector terminals #A1 and #A2 must be between 1-3 V below Ubat.

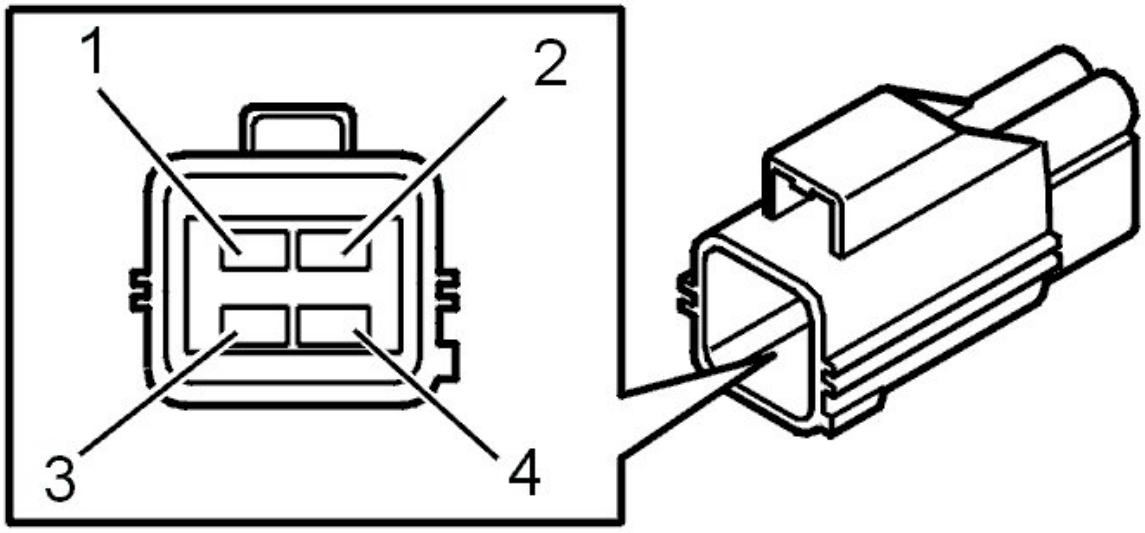
Remedy as necessary.

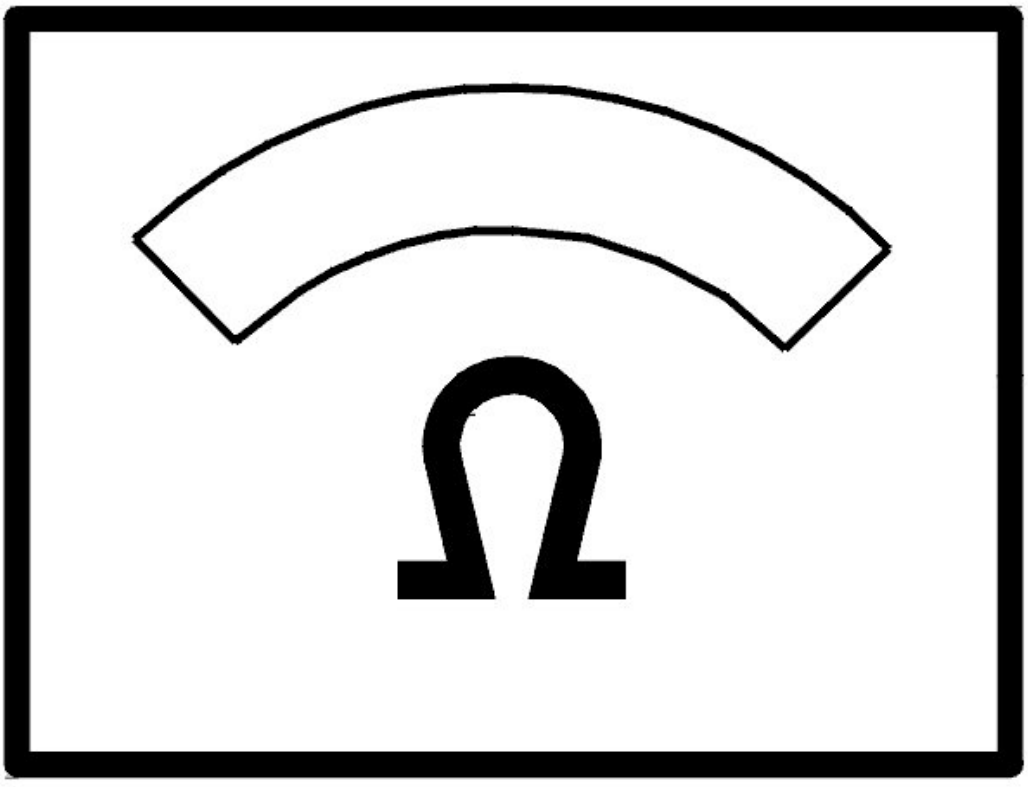
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the automatic transmission connectors, see Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN,

B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures

- To replace the transmission input speed sensor, see Replacing the transmission input speed sensor and the transmission output speed sensor See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

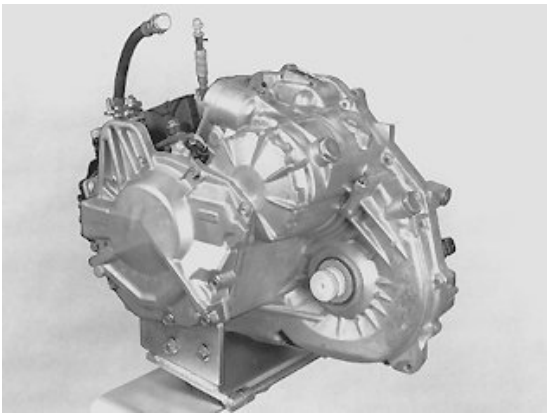




Continue - Verification

Replacing the transmission

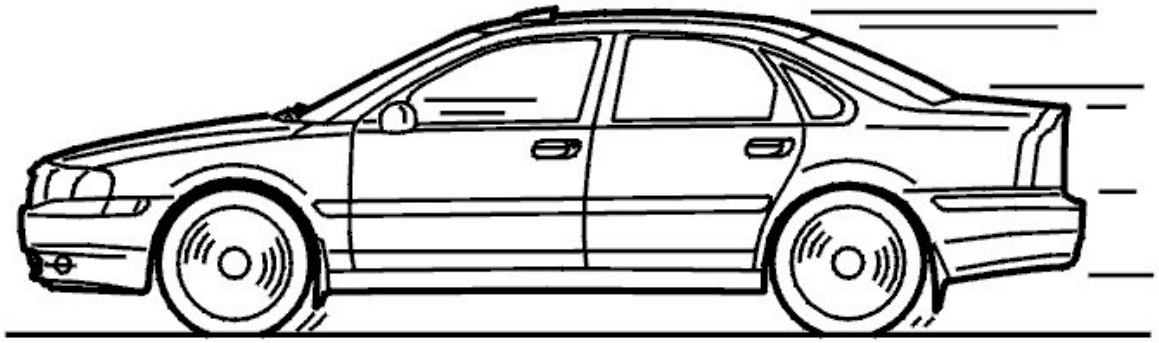
- Fault-tracing indicates an internal fault in the transmission. Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.



Continue - Verification

Test driving the transmission

Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description. When test driving, the oil temperature must be above 20°C.
Look out for any transmission malfunction.



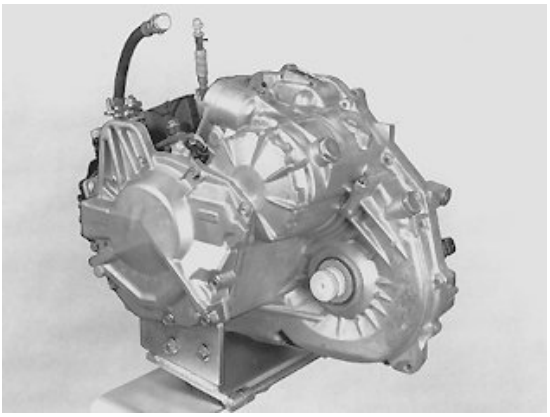
Is the transmission operating correctly?

Yes - Fault-tracing information

No - Replacing the transmission control system

Replacing the transmission control system

The previous tests indicate that there is a fault in the transmission control system.
Try a new control system. See Solenoid control system, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Automatic Transmission Components/Solenoid Control System, Replacing.



Select "Continue" when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

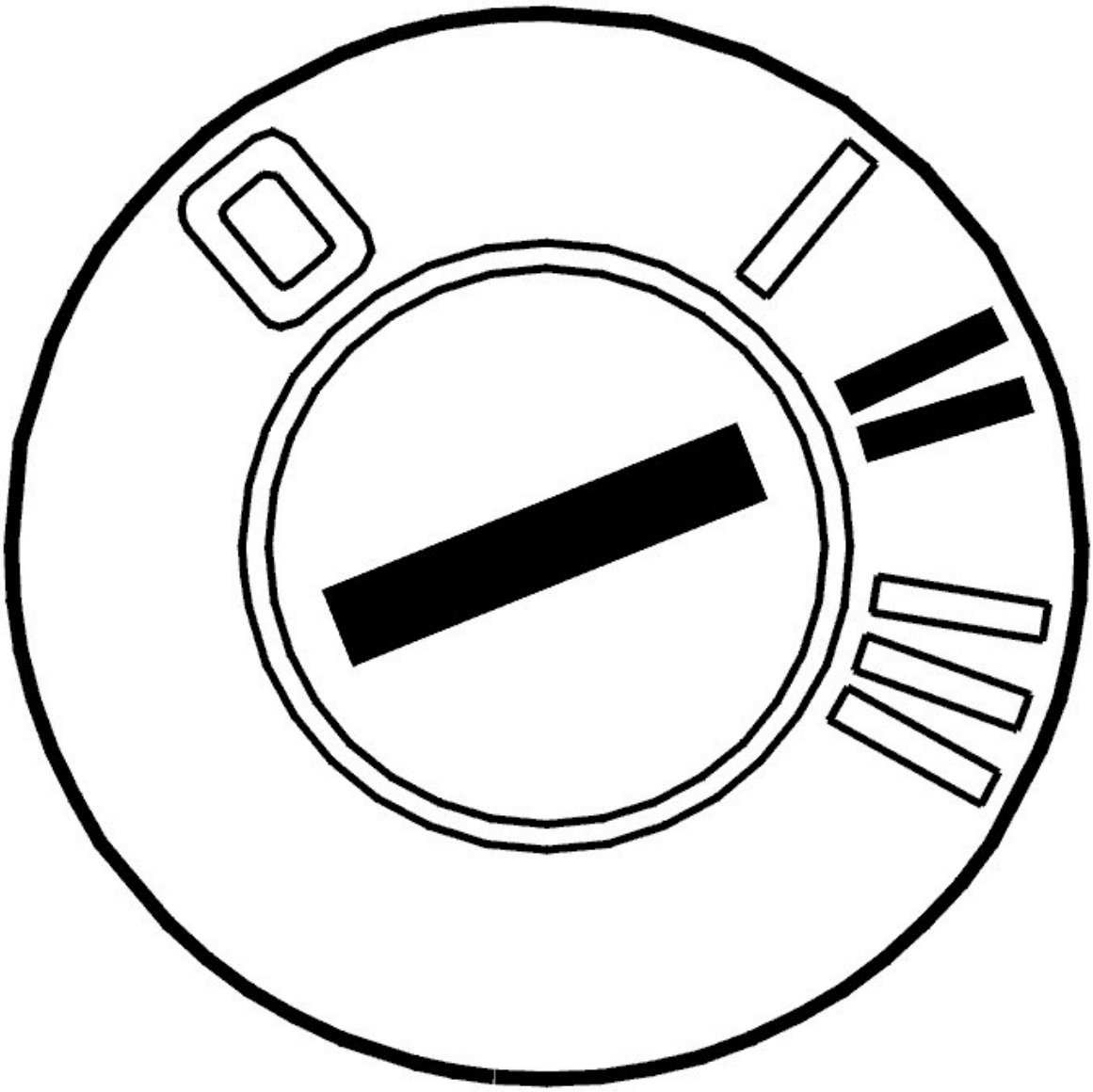
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - DONE

DONE - Verification

Fault-tracing information

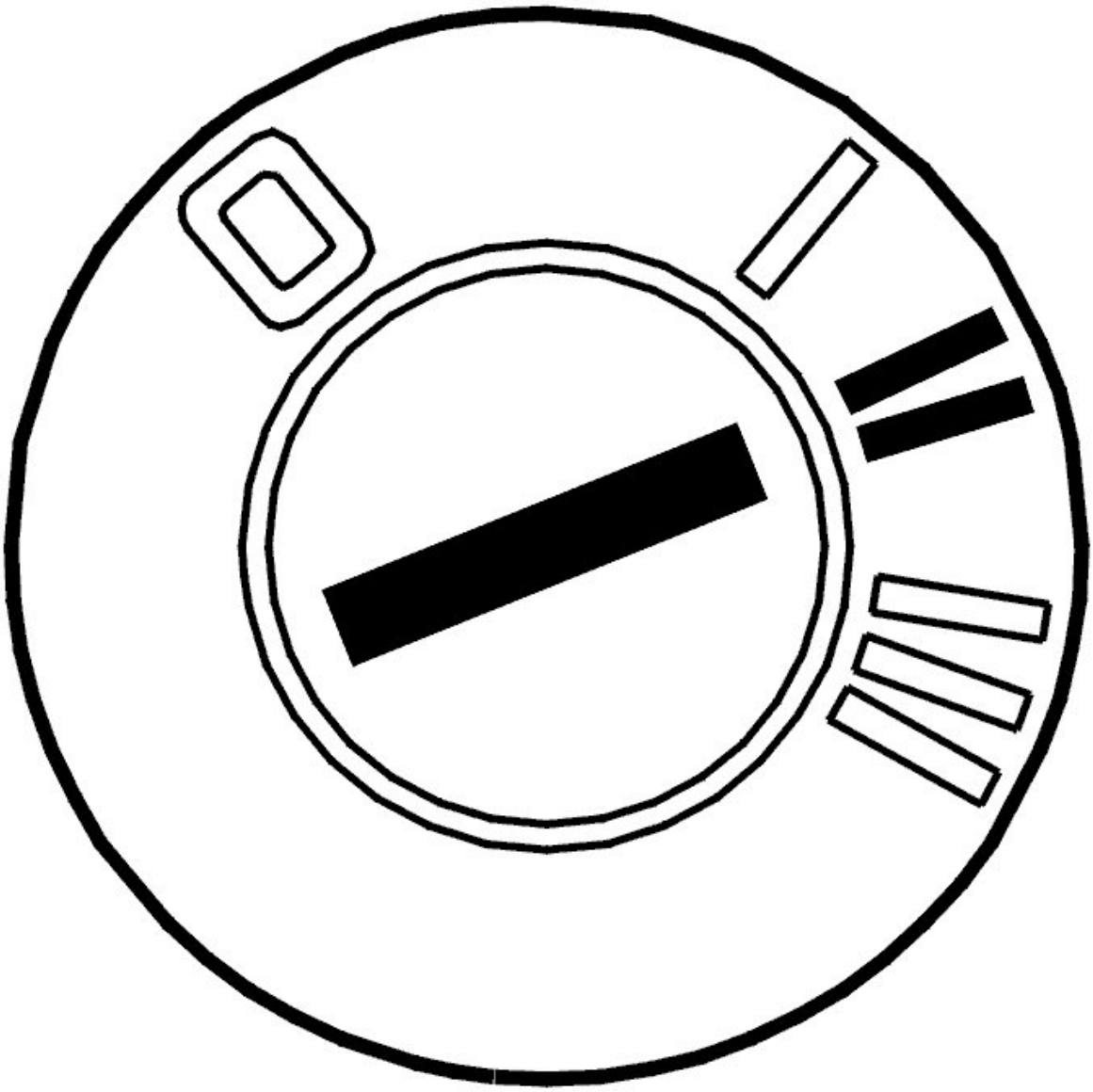
The control module has previously registered a fault. The fault is now no longer present. A test of the transmission function indicates that everything is now OK.

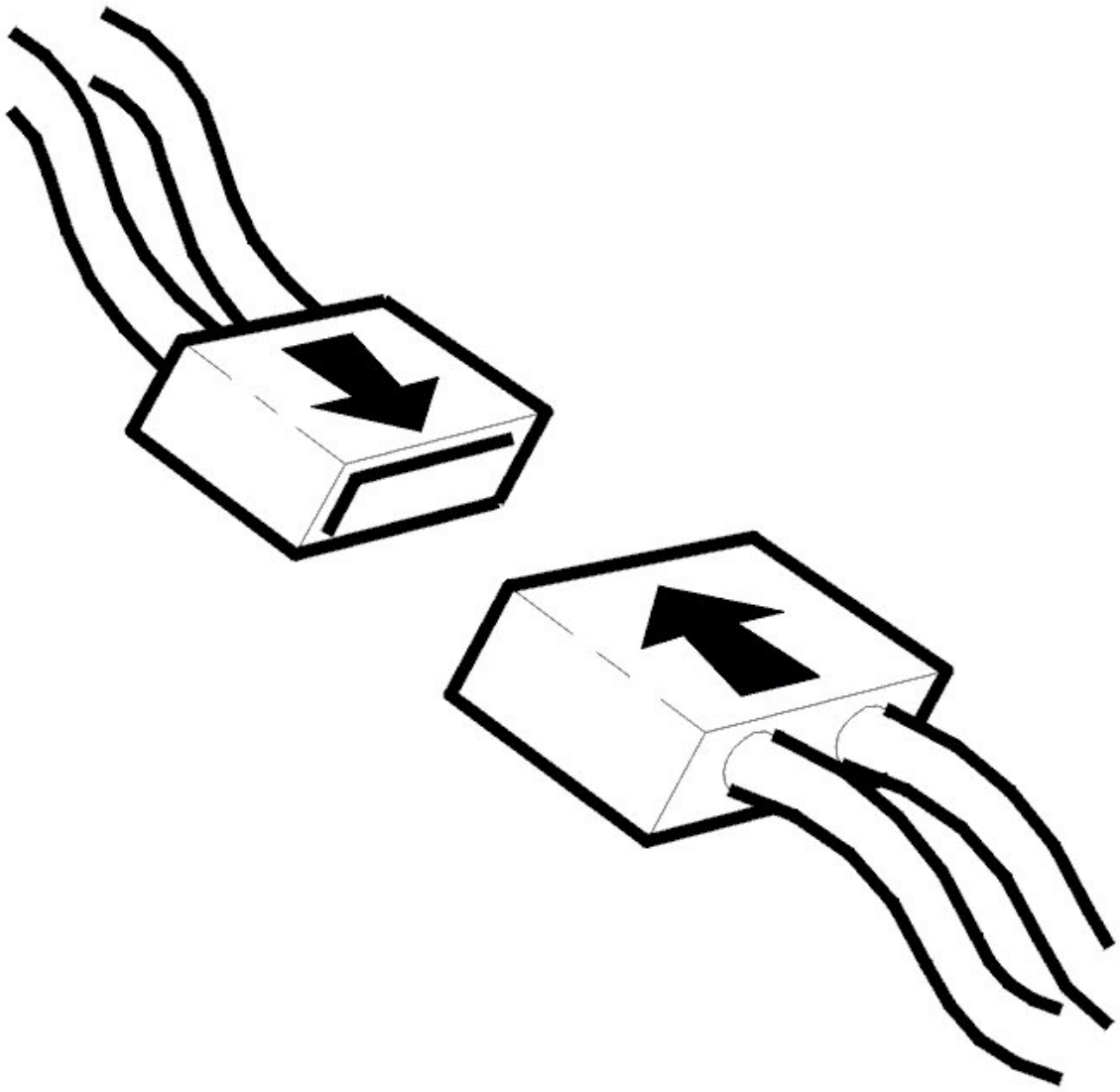
Continue - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Checking for contact resistance and oxidation

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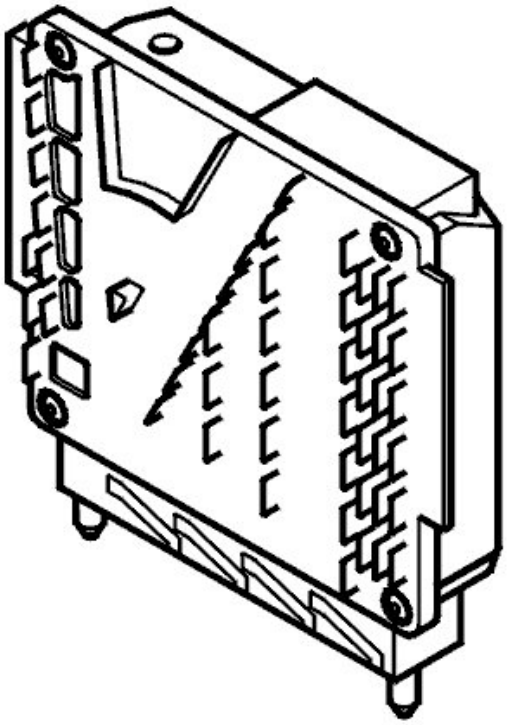
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0028 is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S1 has jammed in the OFF position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

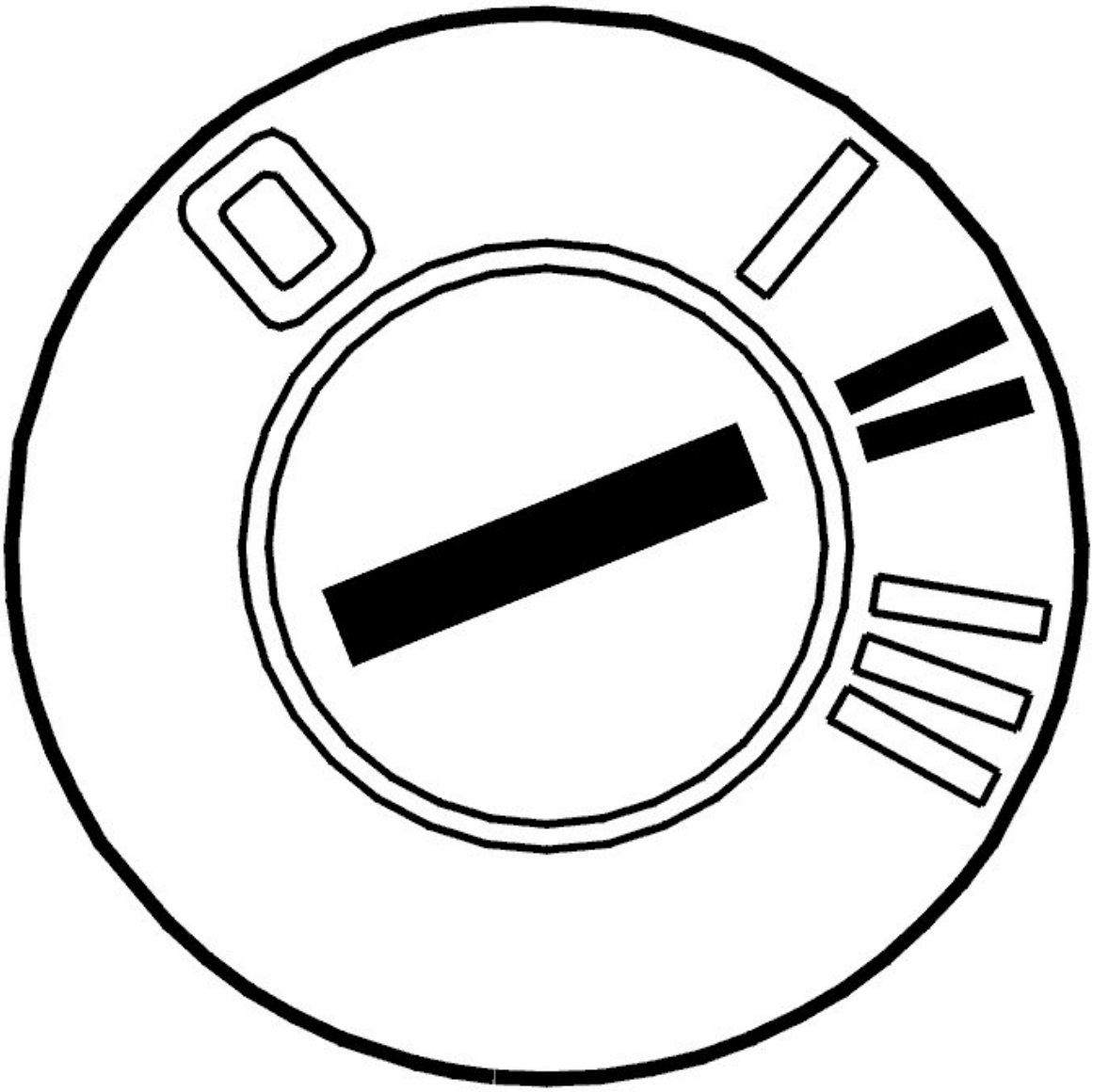
Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Incorrect Gear Ratio

Incorrect gear ratio

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear selector.

Move the gear selector into all positions. Check that the gear-shift positions are updated.

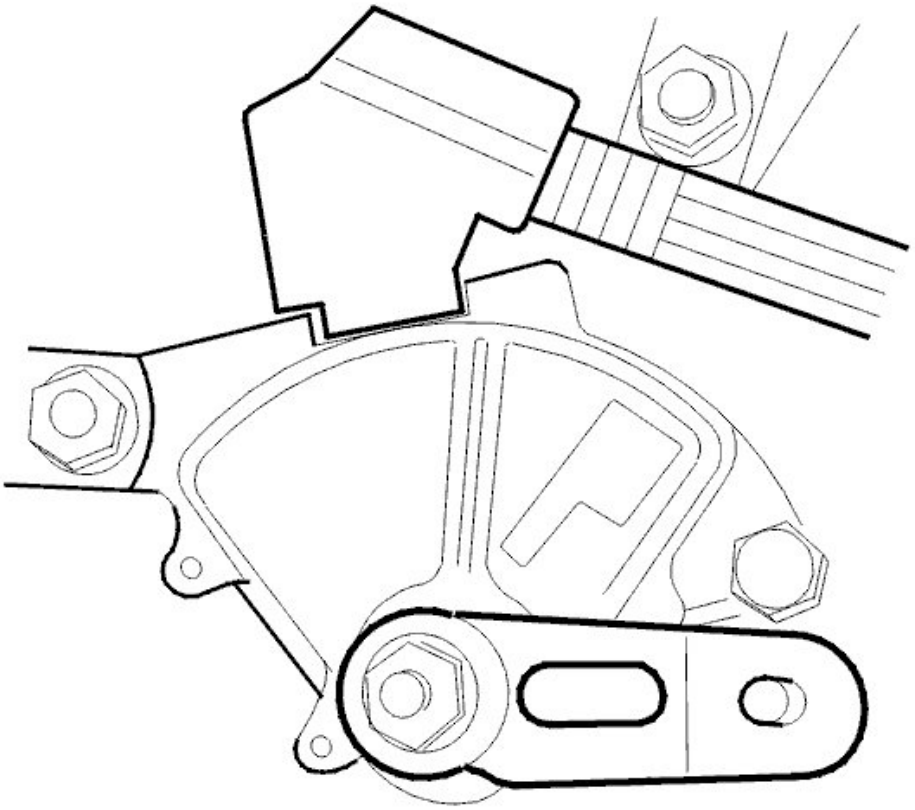
Note! Select the correct gear lever carrier from the list.

Hint: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments



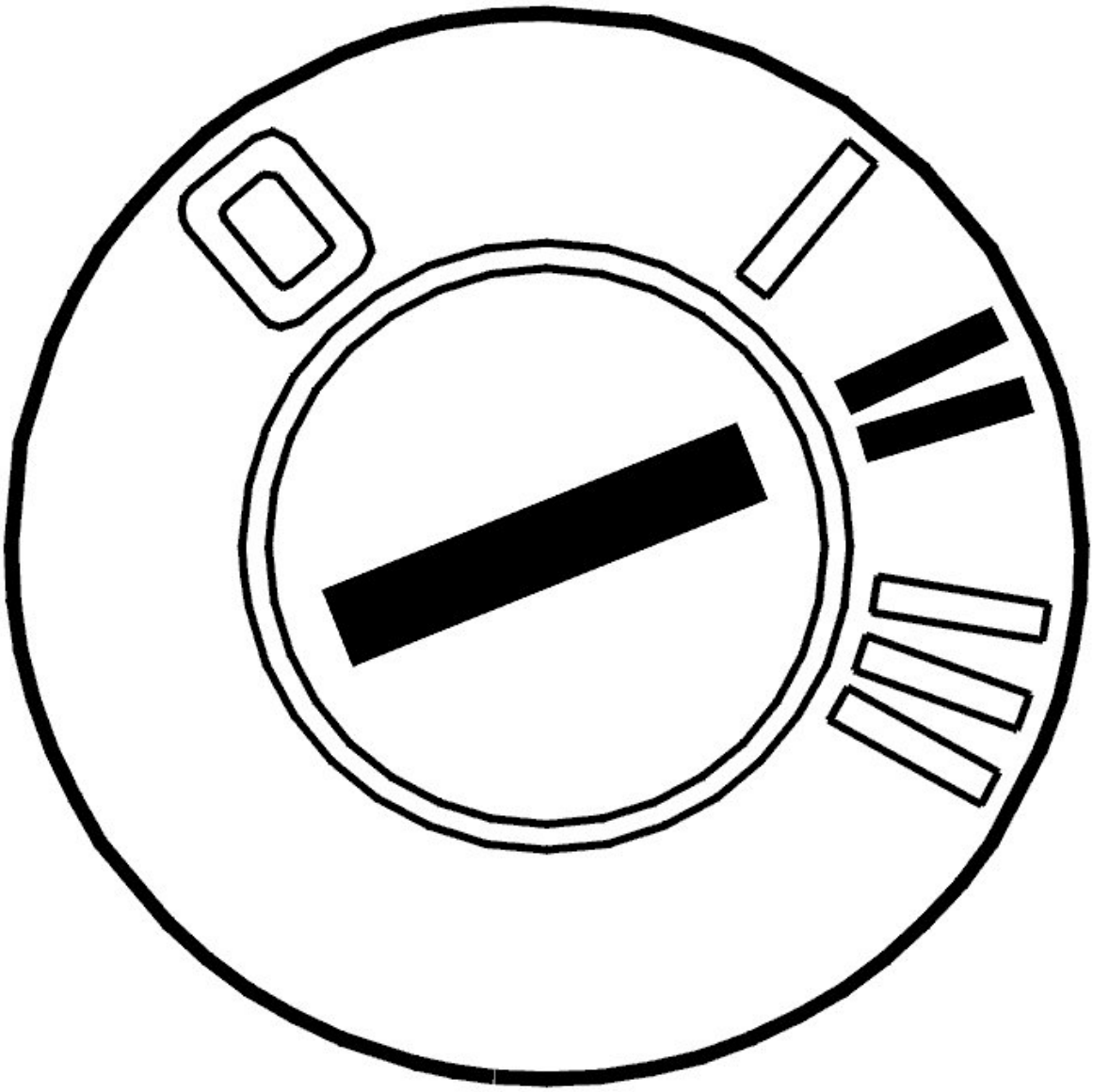
Is the gear-shift position sensor incorrectly adjusted?

Yes - Verification

No - Checking the quality and level of transmission fluid

Checking the quality and level of transmission fluid

Note! The quality and level of transmission fluid is vital to transmission function. It is therefore important that these are correct. Fluid level is also affected by its temperature.



- Ignition on
- Read the fluid temperature.

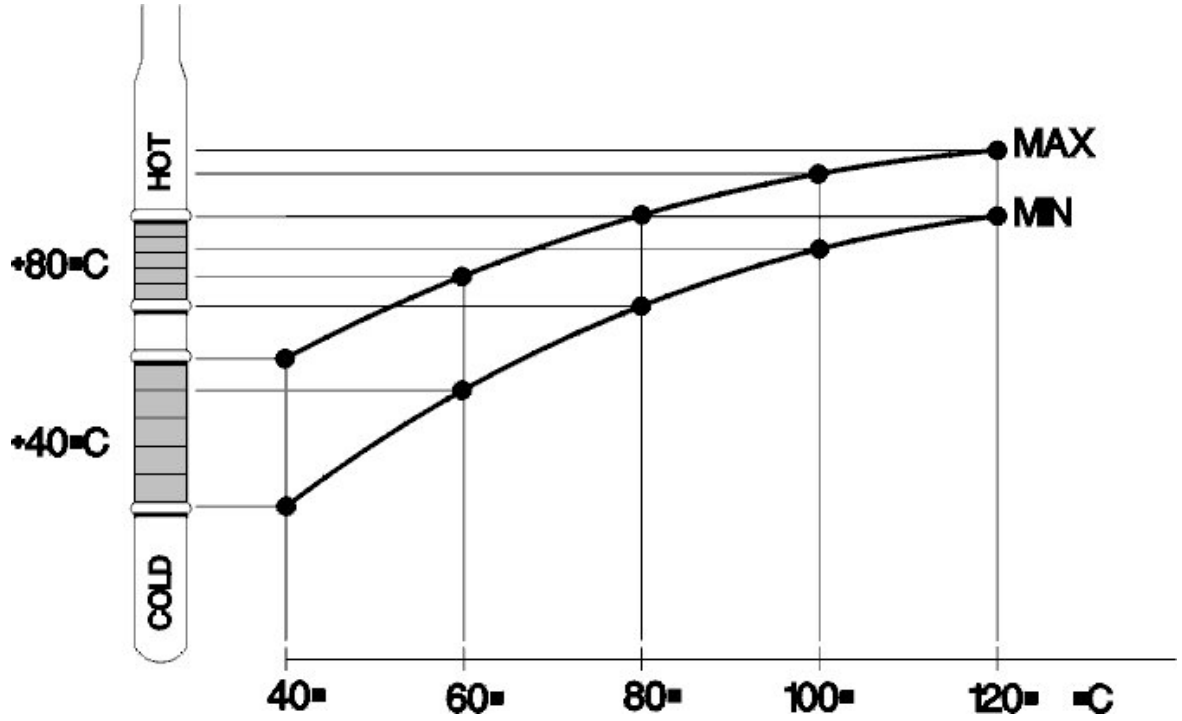
Check the transmission fluid level. If it is low, check the transmission for leaks and then top off the fluid.
Check the fluid quality.
If the fluid smells burnt, change the transmission fluid.
In addition, check the transmission fluid for an **abnormal** amount of particles by taking a sample with the dipstick.
If the transmission fluid contains an **abnormal** amount of particles, replace the transmission.

Other information

- Oil level, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Transmission Oil Level - Checking
- Gearbox fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing

Select an alternative below

1. No fault found.
2. Transmission fluid changed, level low or quality poor.
3. The transmission fluid contains an **abnormal** amount of particles.

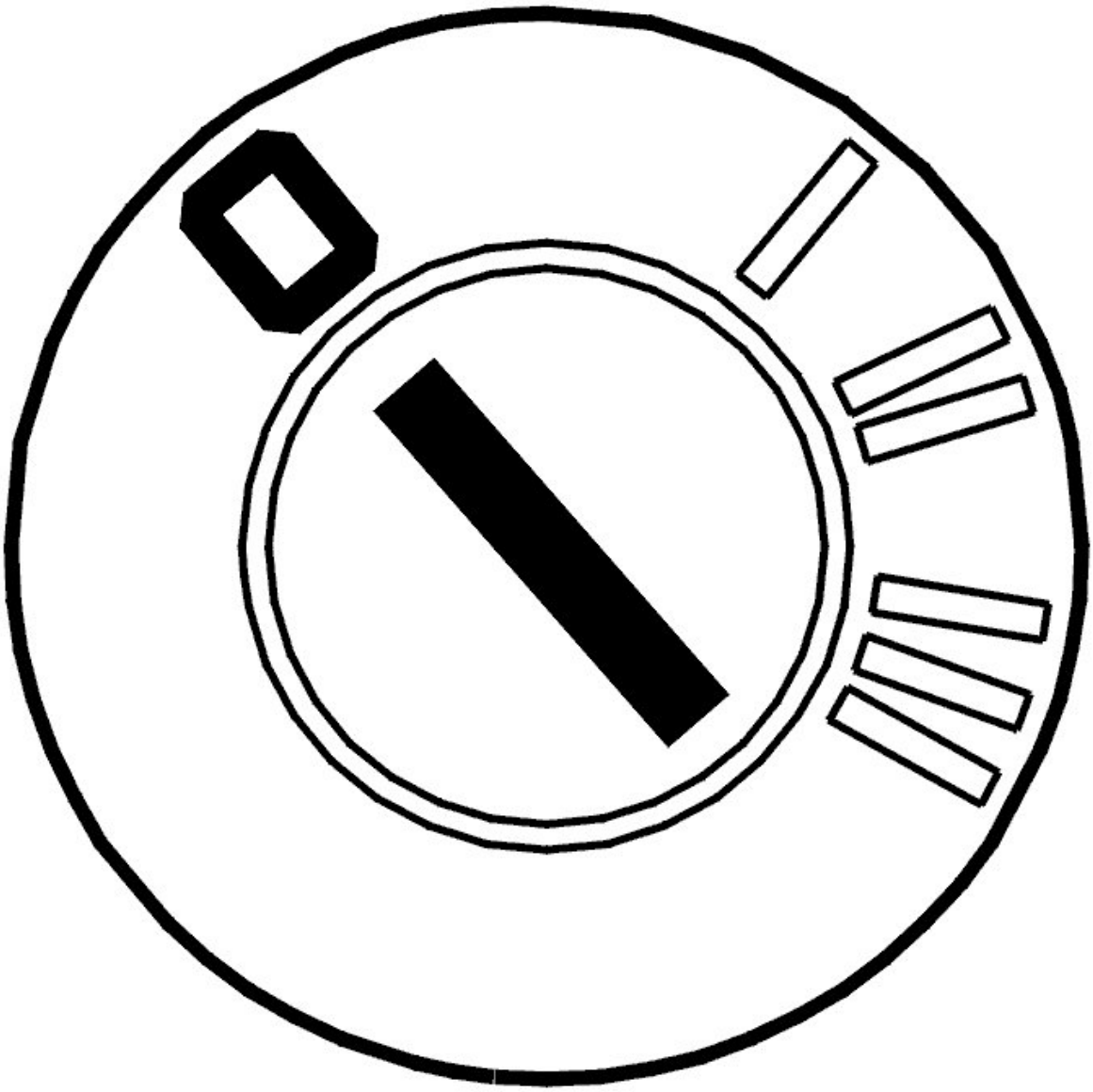


1 - Checking for contact resistance and oxidation

2 - Resetting adaptation and the fluid quality counter

3 - Replacing the gearbox

Checking for contact resistance and oxidation



- Ignition off

Check the transmission connectors and the control module connector for contact resistance and oxidation.

Other information:

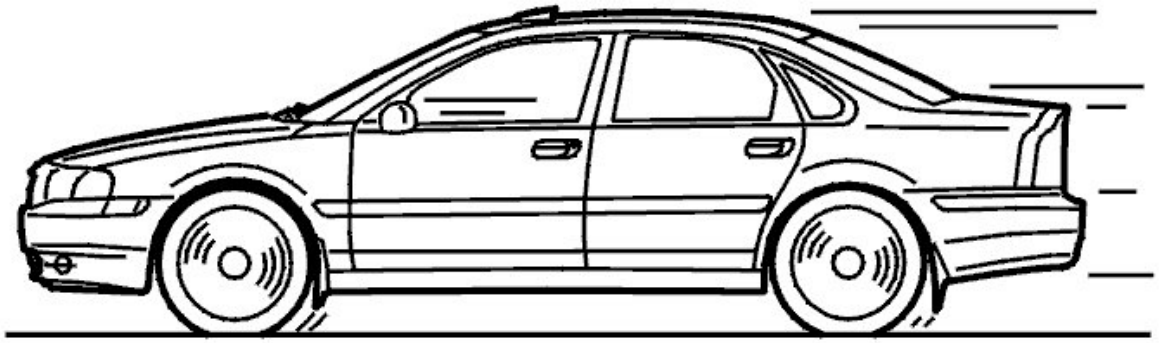
- To access transmission connectors: Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

Continue - Checking noise in the gearbox

Checking noise in the gearbox

- Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
- Check for any clearly audible noises from the gearbox. Check for malfunctions.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



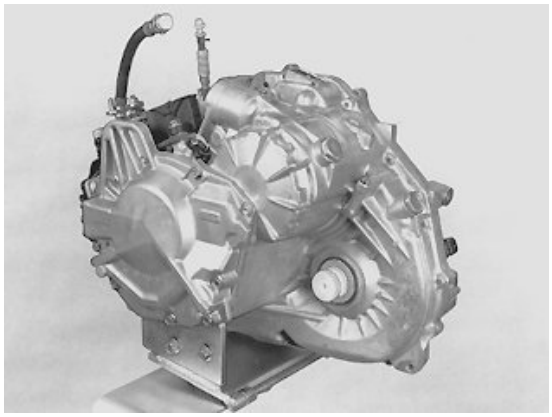
Does the transmission exhibit any noises or function problems?

Yes - Replacing the gearbox

No - Replacing the control system/transmission

Replacing the control system/transmission

Test with a new control system following: Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing.
If this does not help, replace the transmission following: Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.



Continue - Resetting adaptation and the fluid quality counter

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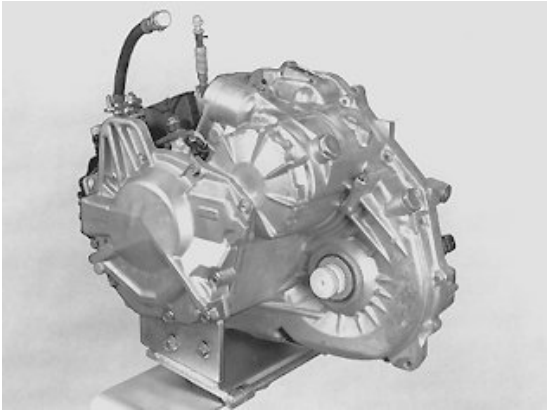
Replacing the gearbox

Replace the gearbox. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Resetting adaptation and the fluid quality counter

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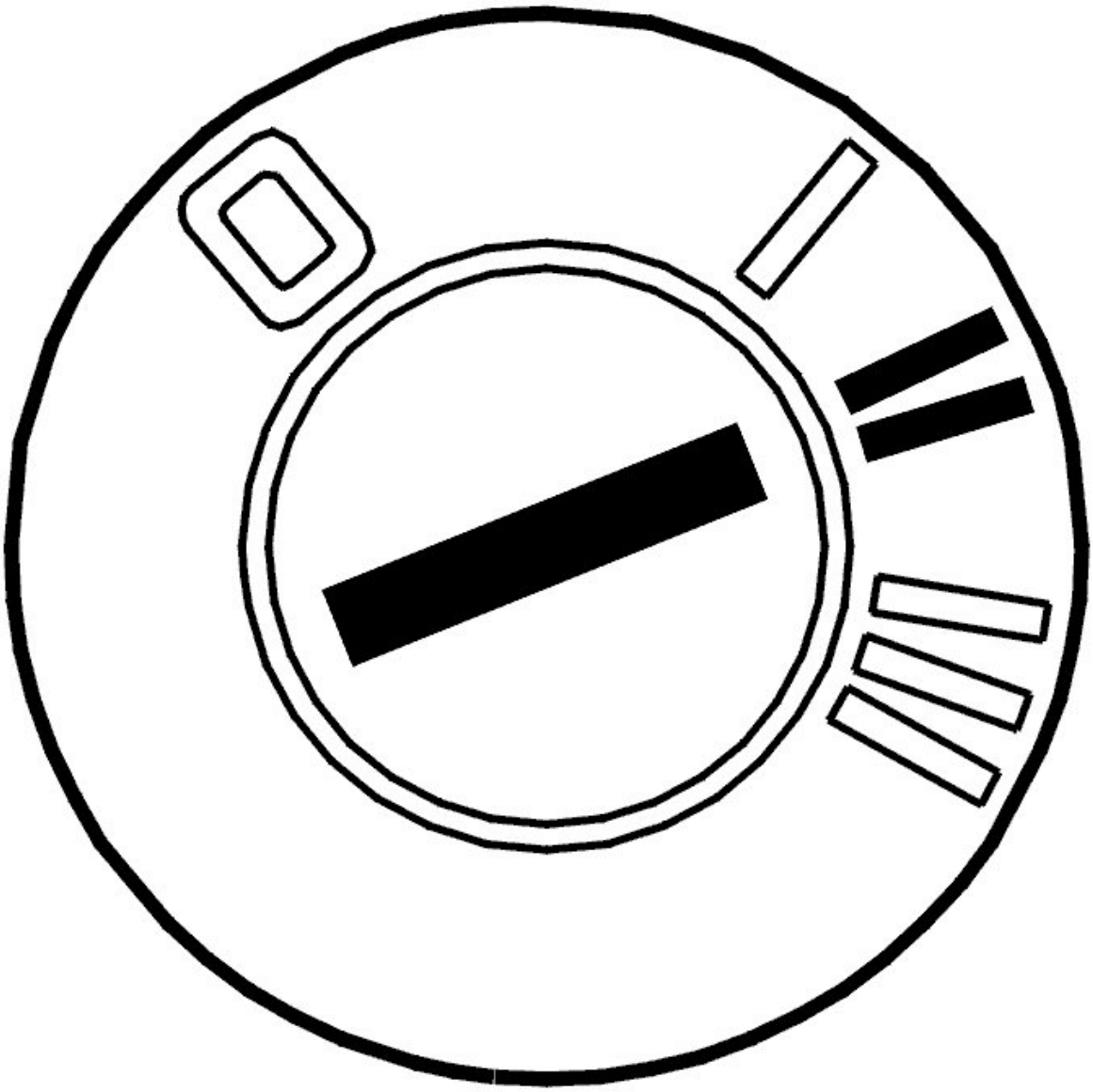
Resetting adaptation and the fluid quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



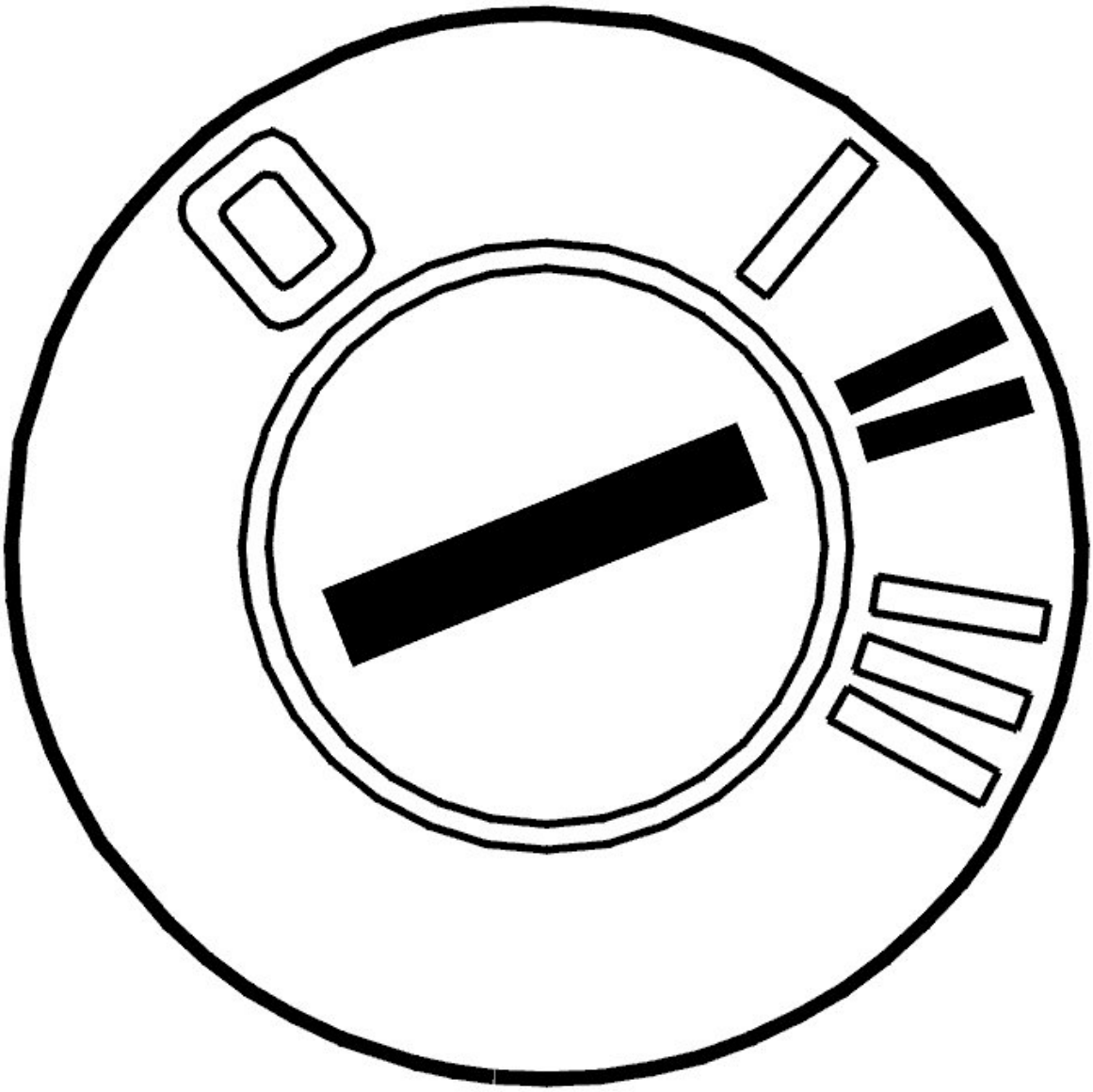
- Ignition on.

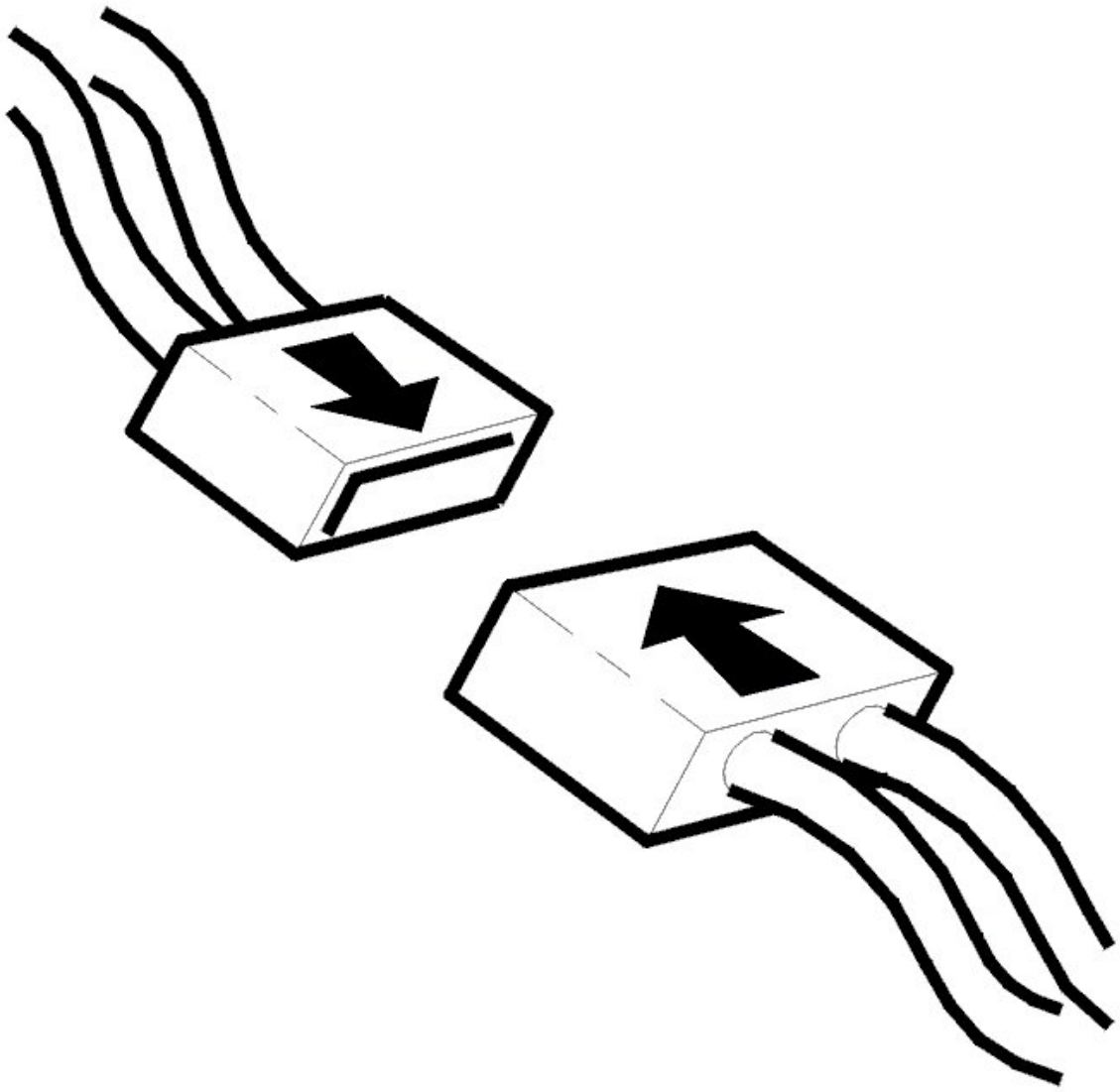
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

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Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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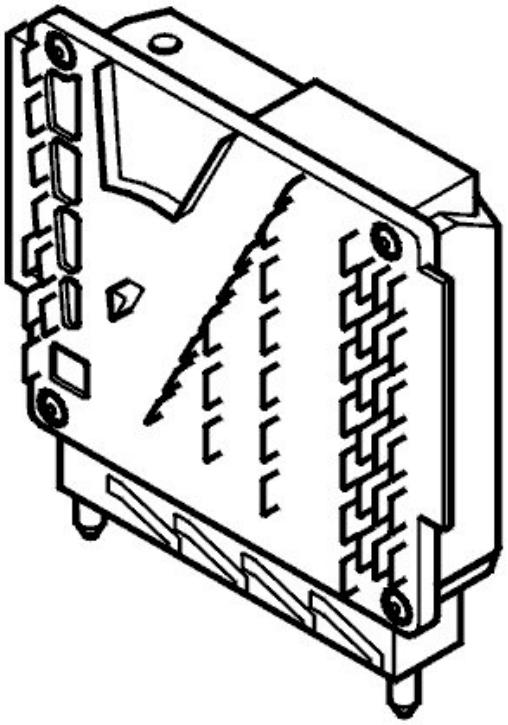
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-0029 is stored if the control module registers that the ratio deviates by more than 10% when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3%.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the ON position.
- Solenoid S3 has jammed in the OFF position.
- Solenoid S4 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

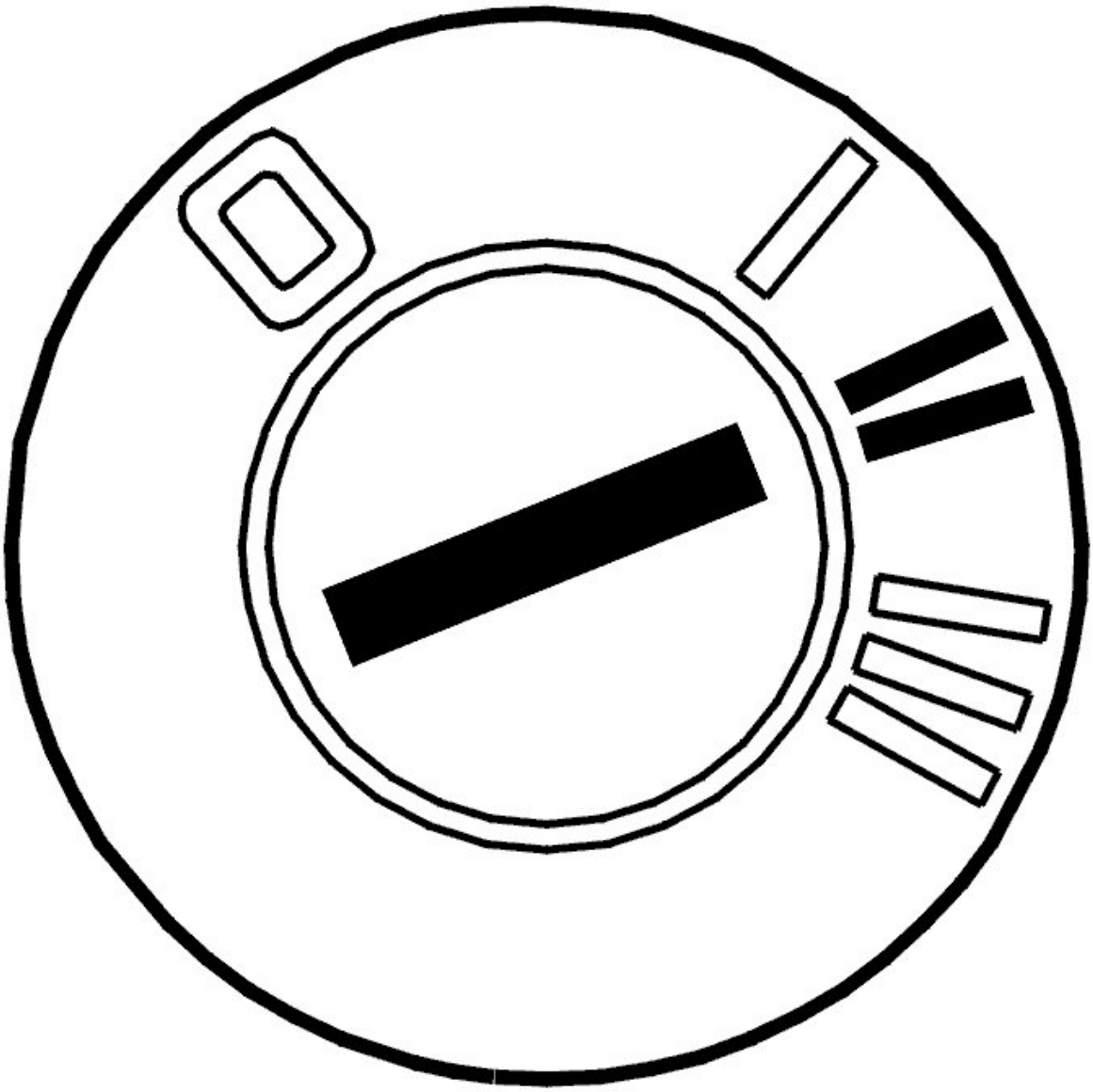
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.

- Harsh gear shifting.
- No shifting.

Incorrect Gear Ratio

Incorrect gear ratio

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear selector.

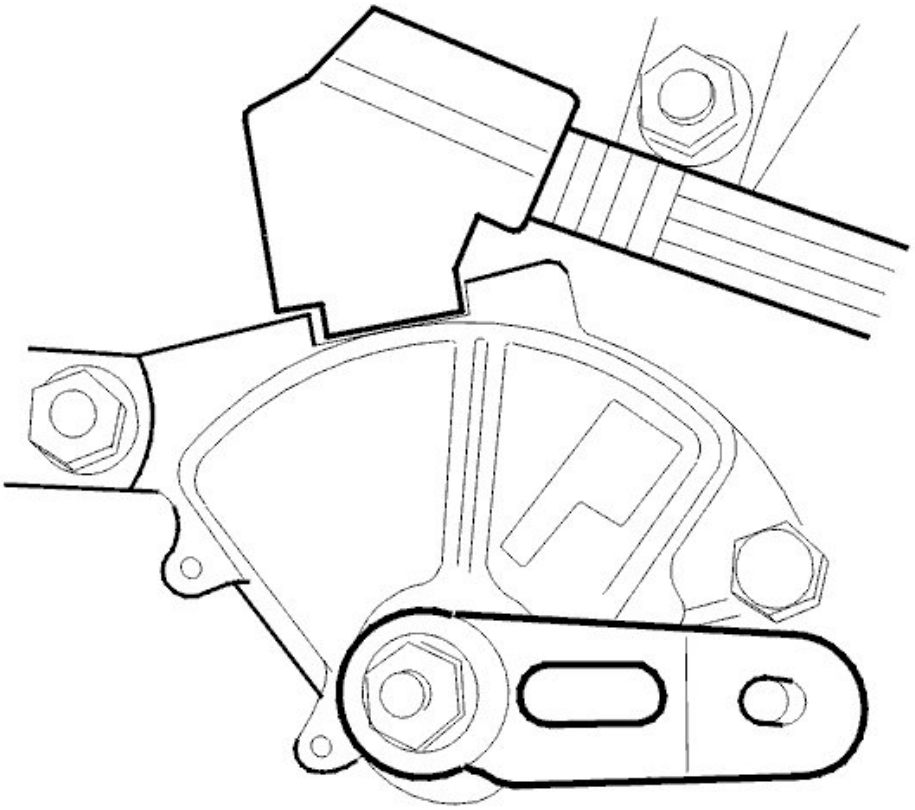
Move the gear selector into all positions. Check that the gear-shift positions are updated.

Hint: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- To adjust the gear-shift position sensor, see Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments.



Is the gear-shift position sensor incorrectly adjusted?

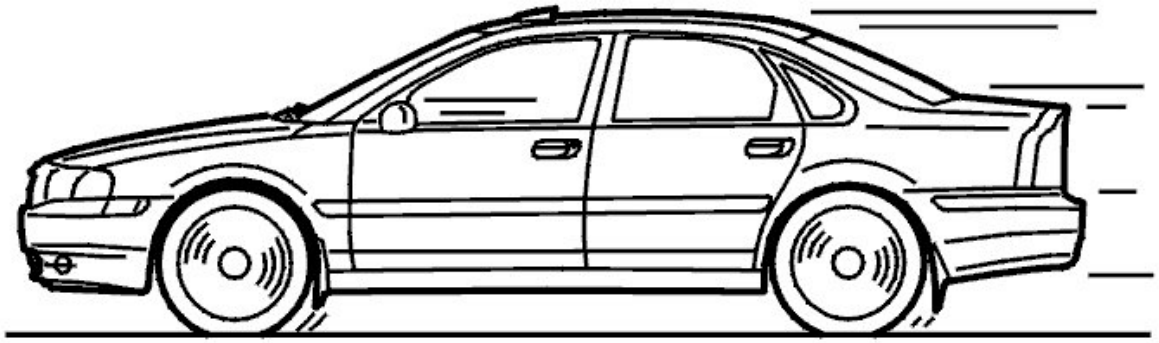
Yes - Verification

No - Checking for contact resistance and oxidation

Checking noise in the transmission

- Test drive the car. See
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

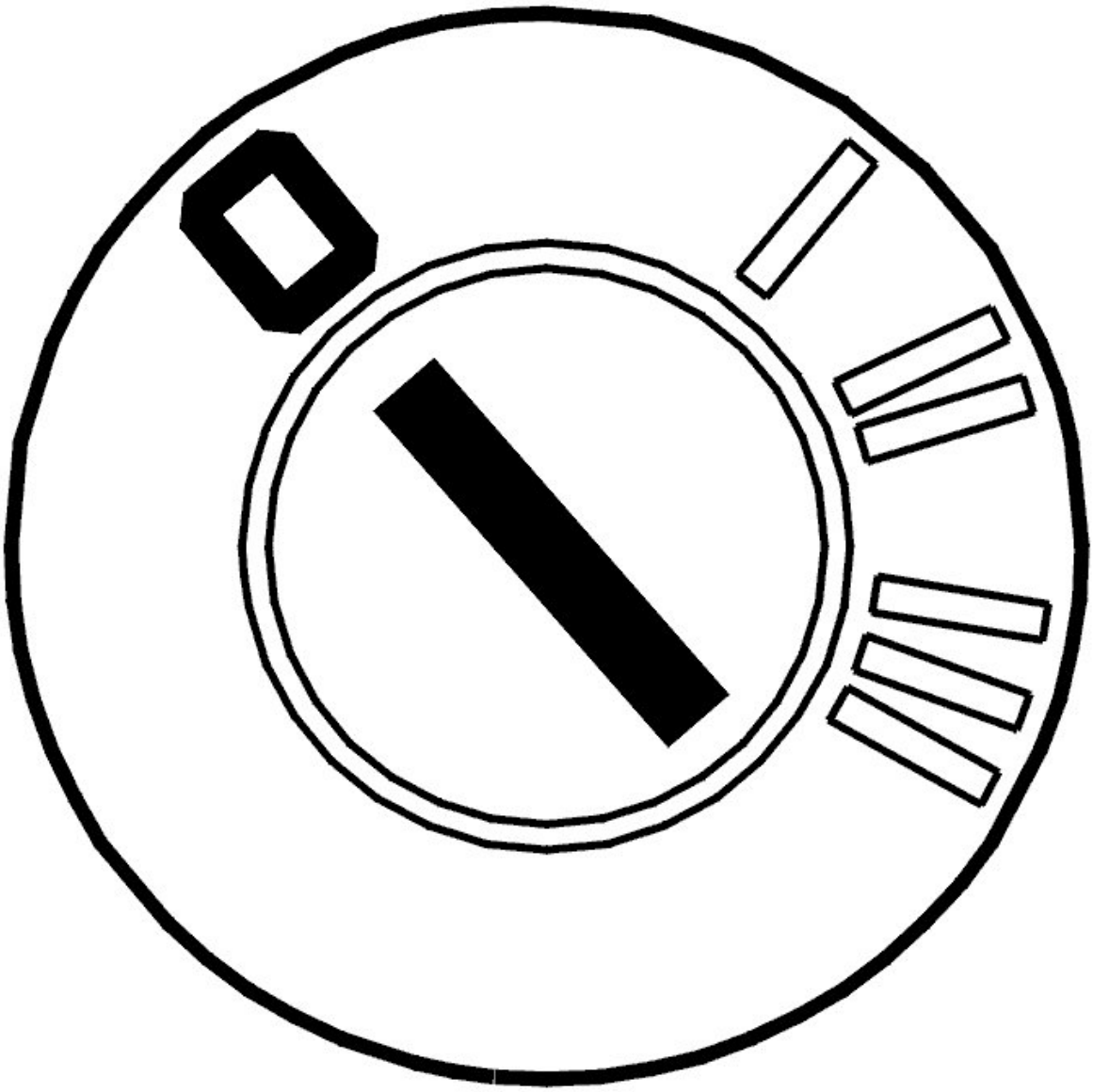


Is the transmission making a noise?

Yes - Replacing the transmission

No - Fault Found

Checking for contact resistance and oxidation

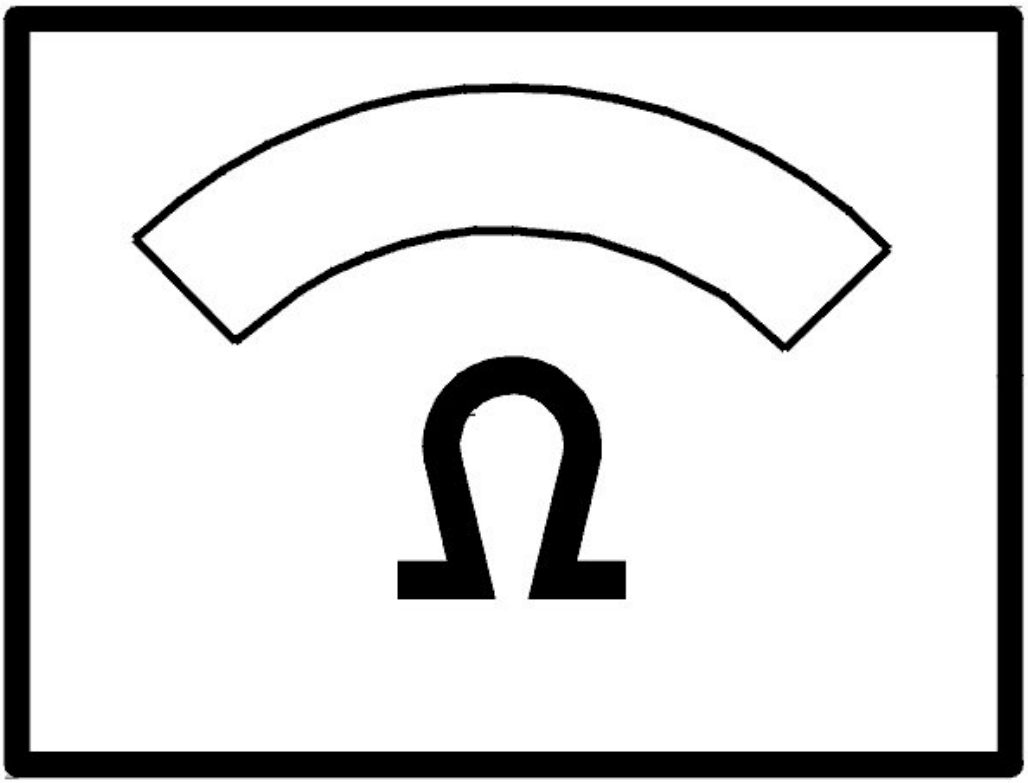


- Ignition off.

Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

Other information:

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures.

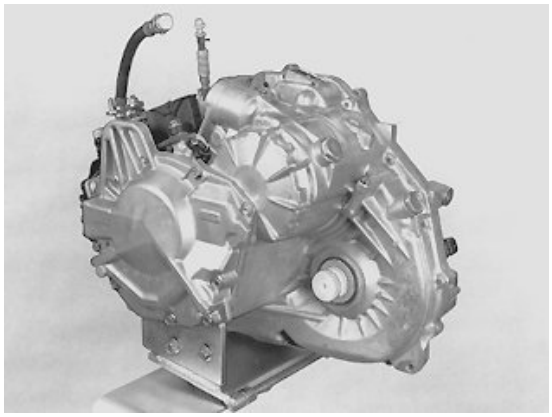


Continue - Checking noise in the transmission

Replacing the transmission

Note! In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

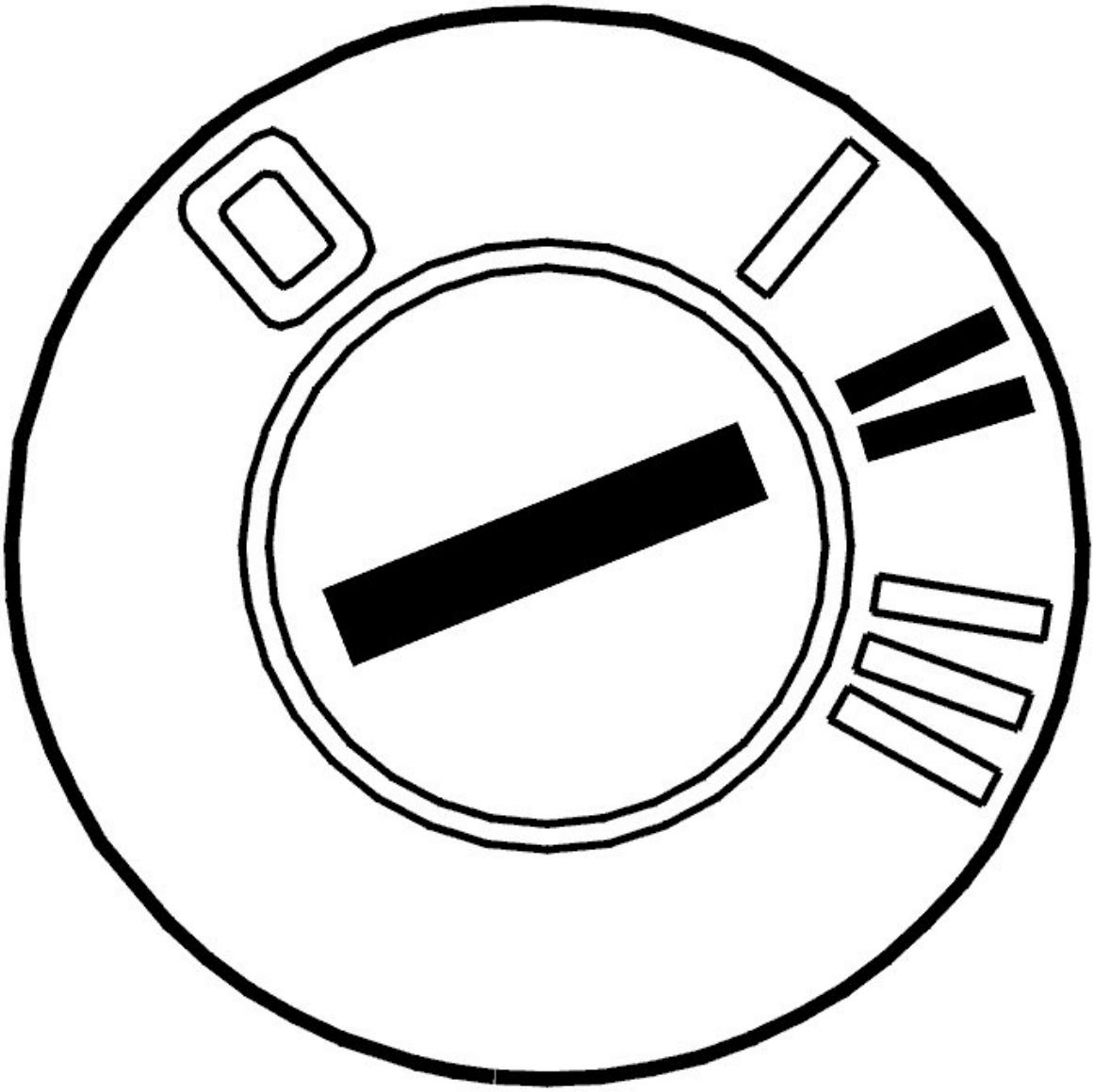


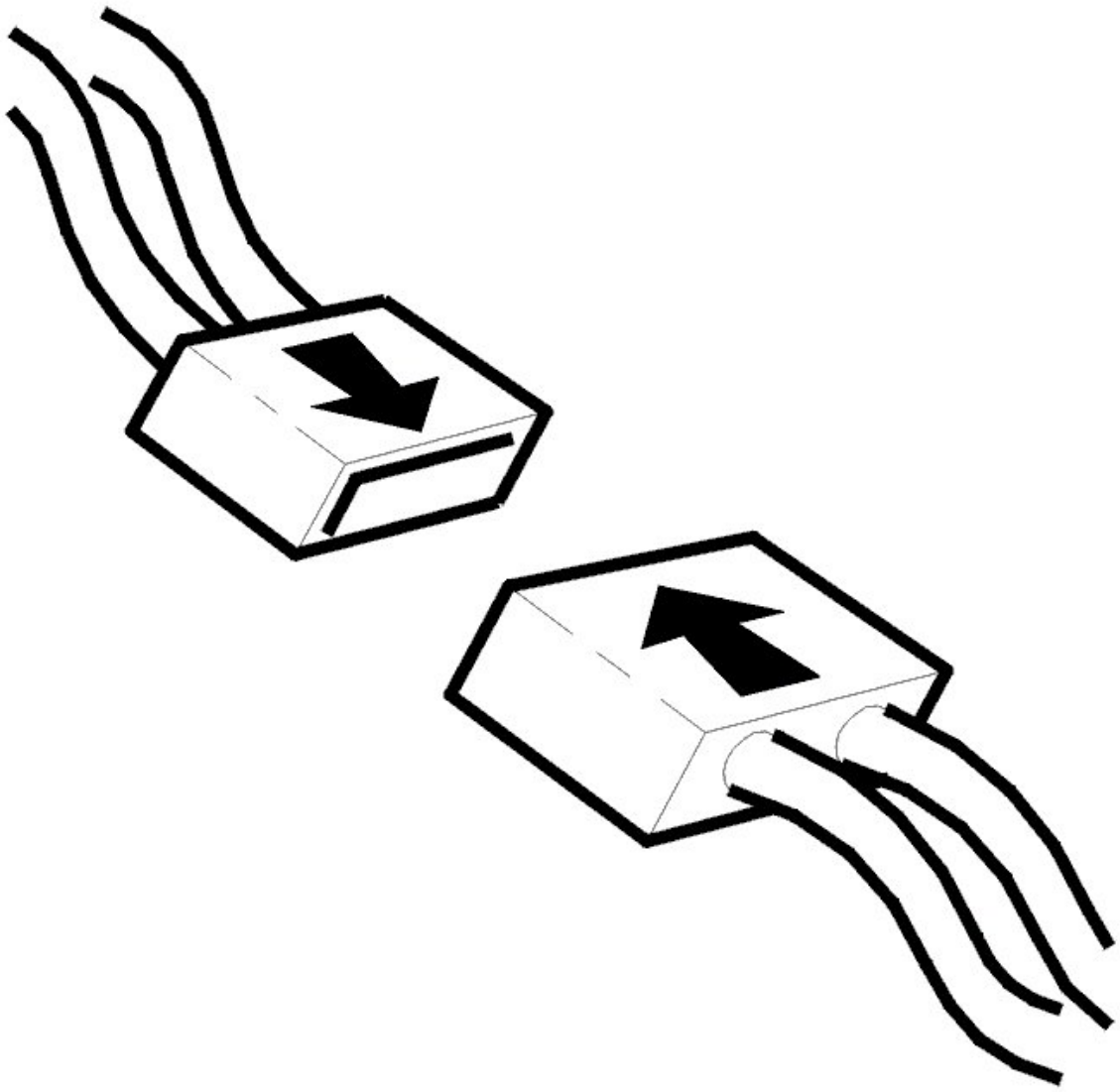
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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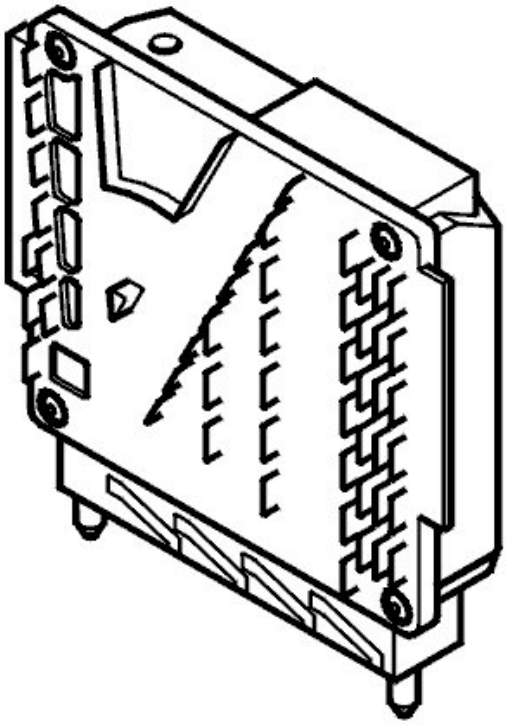
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002A is stored if the control module registers that the ratio deviates by more than 10% when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3%.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S1 jammed in the ON position.
- Solenoid S2 has jammed in the ON position.
- Solenoid S3 has jammed in the OFF position.
- Solenoid S4 has jammed in the OFF position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

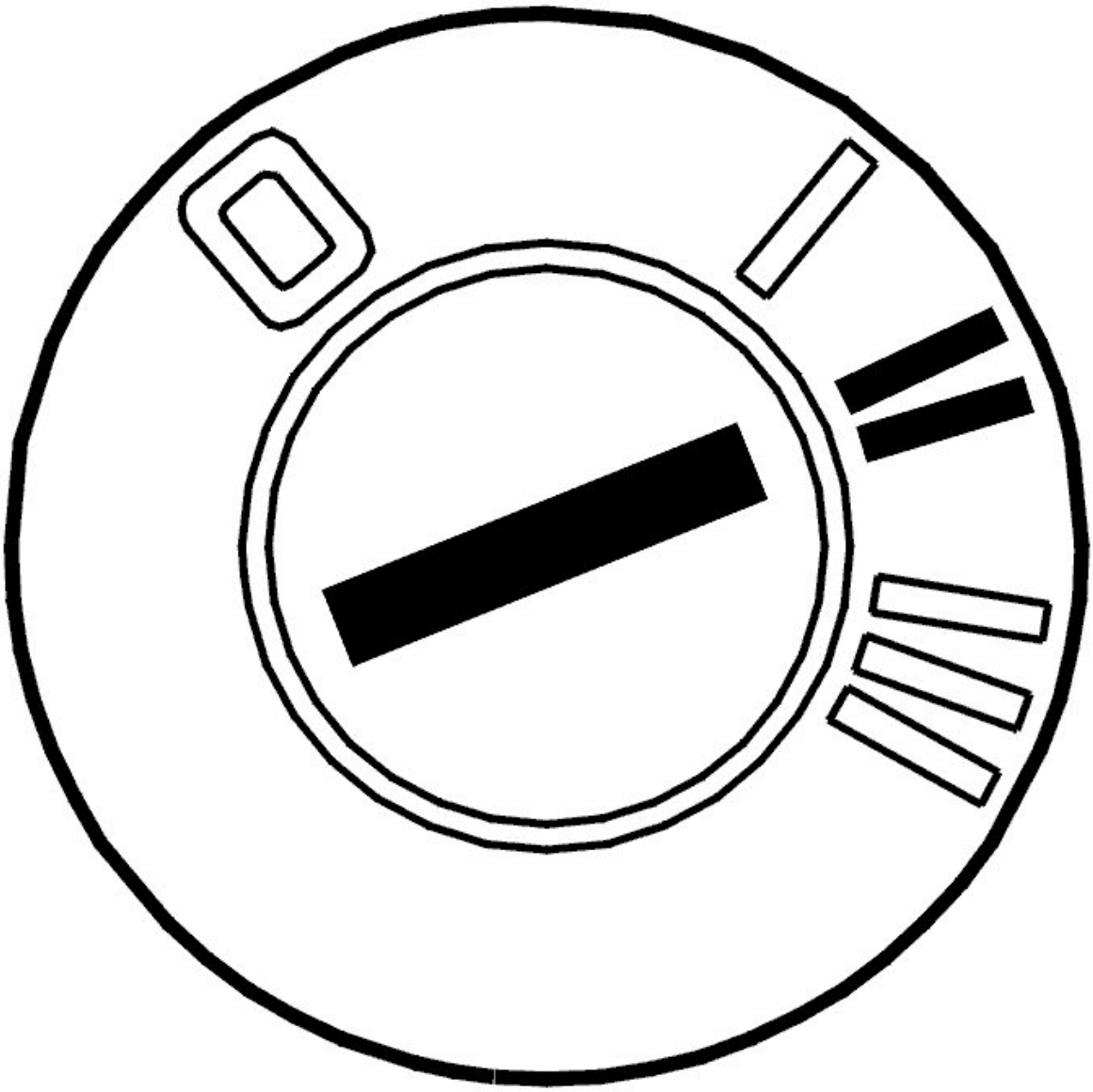
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.

- No lock-up function.
- Harsh gear shifting.
- No shifting.

Incorrect Gear Ratio

Incorrect gear ratio

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear selector.

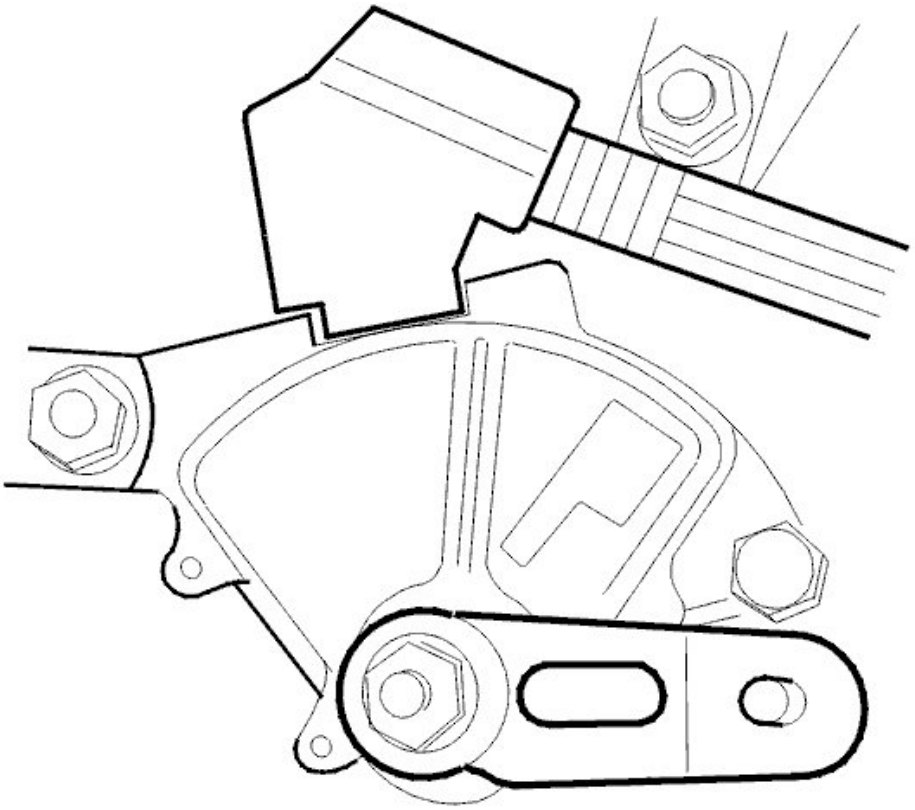
Move the gear selector into all positions. Check that the gear-shift positions are updated.

Hint: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- To adjust the gear-shift position sensor, see Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments.



Is the gear-shift position sensor incorrectly adjusted?

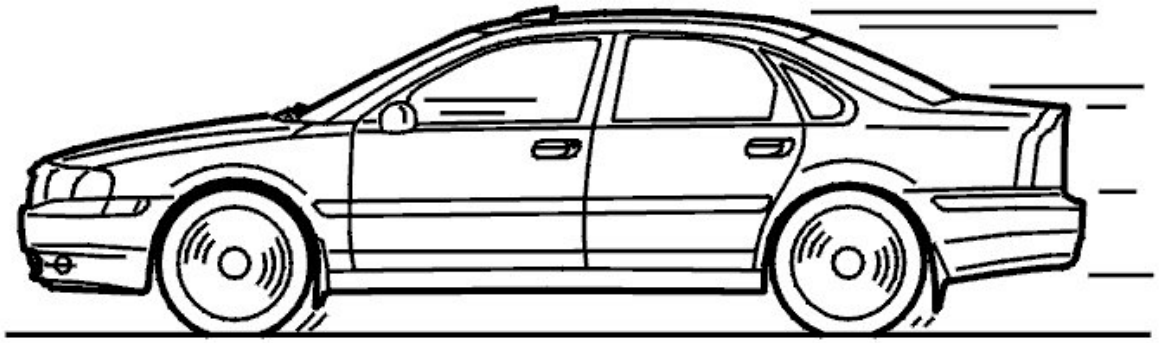
Yes - Verification

No - Checking for contact resistance and oxidation

Checking noise in the transmission

- Test drive the car. See
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

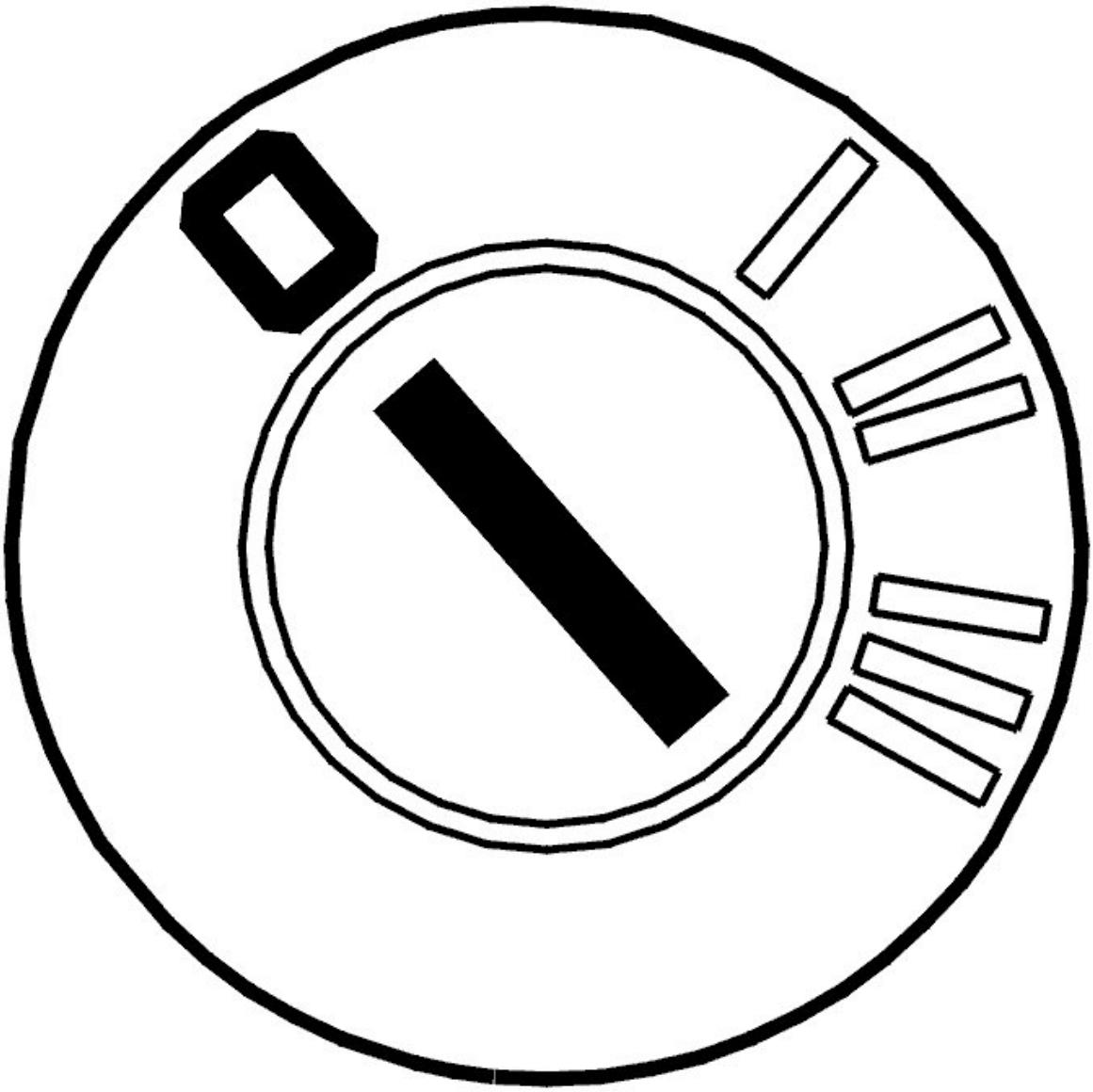


Is the transmission making a noise?

Yes - Replacing the transmission

No - Fault Found

Checking for contact resistance and oxidation

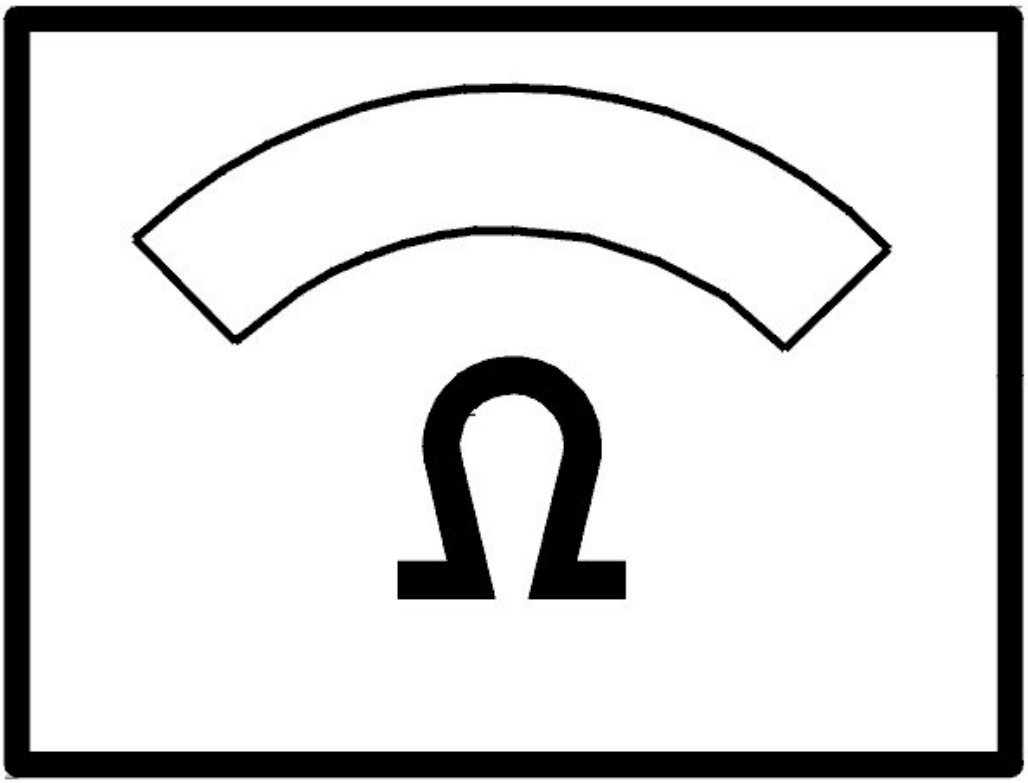


- Ignition off.

Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

Other information:

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures.

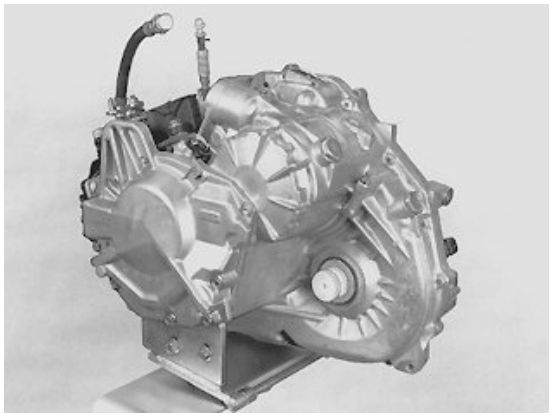


Continue - Checking noise in the transmission

Replacing the transmission

Note! In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

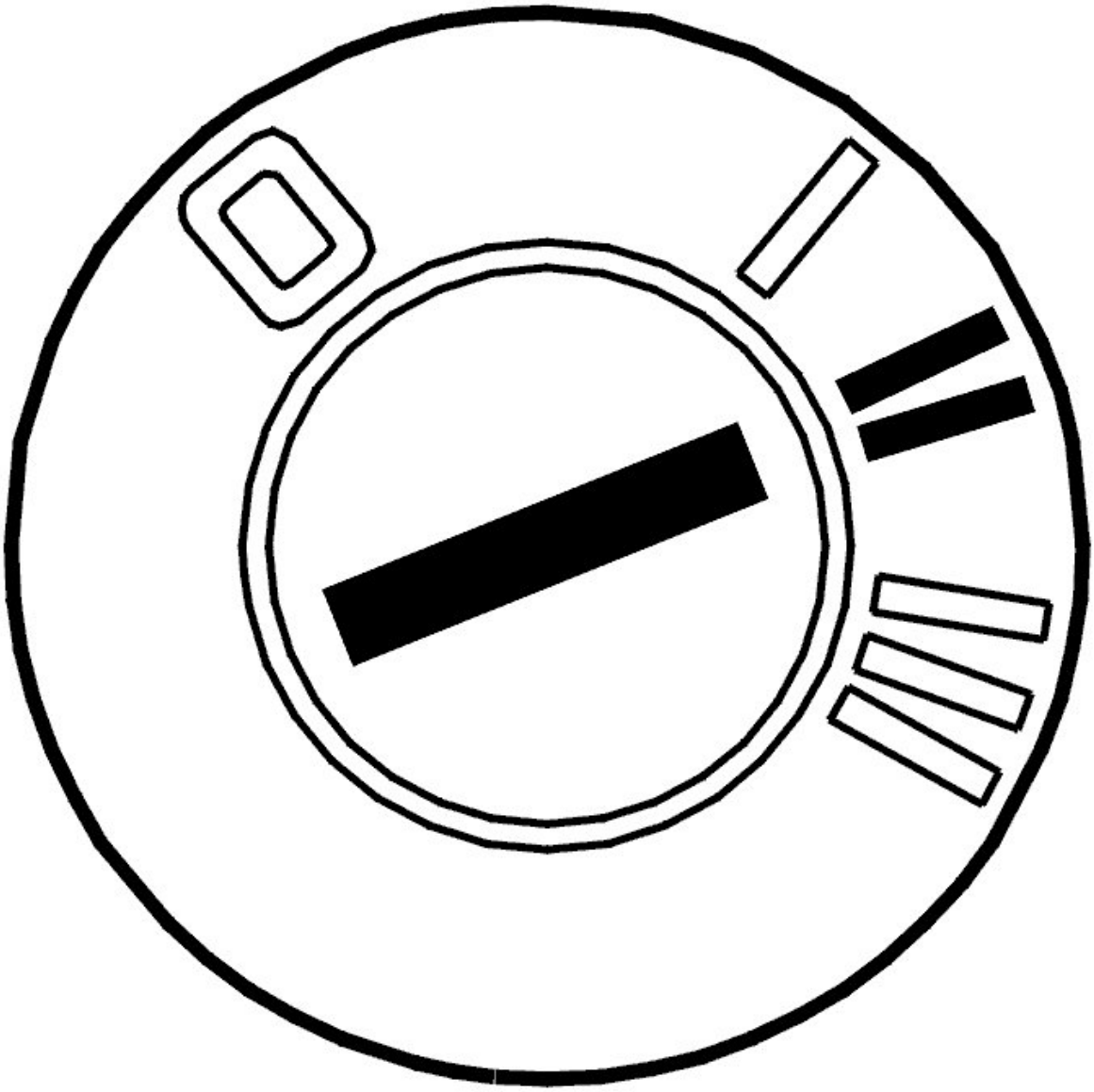


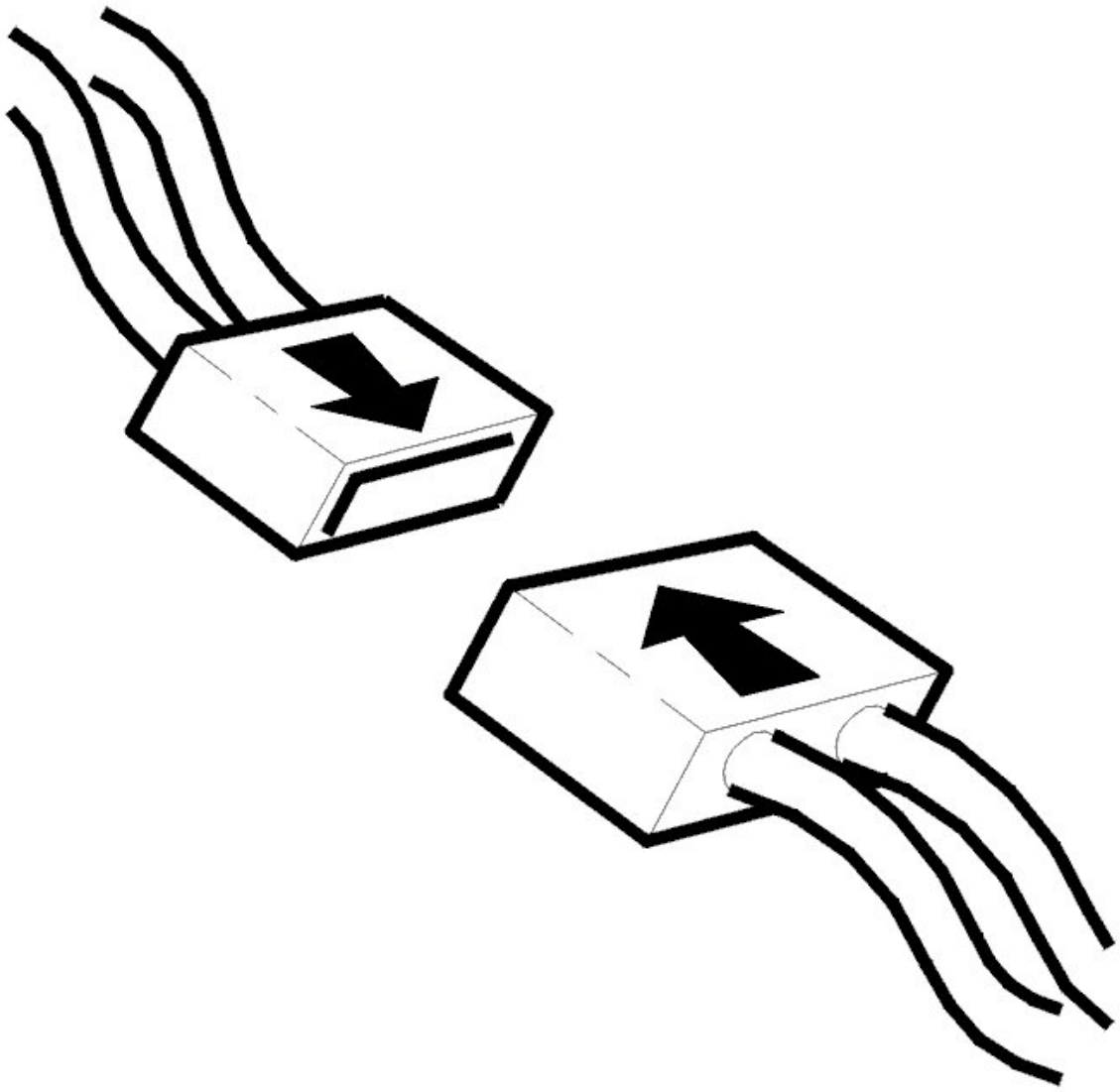
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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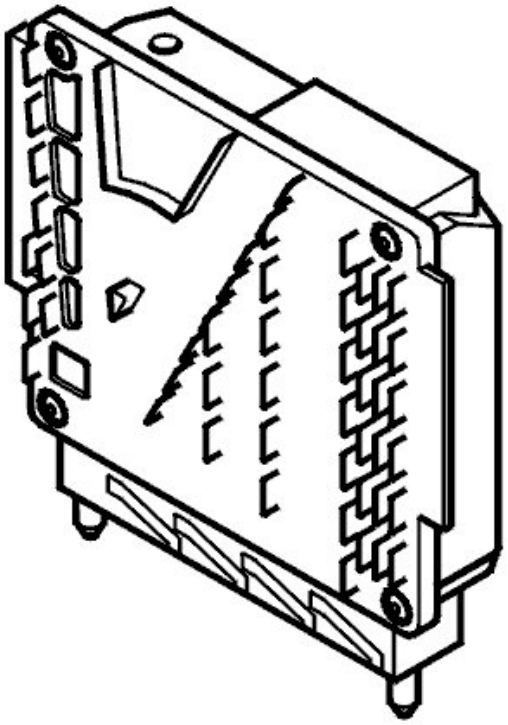
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002B is stored if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

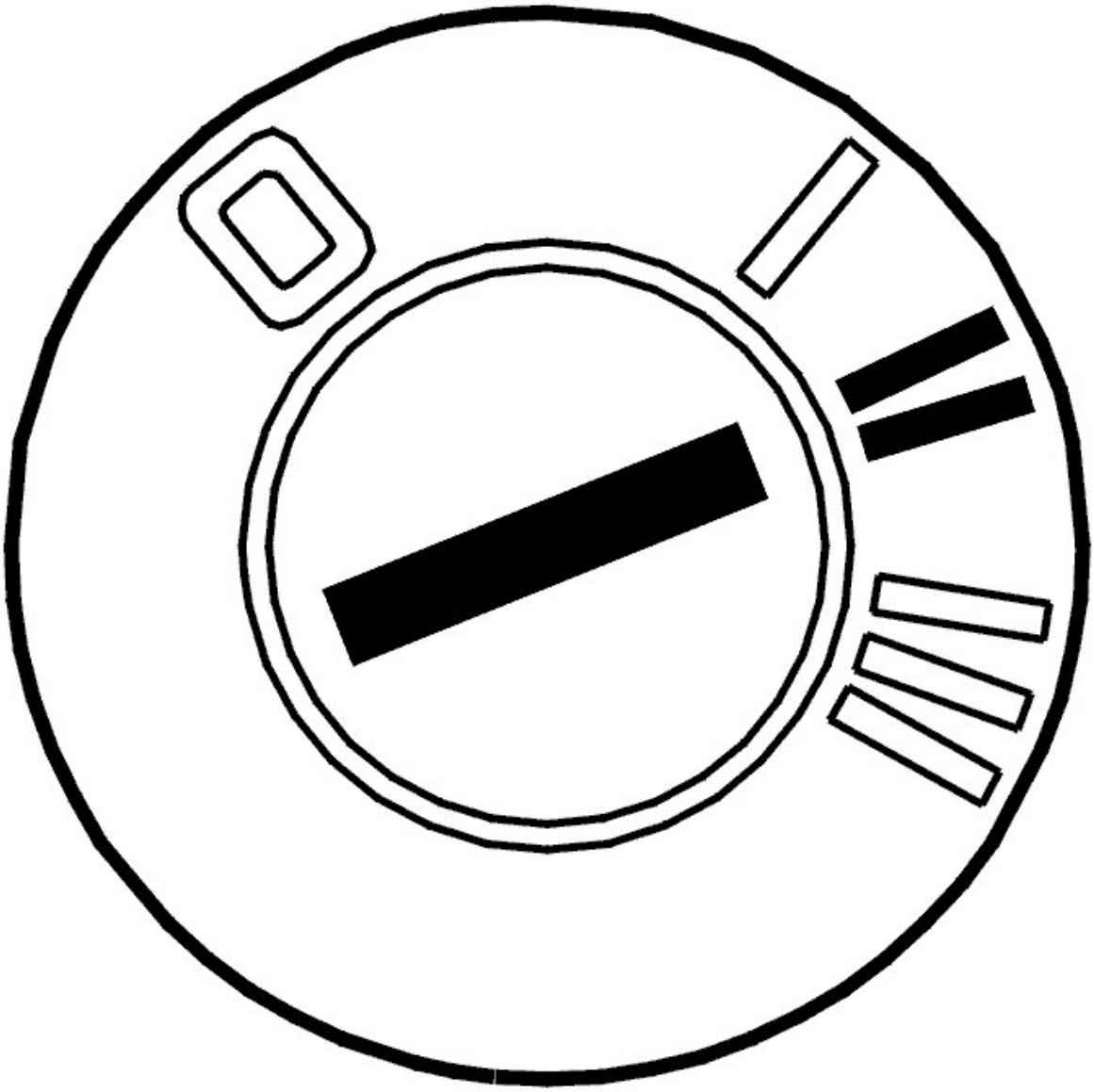
Fault symptom[s]

- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Incorrect Gear Ratio

Incorrect gear ratio

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear selector.

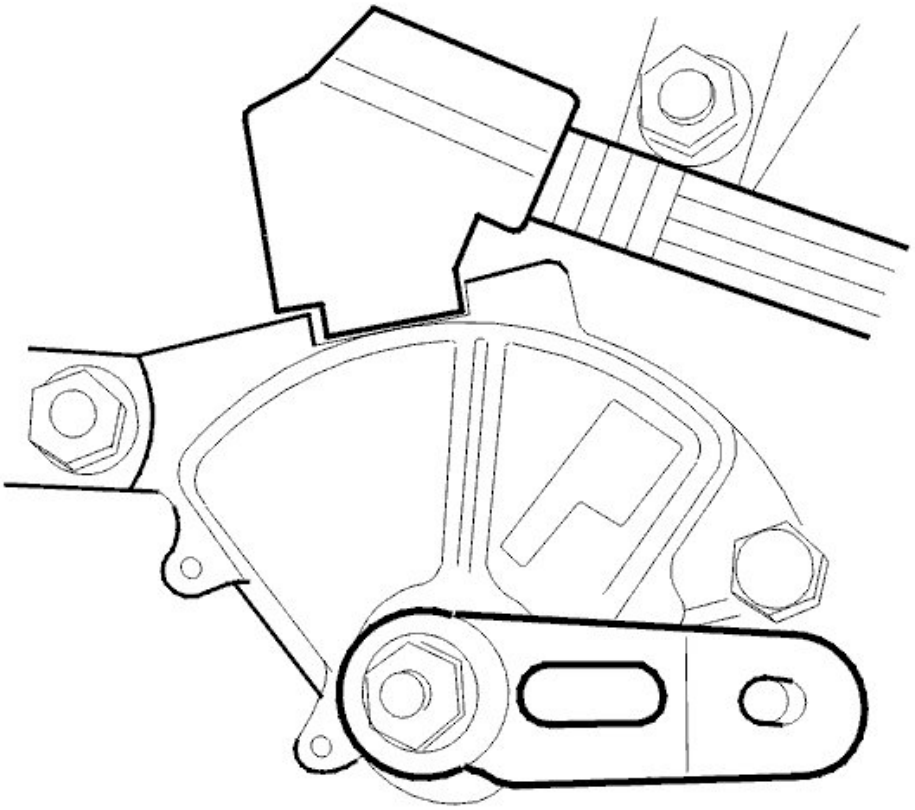
Move the gear selector into all positions. Check that the gear-shift positions are updated.

Hint: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- To adjust the gear-shift position sensor, see Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments.



Is the gear-shift position sensor incorrectly adjusted?

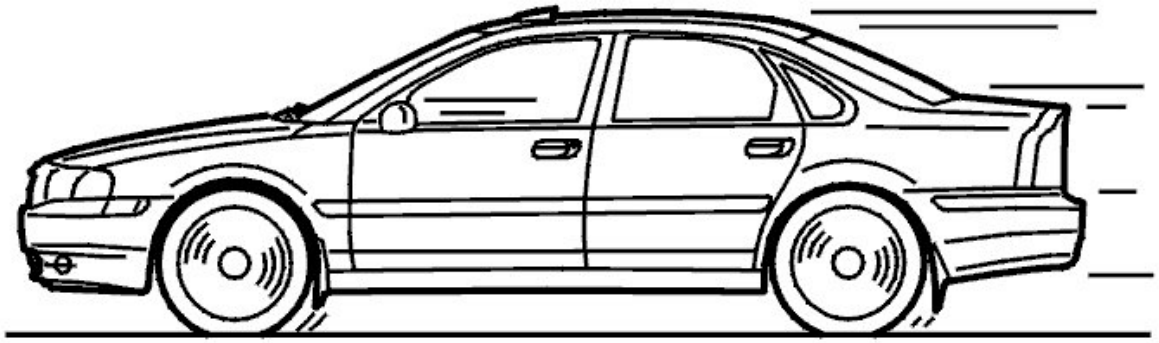
Yes - Verification

No - Checking for contact resistance and oxidation

Checking noise in the transmission

- Test drive the car. See
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

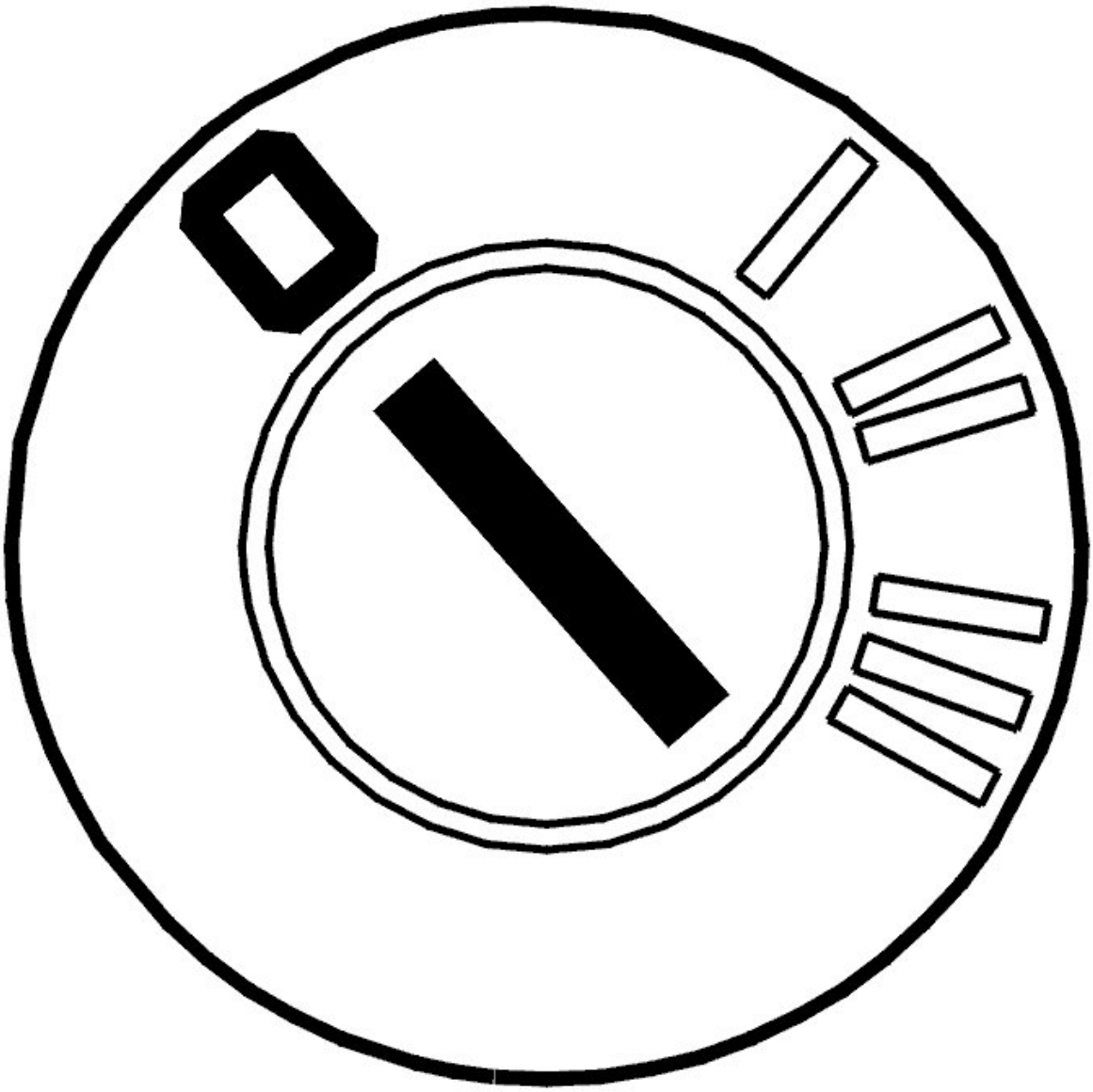


Is the transmission making a noise?

Yes - Replacing the transmission

No - Fault Found

Checking for contact resistance and oxidation

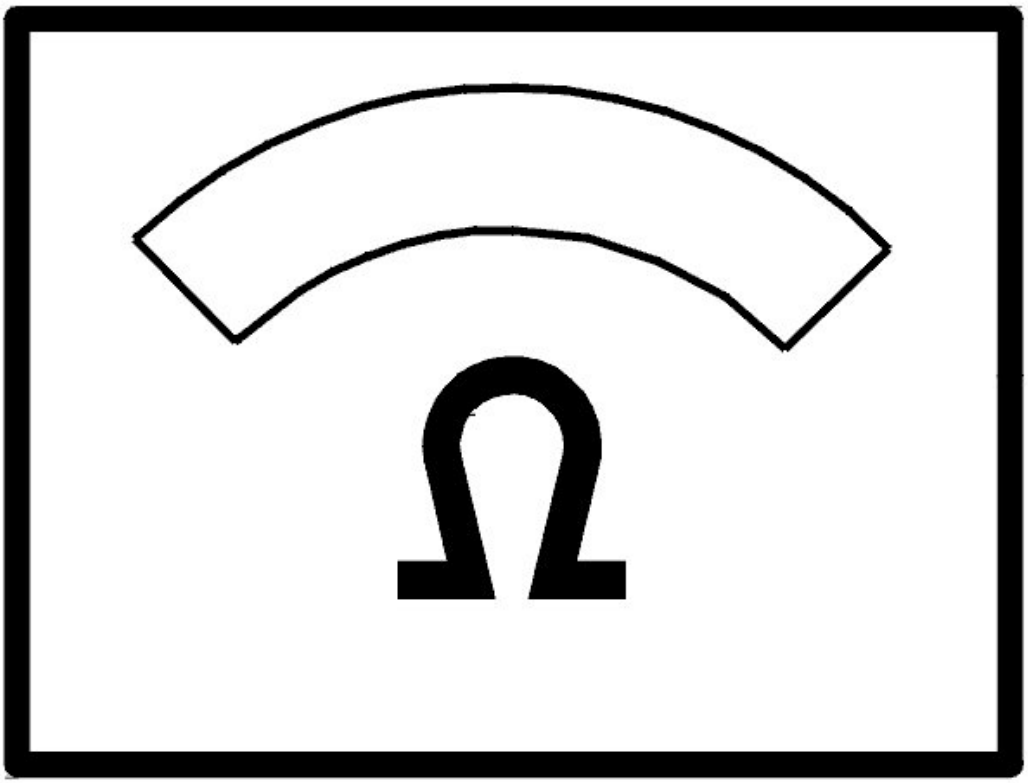


- Ignition off.

Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

Other information:

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures.

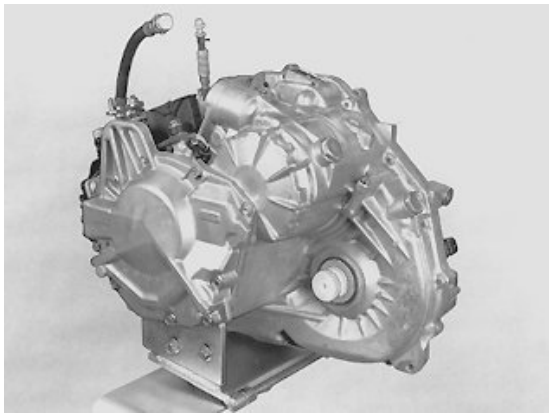


Continue - Checking noise in the transmission

Replacing the transmission

Note! In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

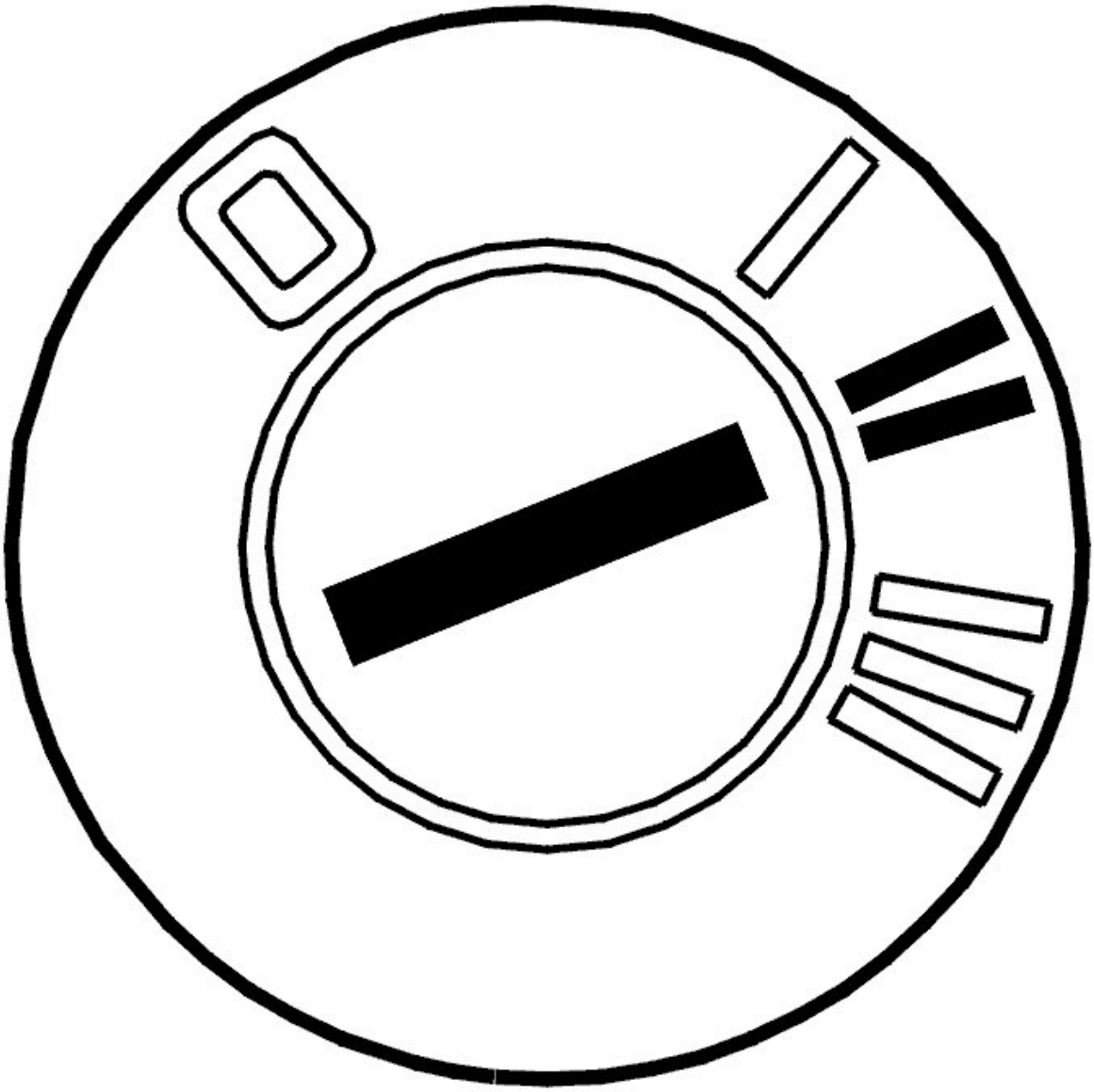


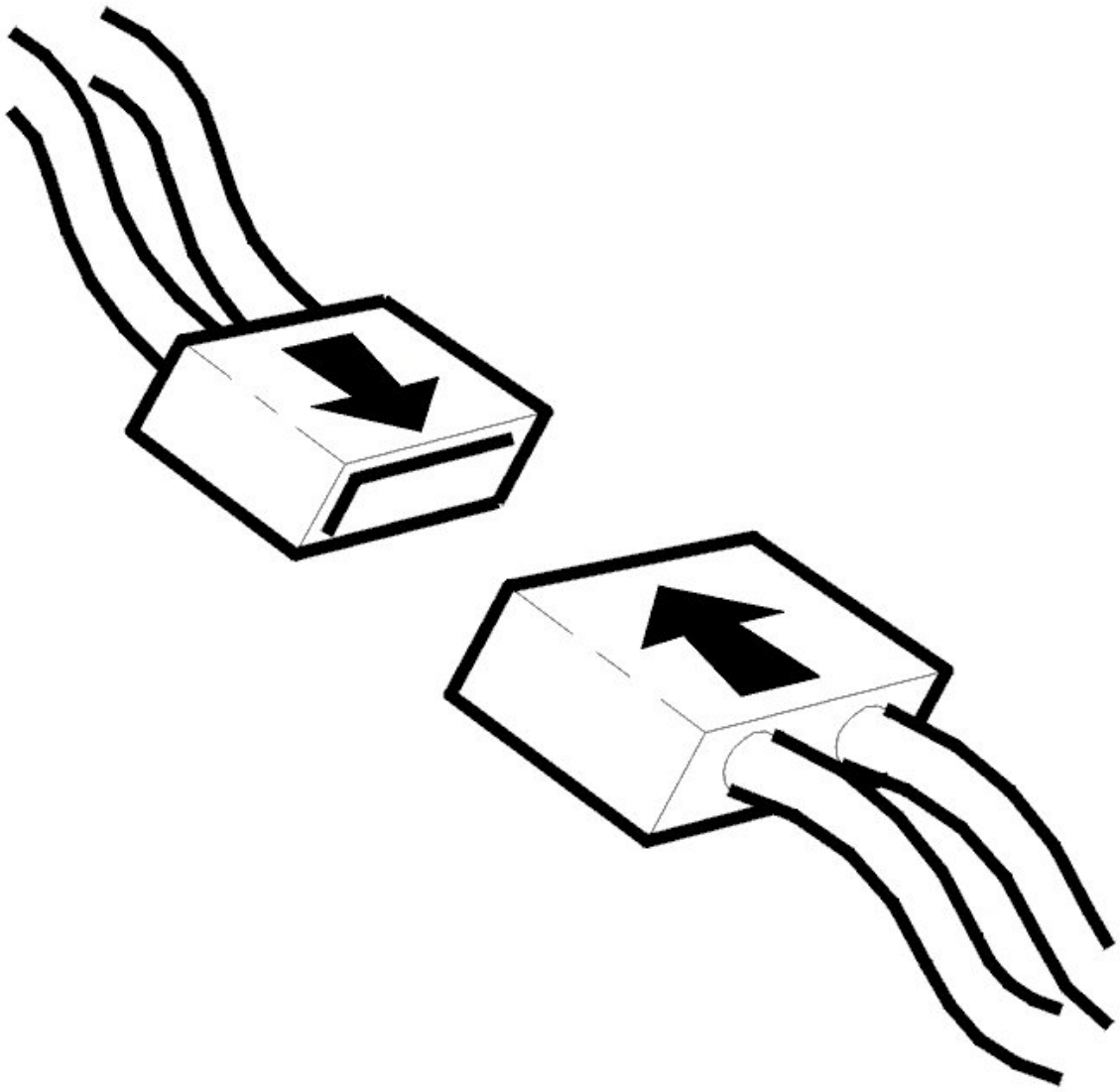
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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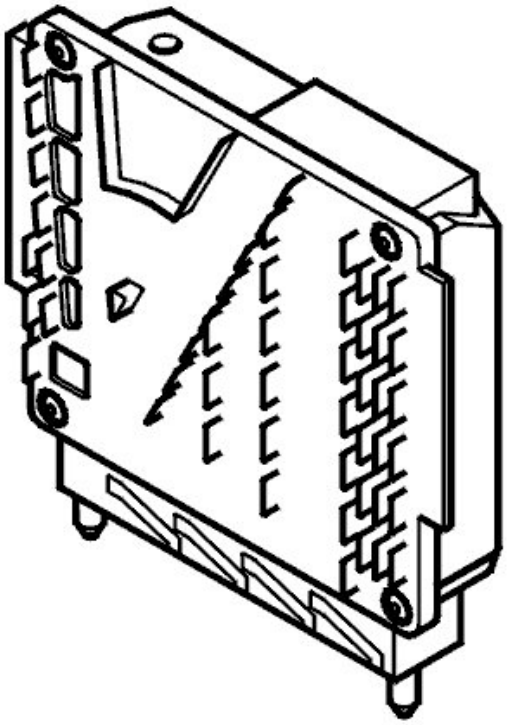
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission control module (TCM) calculates the ratio between the transmission input speed and the vehicle speed. There is a specific ratio for each gear. Diagnostic trouble code (DTC) TCM-002C is stored, depending on the gear, if the control module registers that the ratio deviates by more than 10 % when the oil temperature is above +20°C (68 °F) and throttle opening exceeds 3 %.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in the circuit for solenoids S1, S2, S3, S4, S5 and SLS.
- Solenoid S2 has jammed in the OFF position.
- Solenoid S3 has jammed in the ON position.
- Solenoid SLS jammed in the ON position.
- Mechanical fault in the transmission. Worn components in the transmission causing slippage or too low line pressure.

Fault symptom[s]

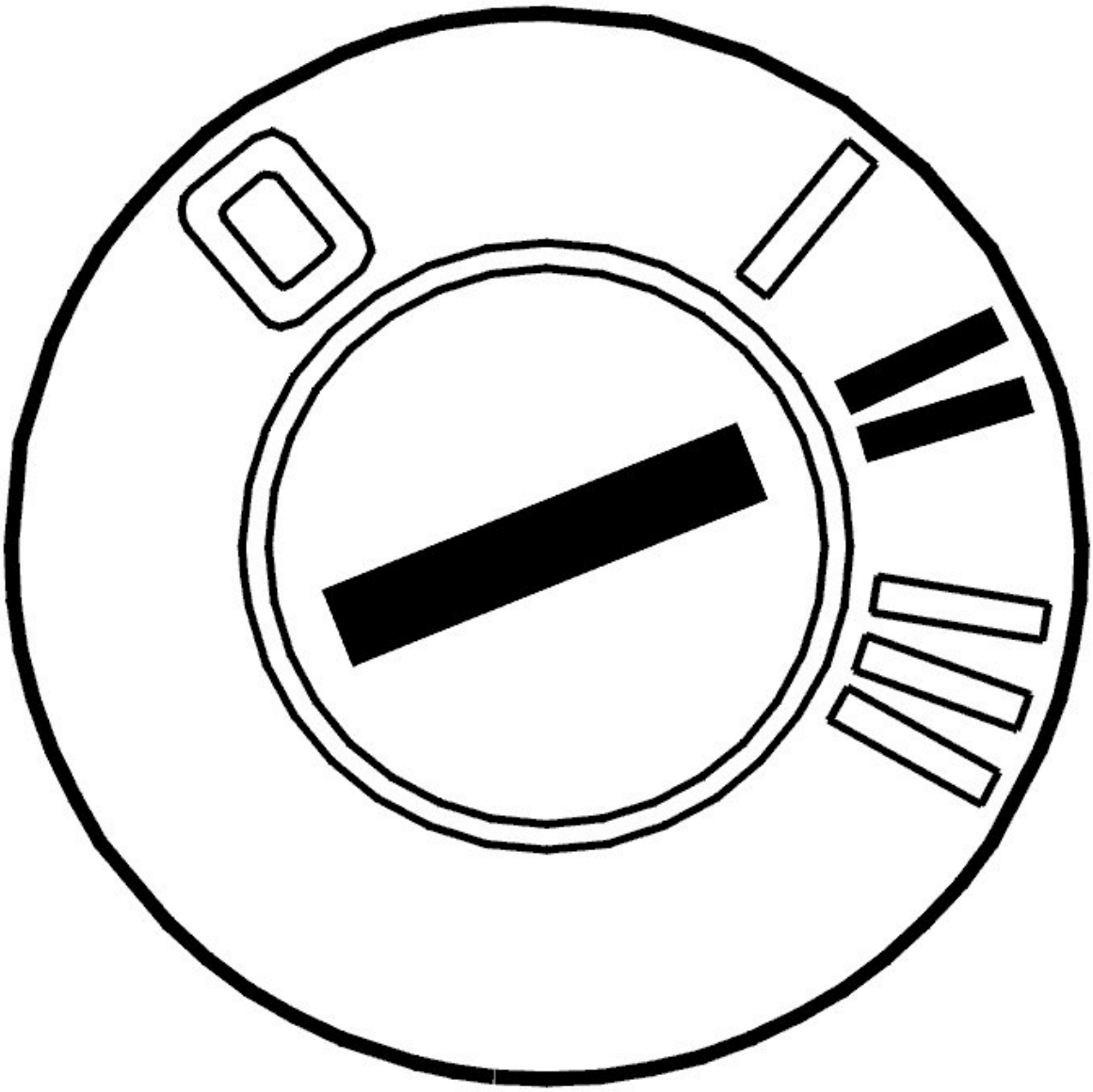
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.

- Harsh gear shifting.
- No shifting.

Incorrect Gear Ratio

Incorrect gear ratio

Checking the adjustment of the gear-shift position sensor



- Ignition on
- Read off the position of the gear selector.

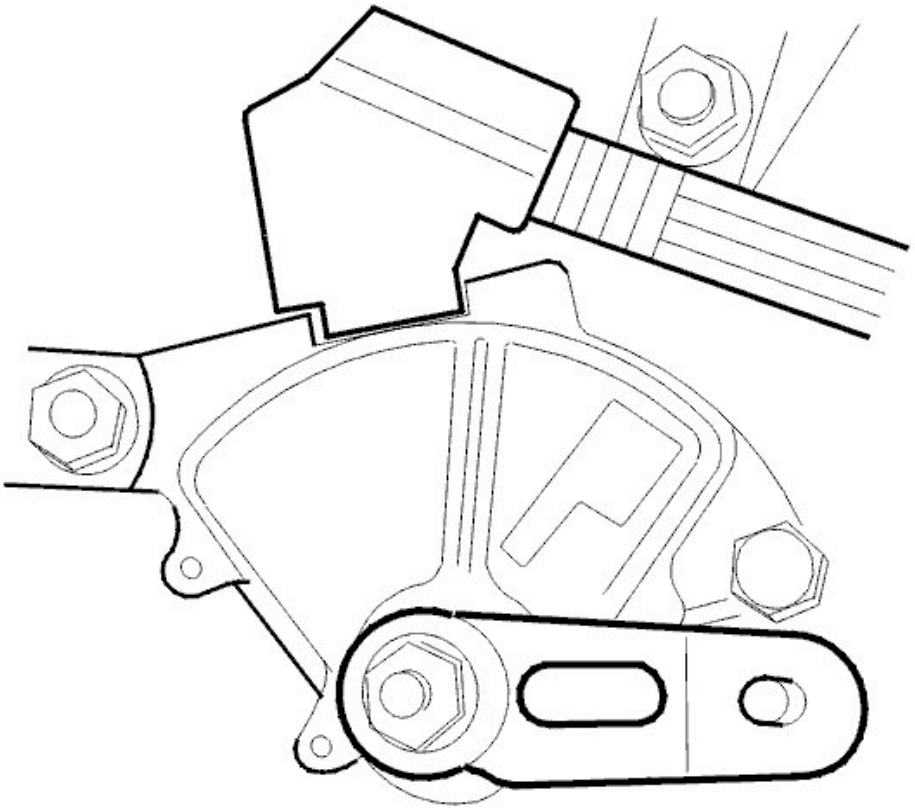
Move the gear selector into all positions. Check that the gear-shift positions are updated.

Hint: If the display shows an undefined position (O2 for example) the gear position sensor is incorrectly adjusted.

Remedy as necessary

Other information:

- To adjust the gear-shift position sensor, see Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments.



Is the gear-shift position sensor incorrectly adjusted?

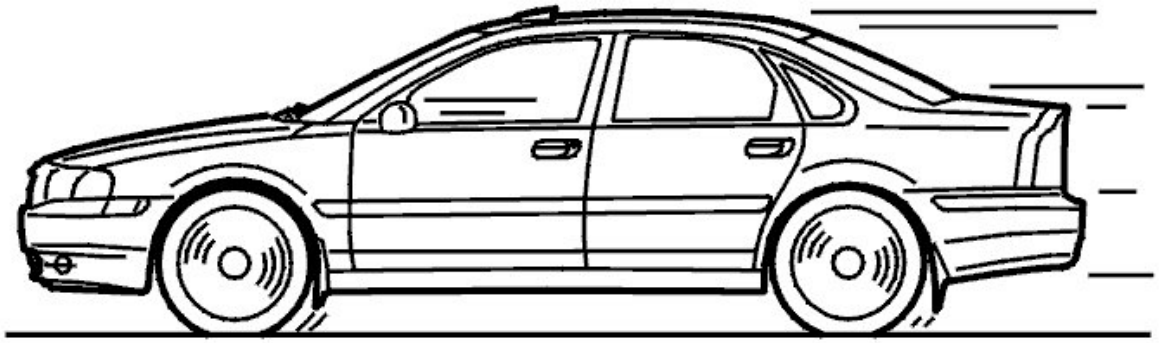
Yes - Verification

No - Checking for contact resistance and oxidation

Checking noise in the transmission

- Test drive the car. See
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

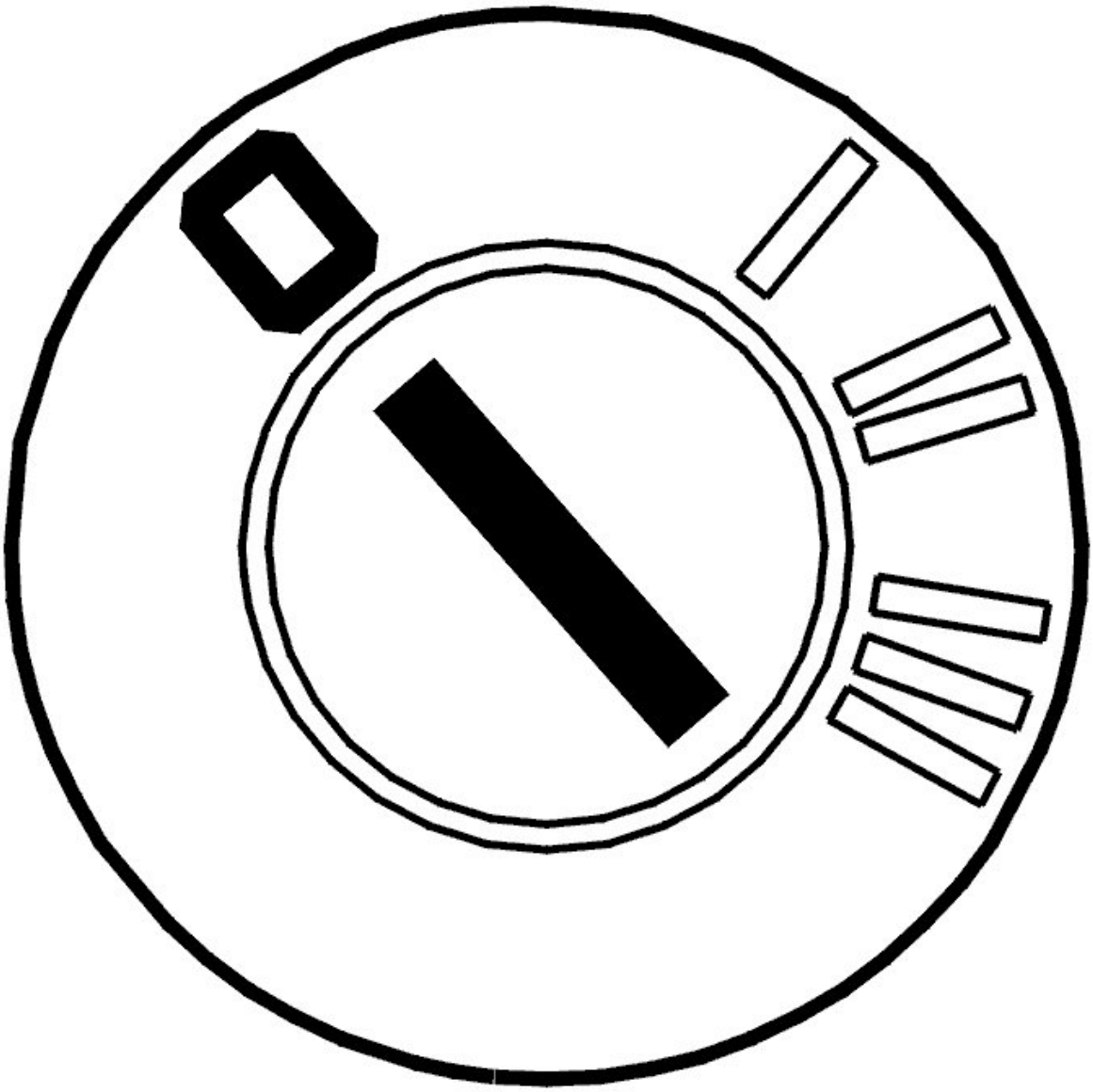


Is the transmission making a noise?

Yes - Replacing the transmission

No - Fault Found

Checking for contact resistance and oxidation



- Ignition off.

Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

Other information:

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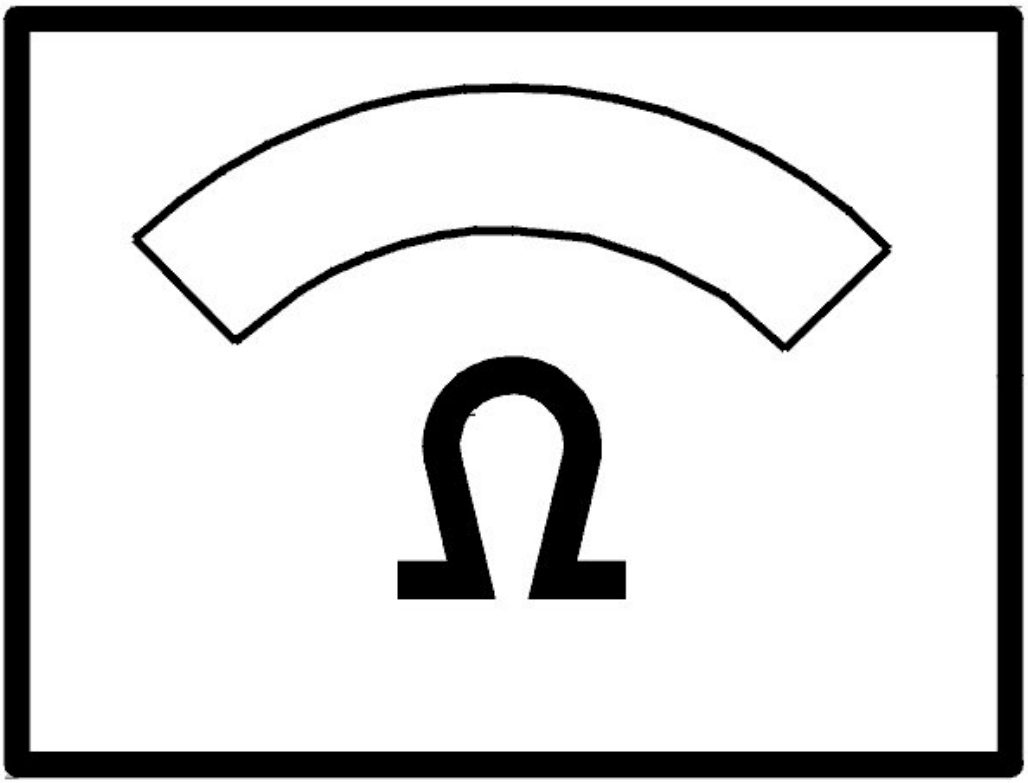
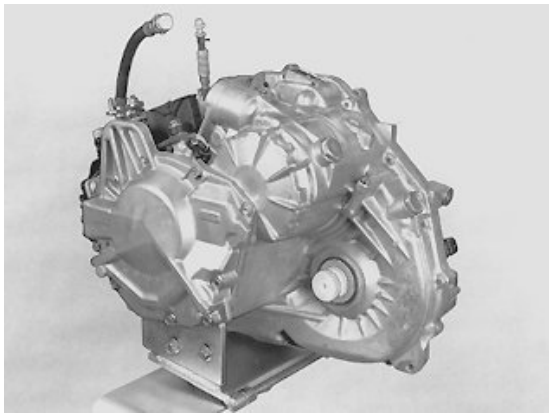


Continue - Checking noise in the transmission

Replacing the transmission

Note! In the event of faults during the first year on the market, replace transmission AW55-50SN.

Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.

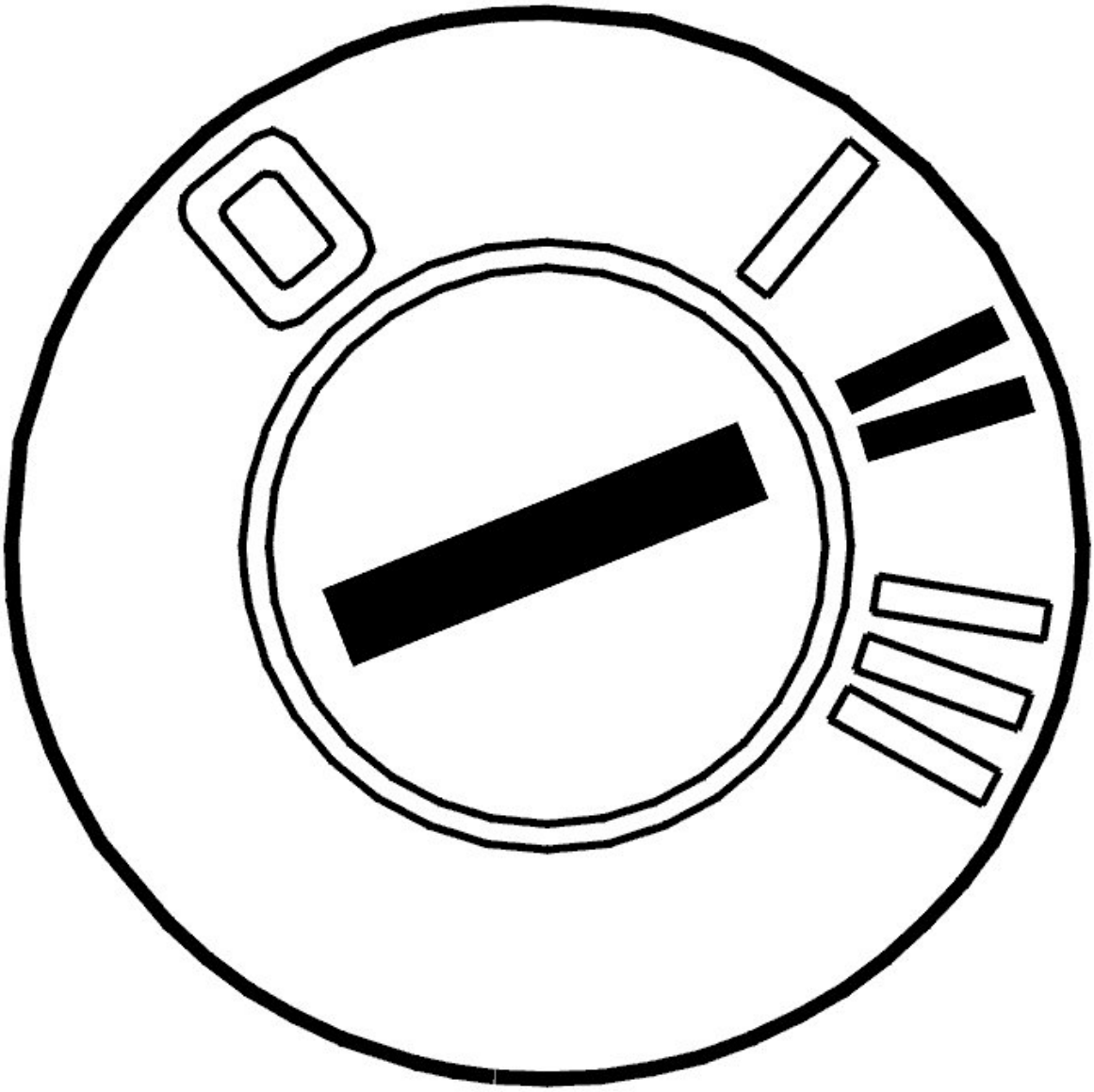


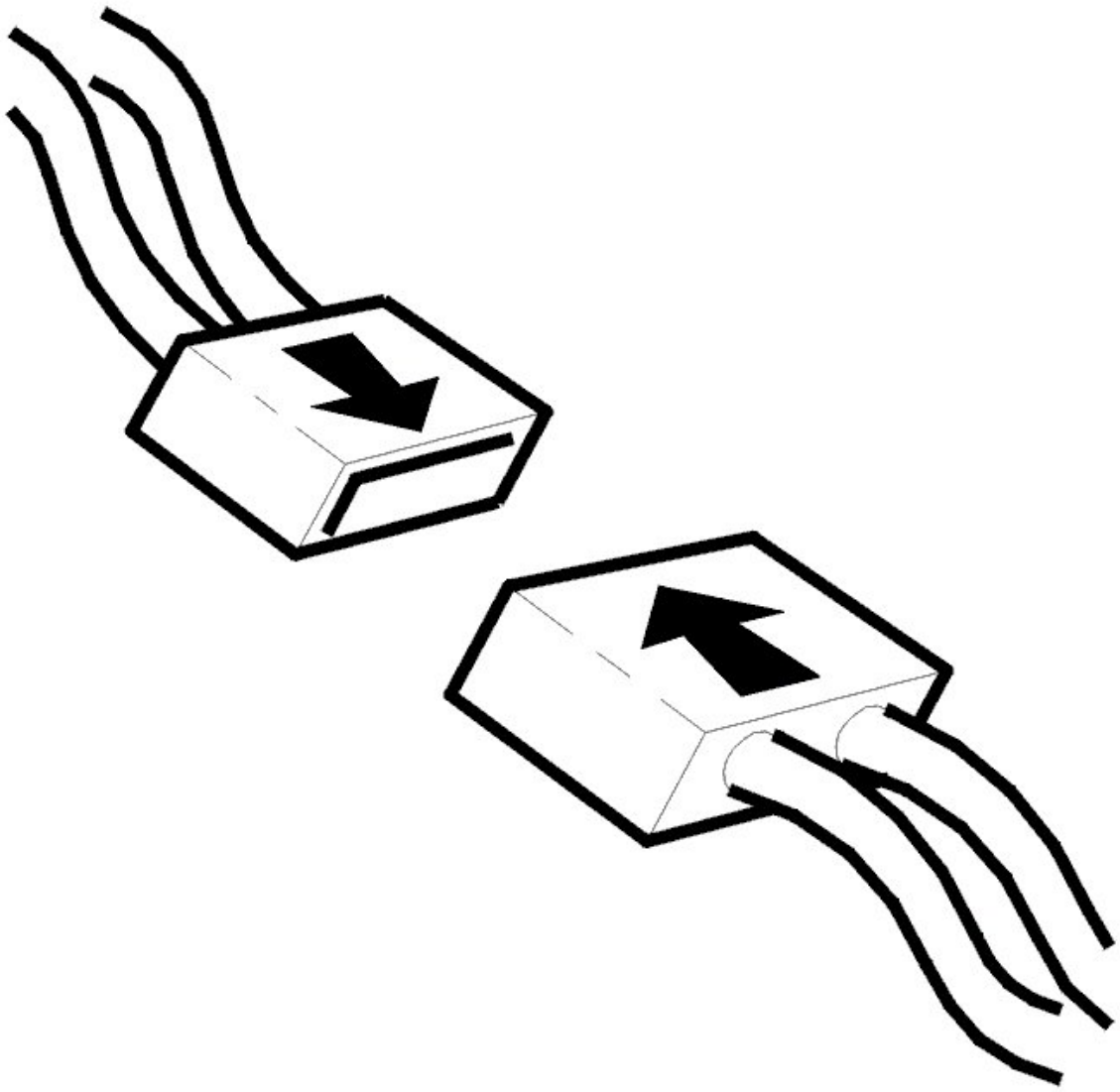
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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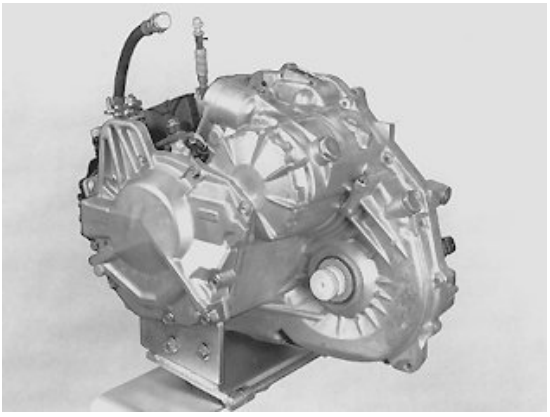
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The diagnostic trouble code (DTC) is stored if the control module repeatedly registers vibrations from slipping lock-up during a number of cycles.

Substitute value
- Slipping lock-up shuts off temporarily.

Possible source
- Poor quality transmission fluid.
- Glycol in the transmission fluid.
- Worn torque converter.
- Mechanical fault in the transmission.

Fault symptom[s]
- Cooling fluid consuption; High
- Vibrations
- Rough gear shift

The Transmission Jerks When Lock-Up Engages

The gearbox jerks when lock-up engages

Checking for the fault

Has the customer complained of vibrations?

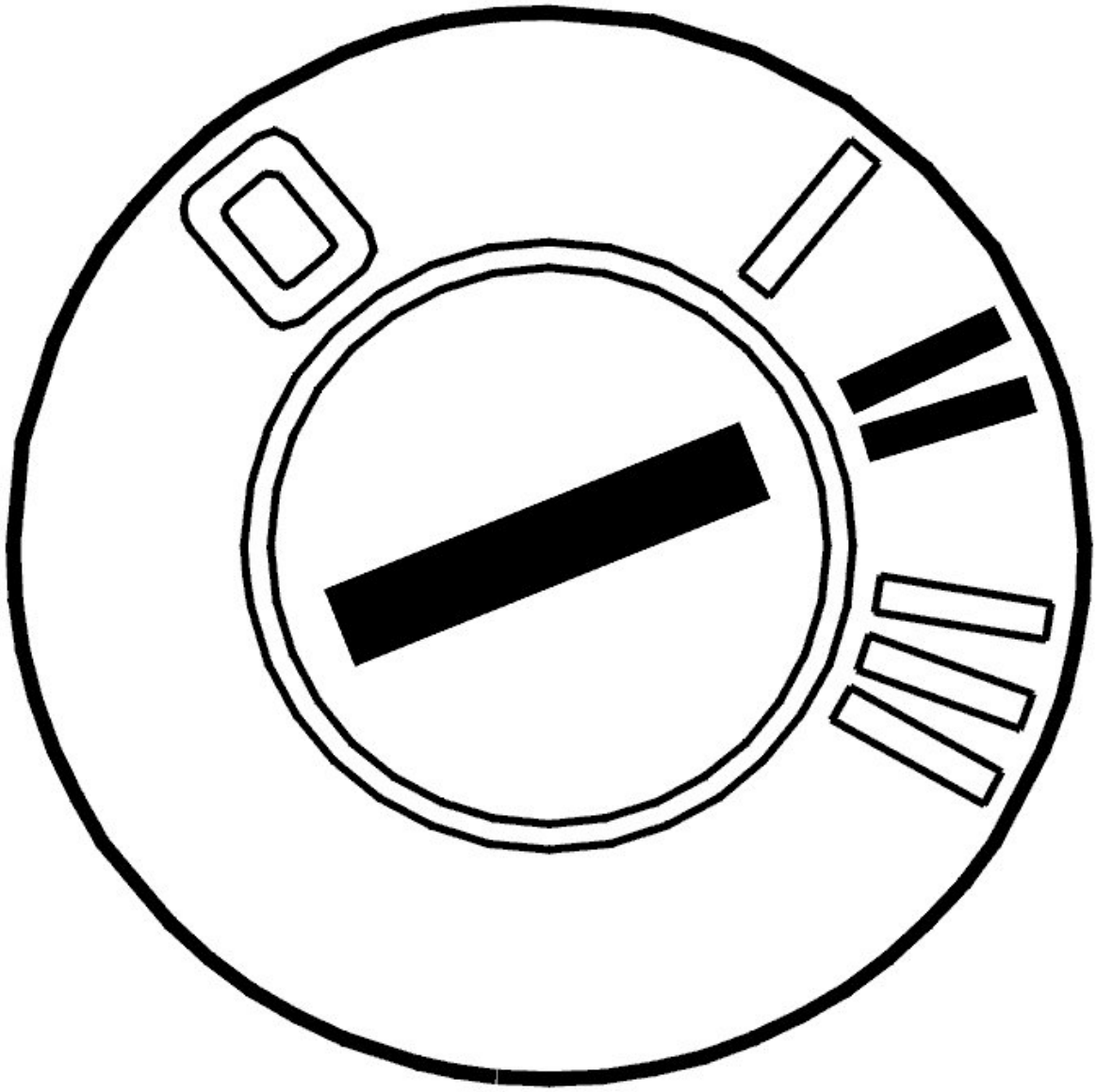
Yes - Checking oil quality and oil level in transmission

No - Fault-tracing without result

Checking oil quality and oil level in transmission

Note! Transmission fluid quality and level are extremely important for the function of the transmission. Therefore it is imperative that

these are correct. In addition the oil level is dependent on oil temperature.



- Ignition on.
- Read off the oil temperature.

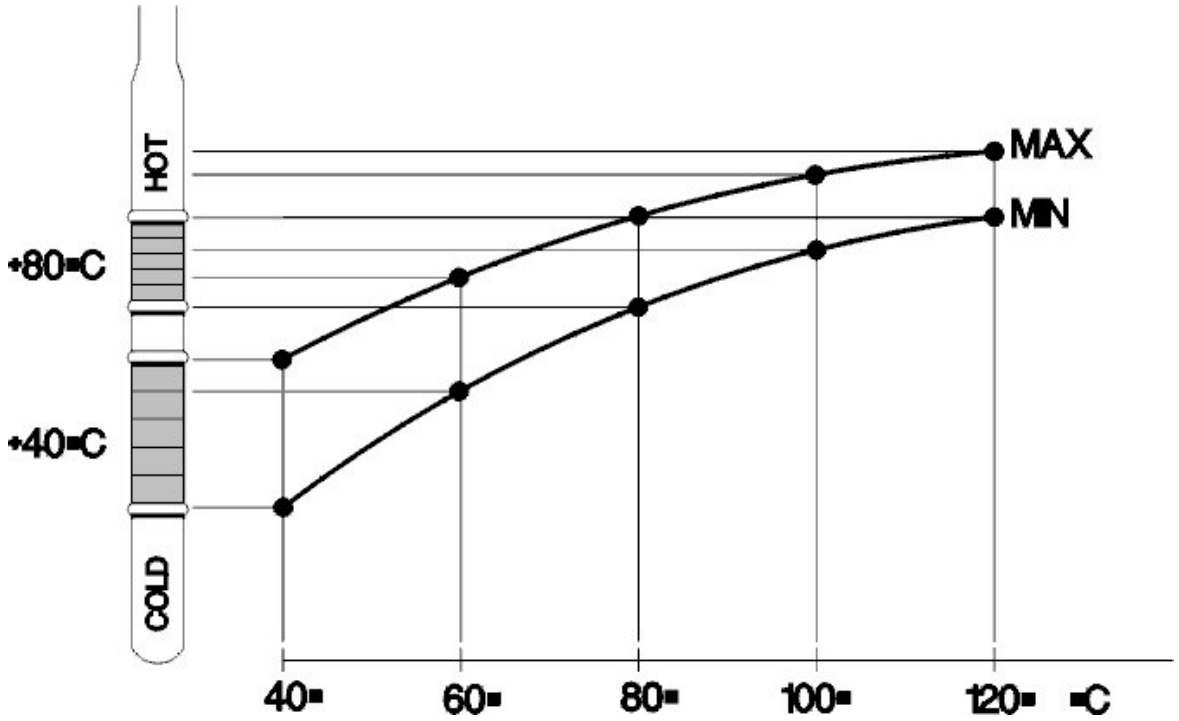
Check the oil level. If the oil level is low, check the transmission for leakage, then top up with oil.
Check the oil's quality.
If the oil smells burnt, change transmission oil.
Check the transmission fluid for metal swarf. Take a sample using the dip stick.
Replace the transmission if the transmission fluid contains metal swarf.

Other information:

- Gearbox fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing
- Oil level, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Transmission Oil Level - Checking
- Oil grade, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Oil Grade, Checking

Select an alternative below:

1. No defect found.
2. Transmission oil changed, level low or quality poor.
3. The transmission fluid contains metal swarf.



1 - Checking the cooling system

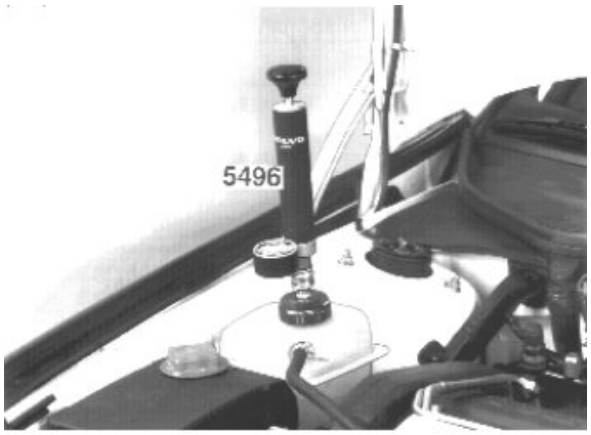
2 - Resetting the oil quality counter

3 - Replacing the gearbox

Checking the cooling system

- Perform the following check.

Test pressurization See: Engine, Cooling and Exhaust/Cooling System/Testing and Inspection



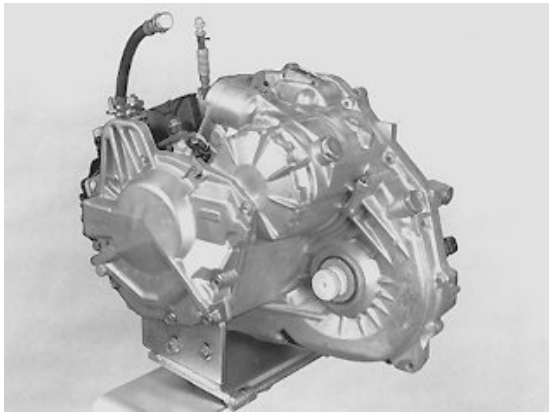
Does the pressure drop?

Yes - Checking the cooling system

No - Checking software

Replacing the gearbox

Earlier tests indicate that there is a fault in the transmission.
Replace transmission. See:
Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation



Continue - Resetting adaptation and the fluid quality counter

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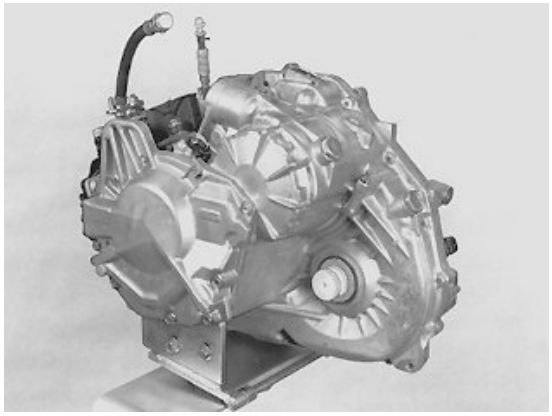
Checking software

Check that the control module has the latest version of the relevant software.

- If new software is available, download to the control module and then select Continue.
- If the control module already has the latest software select Continue.



Continue - Test driving the transmission

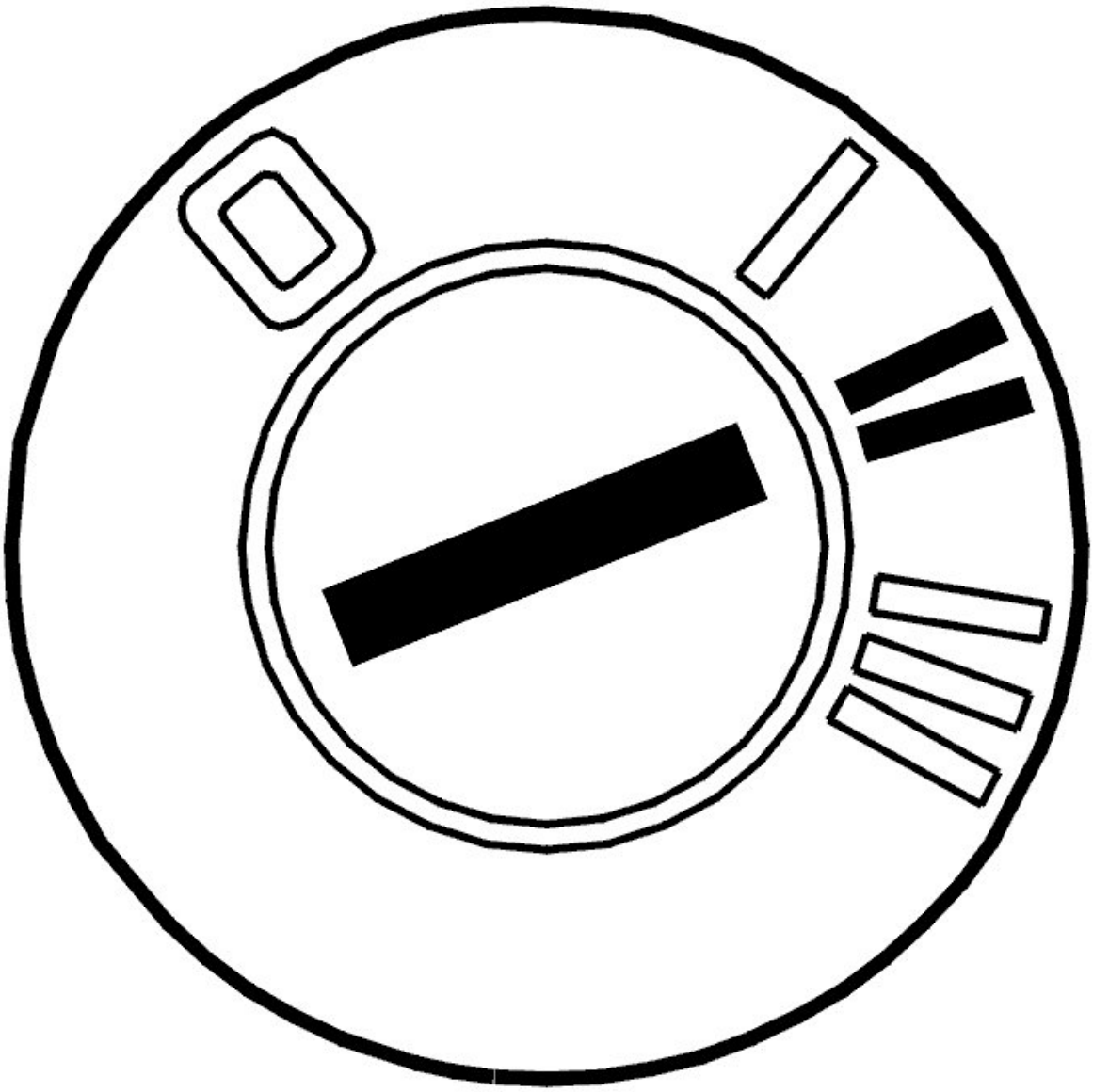
Resetting the oil quality counter

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

Continue - DONE

DONE - Verification

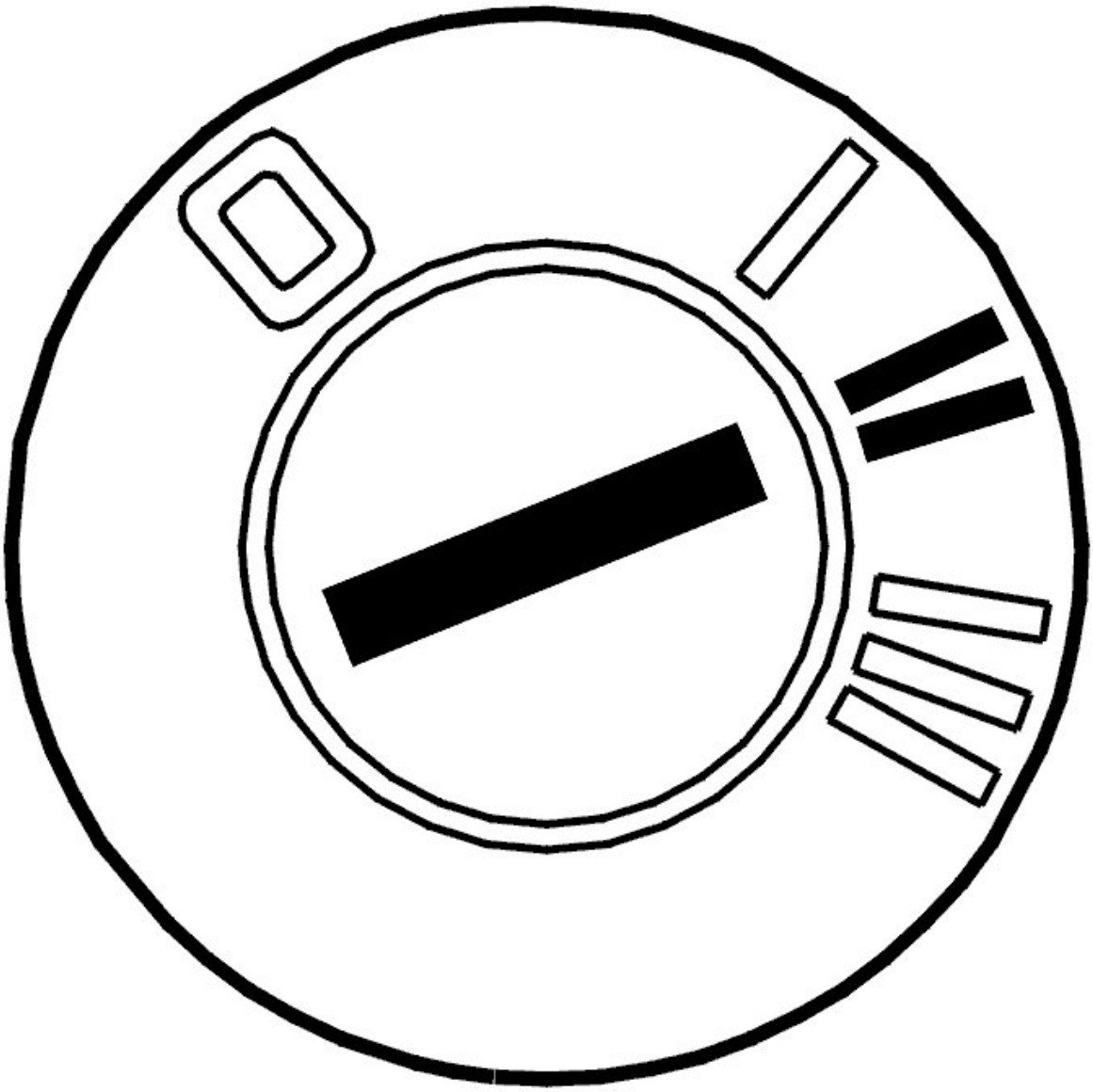
Resetting adaptation and the fluid quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

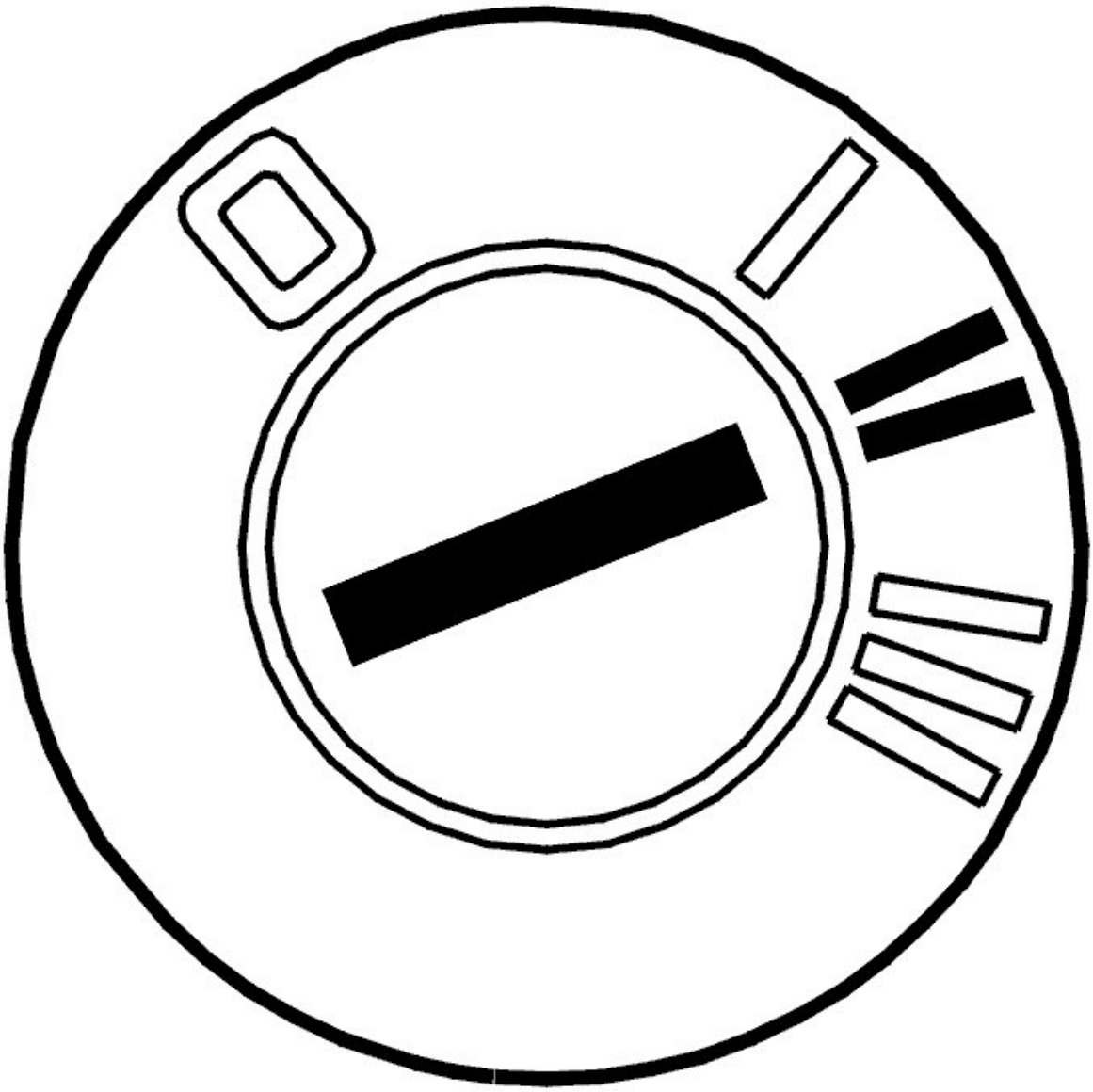
Continue - **DONE**

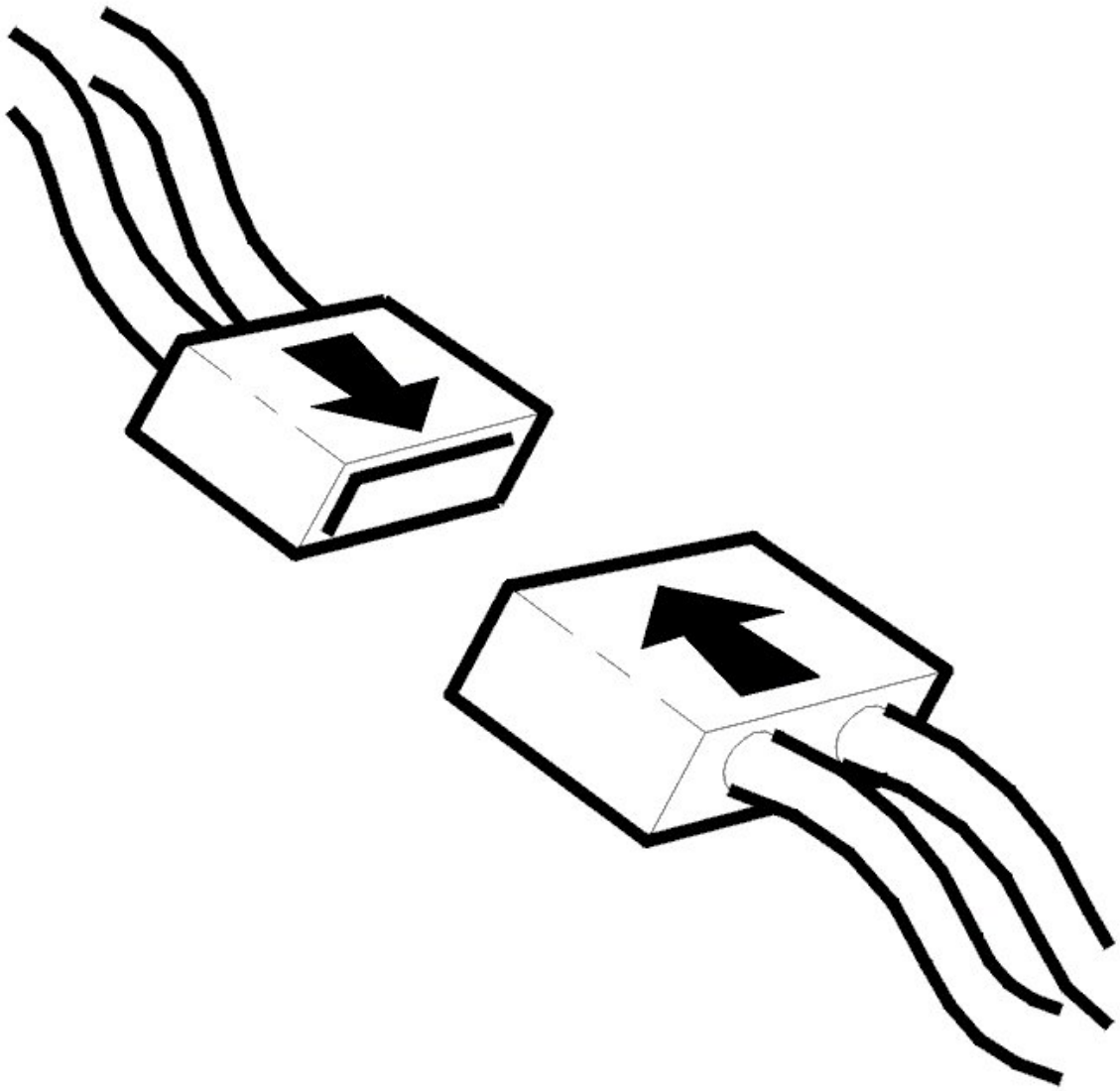
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Ignition on.

Test drive the vehicle following:
Test-drive schedule TCM-002E AW55-50/51SN, AW55-50/51SN See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/TCM Codes (Transmission Control Module)/TCM-002E/Test-Drive Schedule
During the test drive the oil temperature must be above 20°C.
Look out for any irregularities in the function of the transmission.

Is the transmission operating correctly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Troubleshooting information

VERIFIED - Fault Found

Troubleshooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for the fault

Fault-tracing without result

The diagnostic trouble code (DTC) indicates that a fault occurred previously but that the fault is no longer present.
No further corrective action is required if the diagnostic trouble code (DTC) is intermittent and does not recur.

Select "Continue" to exit.

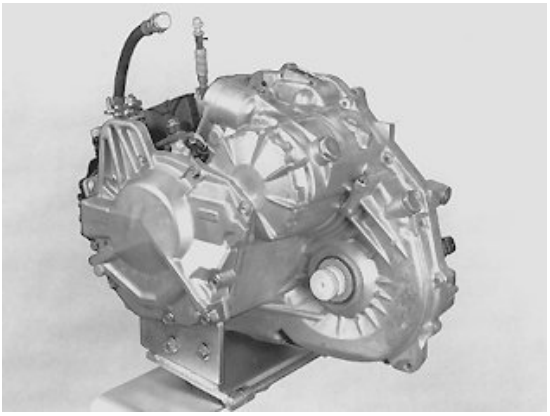
Continue - No Fault Found

Checking the cooling system

Ensure that the leak is the cause of the coolant coming in contact with the transmission oil by checking the quality of the oil.
If the quality of the transmission fluid had deteriorated due to leakage from the cooling system, replace the transmission, radiator, hoses and expansion tank as below.

Other information:

- Oil grade, checking, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Oil Grade, Checking
- Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
- Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation
- Radiator / charge air cooler (CAC), replacement See: Fuel Delivery and Air Induction/Turbocharger/Intercooler/Service and Repair/Radiator / Charge Air Cooler (CAC), Replacement



Select "Continue" when you are ready.

Continue - Resetting adaptation and the fluid quality counter

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Replacing the torque converter

- Ignition off.

Replace the torque converter.
Remedy as necessary.

Other information

- Replacing the sealing ring for the oil pump See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Seals and Gaskets/Service and Repair/Replacing the Sealing Ring For the Oil Pump

Continue - REPAIRED

Test driving the transmission

Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description

Was any corrective action taken?

Yes - DONE

No - Replacing the torque converter

Test-Drive Schedule

Test-drive schedule TCM-002E AW55-50/51SN

Perform the following test-drive:

Note! Read through the whole document before starting to test-drive.

1. Check the oil temperature in the transmission via read-out. Suitable temperature range is 40-65 °C.
2. Start Activation of gear indication. See, Diagnostics/Vehicle communication/Advanced.

   Note! The activation only applies during one driving cycle.

3. Drive the vehicle with light load, approx. 60 km/h (37 mph) in 4th gear (engine speed approx. 1600 rpm). Check status of lock-up via control light IND.

   Hint: The problems occur at slipping lock-up (IND-light flashes).

4. When the IND-light flashes, throttle up slightly on a slight uphill grade. Pay attention to if a brief vibration occurs, and that slipping lock-up is turned off. The engine speed should increase by approx. 500 rpm.

   Vehicles with GearTronic lever carrier:
   1. Perform the same step as above once more with the gear lever in GearTronic-position with 4th gear selected. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.

   Vehicles with standard lever carrier:
   - Perform the same step as above but with the gear lever in position 3. Try also to keep the engine in the same engine speed range as during the previous check. In this position, slipping lock-up will not be possible, only locked lock-up. Then the indicator light will be on with a steady glow.
1. Check if the vibrations follow the speed or if they are brief vibrations.

Note! It is likely that no new diagnostic trouble code will be stored as the diagnosis requires that the malfunction occurs during a number of driving cycles to enable storing of the diagnostic trouble.

Perform one of the alternatives below:

1. Vibrations occur both at slipping and locked lock-up: replace transmission.
Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation
2. Vibrations only occur at slipping lock-up: replace torque converter.

3. Vibrations only occur at locked lock-up: replace transmission.
Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation

4. Vibrations follow the speed:

Investigate other components, such as tire imbalance and similar.

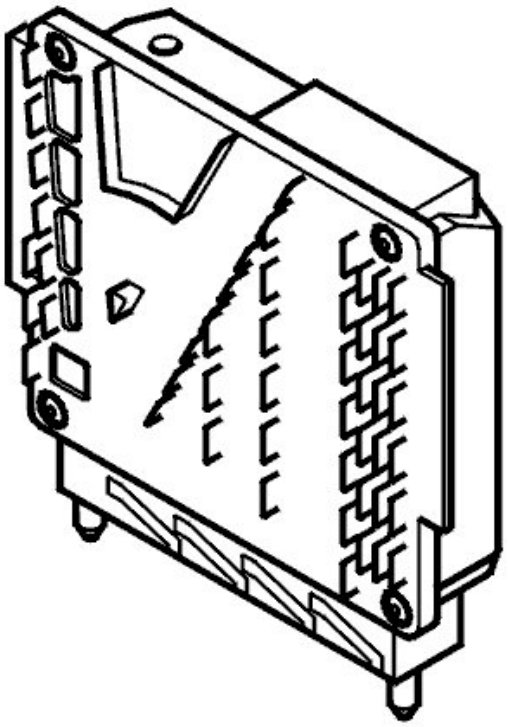
5. No vibrations can be detected:

No further troubleshooting is required.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



The automatic transmission checks that lock-up is not engaged or slips by comparing the rpm signal from the transmission speed (rpm) sensor to the engine speed. The signals must then show the same calculated speed (rpm). If the control module detects that the engine speed (RPM) signals do not correspond with the programmed values, it means that lock-up is slipping or does not engage in the locked position. The diagnostic trouble code (DTC) is stored.

Substitute value

- Control unit help program "Emergency mode I" has started to work.

Possible source

- Poor quality transmission fluid.
- Water in the oil.
- Contact resistance in the connectors.
- Gear shift solenoid S4 is jammed in OFF position.
- Gear shift solenoid SLU is jammed in OFF position.
- Mechanical fault in the gearbox.

Fault symptom[s]

- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- No lock up function.
- Rough gear shifts.

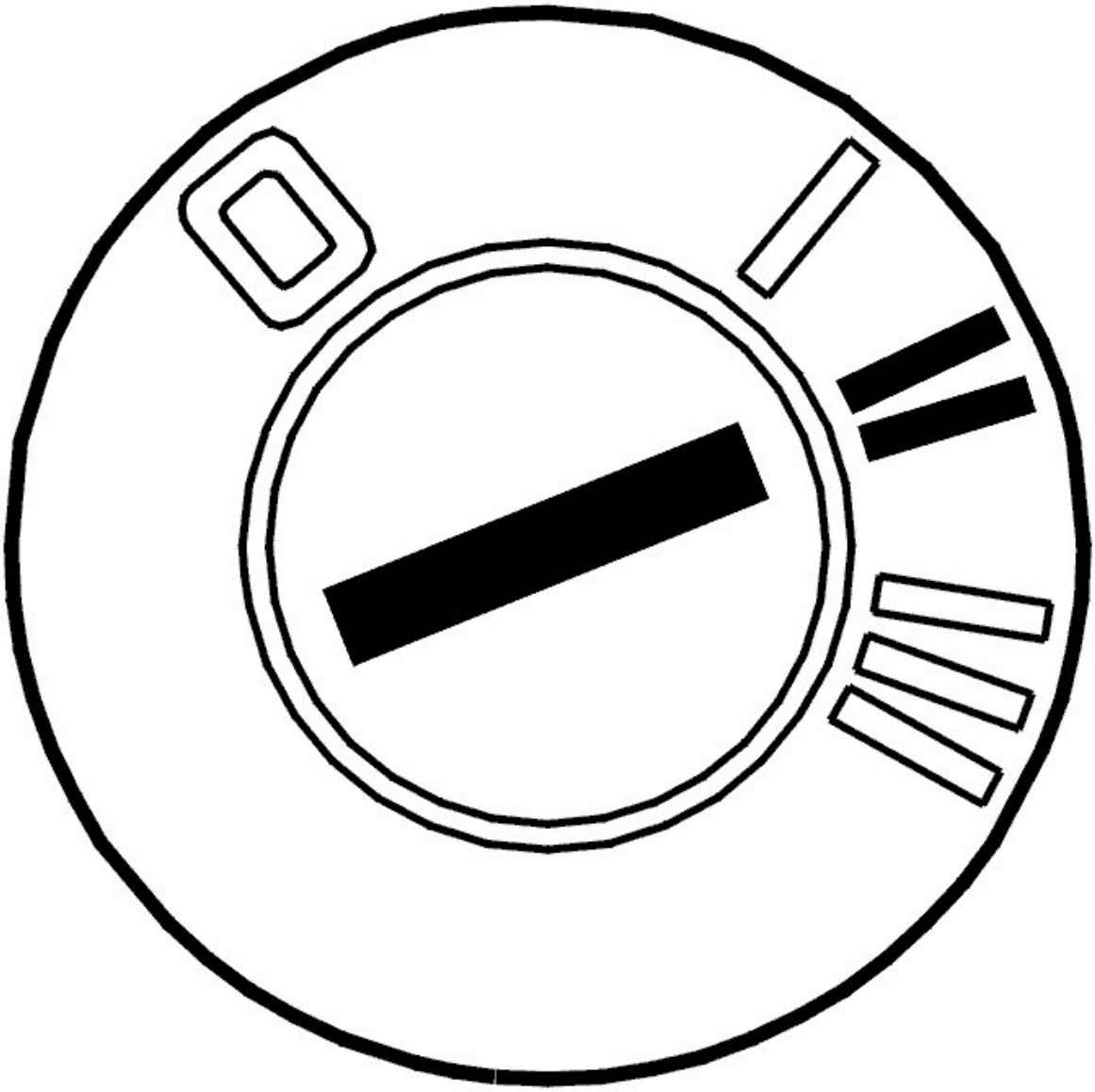
Slipping or Not Engaged

Slipping or not engaged

Checking the oil quality and the oil level in the transmission

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Note! Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.



- Ignition on
- Read off the oil temperature.

Check the oil level. Check the transmission for leakage if the fluid level is low. Then top up with oil.
Check the quality of the oil.
Check the transmission fluid for metal swarf. Take a sample using the dip stick.

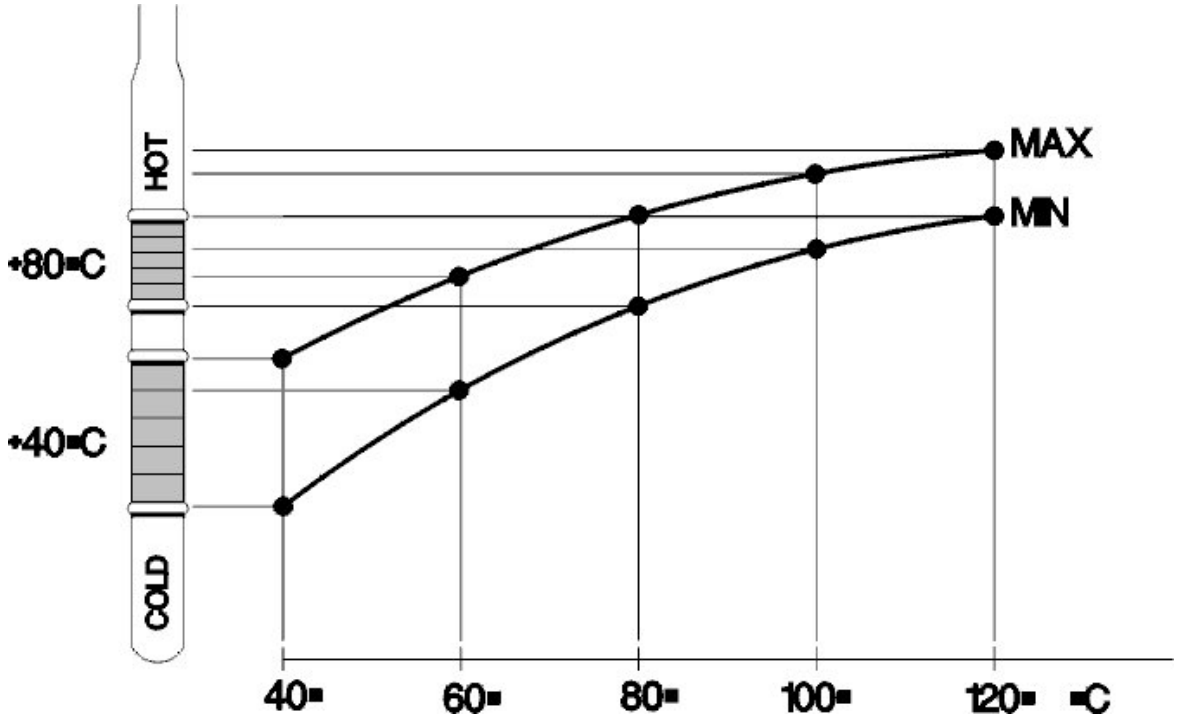
- Replace the transmission if the transmission fluid contains metal swarf
- Replace the transmission fluid if the fluid smells burnt.

Other information:

- Transmission fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing
- Oil level, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Transmission Oil Level - Checking
- Oil grade, checking, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Oil Grade, Checking

Select an alternative below:

1. No fault detected
2. Transmission fluid replaced, the level was low or quality was poor
3. The transmission fluid contains metal swarf.

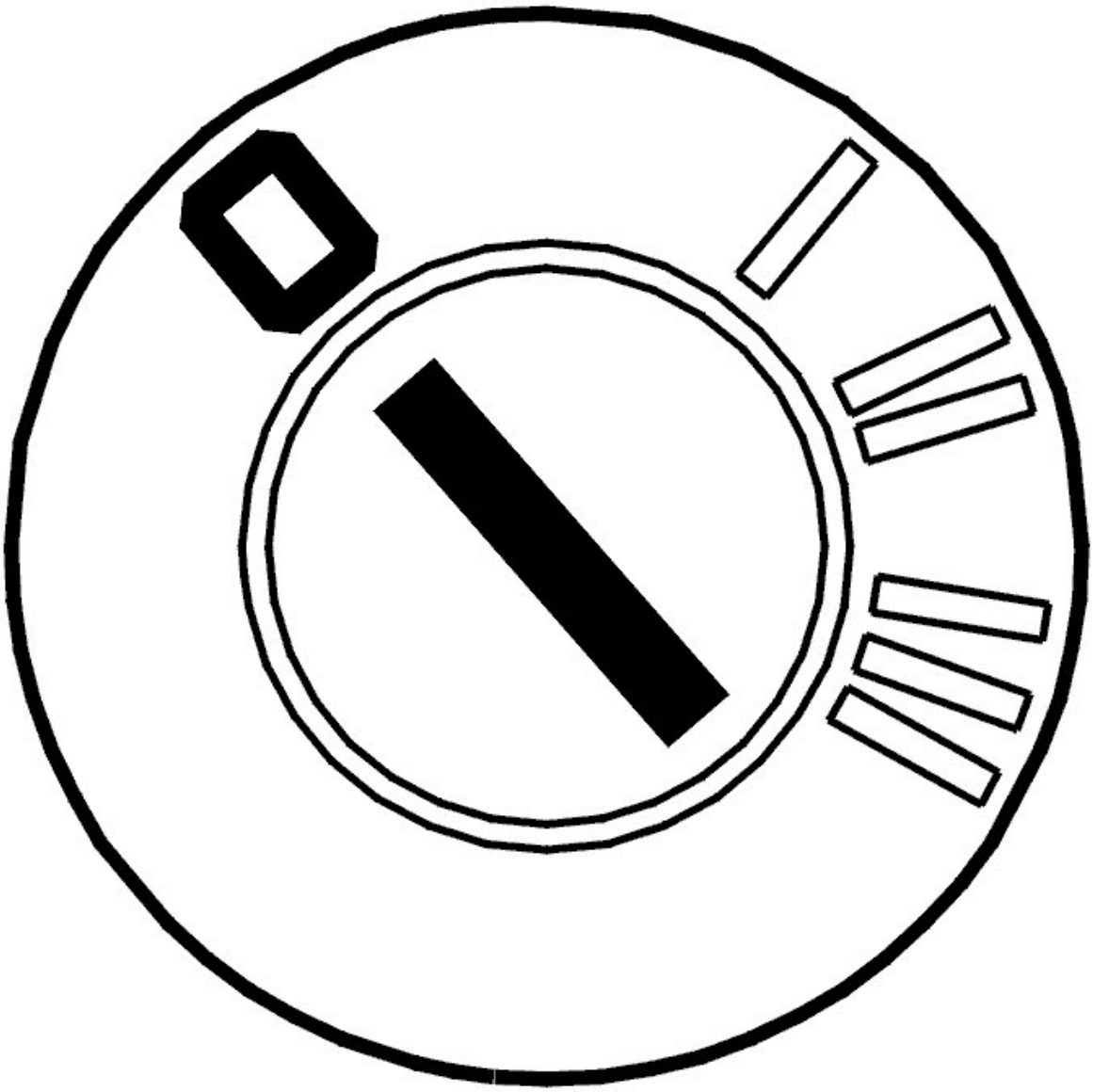


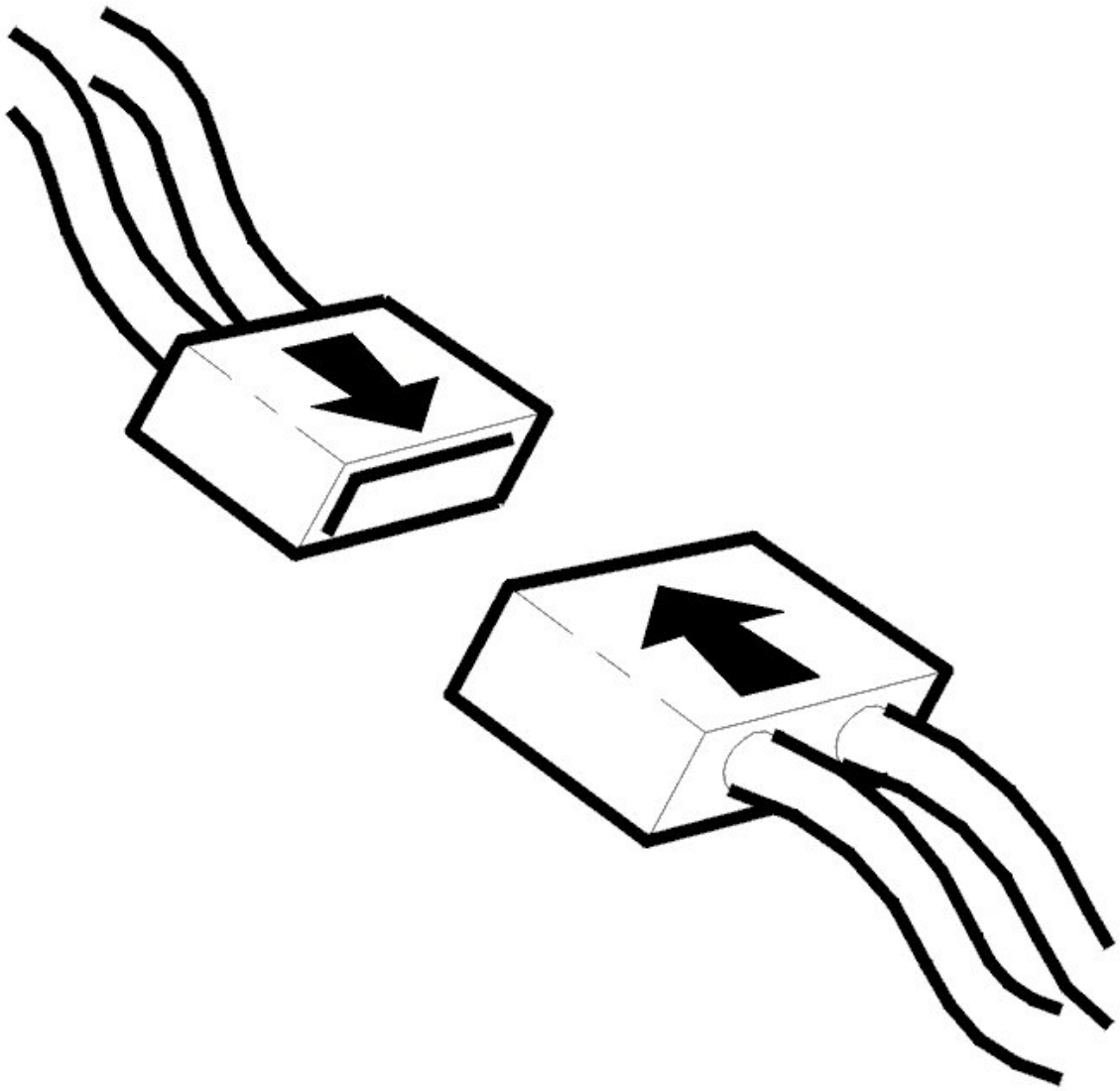
1 - Replacing the transmission control system

2 - Resetting the oil quality counter

3 - Replacing the transmission

Checking for contact resistance and oxidation





- Ignition off
- Check connectors and connections for contact resistance or oxidation.

Measure the resistance on the terminals for solenoid SLU. Check for an open-circuit. Check for a short-circuit to ground.
Remedy as necessary.

Other information

- Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- To access transmission connectors, see:

Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures

- To access the control module connector, see:

Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair

- Solenoid control system, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Automatic Transmission Components/Solenoid Control System, Replacing

Continue - Test driving the transmission

Replacing the transmission

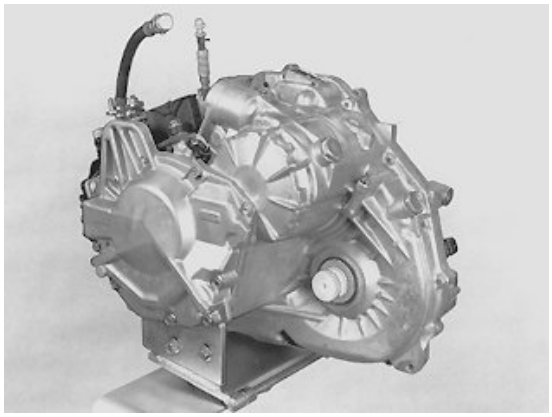
The previous tests indicate an internal fault in the transmission.
Replace the transmission.

Other information:

- Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
- Transmission, installing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Replacement/Transmission, Installation



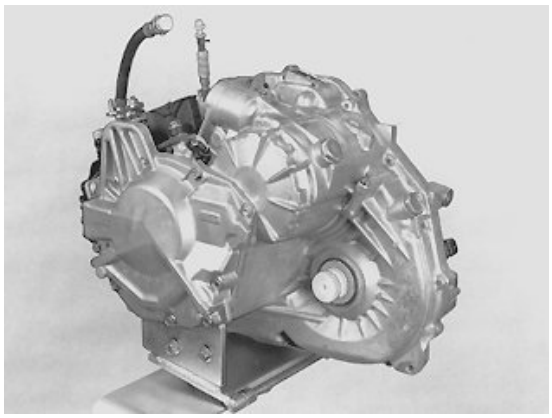
Continue - Resetting the adaptation and oil quality counter

Replacing the transmission control system

- Perform the following check.

Test pressurization See: Engine, Cooling and Exhaust/Cooling System/Testing and Inspection

- Check the cooling system's pipes and connections to the automatic transmission. Check for leakage.



Does the pressure drop?

Yes - Checking the cooling system

No - Checking software

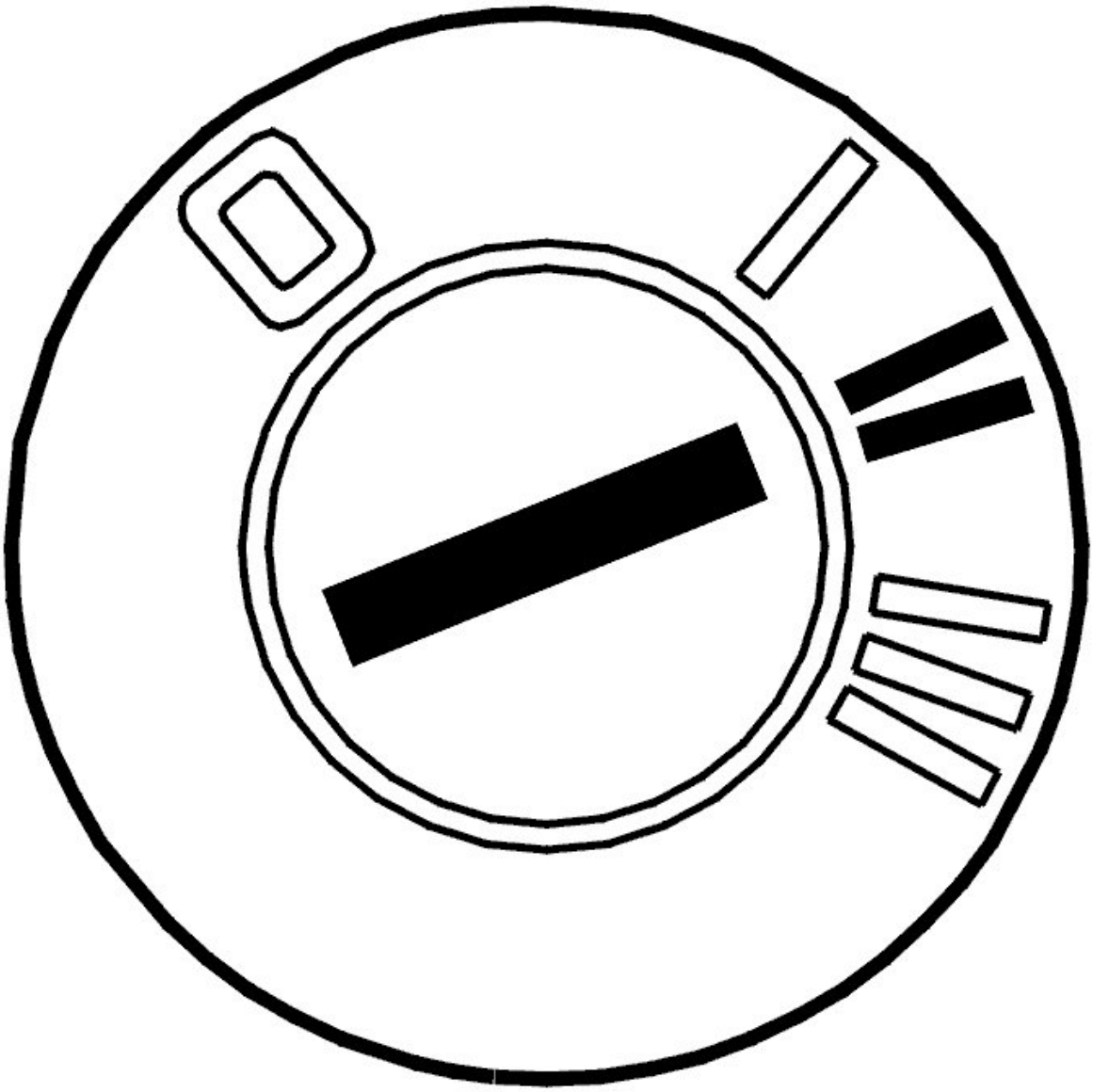
Resetting the oil quality counter

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

Continue - DONE

DONE - Verification

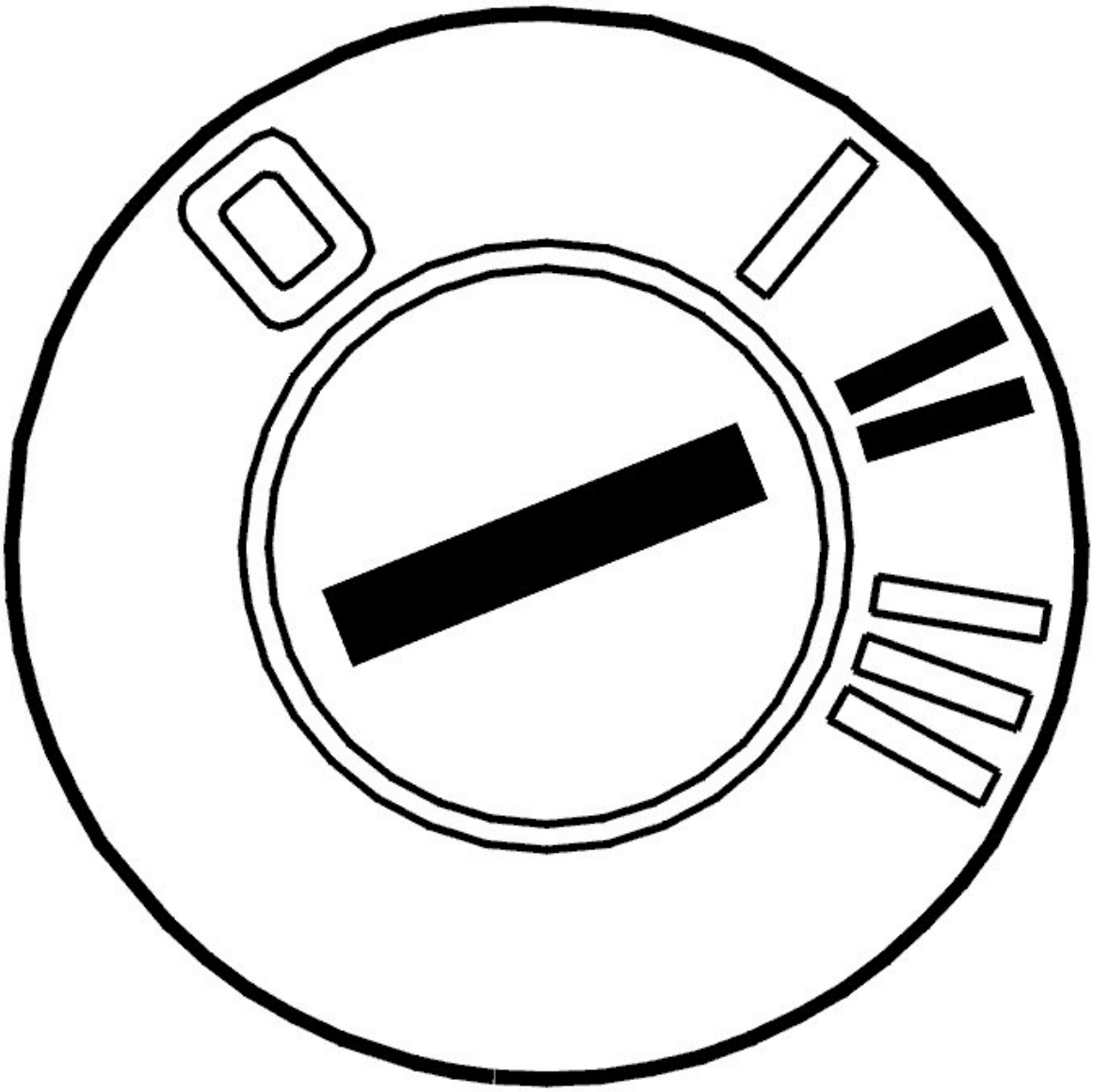
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

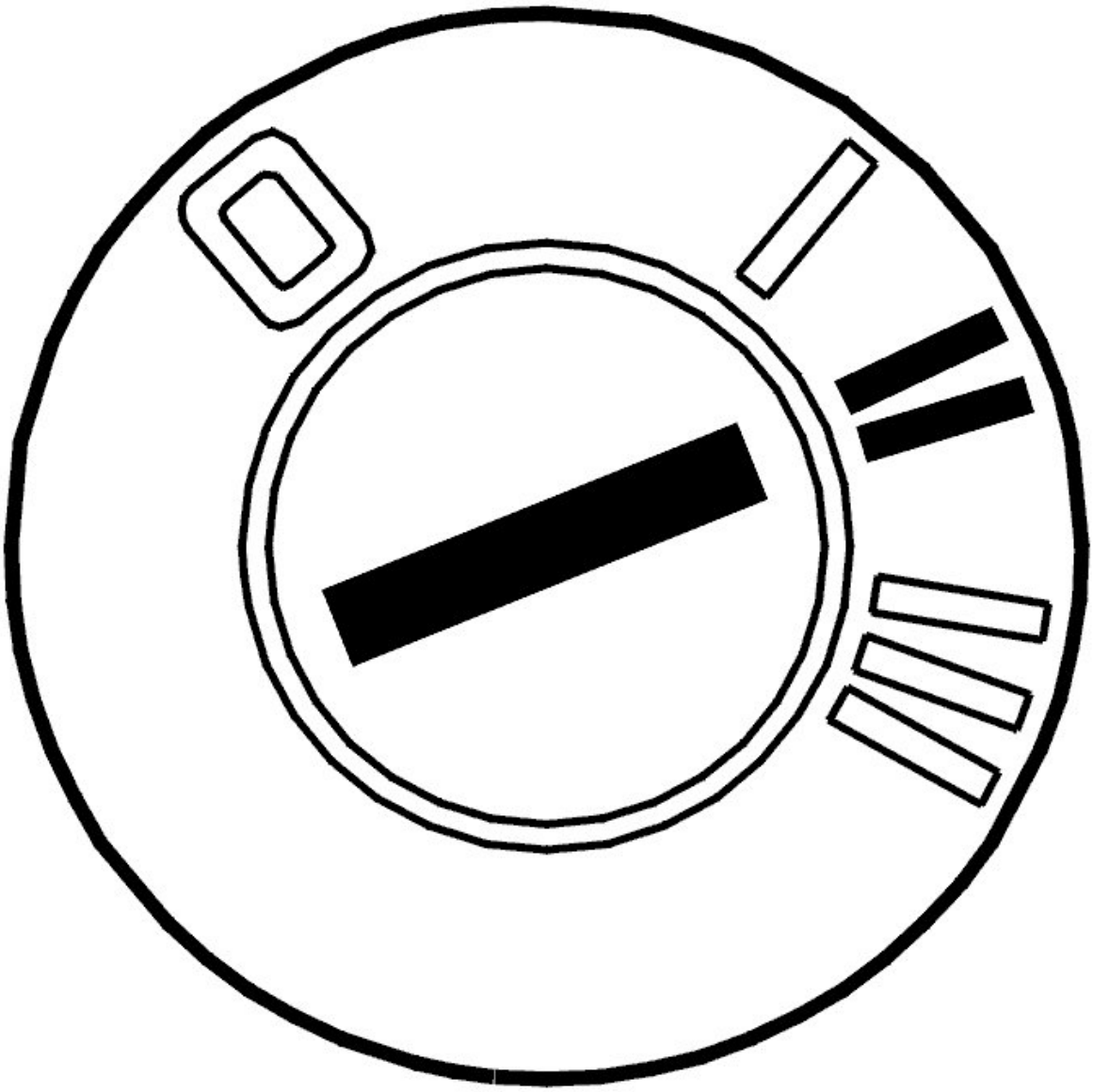
Continue - **DONE**

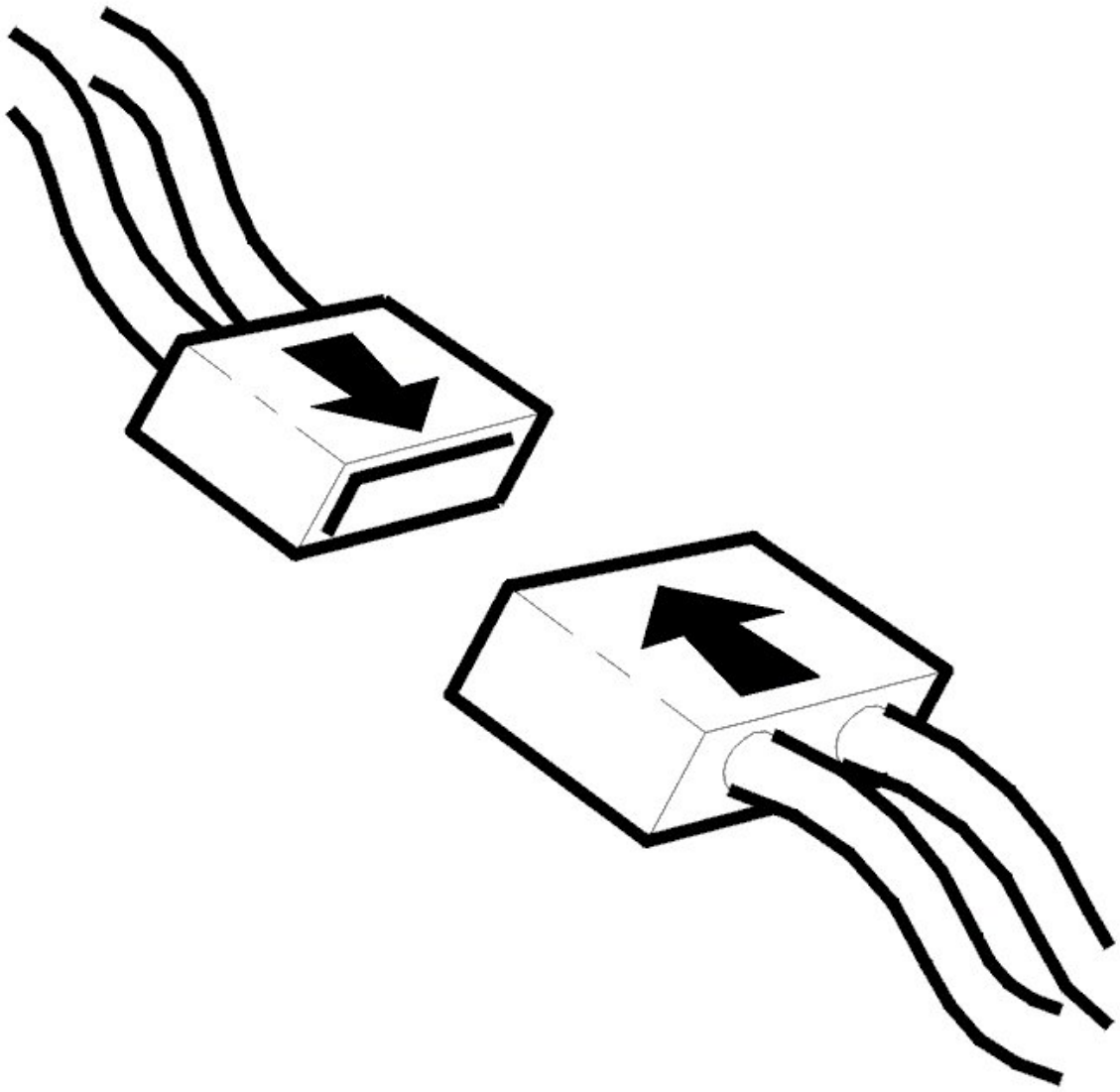
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the oil quality and the oil level in the transmission

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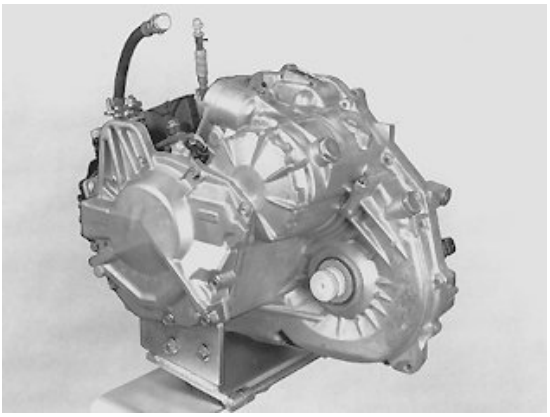
Checking the cooling system

Ensure that the leak is the cause of the coolant coming in contact with the transmission oil by checking the quality of the oil.
If the quality of the transmission fluid had deteriorated due to leakage from the cooling system, replace the transmission, radiator, hoses and expansion tank as below.

Other information:

- Oil grade, checking, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Oil Grade, Checking
- Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
- Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation
- Radiator / charge air cooler (CAC), replacement See: Fuel Delivery and Air Induction/Turbocharger/Intercooler/Service and Repair/Radiator / Charge Air Cooler (CAC), Replacement



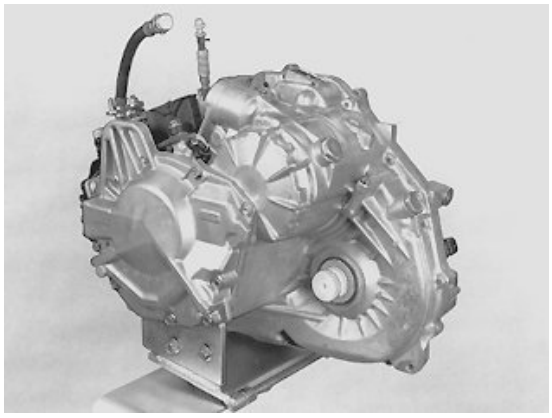
Select "Continue" when you are ready.

Continue - Resetting the adaptation and oil quality counter

Checking software

- Check that the control module has the latest version of the relevant software.
- If new software is available, download to the control module and then select Continue.
- If the control module already has the latest software select Continue.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



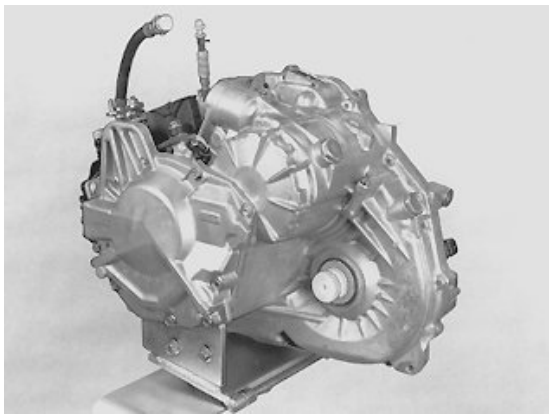
Continue - Test driving the transmission

Replacing automatic transmissions

Replace the transmission.

Other information:

- Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing
- Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation



Continue - REPAIRED

Test driving the transmission

- Perform the following check.

Other information:

- Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description

Does the problem persist?

Yes - Checking for contact resistance and oxidation

No - Fault Found

Test driving the transmission

- Perform the following check.

Other information:

- Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description Test drive schedule,

description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description

Does the problem persist?

Yes - Replacing automatic transmissions

No - Fault Found

Test-Drive Schedule

Test-drive schedule TCM-002F AW55-50/51SN

Note! Read through the whole test-drive schedule before starting to test-drive.

1. Check the oil temperature in the transmission. Suitable temperature range is approx. 40-100 °C.
2. Start Activation of gear indication. See, Diagnostics/Vehicle communication/Advanced.

   Note! The function is only active during the driving cycle in question.

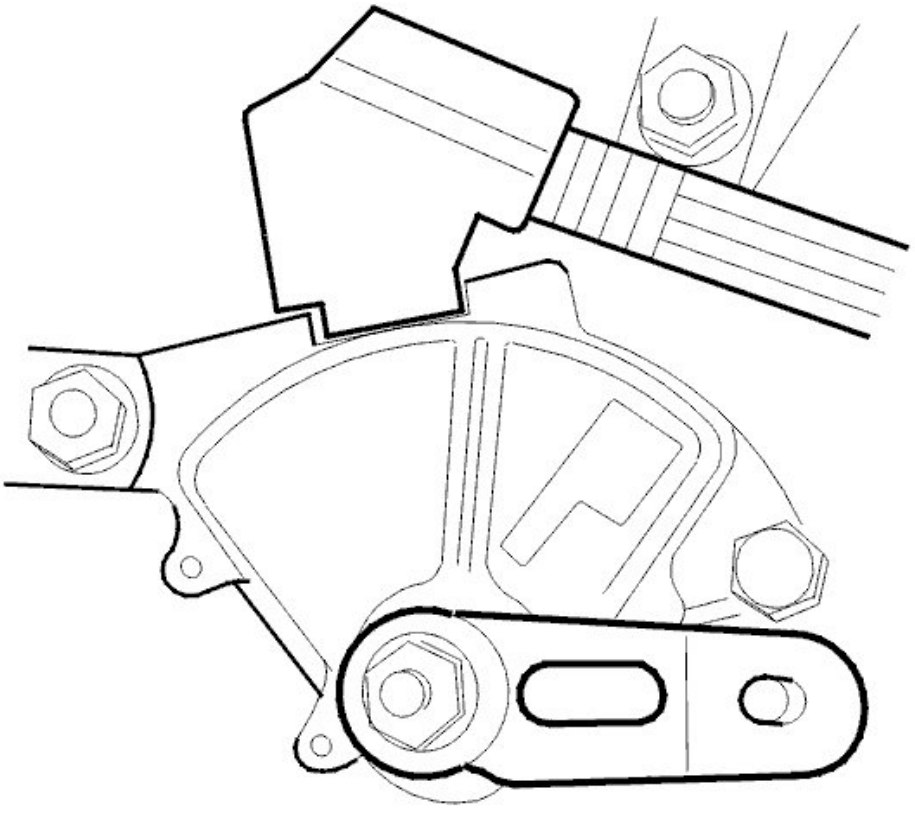
3. Activate tools to measure the rpm difference between the transmission's rpm sensor and the engine speed. See, Diagnostics/Vehicle communication/Advanced.
4. Drive the vehicle at approx. 60 km/h (37 mph) with the gear selector in lever position 3, alternatively manually selected position 3 if the vehicle is equipped with lever carrier with GearTronic. Check that the lock-up locks (indicated by steady glow from IND-light).
5. Press down the accelerator pedal and check if the difference in rpm between engine and transmission is greater than 100 rpm.
6. Perform the above check at other speeds and with other lever positions.

Note! Diagnostic trouble code is stored after approx. 20 sec. with an rpm difference that is greater than 100 rpm.

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The gear-shift position sensor signals provide the transmission control module (TCM) with data on the gear selector position. This is done by grounding a combination of signals A, B, C and PA inside the gear position sensor. Diagnostic trouble code (DTC) TCM-0039 is stored if the

transmission control module (TCM) registers an unacceptable combination of A, B, C and PA for a period of 10 seconds as shown below.

A	B	C	PA	
â¢	â¢	o	o	Diagnostic Trouble Code (DTC)
â¢	â¢	â¢	â¢	Diagnostic Trouble Code (DTC)
â¢	â¢	â¢	o	Diagnostic Trouble Code (DTC)
o	â¢	â¢	â¢	Diagnostic Trouble Code (DTC)
â¢	â¢	o	â¢	Diagnostic Trouble Code (DTC)
o	o	o	â¢	Diagnostic Trouble Code (DTC)

â€¢ = 0-2 V below battery voltage
o = ground

Substitute value
- The control module "Limp Home" program has been initiated.

Possible source
- Contact resistance in terminals.
- Short-circuit to supply voltage or ground in the signal cable.
- Open-circuit in the signal cable.
- Incorrectly adjusted gear-shift position sensor.
- Defective gear-shift position sensor.

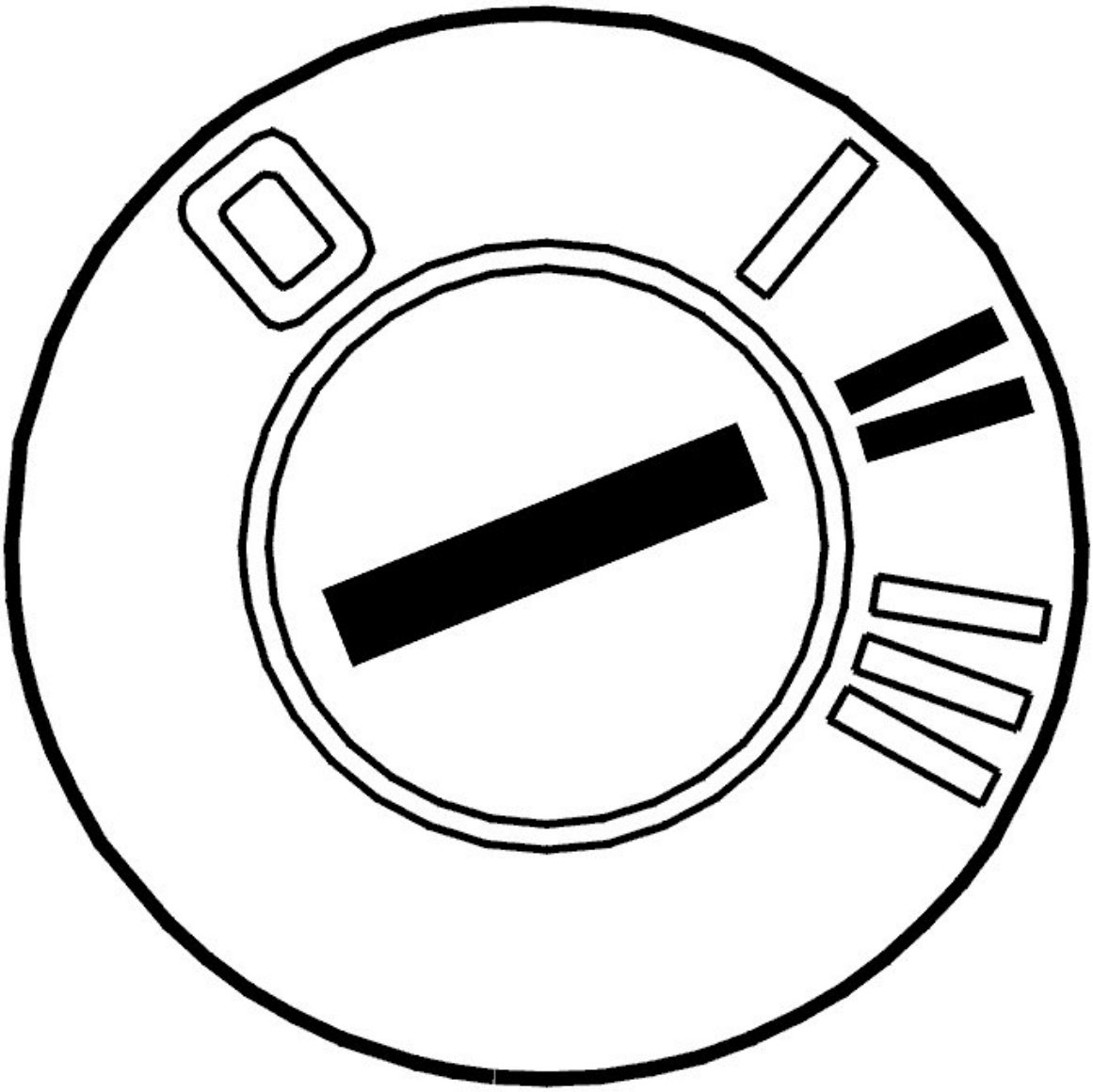
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Caution! The gear-shift position sensor will malfunction if there is a short-circuit to supply voltage.

Faulty Signal

Faulty signal

Checking the adjustment of the gear-shift position sensor



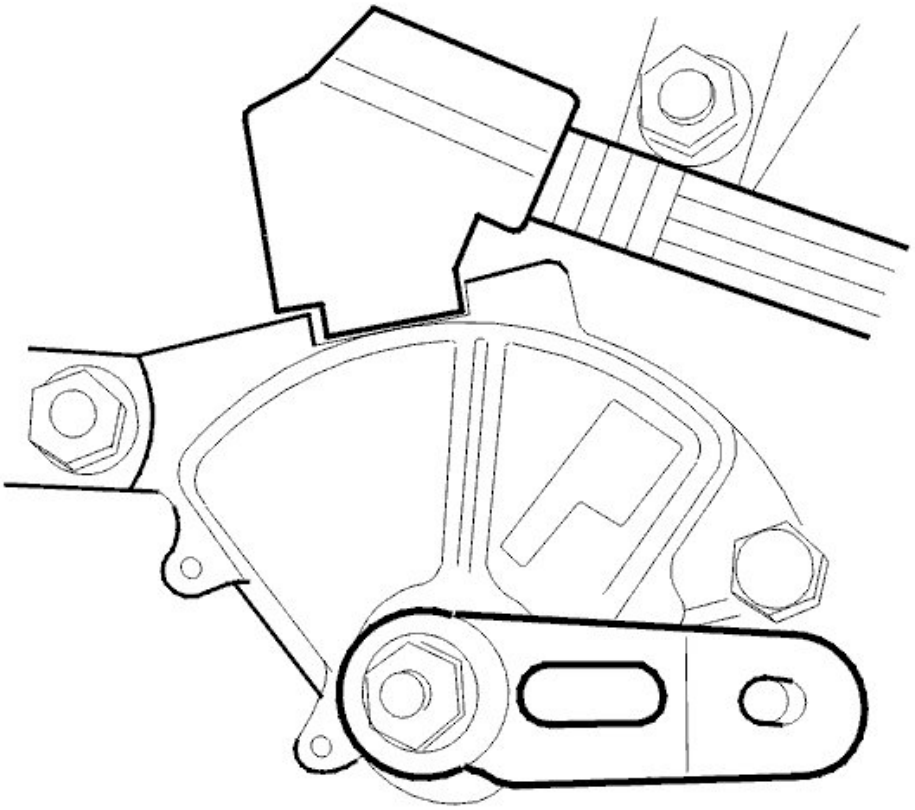
- Ignition on
- Read off the position of the gear selector.

Note! Select the correct gear selector assembly from the list.

Shift the gear selector to all gear positions several times. This is to check the function of the gear selector sensor.
The selected position must be the same as that displayed in VIDA. If the display shows an undefined position (OR for example) when a specific gear is selected, the transmission cable needs adjusting.

Note! An undefined position may be displayed between the fixed gear positions. This isnota fault.

Adjust the gear-shift position sensor if necessary according to Gear-shift position sensor, checking/adjusting See: Sensors and Switches - Computers and Control Systems/Transmission Position Switch/Sensor/Adjustments.

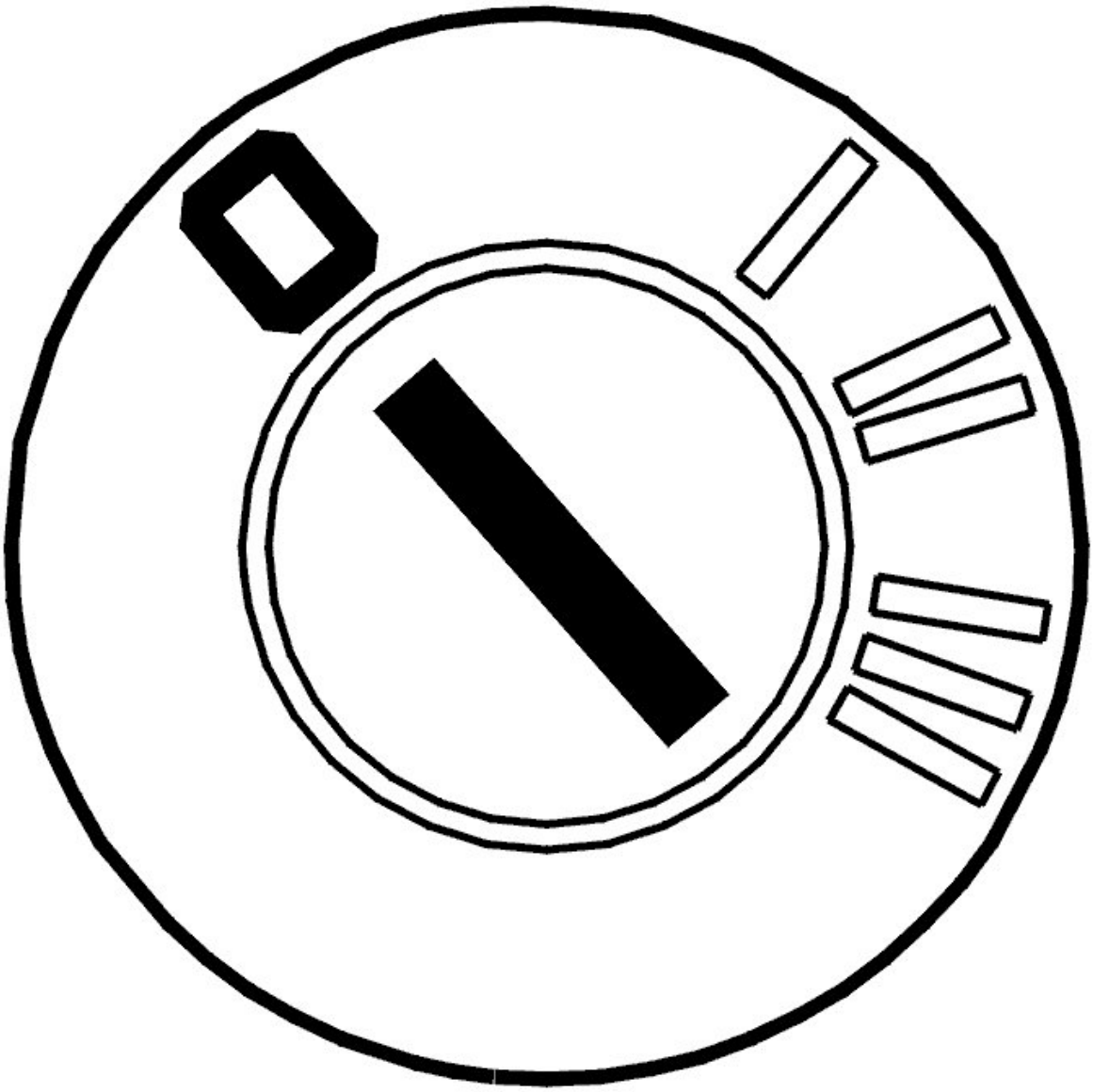


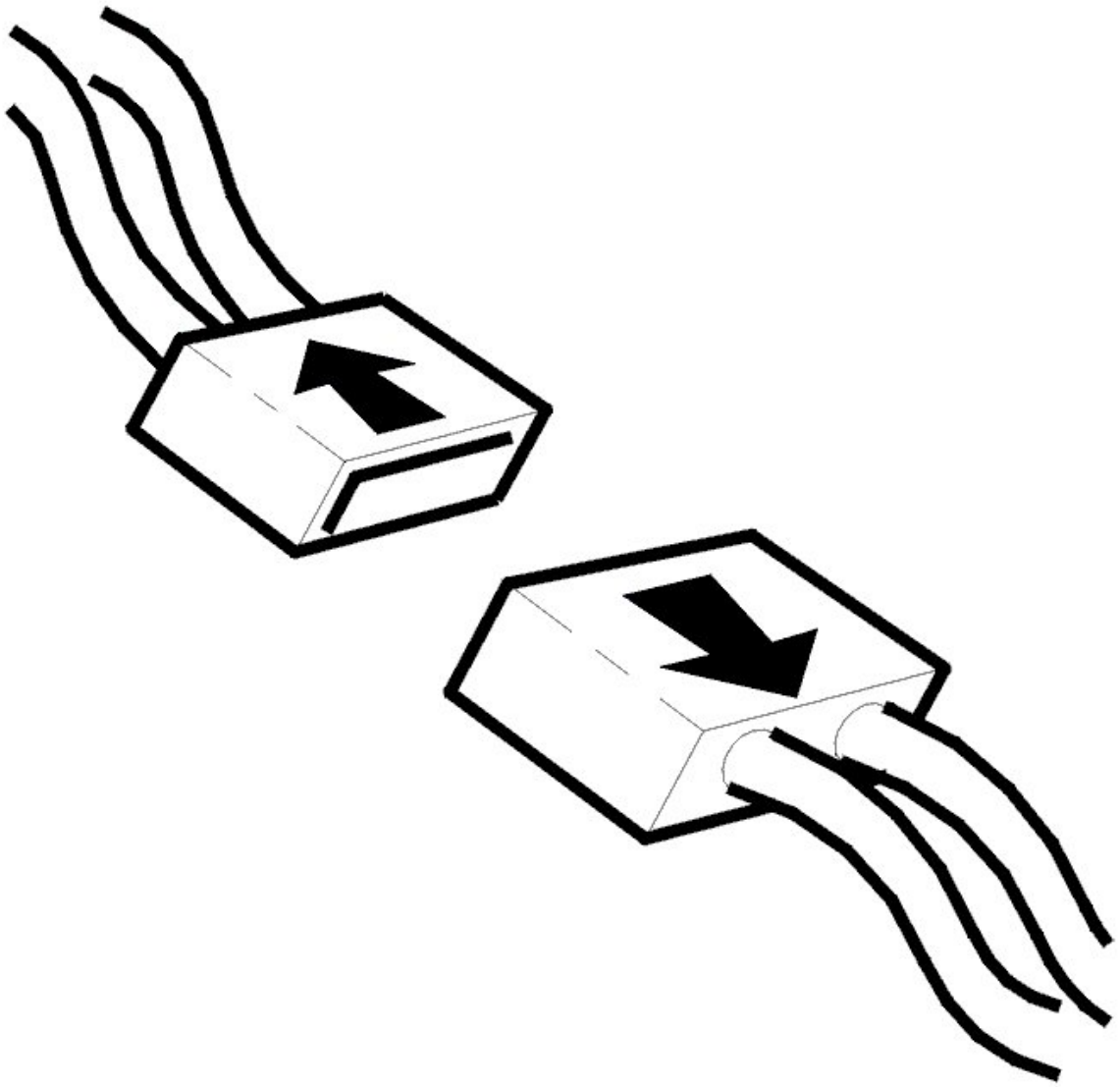
Is the gear-shift position sensor incorrectly adjusted?

Yes - Verification

No - Checking the wiring

Checking the wiring





- Ignition off
- Disconnect the transmission connector
- Connect the breakout box.

Check the wiring between the transmission connector (control module side):

- terminal #B5 and control module terminal #A46 (#A46) "A"
- terminal #B6 and control module terminal #B4 (#A64) "B"
- terminal #B7 and control module terminal #A45 (#A45) "C"
- terminal #B8 and control module terminal #B3 (#A63) "PA".

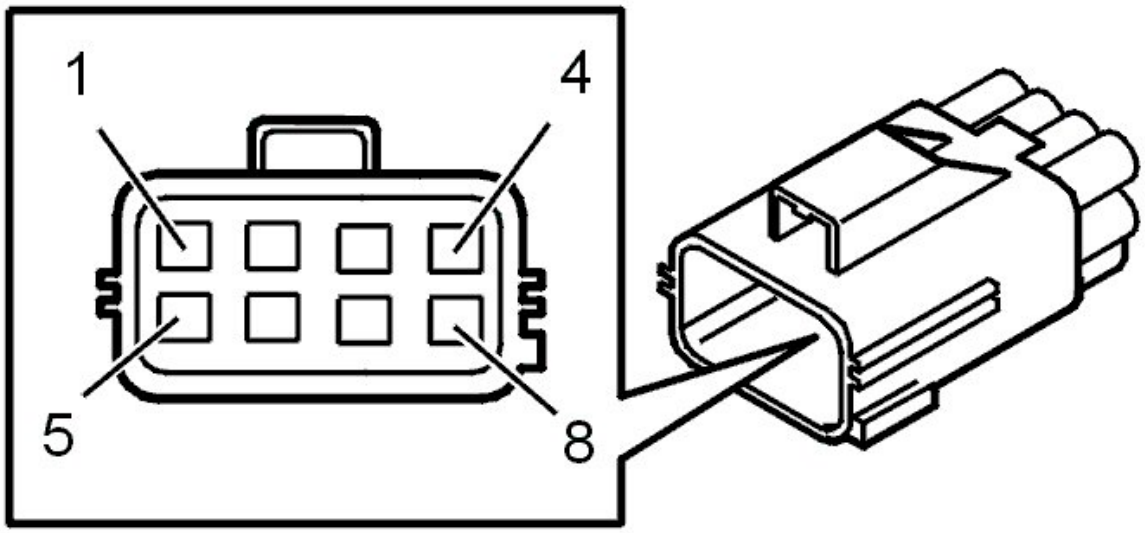
check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

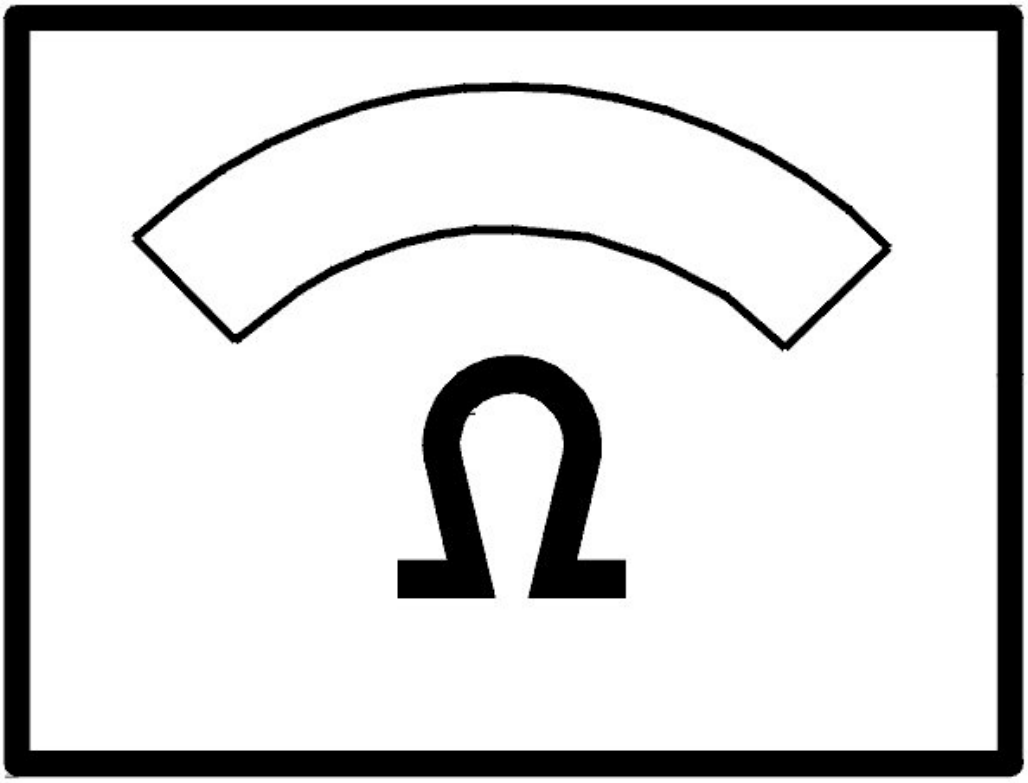
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

Was a fault detected? Select an option according to the following:

1. No fault detected
2. Open-circuit in the wiring or a short-circuit to ground
3. Short-circuit to supply voltage in the wiring.





1 - Replacing the component

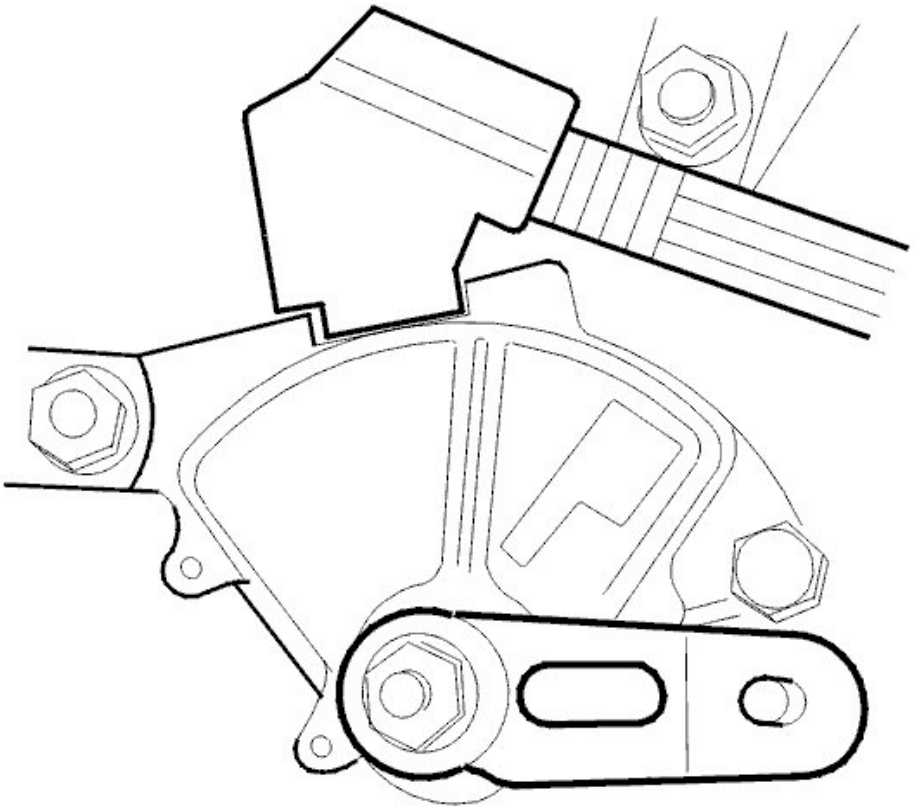
2 - Verification

3 - Checking the gear-shift position sensor

Replacing the component

Try a new gear-shift position sensor according to Gear-shift position sensor, position See: Sensors and Switches - Computers and Control

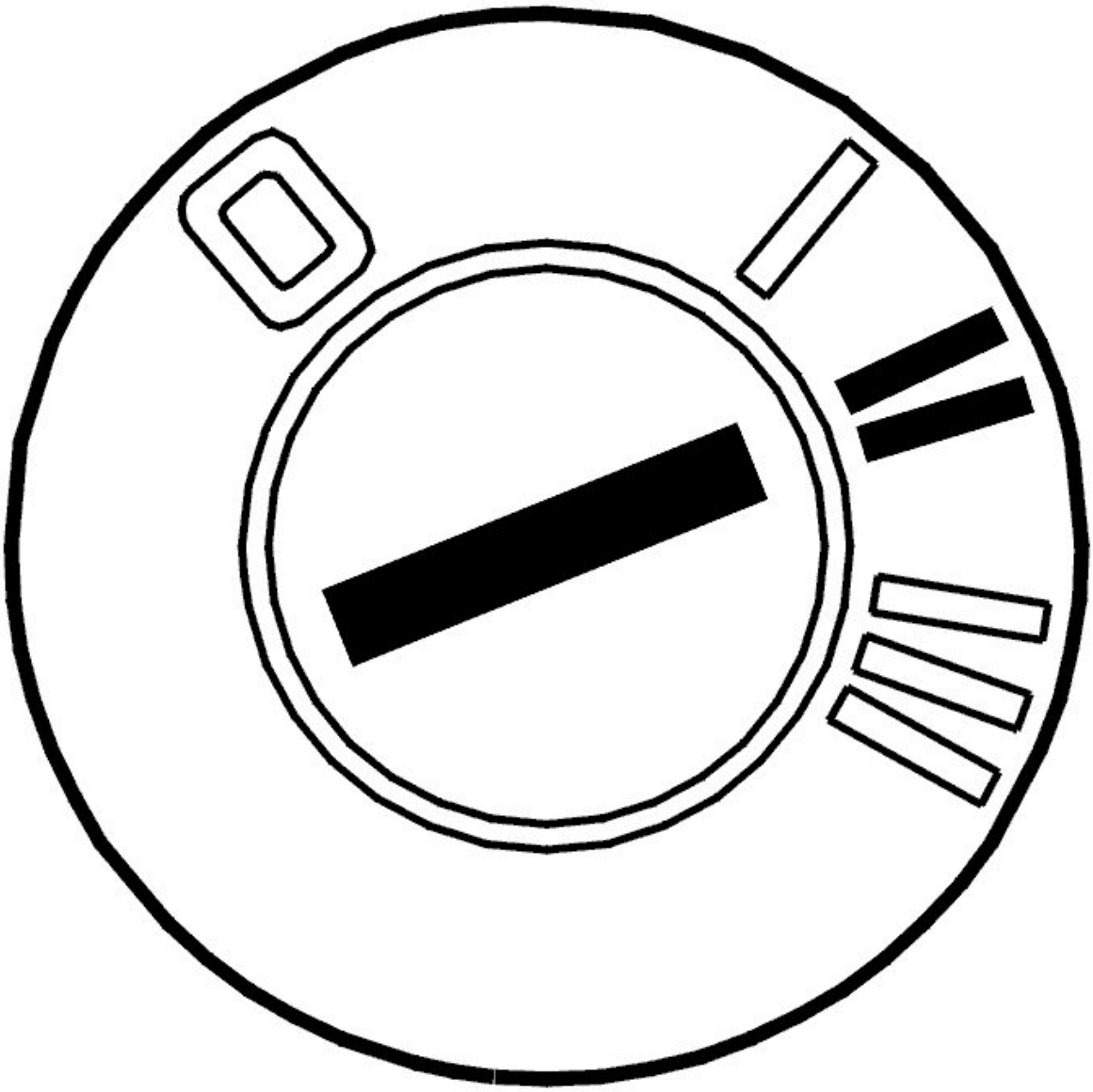
Systems/Transmission Position Switch/Sensor/Service and Repair.

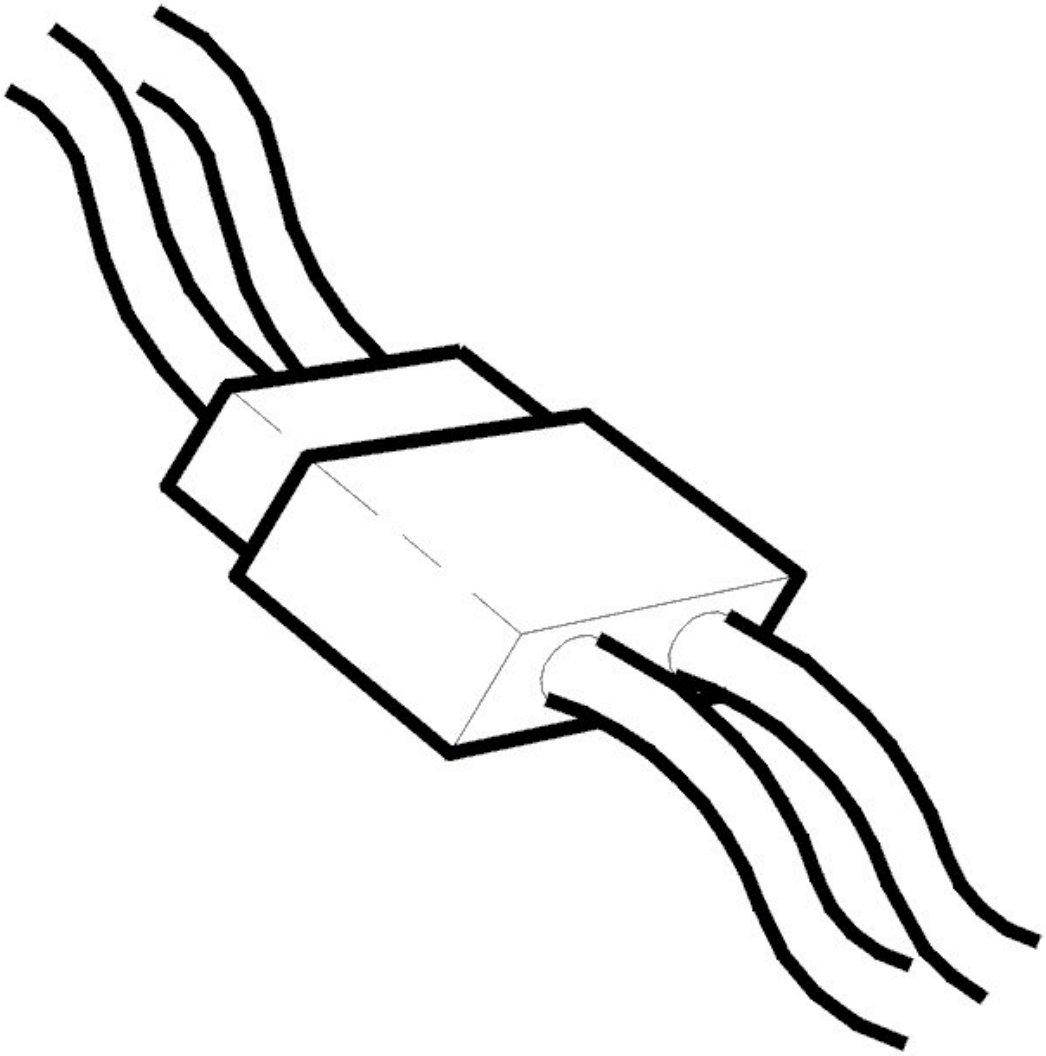


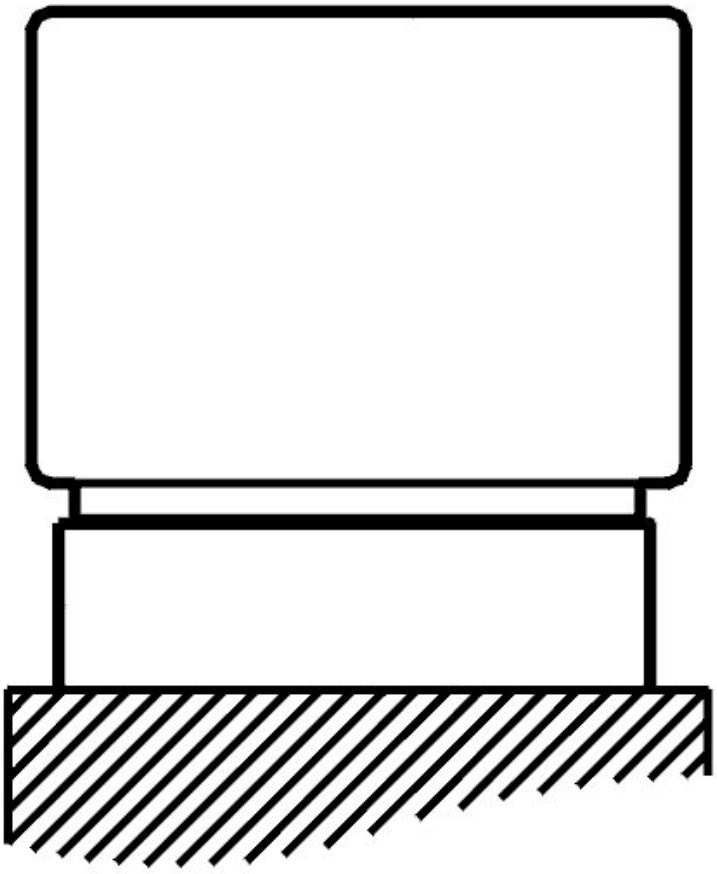
Continue - Verification

Checking the gear-shift position sensor

Hint: The gear-shift position sensor may malfunction if there has been a short-circuit to supply voltage in the signal cable. Check the gear-shift position sensor as follows:





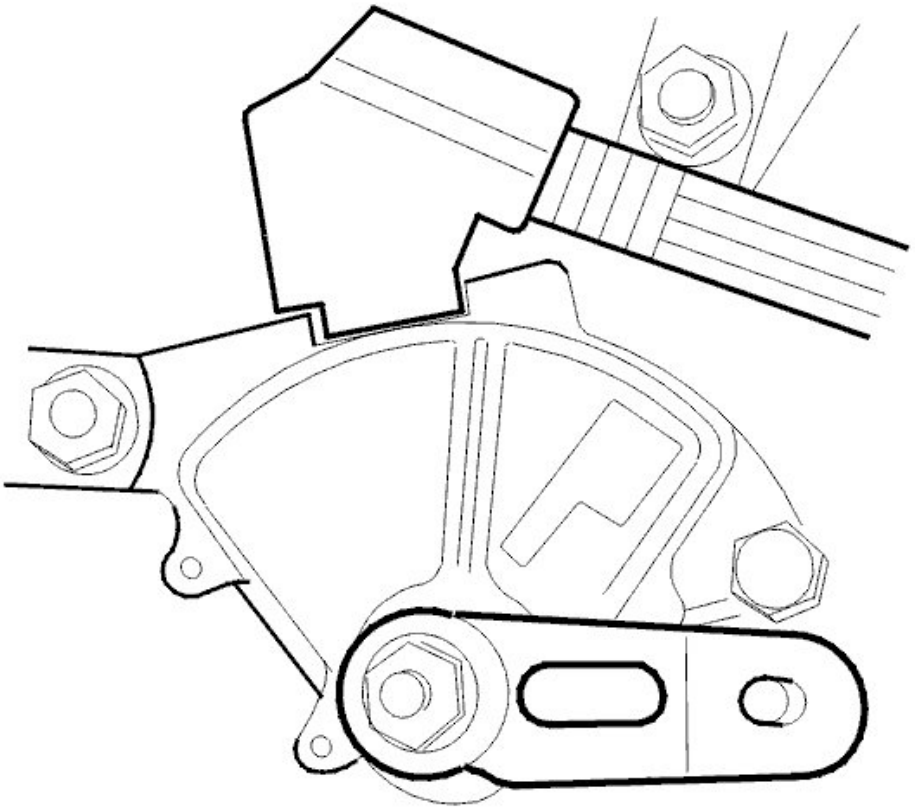


- Ignition off
- Transmission connector connected
- Control module connected.
- Ignition on
- Read off the position of the gear-shift position sensor

Note! Select the correct gear selector assembly from the list.

Move the gear selector to the different gear positions a number of times. Check the gear-shift position sensor function. If the gear-shift position sensor function is OK the cause of the fault was contact resistance and oxidation.

Note! An undefined position may be displayed between the fixed gear positions. This isnota fault.



Are all positions OK?

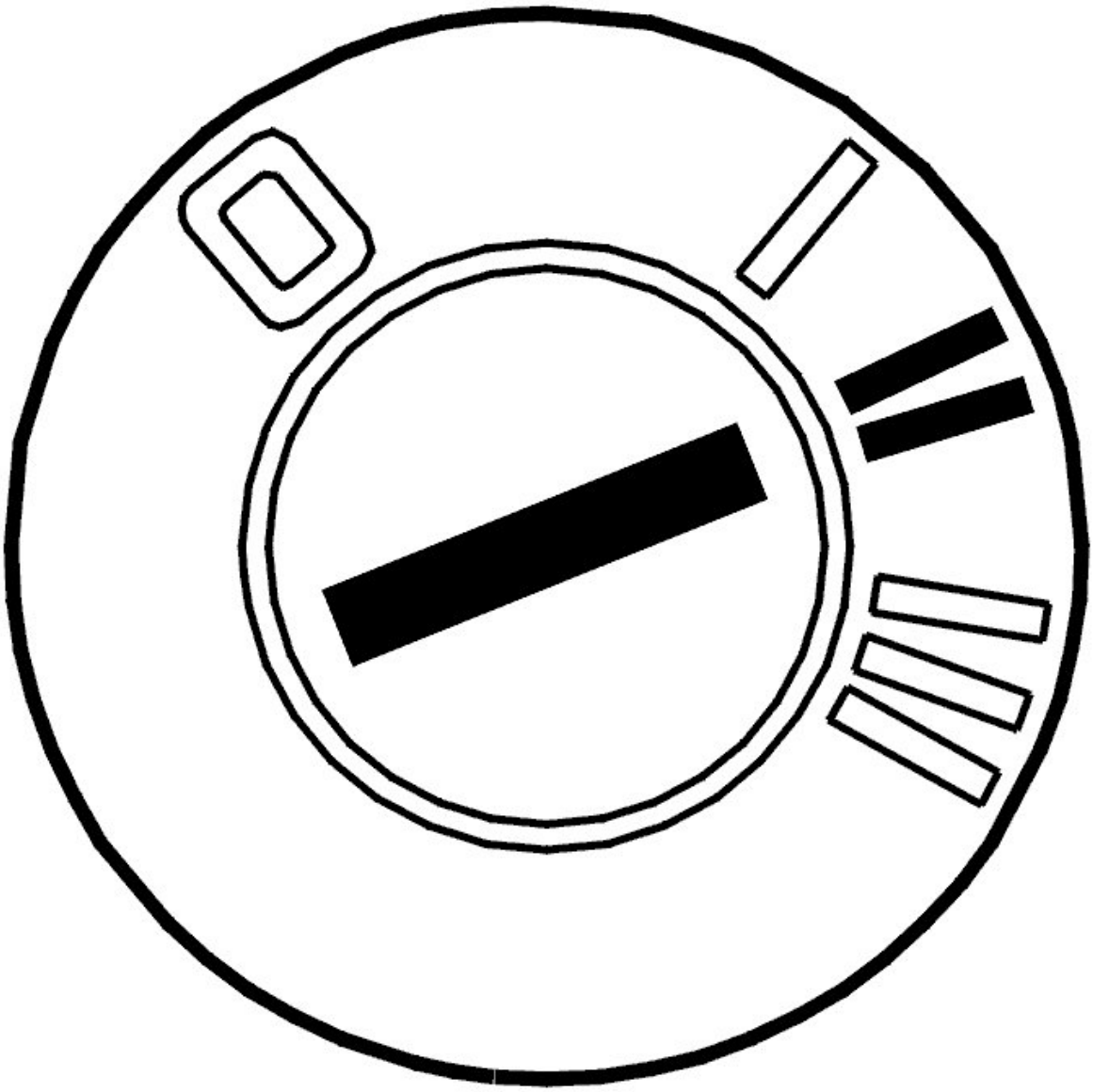
Yes - Fault Found

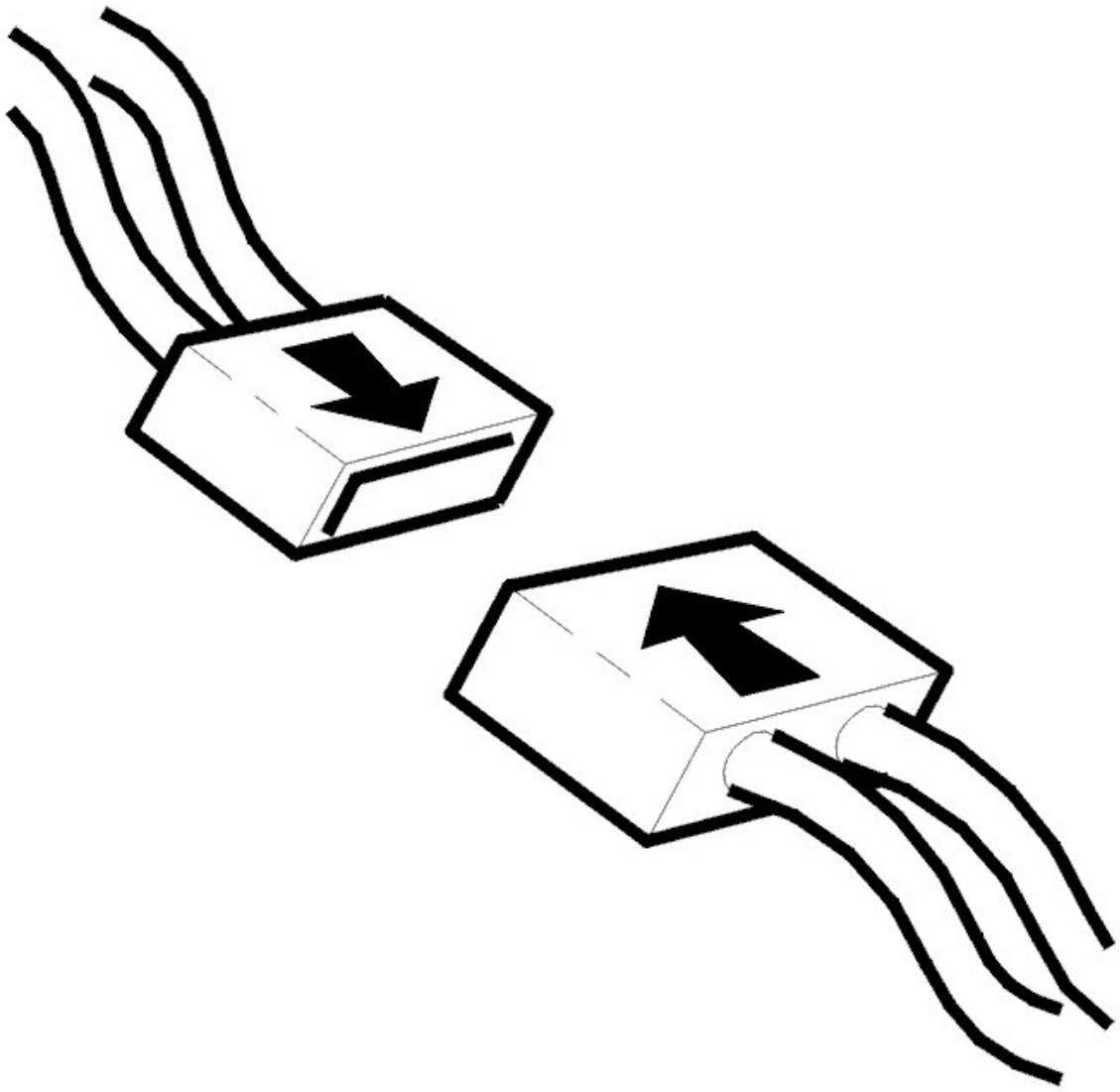
No - Replacing the component

Verification

Verification

Hint: After carrying out the repair check that the fault has been remedied.





- Ignition off.
- Reconnect components, connectors etc.
- Ignition on.
- Read off gear-shift position sensor position.

Move the gear selector to all shift positions a number of times, and repeatedly select the same position to check the operation of the gear-shift position sensor.

Are all values OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the adjustment of the gear-shift position sensor

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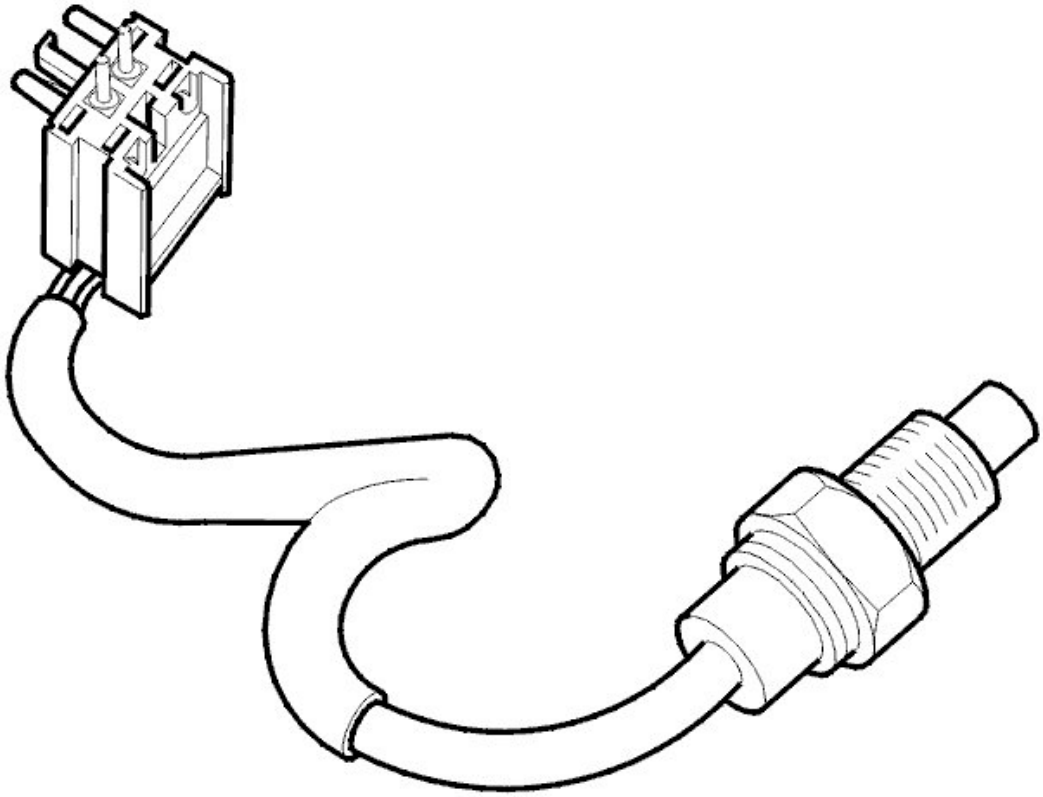
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The oil temperature sensor sends a signal to the transmission control module (TCM) which is used for functions such as temperature controlled lockup and initiating high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0042 is stored if the transmission control module (TCM) receives a signal from the oil temperature sensor corresponding to a temperature above approximately +150°C for approximately 2 minutes.

Substitute value
- No substitute values.

Possible source
- Contact resistance in terminals.
- Short-circuit to ground in signal cable.
- Defective oil temperature sensor.
- Mechanical fault in the transmission.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]
- General orange warning lamp lit.

Temperature Too High

Temperature too high

Checking the wiring and component

The diagnostic trouble code (DTC) was caused by the transmission being subjected to high loads and high temperatures. It is therefore important to change transmission fluid and to check the function of the transmission.
Replace the oil according to Gearbox fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing.

Continue - Resetting the oil quality counter

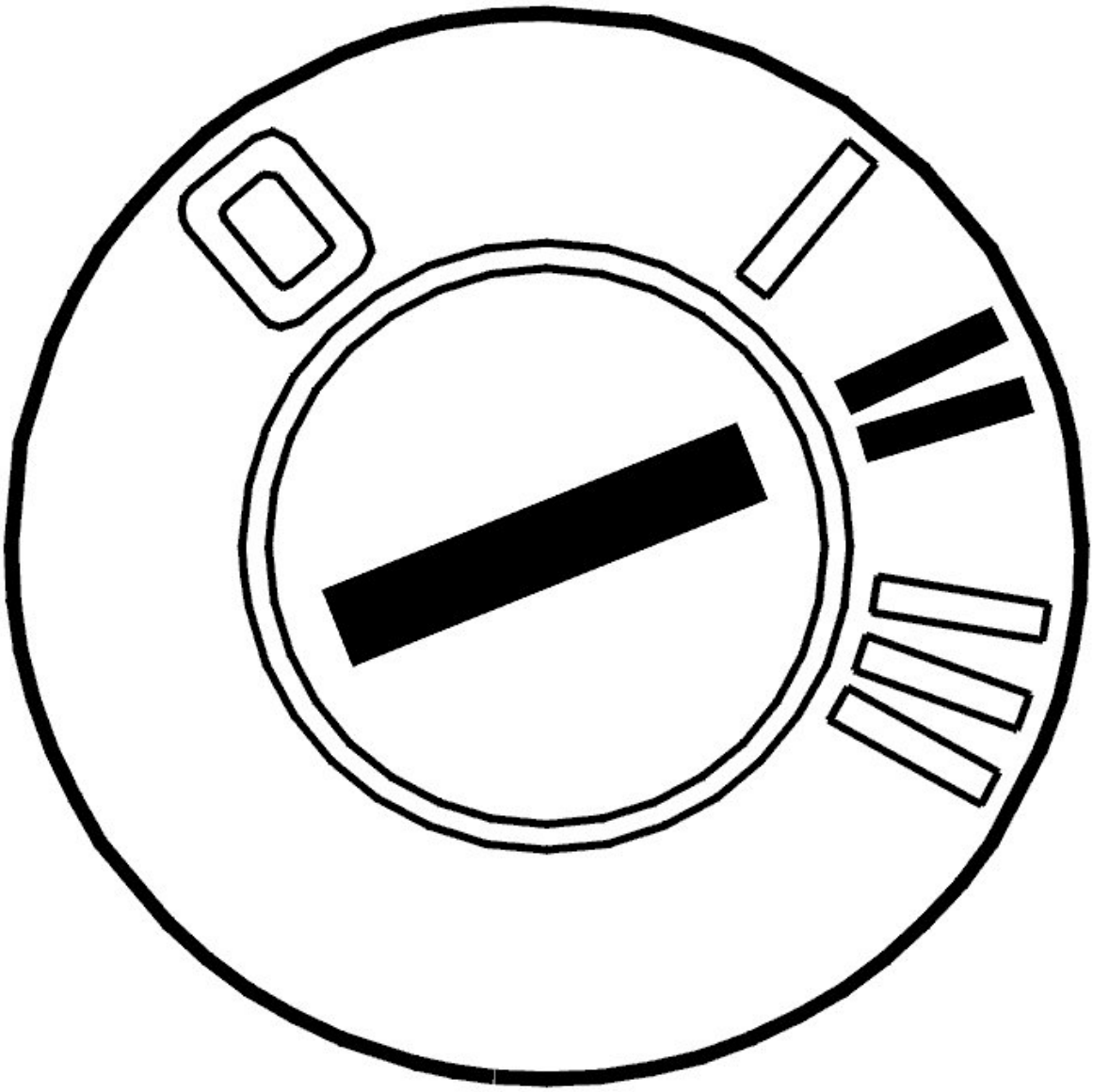
Resetting the oil quality counter

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

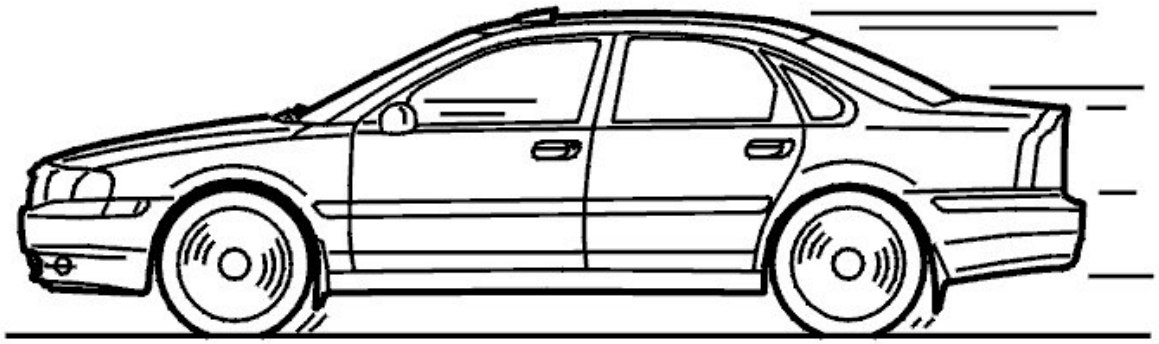
Reset the counter by clicking on the VCT 2000 symbol.

Continue - DONE

DONE - Test driving

Test driving

Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.



Does the transmission have any mechanical faults?

Yes - Fault-tracing information

No - **DONE**

Fault-tracing information

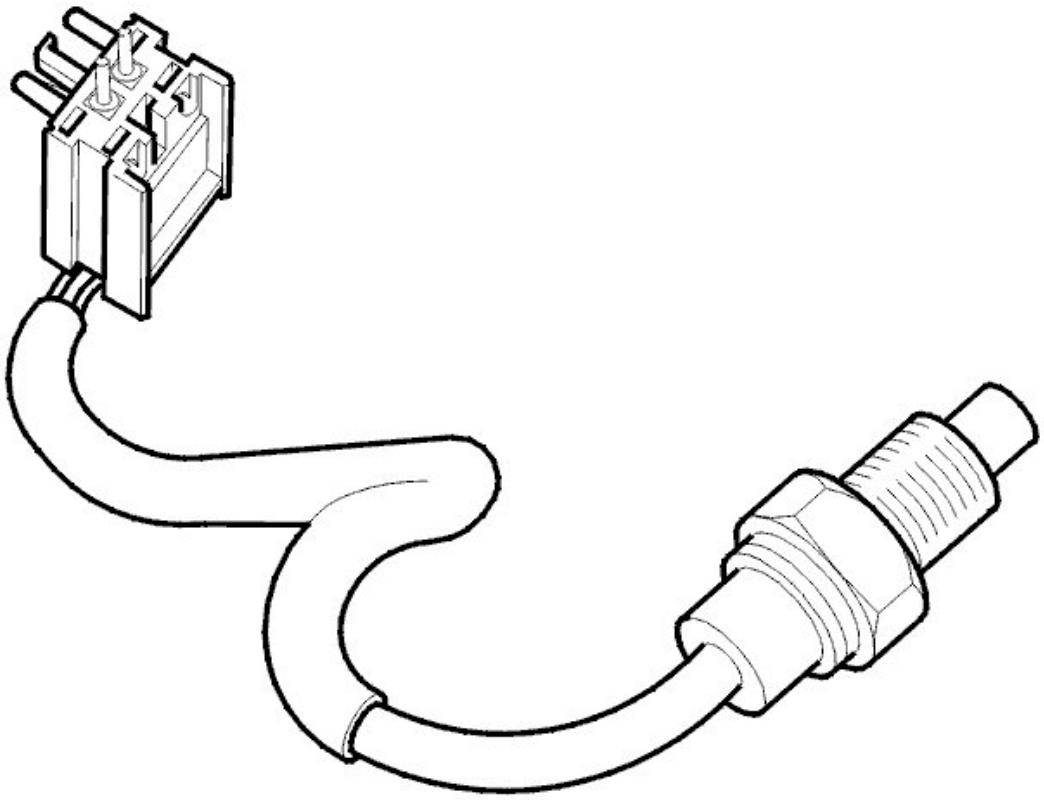
Exit the current fault-tracing. Add mechanical symptoms to the symptoms list. Fault-trace the symptoms.

Continue - **DONE**

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0043 is stored if the control module receives too low a signal from the oil temperature sensor for approximately 20 seconds.

Substitute value
- No substitute values.

Possible source
- The power supply and signal cables are short-circuited to each other.
- Short-circuit to ground in the signal cable.
- Defective oil temperature sensor.

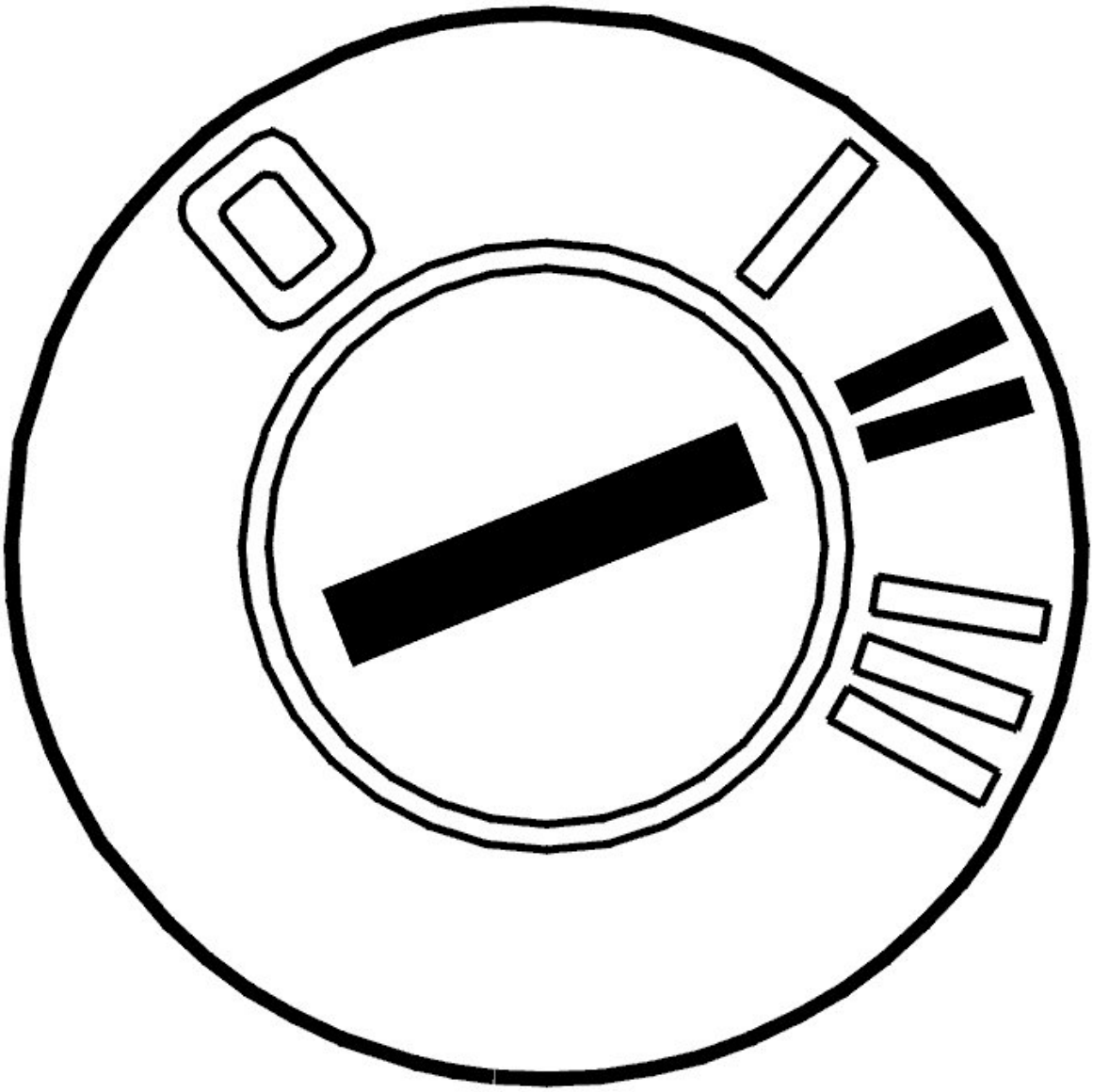
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Signal Too Low

Signal too low

Checking the function of the oil temperature sensor



- Ignition on
- Read off the oil temperature.

Check that the temperature is within its permitted range.
Compare with the transmission temperature.

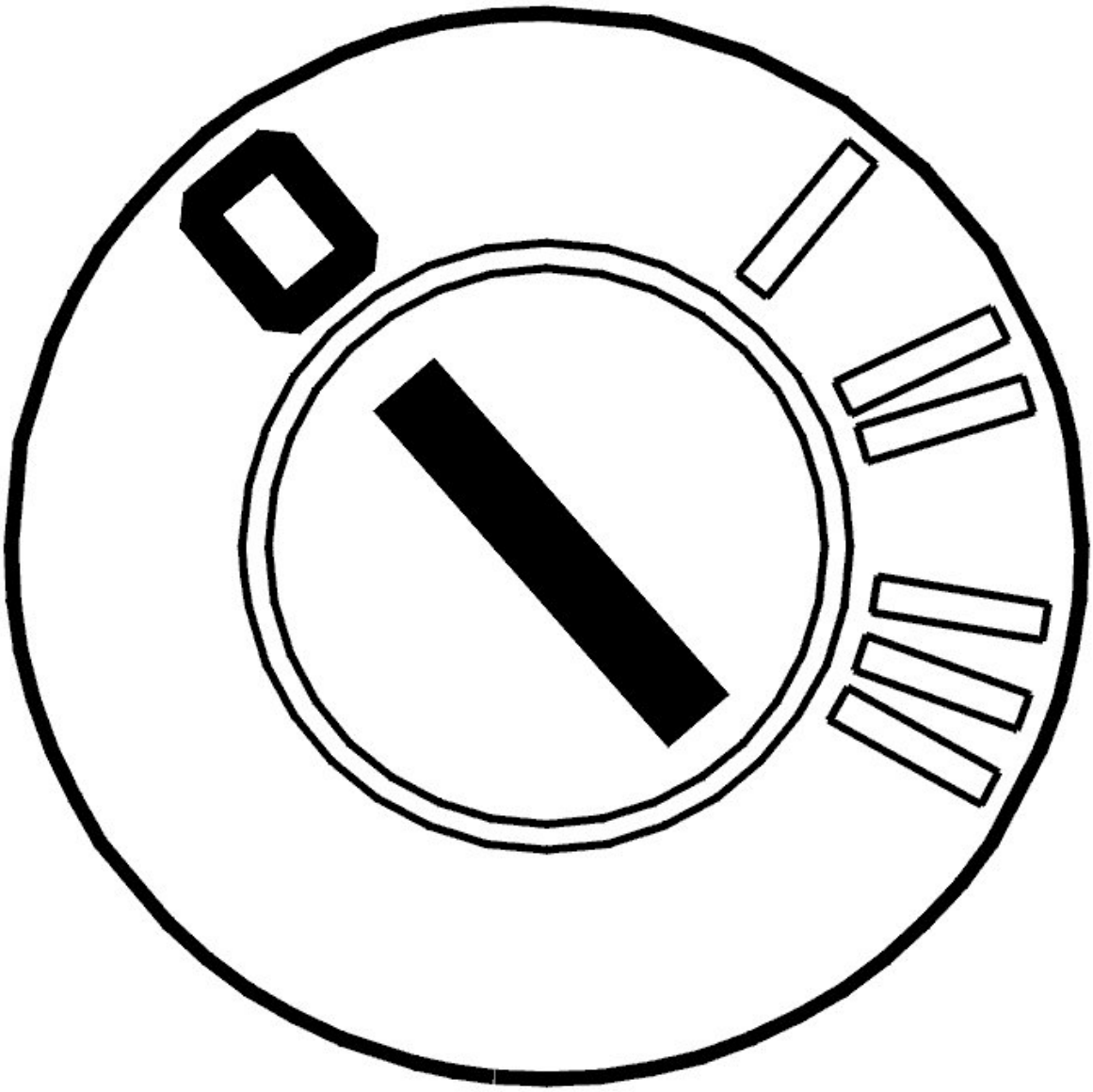
Note! The transmission temperature sensor is located inside the control system and may be affected by the heat given off by the solenoids.

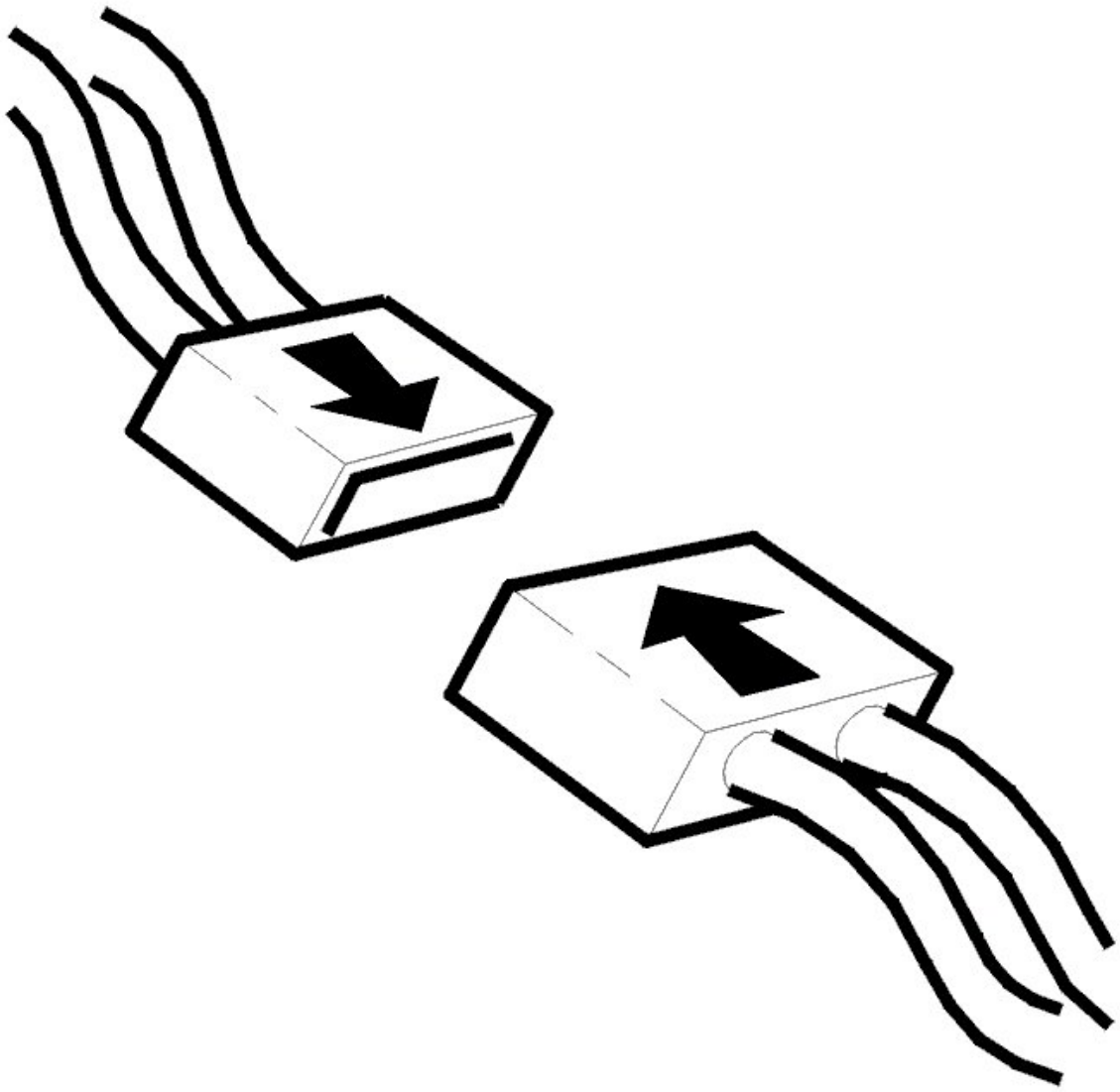
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

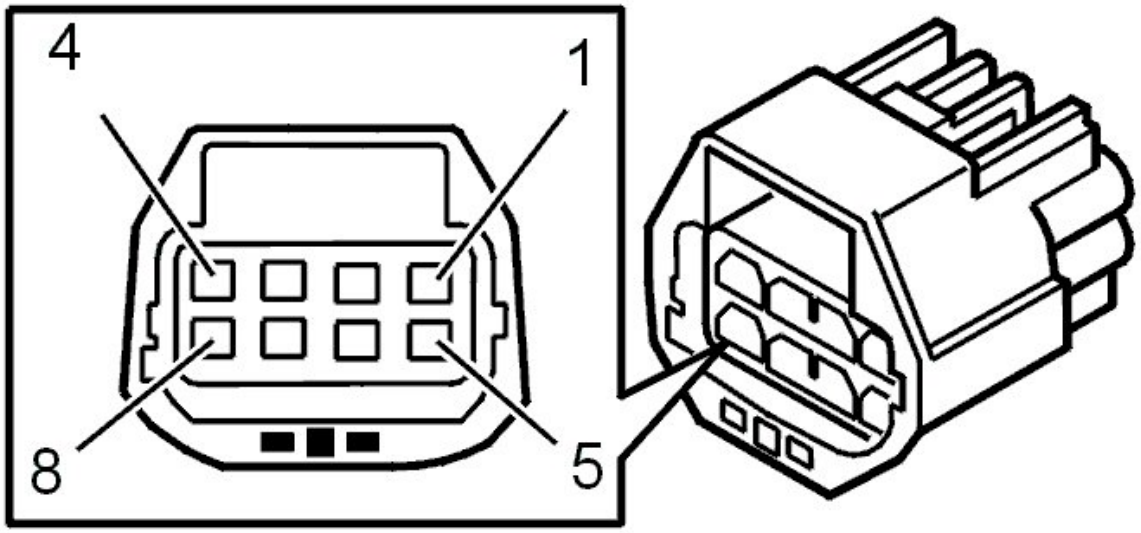
Checking transmission fluid temperature sensor





- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.



Was the resistance OK?

Yes - Checking the wiring and component

No - Checking the cable and component

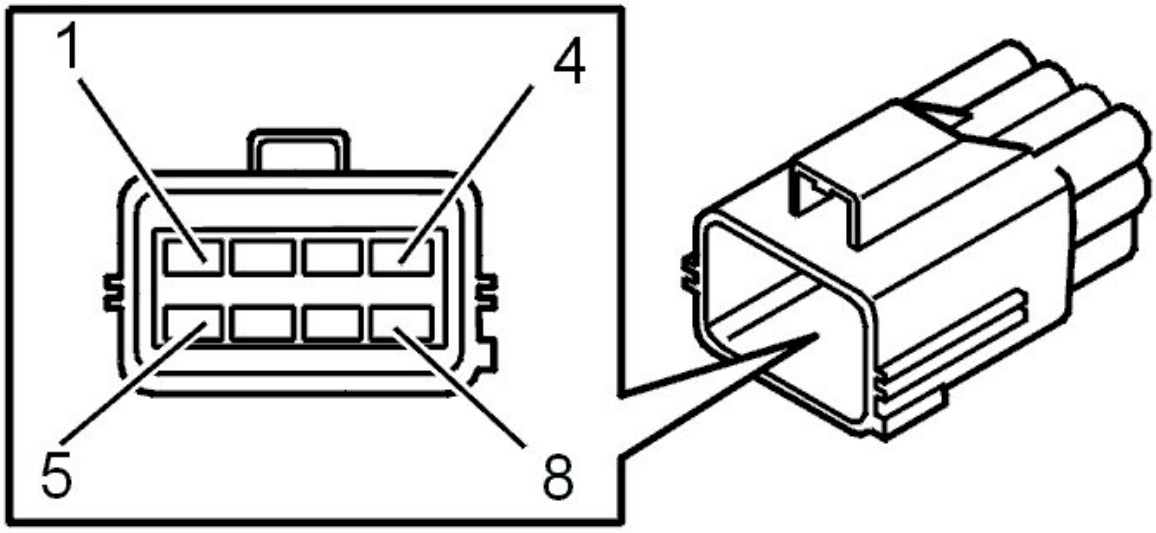
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

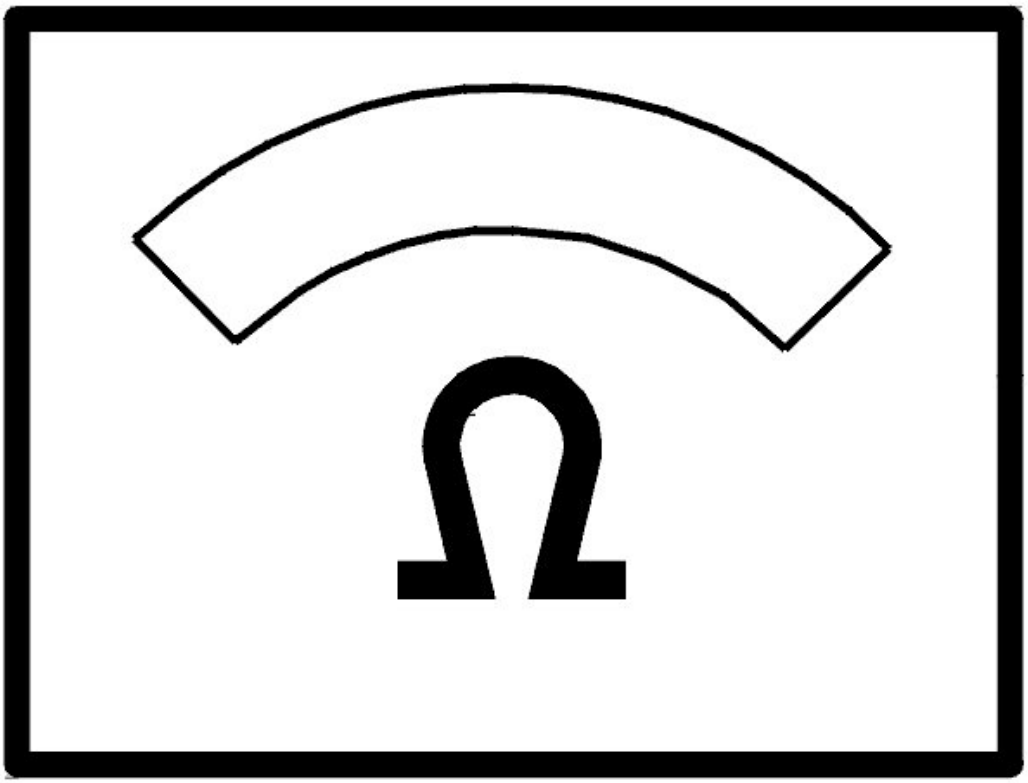
Checking the wiring and component

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



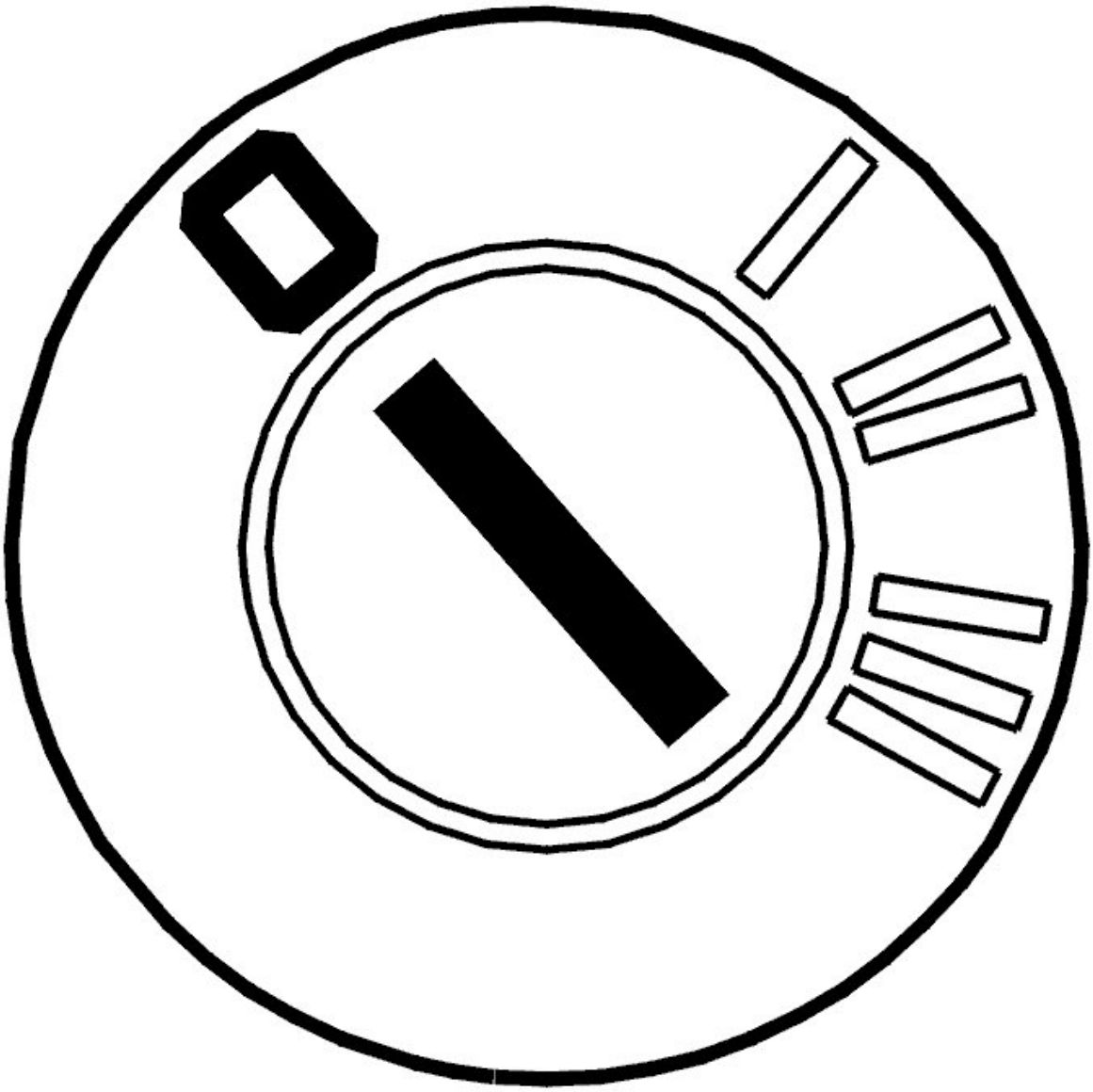


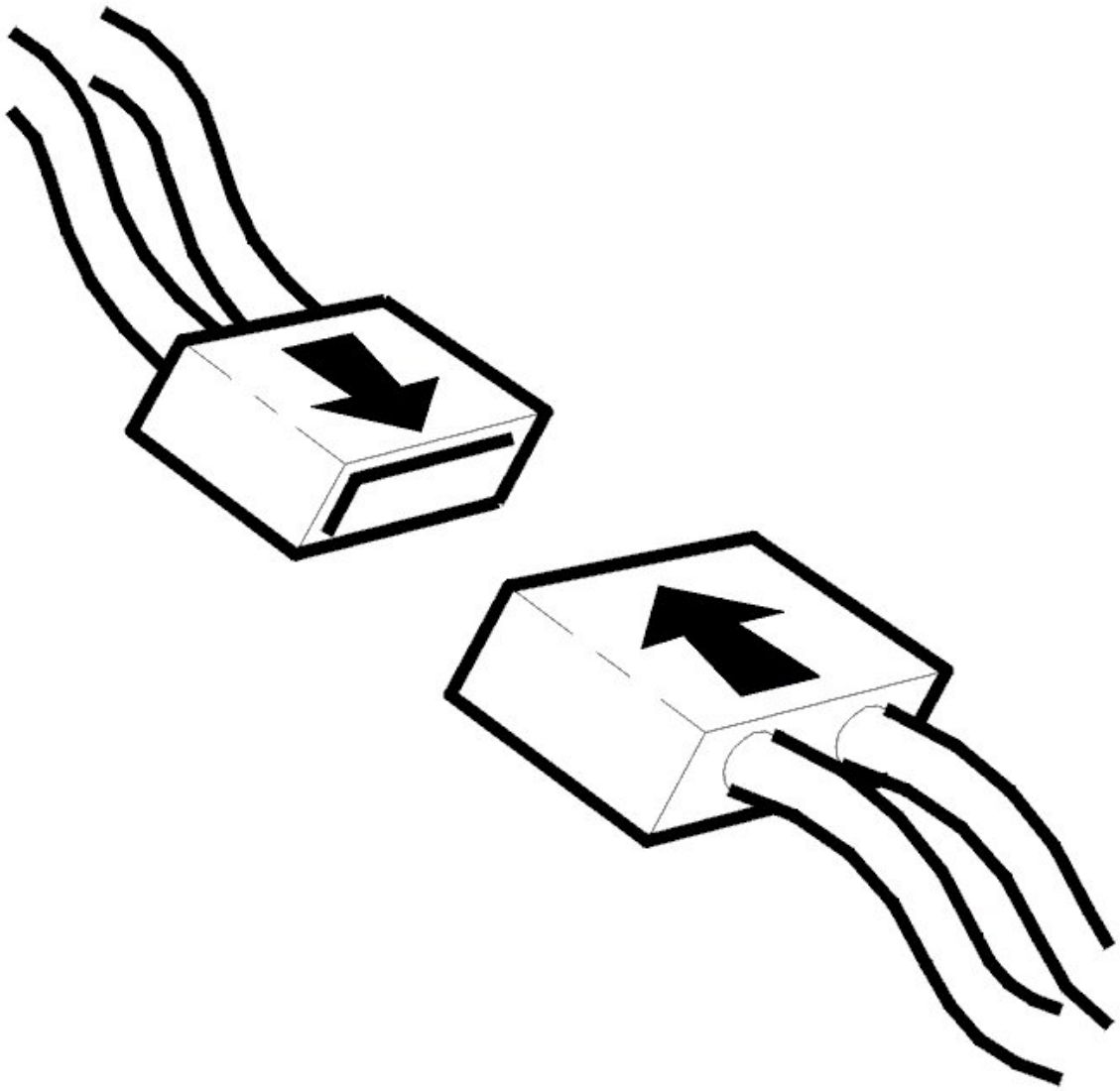
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

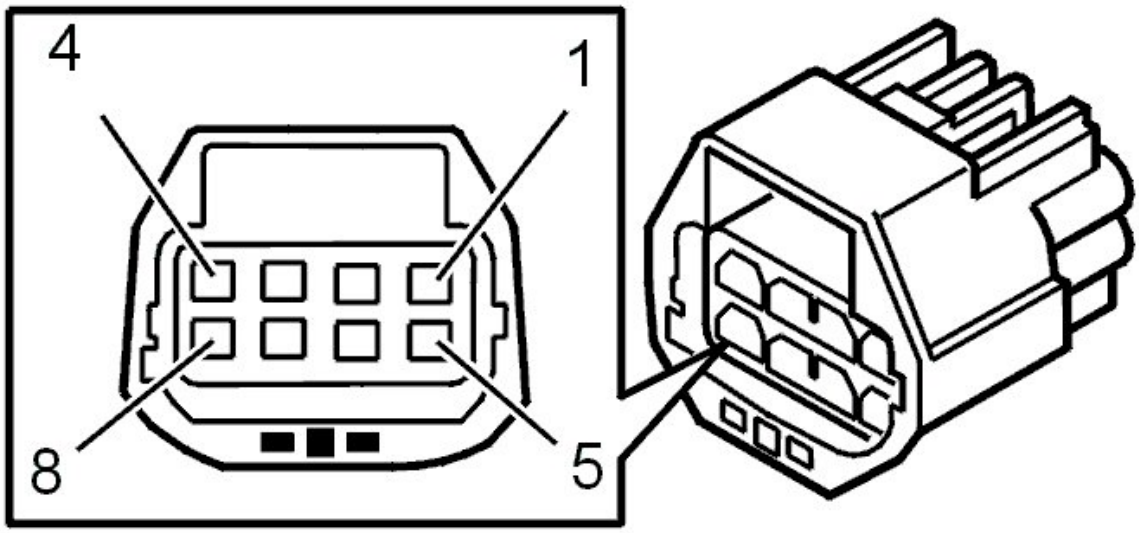
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector terminal #D8 and temperature sensor terminal #2. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check the cables for a short-circuit to each other.

Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20°C.

Remedy as necessary

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To check and replace the temperature sensor, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



Select "Continue".

Continue - Resetting the adaptation

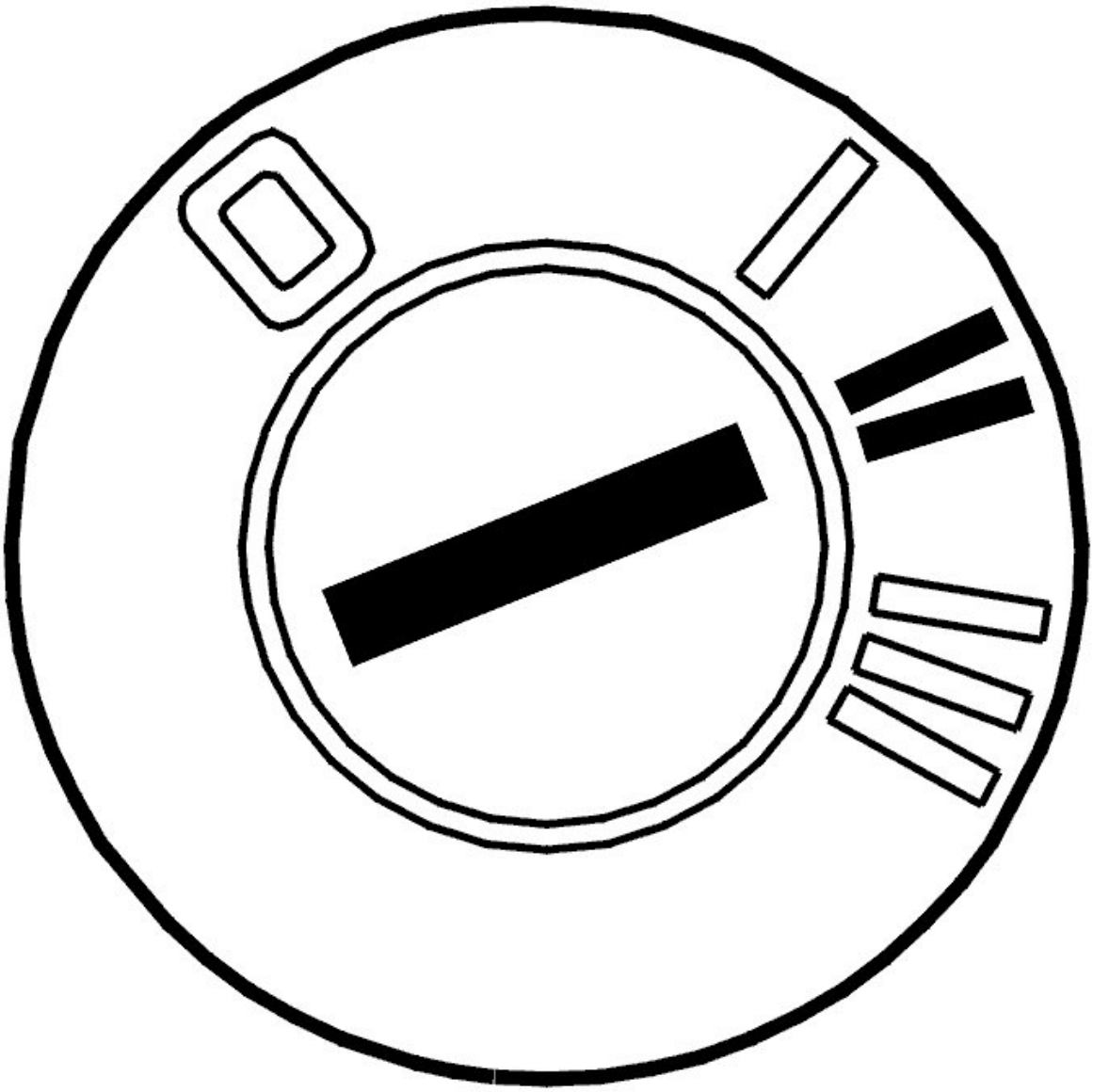
Resetting the adaptation

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

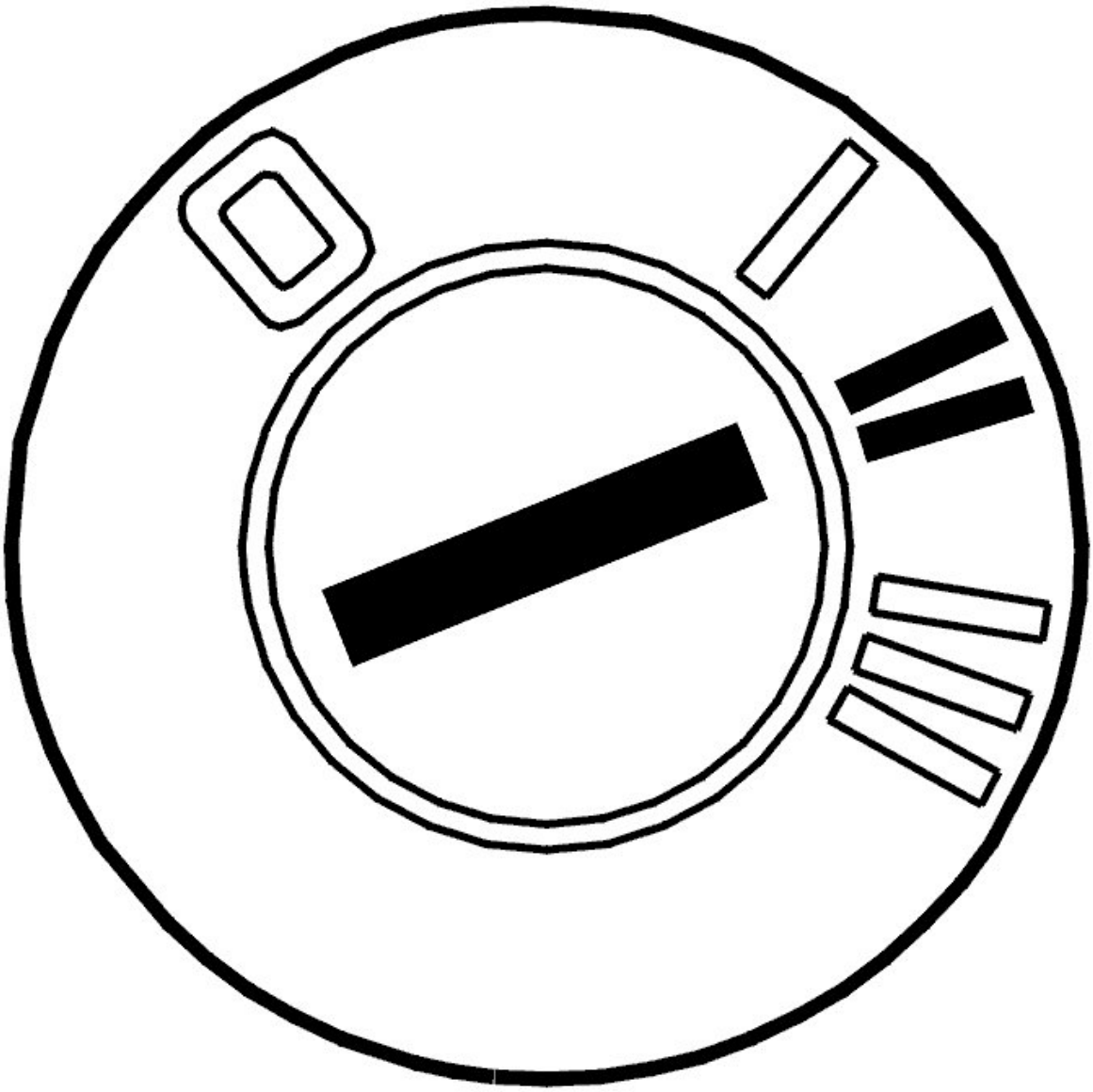
Continue - **DONE**

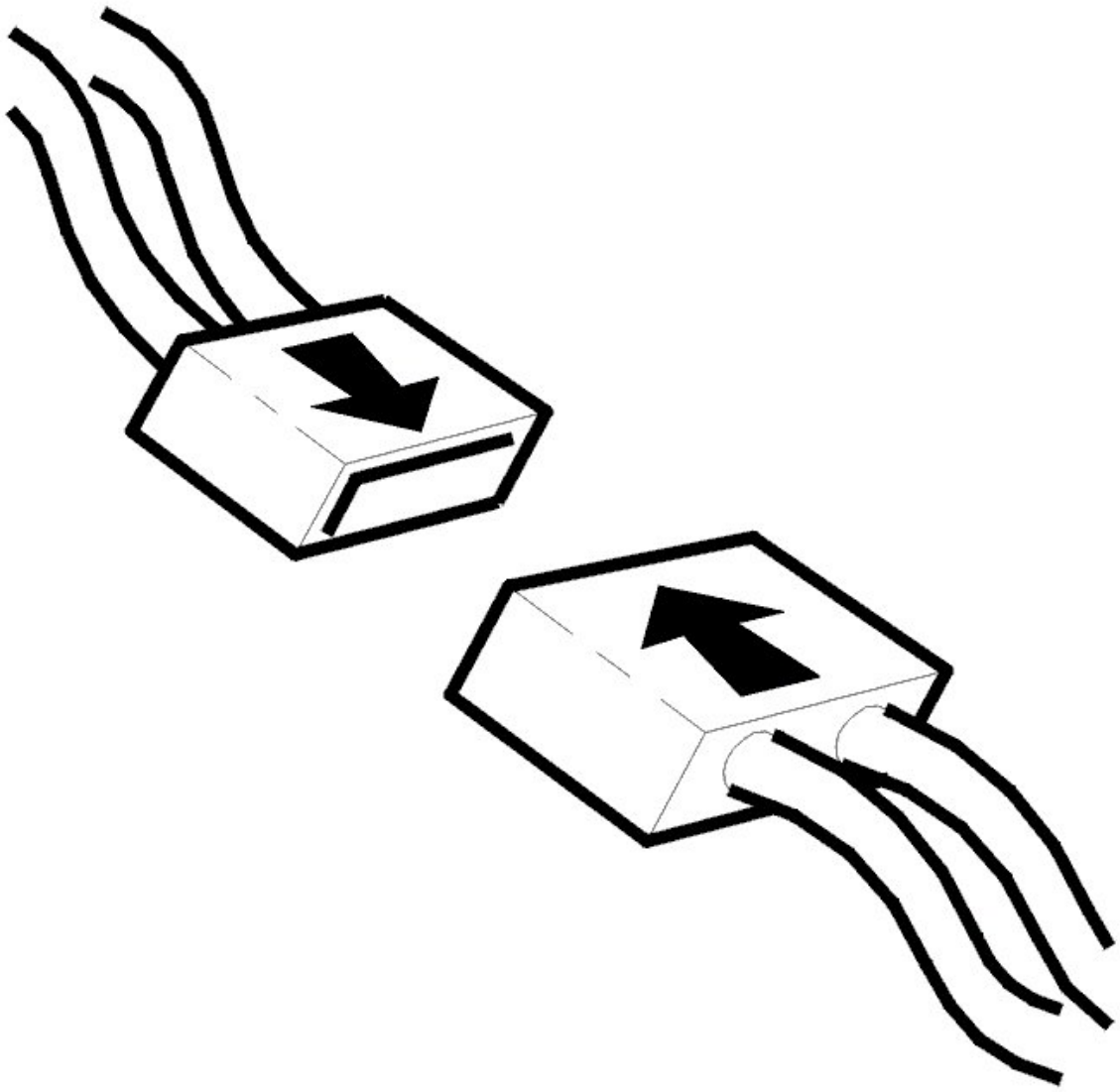
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the function of the oil temperature sensor

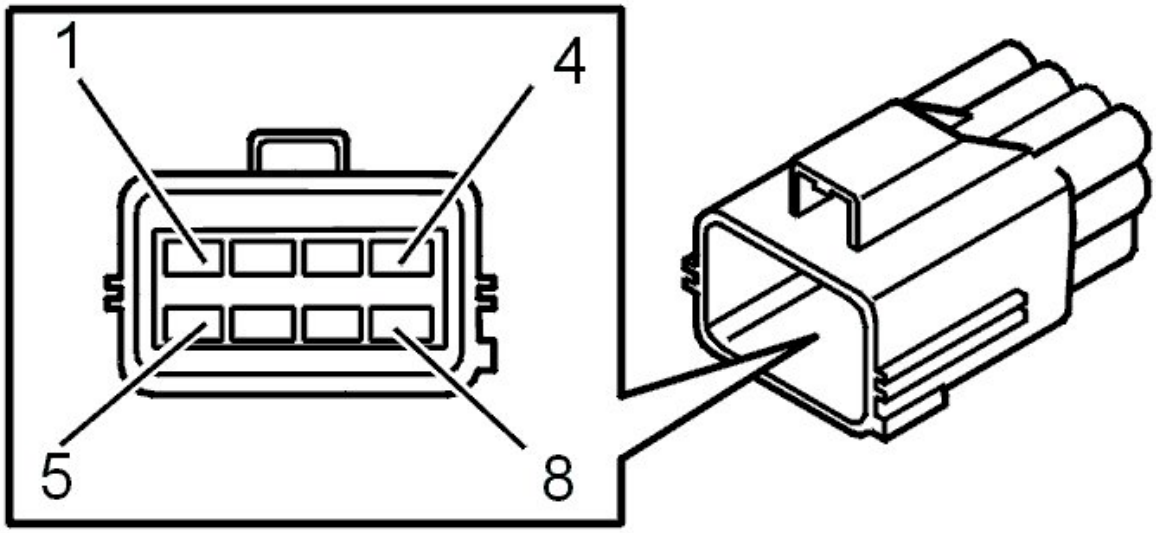
---

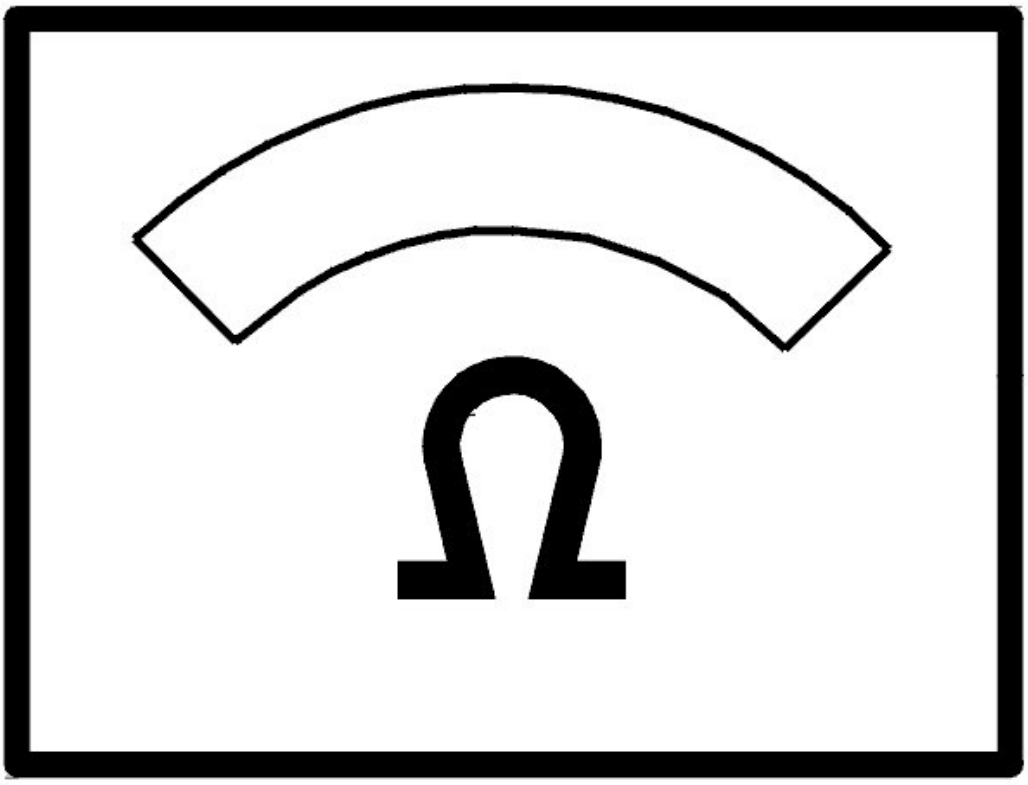
Intermittent fault

Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Also check the cables for a short-circuit to each other. For information about the cable routing, see the relevant Wiring Diagram.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the function of the oil temperature sensor

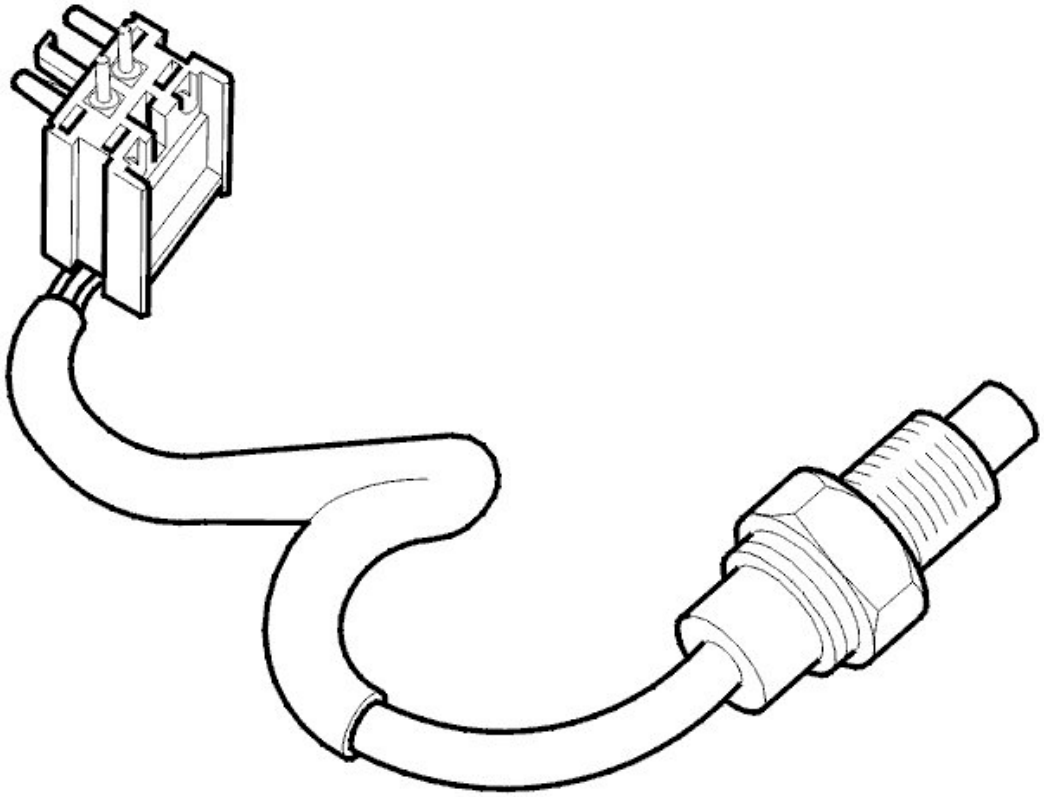
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



The oil temperature sensor transmits a signal to the control module. This signal is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0044 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature below approximately -10°C when the engine is started, and the signal has not changed after the engine has been running for approximately 10 minutes.

Substitute value
- No substitute values.

Possible source
- Contact resistance in the terminals.
- Open-circuit in the signal cable or in the ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

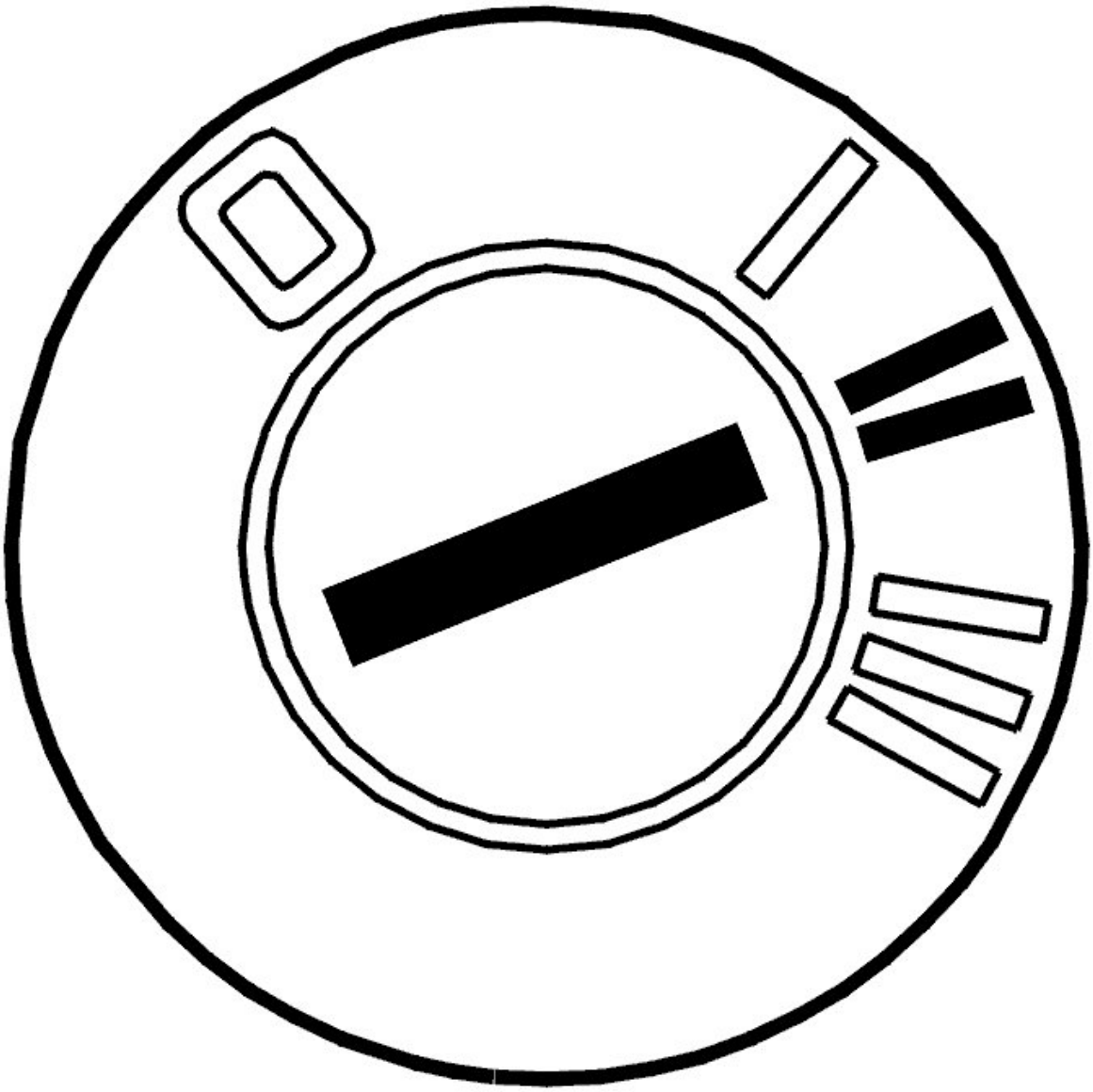
Fault symptom[s]
- General orange warning lamp lit.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Signal Too High

Signal too high

Checking transmission fluid temperature sensor

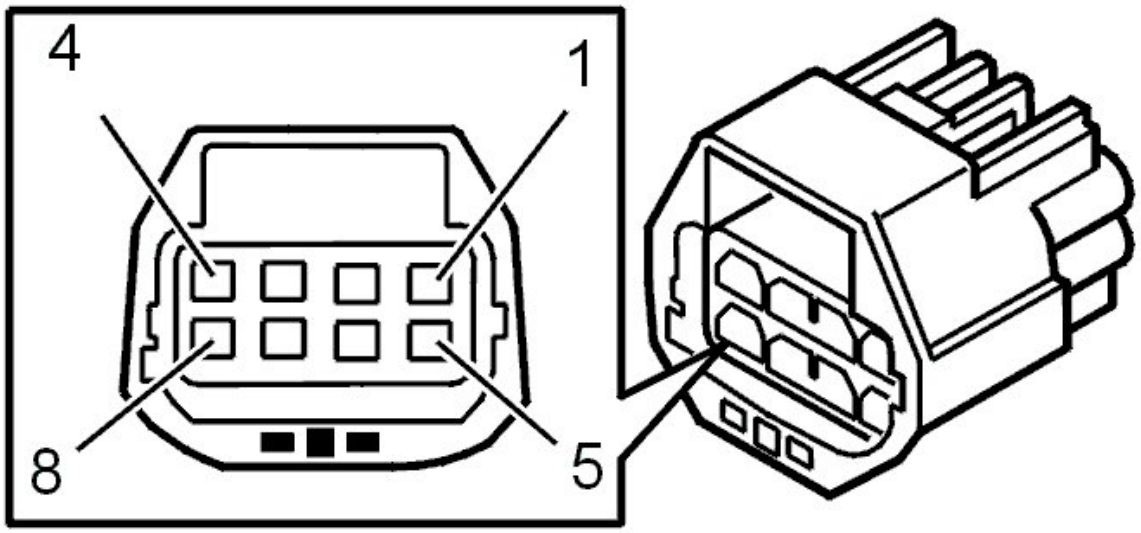


- Ignition off
- Check the control module connector and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reconnect the control module and transmission connectors
- Ignition on
- Read off the oil temperature.

Check that the temperature is within its permitted range.
Compare with the transmission temperature.
If the transmission temperature is within its permitted range, the cause of the fault was contact resistance or oxidation in the control module or transmission connector.

Other information:

- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures.

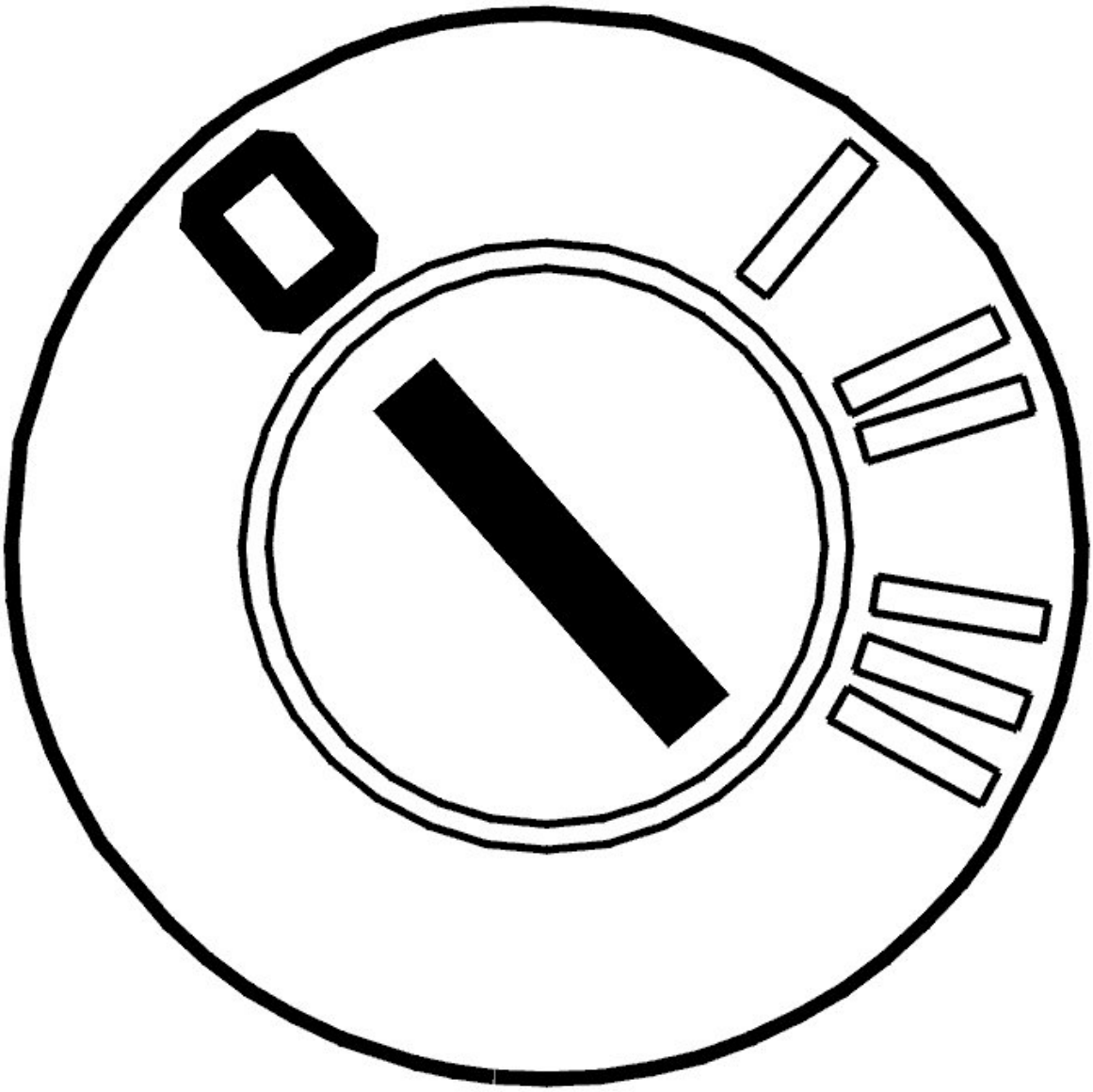


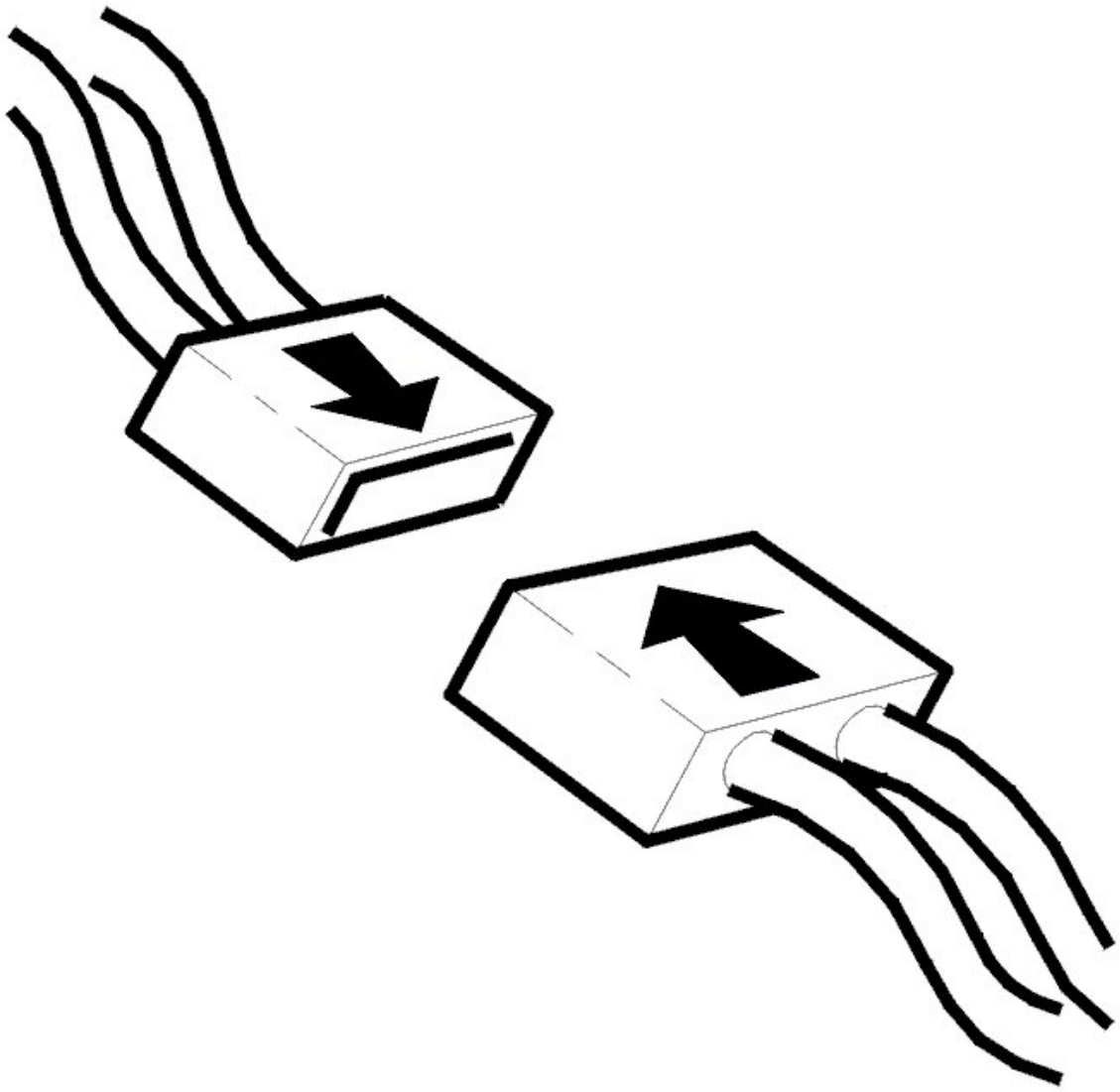
Was the transmission temperature within its permitted range?

Yes - Fault Found

No - Checking transmission fluid temperature sensor

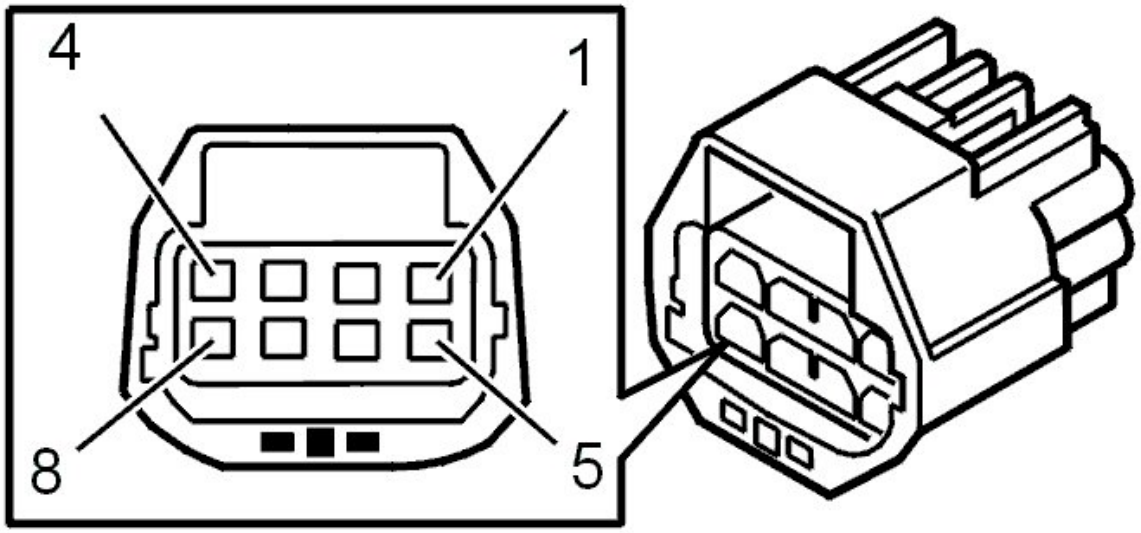
Checking transmission fluid temperature sensor

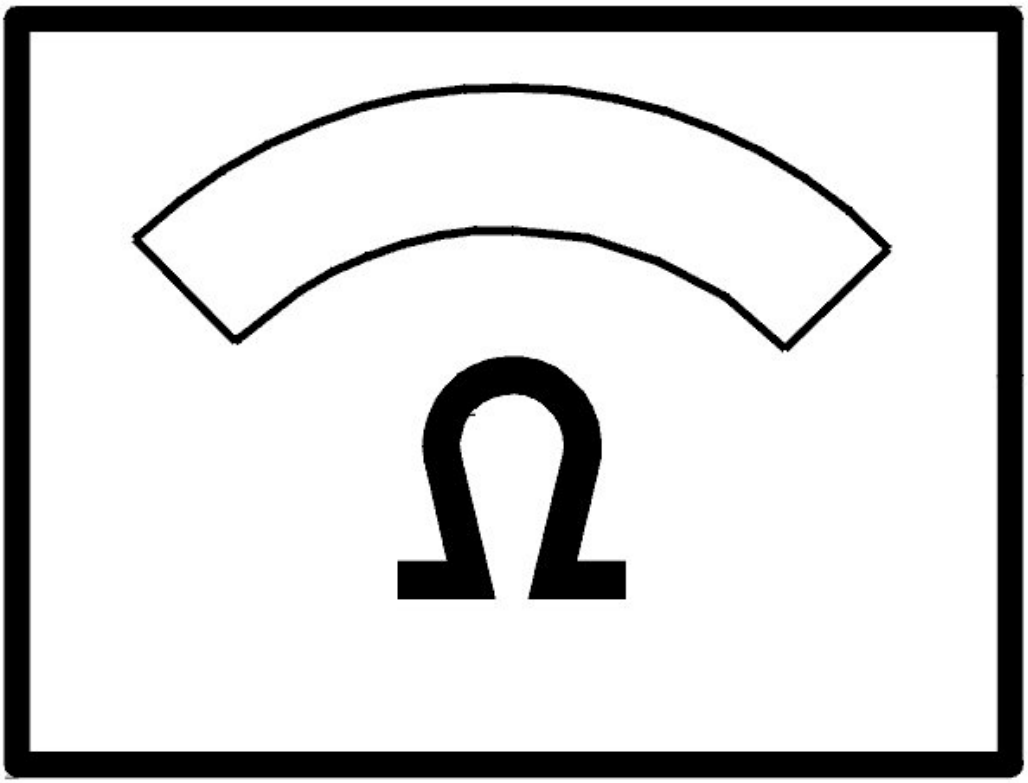




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking the wiring and component

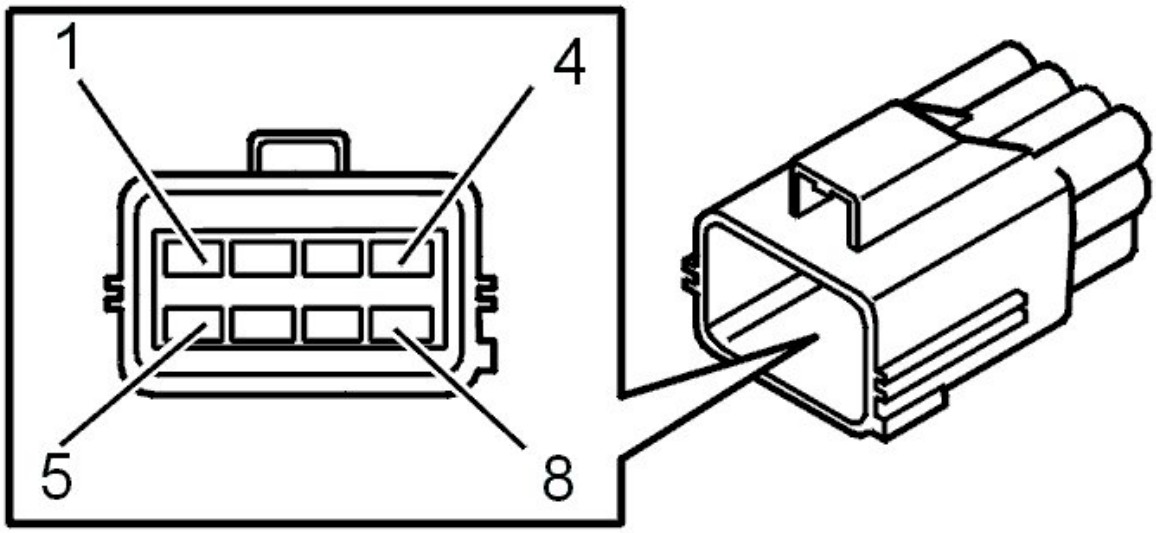
No - Checking the cable and component

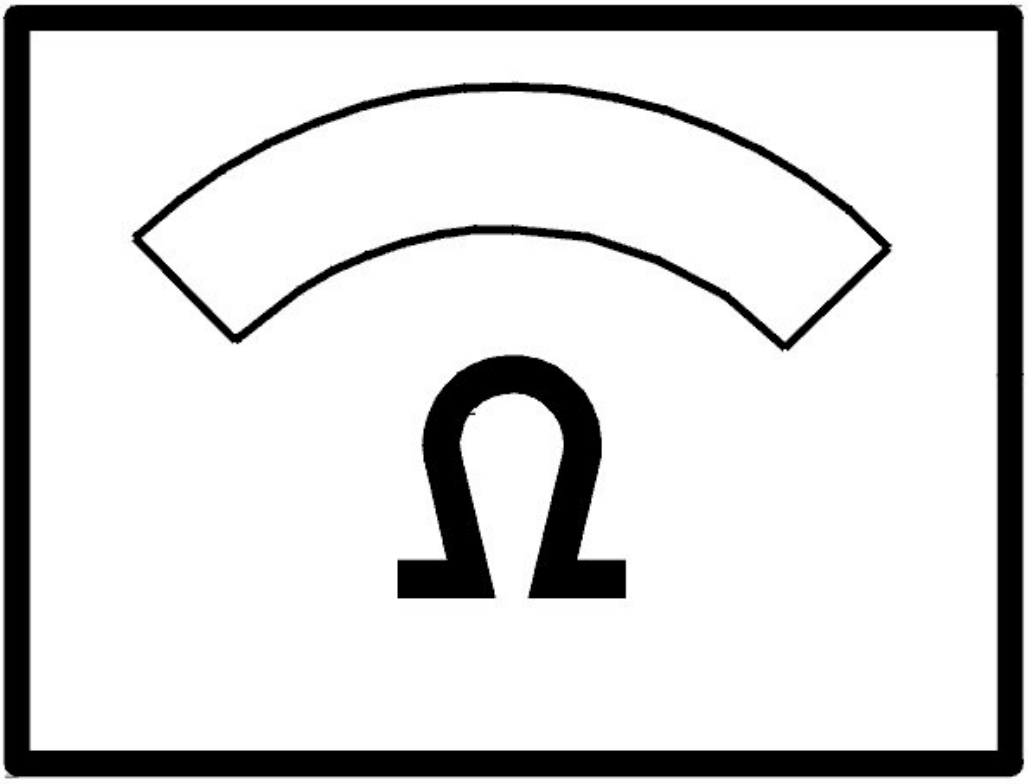
Checking the wiring and component

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55) and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



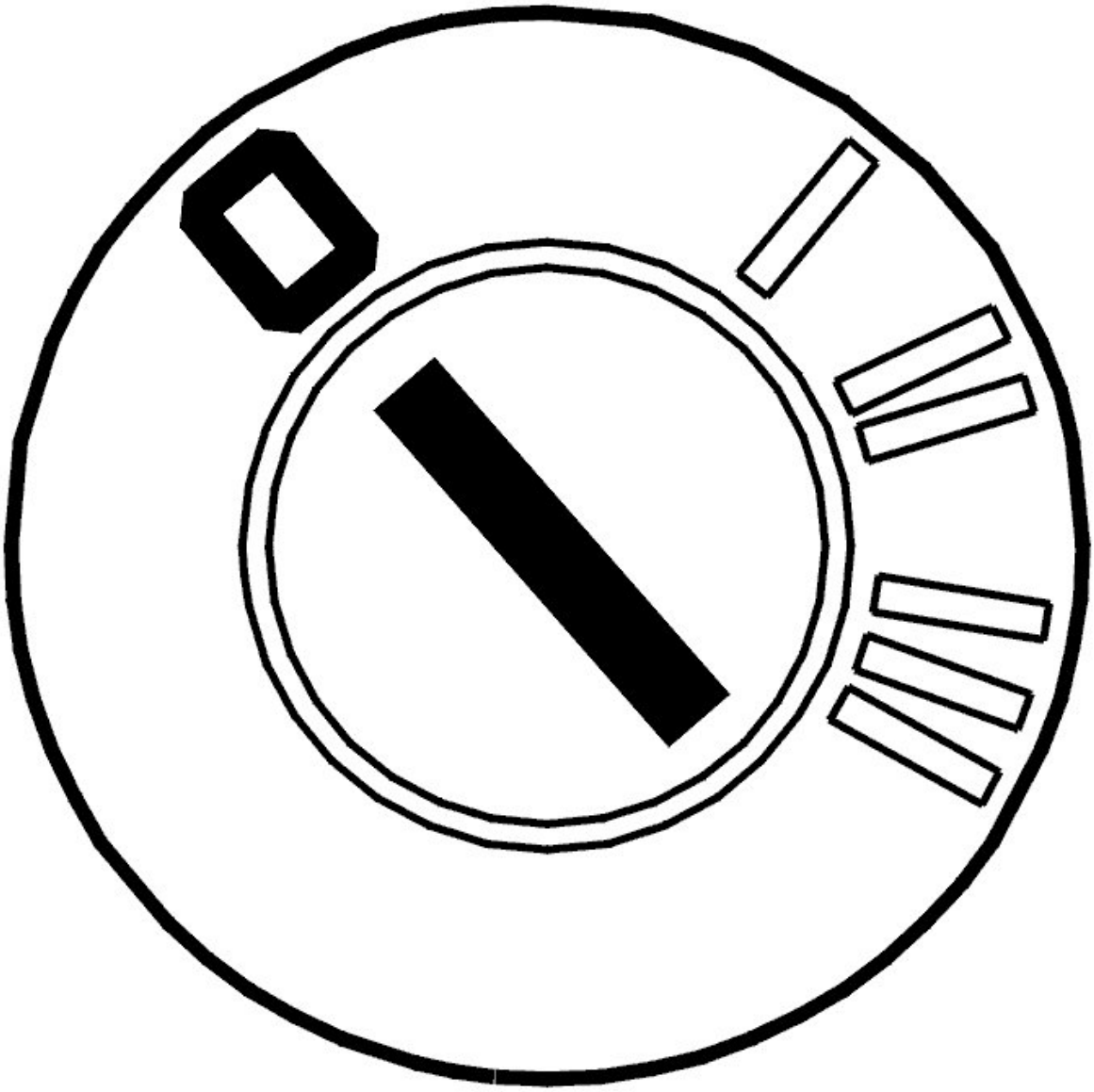


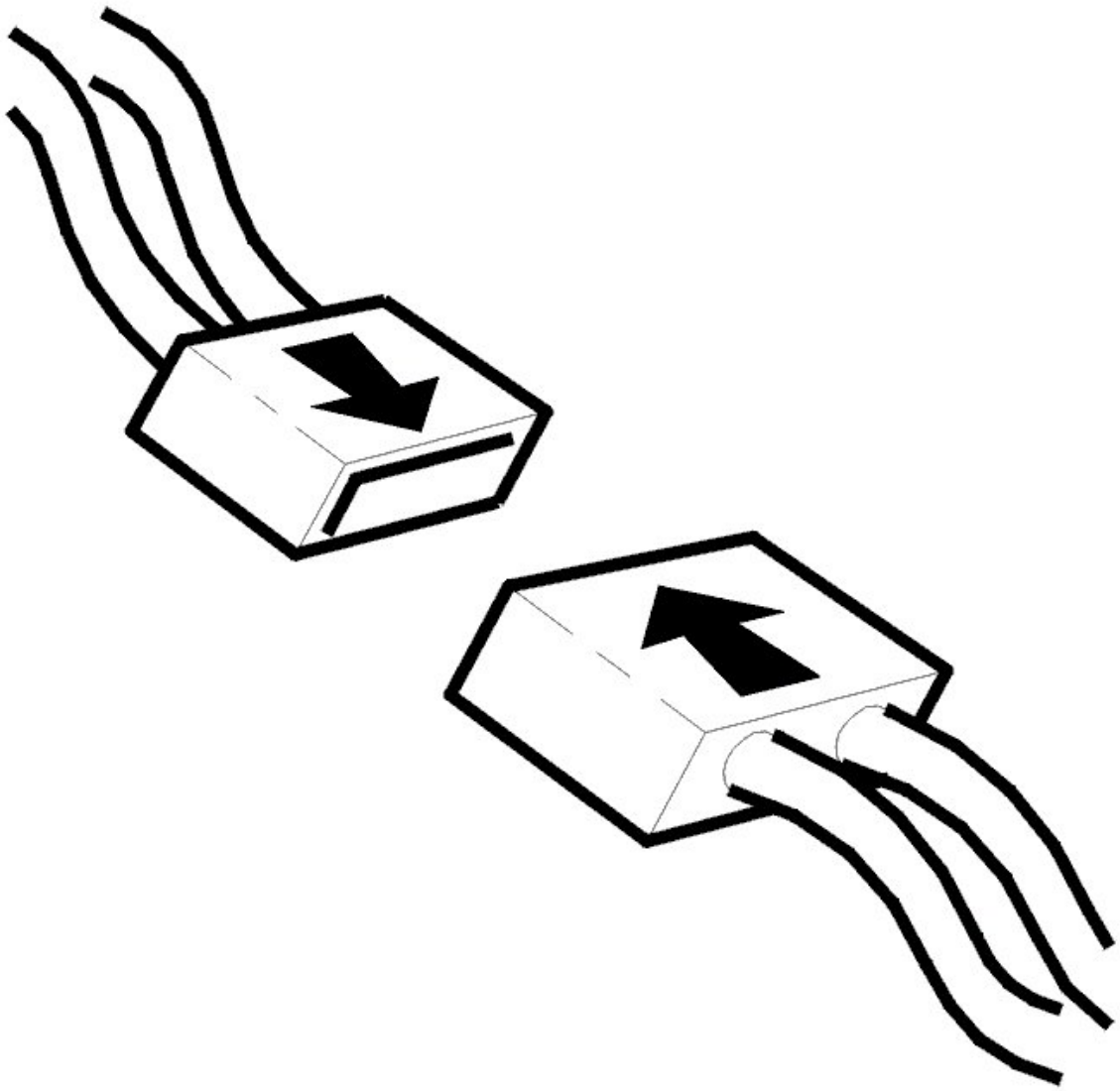
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

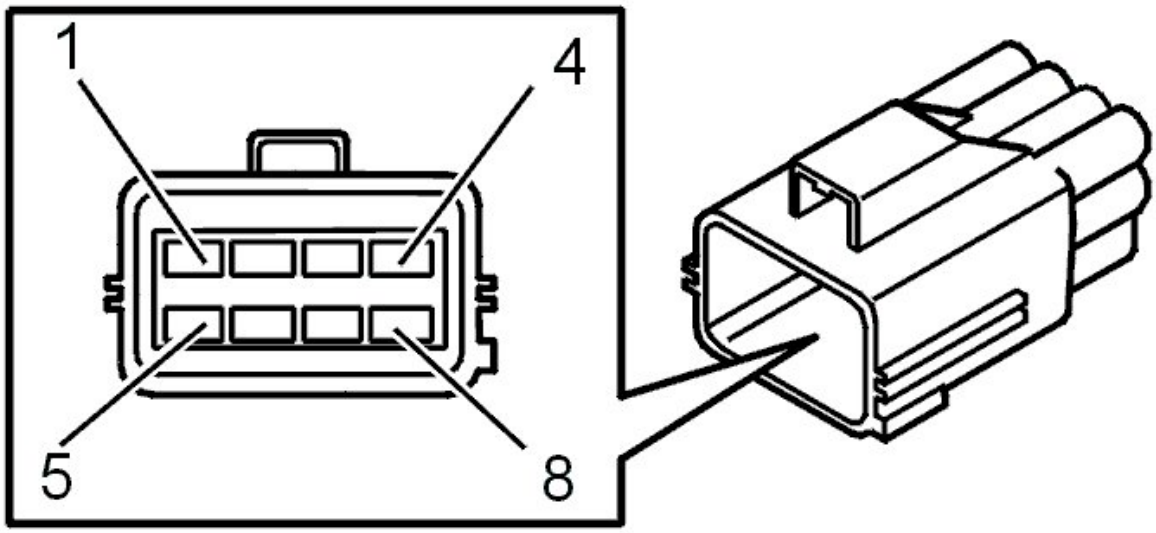
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check the cables for a short-circuit to each other.

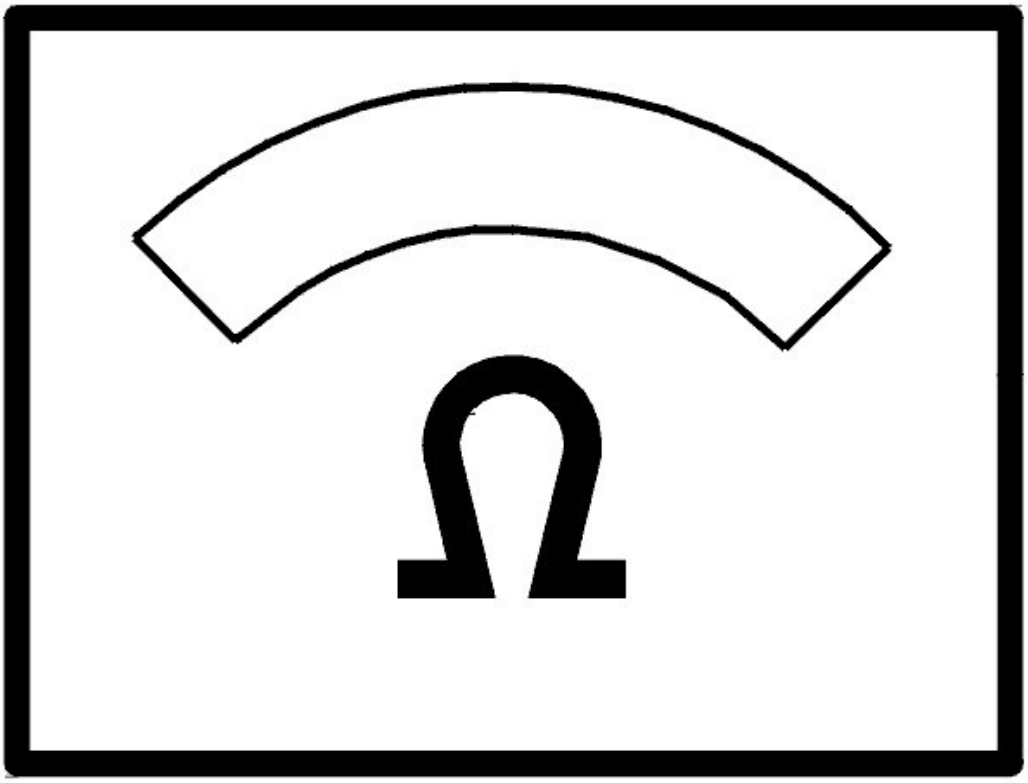
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20°C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

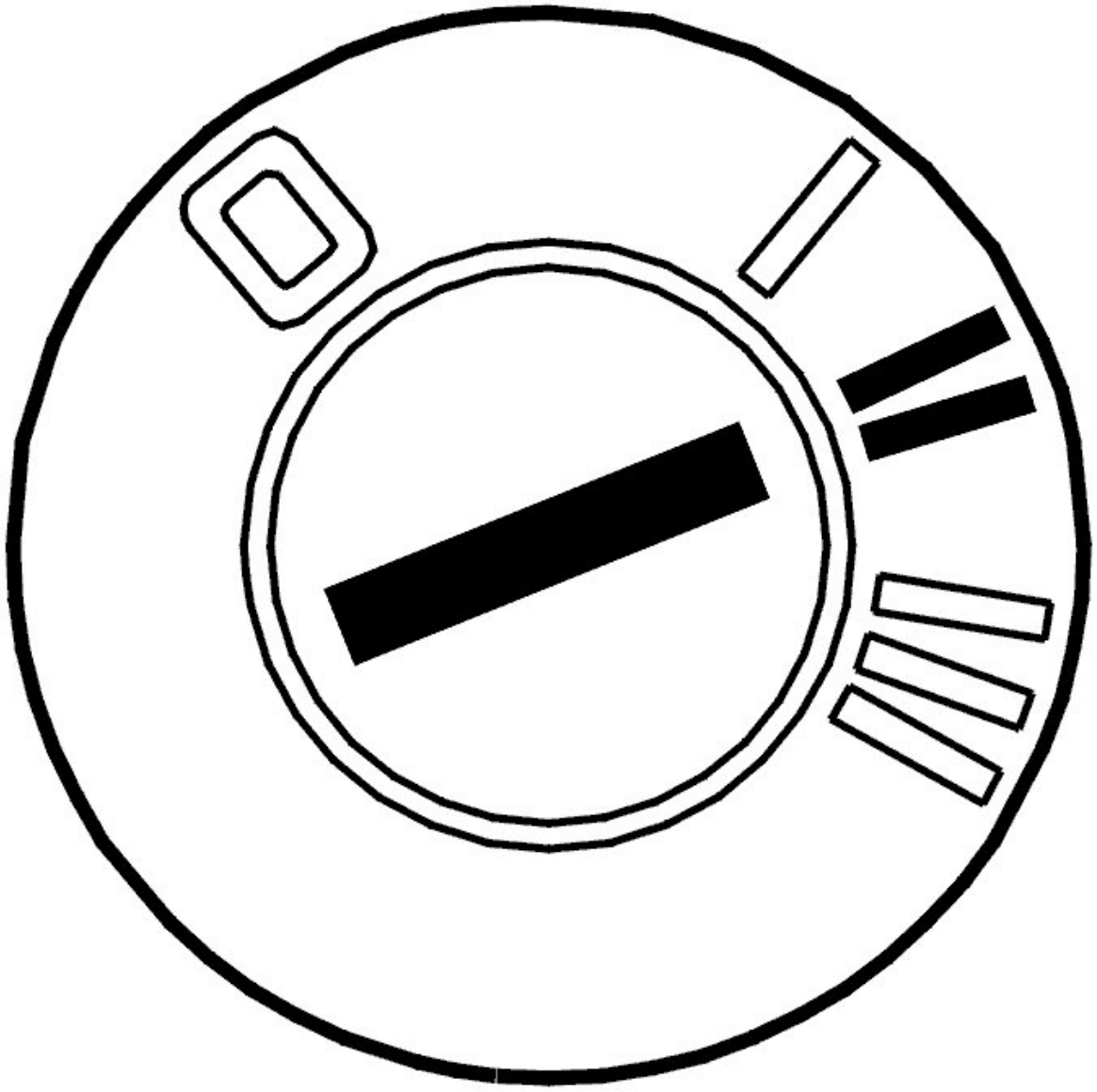
Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a

load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

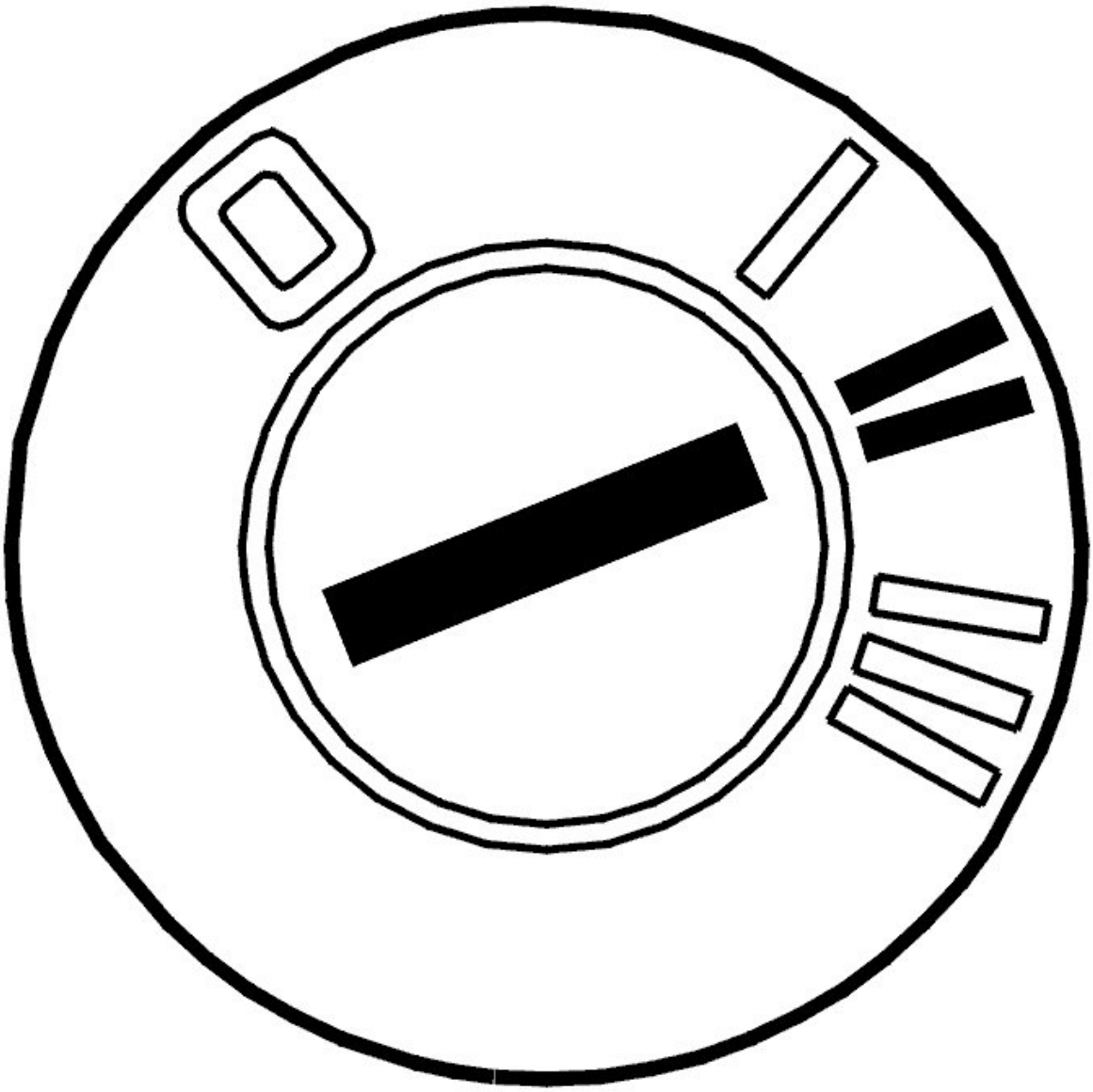
Continue - DONE

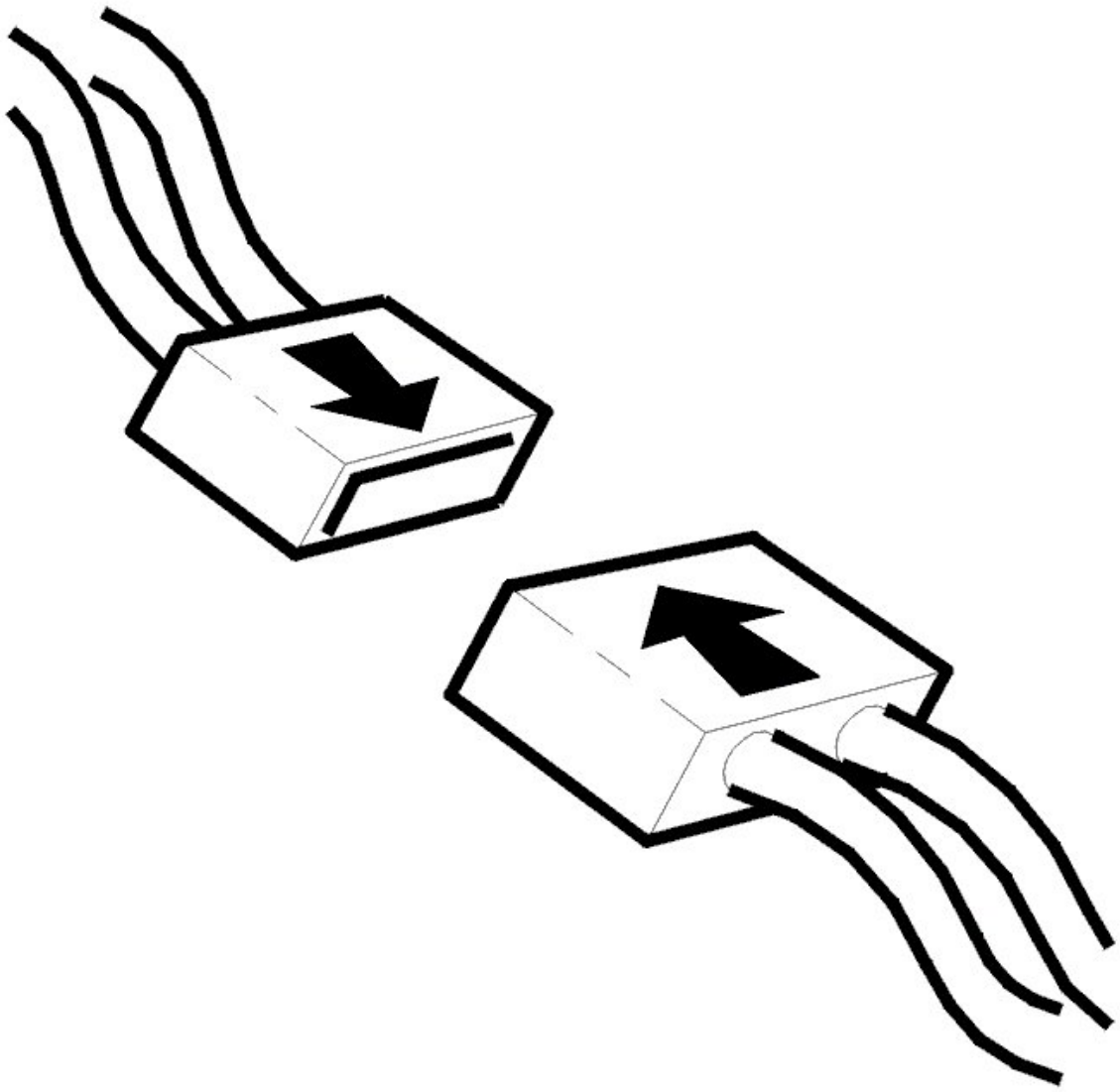
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

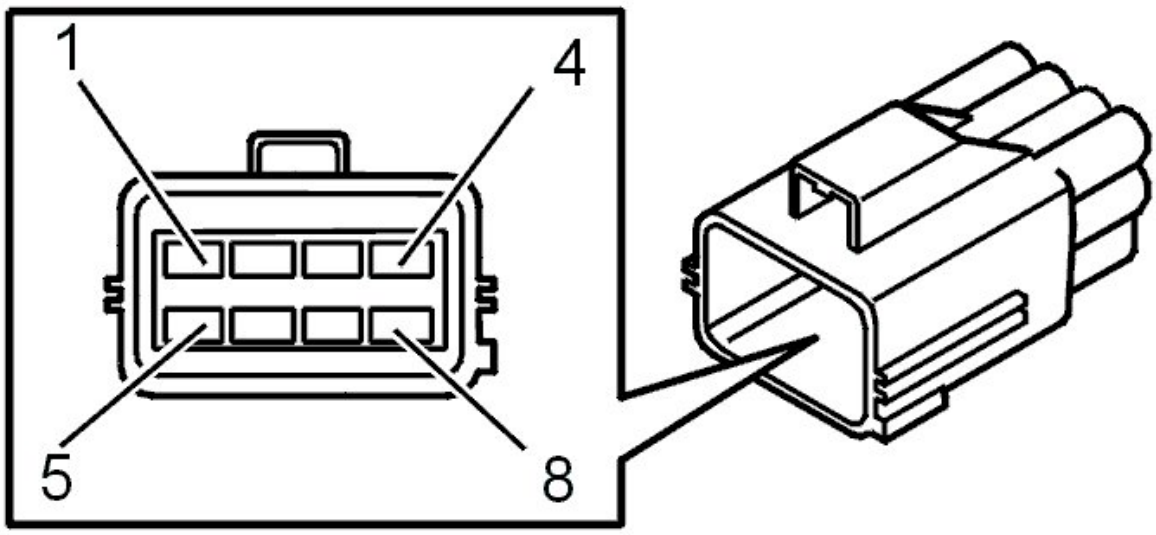
---

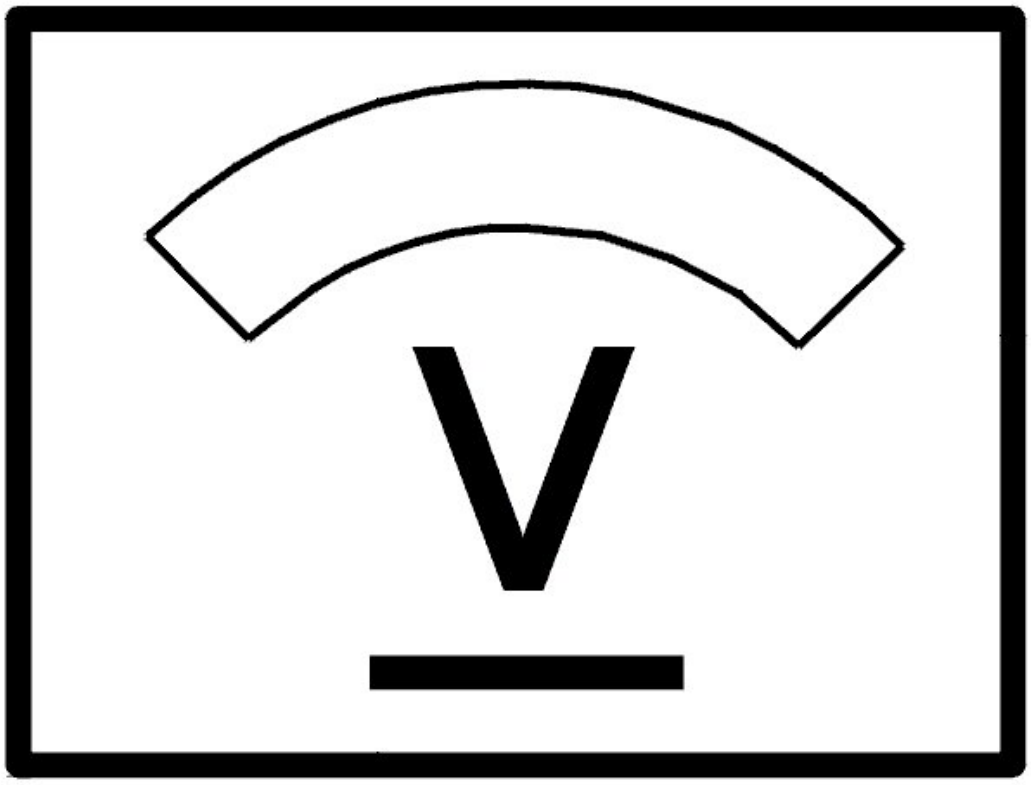
Intermittent fault

Check the wiring between transmission control module (TCM) terminals #A37 (#A37) and #A55 (#A55) and transmission connector terminals #D7 and #D8. Check for an intermittent short-circuit to each other.
Check the cables between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55) and transmission connector terminal #D8 (control module side). Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking transmission fluid temperature sensor

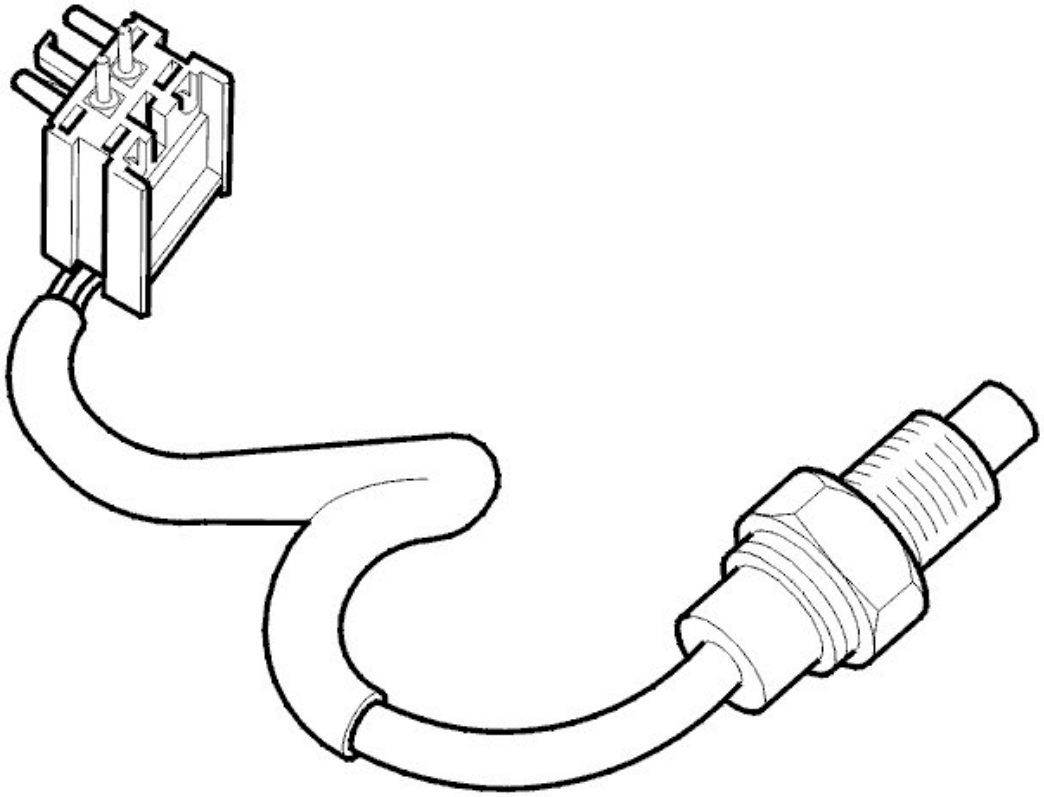
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



The oil temperature sensor sends a signal to the transmission control module (TCM) which is used for functions such as temperature controlled lockup and initiating high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0045 is stored if the transmission control module (TCM) receives a signal from the oil temperature sensor which has not changed after the engine has run for 10 minutes.

Substitute value
- No substitute values.

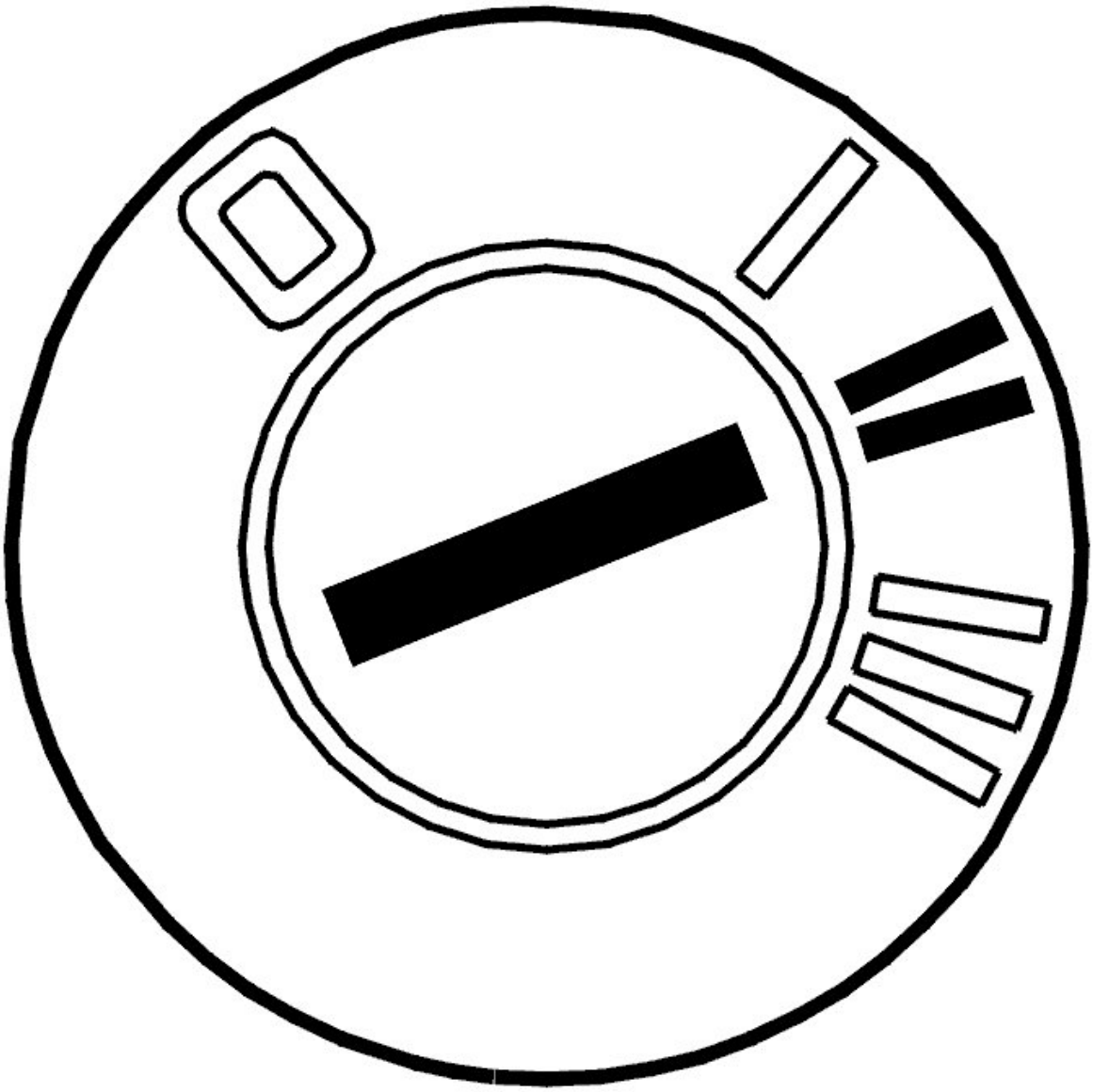
Possible source
- Contact resistance in terminals.
- Open-circuit in signal cable or ground lead.
- Short-circuit to supply voltage in the signal cable.
- Defective oil temperature sensor.

Fault symptom[s]
- General orange warning lamp lit.

Faulty Signal

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

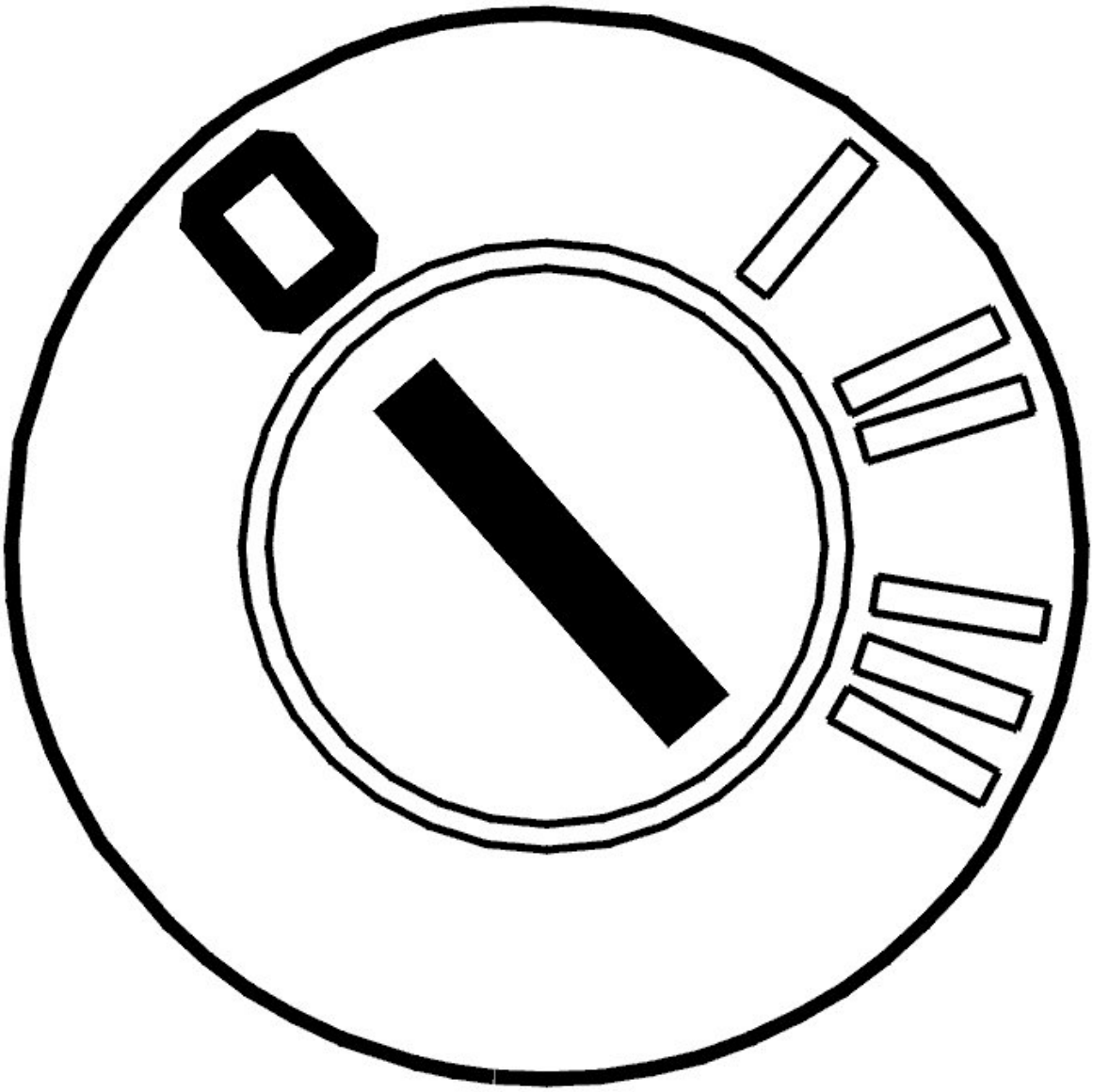
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

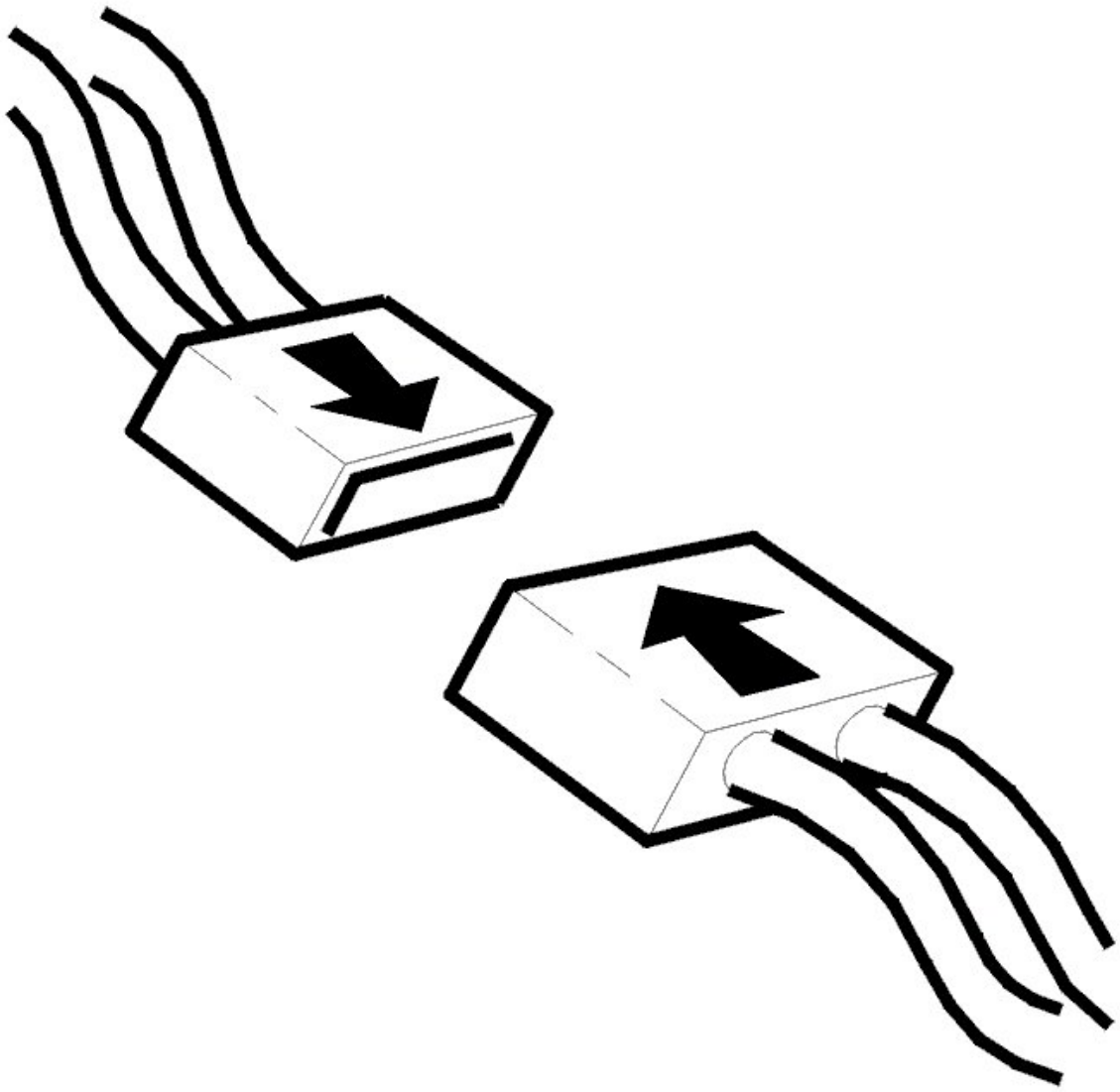
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

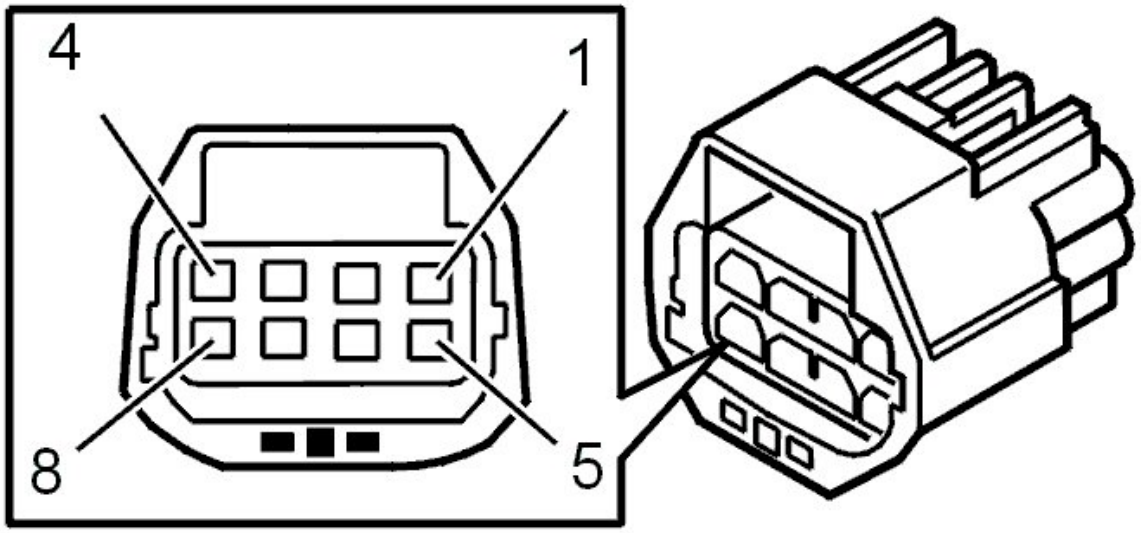
Checking transmission fluid temperature sensor

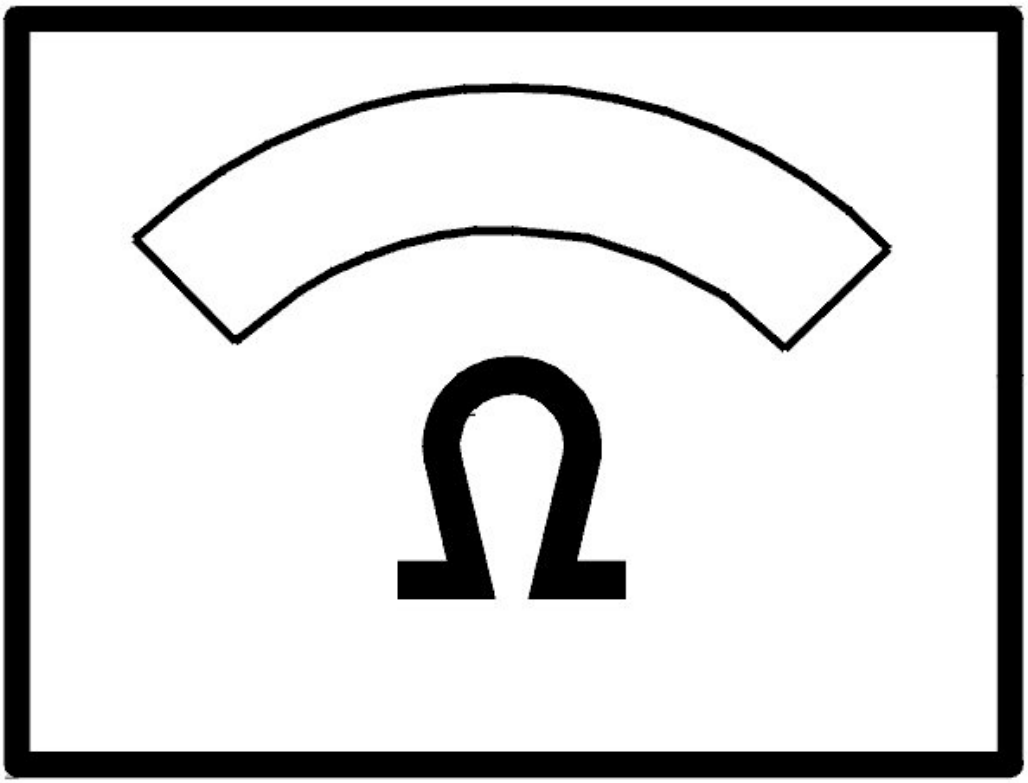




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

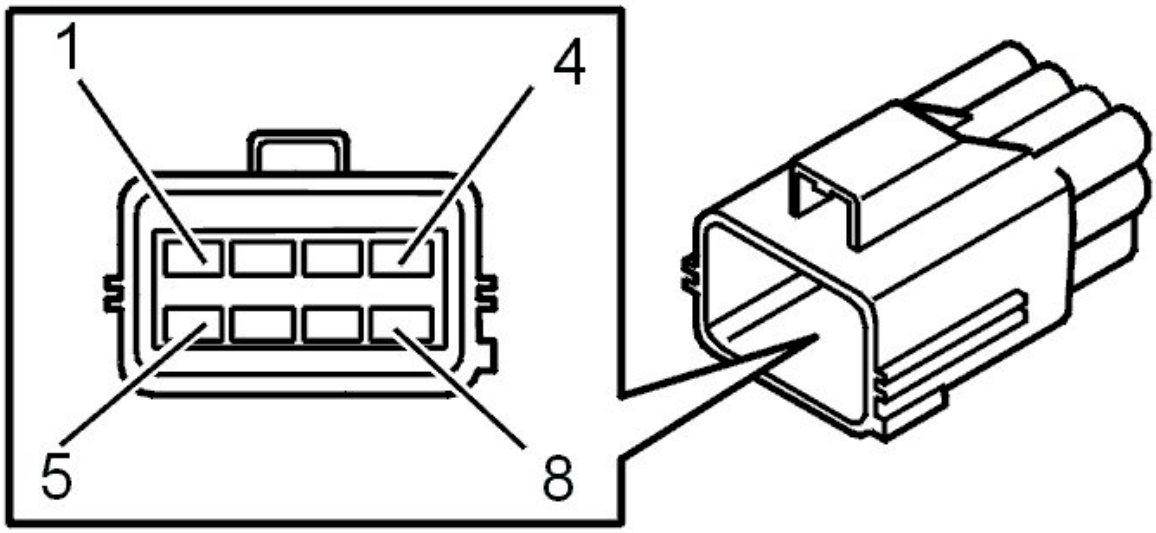
No - Checking the cable and component

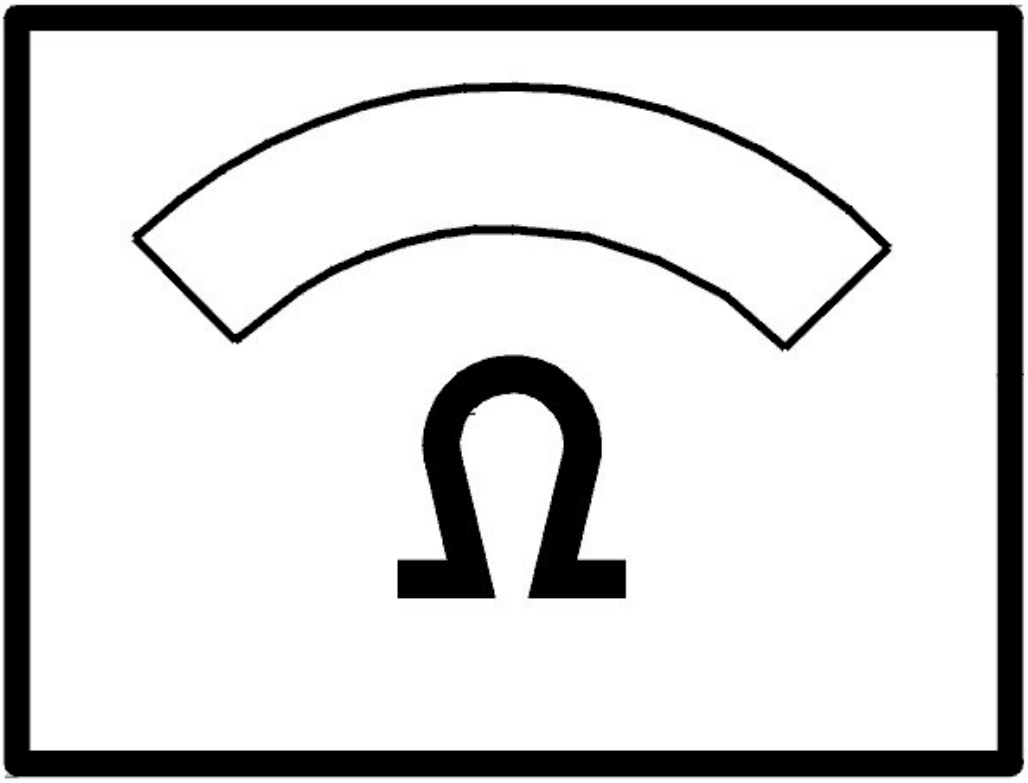
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



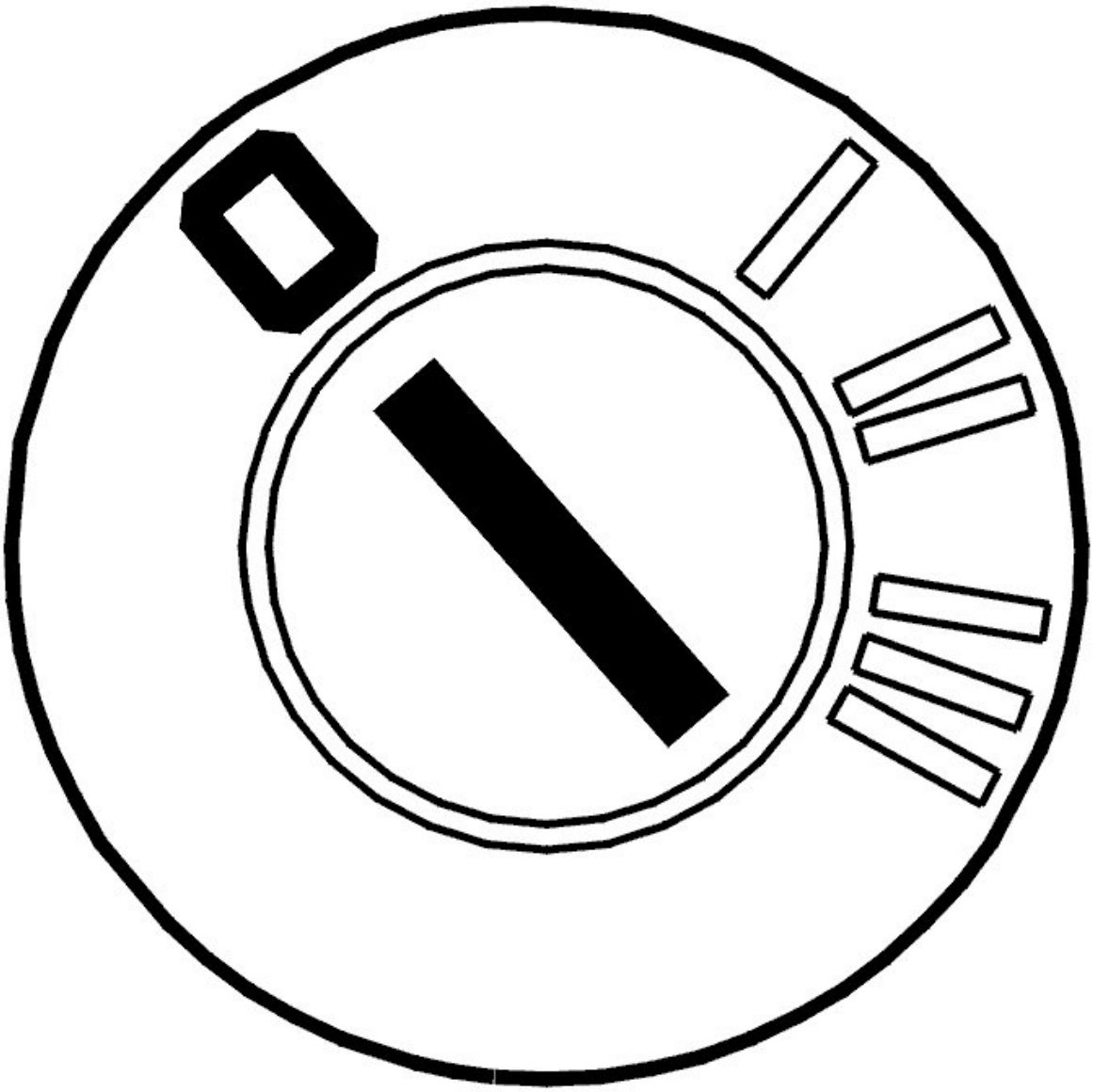


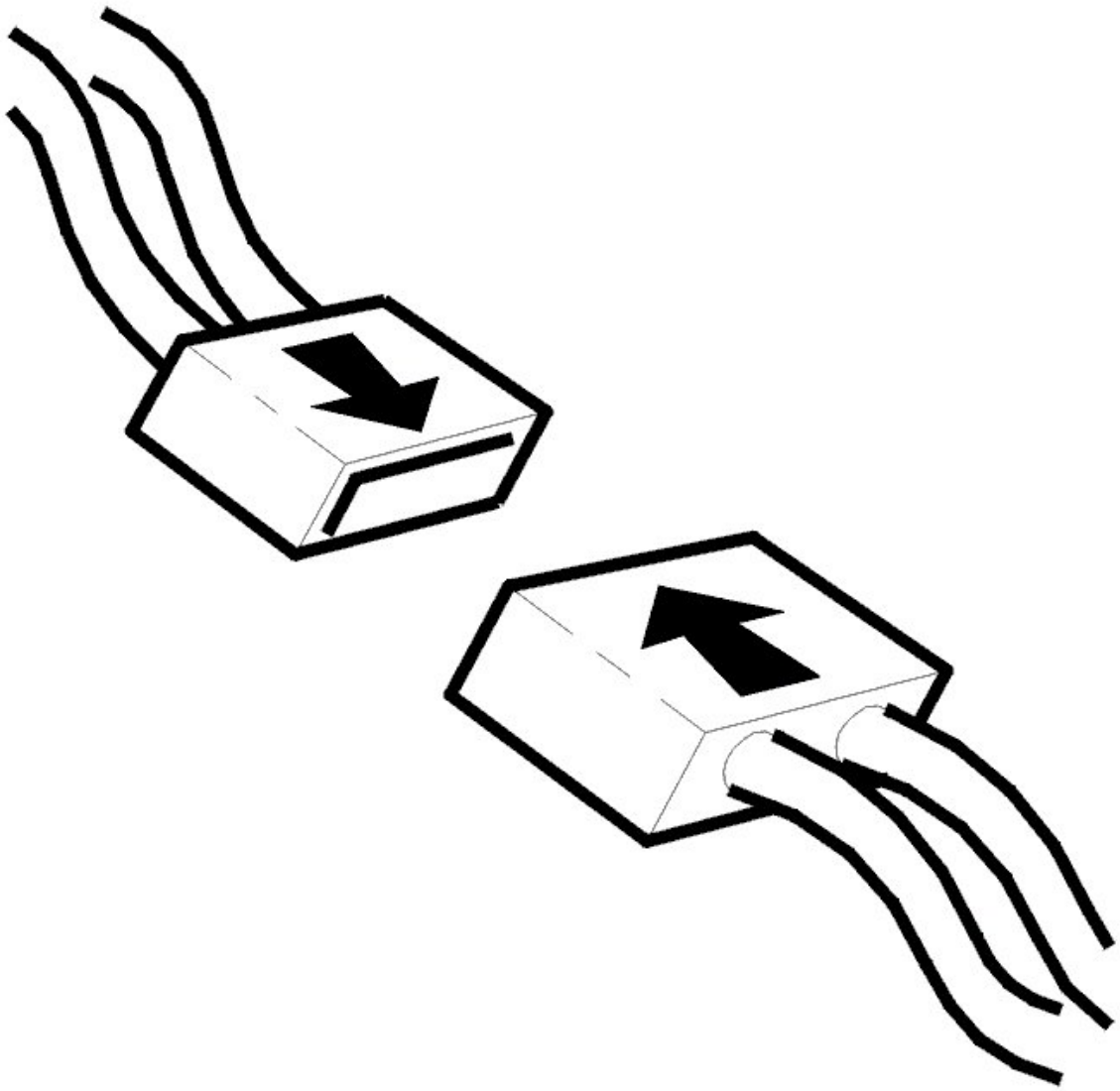
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

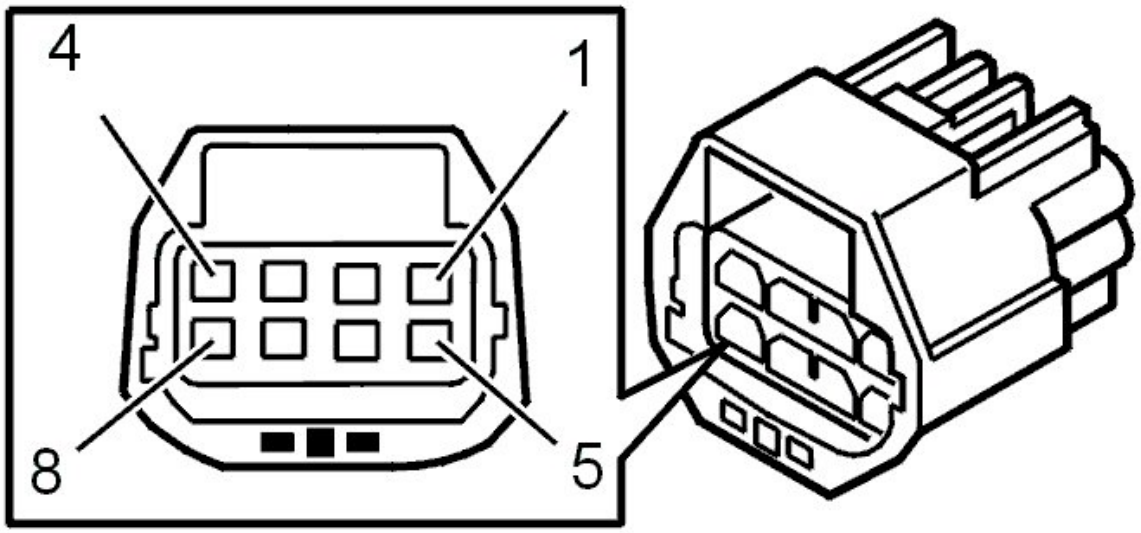
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

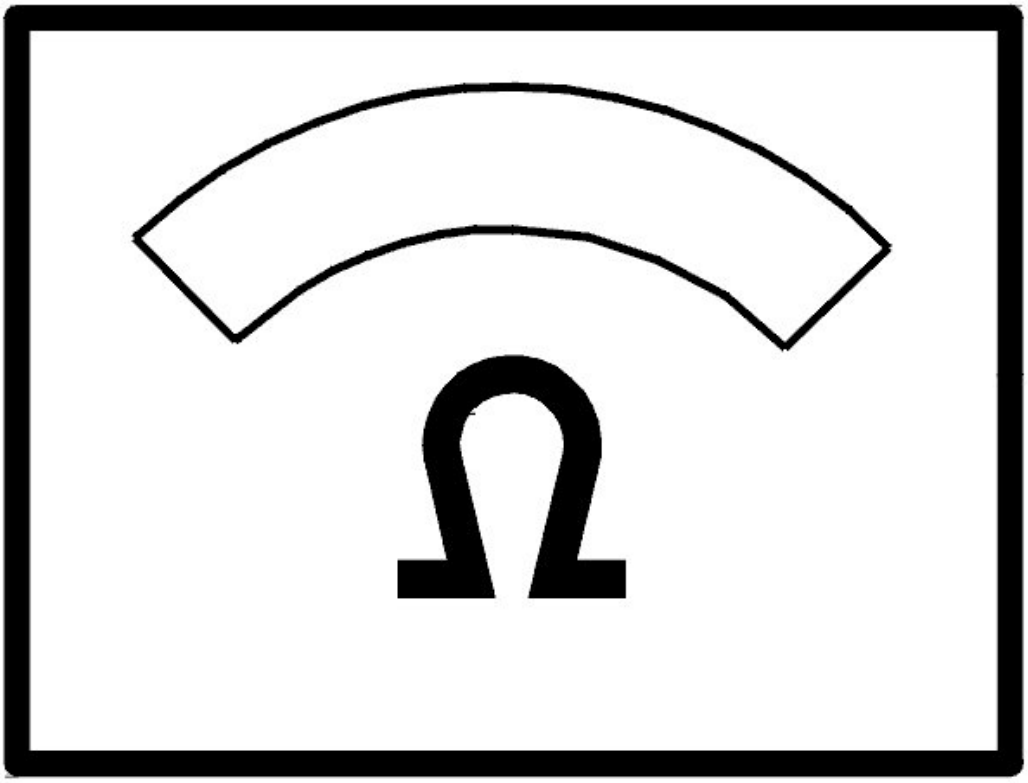
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

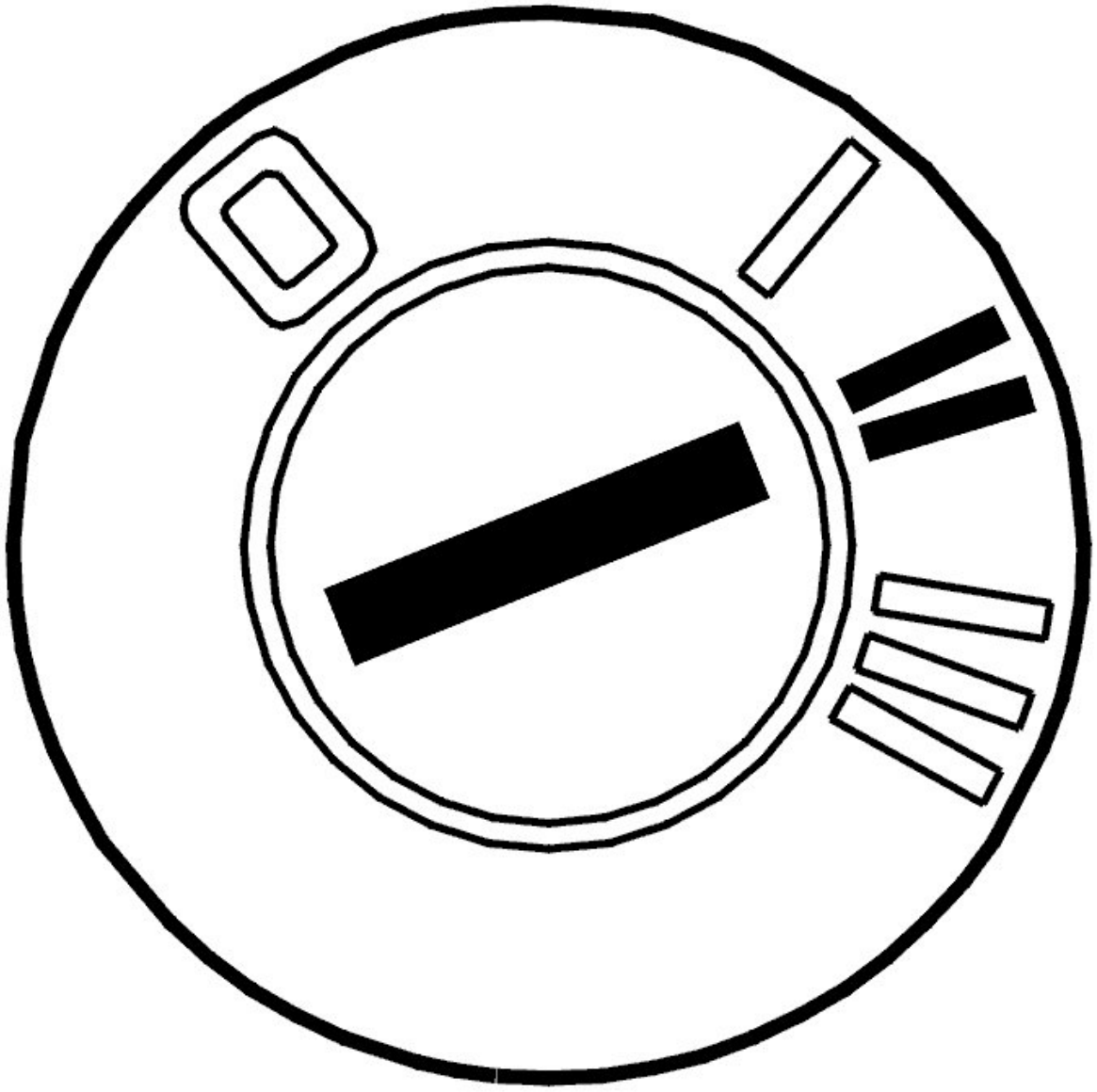
Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a

load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

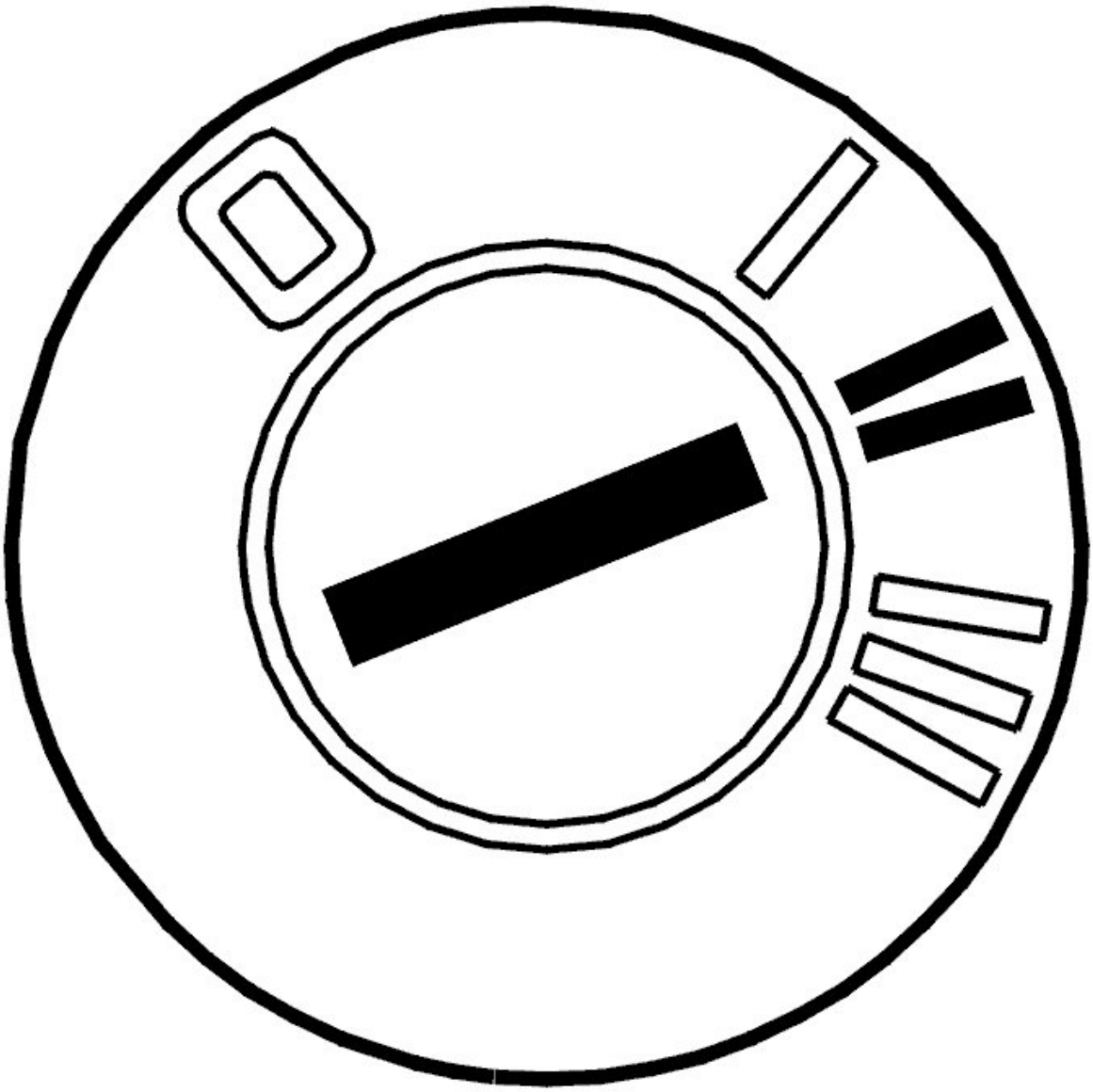
Continue - DONE

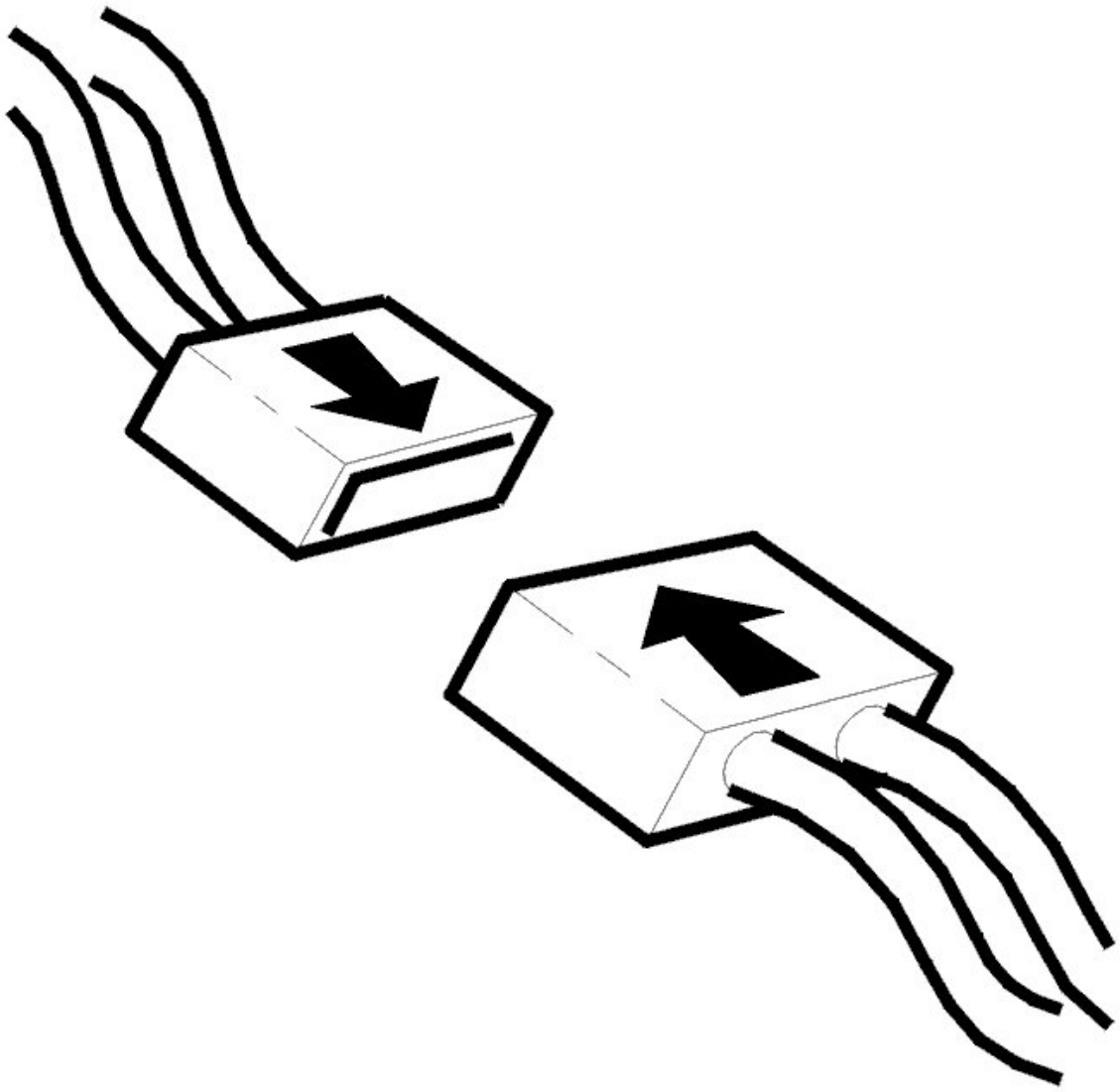
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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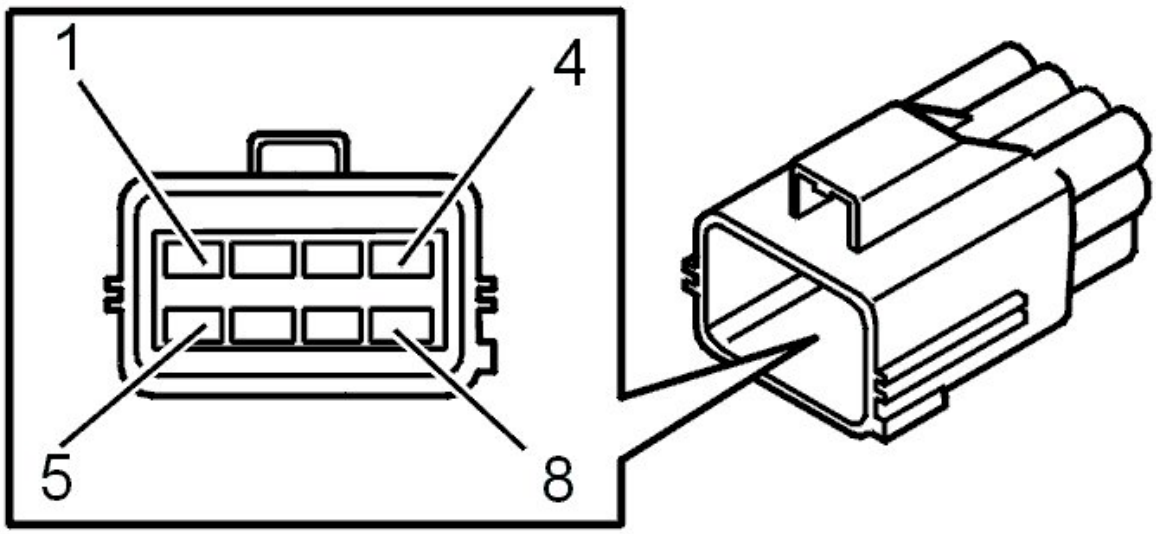
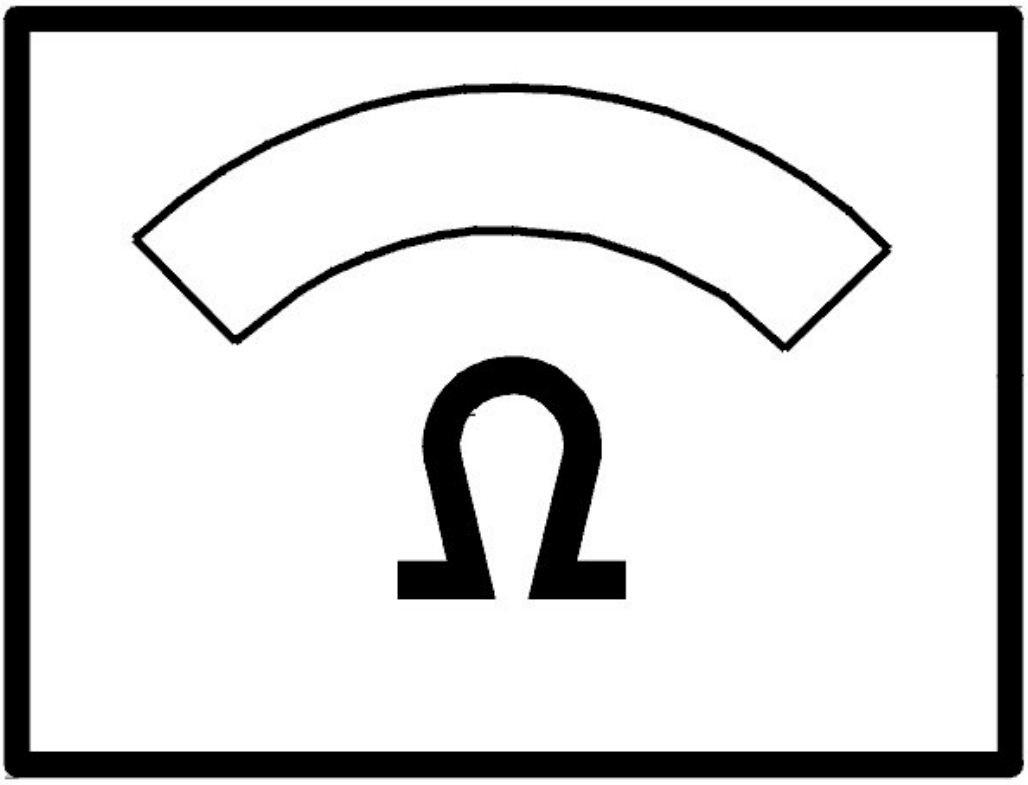
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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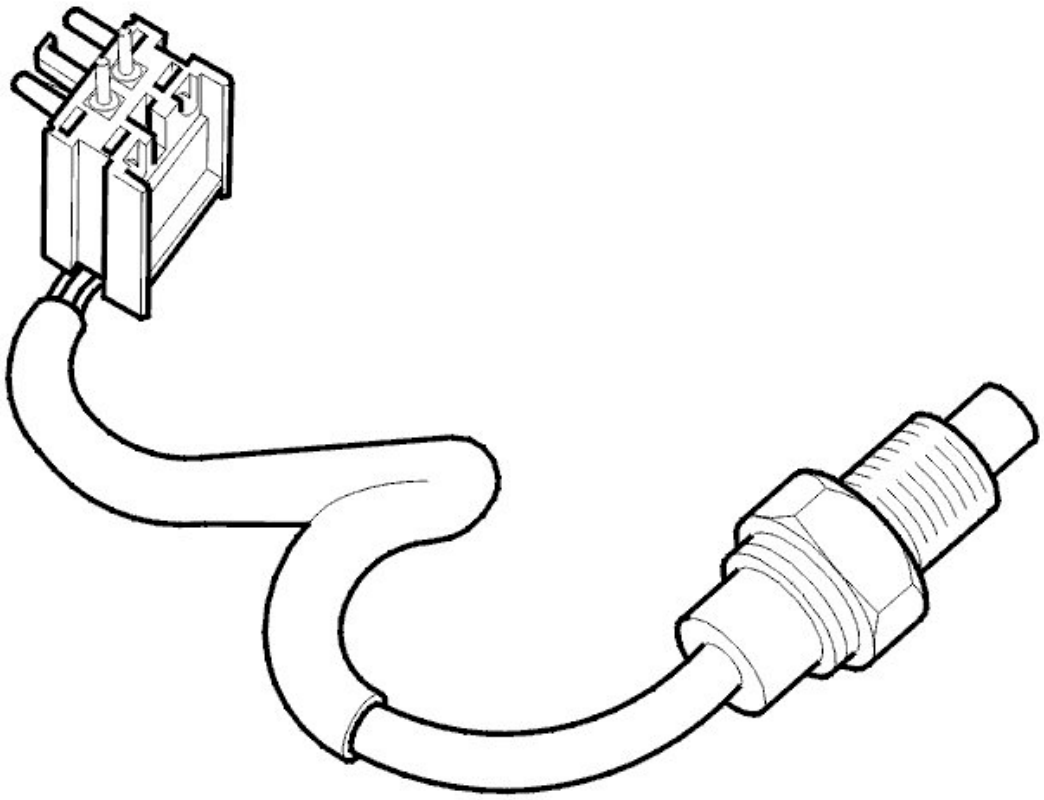
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The oil temperature sensor sends a signal to the control module which is used for functions such as temperature controlled lock-up and the engagement of high-temperature programs. The sensor has an NTC (negative temperature coefficient) resistor. The signal (voltage) decreases with increasing oil temperature. Diagnostic trouble code (DTC) TCM-0046 is stored if the control module receives a signal from the oil temperature sensor corresponding to a temperature above approximately +160°C (320 °F) for approximately 2 minutes.

Substitute value
- None.

Possible source
- Poor oil cooling.
- Mechanical fault in the transmission.
- The transmission has been exposed to extreme load and high ambient temperature.

Fault symptom[s]
- General orange warning lamp lit.

Temperature Too High

Temperature too high

Checking the oil cooler and hoses

The cause of the diagnostic trouble code (DTC) was insufficient oil cooling in the transmission. Check the oil cooler and hoses for signs of damage and blockage. Then replace the oil.

Other information:
- To replace the oil, see Gearbox fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing.

Continue - Resetting the adaptation and oil quality counter

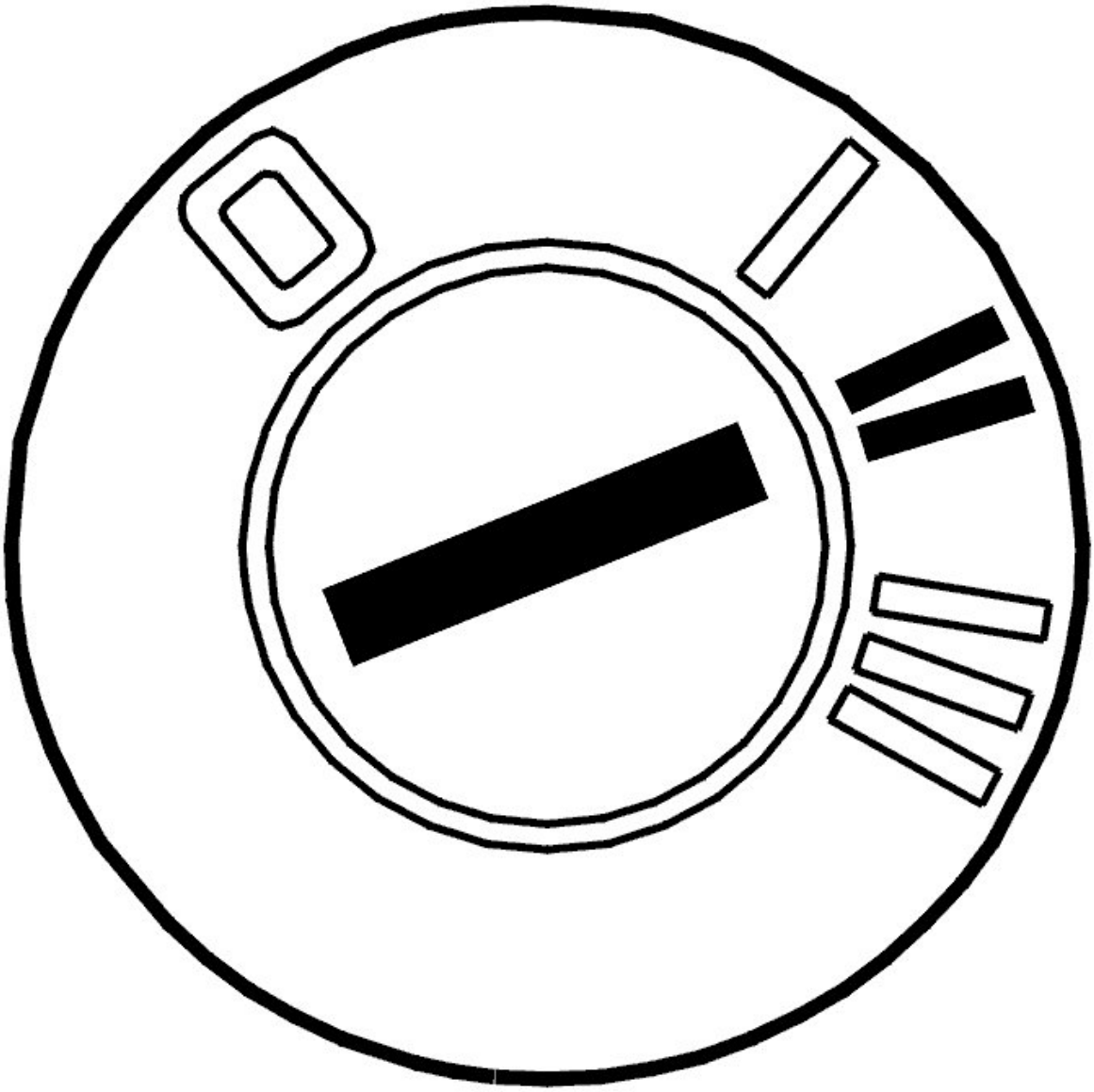
Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



- Ignition on.

Reset the counter by clicking on the VCT 2000 symbol.

Continue - DONE

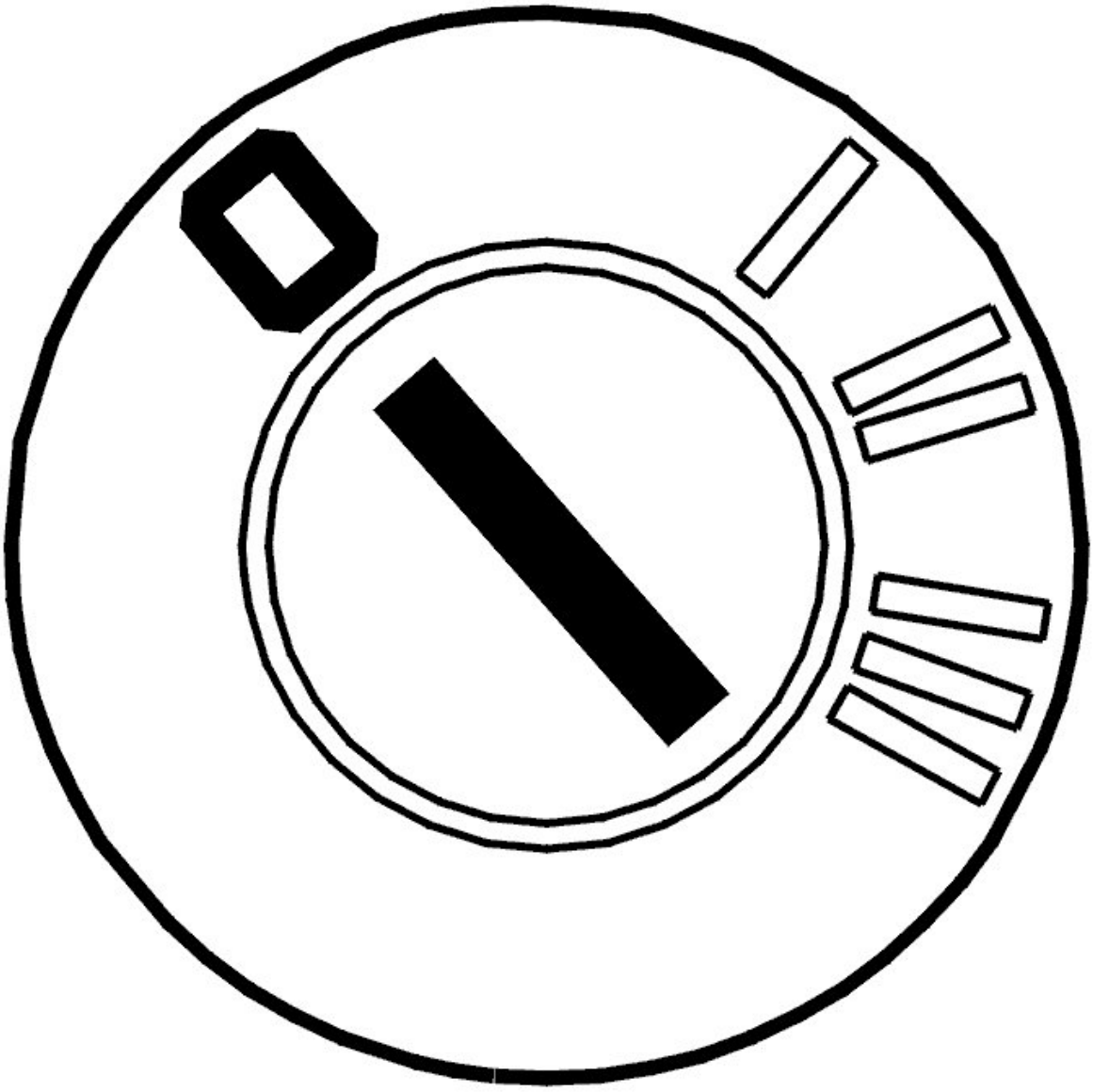
DONE - Verification

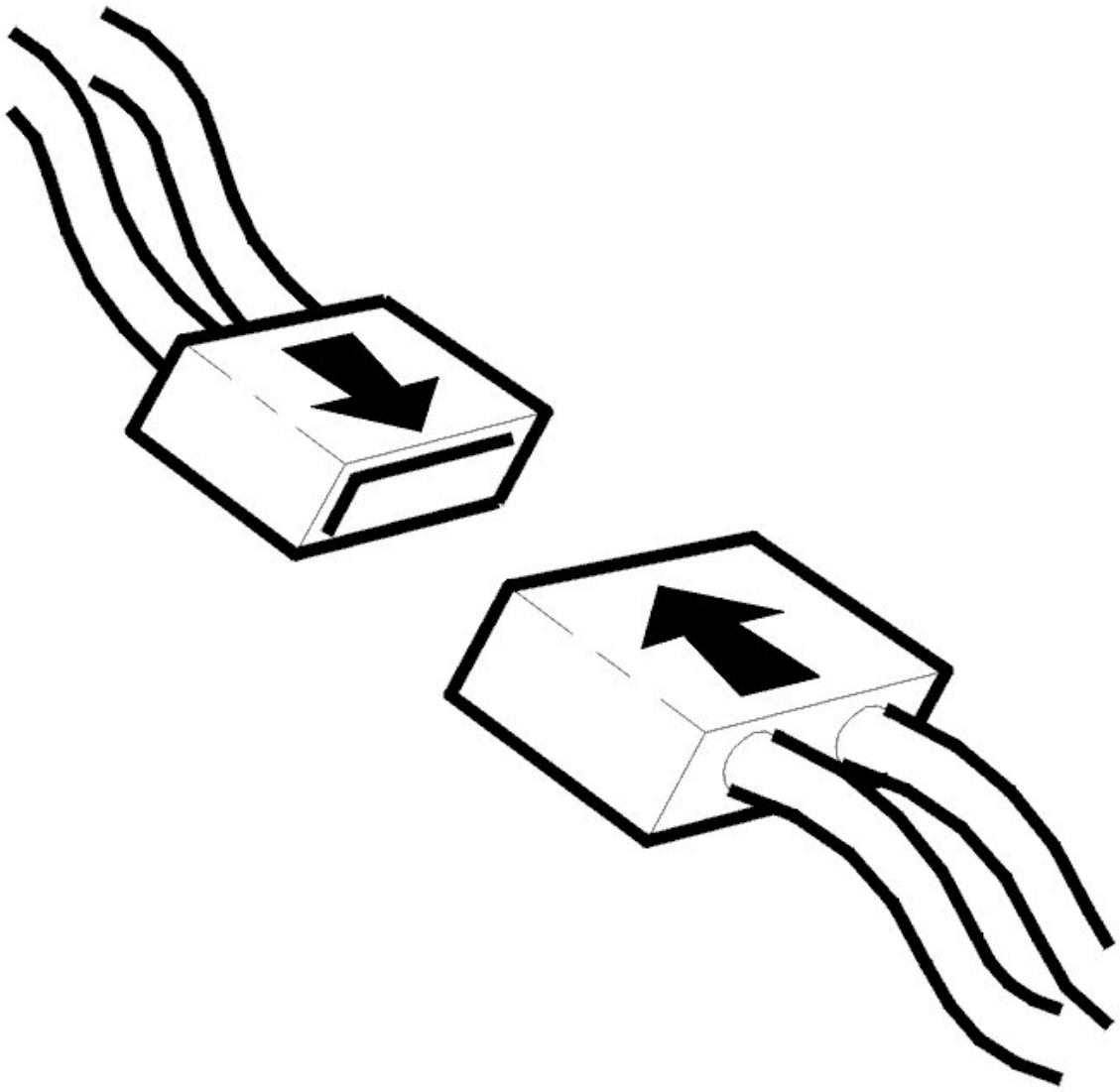
Verification

Verification

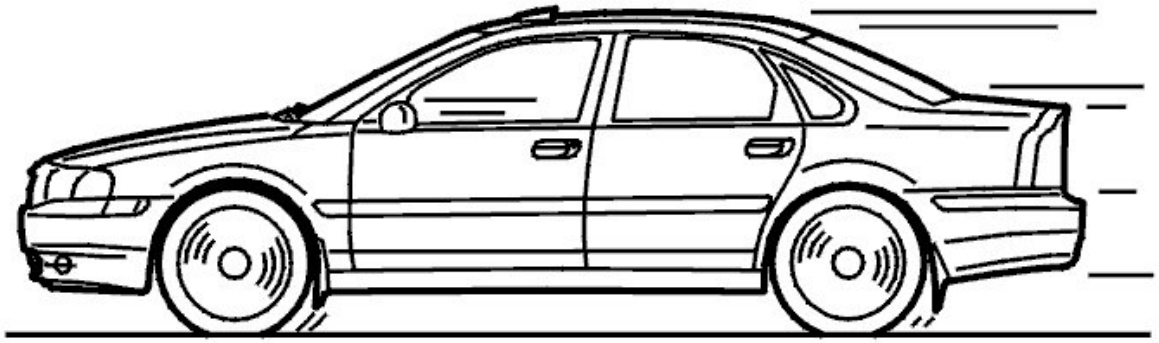
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors. Reinstall the components.
- Test drive the car according to Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description .



Is the function of the transmission OK?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

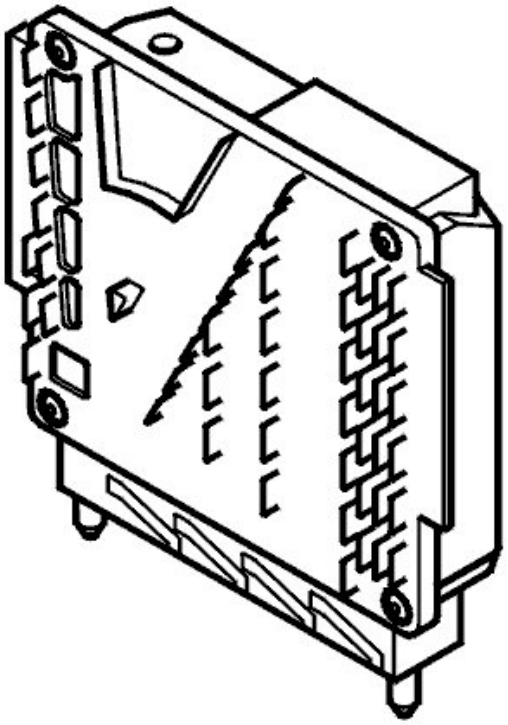
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the oil cooler and hoses

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The control module software is adapted to the engine and transmission of the car. The control module must contain the correct software version in order for the transmission to function satisfactorily. Diagnostic trouble code (DTC) TCM-0048 is stored if the control module registers that the engine, transmission and software are not compatible.

Substitute value
- The control module "Limp Home" program has been initiated.

Possible source
- Faulty software in the transmission control module (TCM).
- Faulty transmission (installed when the transmission was replaced for example).

Fault symptom[s]
- General orange warning lamp lit.
- The malfunction indicator lamp (MIL) flashes.

Faulty Software

Faulty software

Ordering software

The control module has registered an internal fault in the software. The control module can be programmed with new software. The software must be replaced to remedy the fault.
Order applicable software.

S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289
S70, V70 -2000, V70 XC -2001	9438299
C70 Coupe, C70 Conv	9438426

Continue - Programming the control module

Programming the control module

Programming can be carried out when the software has been delivered.
Program the control module according to the table below.

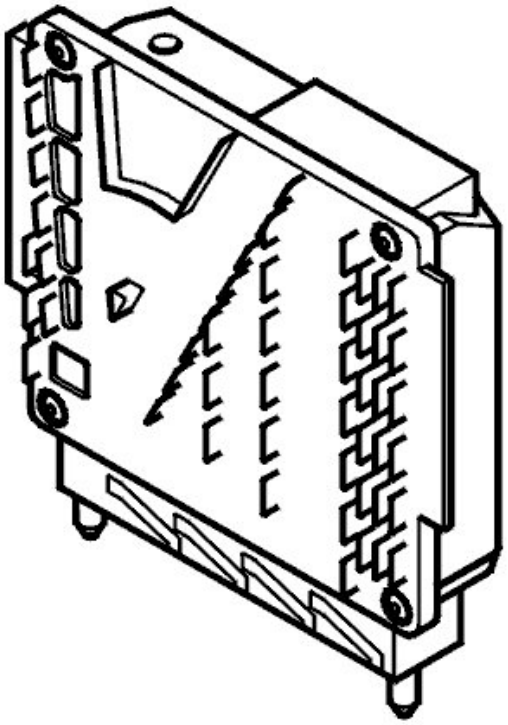
S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289
S70, V70 -2000, V70 XC -2001	9438299
C70 Coupe, C70 Conv	9438426

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) TCM-0049 is stored if the control module detects a fault in the control module EEPROM memory.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Faulty software in control module.
- Internal fault in control module.

Fault symptom[s]
- No fault symptoms.

Internal Fault. Permanent Fault

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

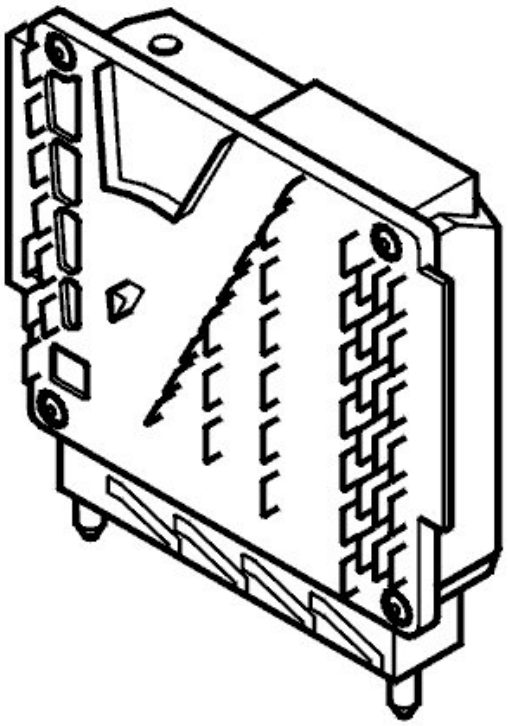
Internal fault. Permanent fault

Replacing the control module and programming

The control module has registered an internal fault.

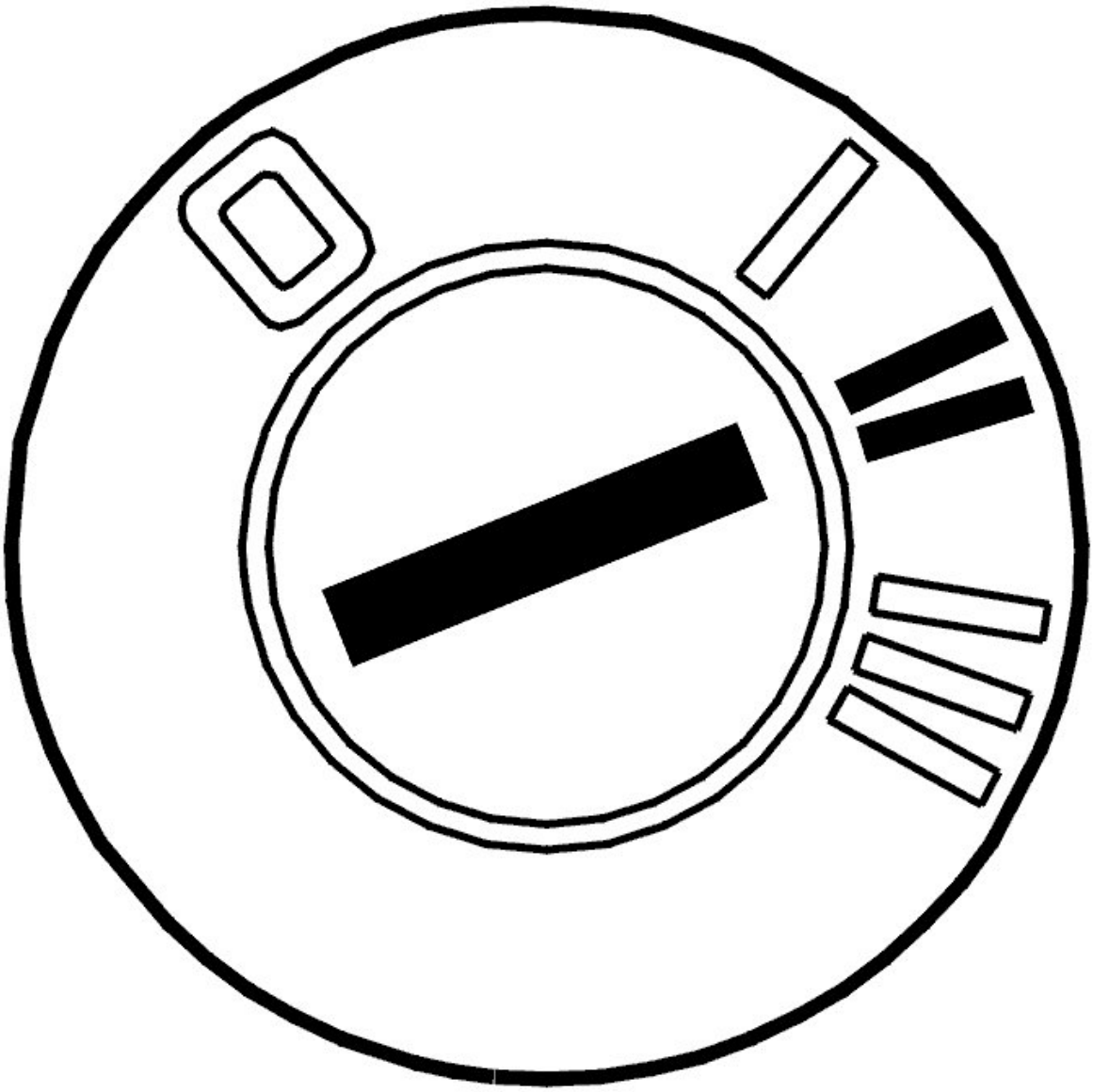
Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



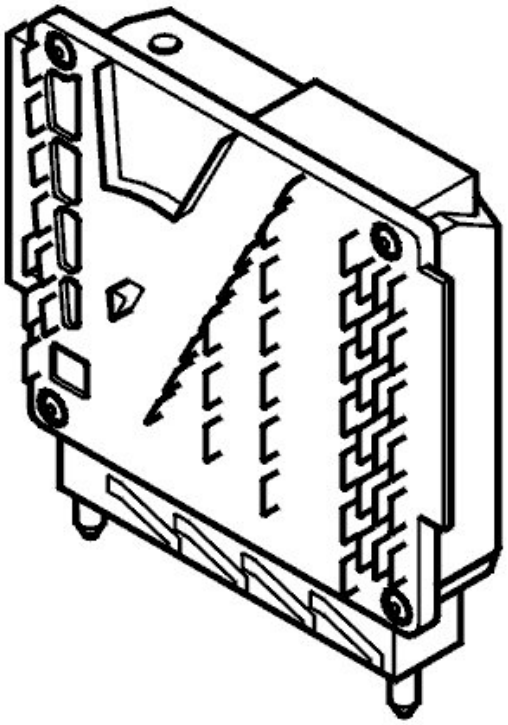
Continue - DONE

Checking the control module



- Ignition on
- Read off the check sum and calculated check sum.

Check that the check sums correspond.
If they do not correspond this indicates an internal fault in the control module.



Are the values correct?

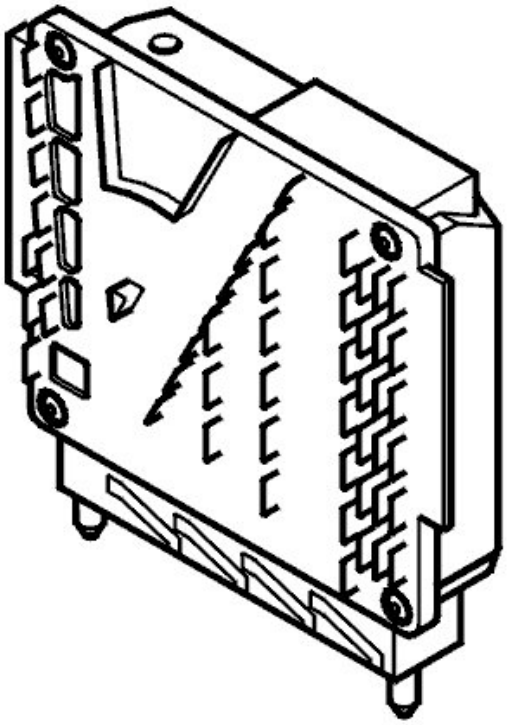
Yes - No Fault Found

No - Replacing the control module and programming

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) TCM-0049 is stored if the control module detects a fault in the control module EEPROM memory.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Faulty software in control module.
- Internal fault in control module.

Fault symptom[s]
- No fault symptoms.

Internal Fault. Intermittent Fault

Internal fault. Intermittent fault

Information

The control module previously registered a fault. The fault is now no longer present.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

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FAULT FOUND - Fault Found

Attempt New Test - Information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble code (DTC) TCM-0060 is stored if the control module registers an internal fault in the power stage circuit for solenoids S1, S2, S3, S4 or S5.

Substitute value
- The transmission control module (TCM) Emergency mode III program has been initiated.

Possible source
- Internal fault in the control module.

Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

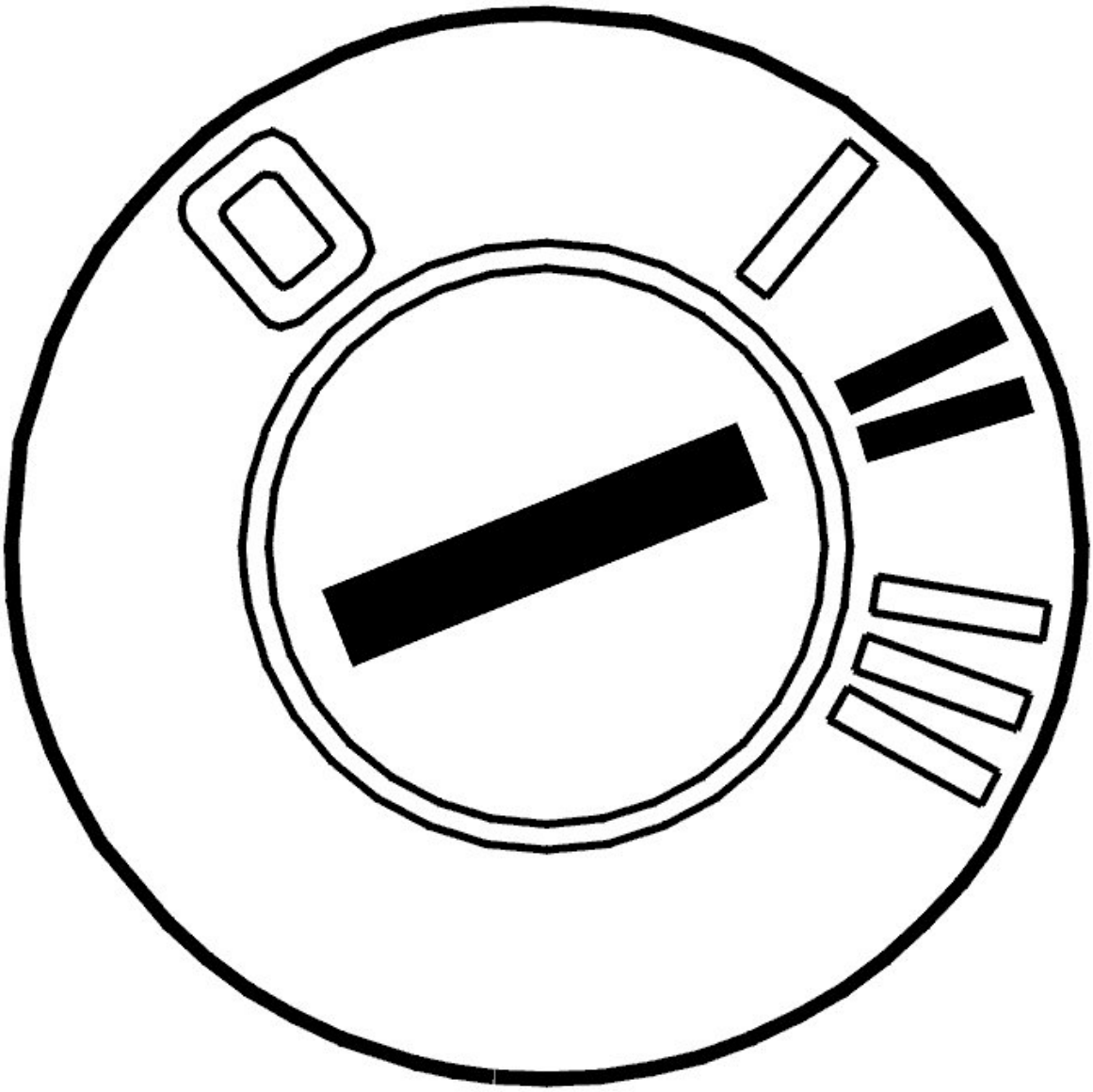
Hint: Harsh gear shifting can be caused by:
- no reduction of line pressure when shifting
- no reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D
- no torque limiting request to engine control module (ECM) when shifting

No shifting - because the transmission control module (TCM) prevents activation of the solenoids. This stops gear-shifting.

Internal Fault

Internal fault

Checking shift solenoids



- Ignition on
- Gear selector in position P.
- Activate shift solenoids S1, S2, S3, S4 and S5 individually.

The status should switch between OFF and ON.
If the status does not change, it indicates that there is an internal fault in the transmission control module (TCM).

Does solenoid status switch?

Yes - No Fault Found

No - Transmission control module (TCM) replacement and programming

---

Transmission control module (TCM) replacement and programming

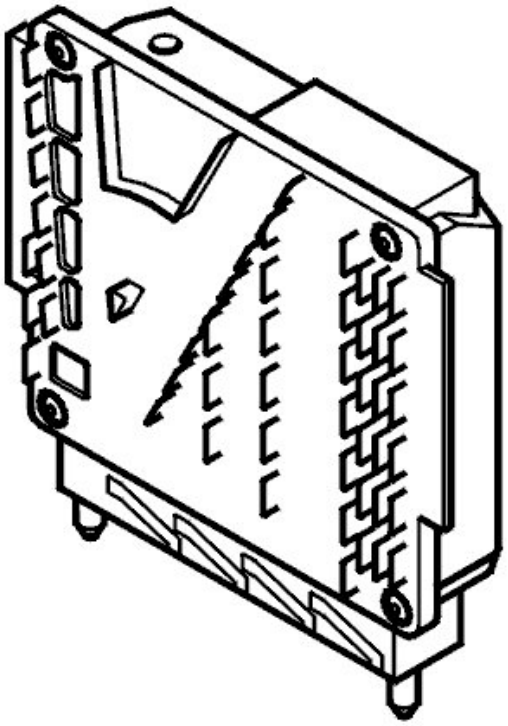
The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

Other information:

- Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See:

Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair



Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

In case of this defect, troubleshooting is not followed by verification.
The information can be displayed again or the fault-tracing for this fault can be interrupted.

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

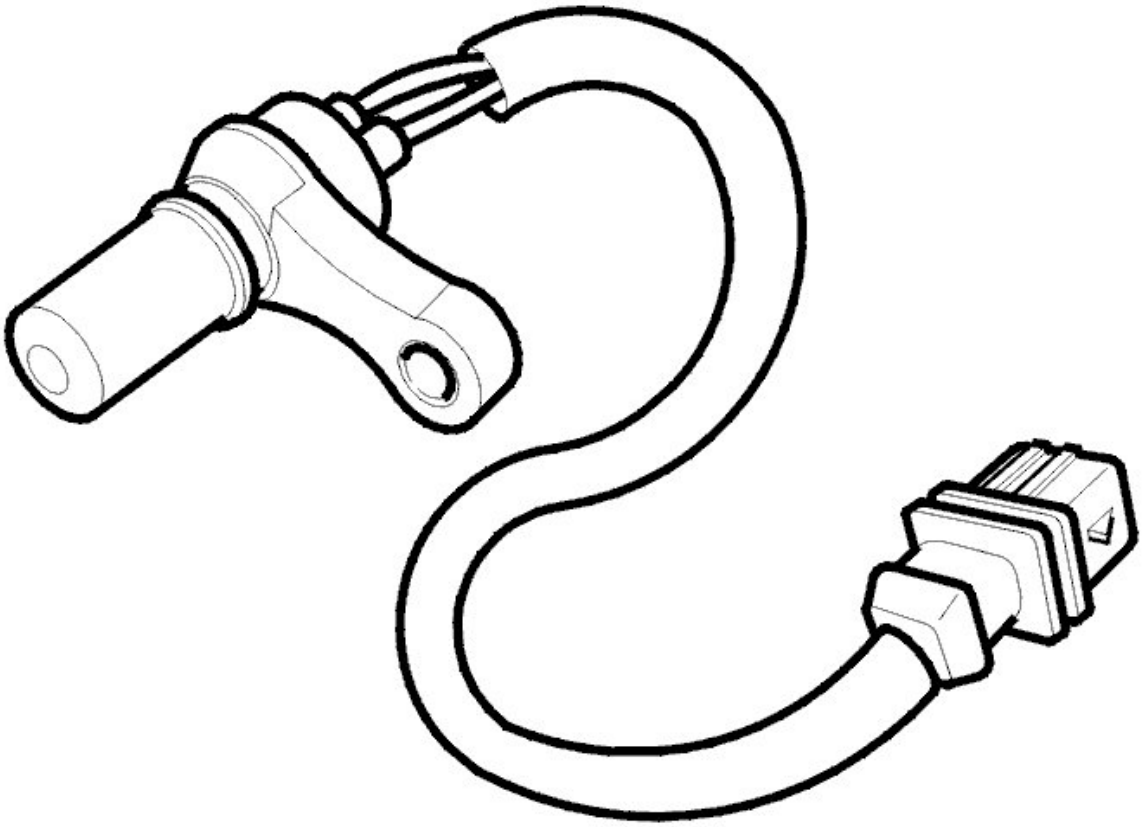
Attempt New Test - Checking shift solenoids

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The automatic transmission control module (TCM) receives speed signals from the transmission speed sensor on the transmission. The transmission control module (TCM) uses the signals to select the correct gear. The control module derives and compares the transmission speed with engine speed (RPM) at the transmission. Diagnostic trouble code (DTC) TCM-0081 is stored if the control module registers that transmission speed signal is too high.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the power supply or signal cable.
- Defective transmission speed sensor.

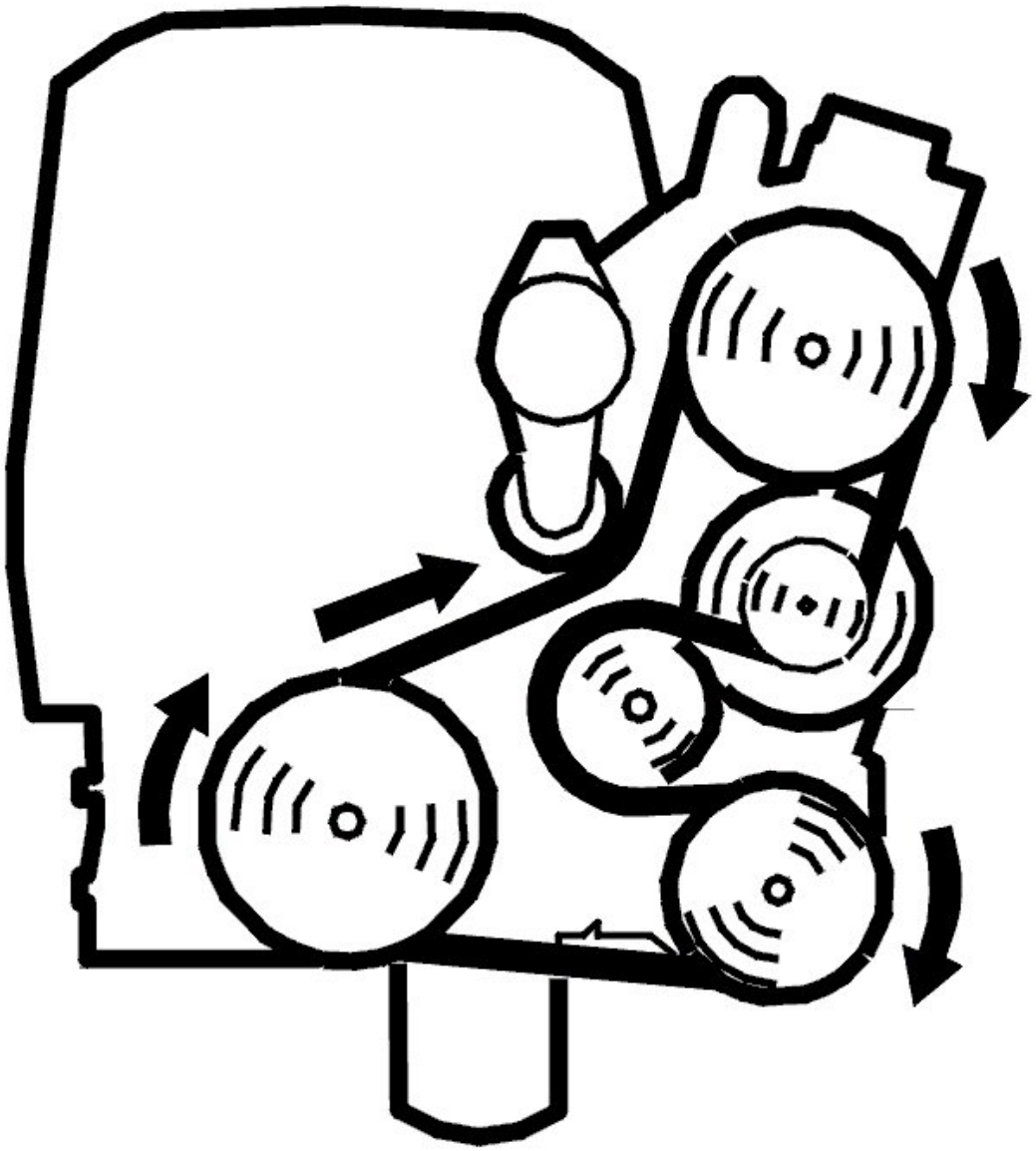
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

Signal Too High

Signal too high

Checking the transmission output speed sensor signal



- Ignition off
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

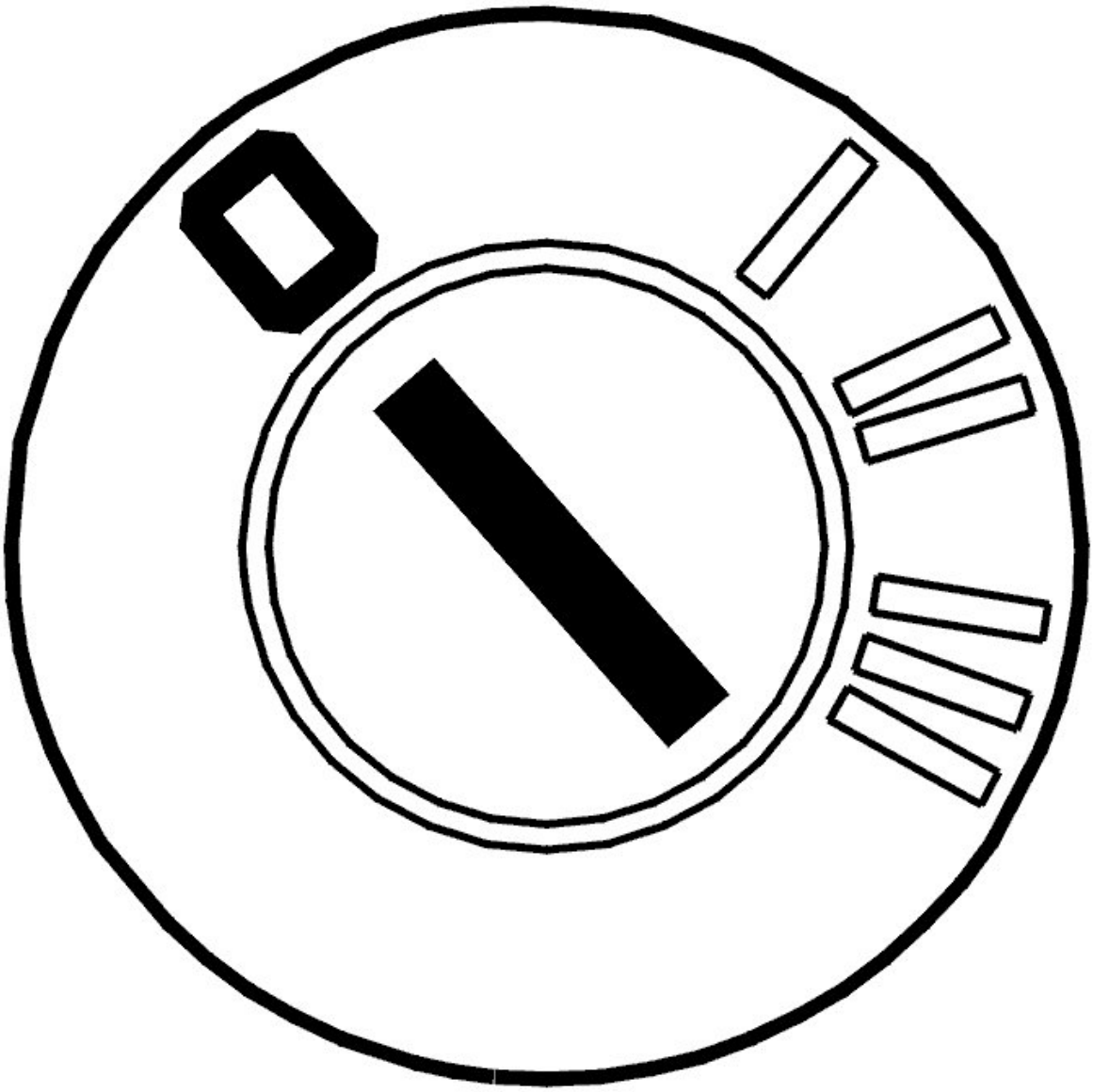
Note! Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Was the speed updated?

Yes - Intermittent fault

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

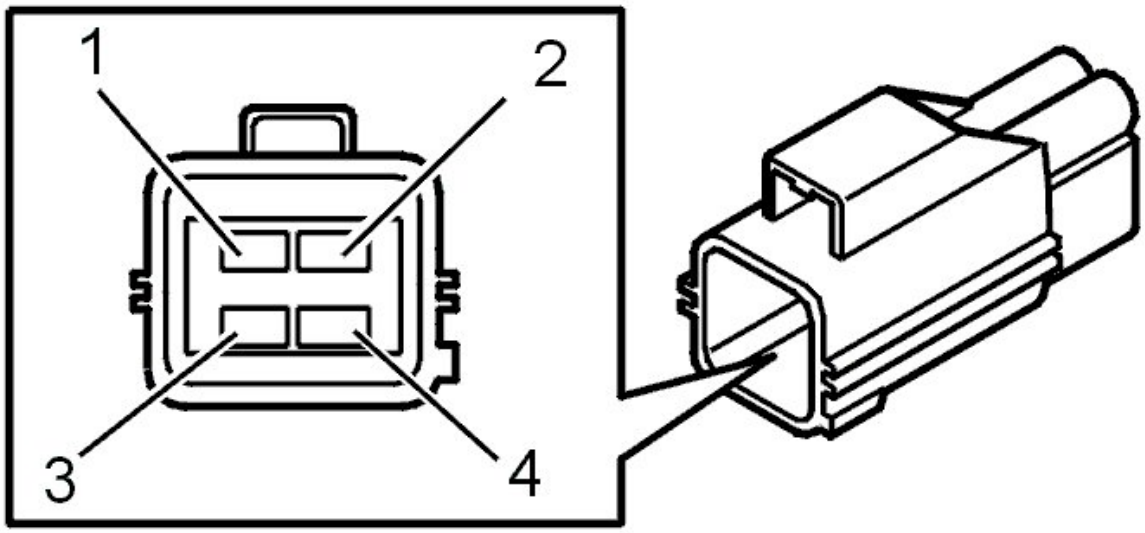
Check the cables between control module terminals #A57 (#A57) and #A39 (#A39) and transmission output speed sensor terminals #A3 and #A4. Check for a short-circuit to each other.
Check the power supply cable between control module terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

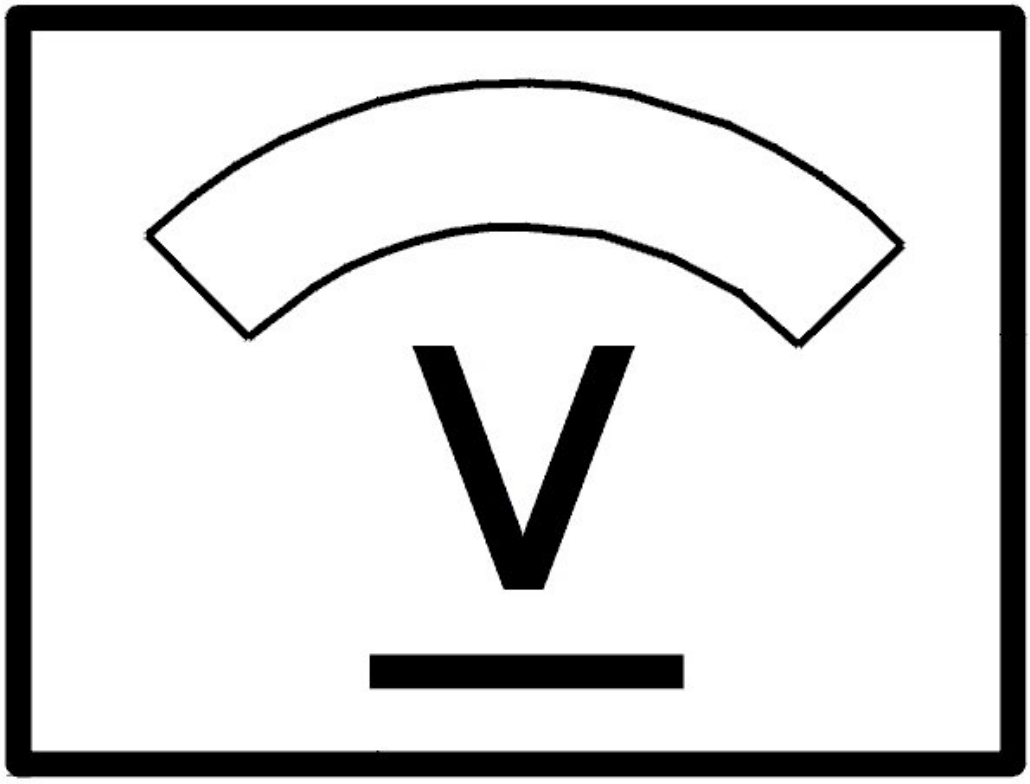
Hint: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A4 and #A3 (control module side), the voltage must be 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



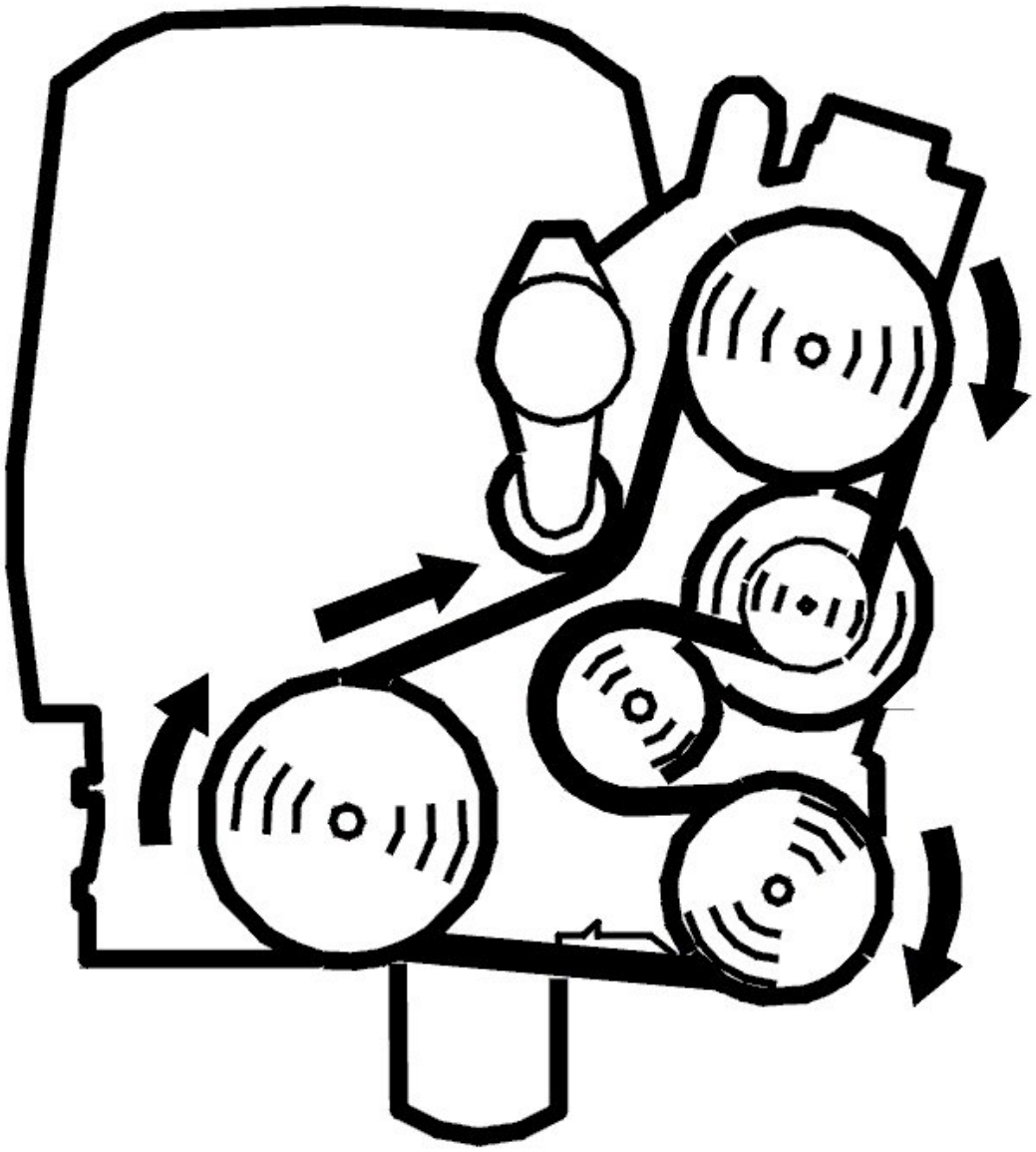


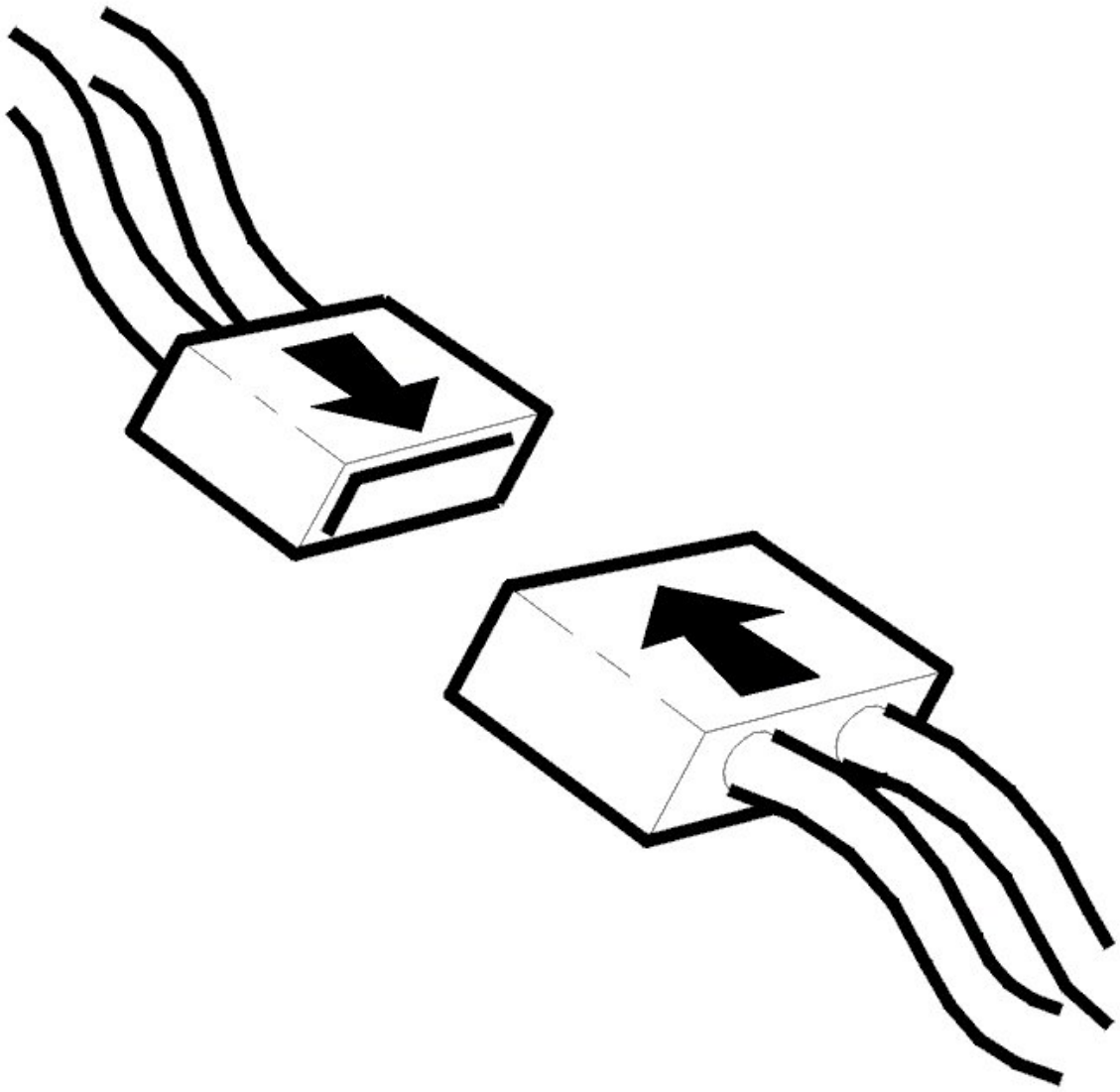
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

Note! When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Was speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission output speed sensor signal

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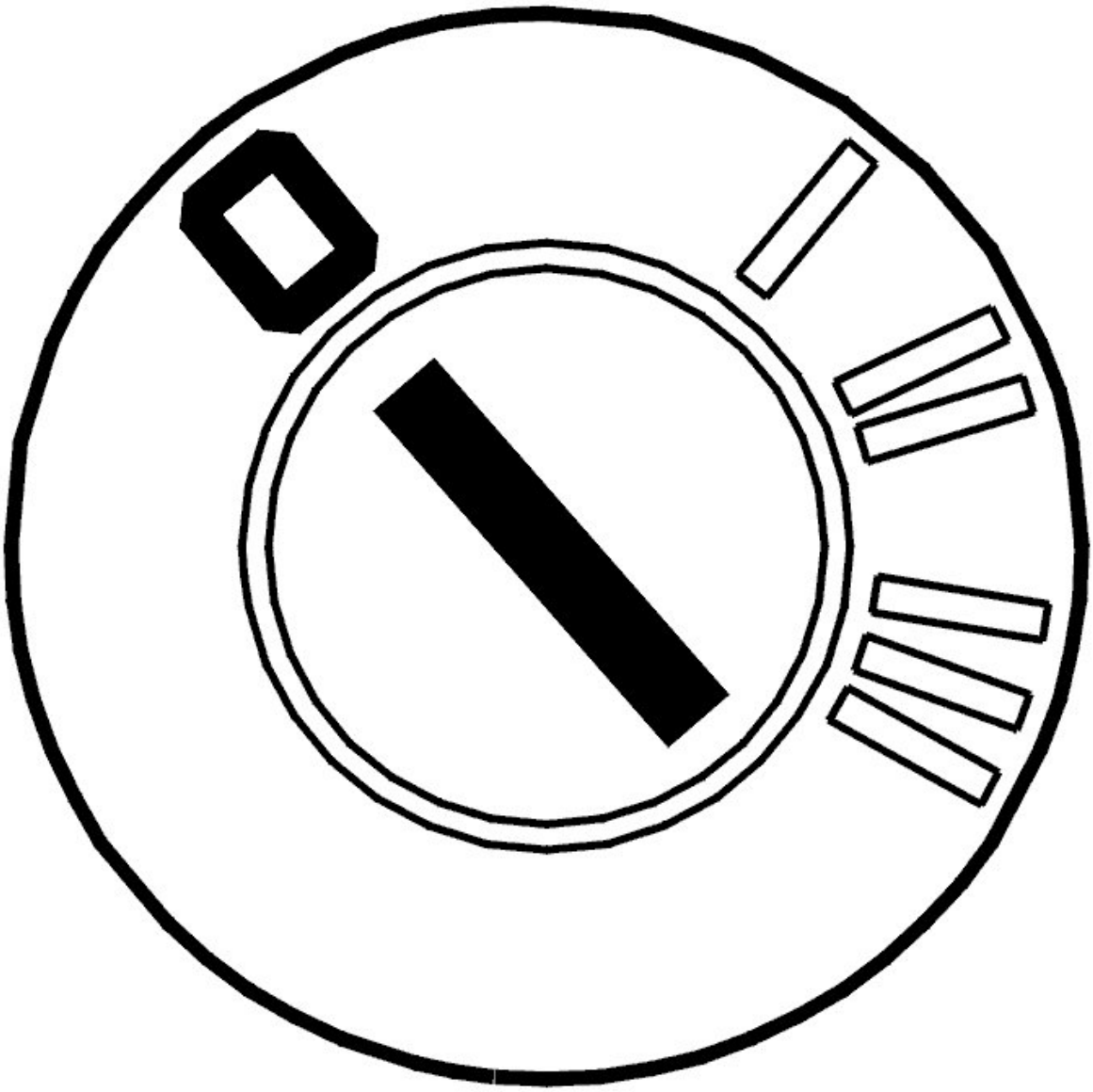
Intermittent fault

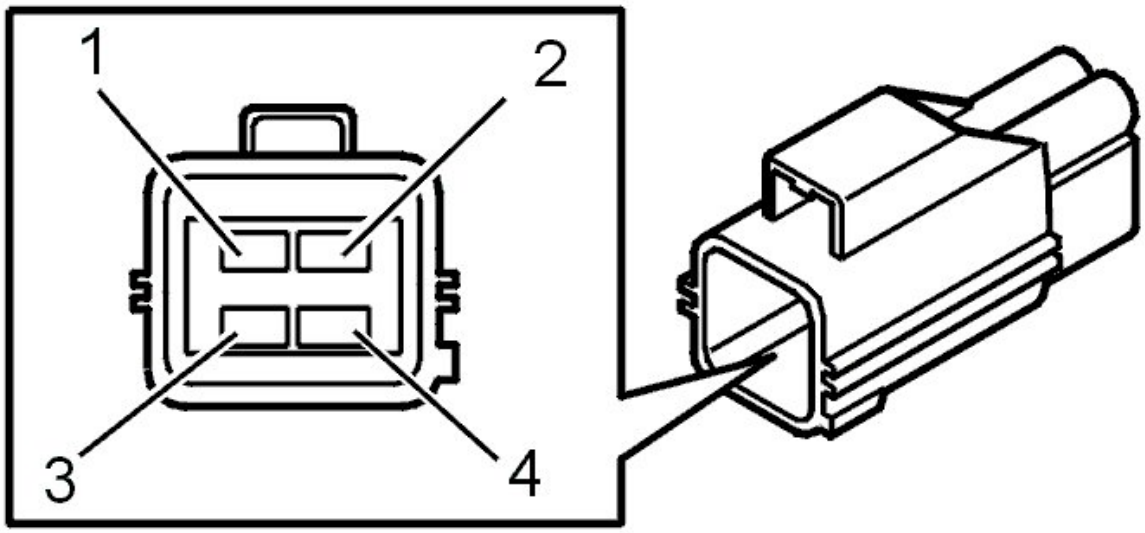


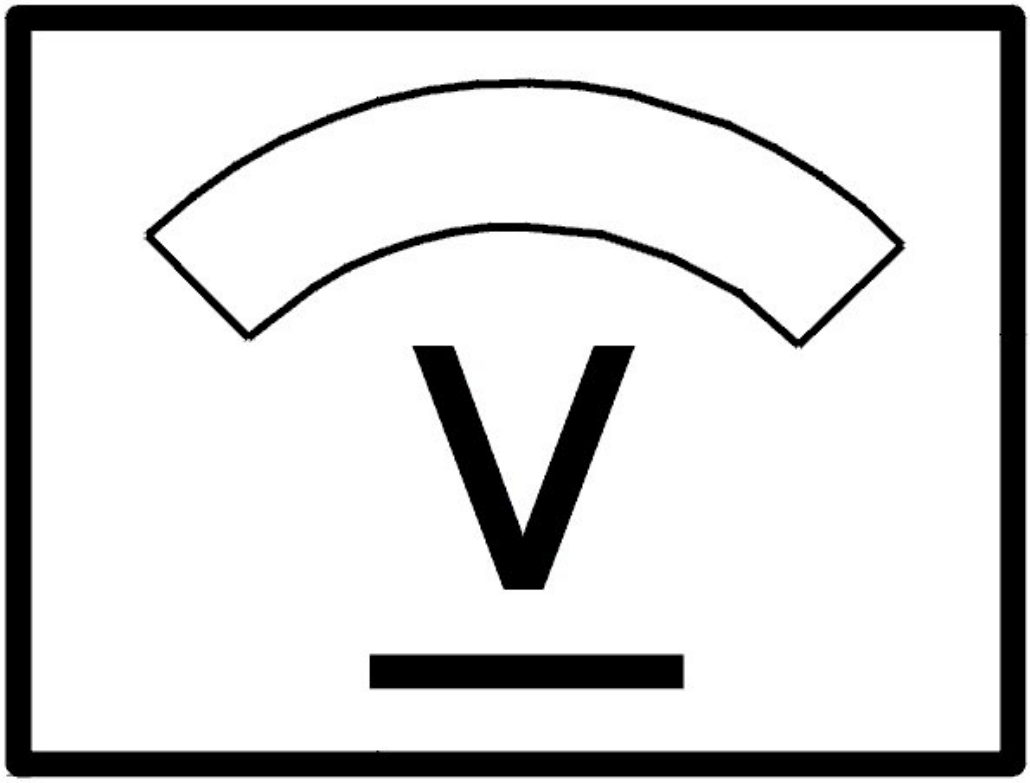
- Ignition off.

Check the control module and transmission connectors. Check for contact resistance and oxidation and remedy according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the power supply cable between control module terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Diagnostic trouble code (DTC) information

Diagnostic trouble code (DTC) information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

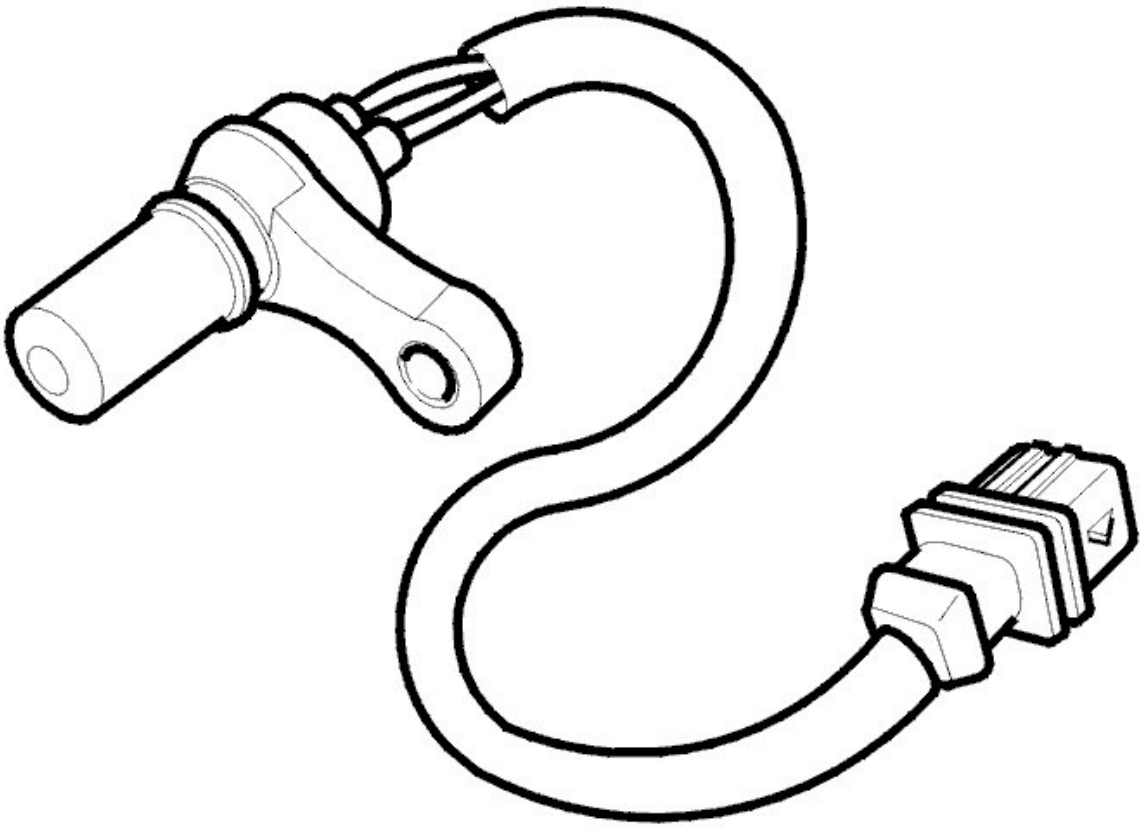
Attempt New Test - Checking the transmission output speed sensor signal

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The speed signal comes from a sensor on the transmission. The transmission control module (TCM) uses the signal to select the correct gear. The control module also uses the engine speed sensor signal to determine the speed. Diagnostic trouble code (DTC) TCM-0083 is stored if the transmission control module (TCM) registers that the speed signal is to low.

Substitute value
- None.

Possible source
- Contact resistance in the terminals.
- Signal cable (+) or signal cable (-) short-circuited to ground, to supply voltage or to each other.
- Defective speed sensor.

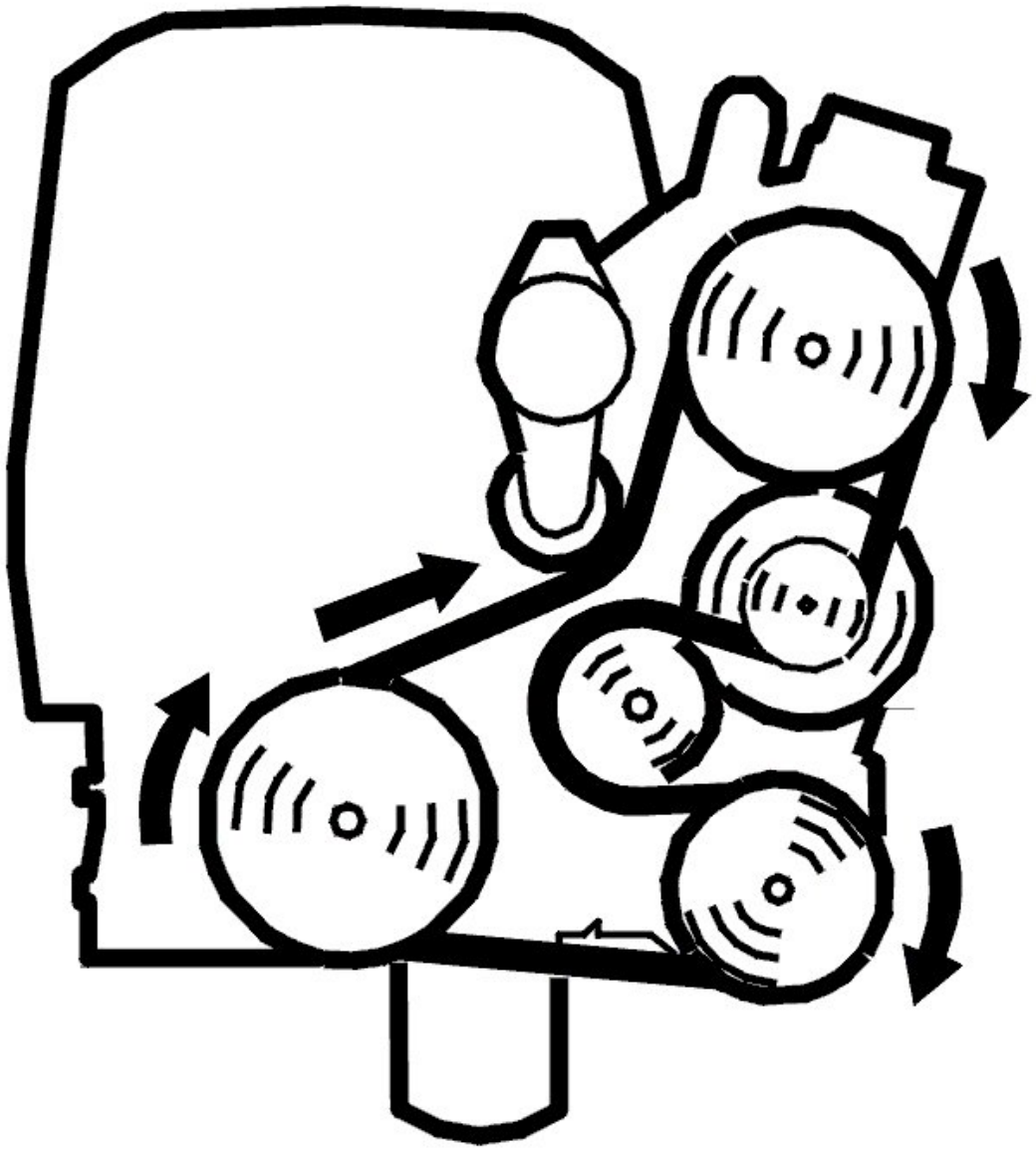
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Signal Too Low

Signal too low

Checking the transmission output speed sensor signal



- Ignition off
- Raise the car so that the drive wheels are clear of the ground
- Start the engine. Allow the engine to idle
- Shift gear selector to position D so that the drive wheels begin to rotate
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that the speed is updated.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Note! Diagnostic trouble codes (DTCs) may be stored in the ABS system when the rear wheels are stationary and the front wheels rotate. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

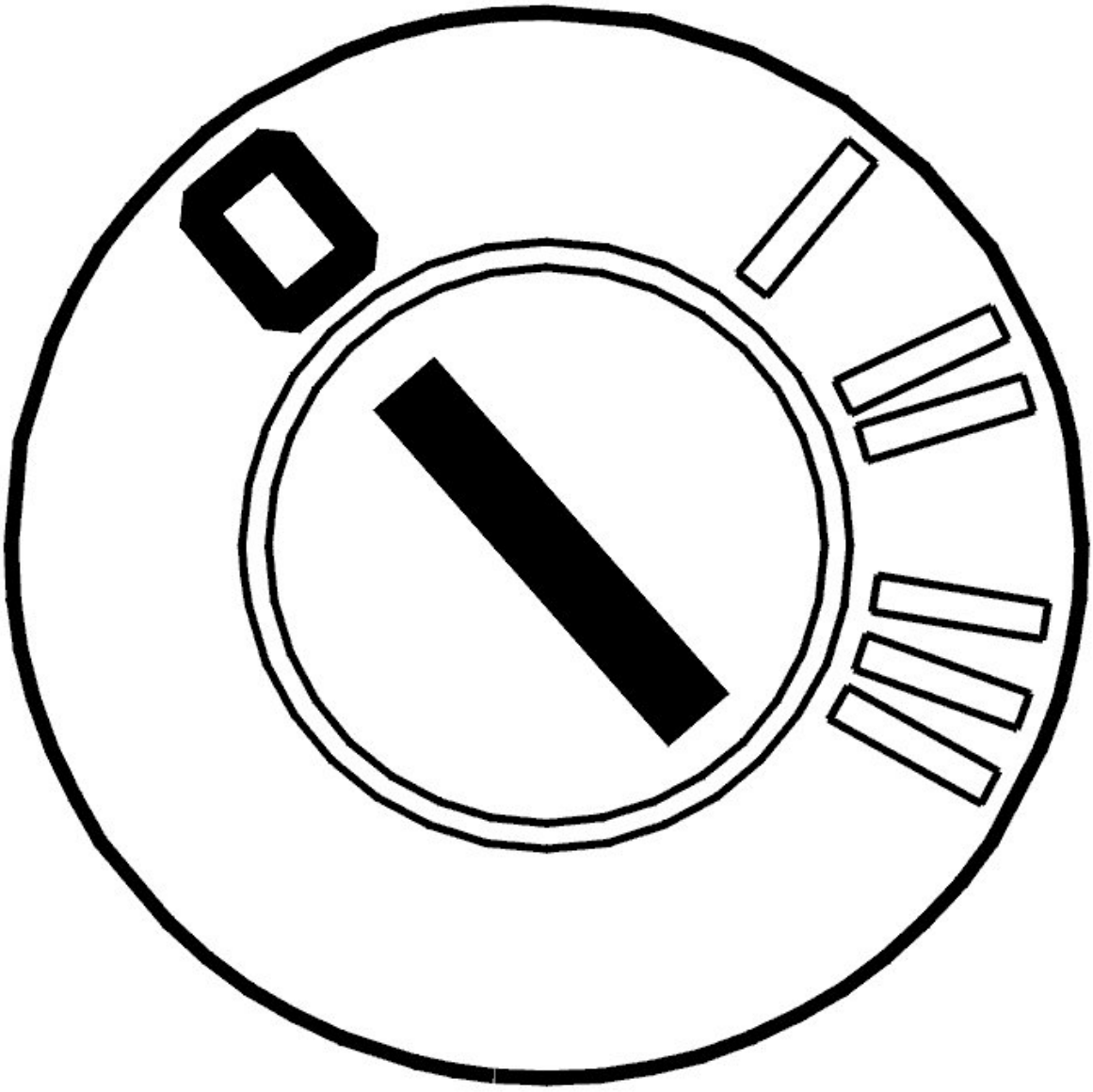
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Was the speed updated?

Yes - Intermittent fault

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off
- Connect the breakout box.

Check the power supply cable between transmission control module (TCM) terminal #A57 (#A57) and transmission output speed sensor terminal #A4. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

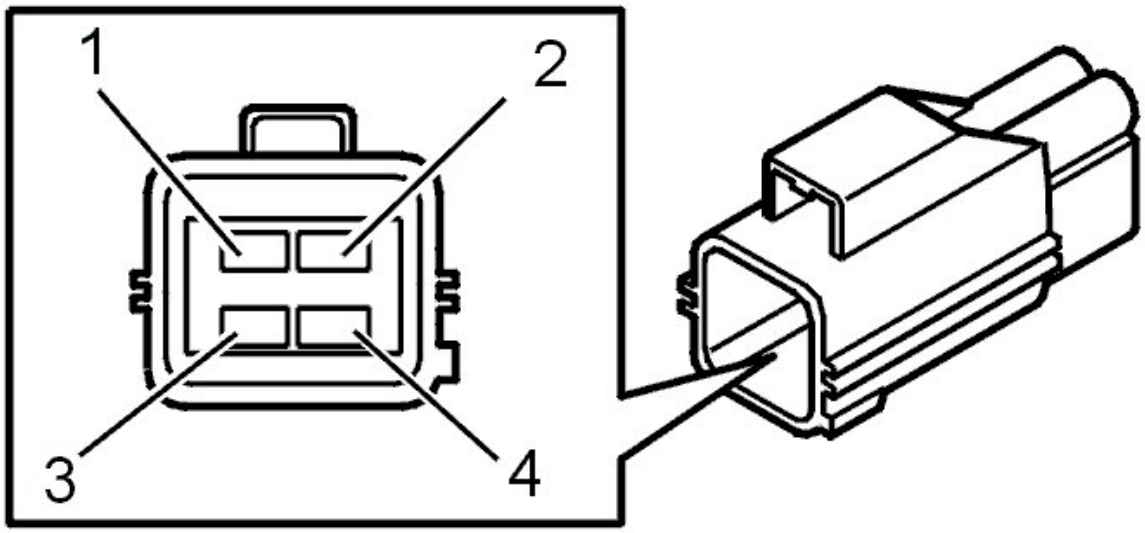
Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

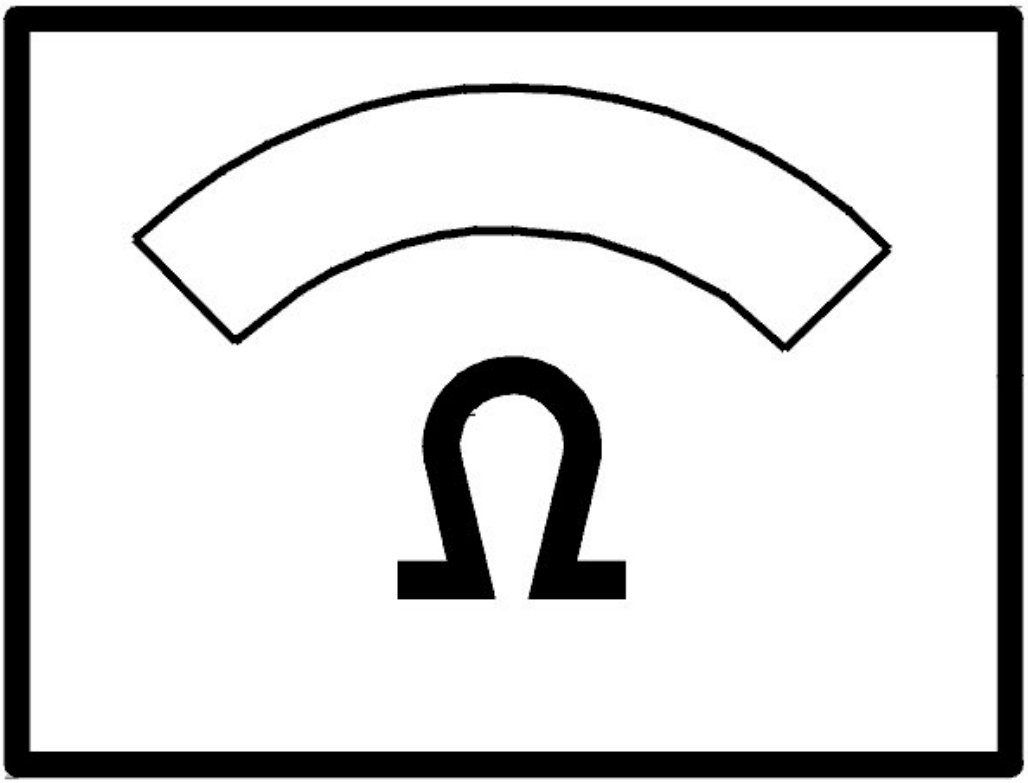
Hint: With the control module connected, the ignition on and a voltmeter connected between transmission output speed sensor terminals #A4 and #A3 (control module side), the voltage must be approximately 1-3 V below Ubat.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission output speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



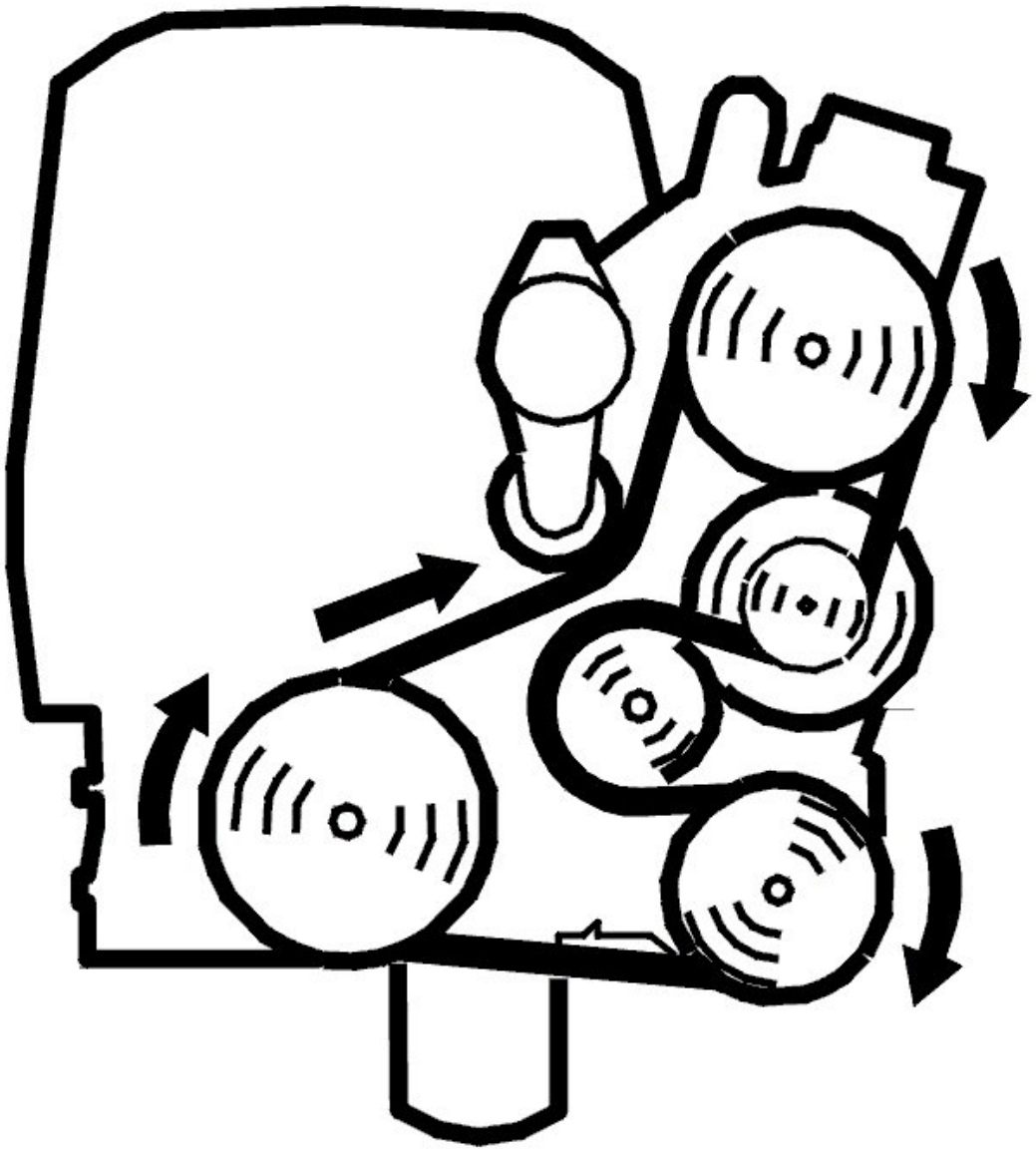


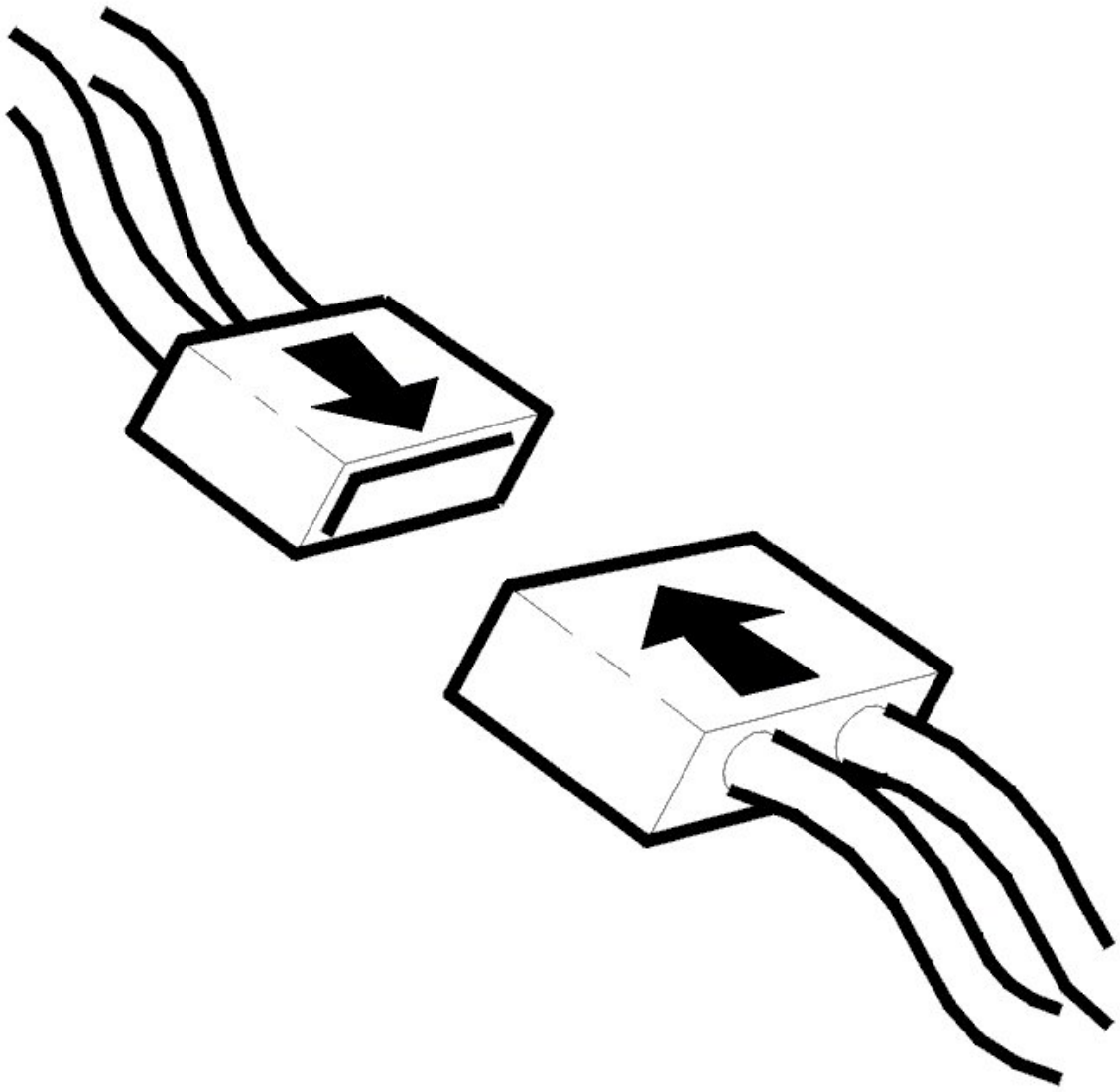
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall connectors, components etc.
- Raise car so that drive wheels are unimpeded.
- Start the engine and let it idle.
- Shift gear selector to position D so that the drive wheels begin to rotate.
- Read off the transmission speed.

Check that speed is updated

Note! When the rear wheels are stationary and the front wheels rotate, diagnostic trouble codes (DTCs) can be stored in the ABS system. Erase any diagnostic trouble codes (DTCs) stored in the ABS system after fault-tracing.

Note! Ensure that the wheels are not rotating when the gear selector is moved.

Was speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission output speed sensor signal

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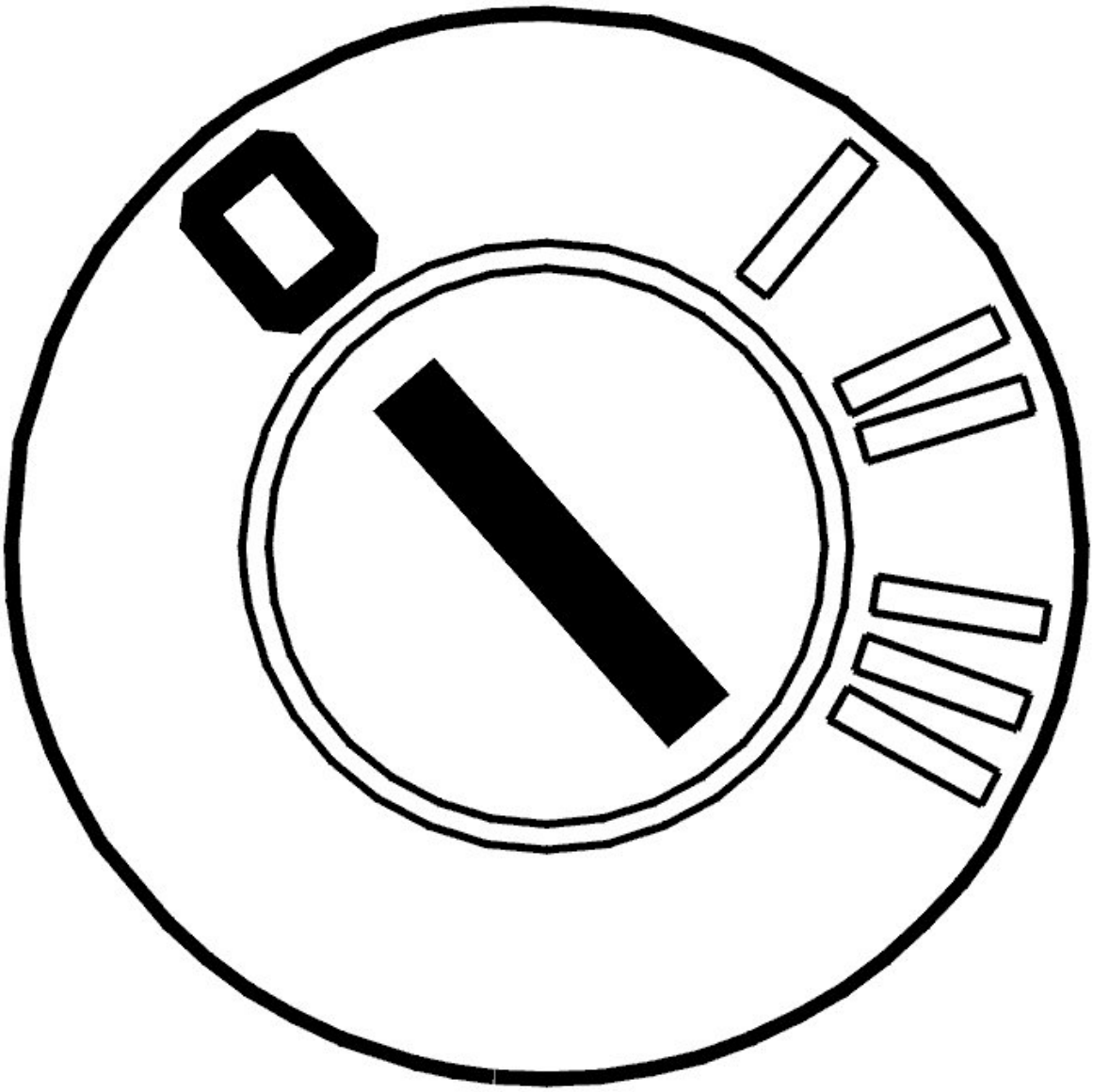
Intermittent fault

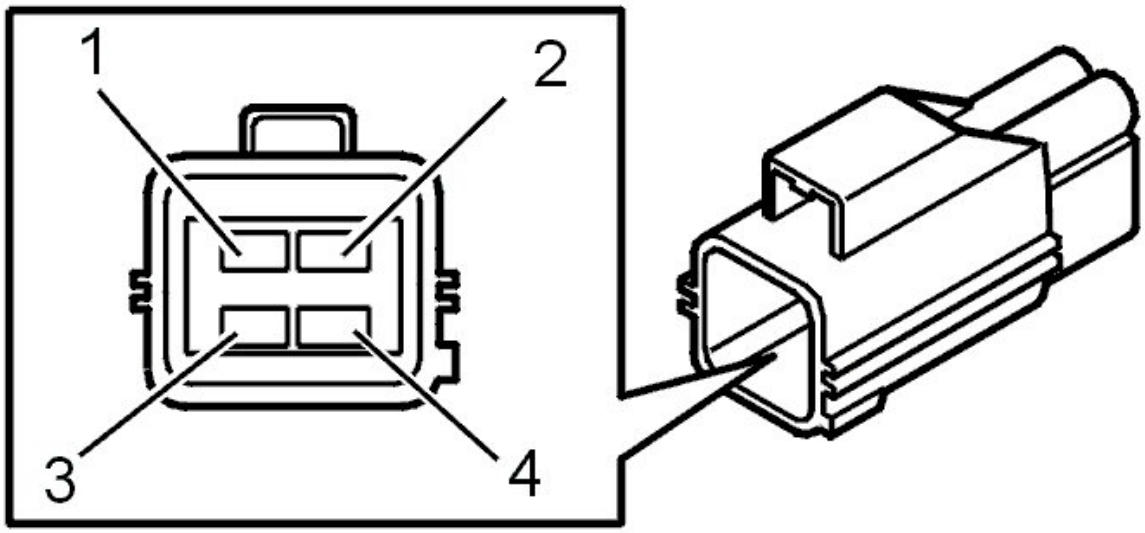


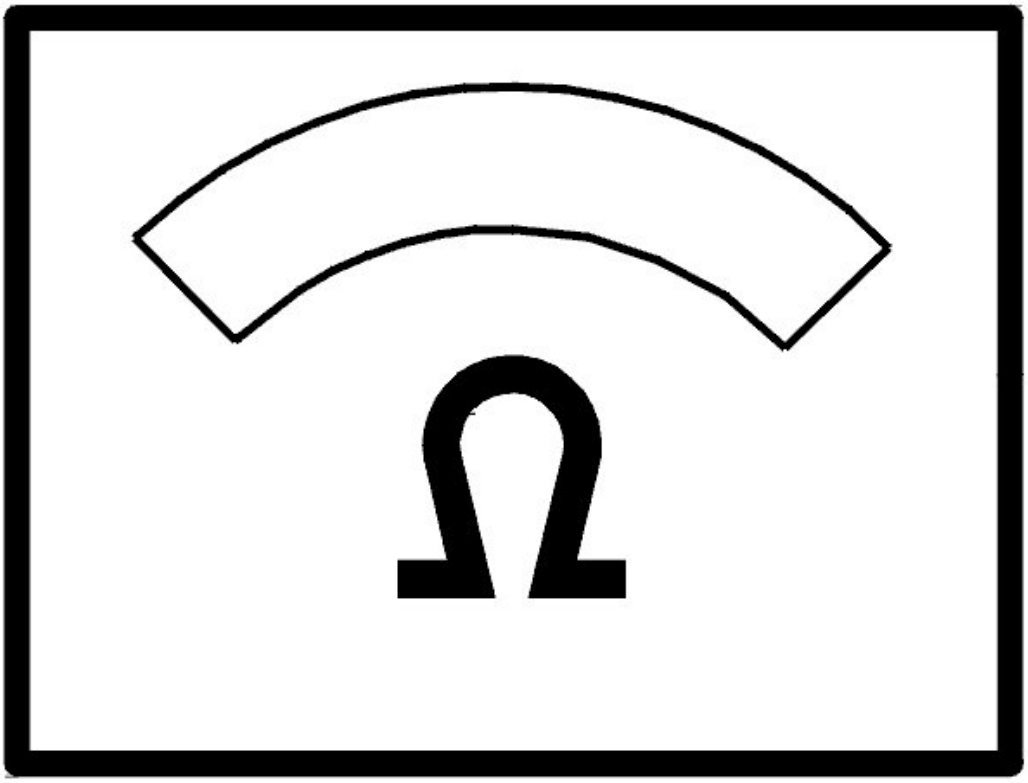
- Ignition off.

Check the power supply cable between control module terminal #A57 (#A57) and transmission output sensor terminal #A4. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the signal cable between control module terminal #A39 (#A39) and transmission output speed sensor terminal #A3. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

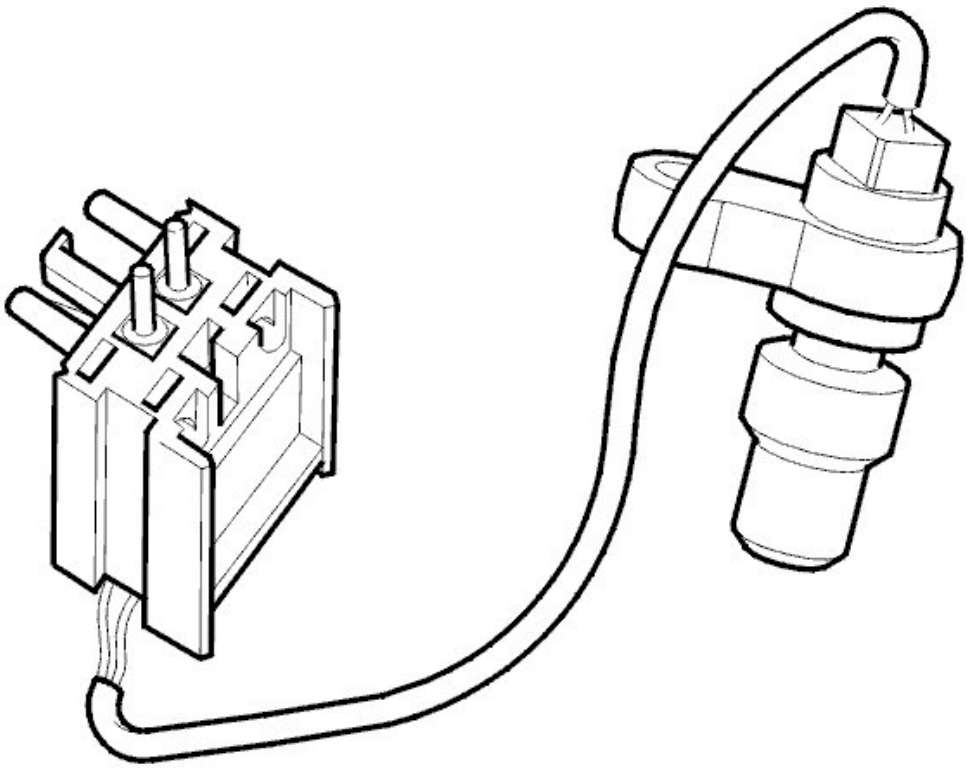
Attempt New Test - Checking the transmission output speed sensor signal

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this comparison to calculate the gear-shift timing. Engine speed and vehicle speed data affects the adjustment of the system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0087 is stored if the control module registers, when comparing with the transmission speed signal, that the engine speed (RPM) signal is too high when the vehicle speed is above approximately 25 km/h.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Power supply (-) short-circuited to supply voltage.
- Defectiveengine speed (RPM) sensor.

Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.

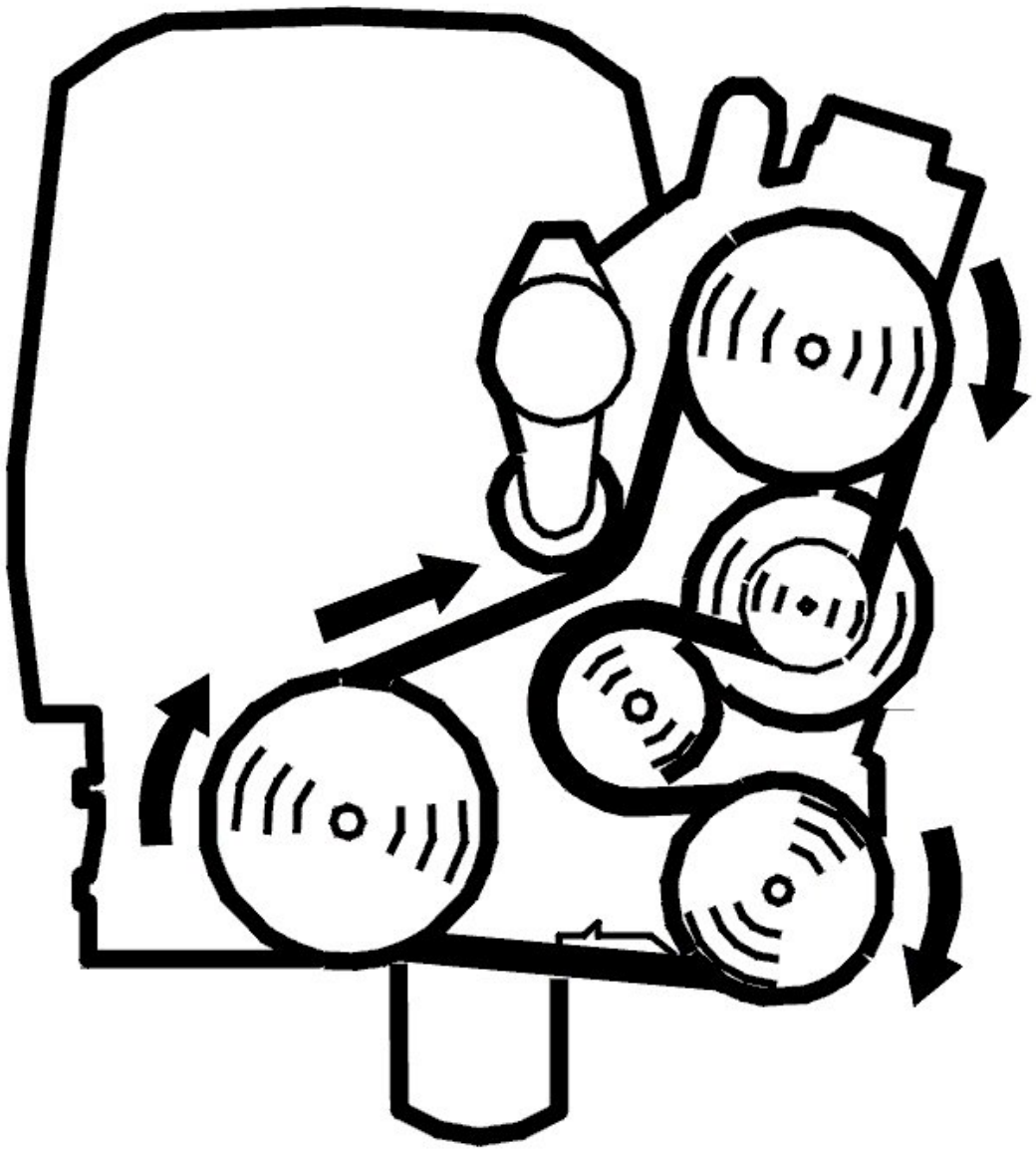
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of the line pressure when shifting.
- No reduction of the line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No request for torque limiting to the engine control module (ECM) when shifting.

Signal Too High

Signal too high

Checking the transmission input speed sensor signal



- Gear selector in position P
- Start the engine. Allow the engine to idle
- Read off the transmission input speed.

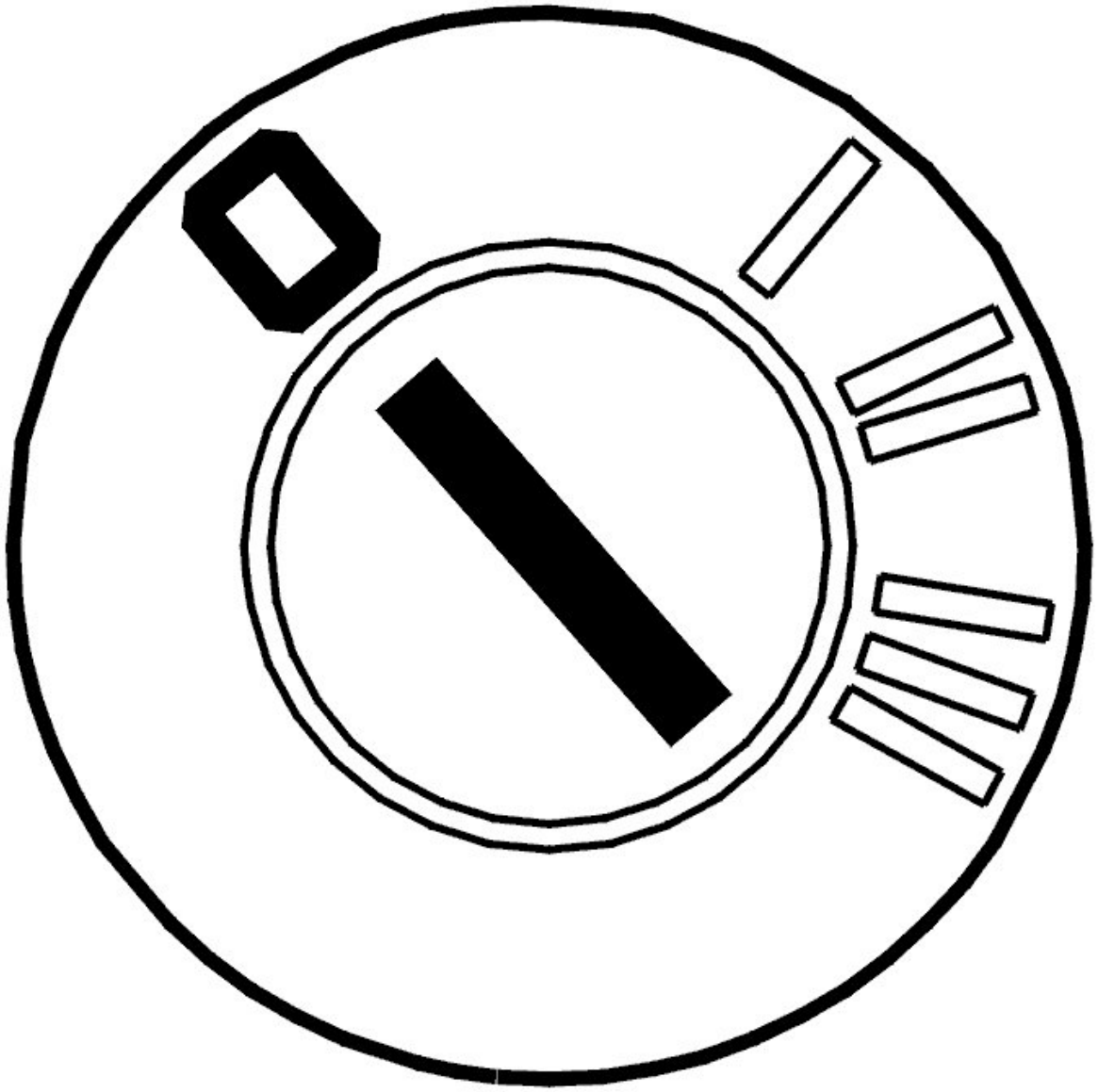
Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.

Is the speed updated?

Yes - Intermittent fault

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off.

Check the cables between transmission control module (TCM) terminals #A59 (#A59) and #A41 (#A41) and transmission connector terminals #A2 and #A1. Check for a short-circuit to each other.
Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit or a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Hint: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A2 and #A1 (control module side), the voltage must be 1-3 V below Ubat.

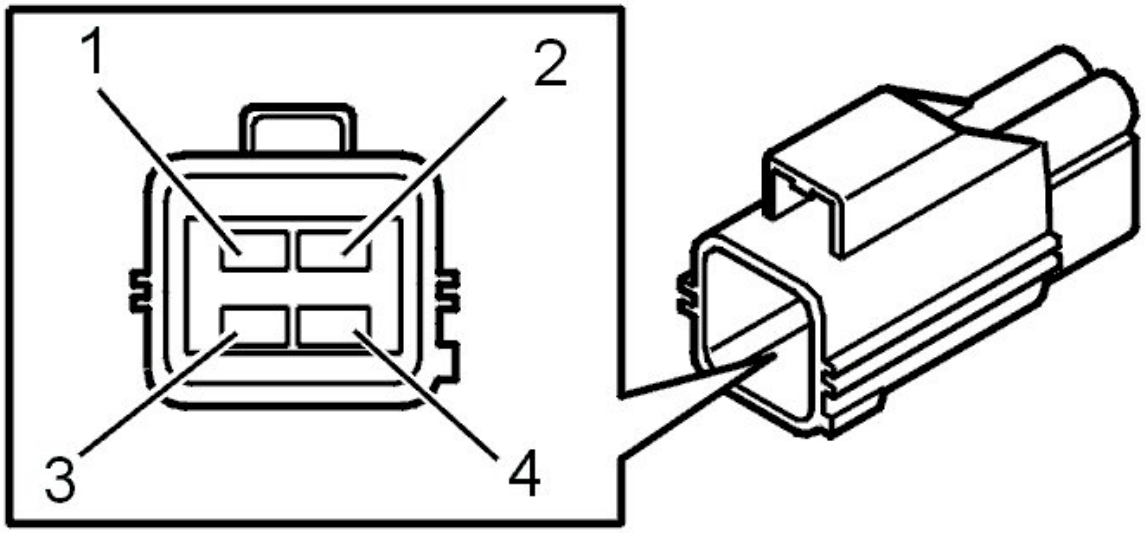
Remedy as necessary.

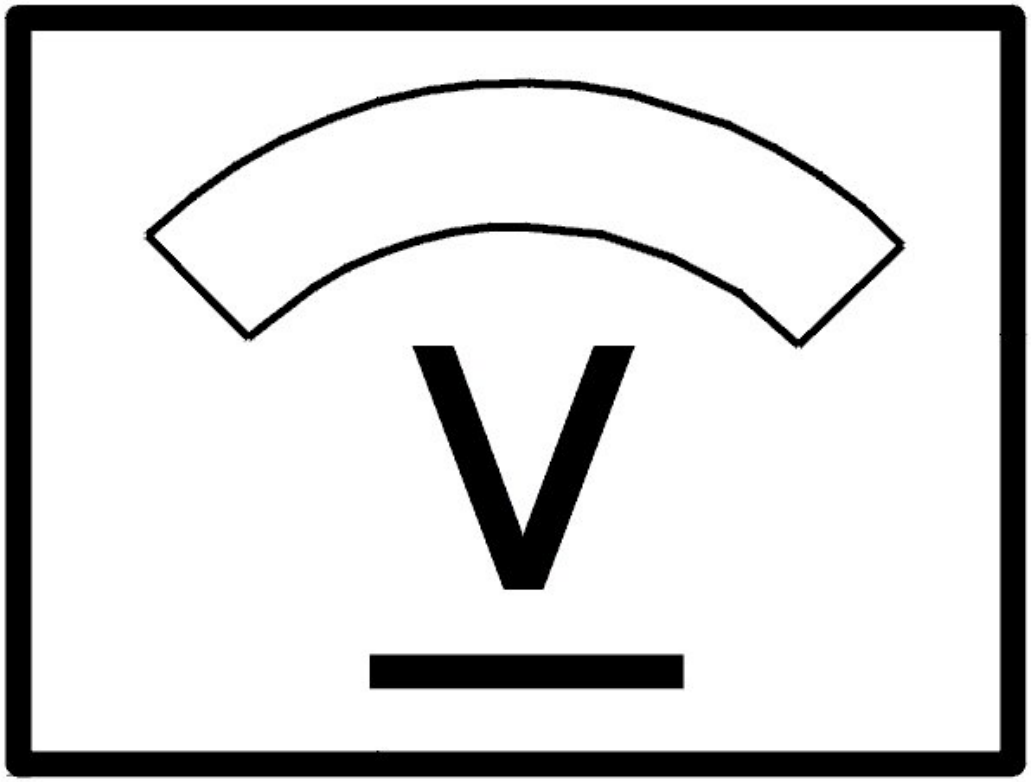
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the transmission speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and

Repair/Input Speed Sensor/Output Speed Sensor, Replacing

- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



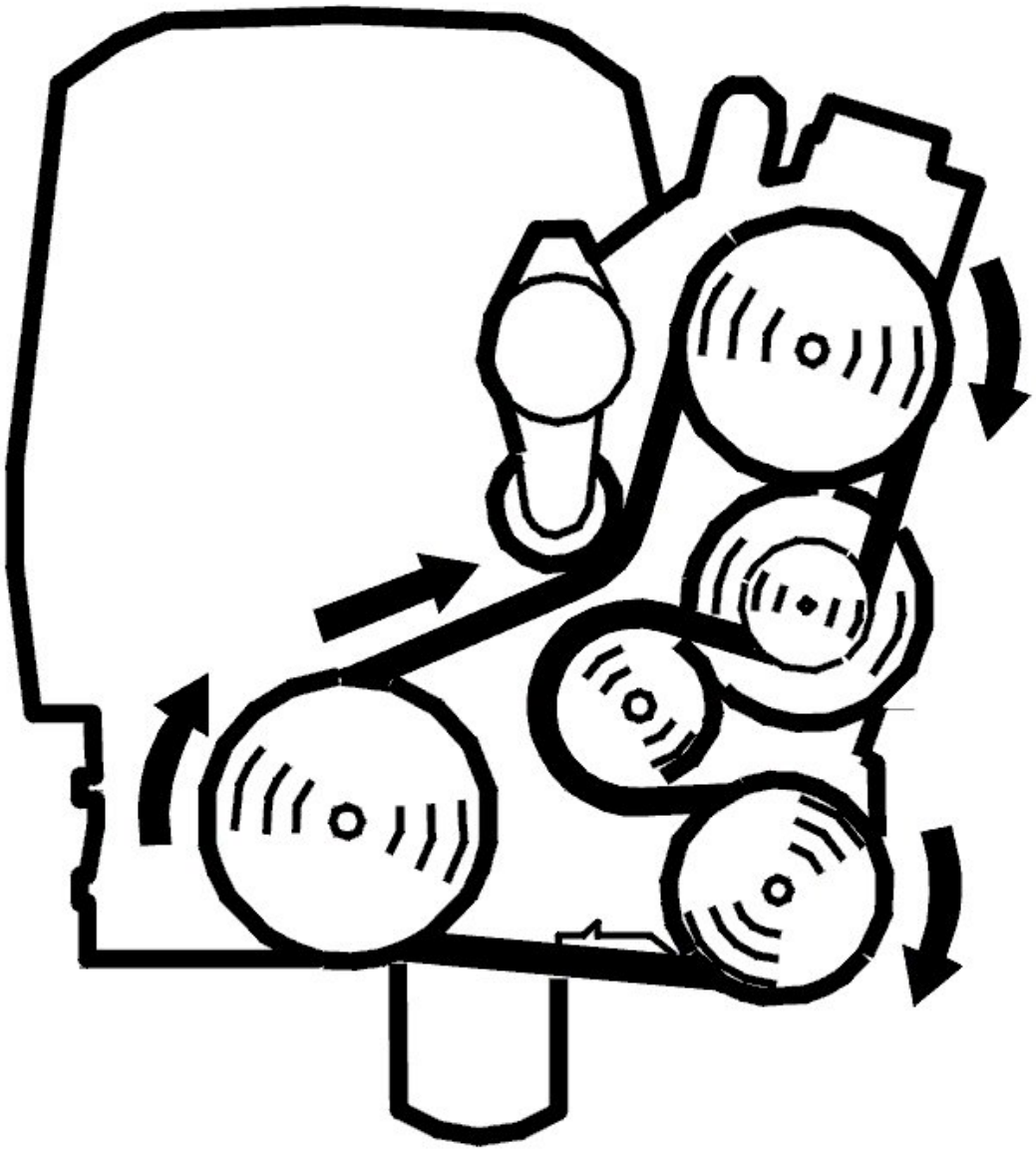


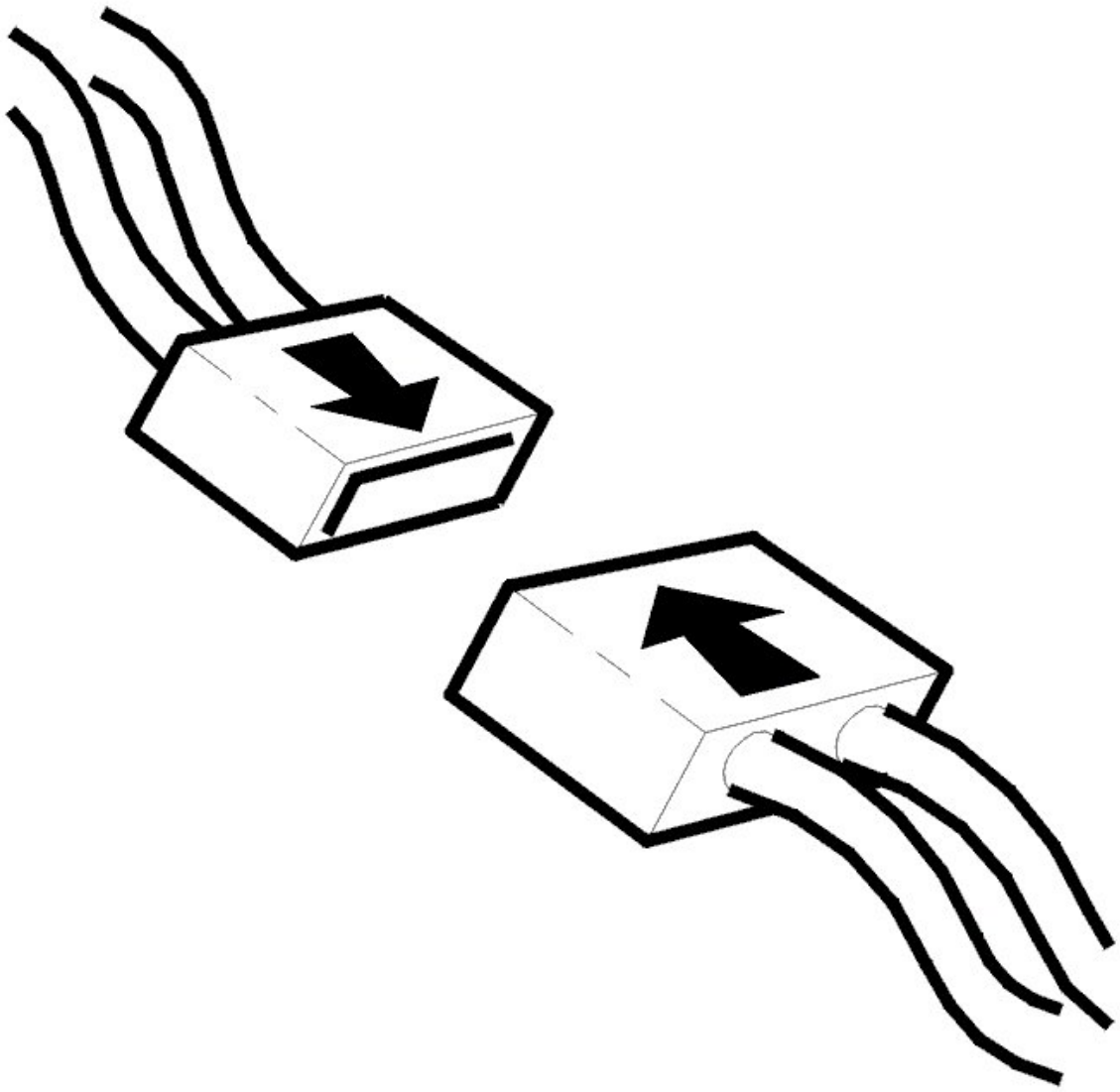
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission input speed sensor signal

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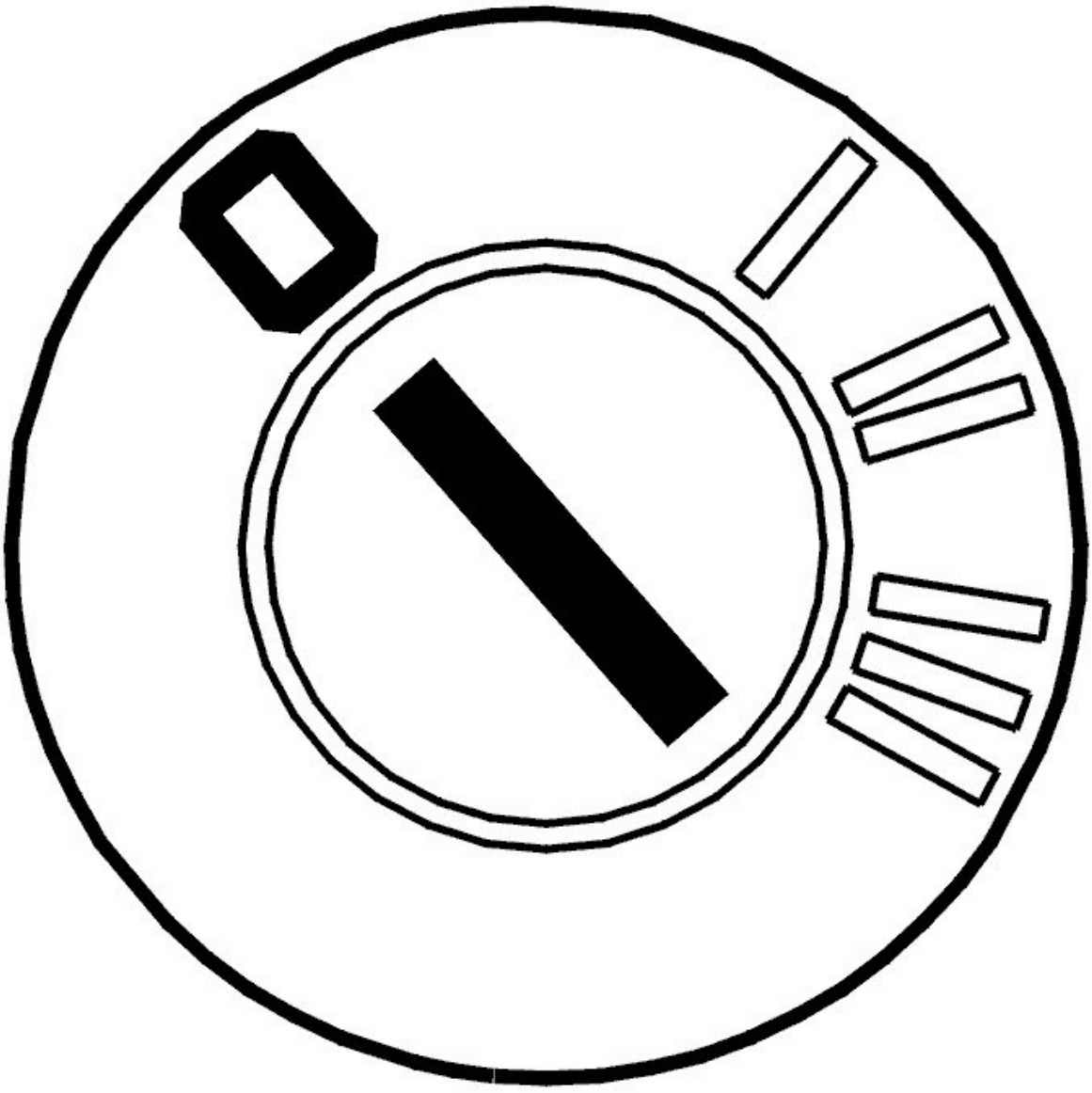
Intermittent fault



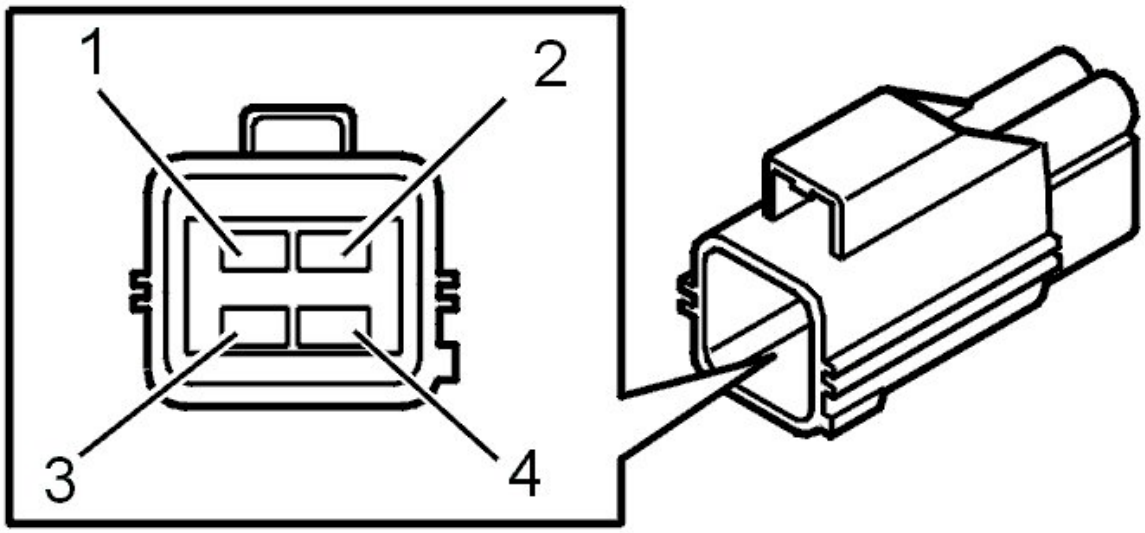
- Ignition off.

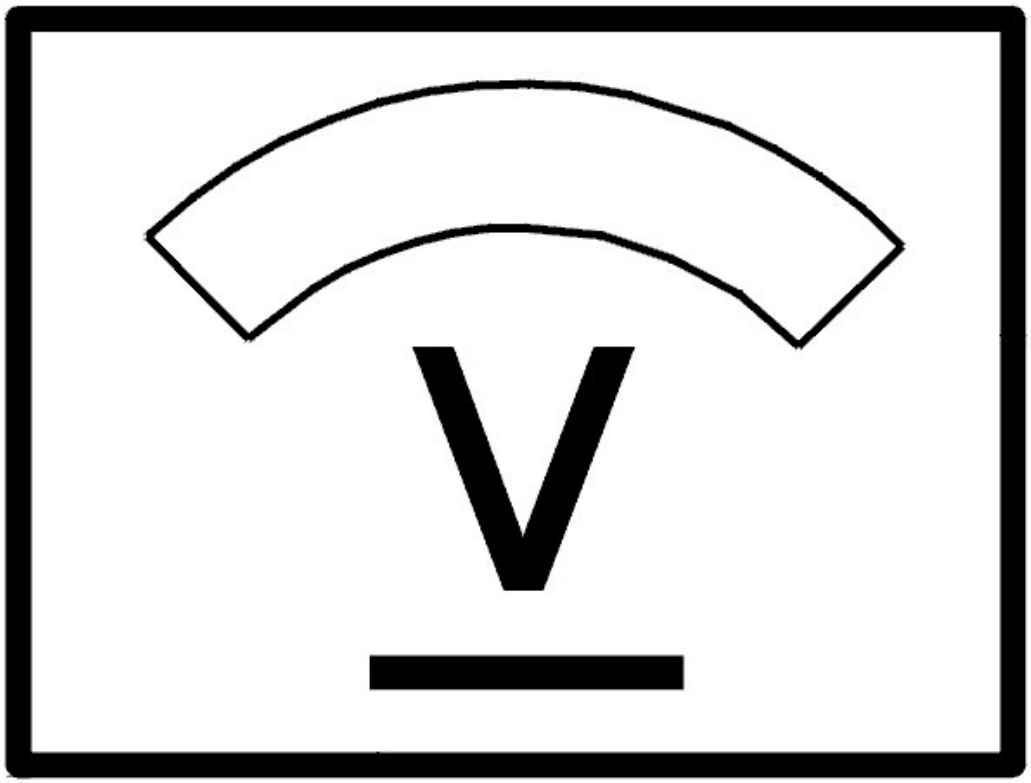
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check or replace the speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and Repair/Input Speed Sensor/Output Speed Sensor, Replacing
- For information about signals see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Diagnostic trouble code (DTC) information

Diagnostic trouble code (DTC) information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the transmission input speed sensor signal

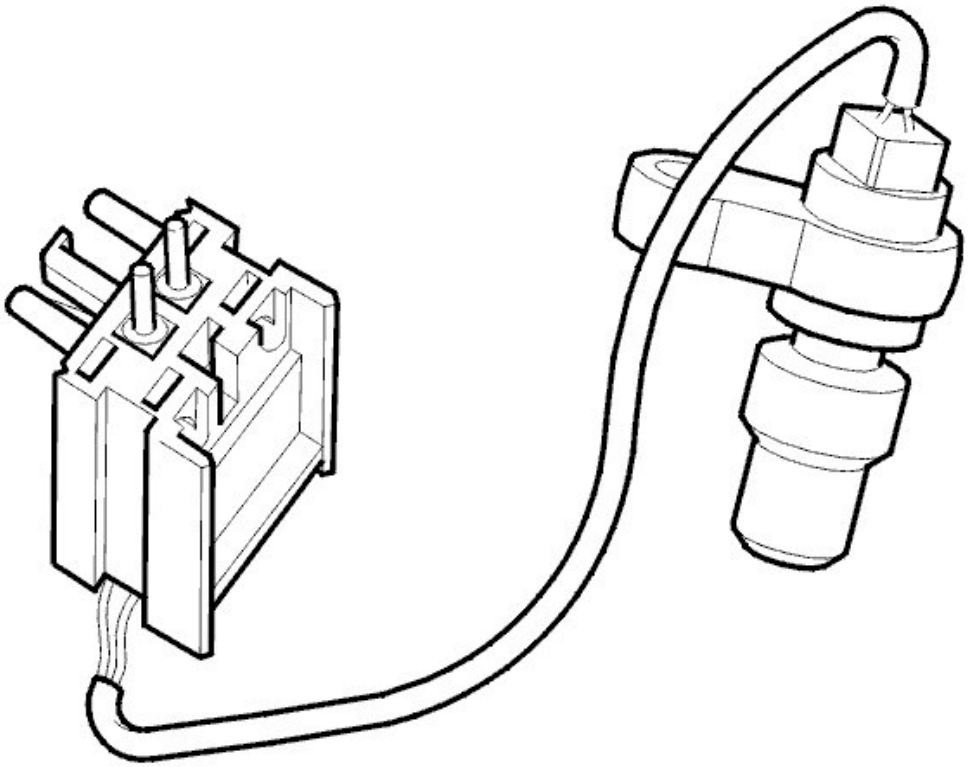
FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



The transmission speed signal is transmitted by a sensor on the transmission. The transmission control module (TCM) uses the signal to determine the input shaft speed after the torque converter. This signal is used to compare the transmission speed with vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. Diagnostic trouble code (DTC) TCM-0089 is stored if the control module registers that the signal is too low when vehicle speed is over approximately 25 km/h.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in the terminals.
- Short-circuit to ground in the signal cable.
- Defective input speed sensor.

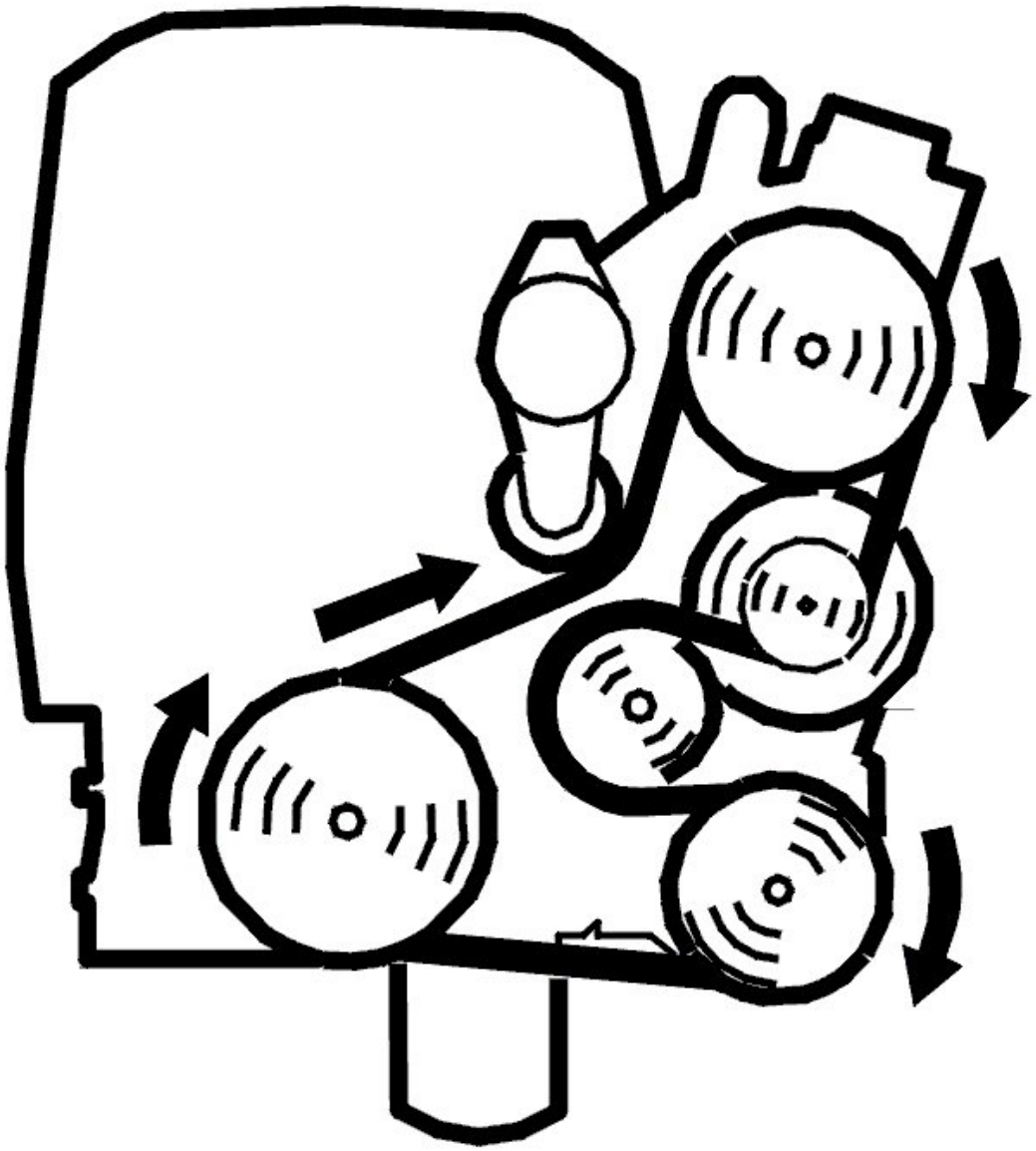
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No reduction of line pressure when shifting.
- No reduction of line pressure when moving the gear selector between positions P-R, N-R and N-D.
- No torque limiting request to engine control module (ECM) when shifting.

Signal Too Low

Signal too low

Checking the transmission input speed sensor signal



- Start the engine. Allow the engine to idle
- Gear selector in position P
- Read off the transmission input speed.

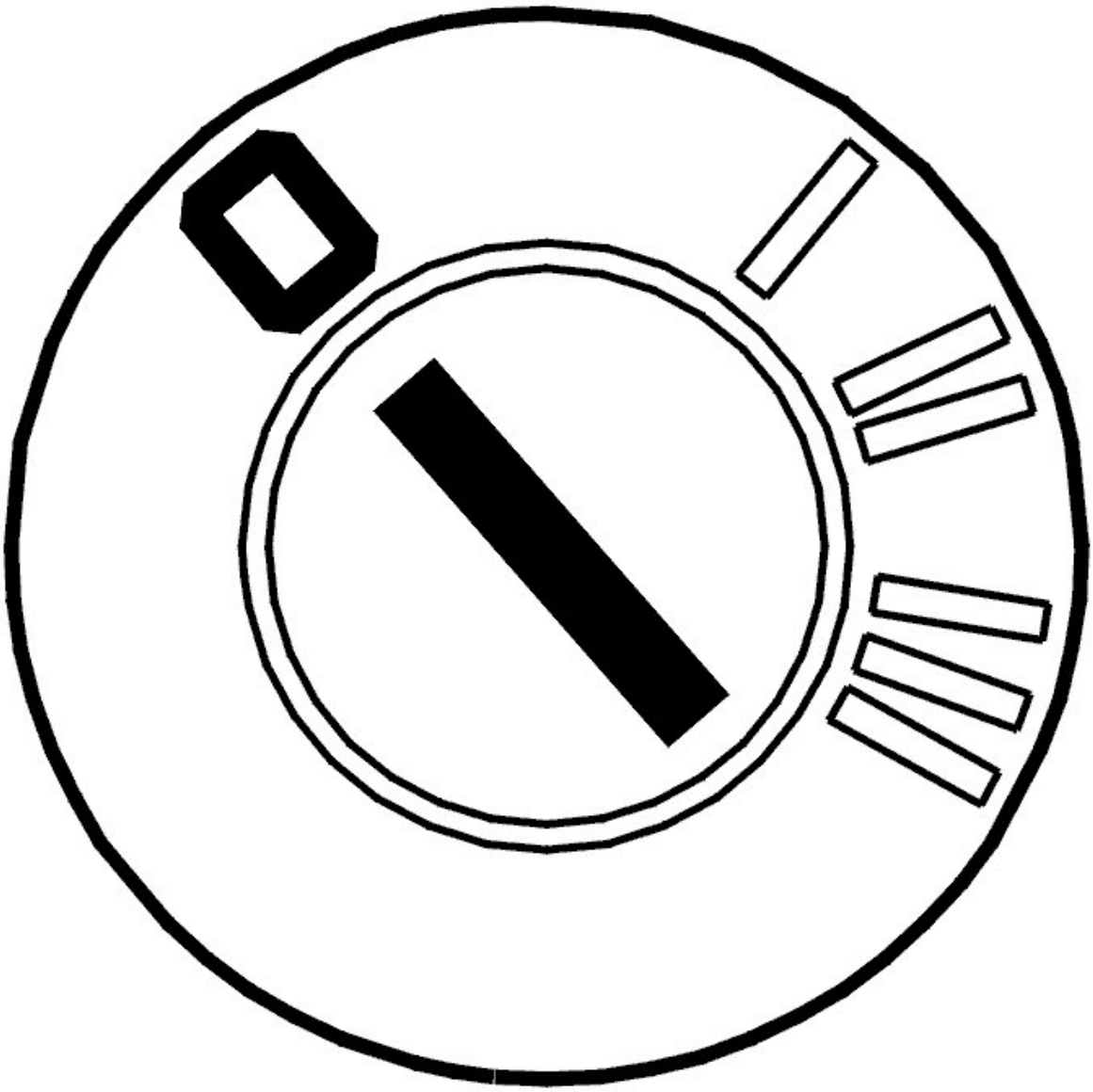
Check that the transmission speed is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - Intermittent fault

No - Checking wiring and sensors

Checking wiring and sensors



- Ignition off.

Check the transmission control module (TCM) and transmission input speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

Hint: With the control module connected, the ignition on and a voltmeter connected between transmission connector terminals #A2 and #A1 (control module side), the voltage must be 1-3 V below Ubat.

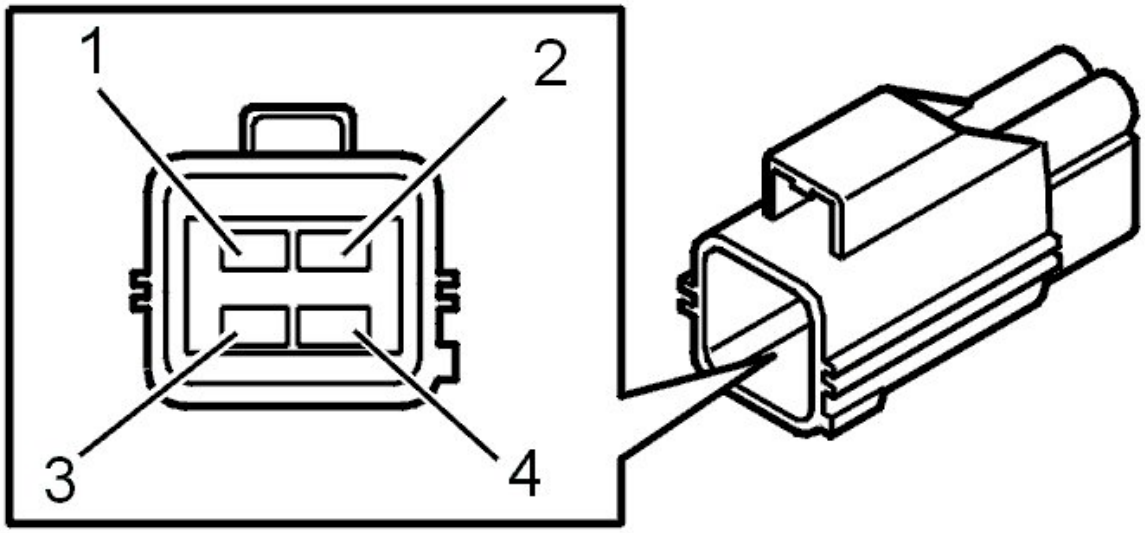
Remedy as necessary.

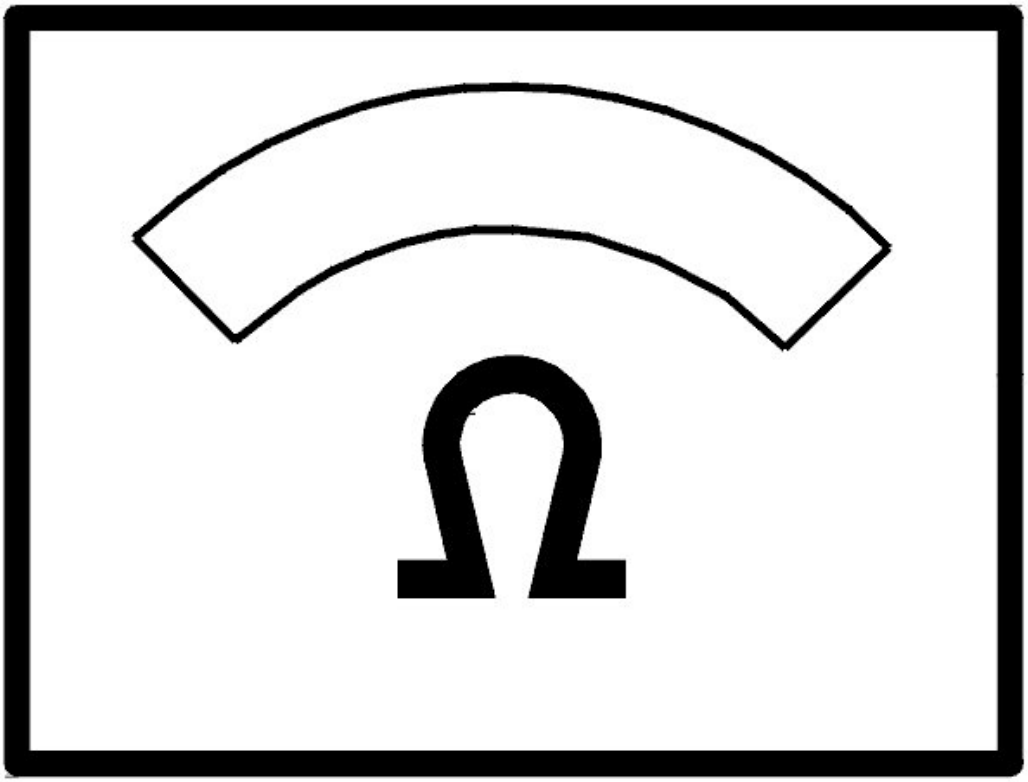
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To check and replace the transmission speed sensor, see Input speed sensor/output speed sensor, replacing See: Transmission Control Systems/Sensors and Switches - Transmission and Drivetrain/Sensors and Switches - A/T/Transmission Speed Sensor/Service and

Repair/Input Speed Sensor/Output Speed Sensor, Replacing

- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



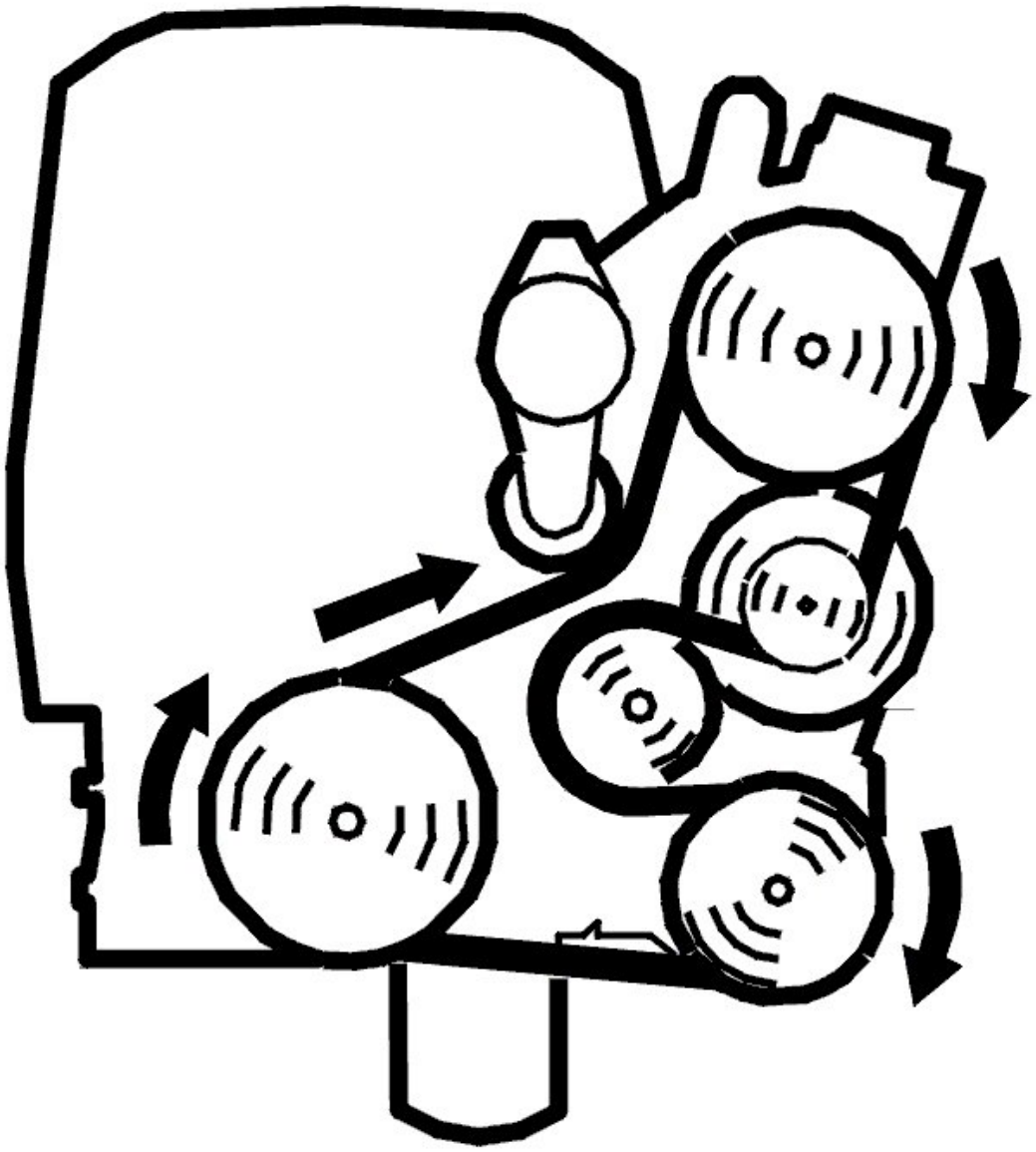


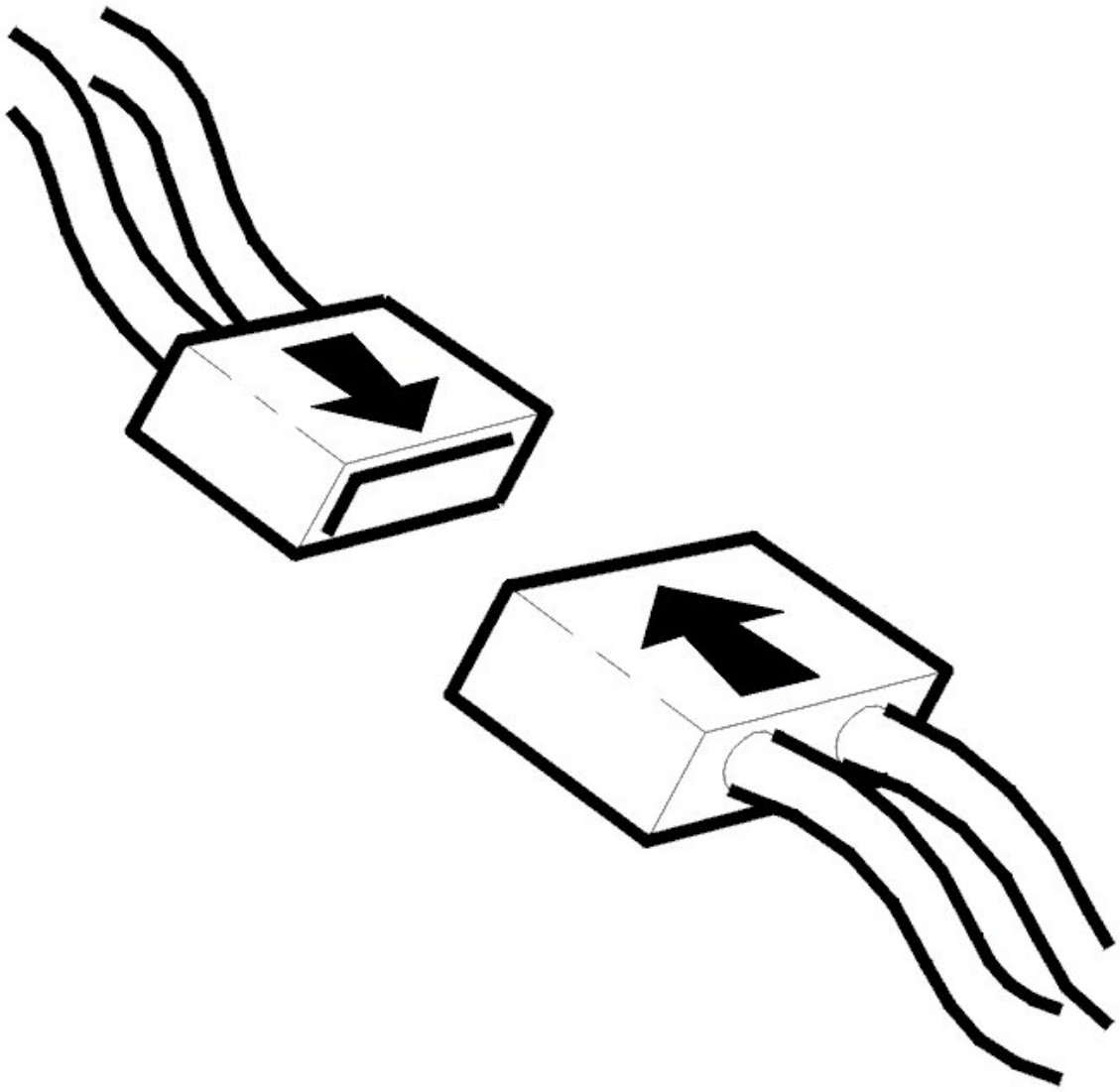
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Start the engine and let it idle.
- Gear selector in position P.
- Read off the transmission speed.

Depress the accelerator pedal (AP) and check that engine speed (RPM) is updated.
Compare with the engine speed (RPM).

Is the speed updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the transmission input speed sensor signal

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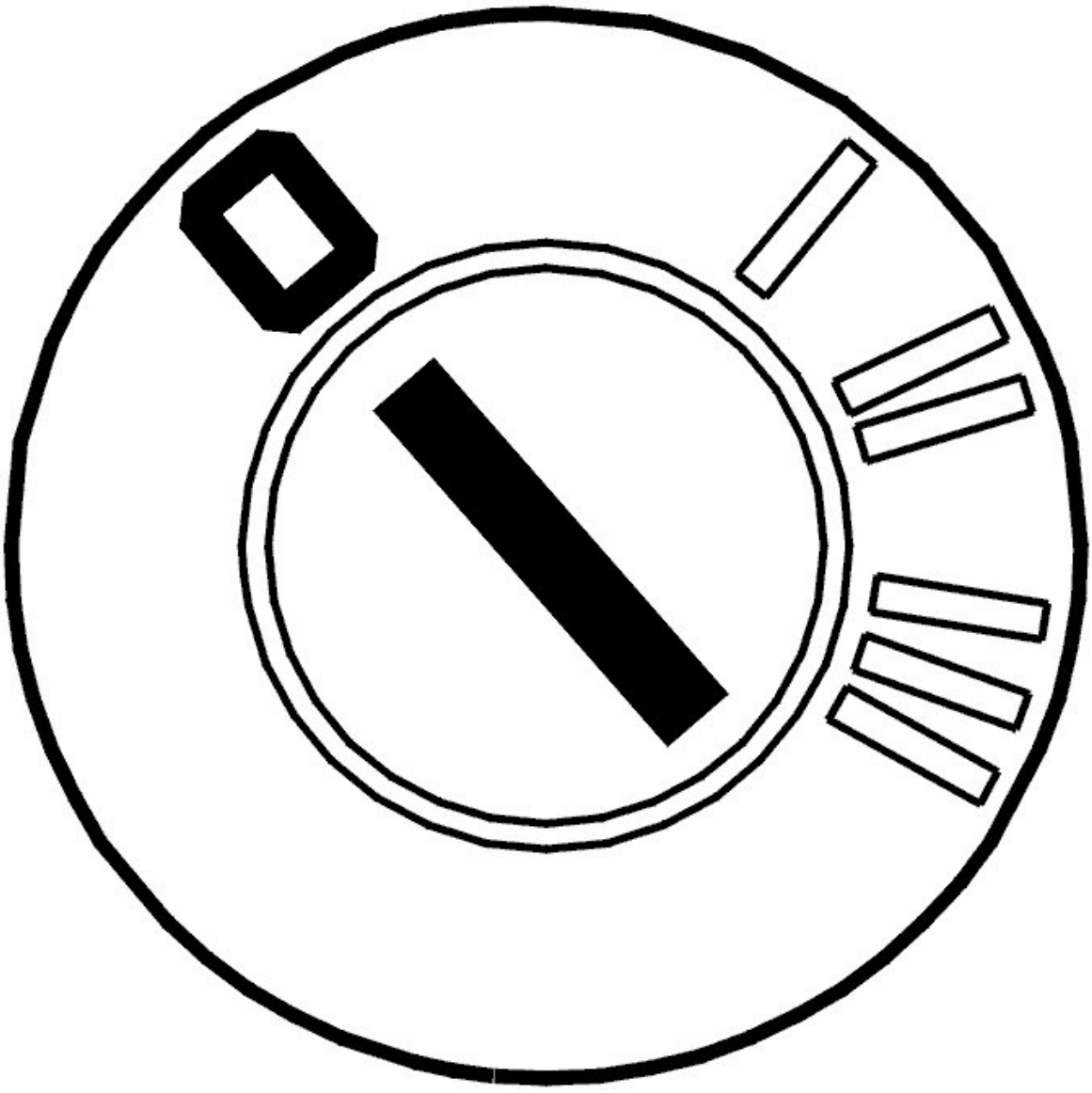
Intermittent fault



- Ignition off.

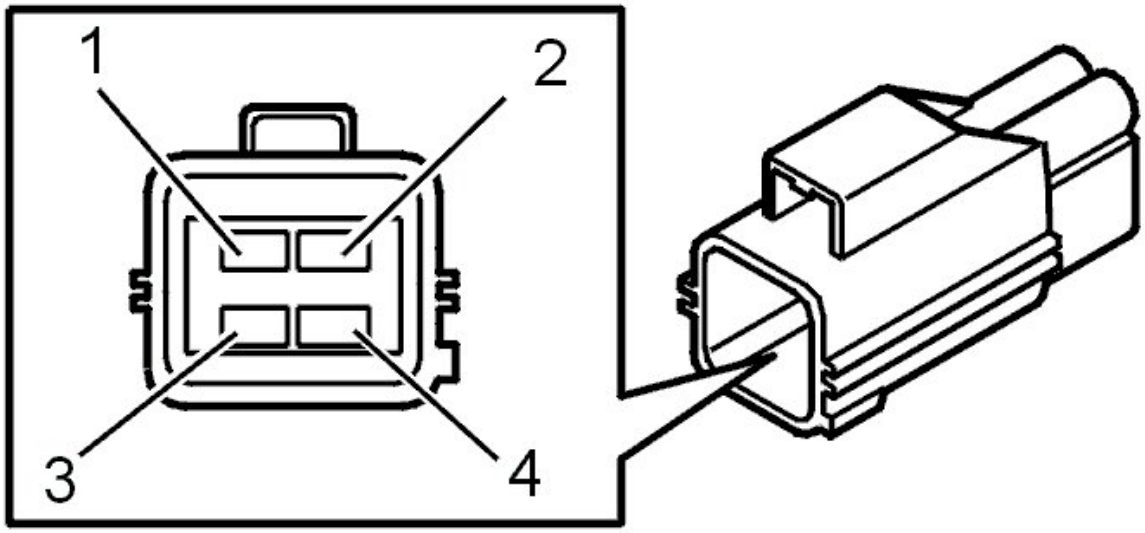
Check the control module and transmission input speed sensor connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

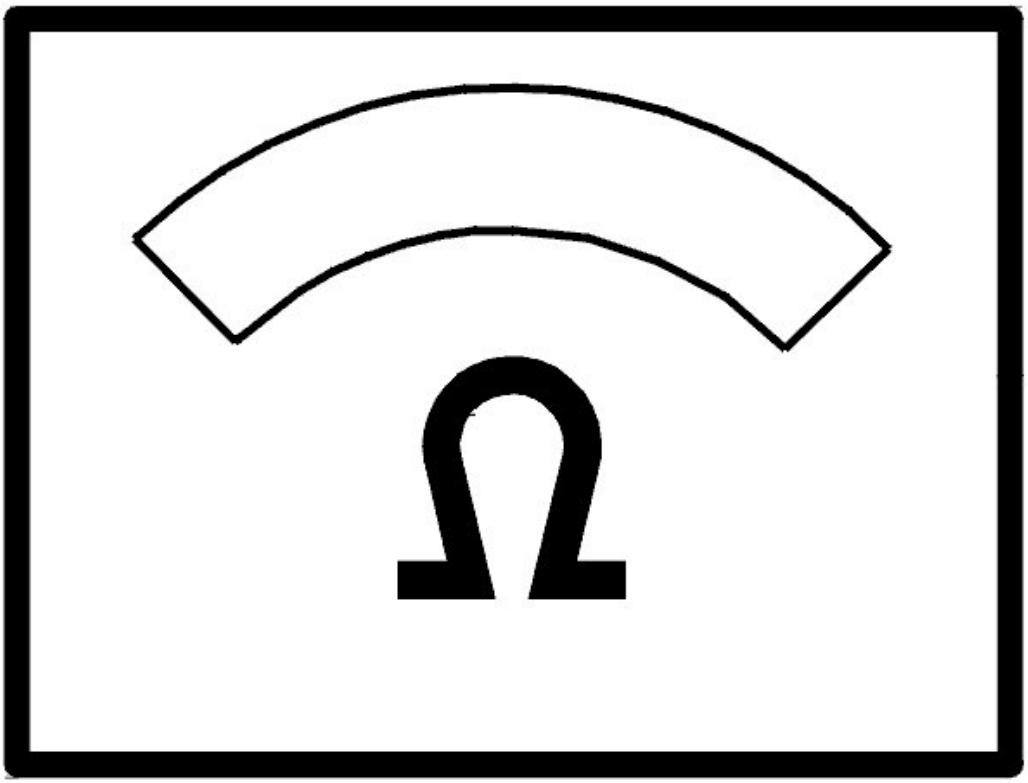
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Check the power supply cable between control module terminal #A59 (#A59) and transmission connector terminal #A2. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the signal cable between control module terminal #A41 (#A41) and transmission connector terminal #A1. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the transmission input speed sensor signal

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers signal too high from solenoid P position lock, diagnostic trouble code TCM-0090 is set.

Substitute value
- Gear selector not blocked.

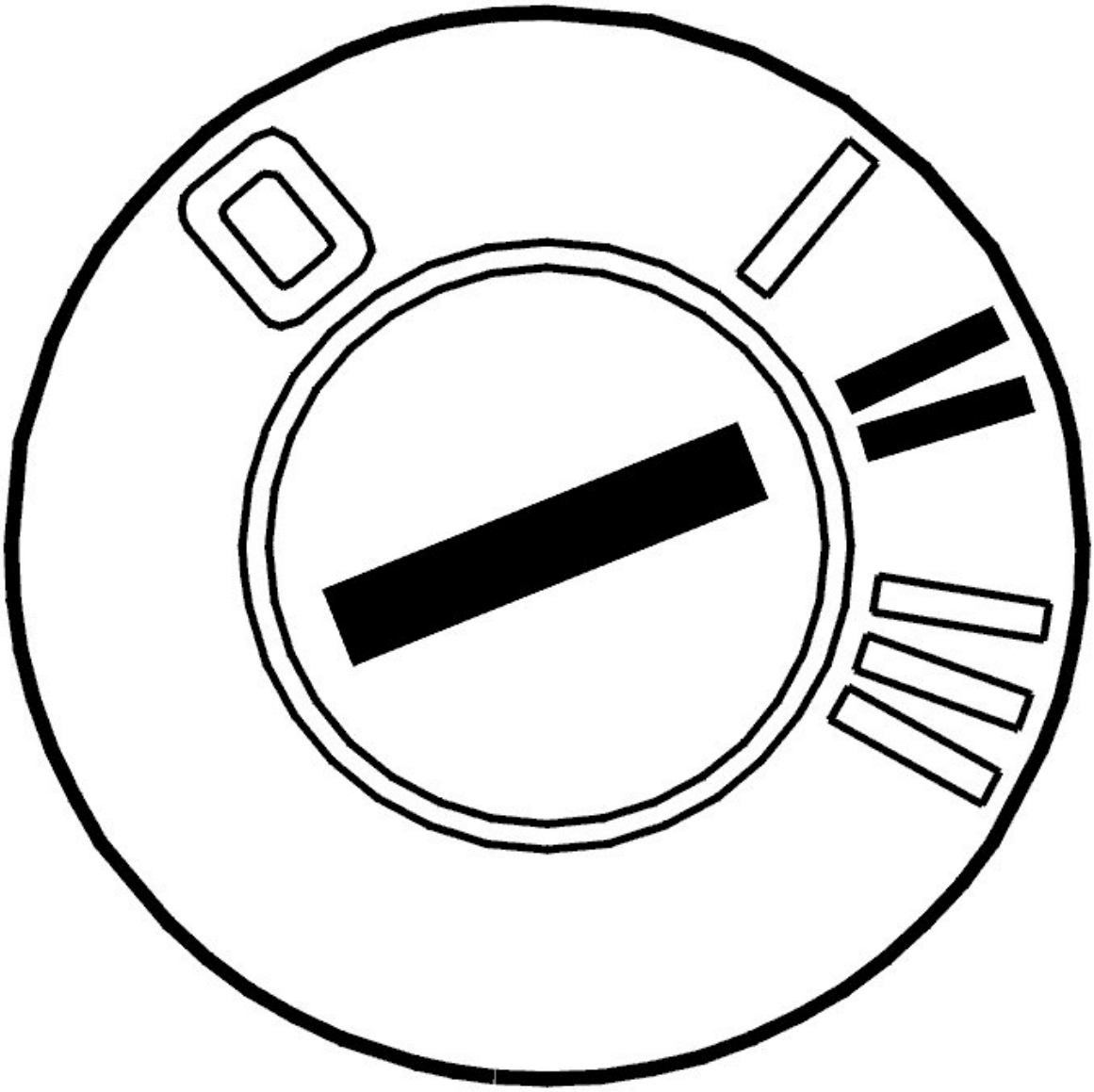
Possible source
- Signal wire short circuited to voltage supply.
- Solenoid defective.

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Gear selector movable with ignition off.

Signal Too High

Signal too high

Checking the P-shift lock solenoid



- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

Yes - Intermittent fault

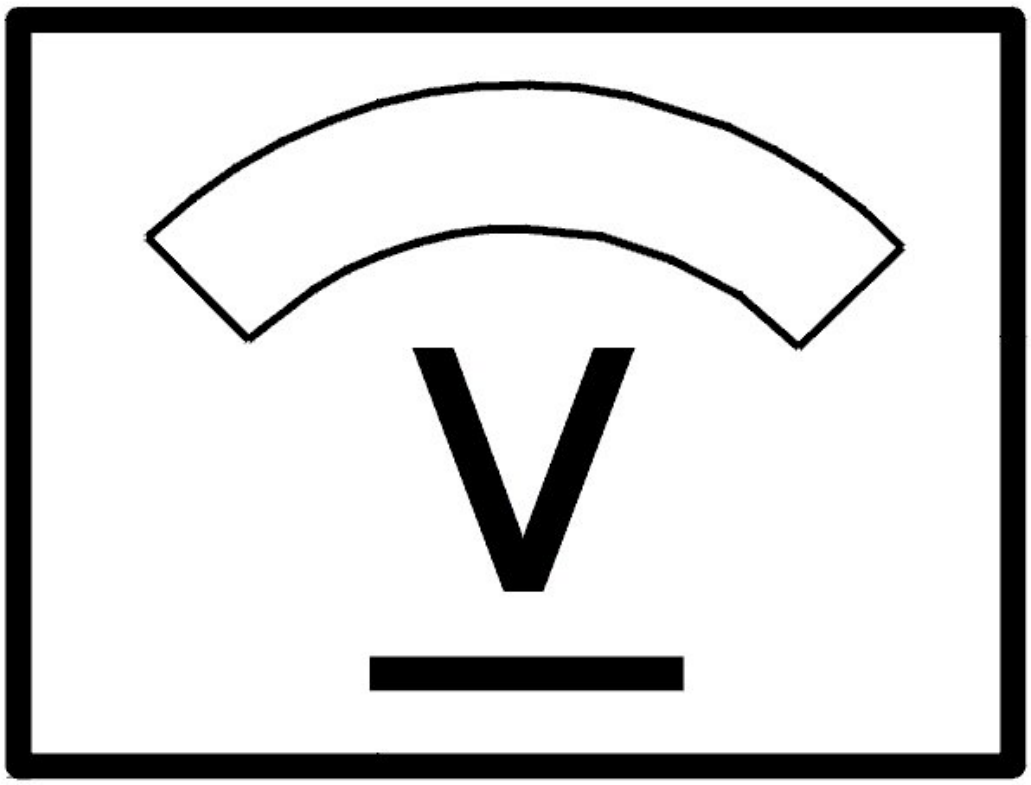
No - Checking the wiring and component

Checking the wiring and component

Check the cable between the control module for the gear selector and the solenoid connector. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the voltage between terminals #1 and #2 on the solenoid connector (female half).
When the ignition is on and the brake pedal is not depressed the voltage should be 0 V. When the brake pedal is depressed the voltage should be Ubat.
Replace the solenoid if the voltage is OK.

Other information

- To check or replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing.

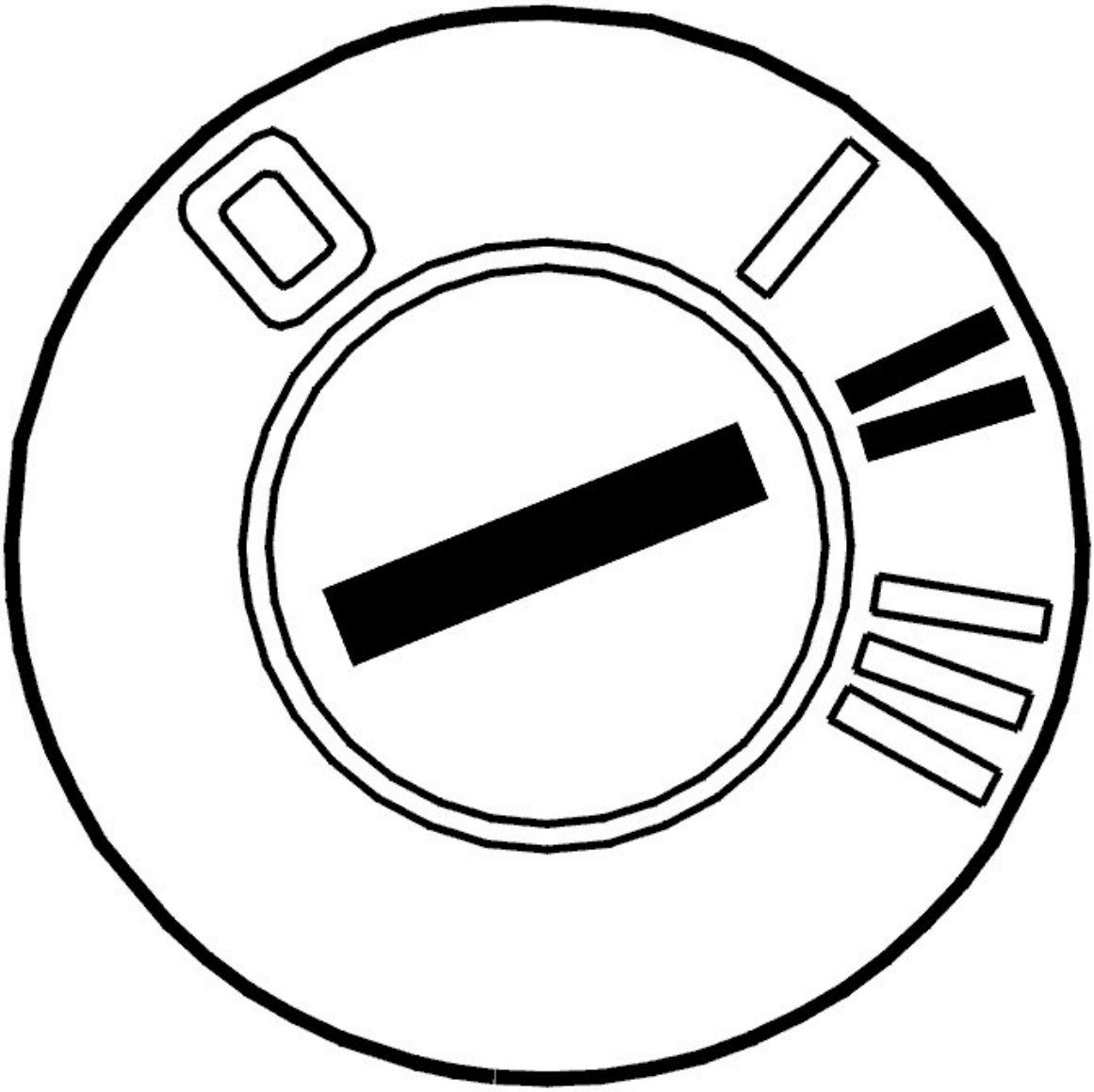


Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Gear selector in position P.

Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.
Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

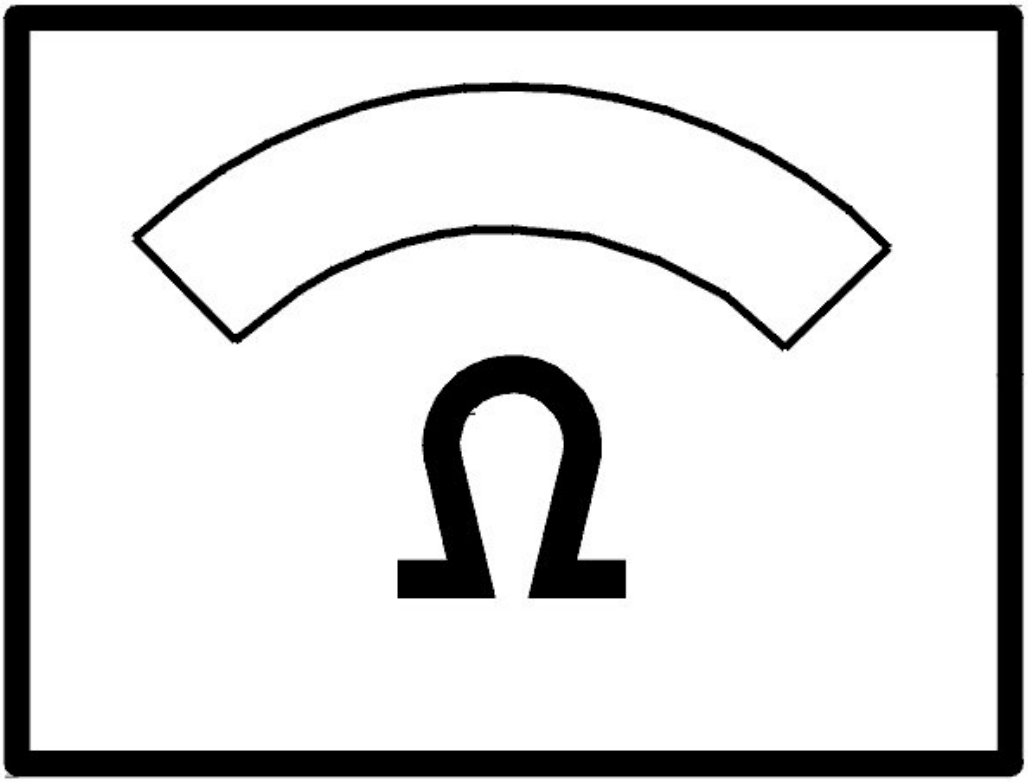
Attempt New Test - Checking the P-shift lock solenoid

Intermittent fault

Check the cable between the control module for the gear selector and the shift lock solenoid. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing ,.



Select "Continue".

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the P-shift lock solenoid

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers signal missing from solenoid P position lock, diagnostic trouble code TCM-0091 will be set.

Substitute value
- Gear selector blocked.

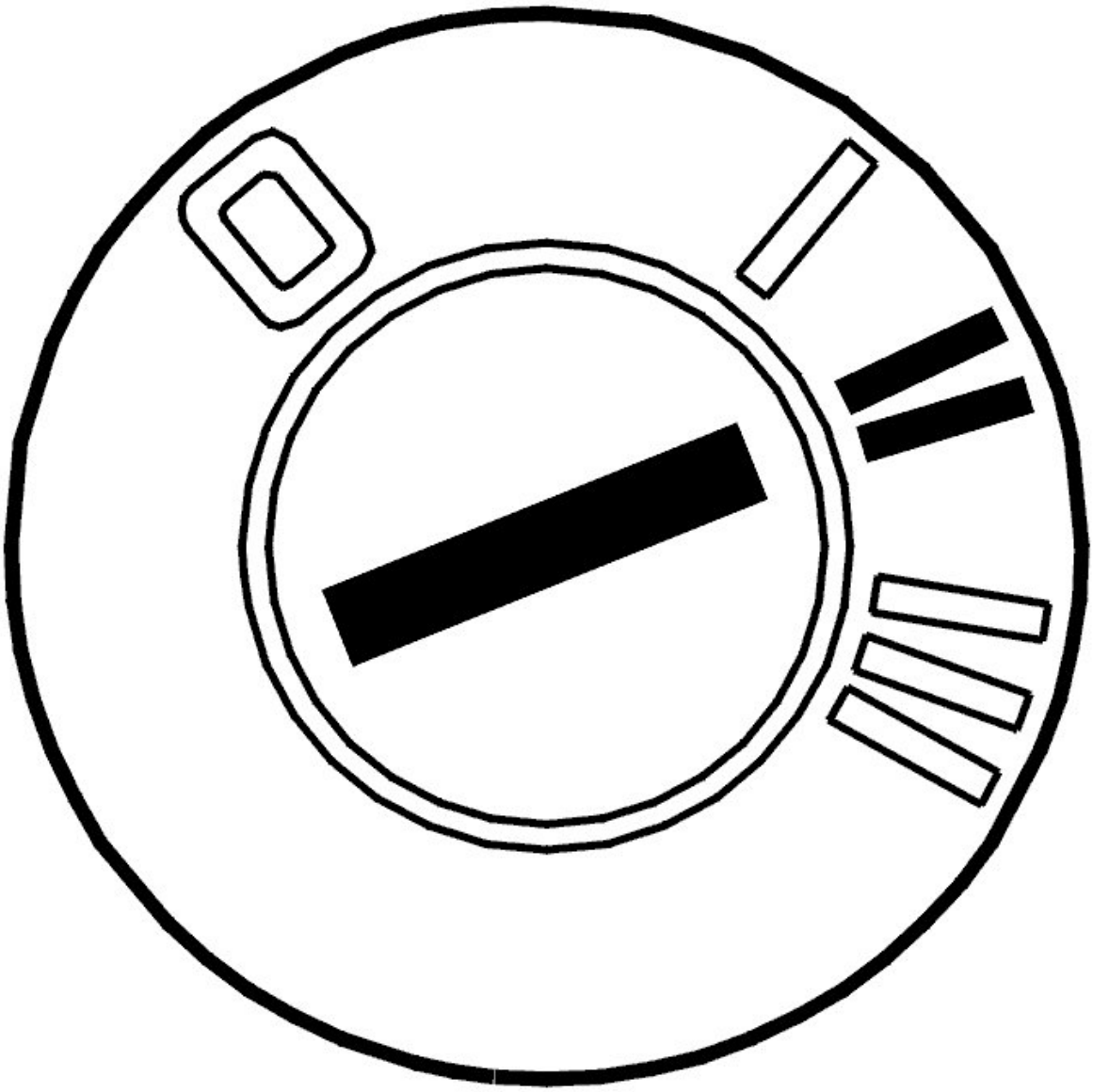
Possible source
- Contact resistance in the connectors.
- Open circuit in signal wire or ground wire

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- The gear selector cannot be moved.

Signal Missing

Signal missing

Checking the P-shift lock solenoid



- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

Yes - Intermittent fault

No - Checking the wiring and component

Checking the wiring and component

Check the cable between the control module for the gear selector and the shift lock solenoid connector (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the voltage between terminals #1 and #2 on the solenoid connector (female half).
When the brake pedal is not depressed the voltage should be 0 V. When the brake pedal is depressed the voltage should be battery voltage.
Replace the solenoid if the voltage is OK.

Other information

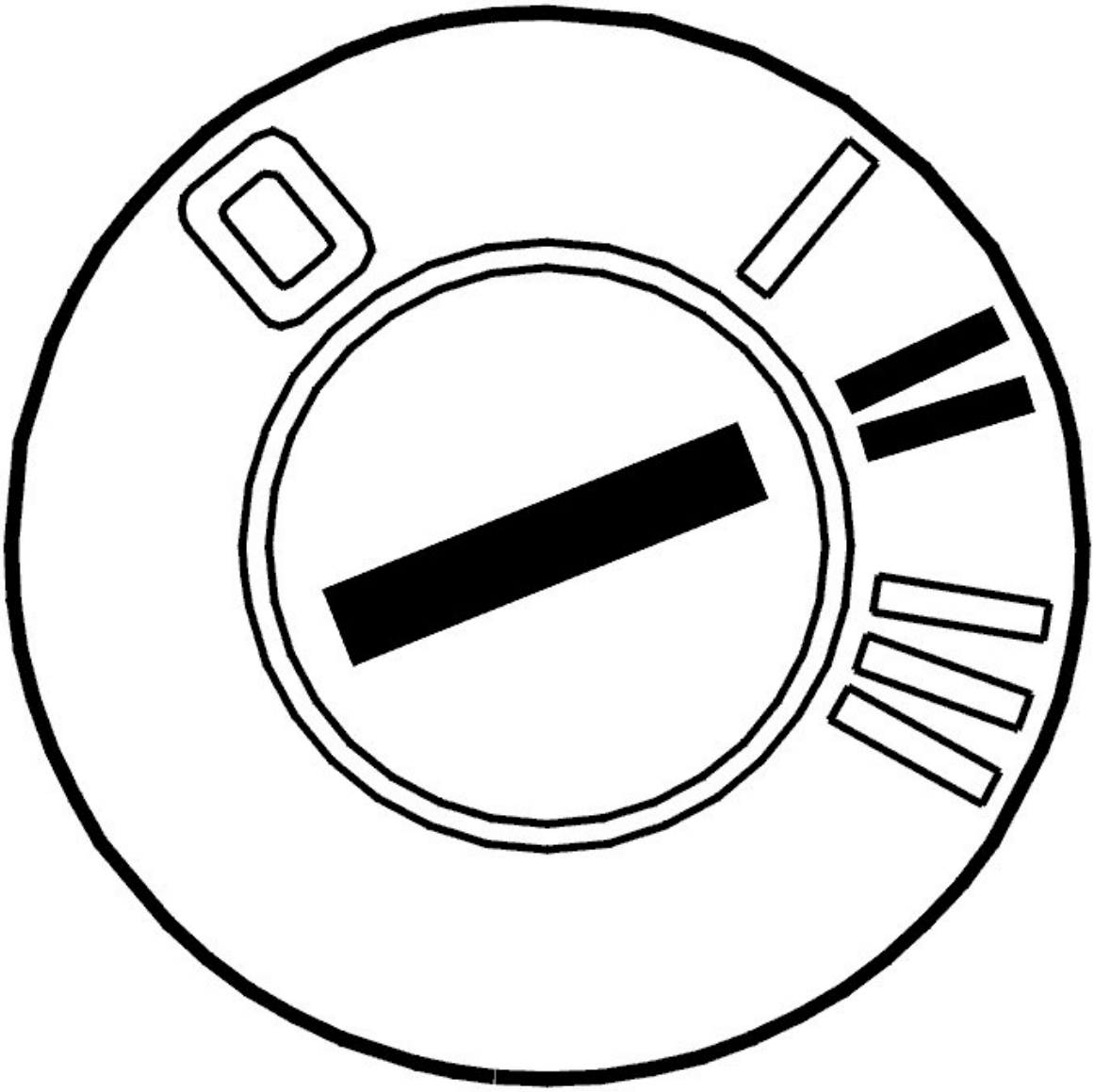
- To check or replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing.

Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Gear selector in position P.

Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.
Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

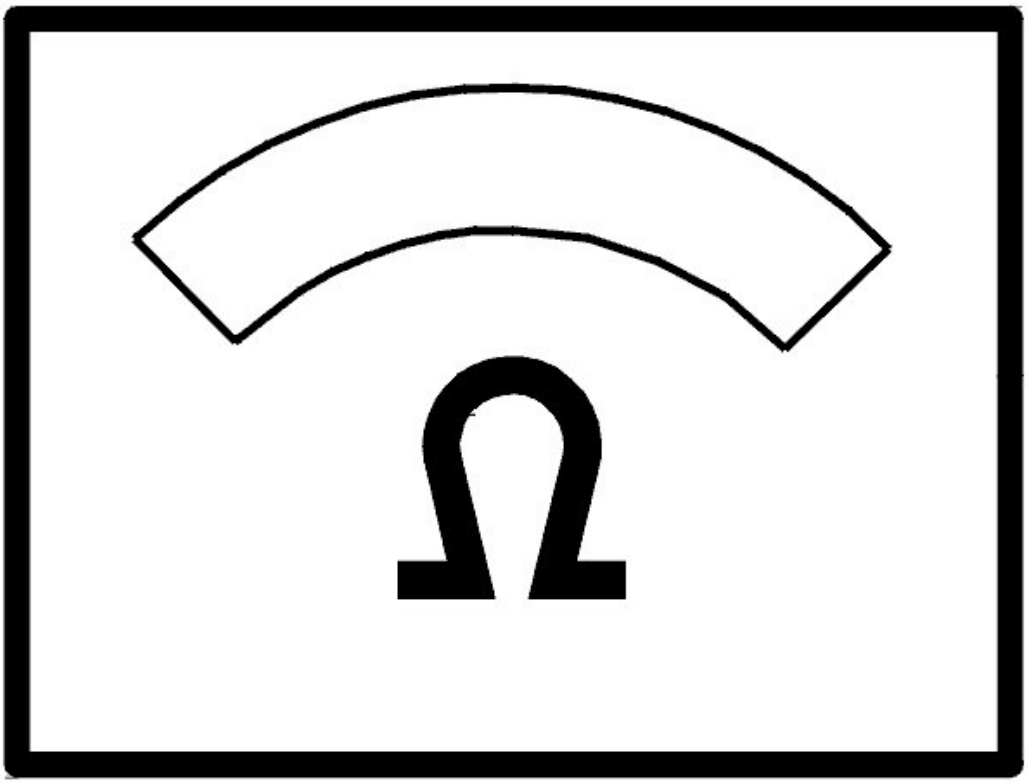
Attempt New Test - Checking the P-shift lock solenoid

Intermittent fault

Check the control module for the gear selector and the solenoid connectors. Check for intermittent contact resistance according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between the control module for the gear selector and the shift lock solenoid. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To check or replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing.



Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the P-shift lock solenoid

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers signal too low from solenoid P position lock, diagnostic trouble code TCM-0092 will be set.

Substitute value
- Gear selector blocked.

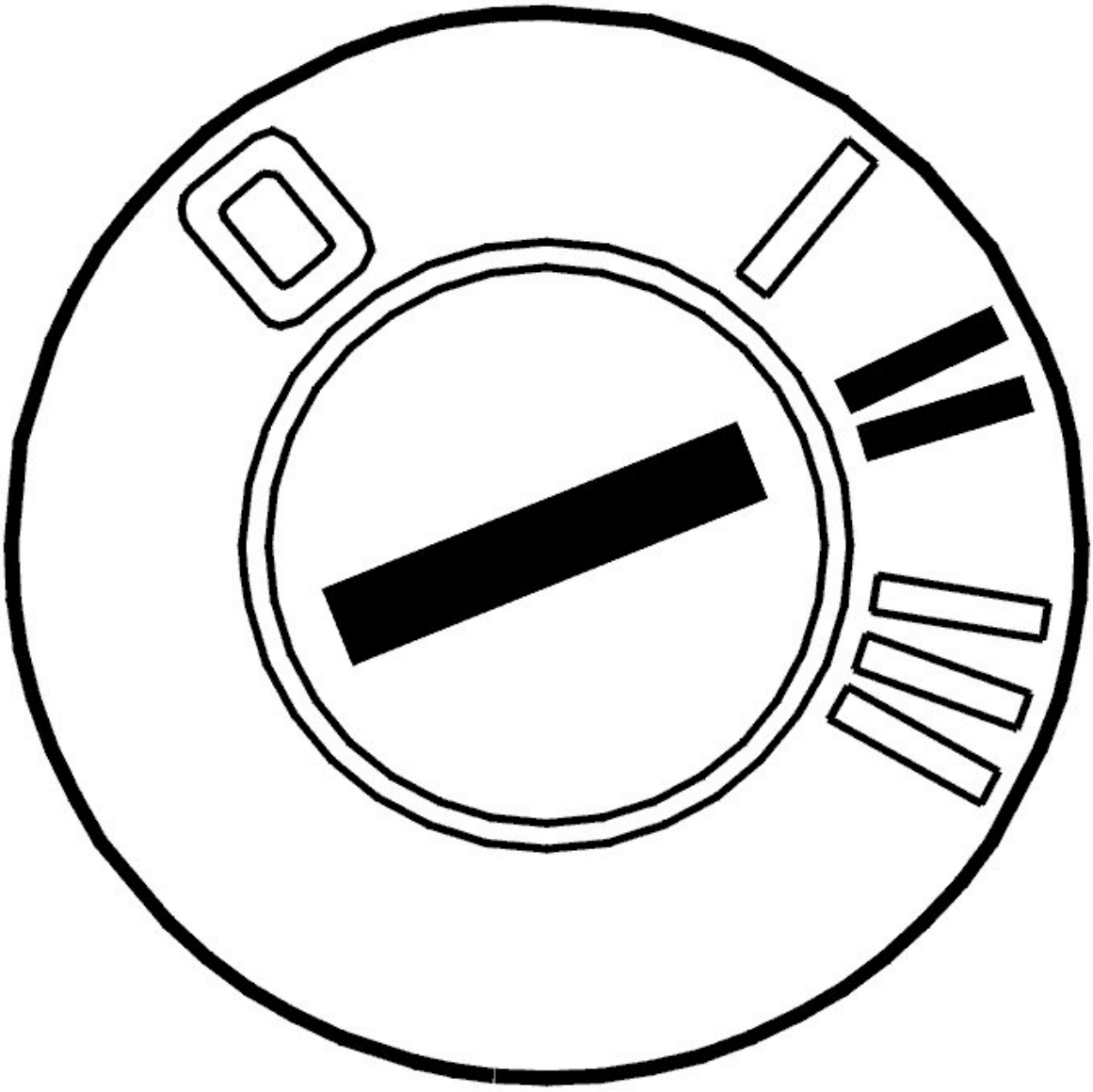
Possible source
- Contact resistance in the connectors.
- Signal wire short-circuited to ground.

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- The gear selector cannot be moved.

Signal Too Low

Signal too low

Checking the P-shift lock solenoid



- Ignition on
- Gear selector in position P
- Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector
- Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector to another position.

Was the function OK?

Yes - Intermittent fault

No - Checking the wiring and component

Checking the wiring and component

Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for a short-circuit to ground.
If no fault is found in the wiring, connect an ohmmeter to solenoid connector terminals #1 and #2 (solenoid side).
Resistance should be 35-45 ohms Replace the solenoid if the resistance is incorrect. If the resistance is OK, replace the circuit board in the top panel.

Other information

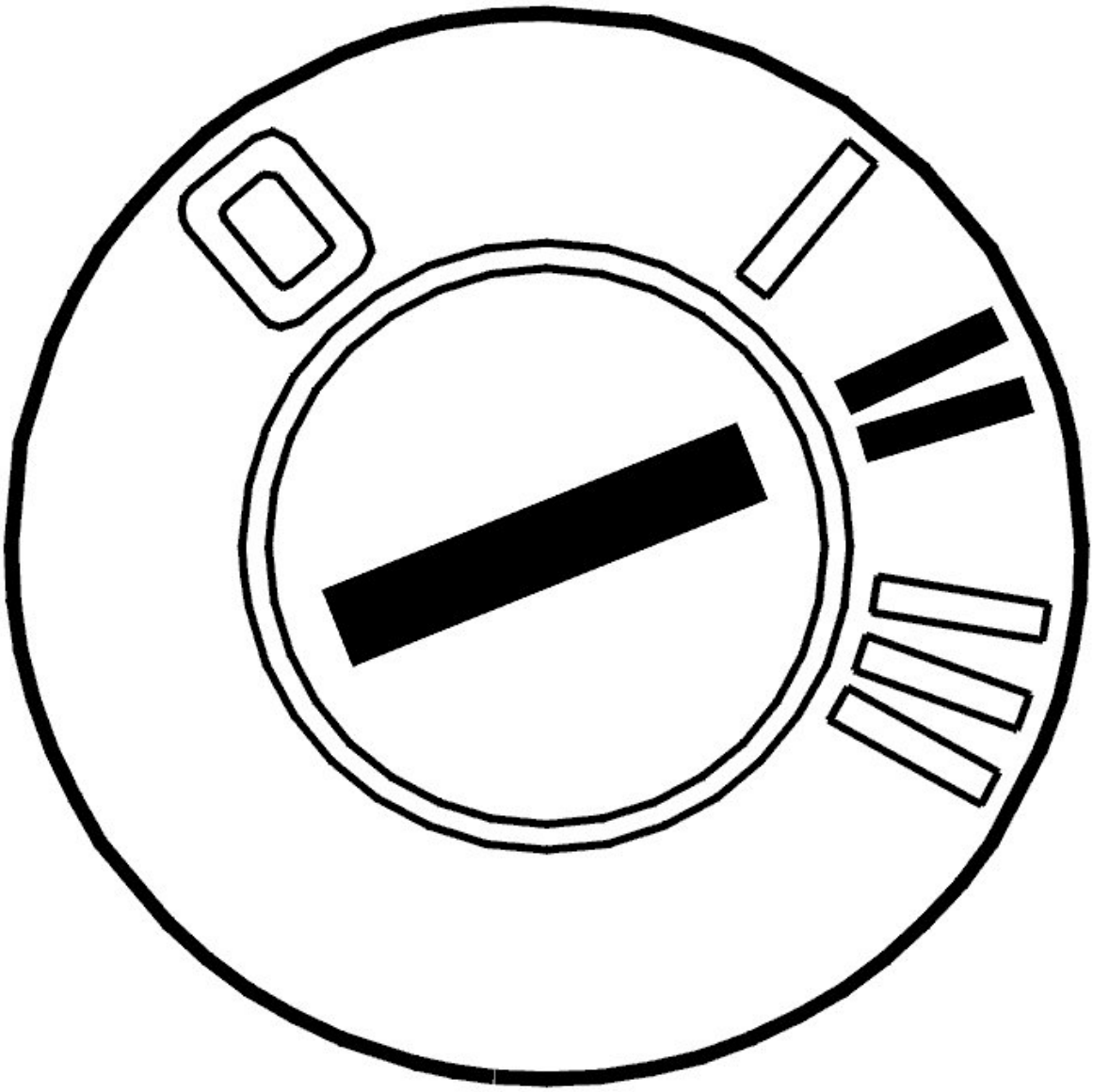
- To check or replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing
- To replace the circuit board in the top panel (standard), see Printed circuit board gear selector assembly / top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (Geartronic), see Printed circuit board gear selector assembly / top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Gear selector in position P.

Try moving the gear selector to another position without depressing the brake pedal. It should not be possible to move the gear selector.
Depress the brake pedal and try moving the gear selector to another position. It should now be possible to move the gear selector.

Was the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the P-shift lock solenoid

Intermittent fault

Check the gear selector module (GSM) and solenoid connectors. Check for intermittent contact resistance.
Check the cable between the gear selector module (GSM) and the shift lock solenoid. Check for an intermittent short-circuit to ground.
Remedy as necessary.

Other information:
- To replace the shift lock solenoid, see Solenoid back-up (reverse) inhibitor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Solenoid Back-Up (Reverse) Inhibitor, Replacing
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the P-shift lock solenoid

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too high, diagnostic trouble code TCM-0093 is set.

Substitute value
- None.

Possible source
- Contact resistance in the connectors.
- Communication wire short-circuited to voltage supply.

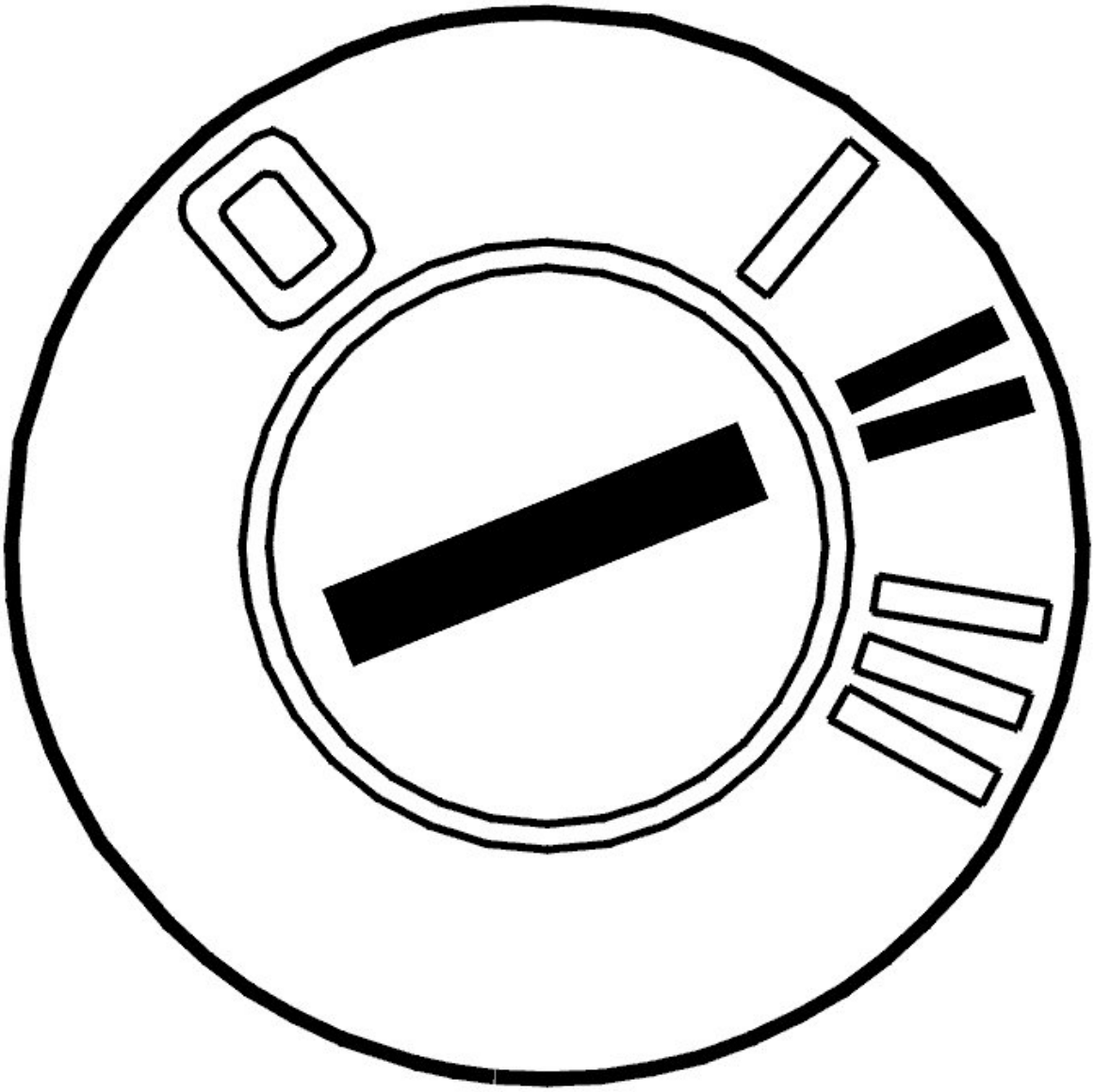
Fault symptom[s]

- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

Signal Too High

Signal too high

Checking communication



- Ignition on.

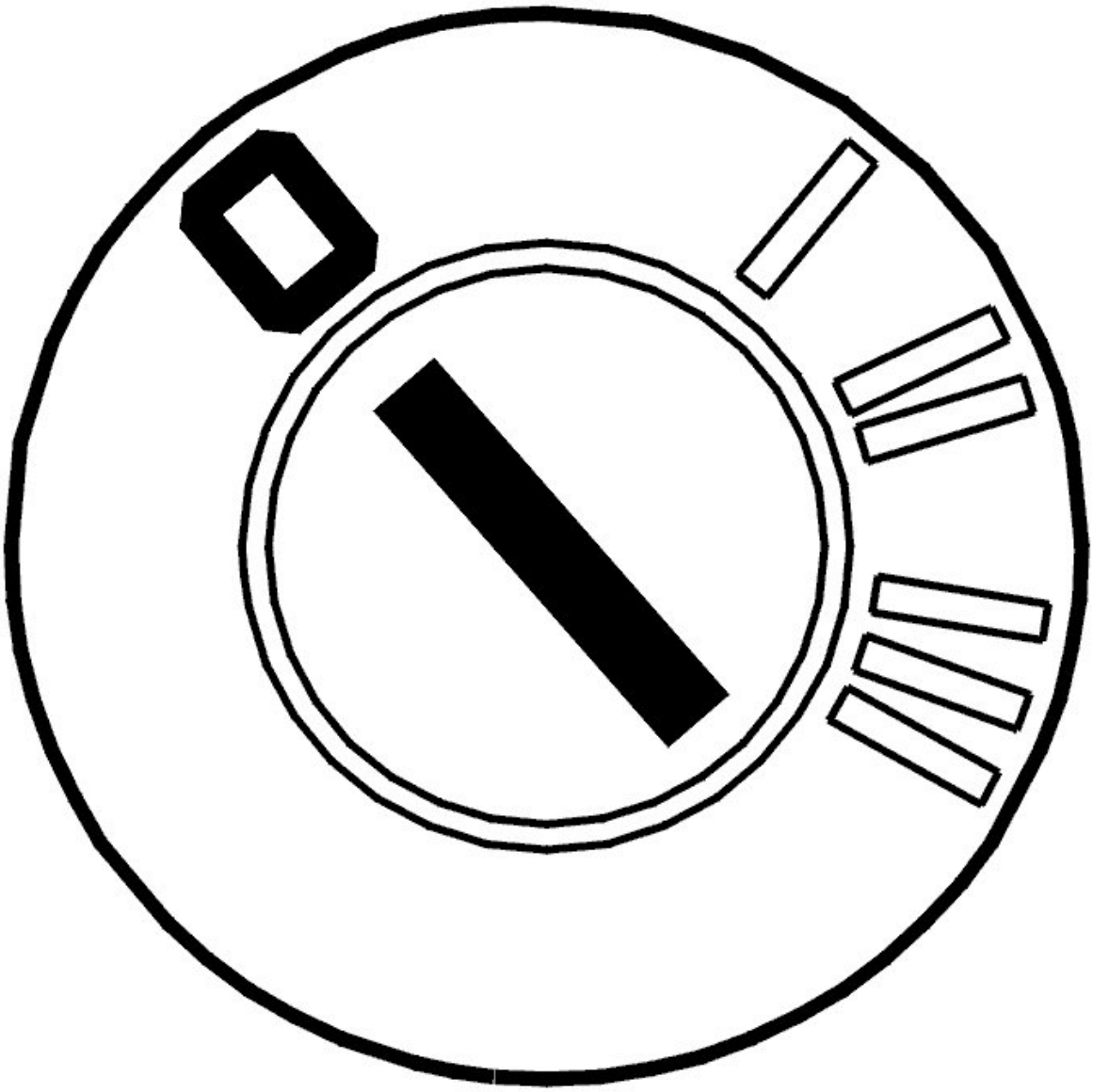
Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - Intermittent fault

No - Checking the wiring and component

Checking the wiring and component

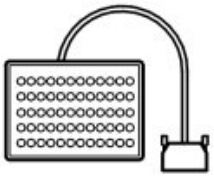


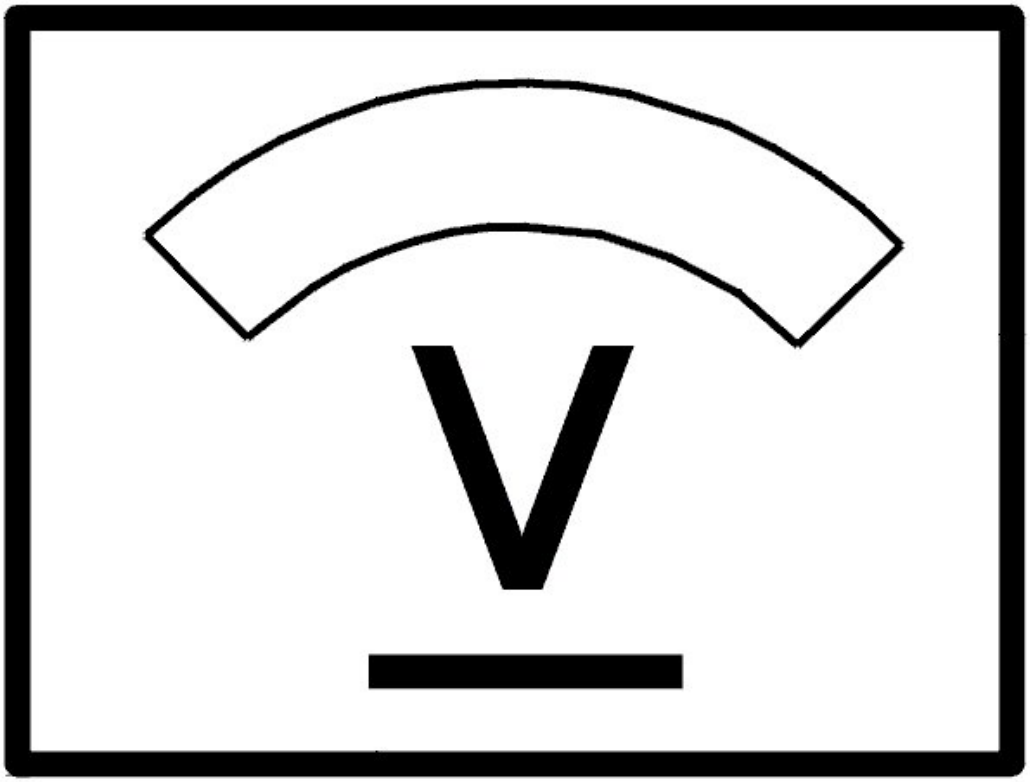
- Ignition off.

Check the communication cable between the gear selector control module terminal #2 and the transmission control module (TCM) terminal #B31 (#B21) for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Replace the circuit board in the top panel if no fault is found in the cable.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the circuit board in the top panel (standard, V70), see Printed circuit board gear selector assembly/top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (standard, S60), see Printed circuit board gear selector assembly/top panel, replacing, B5254T2, AW55-50/51SN See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (geartronic, V70), see Printed circuit board gear selector assembly/top panel Geartronic, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel Geartronic, Replacing
- To replace the circuit board in the top panel (geartronic, S60), see Printed circuit board gear selector assembly/top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Was a fault detected?

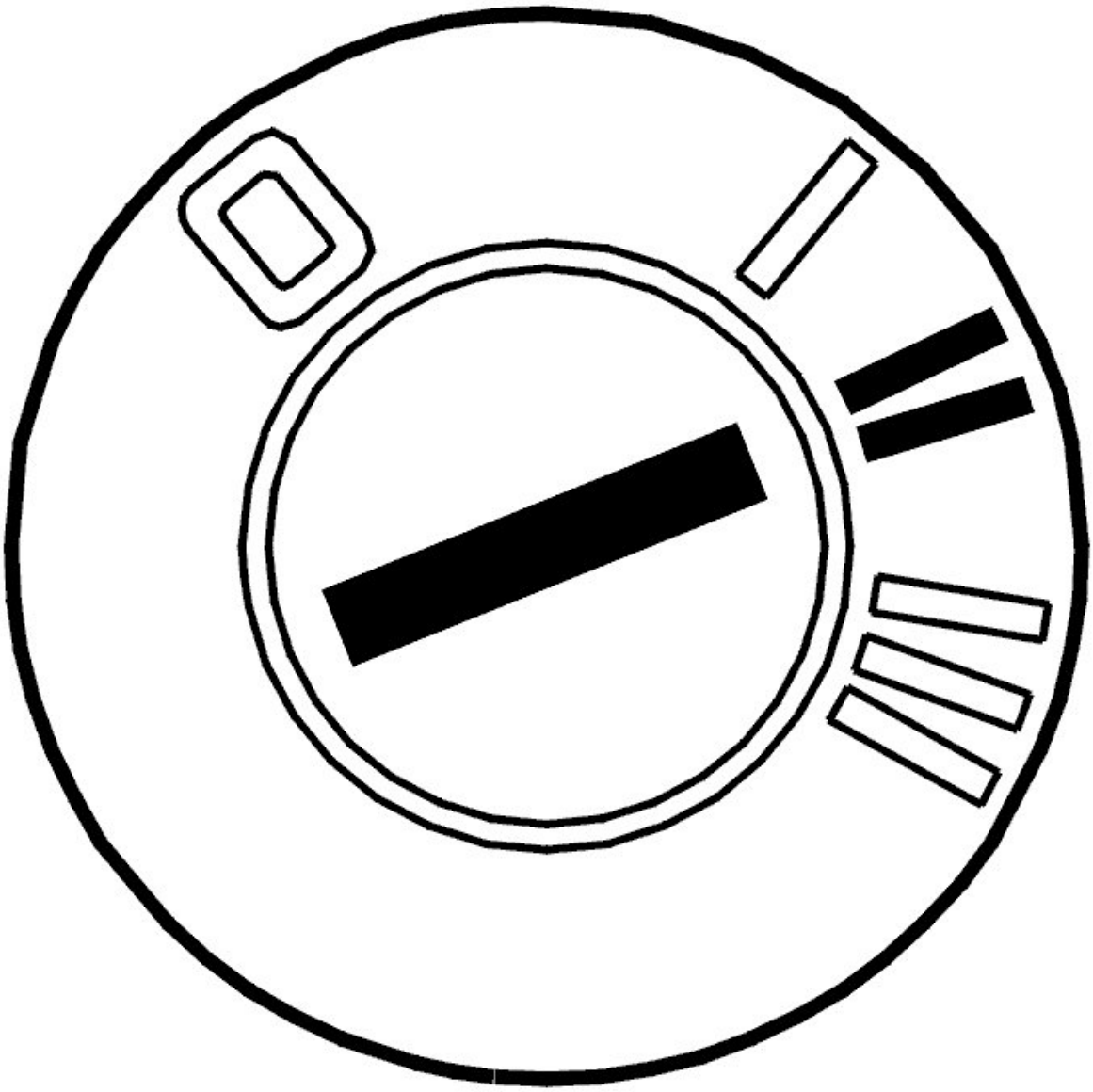
Yes - Verification

No - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.

Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

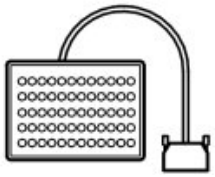
Attempt New Test - Checking communication

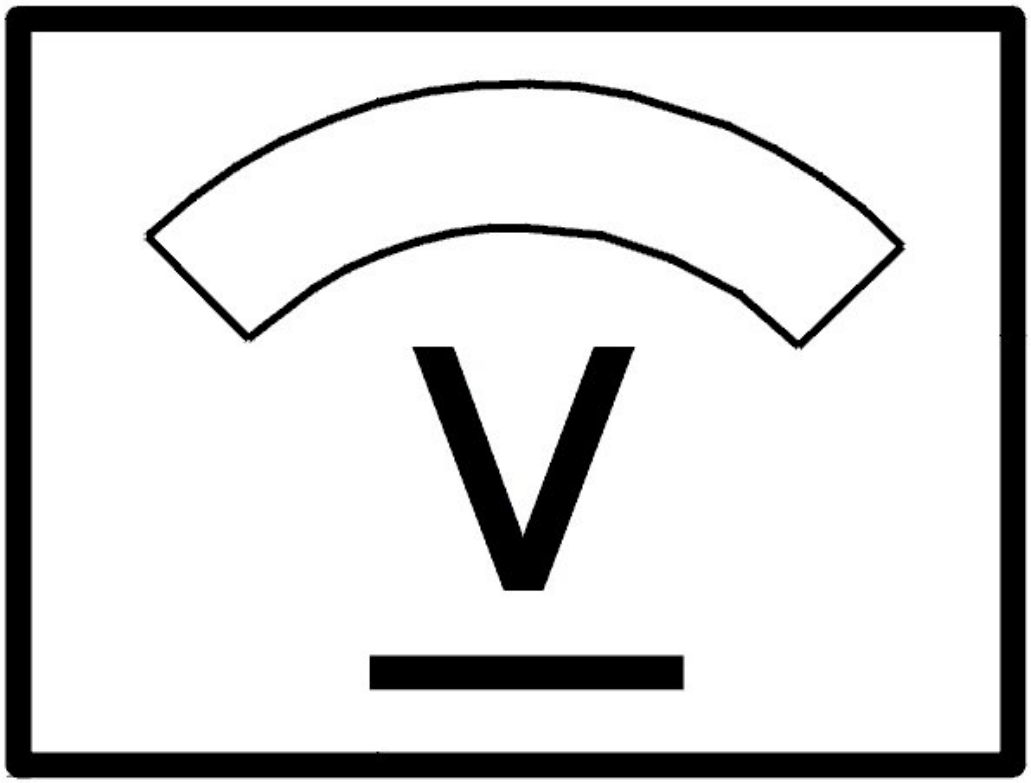
Intermittent fault

Check the communication cable between the gear selector control module terminal #2 and the transmission control module (TCM) terminal #B31 (#B21) for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking communication

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers that there is no signal from the gear selector control unit (GSM) diagnostic trouble code TCM-0094 will be set.

Substitute value
- None.

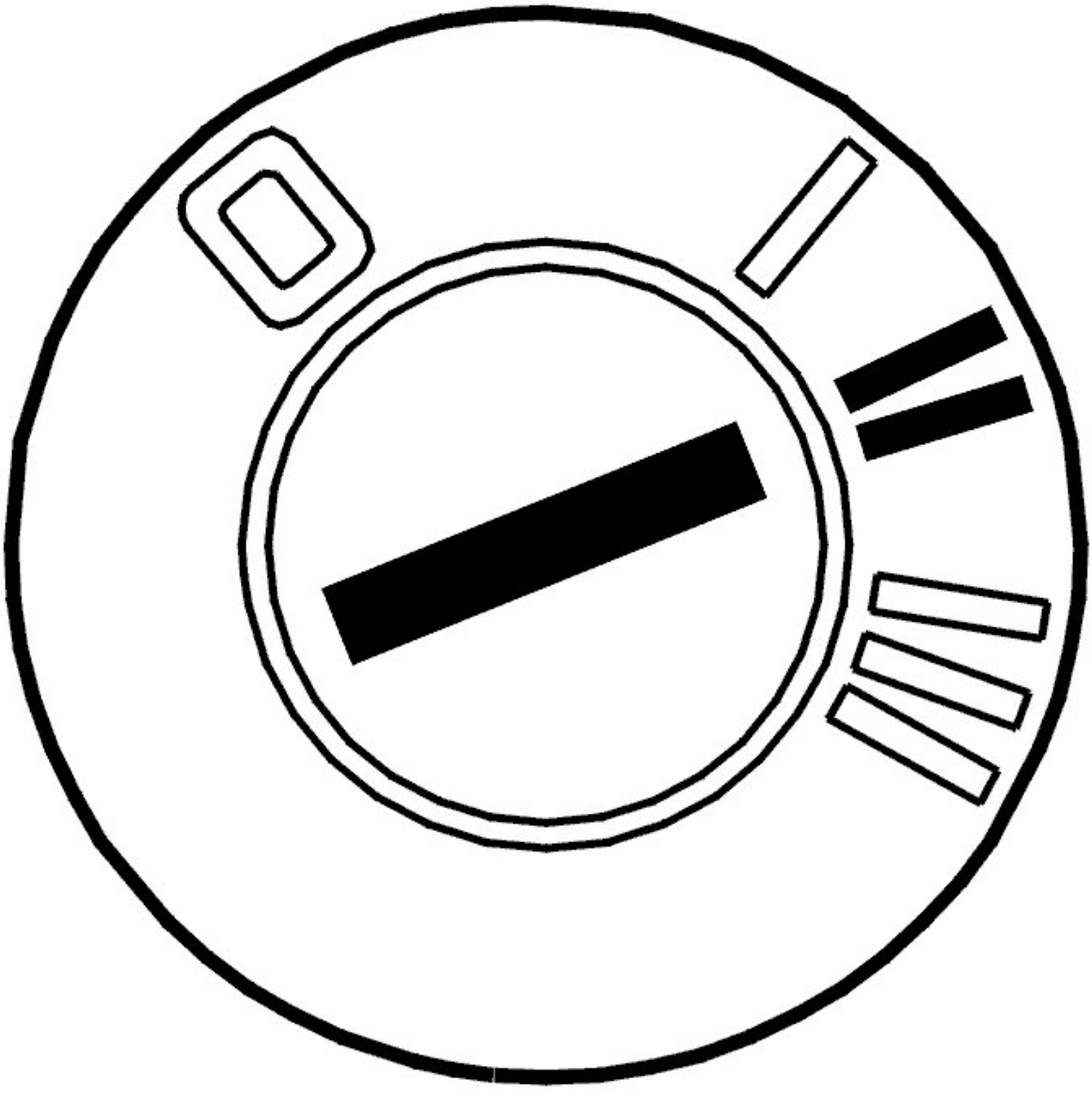
Possible source
- Contact resistance in the connectors.
- Open circuit in the communication wire.

Fault symptom[s]
- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

Signal Missing

Signal missing

Checking communication



- Ignition on.

Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the

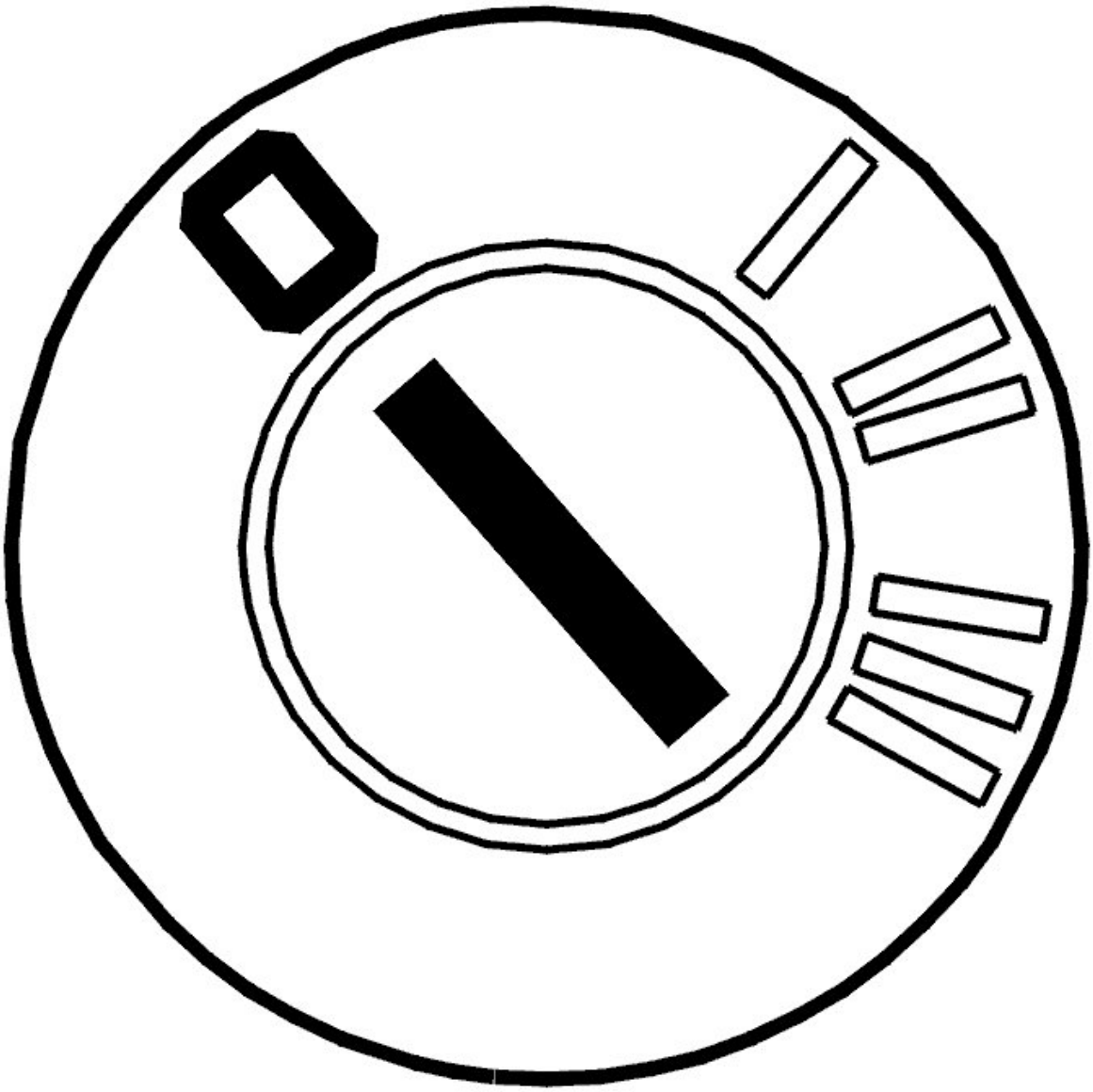
combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - Intermittent fault

No - Checking the wiring and component

Checking the wiring and component



- Ignition off.

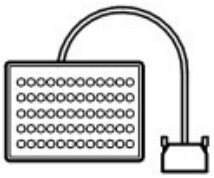
Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B31 (#B21) for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Replace the circuit board in the top panel if no fault is found in the cable.
Remedy as necessary.

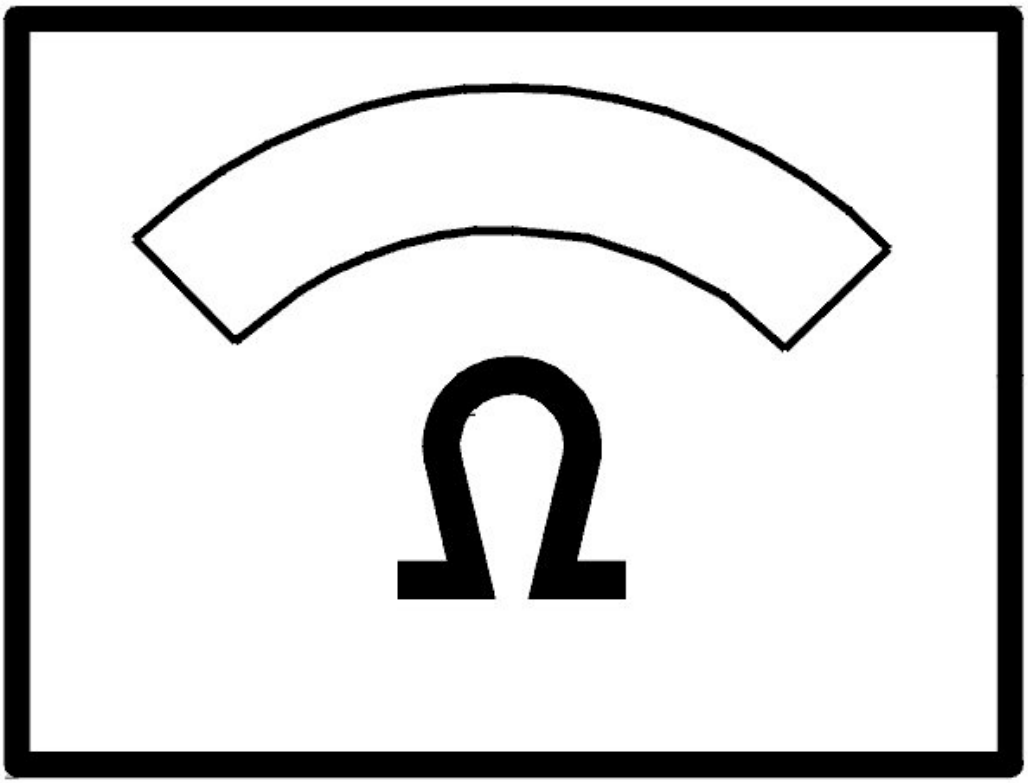
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the circuit board in the top panel (standard, V70), see Printed circuit board gear selector assembly/top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (standard, S60), see Printed circuit board gear selector assembly/top panel, replacing, B5254T2, AW55-50/51SN See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (geartronic, V70), see Printed circuit board gear selector assembly/top panel Geartronic, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear

Selector Assembly/Top Panel Geartronic, Replacing

- To replace the circuit board in the top panel (geartronic, S60), see Printed circuit board gear selector assembly/top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Was a fault detected?

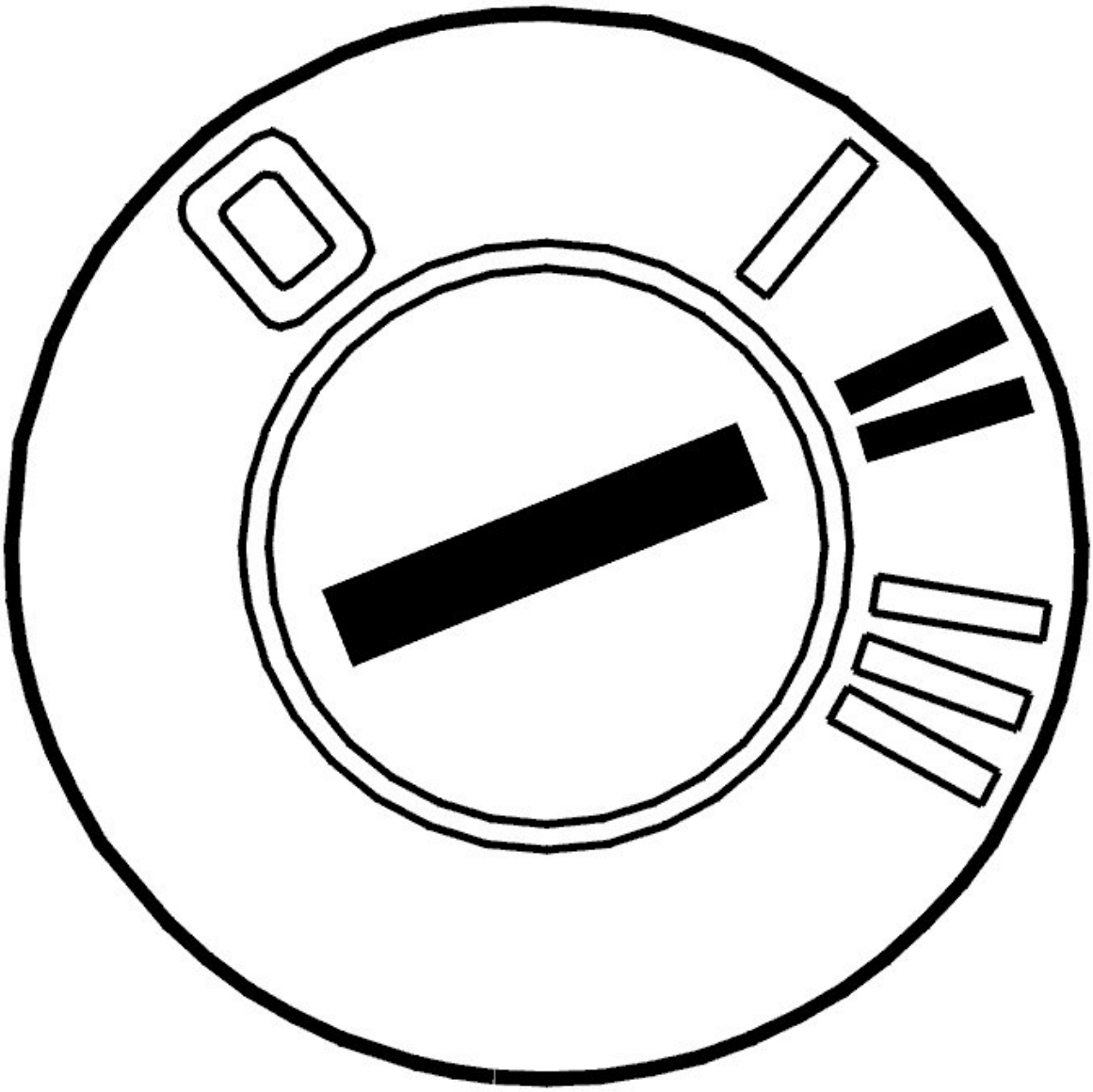
Yes - Verification

No - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.

Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking communication

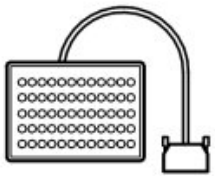
Intermittent fault

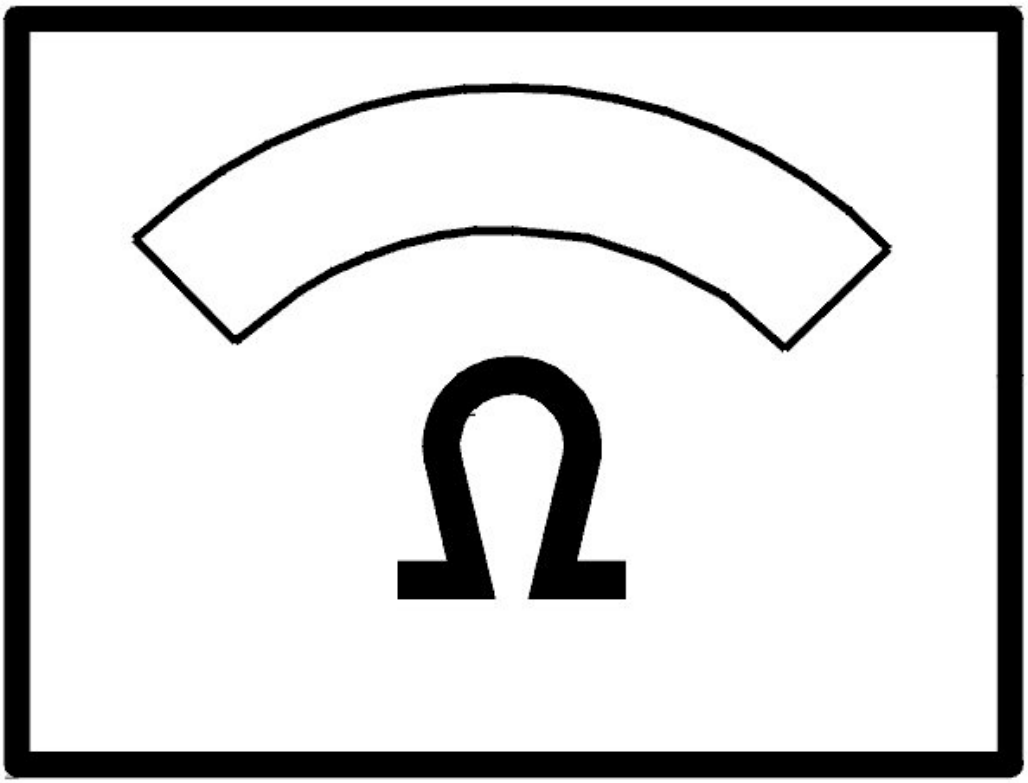
Hint: Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B31 (#B21). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking communication

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers that the signal from the gear selector control unit (GSM) is too low, diagnostic trouble code TCM-0095 is set.

Substitute value
- None.

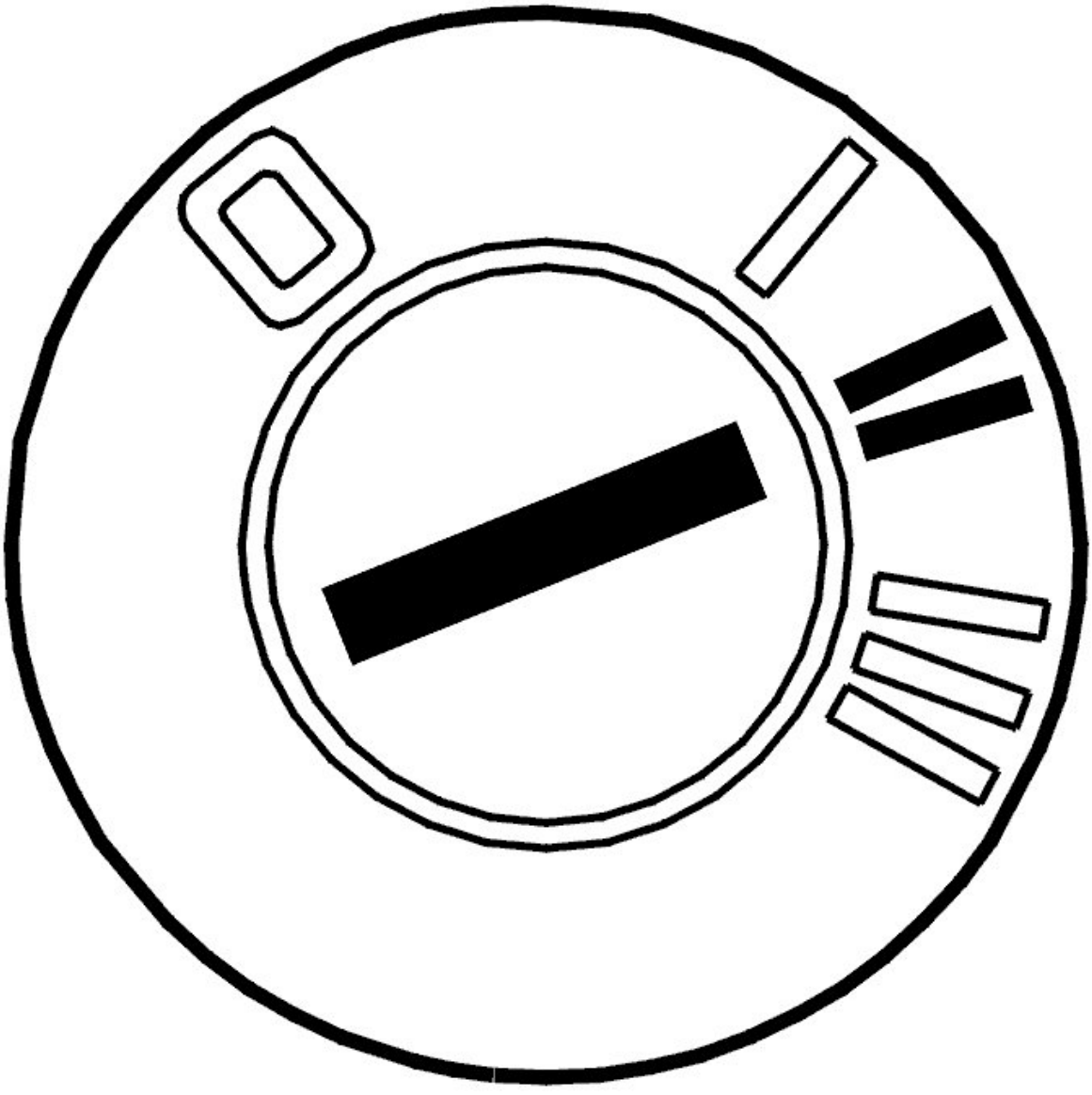
Possible source
- Contact resistance in the connectors.
- Communication wire short-circuited to ground.

Fault symptom[s]
- Malfunction indicator light (MIL) is on.
- General warning lamp on.
- Position indication on the gear selector panel not working.

Signal Too Low

Signal too low

Checking communication



- Ignition on.

Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the

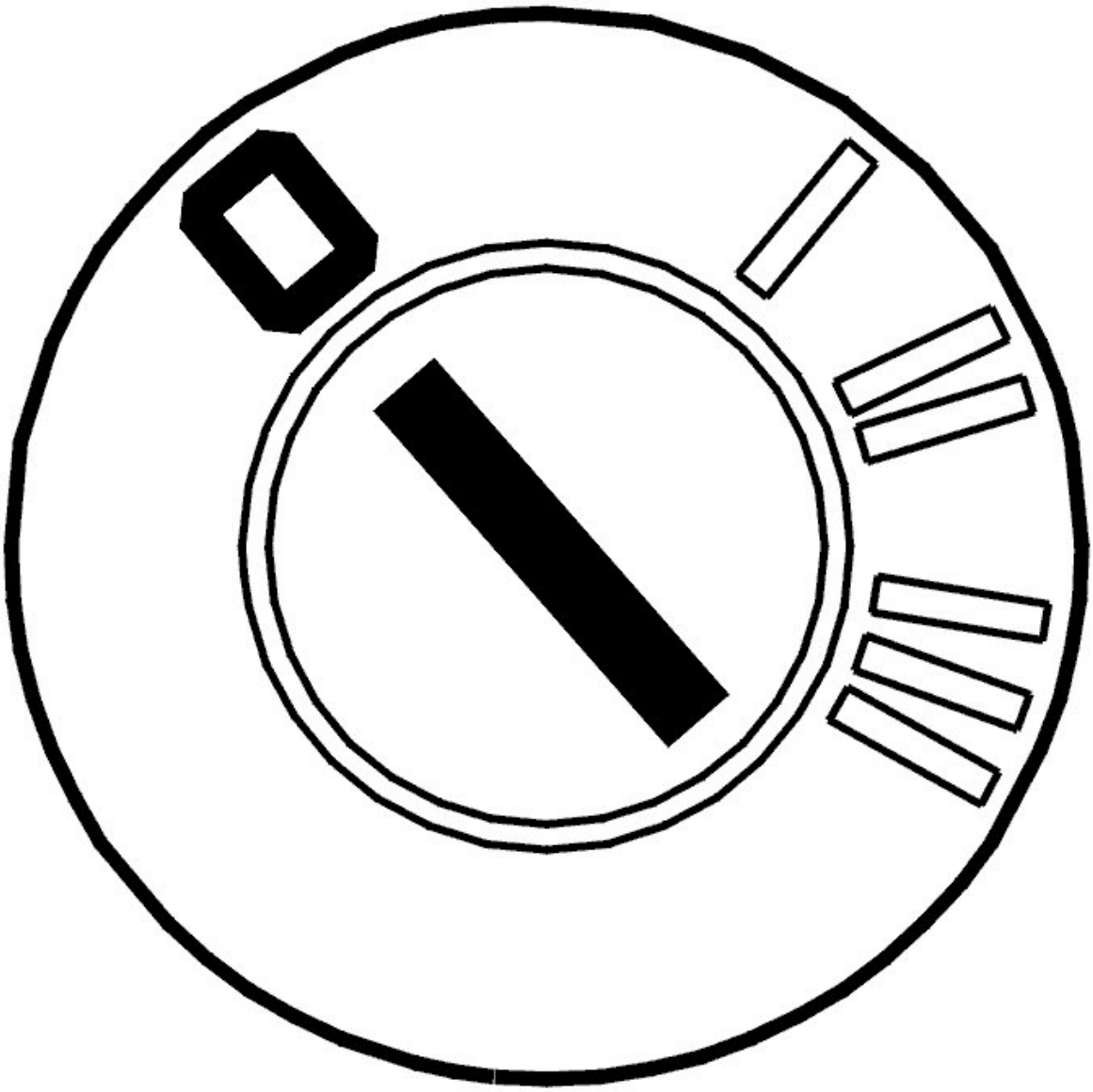
combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - Intermittent fault

No - Checking the wiring and component

Checking the wiring and component



- Ignition off.

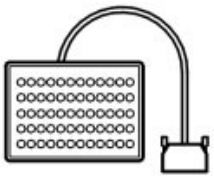
Check the communication cable between the gear selector control module terminal #2 and the transmission control module (TCM) terminal #B31 (#B21). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Replace the circuit board in the top panel if no fault is found in the cable.
Remedy as necessary.

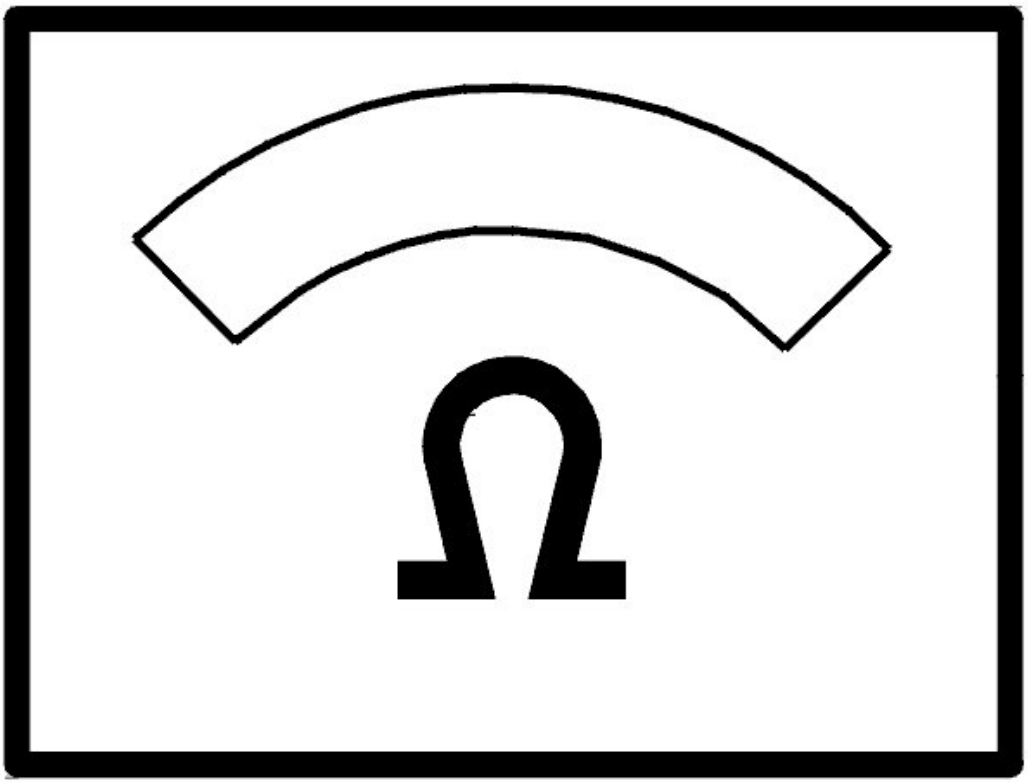
Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the circuit board in the top panel (standard, V70), see Printed circuit board gear selector assembly/top panel, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (standard, S60), see Printed circuit board gear selector assembly/top panel, replacing, B5254T2, AW55-50/51SN See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel, Replacing
- To replace the circuit board in the top panel (geartronic, V70), see Printed circuit board gear selector assembly/top panel Geartronic, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear

Selector Assembly/Top Panel Geartronic, Replacing

- To replace the circuit board in the top panel (geartronic, S60), see Printed circuit board gear selector assembly/top panel Geartronic, replacing, B5254T2, AW55-50/51SN See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel Geartronic, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Was a fault detected?

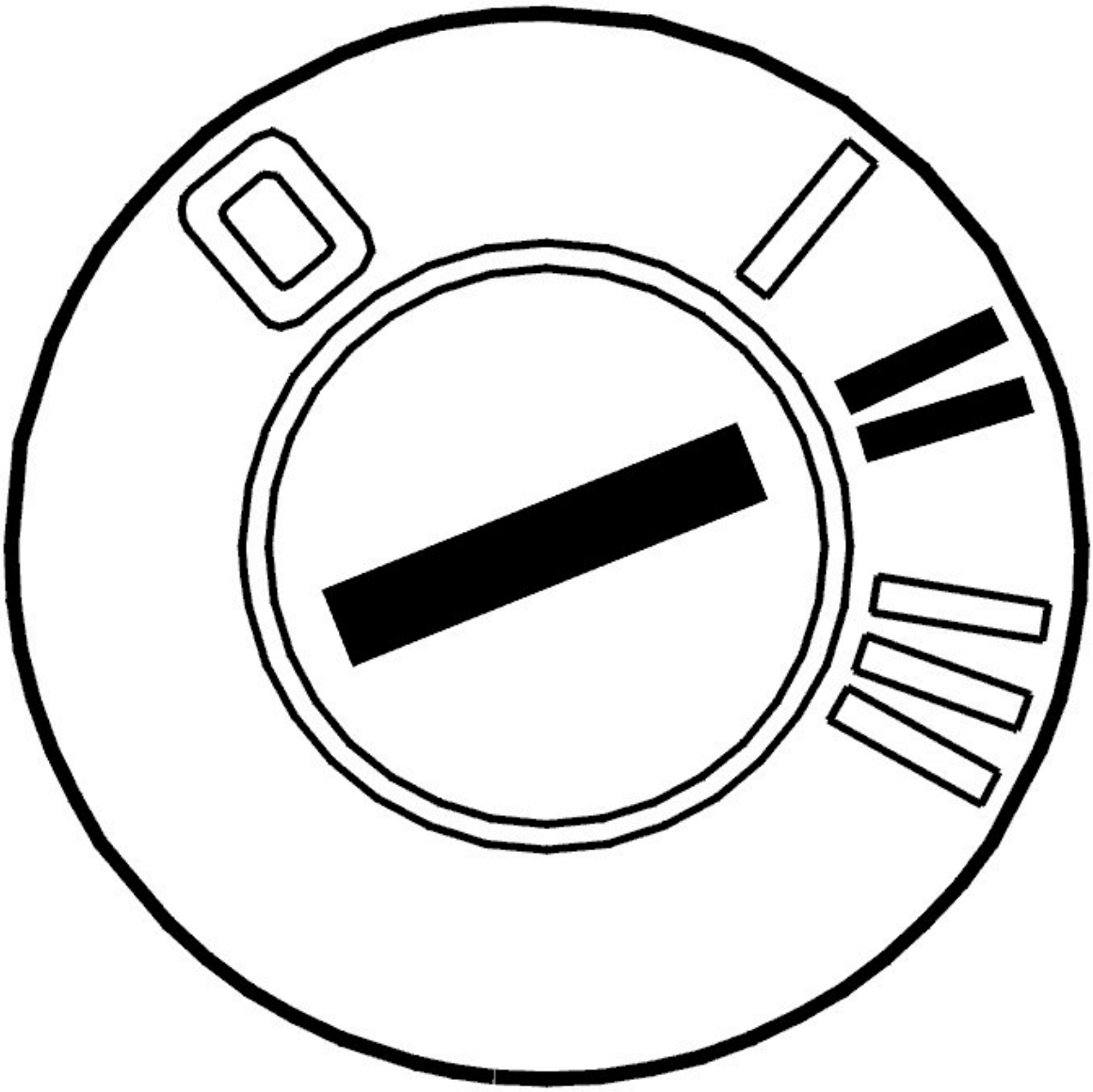
Yes - Verification

No - No Fault Found

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.

Depress the brake pedal and move the gear shift selector to different positions. Check that the gear position is updated in the display in the combined instrument panel and on the panel on the gear selector assembly.

Is the gear position updated?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

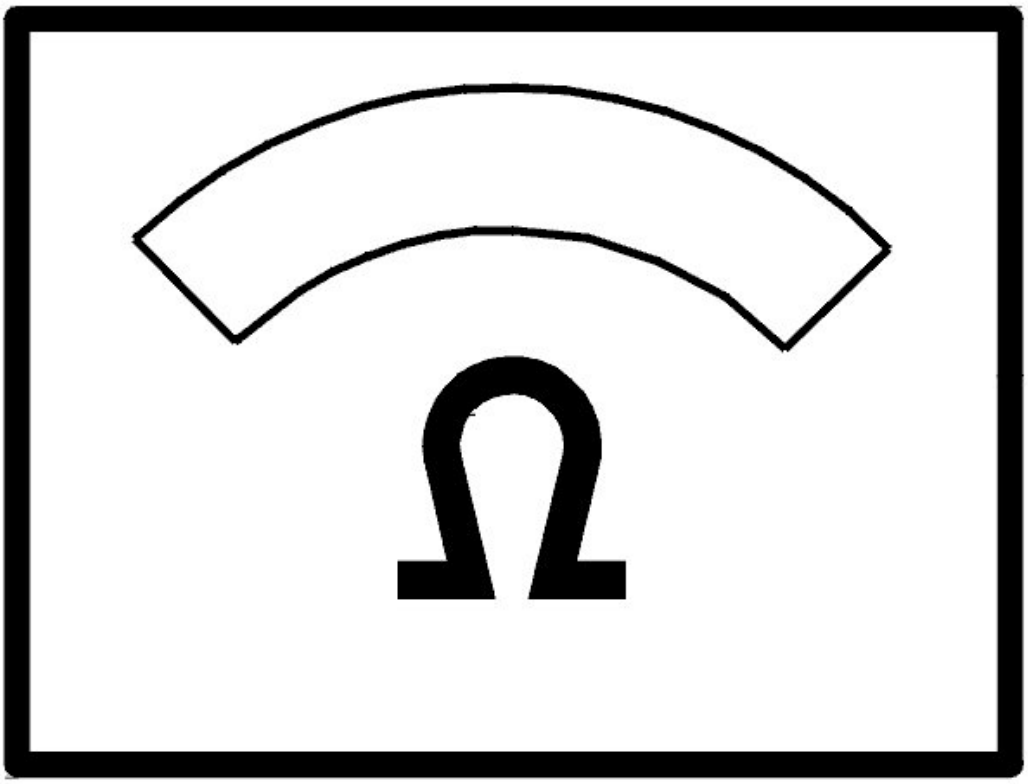
Attempt New Test - Checking communication

Intermittent fault

Check the communication cable between gear selector control module terminal #2 and transmission control module (TCM) terminal #B31 (#B21). Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For other values, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking communication

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) TCM-0096 is stored if the gear selector module registers that signals from the gear selector position Quickshift do not agree.

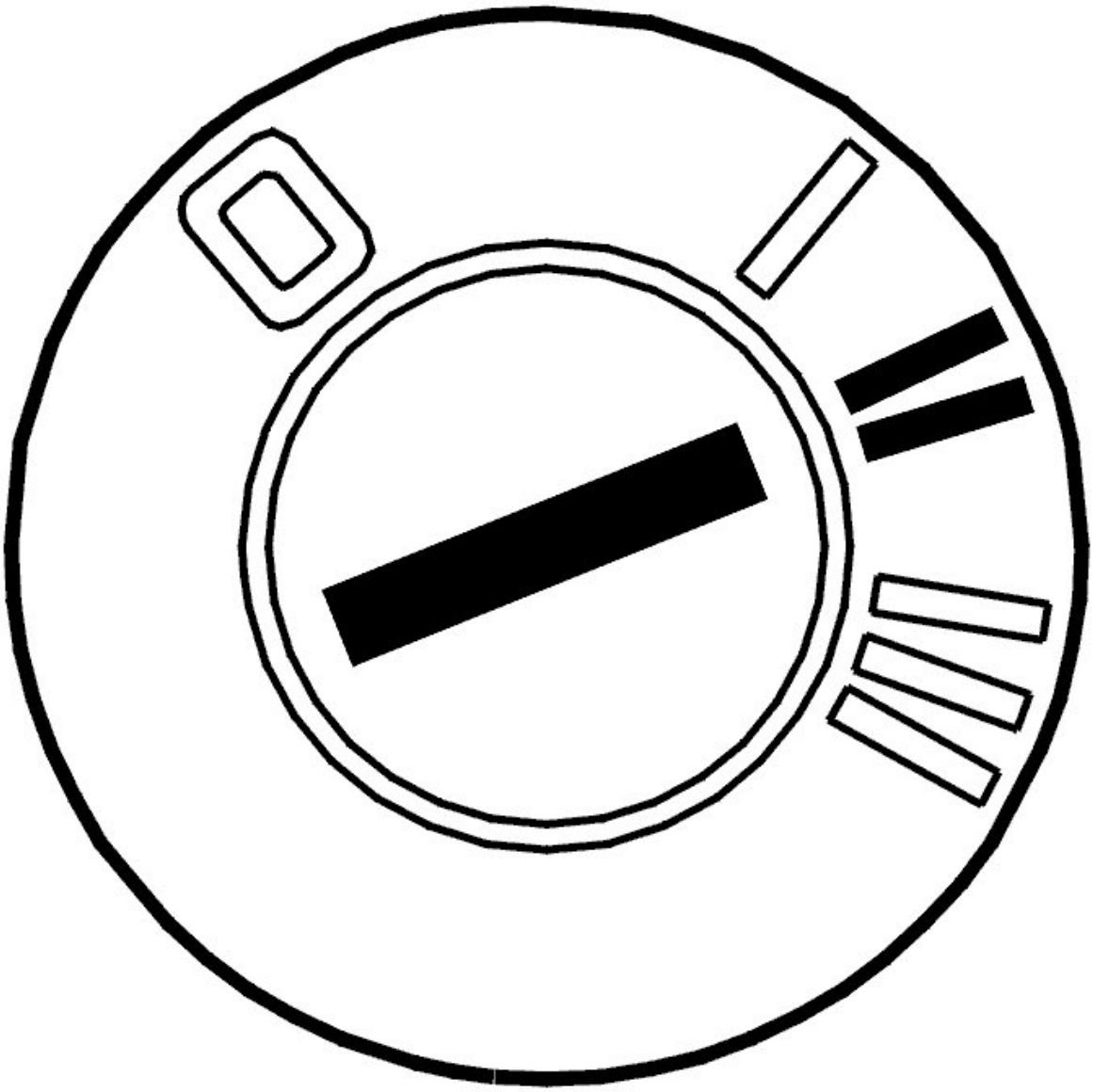
Possible source
- Defective gear selector control module.

Fault symptom[s]
- No shifting.

Faulty Signal

Faulty signal

Checking the position sensor



- Ignition on
- Depress the brake pedal. Move the gear selector to "Quickshift" position
- Move the gear selector to + and check that the gear selection is updated in the display on the combined instrument panel. Move the gear selector to -. Check that the gear selection is updated.

Was the function OK?

Yes - No Fault Found

No - Checking the wiring and component

Checking the wiring and component

Try a new gear shift selector control module.

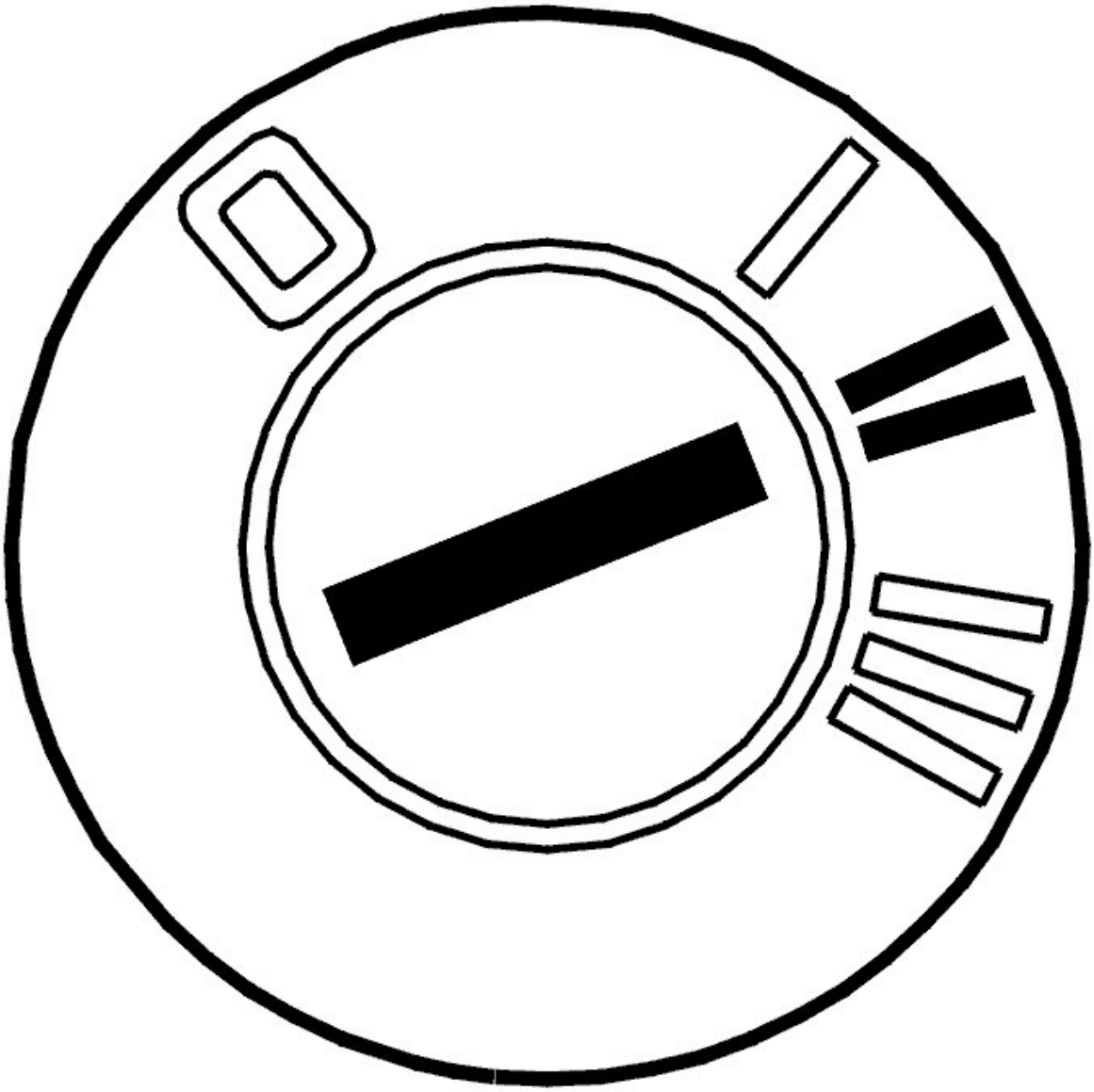
Other information

- To access or replace the gear shift selector control module, see Printed circuit board gear selector assembly/top panel Geartronic, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Shifter A/T/Service and Repair/Printed Circuit Board Gear Selector Assembly/Top Panel Geartronic, Replacing.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Depress the brake pedal. Move the gear selector to "Quickshift" position
- Move the gear selector to + and check that the gear selection is updated in the display on the combined instrument panel. Move the gear selector to -. Check that the gear selection is updated.

Was the function OK?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the position sensor

TCM-0097

Faulty software

Ordering software and programming the control module

The software in the control module requires updating with new software.
Order applicable software.

S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289

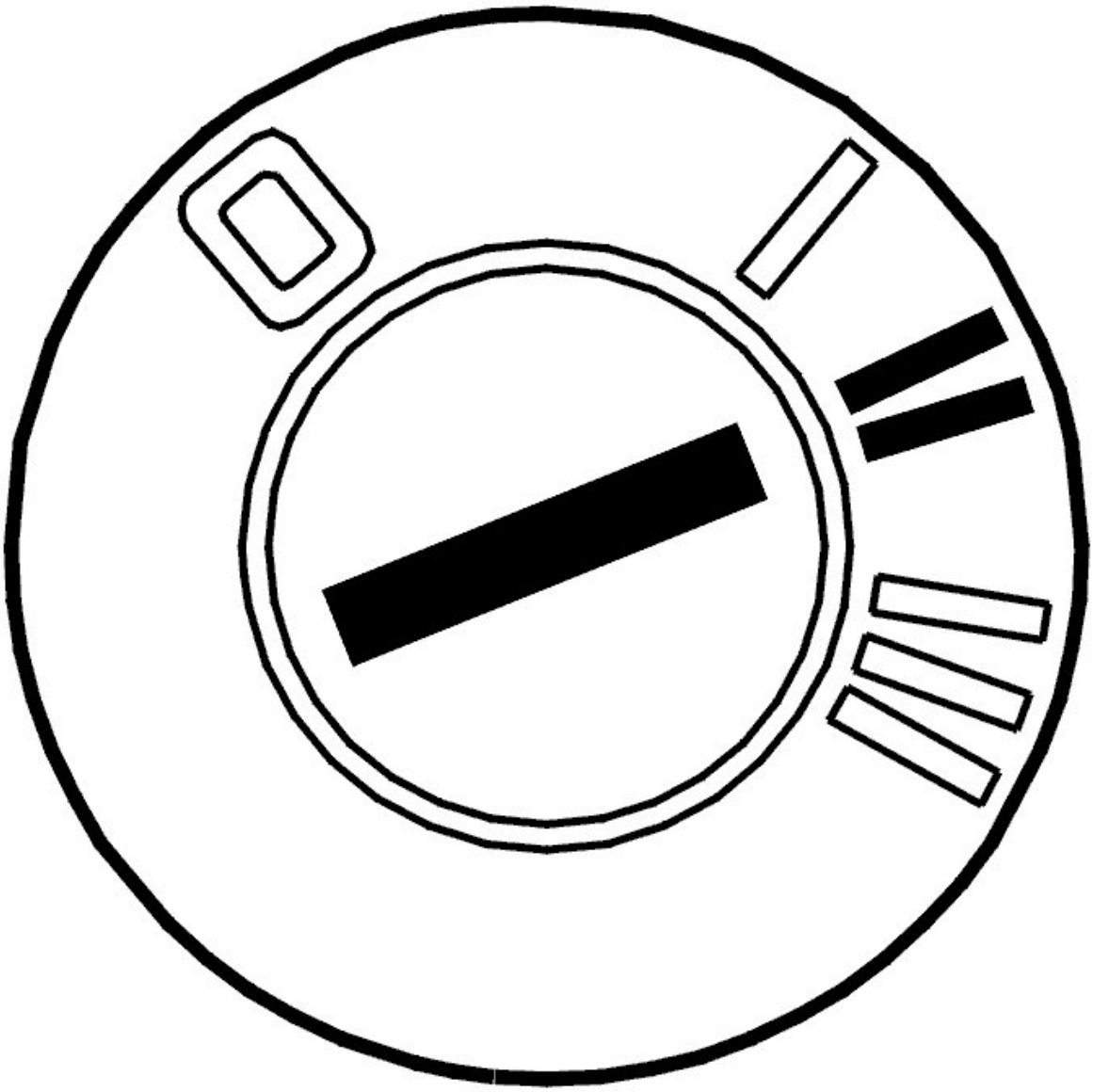
Programming can be carried out when the software has been delivered.
Program the control module according to the table below.

S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289

Continue - Test driving and reading off diagnostic trouble codes (DTCs)

Test driving and reading off diagnostic trouble codes (DTCs)

Hint: To check that the fault is remedied, test drive the car and then read off the diagnostic trouble codes (DTCs).

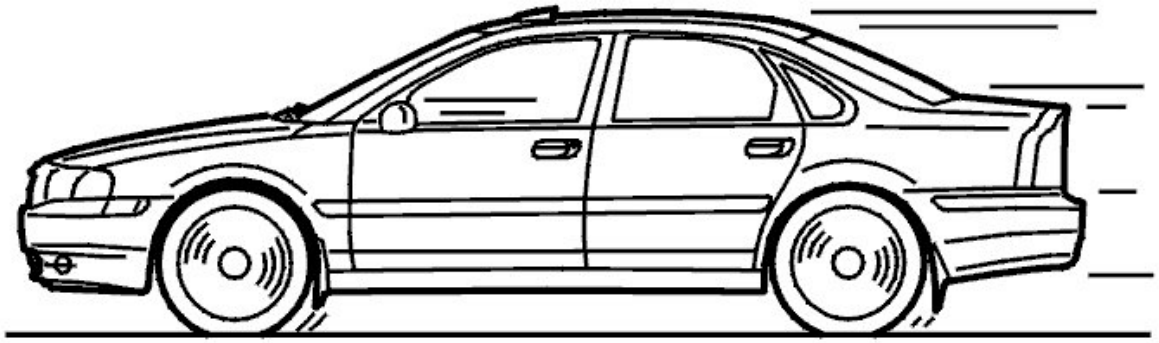


- Ignition on
- Read off diagnostic trouble codes (DTCs).

Other information

- For the test driving schedule, see Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

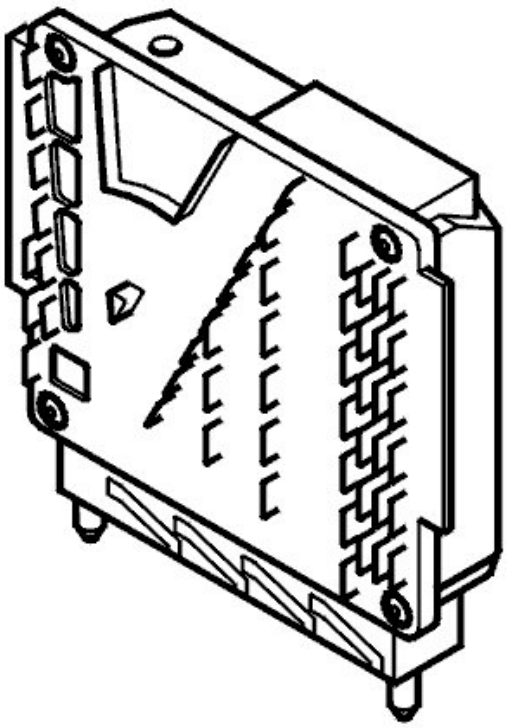


Does diagnostic trouble code (DTC) TCM-0097 or TCM-0098 recur?

Yes - Replacing the transmission control module (TCM)

No - Fault Found

Replacing the transmission control module (TCM)



Replace the transmission control module (TCM). See Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

Continue - DONE

TCM-0098

Faulty software

Ordering software and programming the control module

The software in the control module requires updating with new software.
Order applicable software.

S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289

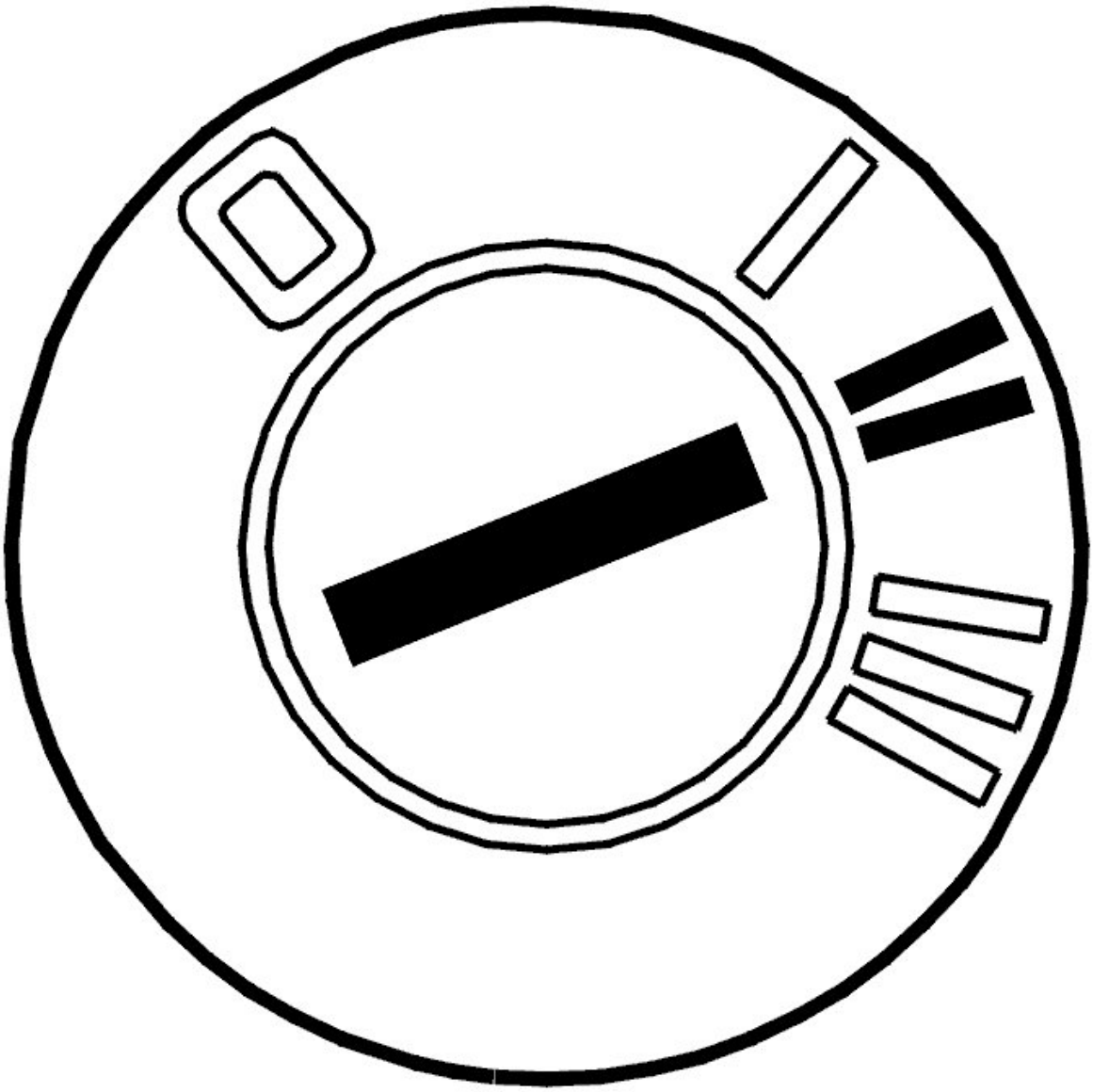
Programming can be carried out when the software has been delivered.
Program the control module according to the table below.

S60	8645432
V70 2000-, V70 XC 2001-/XC70	9494721
S80	9438291
XC90	8691289

Continue - Test driving and reading off diagnostic trouble codes (DTCs)

Test driving and reading off diagnostic trouble codes (DTCs)

Hint: To check that the fault is remedied, test drive the car and then read off the diagnostic trouble codes (DTCs).

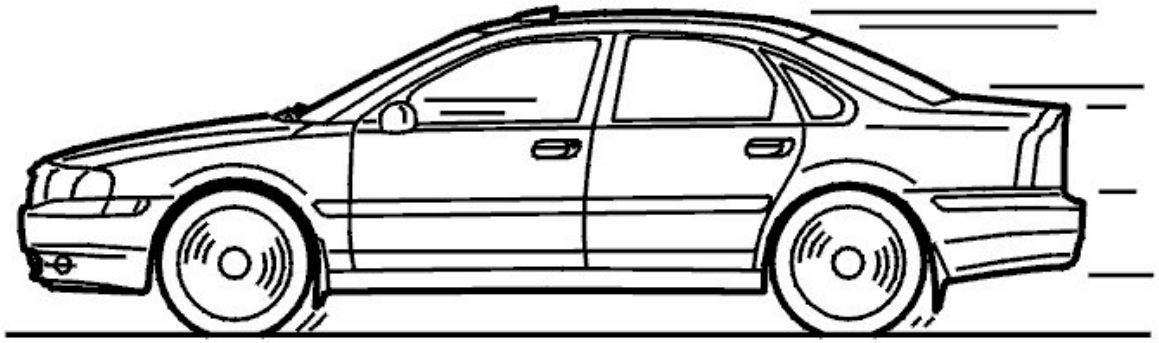


- Ignition on
- Read off diagnostic trouble codes (DTCs).

Other information

- For the test driving schedule, see Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

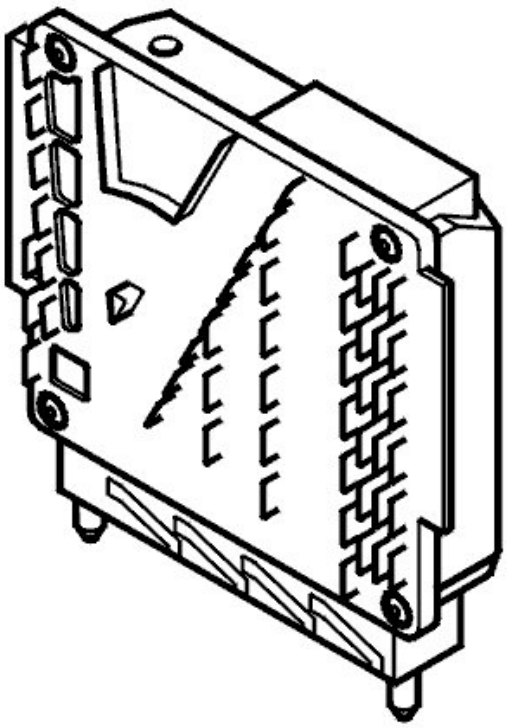


Does diagnostic trouble code (DTC) TCM-0097 or TCM-0098 recur?

Yes - Replacing the transmission control module (TCM)

No - Fault Found

Replacing the transmission control module (TCM)



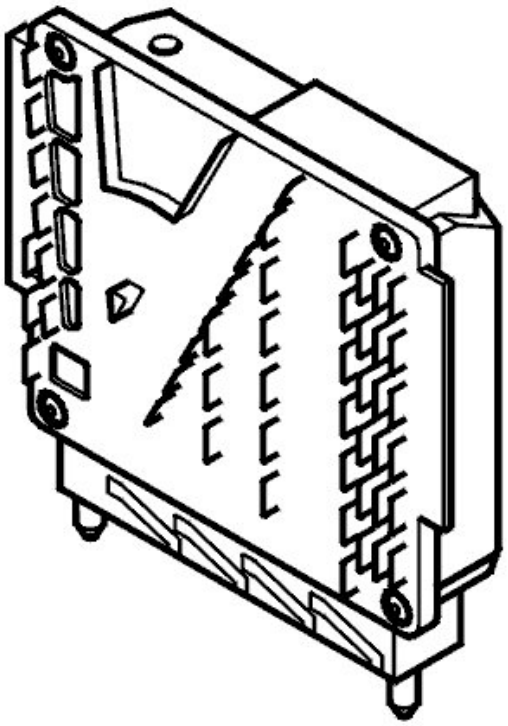
Replace the transmission control module (TCM). See Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) TCM-0099 is stored if the transmission control module (TCM) registers that the storage of data to the control module EEPROM memory is not correctly completed.

Substitute value
- None.

Possible source
- Faulty software in the control module
- Defective EEPROM memory.

Fault symptom[s]
- None.

Internal Fault

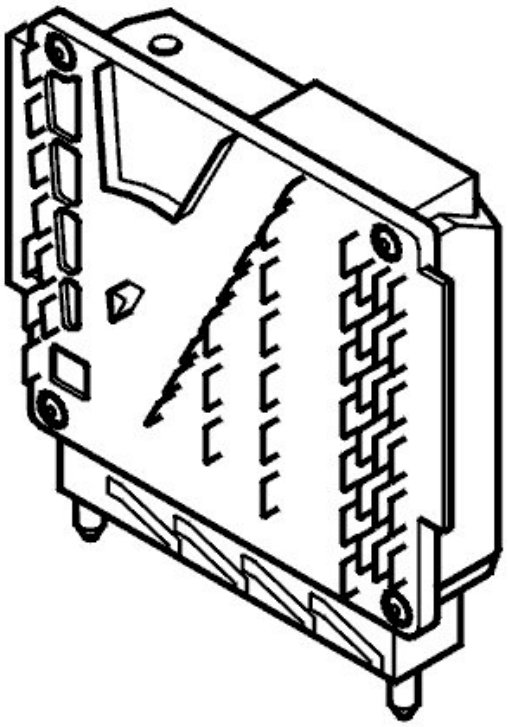
Internal fault

Replacing the control module and programming

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) TCM-009A is stored if the control module registers that the power supply is too low in comparison with the supply to the central electronic module (CEM).

Substitute value
- None.

Possible source
- Contact resistance or oxidation in the control module or transmission connectors.

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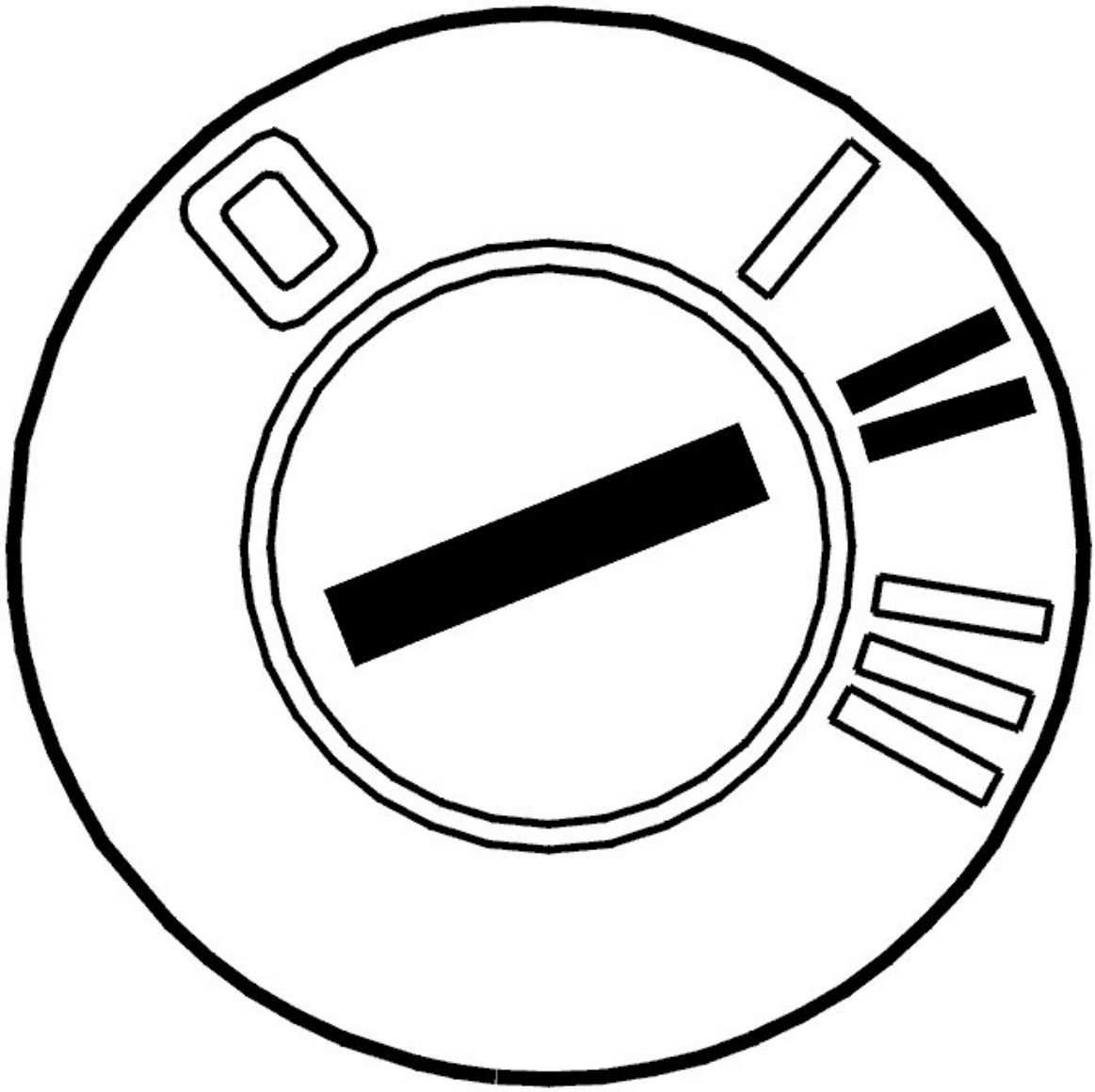
Fault symptom[s]

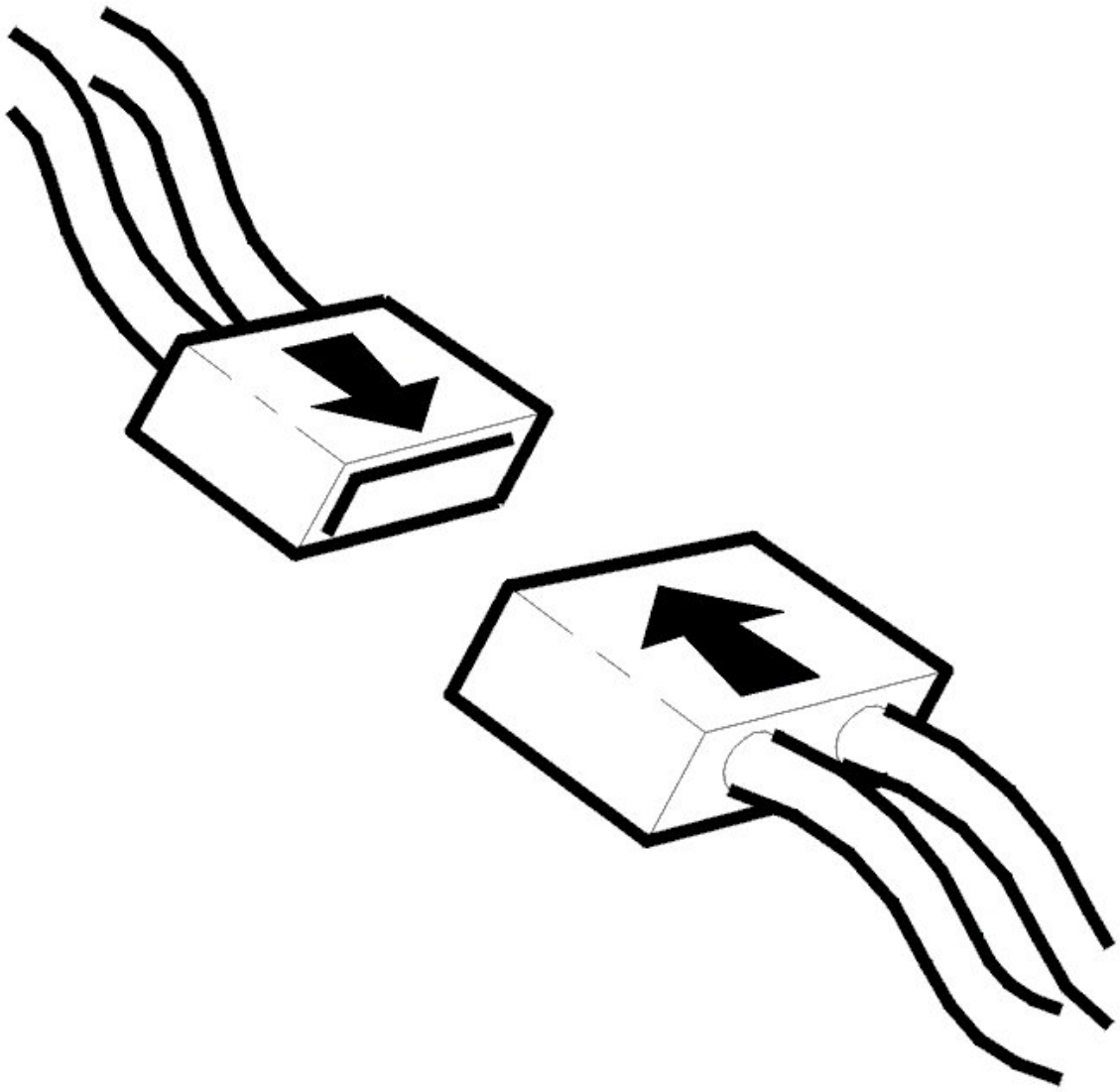
- General orange warning lamp lit.

Signal Too Low

Signal too low

Checking the battery voltage





- Ignition on
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

The voltage must be battery voltage for both the control modules.

Other information:

- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

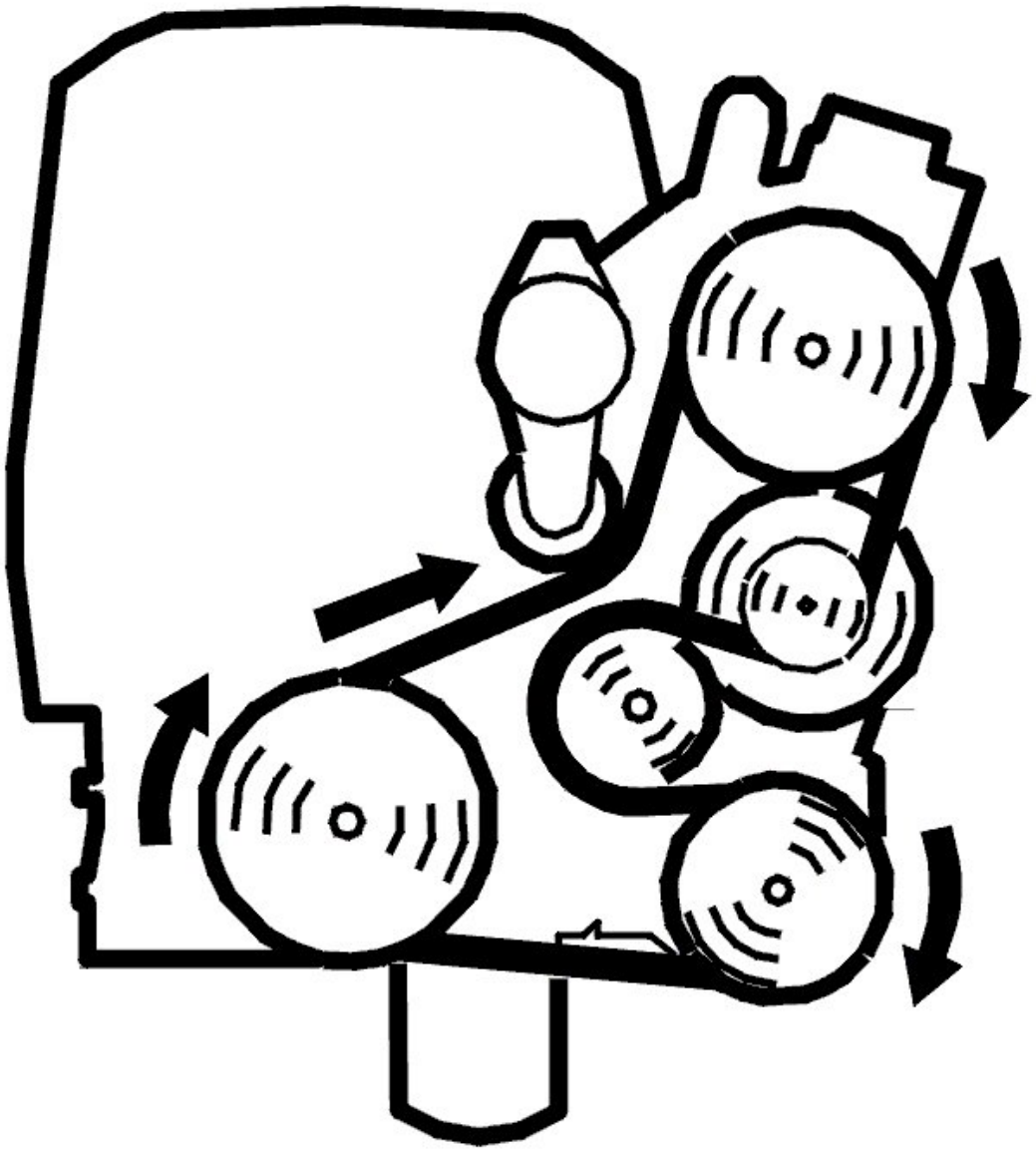
Select an option:

1. Voltage too low for both control modules
2. Voltage too low for the transmission control module (TCM).

1 - Checking the battery voltage

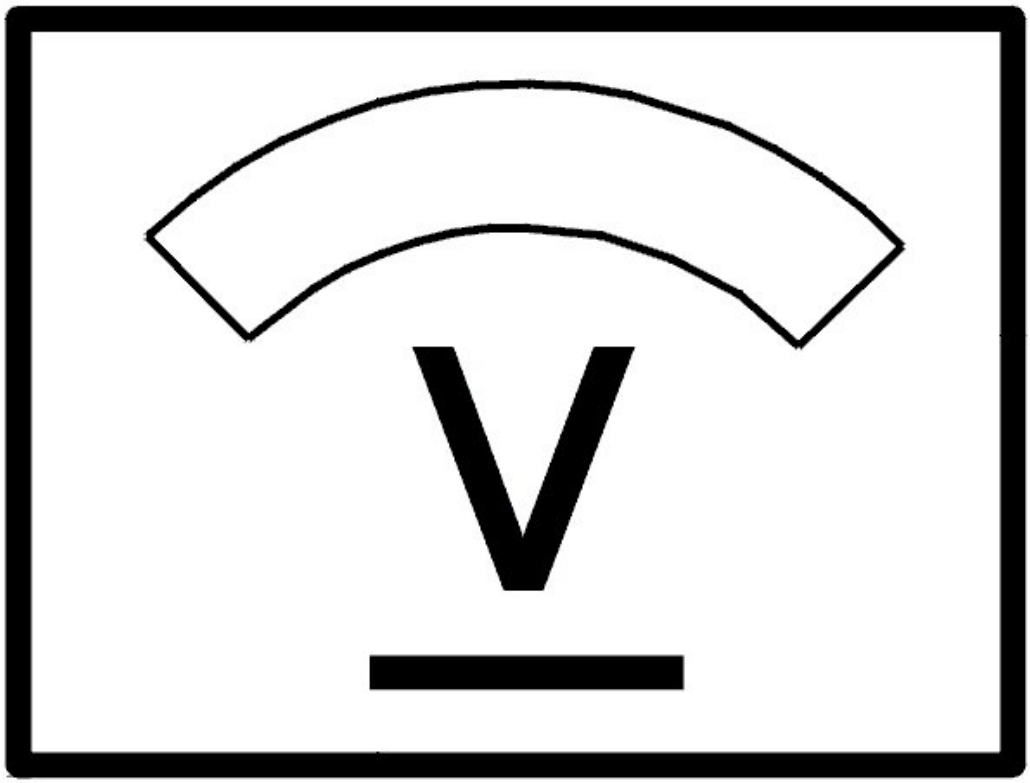
2 - Checking the power supply

Checking the battery voltage



- Start the engine and let it run at idle speed
- Connect a voltmeter between the battery positive and negative terminals.

The voltmeter should read 12-15 V. If the voltage is lower, check the charging system for low charge voltage.



Was a fault detected?

Yes - Verification

No - Checking the battery terminals

Checking the battery terminals

Check the battery positive and negative terminals and the front terminals in the engine compartment. Check for contact resistance and oxidation. Remedy as necessary.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should be diagnosed and remedied. Since this is not the case the fault-tracing process has failed.
Complete the fault-tracing for those fault or try again.

Do you want to terminate fault-tracing at this time?

Yes - FAULT-TRACING FAILED

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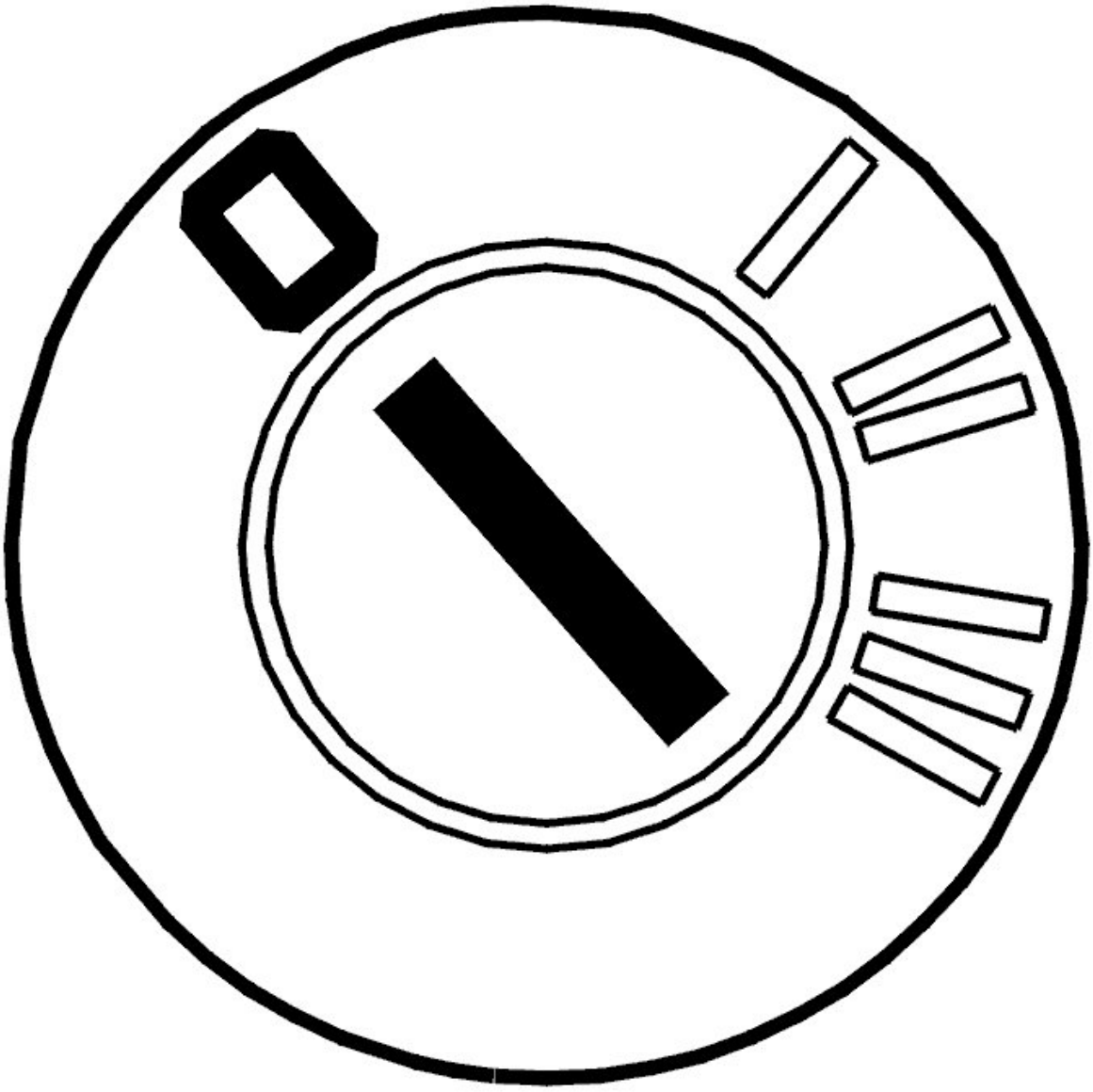
No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the battery voltage

Checking the power supply



- Ignition off.

Check the transmission control module (TCM) connector and the relay for extended X supply 2/101 (located in the central electronic module (CEM)). Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Check the power supply cable between fuse 20 in the integrated relay / fusebox in the engine compartment and the relay for extended X supply 2/101 (terminal #3 on the central electronic module CEM). Check the power supply cable between relay terminal #1 and transmission control module (TCM) terminal #A35 (#A35). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. For information about the cable routing, see the relevant Wiring Diagram.

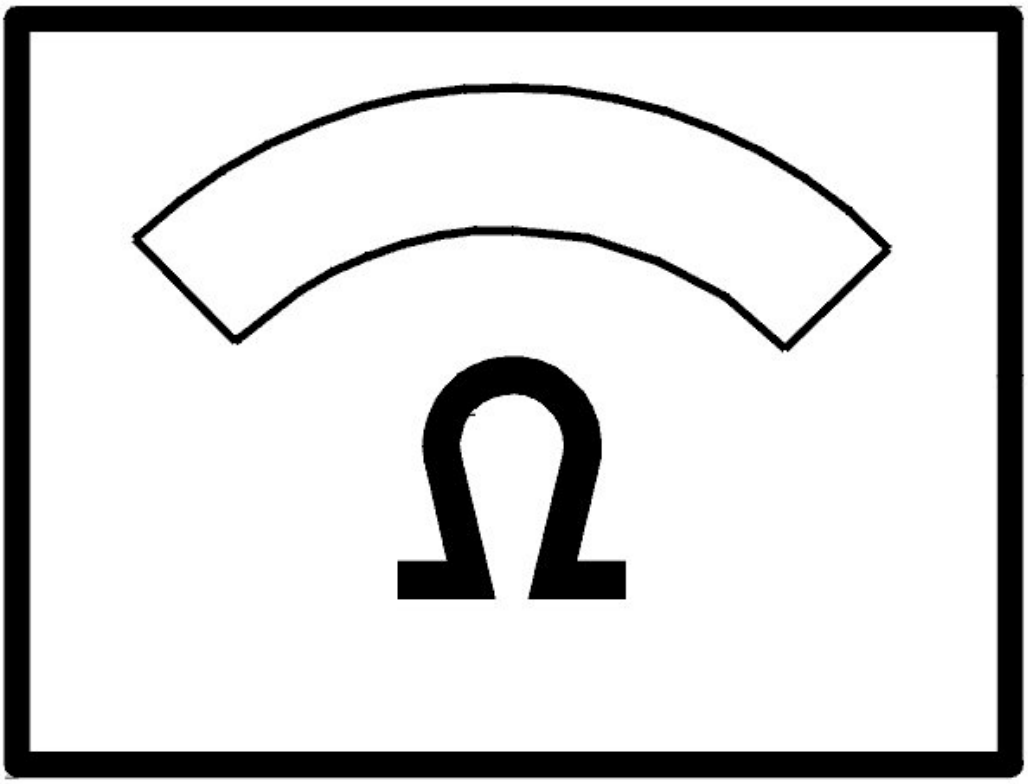
Hint: With the ignition on and voltmeter connected between transmission control module (TCM) terminals #A35 (#A35) and #A53 (#A53) the voltmeter should read battery voltage.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2,

AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair

- To disconnect relay 2/101 for extended X-supply, see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

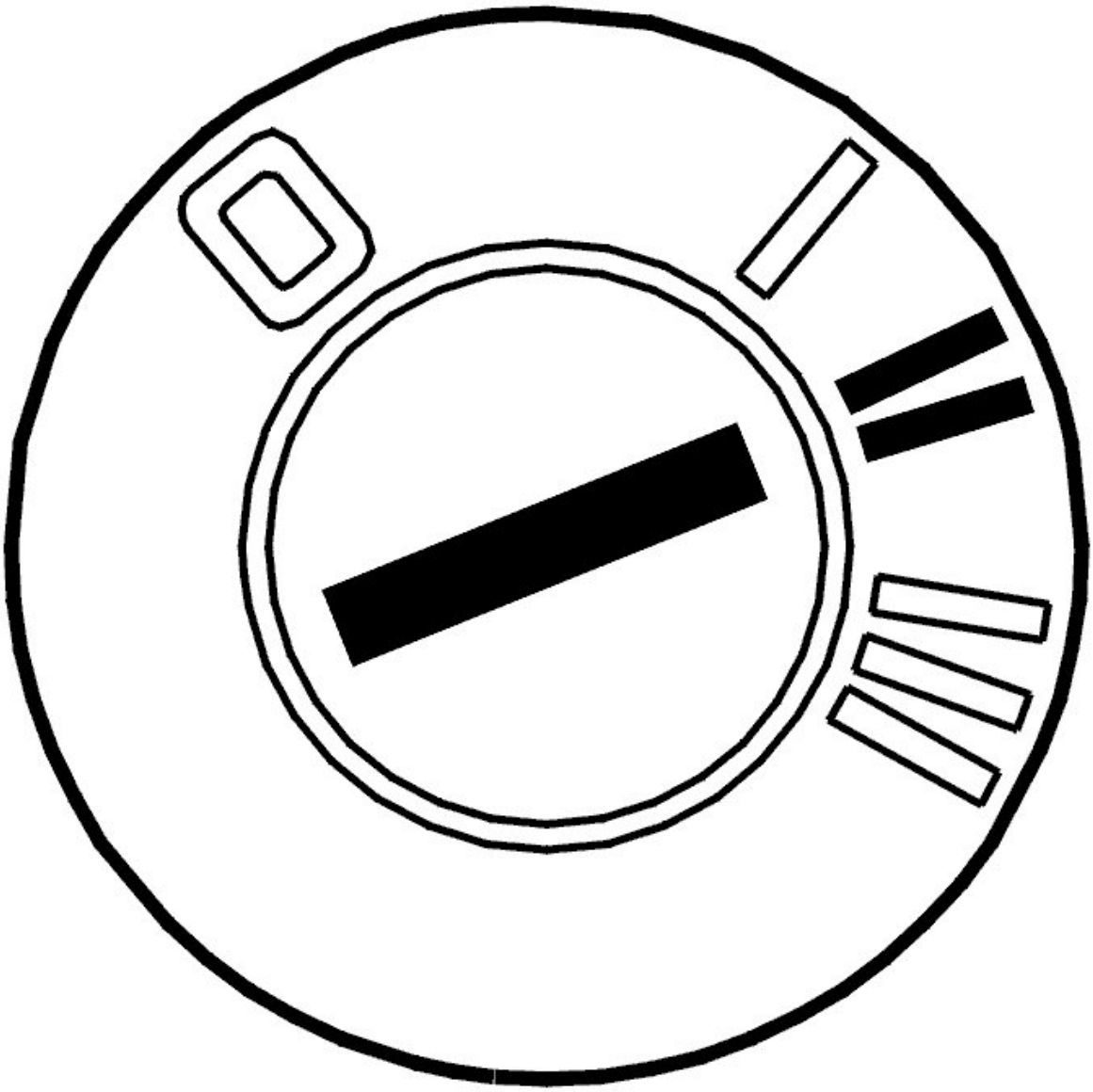


Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Read off the voltage for the transmission control module (TCM) and the central electronic module (CEM).

The voltage must be battery voltage for both the control modules.

Was the voltage OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the battery voltage

Diagnostic trouble code (DTC) information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

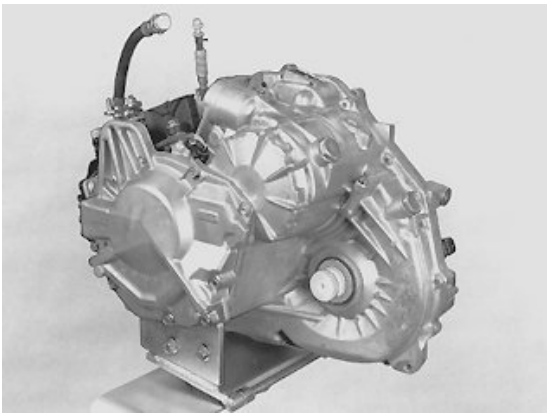
Attempt New Test - Checking the battery voltage

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Diagnostic trouble code (DTC) TCM-0100 is stored if the transmission control module (TCM) registers that the quality of gearshifts in the transmission is too low.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

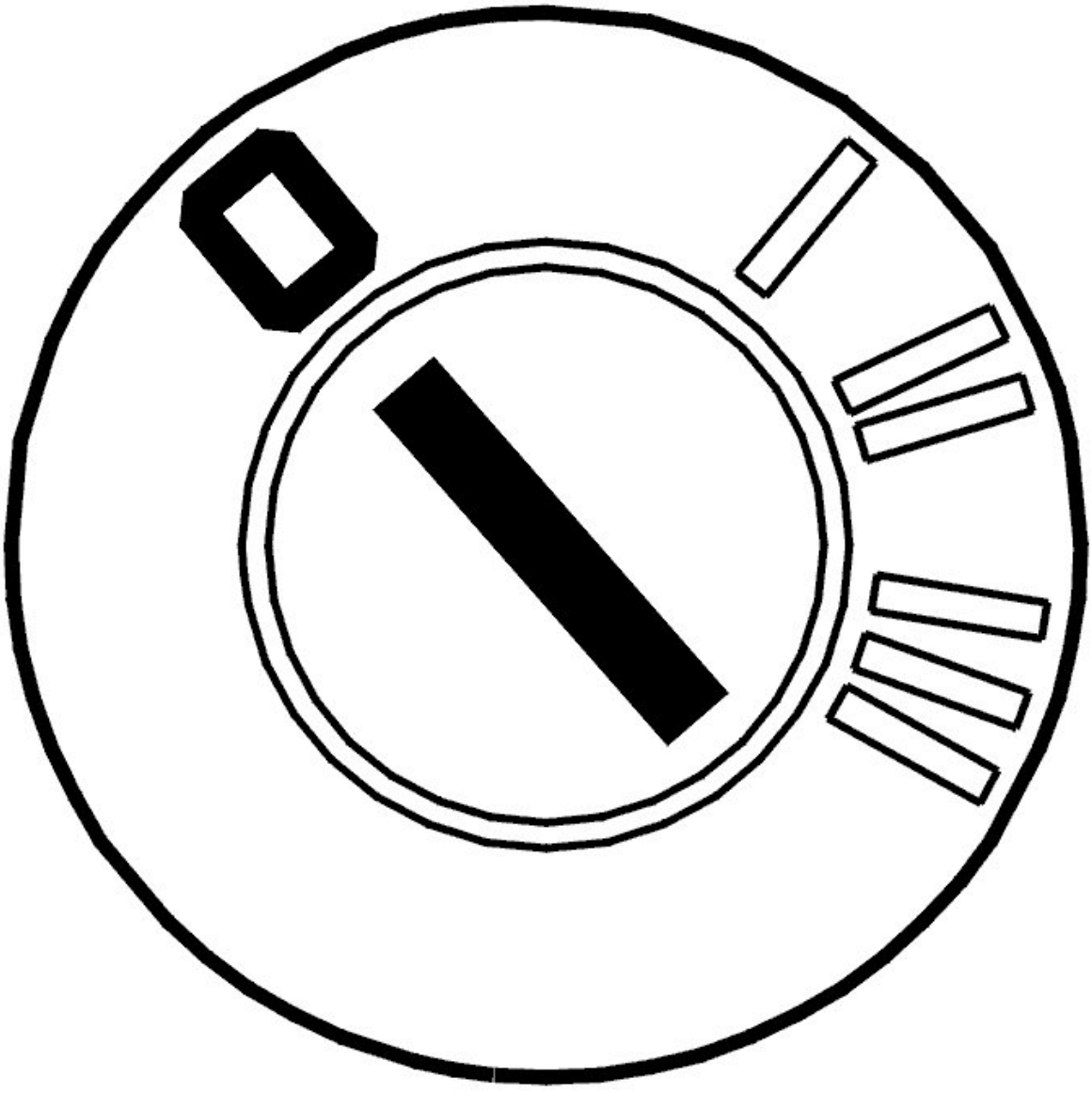
Fault symptom[s]
- General orange warning lamp lit.

Poor Gear Shifting Quality

Poor gear shifting quality

Checking diagnostic trouble codes (DTCs)

Hint: Remedy any other diagnostic trouble codes (DTCs) stored for the transmission control module (TCM) first. One of these faults could have caused diagnostic trouble code (DTC) TCM-0100.



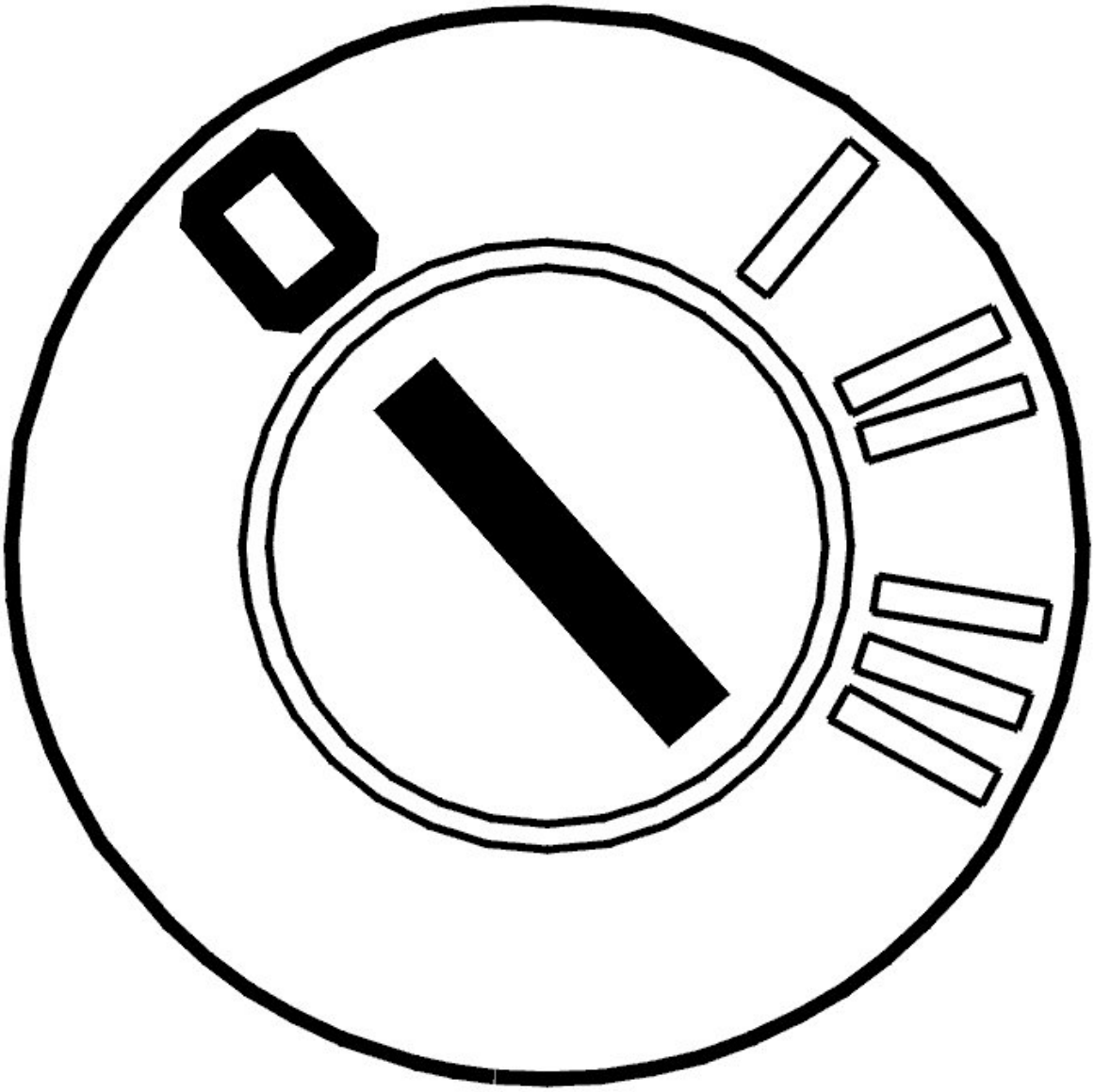
- Ignition on
- Read off diagnostic trouble codes (DTCs).

Are other diagnostic trouble codes (DTCs) stored?

Yes - DONE

No - Checking for contact resistance and oxidation

Checking for contact resistance and oxidation



- Ignition off
- Check the transmission connectors and transmission control module (TCM) connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.

Check for any clearly audible noises from the transmission. Check for malfunctions.

Other information

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To access the control module connector, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

Is the transmission operating correctly?

Yes - Fault Found

No - Replacing the control system

Replacing the control system

Fault-tracing indicates an internal fault in the transmission.
Replace the control system. See Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing.

Continue - Resetting the adaptation and oil quality counter

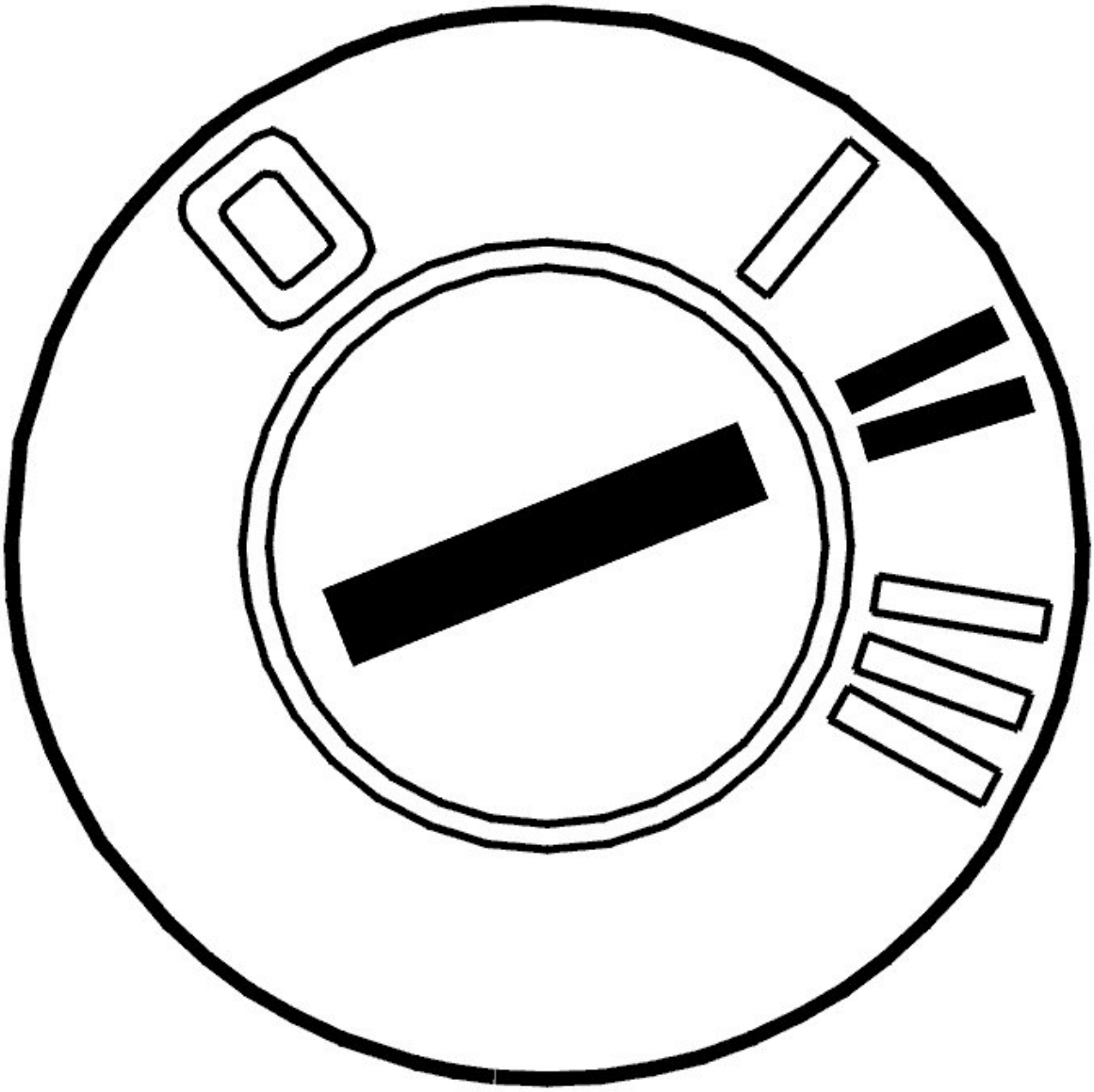
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - DONE

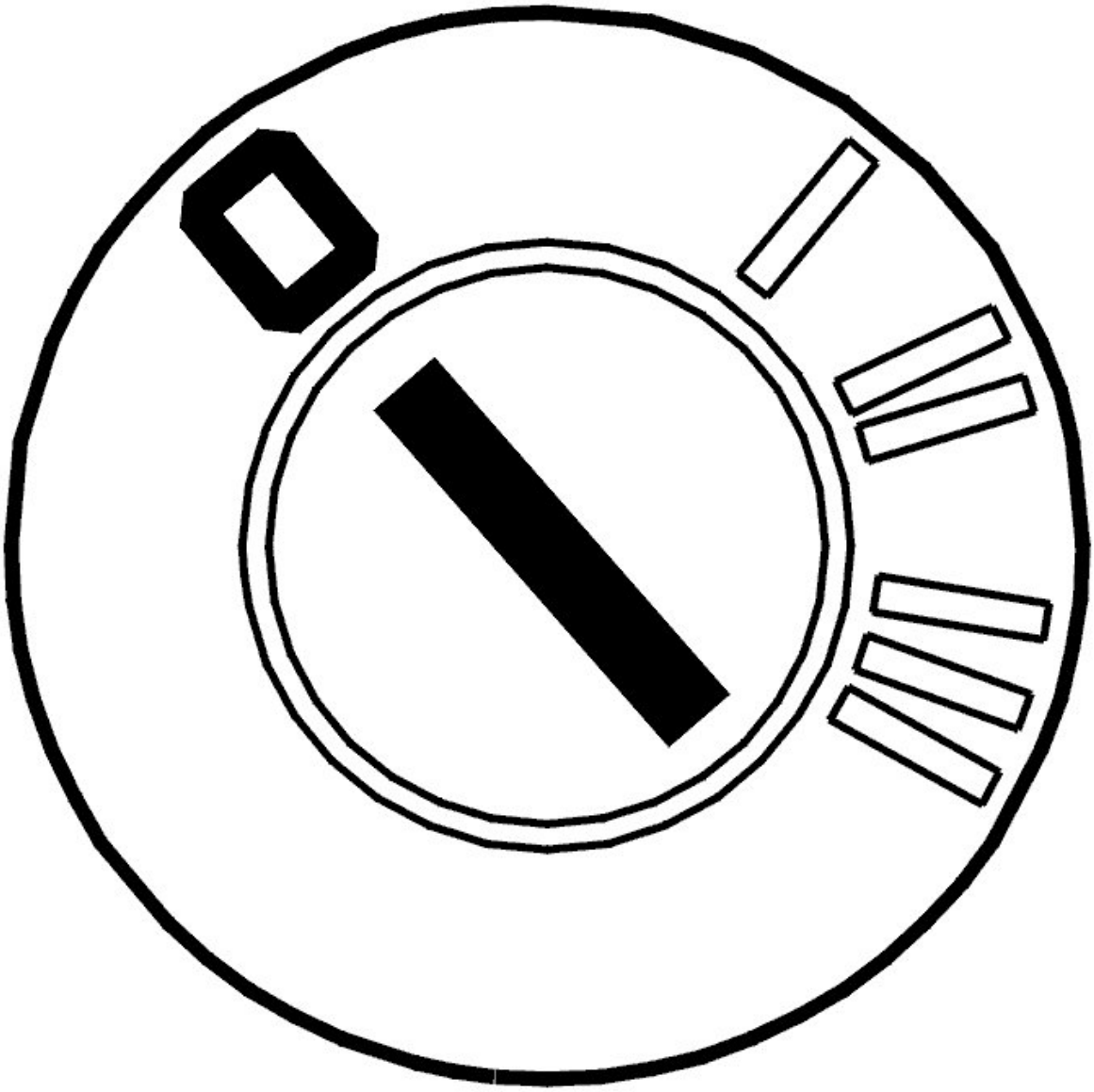
DONE - Verification

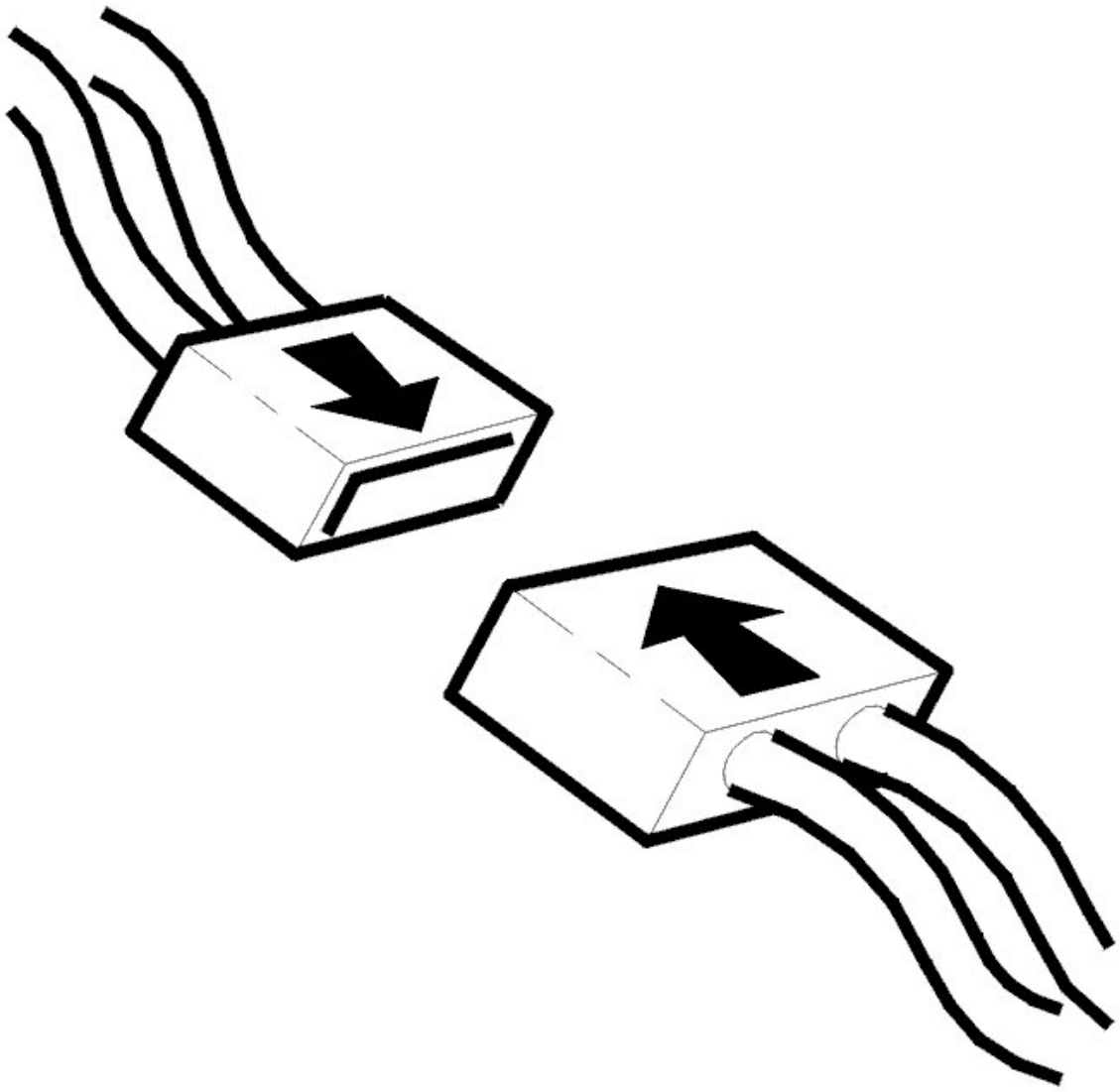
Verification

Verification

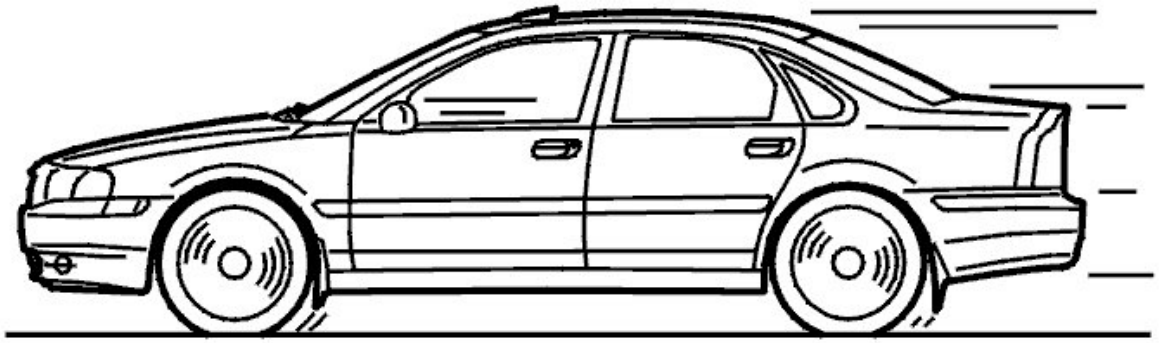
Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors. Reinstall the components.
- Test drive the car according to Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description .



Is the function of the transmission OK?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking for contact resistance and oxidation

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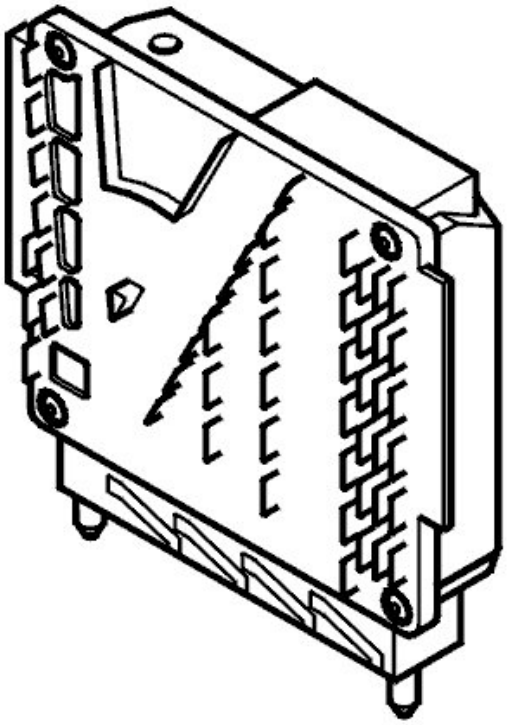
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid)if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

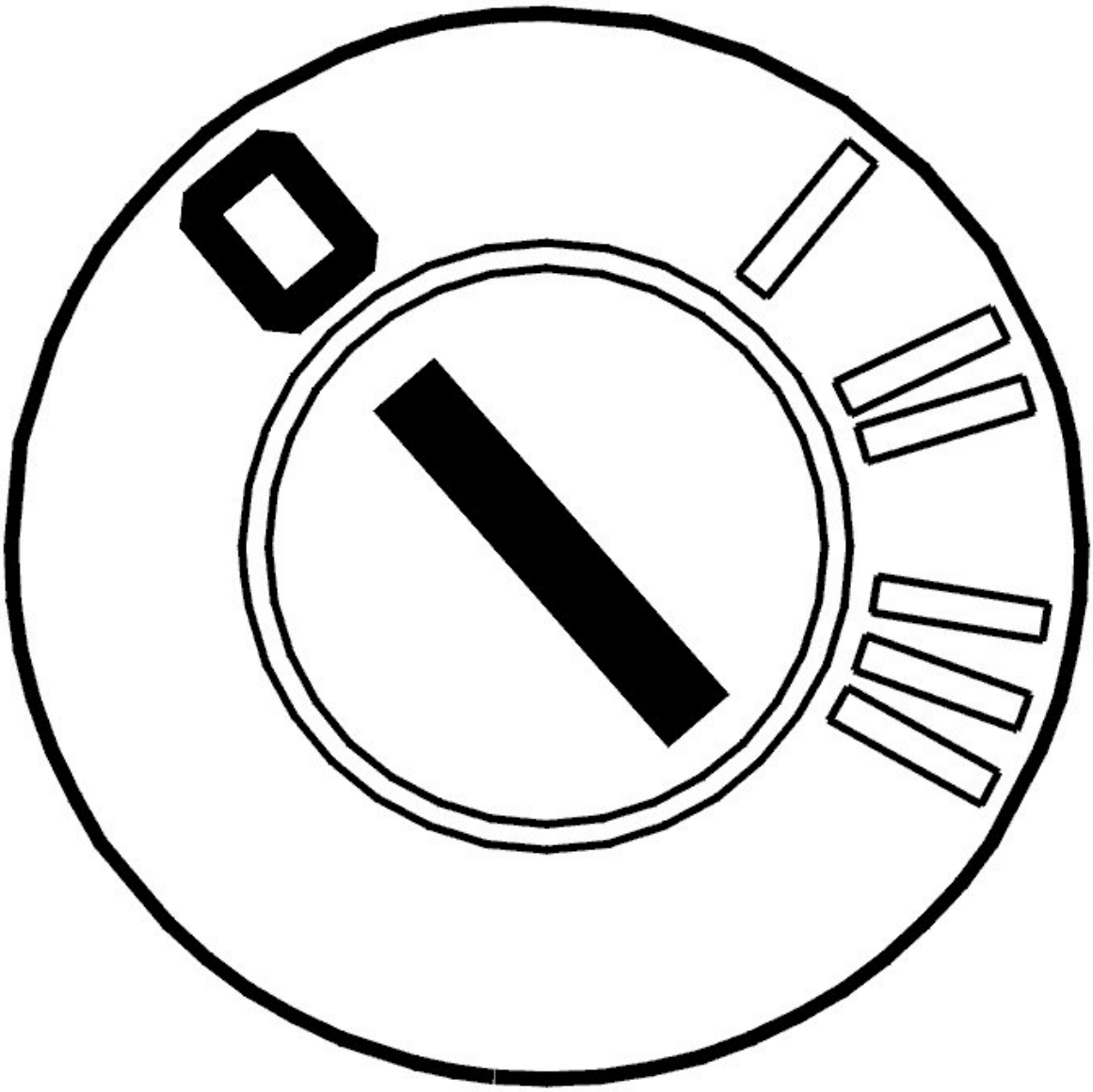
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Too High

Signal too high

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

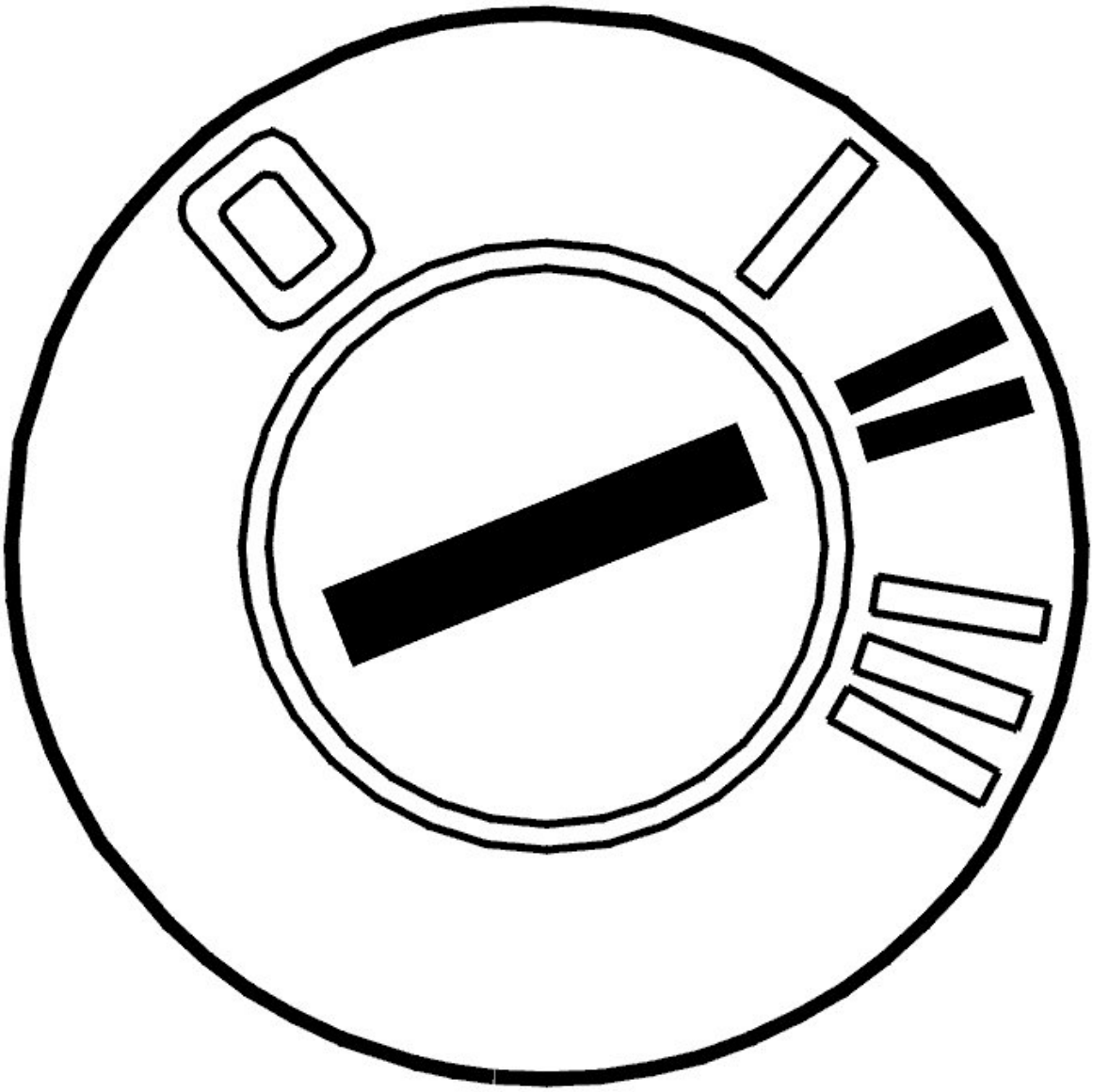
Note! If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S3

No - Checking transmission fluid temperature sensor

Checking shift solenoid S3



- Ignition on
- Gear selector in position P
- Activate solenoid S3.

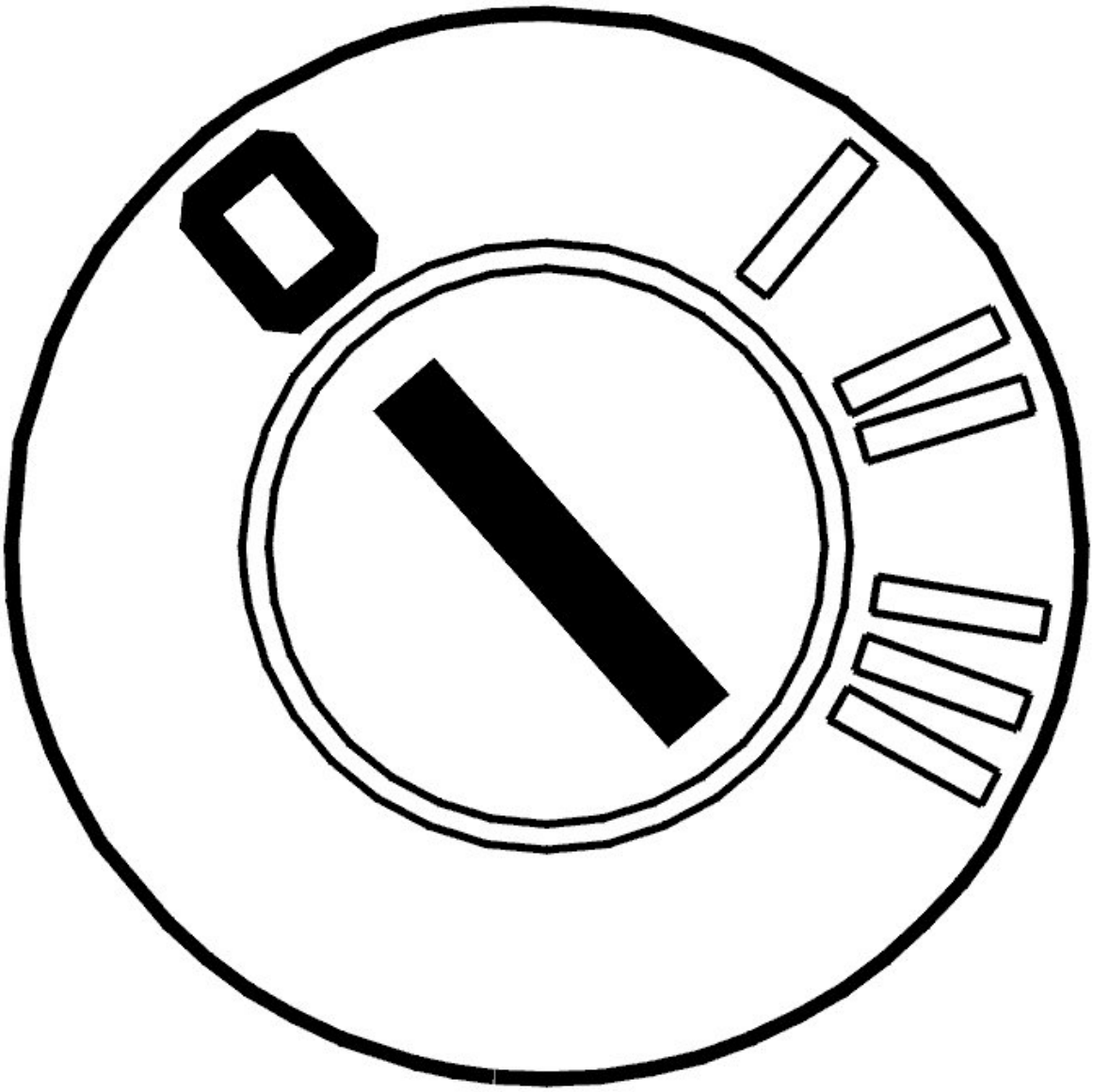
The value must change between OFF and ON.

Does the value change?

Yes - Intermittent fault

No - Checking the wiring

Checking the wiring

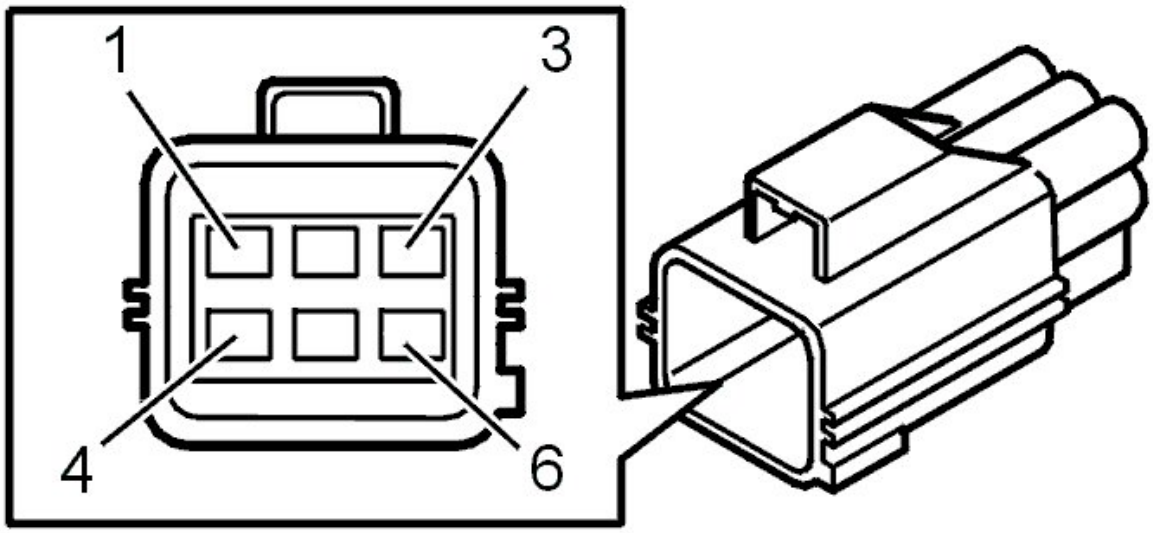


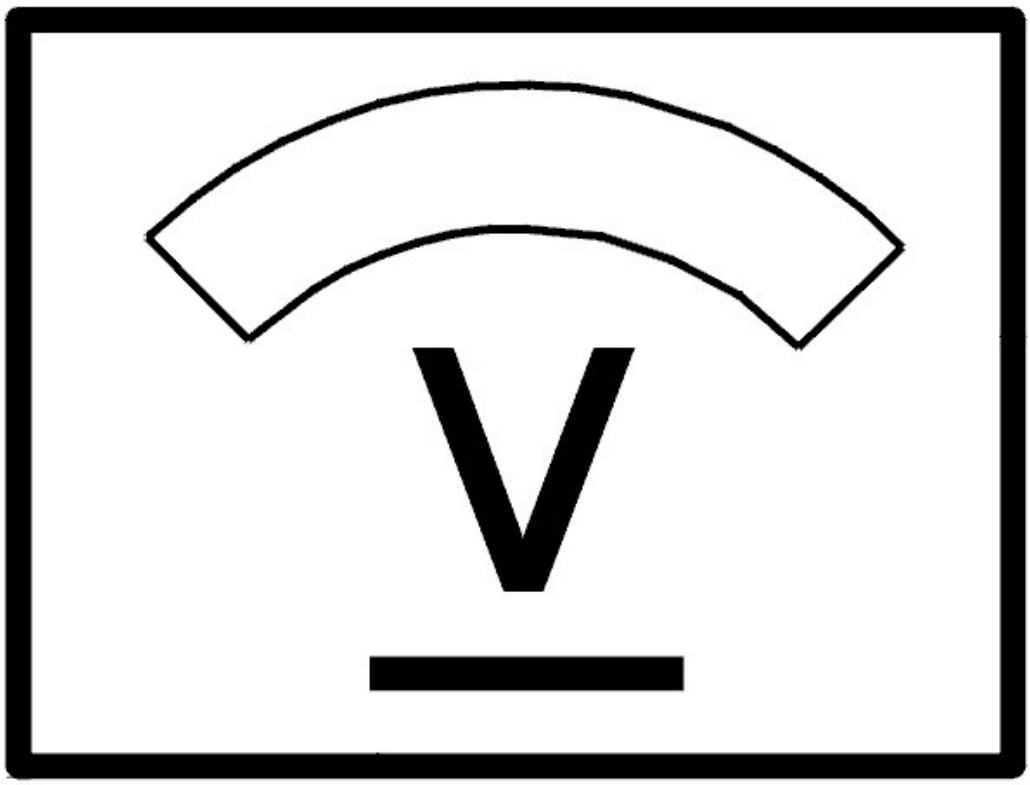
- Ignition off.

Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



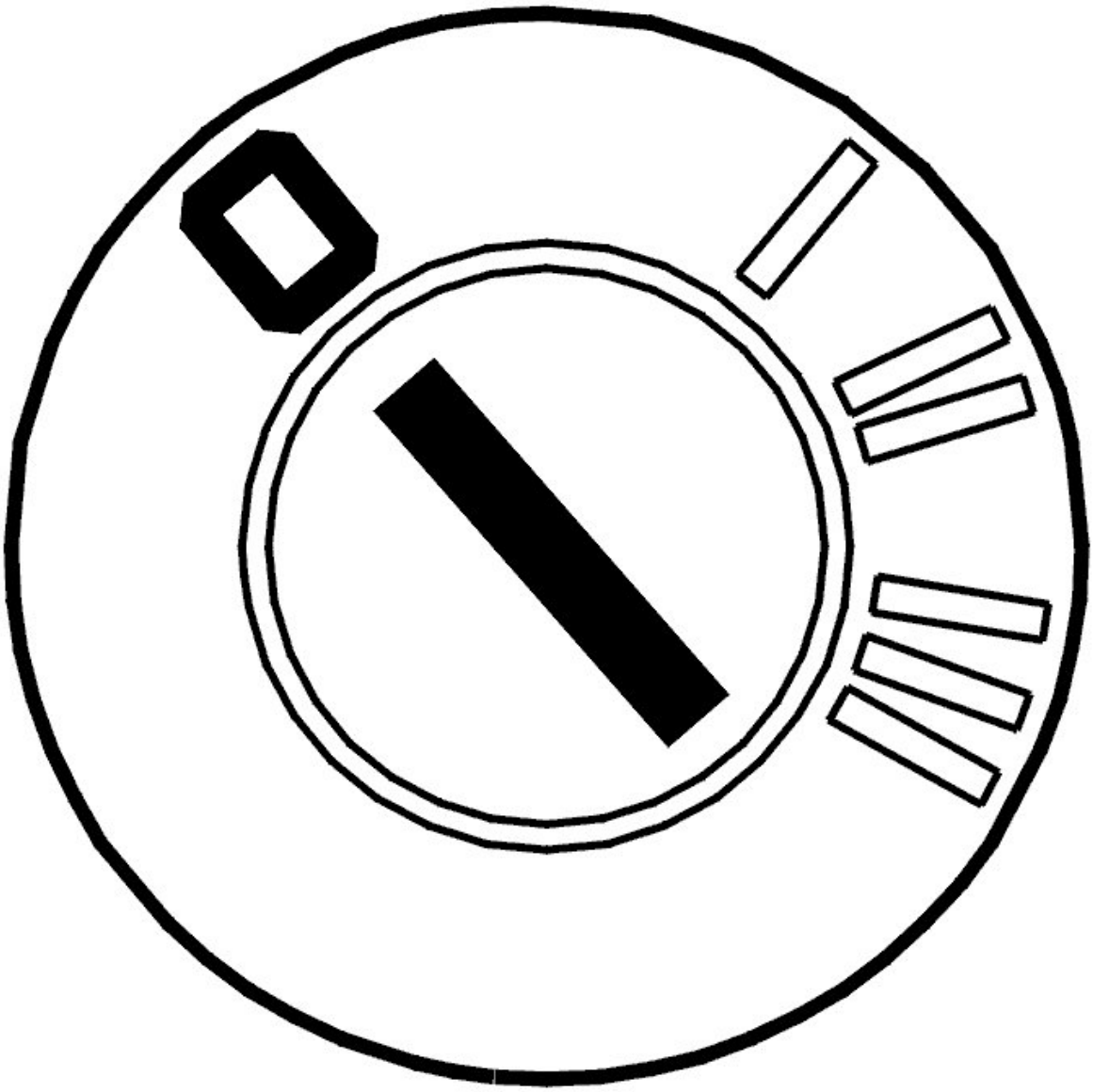


Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component

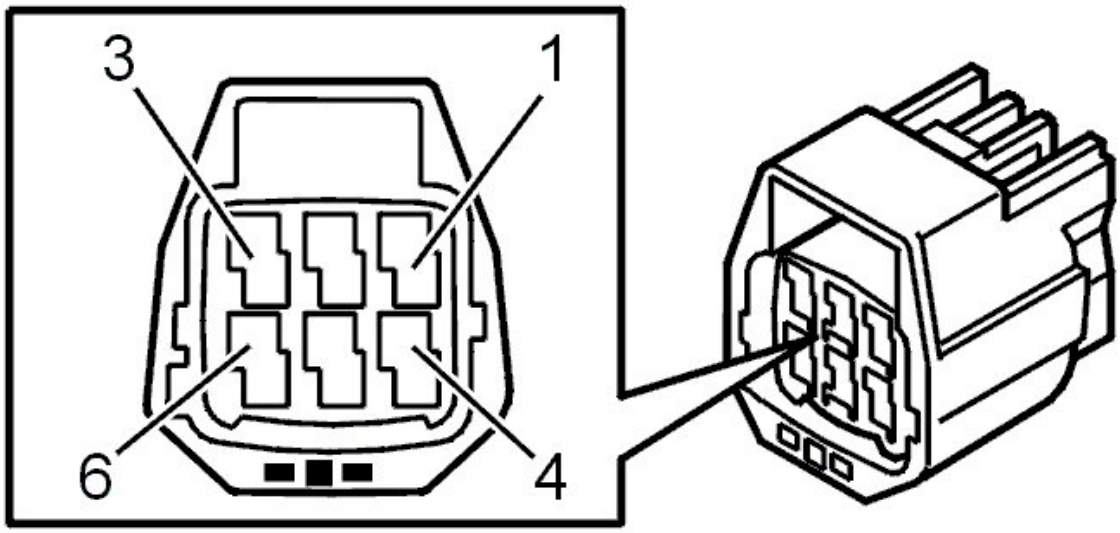


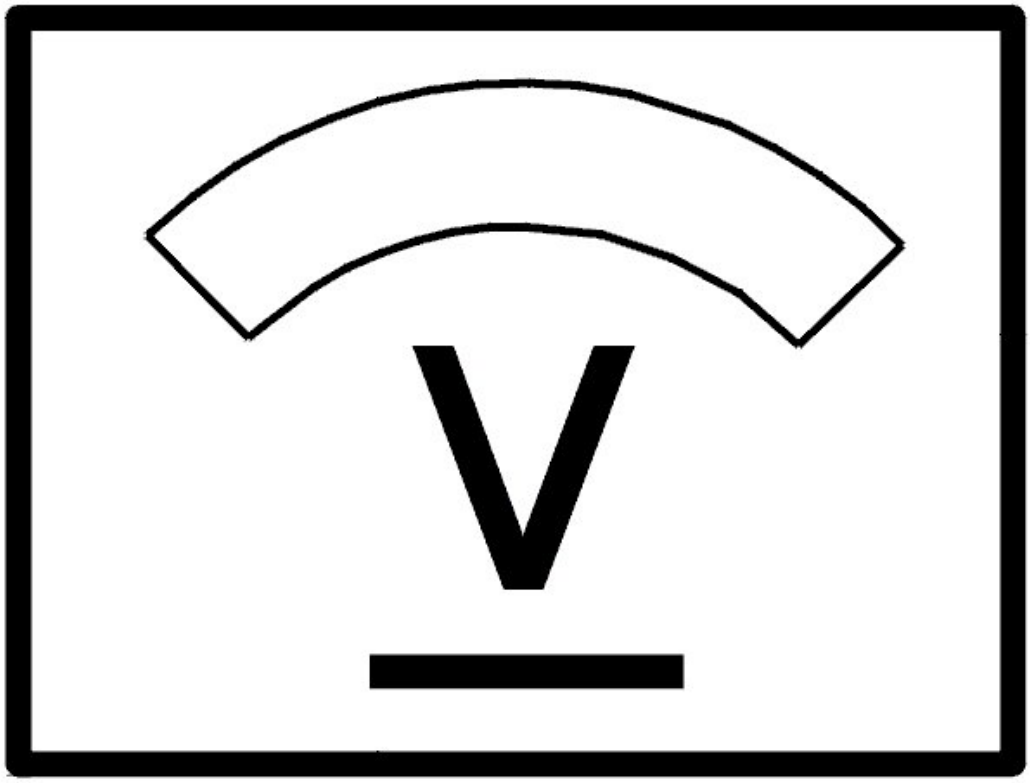
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Replace solenoid S3 if no faults are found in the cable-.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S3, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

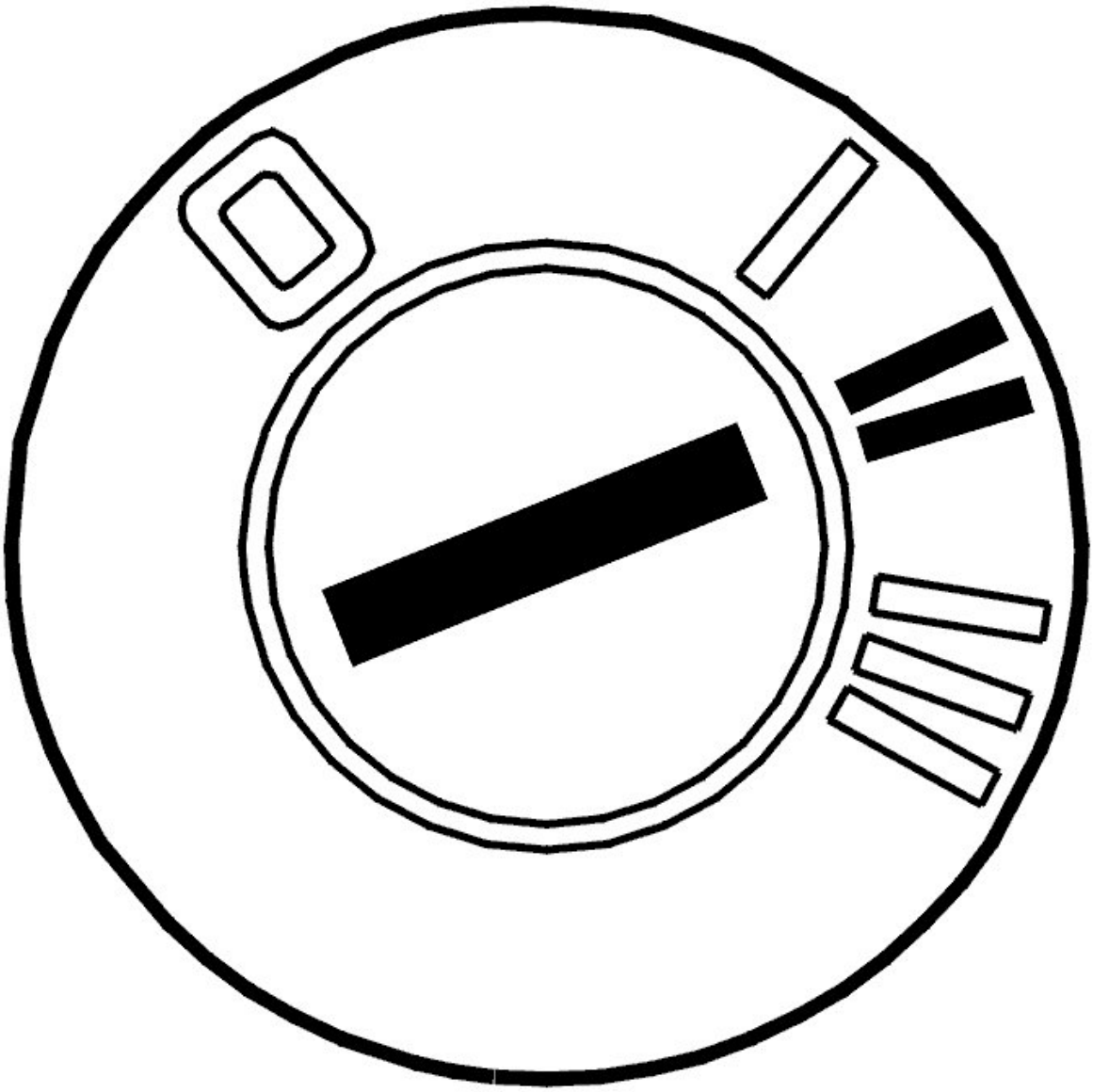
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

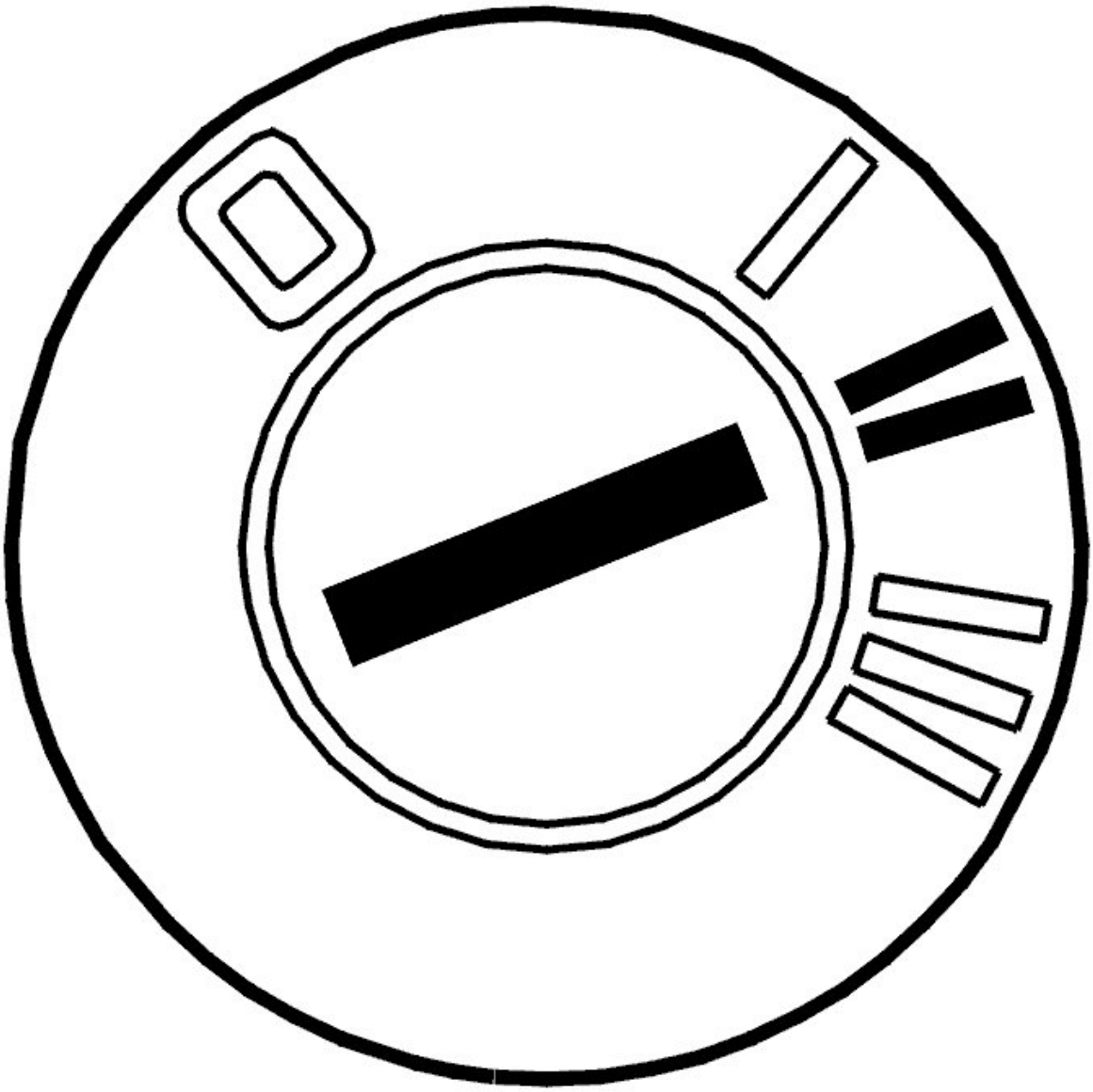
Continue - Verification

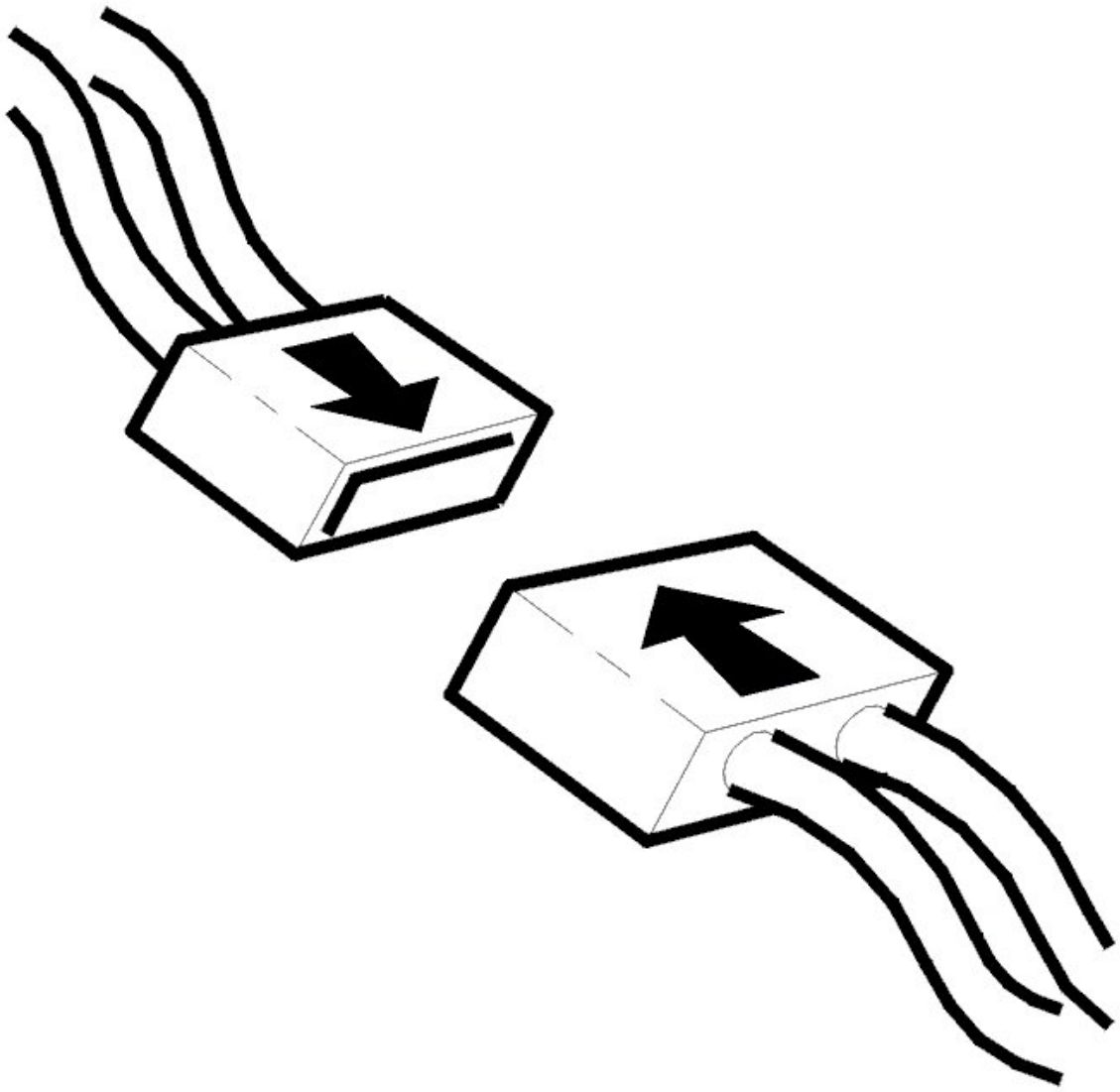
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

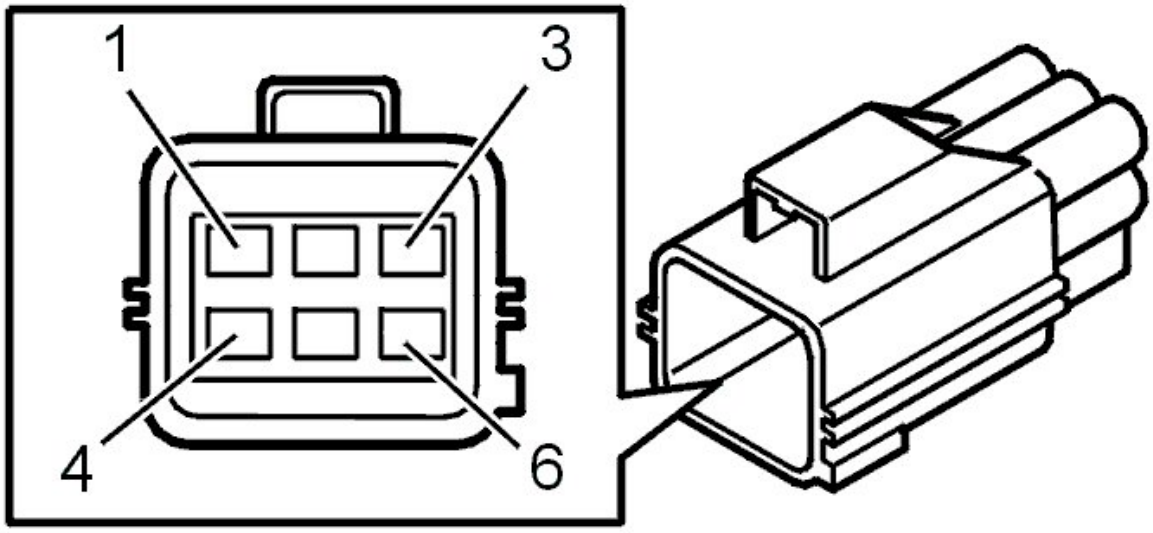
Attempt New Test - Checking the temperature sensor

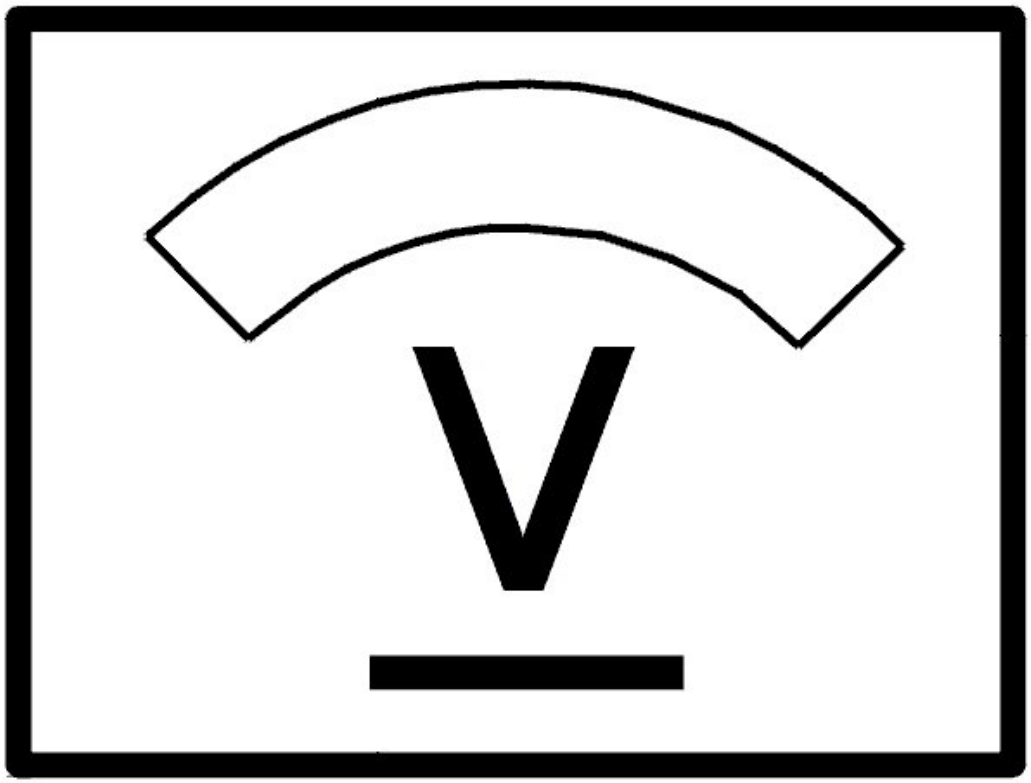
Intermittent fault

Check the cable between transmission control module (TCM) terminal #A48 (#A48) and transmission connector terminal #C3. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

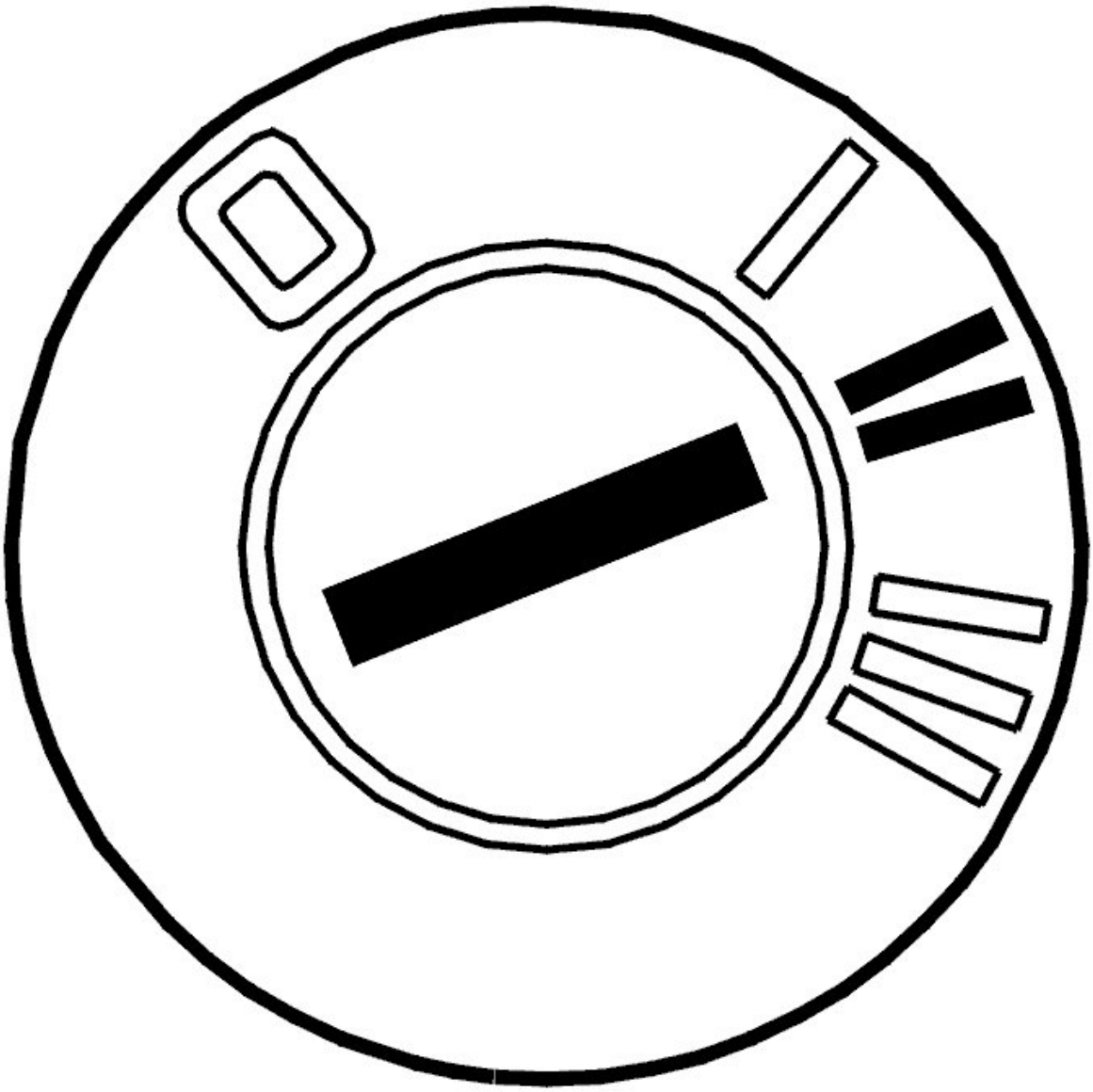
No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking the temperature sensor

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

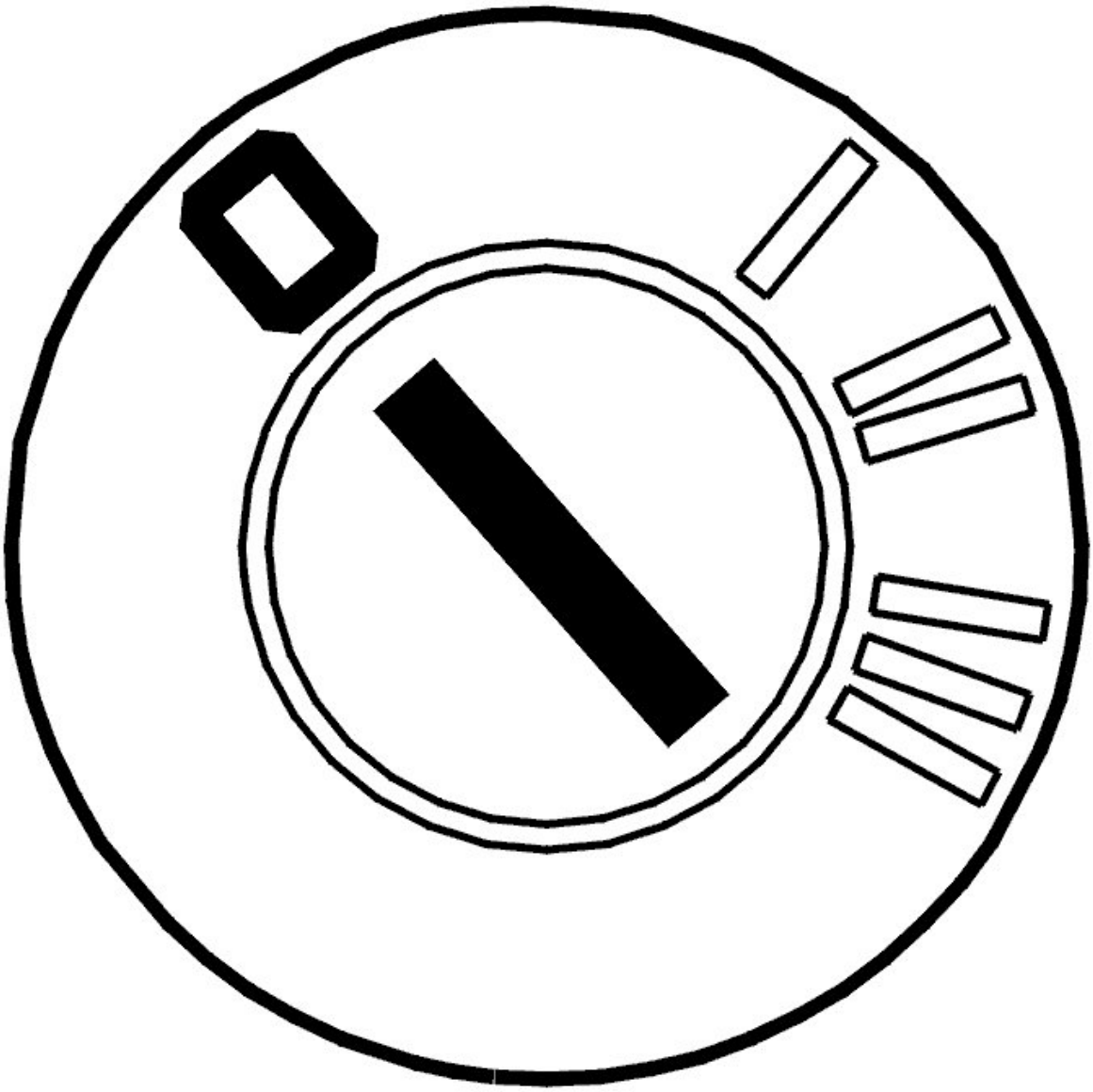
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

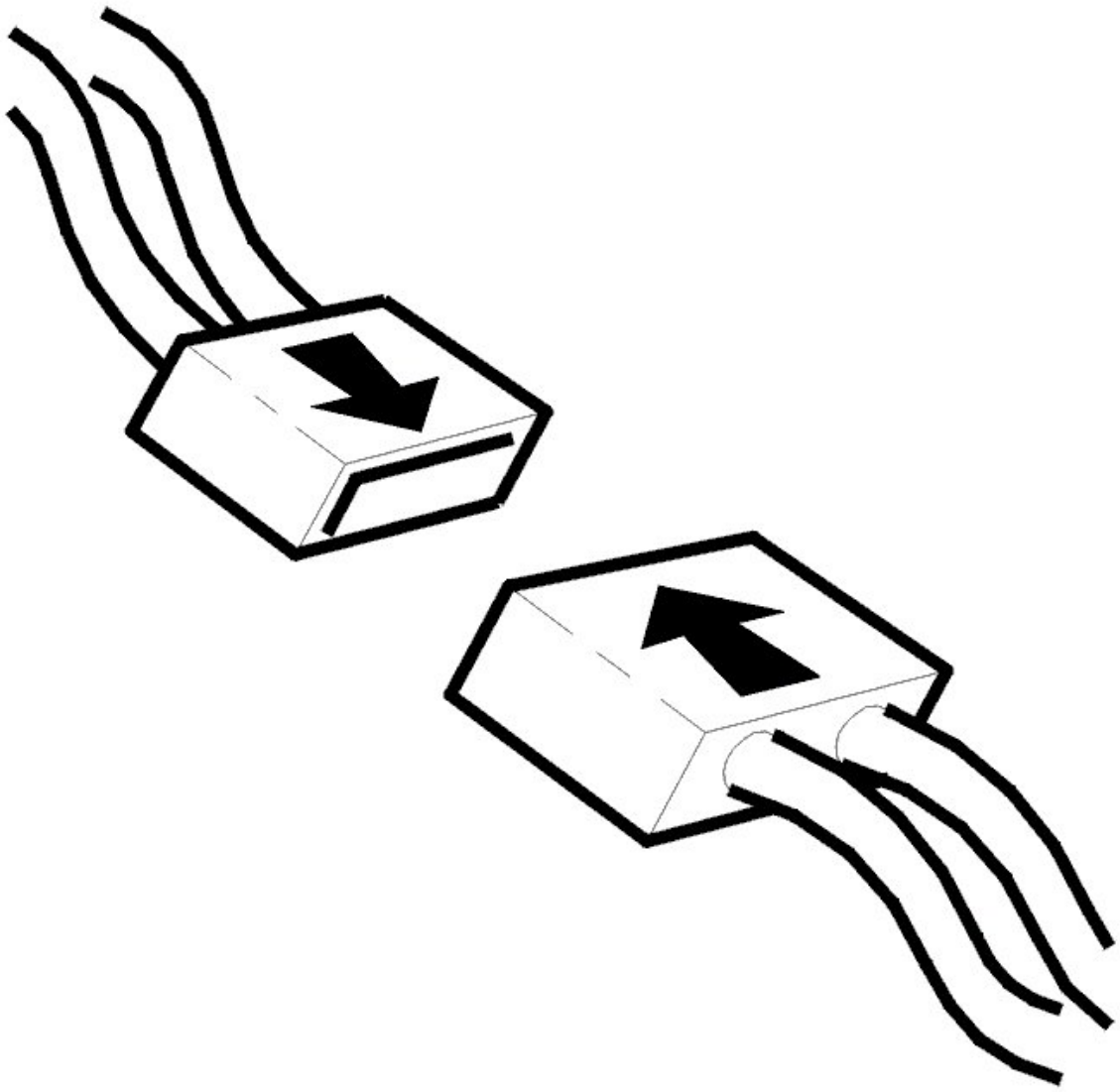
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

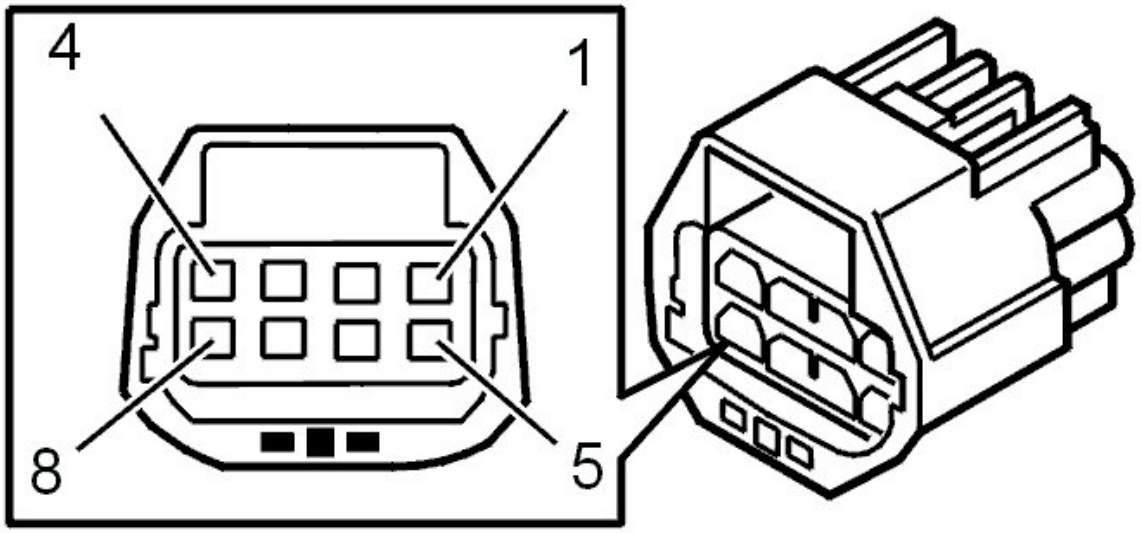
Checking transmission fluid temperature sensor

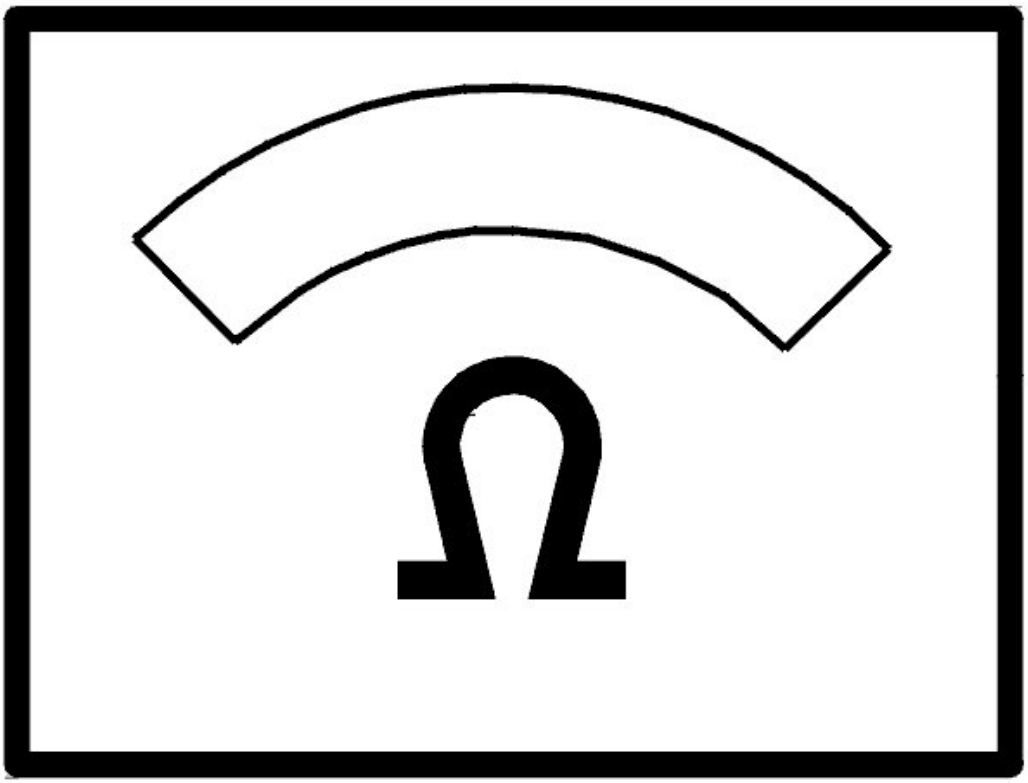




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

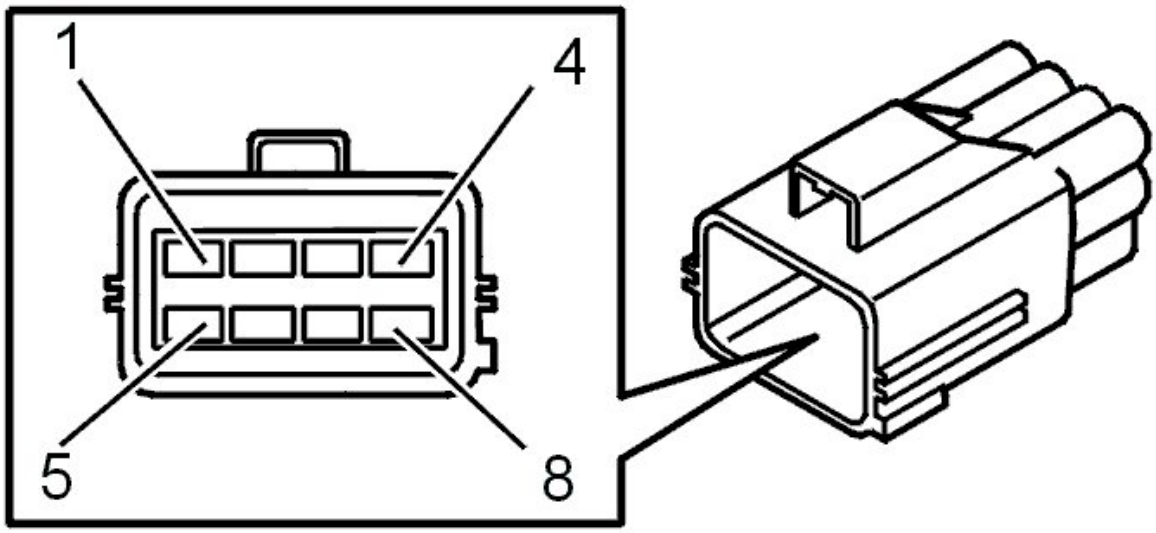
No - Checking the cable and component

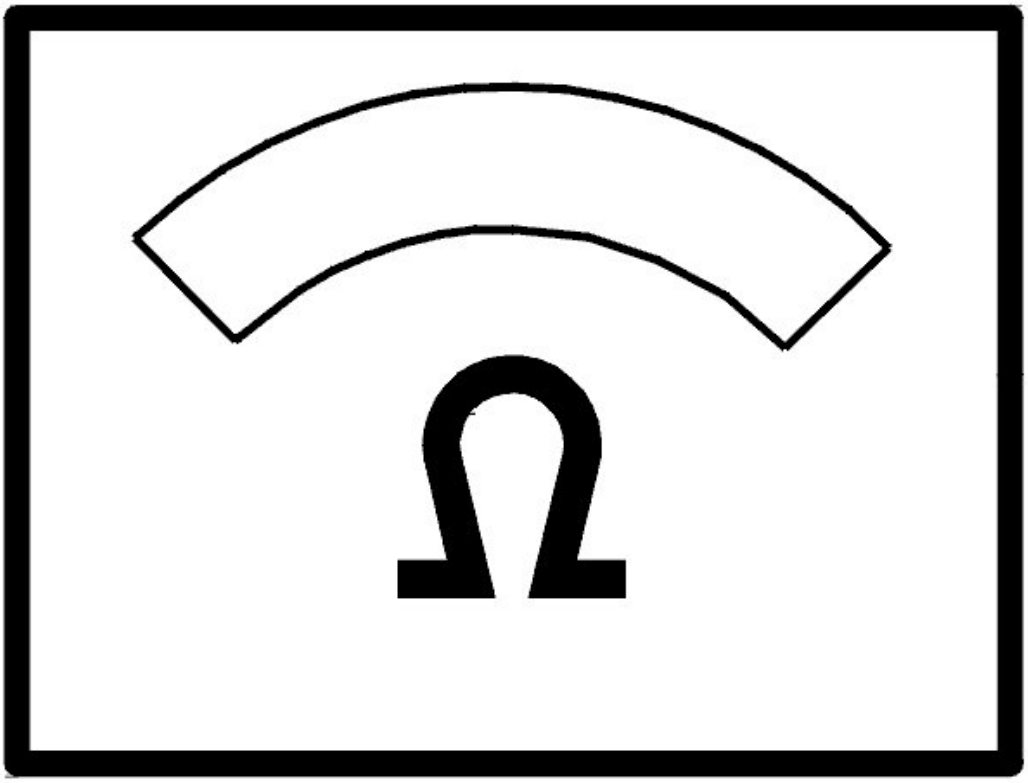
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



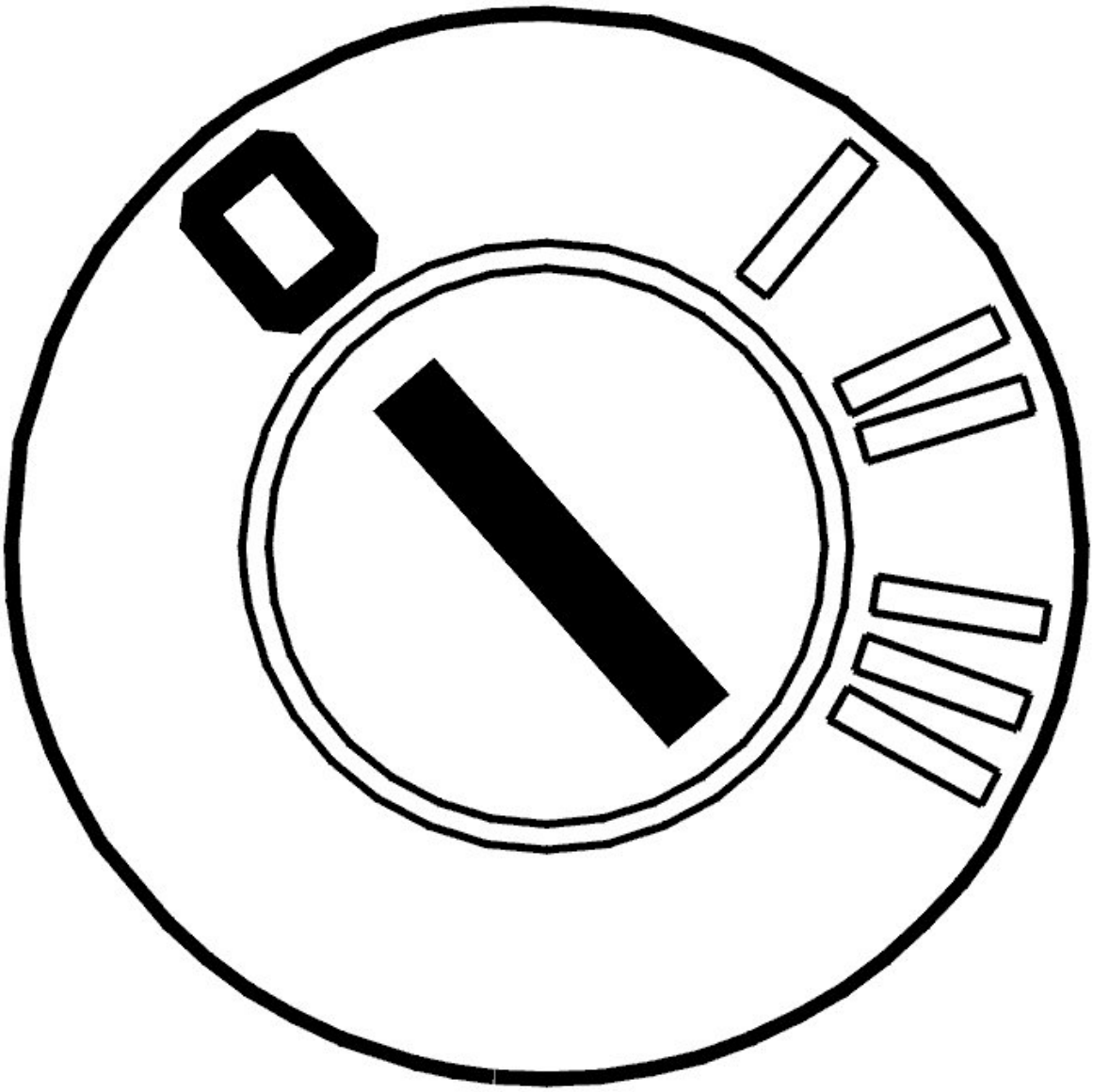


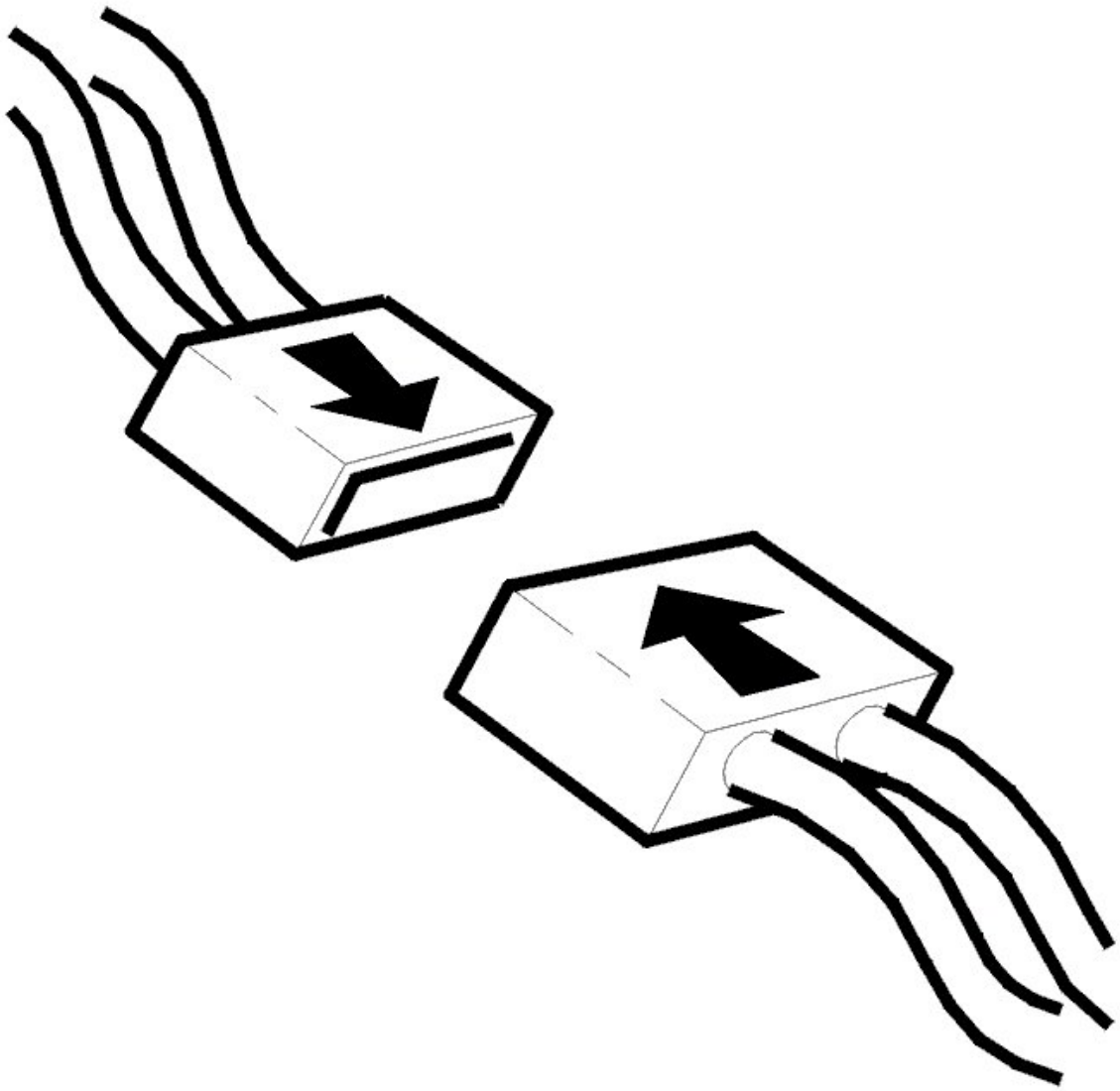
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

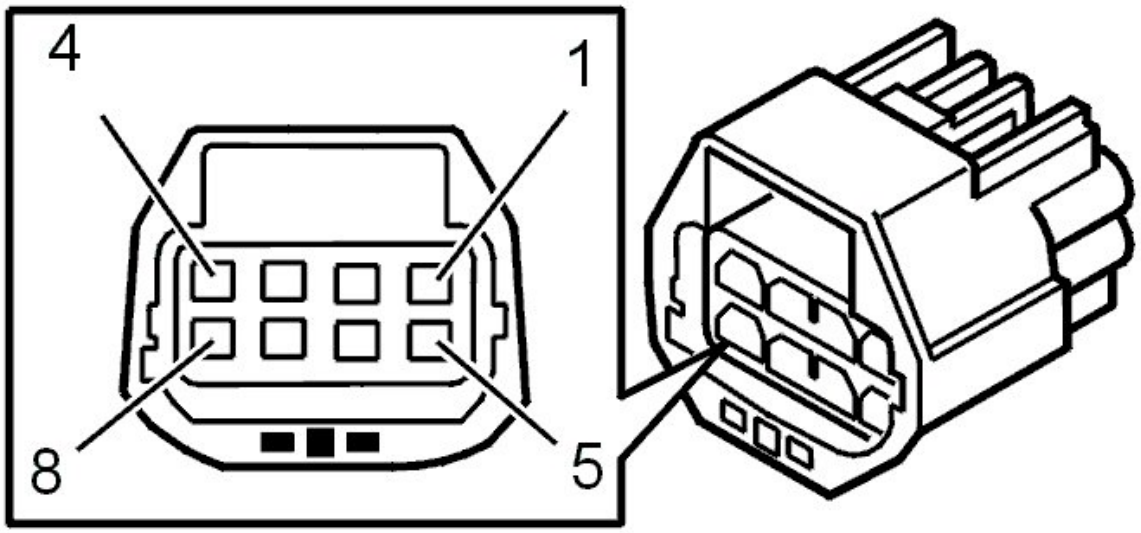
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

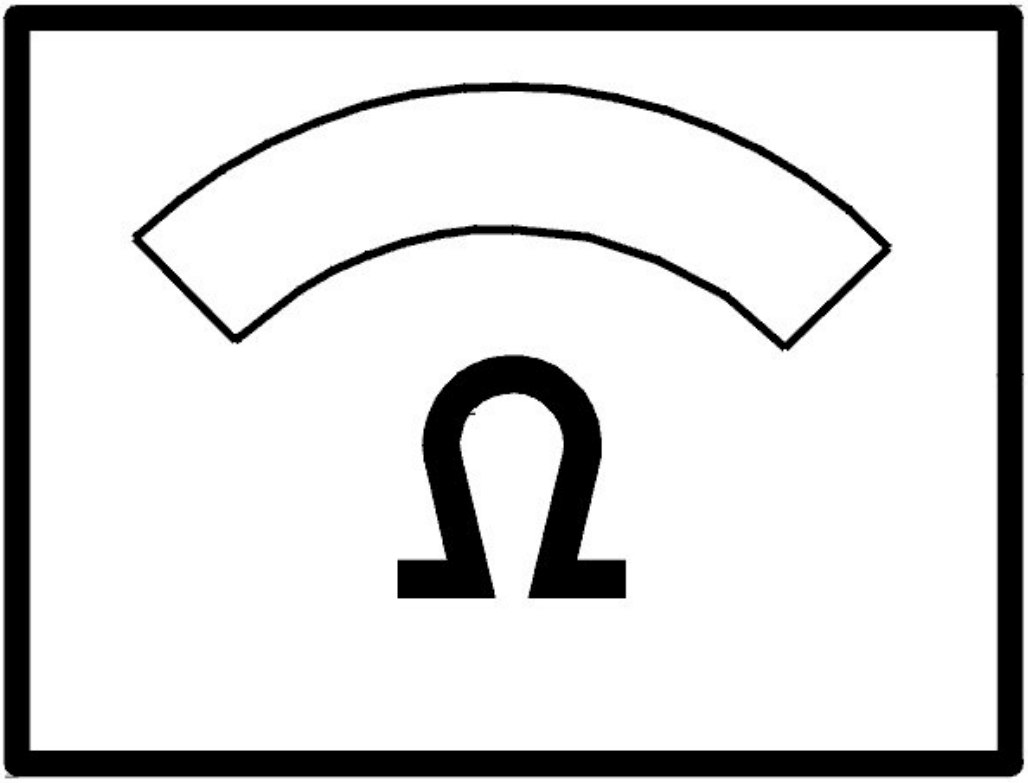
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





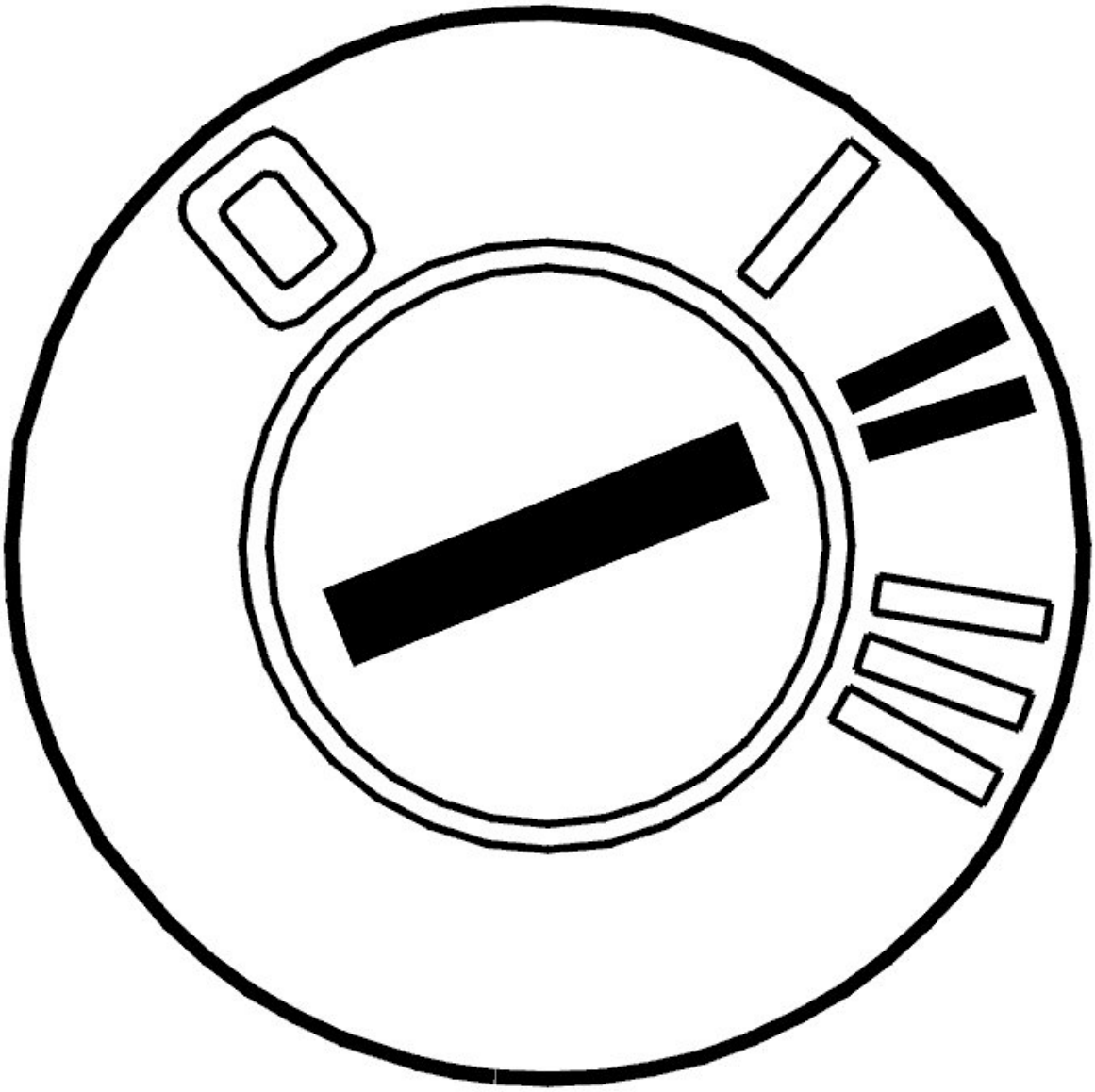
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



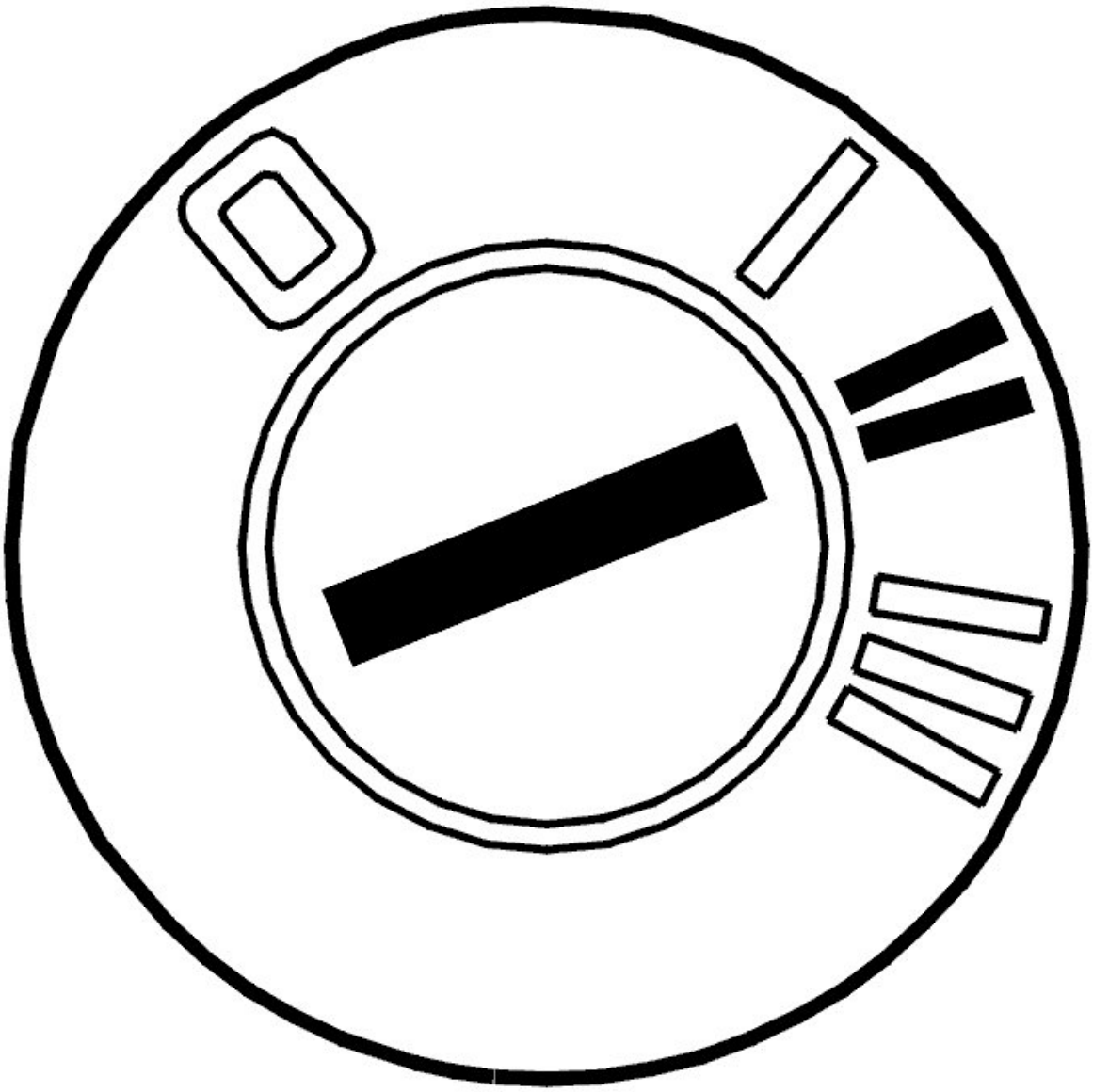
- Ignition on.

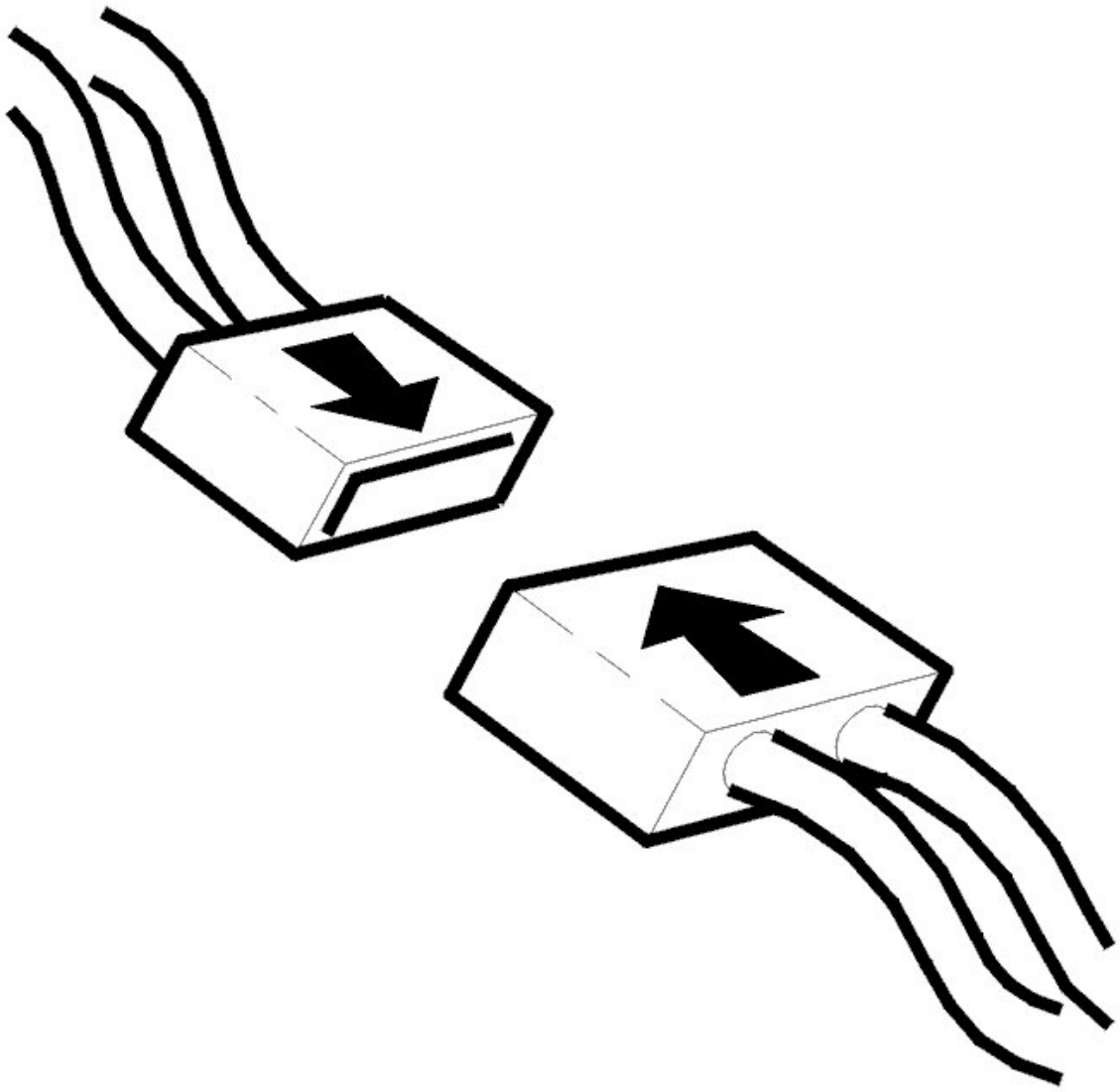
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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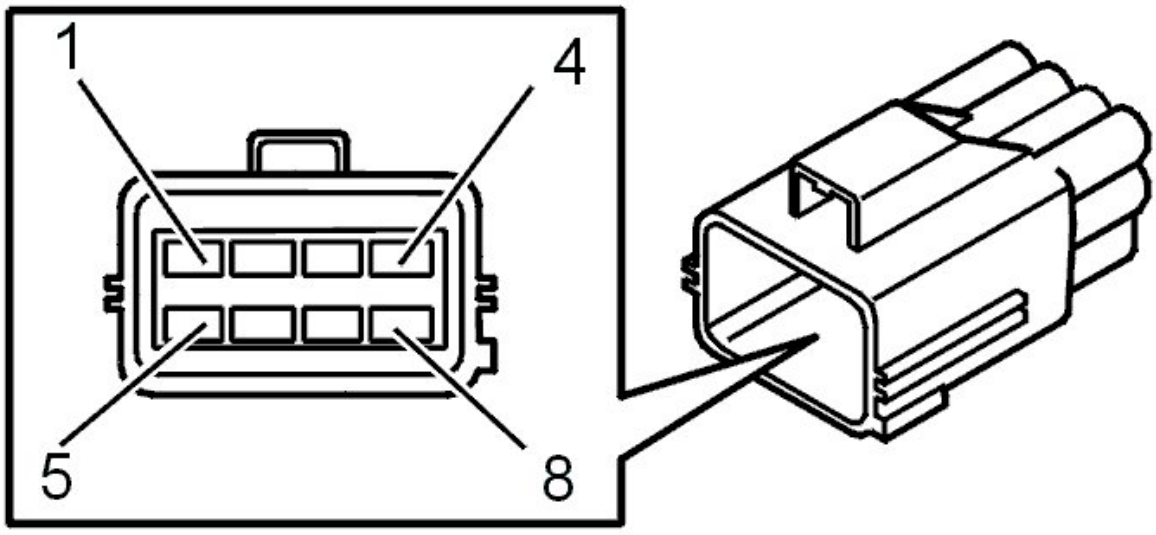
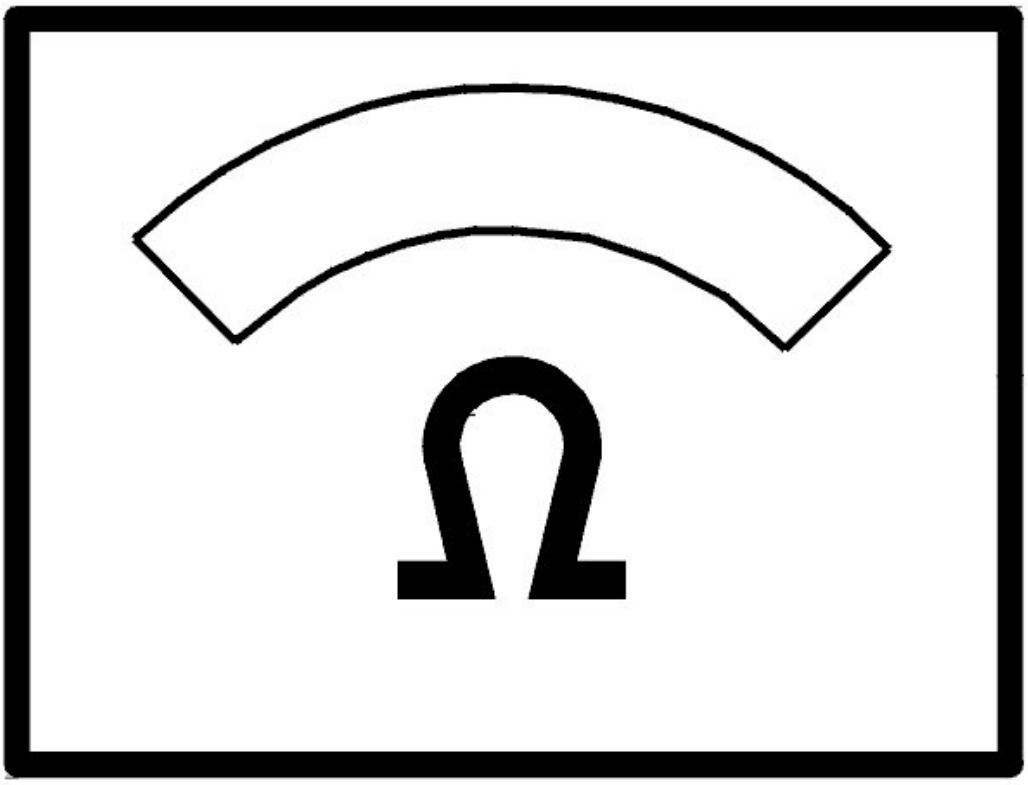
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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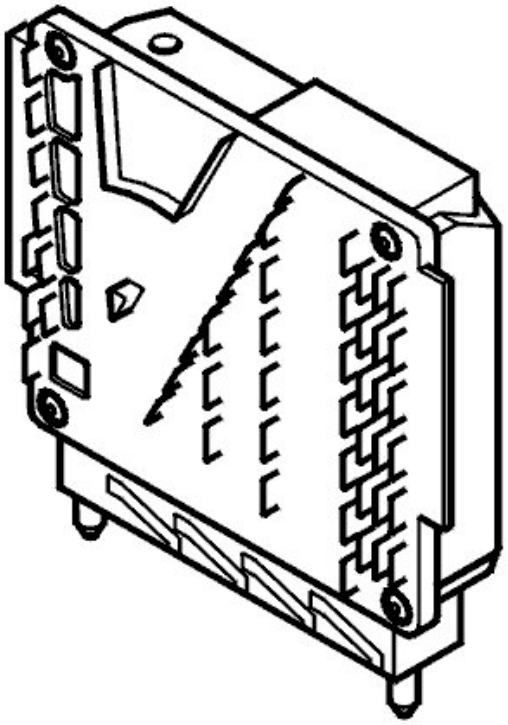
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

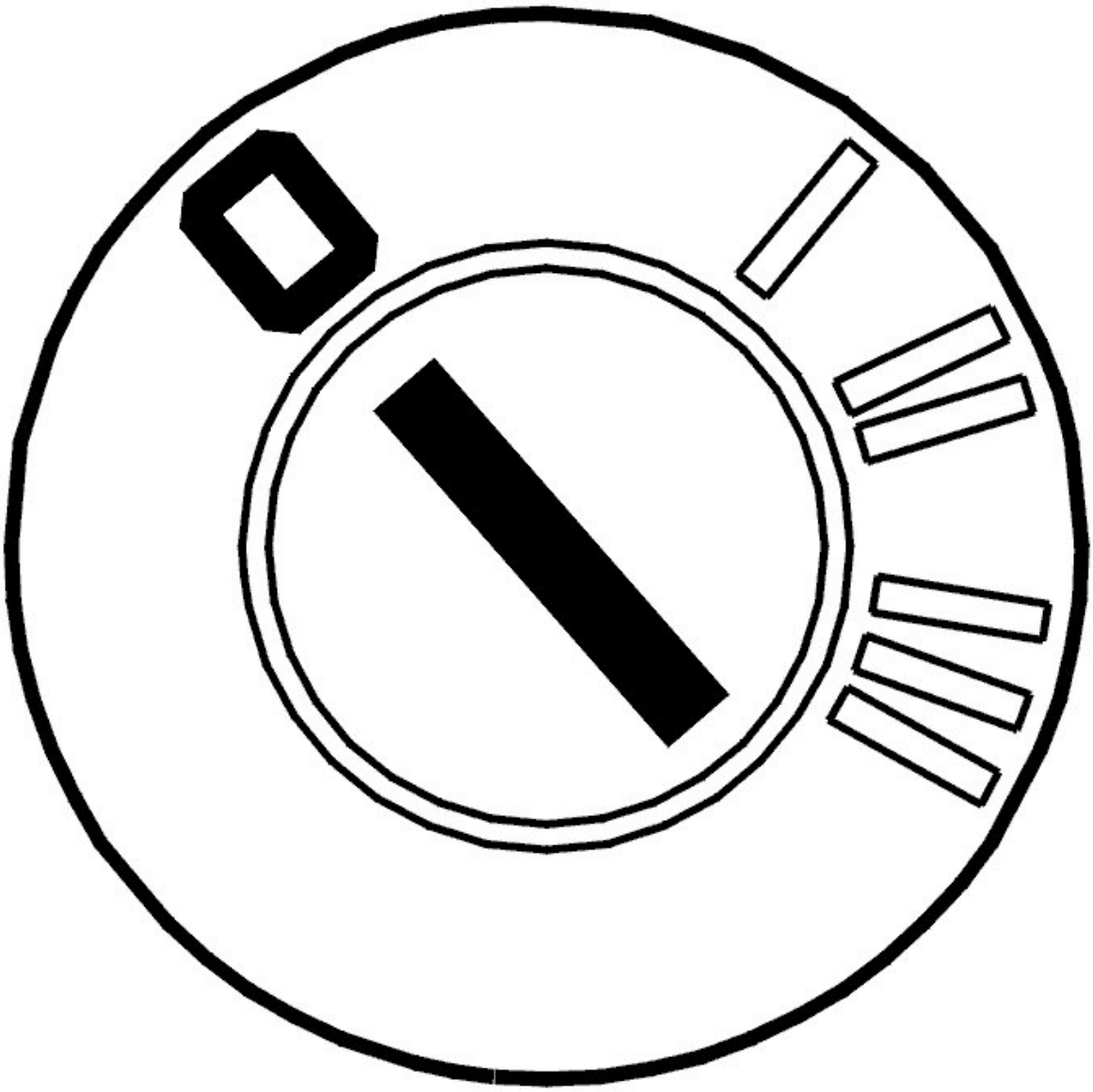
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Missing

Signal missing

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

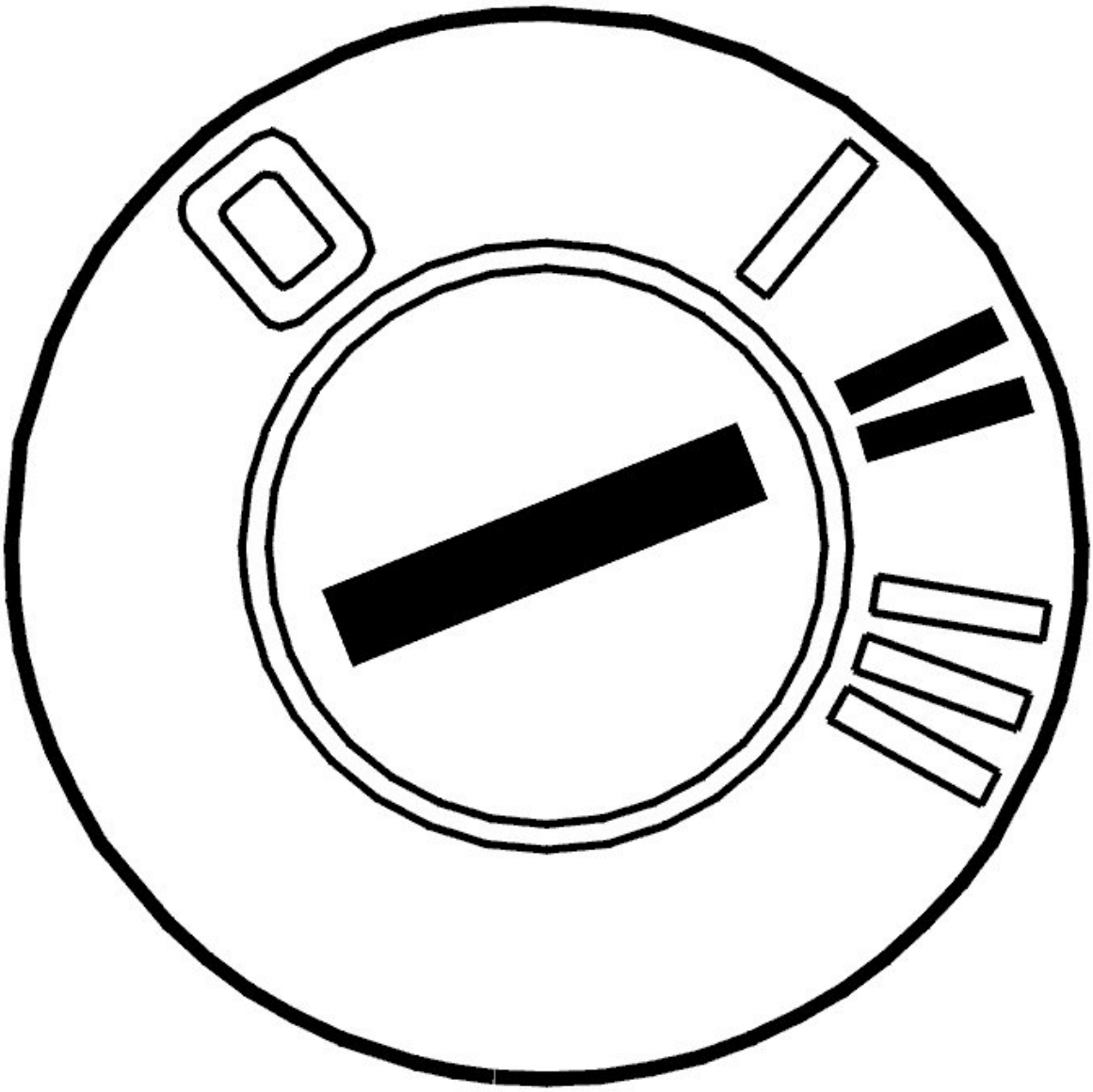
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S3

No - Checking transmission fluid temperature sensor

Checking shift solenoid S3



- Ignition on
- Gear selector in position P
- Activate solenoid S3.

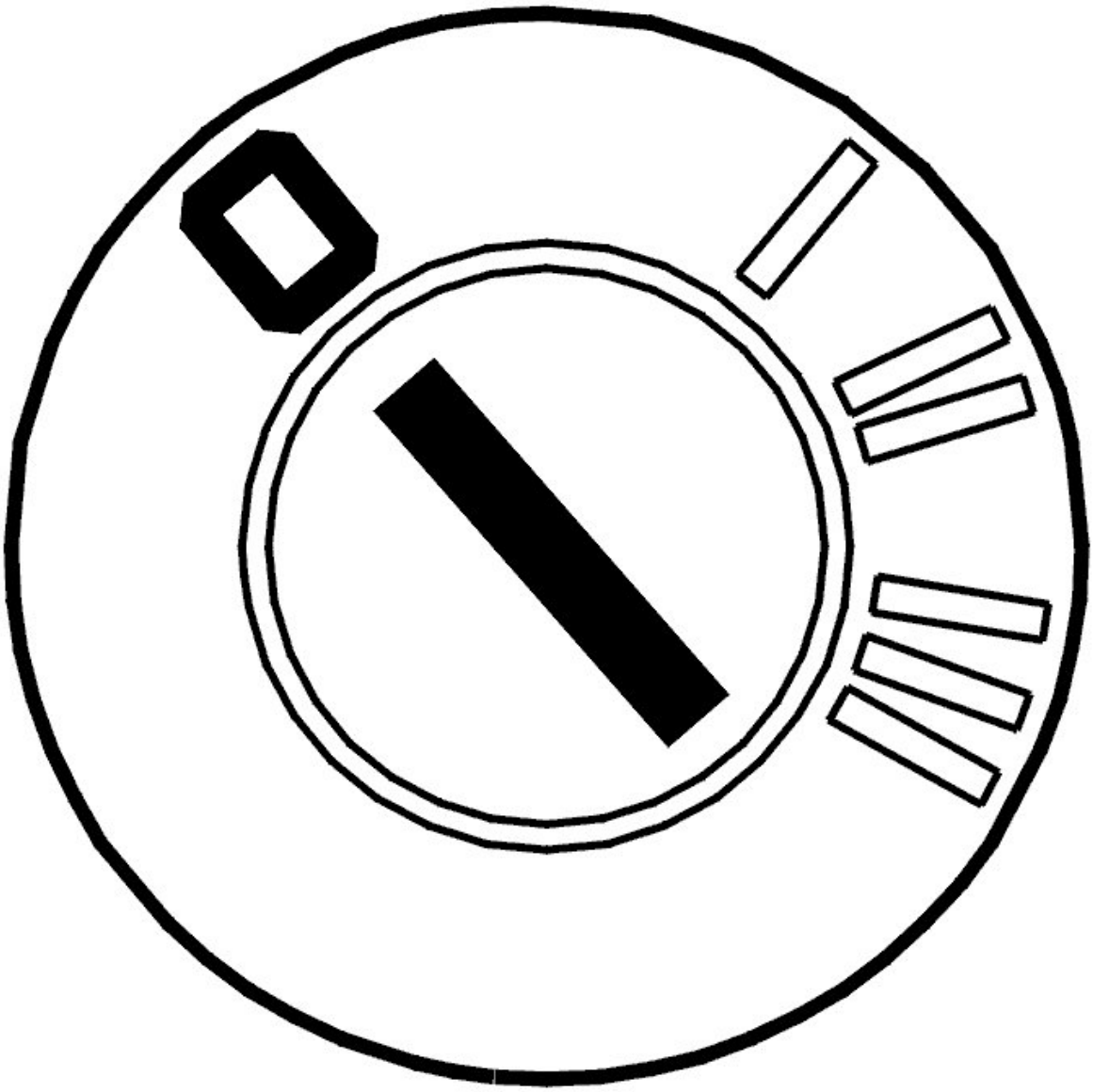
The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - Intermittent fault

No - Checking resistance

Checking resistance

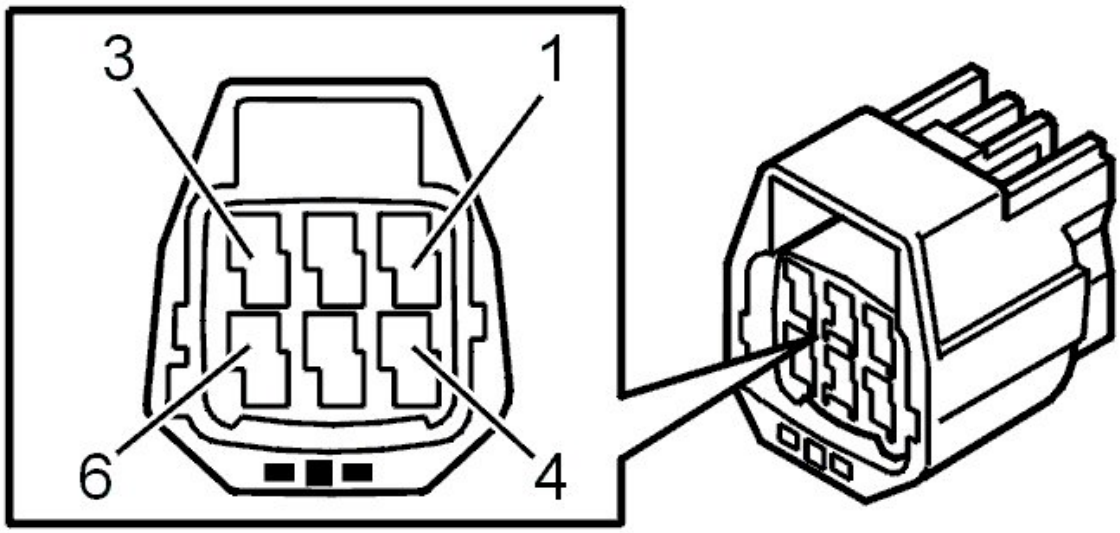


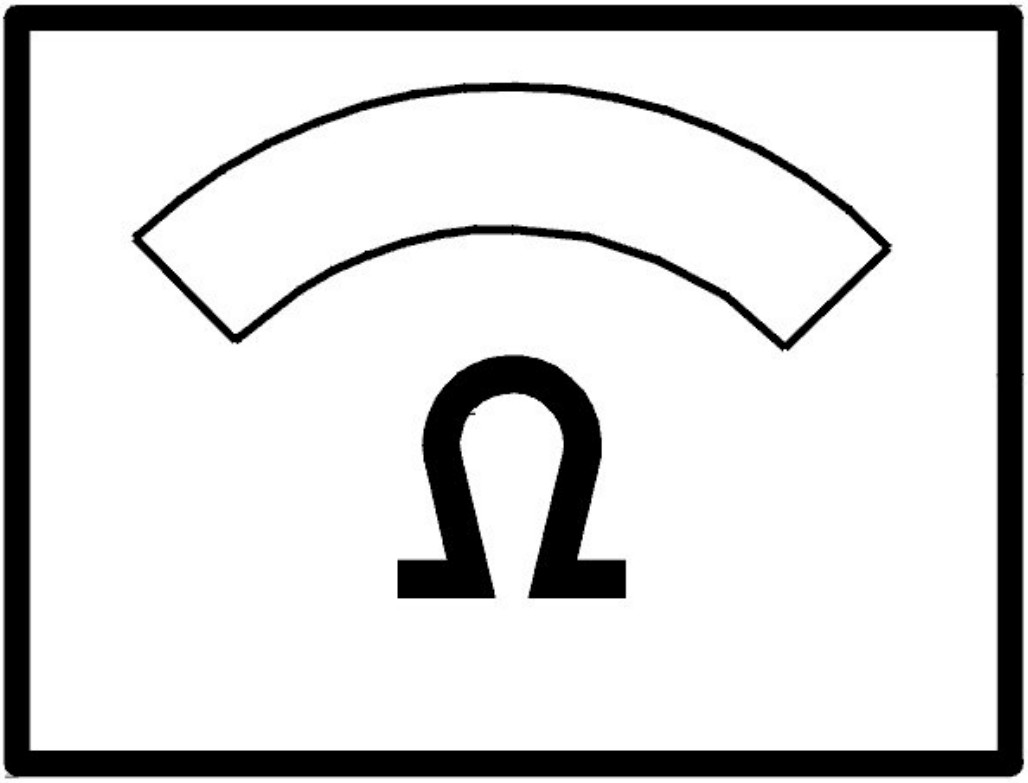
- Ignition off
- Disconnect the transmission connector.

Check solenoid S3 by measuring the resistance between transmission connector terminal #C3 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



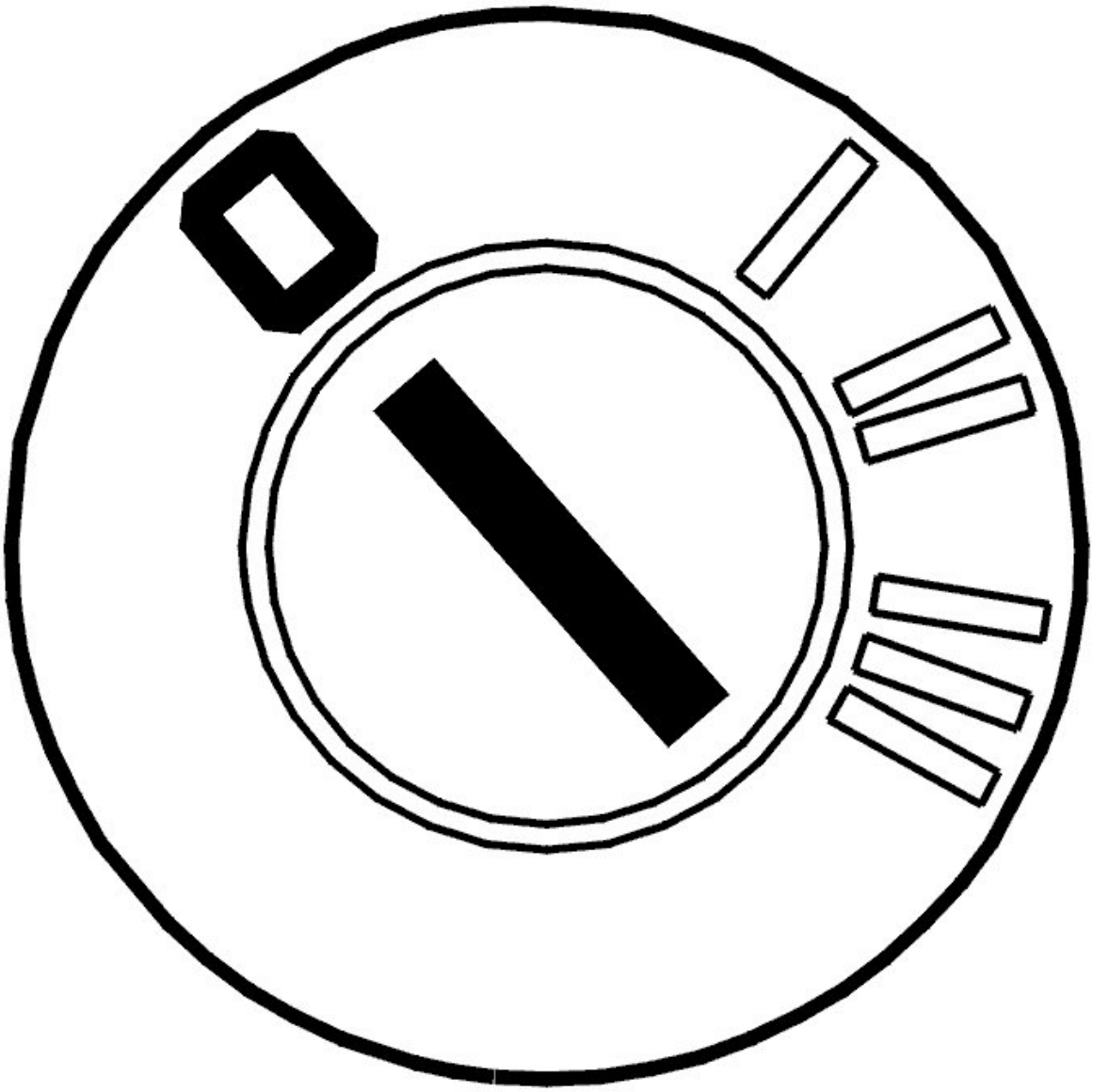


Was the resistance OK

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring

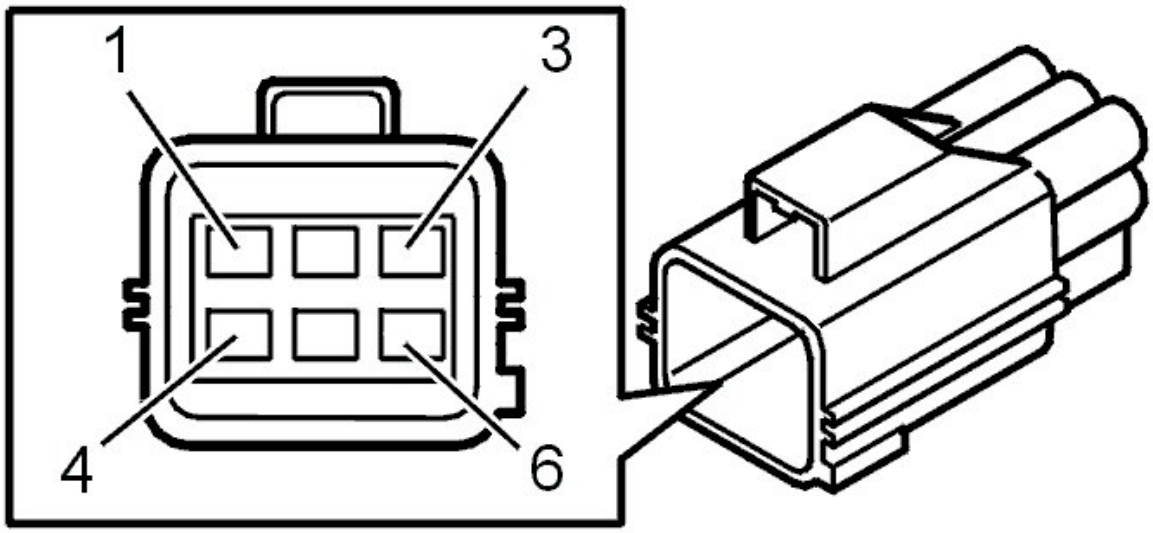


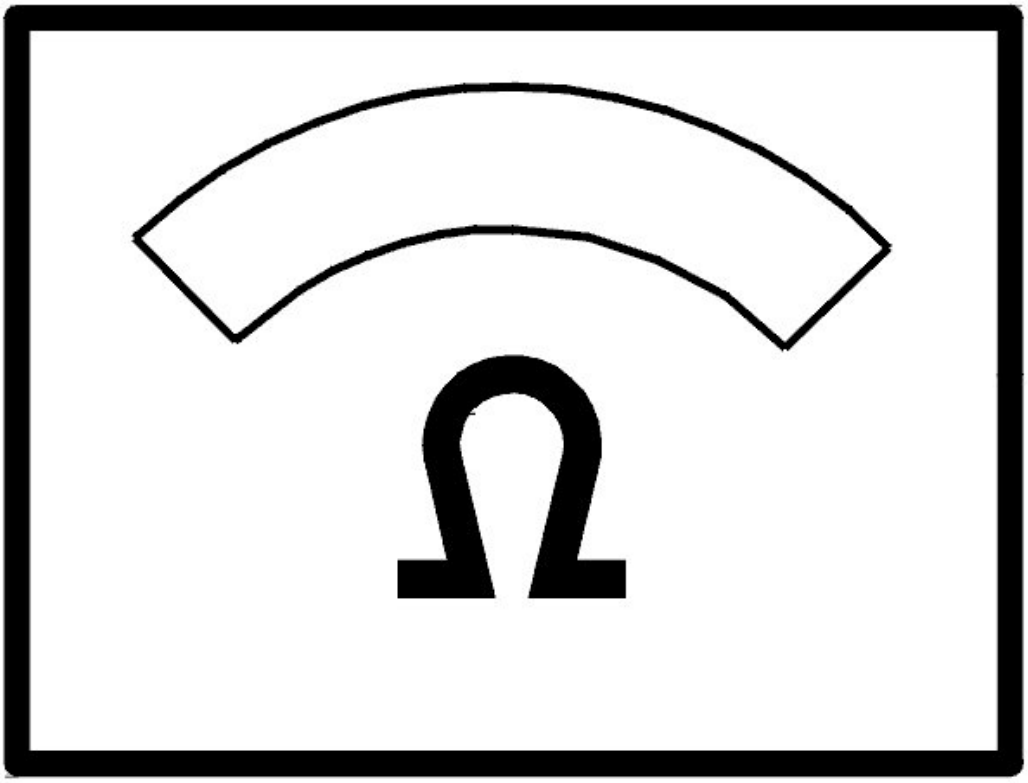
- Ignition off.

Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



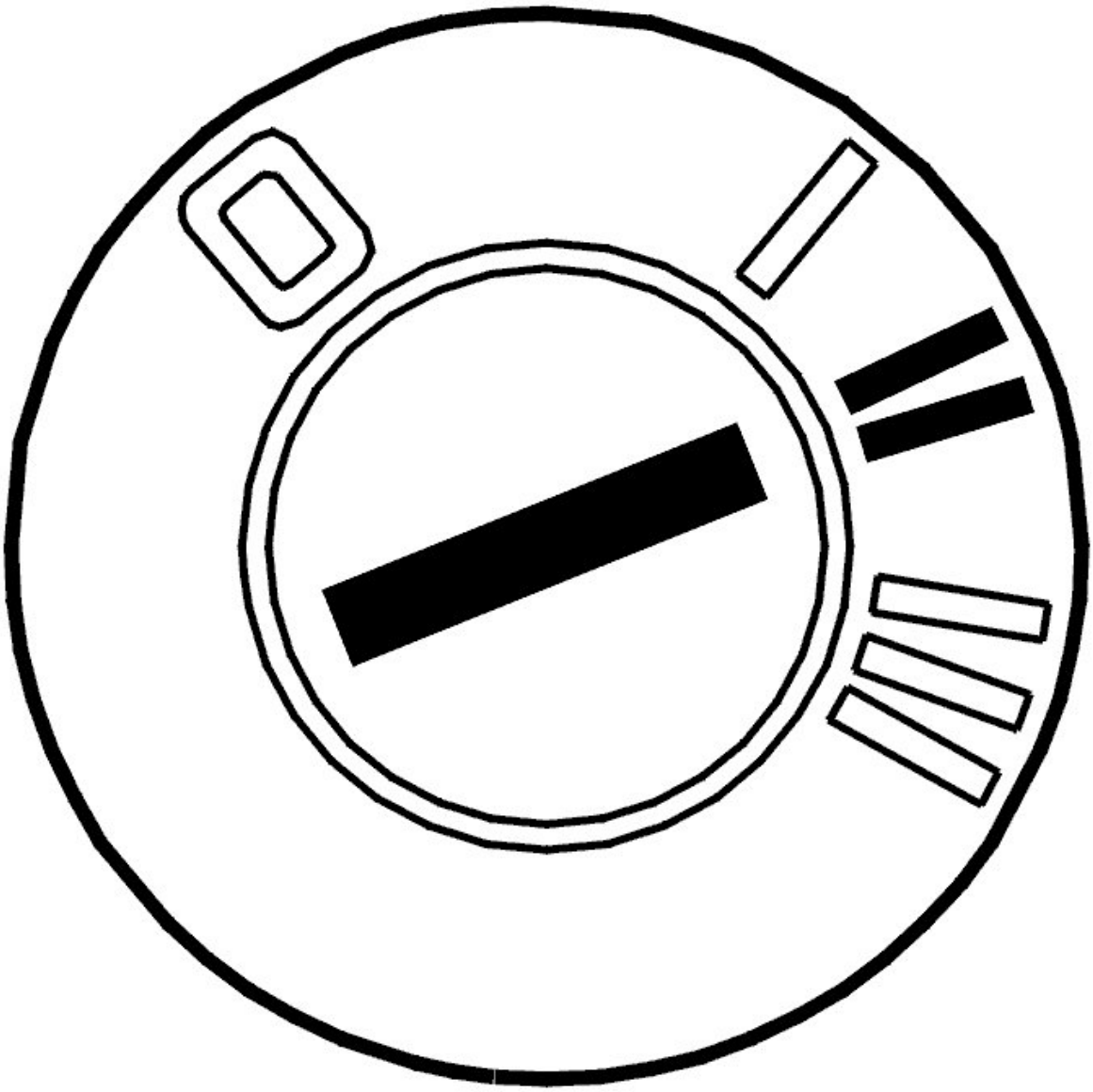


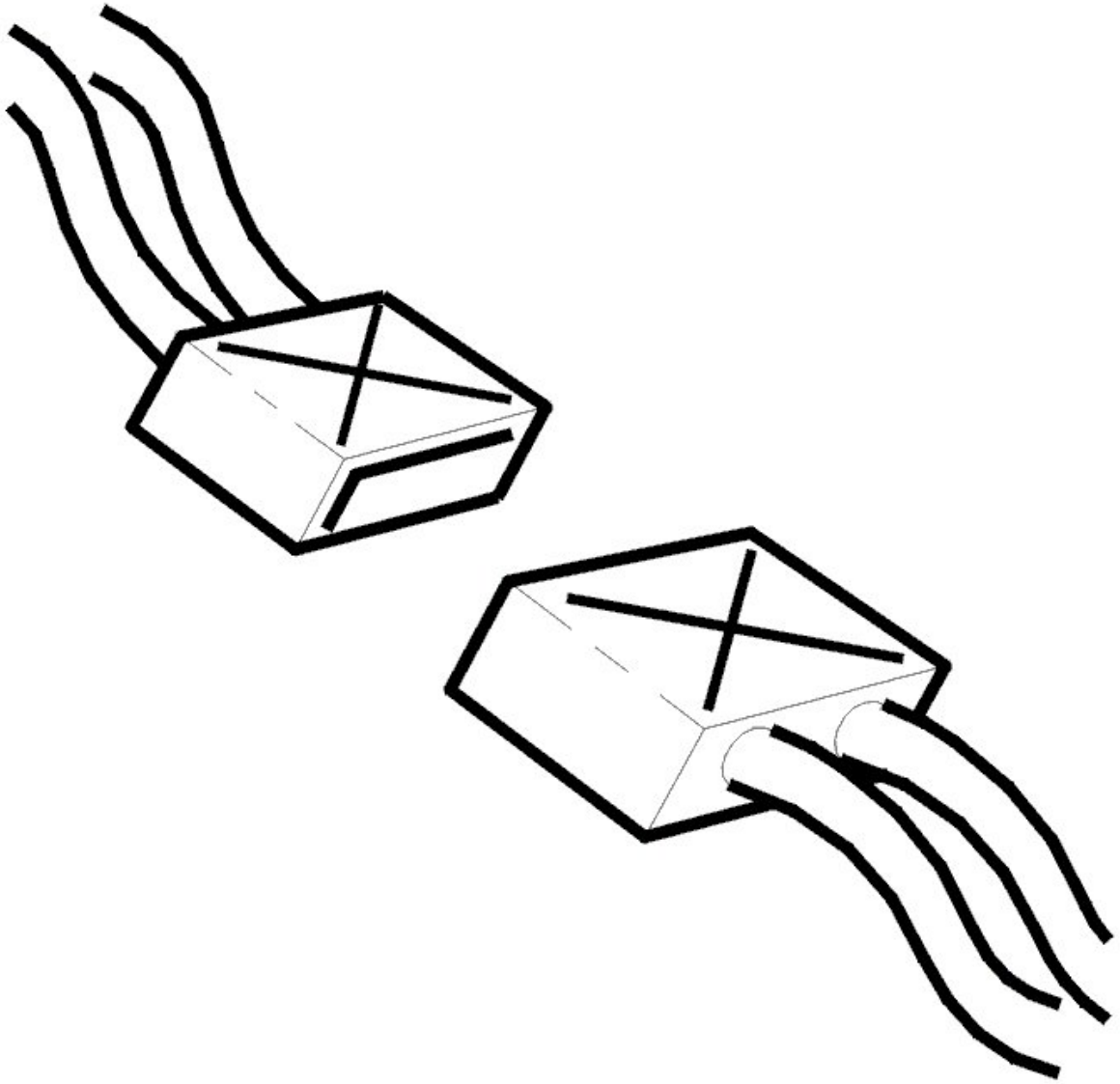
Was a fault detected?

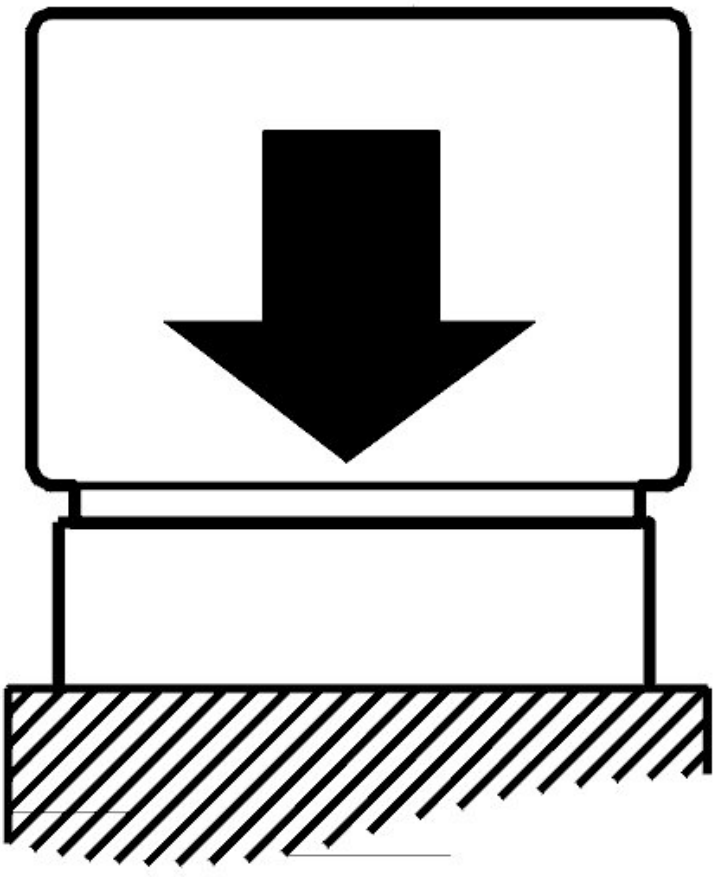
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Ignition on
- Gear selector in position P.

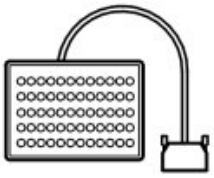
Check the transmission control module (TCM) by measuring the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

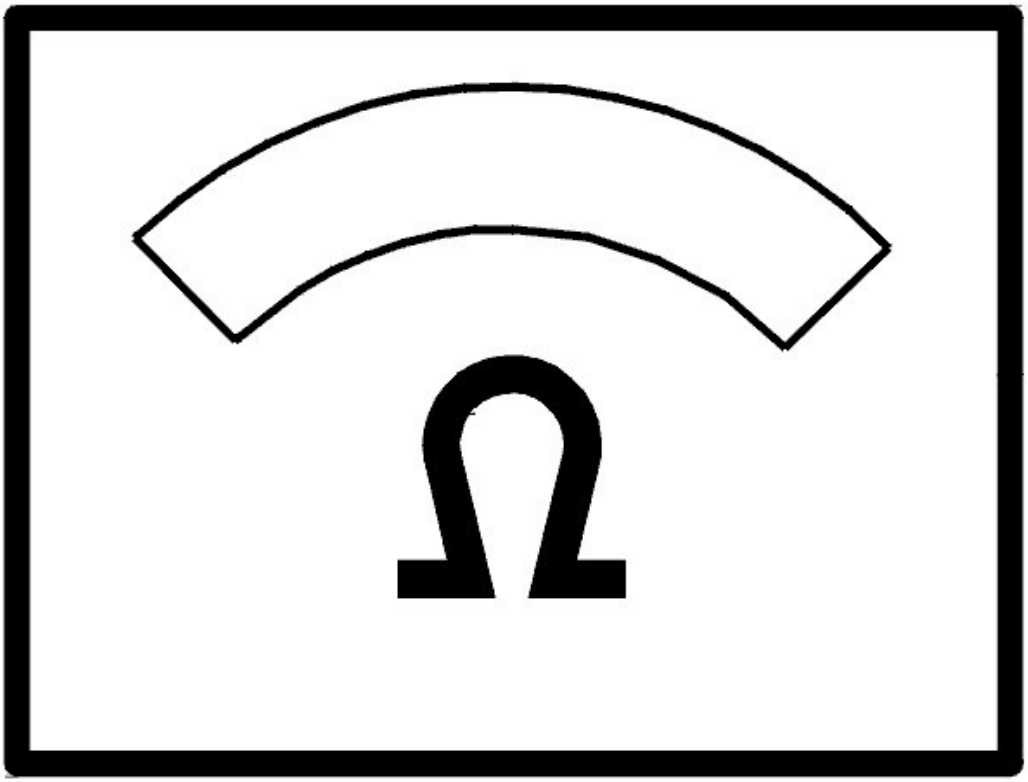
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



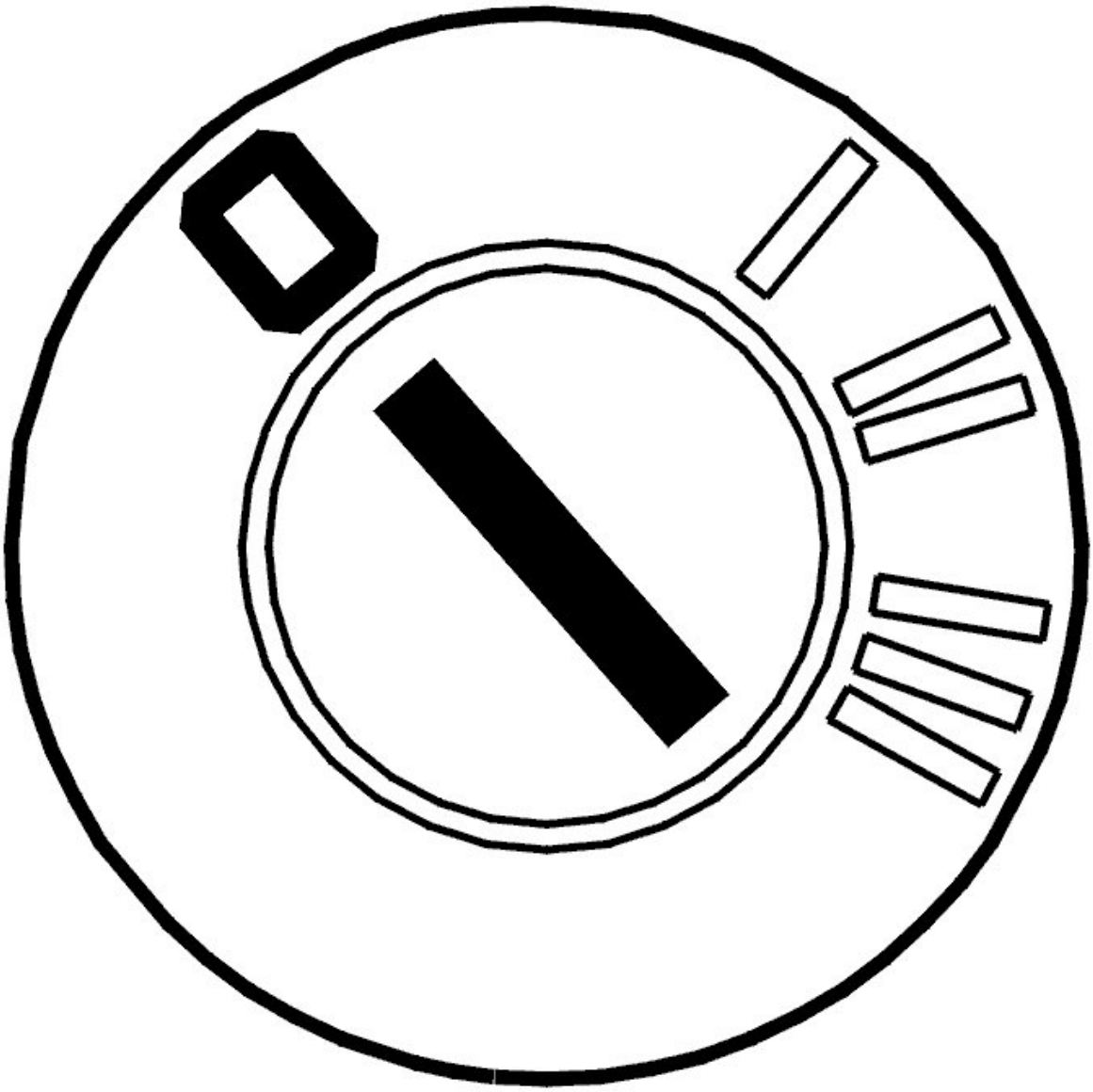


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

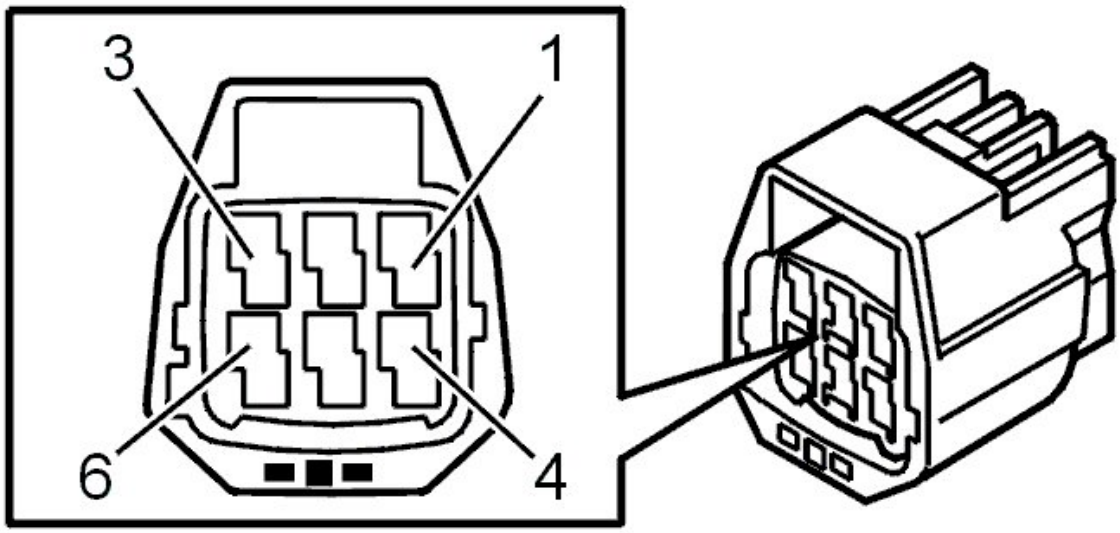
Hint:

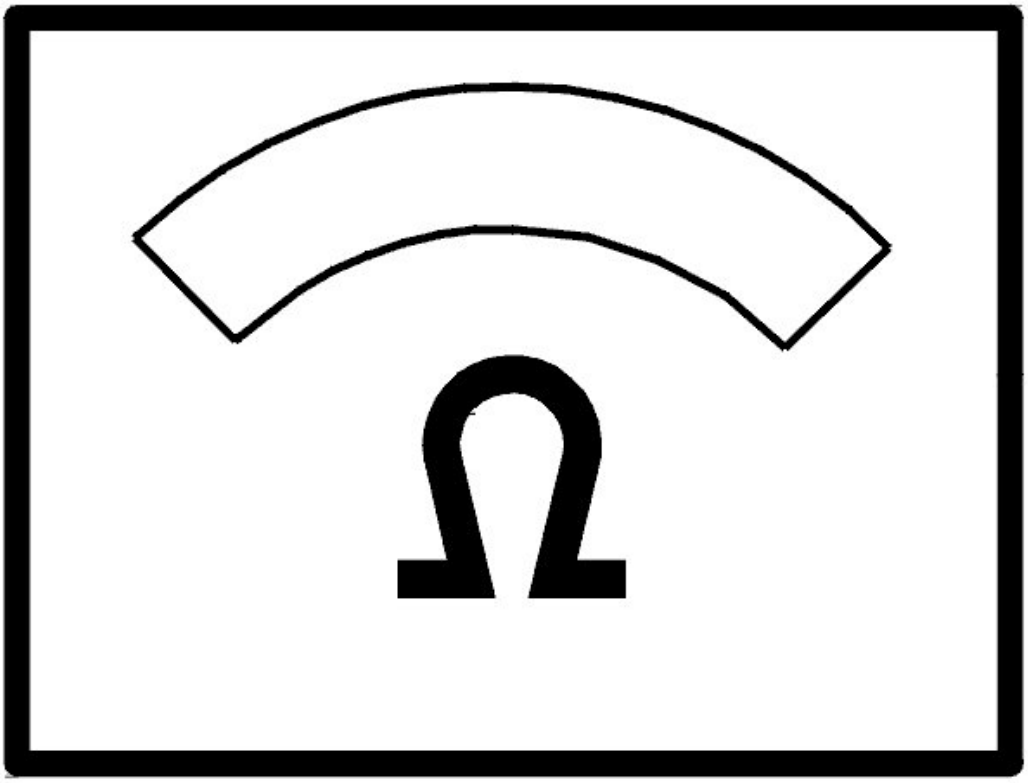
- Check solenoid S3 by measuring the resistance between the terminal pin on solenoid S3 and the transmission housing. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S3, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

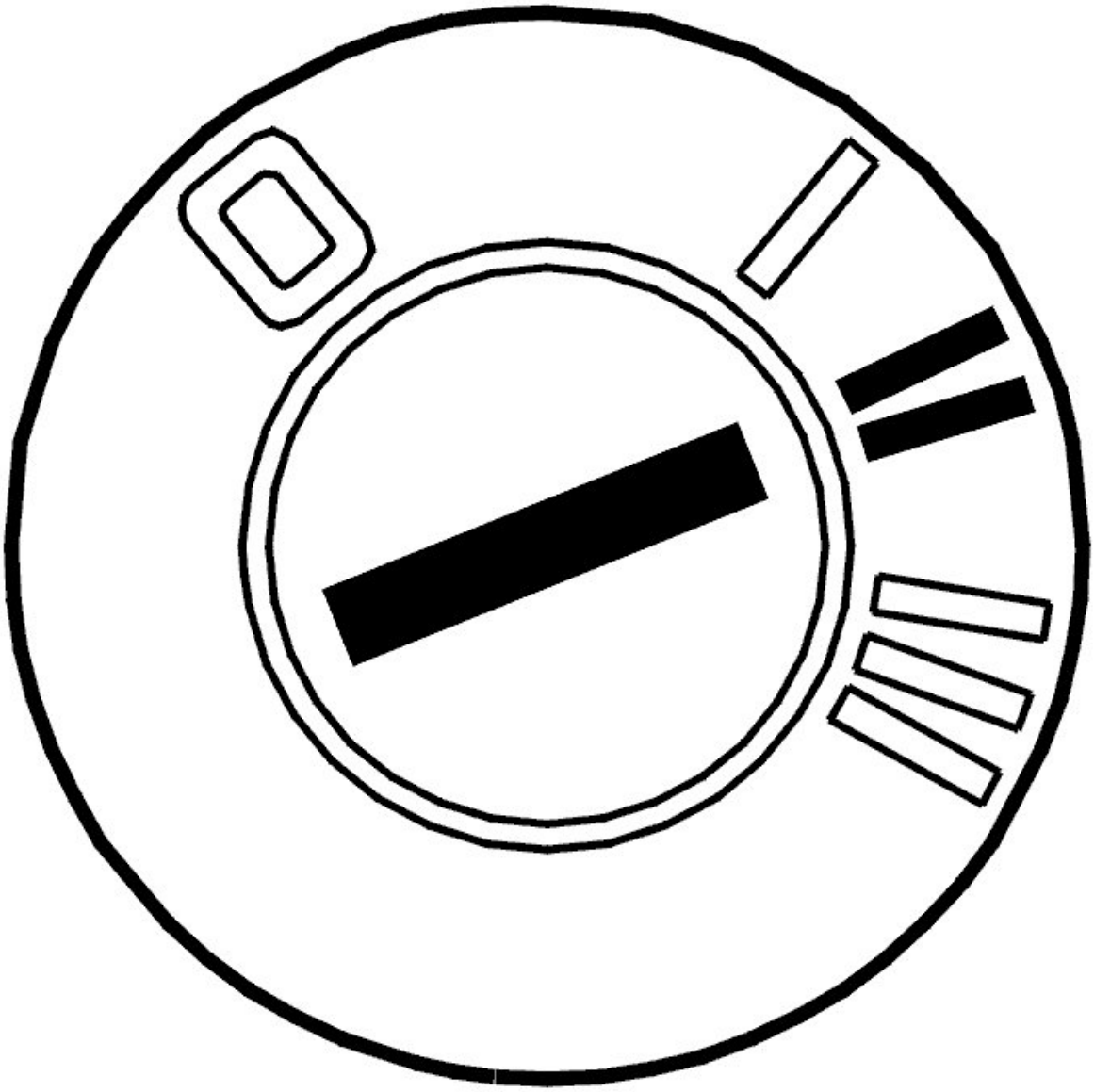
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



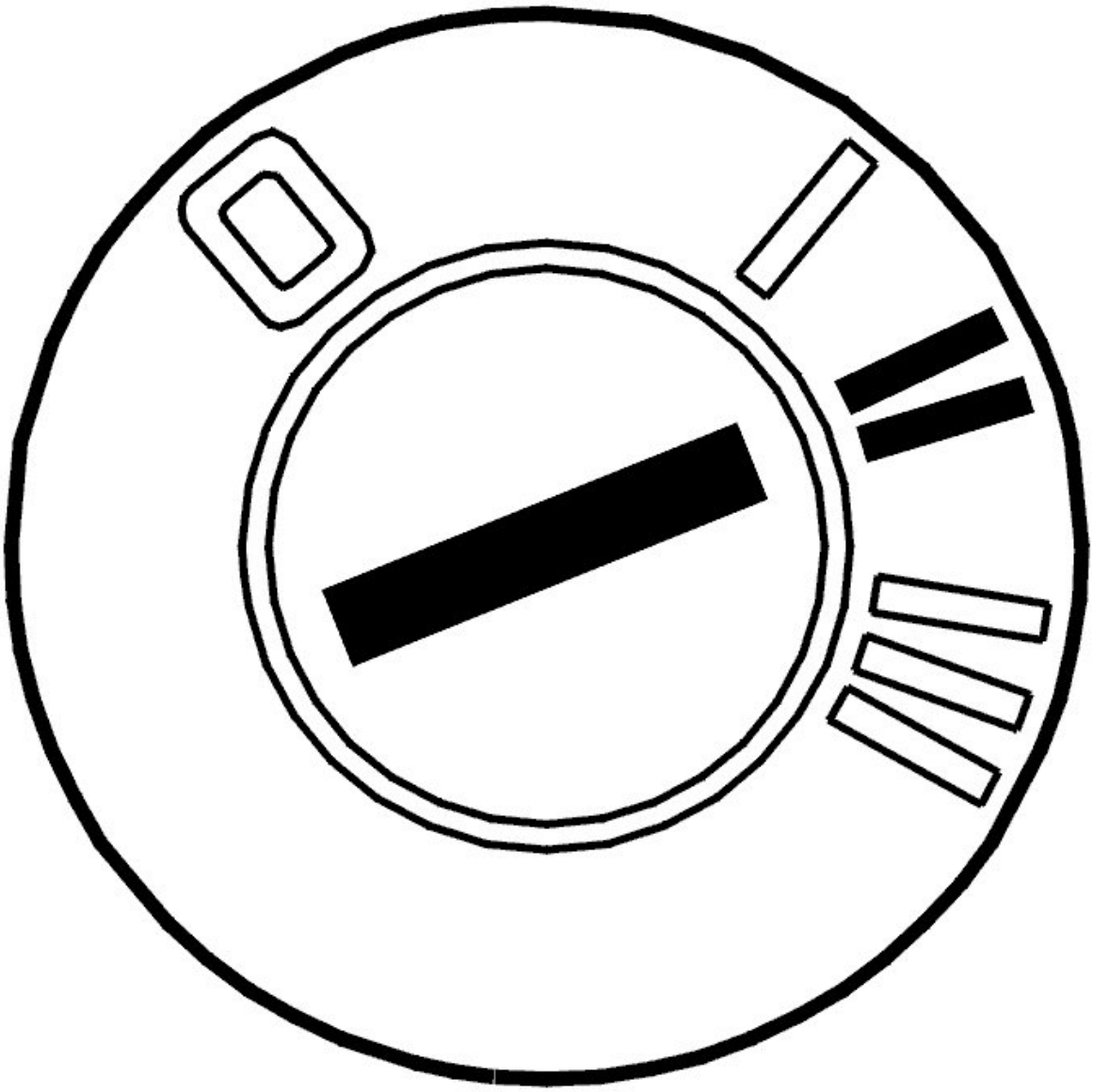
- Ignition on.

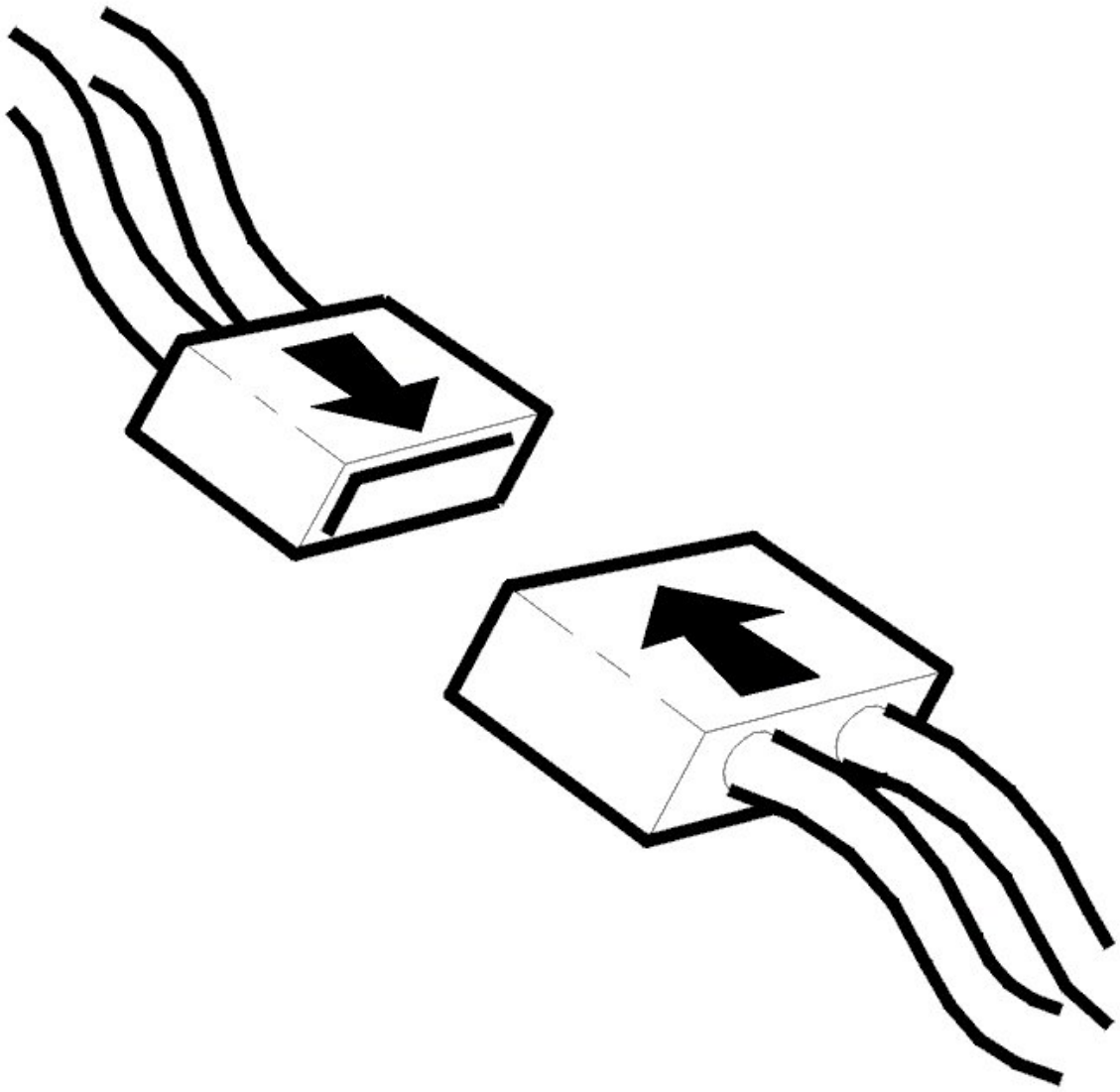
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The current should oscillate between 0 and 1.5 A.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the transmission control module (TCM) connector and transmission connector C. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

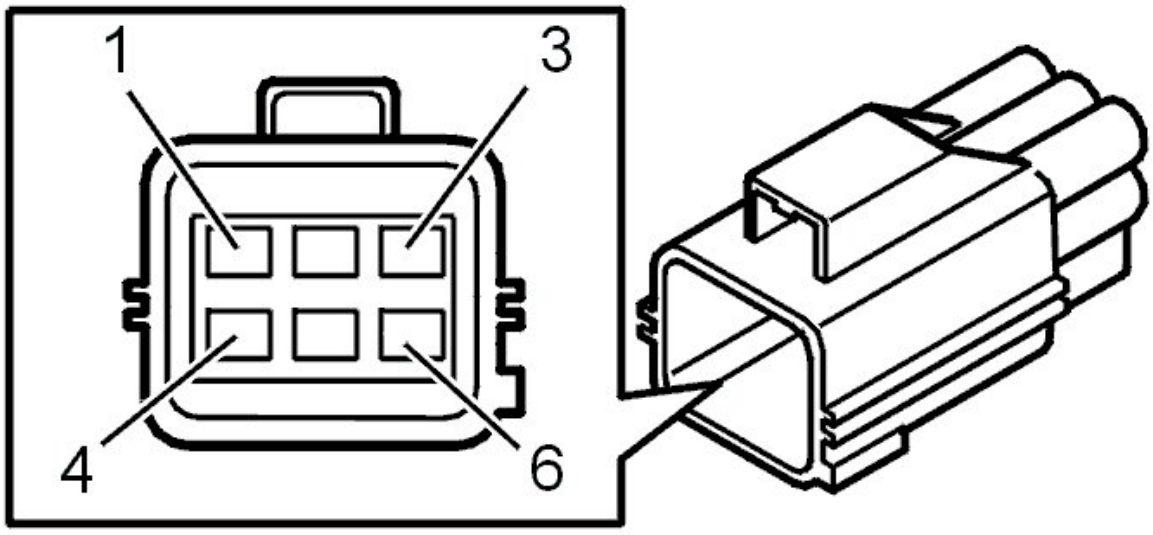
Hint:

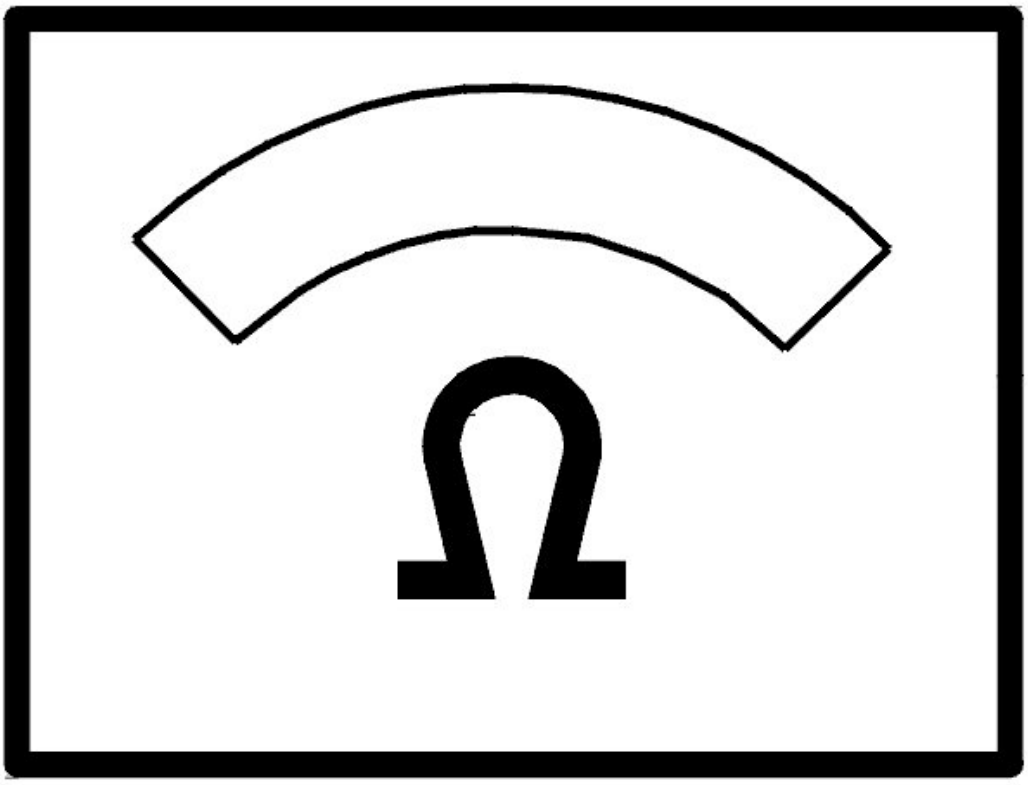
- Check the circuit for solenoid S3. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

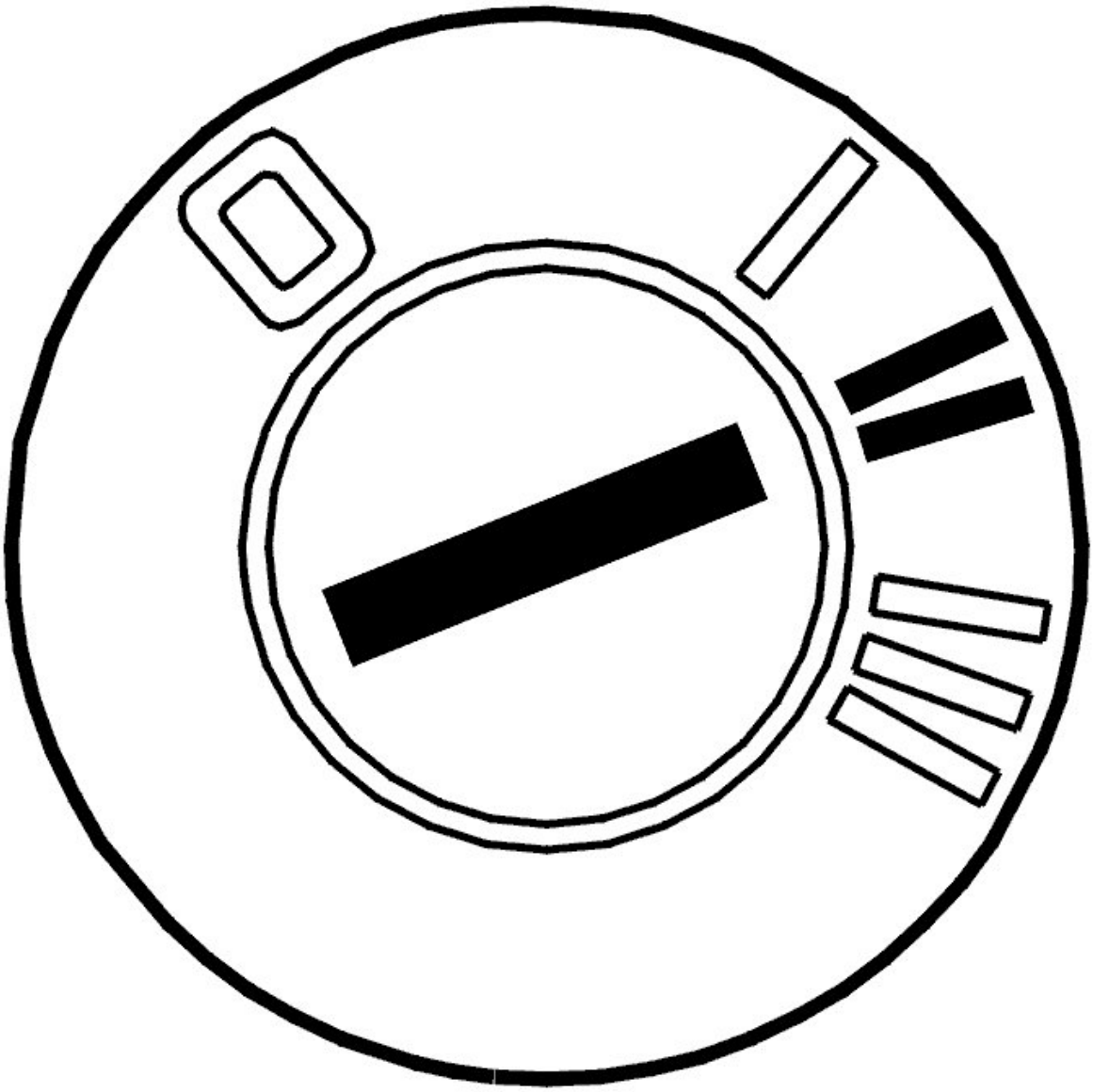
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

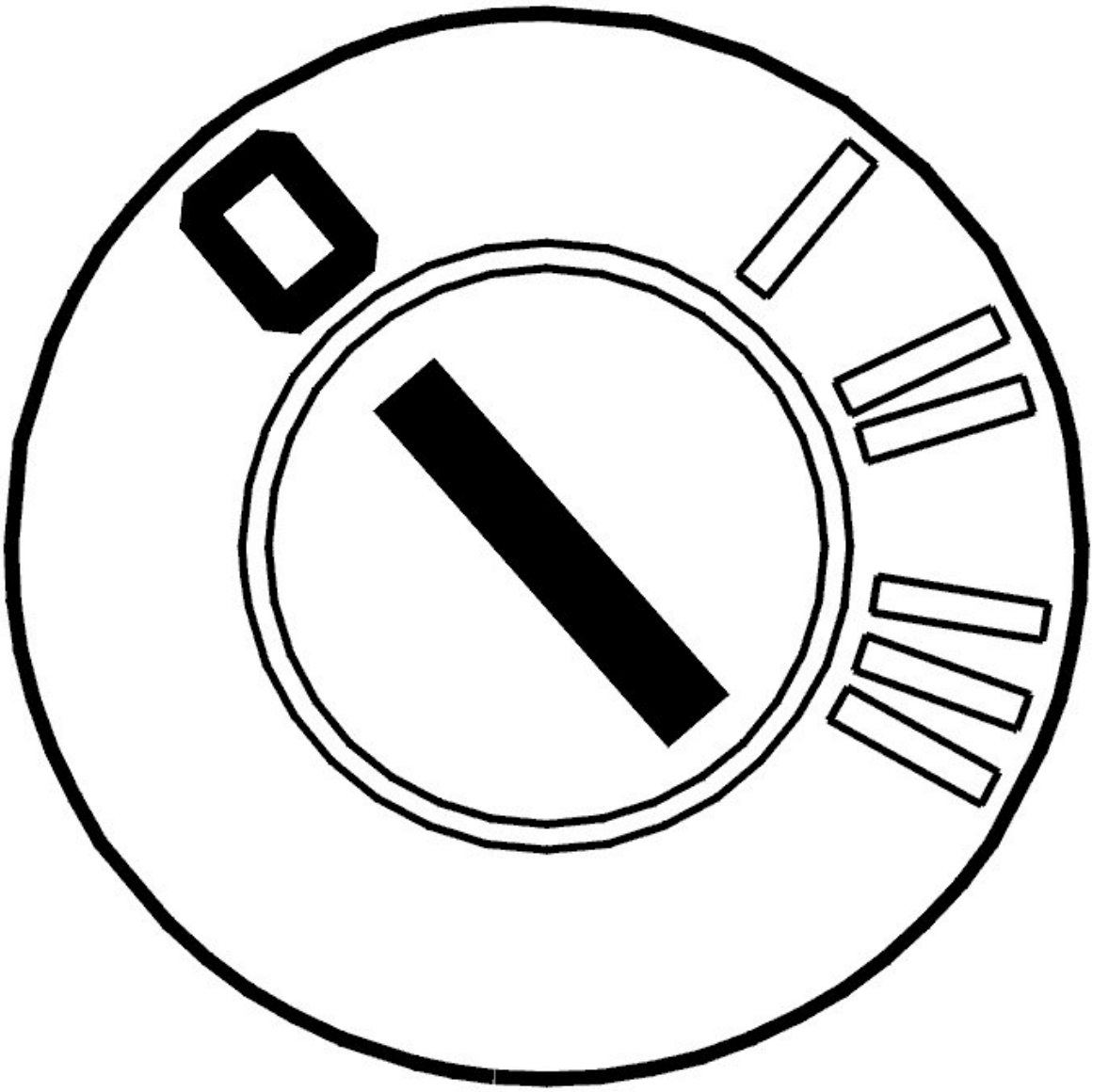
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

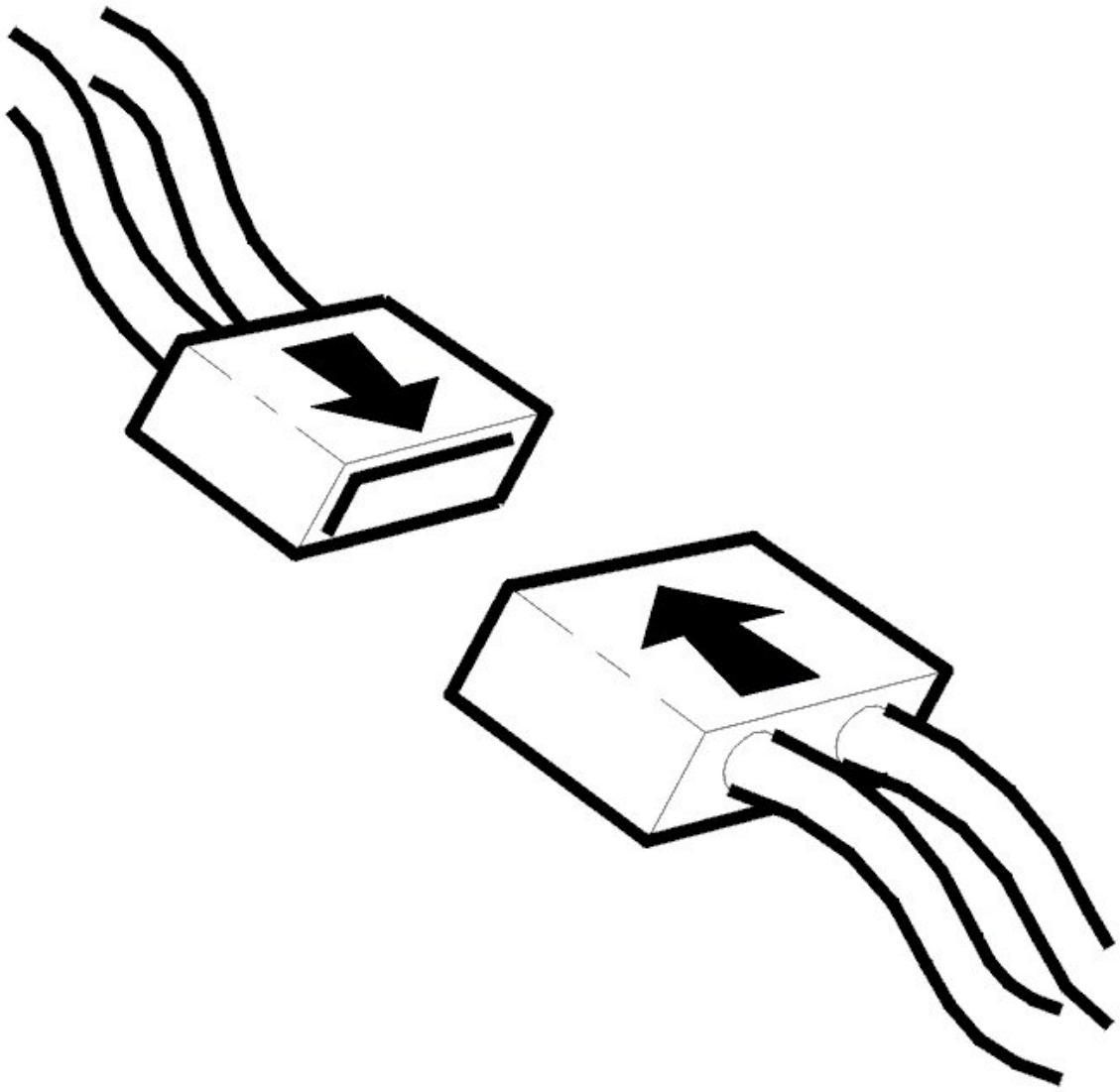
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

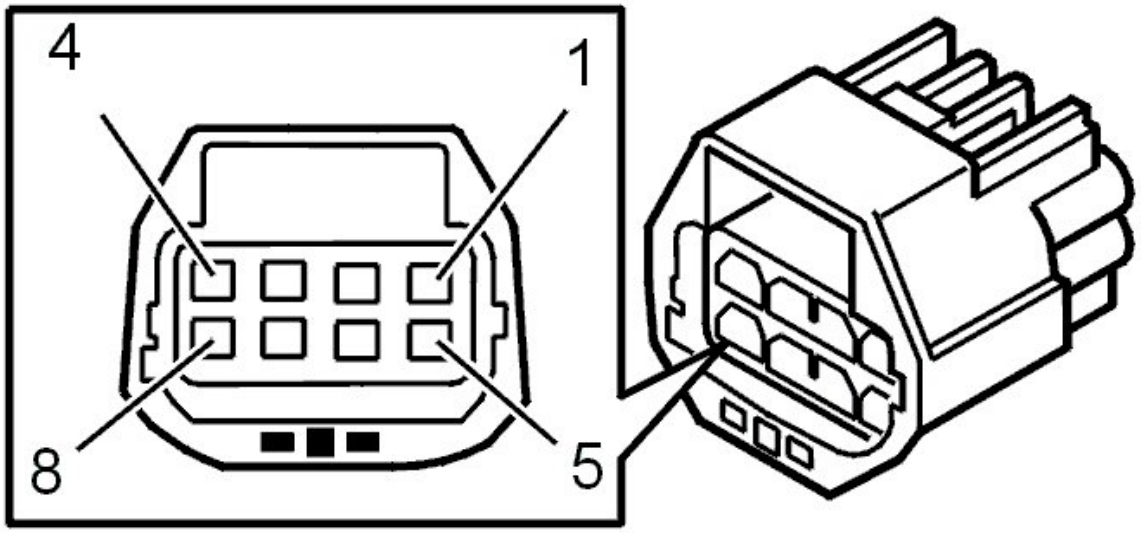
Checking transmission fluid temperature sensor

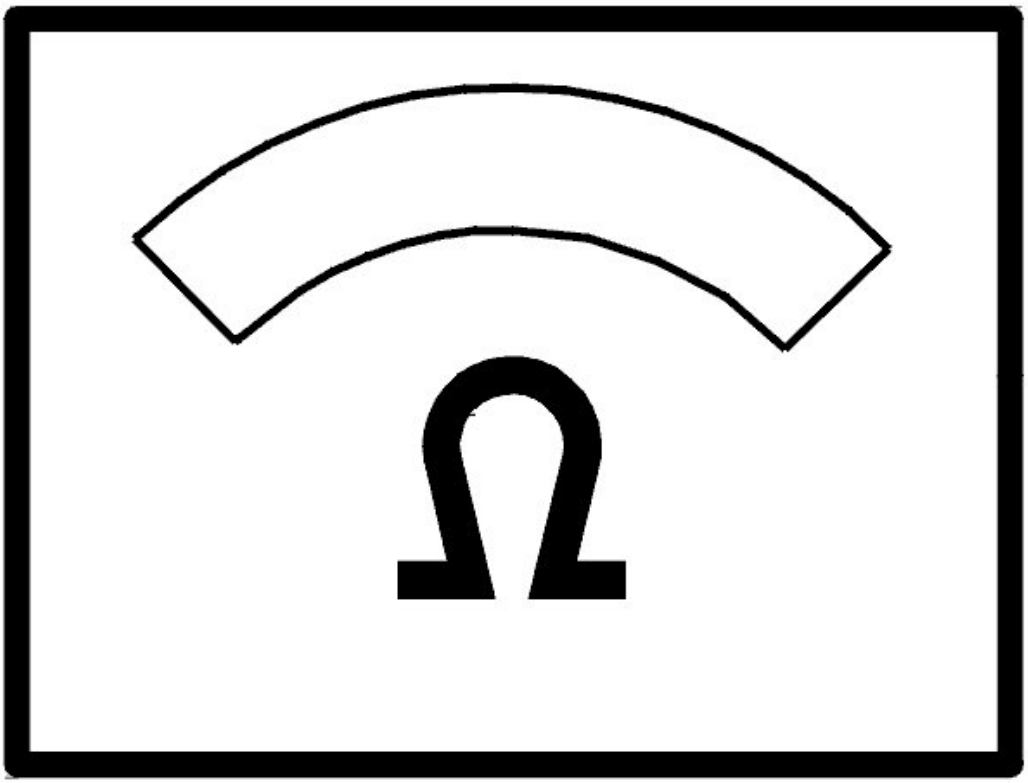




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

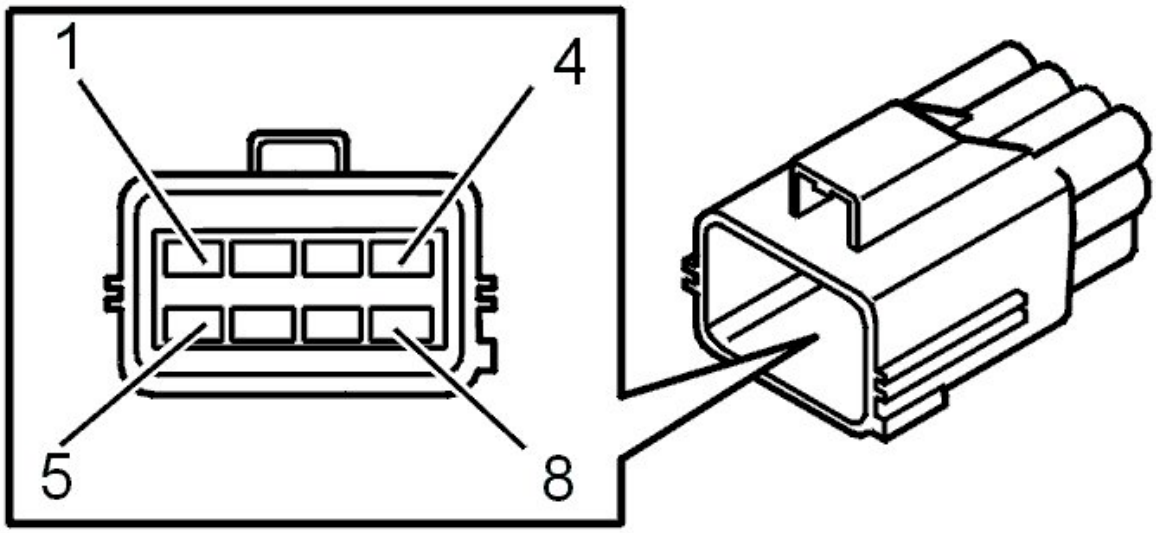
No - Checking the cable and component

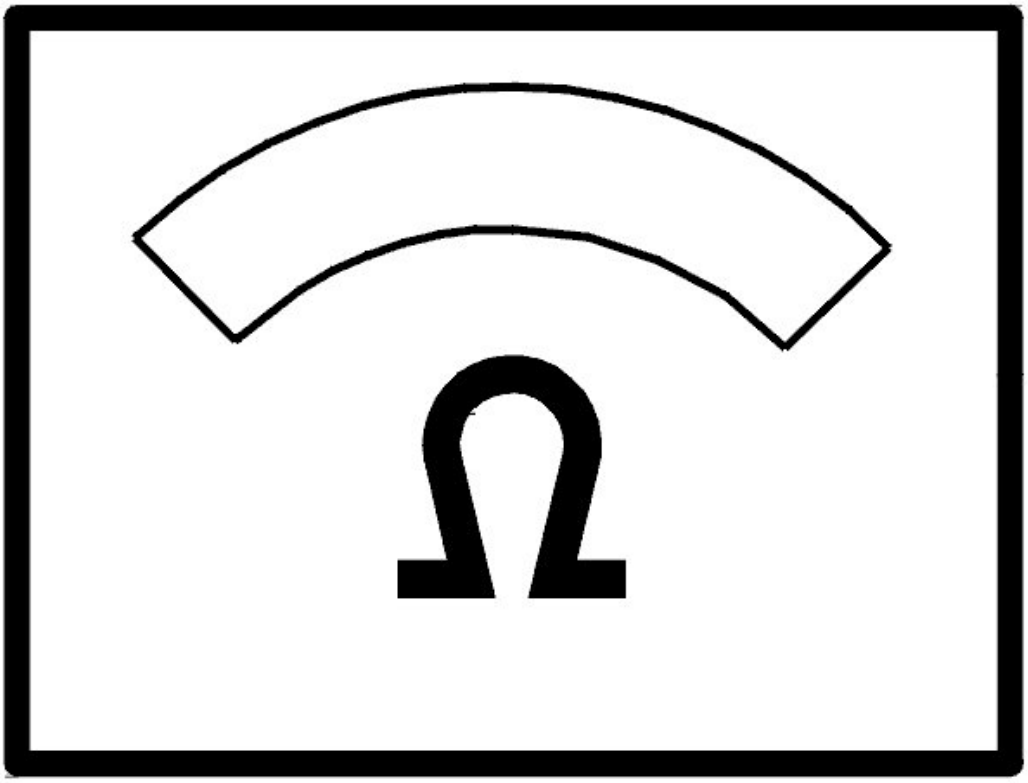
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



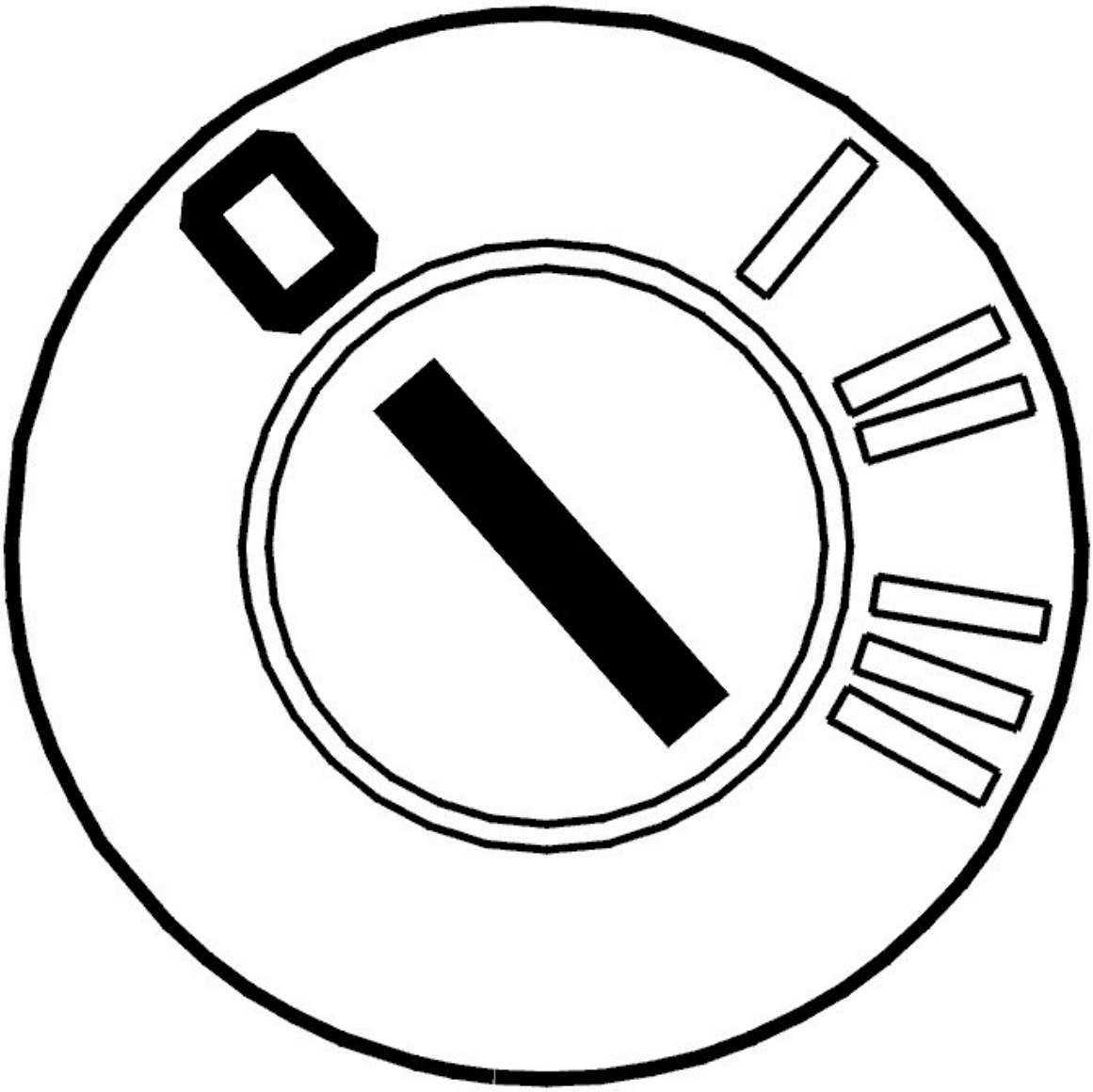


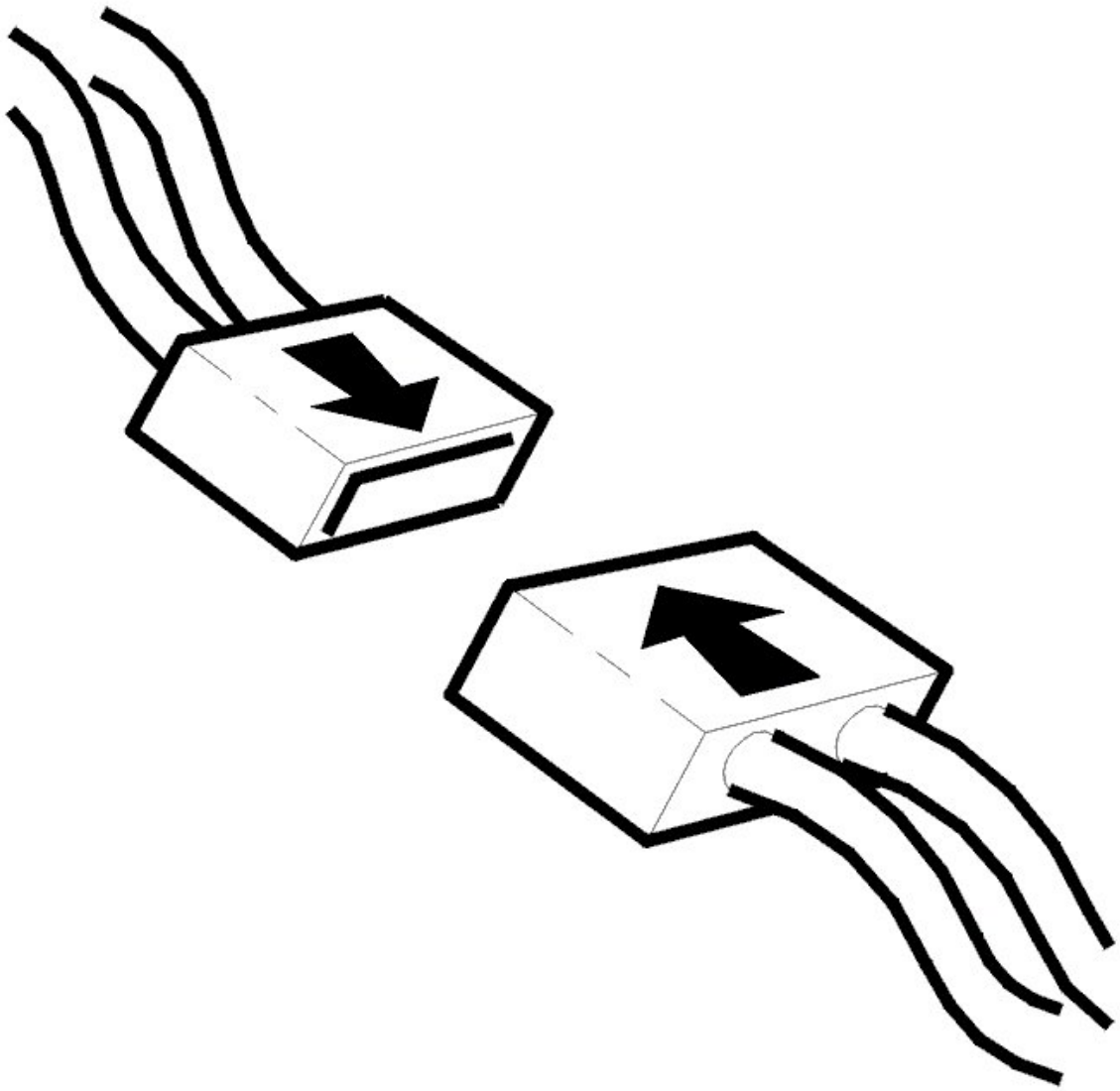
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

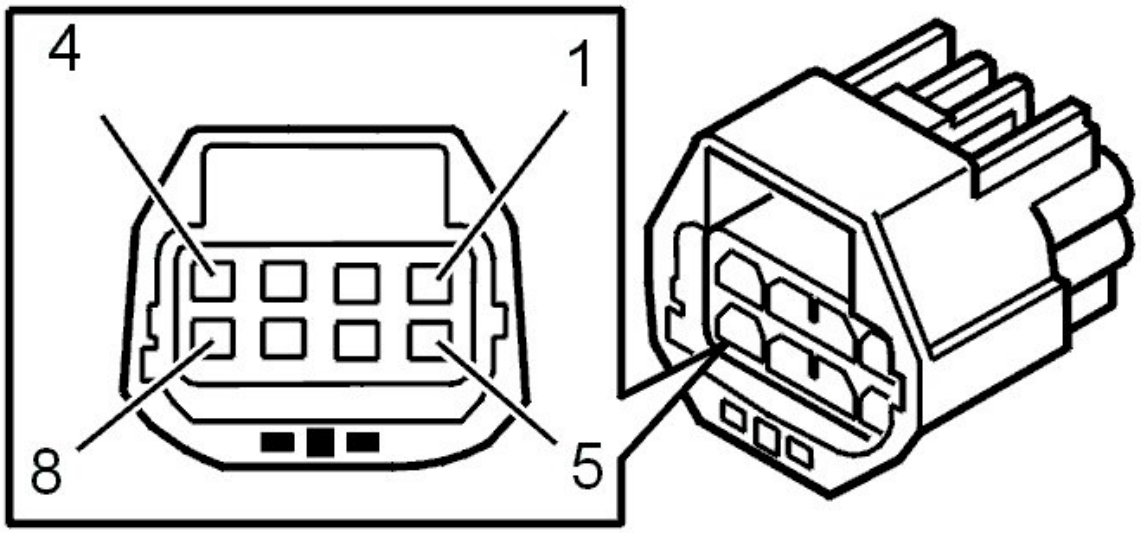
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

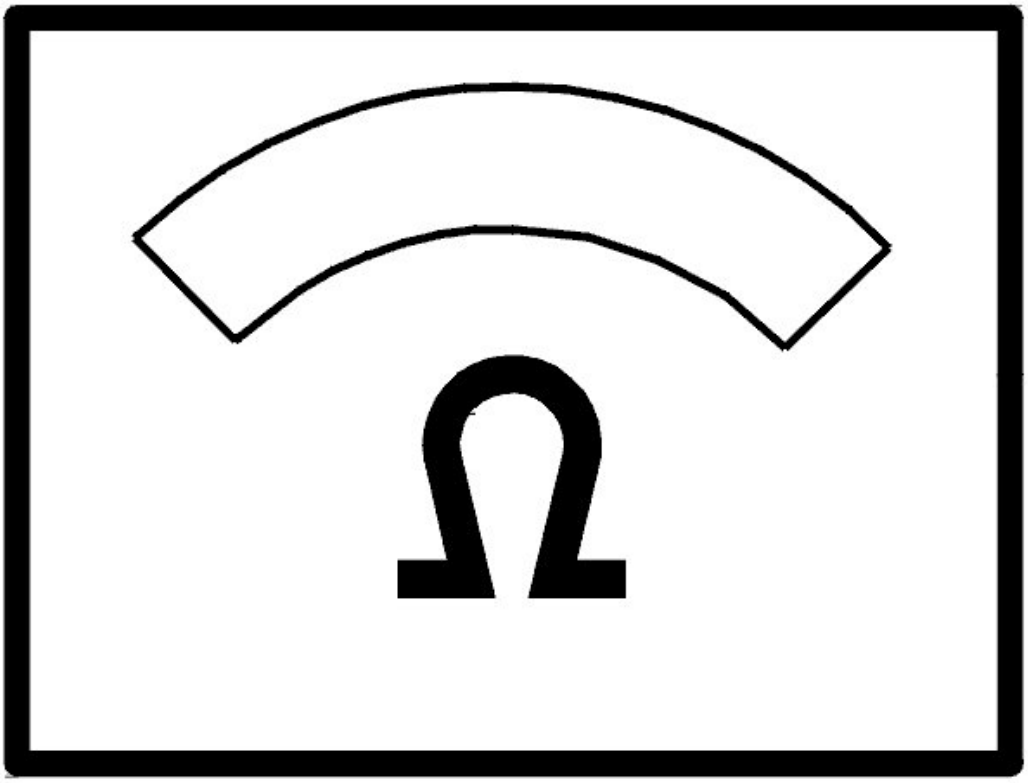
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





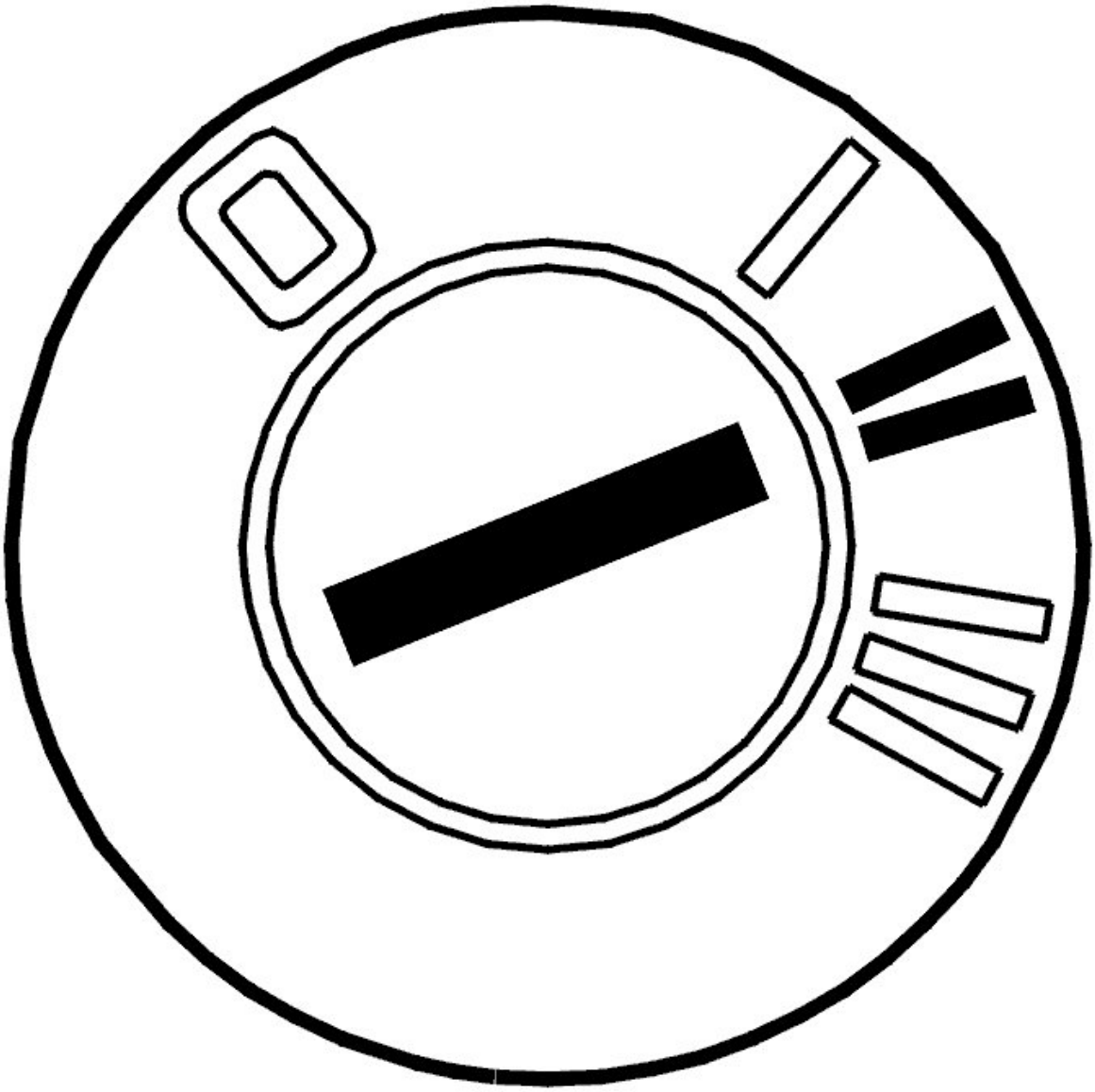
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



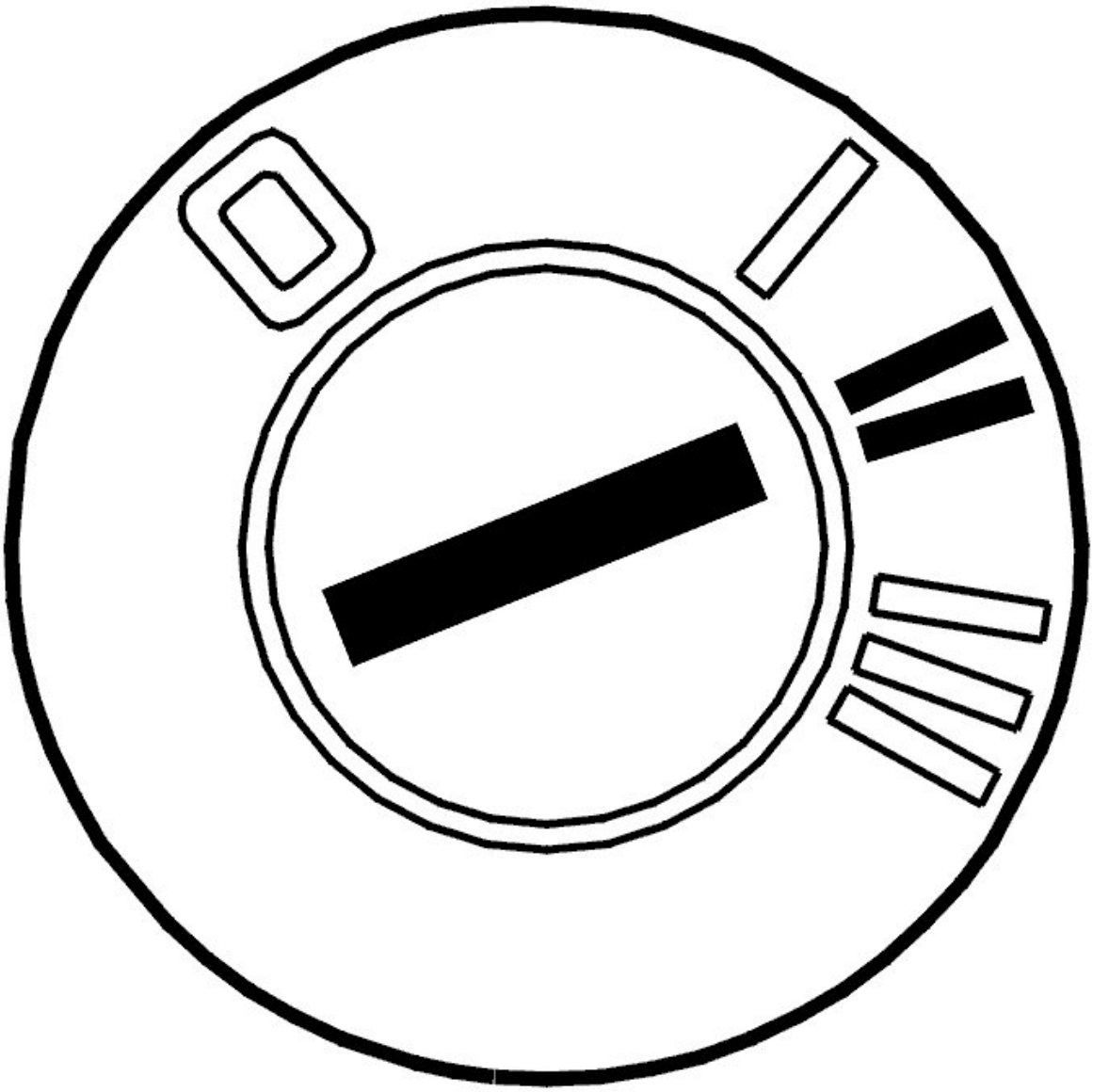
- Ignition on.

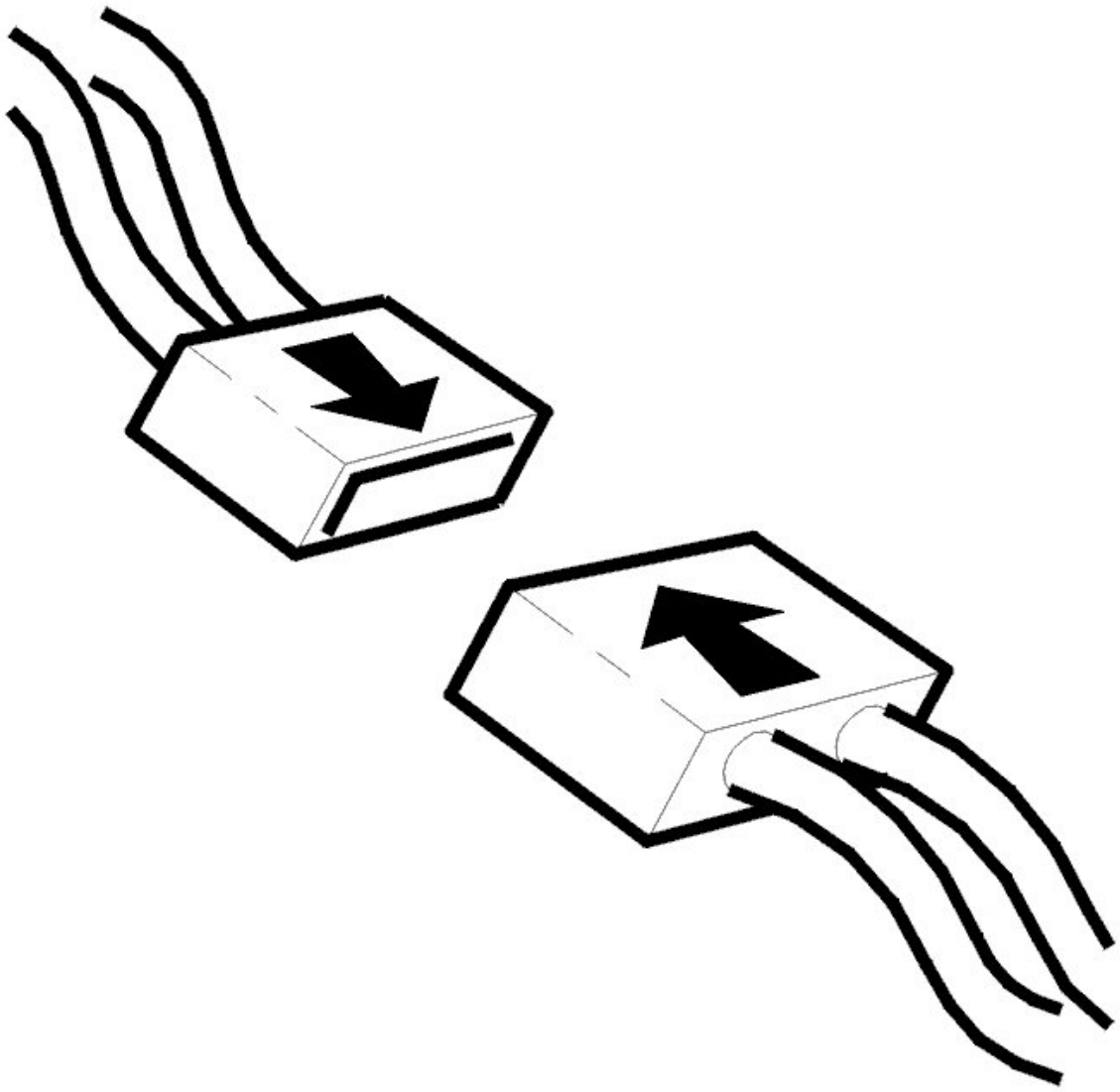
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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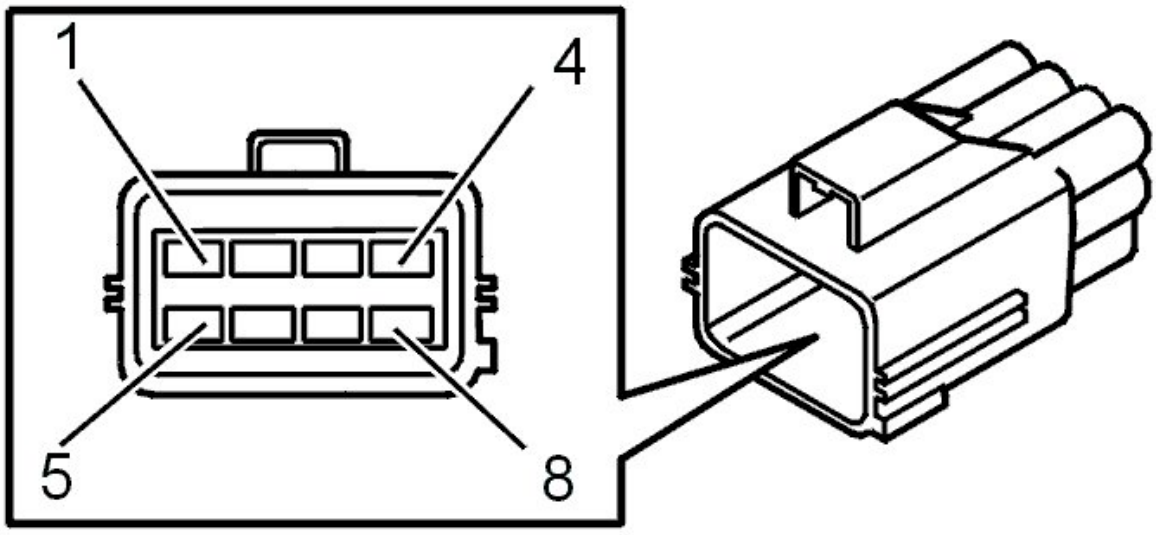
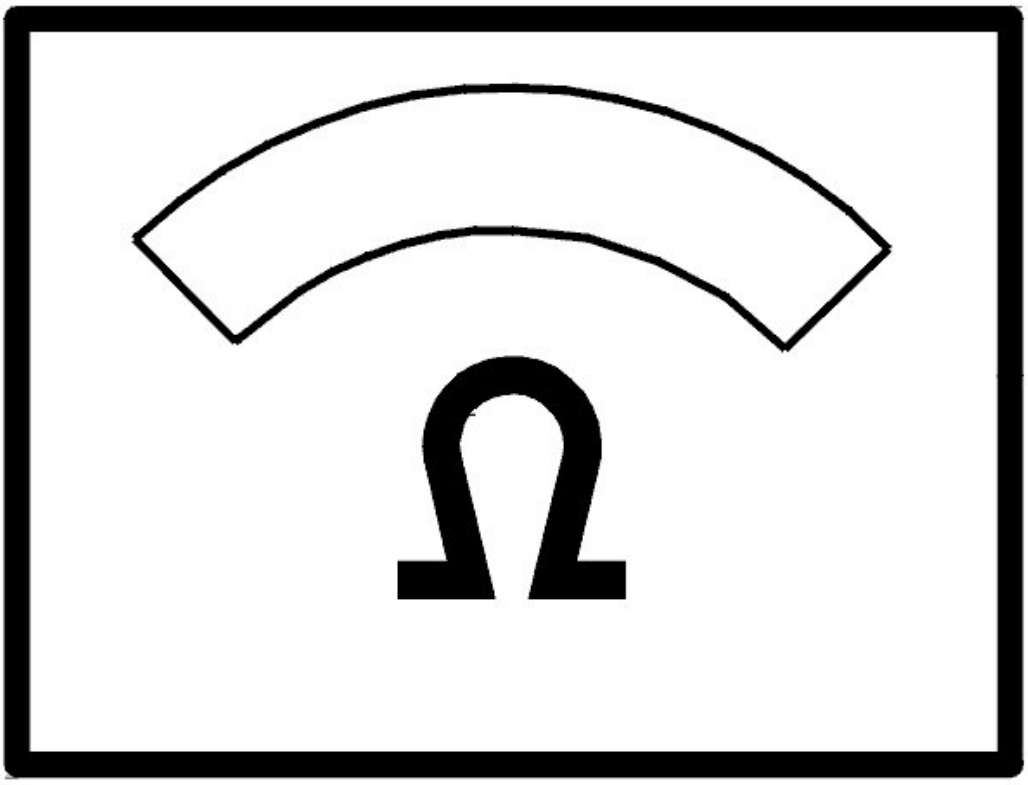
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition
Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid should be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

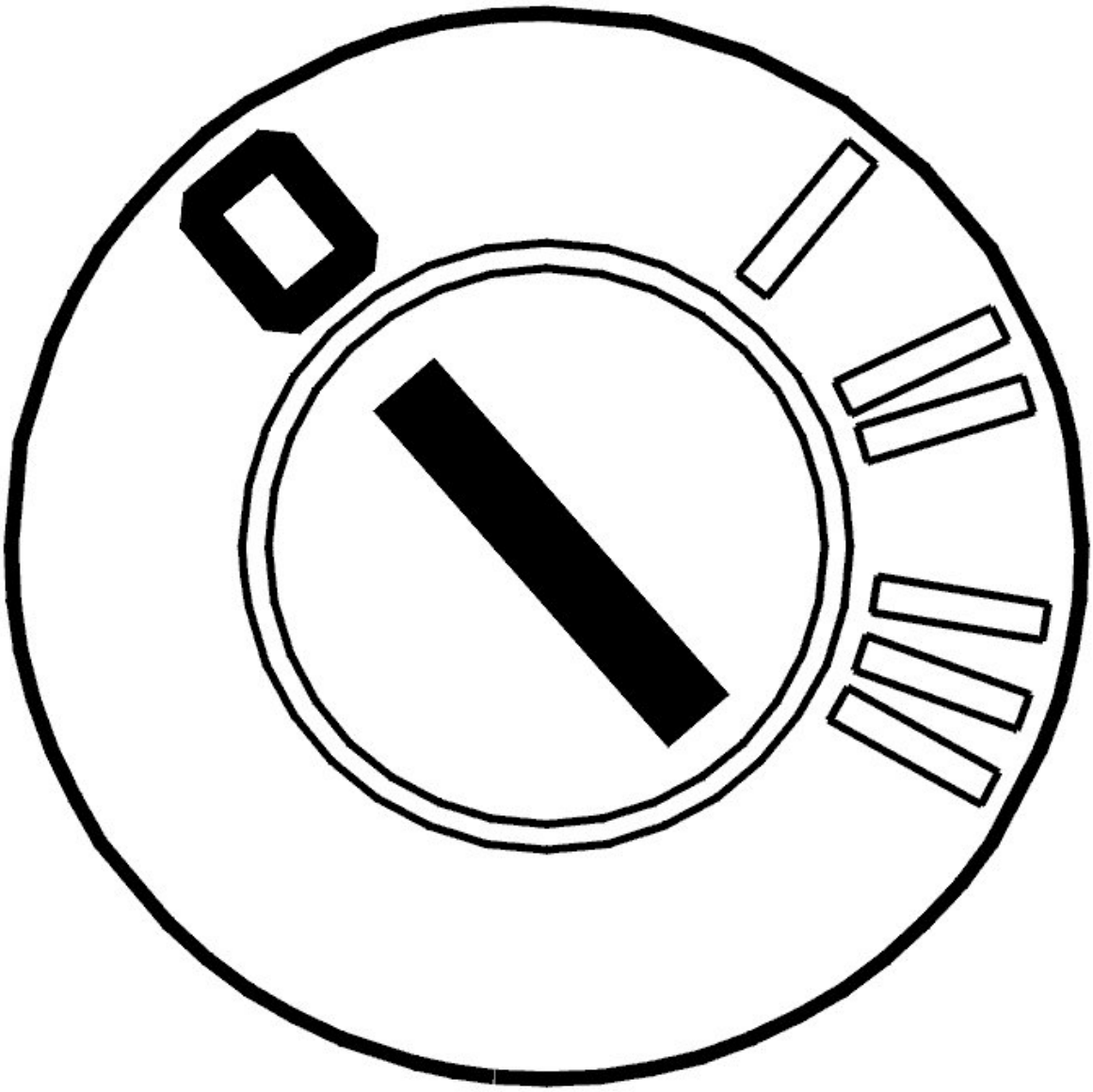
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Signal Too Low

Signal too low

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

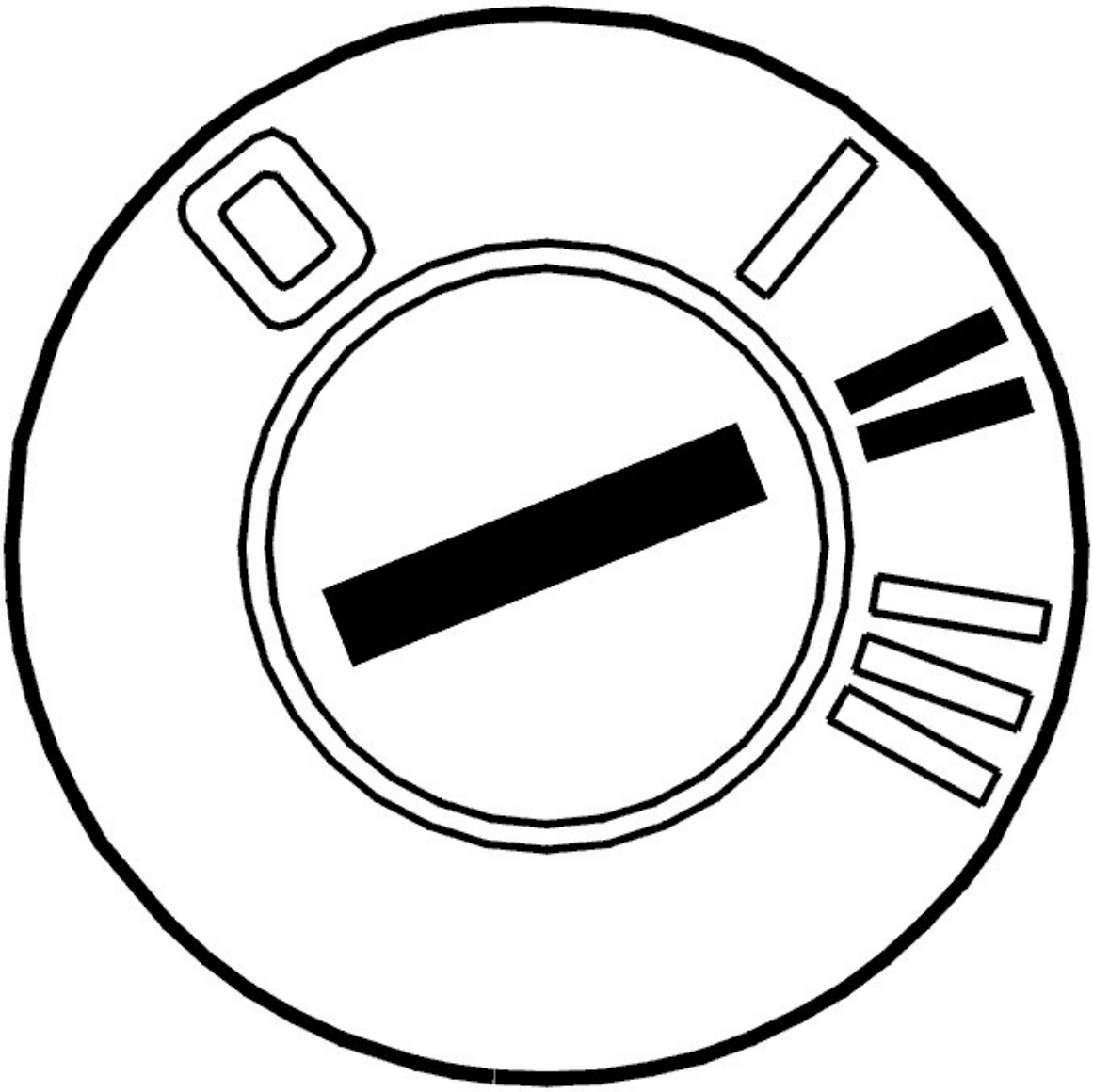
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S3

No - Checking transmission fluid temperature sensor

Checking shift solenoid S3



- Ignition on
- Gear selector in position P
- Activate solenoid S3.

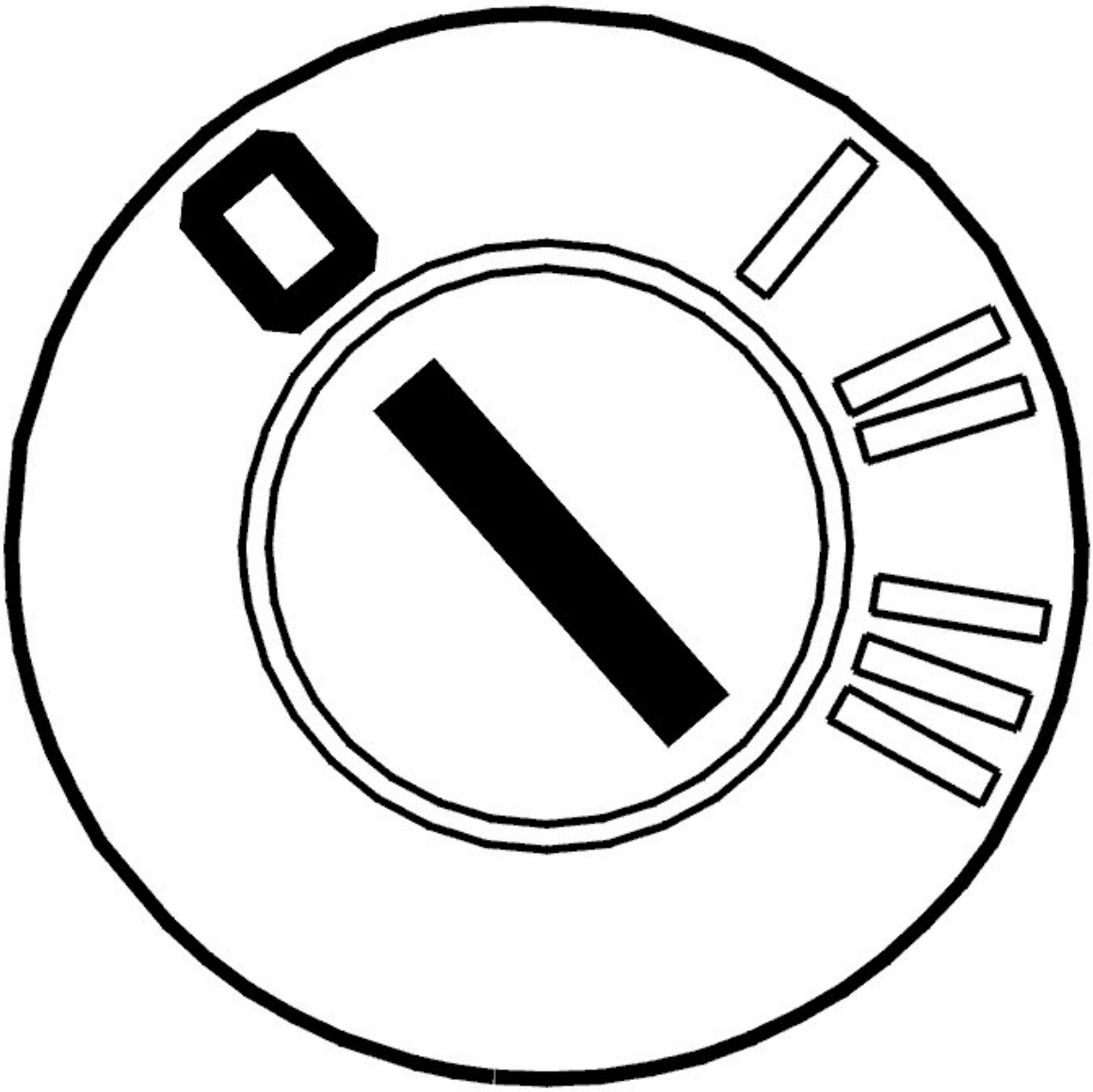
The value must change between OFF and ON.

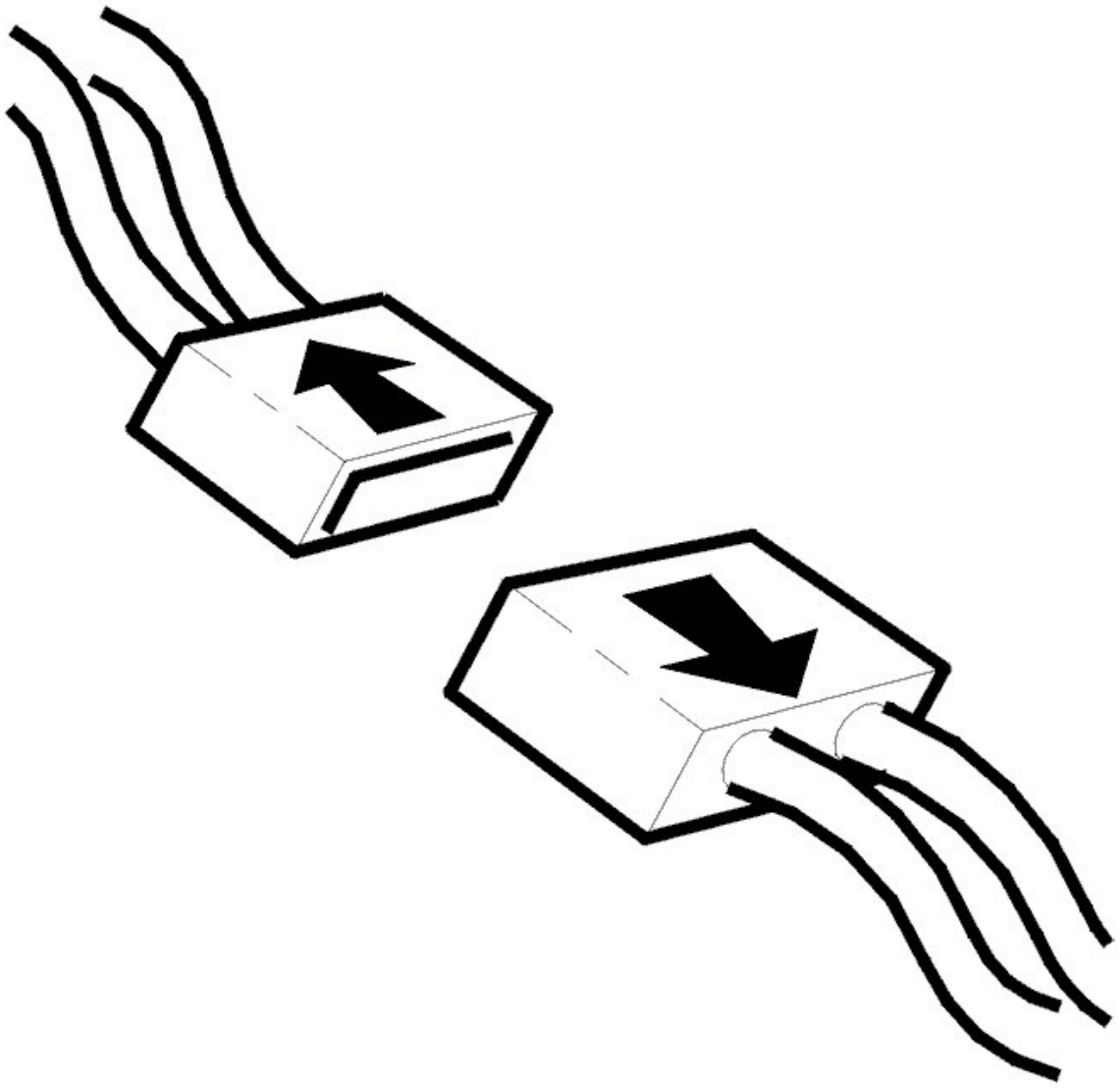
Does the value change?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



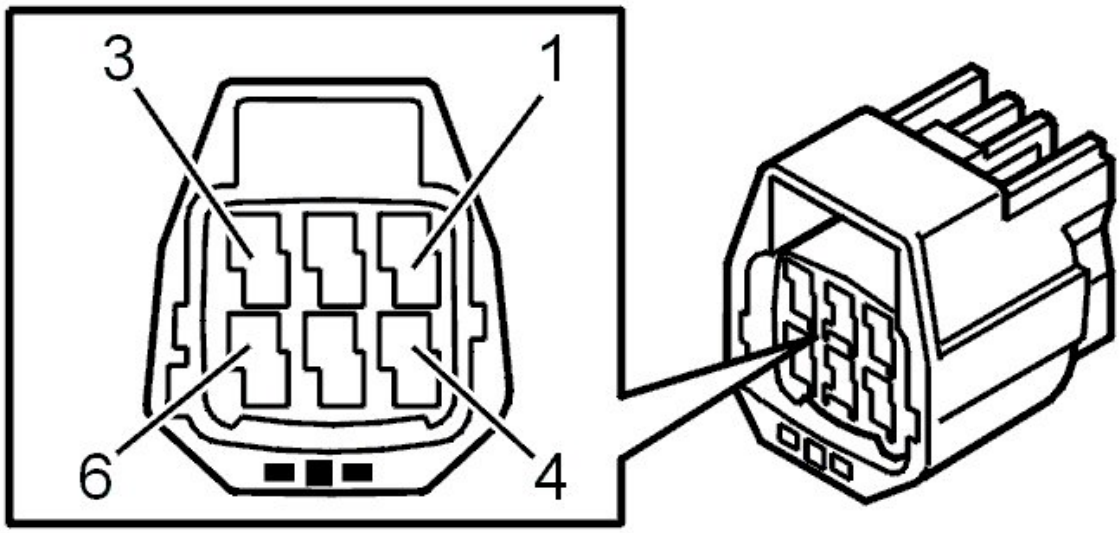


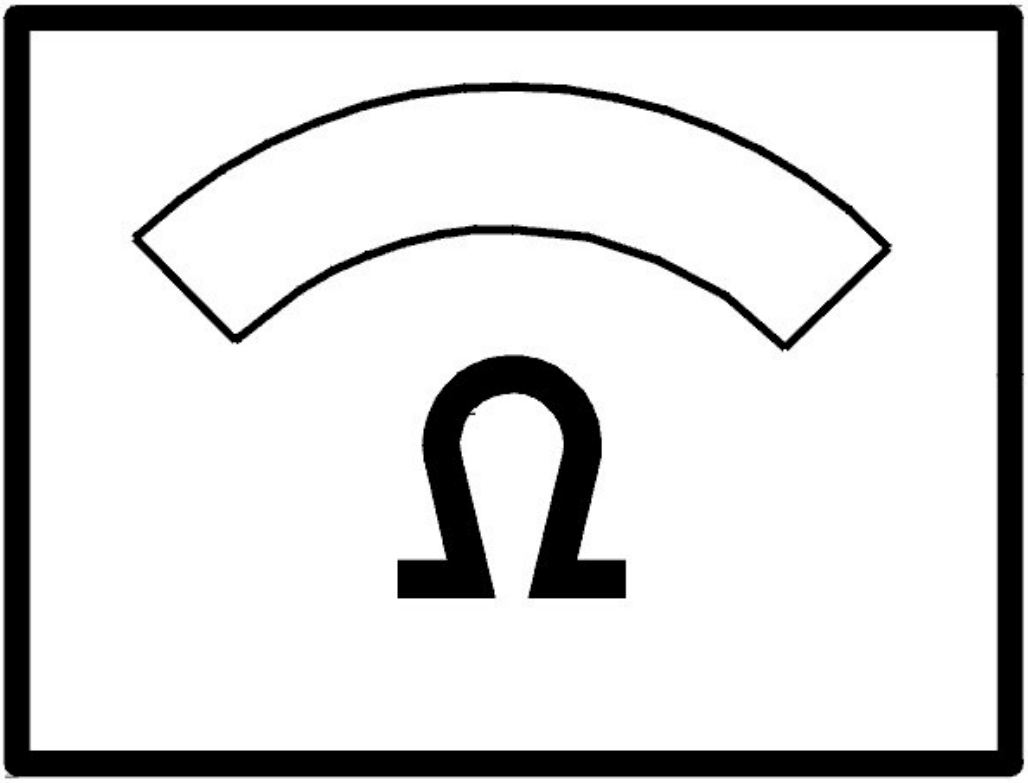
- Ignition off
- Disconnect transmission connector C.

Check solenoid S3 by measuring the resistance between transmission connector terminal #C3 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



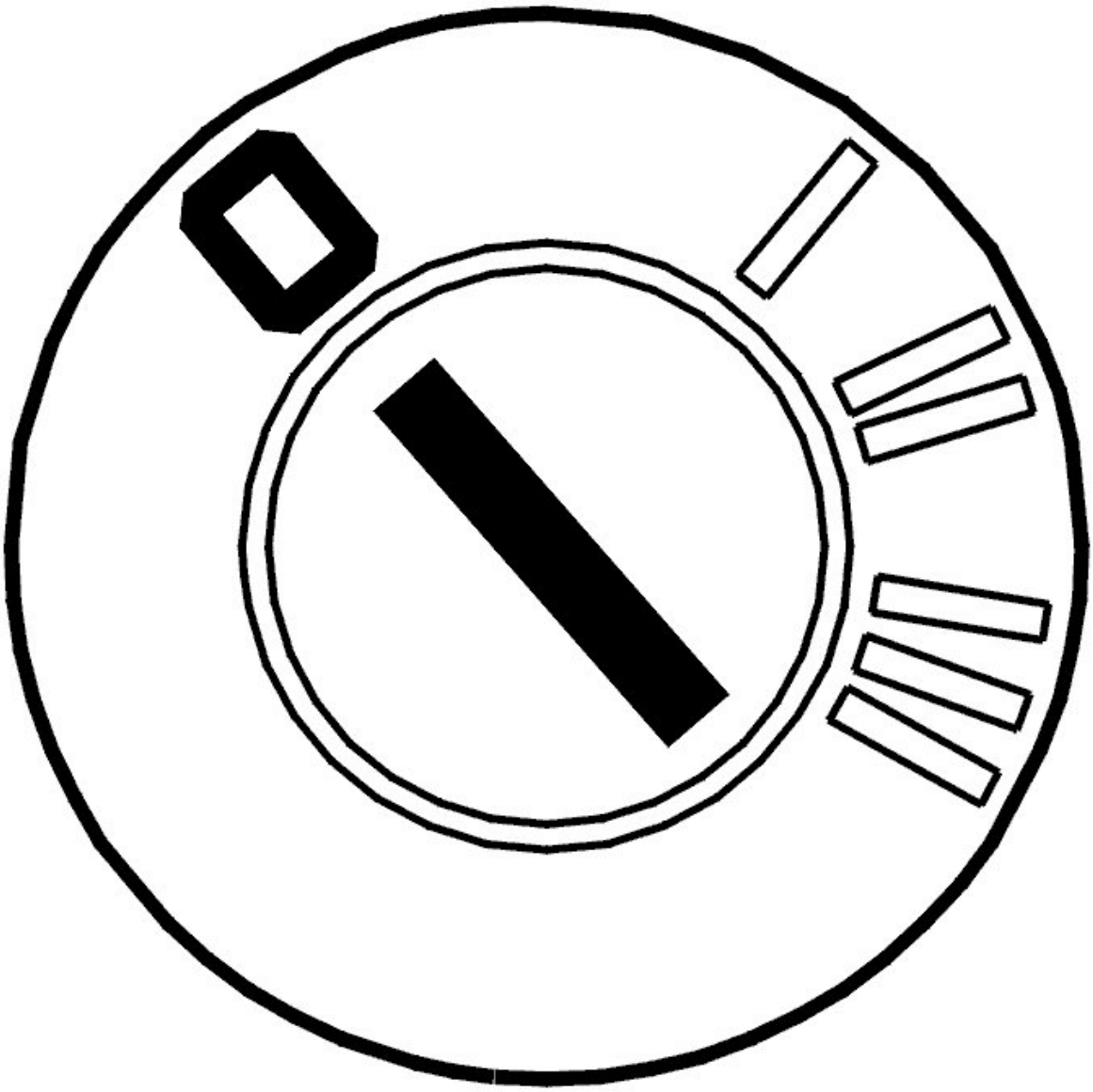


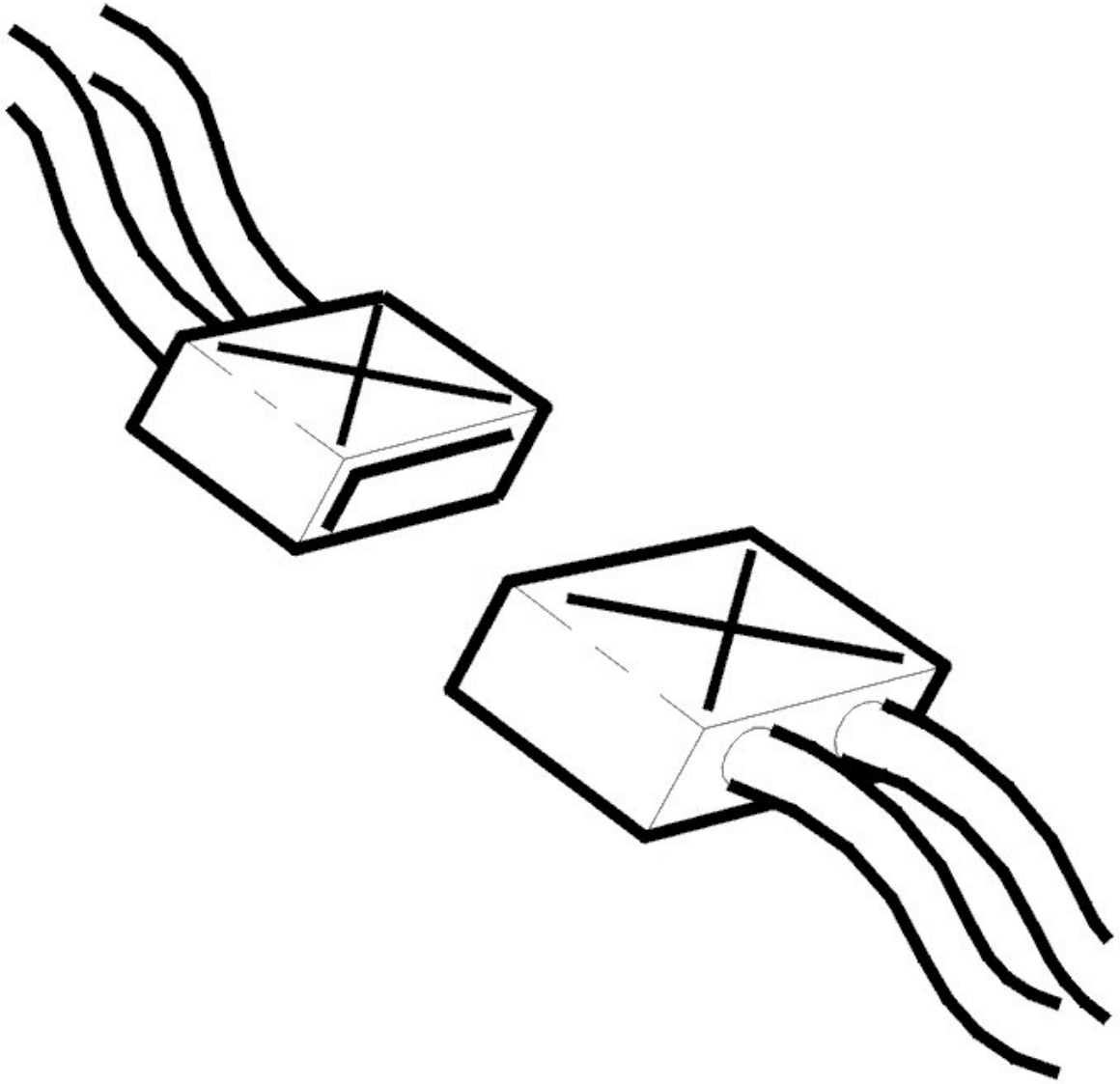
Was the resistance OK

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



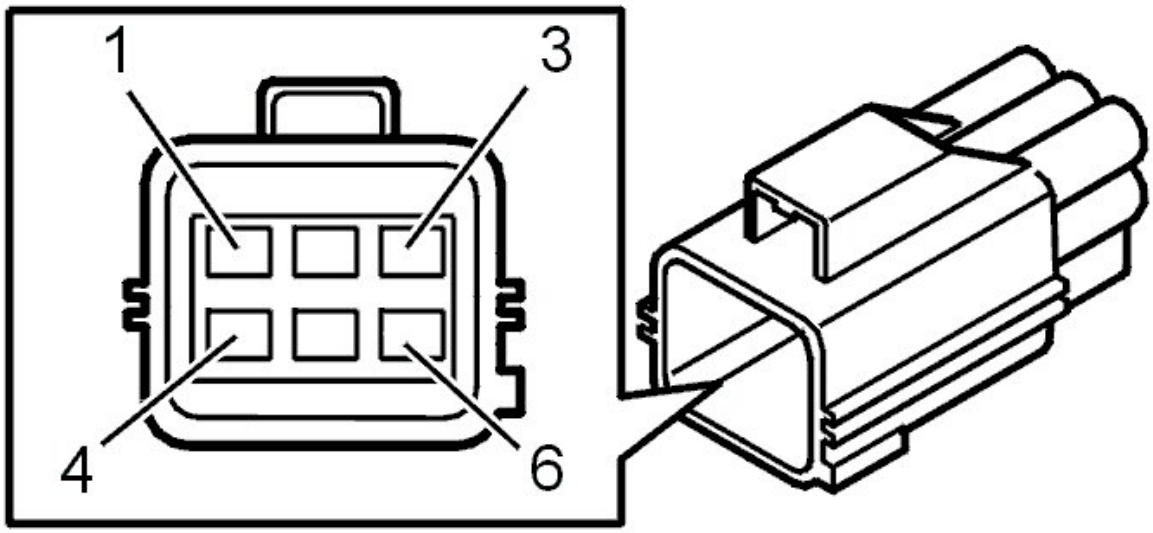


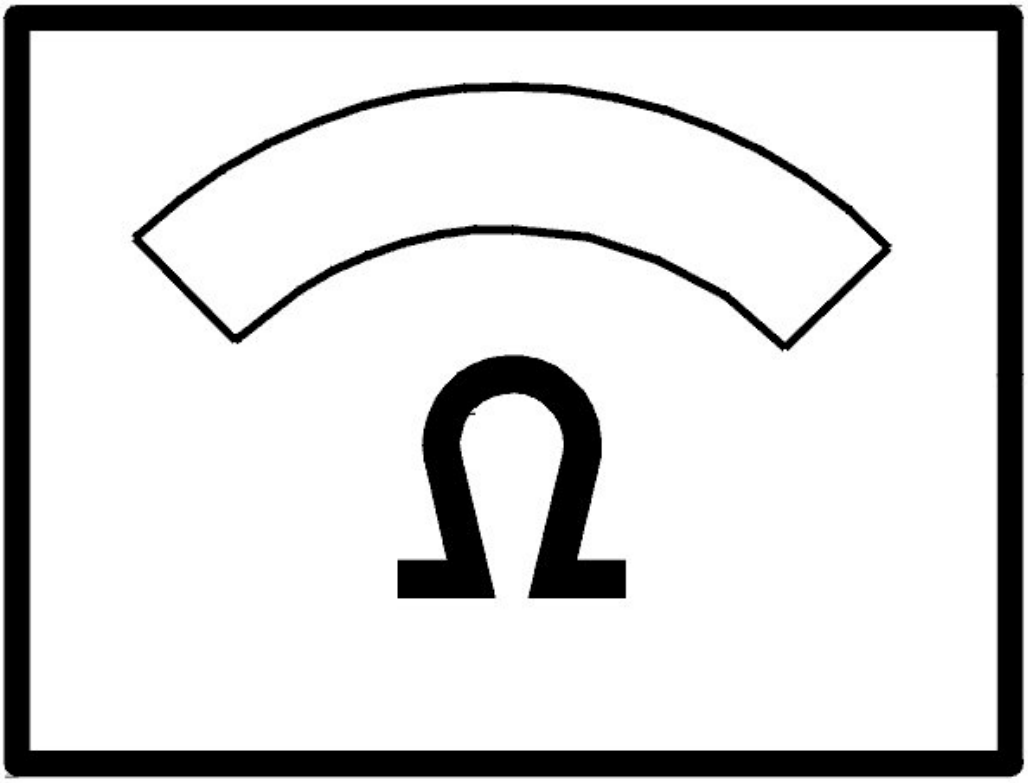
- Ignition off
- Transmission connector C disconnected.

Check the cable between control module terminal #A48 (#A48) and transmission connector terminal #C3 (control module side). Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



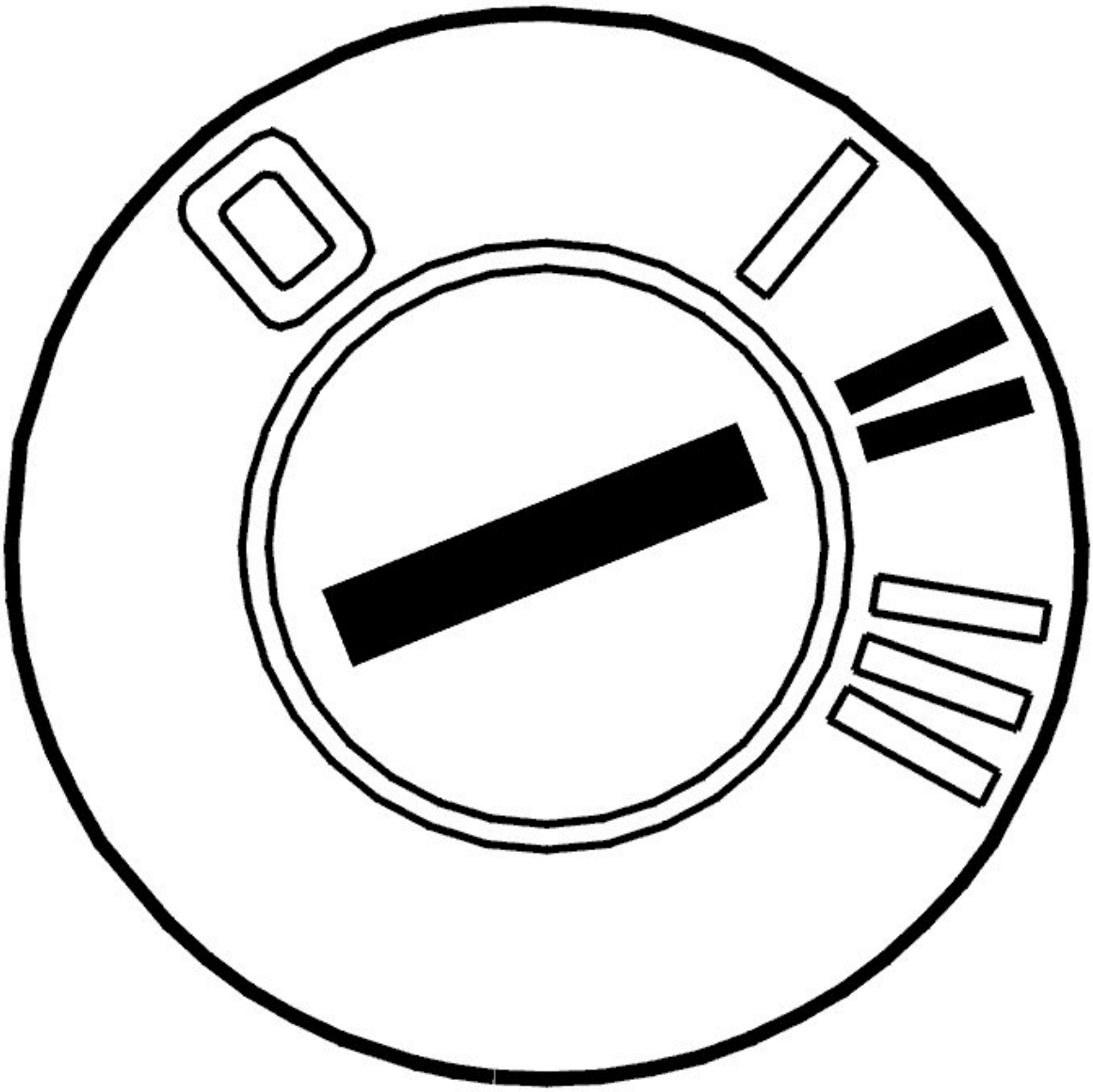


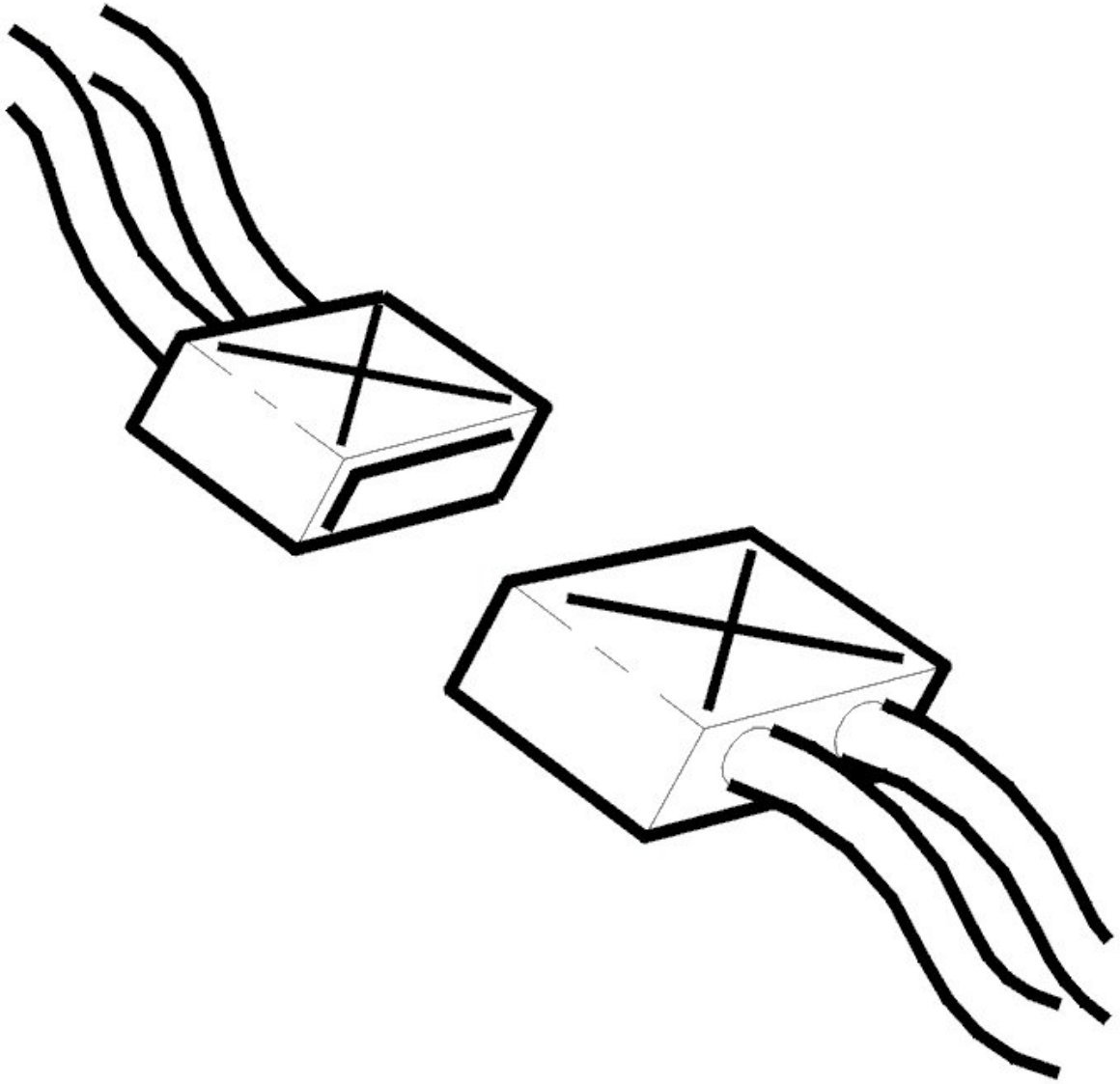
Was a fault detected?

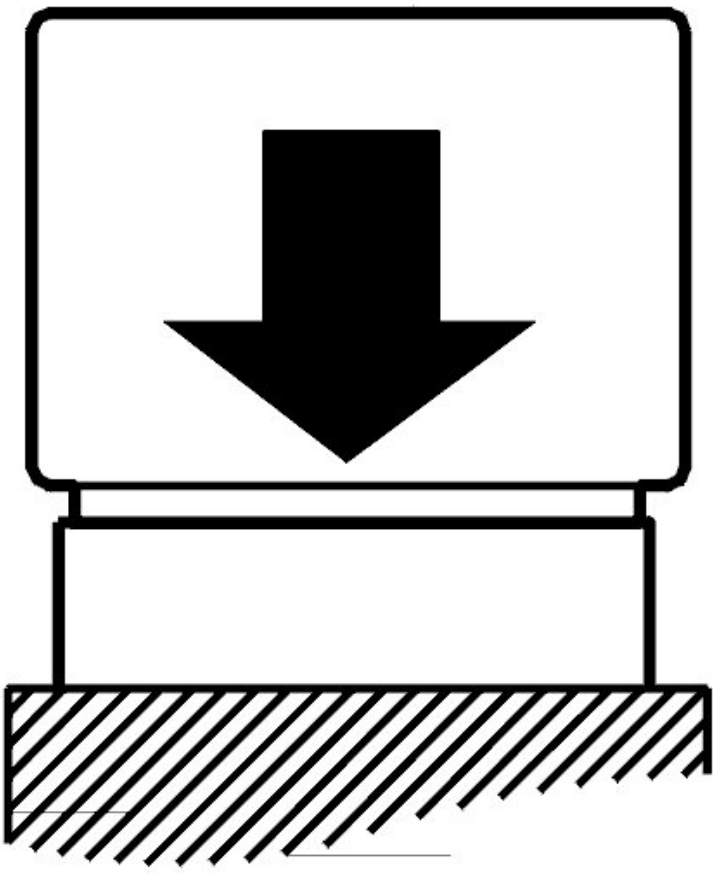
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

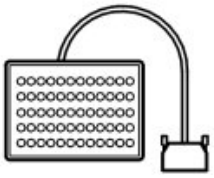
Check the transmission control module (TCM) by measuring the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

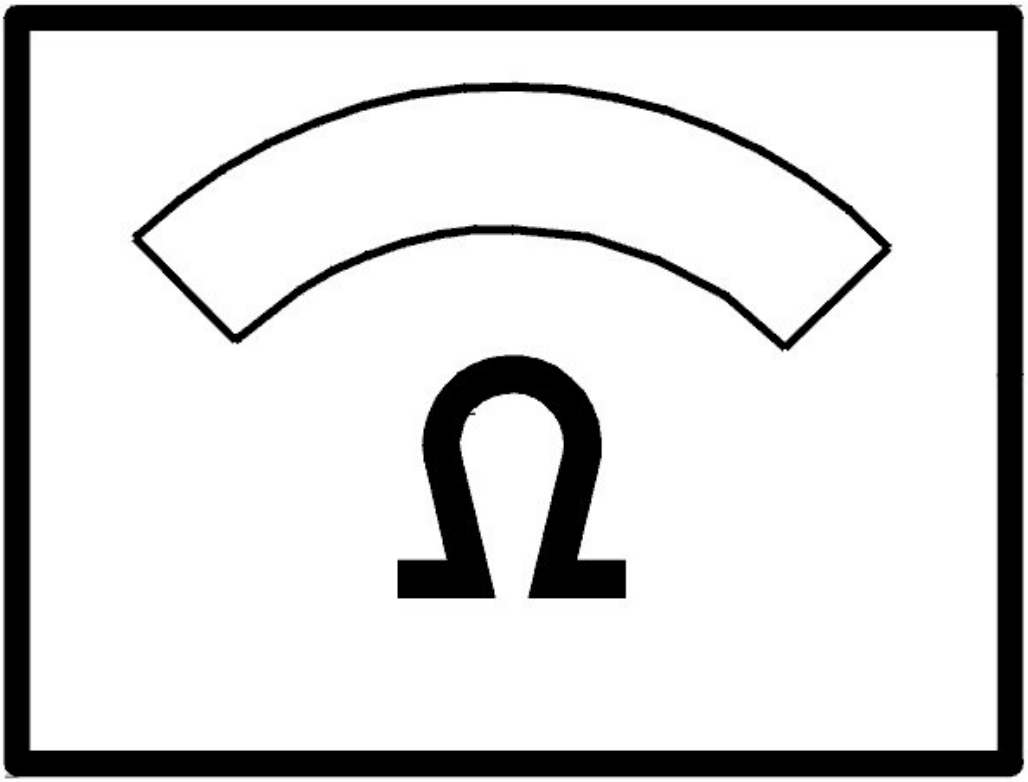
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



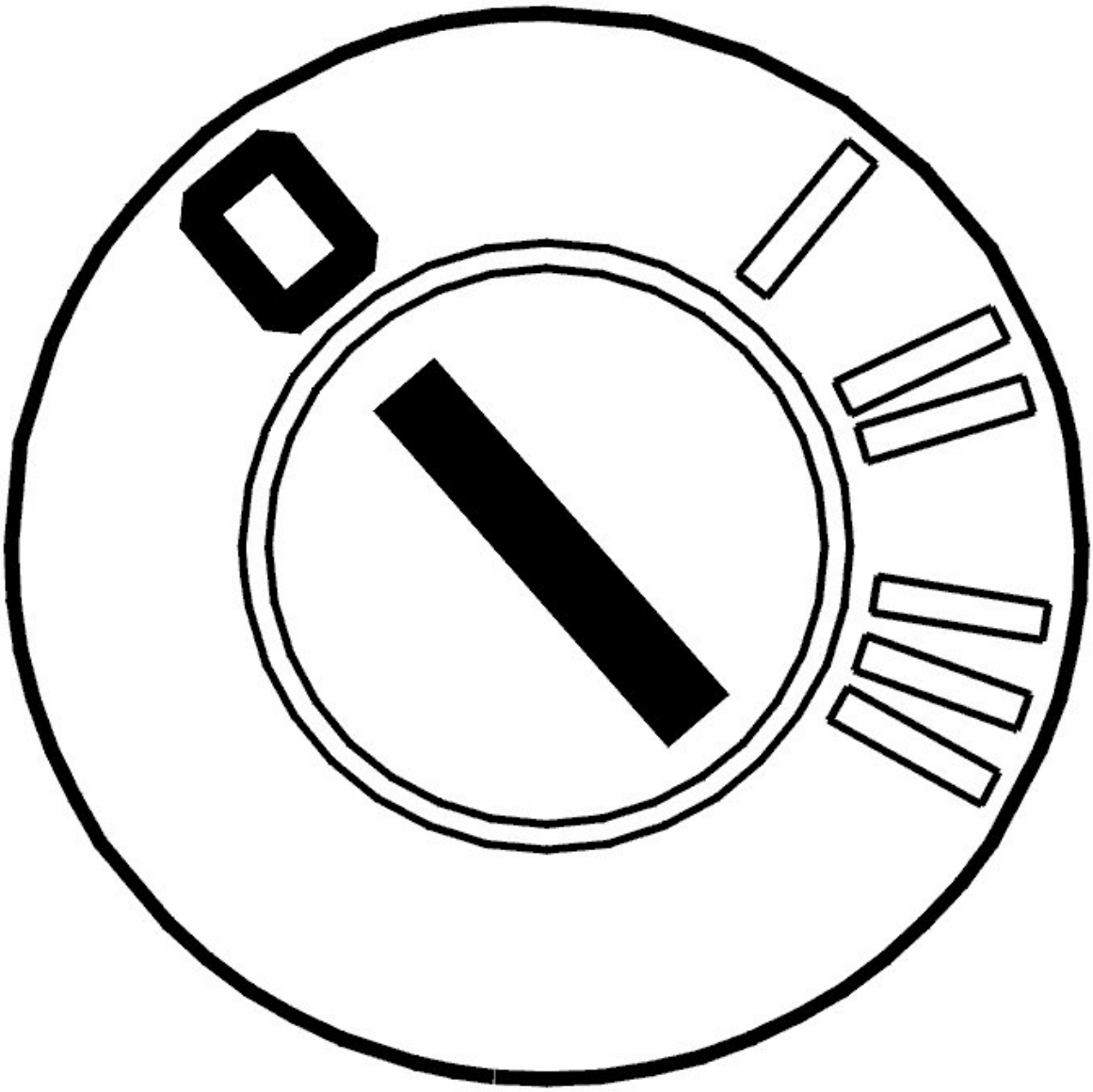


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

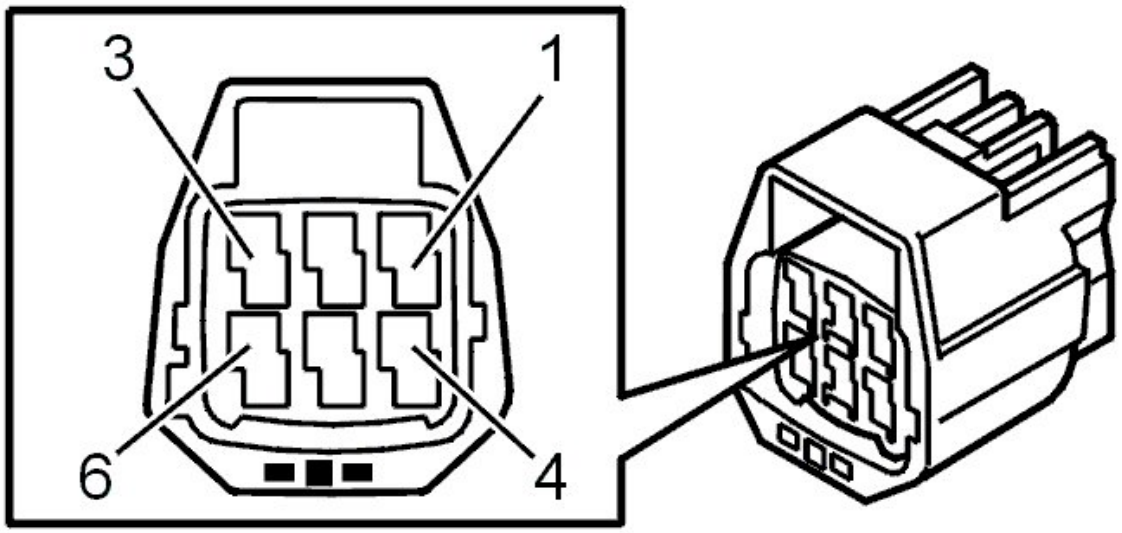


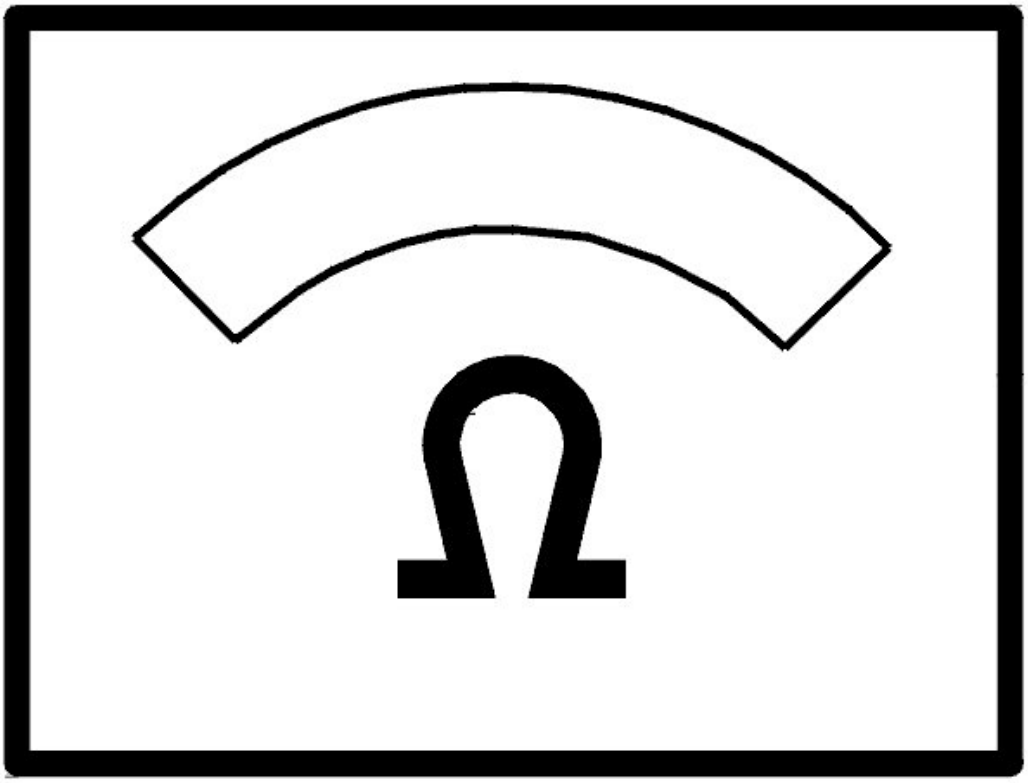
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C3 (transmission side) and the connector for solenoid S3. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S3 by measuring the resistance between the terminal pin on solenoid S3 and the transmission housing. The resistance must be 11-15 ohms.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S3, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

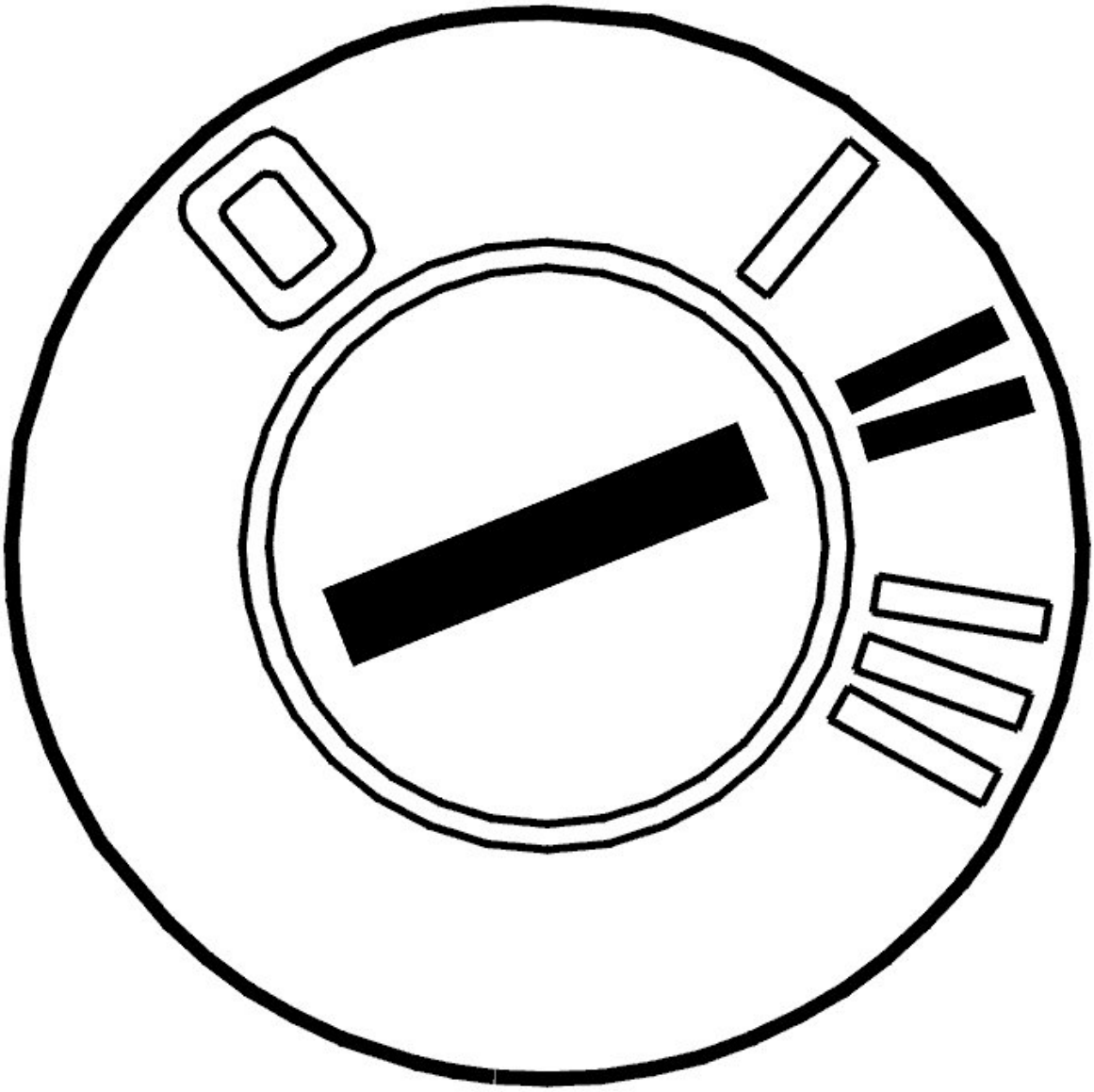
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



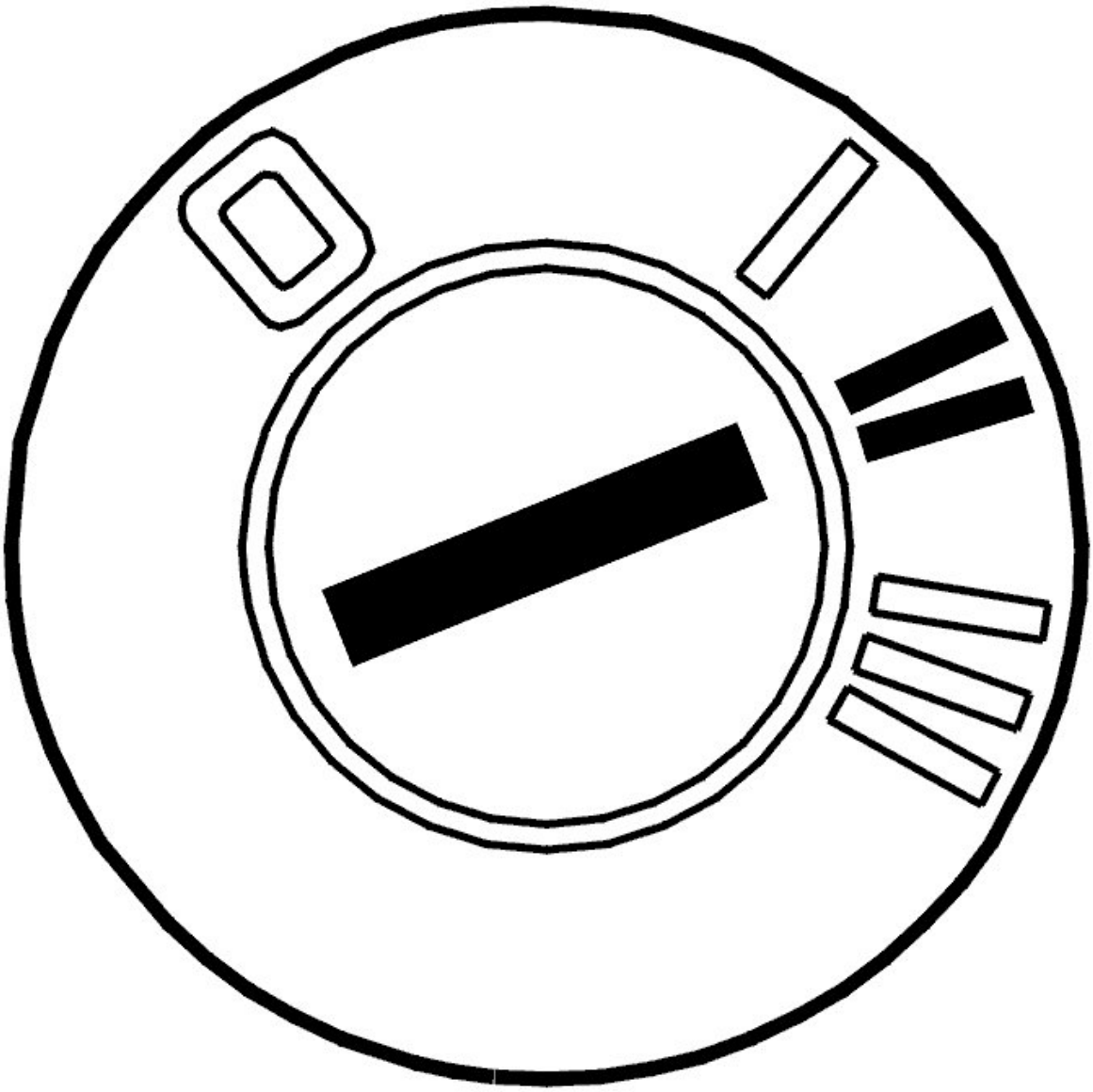
- Ignition on.

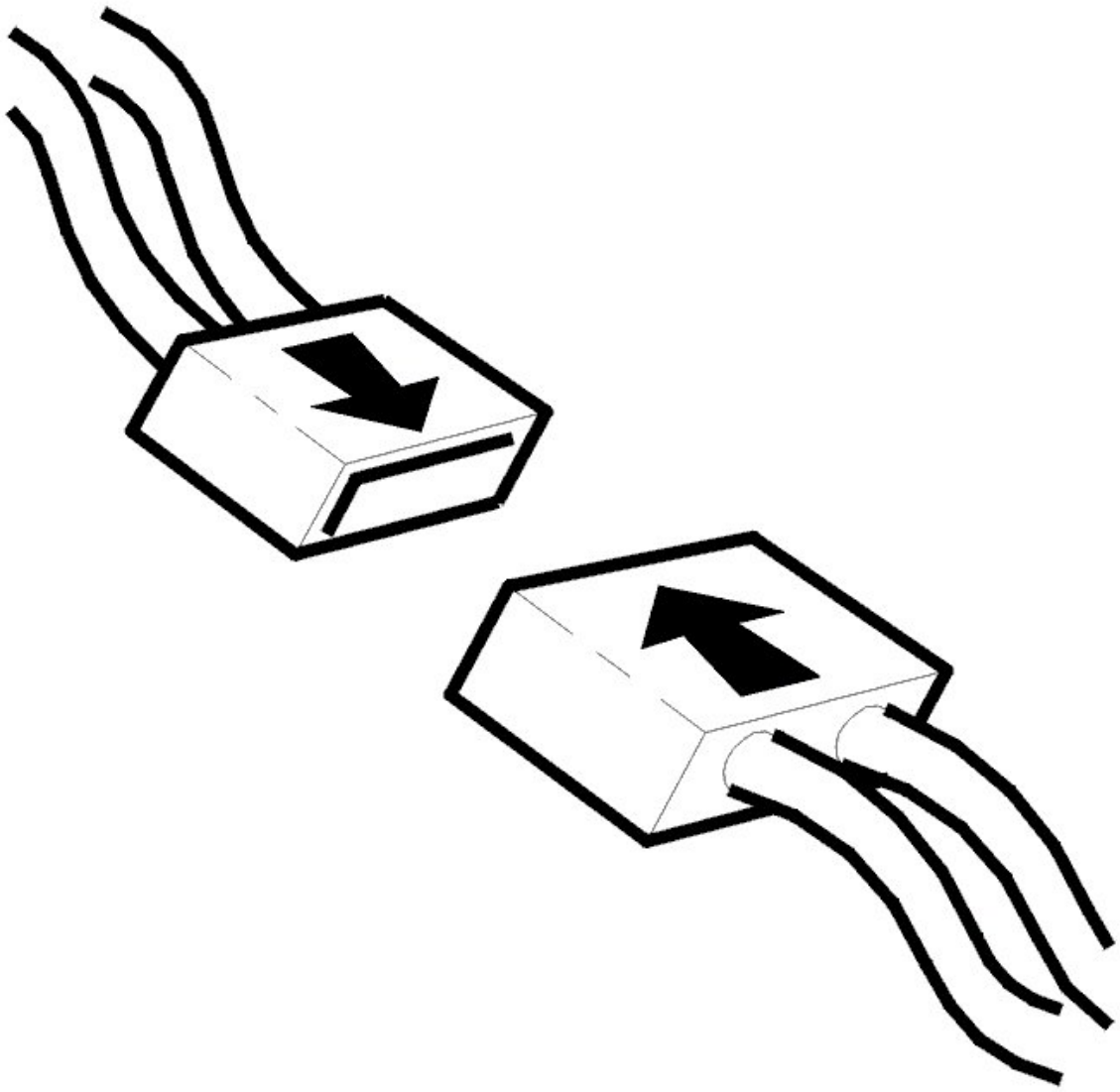
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the cable between transmission control module (TCM) terminal #A48 (#A48) and transmission connector terminal #C3. Check for intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

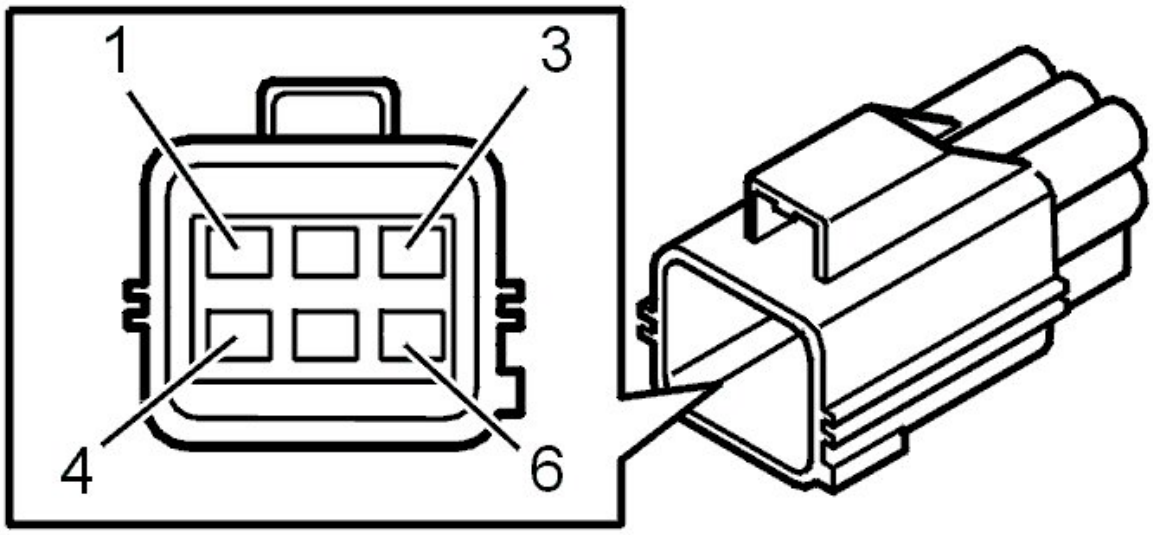
Hint:

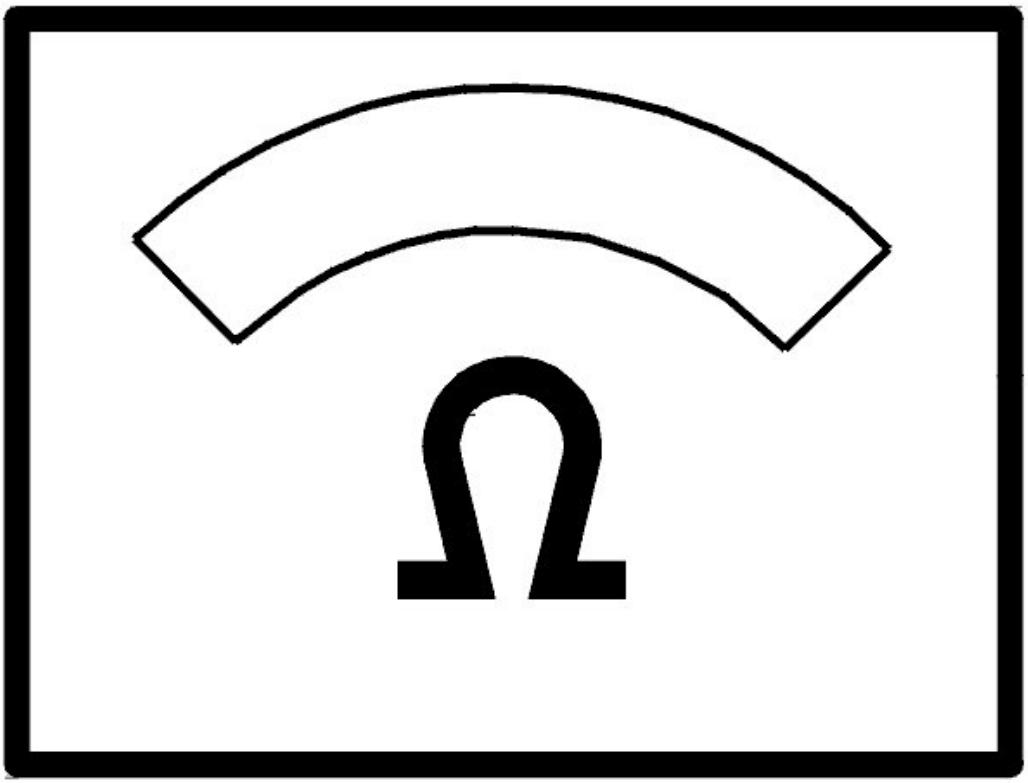
- Check the circuit for solenoid S3. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A48 (#A48) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

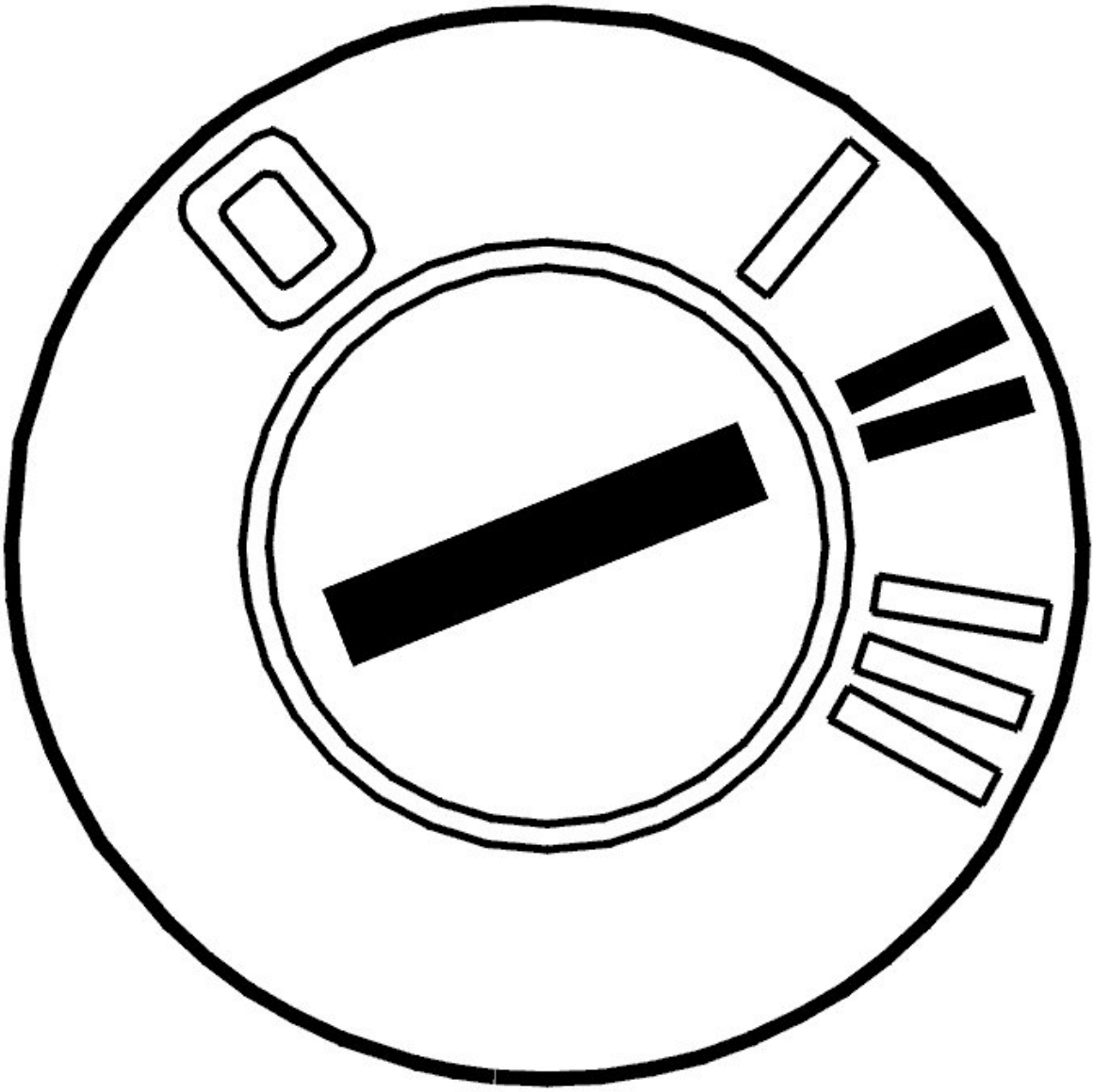
Attempt New Test - Checking the temperature sensor

DONE - DONE

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

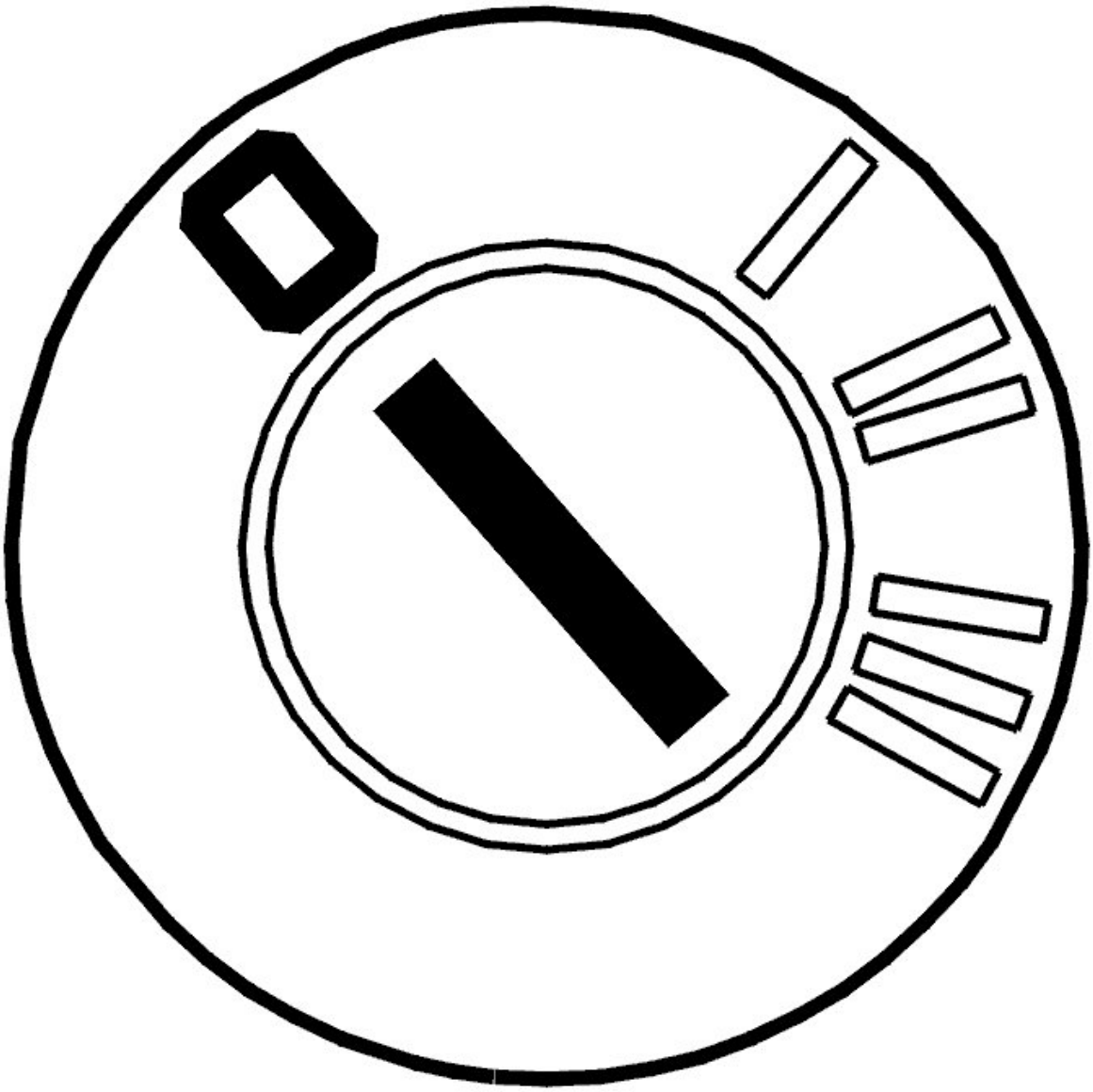
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

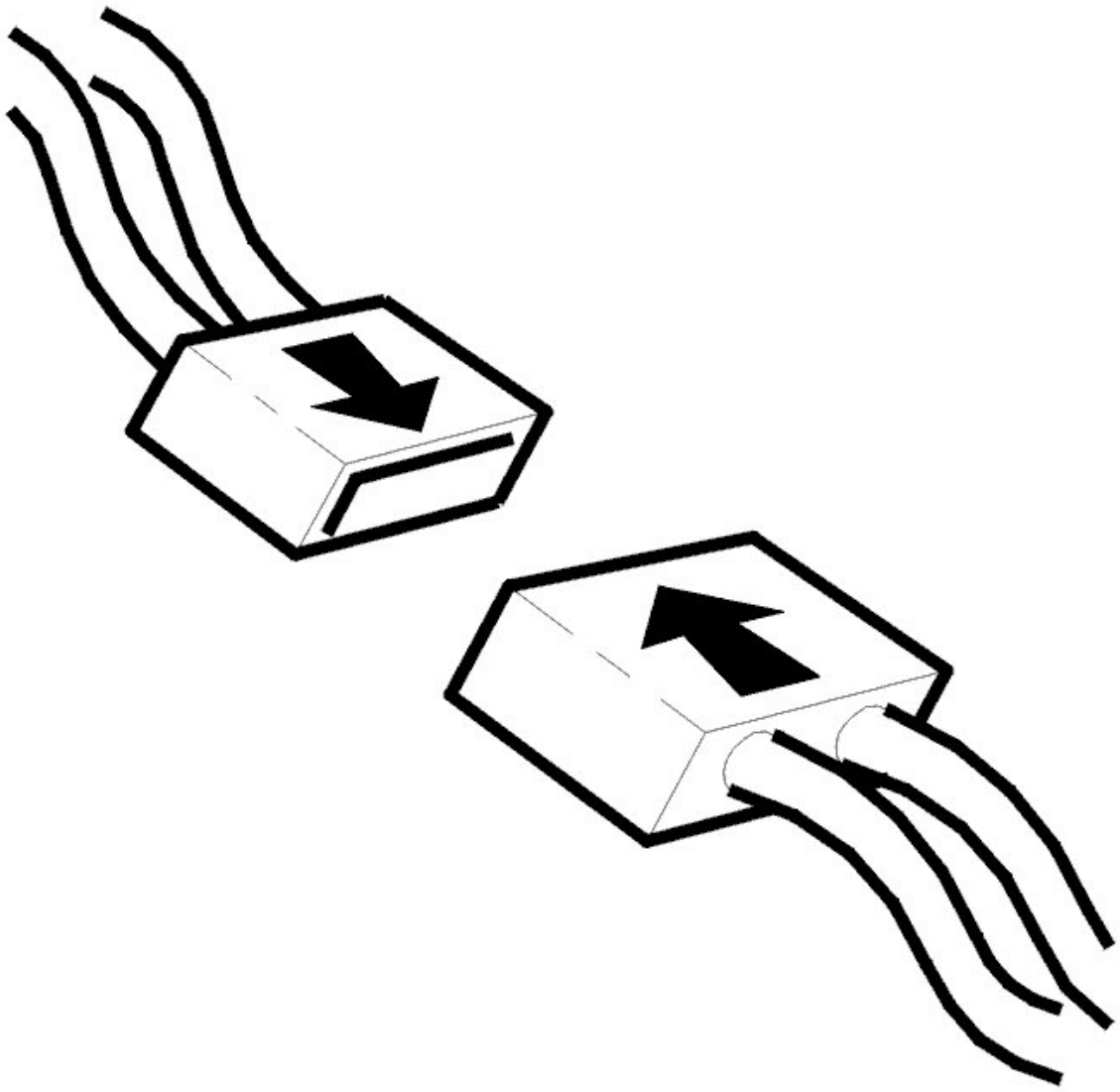
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

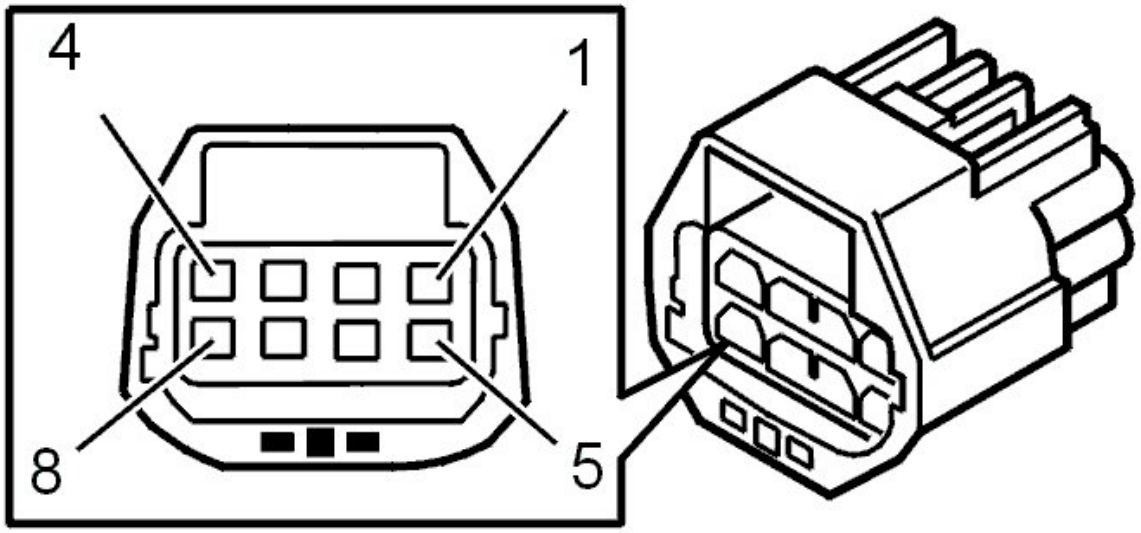
Checking transmission fluid temperature sensor

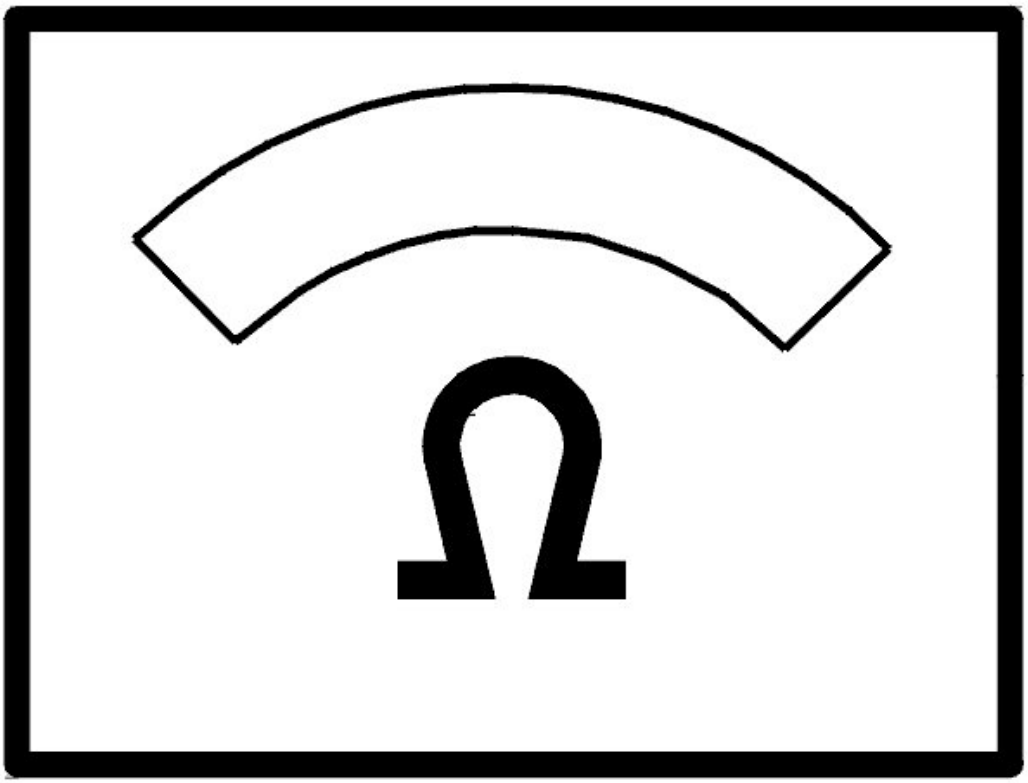




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

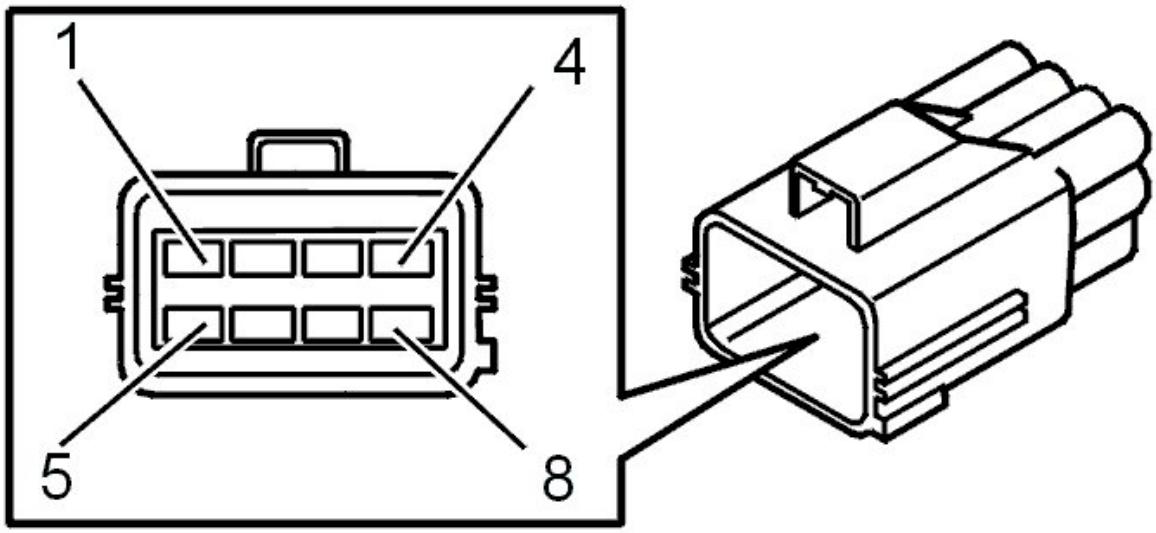
No - Checking the cable and component

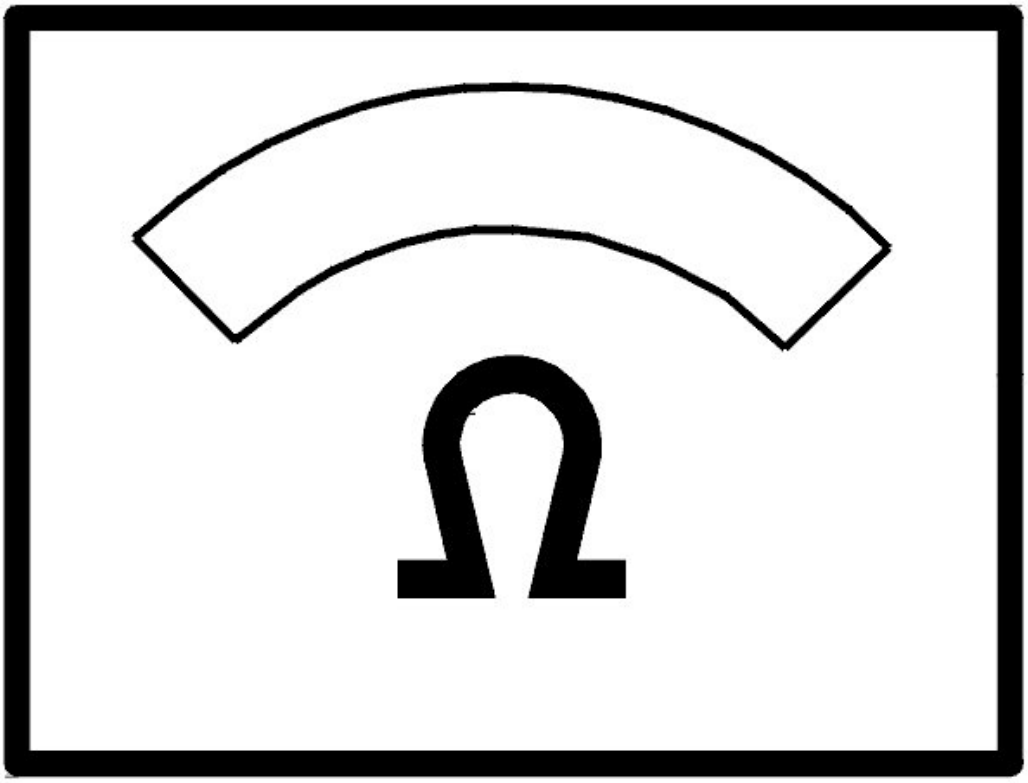
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



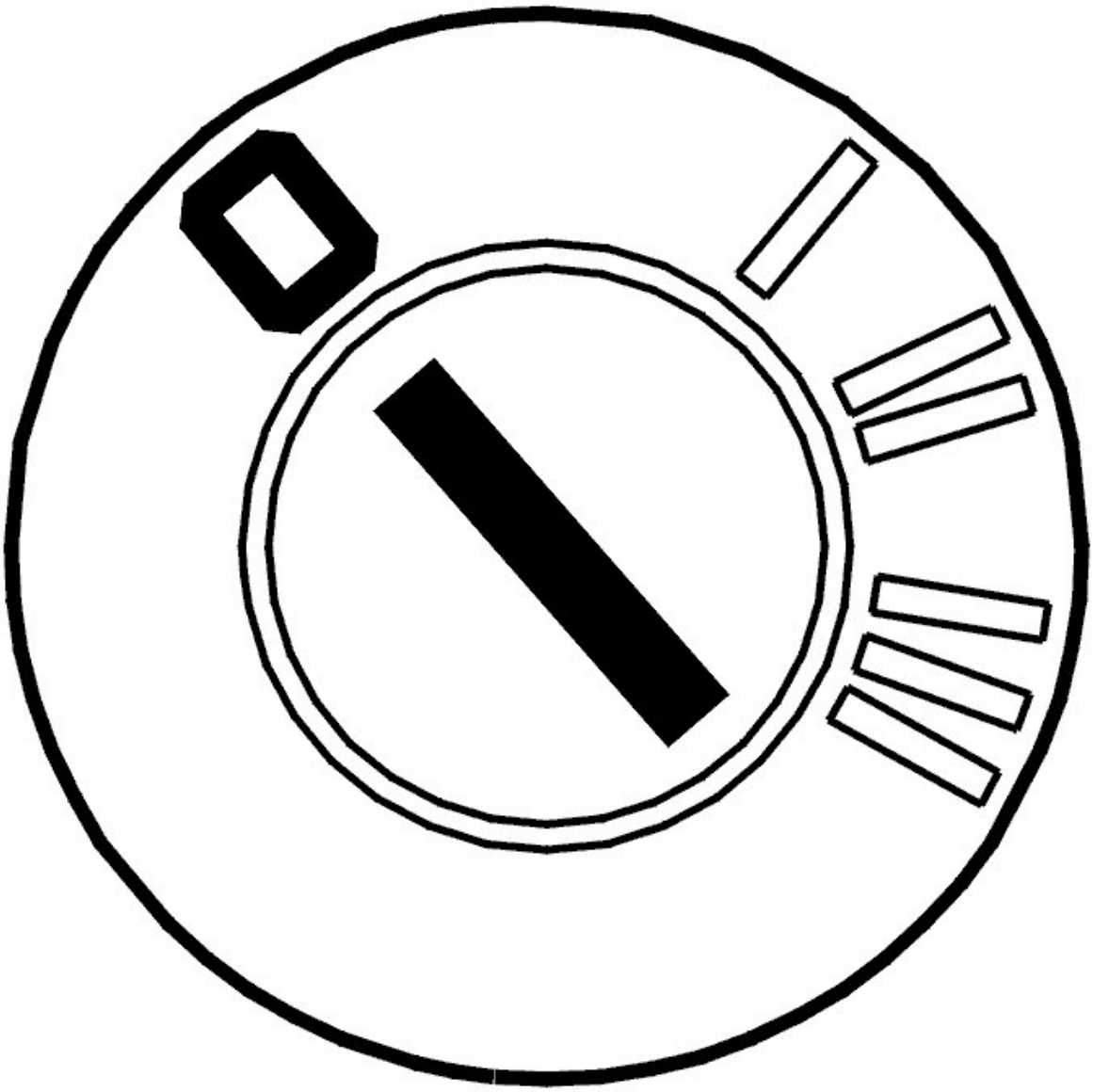


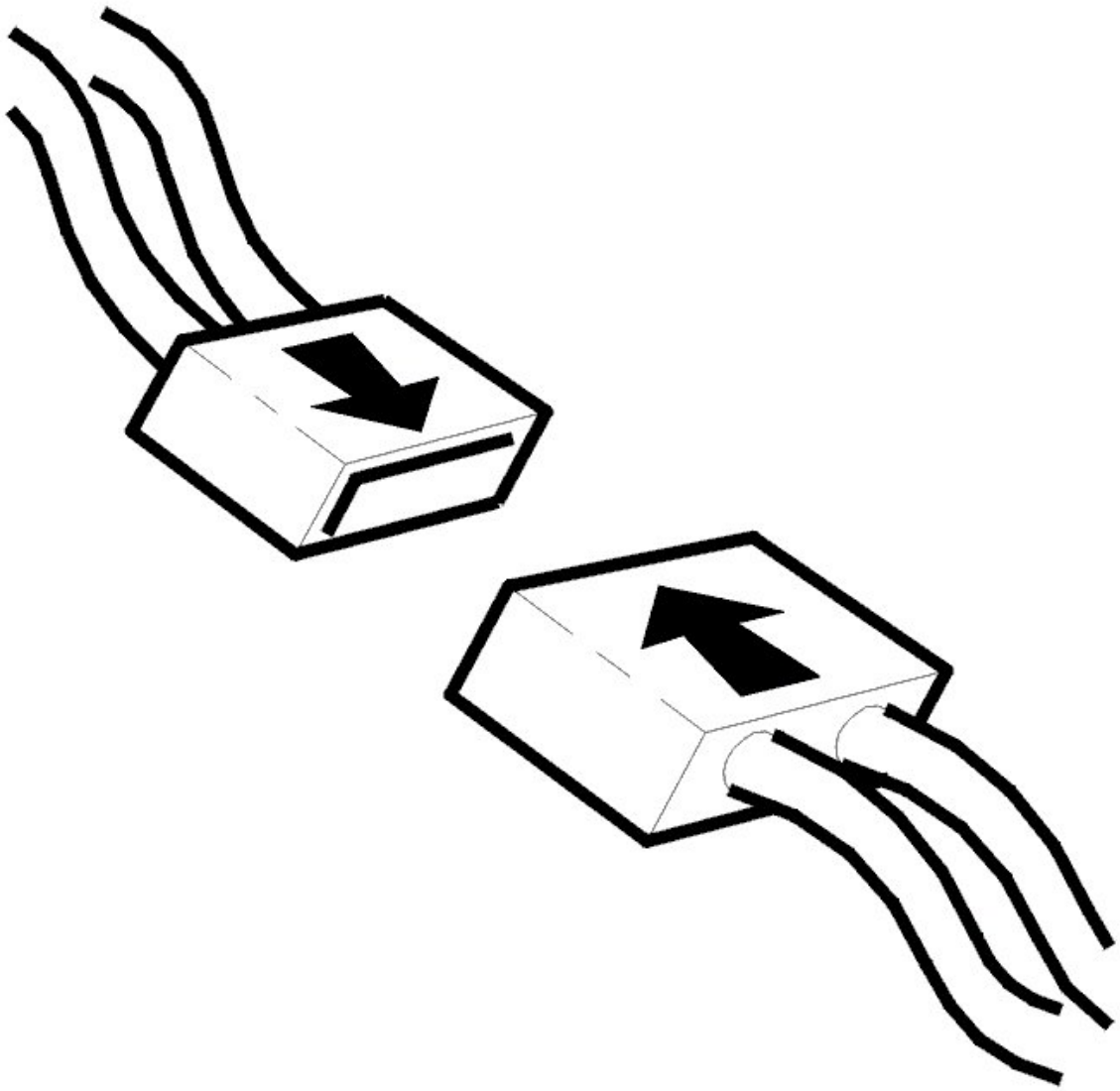
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

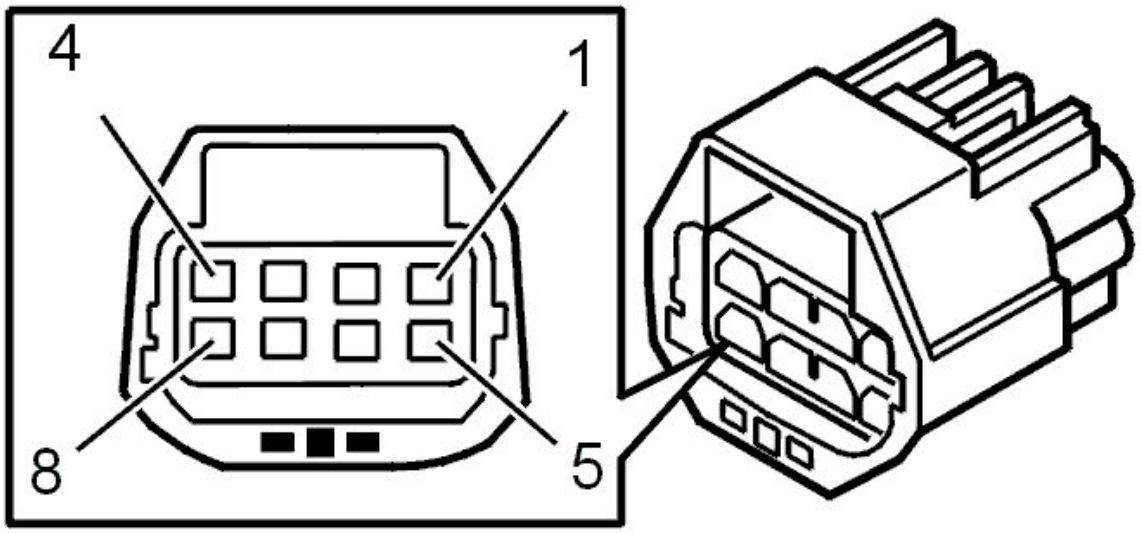
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

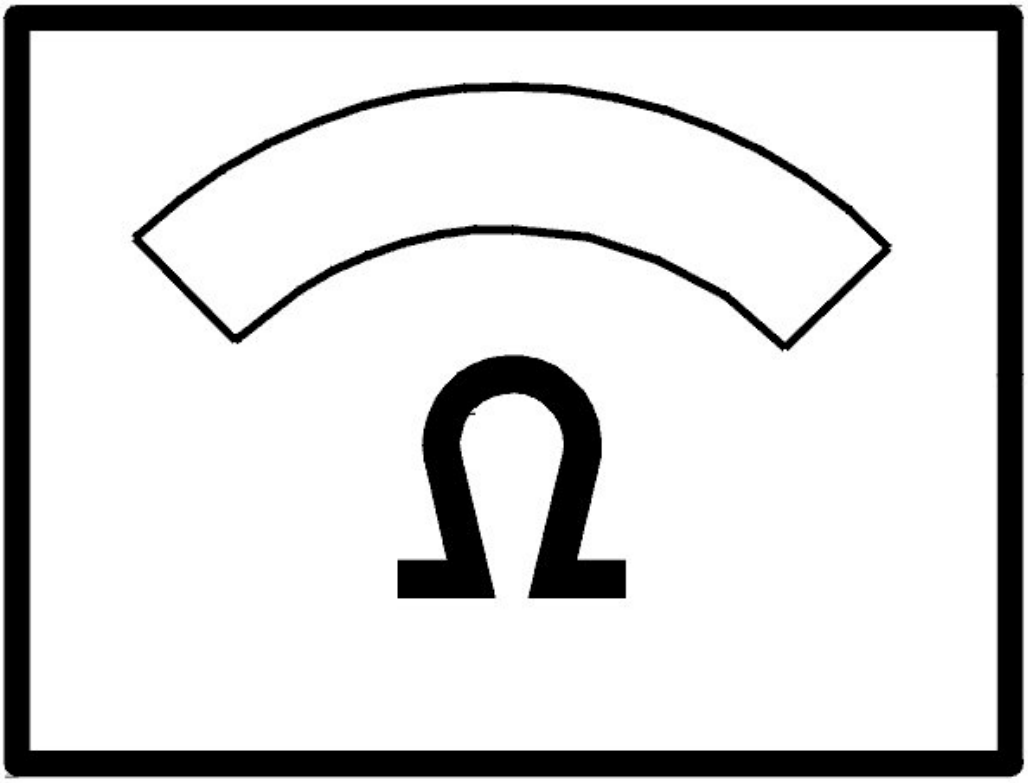
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





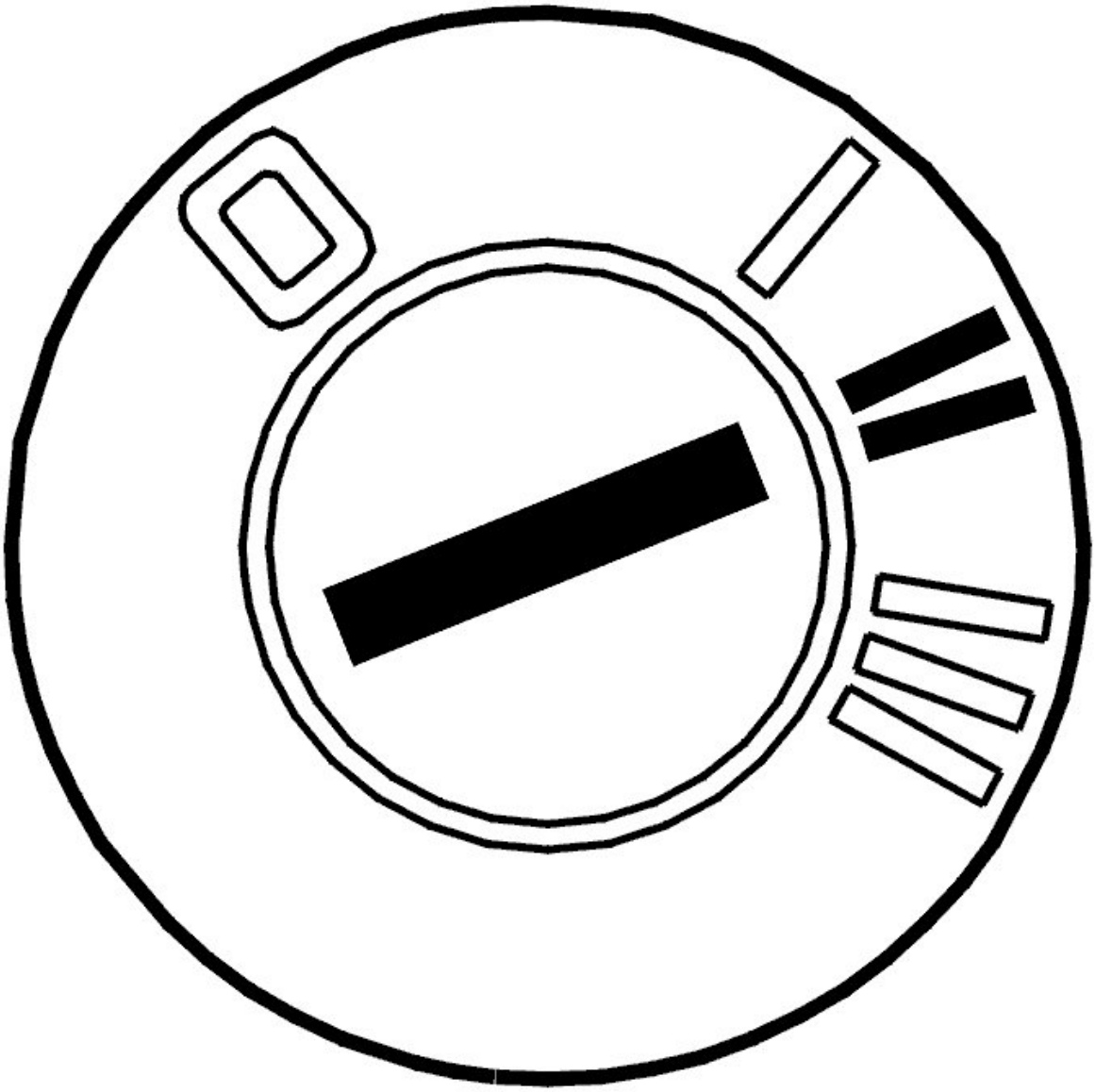
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



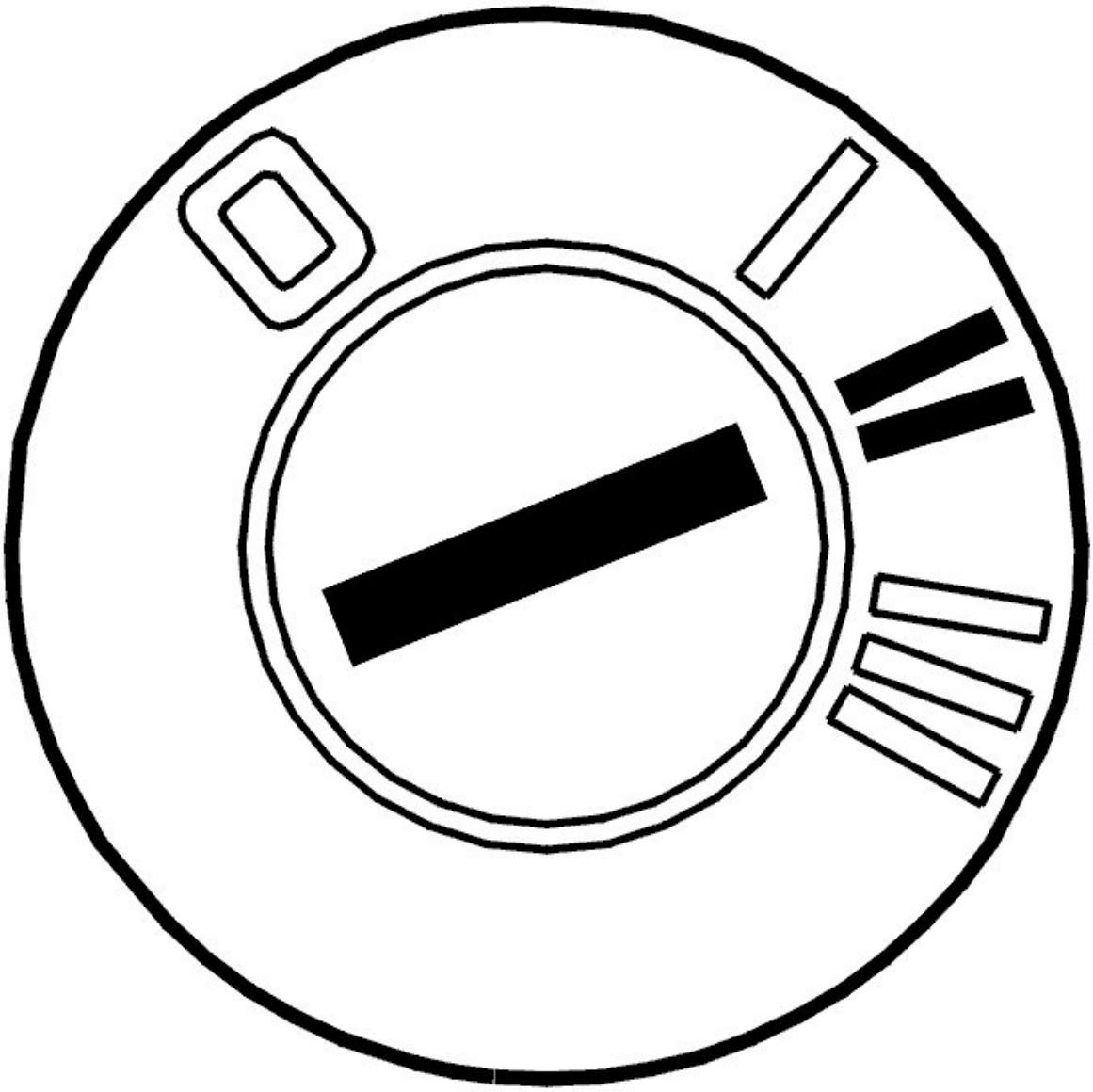
- Ignition on.

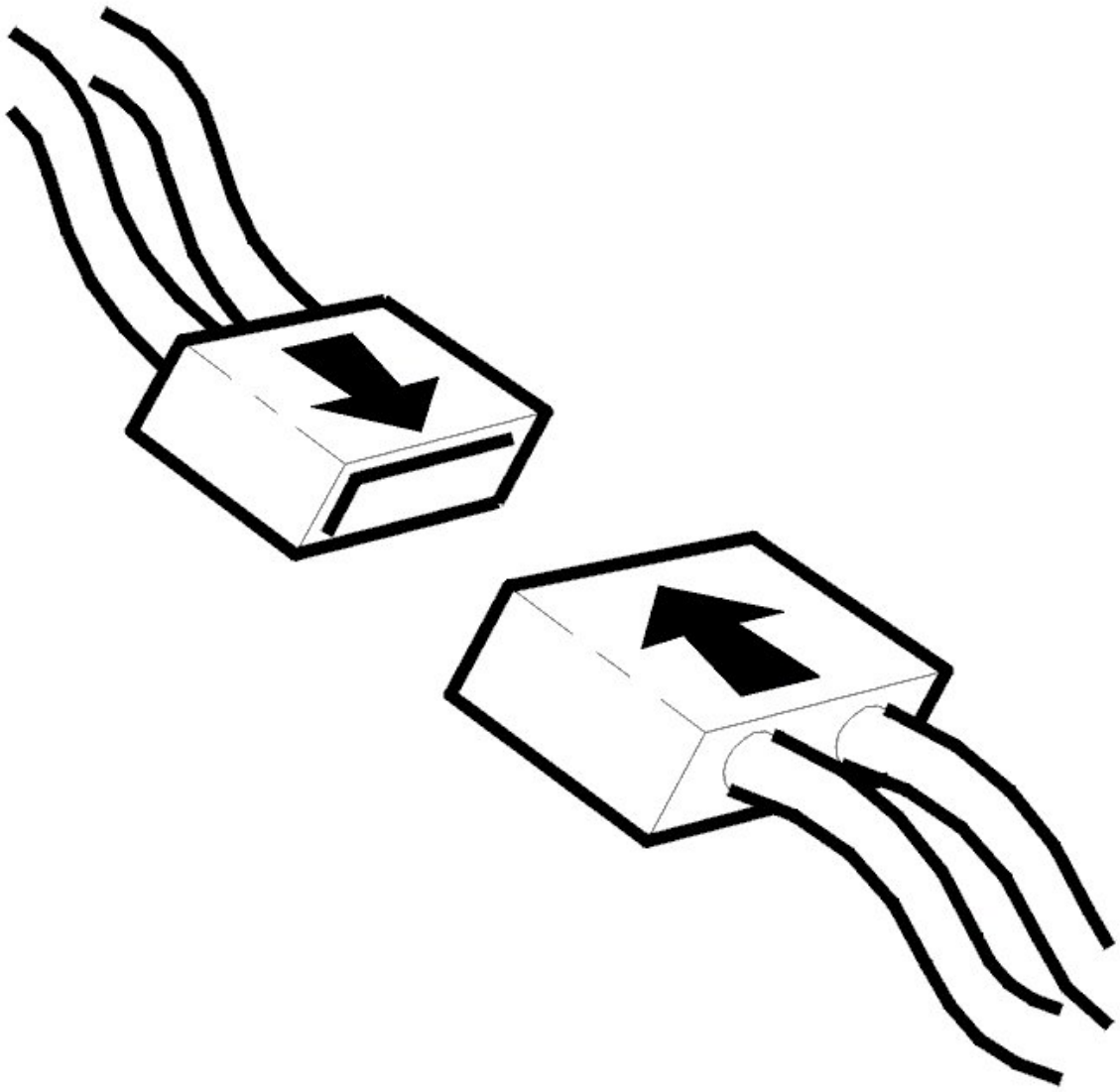
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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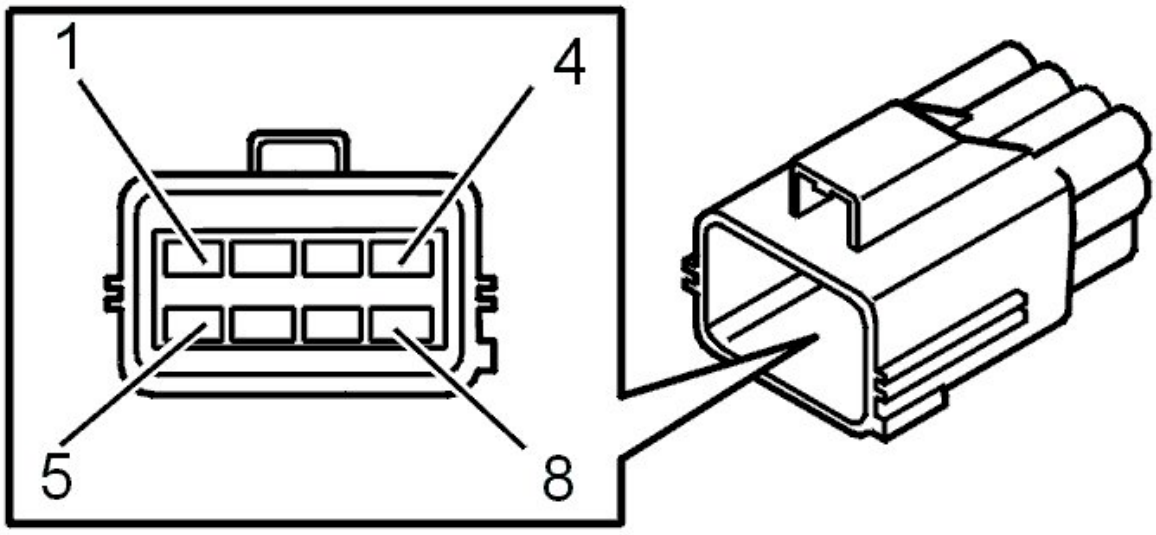
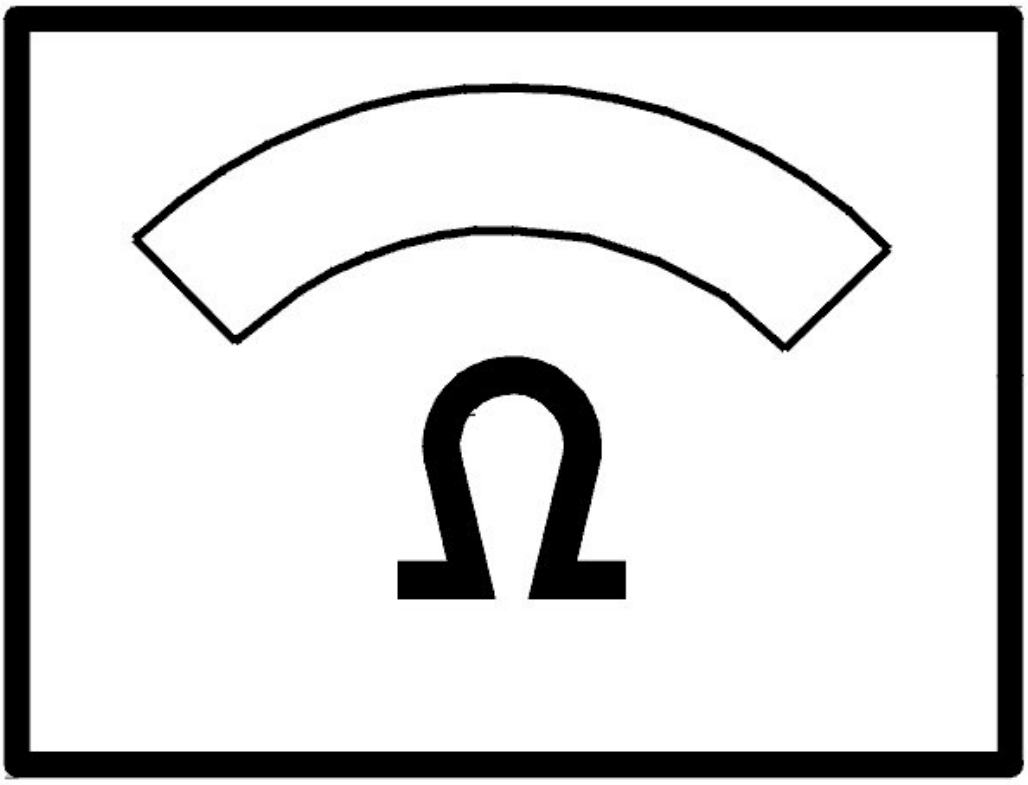
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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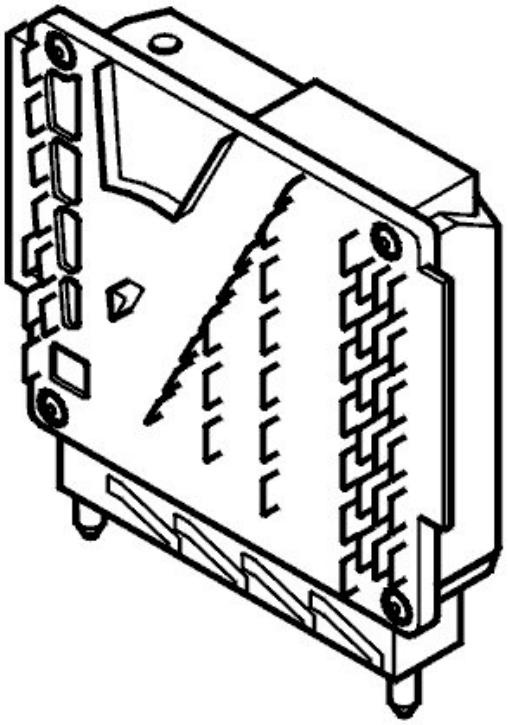
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid)if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

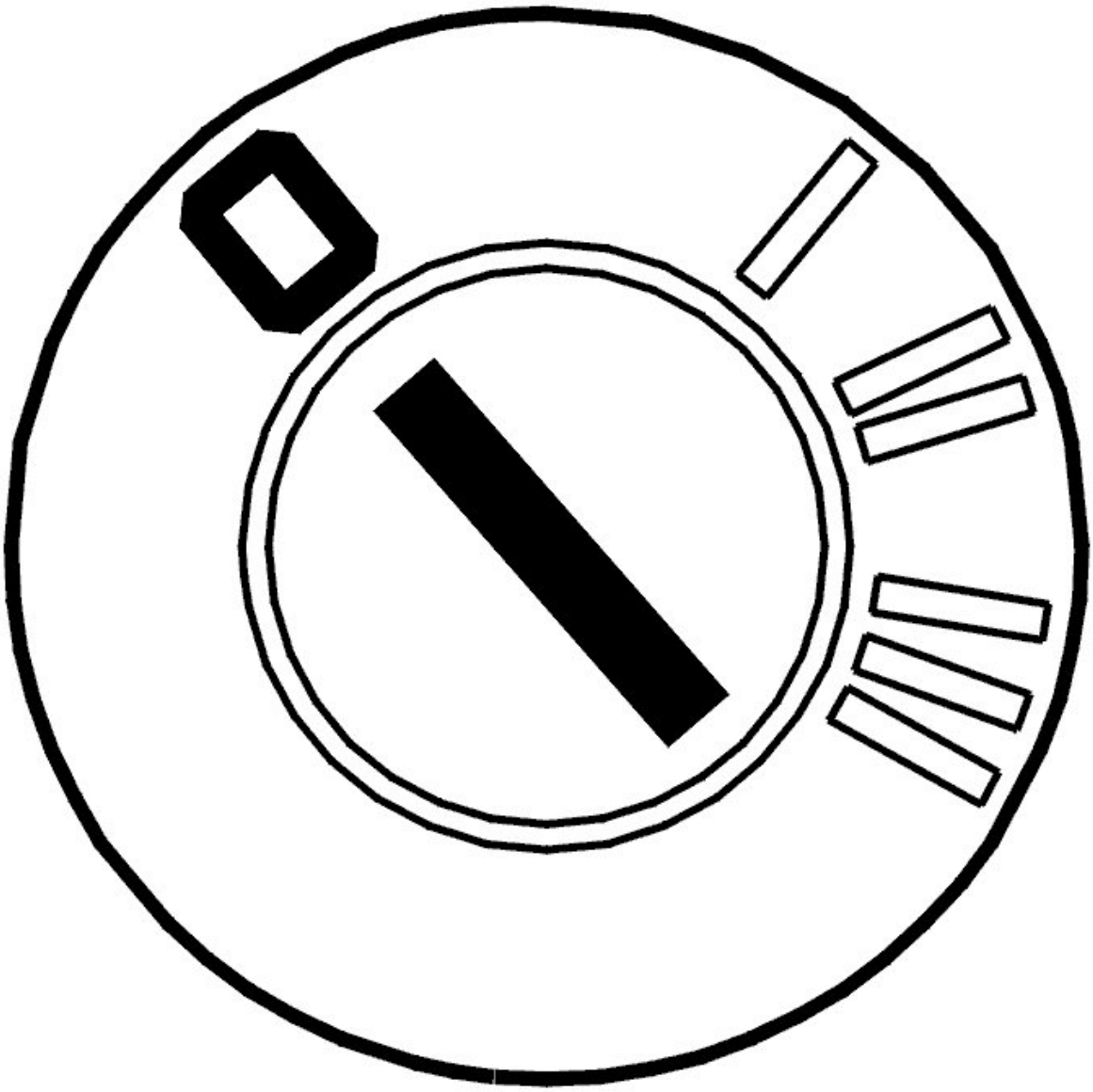
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Too High

Signal too high

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

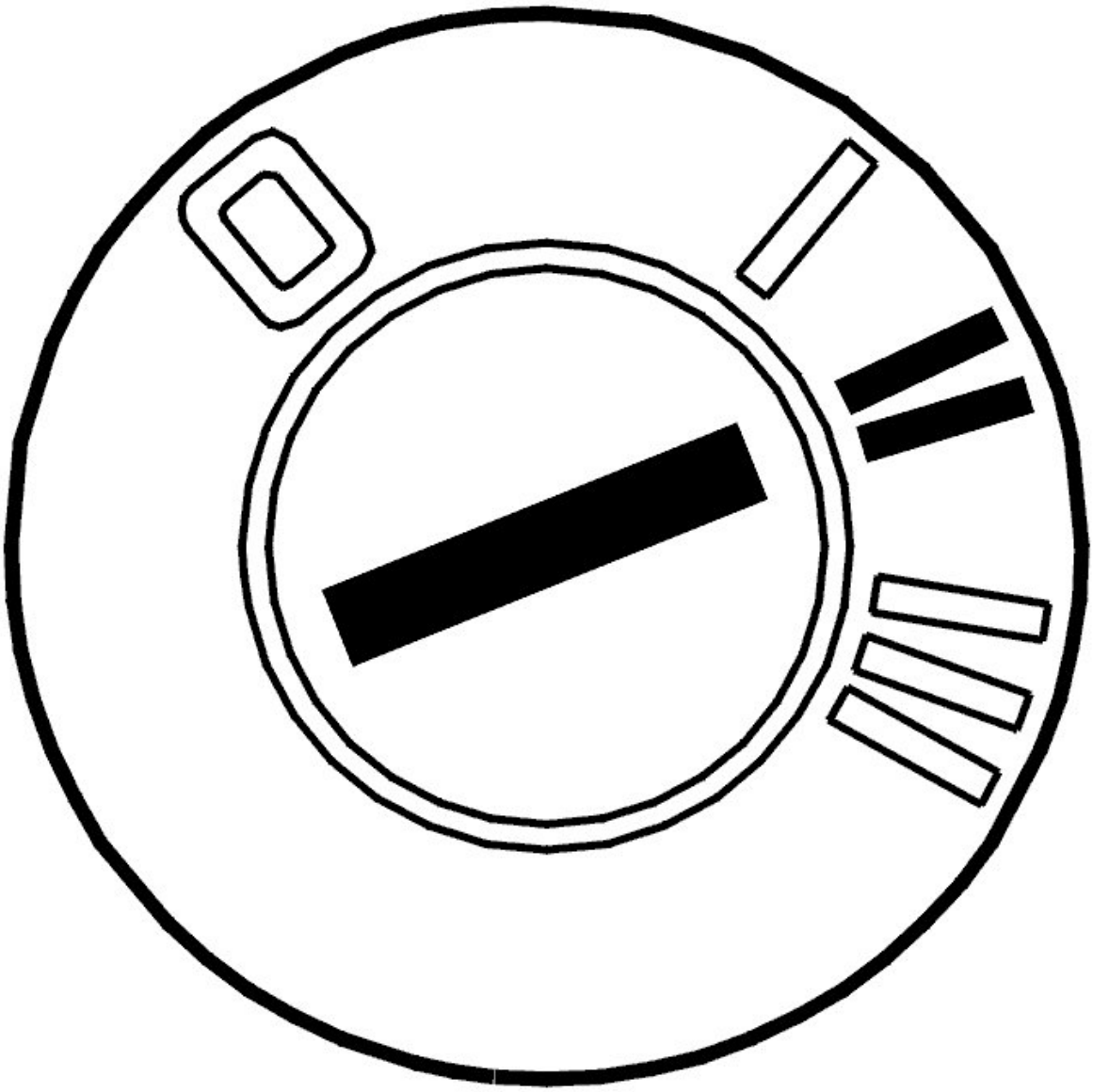
Note! If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S4

No - Checking transmission fluid temperature sensor

Checking shift solenoid S4



- Ignition on
- Gear selector in position P
- Activate solenoid S4.

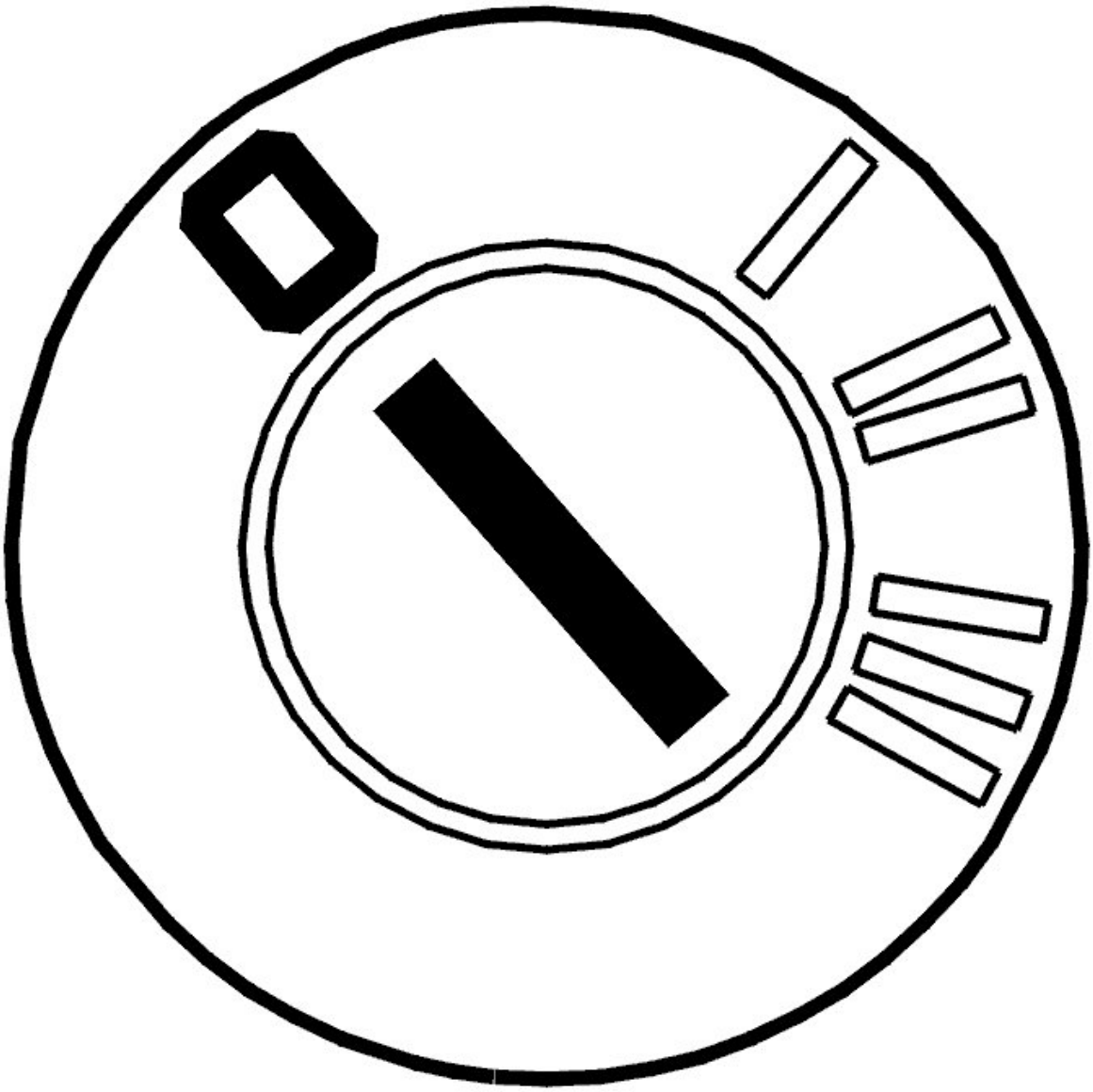
The value must change between OFF and ON.

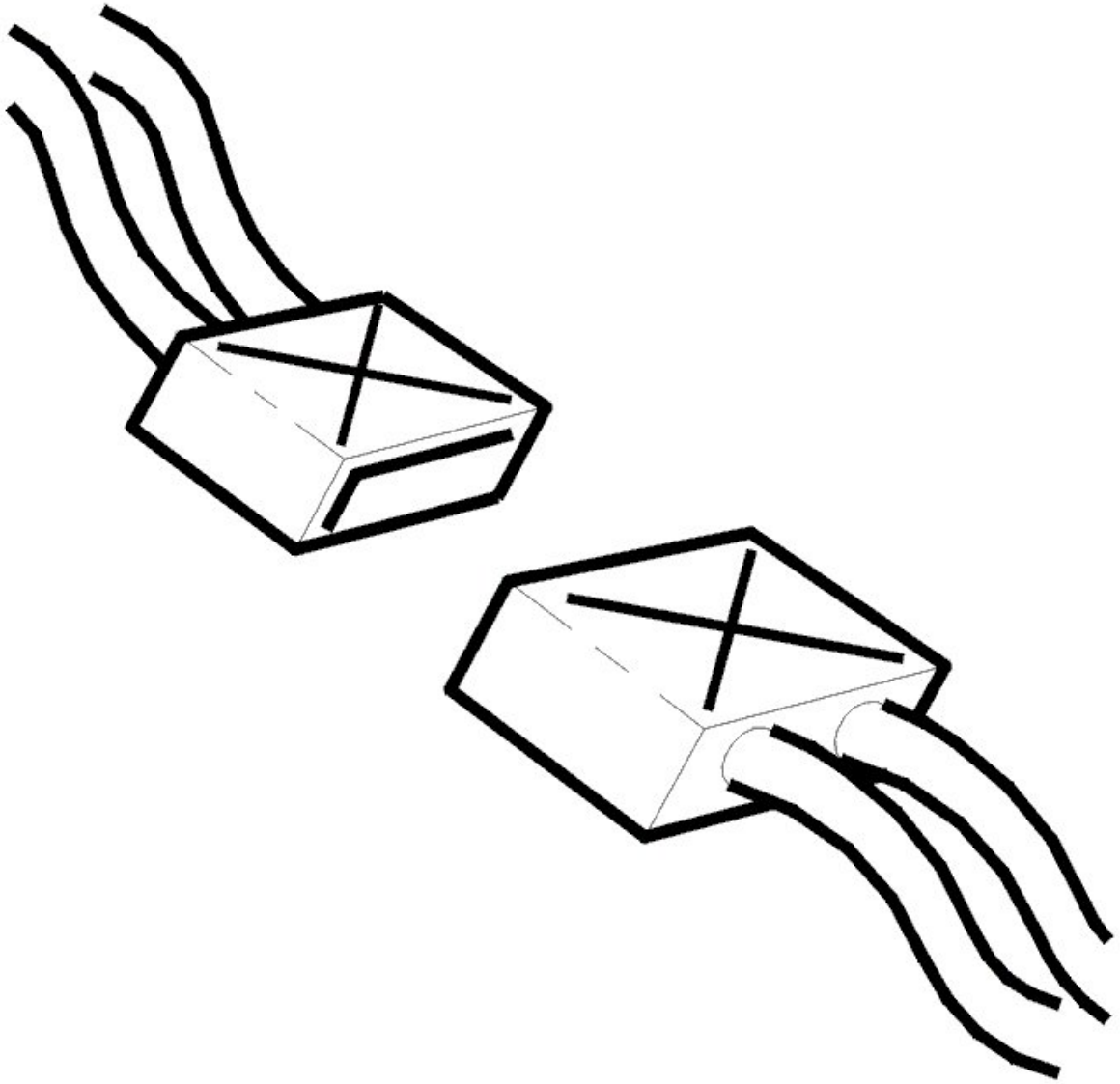
Does the value change?

Yes - Intermittent fault

No - Checking solenoid S4

Checking solenoid S4



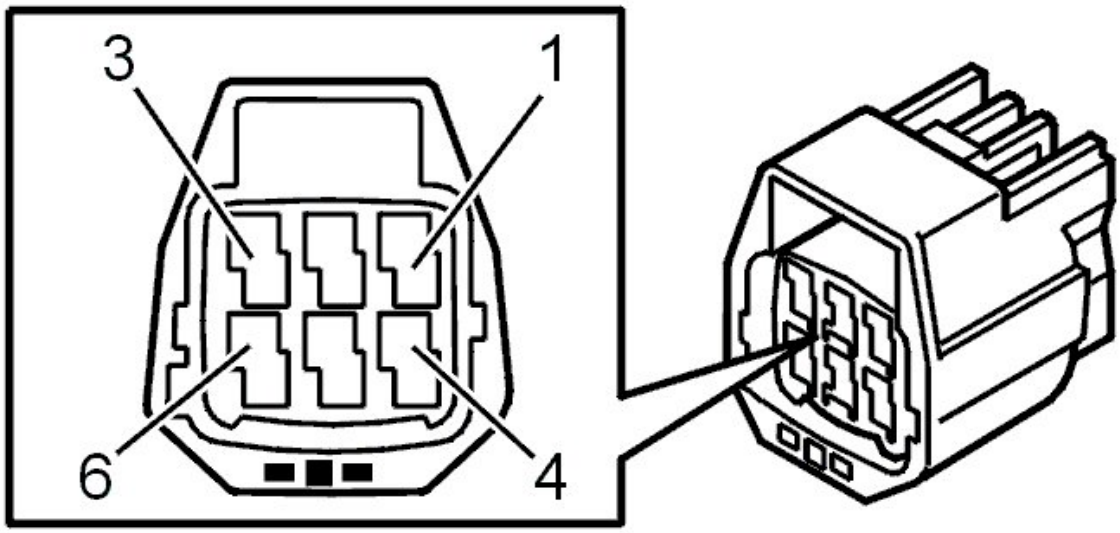


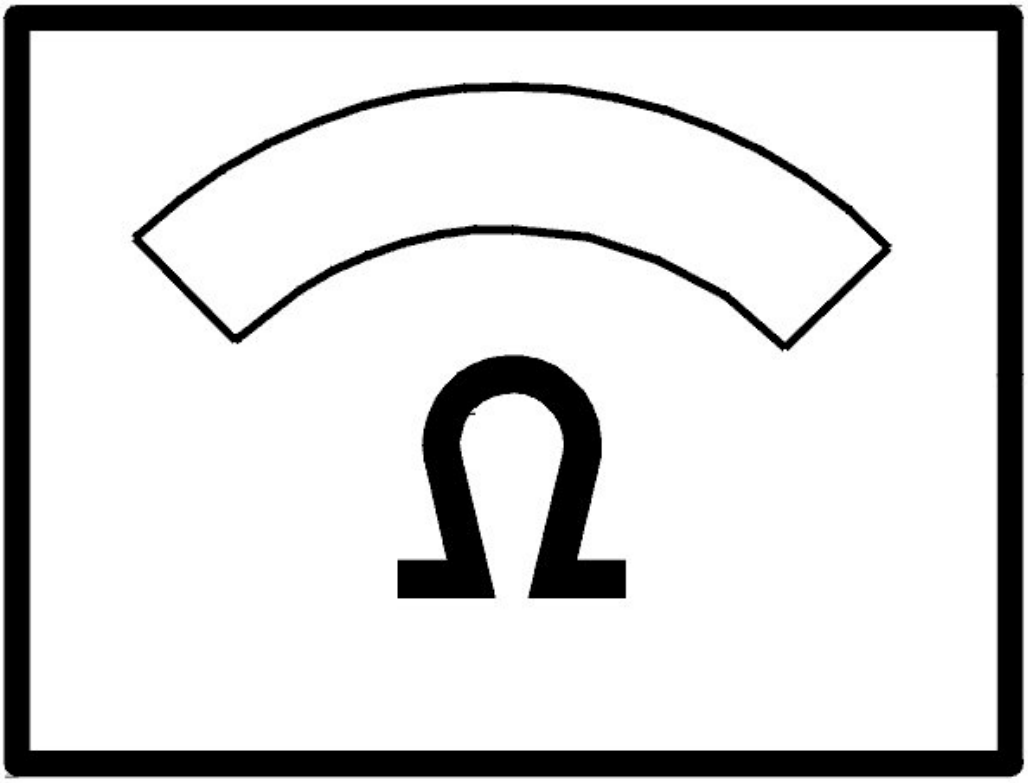
- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The ohmmeter should read 11-15 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



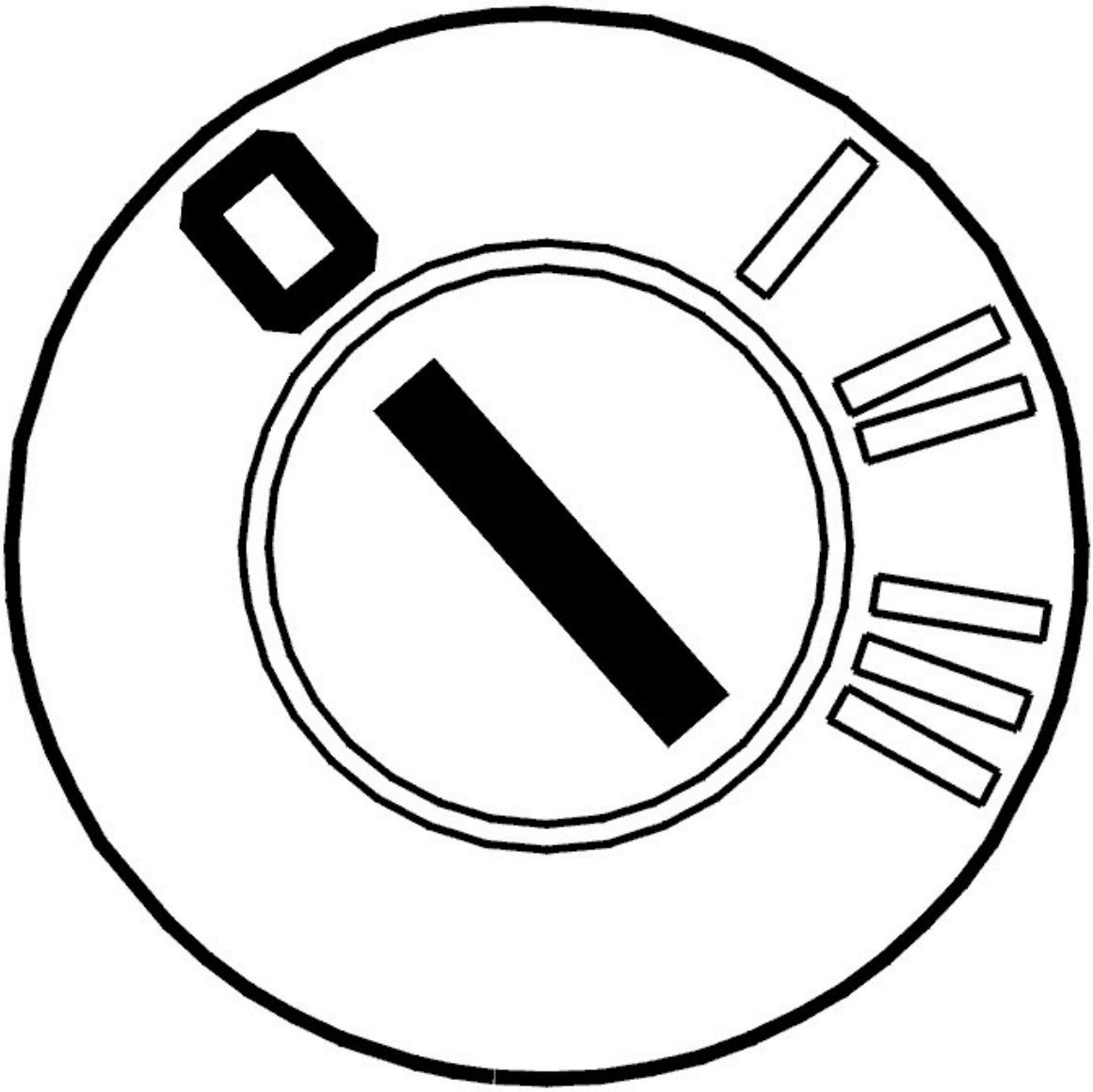


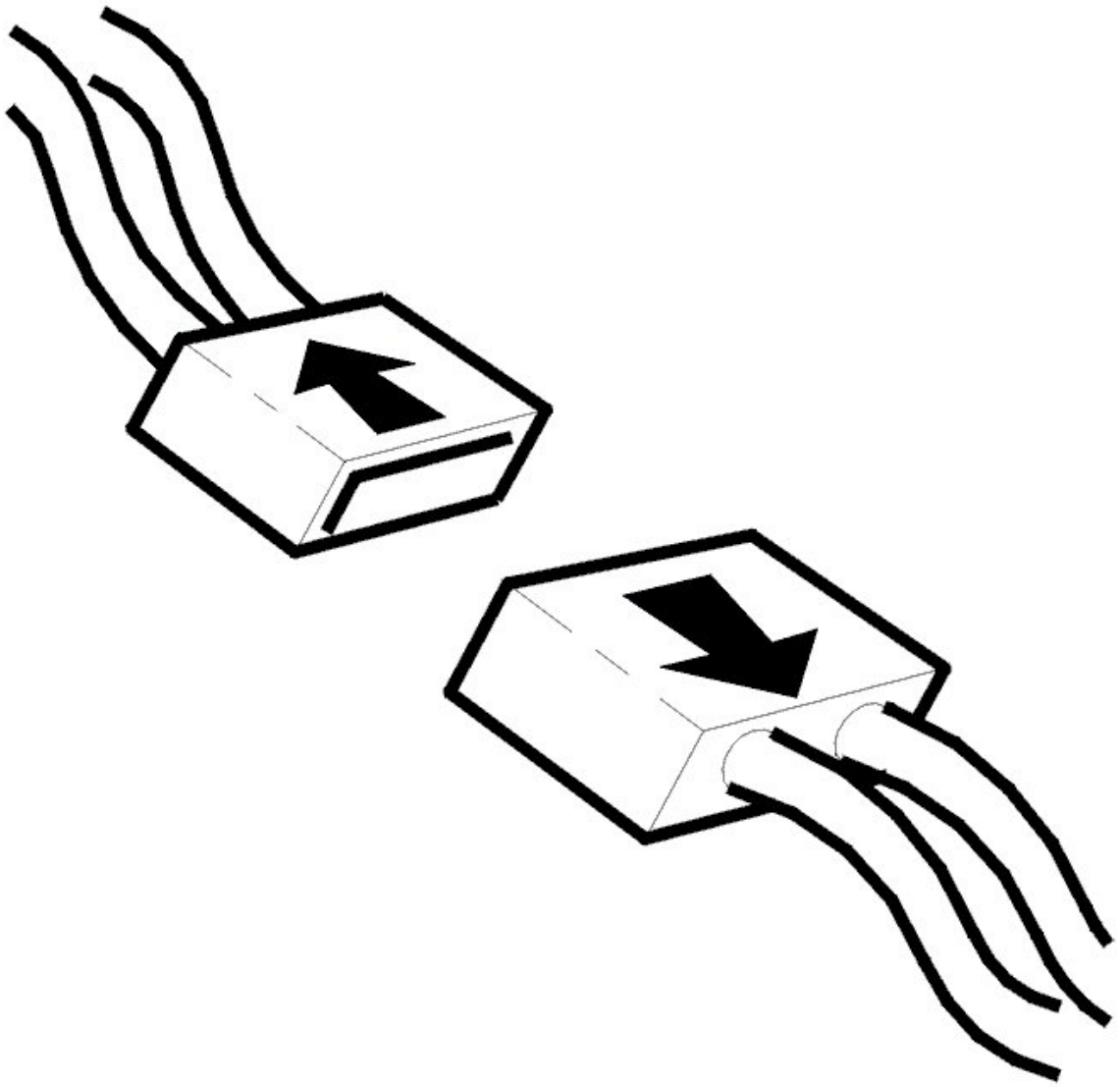
Was the resistance OK?

OK - Checking the wiring

Not OK - Checking the wiring and component

Checking the wiring



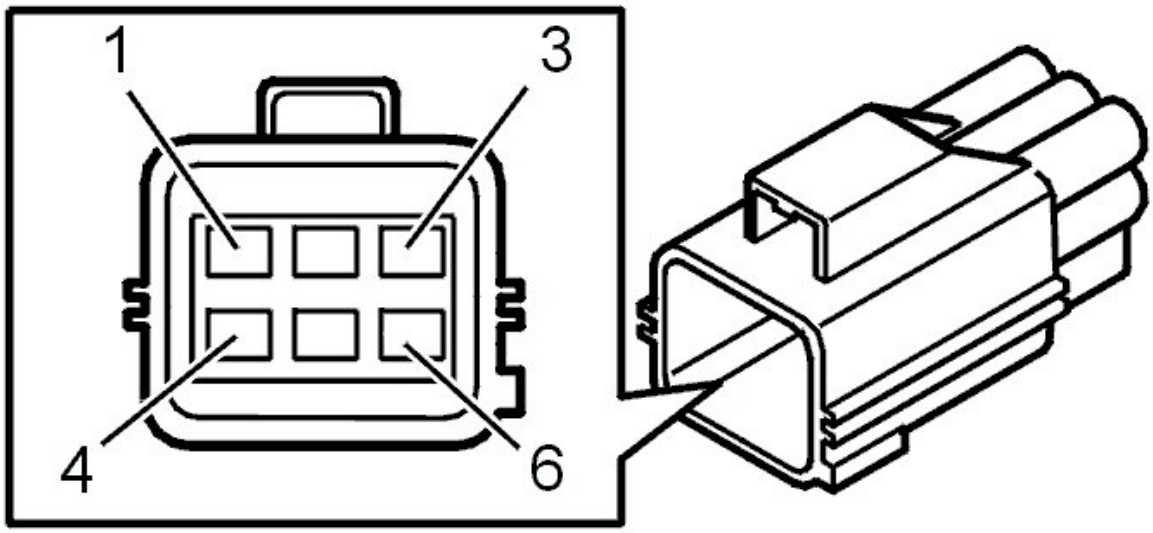


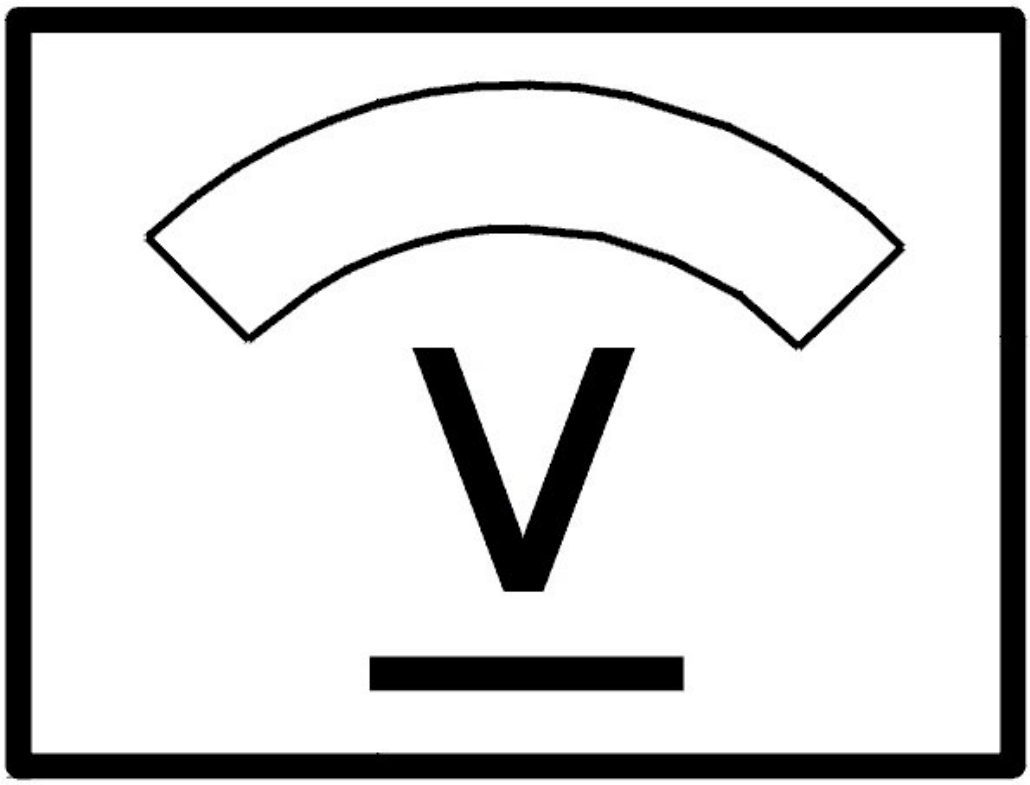
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



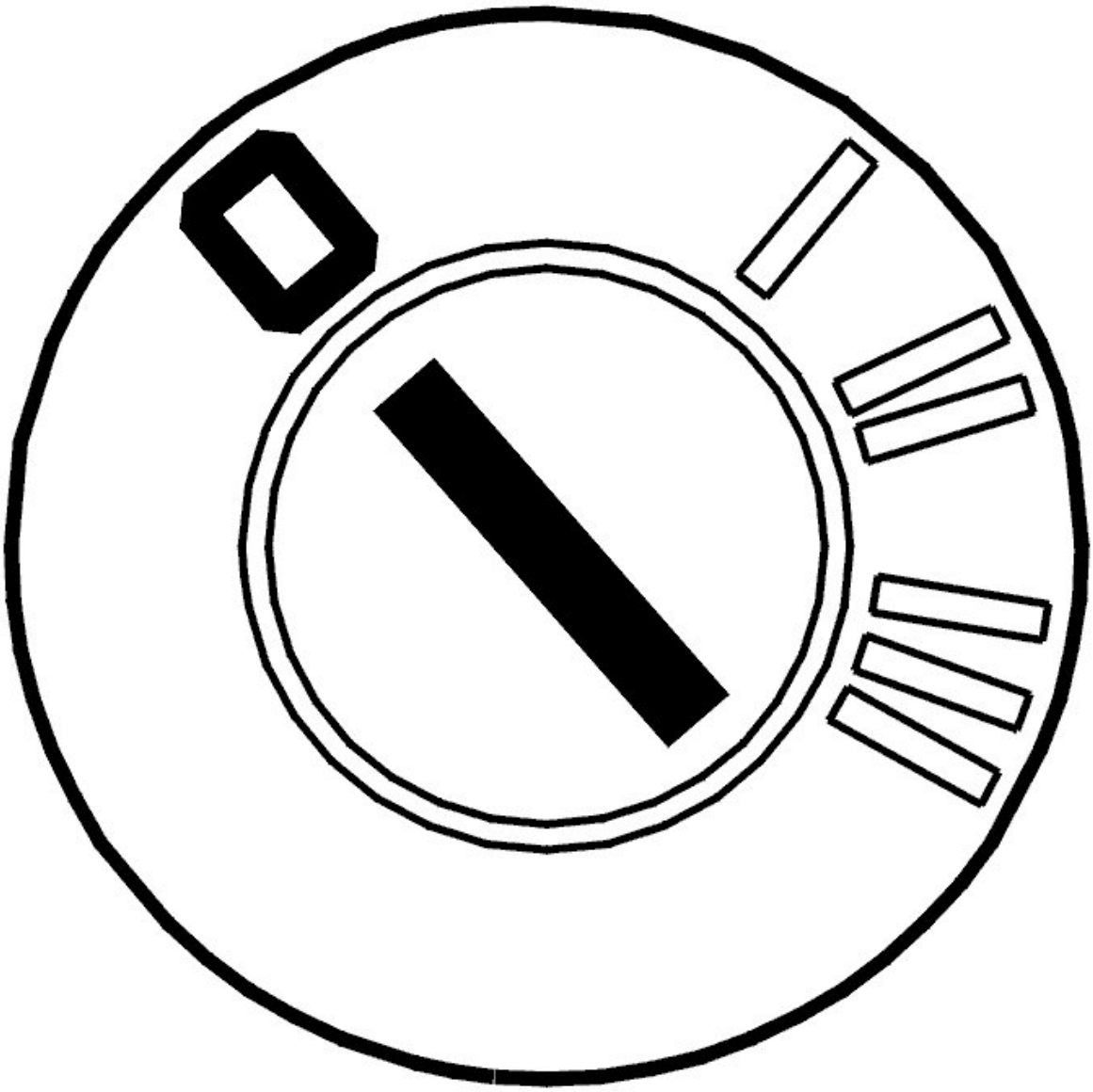


Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component

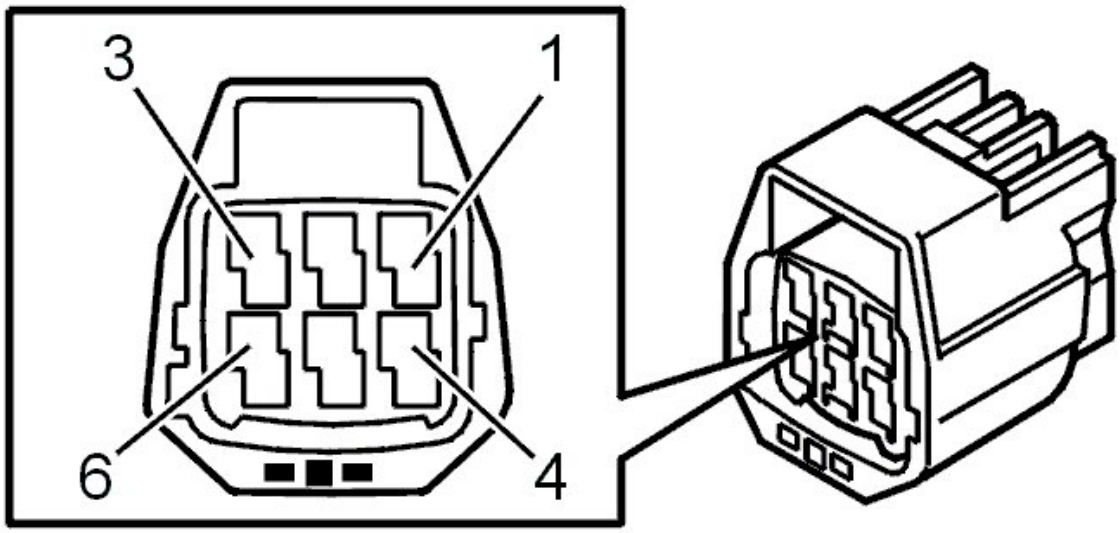


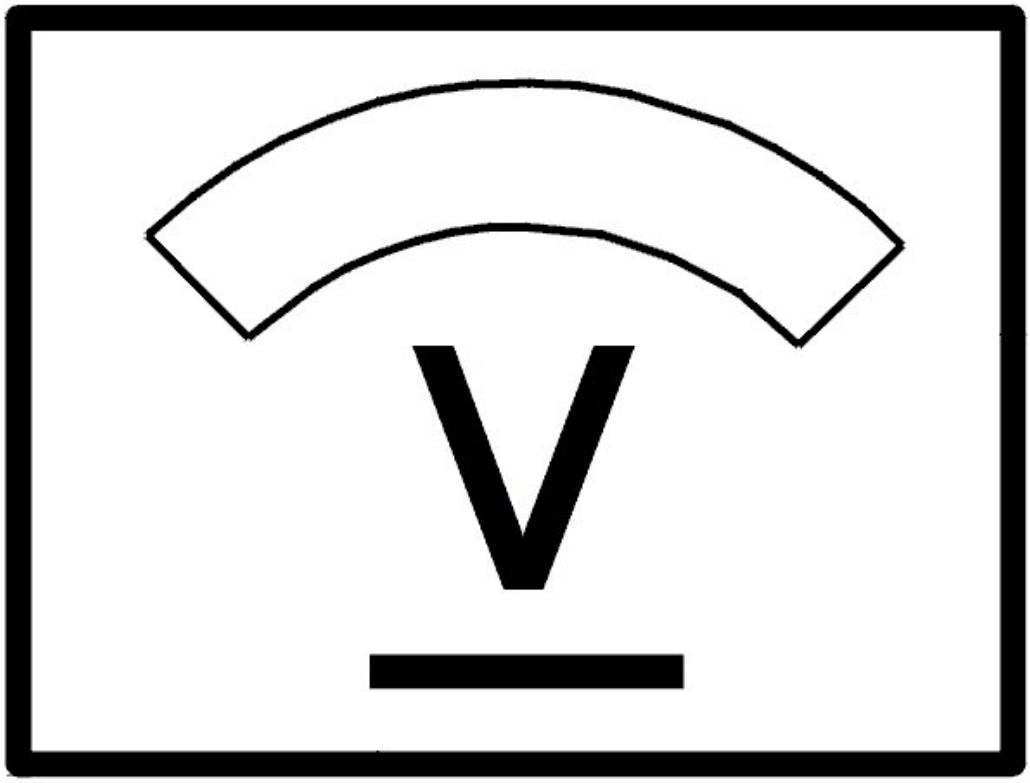
- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Replace solenoid S4 if no faults are found in the cable-.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S4, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

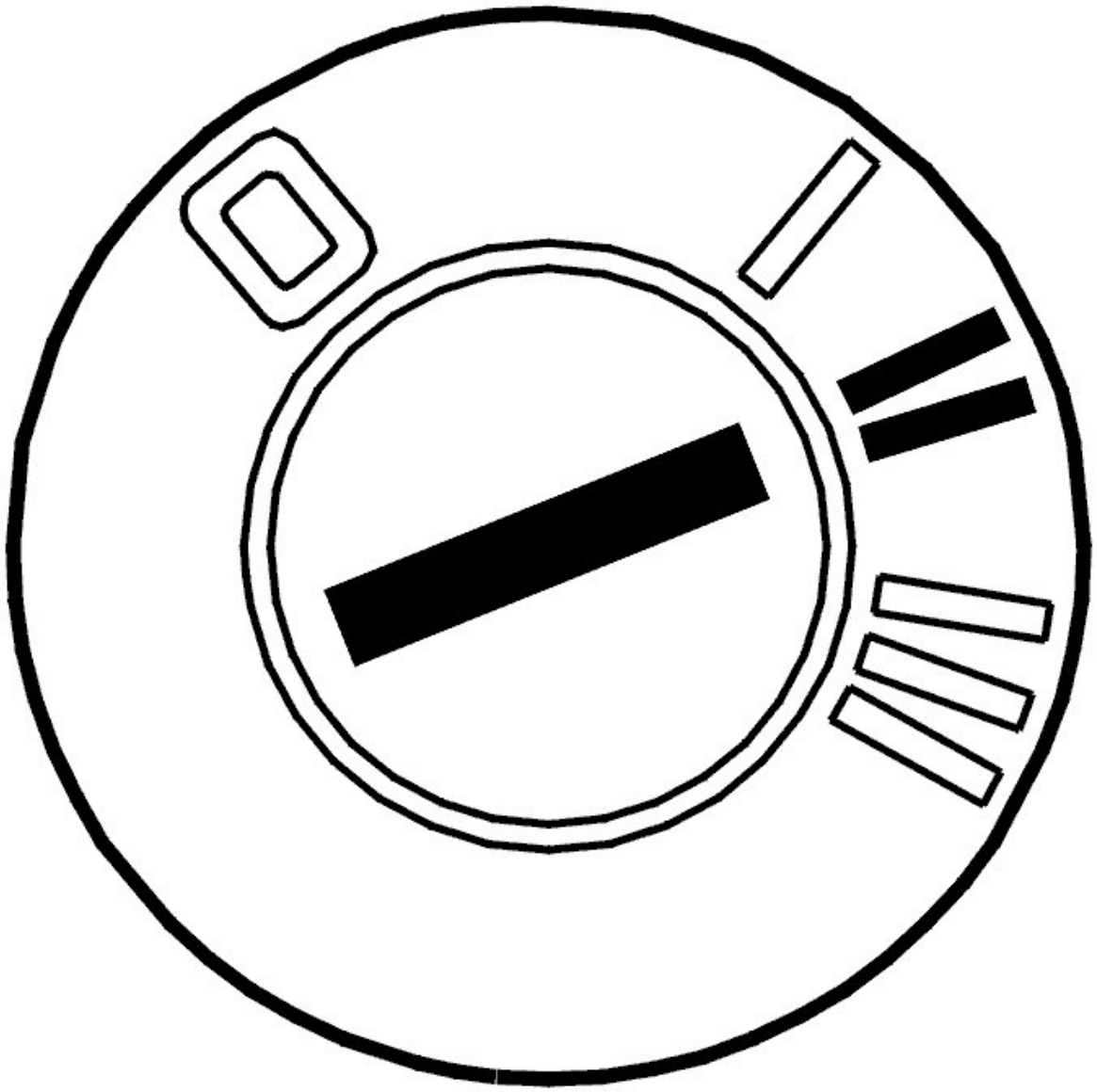
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



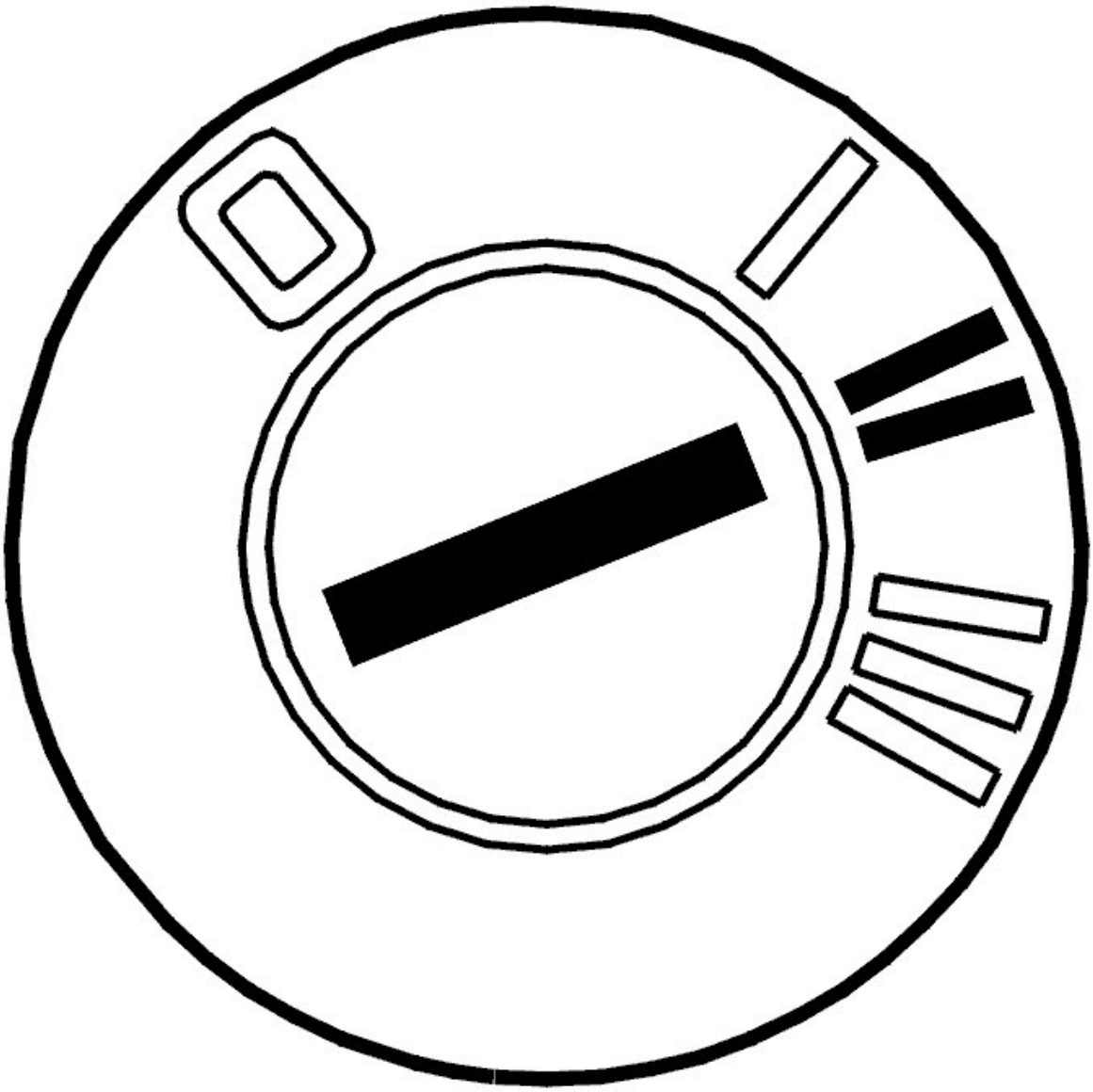
- Ignition on.

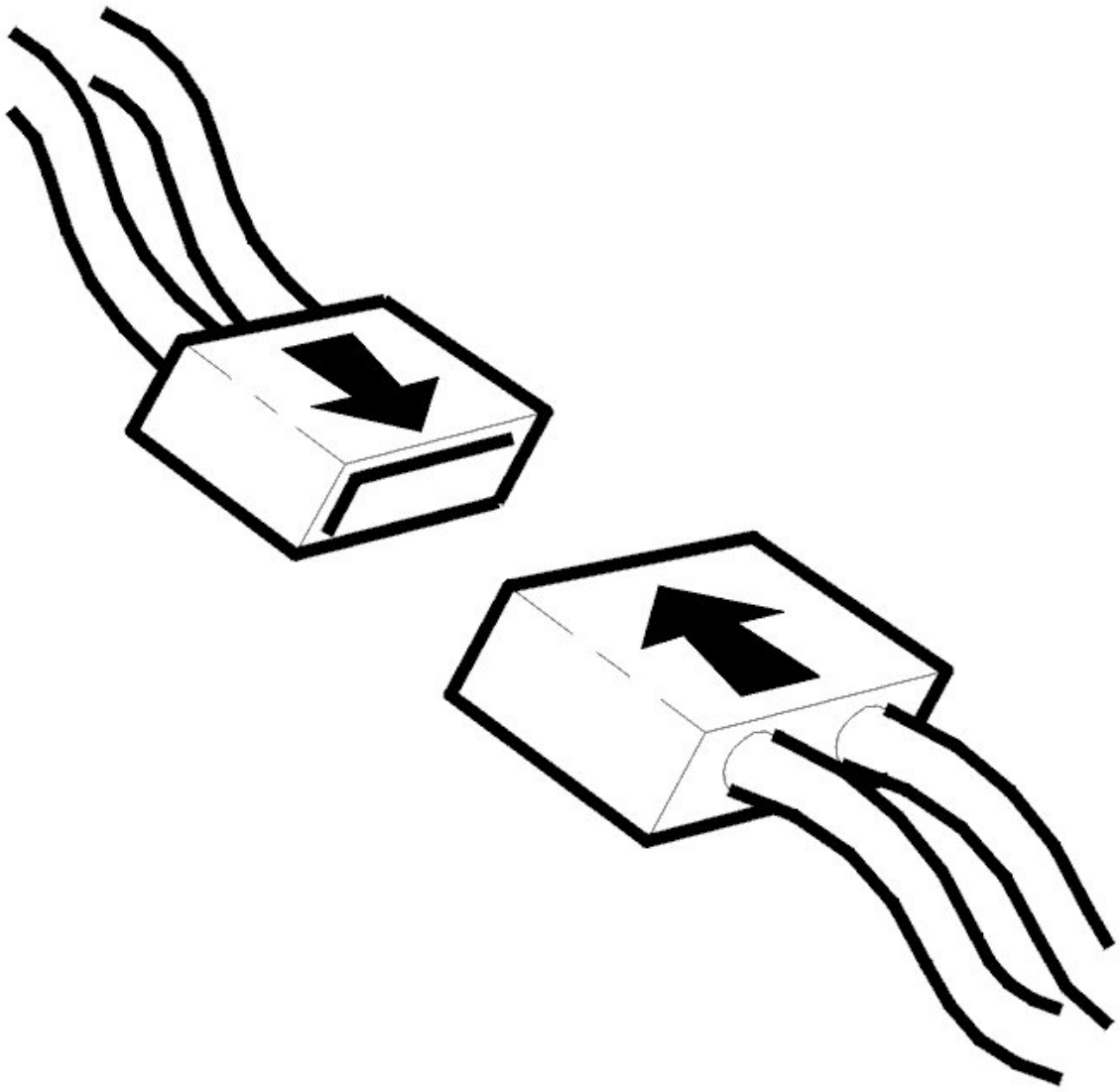
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S4.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

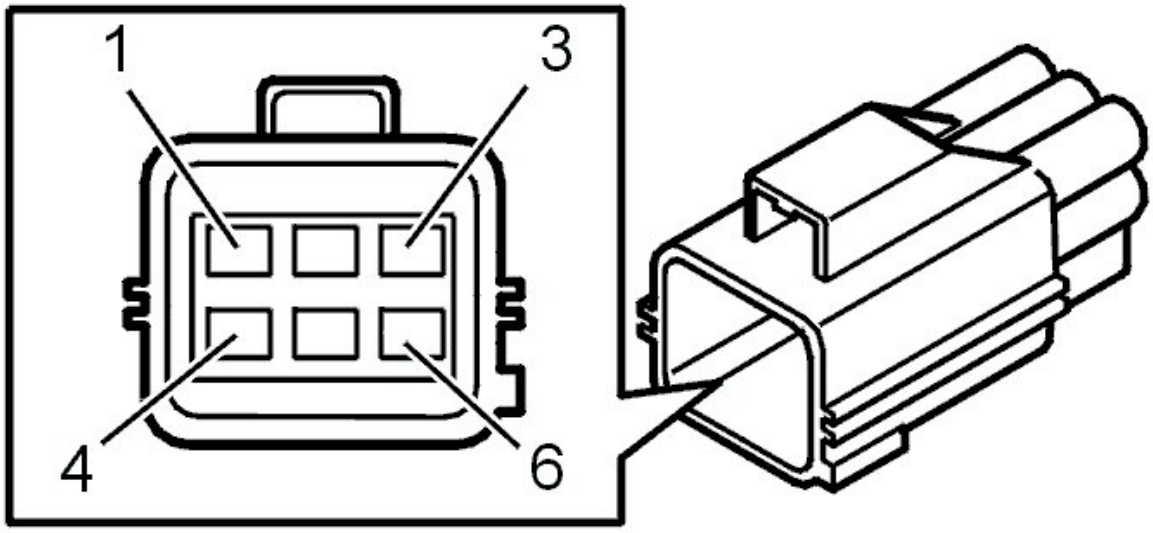
Attempt New Test - Checking the temperature sensor

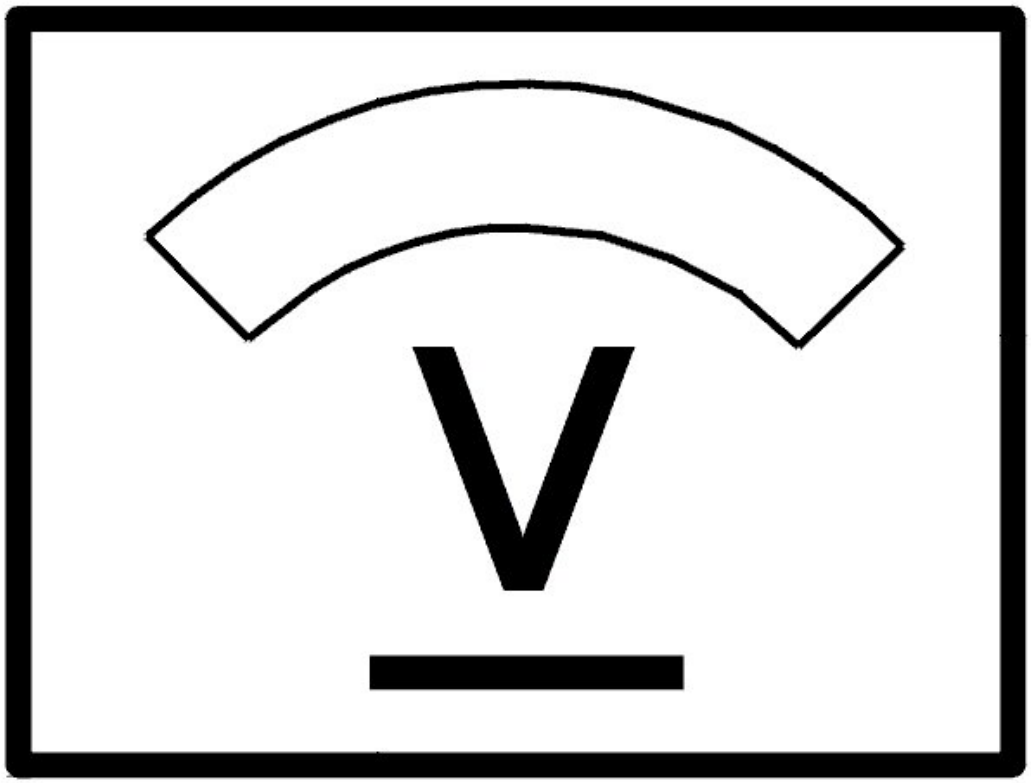
Intermittent fault

Check the cable between transmission control module (TCM) terminal #A47 (#A47) and transmission connector terminal #C4. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

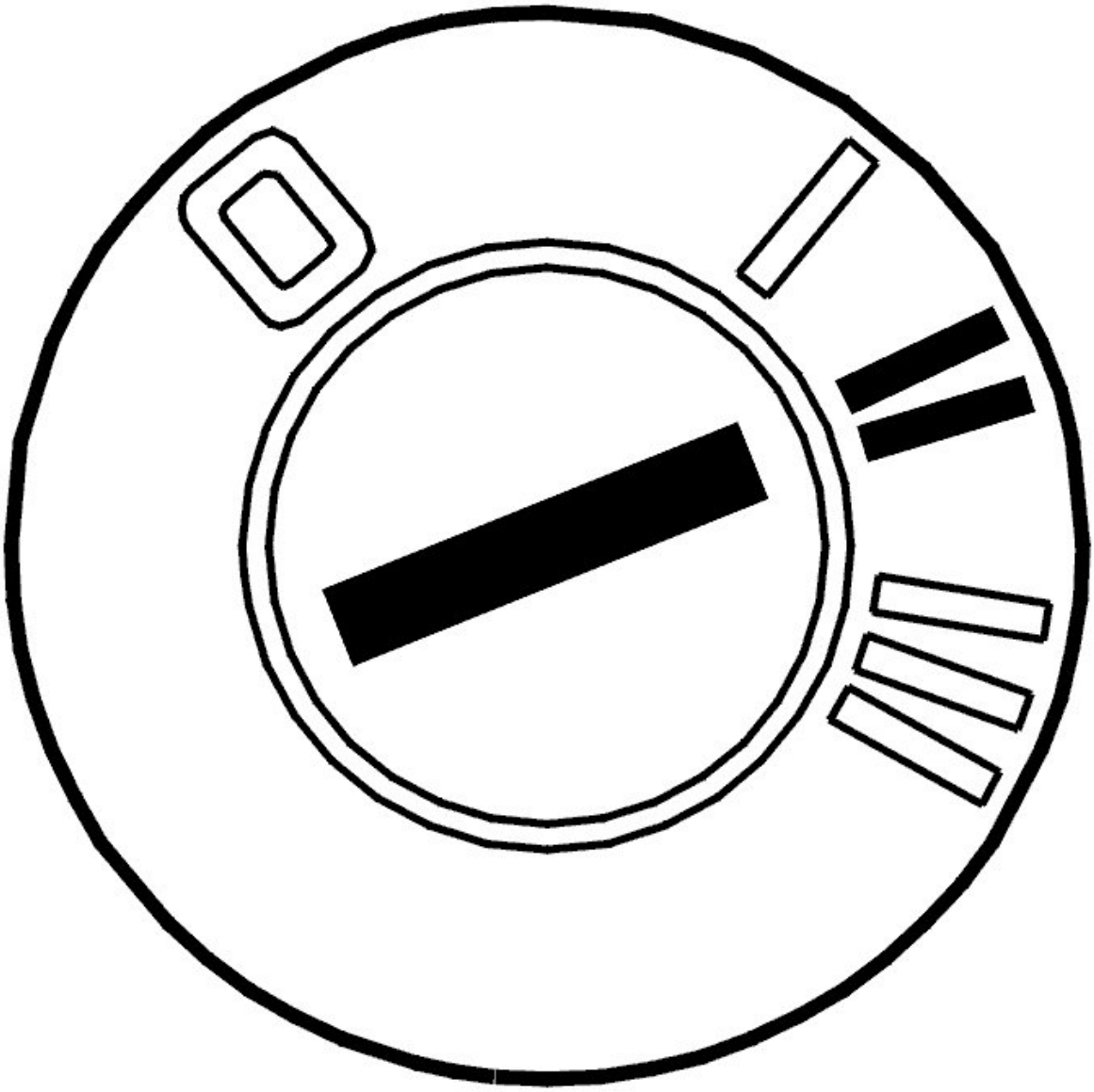
Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking the temperature sensor

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

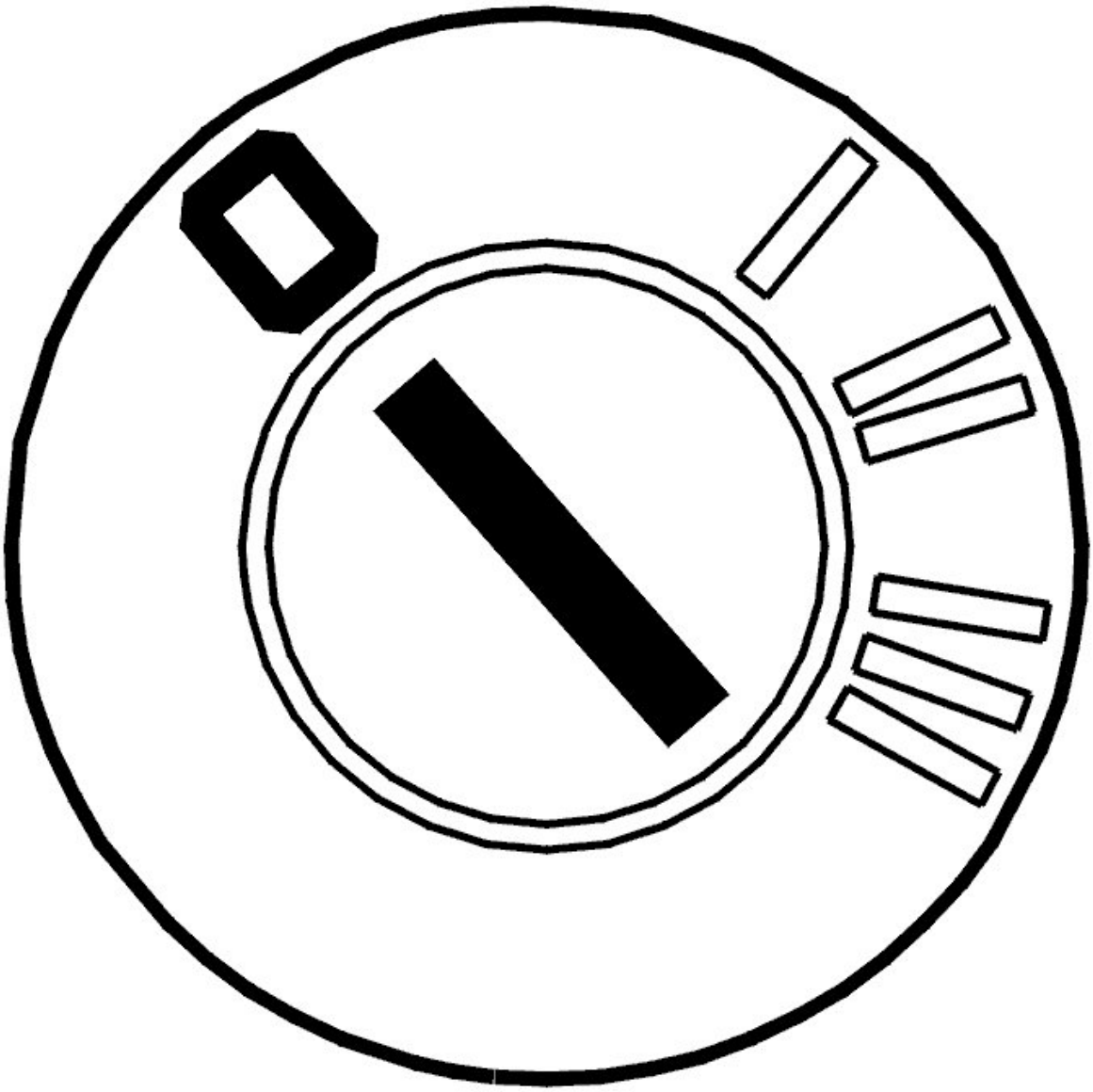
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

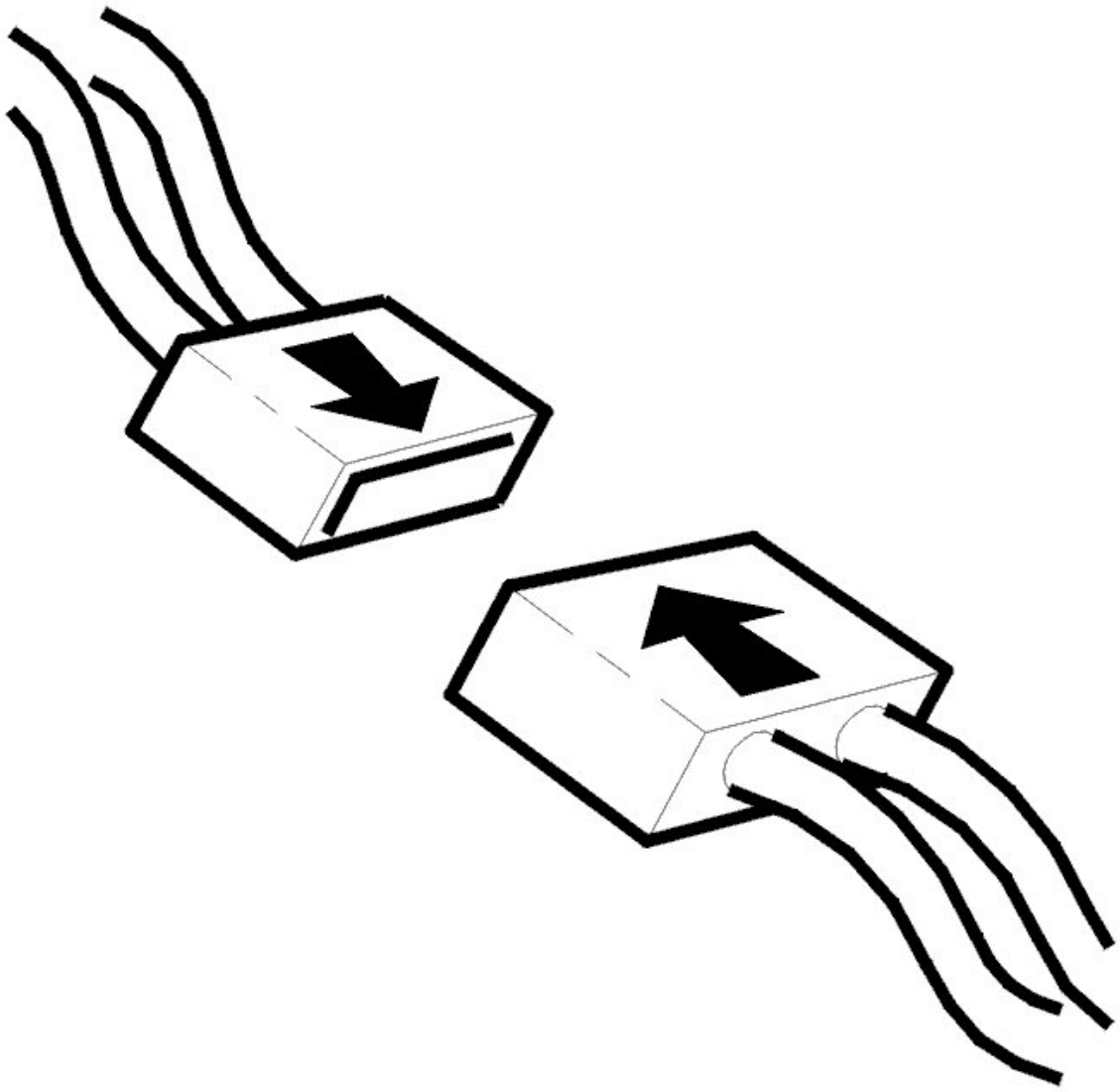
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

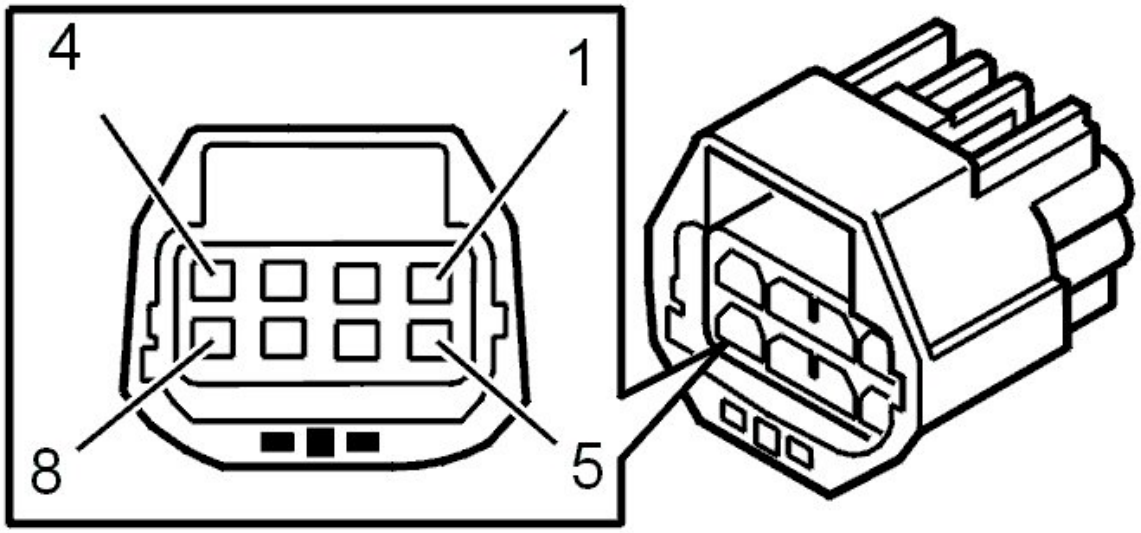
Checking transmission fluid temperature sensor

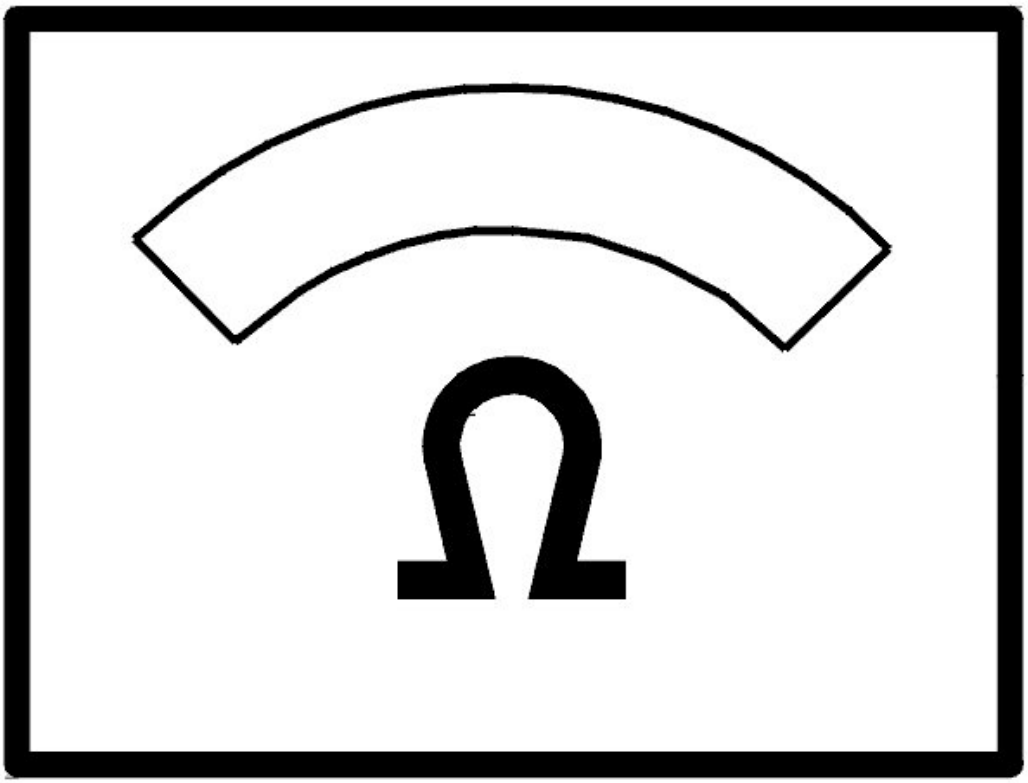




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

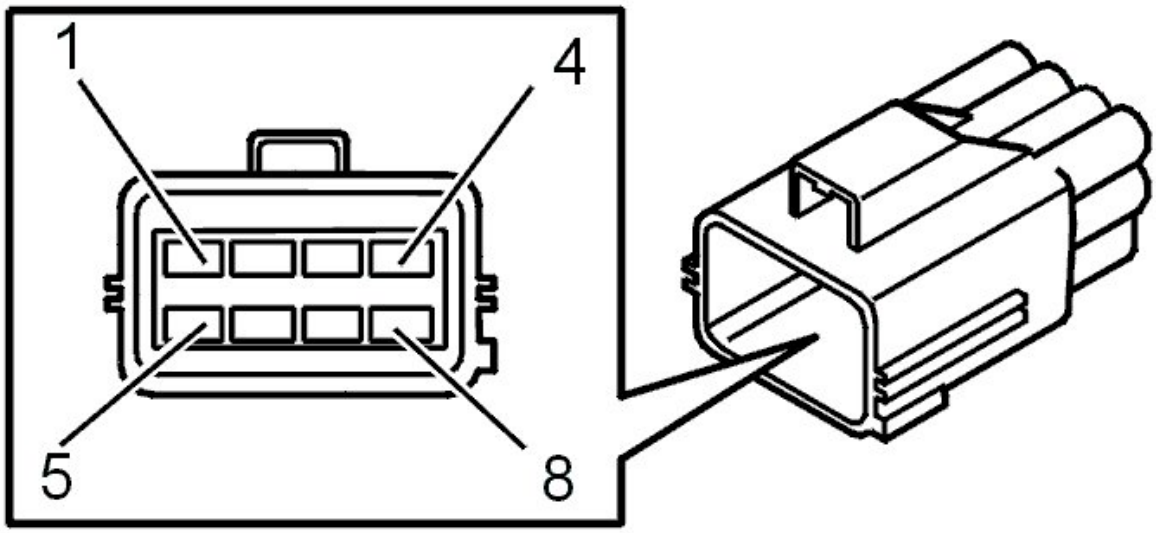
No - Checking the cable and component

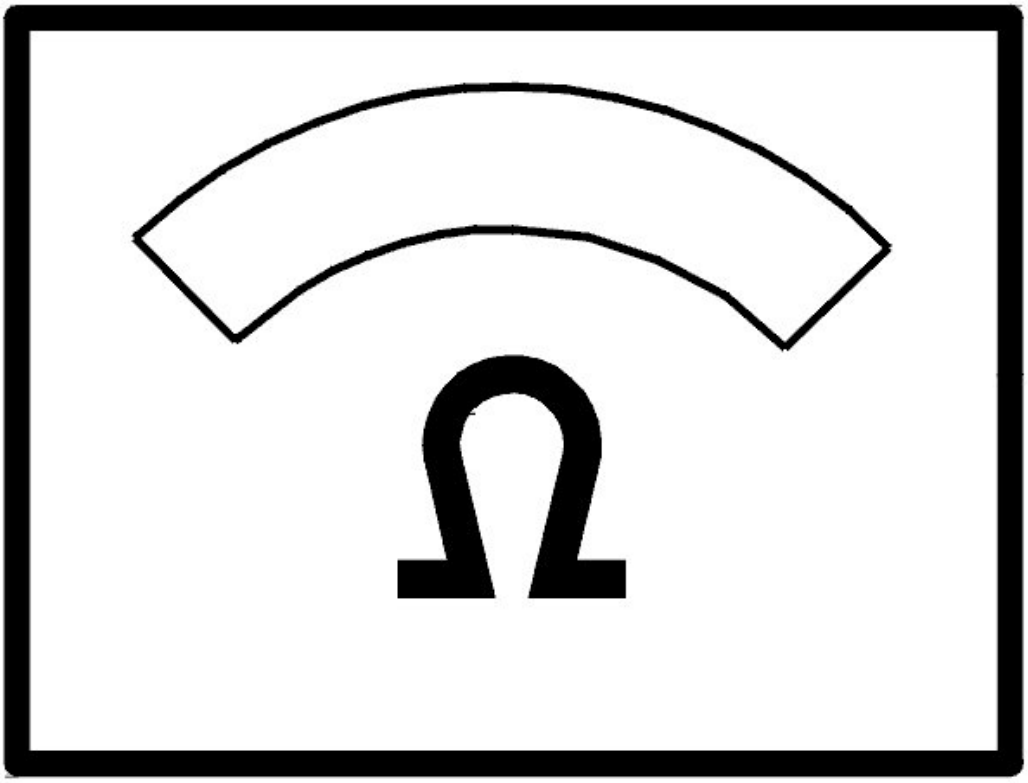
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



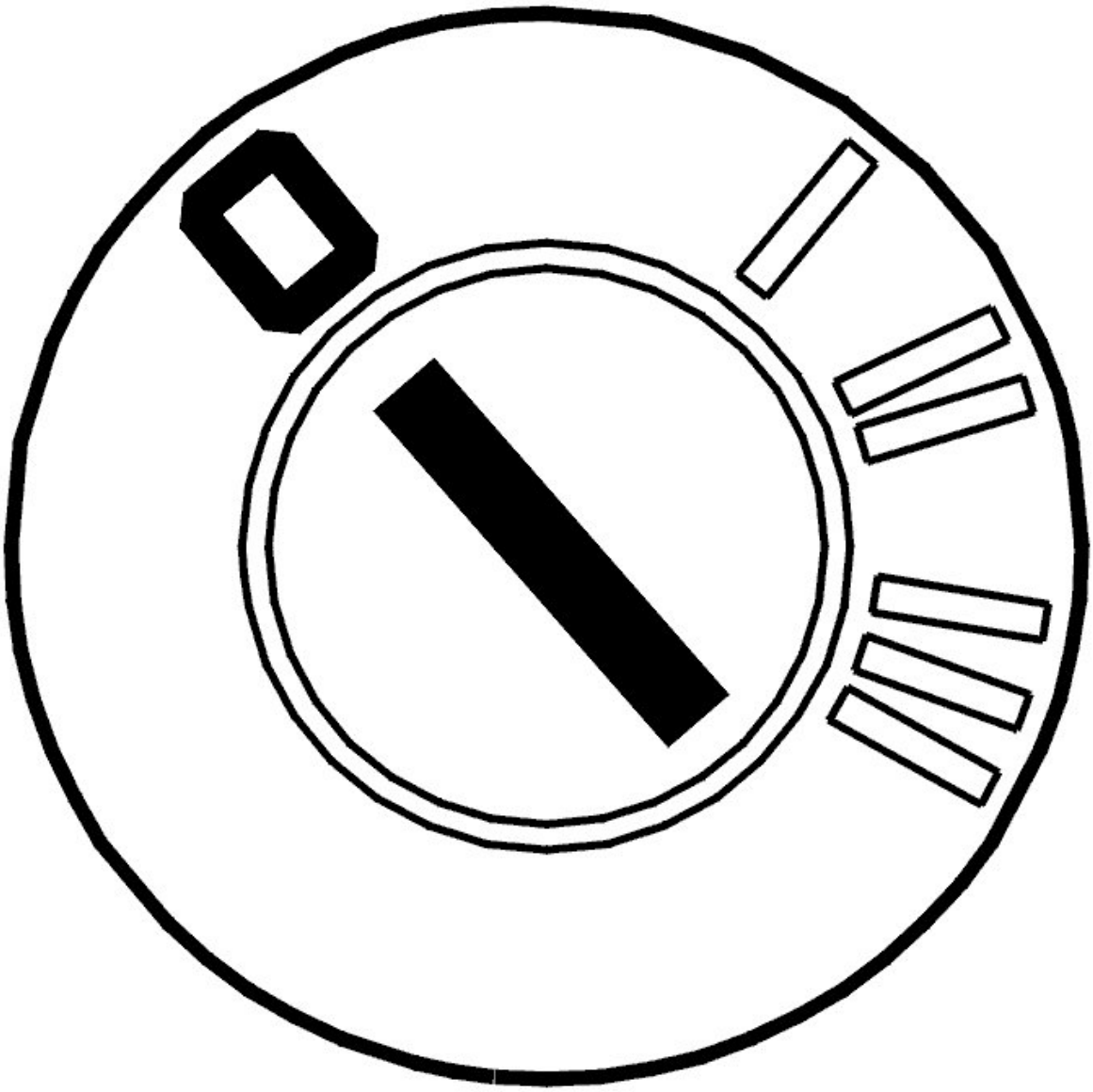


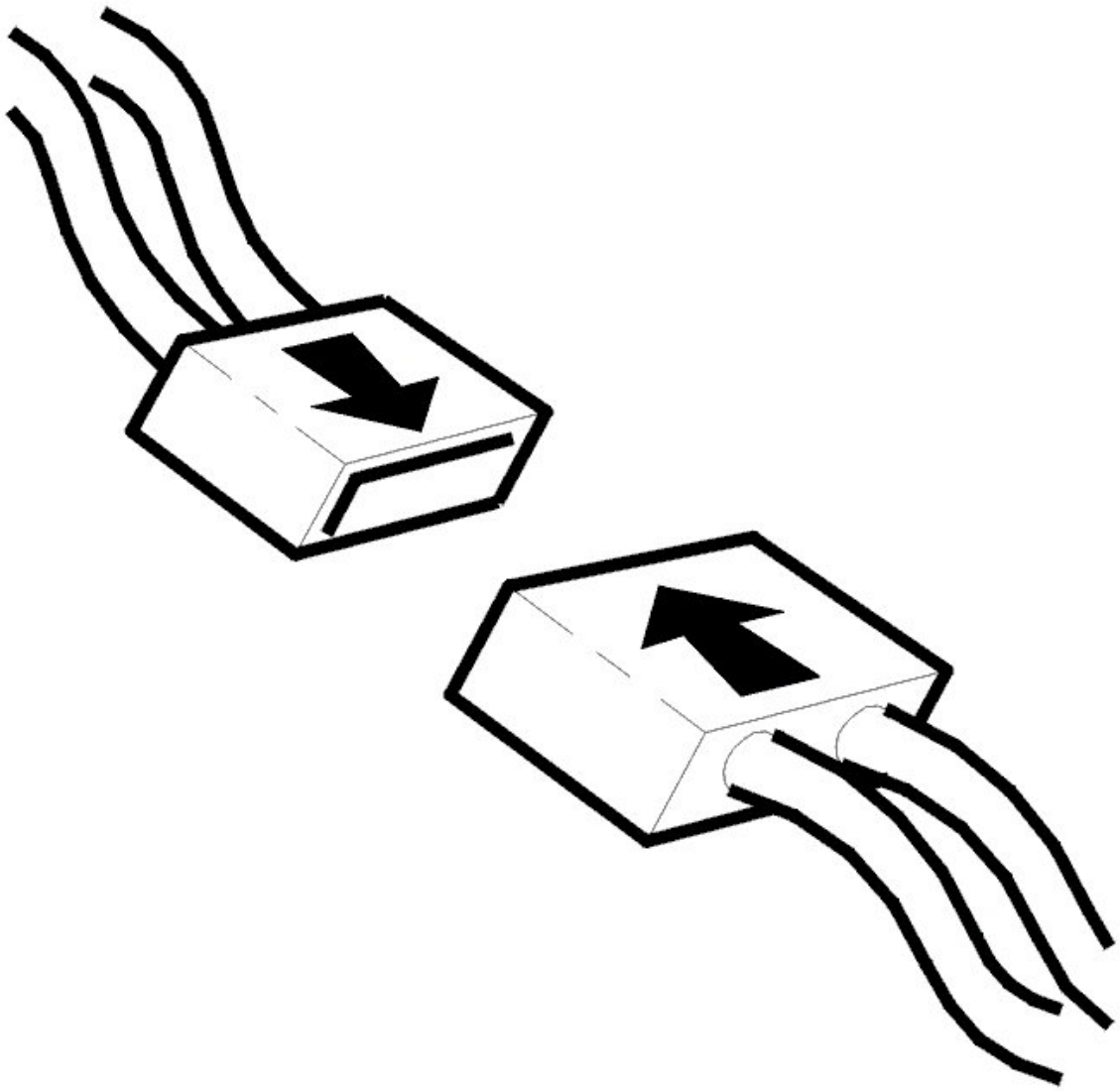
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

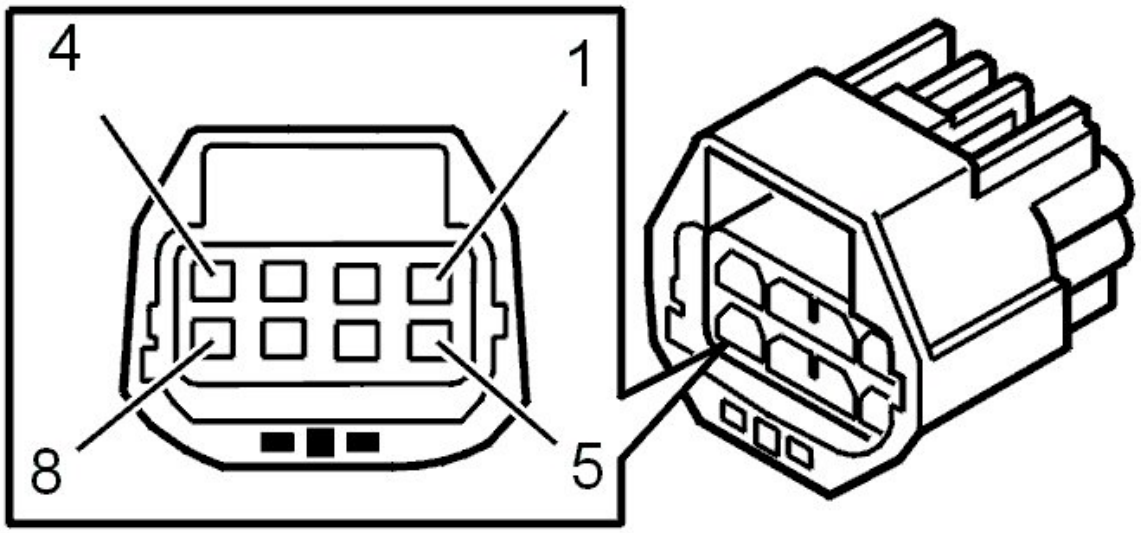
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

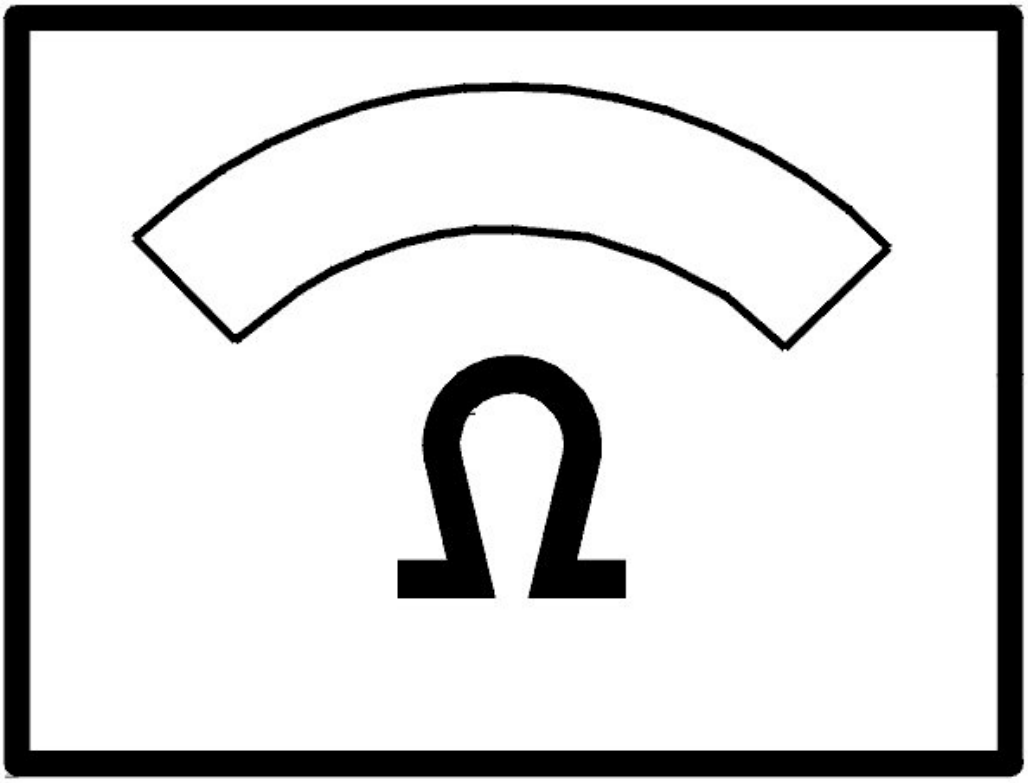
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





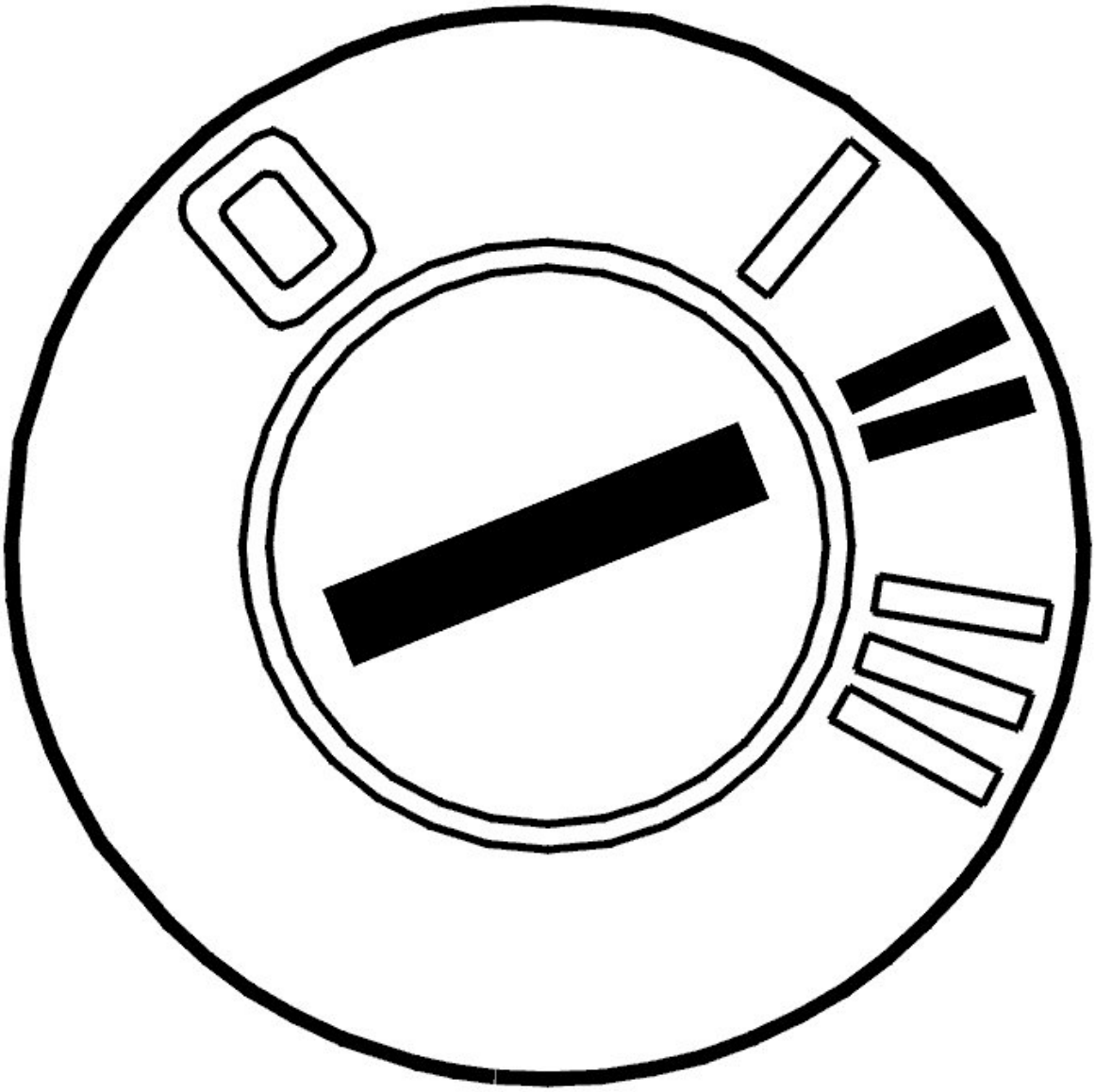
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



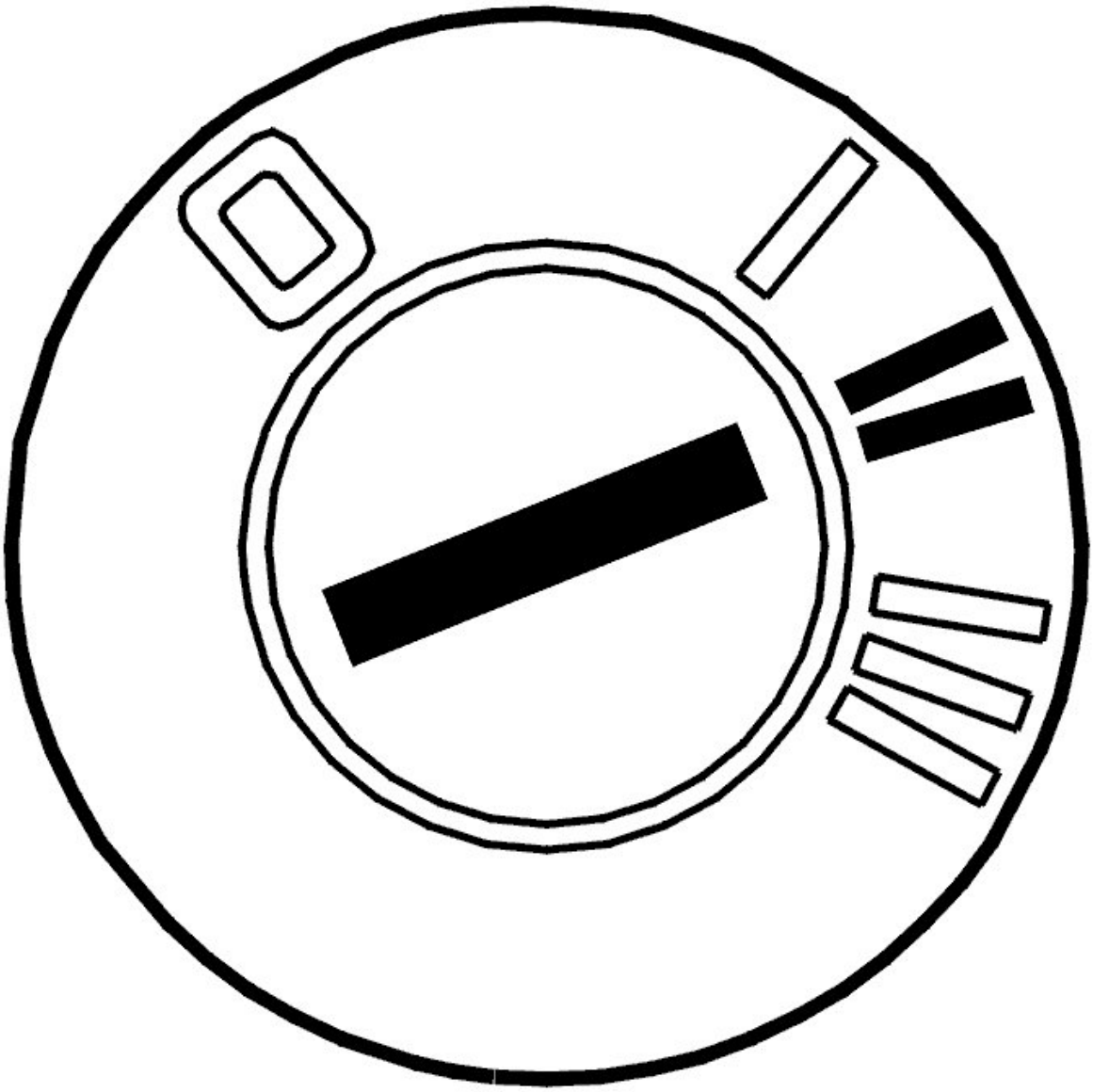
- Ignition on.

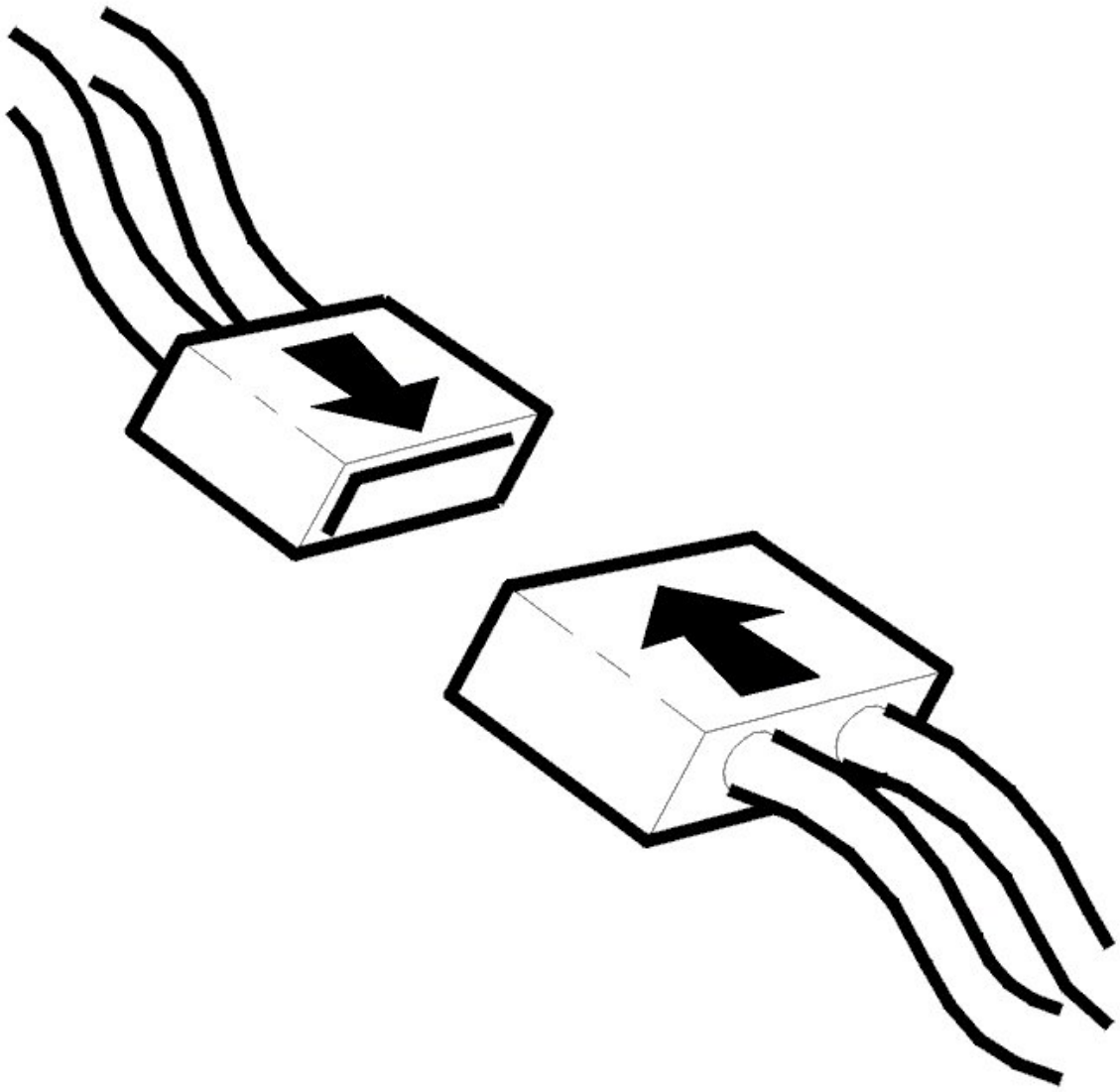
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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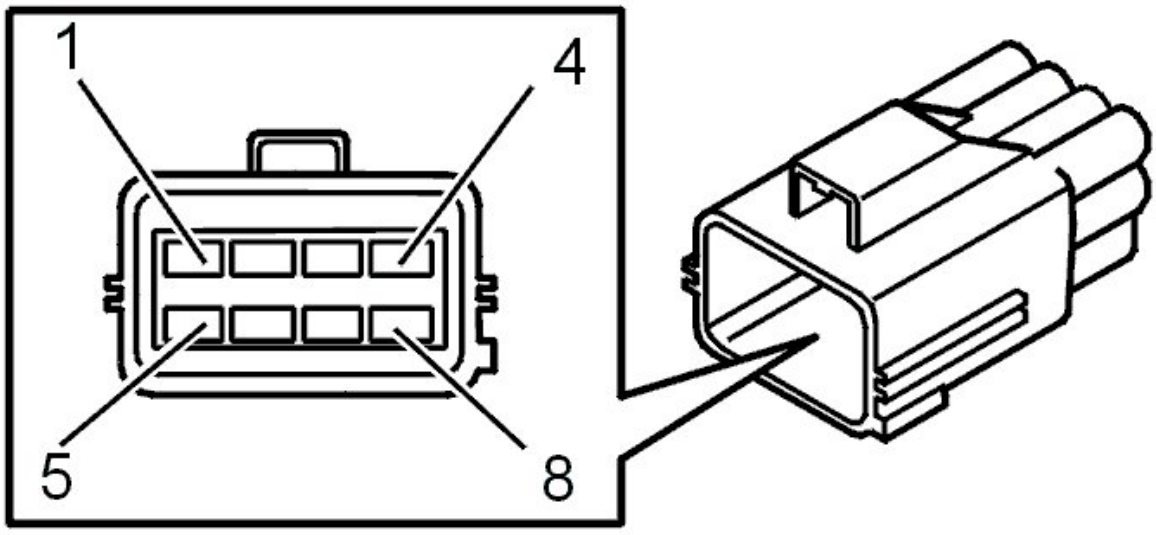
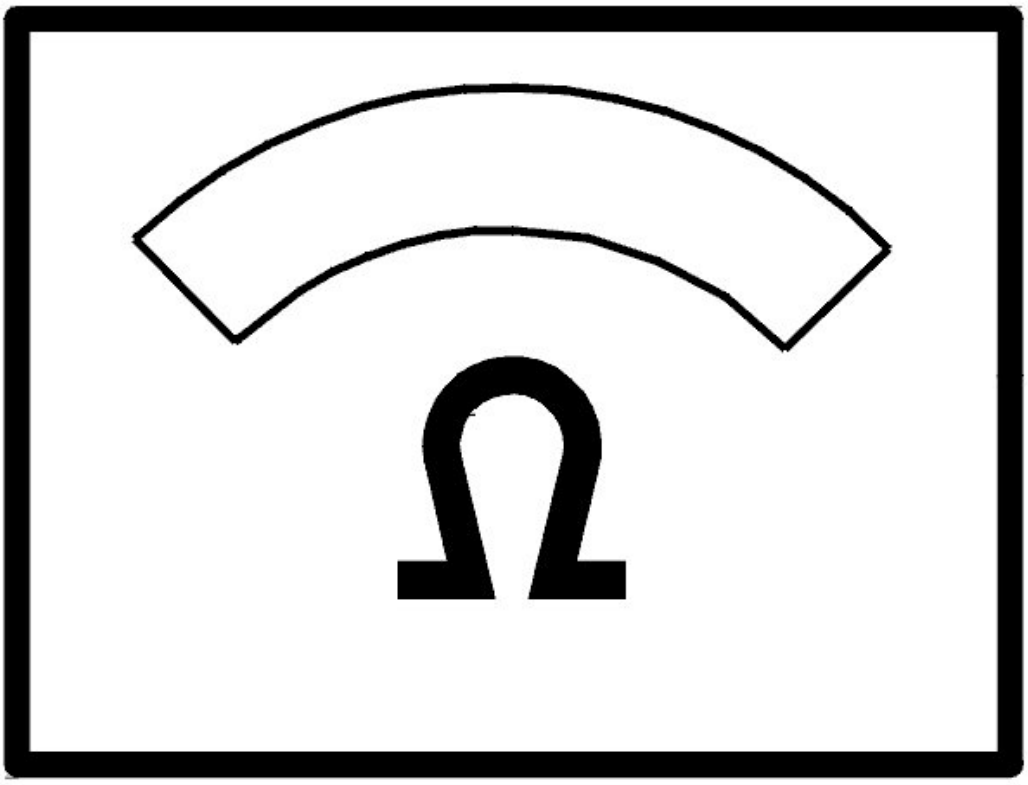
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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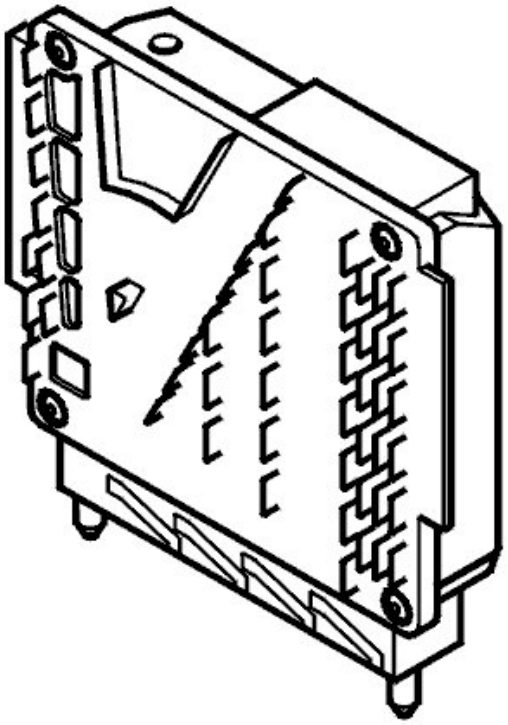
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

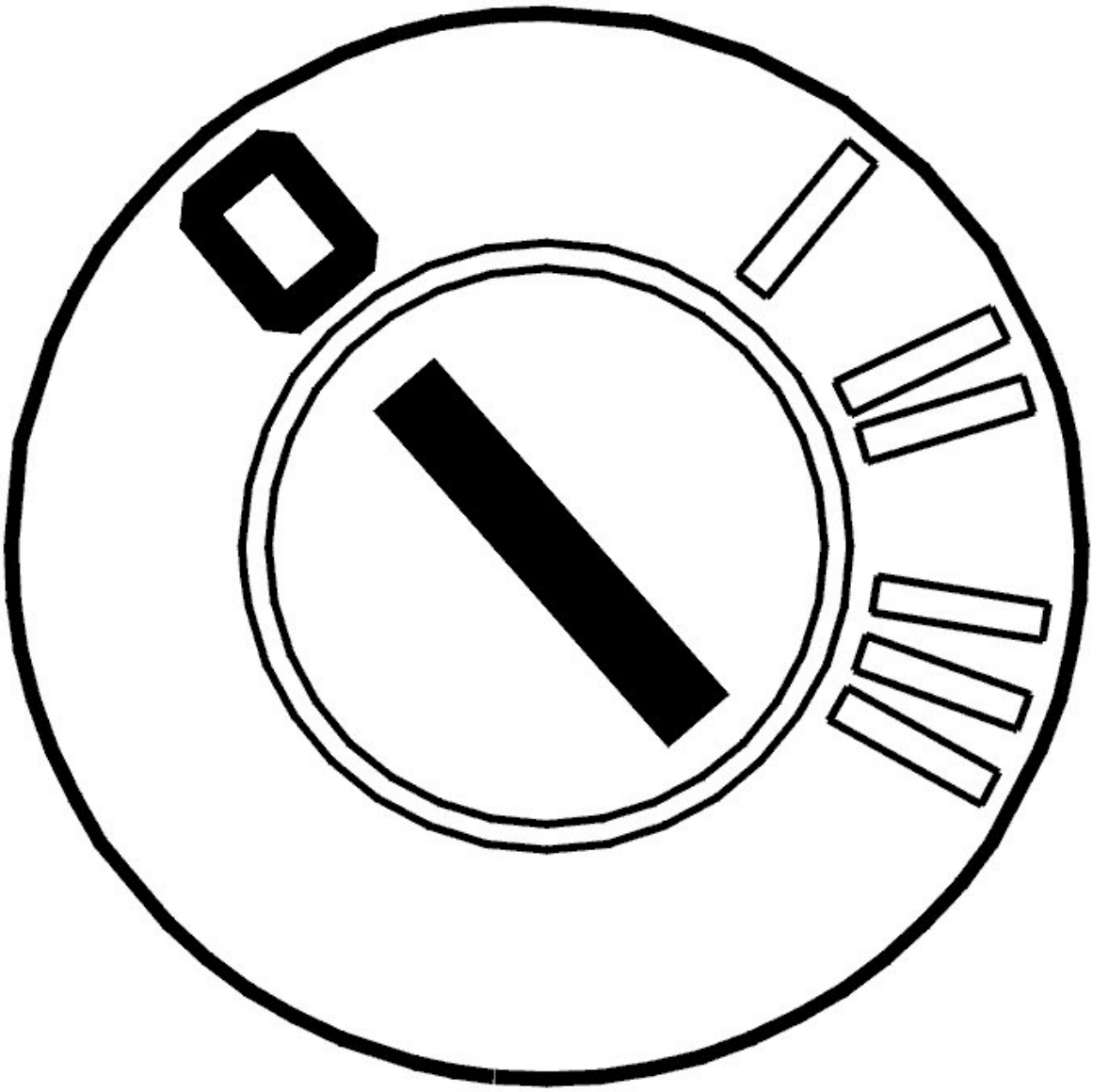
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Missing

Signal missing

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

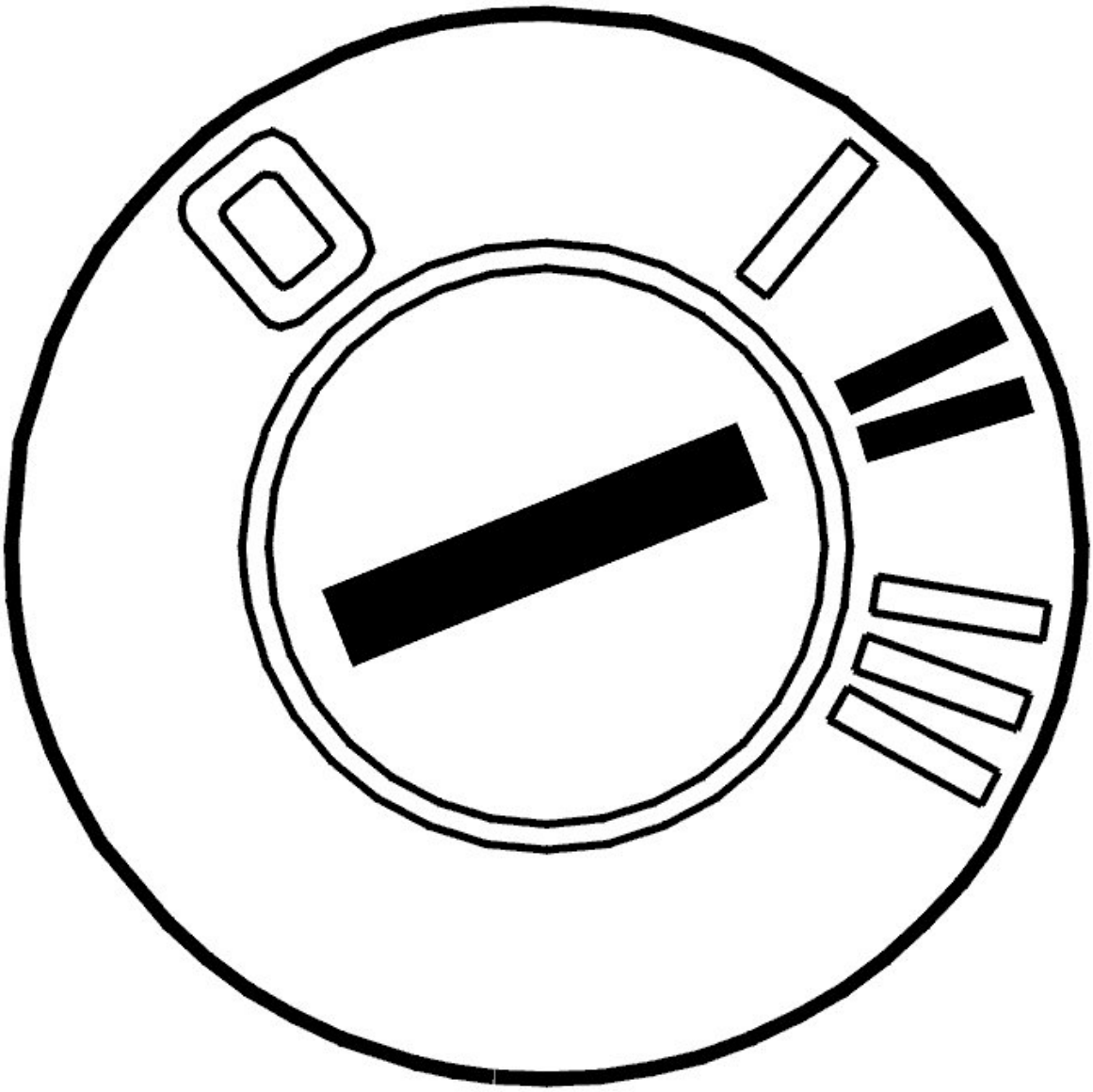
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S4

No - Checking transmission fluid temperature sensor

Checking shift solenoid S4



- Ignition on
- Gear selector in position P
- Activate solenoid S4.

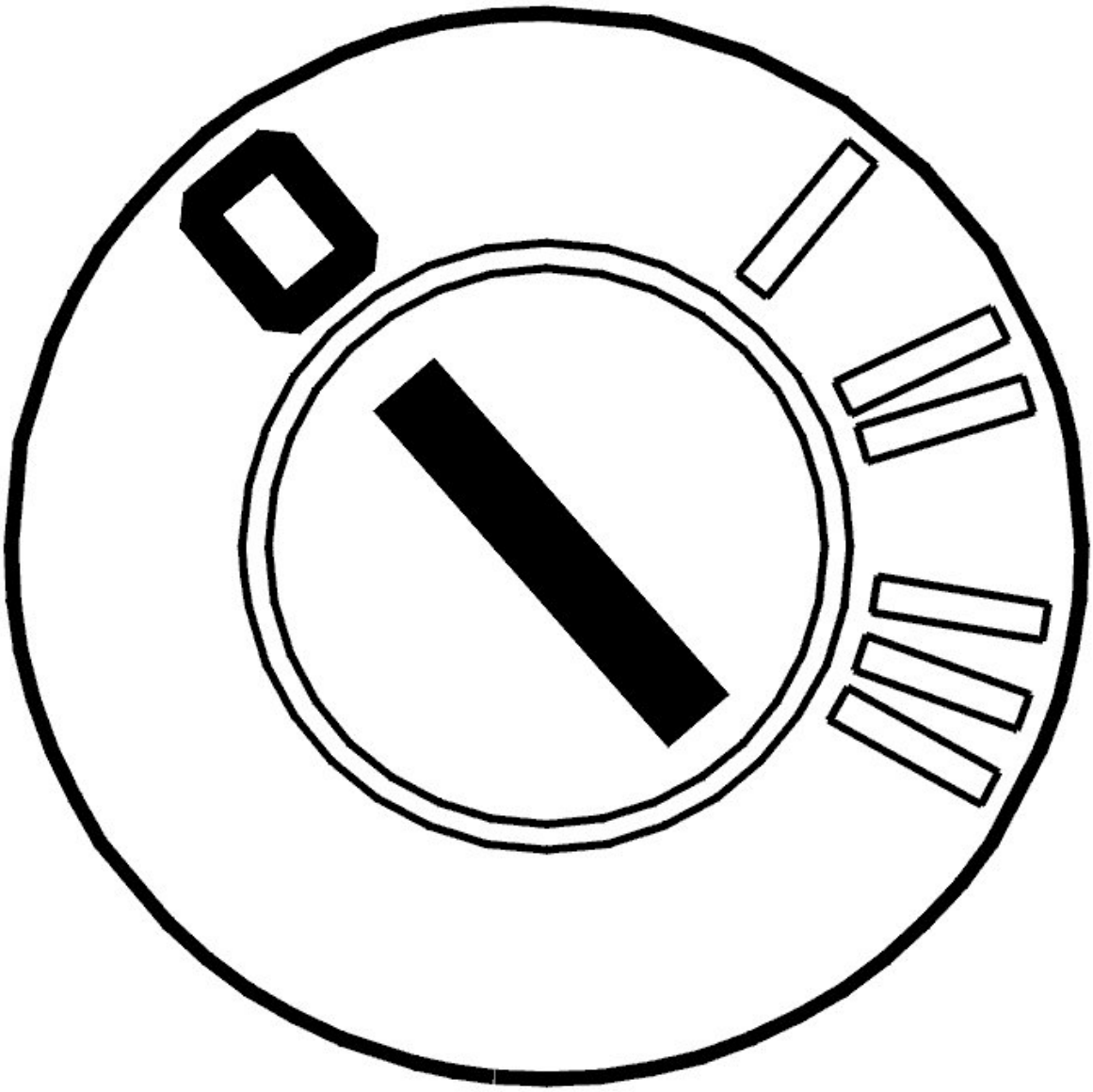
The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - Intermittent fault

No - Checking resistance

Checking resistance

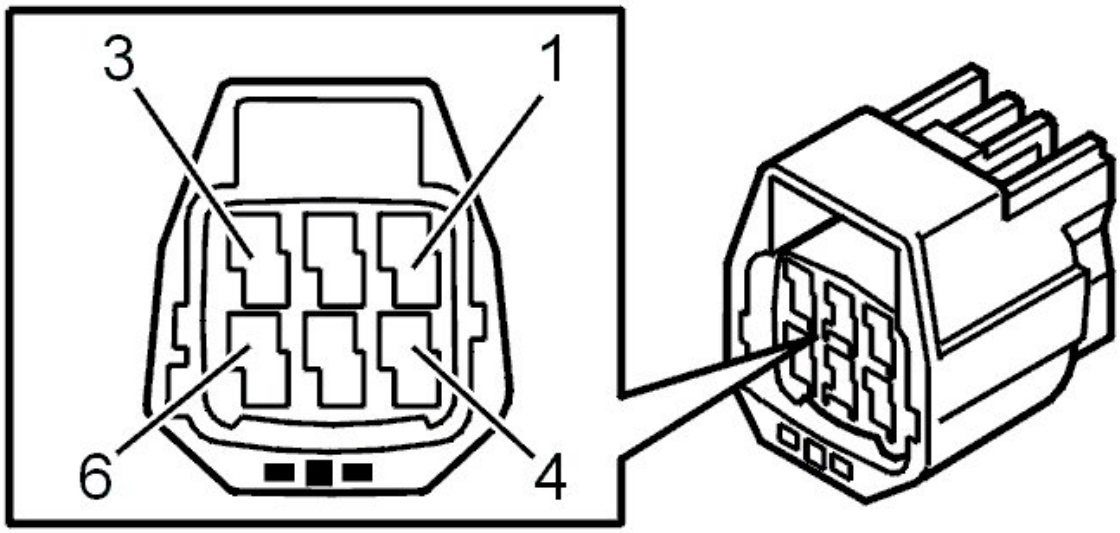


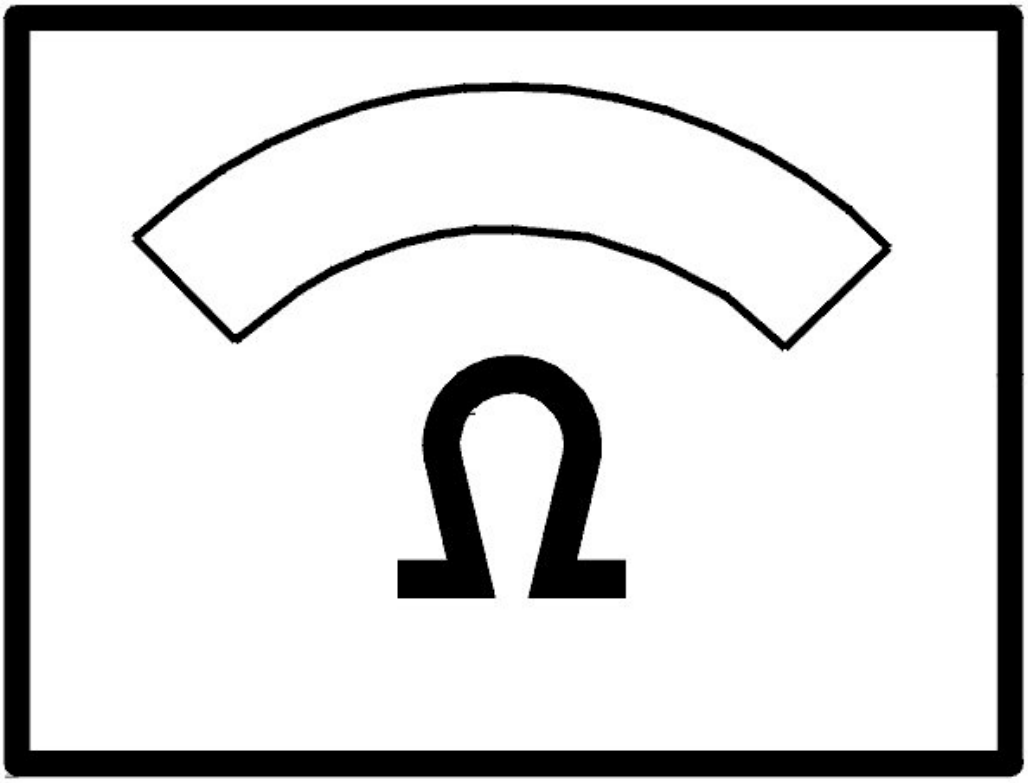
- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



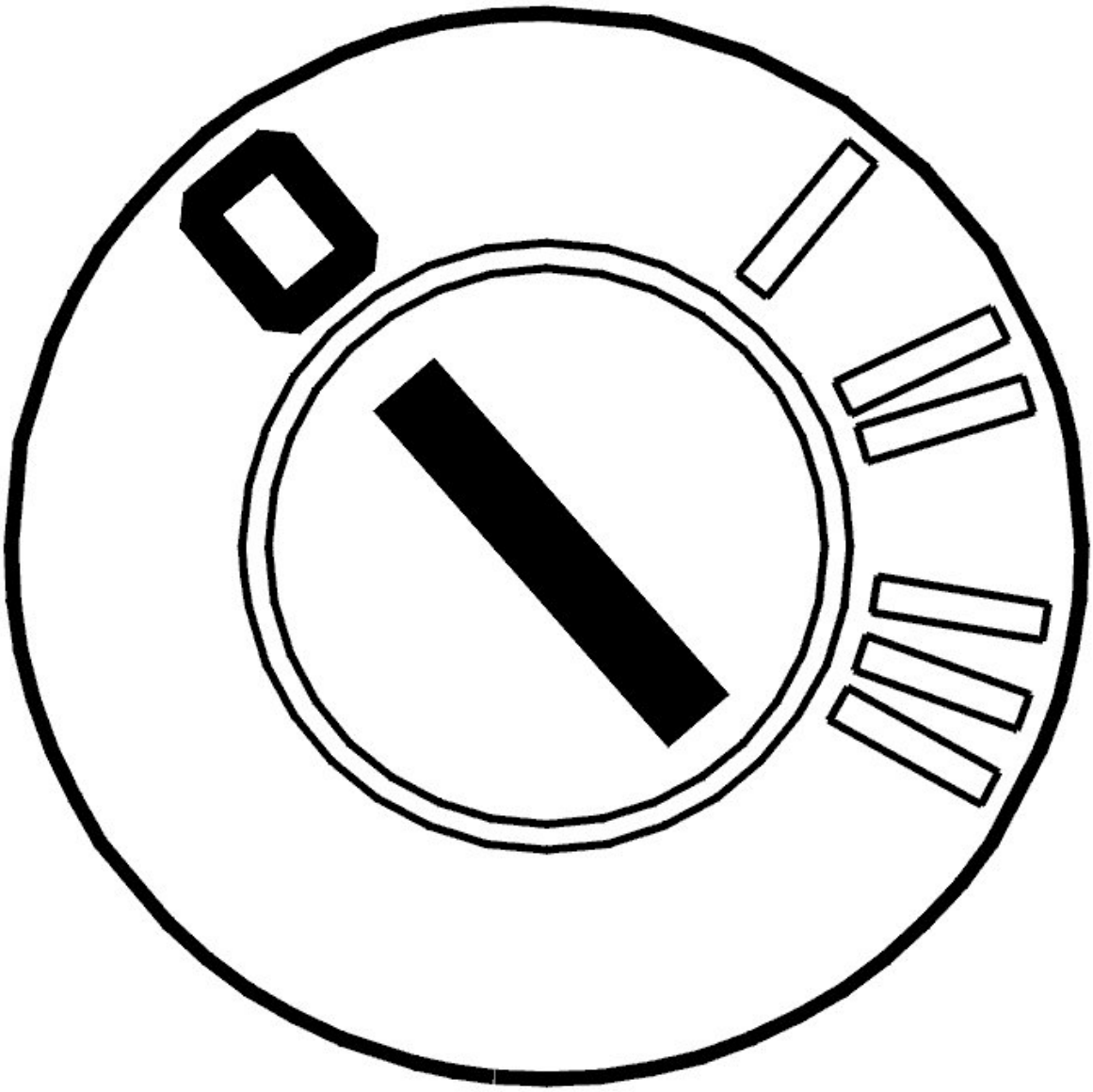


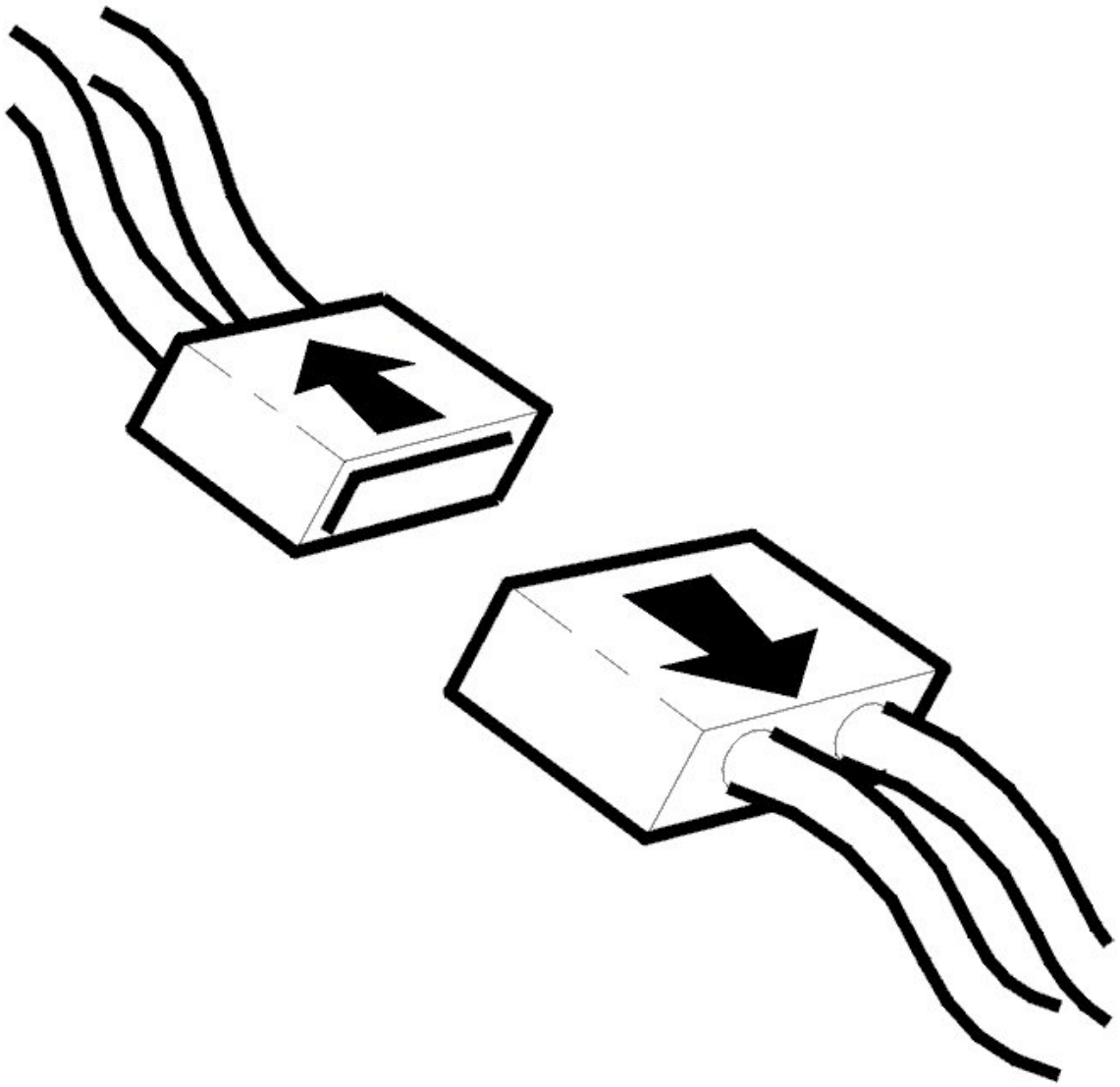
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



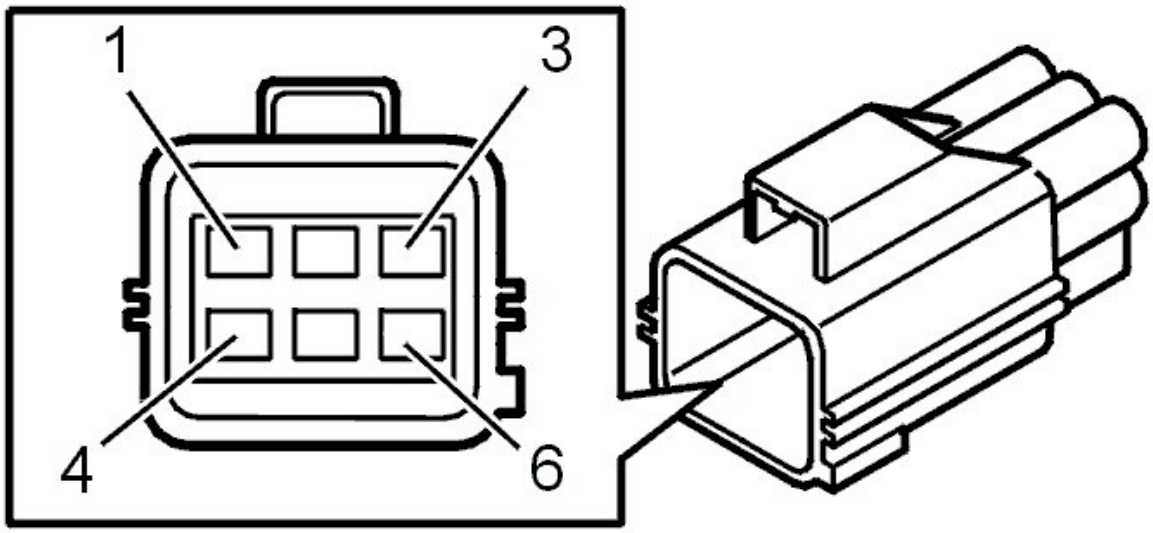


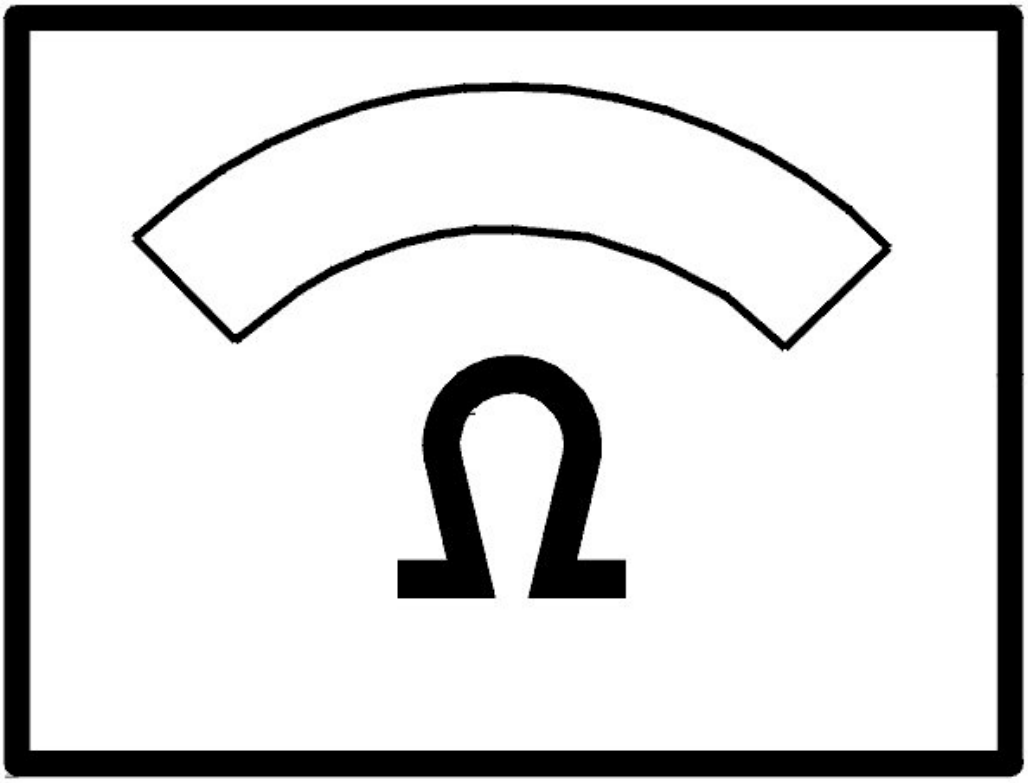
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



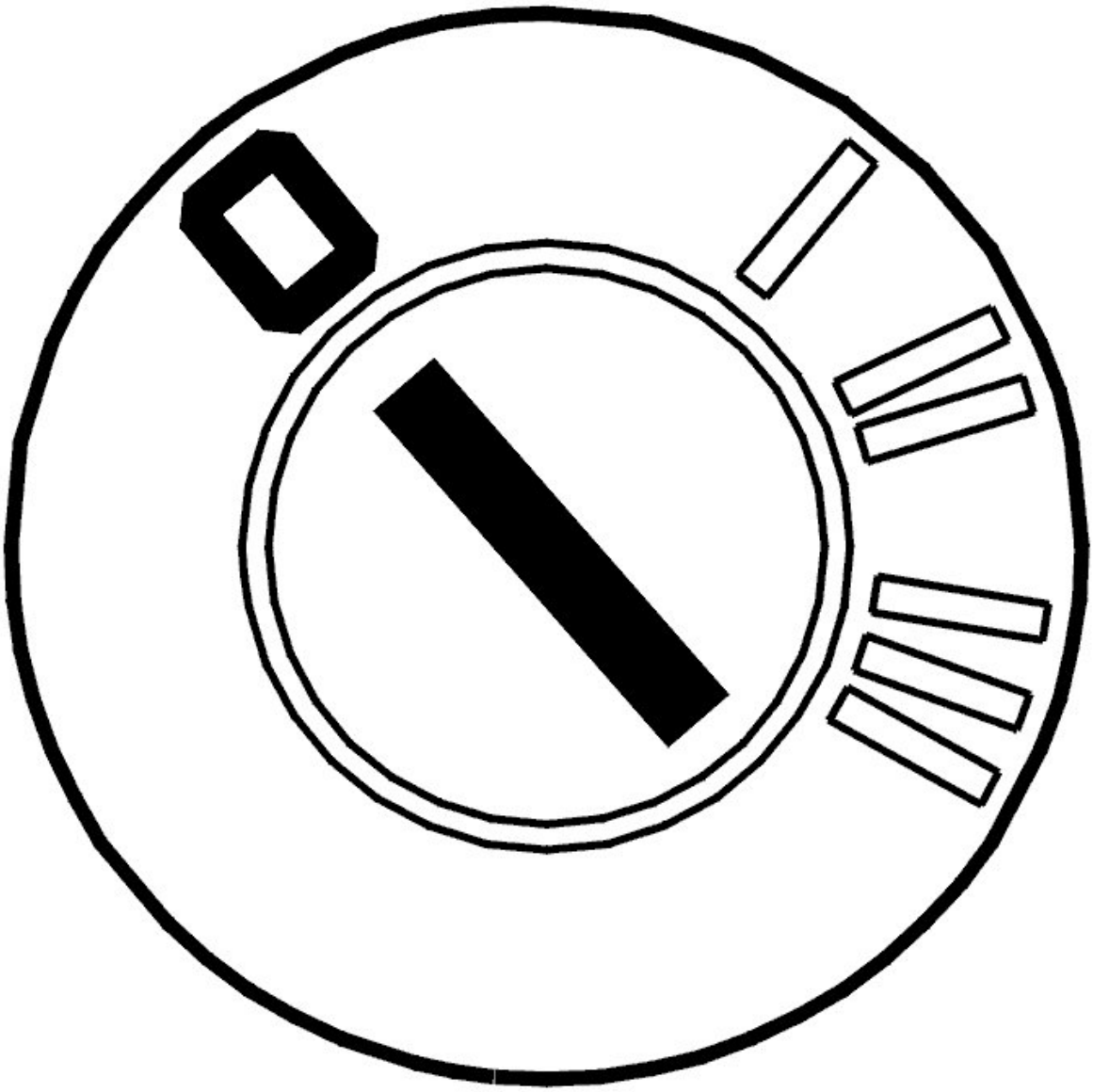


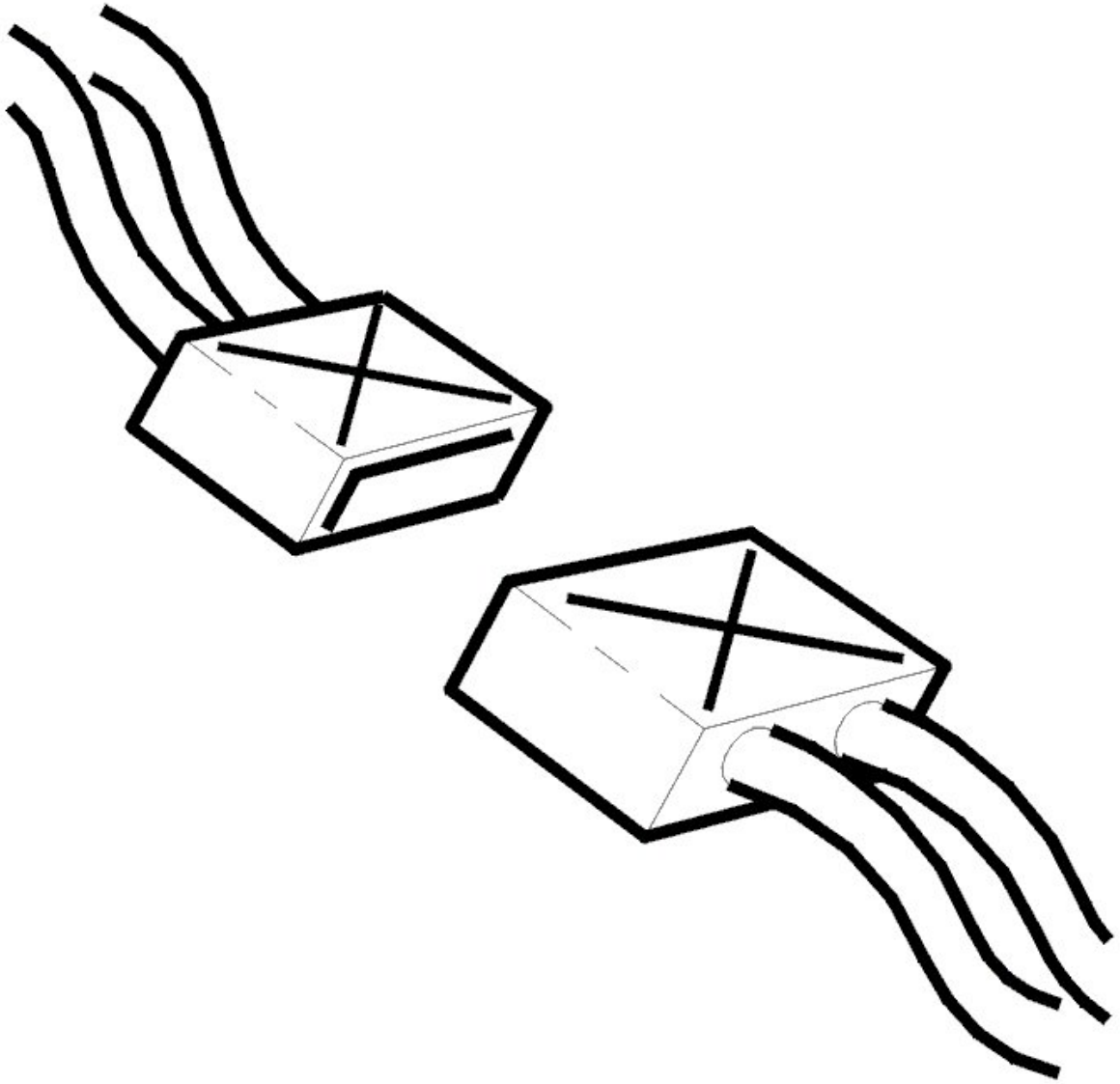
Was a fault detected?

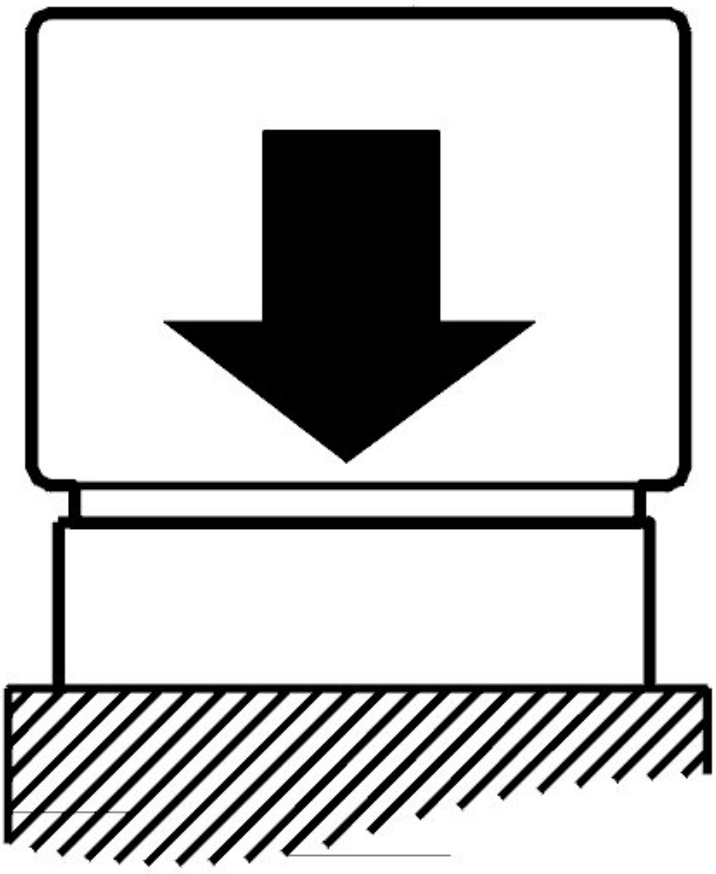
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Gear selector in position P.

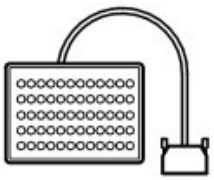
Check the transmission control module (TCM) by measuring the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

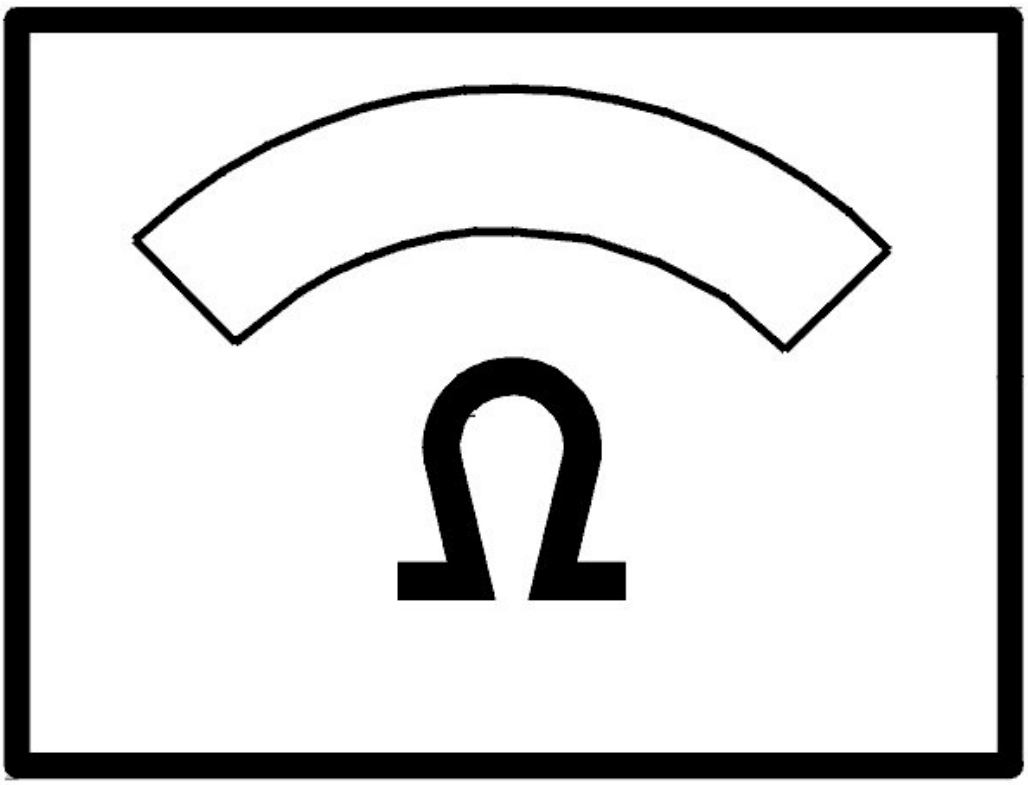
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



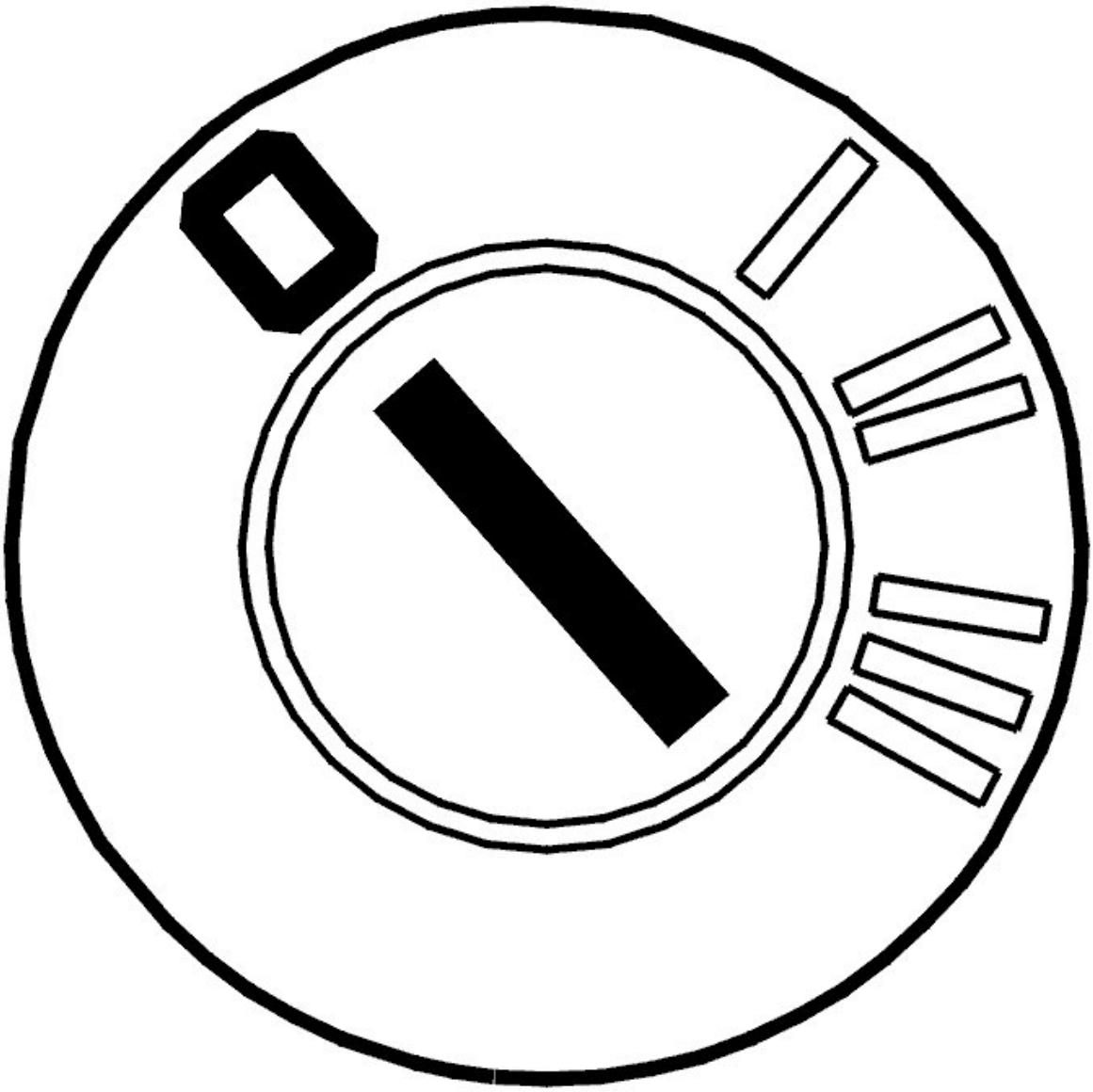


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

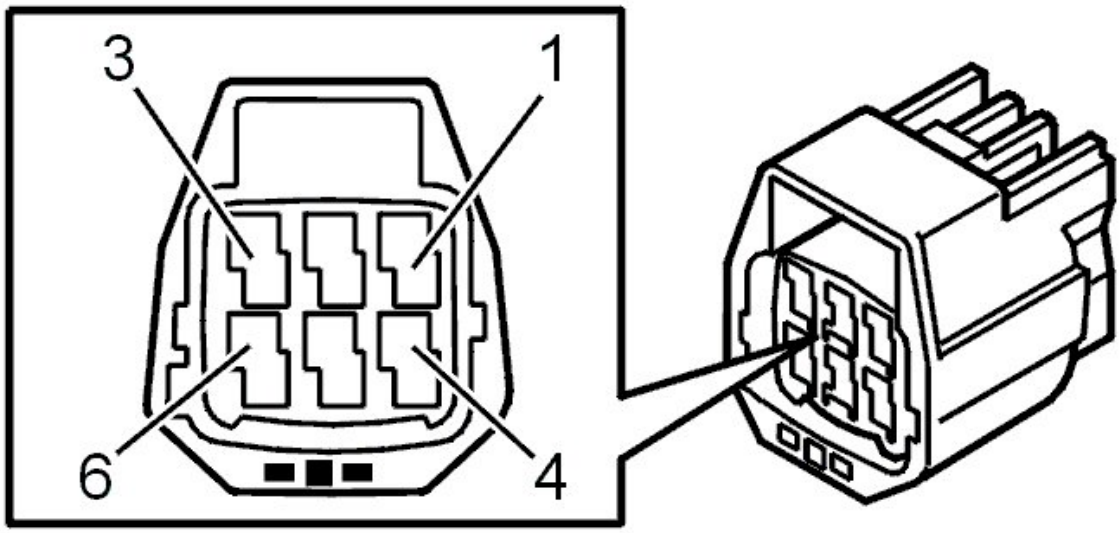


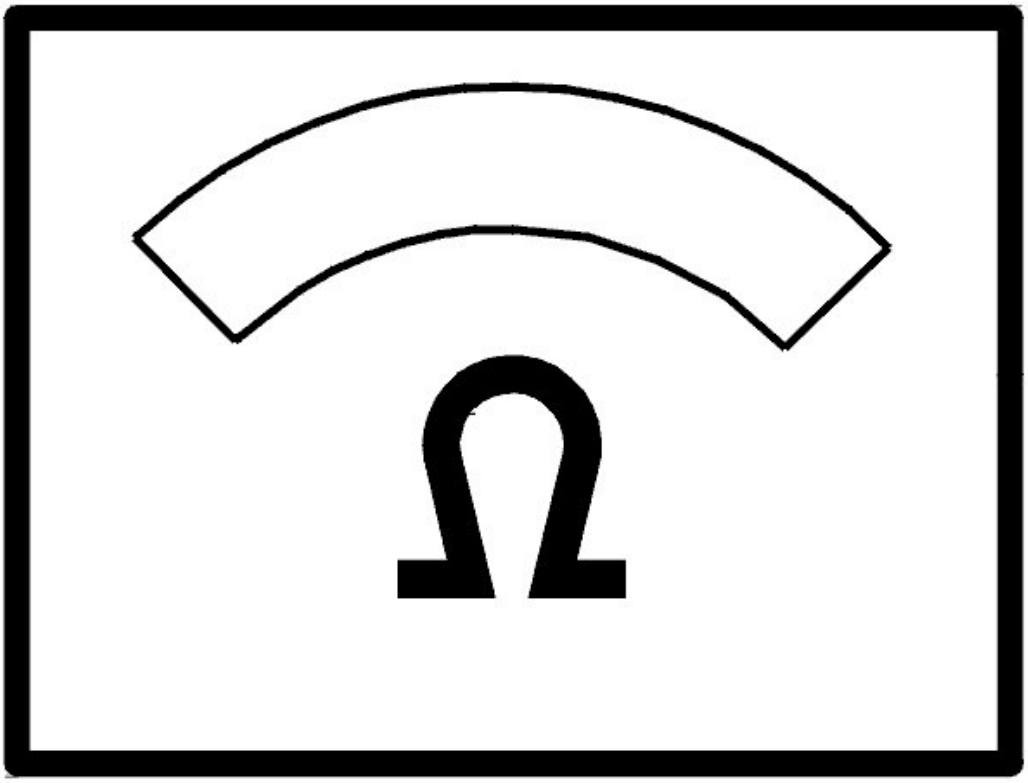
- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S4 by measuring the resistance between the terminal pin on solenoid S4 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S4 if the resistance is incorrect.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S4, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

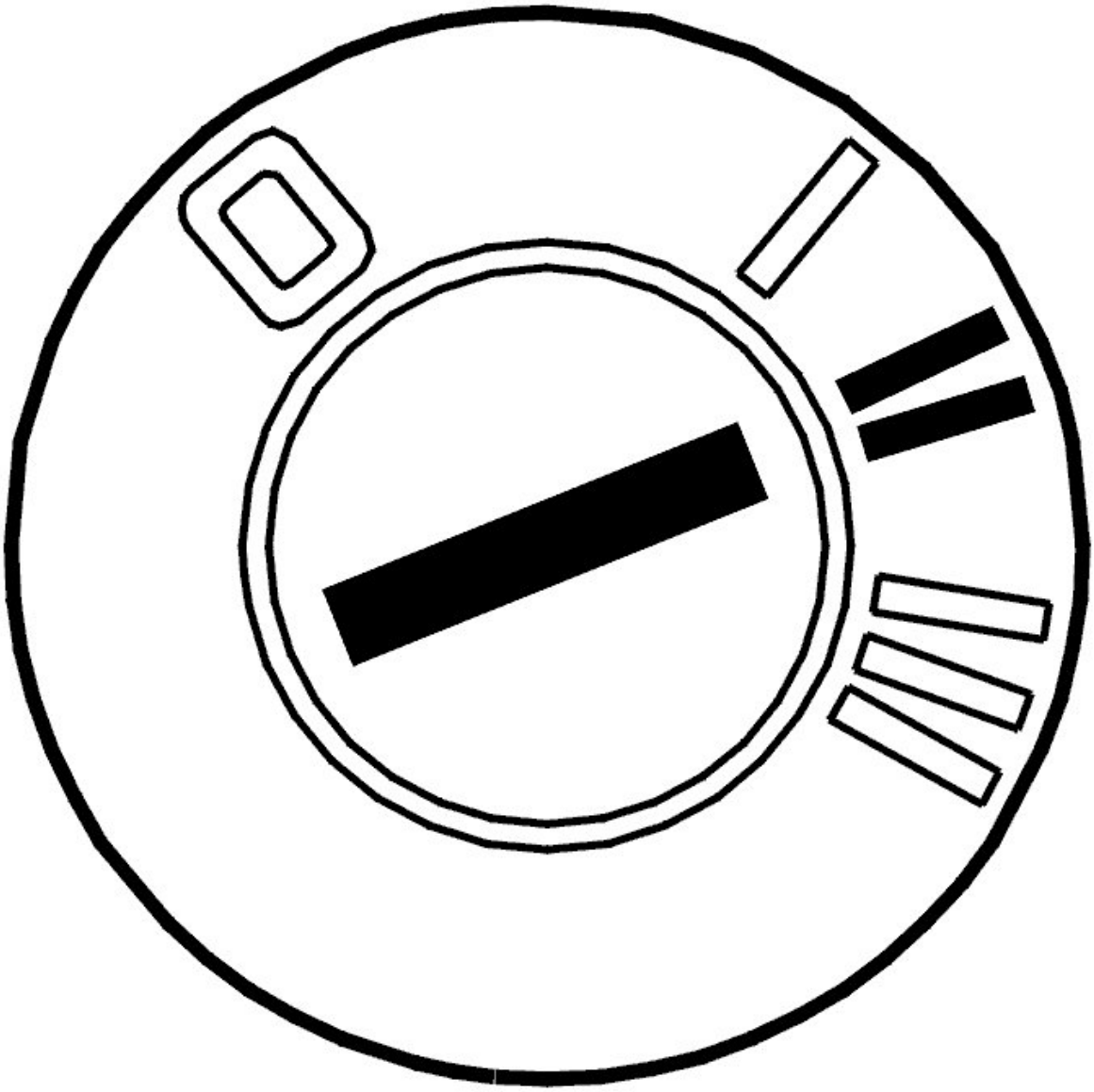
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



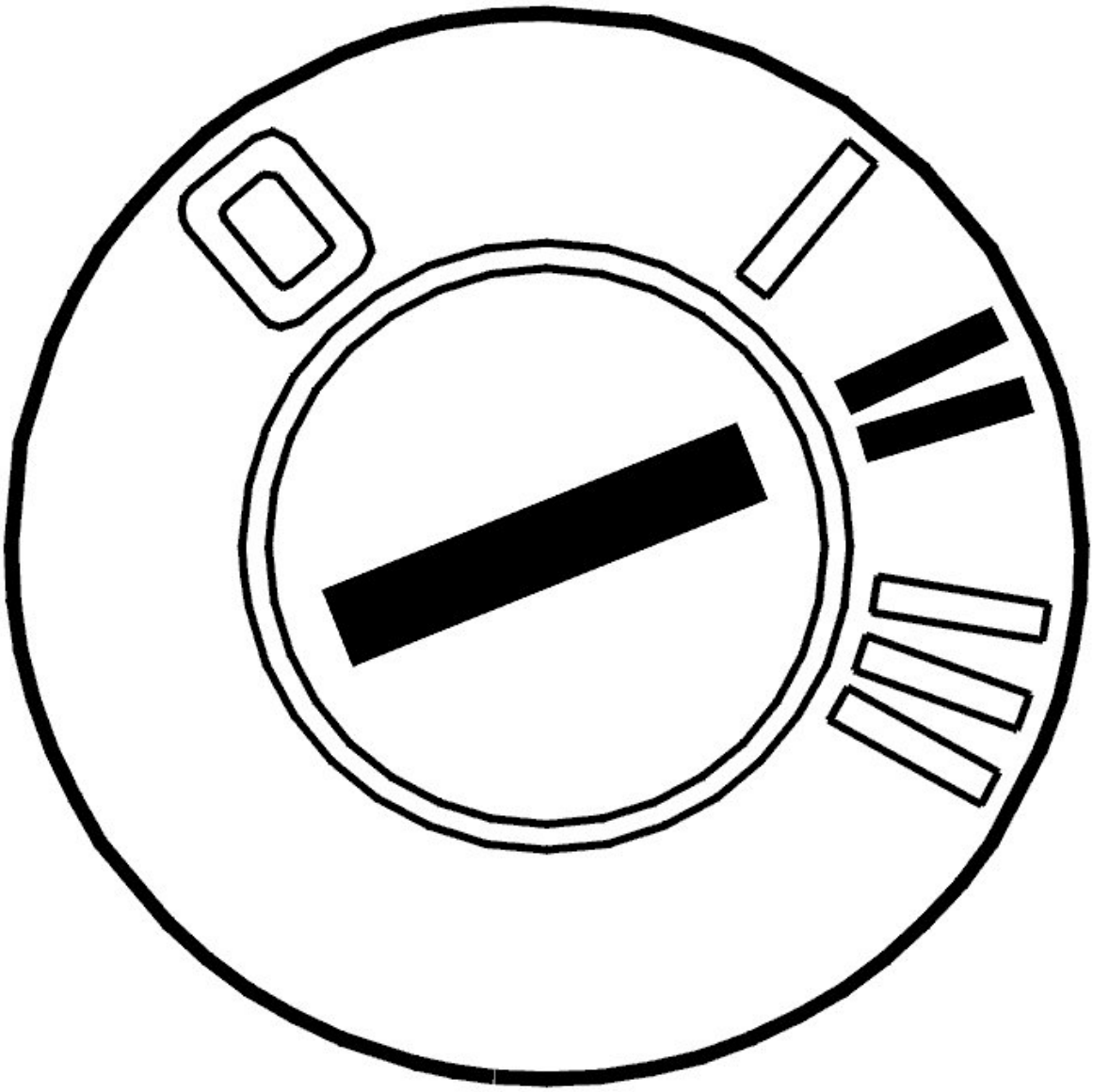
- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on
- Gear selector in position P
- Activate solenoid S4.

The current should oscillate between 0 and approximately 1.5 A.

Does the current oscillate?

Yes - VERIFIED

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

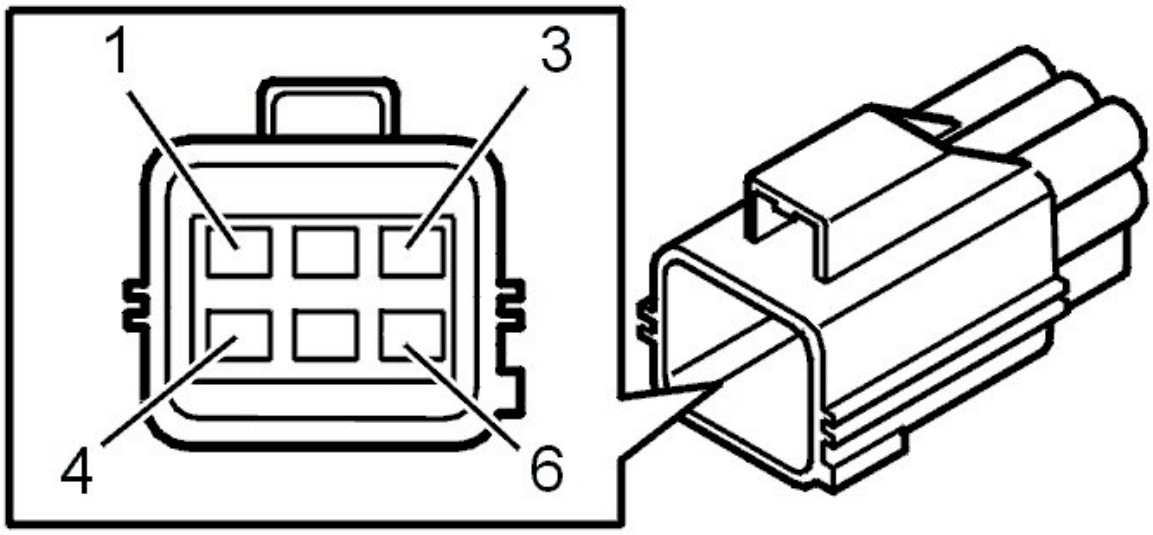
Hint:

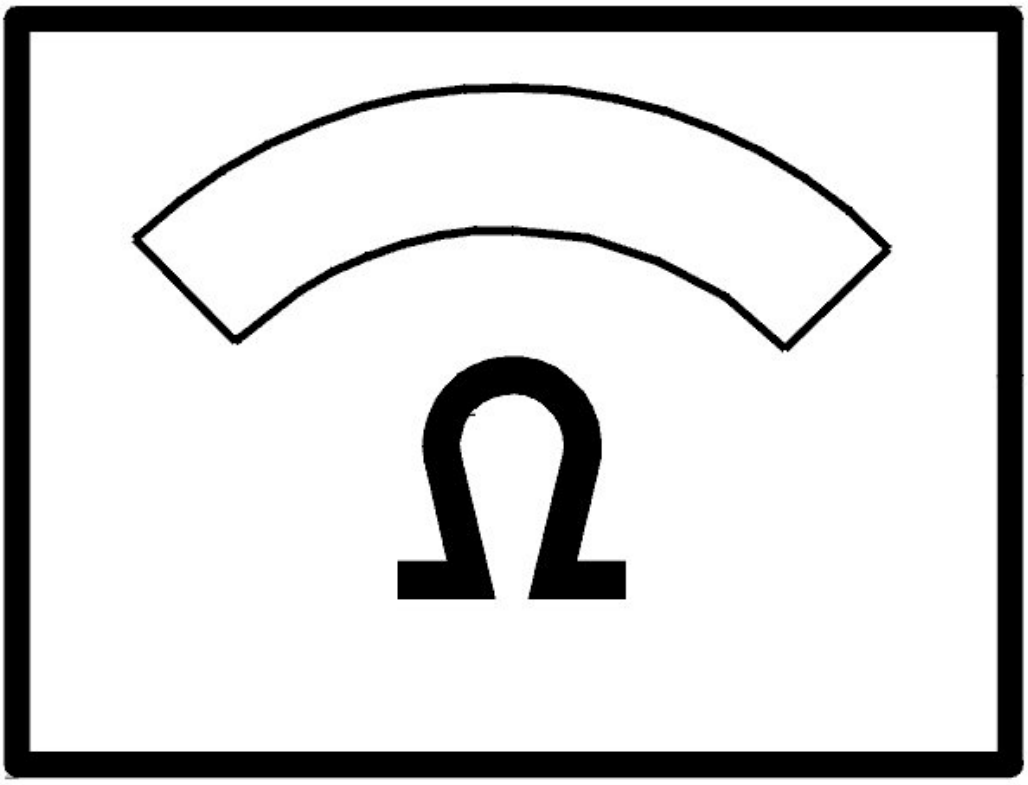
- Check the circuit for solenoid S4. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

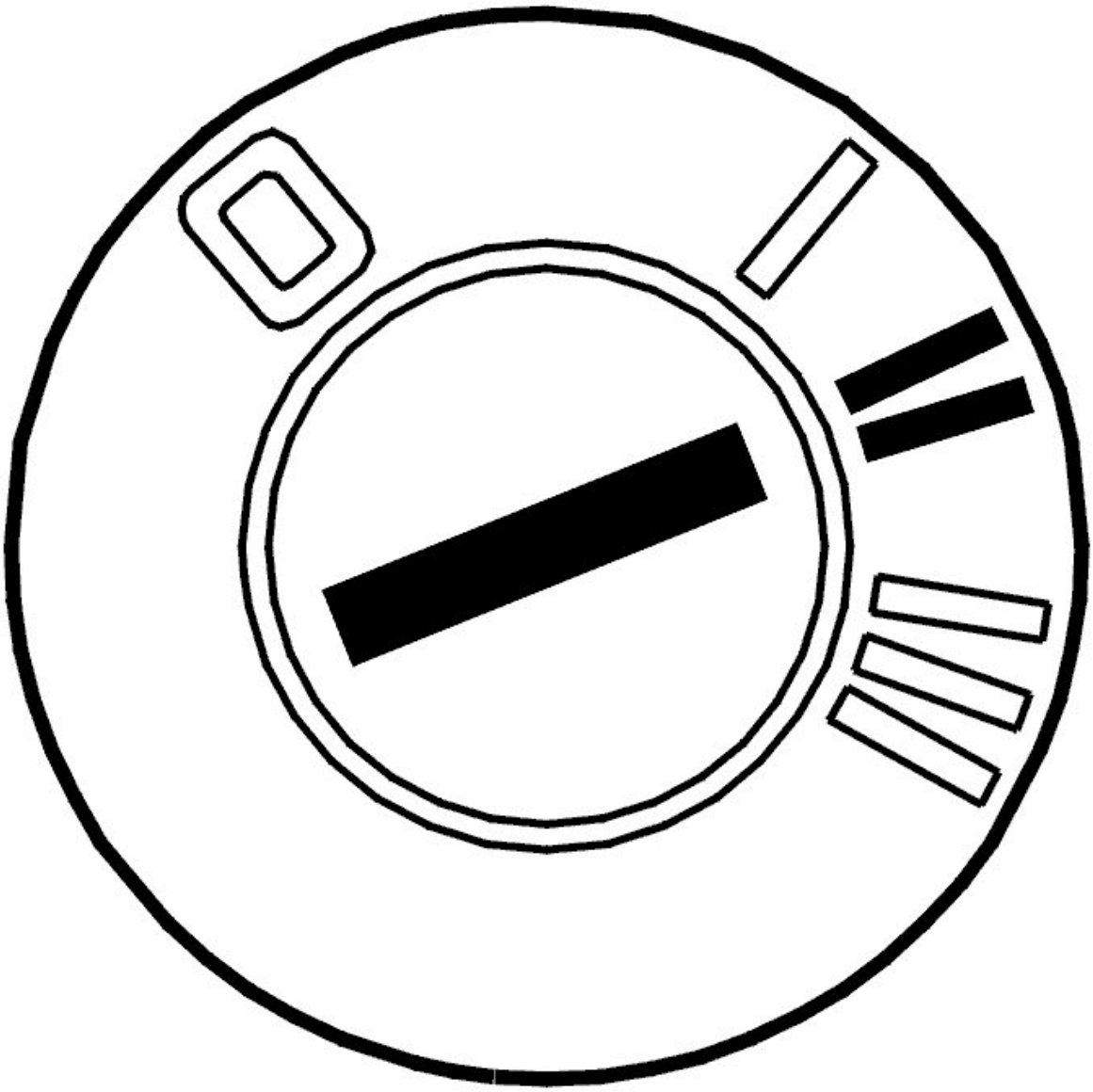
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

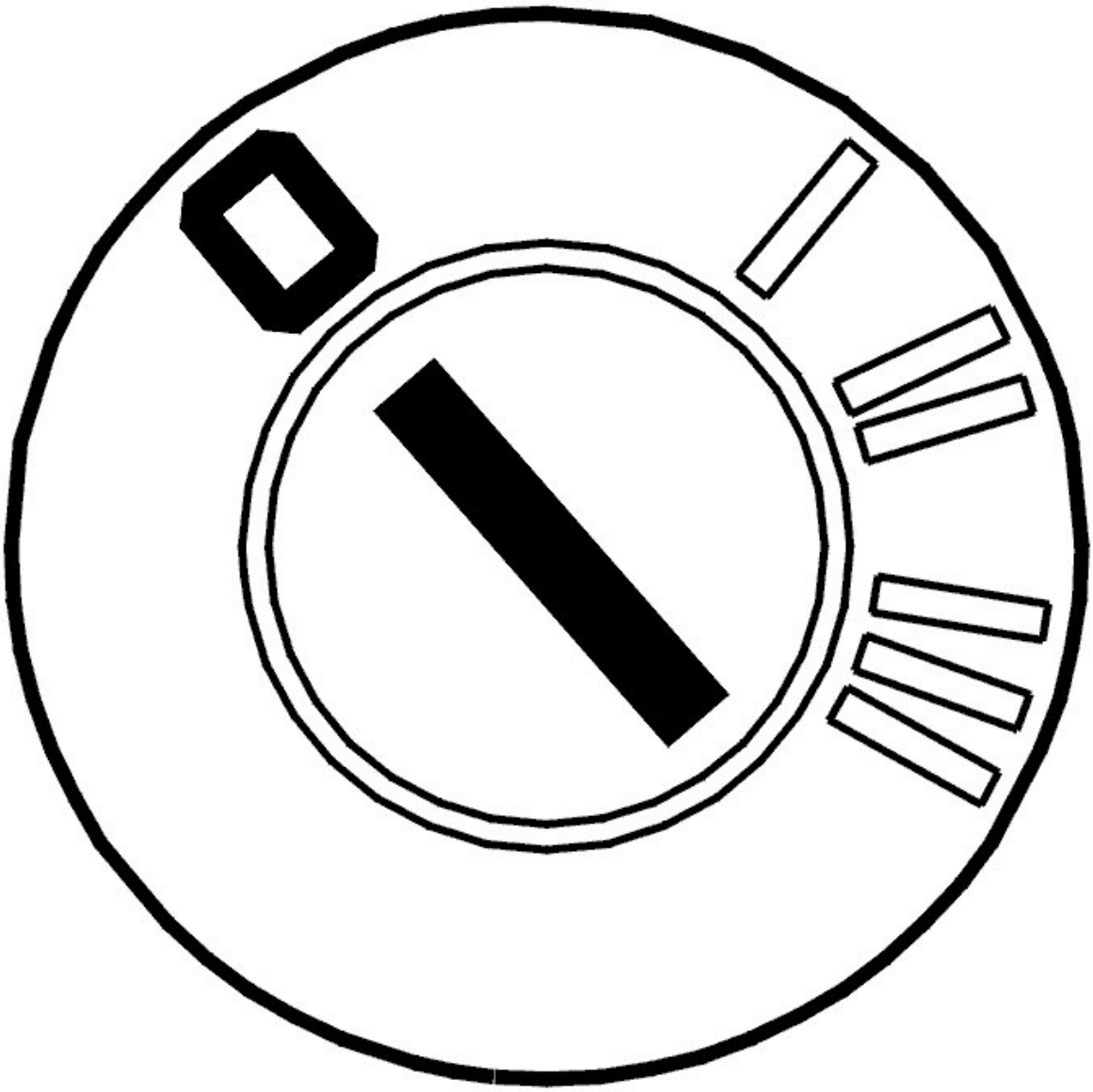
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

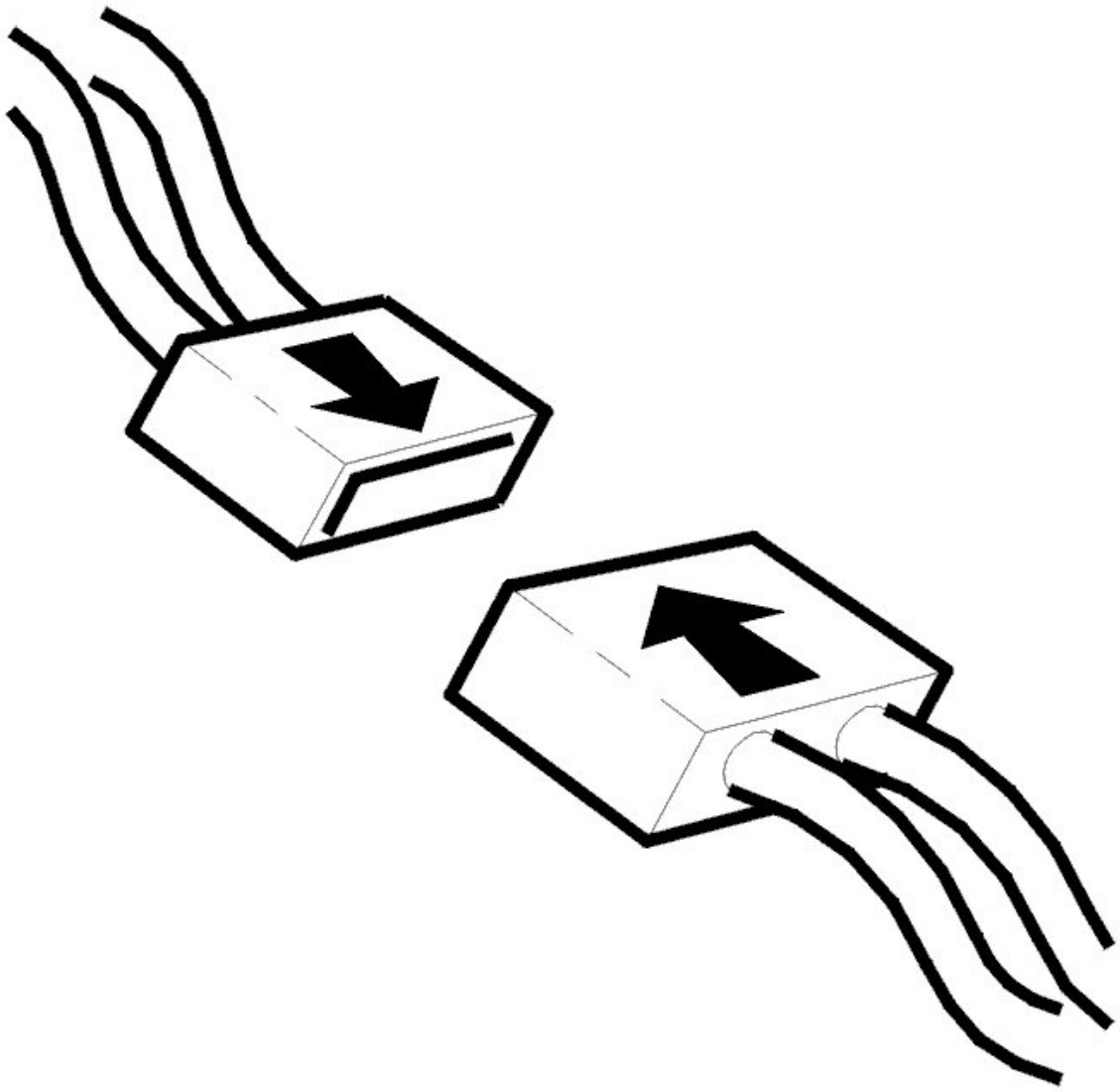
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

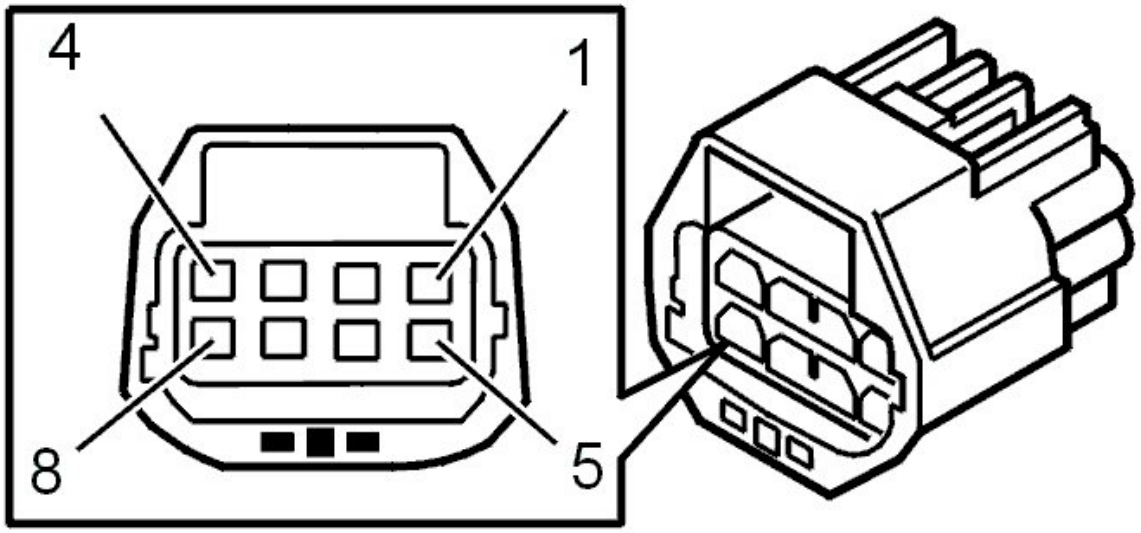
Checking transmission fluid temperature sensor

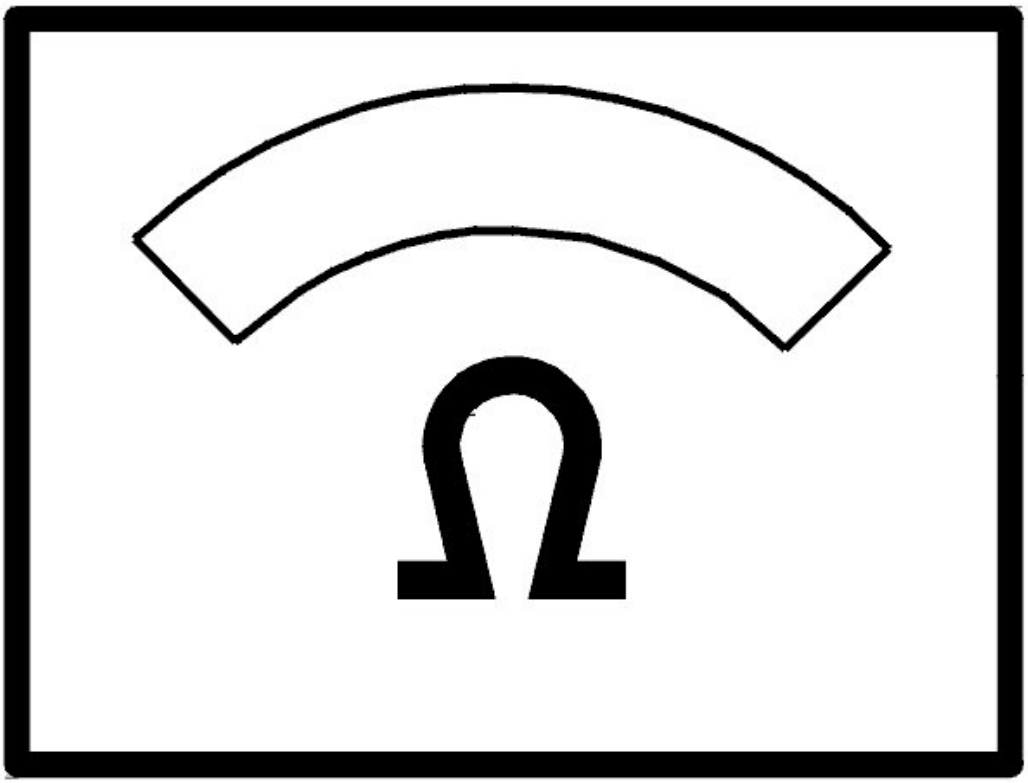




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

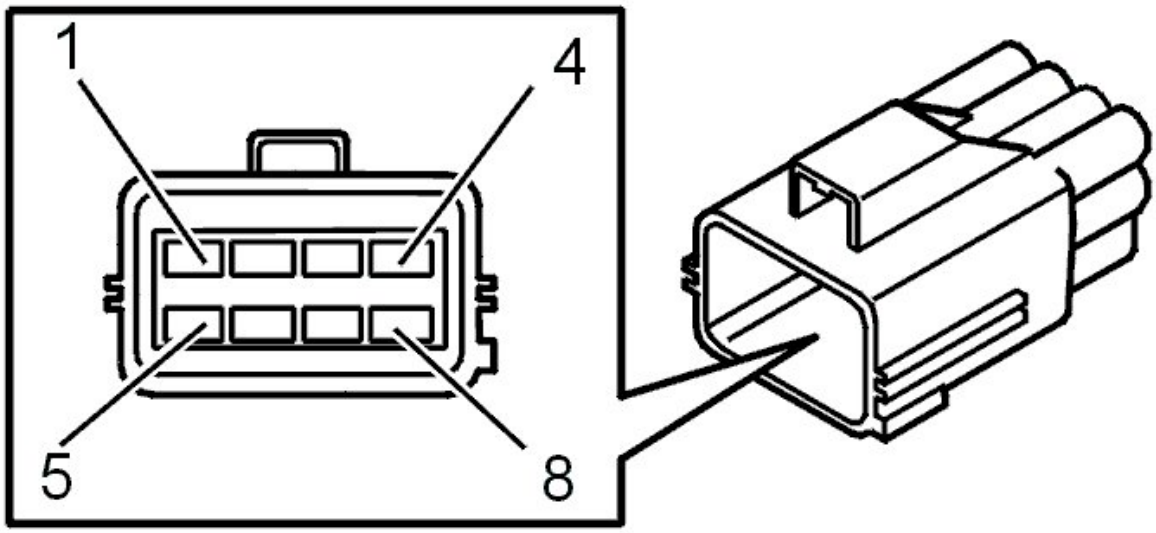
No - Checking the cable and component

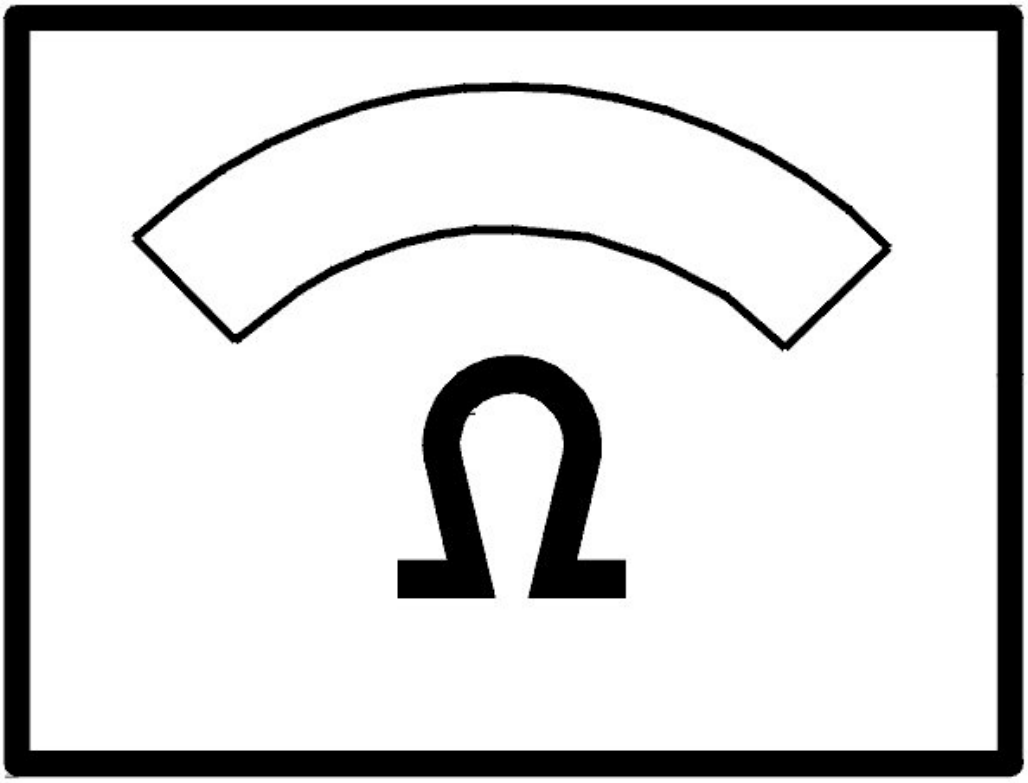
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



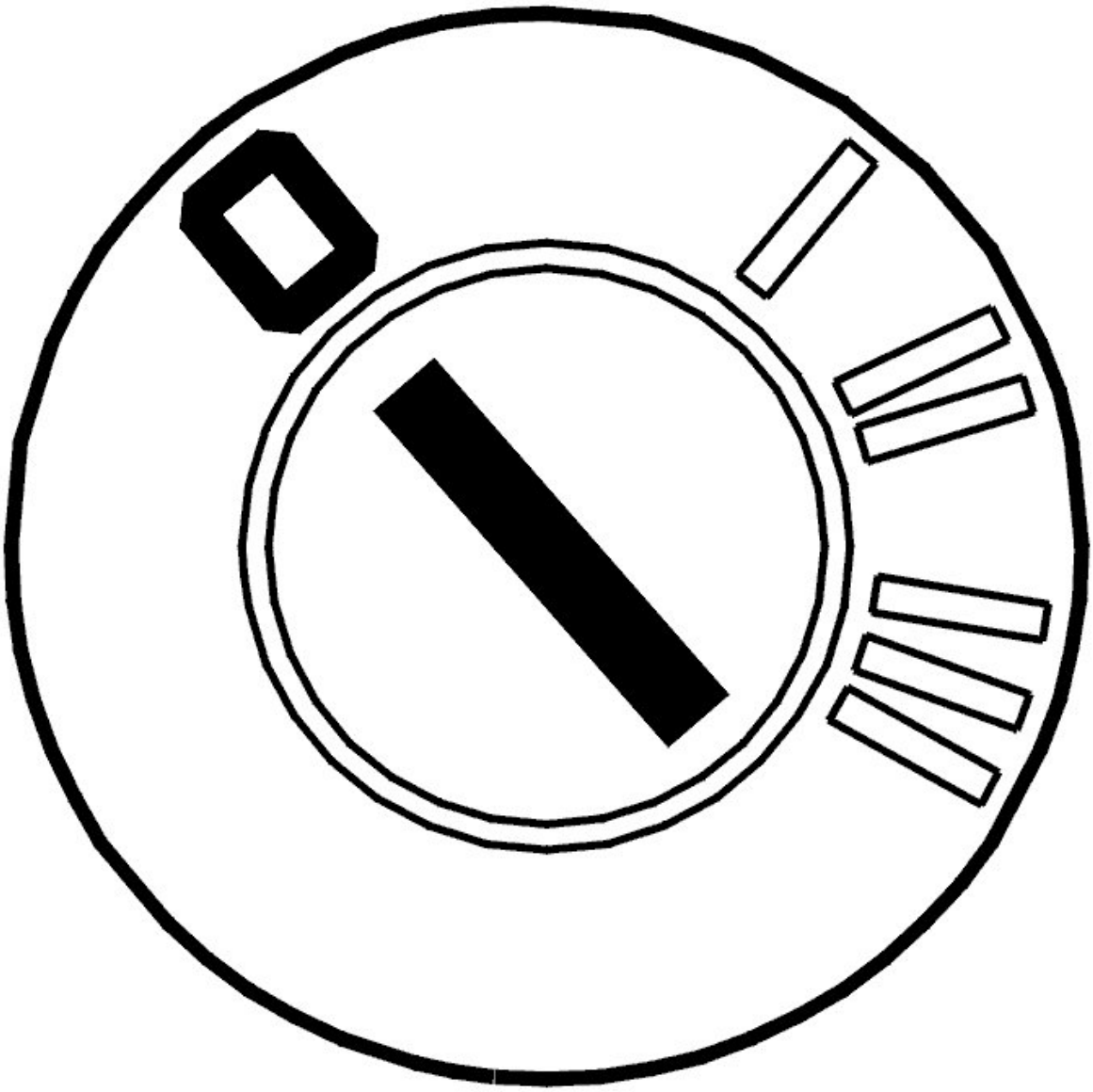


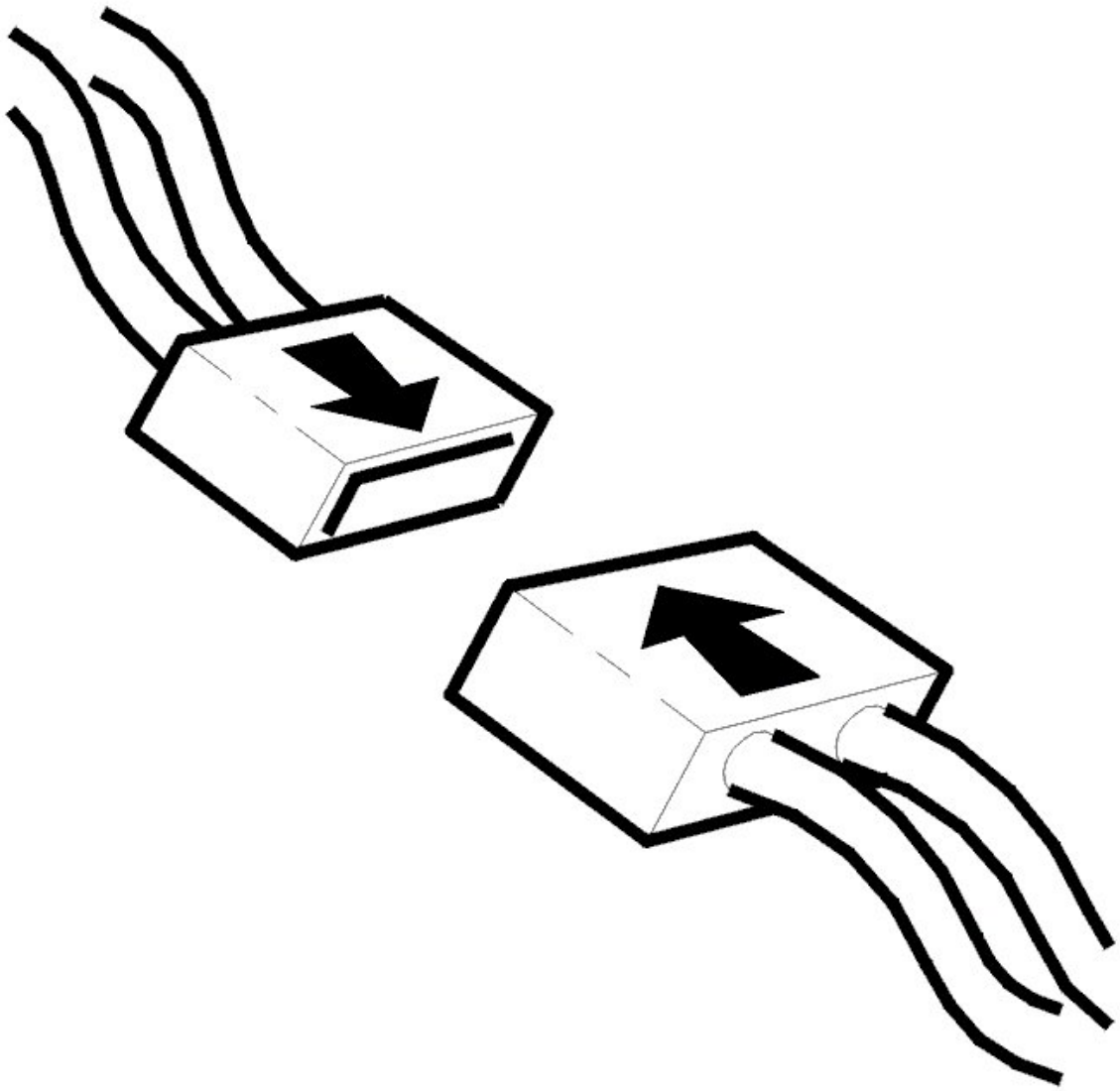
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

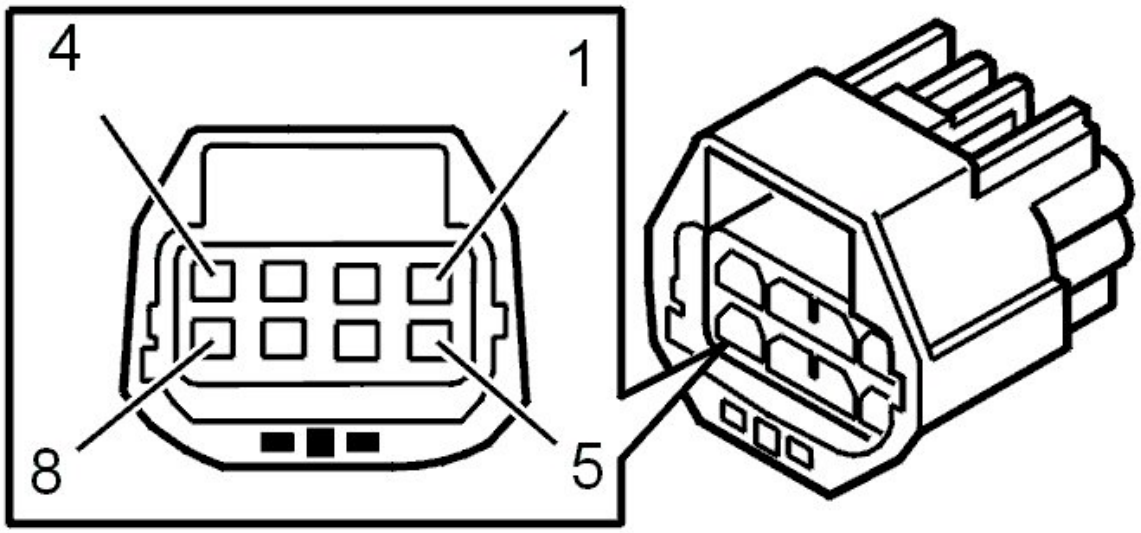
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

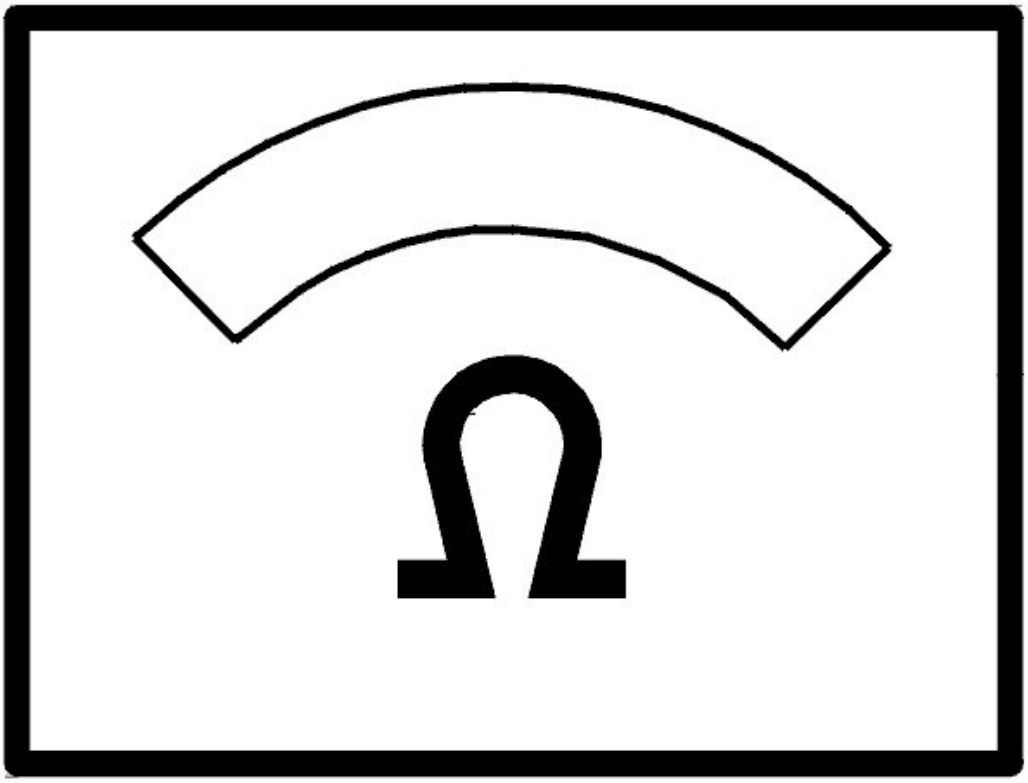
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





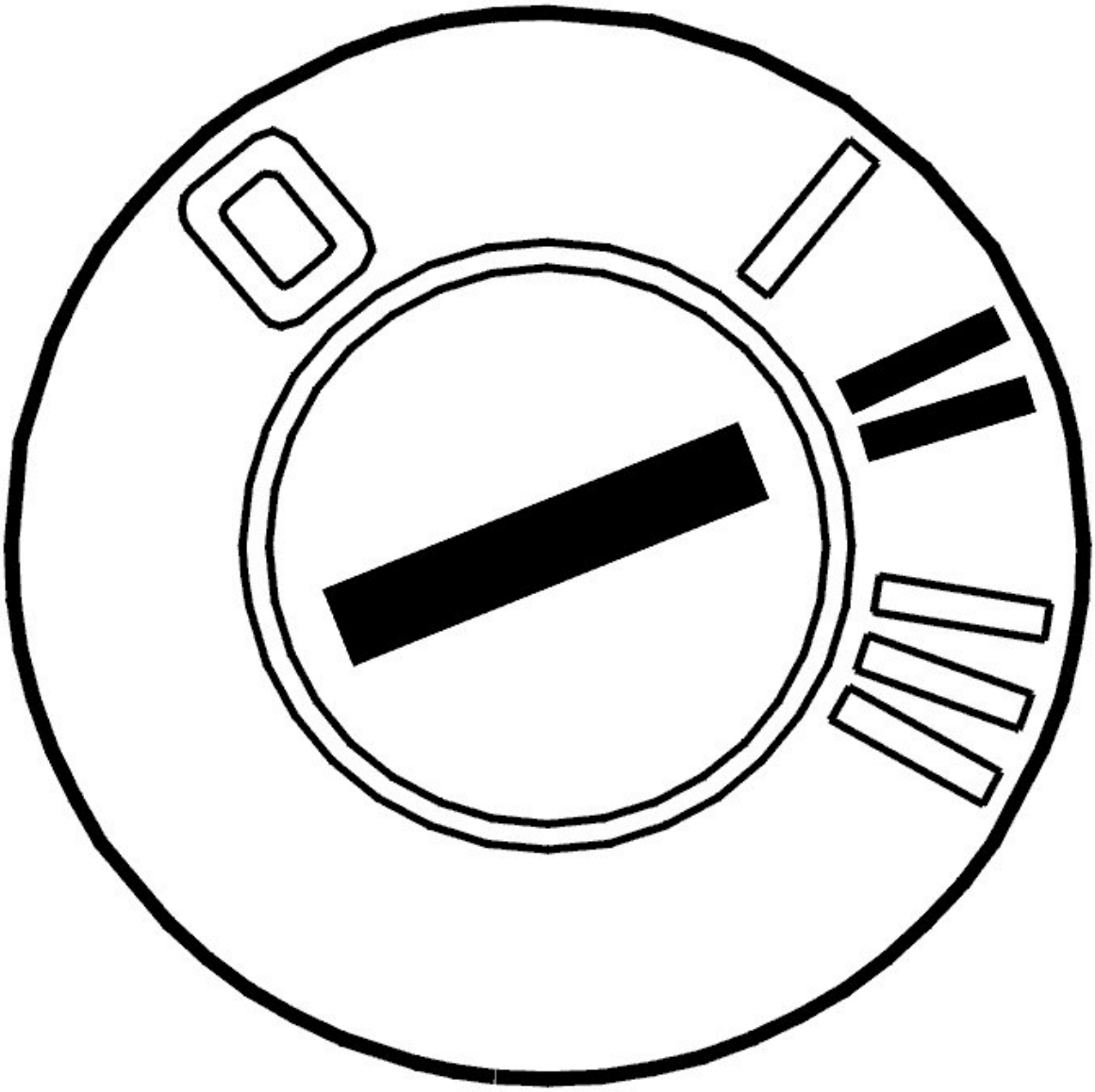
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



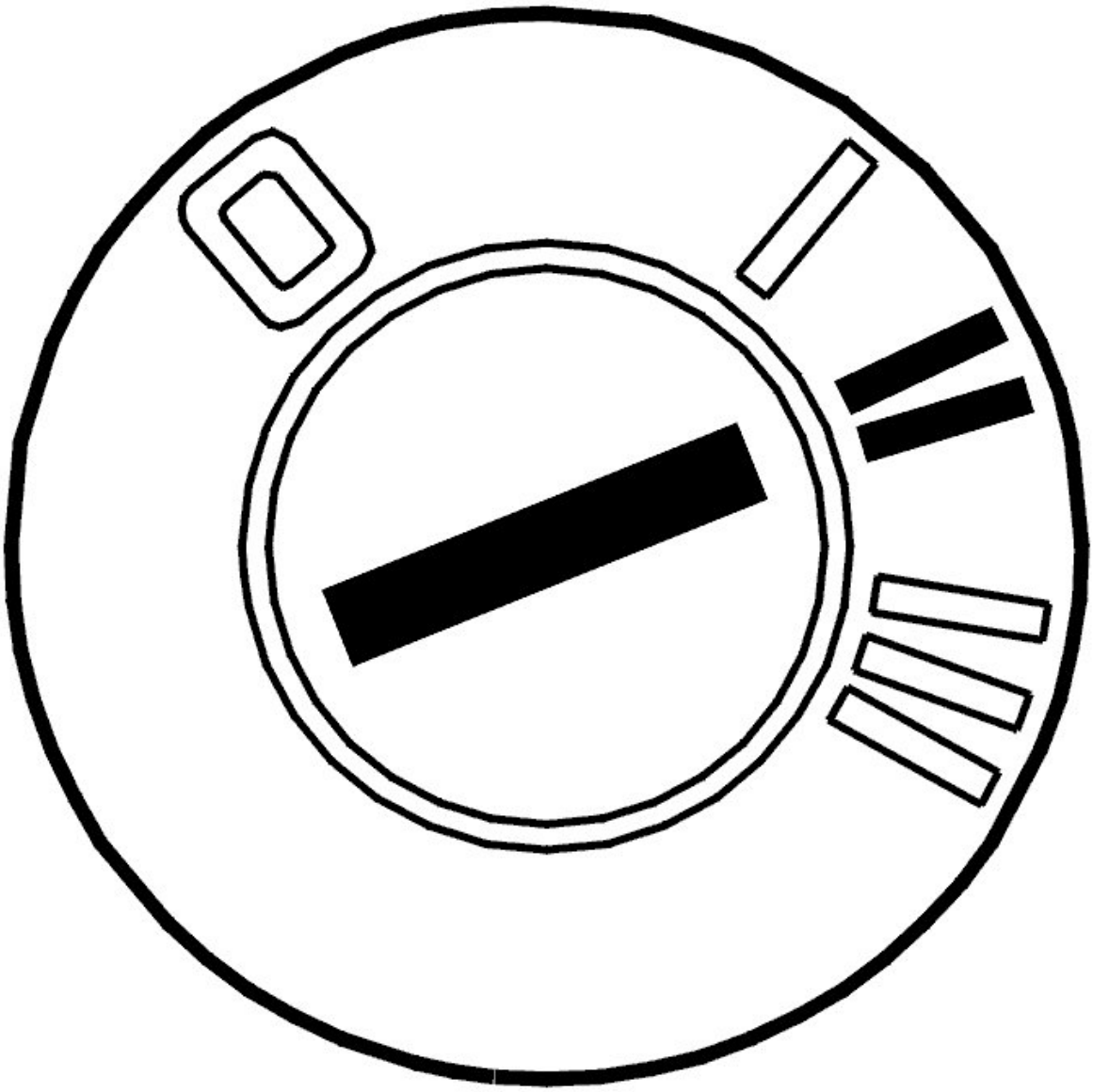
- Ignition on.

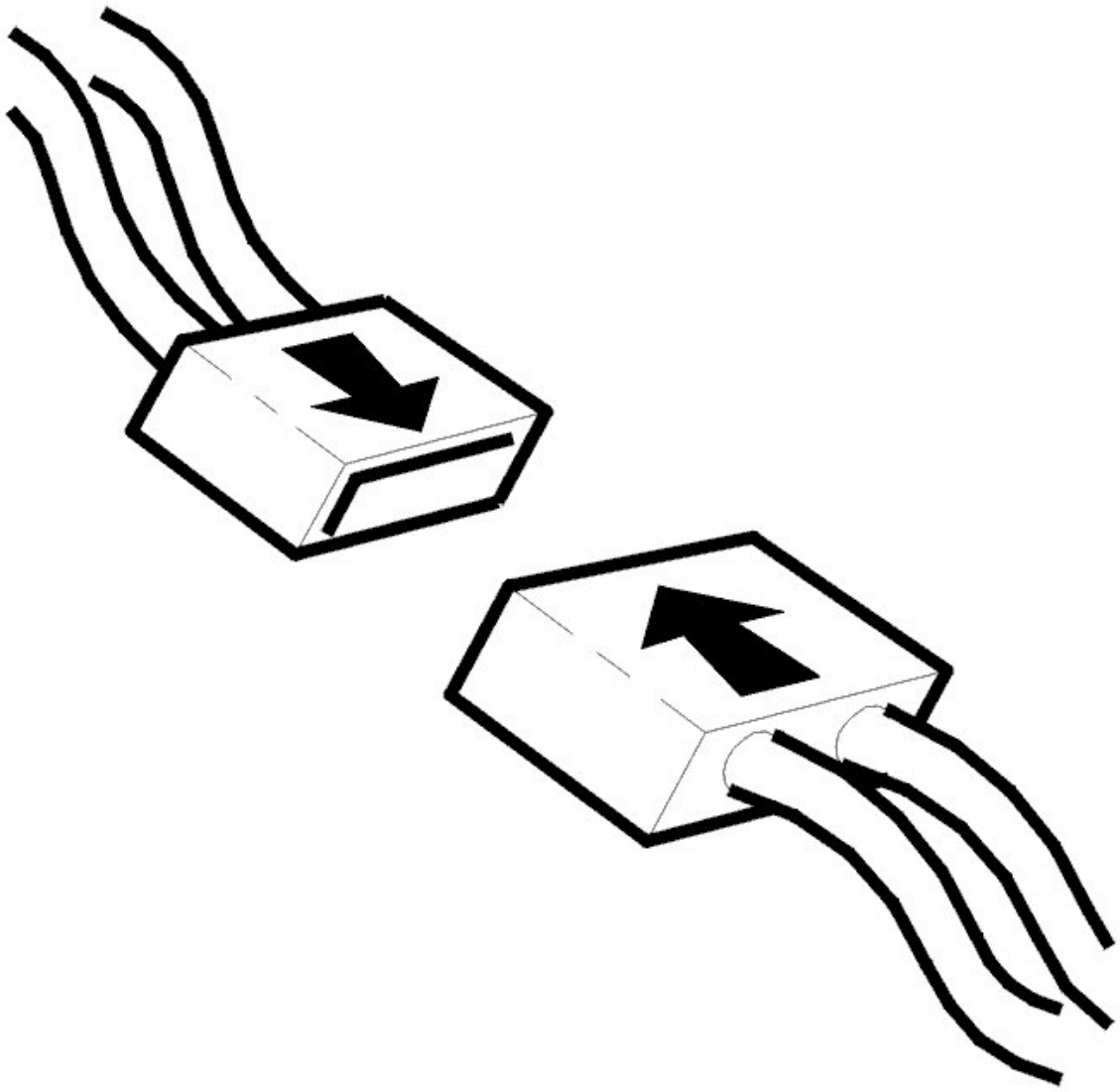
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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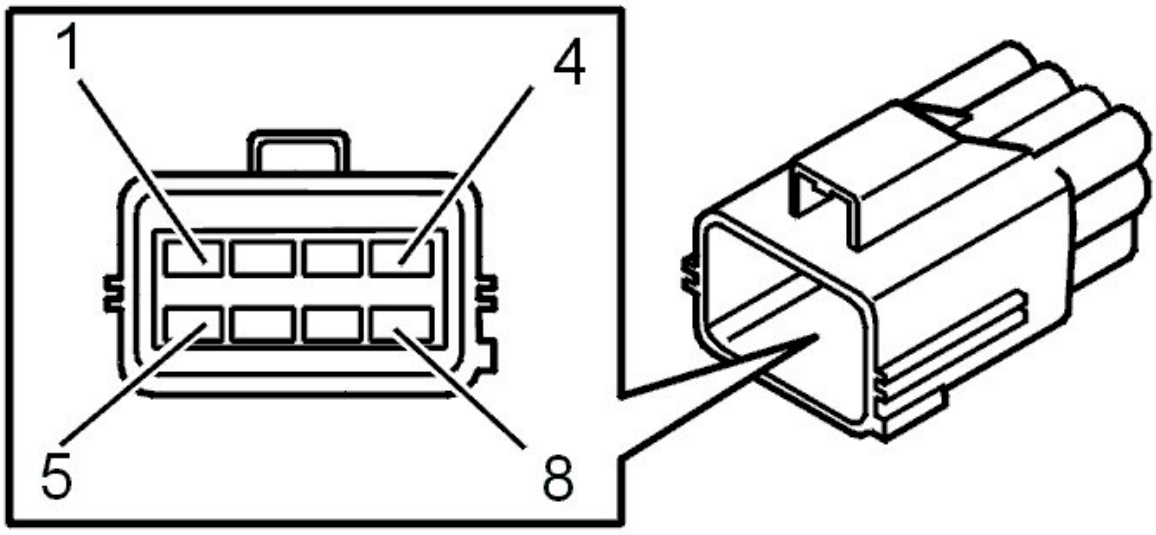
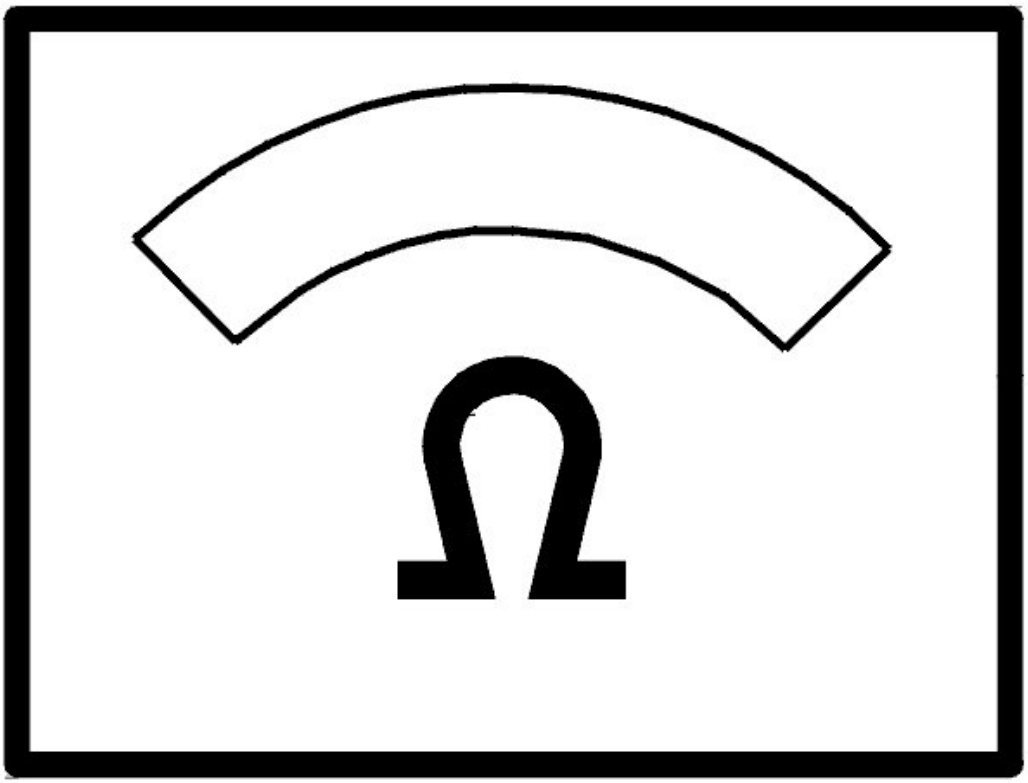
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking transmission fluid temperature sensor

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition
Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid should be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

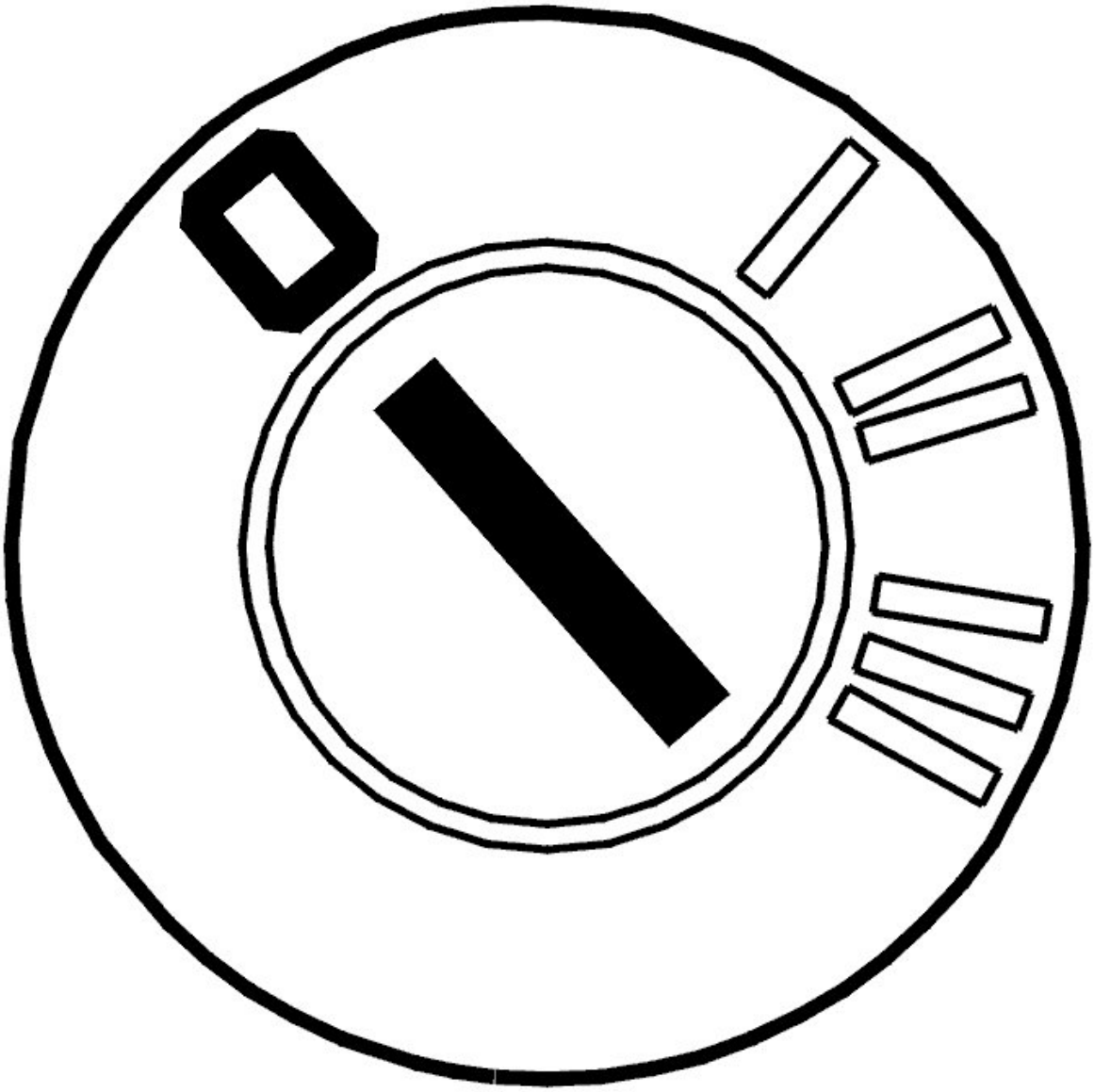
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Signal Too Low

Signal too low

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off

- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

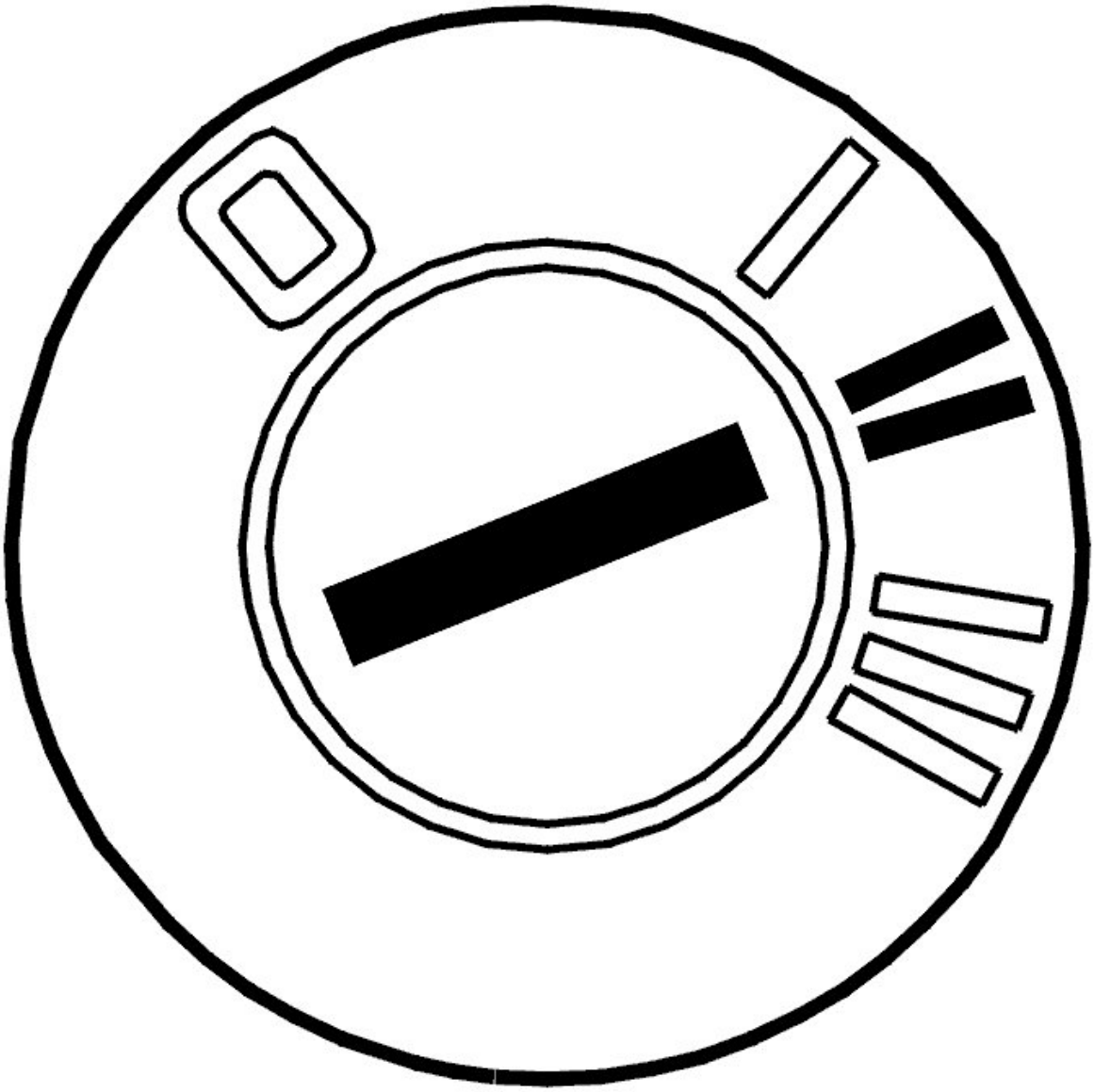
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S4

No - Checking transmission fluid temperature sensor

Checking shift solenoid S4



- Ignition on
- Gear selector in position P
- Activate solenoid S4.

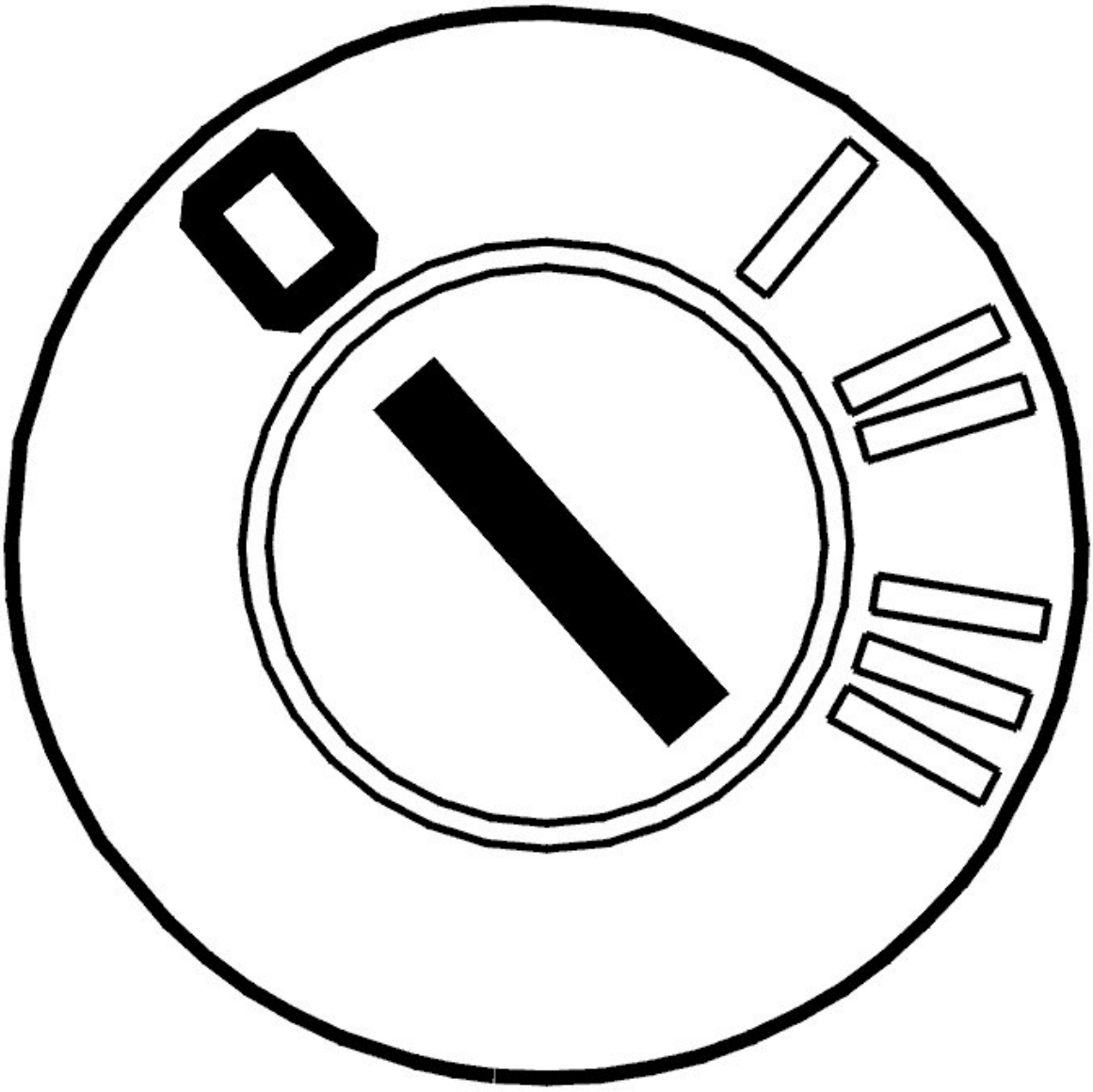
The value must change between OFF and ON.

Does the value change?

Yes - Intermittent fault

No - Checking resistance

Checking resistance

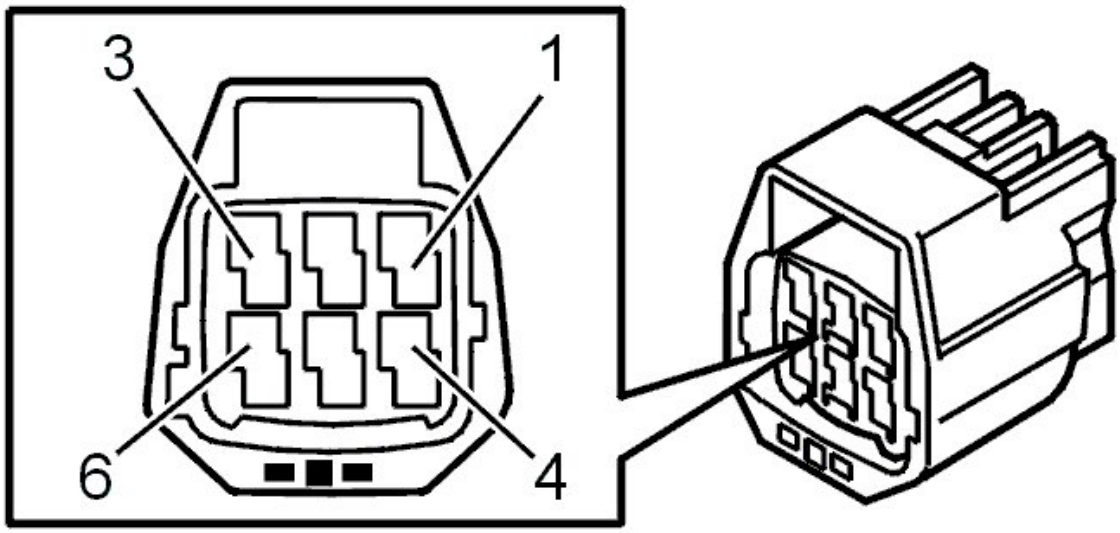


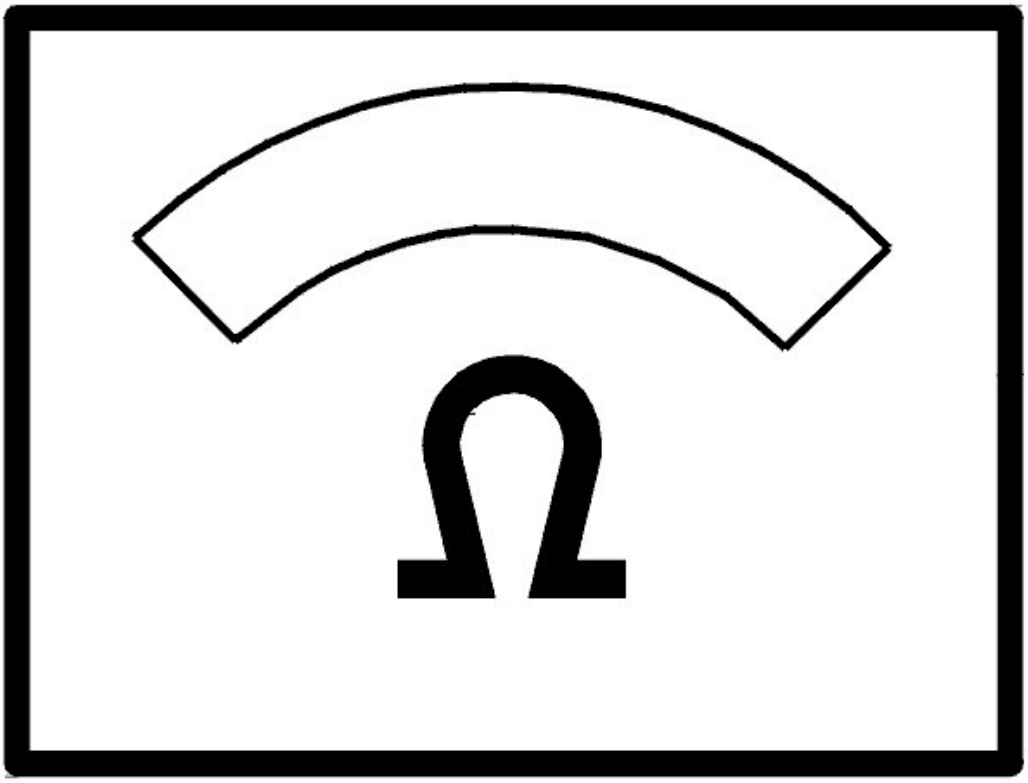
- Ignition off
- Disconnect transmission connector C.

Check solenoid S4 by measuring the resistance between transmission connector terminal #C4 and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



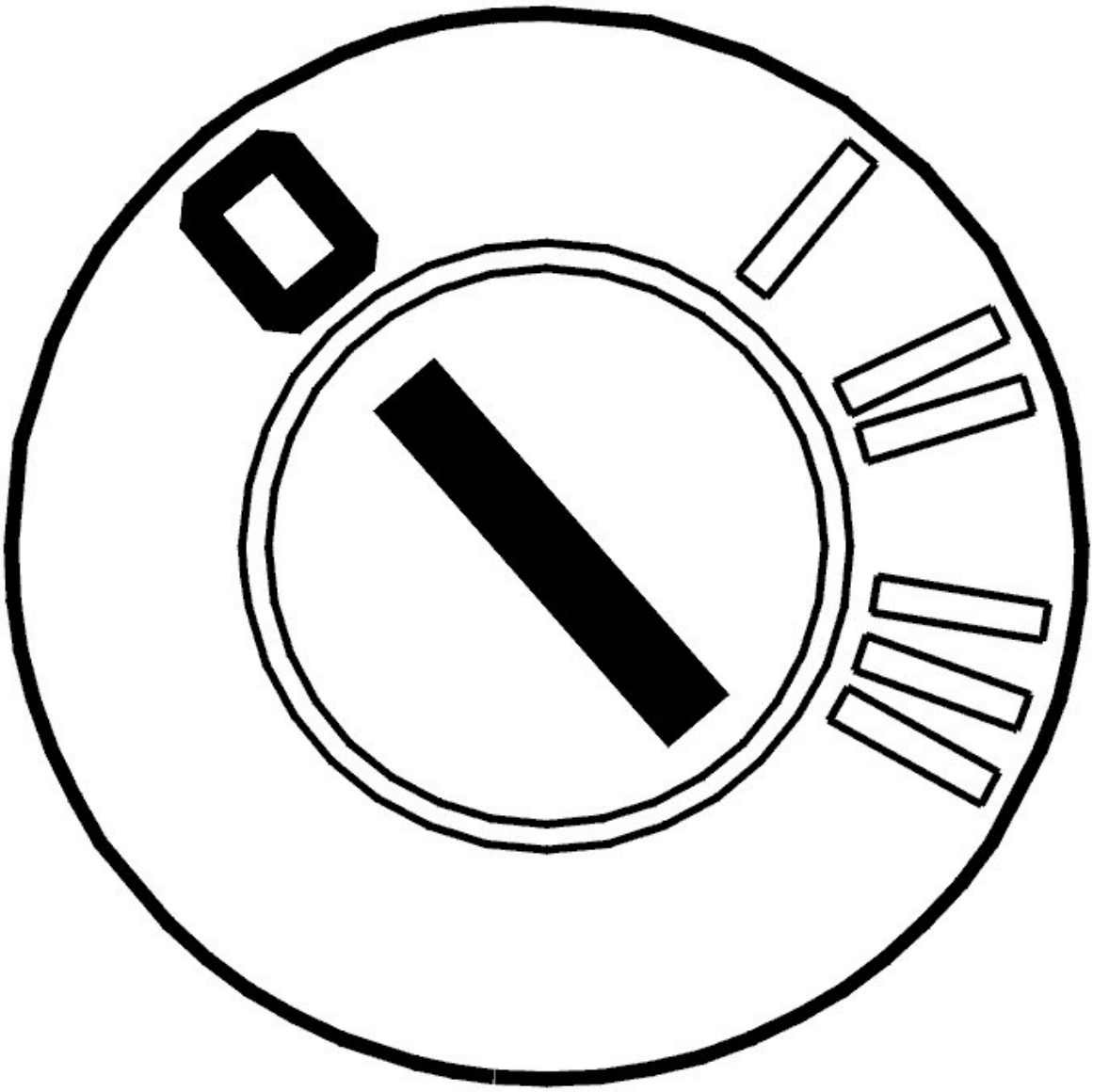


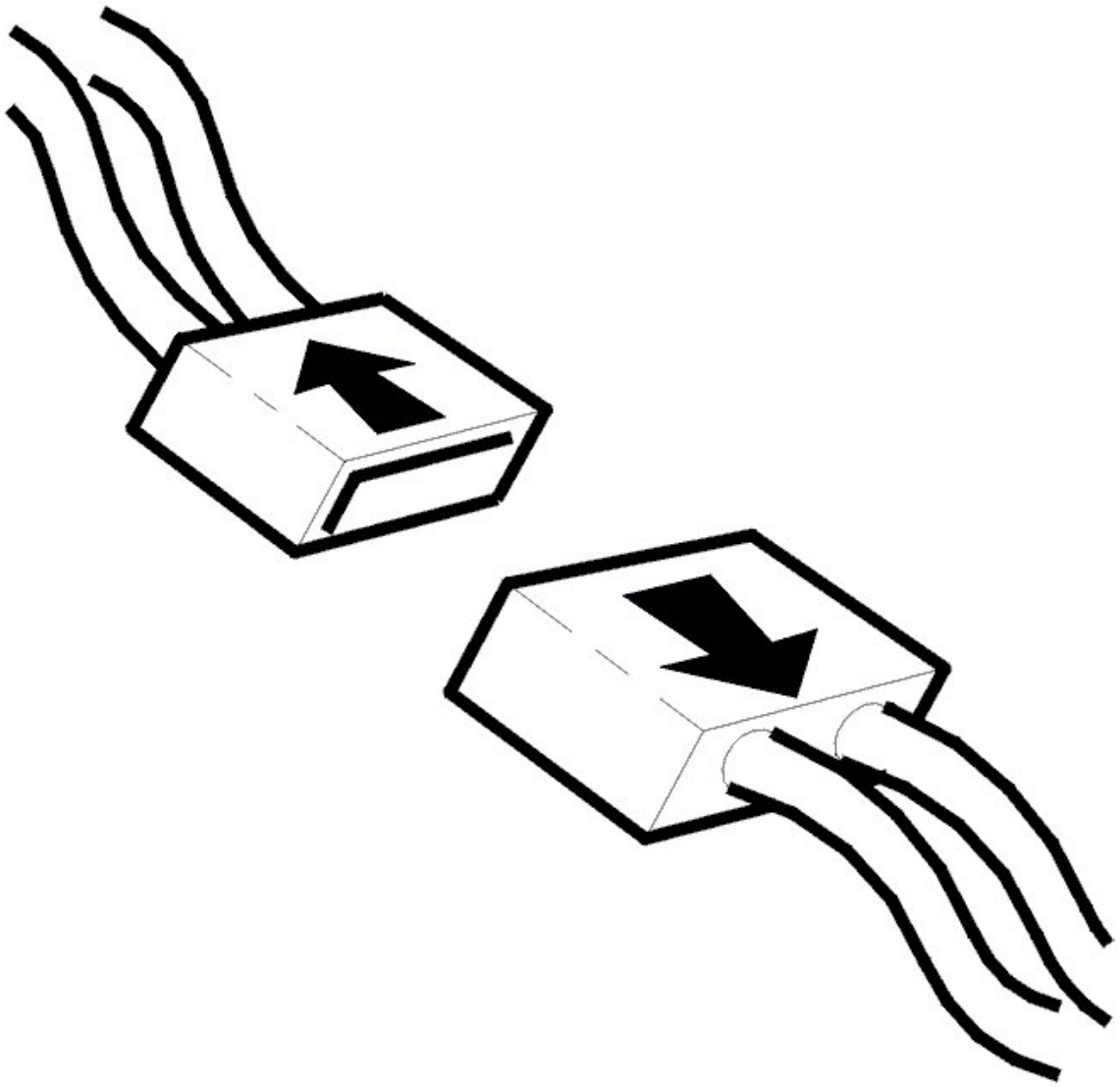
Was the resistance OK

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



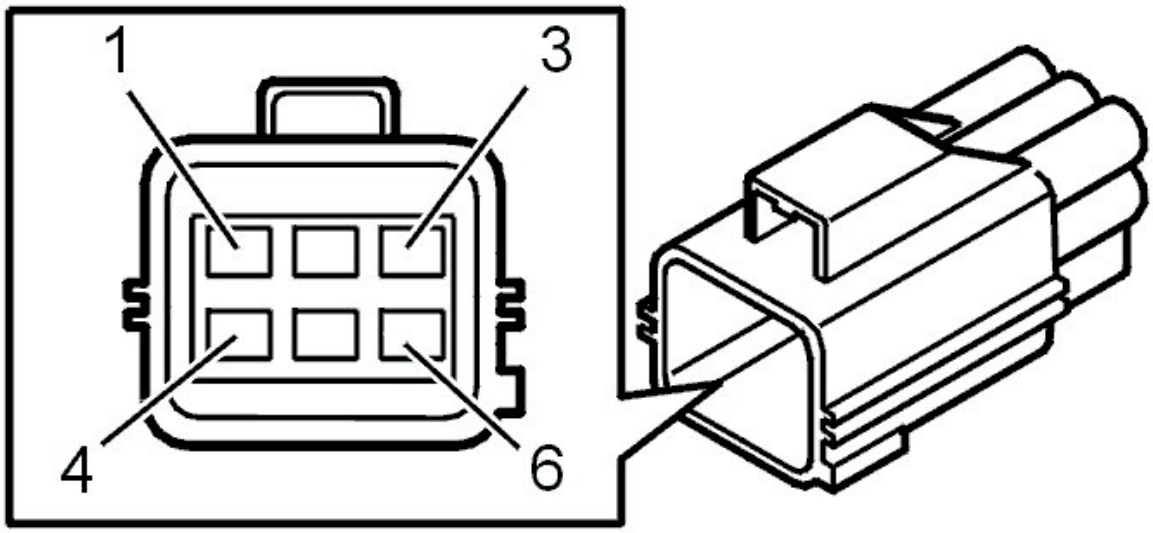


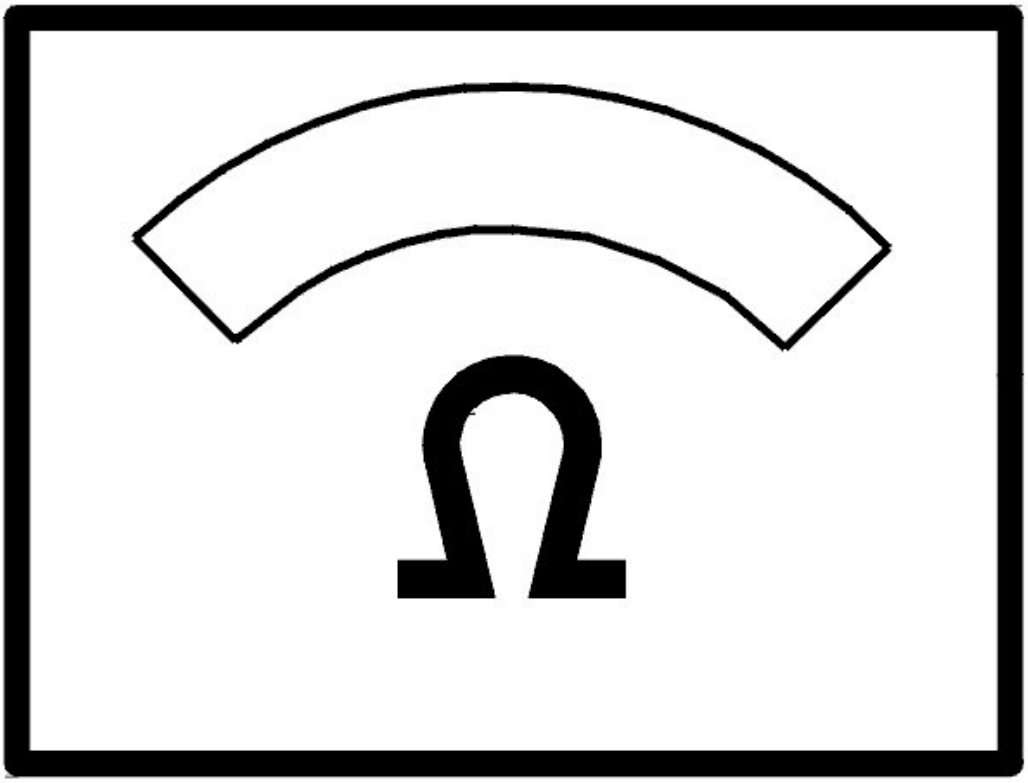
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between transmission control module (TCM) terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



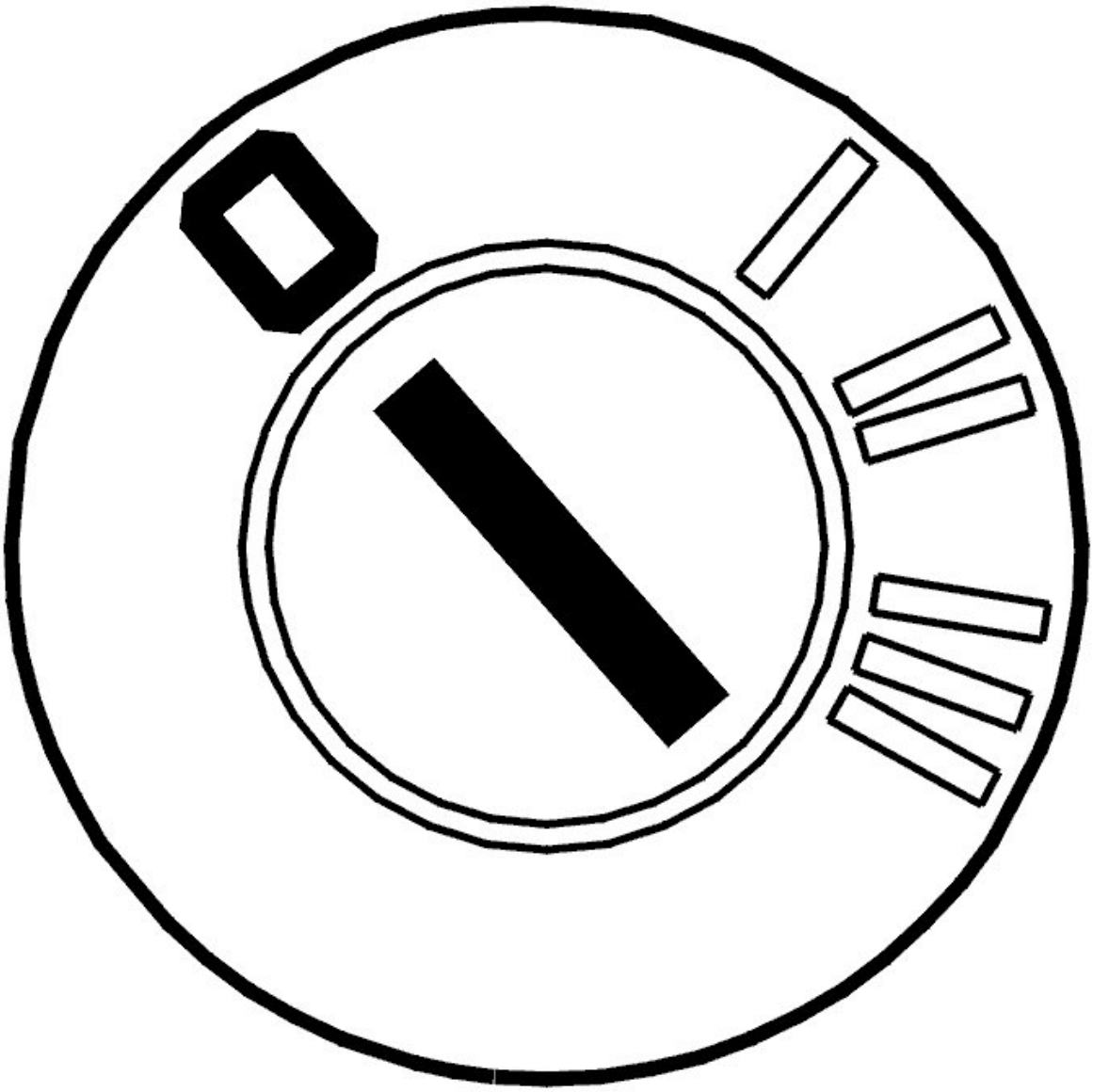


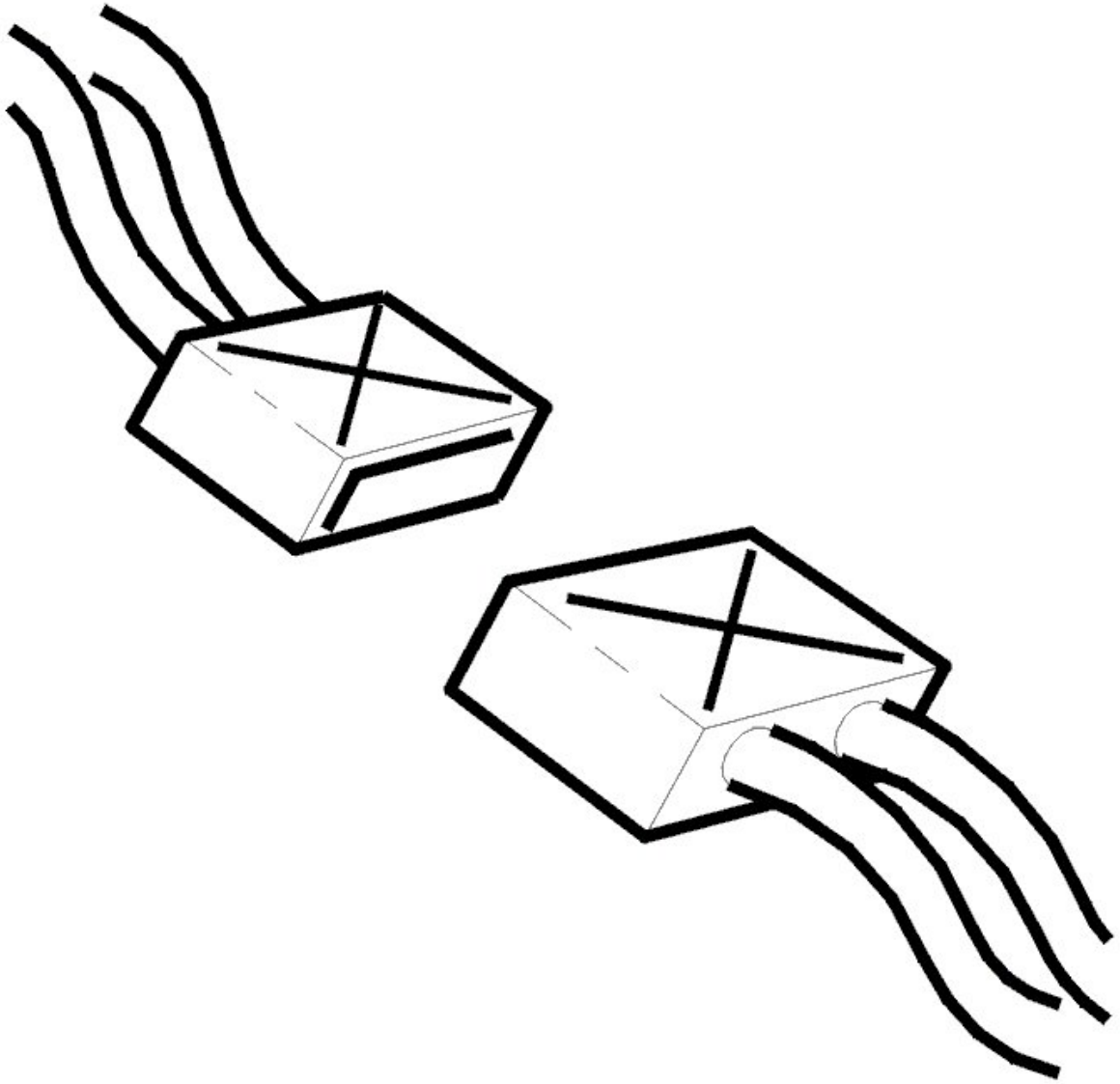
Was a fault detected?

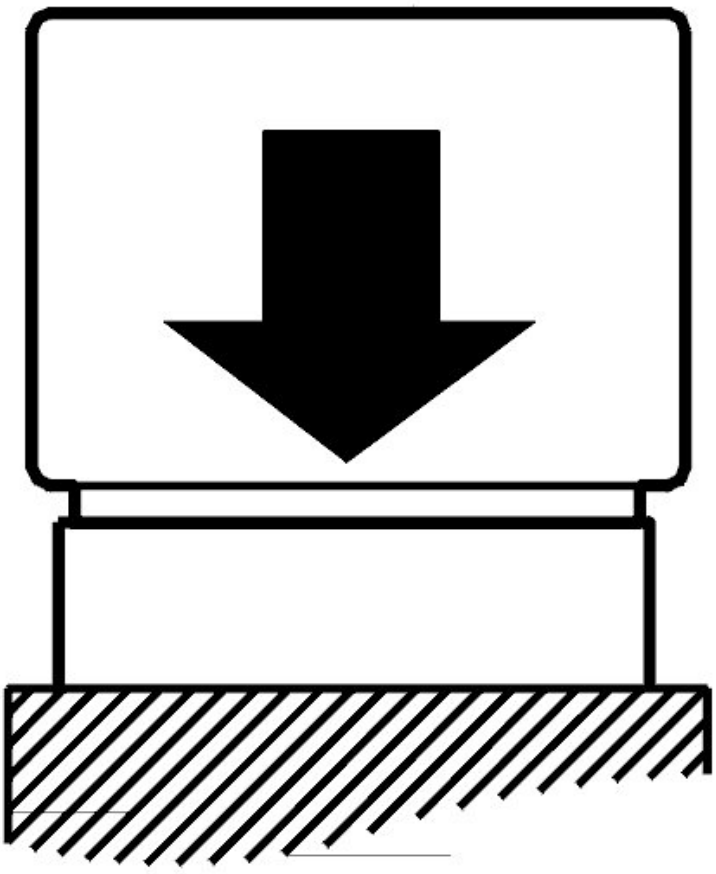
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Gear selector in position P.

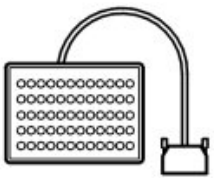
Check the transmission control module (TCM) by measuring the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

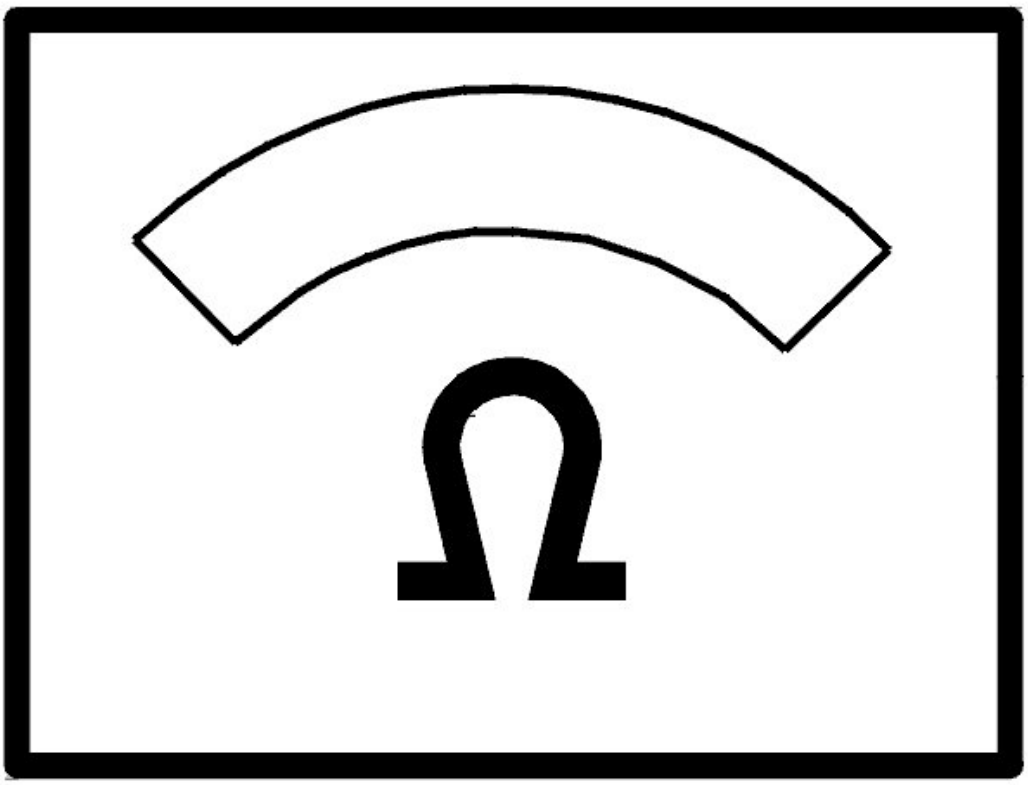
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



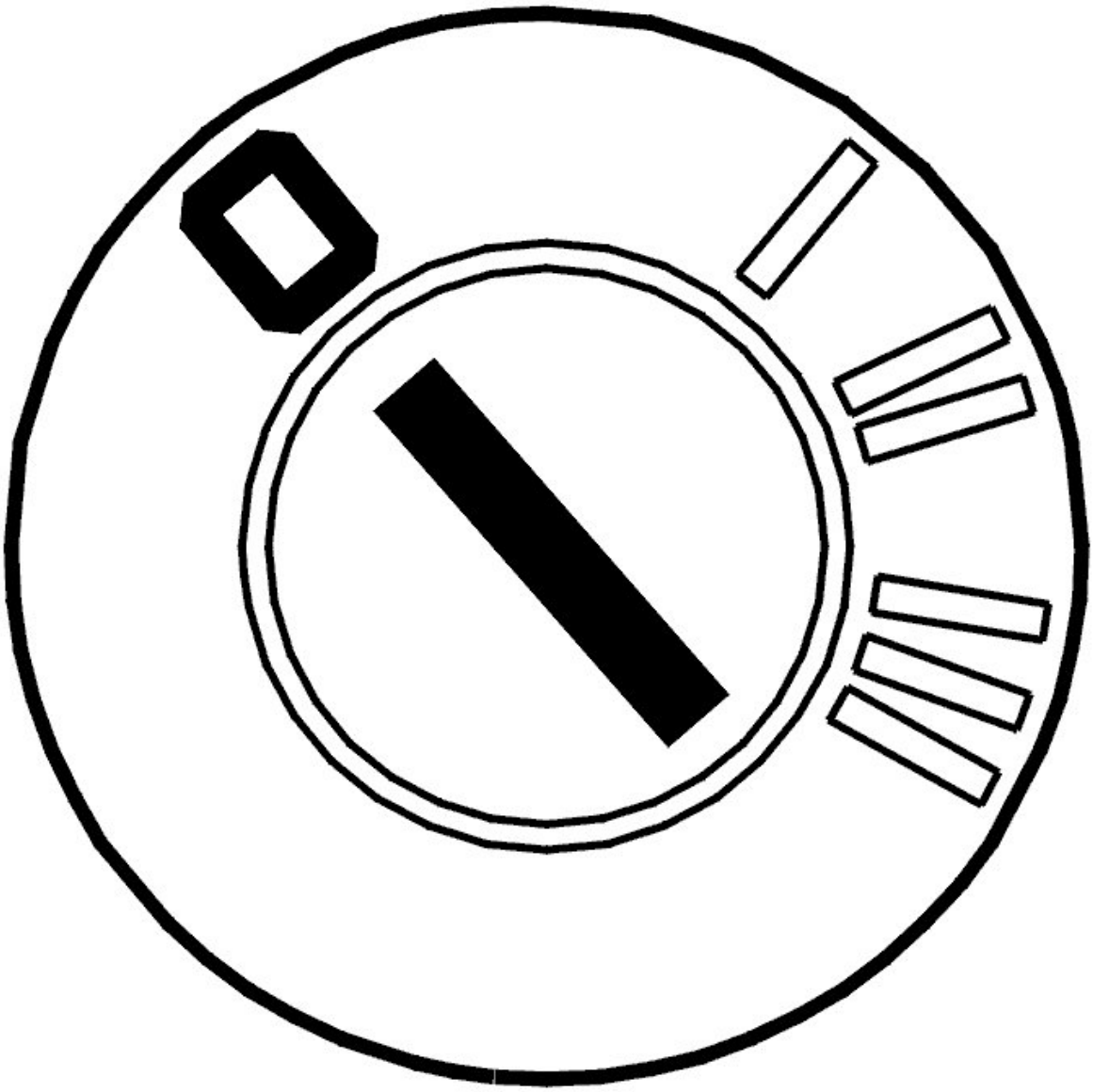


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

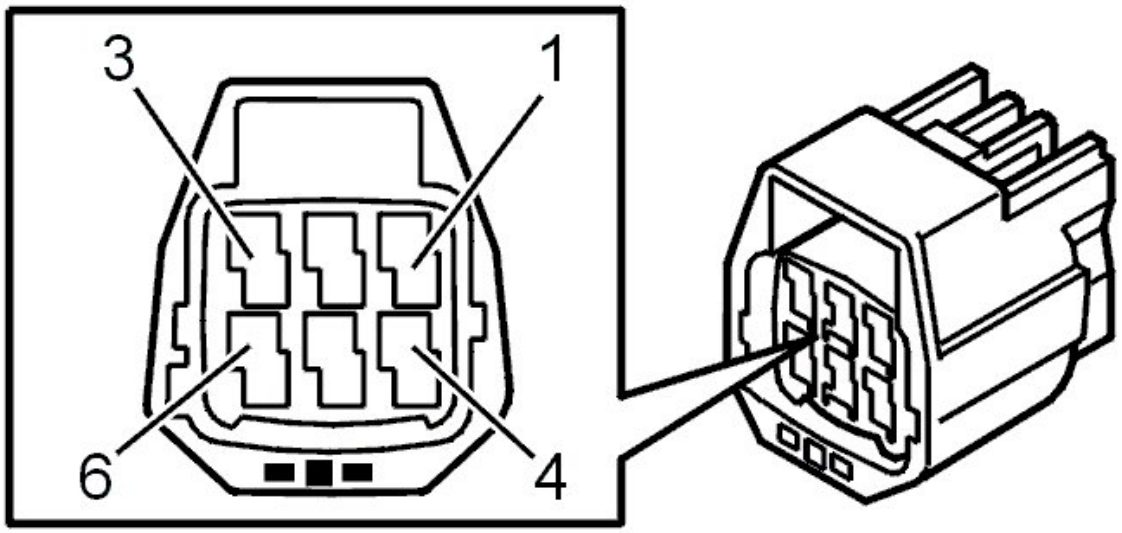


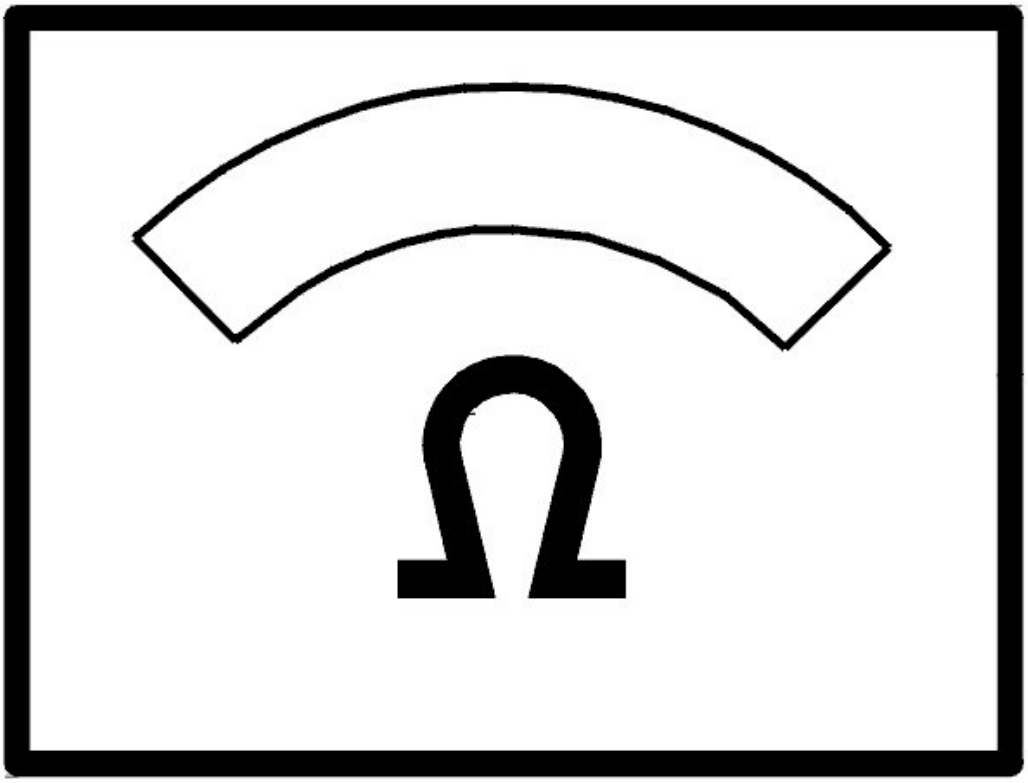
- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #C4 (transmission side) and the connector for solenoid S4. Check for a short-circuit to ground according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S4 by measuring the resistance between the terminal pin on solenoid S4 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S4 if the resistance is incorrect.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S4, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

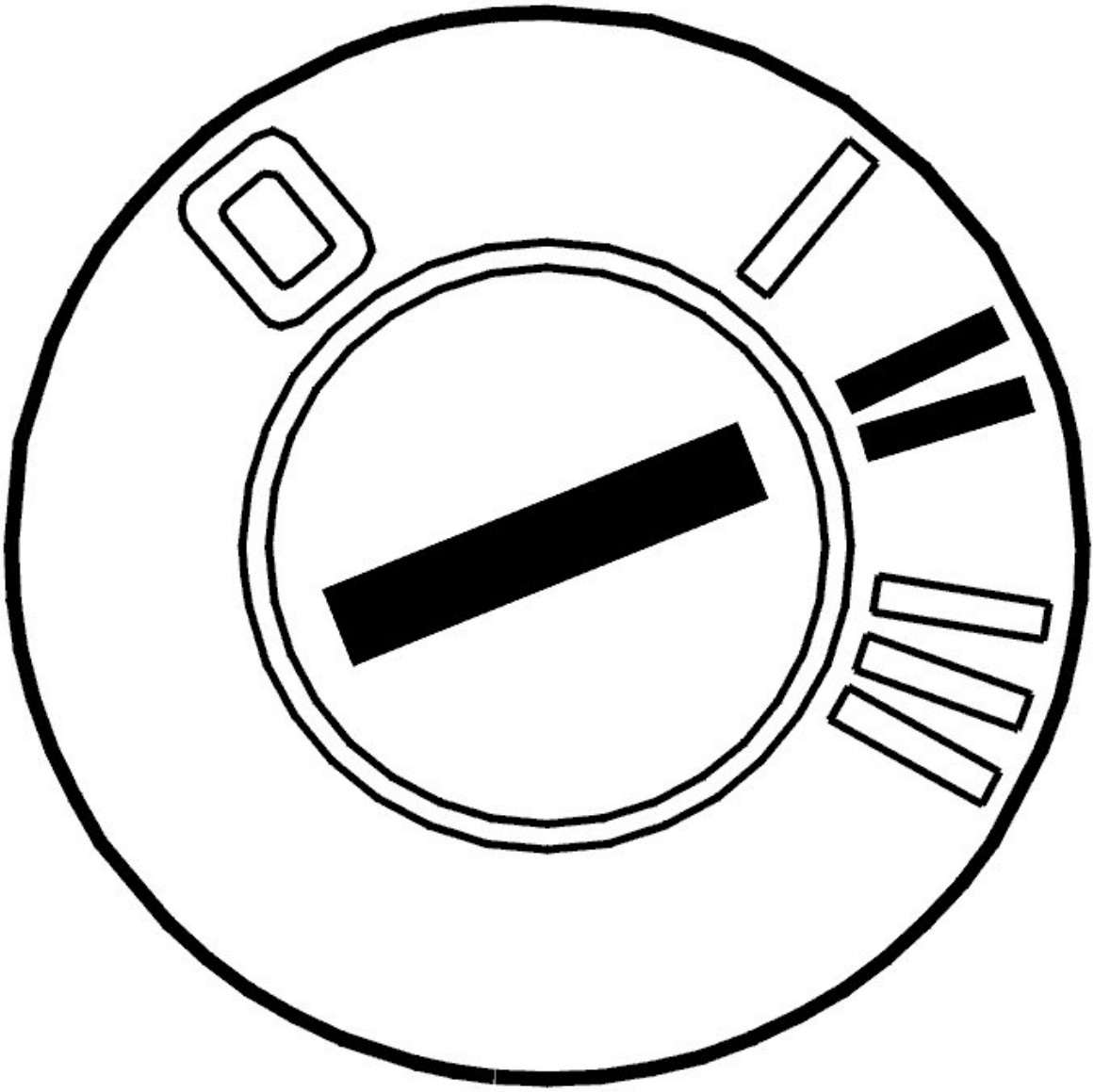
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



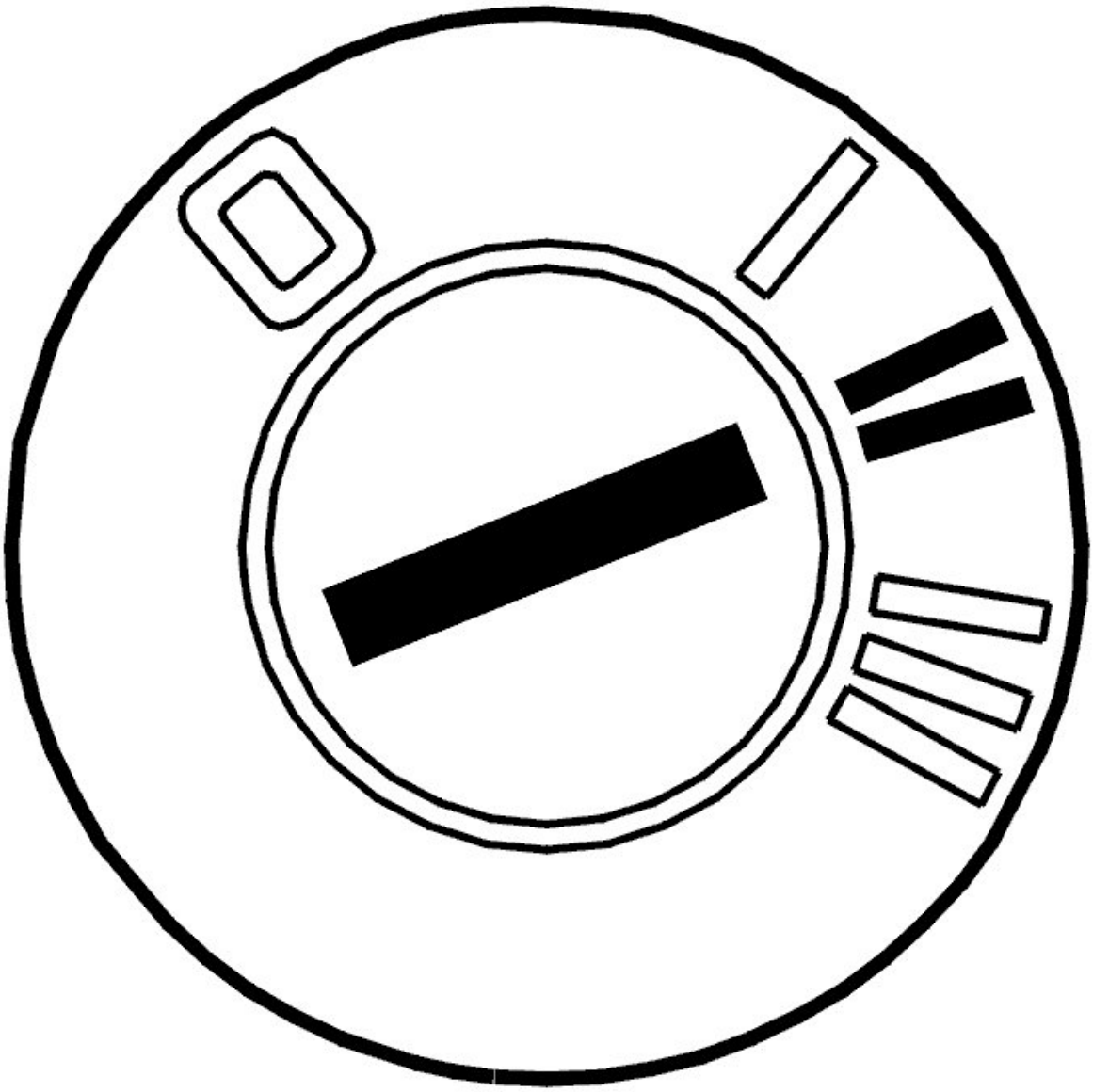
- Ignition on.

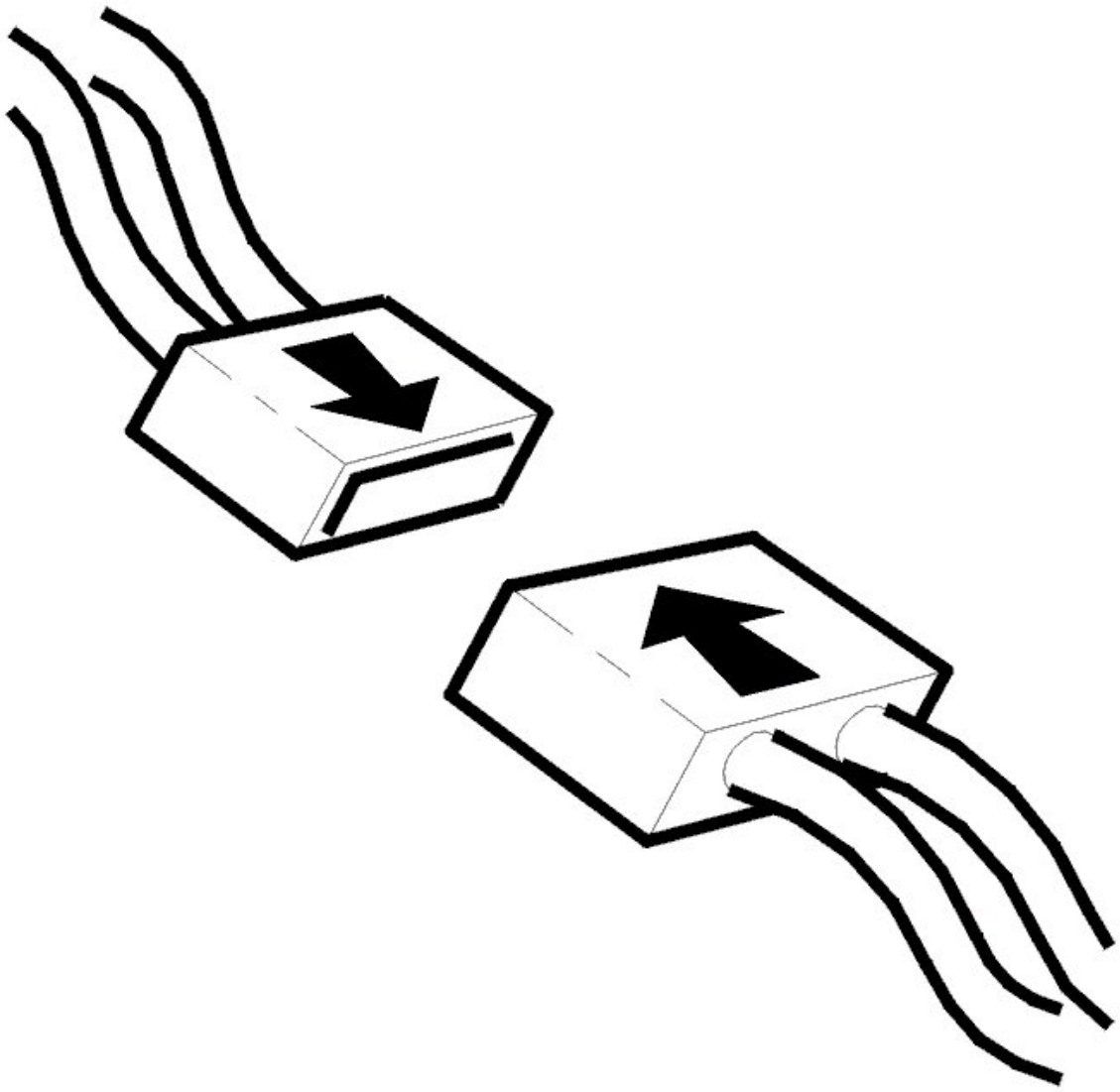
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S4.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

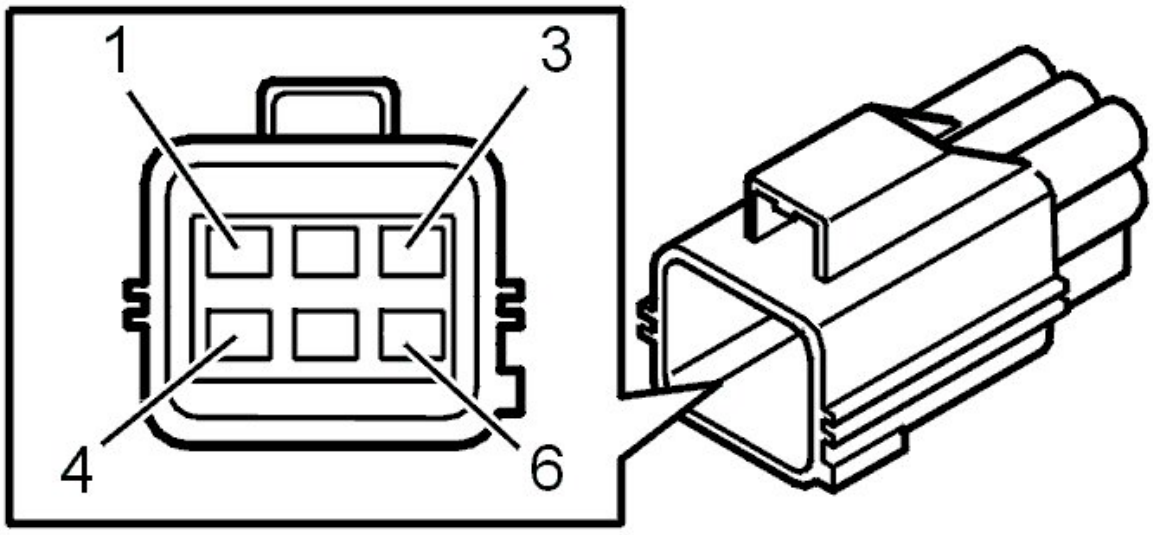
Check the cable between control module terminal #A47 (#A47) and transmission connector terminal #C4 (control module side). Check for intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

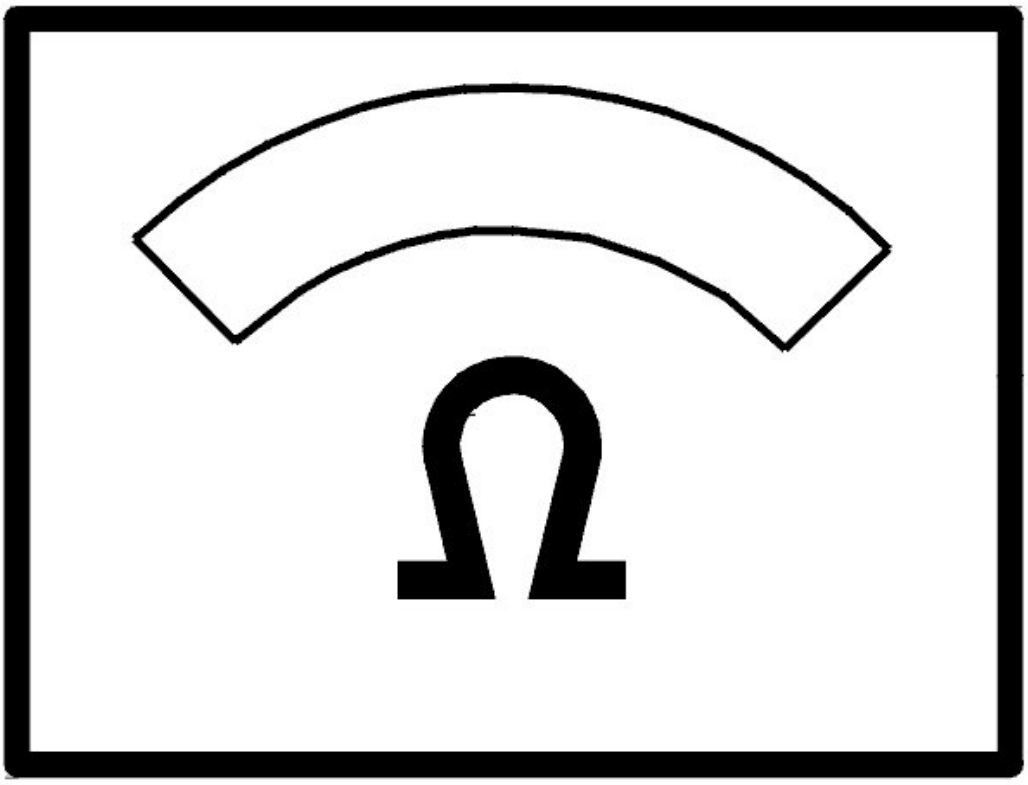
- Check the circuit for solenoid S4. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #A47 (#A47) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

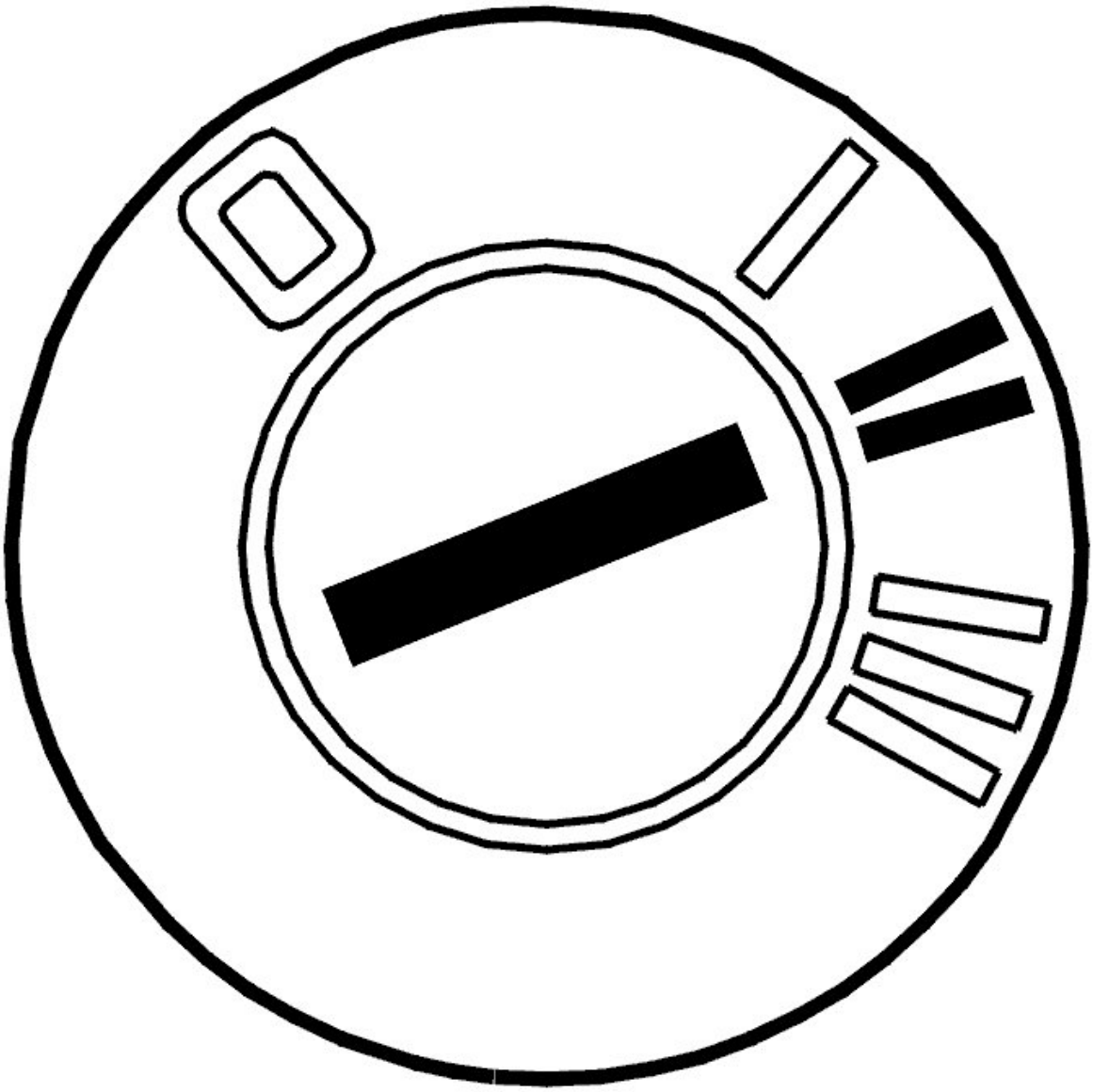
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

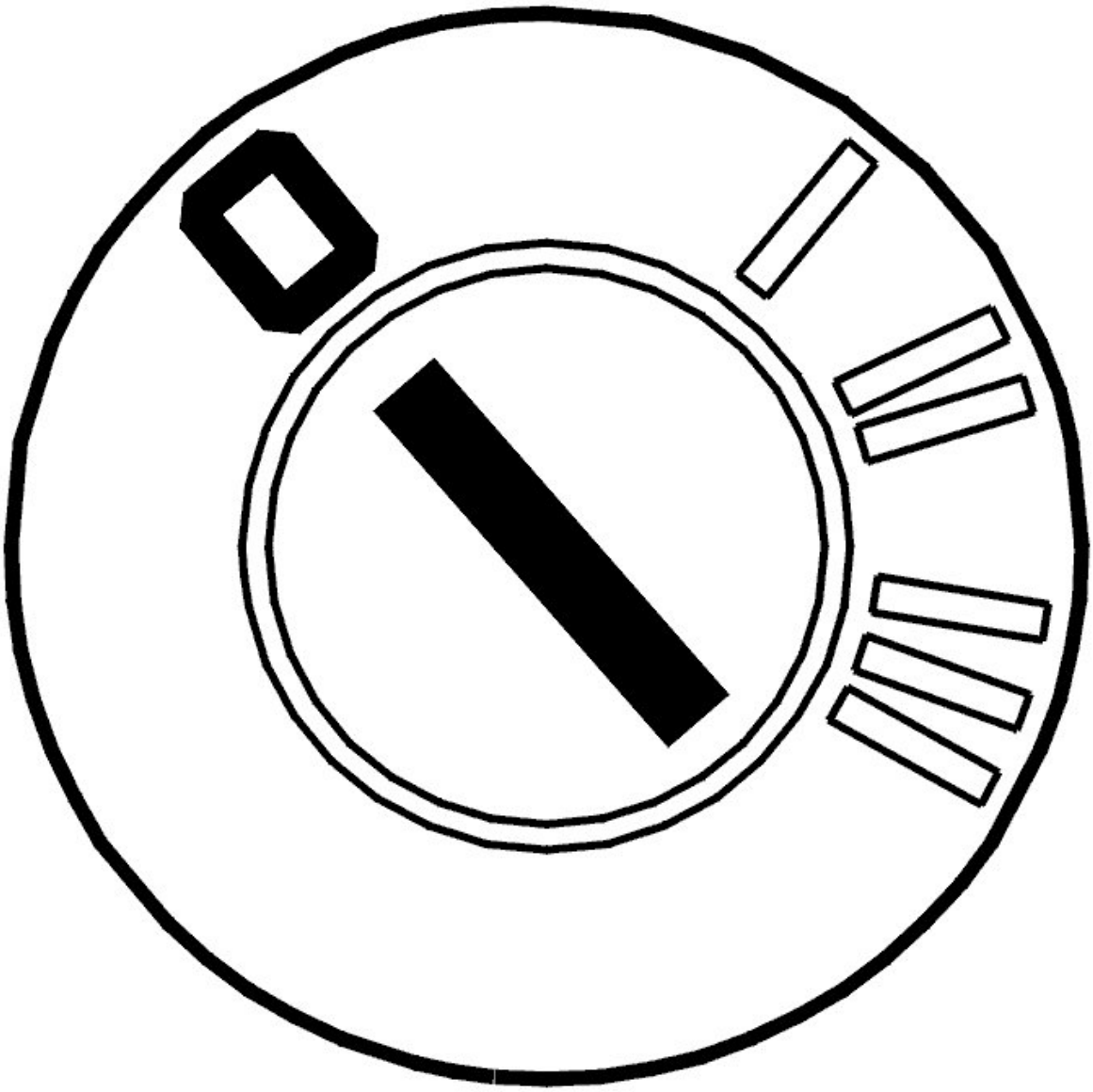
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

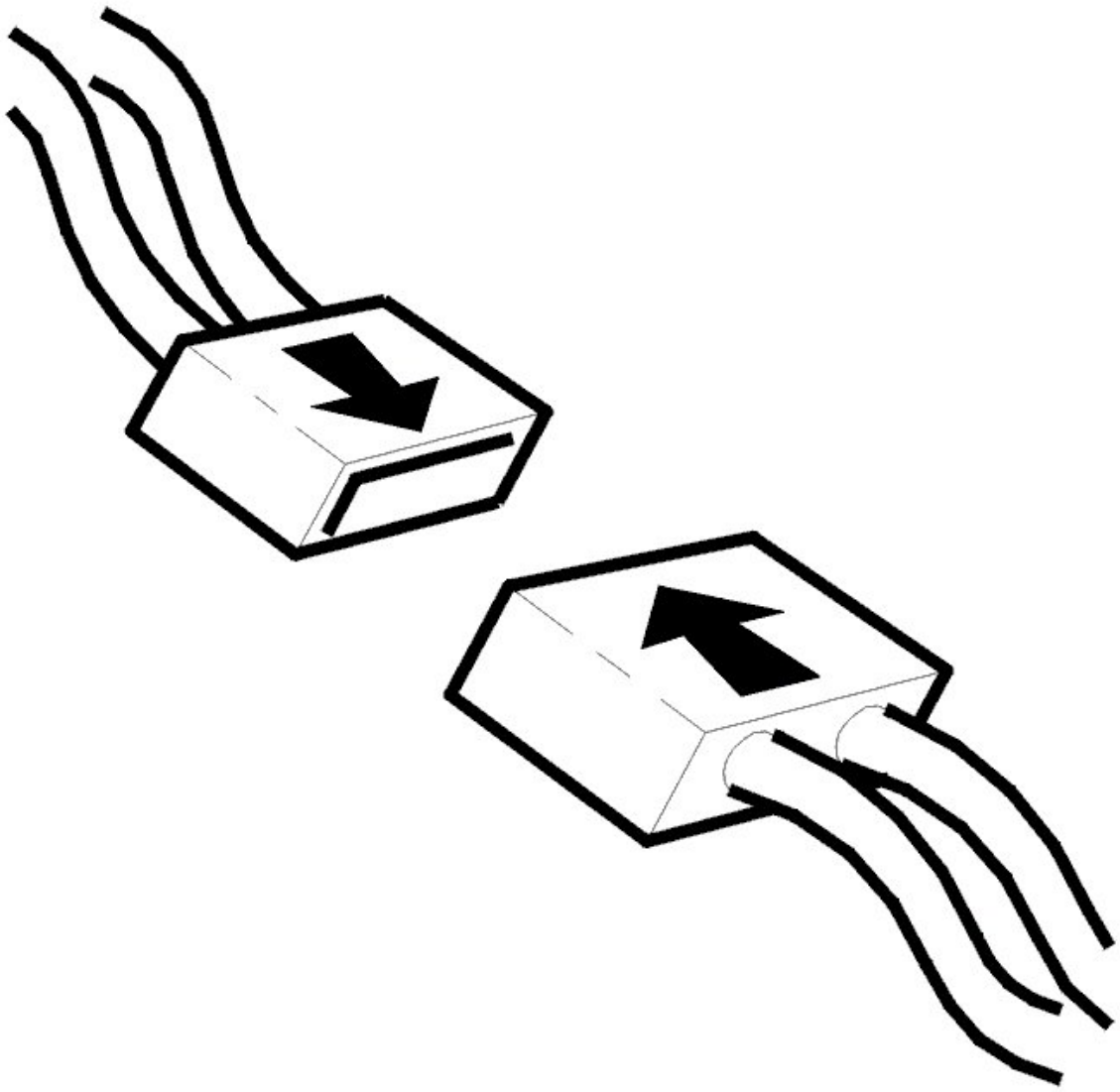
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

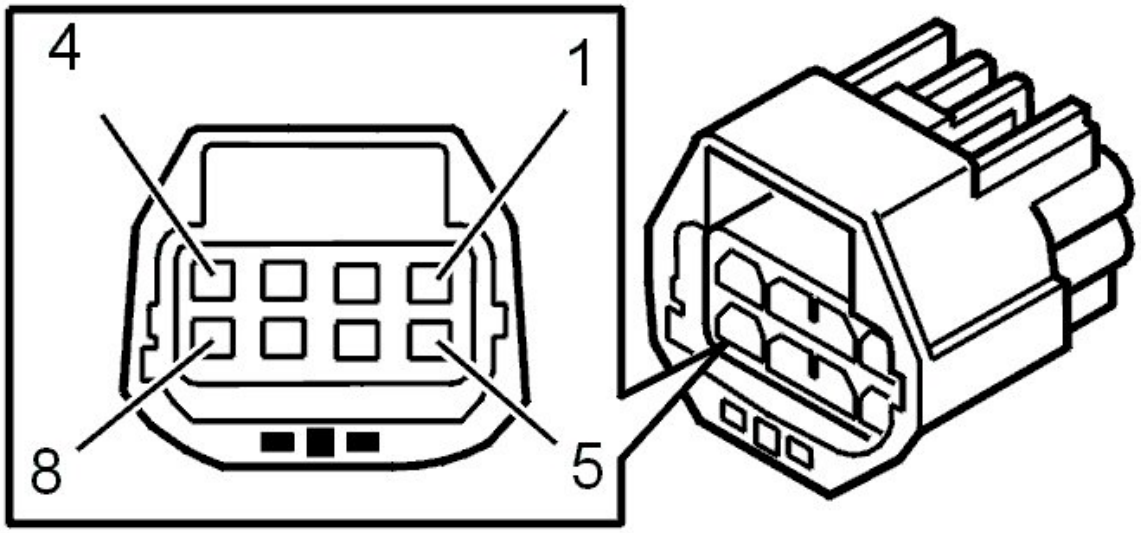
Checking transmission fluid temperature sensor

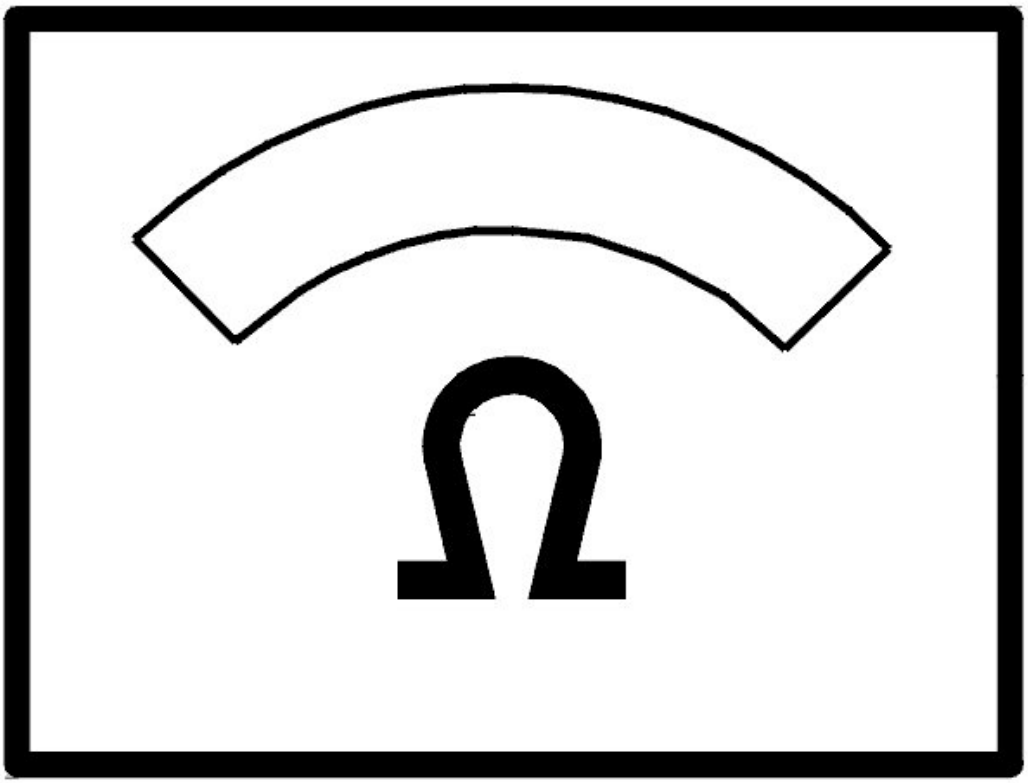




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

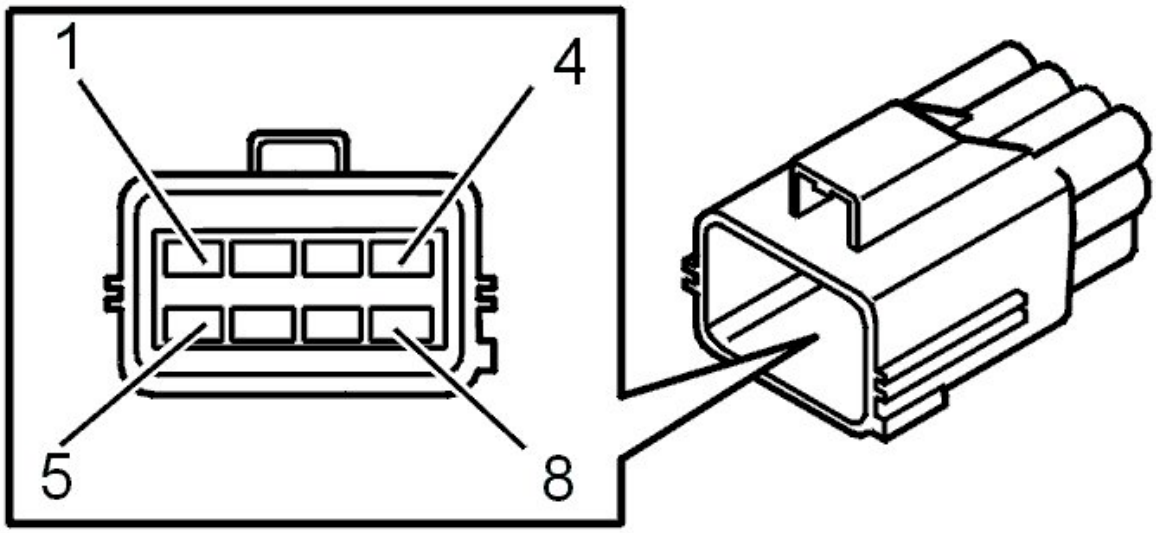
No - Checking the cable and component

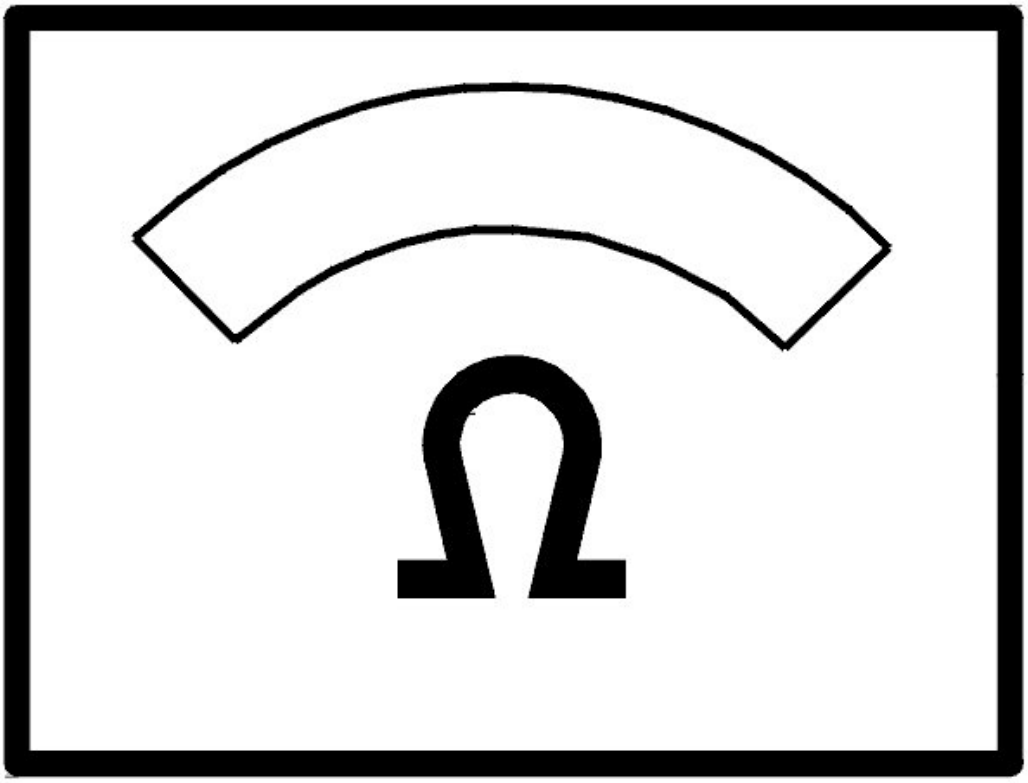
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



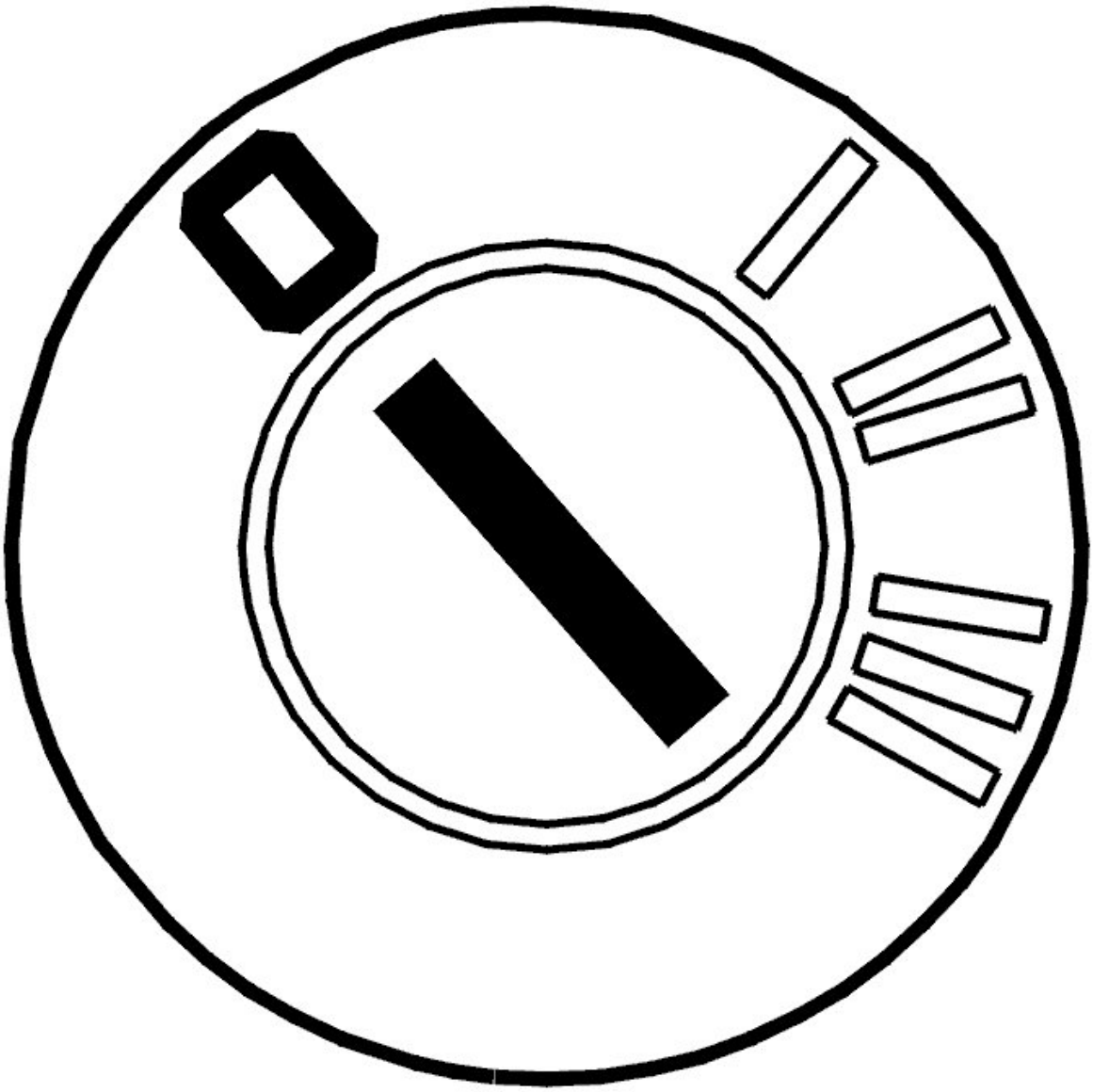


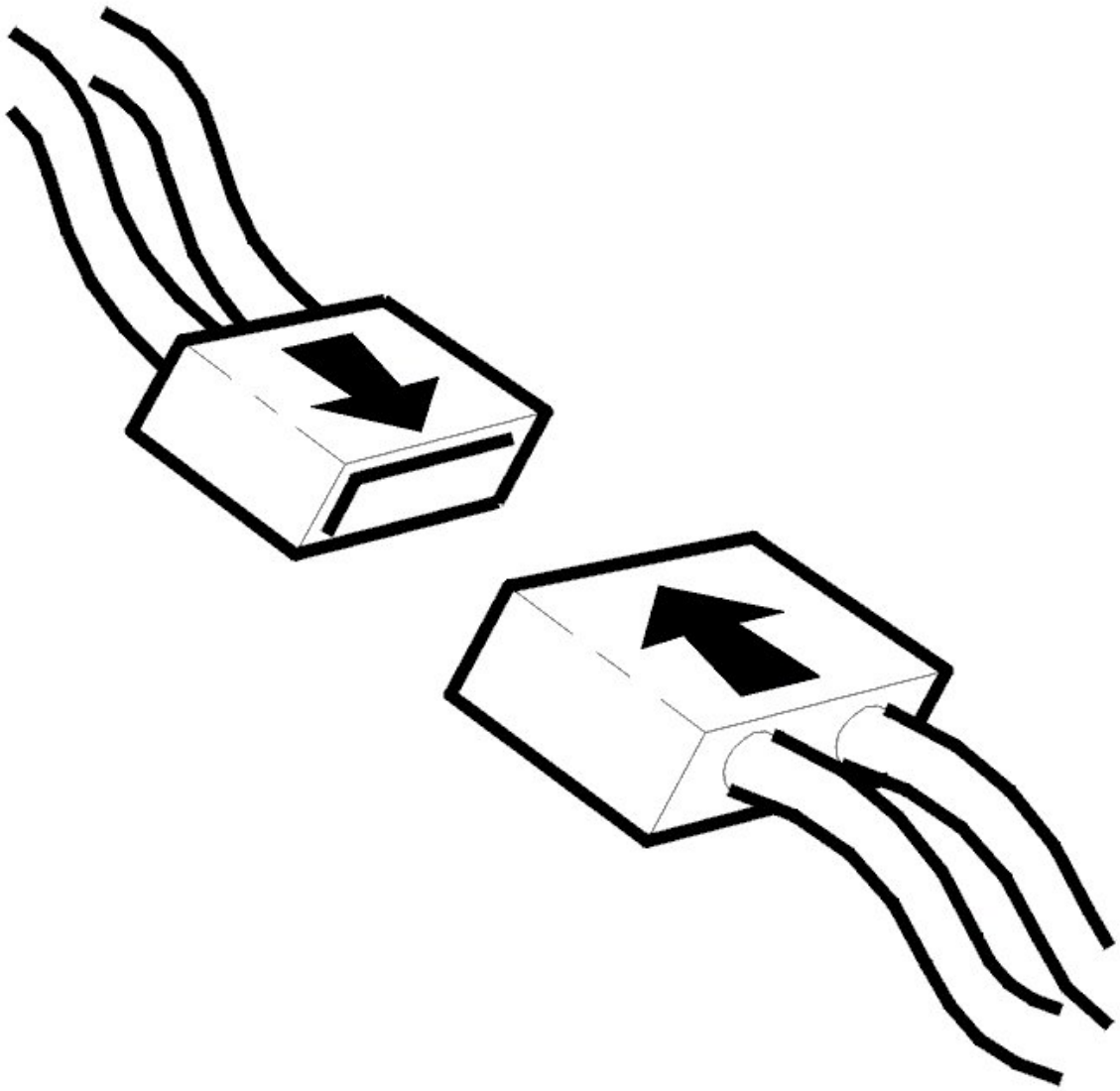
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

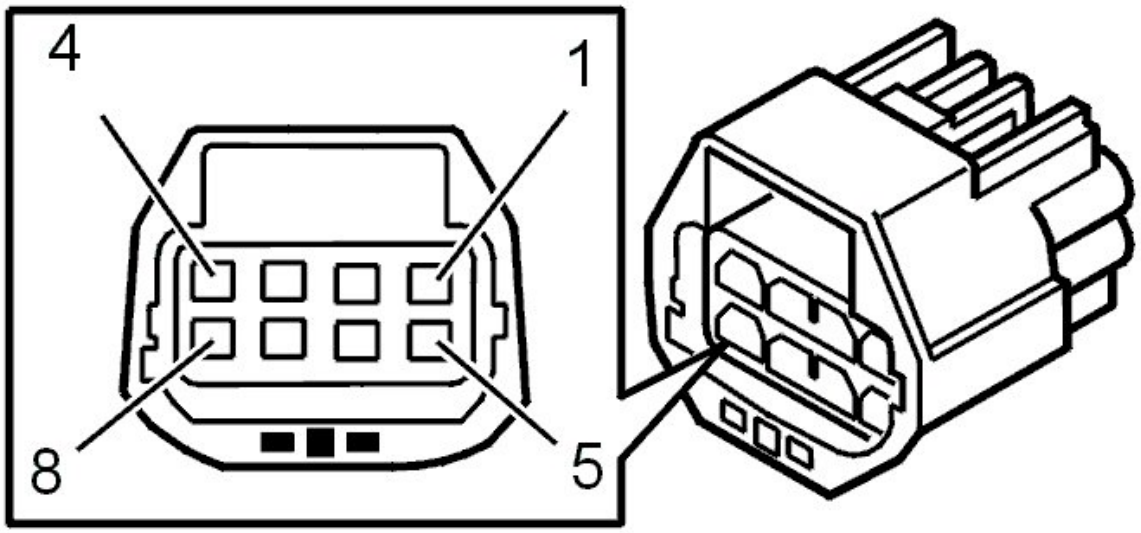
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

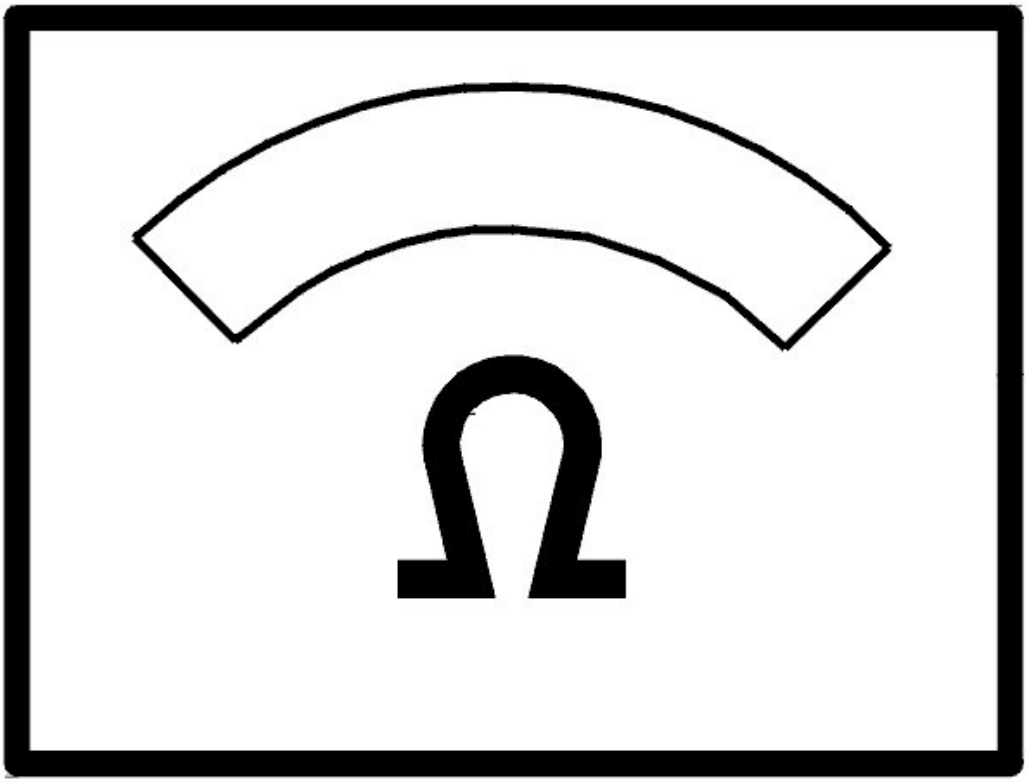
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





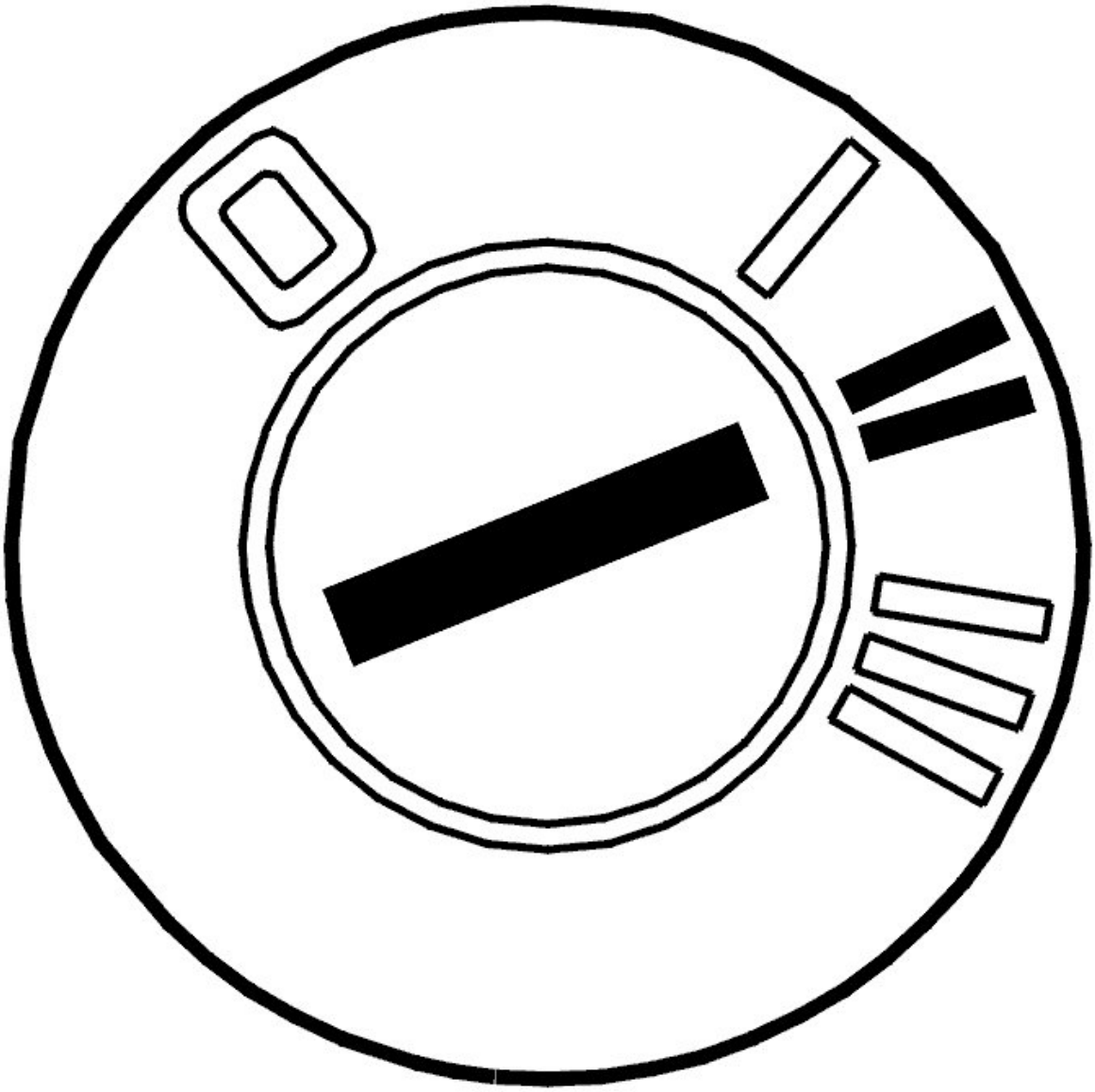
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



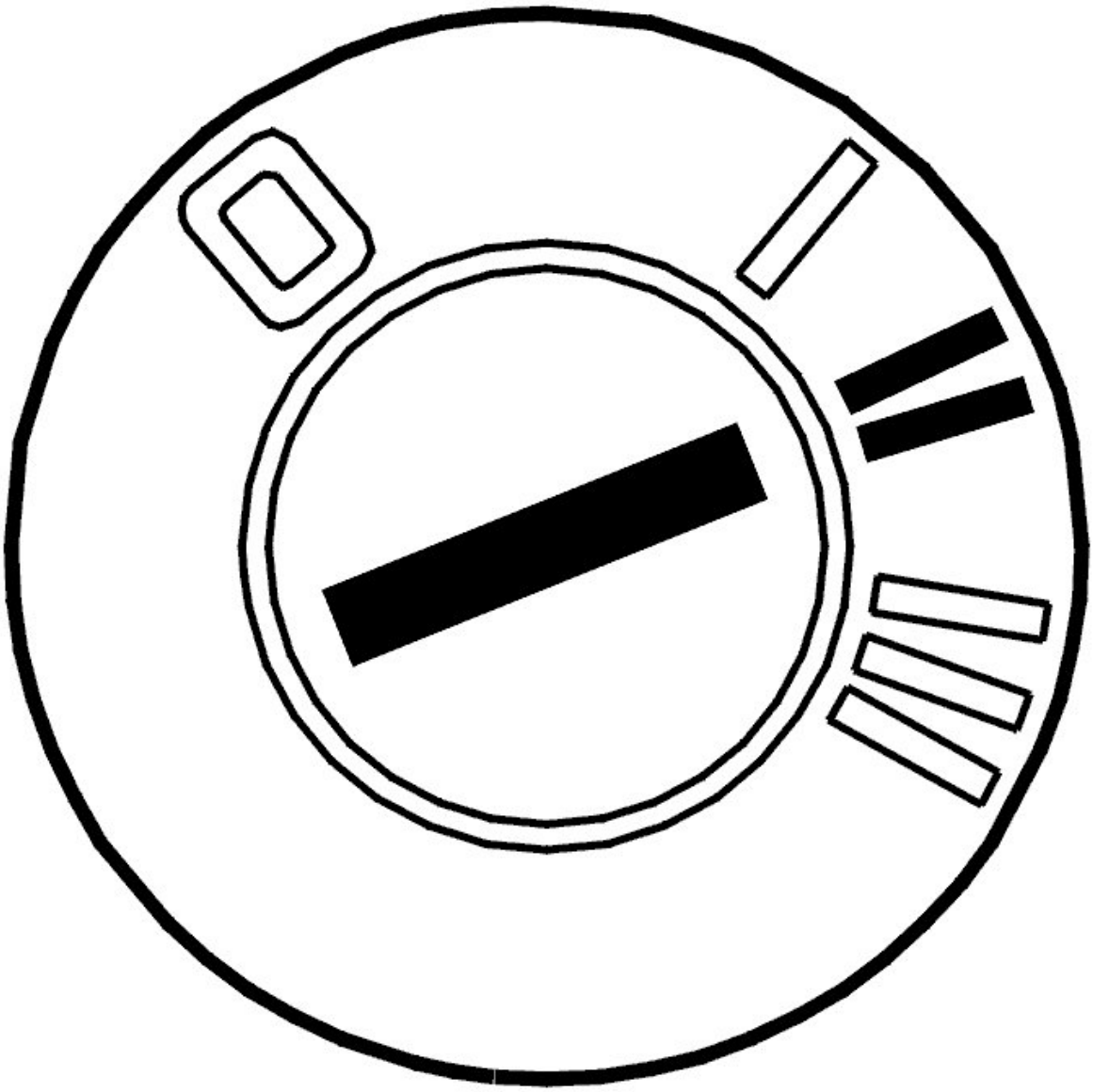
- Ignition on.

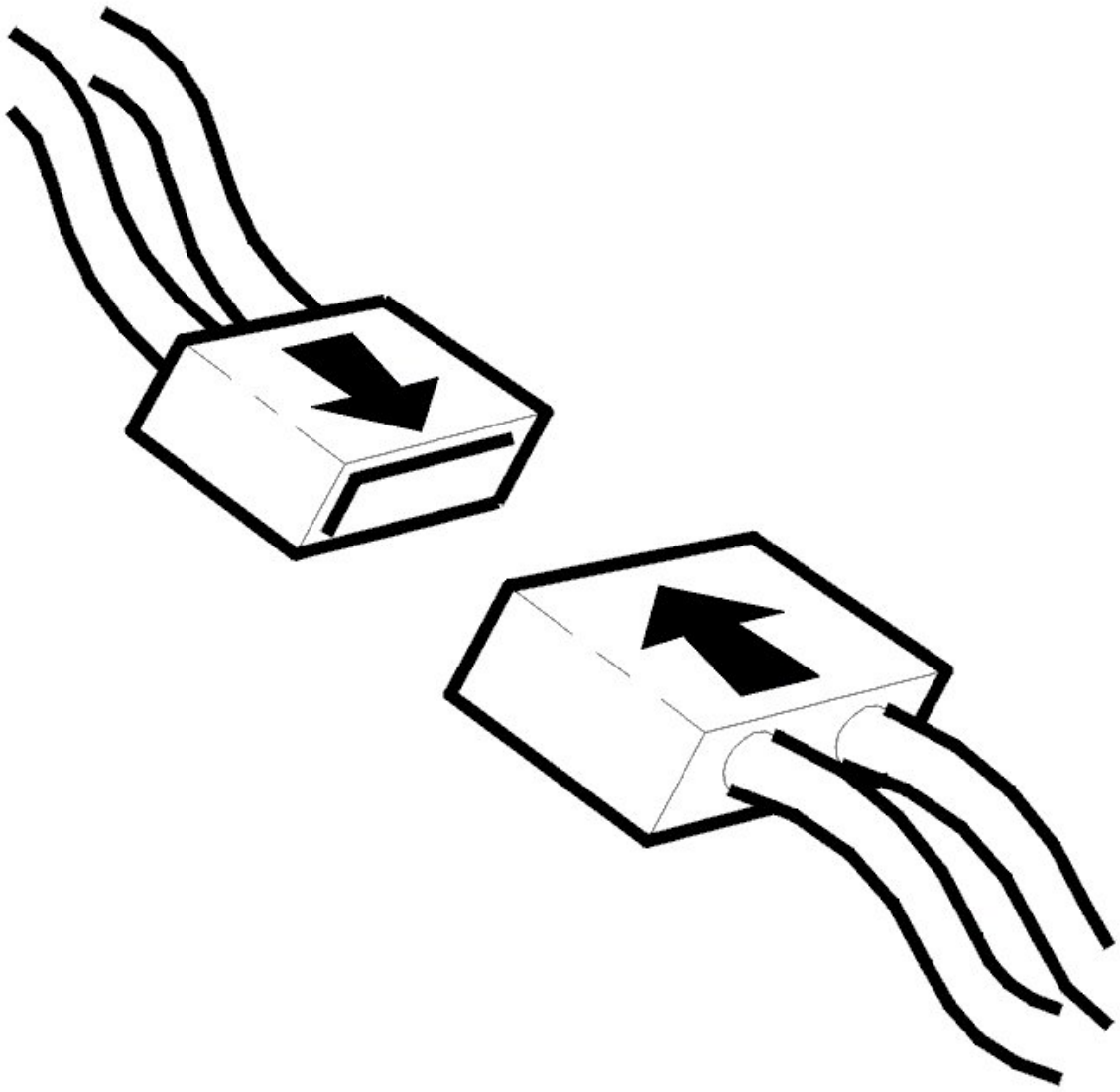
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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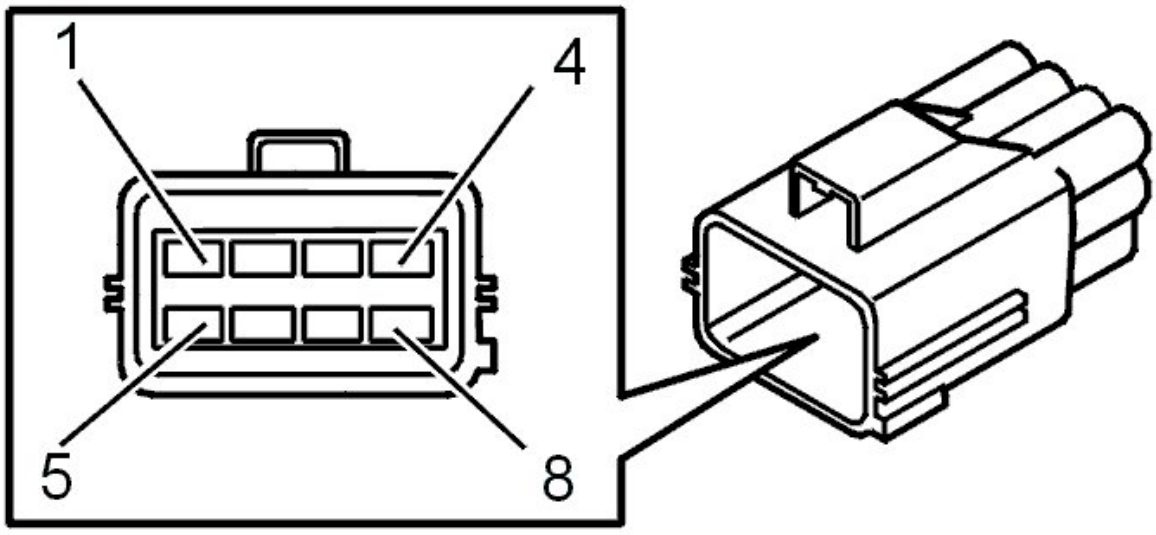
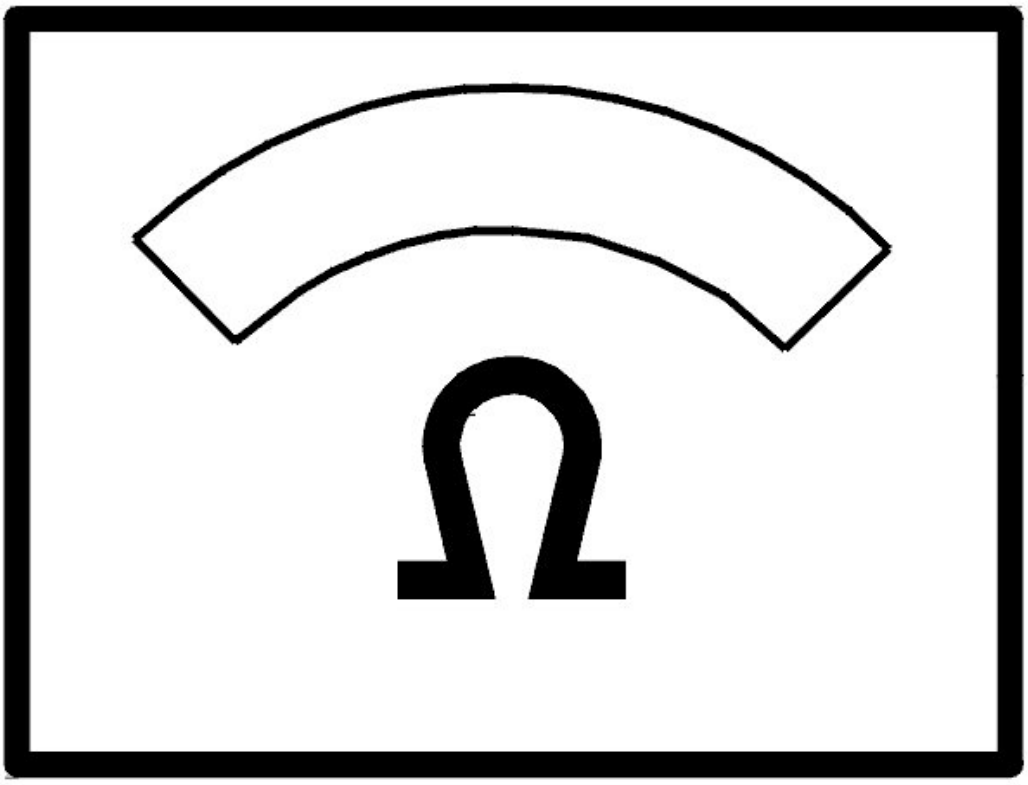
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

DONE - DONE

Attempt New Test - Checking transmission fluid temperature sensor

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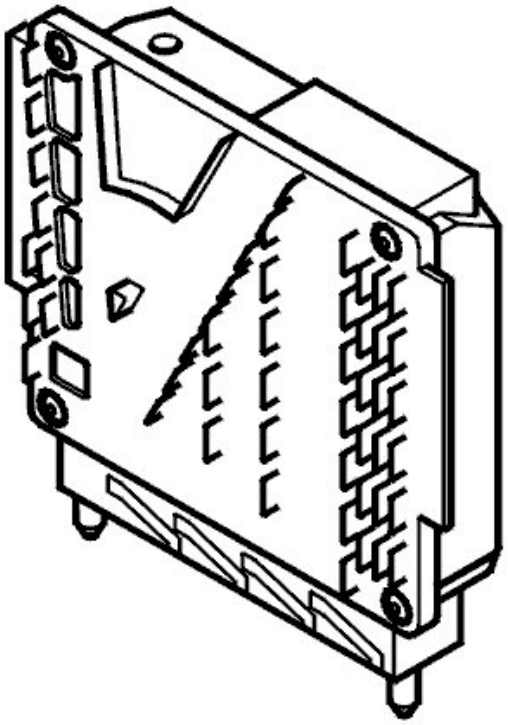
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0001, TCM-0007, TCM-0101 TCM-0107 or TCM-010A are stored (depending on the solenoid)if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is too high when the solenoid should not be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to supply voltage in the signal cable.
- Internal fault in the control module.

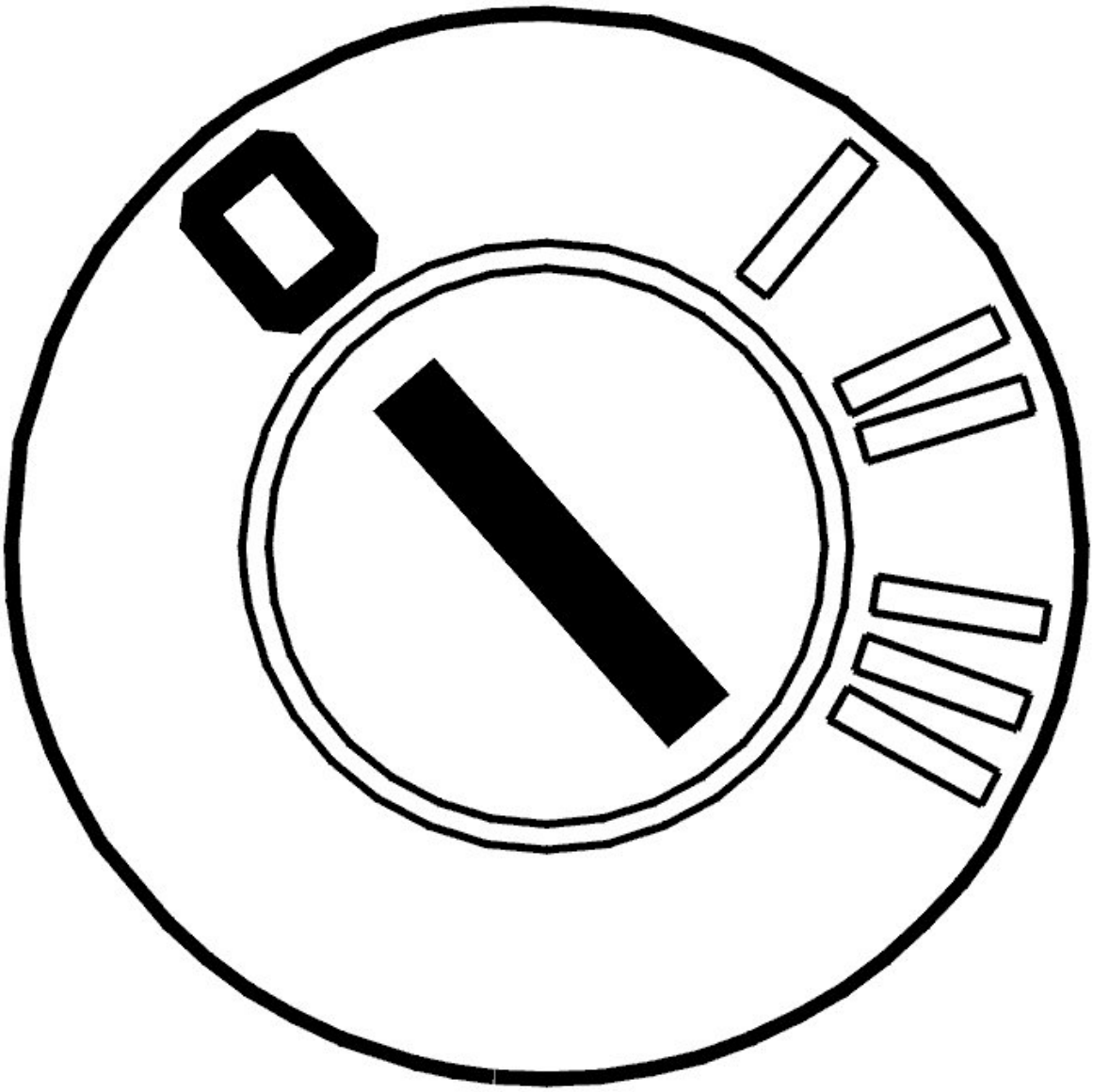
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Too High

Signal too high

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

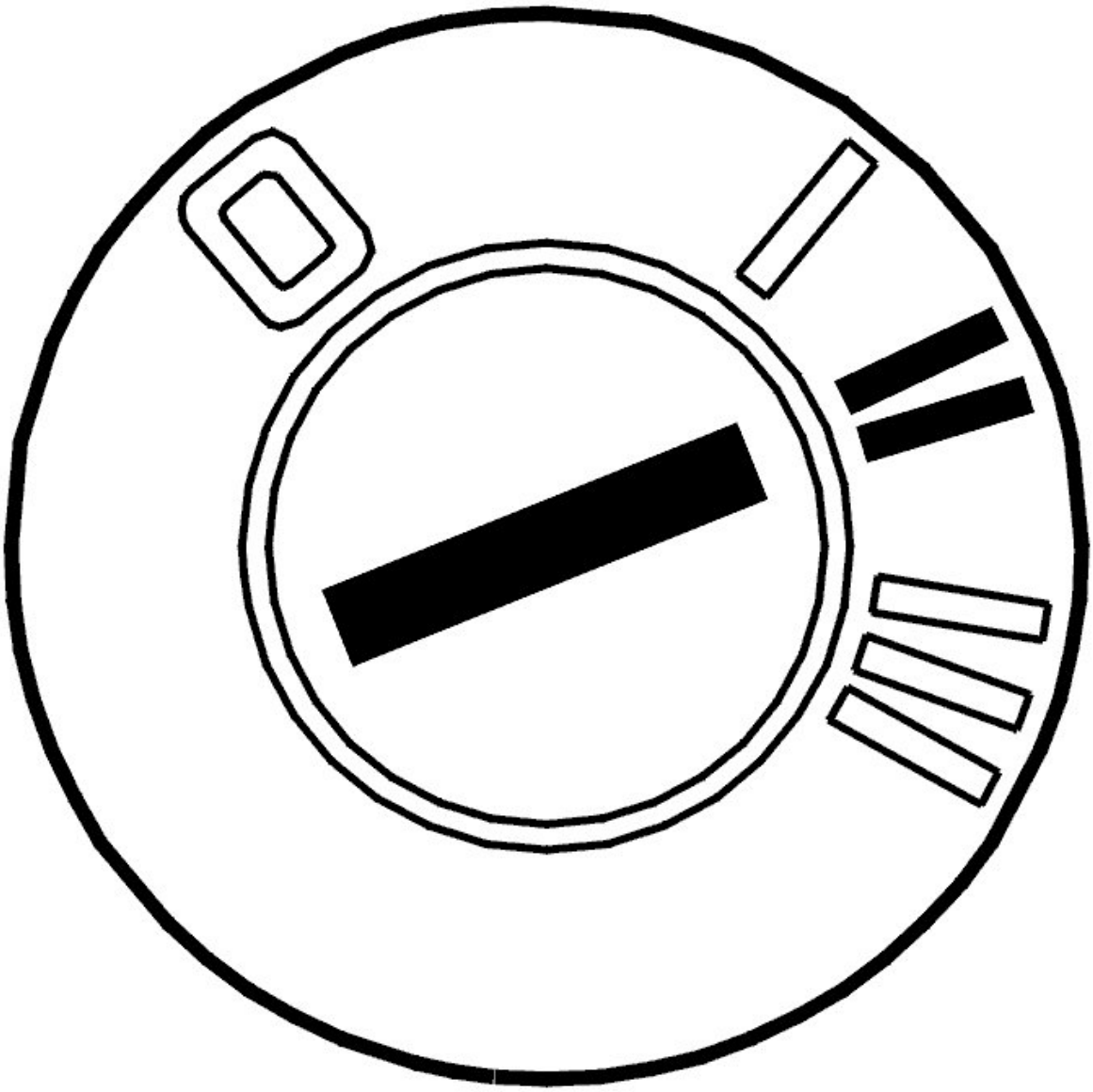
Note! If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S5

No - Checking transmission fluid temperature sensor

Checking shift solenoid S5



- Ignition on
- Gear selector in position P
- Activate solenoid S5.

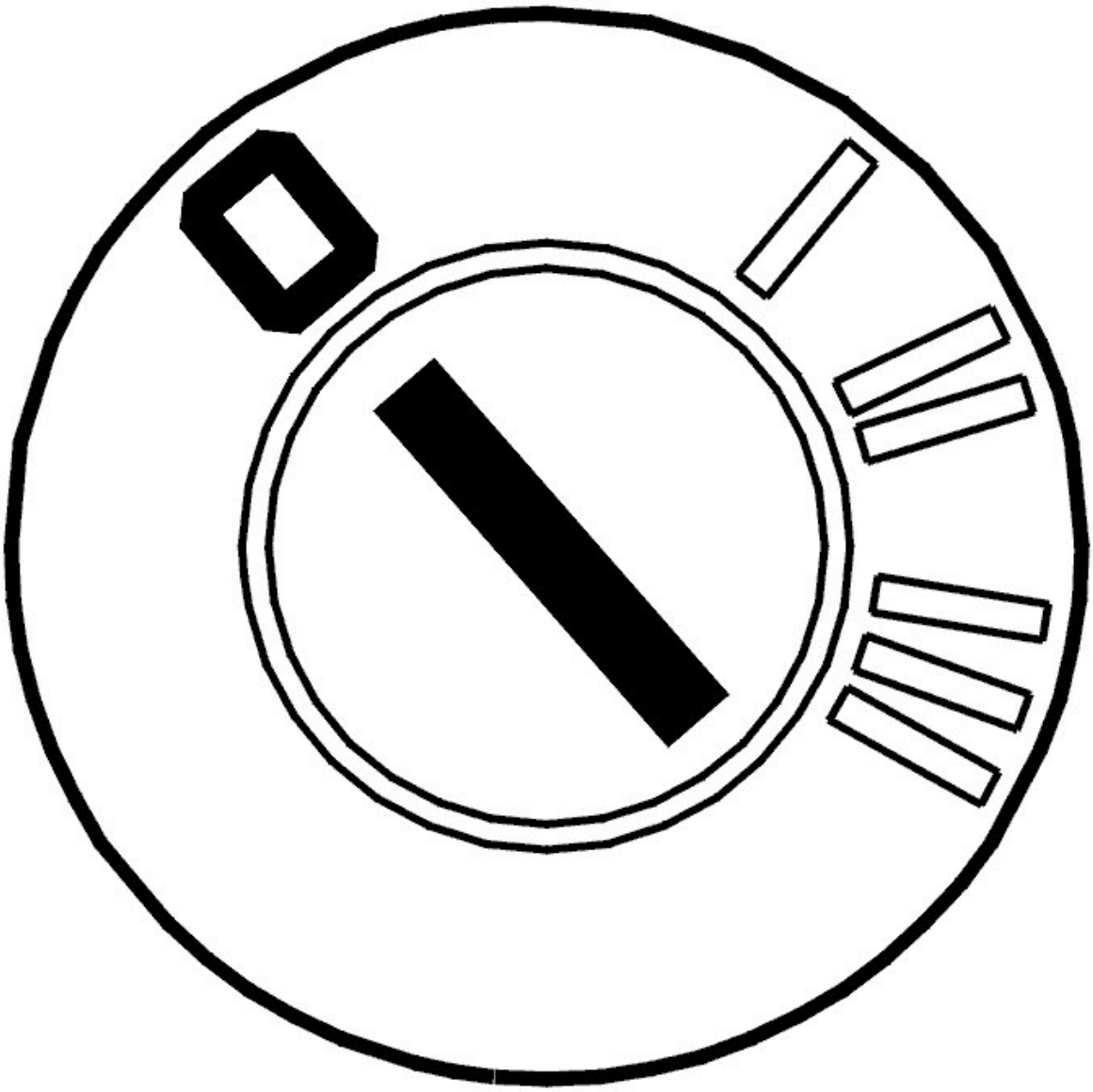
The value must change between OFF and ON.

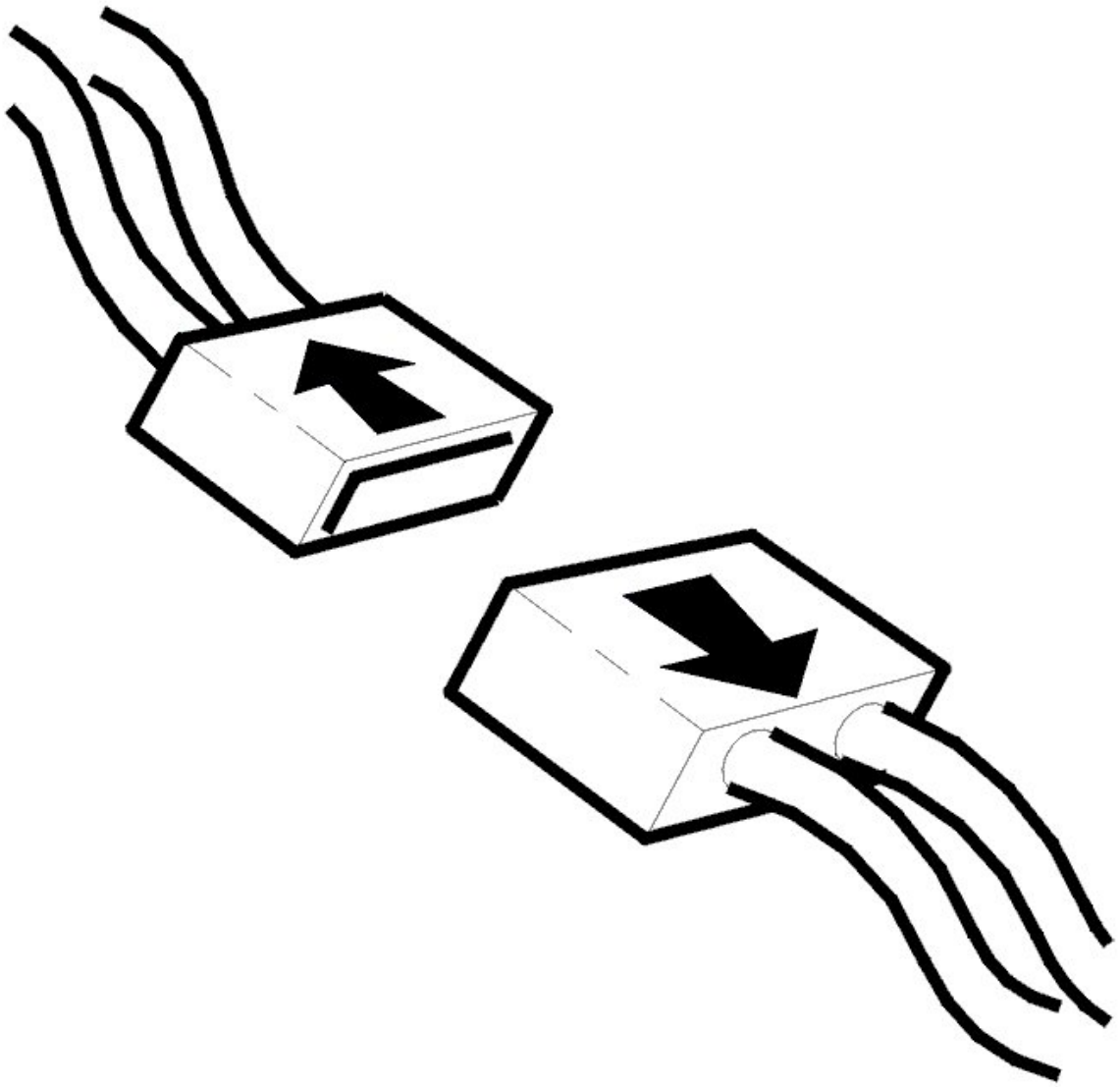
Does the value change?

Yes - Intermittent fault

No - Checking the wiring

Checking the wiring



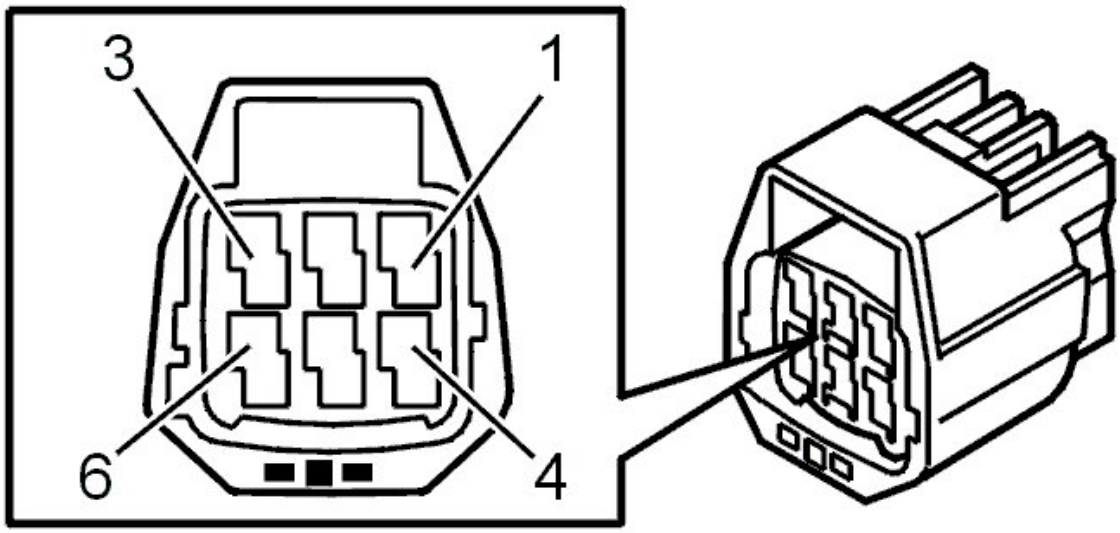


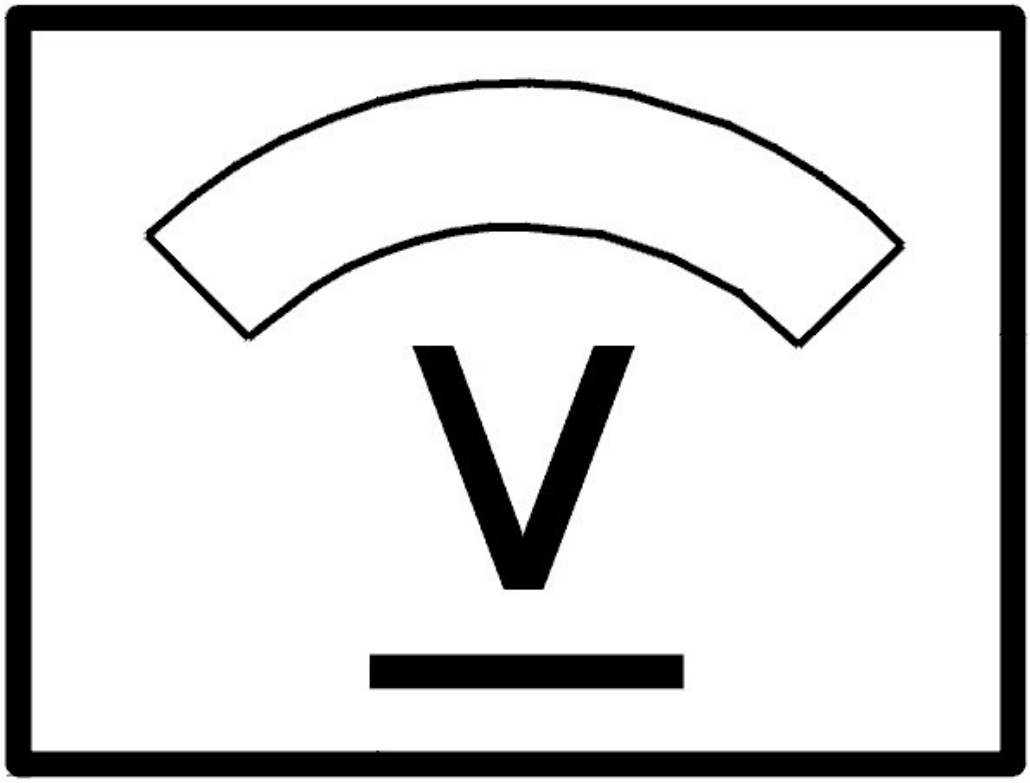
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



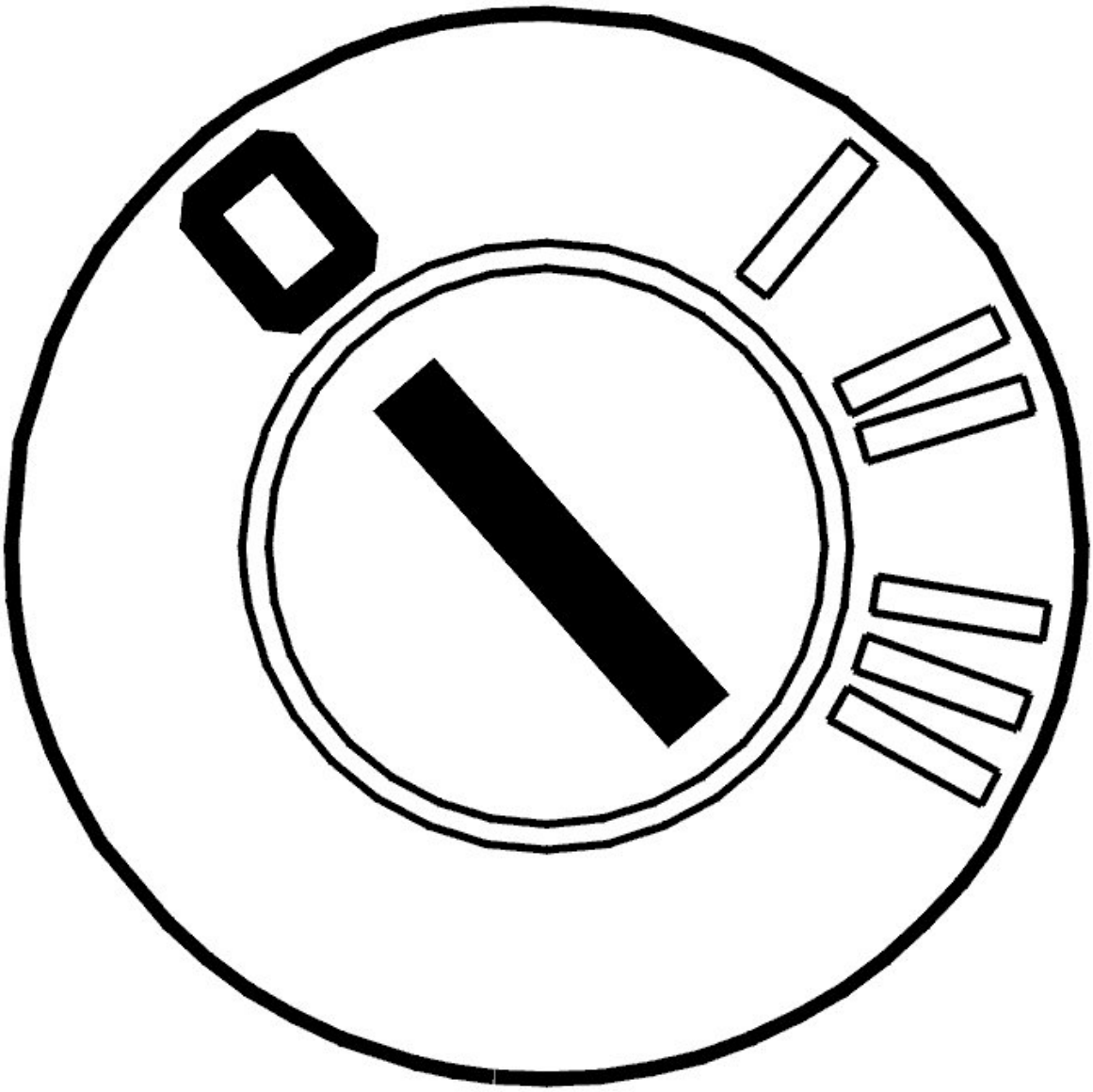


Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component

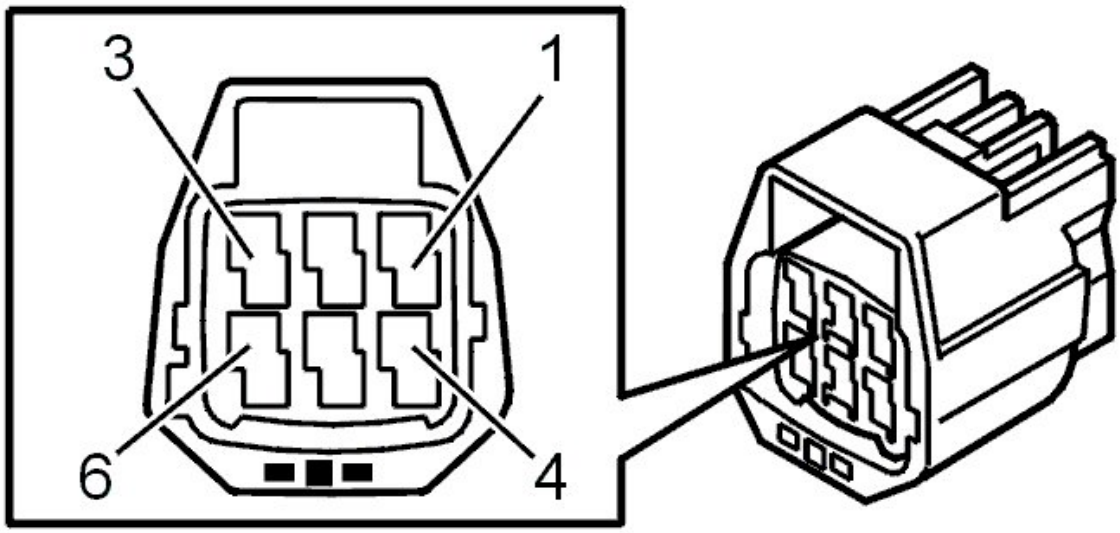


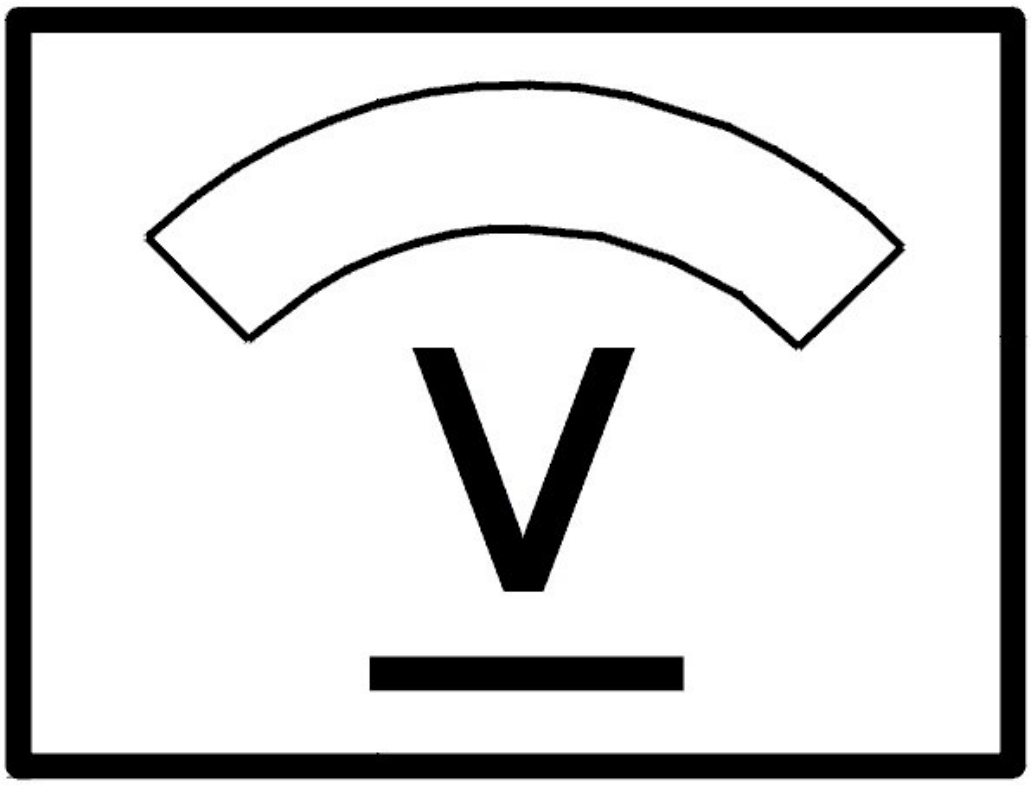
- Ignition off
- Open the control system.

Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for a short-circuit to supply voltage according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Replace solenoid S5 if no faults are found in the cable.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S5, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

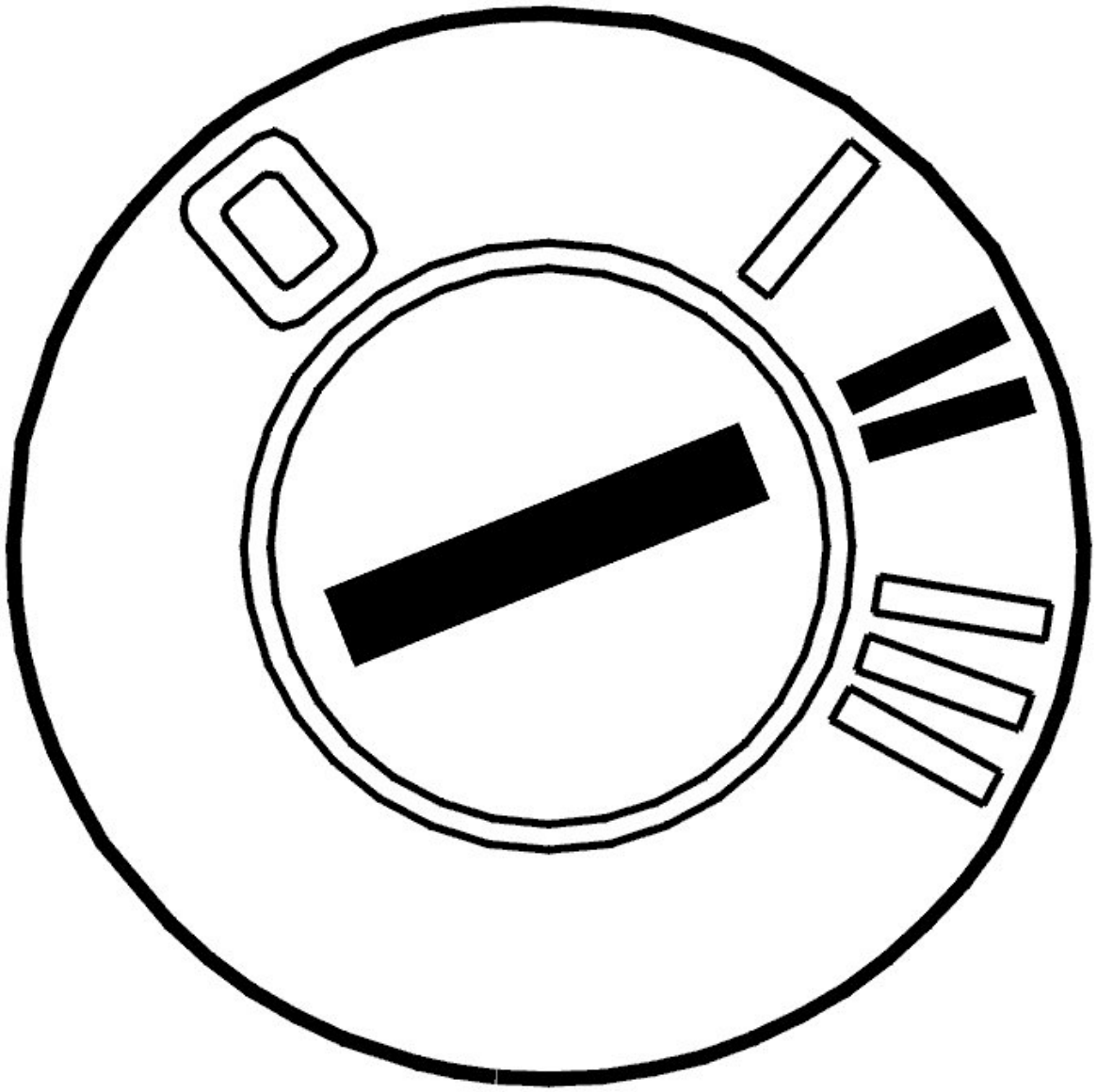
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



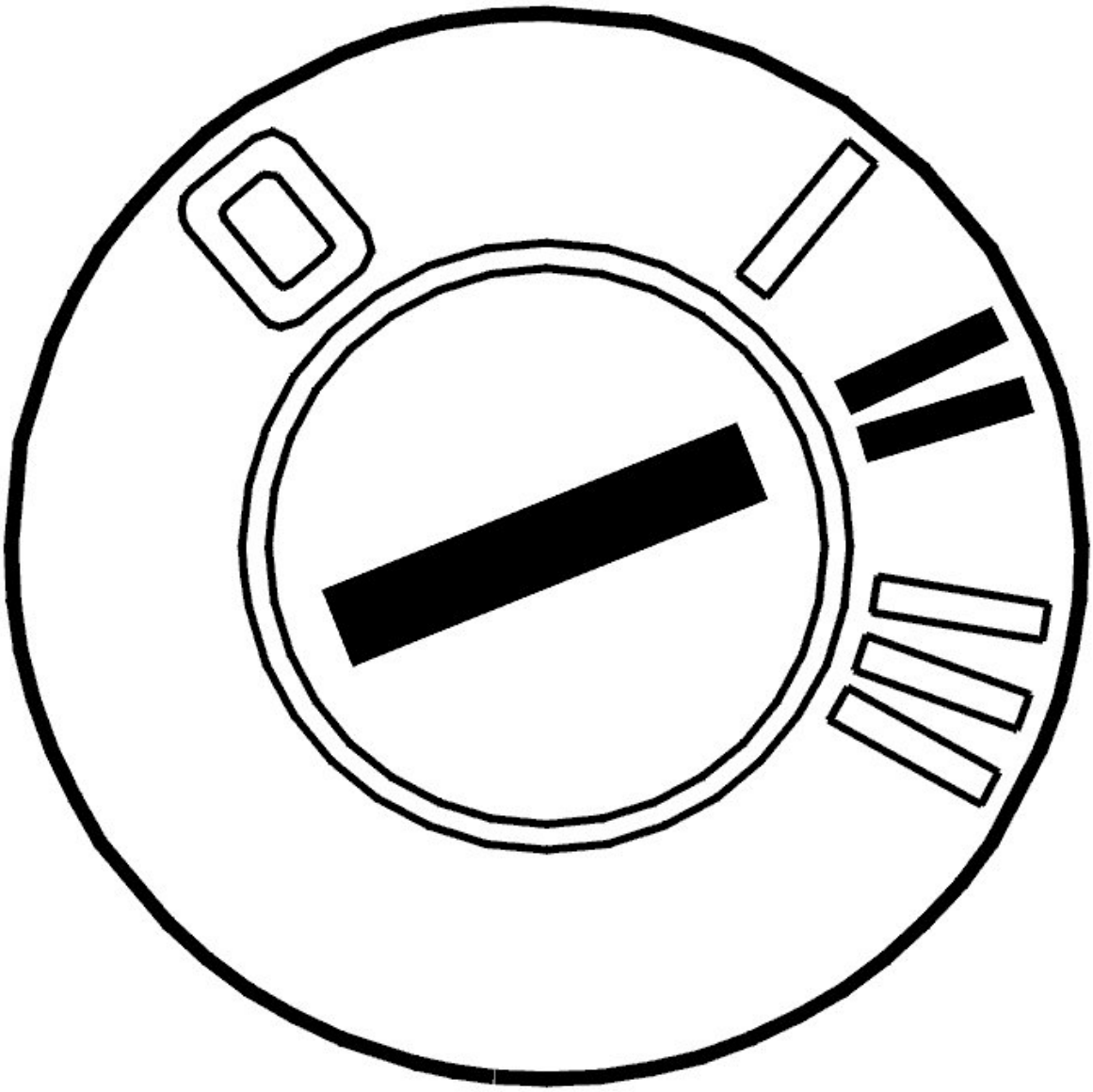
- Ignition on.

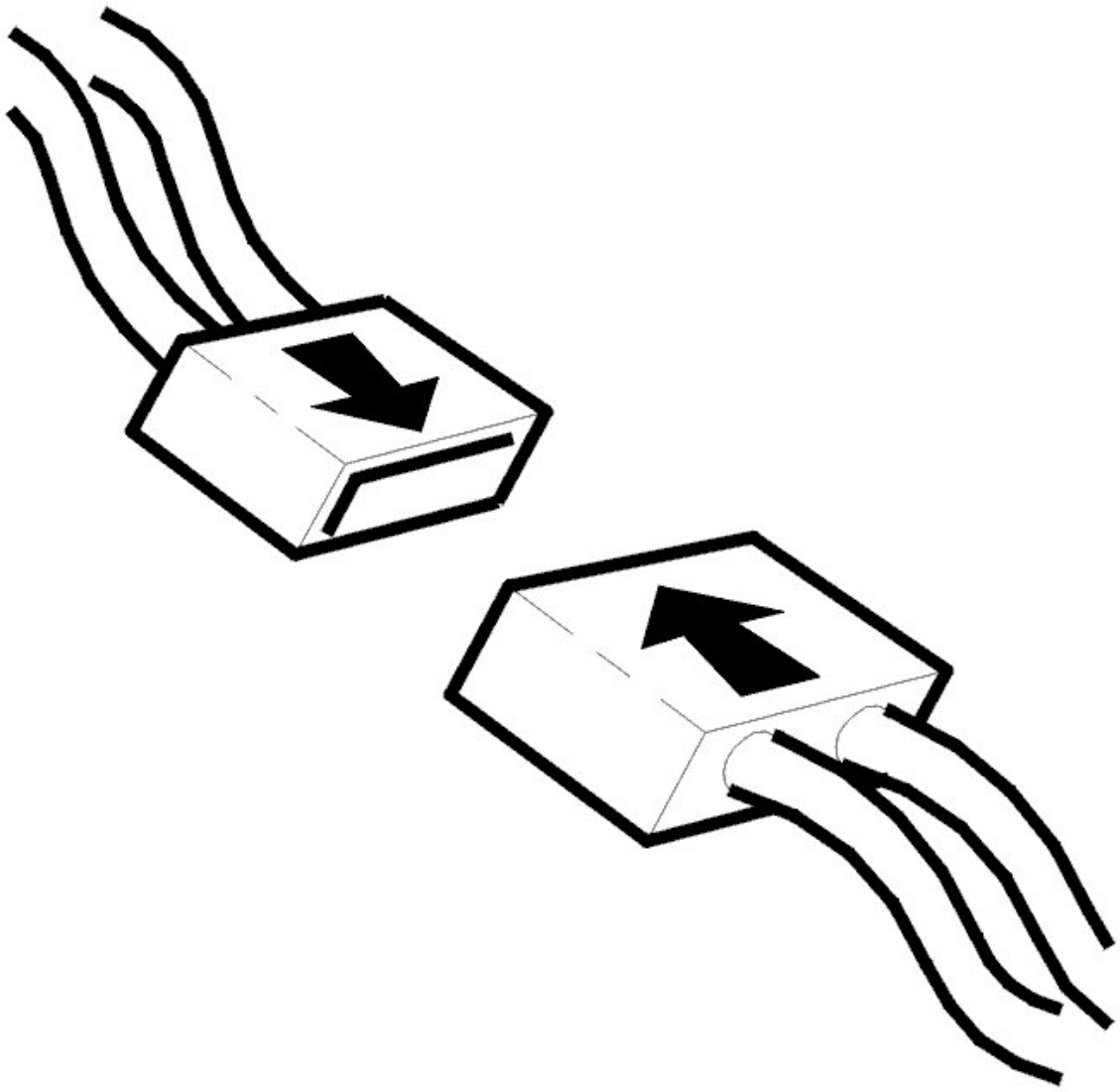
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

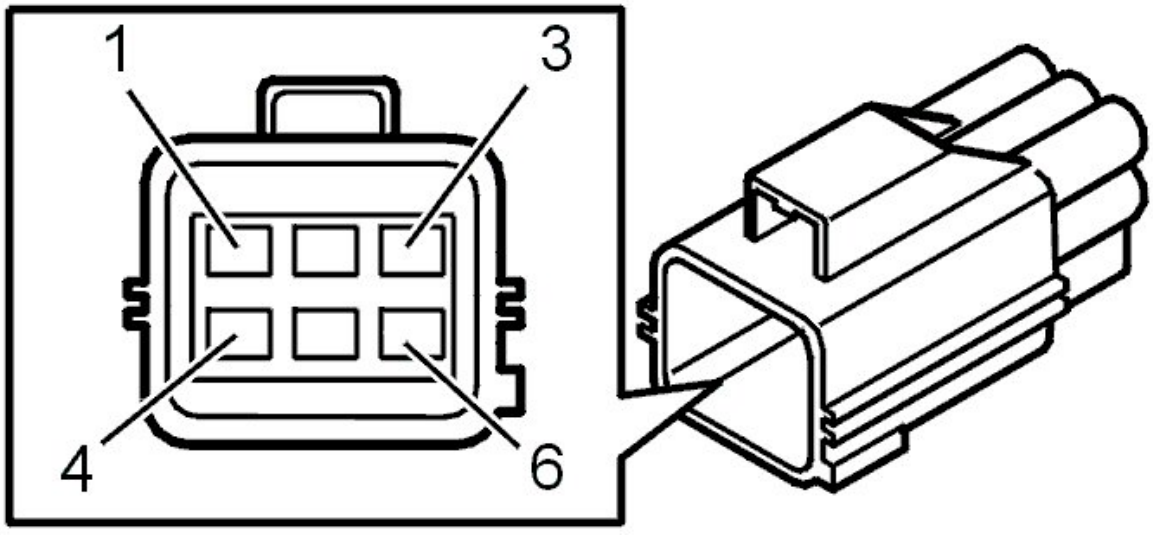
Attempt New Test - Checking the temperature sensor

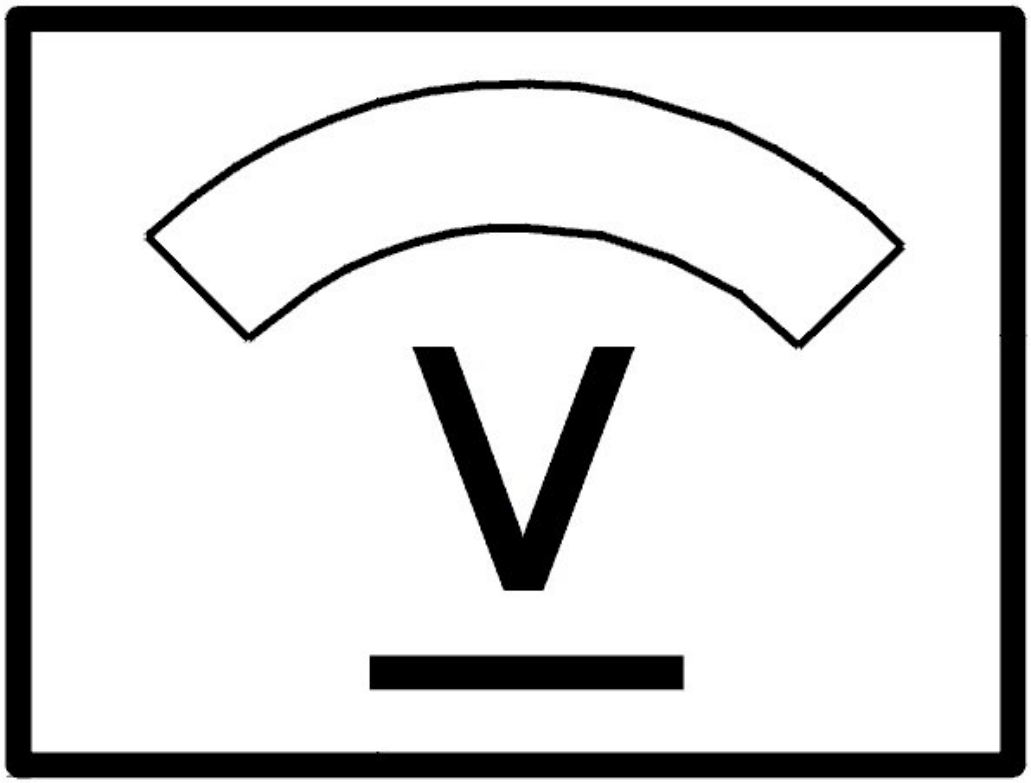
Intermittent fault

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

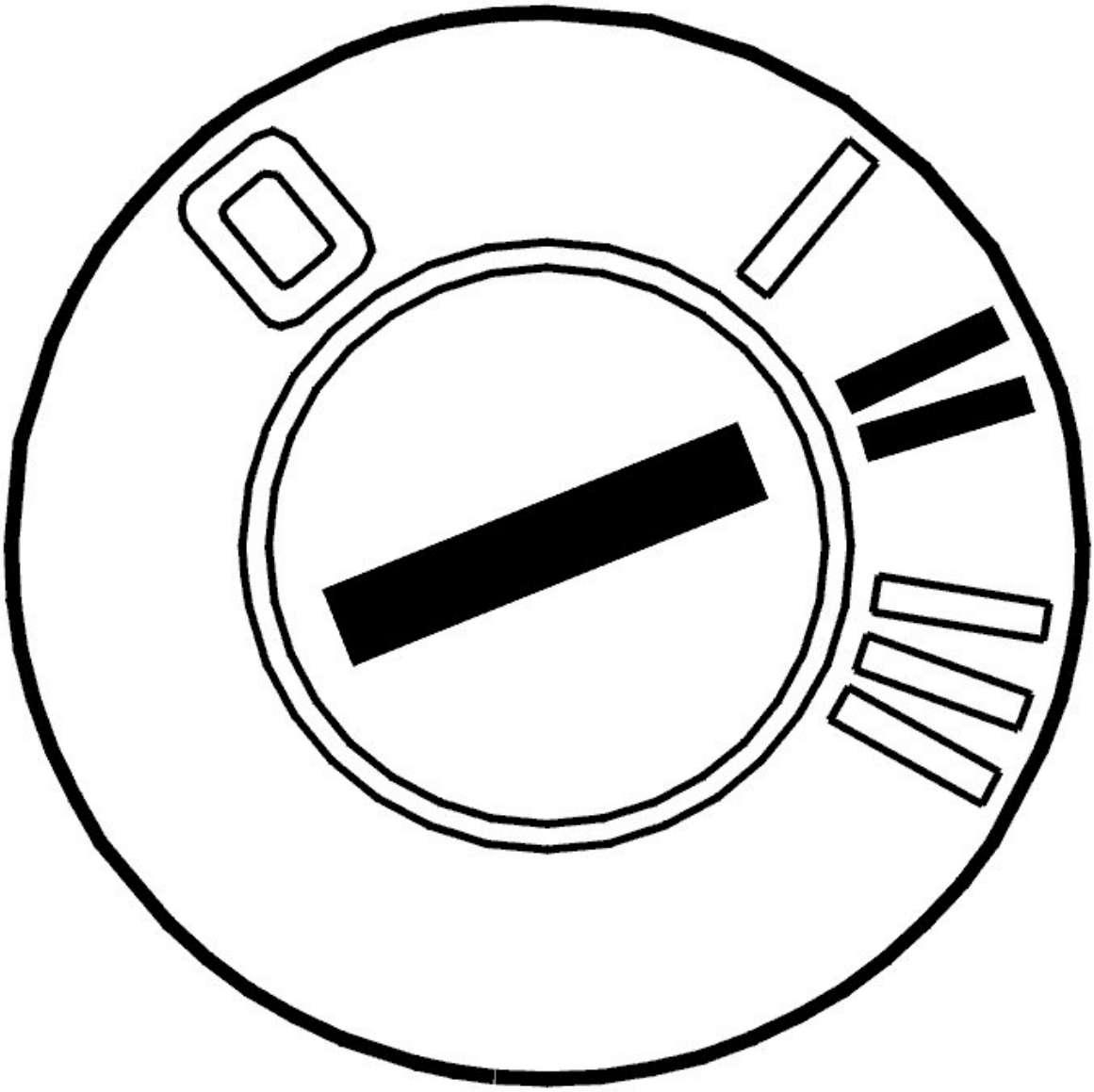
No - Fault Found

Attempt New Test - Checking the temperature sensor

DONE - DONE

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

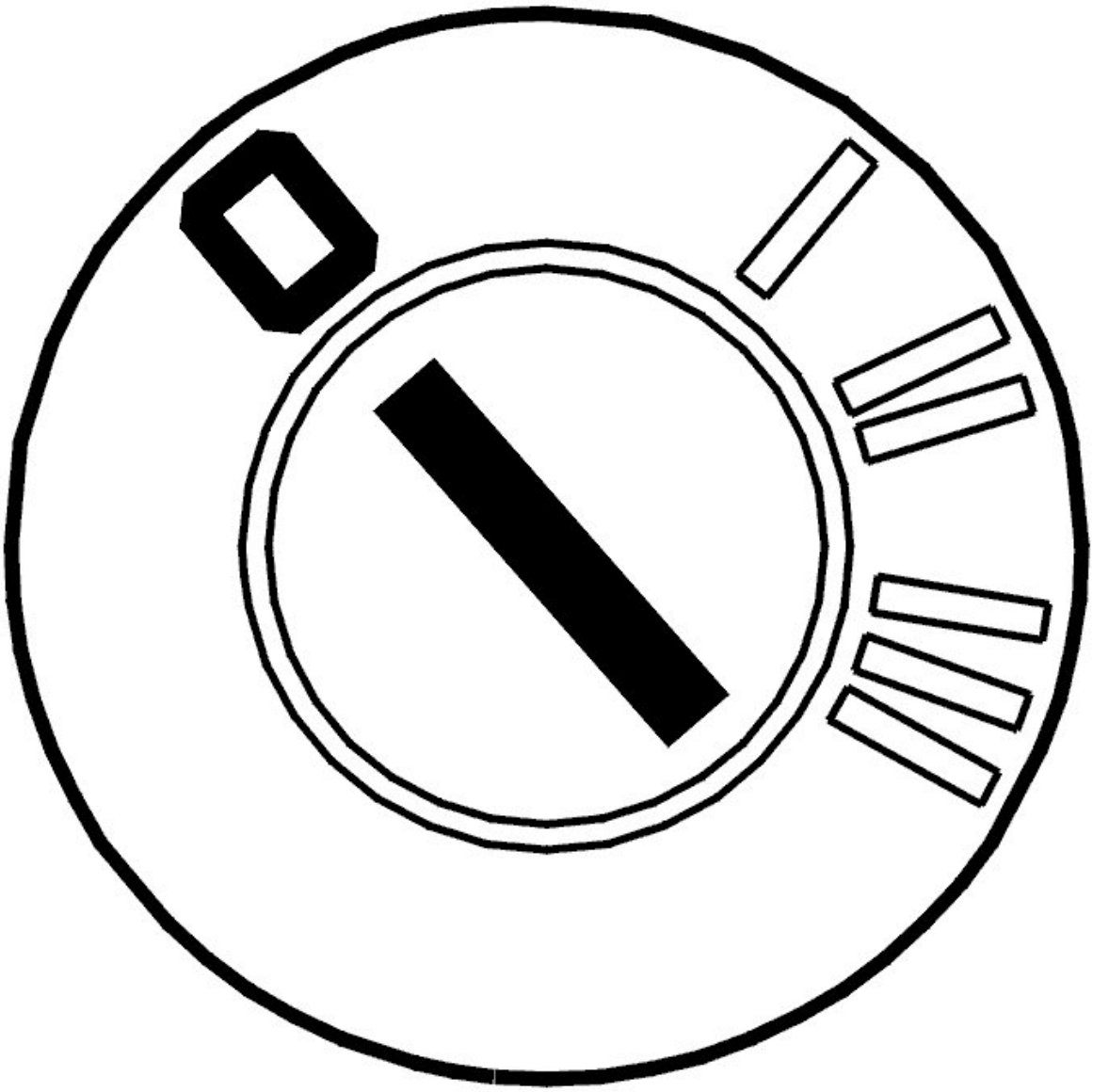
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

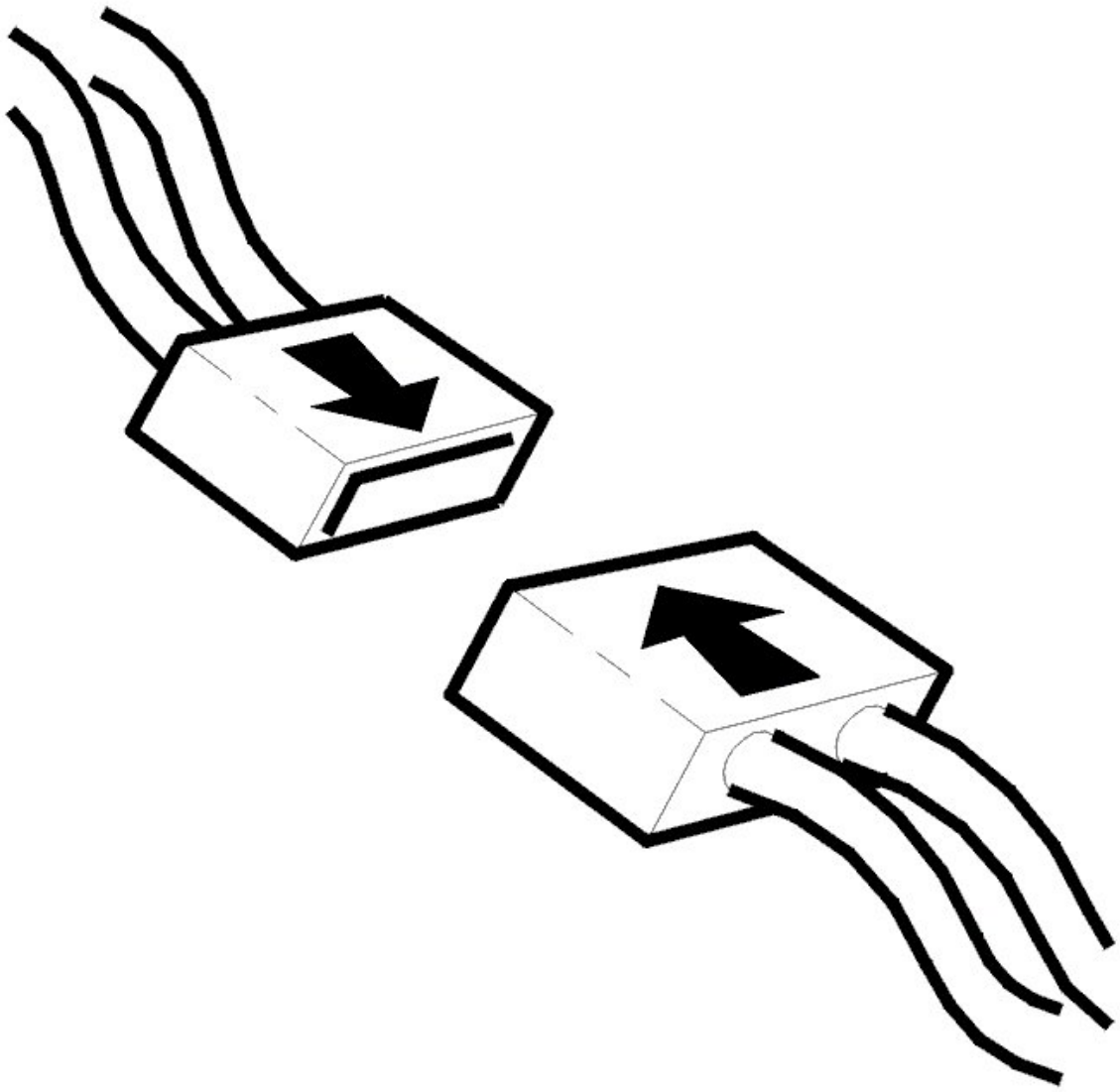
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

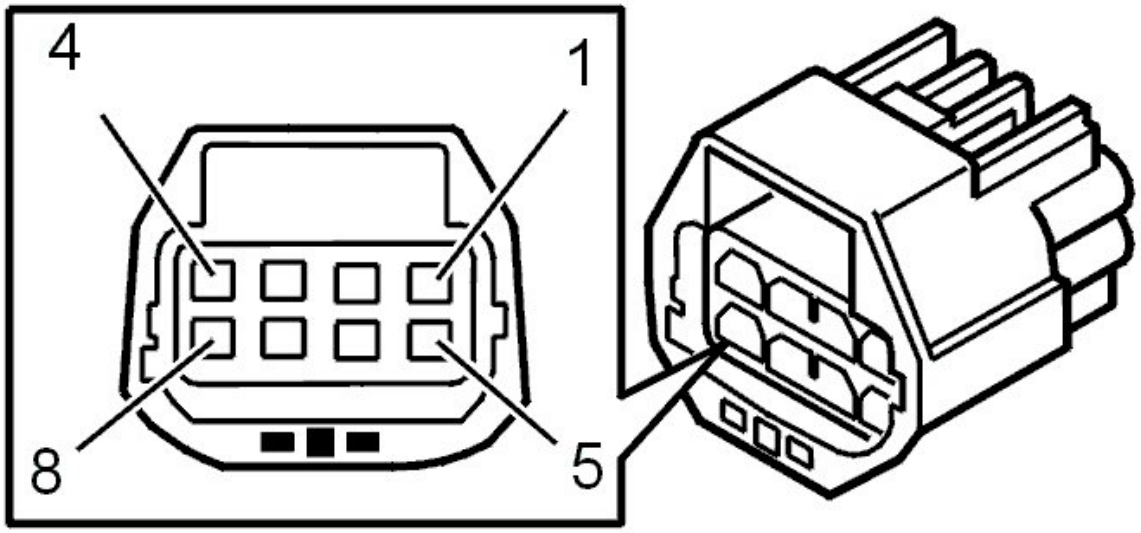
Checking transmission fluid temperature sensor

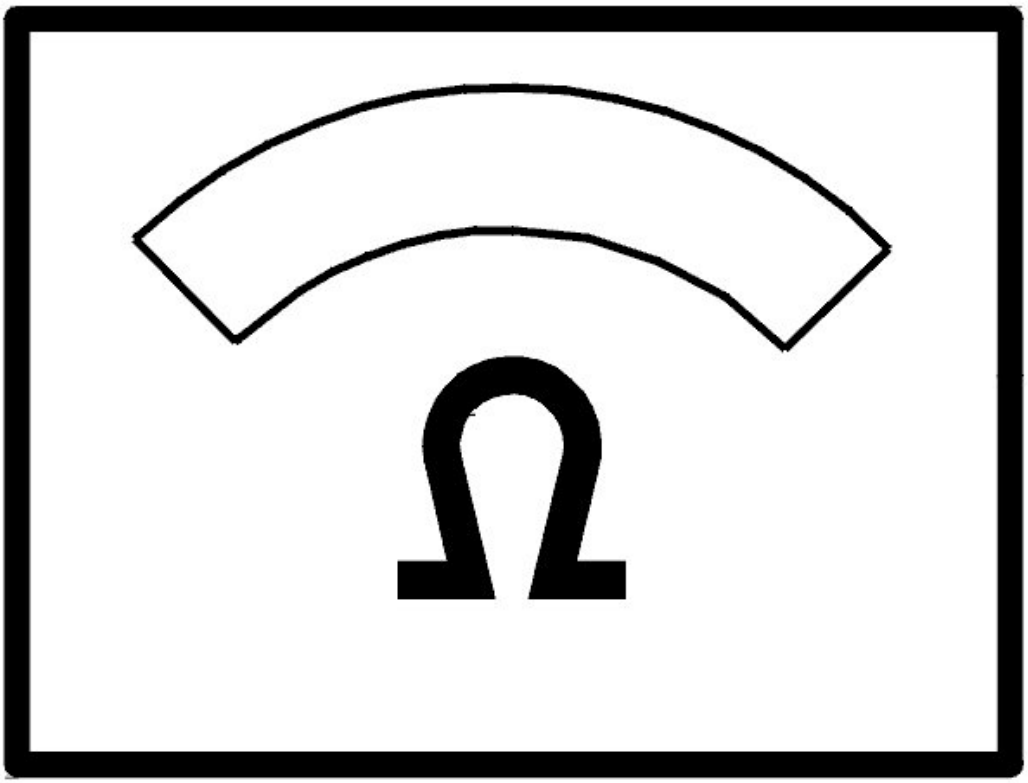




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

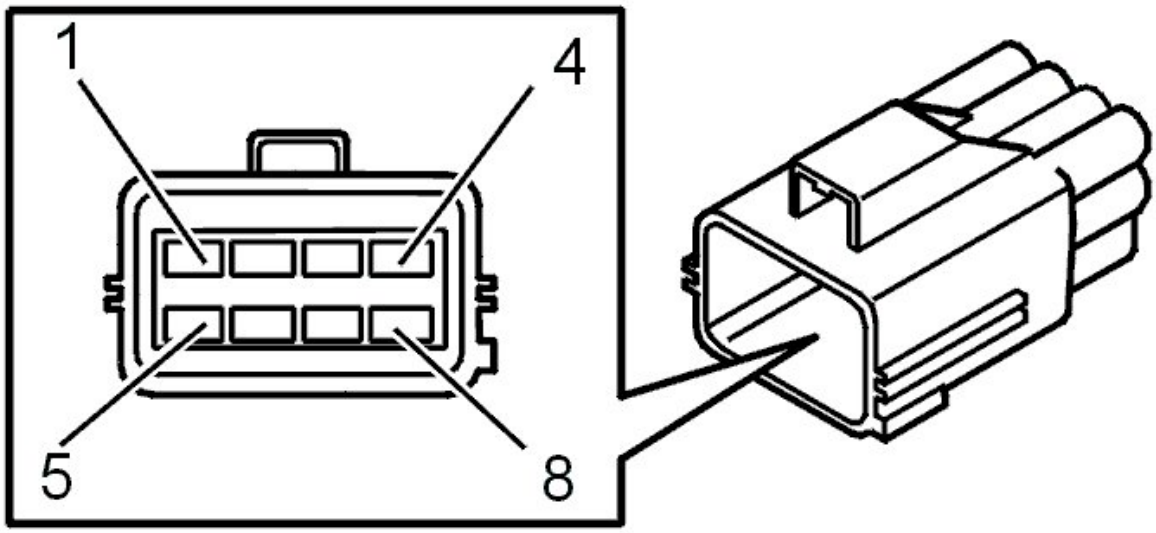
No - Checking the cable and component

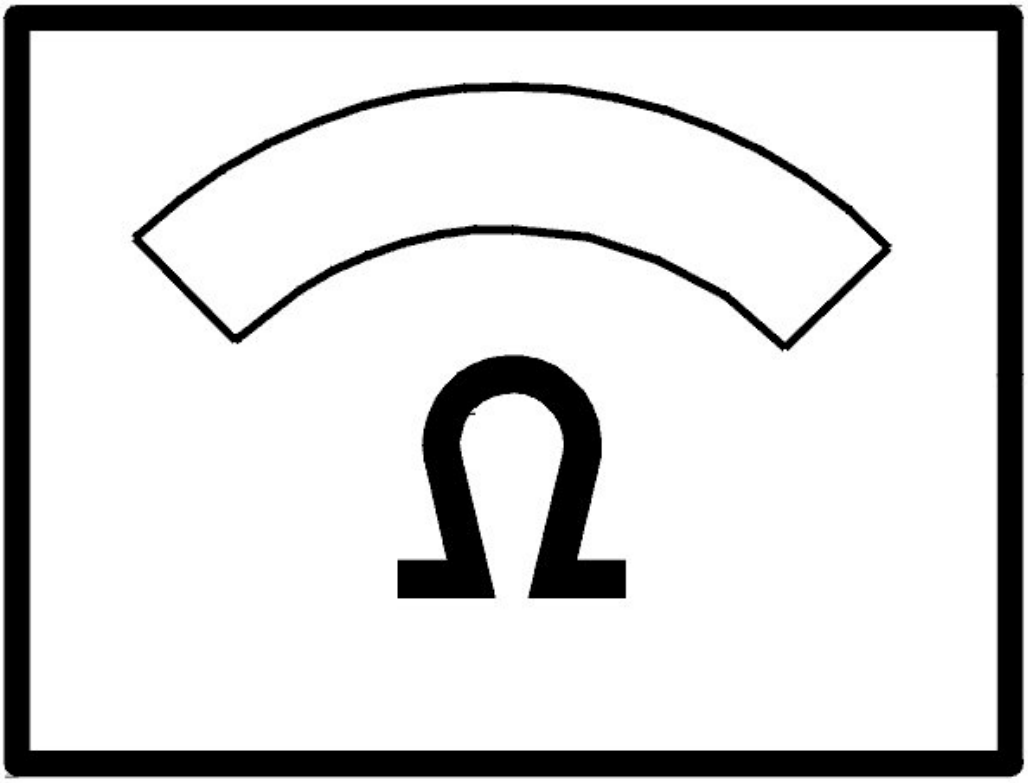
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



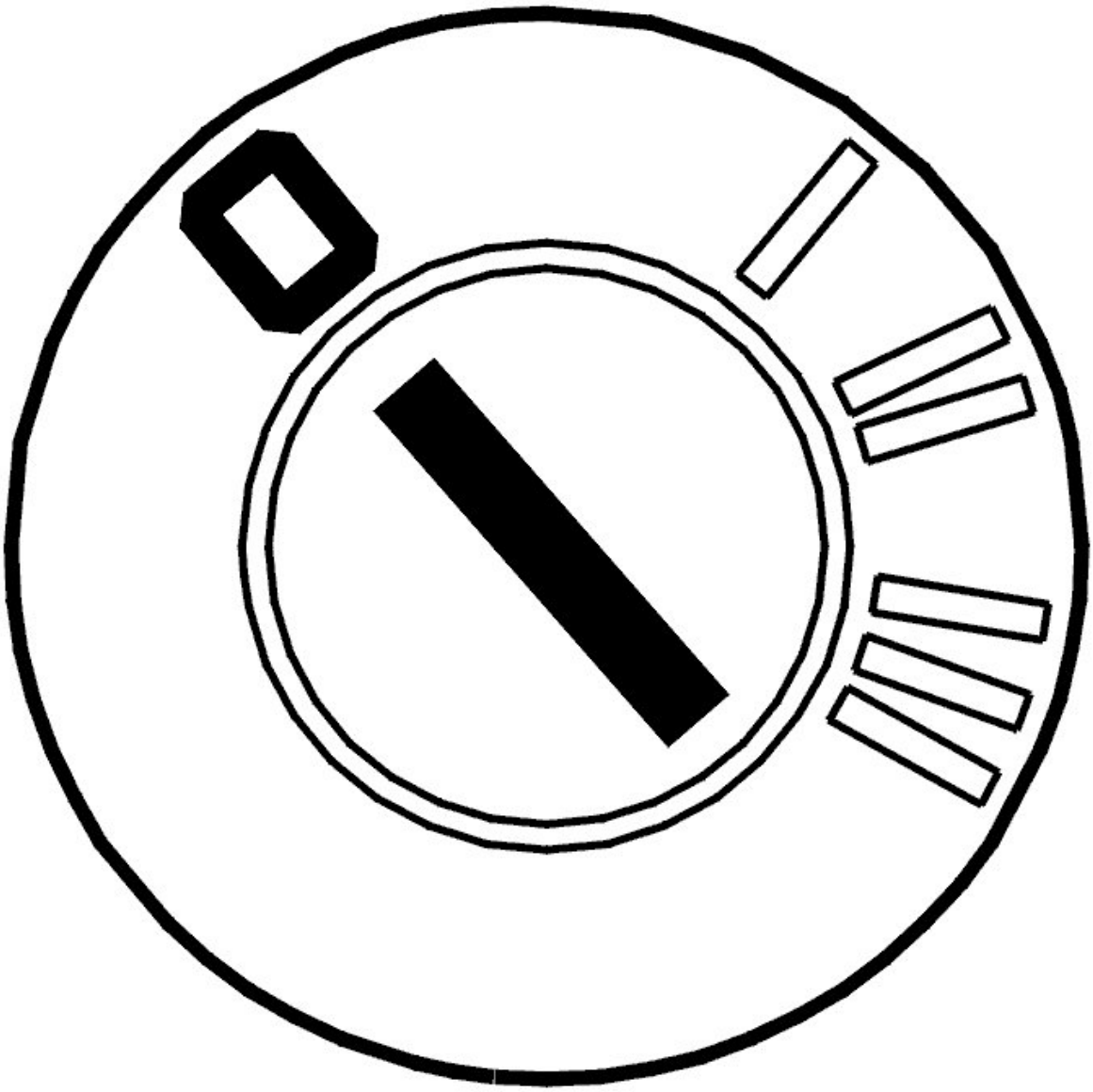


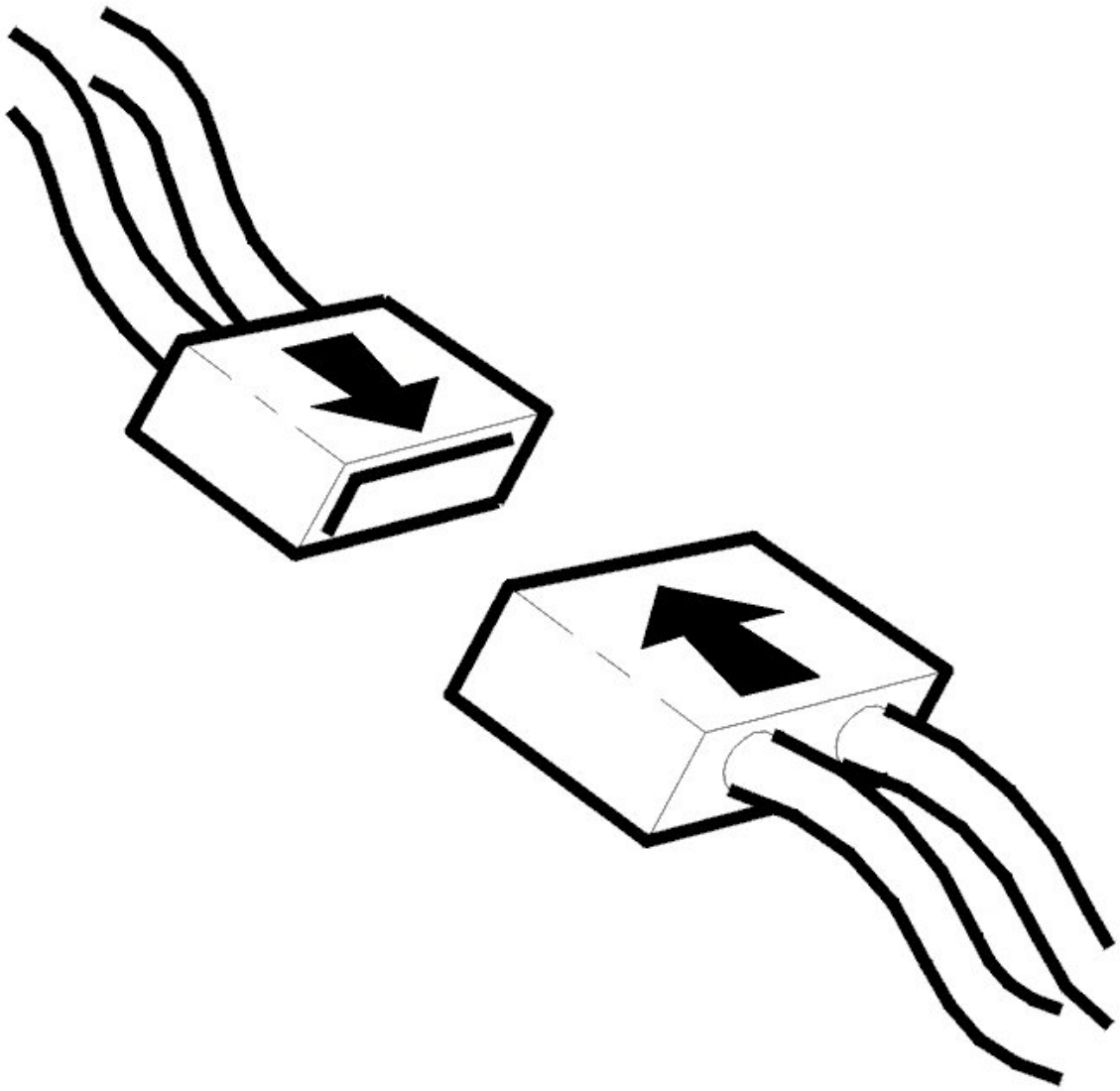
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

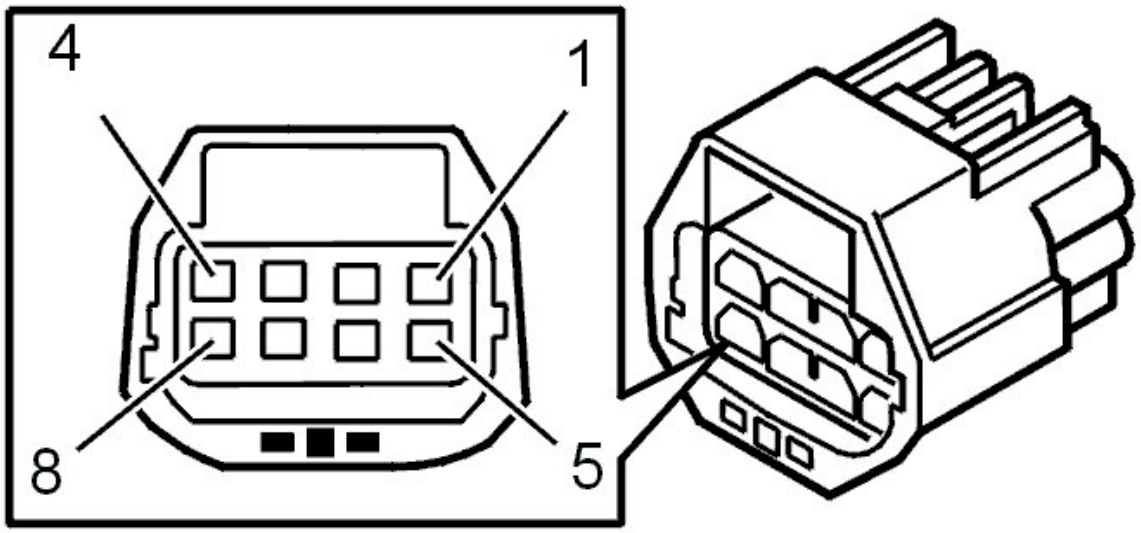
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

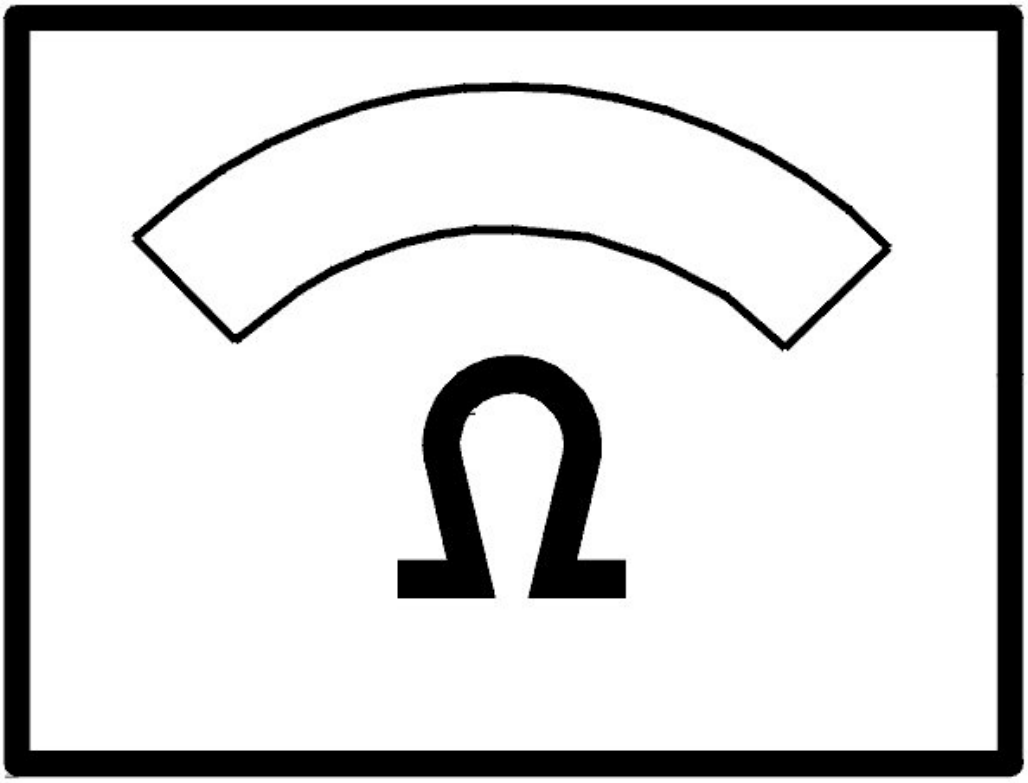
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





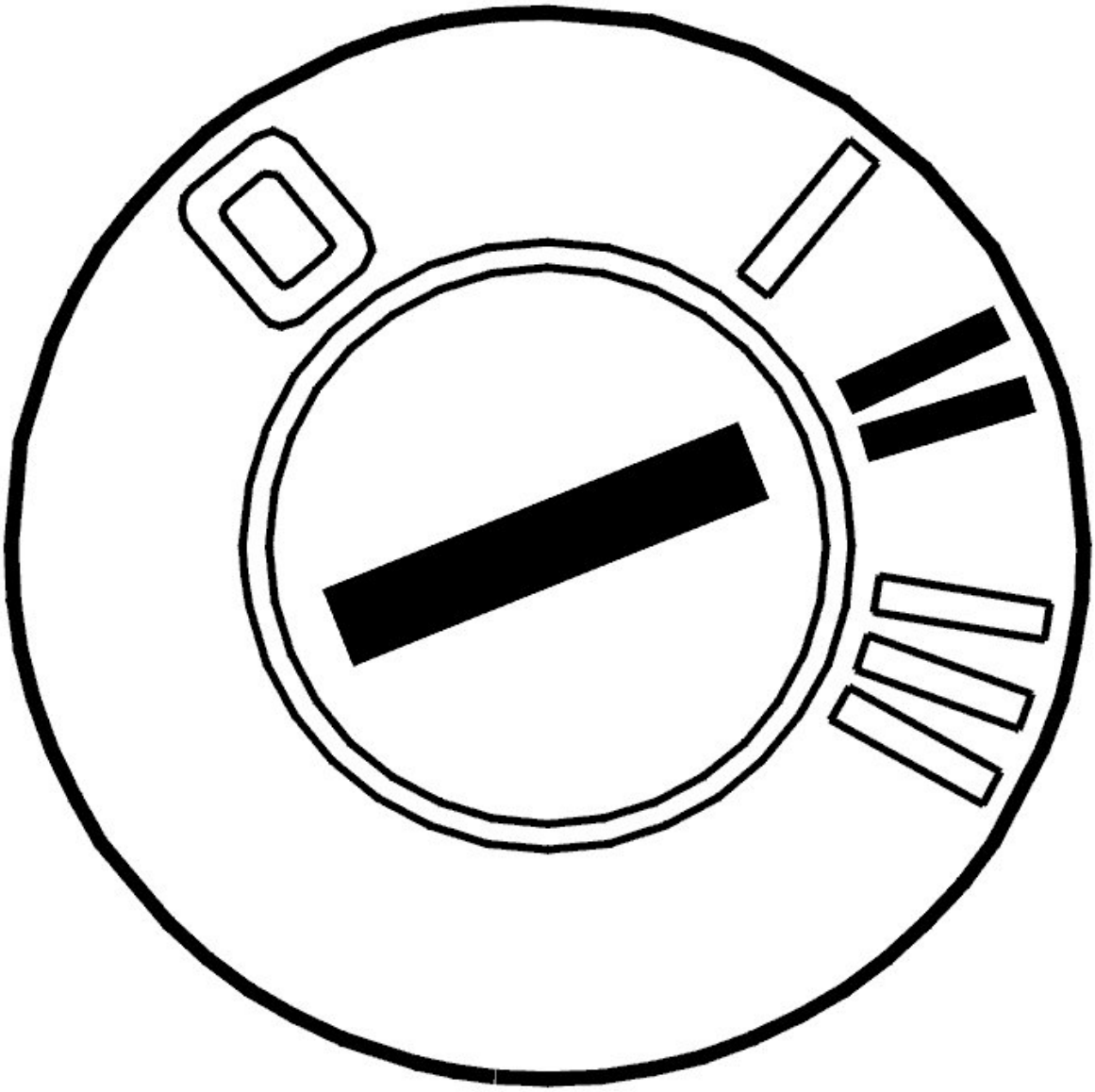
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



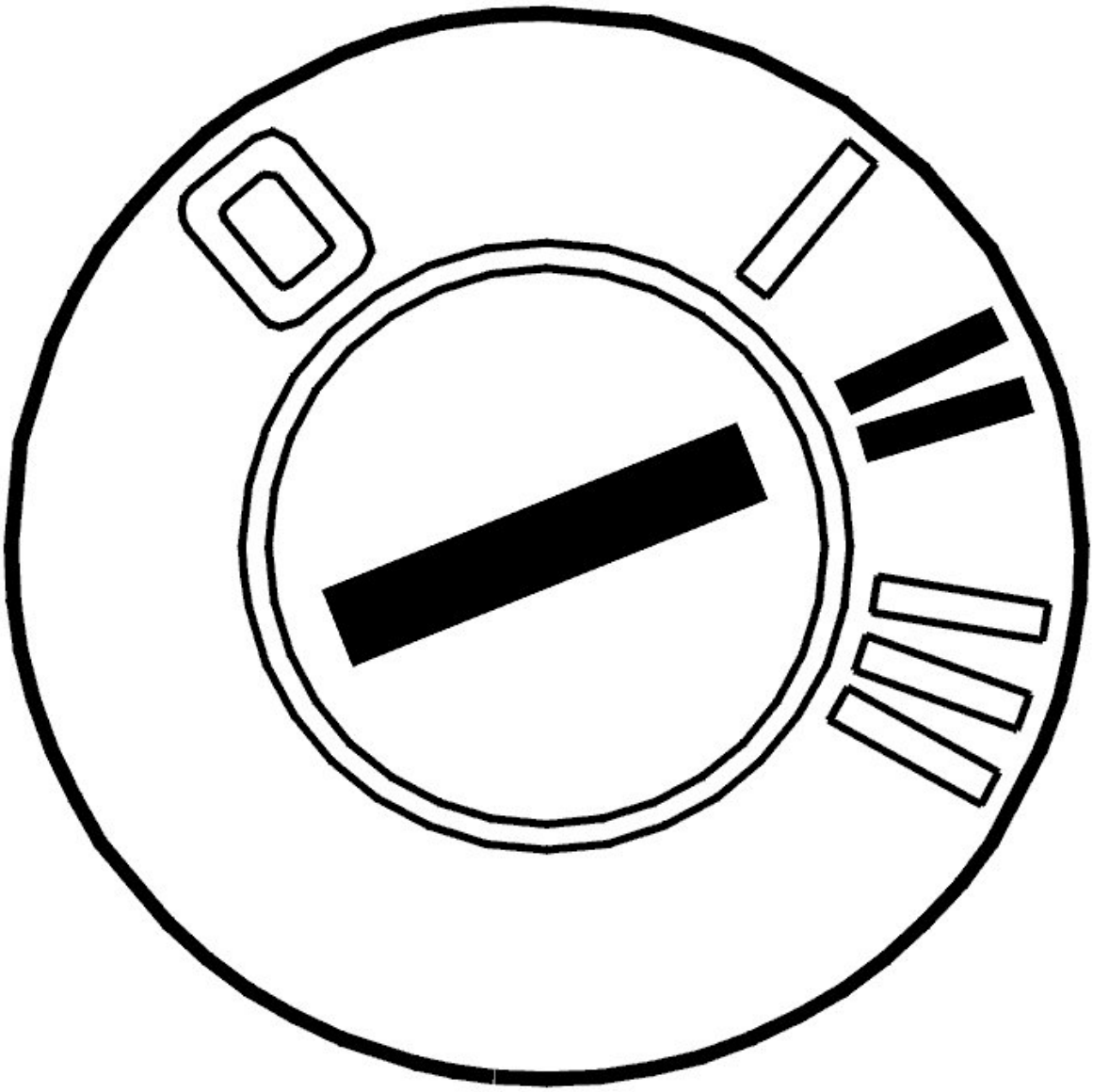
- Ignition on.

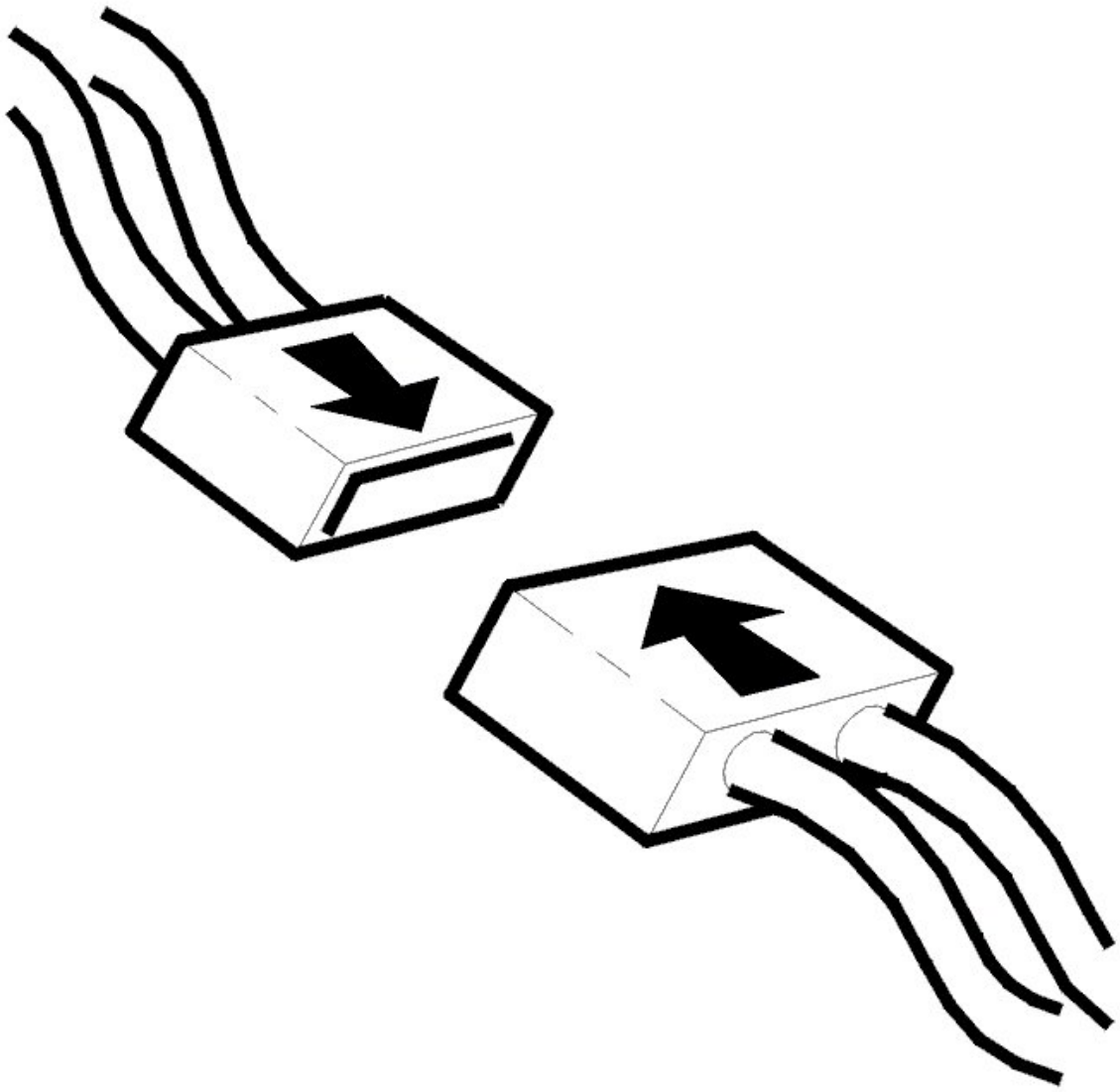
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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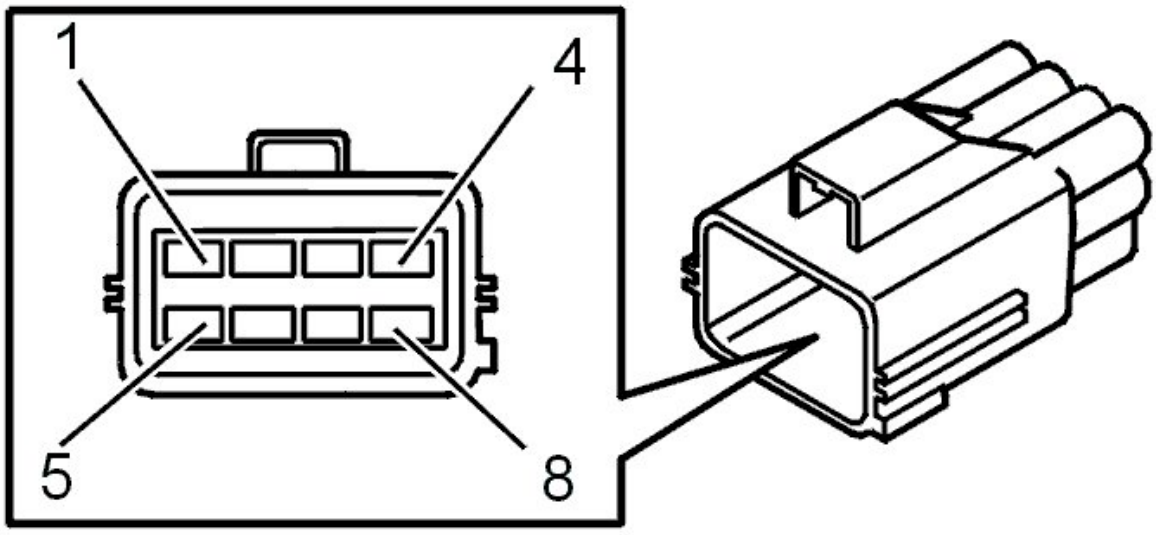
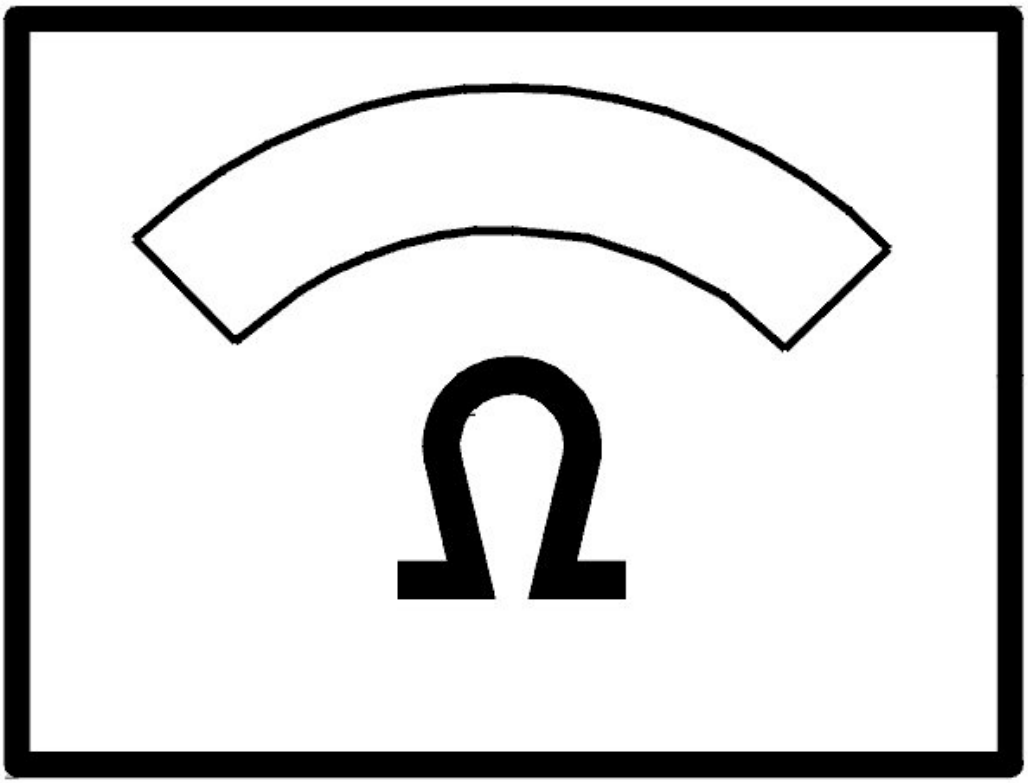
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking transmission fluid temperature sensor

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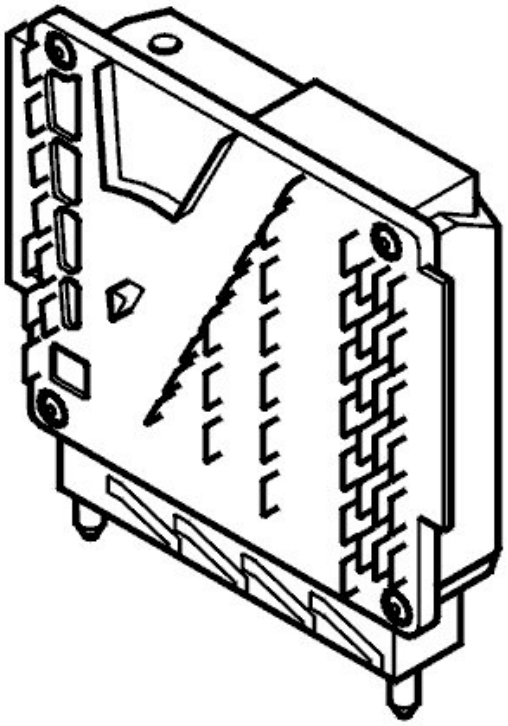
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. The solenoids are controlled by power stages in the transmission control module (TCM). The transmission control module (TCM) opens the power stages to activate the solenoids and sends a voltage through the circuit. Diagnostic trouble codes (DTCs) TCM-0002, TCM-0008, TCM-0102, TCM-0108 or TCM-010B are stored (depending on the solenoid) if the transmission control module (TCM) registers that the signal in circuits S1, S2, S3, S4 or S5 is missing when the solenoid is activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

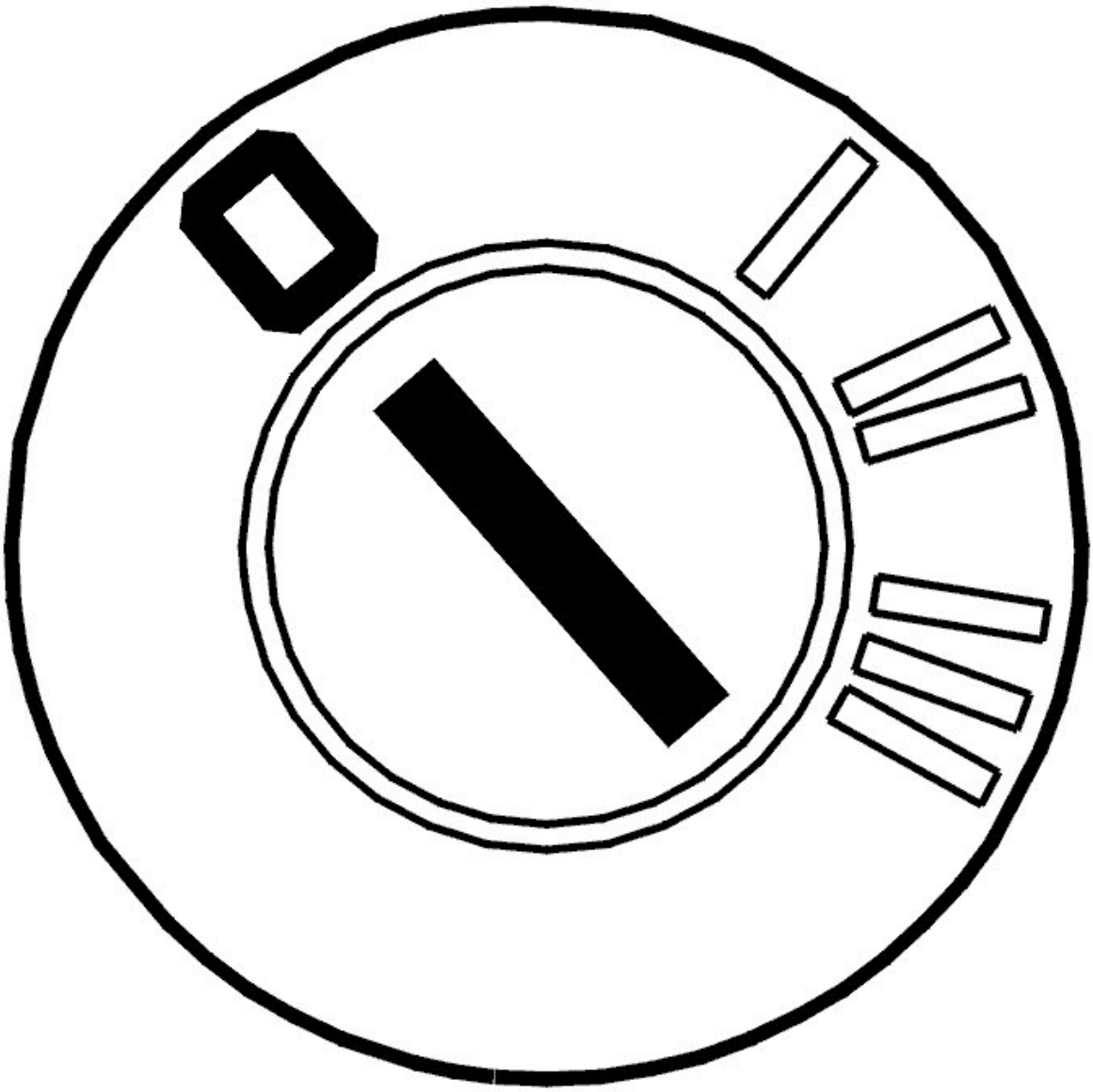
Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- Harsh gear shifting.
- No shifting.
- No lock-up function.

Signal Missing

Signal missing

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off
- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

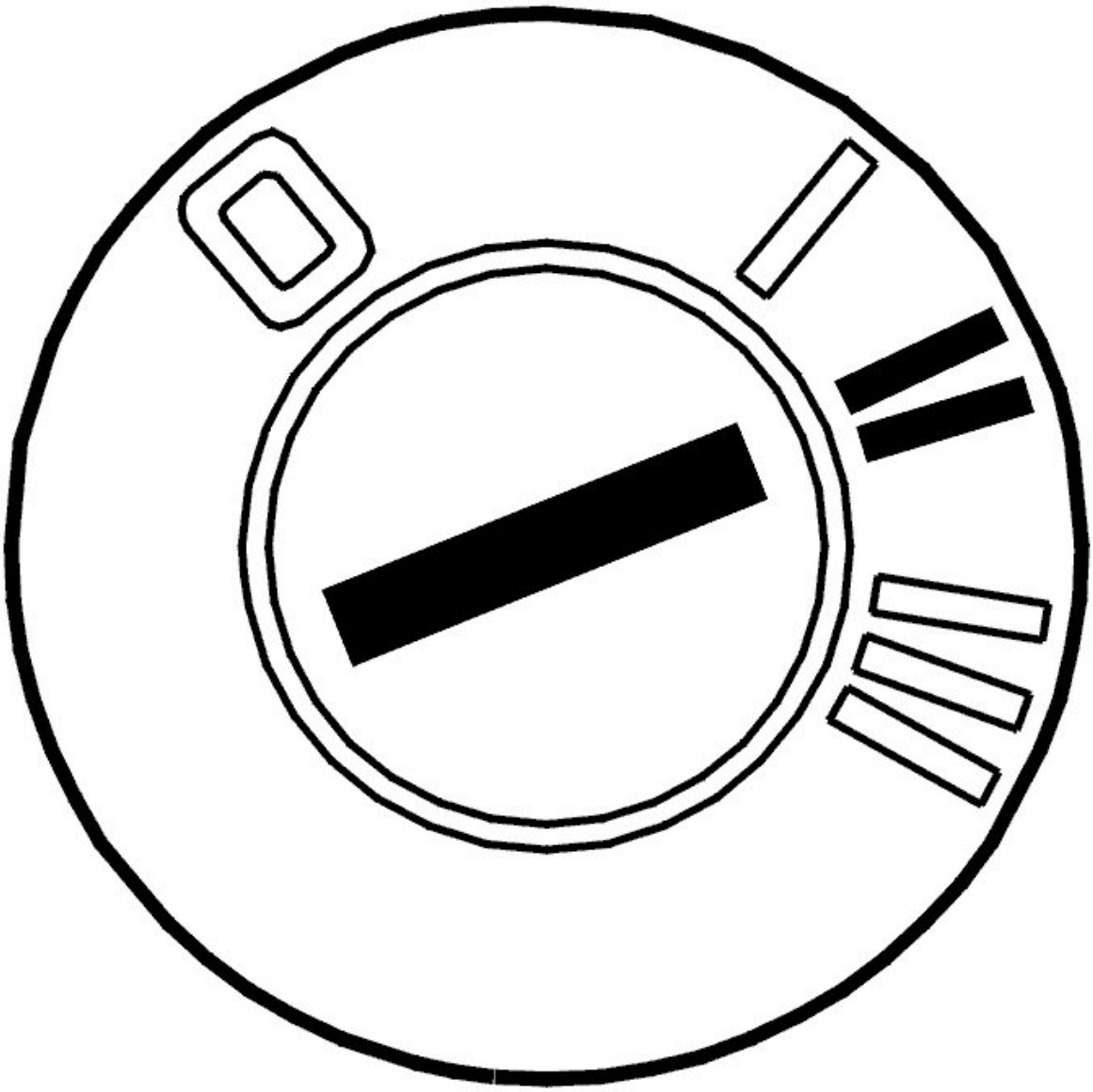
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S5

No - Checking transmission fluid temperature sensor

Checking shift solenoid S5



- Ignition on
- Gear selector in position P
- Activate solenoid S5.

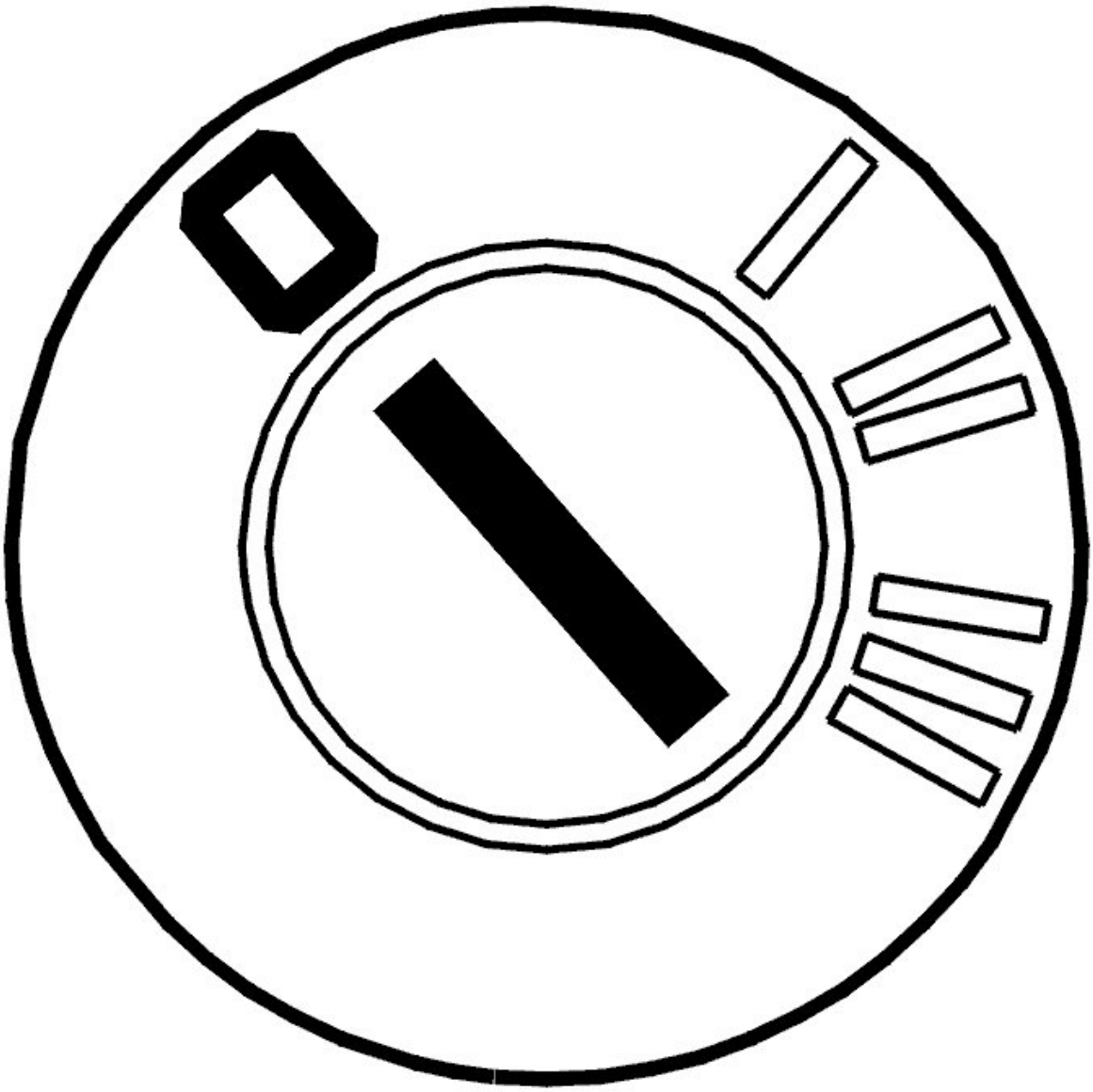
The current should oscillate between 0 and approximately 1.5 A.

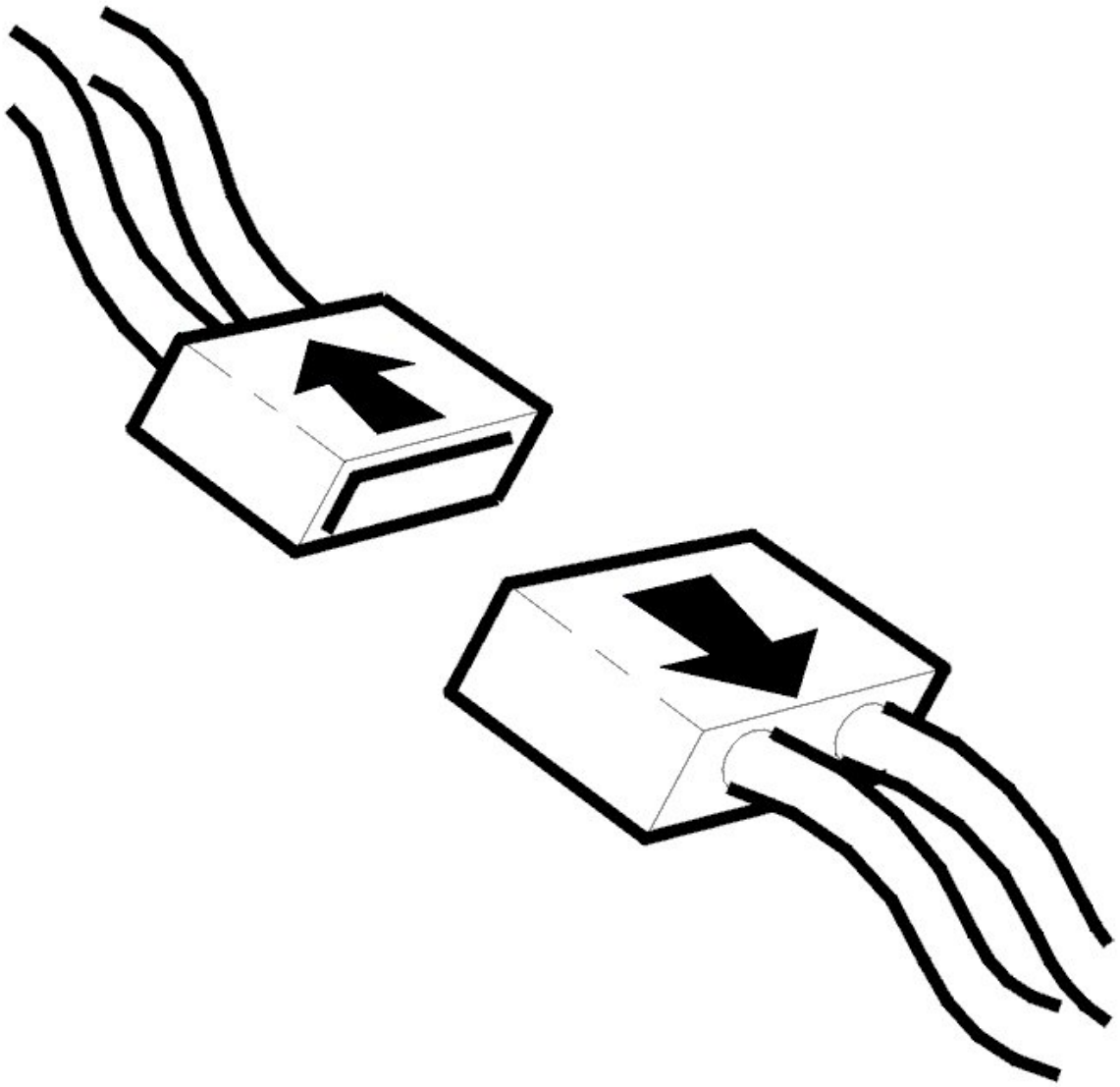
Does the current oscillate?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



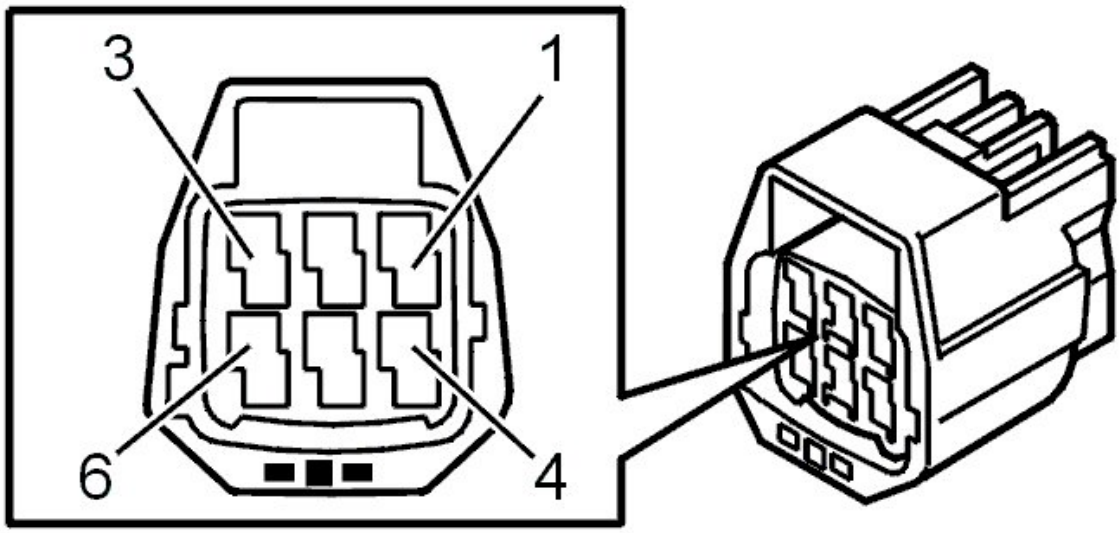


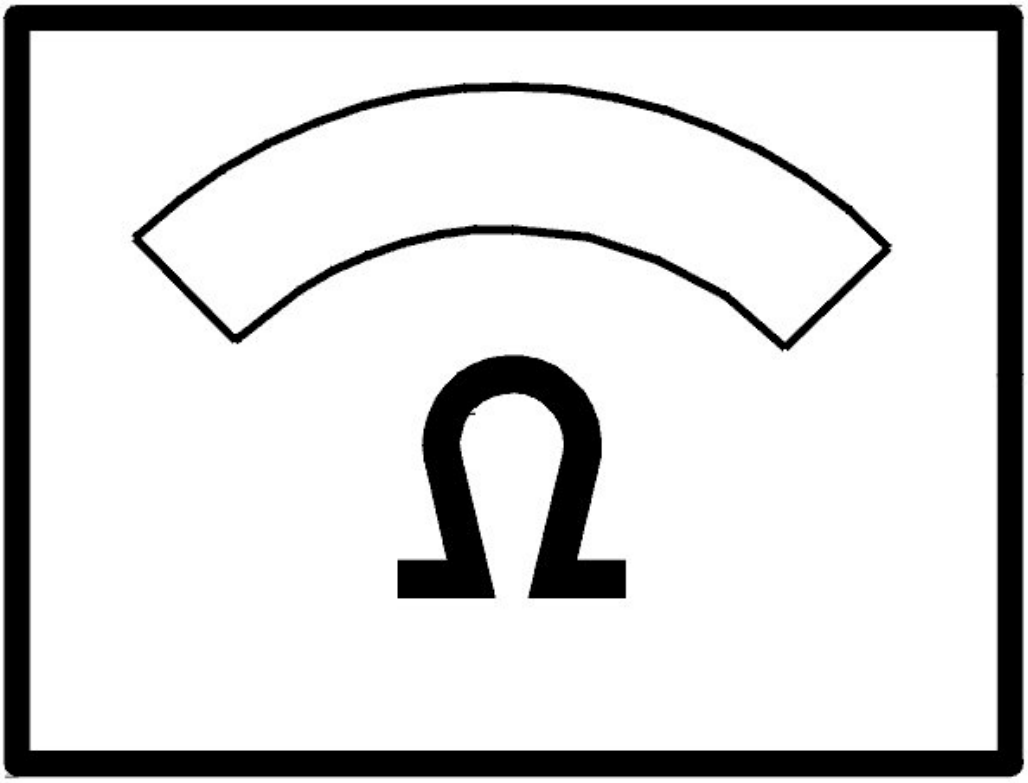
- Ignition off
- Disconnect transmission connector C.

Check solenoid S5. Measure the resistance between transmission connector terminal #C5 (transmission side) and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



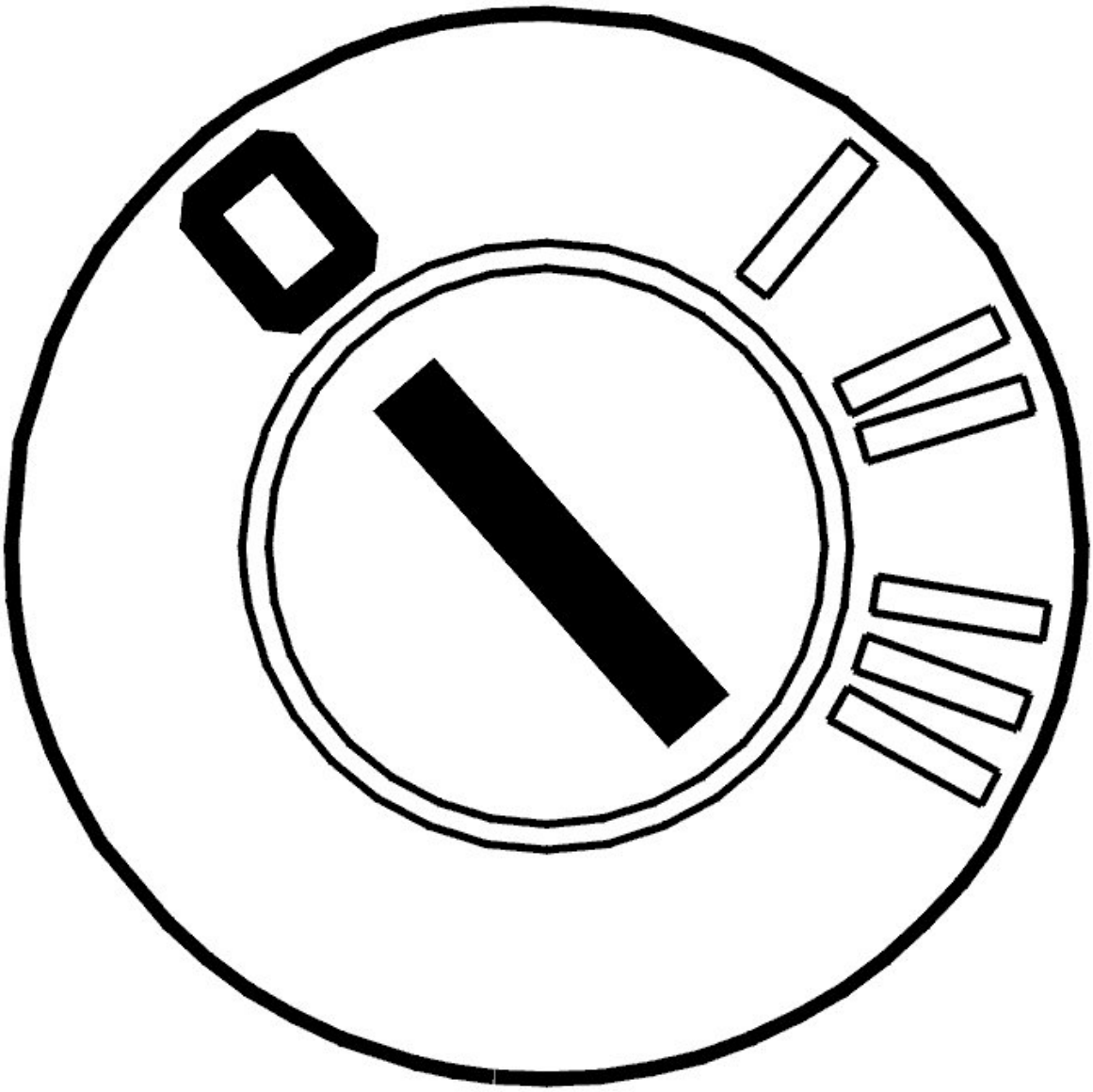


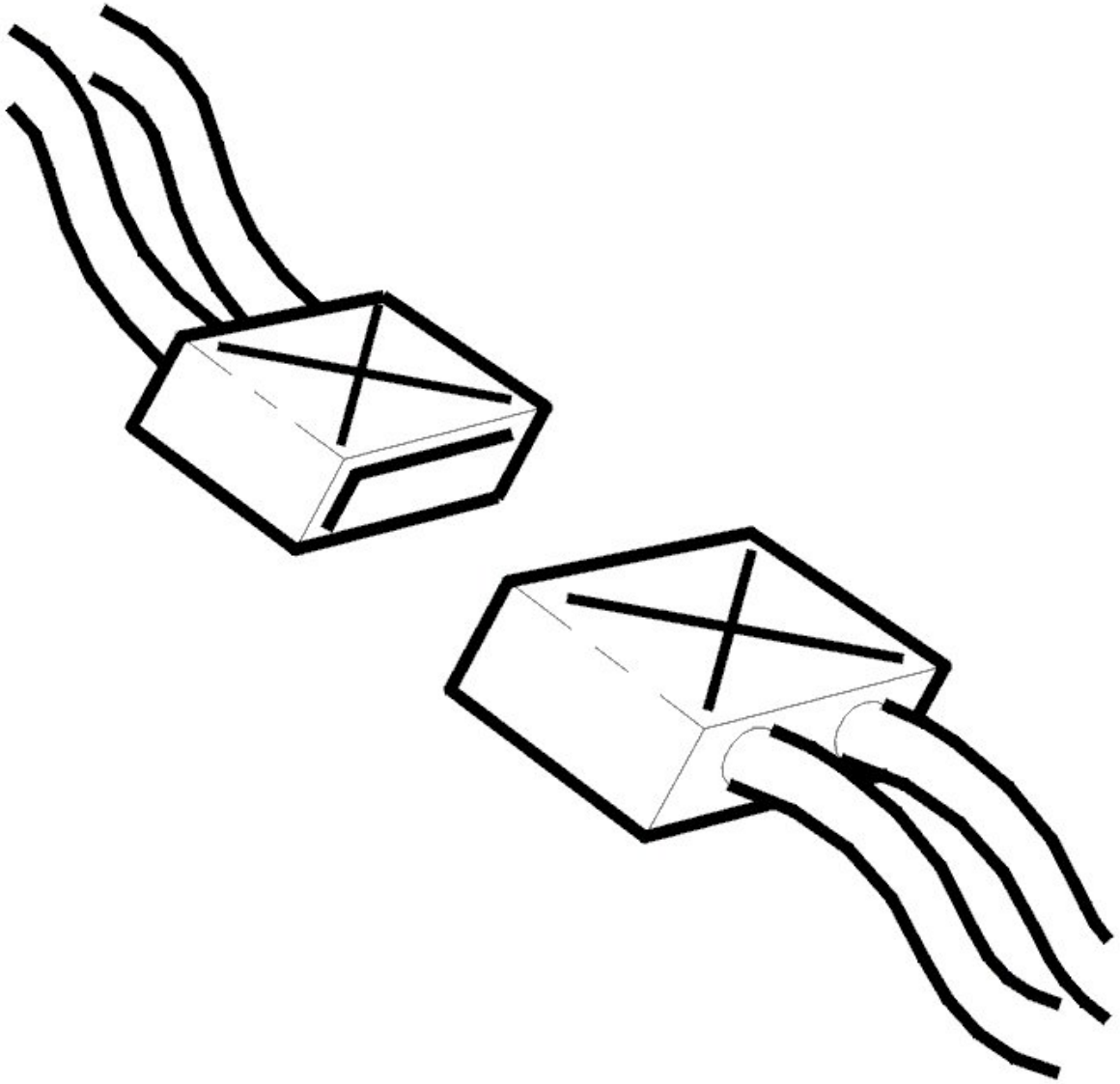
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



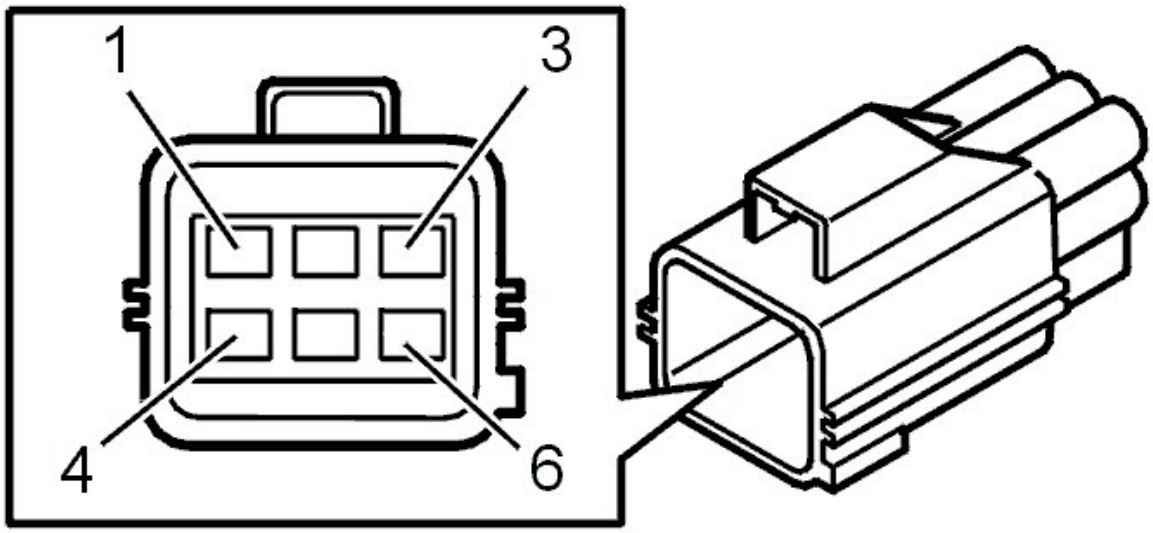


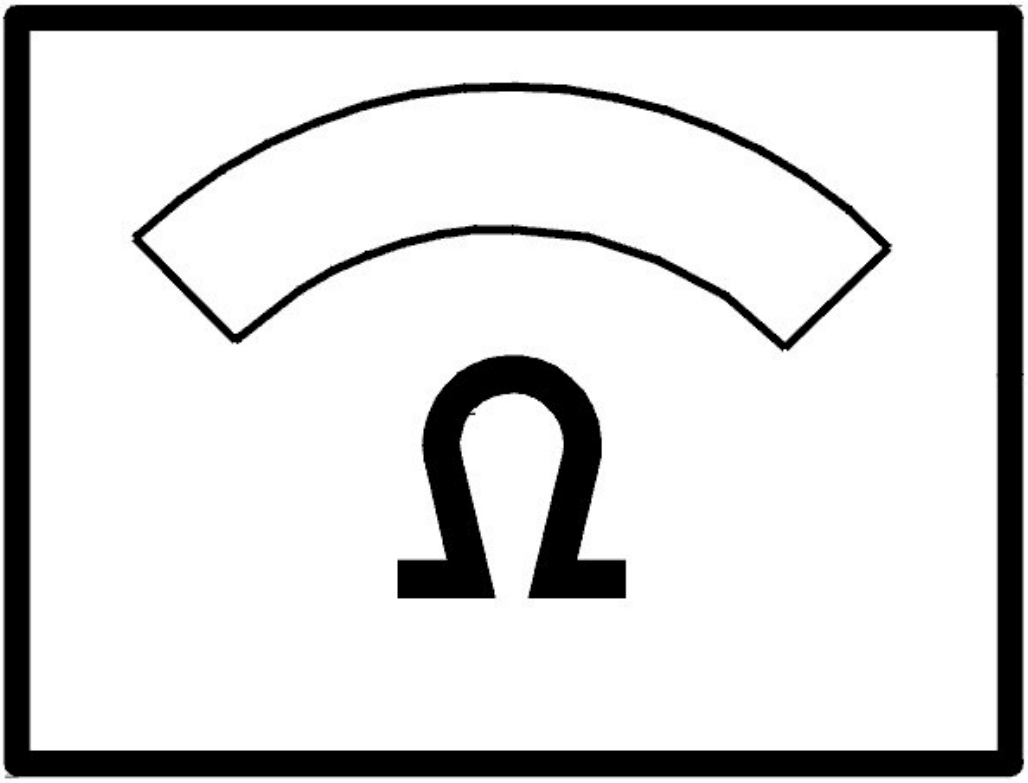
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between transmission control module (TCM) terminal #B6 (#A66) and transmission connector terminal #C5 (control module side).
Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



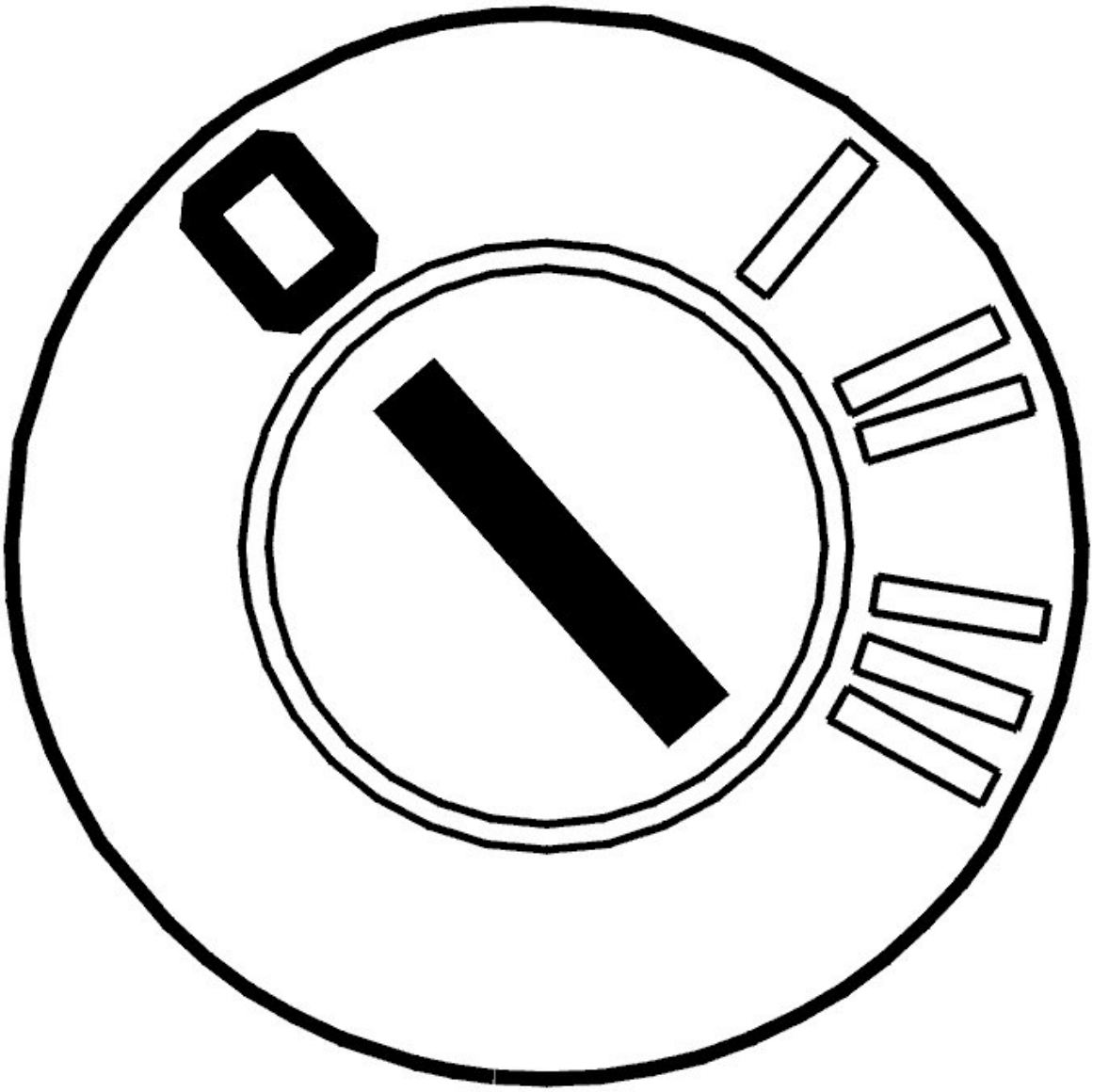


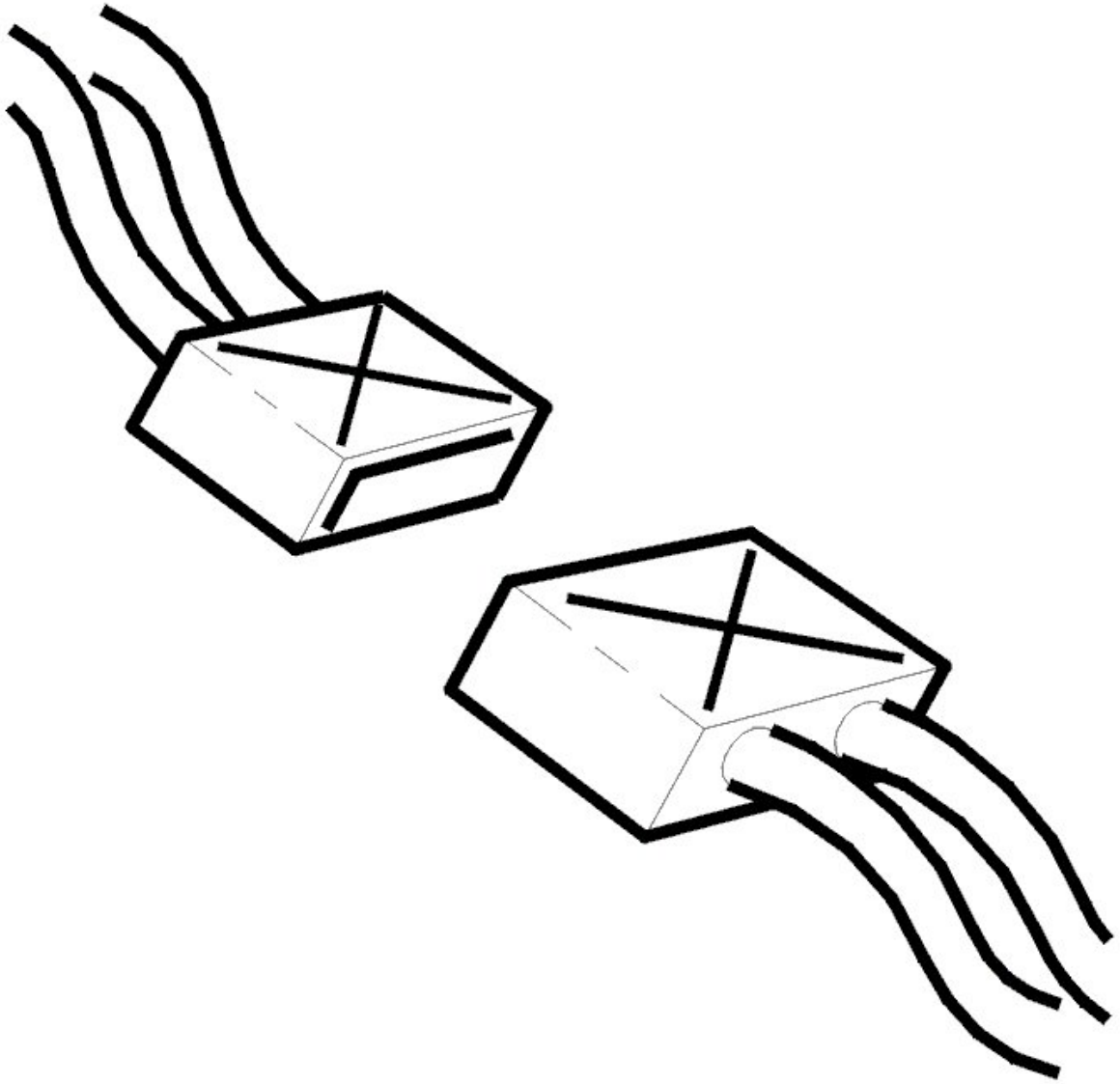
Was a fault detected?

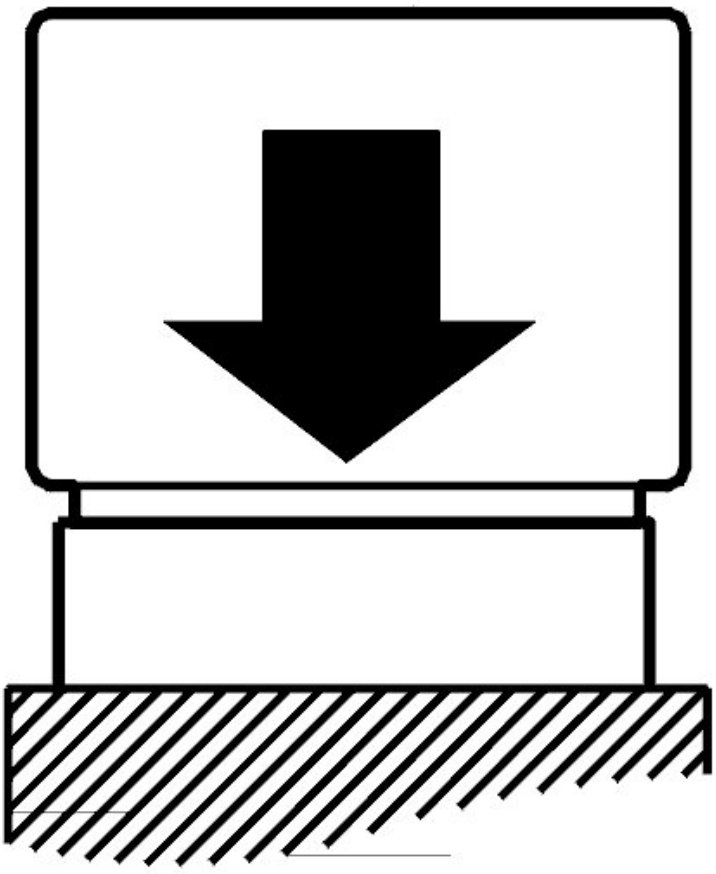
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector C disconnected
- Gear selector in position P.

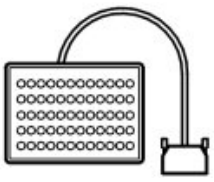
Check the transmission control module (TCM) by measuring the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

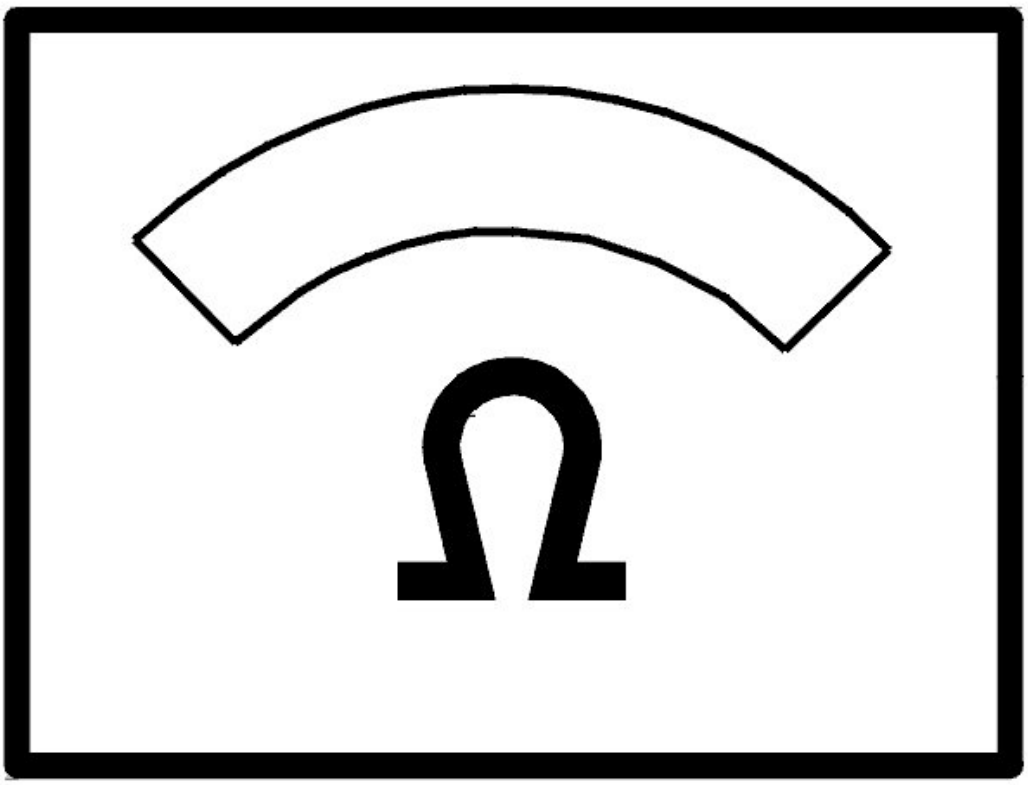
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



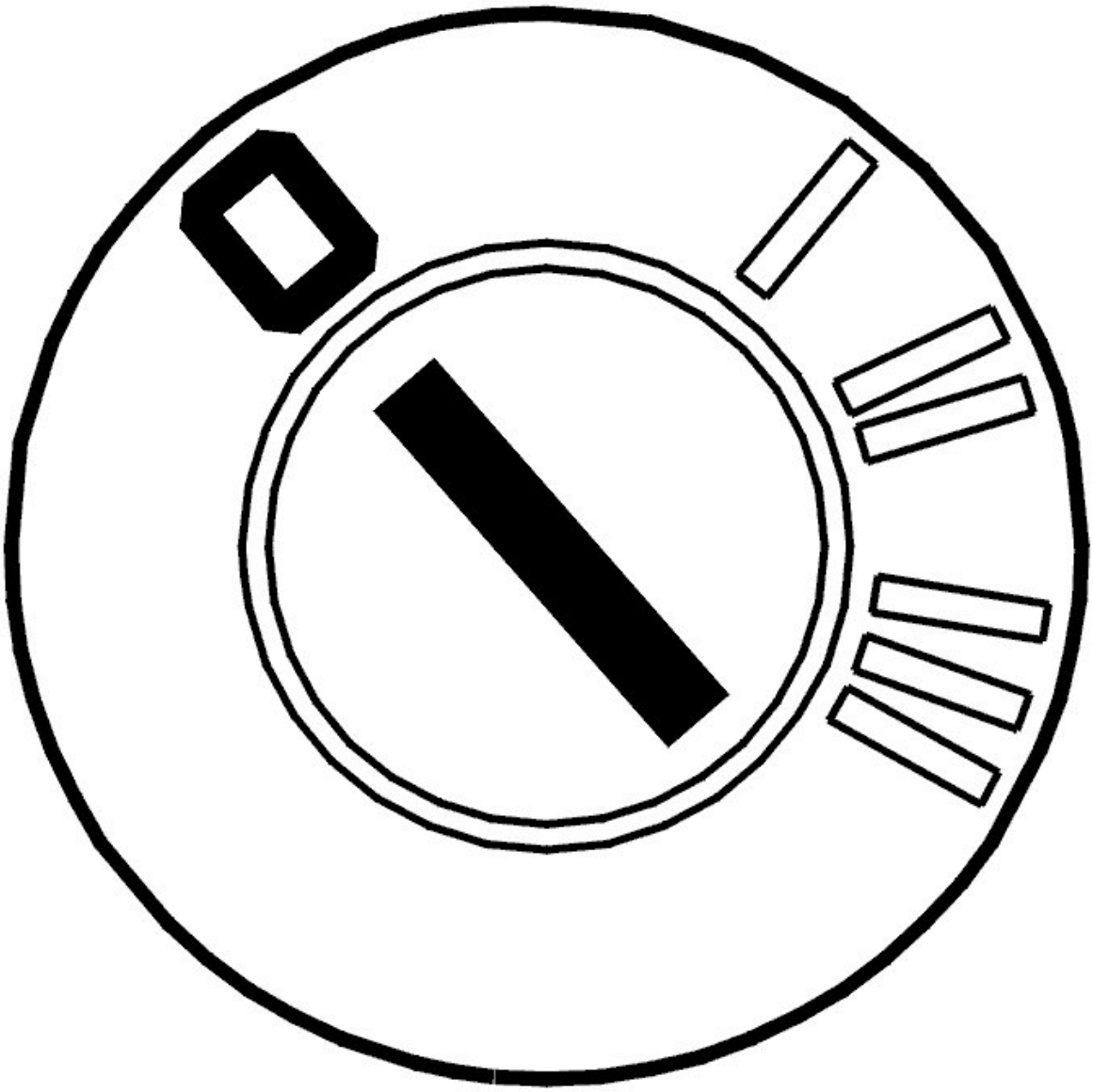


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

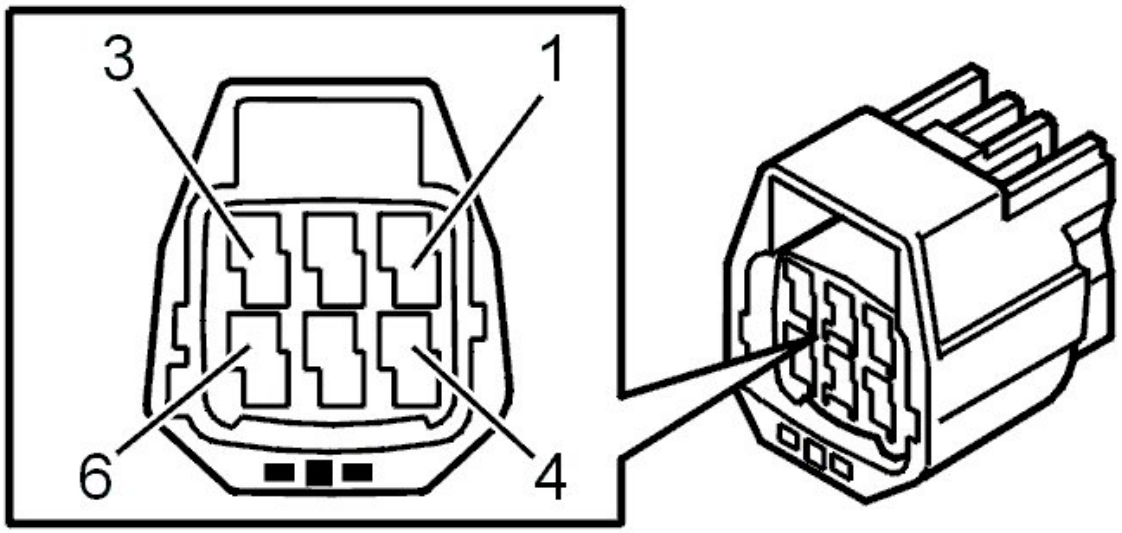


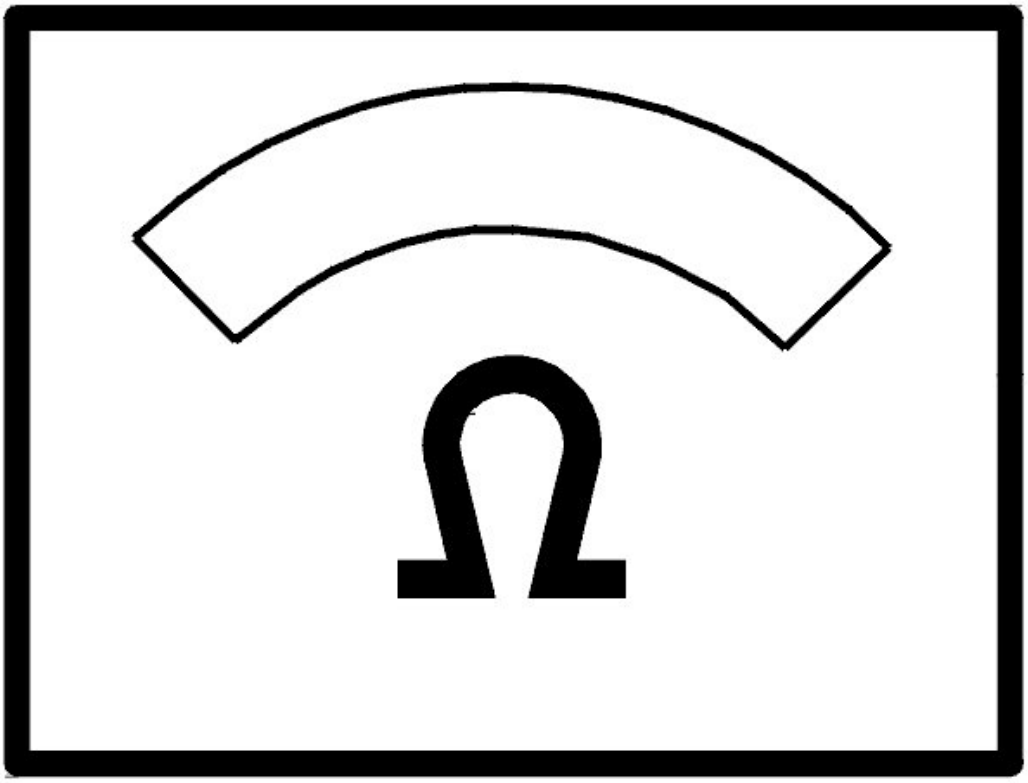
- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S5 by measuring the resistance between the terminal pin on solenoid S5 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S5 if the resistance is incorrect.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S5, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

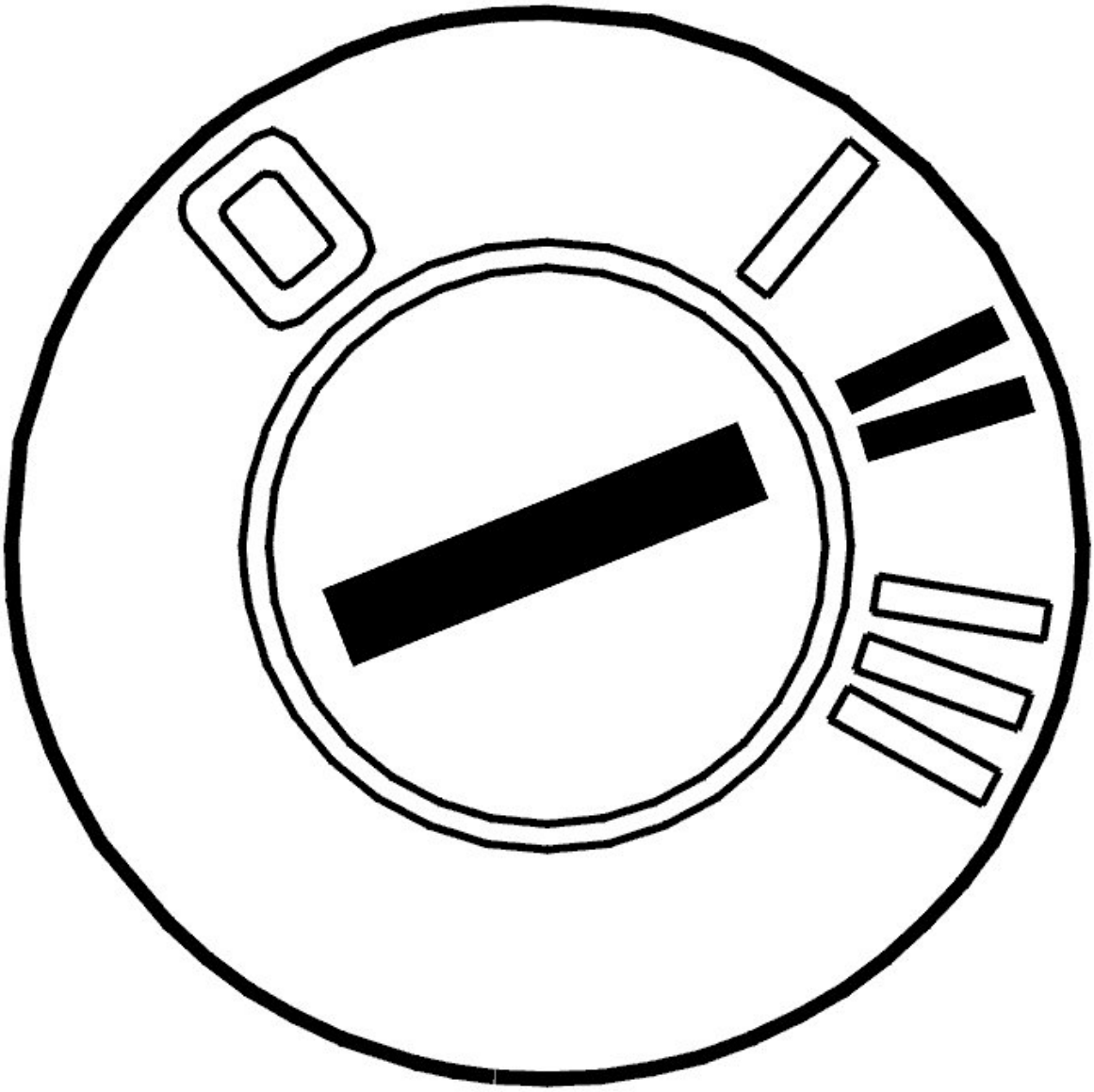
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



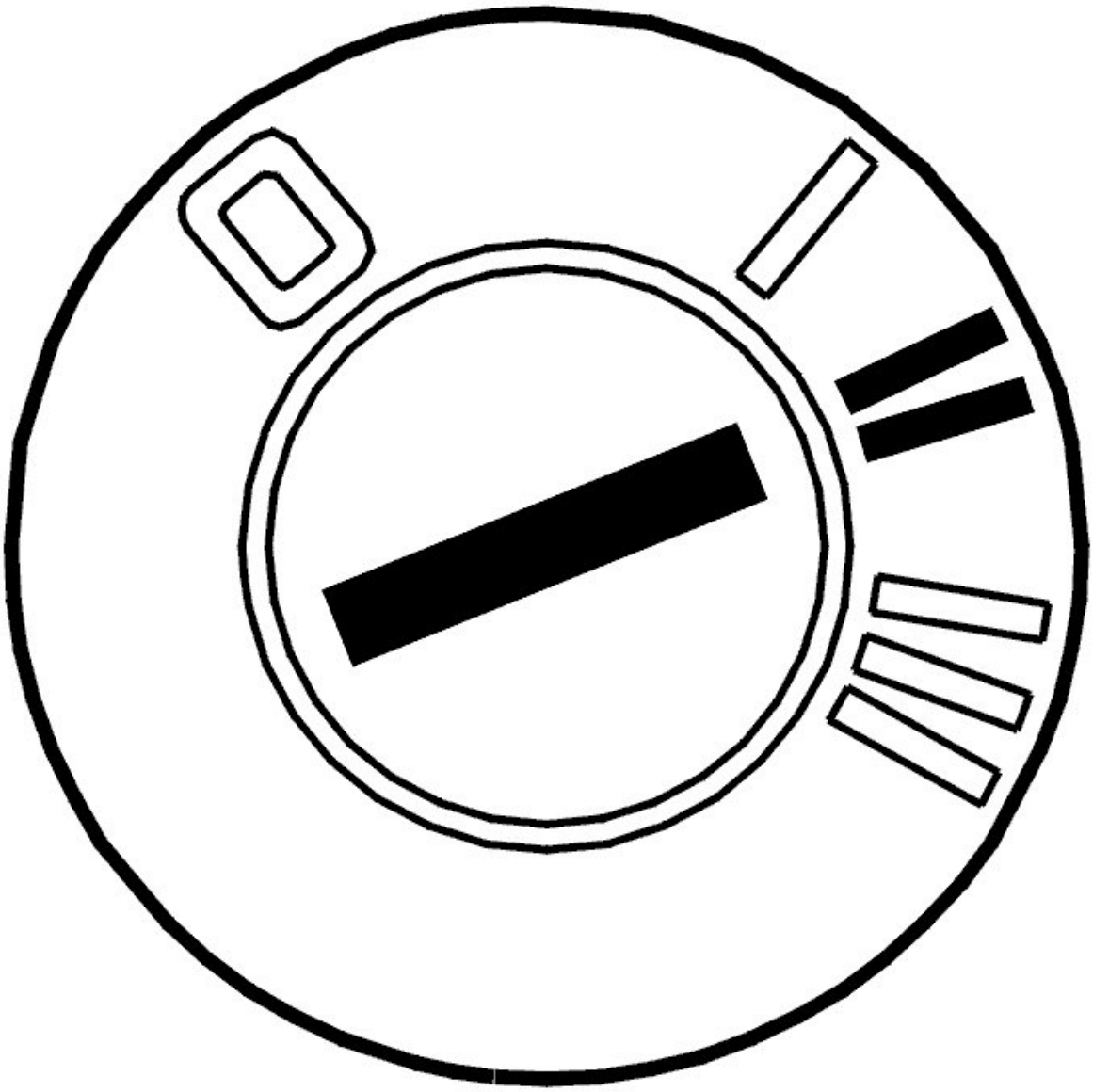
- Ignition on.

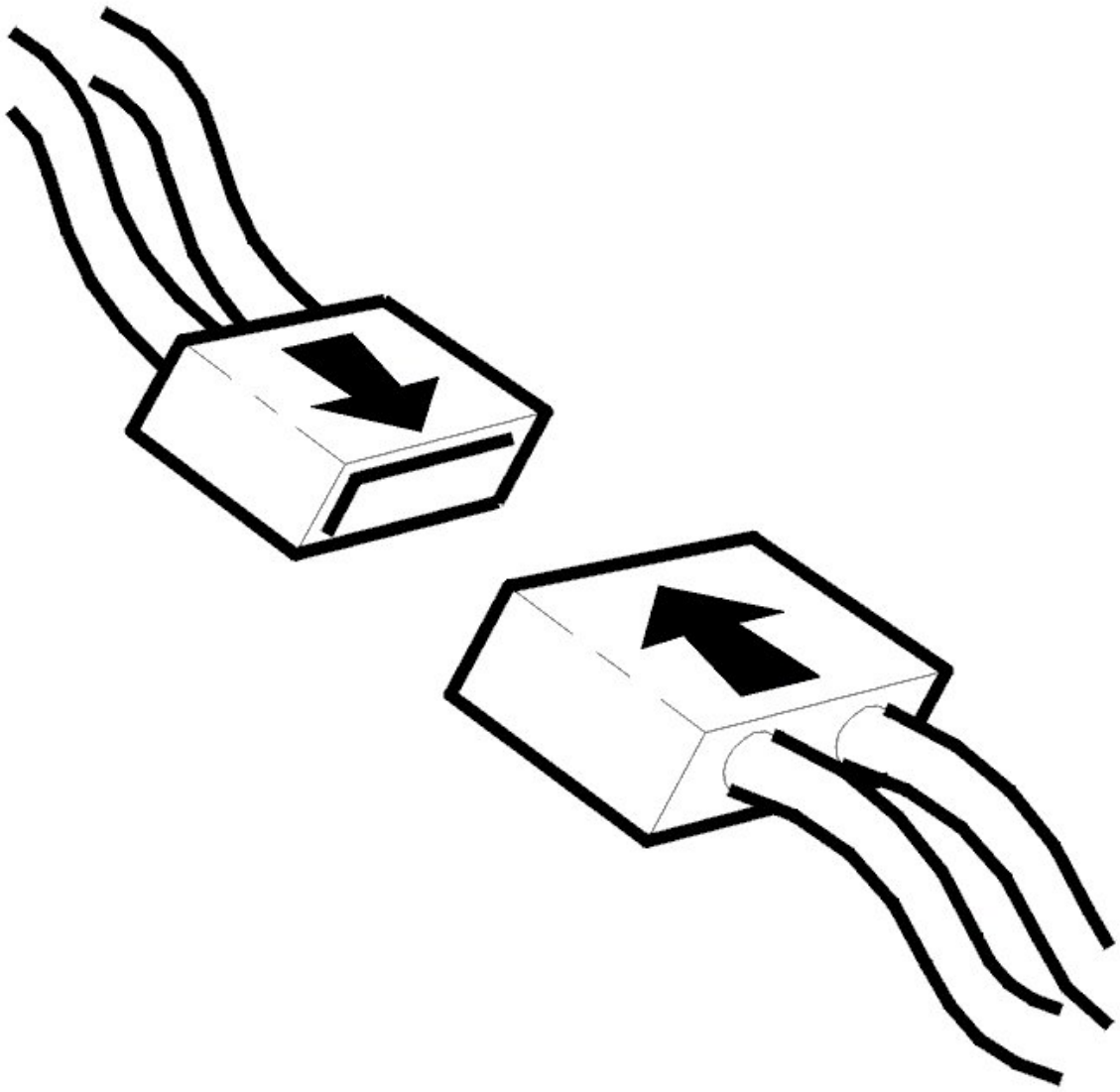
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The current should oscillate between 0 and 1.5 A.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

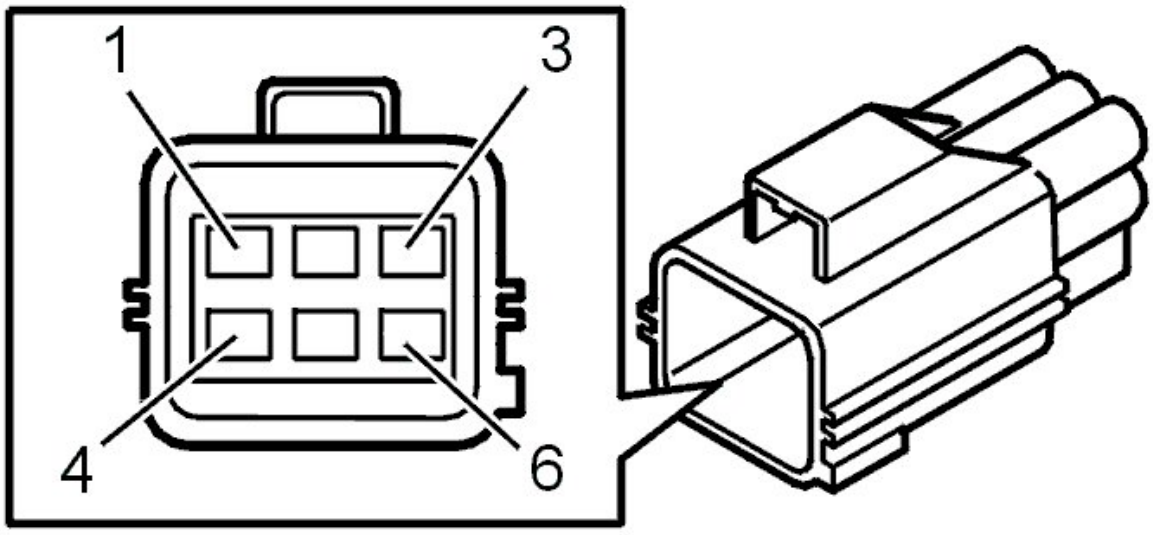
Hint:

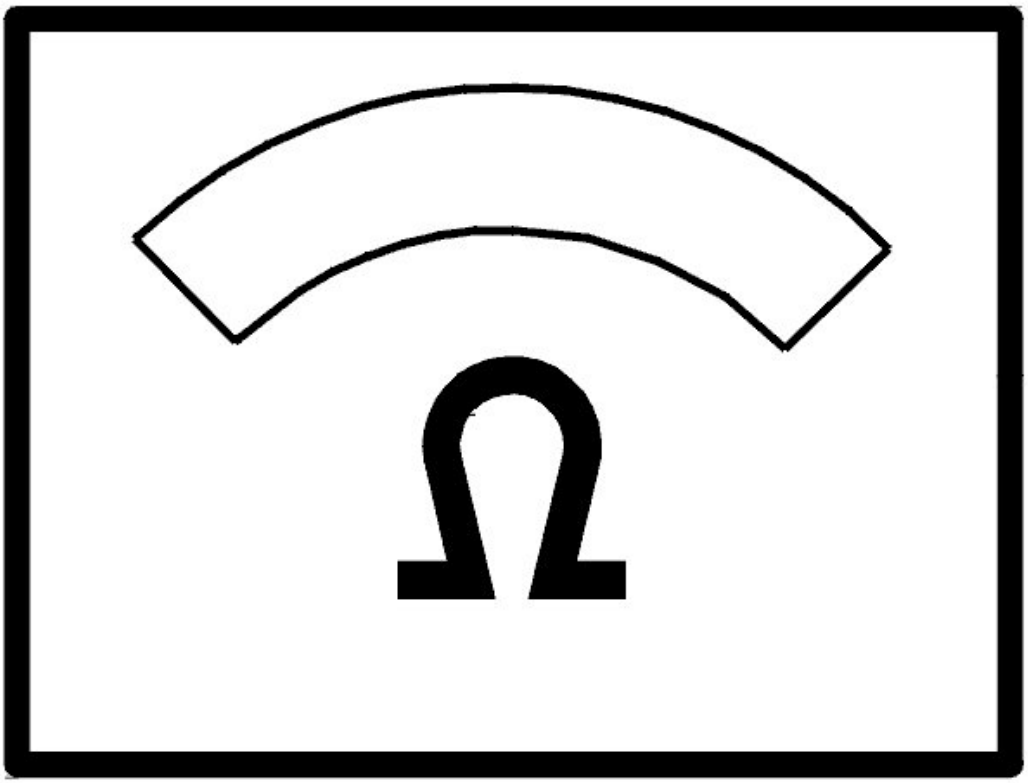
- Check the circuit for solenoid S5. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

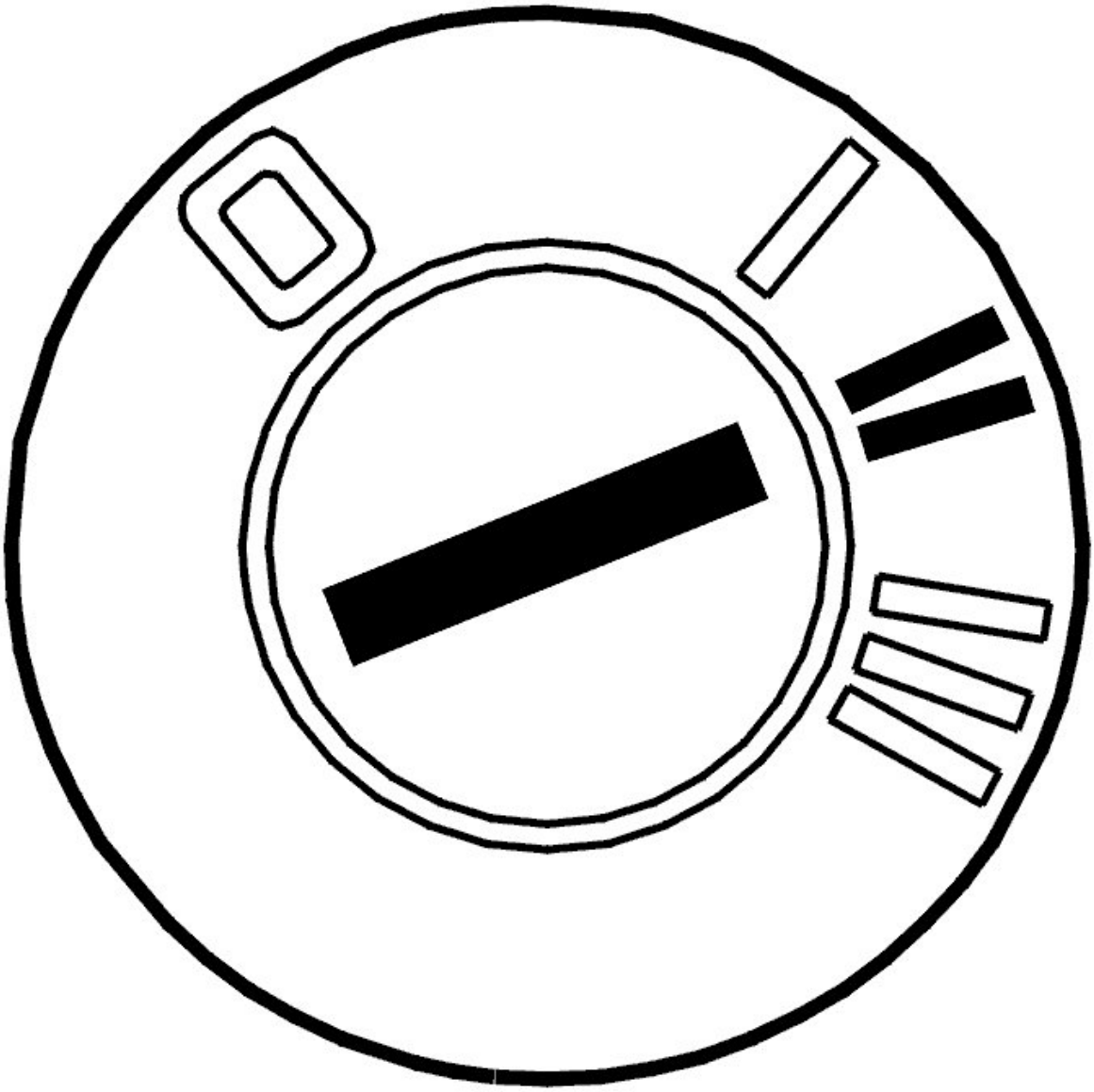
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

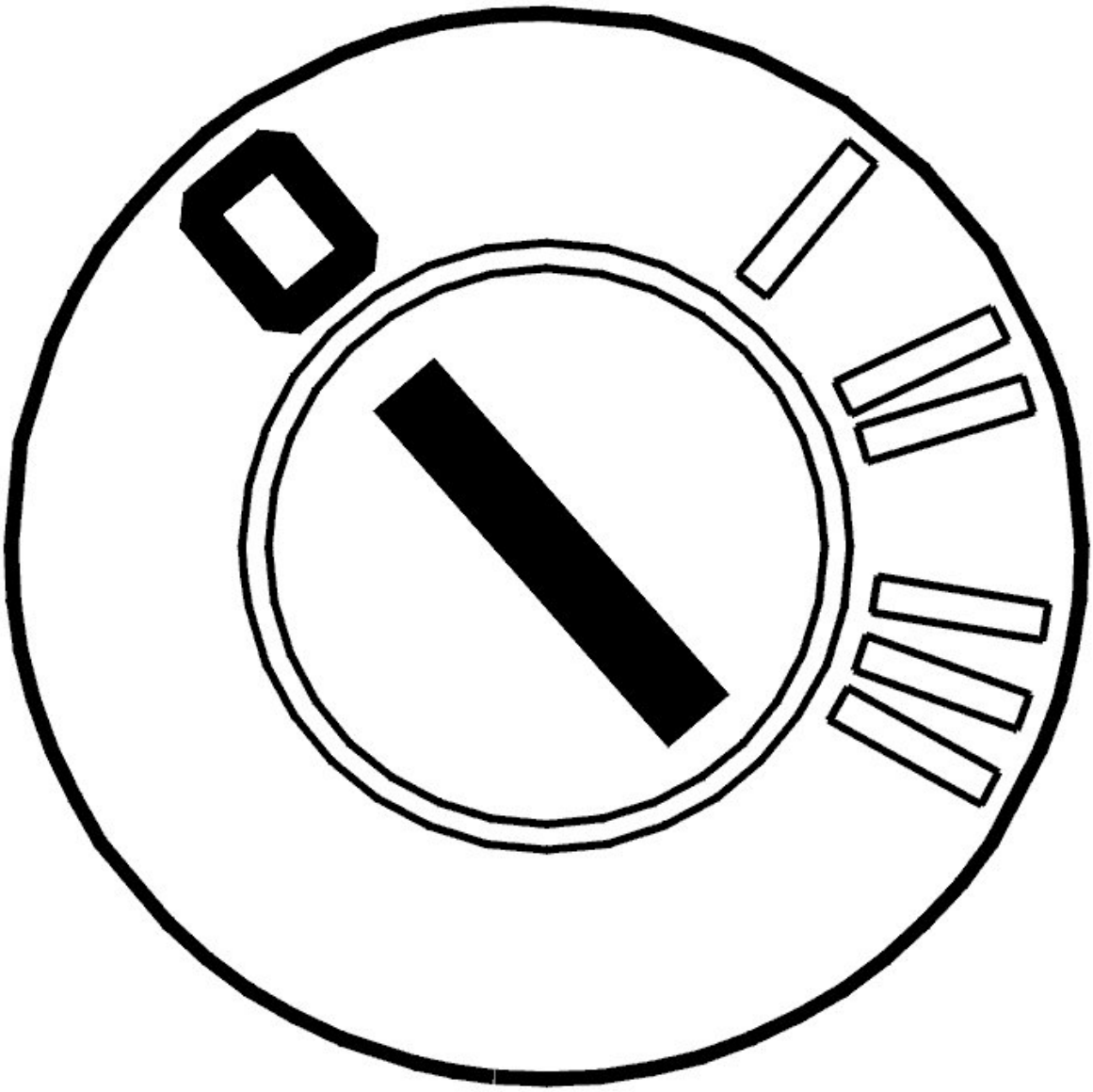
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

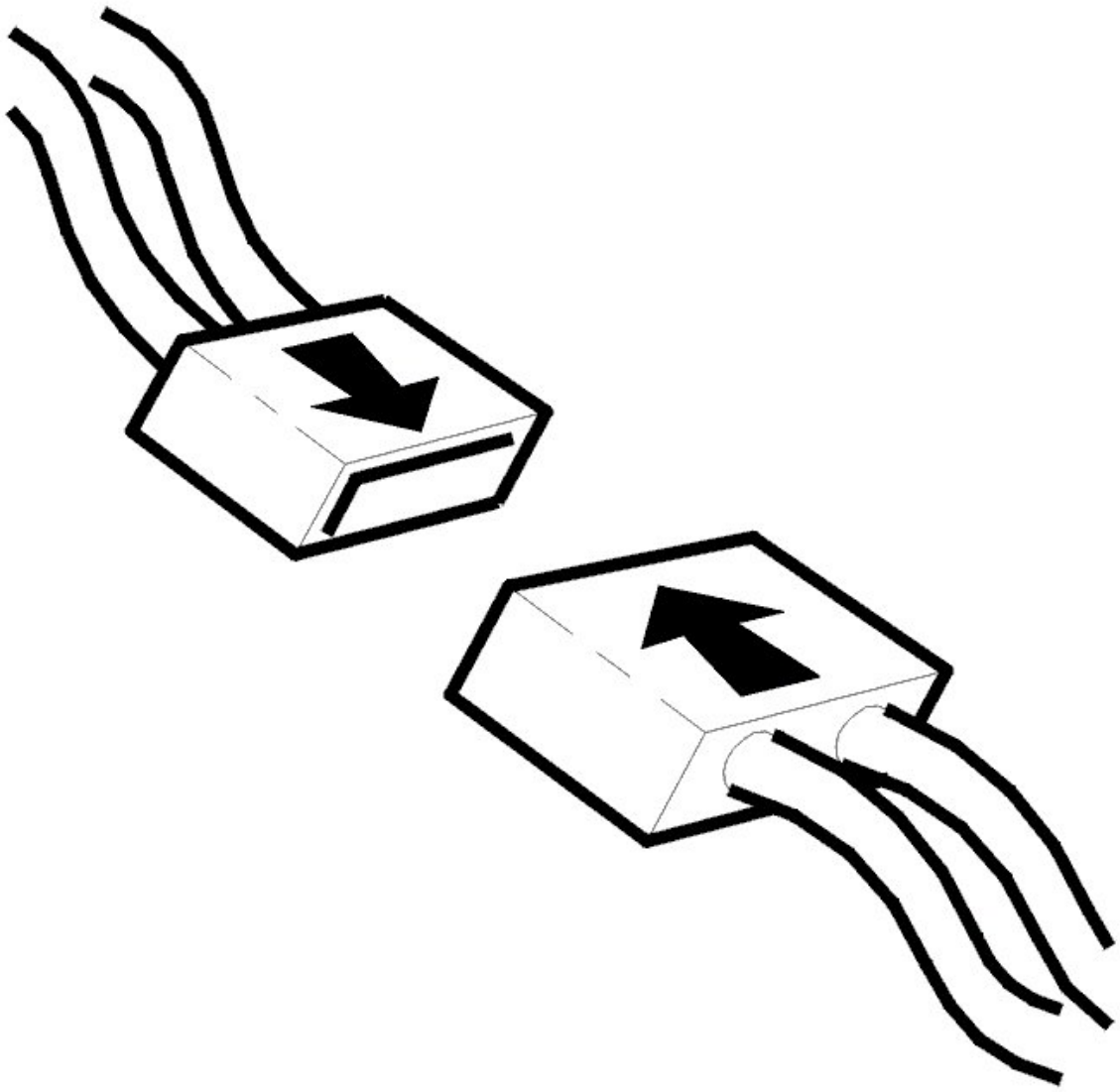
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

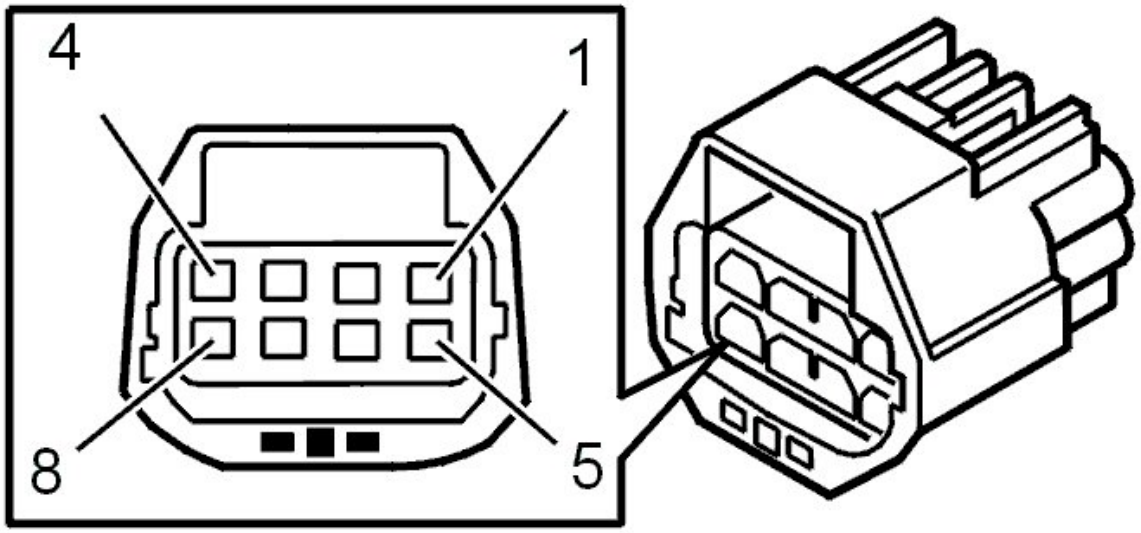
Checking transmission fluid temperature sensor

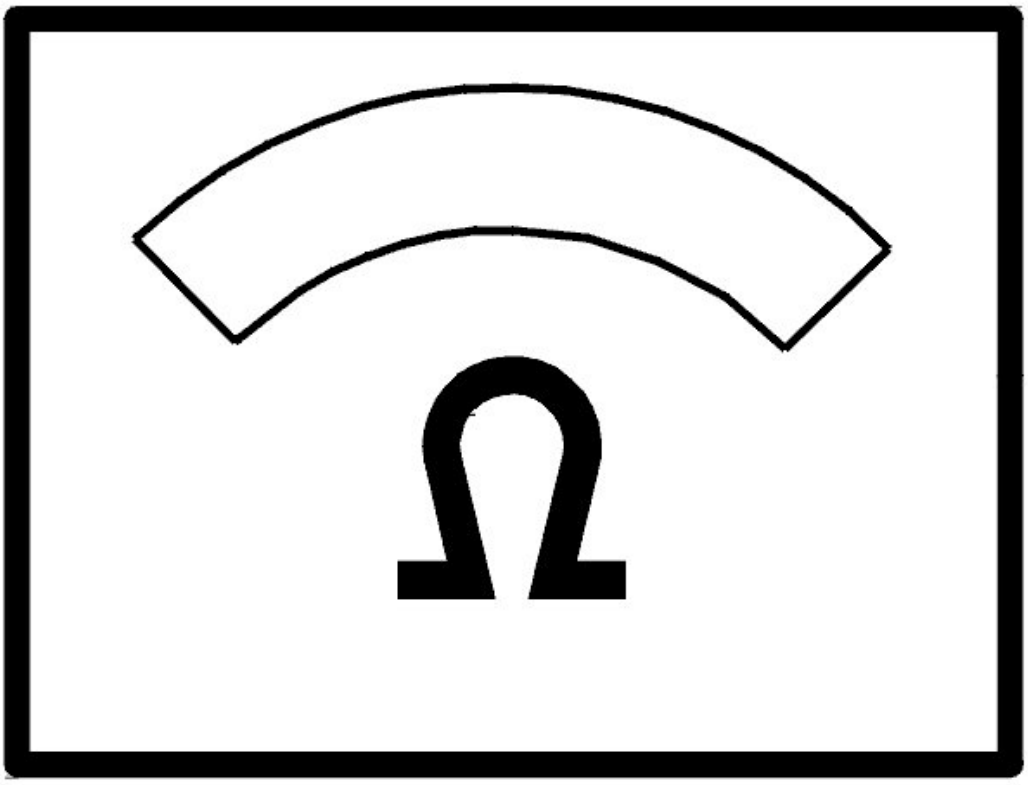




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

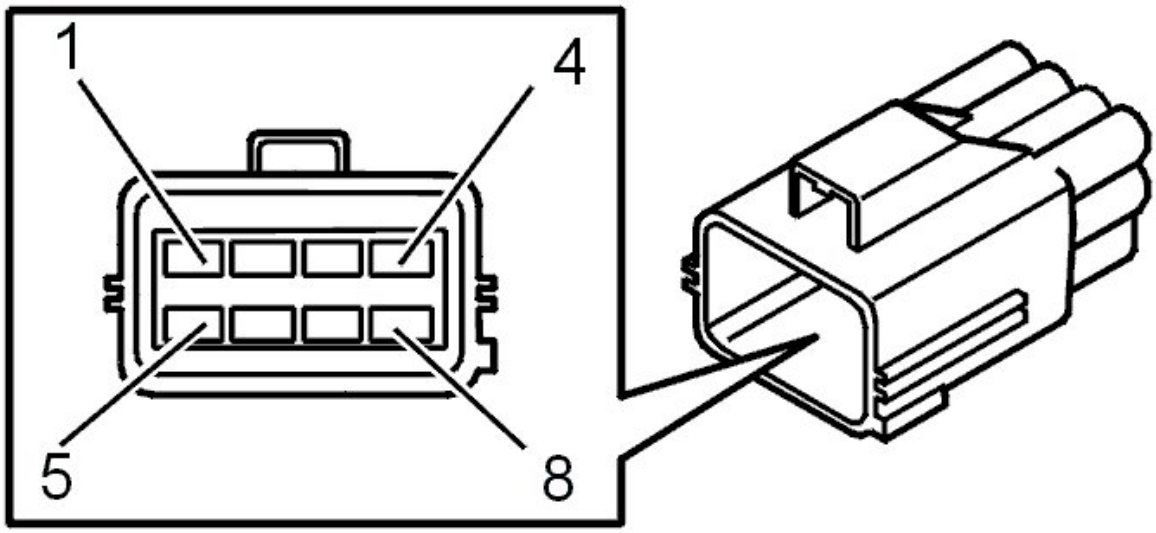
No - Checking the cable and component

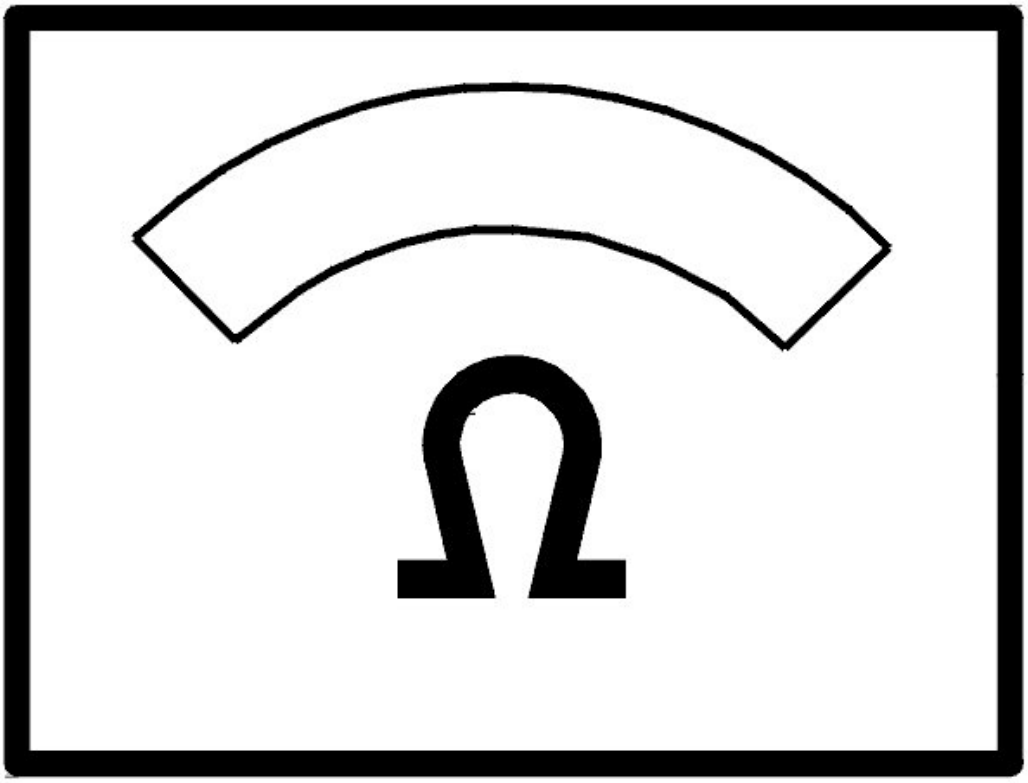
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



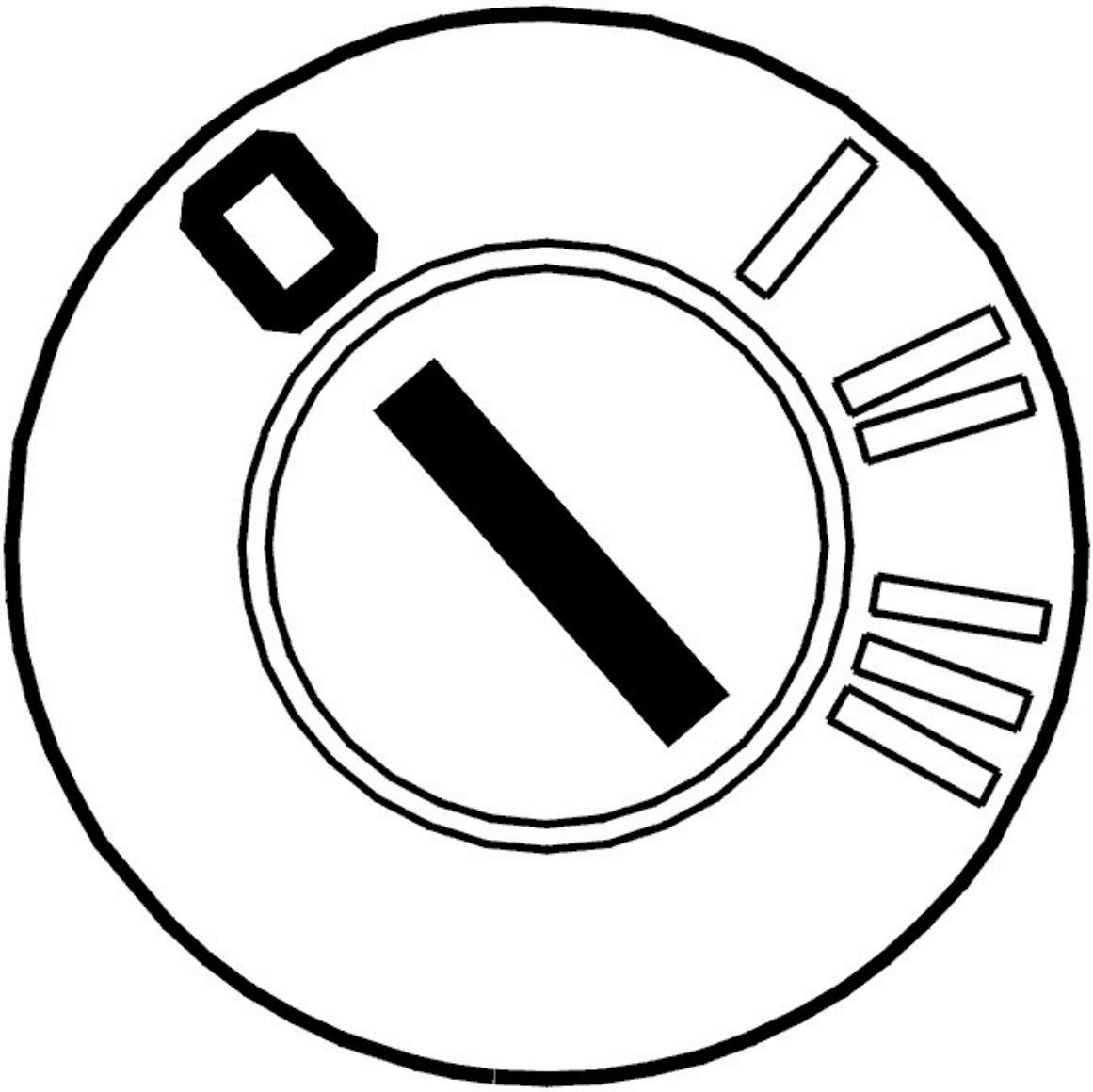


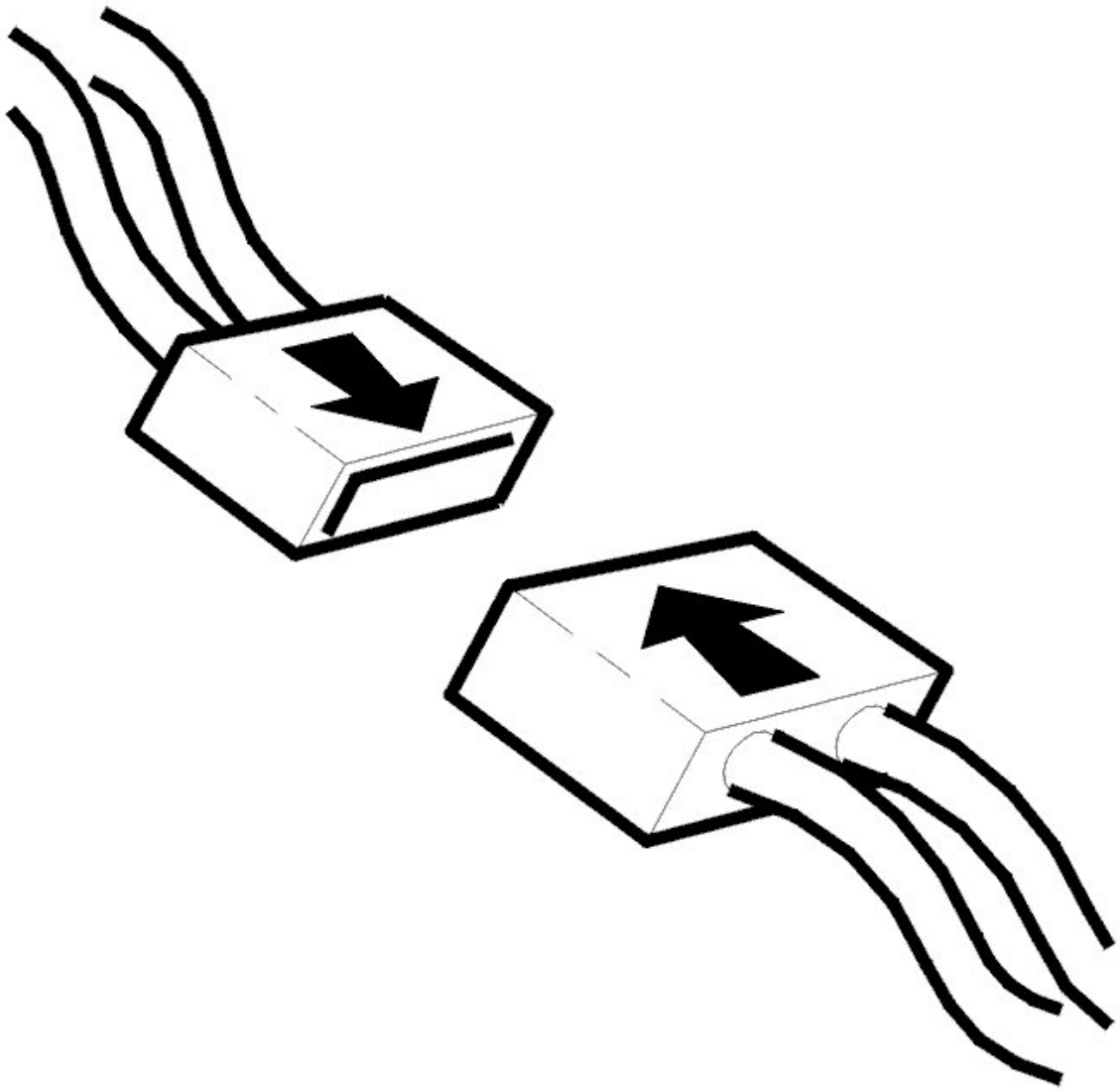
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

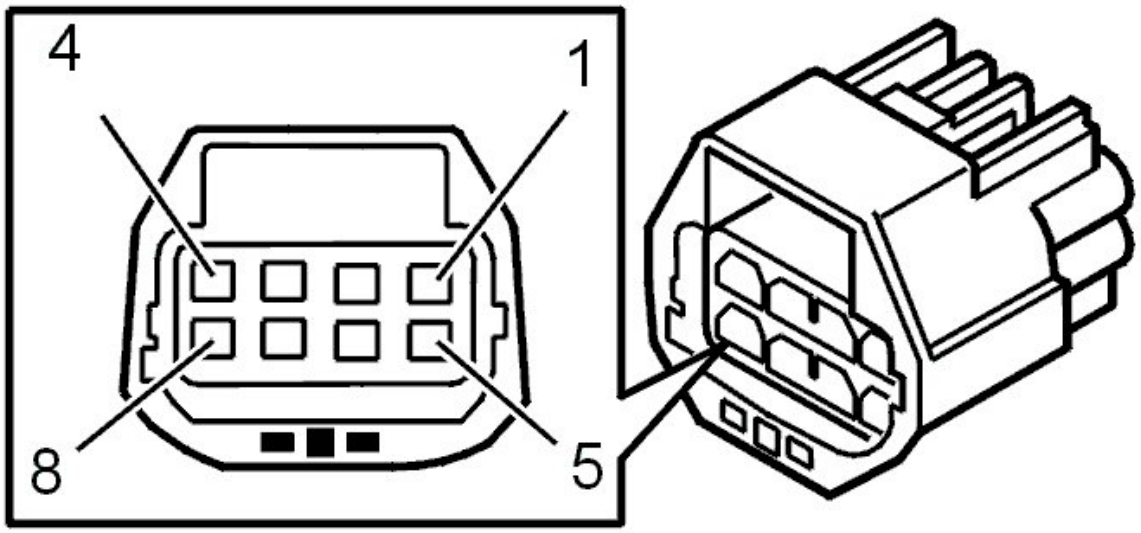
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

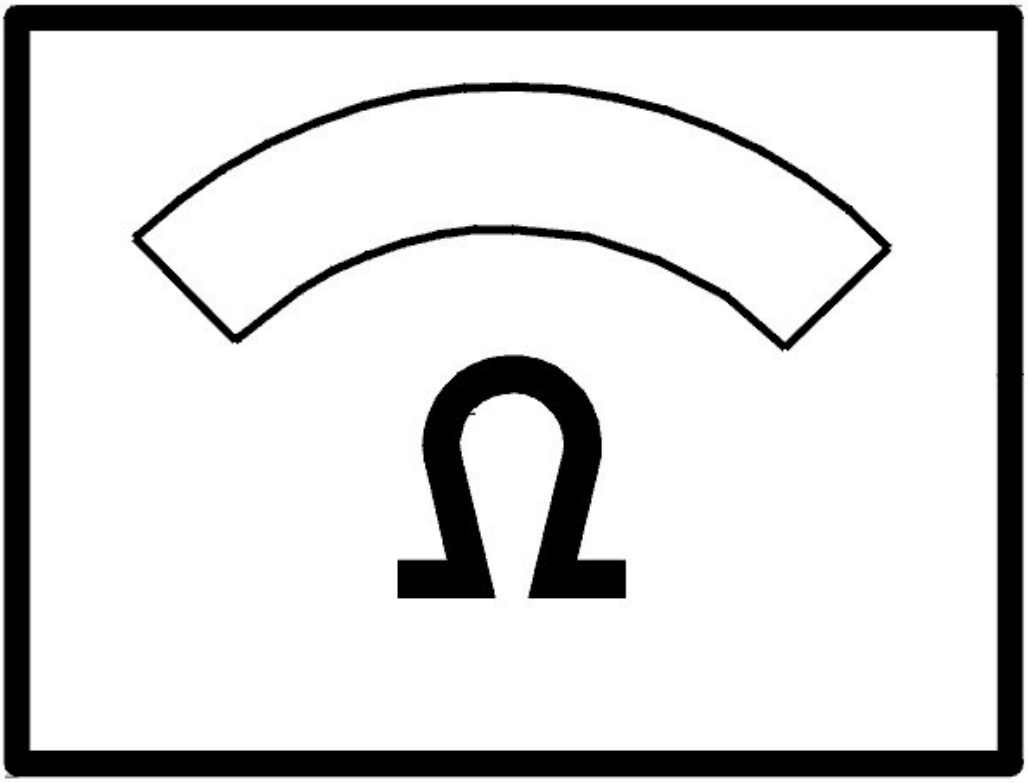
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





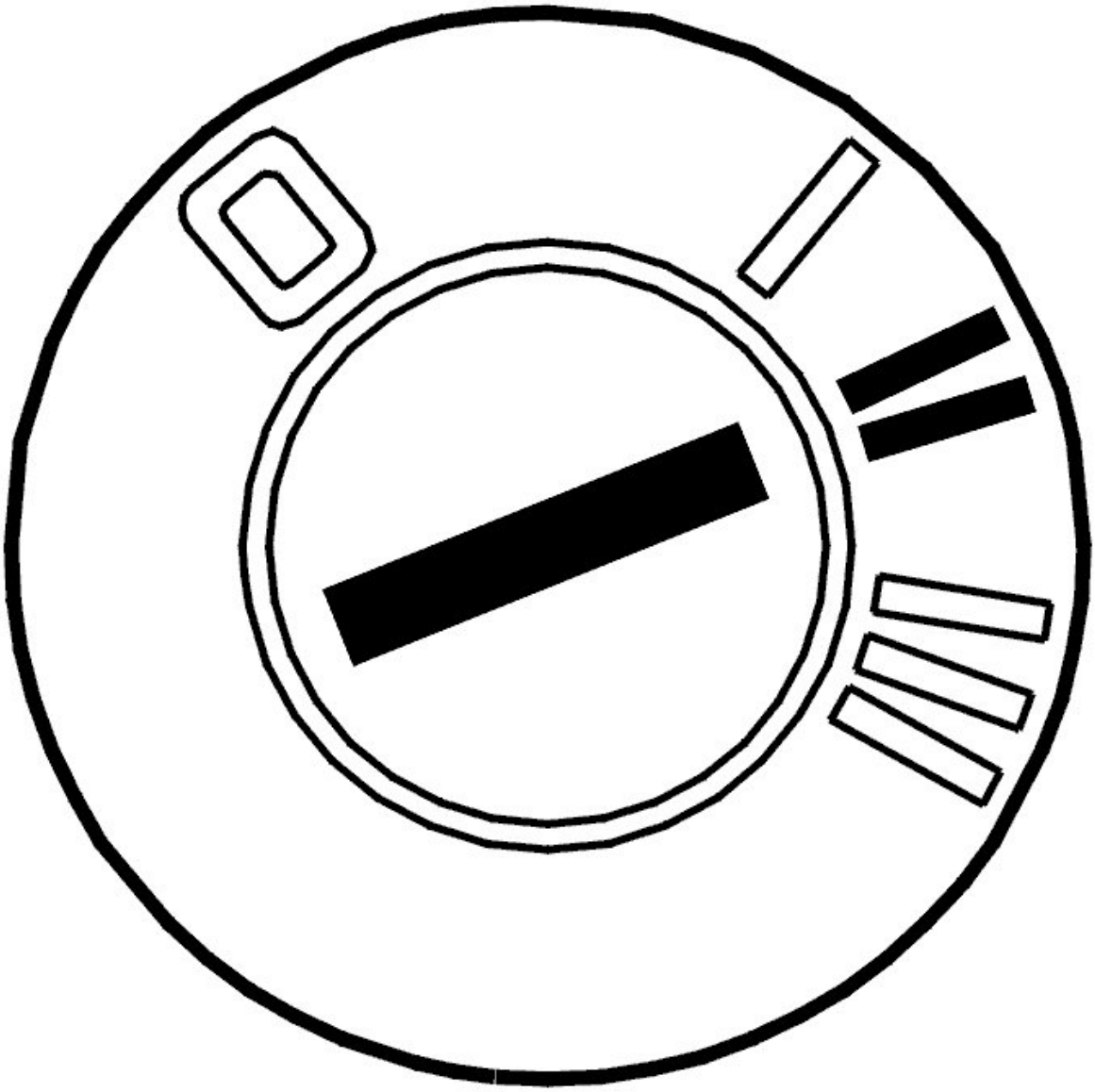
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



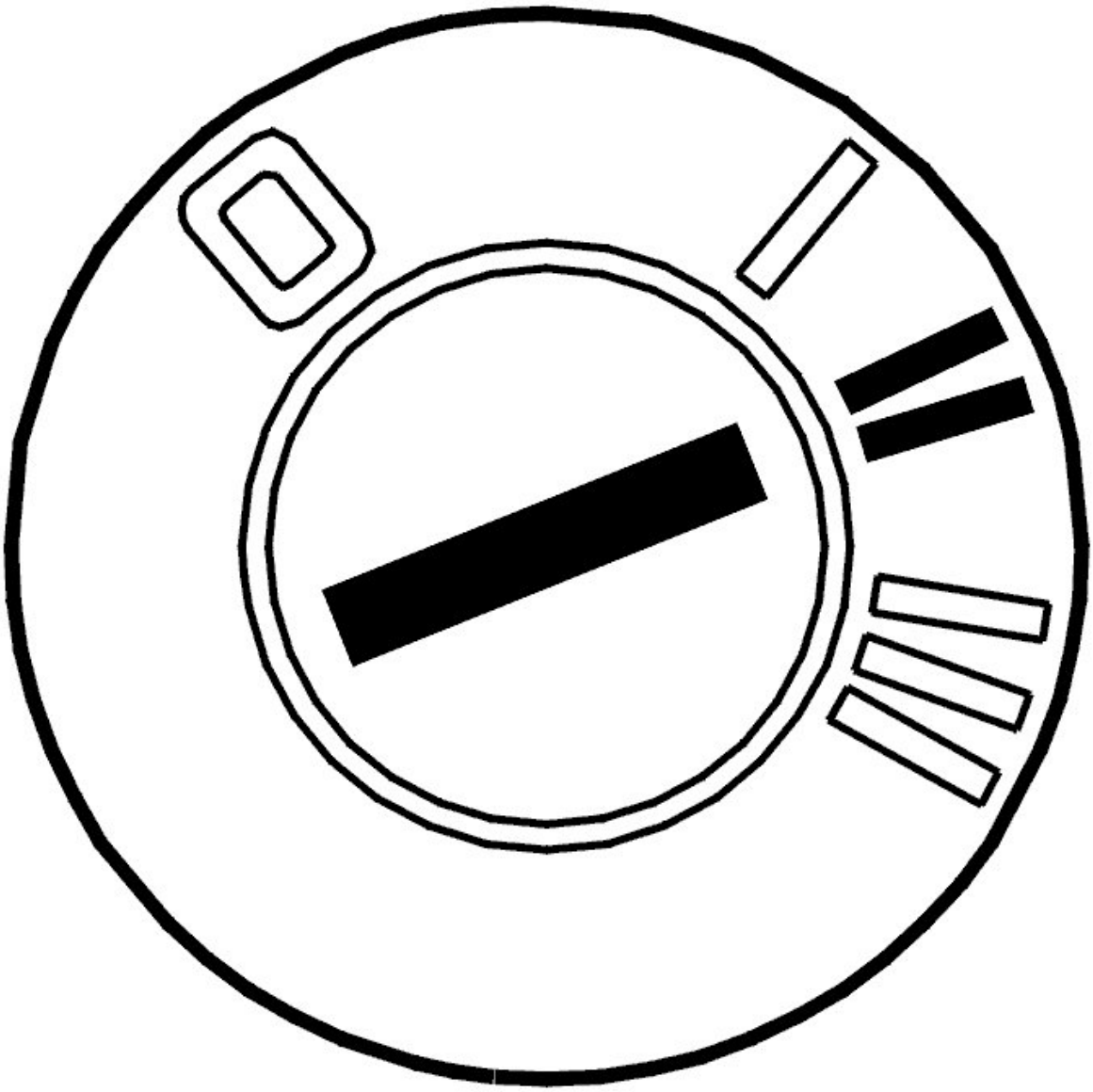
- Ignition on.

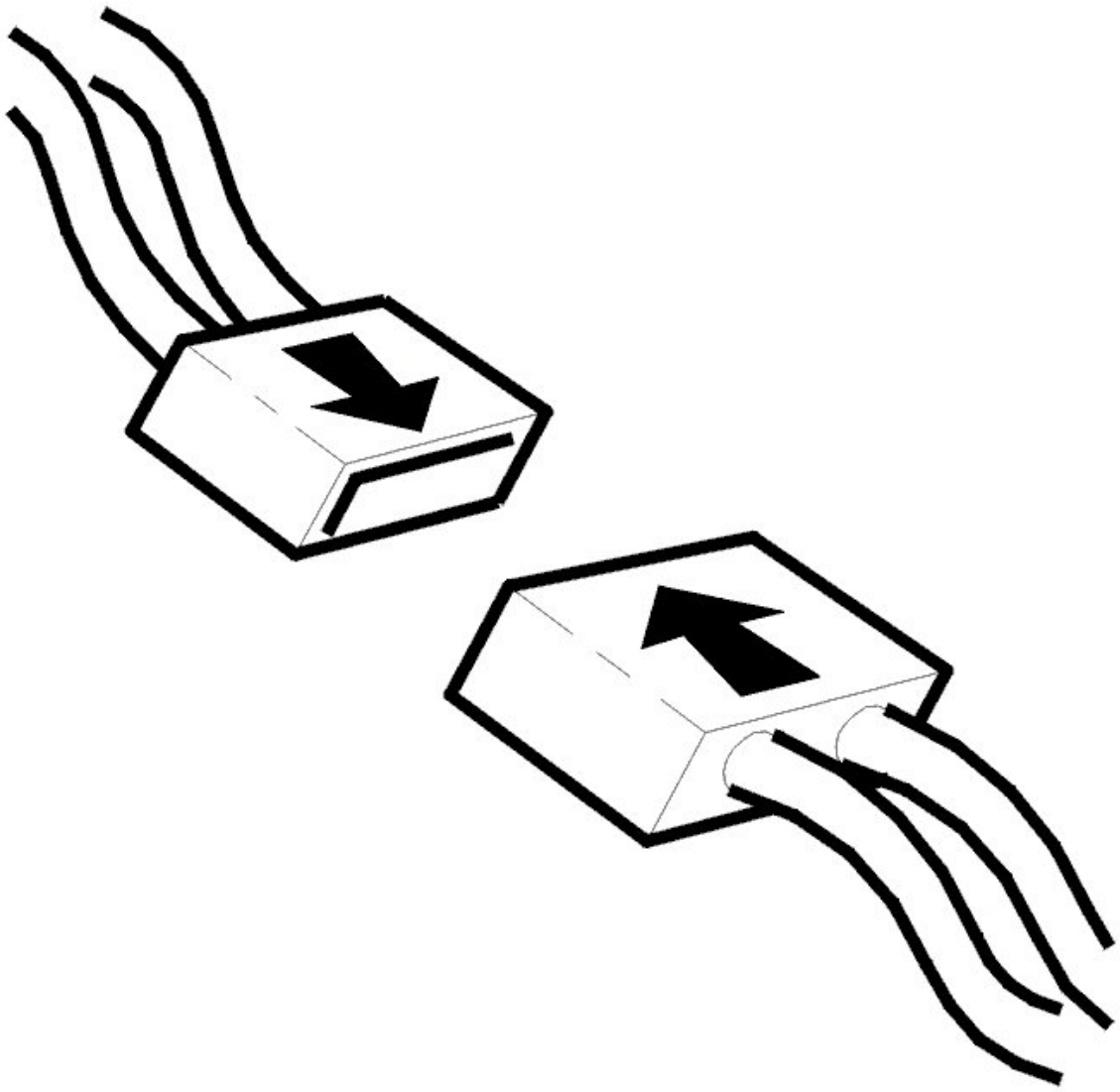
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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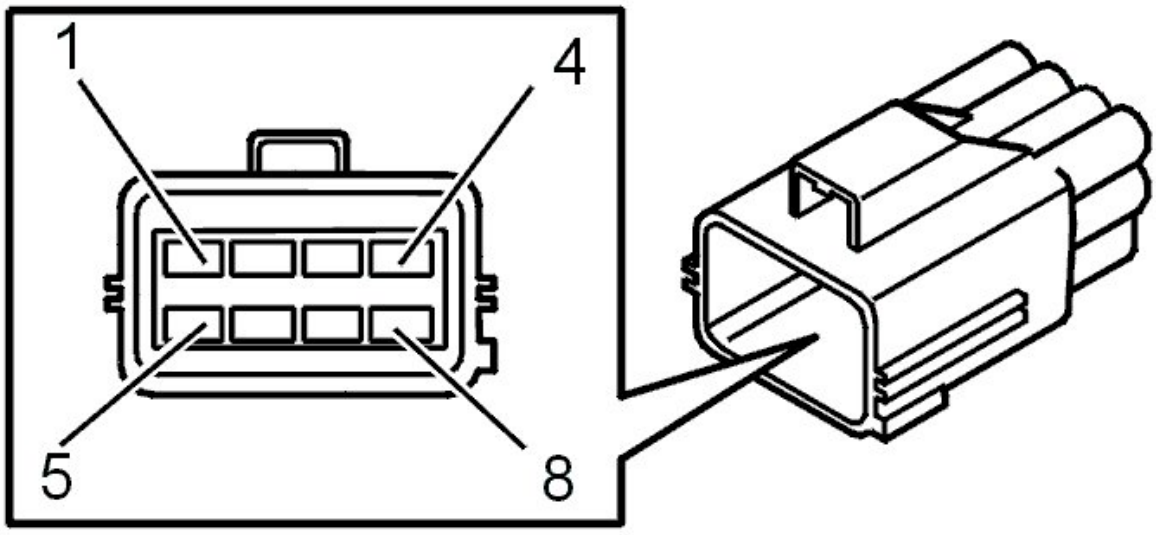
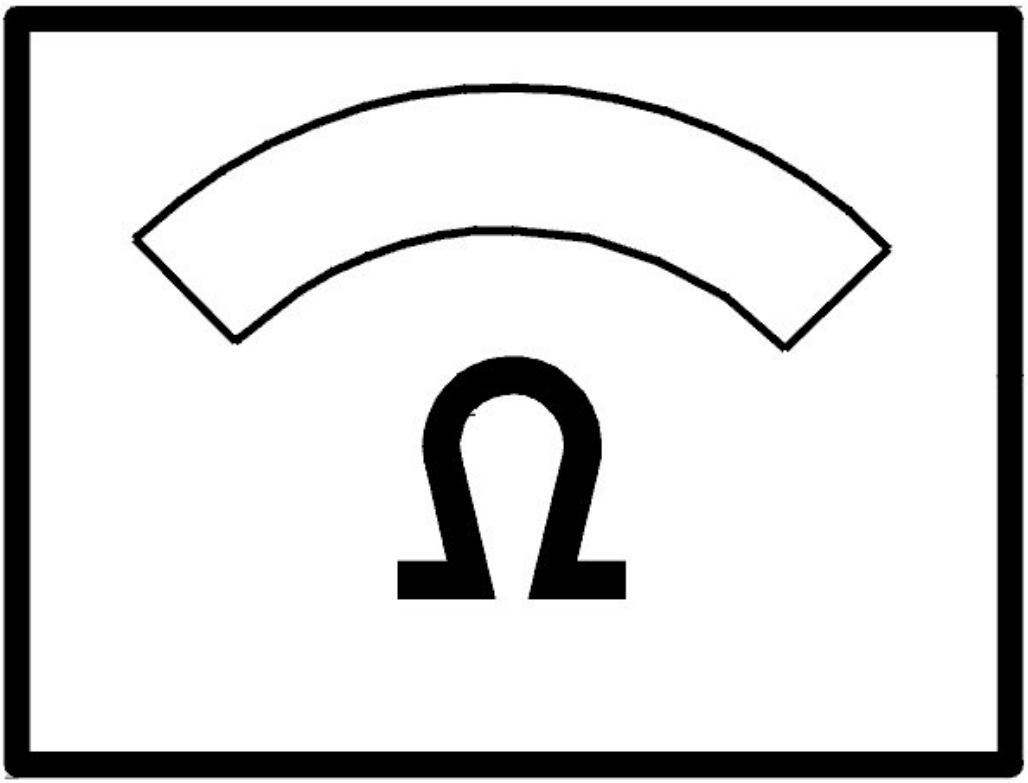
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking transmission fluid temperature sensor

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition
Shift solenoids S1, S2, S3, S4 and S5 operate in tandem to control gear-shifting. Diagnostic trouble codes (DTCs) TCM-0003, TCM-0009, TCM-0103, TCM-0109 or TCM-010C are stored if the transmission control module (TCM) registers that there is a short-circuit to ground in circuits S1, S2, S3, S4 or S5 when the solenoid should be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the signal cable.
- Defective solenoid.
- Internal fault in the control module.

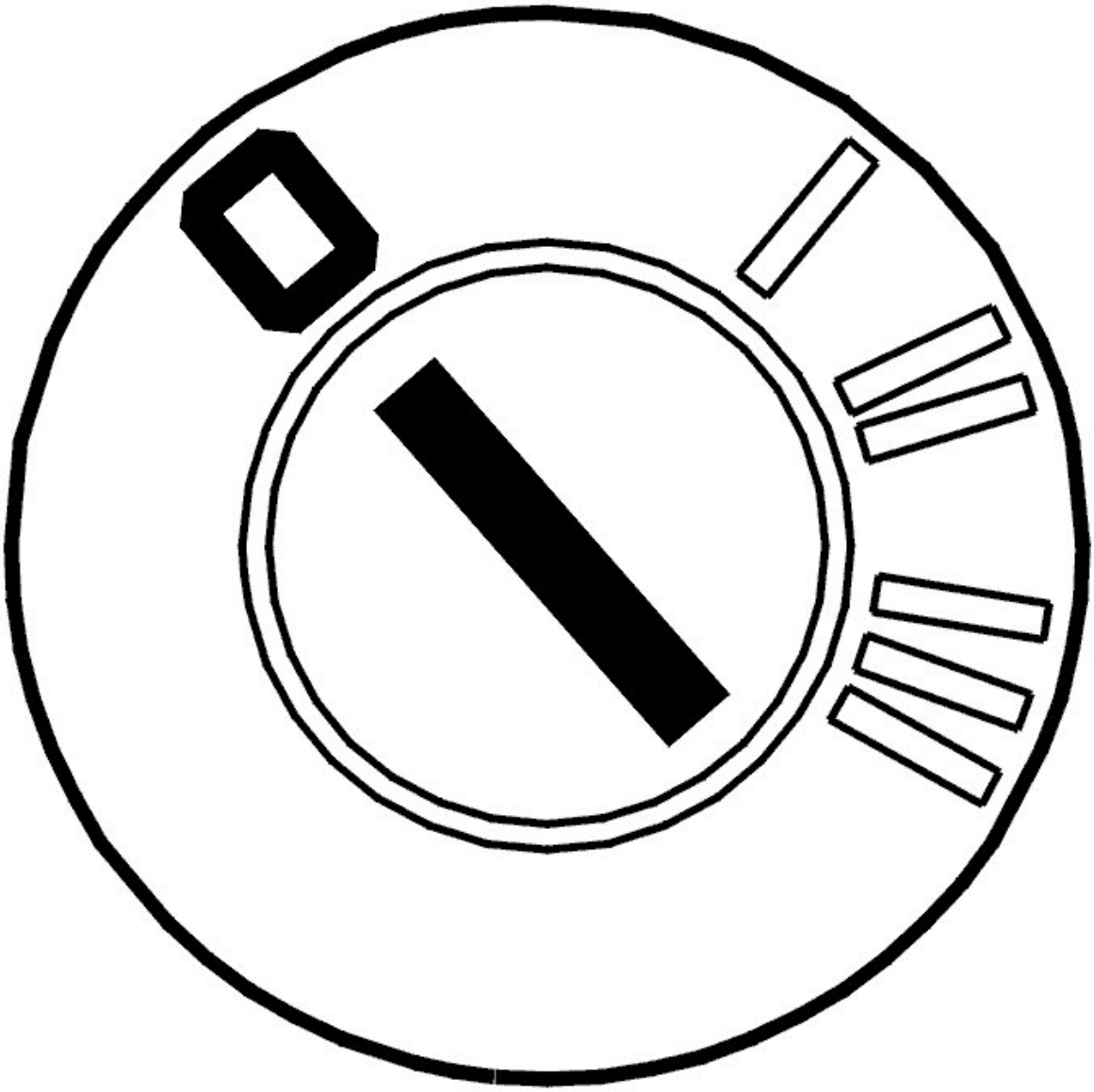
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.
- No shifting.

Signal Too Low

Signal too low

Checking the temperature sensor

Hint: In some cases, the diagnostic trouble code (DTC) may be caused by a defective oil temperature sensor. Check the function of the oil temperature sensor first.



- Ignition off

- Read off the oil temperature.

Check that the function of the temperature sensor is OK. Test drive the car to increase the temperature of the transmission fluid. Read off the temperature again. Check that the temperature has increased.

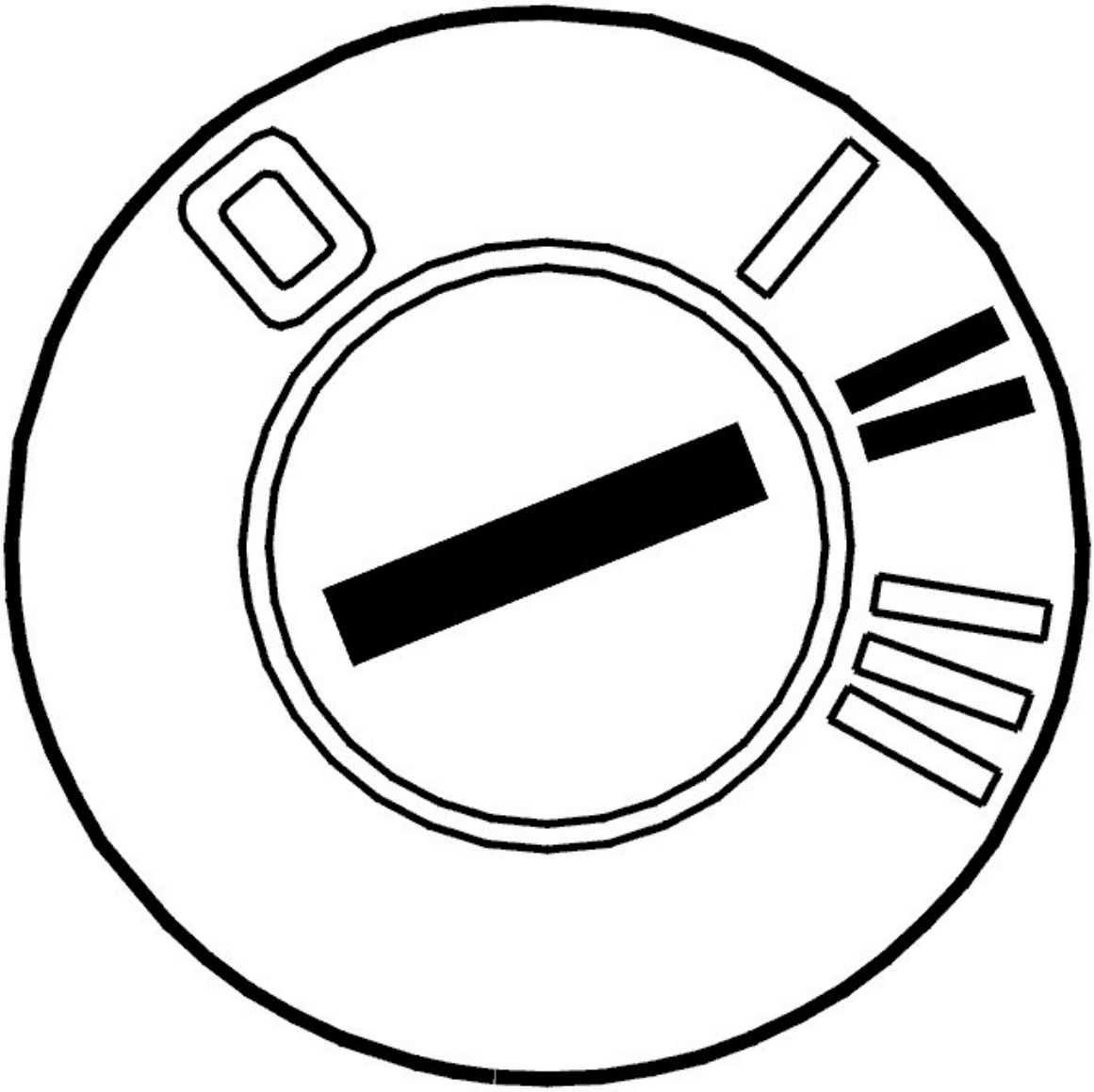
Hint: If the temperature is outside its permitted range, fault-trace the temperature sensor.

Is the oil temperature within its permitted range?

Yes - Checking shift solenoid S5

No - Checking transmission fluid temperature sensor

Checking shift solenoid S5



- Ignition on
- Gear selector in position P
- Activate solenoid S5.

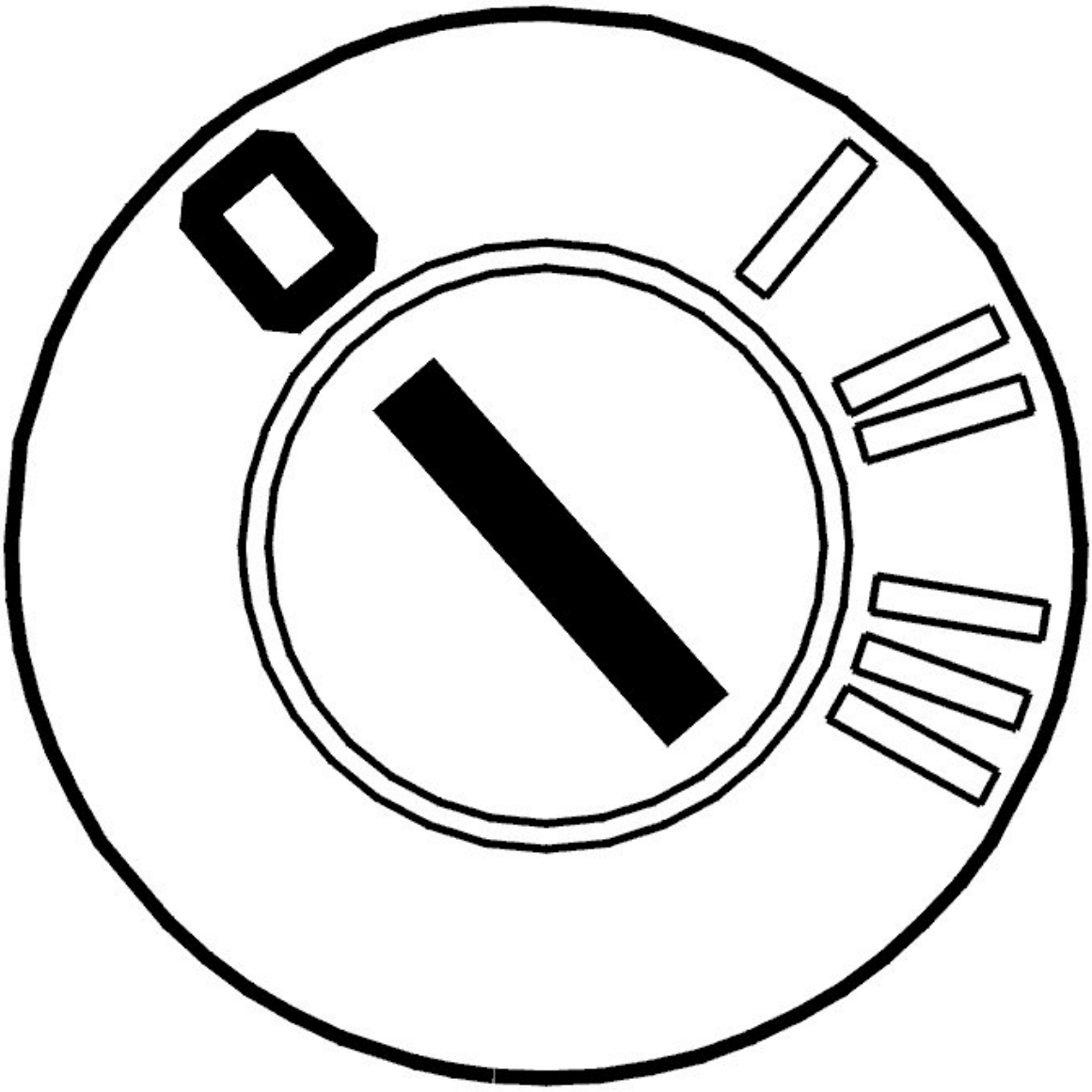
The value must change between OFF and ON.

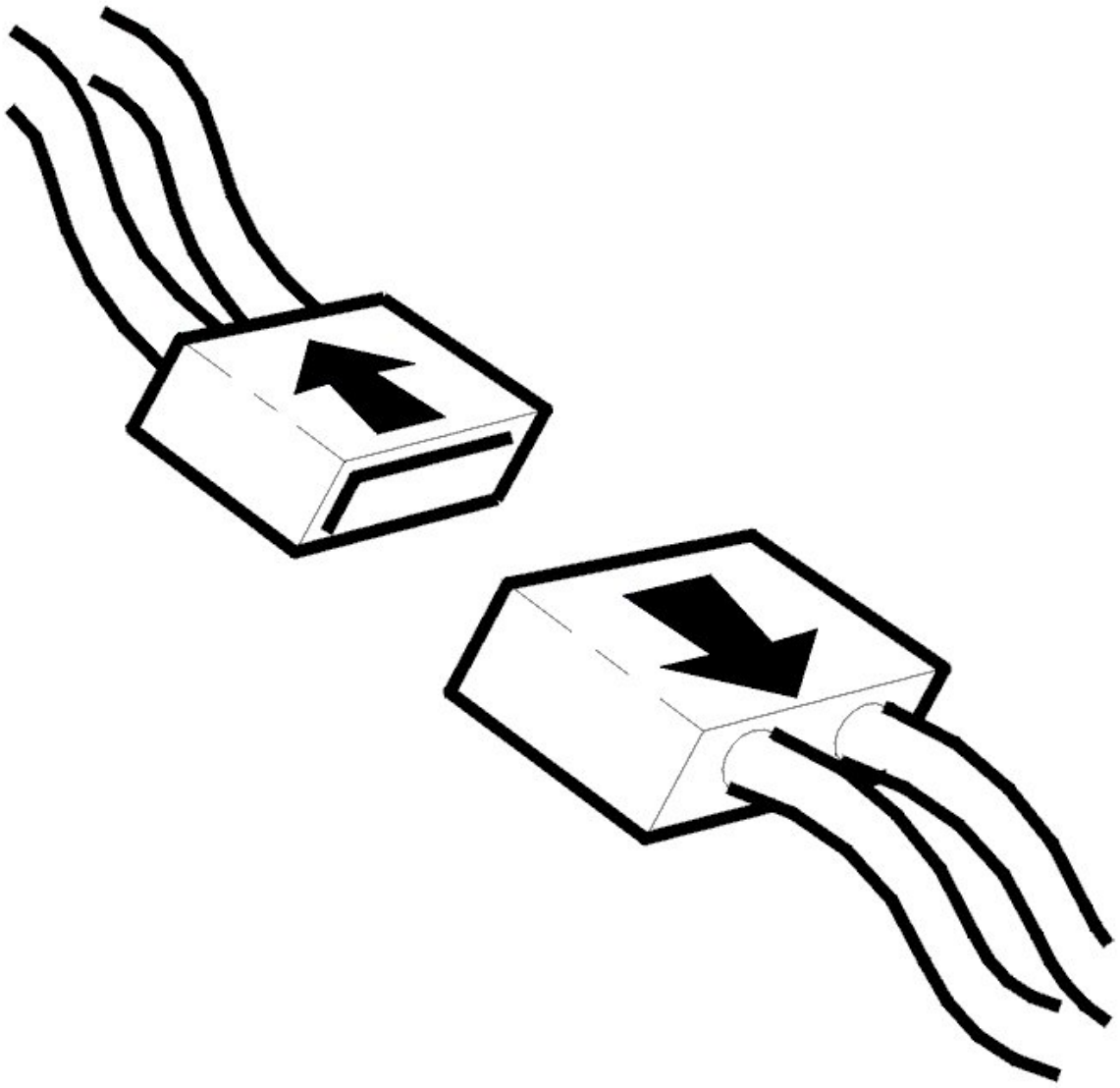
Does the value change?

Yes - Intermittent fault

No - Checking resistance

Checking resistance



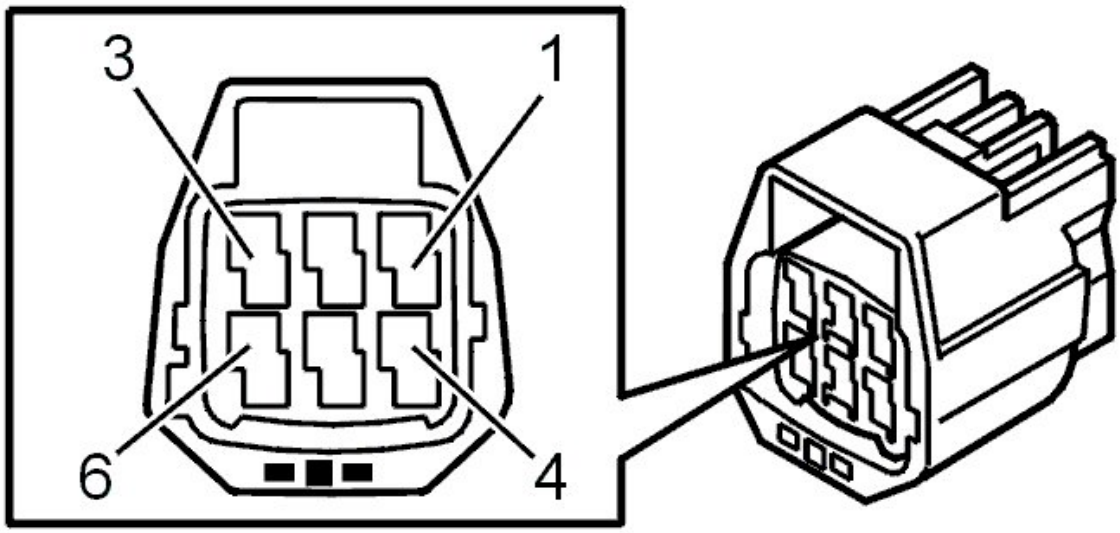


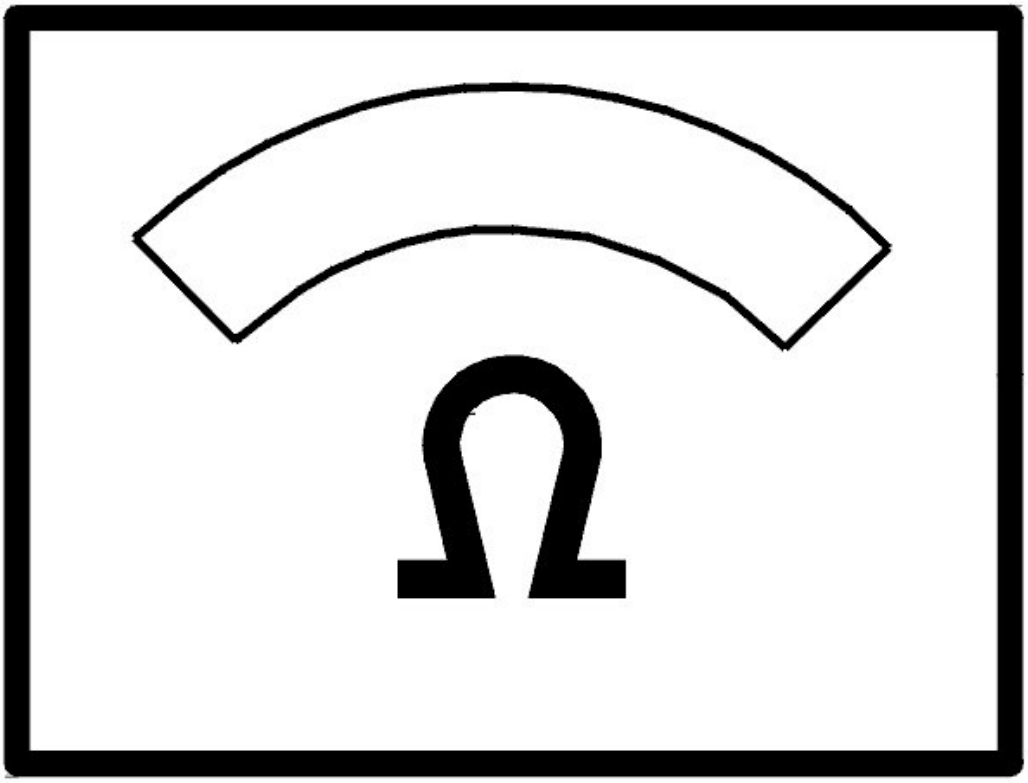
- Ignition off
- Disconnect transmission connector C.

Check solenoid S5. Measure the resistance between transmission connector terminal #C5 (transmission side) and the transmission housing. The resistance must be 11-15 ohms.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



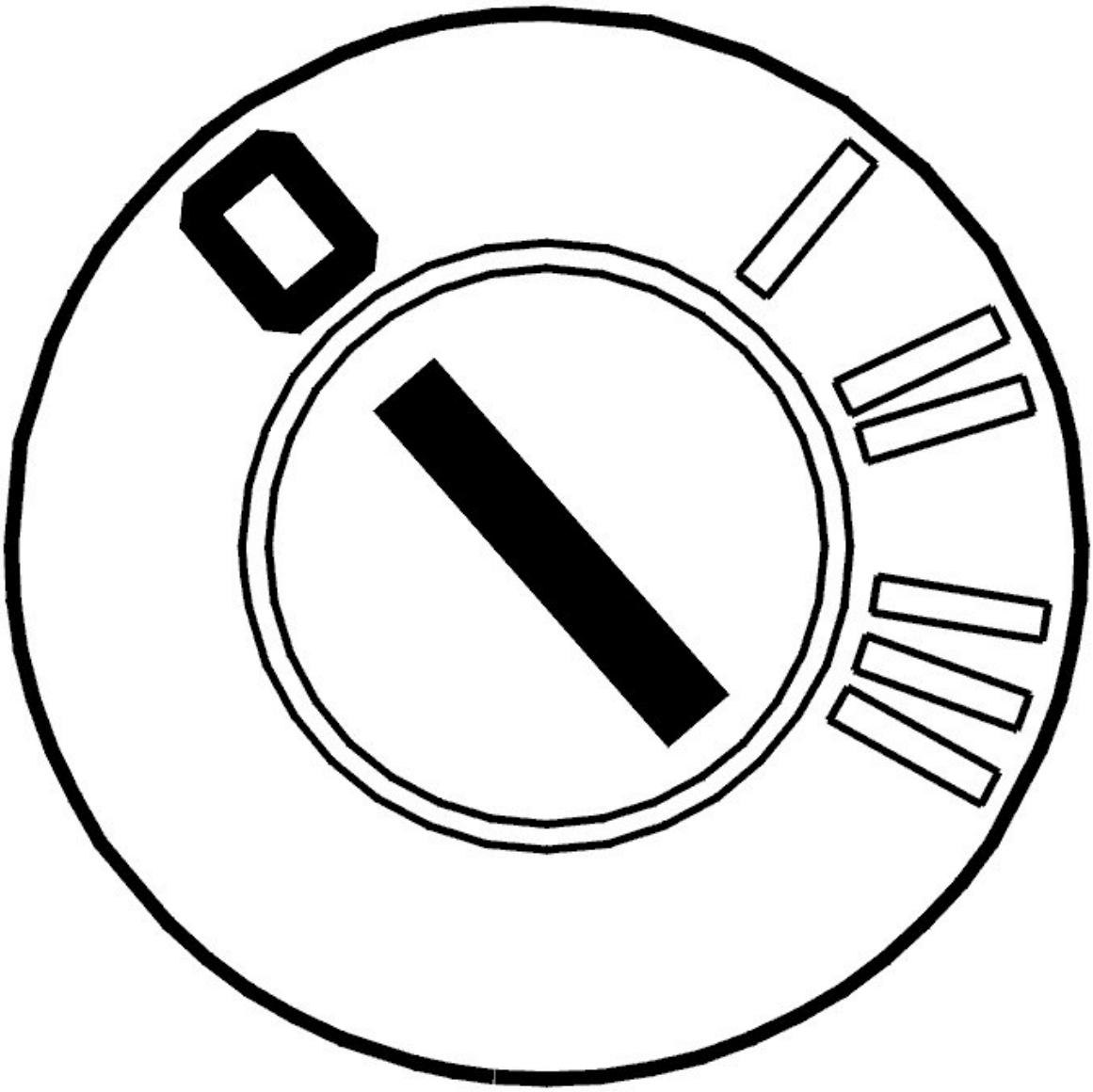


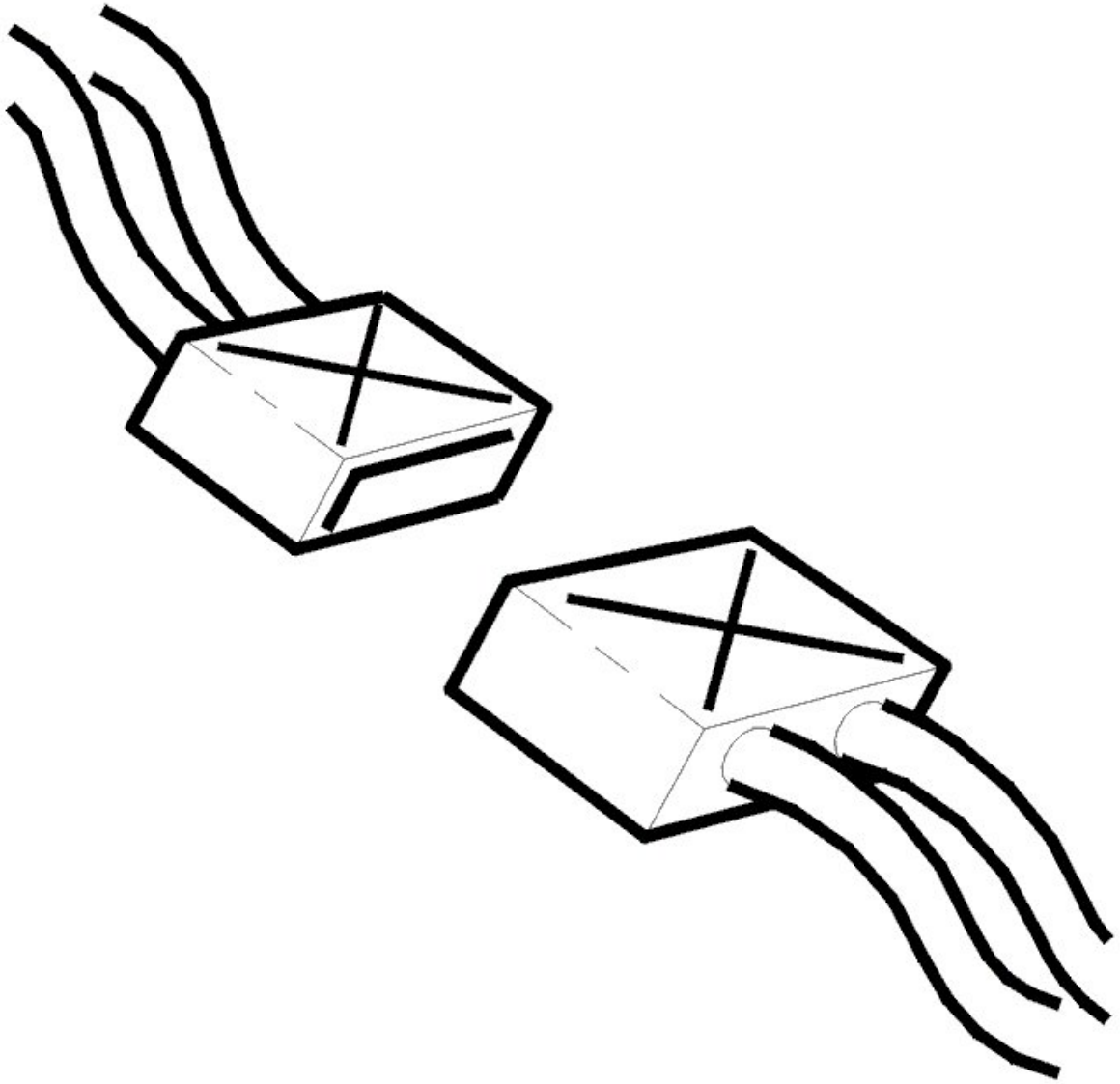
Was the resistance OK

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



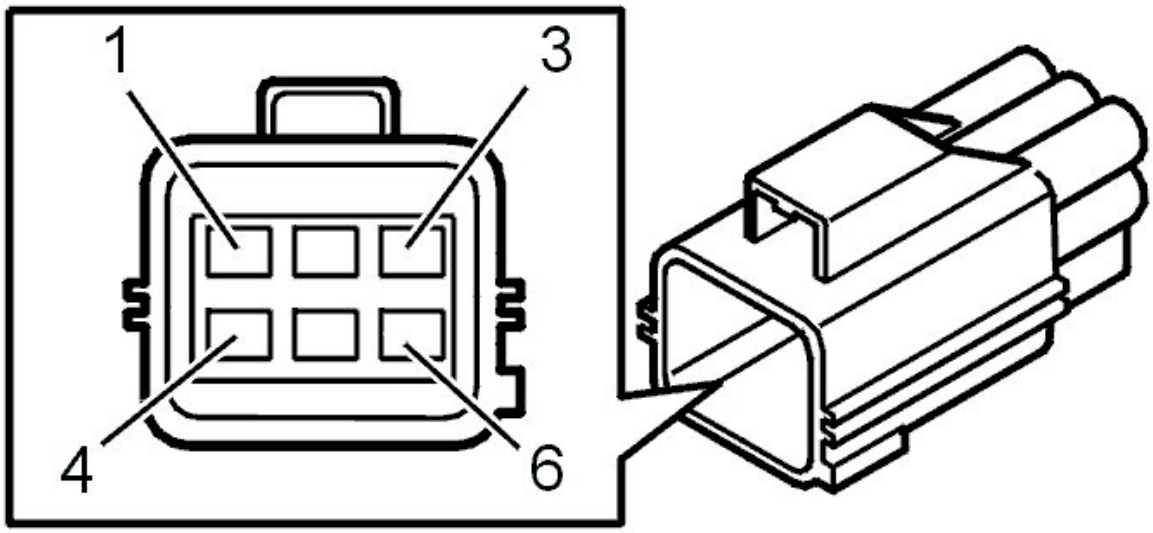


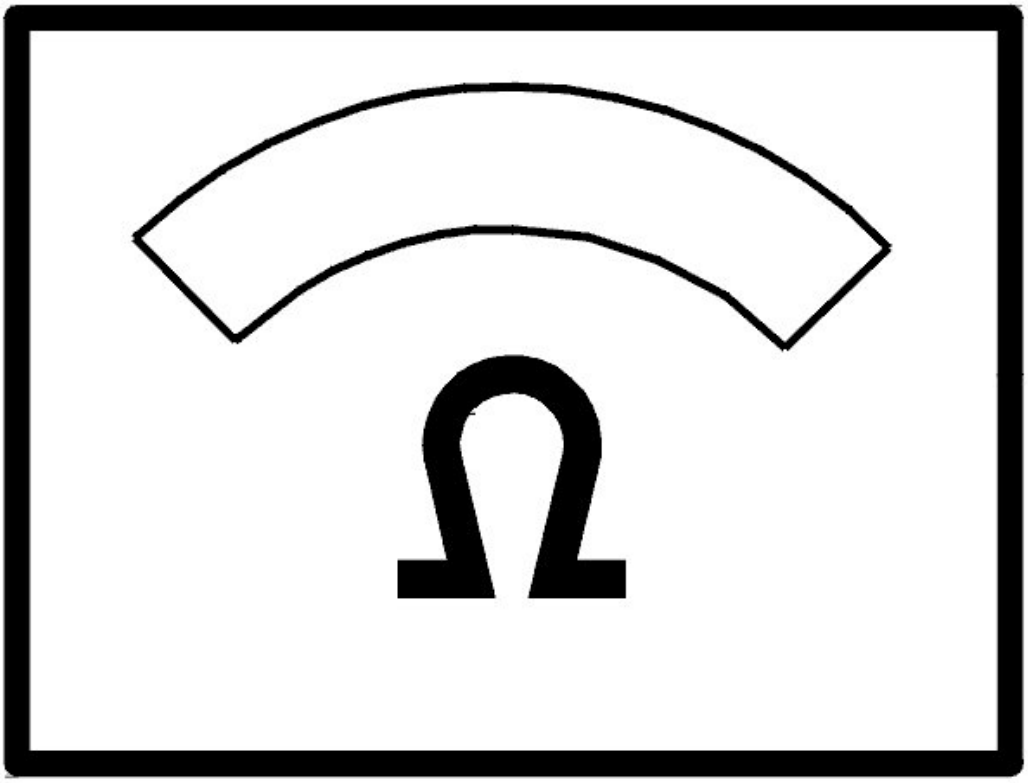
- Ignition off
- The breakout box connected
- Transmission connector C disconnected.

Check the cable between control module terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



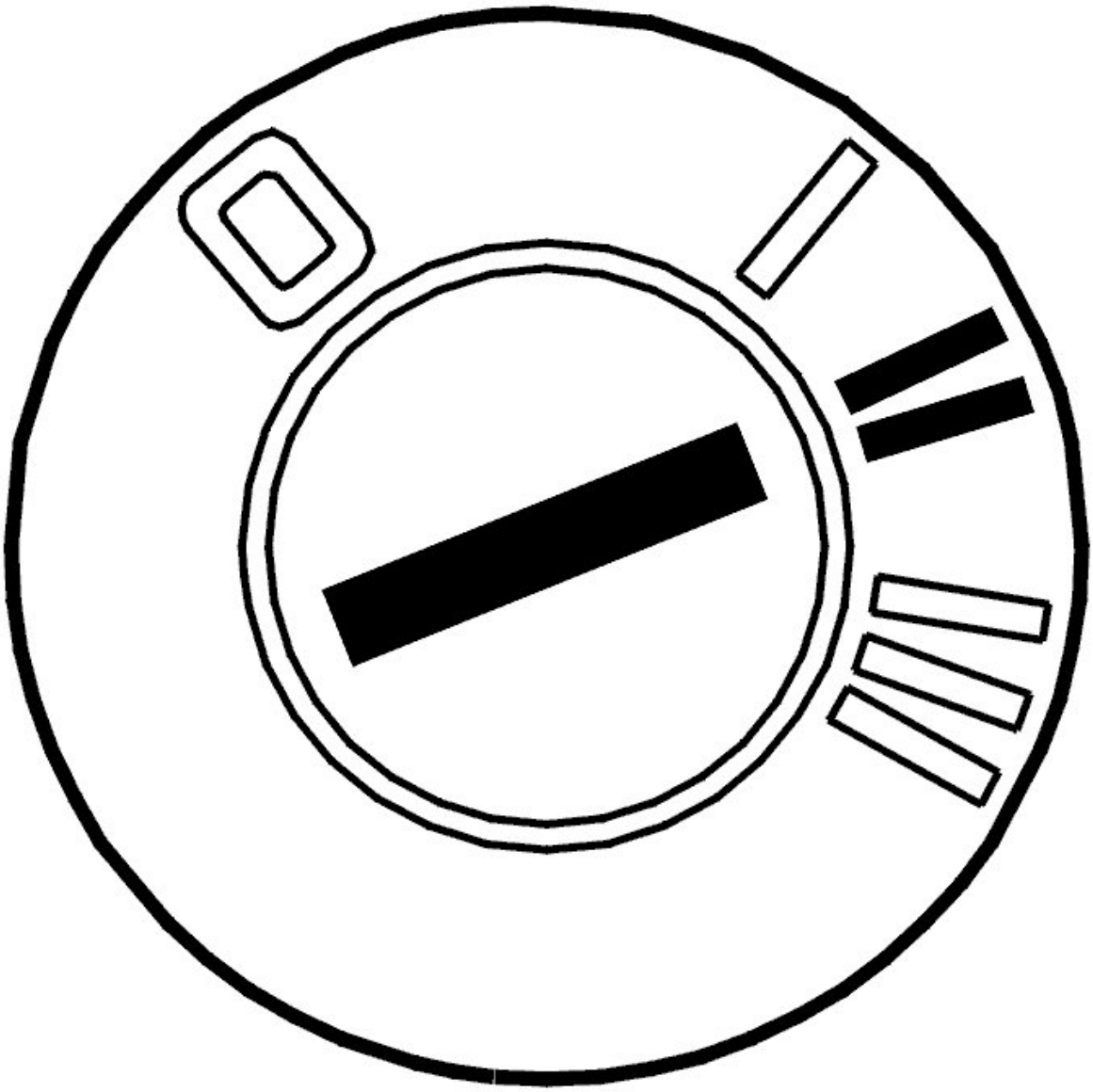


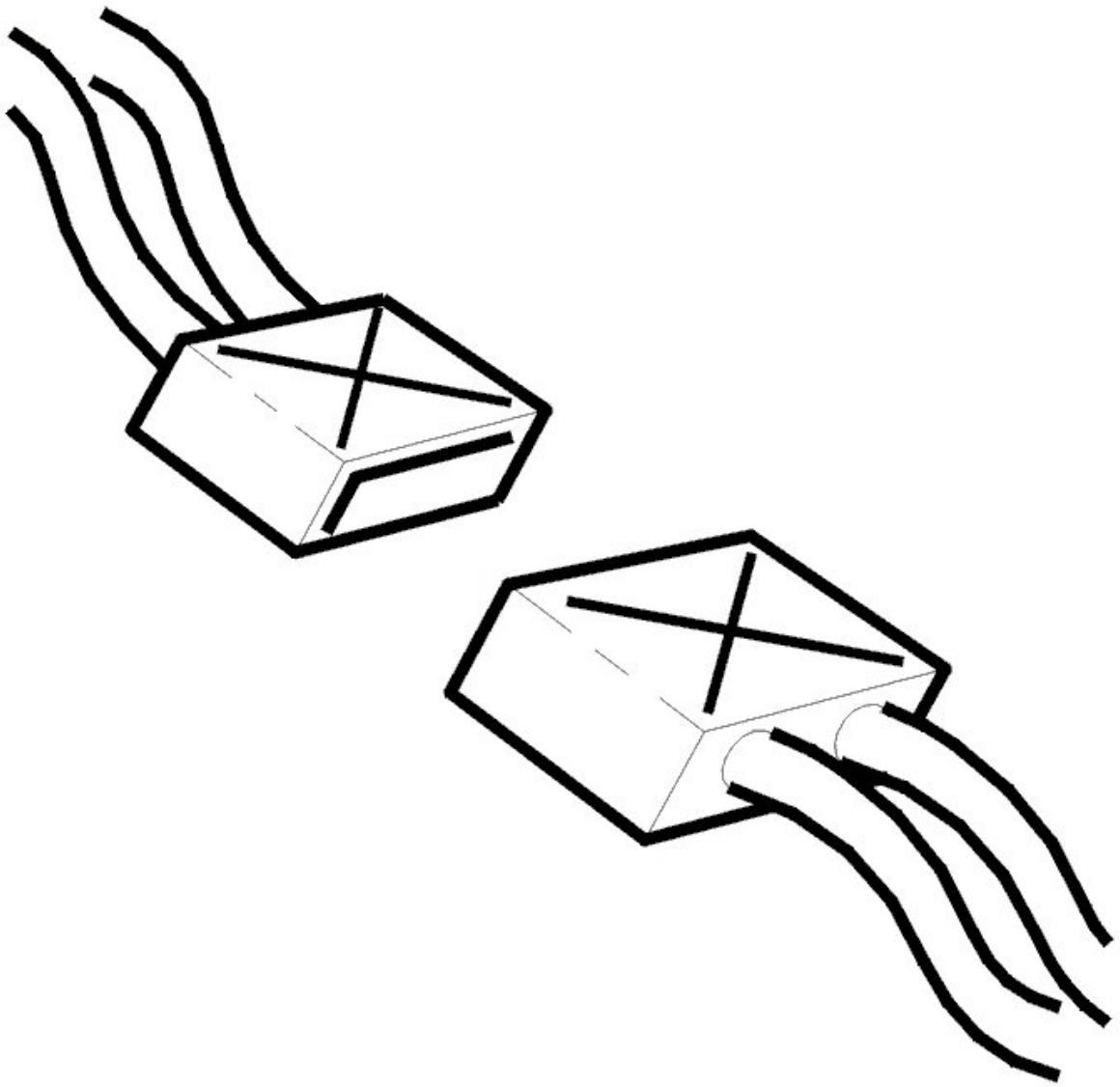
Was a fault detected?

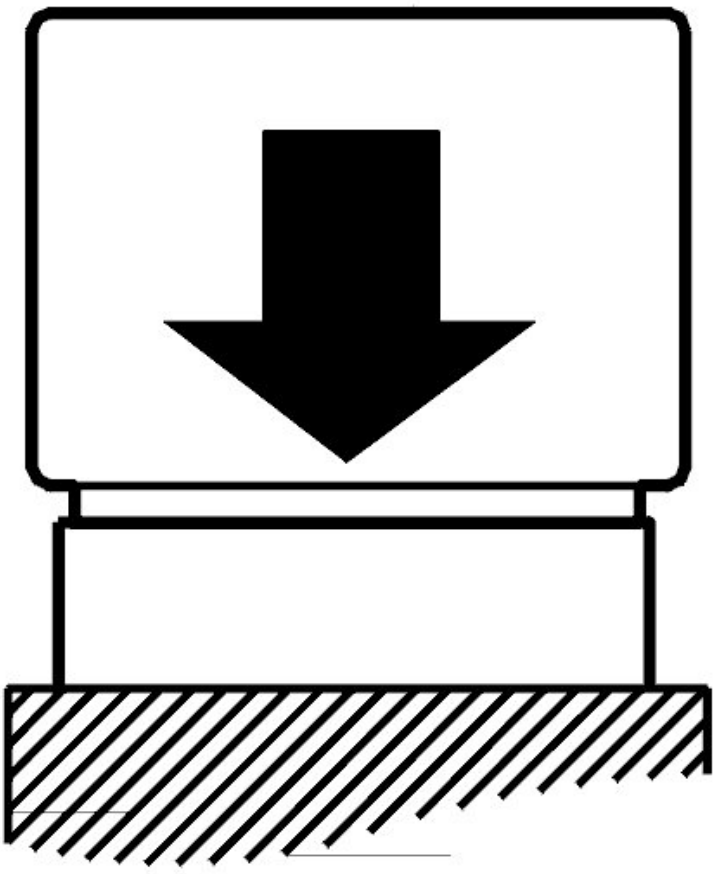
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector disconnected
- Ignition on
- Gear selector in position P.

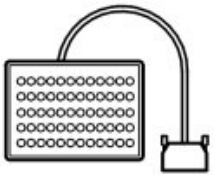
Check the transmission control module (TCM) by measuring the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be approximately 9 kohms.

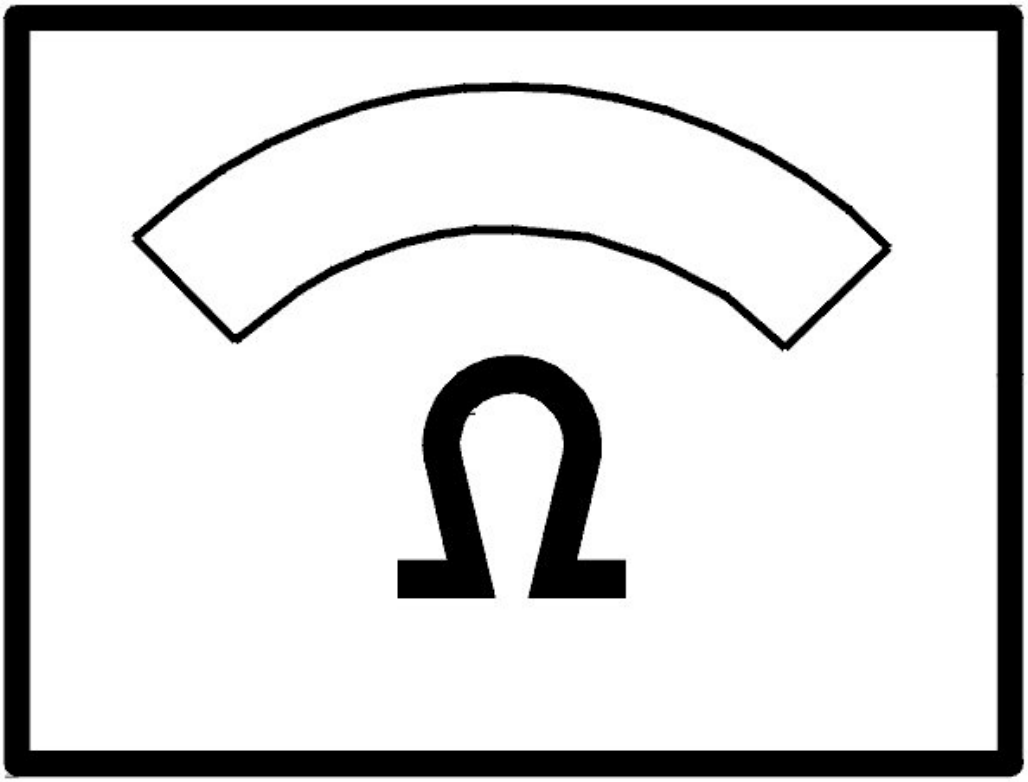
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



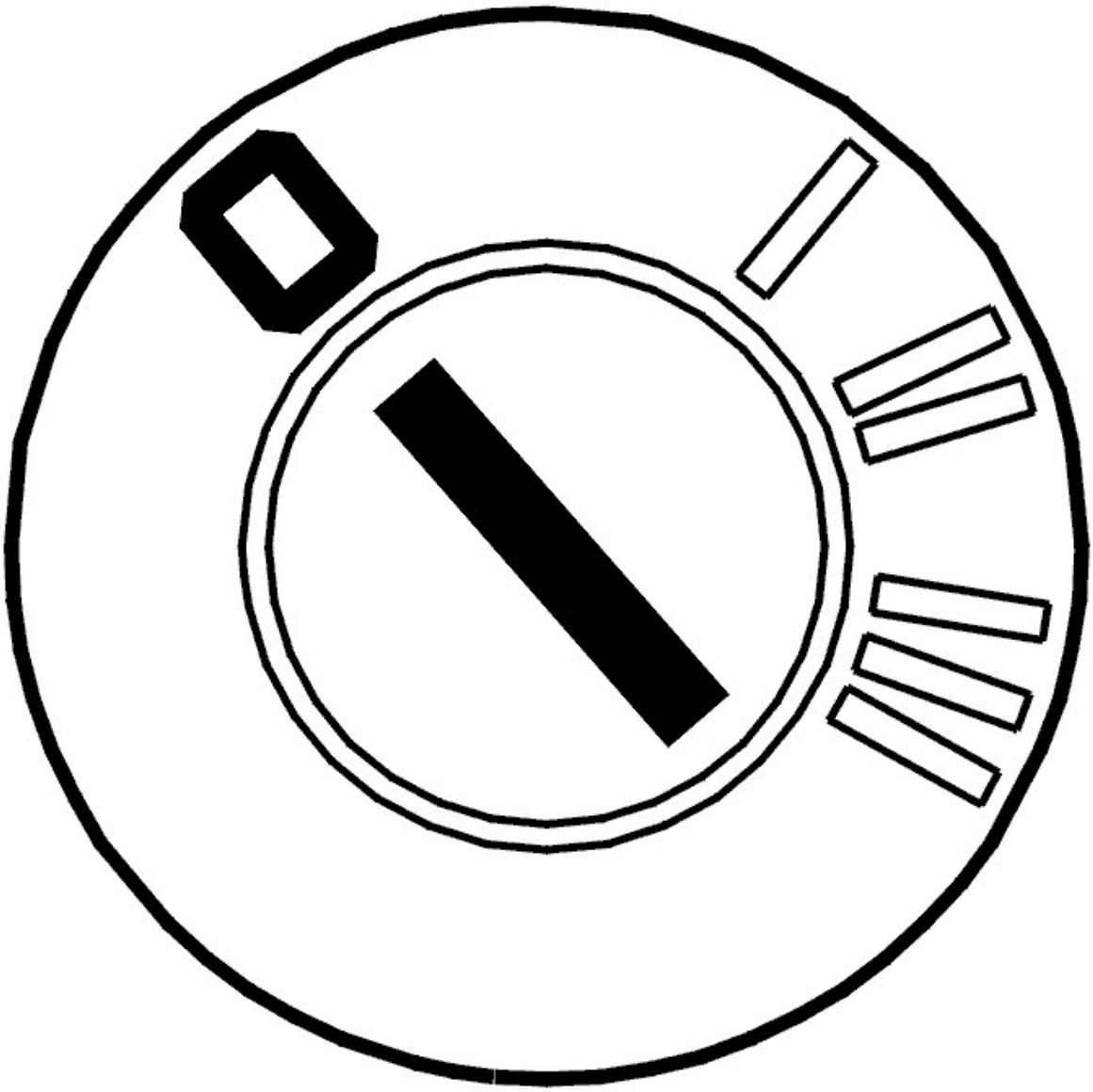


Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component

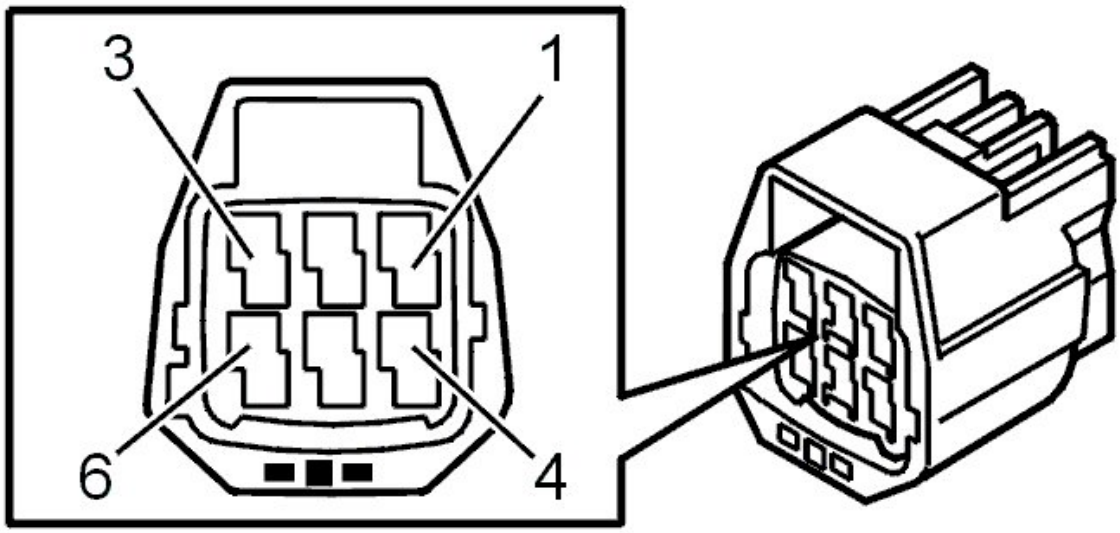


- Ignition off
- Open the transmission control system.

Check the cable between transmission connector terminal #C5 (transmission side) and the connector for solenoid S5. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check solenoid S5 by measuring the resistance between the terminal pin on solenoid S5 and the transmission housing. The resistance must be 11-15 ohms. Replace solenoid S5 if the resistance is incorrect.
Remedy as necessary.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the control system and to check or replace solenoid S5, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).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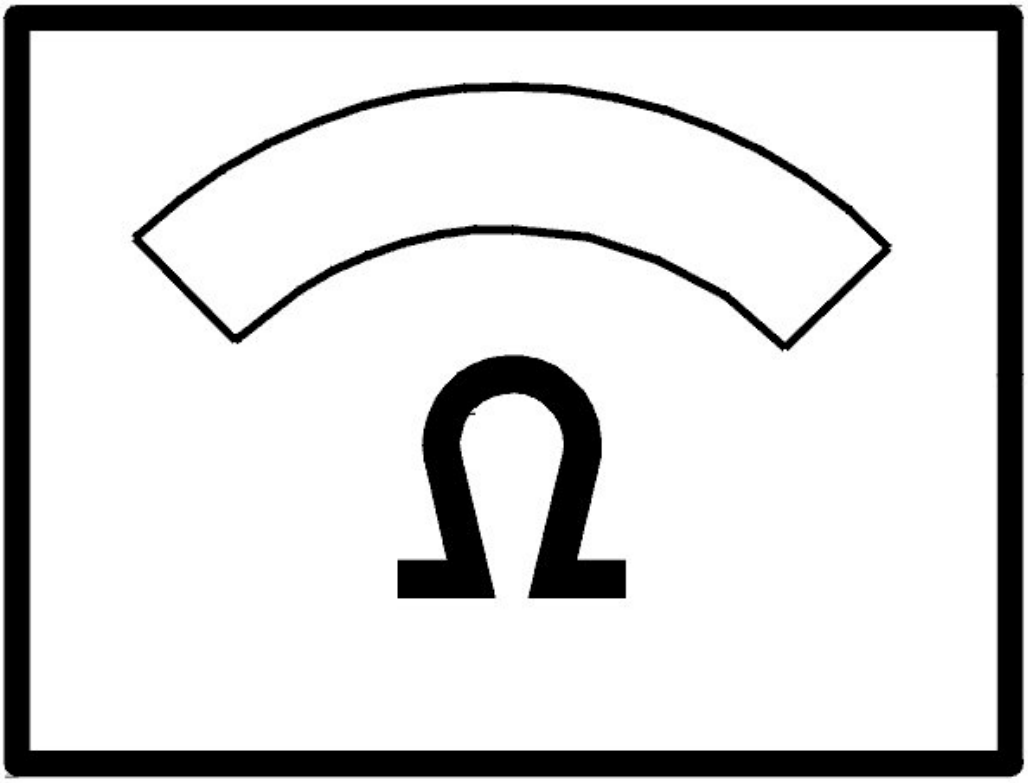
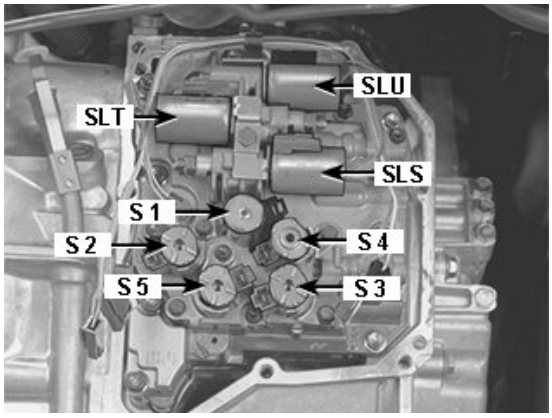
6
4





Location Of Components (Solenoids)

Select Continue when the fault has been remedied.

Continue - Resetting the adaptation and oil quality counter

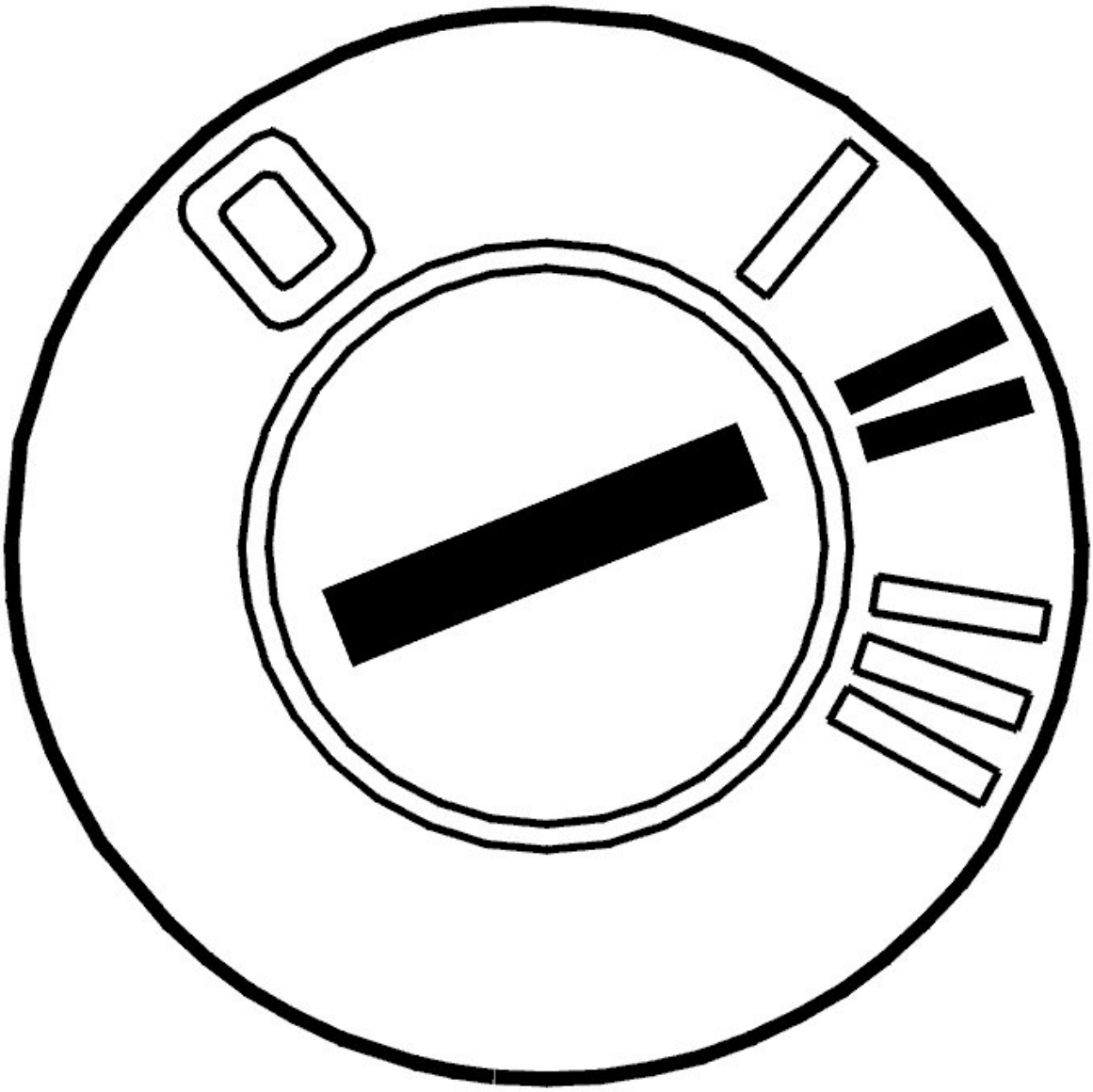
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



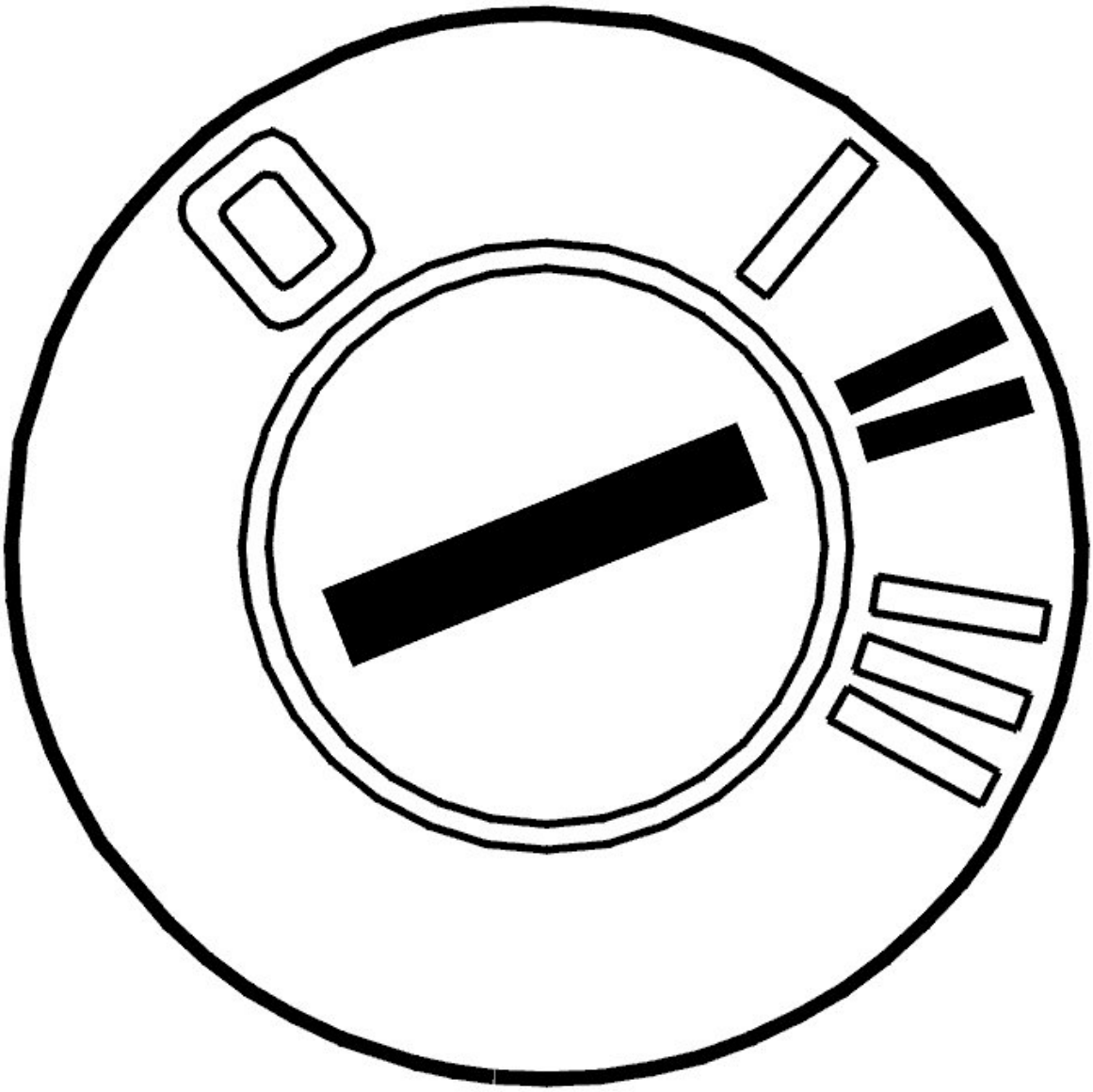
- Ignition on.

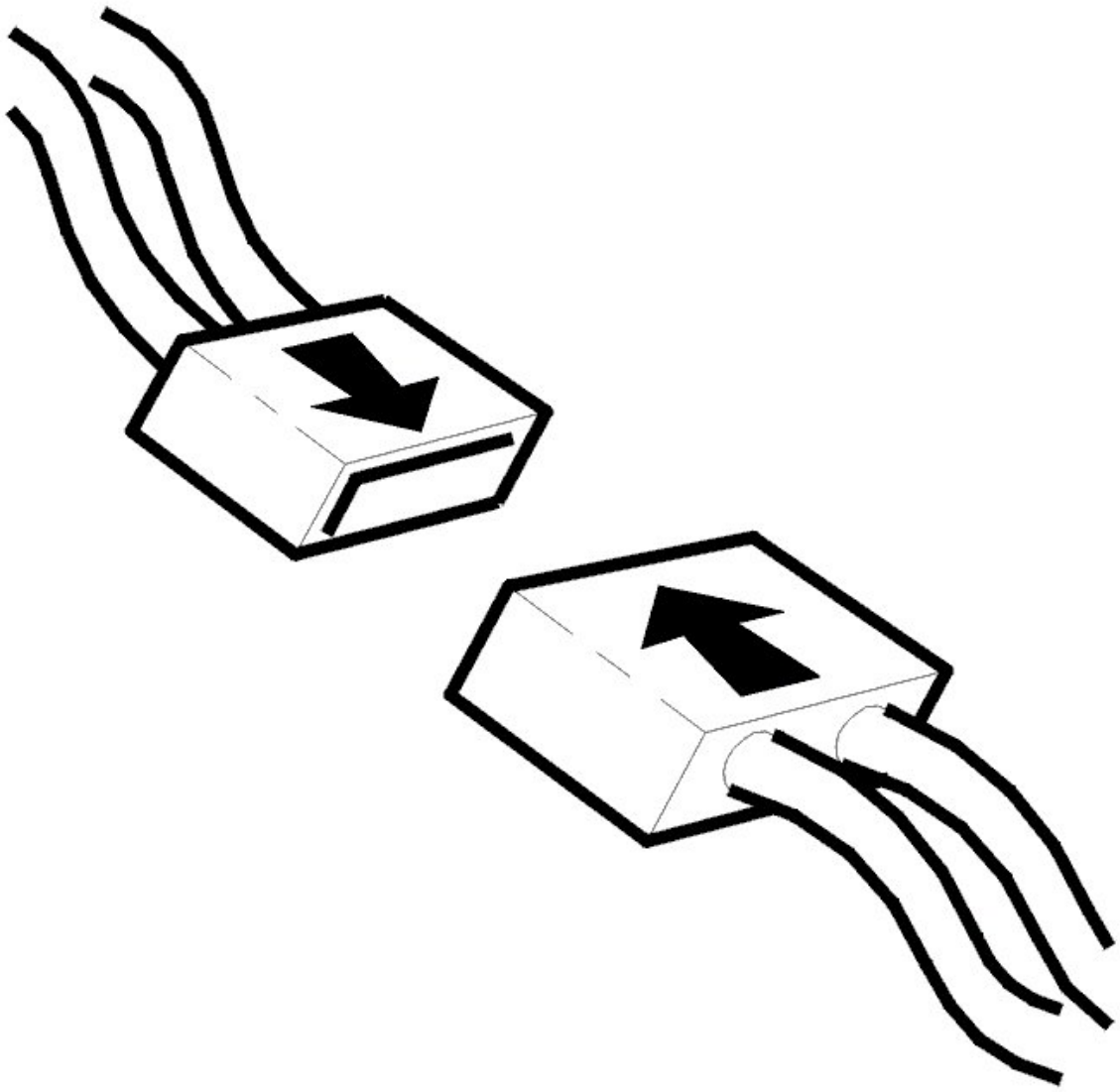
Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S5.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the temperature sensor

Intermittent fault

Check the cable between transmission control module (TCM) terminal #B6 (#A66) and transmission connector terminal #C5 (control module side). Check for an intermittent short-circuit to ground. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults. Check for contact resistance and oxidation. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

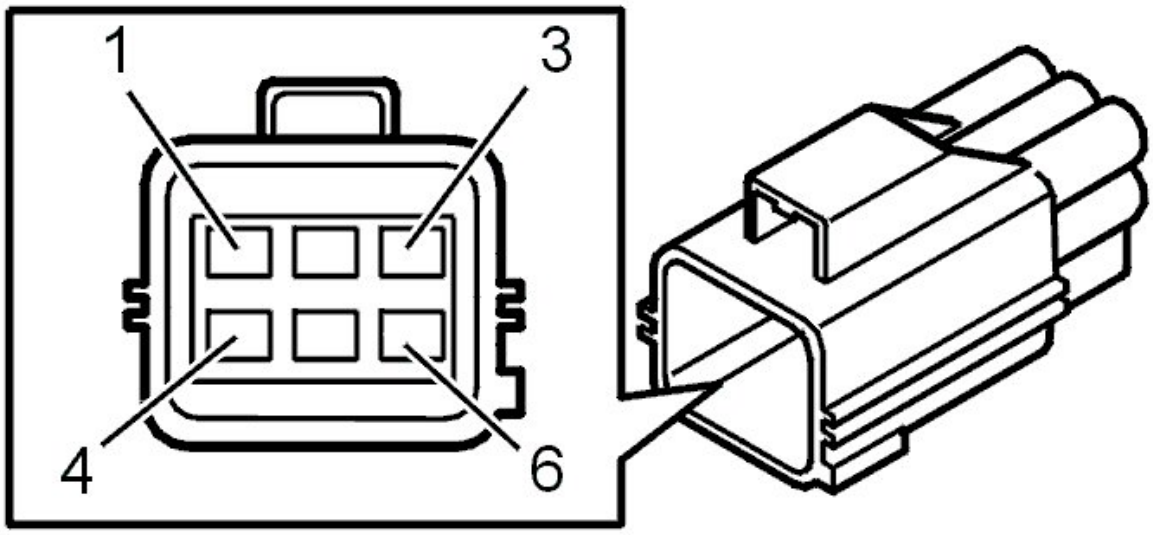
Hint:

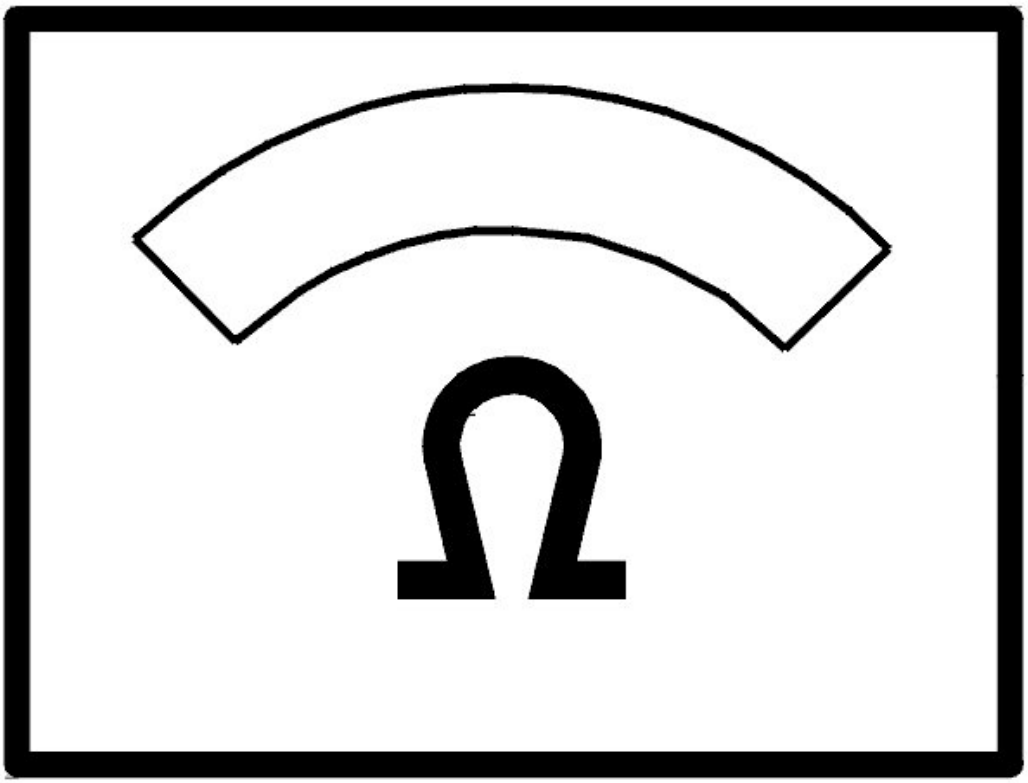
- Check the circuit for solenoid S5. Switch off the ignition. Disconnect the control module. Measure the resistance between terminals #B6 (#A66) and #A53 (#A53) on the breakout box. The resistance must be 11-15 ohms.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information
DONE

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

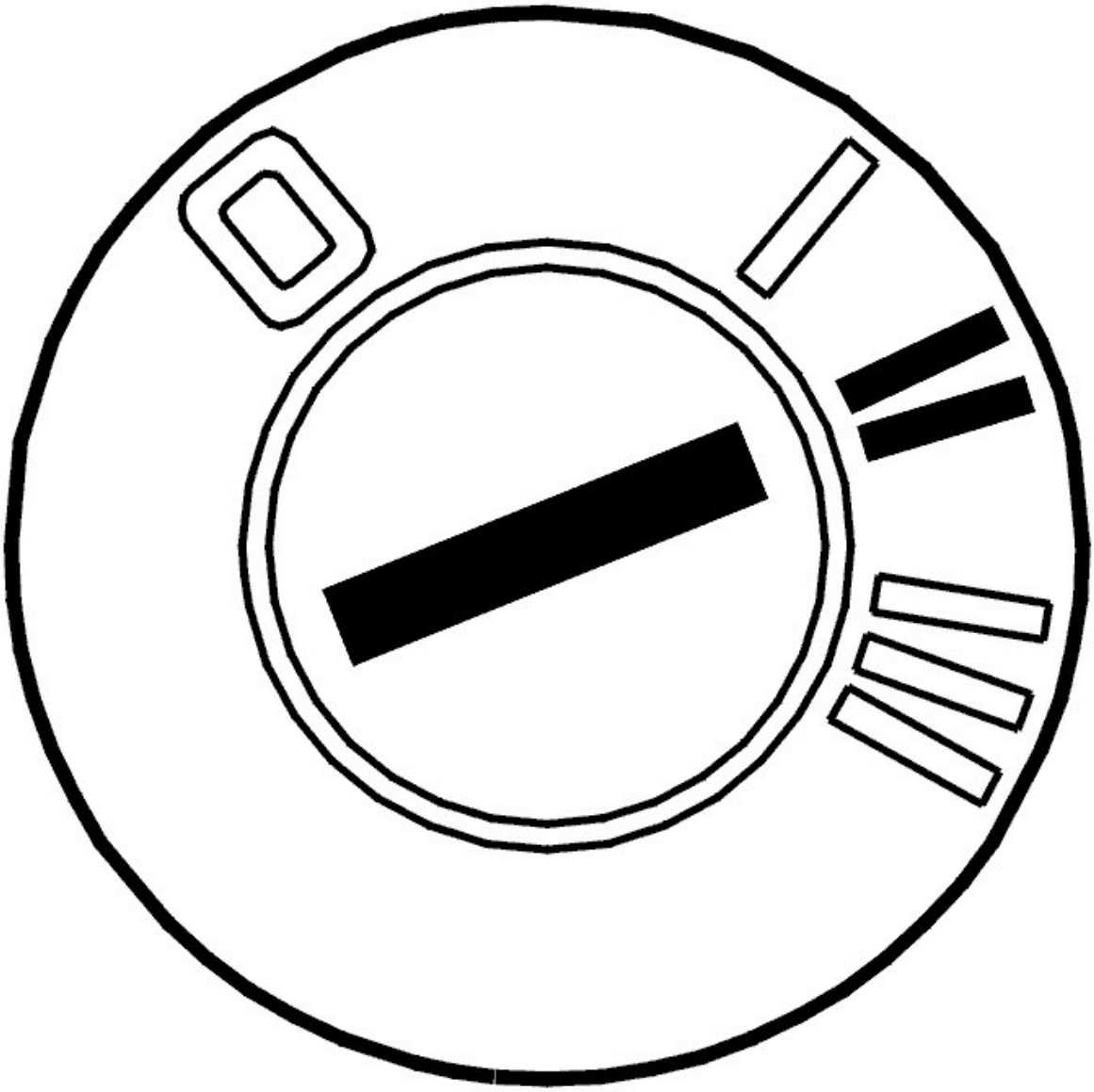
No - Fault Found

Attempt New Test - Checking the temperature sensor

FAULT FOUND - Fault Found

Faulty signal

Checking transmission fluid temperature sensor



- Ignition on
- Read off the oil temperature.

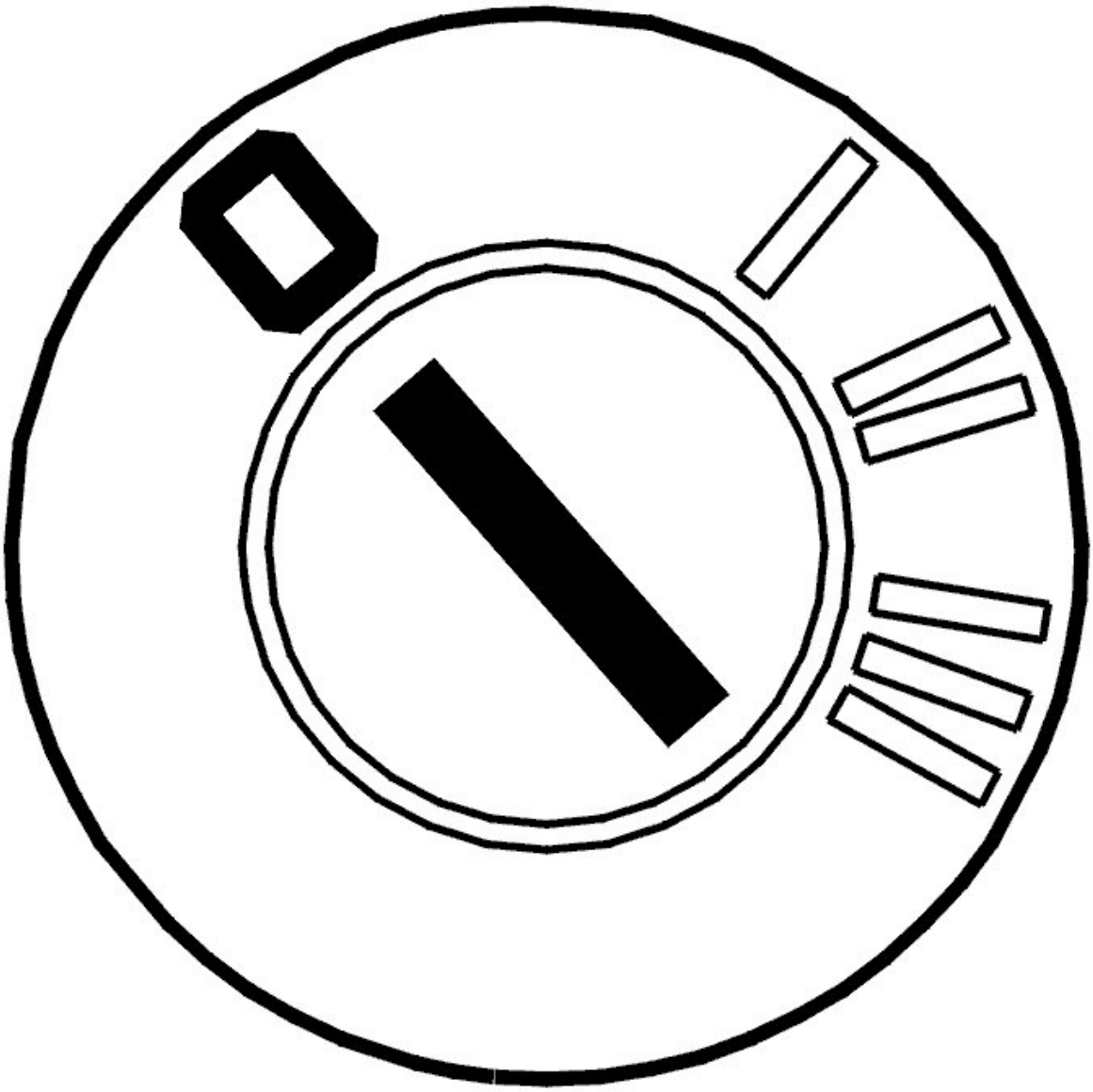
Check that the temperature is within its permitted range.
Compare with the transmission temperature.

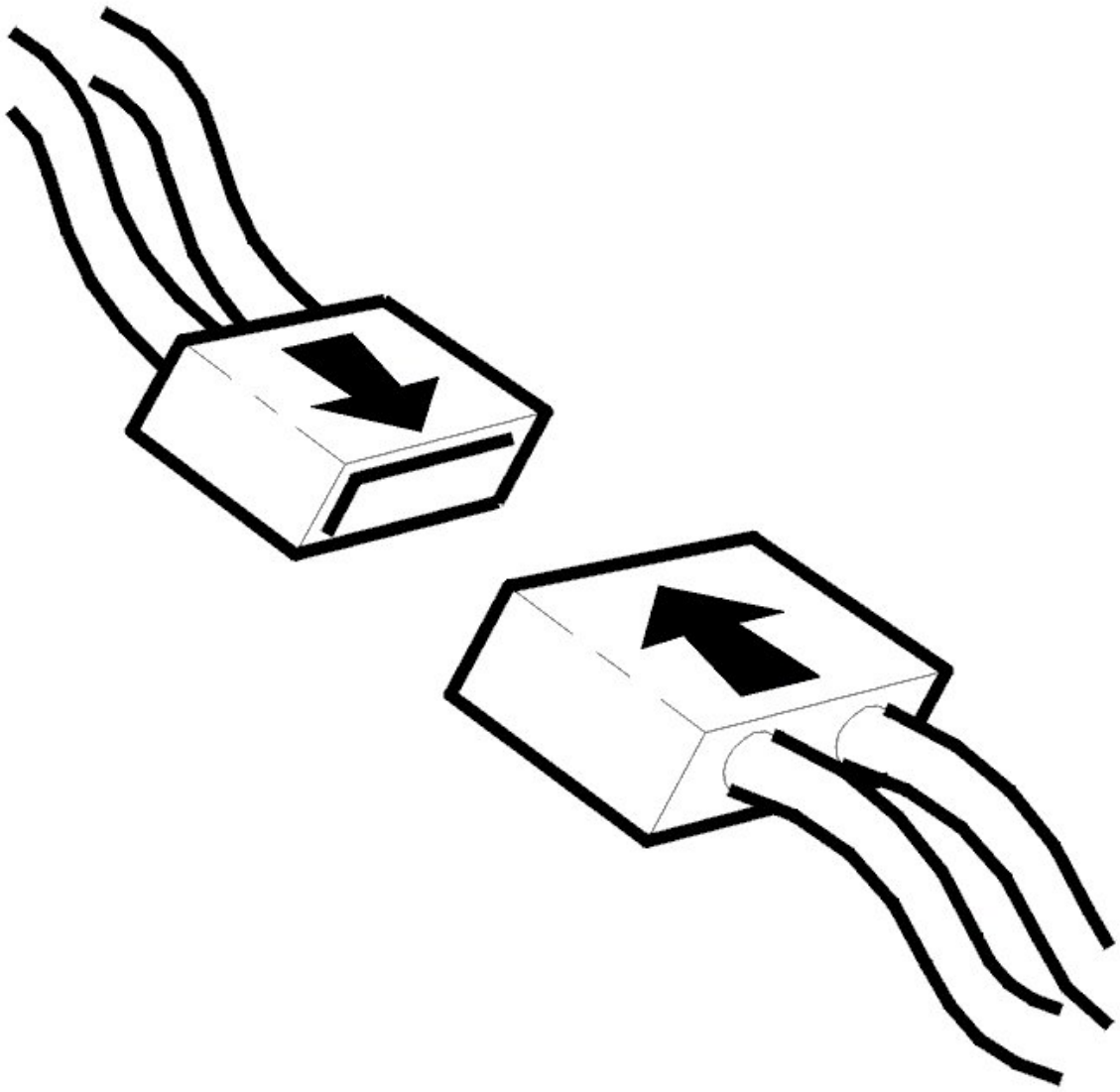
Was the transmission temperature within its permitted range?

Yes - Intermittent fault

No - Checking transmission fluid temperature sensor

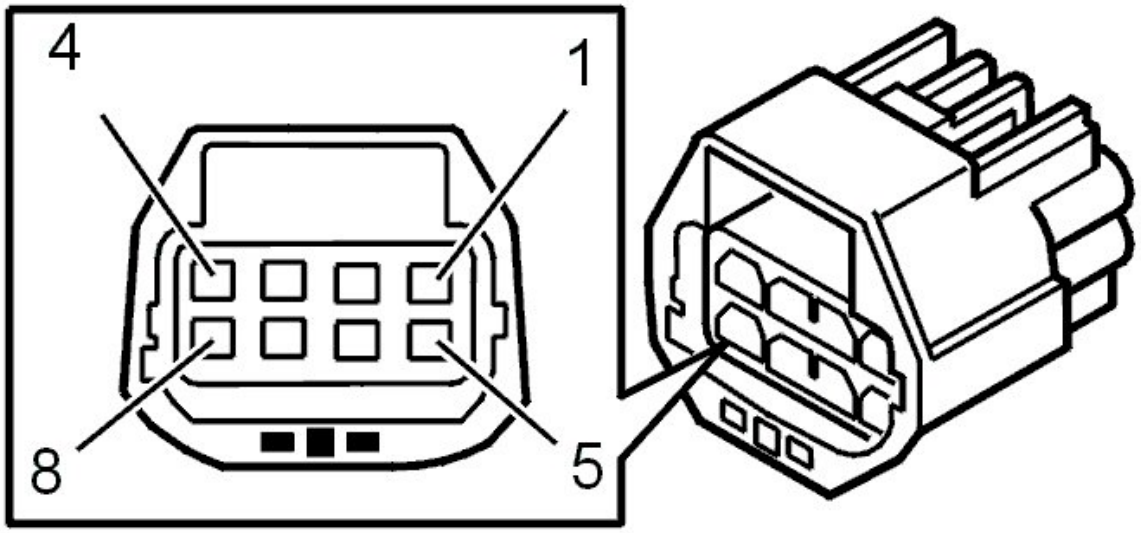
Checking transmission fluid temperature sensor

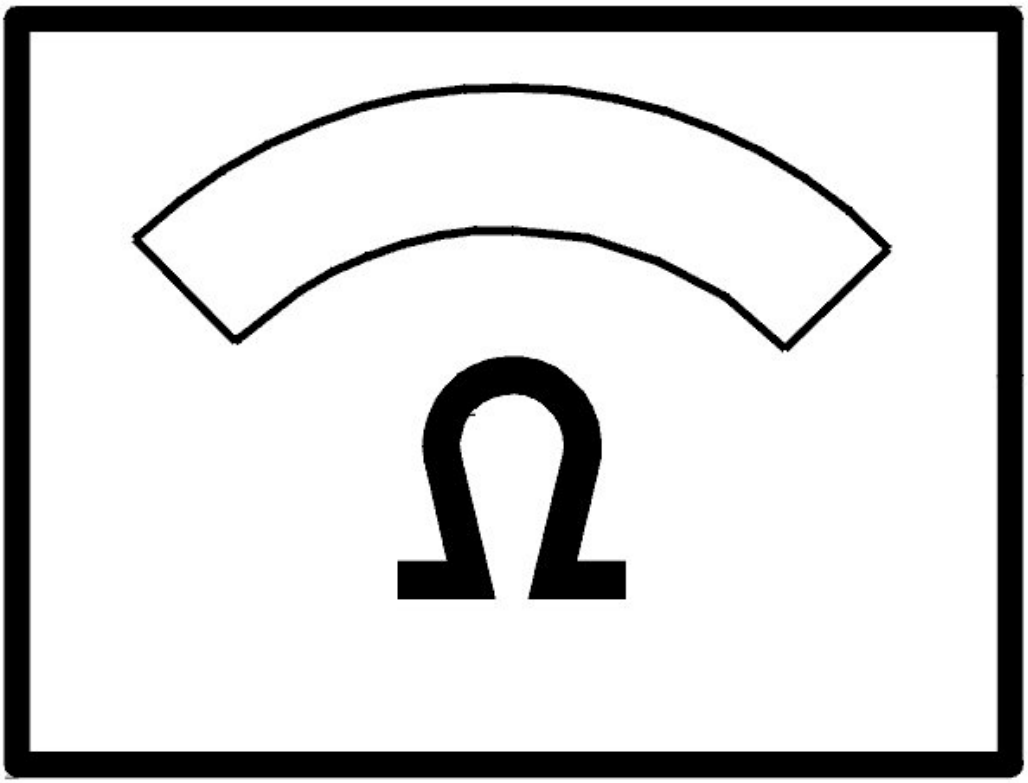




- Ignition off
- Transmission connector D disconnected.

Check the temperature sensor. Measure the resistance between transmission connector D terminals #D7 and #D8.
The resistance must be 4.5-6 kohms at 20°C.





Was the resistance OK?

Yes - Checking transmission fluid temperature sensor

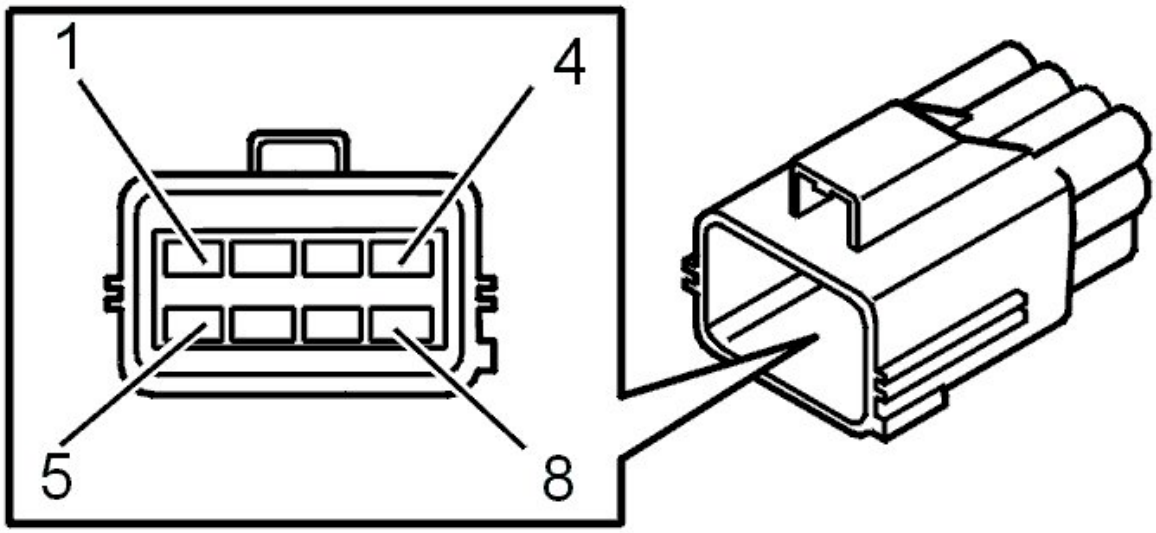
No - Checking the cable and component

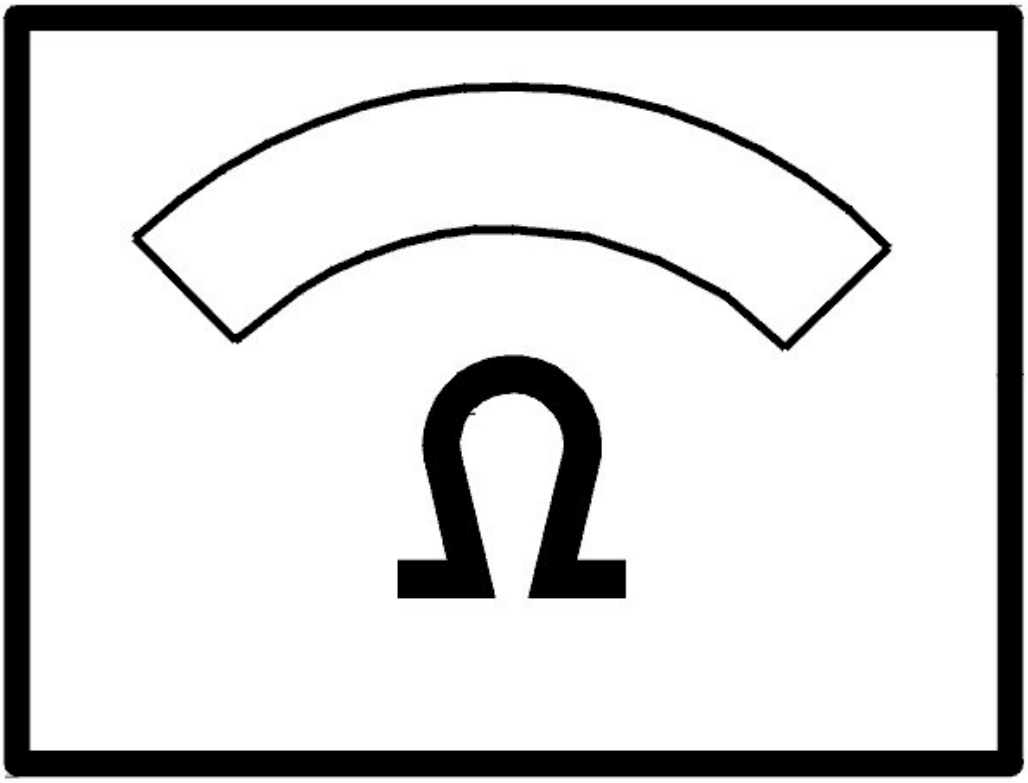
Checking transmission fluid temperature sensor

Check the cable between control module terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



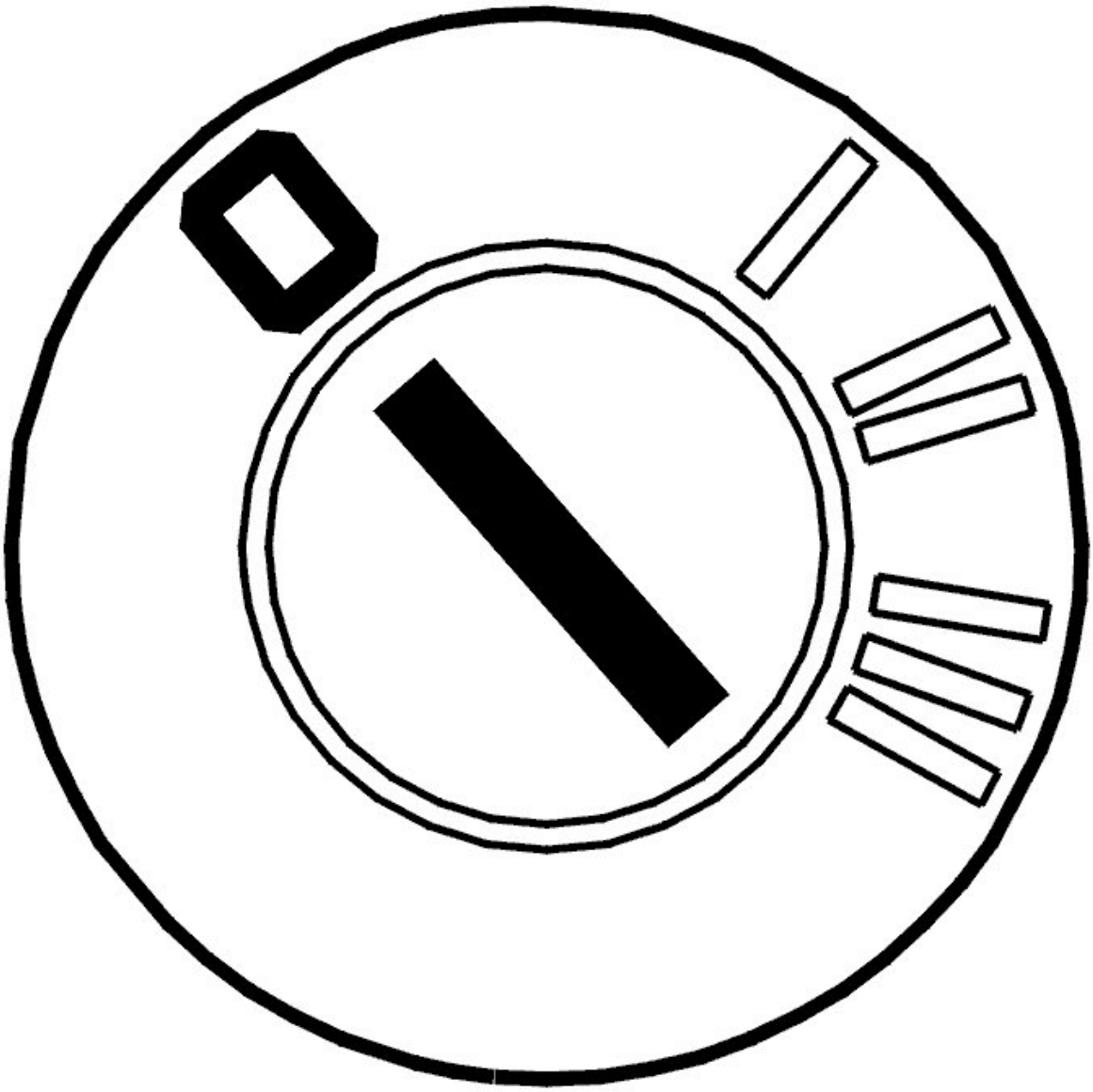


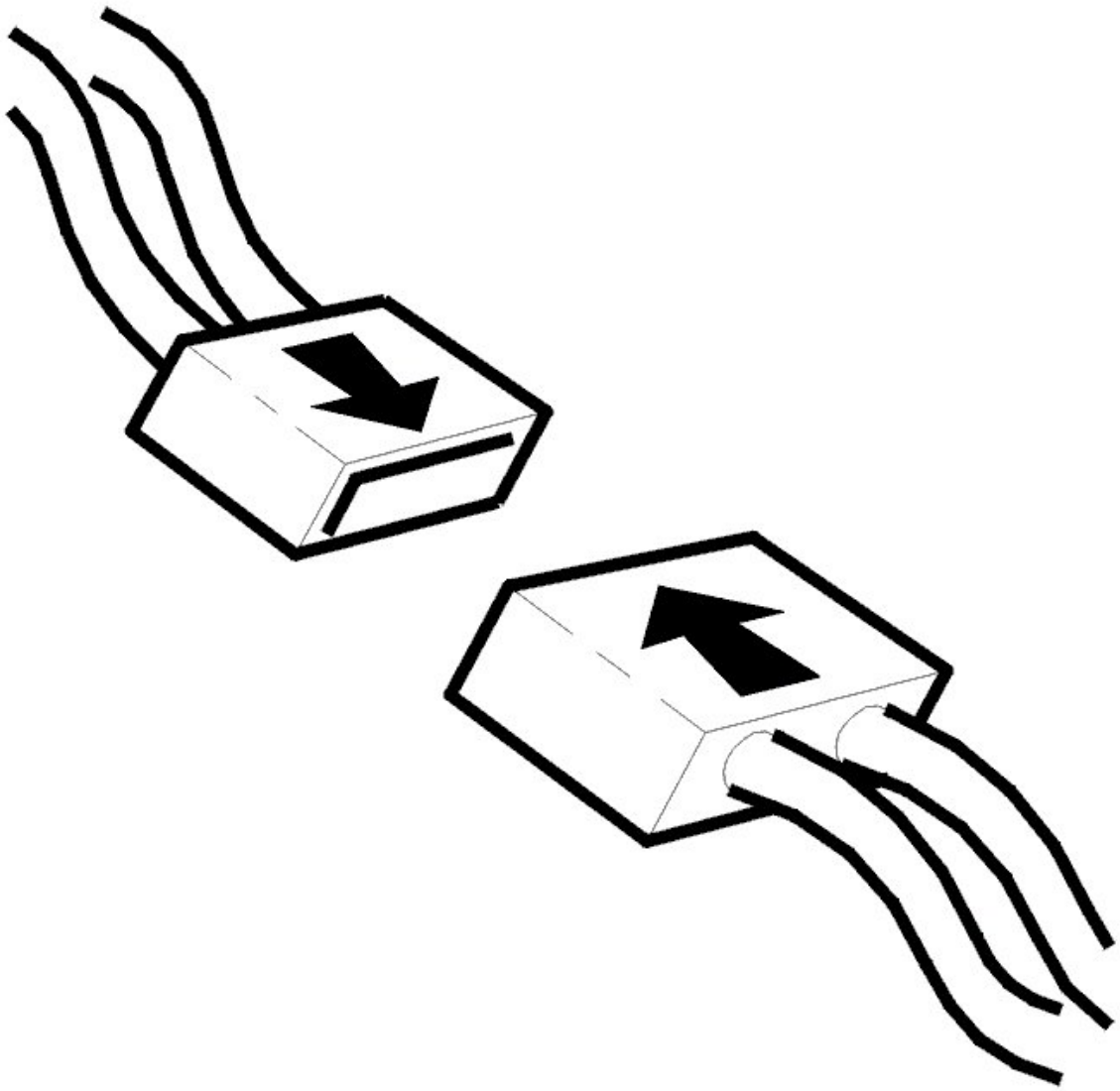
Was a fault detected?

Yes - Verification

No - Checking the cable and component

Checking the cable and component





- Ignition off
- Open the transmission control system.

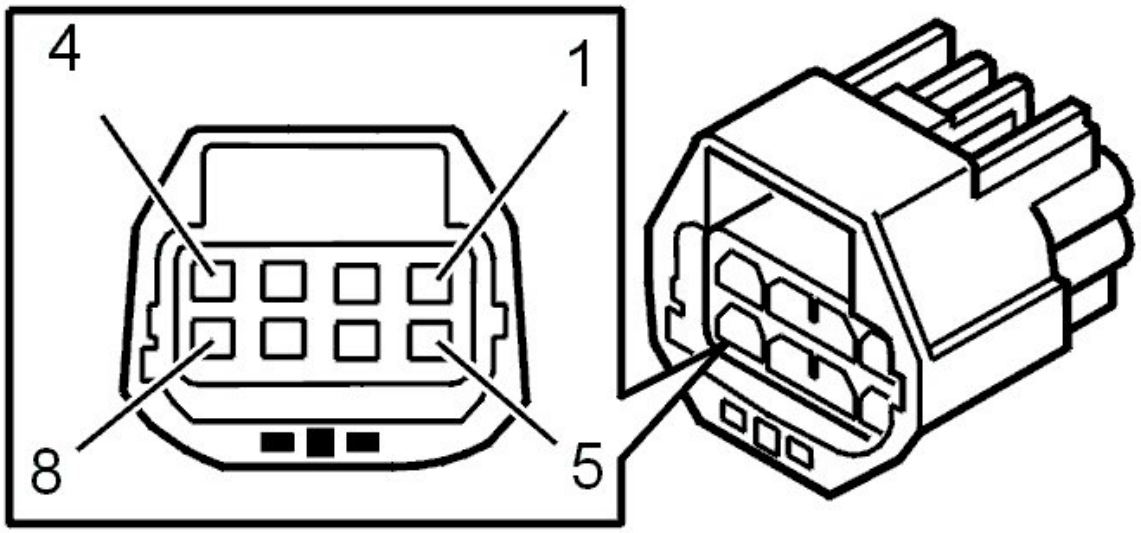
Check the cable between transmission connector terminal #D7 and temperature sensor terminal #1. Check the cable between transmission connector #D8 and temperature sensor terminal #2. Check for an open-circuit according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check the cables for a short-circuit to each other.

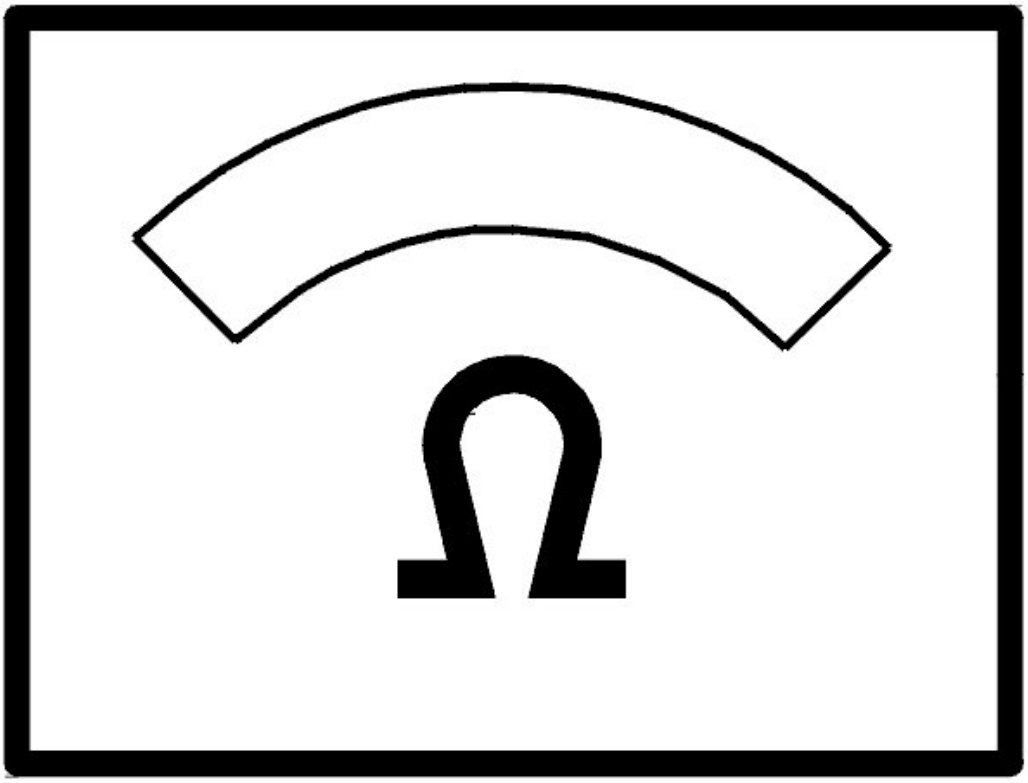
Hint: Check the temperature sensor. With the ignition off and transmission connector D disconnected, measure the resistance between transmission connector D terminals #D7 and #D8. The resistance must be 4.5-6 kohms at 20 °C.

Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open the transmission control system and to check or replace the temperature sensor, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





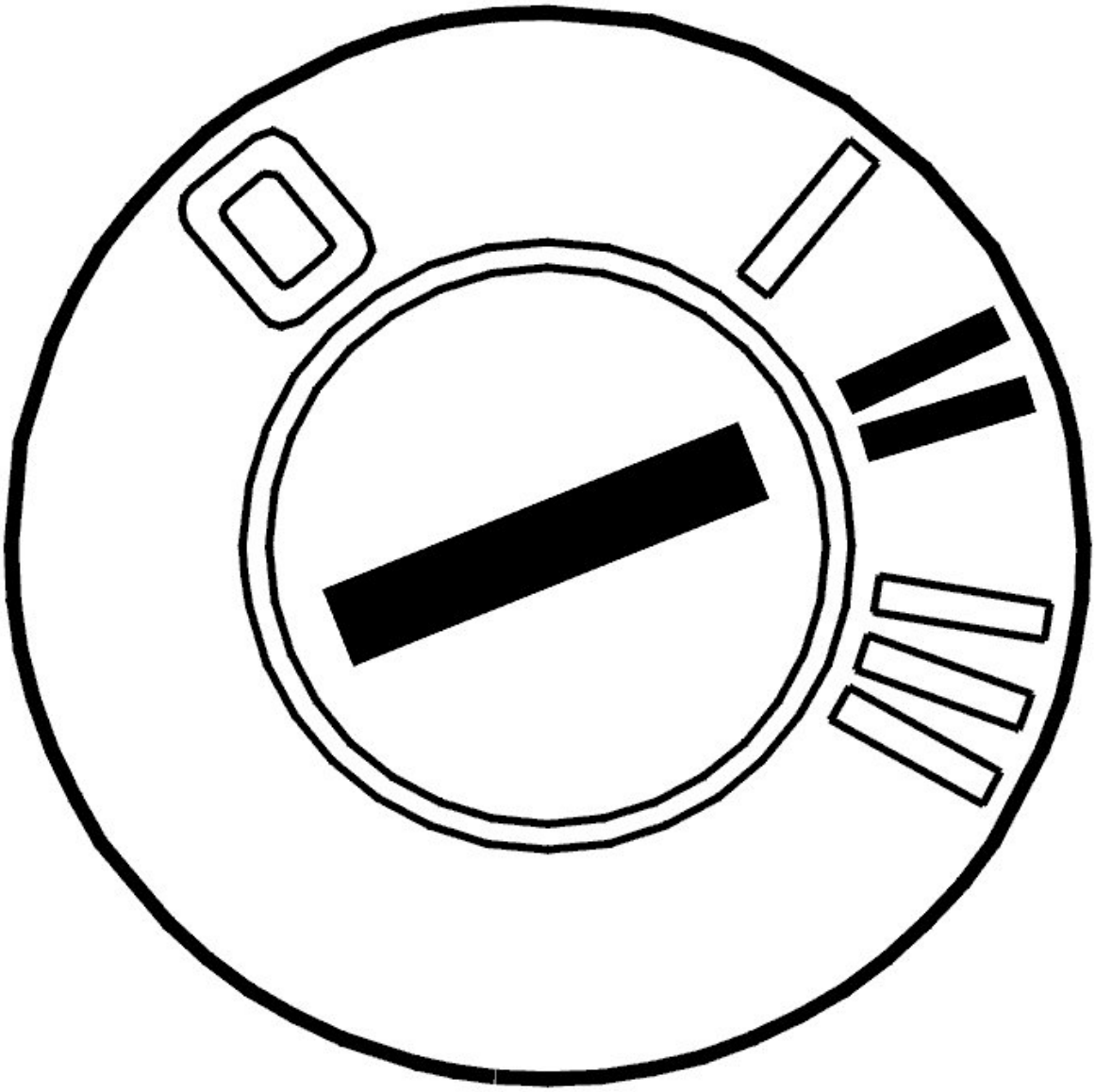
Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

Resetting Transmission fluid change counter

Hint: The transmission control module (TCM) has a counter for the oil quality. The counter counts up if the transmission is exposed to too high a load or an ambient temperature that is too high. If the counter is not reset when the oil is drained or changed, there is a risk that a diagnostic trouble code (DTC) will be stored in faulty circumstances. Therefore it is important that the "Transmission oil change" counter is reset.

Note! This applies only when the transmission fluid is changed and when the fluid is changed when repairs are carried out to the transmission temperature sensor.



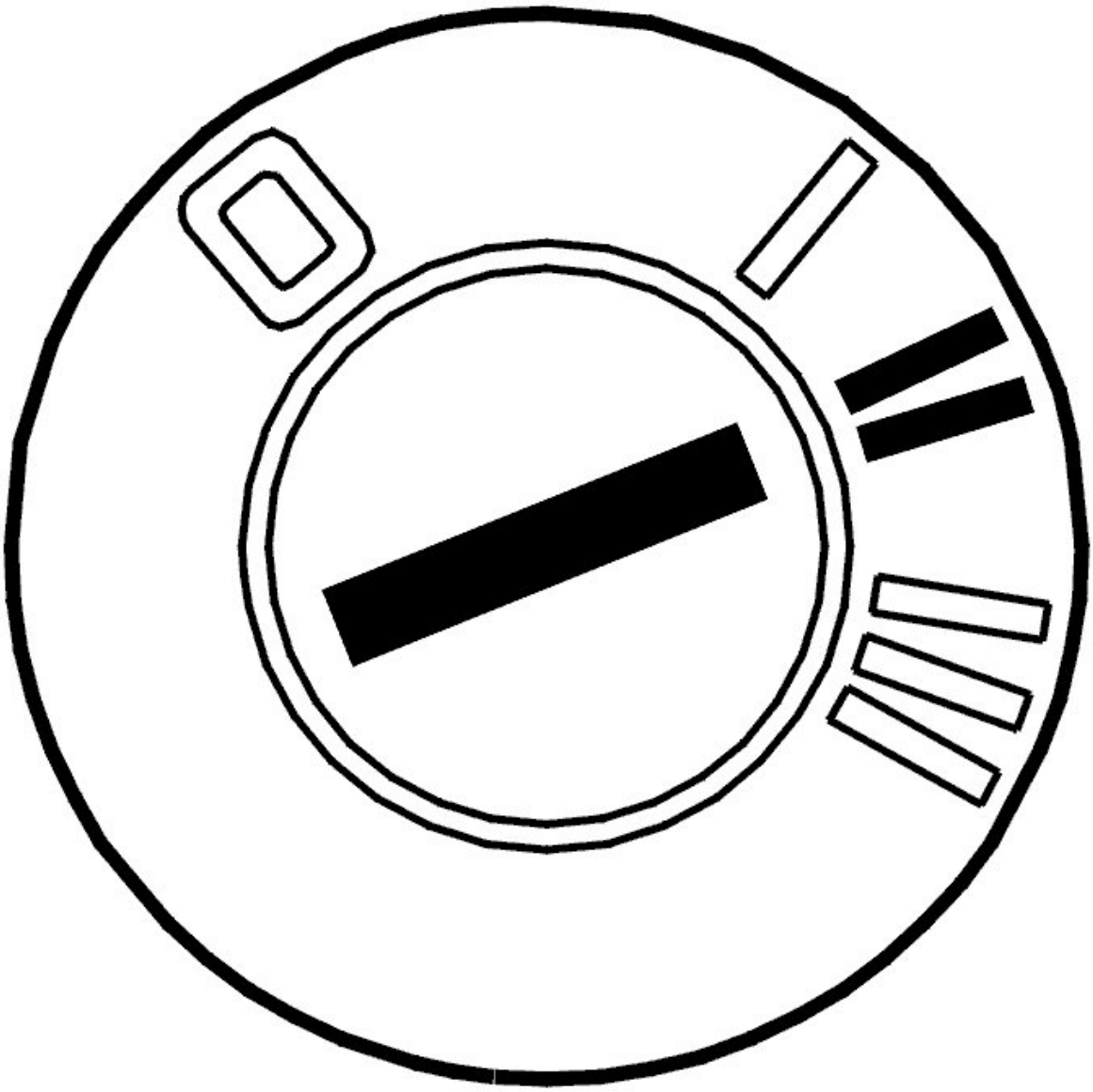
- Ignition on.

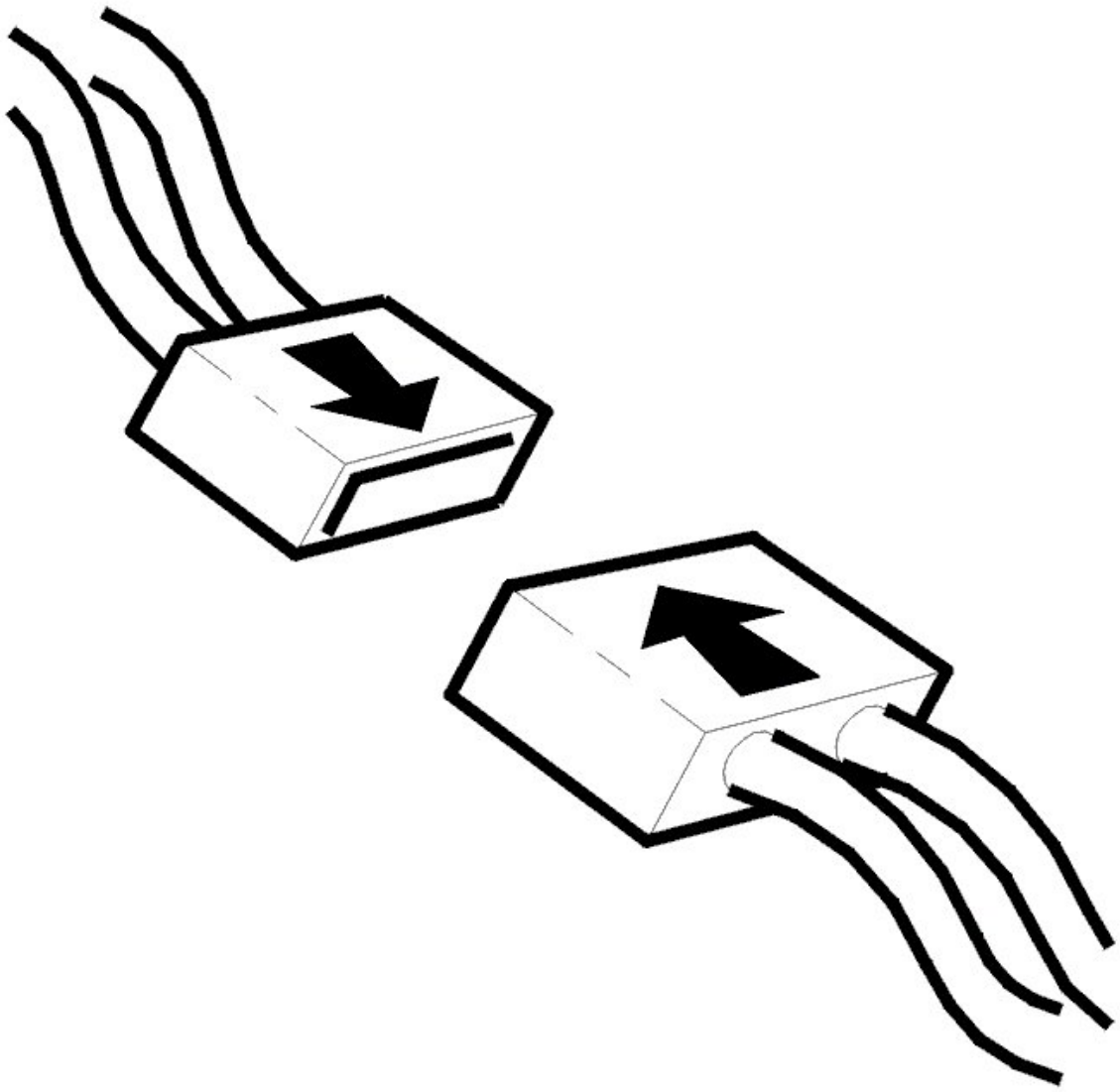
Reset the counter by clicking on the VCT 2000 symbol.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.
- Read off the oil temperature.

Check that the transmission oil temperature is within its permitted range.
Compare with the transmission temperature.

Note! The transmission temperature sensor is located inside the control unit and can be affected by the heat given off by the solenoids.

Is the oil temperature within its permitted range?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking transmission fluid temperature sensor

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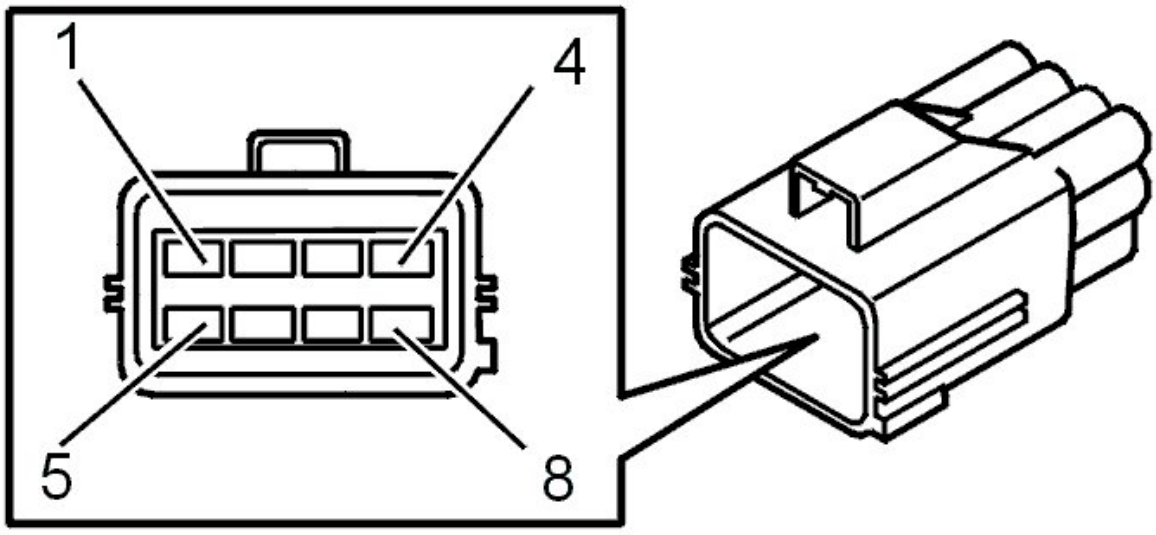
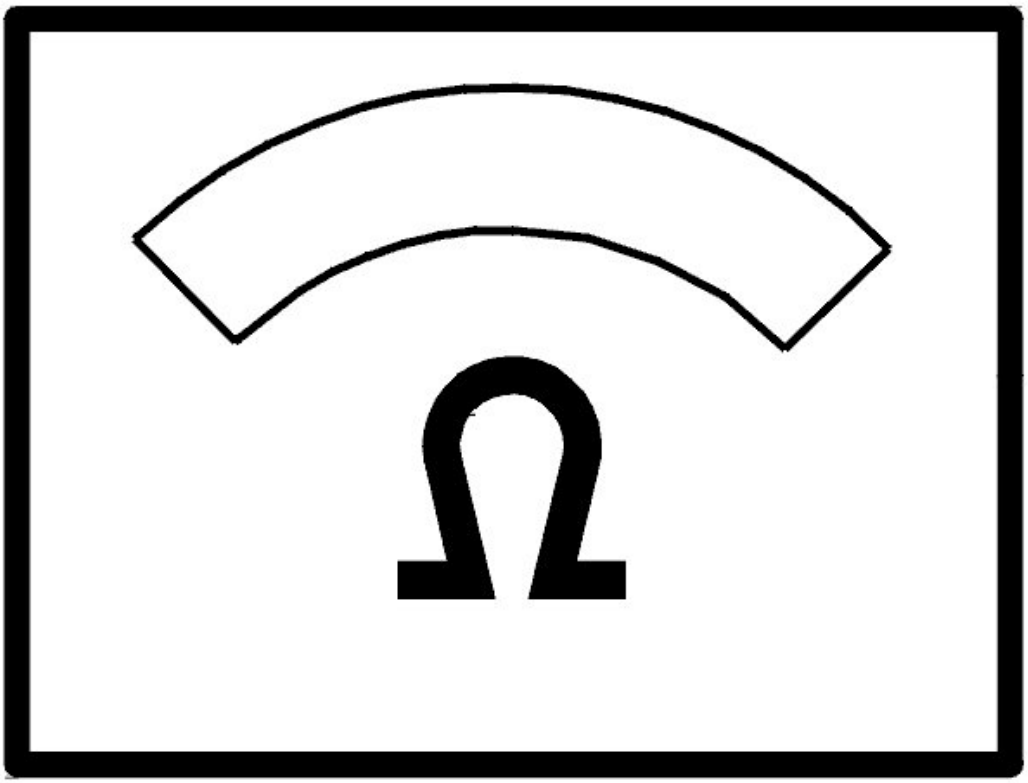
Intermittent fault

Check the transmission control module (TCM) and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between transmission control module (TCM) terminal #A37 (#A37) and transmission connector terminal #D7 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cable between control module terminal #A55 (#A55)and transmission connector terminal #D8 (control module side). Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking transmission fluid temperature sensor

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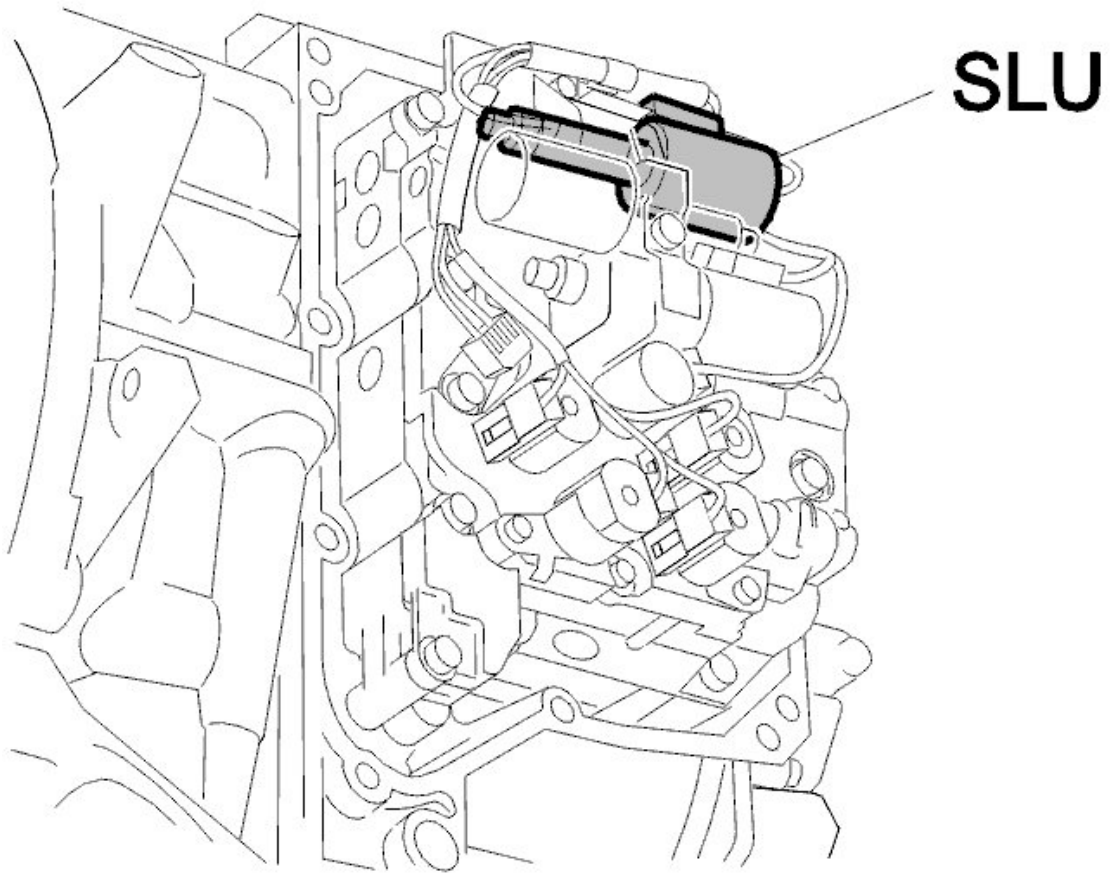
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010D is stored if the transmission control module (TCM) registers a short-circuit to supply voltage in the solenoid SLU circuit when the solenoid should not be activated. Solenoid SLU is probably activated permanently.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source

- Short-circuit to supply voltage in the signal cable.
- Defective control module.

Fault symptom[s]

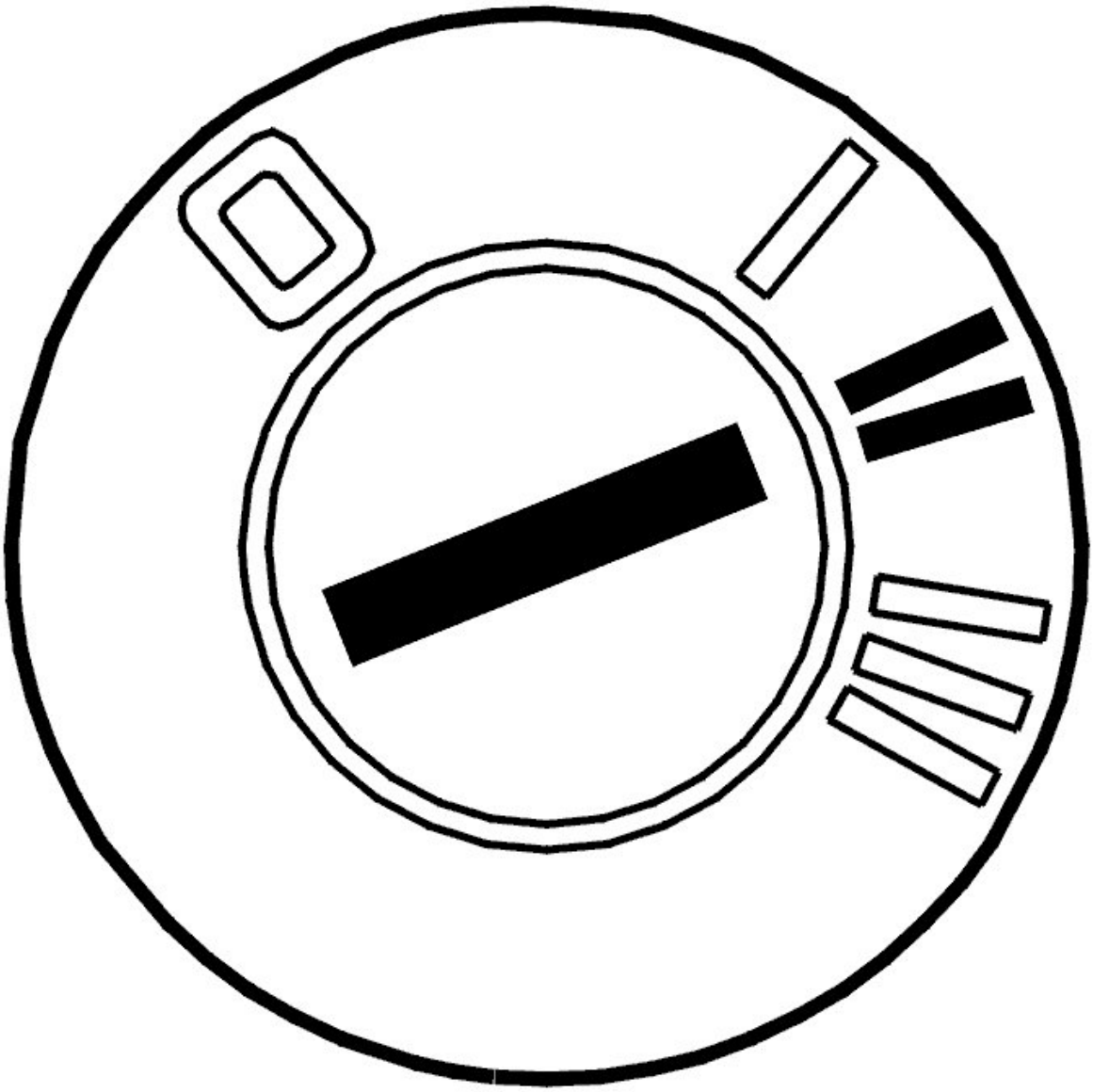
- General orange warning lamp lit.
- Harsh gear shifting.
- No shifting.
- Irregular shifting.

Hint: Harsh shifting is caused by the solenoid being permanently activated.

Signal Too High. Permanent Fault

Signal too high. Permanent fault

Checking line pressure solenoid SLU



- Ignition on
- Activate solenoid SLU.

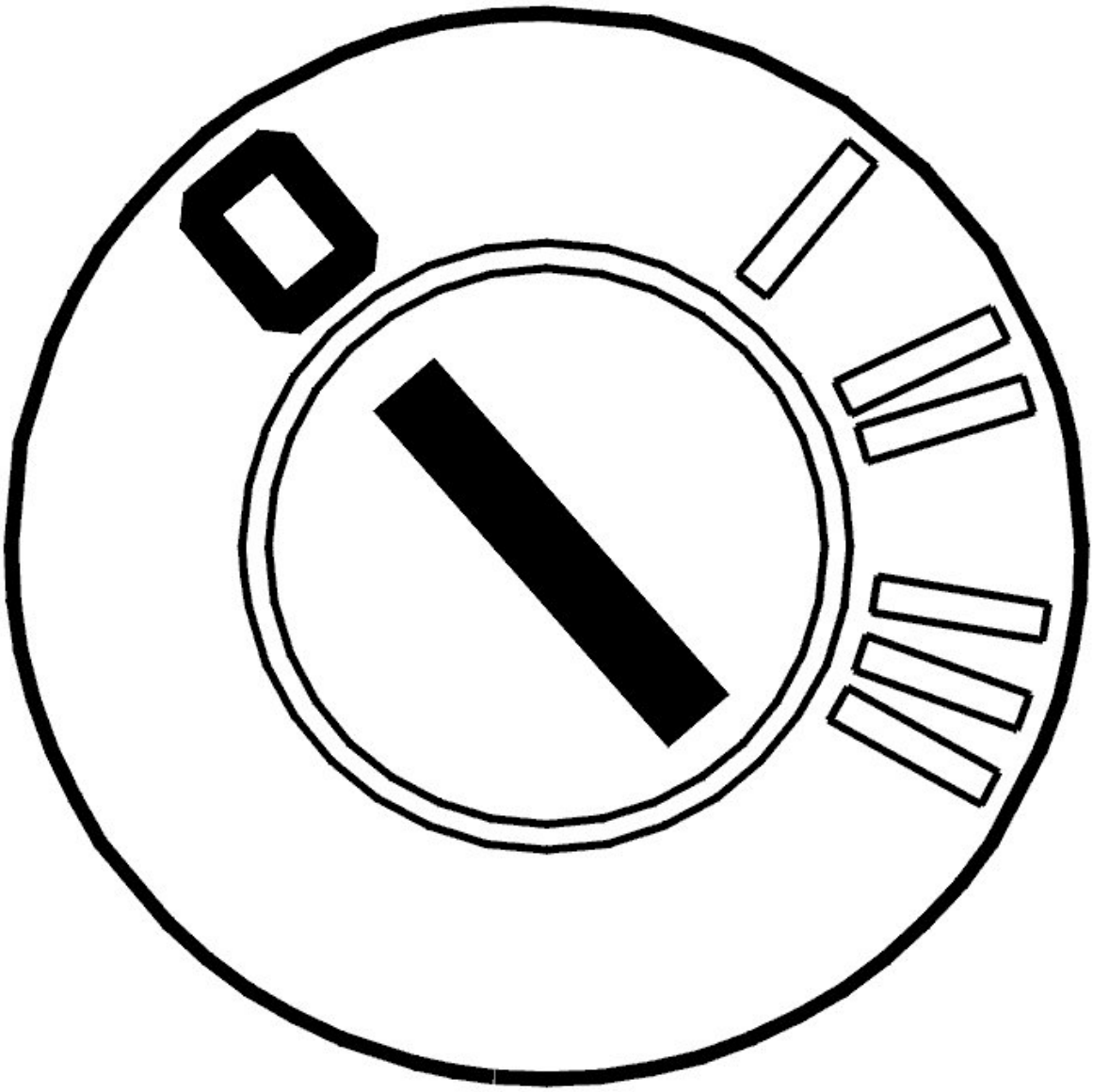
Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

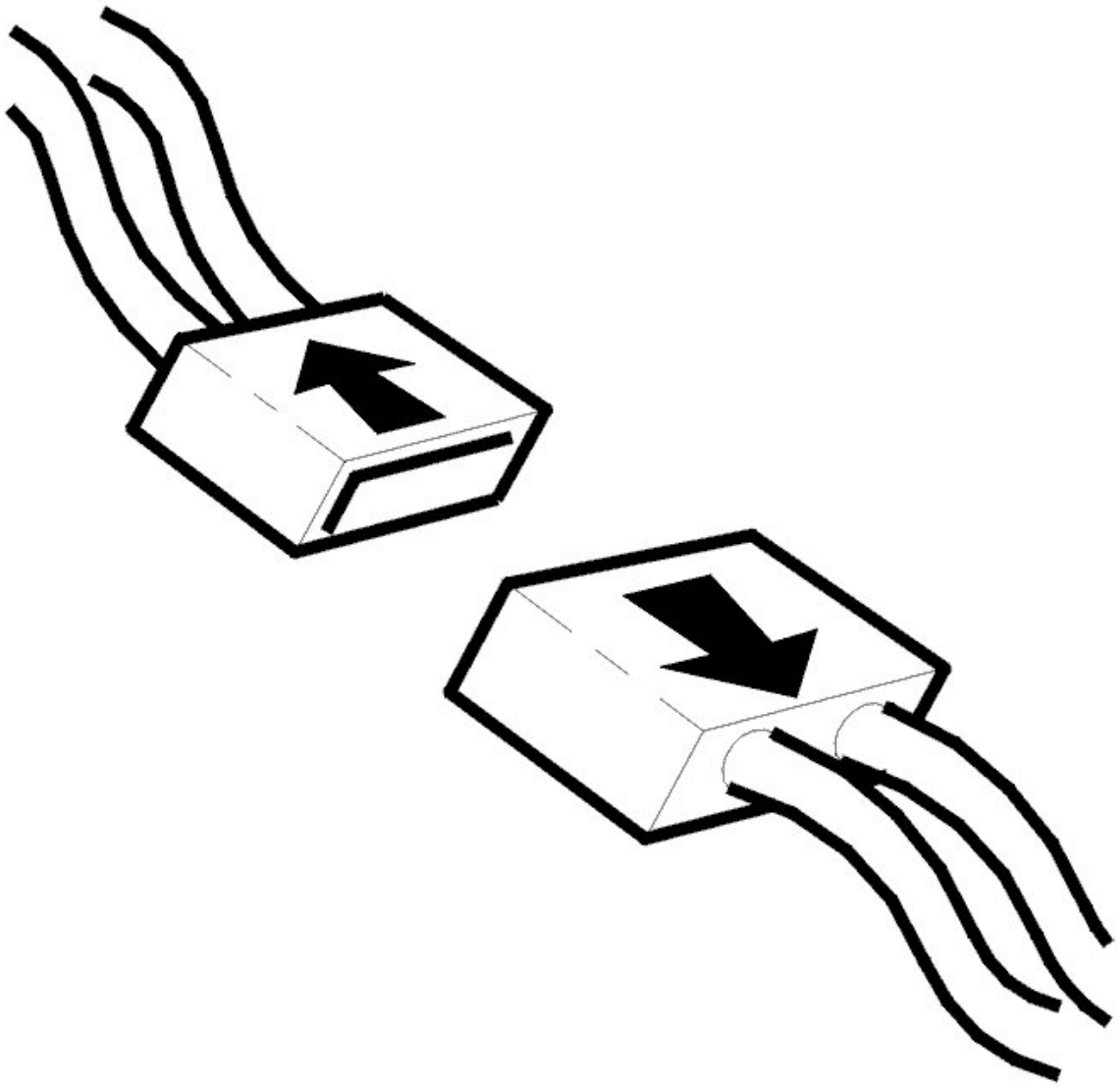
Does the current oscillate?

Yes - No Fault Found

No - Checking the wiring

Checking the wiring



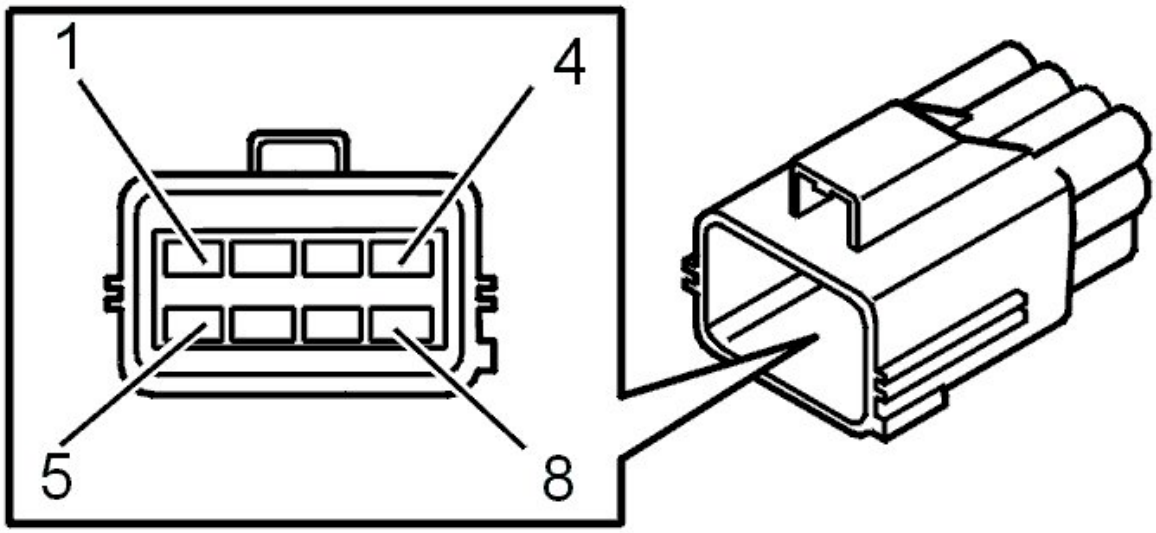


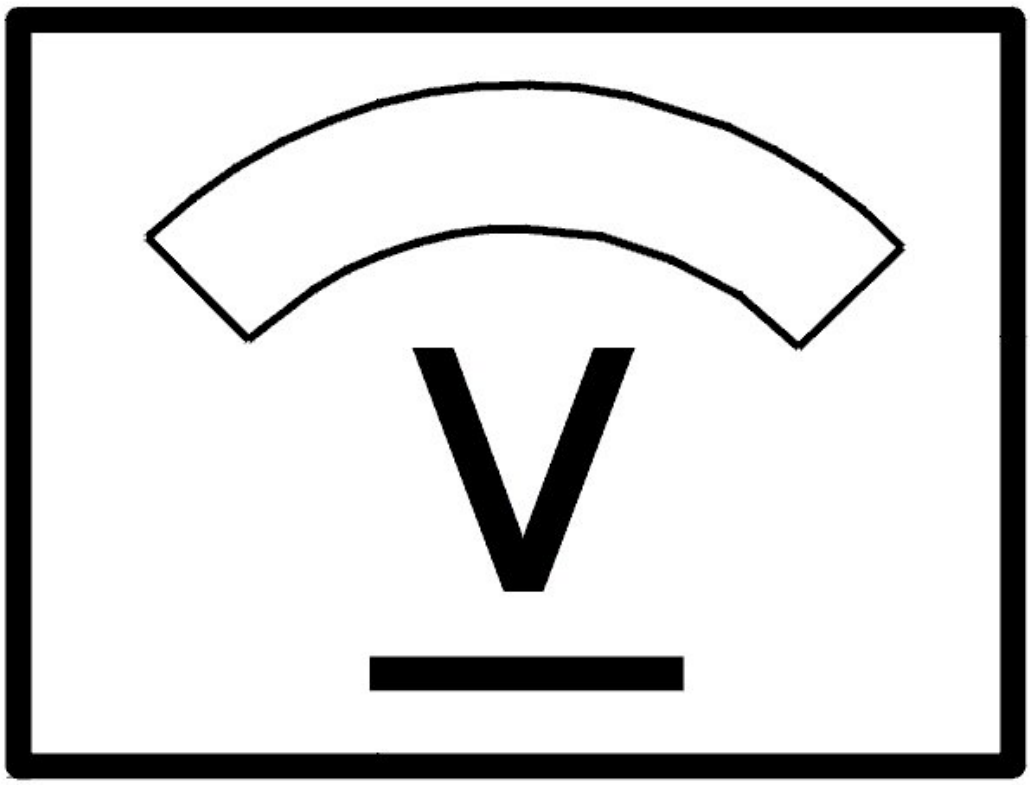
- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B9 (#A69) and transmission connector terminal #D2 (control module side). Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



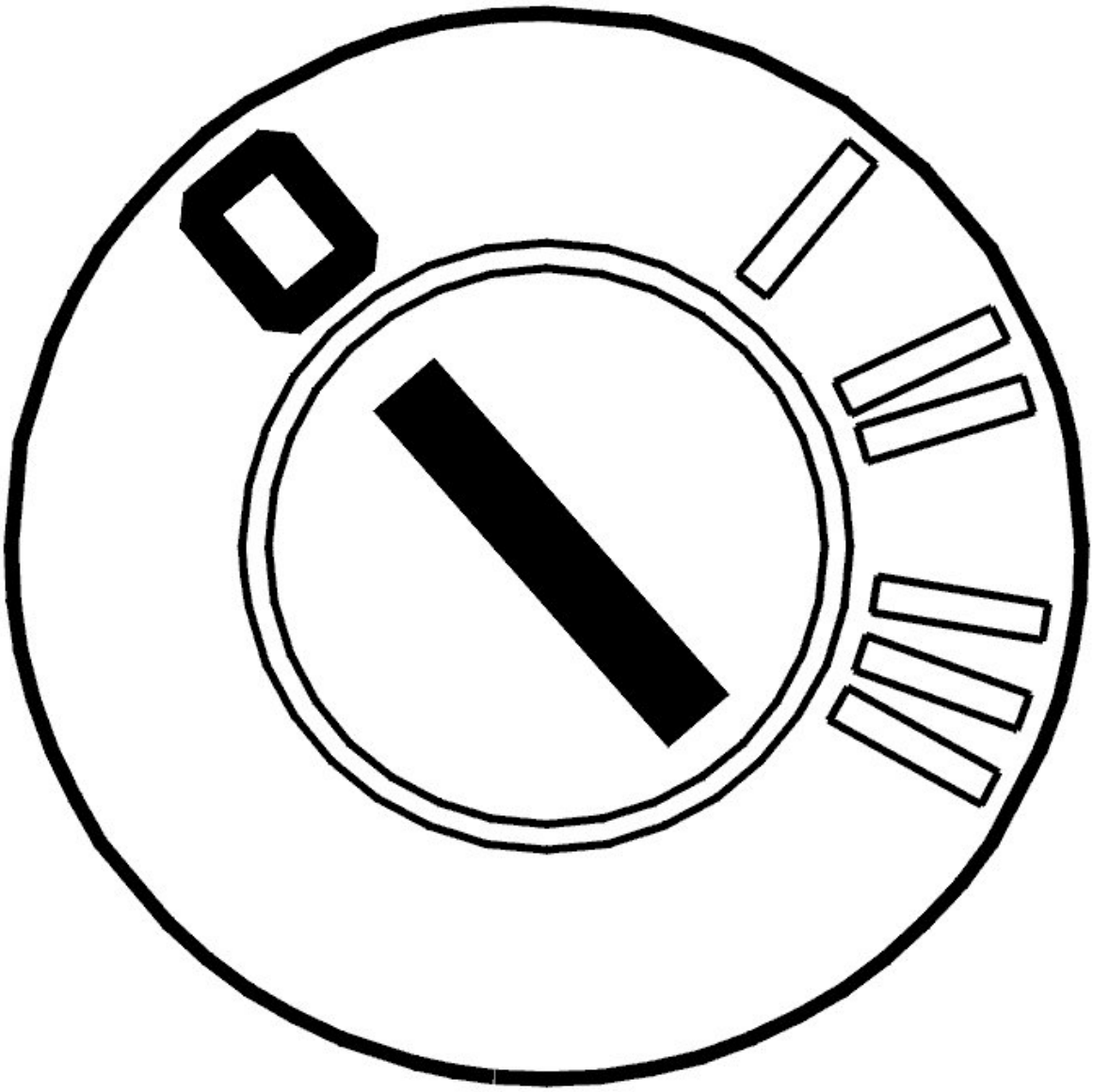


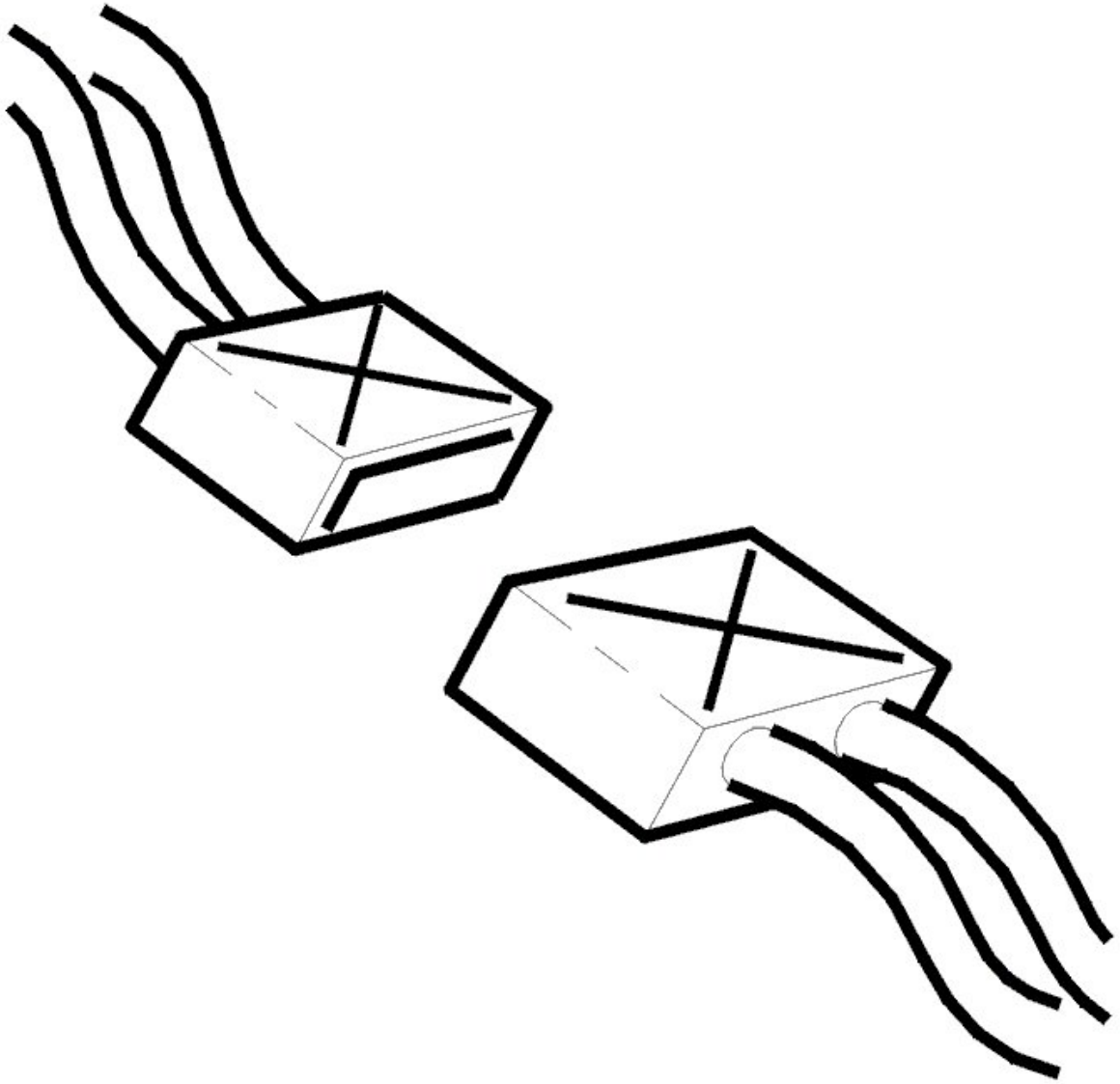
Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component



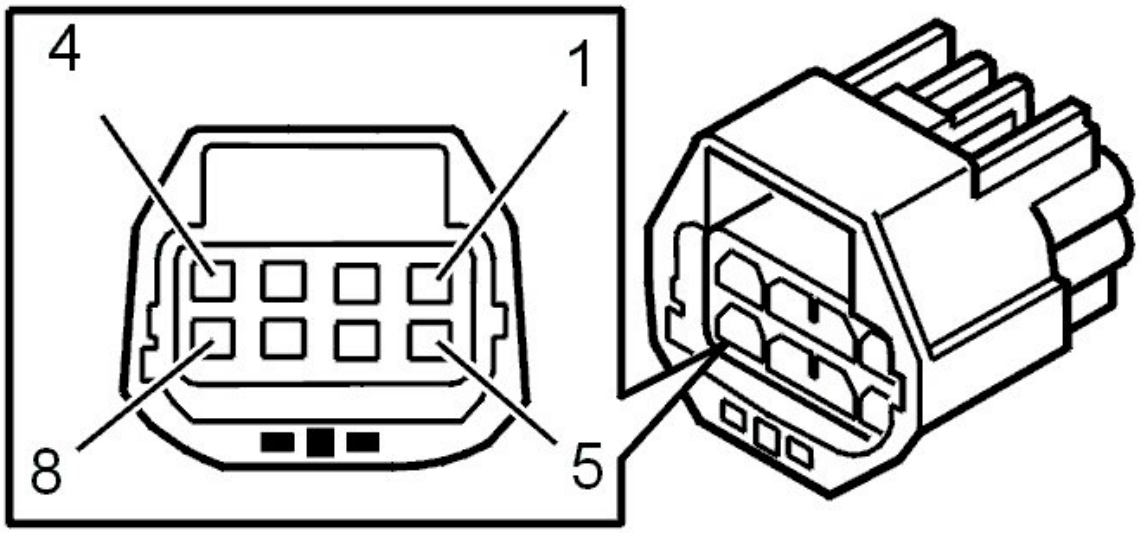


- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check solenoid SLU by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C.
Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).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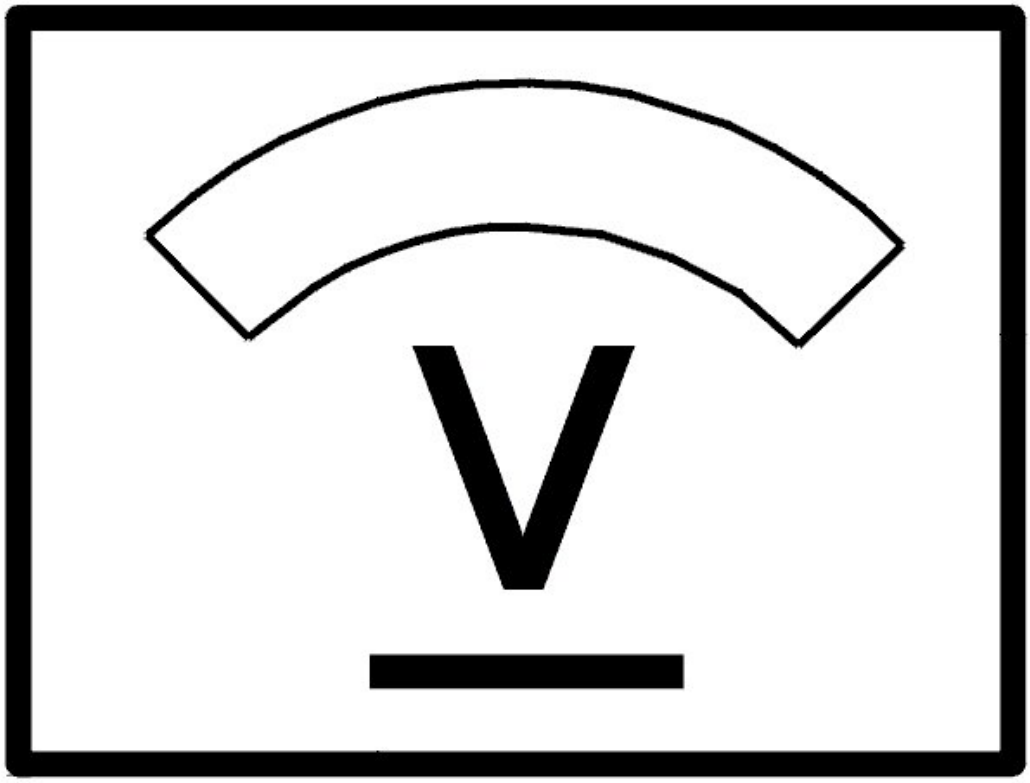
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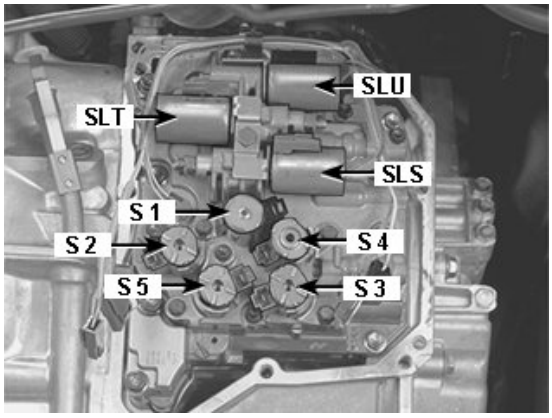


Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

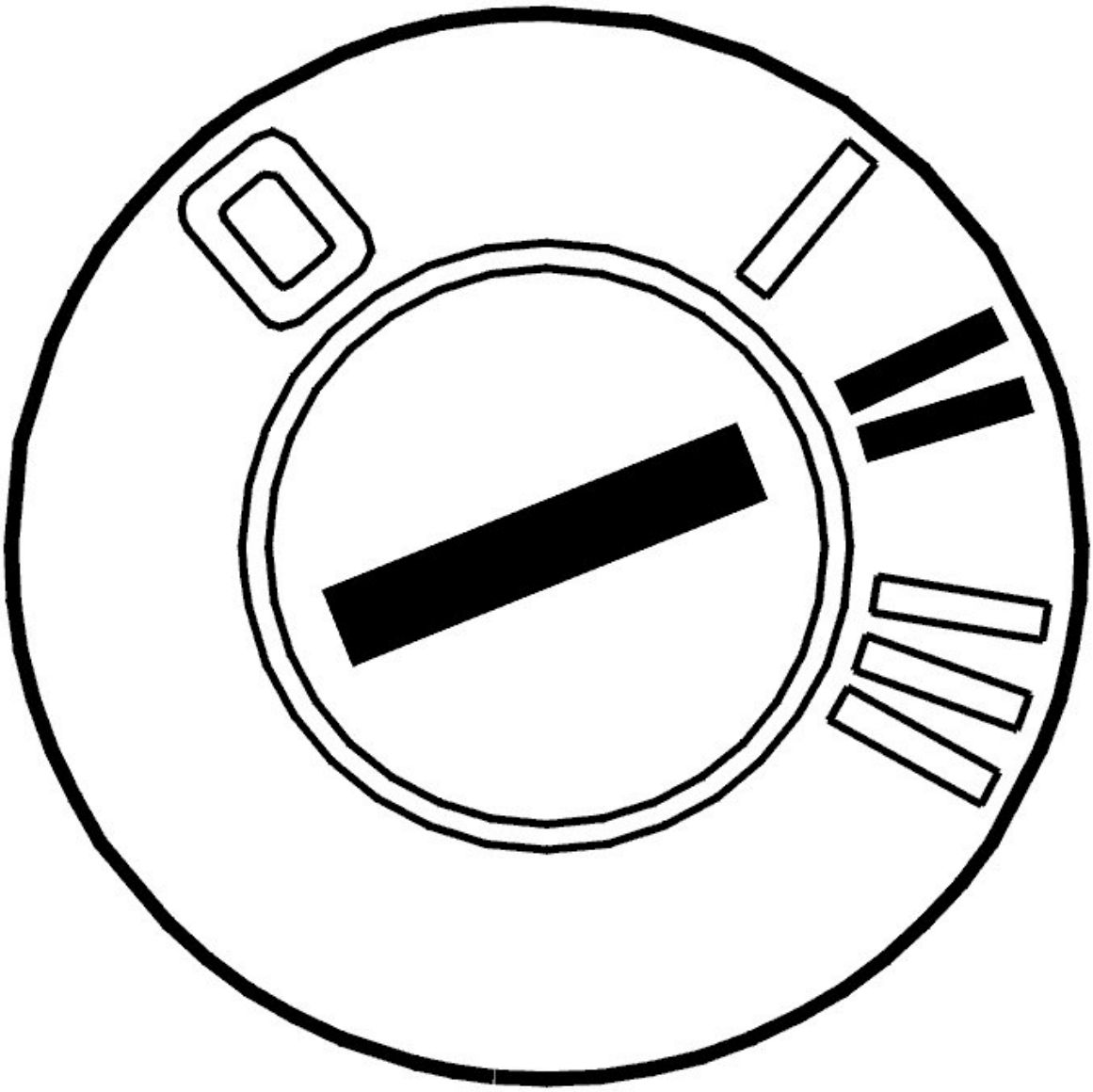
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

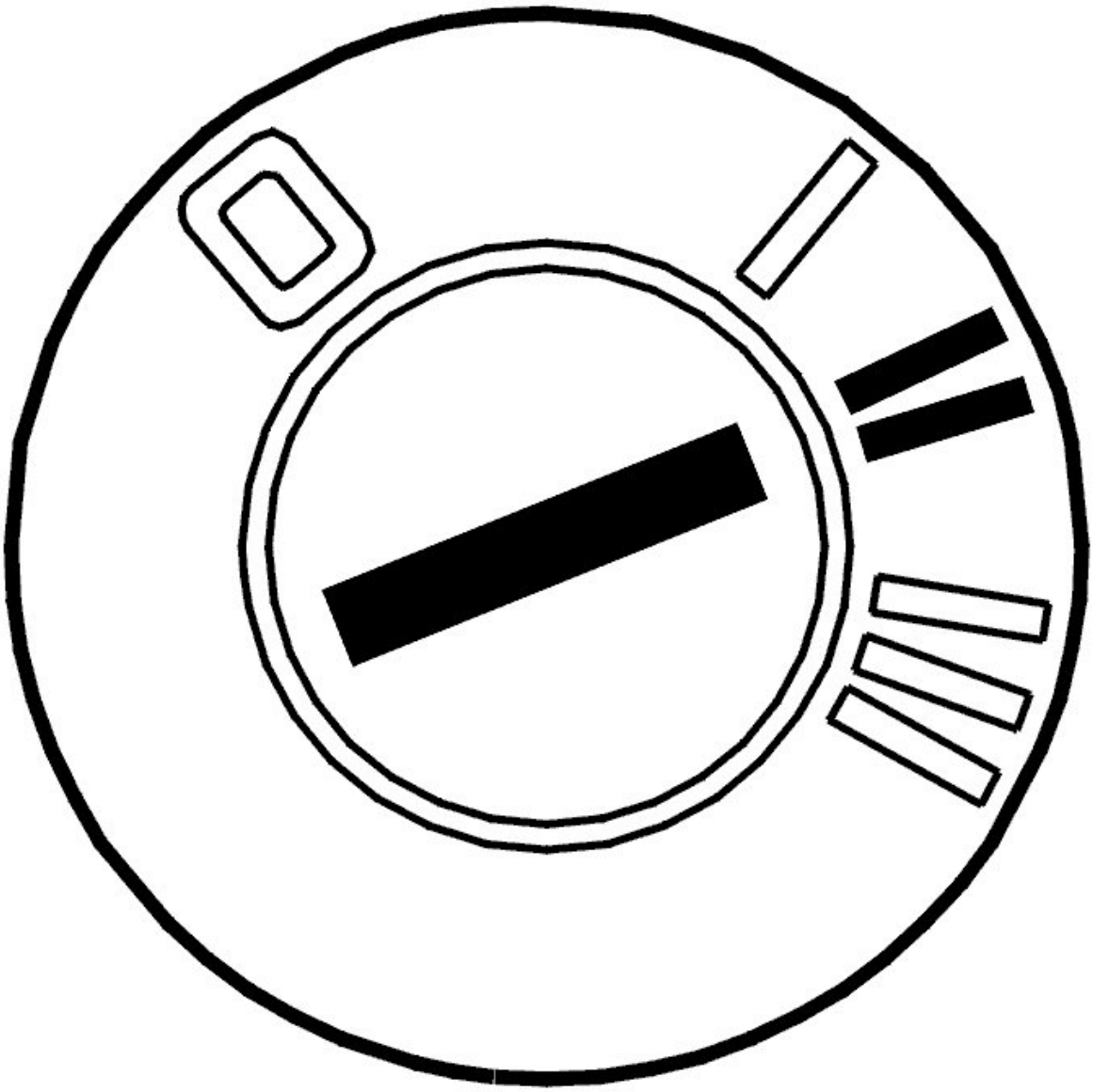
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

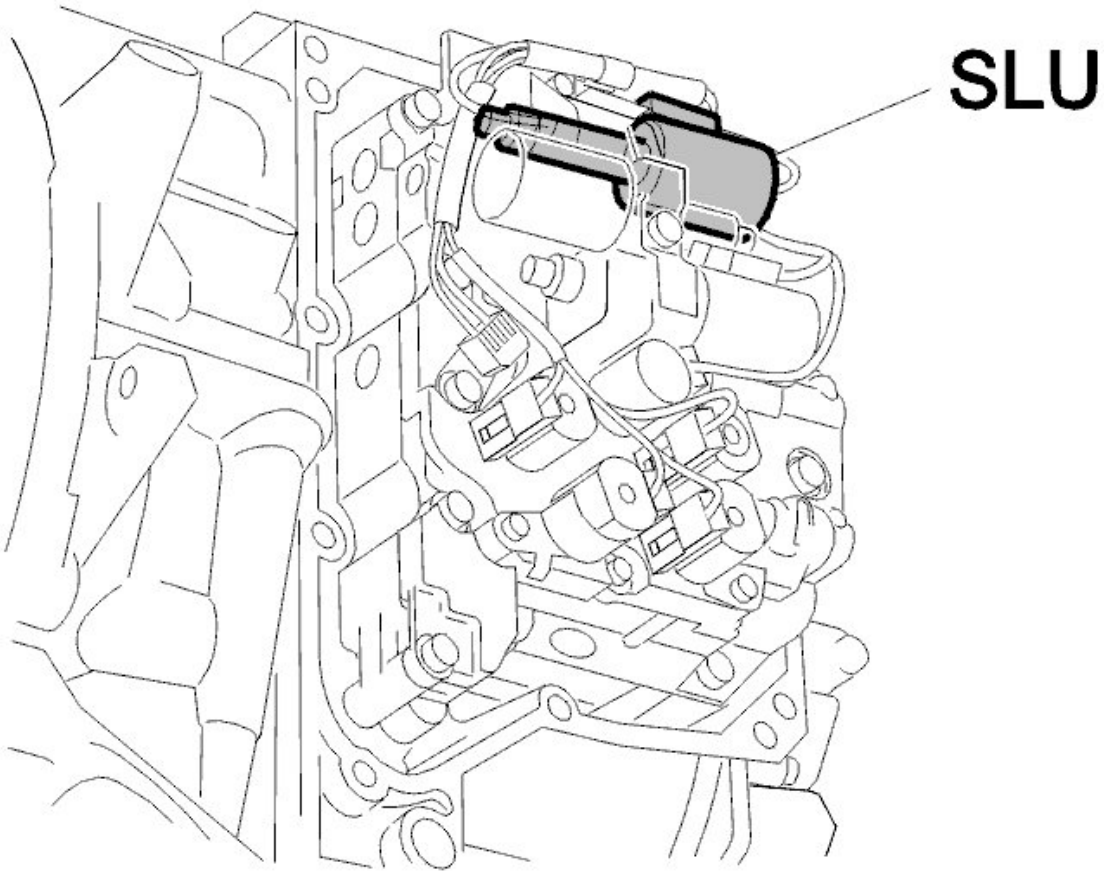
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLU

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010D is stored if the transmission control module (TCM) registers a short-circuit to supply voltage in the solenoid SLU circuit when the solenoid should not be activated. Solenoid SLU is probably activated permanently.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source
- Short-circuit to supply voltage in the signal cable.
- Defective control module.

Fault symptom[s]
- General orange warning lamp lit.
- Harsh gear shifting.
- No shifting.
- Irregular shifting.

Hint: Harsh shifting is caused by the solenoid being permanently activated.

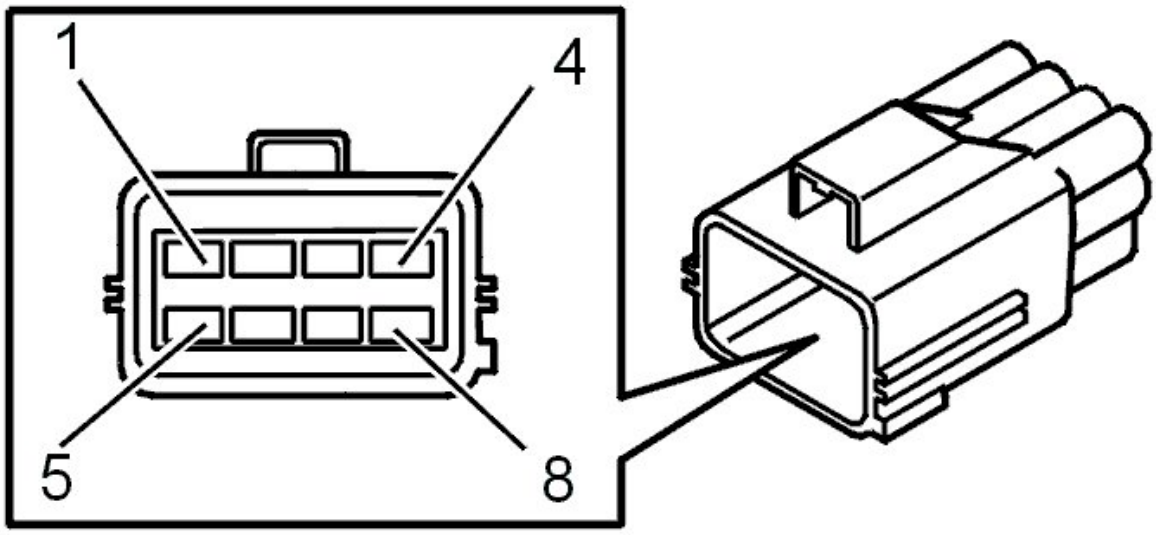
Signal Too High. Intermittent Fault

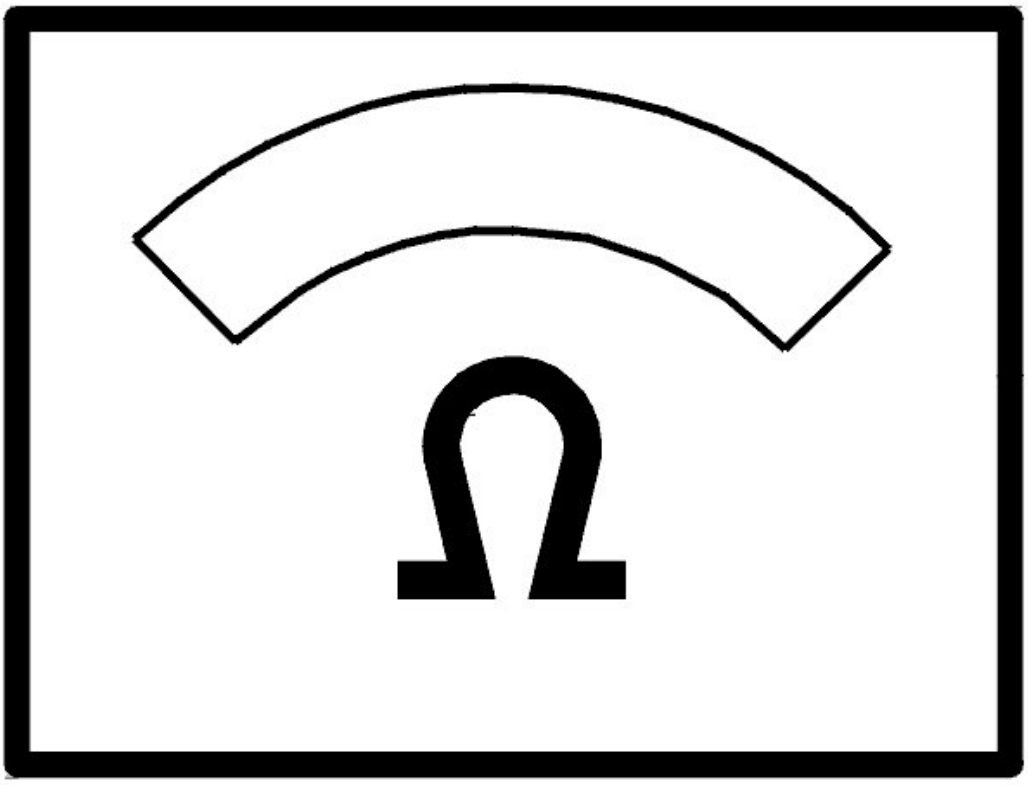
Signal too high. Intermittent fault

Intermittent fault

Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

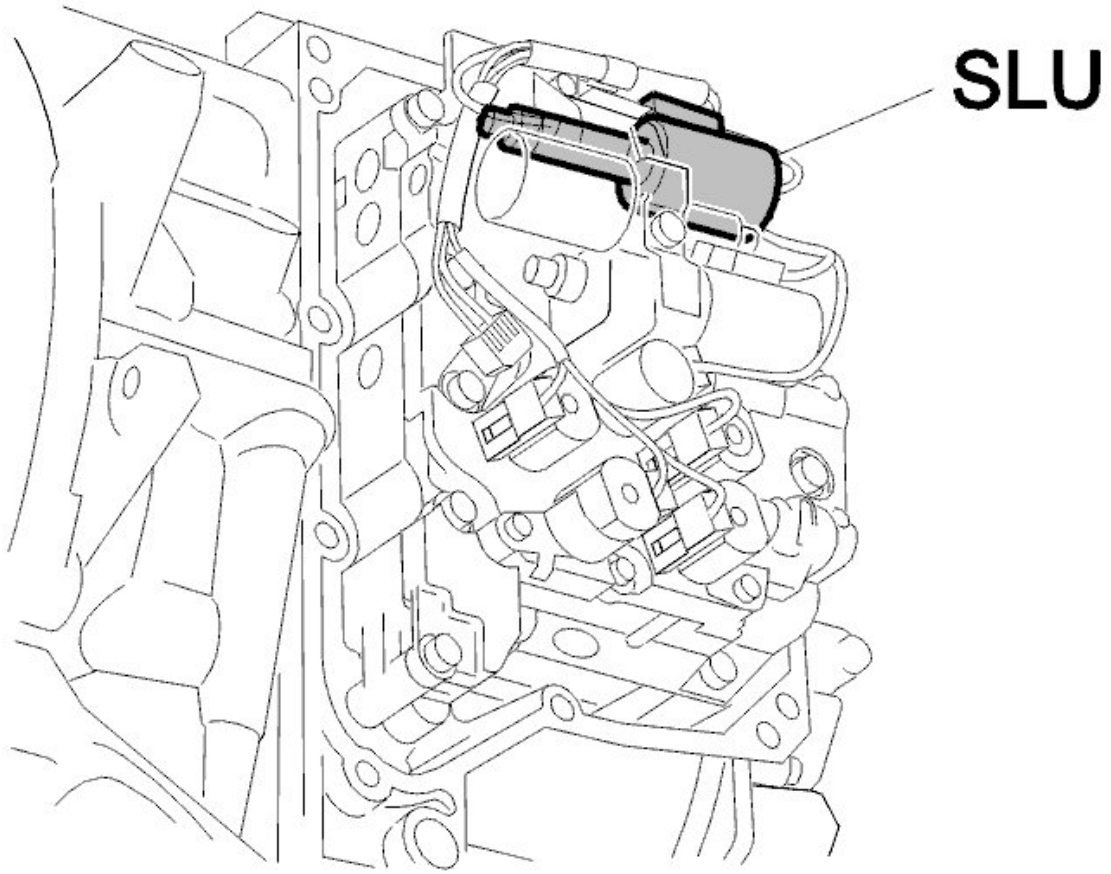
FAULT FOUND - DONE

Attempt New Test - Intermittent fault

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010F is stored if the control module registers an open-circuit in the solenoid SL circuit when the solenoid should be activated. Solenoid SLU cannot then be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.
- Defective control module.

Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

Intermittent fault

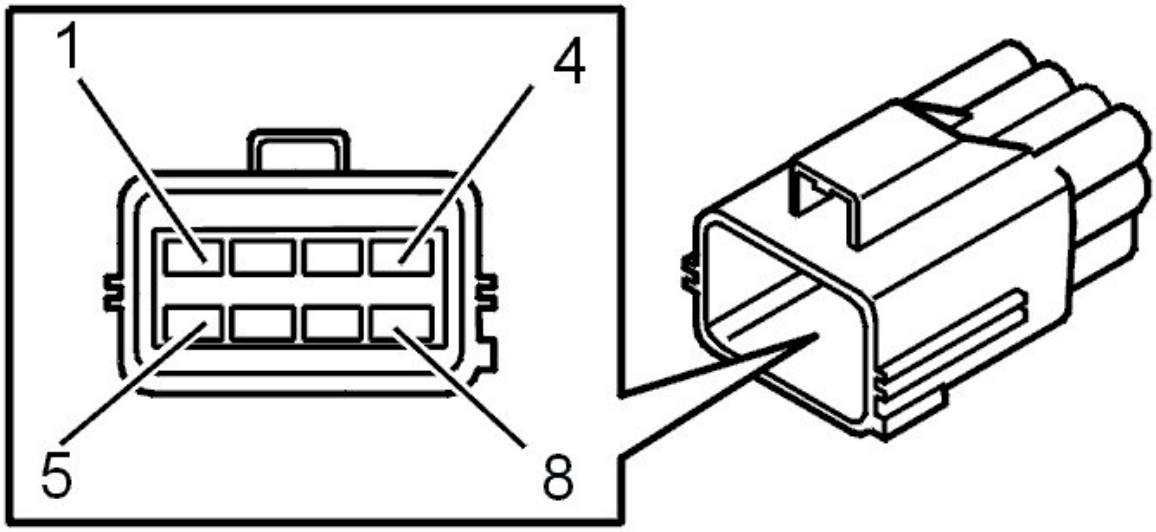
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

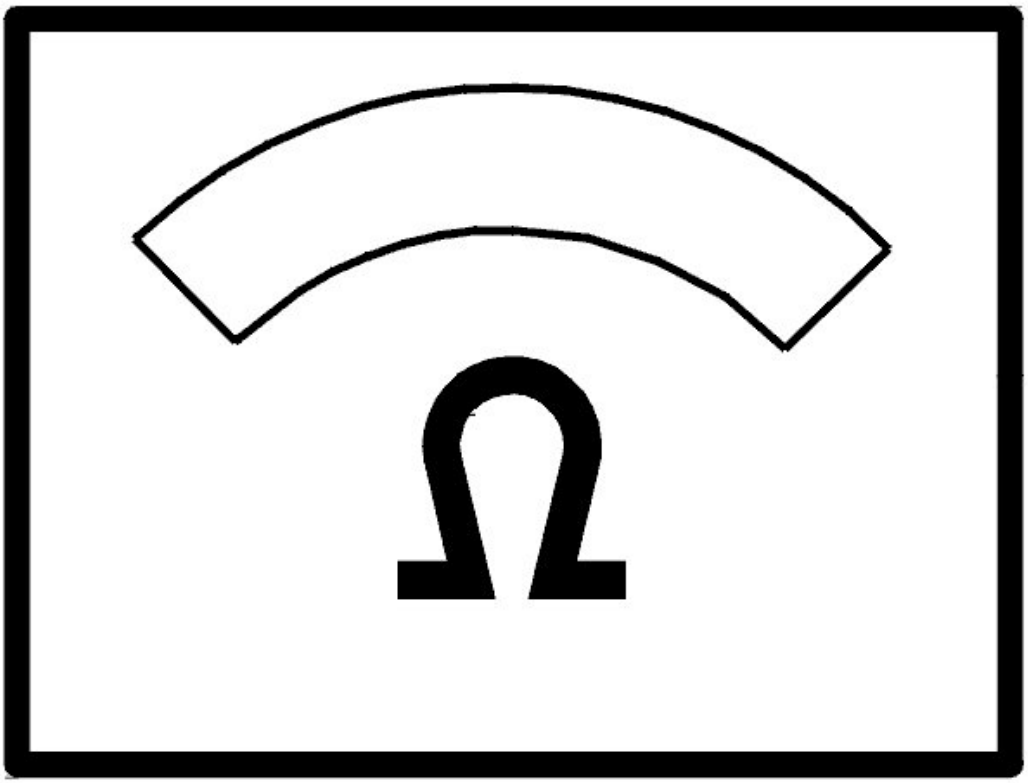
Hint: Check the solenoid SLU by measuring the resistance between terminals #D1 and #D2 on transmission connector D. The resistance should be 5-6 ohms at 20°C.

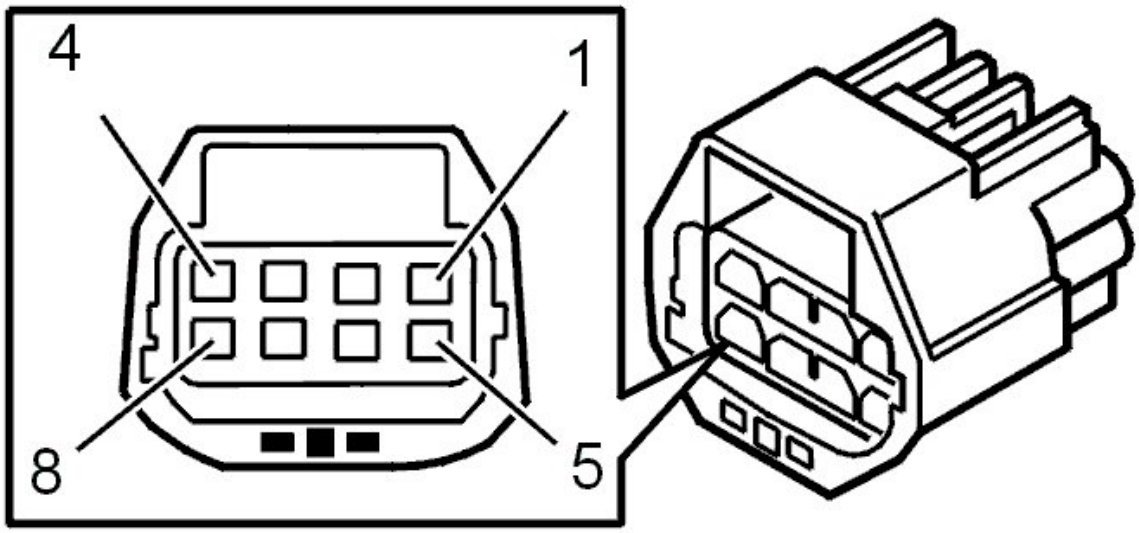
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

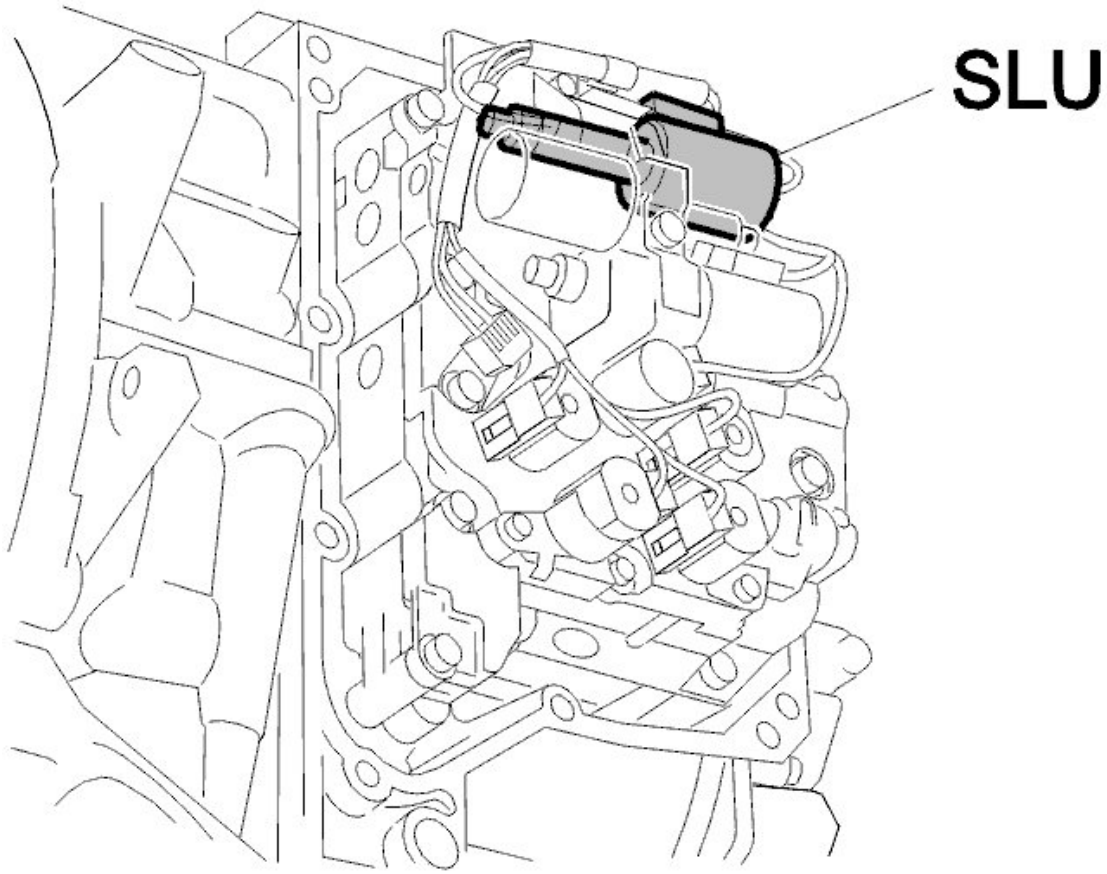
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-010F is stored if the control module registers an open-circuit in the solenoid SL circuit when the solenoid should be activated. Solenoid SLU cannot then be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source
- Contact resistance in terminals.
- Open-circuit in the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.
- Defective control module.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

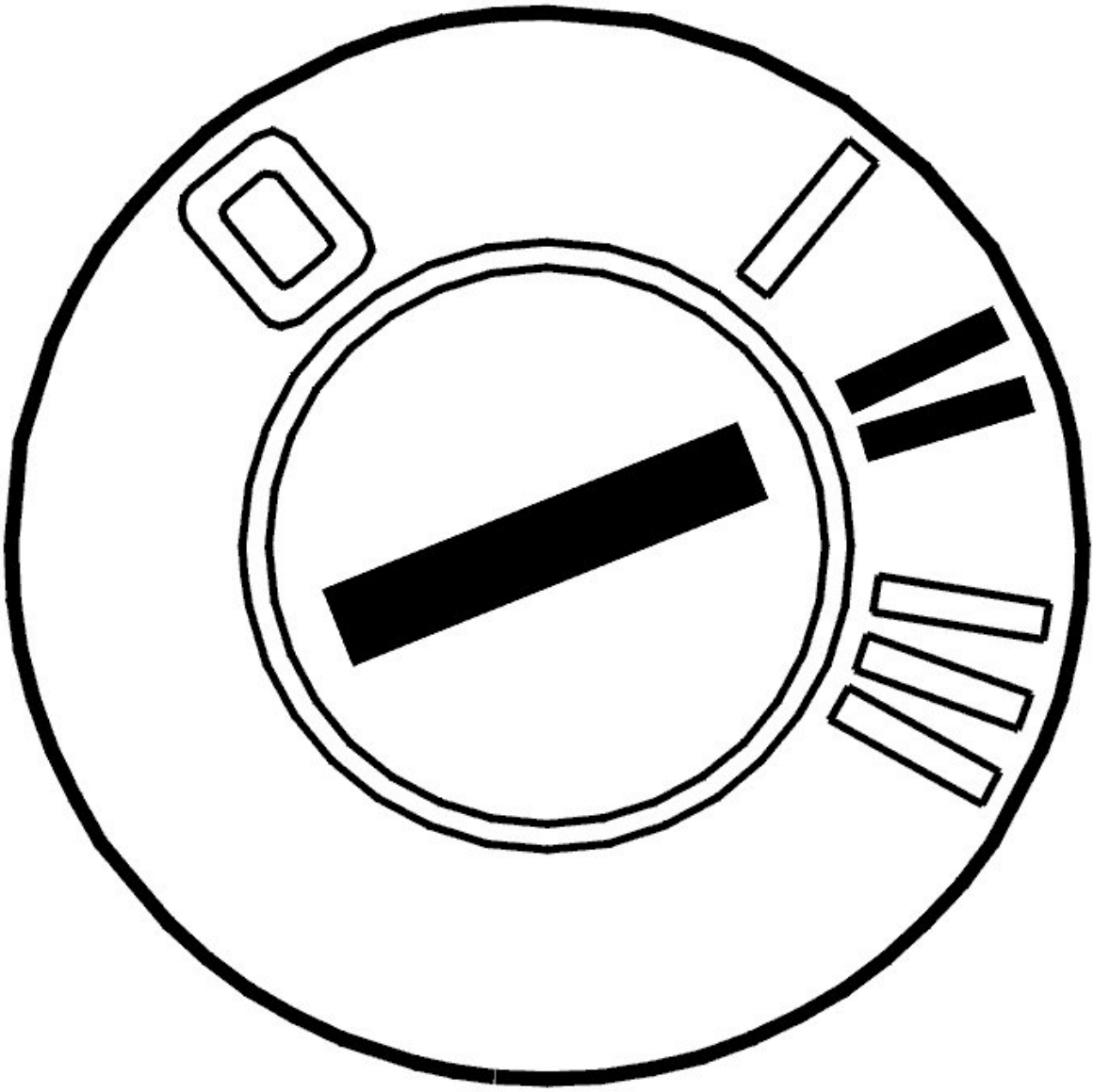
Fault symptom[s]

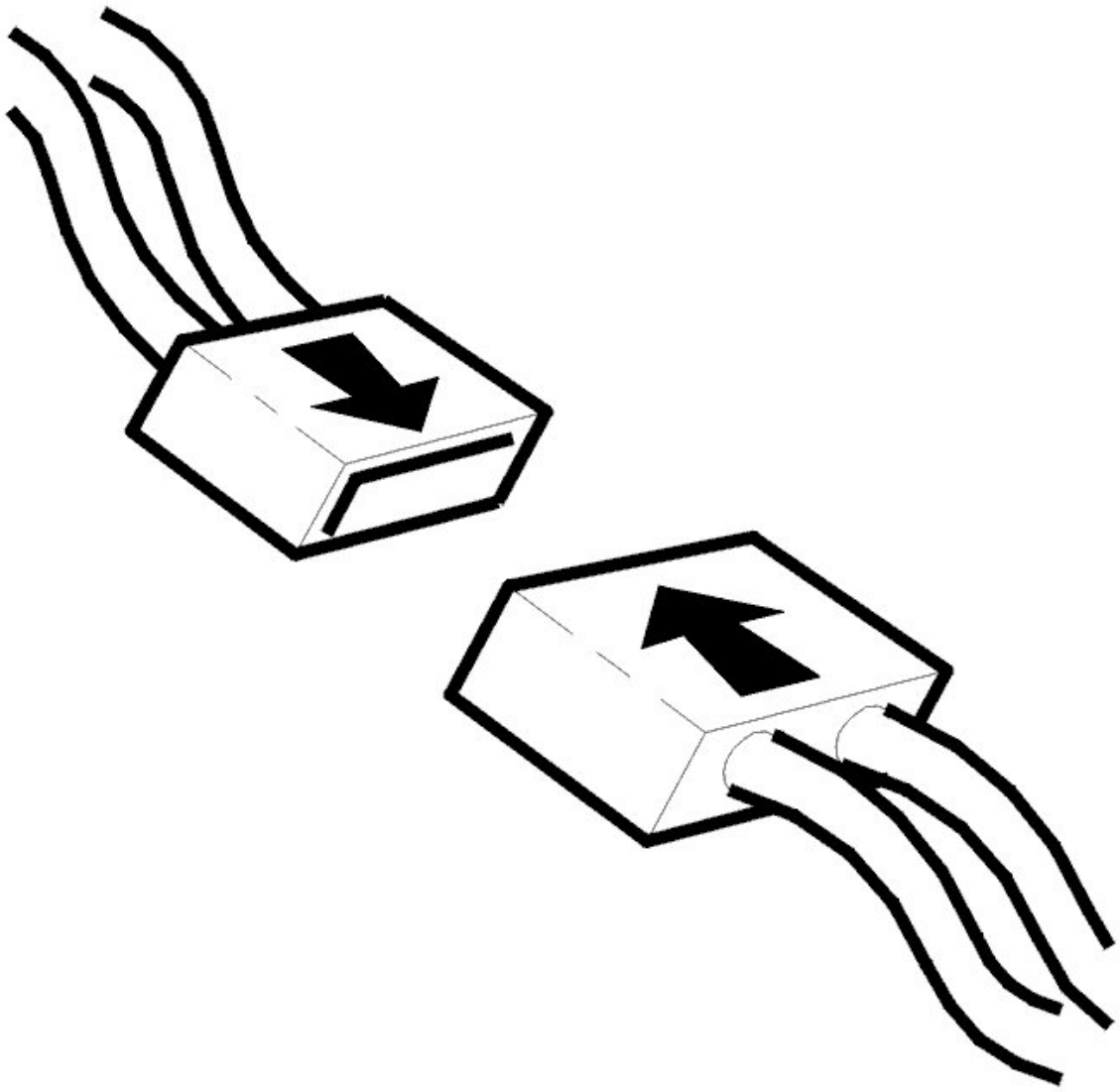
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking line pressure solenoid SLU





- Ignition off
- Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

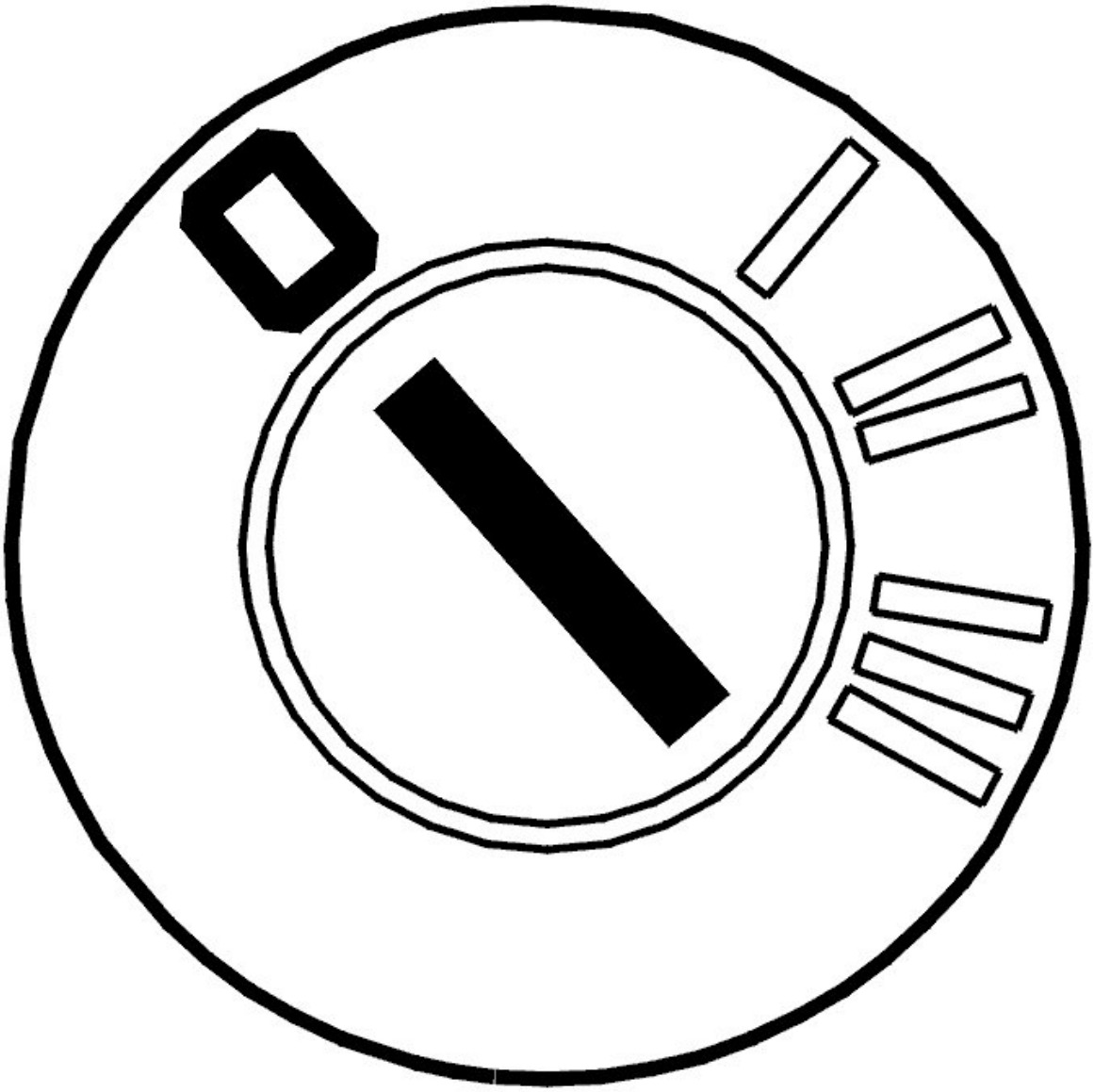
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

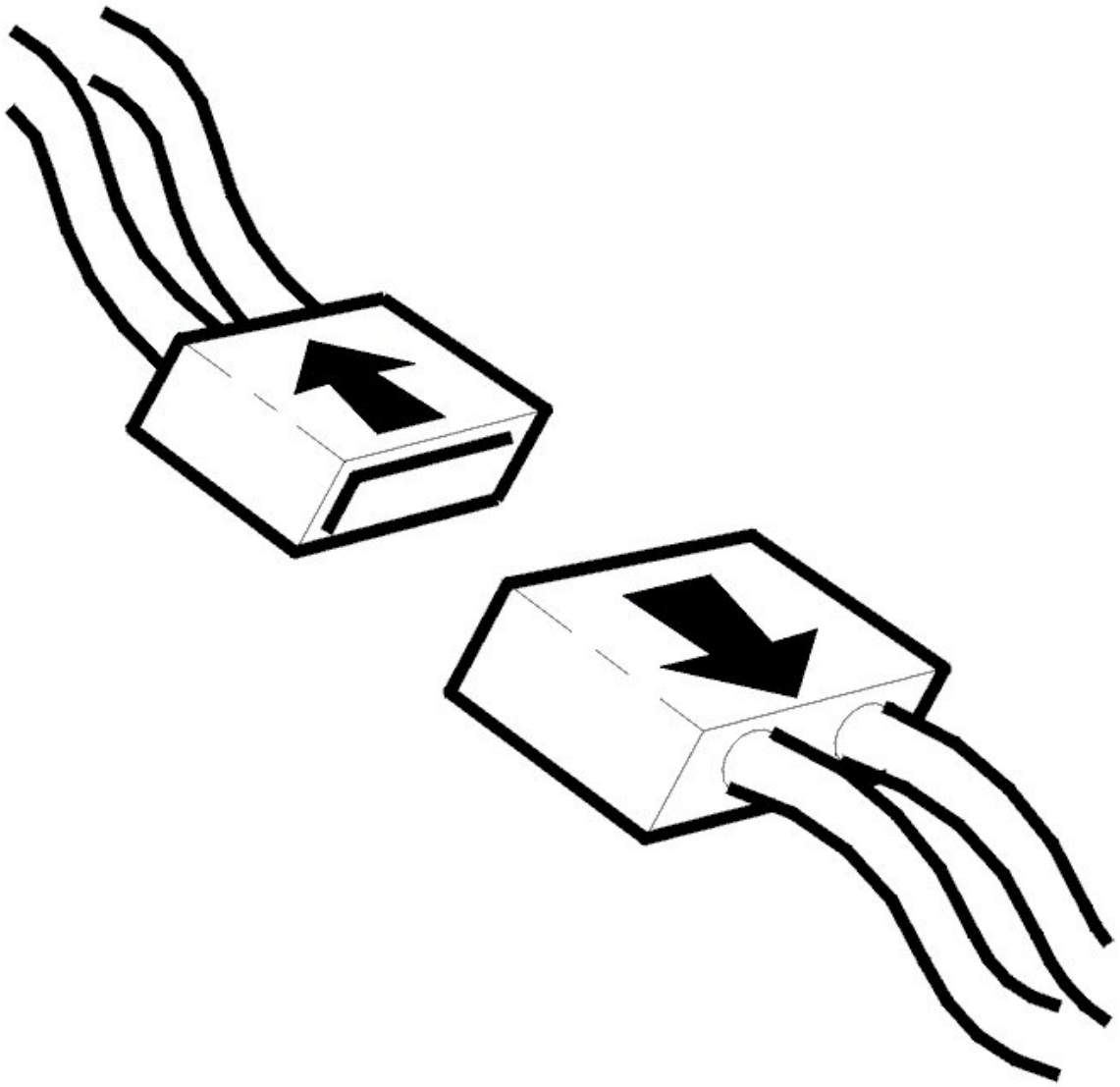
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



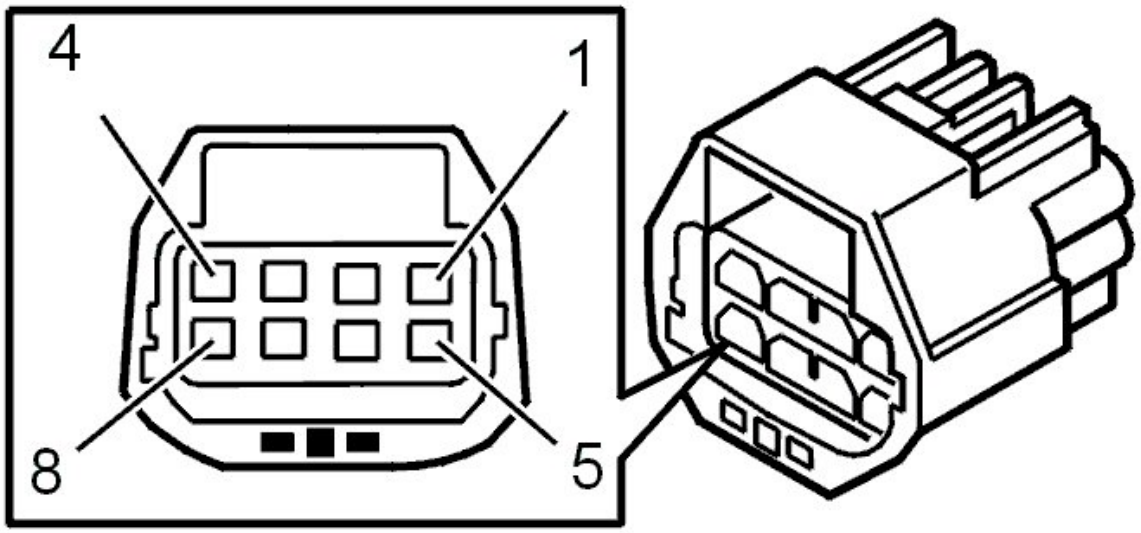


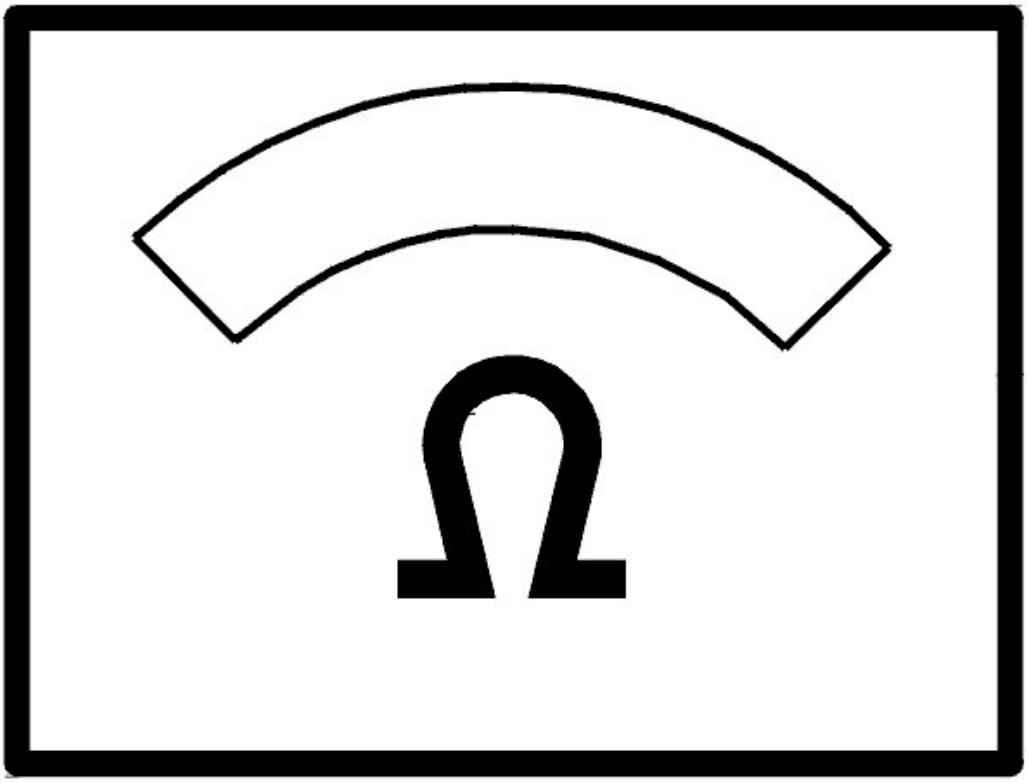
- Ignition off
- Disconnect transmission connector D.

Check the circuit for solenoid SLU. Measure the resistance between transmission connector D terminals #D1 and #D2.
The ohmmeter should read 5-5.6 ohms (at 20°C).

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



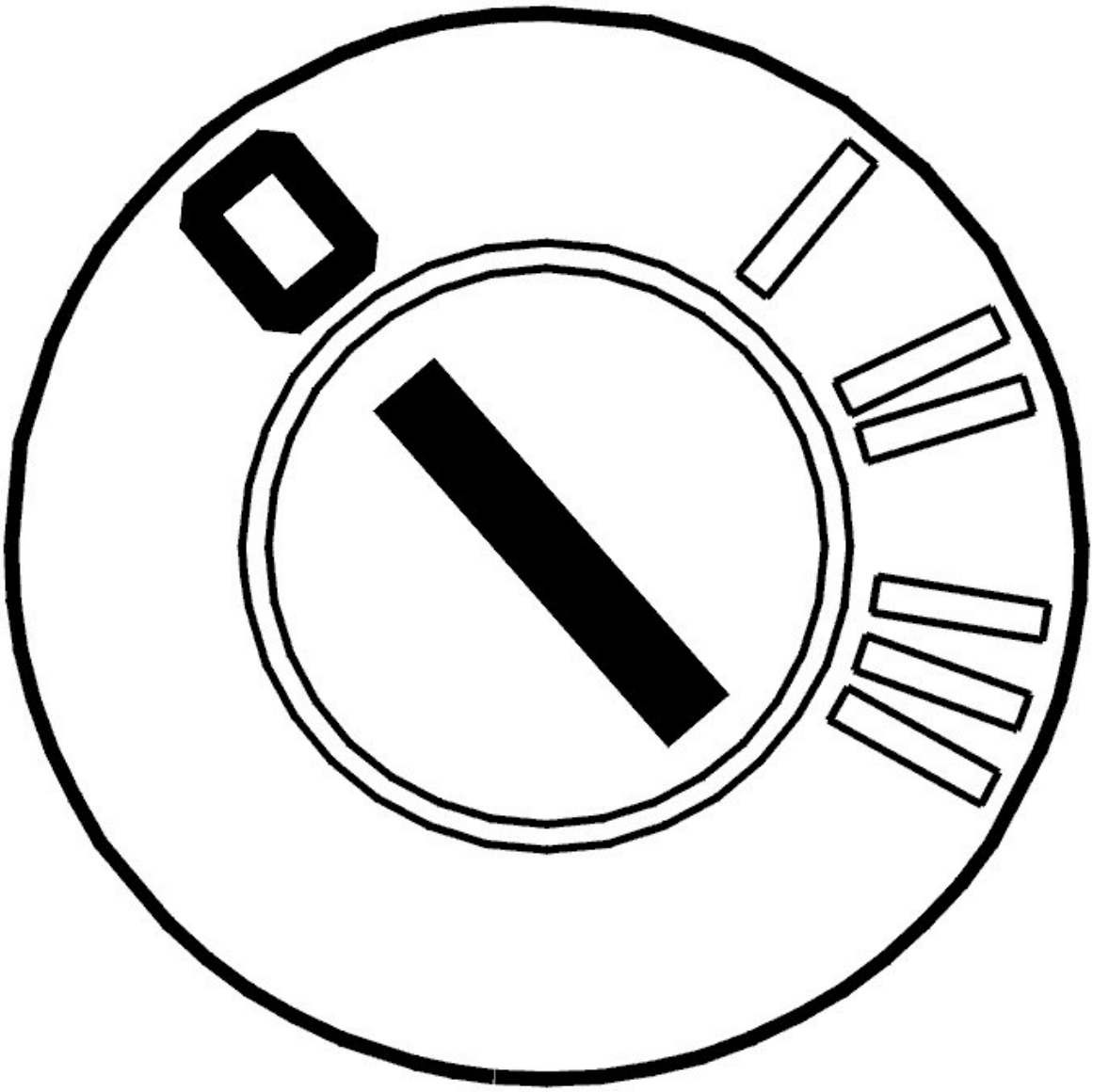


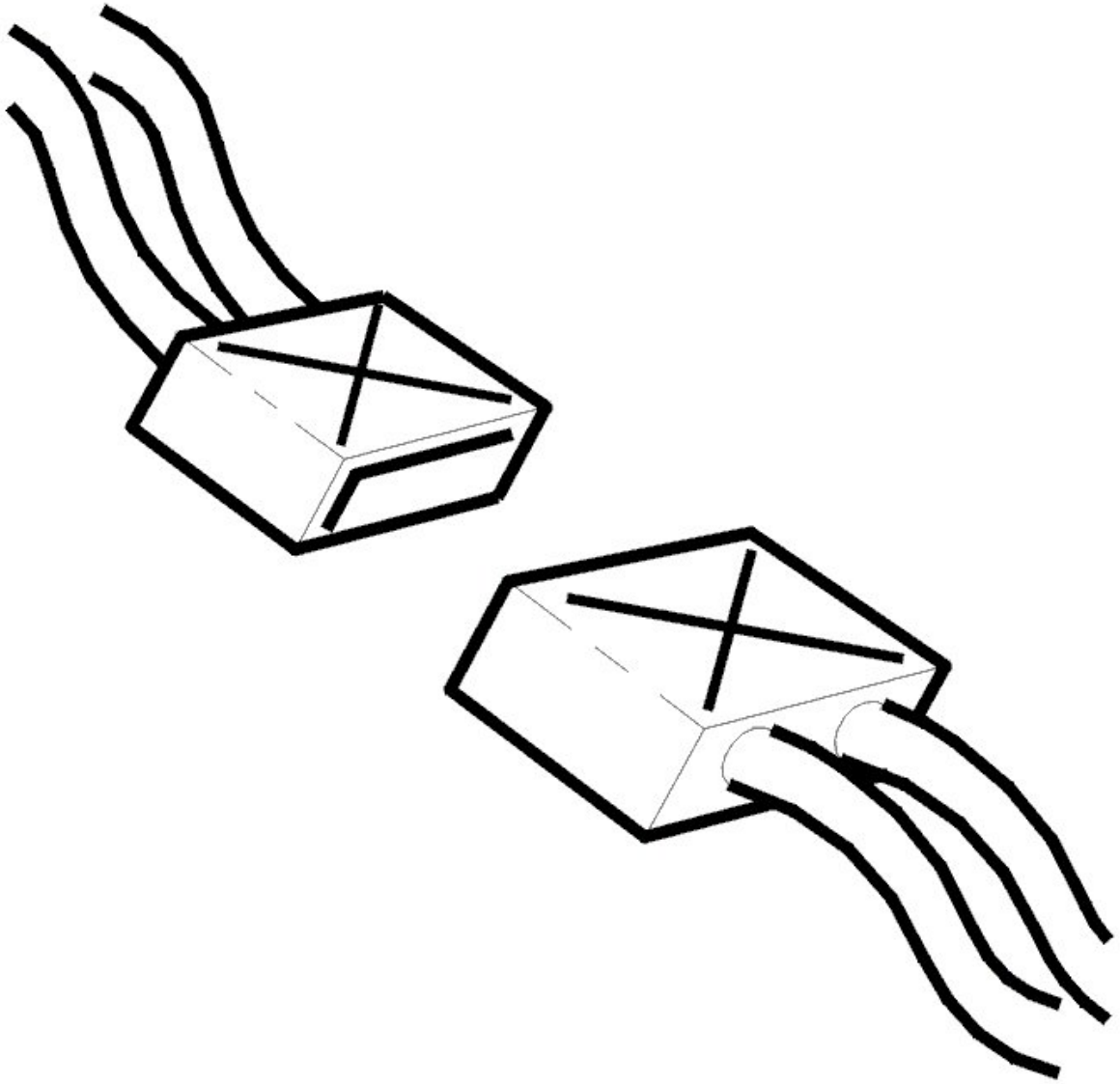
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



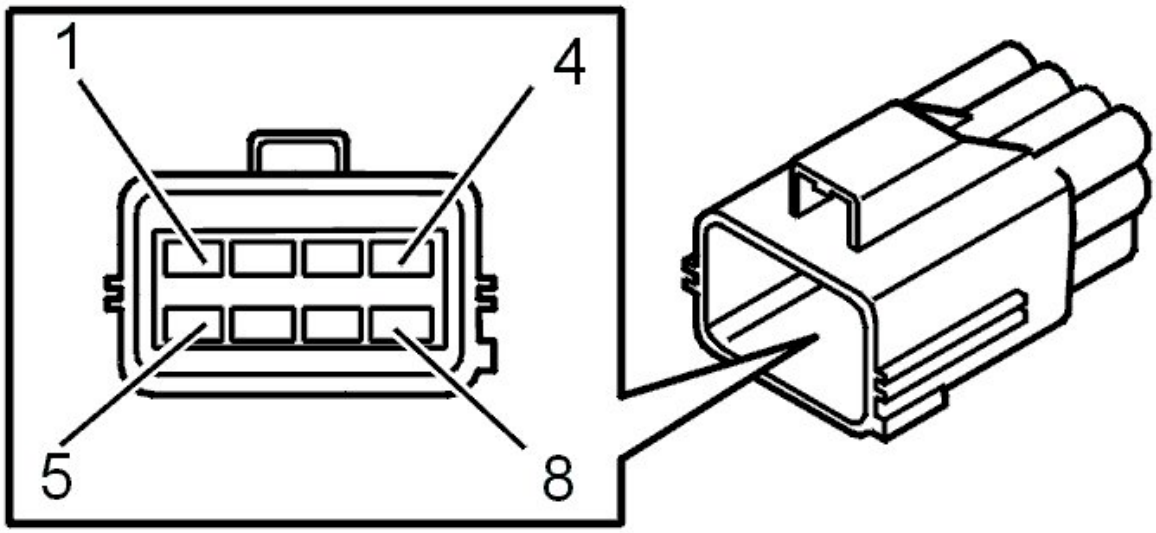


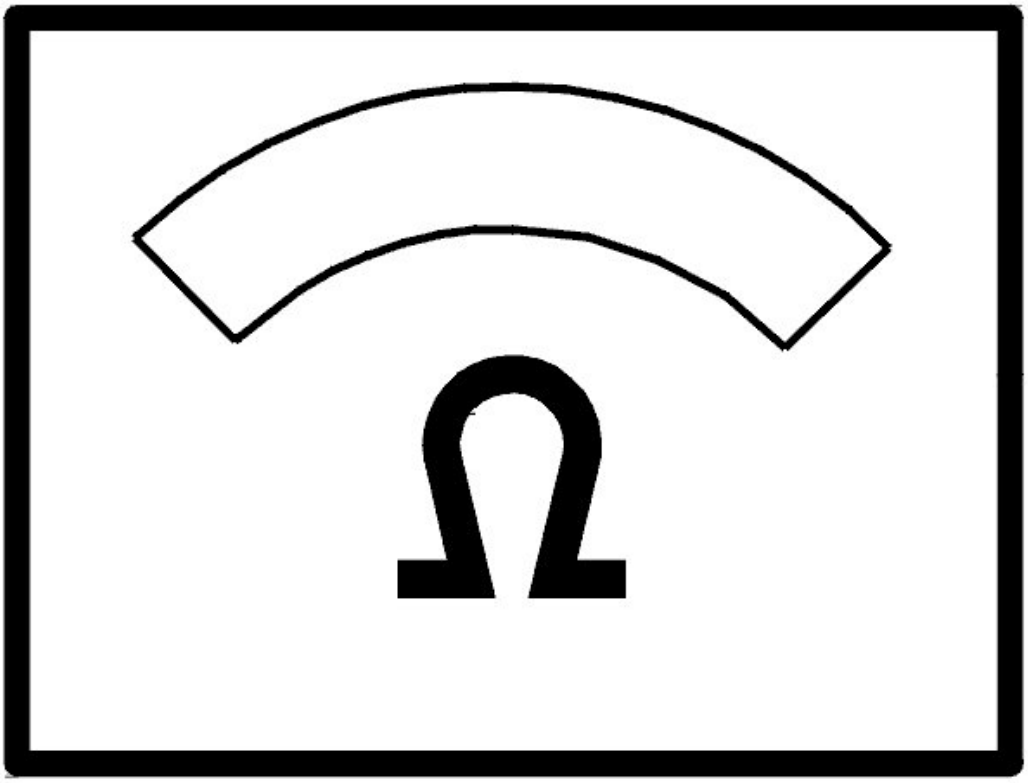
- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B9 (#A69) and transmission connector #D2 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



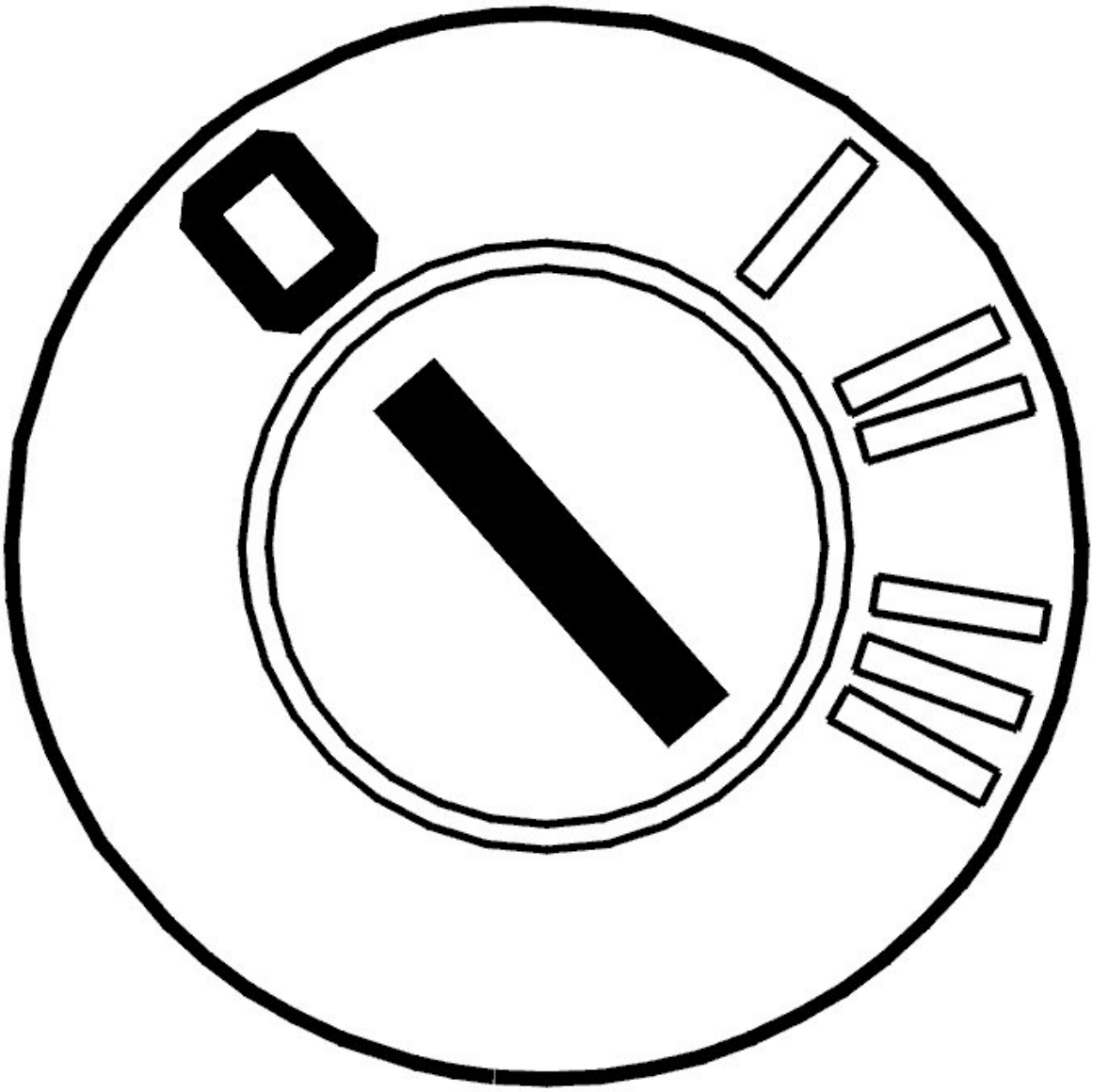


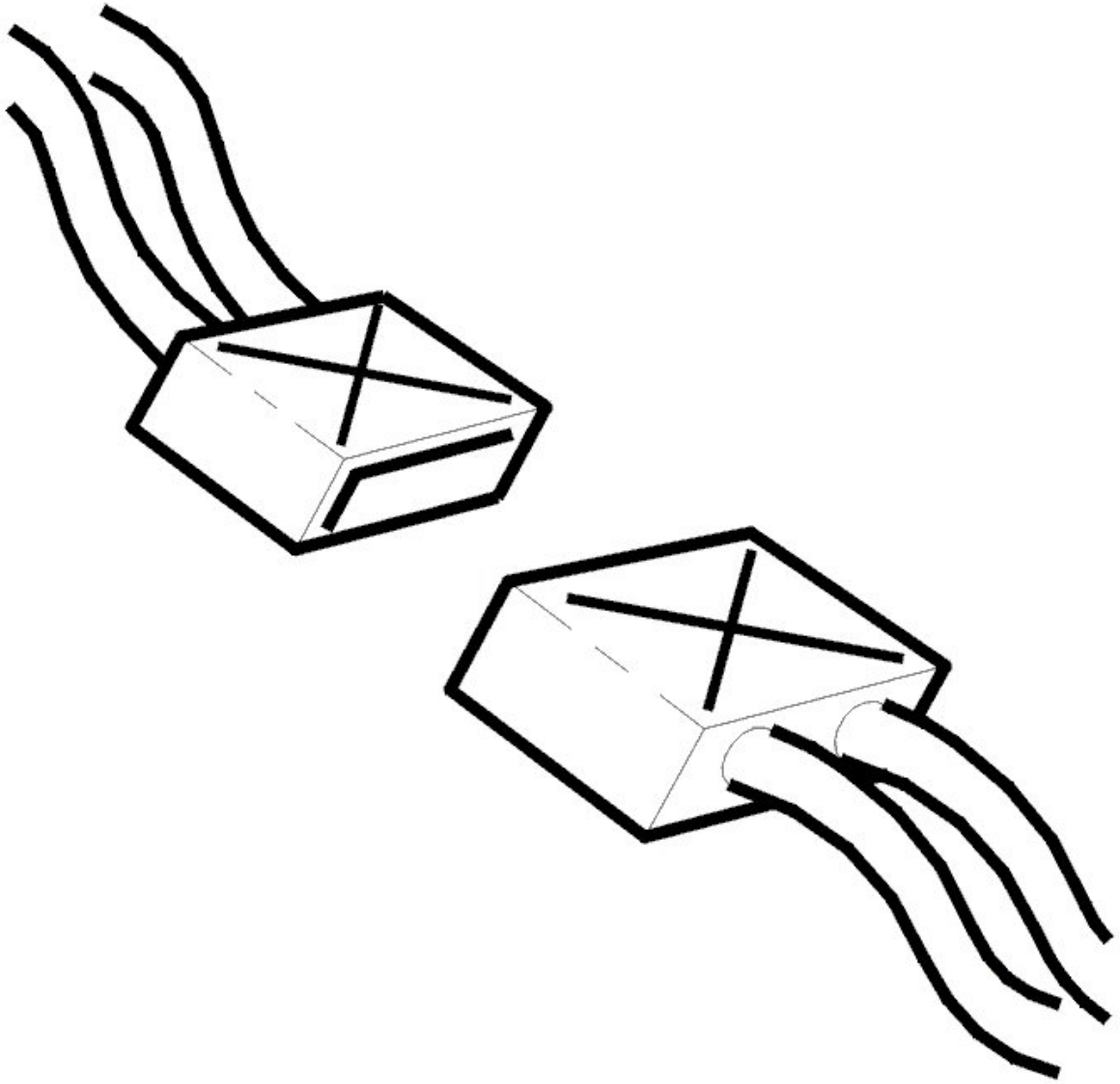
Was a fault found in the wiring?

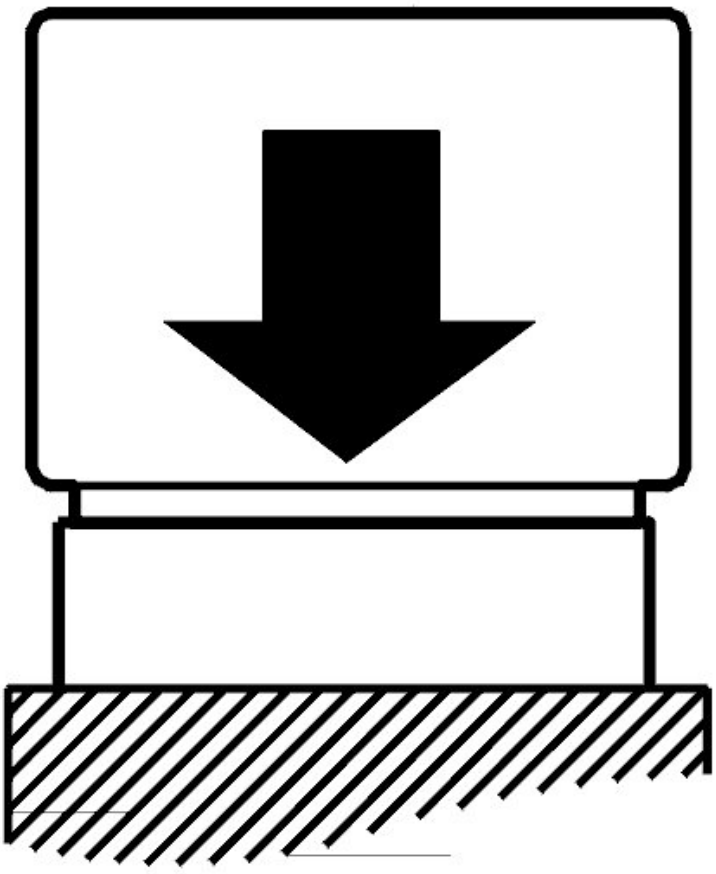
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

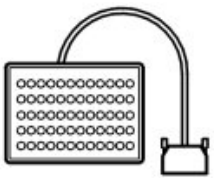
Check the transmission control module (TCM) by measuring the resistance between terminals #A51 (#A51) and #B9 (#A69) on the breakout box. The resistance must be approximately 9 kohms.

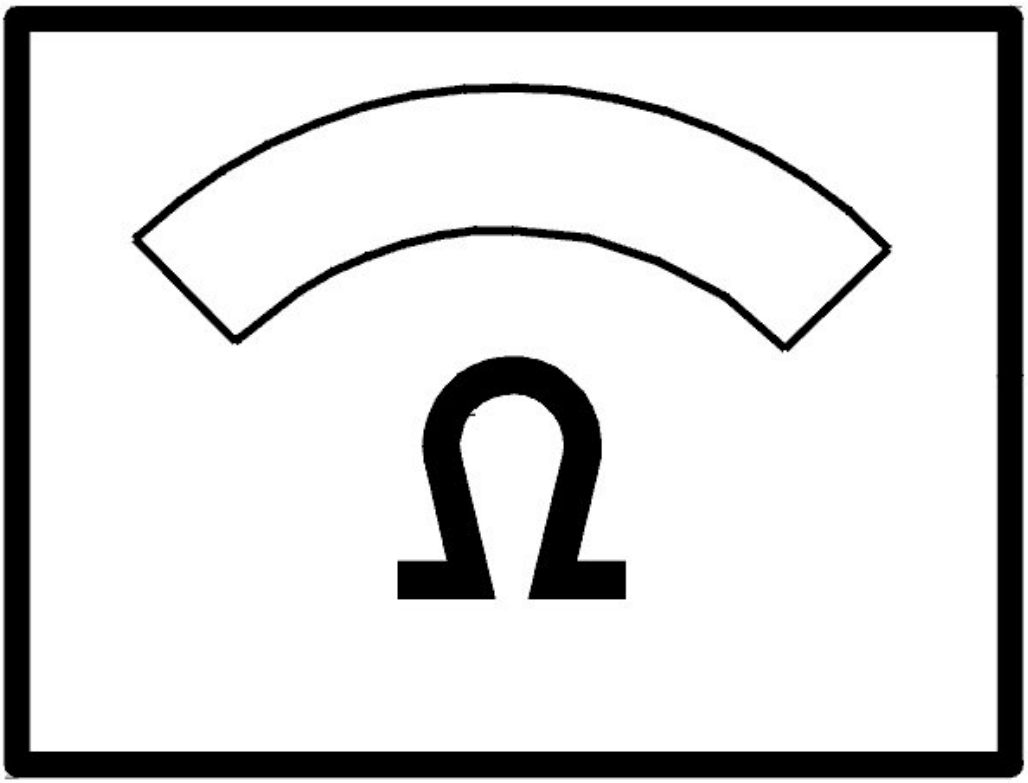
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



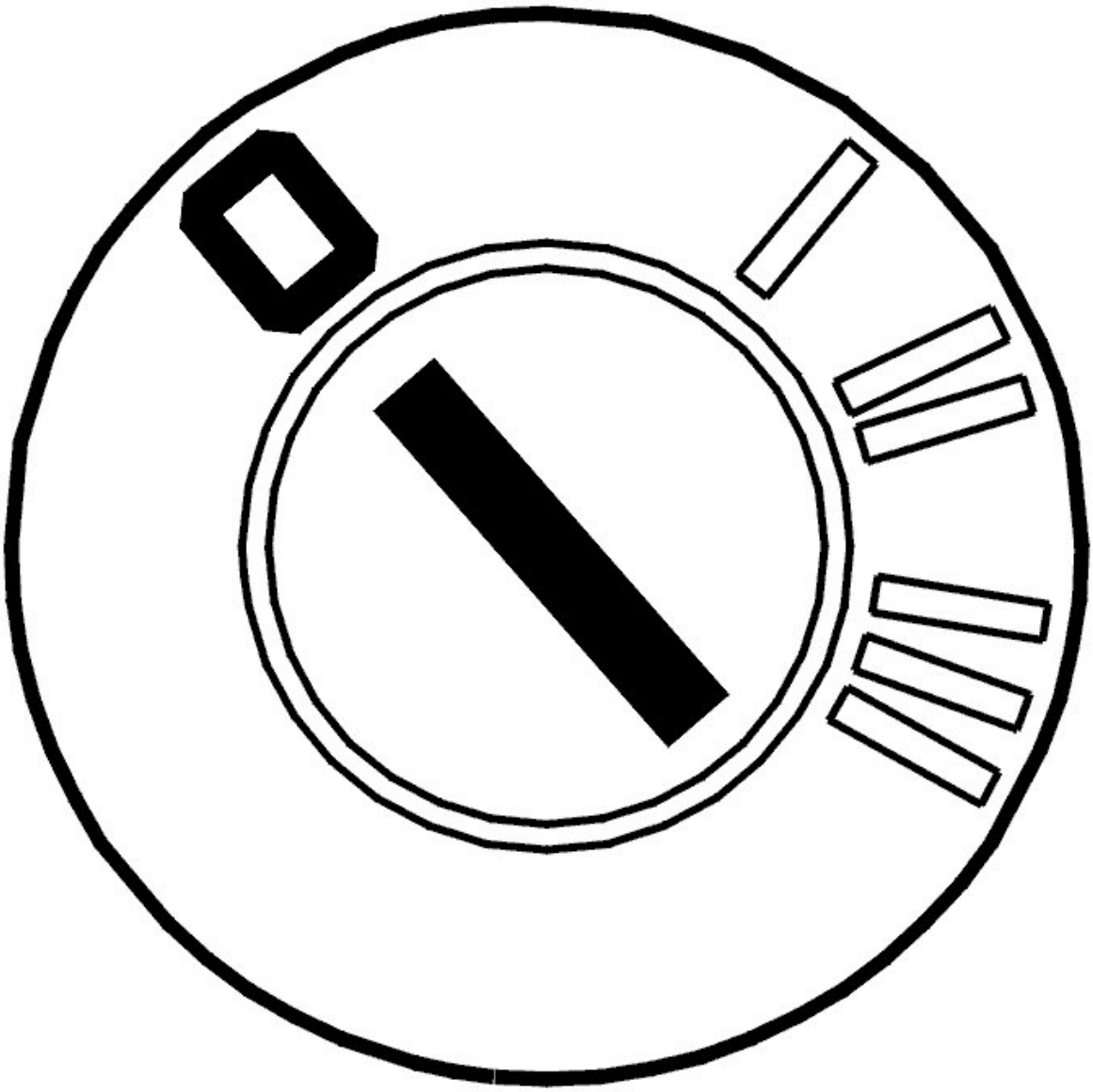


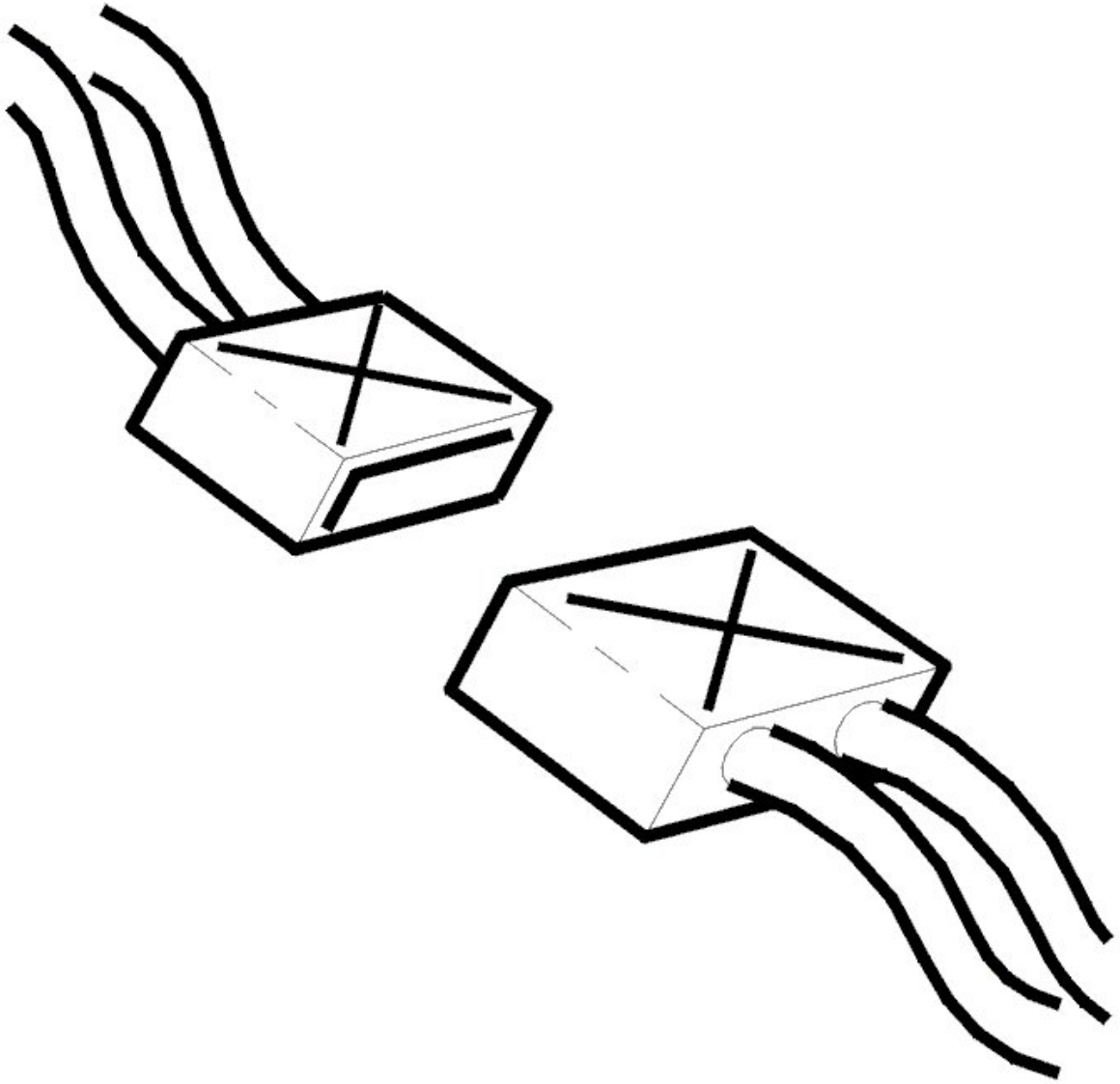
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



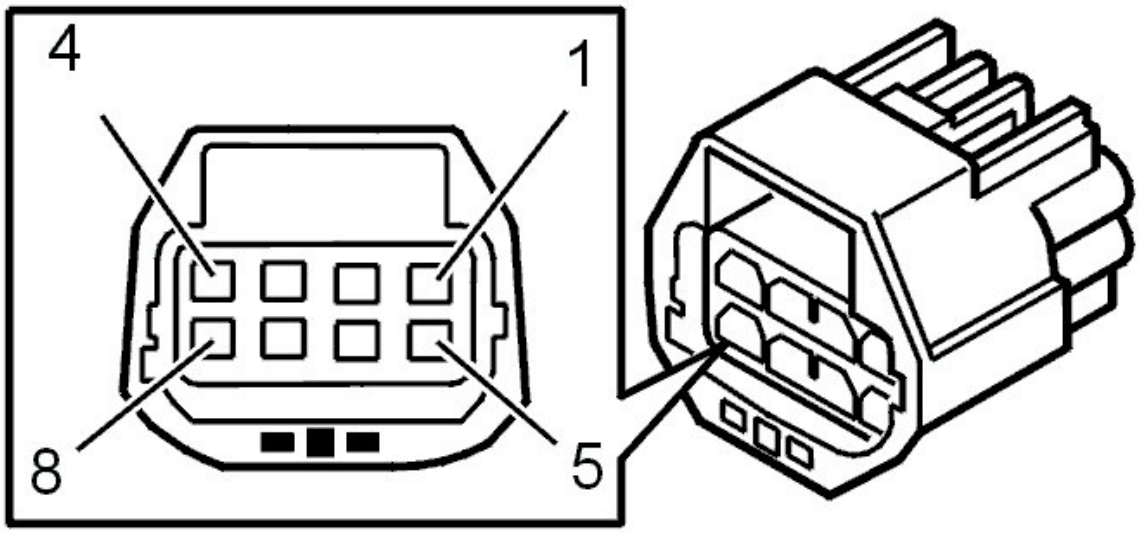


- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check the solenoid SLU by measuring the resistance between terminals #1 and #2. The resistance should be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).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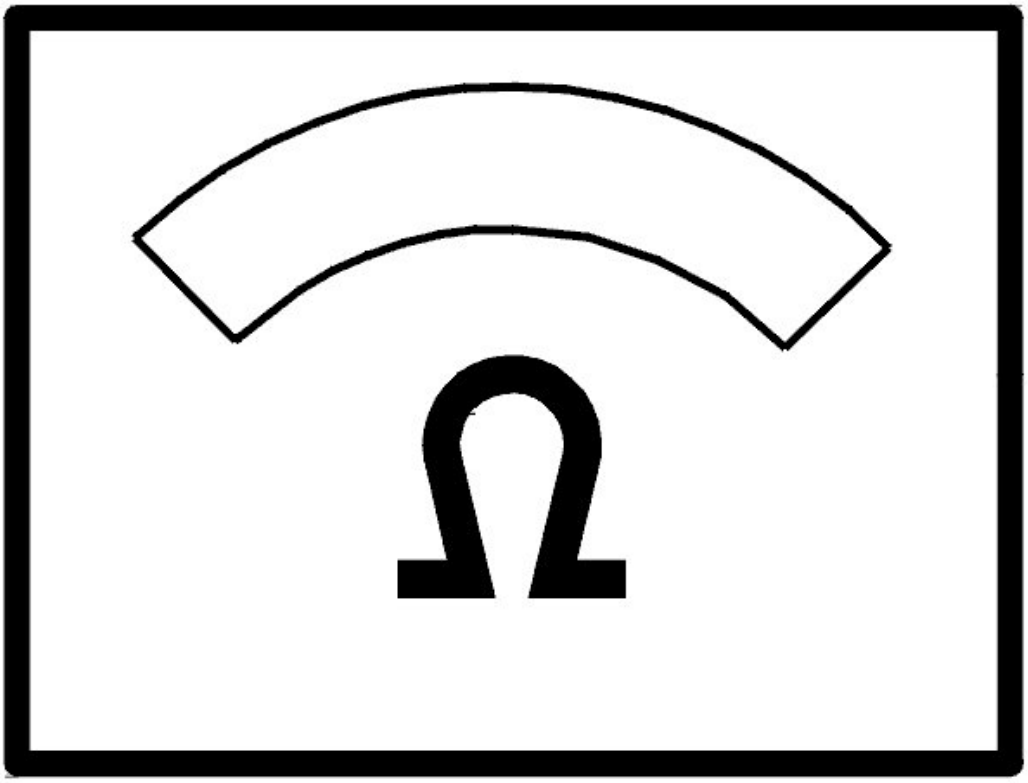
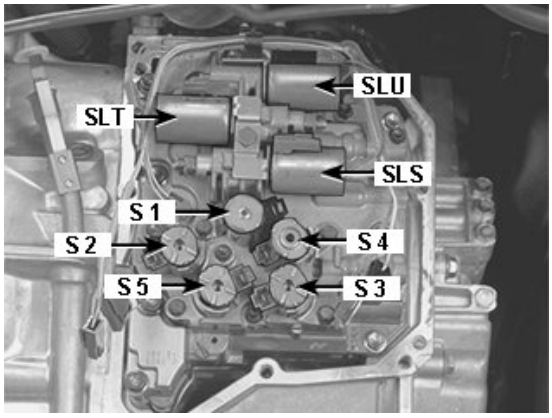




Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

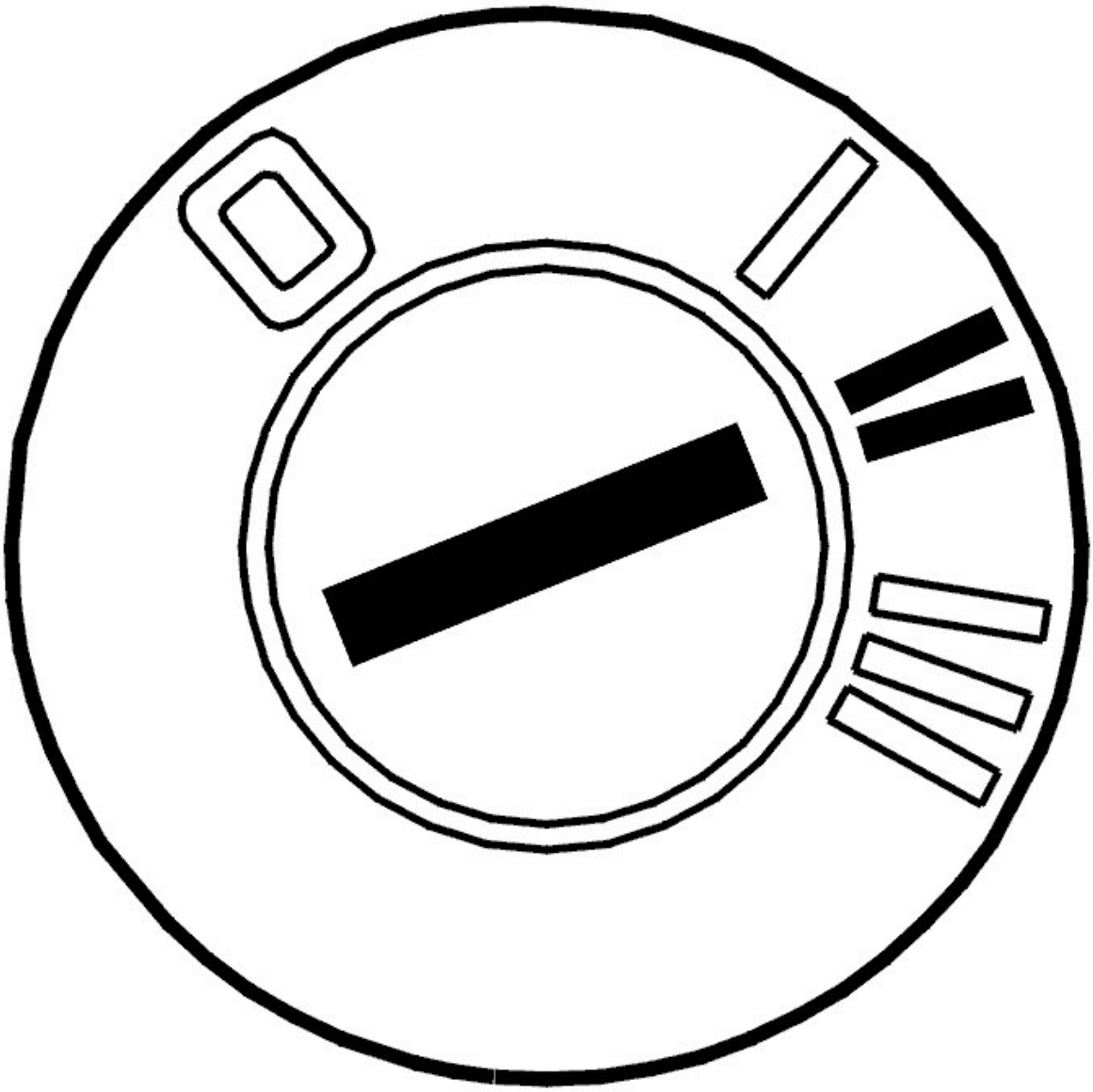
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

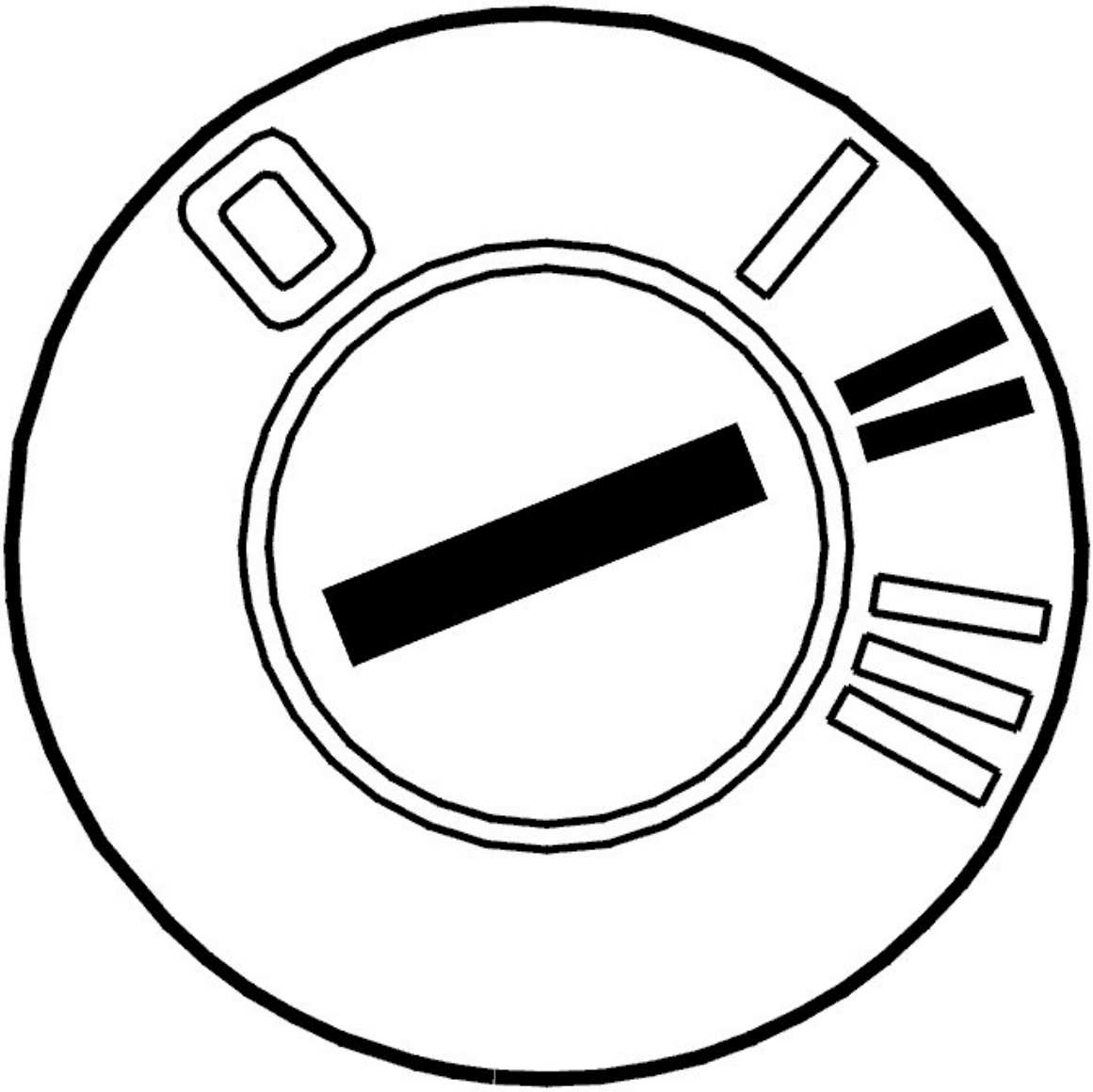
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

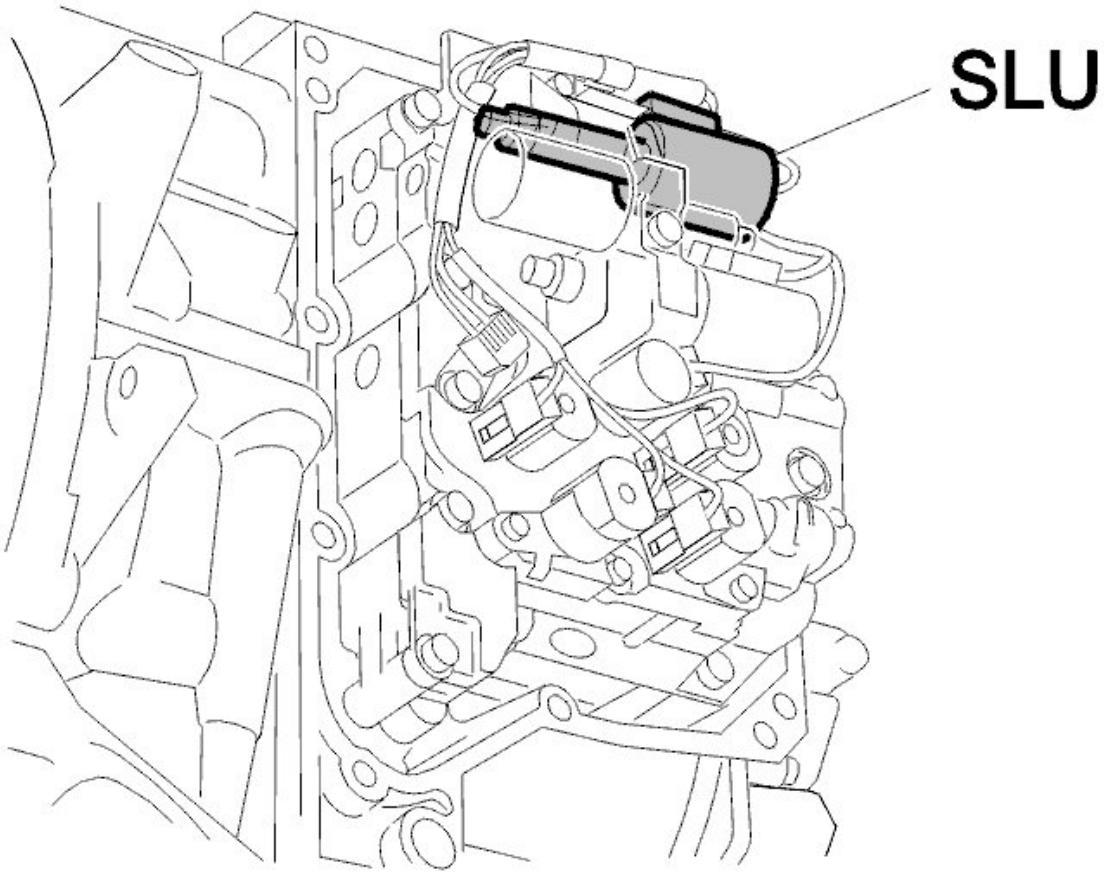
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLU

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function and certain gear shifts in the transmission. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0110 is stored if the control module registers a short-circuit to ground in the solenoid SLU circuit when the solenoid should be activated. Solenoid SLU can probably not be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source
- Short-circuit to ground in the signal cable.
- Defective control module.
- Defective solenoid.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

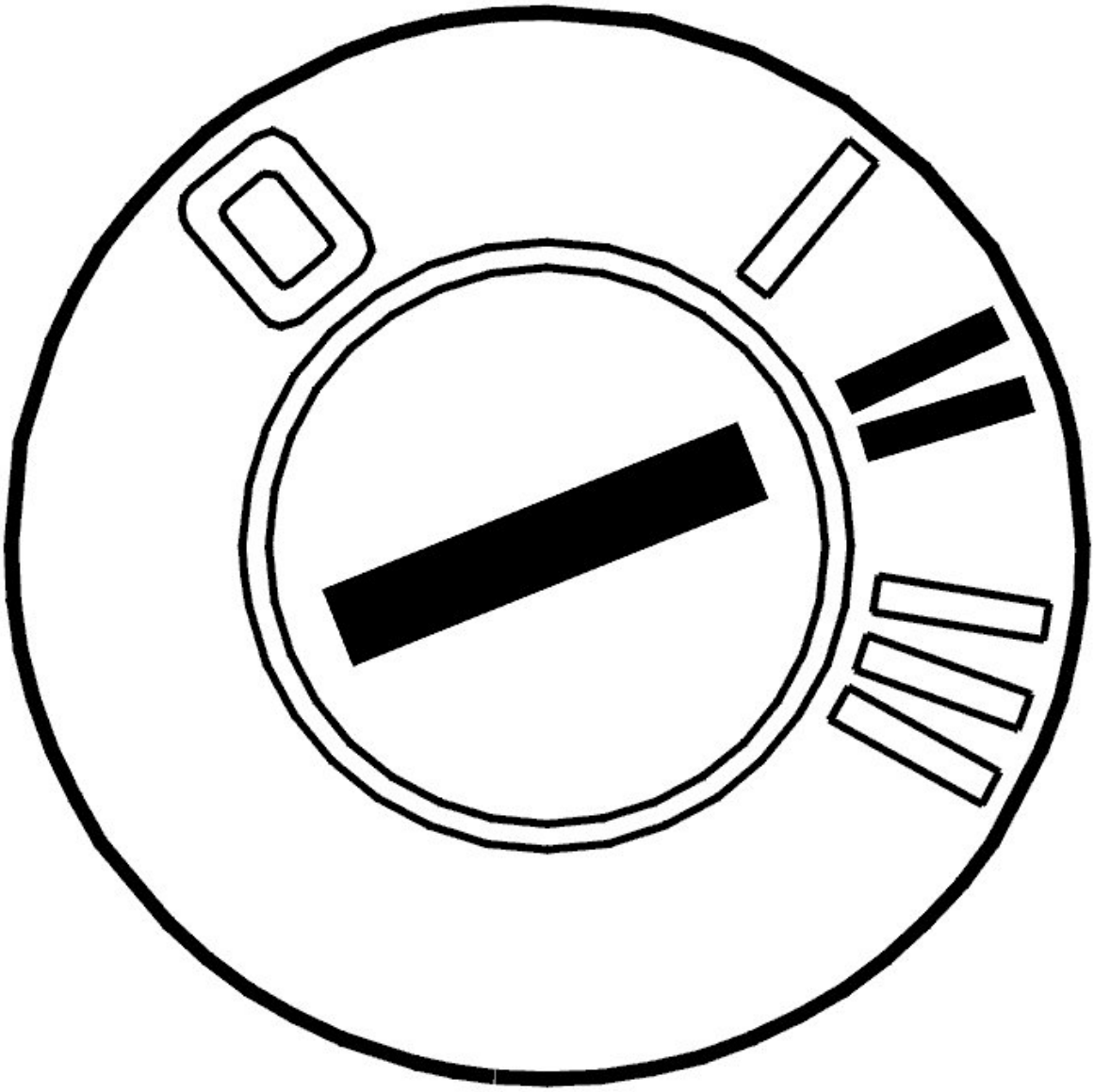
Fault symptom[s]

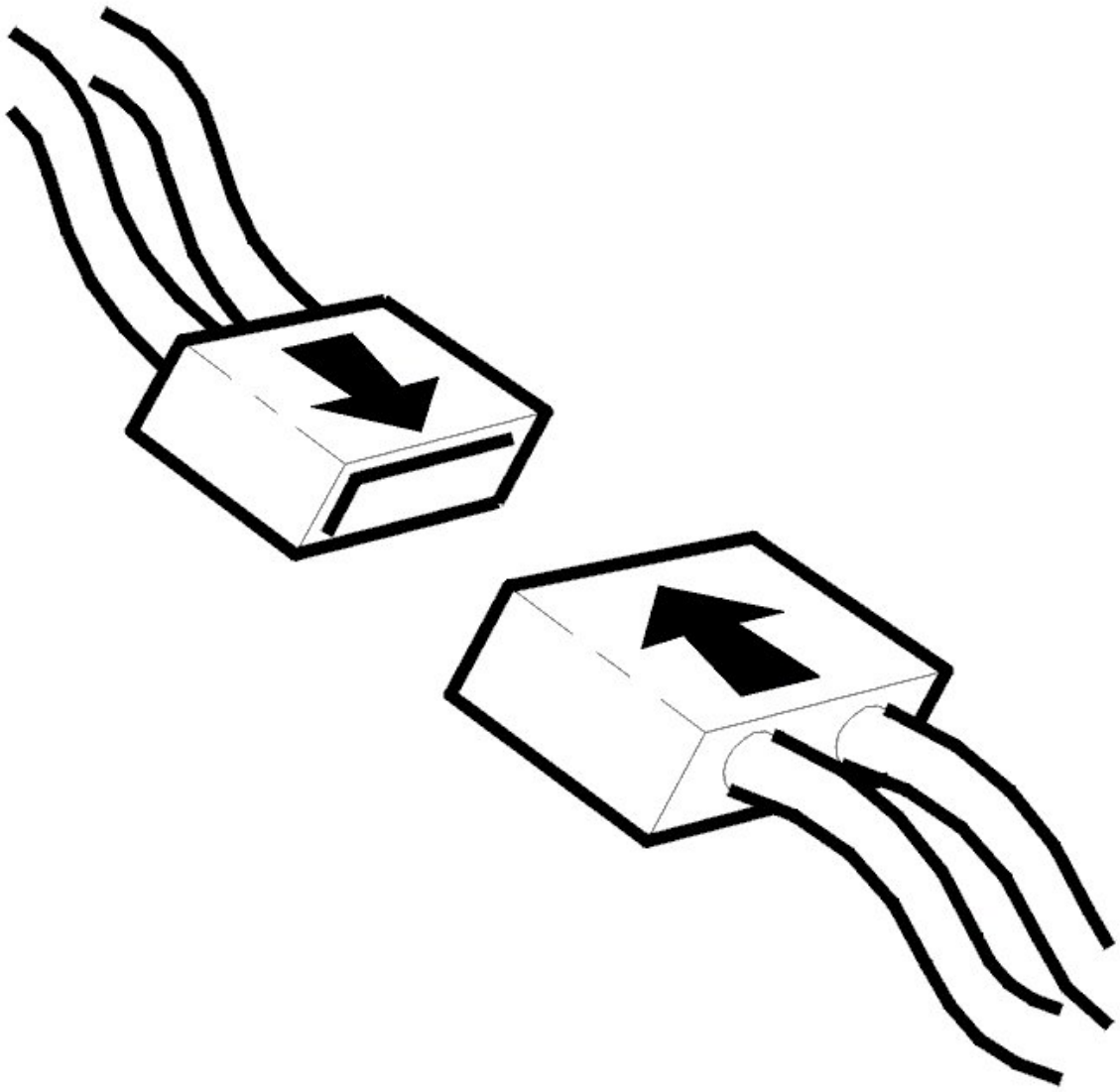
- General orange warning lamp lit.
- No shifting.
- Irregular shifting.
- No lock-up function.

Signal Too Low. Permanent Fault

Signal too low. Permanent fault

Checking line pressure solenoid SLU





- Ignition off
- Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

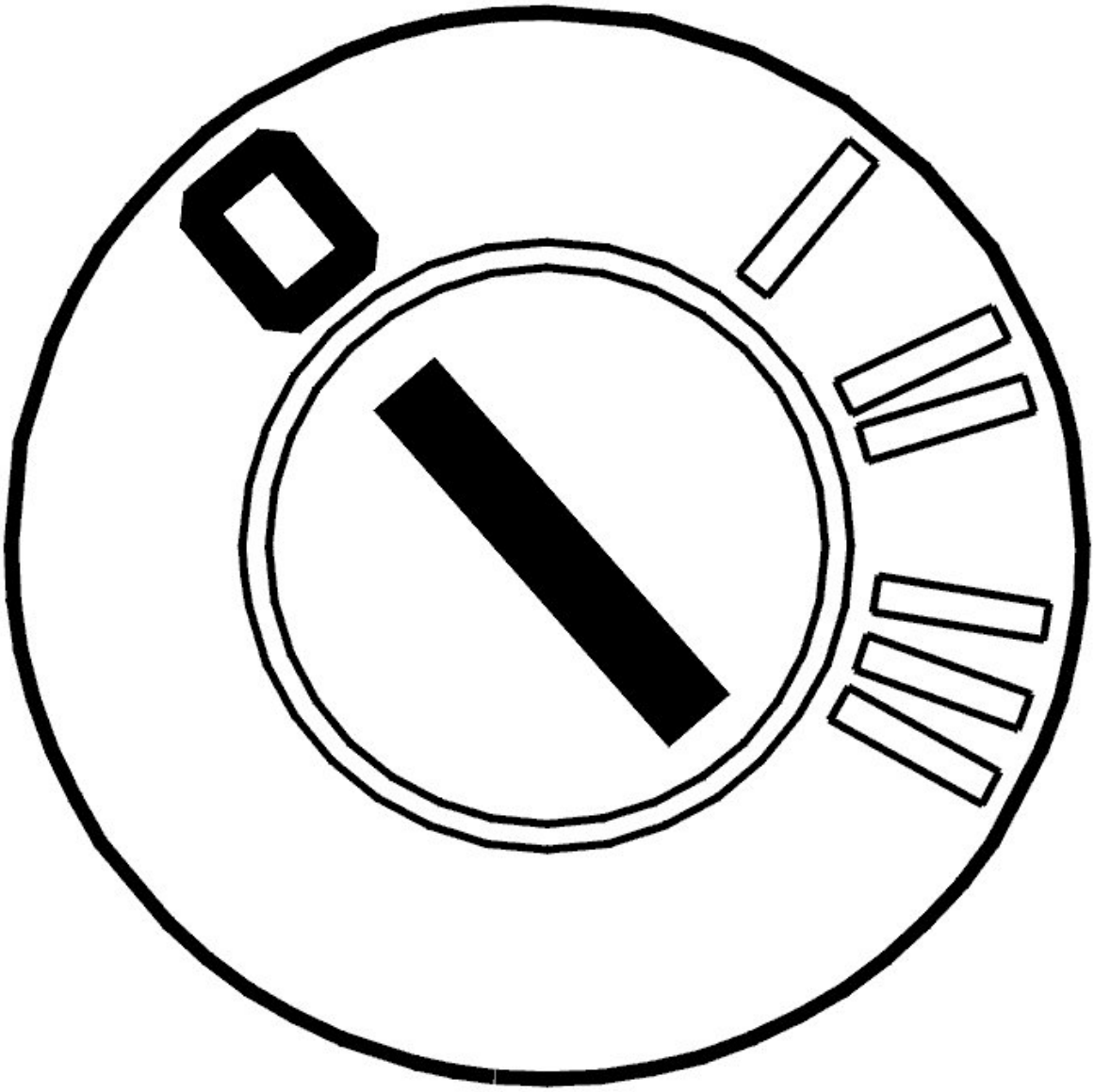
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

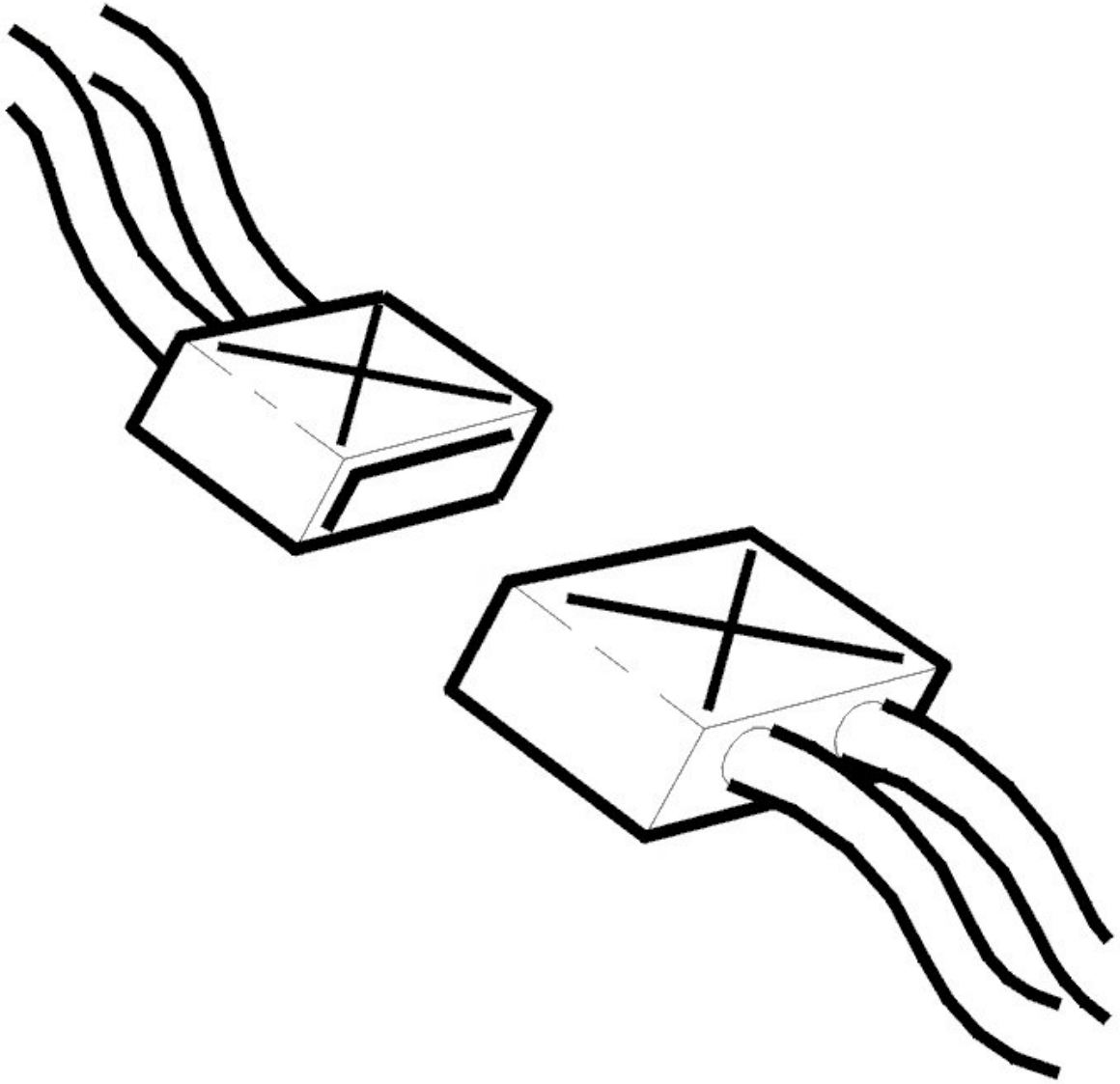
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



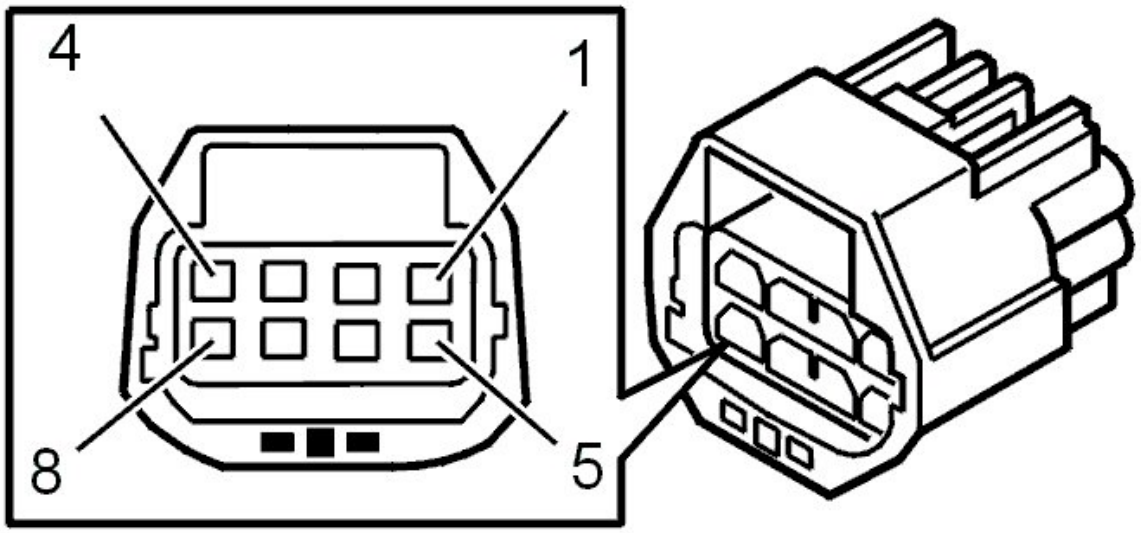


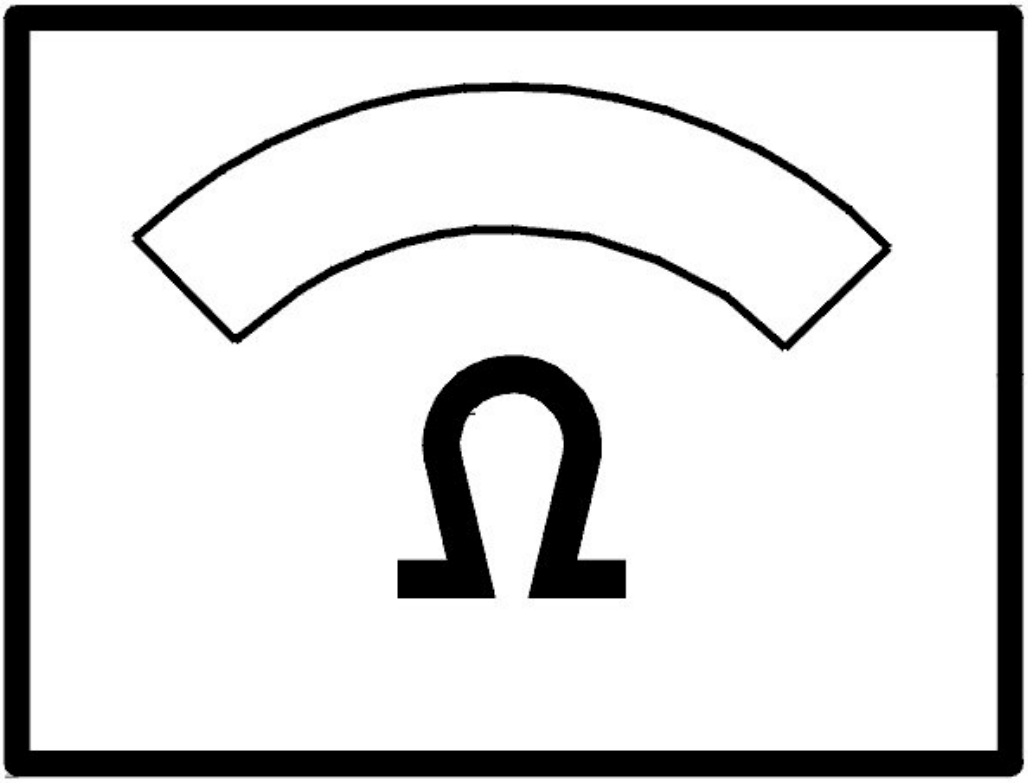
- Ignition off
- Transmission connector D disconnected.

Check solenoid SLU. Measure the resistance between terminals #D1 and #D2 on transmission connector D. The resistance must be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



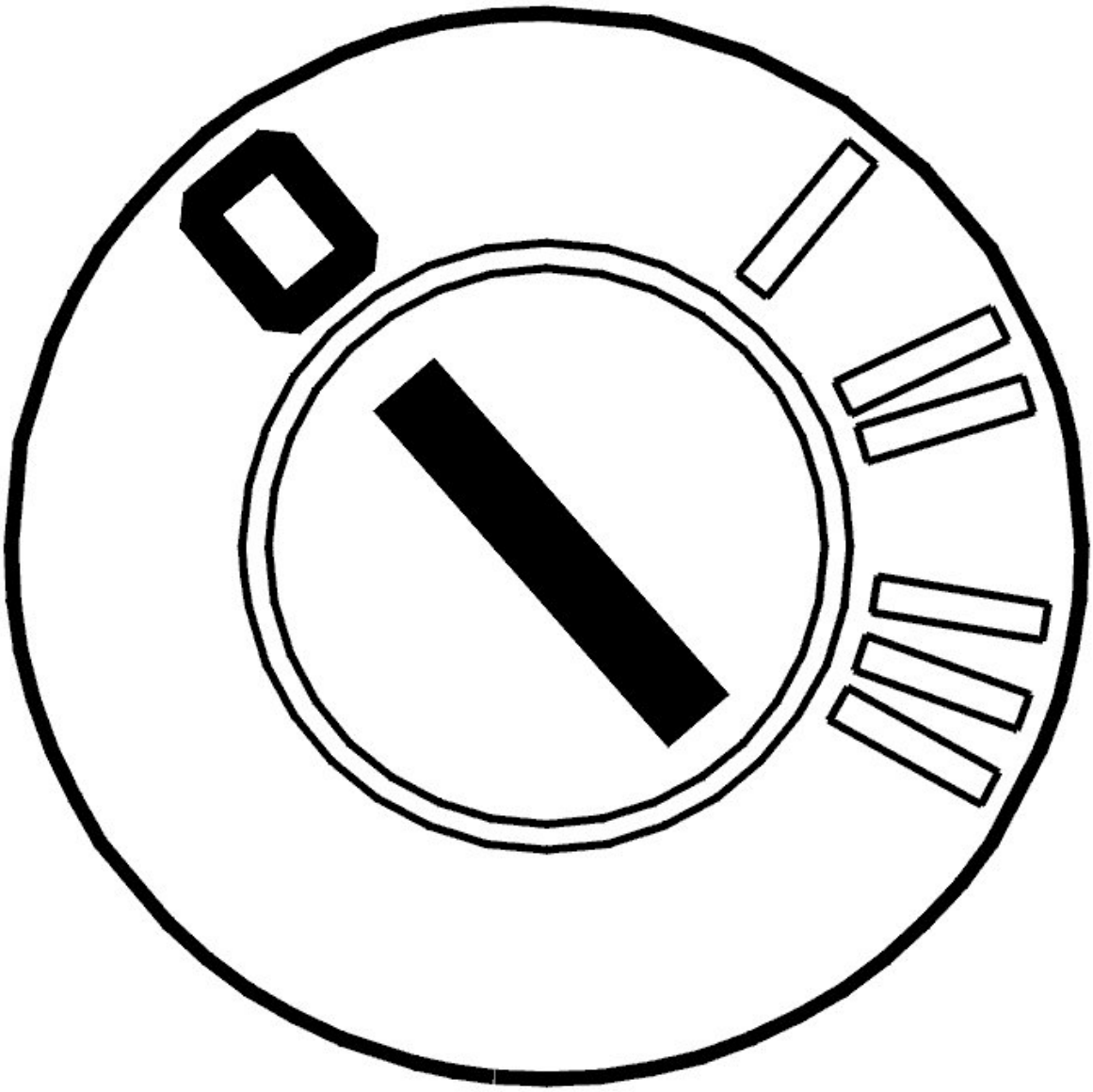


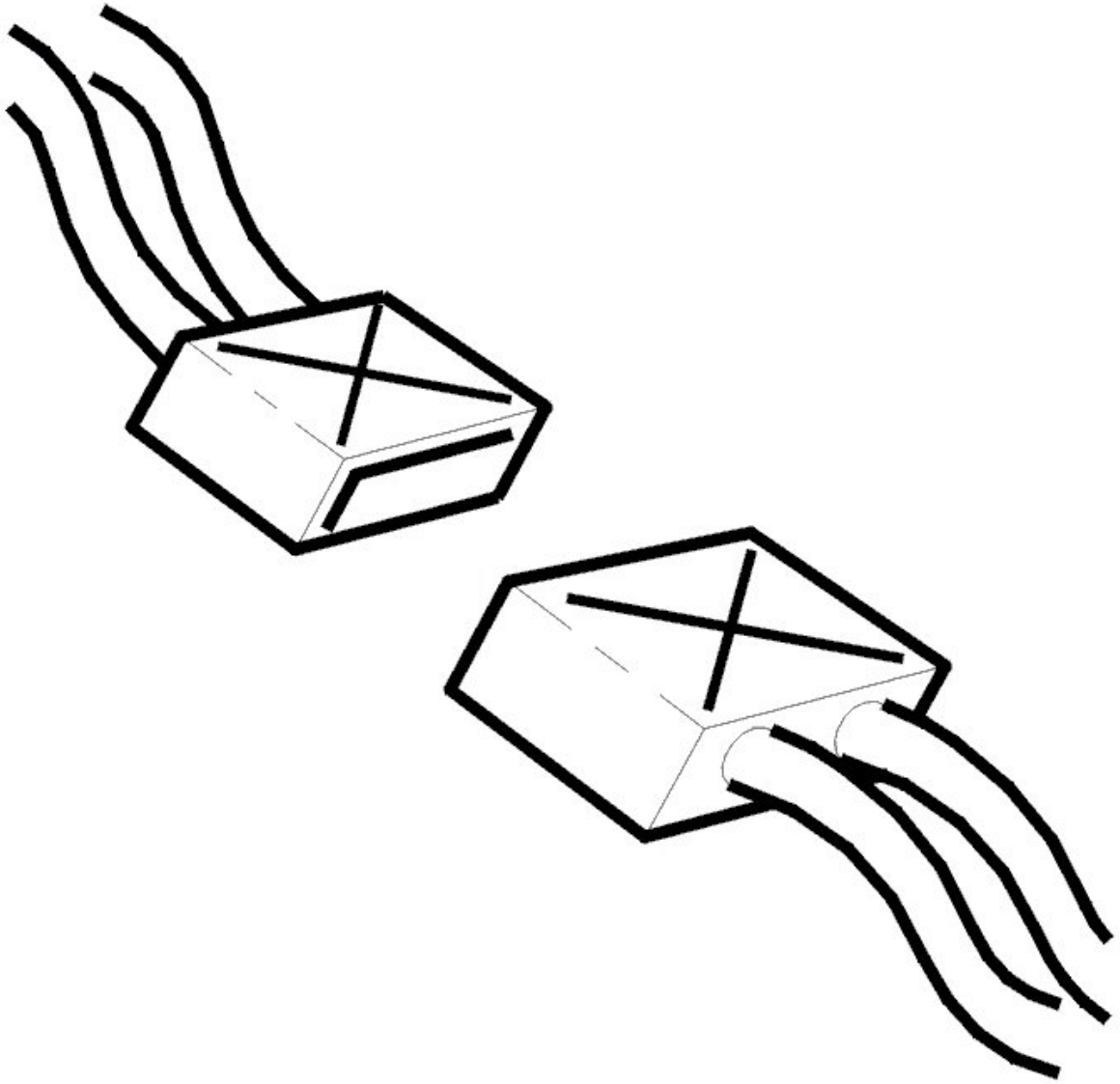
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



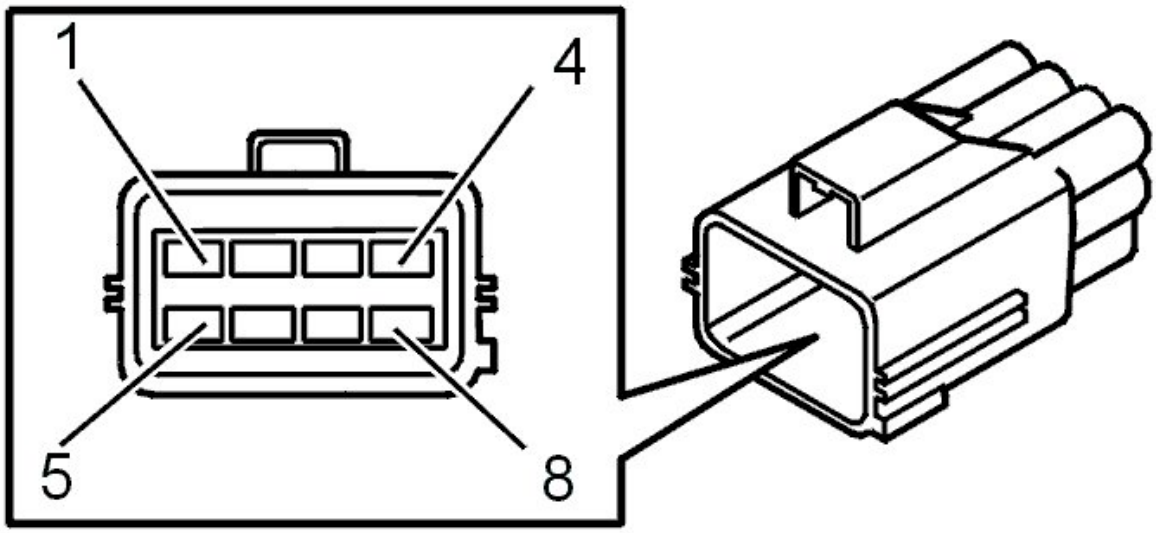


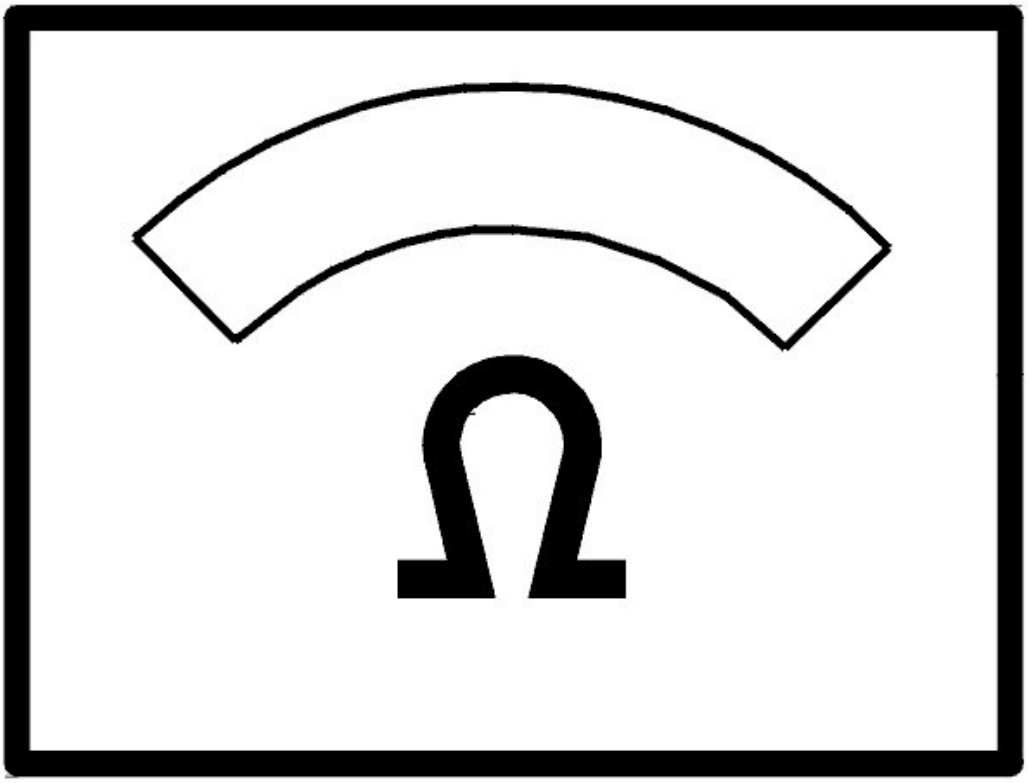
- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A51 (#A51) and transmission connector terminal #D1 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B9 (#A69) and transmission connector terminal #D2 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



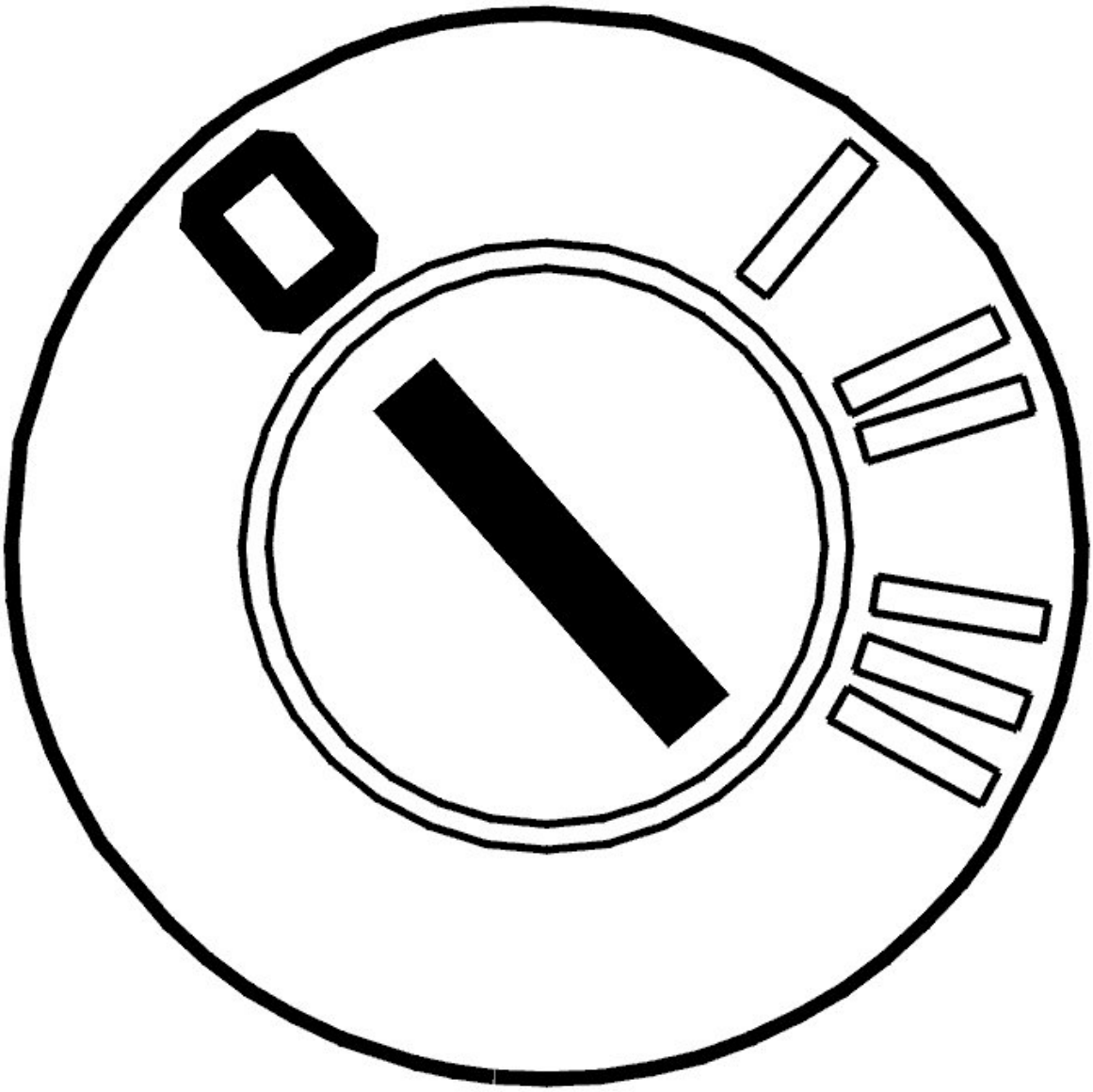


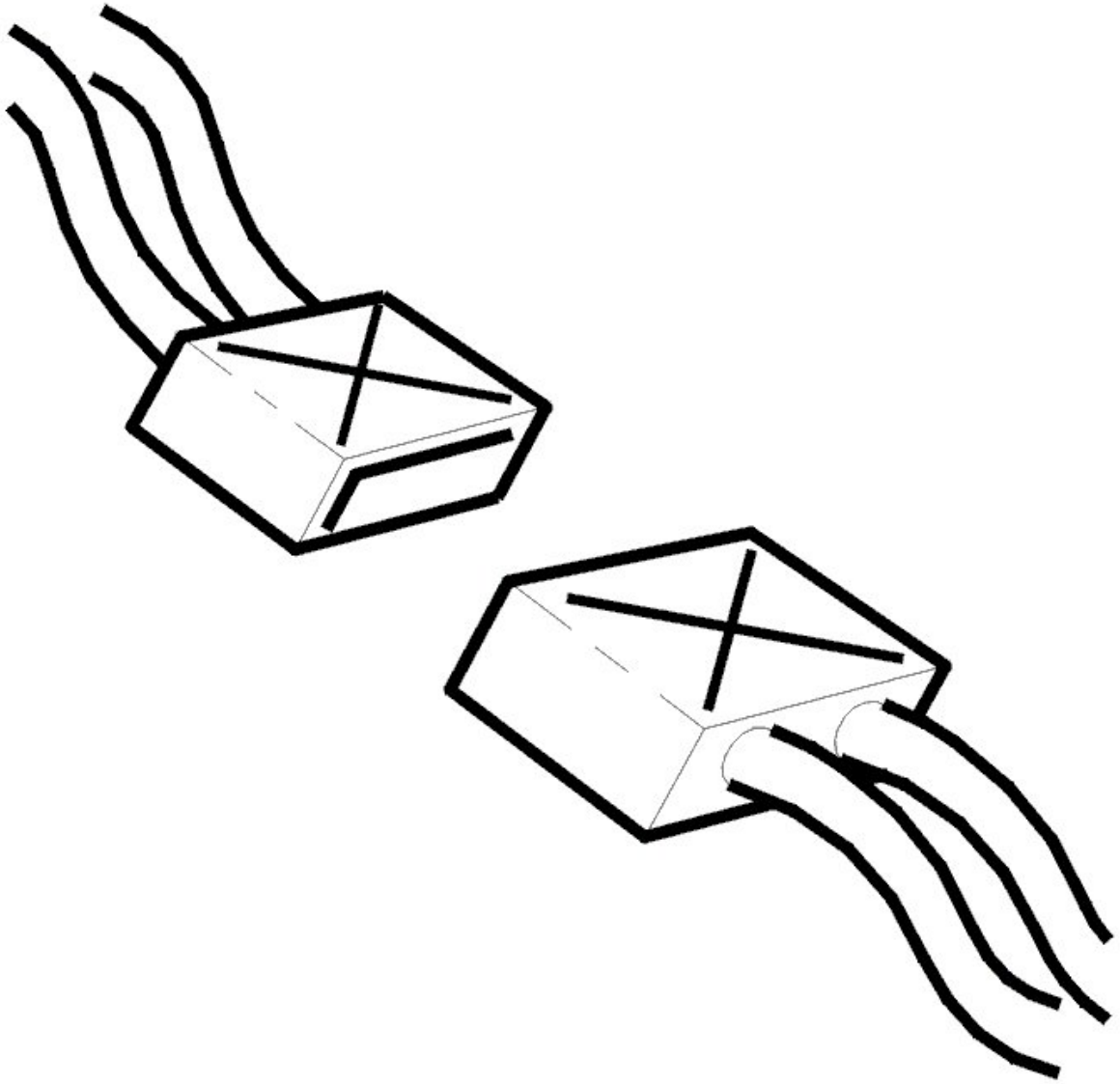
Was a fault detected?

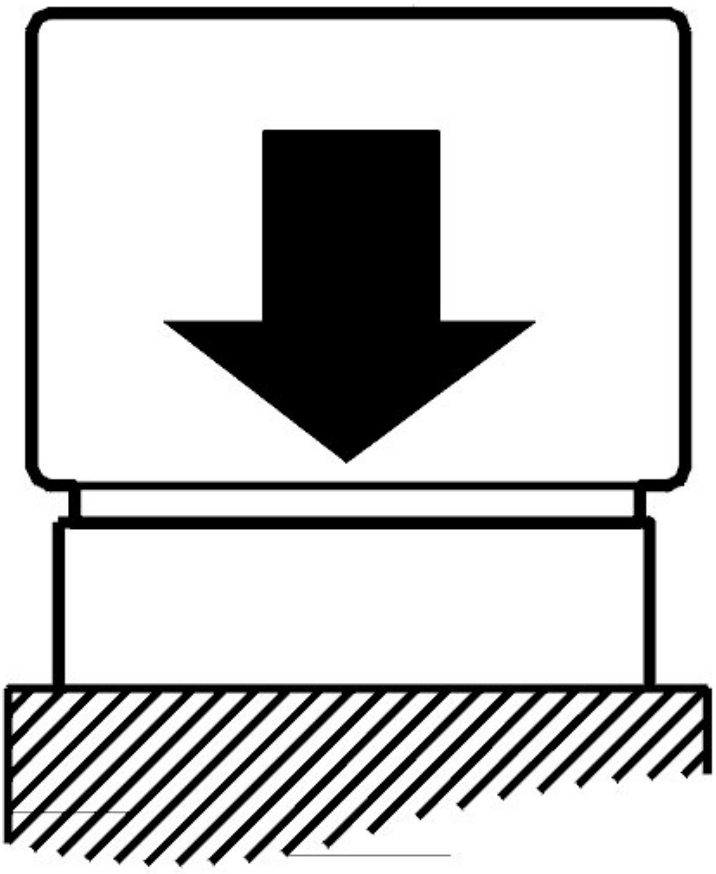
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

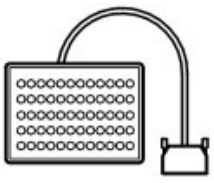
Check the transmission control module (TCM) by measuring the resistance between terminals #A51 (#A51) and #B9 (#A69). The resistance must be approximately 9 kohms.

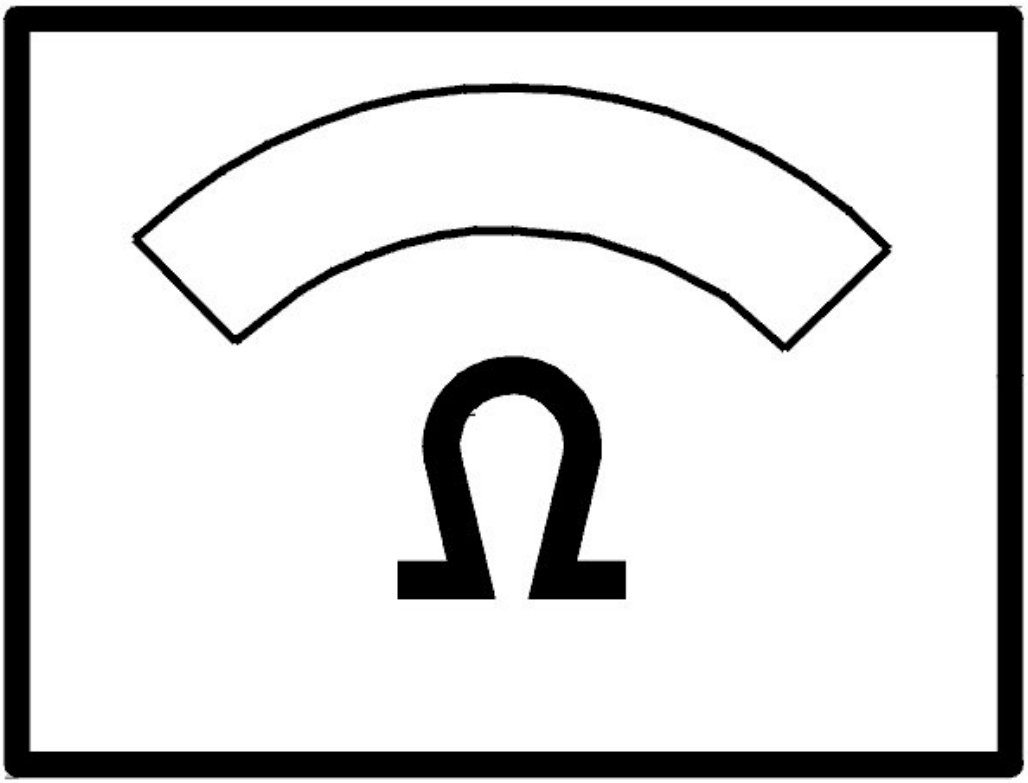
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



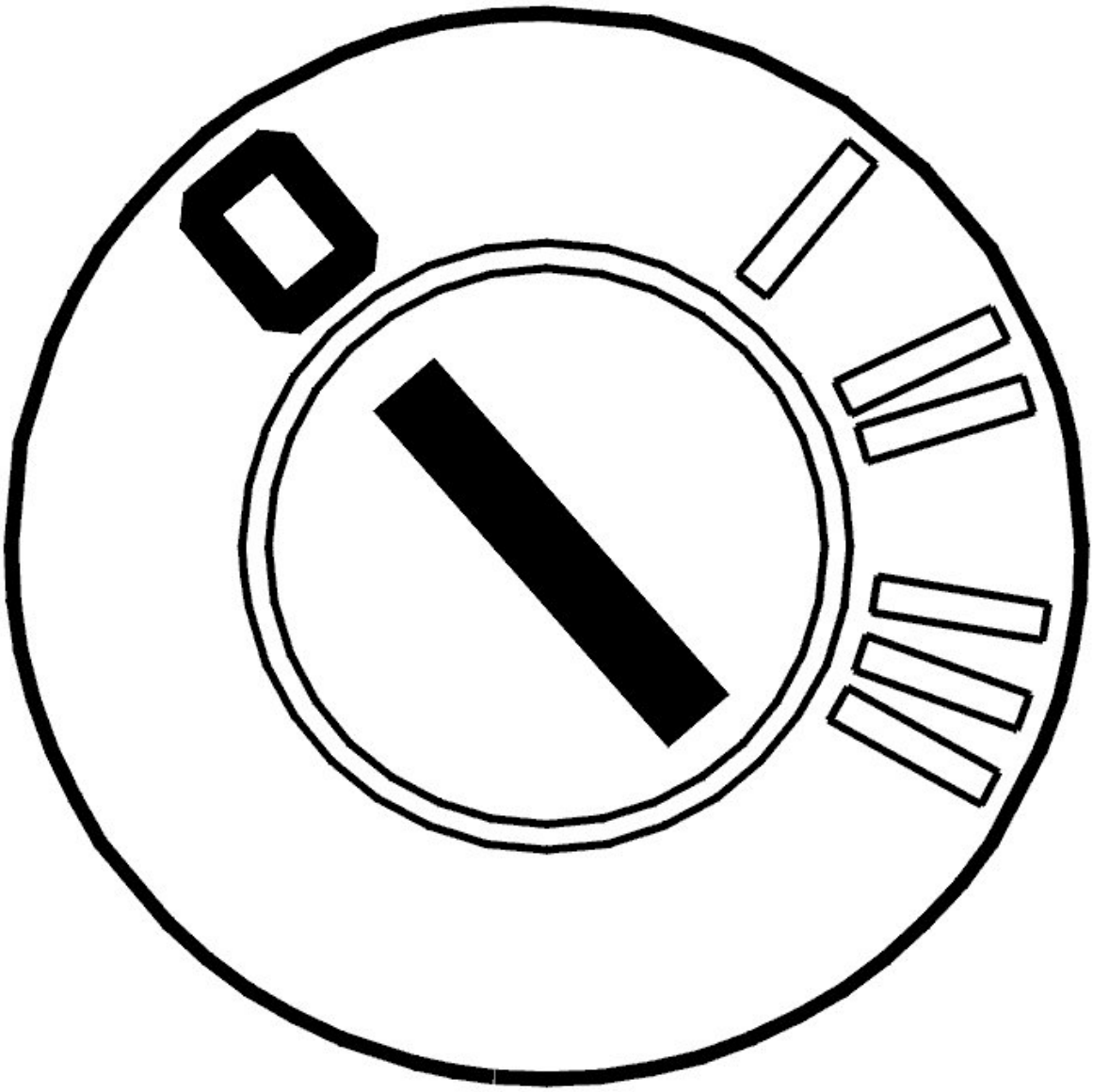


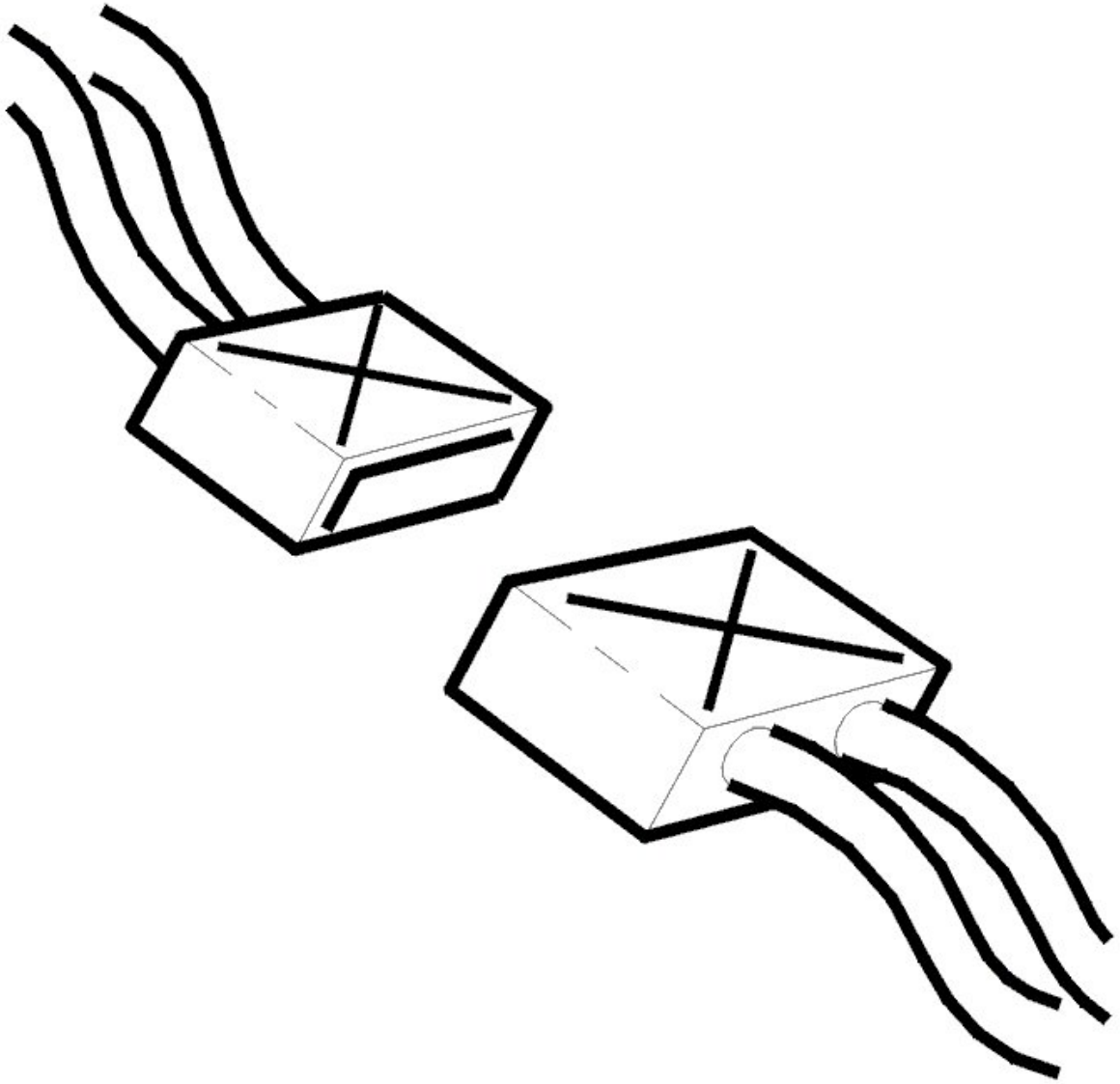
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



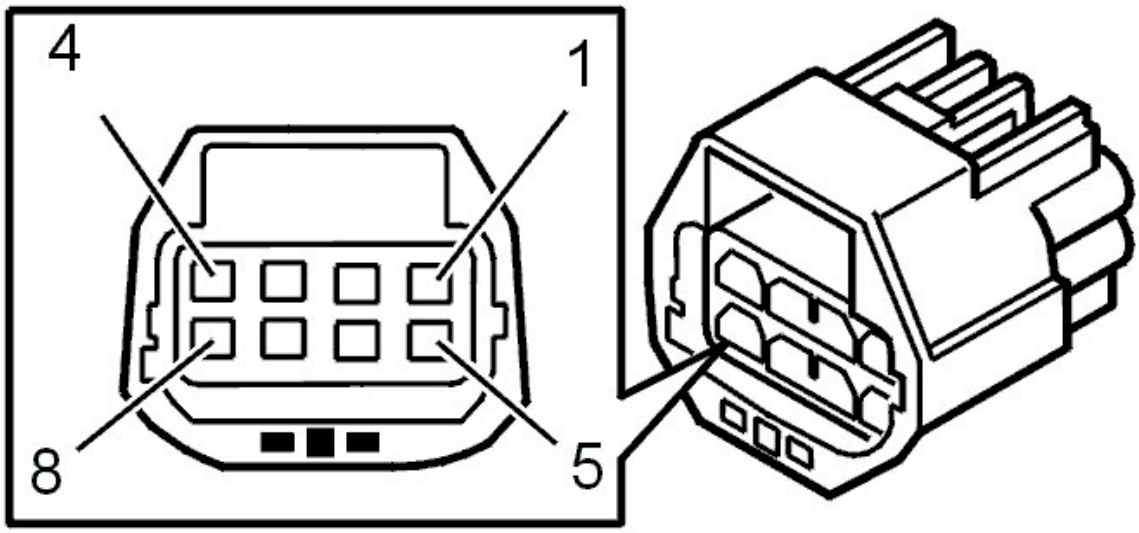


- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D1 and solenoid SLU terminal #1. Check the wiring between transmission connector terminal #D2 and solenoid SLU terminal #2. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the solenoid SLU by measuring the resistance between solenoid connector terminals #1 and #2. The resistance should be 5-5.6 ohms at 20° C.
Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).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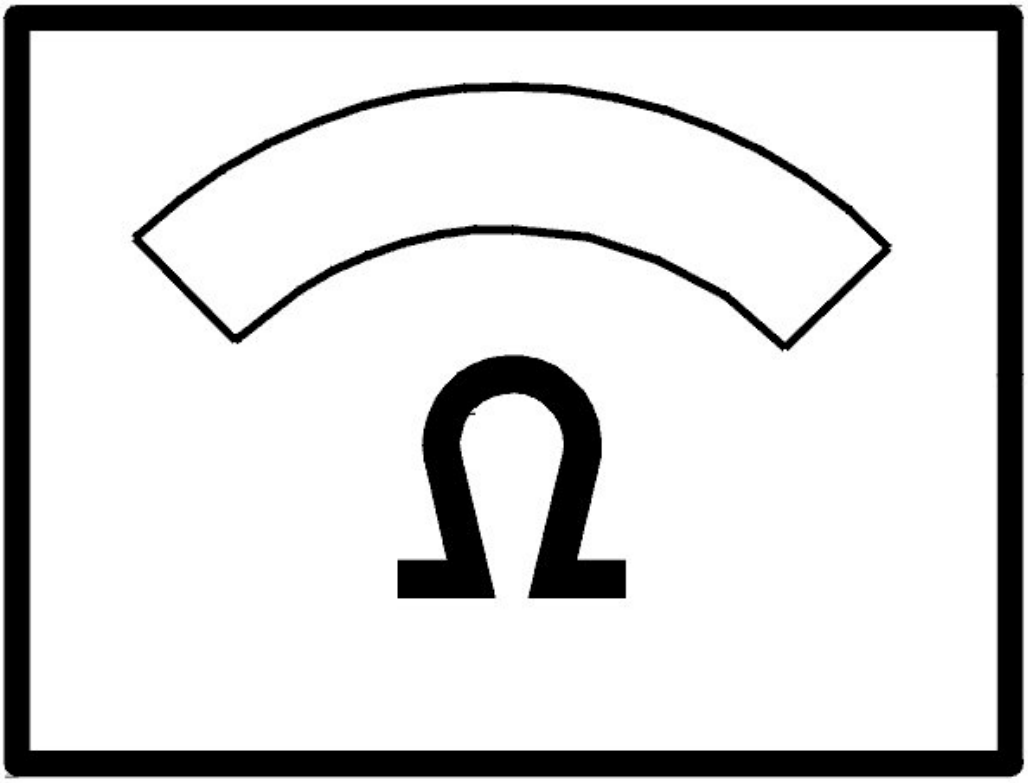
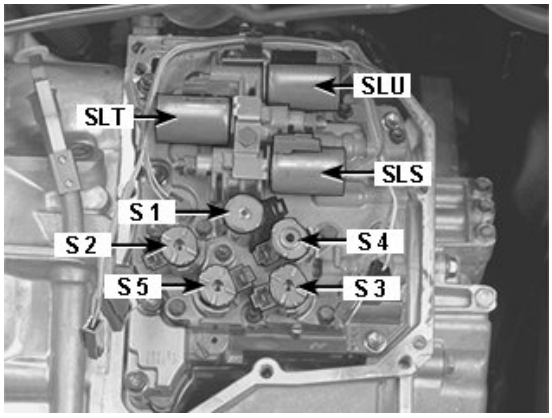




Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

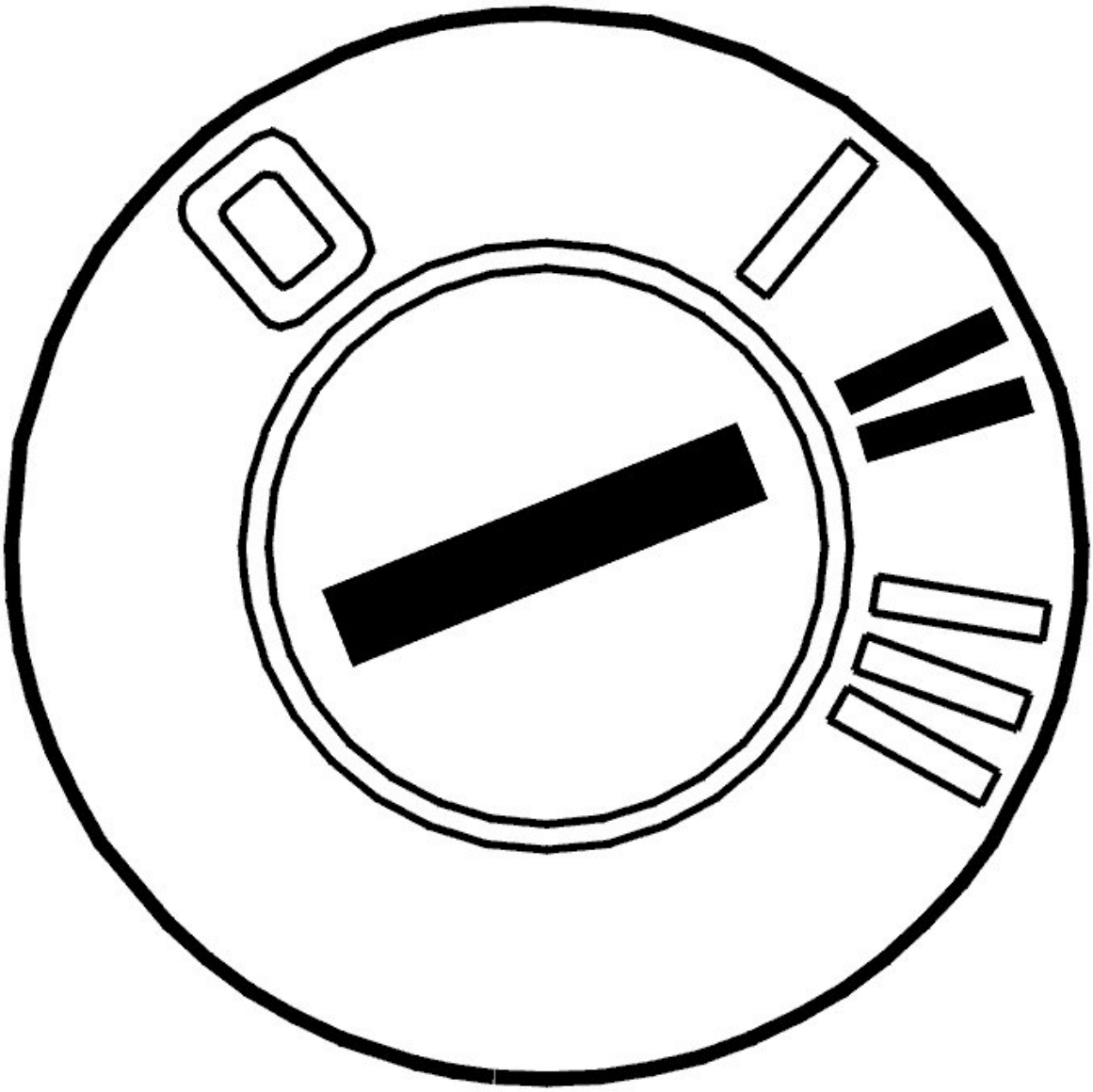
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

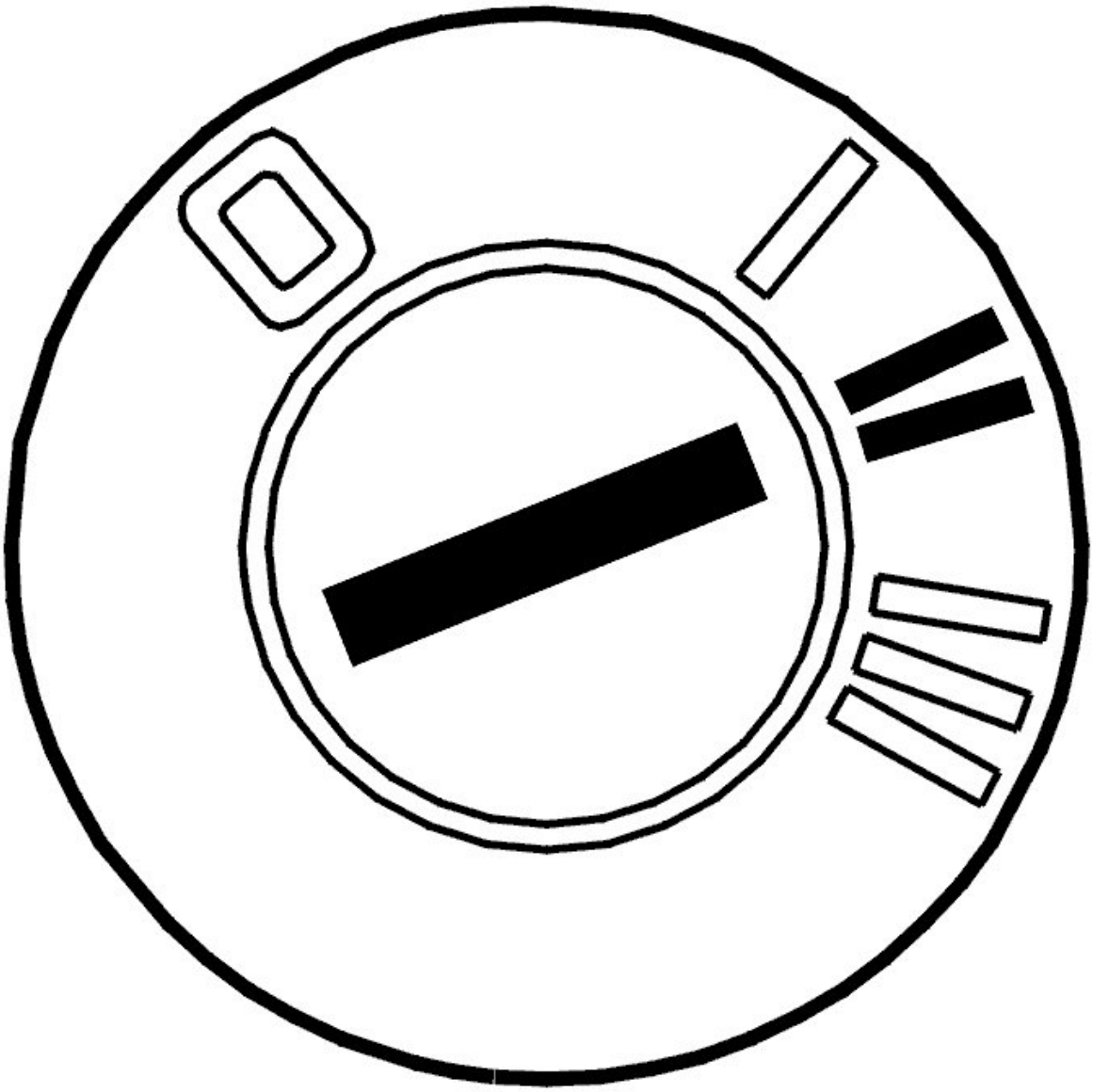
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

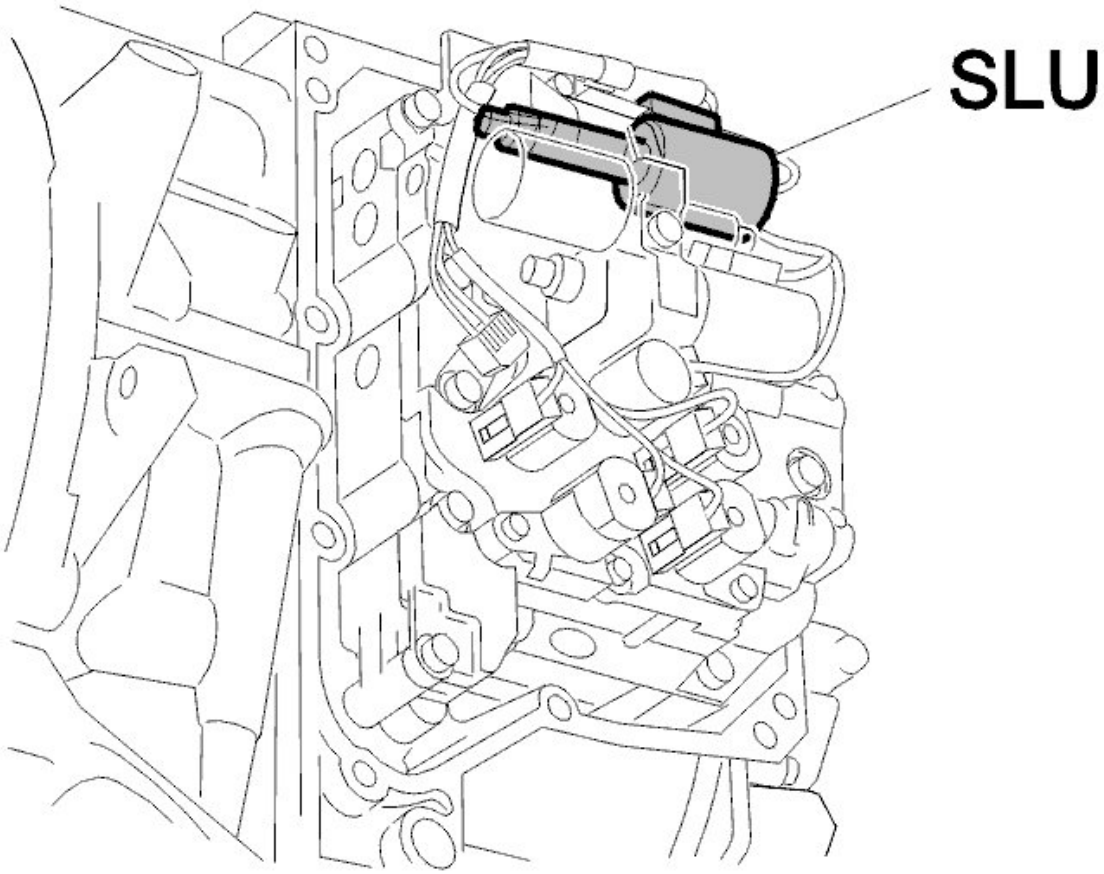
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLU

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Lock-up solenoid SL controls the transmission lock-up function and certain gear shifts in the transmission. Solenoid SLU operates when it receives voltage from the transmission control module (TCM) and is activated under different driving conditions depending on road speed, throttle position and the driving mode selected. Diagnostic trouble code (DTC) TCM-0110 is stored if the control module registers a short-circuit to ground in the solenoid SLU circuit when the solenoid should be activated. Solenoid SLU can probably not be activated.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.
- The transmission control module (TCM) does not activate the lock-up solenoid.

Possible source
- Short-circuit to ground in the signal cable.
- Defective control module.
- Defective solenoid.

Fault symptom[s]
- General orange warning lamp lit.
- No shifting.
- Irregular shifting.
- No lock-up function.

Signal Too Low. Intermittent Fault

Signal too low. Intermittent fault

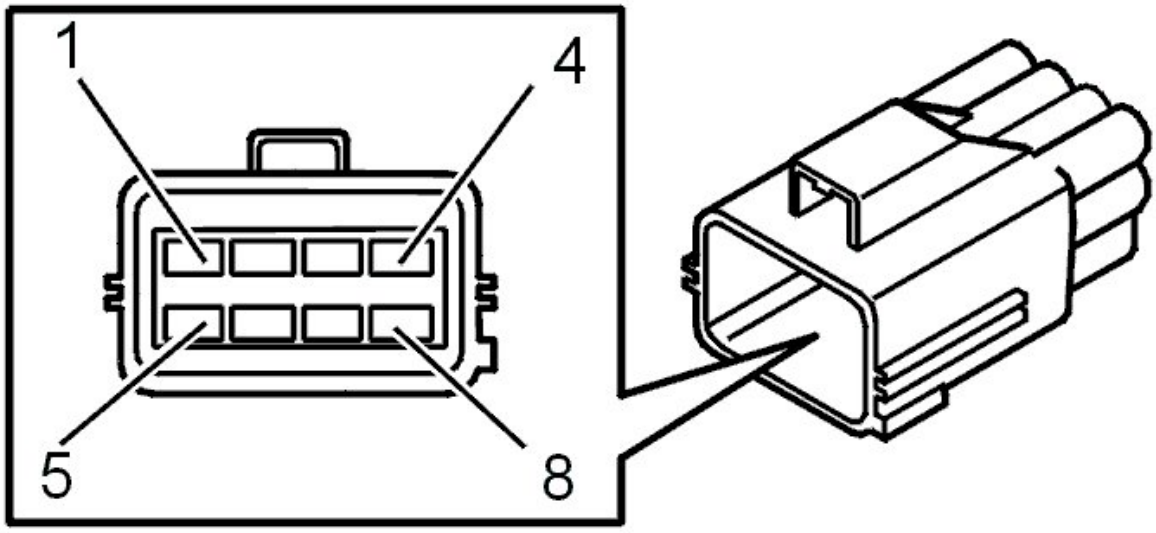
Intermittent fault

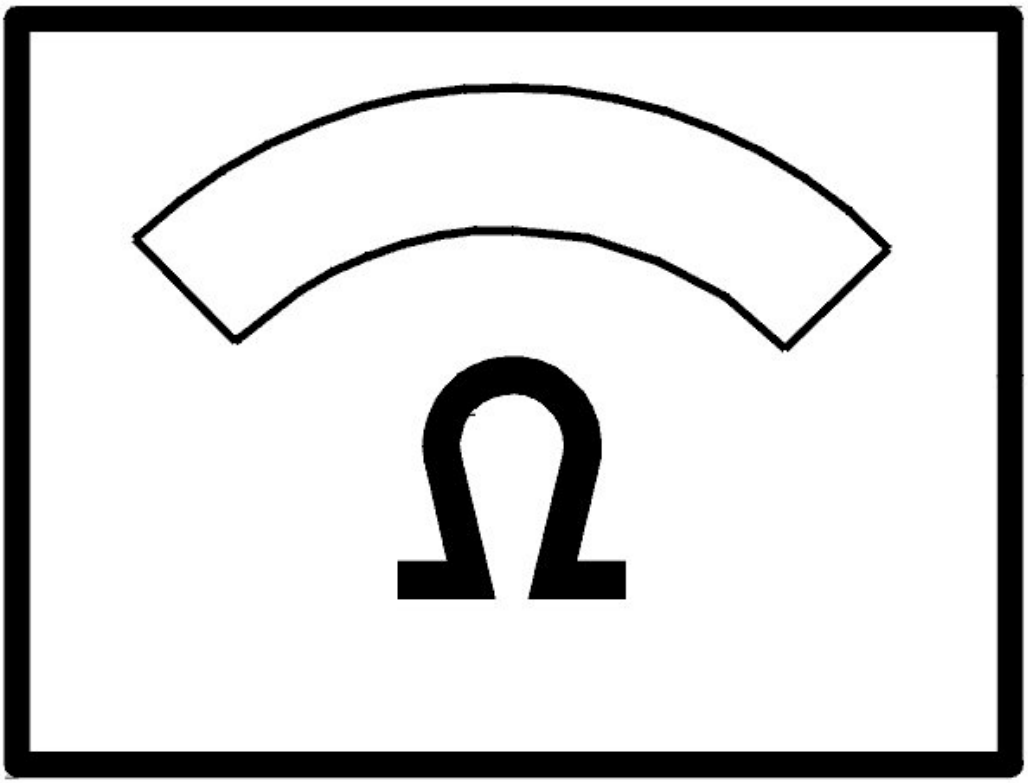
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between transmission control module (TCM) terminal #A51 (#A51) and transmission connector terminal #D1. Check the wiring between control module terminal #B9 (#A69) and transmission connector terminal #D2. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

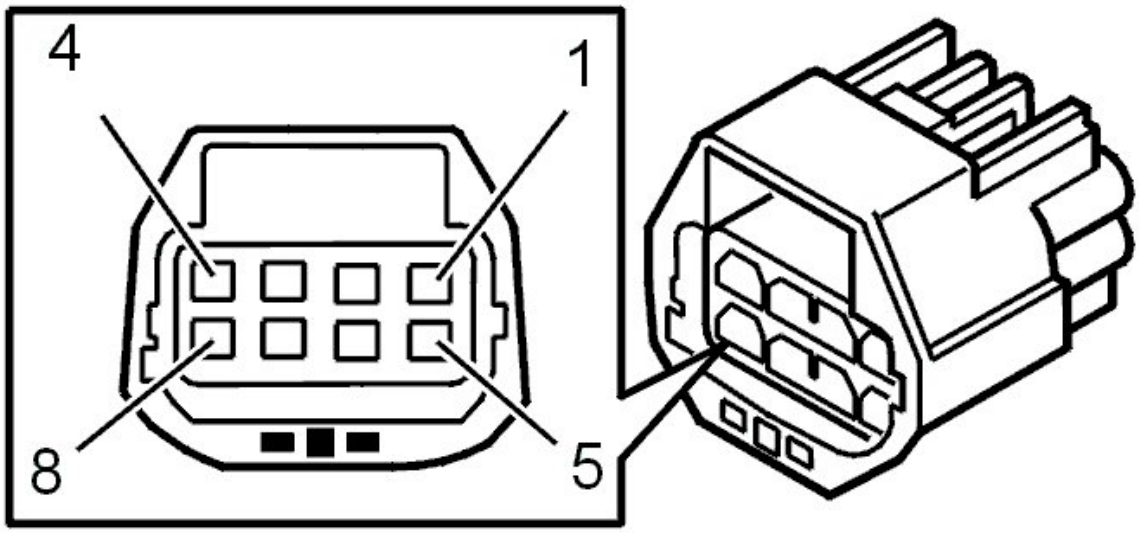
Hint: Check solenoid SLU. Measure the resistance between terminals #D1 and #D2 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

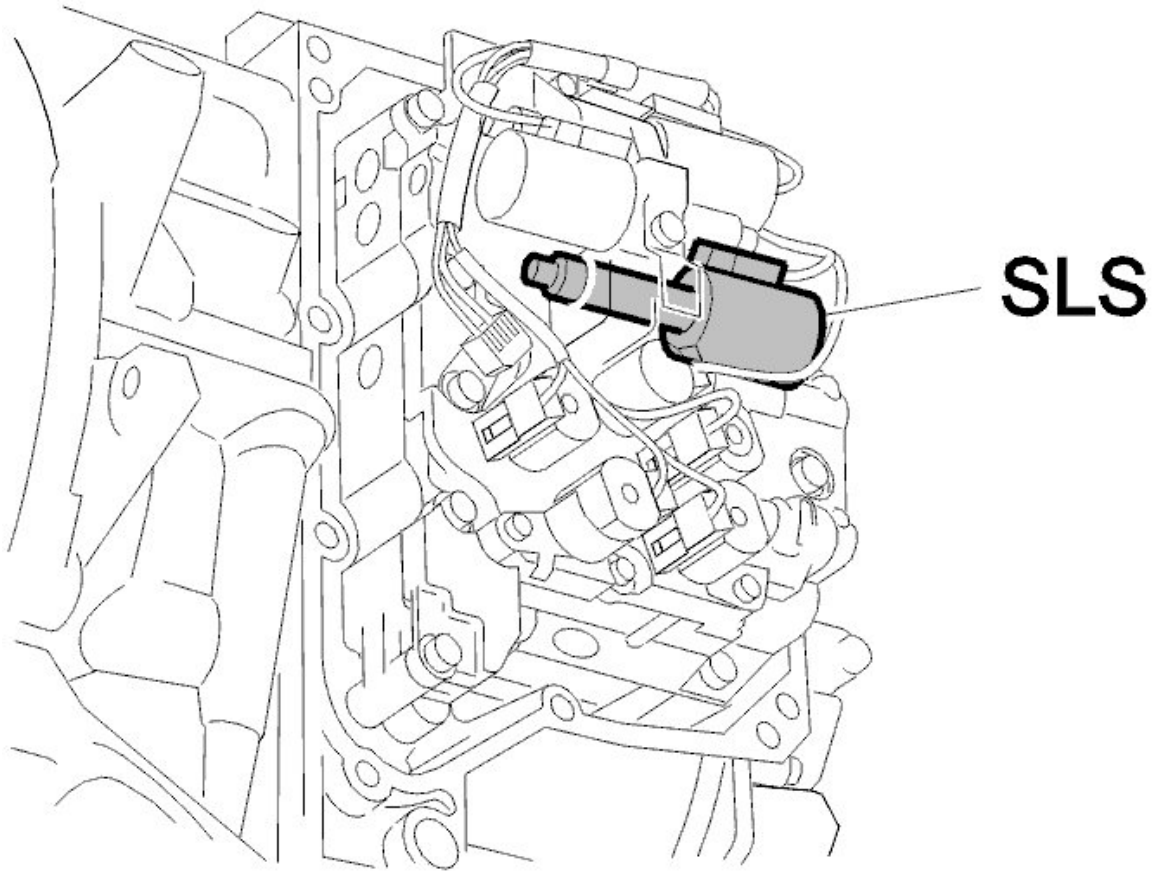
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0112 is stored if the control module (TCM) registers a short-circuit to battery voltage in the circuit for solenoid SLS. This results in too high an amperage in the circuit. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- No lock-up function.

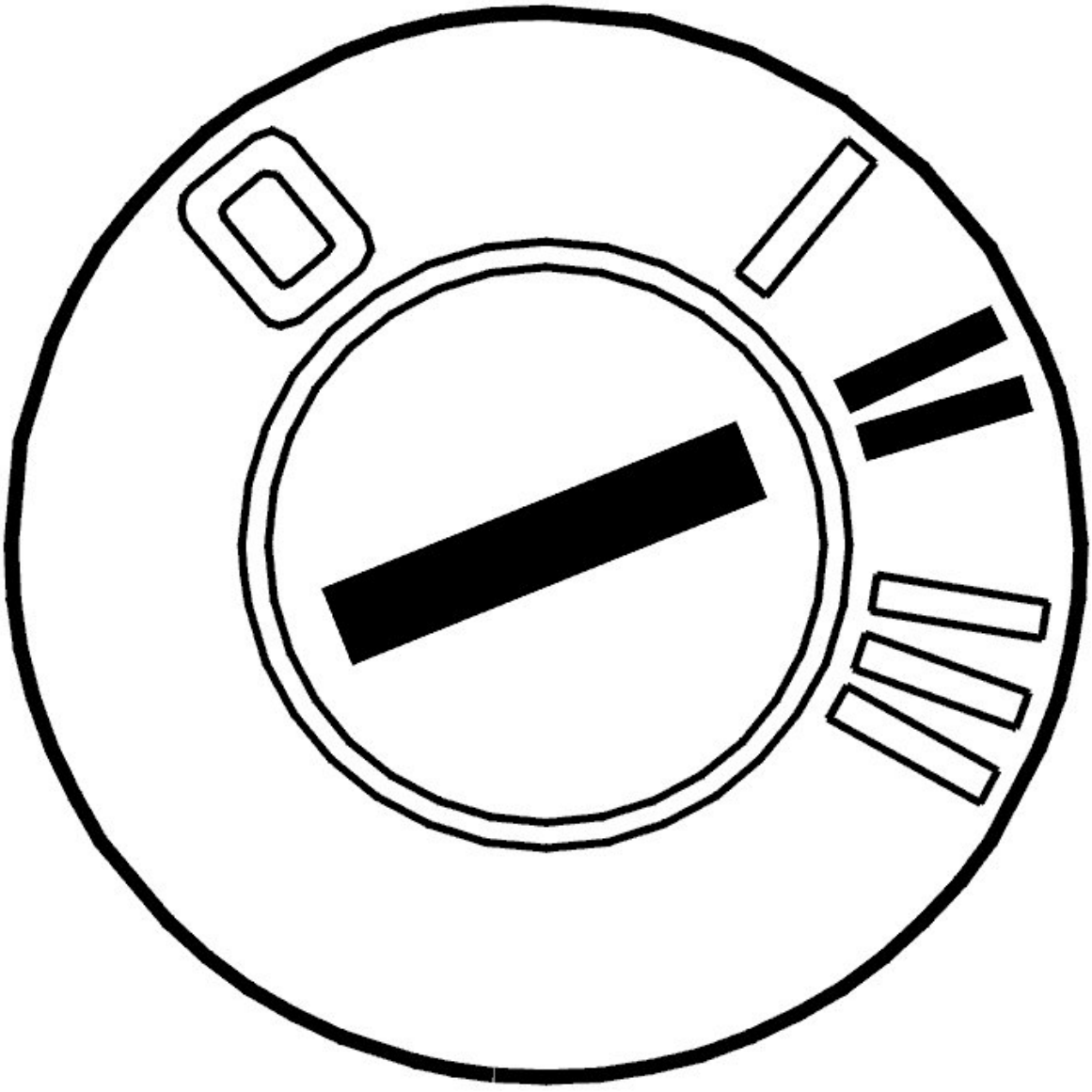
Hint: No shifting because the control module prevents activation of the solenoids.

Caution! There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

Signal Too High. Permanent Fault

Signal too high. Permanent fault

Checking line pressure solenoid SLS



- Ignition on
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

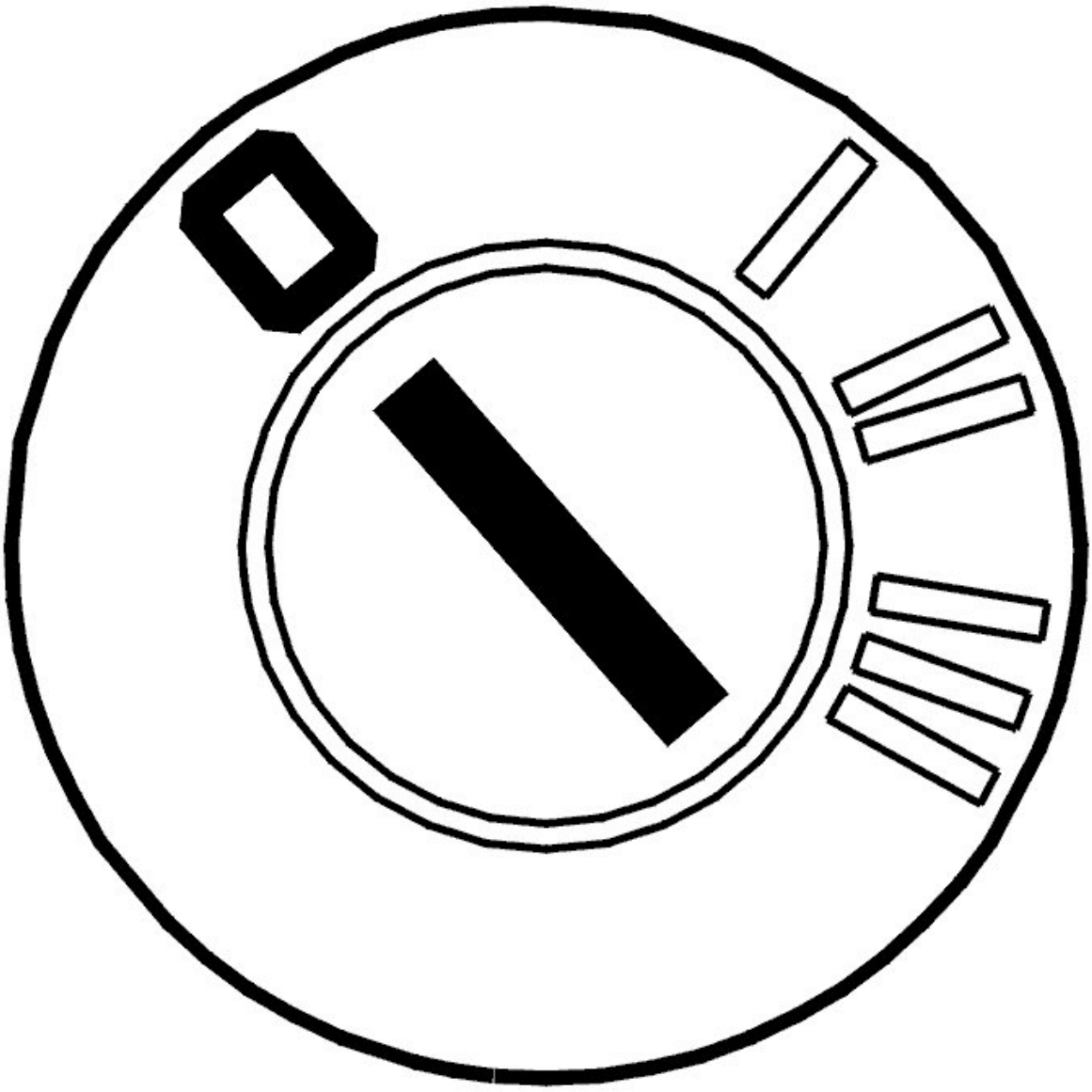
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

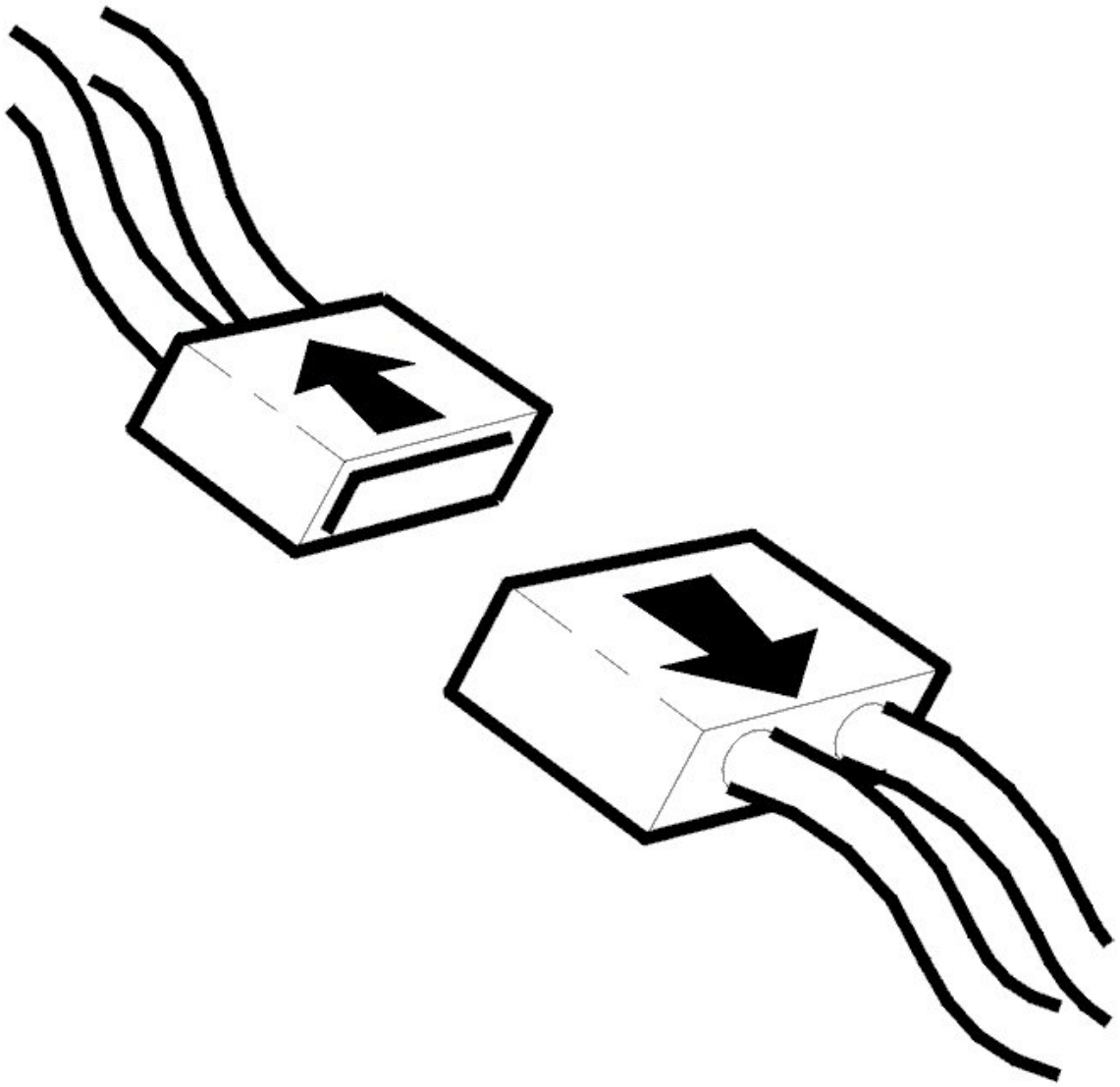
Does the current oscillate?

Yes - No Fault Found

No - Checking the wiring

Checking the wiring



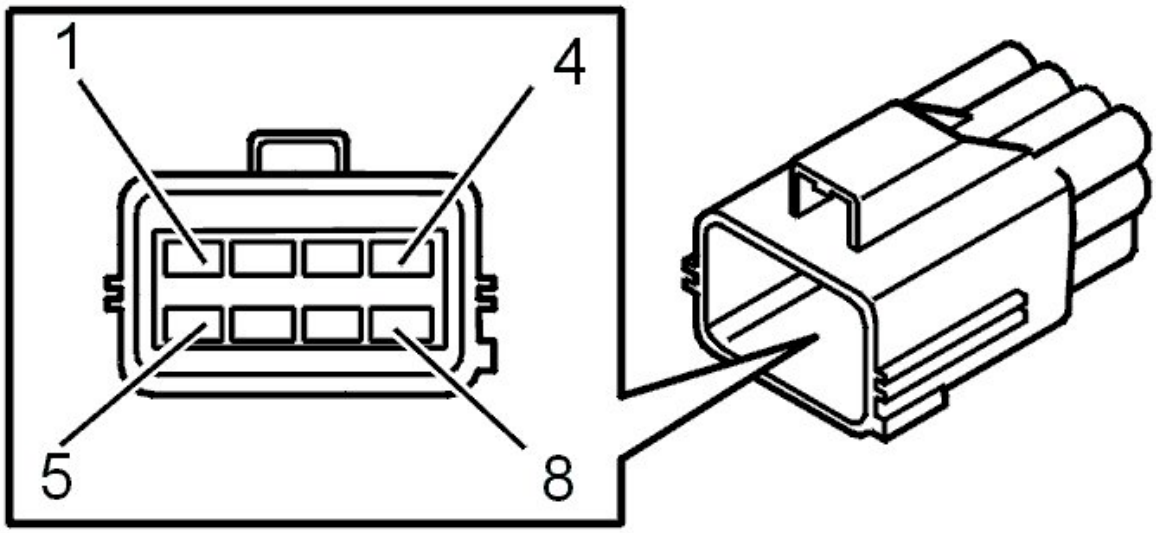


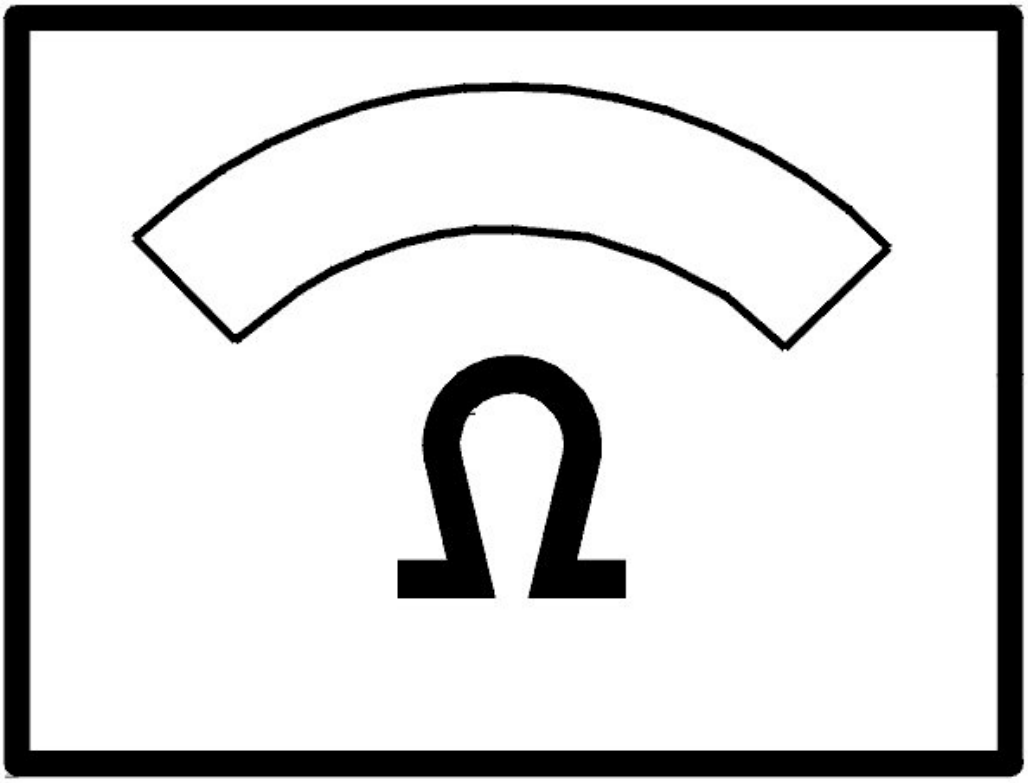
- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between control module terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B7 (#A67) and transmission connector terminal #D6 (control module side). Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the wiring in the circuit for short-circuits to other cables in the circuit. Use the relevant Wiring Diagram.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



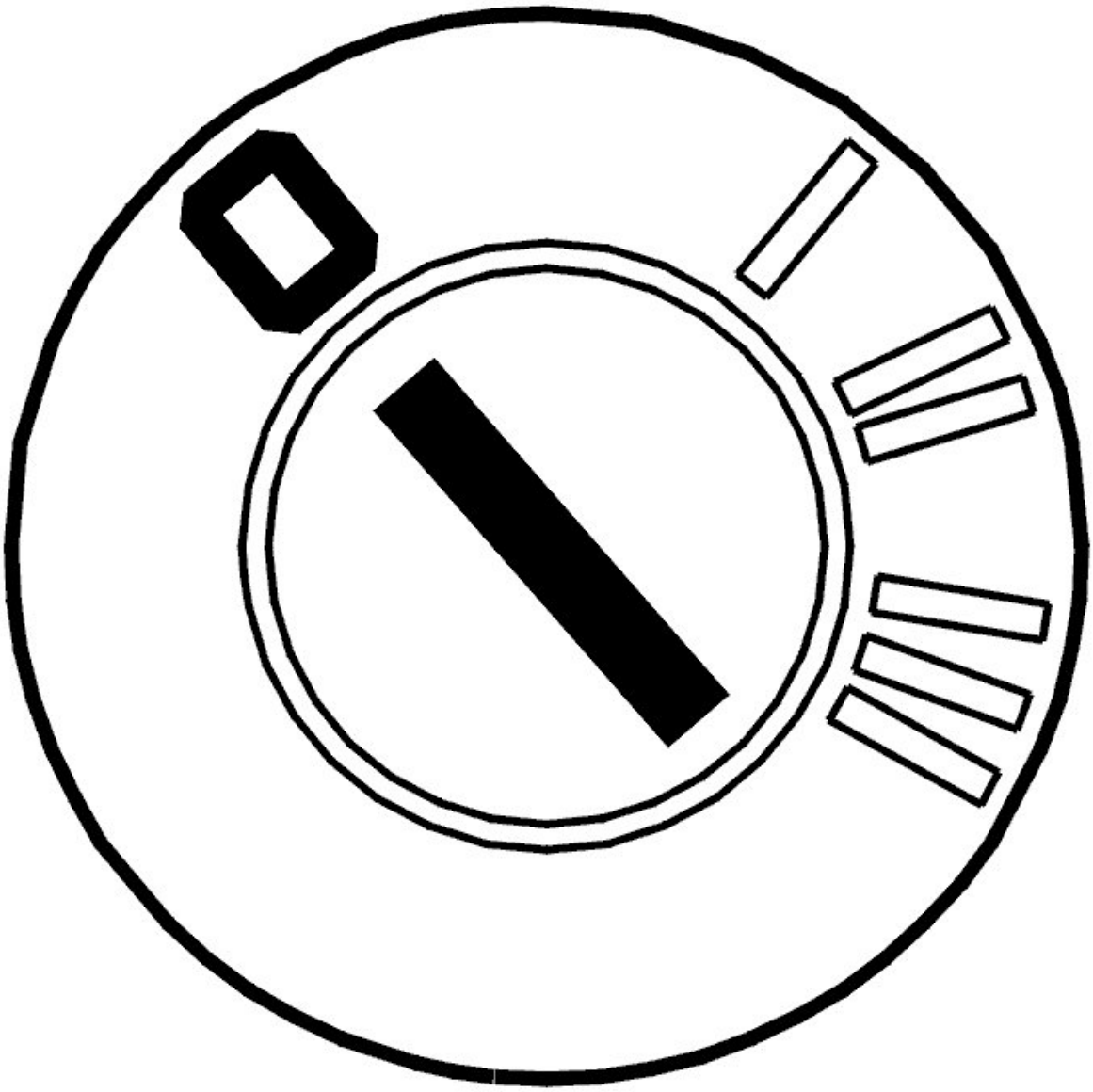


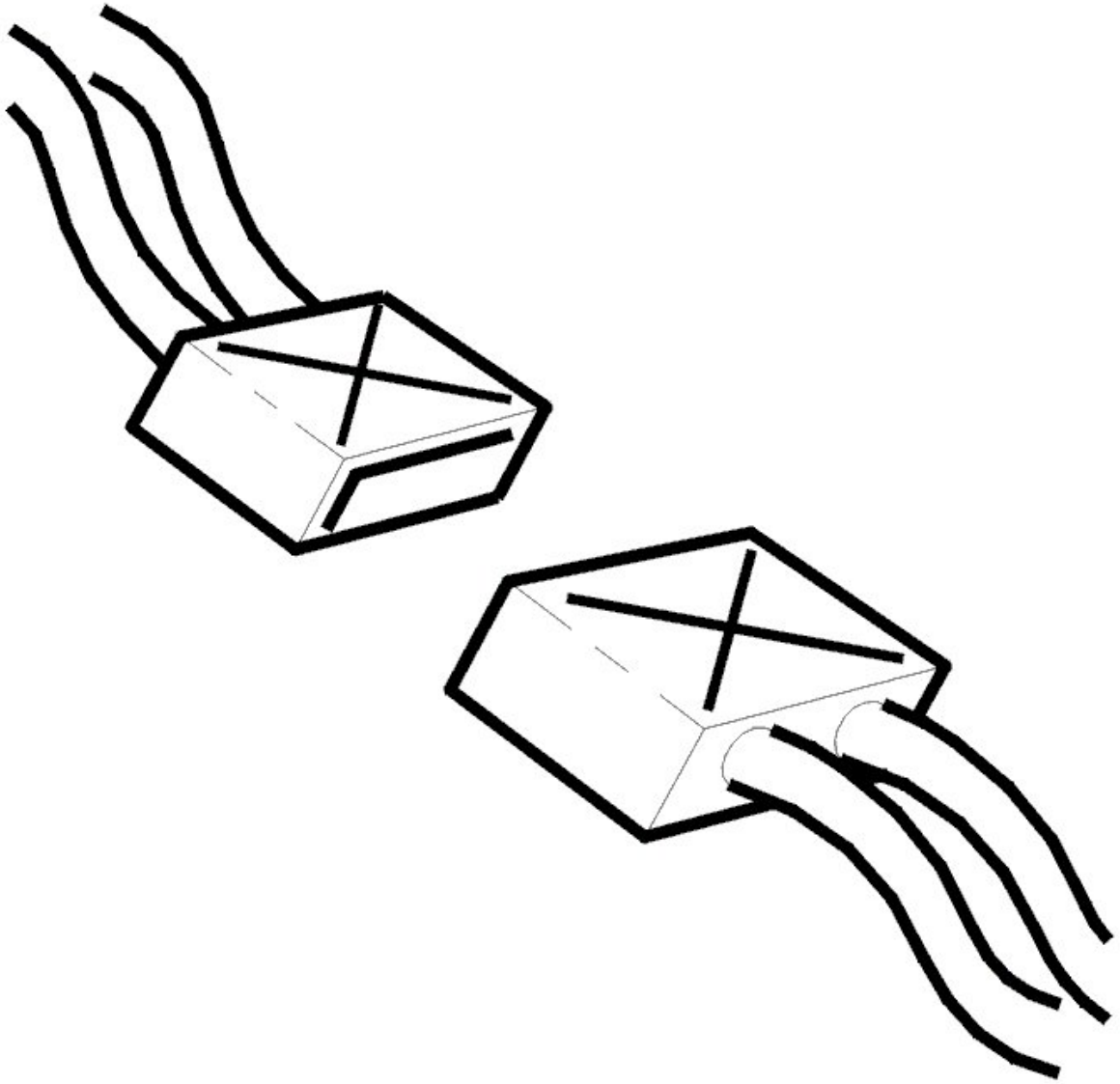
Was a fault found in the wiring?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component



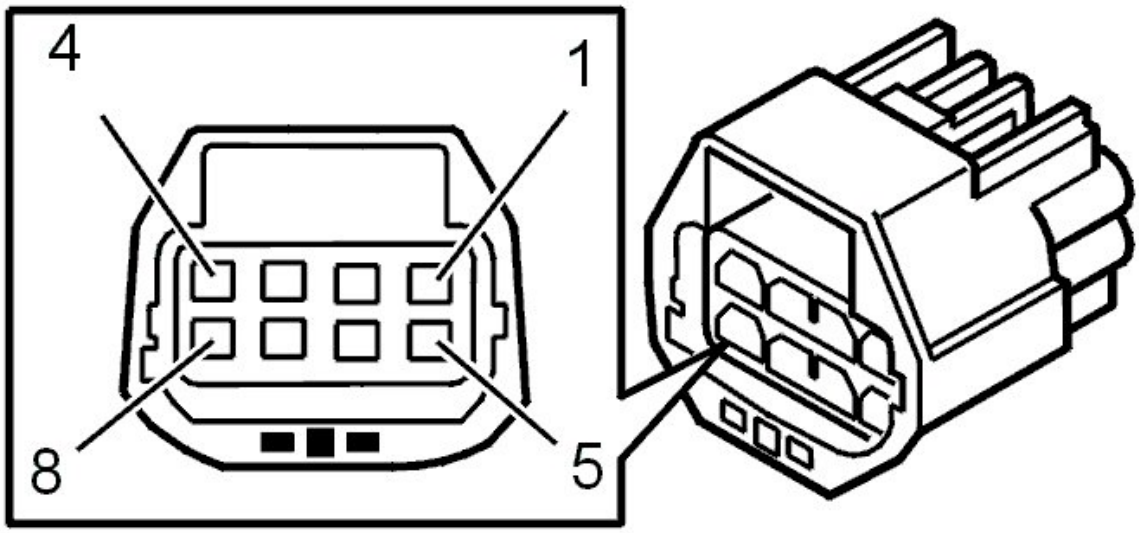


- Ignition off
- Open the transmission control system.

Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for a short-circuit to supply voltage. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check solenoid SLS by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms (at 20°C).
Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).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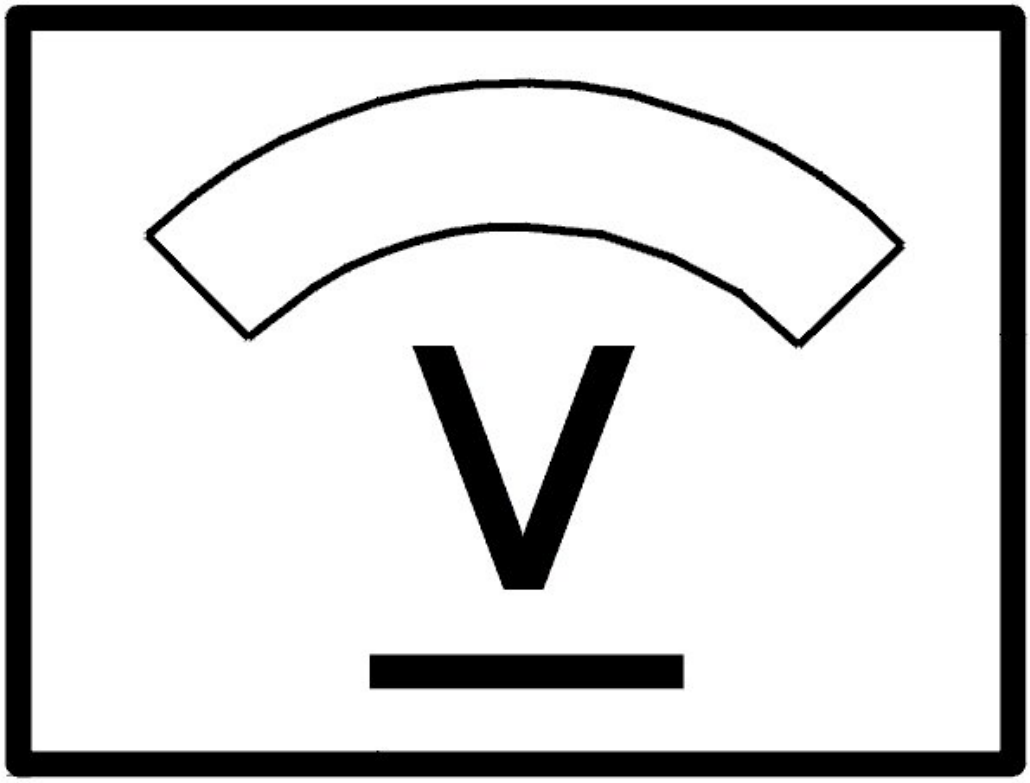
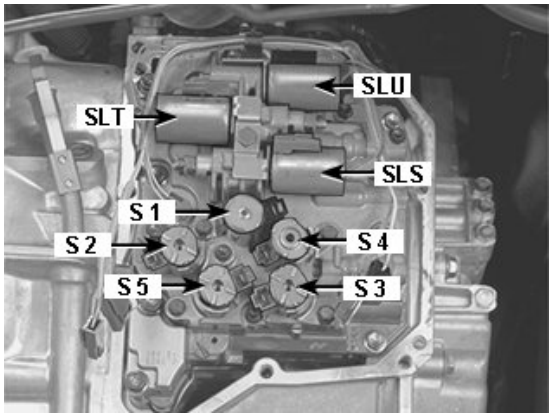
1
8
5


V



Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

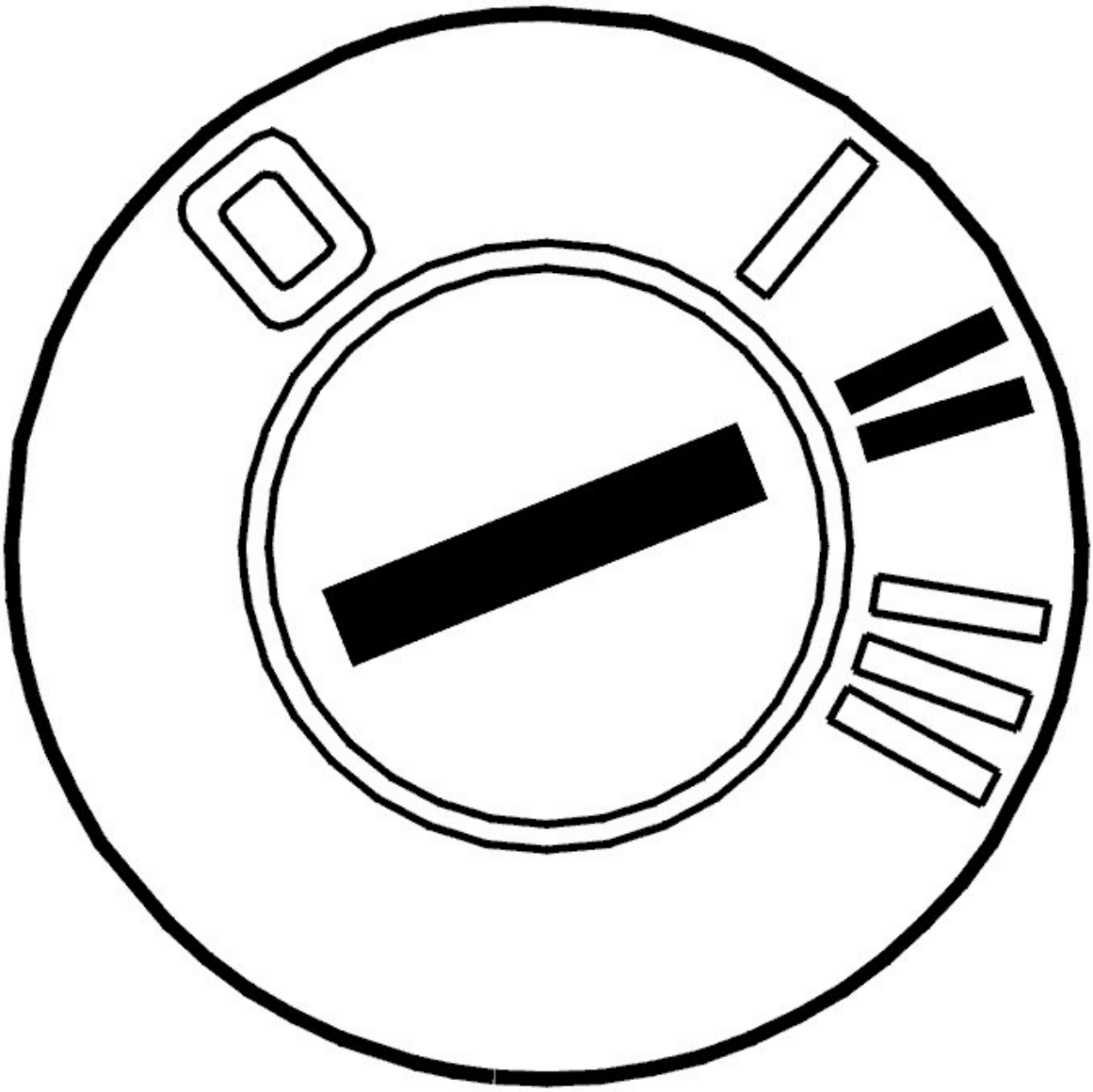
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

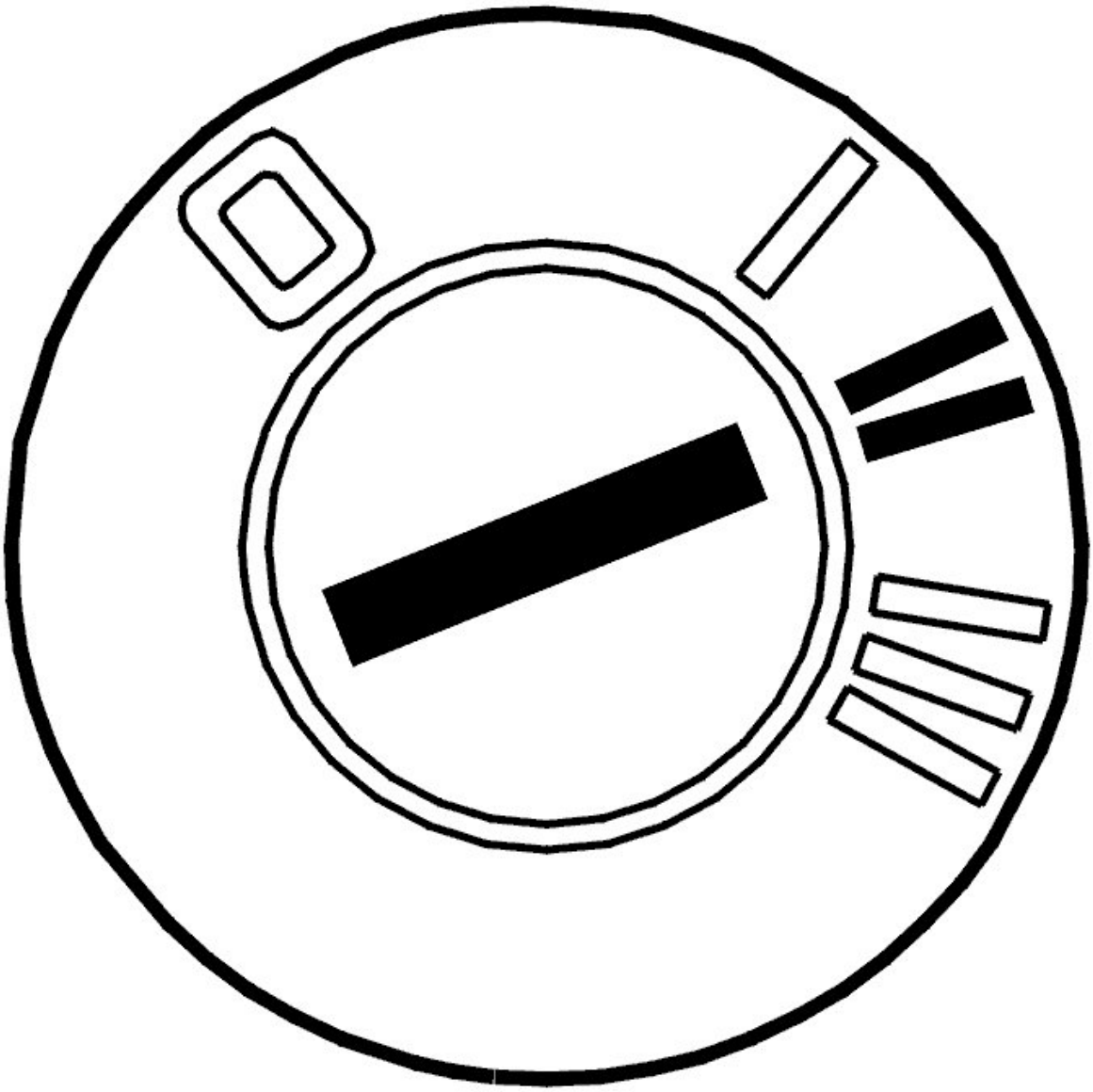
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

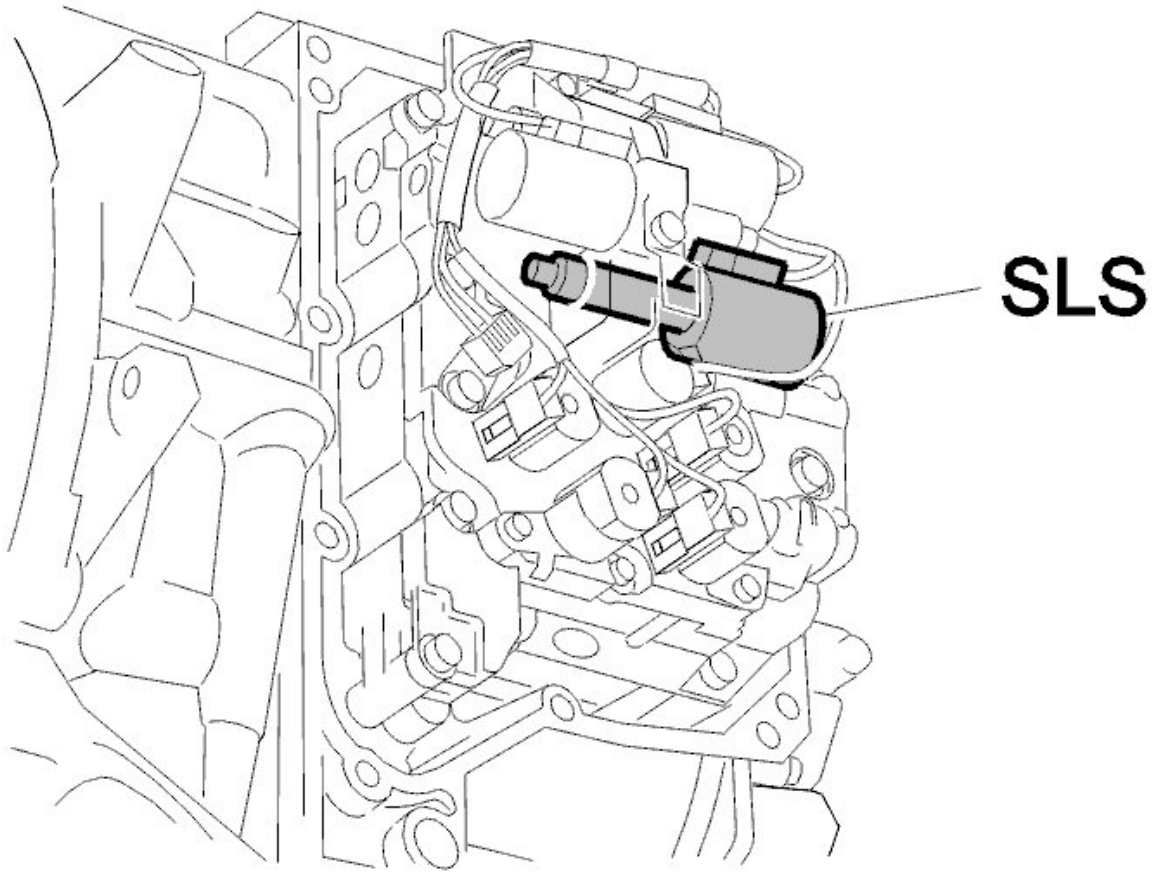
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLS

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0112 is stored if the control module (TCM) registers a short-circuit to battery voltage in the circuit for solenoid SLS. This results in too high an amperage in the circuit. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.
- Defective solenoid.

Fault symptom[s]
- General orange warning lamp lit.
- No shifting.
- No lock-up function.

Hint: No shifting because the control module prevents activation of the solenoids.

Caution! There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

Signal Too High. Intermittent Fault

Signal too high. Intermittent fault

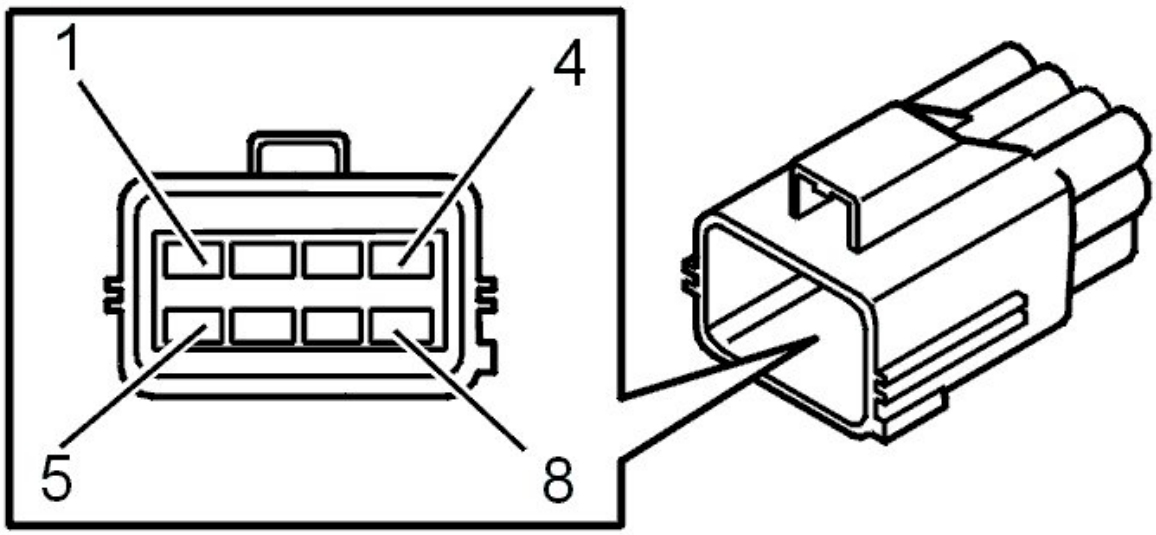
Intermittent fault

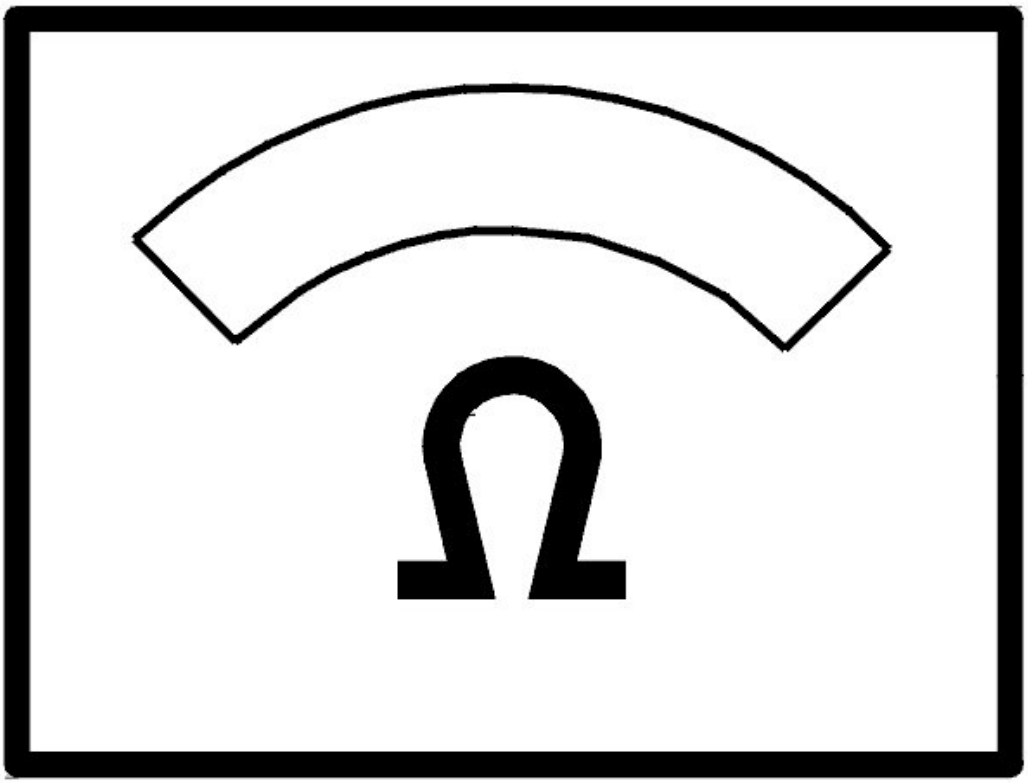
Check the wiring between transmission control module (TCM) terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent short-circuit to supply voltage according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

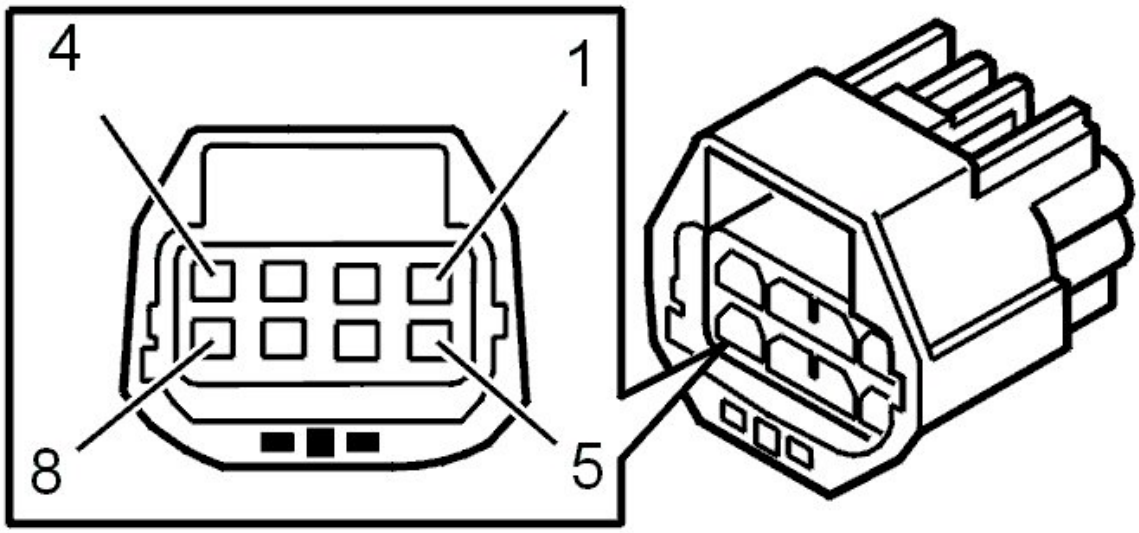
Hint: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

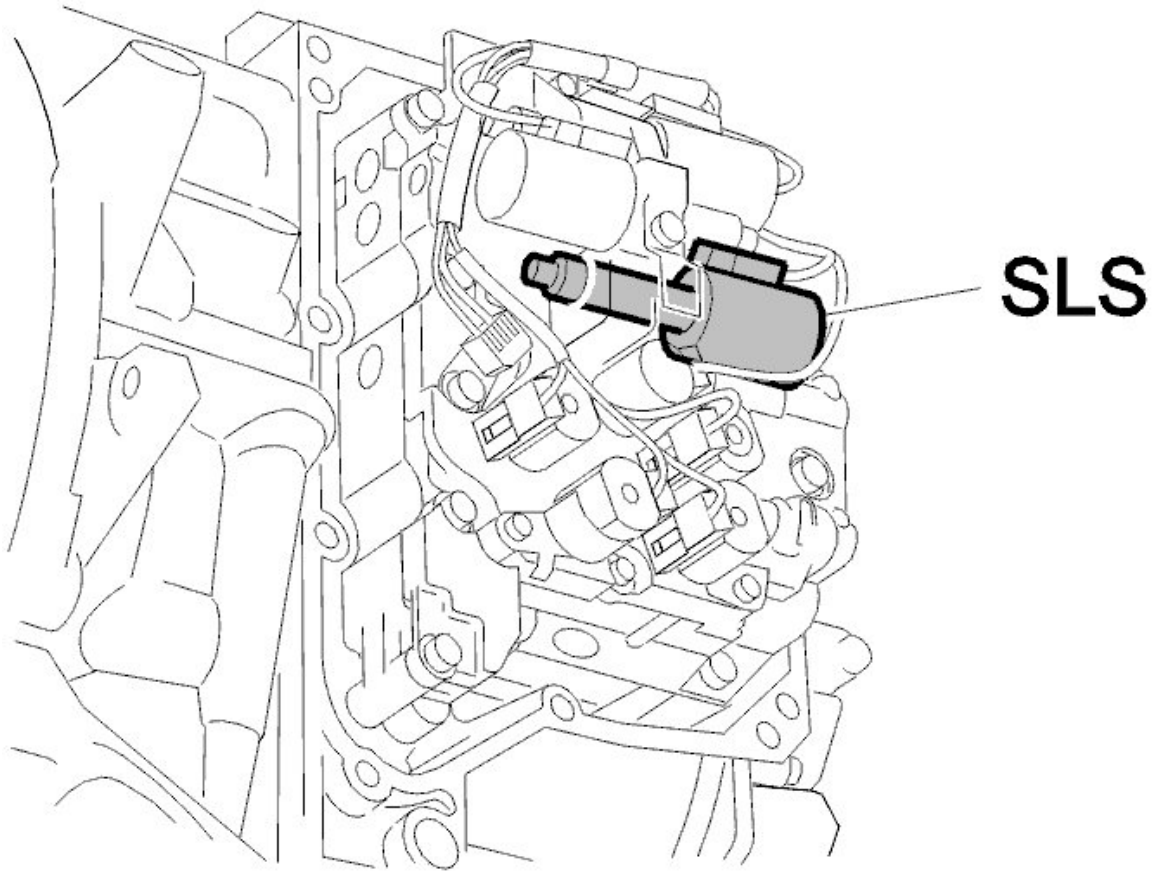
FAULT FOUND - DONE

Attempt New Test - Intermittent fault

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-113 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.
- Contact resistance in terminals.
- Defective control module.

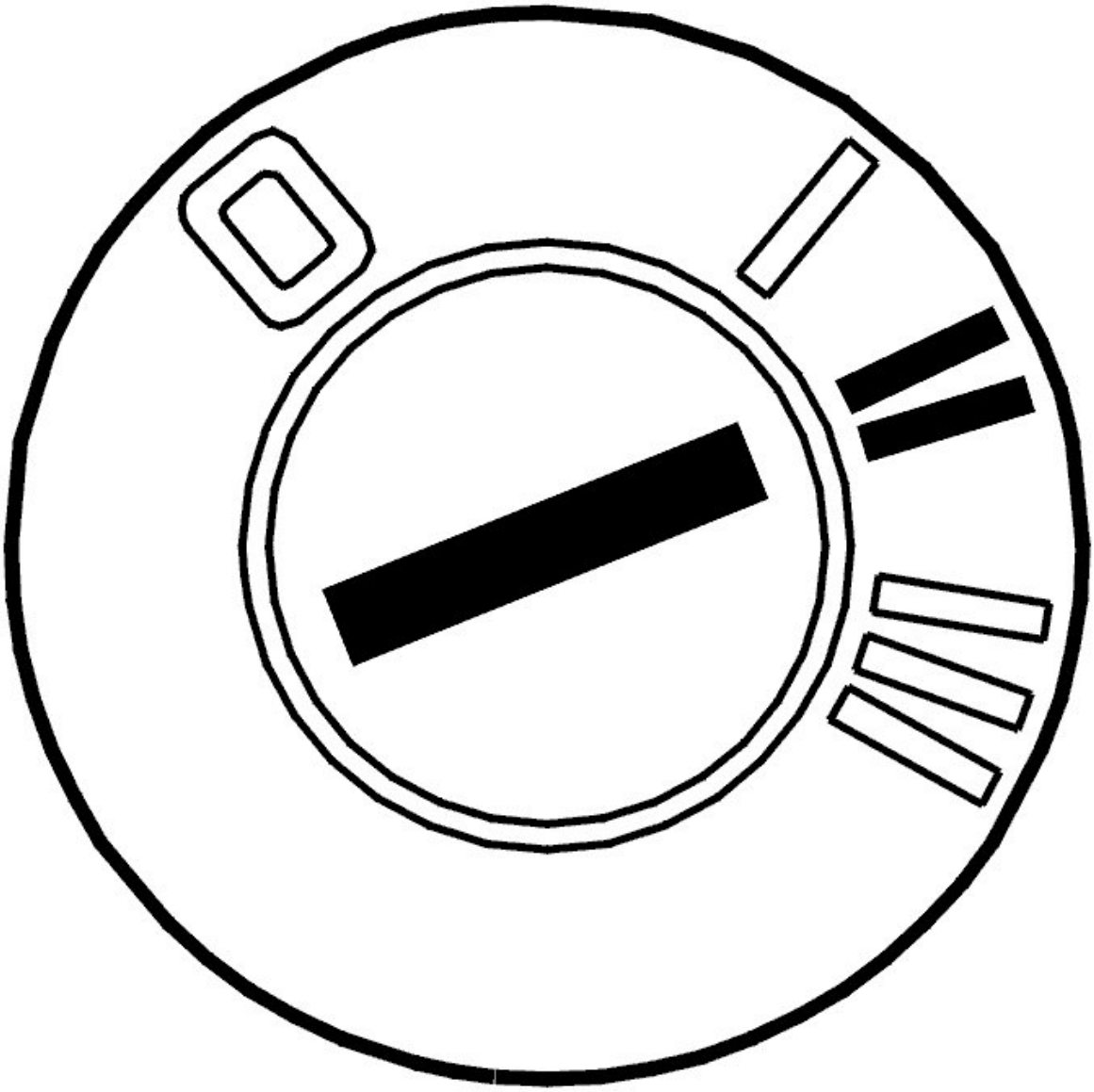
Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

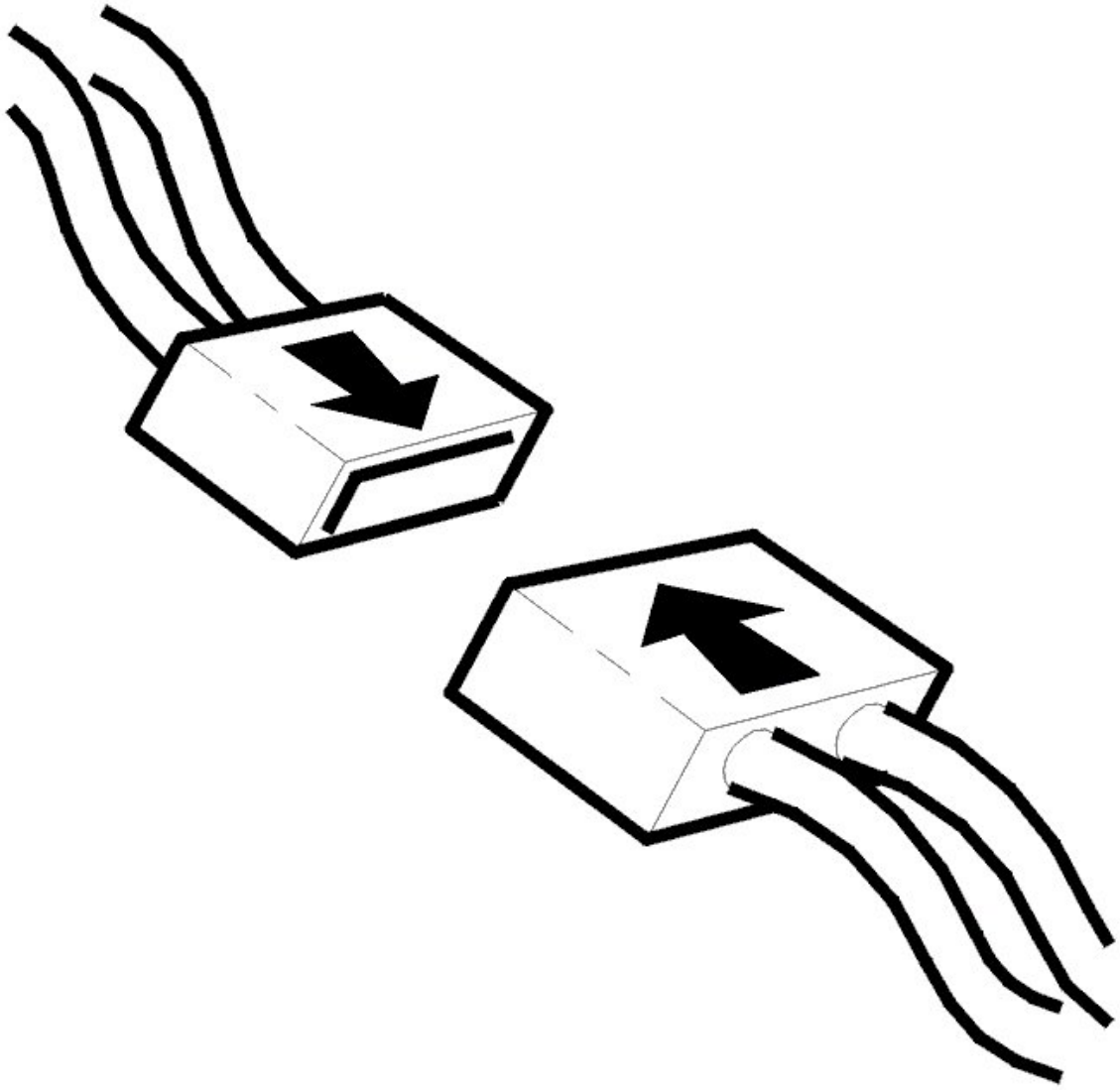
Hint: Harsh gear shifting can be caused by:
- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS control. This results in constant maximum line pressure.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking line pressure solenoid SLS





- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

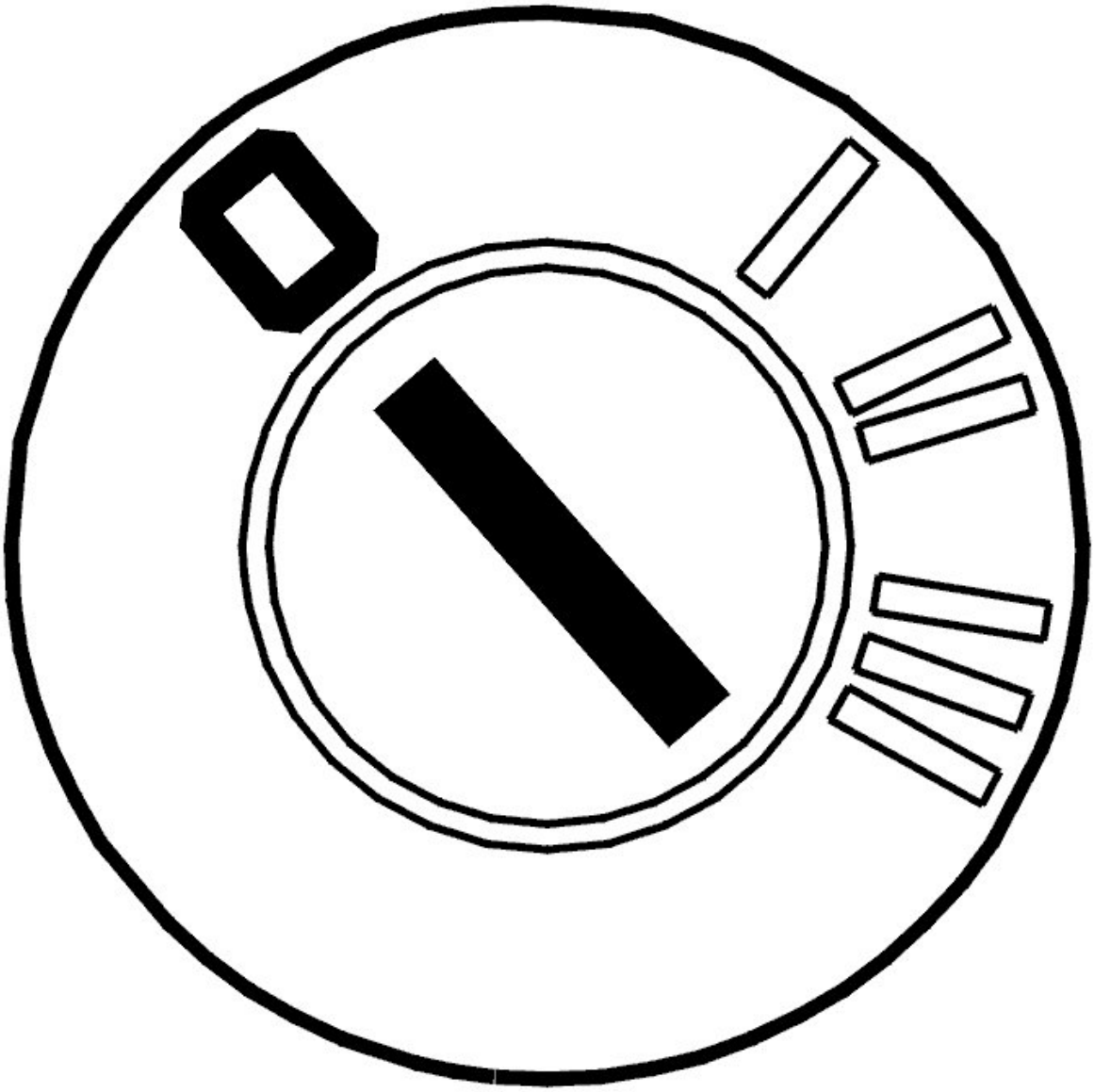
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

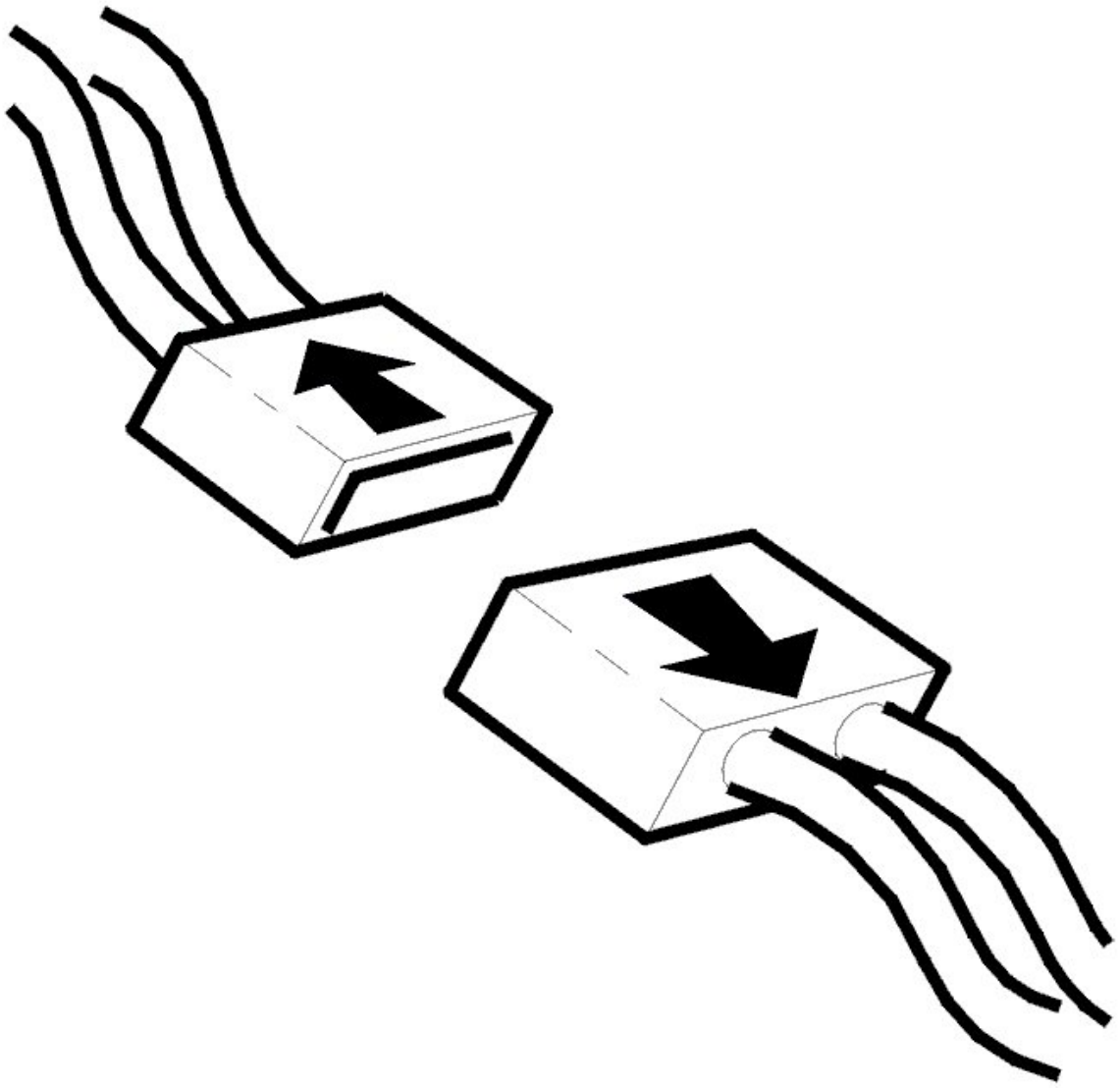
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



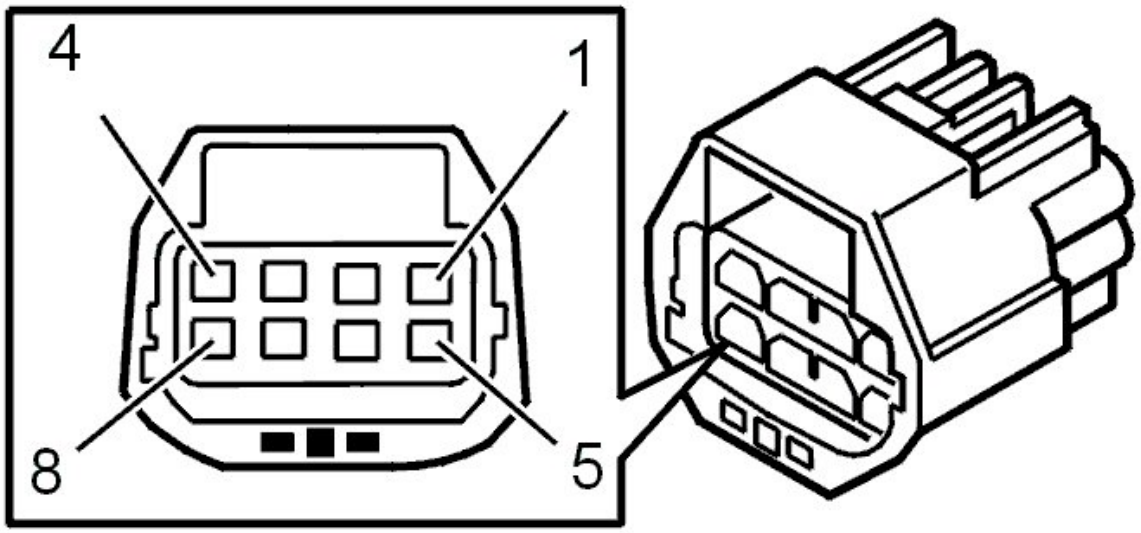


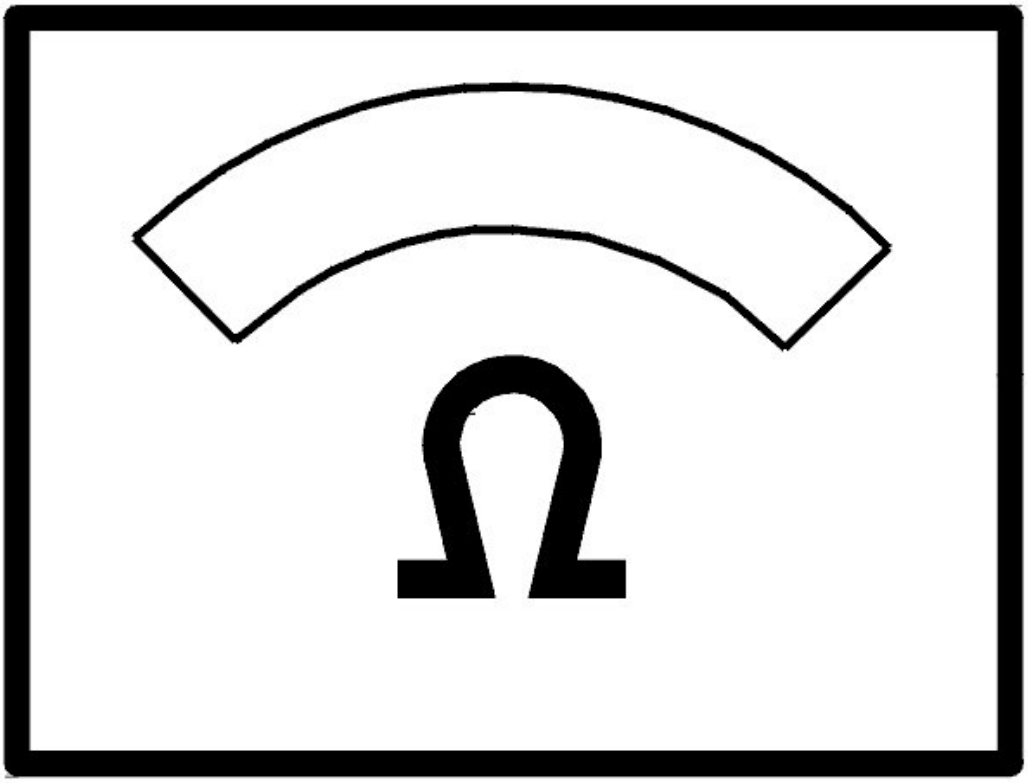
- Ignition off
- Disconnect transmission connector D.

Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



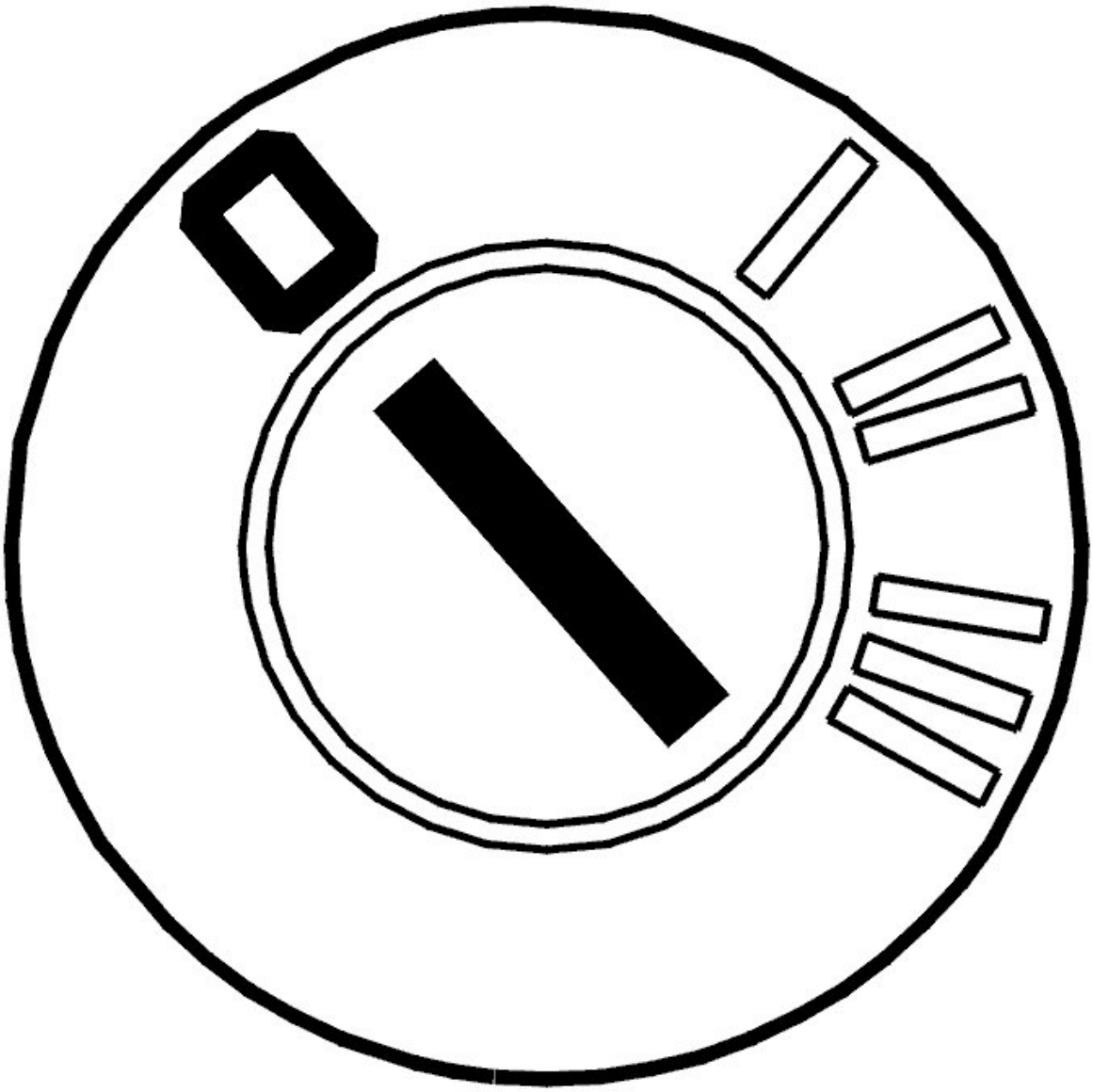


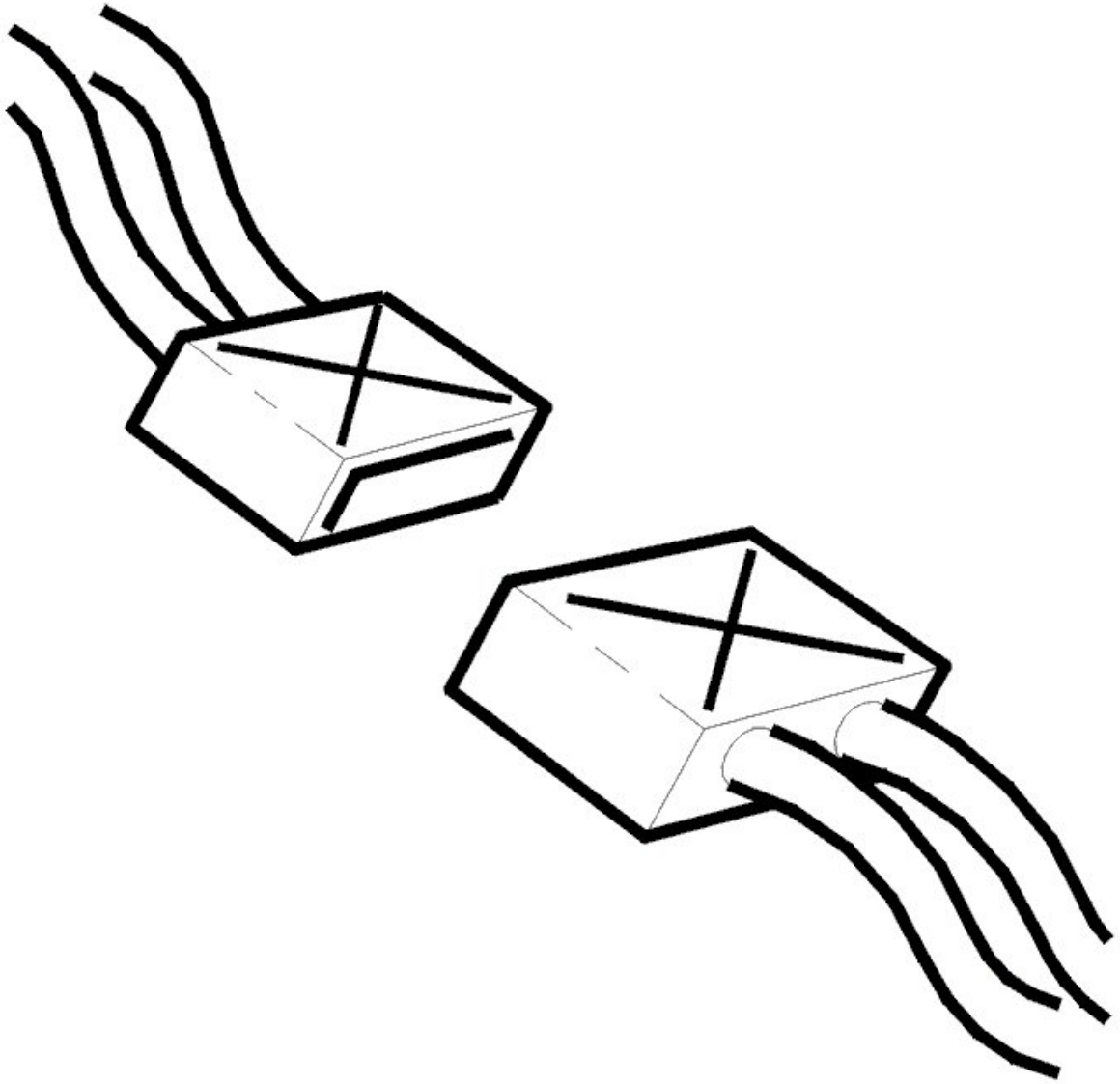
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



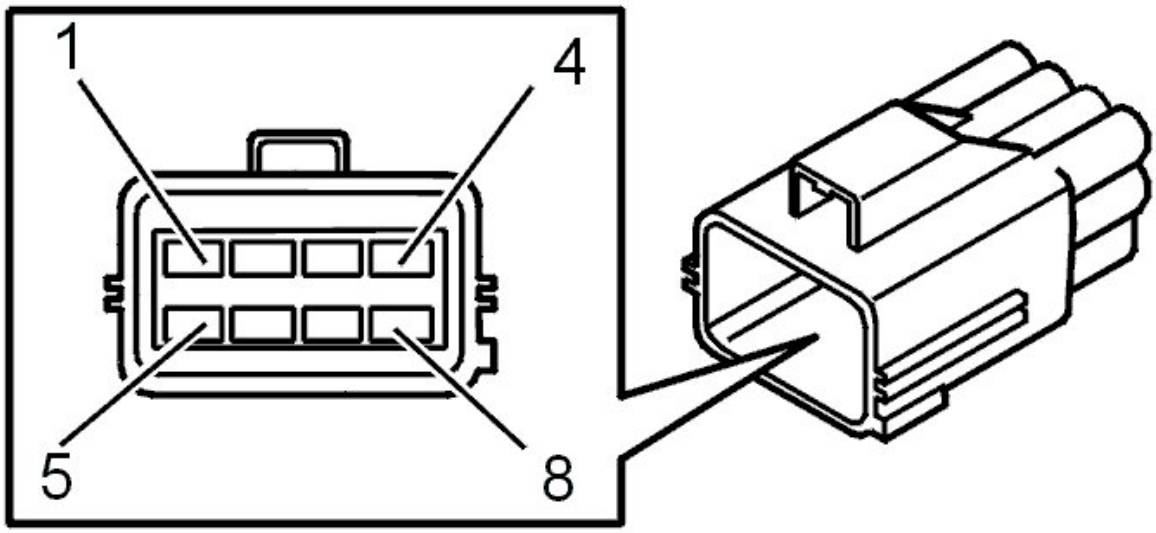


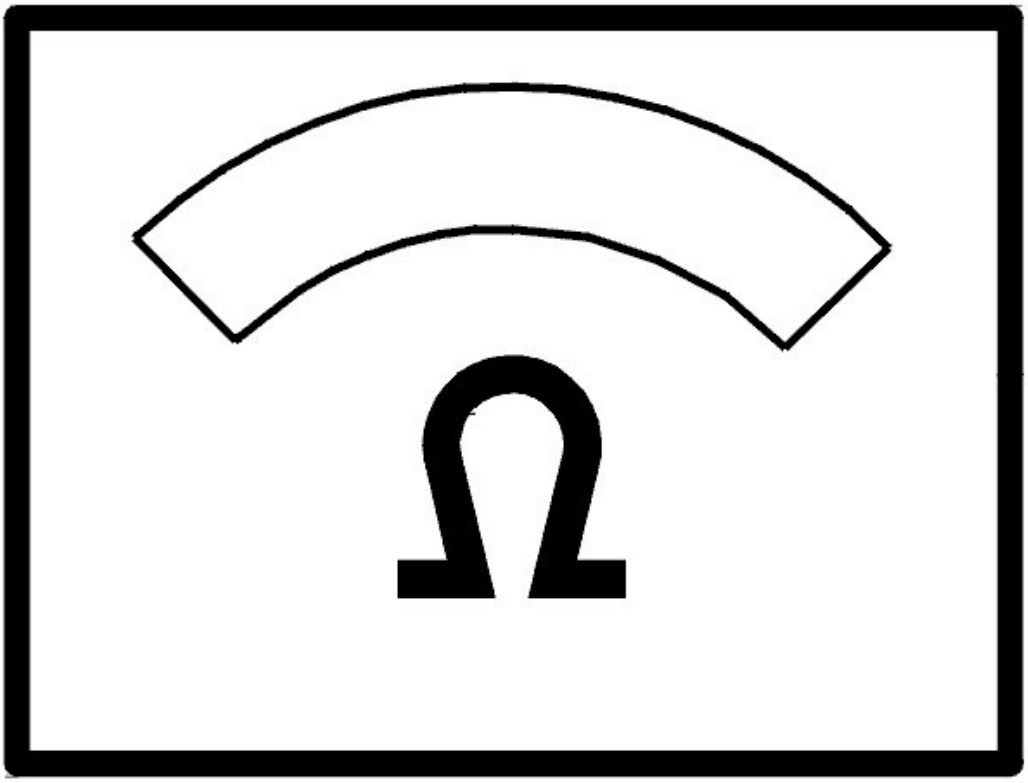
- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between control module terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B7 (#A67) and transmission connector #D6 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



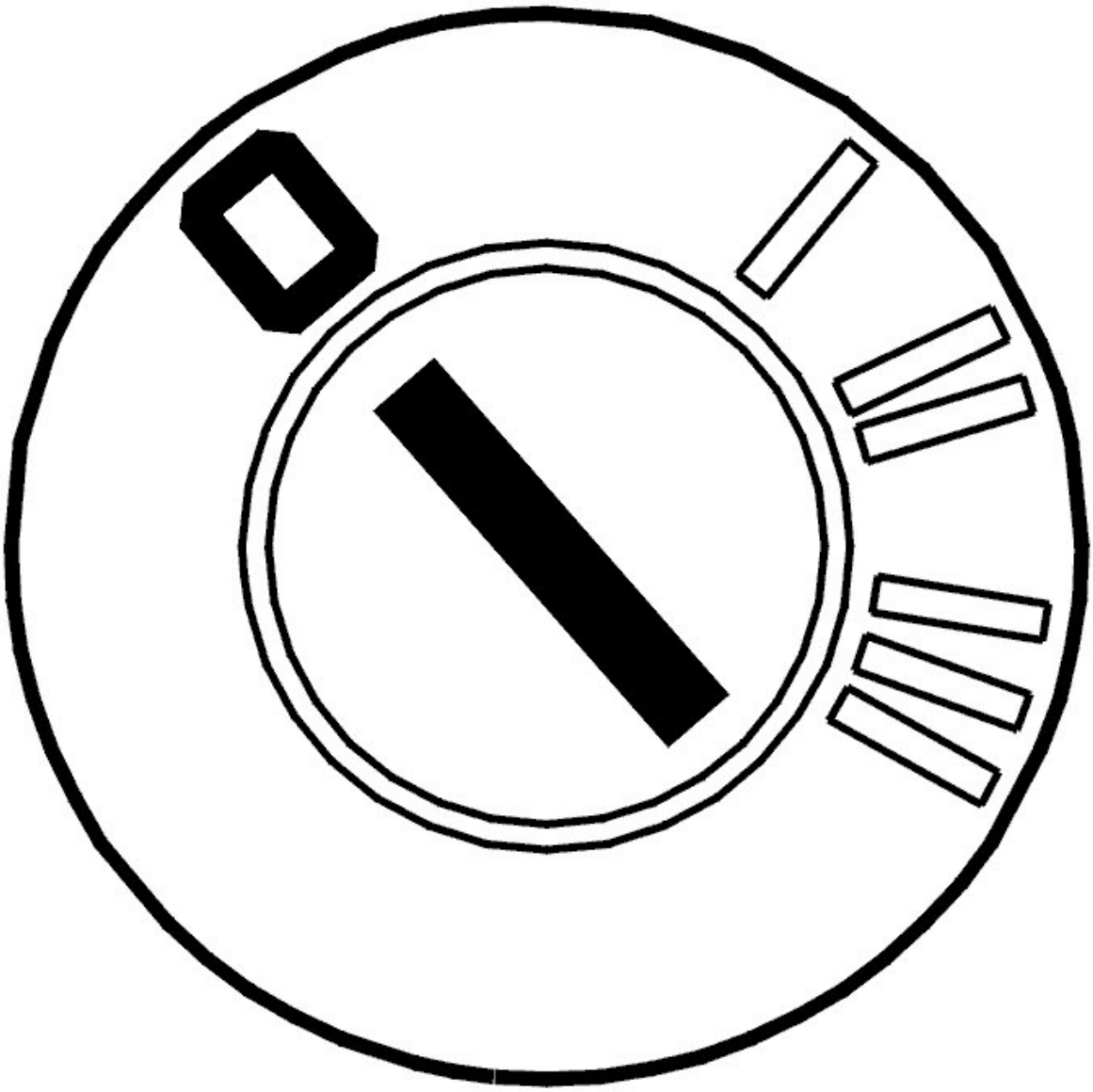


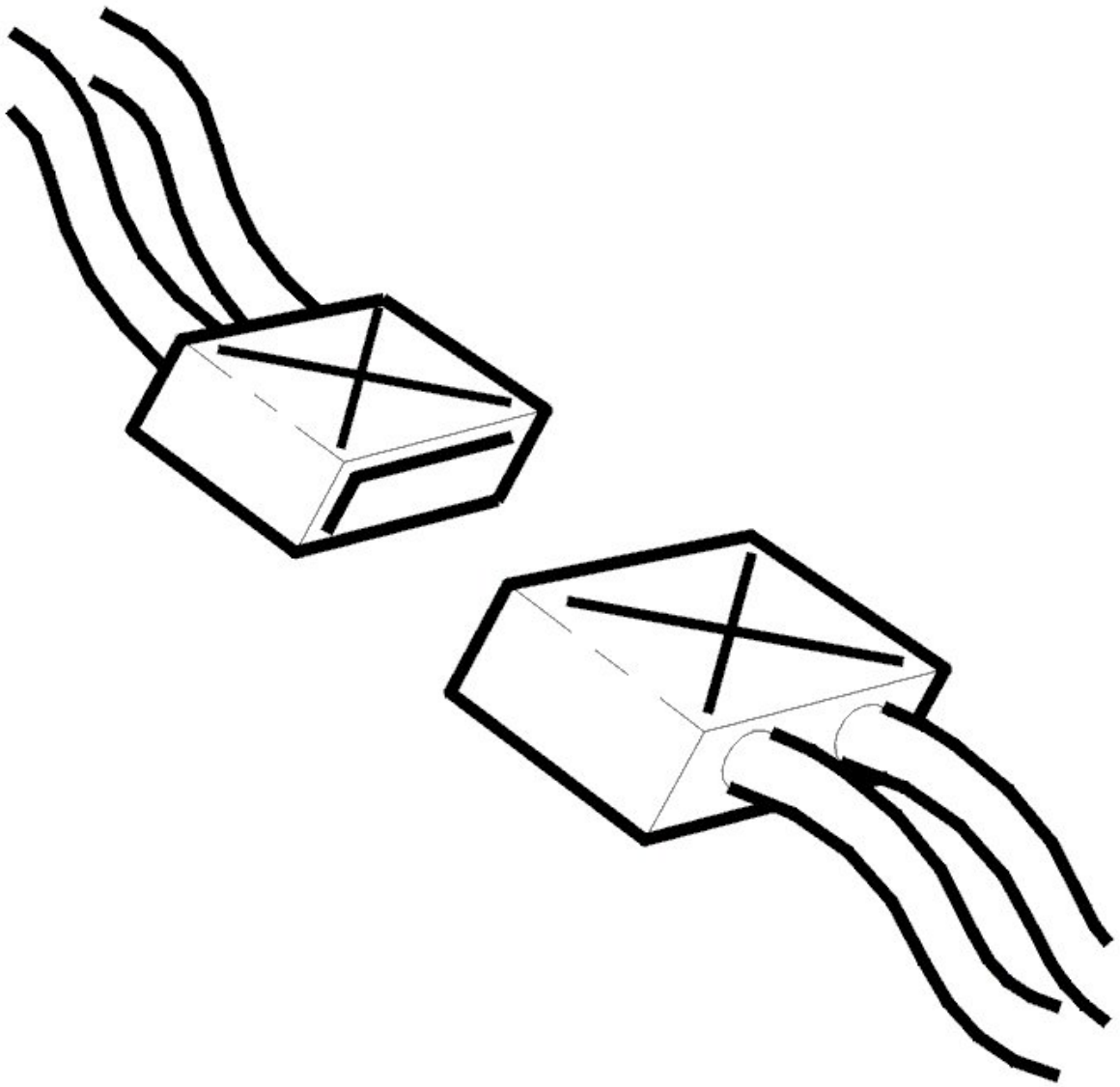
Was a fault found in the wiring?

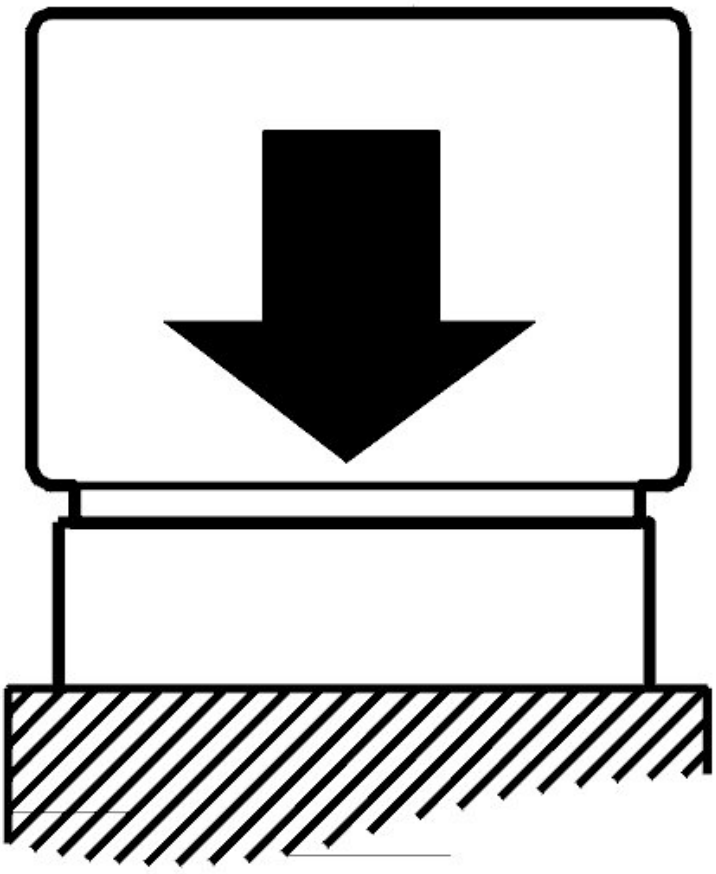
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

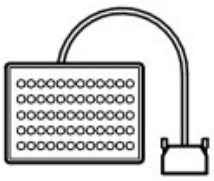
Check the transmission control module (TCM) by measuring the resistance between terminals #A49 (#A49) and #B7 (#A67) on the breakout box. The resistance must be approximately 9 kohms.

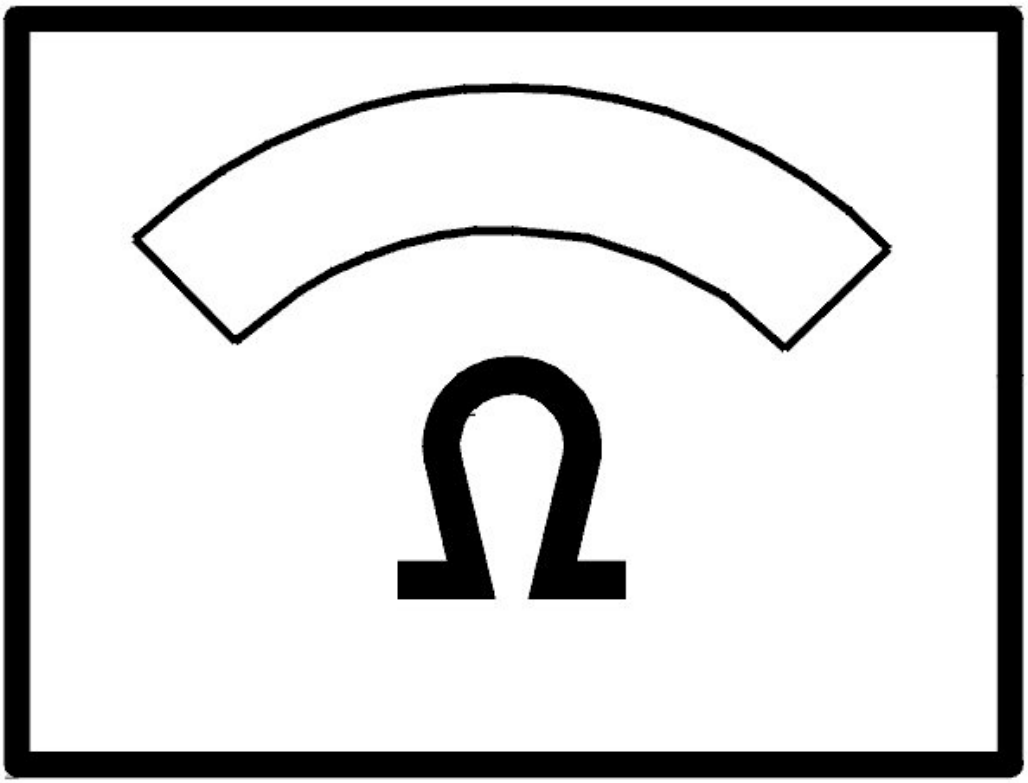
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



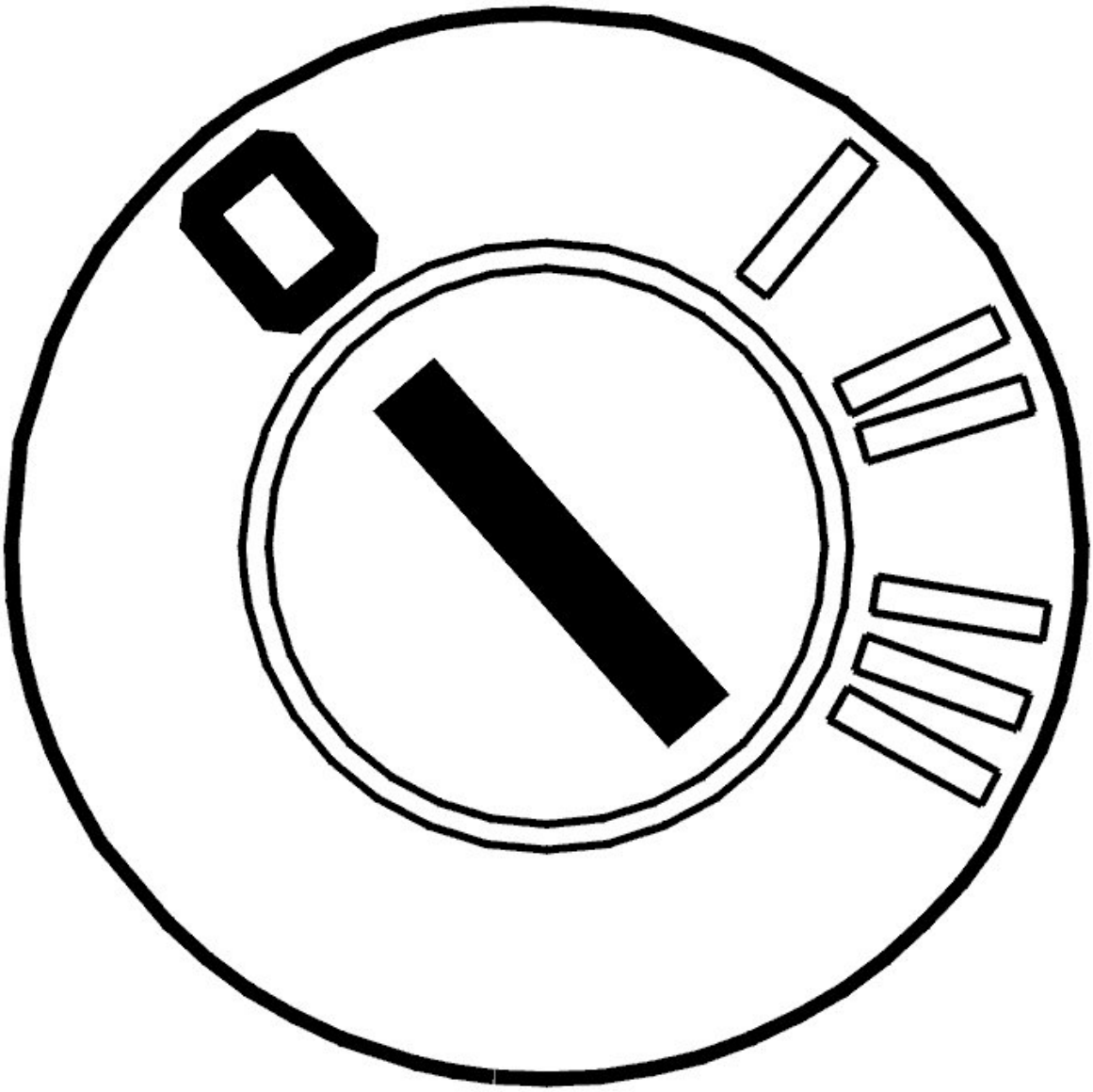


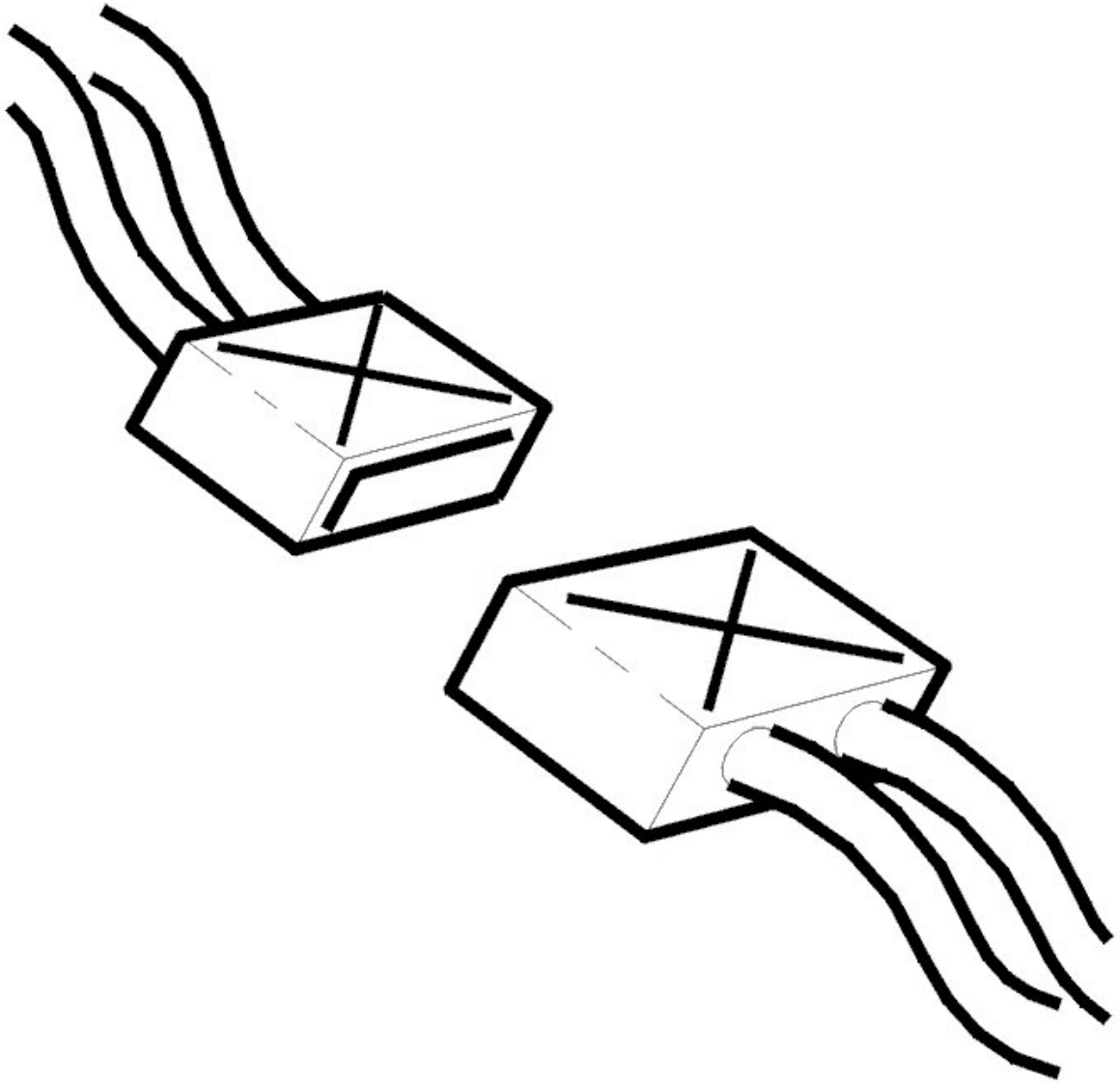
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



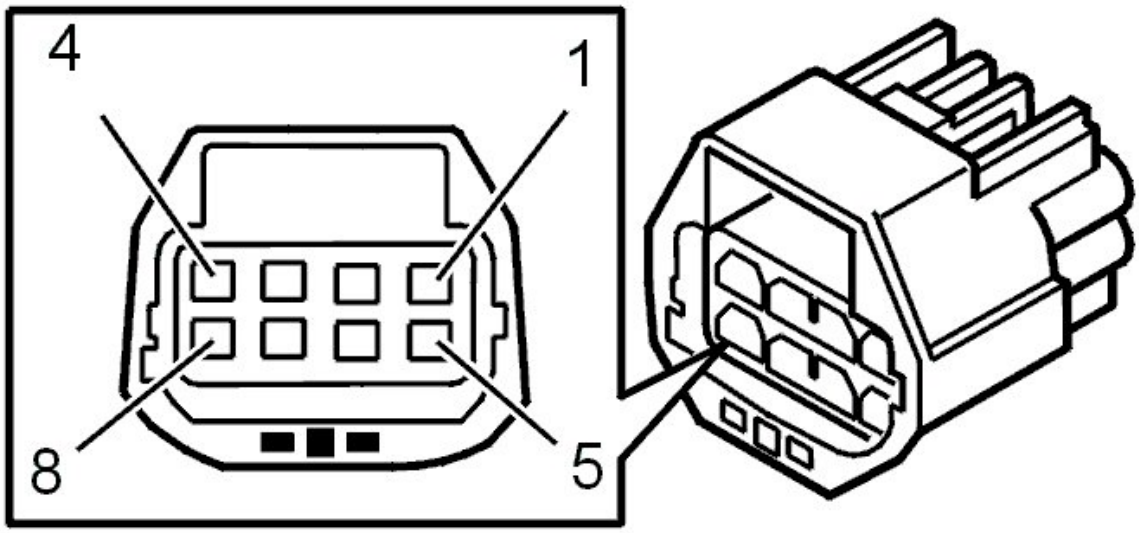


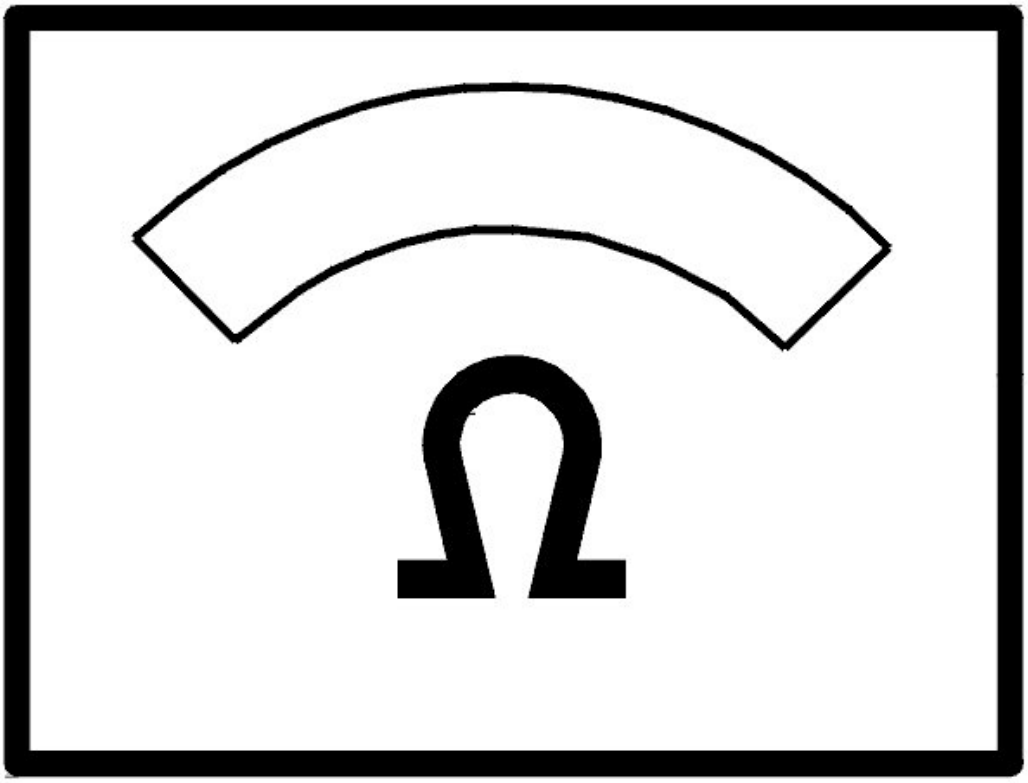
- Ignition off
- Open the transmission control system.

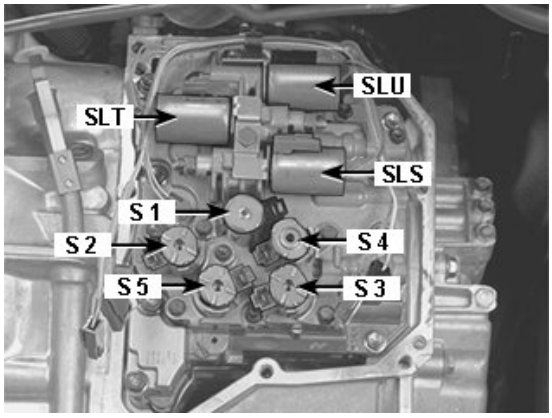
Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check the solenoid SLS by measuring the resistance between terminals #1 and #2. The resistance should be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).


4
1
8
5





Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

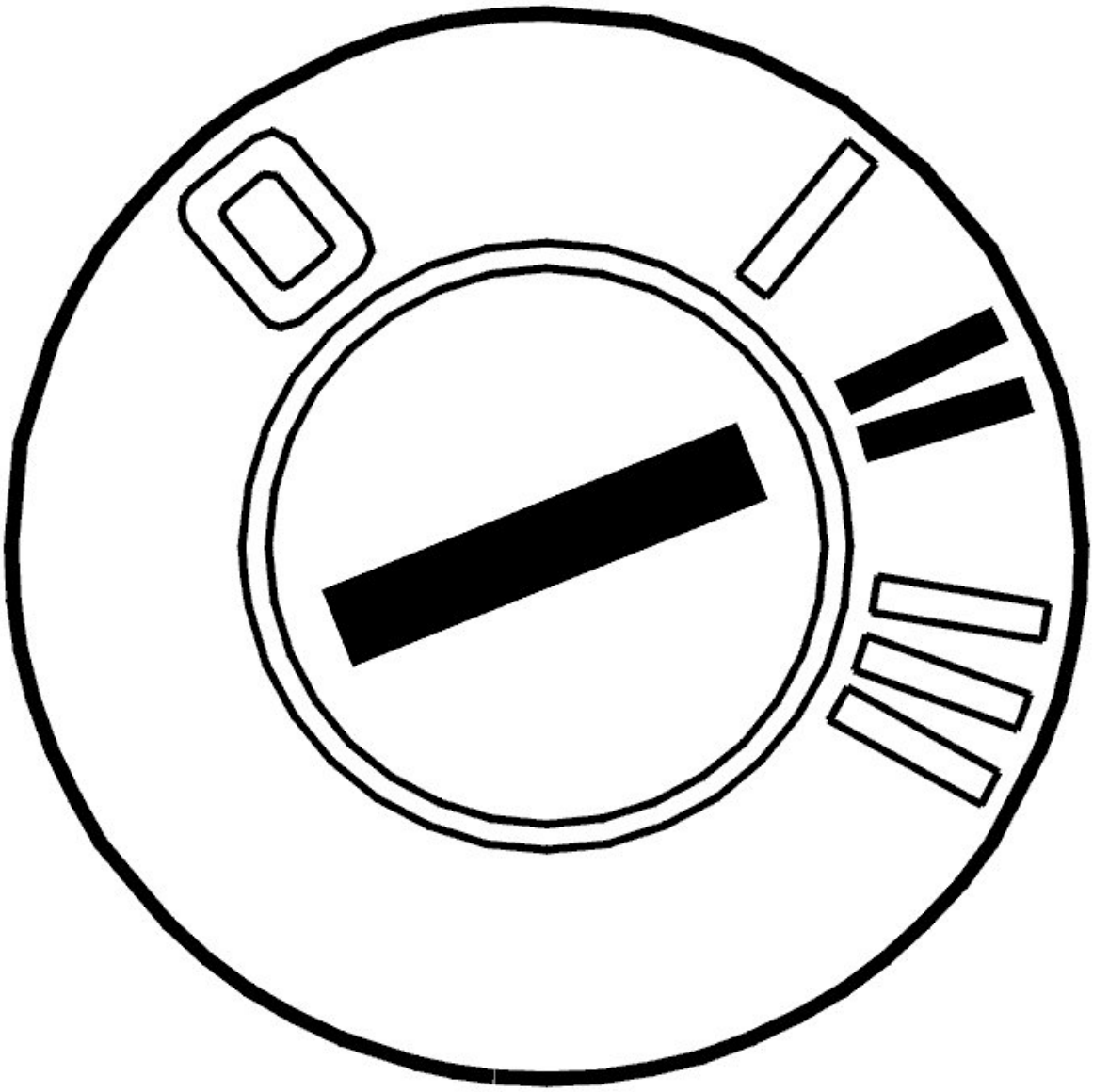
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

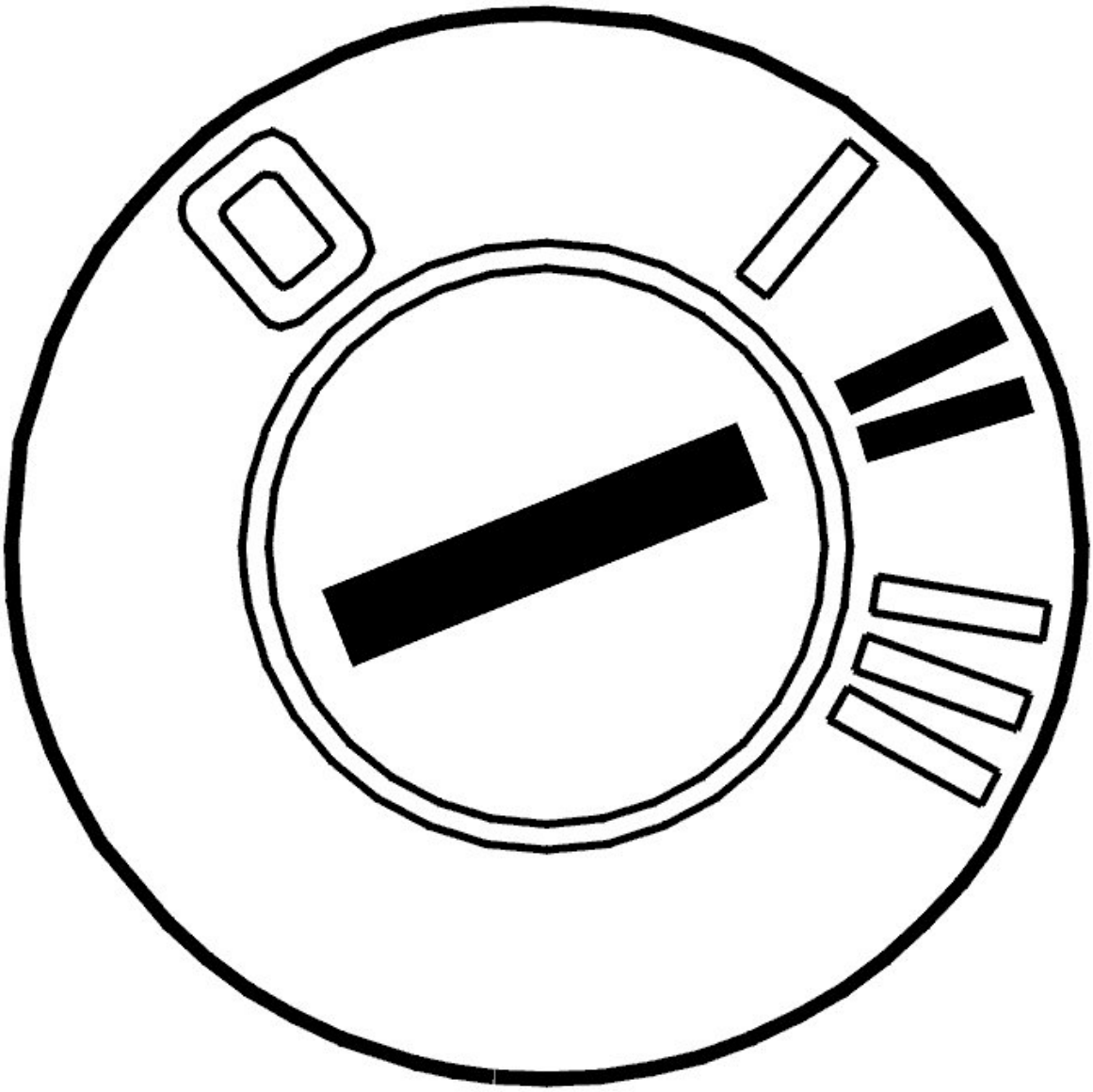
Continue - **DONE**

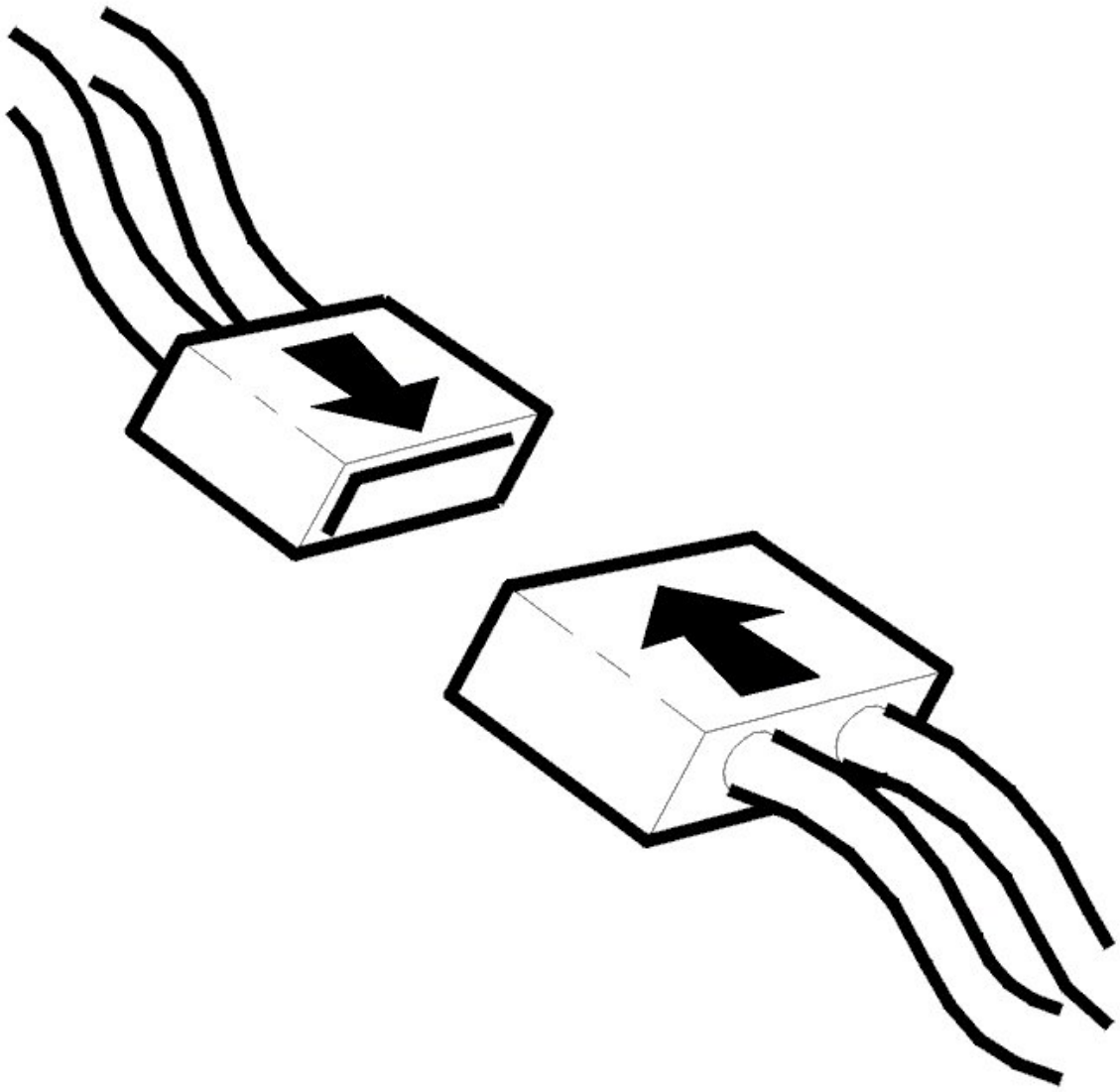
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition on.
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

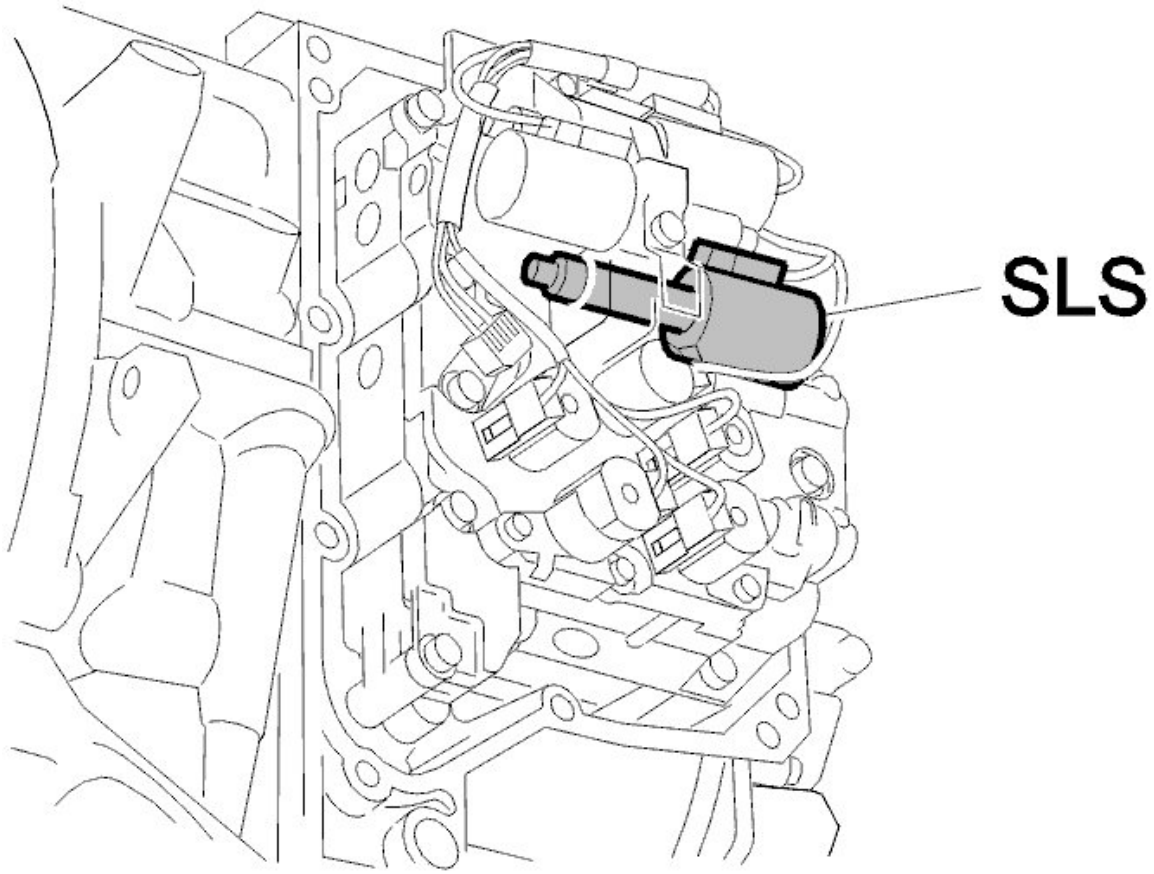
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLS

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-113 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.

- Contact resistance in terminals.
- Defective control module.

Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS control. This results in constant maximum line pressure.

Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

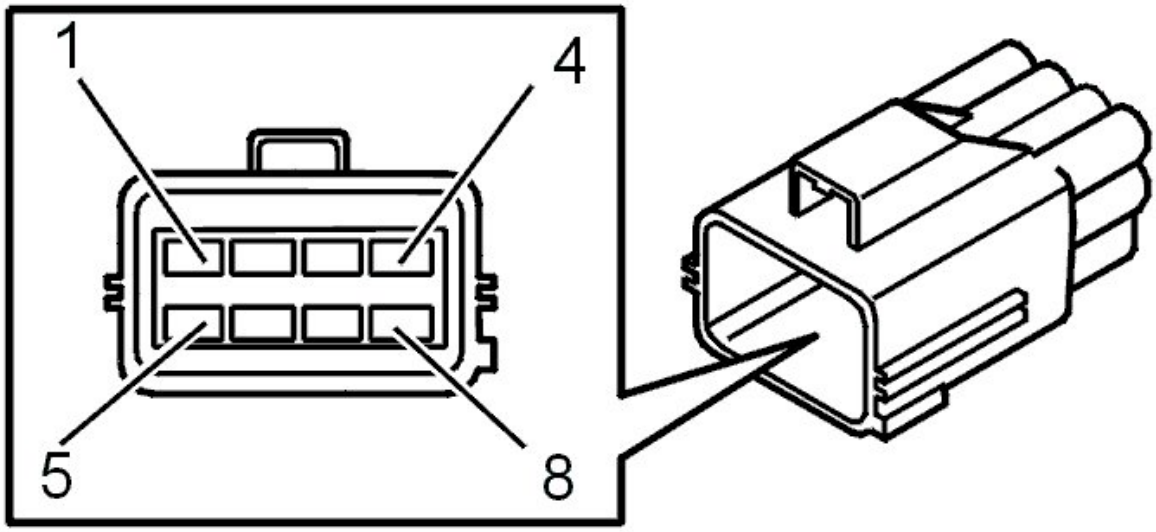
Intermittent fault

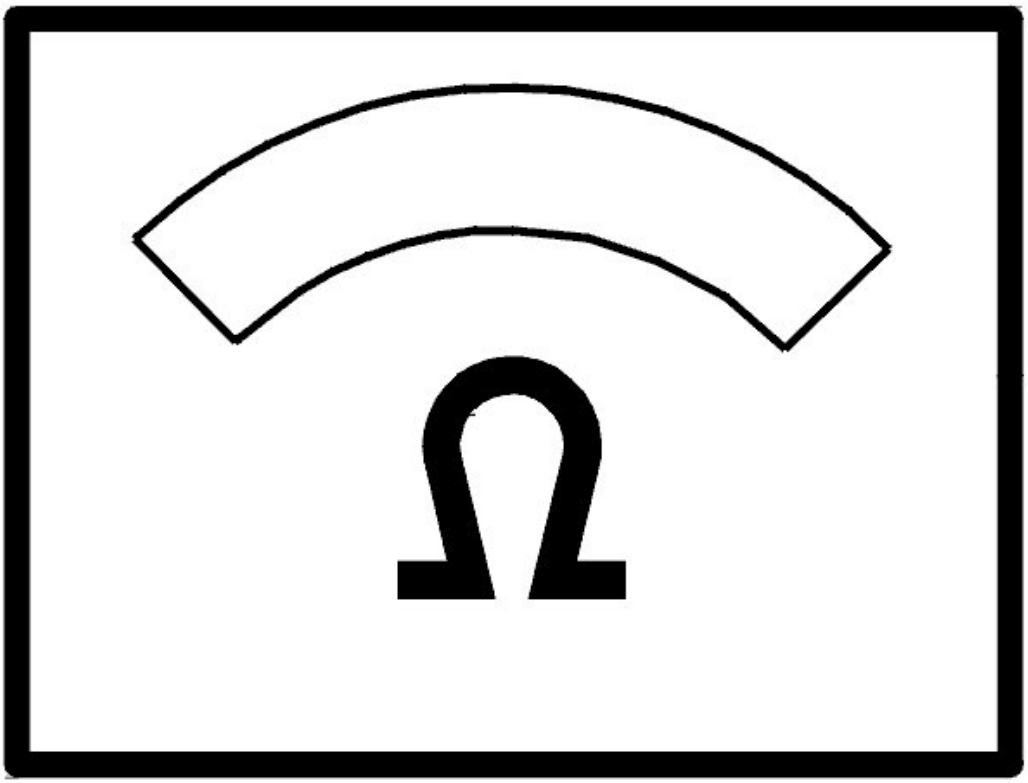
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between control module terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

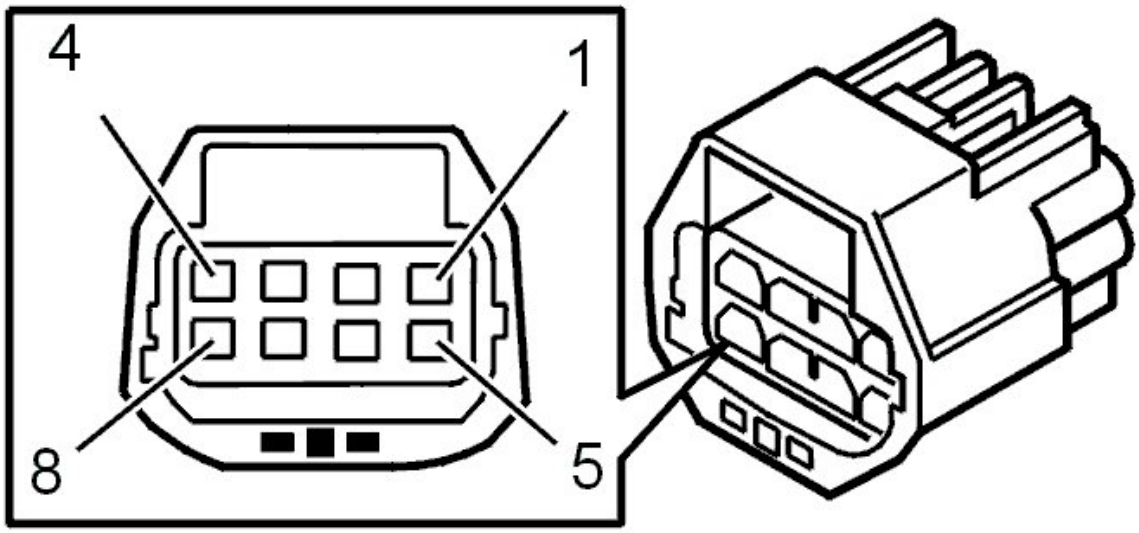
Hint: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

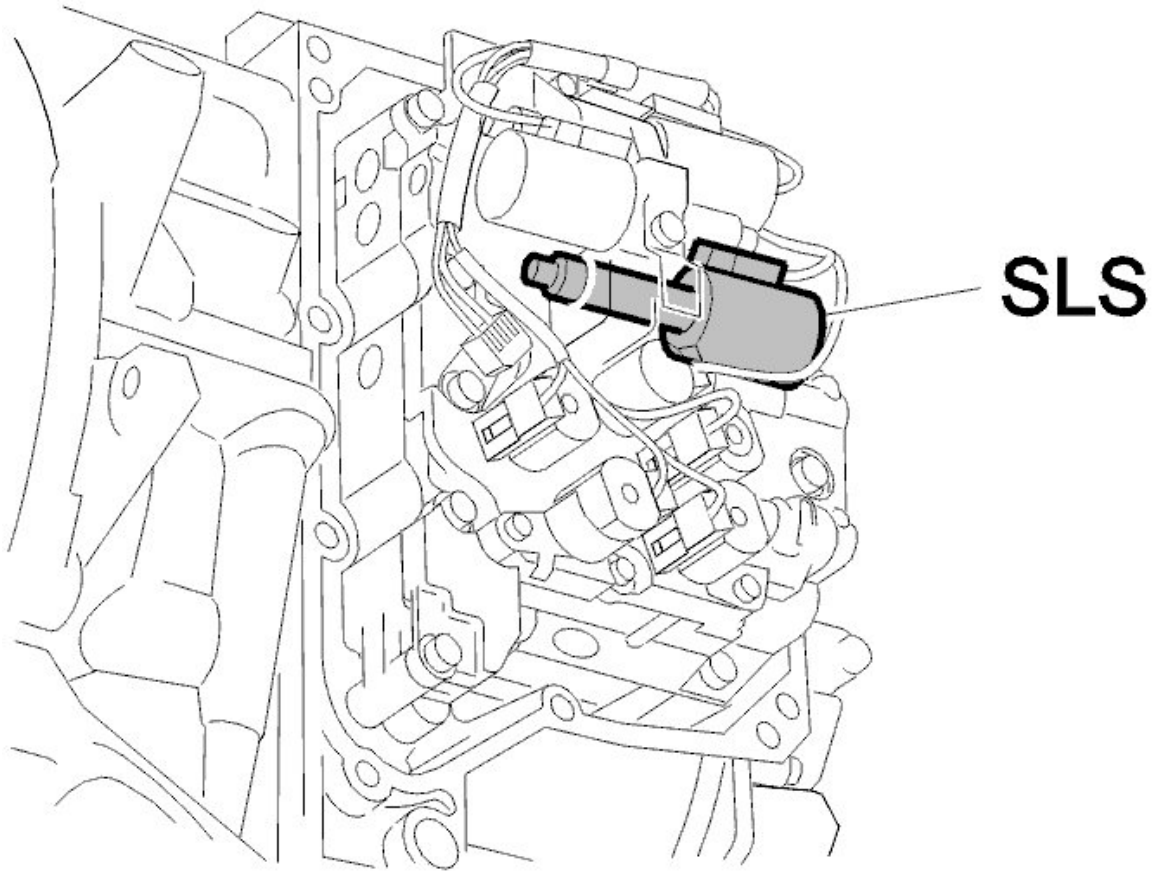
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-114 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.
- Contact resistance in terminals.
- Defective control module.

Fault symptom[s]
- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS or SLT control. This results in constant maximum line pressure.

Signal Too Low. Intermittent Fault

Signal too low. Intermittent fault

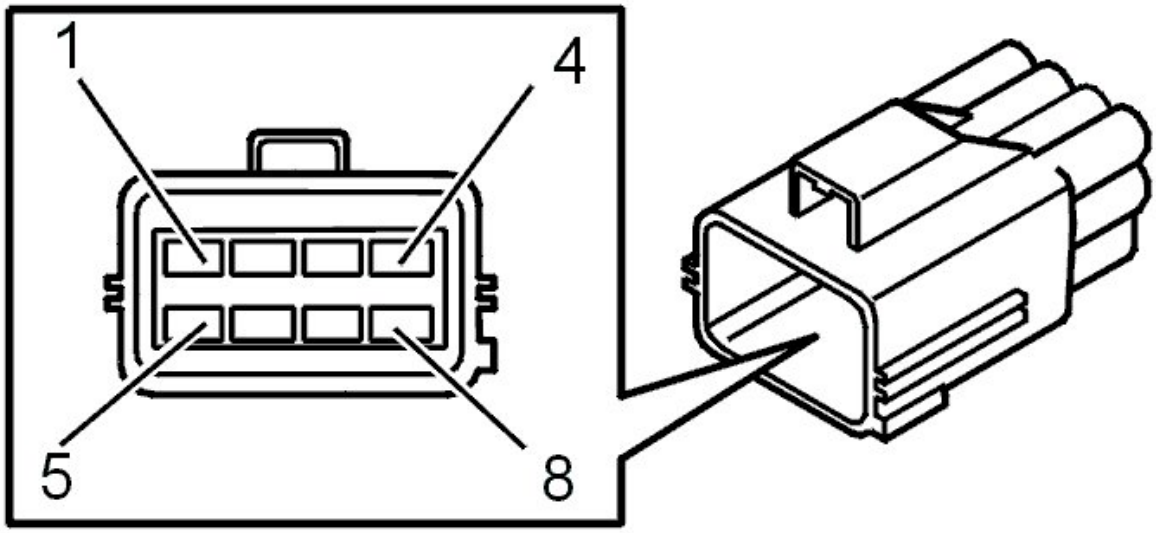
Intermittent fault

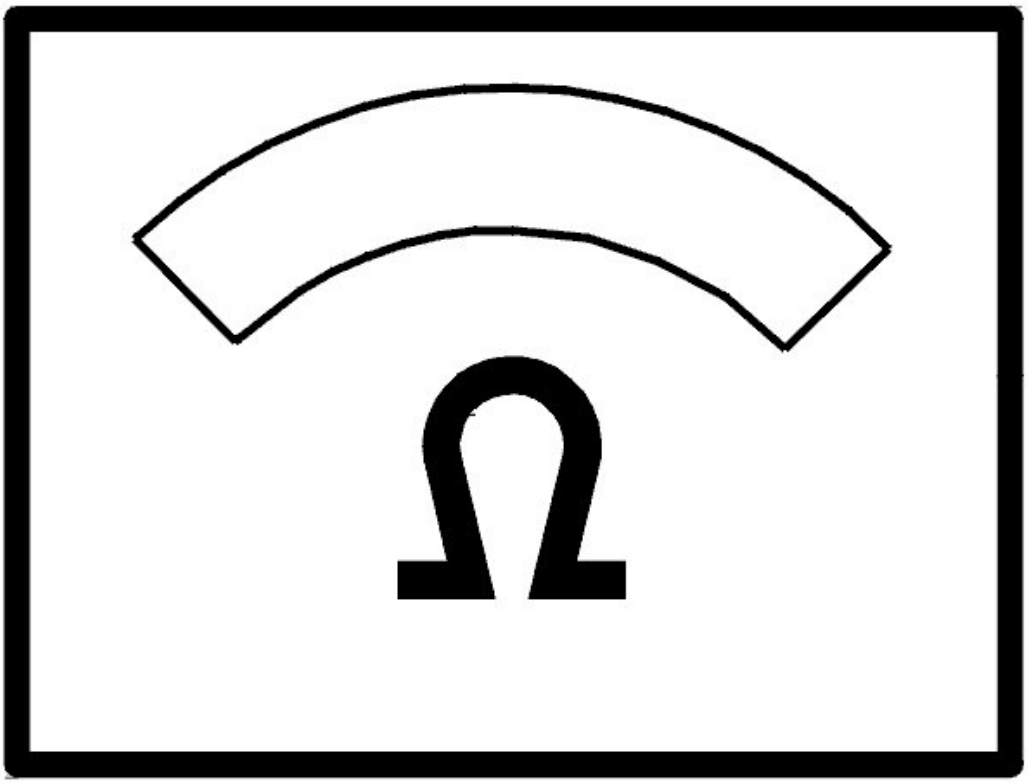
Check the transmission control module (TCM) connector and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the wiring between control module terminal #A49 (#A49) and transmission connector terminal #D5. Check the wiring between control module terminal #B7 (#A67) and transmission connector terminal #D6. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

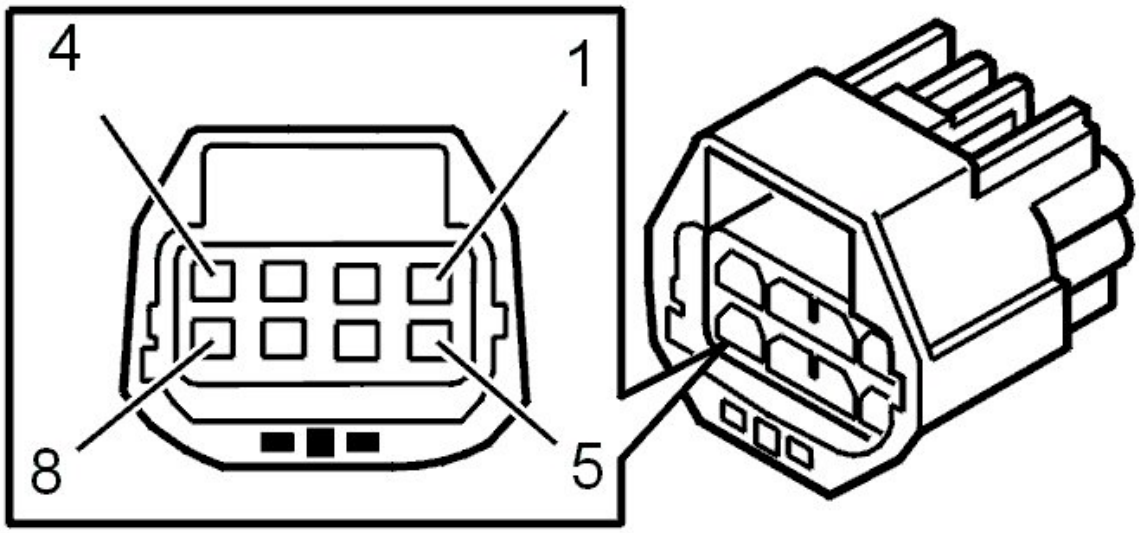
Hint: Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

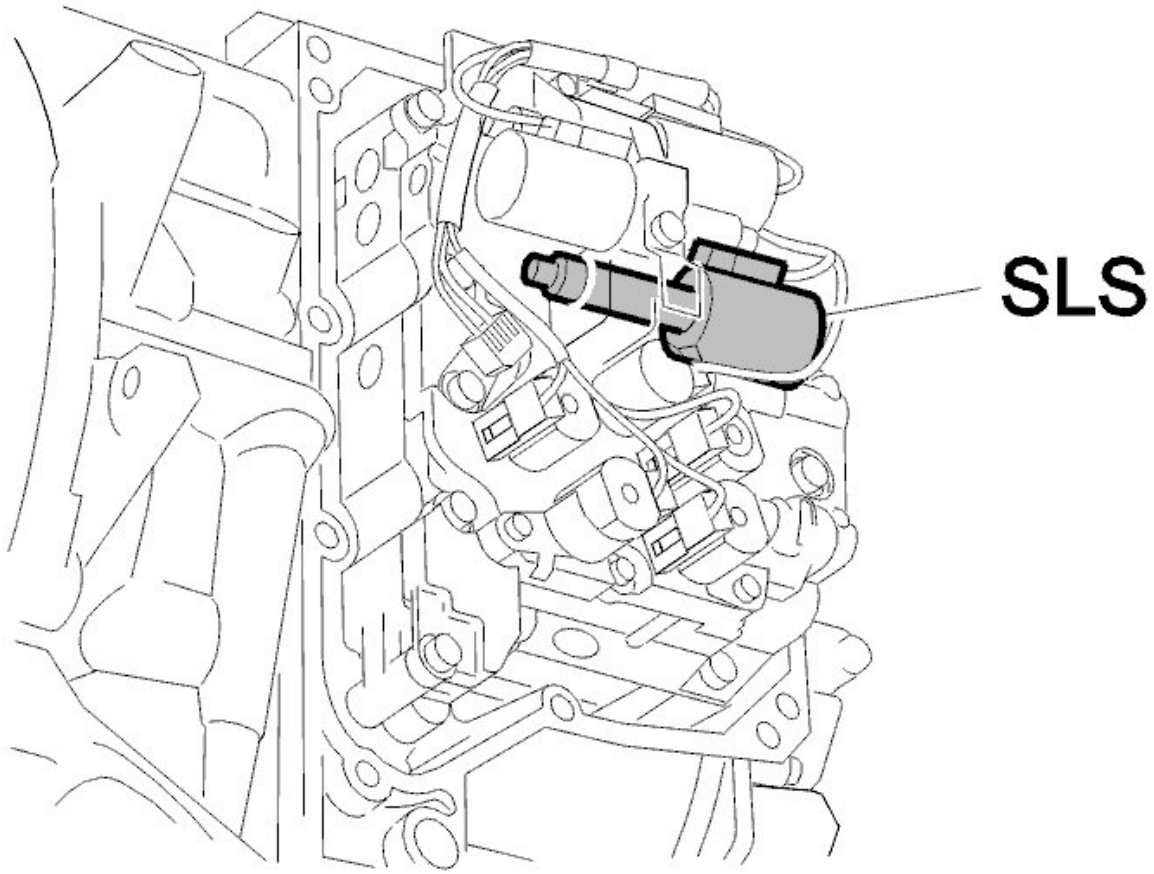
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Line pressure solenoid SLS regulates the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-114 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLS. Solenoid SLS cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) Emergency mode III program is initiated.

Possible source
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid.
- Open-circuit in the power ground.
- Contact resistance in terminals.
- Defective control module.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]

- General orange warning lamp lit.
- No lock-up function.
- Harsh gear shifting.

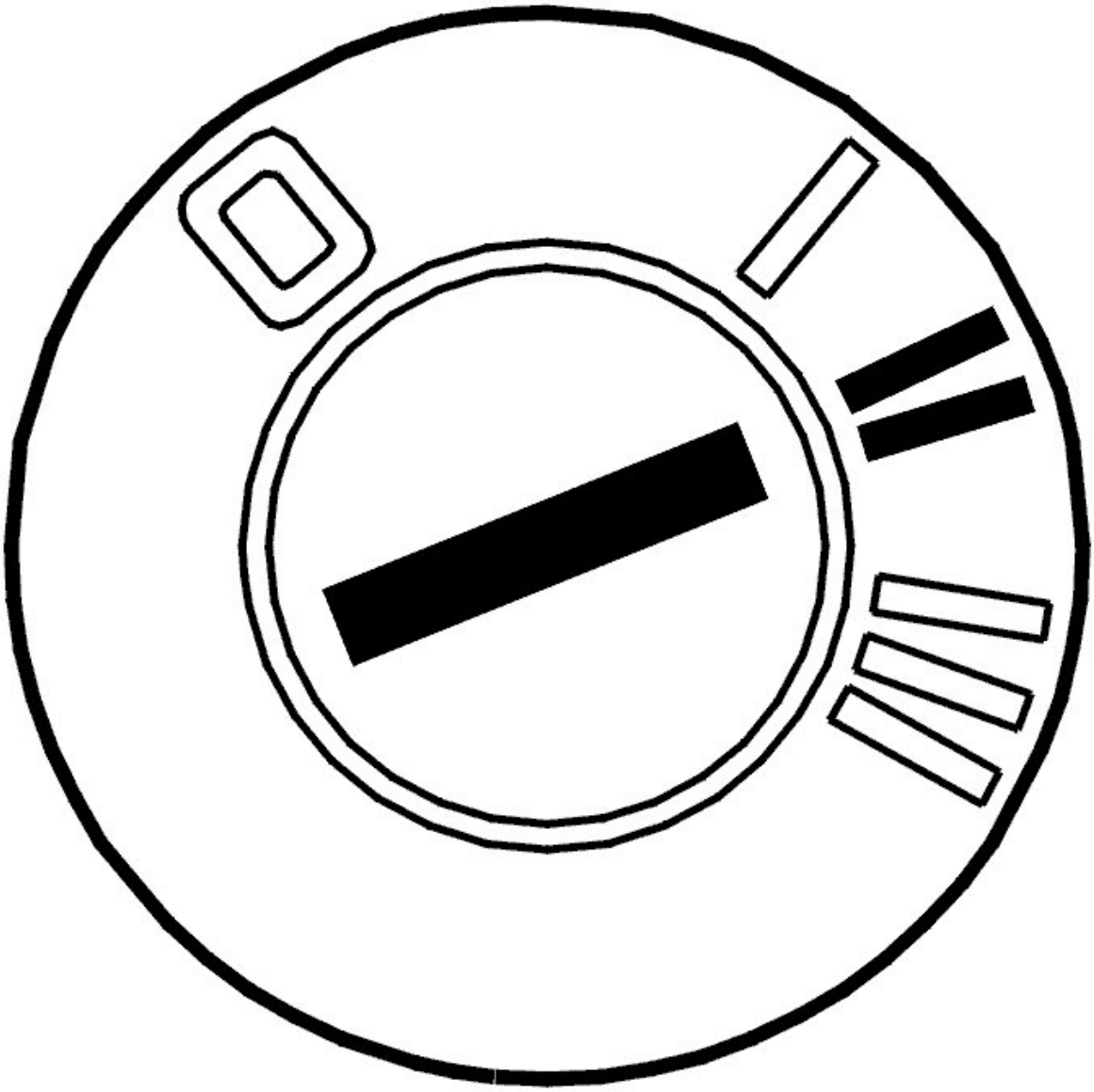
Hint: Harsh gear shifting can be caused by:

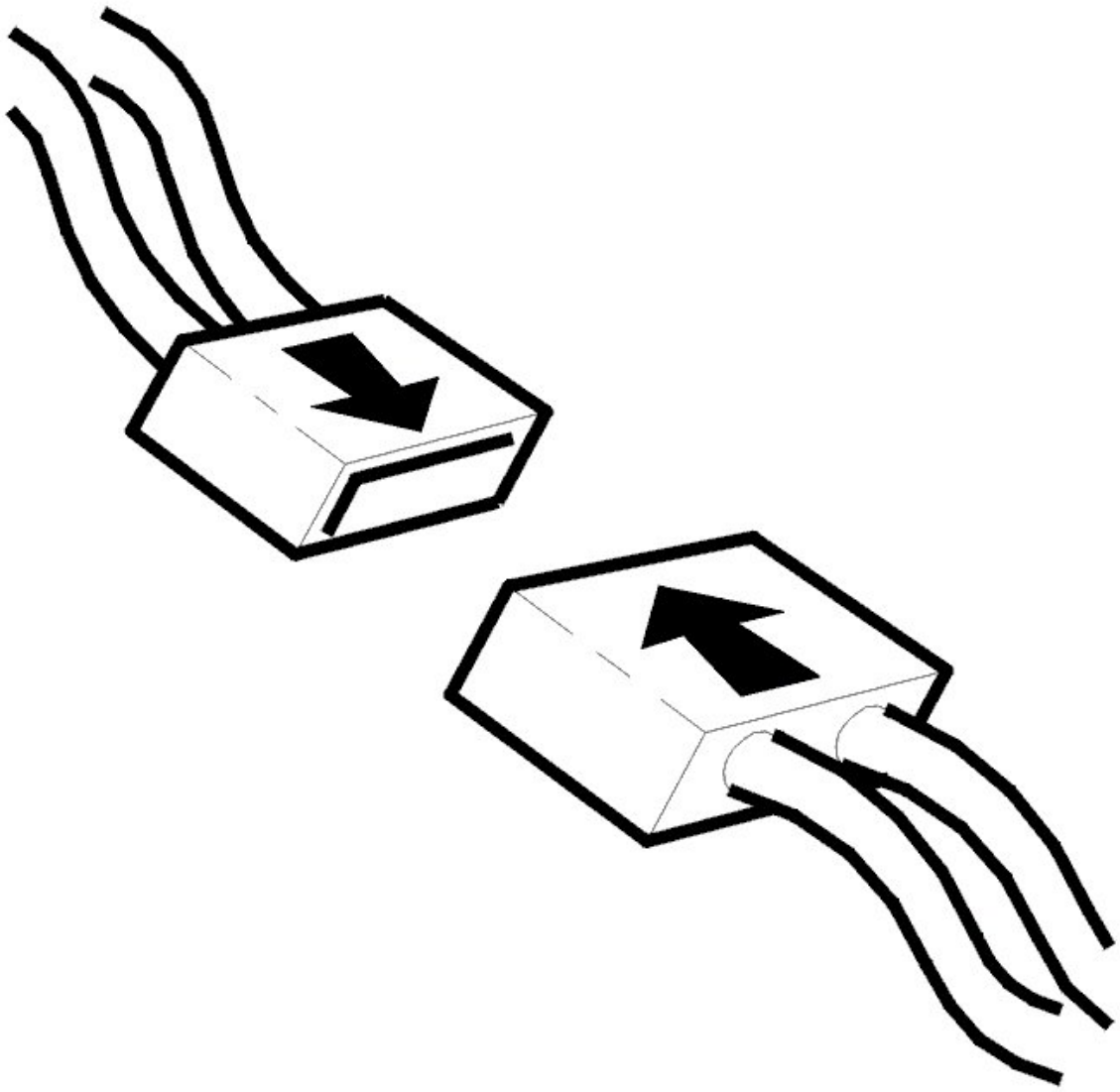
- No torque limiting request to the engine control module (ECM) when shifting.
- No line pressure solenoid SLS or SLT control. This results in constant maximum line pressure.

Signal Too Low. Permanent Fault

Signal too low. Permanent fault

Checking line pressure solenoid SLS





- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

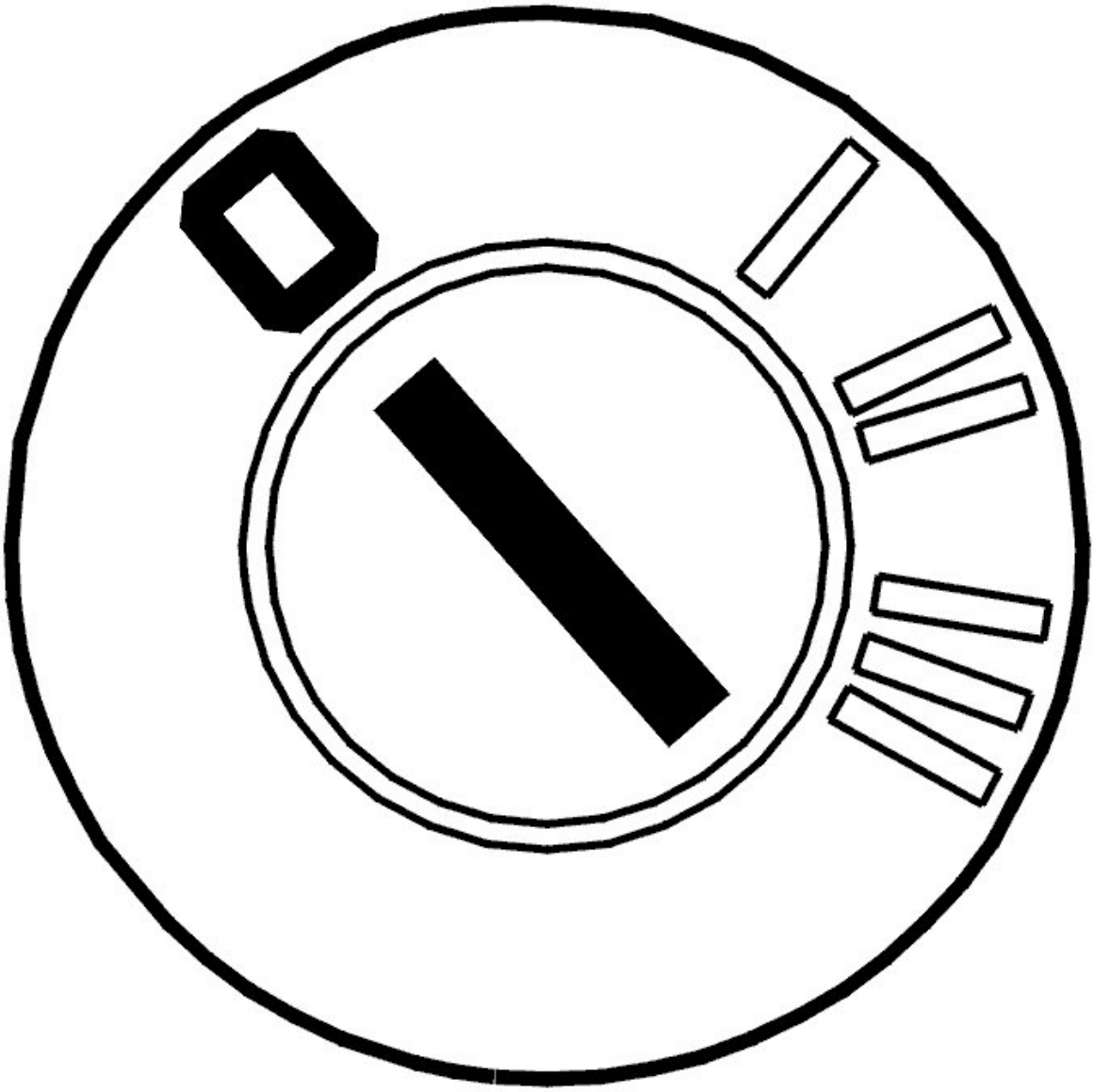
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).

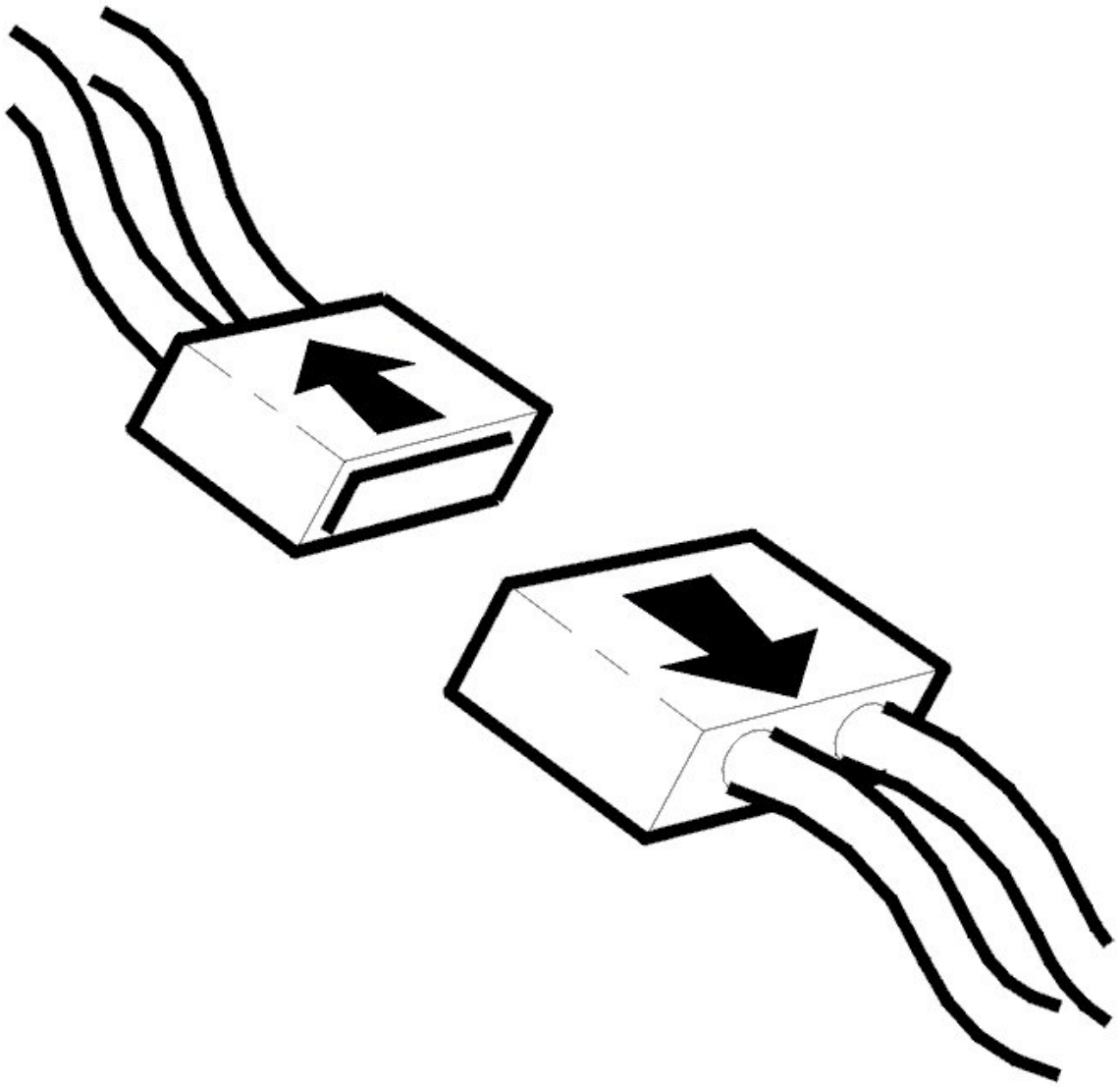
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



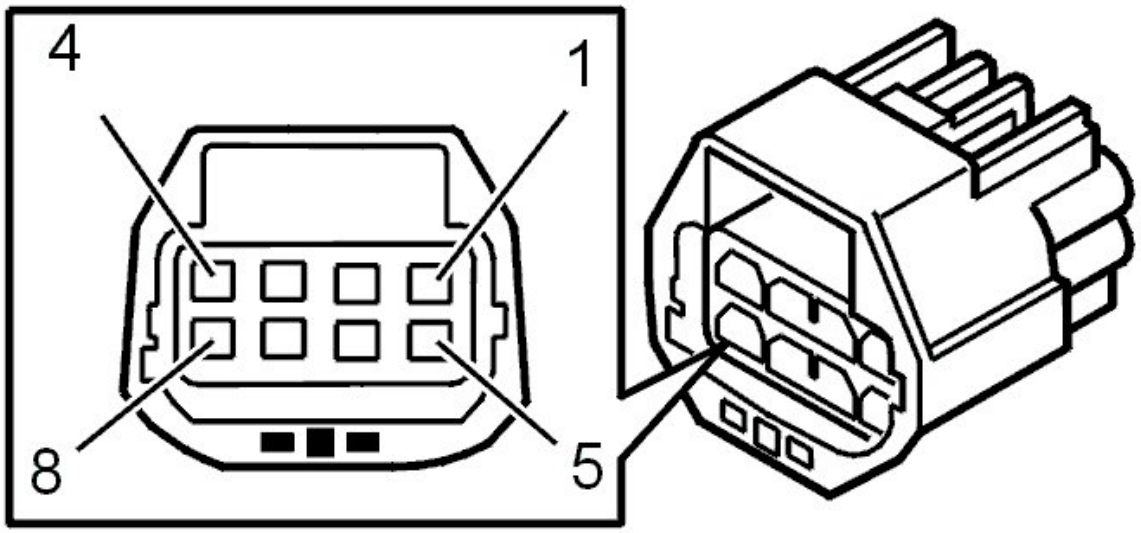


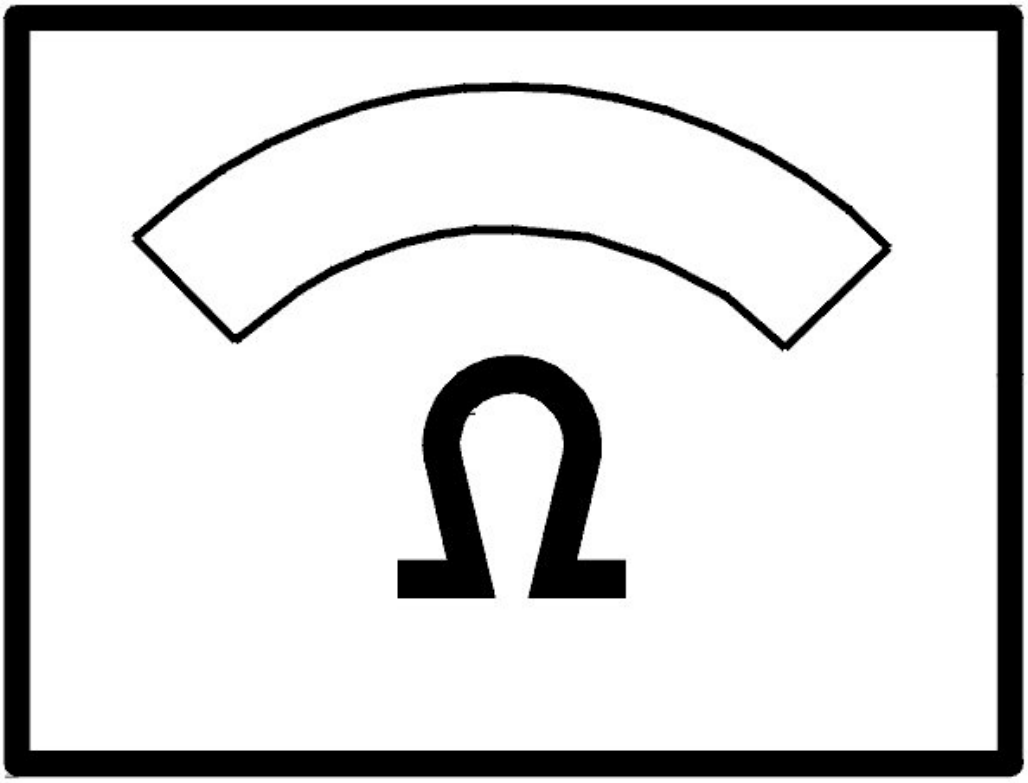
- Ignition off
- Disconnect transmission connector D.

Check solenoid SLS. Measure the resistance between terminals #D5 and #D6 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



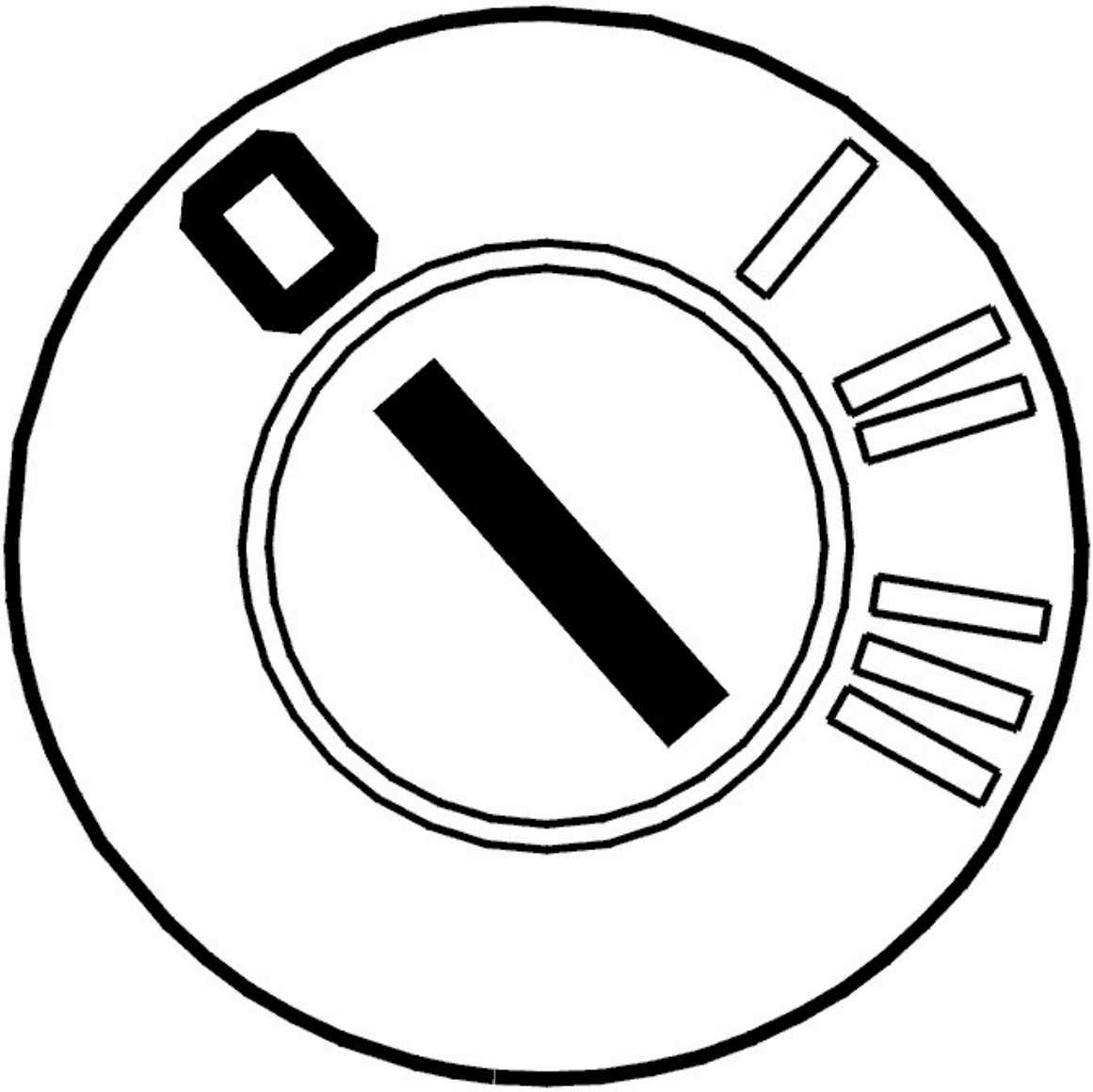


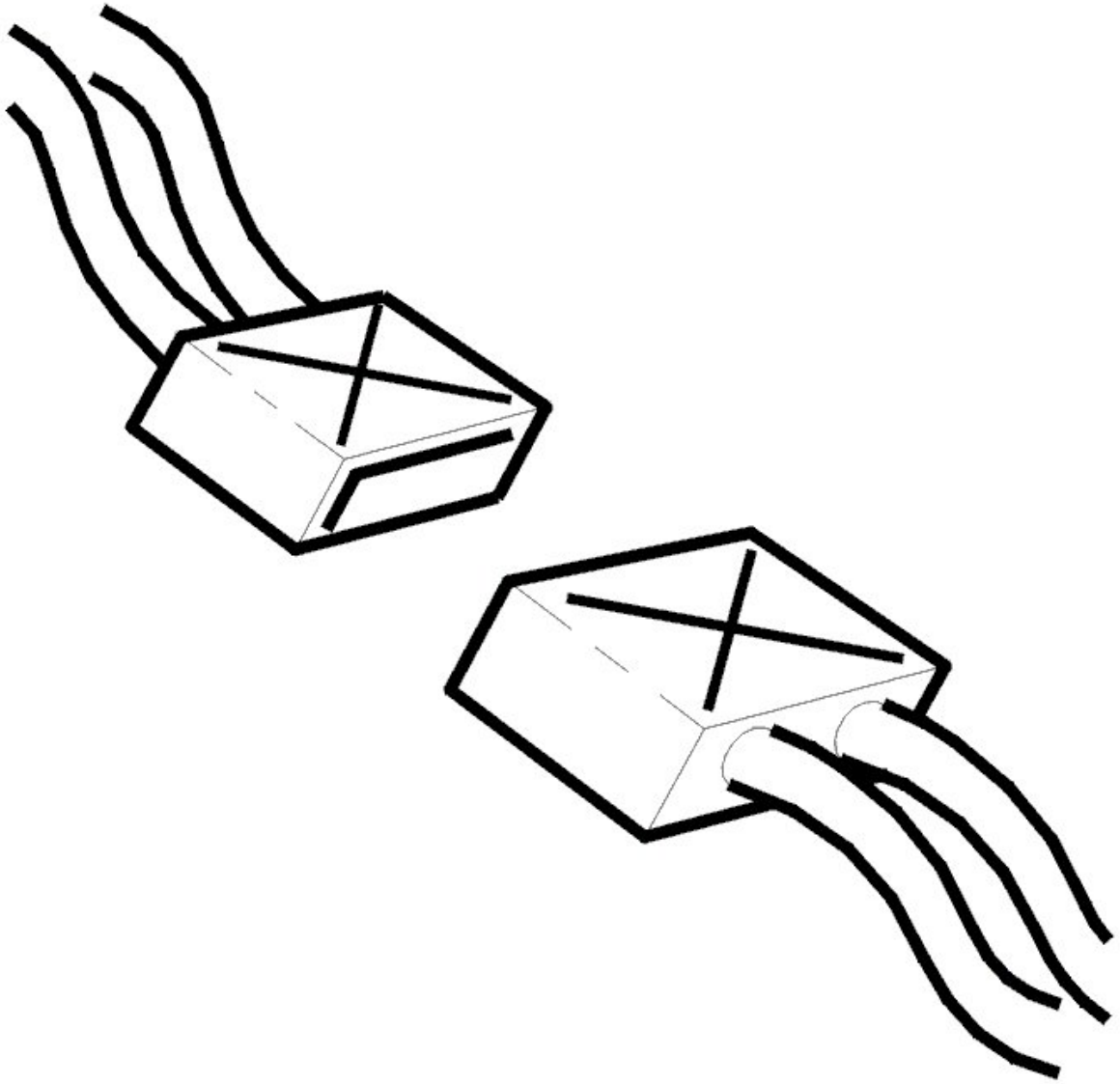
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



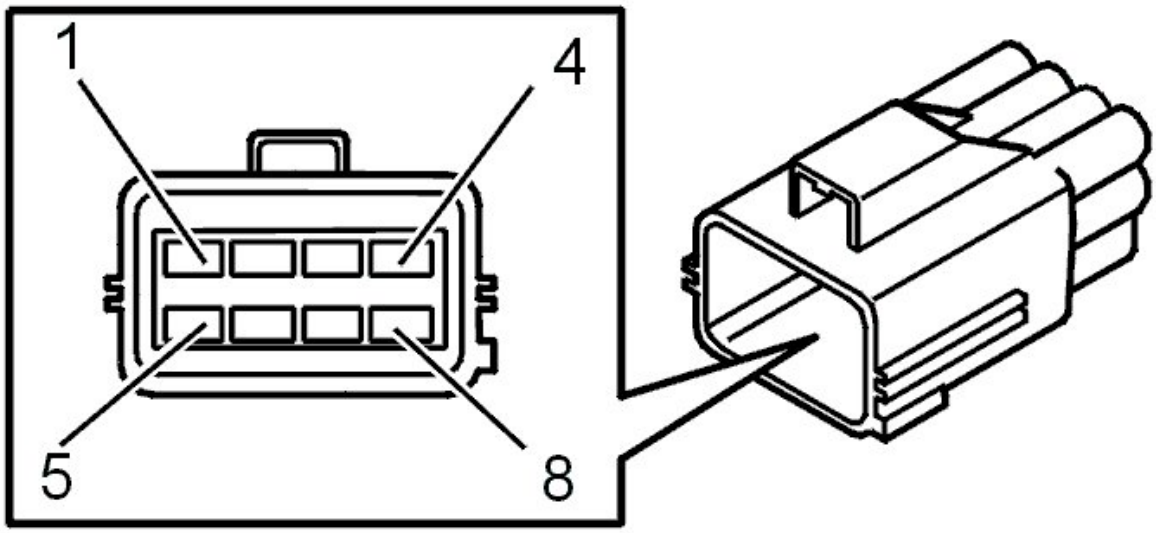


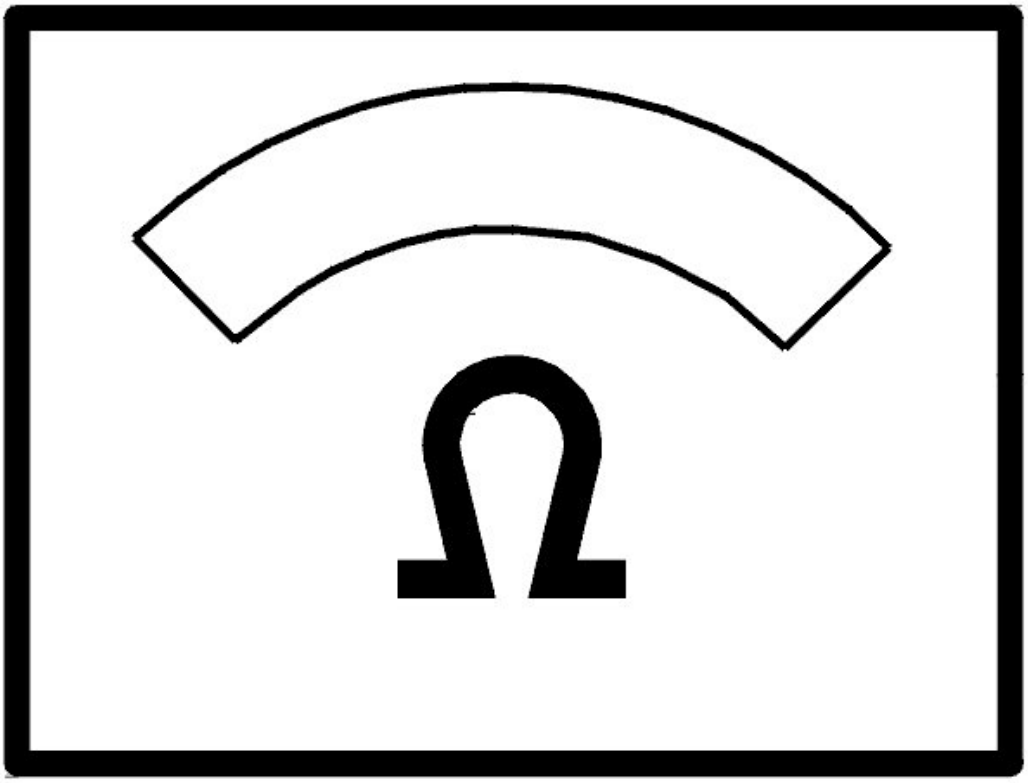
- Ignition off
- The breakout box connected
- Transmission connector D disconnected.

Check the cable between transmission control module (TCM) terminal #A49 (#A49) and transmission connector terminal #D5 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B7 (#A67) and transmission connector terminal #D6 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



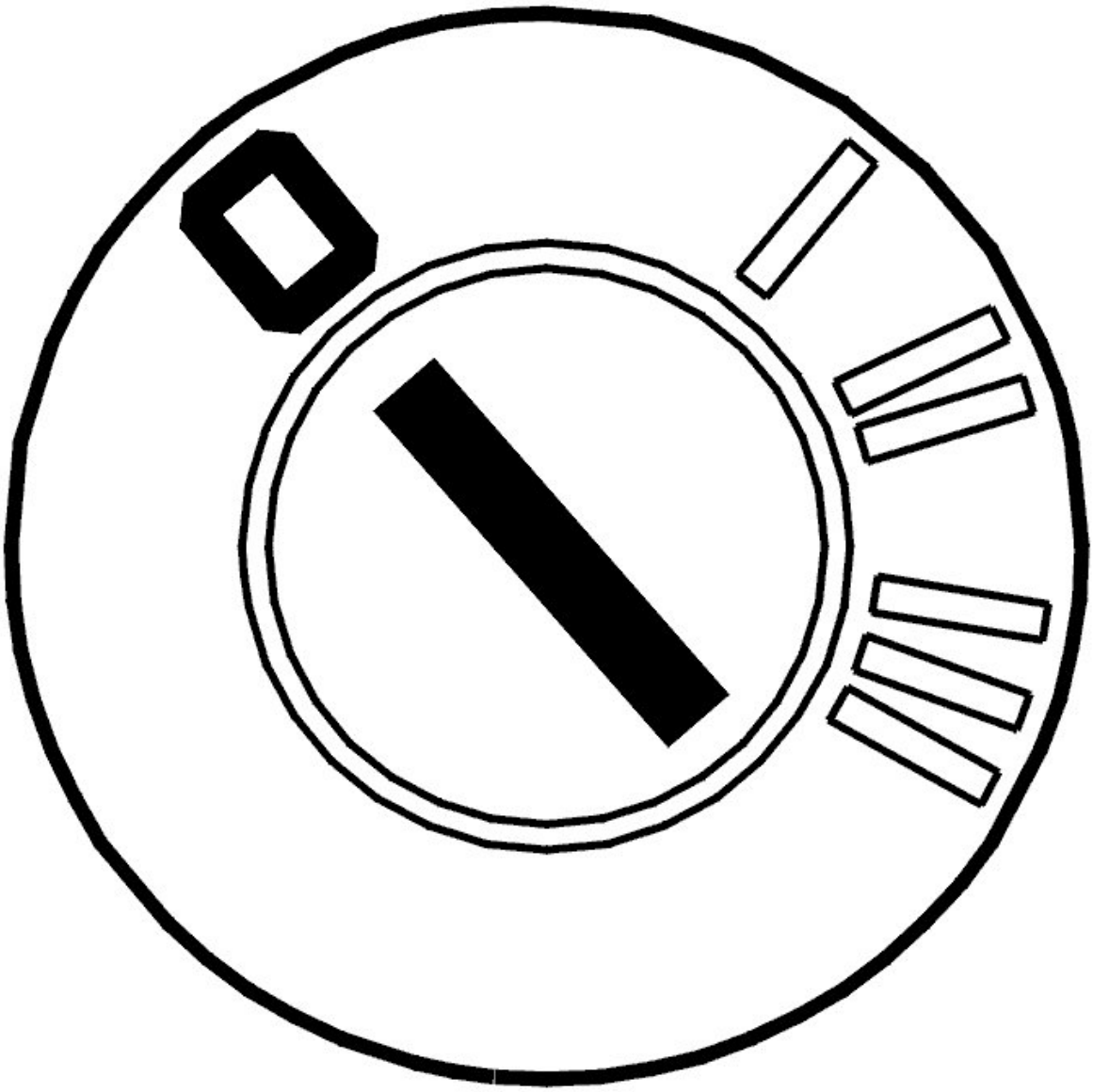


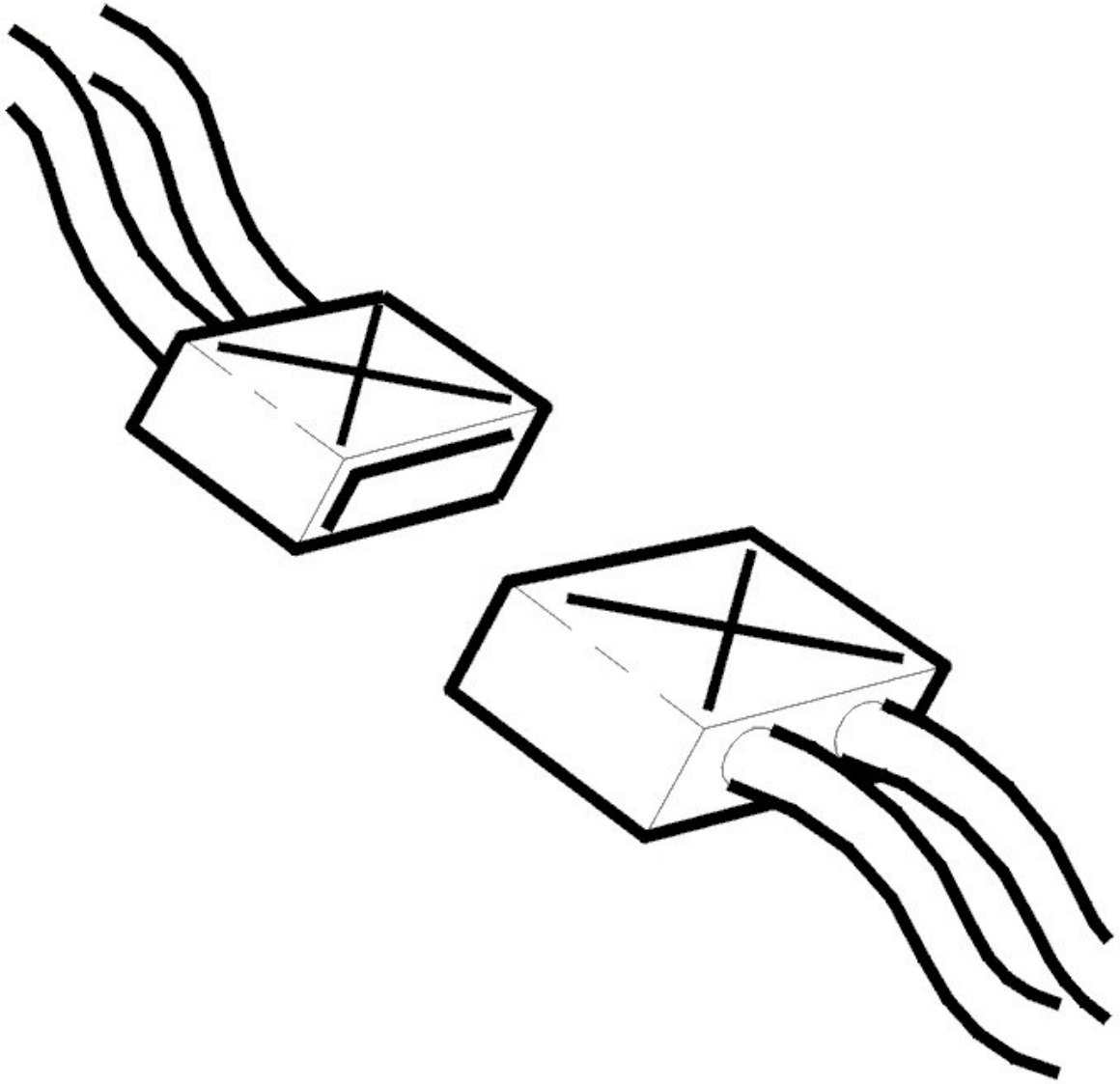
Was a fault detected?

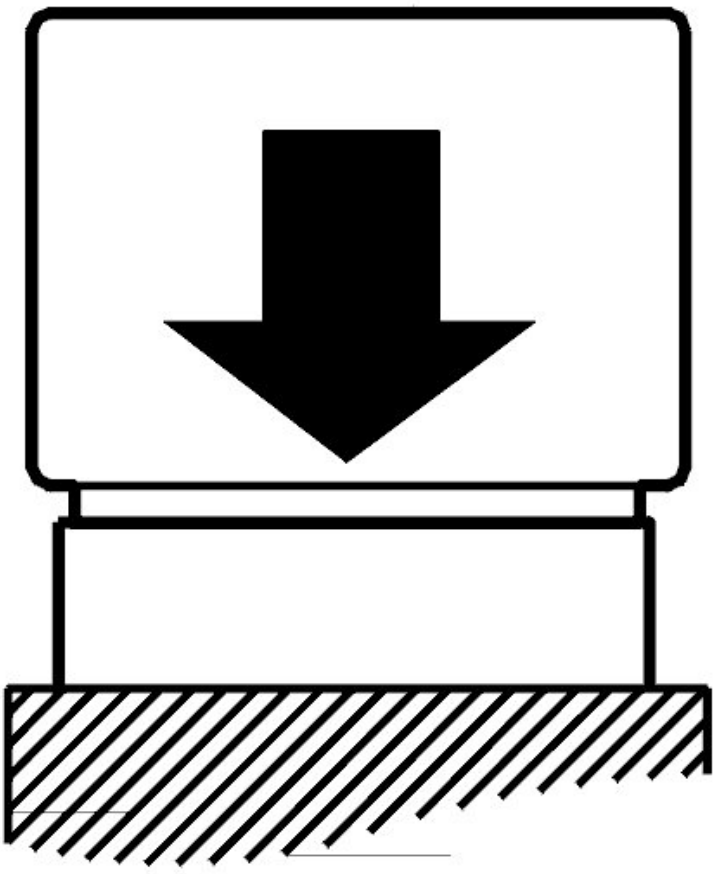
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

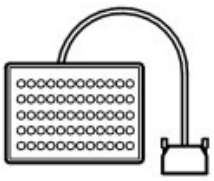
Check the transmission control module (TCM) by measuring the resistance between terminals #A49 (#A49) and #B7 (#A67) on the breakout box. The resistance must be approximately 9 kohms.

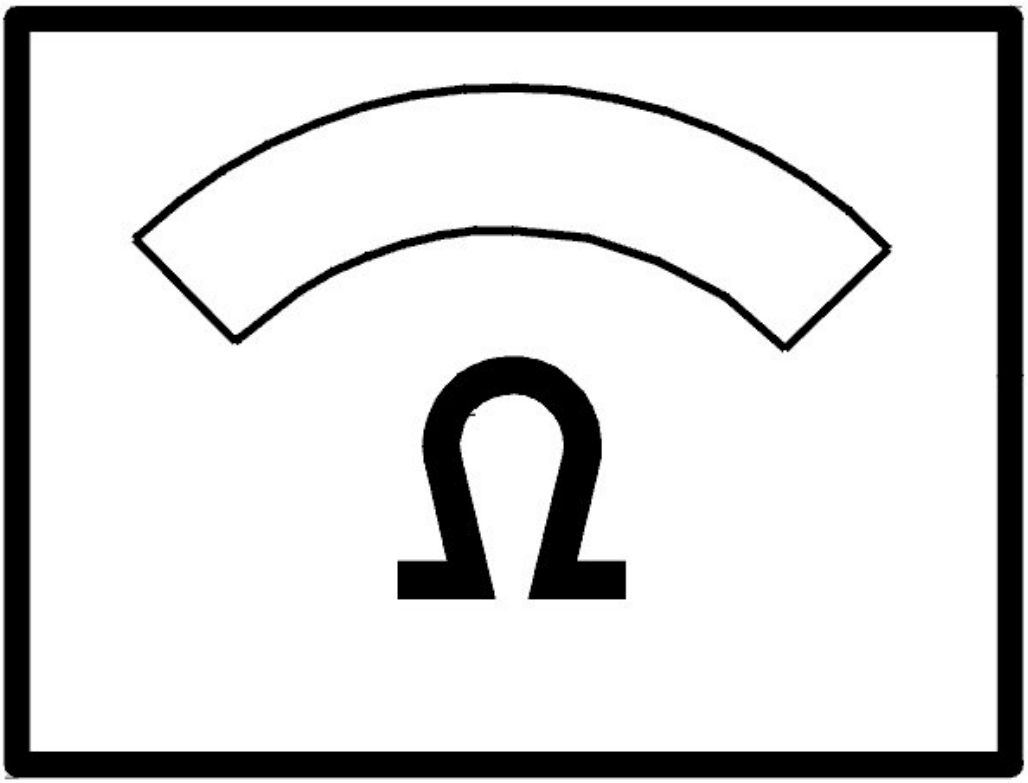
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



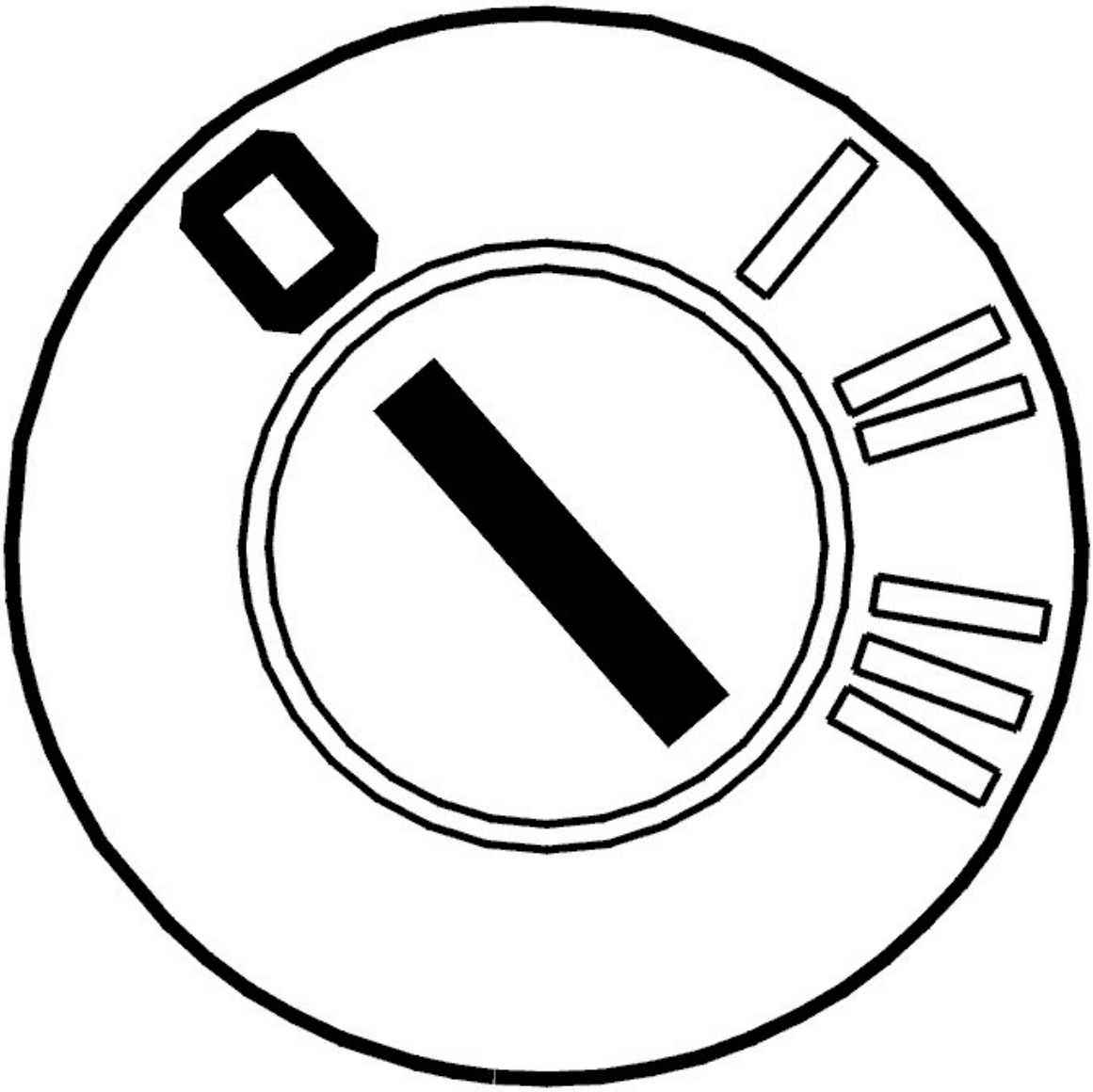


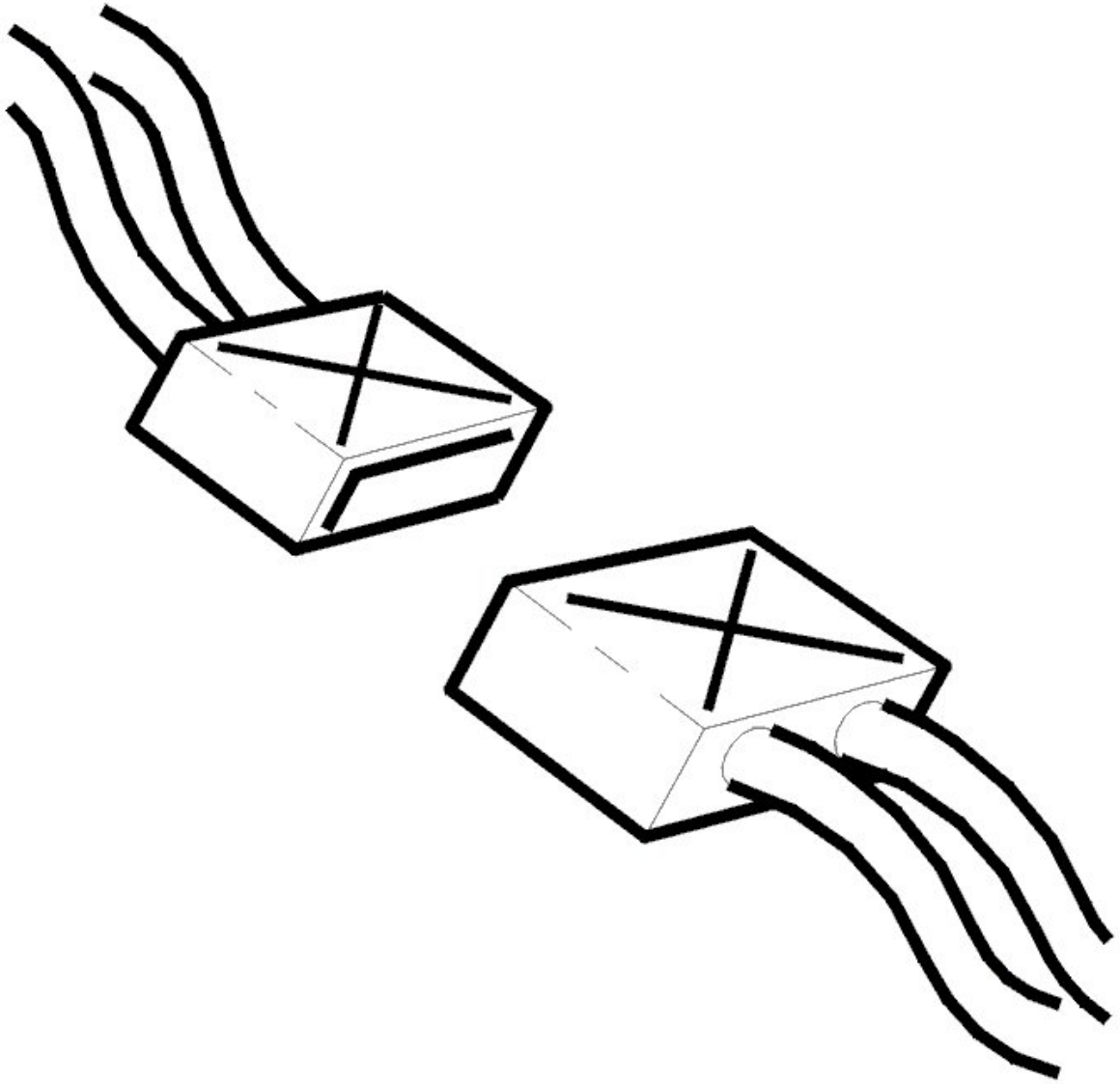
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component





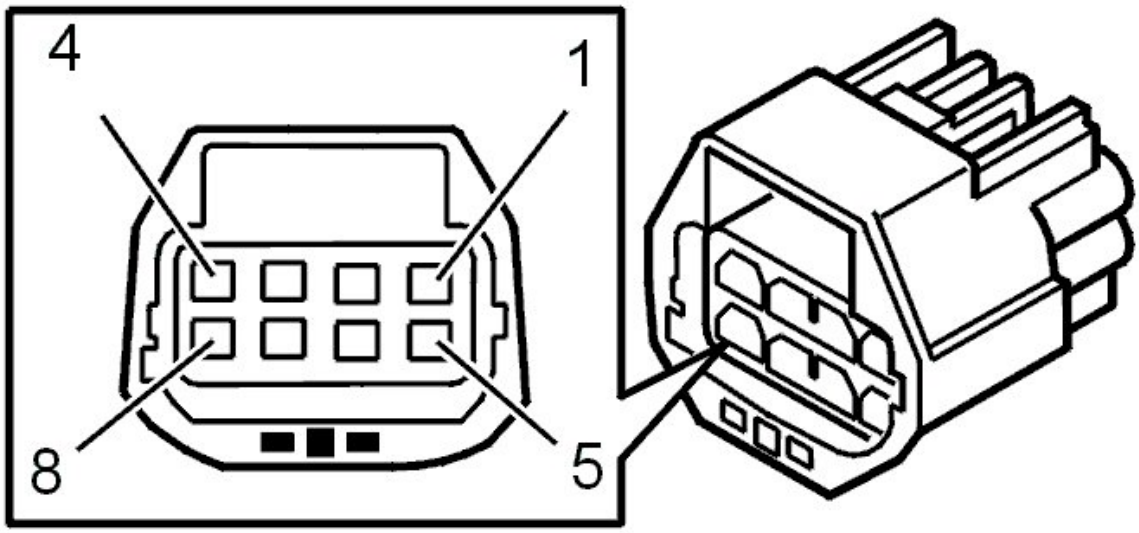
- Ignition off
- Open the transmission control system.

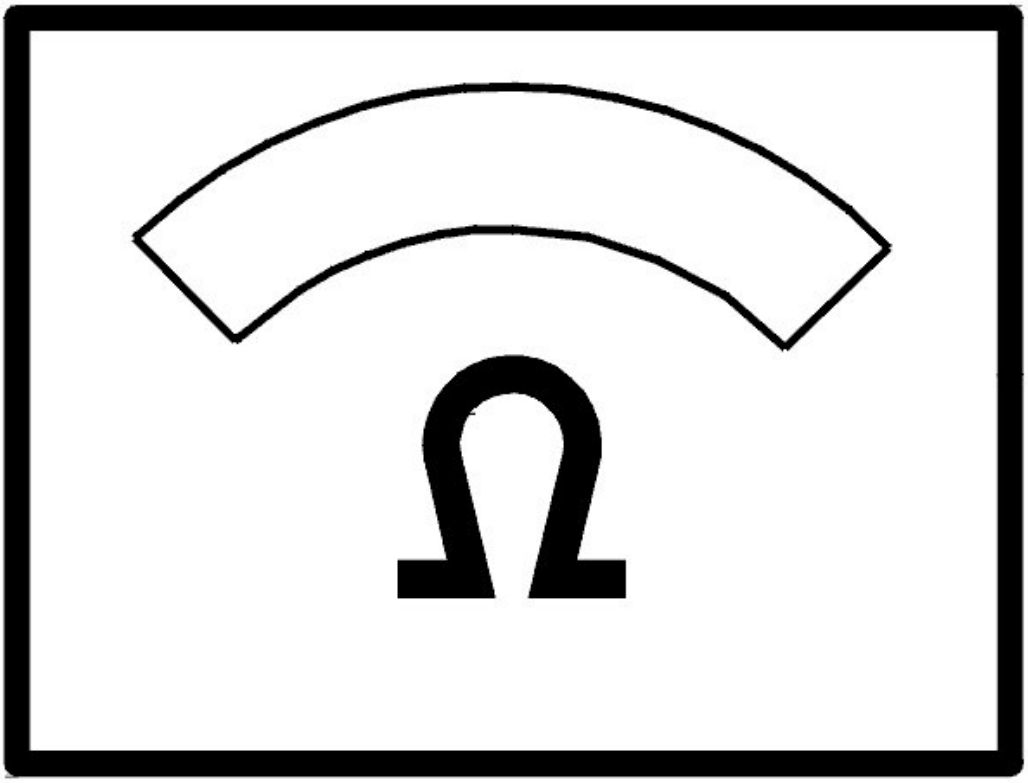
Check the wiring between transmission connector terminal #D5 (transmission side) and solenoid SLS terminal #1. Check the wiring between transmission connector terminal #D6 (transmission side) and solenoid SLS terminal #2. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

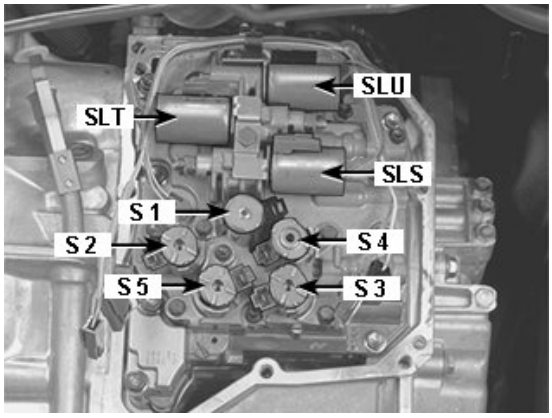
Check solenoid SLS by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).


4
1
8
5





Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

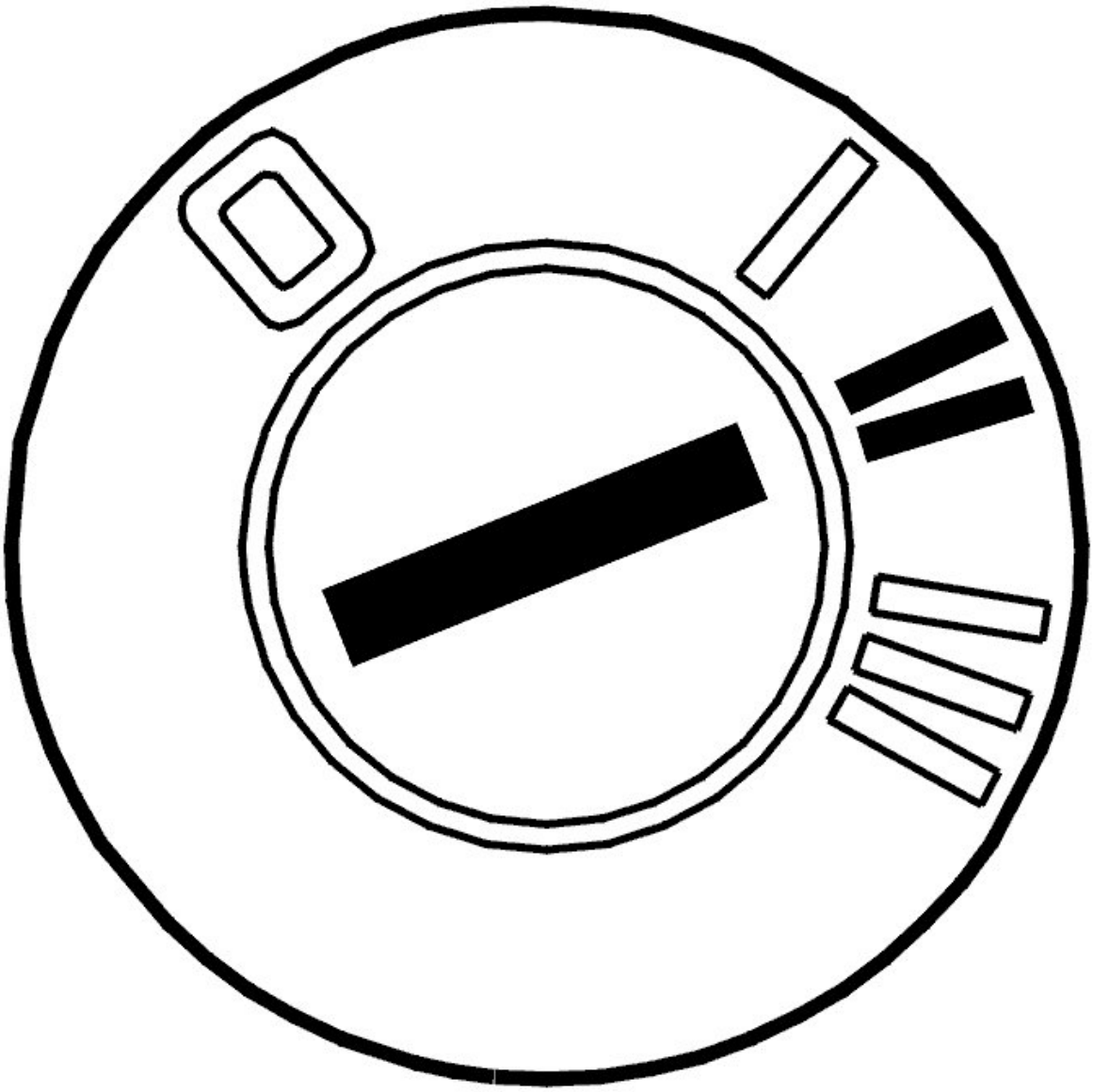
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

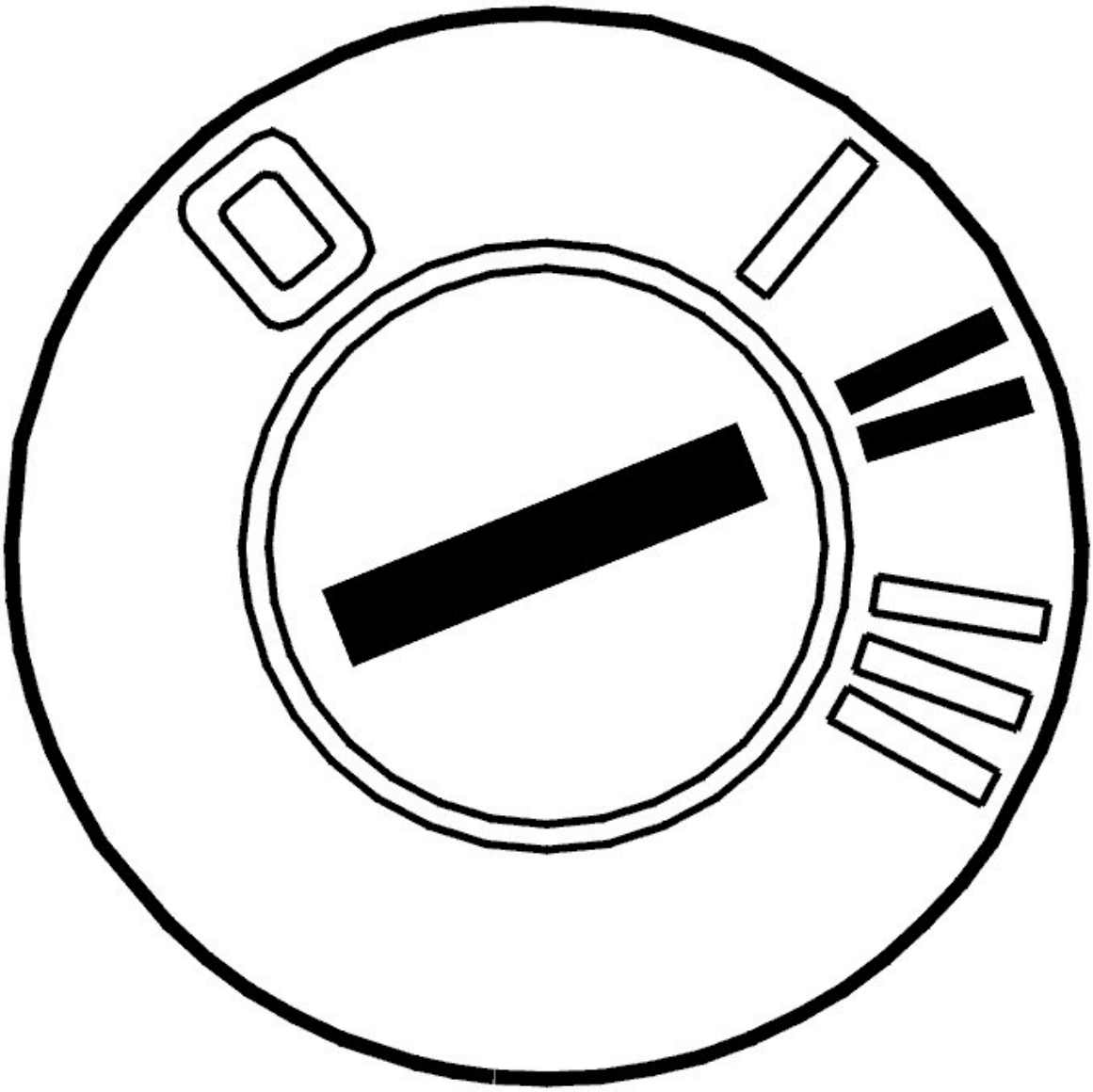
Continue - **DONE**

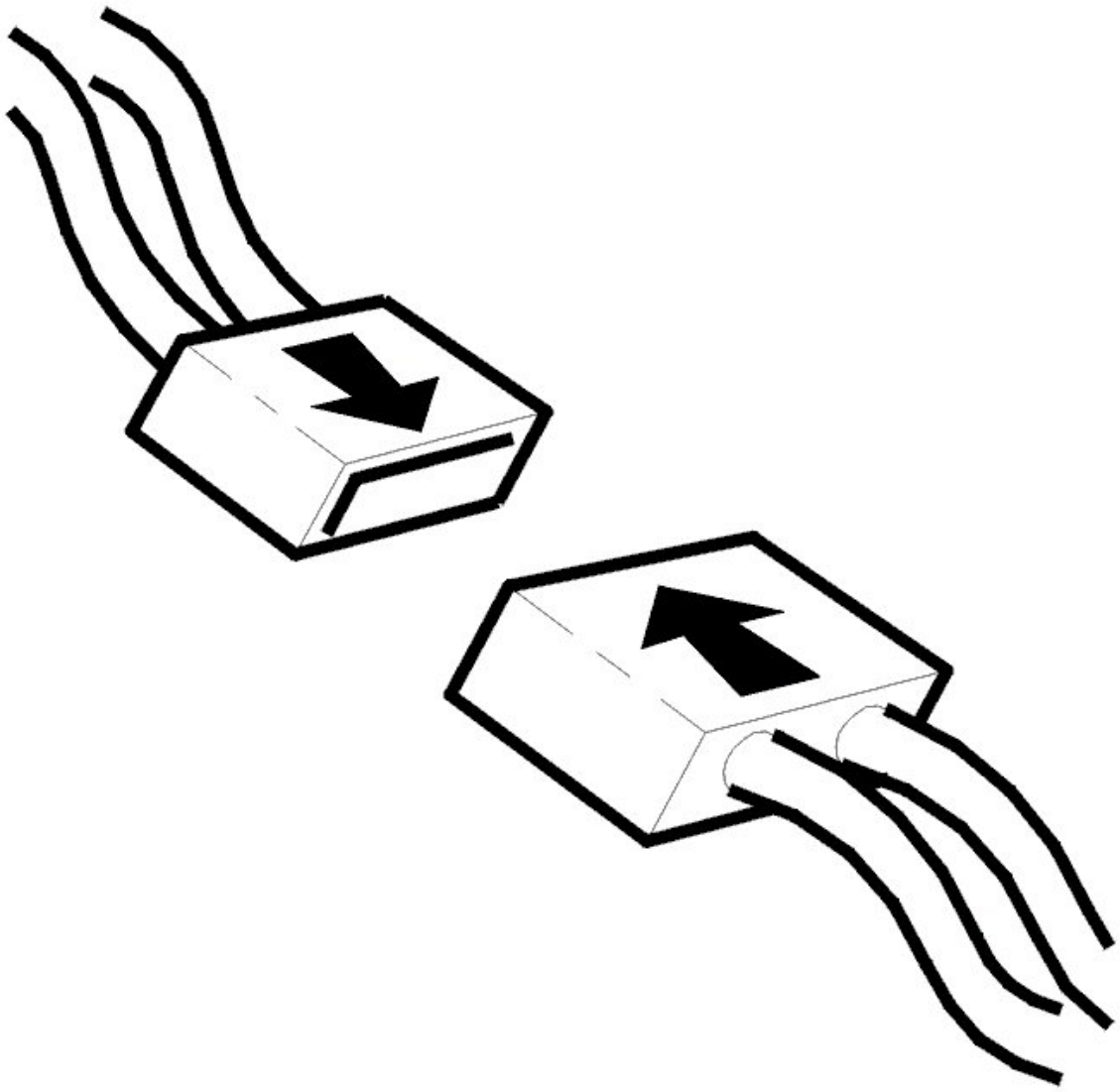
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition on.
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

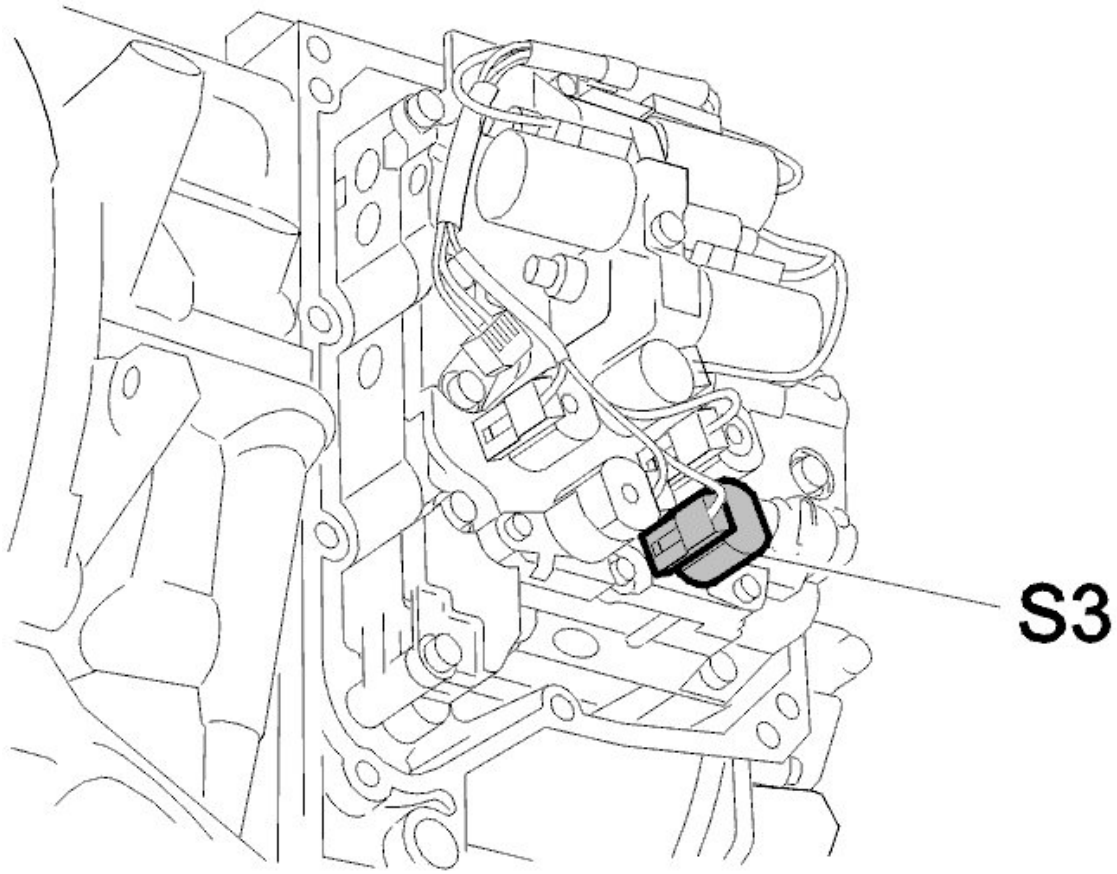
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLS

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Transmission control module (TCM) receives a speed signal from the ABS system and from the automatic transmission speed sensor. The transmission control module (TCM) compares the speed signals from the ABS system and from the transmission speed sensor. The two signals should be approximately the same. The control module derives and compares the transmission speed with the vehicle speed. The transmission control module (TCM) uses this comparison to calculate gear-shift timing. Engine speed (RPM) and vehicle speed data affects the adjustment of system pressure, lock-up function control and engine torque reduction. The result is smooth gear-shifting. The transmission control module also derives and calculates the ABS system signal with the engine speed (RPM) signal. The control module also checks which gear is selected and compares it with the calculated gear. The ABS system and transmission speed signals should be almost identical. The engine speed (RPM) signal should be greater or lower than the ABS system speed signal (note that vehicle speed must be above 30 km/h, engine speed (RPM) above 1400 rpm and transmission oil temperature over 20°C). Diagnostic trouble code (DTC) TCM-0115 is stored if the control module detects that the transmission speed and engine speed (RPM) signals do not correspond with the programmed values and that an "incorrect" gear is selected. This is because solenoid S3 is stuck in the open or closed position.

Substitute value

- The transmission control module (TCM) Emergency mode II program is initiated.

Possible source
- The solenoid has stuck in the open or closed position.
- Defective solenoid.

Fault symptom[s]
- General orange warning lamp lit.
- No shifting.
- Harsh gear shifting.
- No lock-up function.

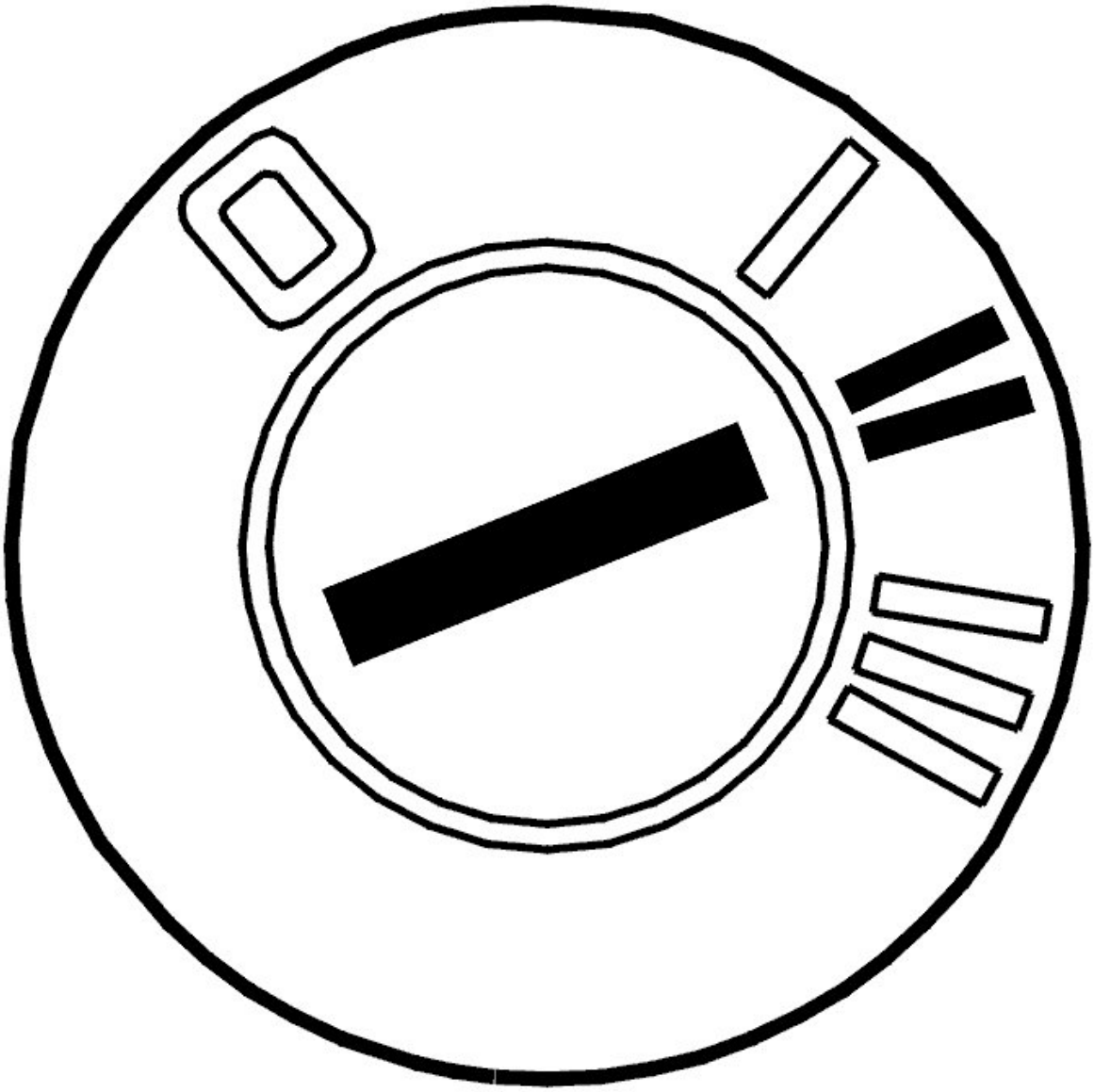
Hint: Harsh shifting because there is no line pressure solenoid SLT control. This results in constant maximum line pressure.
No shifting because the control module prevents activation of the solenoids.

Hydraulic Fault

Hydraulic fault

Checking the oil quality and the oil level in the transmission

Note! Transmission fluid quality and level are extremely important for transmission function. Therefore it is imperative that these are correct. In addition the oil level is dependent on oil temperature.



- Ignition on
- Read off the oil temperature.

Check the oil level. If the oil level is low check for leakage. Top up with oil.
Check the quality of the oil.
Replace the transmission fluid if the fluid smells burnt.
Check the transmission fluid for metal swarf. Take a sample using the dip stick.

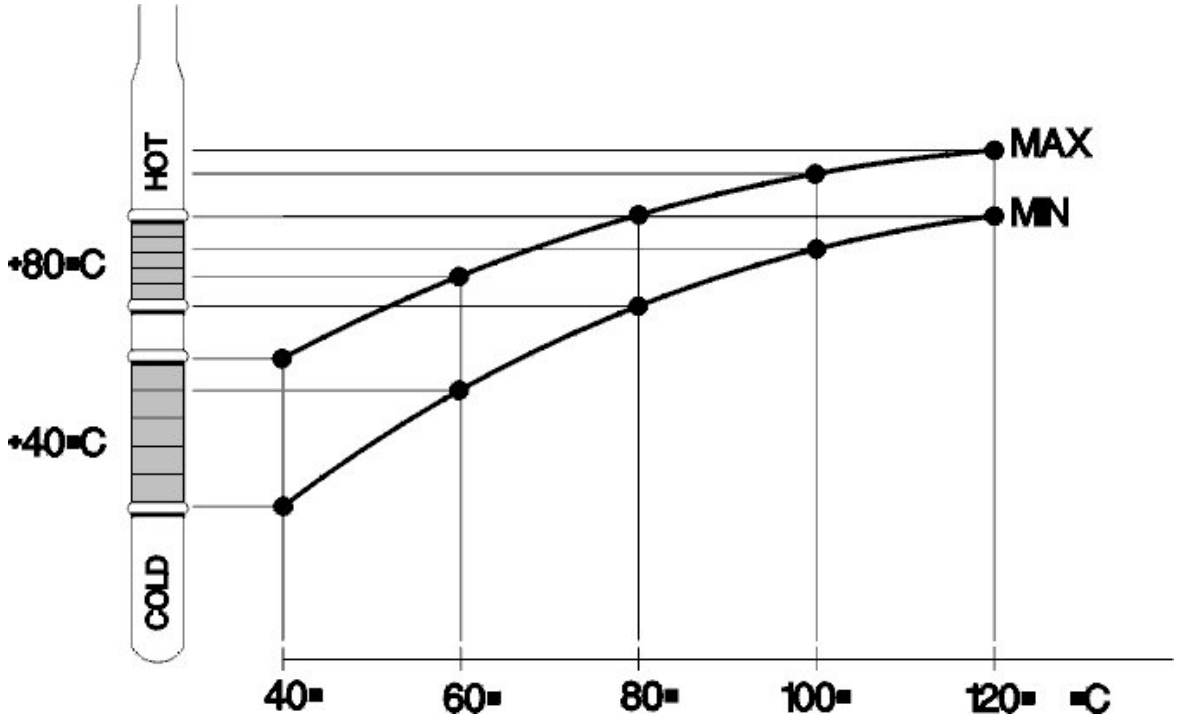
Replace the transmission if the transmission fluid contains metal swarf.

Other information:

- To replace the transmission fluid, see Transmission fluid, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission Fluid, Replacing
- To check the level, see Oil level, checking See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Transmission Oil Level - Checking
- To check the quality of the transmission fluid, see the relevant service procedure.

Select an alternative below:

1. No fault detected
2. Transmission fluid replaced, the level was low or quality was poor
3. The transmission fluid contains metal swarf.



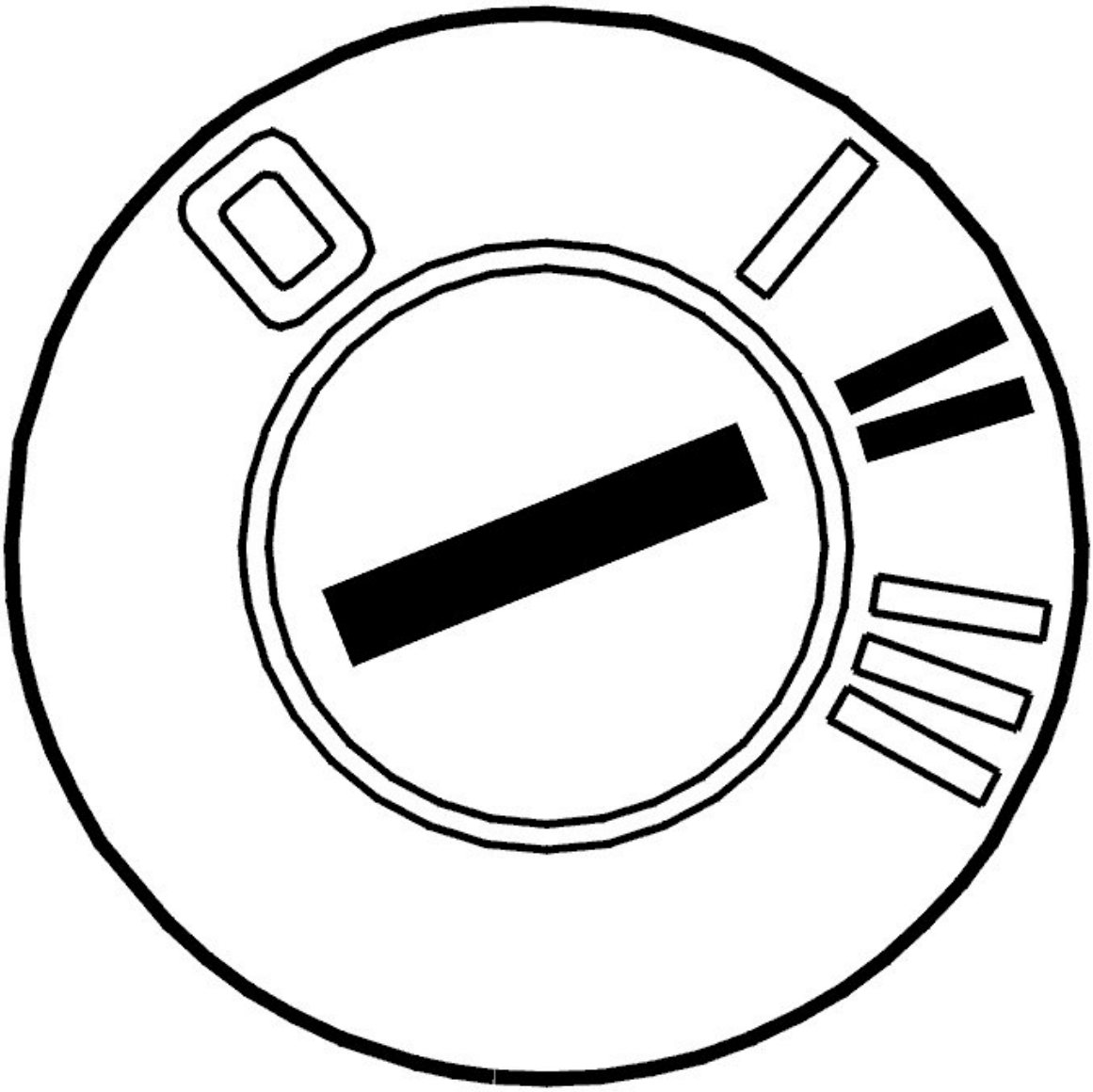
1 - Checking shift solenoid S3

2 - Resetting the adaptation and oil quality counter

3 - Replacing the transmission

Checking shift solenoid S3

Note! The transmission must not be colder than room temperature when activated.



- Ignition off
- Check the transmission and control module connectors. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Ignition on
- Activate shift solenoid S3.

A "click" should be heard when the solenoid is activated. Use a stethoscope to hear the click more clearly.
There is a mechanical fault if the solenoids do not click. If the solenoid "clicks" the cause of the fault is contact resistance and oxidation.

Other information

- To access the transmission connectors, see Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To access the control module connector, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

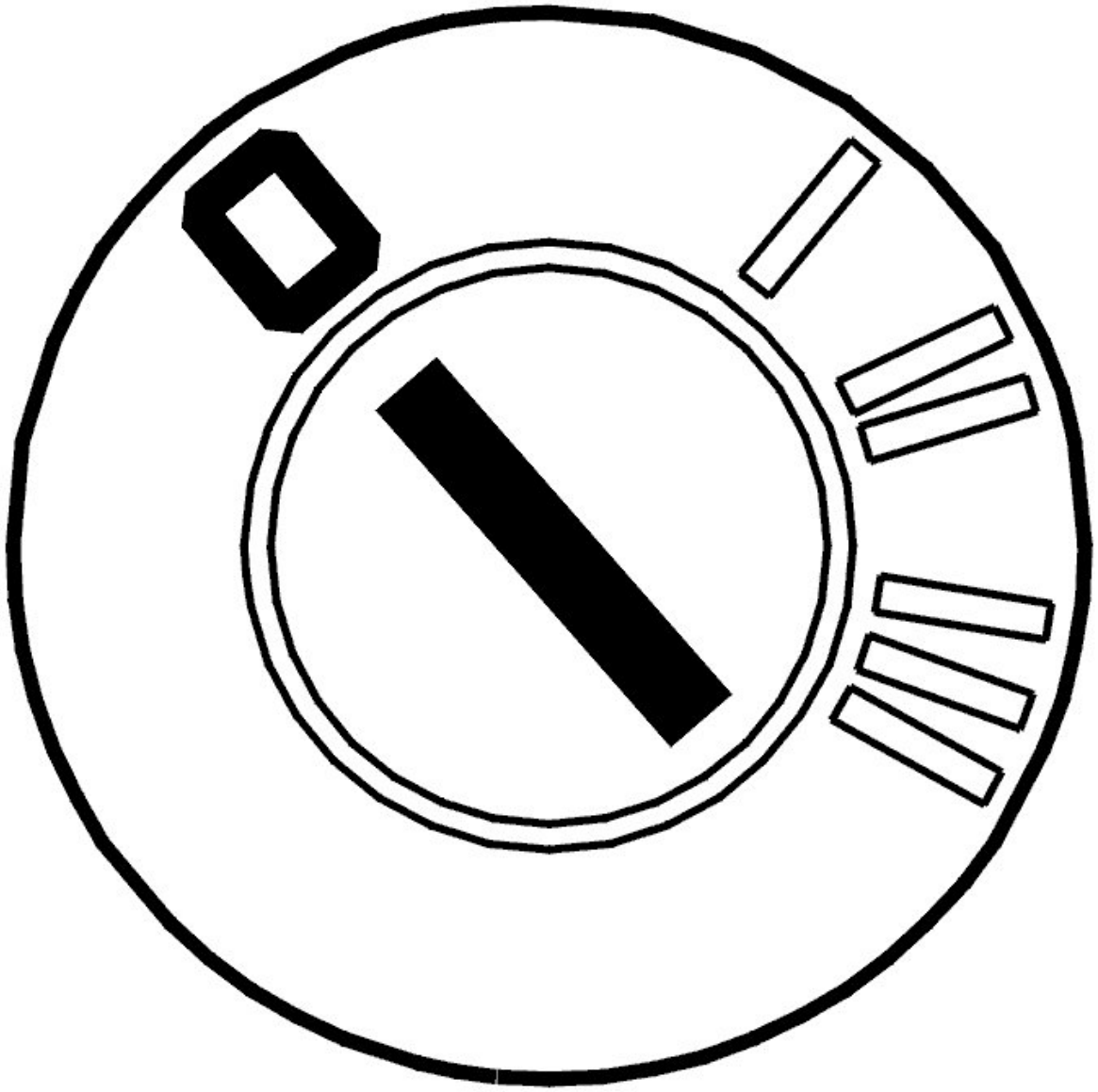
Was there a click from the solenoid?

Yes - Checking noise in the transmission

No - Checking the wiring and component

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking the wiring and component

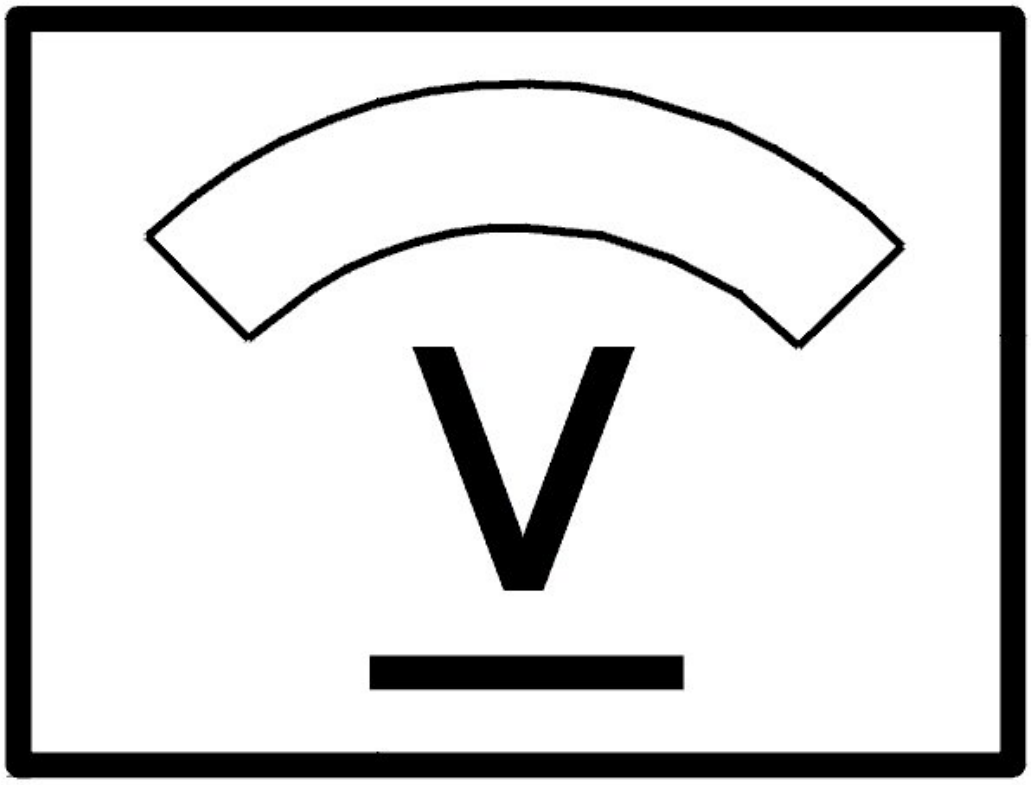


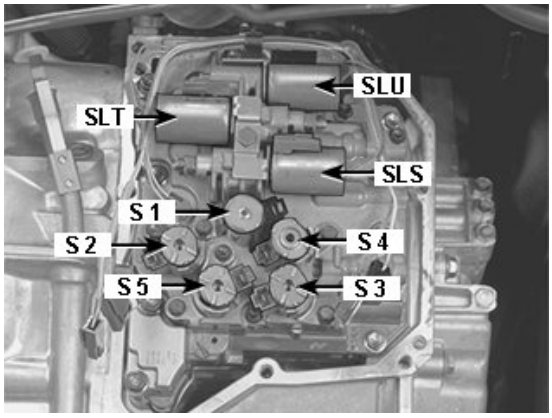
- Ignition off
- Open the transmission control system.

Check that there is no metal swarf or dirt in the control system. Replace solenoid S3 if the control system is OK.
Replace the transmission if there is any metal swarf in the control system.
Remedy as necessary.

Other information:

- To open the control system and to check or replace solenoid S3, see Solenoid control system, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Automatic Transmission Components/Solenoid Control System, Replacing
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).





Location Of Components (Solenoids)

Is there any metal swarf in the transmission?

Yes - Replacing the transmission

No - Resetting the adaptation and oil quality counter

Checking noise in the transmission

- Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
- Check for any clearly audible noises from the transmission. Check for malfunctions.

Is the function of the transmission OK?

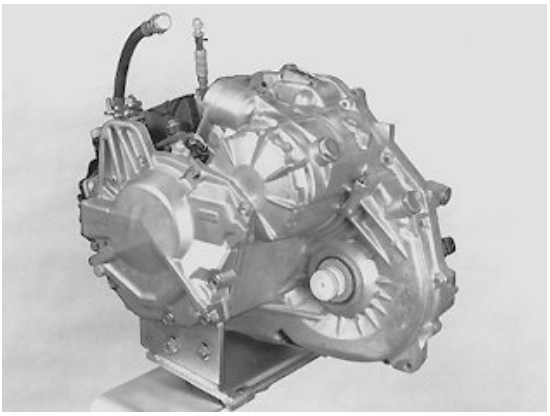
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Yes - Fault Found

No - Replacing the transmission

Replacing the transmission

The previous tests indicate an internal fault in the transmission.
Replace the transmission. See Gearbox, removing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Removing and Installing the gearbox See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Removal and Replacement/Transmission, Installation.



Continue - Resetting the adaptation and oil quality counter

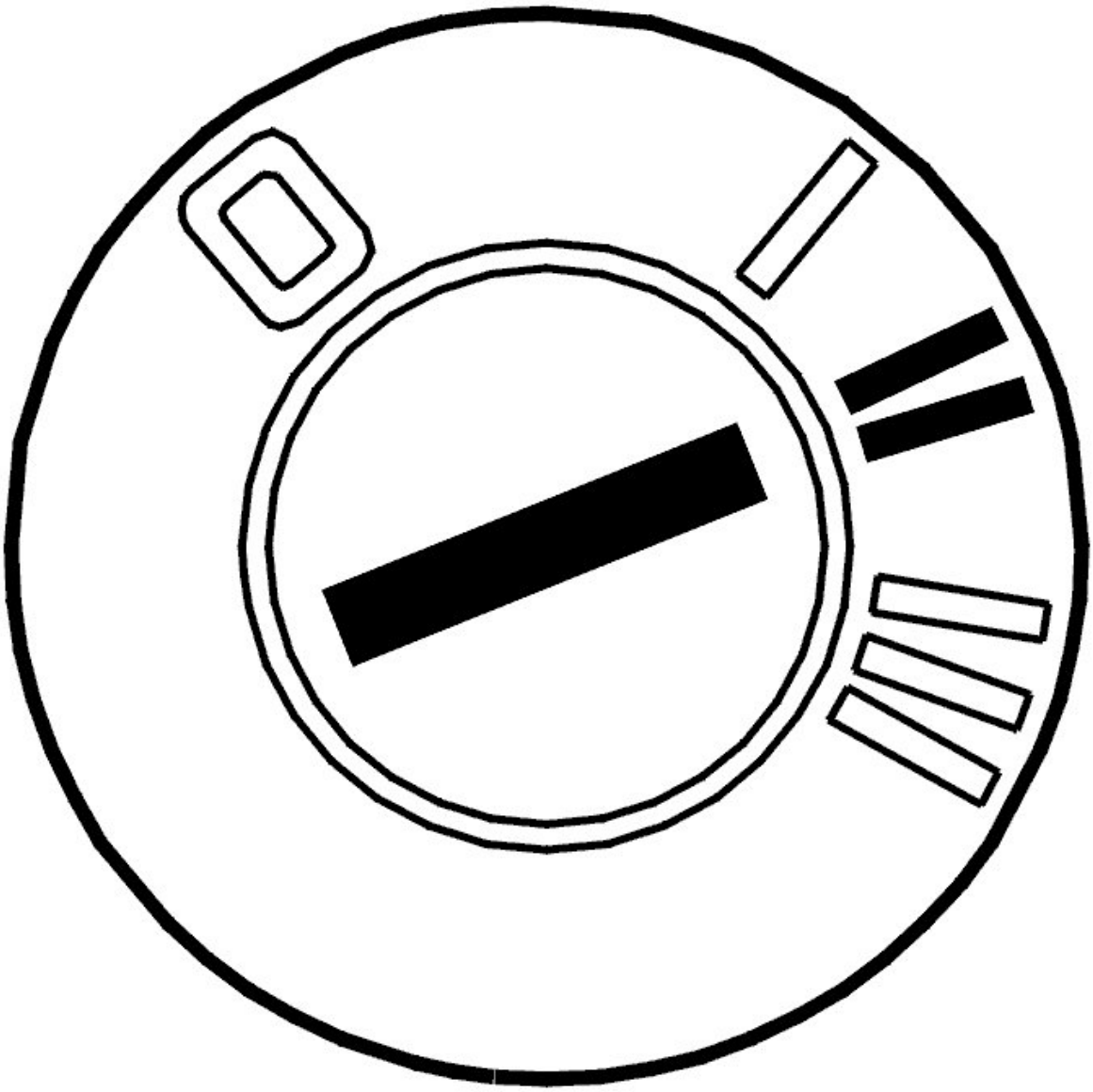
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

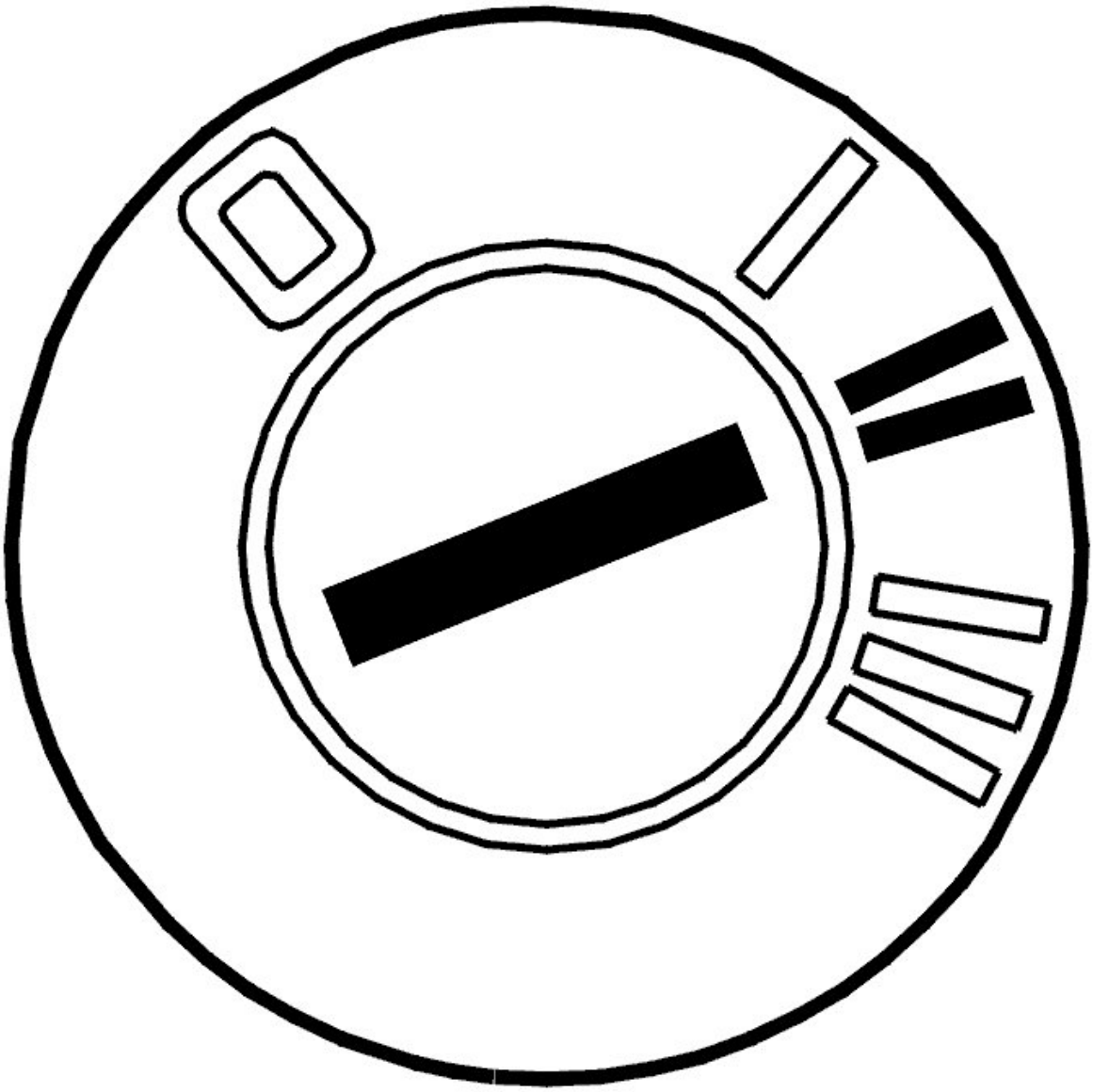
Continue - **DONE**

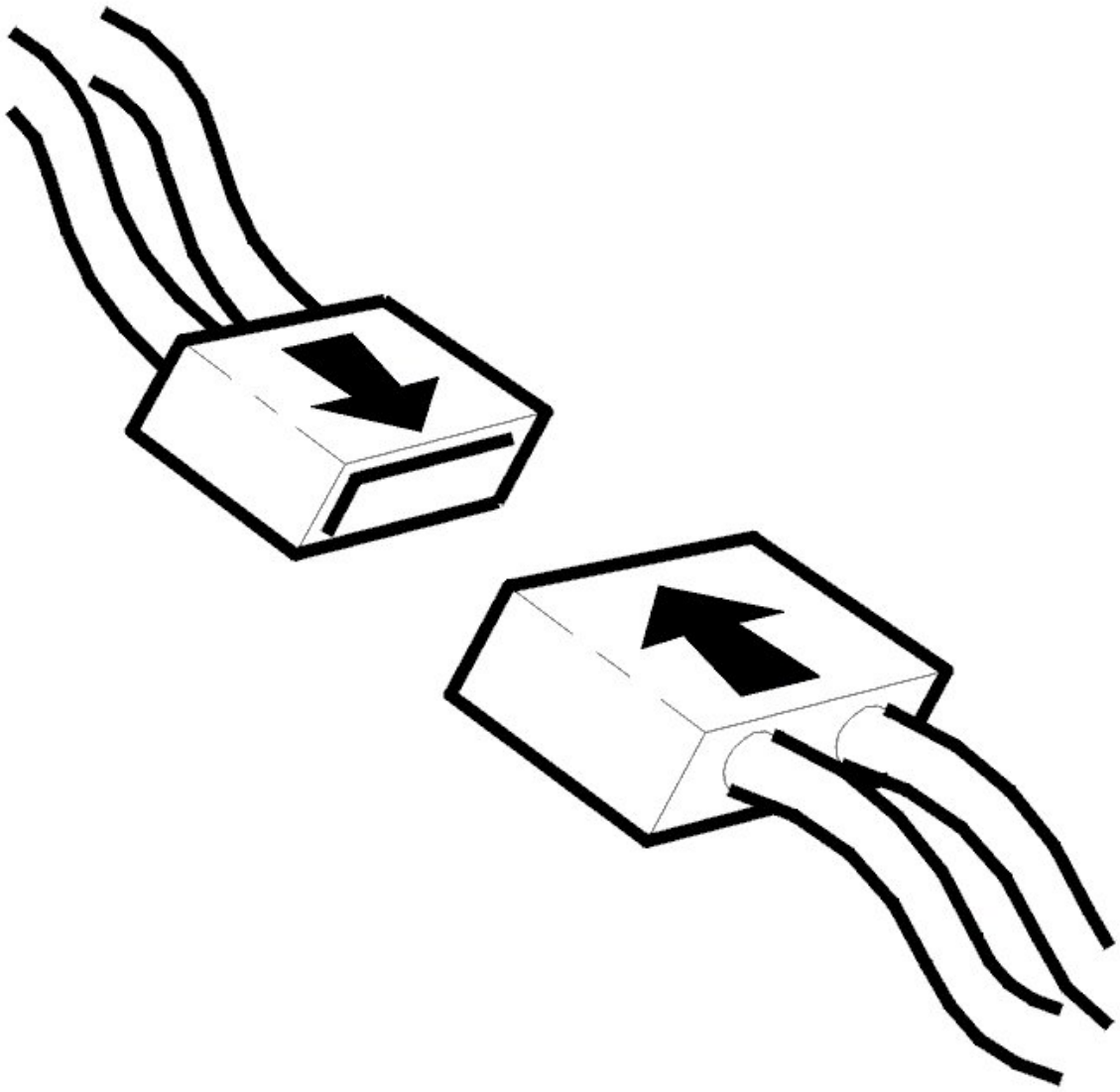
DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reconnect the connectors, components, etc.
- Ignition on

Test drive the vehicle following: Test drive schedule, description See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description
During the test drive, oil temperature should be over 20 °C.
Note any deviations in transmission function.

Does the transmission function flawlessly?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the oil quality and the oil level in the transmission

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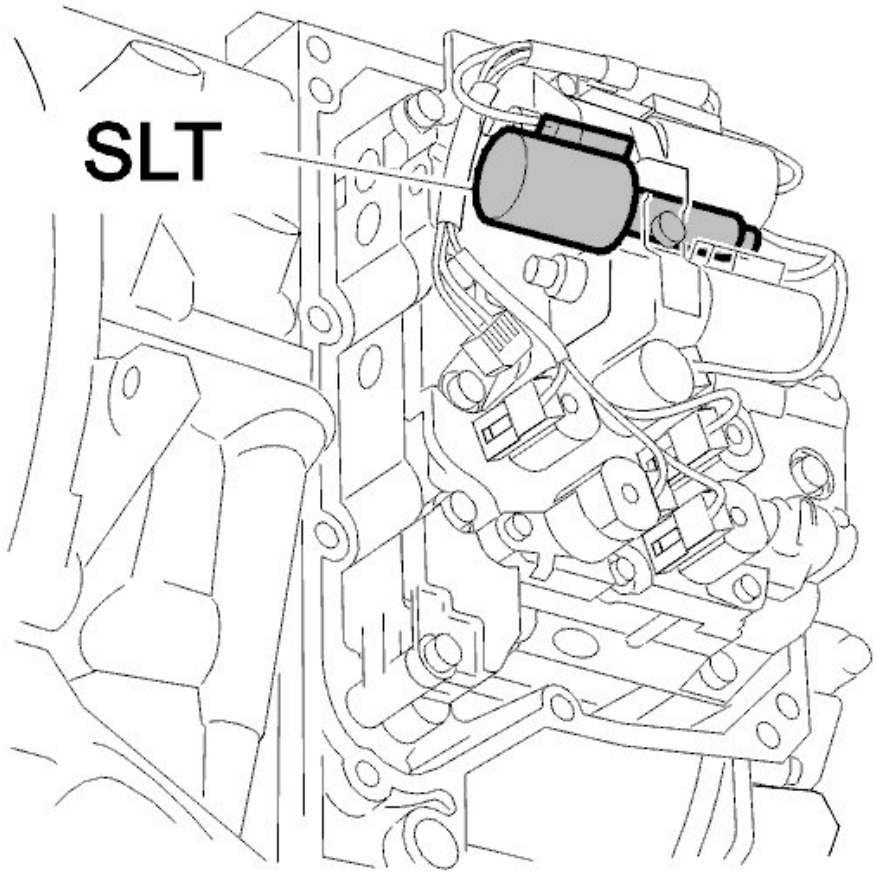
Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0116 is stored if the transmission control module (TCM) registers a short-circuit to battery voltage in the solenoid SLT circuit. This results in too high an amperage. Solenoid SLT cannot then control the line pressure.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- Malfunction indicator lamp (MIL) lit.

- No lock-up function.

Hint: No shifting because the control module prevents activation of the solenoids.

Caution! There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

Signal Too High. Intermittent Fault

Signal too high. Intermittent fault

Intermittent fault

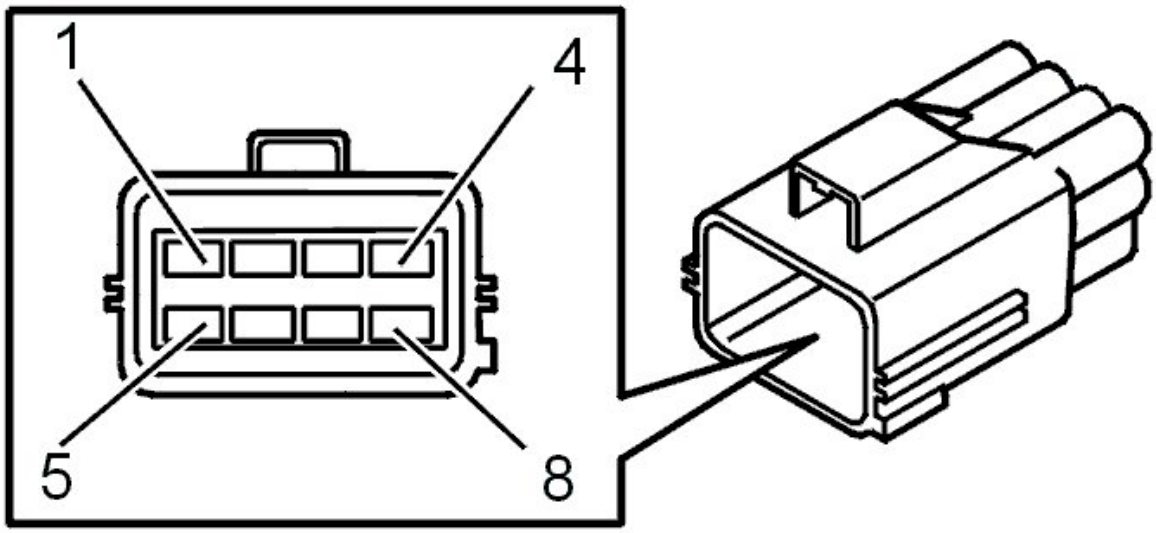
Check the wiring between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3. Check the wiring between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent short-circuit to supply voltage. See Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

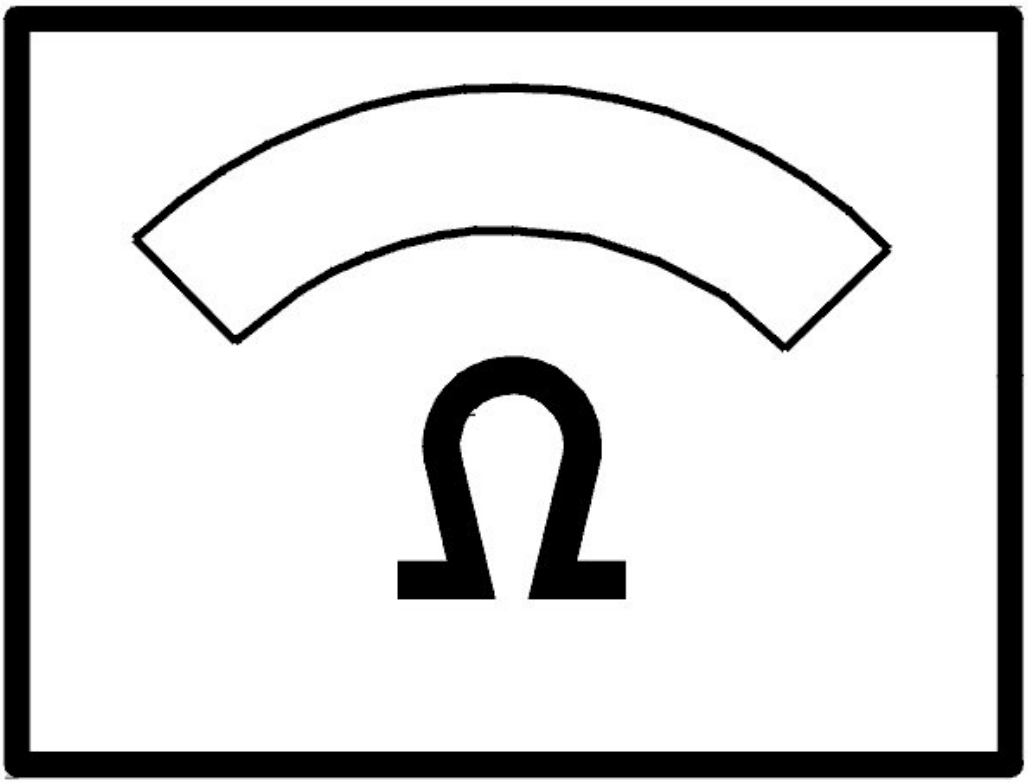
Hint: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

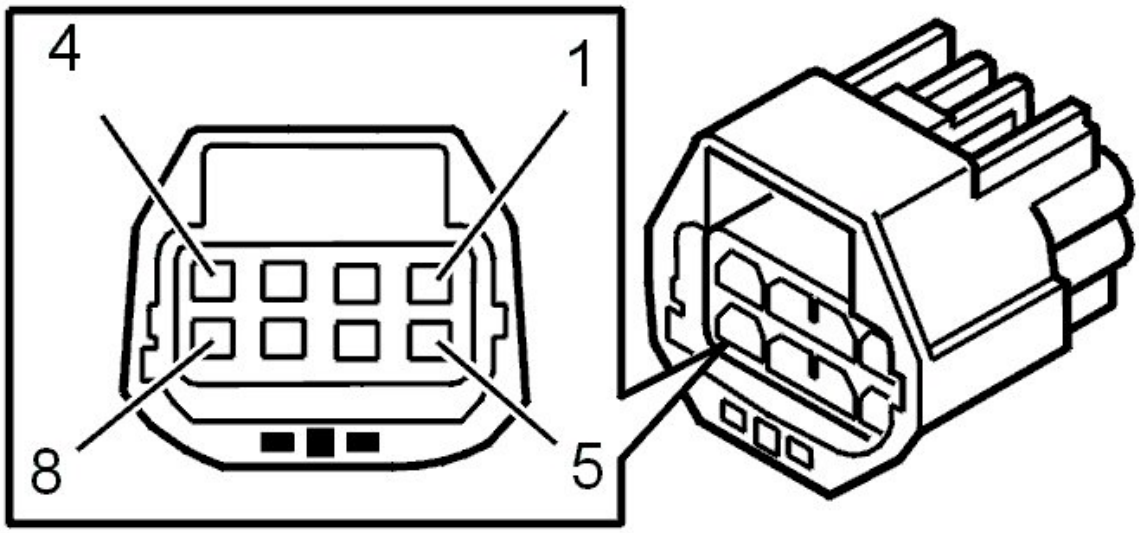
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select "Continue" when the fault has been repaired.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

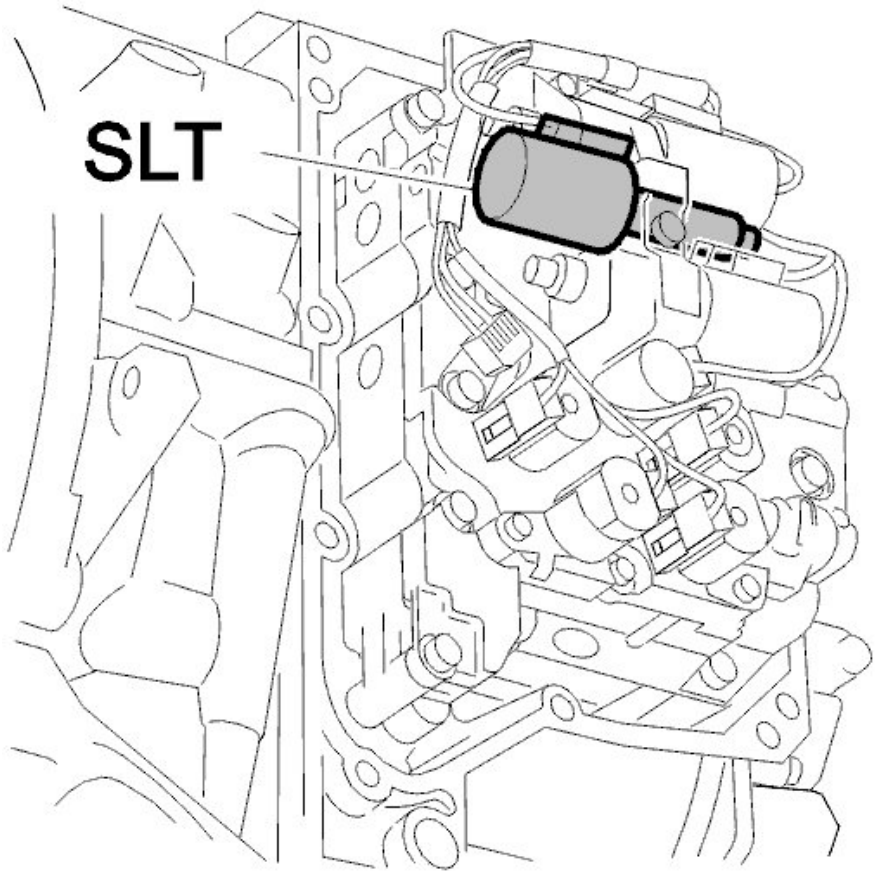
FAULT FOUND - DONE

Attempt New Test - Intermittent fault

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0116 is stored if the transmission control module (TCM) registers a short-circuit to battery voltage in the solenoid SLT circuit. This results in too high an amperage. Solenoid SLT cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to supply voltage in the control signal wiring or signal wiring.
- Short-circuit between the control signal cable and the signal cable.
- Defective solenoid.

Fault symptom[s]

- General orange warning lamp lit.
- No shifting.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.

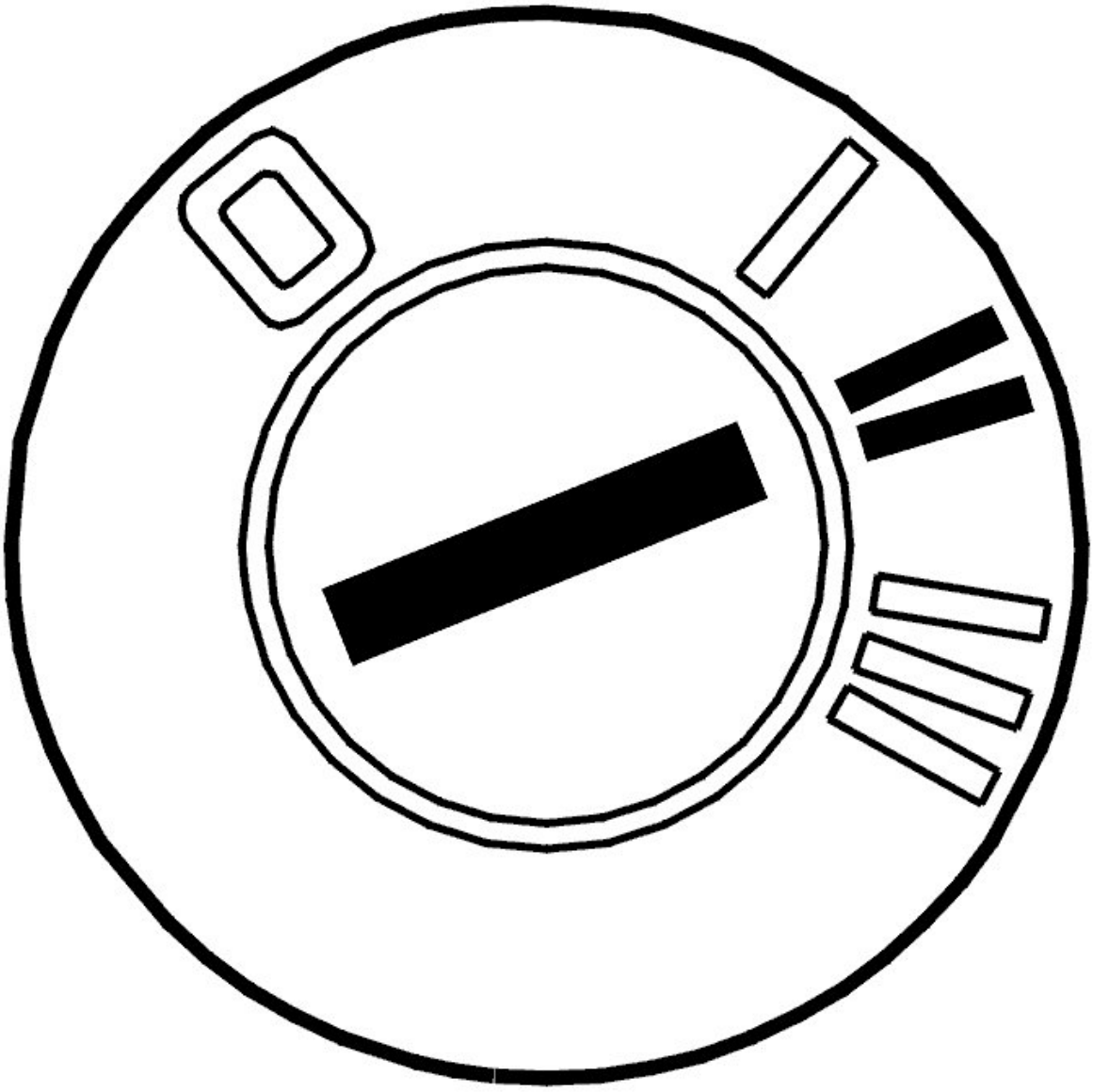
Hint: No shifting because the control module prevents activation of the solenoids.

Caution! There is a danger that this fault will cause line pressure in the transmission to be too low. This will result in a high level of wear.

Signal Too High. Permanent Fault

Signal too high. Permanent fault

Checking line pressure solenoid SLT



- Ignition on
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

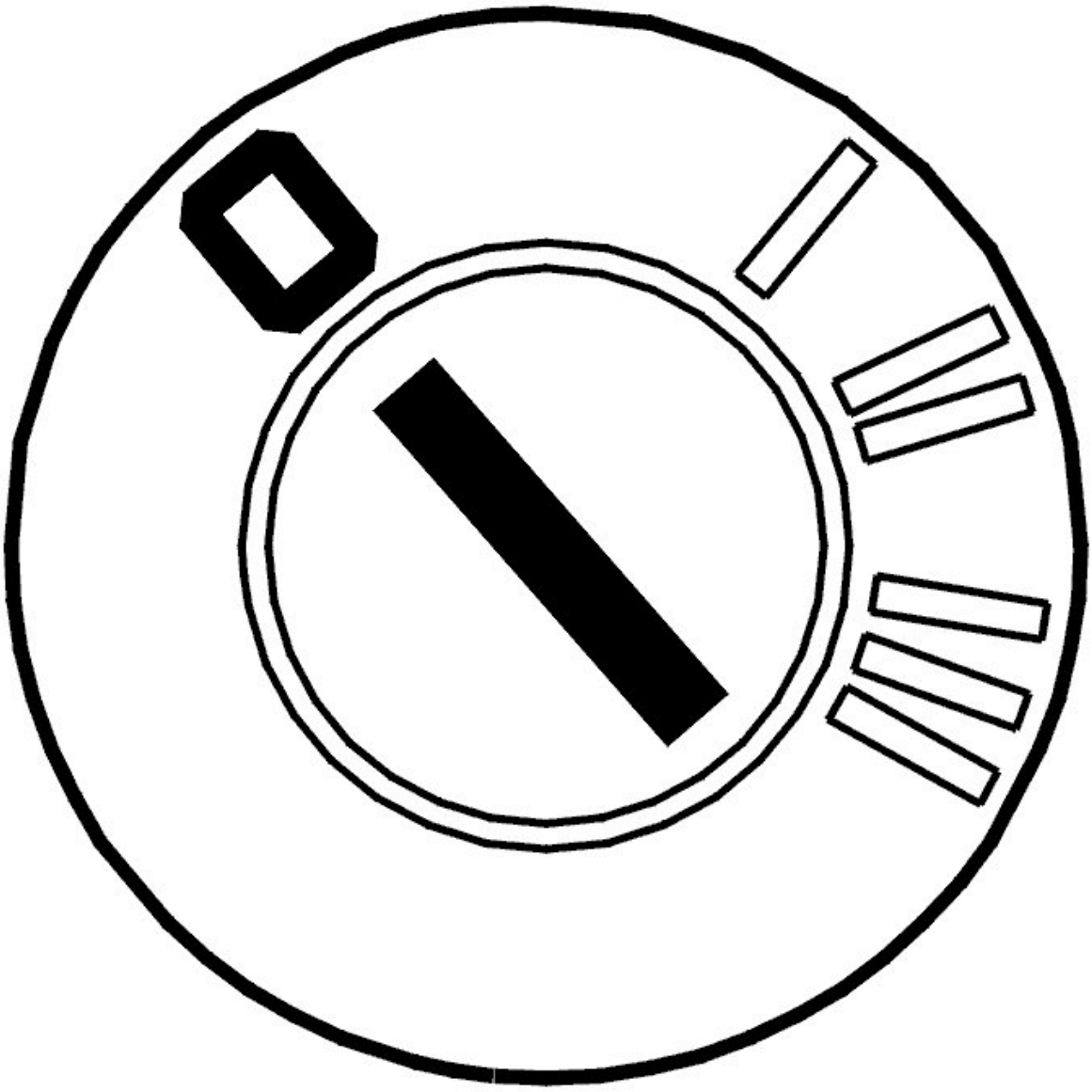
- Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair

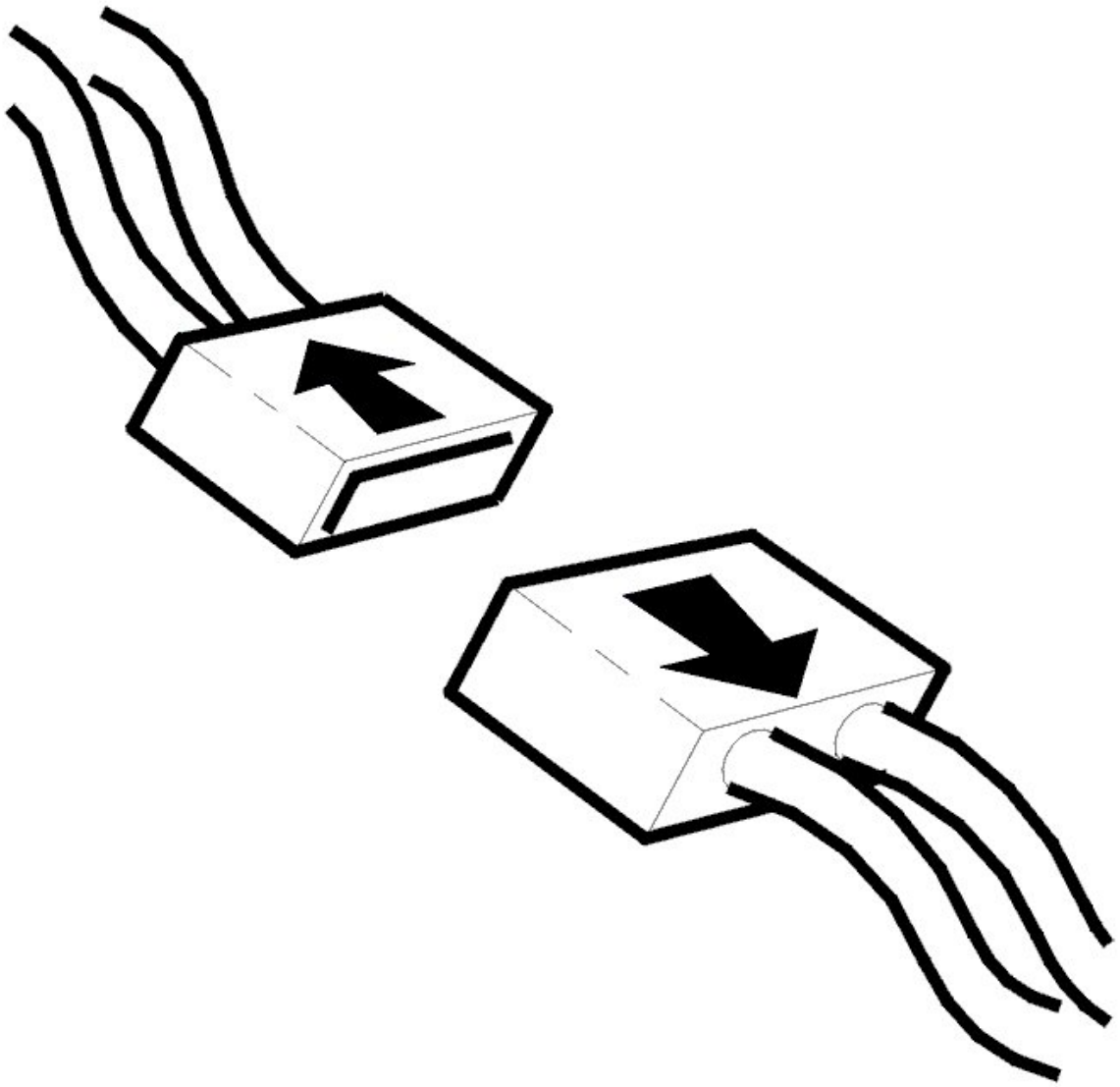
Does the current oscillate?

Yes - Fault-tracing information

No - Checking the wiring

Checking the wiring



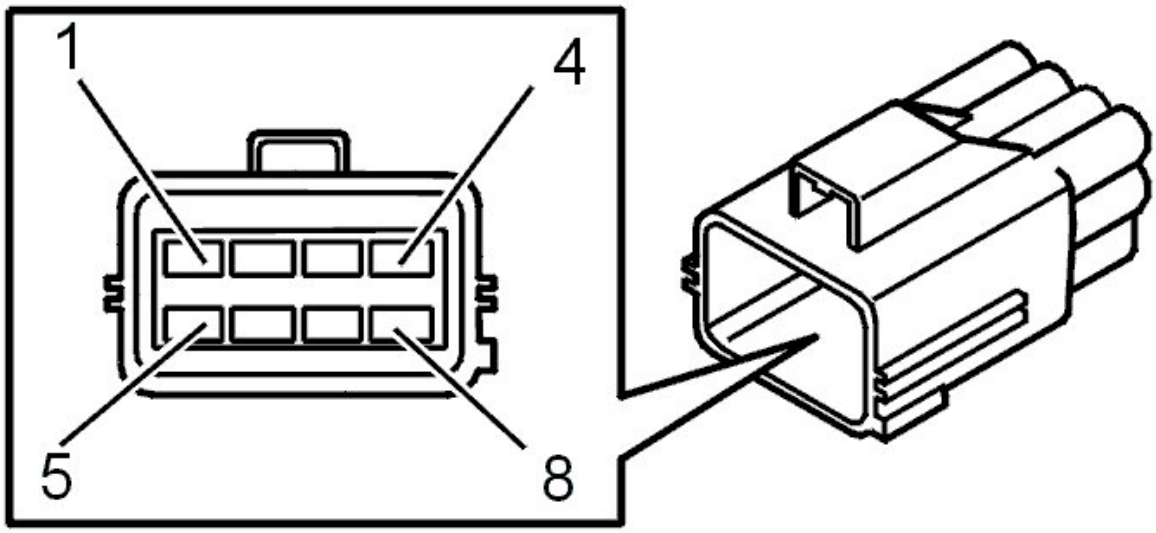


- Ignition off
- Breakout box connected.
- Disconnect gearbox connector D.

Check the cable between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for a short-circuit to supply voltage. Check the cable for short-circuits to other cables in the circuit.
Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for a short-circuit to supply voltage. Check the cable for short-circuits to other cables in the circuit.
Check the cables between connector terminals #D3 and #D4 on the transmission side. Check for damage. Check for short-circuits to other cables in the circuit.
Check the connector. Check for damage and pressed in pins.
Remedy as necessary.

Other information:

- Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- Connectors, transmission, disconnecting / connecting, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault

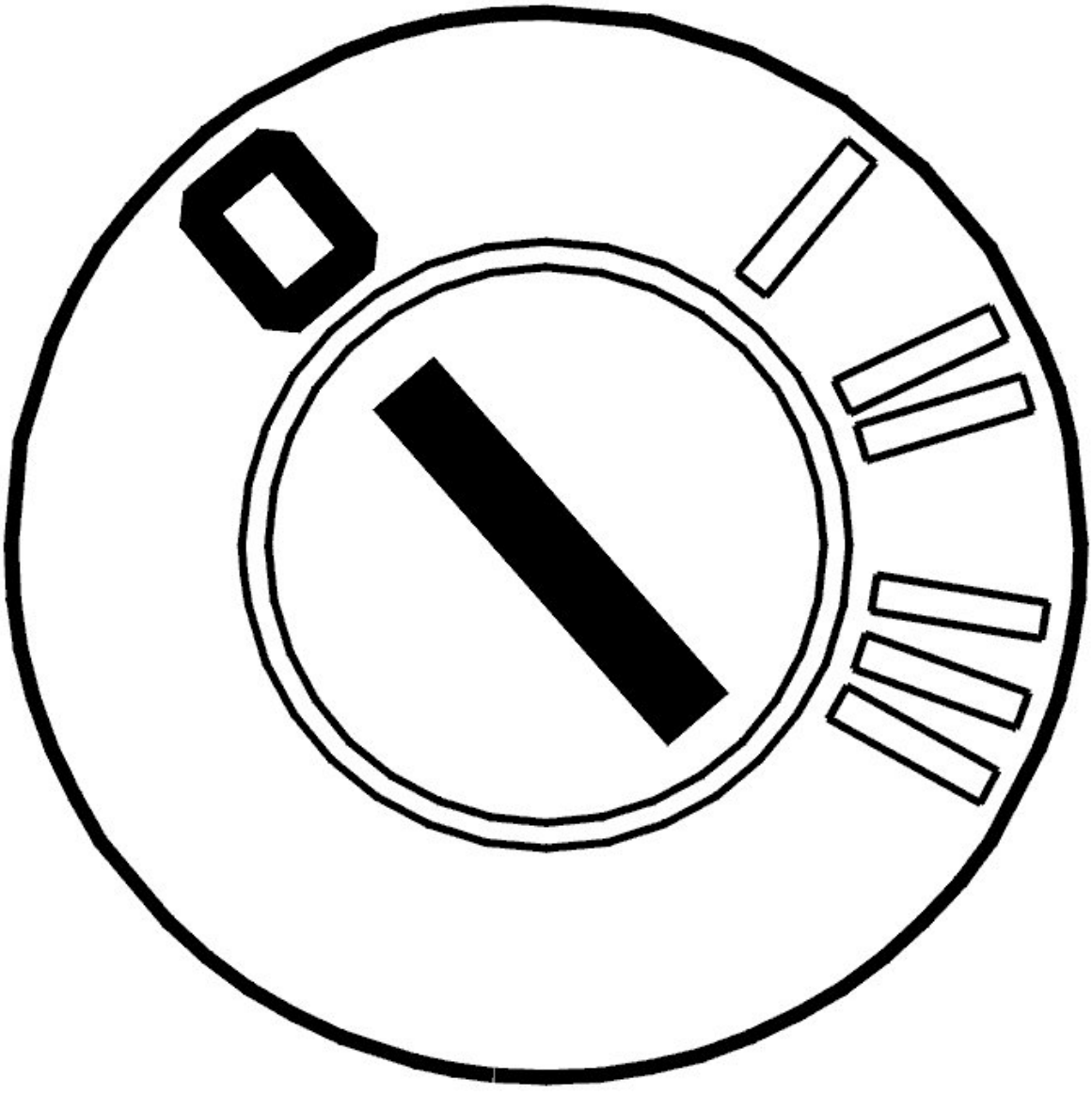


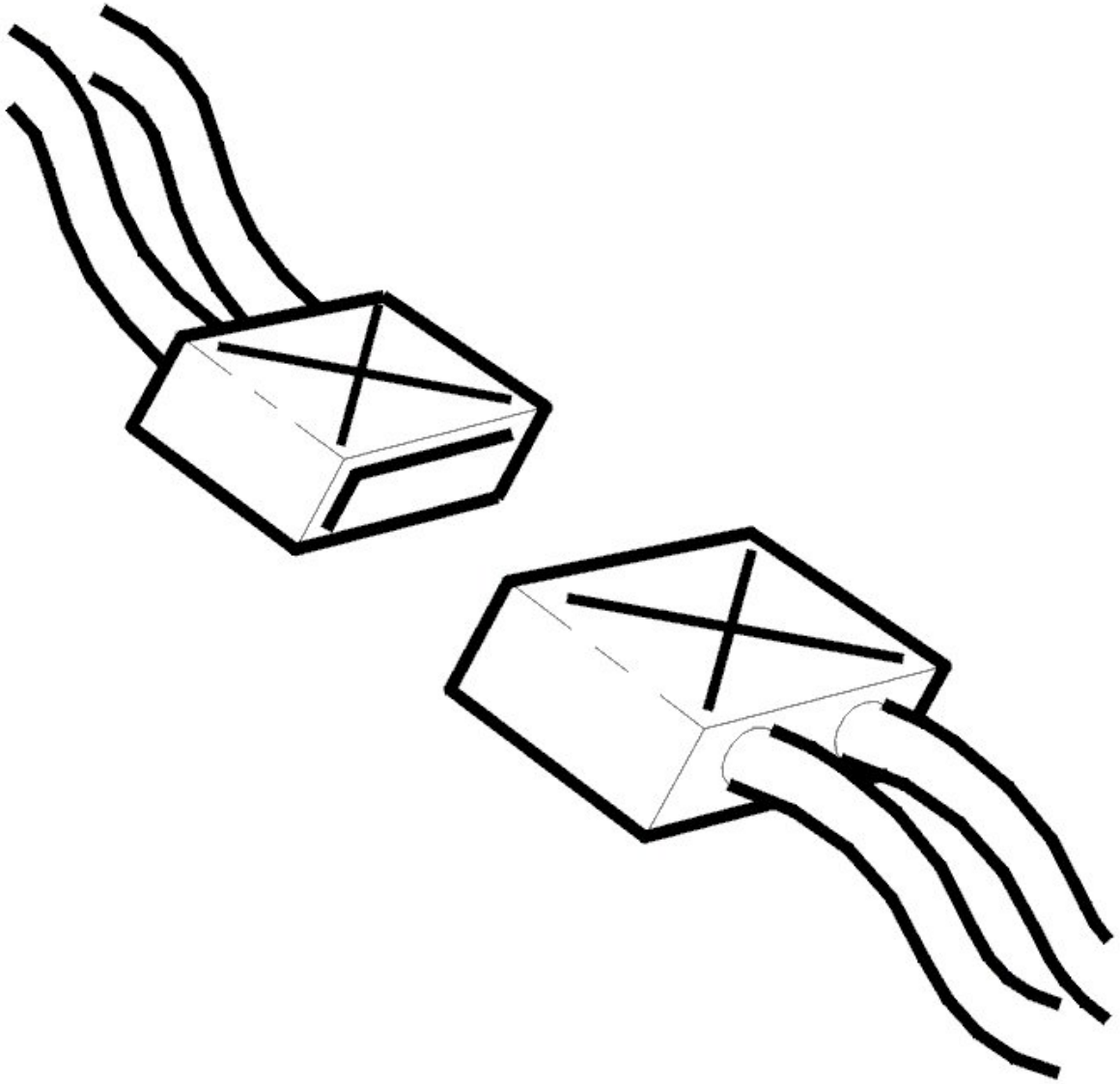
Was a fault detected?

Yes - Verification

No - Checking the wiring and component

Checking the wiring and component



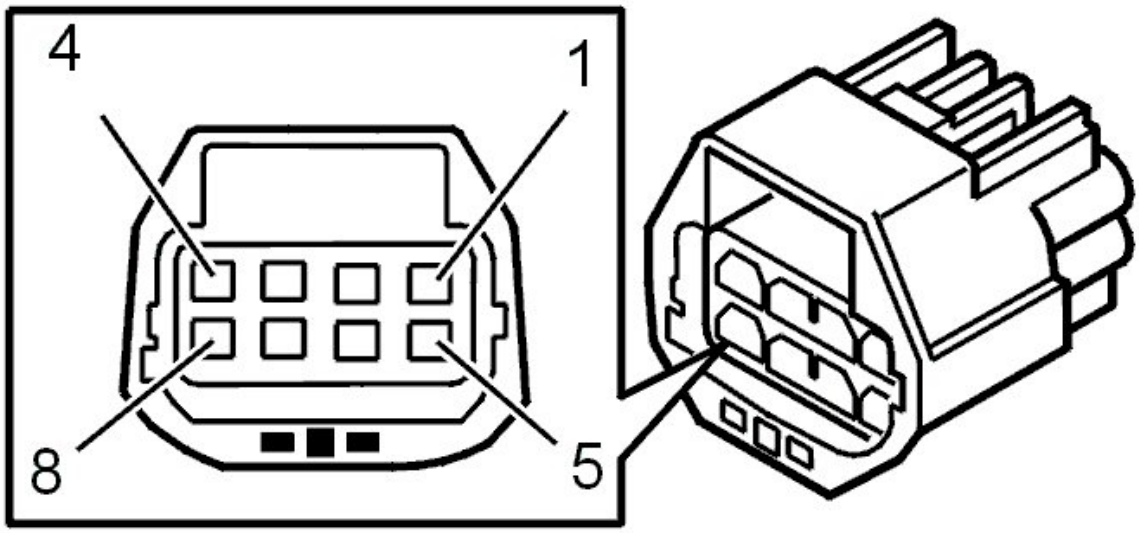


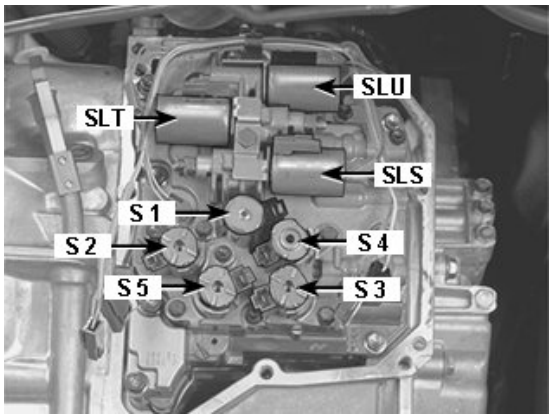
- Ignition off
- Open the gearbox control system

Check the connector. Check for damage and pressed in pins.
Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for a short-circuit to supply voltage.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check the solenoid SLT by measuring the resistance between terminals #1 and #2. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM)
- Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Location Of Components (Solenoids)

Continue - Resetting adaptation and the fluid quality counter

---

Fault-tracing information

The transmission control module (TCM) has previously registered a fault but the faulty no longer occurs. The diagnostic trouble code (DTC) was probably caused by an intermittent fault. If the fault remains, fault tracing according to this diagnostic trouble code (DTC) should be carried out despite no fault symptoms being detected. The fault is evaluated on an individual basis.

Continue - No Fault Found

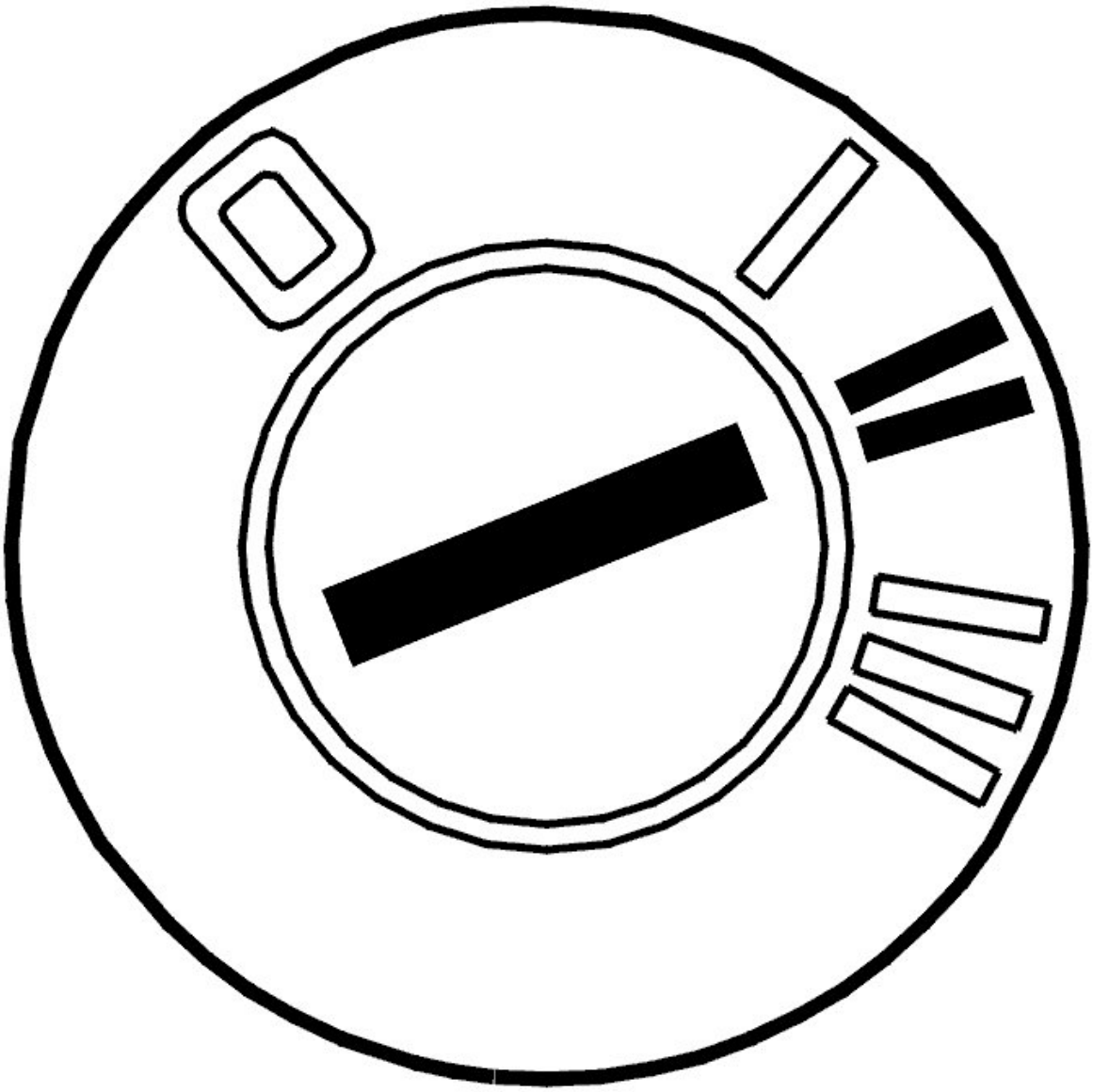
Resetting adaptation and the fluid quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

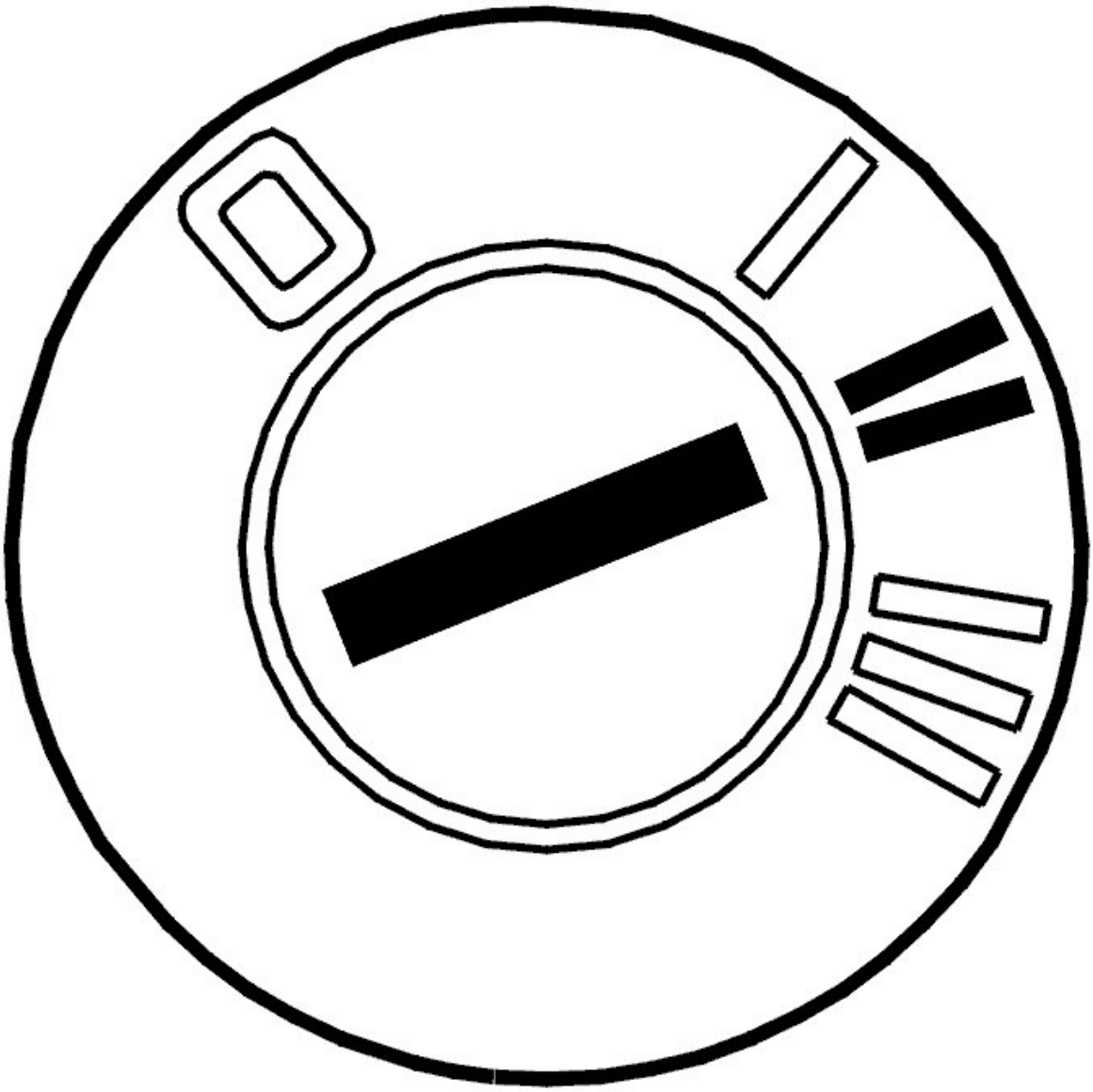
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

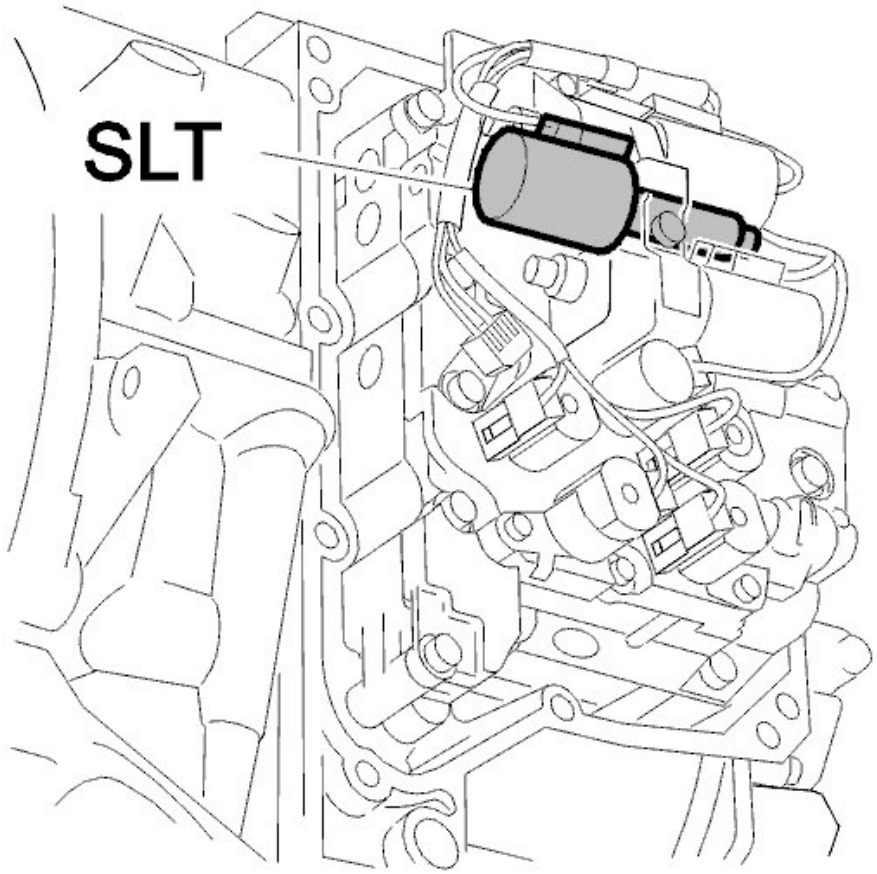
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLT

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) gives a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0117 is stored if the control module registers that there is an open-circuit in the circuit for solenoid SLT. Solenoid SLT cannot then control the line pressure.

Substitute value

- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source

- Contact resistance in terminals.
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid SLT.

Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: Harsh gear shifting can be caused by:
- No torque limiting request to the engine control module (ECM) when shifting.

Signal Missing. Intermittent Fault

Signal missing. Intermittent fault

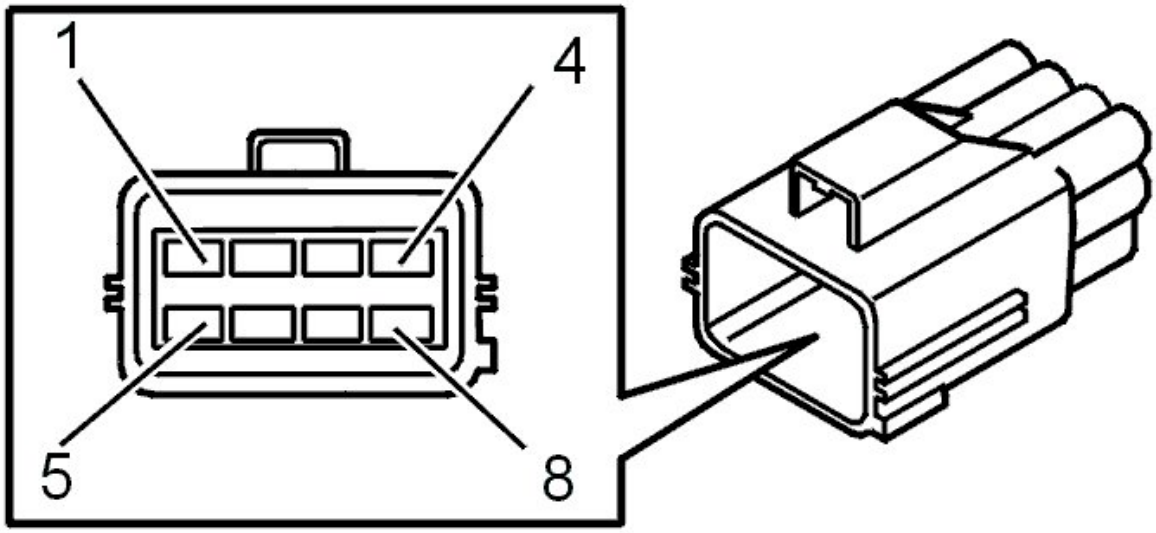
Intermittent fault

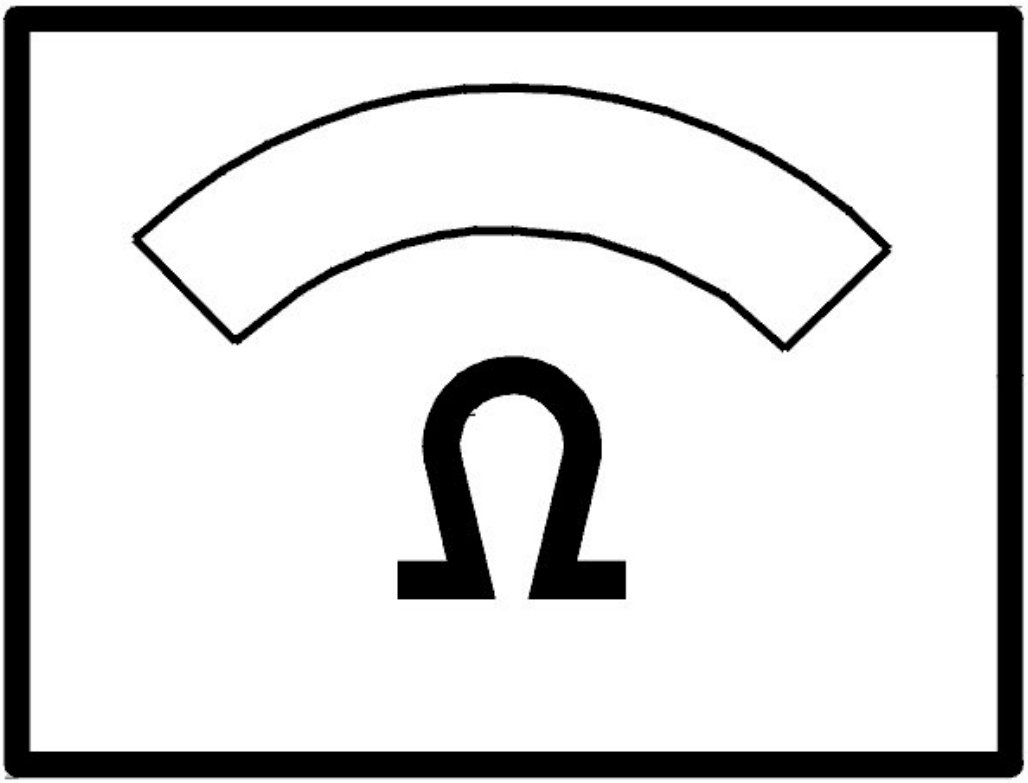
Check the transmission control module (TCM) and transmission connectors. Check for contact resistance and oxidation according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Check the cables between control module terminal #A52 (#A52) and transmission connector terminal #D3. Check the cables between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent open-circuit according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

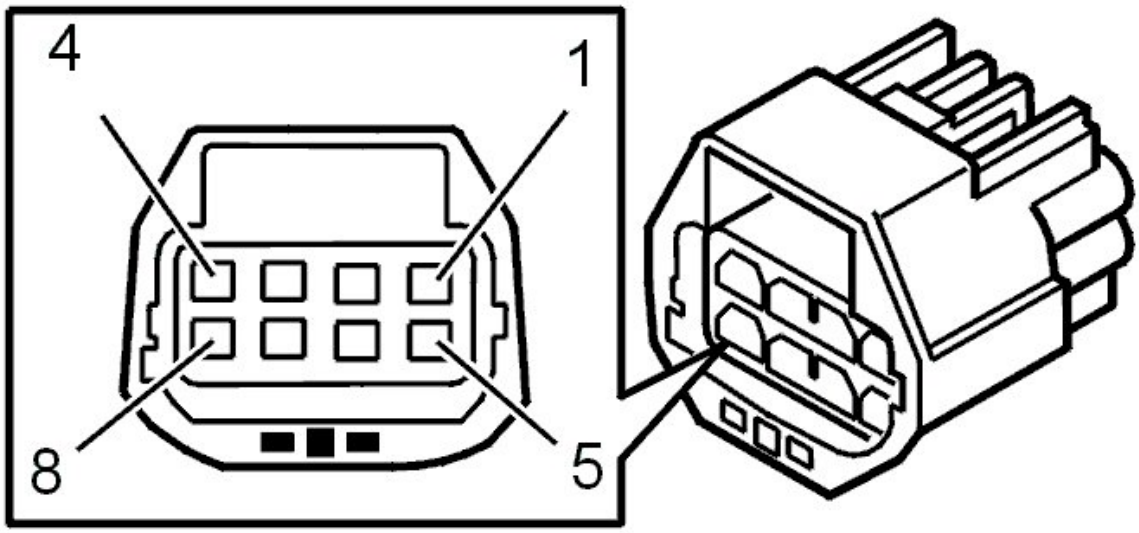
Hint: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector A. The resistance should be 5-6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

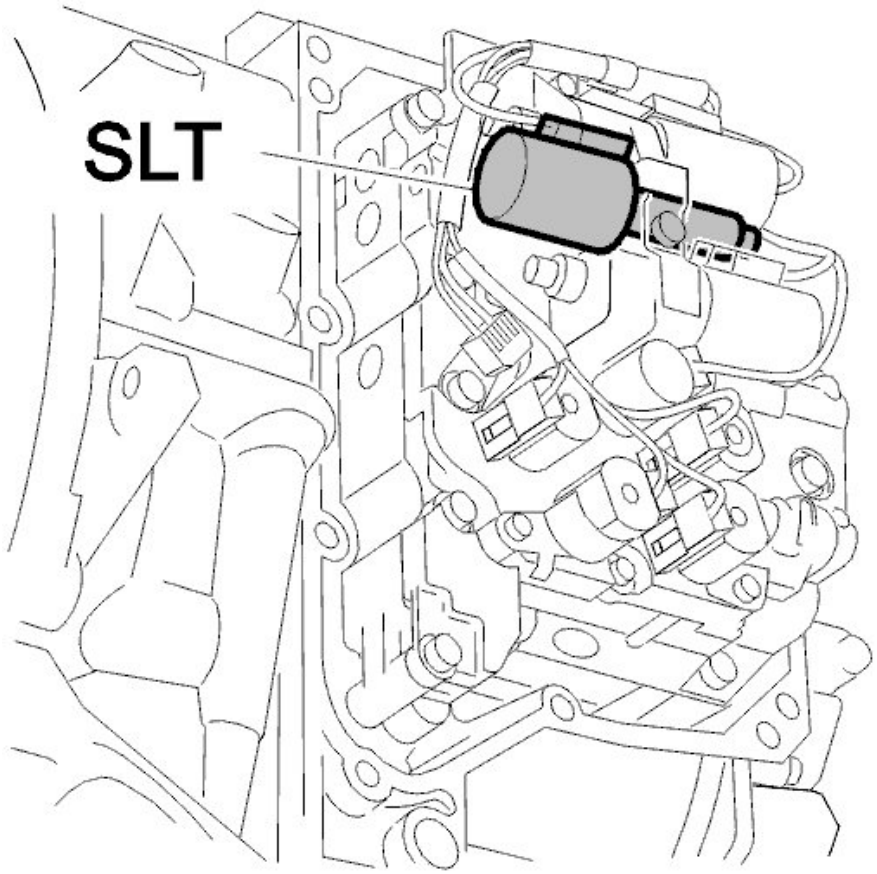
Attempt New Test - Intermittent fault

FAULT FOUND - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



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Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Contact resistance in terminals.
- Open-circuit in the control signal cable or the signal cable.
- Defective solenoid SLT.

Fault symptom[s]

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

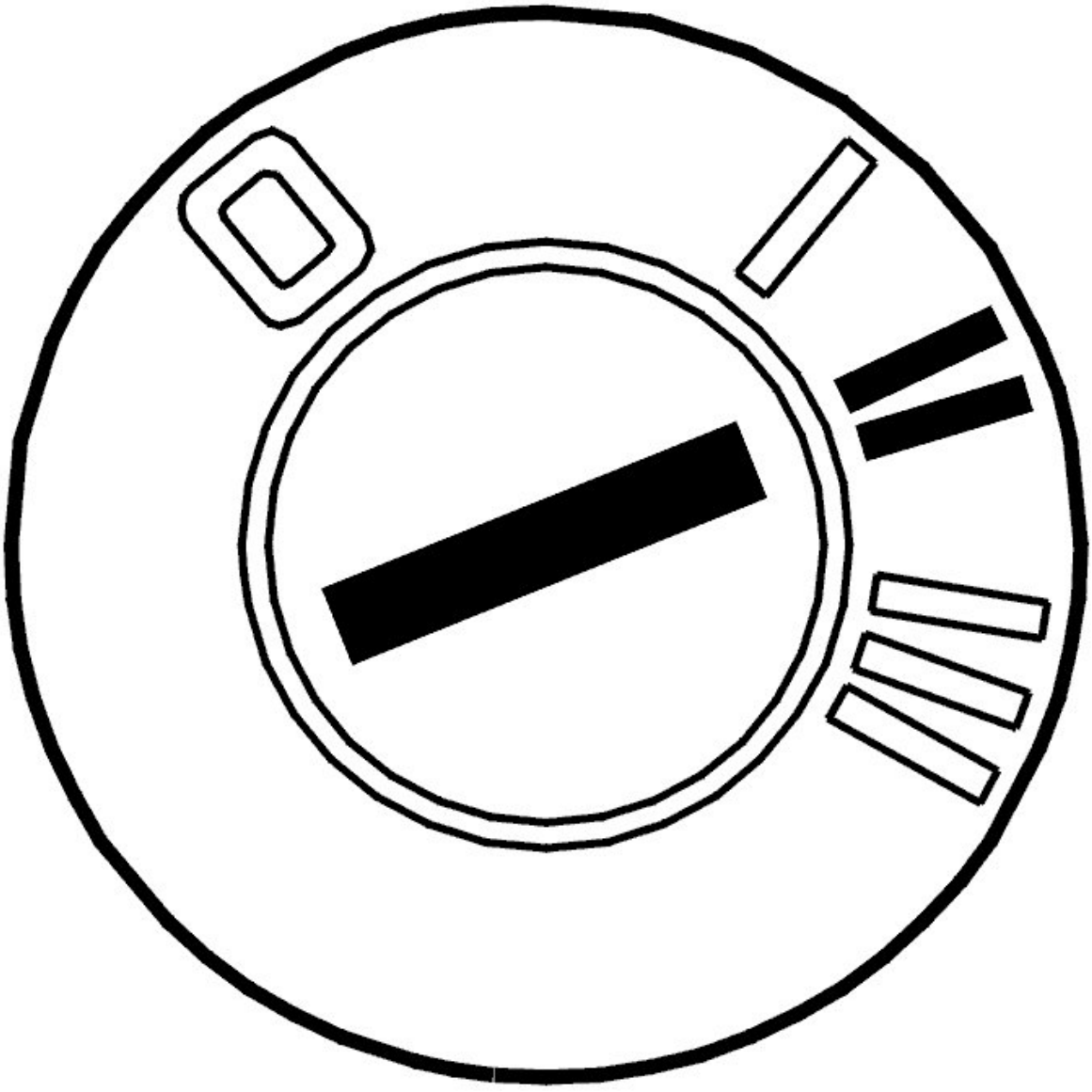
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

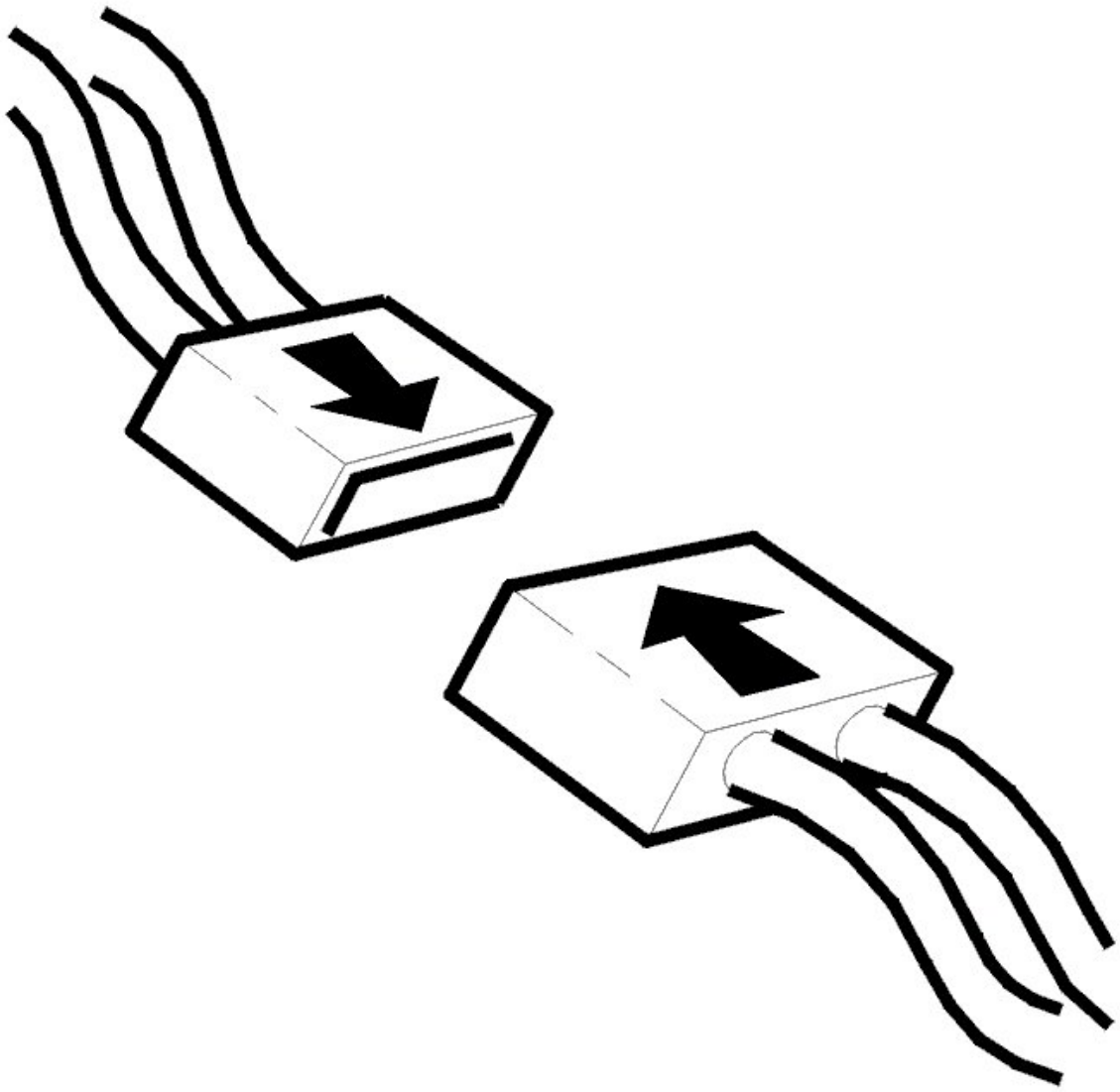
Hint: Harsh gear shifting can be caused by:
- No torque limiting request to the engine control module (ECM) when shifting.

Signal Missing. Permanent Fault

Signal missing. Permanent fault

Checking line pressure solenoid SLT





- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

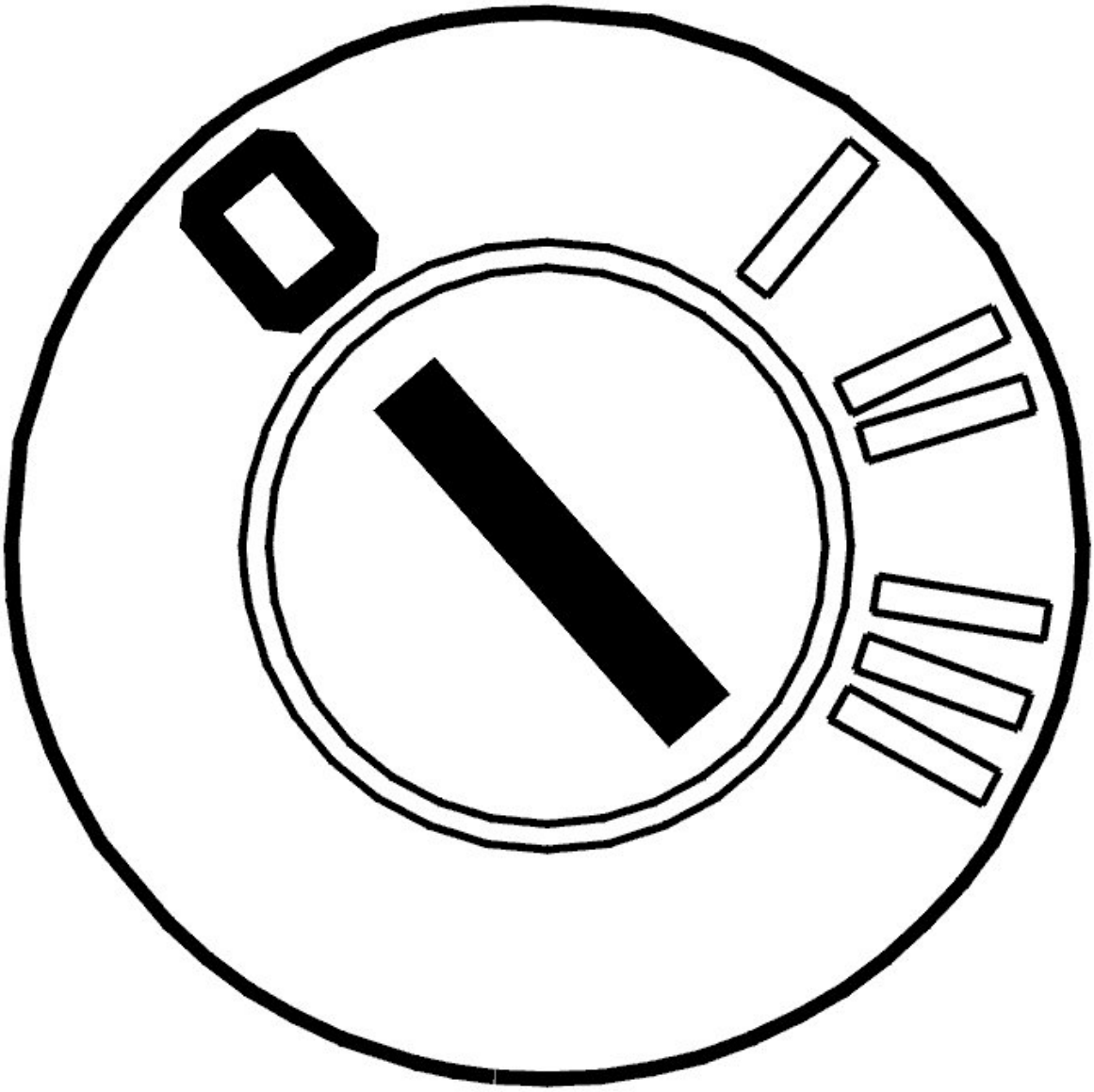
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

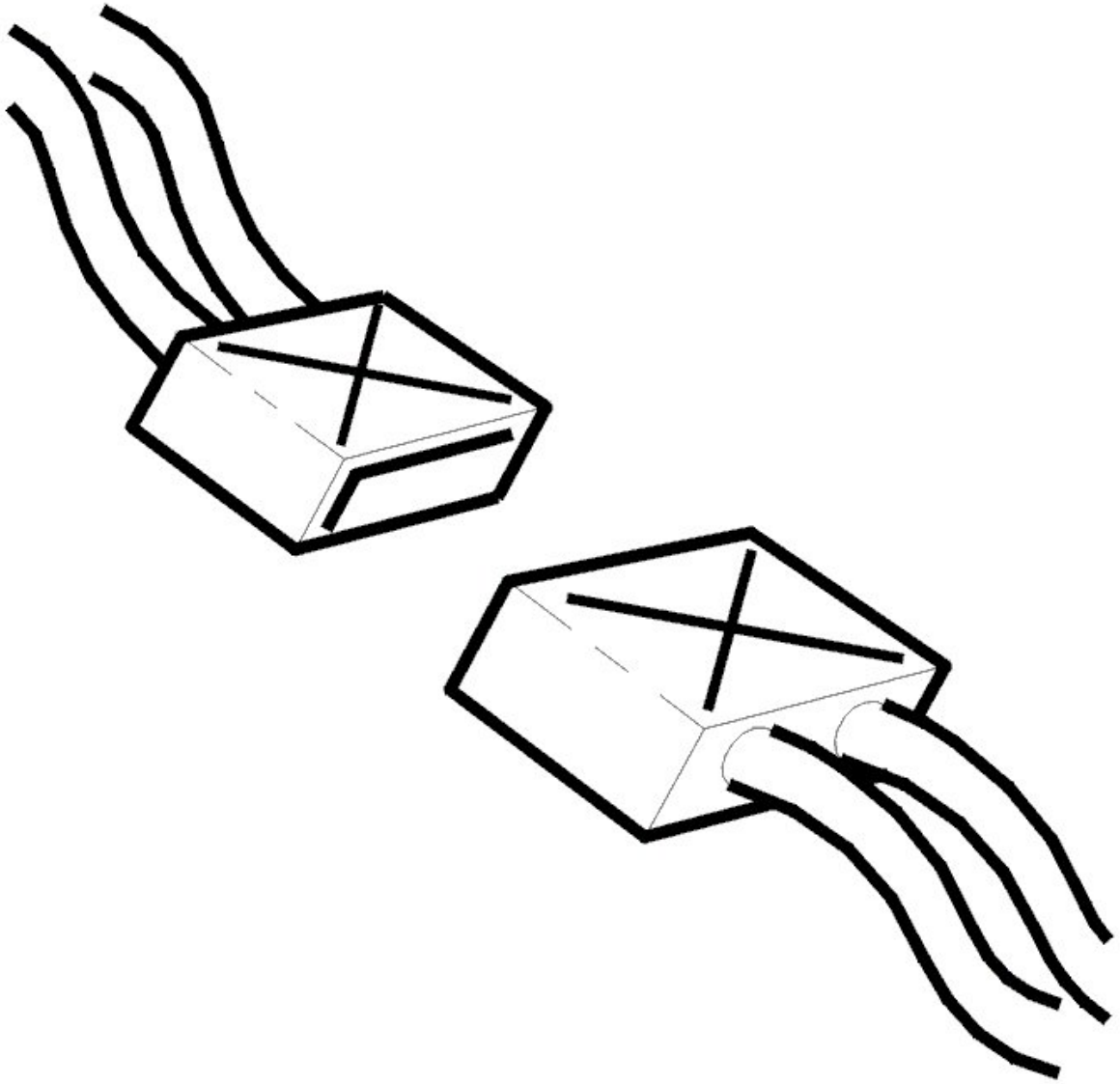
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



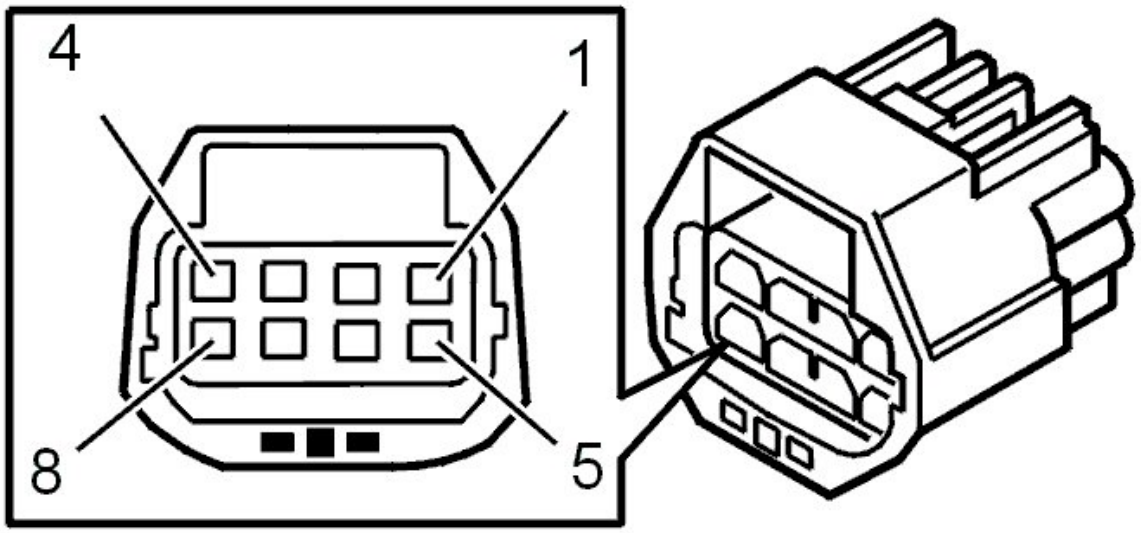


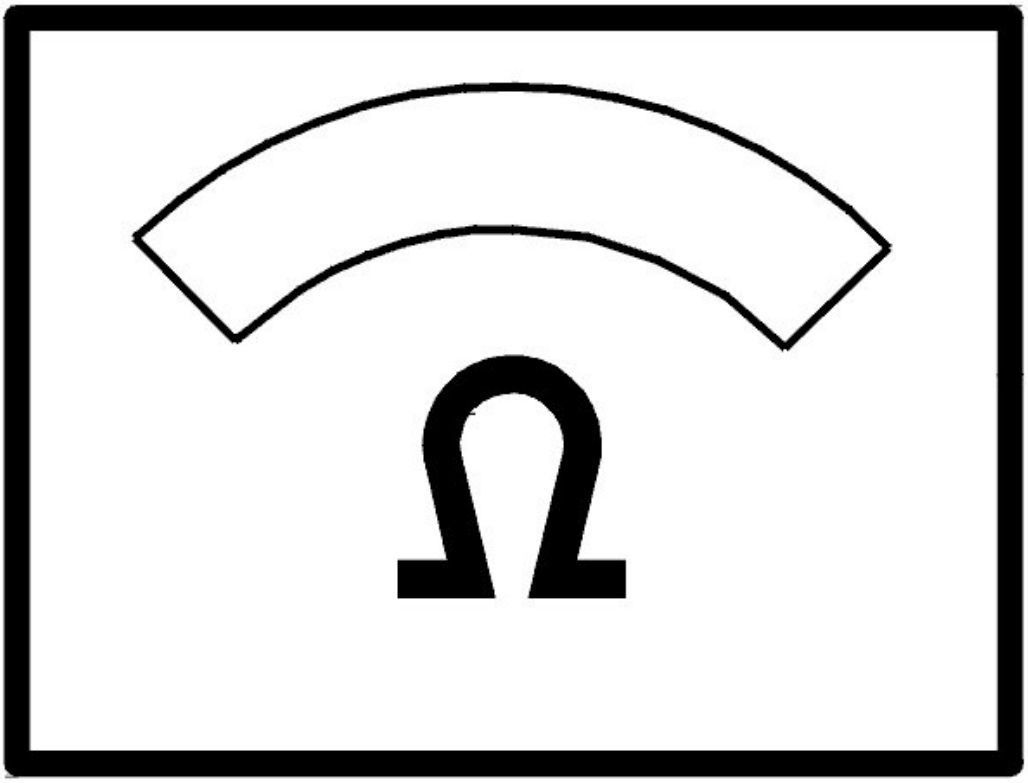
- Ignition off
- Transmission connector D disconnected.

Check the circuit for solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance must be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



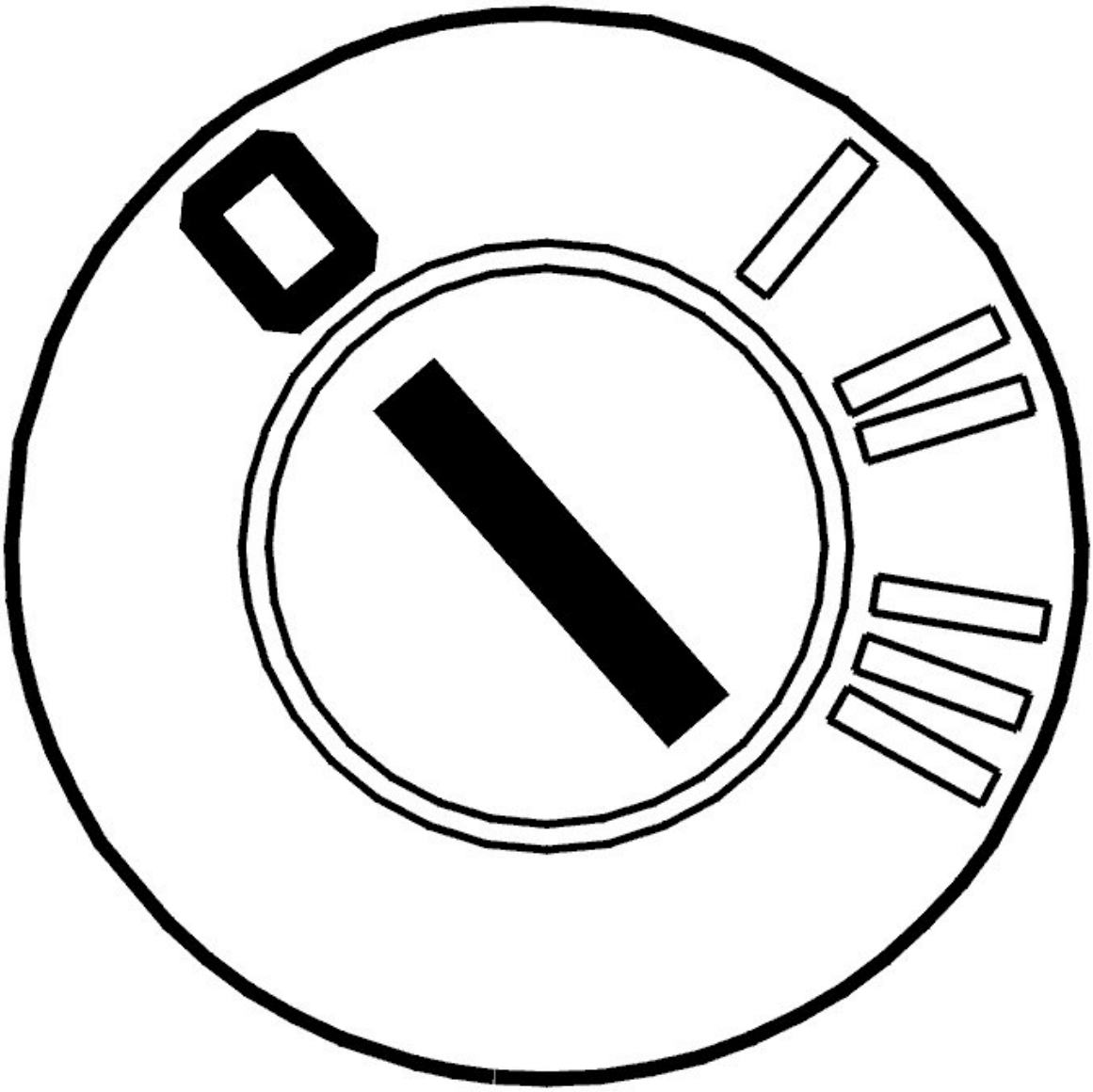


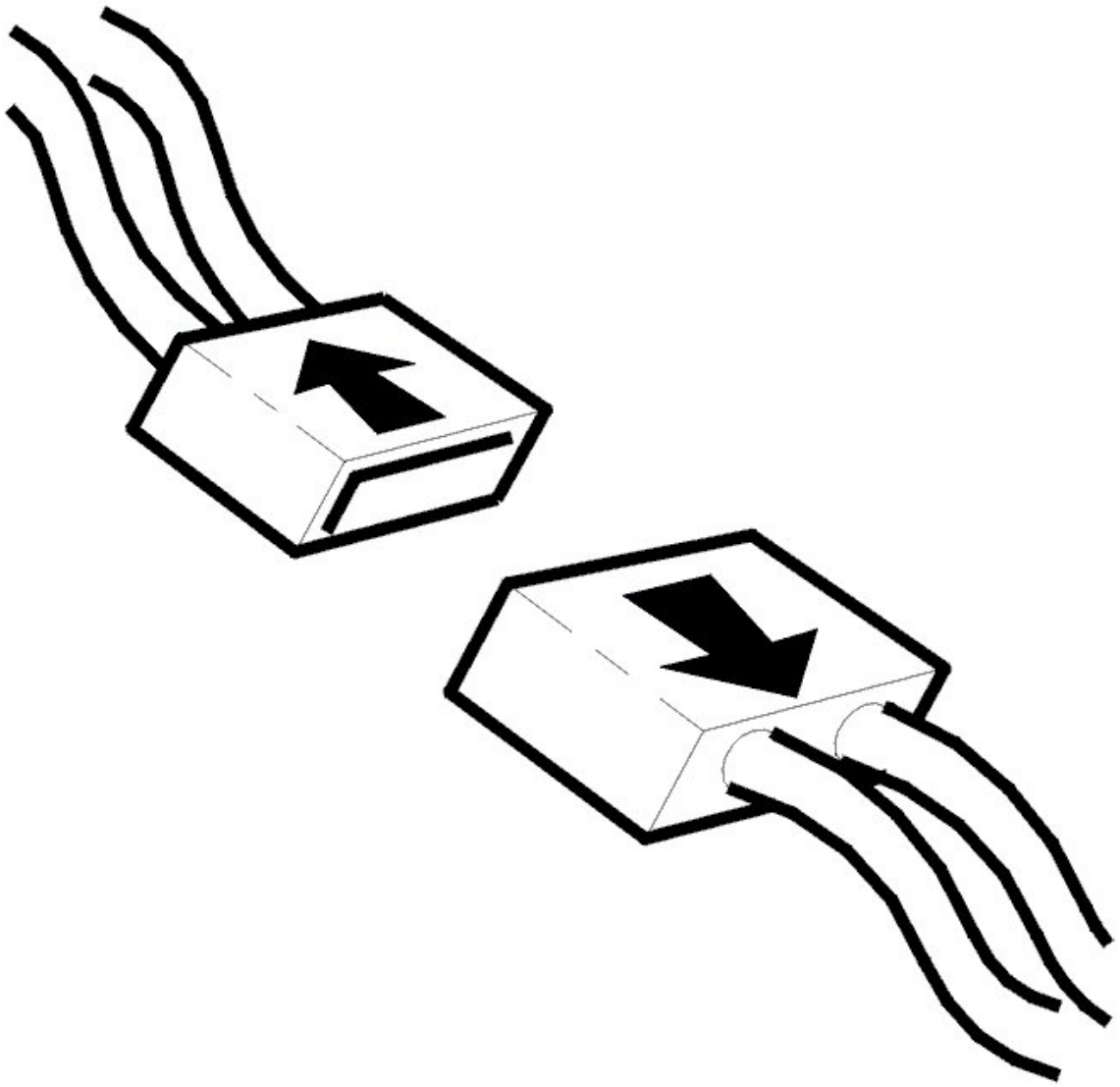
Was the resistance OK?

OK - Checking the wiring

Not OK - Checking the wiring and component

Checking the wiring



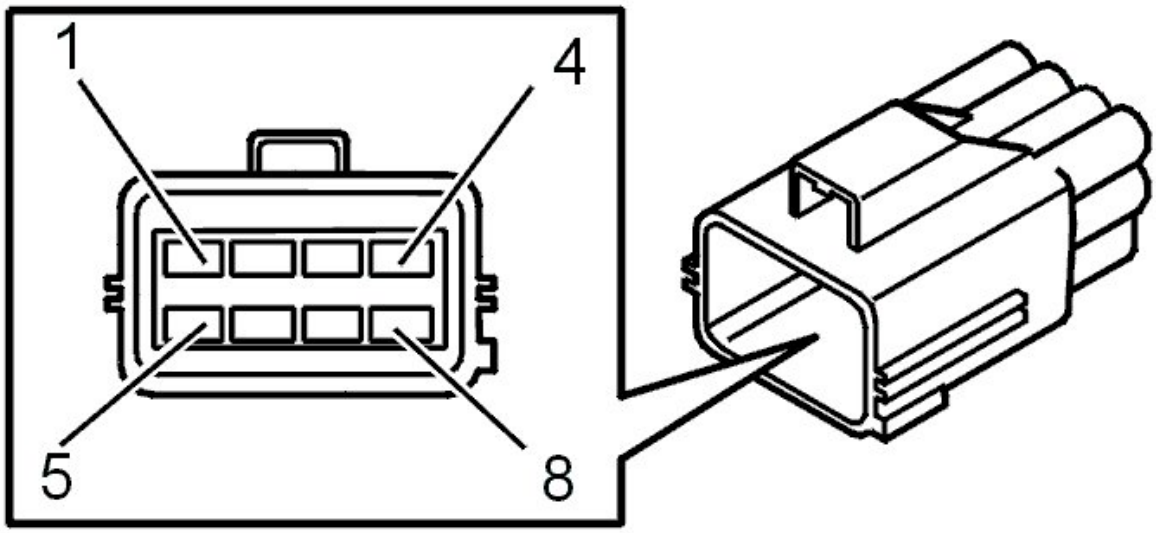


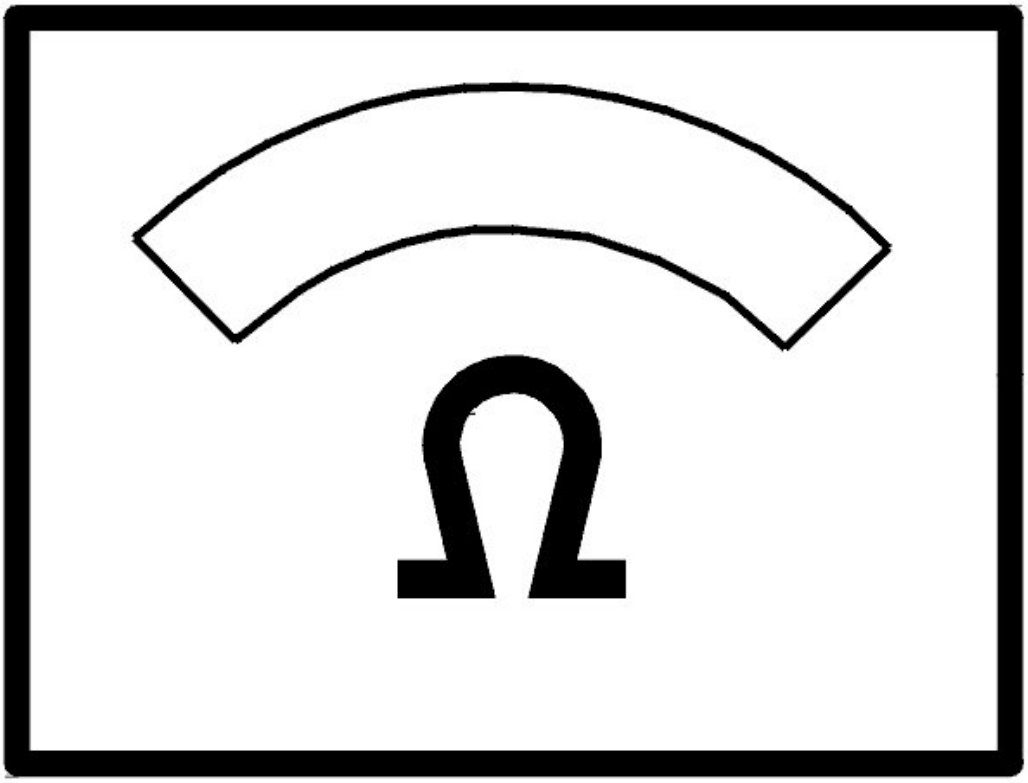
- Ignition off
- Disconnect transmission connector D.

Check the cable between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



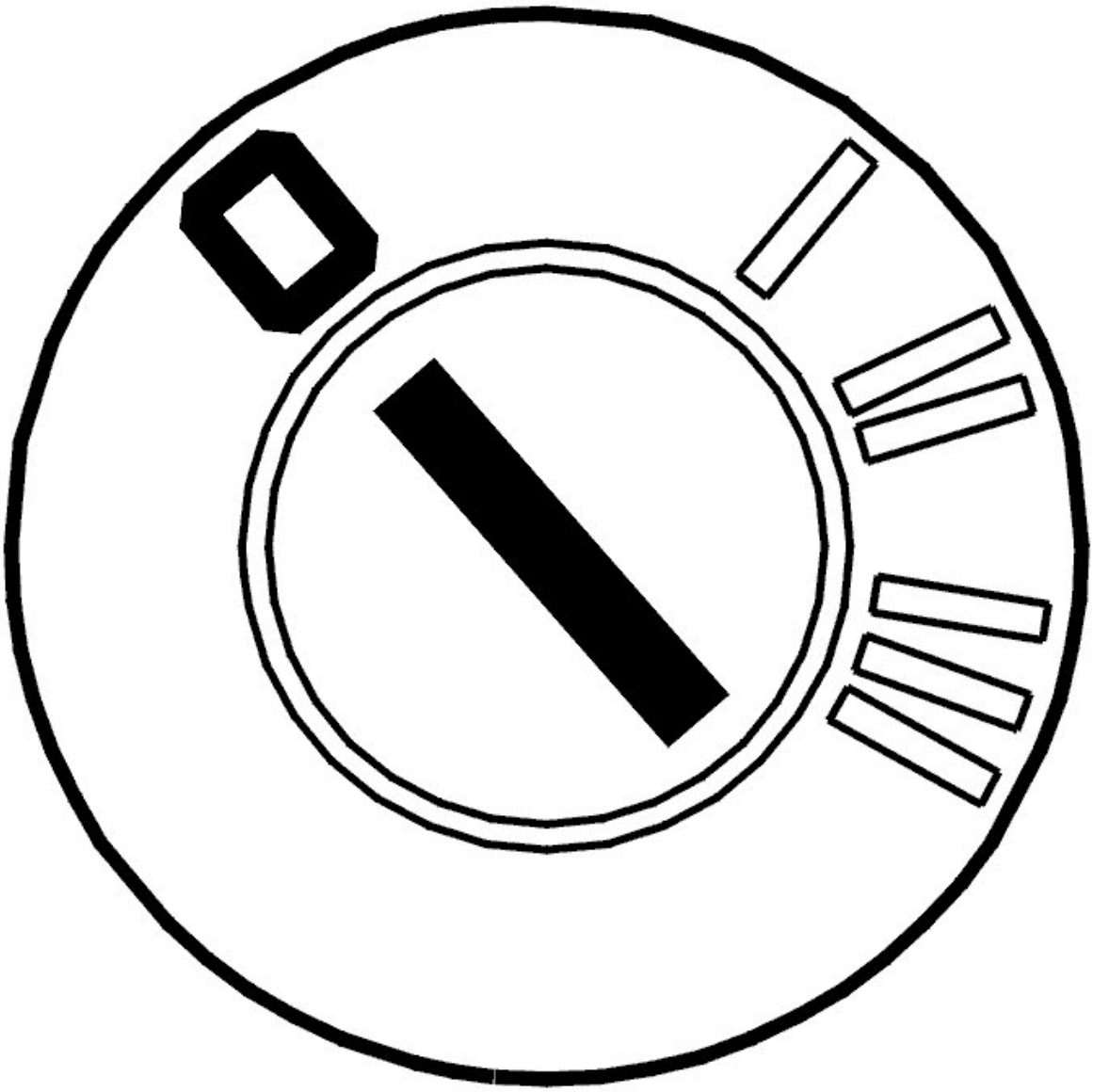


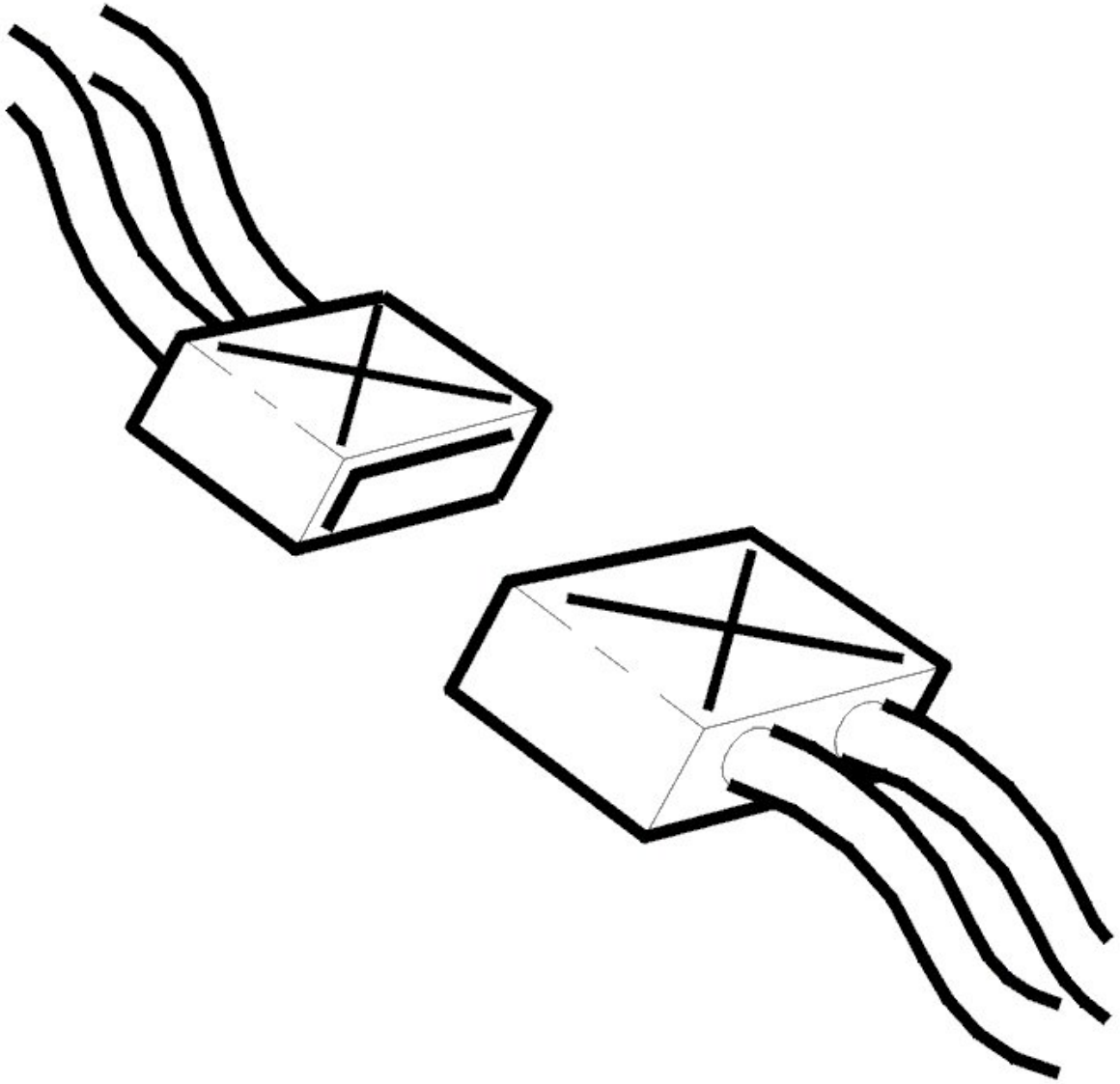
Was a fault found in the wiring?

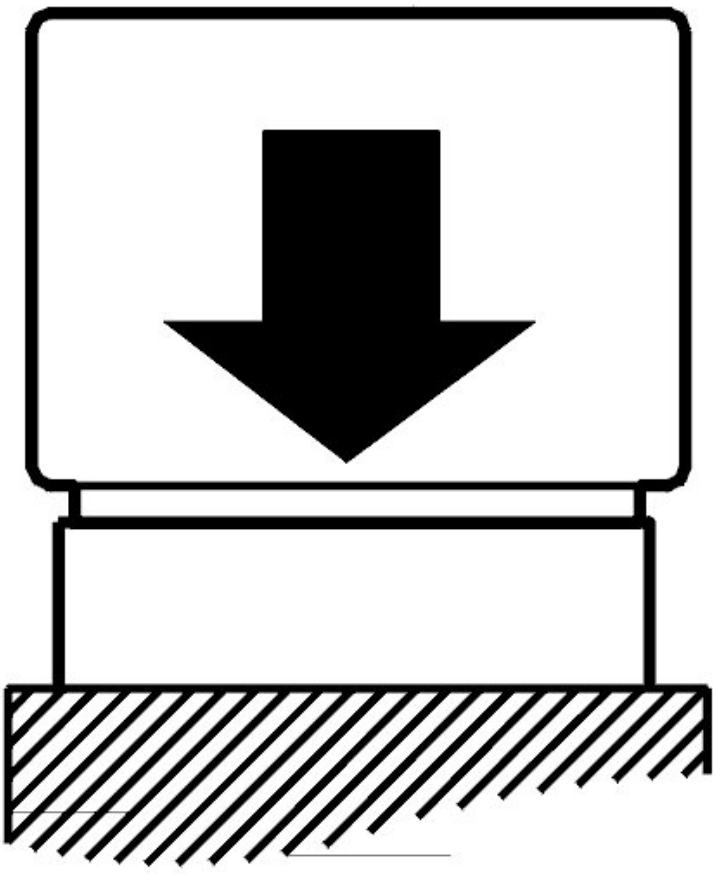
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

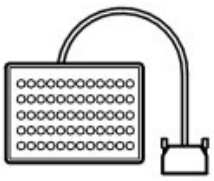
Check the transmission control module (TCM) by measuring the resistance between terminals #52 (#A52) and #B10 (#A70) on the breakout box. The resistance must be approximately 9 kohms.

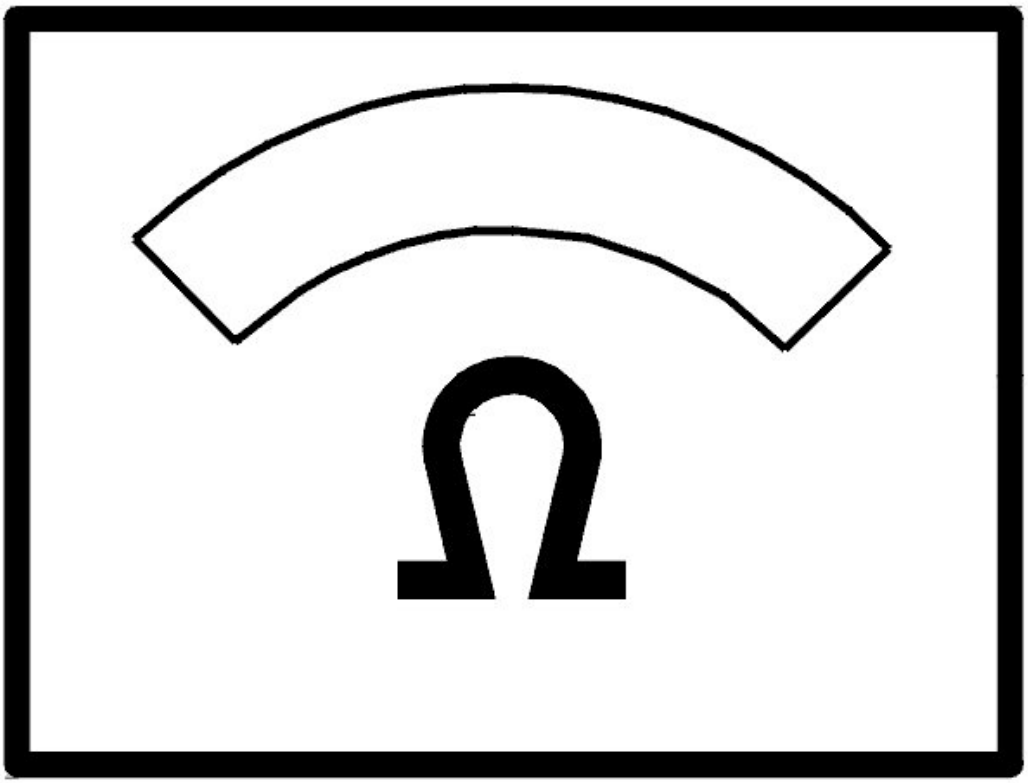
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



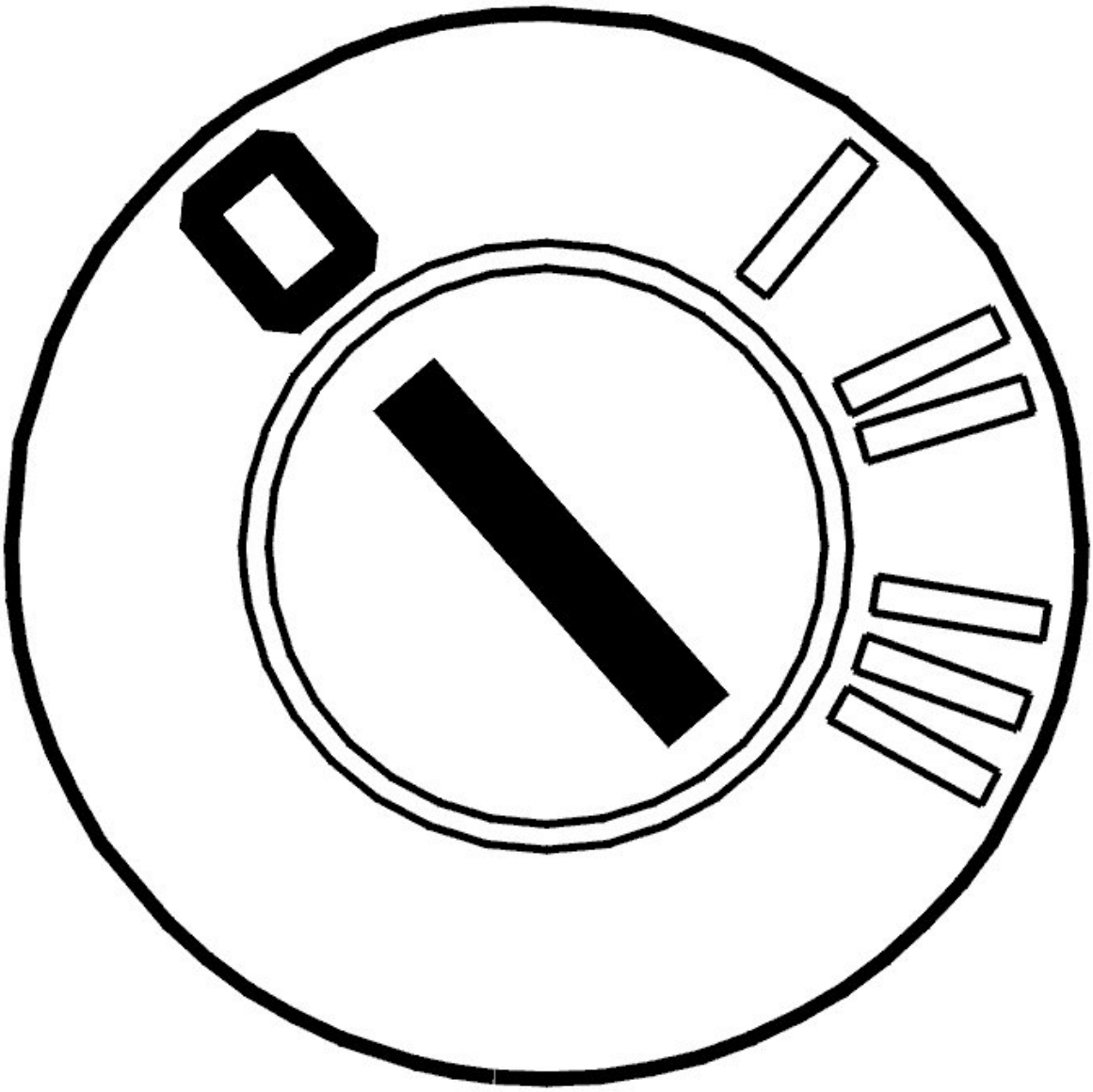


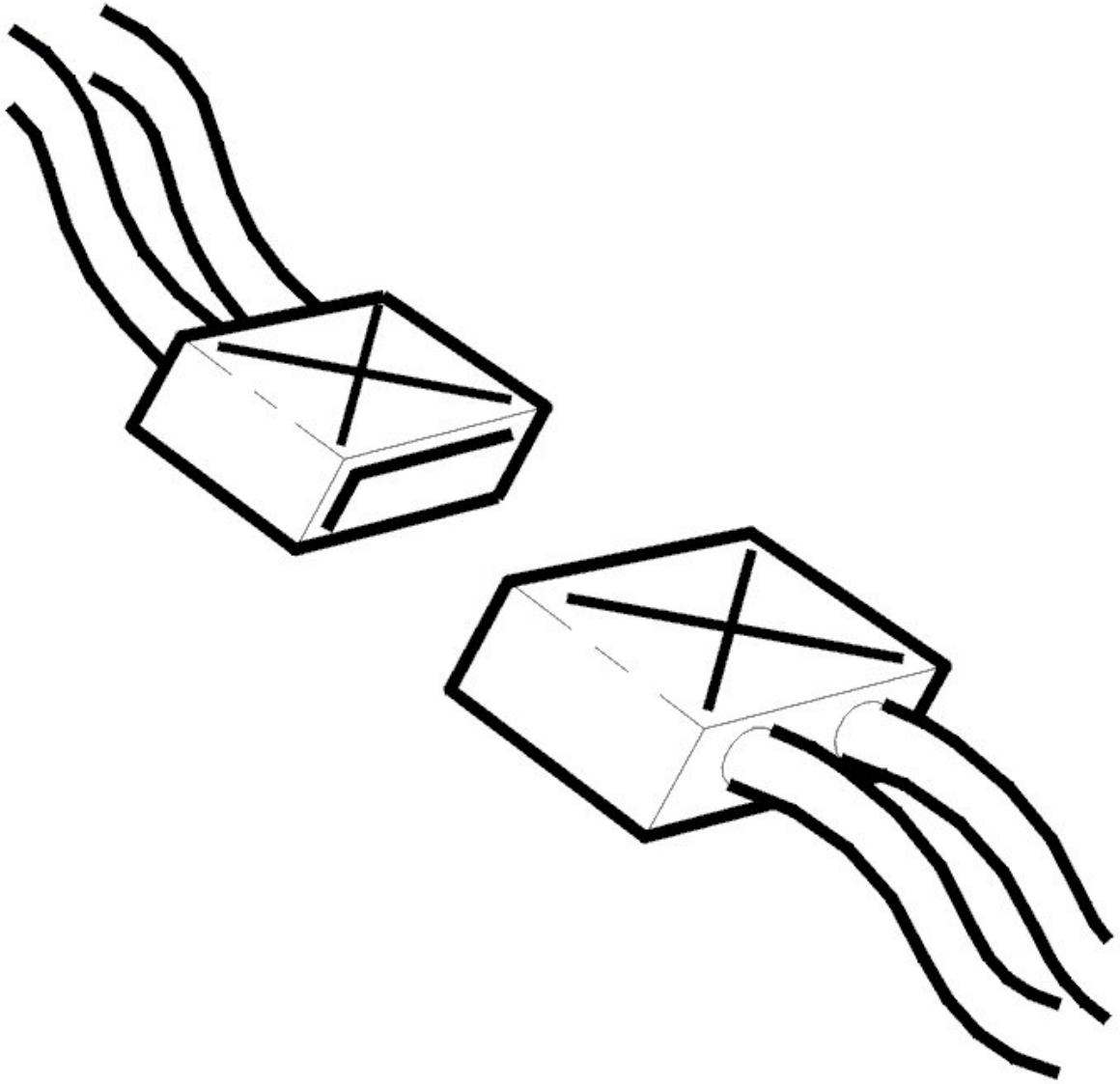
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



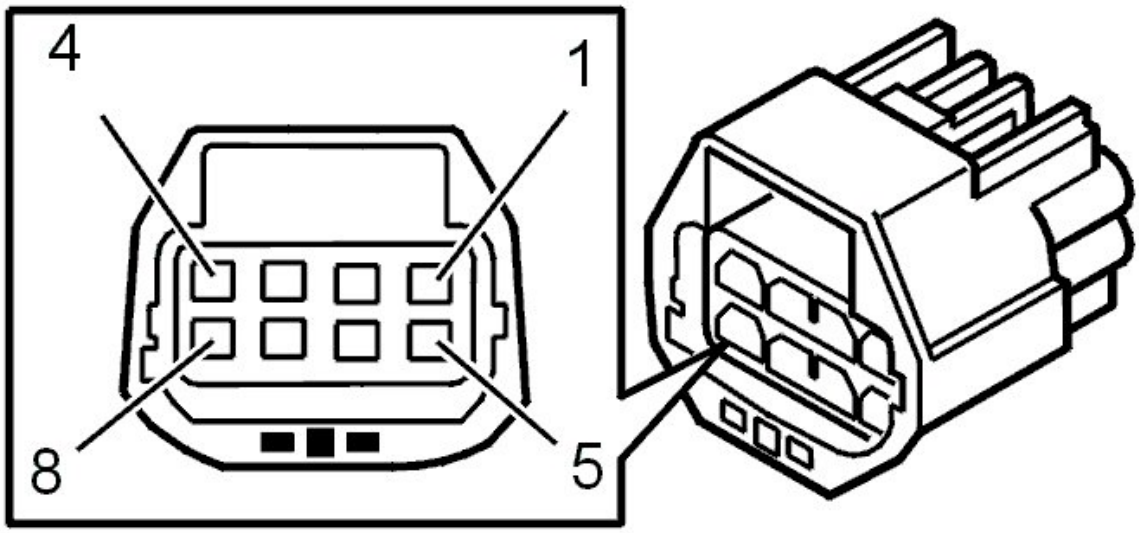


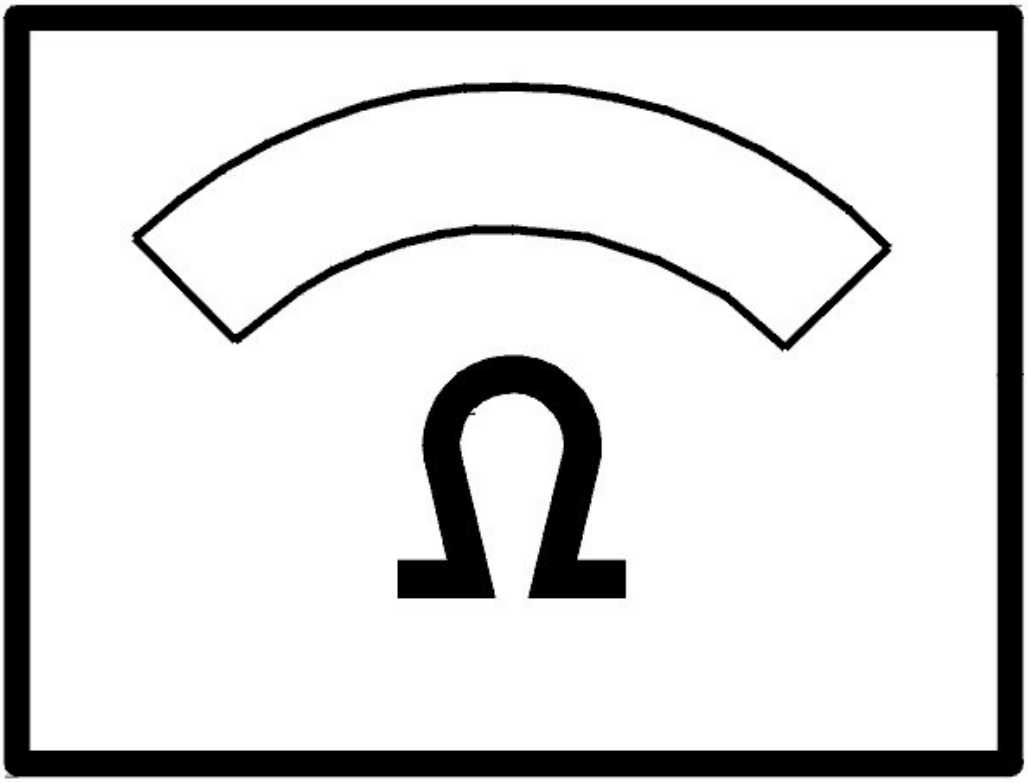
- Ignition off
- Open the transmission control system.

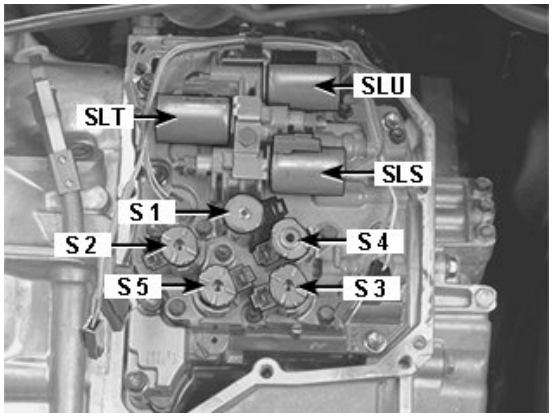
Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for an open-circuit. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check solenoid SLT by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C.
Replace the control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Transmission Control Systems; Specifications. See: Transmission Control Systems/Specifications


4
1
8
5





Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

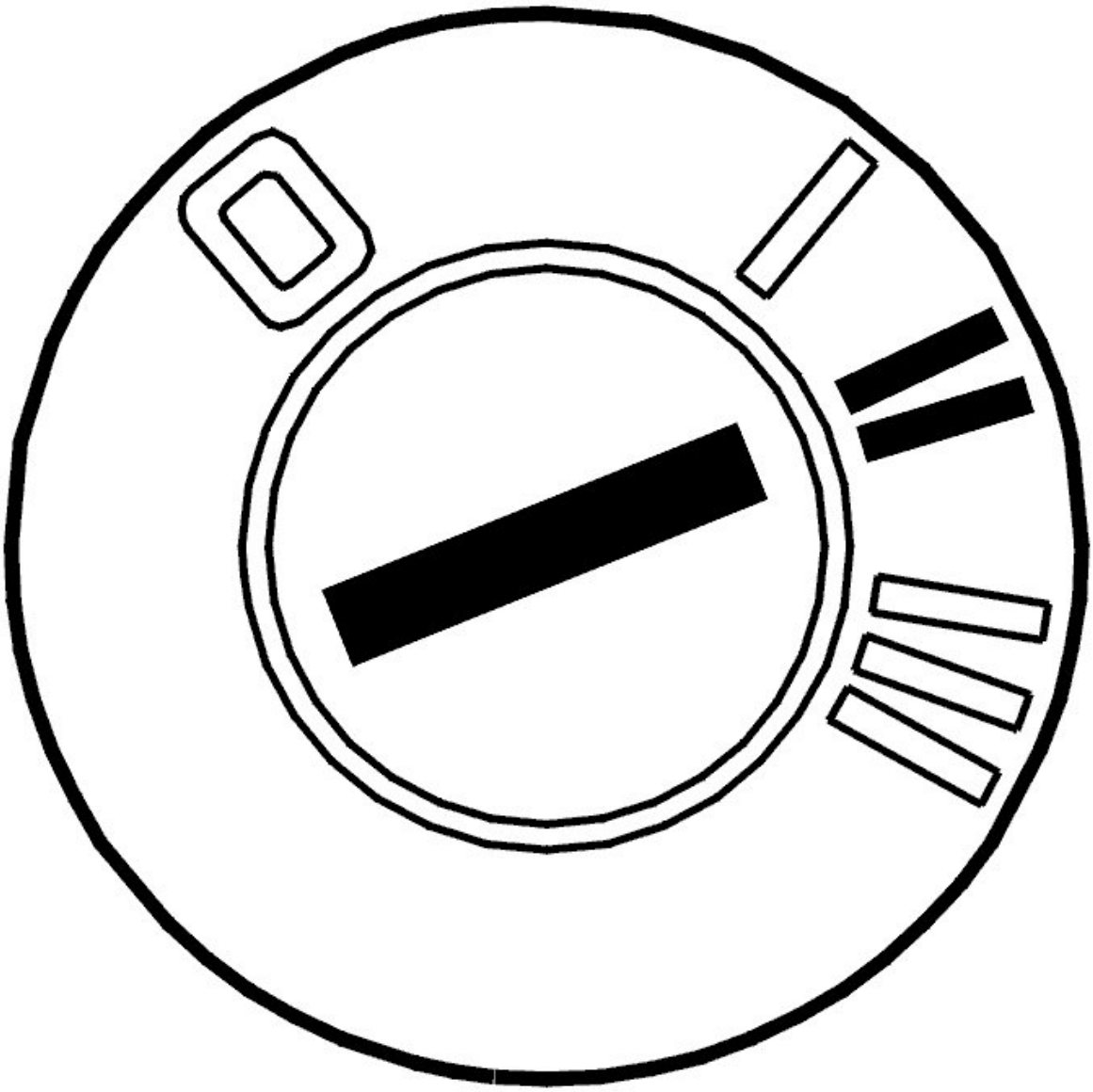
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

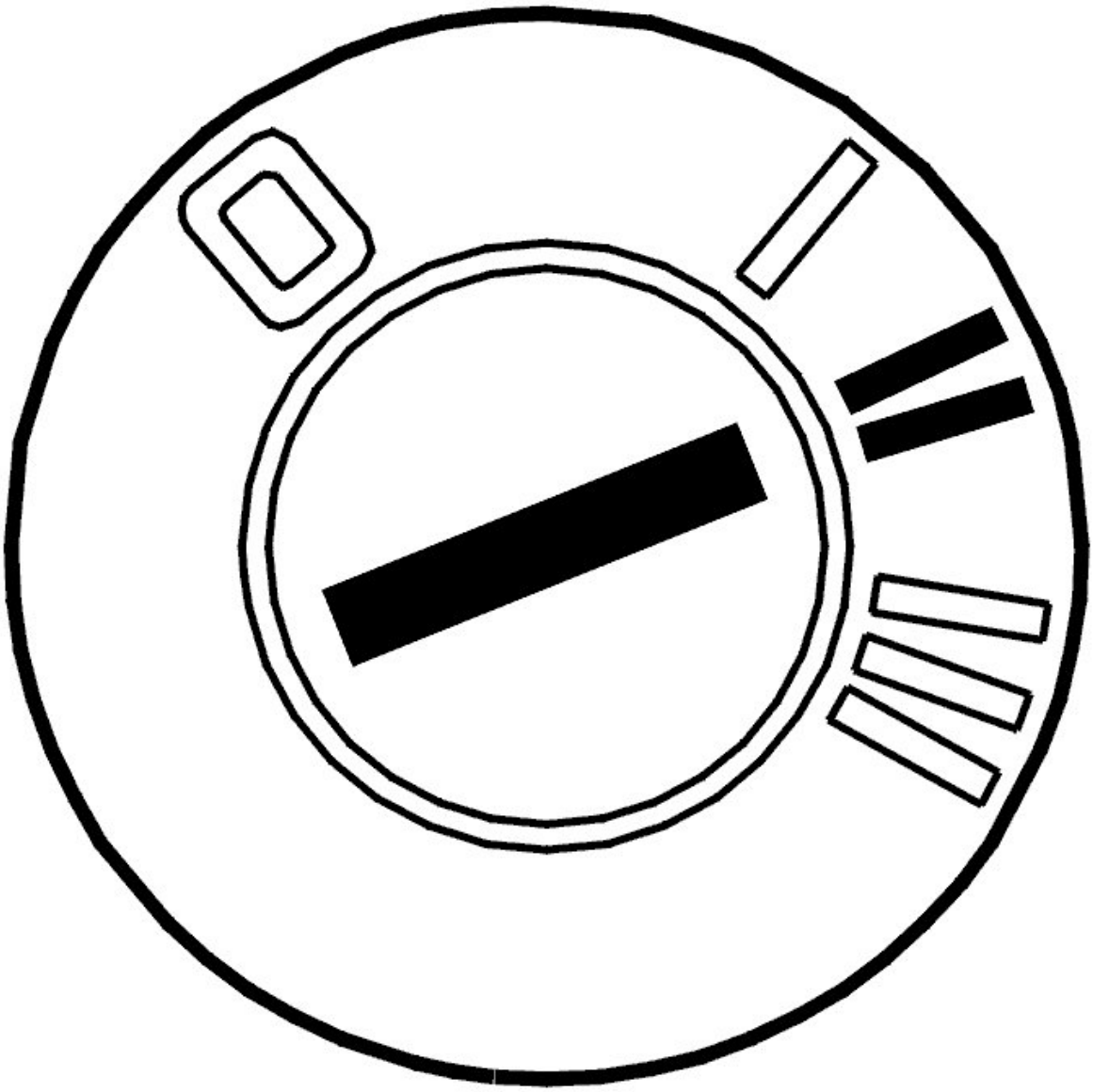
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

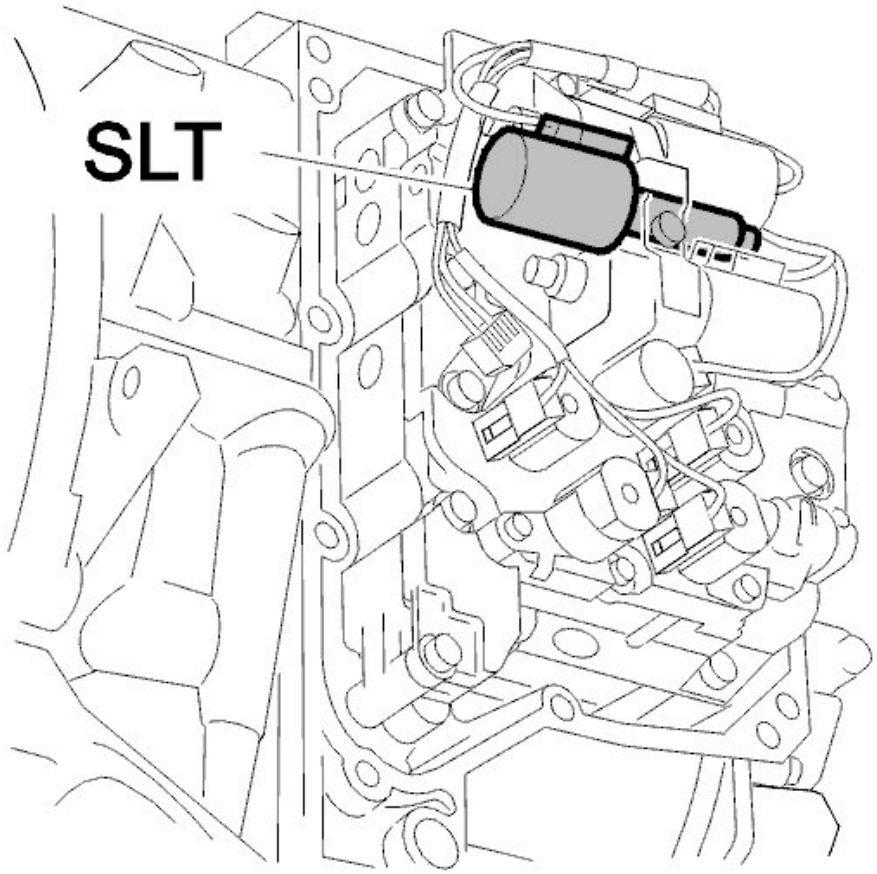
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLT

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) results in a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0118 is stored if the control module registers a short-circuit to ground in the solenoid SLT circuit. Solenoid SLT cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the control signal cable or the signal cable.
- Defective solenoid SLT.

Fault symptom[s]
- General orange warning lamp lit.
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

Hint: The shifting may be harsh if there is no request for torque limiting to the engine control module (ECM) during shifting.

Signal Too Low. Intermittent Fault

Signal too low. Intermittent fault

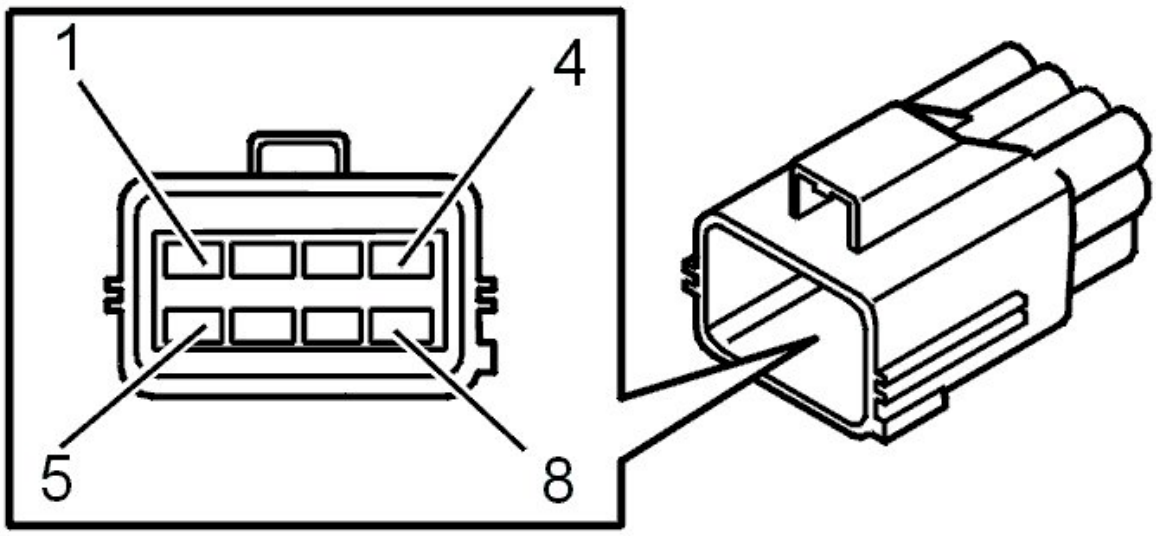
Intermittent fault

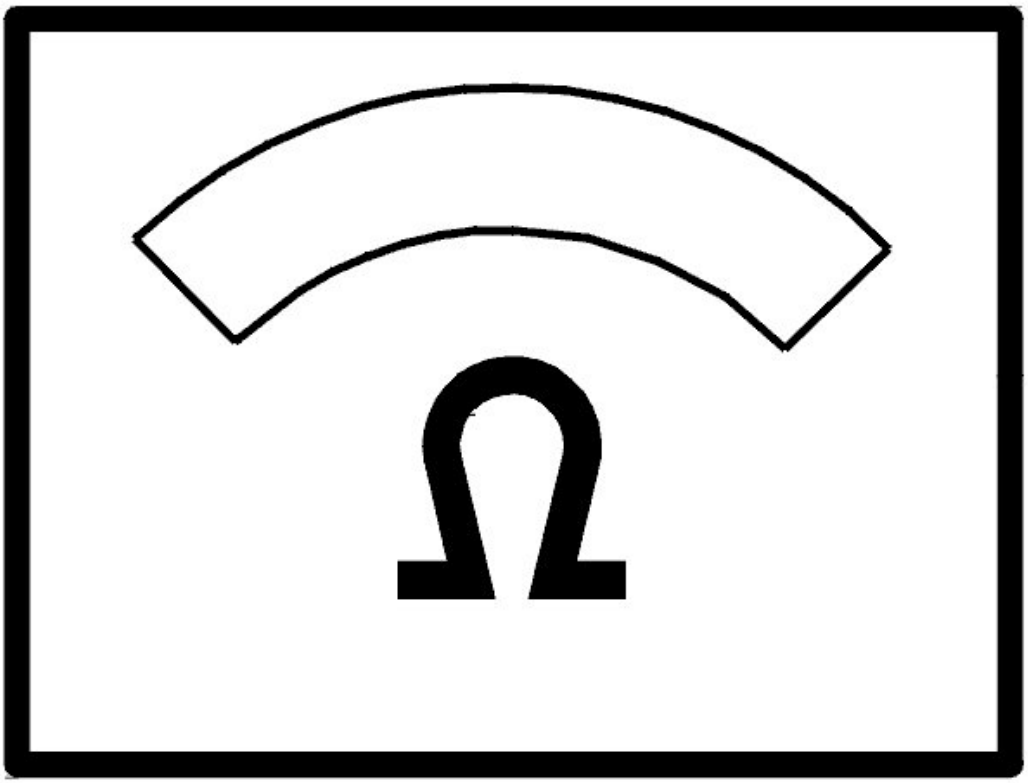
Check control module connector and transmission connector D. Check for contact resistance and oxidation according to Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the wiring between transmission control module (TCM) terminal #A52 (#A52) and transmission connector terminal #D3. Check the wiring between control module terminal #B10 (#A70) and transmission connector terminal #D4. Check for an intermittent short-circuit to ground according to Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

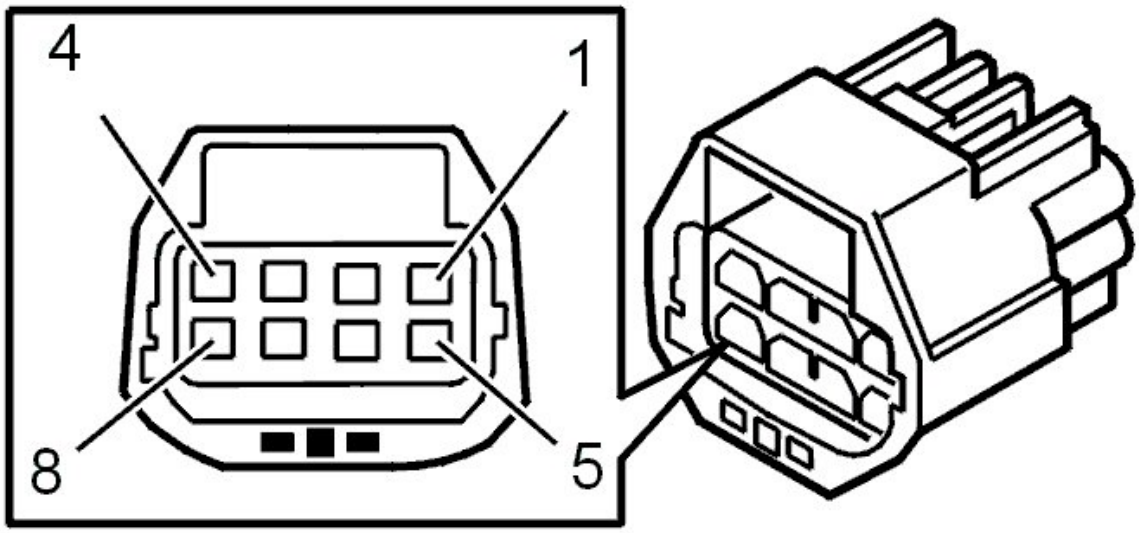
Hint: Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Remedy as necessary.

Other information:
- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission control module (TCM), see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).







Select Continue when the fault has been remedied.

Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

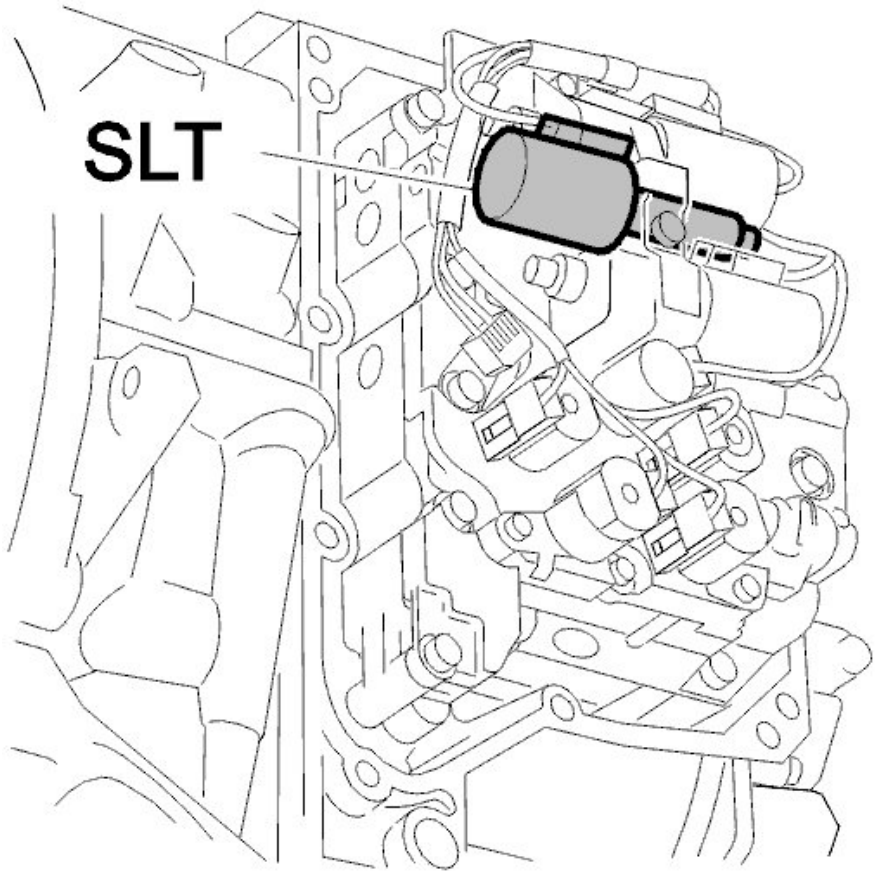
Attempt New Test - Intermittent fault

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



Throttle solenoid SLT controls the line pressure in the transmission. The solenoid is controlled by a power stage in the transmission control module (TCM) output. The transmission control module (TCM) uses the power stage to control the current to the solenoid. A low amperage results in a high line pressure. A high amperage (approximately 1 A) results in a low line pressure. The amperage is primarily affected by the throttle position. Diagnostic trouble code (DTC) TCM-0118 is stored if the control module registers a short-circuit to ground in the solenoid SLT circuit. Solenoid SLT cannot then control the line pressure.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Short-circuit to ground in the control signal cable or the signal cable.
- Defective solenoid SLT.

Fault symptom[s]
- General orange warning lamp lit.

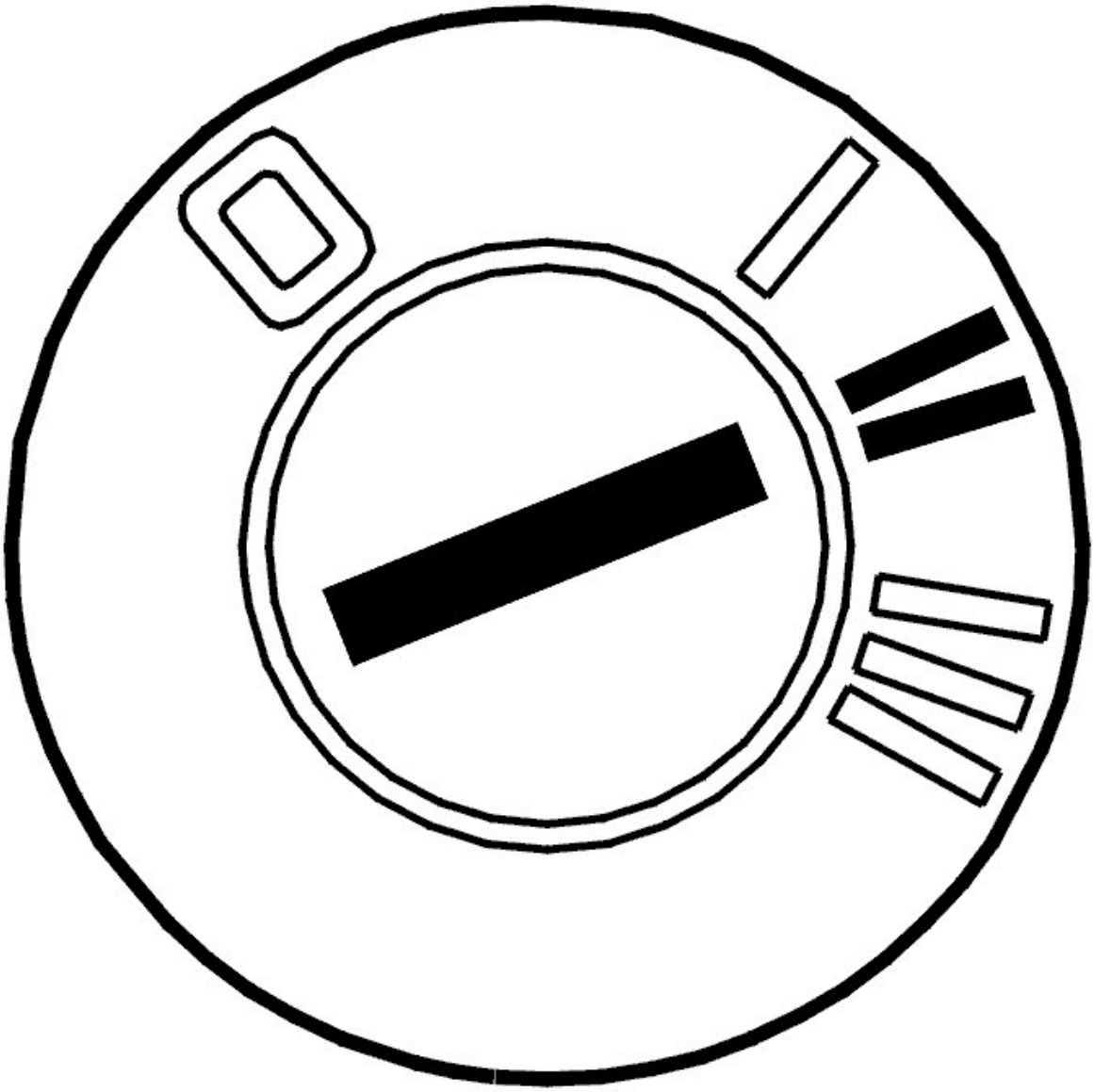
- Malfunction indicator lamp (MIL) lit.
- No lock-up function.
- Harsh gear shifting.

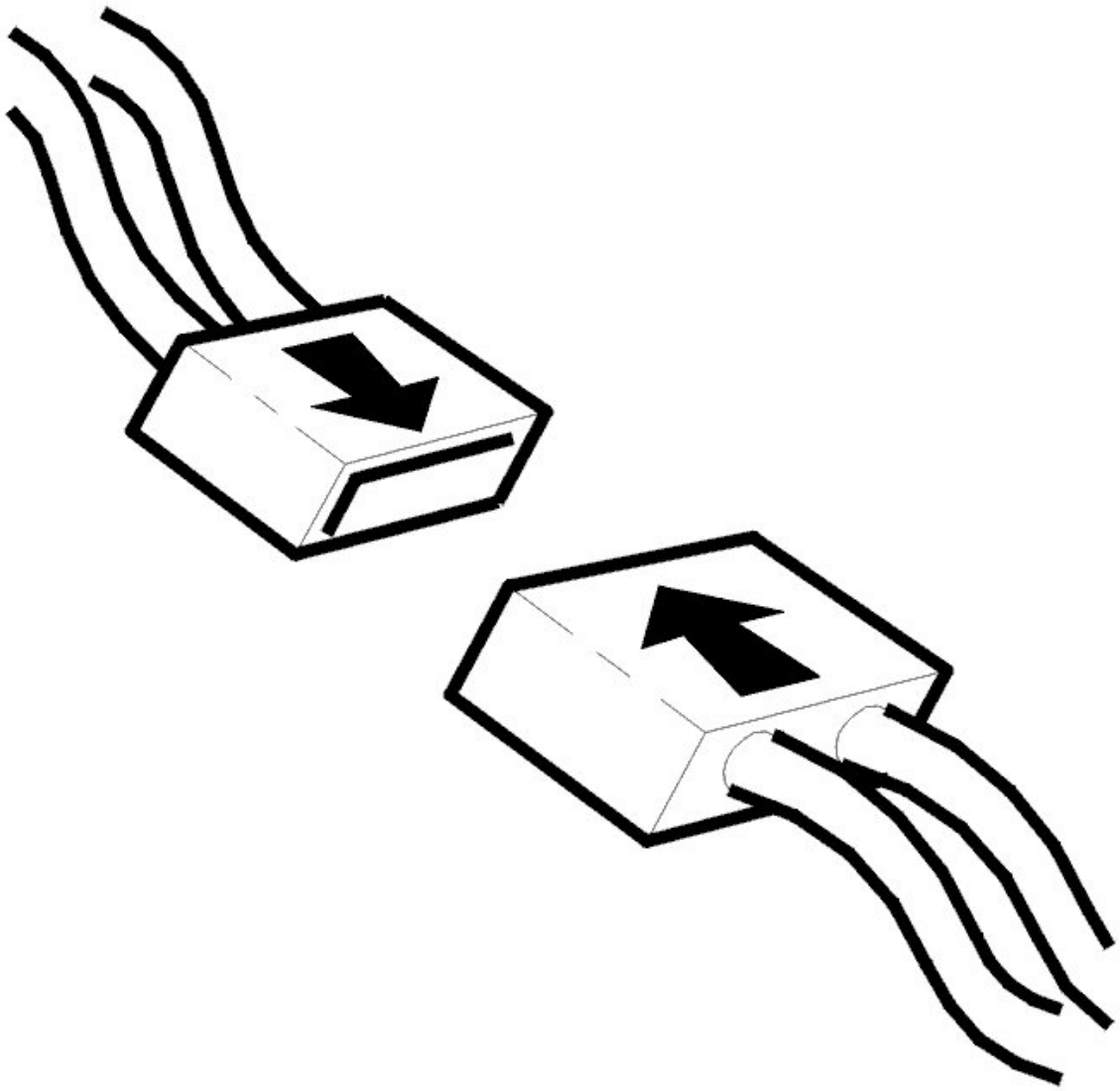
Hint: The shifting may be harsh if there is no request for torque limiting to the engine control module (ECM) during shifting.

Signal Too Low. Permanent Fault

Signal too low. Permanent fault

Checking line pressure solenoid SLT



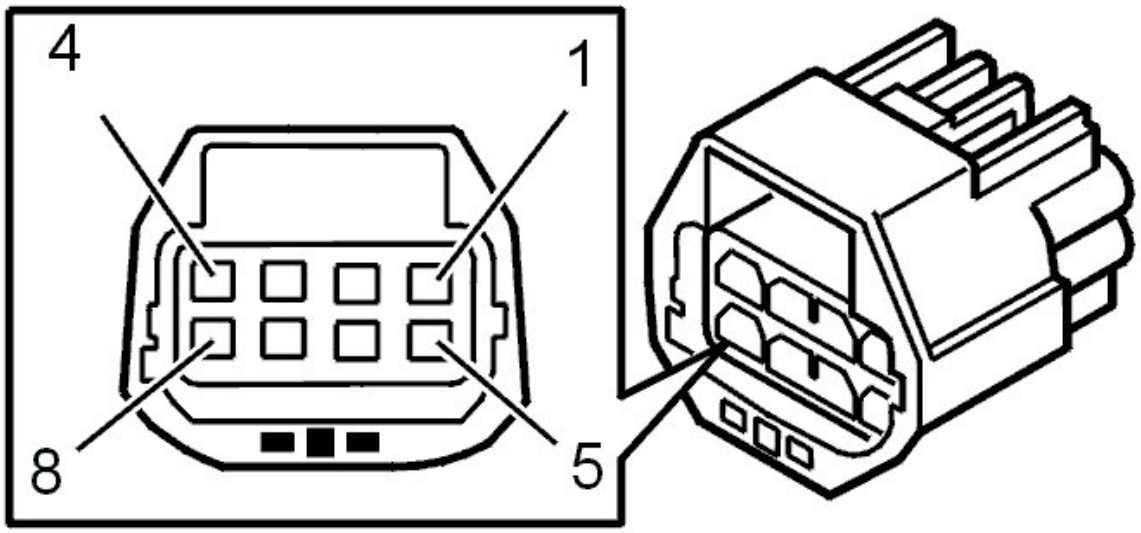


- Ignition off
- Check the control module connector and automatic transmission connector D. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Remedy if necessary
- Reinstall the components, reconnect the connectors etc.
- Ignition on
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To disconnect the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

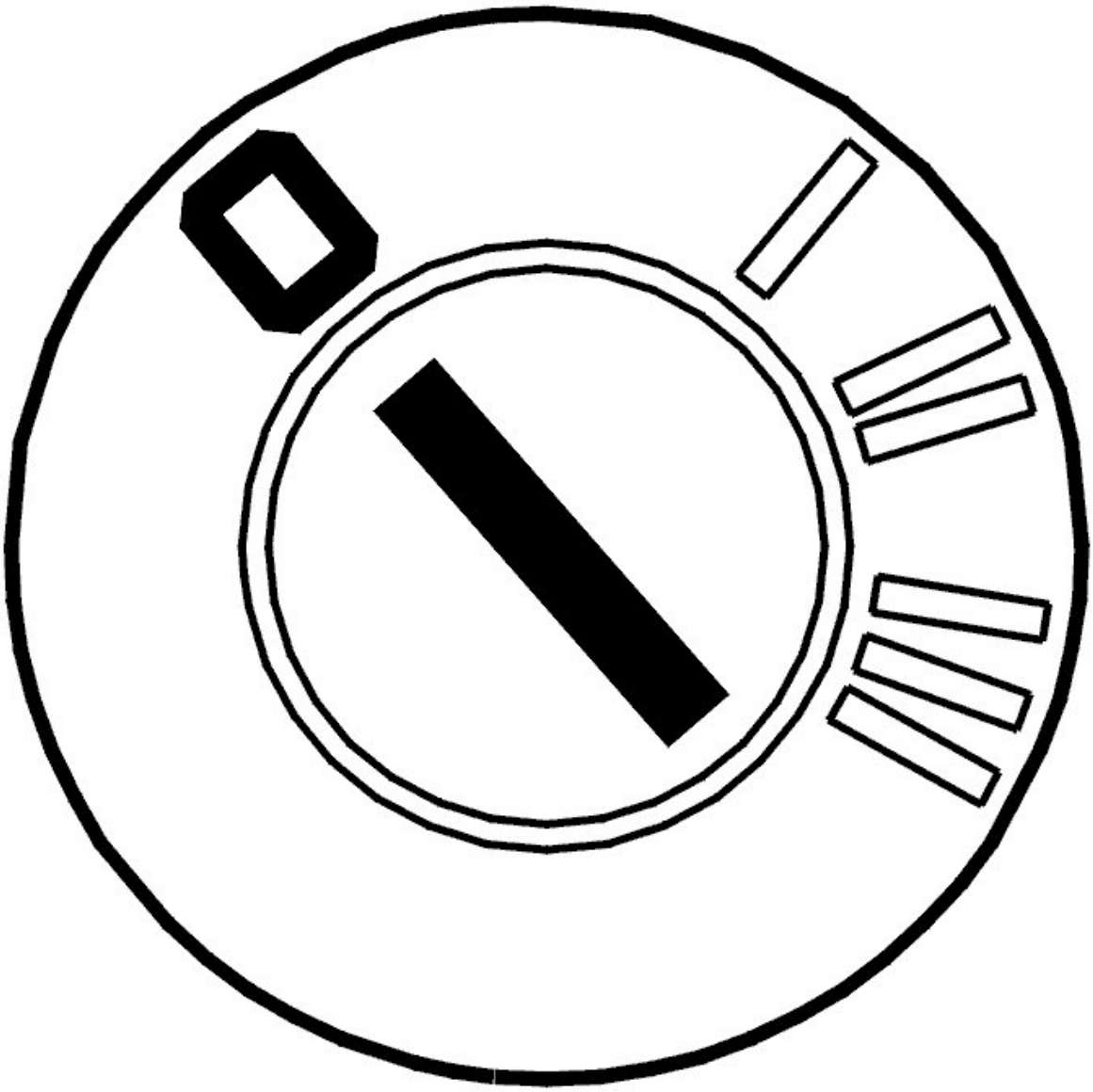


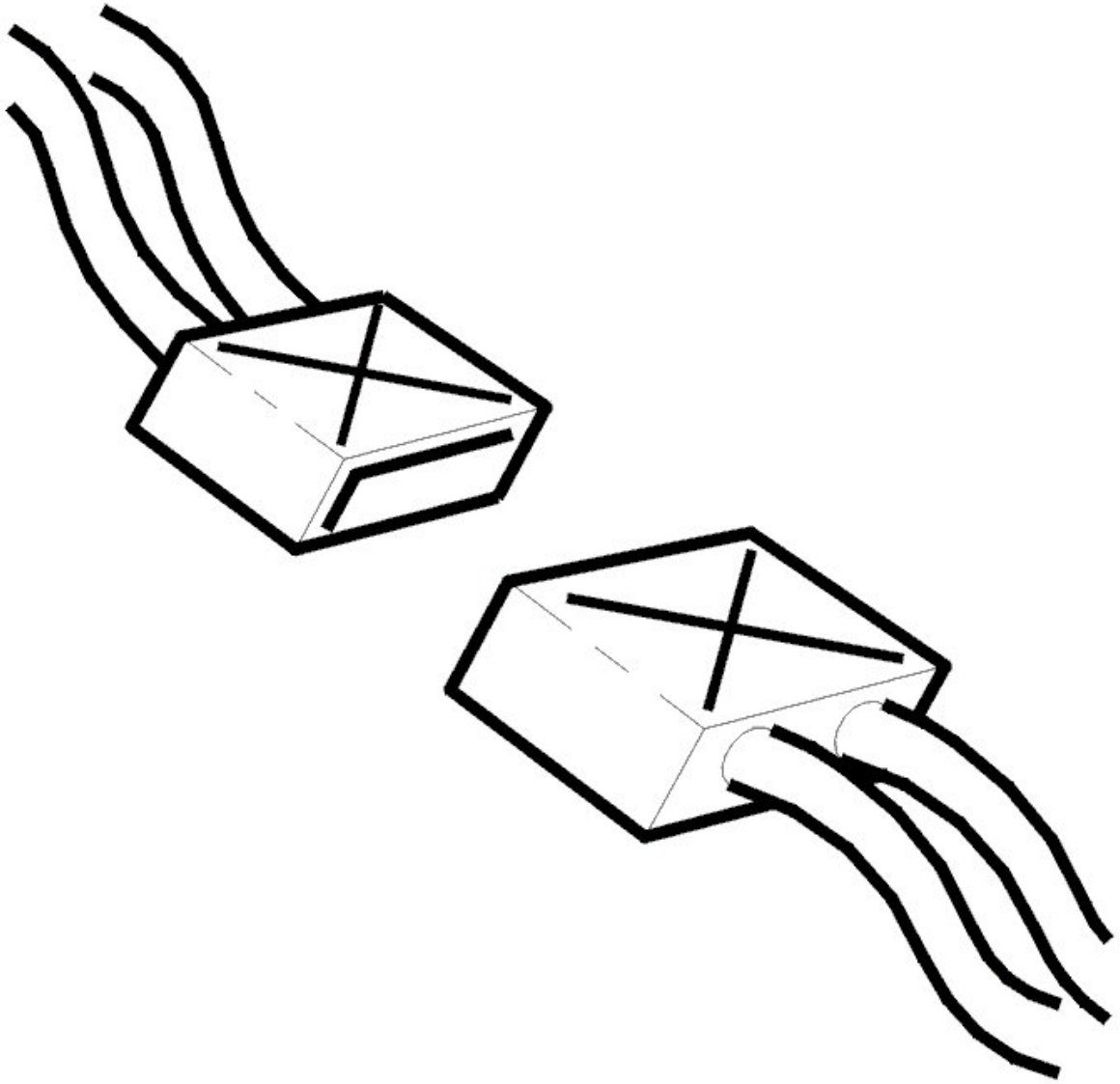
Does the current oscillate?

Yes - Fault Found

No - Checking resistance

Checking resistance



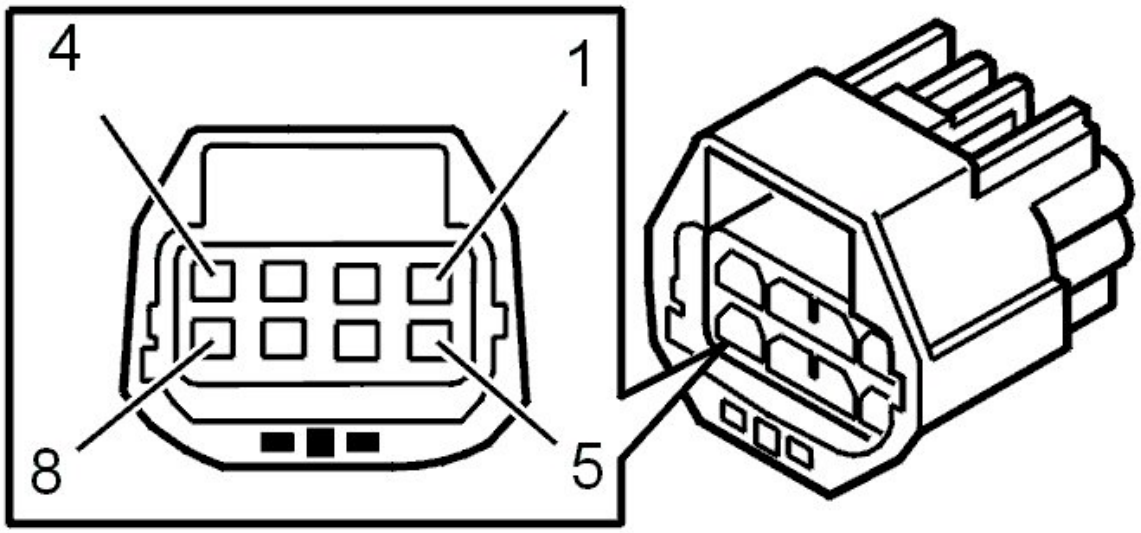


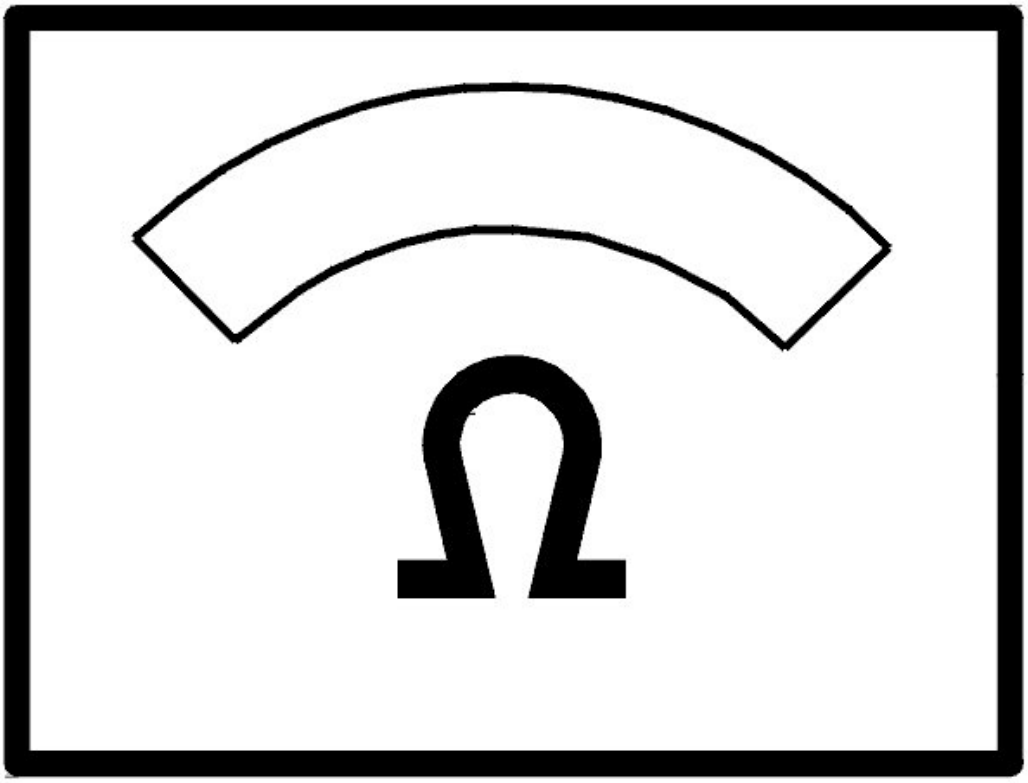
- Ignition off
- Transmission connector D disconnected.

Check solenoid SLT. Measure the resistance between terminals #D3 and #D4 on transmission connector D. The resistance should be 5-5.6 ohms at 20°C.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



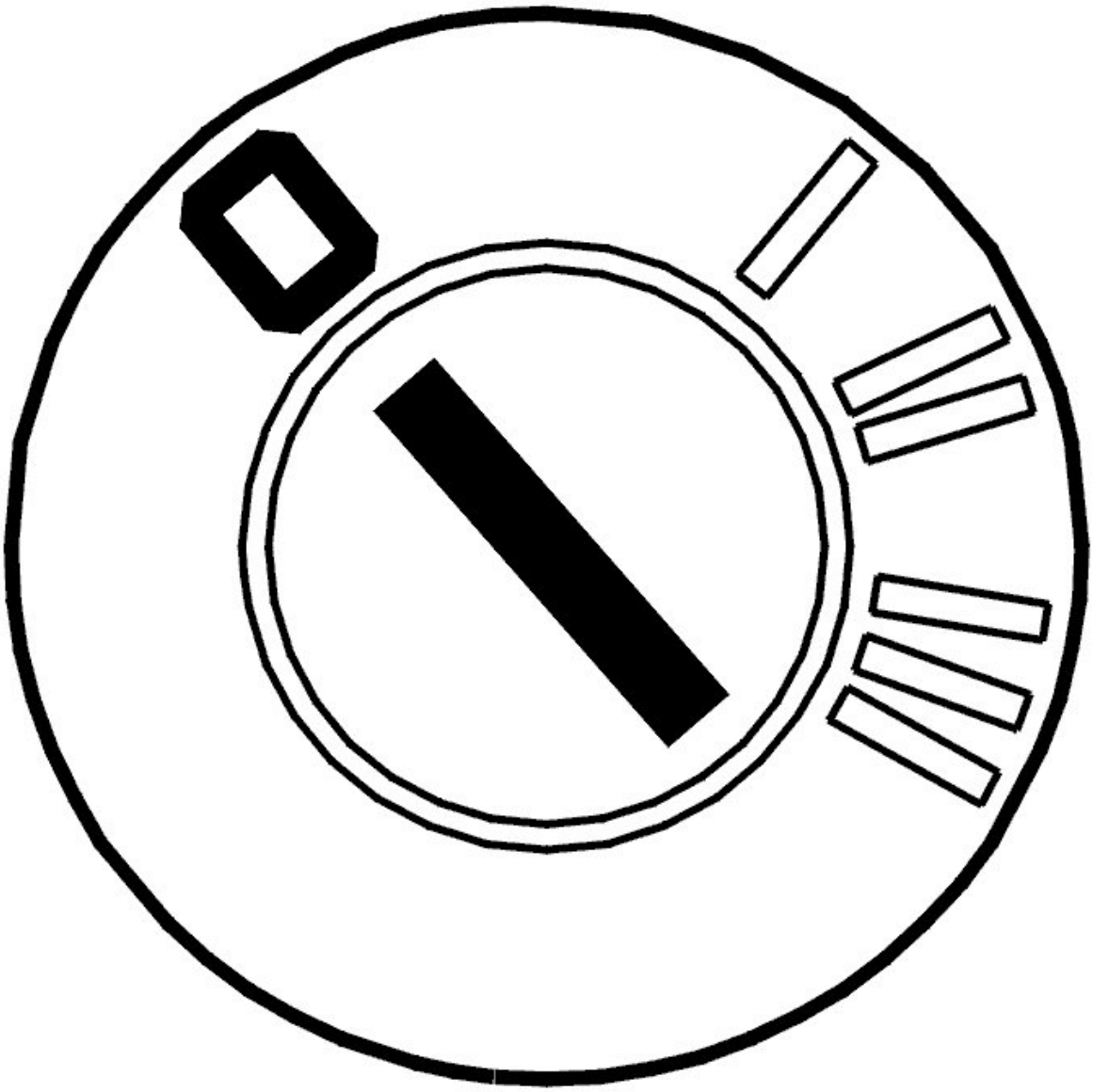


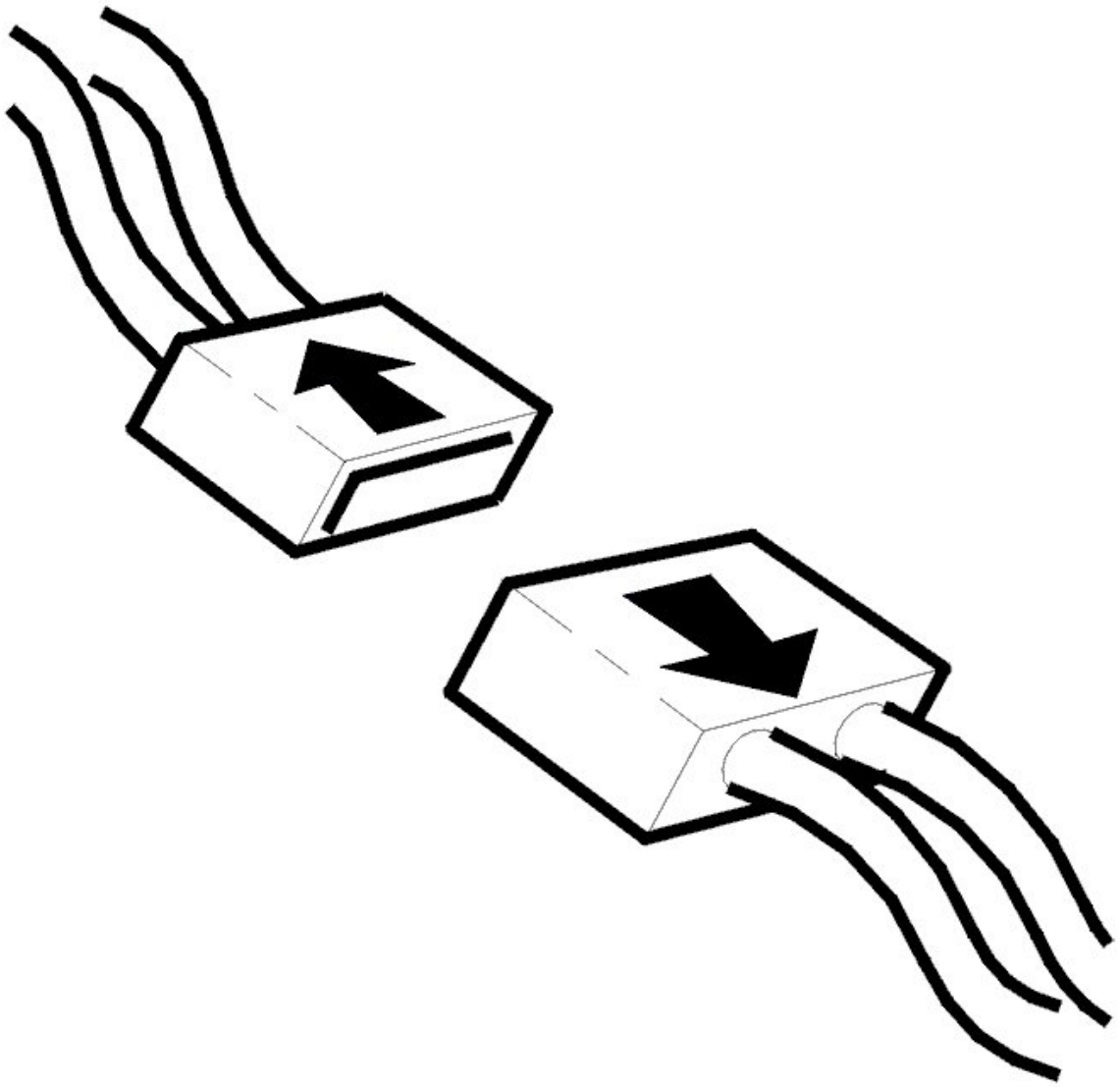
Was the resistance OK?

Yes - Checking the wiring

No - Checking the wiring and component

Checking the wiring



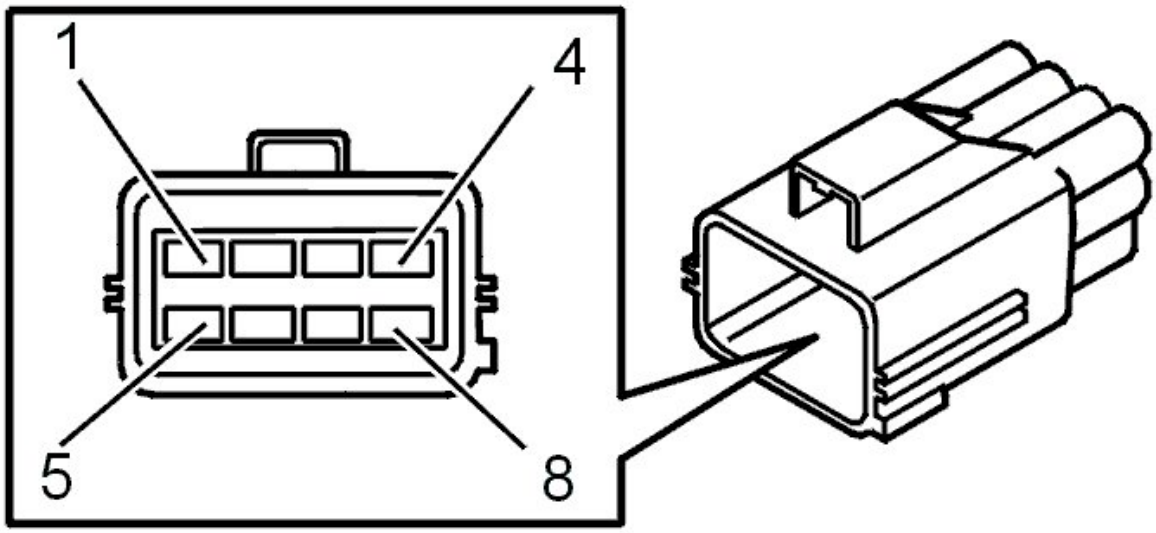


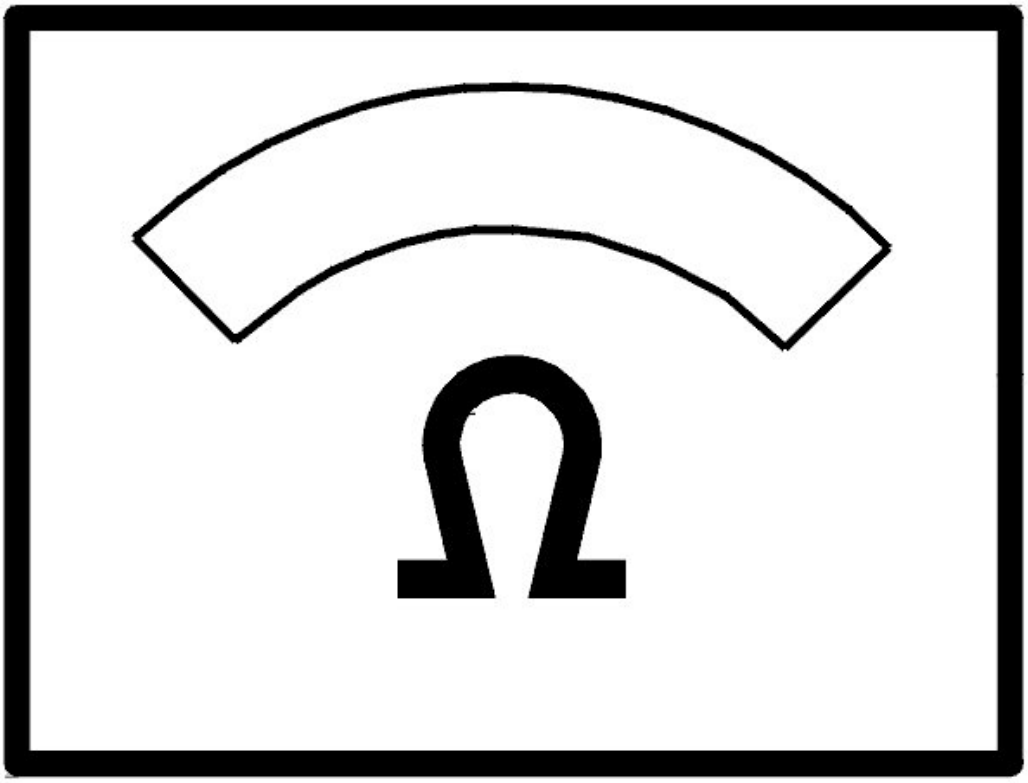
- Ignition off
- The breakout box connected
- Disconnect transmission connector D.

Check the cable between control module terminal #A52 (#A52) and transmission connector terminal #D3 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Check the cable between control module terminal #B10 (#A70) and transmission connector terminal #D4 (control module side). Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



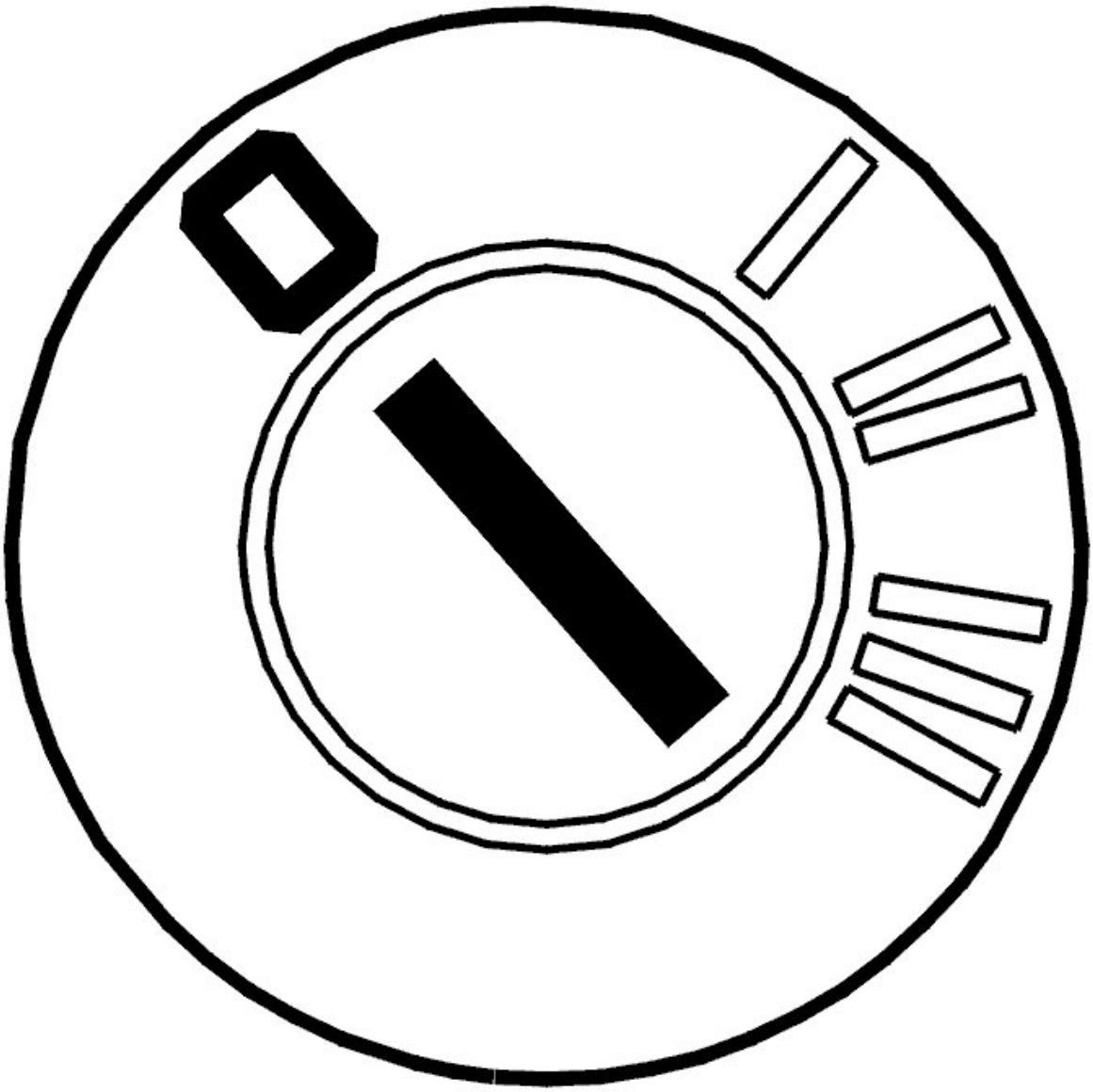


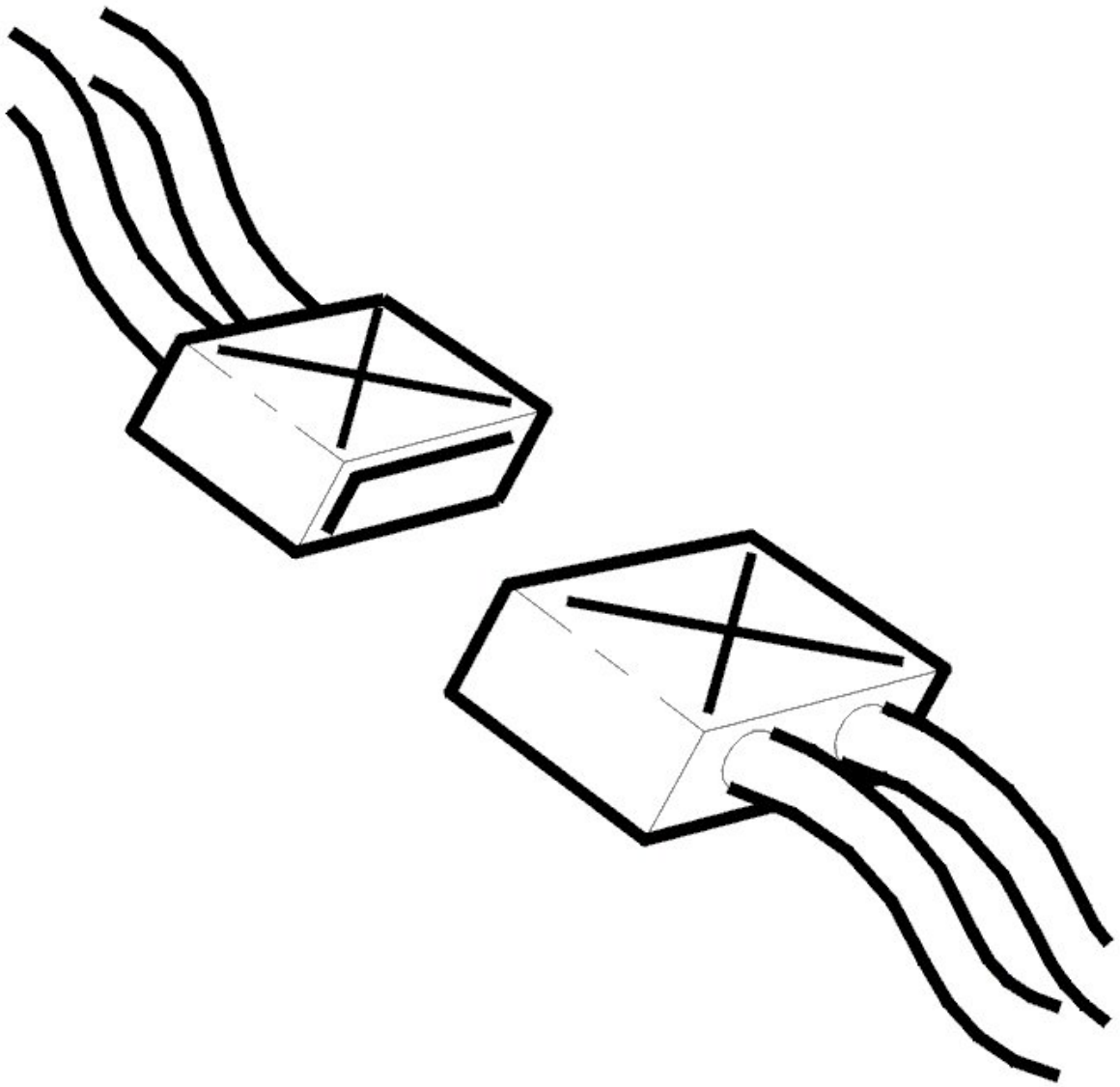
Was a fault detected?

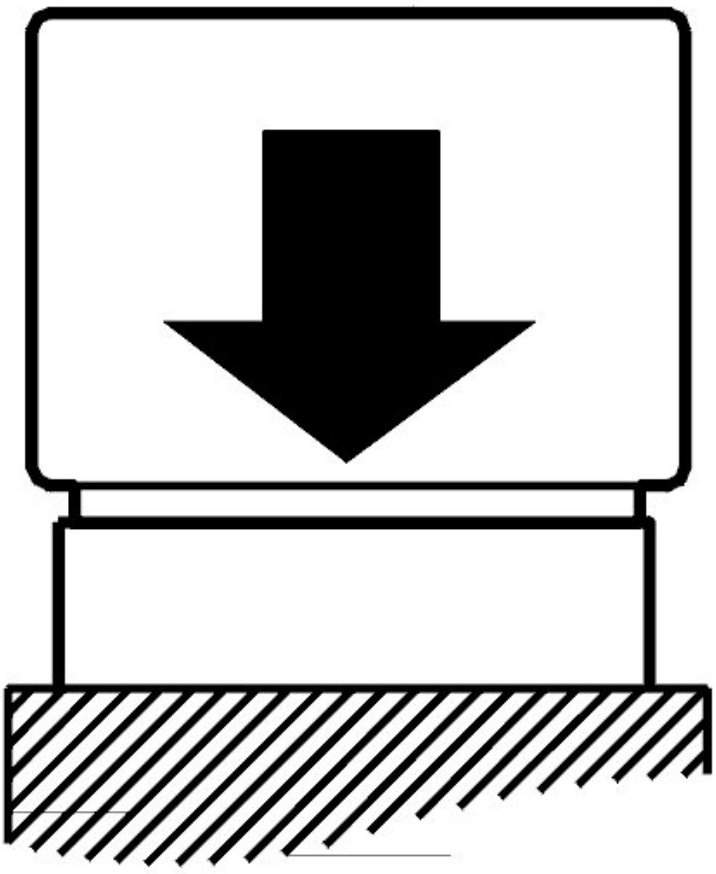
Yes - Verification

No - Checking the control module

Checking the control module







- Ignition off
- The breakout box connected
- Connect the control module.
- Transmission connector D disconnected.

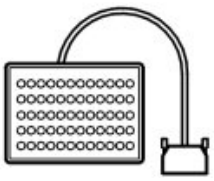
Check the transmission control module (TCM) by measuring the resistance between terminals #A52 (#A52) and #B10 (#A70) on the breakout box. The resistance must be approximately 9 kohms.

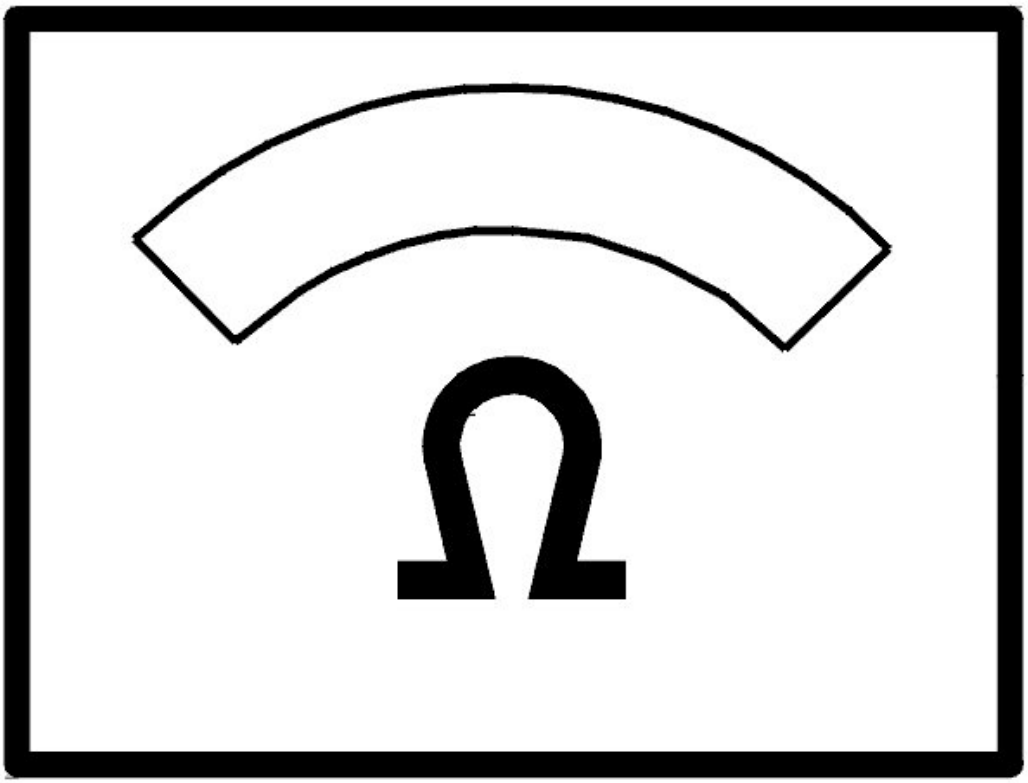
Note! When removing the transmission connector, the control module may store diagnostic trouble codes (DTCs) for the gear-shift position sensor, the shift solenoids, the temperature sensor etc.

Try a new control module if the resistance is infinite.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To replace the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).



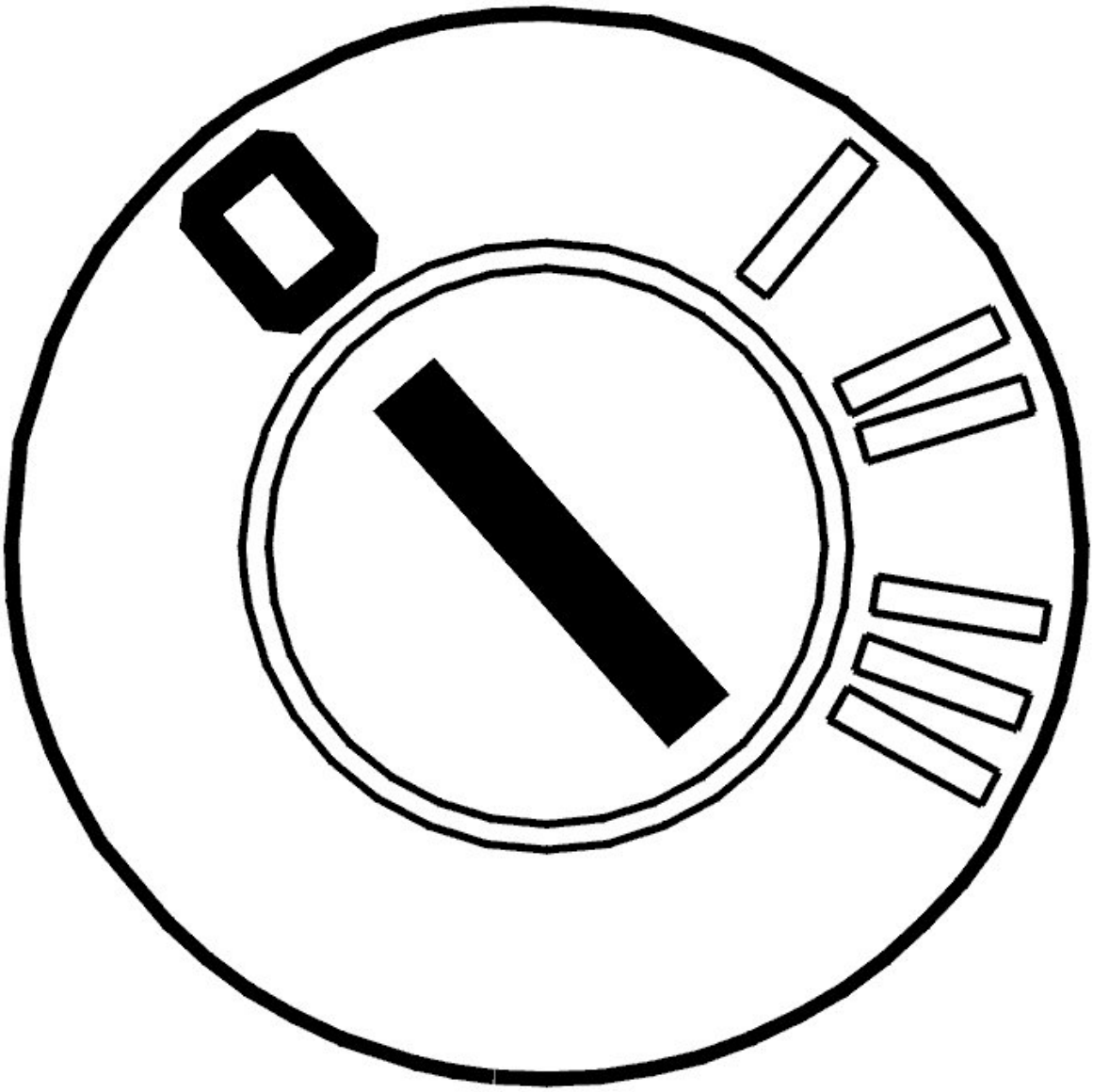


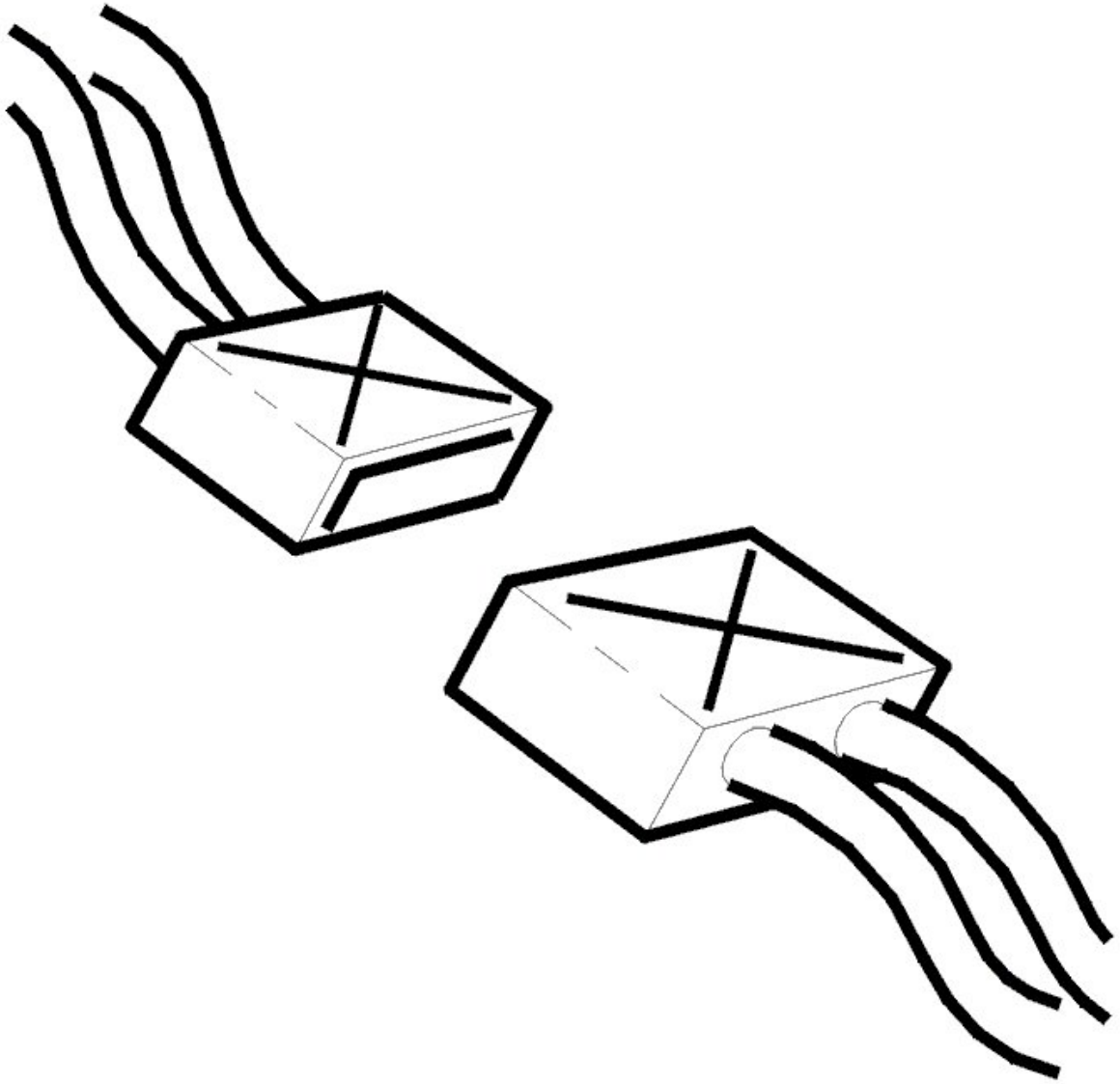
Was the resistance OK?

Yes - No Fault Found

No - Verification

Checking the wiring and component



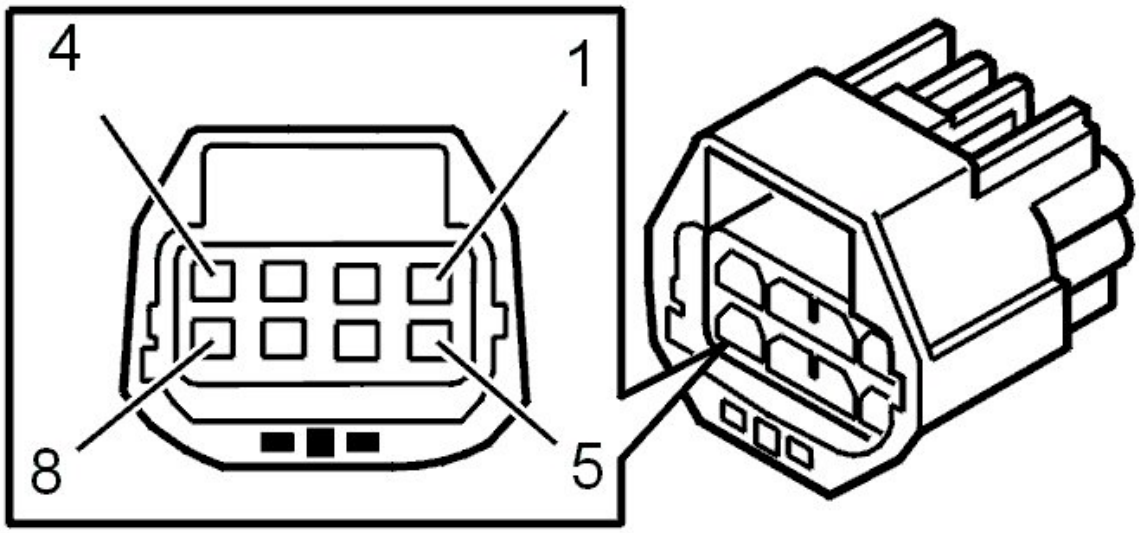


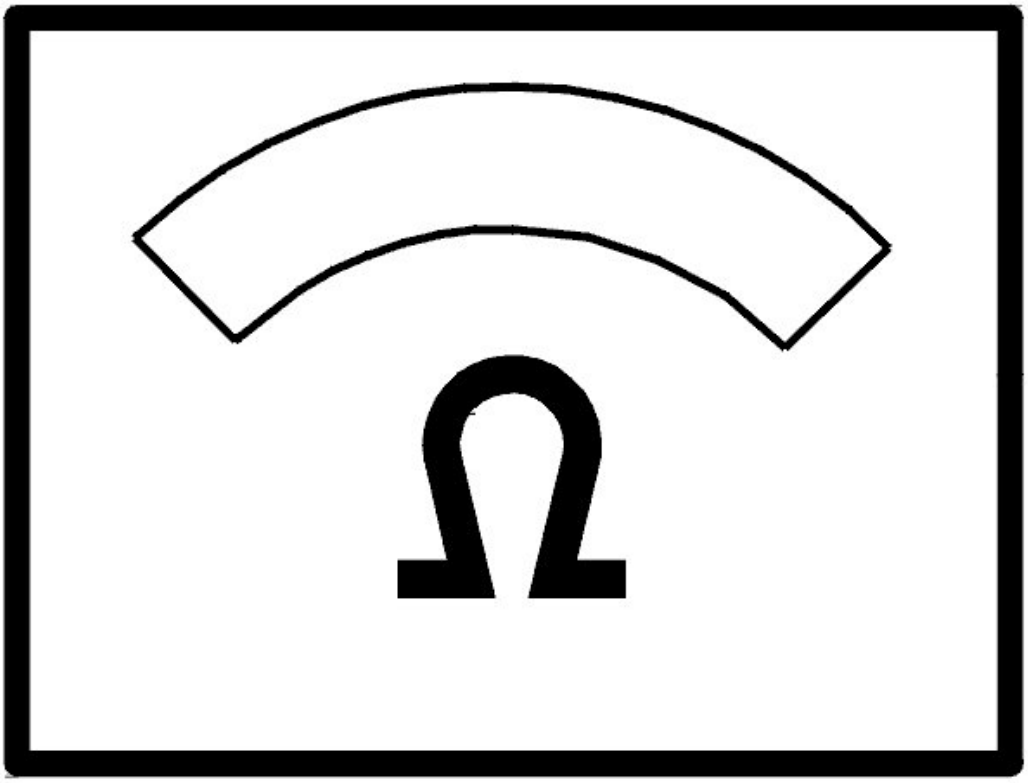
- Ignition off
- Open the transmission control system.

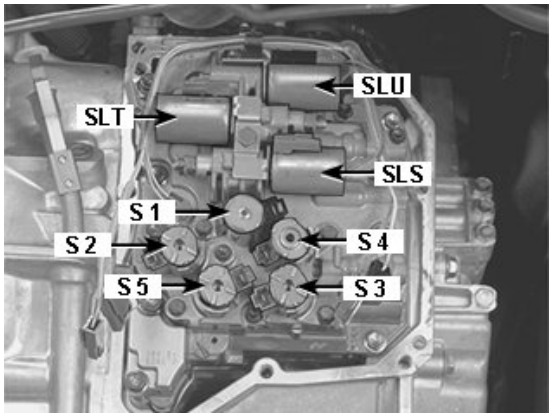
Check the wiring between transmission connector terminal #D3 and solenoid SLT terminal #1. Check the wiring between transmission connector terminal #D4 and solenoid SLT terminal #2. Check for a short-circuit to ground. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault. Also check against the other cables in the circuit. Use the relevant wiring diagram.
Check solenoid SLT by measuring the resistance between terminals #1 and #2 on the connector. The resistance must be 5-5.6 ohms at 20°C. Replace the transmission control system if the resistance is incorrect.

Other information:

- To disconnect the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To open and replace the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing
- To replace the cable harness for the control system, see Wiring harness / oil temperature sensor, replacing See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Removal and Replacement
- For information about signals, see Signal description. Transmission control module (TCM), AW50/51 AWD, AW55-50/51SN See: Transmission Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description. Transmission Control Module (TCM).


4
1
8
5





Location Of Components (Solenoids)

Continue - Resetting the adaptation and oil quality counter

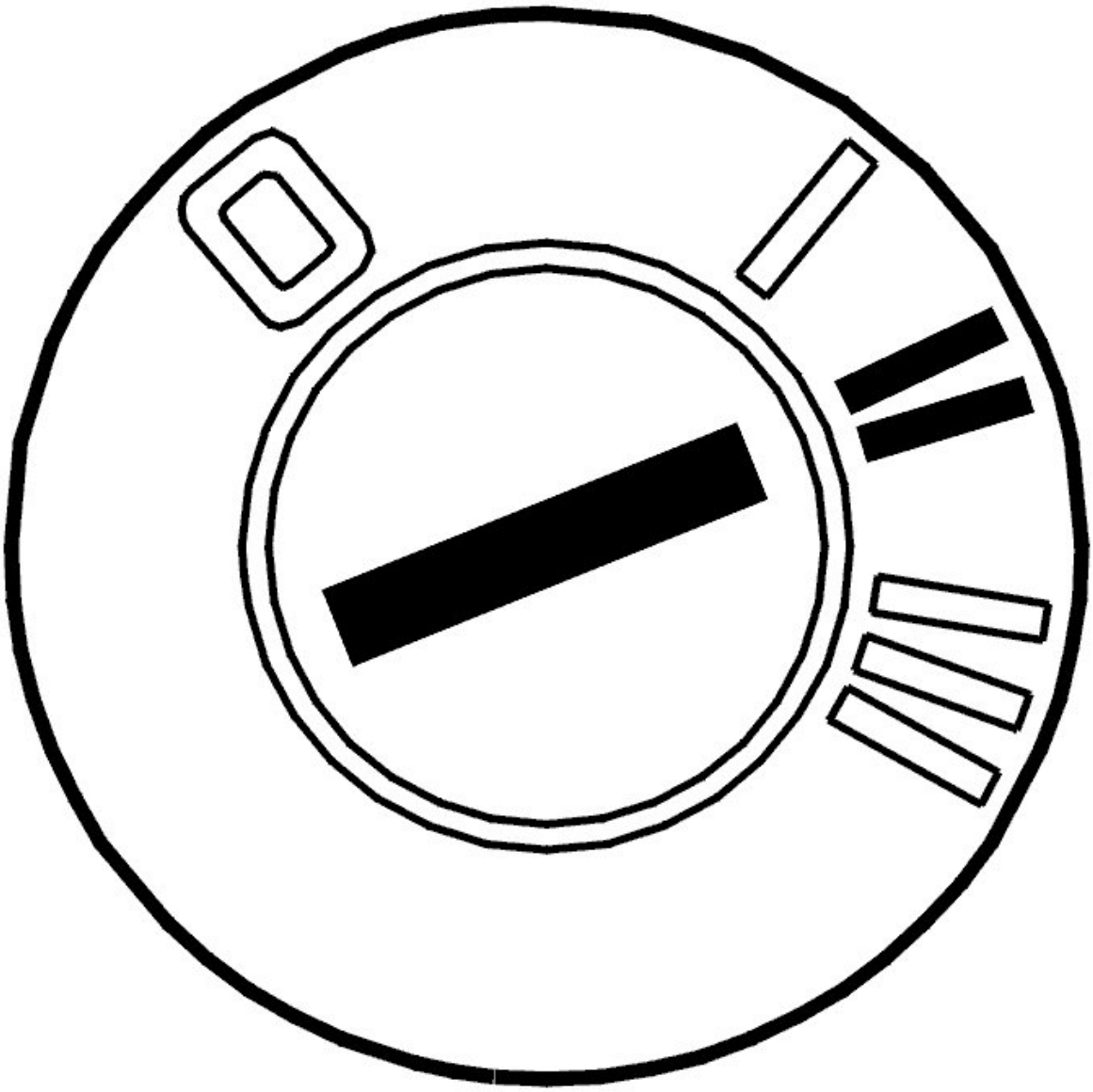
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

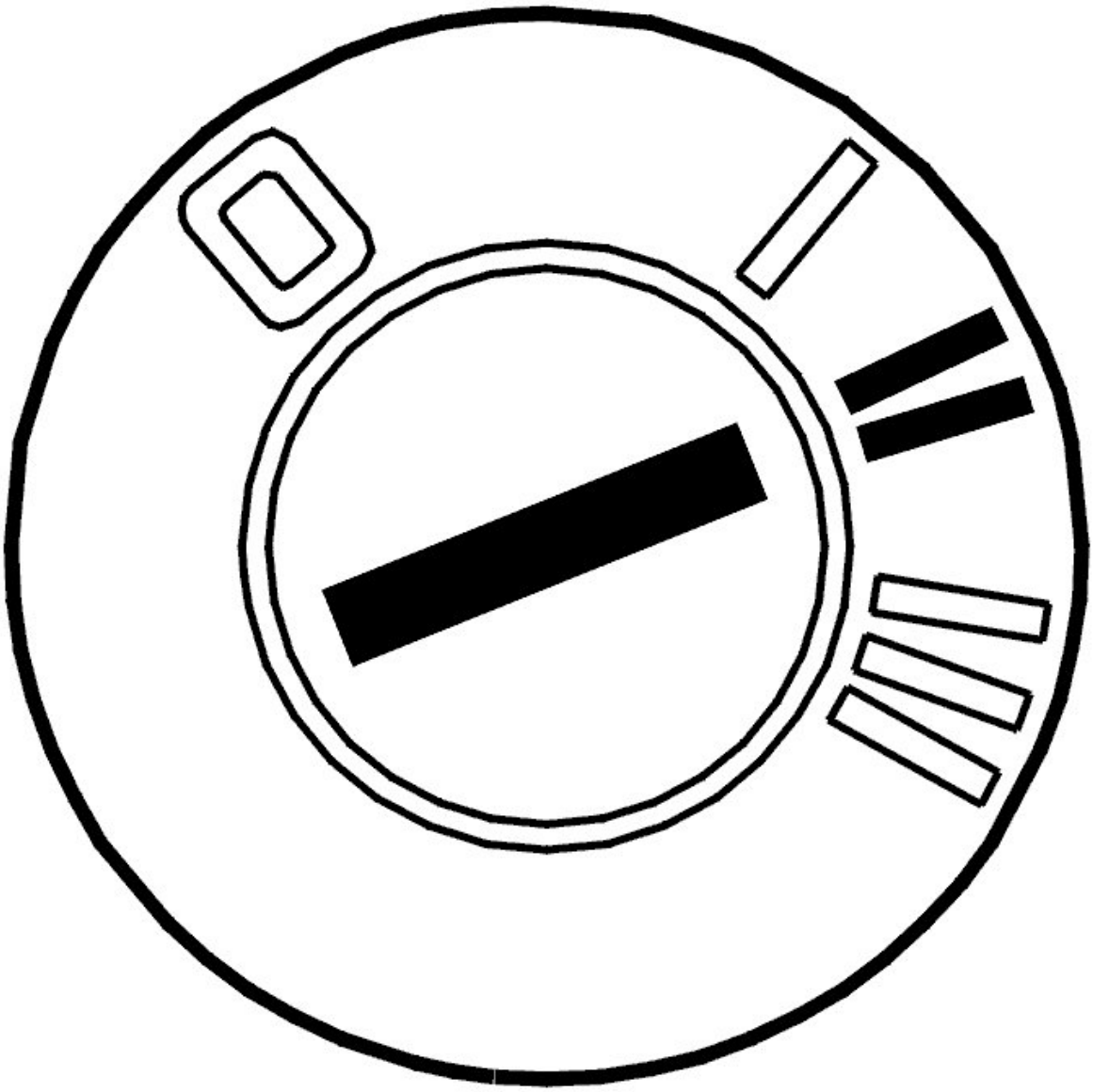
Continue - **DONE**

DONE - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLT.

Read off the current through the solenoid SLT circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

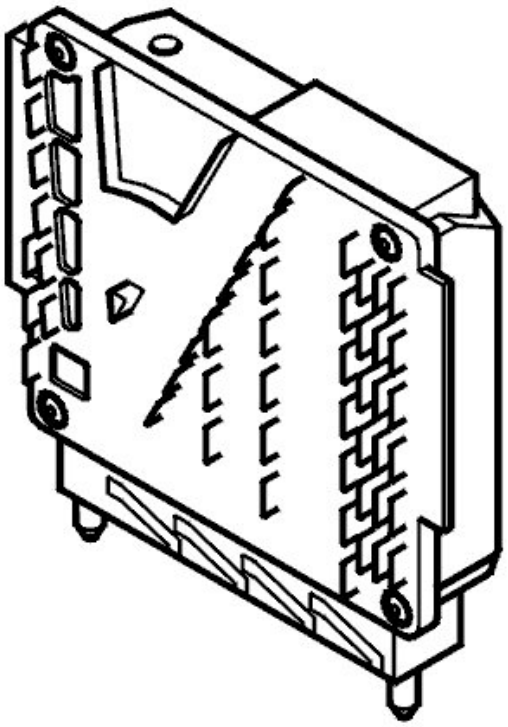
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking line pressure solenoid SLT

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute value
- Transmission control unit help program "Limp-home" has started to work.

Possible source
- Internal fault in control unit.

Fault symptom[s]
- Orange general warning lamp is on.

- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

Hint:
- Rough gear shifts can be caused by:
- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

Internal Fault

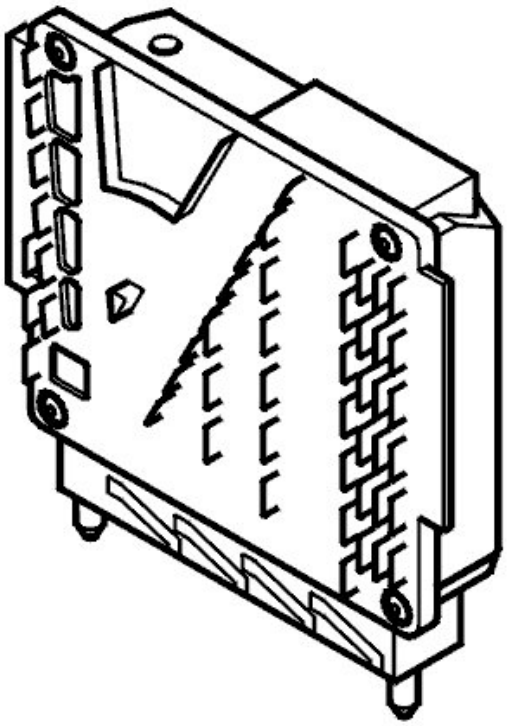
Internal fault

Replacing the control module

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



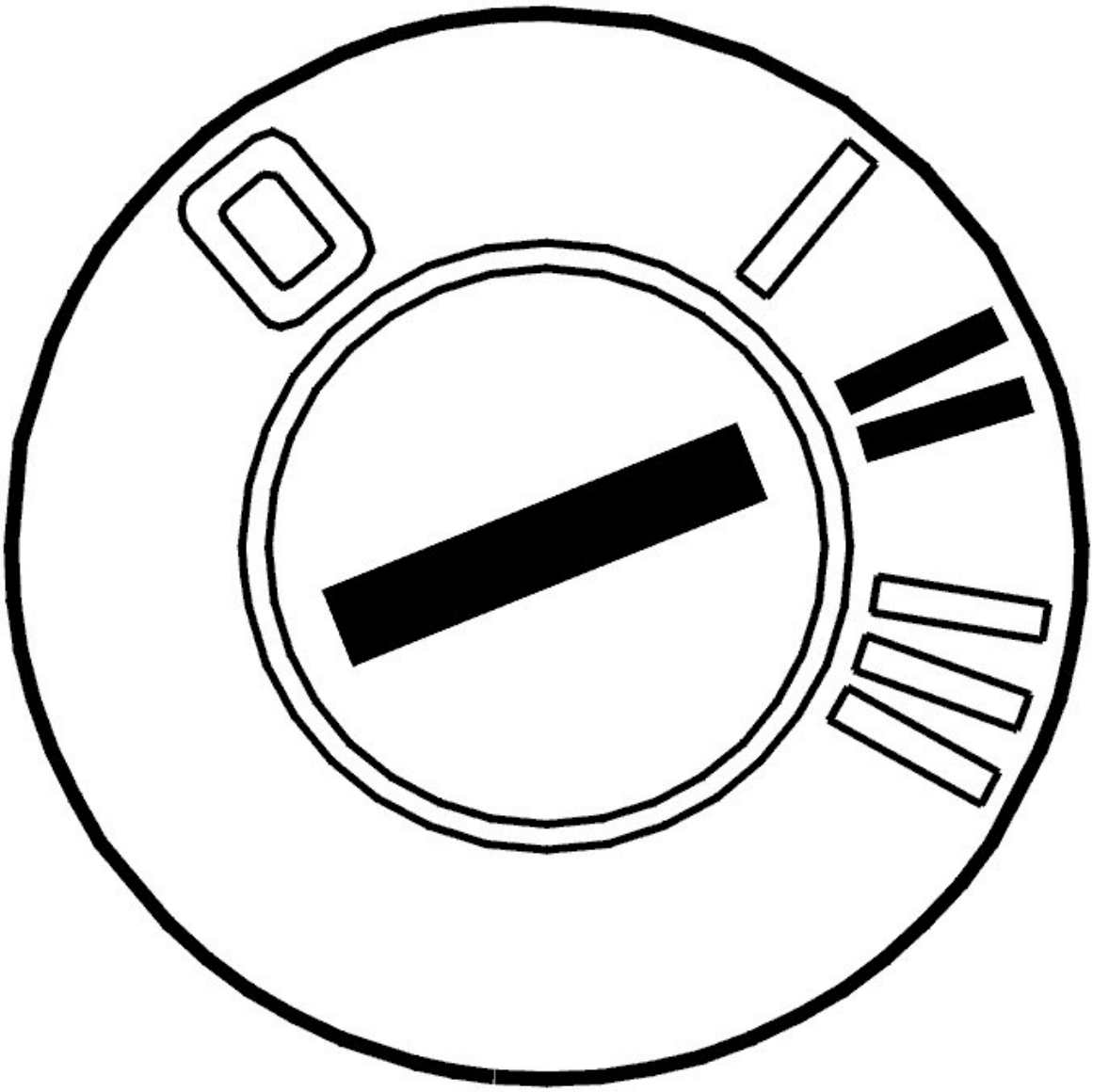
Continue - Verification

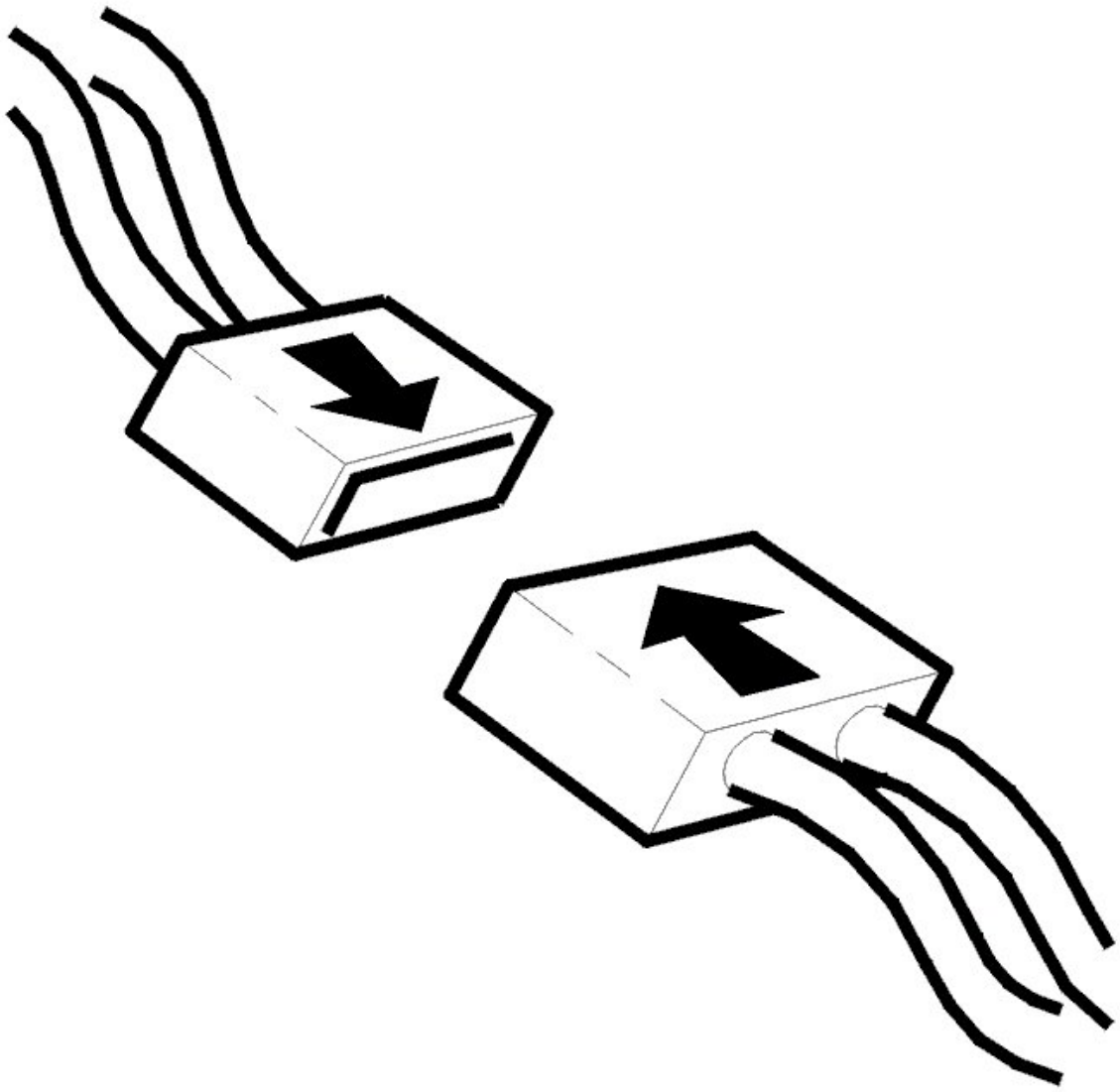
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoid S3.

The value should change between OFF and ON.

Does the value change between OFF and ON?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

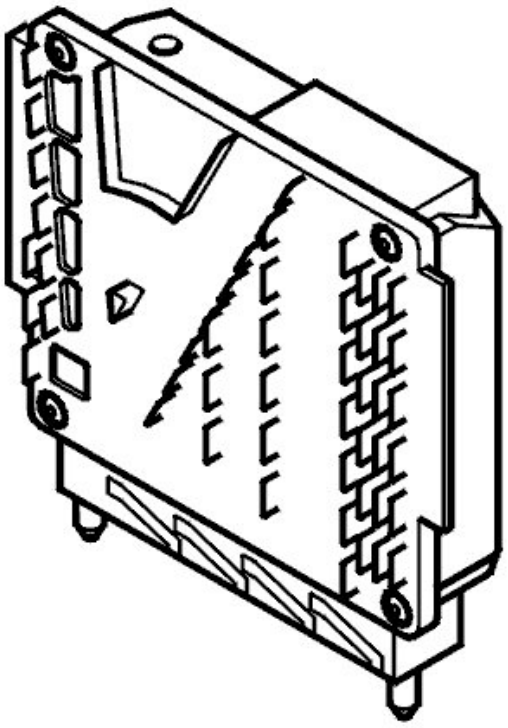
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the control module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute value

- Transmission control unit help program "Limp-home" has started to work.

Possible source

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- Internal fault in control unit.

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

Hint:
- Rough gear shifts can be caused by:
- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

Internal Fault

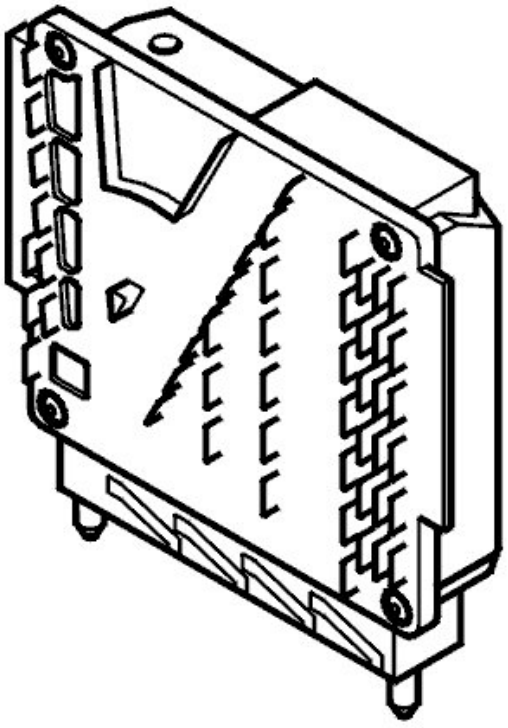
Internal fault

Replacing the control module

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.



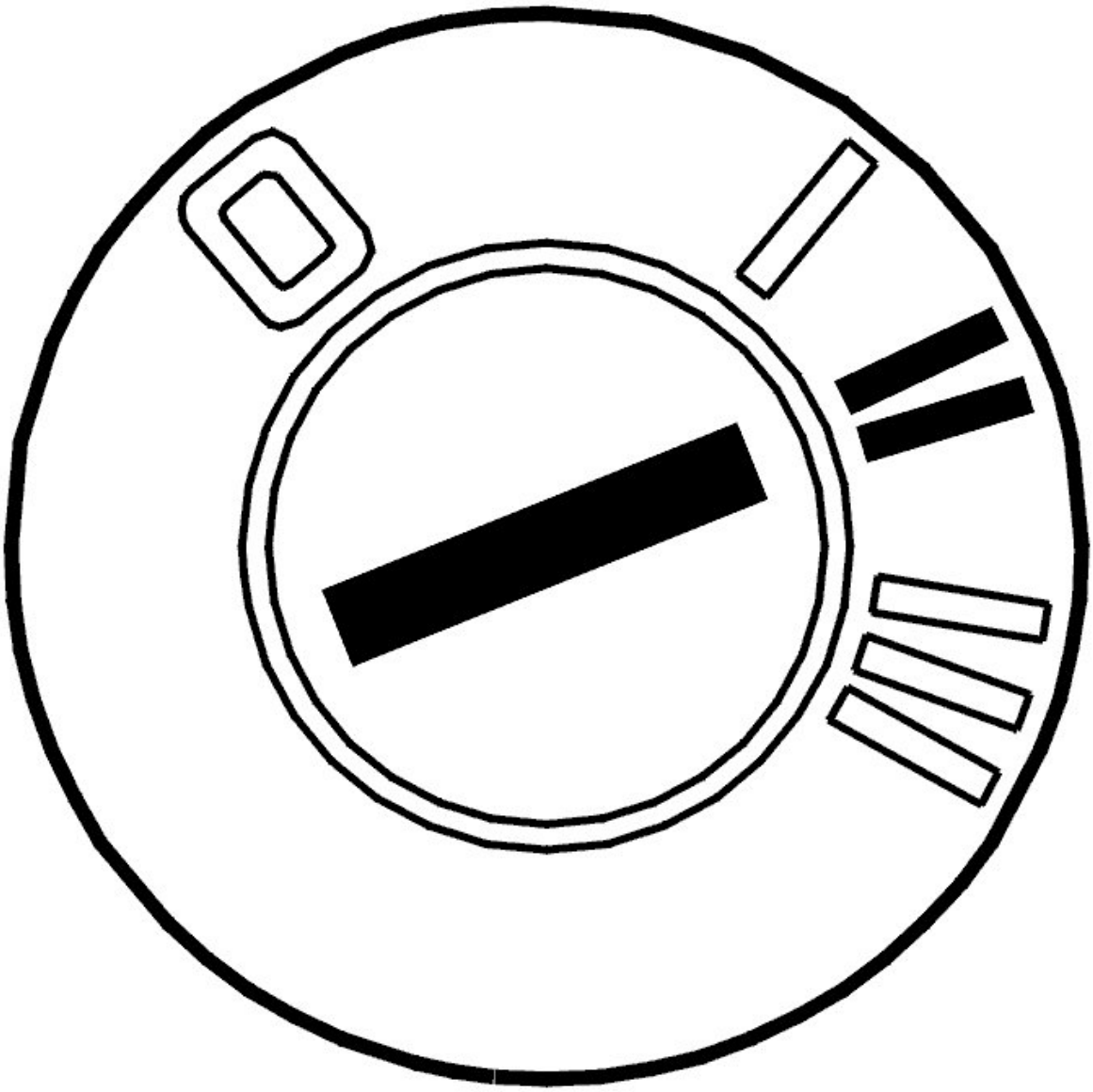
Continue - Verification

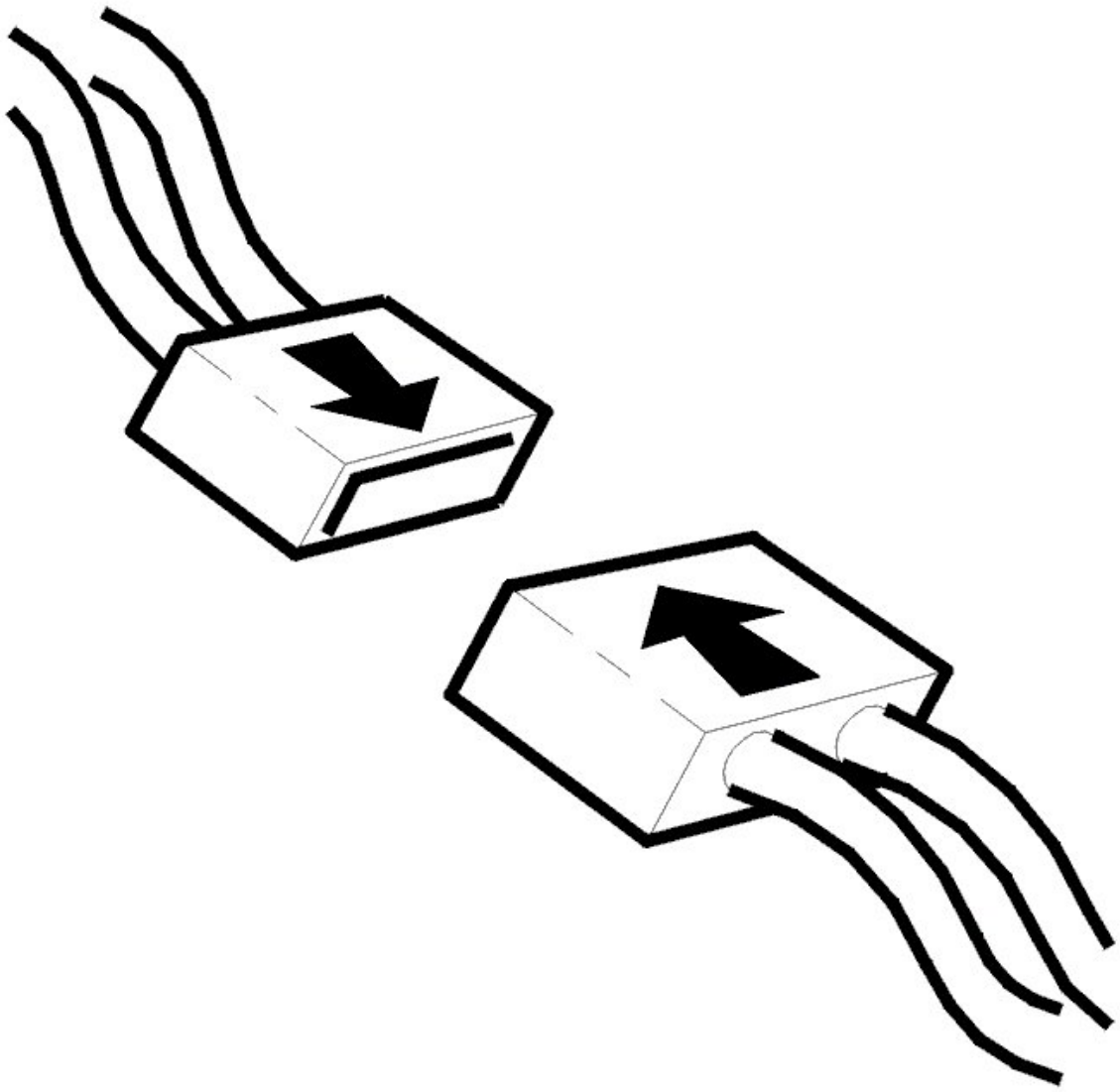
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the components, reconnect the connectors etc.
- Ignition on.
- Gear selector in position P.
- Activate solenoids S4 and S5 individually.

Read off the current in the circuit. The current should oscillate between 0 and approximately 1 A.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

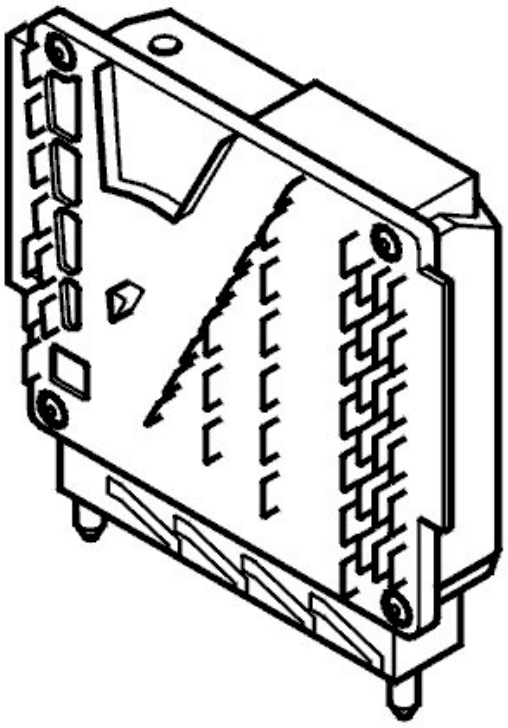
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the control module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute value

- Transmission control unit help program "Limp-home" has started to work.

Possible source

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- Internal fault in control unit.

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

Hint:
- Rough gear shifts can be caused by:
- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

Internal Fault

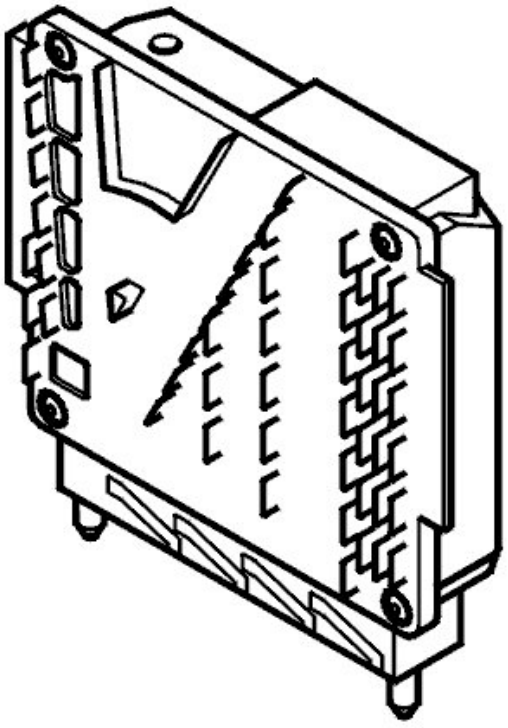
Internal fault

Replacing the control module

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

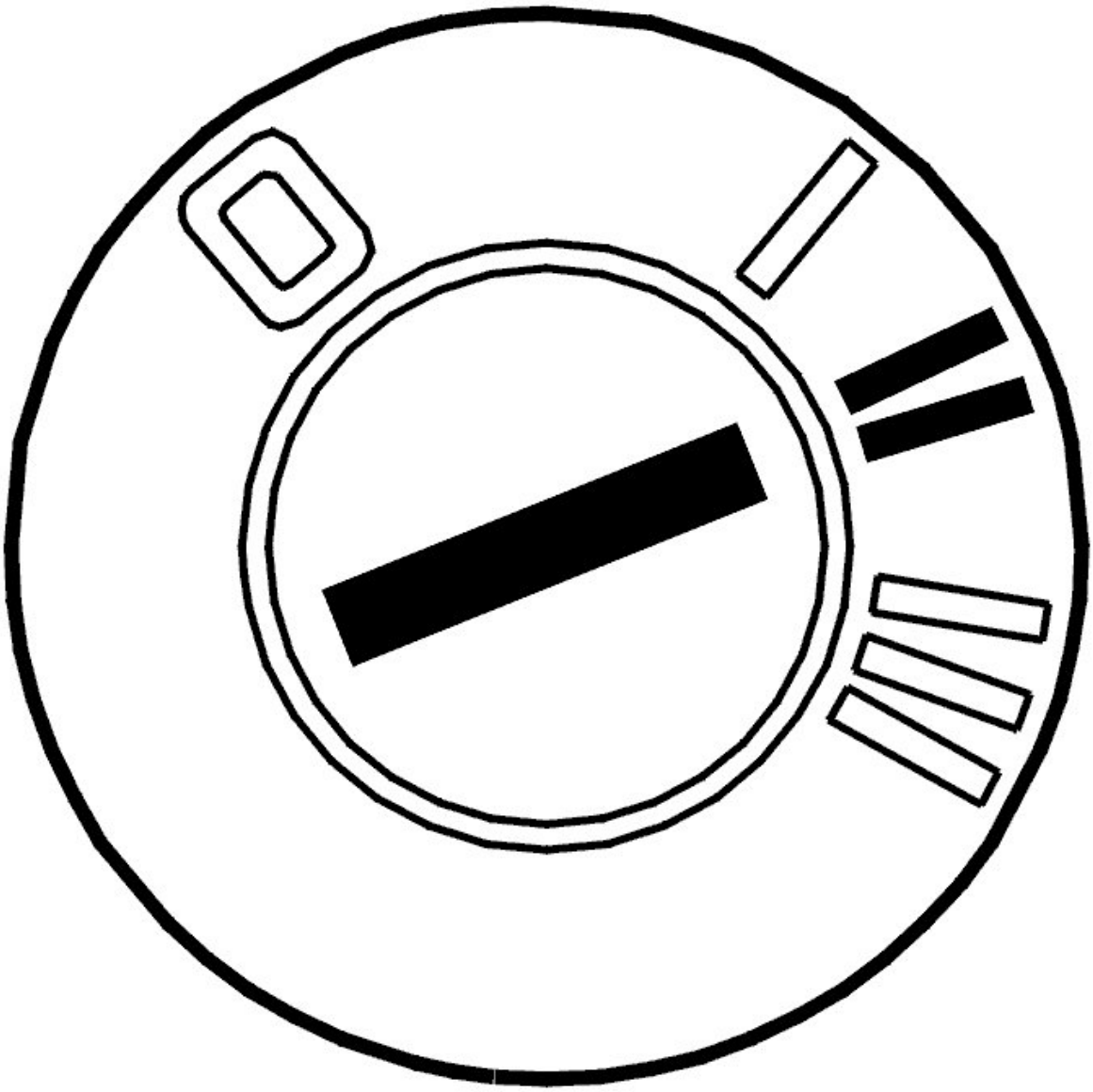


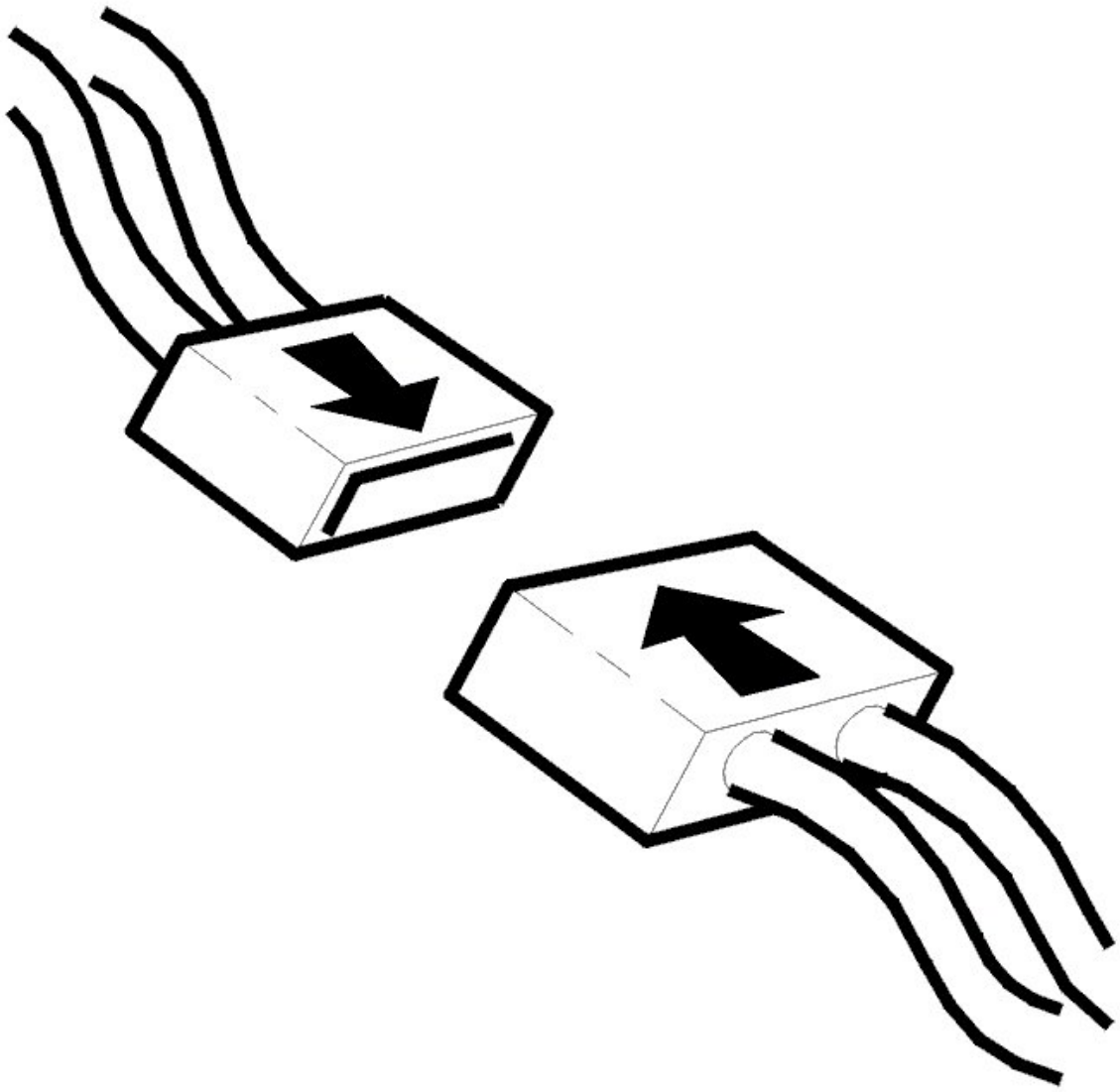
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition on.
- Activate solenoid SLS.

Read off the current through the solenoid SLS circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

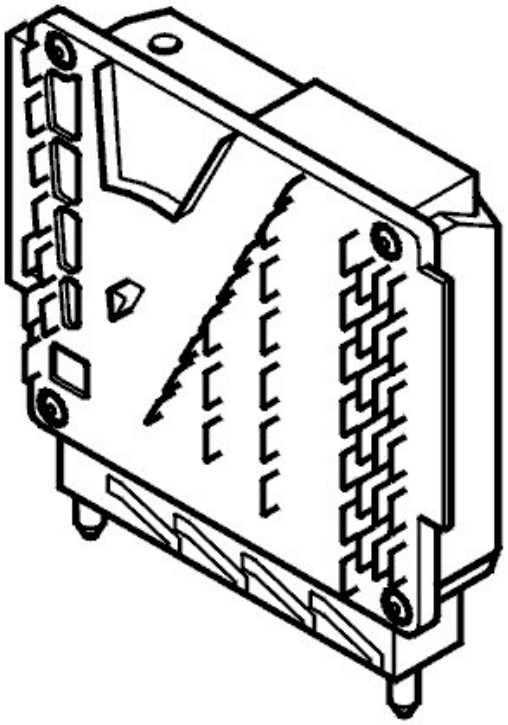
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the control module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute value
- Transmission control unit help program "Limp-home" has started to work.

Possible source
- Internal fault in control unit.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

Hint:
- Rough gear shifts can be caused by:
- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

Internal Fault

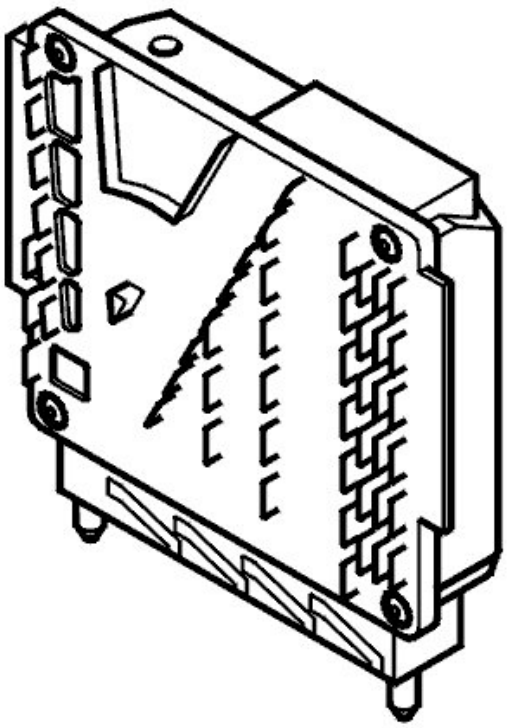
Internal fault

Replacing the control module

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

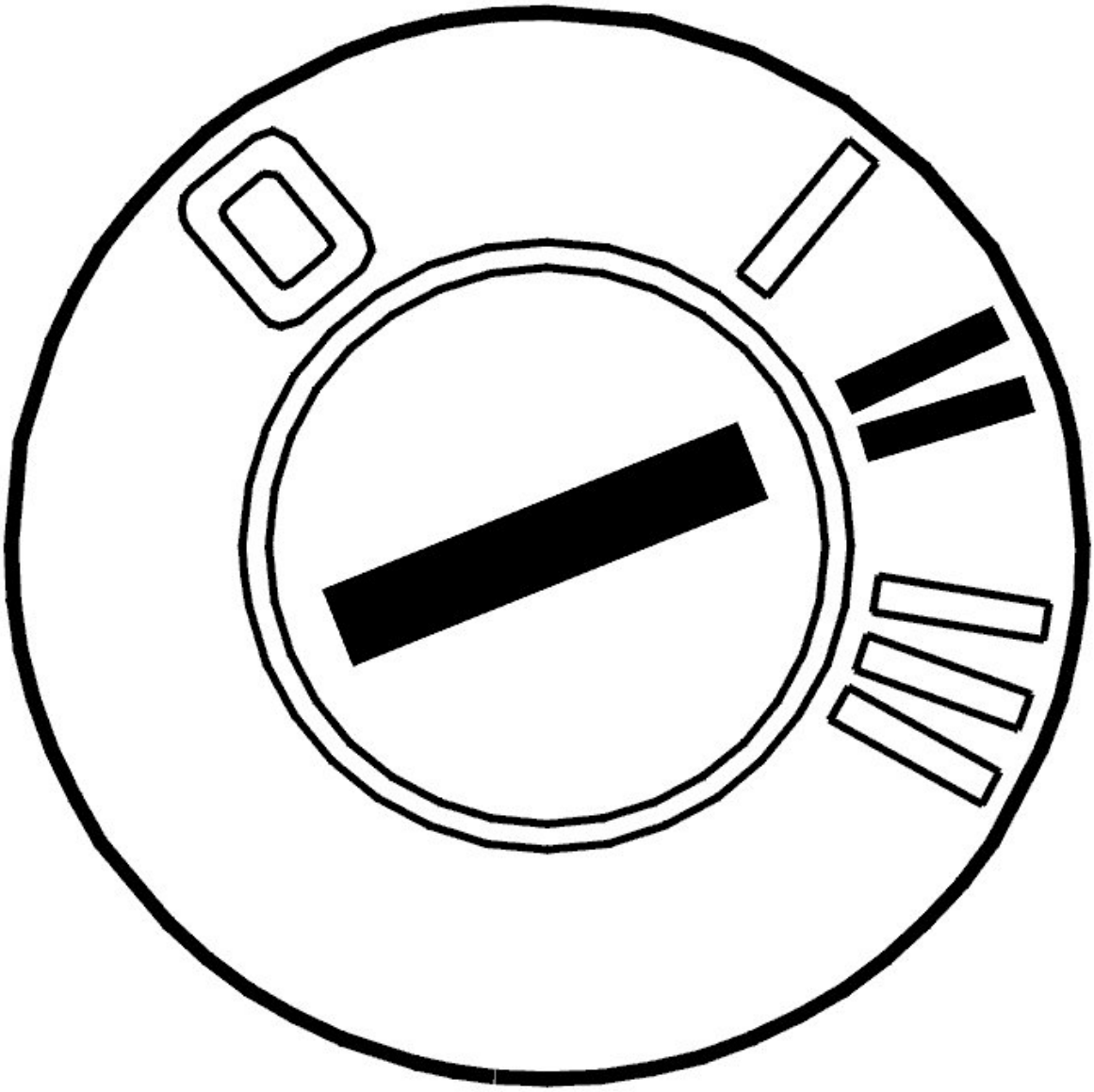


Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.



- Ignition on.
- Activate solenoid SLU.

Read off the current through the solenoid SLU circuit.
The current should oscillate between 0 and 1000 mA.

Does the current oscillate?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

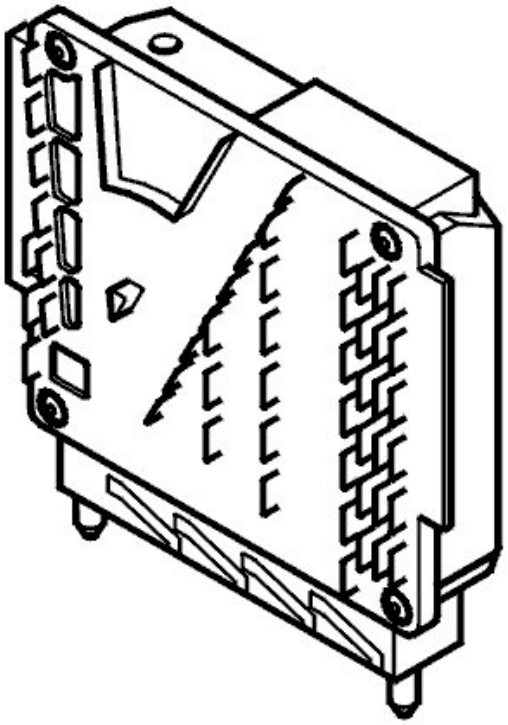
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the control module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition



Solenoids are controlled by output stages in the transmission control unit (TCM). The control unit opens the output stages when the solenoids should be activated, and voltage is supplied to the circuit. If the control unit registers that there is an internal fault in the output stage circuit for solenoid S1, S2, S3, S4, S5, SLU, SLT or SLS diagnostic trouble code TCM-0060, TCM-0120, TCM-0121, TCM-0122, TCM-0123 or TCM-0124 will be stored depending on the output stage.

Substitute value
- Transmission control unit help program "Limp-home" has started to work.

Possible source
- Internal fault in control unit.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Fault symptom[s]
- Orange general warning lamp is on.
- Malfunction indicator light (MIL) is on.
- Lock up function not working.
- Rough gear shifts.
- Gear shifts not working.

Hint:
- Rough gear shifts can be caused by:
- No reduction of system pressure during gear shifts
- No request for torque limitation to the engine control unit during gear shifts

Gear shift failure is caused by the transmission control unit interrupting all solenoid activation.

Internal Fault

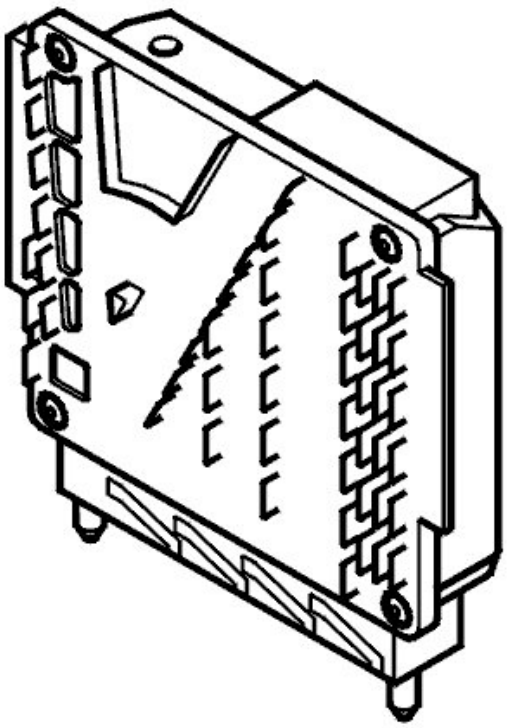
Internal fault

Replacing the control module

The control module has registered an internal fault.

Caution! A new control module is delivered without software. The control module must be programmed in order to function after replacement.

For further information about programming and replacing the control module, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

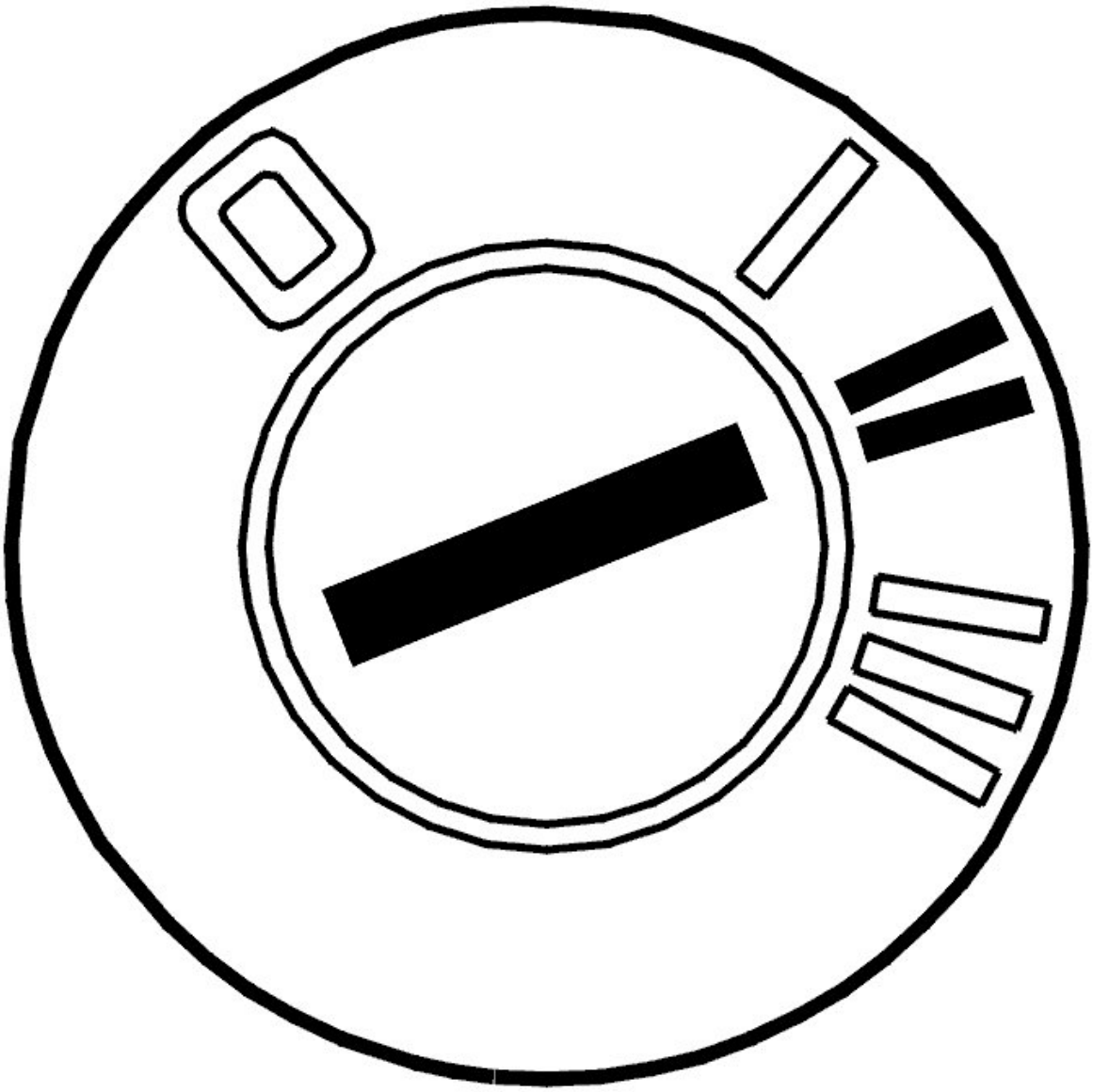


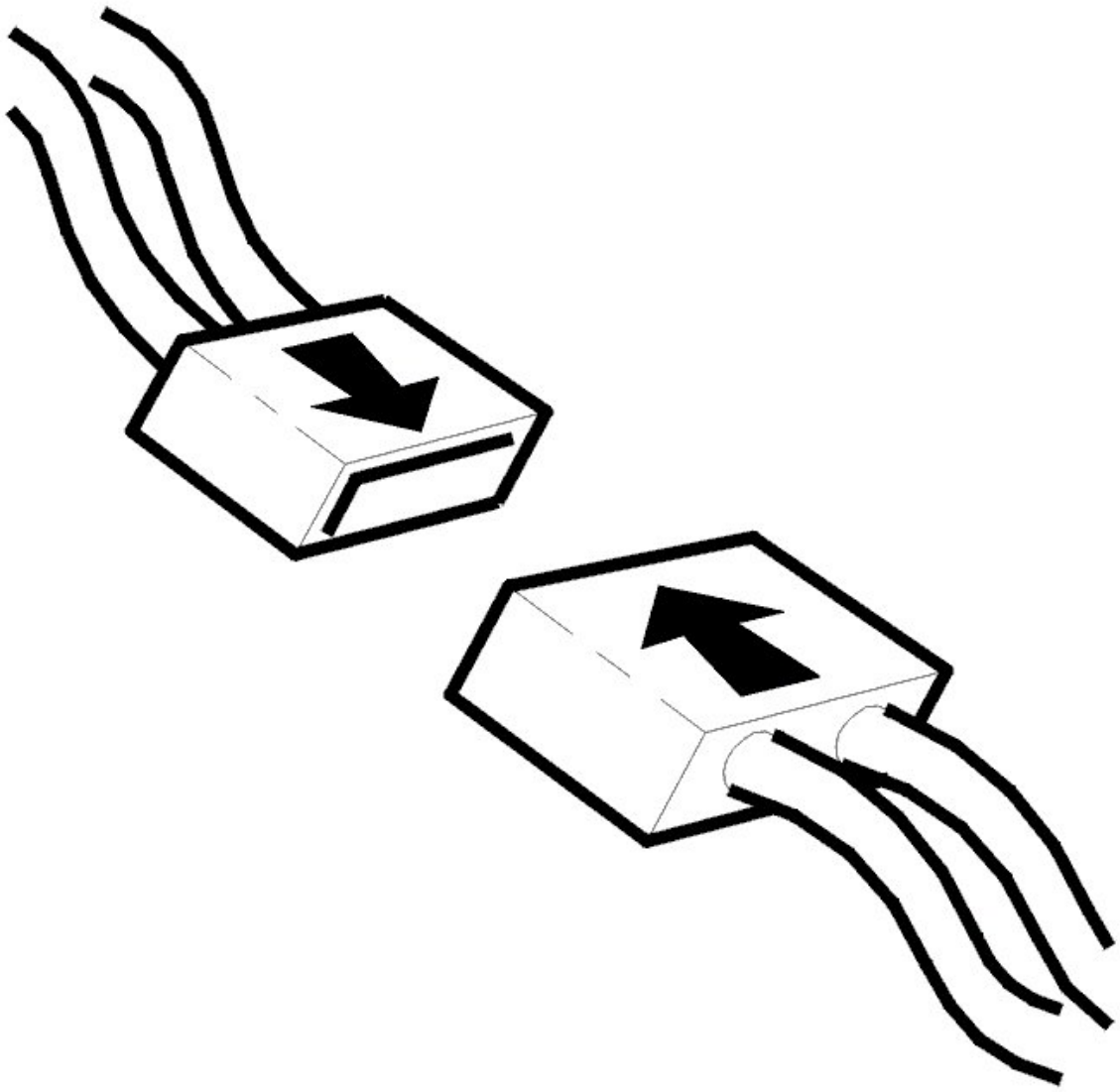
Continue - Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect connectors, reinstall components etc.
- Start the car.
- Depress the accelerator pedal (AP) slowly.
- Read off the current through the solenoid circuit.

The current should decrease as the accelerator pedal (AP) is depressed.

Does the current decrease?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

PAPER - No Fault Found

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

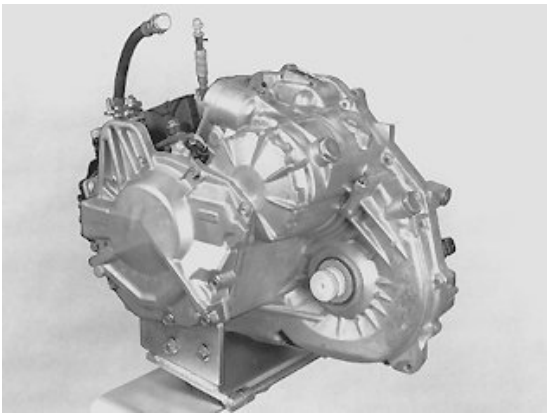
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Replacing the control module

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The driving section of the transmission is disengaged when certain conditions are met:
- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.
Diagnostic trouble code (DTC) TCM-012A is stored if the transmission control module (TCM) registers that clutch C1 disengages incorrectly.

Substitute value
- None.

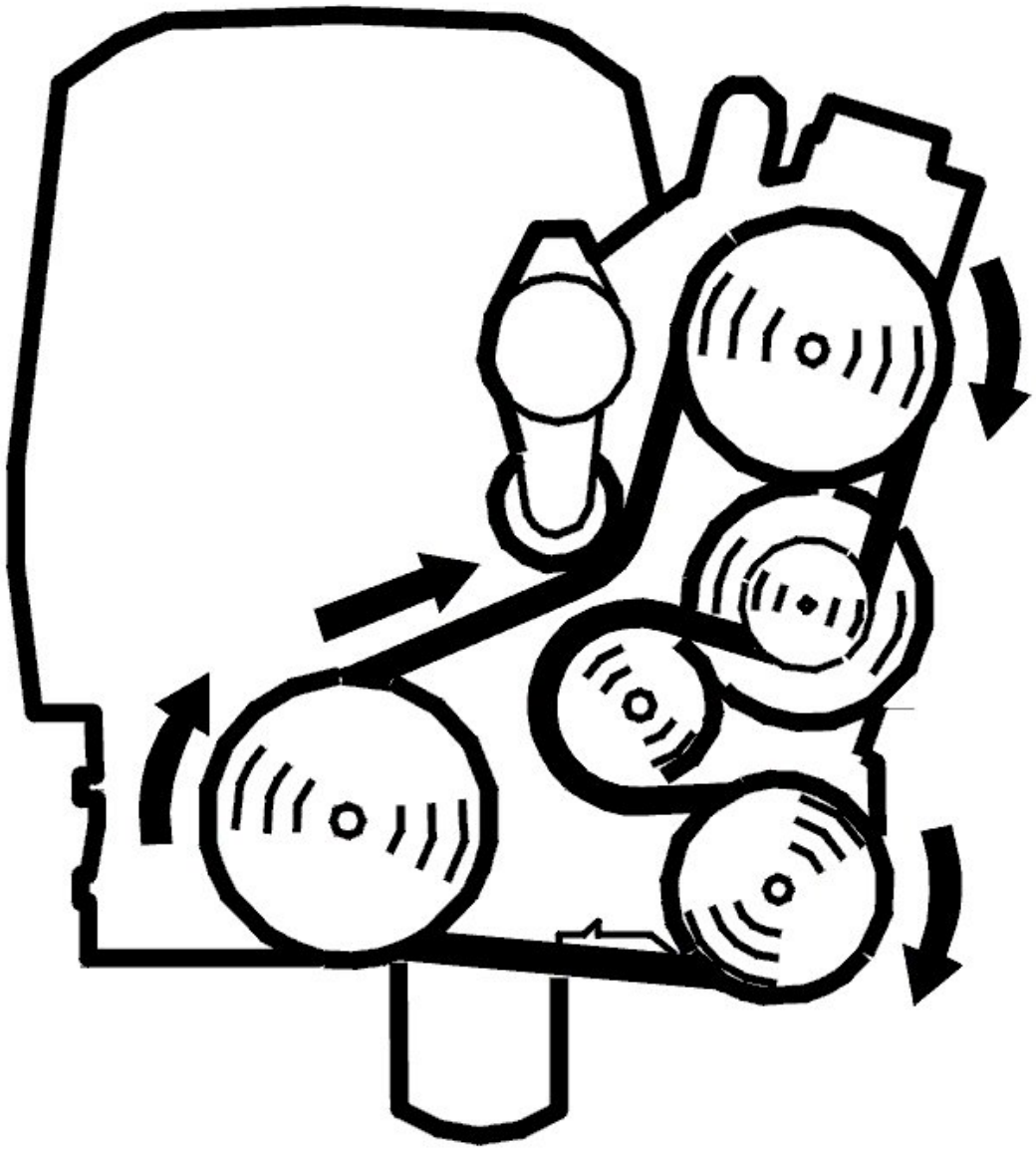
Possible source
- Shift solenoid S1 has jammed in the OFF position
- Shift solenoid S2 has jammed in the ON position
- Solenoid SLT has jammed in the OFF position
- Internal fault in the transmission
- Defective control module.

Fault symptom[s]
- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit.

Faulty Connection

Faulty connection

Checking the neutral check



- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

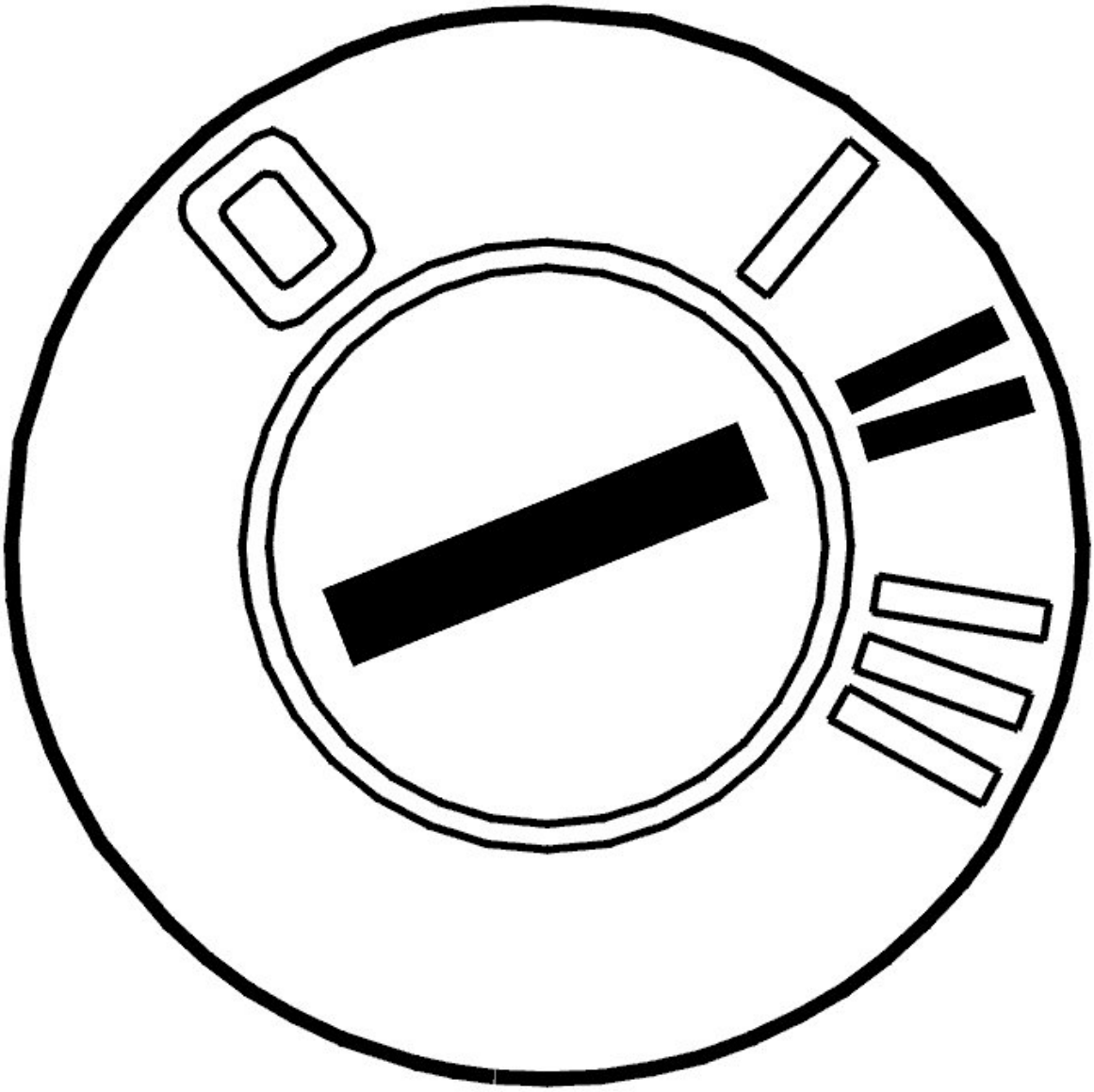
Check that the function operates in gear positions 4, 3 and 2.

Does the status change?

Yes - Fault Found

No - Checking shift solenoids S1 and S2

Checking shift solenoids S1 and S2



- Ignition on
- Gear selector in position P
- Activate solenoids S1 and S2 individually.

Note! Select to read the status for the solenoid that should be activated.

The value should shift between OFF and ON and a " clicking sound" should be heard in the transmission (at 20° C).

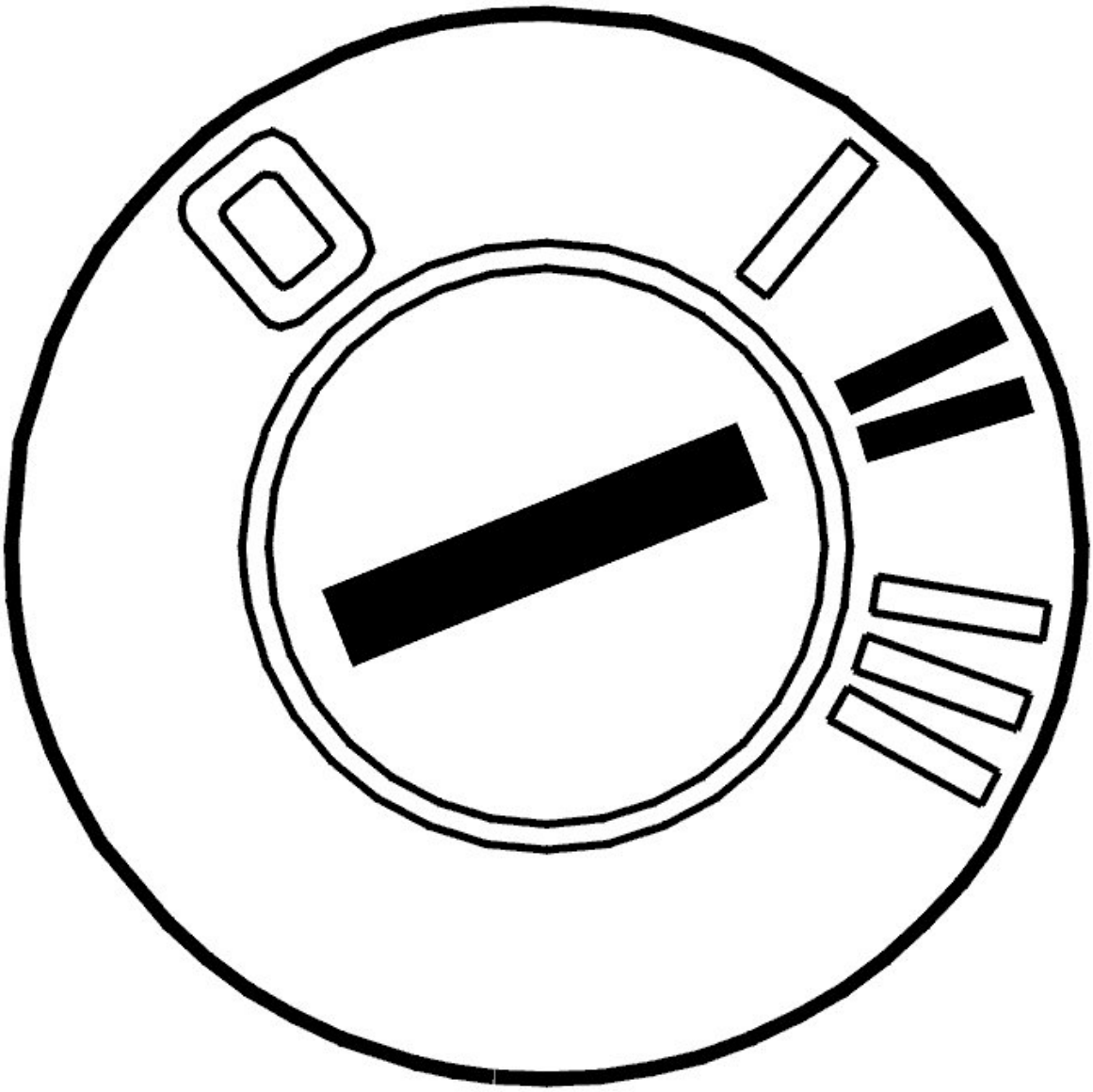
Does the value change?

Yes - Checking solenoid SLT

No - Replacing the transmission control system

Checking solenoid SLT

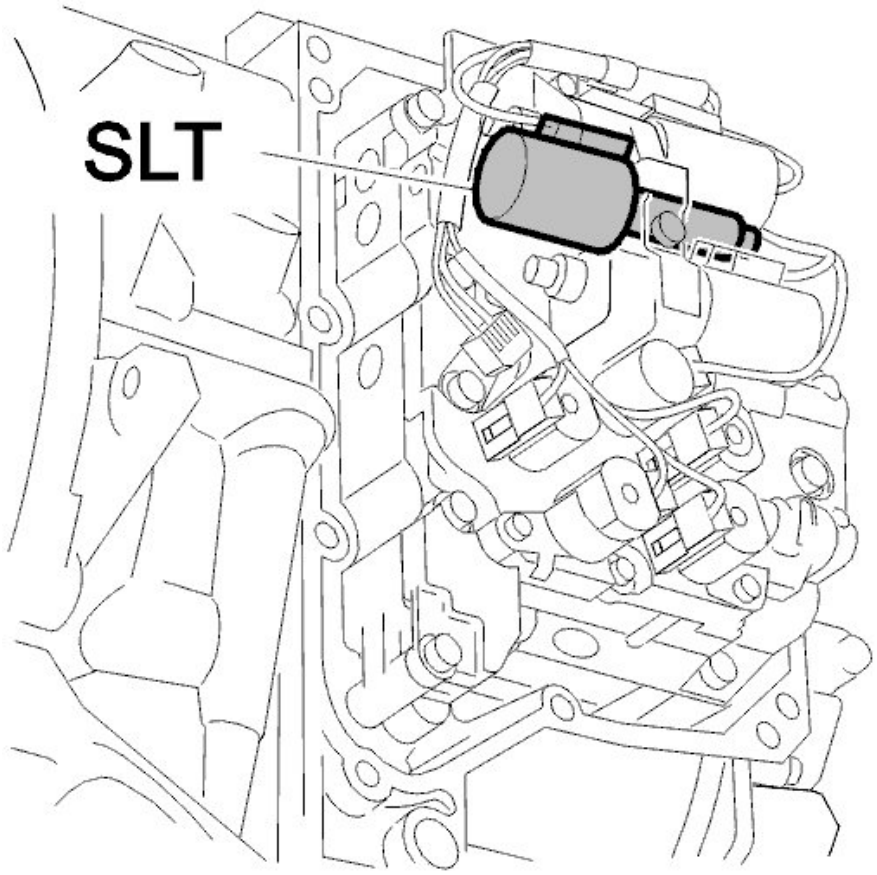
Note! The transmission must not be colder than room temperature when activated.



- Ignition on
- Activate solenoid SLT.

Check that the solenoid " clicks" on activation. Use a stethoscope to hear the sound more clearly.
If no "click" is heard, this indicates that there is a mechanical fault.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

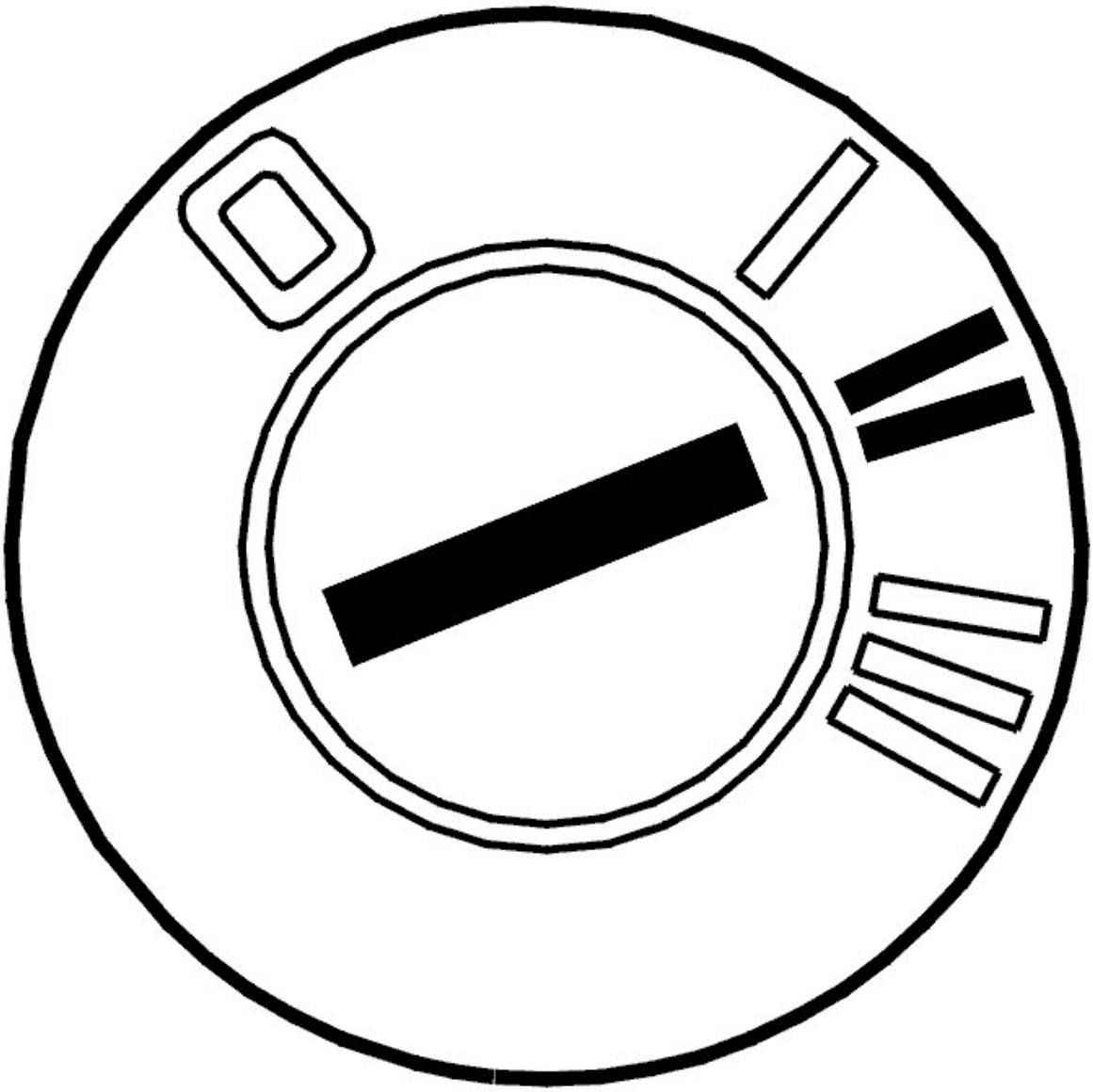


Was solenoid SLT OK?

Yes - No Fault Found

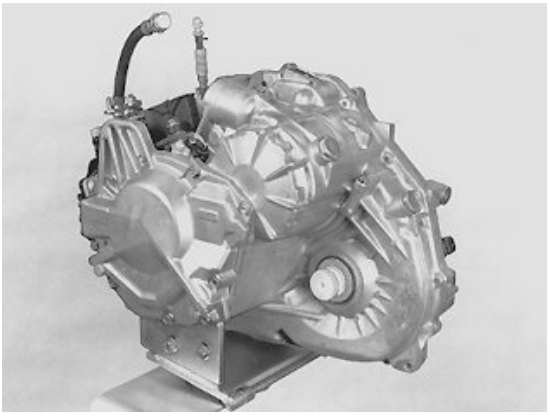
No - Replacing the transmission control system

Replacing the transmission control system



- Ignition off
- Replace the faulty shift solenoid.

The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing.



Continue - Resetting the adaptation and oil quality counter

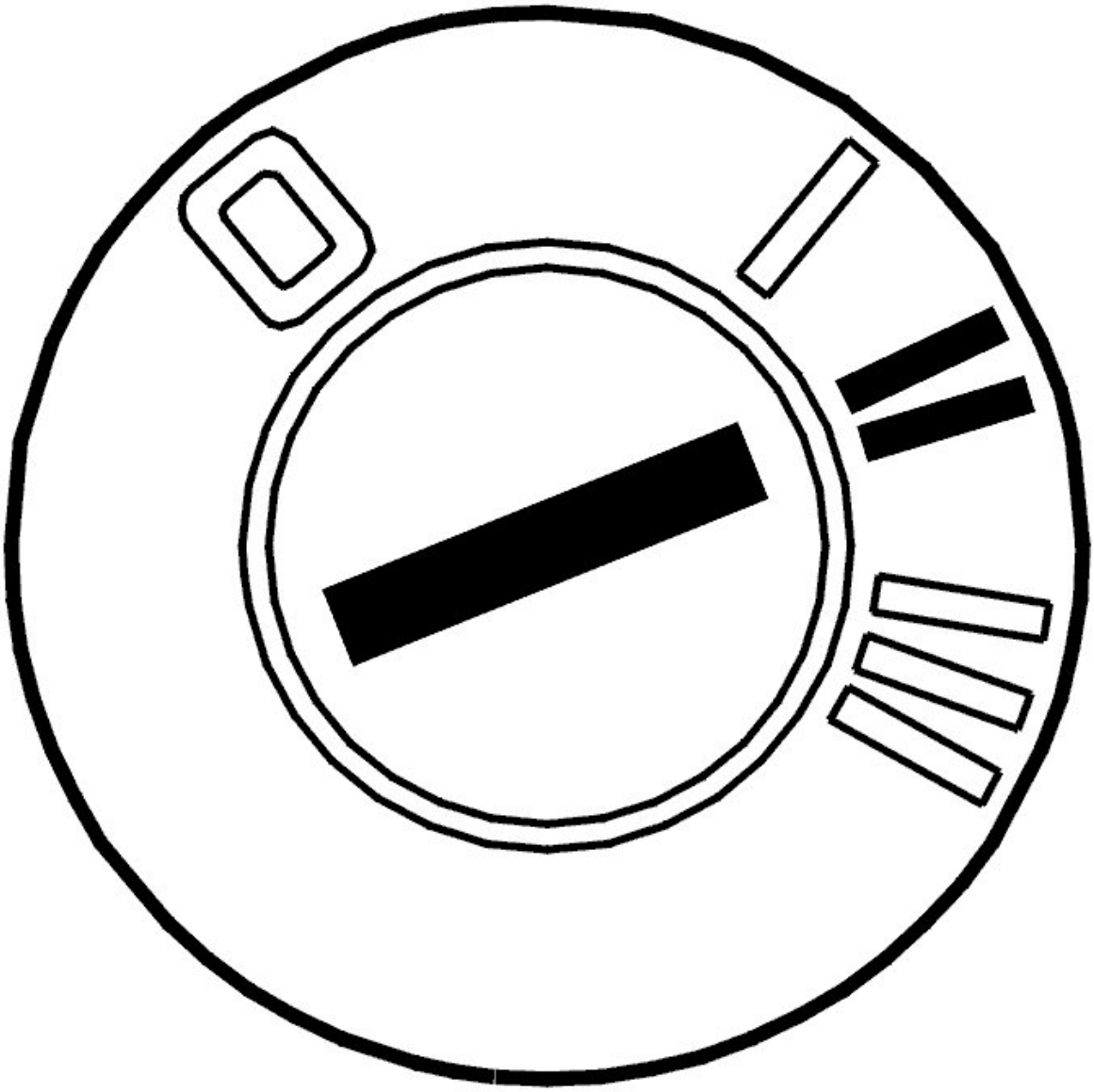
Resetting the adaptation and oil quality counter

Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - **DONE**

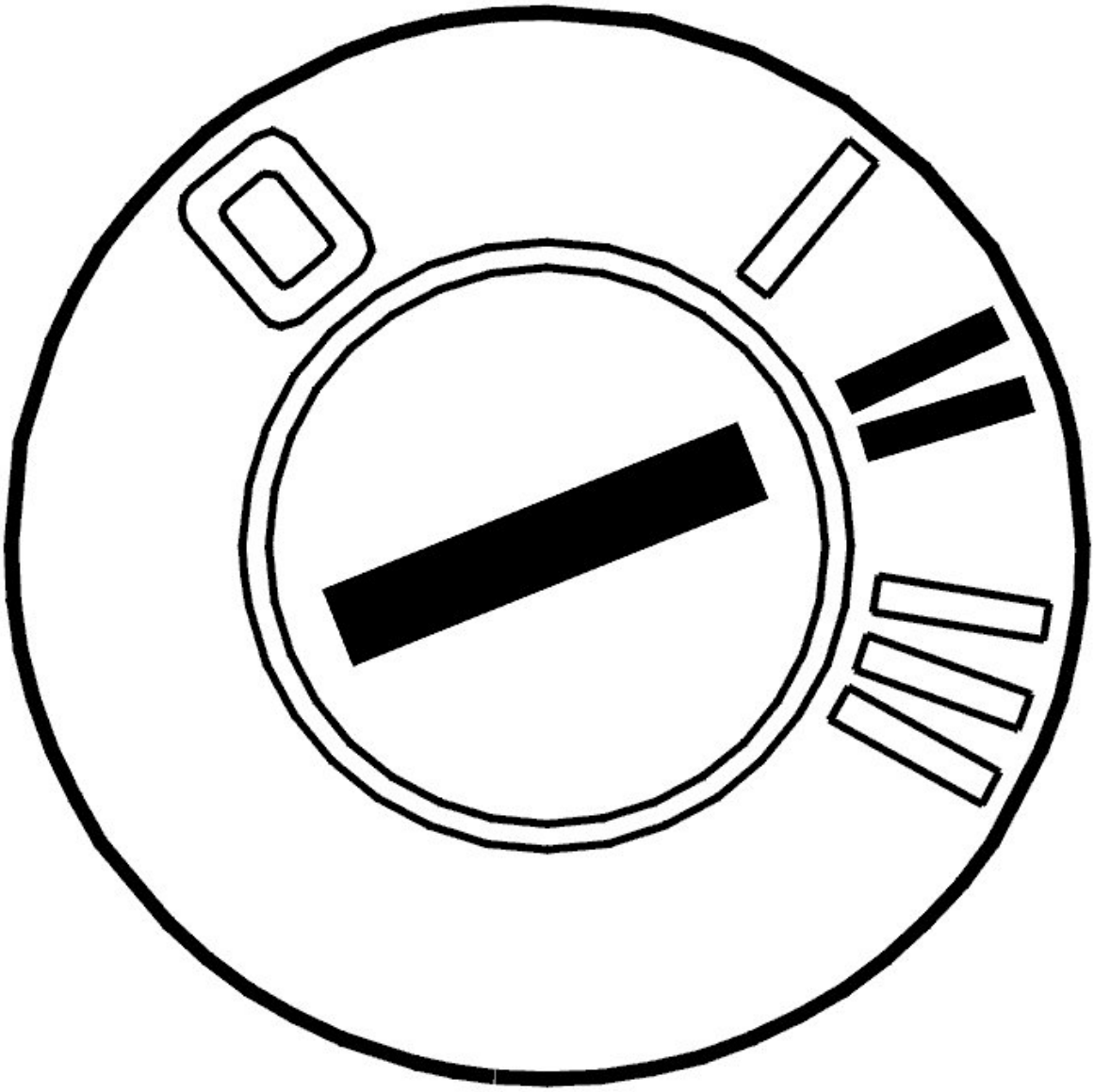
DONE - Verification

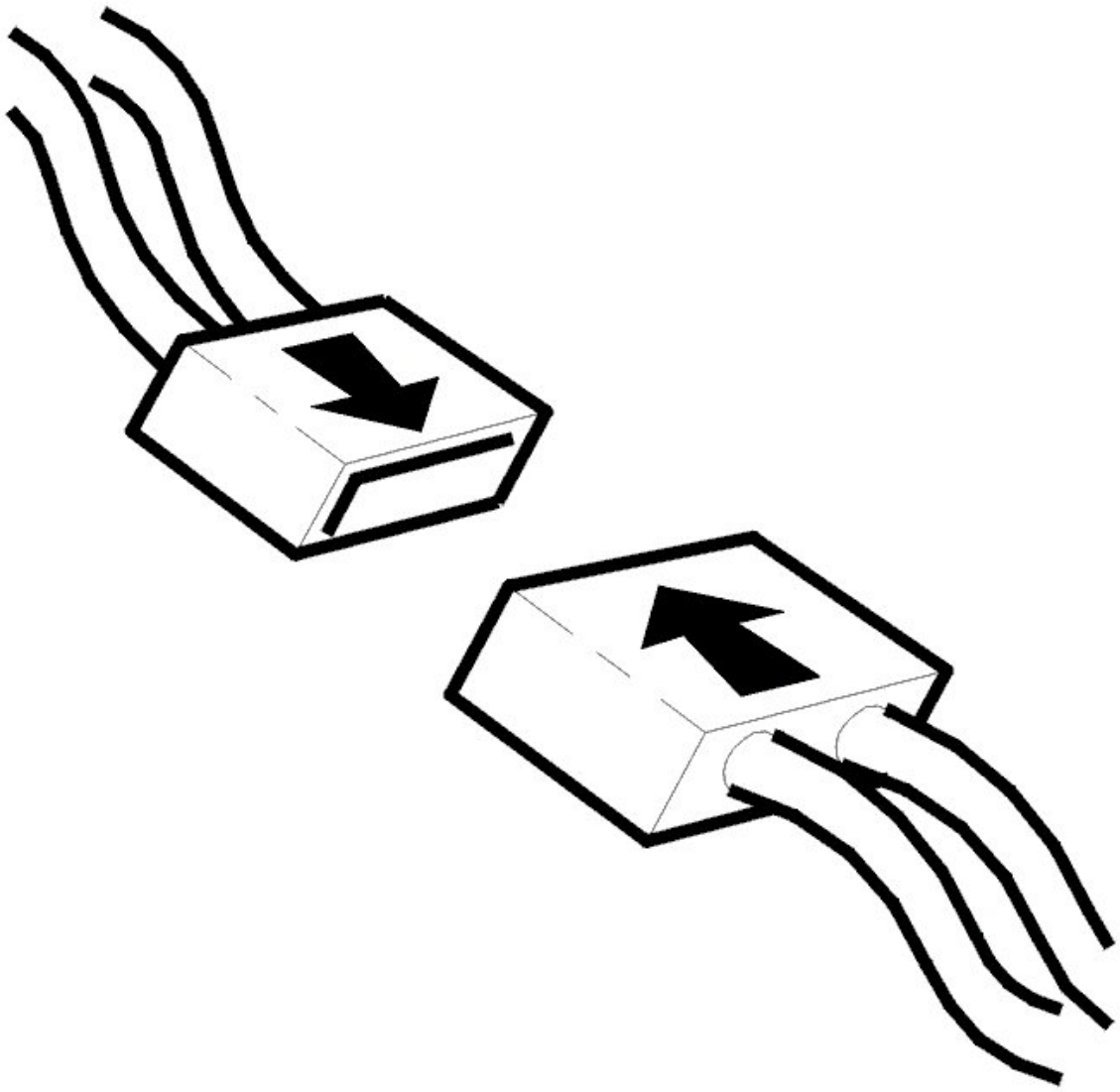
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

Check that the function operates in gear positions 4, 3 and 2.

Is transmission function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

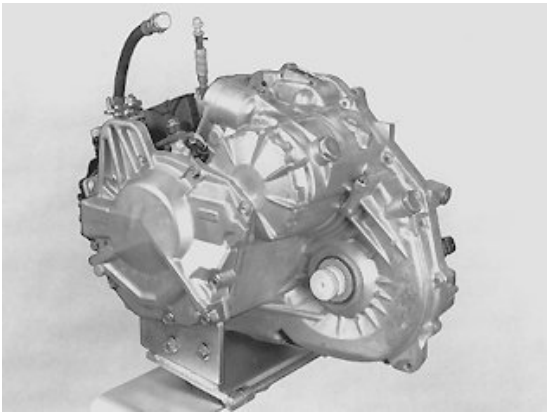
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the neutral check

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The driving section of the transmission is disengaged when certain conditions are met:
- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.
Diagnostic trouble code (DTC) TCM-012B is stored if the transmission control module (TCM) registers that clutch C1 does not engage.

Substitute value
- None.

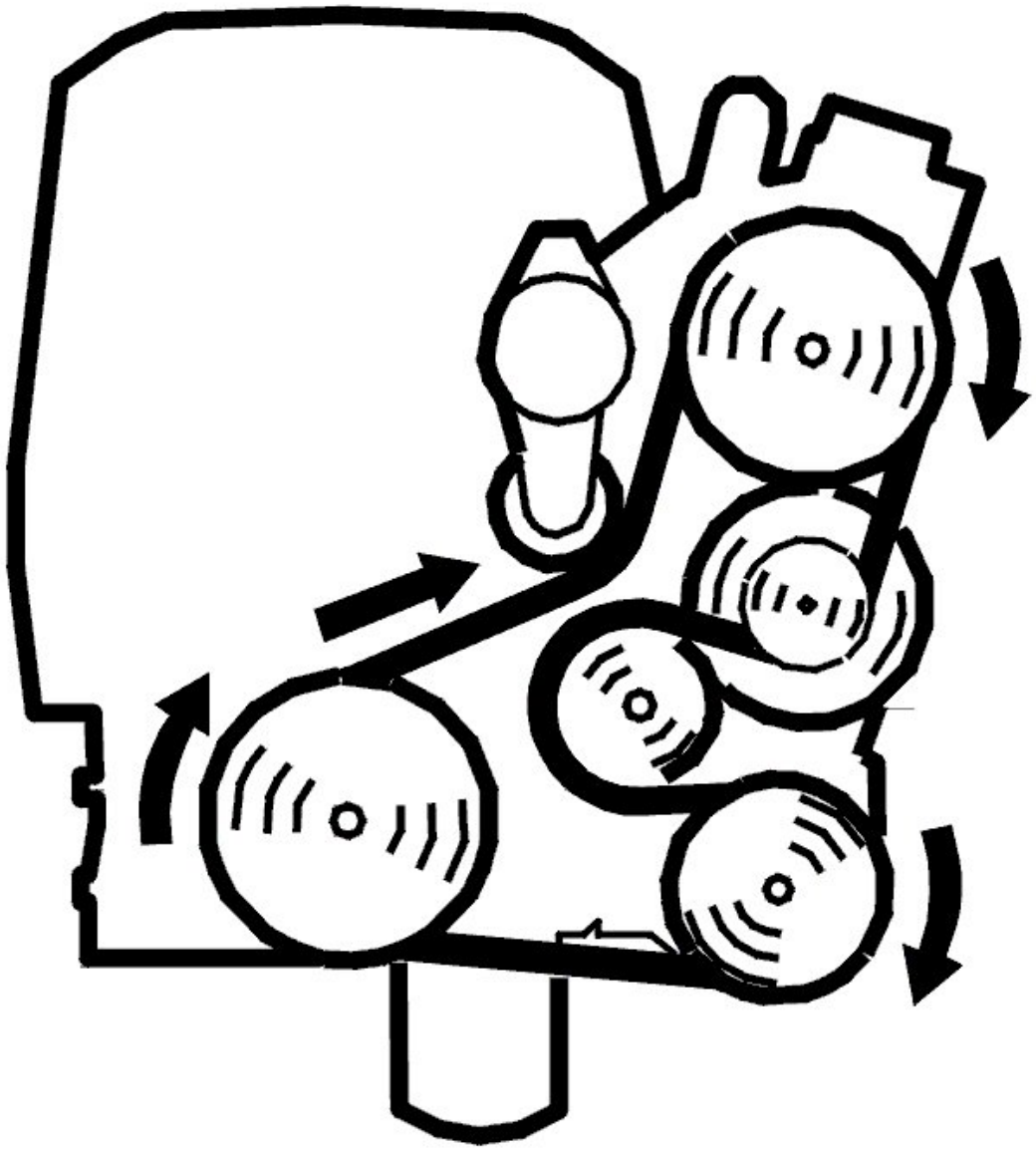
Possible source
- Shift solenoid SLS has jammed in the OFF position
- Internal fault in the transmission
- Internal fault in the control module.

Fault symptom[s]
- General orange warning lamp lit
- Malfunction indicator lamp (MIL) lit.

No Neutral Check

No neutral check

Checking the neutral check



- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

The engine speed (RPM) should be even when transferring from Active to Inactive status.
Check that the function operates in gear positions 4, 3 and 2.

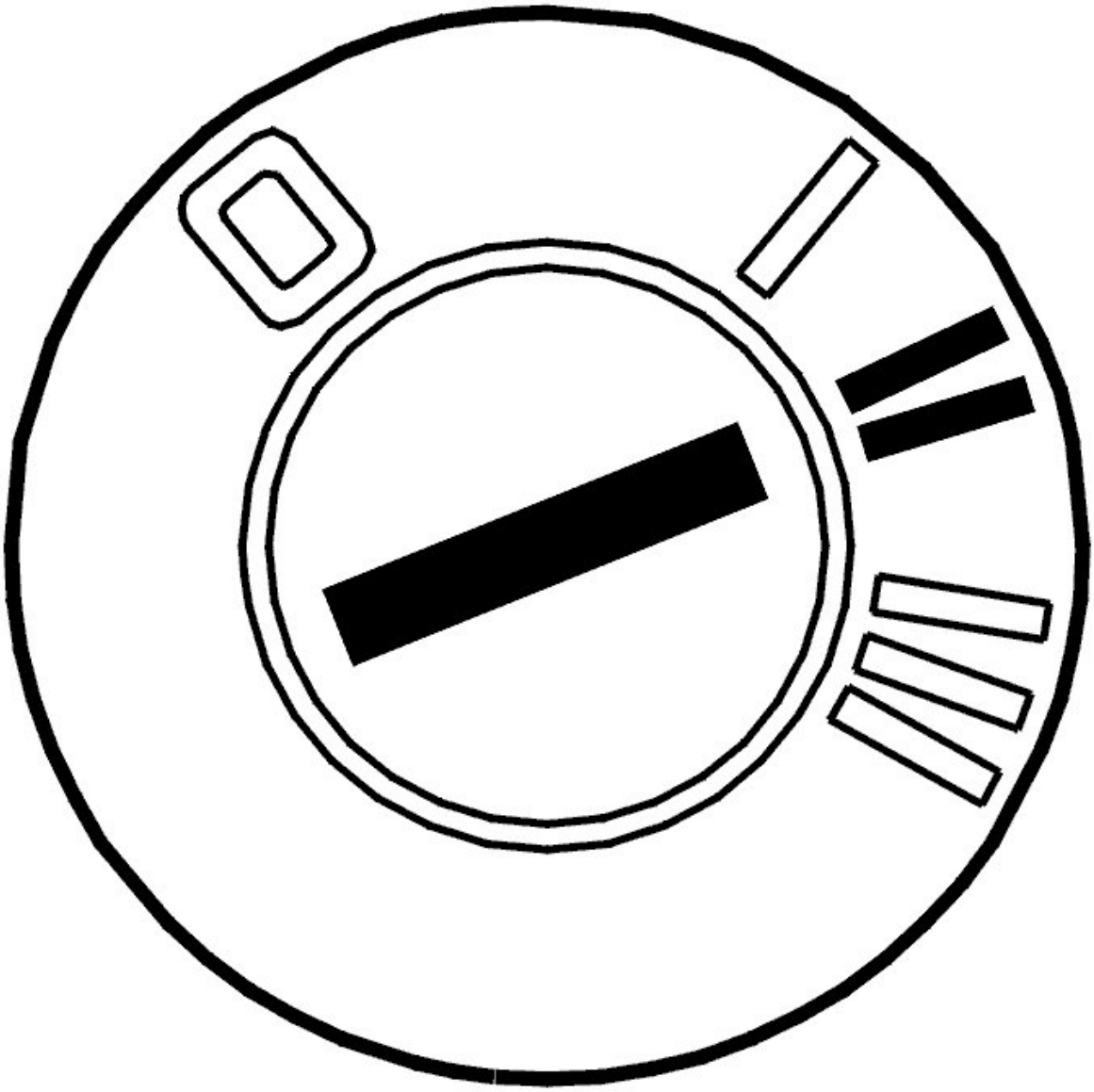
Is the function of the transmission OK?

Yes - Test driving

No - Checking solenoid SLT

Checking solenoid SLT

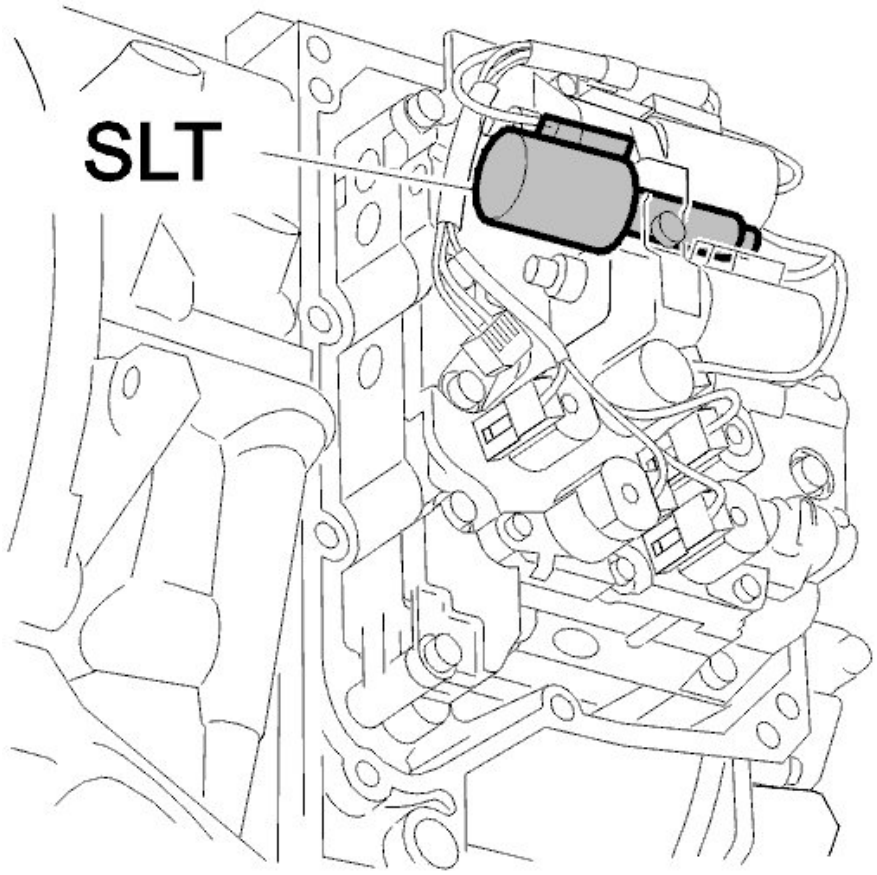
Note! The transmission must not be colder than room temperature when activated.



- Ignition on
- Activate solenoid SLT.

Check that the solenoid " clicks" on activation and that the current changes from approximately 0 to 1 A. Use a stethoscope to hear the sound more clearly.
If no "click" is heard, this indicates that there is a mechanical fault.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

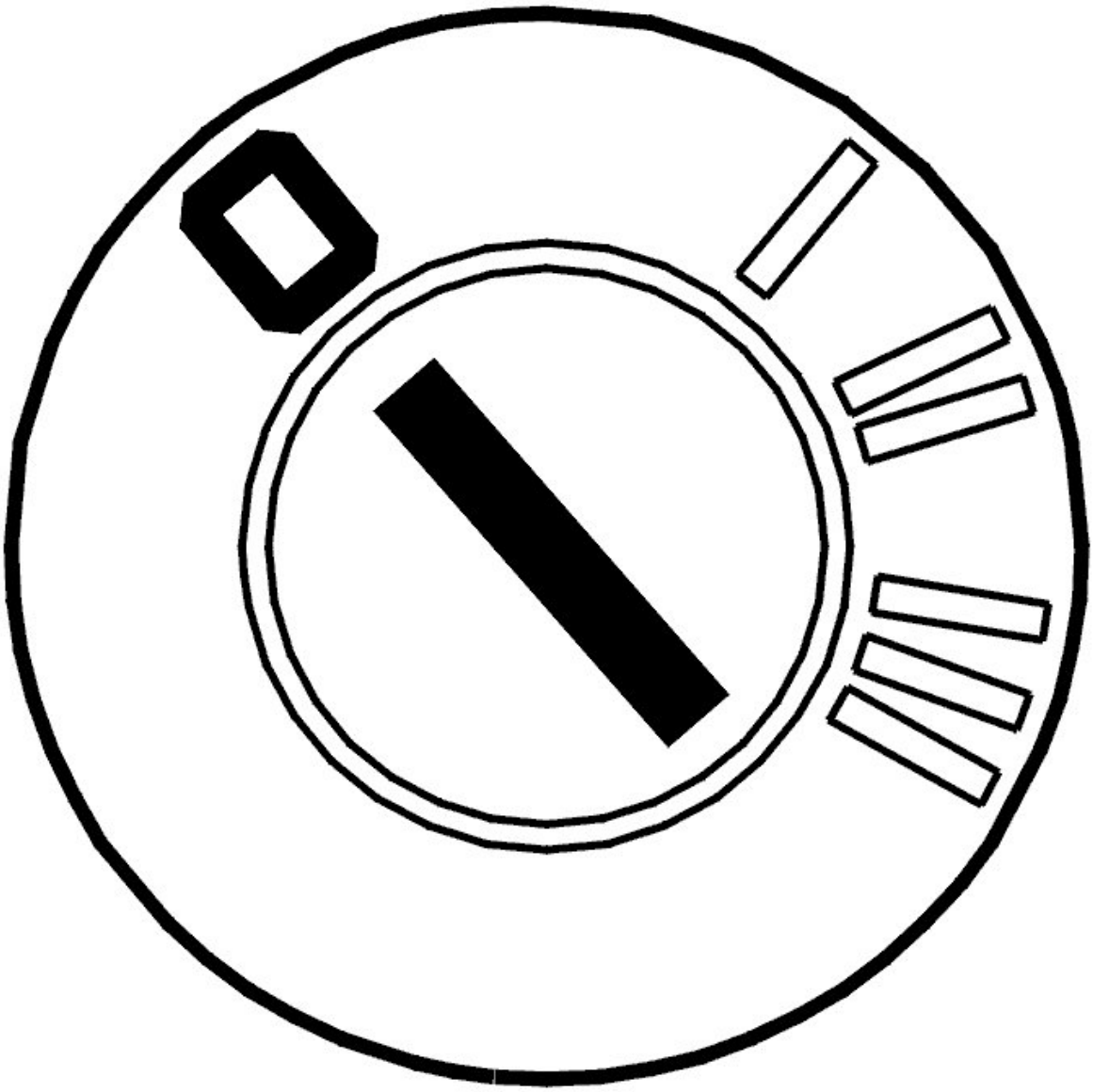


Was there a click from the solenoid?

Yes - Test driving

No - Replacing the transmission control system

Test driving



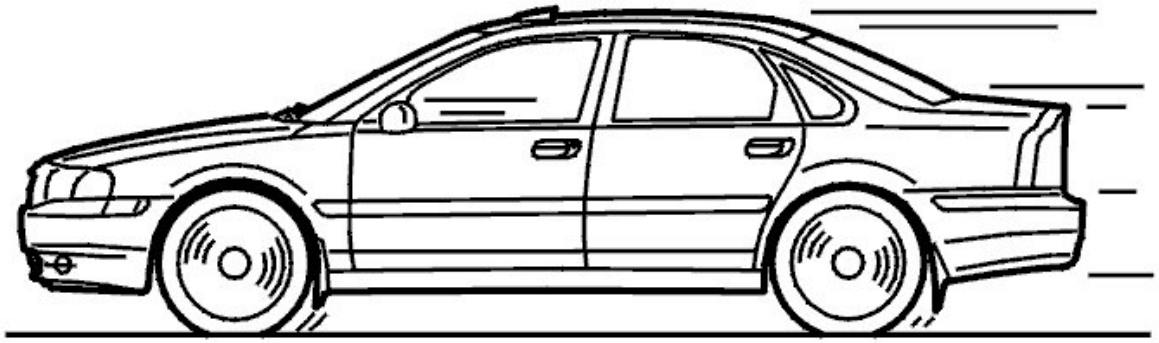
- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Test drive schedule, description, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Service and Repair/Procedures/Test Drive Schedule, Description.

Check that the shifts and the neutral check function without any problems.

Other information

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To access the control module connector, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

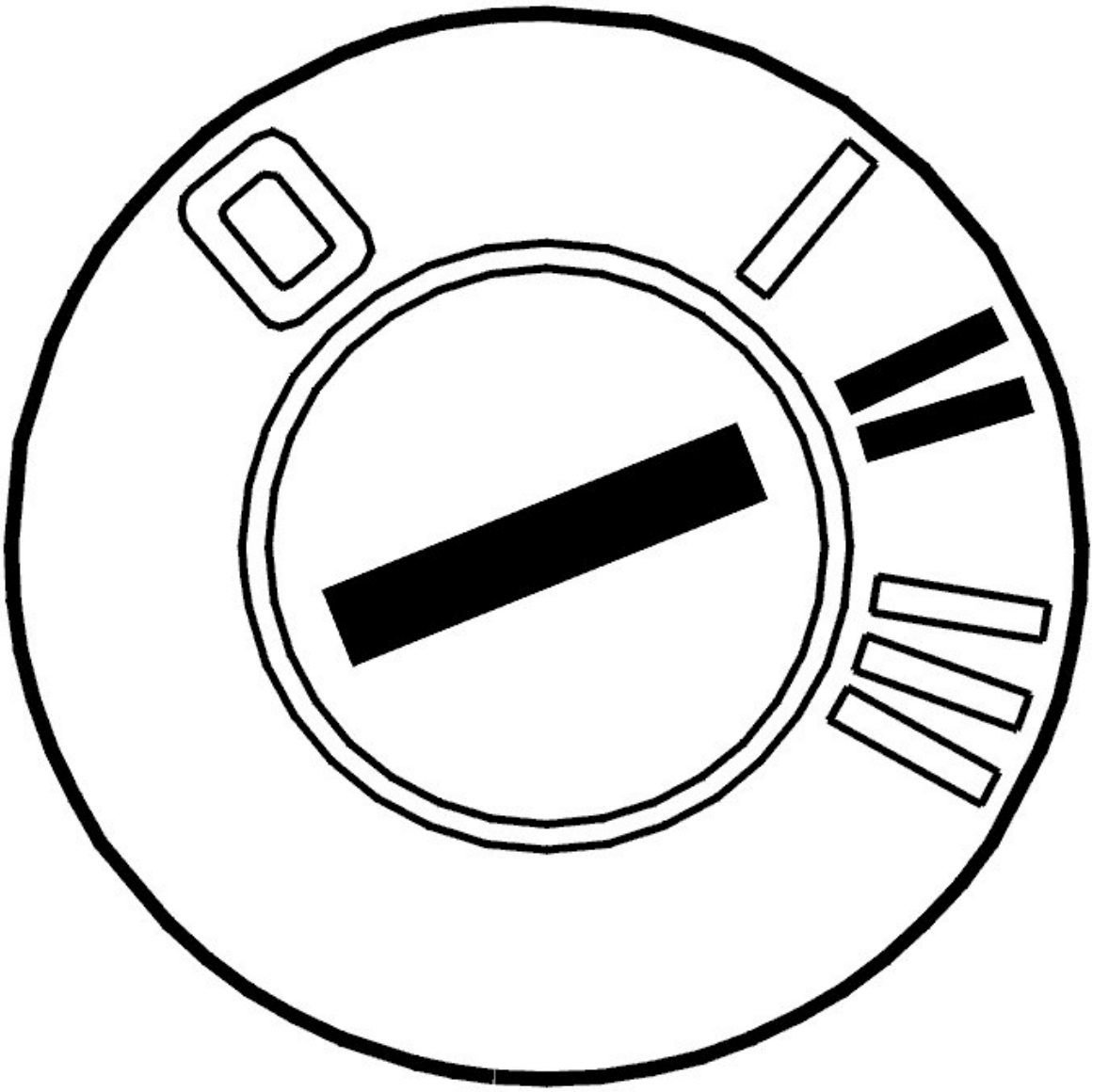


Is the transmission operating correctly?

Yes - Fault Found

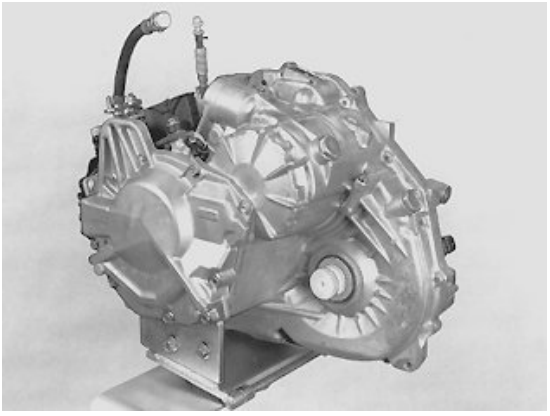
No - Replacing the transmission control system

Replacing the transmission control system



- Ignition off.

The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing.



Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

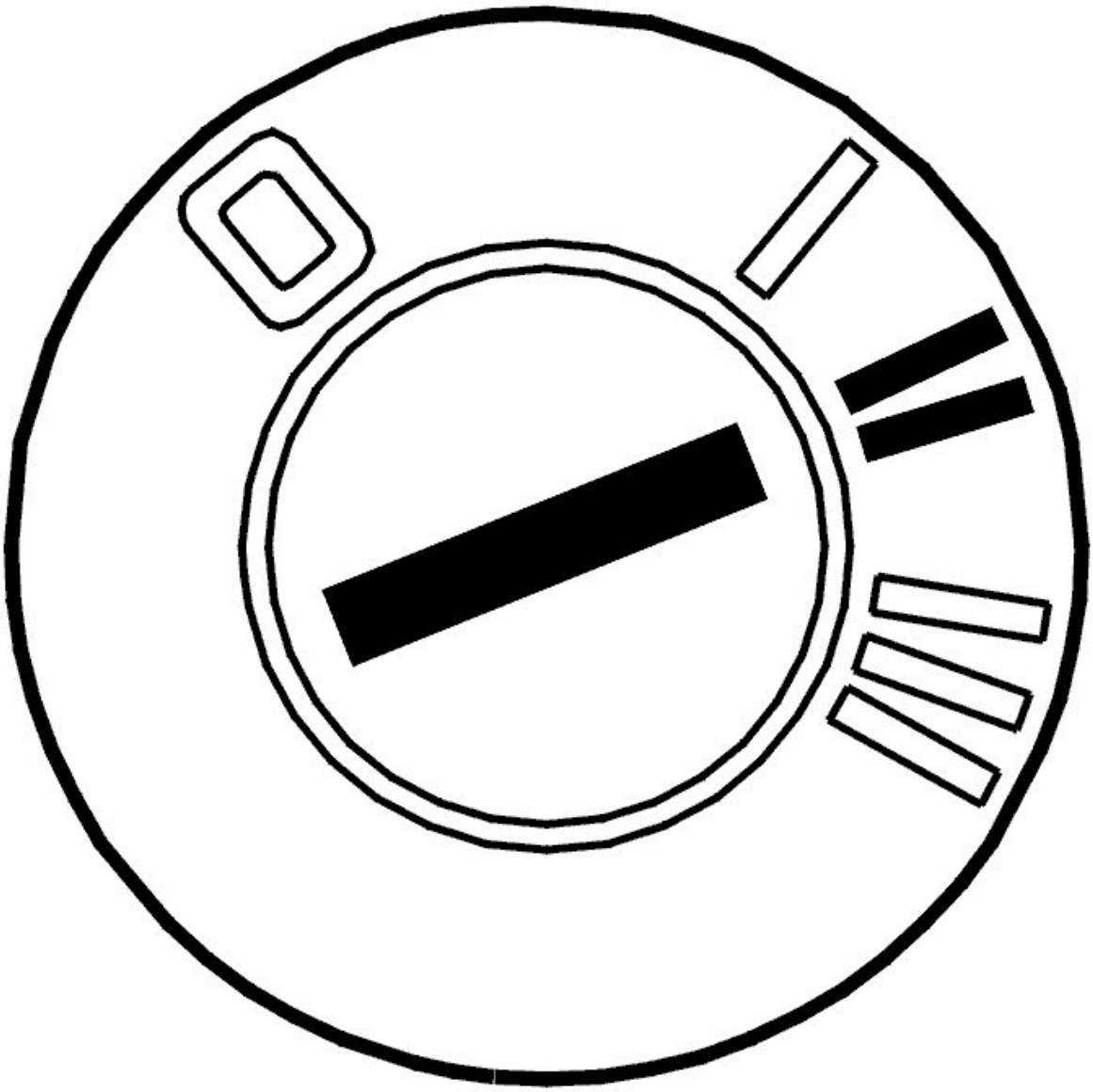
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - DONE

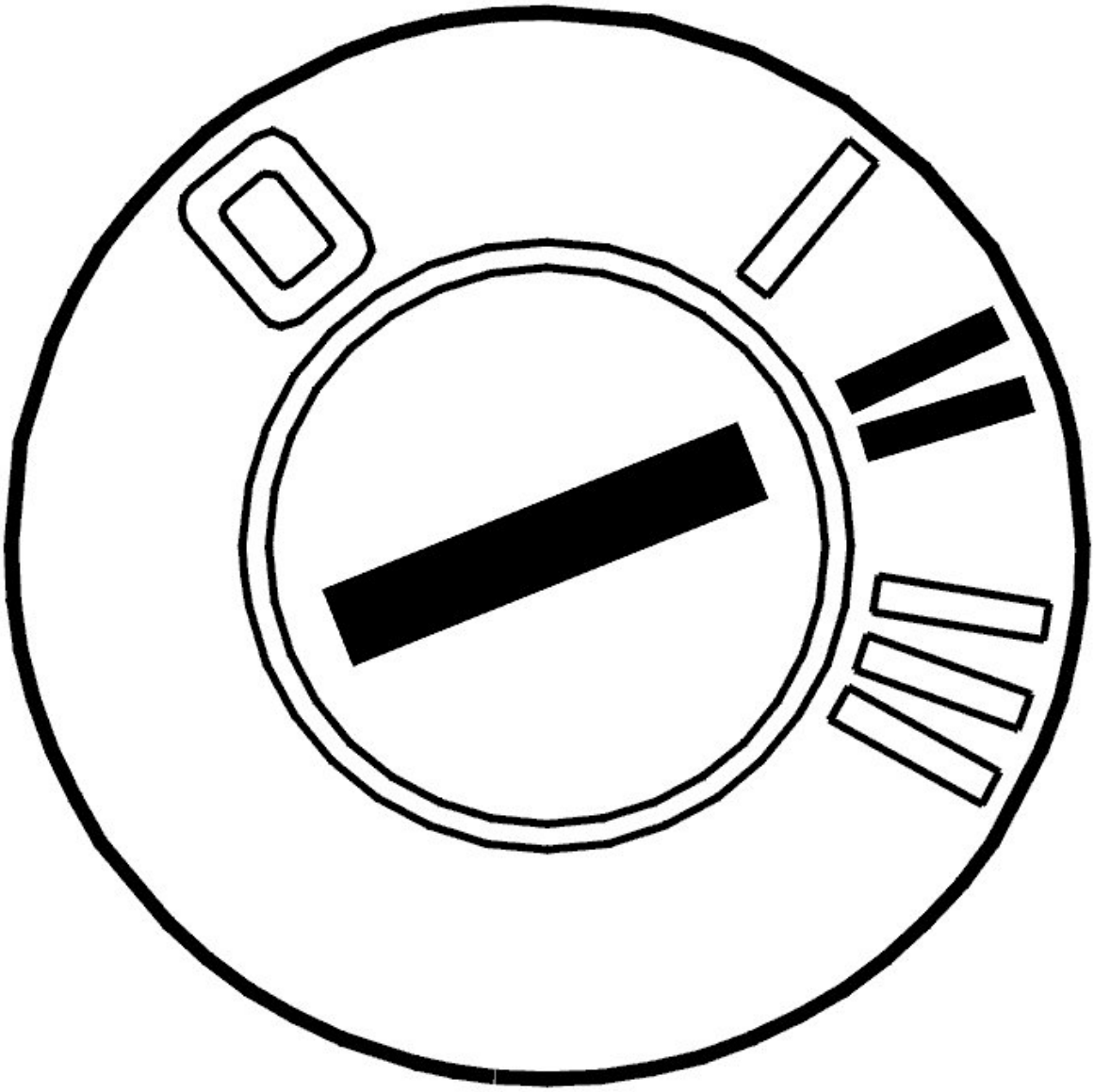
DONE - Verification

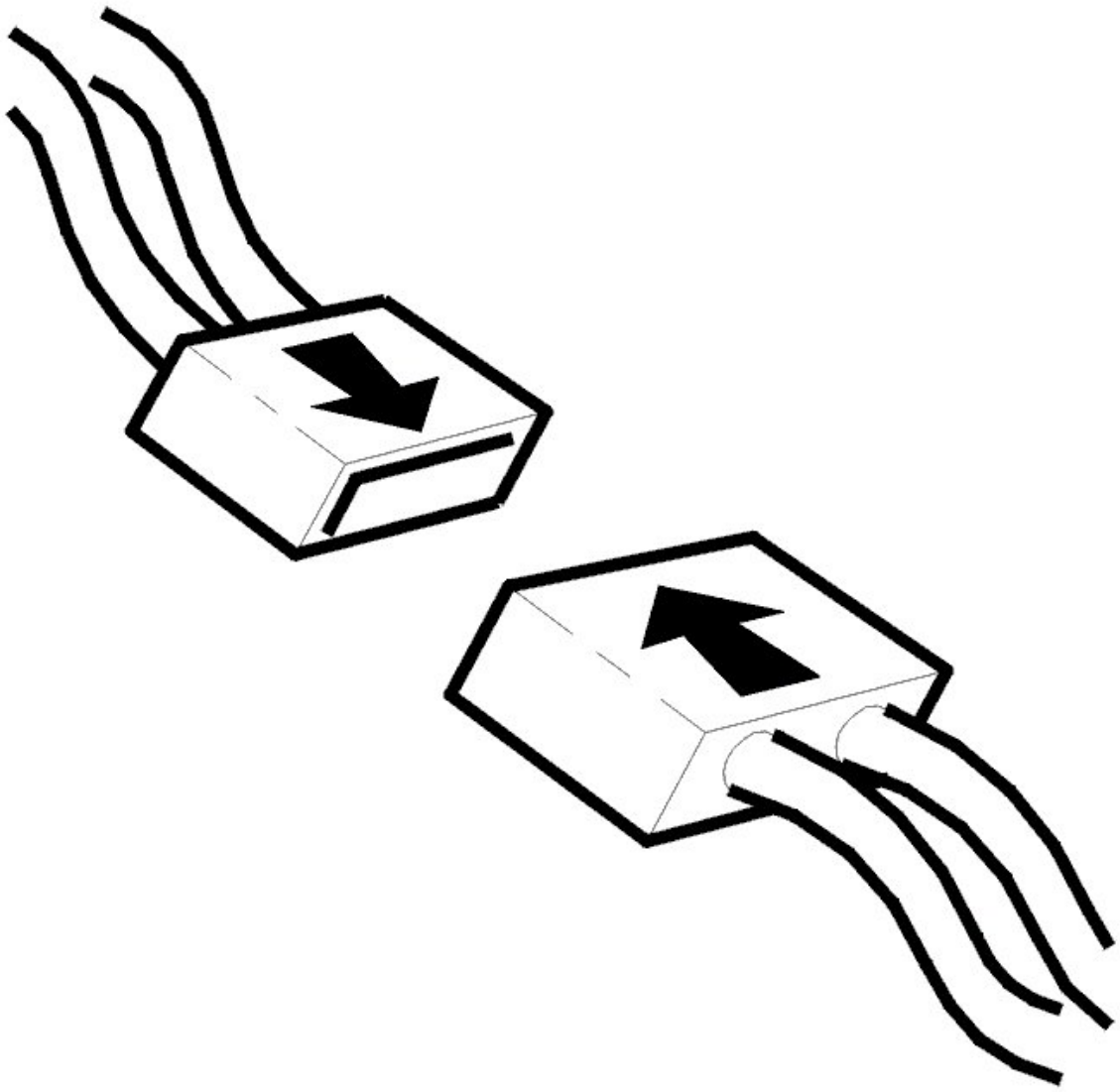
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

Check that the function operates in gear positions 4, 3 and 2.

Is transmission function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

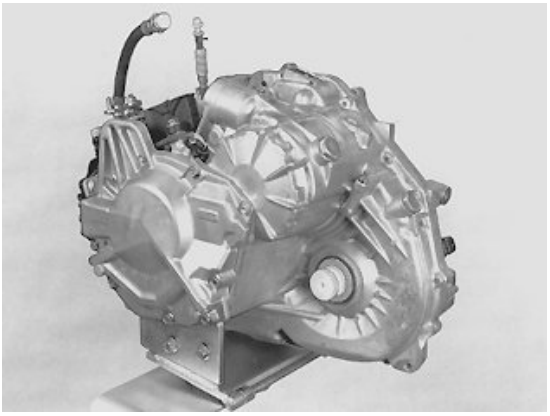
FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - Checking the neutral check

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition



The driving section of the transmission is disengaged when certain conditions are met:
- Stationary
- Engine idling
- Stop pedal depressed
- Gear position D, 3 or 4.

The function decreases fuel consumption and vibration from the transmission when running the engine at idle speed.
Diagnostic trouble code (DTC) TCM-012C is stored if the transmission control module (TCM) registers that the engine is juddering or running unevenly when engaging clutch C1.

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

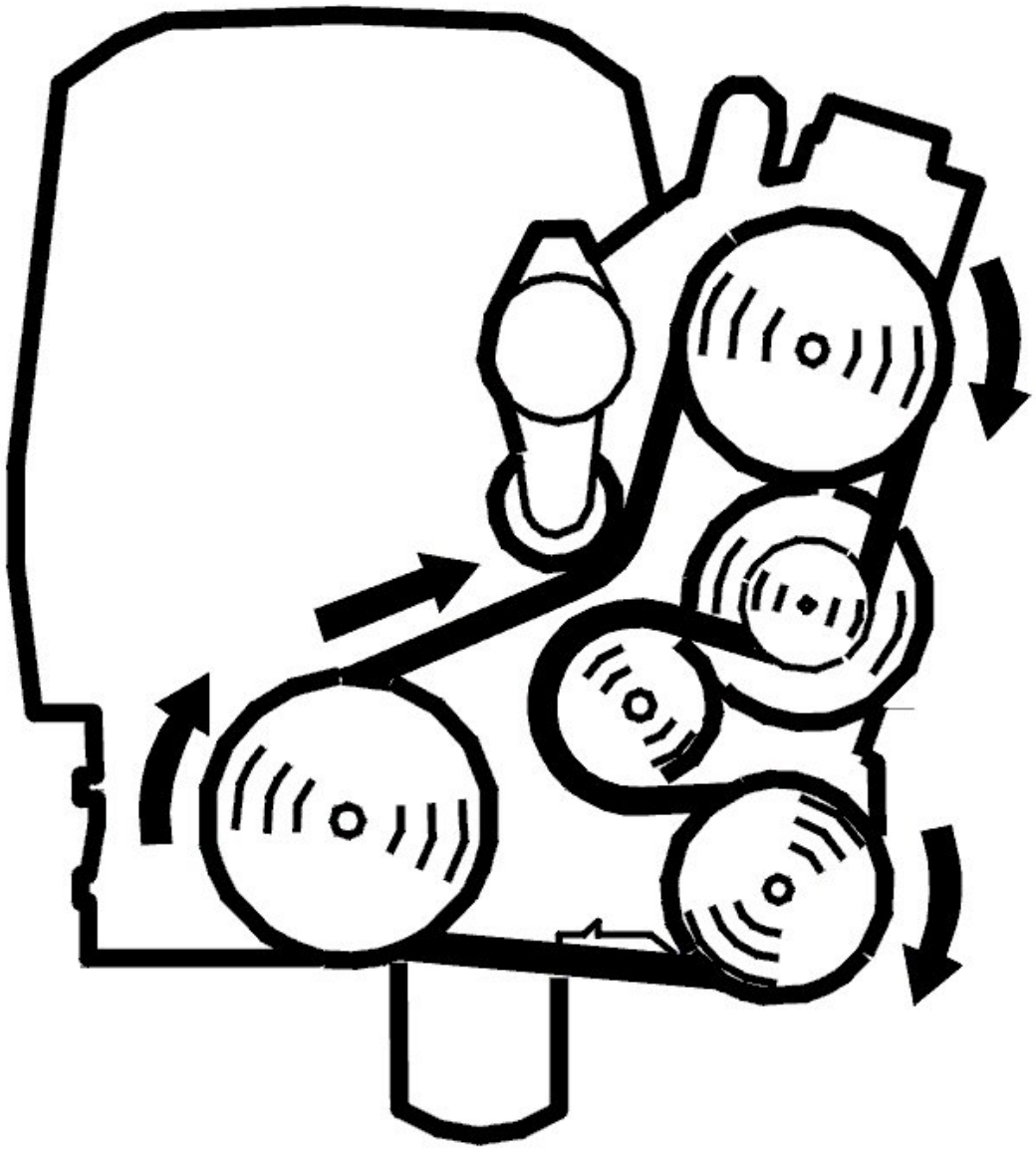
Possible source
- Solenoid SLS jammed in the ON position
- Internal fault in the transmission
- Internal fault in the control module.

Fault symptom[s]
- General orange warning lamp lit
- The engine speed (RPM) oscillates
- No lock-up function
- Malfunction indicator lamp (MIL) lit.

The Engine Speed (RPM) Oscillates

The engine speed (RPM) oscillates

Checking the neutral check



- Ignition off
- Check the transmission connectors and the control module connector. Check for contact resistance and oxidation. See Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels can rotate freely
- Start the car
- Move the gear selector to position D. Accelerate so that the speed exceeds 50 km/h
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check must display the status as "Active" (this may take up to 30 seconds)
- Brake the wheels. Move the gear selector to position D. Carefully depress the accelerator. Check that the neutral check changes to the "Inactive" status.

The engine speed (RPM) should be even when transferring from Active to Inactive status.
Check that the function operates in gear positions 4, 3 and 2.

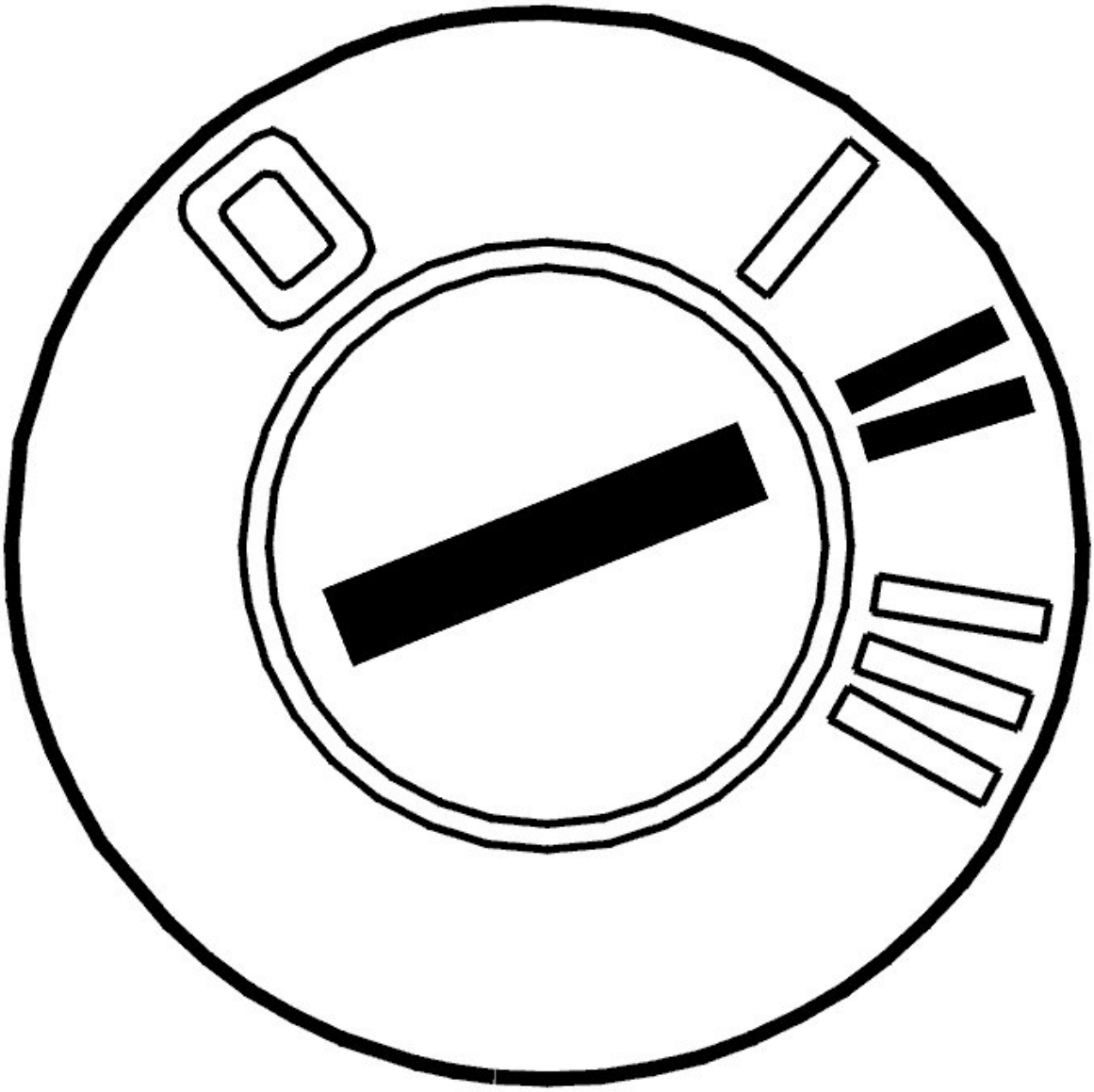
Is the function of the transmission OK?

Yes - Test driving

No - Checking solenoid SLT

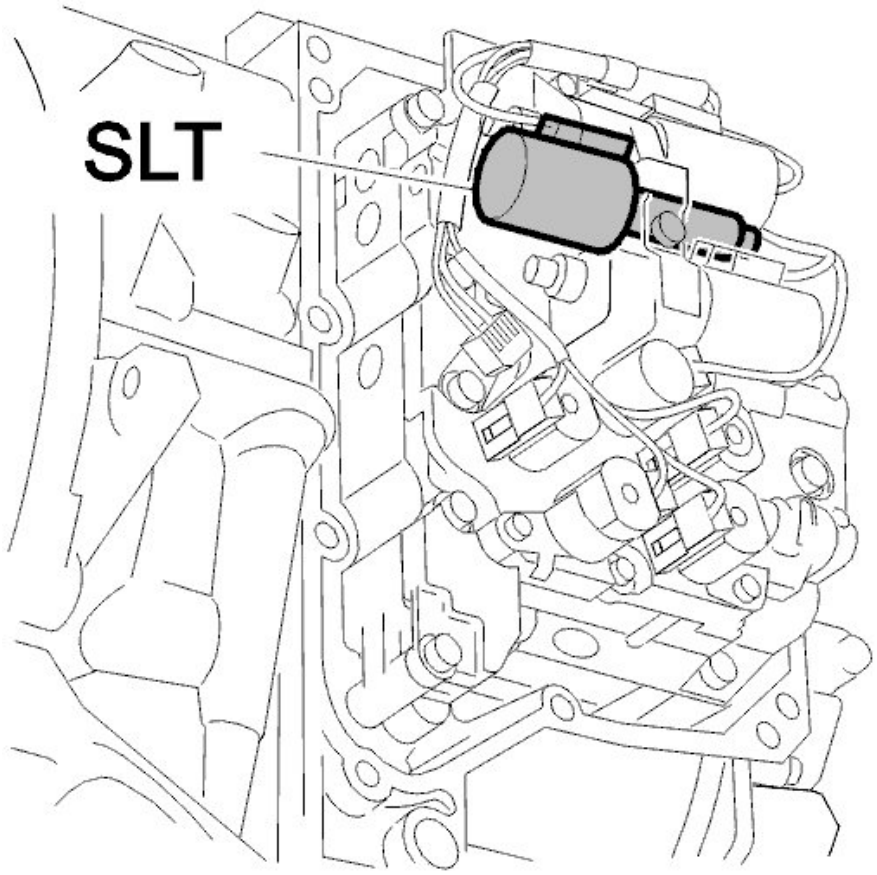
Checking solenoid SLT

Note! The transmission must not be colder than room temperature when activated.



- Ignition on
- Activate solenoid SLT.

The solenoid must "click" on activation (use a stethoscope to hear the sound more clearly) and the current must oscillate between 0 and 1 A. There is a mechanical fault if no "clicking" noise is heard.

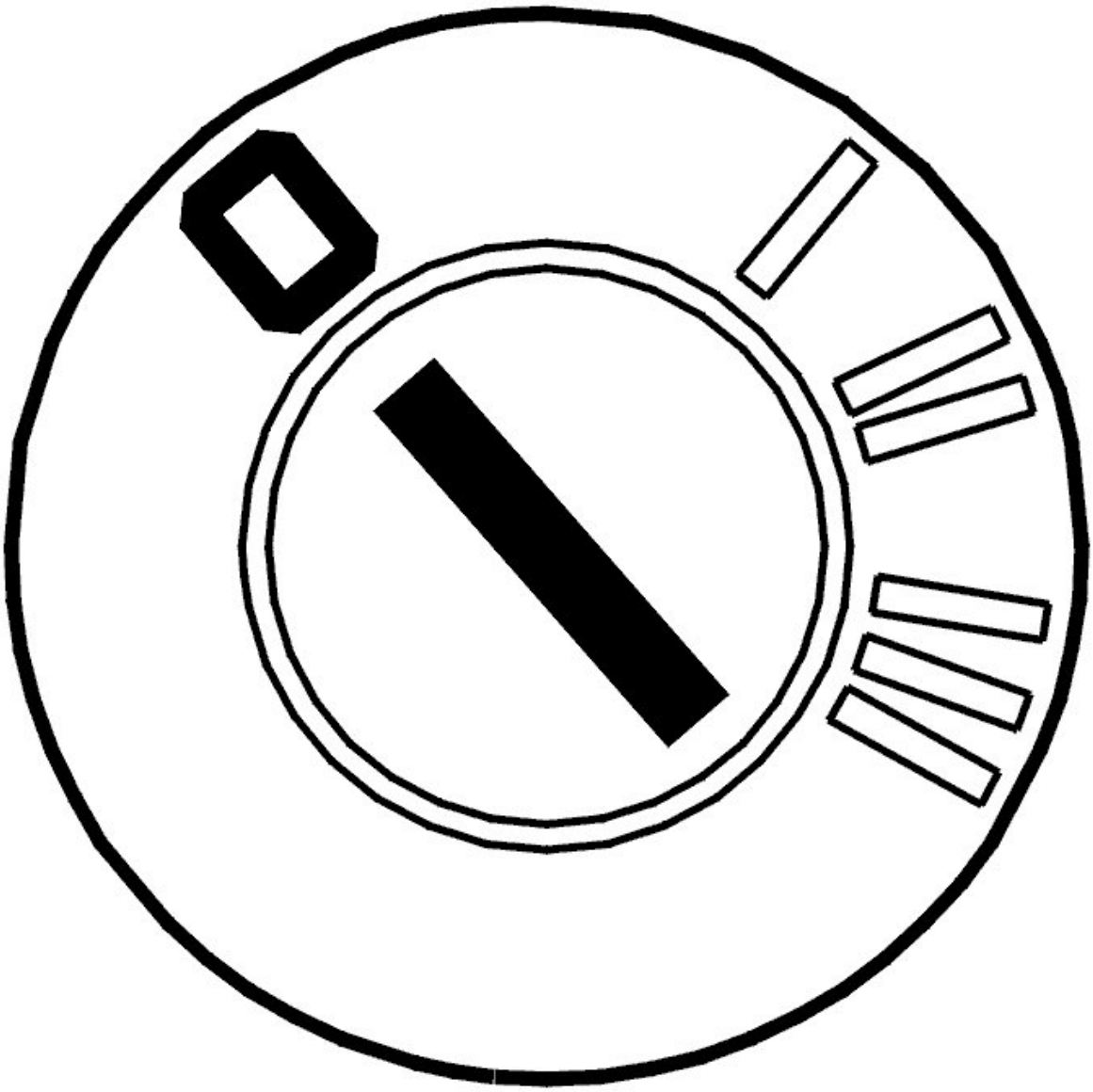


Was solenoid SLT OK?

Yes - Test driving

No - Replacing the transmission control system

Test driving



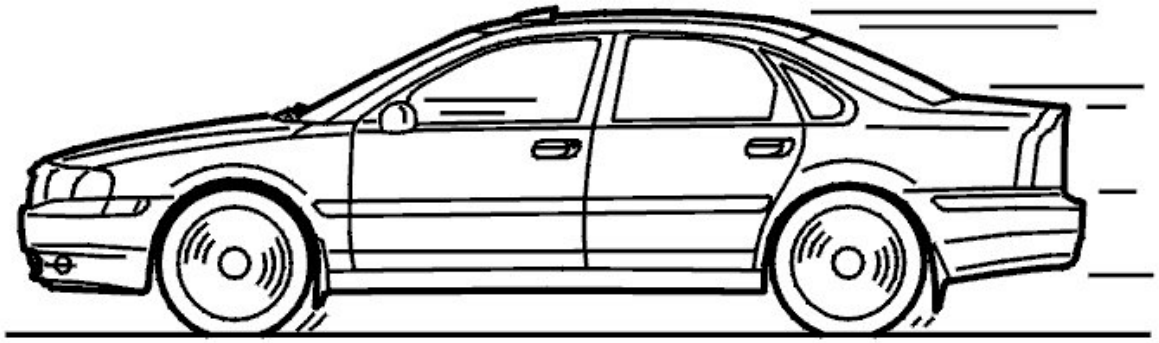
- Ignition off
- Reconnect the connectors, reinstall components etc.
- Test drive the car. See Verification See: Diagnostic Trouble Code Tests and Associated Procedures/Manufacturer Code Charts/TCM Codes (Transmission Control Module)/TCM-012C/Verification.

Check that the shifts and the neutral check function without any problems.

Other information

- To access the transmission connectors, see Connectors transmission, disconnecting / connecting See: Transmission and Drivetrain/Automatic Transmission/Transaxle/Wiring Harness/Service and Repair/Procedures
- To access the control module connector, see Transmission control module (TCM), replacing, B5244T5, AW55-50/51SN, B5254T2, AW55-50/51SN, B5254T2, AW50/51 AWD See: Transmission Control Systems/Relays and Modules - Transmission and Drivetrain/Relays and Modules - A/T/Control Module/Service and Repair.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

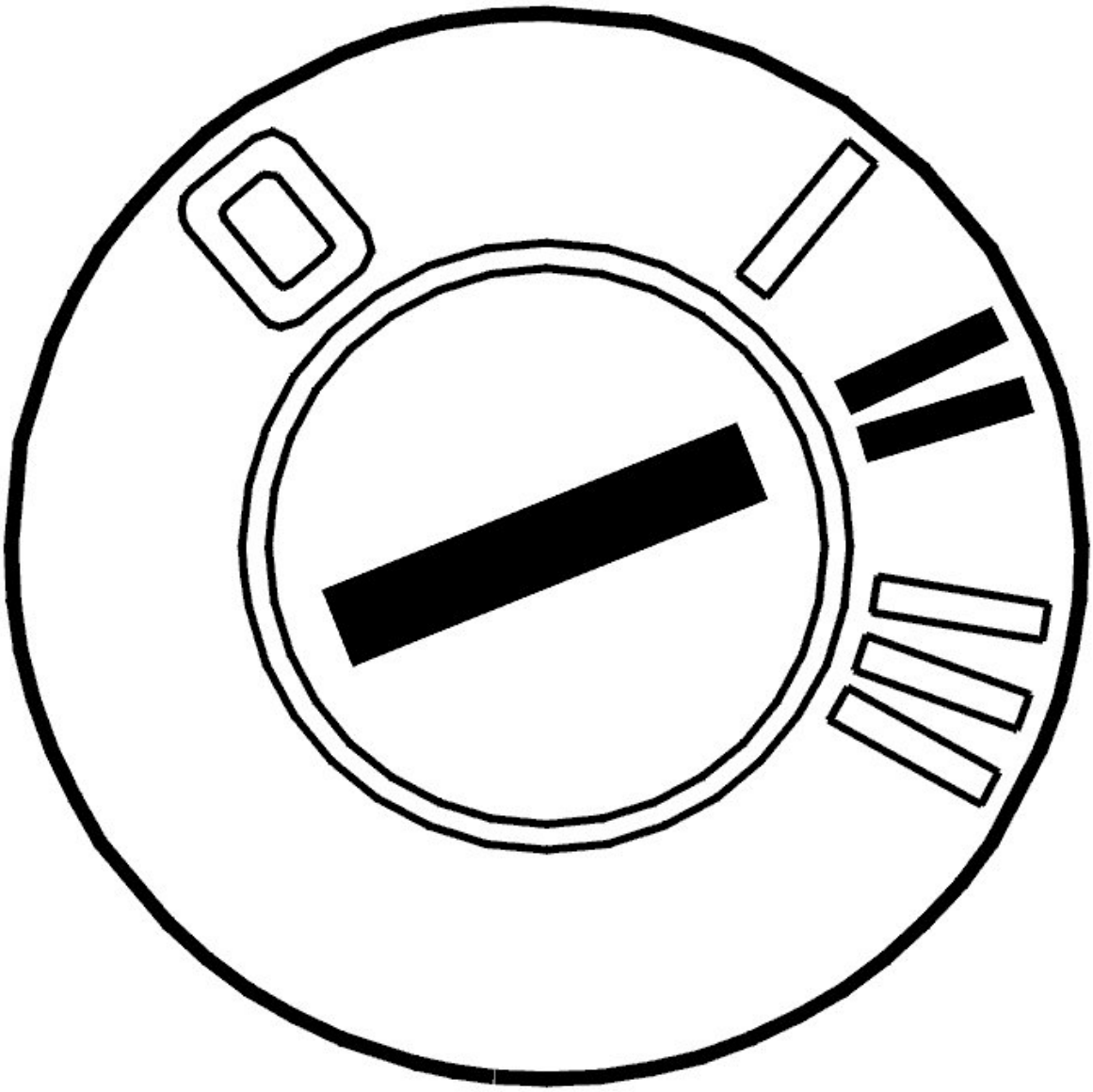


Is the transmission operating correctly?

Yes - Fault Found

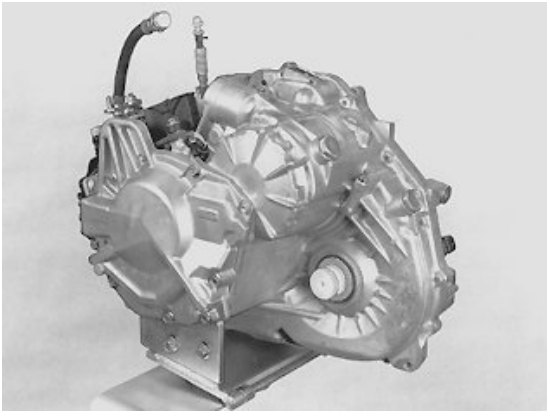
No - Replacing the transmission control system

Replacing the transmission control system



- Ignition off.

The transmission control system must be replaced if there is a fault in solenoid SLT. To replace the solenoids and the transmission control system, see Solenoid control system, replacing See: Transmission Control Systems/Actuators and Solenoids - Transmission and Drivetrain/Actuators and Solenoids - A/T/Shift Solenoid/Service and Repair/Solenoid Control System, Replacing.



Continue - Resetting the adaptation and oil quality counter

Resetting the adaptation and oil quality counter

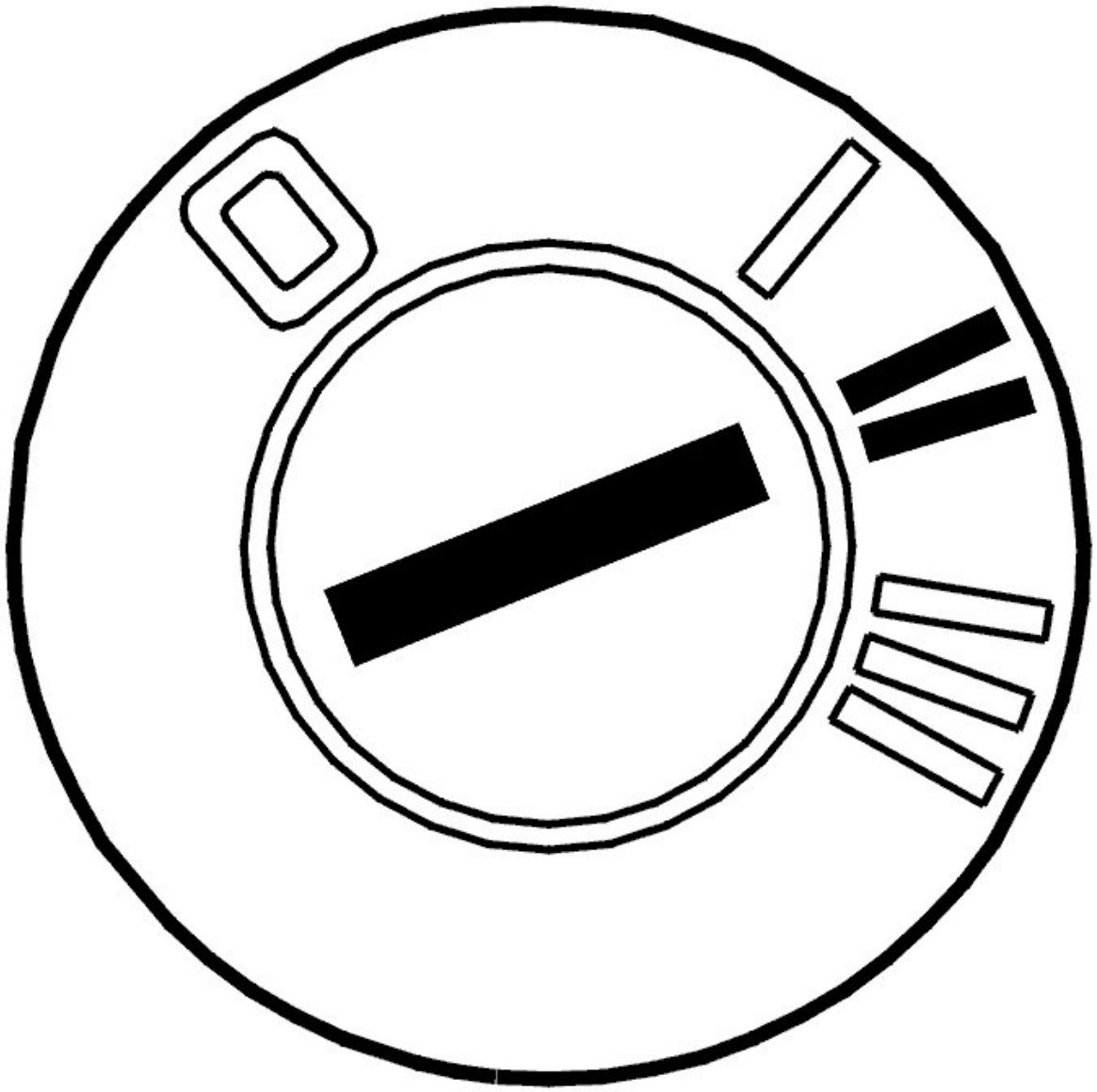
Resetting the adaptation

Resetting adaptation and the counter for "Transmission oil change"

Hint: The transmission has torque controlled adaptive pressure control. Pressure control means that the transmission regulates the pressure itself

during each gear shift. This avoids harsh gear shifting. Each gear shift is evaluated by the control module and stored in the memory. This allows for compensation for wear and tear in the transmission and clutch. It is important that the adaptation in the memory is reset after the transmission has been repaired. This is to ensure normal operation. The oil is replaced during repair; the "Transmission oil change" counter must be reset. If the counter is not reset when the fluid is drained and replaced, there is a risk that a diagnostic trouble code (DTC) will be stored in incorrect circumstances.

Note! This applies only if the transmission or one of the components in the transmission have been replaced.



- Ignition on.

Click on the VCT2000 symbol to reset the adaptation and counter.

Continue - DONE

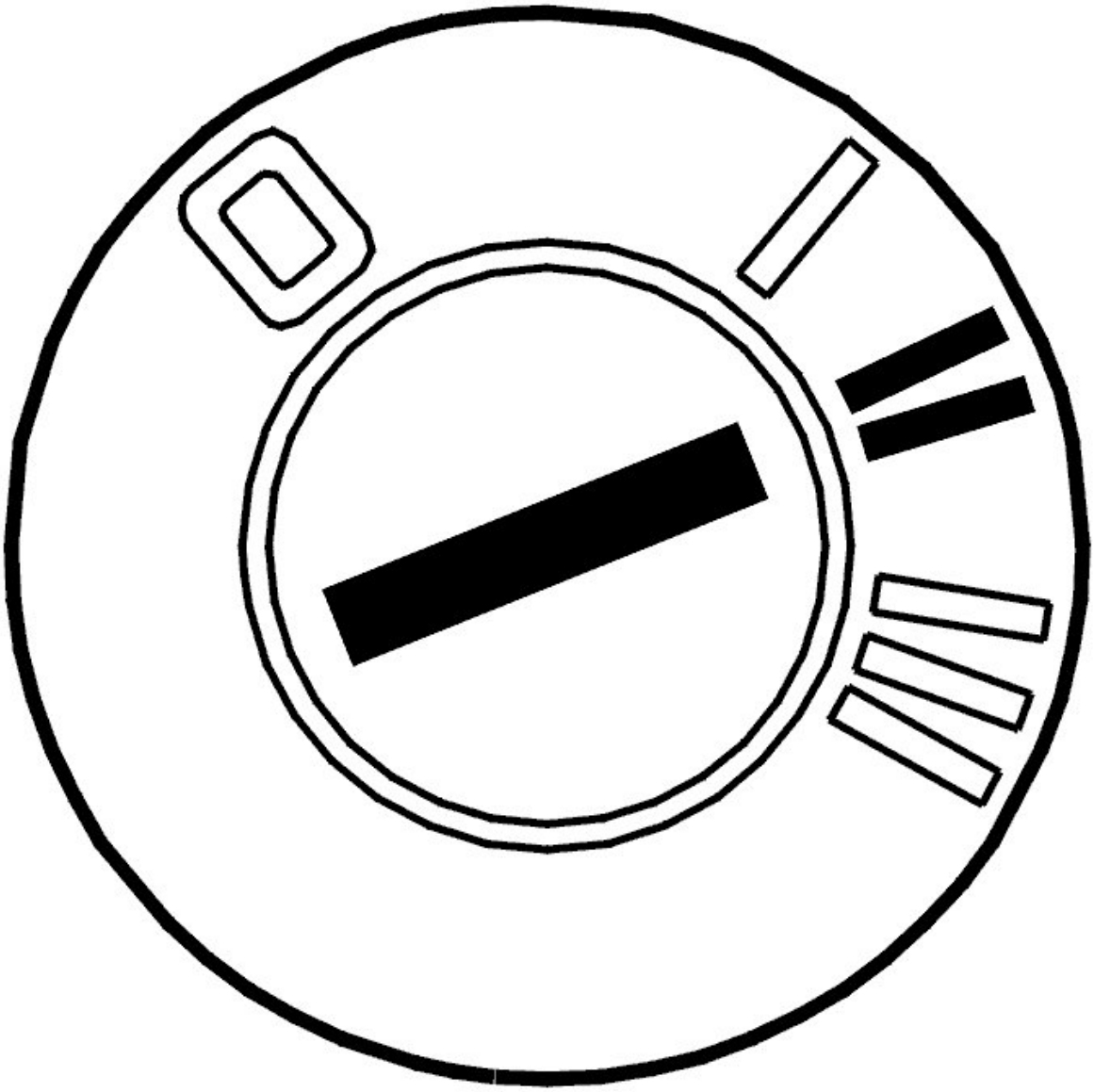
DONE - Verification

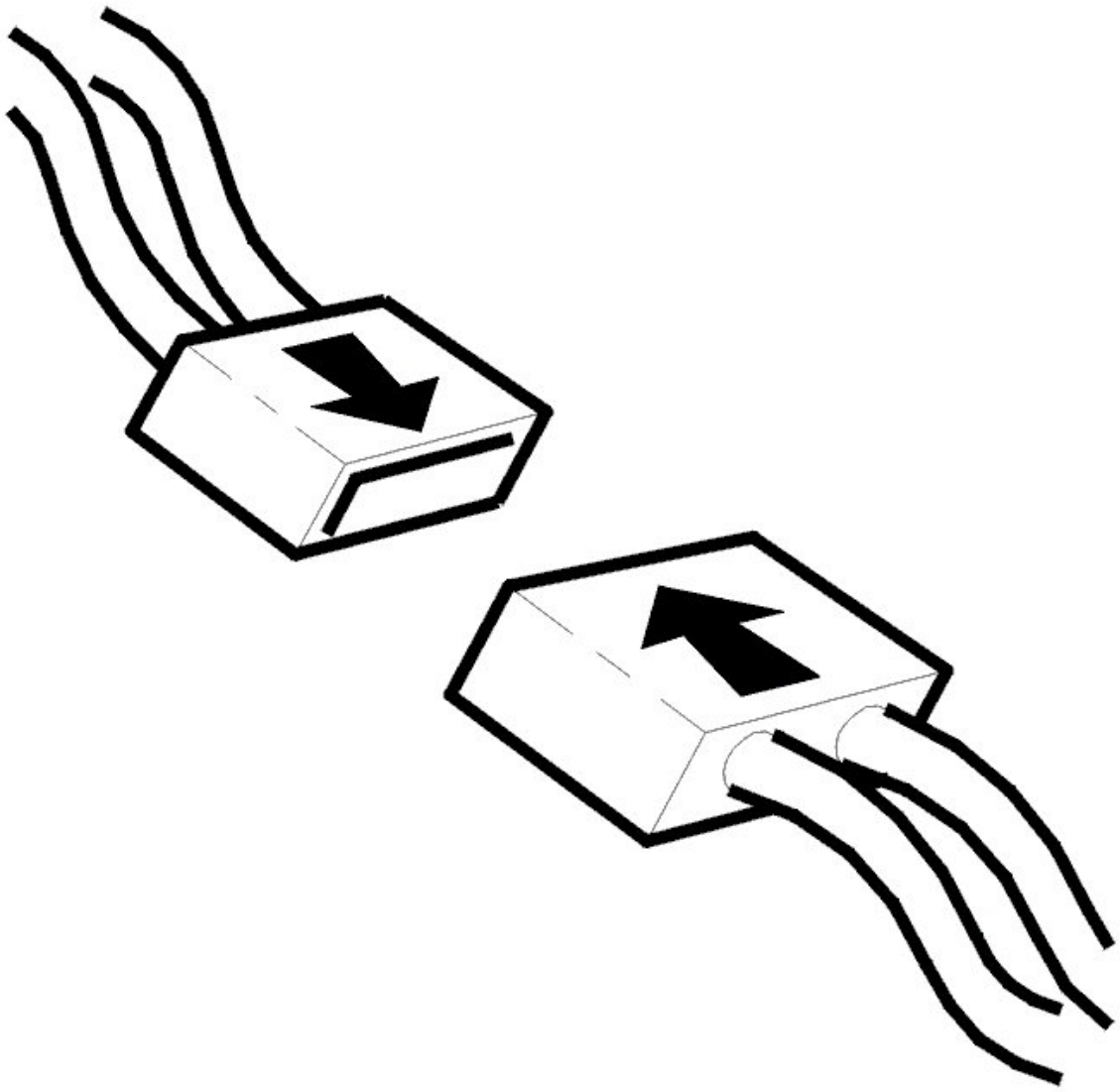
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
- Brake the wheels and let the engine run at idling speed without touching the accelerator pedal (AP). The neutral check should display "Active" status (this may take up to 30 seconds).
- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

Check that the function operates in gear positions 4, 3 and 2.

Is transmission function OK ?

Yes - VERIFIED

No - VERIFICATION FAILEDPAPER

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

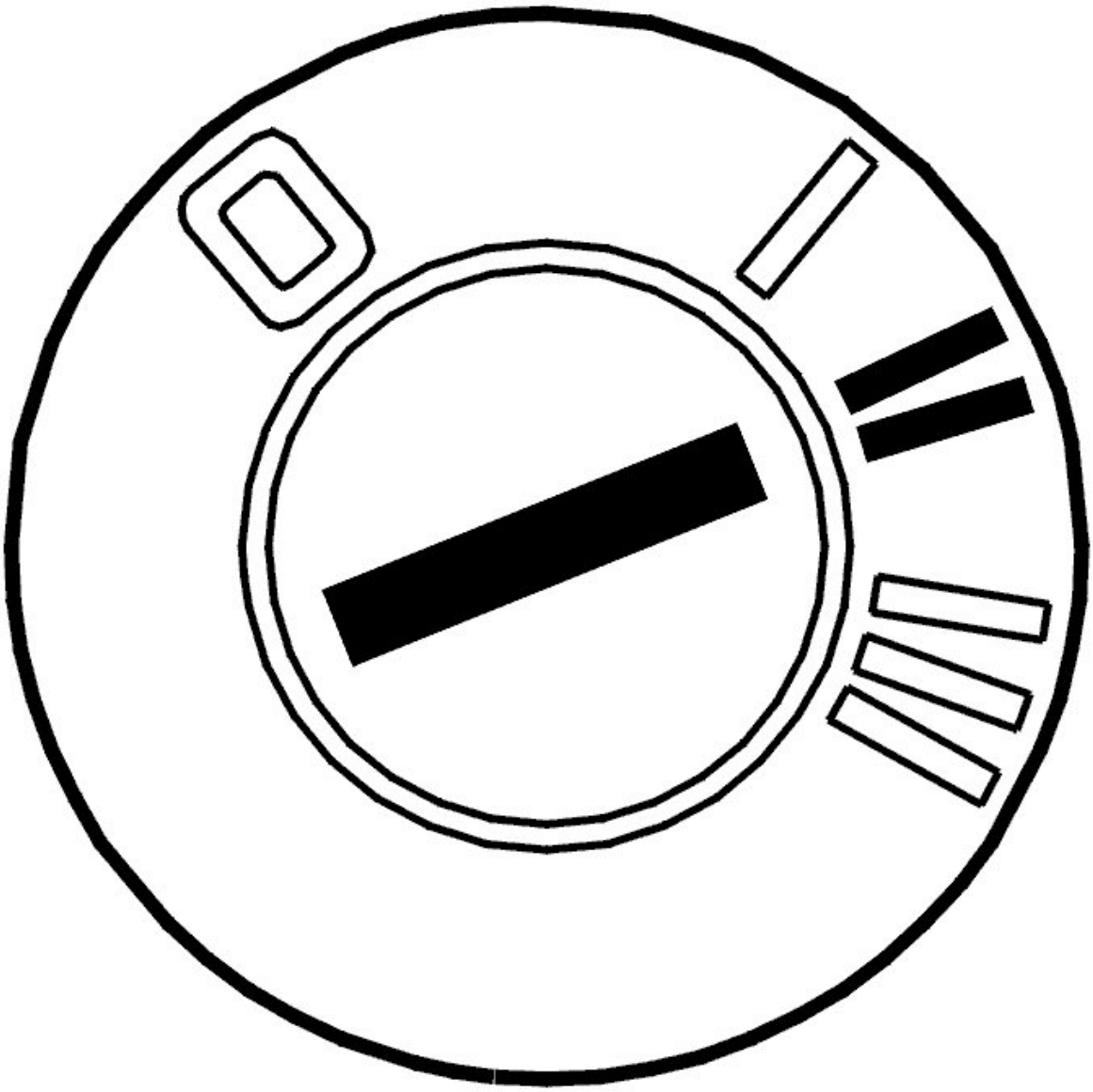
Attempt New Test - Checking the neutral check

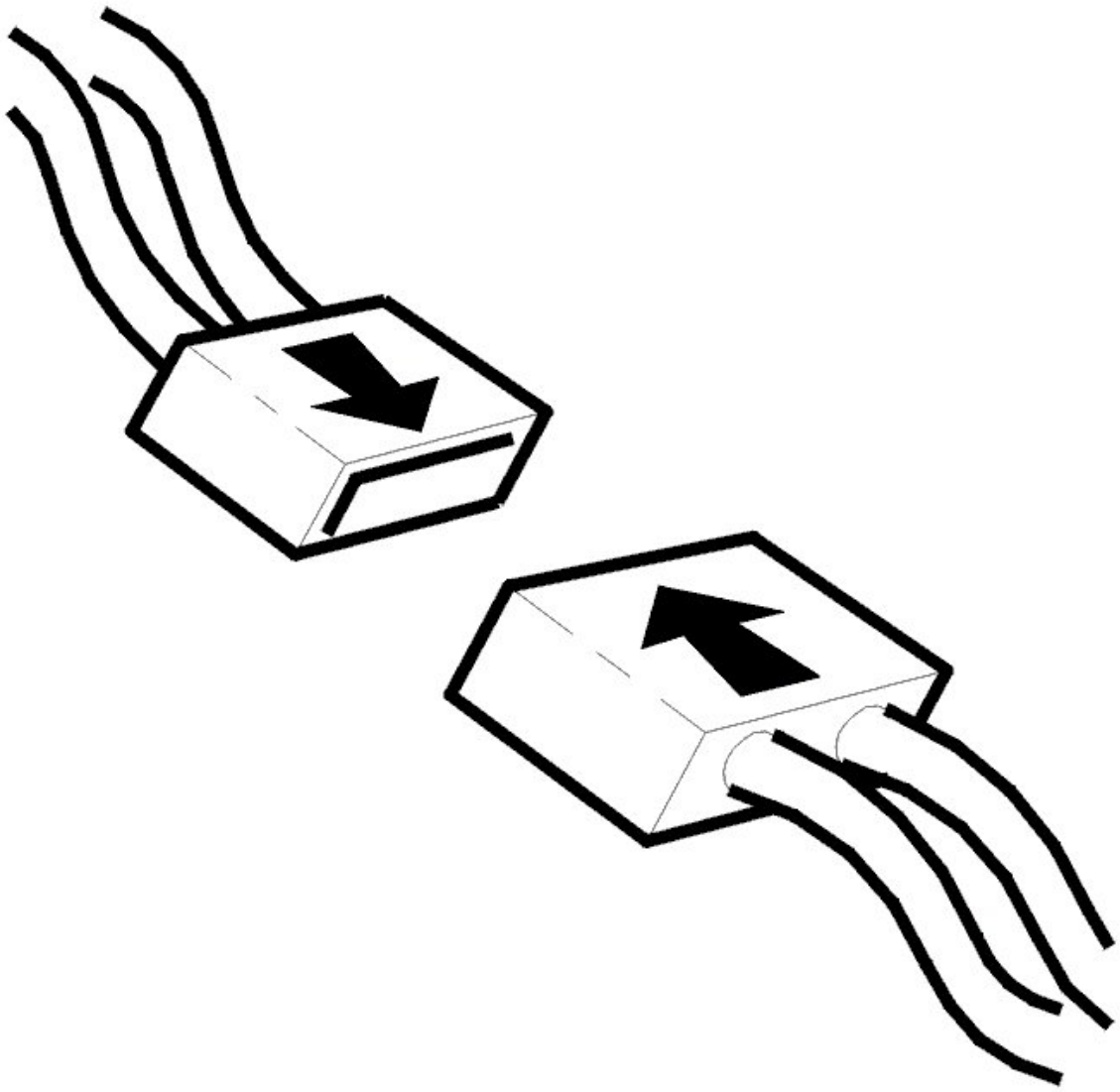
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reconnect the connectors, reinstall components etc.
- Raise the car so that the drive wheels are unimpeded.
- Start the car.
- Move the gear selector to position D and accelerate so that the speed exceeds 50 km/h.
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- Brake the wheels, move the gear selector to position D. Carefully depress the accelerator and check that the neutral check changes to the "Inactive" status.

Check that the function operates in gear positions 4, 3 and 2.

Is transmission function OK ?

Yes - VERIFIED

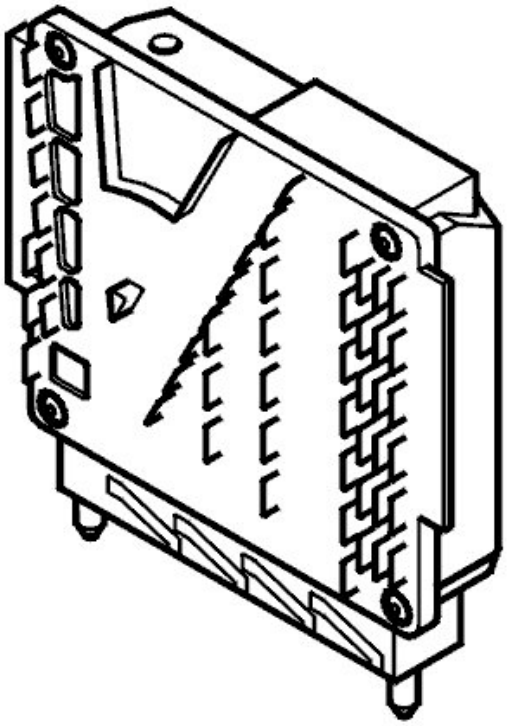
No - VERIFICATION FAILEDPAPER

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information TCM-E000

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value

- Control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

Possible source

- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Damaged pins on Transmission control module (TCM).
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]

- No shifting.
- Text window and warning symbol/Yellow symbol and text message

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:

- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.

CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.
XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

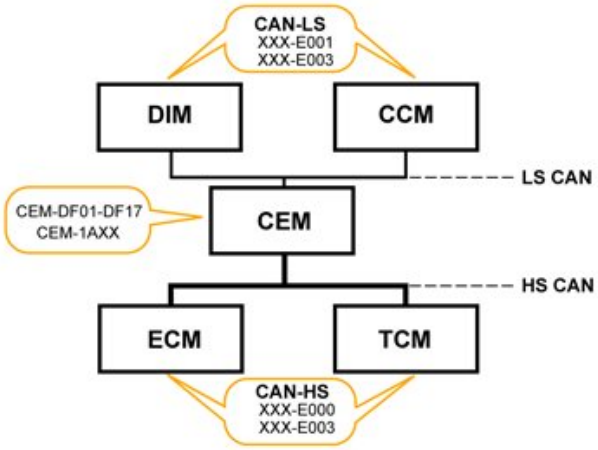
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

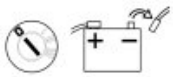
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

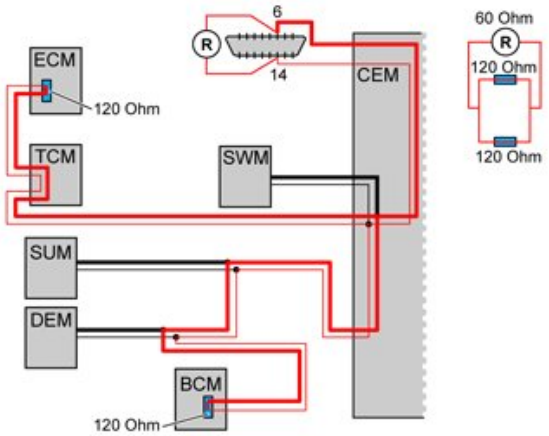
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

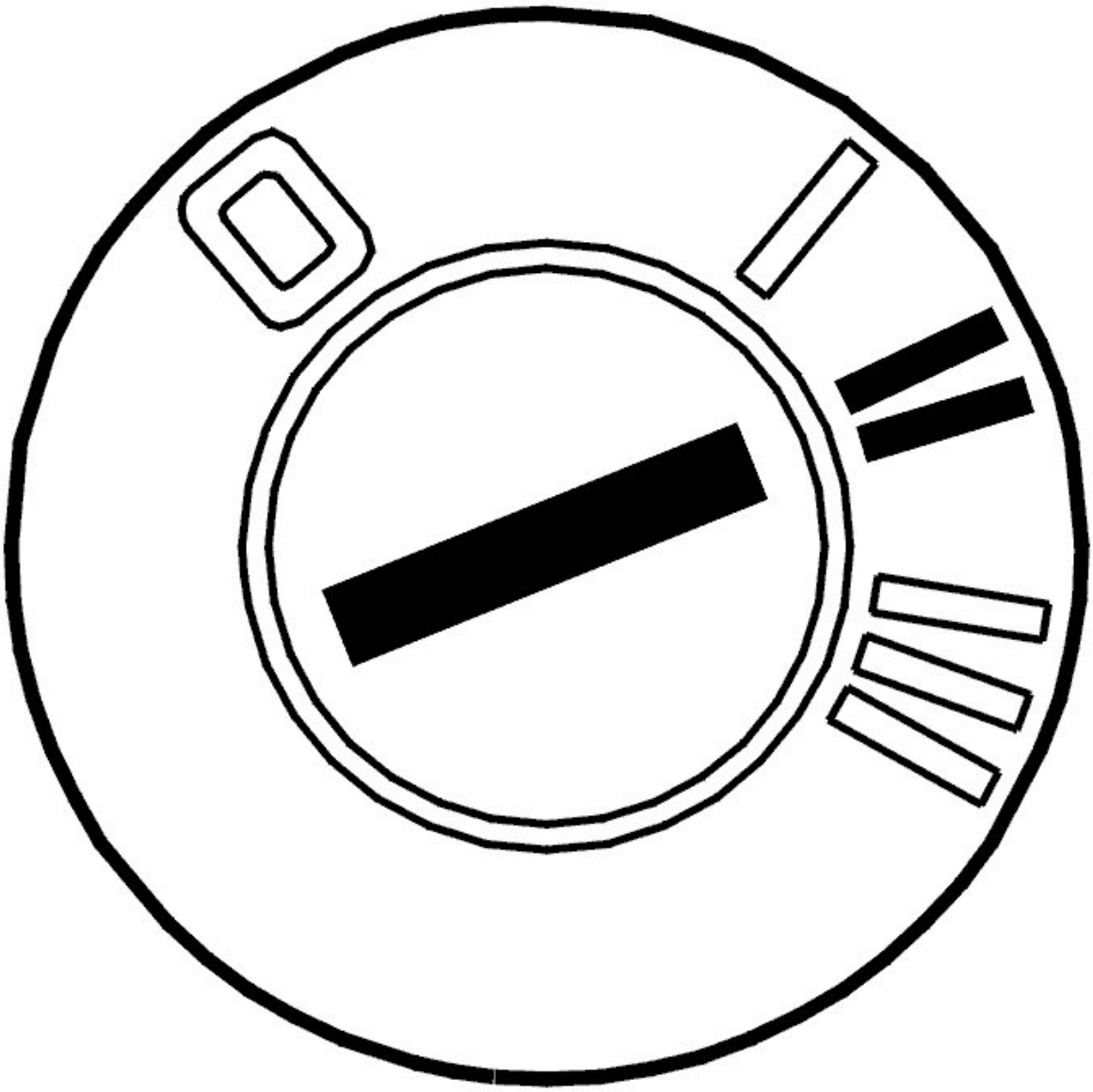


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

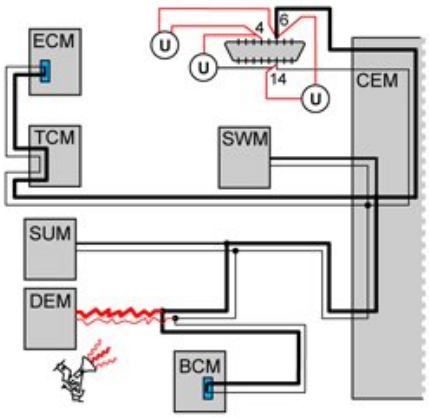
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

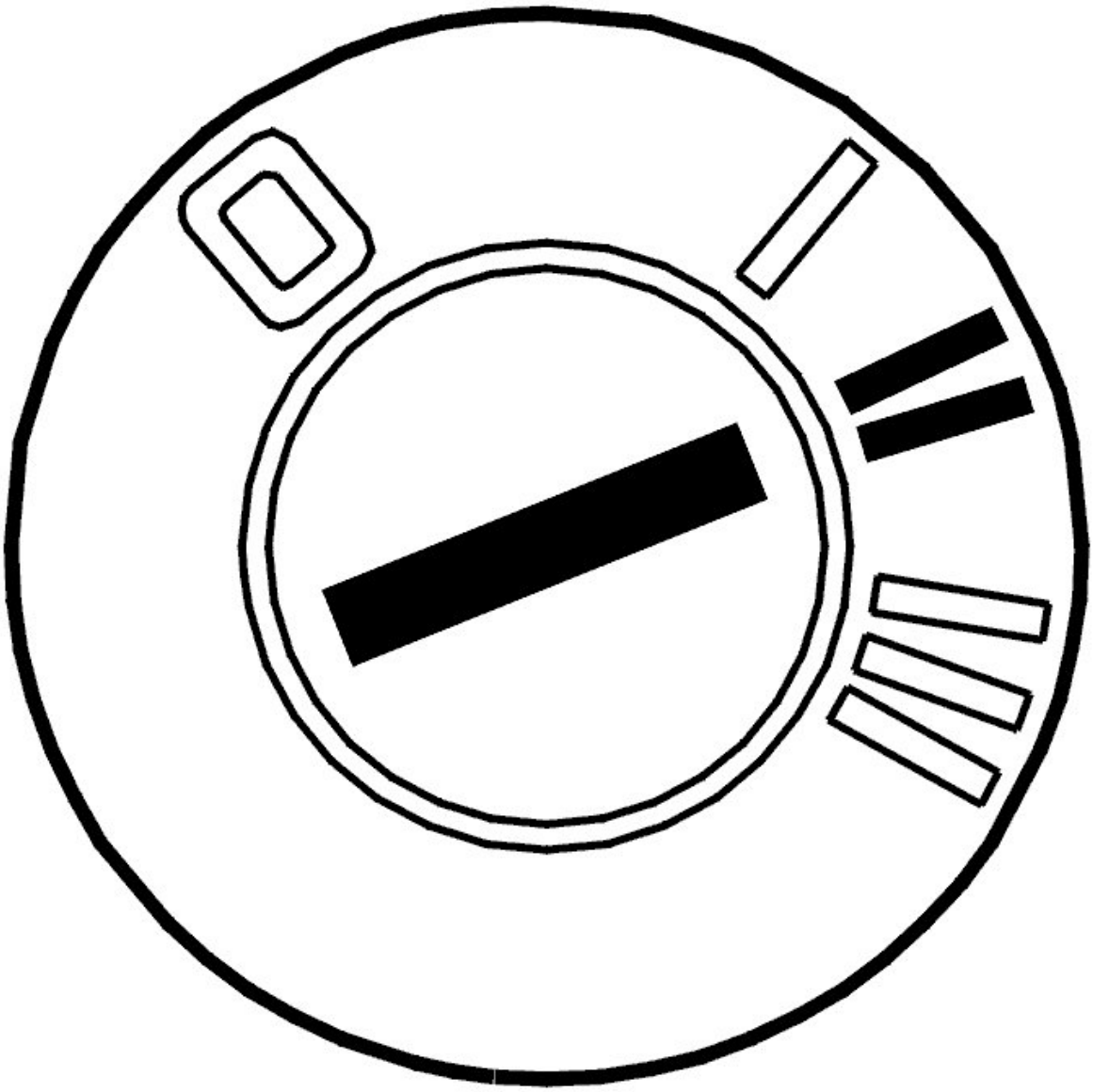


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

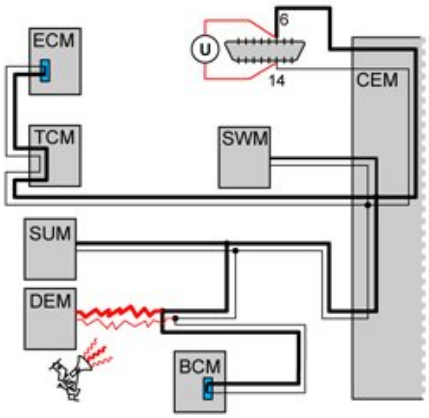
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

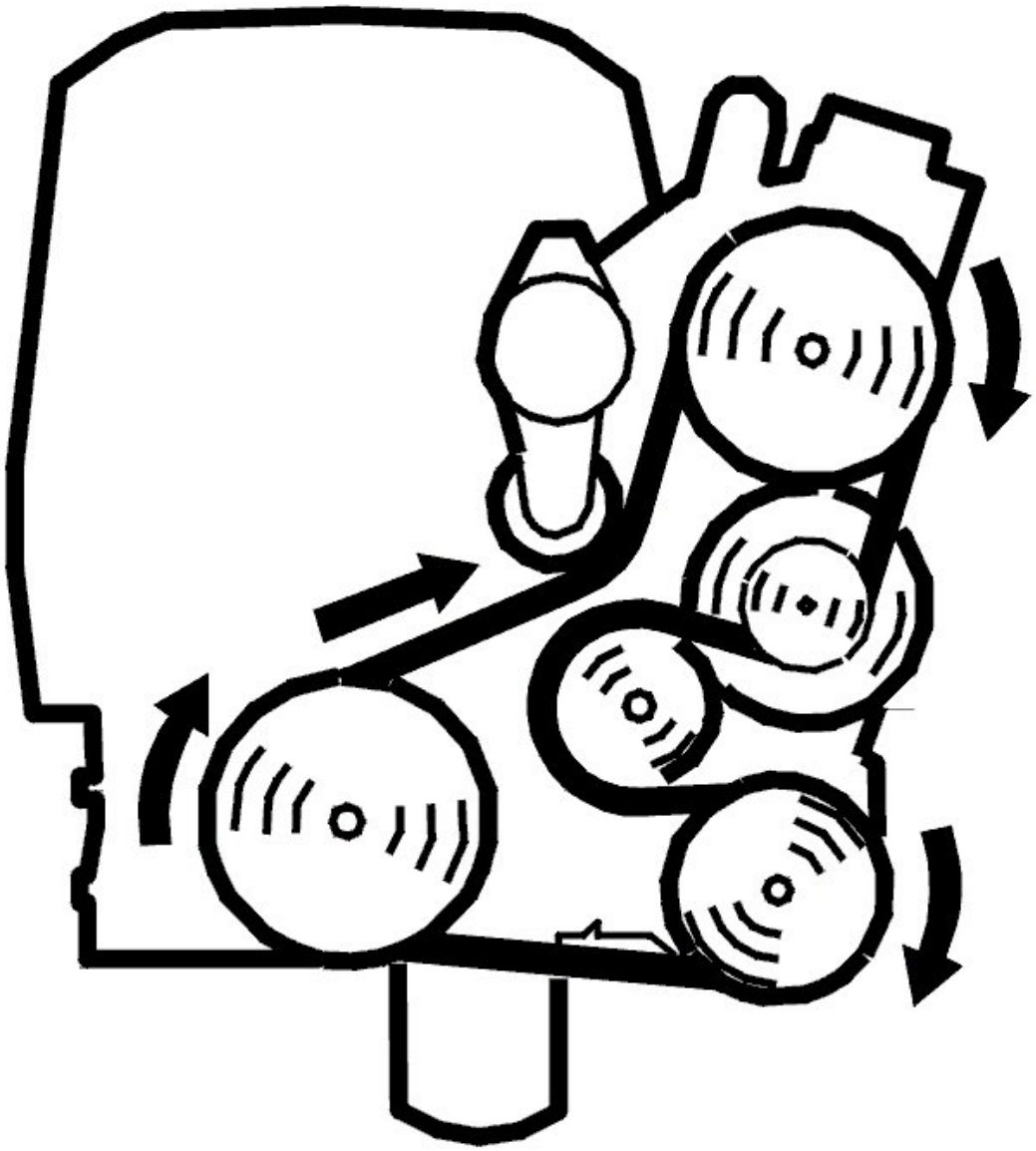
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

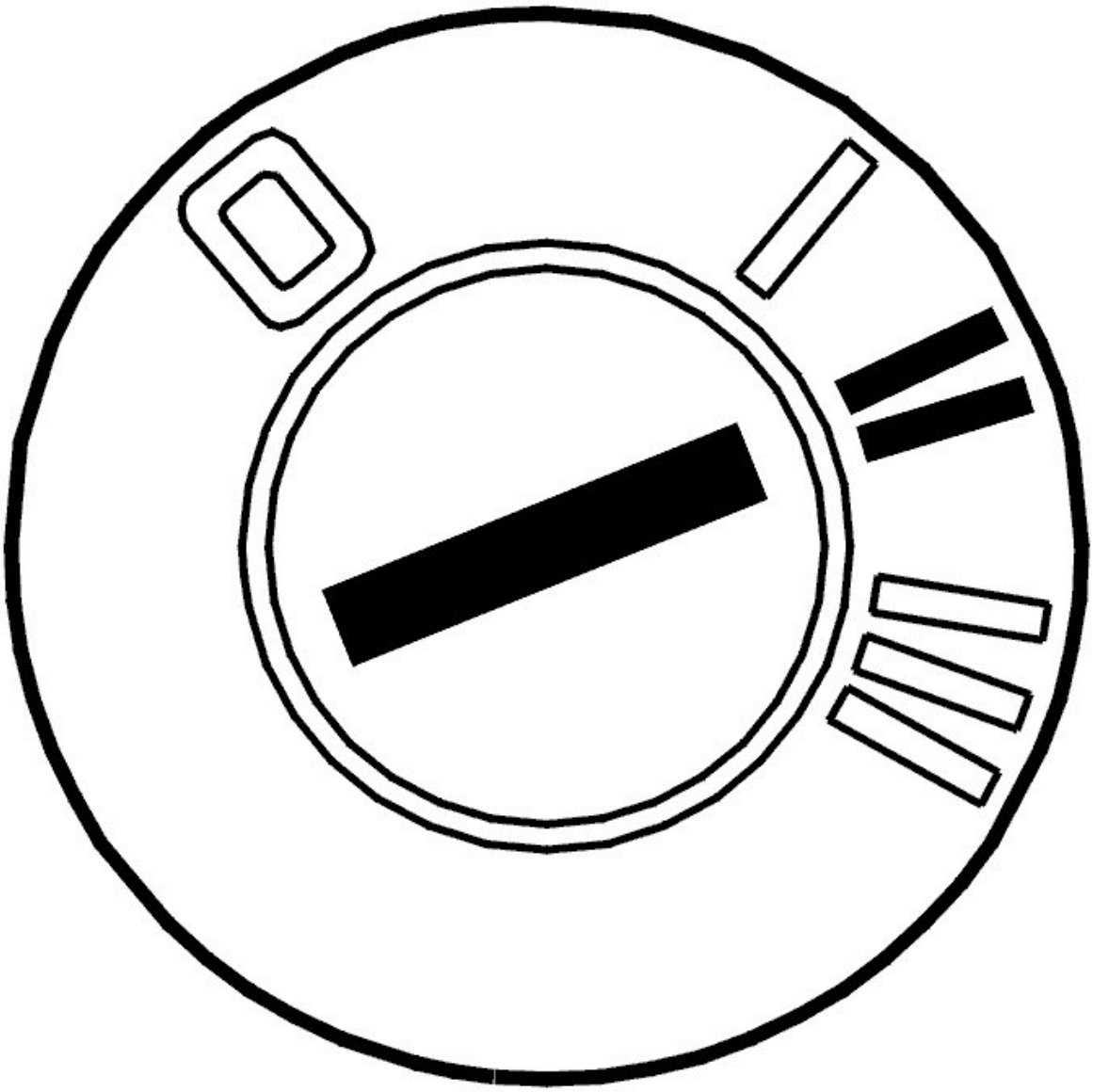


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

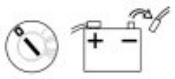
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

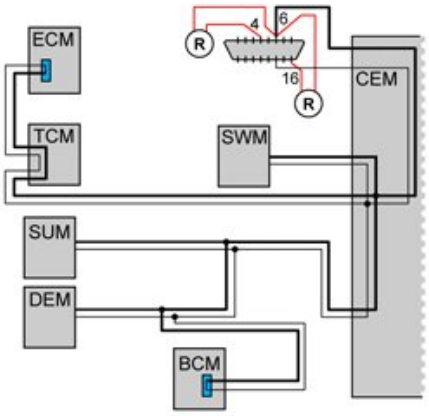
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

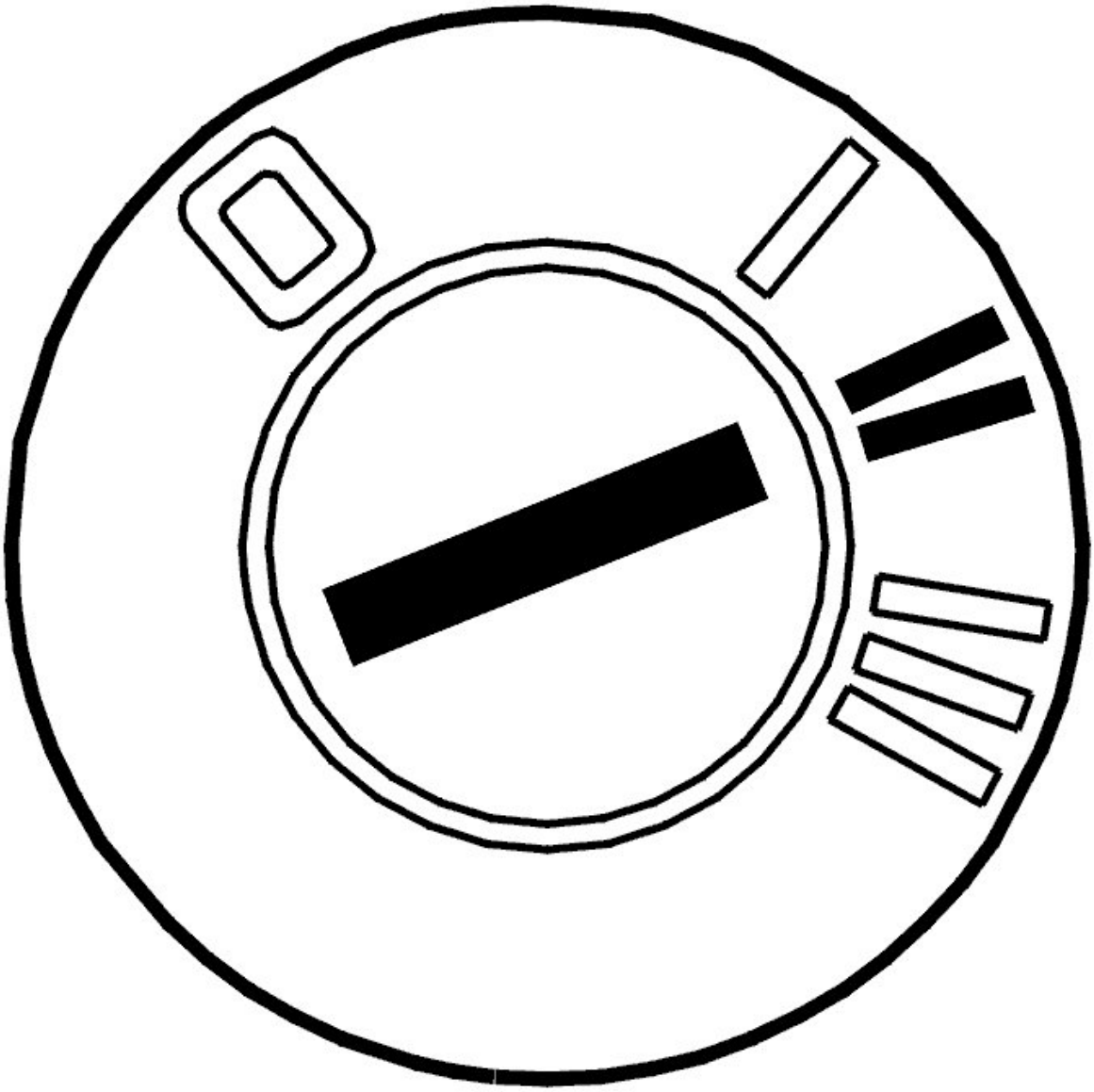


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

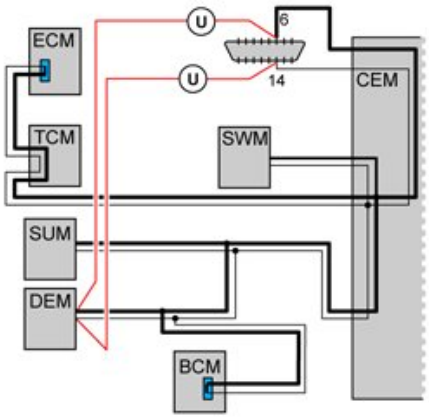
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

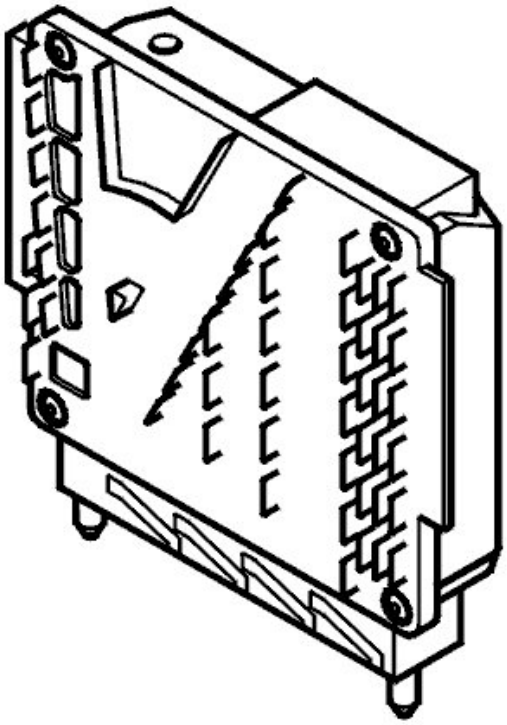


Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information TCM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- The transmission control module (TCM) "Emergency mode I" program has been initiated.

Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- No shifting.

Signal Missing

Signal missing

General information

Note! Figures shown are only examples.

Hint: For general information about CAN-troubleshooting, see:
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

General about CAN-related diagnostic trouble codes.
CEM-DF01 - DF17can only be stored in Central electronic module (CEM). These diagnostic trouble codes are stored when an electric fault is detected in CAN-lines. Start with these diagnostic trouble codes first.
CEM-1AXX only stored in Central electronic module (CEM). One diagnostic trouble code for every control module on the CAN-net. These diagnostic trouble codes indicate that Central electronic module (CEM) does not receive any reply from other control modules.
XXX-E000 (HS-CAN)/E001 (LS-CAN) can be stored in all CAN-connected control modules. These diagnostic trouble codes indicate that the control module has detected interference on the CAN-net.

XXX-E003 can be stored in all CAN-connected control modules except in Central electronic module (CEM). The control modules on the CAN-net listen for a message (identity number) that is sent out at regular intervals from Central electronic module (CEM). This diagnostic trouble code indicates that the control module has not received any identity number, or that the expected number is not correct. Interference on the CAN-net can also store this diagnostic trouble code.

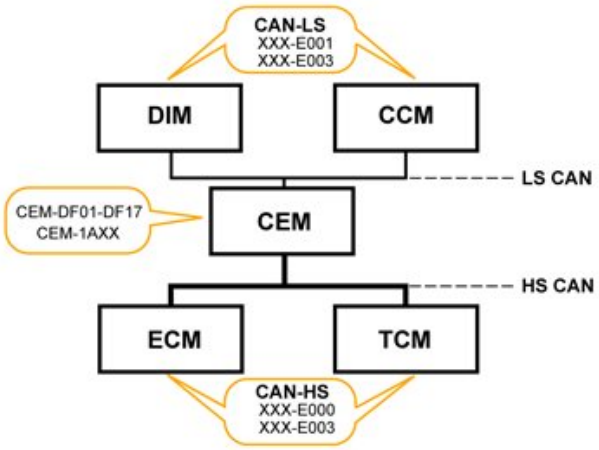
Note! In case of CAN-related faults, it is likely that a combination of above diagnostic trouble codes occur.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

If a communication diagnostic trouble code can be read from the control module, the malfunction is probably intermittent.
Intermittent fault in the voltage supply and ground to a control module on the CAN network results in the Central electronic module (CEM) storing a diagnostic trouble code (DTC) for an open-circuit in communication with the control module where the voltage supply does not work. There will probably not be a diagnostic trouble code (DTC) in the control module where the open-circuit in the voltage supply occurred as the control module cannot store a diagnostic trouble code (DTC) when it is not supplied with power.

Note! Central electronic module (CEM) should not be replaced in case of CAN-fault, unless troubleshooting reveals that Central electronic module (CEM) has an internal fault.

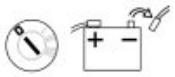
Caution! During this fault-tracing use the wiring diagram to provide support when taking readings.



Select "Continue".

Continue - Checking resistance in CAN-net

Checking resistance in CAN-net



- Ignition off
- Disconnect the battery negative lead
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #14. The resistance should be approx. 55 - 65 ohms.
- If resistance is approx. 120 ohms, this indicates open circuit in the circuit so that only one terminating resistor (120 ohms) has been measured.
- If resistance is above 1 kohms this indicates open circuit/high contact resistance somewhere in the circuit.
- If resistance is below 55 ohms this indicates short-circuiting/contact resistance between the CAN-lines somewhere in the circuit.

Hint: For HS-CAN (High Speed) the terminating resistors are located in Brake control module (BCM) and in Engine control module (ECM).

Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

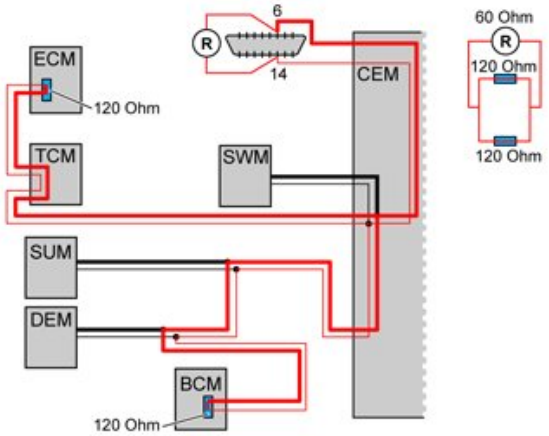
Note! Resistance measurement measures only main lines in the CAN-net (in circuit where both terminating resistors are found), not branches to certain control modules. See wiring diagram for vehicle model in question.Open circuit on branching without a terminating resistor cannot be detected with this measurement. However, short-circuiting on a branch can be detected. To measure resistance in the CAN-net to control modules located in a branching of their own, the measurement shall be done against the CAN-net at that control module. The values shall be as above.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

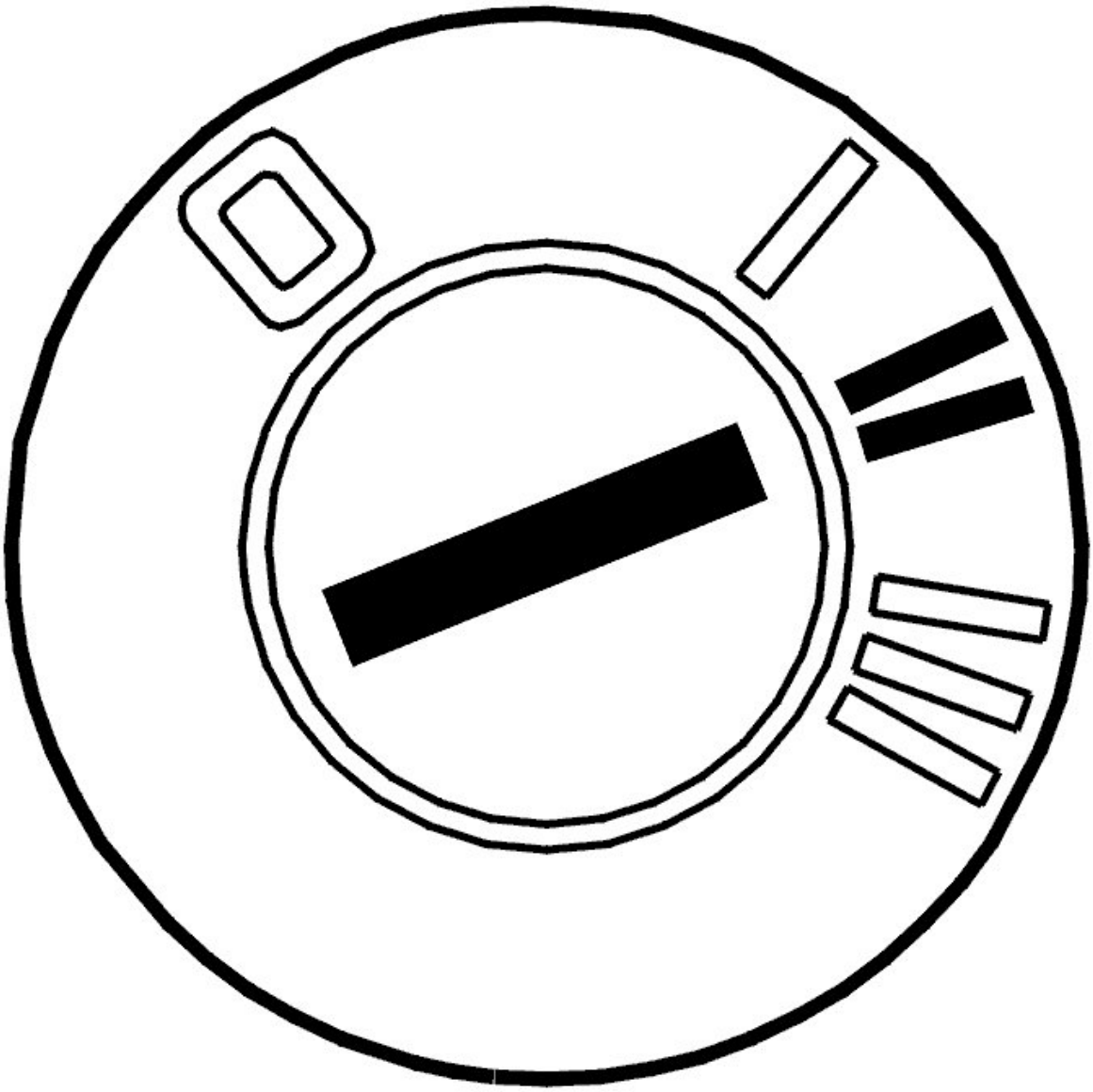


Was a fault detected?

Yes - Verification

No - Checking short-circuiting to ground/voltage in CAN-net

Checking the traffic load on the CAN cables



- Connect the battery
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Faults in the CAN network may be due to a control module sending faulty messages that disrupt normal communication. When messages are sent incorrectly, this results in a considerable increase in the amount of traffic on the CAN network. Check the load by measuring the average voltage value on the CAN cables in relation to ground.
For further information, see the wiring diagram.
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). The voltage should be approx: 2,8 - 3,2 V.
- #14 and #4 (ground). The voltage should be approx: 1,8 - 2,2 V.
- #6 and #14. The voltage shall be between approx. 0.55-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

- Ignition on.
- Connect DiCE Error Frame Finder to the diagnostics socket.
- Note the blue LED-indicator. The indicator flashes to show detection of fault messages.

Note! Certain interference may occur without any real fault!

Cable fault

- Shake the cables lightly and pull lightly on the connections during the check to locate any fault. Note the blue LED-indicator.

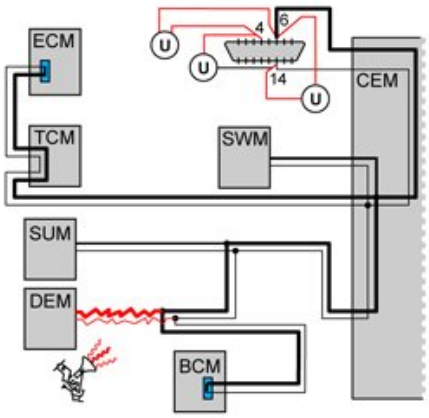
"Chatting" control modules

- "Chatting" control modules may be difficult to find and troubleshooting may take time. Let the vehicle stand with DiCE connected for an extended time period. Afterwards, activate functions to provoke a malfunction. It may take up to several hours before the fault messages are sent. When the indicator starts to flash, remove the fuse for one control module at a time until the indicator stops flashing. When the indicator stops flashing, restore the fuse for the relevant control module and check that the indicator starts to flash again. Then it is likely that the problem is identified.

Remedy wiring as necessary.

Other information

- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

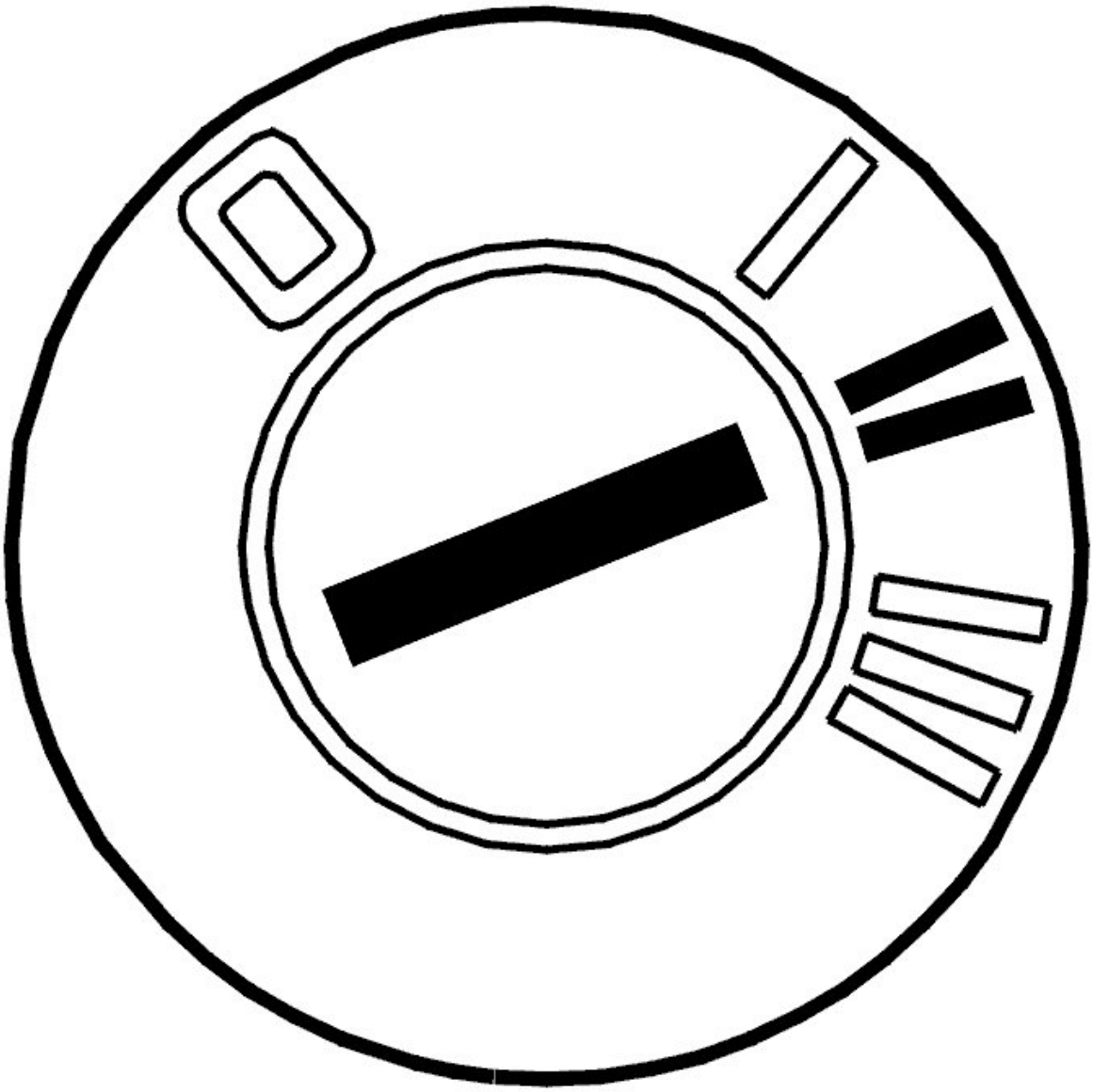


Was a fault detected?

Yes - Identifying a control module in the CAN network

No - respectively

Identifying a control module in the CAN network



Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:

- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Hint: DiCE Error Frame Finder can be used as fault detection tool if fault is suspected on the CAN-net that cannot be detected with normal troubleshooting. Interference, intermittent faults, faulty messages on the CAN-net (chattering control modules) etc., are examples of such faults. The tool registers fault messages used on the CAN-net. Fault messages may be caused by short intermittent malfunctions on the CAN-net or by a control module sending fault messages. See tools: **951 3010** (memory card) as well as associated TJ 20402.

If the load on the CAN network is too high, this may be due to a control module sending faulty messages on the CAN network (known as a disruptive control module). The fault may also be due to an intermittent short-circuit to supply voltage or ground in one of the CAN cables. This results in the control modules on the CAN network starting to send faulty messages. The faults can occur without a diagnostic trouble code (DTC) being stored by the control modules. The voltage can be measured between the CAN cables in order to check the load on the CAN network.

Note! It is not necessarily the control module(s) that stored the diagnostic trouble code (DTC) that is communicating faultily. Faulty messages can come from any control module in the same section of the CAN network. However, faulty communication in one network cannot affect the communication on the other network. In other words, faulty communication on the LS-CAN cannot disrupt communication on the HS-CAN and vice versa.

- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Check communication/load on CAN-net by measuring voltage between CAN-L and CAN-H. Measure voltage between the following connections on the OBDII-box/diagnostics socket.

- #6 and #14. The average value of the voltage must be approximately 0.6-1.4 V. The voltage shall normally be between 0.55 - 0.90 V. A higher voltage may indicate increased traffic on the CAN-net. In case of fault in communication/too high traffic on the CAN-net, the voltage is considerably higher than the above stated values.

In order to identify which control module has faulty communication, cut the power supply to one control module at a time. Check the voltage in the

CAN cables again. The easiest way to cut the power supply is to remove the fuse(s) for the relevant control module. Repeat until the voltage between the CAN wiring drops to the normal level.

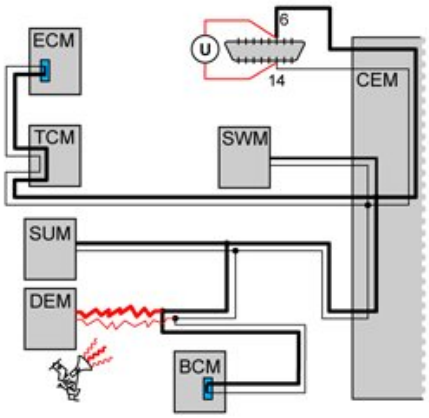
Note! When connecting and disconnecting individual control modules, other diagnostic trouble codes (DTCs) may be stored in certain control modules.

Hint: When the suspected defective control module has been identified, connect and disconnect the supply voltage to the control module a number of times to verify that the malfunction appears and disappears. Switch off the ignition between each check.

Note! Do not cut the power to the central electronic module (CEM) unless it is the last control module left to check.

A control module that is communicating incorrectly must be replaced. See Repairing and installing/Removing, replacing and installing.

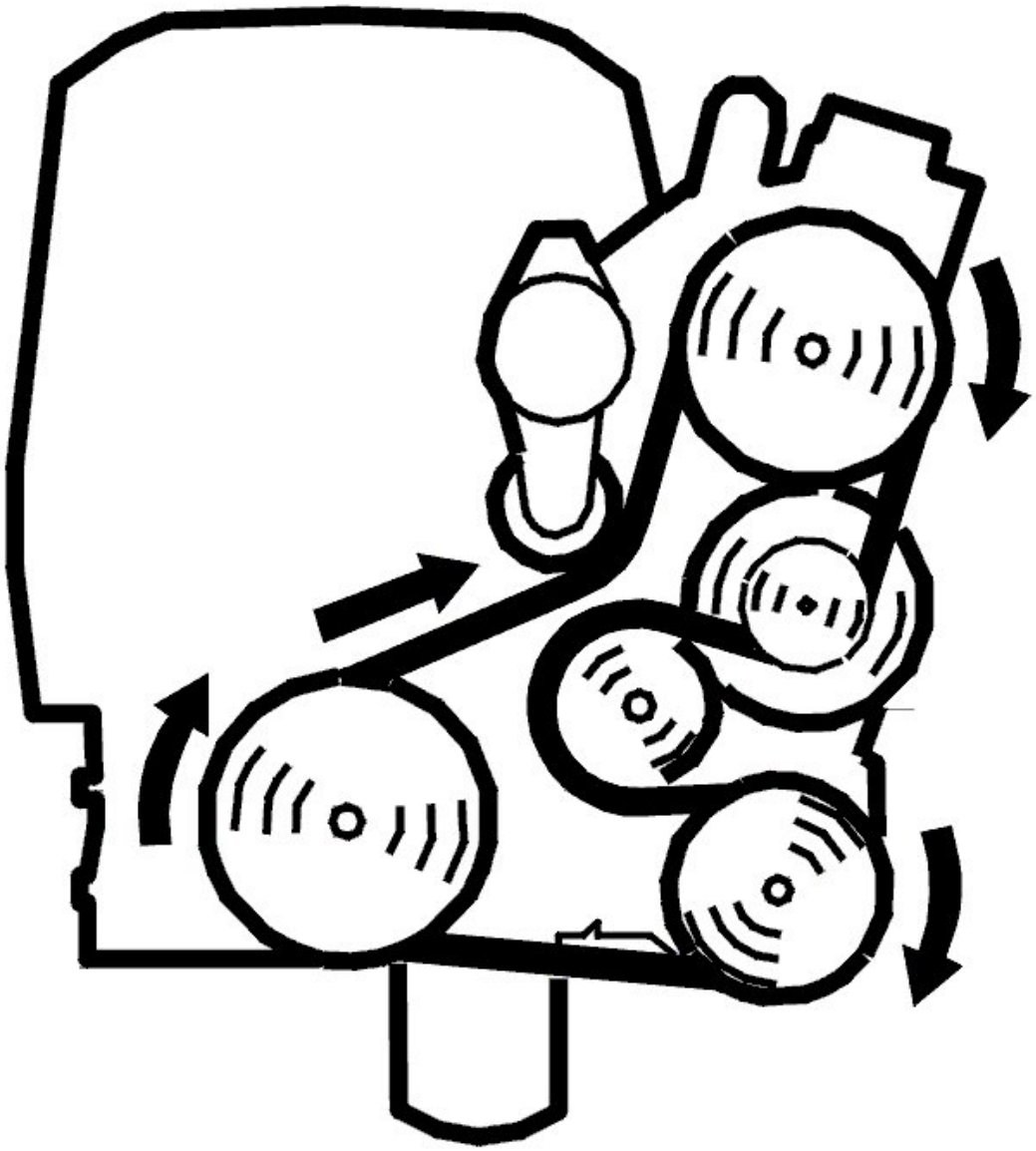
Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

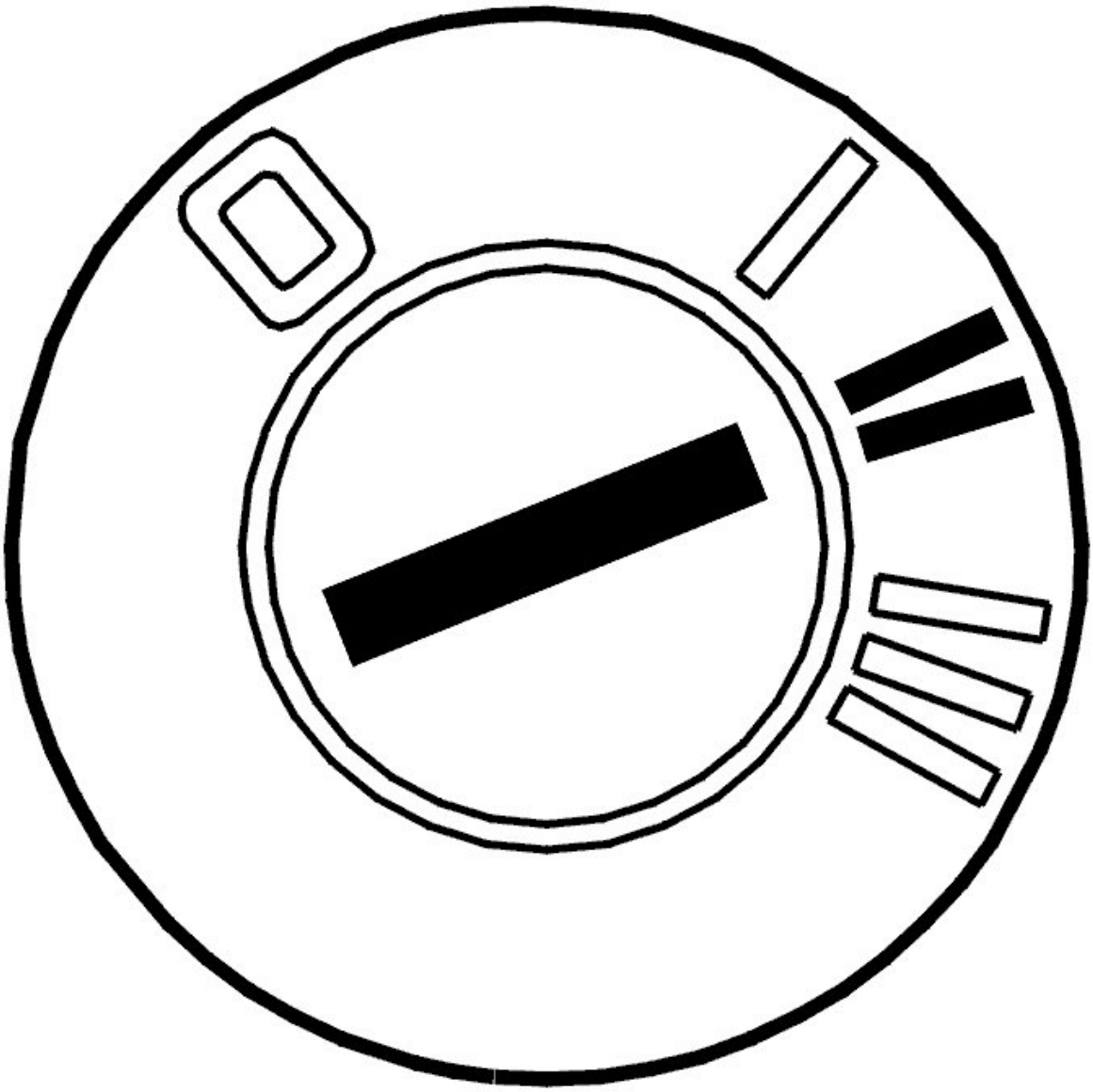


Continue - Verification

Verification

Hint: After rectifying a fault, a verification should be carried out.





- Reinstall the connectors, components etc.
- Ignition on.

Note! For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

- Erase diagnostic trouble codes (DTCs) in all control modules.
- Ignition off.
- Ignition on.
- Start the vehicle. Allow the vehicle to run for 10 minutes.
- Read out the diagnostic trouble codes in the vehicle via the DIAGNOSTICS tab.

Does the diagnostic trouble code (DTC) for faulty communication return?

Yes - Fault-tracing information

No - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

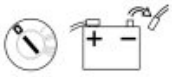
Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Attempt New Test - General information

Checking short-circuiting to ground/voltage in CAN-net



- Ignition off.
- Disconnect the battery negative lead.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

Checking for a short-circuit to ground

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #4 (ground). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #4 (ground). The resistance should be above 1 kohms.

If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and ground.

Checking for a short-circuit to voltage

Measure resistance between the following connections on the OBDII-box/diagnostics socket.
- #6 and #16 (voltage). Measurement is shown in the figure. The resistance should be above 1 kohms.
- #14 and #16 (voltage). The resistance should be above 1 kohms.

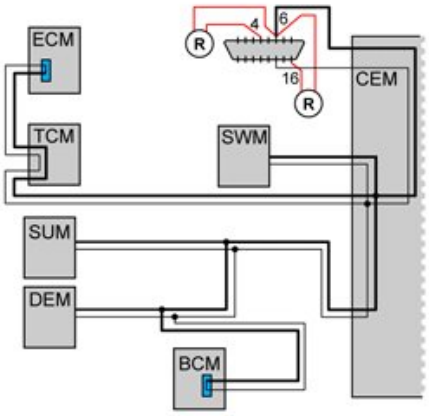
If resistance is below 1 kohms this indicates short-circuiting between the CAN-line and voltage cable.
Twist the cable harness and wiggle connectors where they can be accessed along the cable harness during every measurement, and note if the resistance changes to detect intermittent short-circuits or open circuit.

Hint: Part the CAN-net at suitable points to decide where a short-circuit may be found.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Battery, disconnecting See: Starting and Charging/Battery/Service and Repair/Procedures/Battery, Disconnecting
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

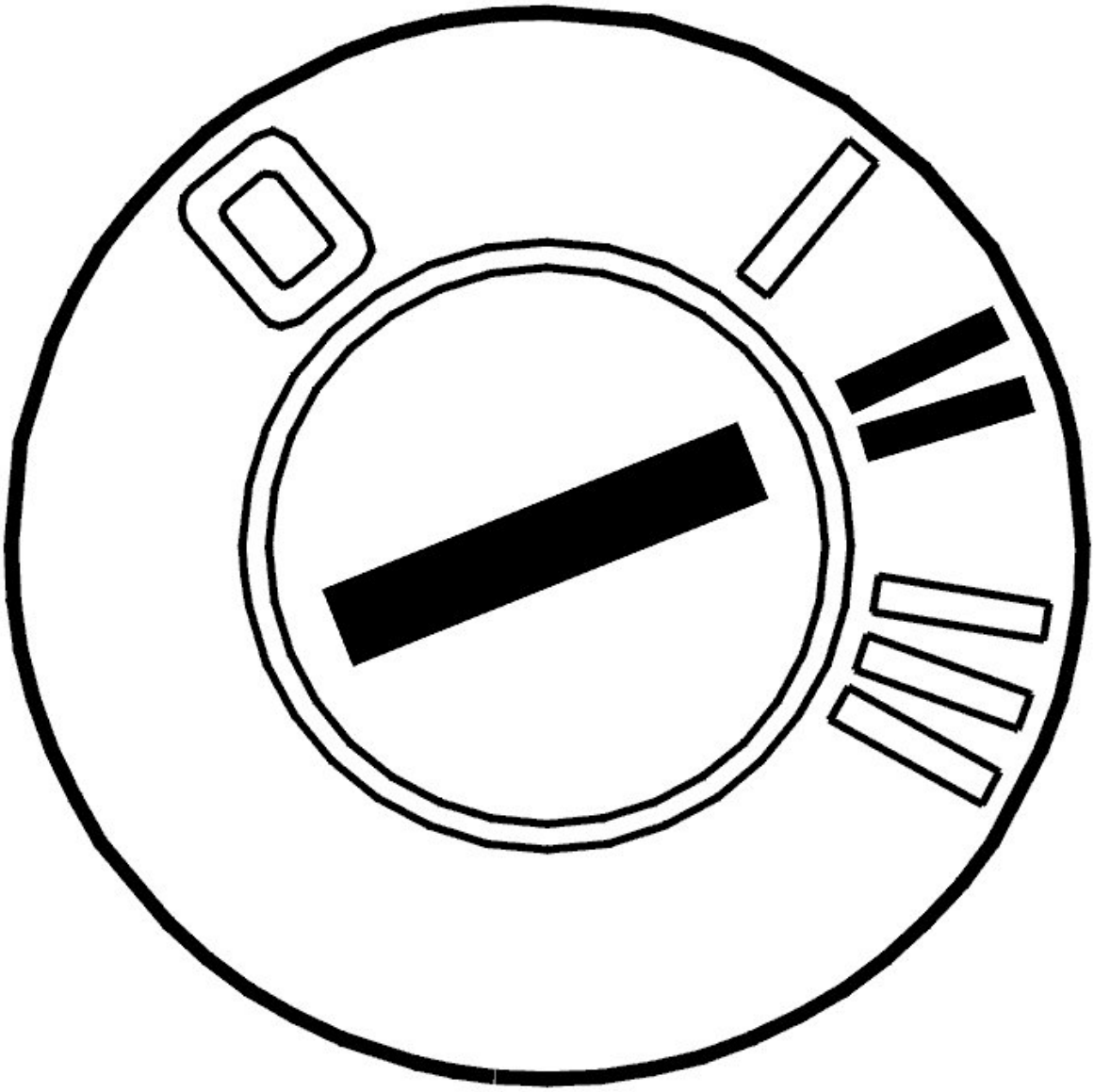


Was a fault detected?

Yes - Verification

No - Checking the traffic load on the CAN cables

Checking voltage-drop in cable for CAN-H and CAN-L, respectively



- Connect the battery.
- Ignition on.
- Connect OBDII-Box **(951 3015)** to the diagnostics socket.

Hint: Use the wiring diagram to provide support when taking readings.

For general information about CAN-troubleshooting, see:
- INFORMATION/PRODUCTSPECIFICATIONS/Design and function/37/CAN-net.
- General information about fault-tracing in the CAN network See: Information Bus/Description and Operation/General Information About Fault-tracing In the CAN Network

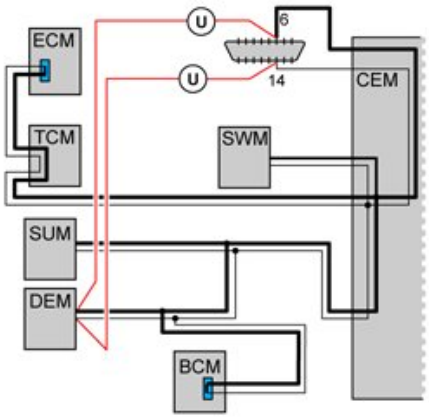
In principle, the voltage measured in each cable in the CAN-net shall be the same at each control module in the network. This means that the voltage-drop in the cable for CAN-H and CAN-L, respectively, between the control modules should be very low. If there is a voltage-difference in the CAN-lines between the diagnostics socket/Central electronic module (CEM) and a control module due to, e.g., contact resistance in a connector or branching, communication may be lost/interfered with.
Check if there is voltage-drop in the cable for CAN-H and CAN-L between the diagnostics socket/Central electronic module (CEM) and the control module where there is problem with communication.
Carry out the following:
Measure voltage between the following connections on the OBDII-box/diagnostics socket.
- #6 and corresponding connection on relevant control module for CAN-H. The voltage shall be lower than 50 mV.
- #14 and corresponding connection on relevant control module for CAN-L. The voltage shall be lower than 50 mV.

If voltage is too high, this indicates too high contact resistance in cable, connector, or branching. Check the circuit between the diagnostics socket and control module in question for contact resistance and oxidation.

Note! After fault with control modules that interfere with communication, other control modules may remain in Limp-Home (that is, they work with reduced functionality) even when the ignition has been turned off and on a few times. For certain faults in the CAN-net where control modules have stopped communicating, it may help to disconnect/reconnect the battery to "restart" the control module/CAN-net.

Remedy wiring as necessary.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

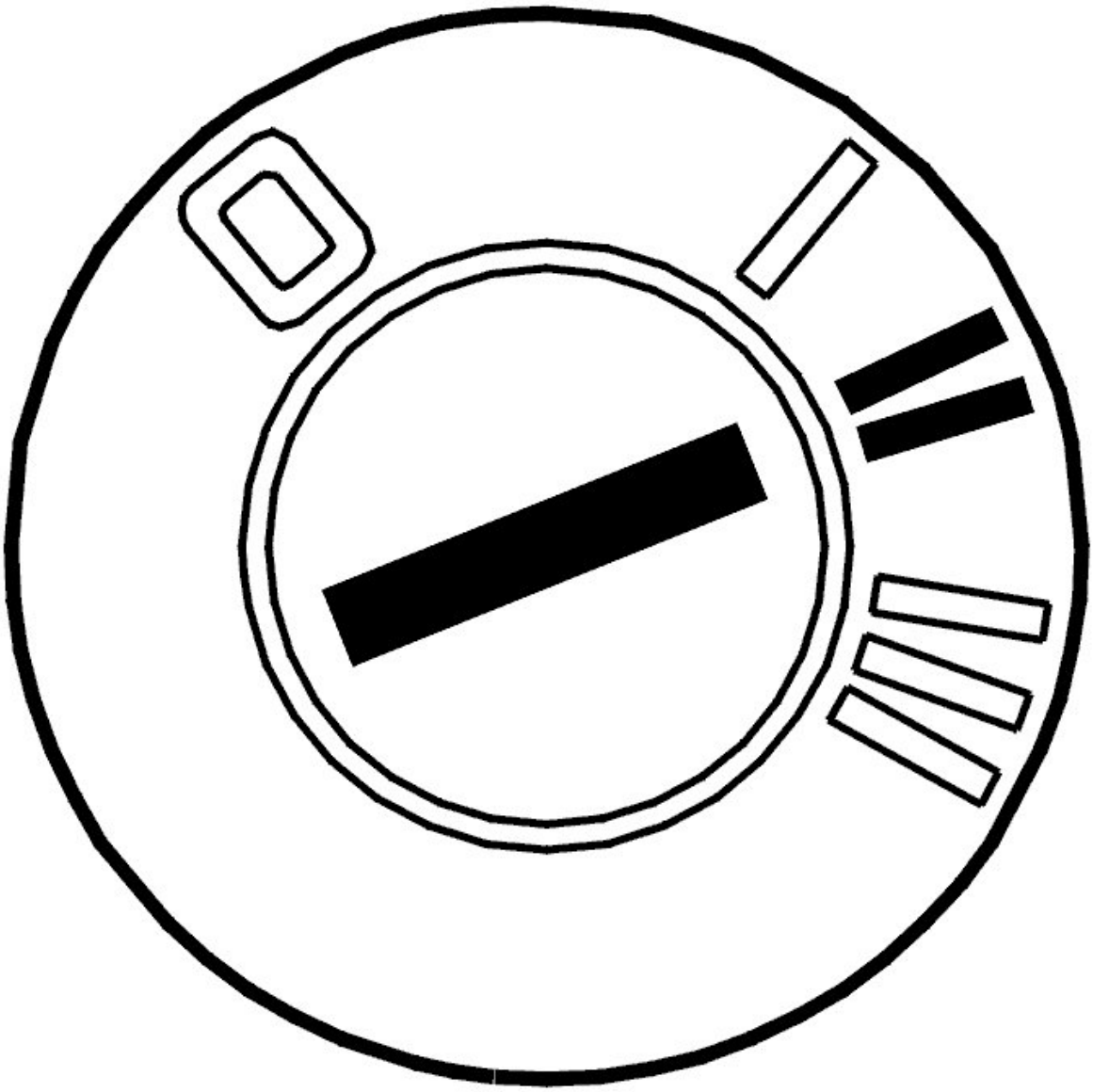


Continue - Verification

TCM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

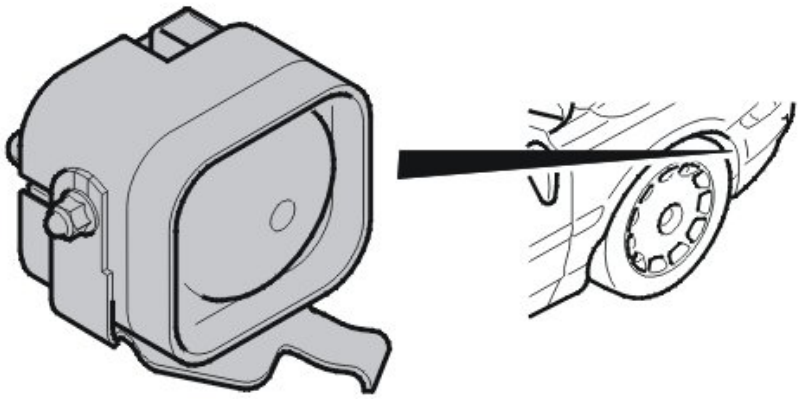
Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0004

Condition



The upper electronic module (UEM) receives information from the siren
If the alarm does not respond to repeated requests from the upper electronic module (UEM), the control module interprets it as a communication fault and the diagnostic trouble code (DTC) is stored.
The diagnostic trouble code (DTC) can be detected 40 seconds after the control module has been initialized.

Substitute value
- None.

Possible source
- Open-circuit in UEM_K3 (the serial cable between the upper electronic module (UEM), siren and sun roof)
- Short-circuit to ground in UEM_K3
- Short-circuit to supply voltage in UEM_K3
- Defective siren.

Fault symptom[s]
- Alarm/Arming does not work/No visible indication
- Alarm/Alarm will not set off/No visible and/or audible signal
- Text window and warning symbol/Text message

Communication Fault

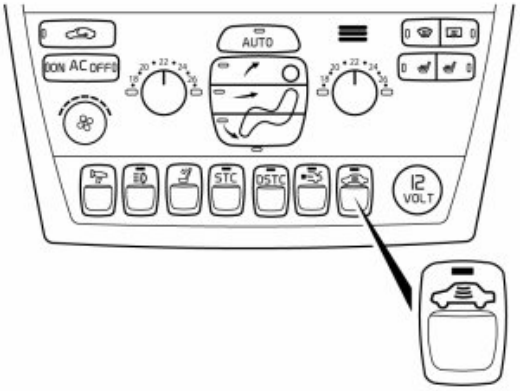
Communication fault

Checking for permanent or intermittent faults

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the vehicle has been alarmed. Trigger the alarm by inserting a hand through the window and unlocking the door from the inside using the internal door handle.

Note! On vehicles with deadlocks, these must be deactivated first. Press the button for the reduced locking position to activate deadlocks.

The function can be engaged in ignition position I and 0. It can also be engaged after the ignition has been switched off, for up to one minute after the ignition key has been removed from the ignition switch. The switch has an integrated light emitting diode for indicating that the function has been activated. A message also appears in the display in the Driver information module (DIM),however, not when the key has been removed. The switches may be positioned differently than shown in the image, depending on the vehicle's configuration and equipment.

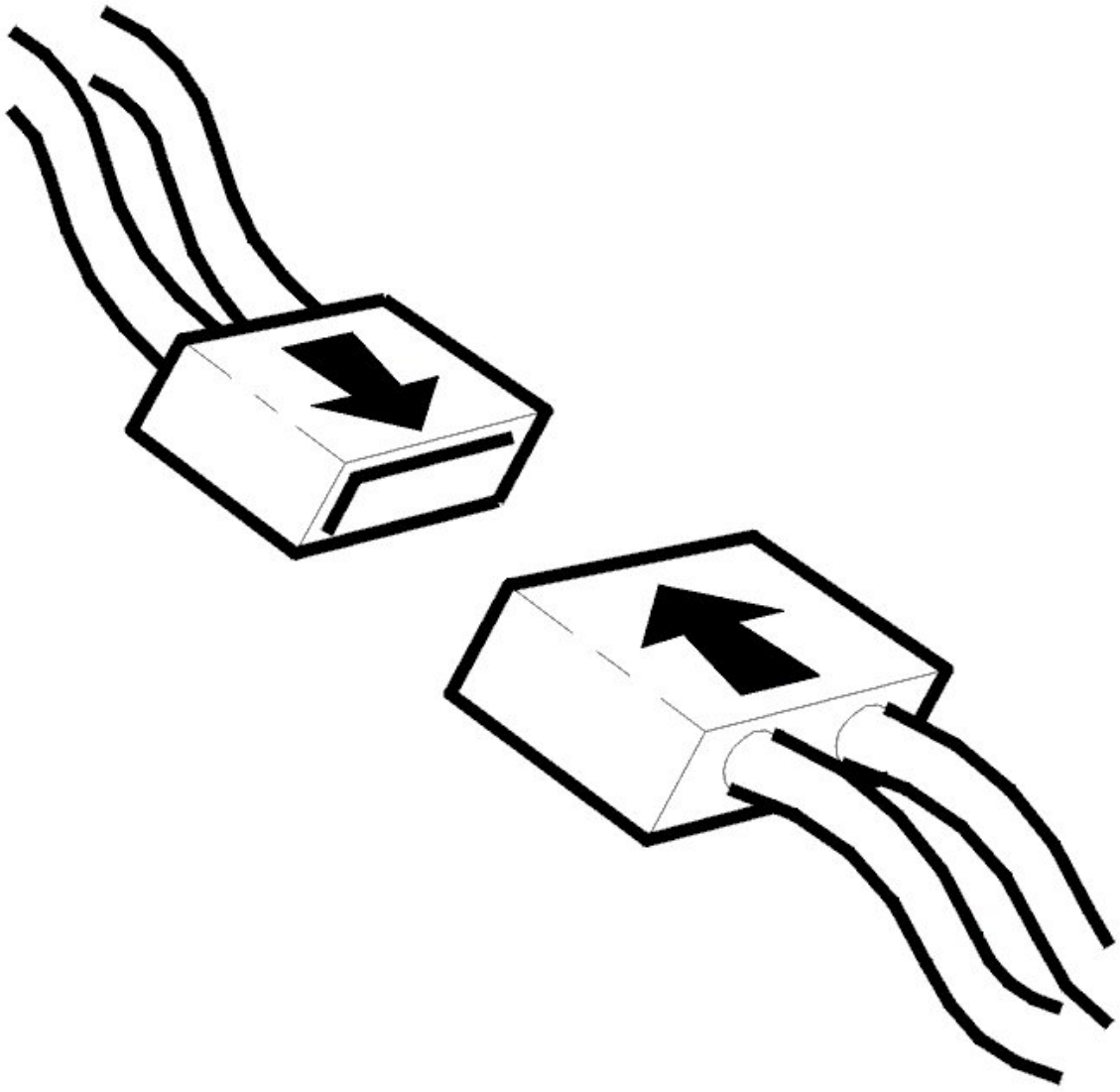


Is the siren triggered?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors



- Check the connectors for the siren, upper electronic control module and cable harness. Check for contact resistance and oxidation. In particular, check for any damage
- Reinstall the components, reconnect the connectors etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the vehicle has been alarmed. Trigger the alarm by inserting a hand through the window and unlocking the door from the inside using the internal door handle.

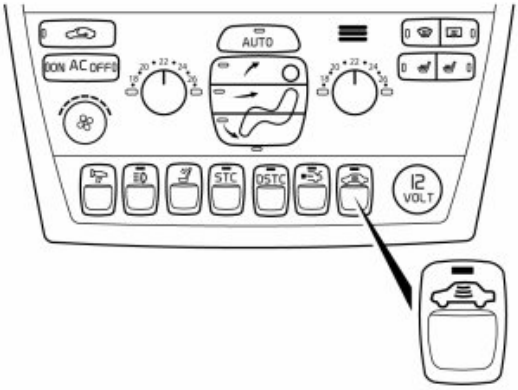
Note! On vehicles with deadlocks, these must be deactivated first. Press the button for the reduced locking position to activate deadlocks.

The function can be engaged in ignition position I and 0. It can also be engaged after the ignition has been switched off, for up to one minute after the ignition key has been removed from the ignition switch. The switch has an integrated light emitting diode for indicating that the function has been activated. A message also appears in the display in the Driver information module (DIM),however, not when the key has been removed. The switches may be positioned differently than shown in the image, depending on the vehicle's configuration and equipment.

Other information:

- To access the siren connector, see Siren, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Alarm Horn/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Is the siren triggered?

Yes - Verification

No - Checking for open-circuits and short-circuits

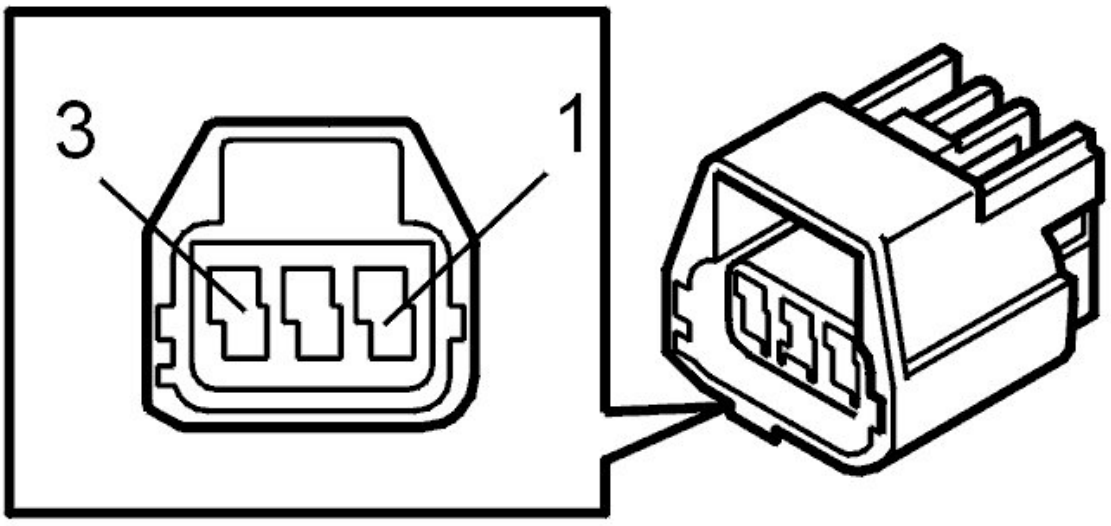
Checking for open-circuits and short-circuits

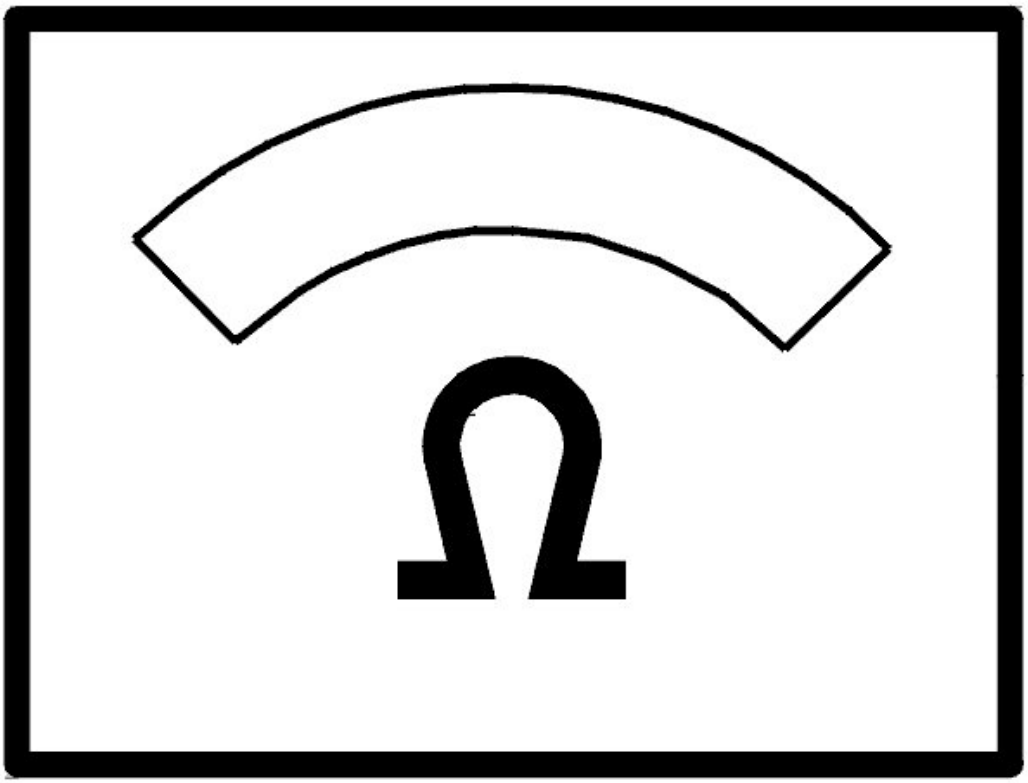
Check that the fuses in the fusebox in the passenger compartment are intact.
Check the cable between control module terminal #21 and siren terminal #2. Check for a short-circuit to ground. Check for an open-circuit. Check for a short-circuit to supply voltage.
Check the wiring from the fuse in the passenger compartment to siren connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground.

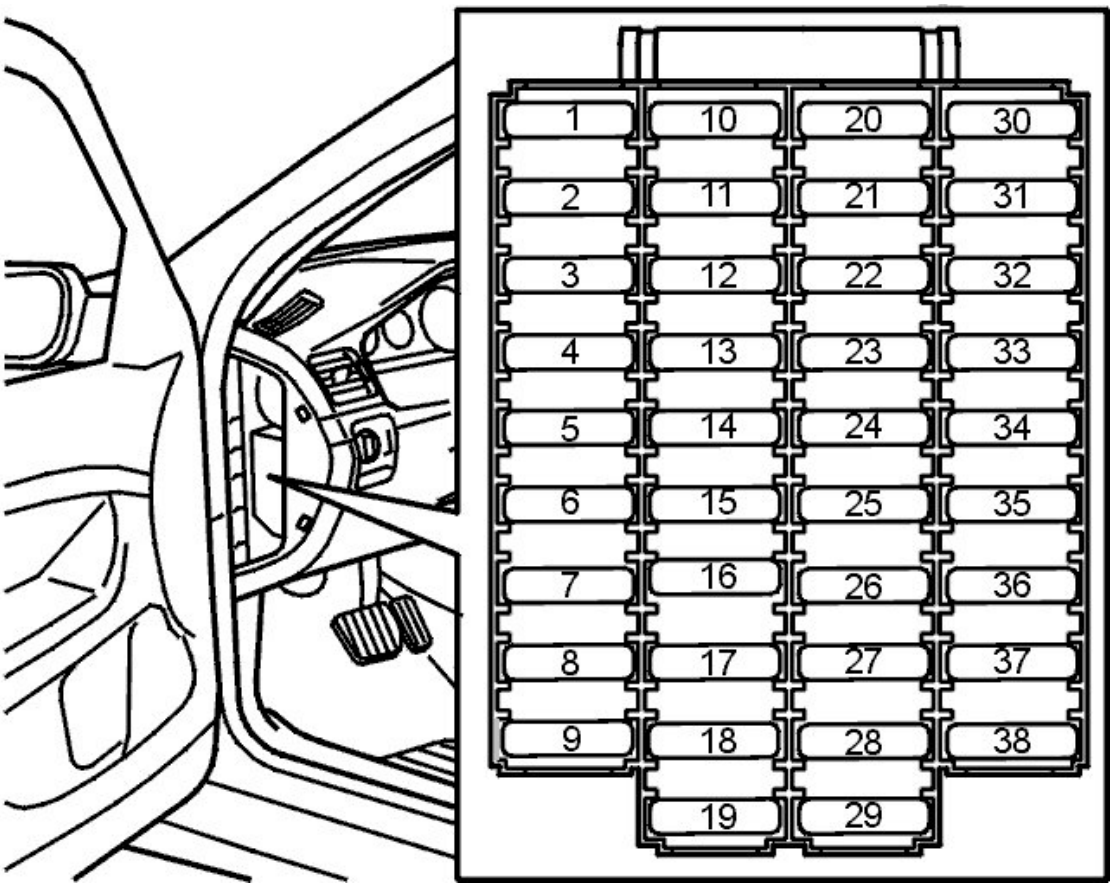
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the siren connector, see Siren, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Alarm Horn/Service and Repair
- For further information about the fuses and relays, see the Wiring Diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Remedy as necessary.



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Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the siren. See Siren, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Alarm Horn/Service and Repair.
The siren must be configured after replacement. Click on the VCT2000 symbol for configuration.

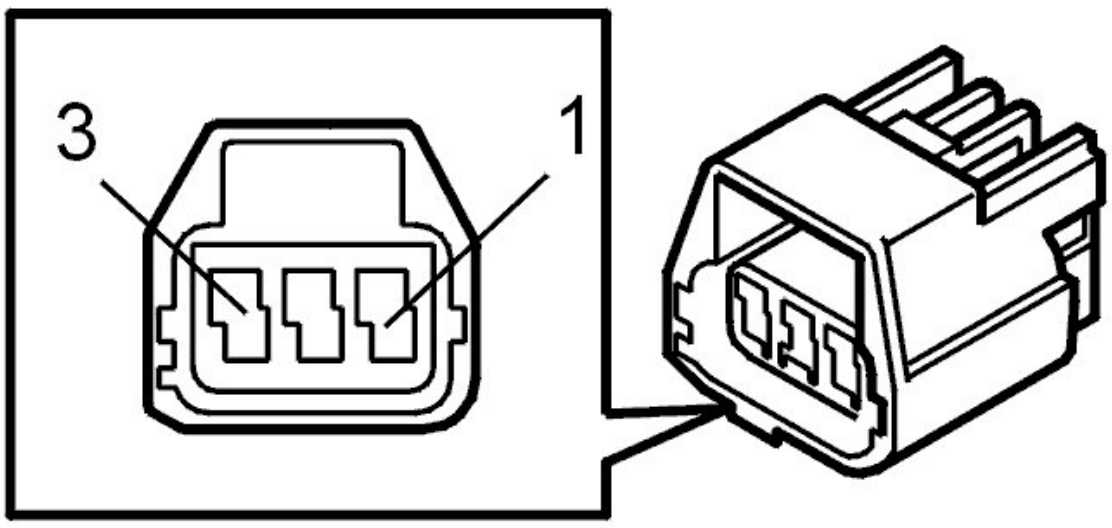
Continue - Verification

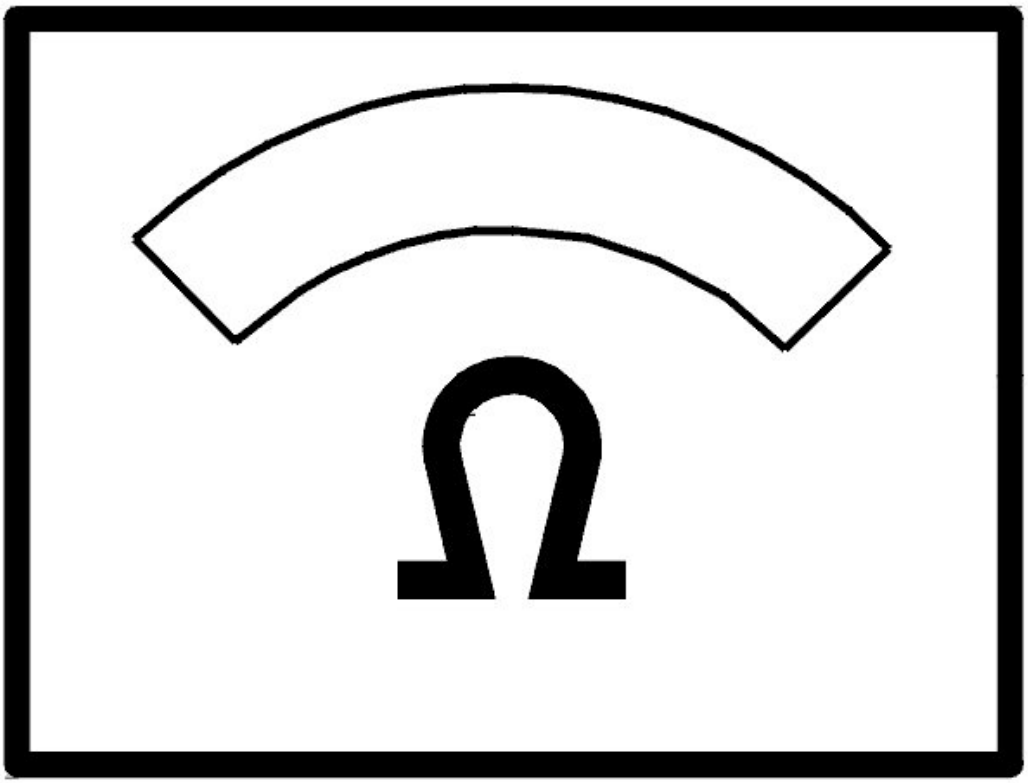
Intermittent fault

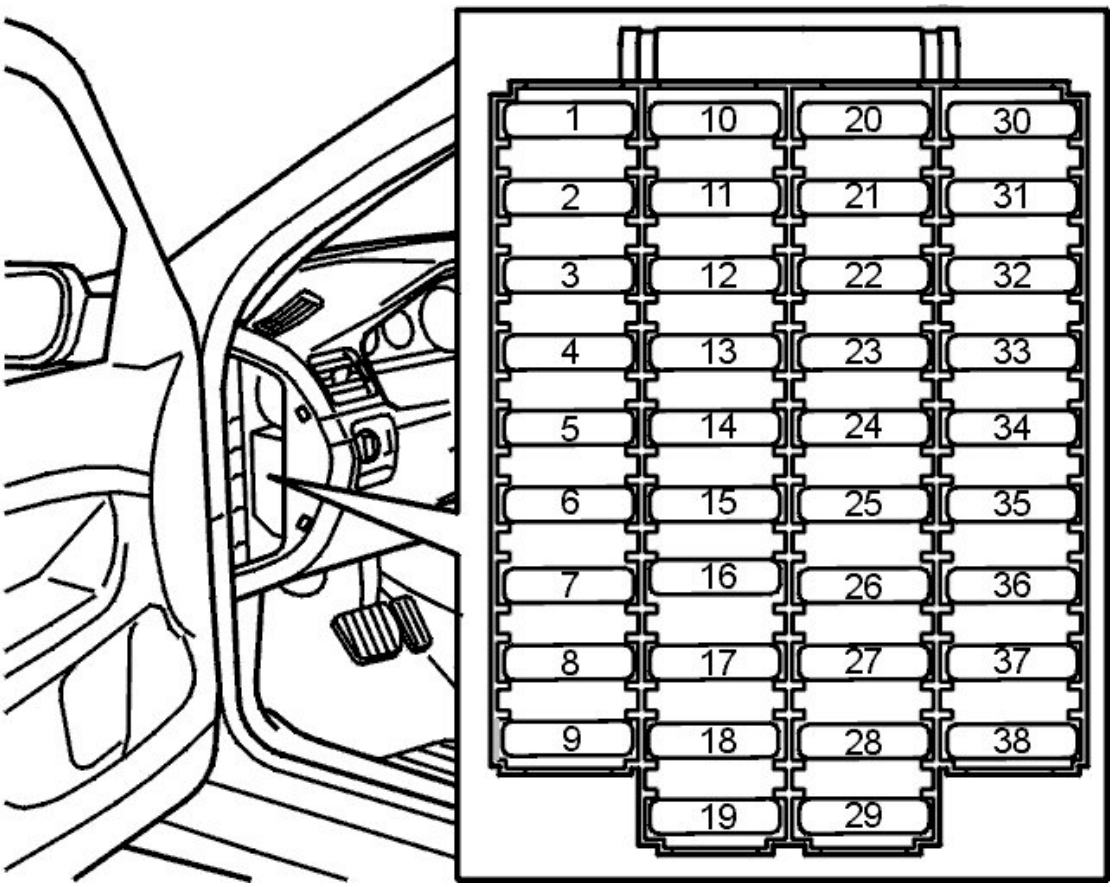
Check the connectors for the upper electronic module (UEM) and the siren. Check for contact resistance and oxidation. Check for loose connections.
Check that the fuses in the fusebox in the passenger compartment are intact.
Check the cable between control module terminal #21 and siren terminal #2. Check for an intermittent short-circuit to ground. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.
Check the cable between ground terminal 31/94 and siren connector terminal #3. Check for an intermittent open-circuit.
Check the cable between the fuse in the fusebox in the passenger compartment and siren connector terminal #1. Check for an intermittent open-circuit. Check for an intermittent short-circuit to ground.
Try replacing the siren if no fault is found.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the siren connector and to replace the siren, see Siren, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Alarm Horn/Service and Repair
- For further information about the fuses and relays, see the Wiring Diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



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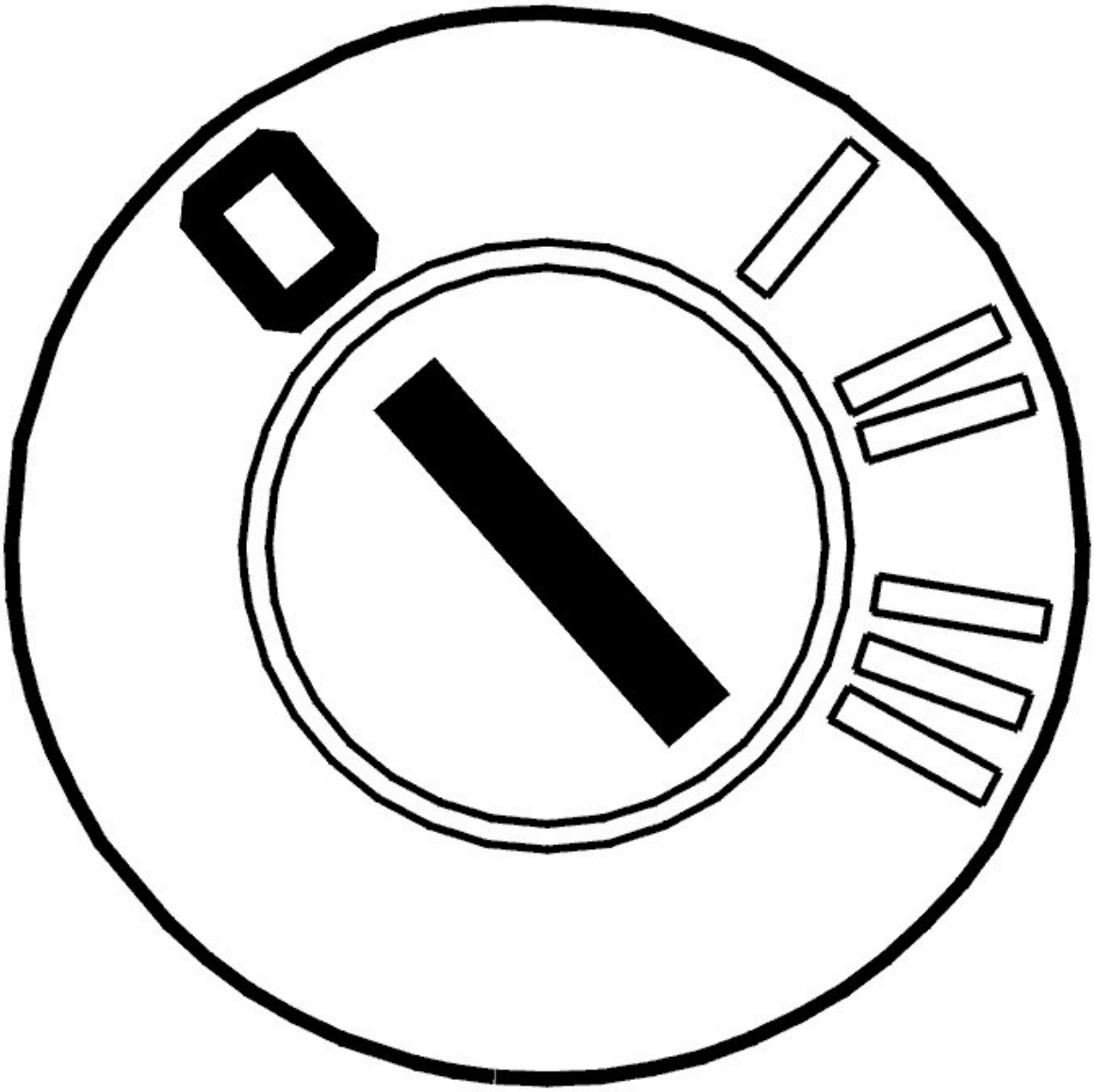
Continue - Fault-tracing information

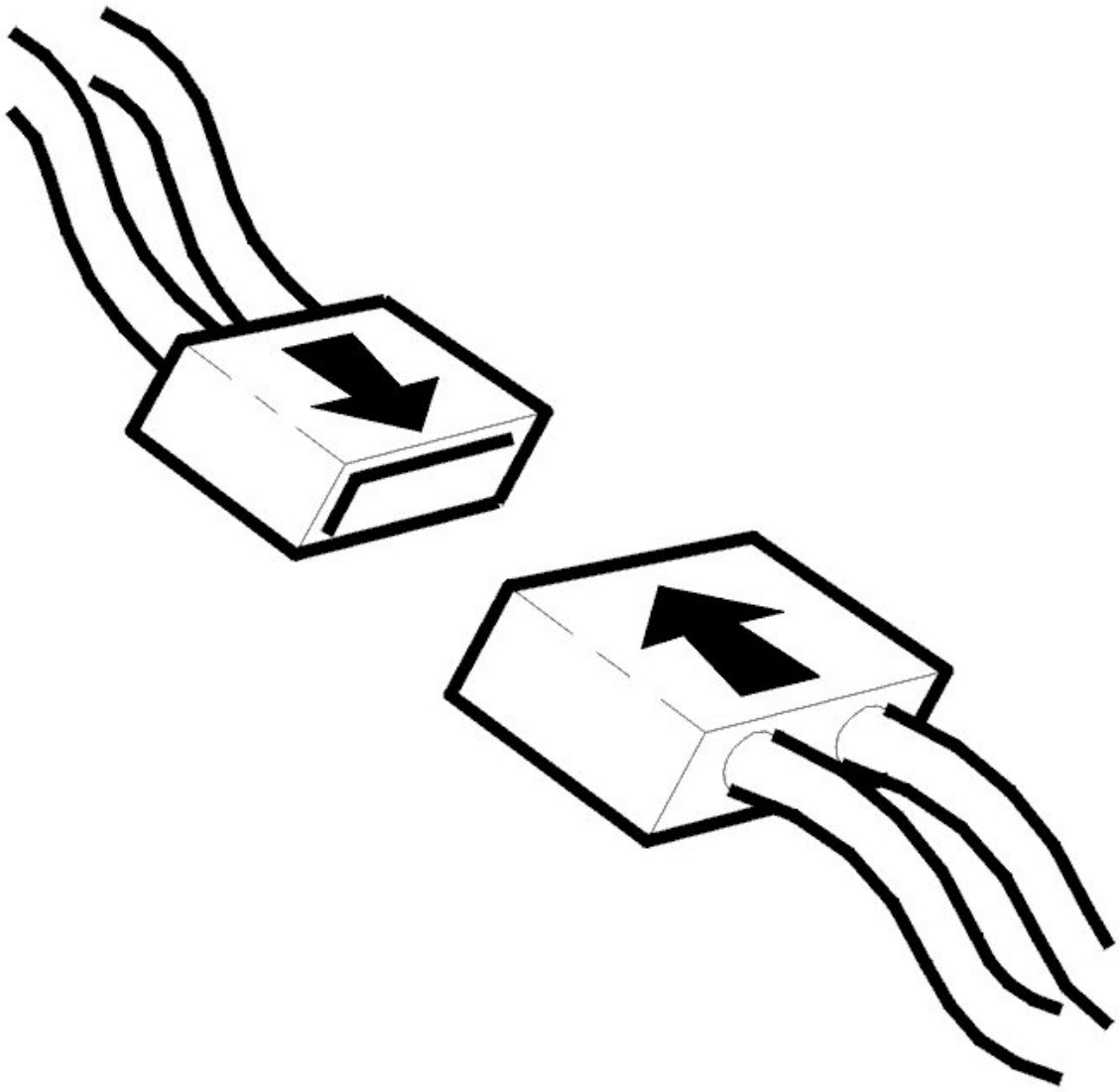
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the alarm is active. Trigger the alarm by reaching into the car and unlocking the door from the inside using the internal door handle.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

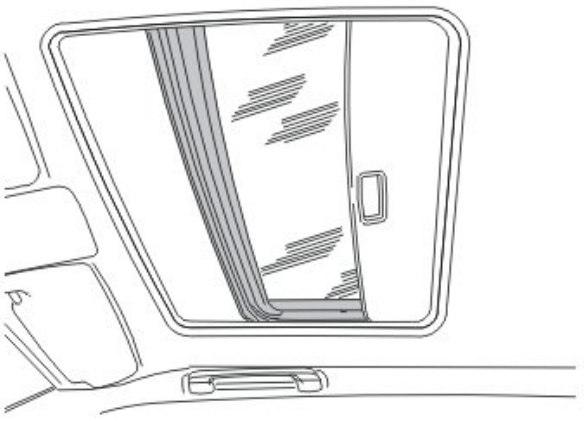
Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0005

Condition



The upper electronic module (UEM) receives information from the sun roof.
If the sun roof does not respond to repeated requests from the upper electronic module (UEM), the control module interprets it as a communication fault and the diagnostic trouble code (DTC) is stored.
The diagnostic trouble code (DTC) can be detected 20 seconds after the control module has been initialized.

Substitute value
- None.

Possible source
- Open-circuit in UEM_K3 (the serial cable between the upper electronic module (UEM), siren and sun roof)
- Short-circuit to ground in UEM_K3
- Short-circuit to supply voltage in UEM_K3

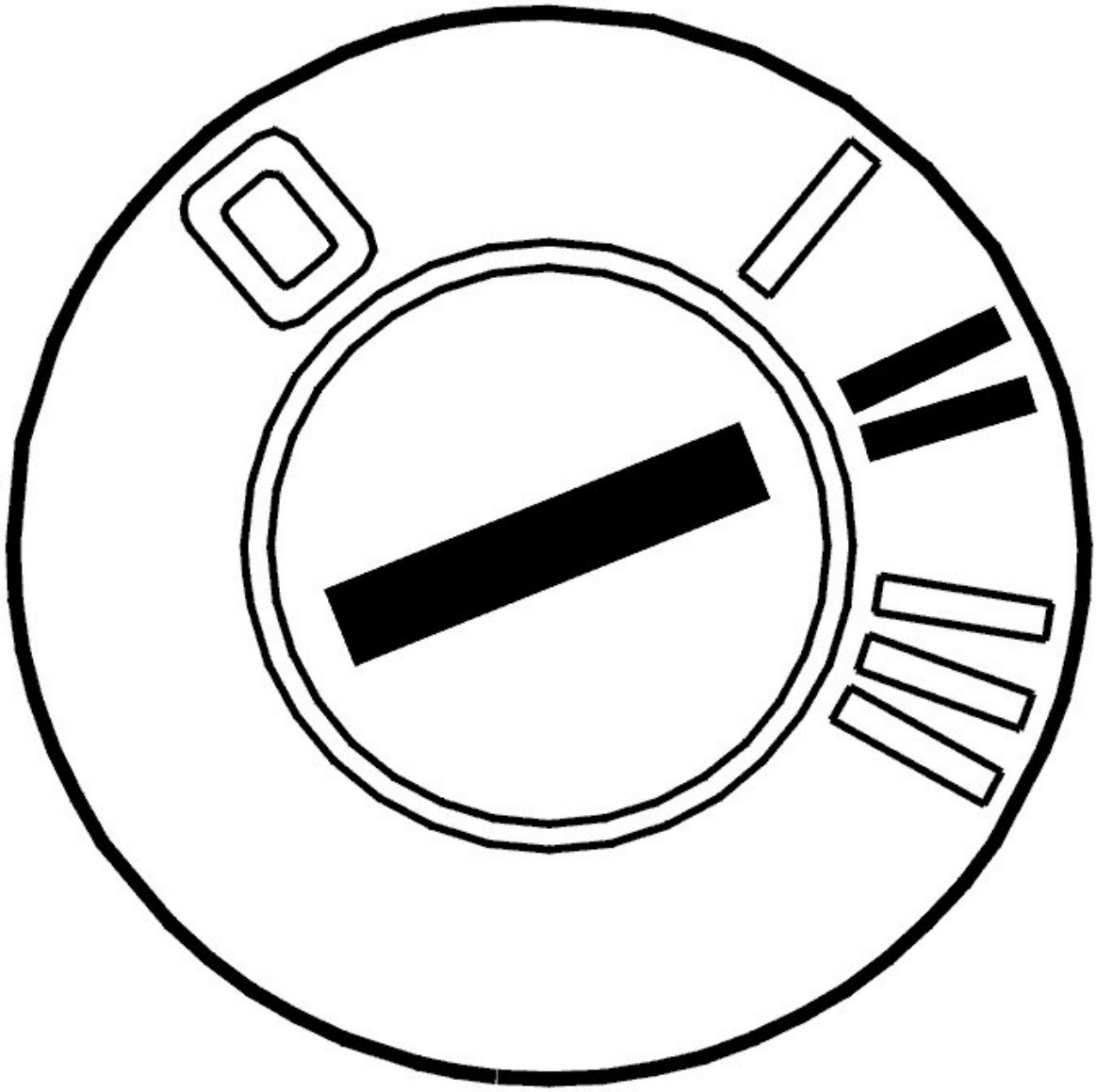
- Damaged Sun roof module (SRM).

Fault symptom[s]
- The power sun roof does not operate.

Communication Fault

Communication fault

Checking for permanent or intermittent faults



- Ignition on.

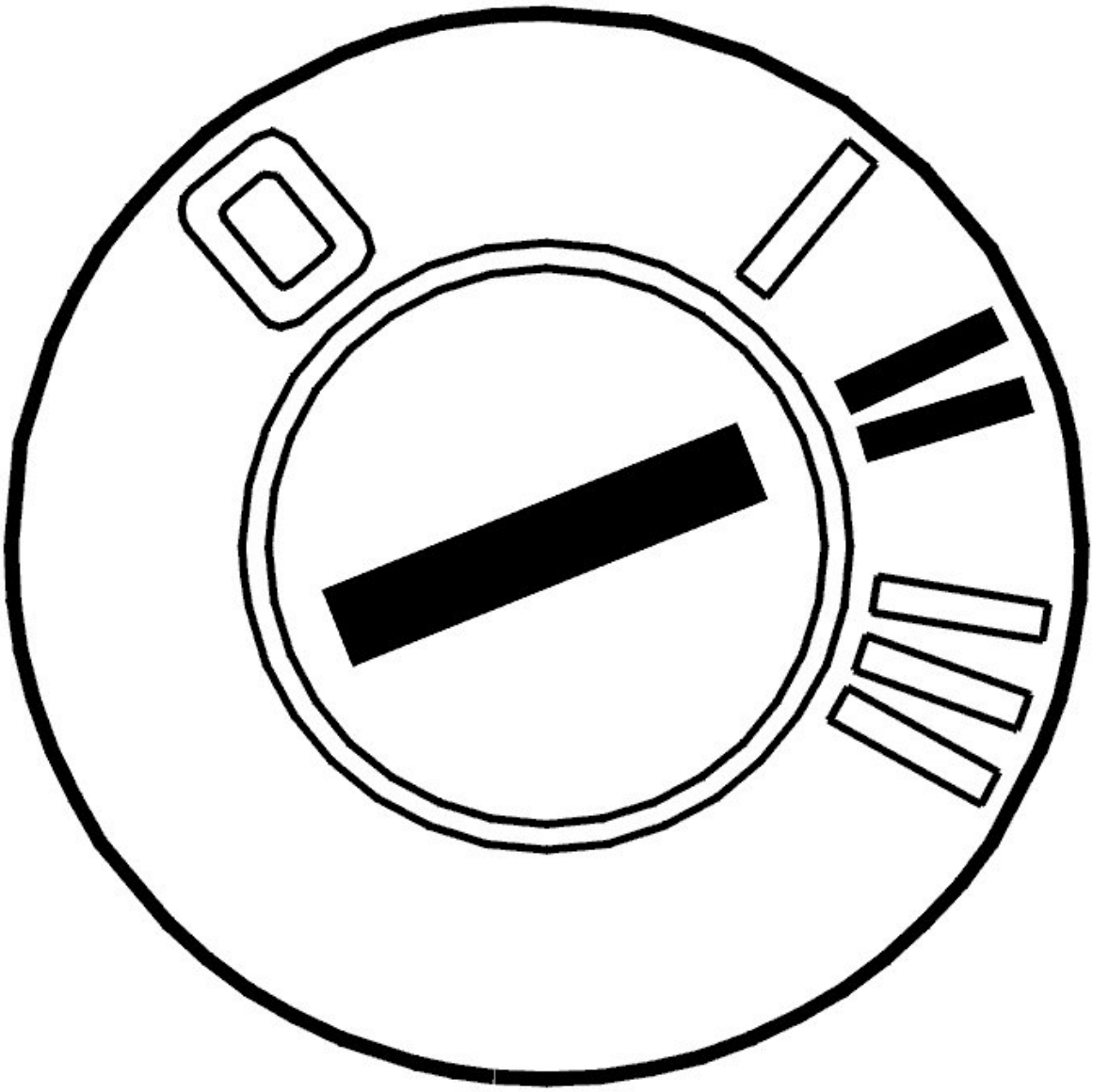
Attempt to operate the sun roof.

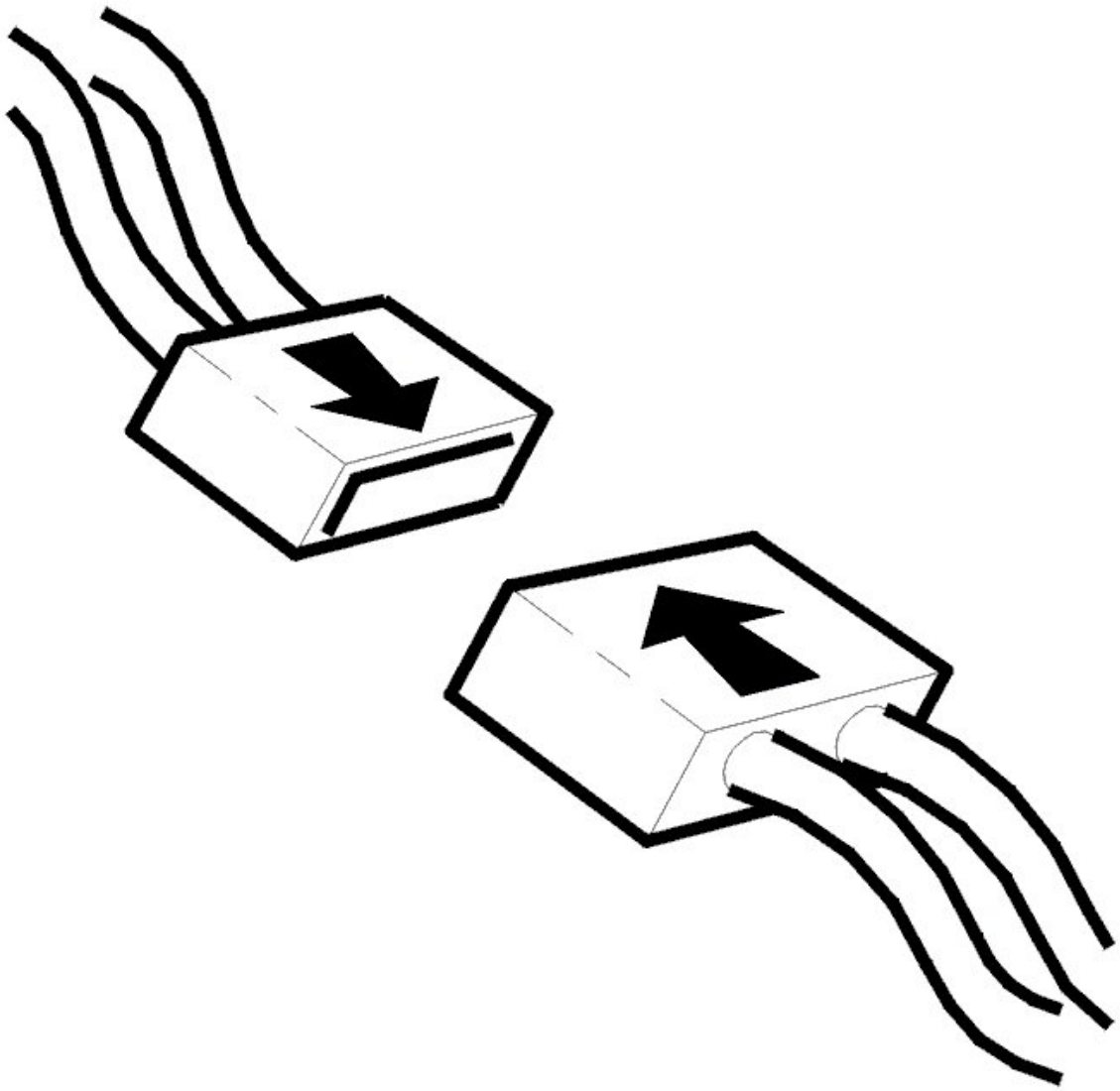
Can the sun roof be operated?

Yes - Intermittent fault

No - Checking the connectors

Checking the connectors





- Ignition off
- Remedy the connectors for the cable harness, sun roof control module and upper electronic module (UEM) for contact resistance and oxidation.

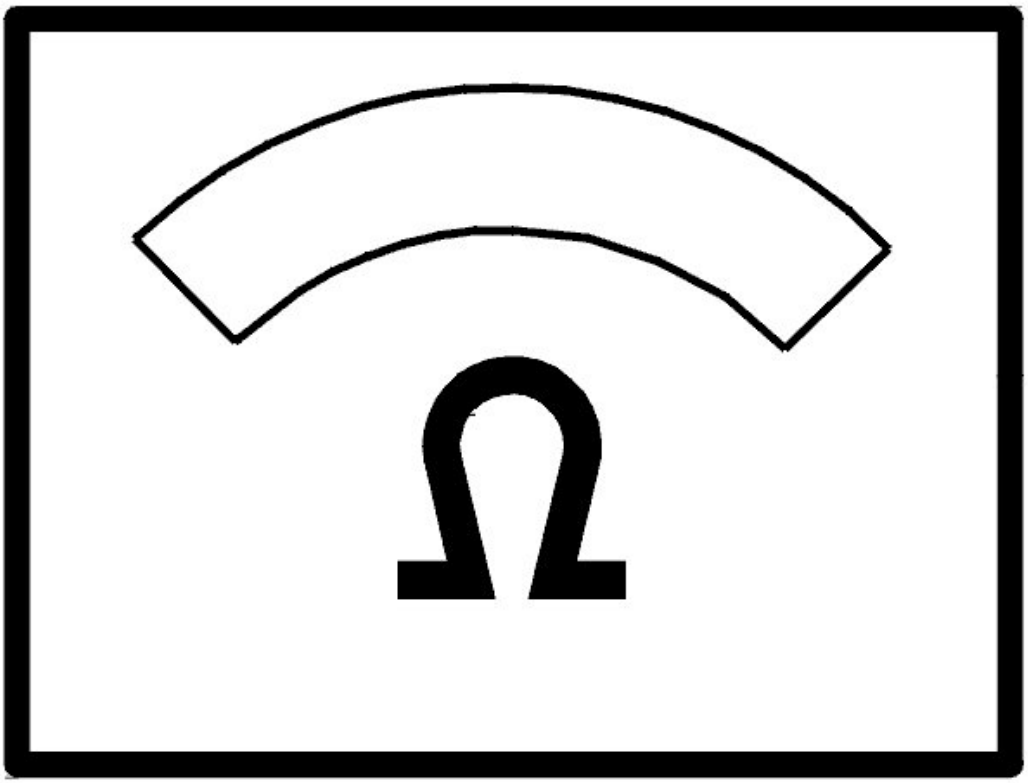
In particular, check for any damage

- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Operate the sun roof.

Other information:

- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- To access the sun roof connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Do the sun roof controls operate?

Yes - Verification

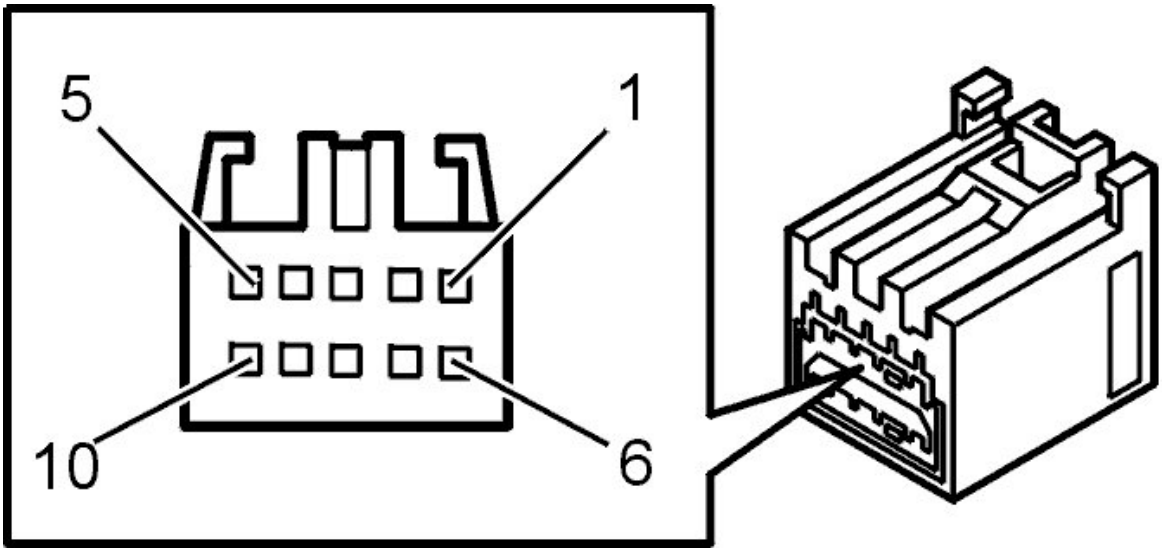
No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the upper electronic module (UEM) terminal #21 and the sun roof module (SRM) terminal #4. Check for a short-circuit to ground. Check for an open-circuit. Check for a short-circuit to supply voltage.
Remedy as necessary.

Other information

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the sun roof control module, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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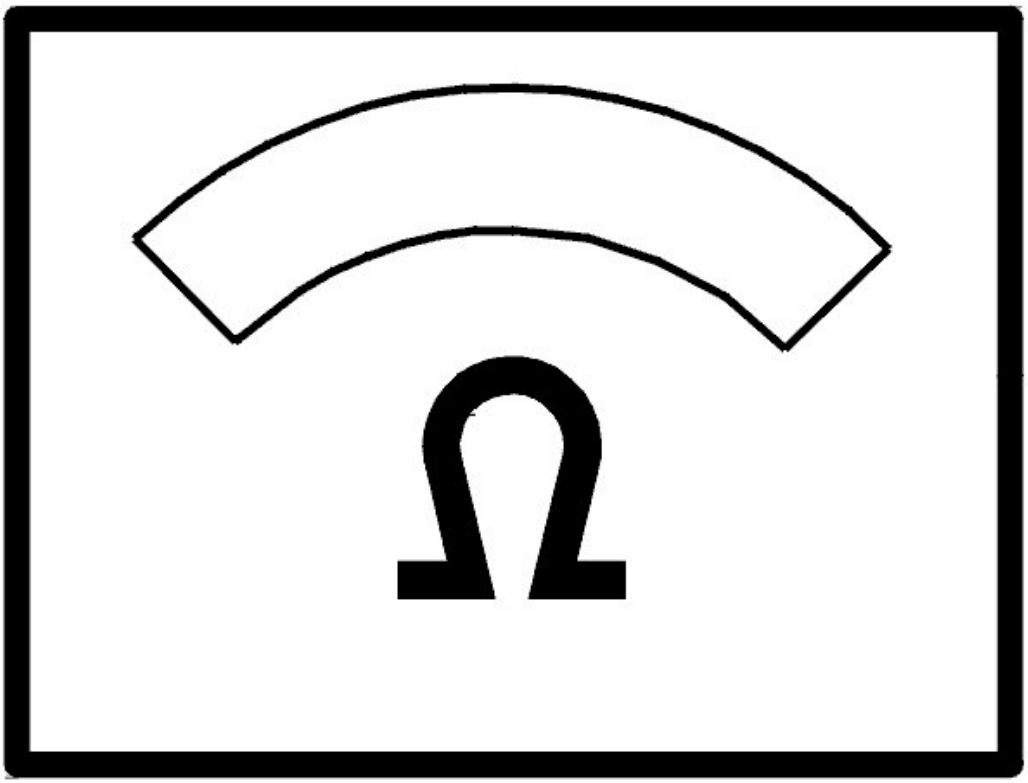
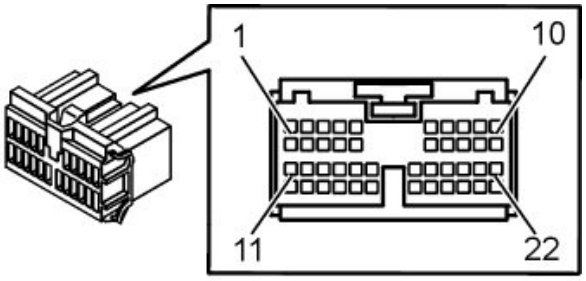




Was a fault detected?

Yes - Verification

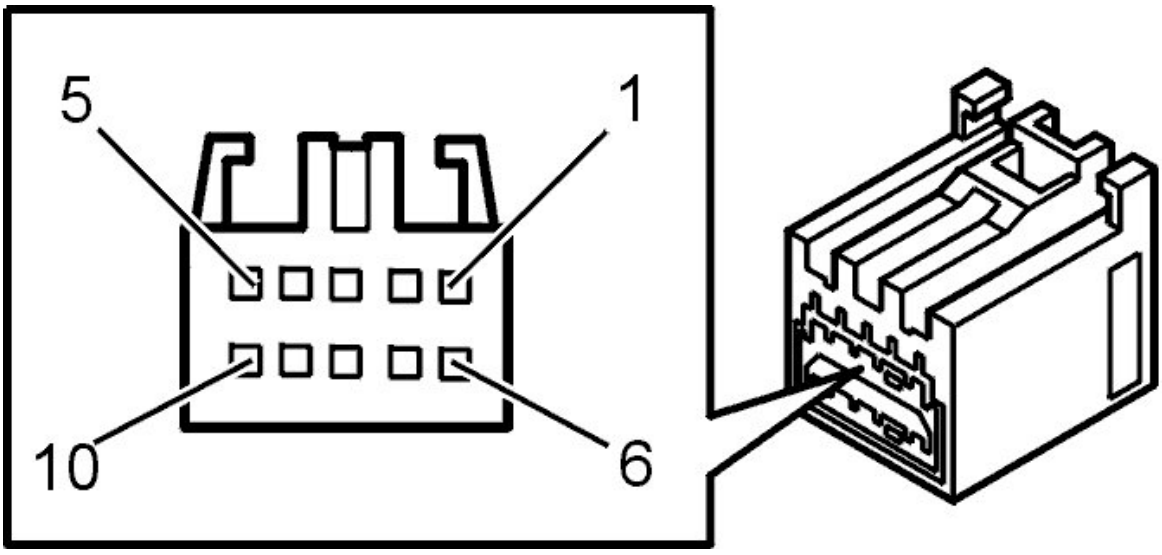
No - **No Fault Found**

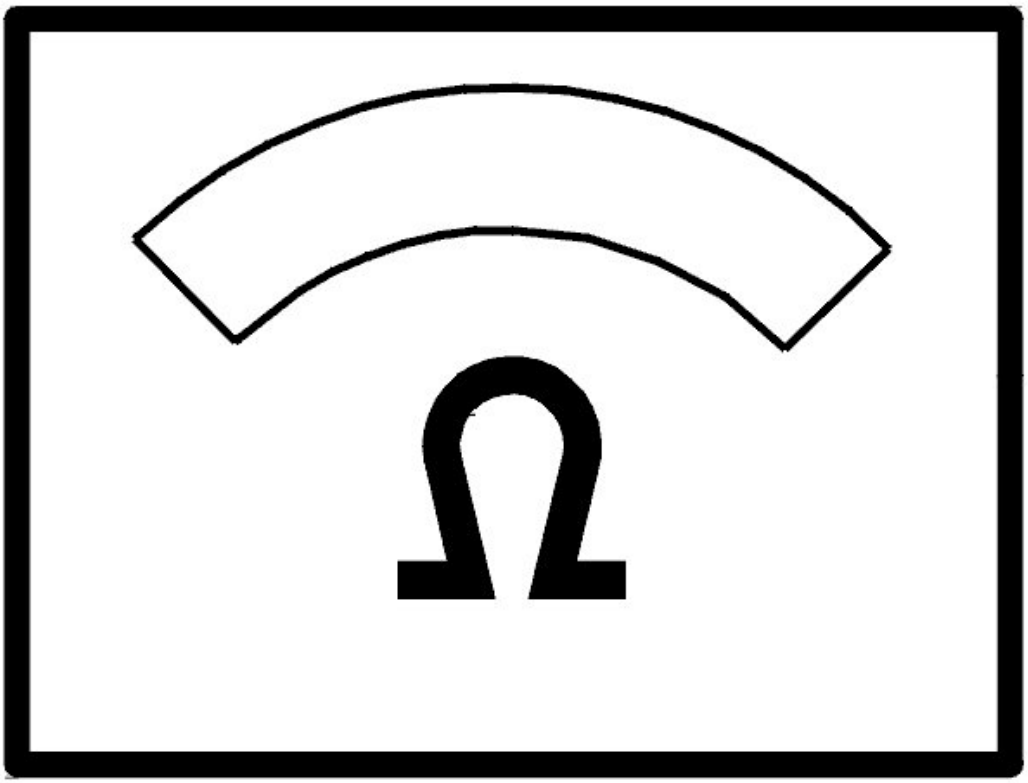
Intermittent fault

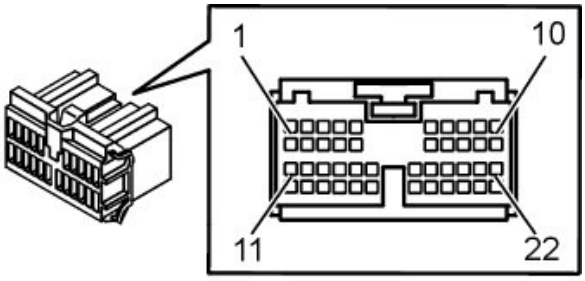
Check the connectors for the upper electronic module (UEM) and the sun roof module (SRM). Check for contact resistance and oxidation. Check for loose connections.
Check the cable between the upper electronic module (UEM) terminal #21 and the sun roof module (SRM) terminal #4. Check for an intermittent short-circuit to ground. Check for an intermittent open-circuit. Check for an intermittent short-circuit to supply voltage.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the sun roof control module, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







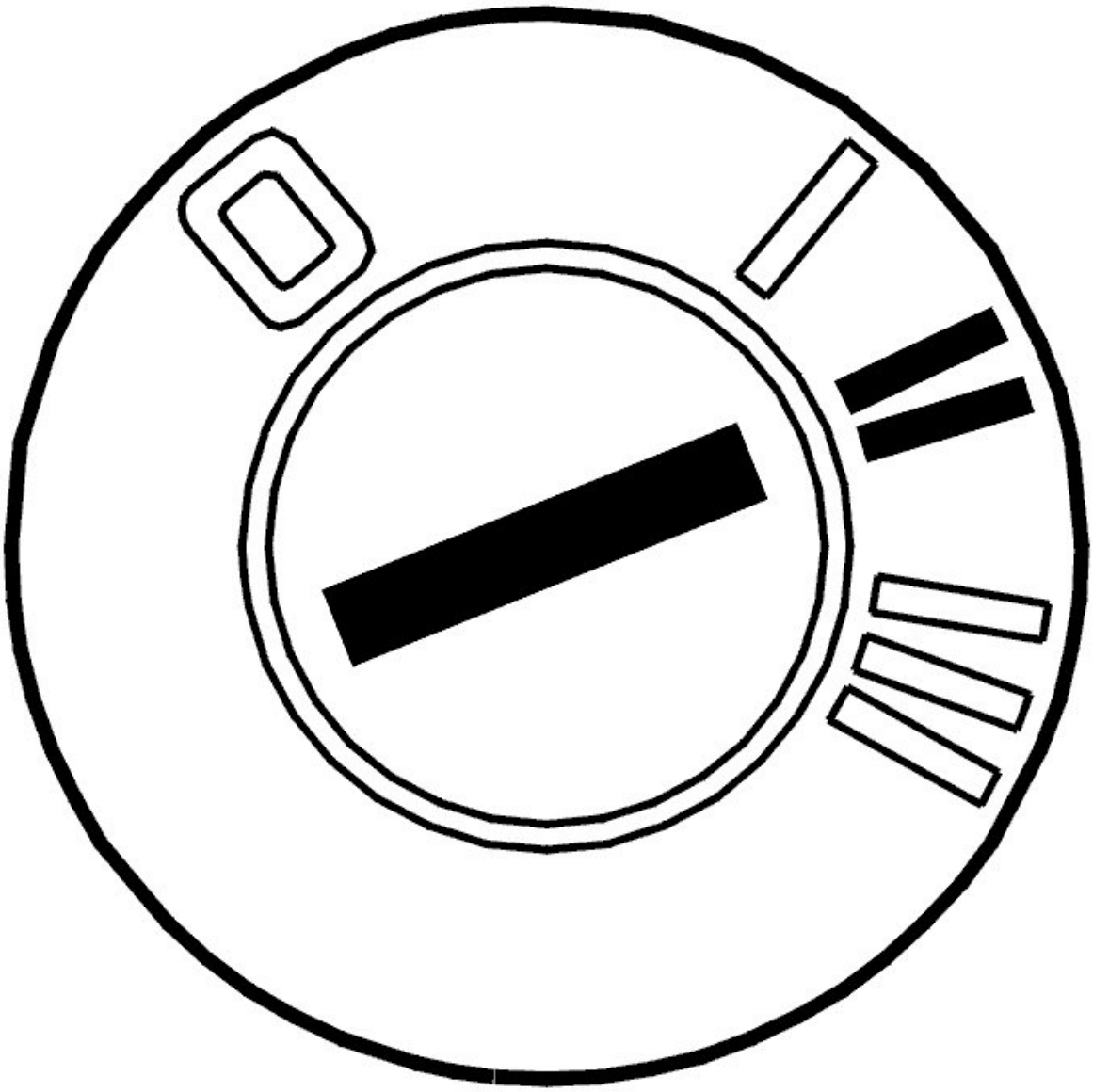
Continue - Fault-tracing information

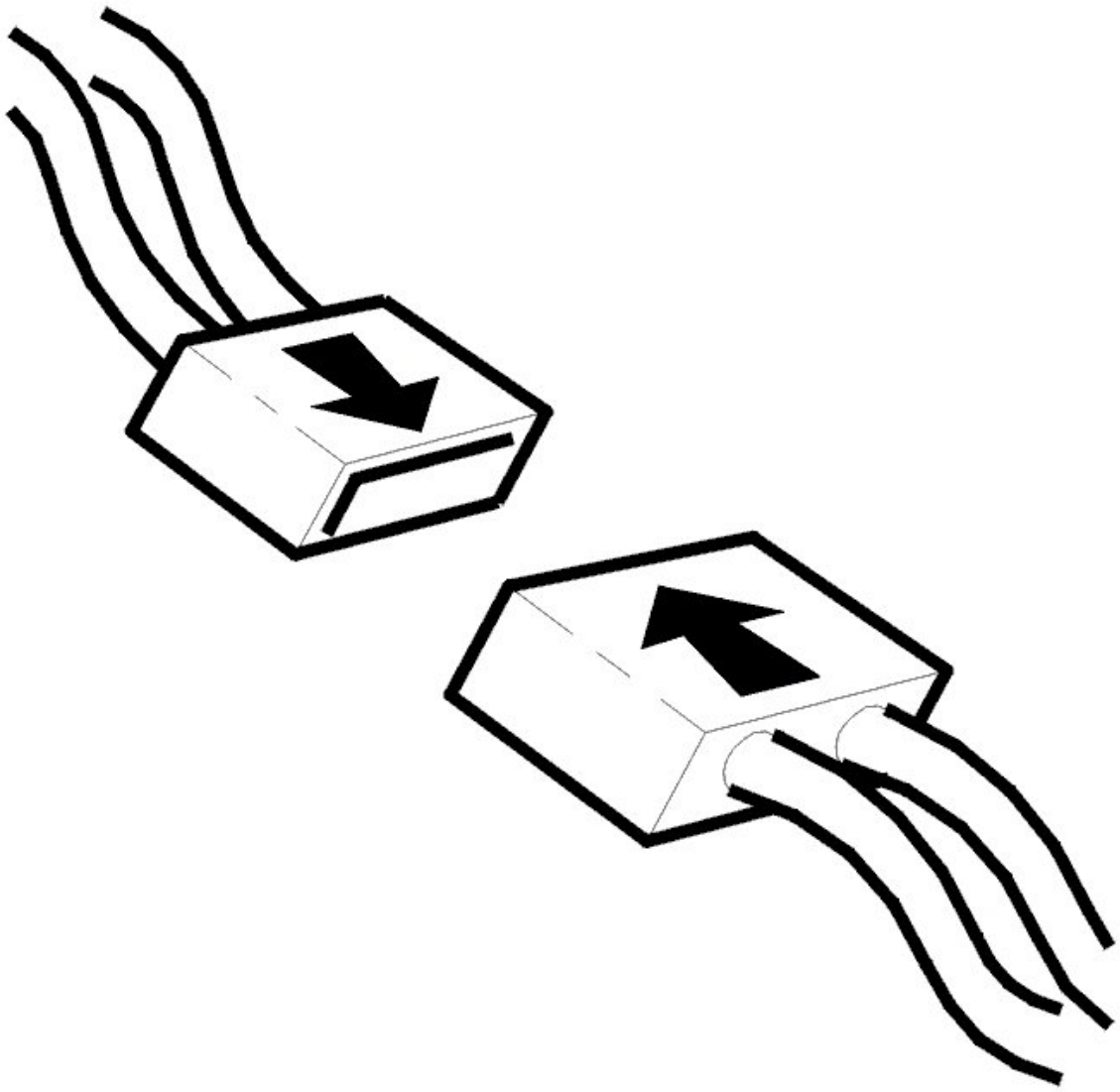
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect connector, install components etc.
- Ignition on.

Try to move the sunroof.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

FAULT FOUND - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers signal too low from the rear right reading lamp, the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The switch for the rear right reading lamp has stuck down
- The signal wire for the rear right reading lamp is short circuited to ground.

Fault symptom[s]
- Courtesy lighting does not work.

Signal Too Low

Signal too low

Checking for a short-circuit

Check that the button has not jammed in its depressed position.
Check the cable from the upper electronic module (UEM) to the rear reading lamp module. Check for a short-circuit to ground.
Remove the connector from the reading lamp module and measure between the connector and the upper electronic module (UEM) as follows.

UEM-0008 Right rear reading lamp

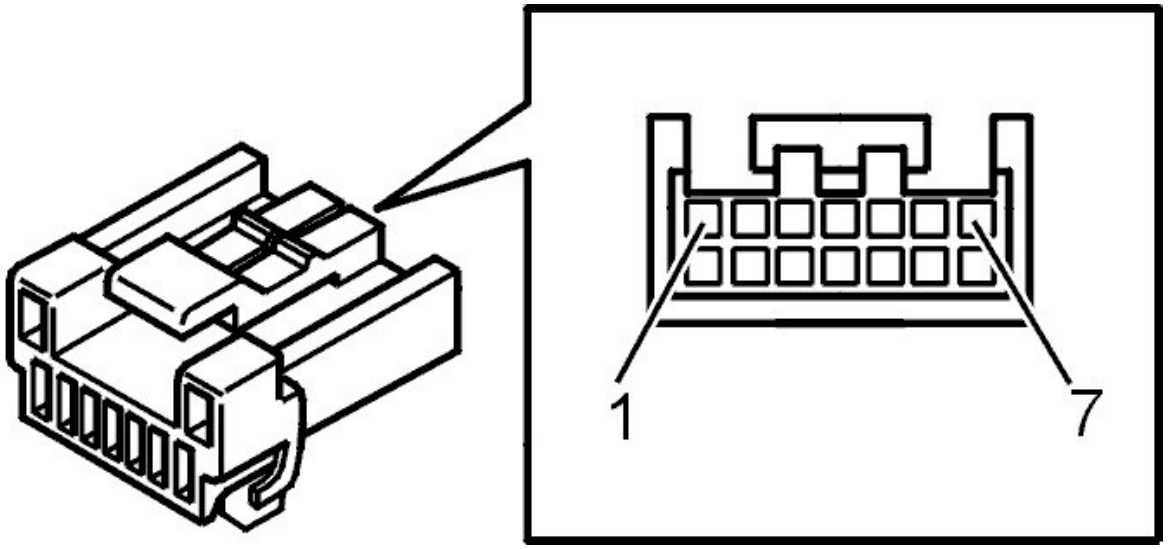
Control module terminal #20 and reading lamp module terminal #6.

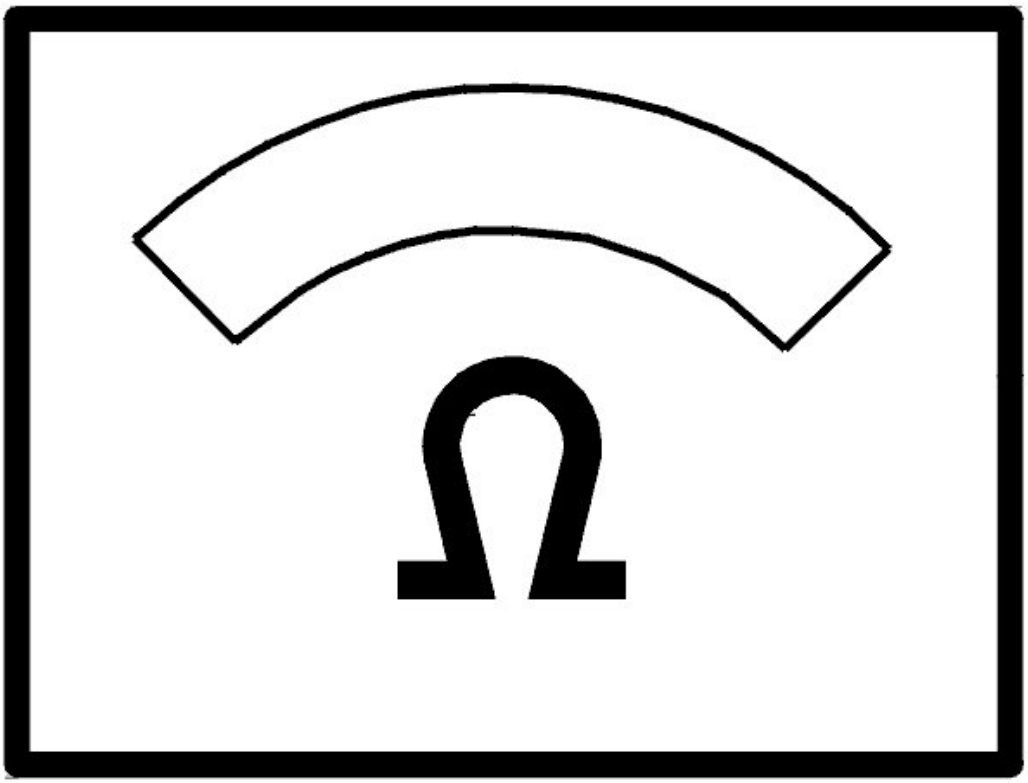
UEM-0009 Left rear reading lamp

Control module terminal #20 and reading lamp module terminal #2.
Replace the cable if a fault is found.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the reading lamp module, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

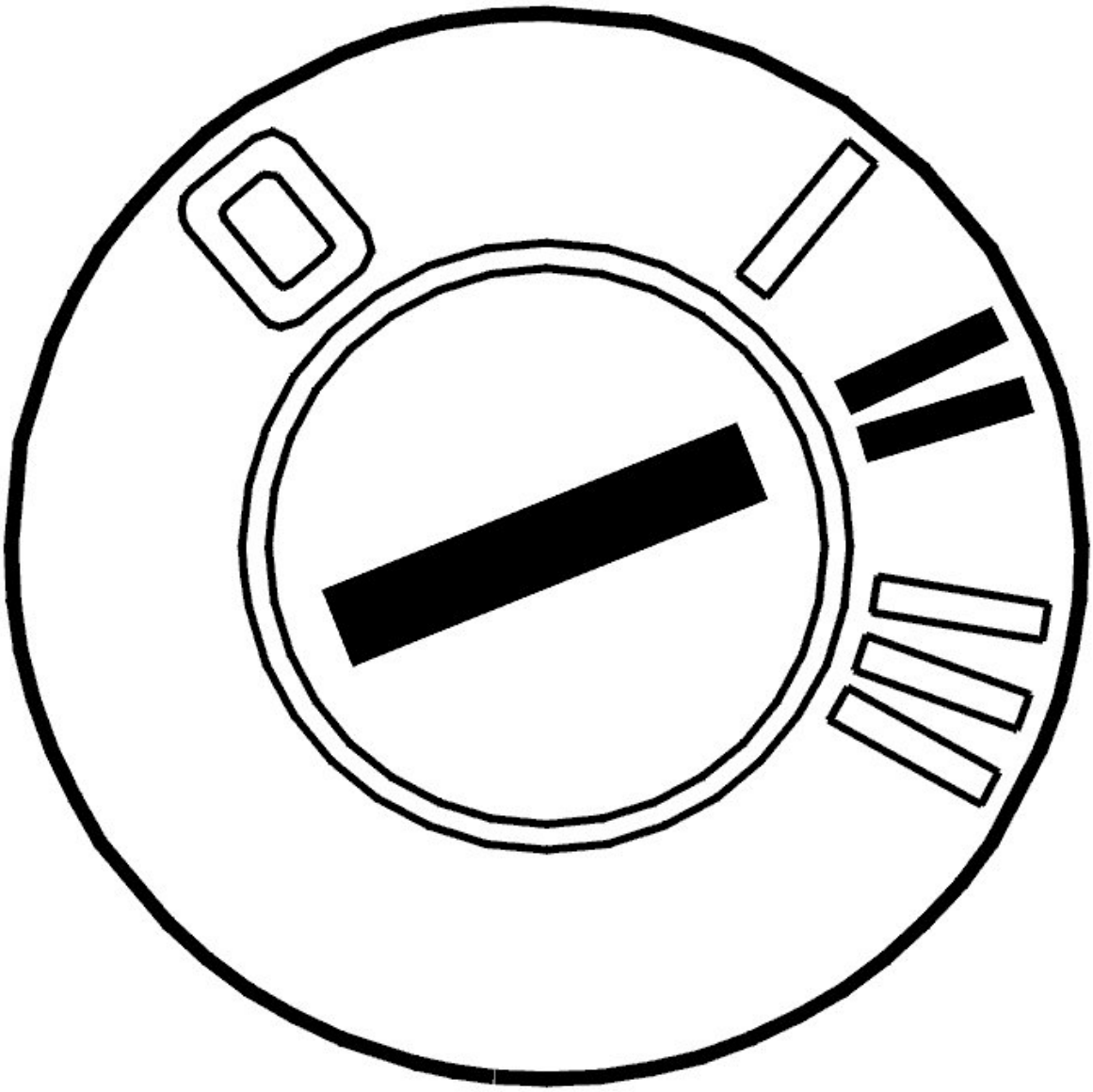
No - No Fault Found

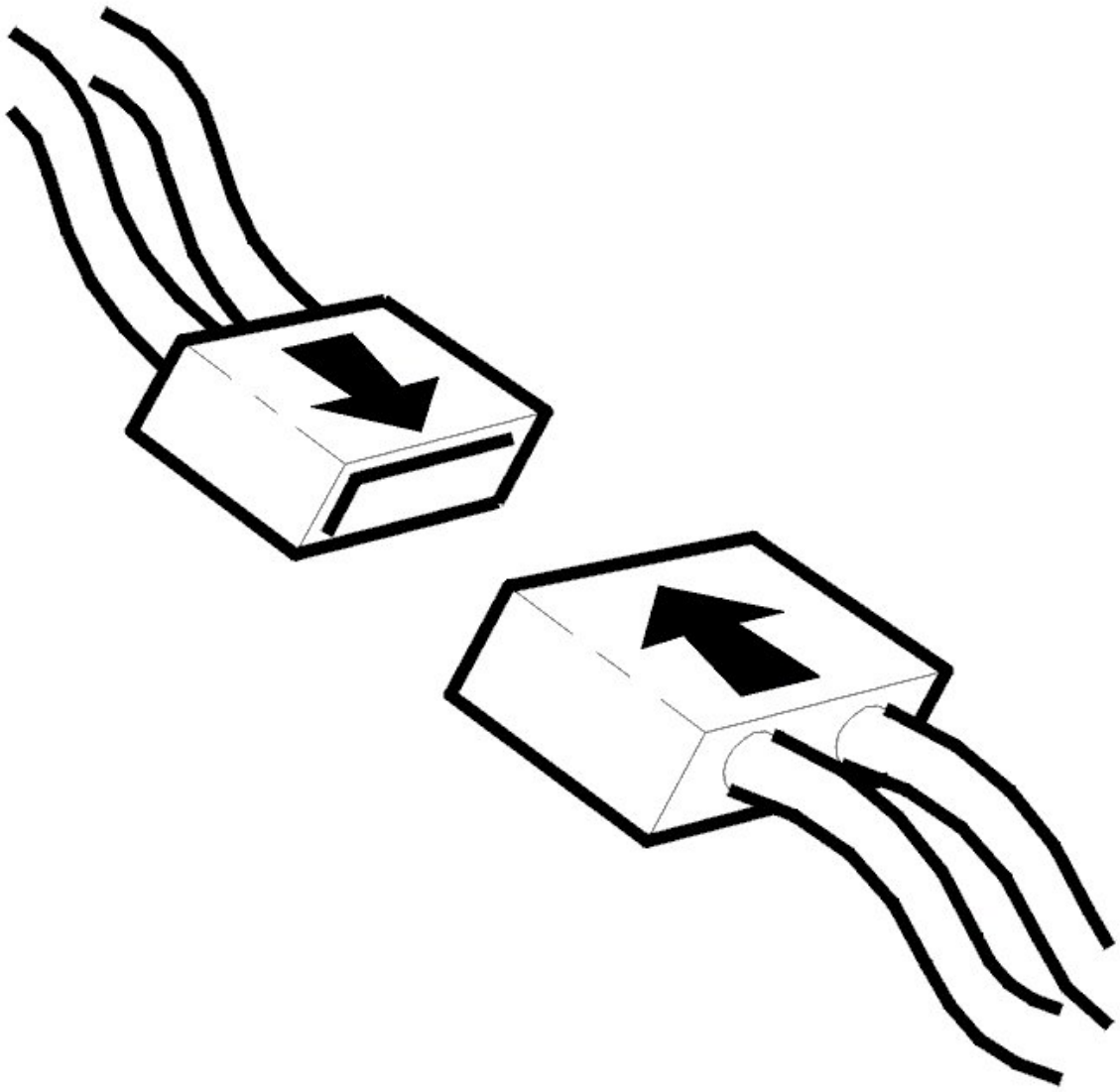
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for a short-circuit

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers signal too low from the rear left reading lamp, the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The switch for the rear left reading lamp has stuck down
- The signal wire for the rear left reading lamp is short circuited to ground.

Fault symptom[s]
- Courtesy lighting does not work.

Signal Too Low

Signal too low

Checking for a short-circuit

Check that the button has not jammed in its depressed position.
Check the cable from the upper electronic module (UEM) to the rear reading lamp module. Check for a short-circuit to ground.
Remove the connector from the reading lamp module and measure between the connector and the upper electronic module (UEM) as follows.

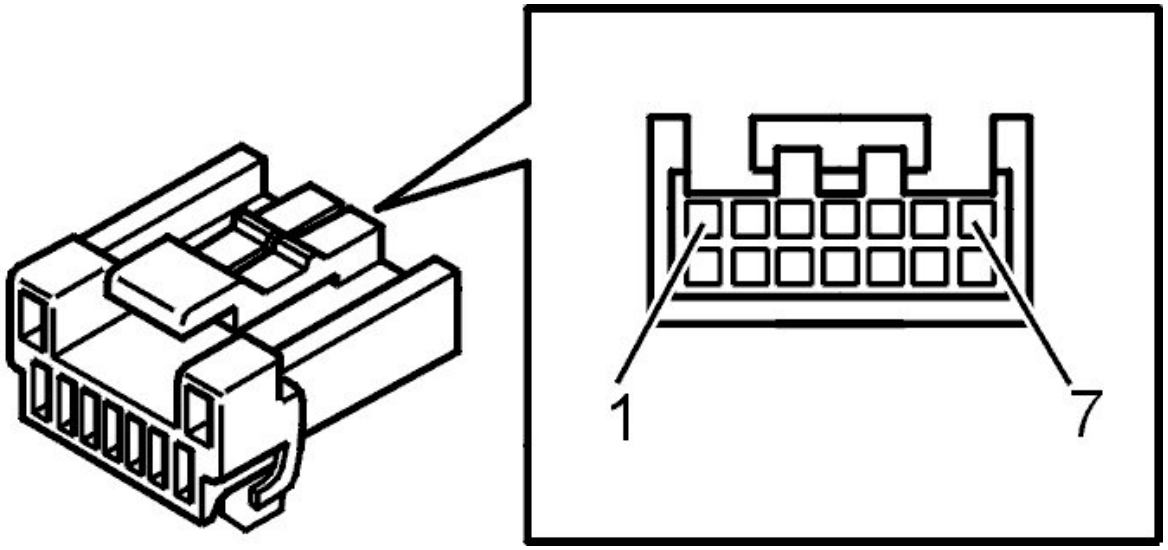
UEM-0008 Right rear reading lamp

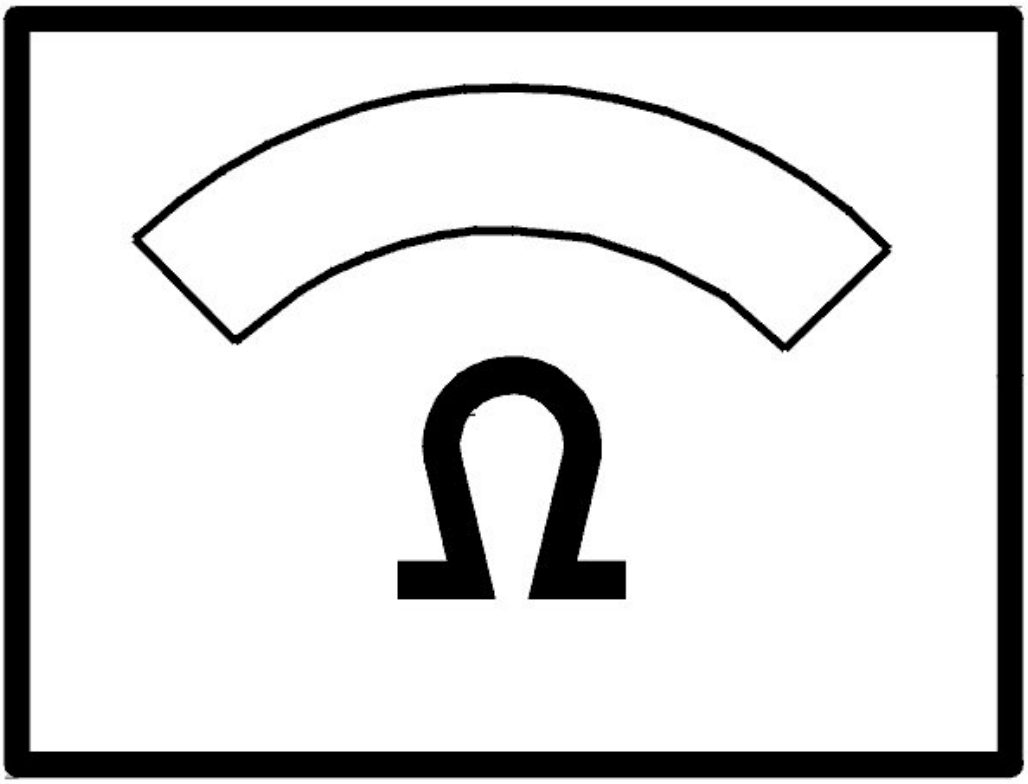
Control module terminal #20 and reading lamp module terminal #6.

UEM-0009 Left rear reading lamp

Control module terminal #20 and reading lamp module terminal #2.
Replace the cable if a fault is found.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the reading lamp module, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

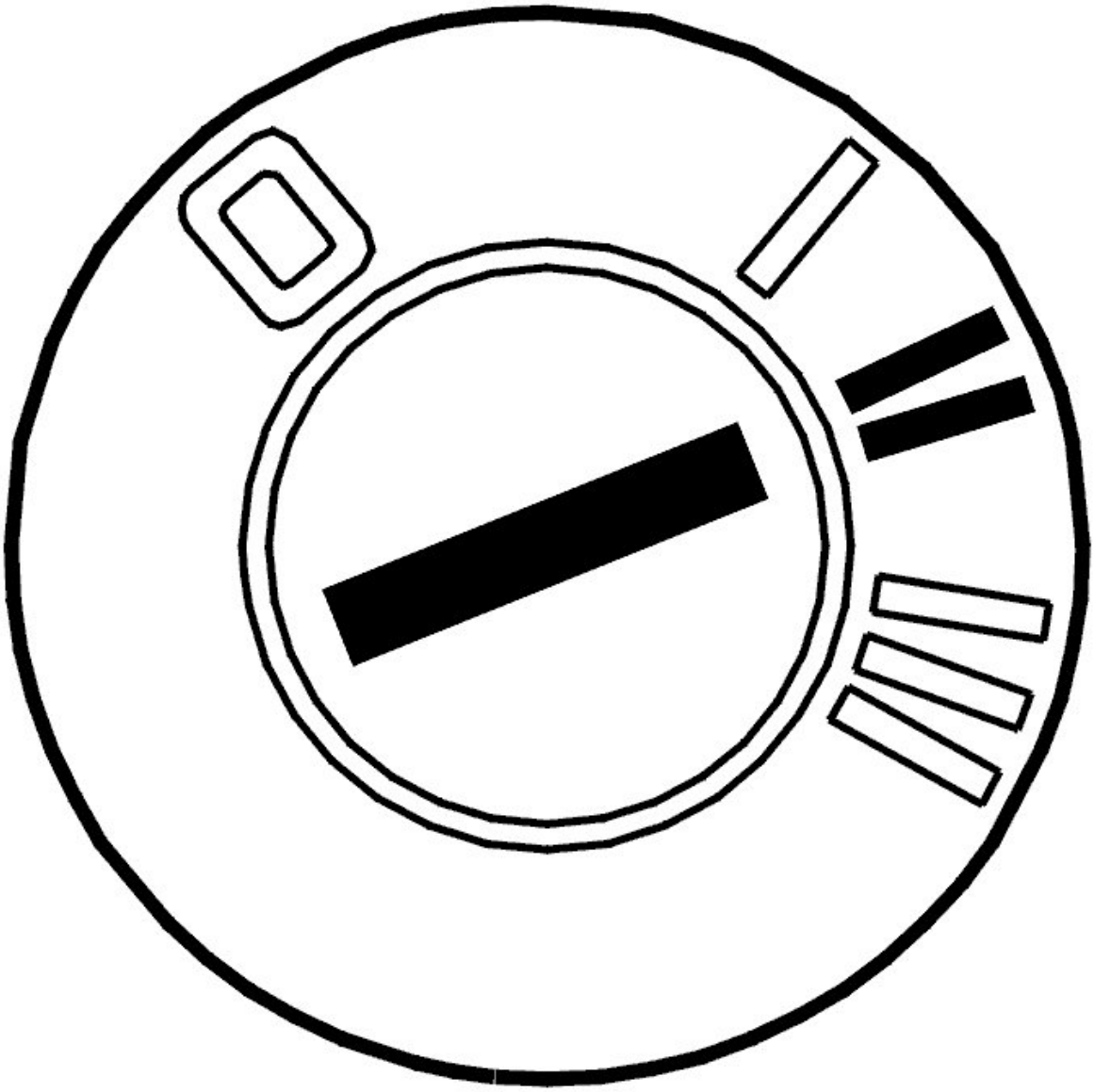
No - No Fault Found

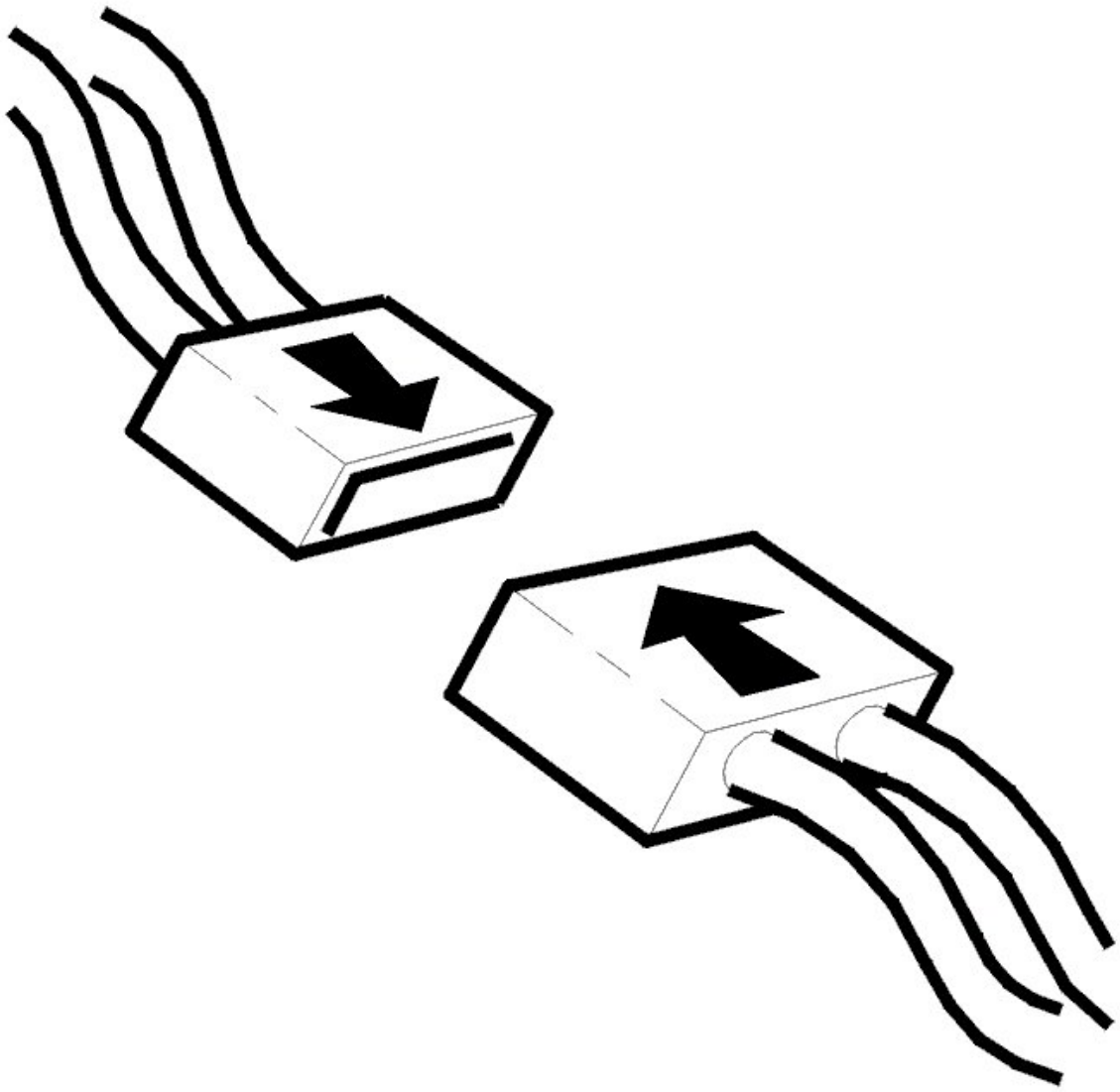
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for a short-circuit

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the upper electronic module registers that there is no signal on the mass movement sensor supply wire when the alarm is switched off and ignition in position l or ll, diagnostic trouble code UEM-000A is displayed.

Substitute value
- Nothing.

Possible source
- A faulty contact at sensor side and/or at control unit side.
- Open circuit on level sensor voltage supply.
- Faulty sensor.

Fault symptom[s]
- No alarm from sensor.

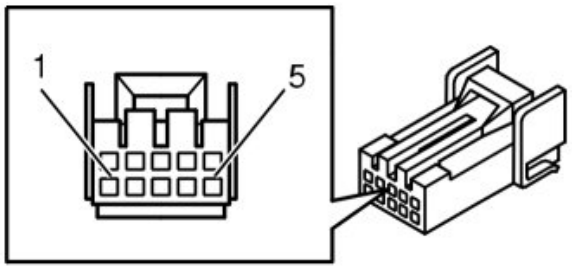
Communication Fault

Communication fault

Checking wiring and connectors

Check the power supply cable between upper electronic module (UEM) connector terminal #10 and movement sensor connector terminal #1. Check for an intermittent open-circuit. Check for an open-circuit.
Also check both connectors for contact resistance and oxidation.
If no fault was found, try a new sensor.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the movement/rear level sensor, see Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- To replace the movement/front level sensor (XC90), see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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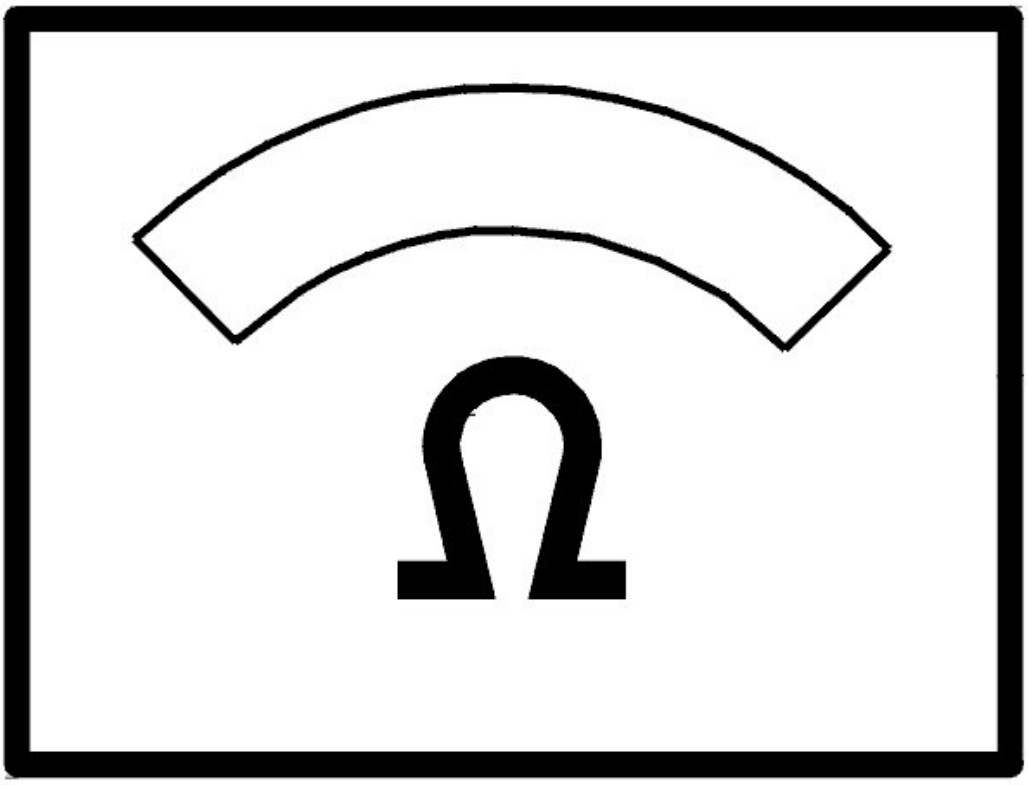
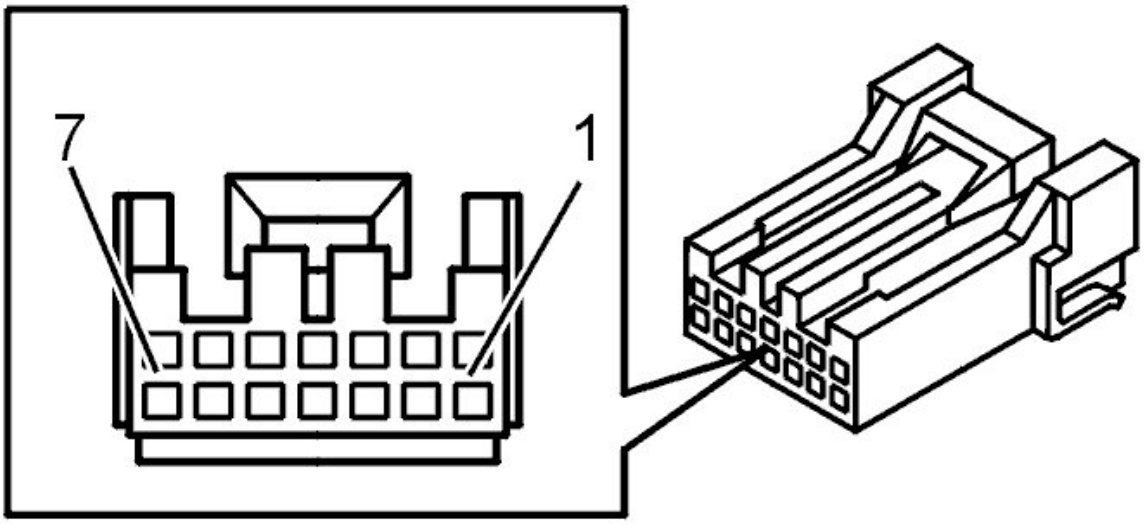




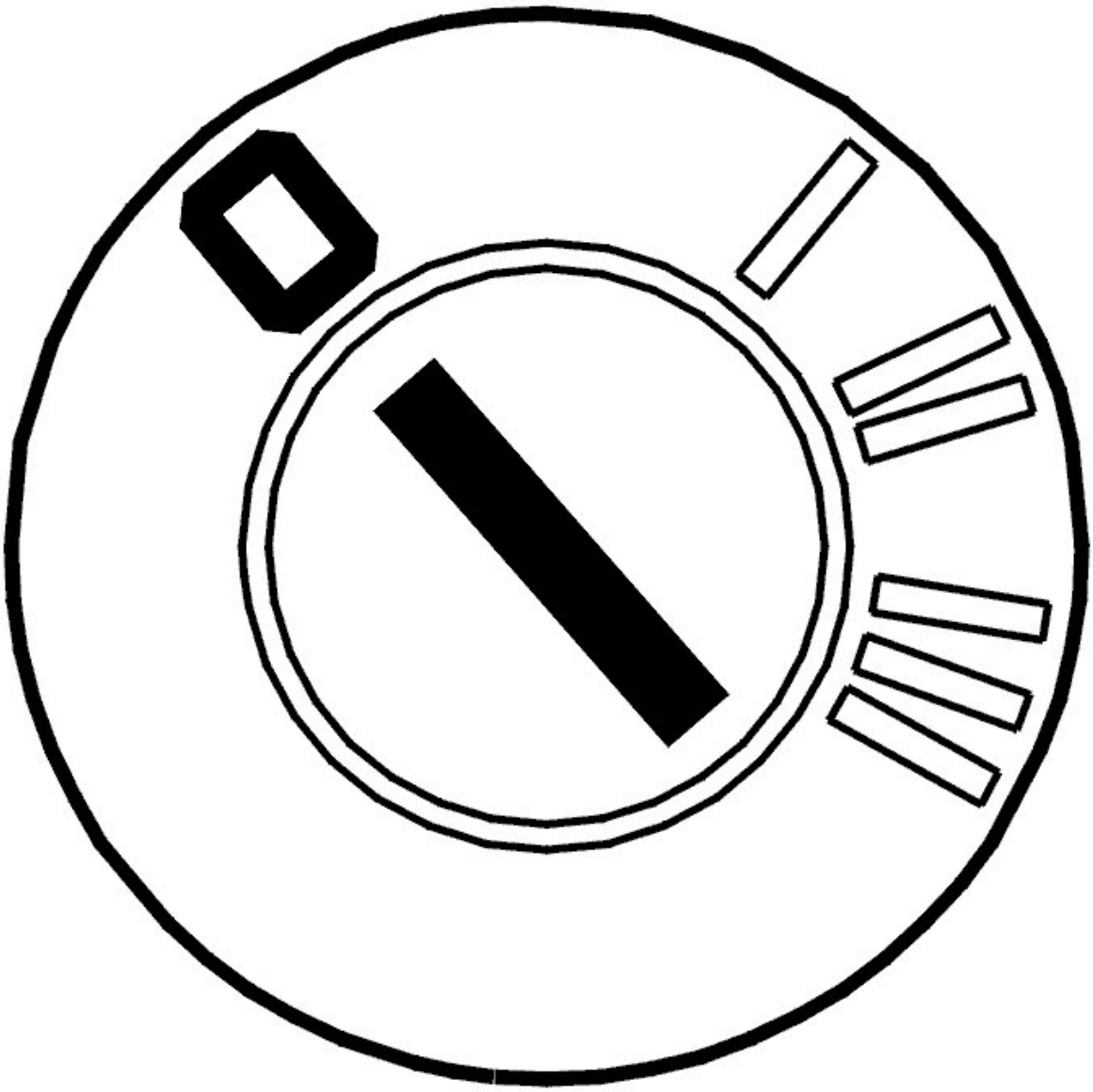
Continue - Verification

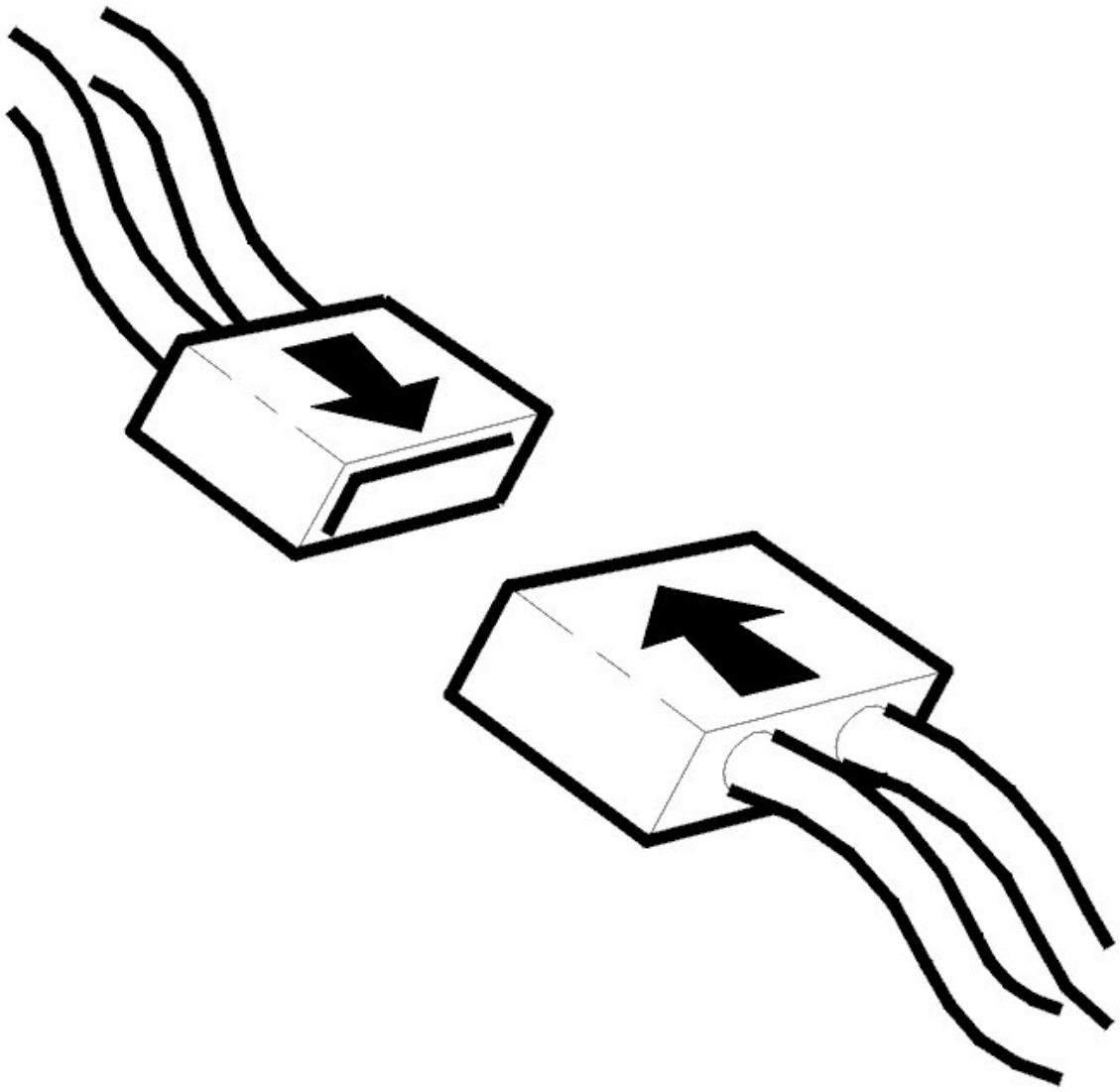
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the alarm is active. Trigger the alarm by reaching into the car and unlocking the door from the inside using the internal door handle.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking wiring and connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the upper electronic module registers too low a signal for the mass movement sensor supply wire when the alarm is set, diagnostic trouble code UEM-000B is displayed.

Substitute value
- Nothing.

Possible source
- Sensor power supply short circuited to ground
- Faulty sensor.

Fault symptom[s]
- No alarm from sensor.

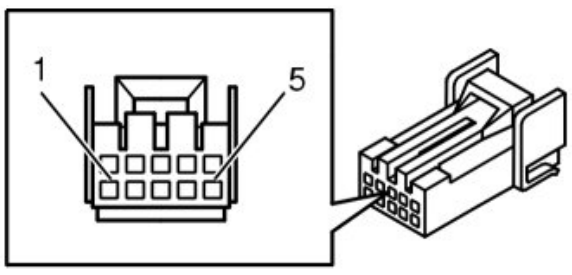
Signal Too Low

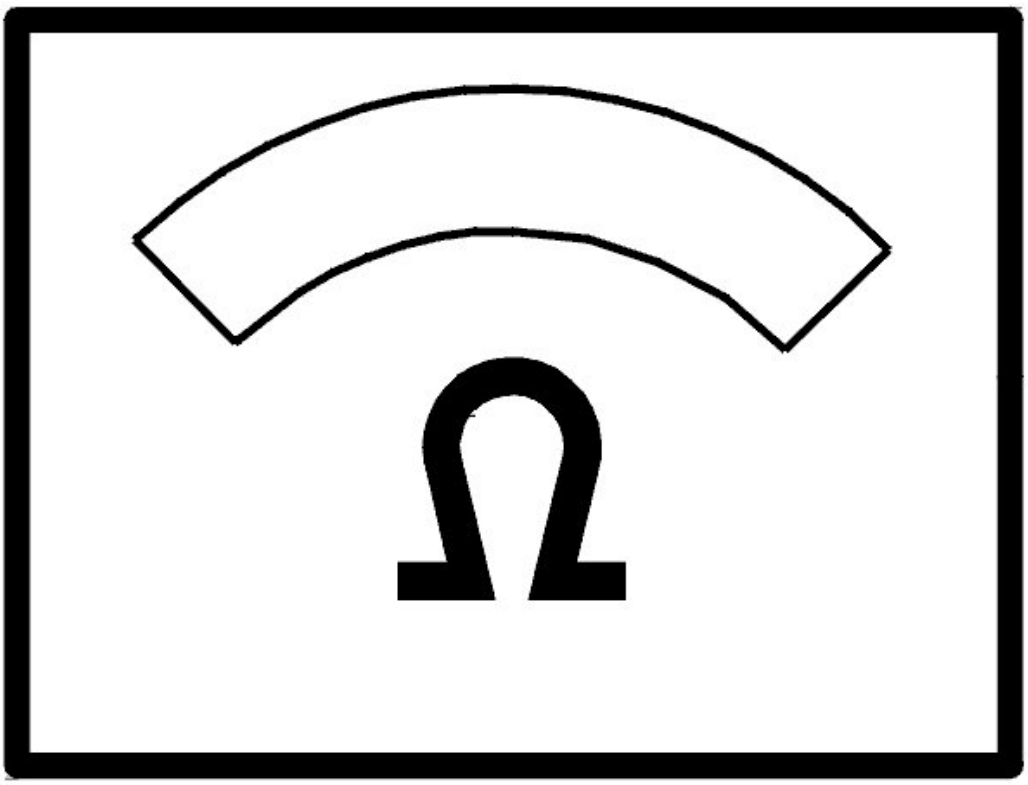
Signal too low

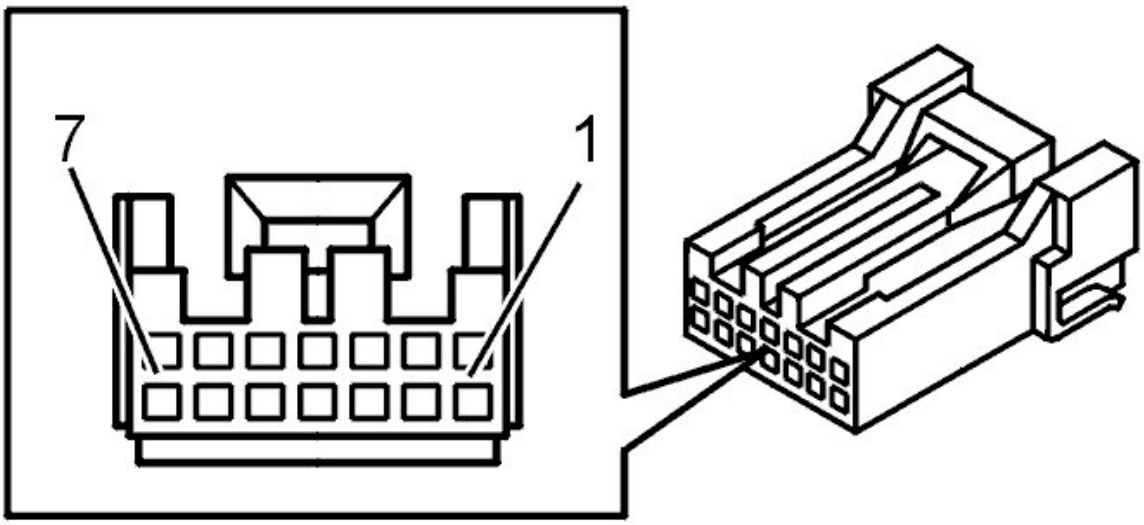
Checking wiring and connectors

Check the power supply cable between upper electronic module (UEM) connector terminal #10 and mass movement sensor connector terminal #1. Check for a short-circuit to ground. Check for an intermittent short-circuit to ground.
If no fault was found, try a new sensor.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the movement/rear level sensor, see Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- To replace the movement/front level sensor (XC90), see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







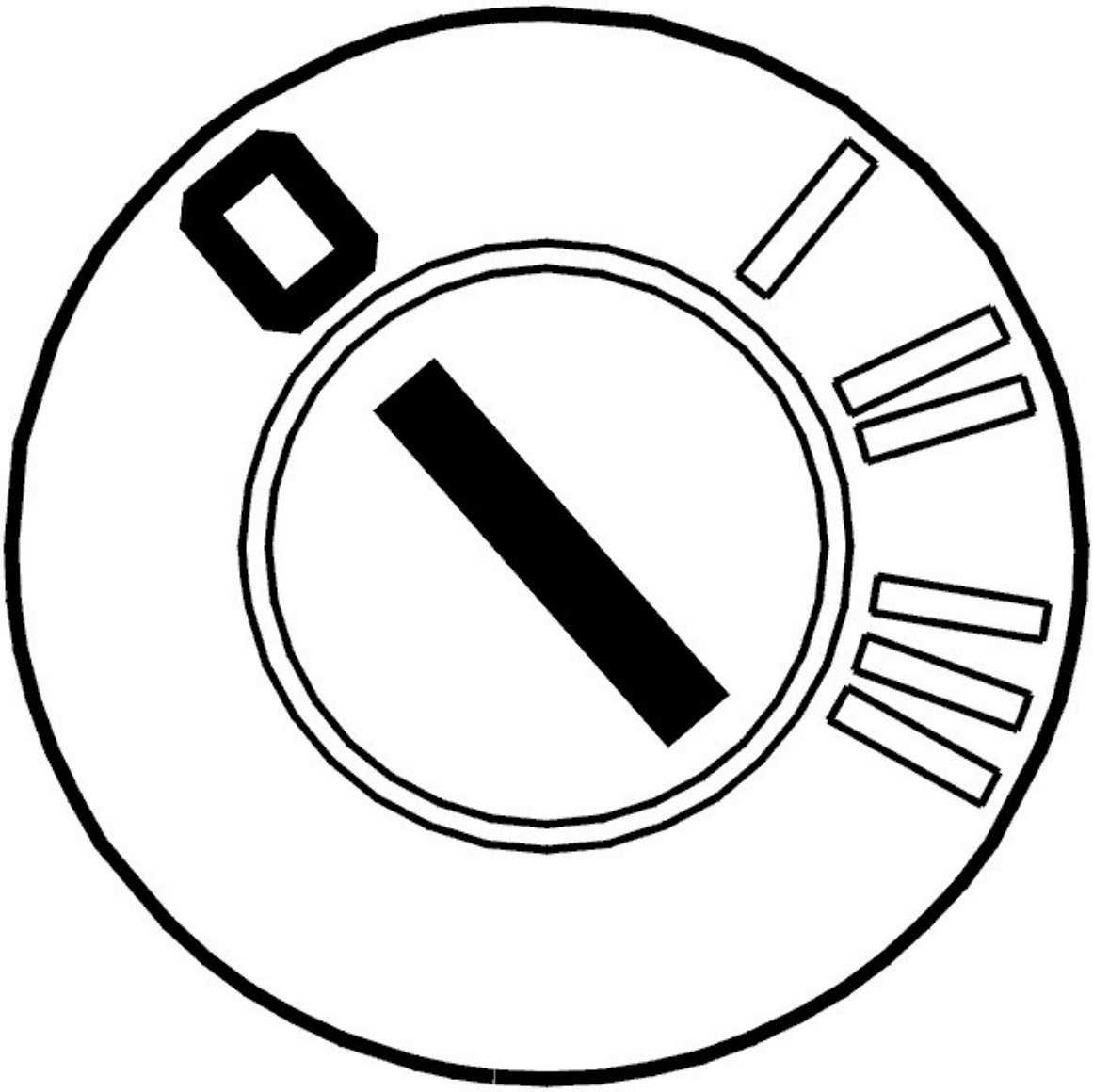
Continue - Verification

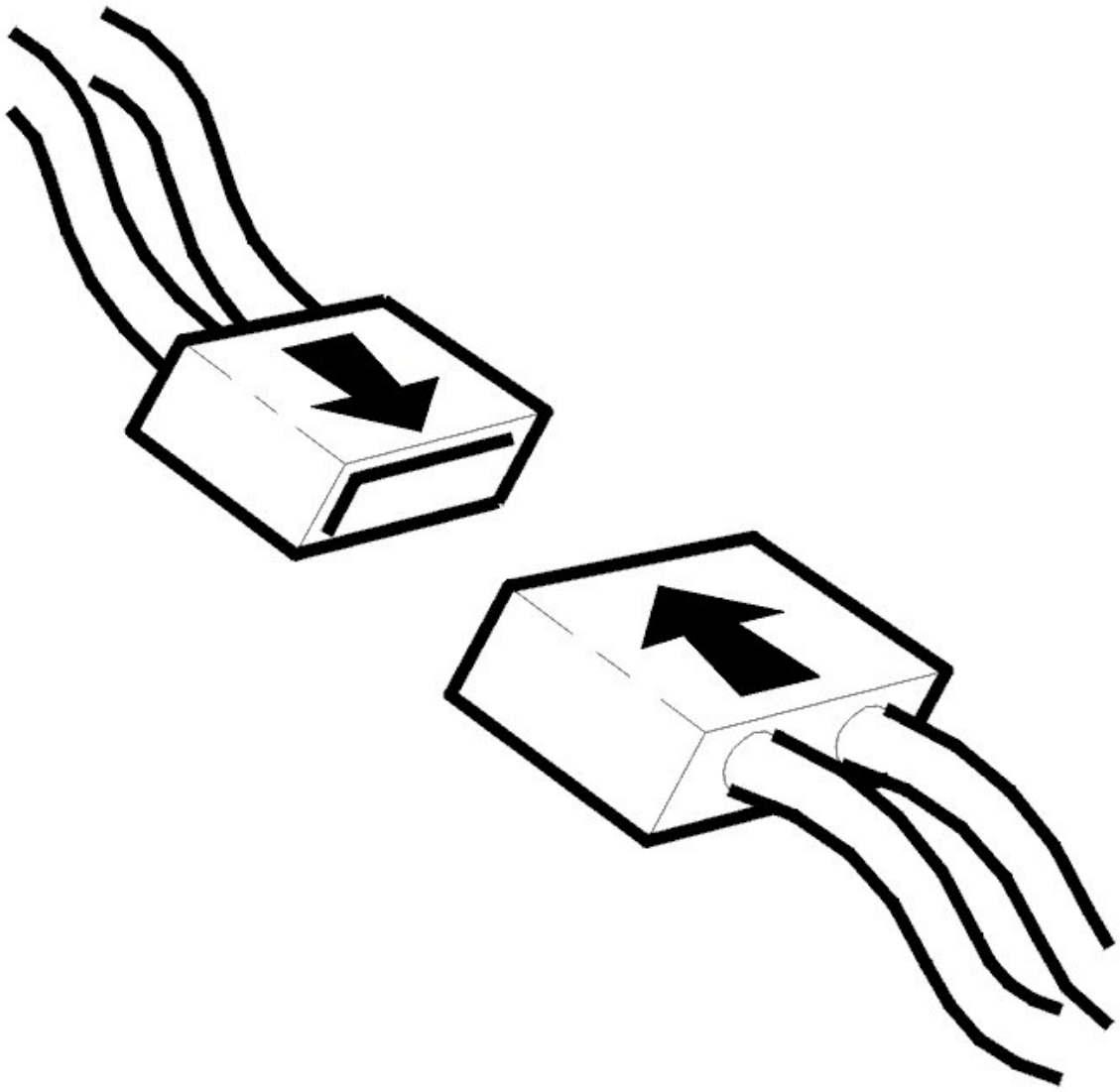
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the alarm is active. Trigger the alarm by reaching into the car and unlocking the door from the inside using the internal door handle.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking wiring and connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) UEM-000C is stored if the upper electronic module registers that the signal in the movement sensor power cable is high when the alarm is deactivated and the ignition is off.

Substitute value
- None.

Possible source
- Short-circuit to supply voltage in the power supply cable to the sensor.

Fault symptom[s]
- Does not alarm the sensor.

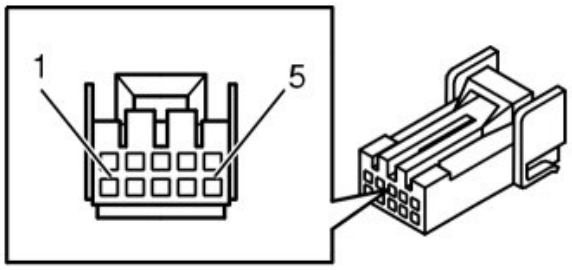
Signal Too High

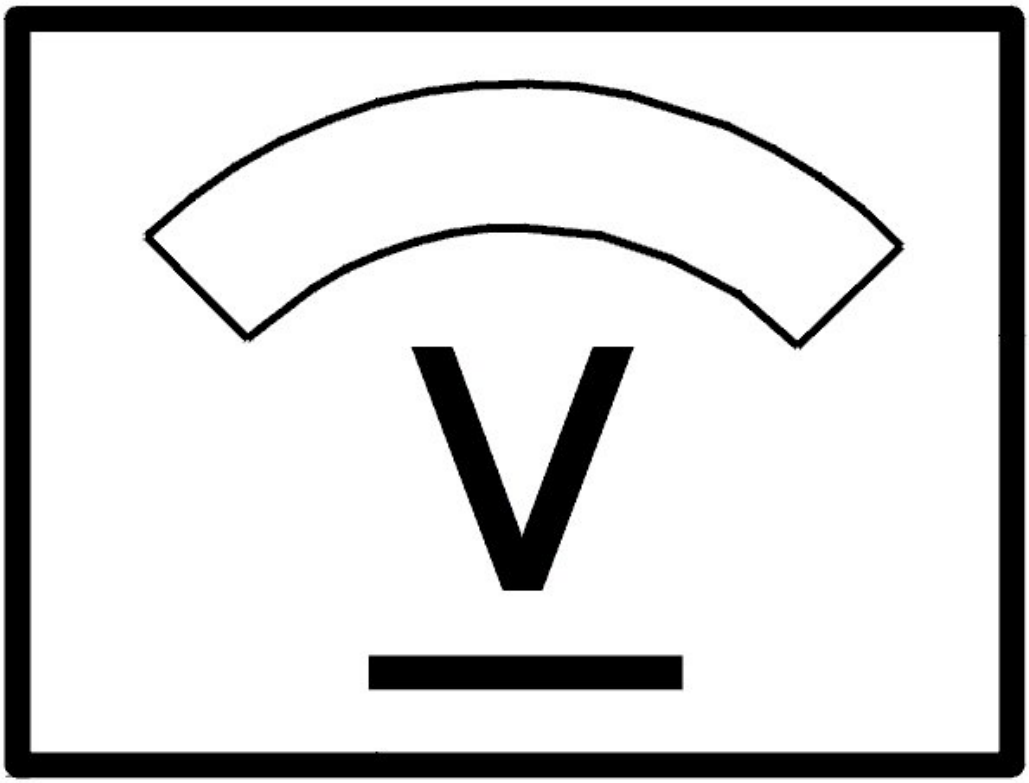
Signal too high

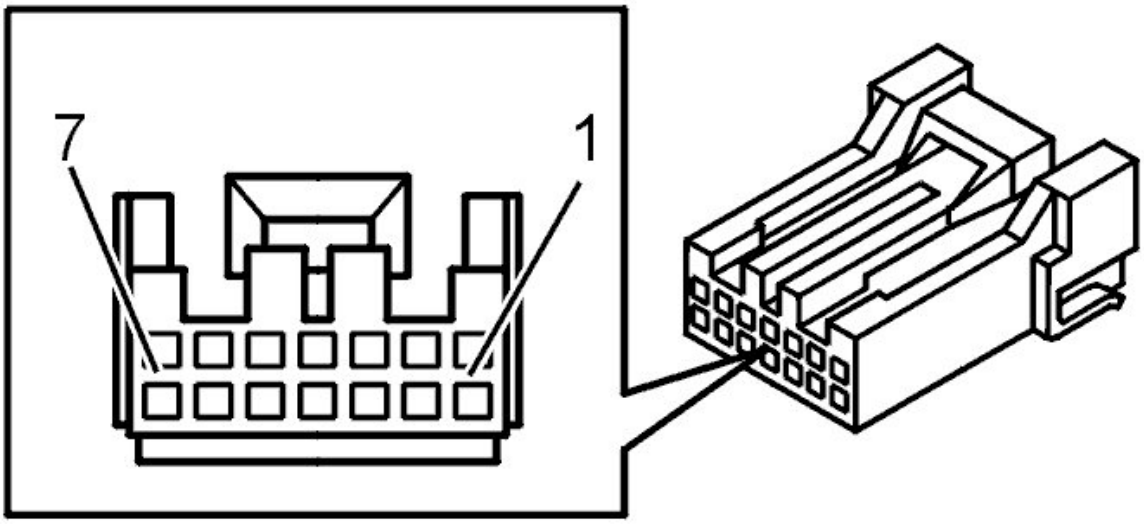
Checking wiring and connectors

Check the power supply cable between upper electronic module (UEM) connector terminal #10 and mass movement sensor connector terminal #1. Check for a short-circuit to supply voltage. Check for an intermittent short-circuit to supply voltage.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the movement/rear level sensor, see Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- To replace the movement/front level sensor (XC90), see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







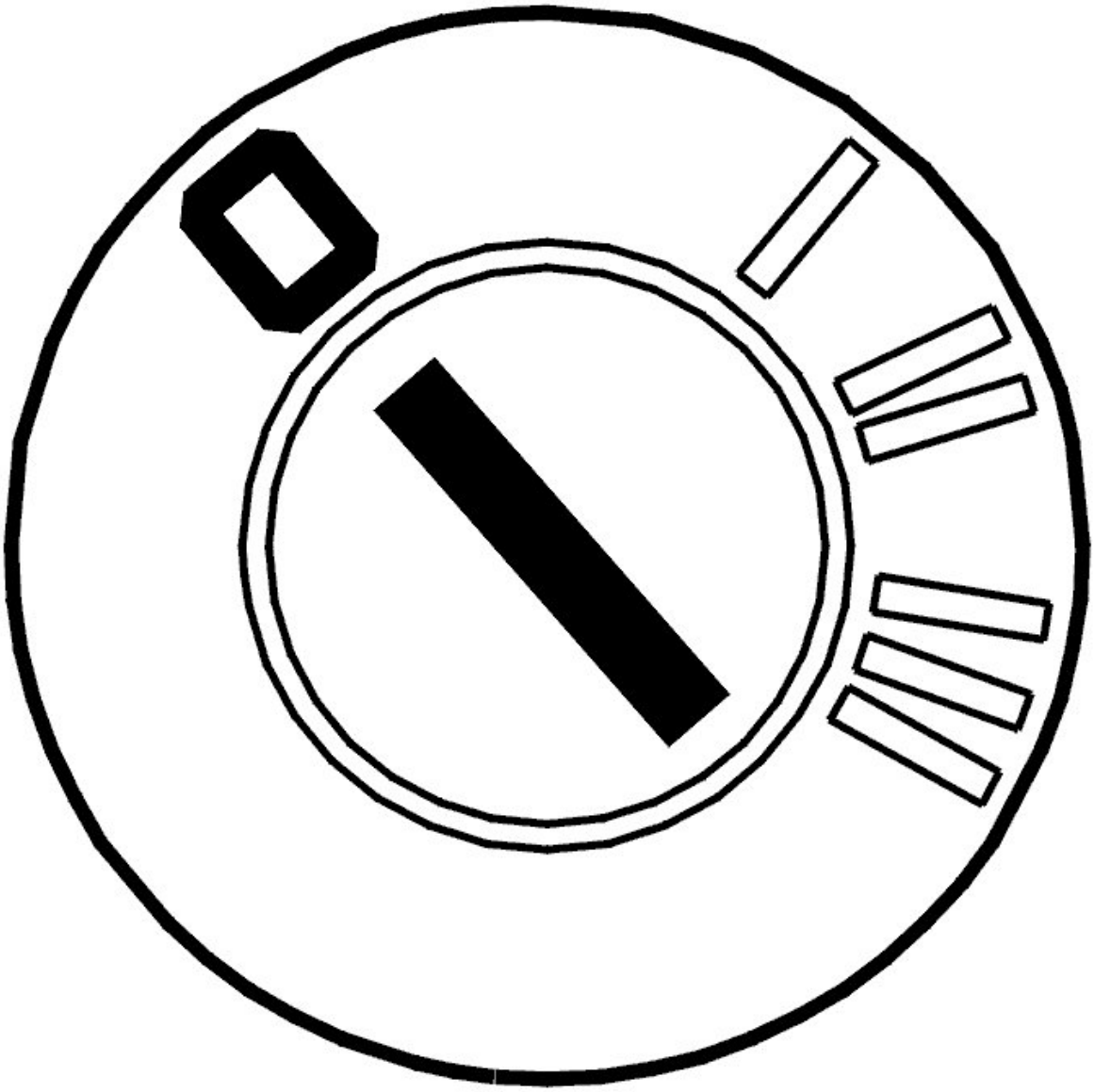
Continue - Verification

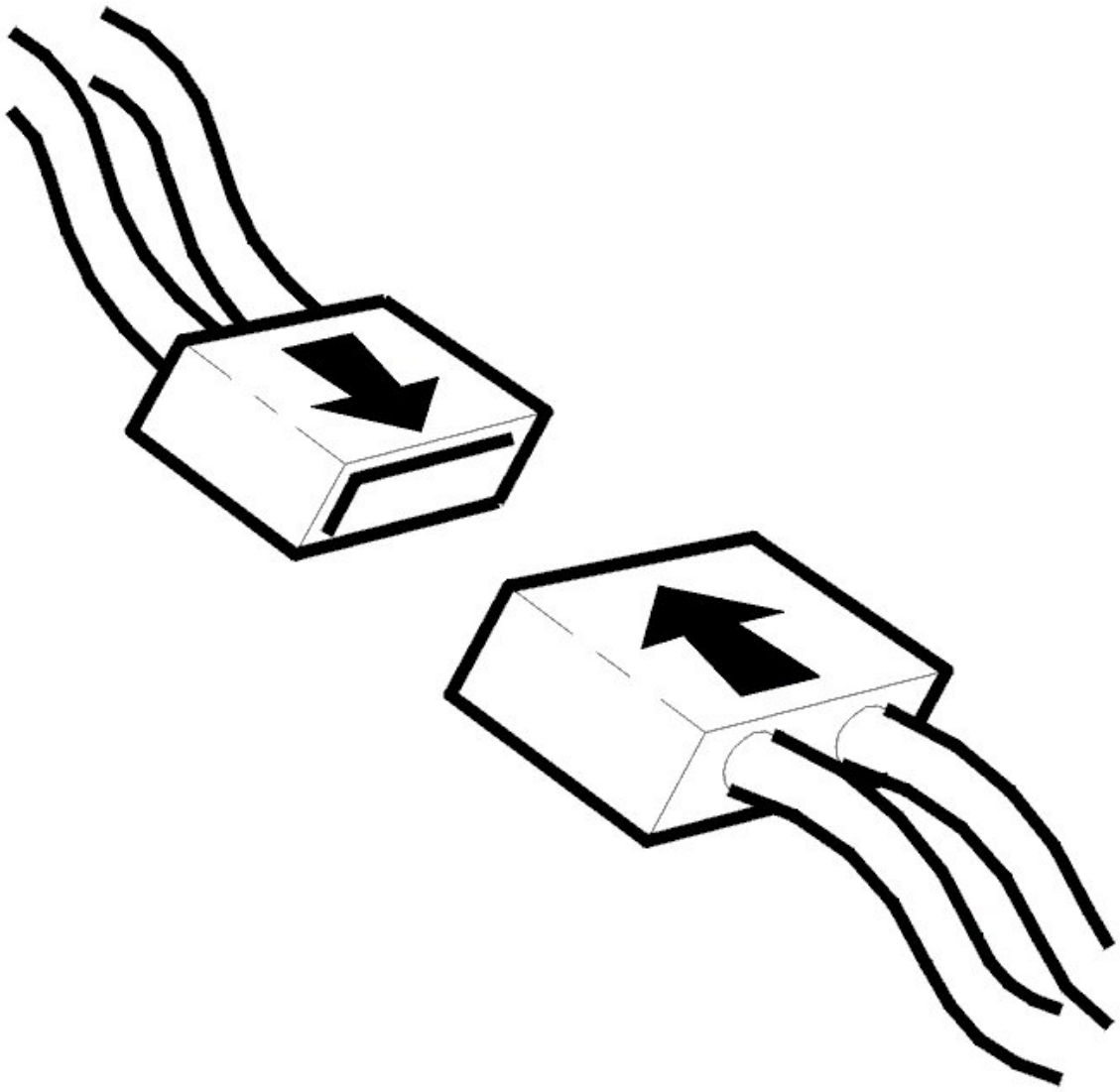
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the alarm is active. Trigger the alarm by reaching into the car and unlocking the door from the inside using the internal door handle.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking wiring and connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) UEM-0011 is stored if the upper electronic module registers that the signal in the movement sensor communication cable is low when the alarm is deactivated.

Substitute value
- None.

Possible source
- Short-circuit to ground in the sensor communication cable.
- Defective sensor.

Fault symptom[s]
- Does not alarm the sensor.

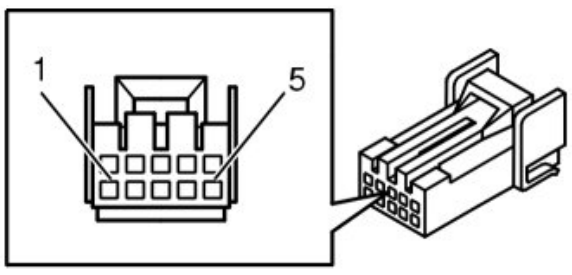
Signal Too Low

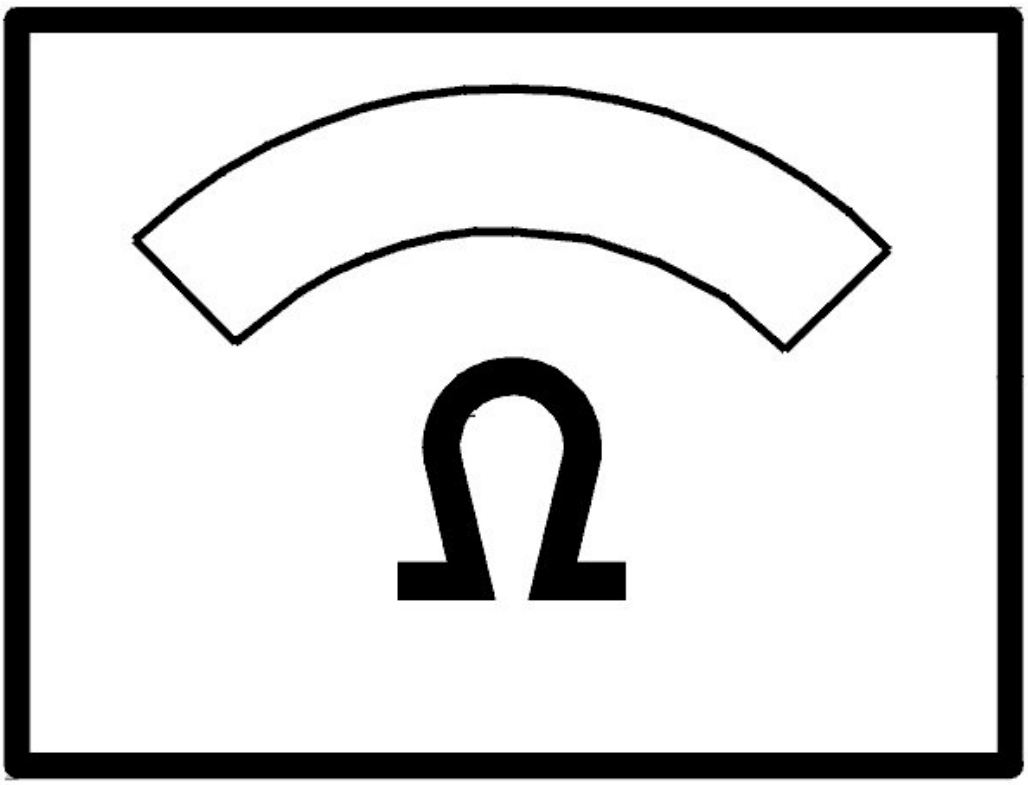
Signal too low

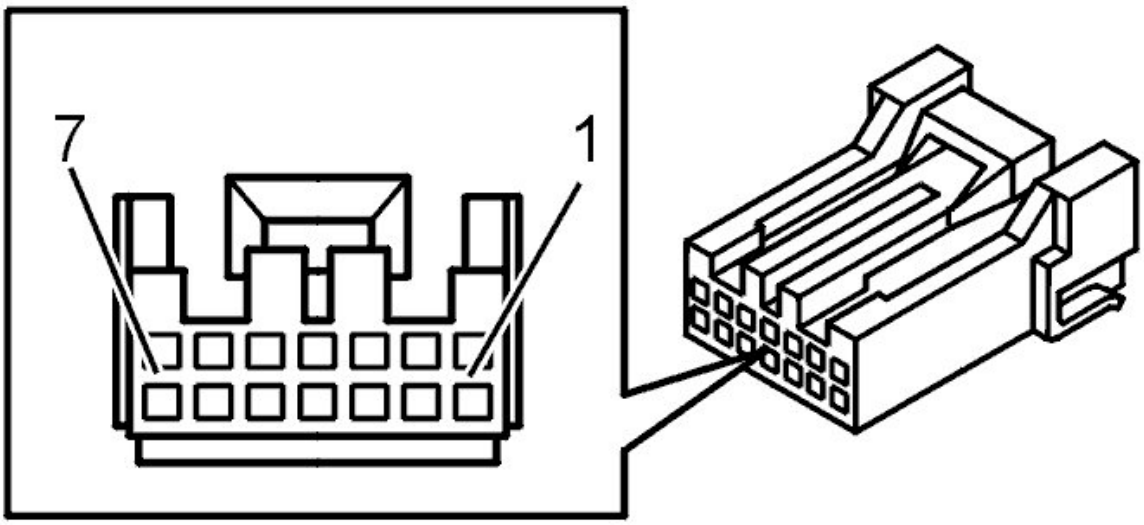
Checking wiring and connectors

Check the signal cable between upper electronic module (UEM) connector terminal #22 and mass movement sensor (MMS) connector terminal #3. Check for a short-circuit to ground. Check for an intermittent short-circuit to ground.
If no fault was found, try a new sensor.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the movement/rear level sensor, see Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- To replace the movement/front level sensor (XC90), see
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







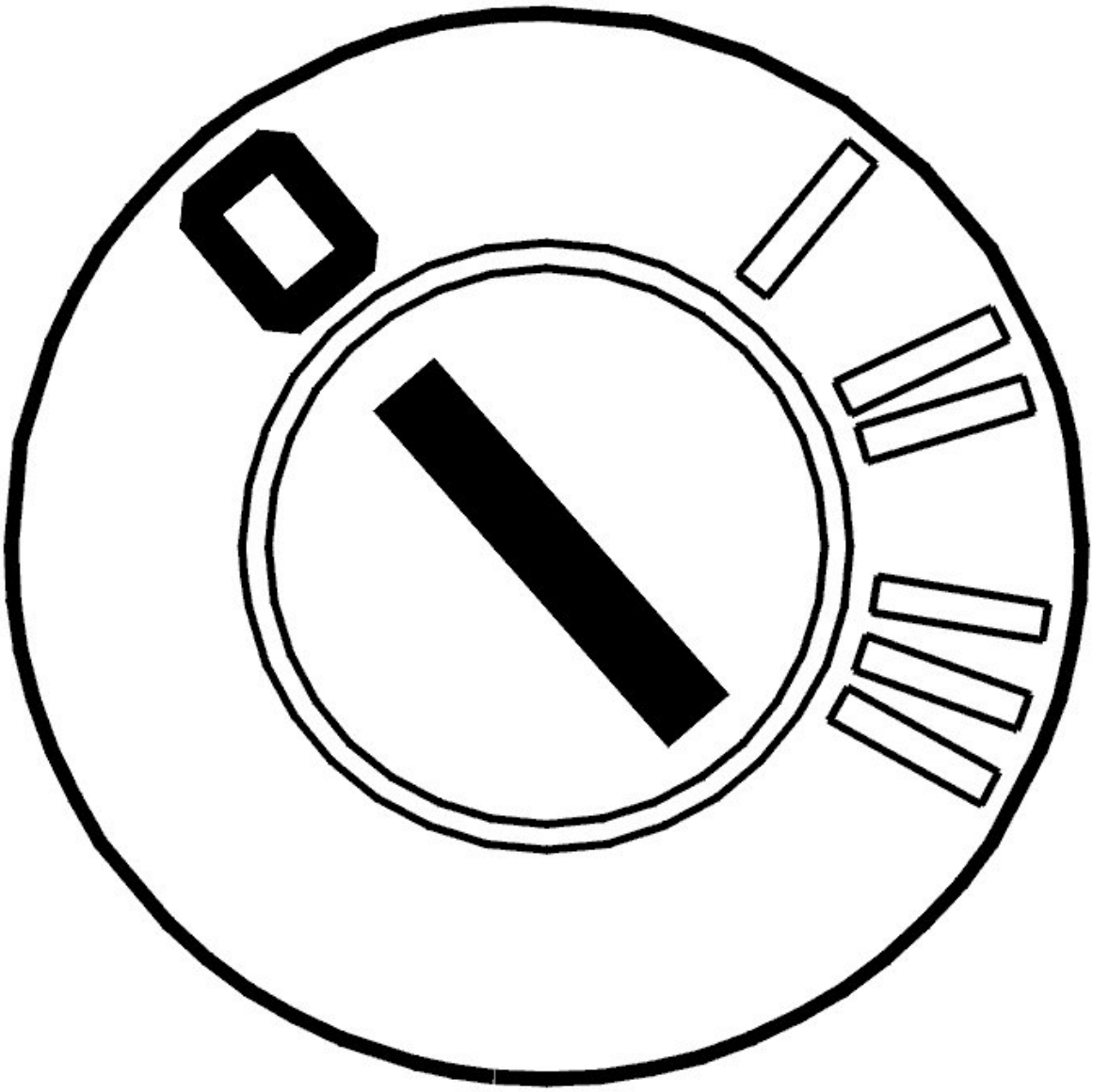
Continue - Verification

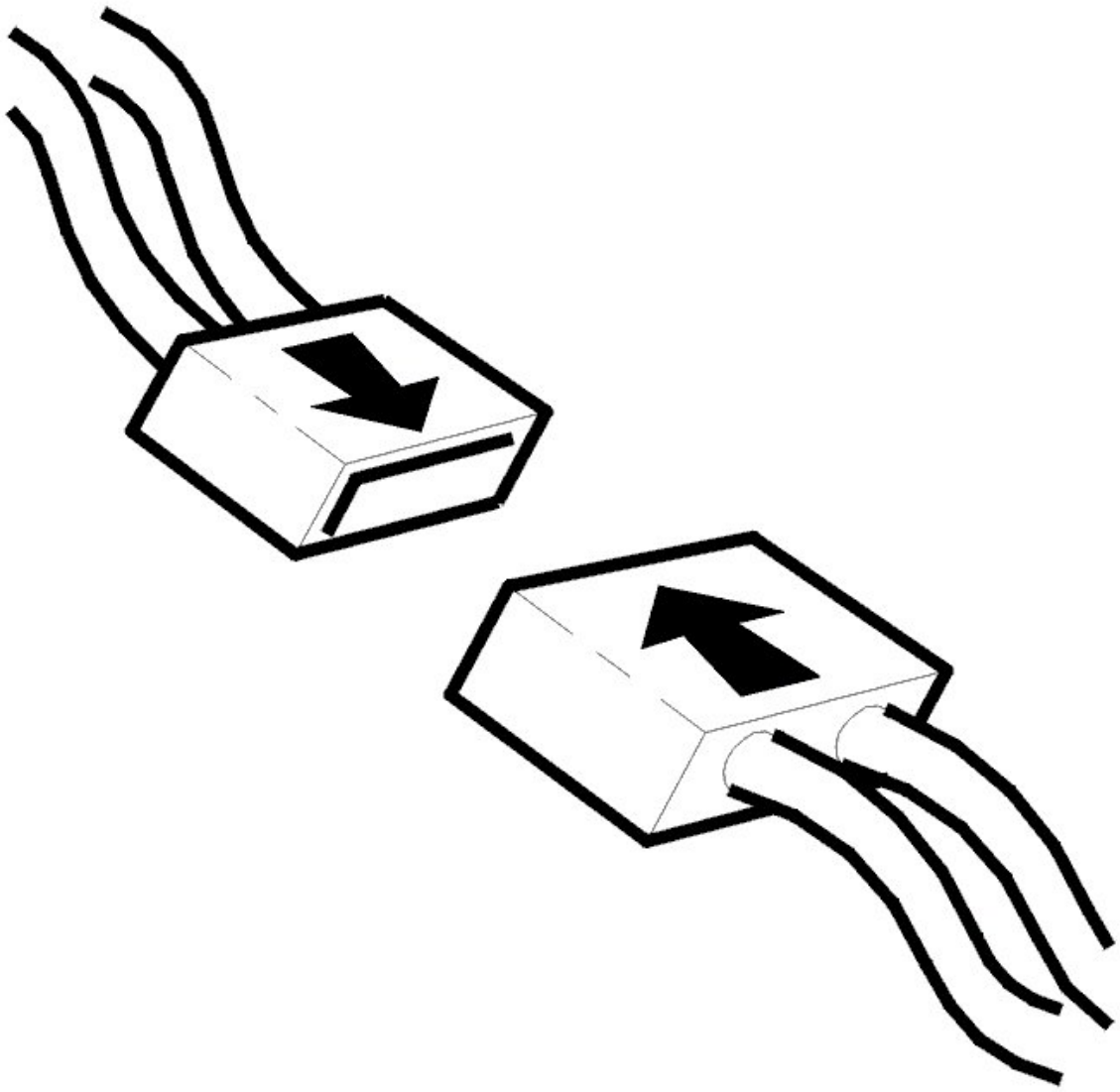
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

Open the driver's door window. Lock the car using the remote control.
Wait 25 seconds until the alarm is active. Trigger the alarm by reaching into the car and unlocking the door from the inside using the internal door handle.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking wiring and connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0013

Condition

Diagnostic trouble code (DTC) UEM-0013 is stored if diagnostic trouble codes (DTCs) UEM-000A, UEM-000B, UEM-000C, UEM-0011 and UEM-0012 are not stored and the upper electronic module (UEM) registers an internal fault in the movement sensor or registers that there is an open-circuit or high signal in the movement sensor communication cable when the alarm is active.
In XC90 the diagnostic trouble code (DTC) means that a fault has been detected in the rear movement sensor.
Diagnostic trouble code (DTC) UEM-0013 can be diagnosed when the car is locked from the outside using the remote control.

Substitute value
- None.

Possible source
- Contact fault on the sensor and/or control module sides
- Open-circuit in the sensor communication cable
- Short-circuit to supply voltage in the sensor communication cable
- Defective sensor.

Fault symptom[s]
- Does not alarm the sensor.

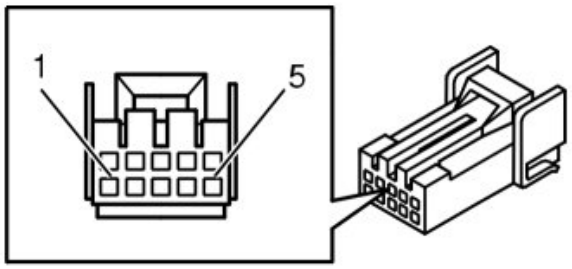
Internal Fault

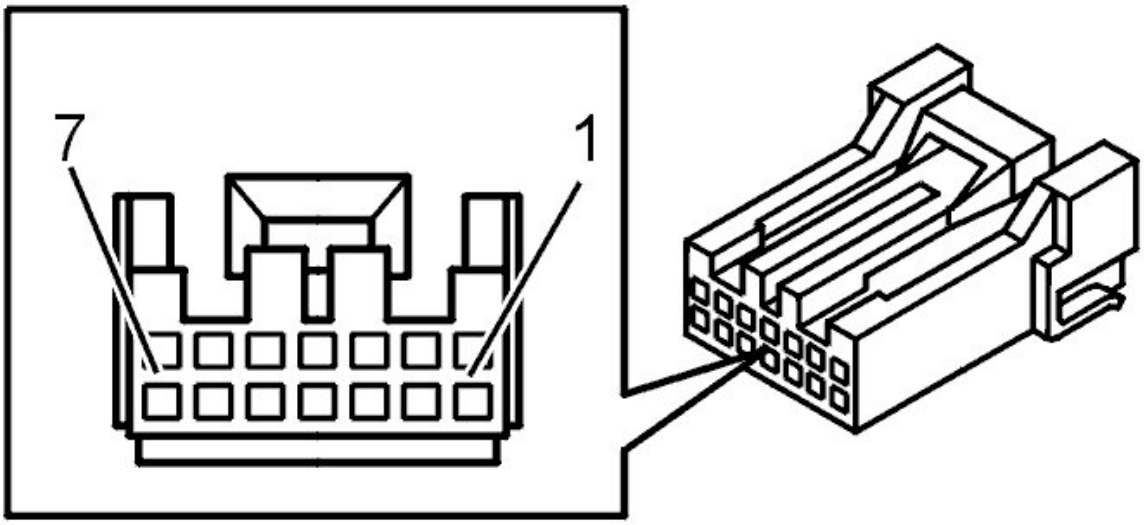
Internal fault

Checking wiring and connectors

(For XC90 the fault-tracing refers to the rear movement sensor.)
Check the signal cable between the upper electronic module (UEM) connector terminal #22 (22) and movement sensor terminal connector terminal #3. Check for an open-circuit. Check for an intermittent open-circuit.
Also check the relevant connectors. Check for oxidation.

Other information:
- To connect the breakout box: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about upper electronic module (UEM) signals: Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

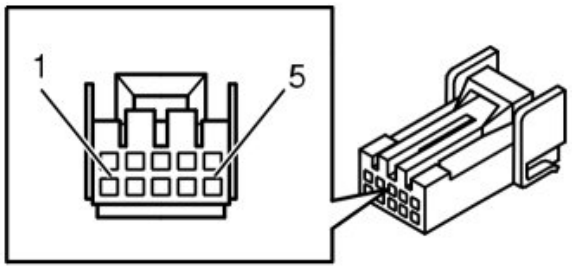
No - Checking wiring and connectors

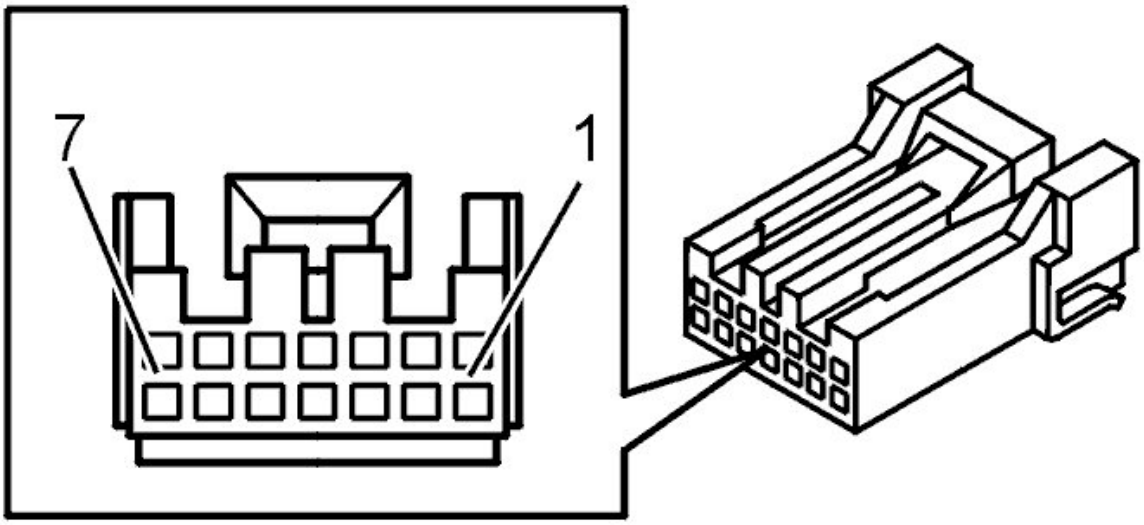
Checking wiring and connectors

(For XC90 the fault-tracing refers to the rear movement sensor.)
Check the signal cable. Check for a short-circuit to supply voltage. Check for an intermittent short-circuit to supply voltage.

Other information:

- To connect the breakout box: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about upper electronic module (UEM) signals: Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

No - Checking wiring and connectors

Checking wiring and connectors

(For XC90 the fault-tracing refers to the rear movement sensor.)
Check the power supply cable between upper electronic module (UEM) connector terminal #10 and movement sensor connector terminal #1. Check for an open-circuit. Check for a short-circuit to ground. Check for an intermittent open-circuit.

Other information:

- To connect the breakout box: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about upper electronic module (UEM) signals: Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
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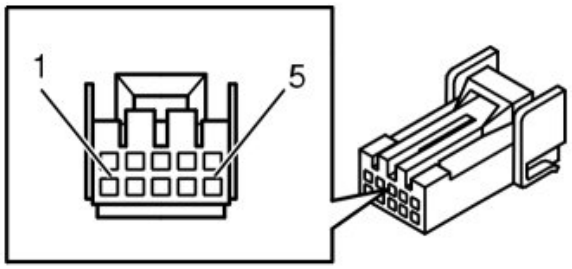
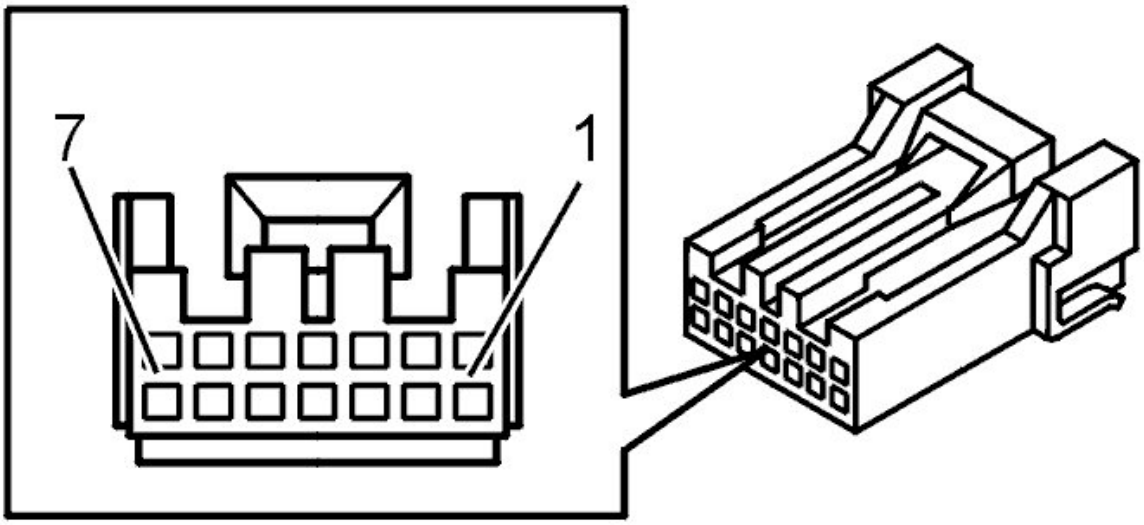
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Was a fault detected?

Yes - Verification

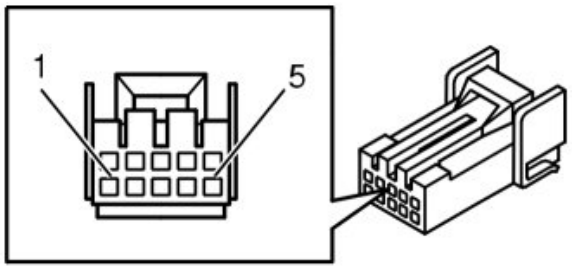
No - Checking wiring and connectors

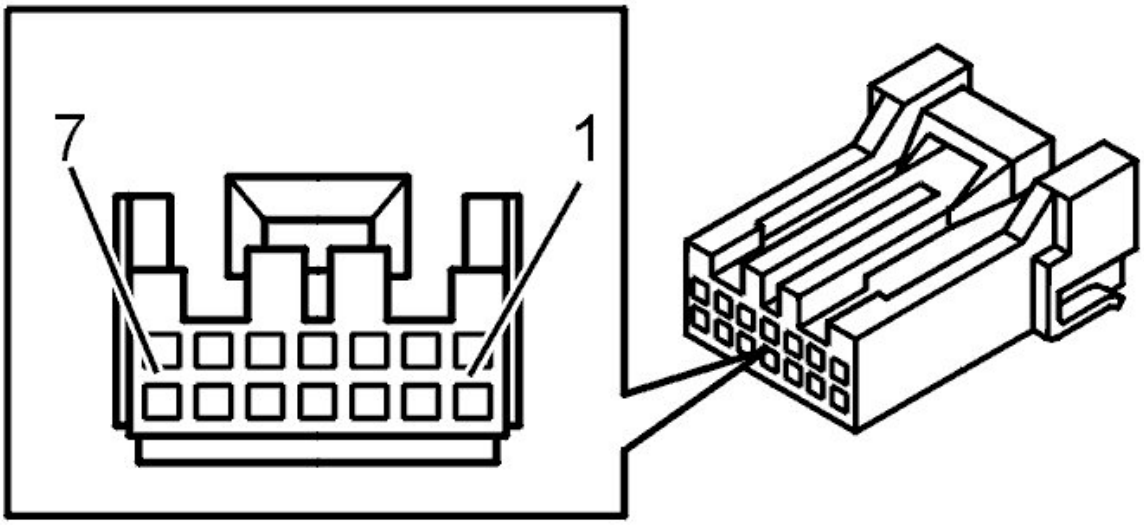
Checking wiring and connectors

(For XC90 the fault-tracing refers to the rear movement sensor.)
Check the ground lead between movement sensor connector terminal #5 and the ground terminal 31/83. Check for an open-circuit. Check for an intermittent open-circuit.
Check in particular intermediate connector (54/13:20) in the cable harness.
If no fault was found, try a new sensor.

Other information:

- To connect the breakout box: Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about upper electronic module (UEM) signals: Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Movement sensor/Volume sensor/ Mass movement sensor (MMS), replace See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Ultrasonic Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





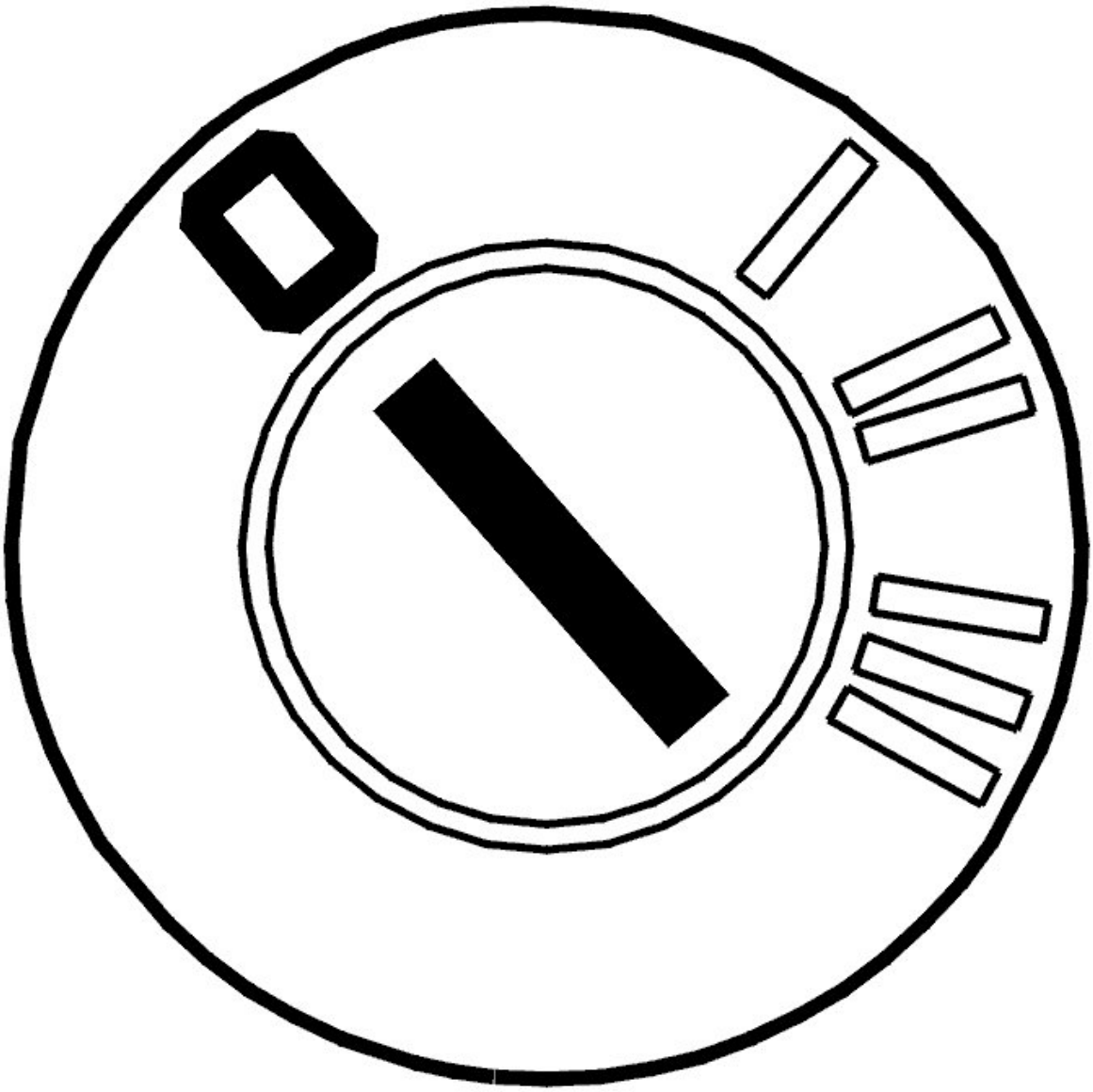
Continue - Verification

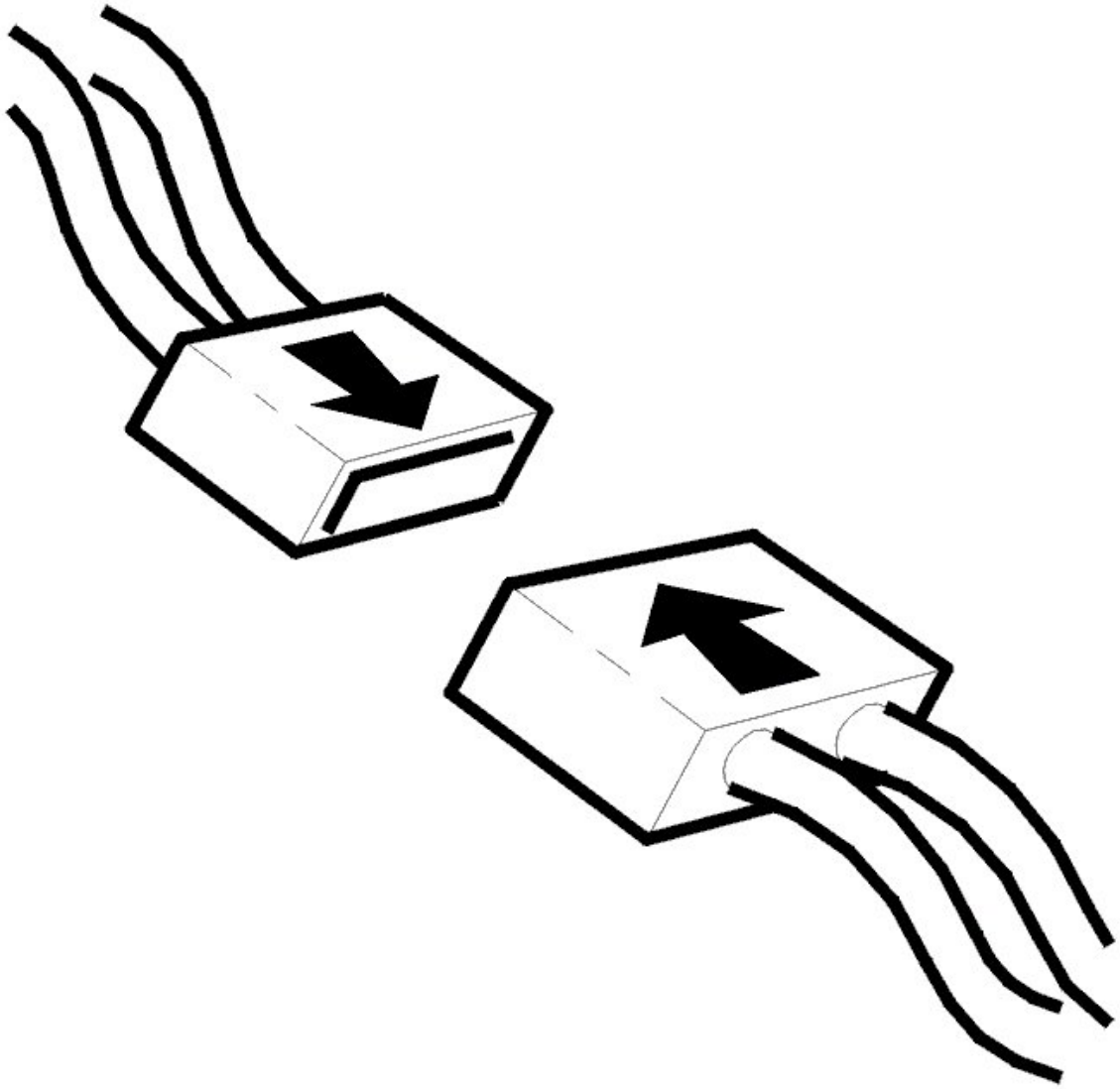
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.

To check the mass movement sensor (MMS) in the S60/S80/V70/XC70

- Check that the function for reduced alarm is not activated (button on 7 in row).
- Open the driver's window, close all doors and hatches. Lock the vehicle using the remote control.
- Wait 25 seconds until the alarm is active. Then trigger the alarm by waving your arm inside the vehicle. The siren or horn must sound and the hazard warning lamps flash. Reset the alarm by pressing the unlocking button on the remote control.
- Check that the mass movement sensor (MMS) has triggered the alarm via the read out of the alarm cause in Vehicle communication.

To check the mass movement sensor (MMS) in the XC90

- Check that the function for reduced alarm is not activated (button on 7 in row).
- Open the driver's window and the rear window on the driver's side. Lock the vehicle using the remote control.
- Wait 25 seconds until the alarm is active. Then trigger the alarm by waving your arm through the driver's door window, inside the vehicle above the front seats. The siren or horn must sound and the hazard warning lamps flash.
- Reset the alarm by pressing the unlocking button on the remote control. Lock the vehicle again.
- Wait 25 seconds until the alarm is active. Then trigger the alarm by waving you arm, through the rear door window on the driver's side, inside the vehicle above the cargo compartment. The siren or horn must sound and the hazard warning lamps flash. Reset the alarm by pressing the unlocking button on the remote control.
- Check that the front and rear mass movement sensor (MMS) has triggered the alarm the last two times via the read out of the alarm cause in Vehicle communication.

Is the function OK?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking wiring and connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the general courtesy lighting switch has been pressed down for more than 3 minutes, a diagnostic trouble code is displayed. The test is done when the ignition is on or off.

Substitute value
- Nothing.

Possible source
- The general courtesy lighting switch has stuck
- CFL (front left reading lamp switch signal) and CFR (front right reading lamp switch signal) short circuited to voltage supply.

Fault symptom[s]
- Courtesy lighting does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults

Unlock the car using the key or remote control from outside.

Does the general interior lighting come on?

Yes - Intermittent fault

No - Checking for a short-circuit

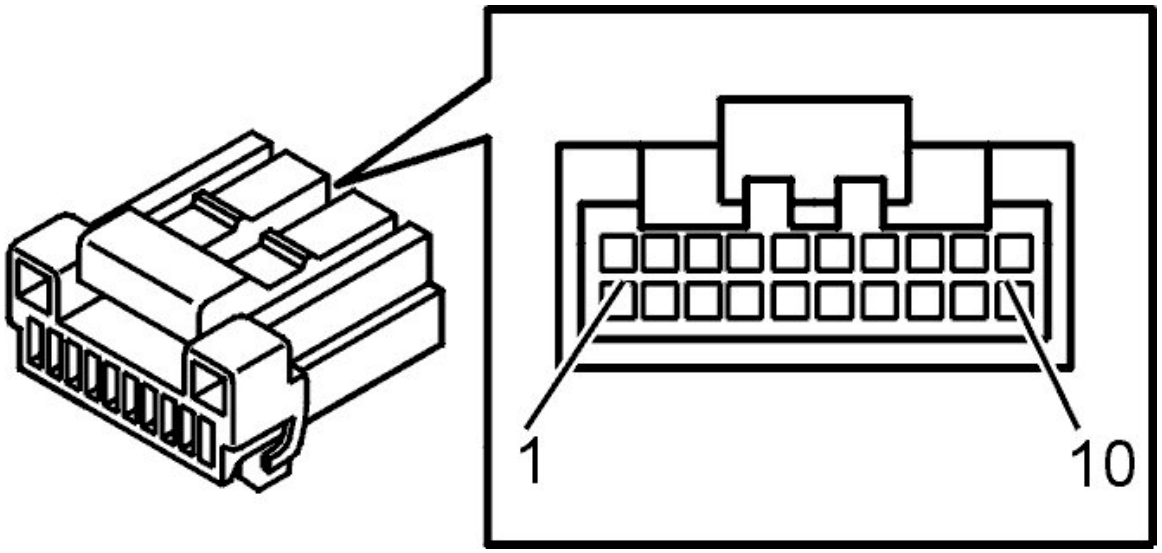
Checking for a short-circuit

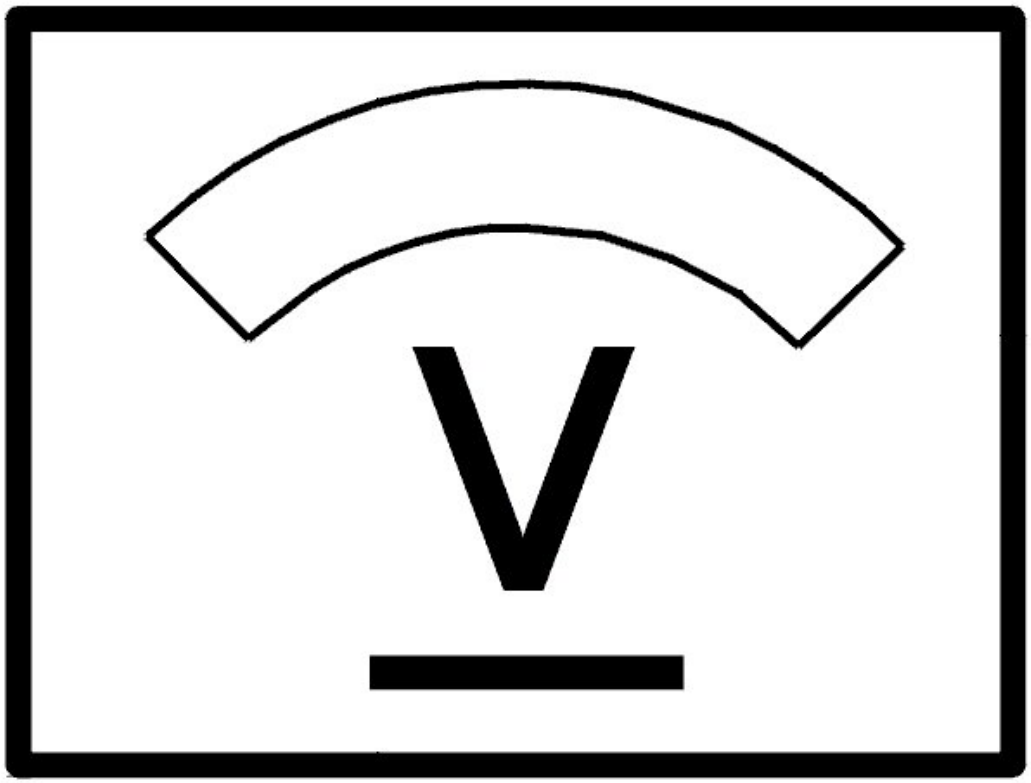
Check that the button has not jammed in its depressed position.
Check the cable between control module terminal #16 and roof lamp module terminal #7A. Check for a short-circuit to supply voltage.

Check the cable between control module terminal #4 and roof lamp module terminal #8A. Check for a short-circuit to supply voltage. Replace the cable if a fault is found.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the roof lamp module switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- With the ignition on and when the function is not activated, the voltage between terminals #7A and #8A and ground should be 0 V
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

Remove the housing with the buttons.
Press directly on the switch for the light button.
If the switch works, replace the lamp housing.
If the switch still does not operate, replace the printed circuit board with switches.

Other information:

- To access the interior lighting, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair.

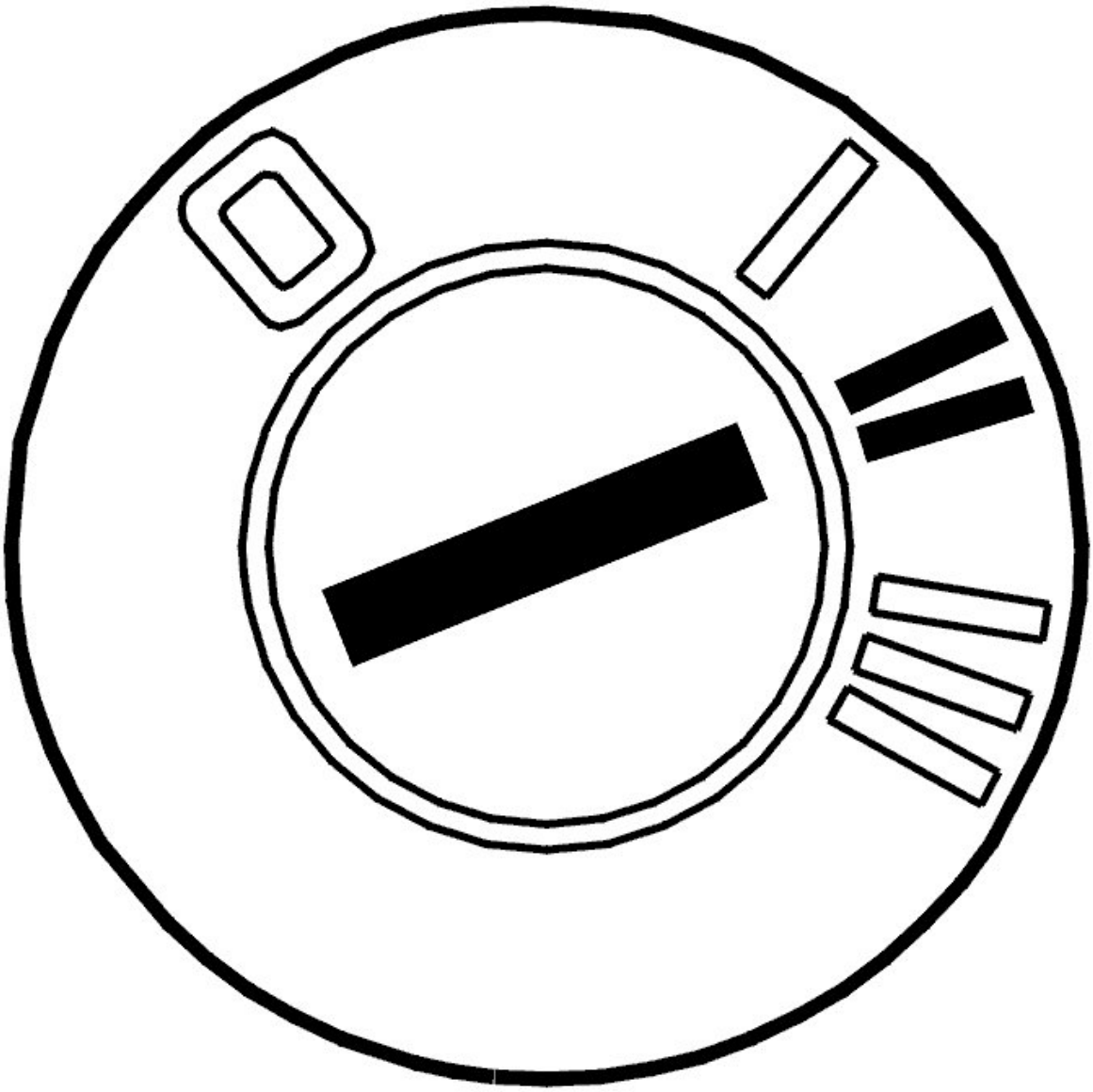
Continue - Verification

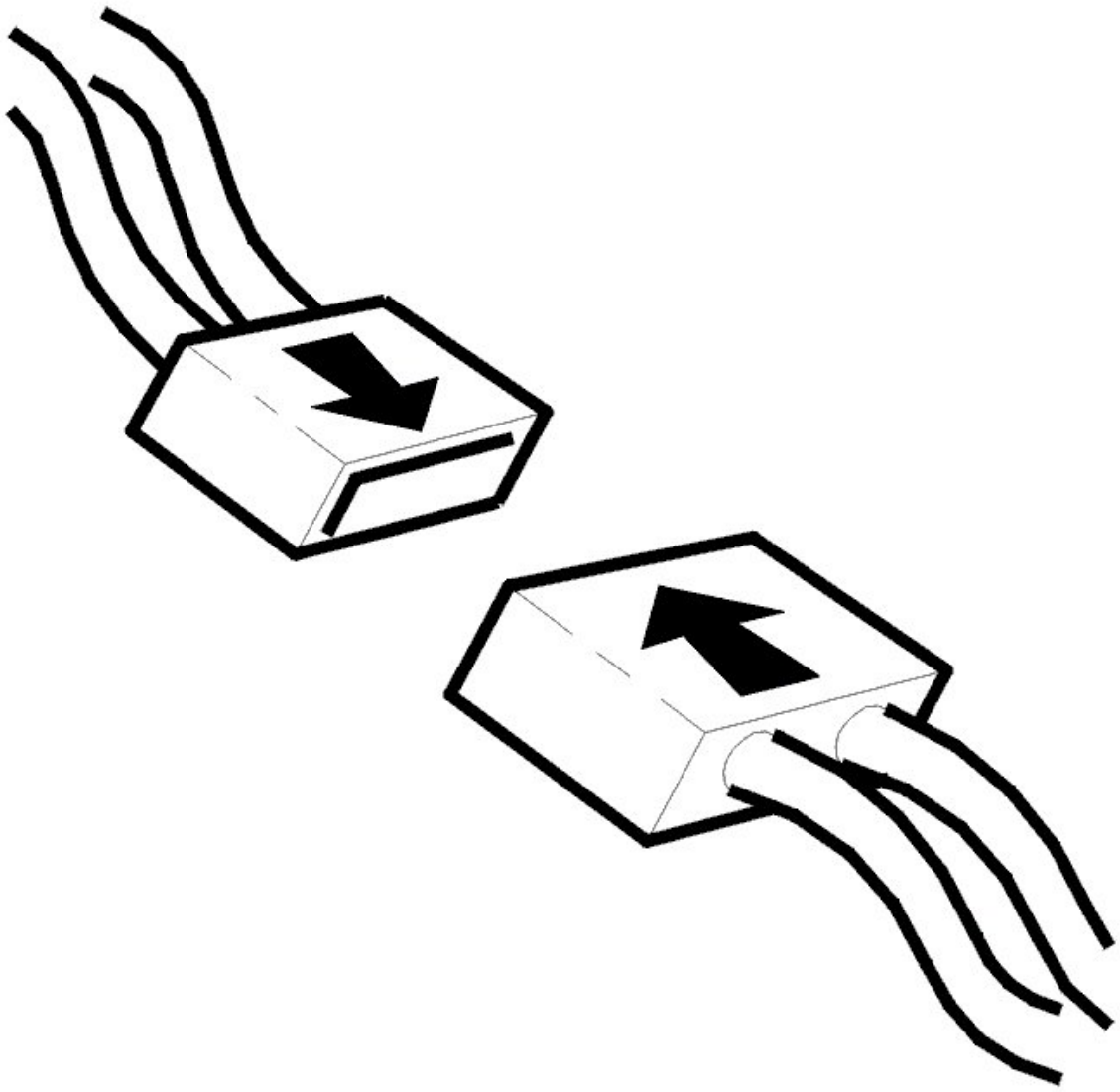
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Press the lamp switch and check that the lamps come on and that the switch does not stick.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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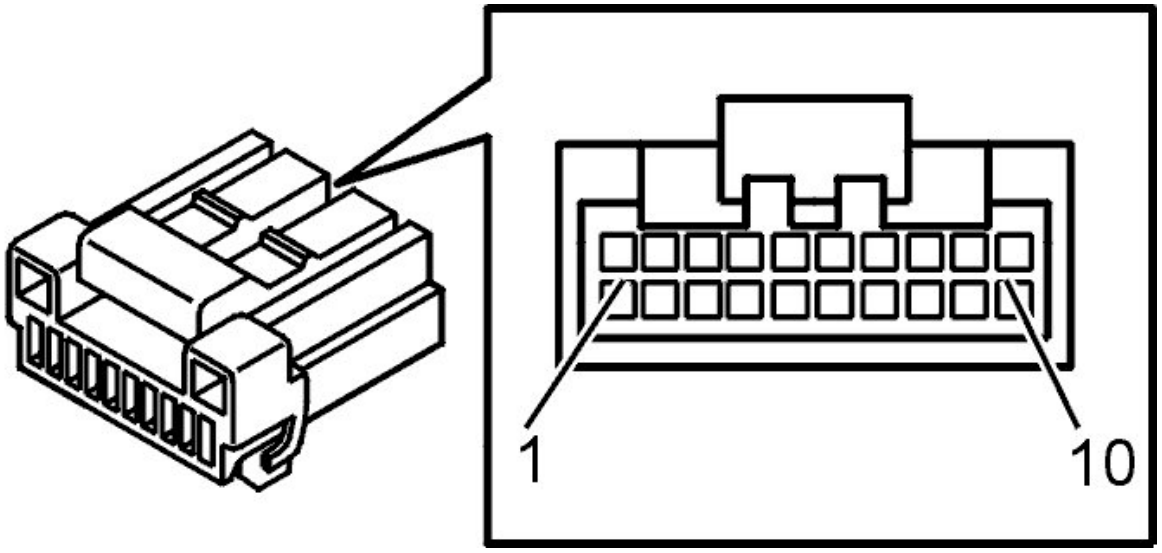
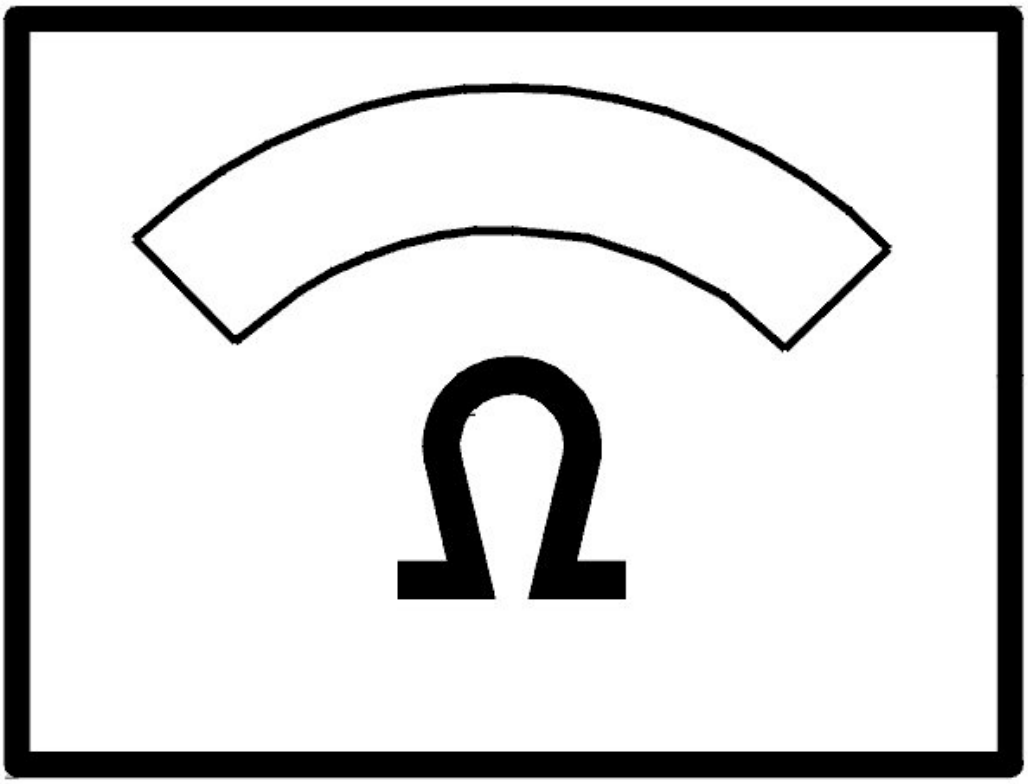
Intermittent fault

Check the control module and roof lamp module connectors. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between control module terminal #16 and roof lamp module terminal #7A. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
Check the cable between control module terminal #4 and roof lamp module terminal #8A. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.
Check the roof lamp module housing.
Check the roof lamp module switches.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the roof lamp module switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- With the ignition on and when the function is not activated, the voltage between terminals #7A and #8A and ground should be 0 V
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers a faulty signal from the front left reading lamp, the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The switch for the front left reading lamp has stuck down
- The signal wire for the front left reading lamp is short circuited to voltage supply.

Fault symptom[s]
- Courtesy lighting does not work.

Signal Too High

Signal too high

Checking for a short-circuit

Check that the button has not jammed in its depressed position.
Check the cable between the upper electronic module (UEM) and the roof lamp module. Check for a short-circuit to supply voltage.

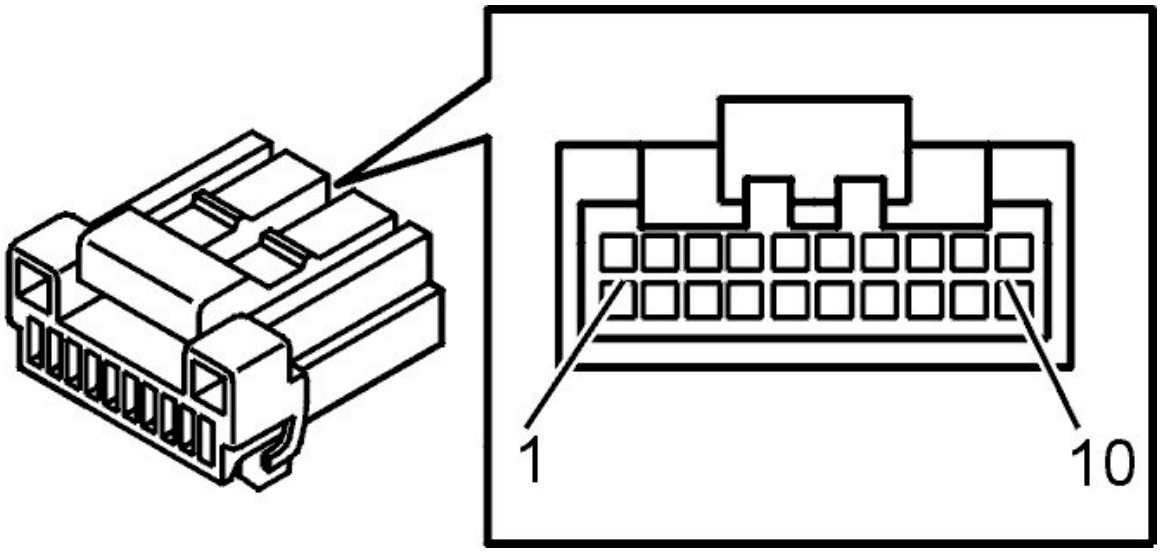
UEM-001D front left reading lamp

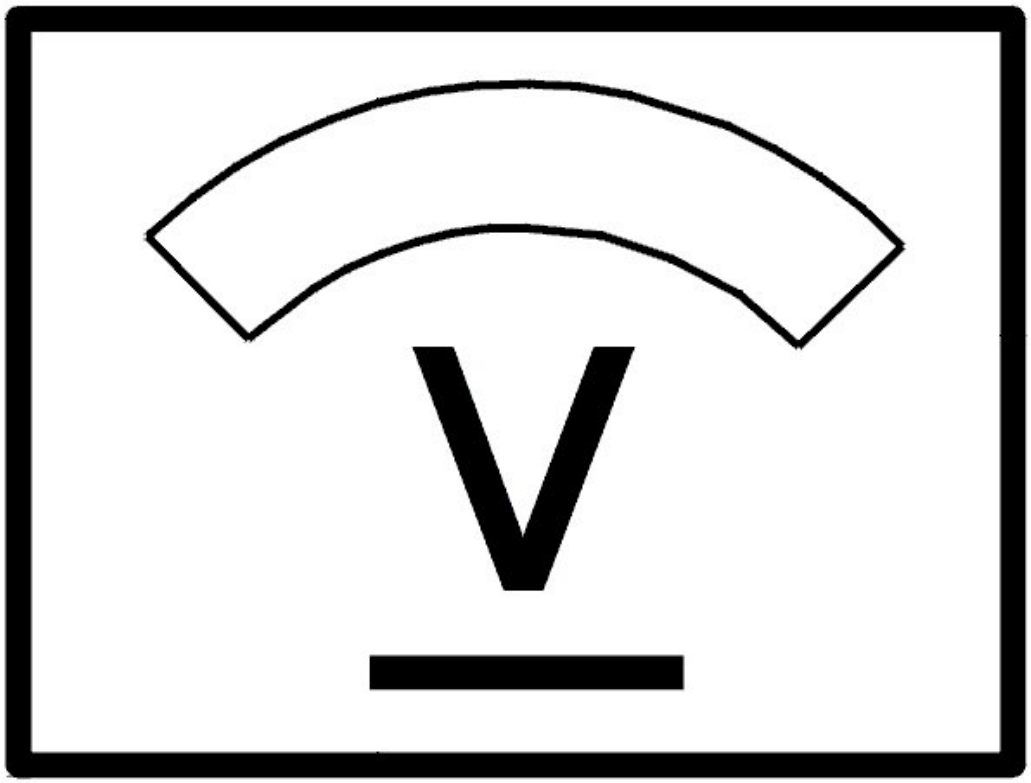
Control module terminal #4 and roof lamp module terminal #8A.

UEM-001E front right reading lamp

Control module terminal #16 and roof lamp module terminal #7A.
Replace the cable if a fault is found.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the roof lamp module switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- With the ignition on and when the function is not activated, the voltage between terminal #8A (UEM 001D) and terminal #7A (UEM 001E) on the roof lamp unit (control module side) and ground should be 0 V
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

Remove the housing with the buttons.
Press the switch for the light button.
If the switch works, replace the lamp housing.
If the switch still does not operate, replace the printed circuit board and its switches.

Other information:

- To access the interior lighting, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair.

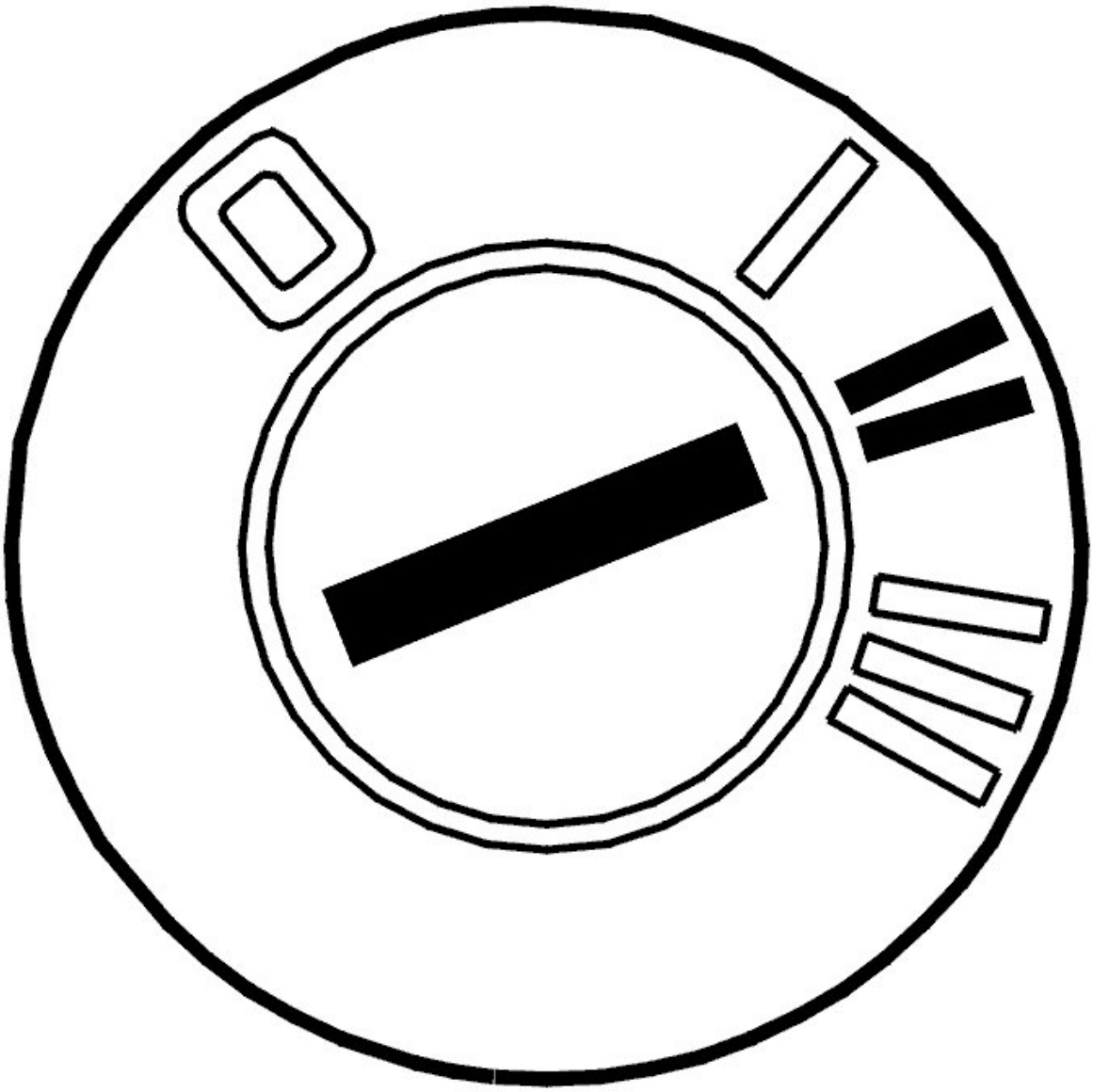
Continue - Verification

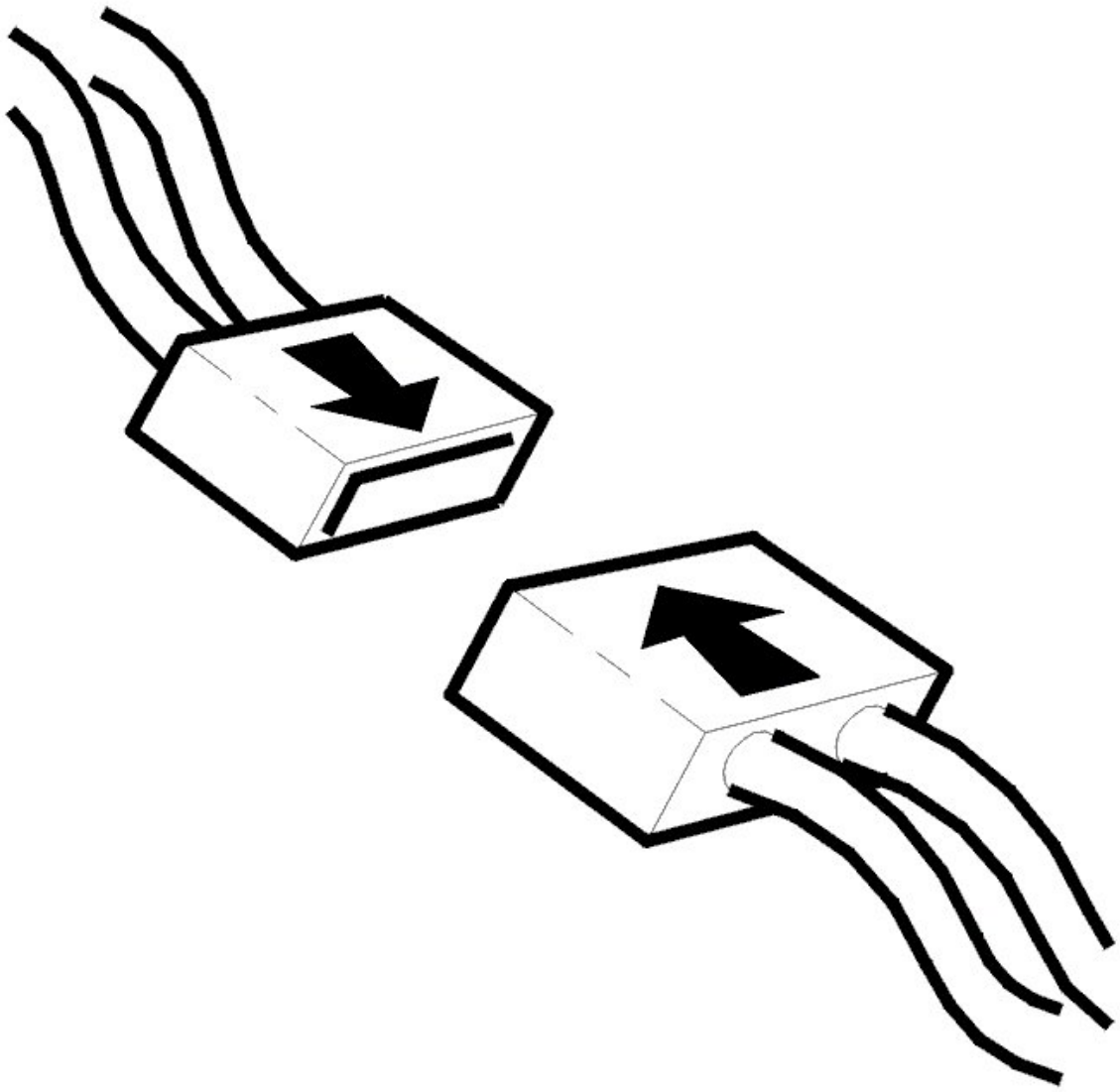
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for a short-circuit

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers a faulty signal from the right front reading lamp, the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The switch for the front right reading lamp has stuck down
- The signal wire for the front right reading lamp is short circuited to voltage supply.

Fault symptom[s]
- Courtesy lighting does not work.

Signal Too High

Signal too high

Checking for a short-circuit

Check that the button has not jammed in its depressed position.
Check the cable between the upper electronic module (UEM) and the roof lamp module. Check for a short-circuit to supply voltage.

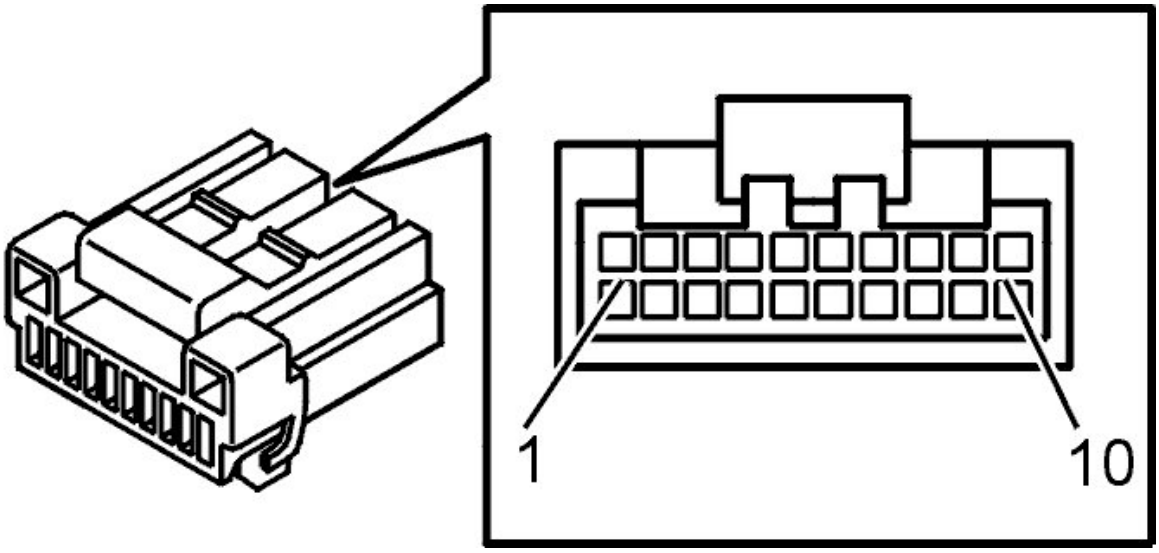
UEM-001D front left reading lamp

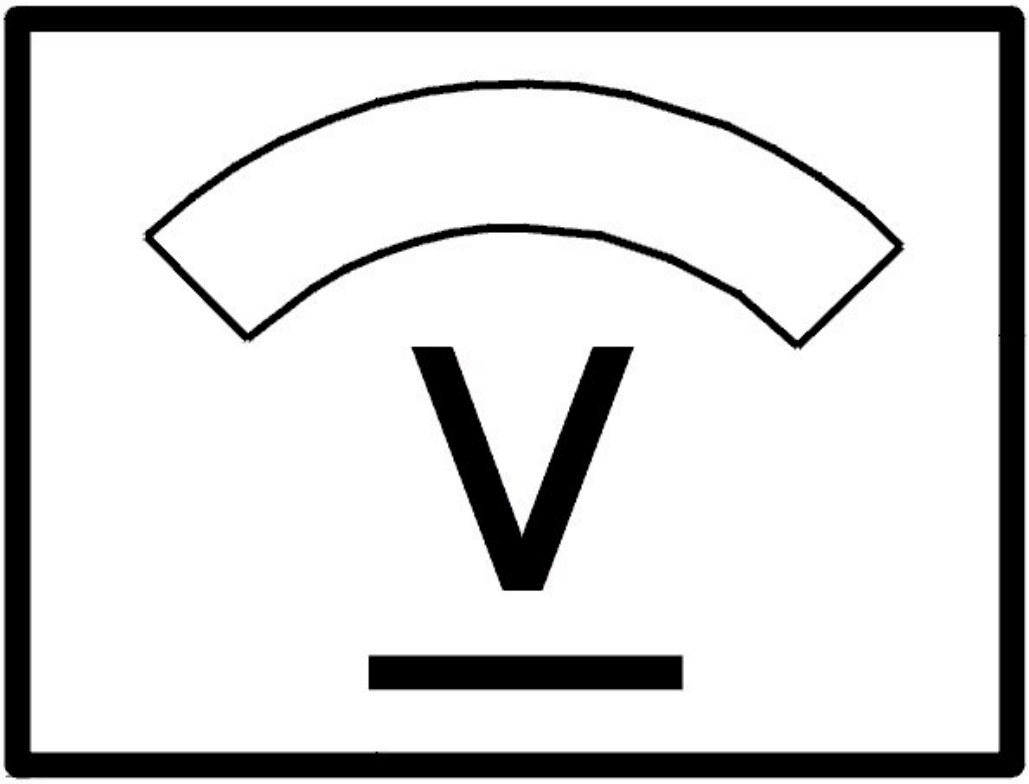
Control module terminal #4 and roof lamp module terminal #8A.

UEM-001E front right reading lamp

Control module terminal #16 and roof lamp module terminal #7A.
Replace the cable if a fault is found.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the roof lamp module switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- With the ignition on and when the function is not activated, the voltage between terminal #8A (UEM 001D) and terminal #7A (UEM 001E) on the roof lamp unit (control module side) and ground should be 0 V
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component

Remove the housing with the buttons.

Press the switch for the light button.
If the switch works, replace the lamp housing.
If the switch still does not operate, replace the printed circuit board and its switches.

Other information:

- To access the interior lighting, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair.

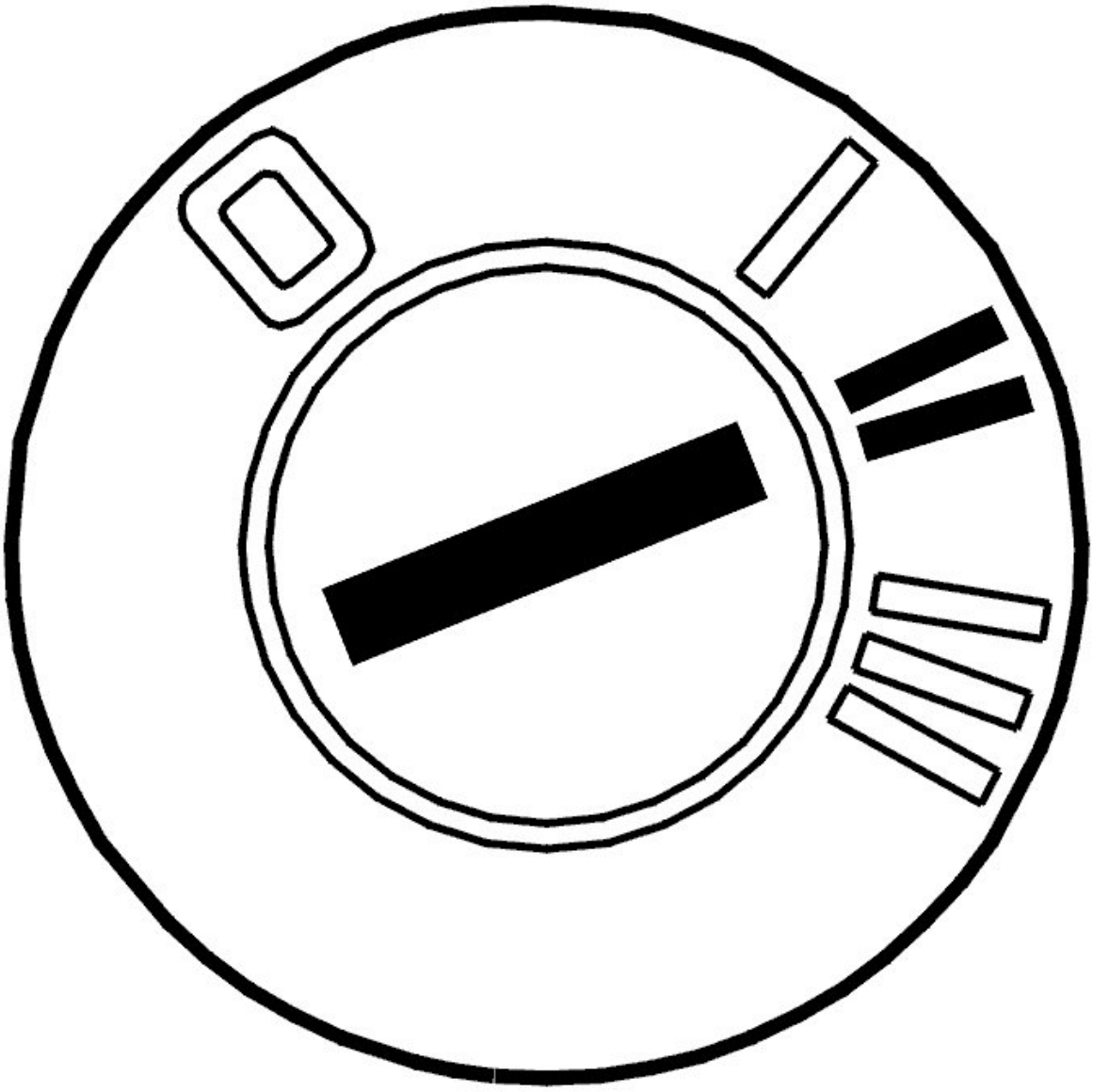
Continue - Verification

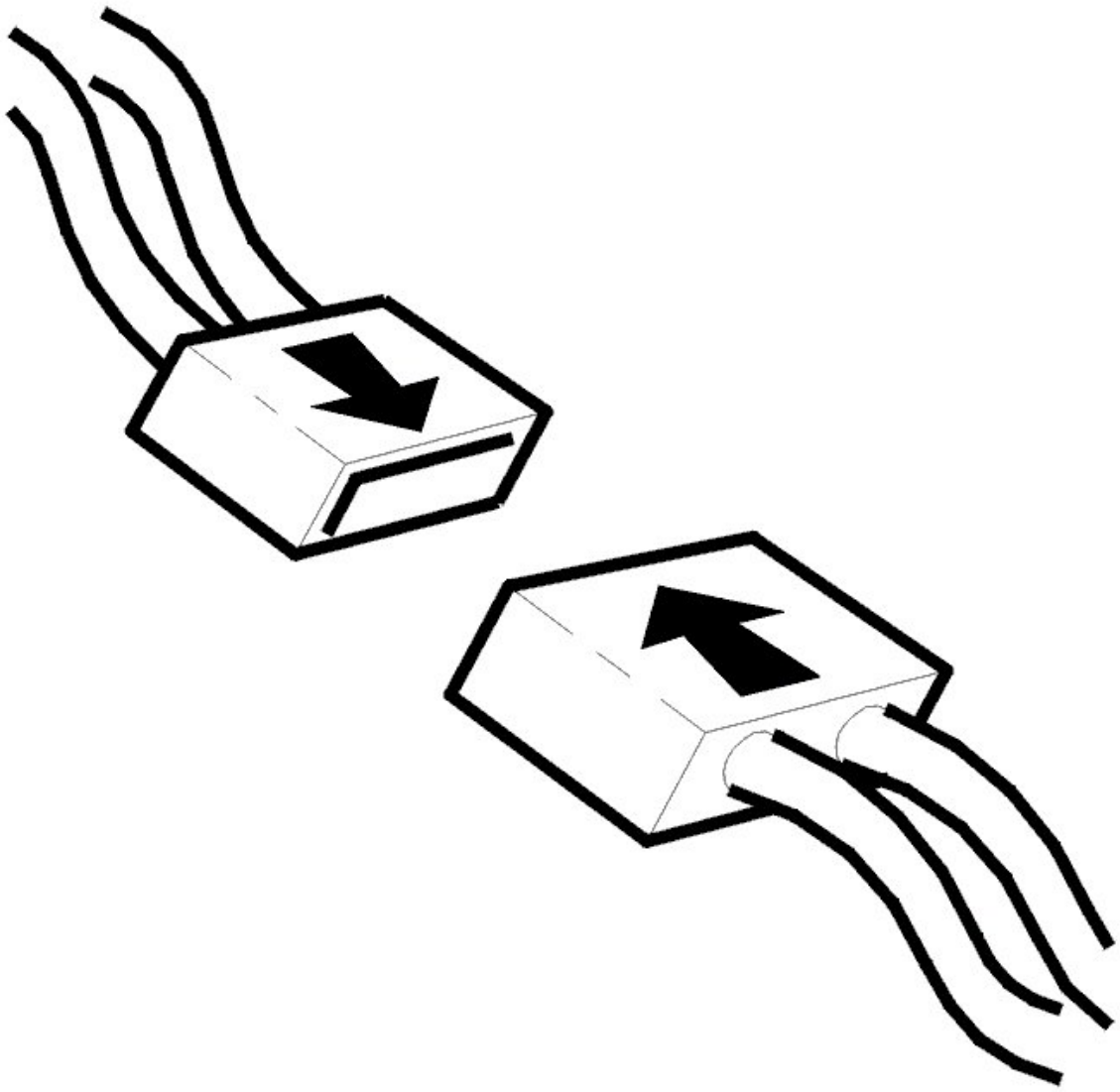
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for a short-circuit

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) UEM-0020 is stored if the control module registers that the actual value for rear view mirror anti-dazzle is different from the desired value.

Substitute value
- None.

Possible source
- Defective circuit in the rear view mirror.

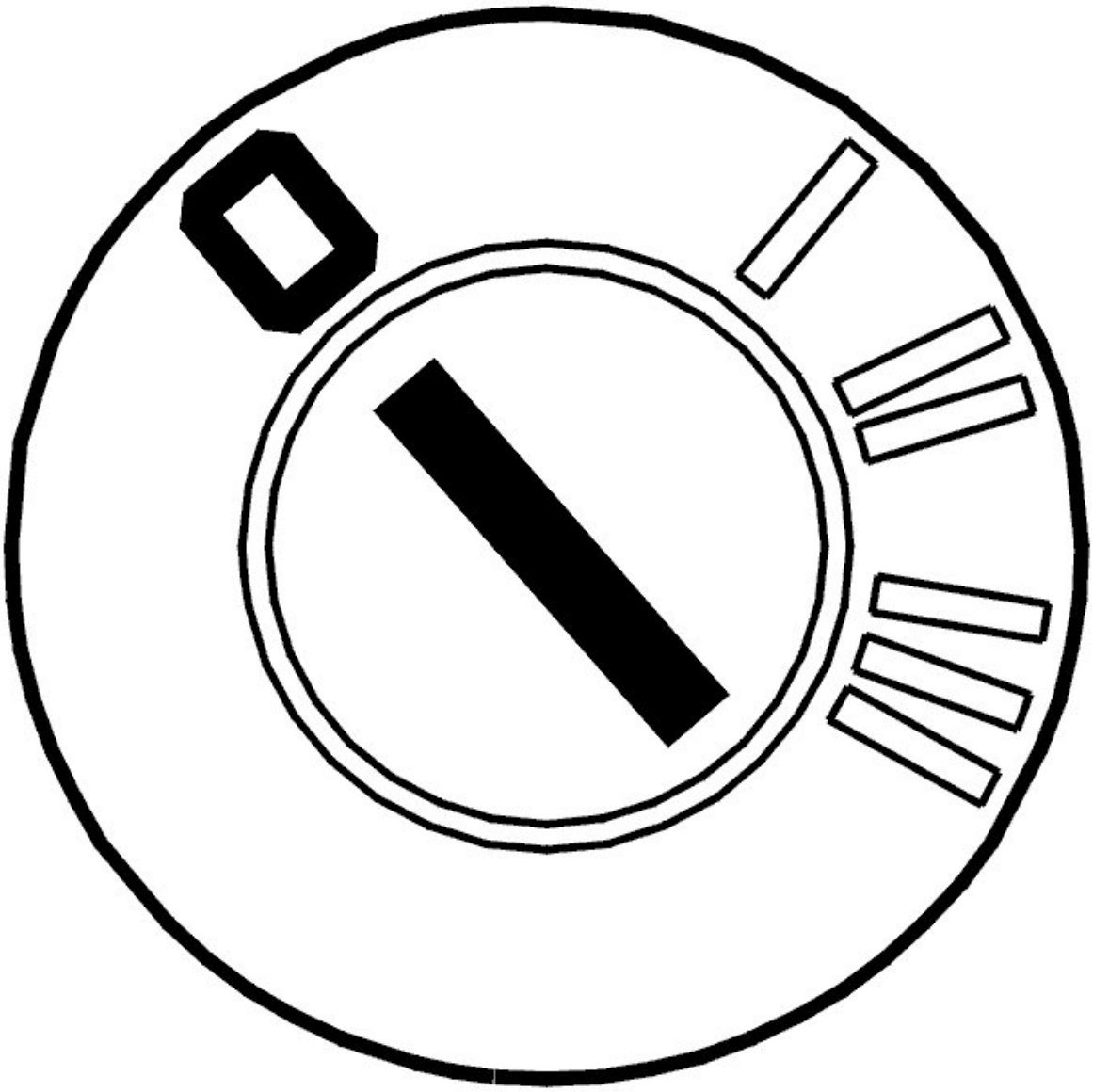
Fault symptom[s]
- No anti-dazzle function
- Poor anti-dazzle function.

Signal Missing

Signal missing

Replacing the control module and programming

Note! If possible, read off the programmed data from the control module before it is replaced.



- Ignition off.

The upper electronic module has registered an internal fault.
As a result of the fault, the control module must be replaced.

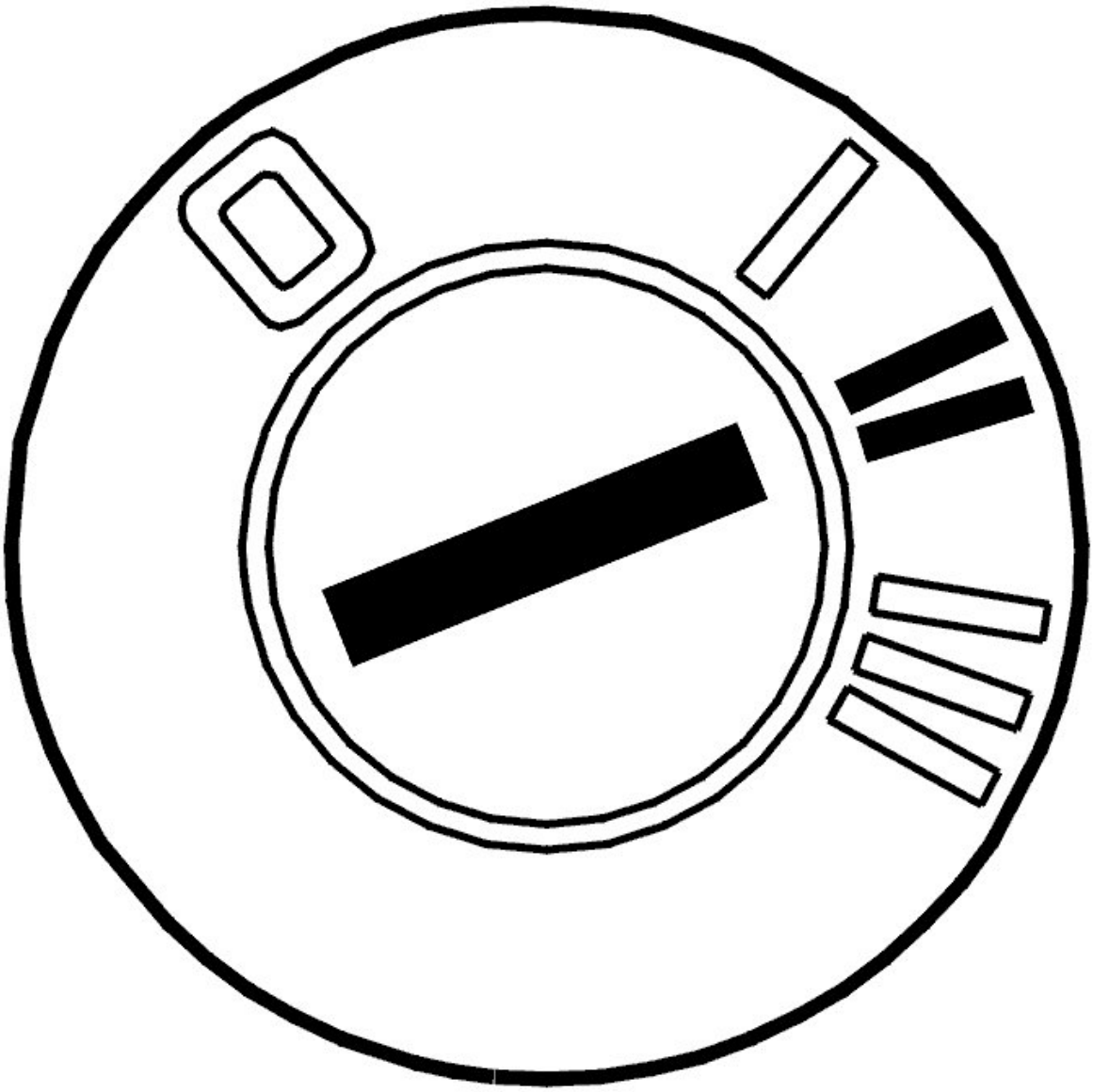
Continue - Replacing the control module

Replacing the control module

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

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Replacing control modules and downloading software

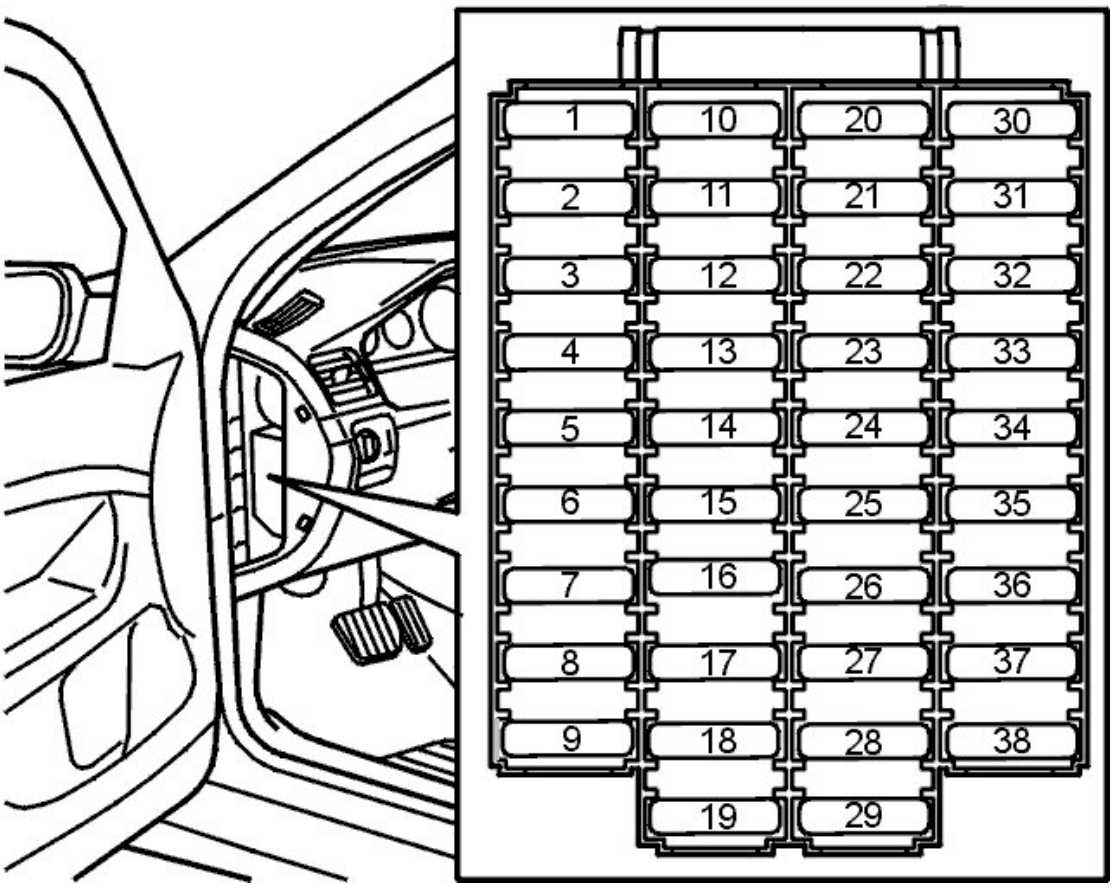
Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting

2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short

- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long

- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:

- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - **Fault Found**

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - **Fault Found**

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - **DONE**

DONE - **DONE**

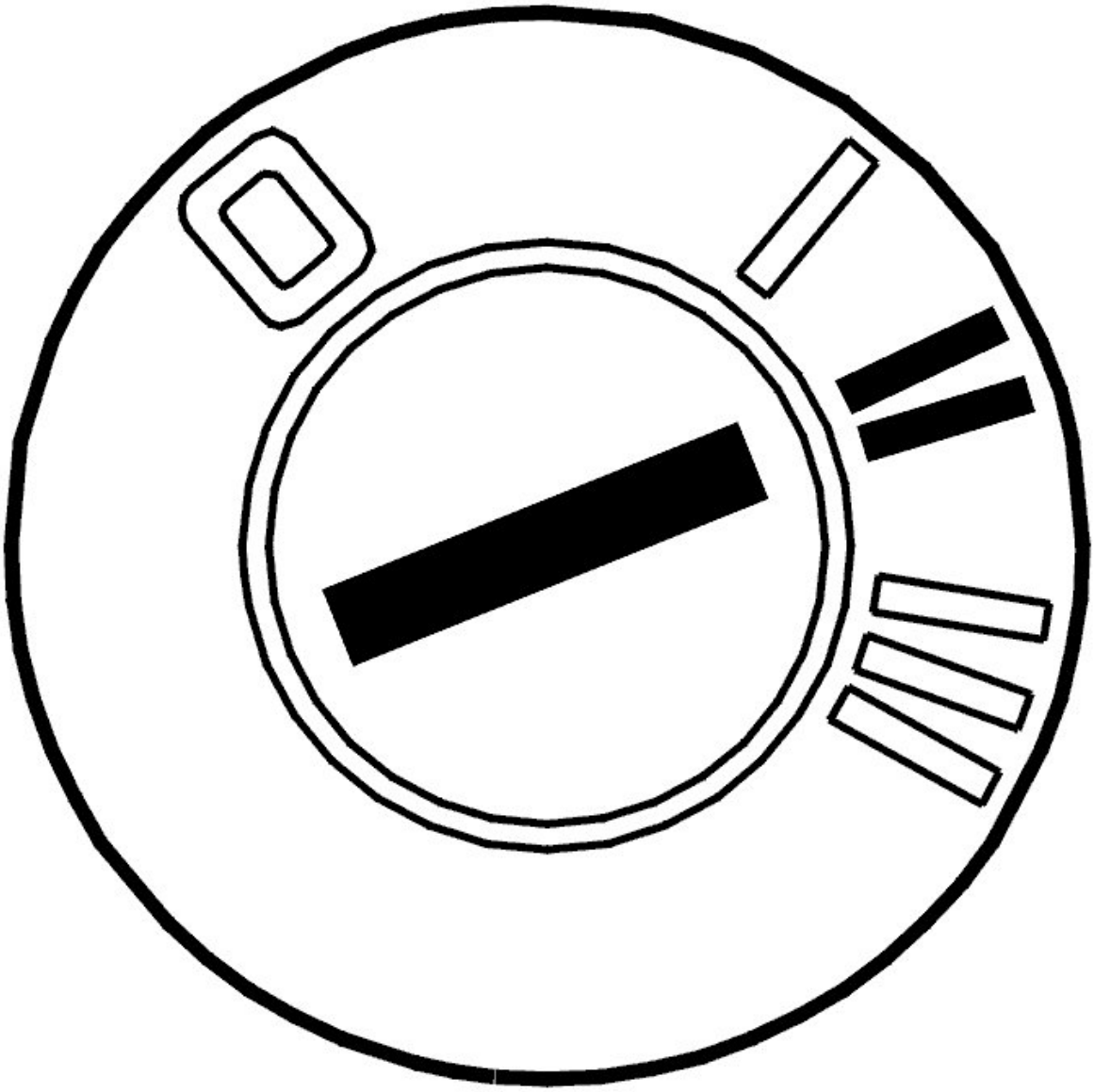
DONE - Verification

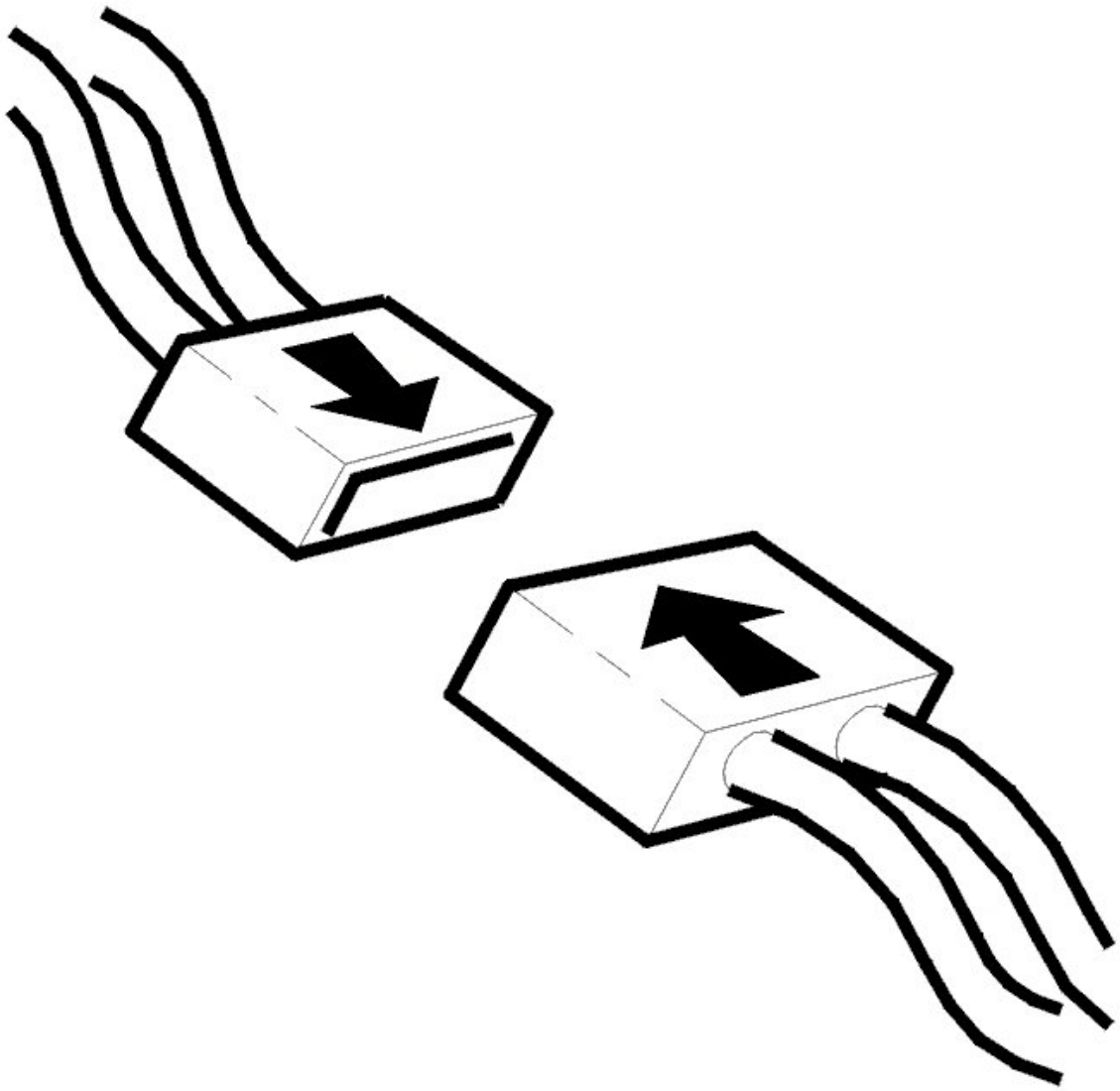
Verification

Checking the inner rear-view mirror dimmer

Symptom verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Shine a strong light on the inner rear-view mirror and check that it dims (becomes darker). Remove the light and check that the mirror lightens. The mirror should also lighten when reverse is engaged.

Does the rear view mirror dimmer work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the control module and programming

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the rear left reading lamp is on when the front left reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- The signal wire for the rear left reading lamp is short circuited to ground
- Intermittent open circuit on signal wire.

Fault symptom[s]
- Courtesy lighting does not work.

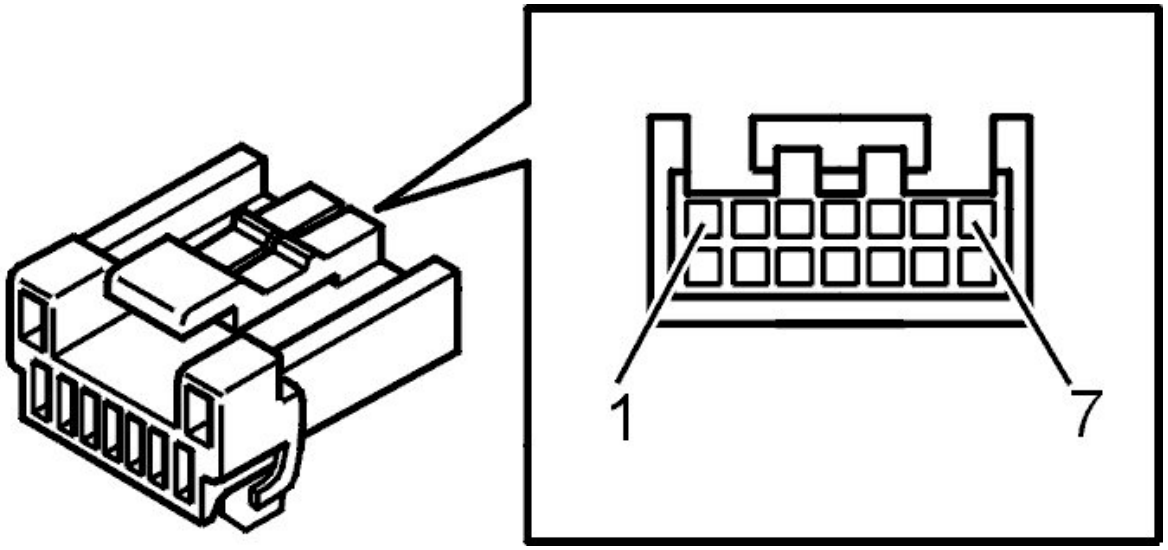
Signal Too Low

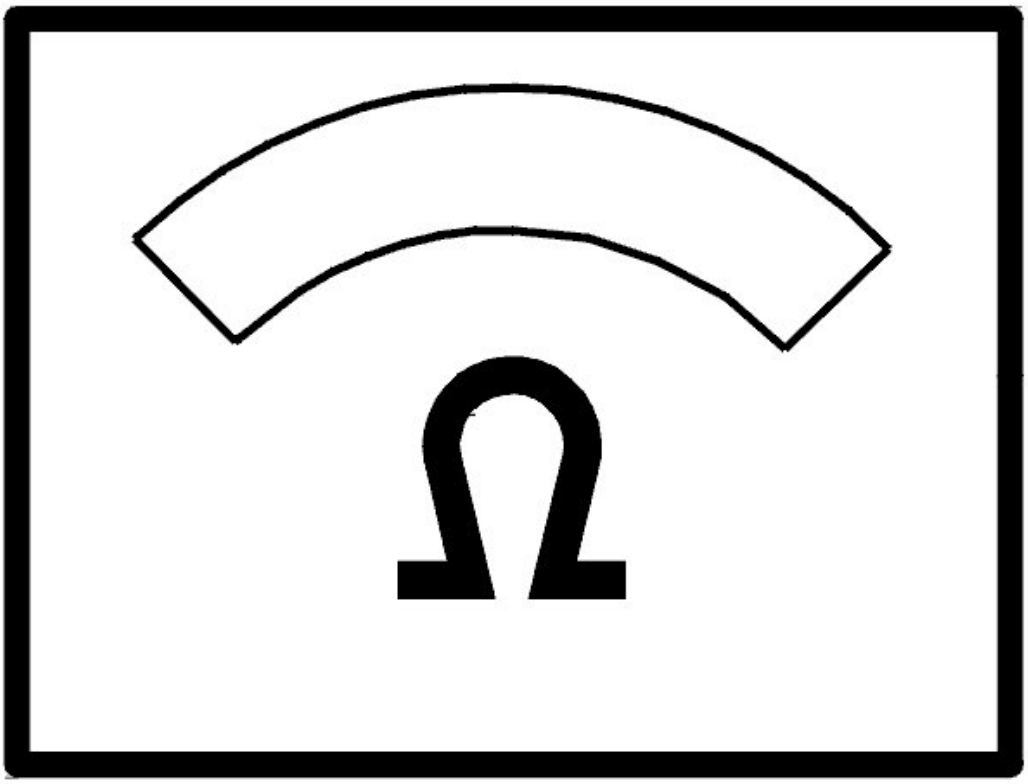
Signal too low

Checking the connectors

Check the connectors on the upper electronic module and rear reading lamp unit for contact resistance and oxidation as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and for a loose contact as described in Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Additional information:
- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.





Is there a fault?

Yes - Verification

No - Checking for open circuits and short circuits

Checking for open circuits and short circuits

Check the wire between the upper electronic module and the control unit of the rear reading lamp unit for a short circuit to ground, as described in

Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remove the connector from the roof lamp unit and measure between the connector and the UEM as described below.

UEM-0030 Rear left reading lamp
Control unit #20 and reading lamp unit #1.

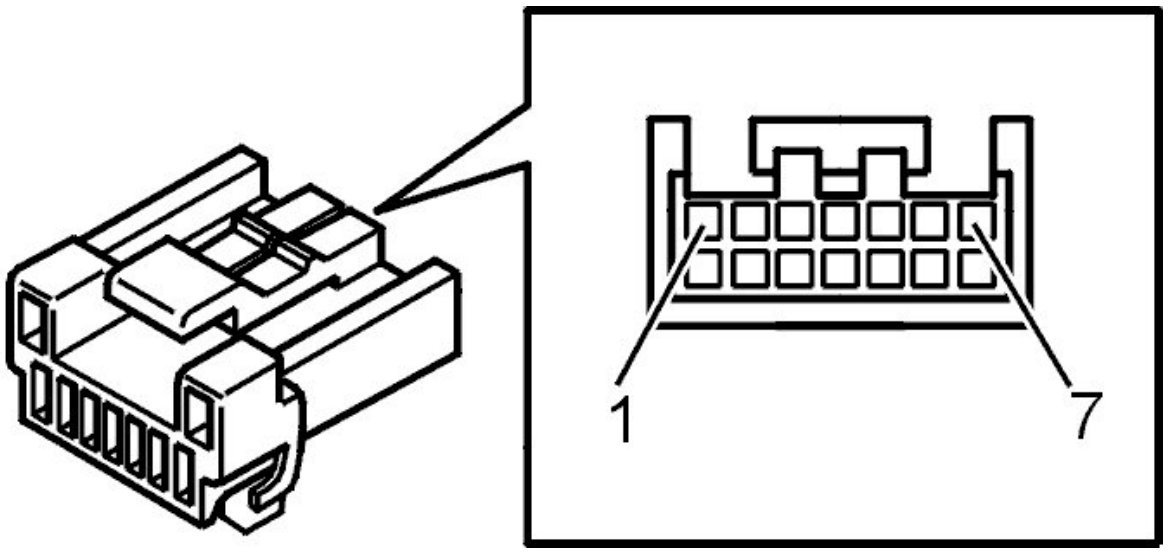
UEM-0032 Rear right reading lamp
Control unit #20 and reading lamp unit #7.
Check the wire between the upper electronic module and the control unit of the rear reading lamp unit for an open circuit, as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

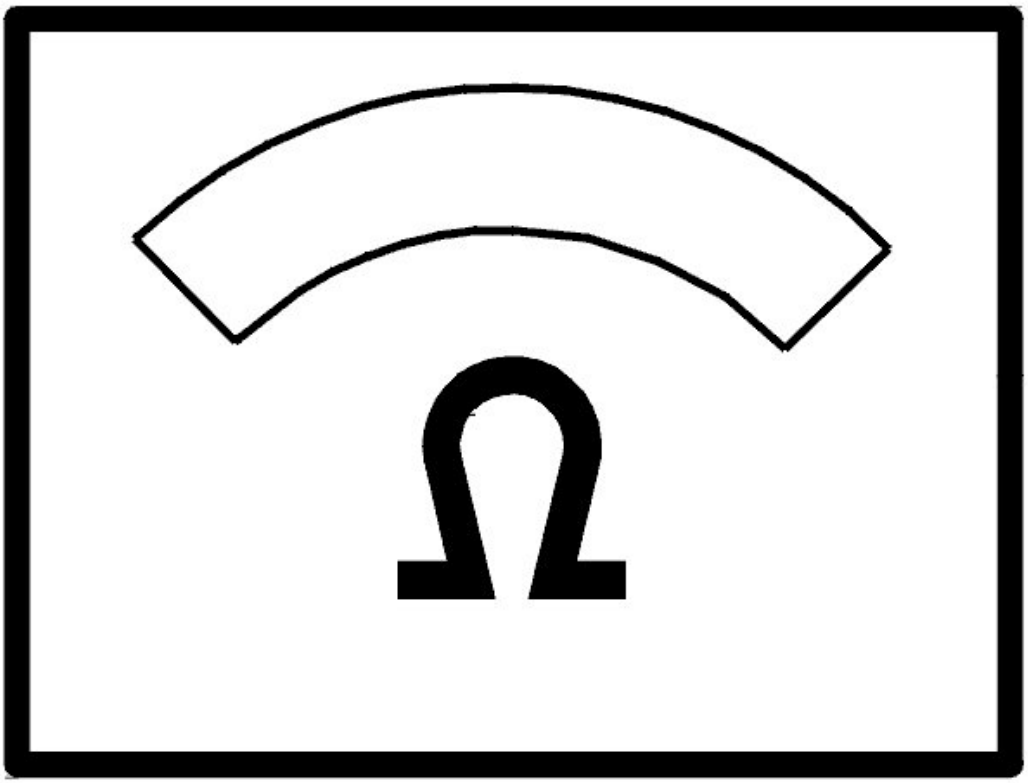
UEM-0030 Rear left reading lamp
Control unit #7 and reading lamp unit #1.

UEM-0032 Rear right reading lamp
Control unit #17 and reading lamp unit #7.
If a fault is found, replace the wire.
If the wire is OK, test with a new bulb.

Additional information:

- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To replace the bulb, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair.





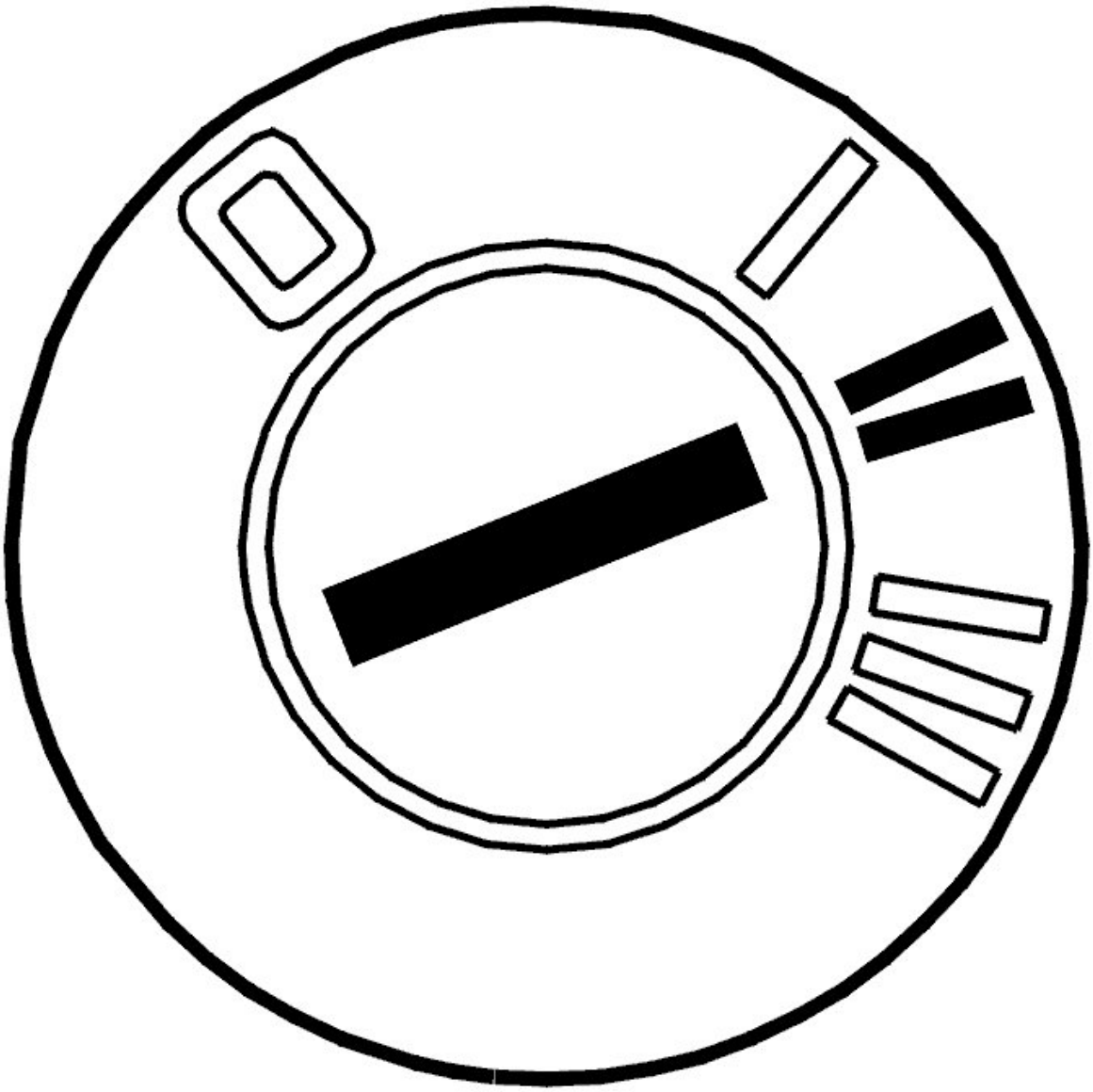
Continue - Verification

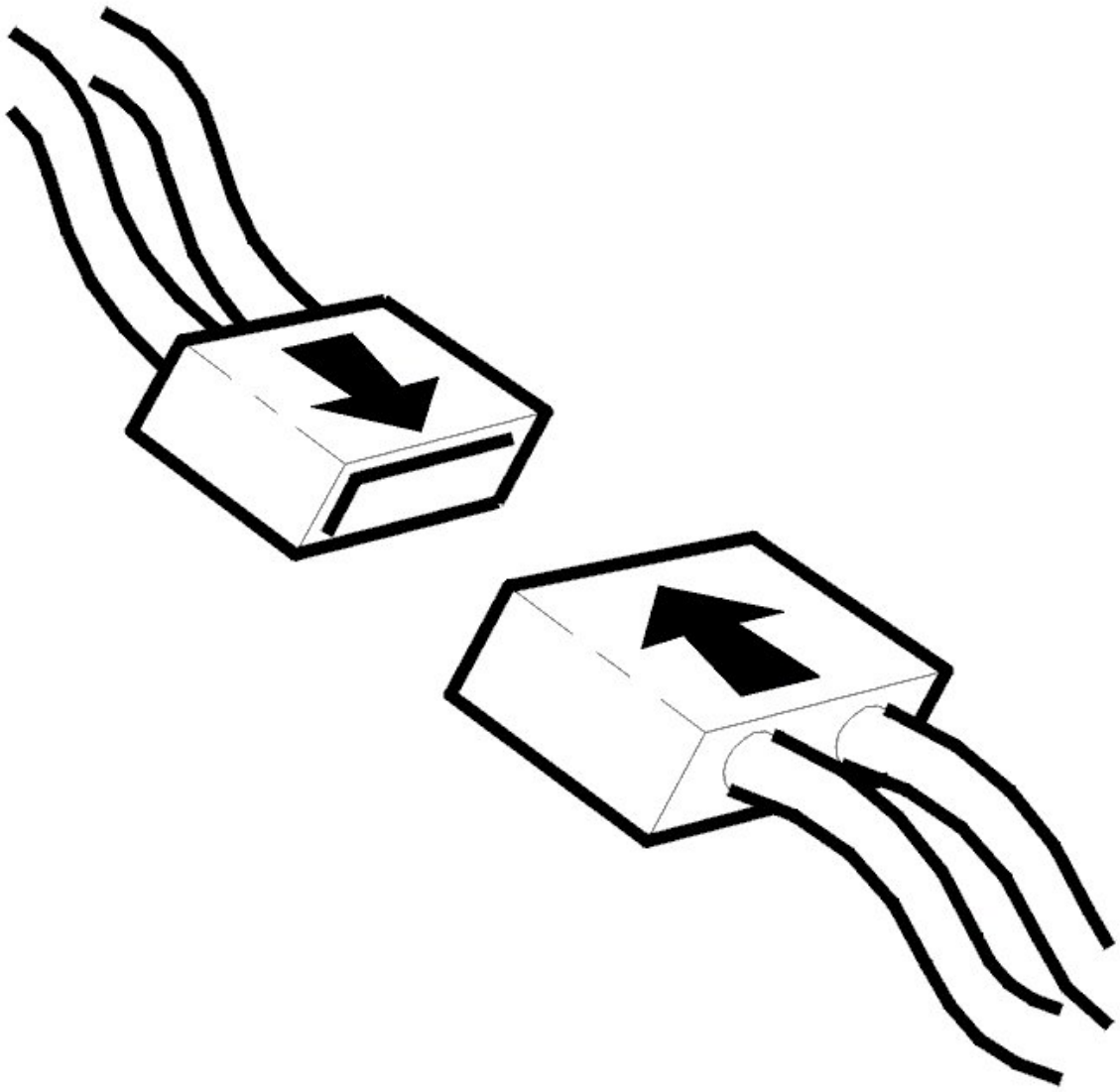
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the rear left reading lamp is on when the front left reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- Open circuit in signal wire for rear left reading lamp.

Short circuit to voltage supply on signal wire for rear left reading lamp.

Fault symptom[s]
- Courtesy lighting does not work.

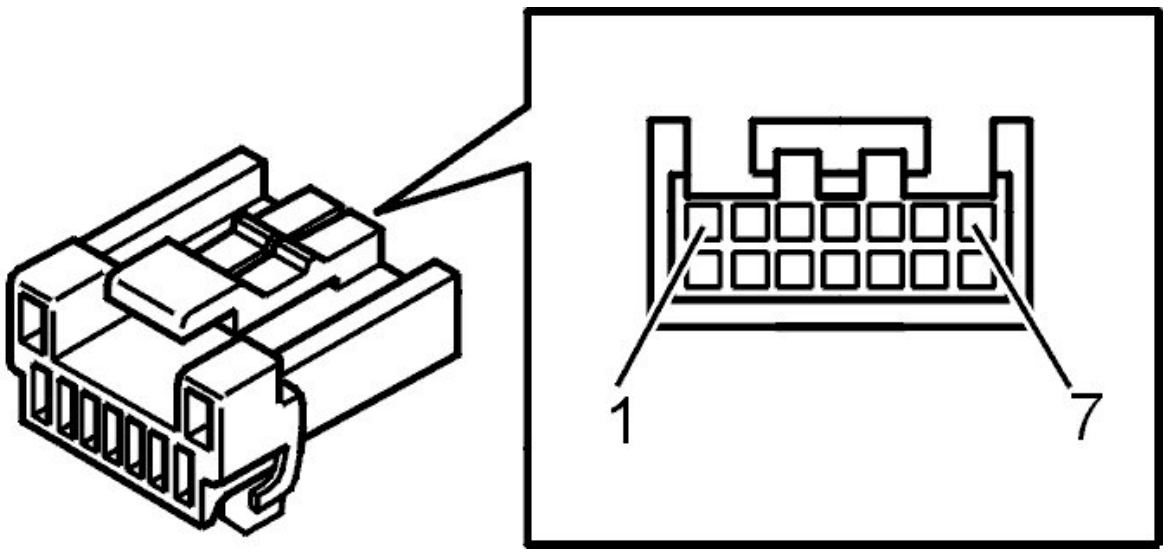
Signal Missing

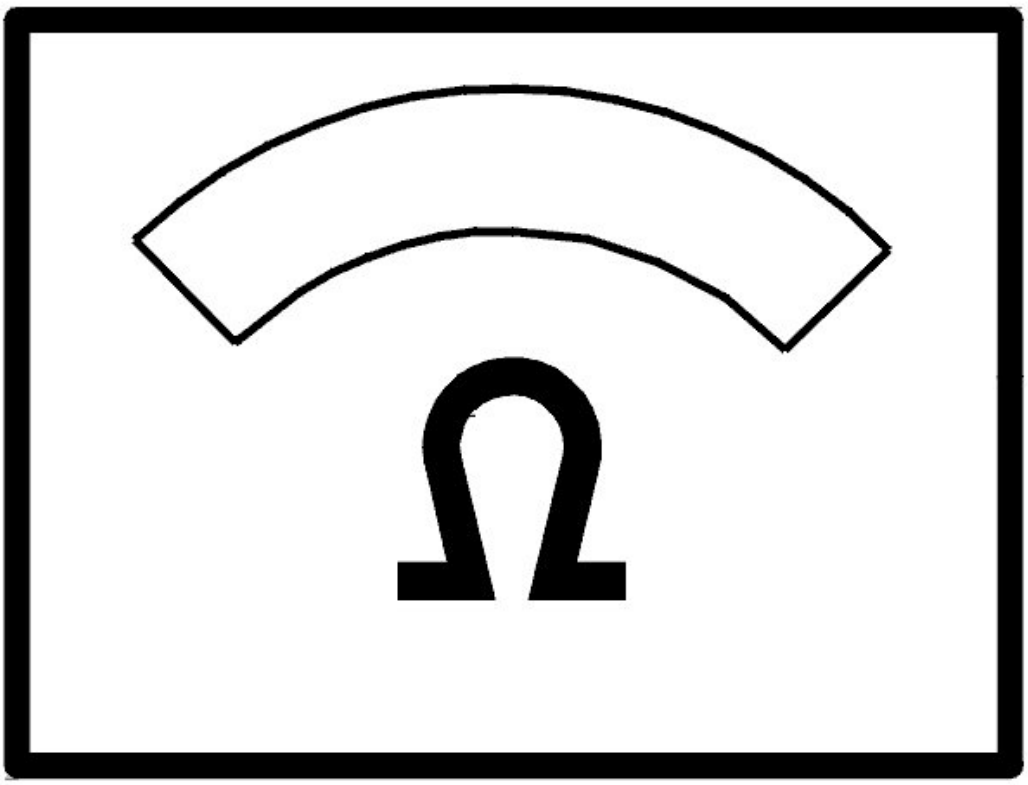
Signal missing

Checking the connectors

Check that the bulb is intact.
Check the connectors on the upper electronic module and rear reading lamp unit for contact resistance and oxidation as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and a loose contact as described in Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Do the necessary corrective action.

Additional information:
- To access/replace the lamp, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair.





Is there a fault?

Yes - Verification

No - Checking for open circuits and short circuits

Checking for open circuits and short circuits

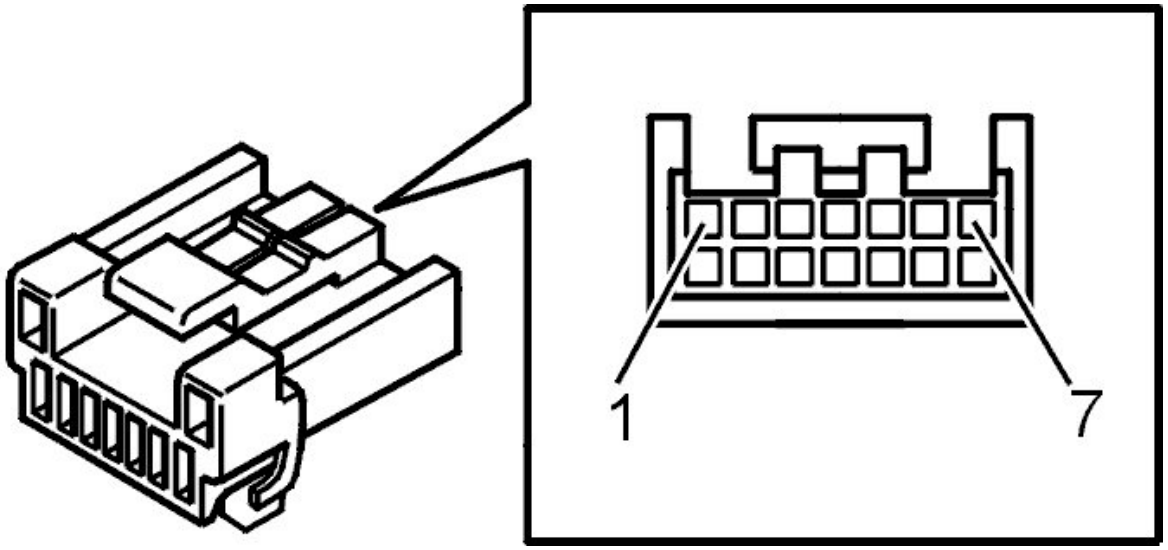
Check the wire between the upper electronic module and rear reading lamp unit for an open circuit as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and a short circuit to voltage supply as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

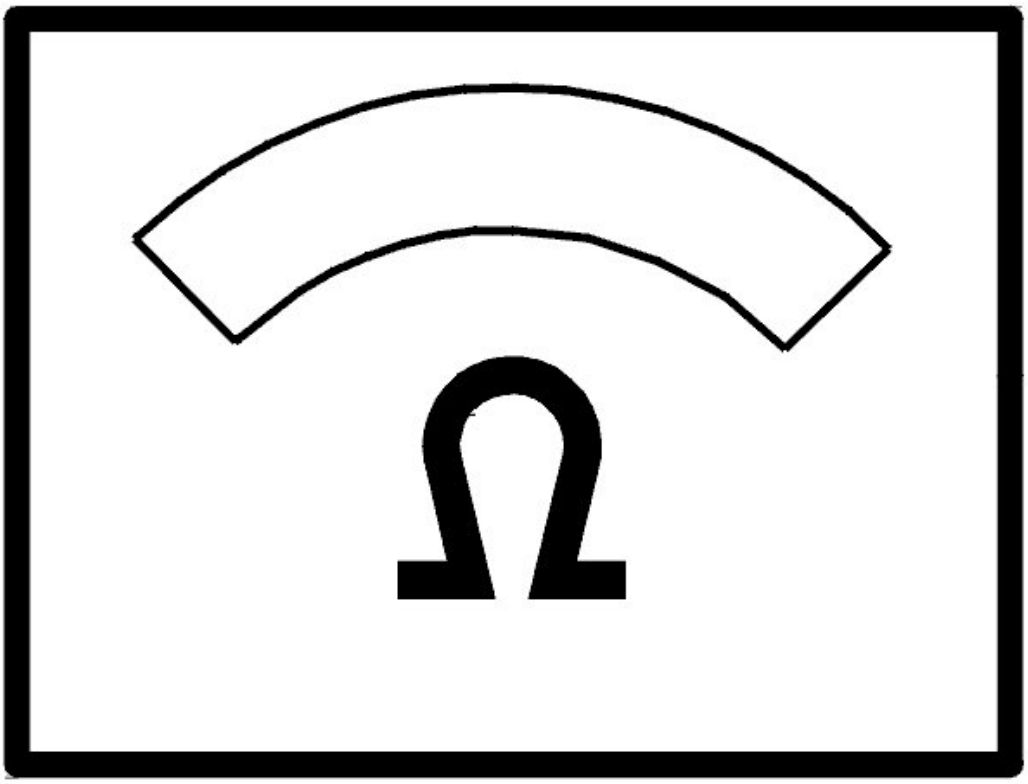
UEM-0031 Rear left reading lamp
Control unit #7 and reading lamp unit #1.

UEM-0033 Rear right reading lamp
Control unit #17 and reading lamp unit #7.

Additional information:

- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.





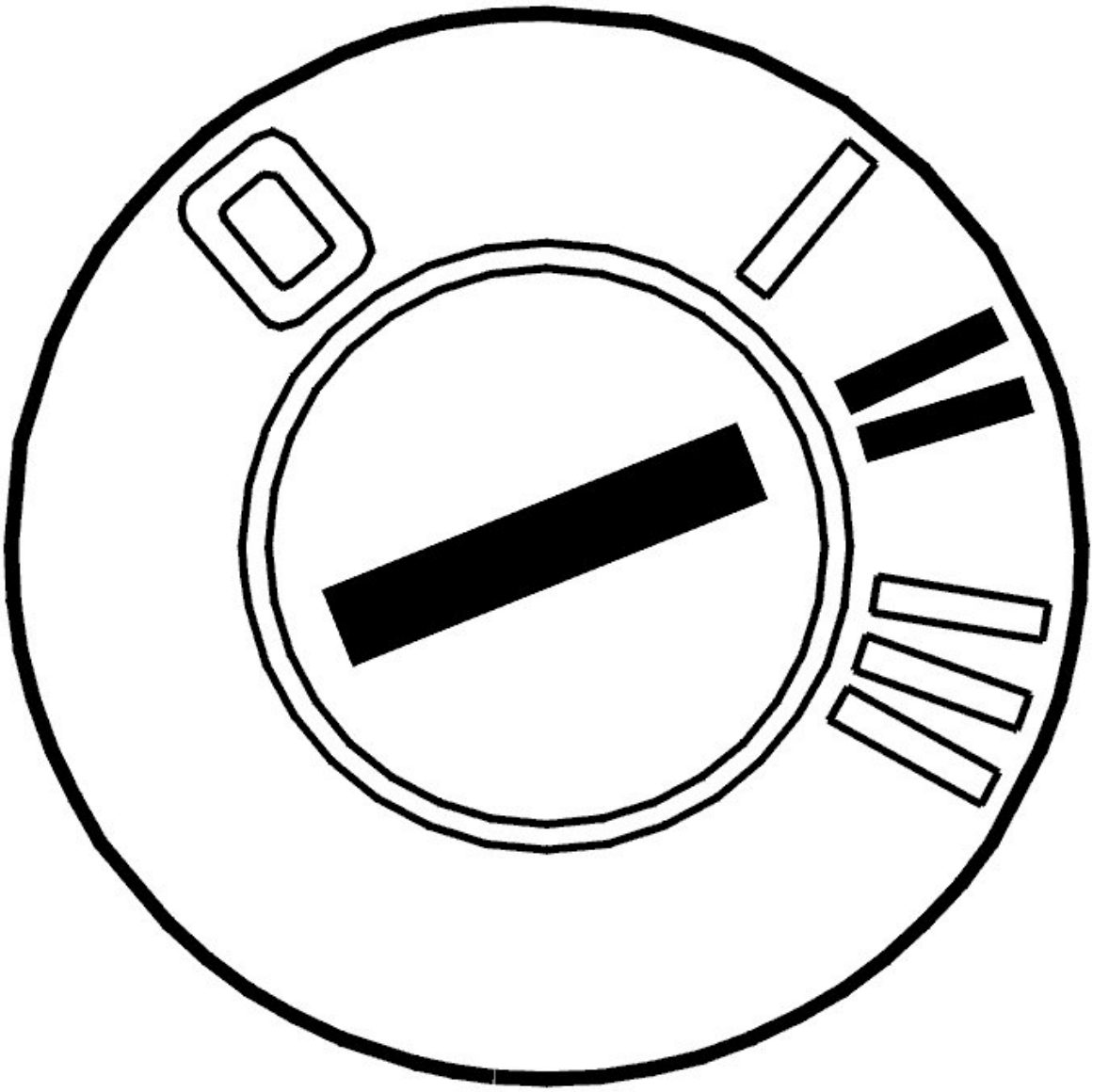
Continue - Verification

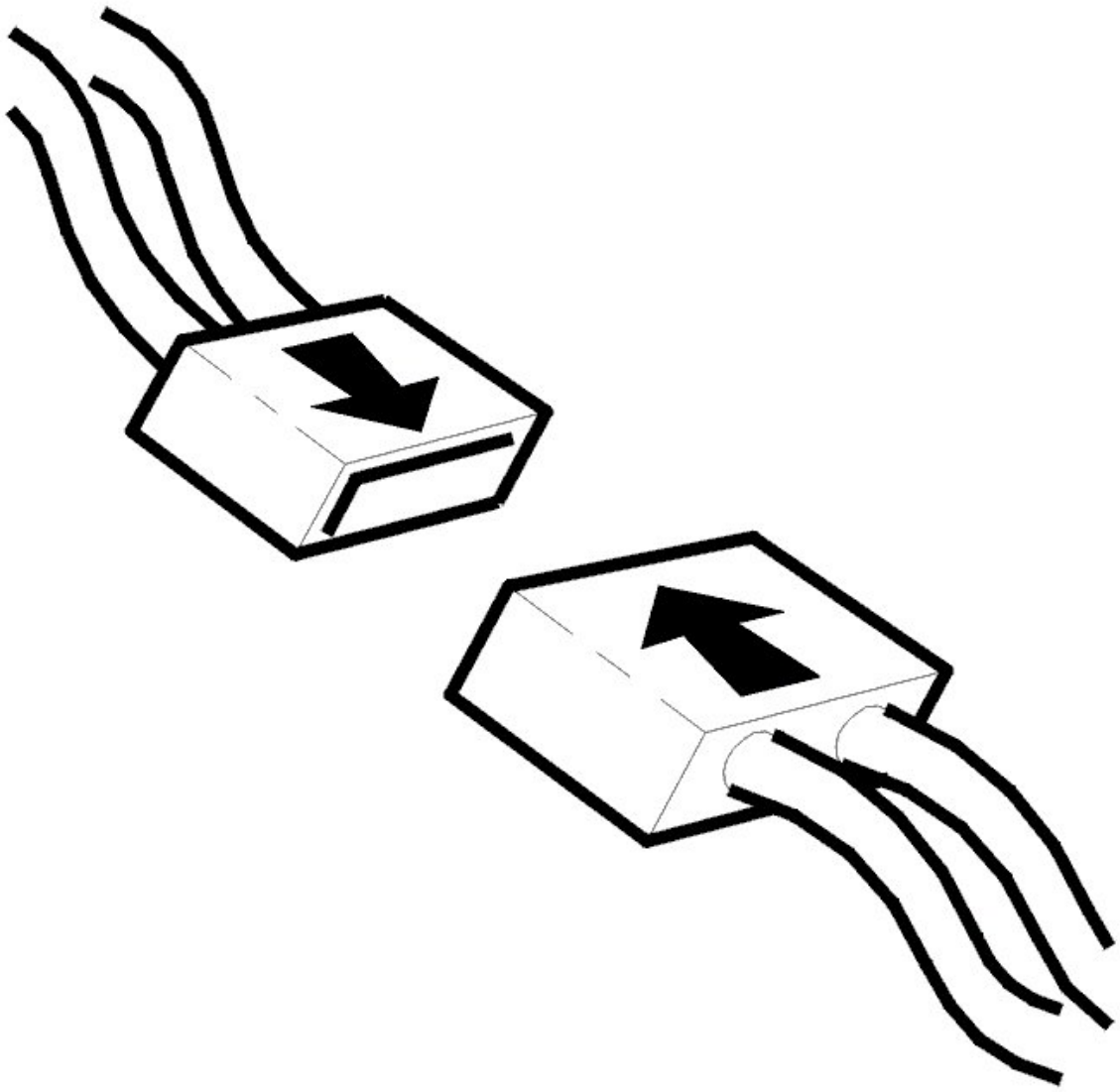
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the rear right reading lamp is on when the front right reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- The signal wire for the rear right reading lamp is short circuited to ground
- Intermittent open circuit on signal wire.

Fault symptom[s]
- Courtesy lighting does not work.

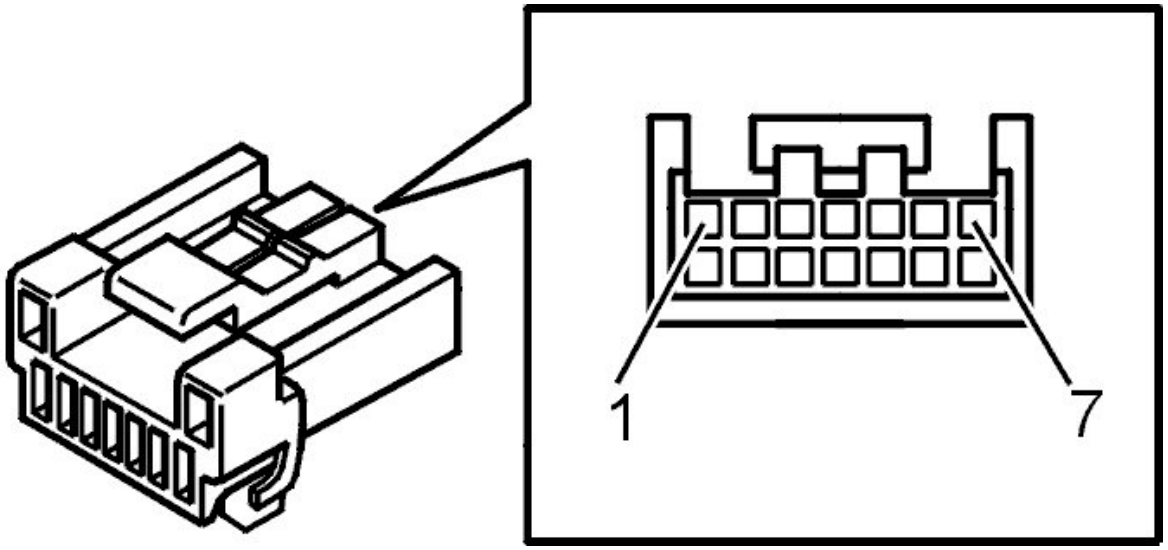
Signal Too Low

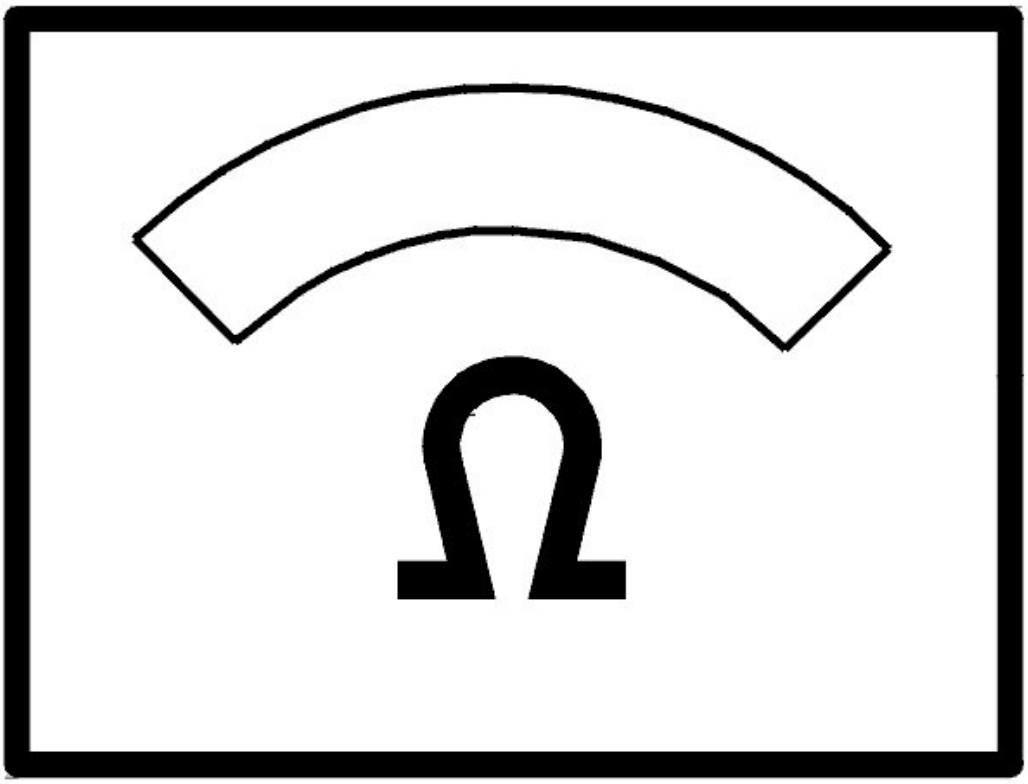
Signal too low

Checking the connectors

Check the connectors on the upper electronic module and rear reading lamp unit for contact resistance and oxidation as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and for a loose contact as described in Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.

Additional information:
- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.





Is there a fault?

Yes - Verification

No - Checking for open circuits and short circuits

Checking for open circuits and short circuits

Check the wire between the upper electronic module and the control unit of the rear reading lamp unit for a short circuit to ground, as described in

Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.
Remove the connector from the roof lamp unit and measure between the connector and the UEM as described below.

UEM-0030 Rear left reading lamp
Control unit #20 and reading lamp unit #1.

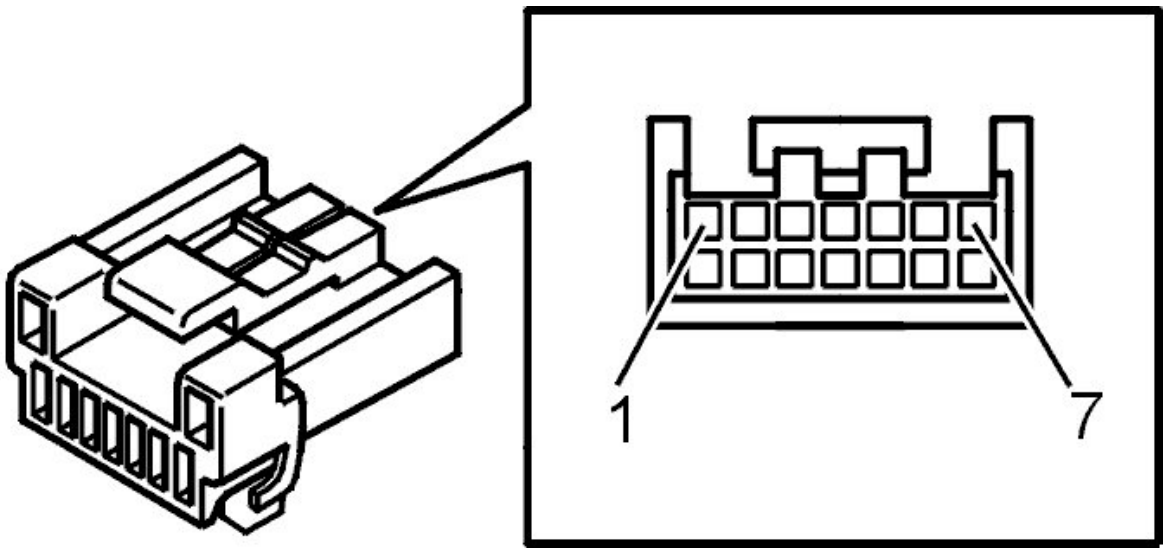
UEM-0032 Rear right reading lamp
Control unit #20 and reading lamp unit #7.
Check the wire between the upper electronic module and the control unit of the rear reading lamp unit for an open circuit, as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

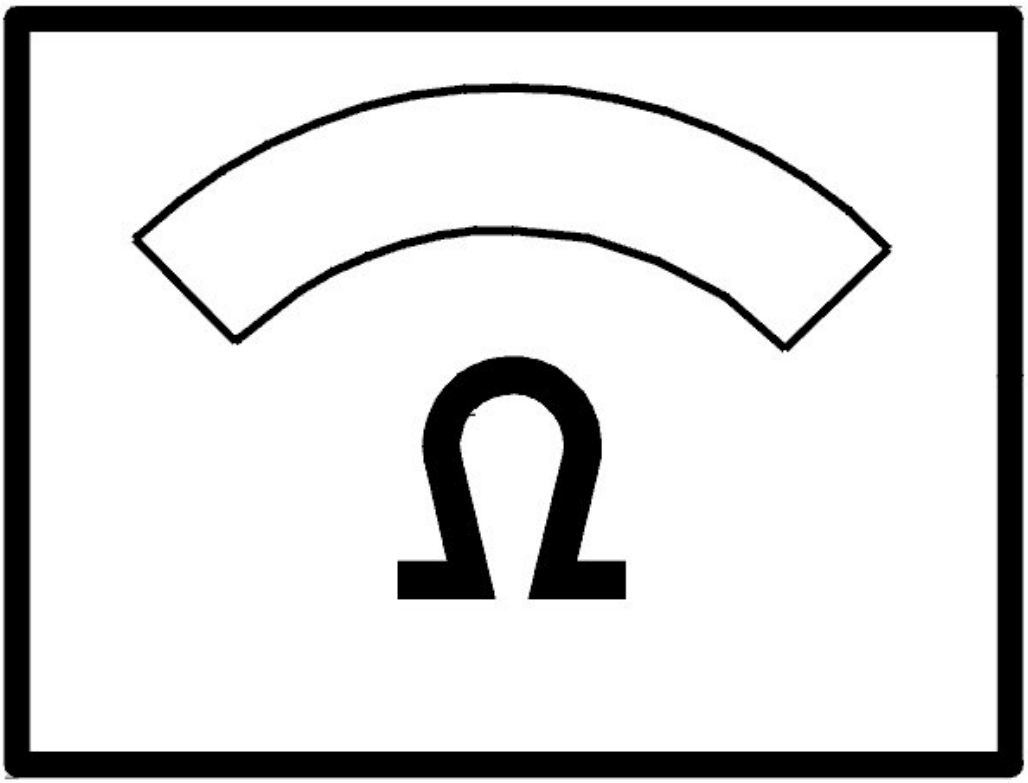
UEM-0030 Rear left reading lamp
Control unit #7 and reading lamp unit #1.

UEM-0032 Rear right reading lamp
Control unit #17 and reading lamp unit #7.
If a fault is found, replace the wire.
If the wire is OK, test with a new bulb.

Additional information:

- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To replace the bulb, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair.





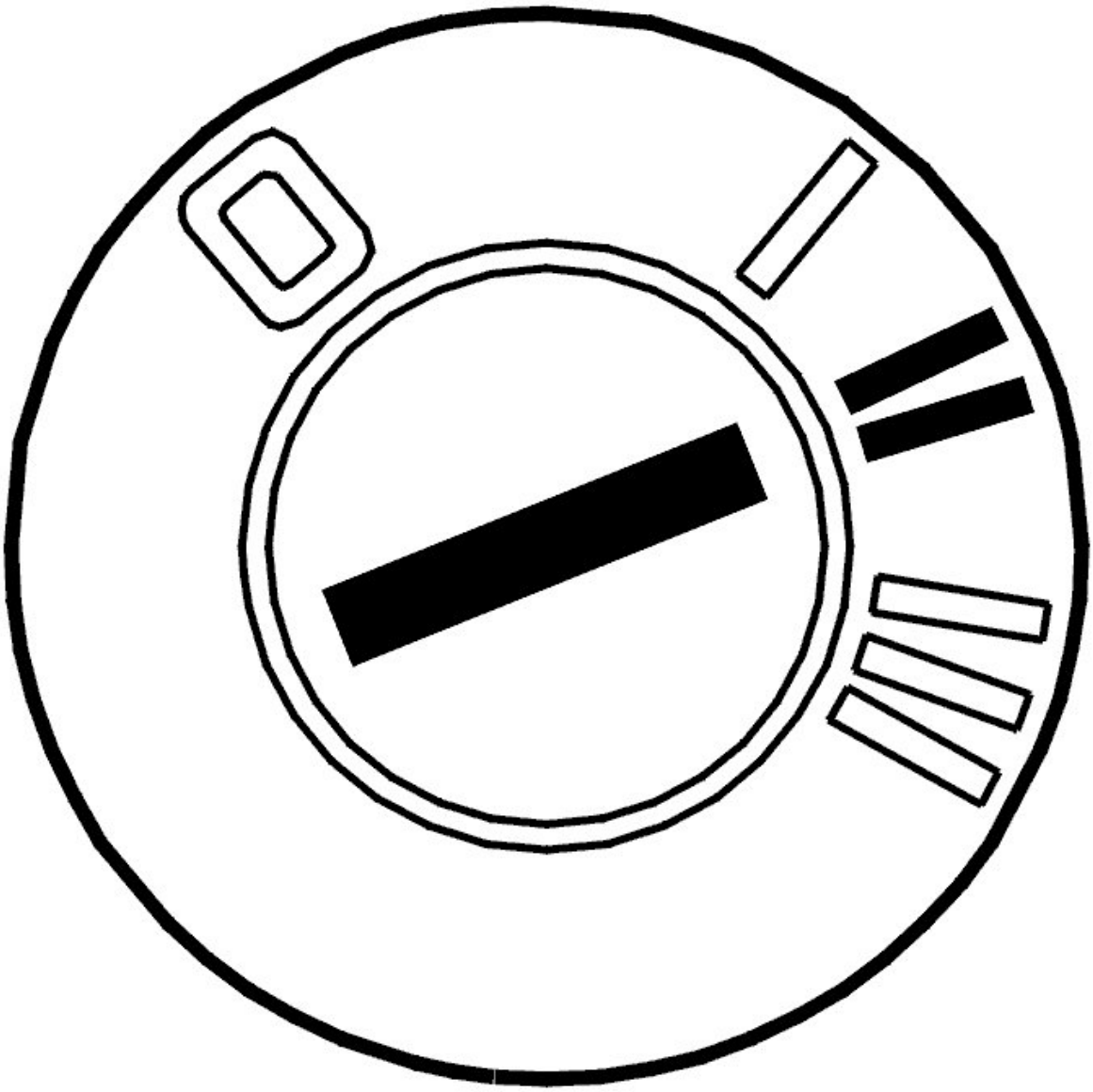
Continue - Verification

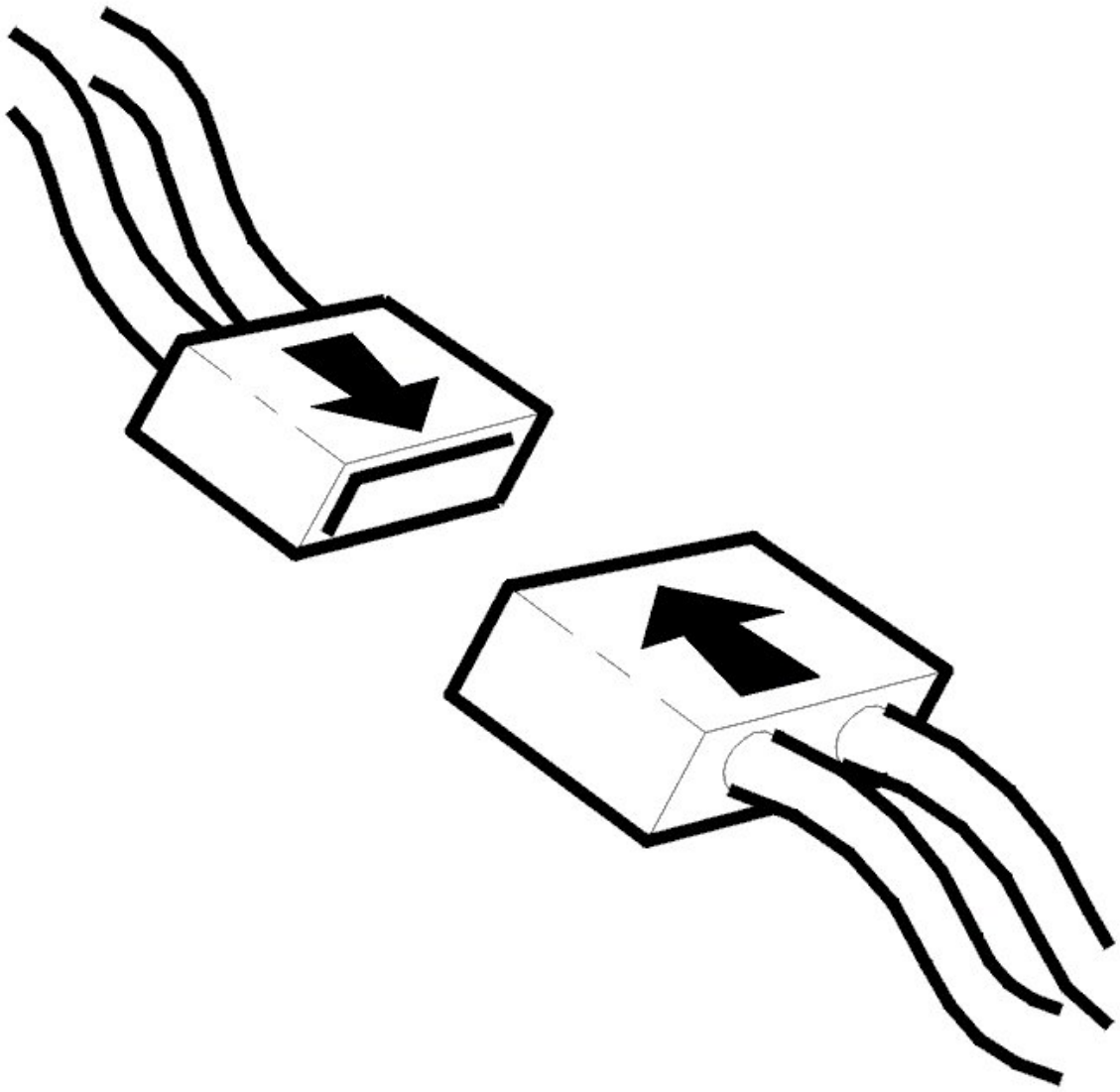
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the rear right reading lamp is on when the front right reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- Open circuit in signal wire for rear right reading lamp.
- Short circuit to voltage supply on signal wire for rear right reading lamp.

Fault symptom[s]
- Courtesy lighting does not work.

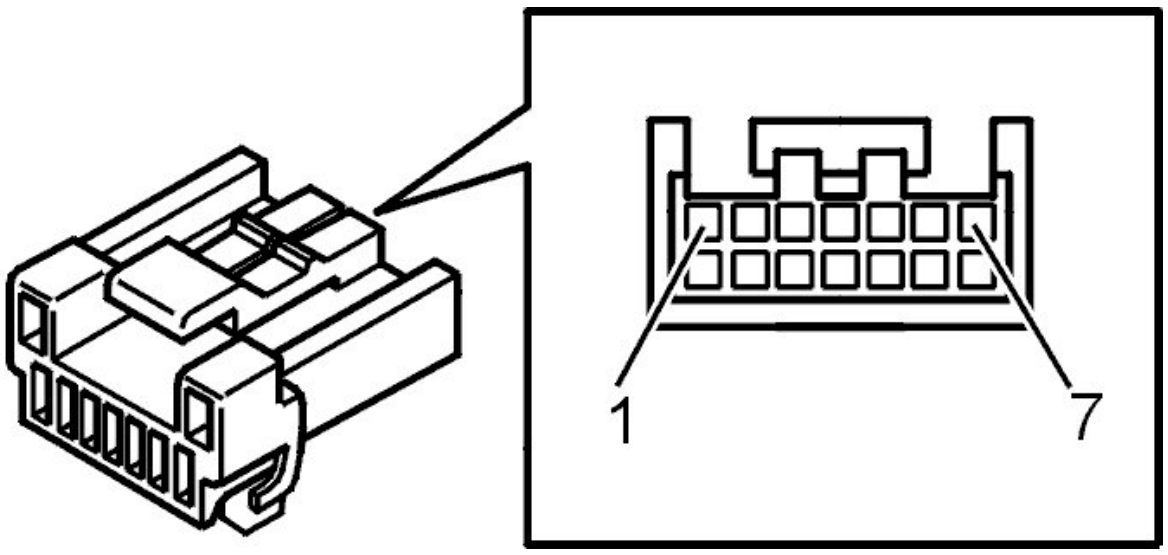
Signal Missing

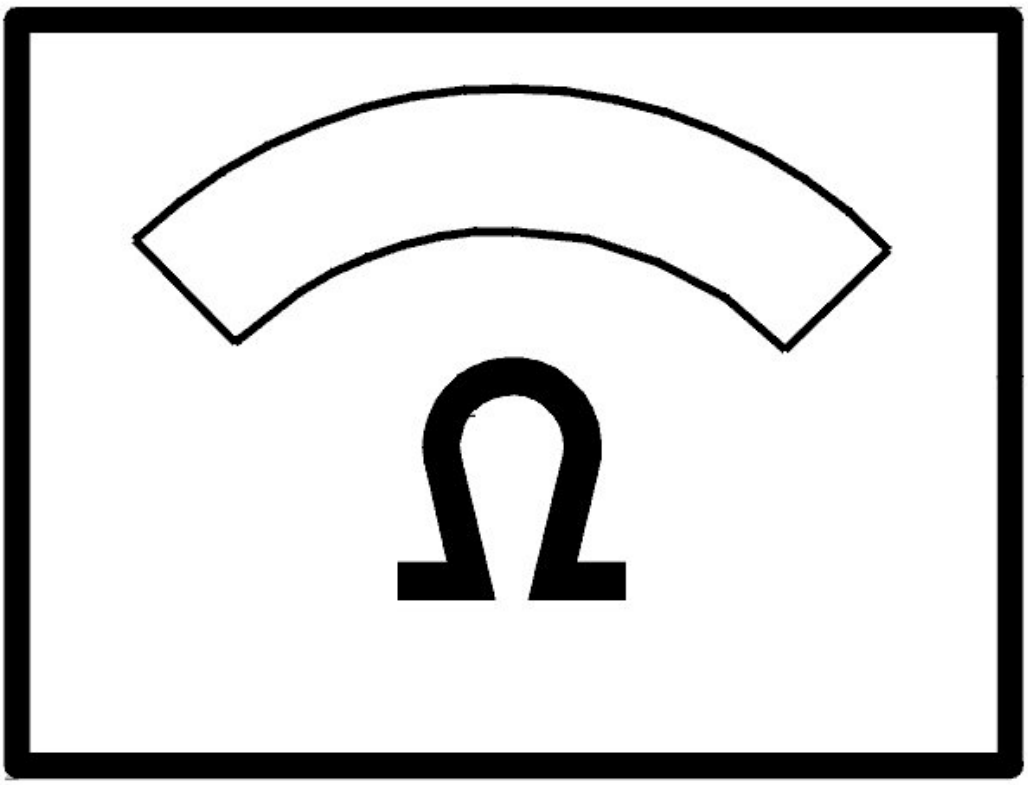
Signal missing

Checking the connectors

Check that the bulb is intact.
Check the connectors on the upper electronic module and rear reading lamp unit for contact resistance and oxidation as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and a loose contact as described in Checking wiring and terminals. Intermittent faults See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Intermittent Faults.
Do the necessary corrective action.

Additional information:
- To access/replace the lamp, see Bulb, reading lamp, rear, replacing See: Lighting and Horns/Dome Lamp/Dome Lamp Bulb/Service and Repair.





Is there a fault?

Yes - Verification

No - Checking for open circuits and short circuits

Checking for open circuits and short circuits

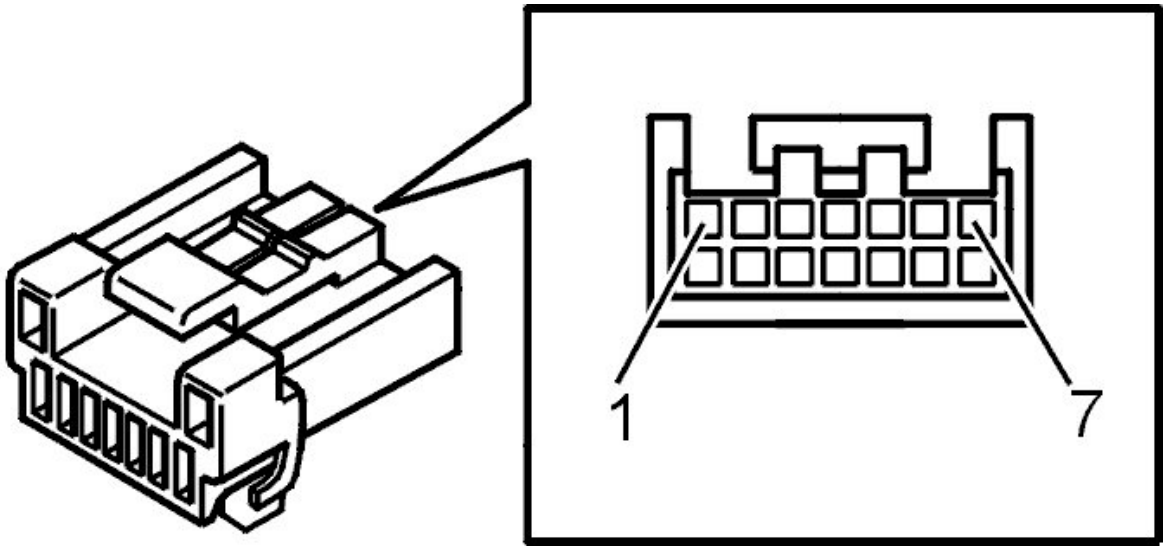
Check the wire between the upper electronic module and rear reading lamp unit for an open circuit as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault , and a short circuit to voltage supply as described in Checking wiring and terminals. Permanent fault See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring and Terminals. Permanent Fault.

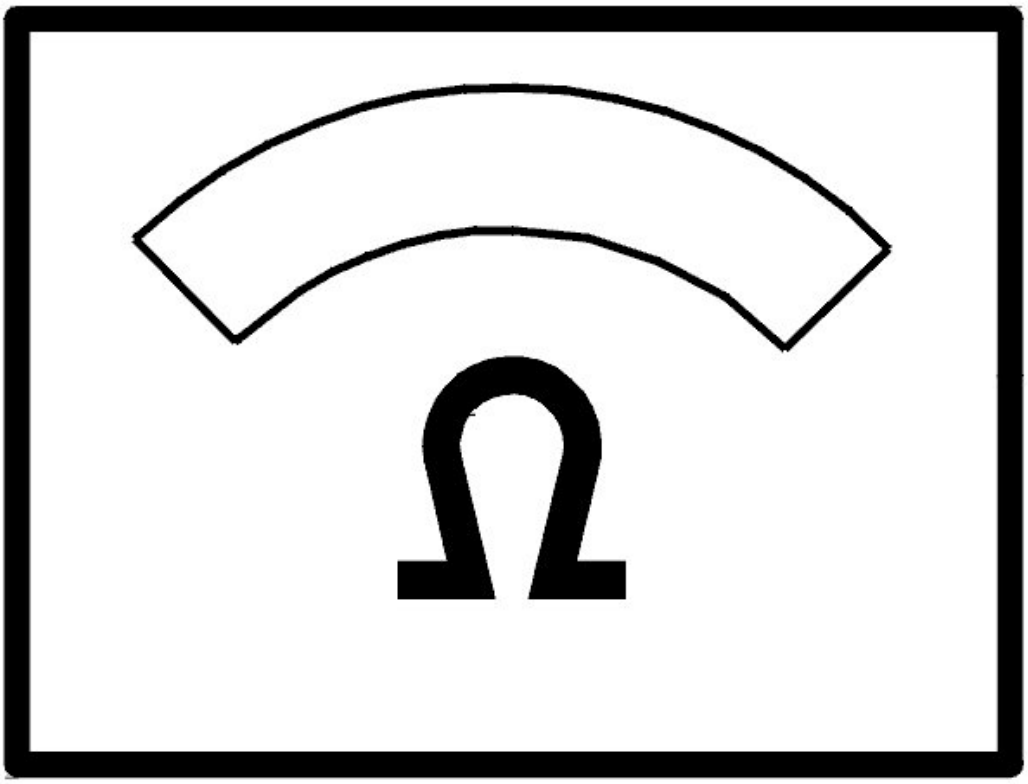
UEM-0031 Rear left reading lamp
Control unit #7 and reading lamp unit #1.

UEM-0033 Rear right reading lamp
Control unit #17 and reading lamp unit #7.

Additional information:

- For information on signals and additional values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the test box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.





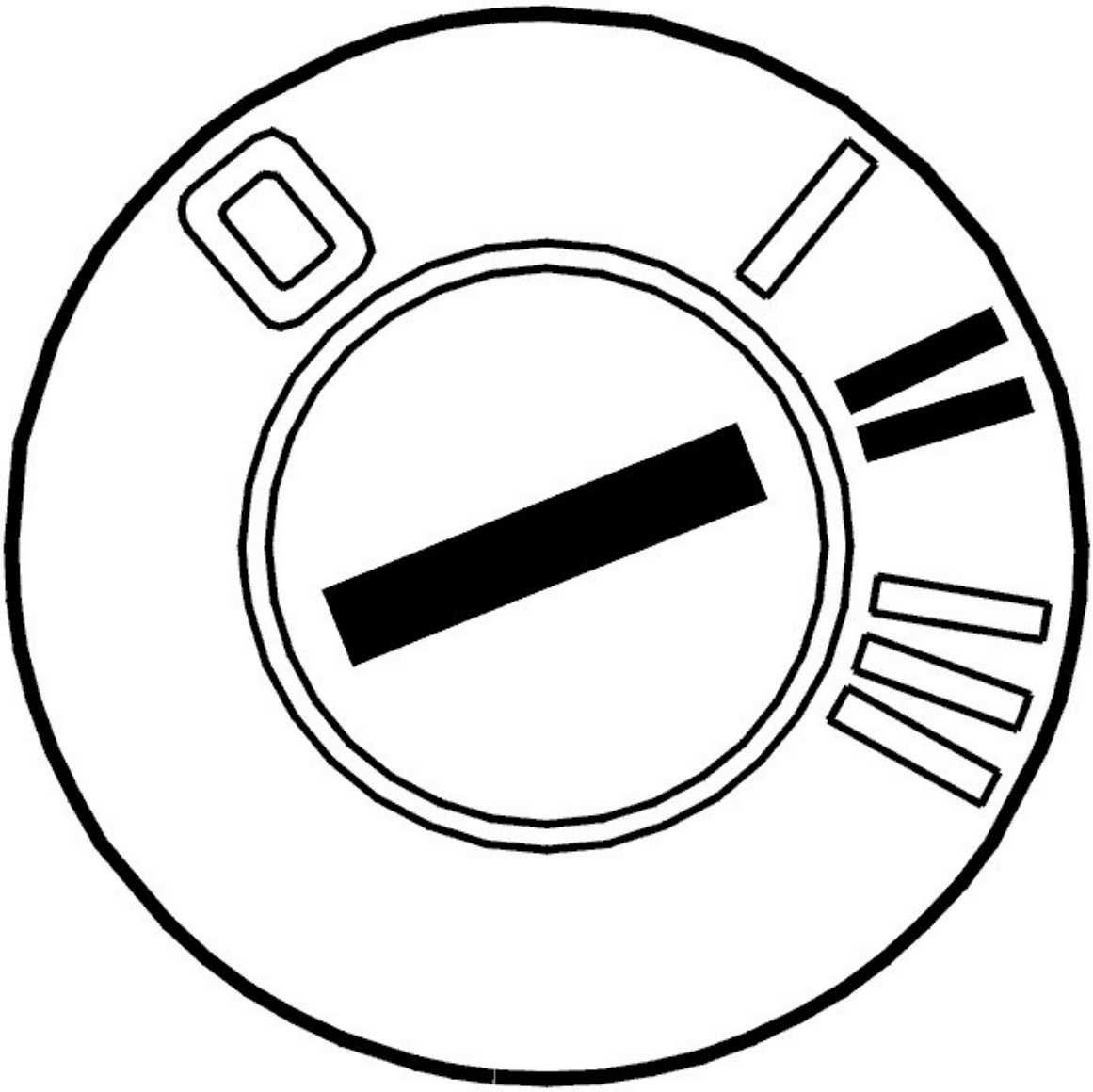
Continue - Verification

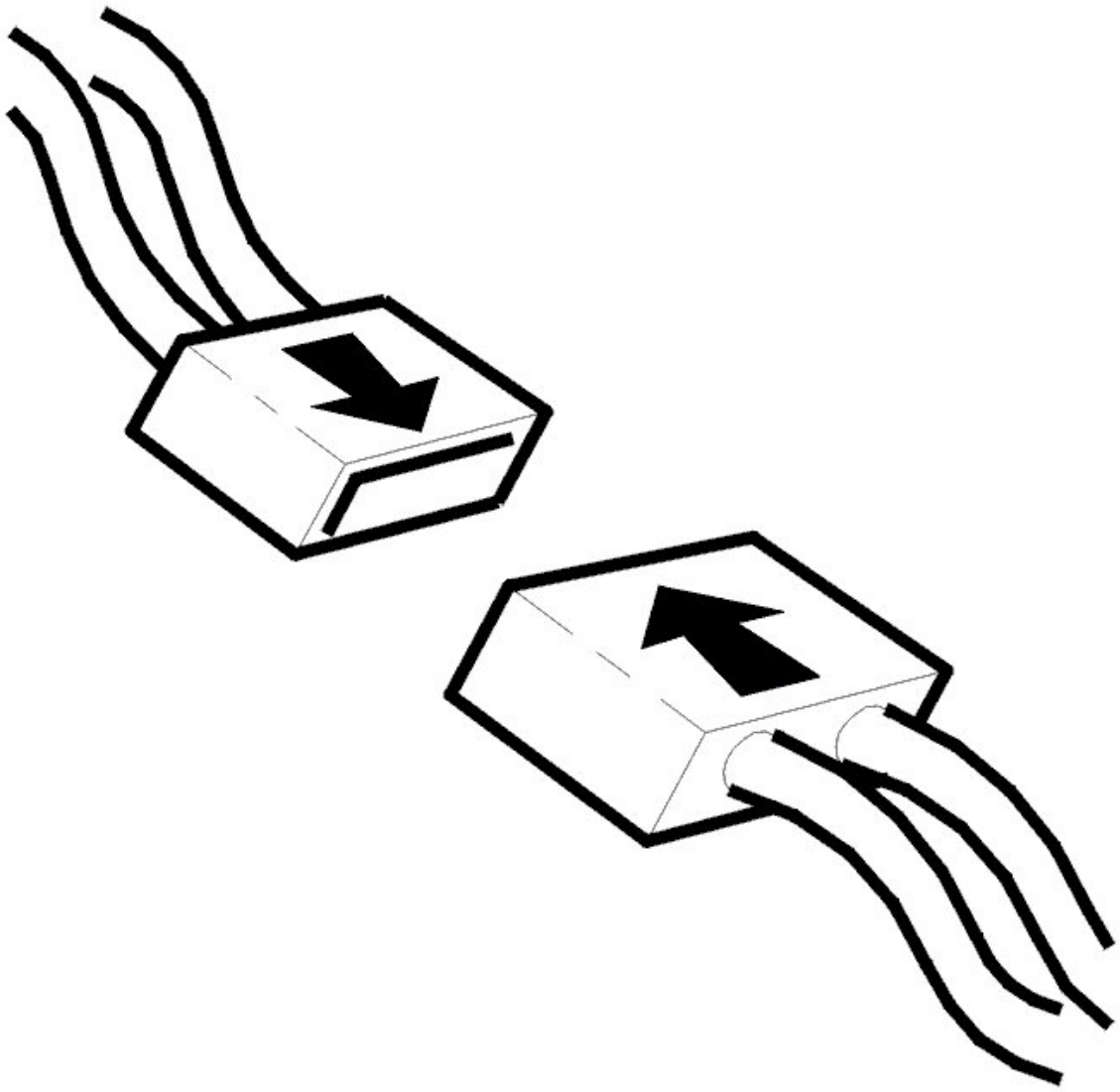
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the front left reading lamp is on when the rear left reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- The signal wire for the front left reading lamp is short circuited to ground
- Intermittent open circuit on signal wire.

Fault symptom[s]
- Courtesy lighting does not work.

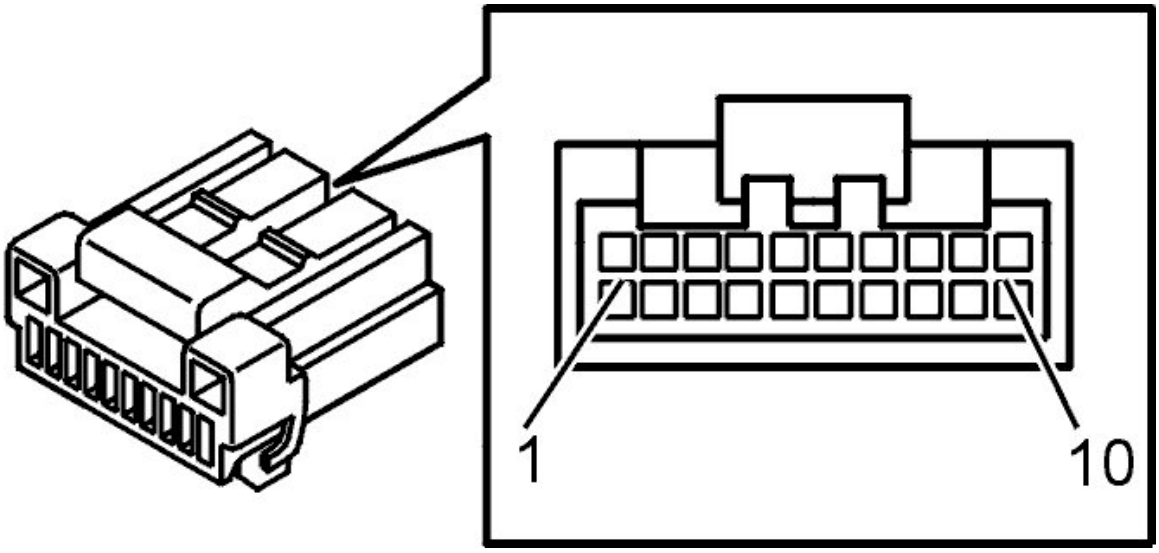
Signal Too Low

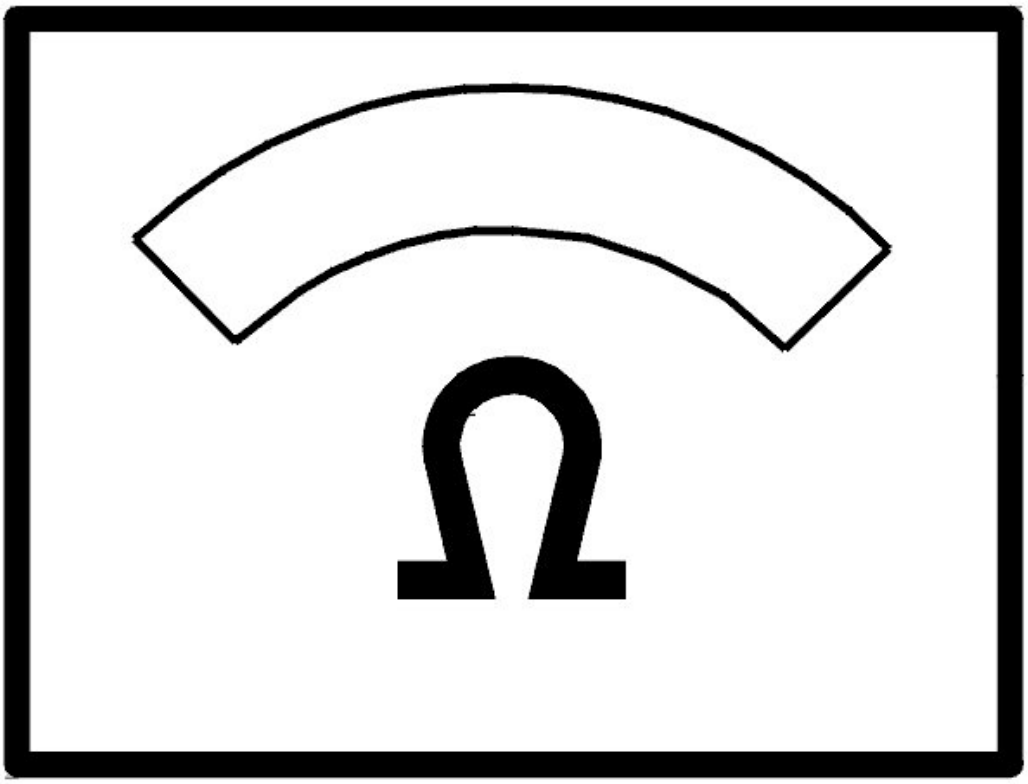
Signal too low

Checking the connectors

Check the control module and roof lamp module connectors. Check for contact resistance and oxidation. Check for loose connections.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the roof lamp module, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the control module and the roof lamp unit. Check for a short-circuit to ground.

Remove the connector from the roof lamp module and measure between the connector and the upper electronic module (UEM) as follows.

UEM-0034 Left front reading lamp

Control module terminal #20 and roof lamp module terminal #3A.

UEM-0036 Right front reading lamp

Control module terminal #20 and roof lamp module terminal #4A.
Check the cable between the control module and the roof lamp unit. Check for an open-circuit.

UEM-0034 Left front reading lamp

Control module terminal #18 and roof lamp module terminal #3A.

UEM-0036 Right front reading lamp

Control module terminal #6 and roof lamp module terminal #4A.
Replace the cable if a fault is found.
If the cable is OK, try a new bulb in the roof lamp module.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
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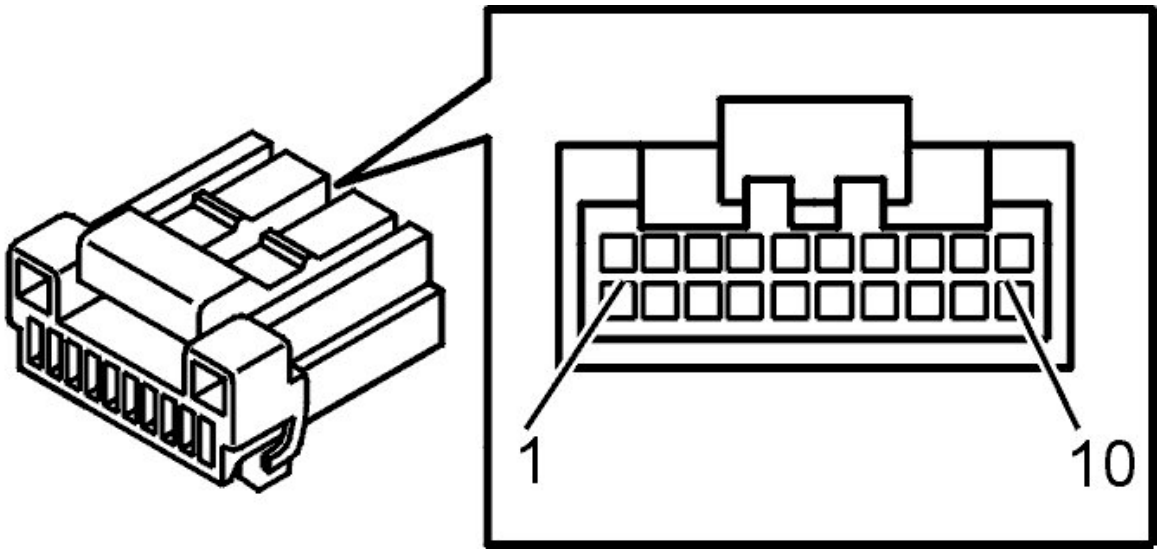
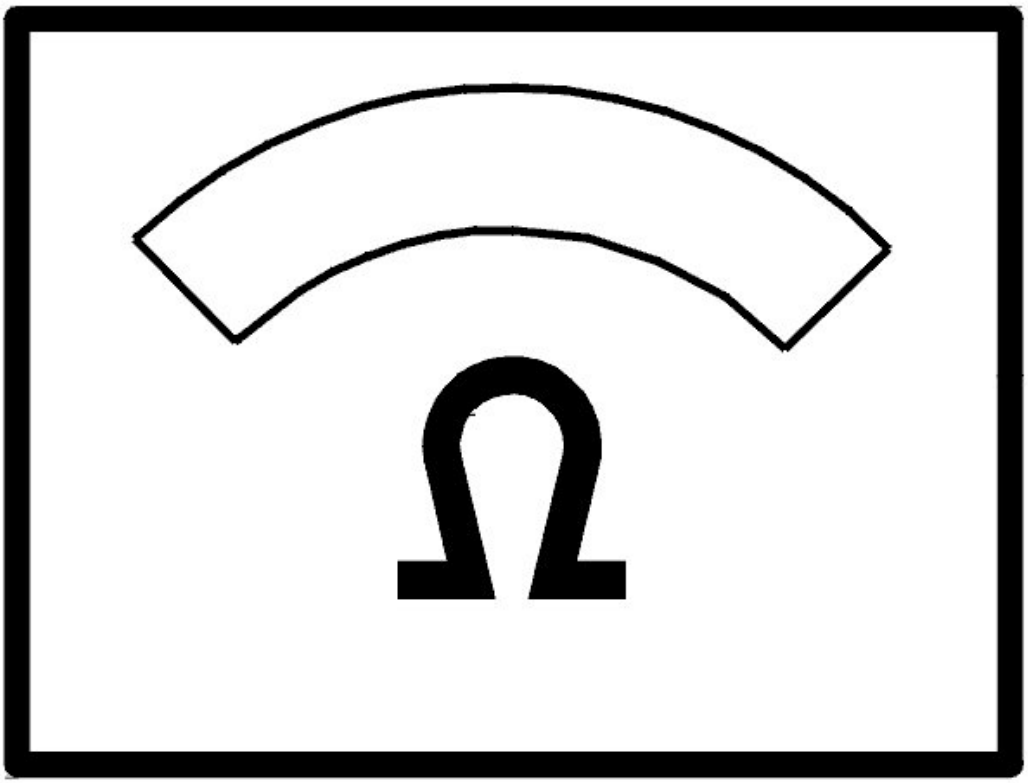
- To access or replace the lamp, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





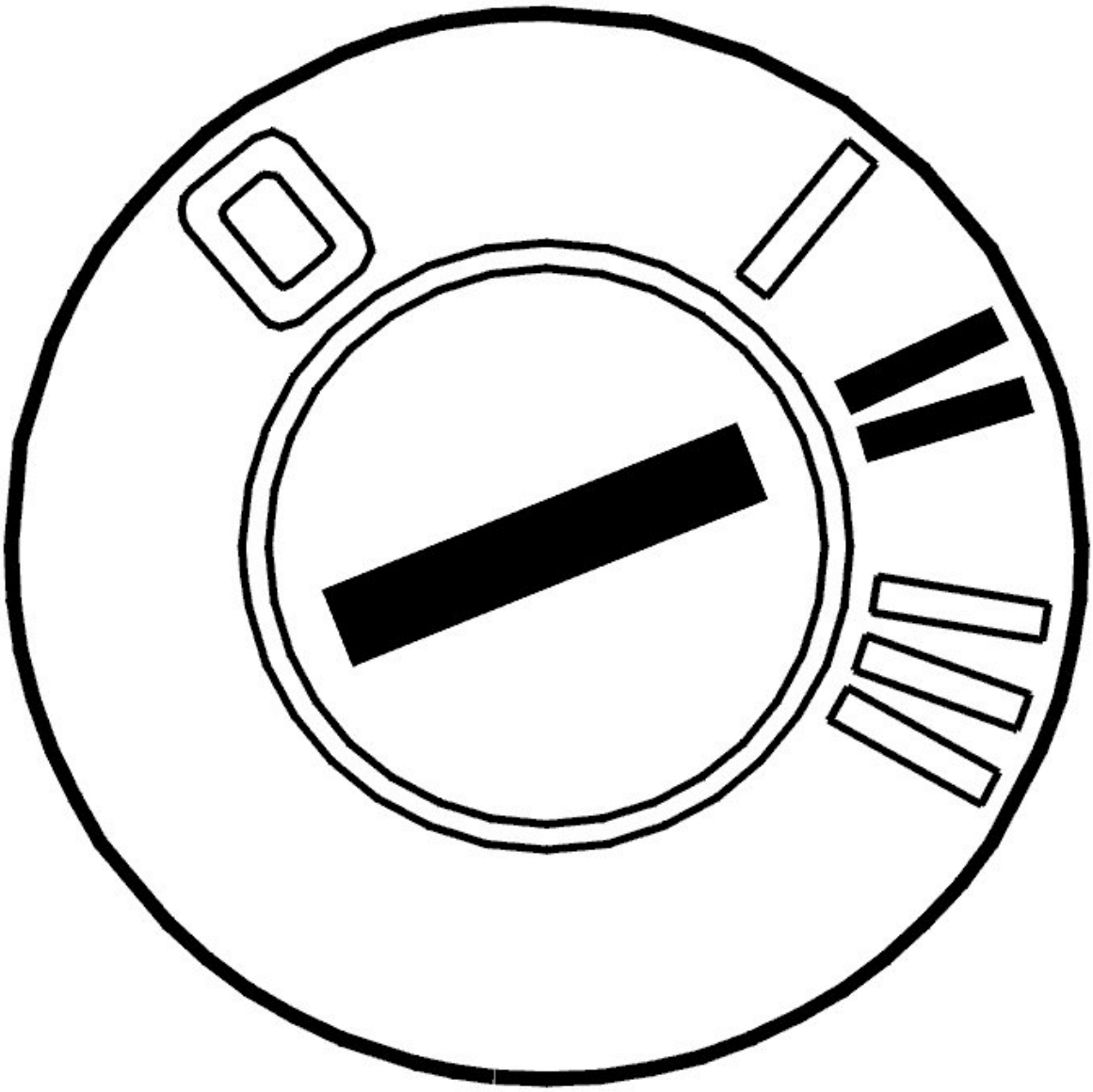
Continue - Verification

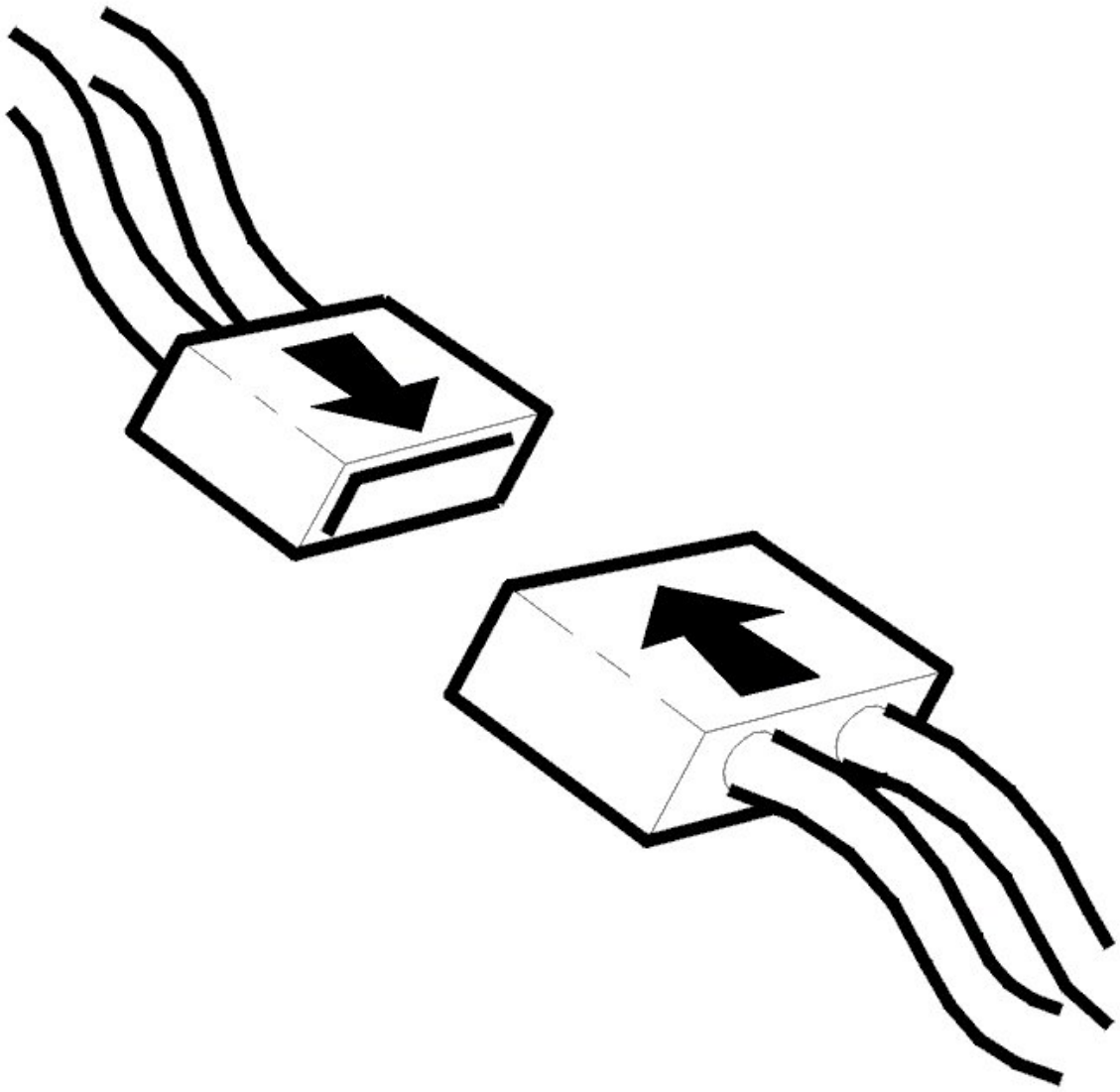
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the front left reading lamp is on when the rear left reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- Faulty bulb.
- Open circuit in signal wire for front left reading lamp.
- Short circuit to voltage supply on signal wire for front left reading lamp.

Fault symptom[s]
- Interior lighting does not work.

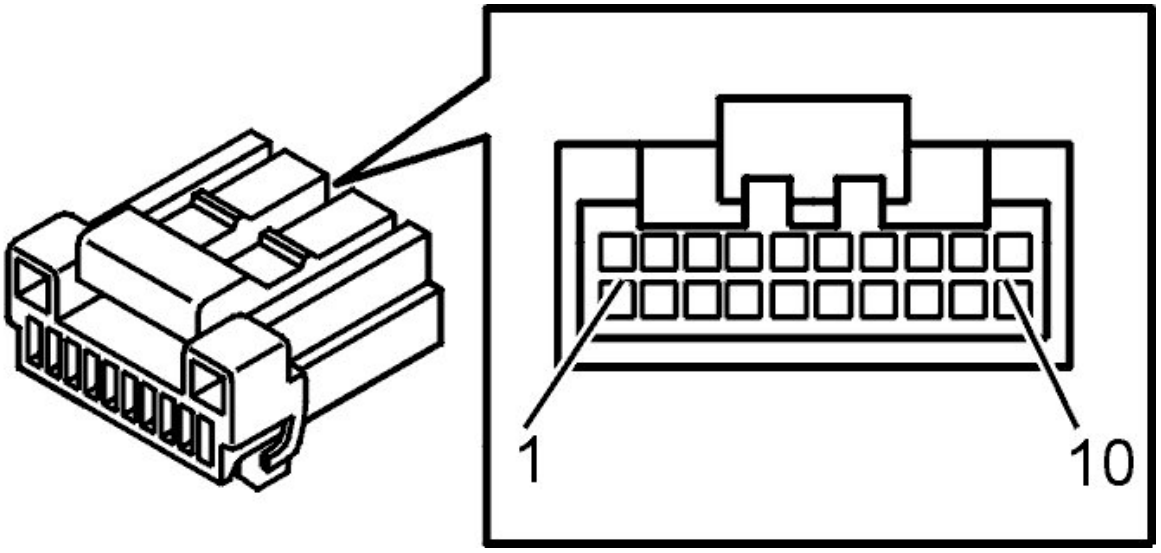
Signal Missing

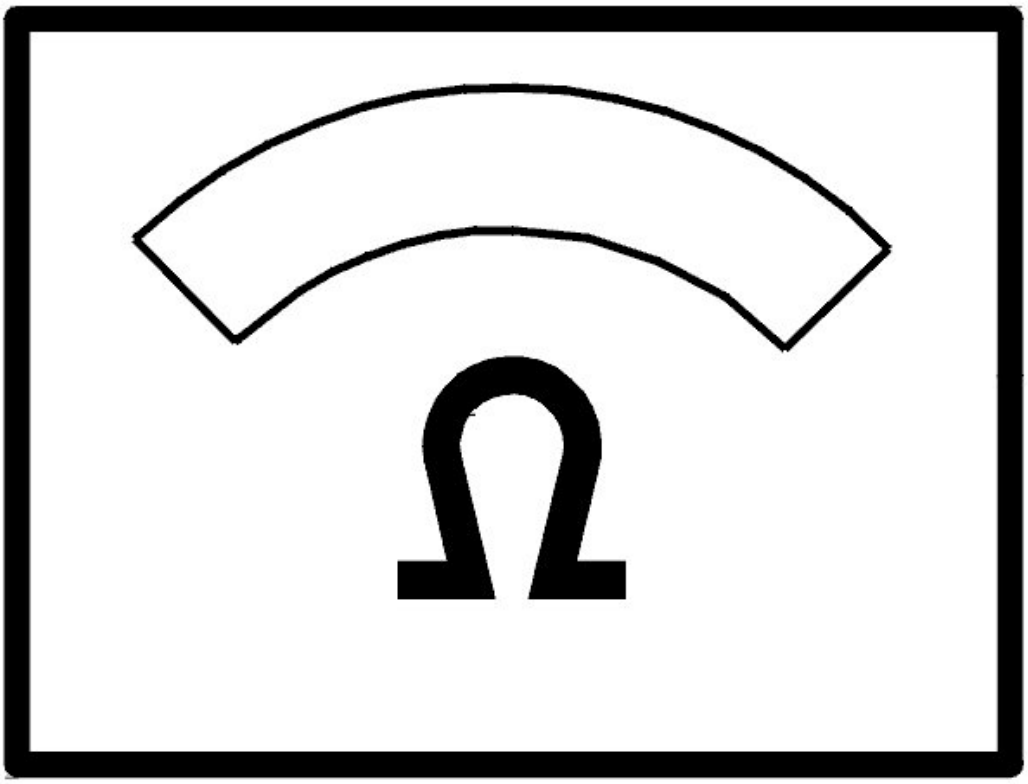
Signal missing

Checking the connectors

Check that the bulb is intact.
Check the connectors for the upper electronic module (UEM) and roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Remedy as necessary.

Other information:
- To access or replace the lamp, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the upper electronic module (UEM) and the roof lamp module. Check for an open-circuit. Check for a short-circuit to

supply voltage.

UEM-0035 Left front reading lamp

Control module terminal #18 and roof lamp module terminal #3A.

UEM-0037 Right front reading lamp

Control module terminal #6 and roof lamp module terminal #4A.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
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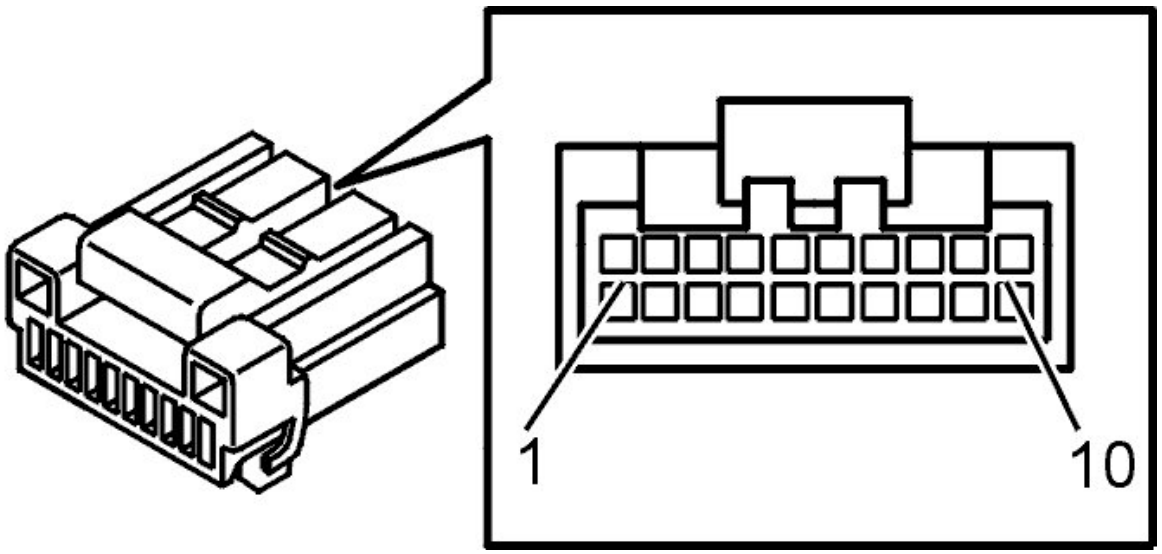
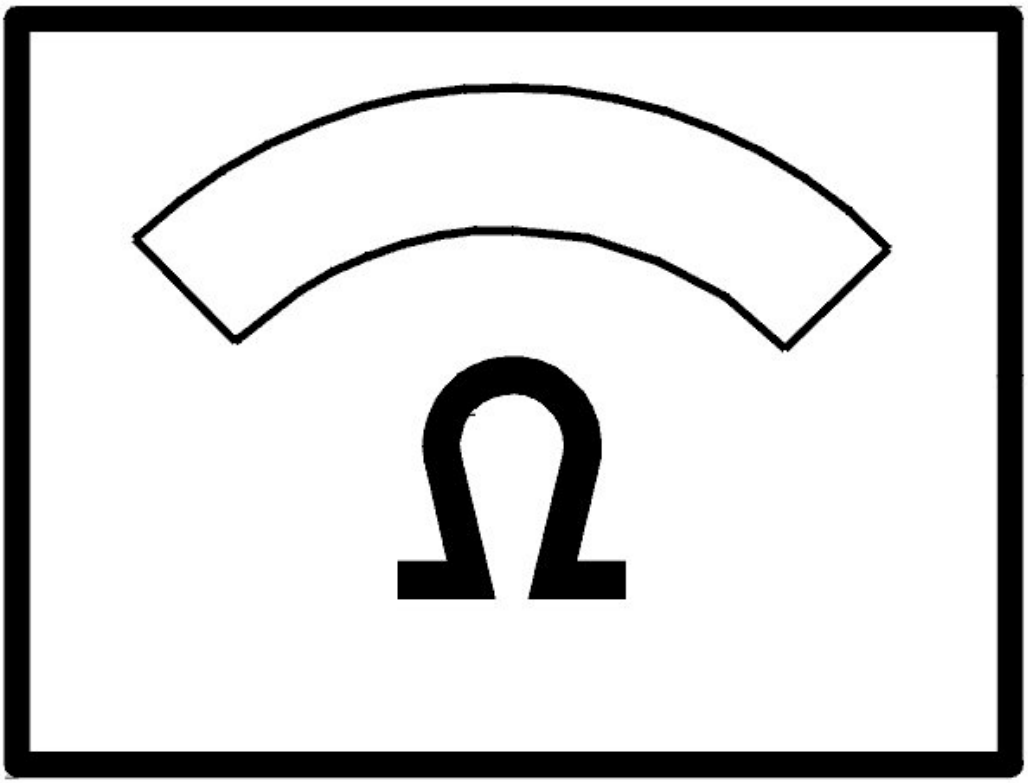




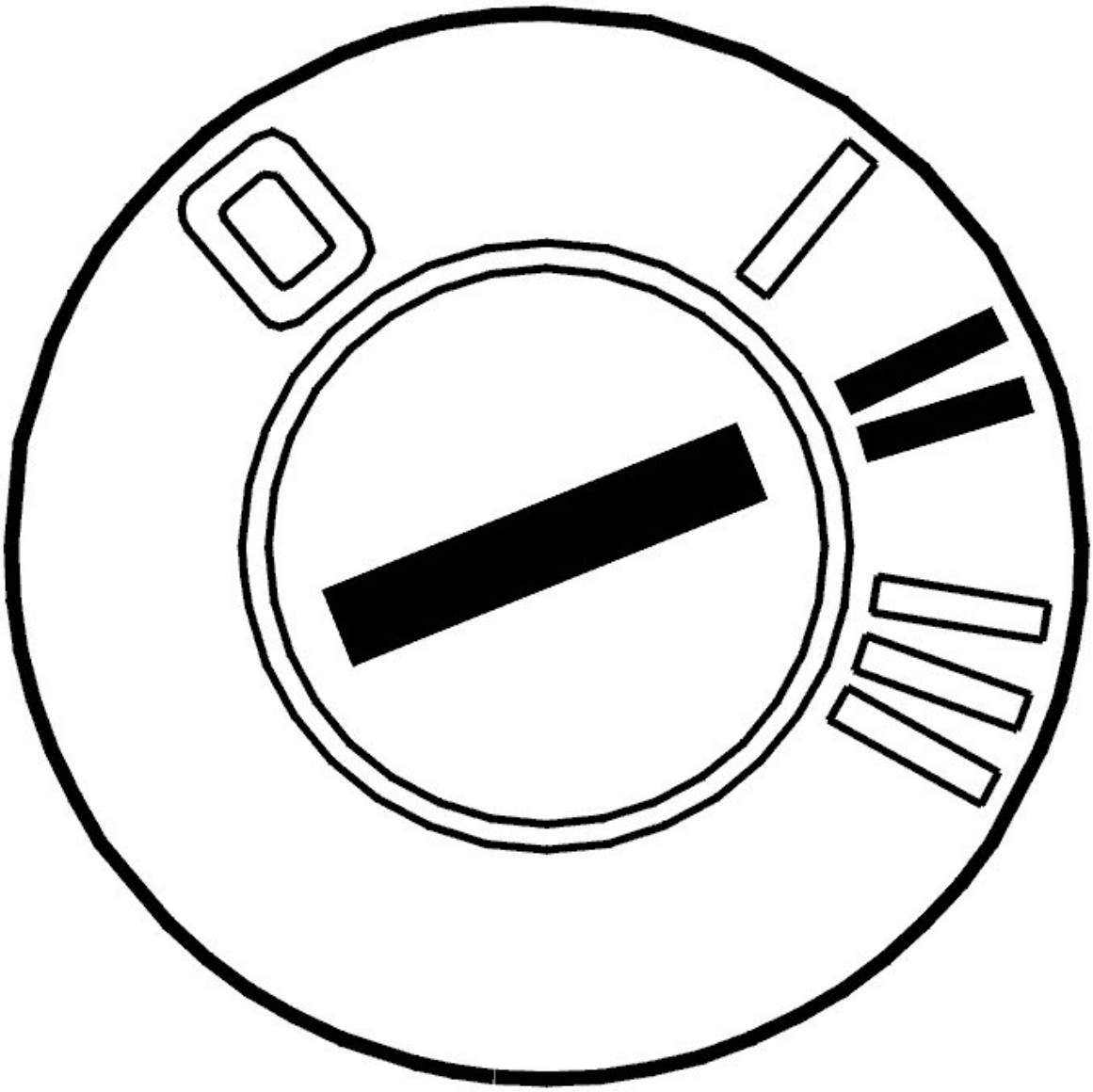
Continue - Verification

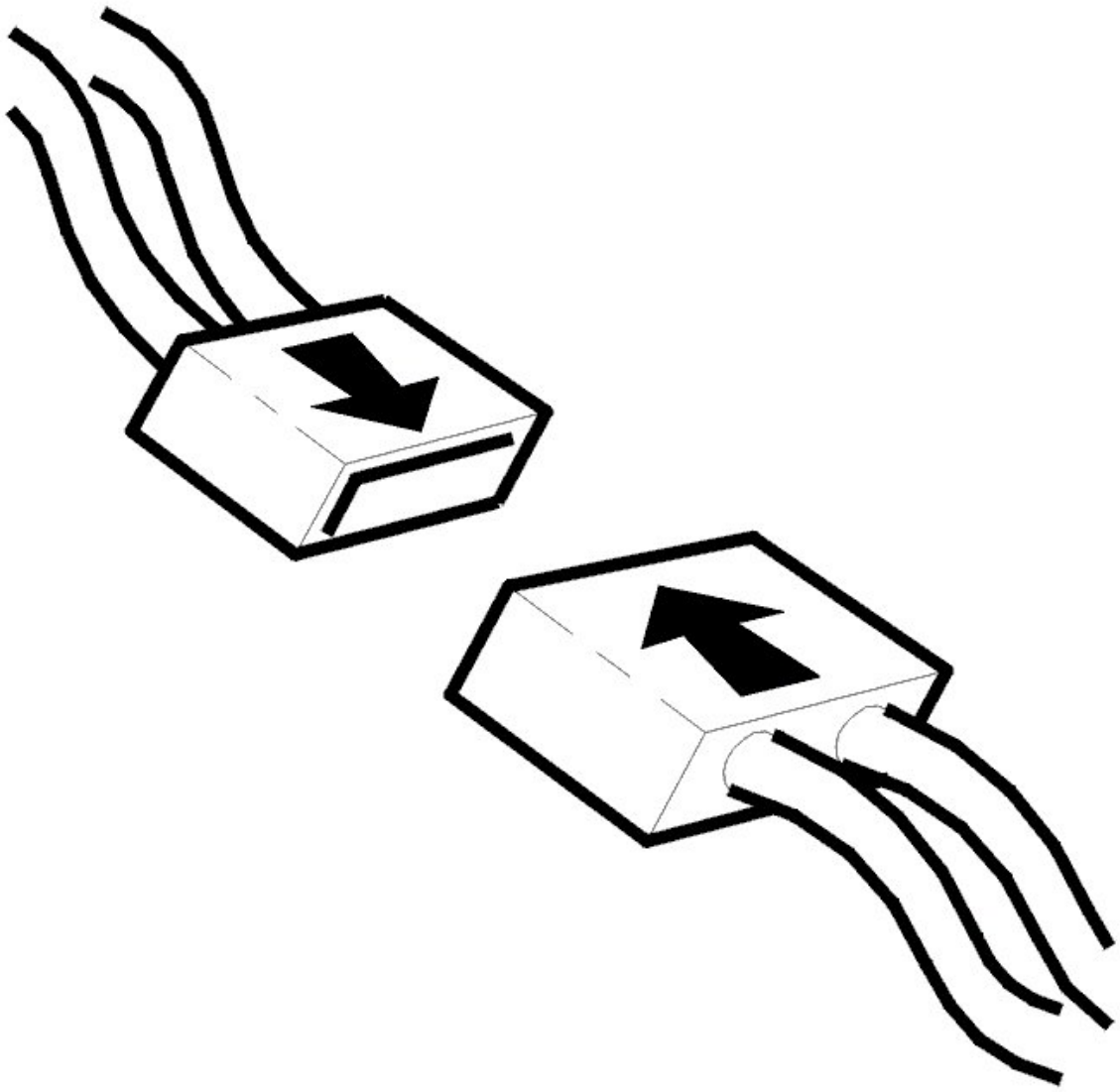
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the front right reading lamp is on at the same time as the rear right reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- The signal wire for the front right reading lamp is short circuited to ground
- Intermittent open circuit on signal wire.

Fault symptom[s]
- Courtesy lighting does not work.

Signal Too Low

Signal too low

Checking the connectors

Check the control module and roof lamp module connectors. Check for contact resistance and oxidation. Check for loose connections.

Other information:
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the roof lamp module, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
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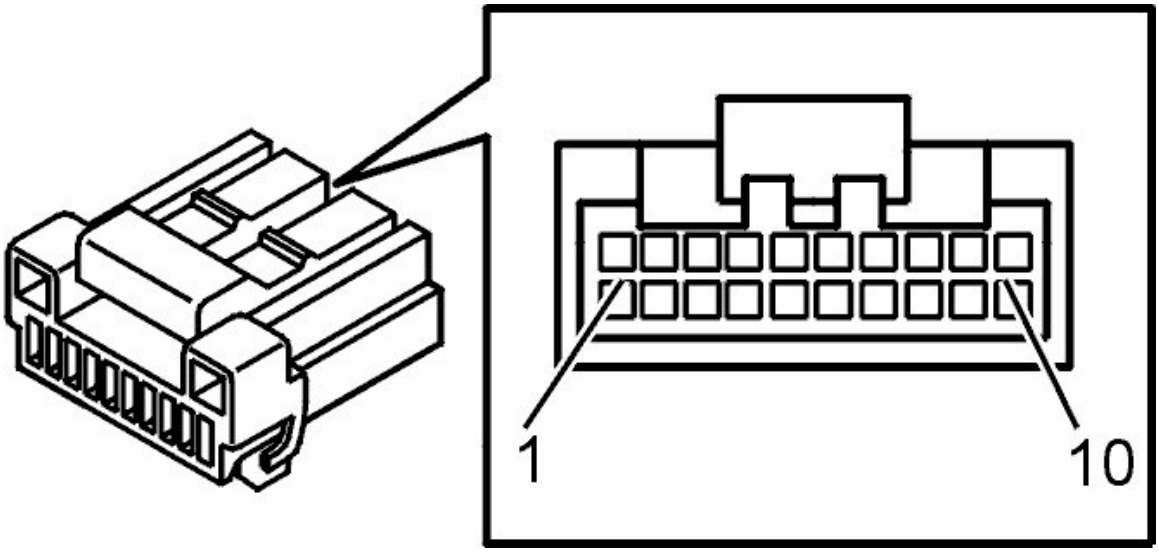

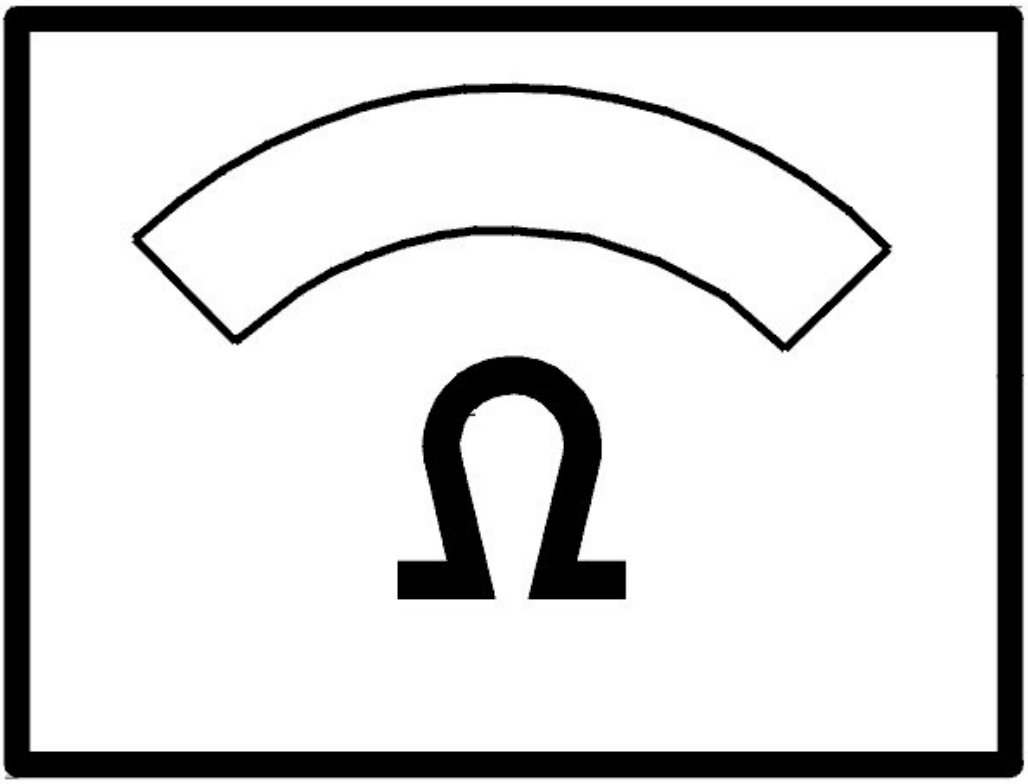

Was a fault detected?

Yes - Verification

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the control module and the roof lamp unit. Check for a short-circuit to ground.

Remove the connector from the roof lamp module and measure between the connector and the upper electronic module (UEM) as follows.

UEM-0034 Left front reading lamp

Control module terminal #20 and roof lamp module terminal #3A.

UEM-0036 Right front reading lamp

Control module terminal #20 and roof lamp module terminal #4A.
Check the cable between the control module and the roof lamp unit. Check for an open-circuit.

UEM-0034 Left front reading lamp

Control module terminal #18 and roof lamp module terminal #3A.

UEM-0036 Right front reading lamp

Control module terminal #6 and roof lamp module terminal #4A.
Replace the cable if a fault is found.
If the cable is OK, try a new bulb in the roof lamp module.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
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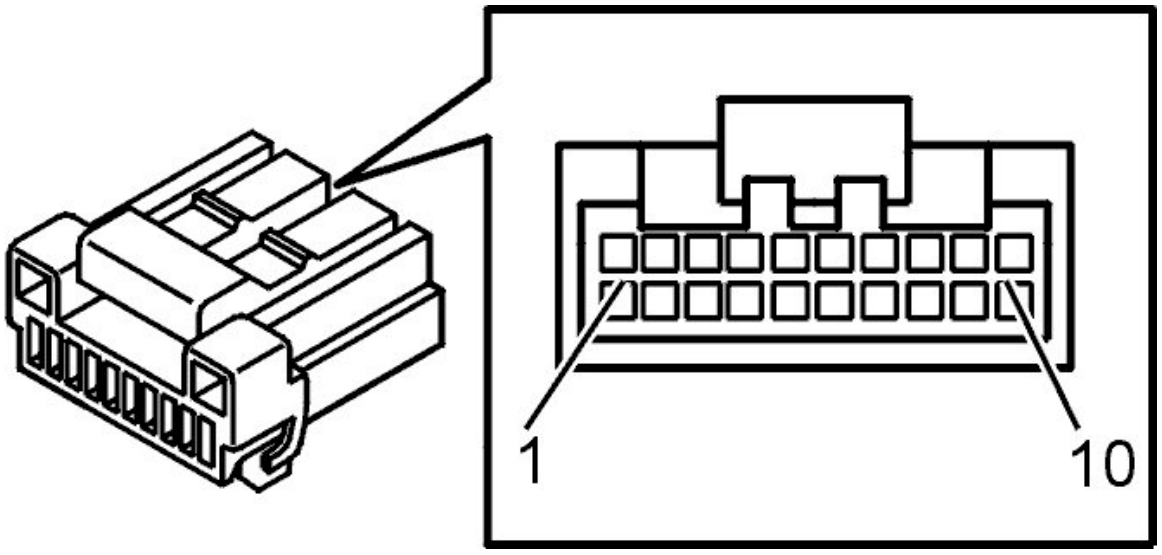
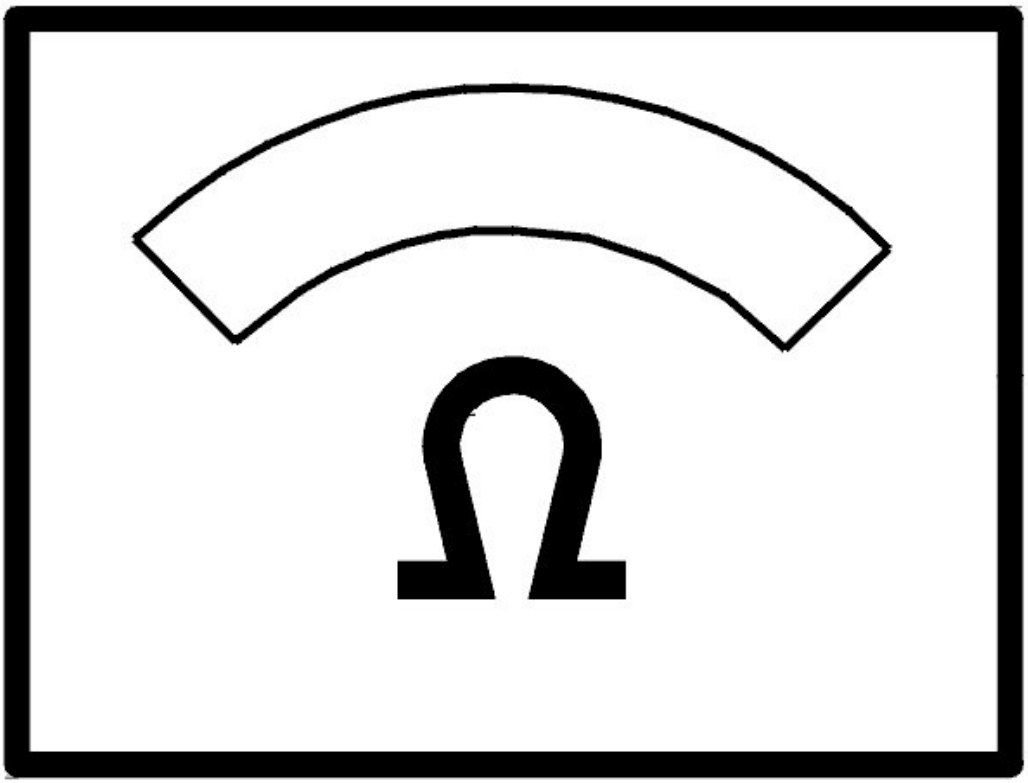
- To access or replace the lamp, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





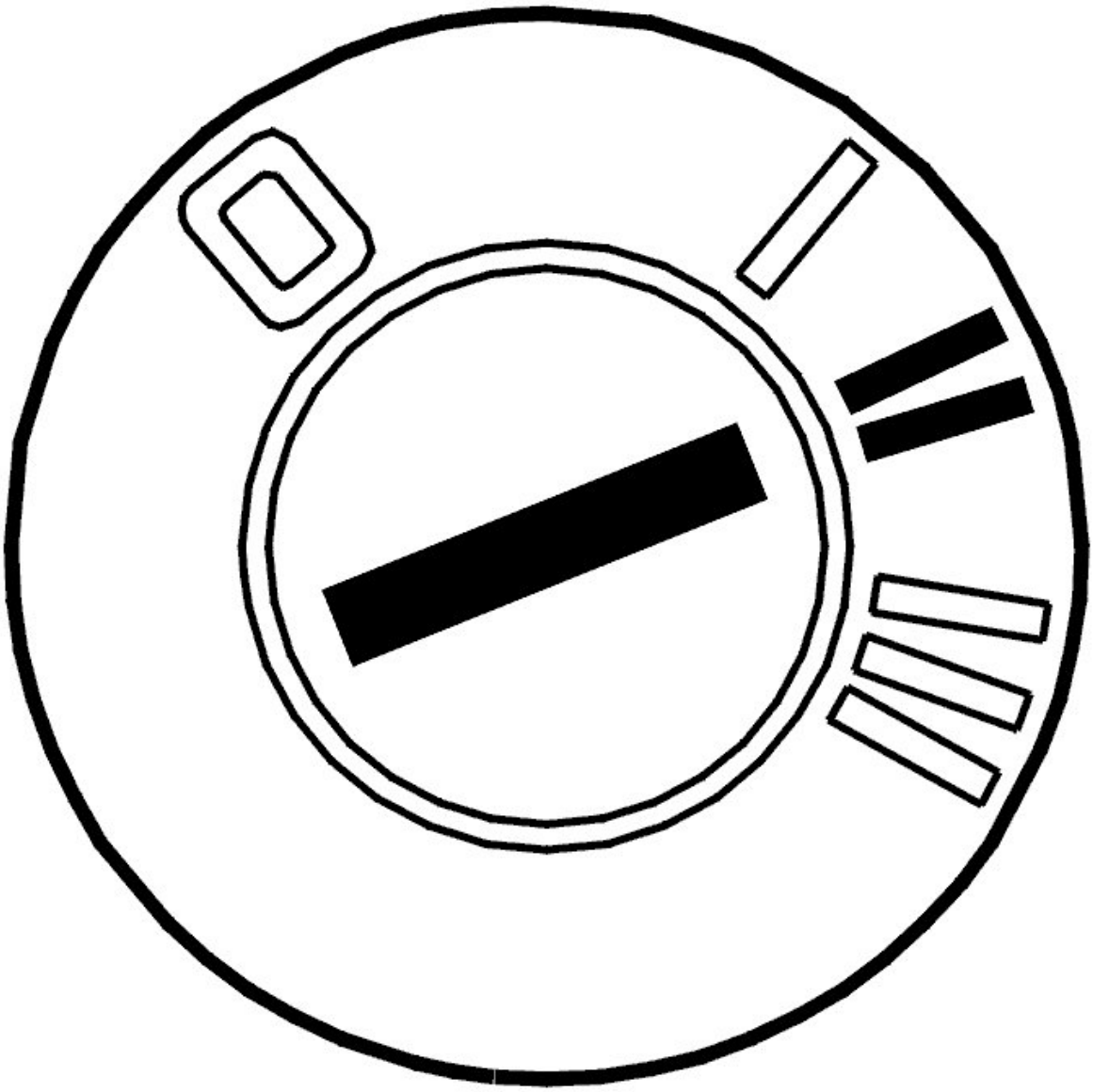
Continue - Verification

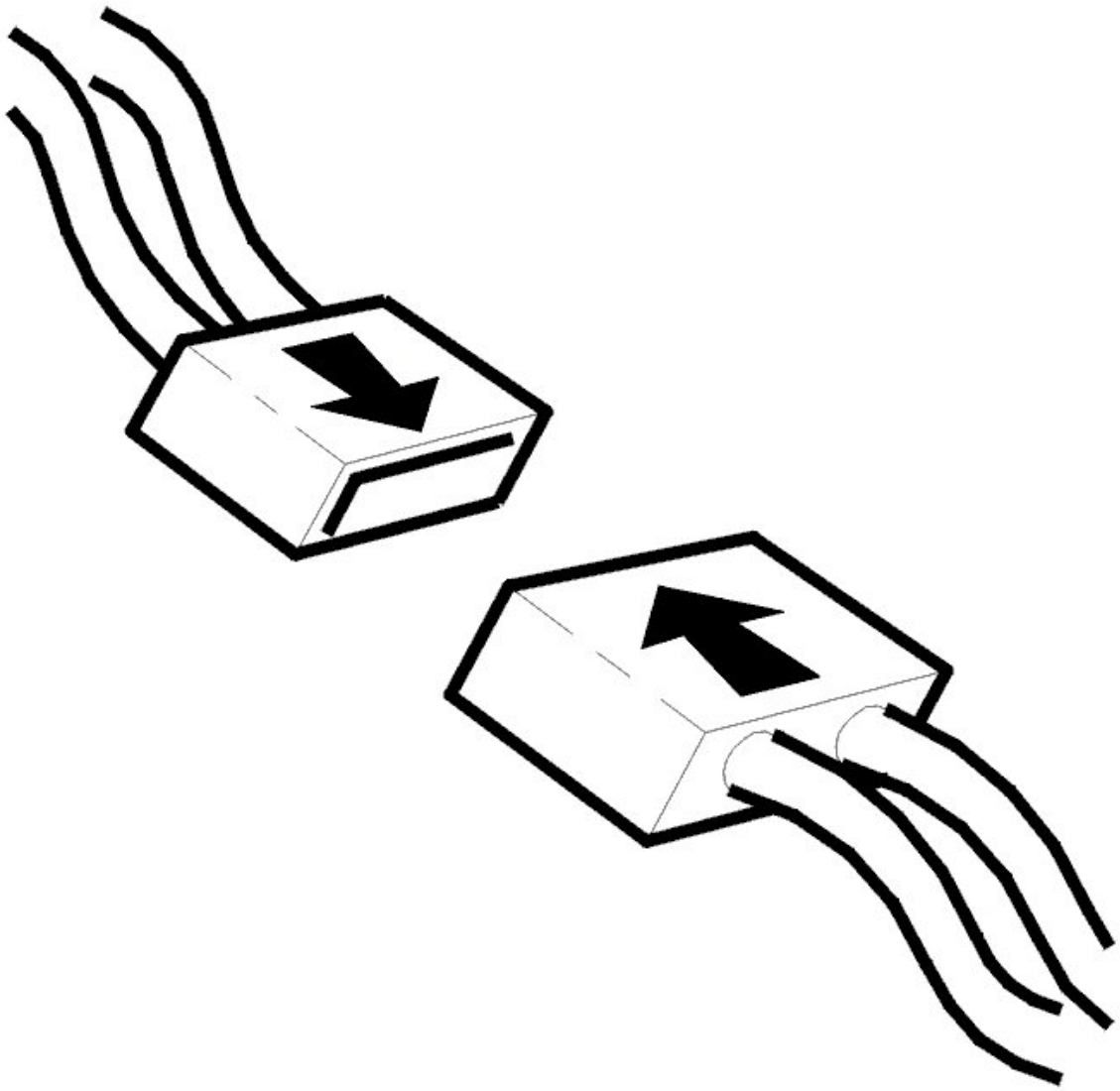
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that the front right reading lamp is on at the same time as the rear right reading lamp is off, a faulty control signal from the lamp circuit displays the diagnostic trouble code.

Substitute value
- The lamp goes off.

Possible source
- Open circuit in signal wire for front right reading lamp.
- Short circuit to voltage supply on signal wire for front right reading lamp.

Fault symptom[s]
- Courtesy lighting does not work.

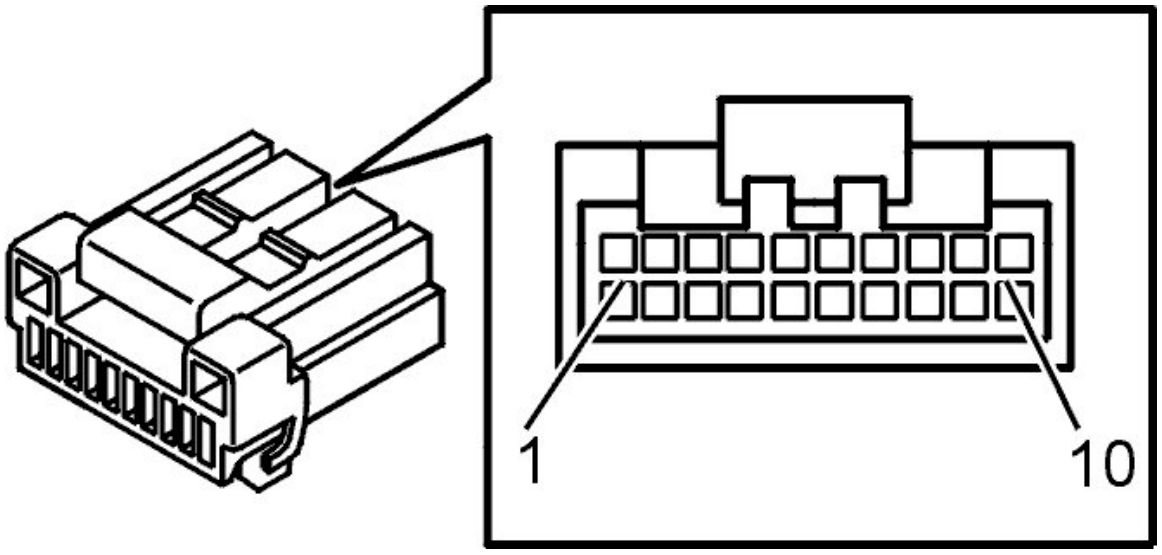
Signal Missing

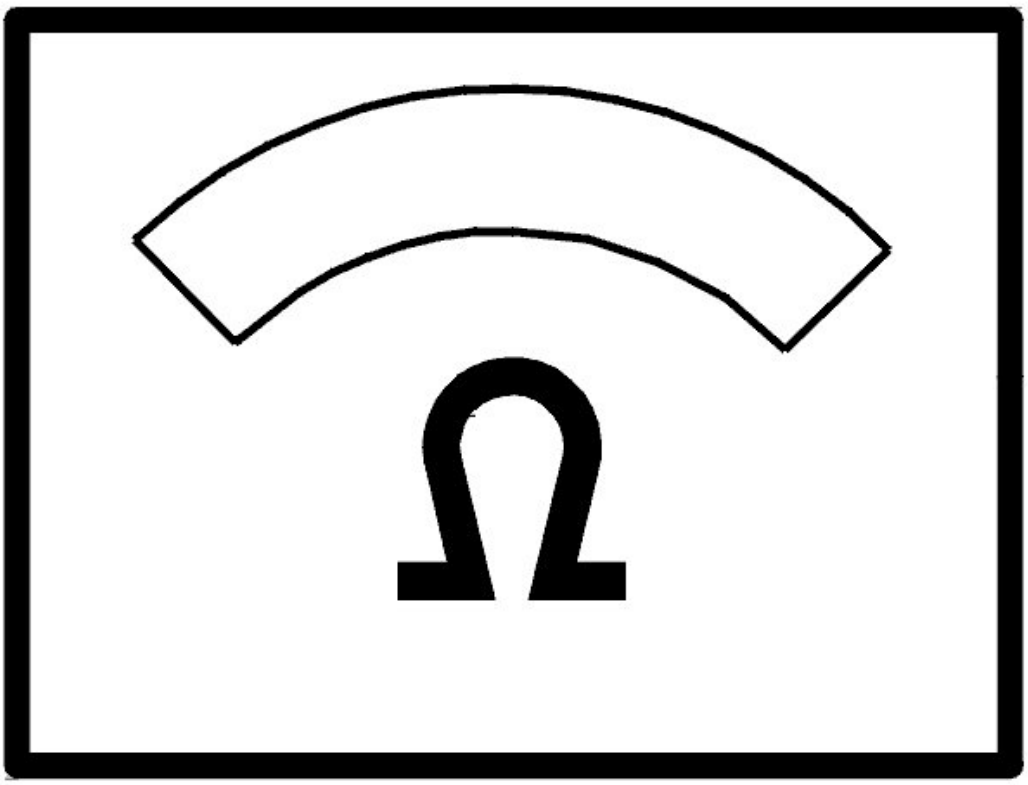
Signal missing

Checking the connectors

Check that the bulb is intact.
Check the connectors for the upper electronic module (UEM) and roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Remedy as necessary.

Other information:
- To access or replace the lamp, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the upper electronic module (UEM) and the roof lamp module. Check for an open-circuit. Check for a short-circuit to supply voltage.

UEM-0035 Left front reading lamp

Control module terminal #18 and roof lamp module terminal #3A.

UEM-0037 Right front reading lamp

Control module terminal #6 and roof lamp module terminal #4A.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
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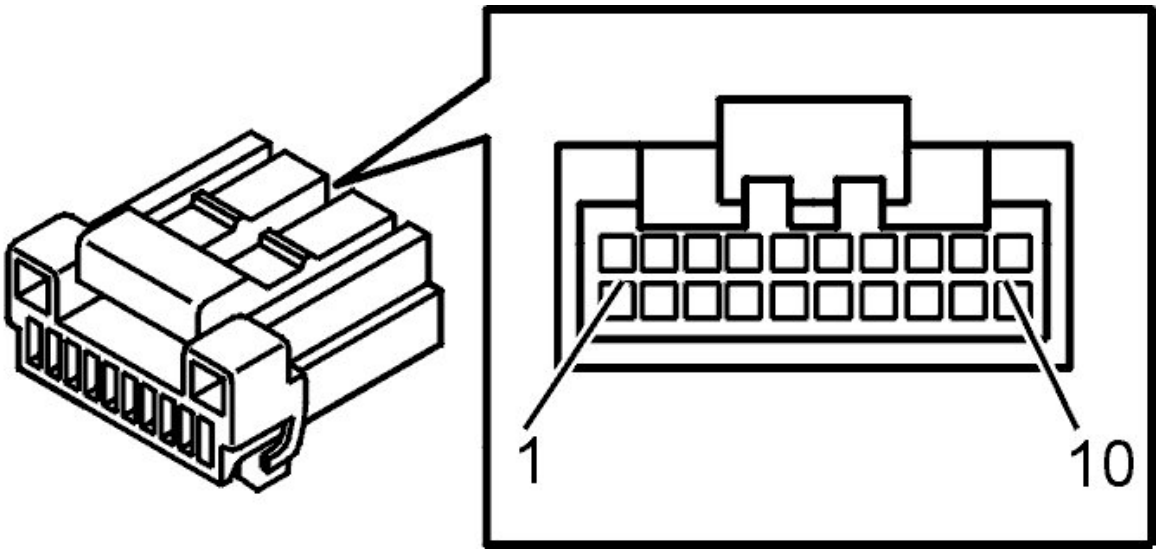
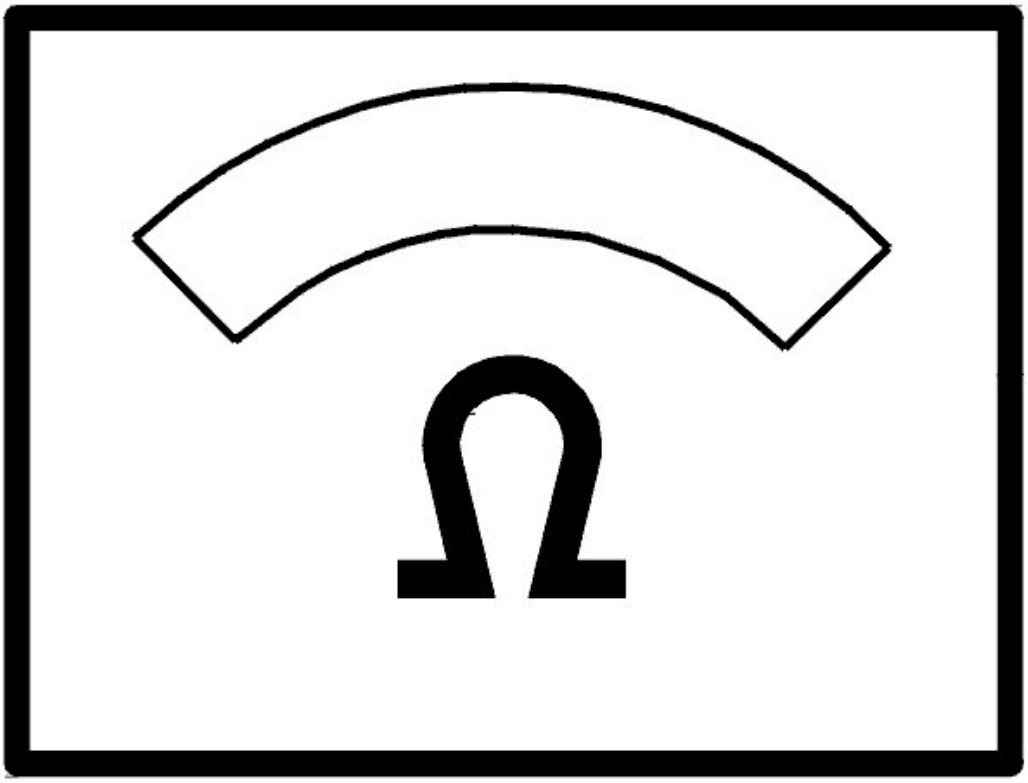




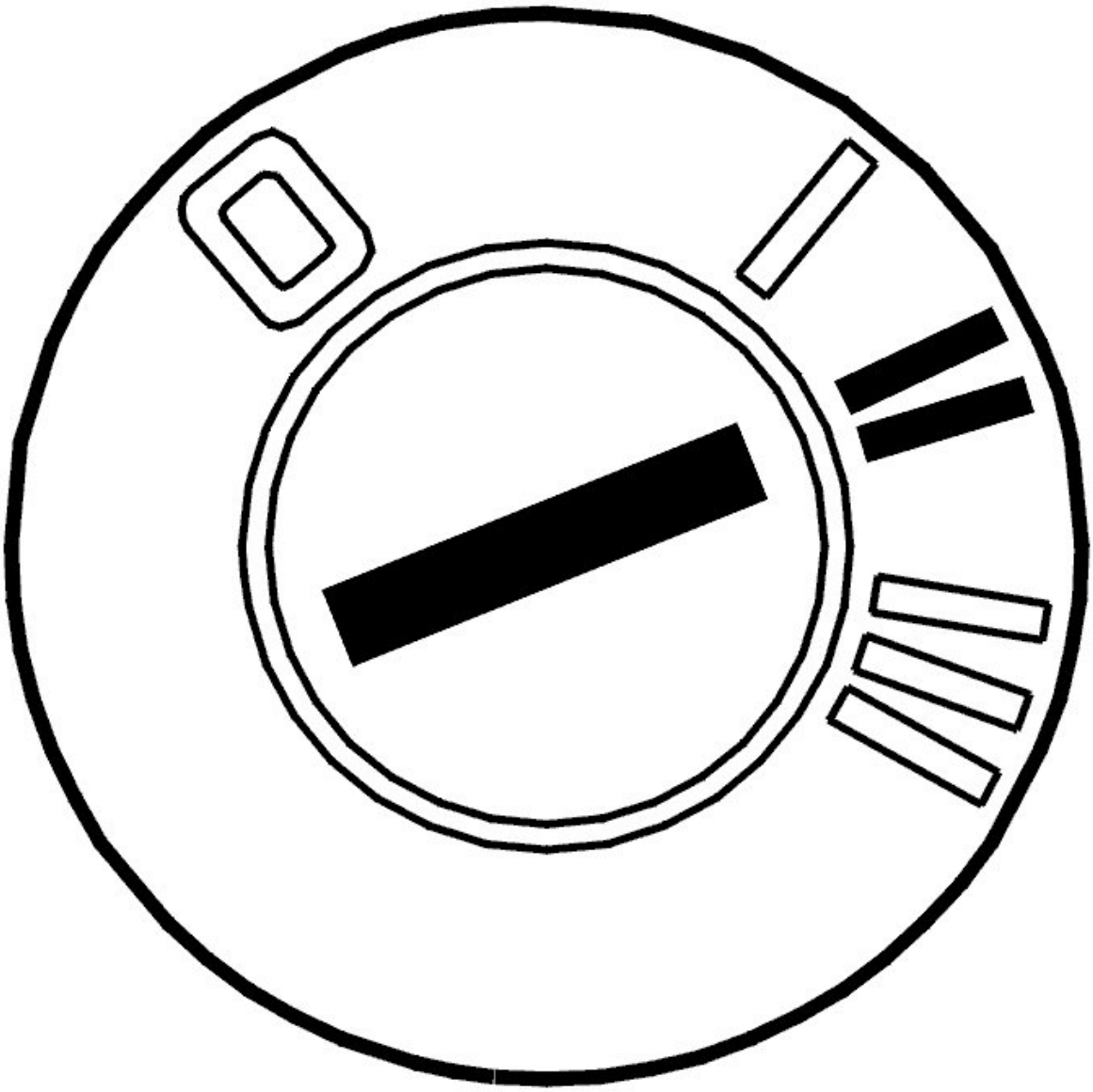
Continue - Verification

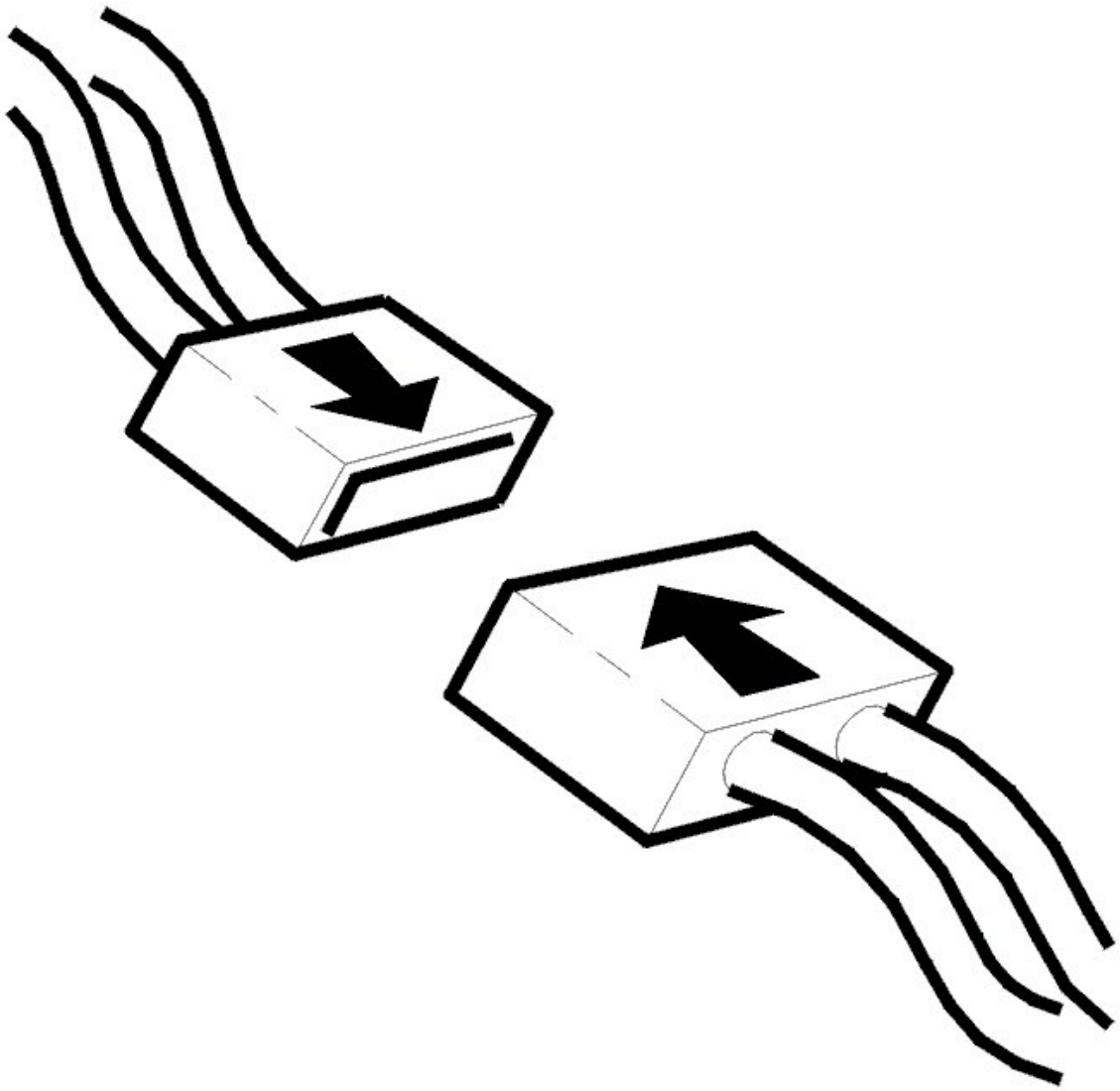
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

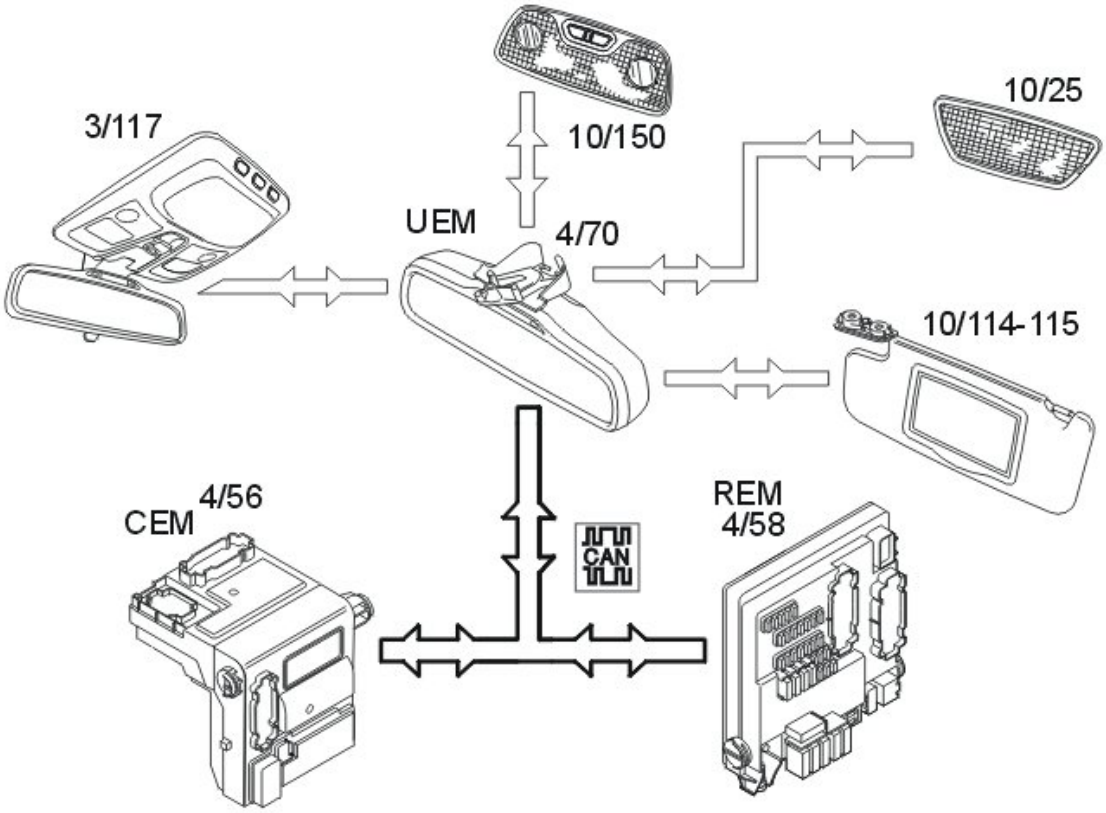
Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0038

Condition



The upper electronic module (UEM) checks the interior lighting. The diagnostic trouble code (DTC) is stored if the control module registers that there is an on signal for the interior lighting in the headlining when the control signal for the general lighting is low.
The diagnostic trouble code (DTC) can be diagnosed when the conditions are met for the interior lighting to be switched on at the same time as the lighting in the cargo compartment is off.

Substitute value
- The lamp goes out.

Possible source
- Short-circuit to ground in the signal cable for the general lighting.

Fault symptom[s]
- The interior lighting does not work.

Signal Too Low

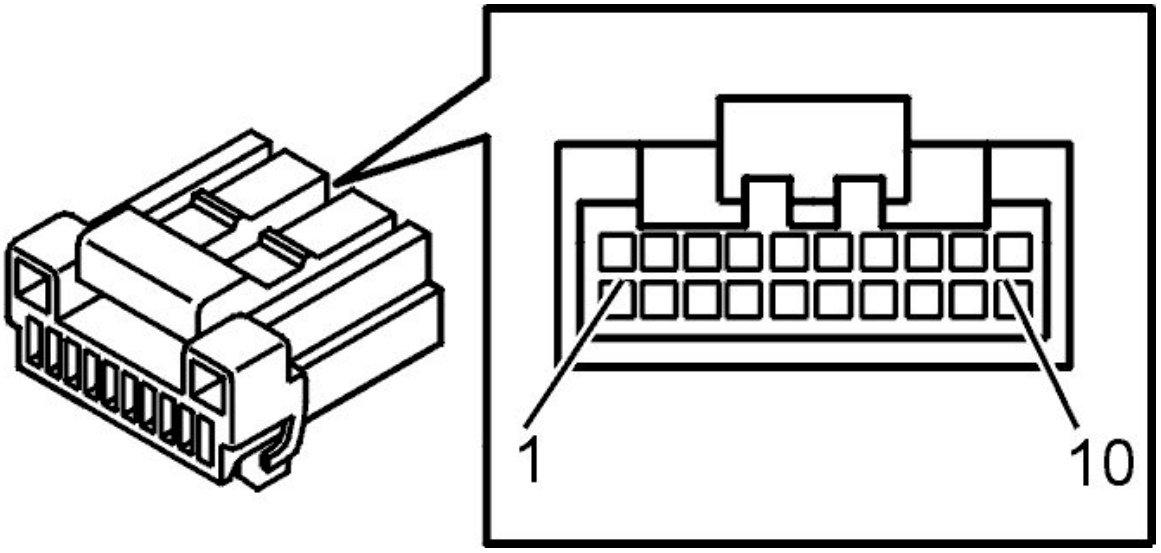
Signal too low

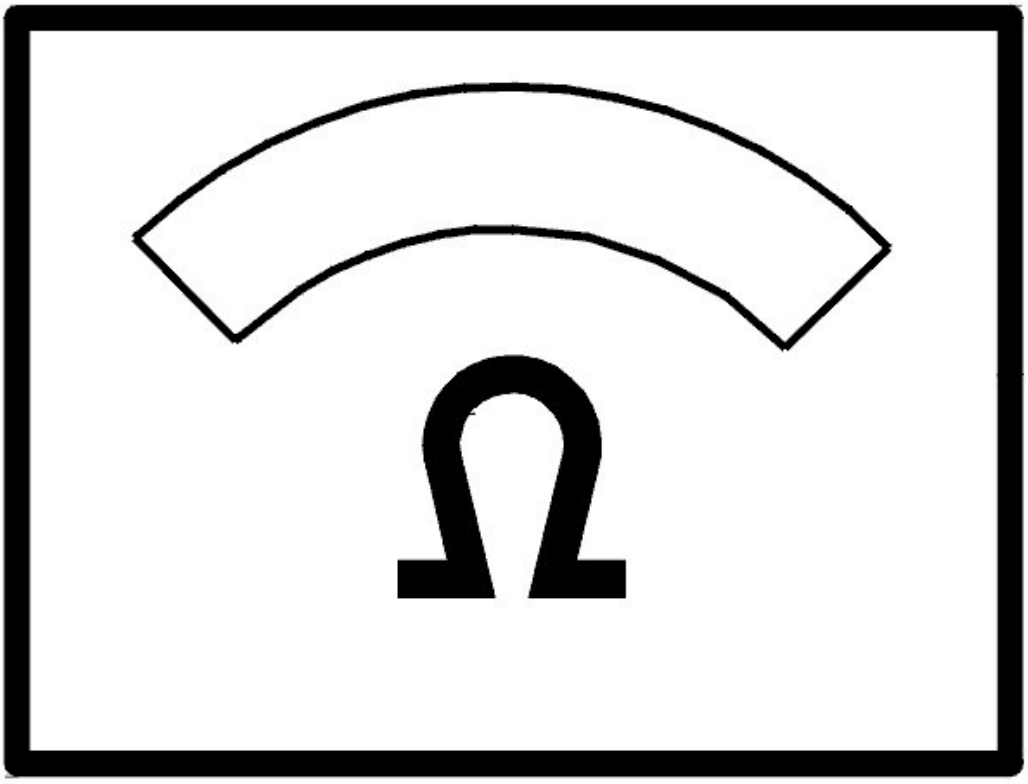
Checking the connectors

Check the control module and roof lamp module connectors. Check for contact resistance and oxidation.

Other information:

- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Was a fault detected?

Yes - Verification

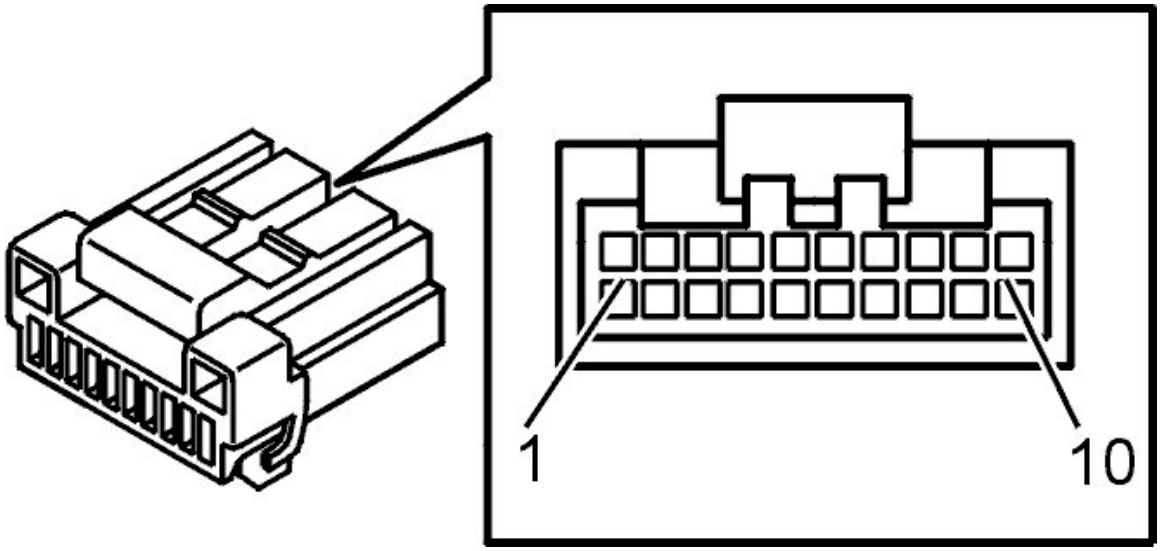
No - Checking for open-circuits and short-circuits

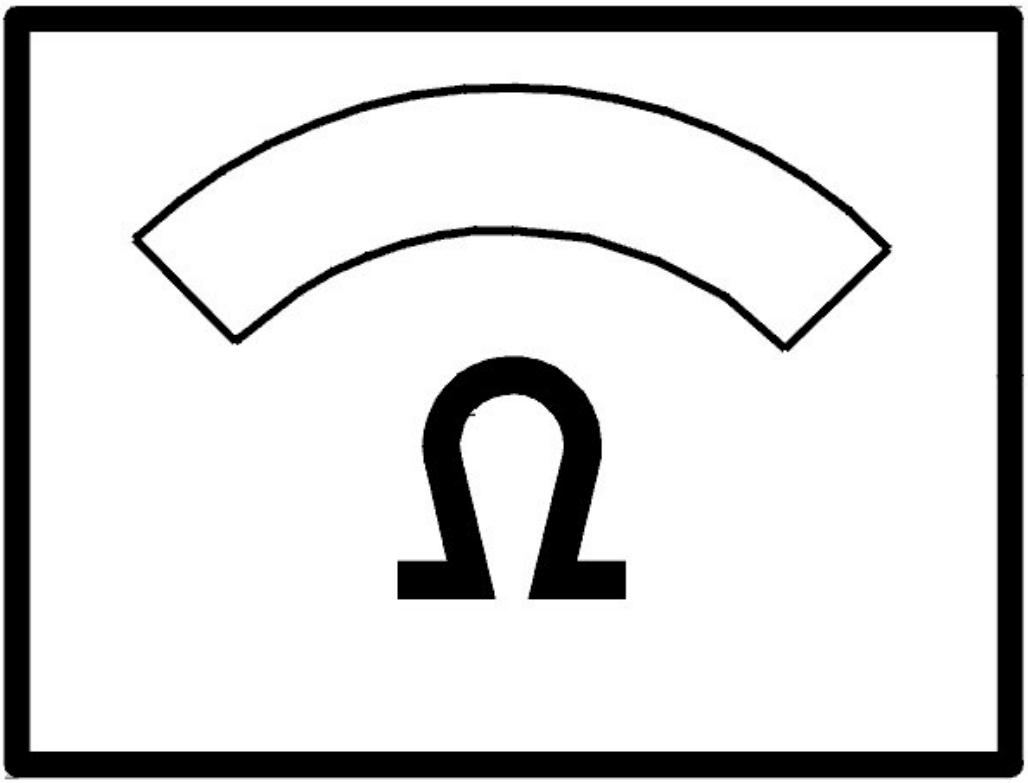
Checking for open-circuits and short-circuits

Check the cable between the control module terminal #19 and roof lamp module terminal #5A. Check for an open-circuit. Check for a short-circuit to ground.
Replace the cable if a fault is found.
Try new bulbs in the roof lamp module if no fault is found.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace bulbs in the roof lamp module, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





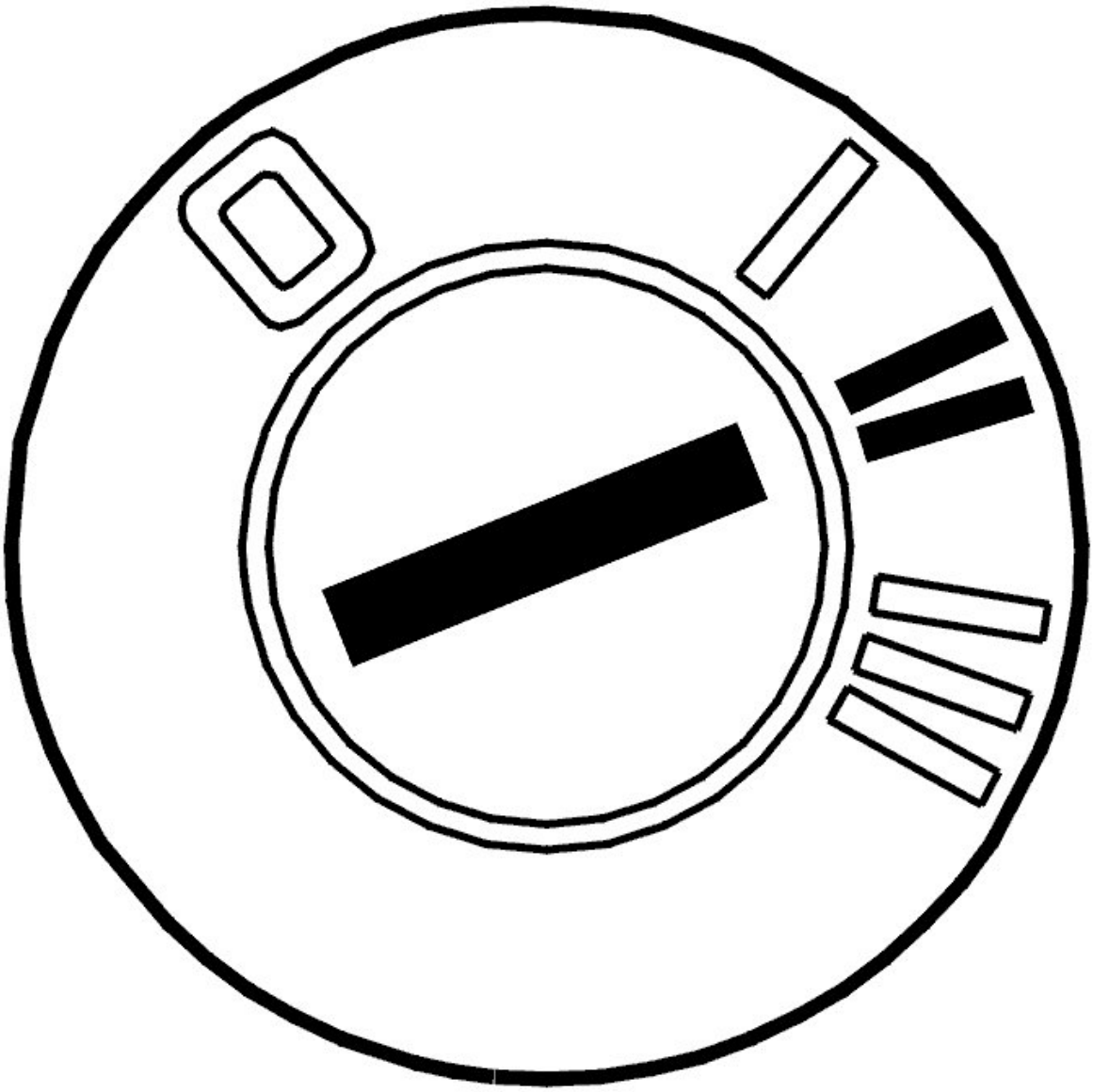
Continue - Verification

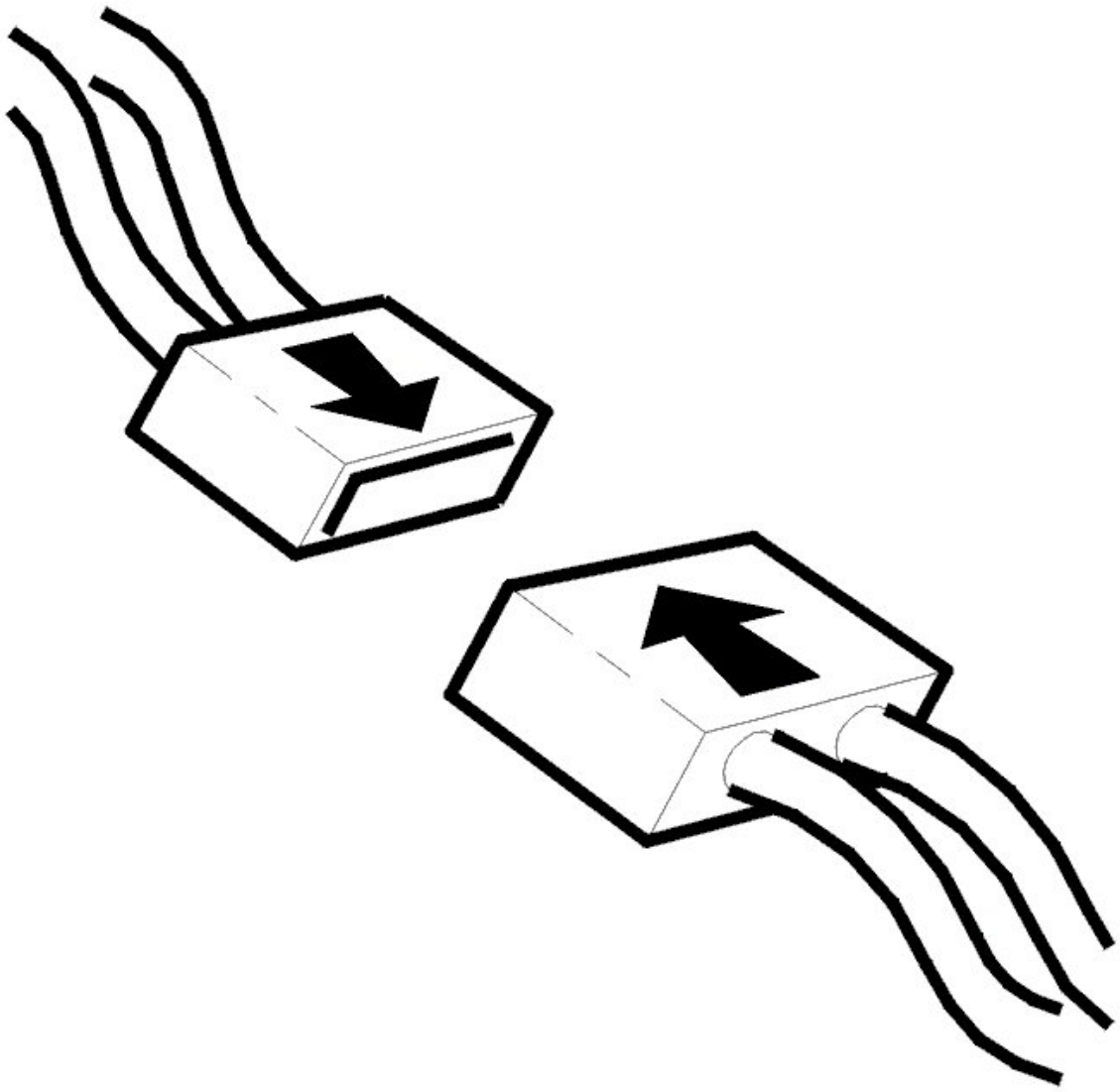
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers a faulty control signal from the general courtesy lighting, the diagnostic trouble code is displayed.

Substitute value
- The lamp goes off.

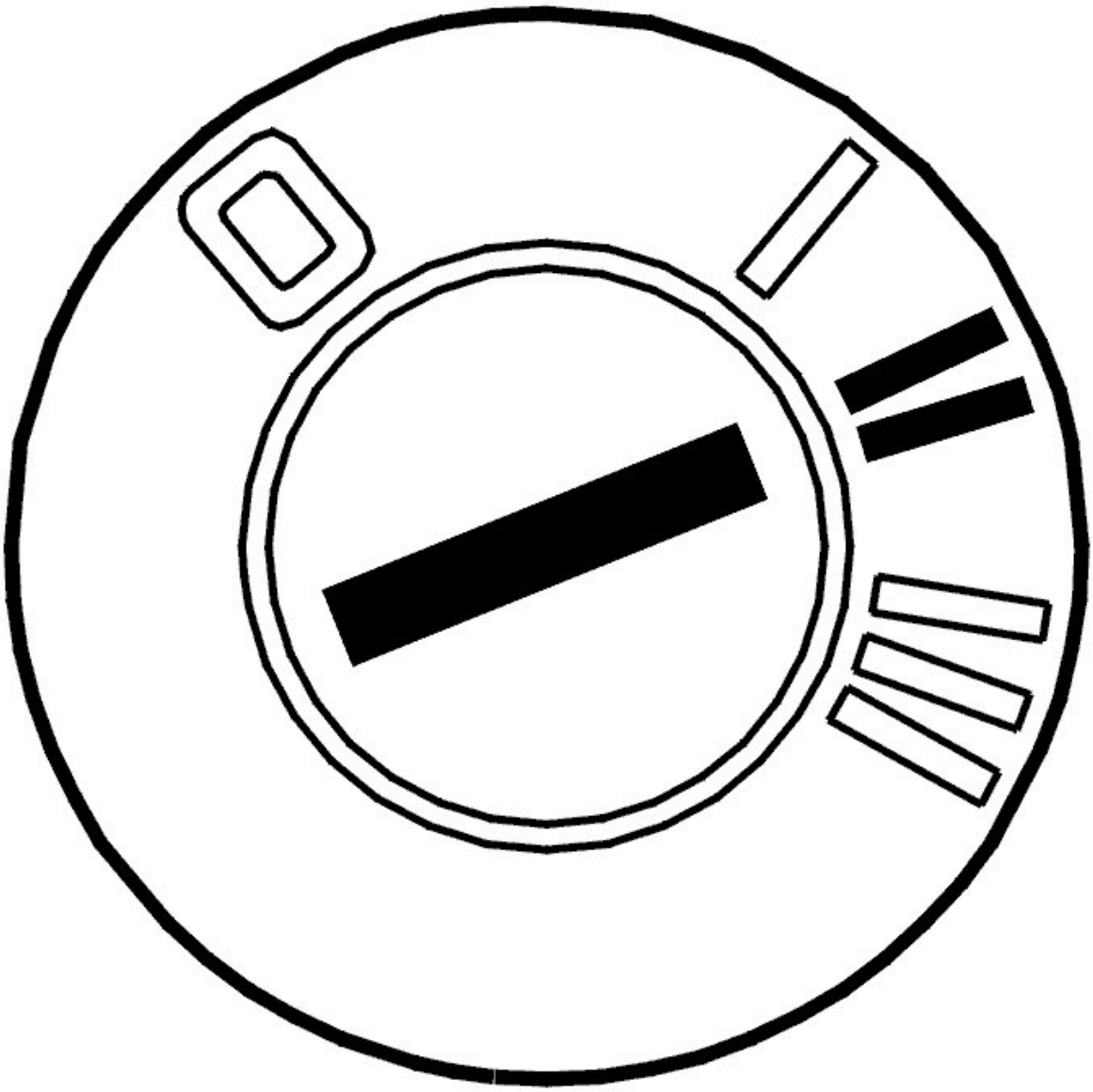
Possible source
- Open circuit in signal wire for the general courtesy lighting.
- Short circuit to voltage supply on signal wire for general lighting.

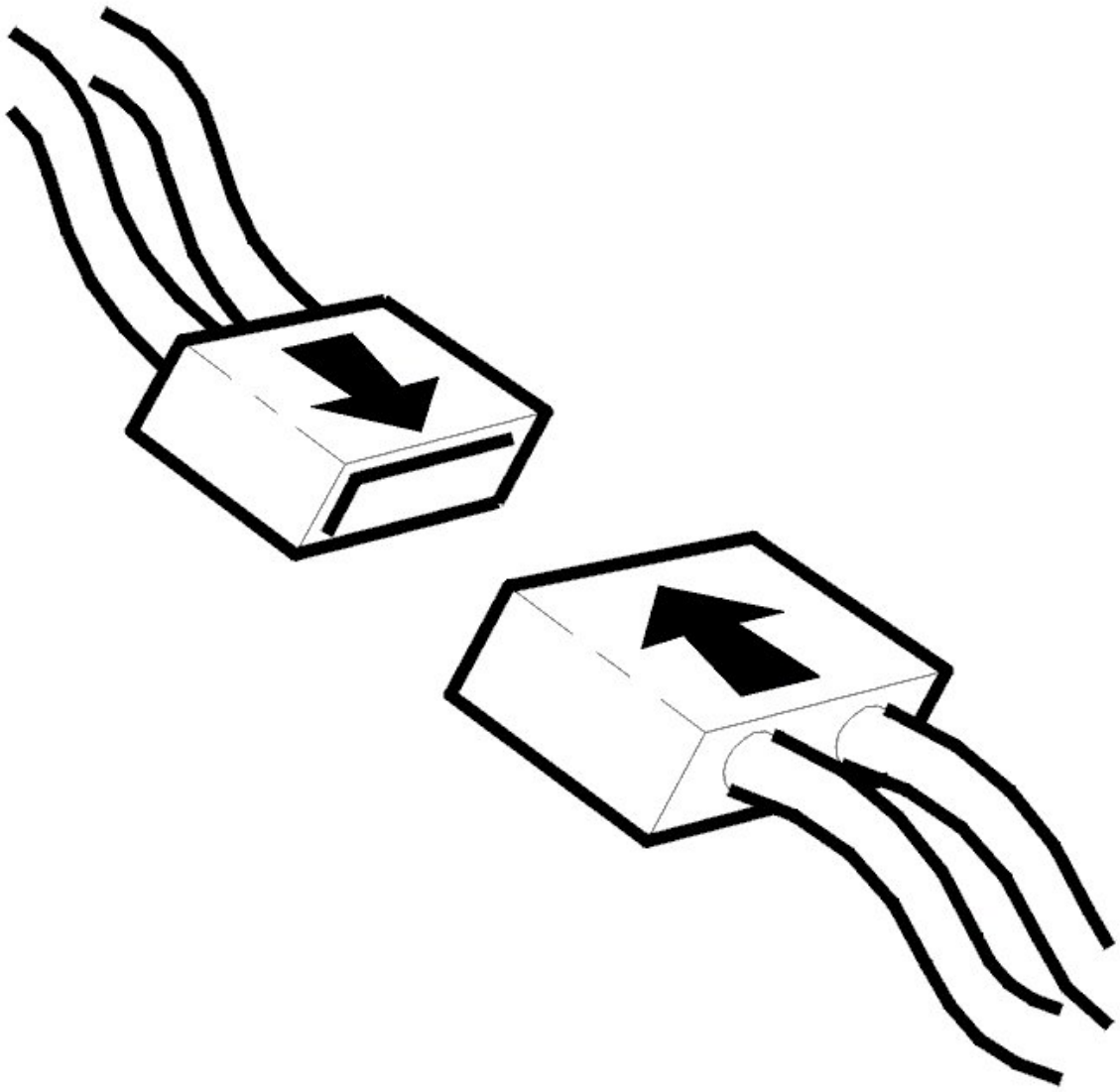
Fault symptom[s]
- Courtesy lighting does not work.

Signal Missing

Signal missing

Checking the cable and component





- Ignition off
- Check the connectors for the upper electronic module (UEM) and roof lamp module. Check for contact resistance and oxidation.

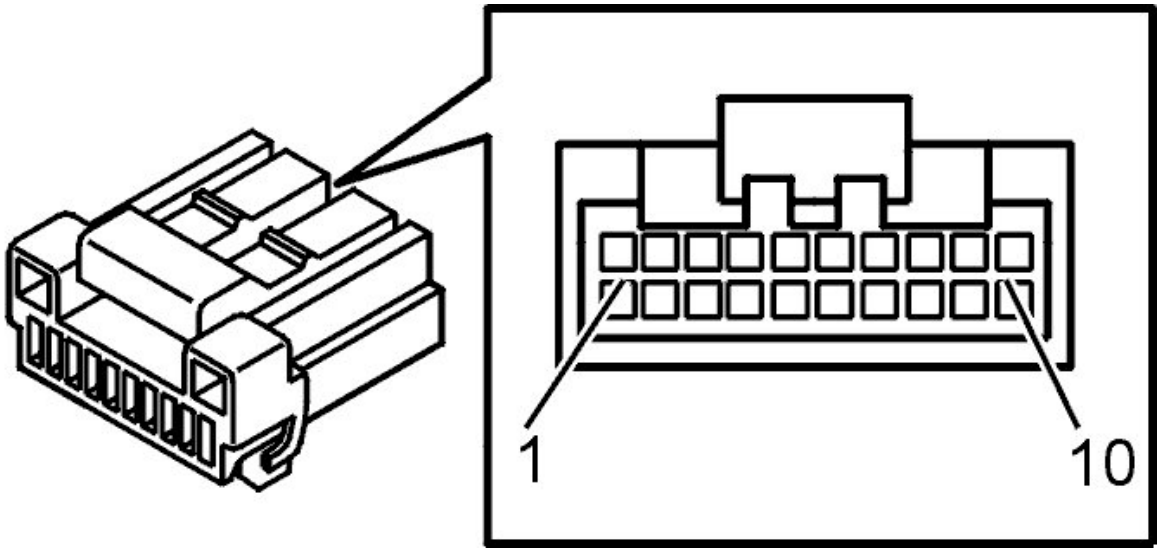
Remedy as necessary

- Reinstall the connectors, components etc.
- Ignition on.

Activate the general lighting: Click on the VCT2000 symbol.

Other information:

- To access the roof lamp switch, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the connector for the upper electronic module (UEM), see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Do the lamps light?

Yes - Verification

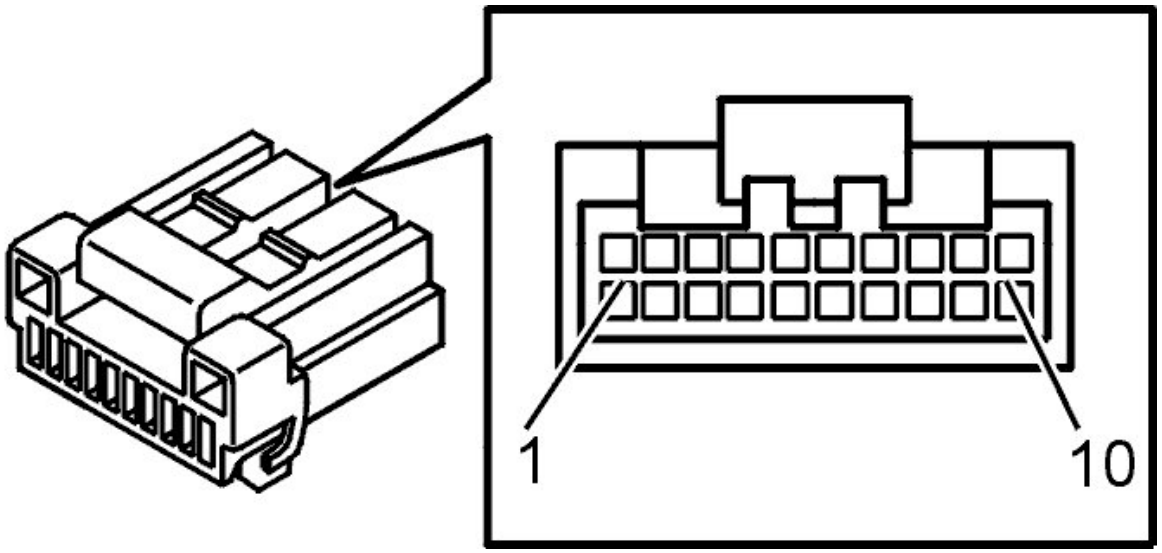
No - Checking for an open-circuit

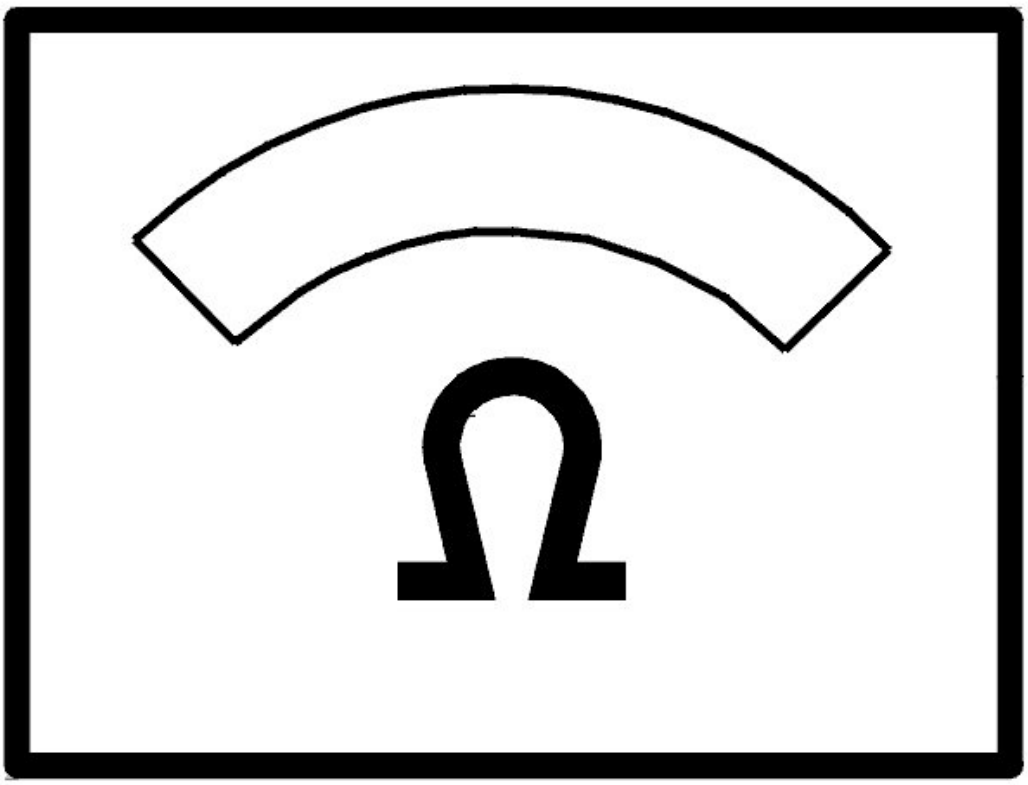
Checking for an open-circuit

Check the cable between the control module terminal #19 and roof lamp module terminal #5A. Check for an open-circuit. Check for a short-circuit to supply voltage.
Replace the cable if a fault is found.
If no fault was found, try replacing the lamps.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To replace the lamps, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





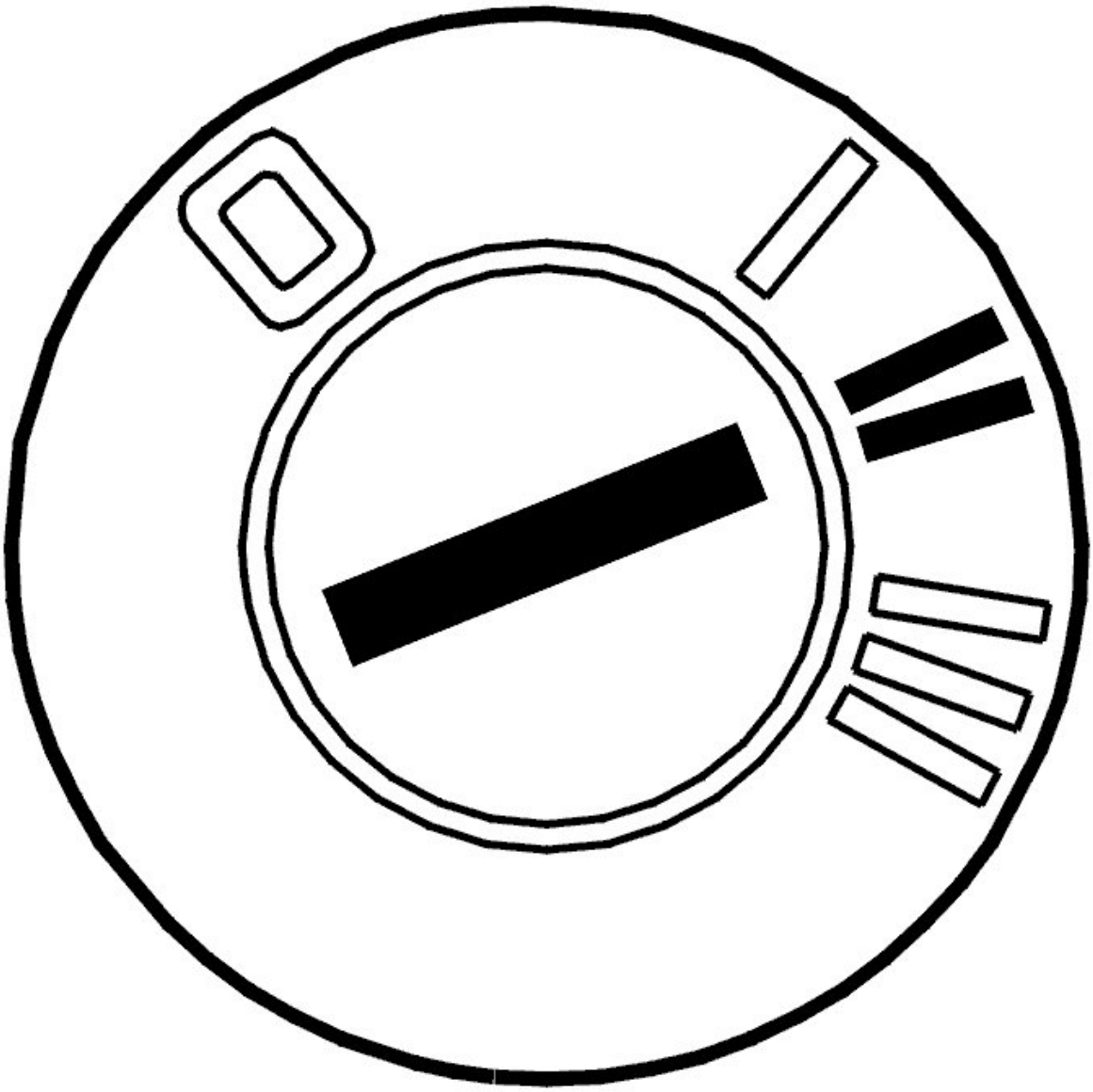
Continue - Verification

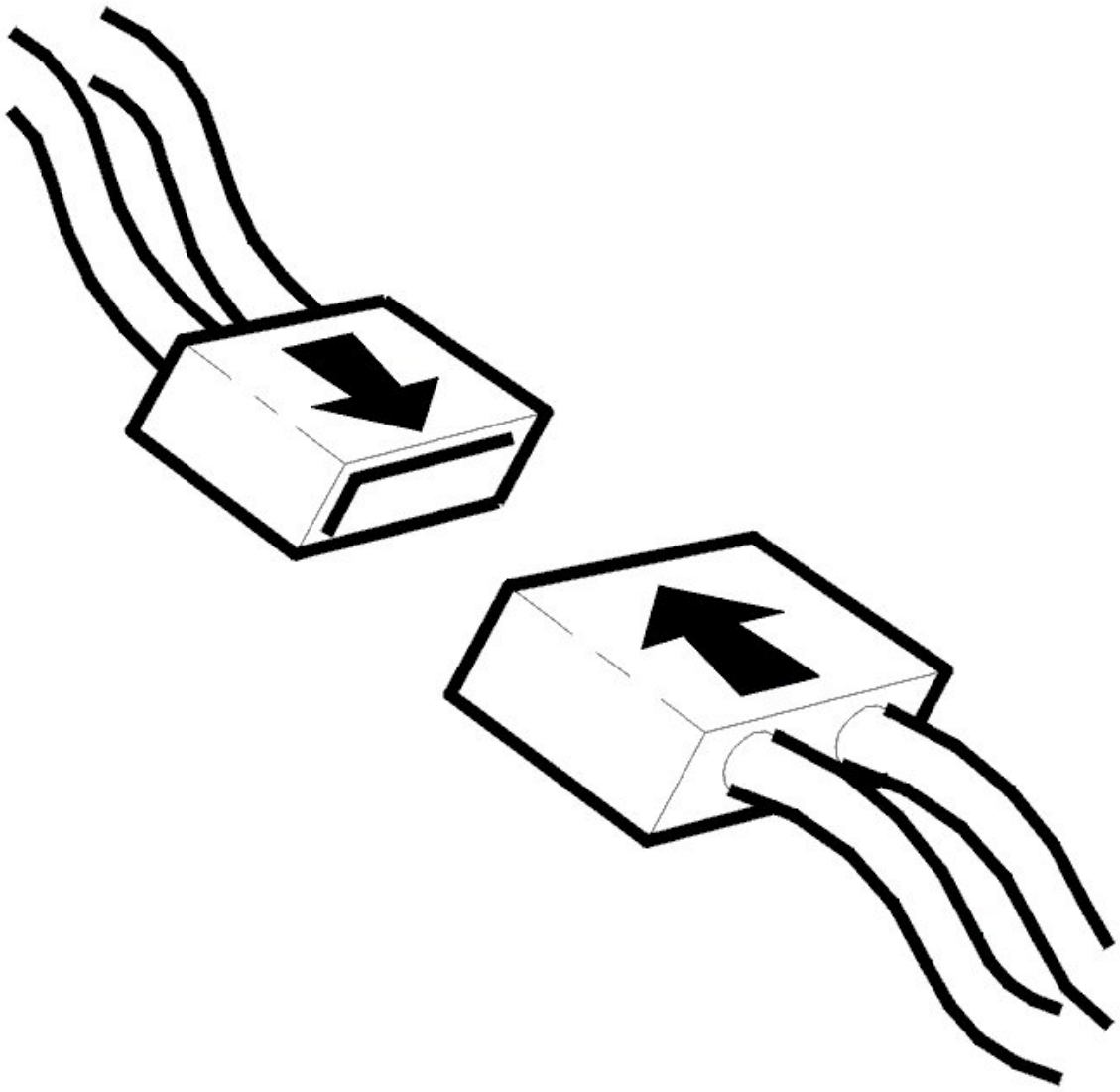
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the cable and component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-003A

Condition

The upper electronic module (UEM) supplies power to a number of functions in the car via Extended X-supply (EXT_X). These functions include the sun roof logic, mirror lamps in the sun visor, rain sensor, buttons for the headlining lighting and certain button lighting.
Diagnostic trouble code (DTC) UEM-003A is stored if the upper electronic module (UEM) registers too low a level for power supply Extended X-supply (EXT_X).
Diagnostic trouble code (DTC) UEM-003A can be diagnosed in ignition positions I or II.

Substitute value
- Sun roof, mirror lamps in the sun visor, buttons for the headlining lighting and certain button lighting are switched off.

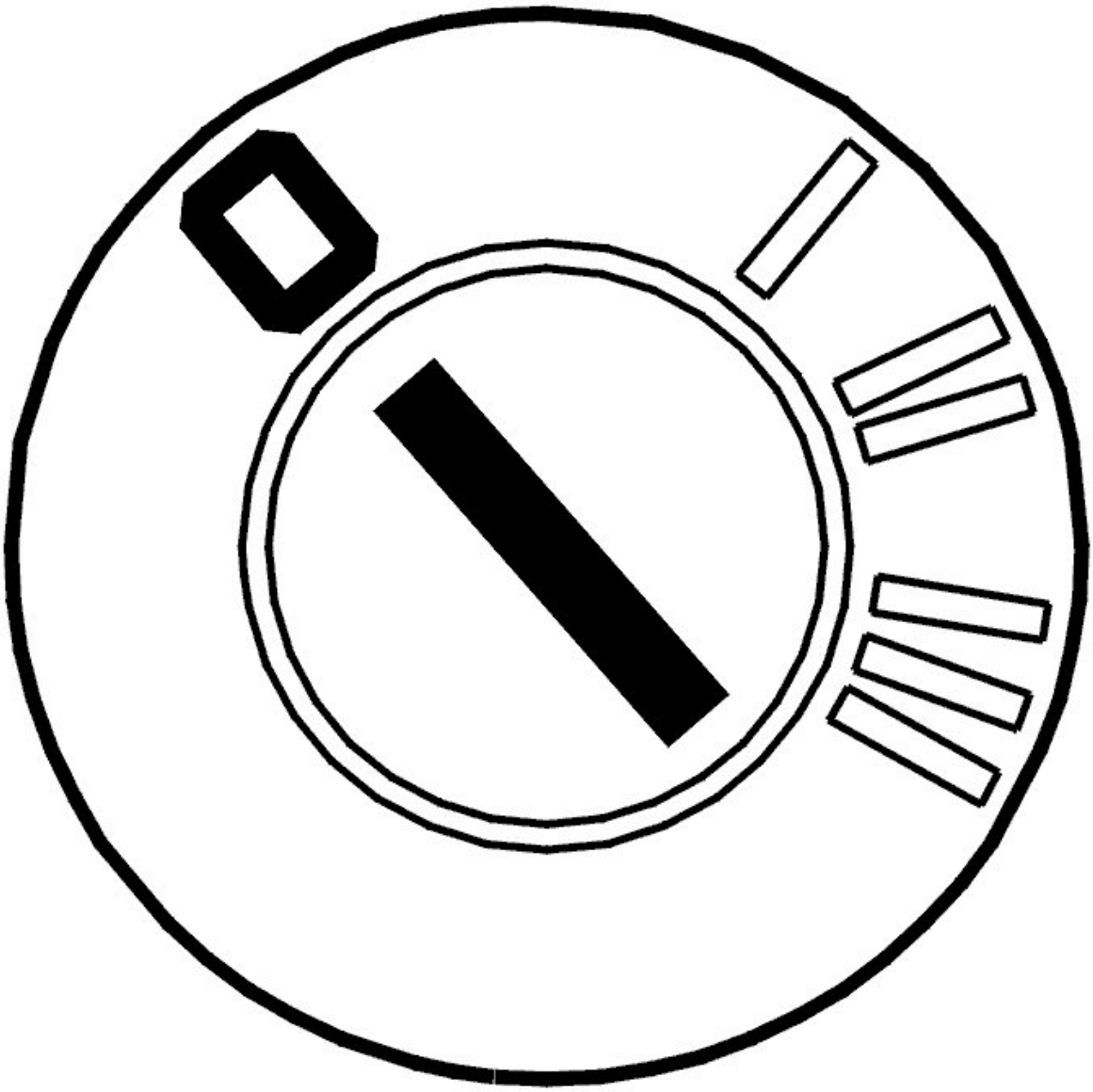
Possible source
- The power supply to the sun roof, mirror lamps in the sun visor, rain sensor, buttons for the headlining lighting and certain button lighting functions is short-circuited to ground.

Fault symptom[s]
- The power sun roof does not operate
- The interior lighting does not operate
- No rain sensor function.

Signal Too Low

Signal too low

Checking for a short-circuit

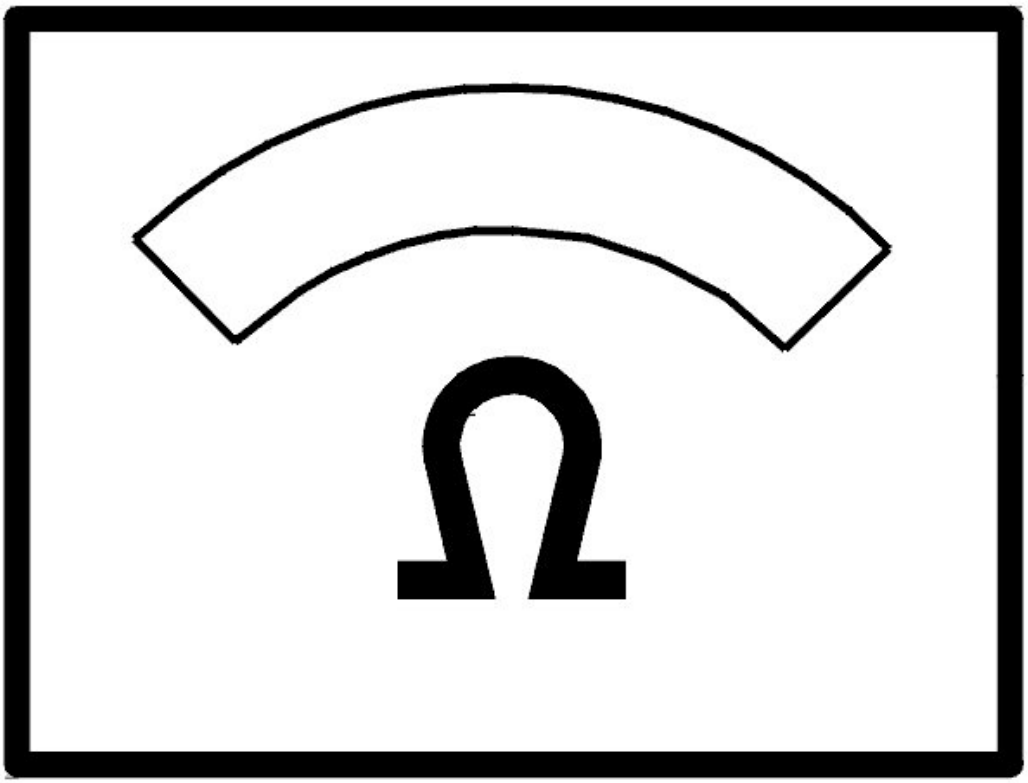


- Ignition off.

If all the functions that are supplied with power from the upper electronic module (UEM) via Extended X-supply (EXT_X) are not working (i.e. sun roof logic, mirror lamps in the sun visor, rain sensor or interior lighting), it can be assumed that either the cable between the upper electronic module (UEM) and the junction point 53/505 is short-circuited to ground or the wiring from the junction point to each component is short-circuited to ground.
First check the power supply cable between the upper electronic module (UEM) and each component. If the cable is short-circuited to ground, 0 ohms will be measured.
For mirror lamps in the sun visor, check the cable between the mirror lamp connector terminal #1 and the connector for the upper electronic module (UEM) terminal #A8. Check for a short-circuit to ground.
For sun roof and interior lighting, take readings on the cable between the connector for roof lamps terminal #A2 (and the sun roof module) and the connector for the upper electronic module (UEM) #A8. Check for a short-circuit to ground.
For rain sensor, take readings on the cable between the rain sensor connector terminal #A3 and the connector for the upper electronic module (UEM) terminal #A8. Check for a short-circuit to ground.
If all the readings result in a short-circuit to ground, it can be assumed that the fault is between the upper electronic module (UEM) #A8 and junction point 53/505.
Remedy as necessary.

Other information:

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access or replace the interior lighting, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To fault-trace wiring and terminals, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Was a fault detected?

Yes - Verification

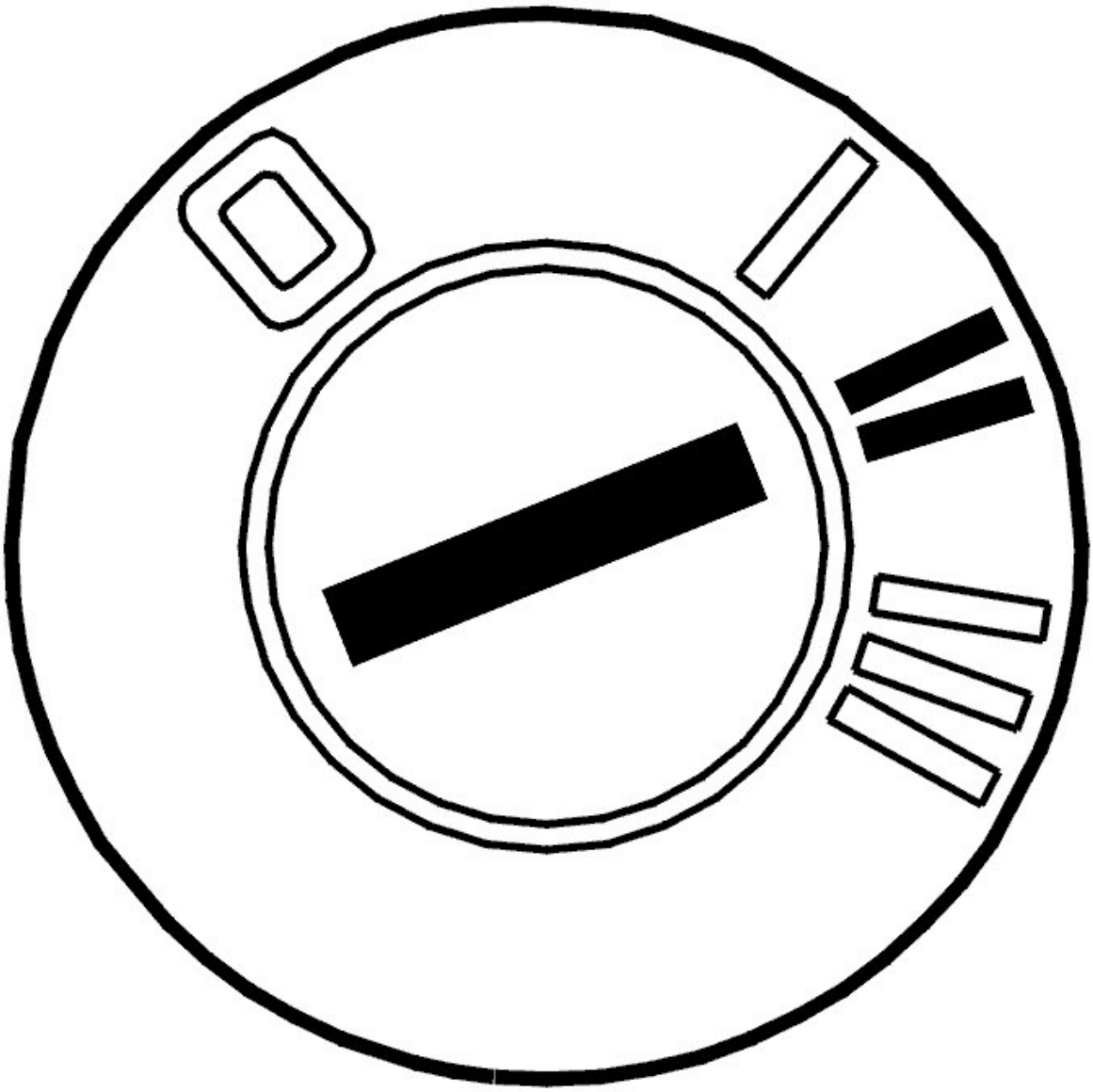
No - No Fault Found

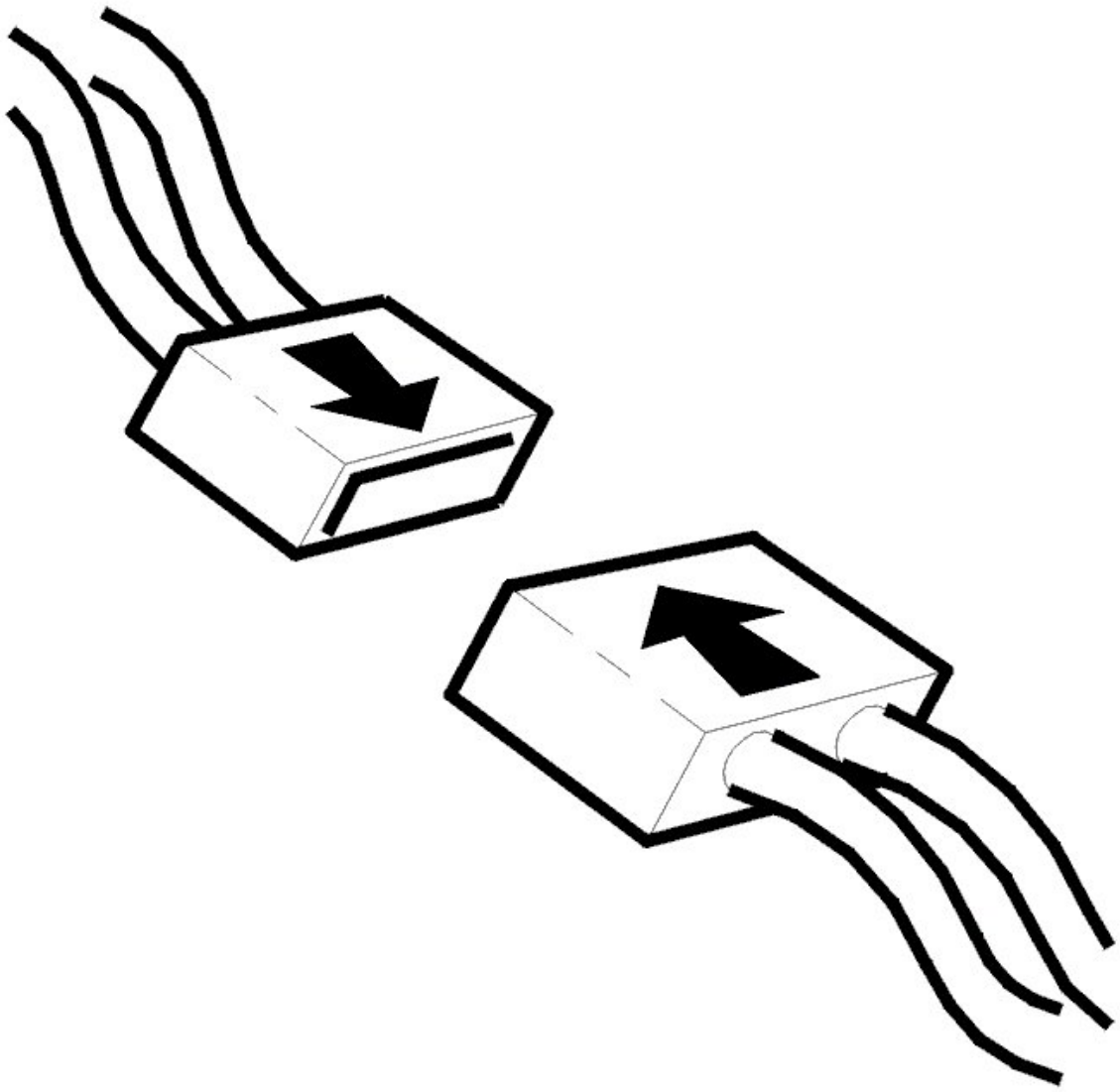
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check whether Extended X supply (EXT_X) is working.

Is each component working (sun roof, mirror lamps in sun visor, rain sensor and interior lighting)?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for a short-circuit

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-003C

Condition

The upper electronic module (UEM) uses the same power stages and outputs for interior lighting in several different models. Diagnostic trouble code (DTC) UEM-003C indicates faults in various units, depending on whether the car is a V70, XC70 or an XC90. In the V70 and XC70, faults are indicated by the control signal from the cargo compartment lighting. In the XC90, faults are indicated by the control signal from the 3rd row reading lamps.
Diagnostic trouble code (DTC) UEM-003C is stored if the control module registers that the control signal from the cargo compartment lighting/third row reading lamps is too low.
Diagnostic trouble code (DTC) UEM-003C can be diagnosed when the general roof lighting is lit and the cargo compartment lighting/third row reading lighting is not lit.

Substitute value
- Cargo compartment lighting/3rd row reading lamps switched off.

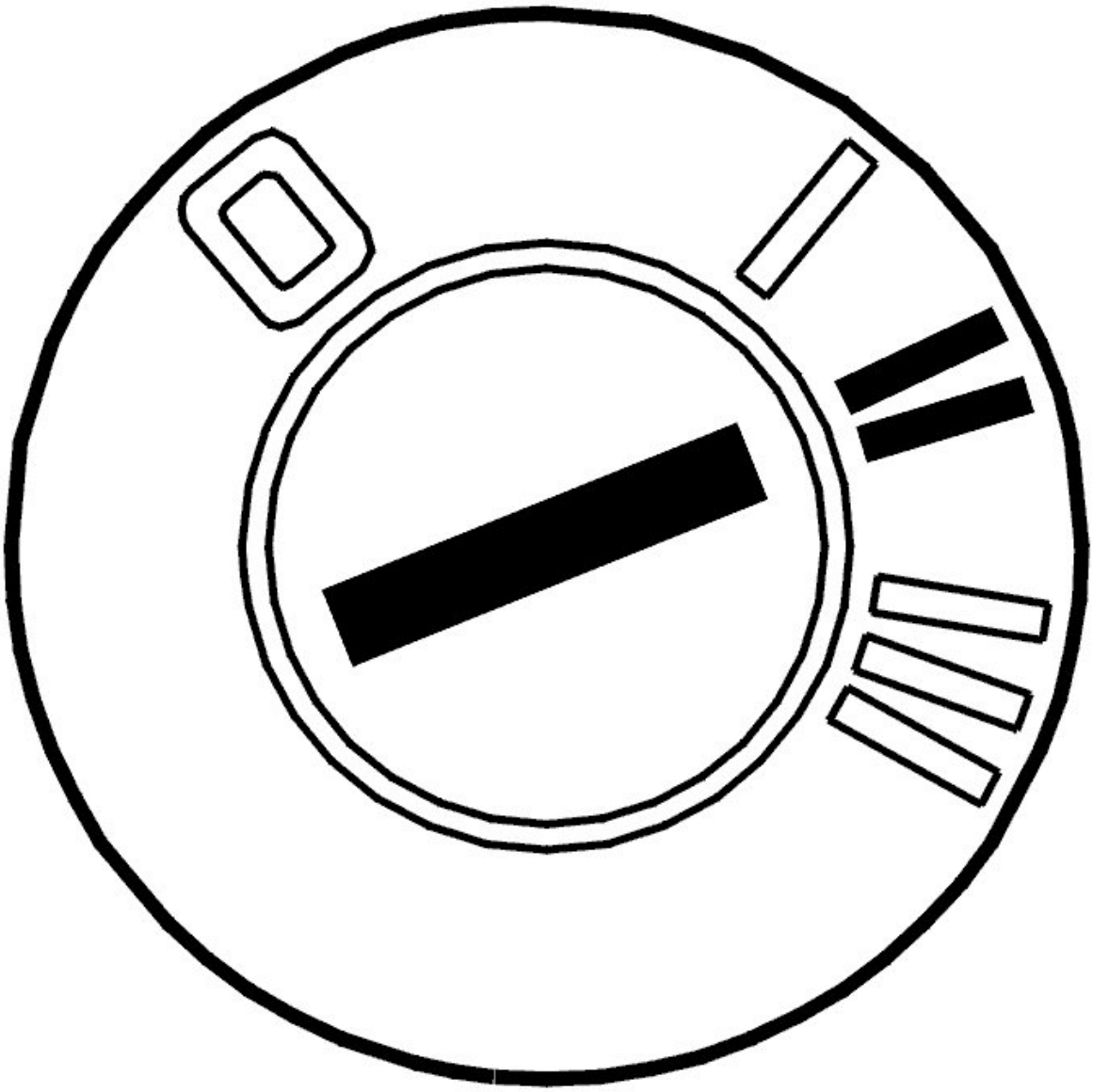
Possible source
- The cable for power supply to the cargo compartment lighting/third row reading lamps is short-circuited to ground
- Loose connections in the cable for power supply to cargo compartment lighting/third row reading lamps.

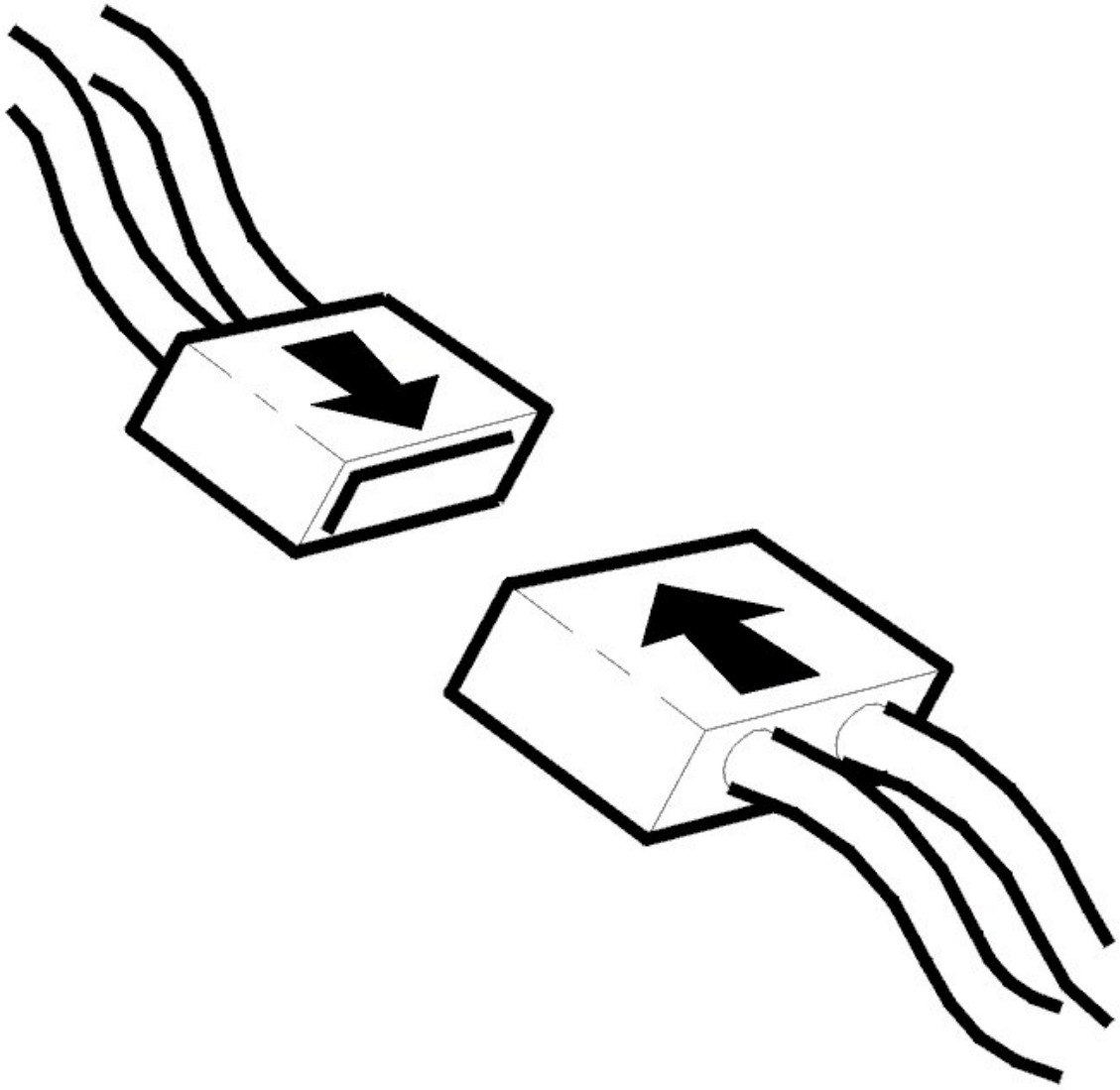
Fault symptom[s]
- The cargo compartment lighting is not working
- The interior lighting does not work.

Signal Too Low

Signal too low

Checking the connectors and components





- Check the lamp
- Check the connector for the upper electronic module (UEM) and cargo compartment lighting/third row reading lamps. Check for contact resistance and oxidation.

Remedy as necessary

- Reinstall the connectors, components etc.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Does the lamp function?

Yes - Verification

No - Checking for short-circuits to ground

Checking for short-circuits to ground

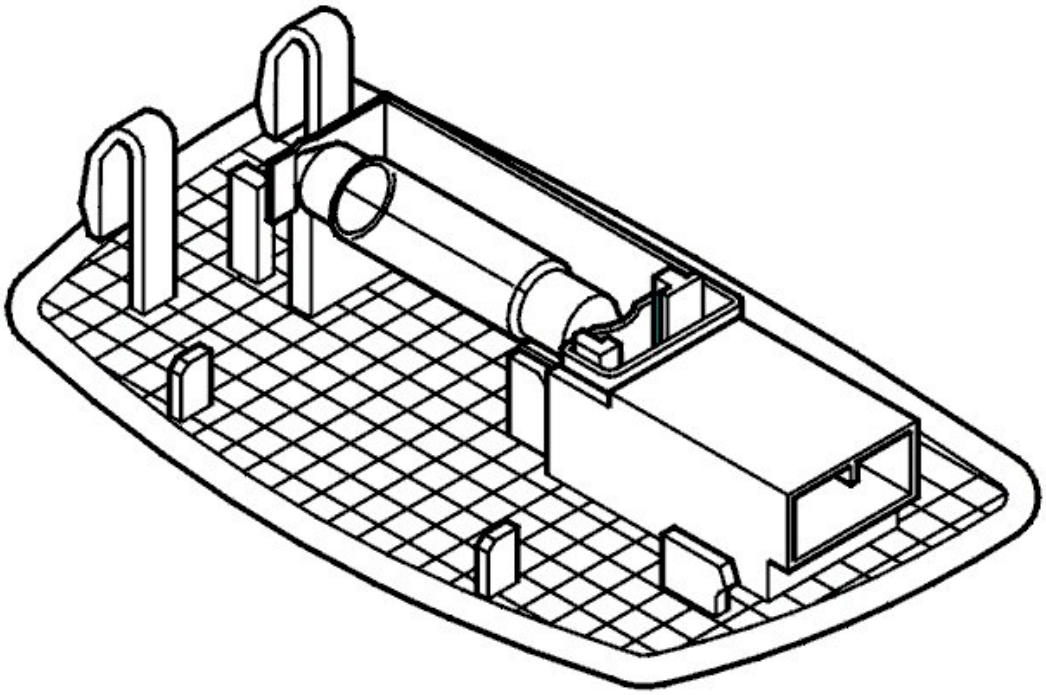
Check the cable between control module terminal #9 and the cargo compartment lighting/third row reading lamps. Check for a short-circuit to ground.
Replace the cable if a fault is found.

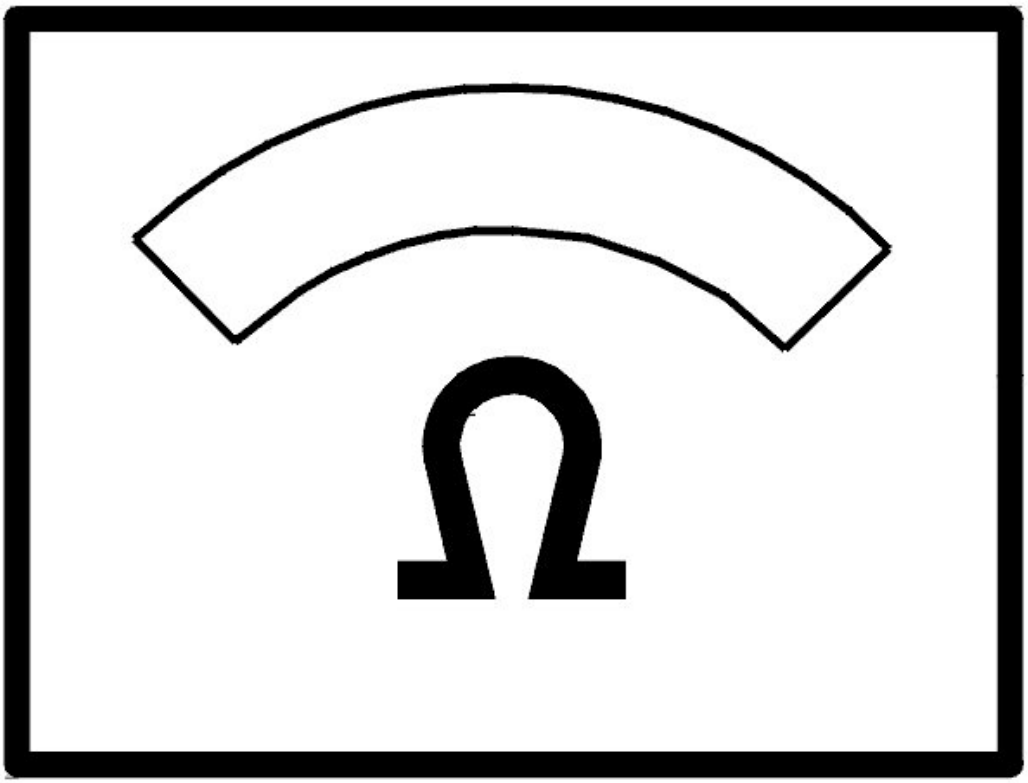
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module

(UEM)

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





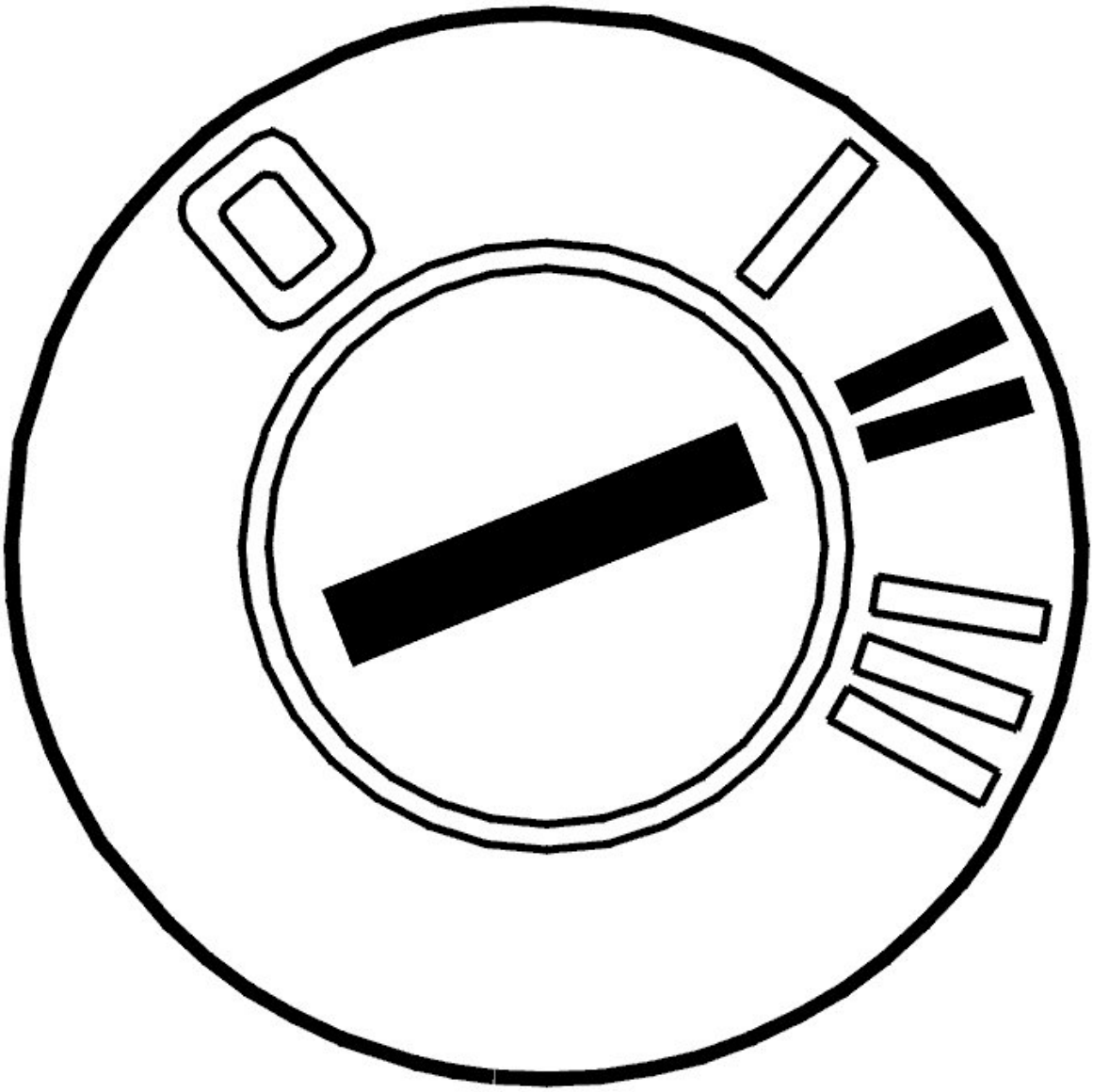
Continue - Verification

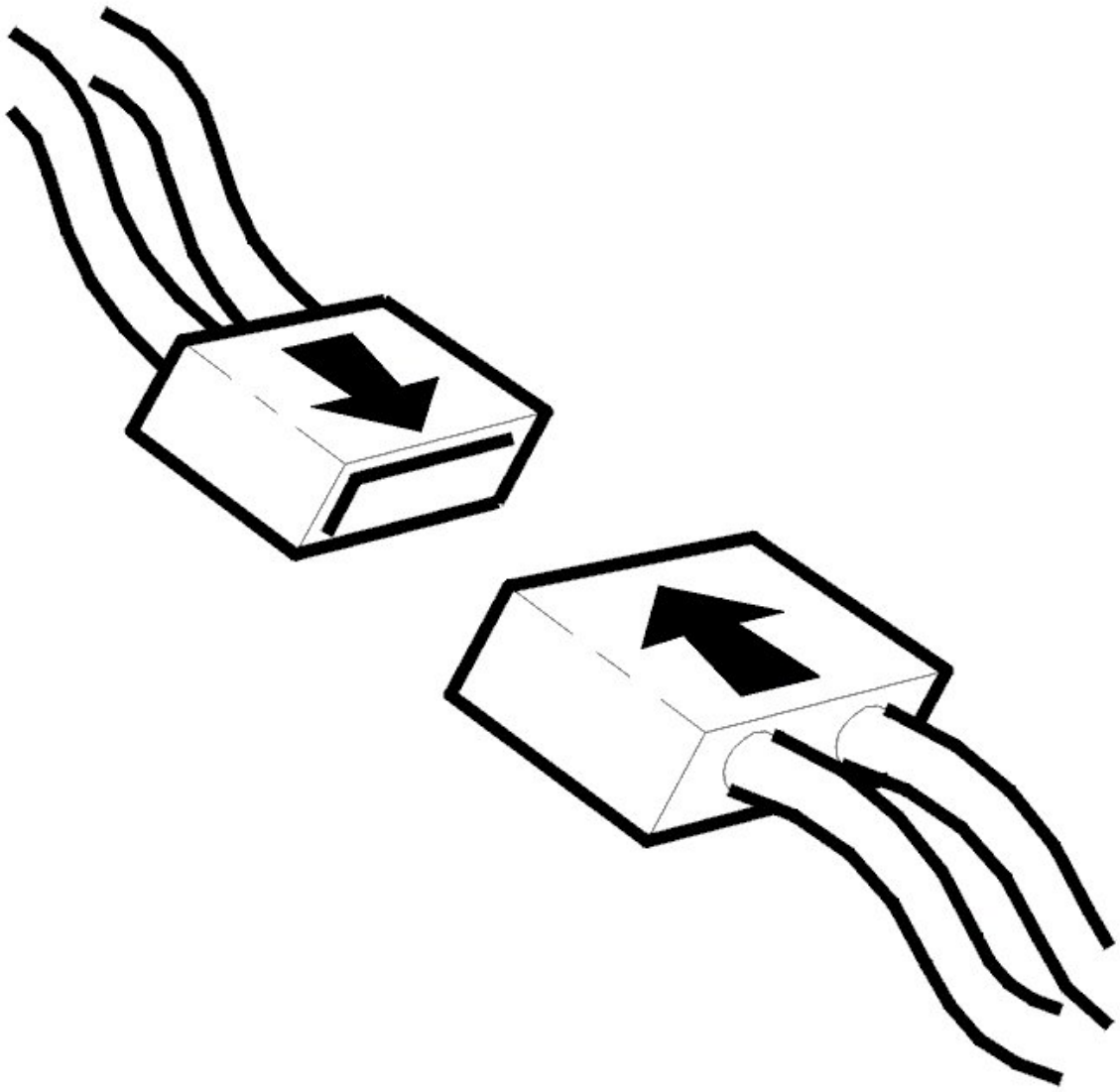
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-003D

Condition

The upper electronic module (UEM) uses the same power stages and outputs for interior lighting in several different models. Diagnostic trouble code (DTC) UEM-003D indicates faults in various units, depending on whether the car is a V70, XC70 or an XC90. In the V70 and XC70, faults are indicated by the control signal from the cargo compartment lighting. In the XC90, faults are indicated by the control signal from the 3rd row reading lamps.
Diagnostic trouble code (DTC) UEM-003D is stored if the control module registers that the control signal to the cargo compartment lighting/third row reading lamps is too high.
Diagnostic trouble code (DTC) UEM-003D can be diagnosed in ignition position II and when the general roof lighting is lit and the cargo compartment lighting/third row reading lighting is not lit.

Substitute value
- Cargo compartment lighting/third row reading lamps switched off.

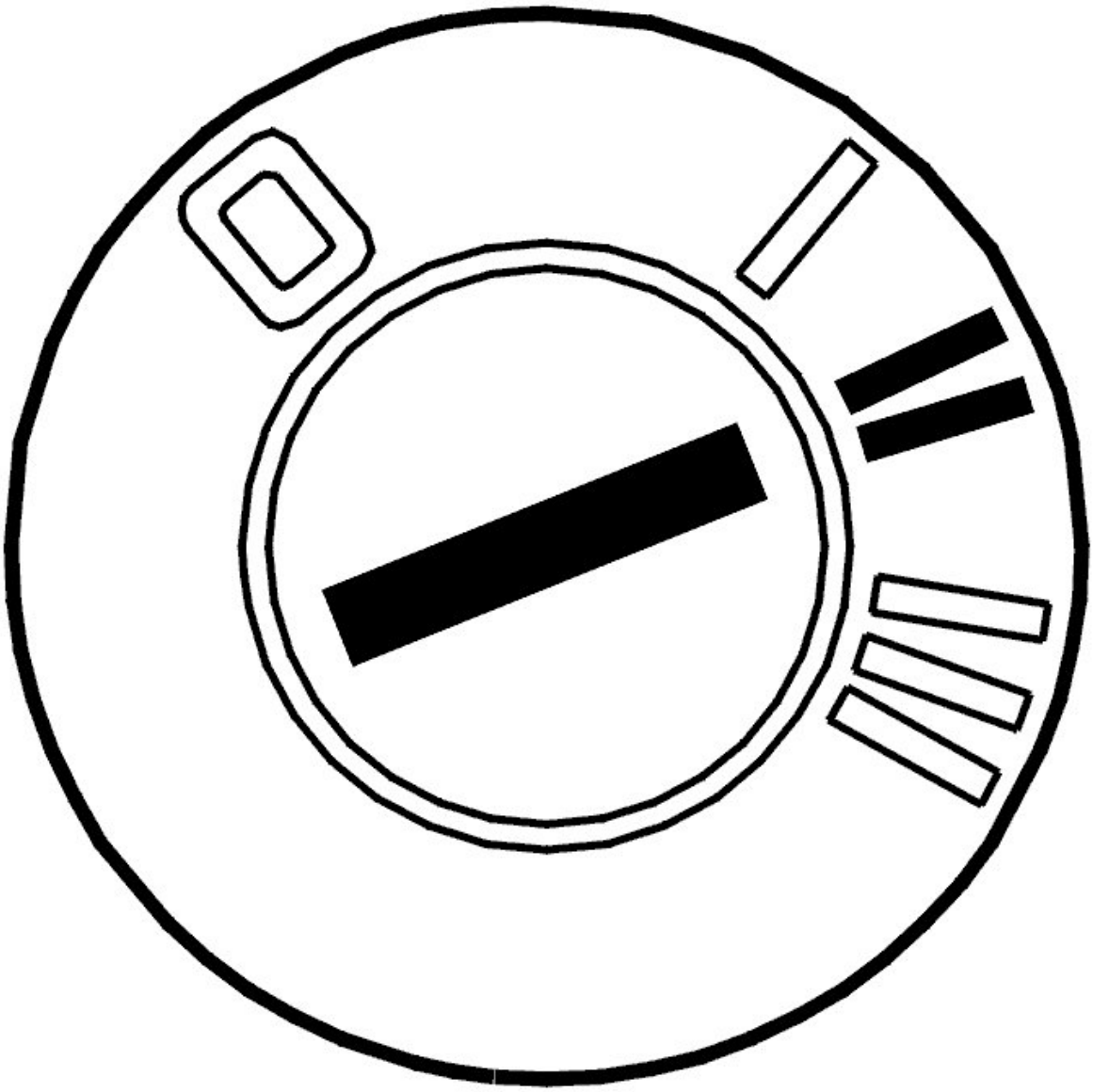
Possible source
- The cable for power supply to the cargo compartment lighting/third row reading lamps is short-circuited to supply voltage
- Open-circuit in the cable for power supply to cargo compartment lighting/third row reading lamps.

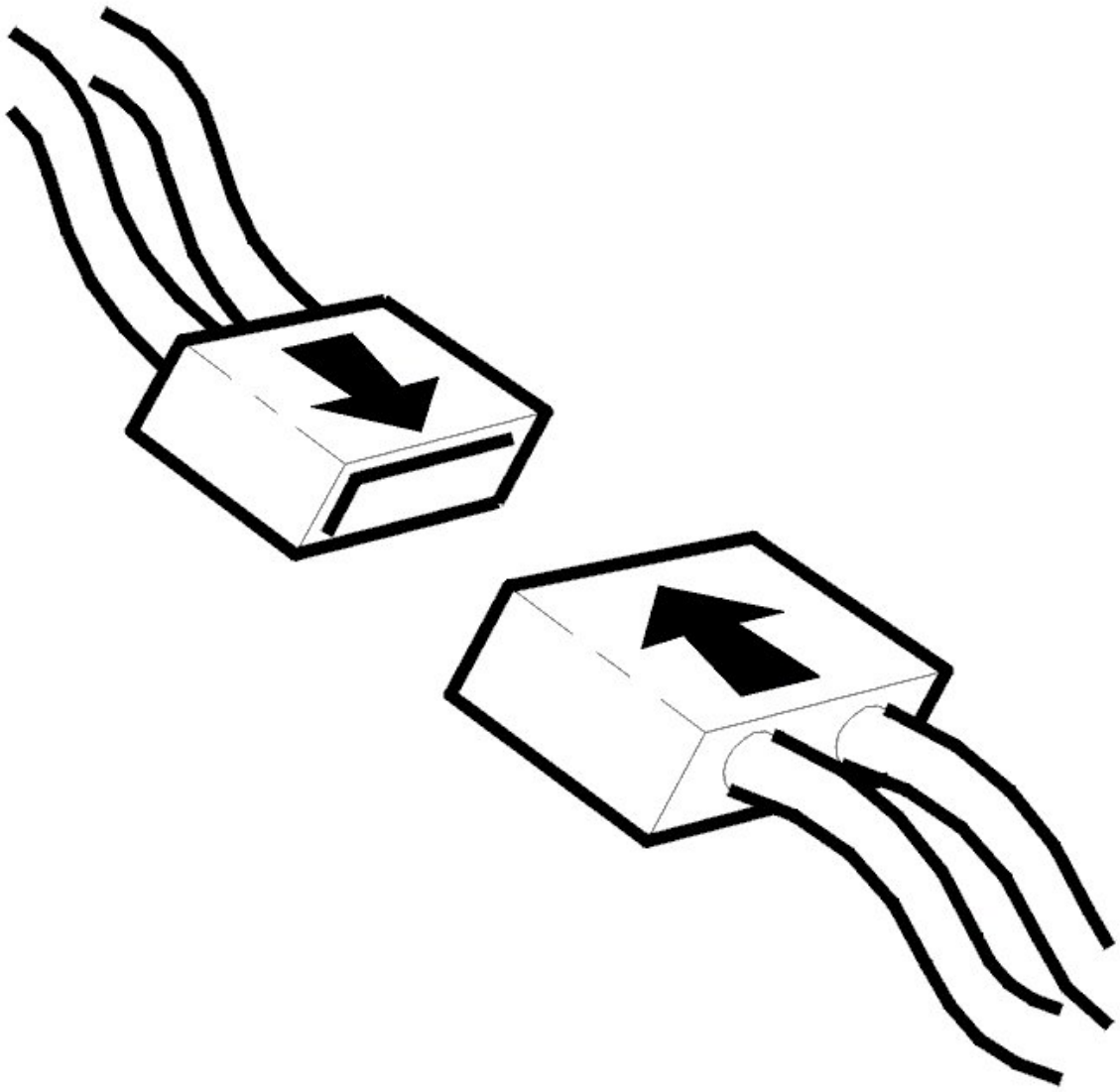
Fault symptom[s]
- The cargo compartment lighting is not working
- The interior lighting does not work.

Faulty Signal

Faulty signal

Checking the connectors and components





- Check the lamp
- Check the connector for the upper electronic module (UEM) and cargo compartment lighting/third row reading lamps. Check for contact resistance and oxidation.

Remedy as necessary

- Reinstall the connectors, components etc.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

Does the lamp function?

Yes - Verification

No - Checking for open-circuits and short-circuits to voltage

---

Checking for open-circuits and short-circuits to voltage

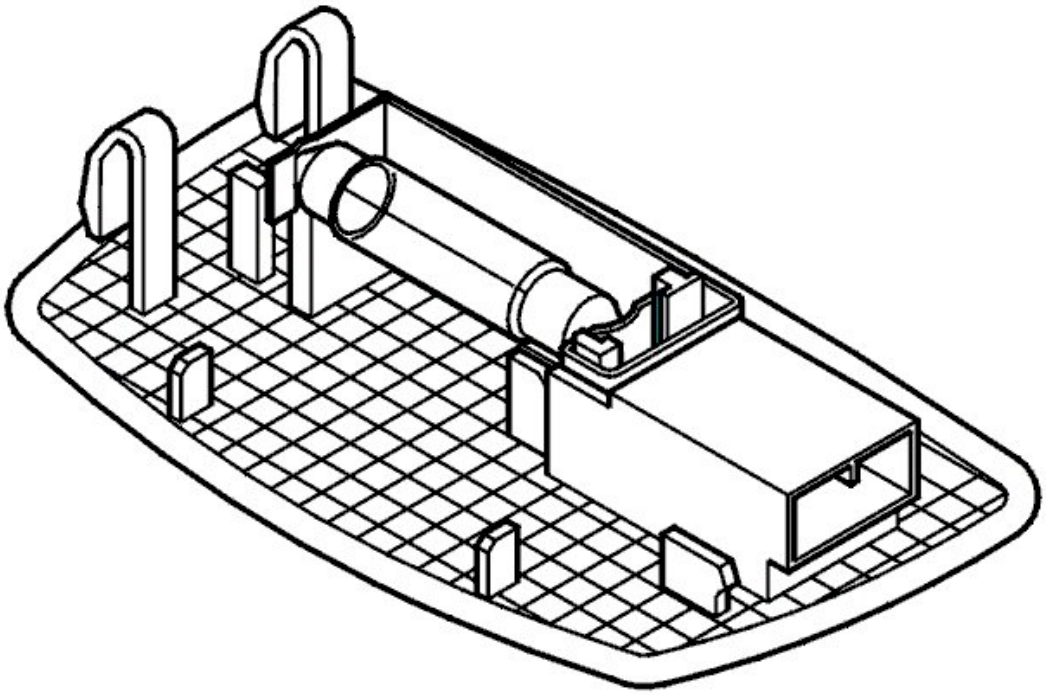
Check the cable between control module terminal #9 and the cargo compartment lighting/third row reading lamps. Check for an open-circuit. Check for a short-circuit to supply voltage.
Also check the ground connection of the cargo compartment lighting/third row reading lamps.
Remedy as necessary.

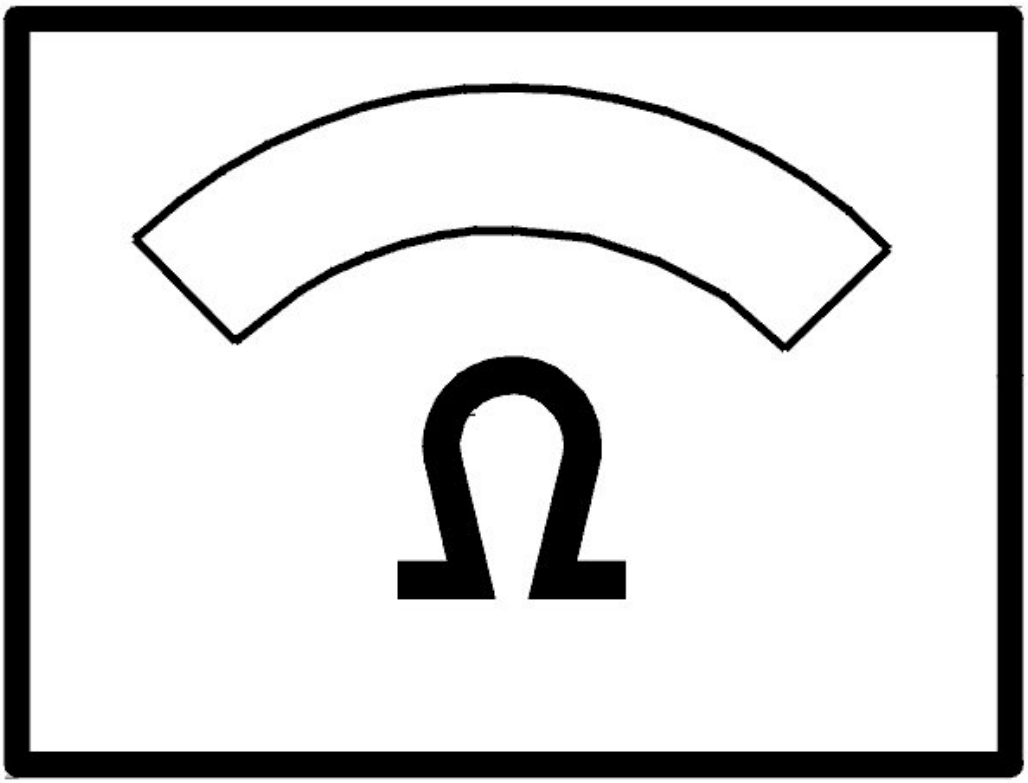
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and

Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)

- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





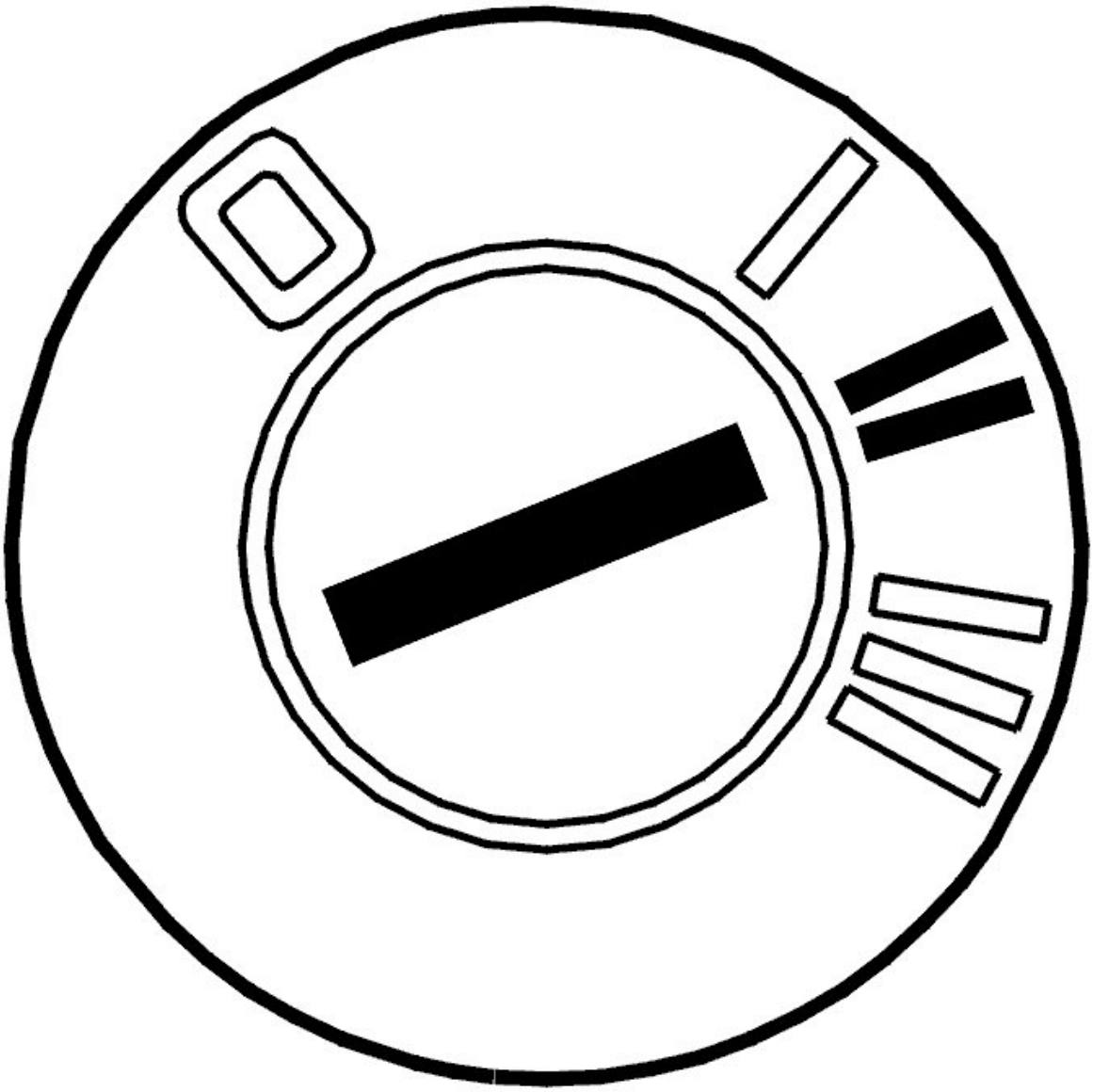
Continue - Verification

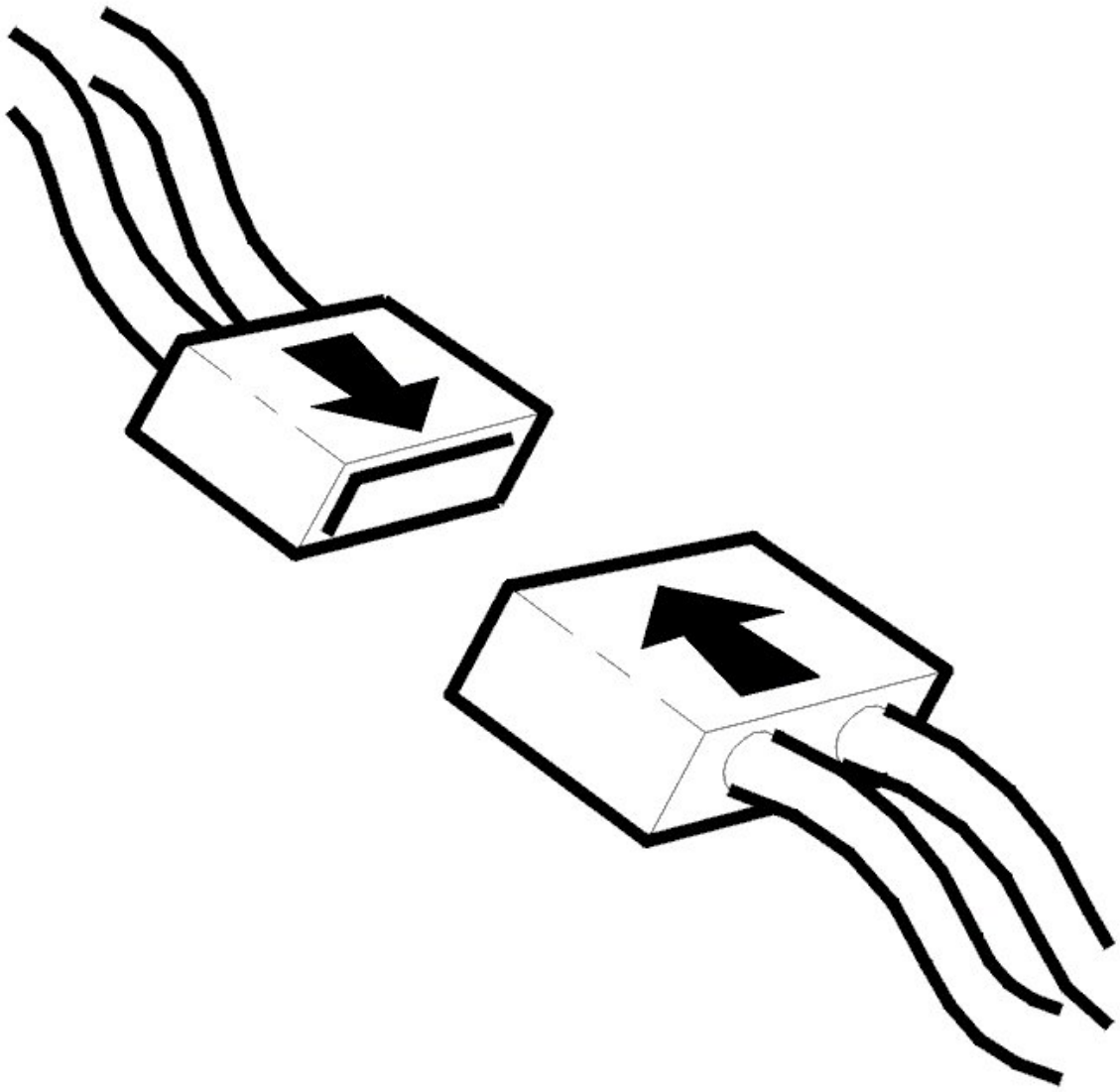
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off.
- Reinstall the connectors, components etc.
- Ignition on.

Check that the relevant lamp button and lamp are functioning.

Does the lamp function?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the connectors and components

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit tries to store data in its memory and the data becomes corrupted, the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- Fault in EEPROM.

Fault symptom[s]
- Courtesy lighting does not work
- Alarm does not work.

Internal Fault

Internal fault

Checking for permanent or intermittent faults

Check whether any customer symptoms persist.

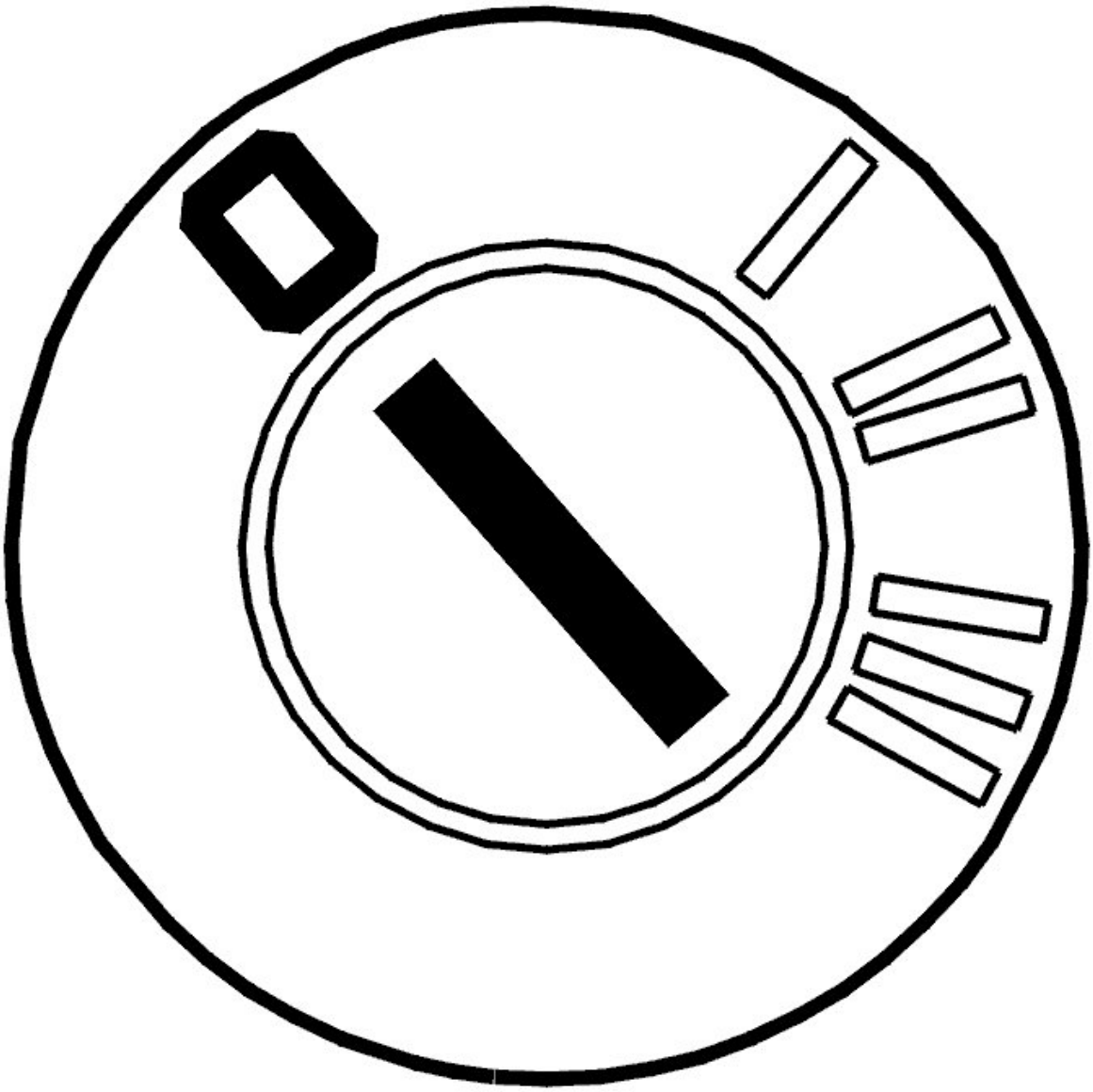
Do any symptoms persist?

Yes - Replacement of control unit and programming

No - Intermittent fault

Replacement of control unit and programming

Note! Before replacing the control unit all the program data should be read from the control unit if possible.



- Ignition off.

The upper electronic module has registered an internal fault.
There is a design fault and the control unit should be replaced.

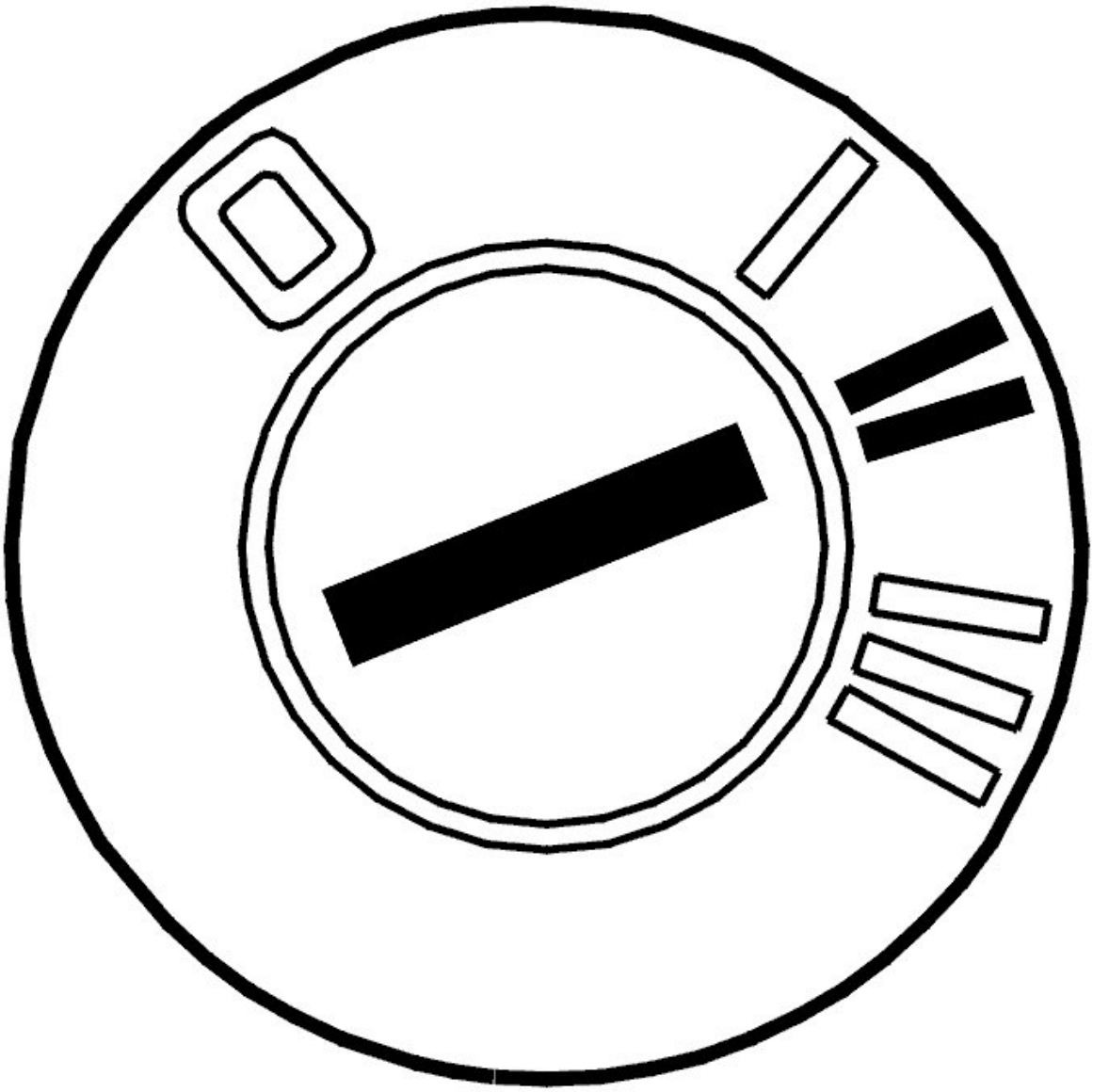
Continue - Replacement of the control unit

Replacement of the control unit

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

---

Replacing control modules and downloading software

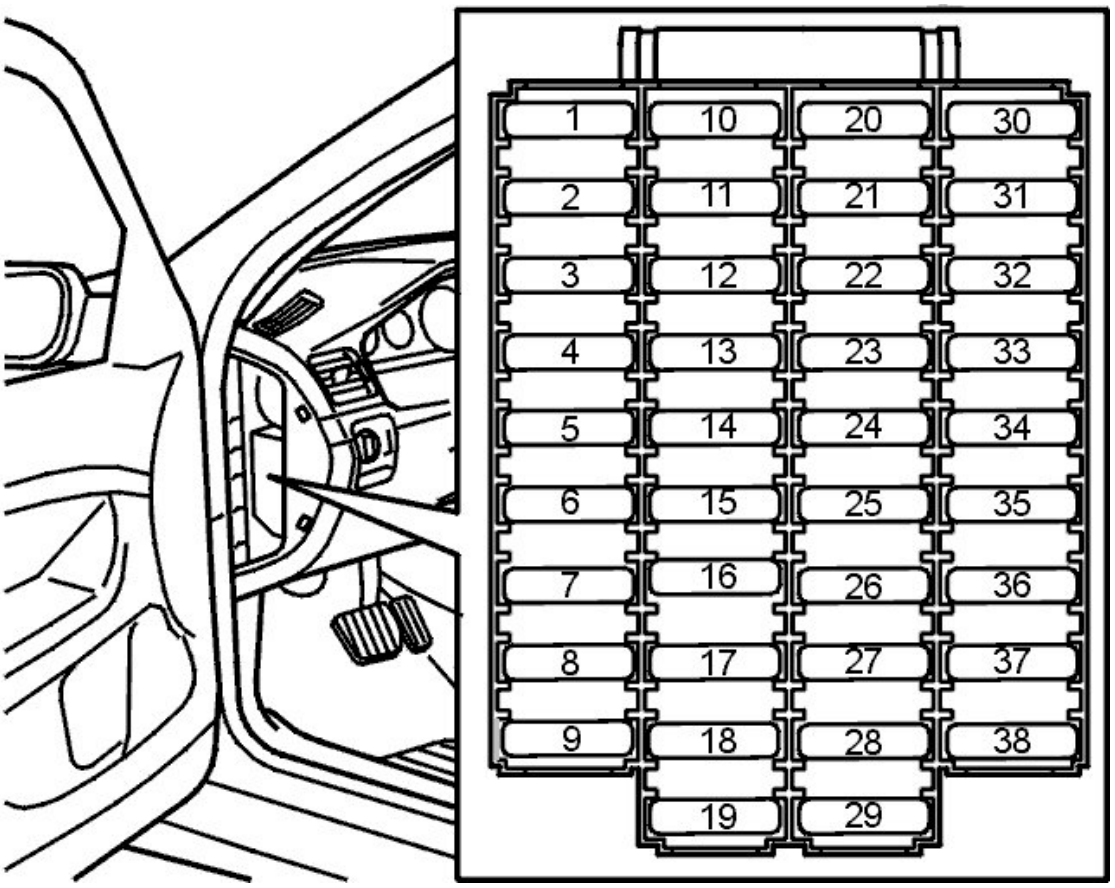
Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting

2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short

- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long

- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:

- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - DONE

DONE - DONE

DONE - Fault Found

Intermittent fault

Fault-tracing information

Fault-tracing information

Fault-tracing indicates that the control module had previously identified an intermittent fault, but that the fault is no longer present.

Continue - DONE

DONE - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- Unknown position of sunroof.

Fault symptom[s]
- Automatic sunroof closing does not work.

Signal Faulty

Signal faulty

Set-up
- The sunroof has lost its position and must be calibrated before it will work again.

Other information
- Sun roof module (SRM), calibrating See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Testing and Inspection

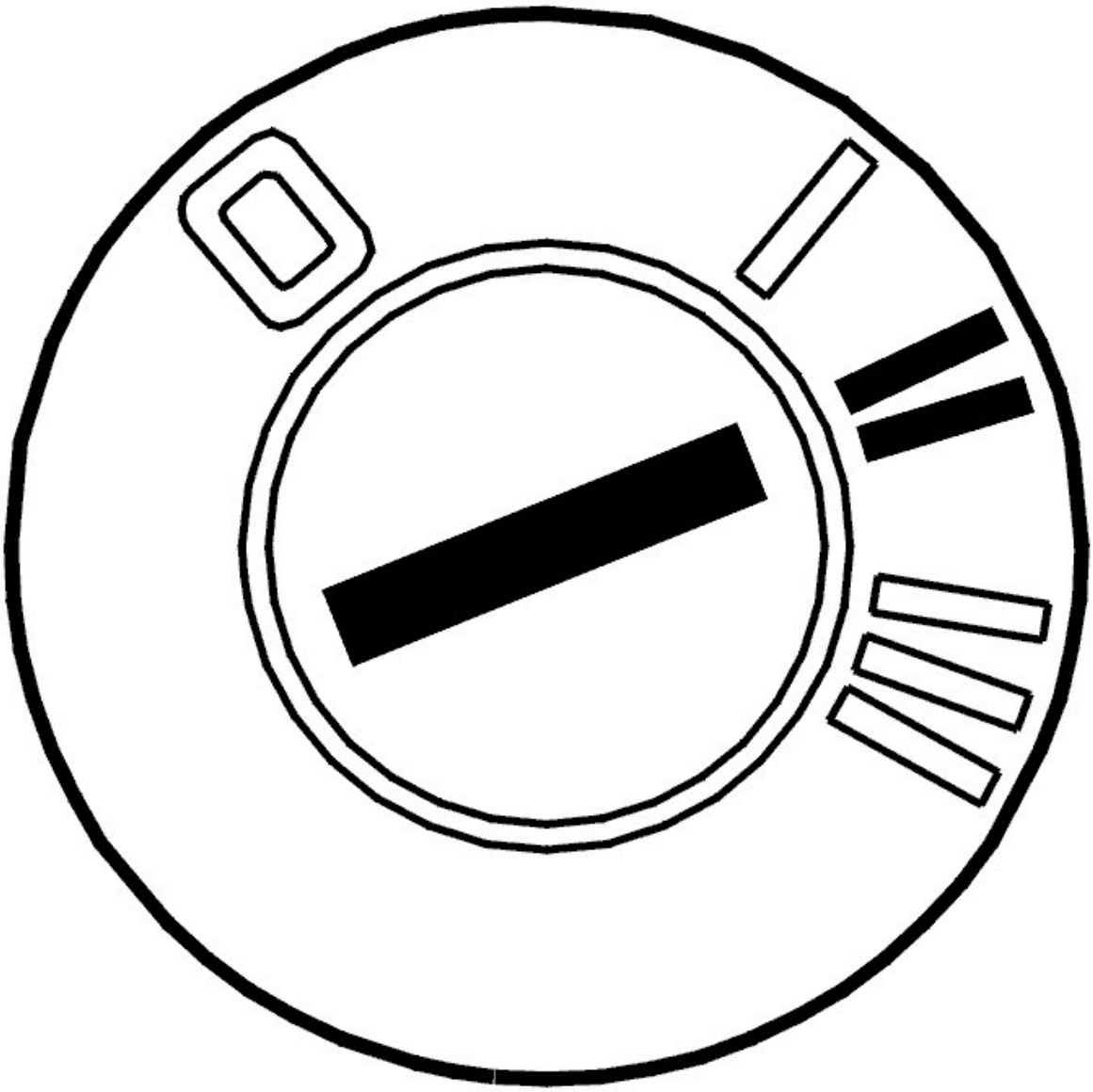
Continue - Verification

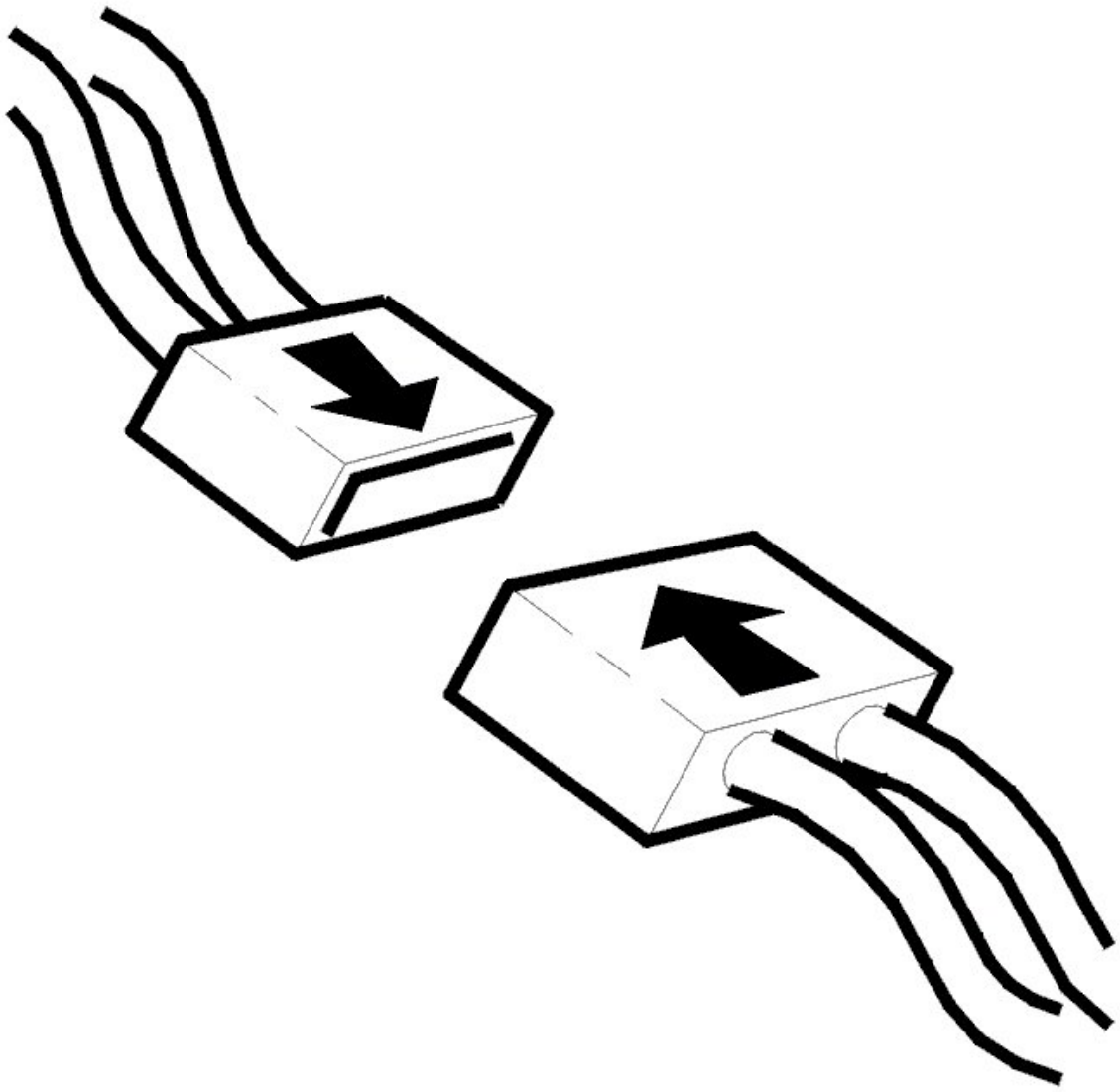
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Try to operate the sunroof automatically by pressing the switch down two stages.

Does the sunroof move automatically?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Set-up

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that SRM-0002 is given when contact is made with the sunroof control unit (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

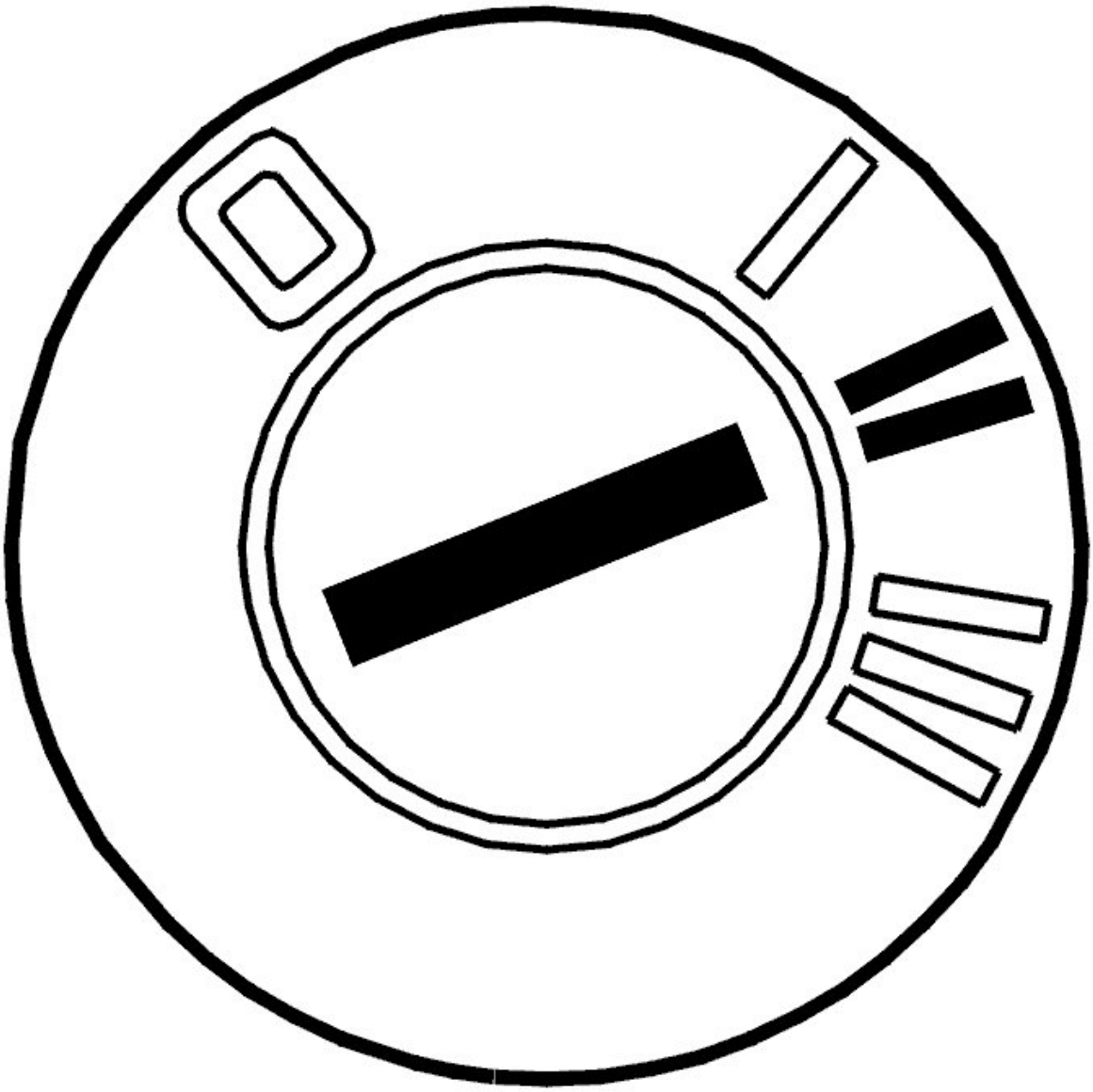
Possible source
- Even though the relay is switched off, the sunroof motor is fed by a current
- Faulty relay.

Fault symptom[s]
- Automatic sunroof closing does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on
- Operate the sun roof to full tilt.

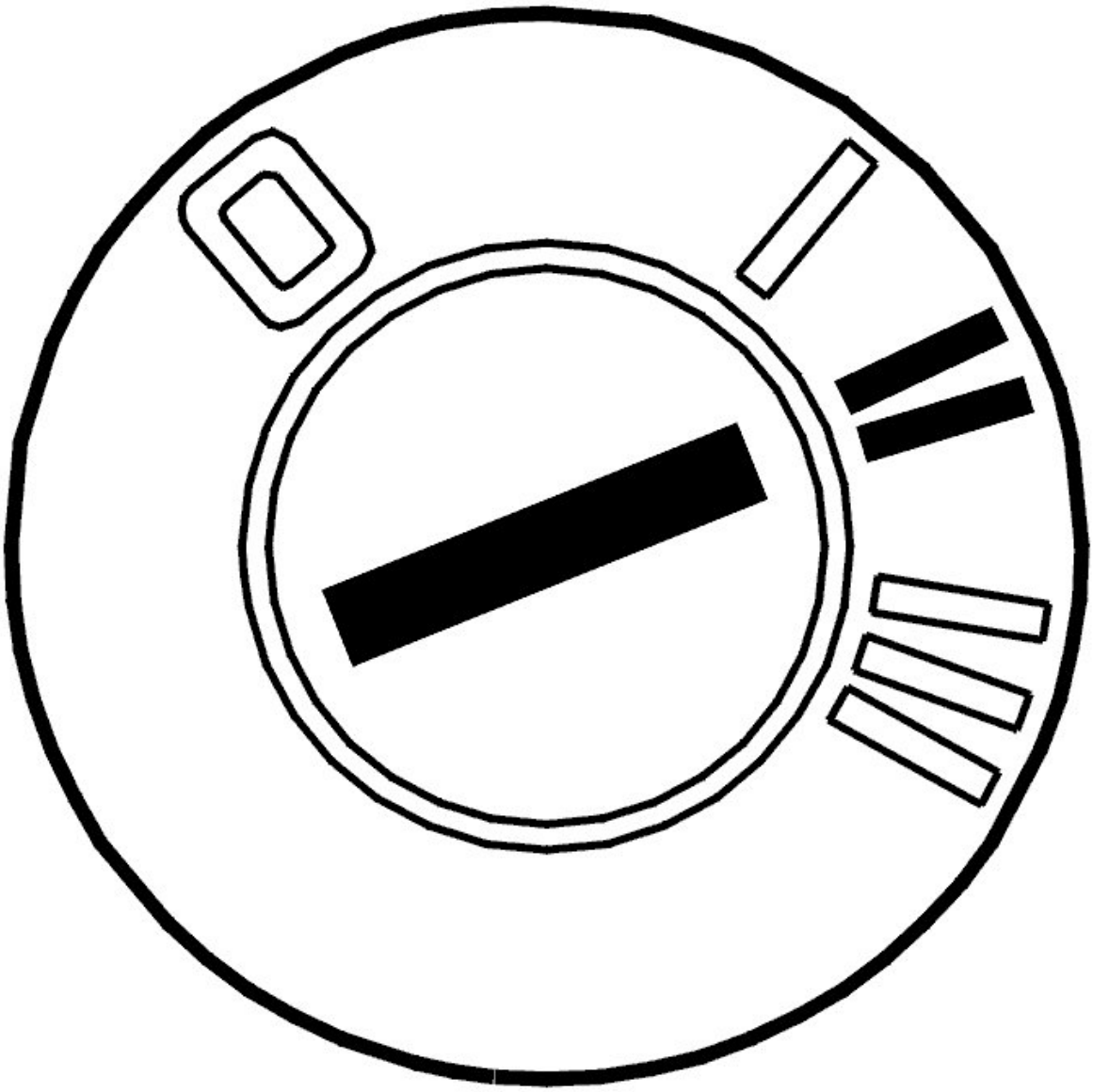
Check that the automatic operation of the sun roof works.

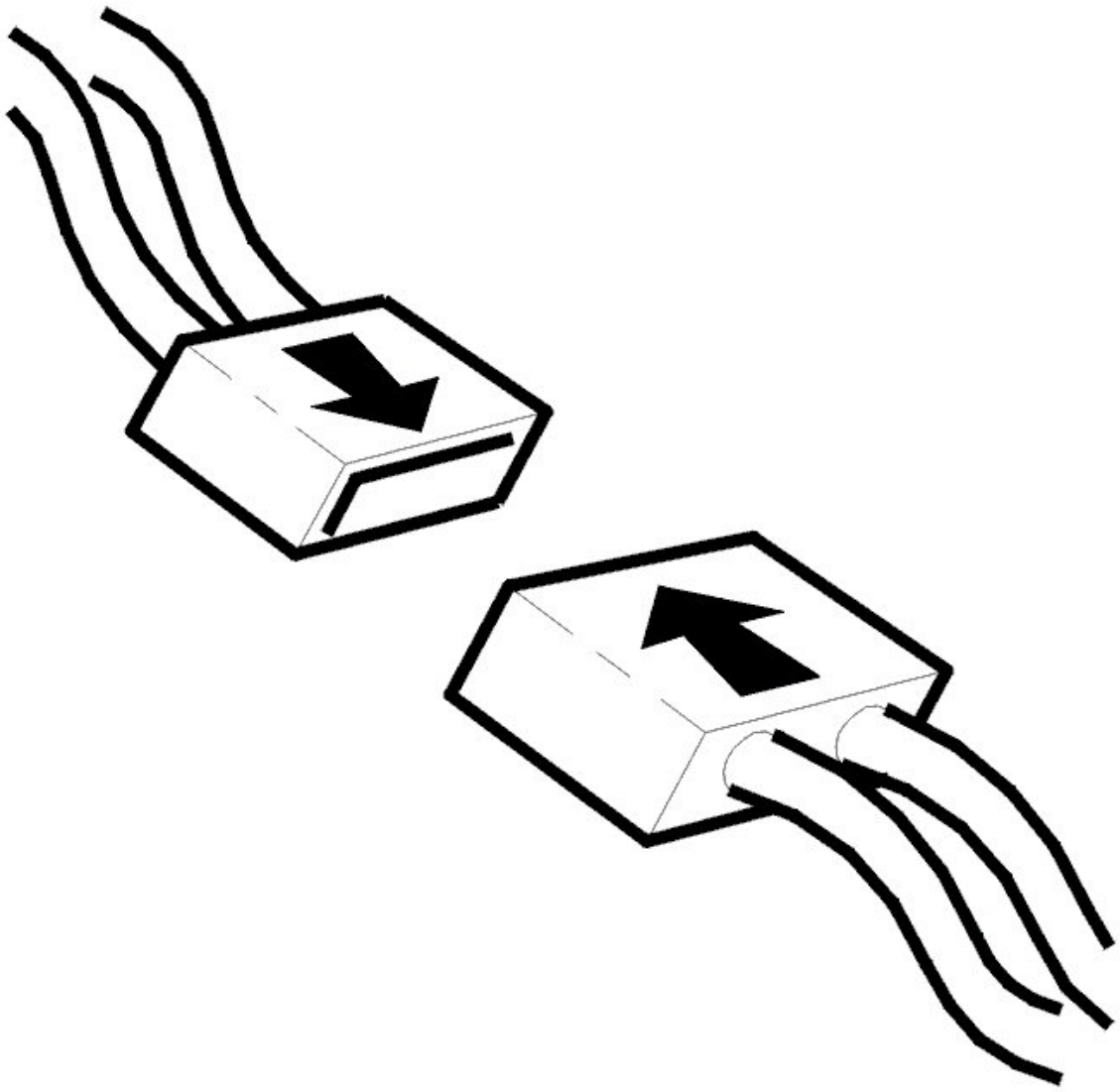
Was the function OK?

Yes - Verification

No - Replacing the component

Replacing the component





- Replace the sun roof motor. See Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check that the automatic closing of the sun roof works.

Does the automatic closing of the sun roof work?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

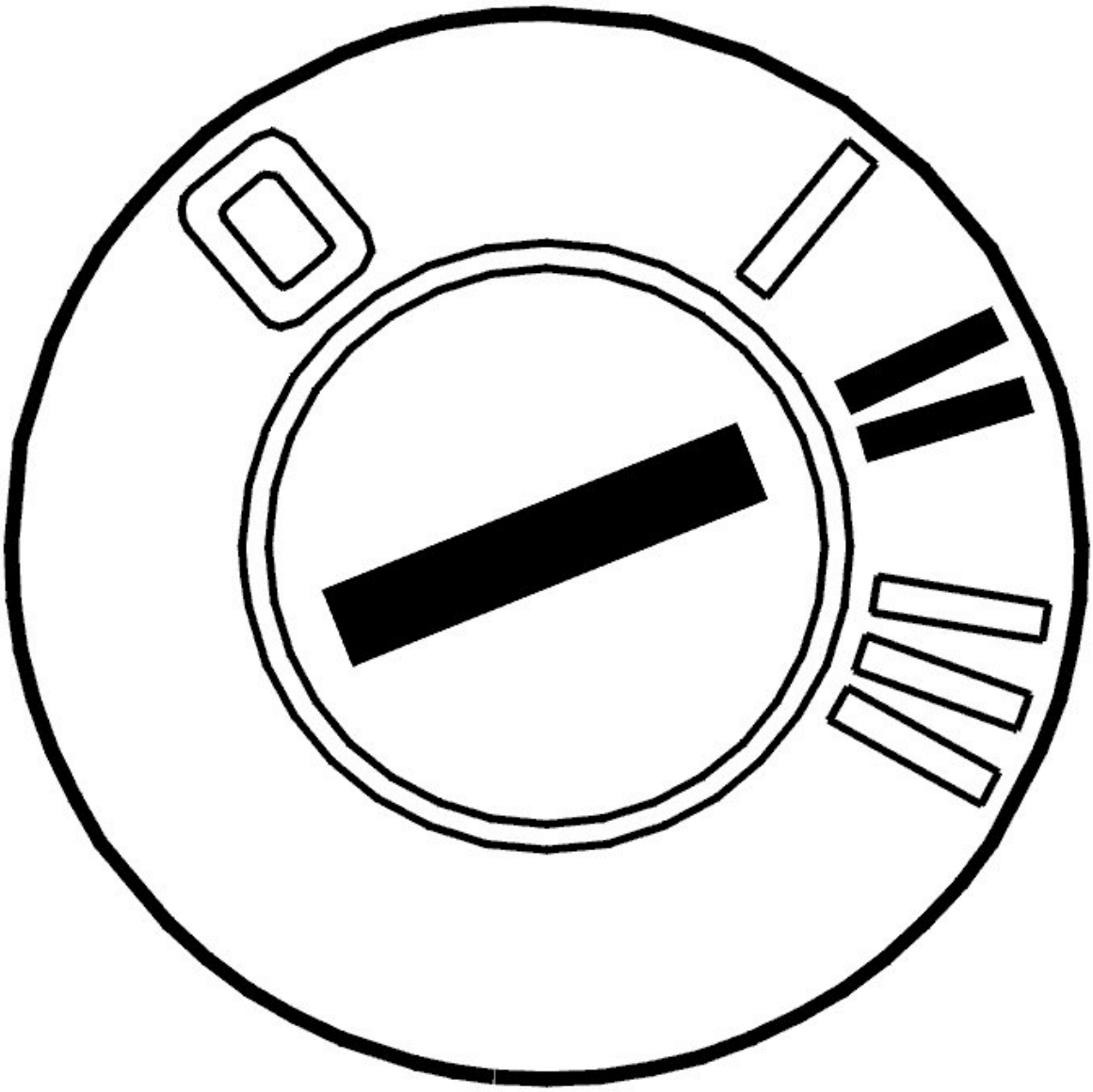
Continue - Verification

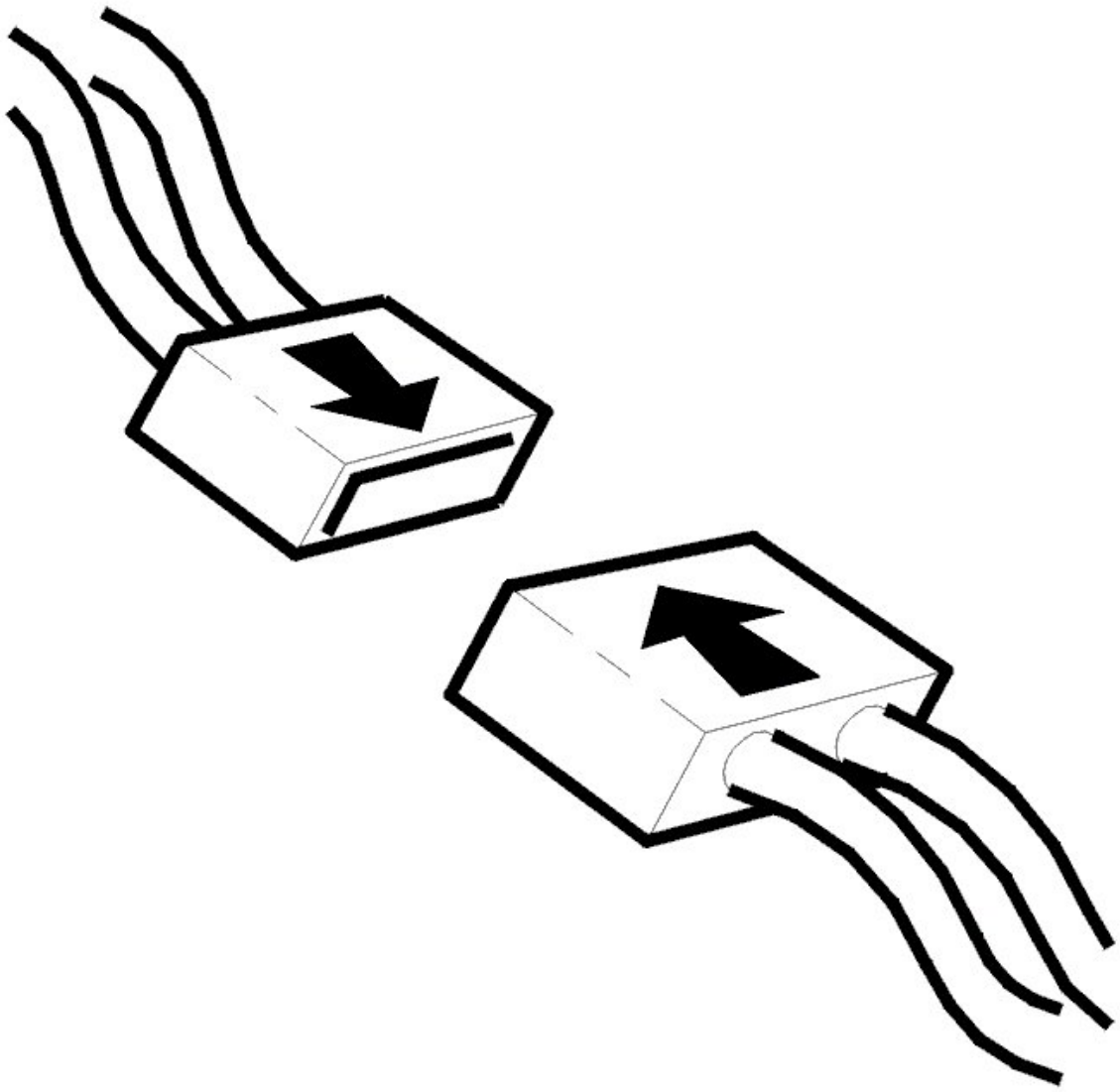
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof closing works.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), diagnostic trouble code is displayed.

Substitute value
- Nothing.

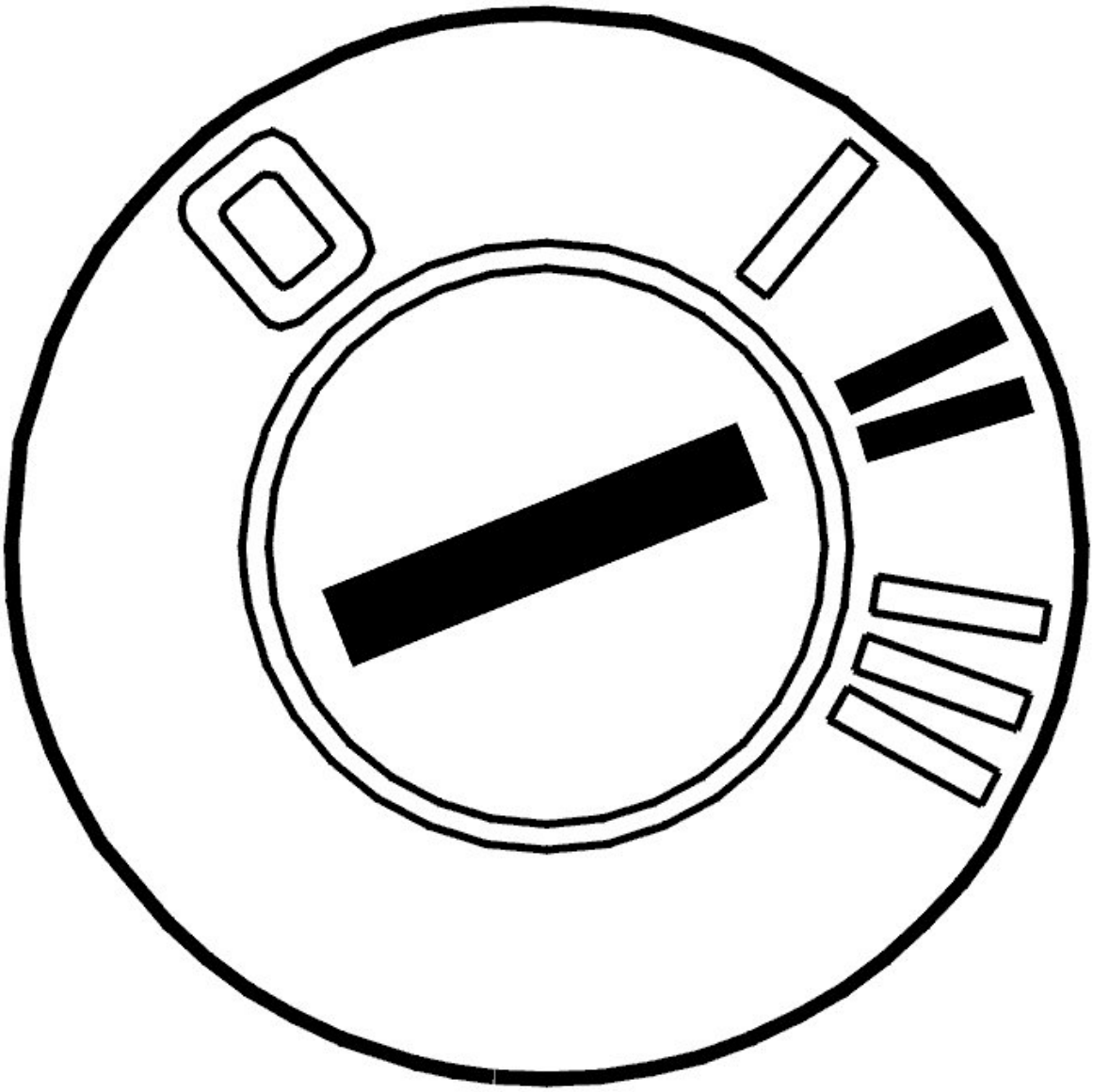
Possible source
- Short circuit to voltage supply on control unit ground wire.
- Open circuit/short circuit to ground on wire from the control unit to the motor.
- Contact resistance or oxidation on the connectors.
- Fuse blown (11C/34).

Fault symptom[s]
- Electric sunroof does not work.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on.

Check that the sun roof can be moved to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

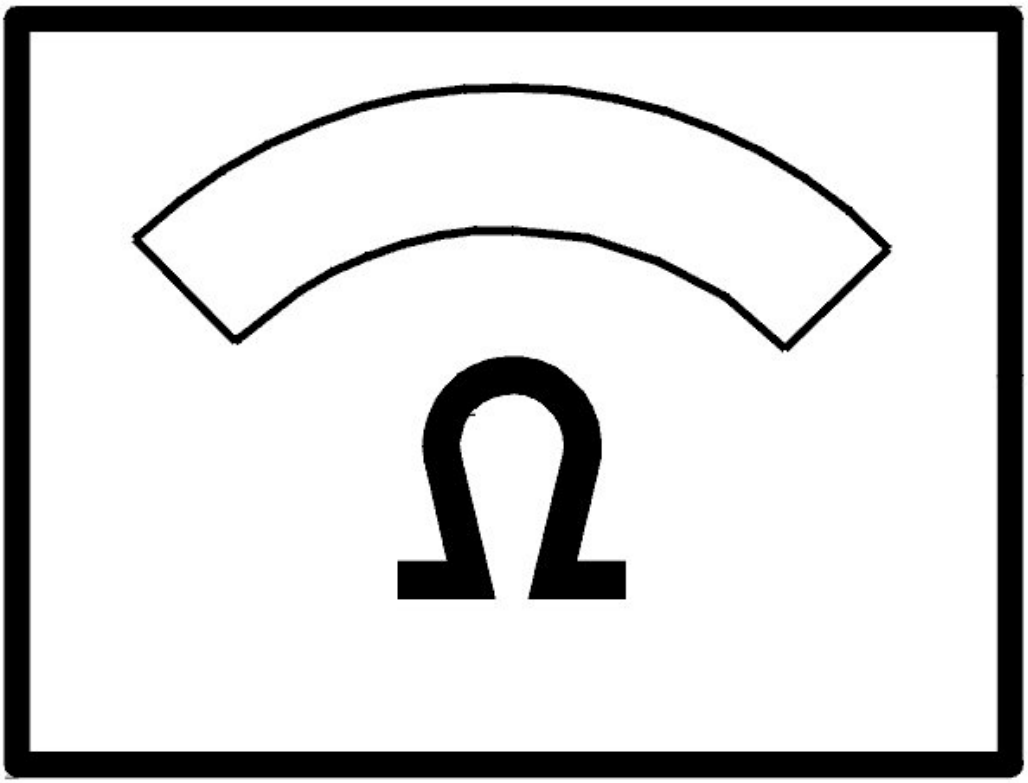
No - Checking the connectors

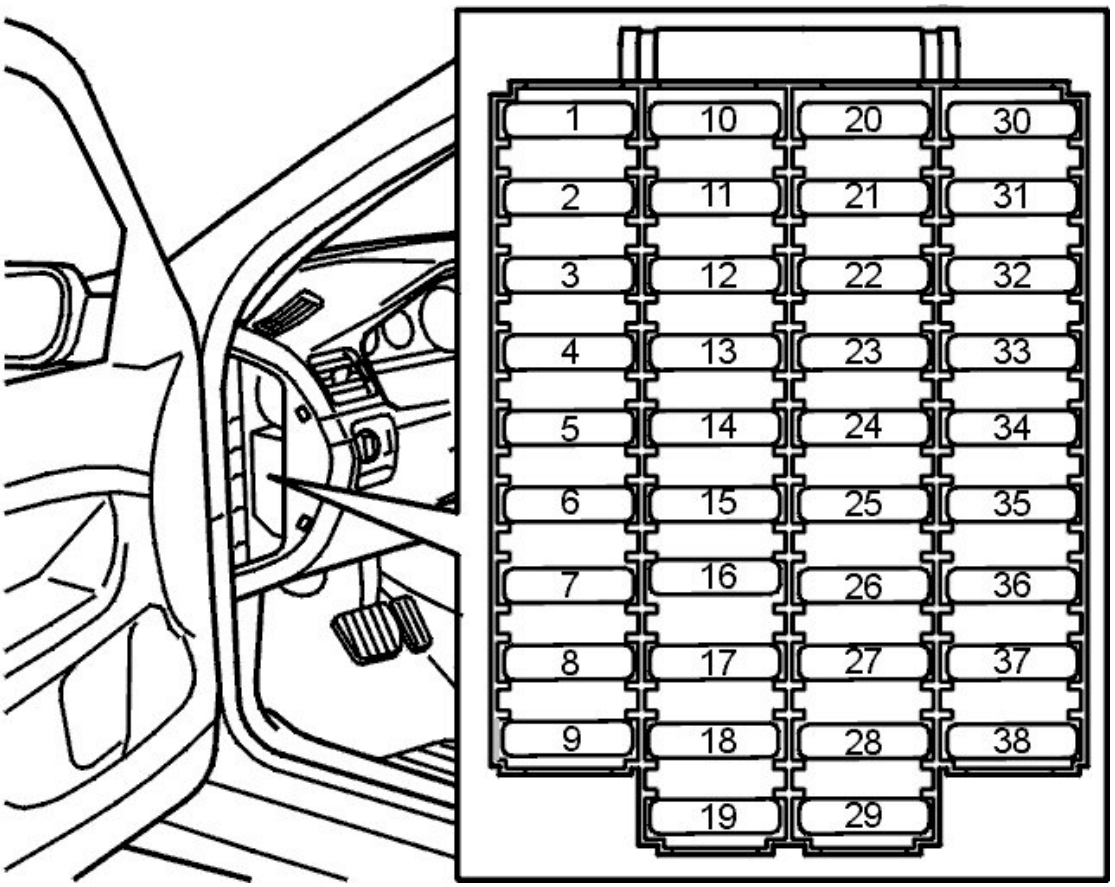
Checking the connectors

Check the connector between the sun roof module (SRM) and sun roof motor. Check for contact resistance and oxidation.
Check that fuse 11C/34 (11C/26 XC90) in the passenger compartment fuse box is intact.
Check connector 54/13. Check for contact resistance and oxidation.

Other information:

- To access the connector between the sun roof module (SRM) and motor, see Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

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Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Was a fault detected?

Yes - Verification

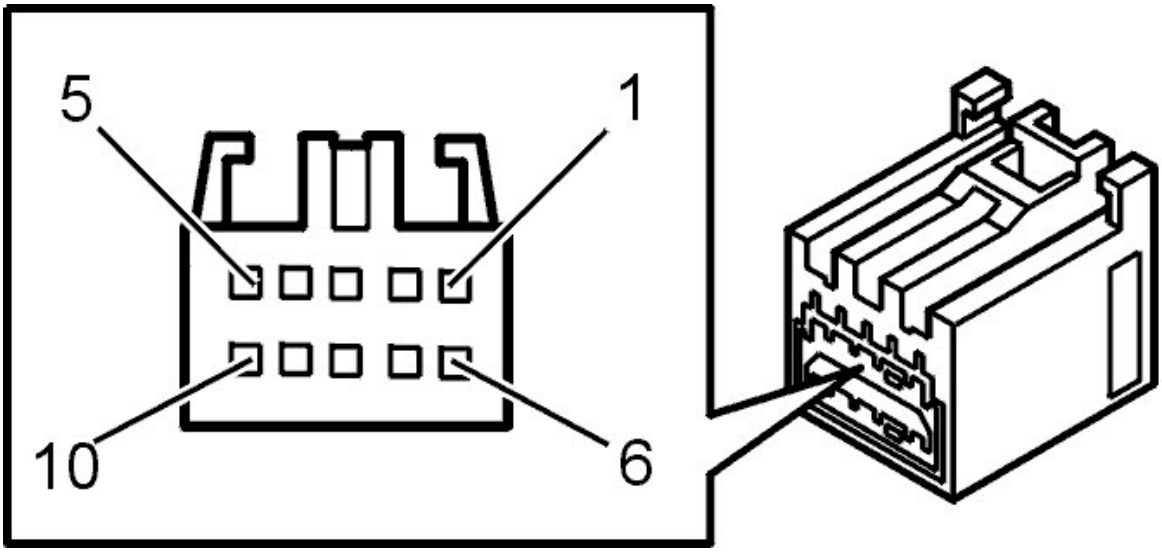
No - Checking for open-circuits and short-circuits

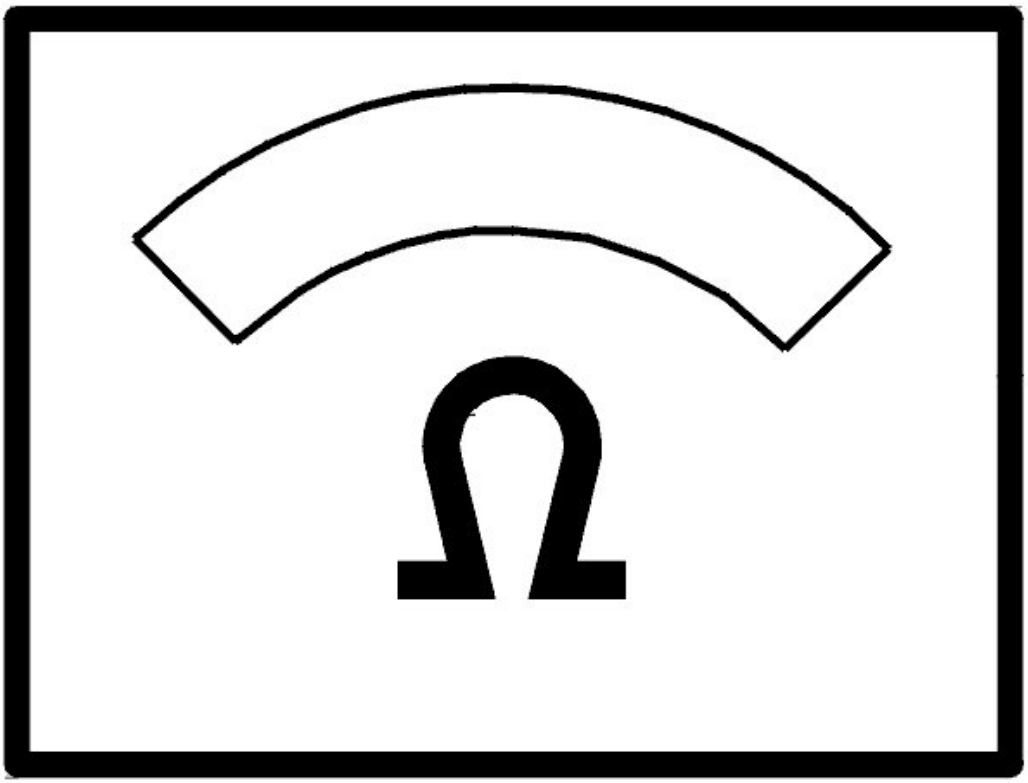
Checking for open-circuits and short-circuits

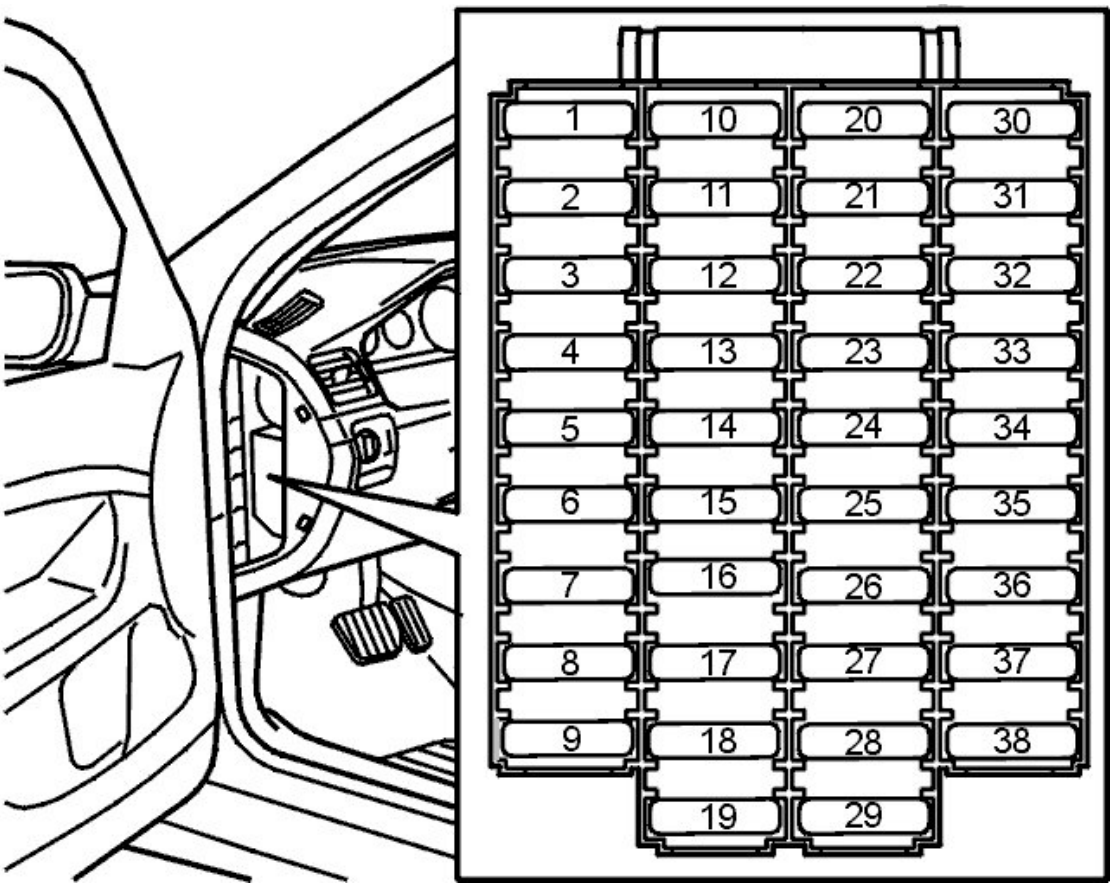
Check the cable between sun roof module (SRM) terminal #10A and ground, left A-post. Check for a short-circuit to supply voltage.
Check the cable between the sun roof module (SRM) terminal #1A and fuse 11C/34 (11C/26 XC90) in the passenger compartment fuse box for a short-circuit to ground or an open-circuit.
Replace the cable if a fault is found.
After carrying out repairs, the sun roof module (SRM) should be calibrated. See Sun roof module (SRM), calibrating See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Testing and Inspection.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



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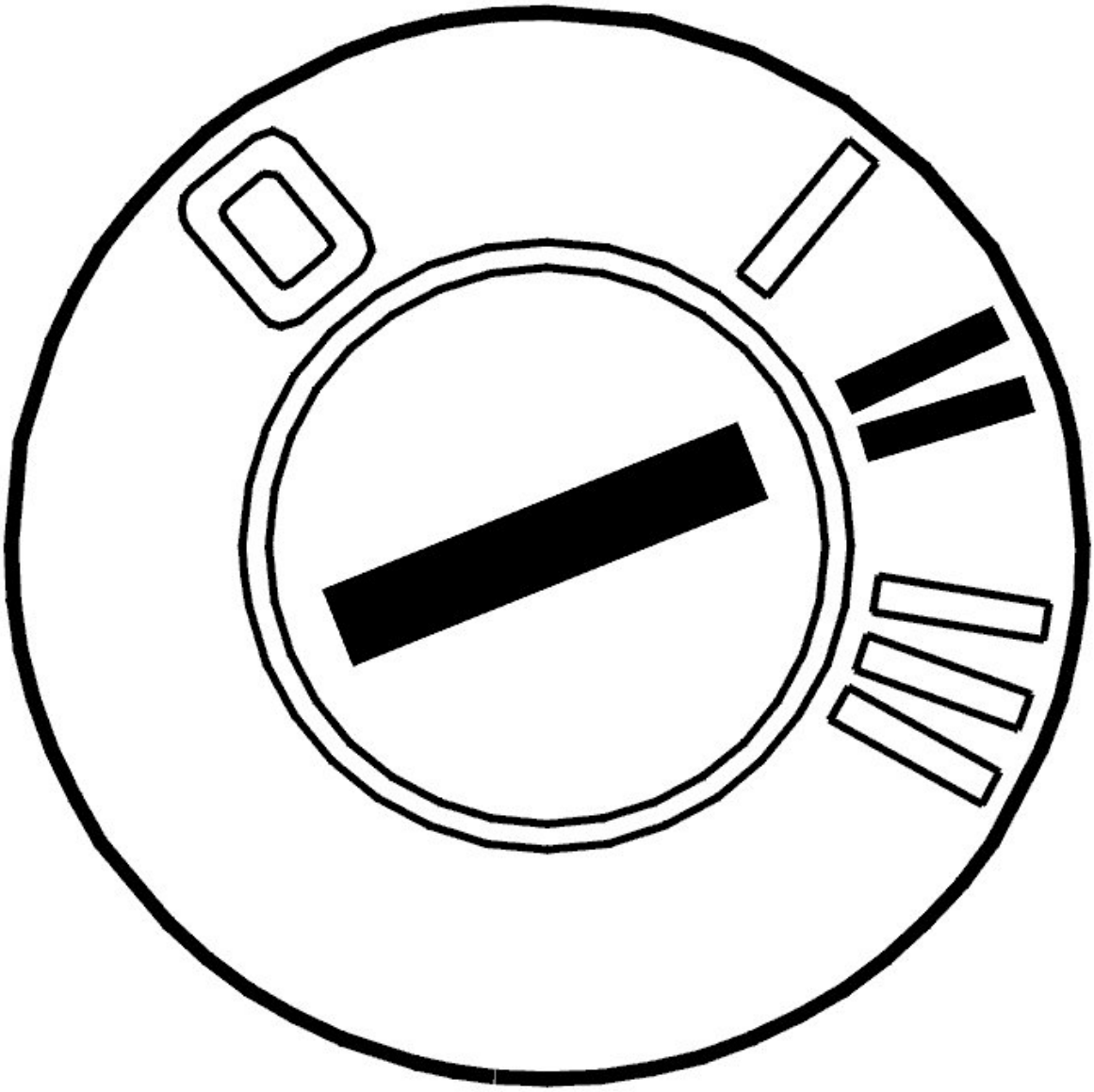
Was a fault detected?

Yes - Verification

No - Replacing the component

Replacing the component



- Replace the sun roof motor. See Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair.
- Ignition off
- Reinstall the components and connectors etc.
- Ignition on.

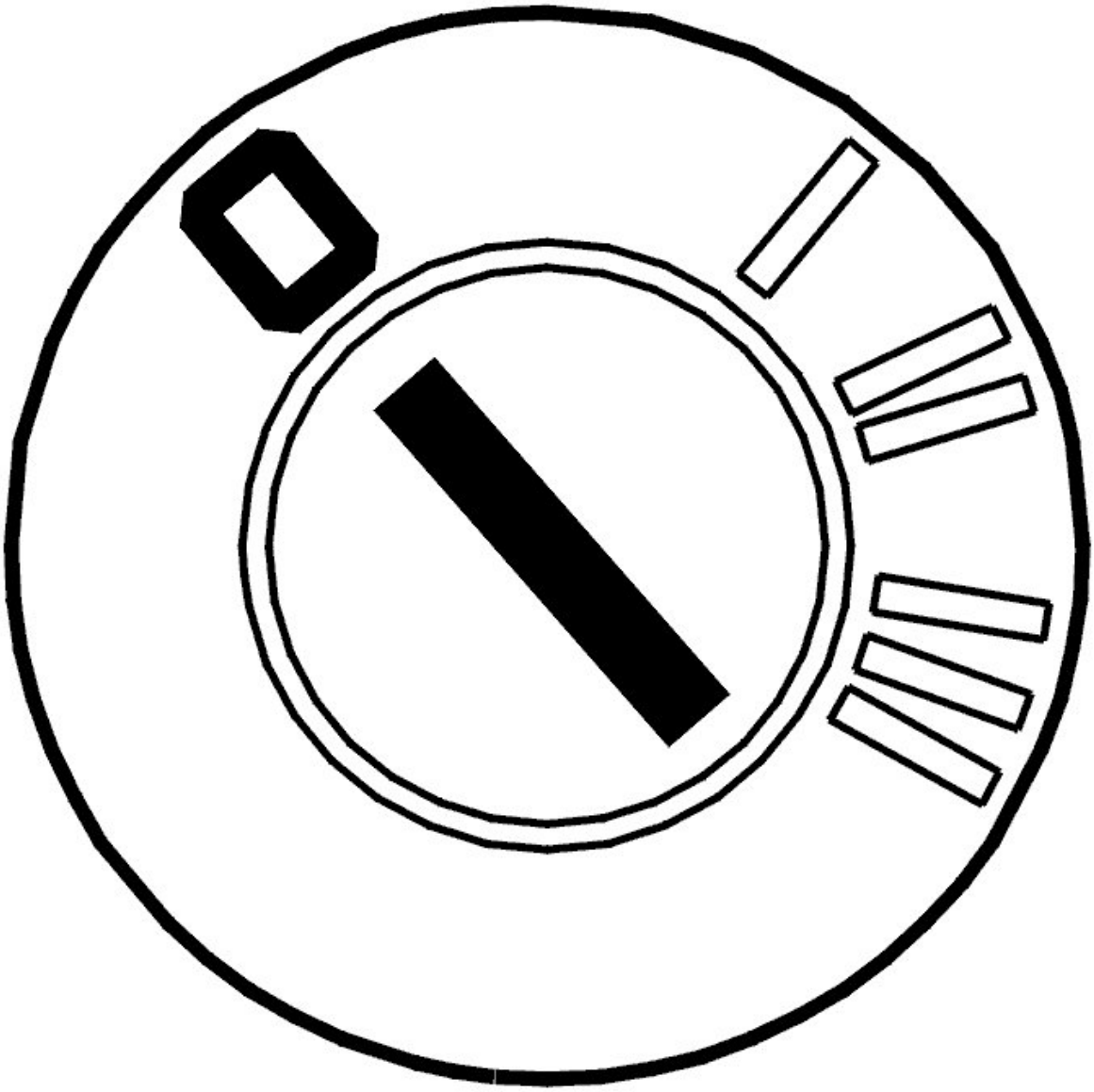
After carrying out repairs, the sun roof module (SRM) should be calibrated. See Sun roof module (SRM), calibrating See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Testing and Inspection.
Check that automatic closing of the sun roof works by pressing forward the switch 2 steps.

Does the automatic closing of the sun roof work?

Yes - Verification

No - Replacing the component

Replacing the component



- Ignition off

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

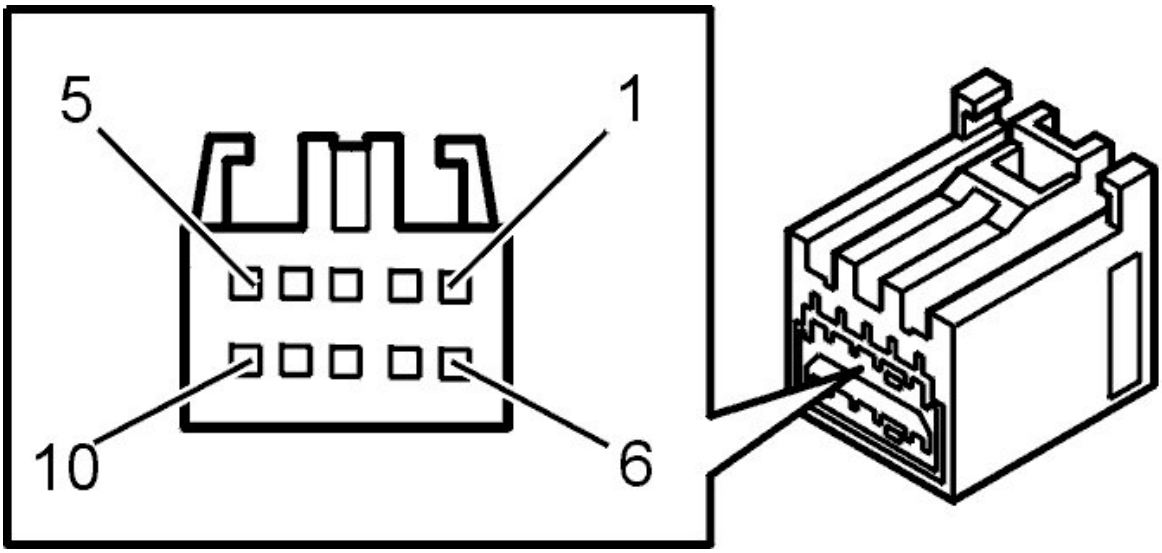
Continue - Verification

Intermittent fault

Check the connector between the sun roof module (SRM) and sun roof motor. Check for contact resistance and oxidation. Check for loose connections.
Check connector 54/13. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between sun roof module (SRM) terminal #10A and ground, left A-post. Check for an intermittent short-circuit to supply voltage.
Check the cable between the sun roof module (SRM) terminal #1A and fuse 11C/34 (11C/26 XC90) in the passenger compartment fuse box for a short-circuit to ground or an intermittent open-circuit.
After carrying out repairs, the sun roof module (SRM) should be calibrated. See Sun roof module (SRM), calibrating See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Testing and Inspection.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM).
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box.
- To access the connector between the sun roof module (SRM) and motor, see Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair.
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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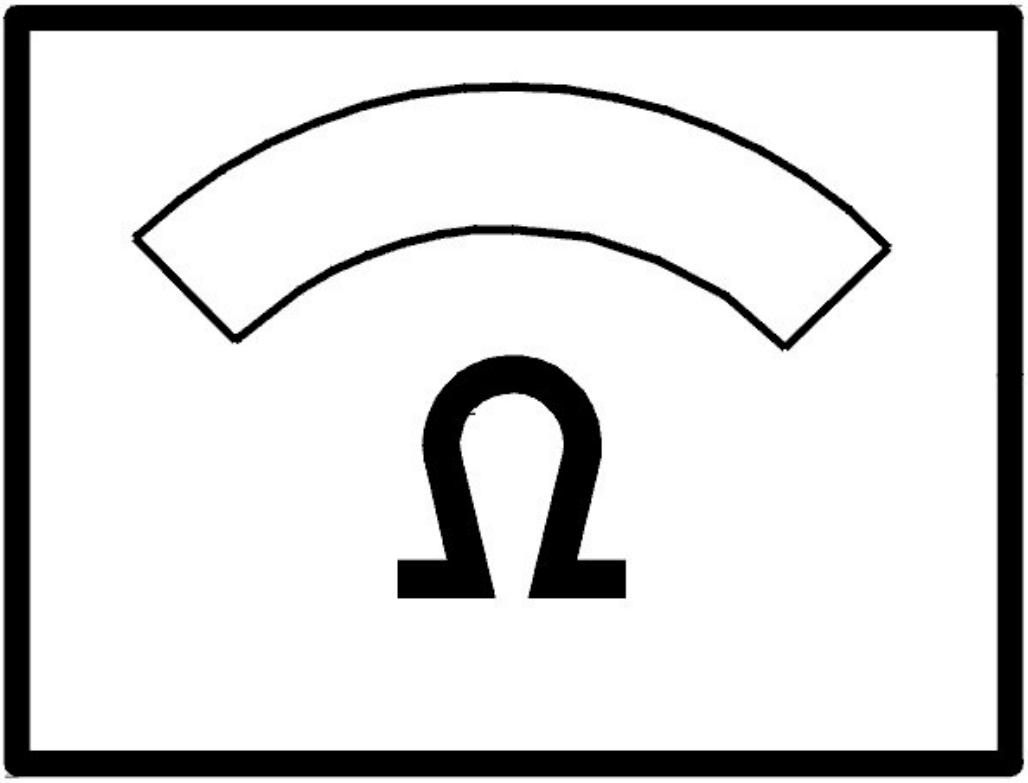
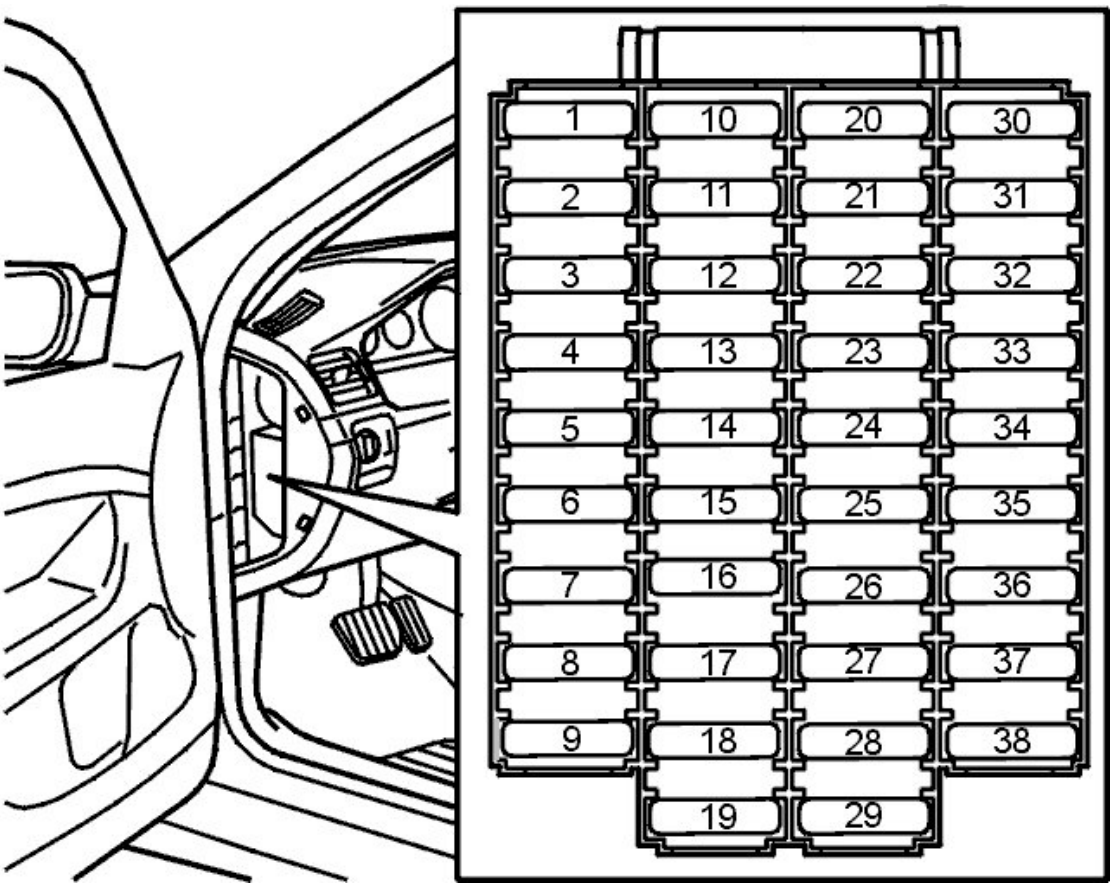




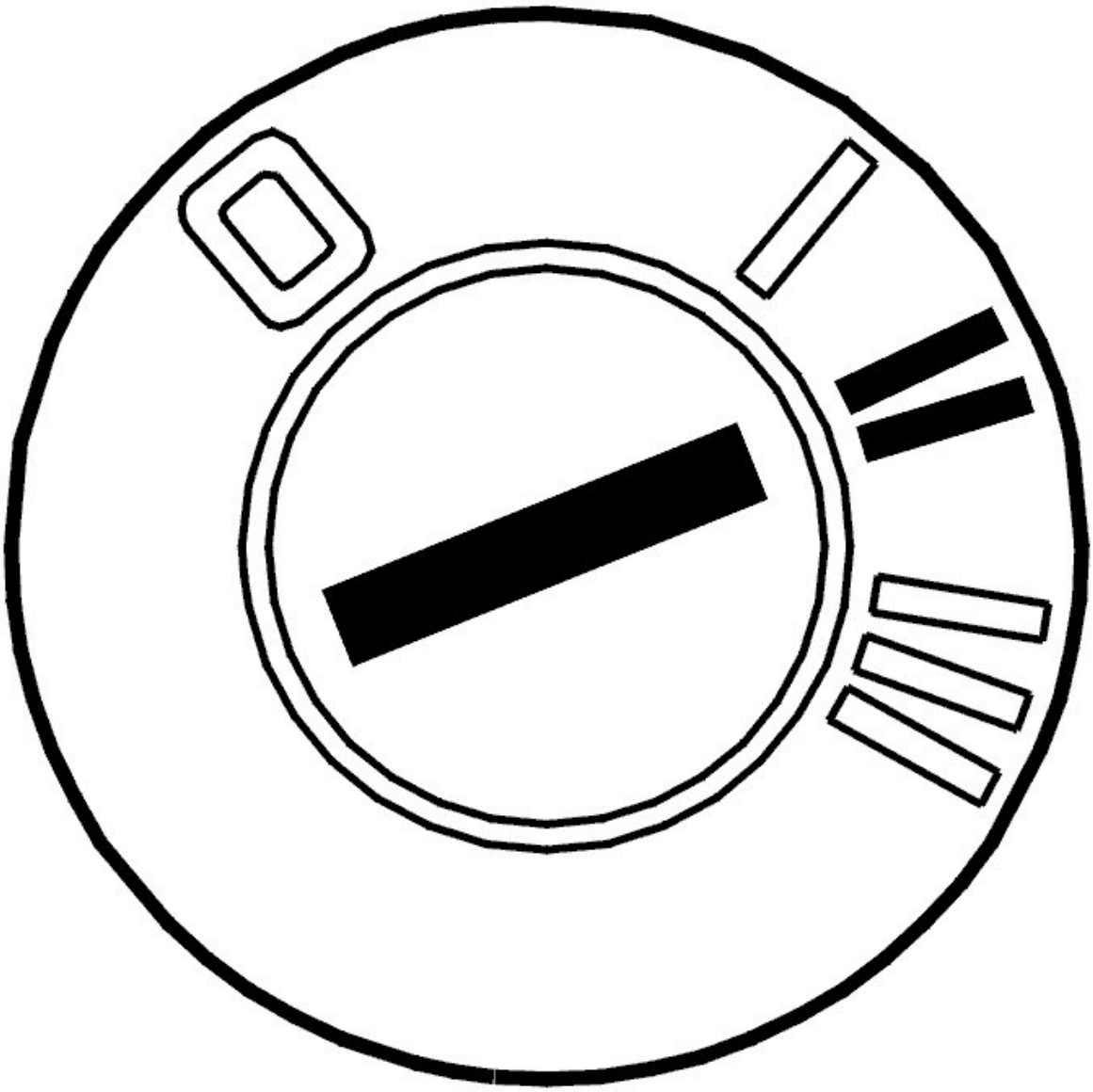
Continue - Trouble-shooting information

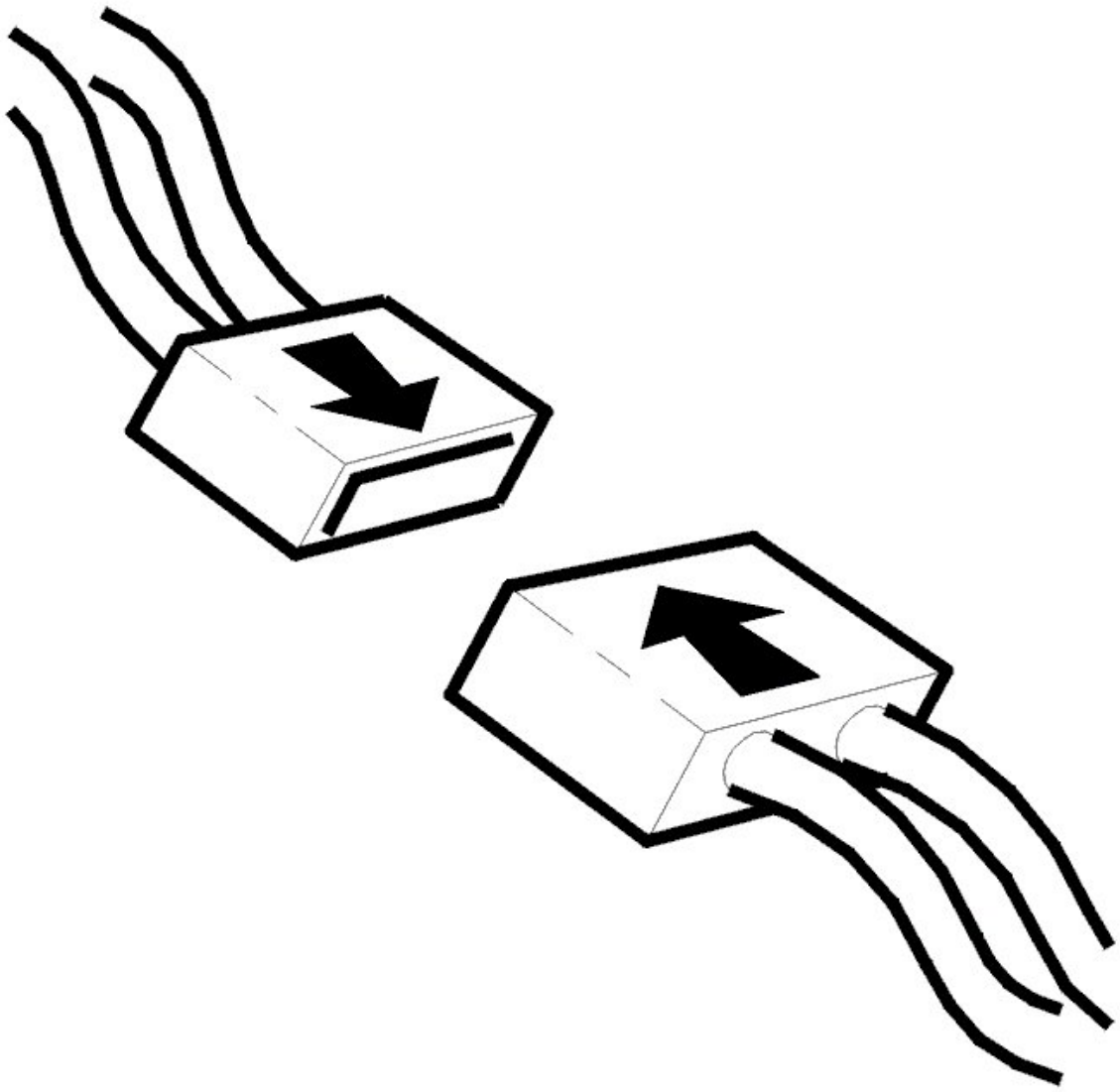
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof can be moved to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Trouble-shooting information

Trouble-shooting information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Trouble-shooting information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof control unit (SRM), diagnostic trouble code is set.

Substitute value
- Nothing.

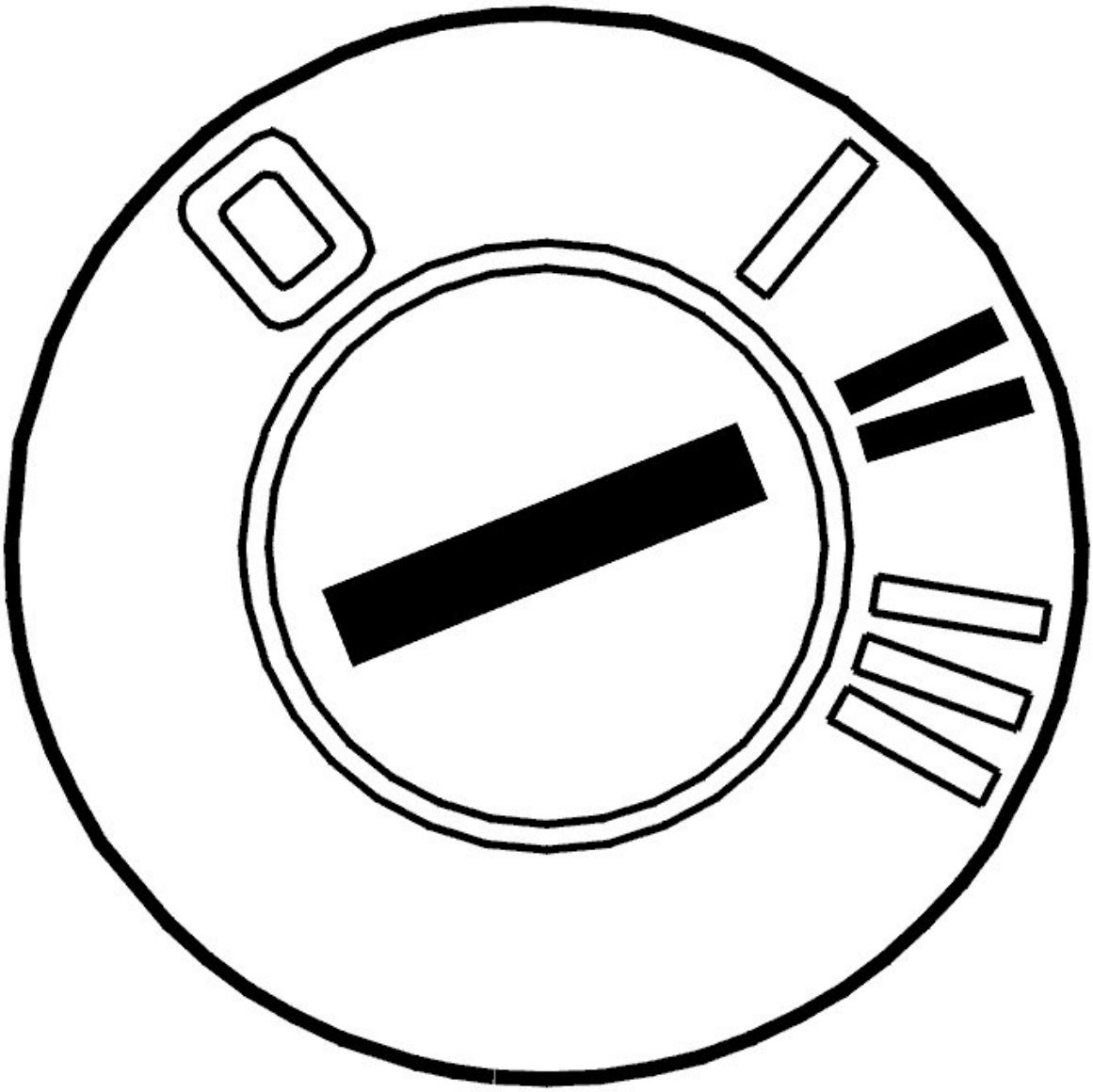
Possible source
- Despite the relay being activated and the sunroof changing position, you cannot measure any current in the motor.

Fault symptom[s]
- Automatic sunroof closing does not work.

Signal Too Low

Signal too low

Checking for permanent or intermittent faults



- Ignition on
- Operate the sun roof to full tilt.

Check that the automatic operation of the sun roof works.

Was the function OK?

Yes - Verification

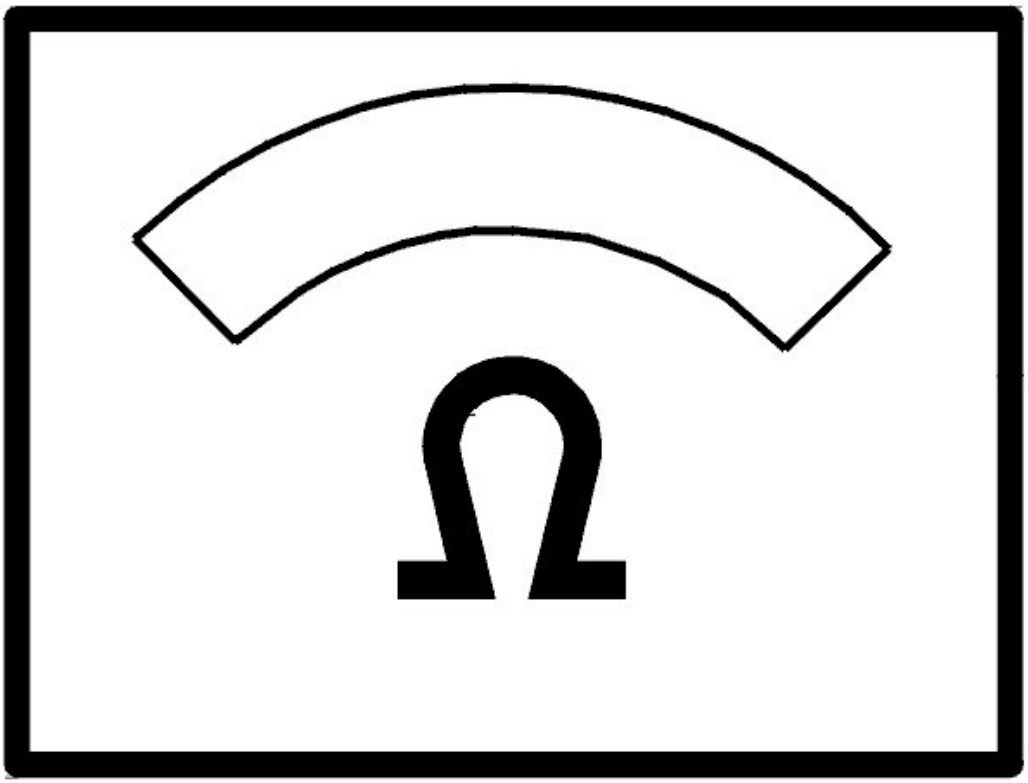
No - Checking the wiring

Checking the wiring

Check the connector to the sun roof motor. Check for contact resistance and oxidation. Check for loose connections.

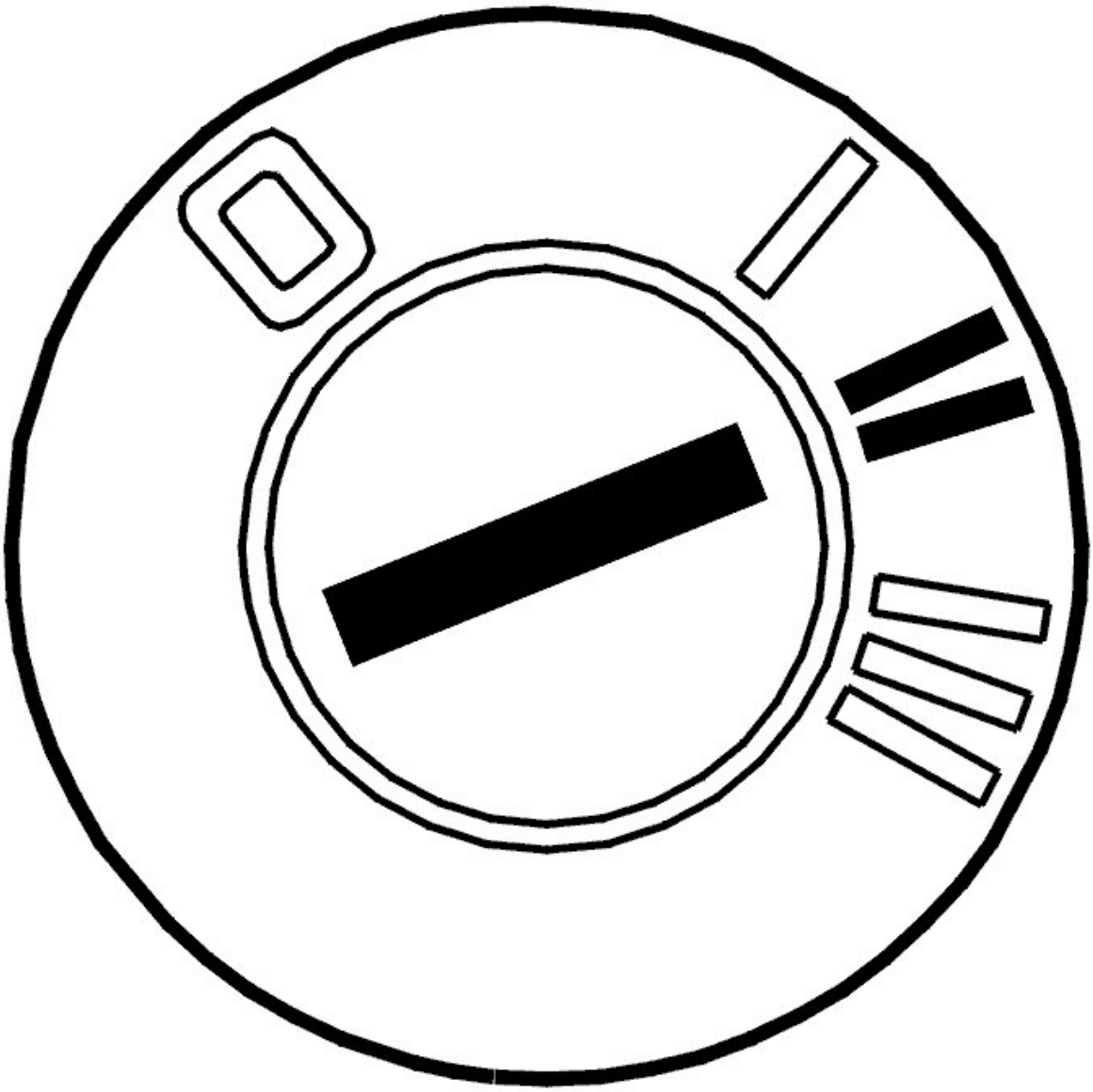
Other information

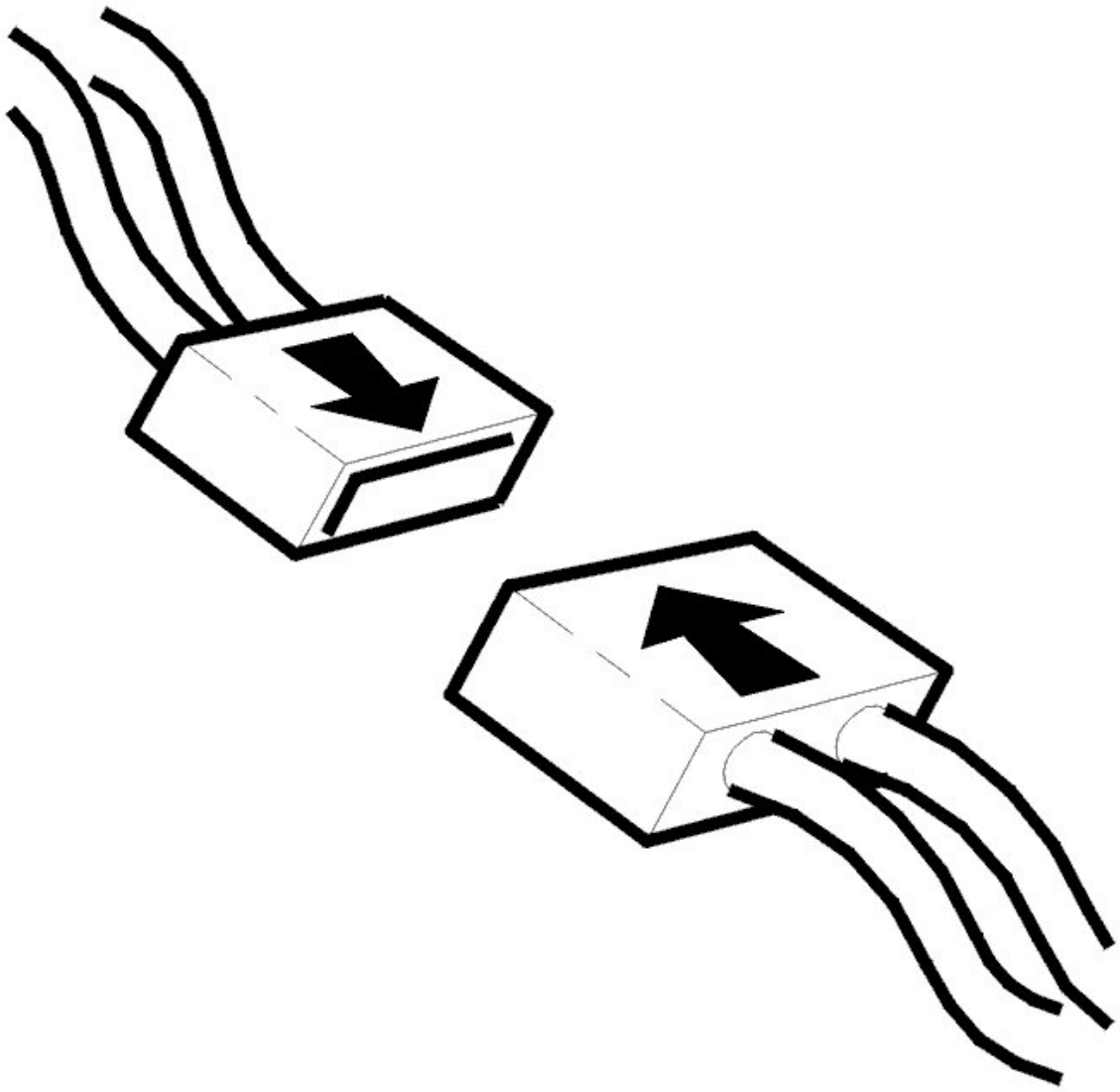
- To access the sun roof motor connector, see Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Replacing the component

Replacing the component





- Replace the sun roof motor. See Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check that automatic closing of the sun roof works by pressing forward the switch 2 steps.

Does the automatic closing of the sun roof work?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

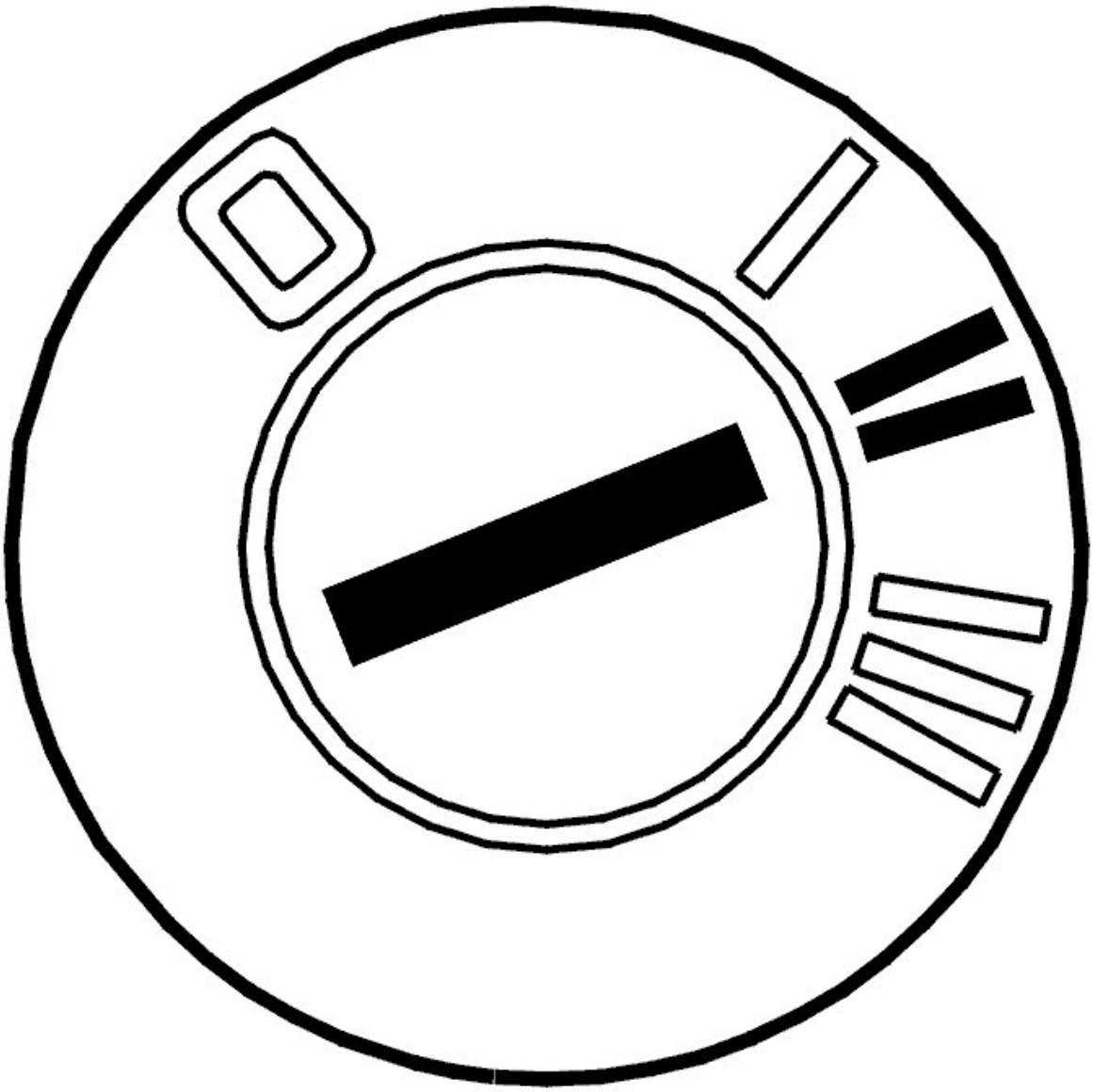
Continue - Verification

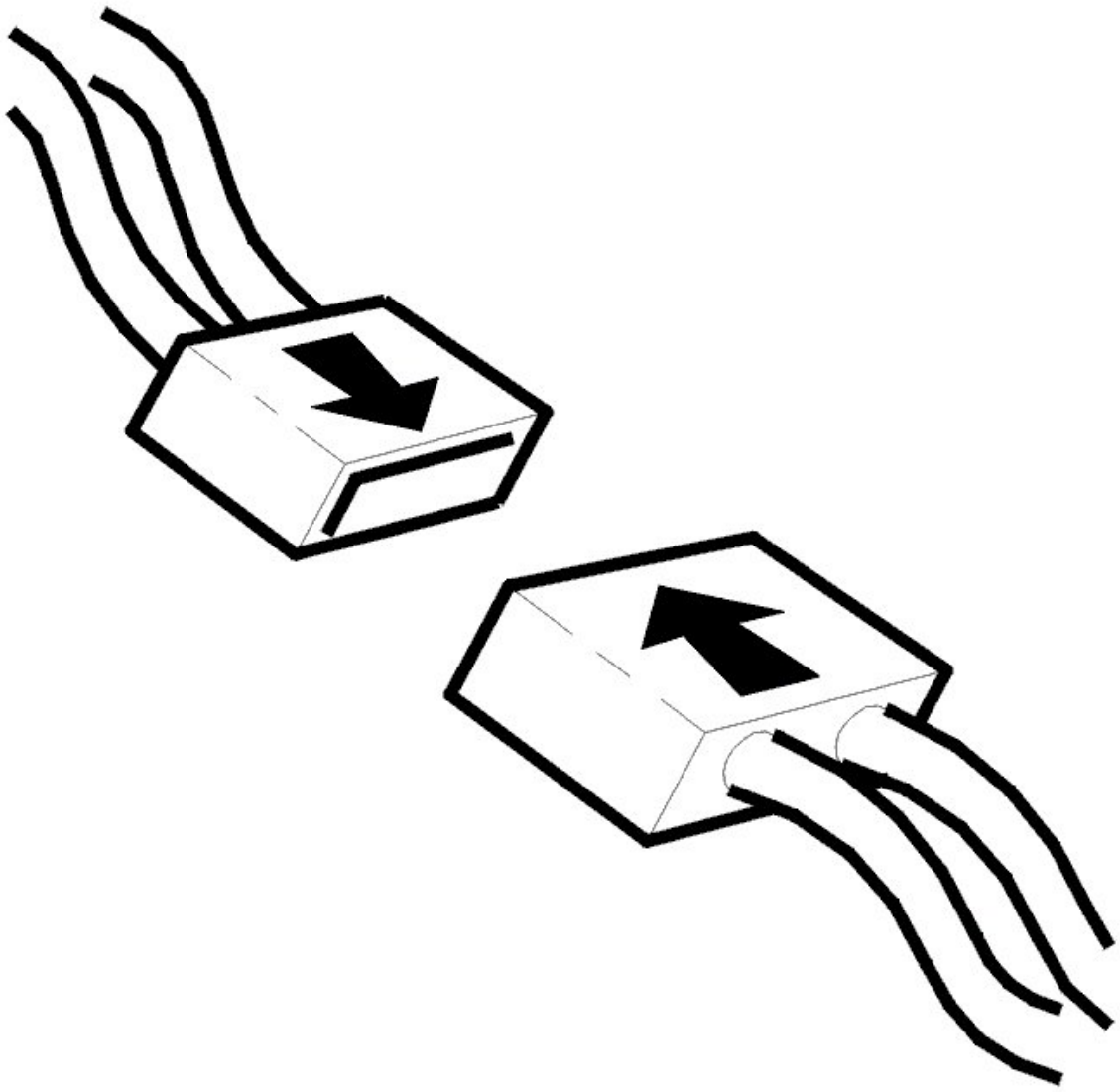
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof closing works.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the wiring

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

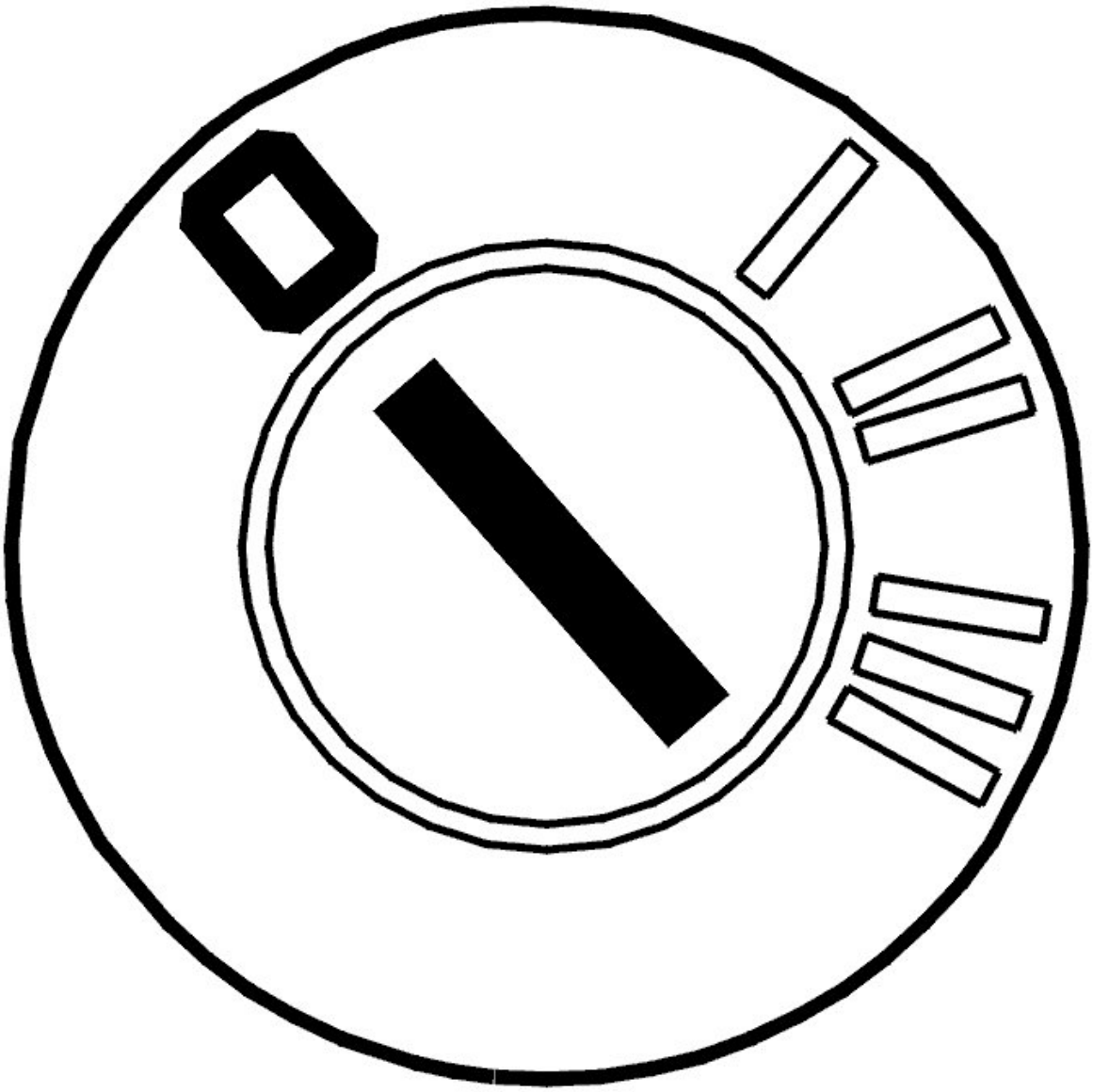
Possible source
- No control signal from optical sensor 1 when the relay is activated and the motor is supplied with power.

Fault symptom[s]
- Automatic sunroof closing does not work.

Signal Too High

Signal too high

Checking the drive wire

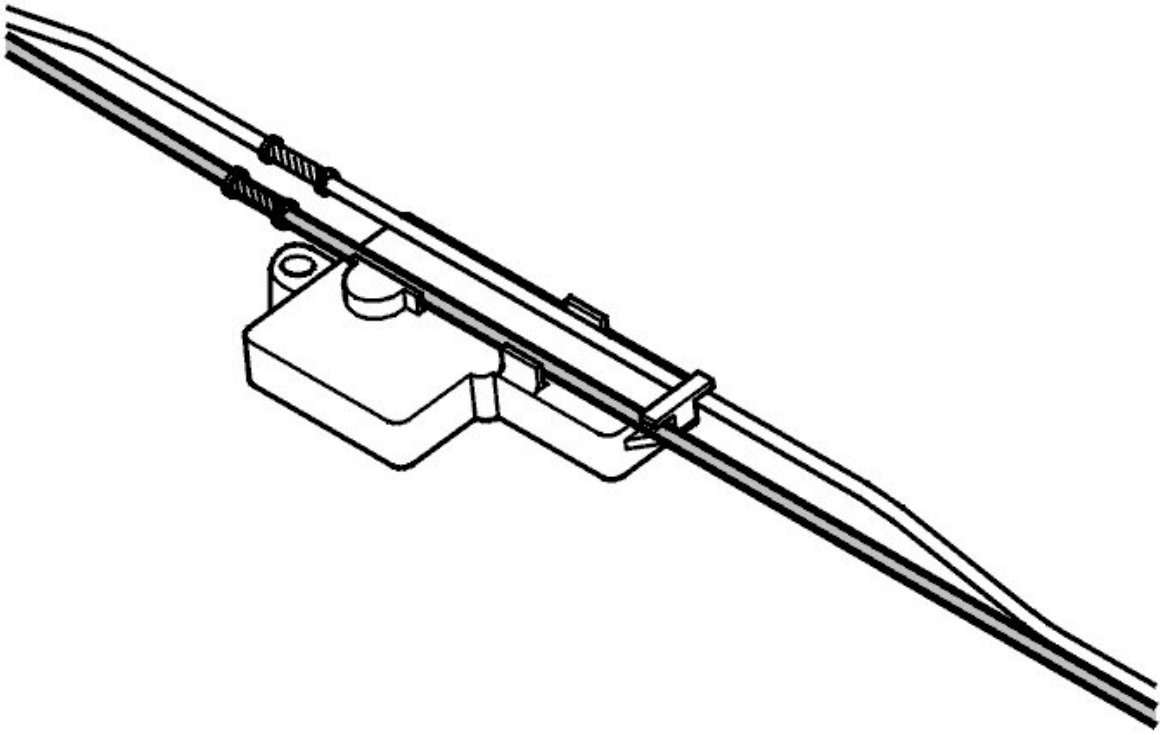


- Ignition off.

Check that the position pulley on the sun roof control module is correctly aligned with the drive wire. A diagnostic trouble code (DTC) is stored if they are not correctly aligned.
Remedy as necessary if a fault is found.

Other information:

- To access the position pulley, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.



Were any faults detected?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

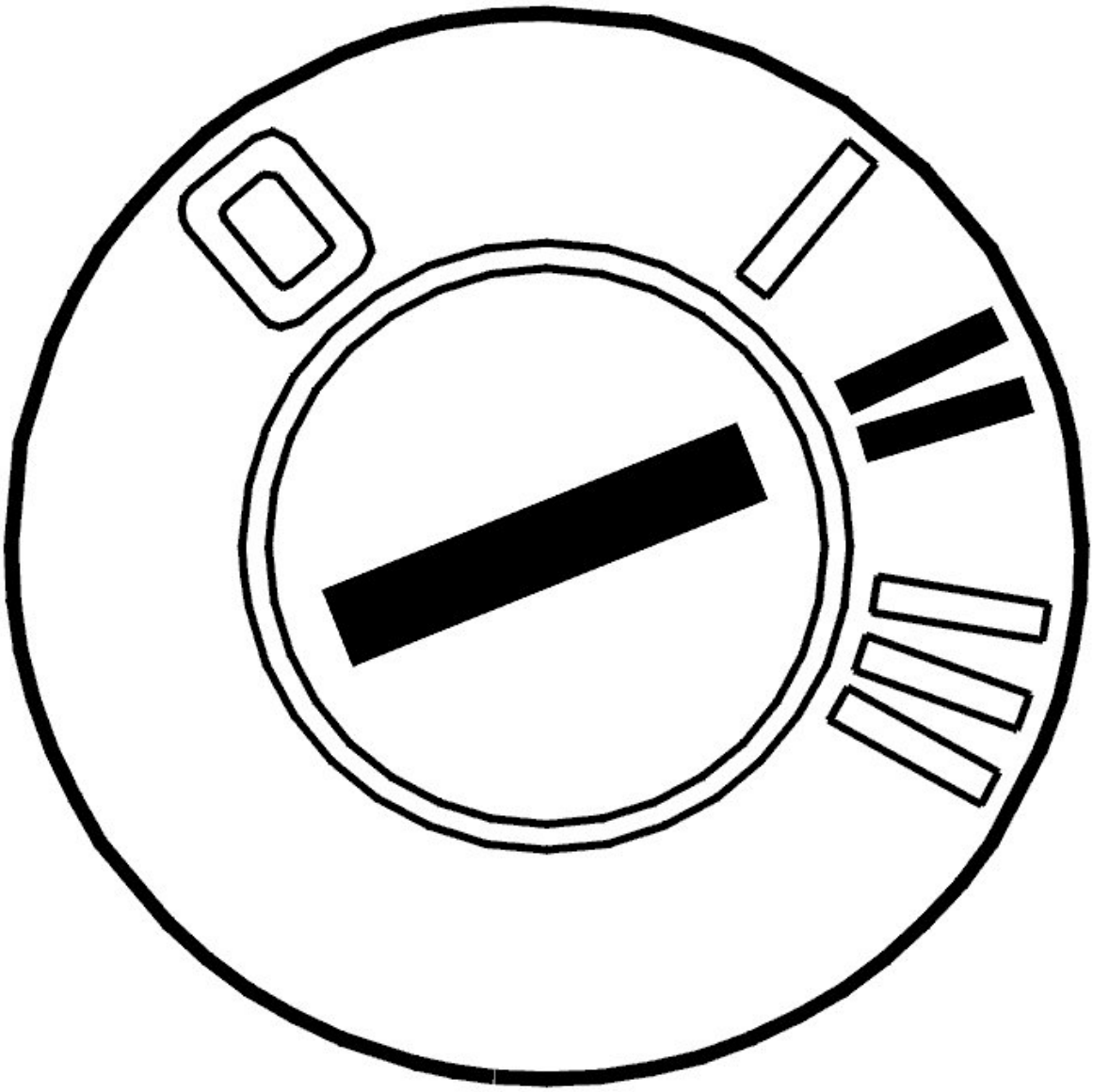
Continue - Verification

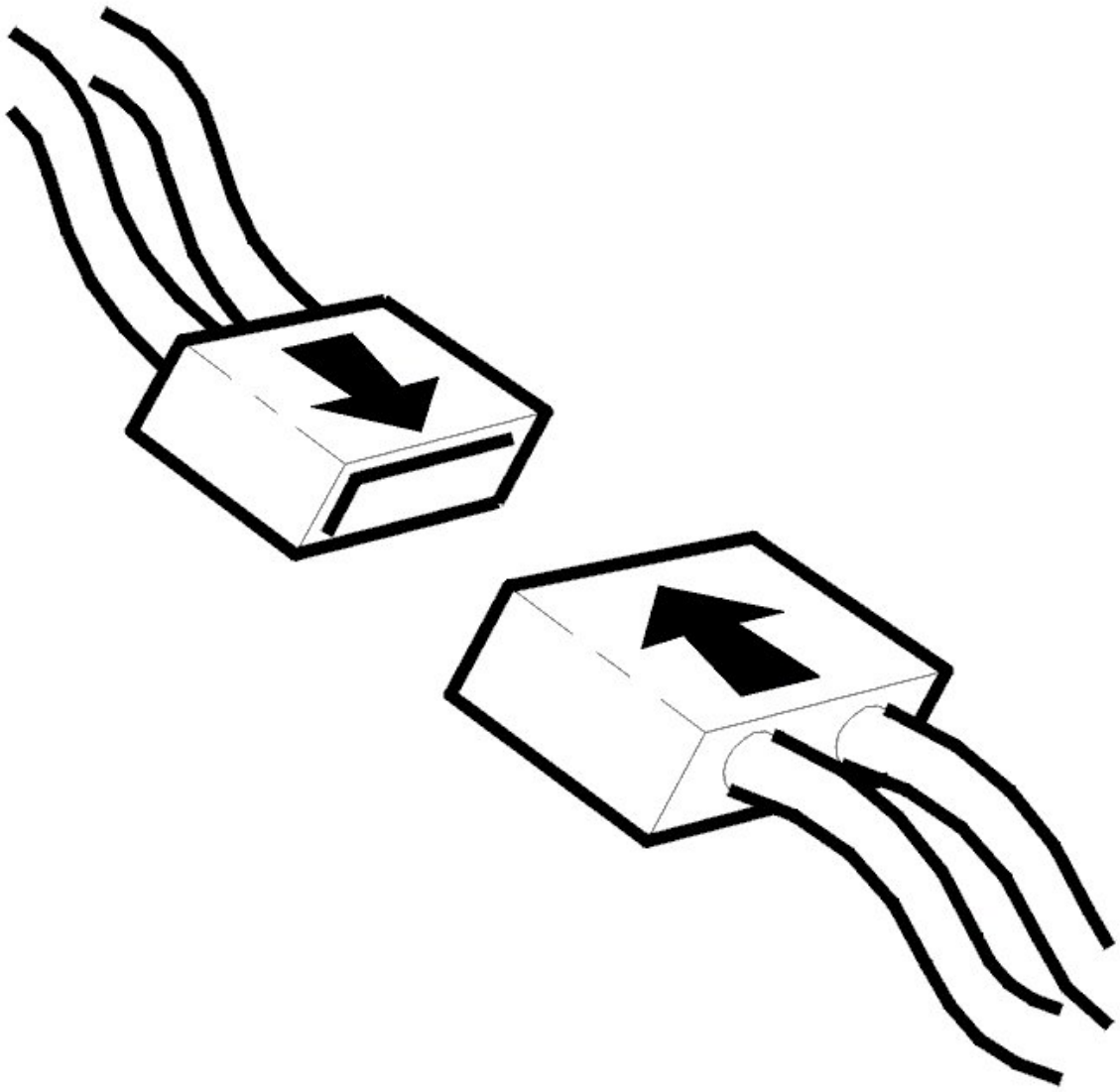
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof control works by pressing the switch down two stages.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the drive wire

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

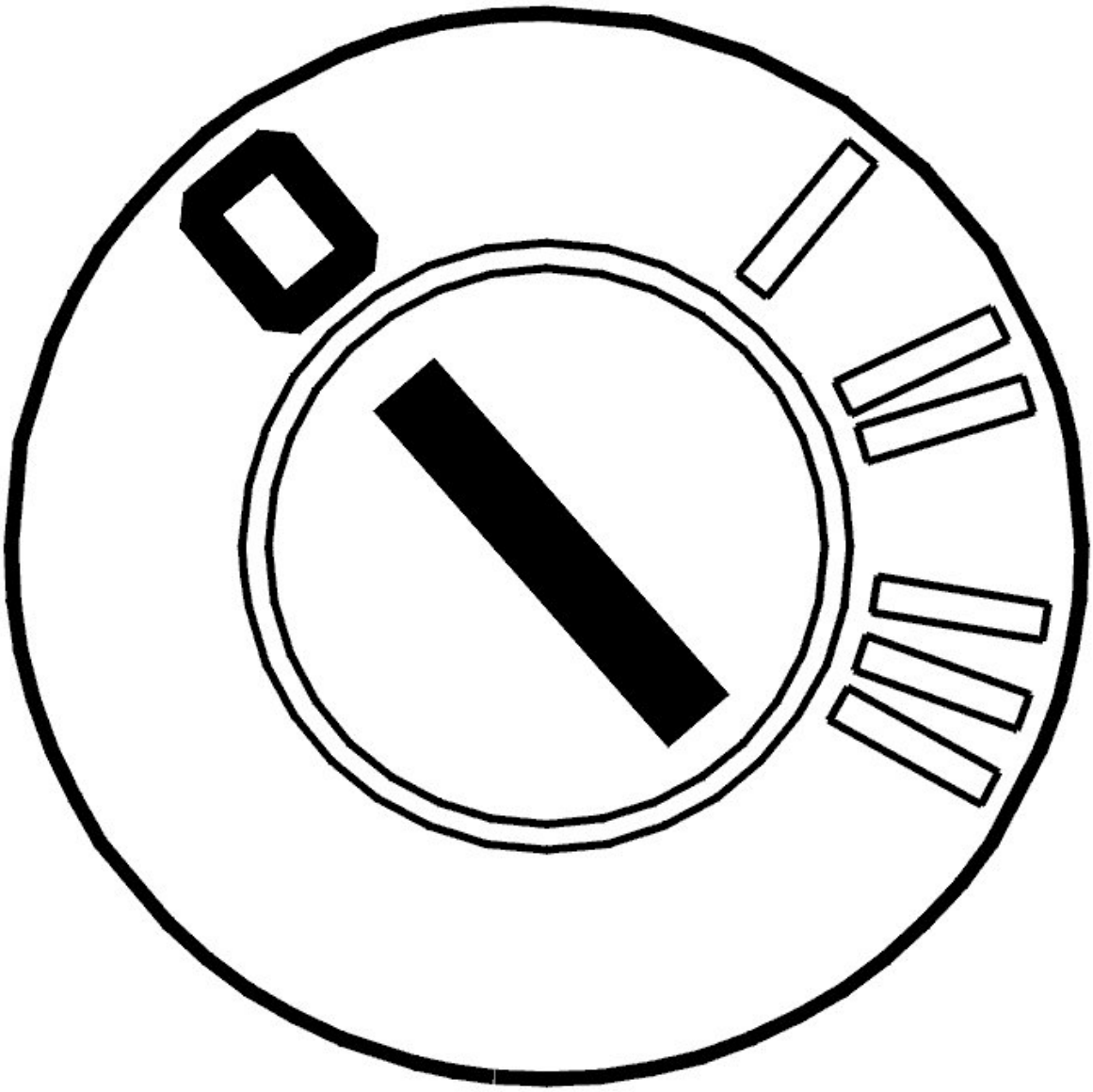
Possible source
- No control signal from optical sensor 2 when the relay is activated and the motor is supplied with power.

Fault symptom[s]
- Automatic sunroof closing does not work.

Signal Too High

Signal too high

Checking the drive wire

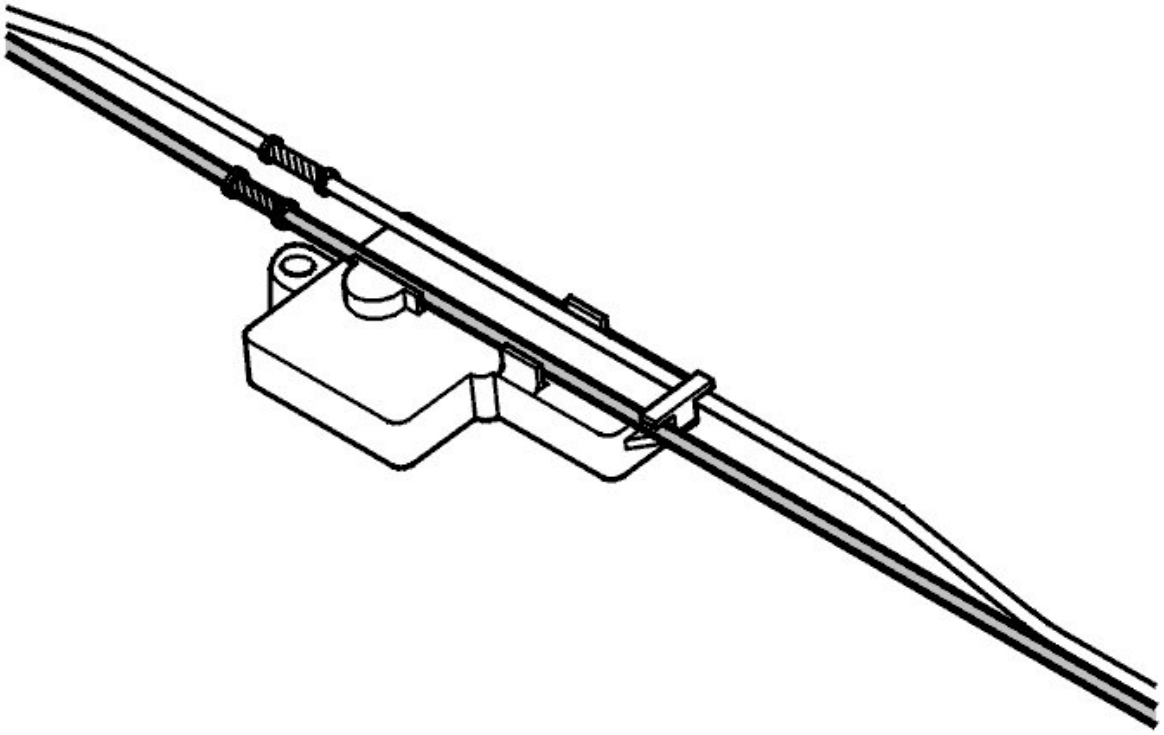


- Ignition off.

Check that the position pulley on the sun roof control module is correctly aligned with the drive wire. A diagnostic trouble code (DTC) is stored if they are not correctly aligned.
Remedy as necessary if a fault is found.

Other information:

- To access the position pulley, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.



Were any faults detected?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

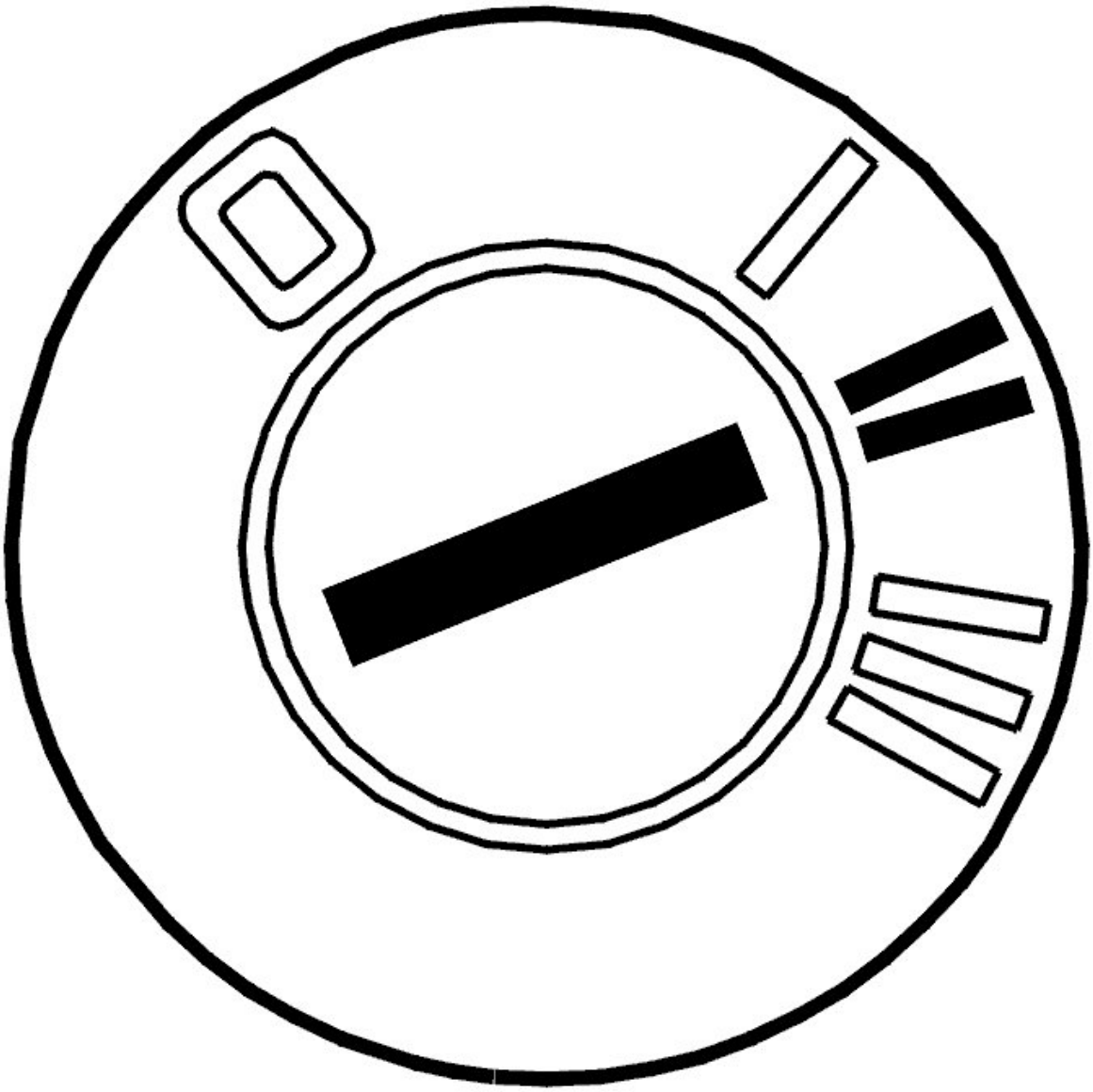
Continue - Verification

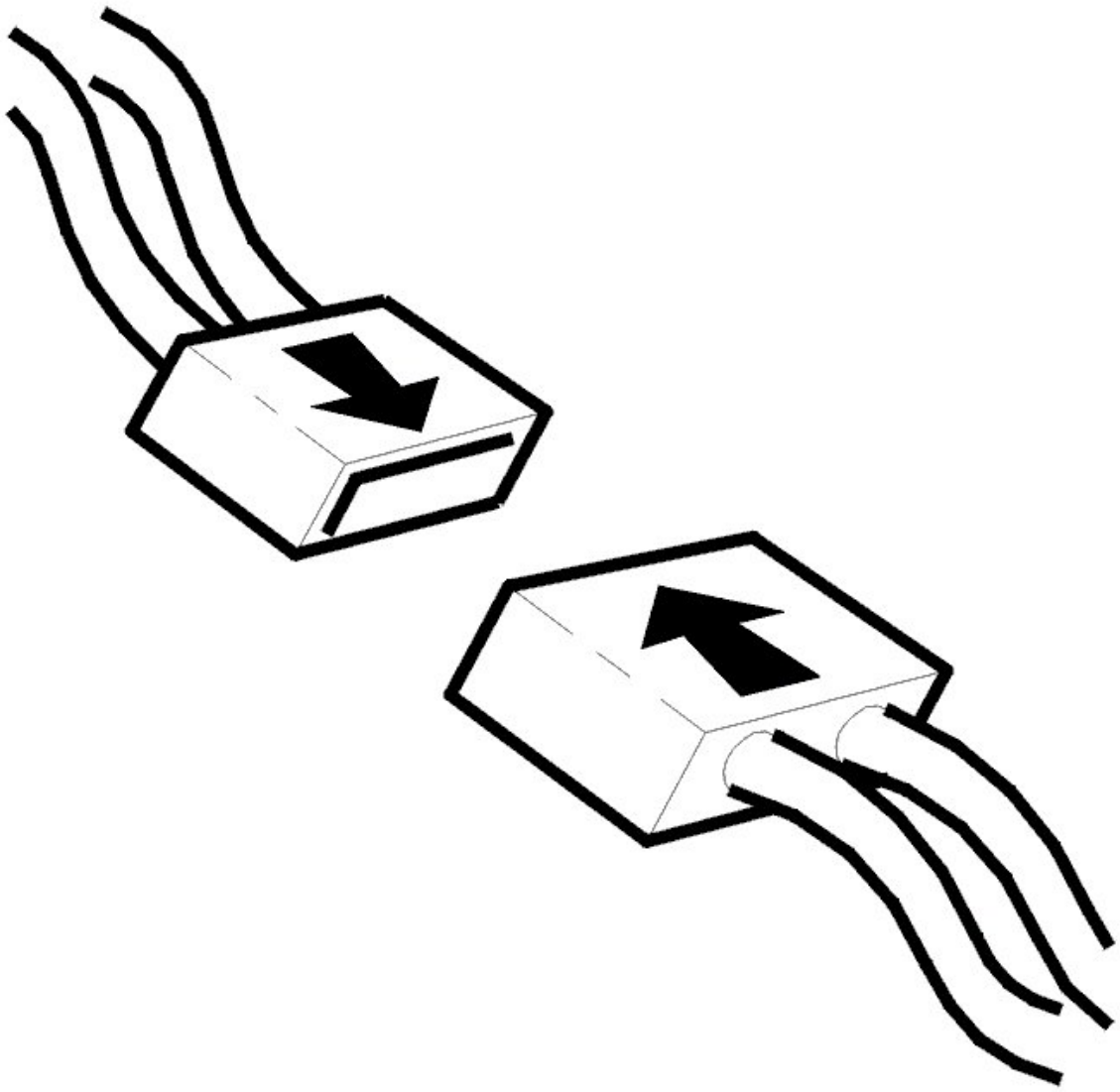
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof control works by pressing the switch down two stages.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - No Fault Found

Attempt New Test - Checking the drive wire

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- Sunroof blocked after starting
- Incorrectly installed sunroof.

Fault symptom[s]
- Nothing.

Signal Too High

Signal too high

Initiating sun roof position

Note! Diagnostic trouble code (DTC) UEM-0058 is stored if the sun roof has been blocked at some point or incorrectly installed.

Try to adjust the sun roof so that it does not move at an angle or stick.
Check that nothing is located in the groove preventing the sun roof from being operated.

Other information
- Sun roof, adjusting See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Adjustments

Continue - Erasing diagnostic trouble code (DTC)

Erasing diagnostic trouble code (DTC)

Erase diagnostic trouble codes (DTCs).

Continue - Reading off diagnostic trouble codes (DTC)

Reading off diagnostic trouble codes (DTC)

Read off diagnostic trouble codes (DTCs). If the diagnostic trouble code (DTC) recurs, replace the sun roof.

Other information

- Sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Service and Repair/Removal and Replacement/Sun Roof, Replacing.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), diagnostic trouble code is displayed.

Substitute value
- Nothing.

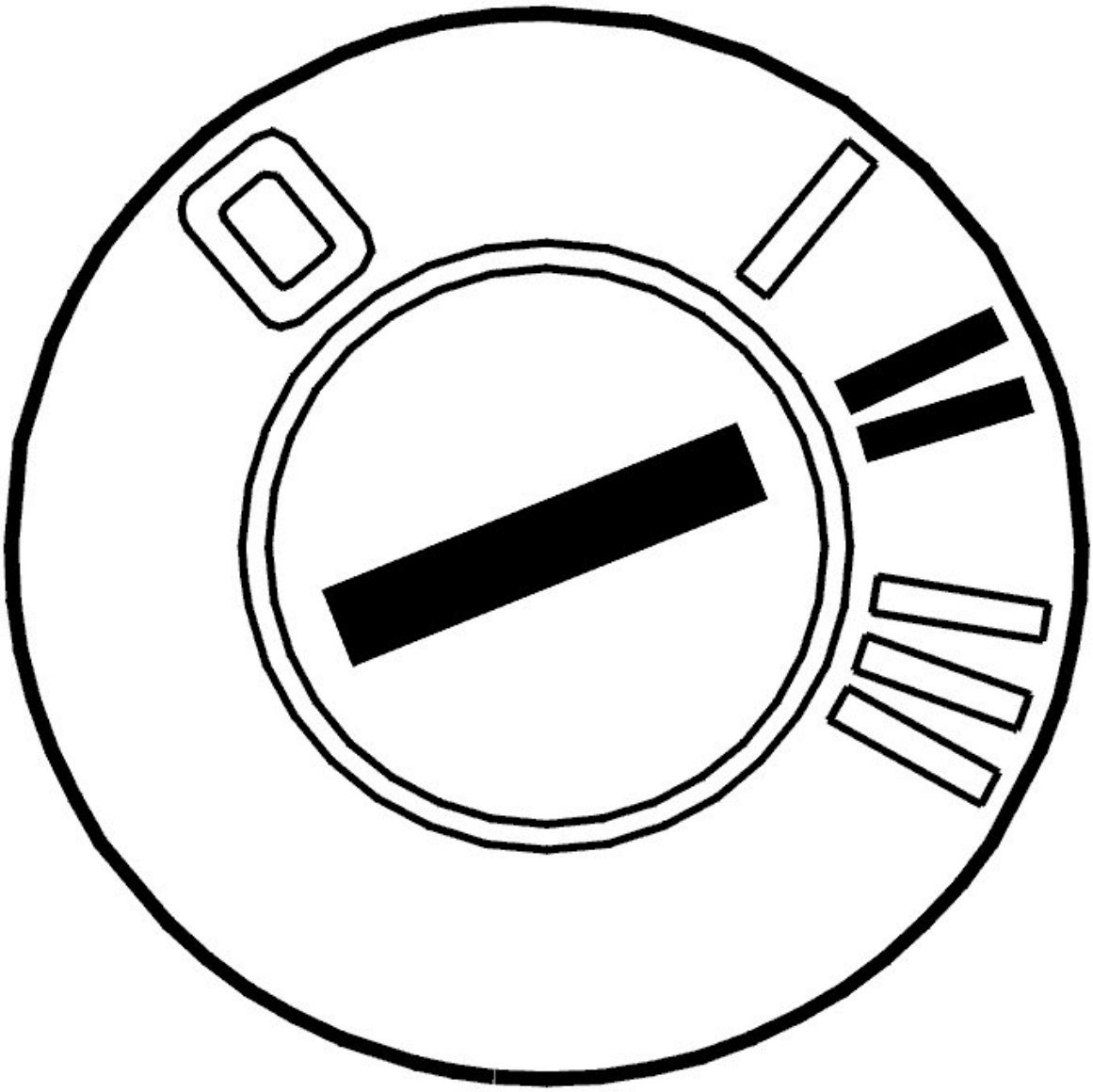
Possible source
- Sunroof motor works and sunroof moves even when the relay is not activated.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on
- Operate the sun roof to full tilt.

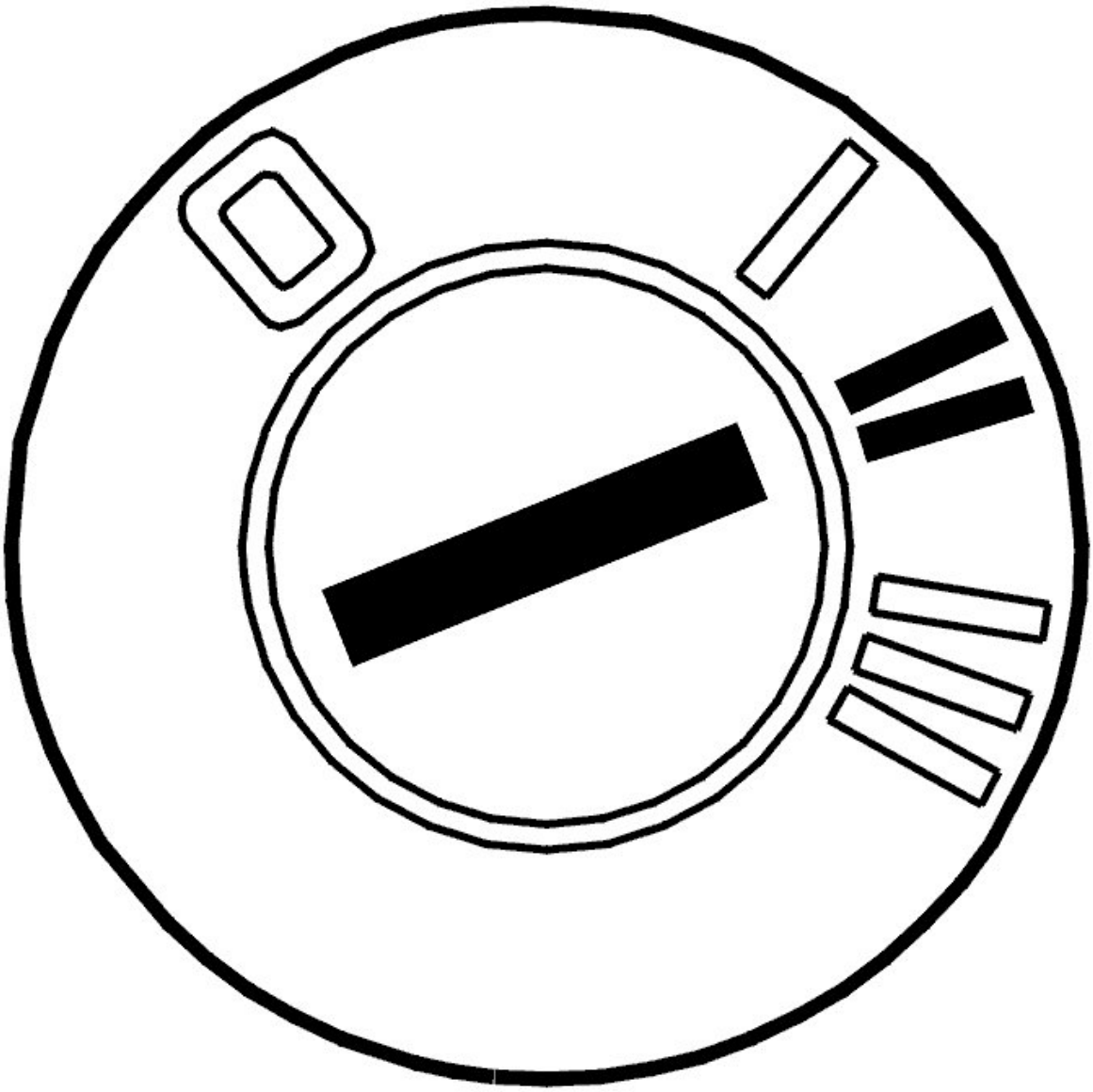
Check that the automatic operation of the sun roof works.

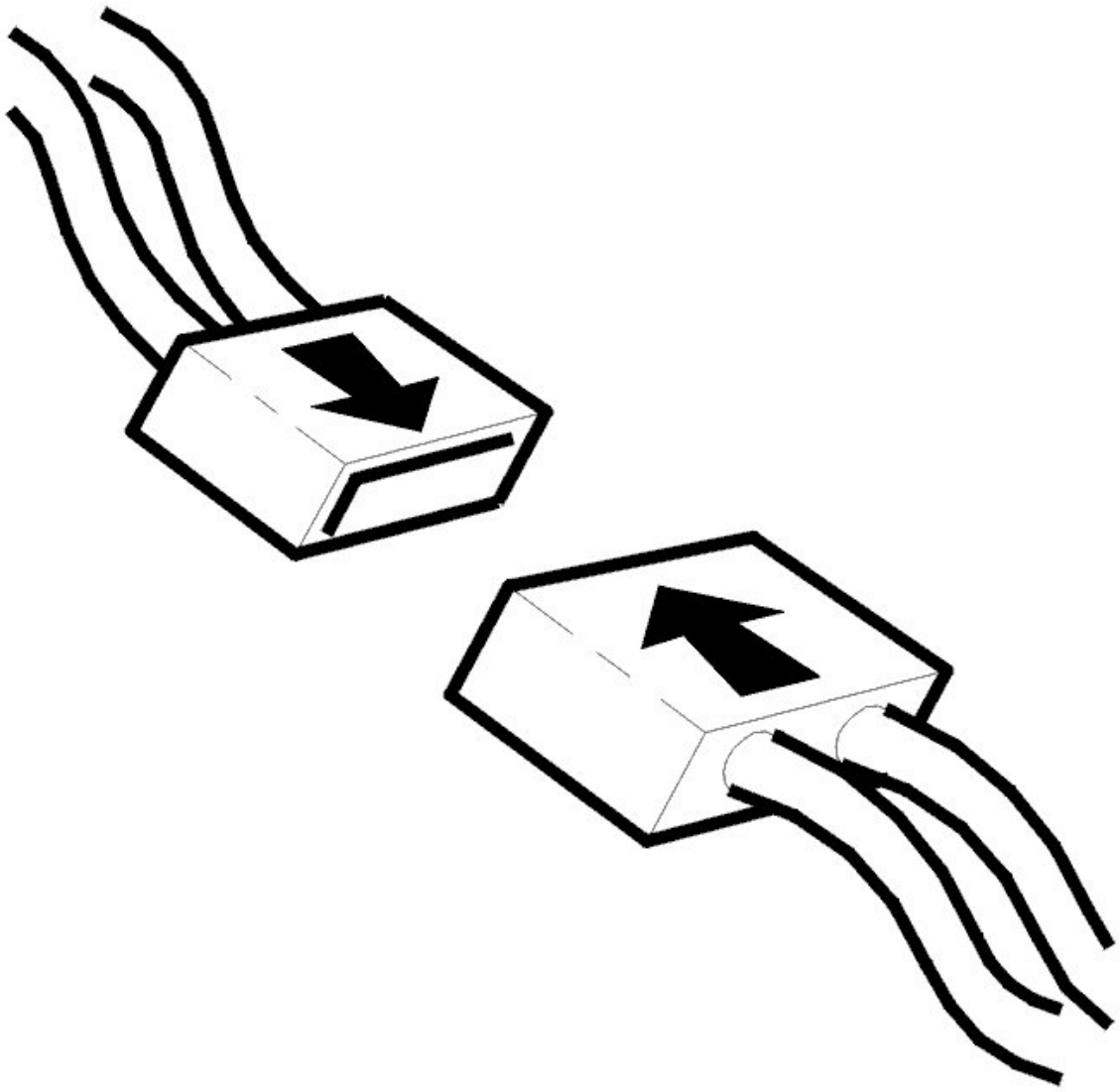
Was the function OK?

Yes - Verification

No - Replacing the component

Replacing the component





- Replace the sun roof motor. See Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check that the automatic closing of the sun roof works.

Does the automatic closing of the sun roof work?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

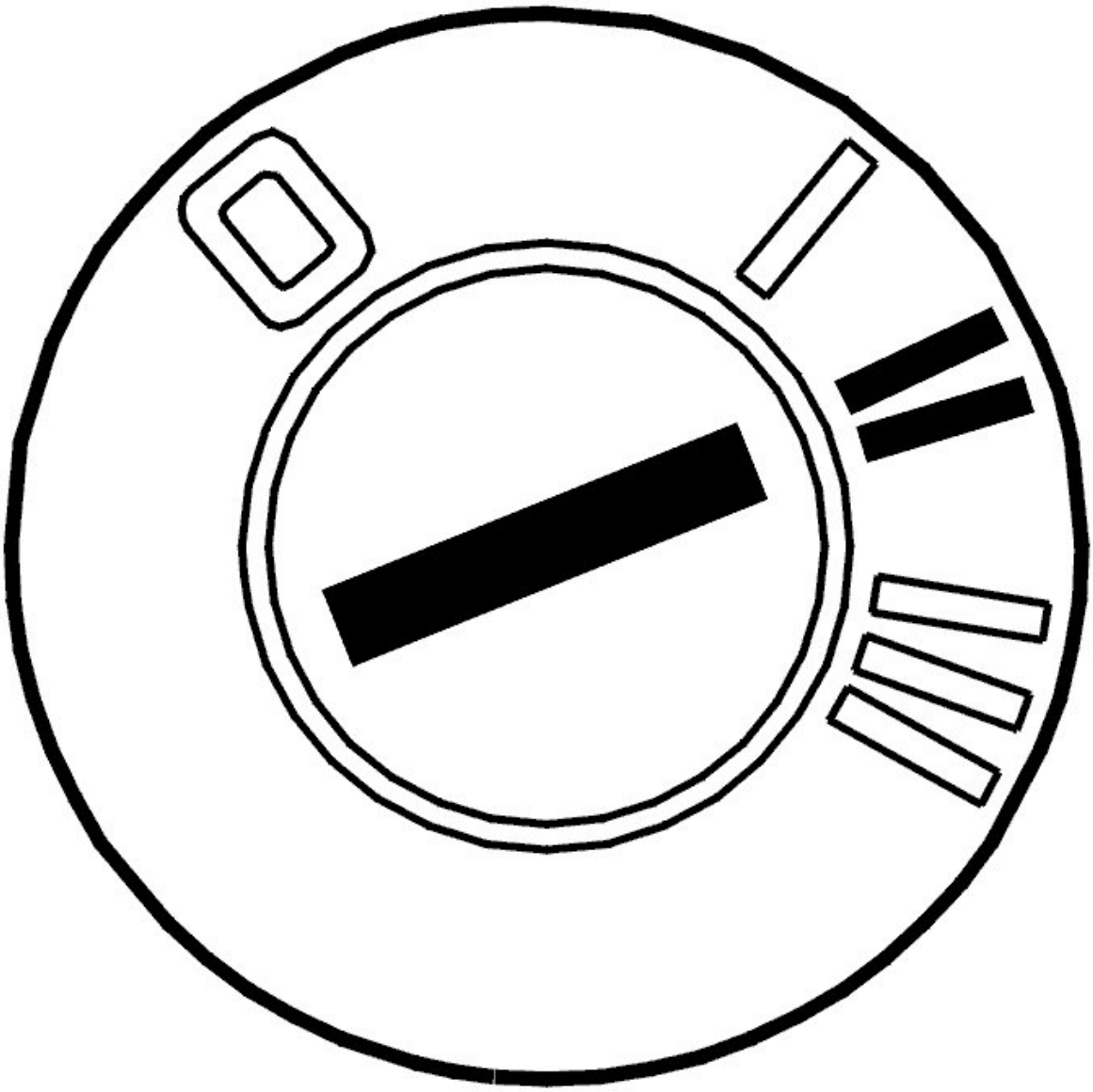
Continue - Verification

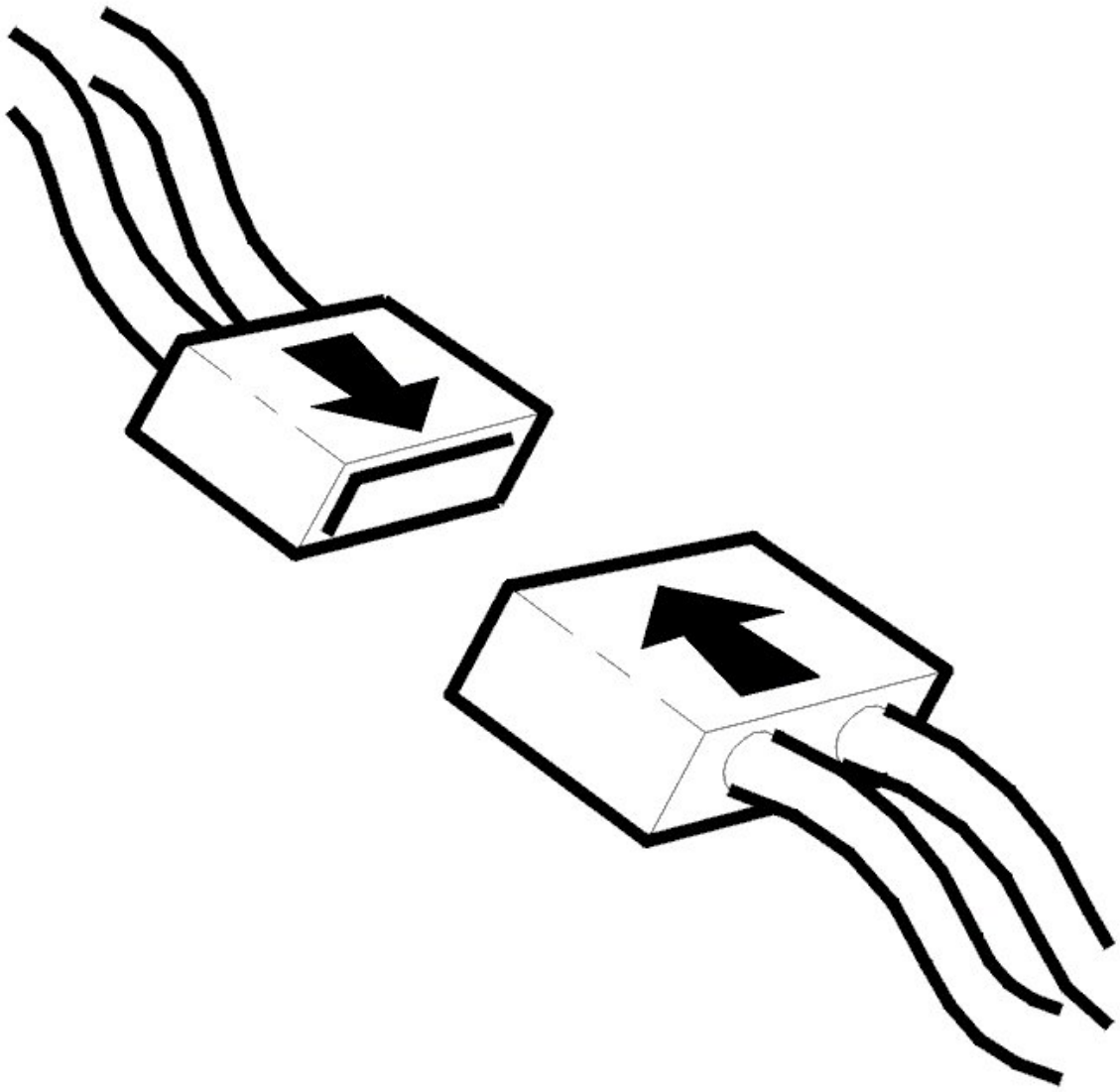
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof closing works.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), diagnostic trouble code is displayed.

Substitute value
- Nothing.

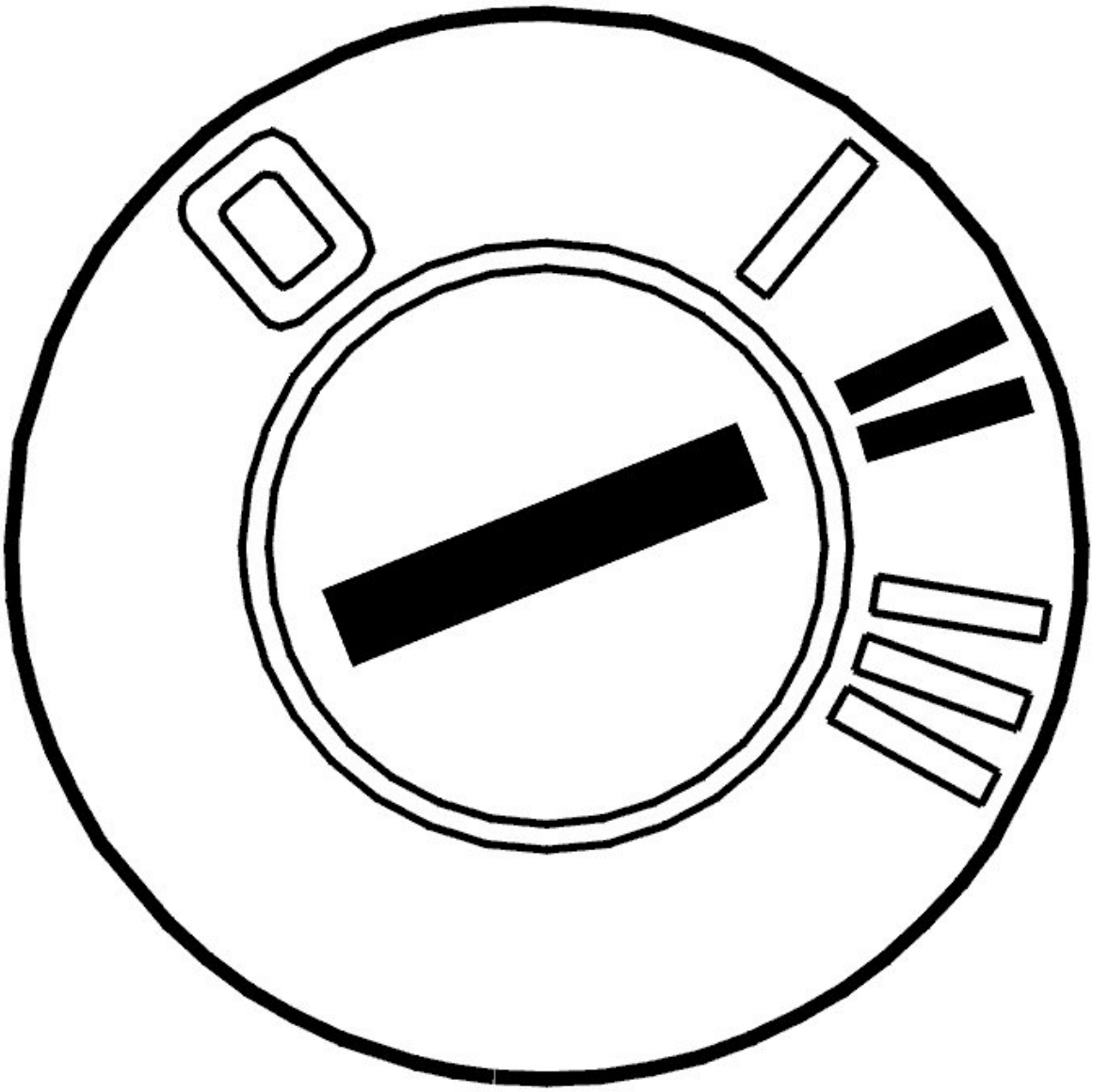
Possible source
- Sunroof motor works and sunroof moves even when the relay is not activated.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on
- Operate the sun roof to full tilt.

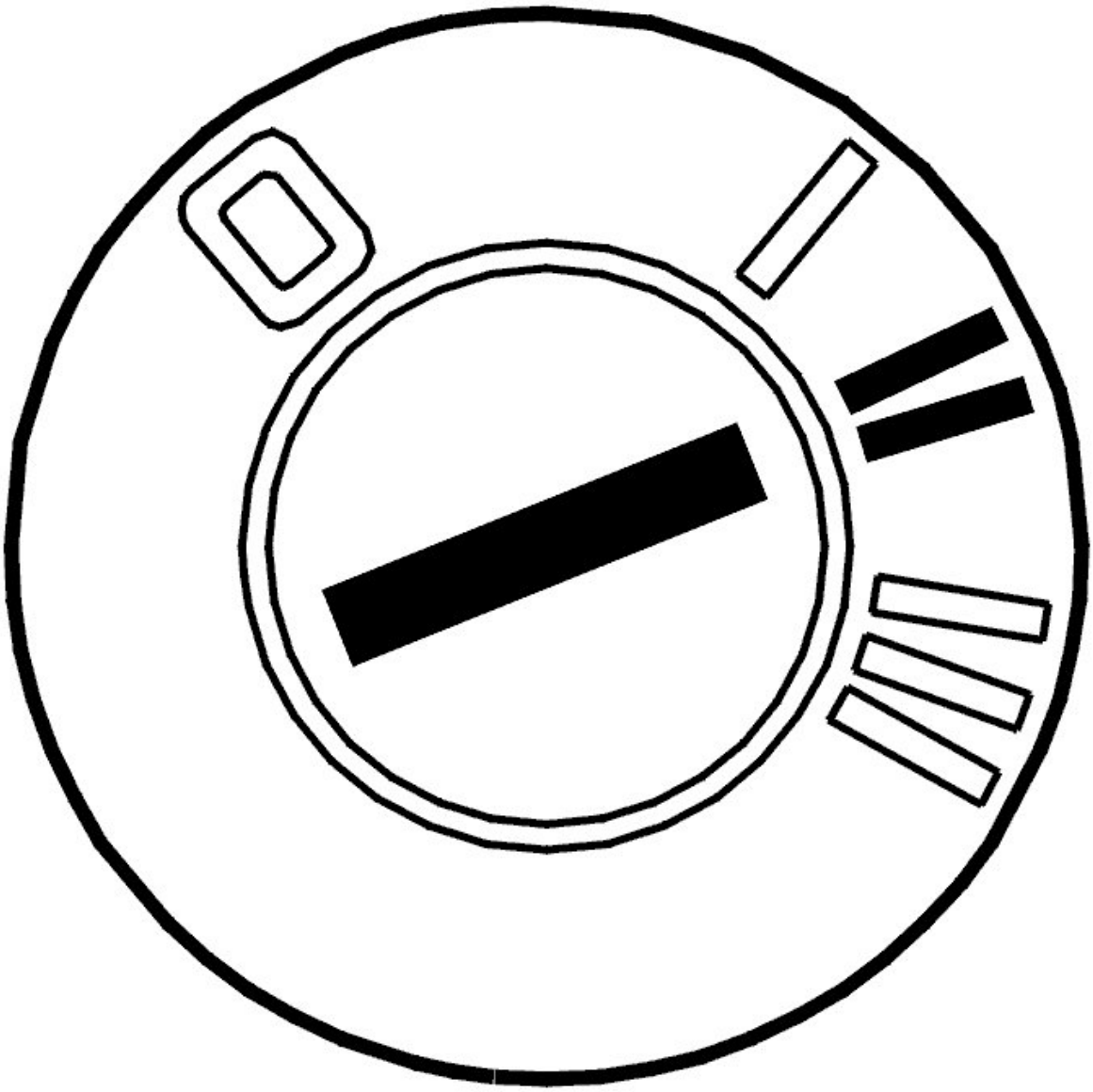
Check that the automatic operation of the sun roof works.

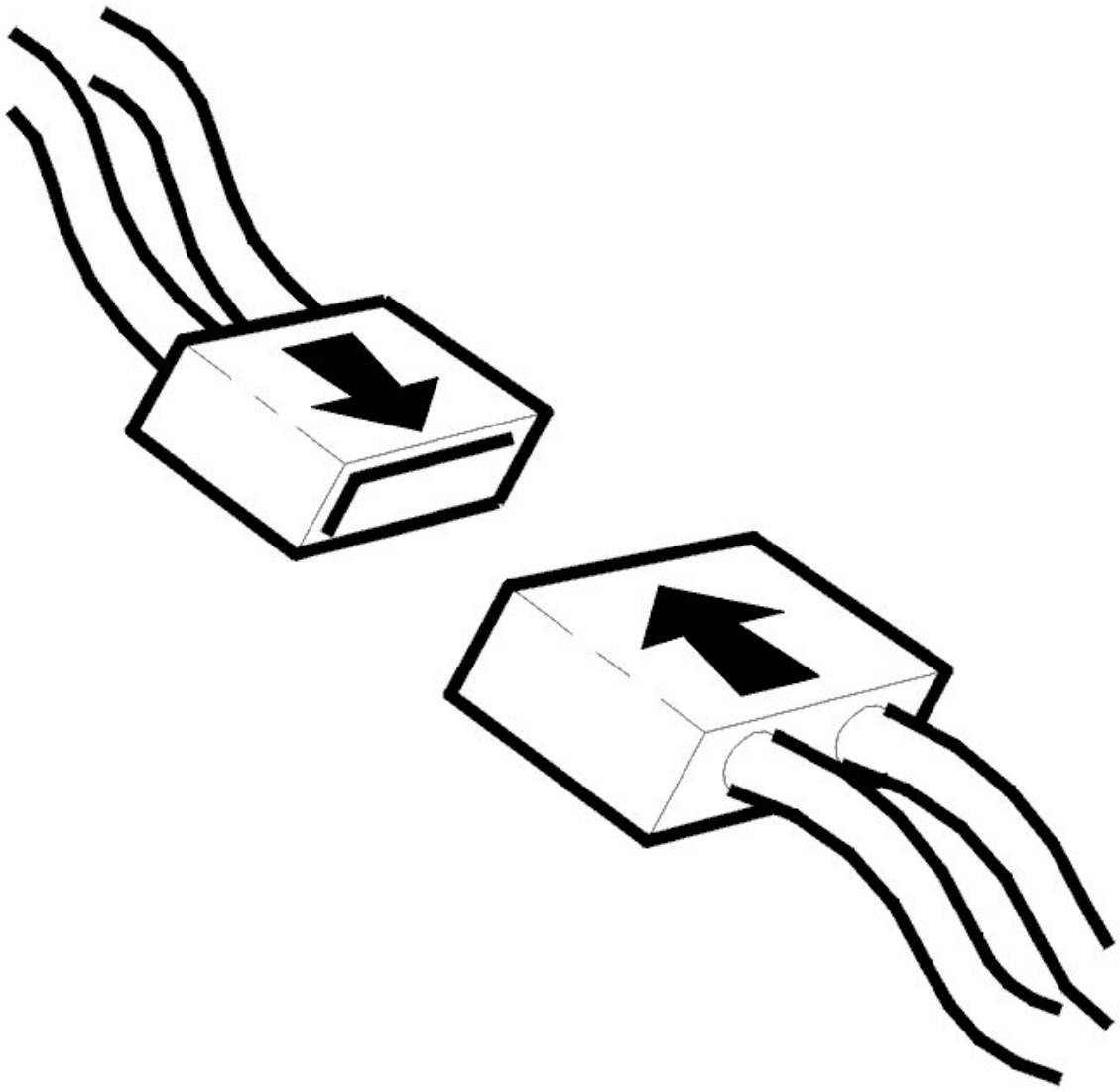
Was the function OK?

Yes - Verification

No - Replacing the component

Replacing the component





- Replace the sun roof motor. See Electric motor, sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Motor/Service and Repair
- Ignition off
- Reinstall the components, reconnect the connectors etc.
- Ignition on.

Check that the automatic closing of the sun roof works.

Does the automatic closing of the sun roof work?

Yes - Verification

No - Replacing the component

Replacing the component

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

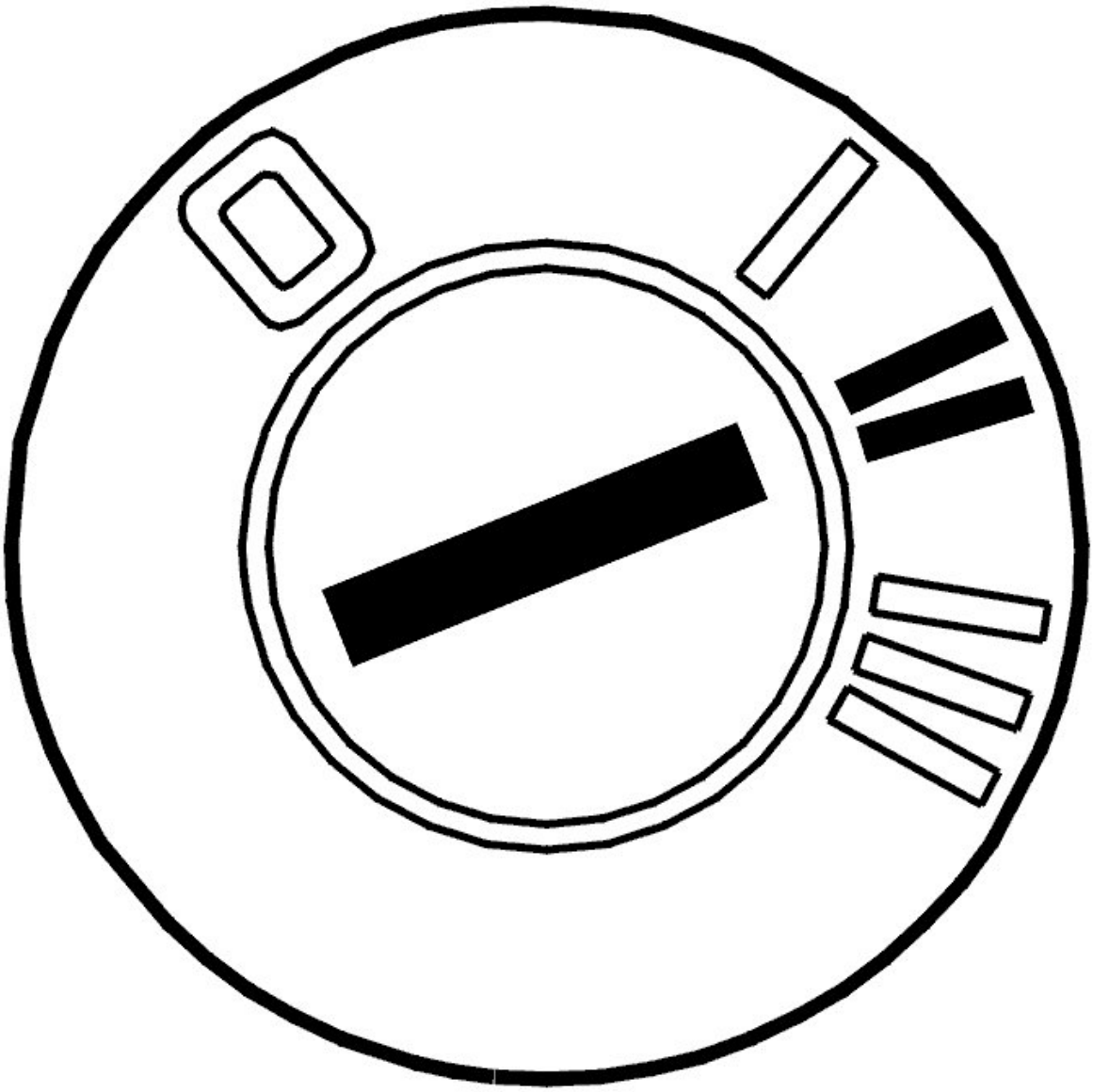
Continue - Verification

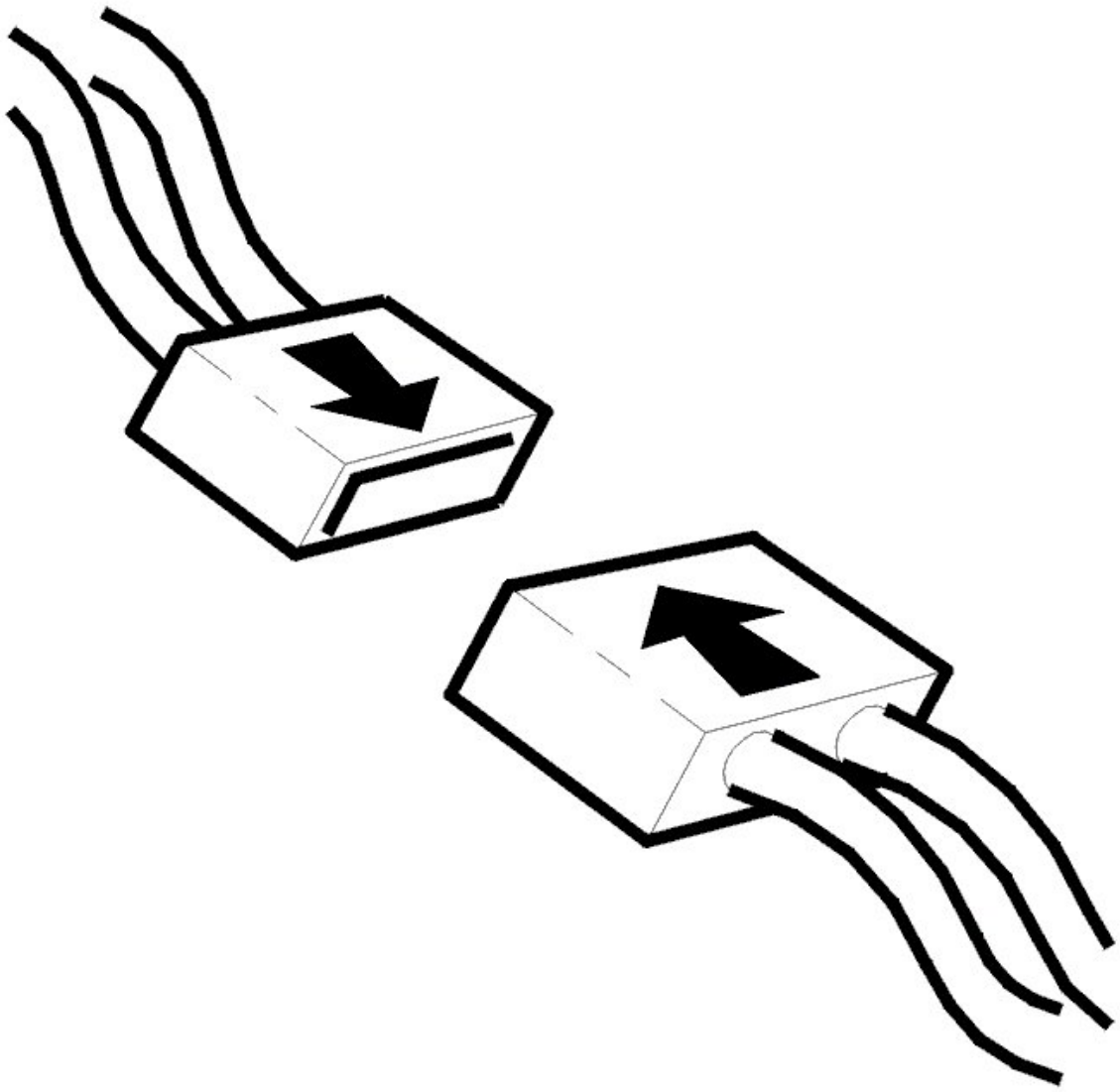
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the automatic sunroof closing works.

Does it work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof control unit (SRM), diagnostic trouble code is set.

Substitute value
- Nothing.

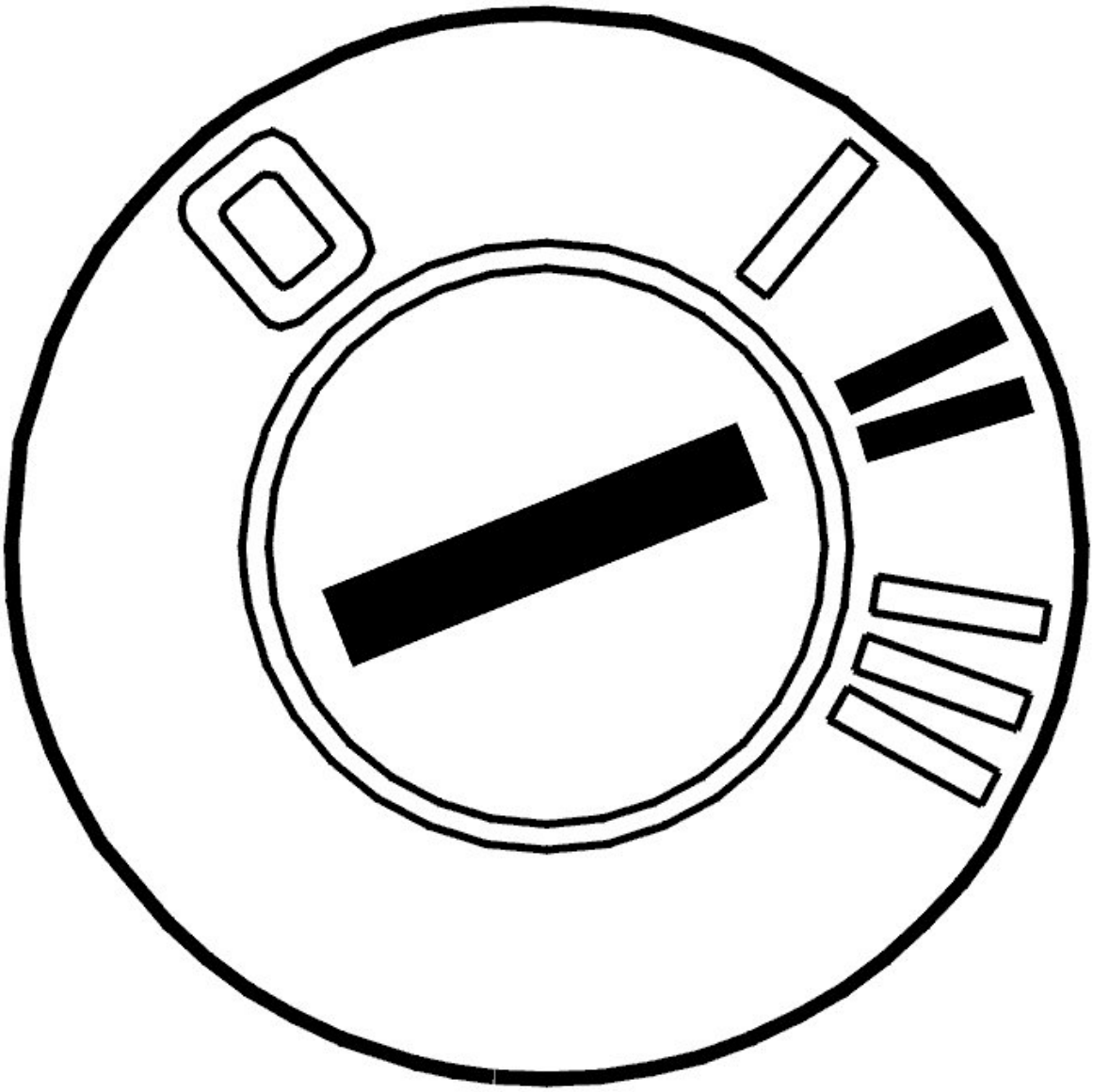
Possible source
- The voltage supply wire for forward movement of the sunroof is short circuited to voltage supply.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Try to operate the sun roof to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the sun roof module (SRM) and the roof lamp module. Check for a short-circuit to supply voltage.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

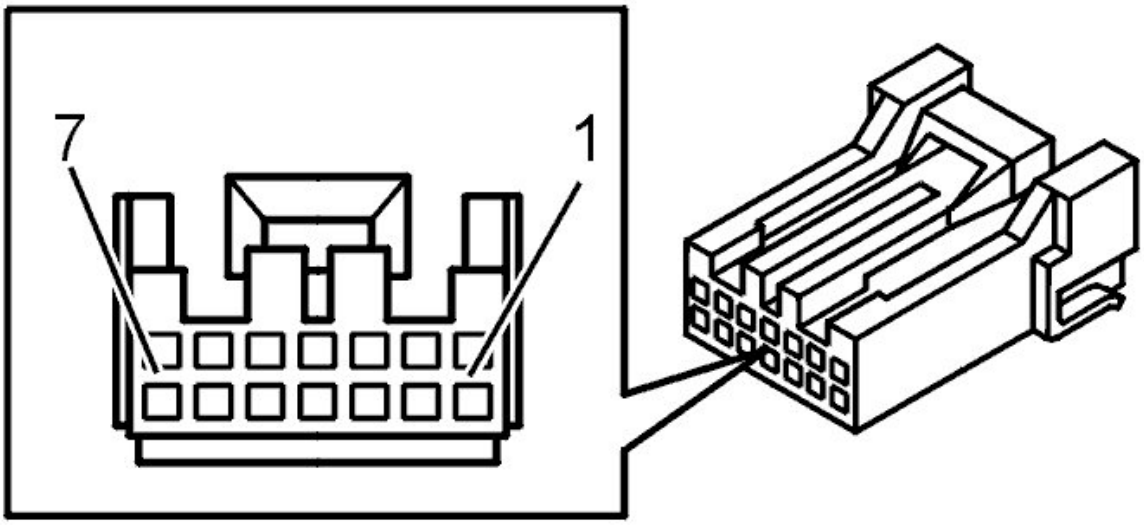
UEM-0064 Motor sun roof. Signal too high

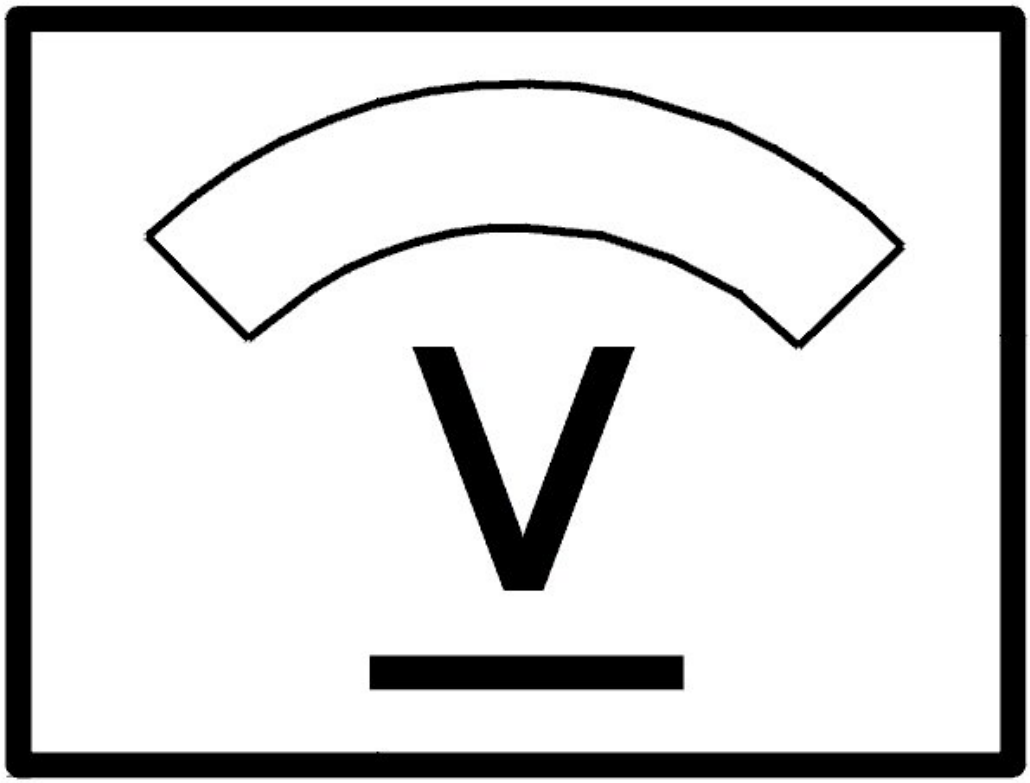
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.

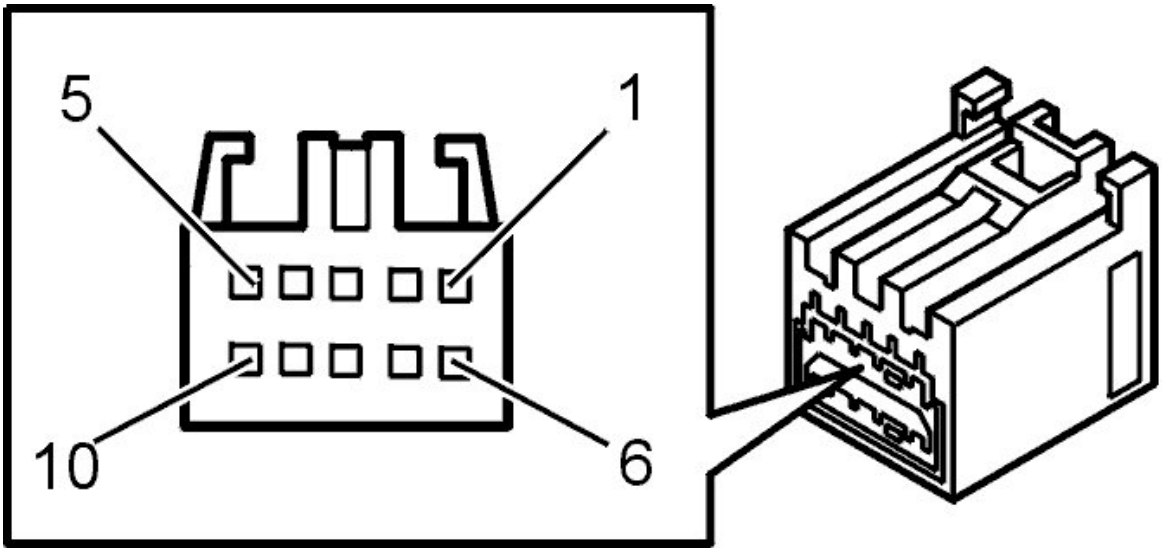
Remedy as necessary.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Was a fault detected?

Yes - Verification

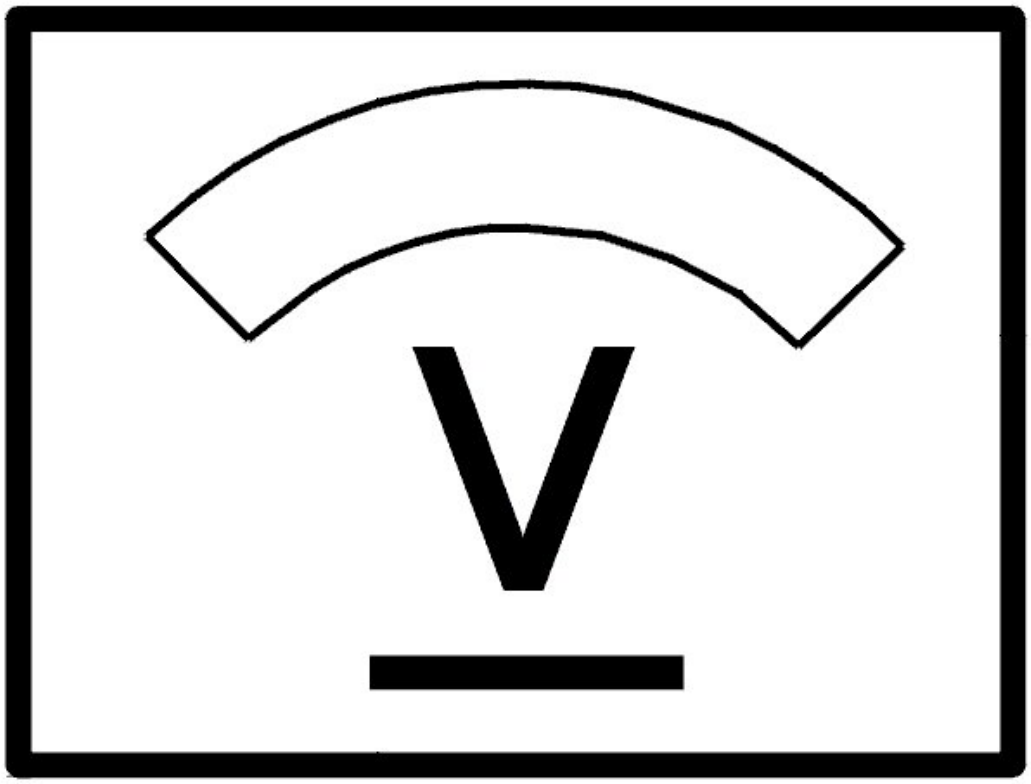
No - Checking the cable

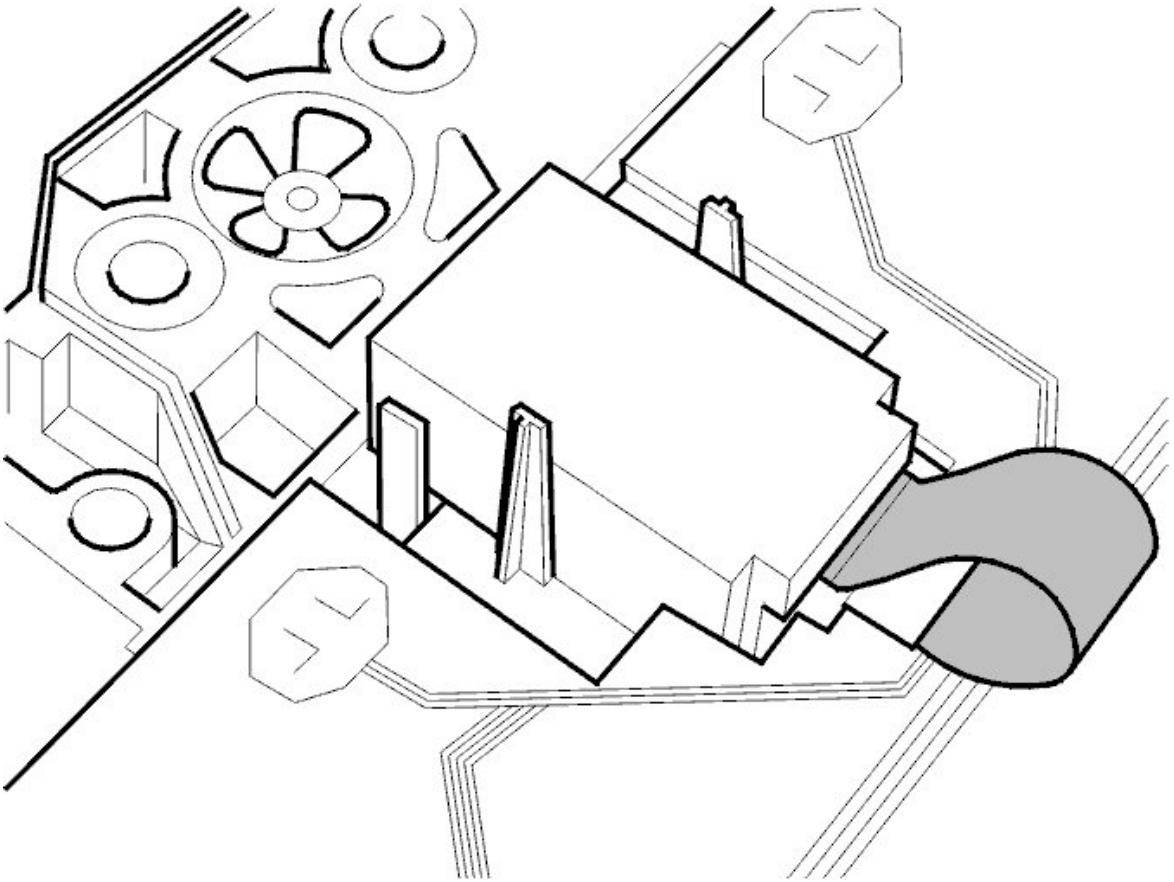
Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Replacing the component

Replacing the component

Visually check the roof lamp module and its switches.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.

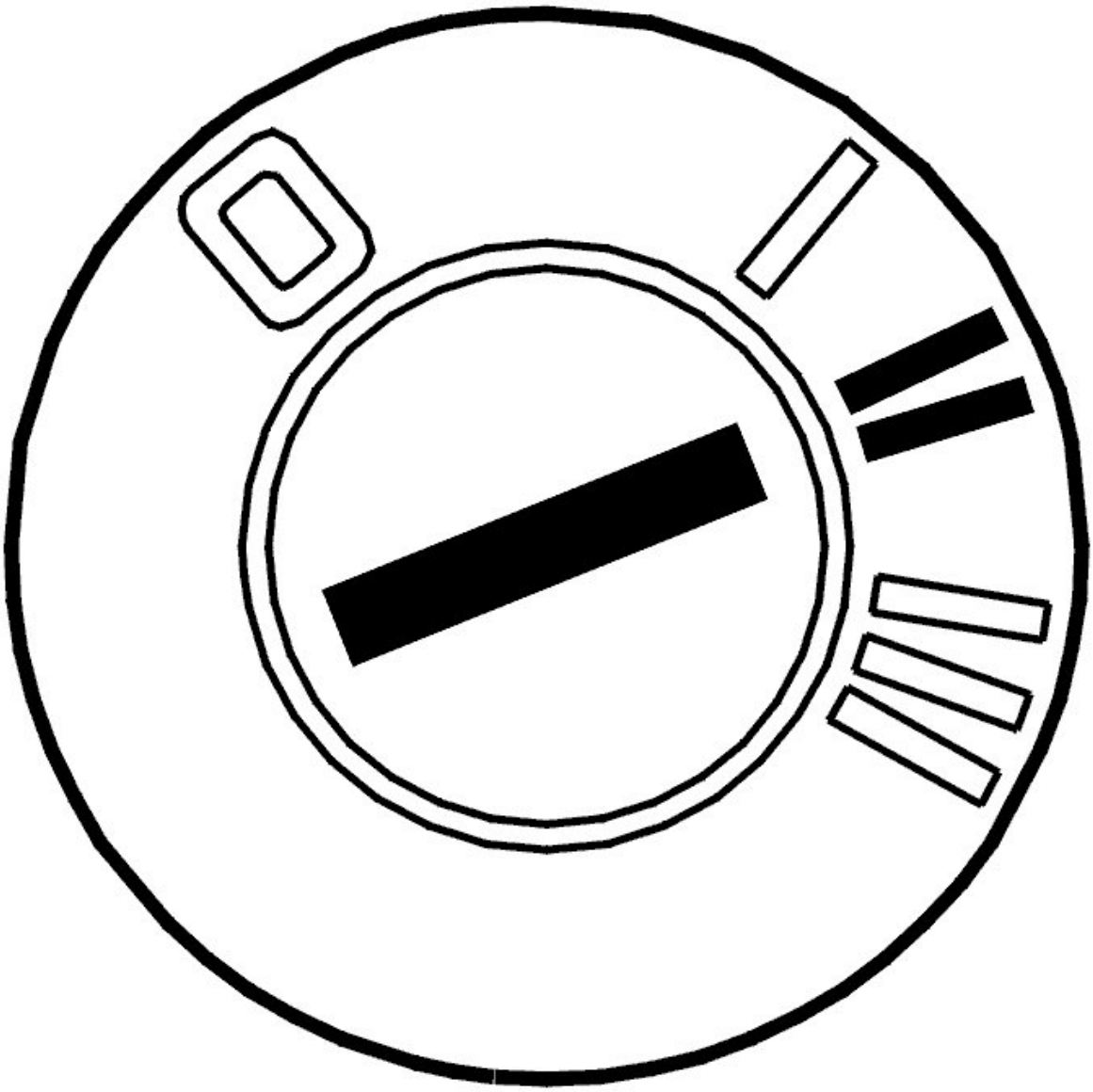
Continue - Verification

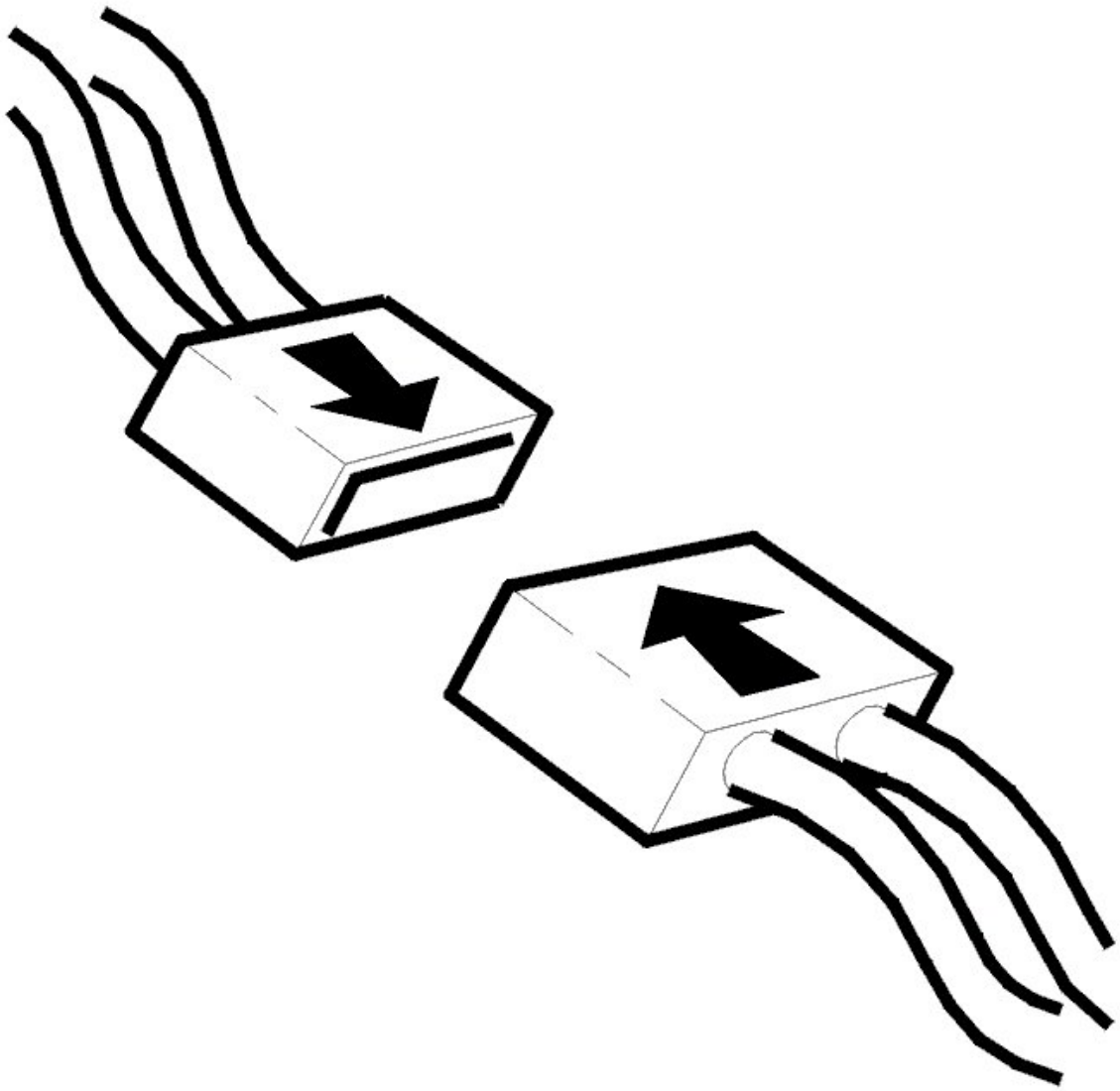
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Try to move the sunroof to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the connector on the sun roof module (SRM) and the connector on the roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Visually check the cable between the sun roof module (SRM) and the roof lamp module. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0064 Motor sun roof. Signal too high

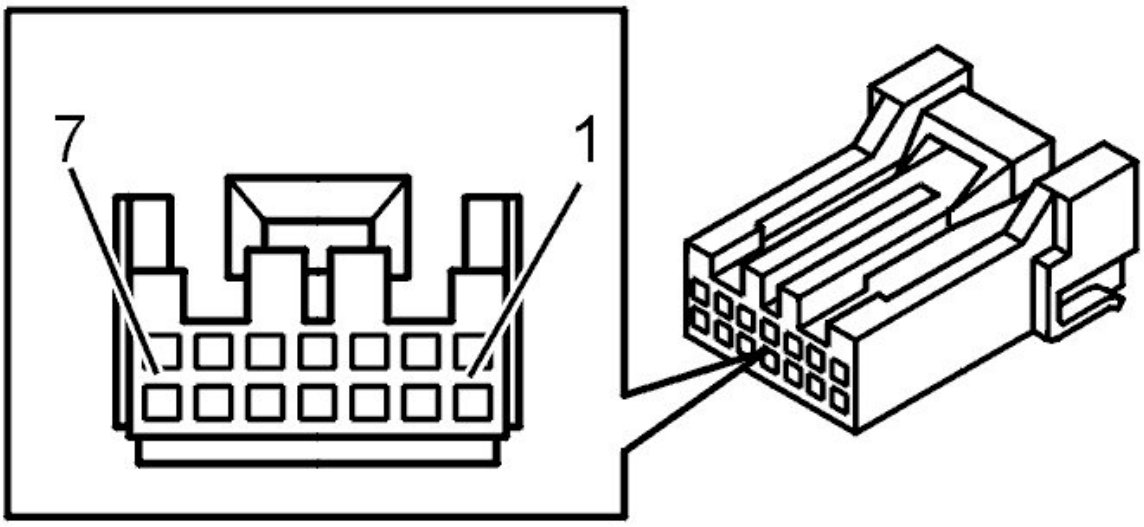
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Check the wiring between the sun roof switch and the roof lamp module (RCM). Check for an intermittent short-circuit to supply voltage.
Visually check the roof lamp module and its switches.

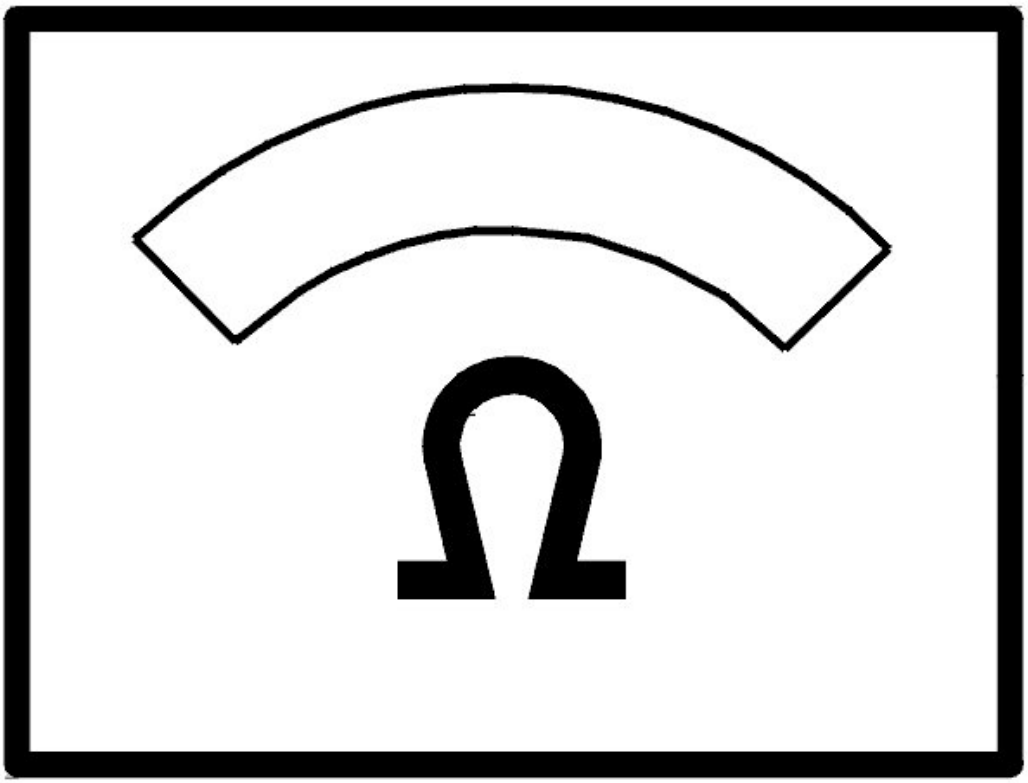
Hint: If no fault is found replace the sun roof switch.

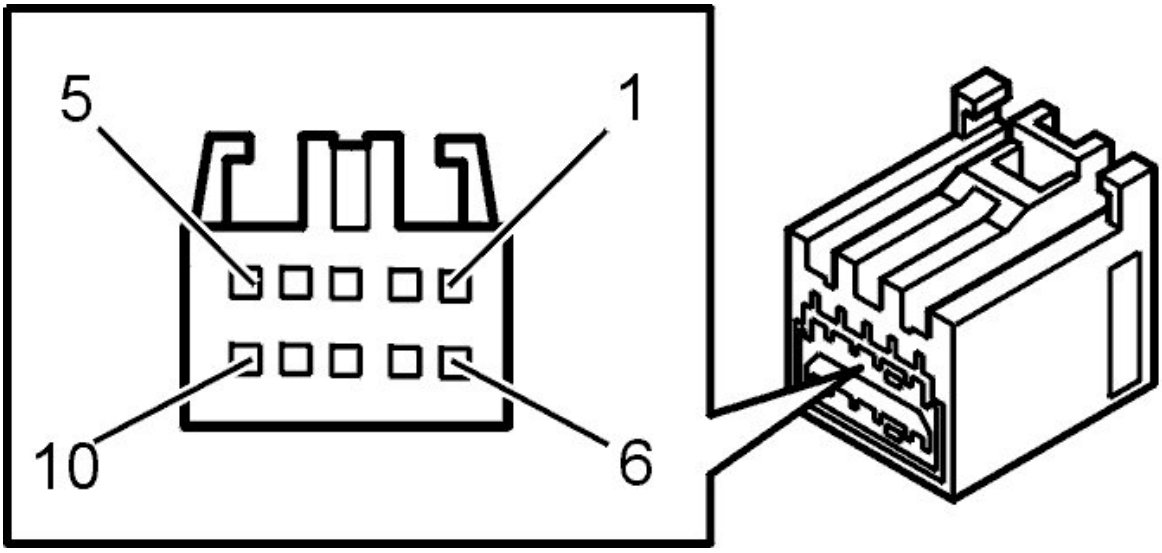
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To replace the printed circuit board and its switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair

- To replace the switch for the sun roof, see Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof control unit (SRM), diagnostic trouble code is set.

Substitute value
- Nothing.

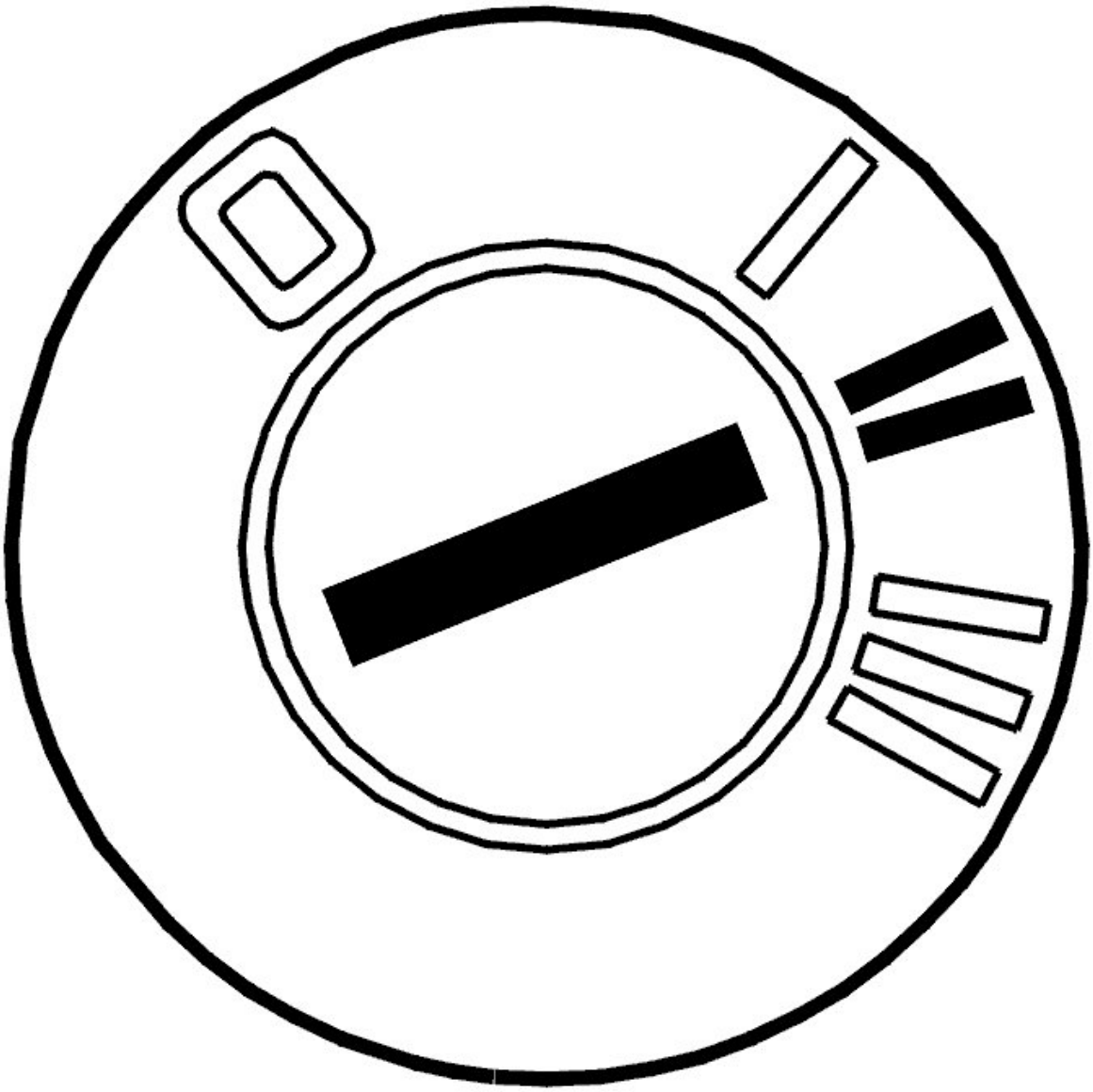
Possible source
- The voltage supply wire for rearward movement of the sunroof is short circuited to voltage supply.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Try to operate the sun roof to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the sun roof module (SRM) and the roof lamp module. Check for a short-circuit to supply voltage.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

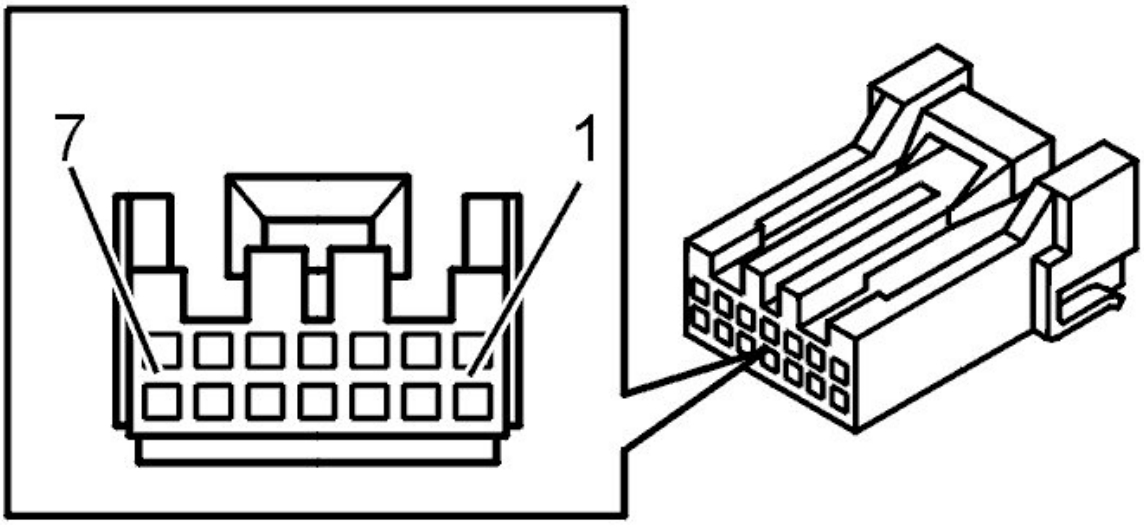
UEM-0064 Motor sun roof. Signal too high

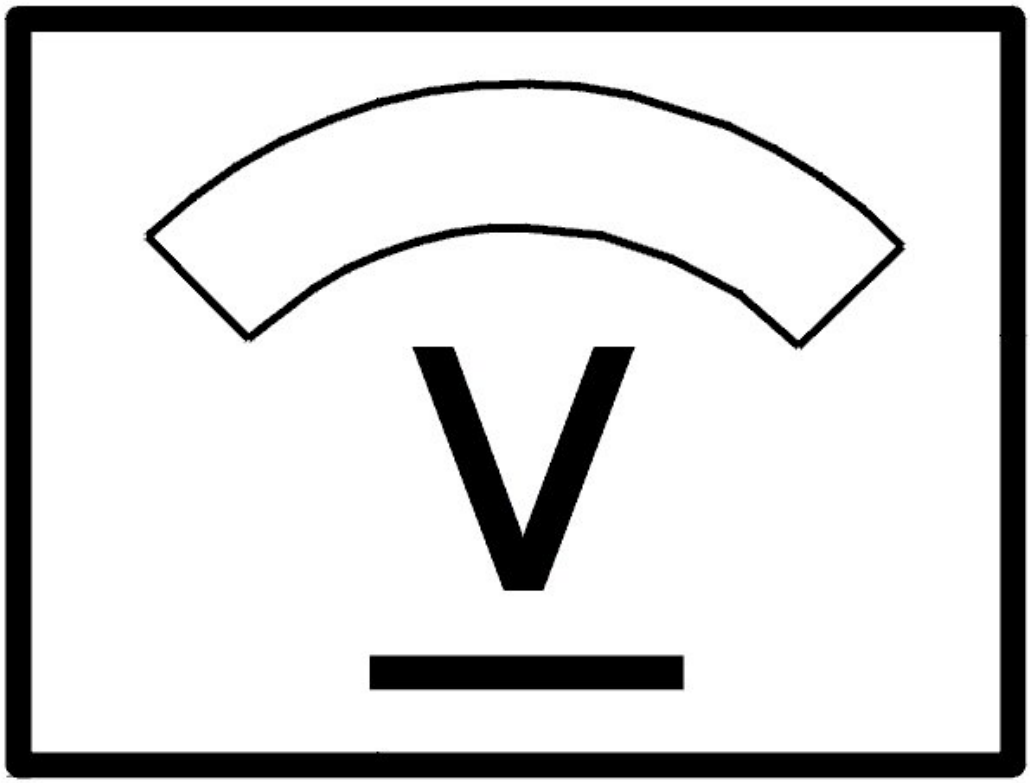
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.

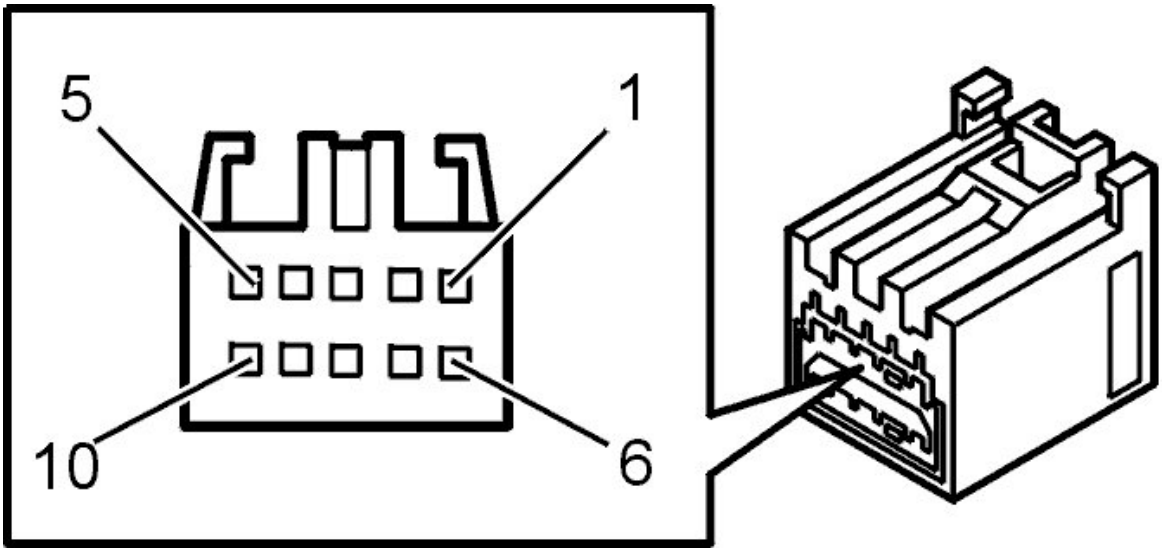
Remedy as necessary.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Was a fault detected?

Yes - Verification

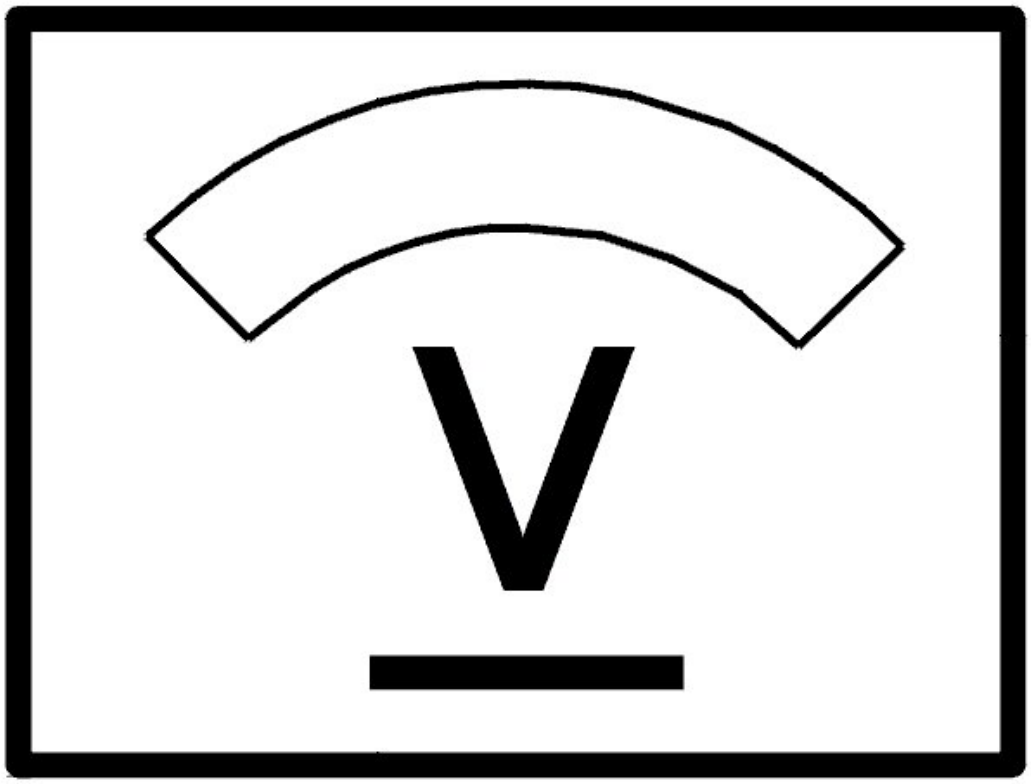
No - Checking the cable

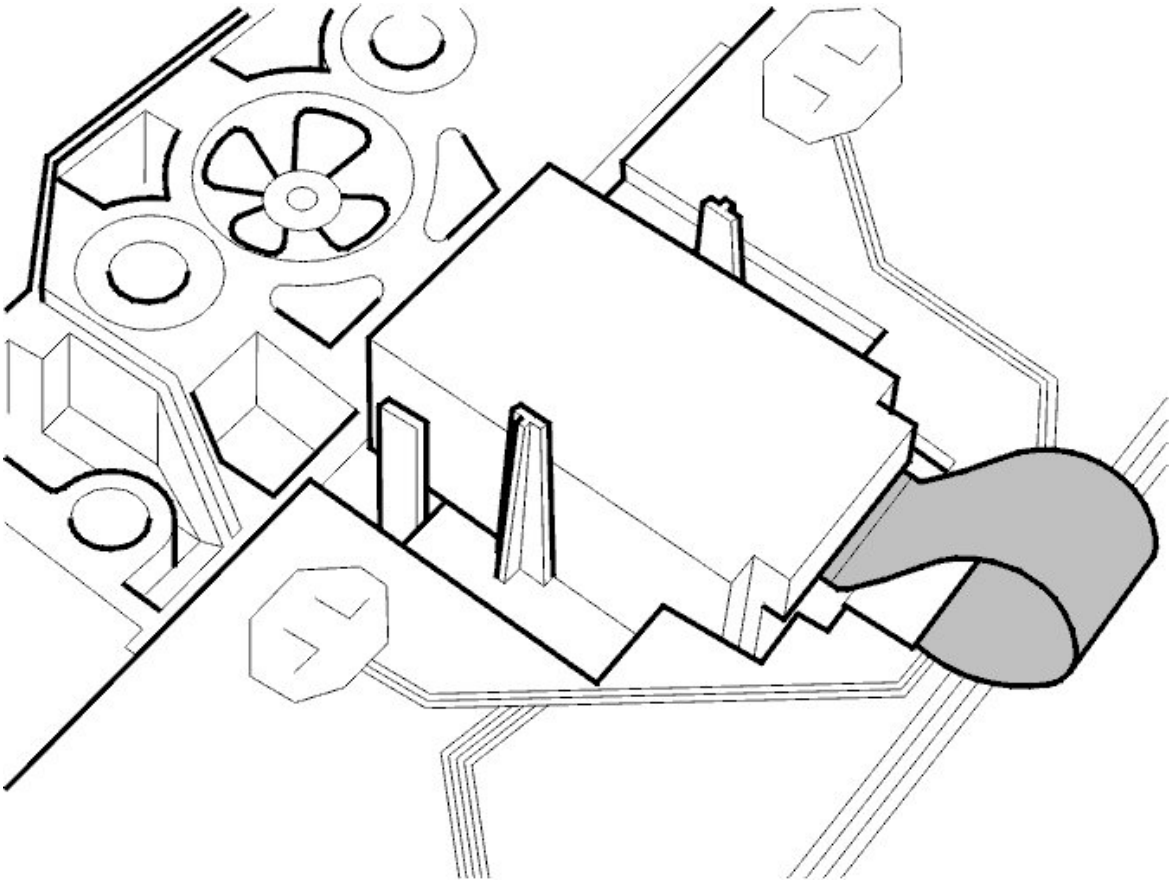
Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Replacing the component

Replacing the component

Visually check the roof lamp module and its switches.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.

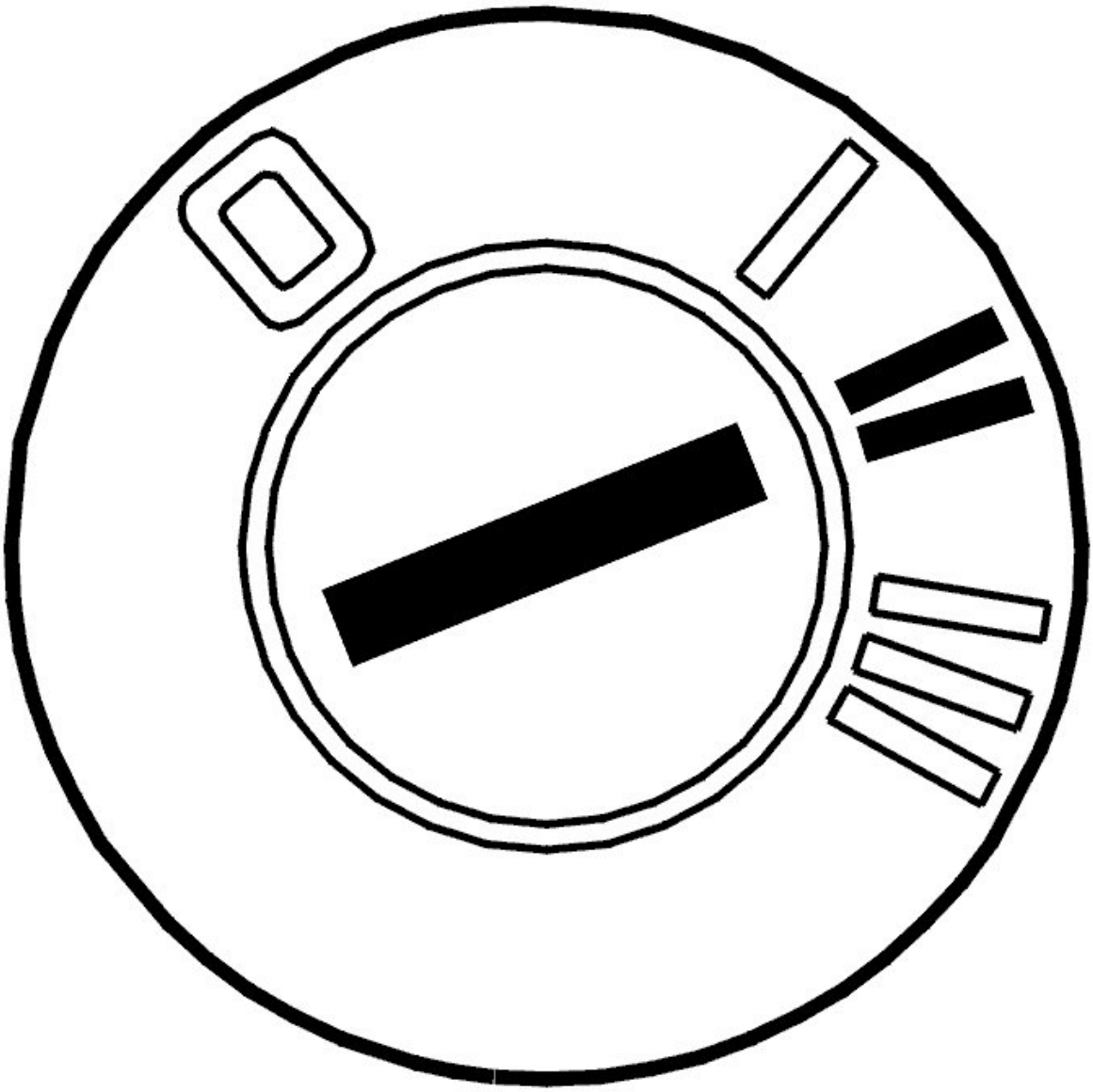
Continue - Verification

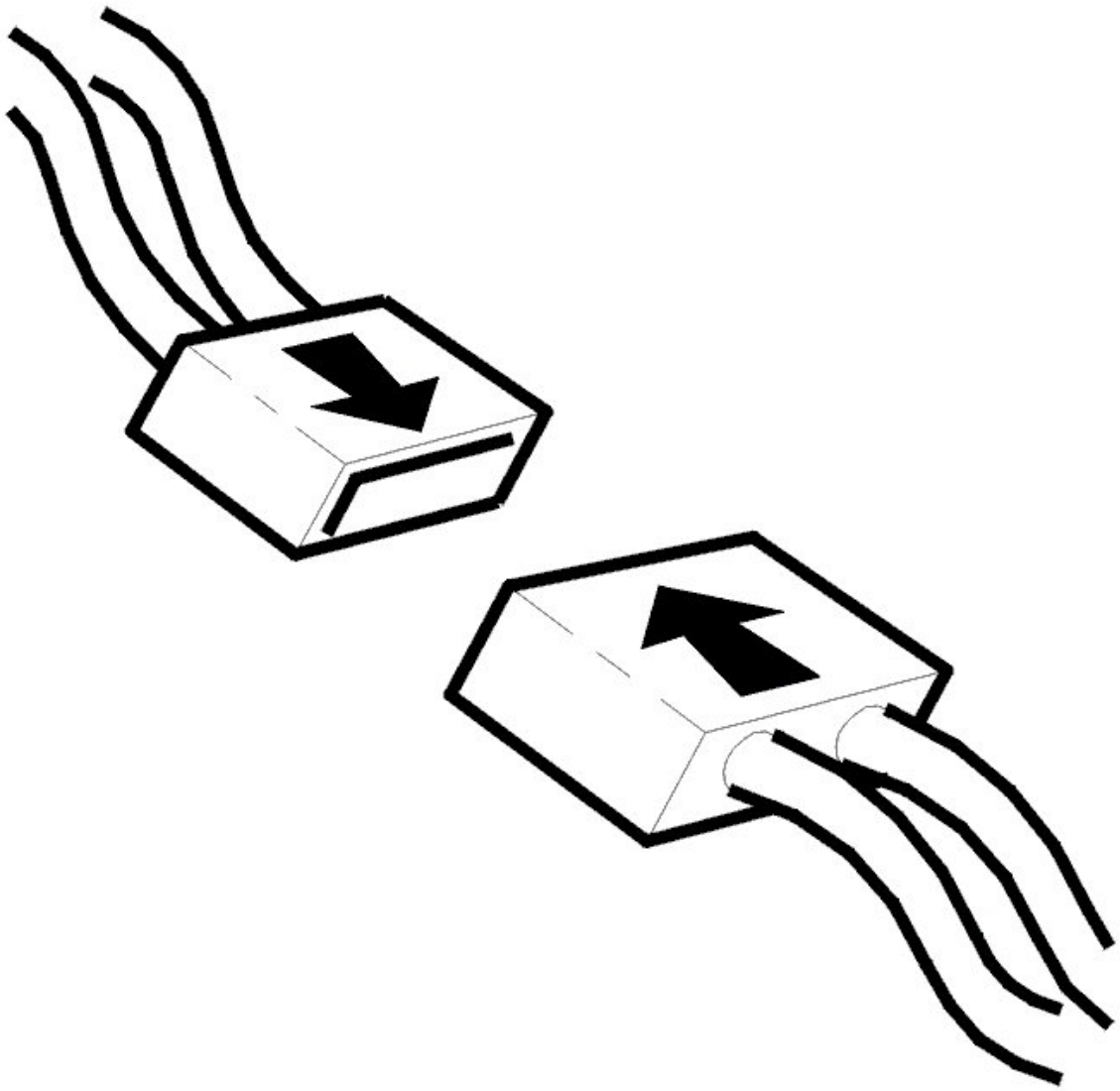
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Try to move the sunroof to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the connector on the sun roof module (SRM) and the connector on the roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Visually check the cable between the sun roof module (SRM) and the roof lamp module. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0064 Motor sun roof. Signal too high

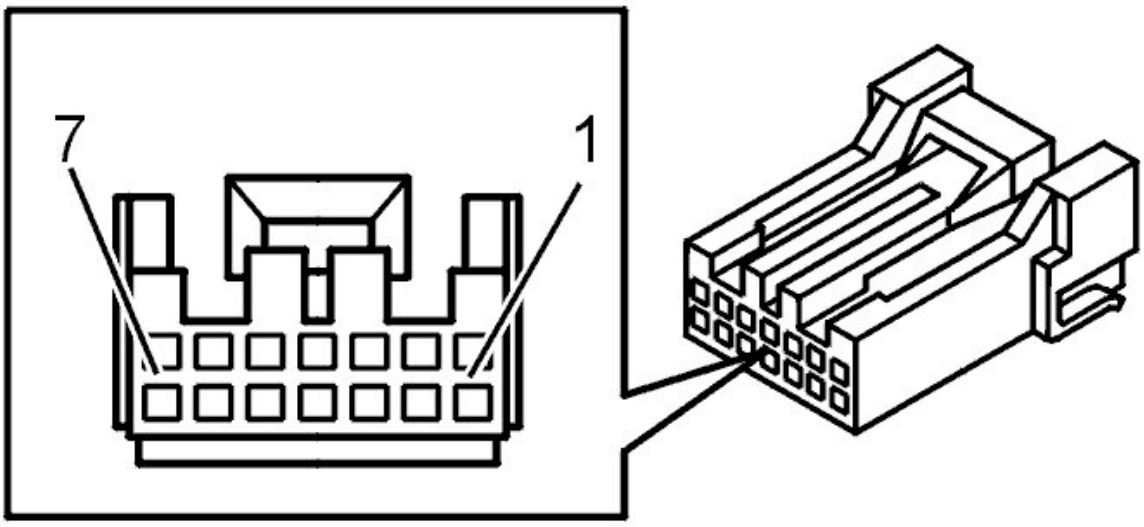
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Check the wiring between the sun roof switch and the roof lamp module (RCM). Check for an intermittent short-circuit to supply voltage.
Visually check the roof lamp module and its switches.

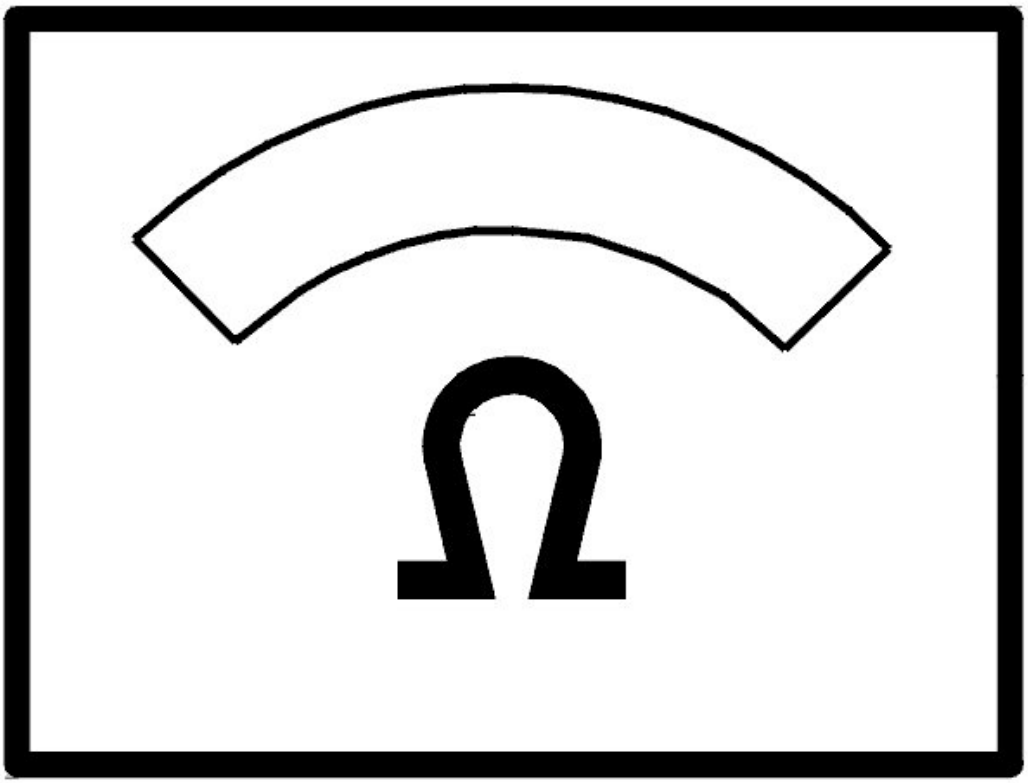
Hint: If no fault is found replace the sun roof switch.

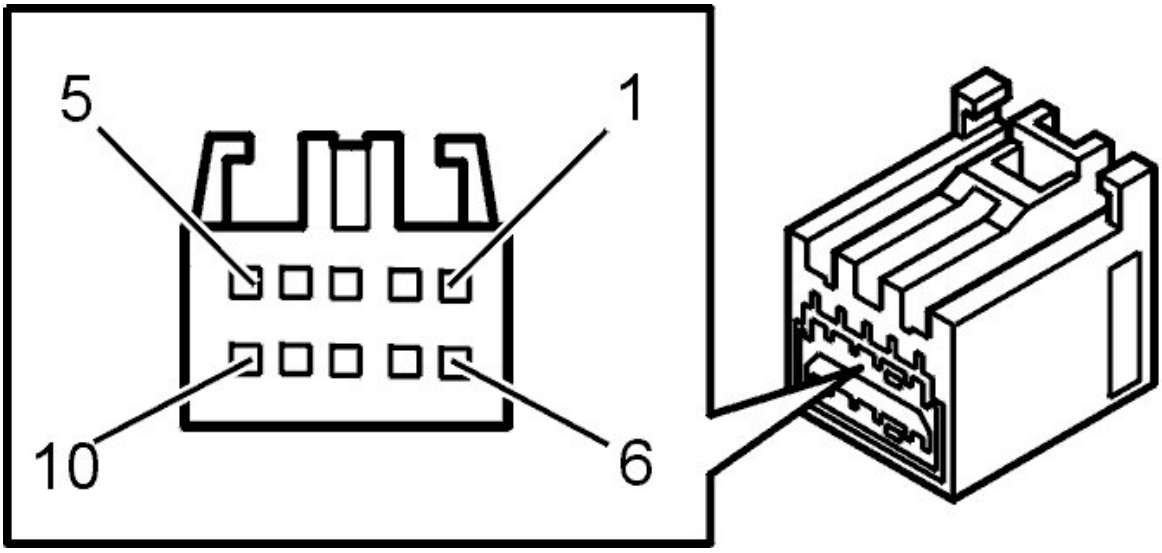
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To replace the printed circuit board and its switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair

- To replace the switch for the sun roof, see Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof control unit (SRM), diagnostic trouble code is set.

Substitute value
- Nothing.

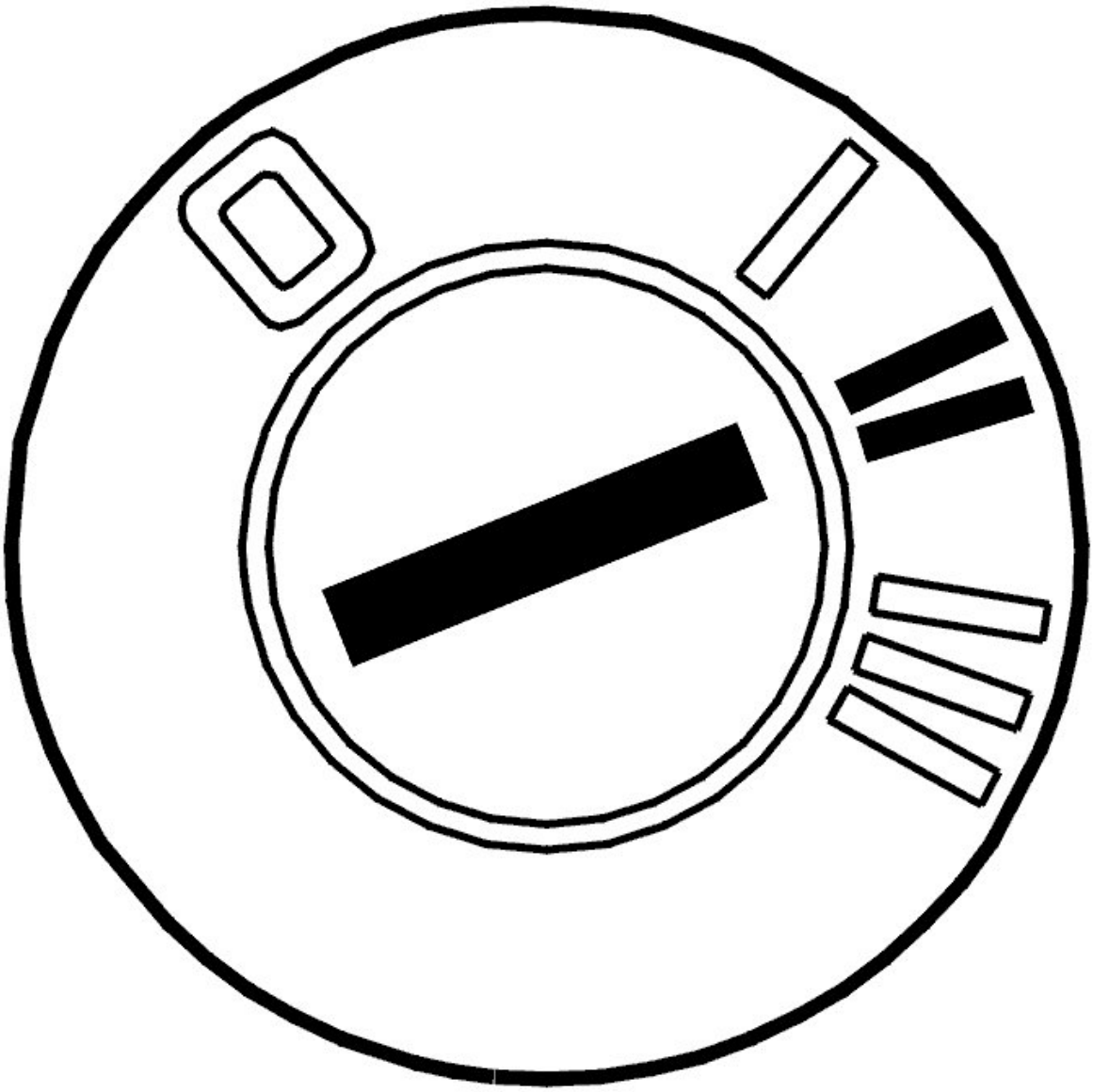
Possible source
- The voltage supply wire for automatic movement of the sunroof is short circuited to voltage supply.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Try to operate the sun roof to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the sun roof module (SRM) and the roof lamp module. Check for a short-circuit to supply voltage.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

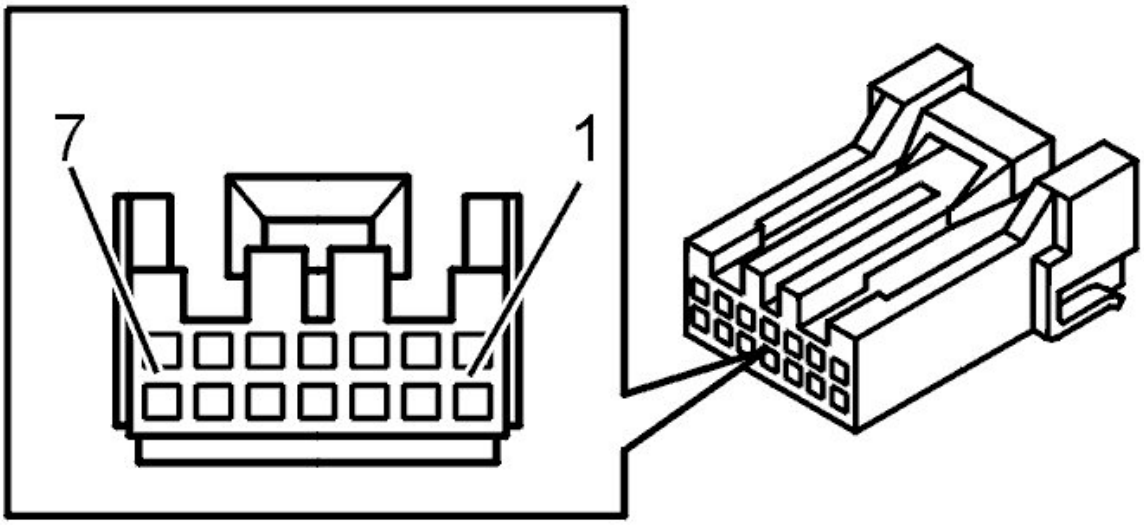
UEM-0064 Motor sun roof. Signal too high

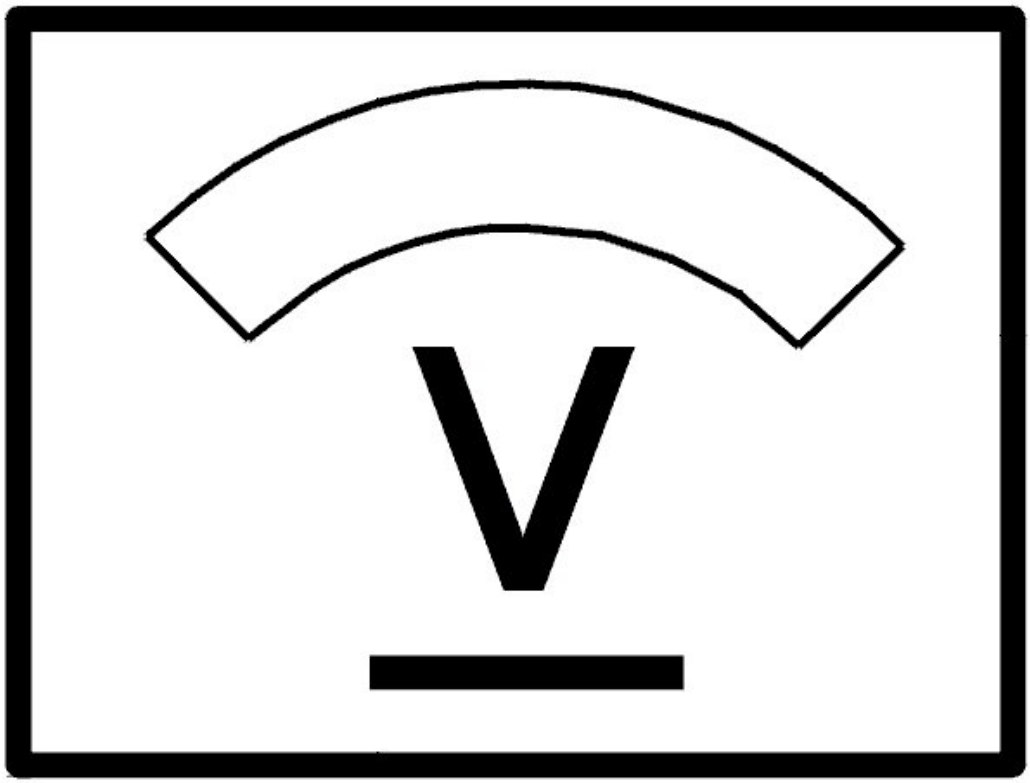
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.

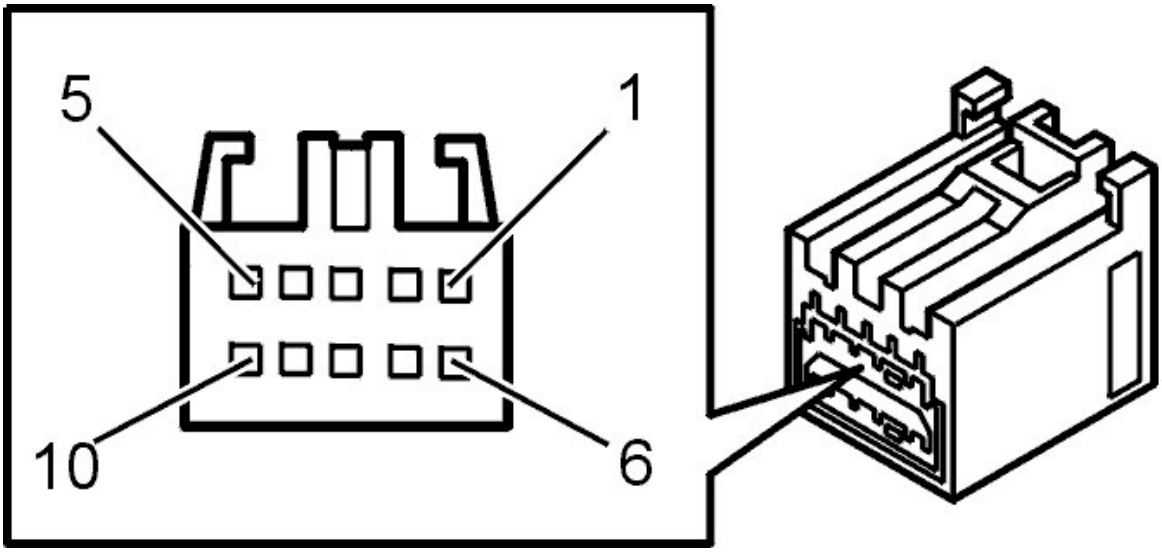
Remedy as necessary.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Was a fault detected?

Yes - Verification

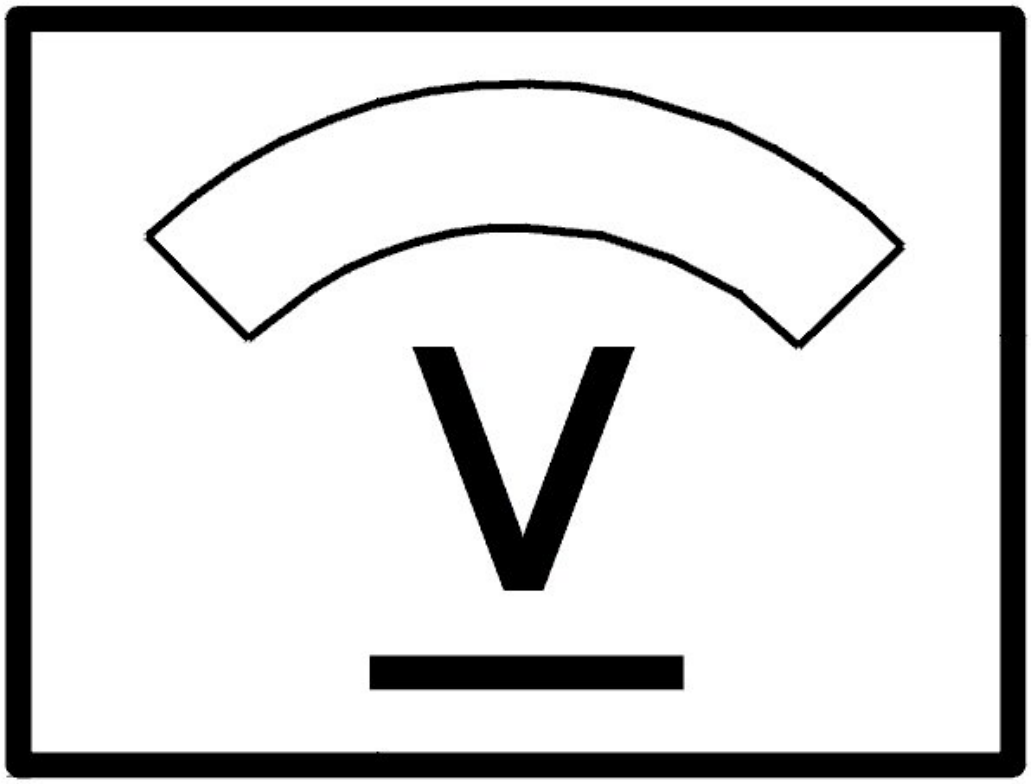
No - Checking the cable

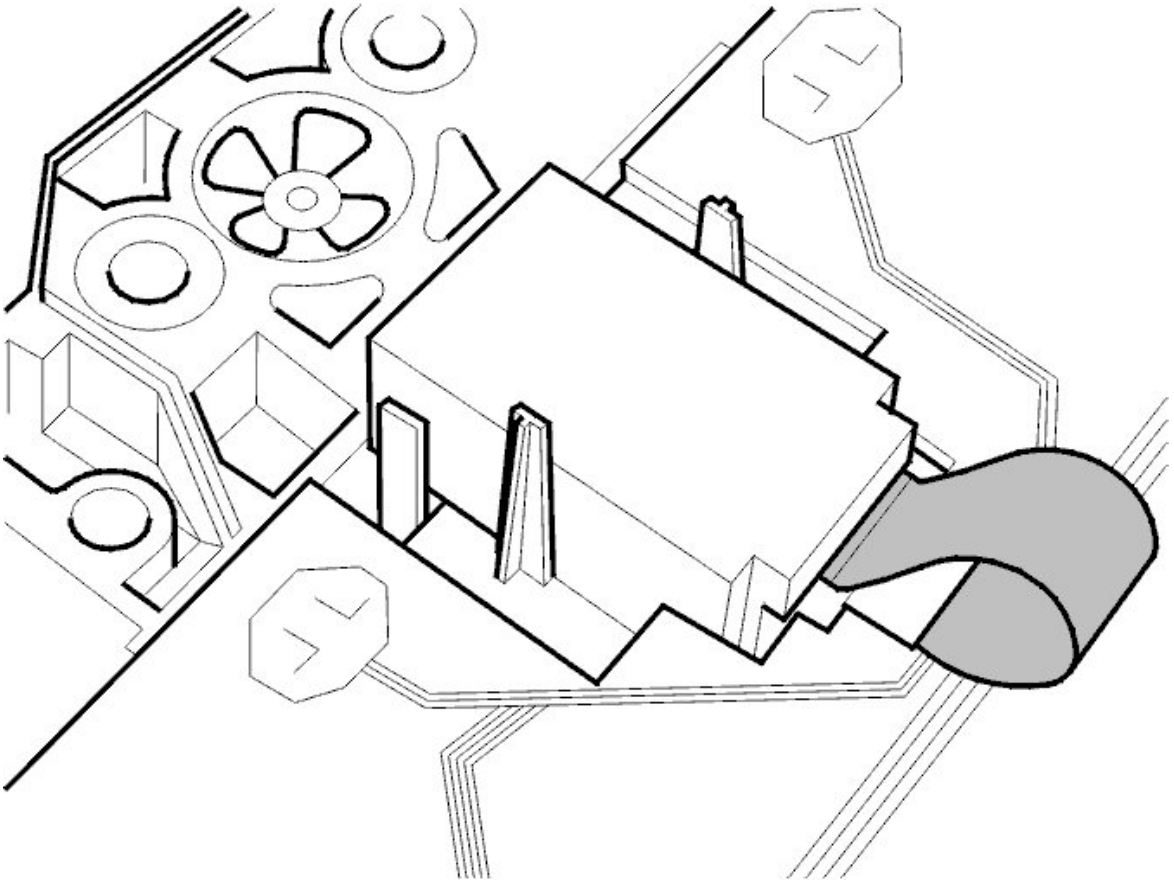
Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Replacing the component

Replacing the component

Visually check the roof lamp module and its switches.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.

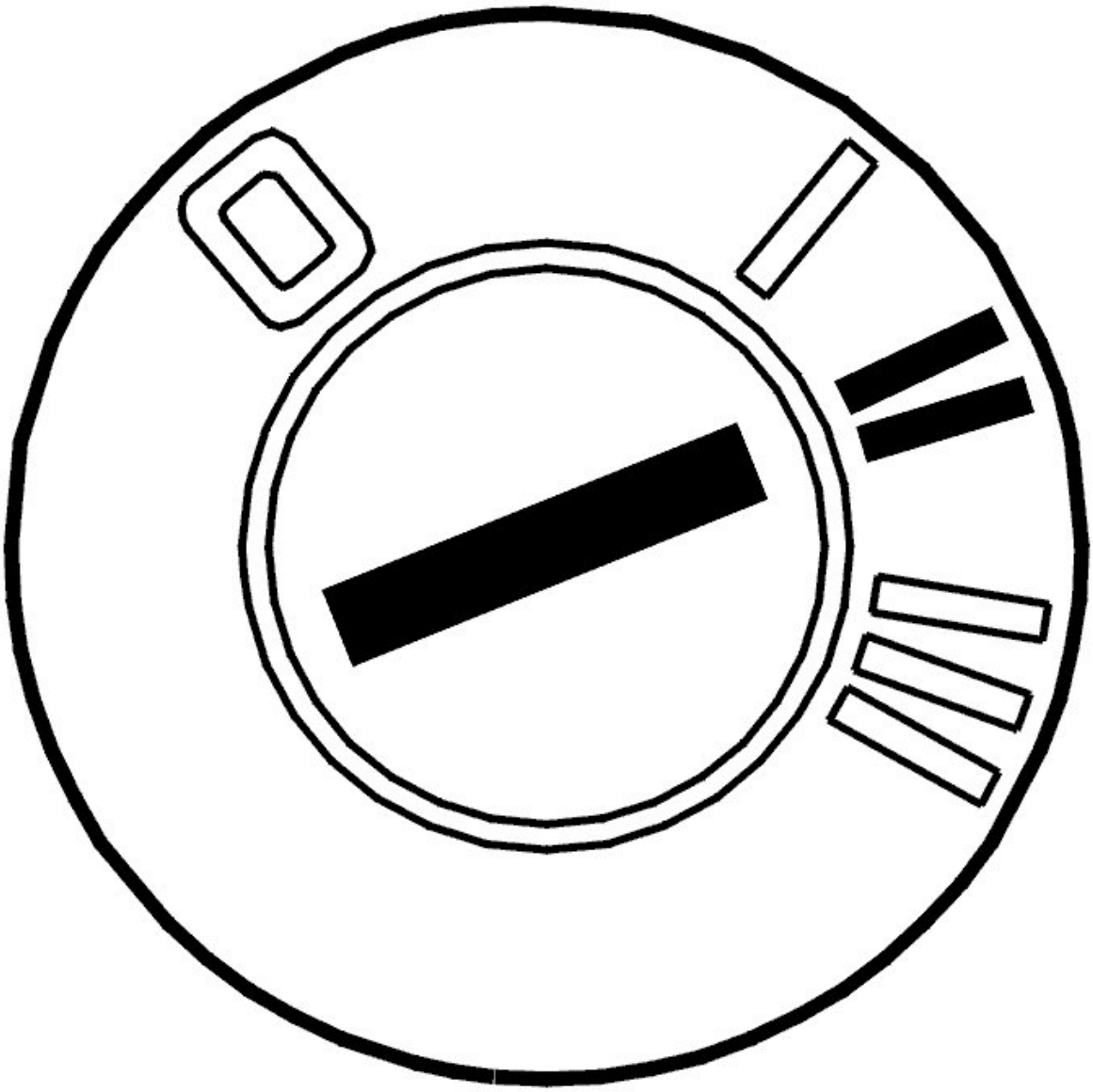
Continue - Verification

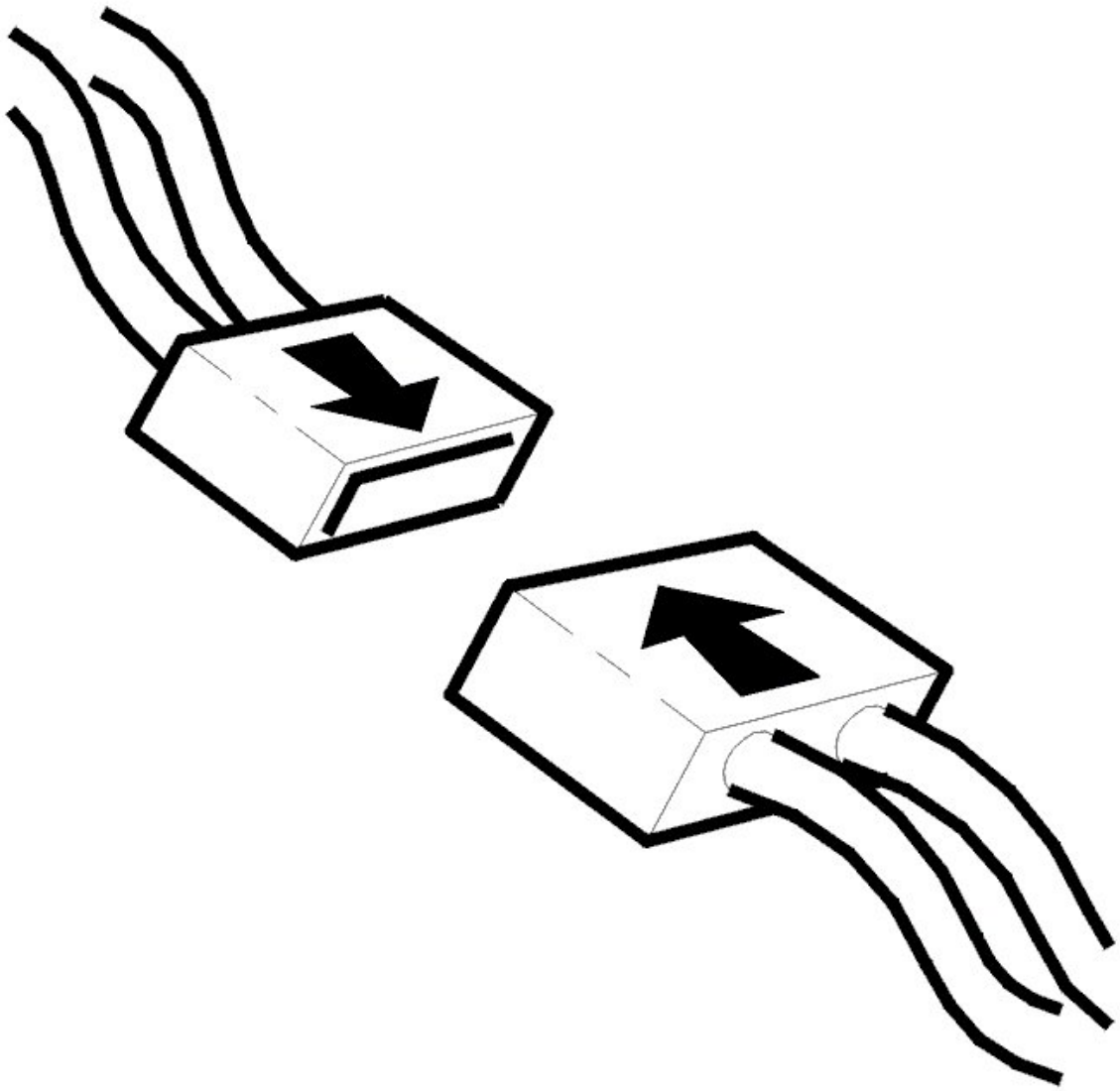
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Try to move the sunroof to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the connector on the sun roof module (SRM) and the connector on the roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Visually check the cable between the sun roof module (SRM) and the roof lamp module. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0064 Motor sun roof. Signal too high

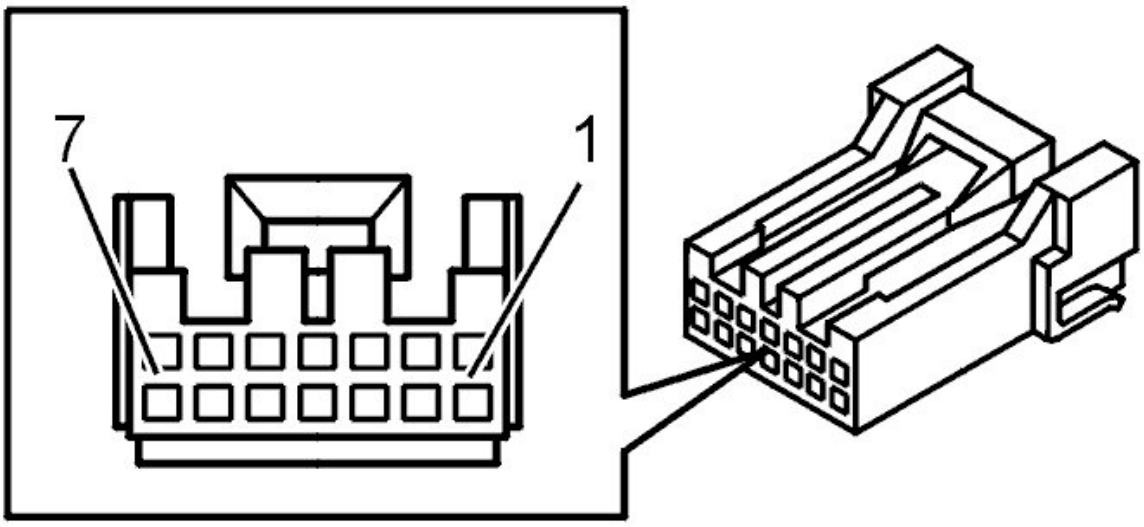
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Check the wiring between the sun roof switch and the roof lamp module (RCM). Check for an intermittent short-circuit to supply voltage.
Visually check the roof lamp module and its switches.

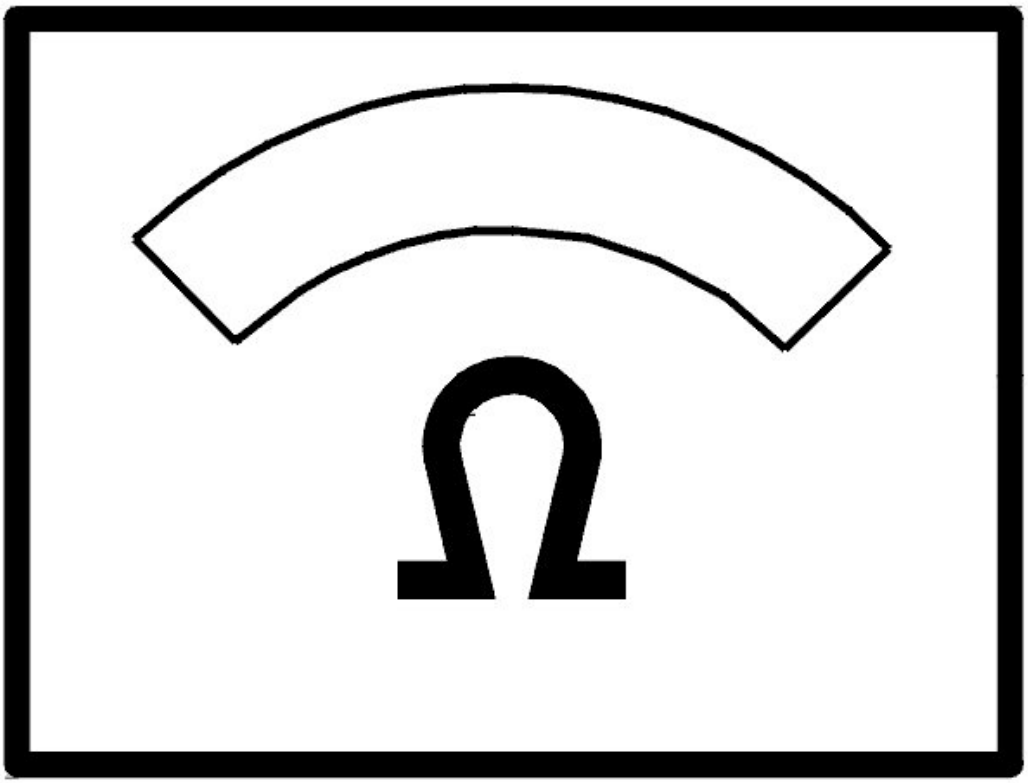
Hint: If no fault is found replace the sun roof switch.

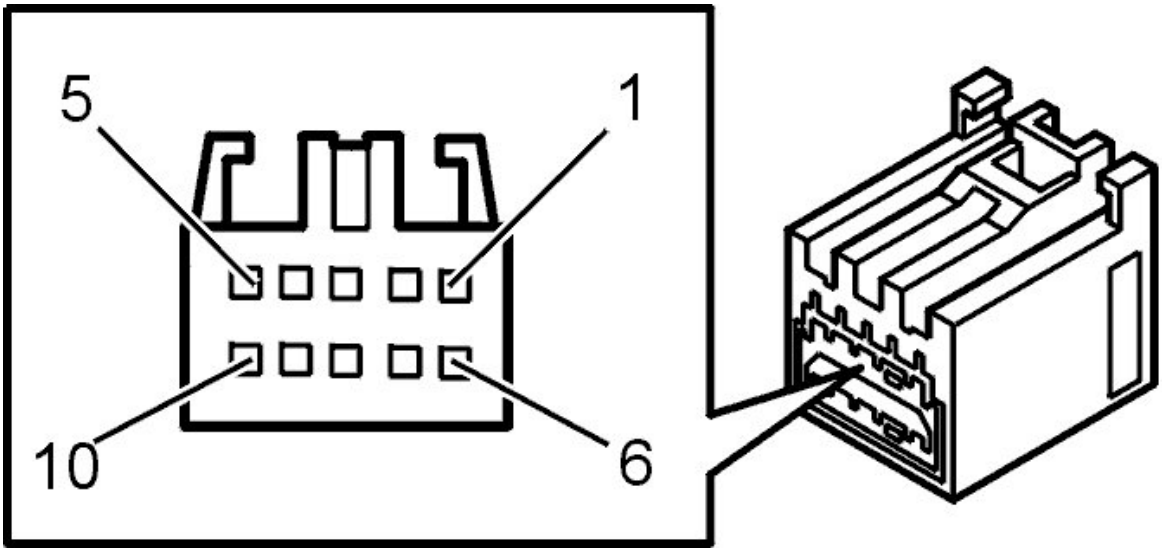
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To replace the printed circuit board and its switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair

- To replace the switch for the sun roof, see Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof control unit (SRM), diagnostic trouble code is set.

Substitute value
- Nothing.

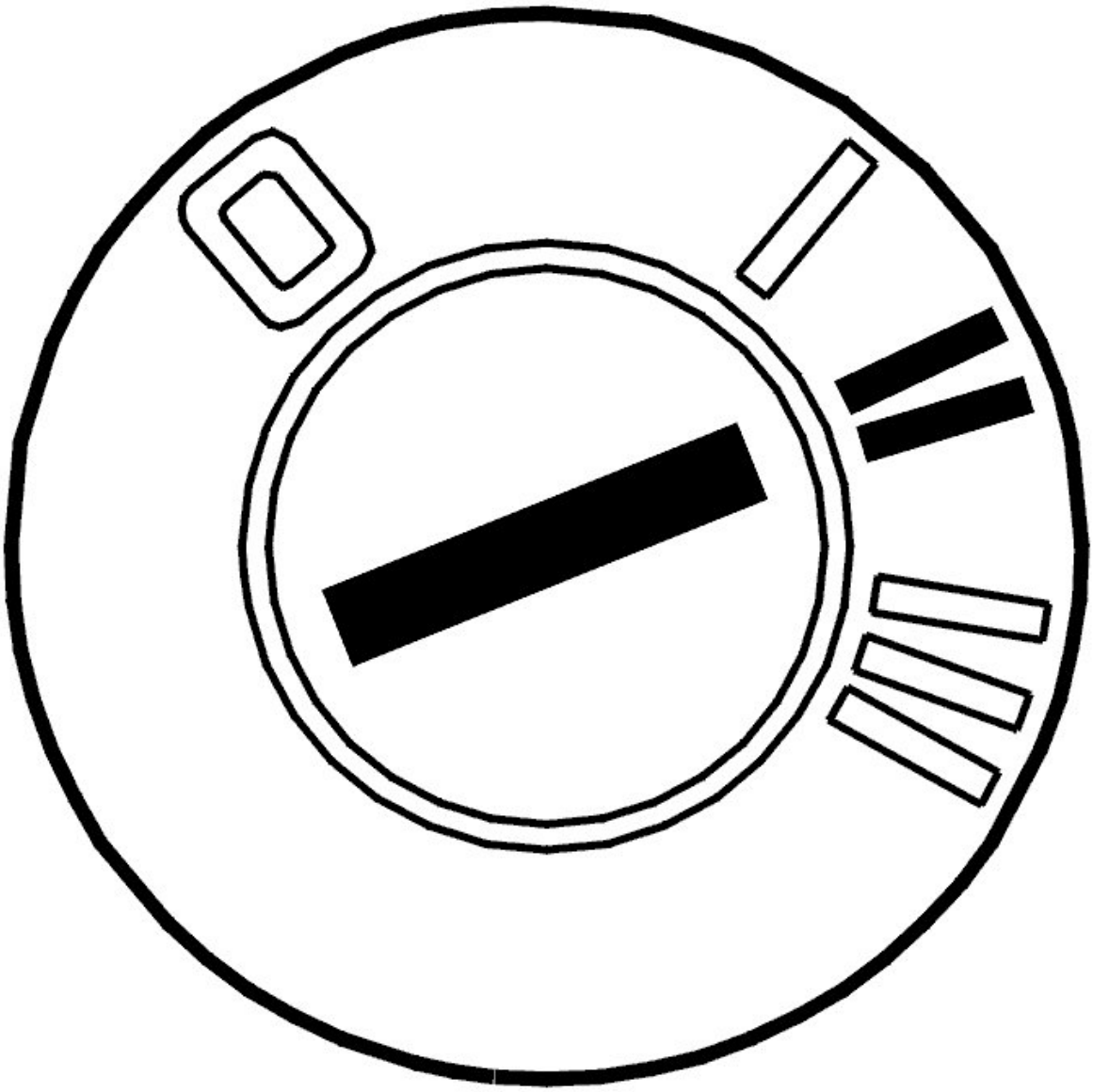
Possible source
- The voltage supply wire for tilt movement of the sunroof is short circuited to voltage supply.

Fault symptom[s]
- Electric sunroof does not work.

Signal Too High

Signal too high

Checking for permanent or intermittent faults



- Ignition on.

Try to operate the sun roof to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the sun roof module (SRM) and the roof lamp module. Check for a short-circuit to supply voltage.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

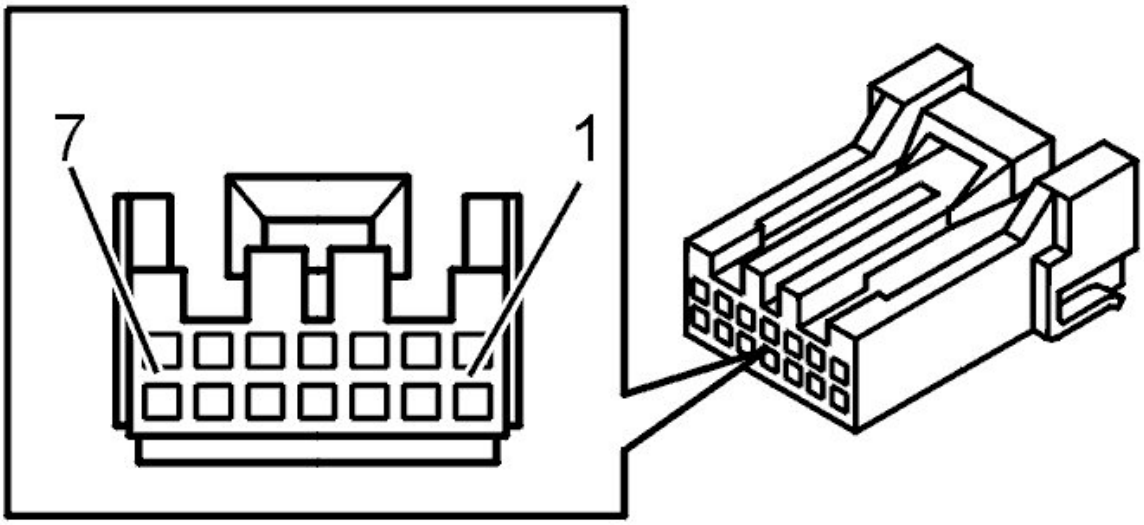
UEM-0064 Motor sun roof. Signal too high

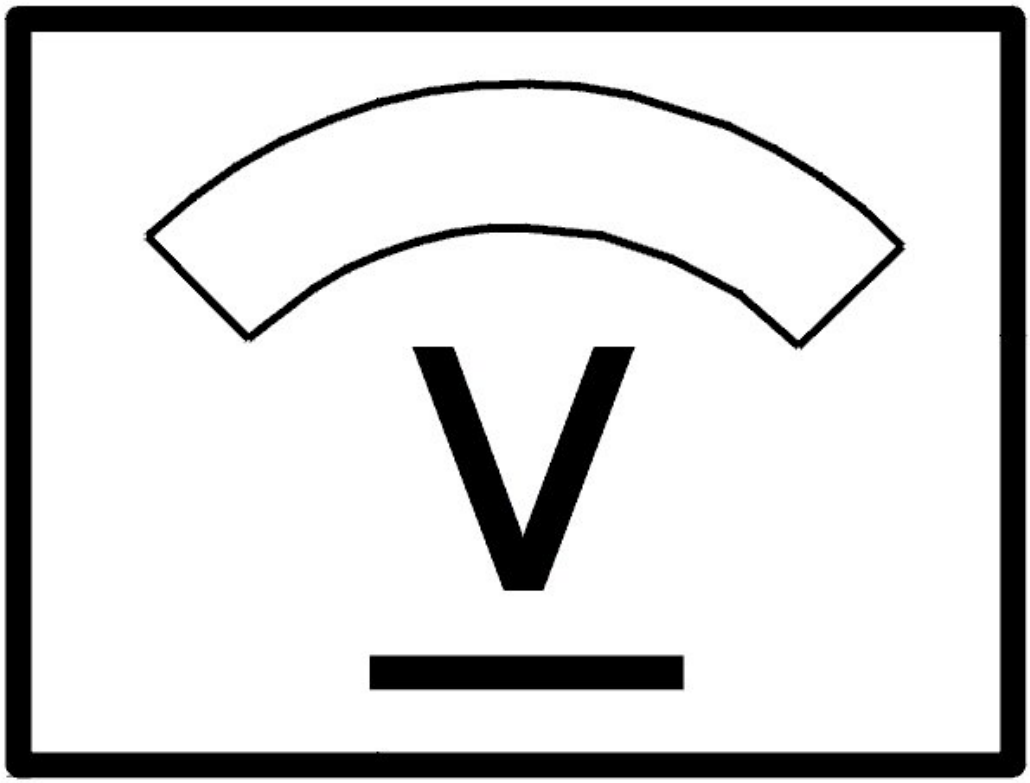
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.

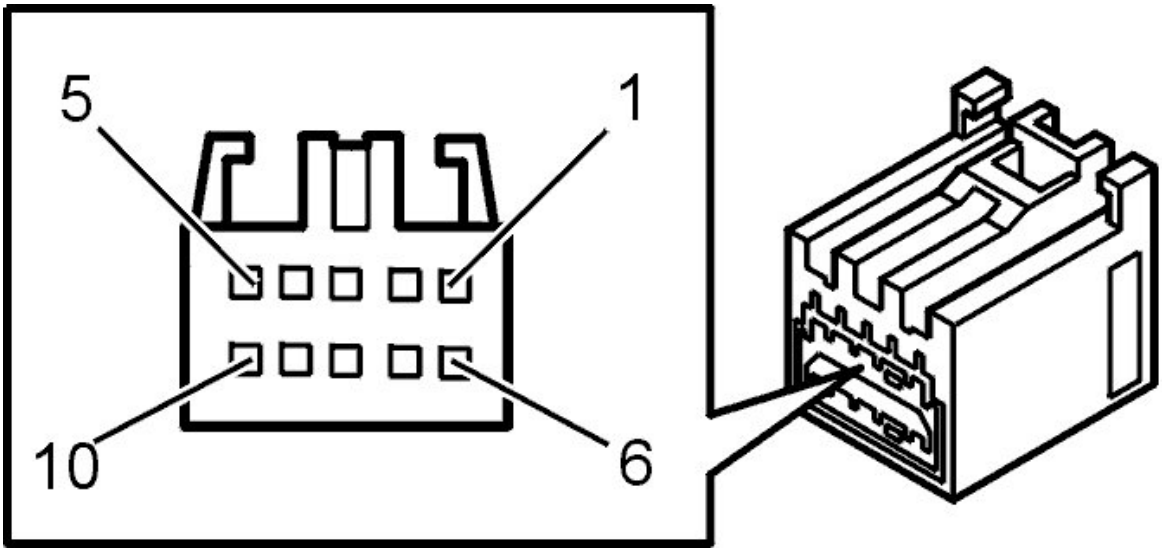
Remedy as necessary.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Was a fault detected?

Yes - Verification

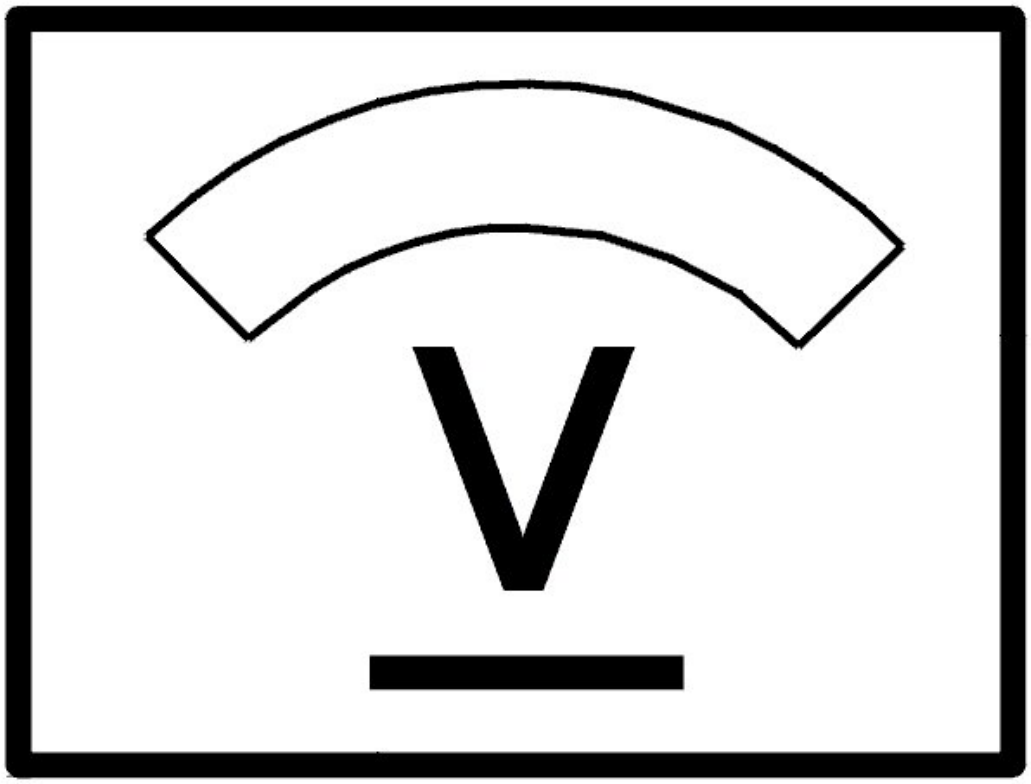
No - Checking the cable

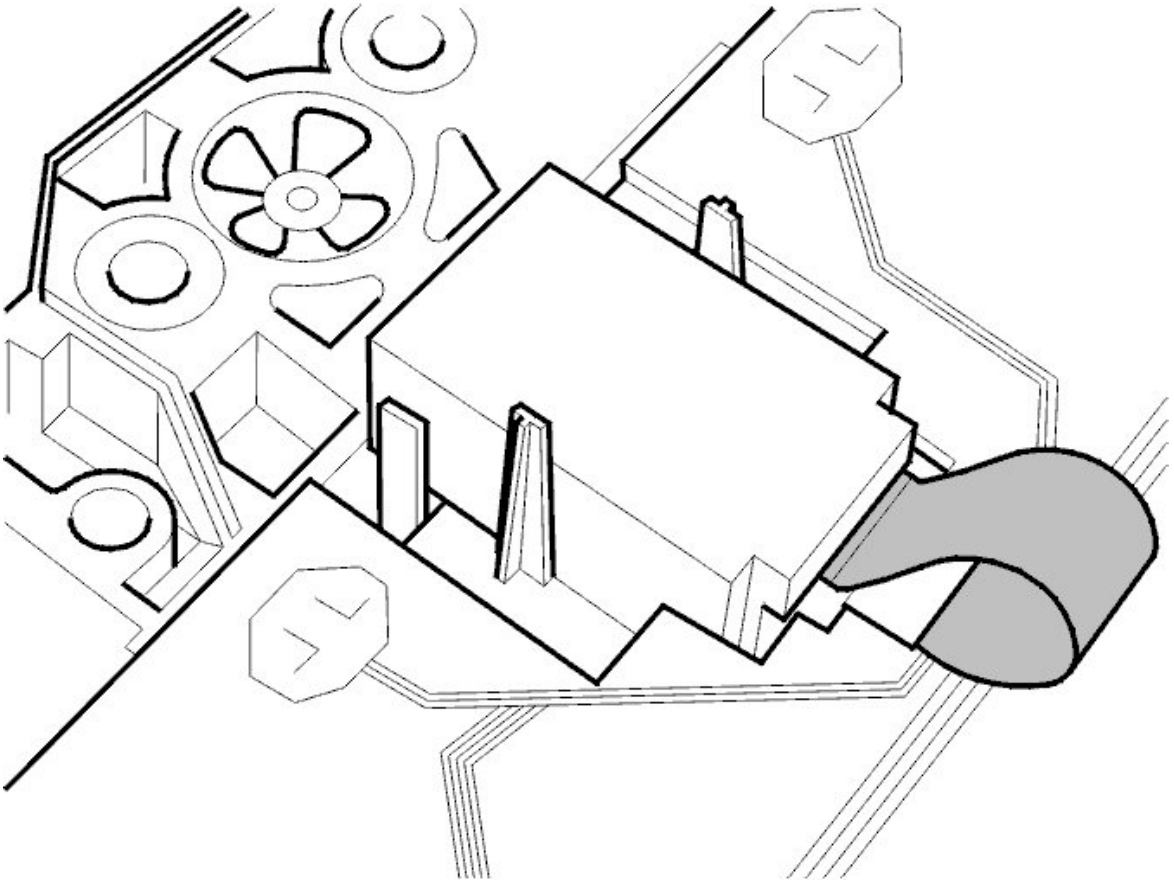
Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Replacing the component

Replacing the component

Visually check the roof lamp module and its switches.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.

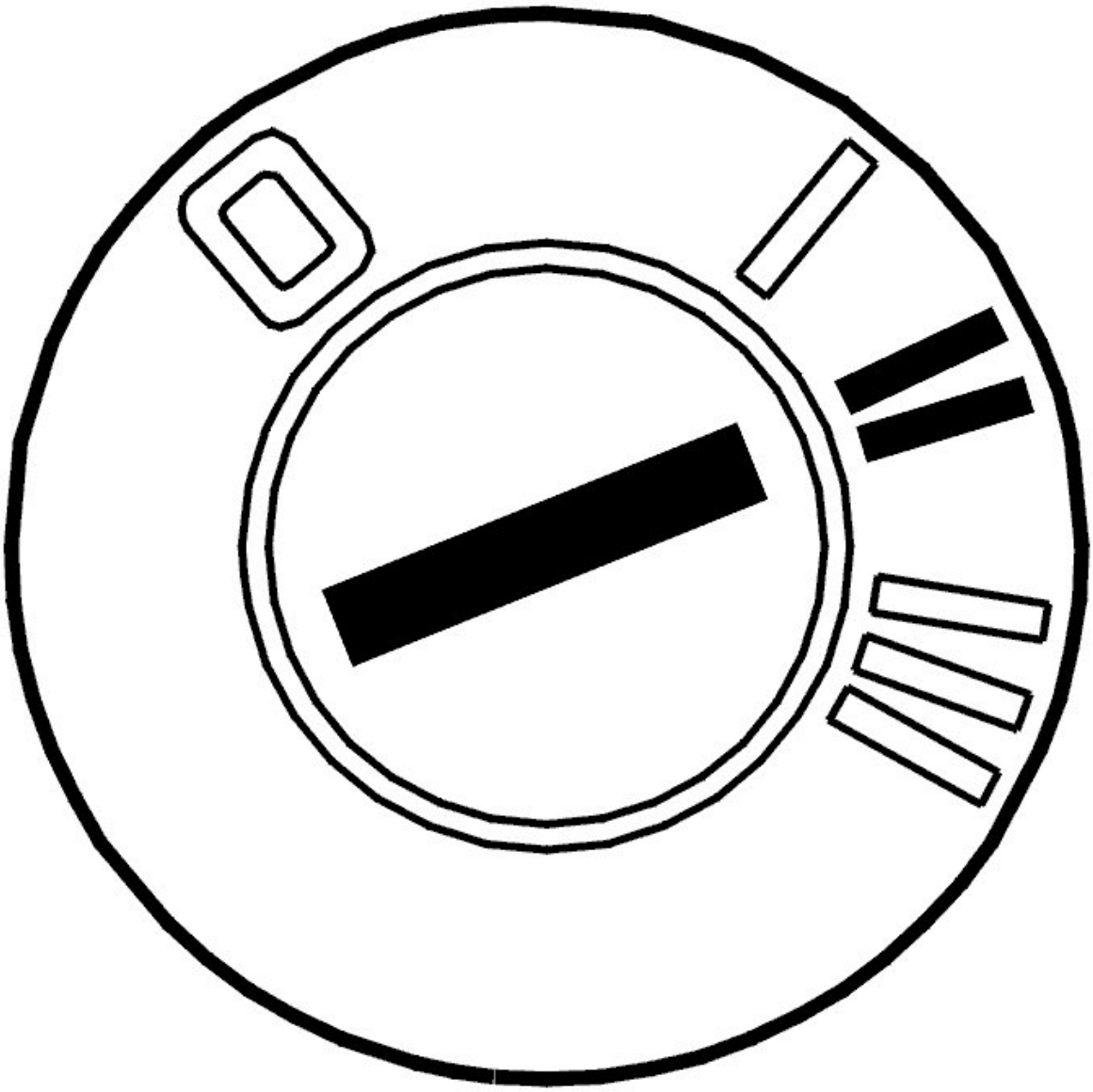
Continue - Verification

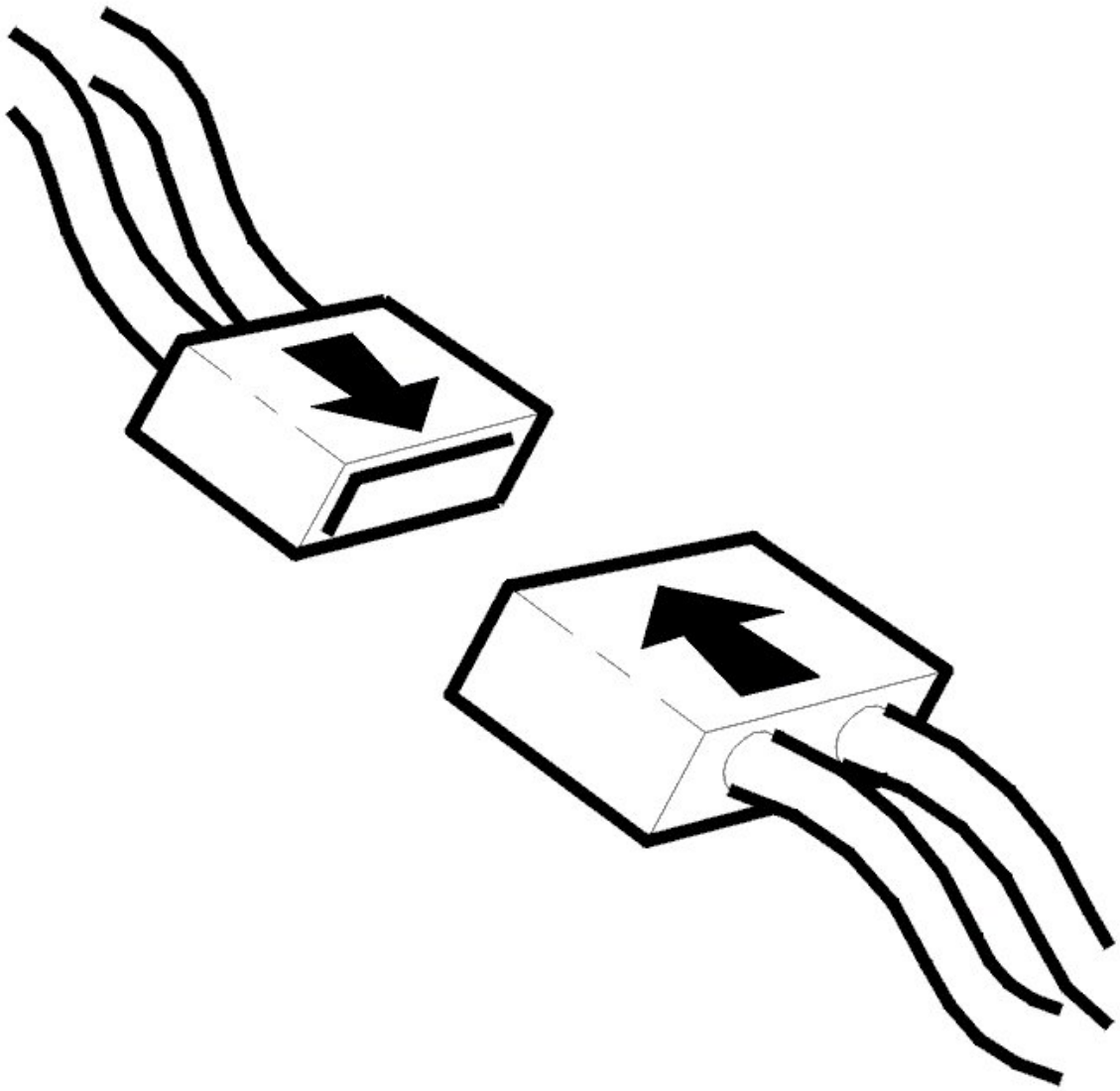
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Try to move the sunroof to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Intermittent fault

Check the connector on the sun roof module (SRM) and the connector on the roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Visually check the cable between the sun roof module (SRM) and the roof lamp module. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

UEM-0061 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #2A and roof lamp module terminal #4B.

UEM-0062 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #8A and roof lamp module terminal #3B.

UEM-0063 Motor sun roof. Signal too high

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0064 Motor sun roof. Signal too high

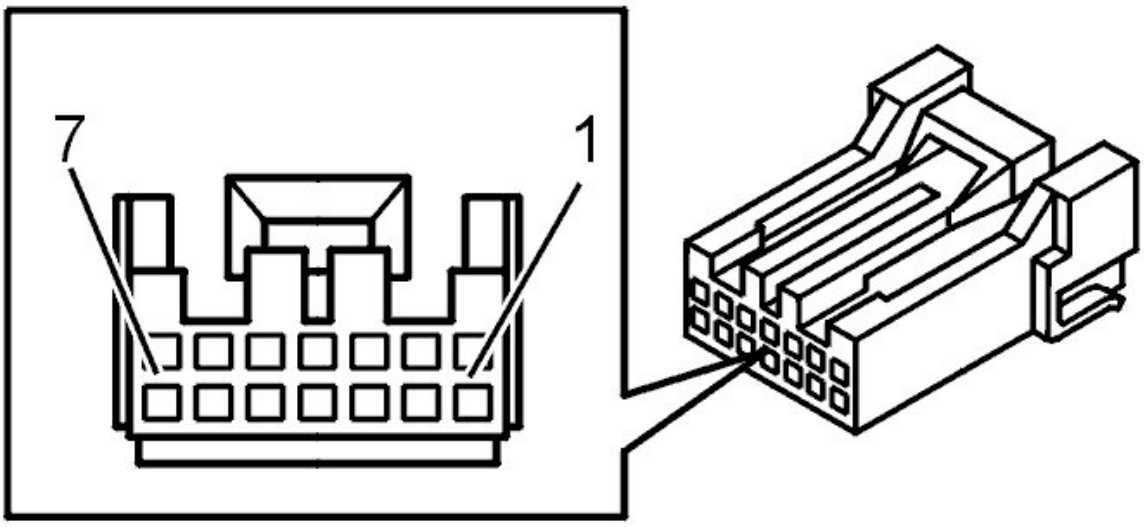
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Check the wiring between the sun roof switch and the roof lamp module (RCM). Check for an intermittent short-circuit to supply voltage.
Visually check the roof lamp module and its switches.

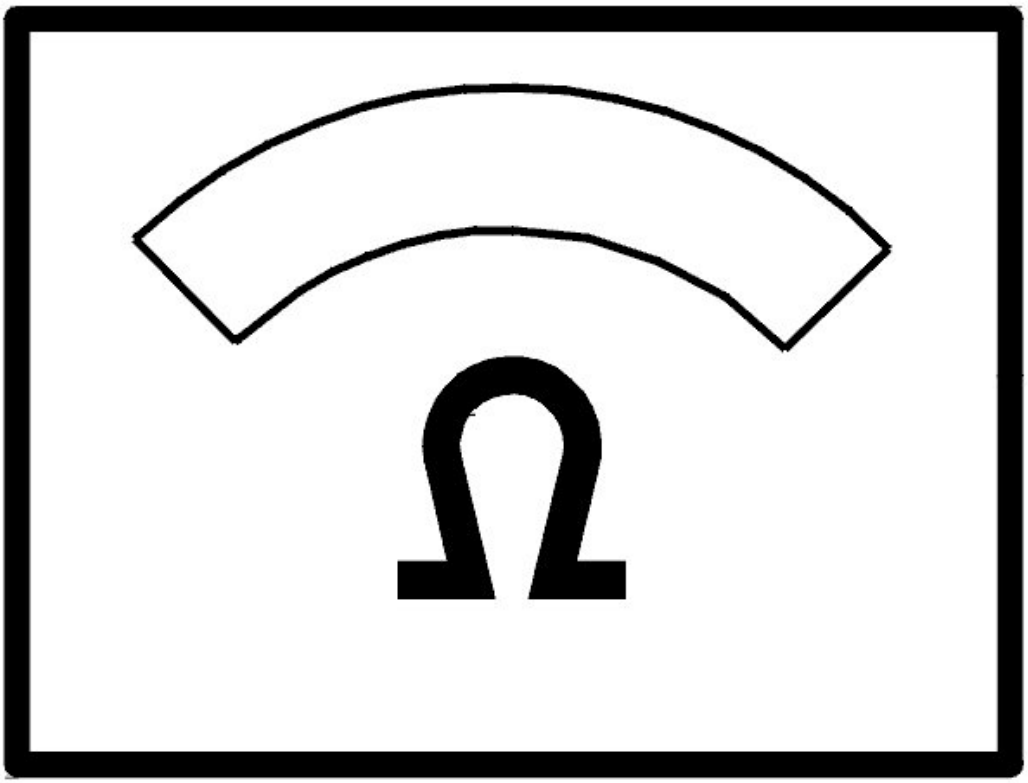
Hint: If no fault is found replace the sun roof switch.

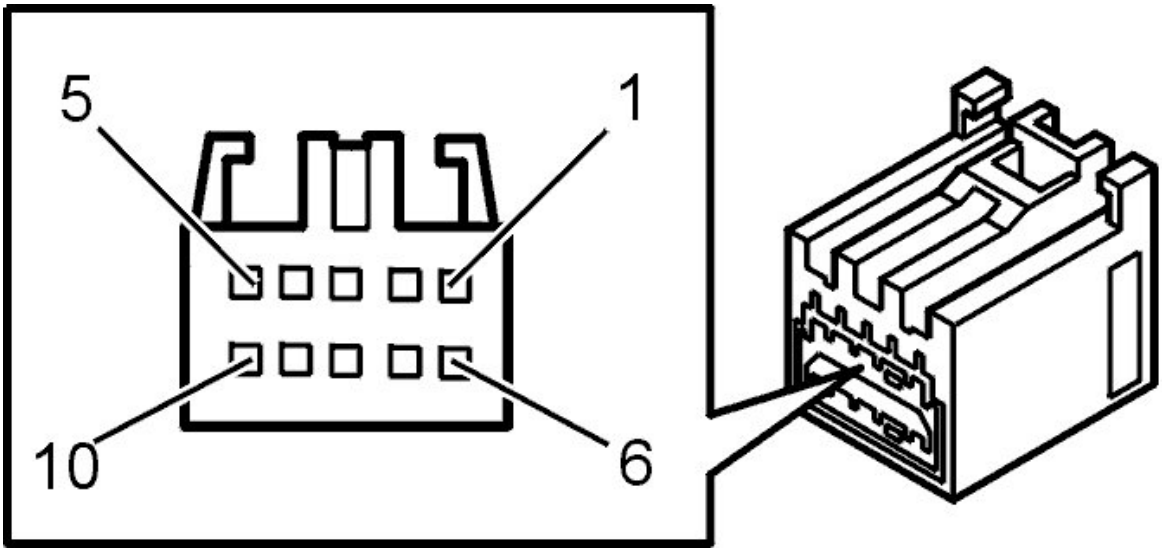
Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To replace the printed circuit board and its switches, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair

- To replace the switch for the sun roof, see Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







Continue - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

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Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The signal for forwards movement of the sunroof is activated too long.

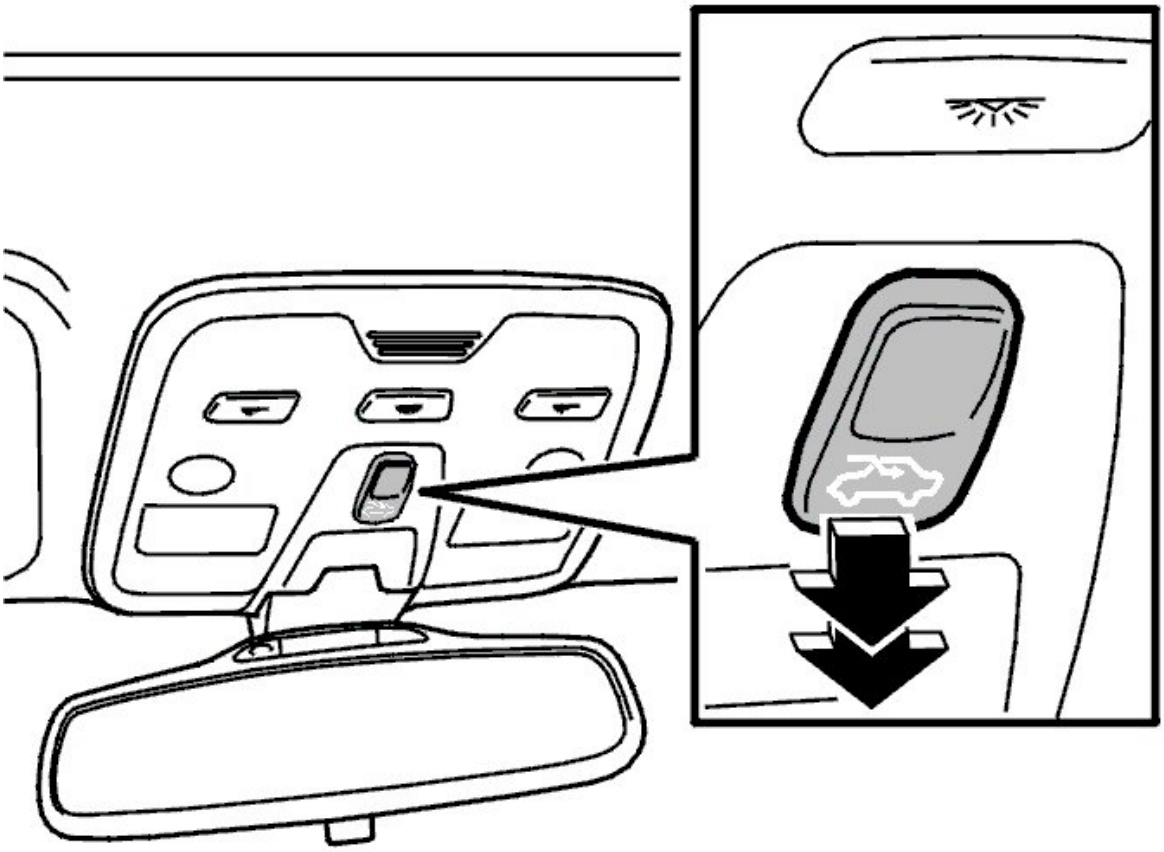
Fault symptom[s]
- Electric sunroof does not work.

Faulty Signal

Faulty signal

Replacing the component

Replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.
Check that the function is now OK.



Is the function OK?

Yes - Verification

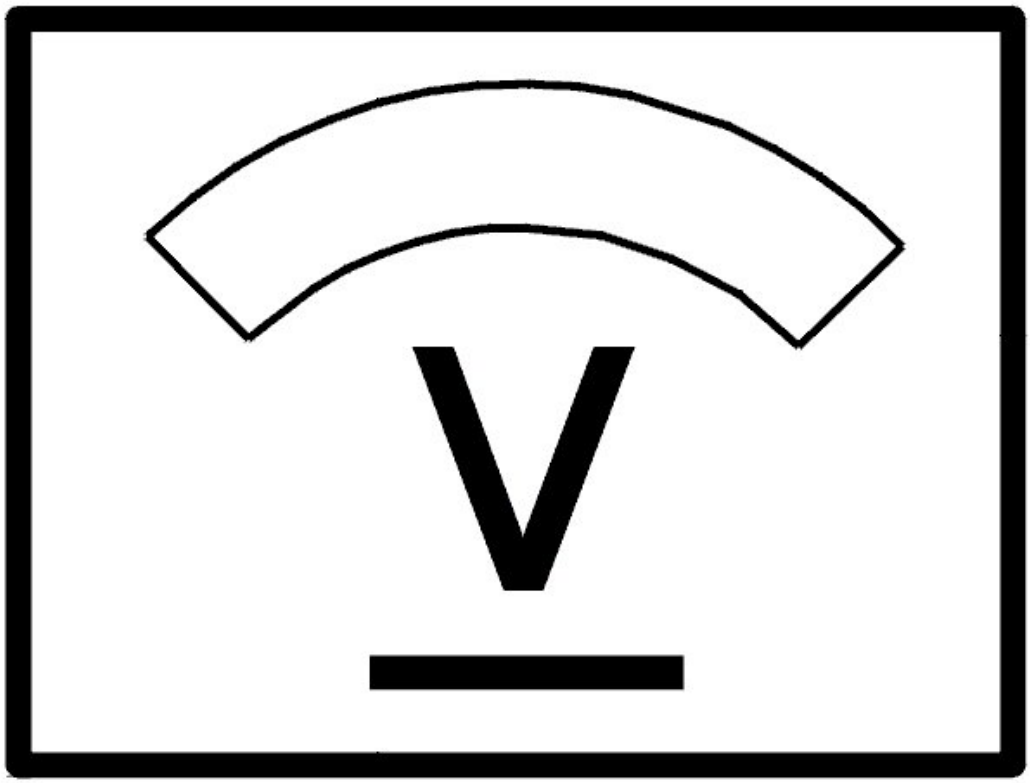
No - Checking the cable

Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.
If a fault is found replace the wiring.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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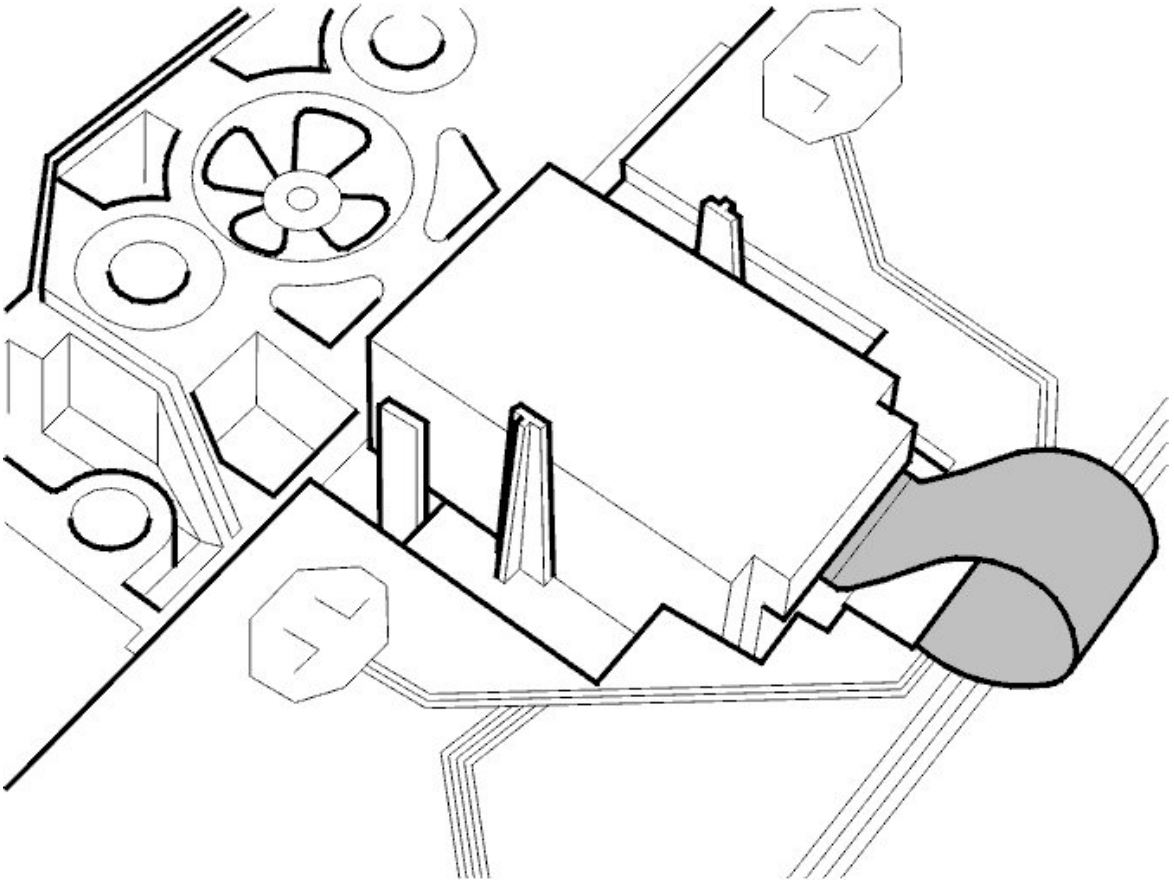


Has a fault been detected?

Yes - Verification

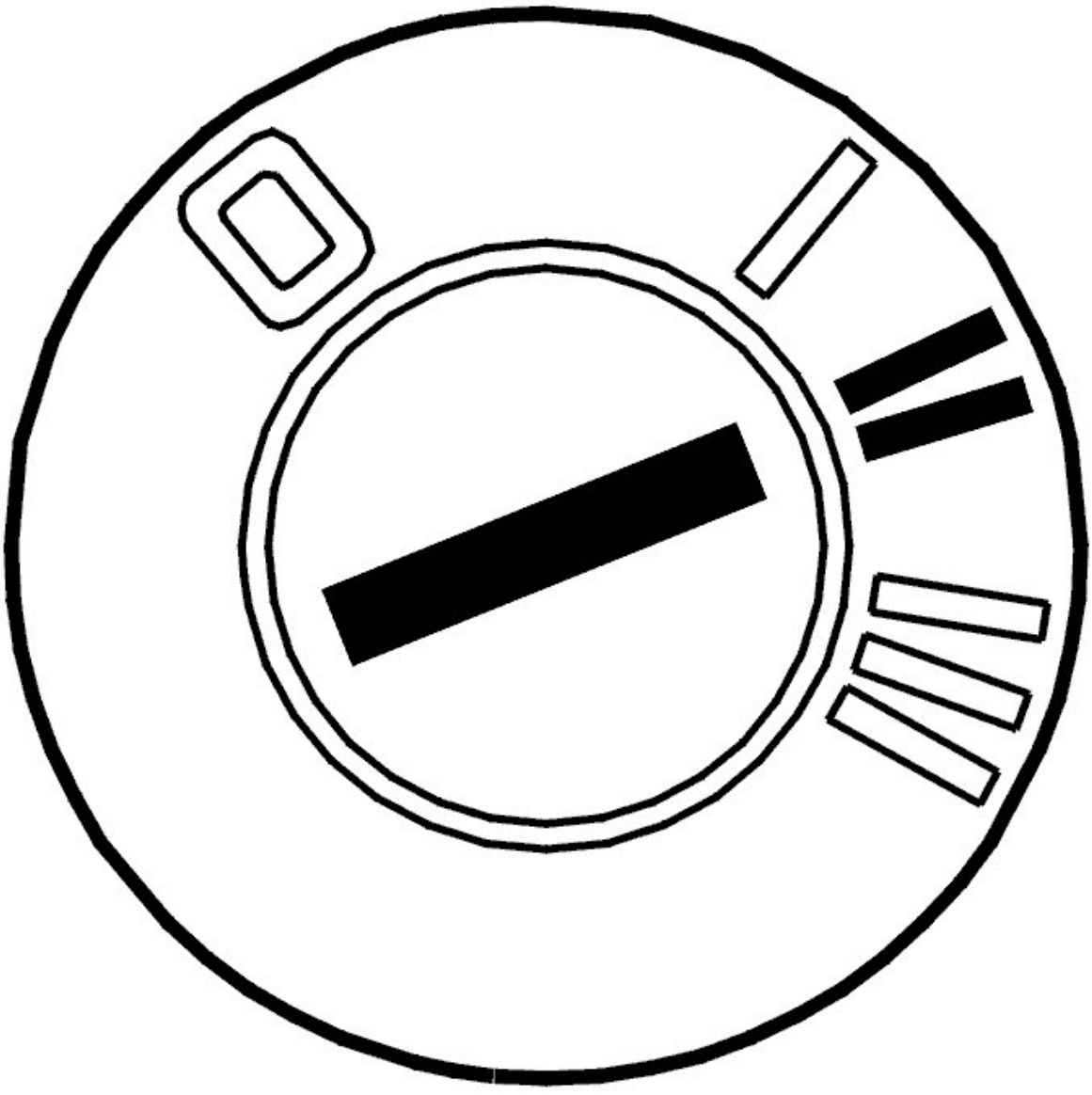
No - Replacing the control module

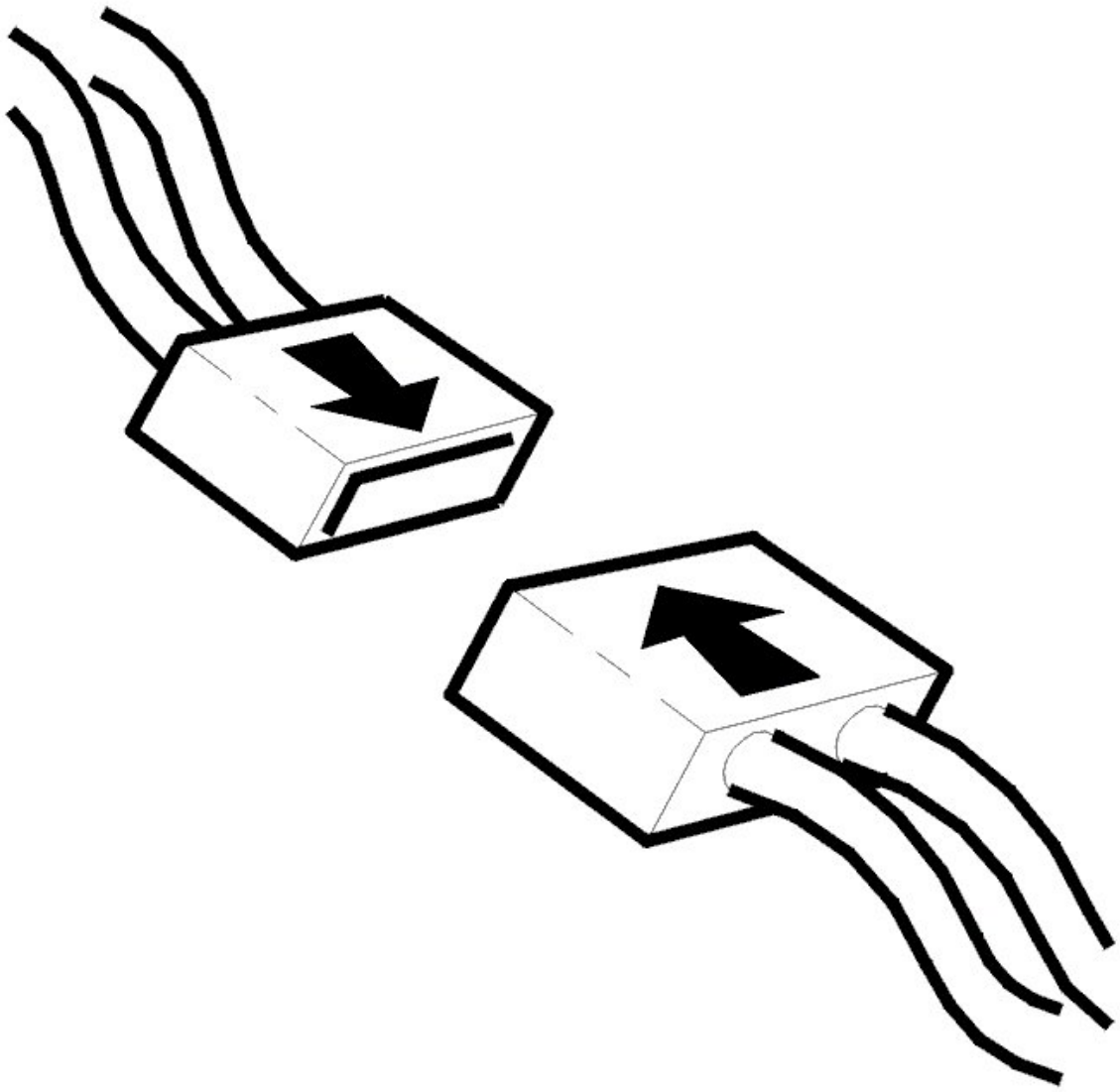
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof control works.

Does the sunroof control work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Replacing the control module

If no fault has been found, replace the sun roof module (SRM).

Other information
- To replace the sun roof module (SRM), see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The signal for backwards movement of the sunroof is activated too long.

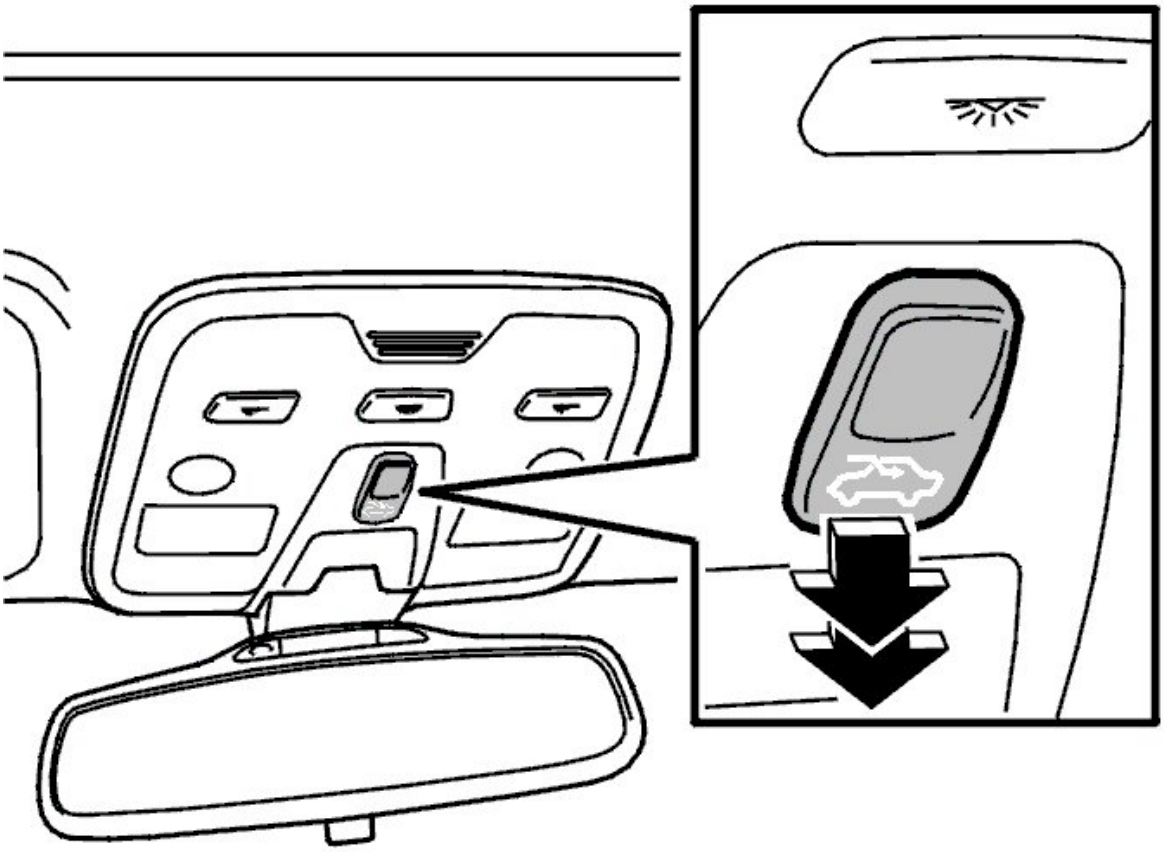
Fault symptom[s]
- Electric sunroof does not work.

Faulty Signal

Faulty signal

Replacing the component

Replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.
Check that the function is now OK.



Is the function OK?

Yes - Verification

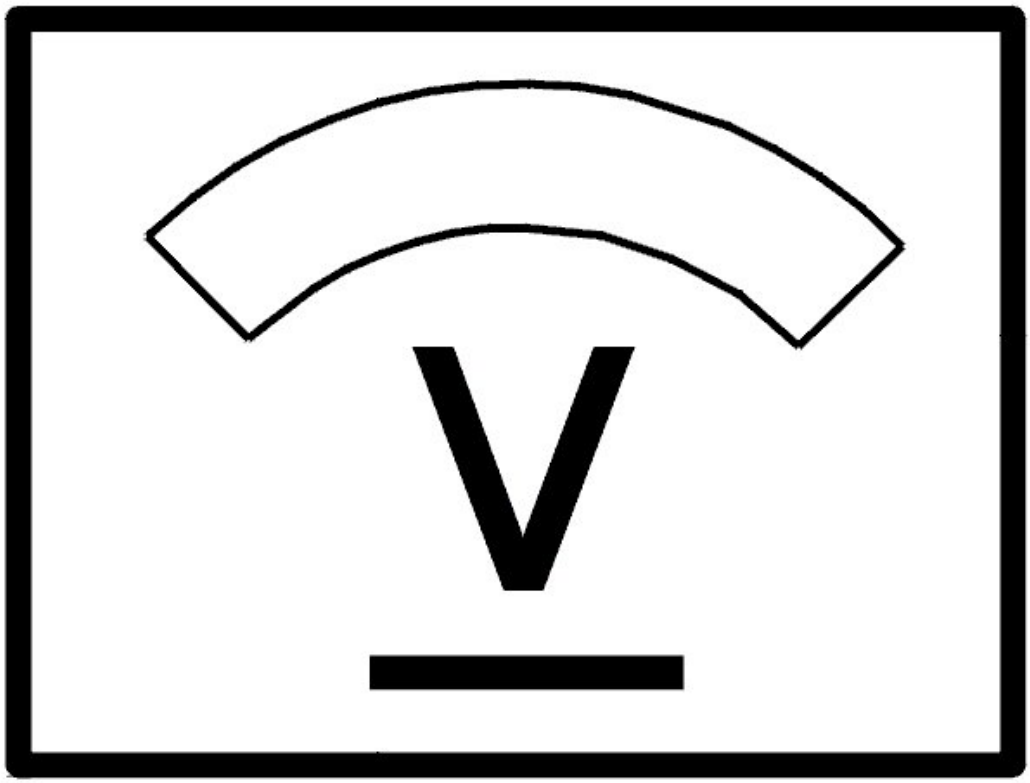
No - Checking the cable

Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.
If a fault is found replace the wiring.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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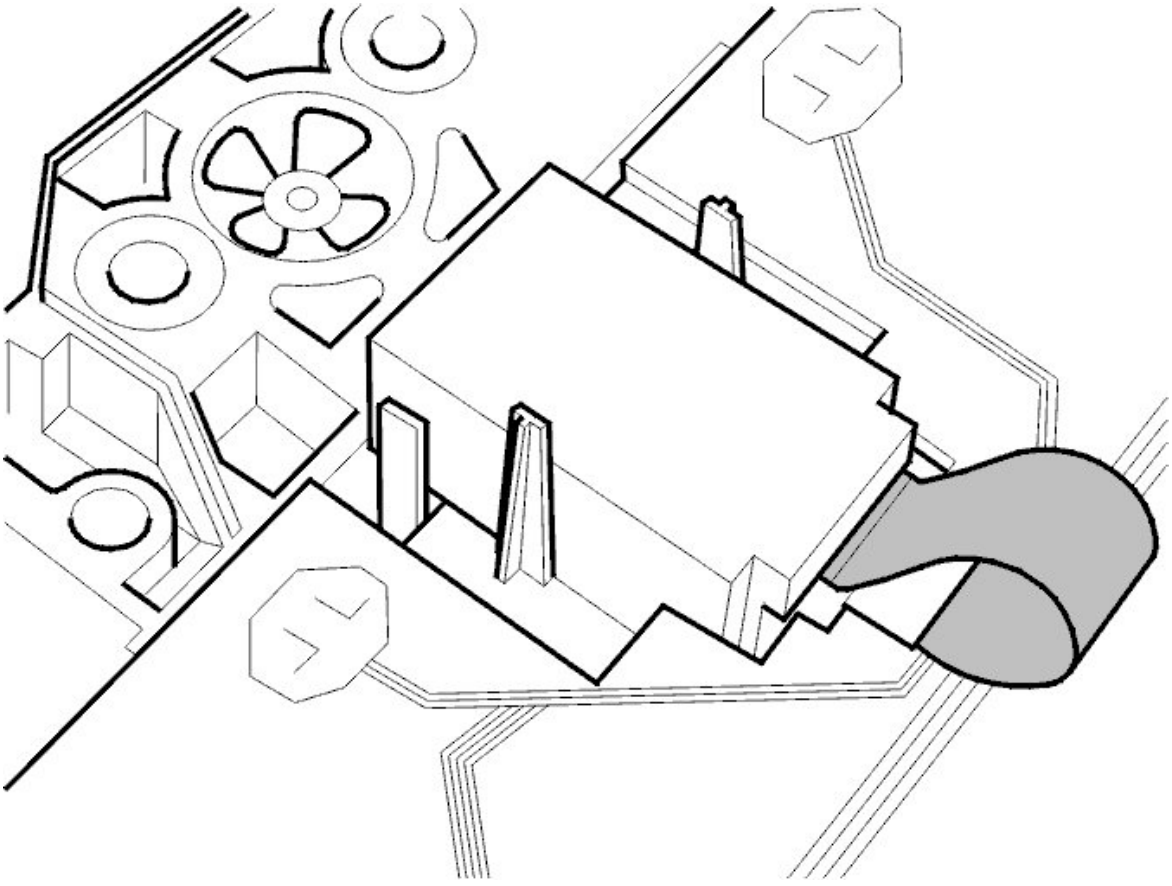


Has a fault been detected?

Yes - Verification

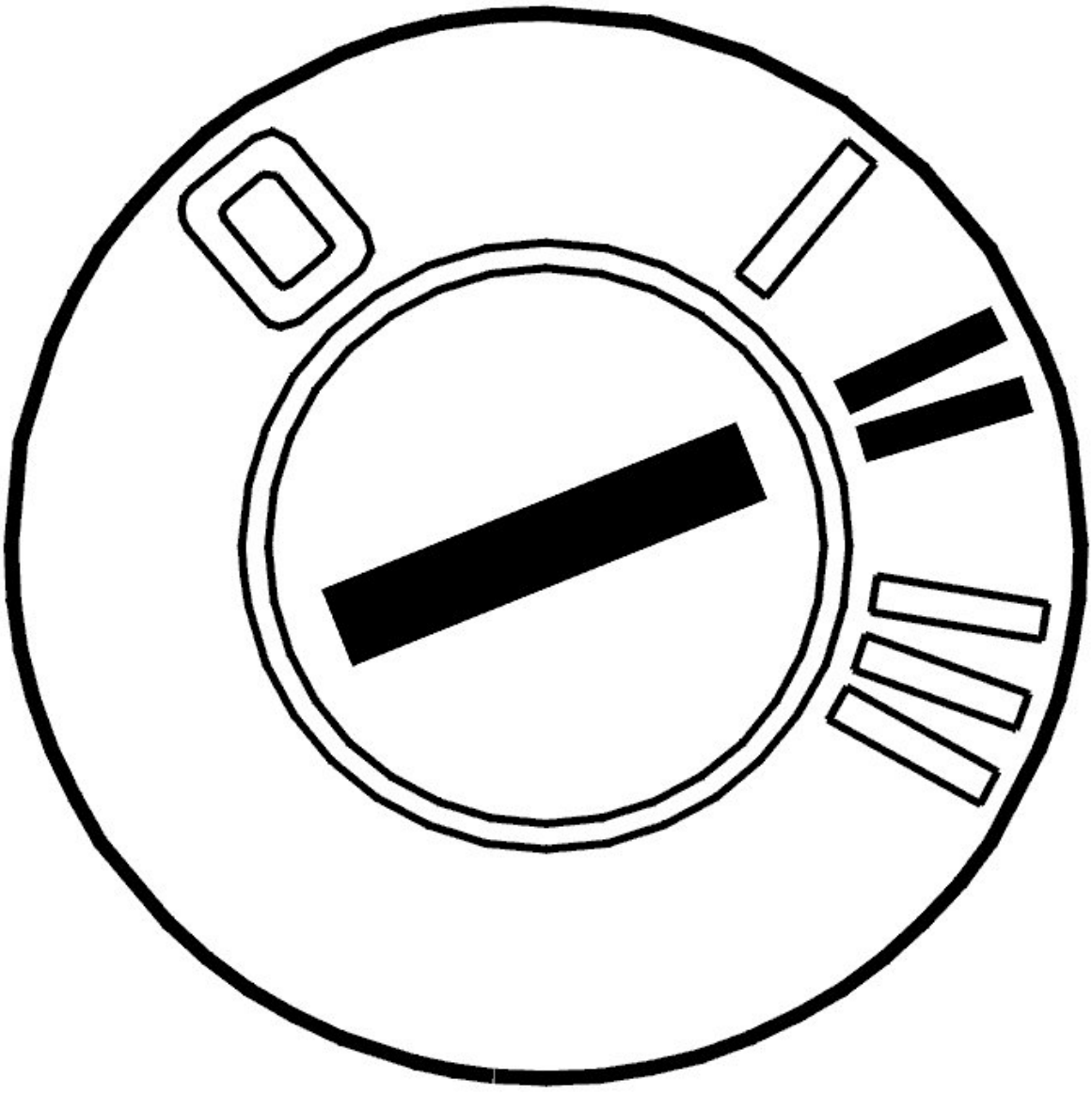
No - Replacing the control module

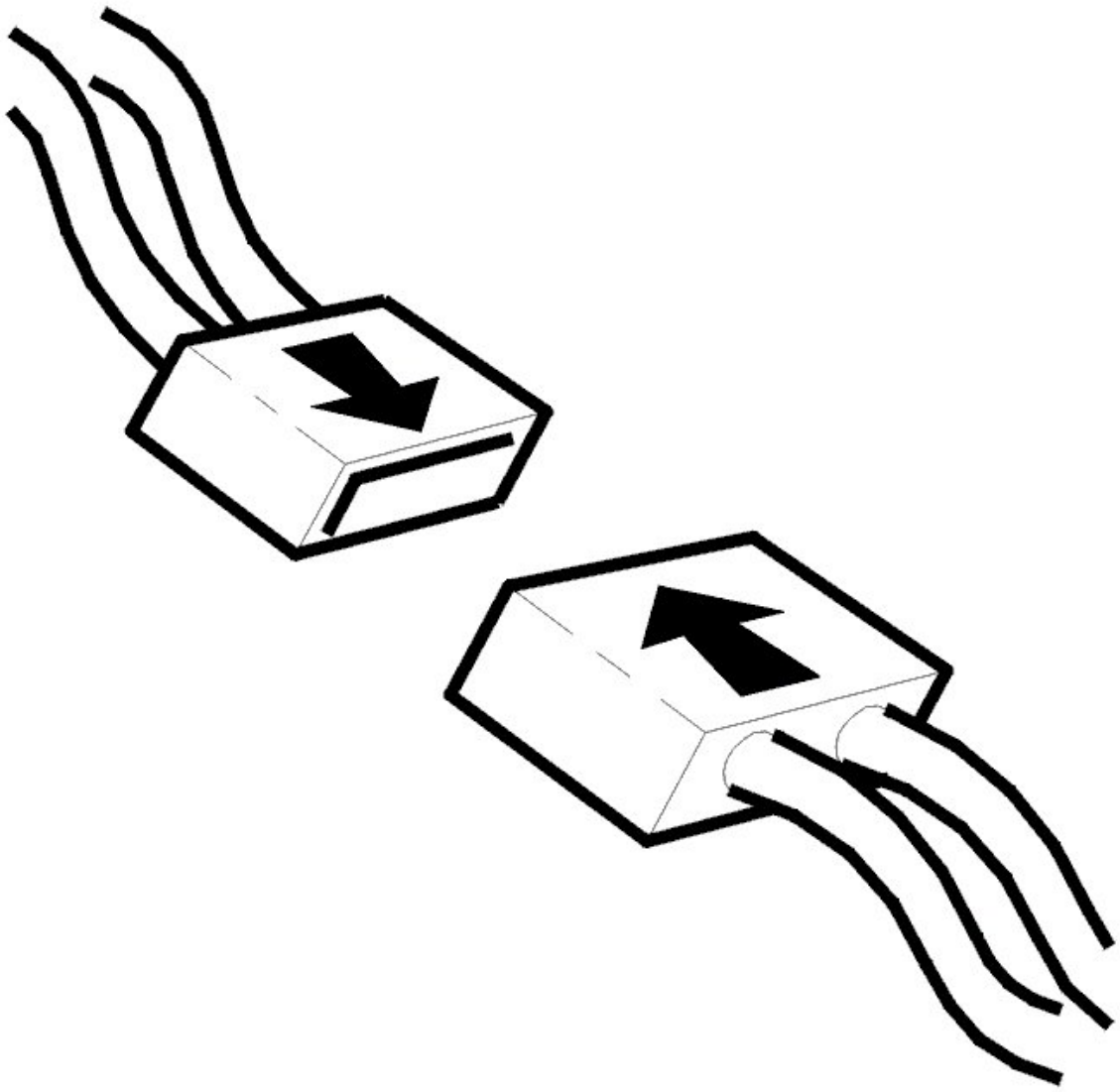
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof control works.

Does the sunroof control work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Replacing the control module

If no fault has been found, replace the sun roof module (SRM).

Other information
- To replace the sun roof module (SRM), see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The sunroof AUTO signal is activated too long.

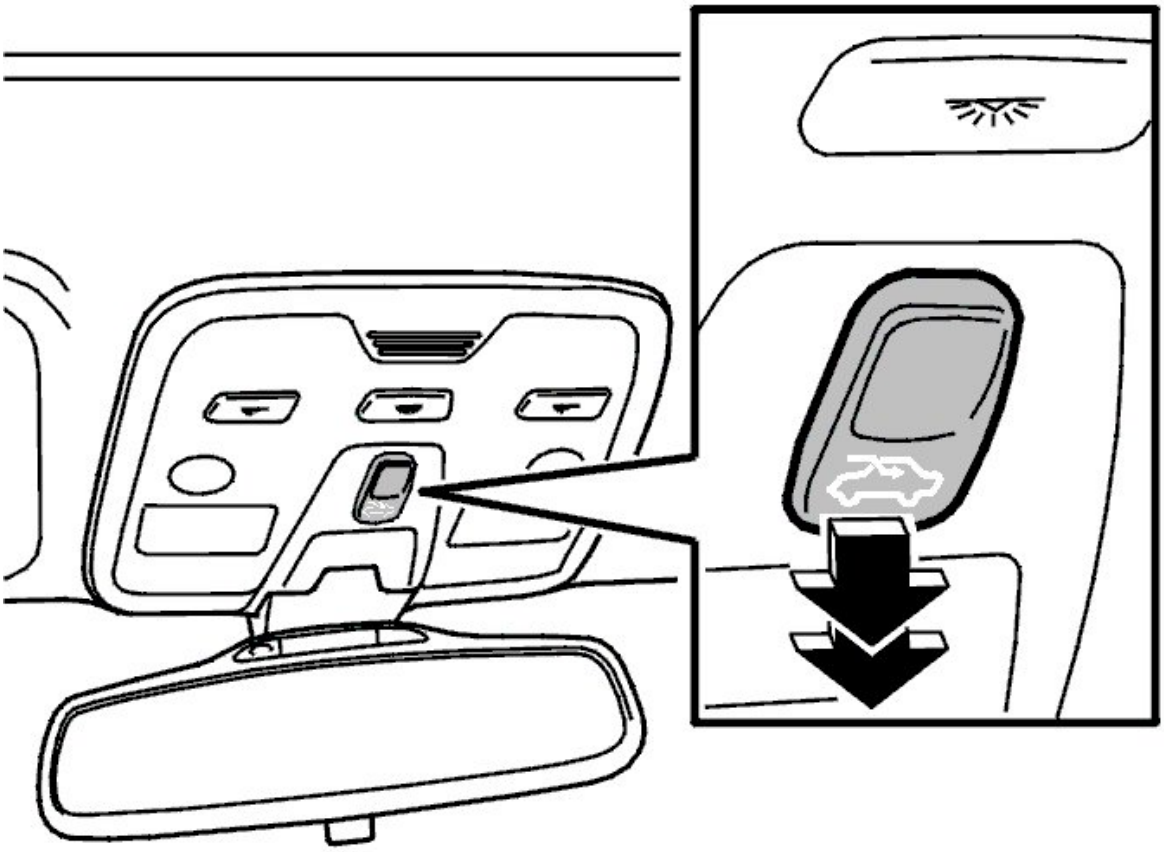
Fault symptom[s]
- Electric sunroof does not work.

Faulty Signal

Faulty signal

Replacing the component

Replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.
Check that the function is now OK.



Is the function OK?

Yes - Verification

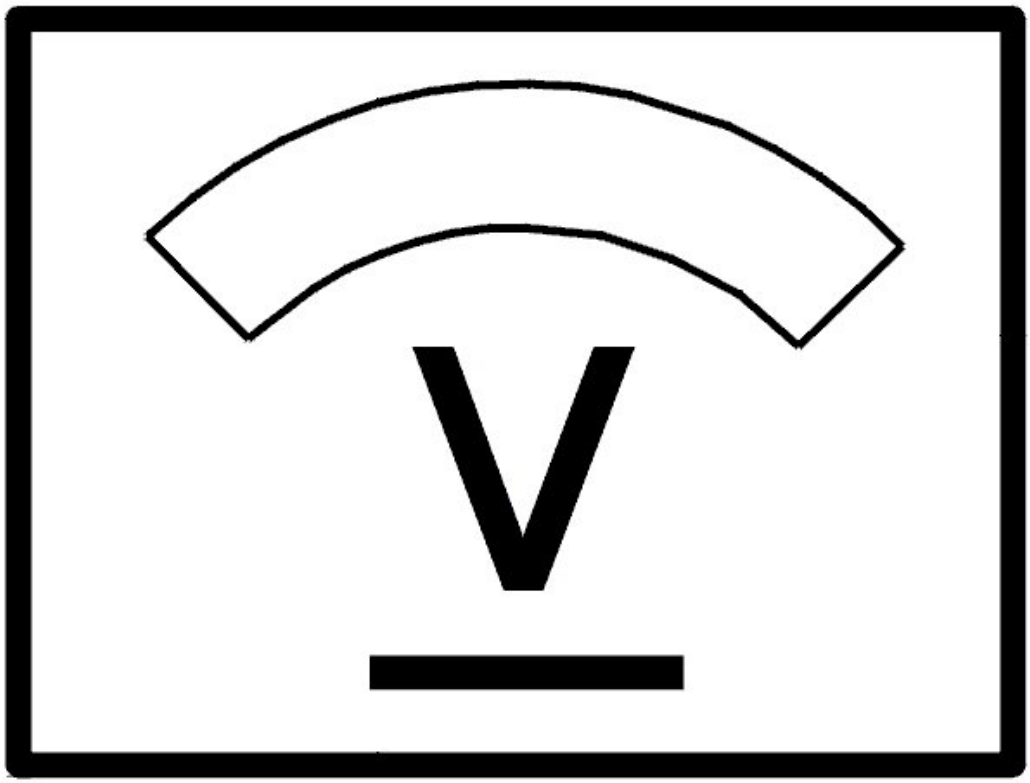
No - Checking the cable

Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.
If a fault is found replace the wiring.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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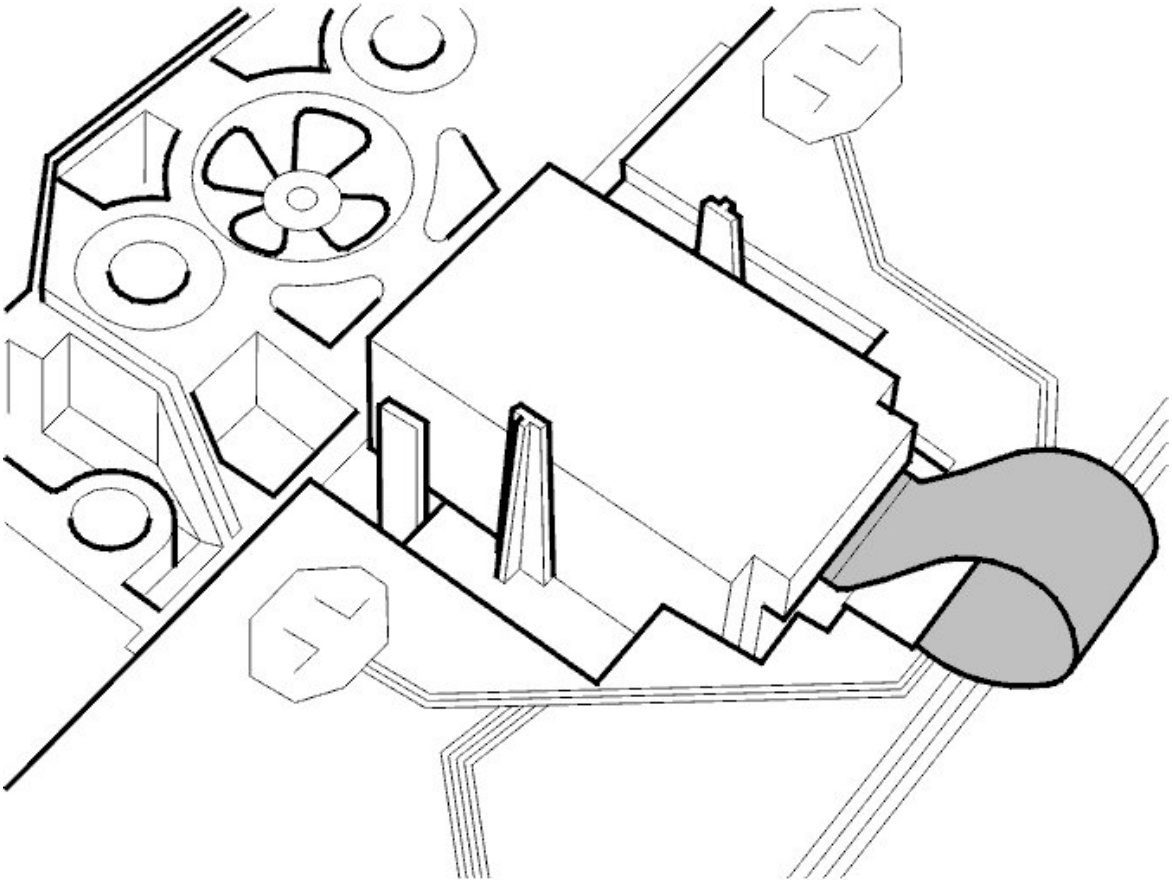


Has a fault been detected?

Yes - Verification

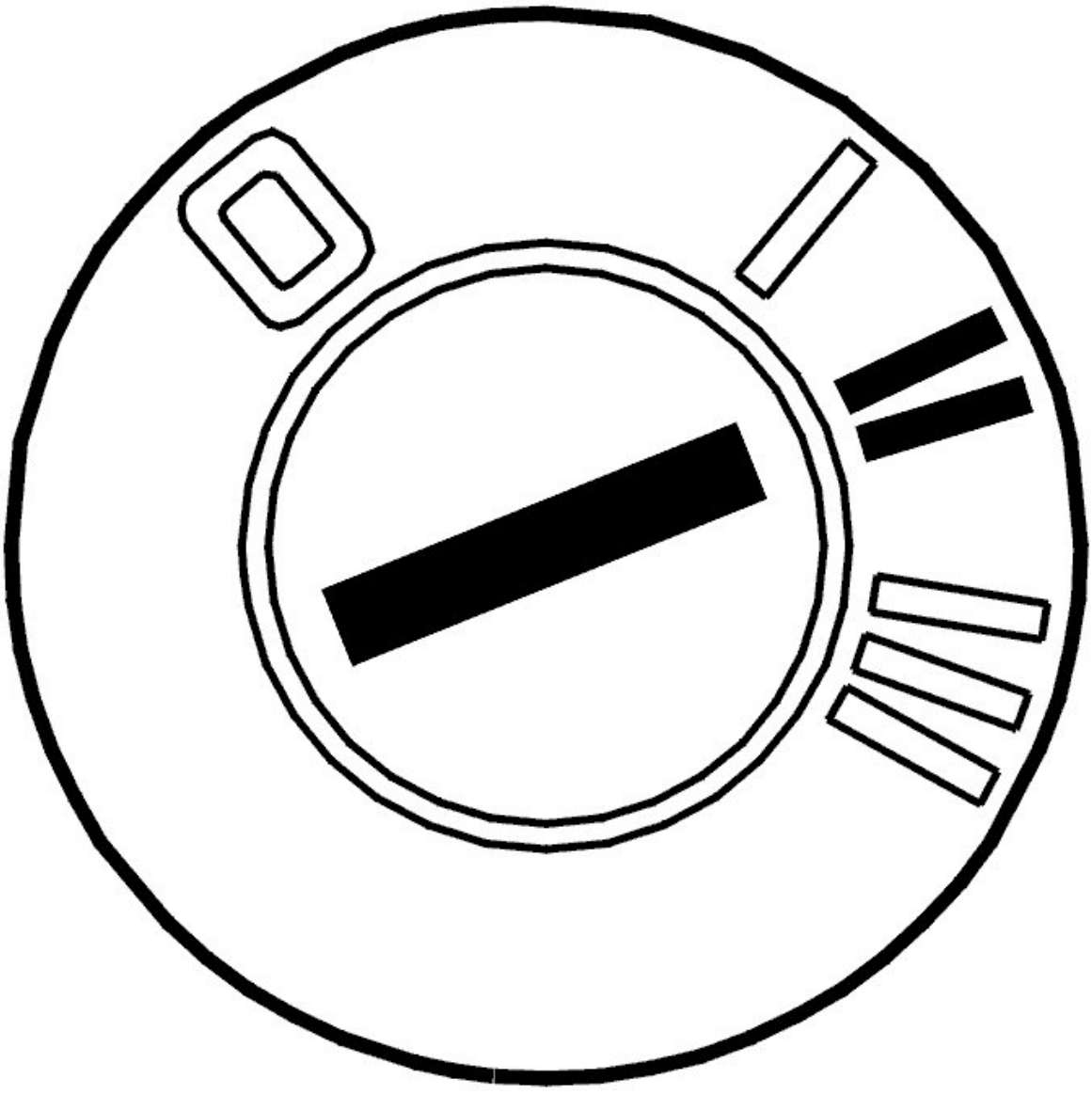
No - Replacing the control module

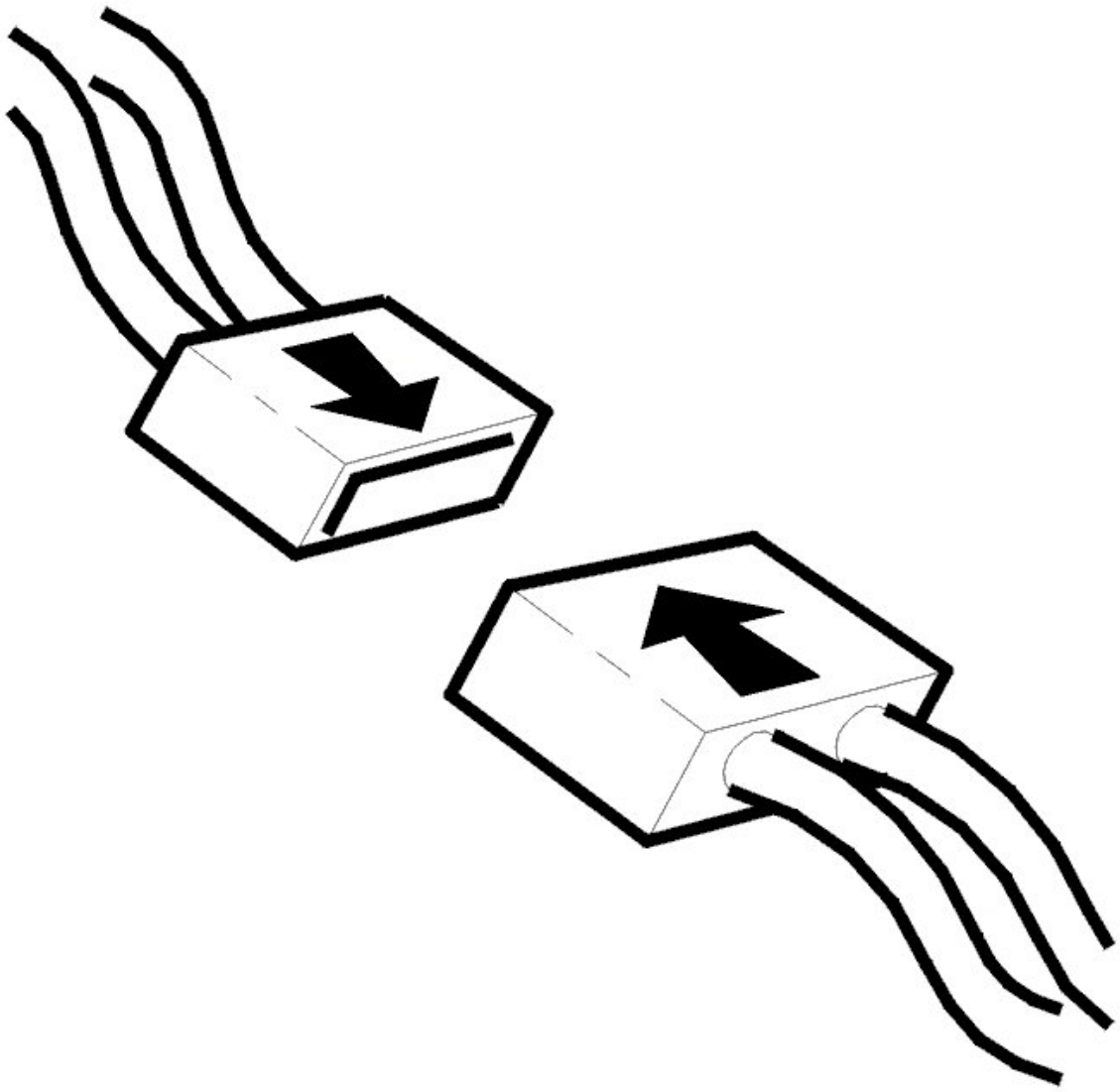
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof control works.

Does the sunroof control work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Replacing the control module

If no fault has been found, replace the sun roof module (SRM).

Other information
- To replace the sun roof module (SRM), see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

Possible source
- The sunroof TILT signal is activated too long.

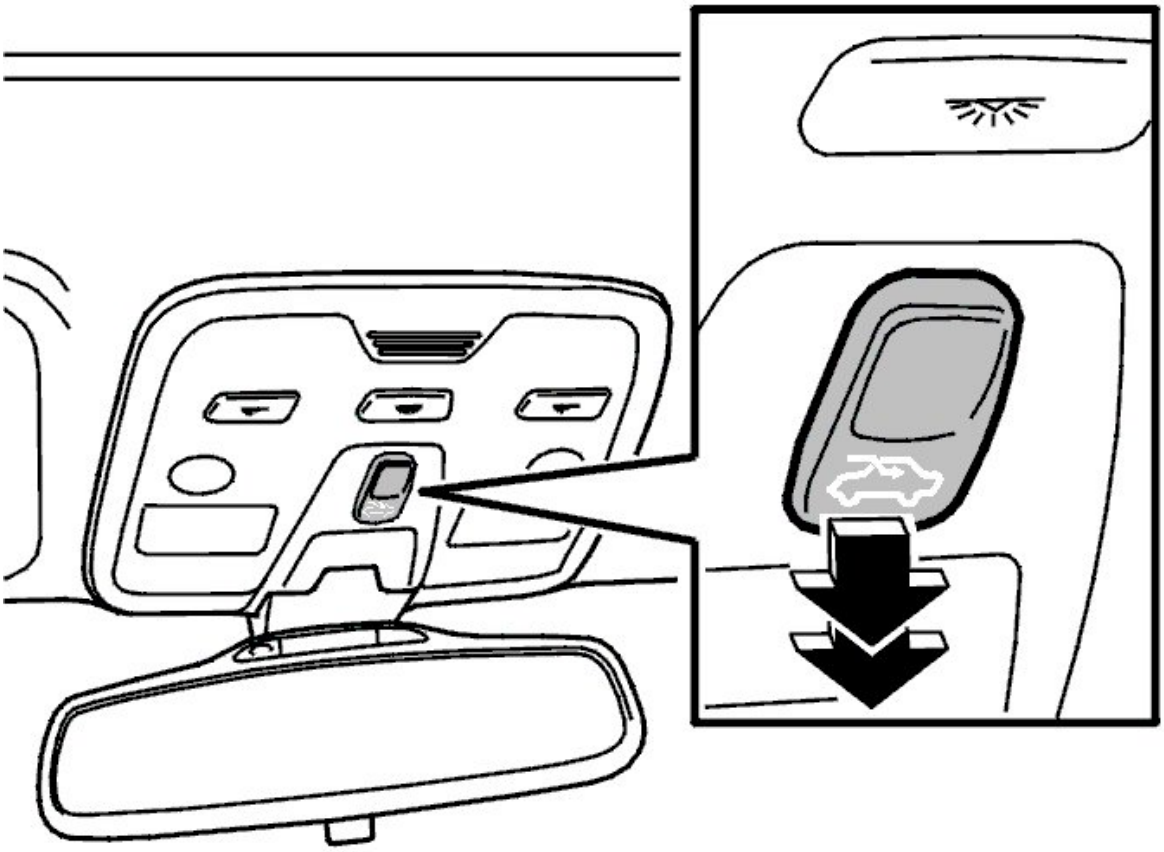
Fault symptom[s]
- Electric sunroof does not work.

Faulty Signal

Faulty signal

Replacing the component

Replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.
Check that the function is now OK.



Is the function OK?

Yes - Verification

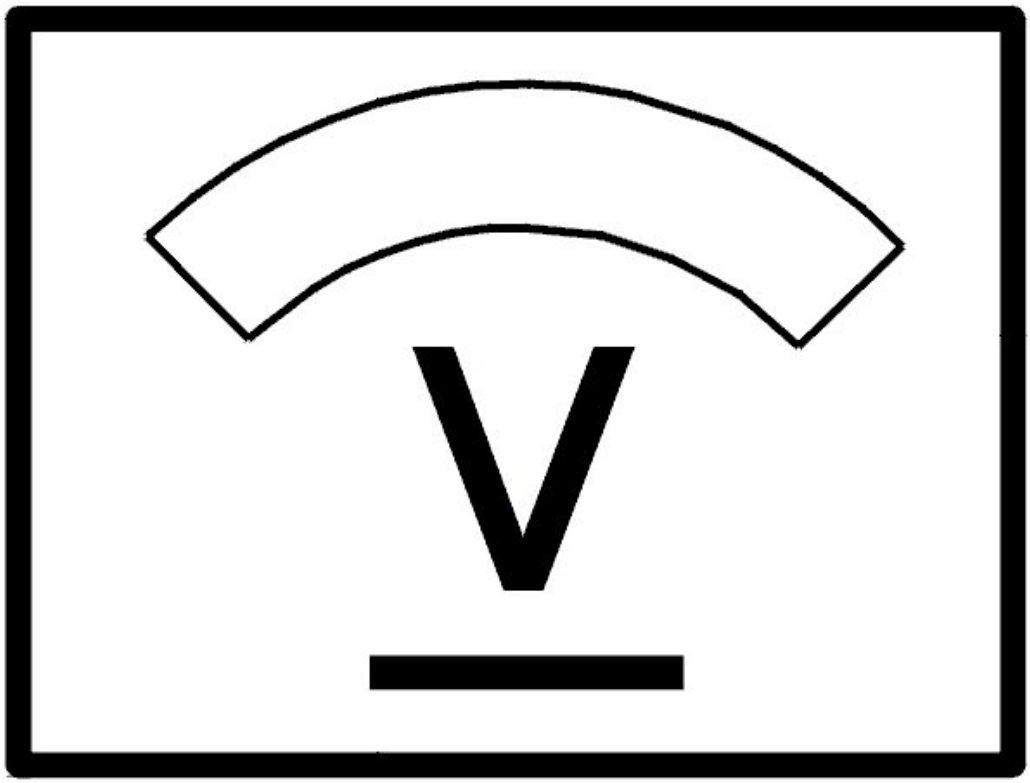
No - Checking the cable

Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.
If a fault is found replace the wiring.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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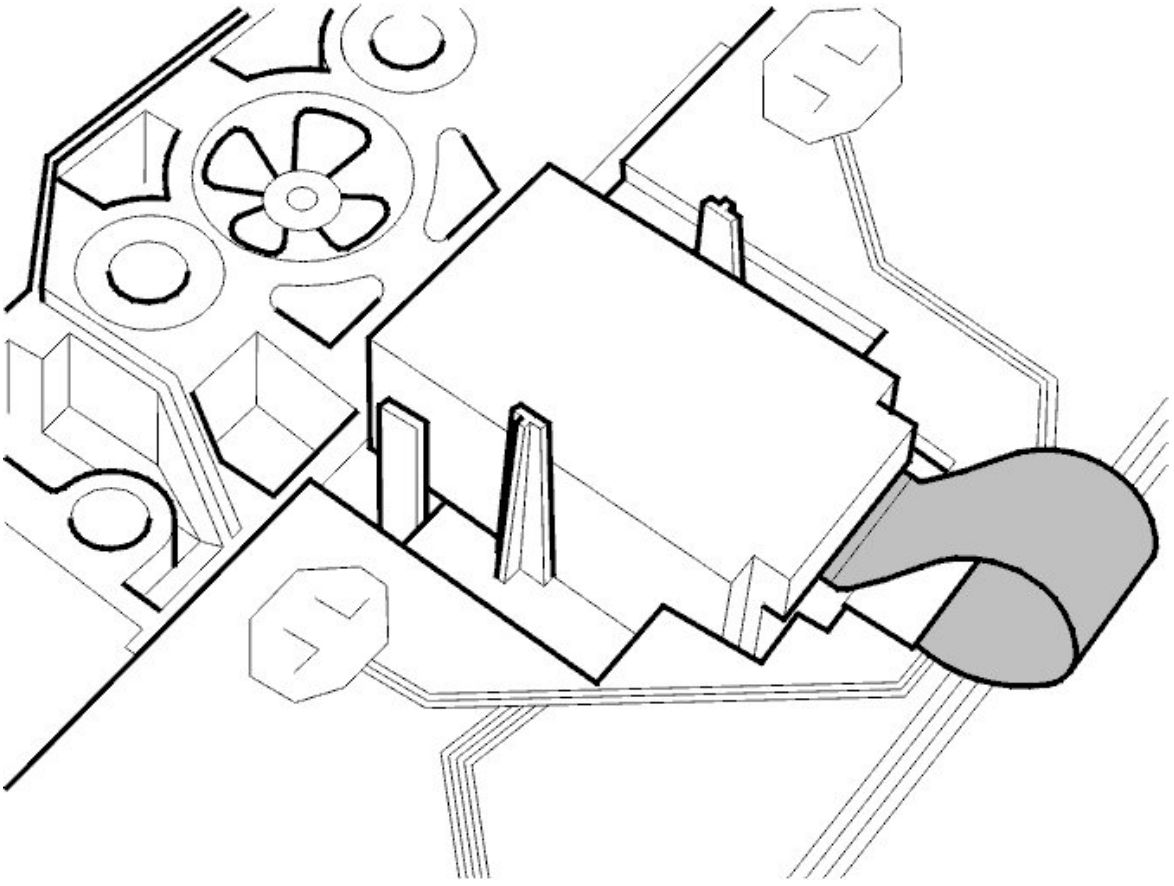


Has a fault been detected?

Yes - Verification

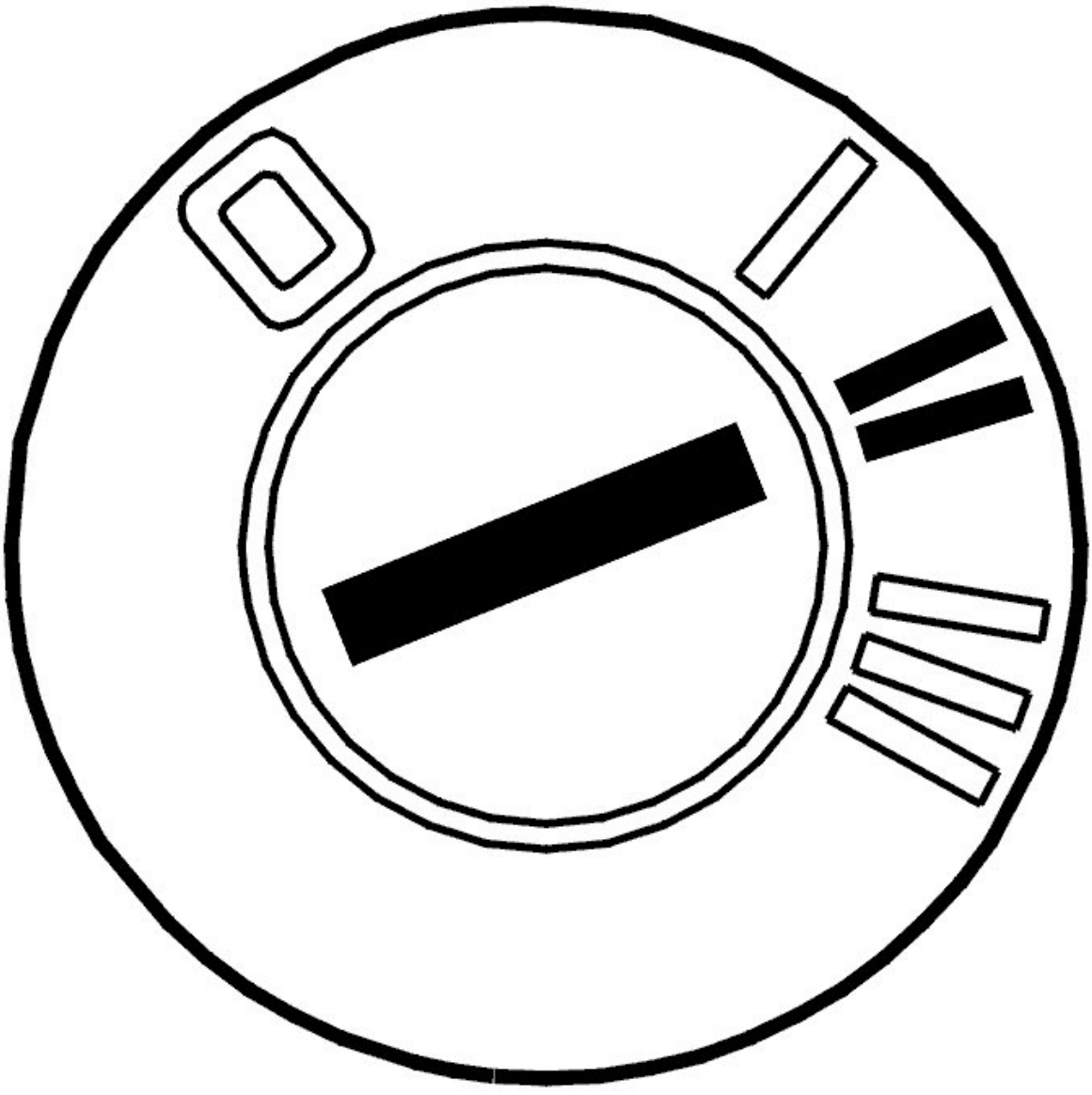
No - Replacing the control module

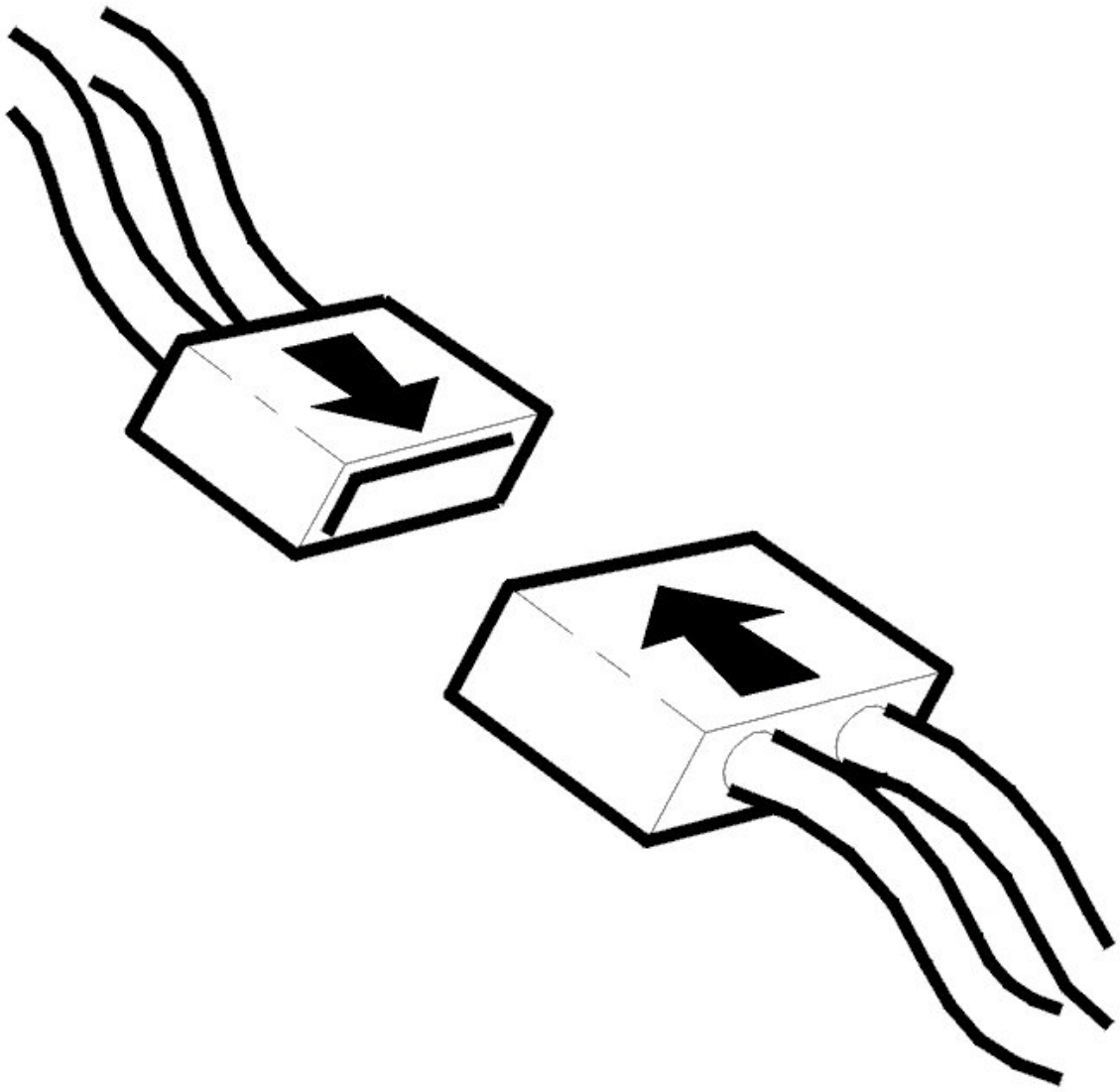
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof control works.

Does the sunroof control work?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Replacing the component

FAULT-TRACING FAILED - No Fault Found

Replacing the control module

If no fault has been found, replace the sun roof module (SRM).

Other information
- To replace the sun roof module (SRM), see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit registers an internal fault in the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

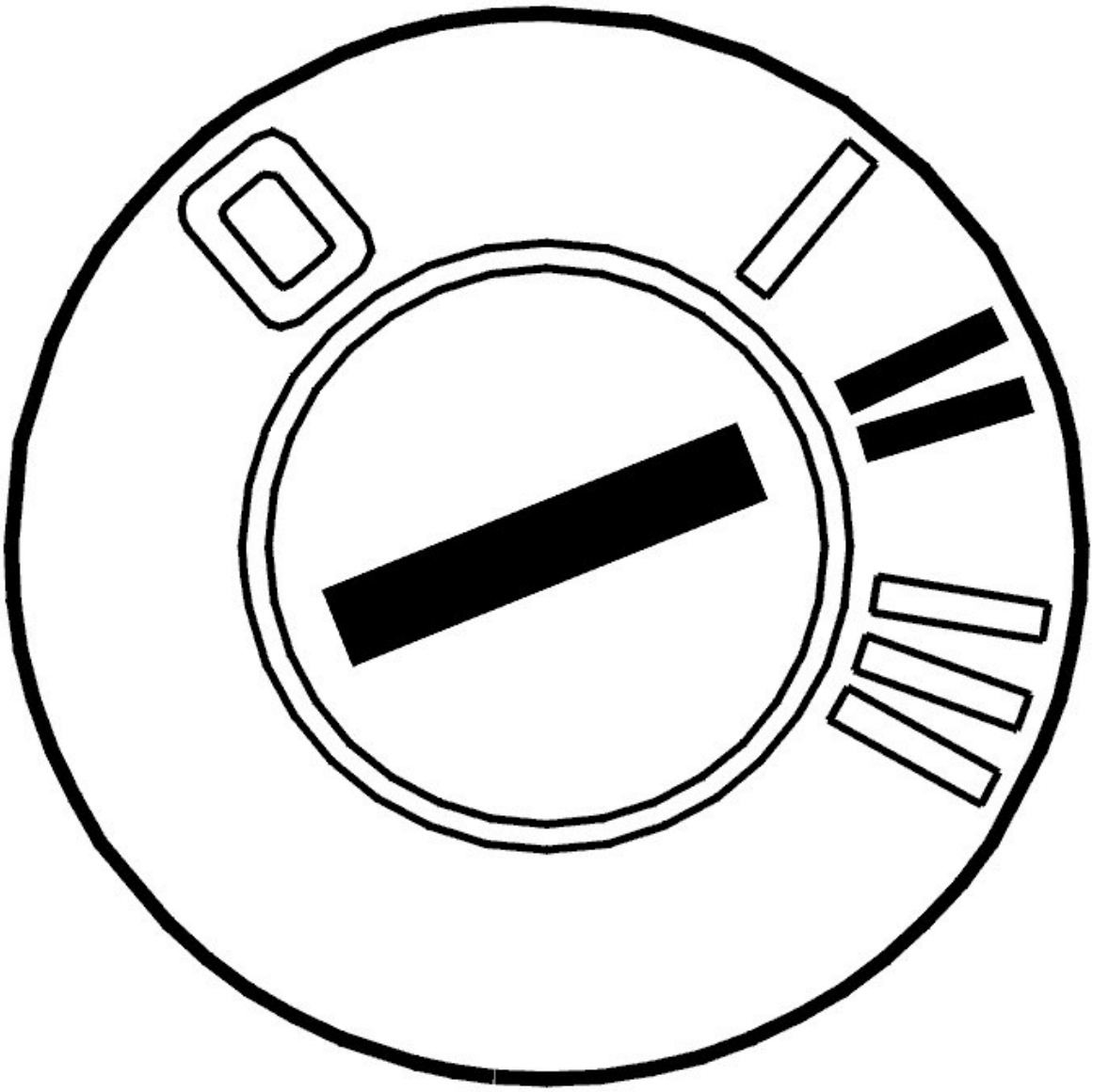
Possible source
- The signals for AUTO and TILT occur at the same time.

Fault symptom[s]
- Electric sunroof does not work.

Faulty Signal

Faulty signal

Checking for permanent or intermittent faults



- Ignition on.

Check that the sun roof can be moved to its limit positions.

Can the sun roof be operated?

Yes - Intermittent fault

No - Checking for a short-circuit

Checking for a short-circuit

Check the cable between the sun roof module (SRM) and the roof lamp module. Check for a short-circuit to supply voltage.

UEM-0070 Sun roof. Faulty signal

The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0070 Sun roof. Faulty signal

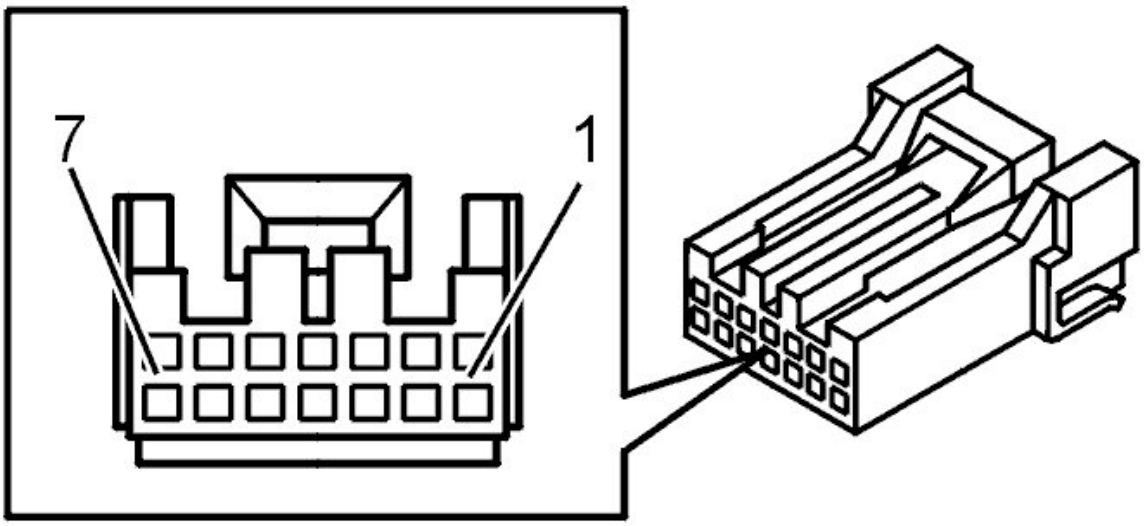
The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Replace the cable if a fault is found.

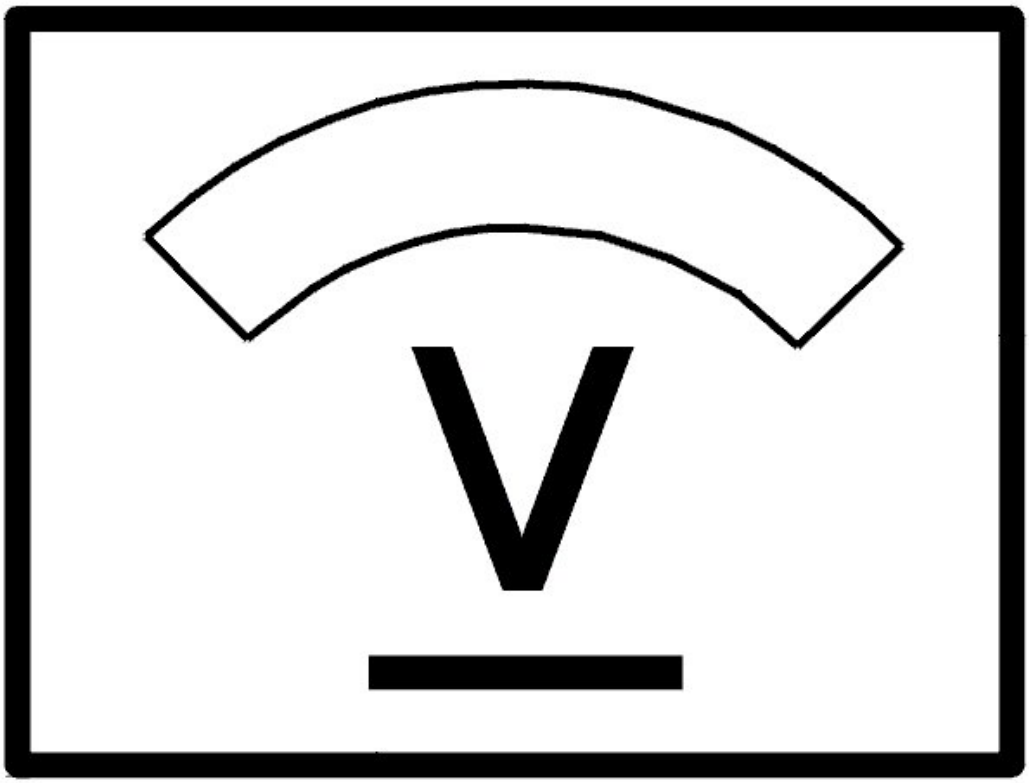
Other information:

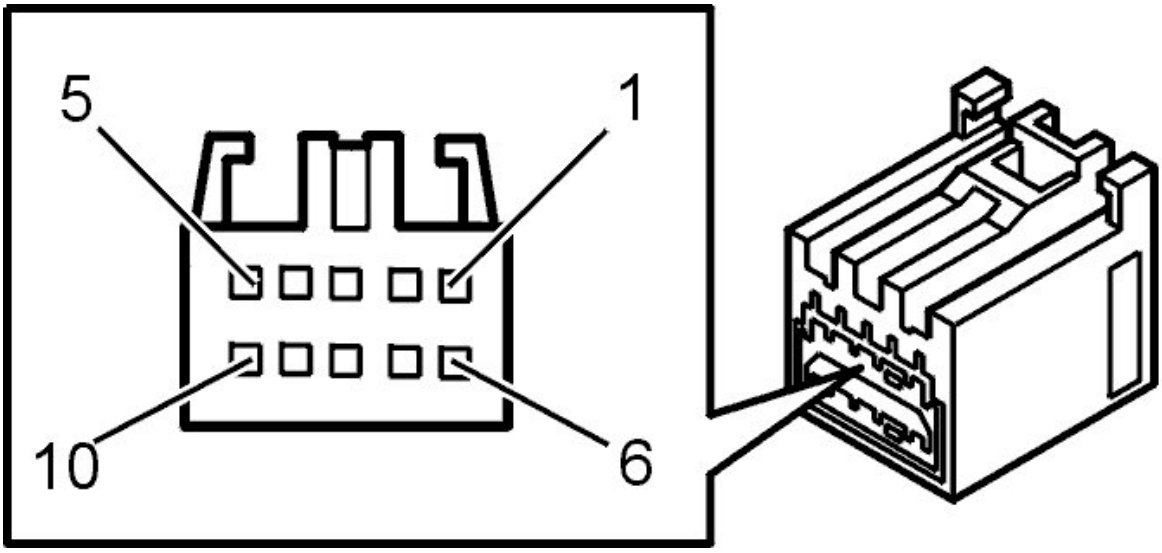
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body

and Frame/Sunroof / Moonroof Module/Service and Repair

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.







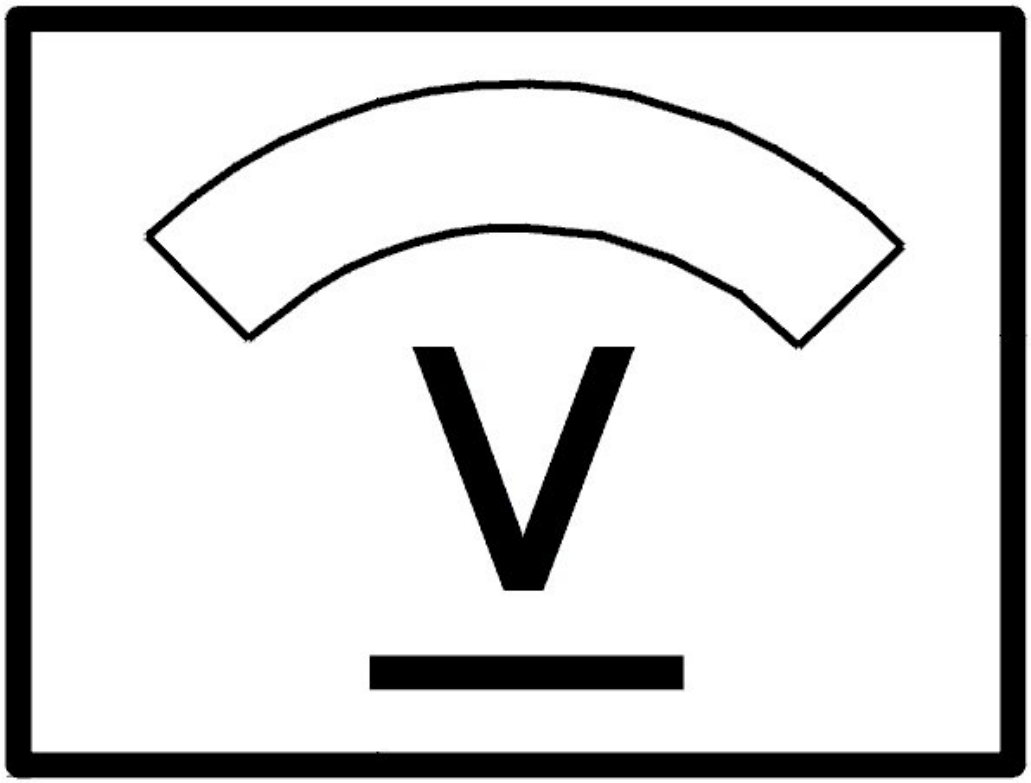
Continue - Checking the cable

Checking the cable

Check the wiring between the sun roof switch and the roof lamp module. Check for a short-circuit to supply voltage.

Other information:

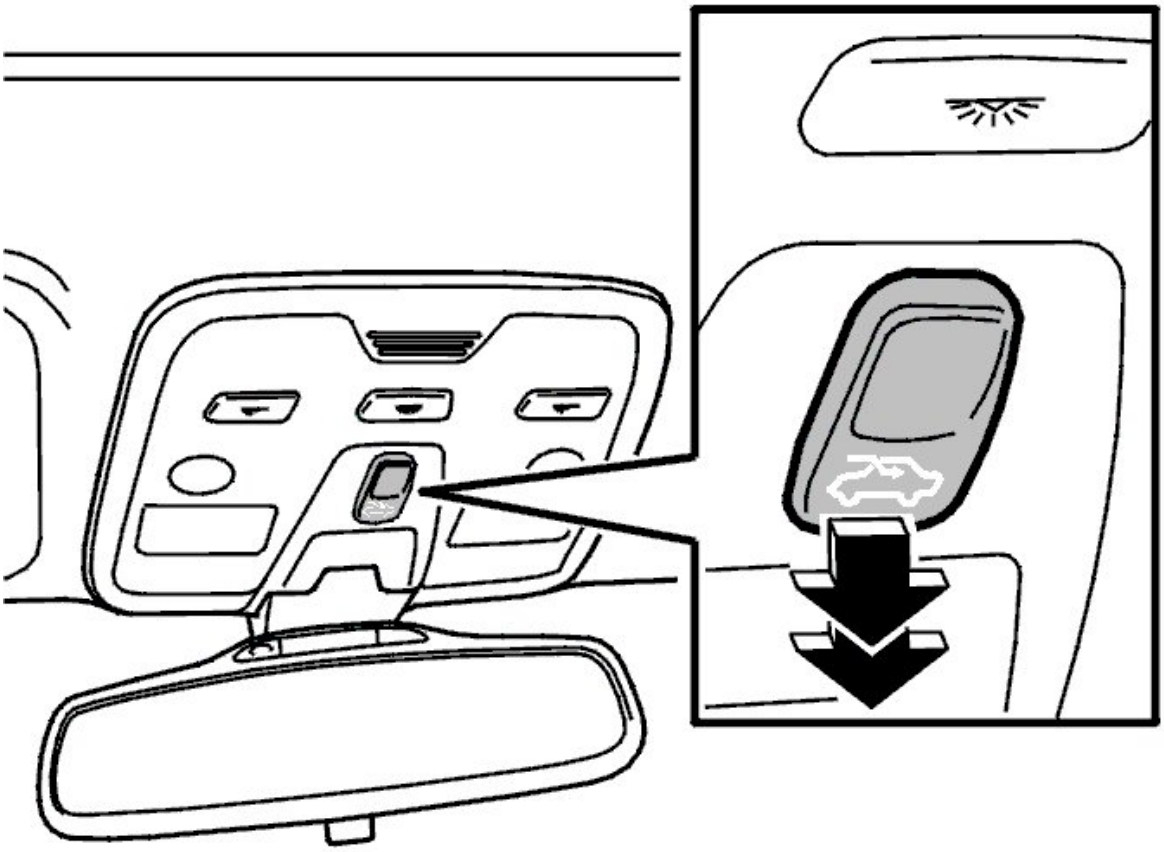
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.



Continue - Replacing the component

Replacing the component

Visually check for damage to the roof lamp module and its switches.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.



Continue - Verification

Intermittent fault

Check the connector on the sun roof module (SRM) and the connector on the roof lamp module. Check for contact resistance and oxidation. Check for loose connections.
Check the cable between the sun roof module (SRM) and the roof lamp module. Check for an intermittent short-circuit to supply voltage. Check for an intermittent open-circuit.

UEM-0070 Sun roof. Faulty signal

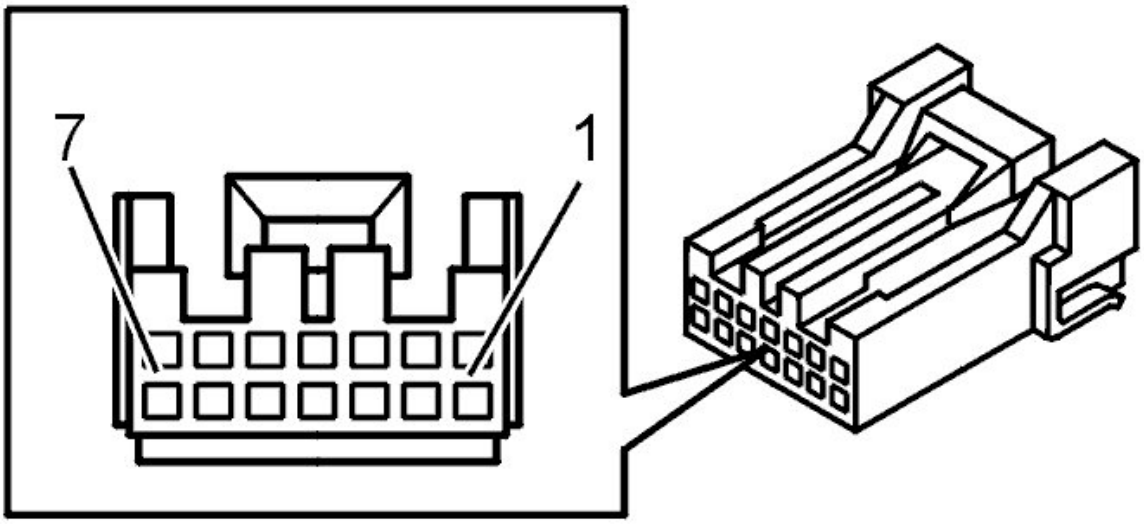
The sun roof module (SRM) terminal #3A and roof lamp module terminal #2B.

UEM-0070 Sun roof. Faulty signal

The sun roof module (SRM) terminal #7A and roof lamp module terminal #1B.
Check the wiring between sun roof switch and RCM. Check for an intermittent short-circuit to supply voltage.
If no fault is found replace the sun roof switch. See Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To access the roof lamp module connector, see Replacing interior lighting See: Lighting and Horns/Dome Lamp/Service and Repair
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- To replace the switch for the sun roof, see Switch sun roof, replacing See: Body and Frame/Roof and Associated Components/Sunroof / Moonroof/Sunroof / Moonroof Switch/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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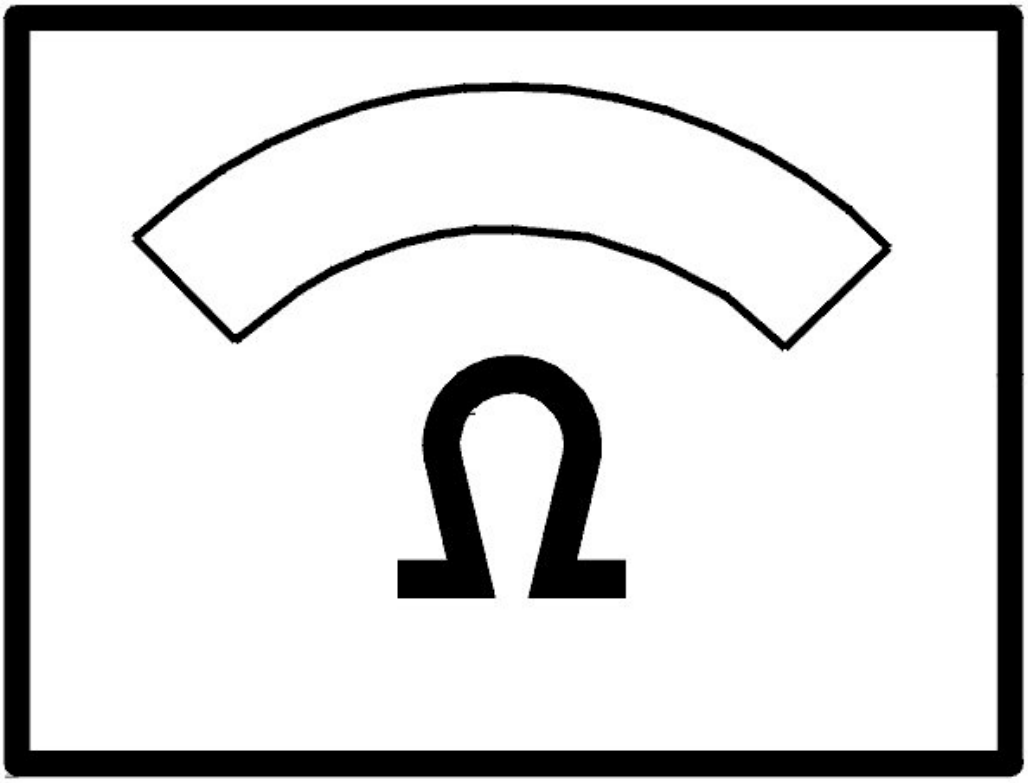
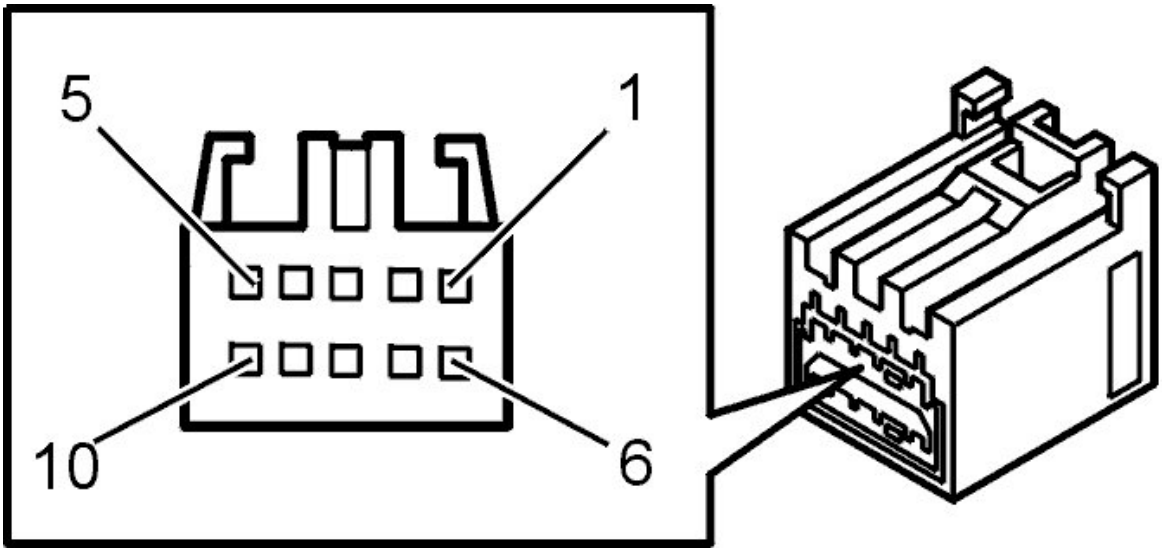




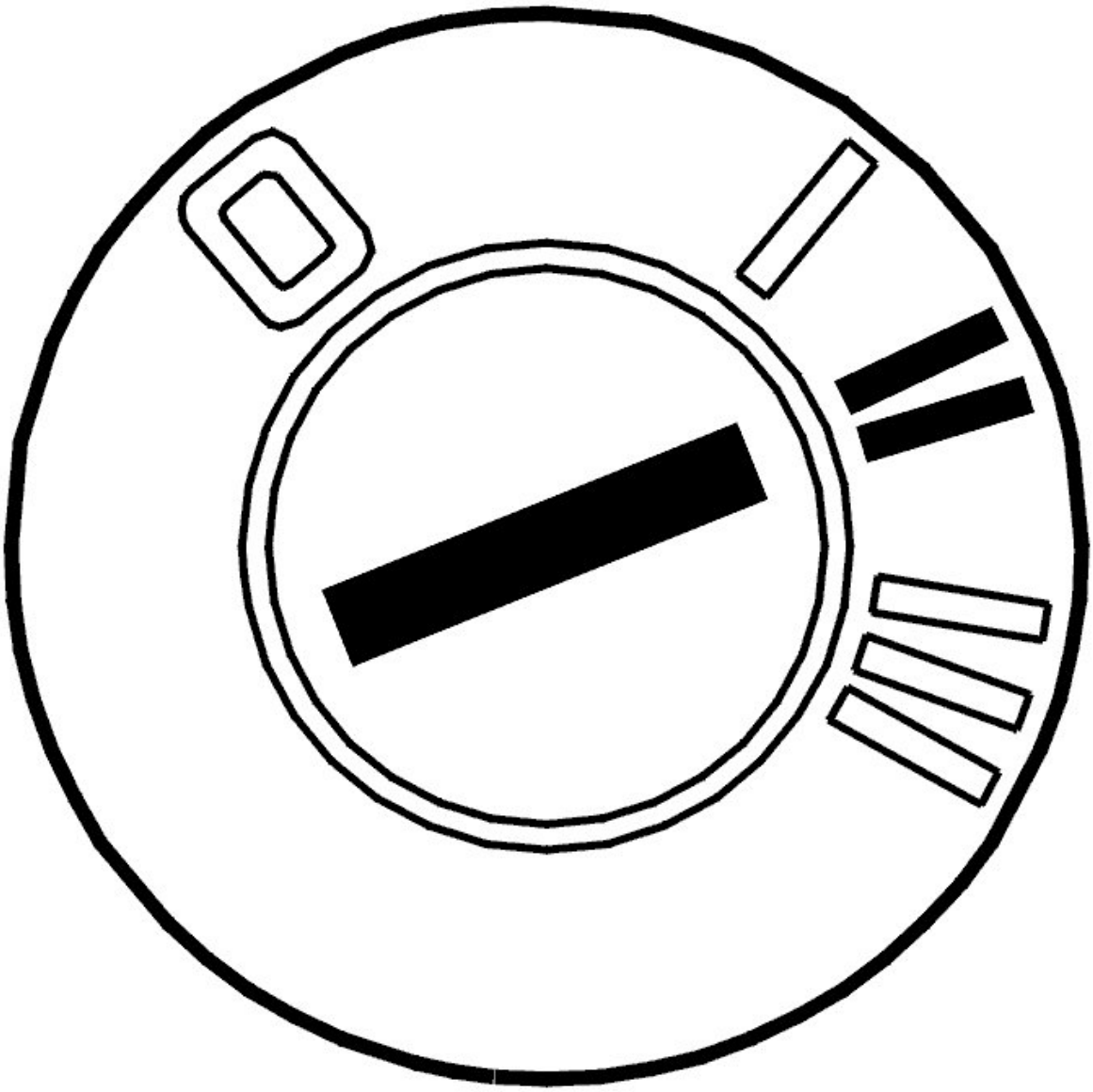
Continue - Fault-tracing information

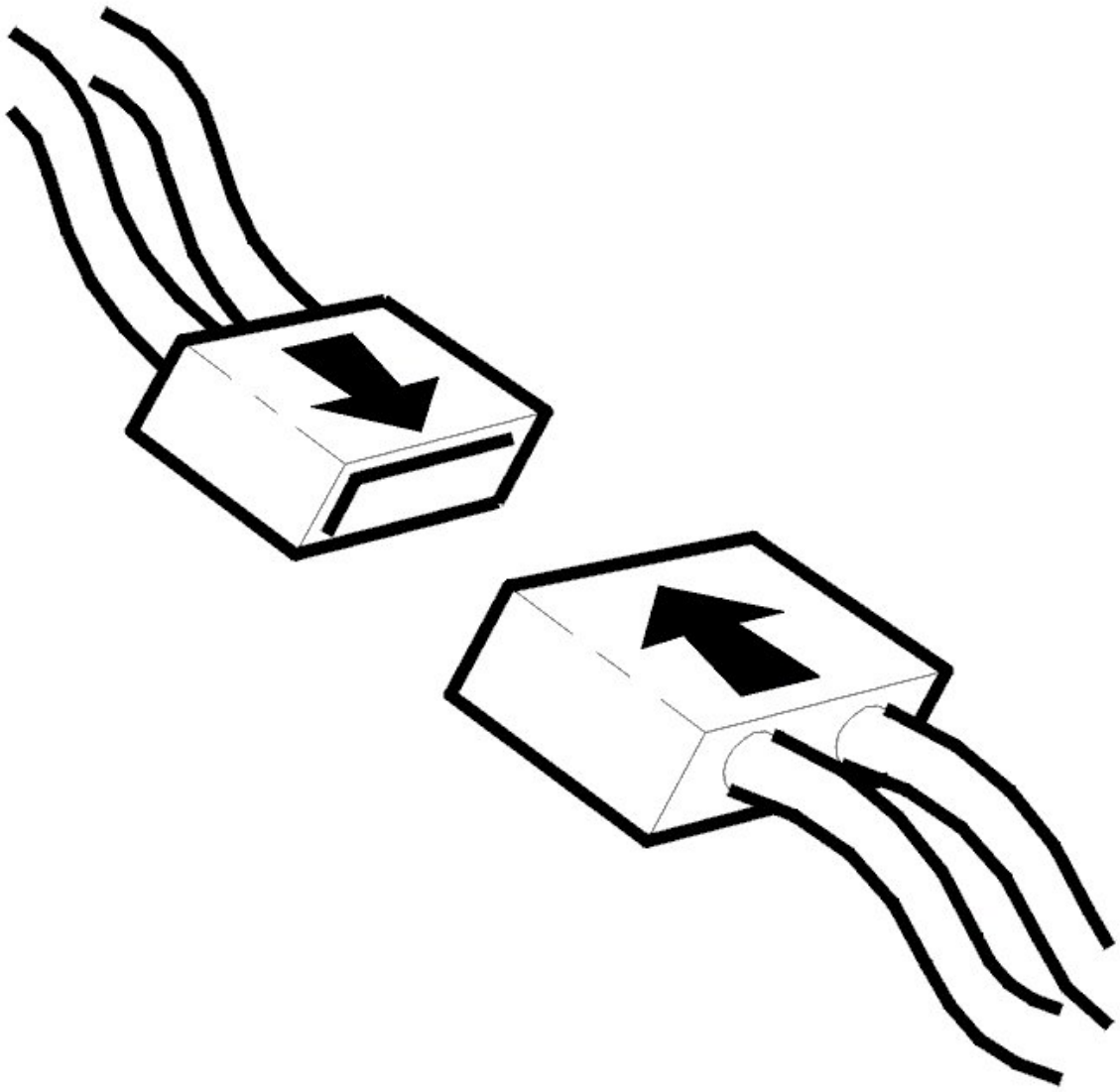
Verification

Verification

Verification

Hint: After the repair it is necessary to check that the fault has been rectified.





- Ignition off.
- Connect the connectors, install the components, etc.
- Ignition on.

Check that the sunroof can be moved to its end position.

Does the sunroof move?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that SRM-0021 is given when contact is made with the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

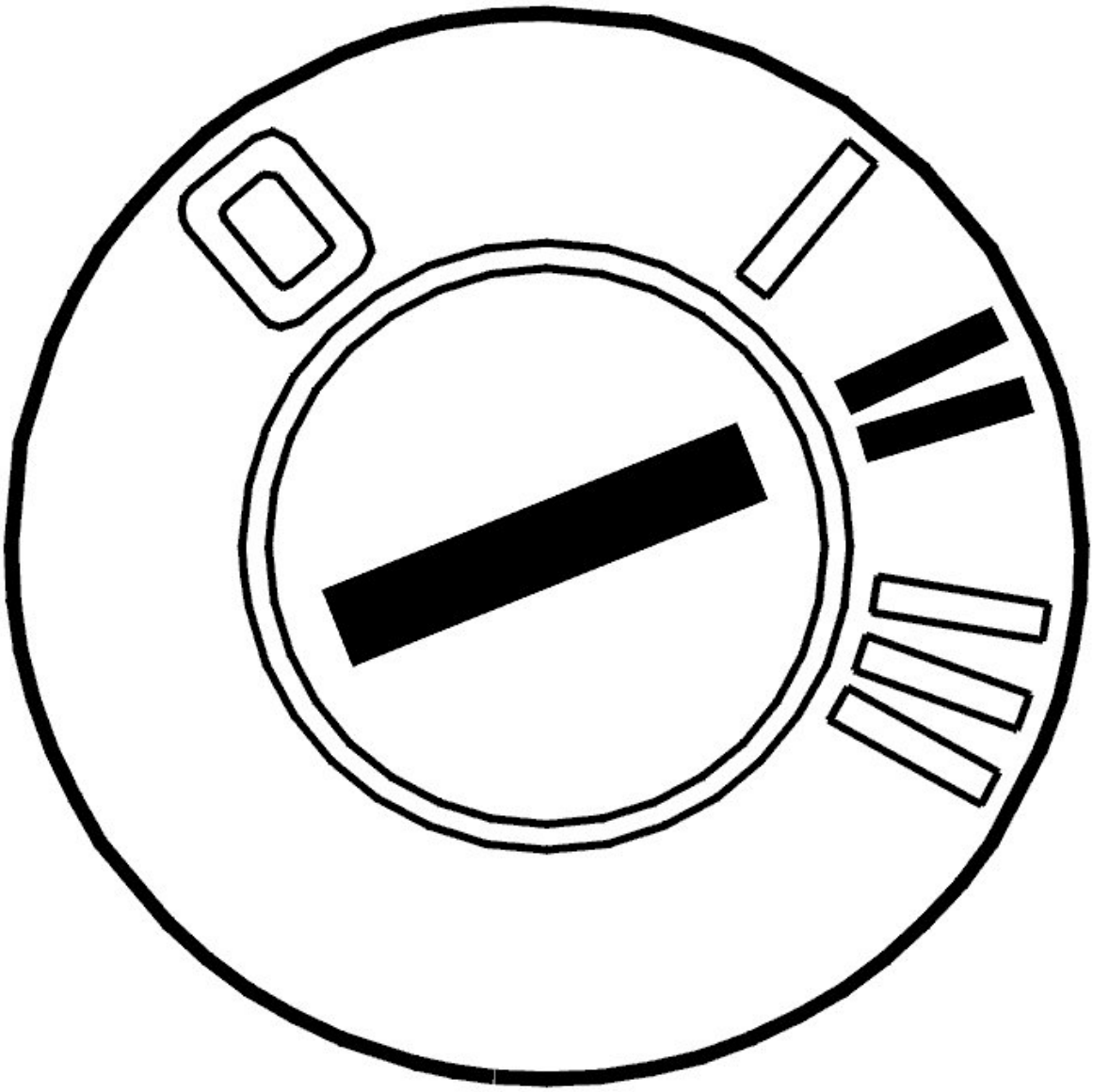
Possible source
- Fault with voltage drop in sunroof module (SRM)
- Internal fault in sunroof module.

Fault symptom[s]
- Electric sunroof does not work
- Automatic sunroof closing does not work.

Internal Fault

Internal fault

Checking for permanent or intermittent faults



- Ignition on.

Check that the sun roof can be operated automatically by pressing the switch 2 steps.

Can the sun roof be operated automatically?

Yes - Intermittent fault

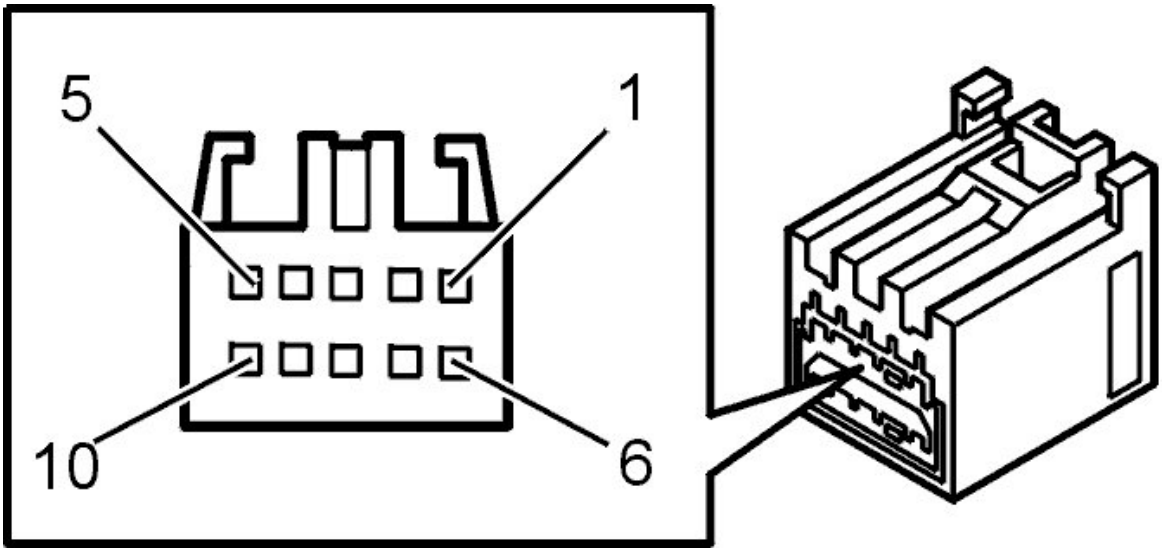
No - Checking for open-circuits and short-circuits

Checking for open-circuits and short-circuits

Check the cable between the sun roof module (SRM) terminal #6A and the upper electronic module (UEM) terminal #8A. Check for an open-circuit.
Replace the cable if a fault is found.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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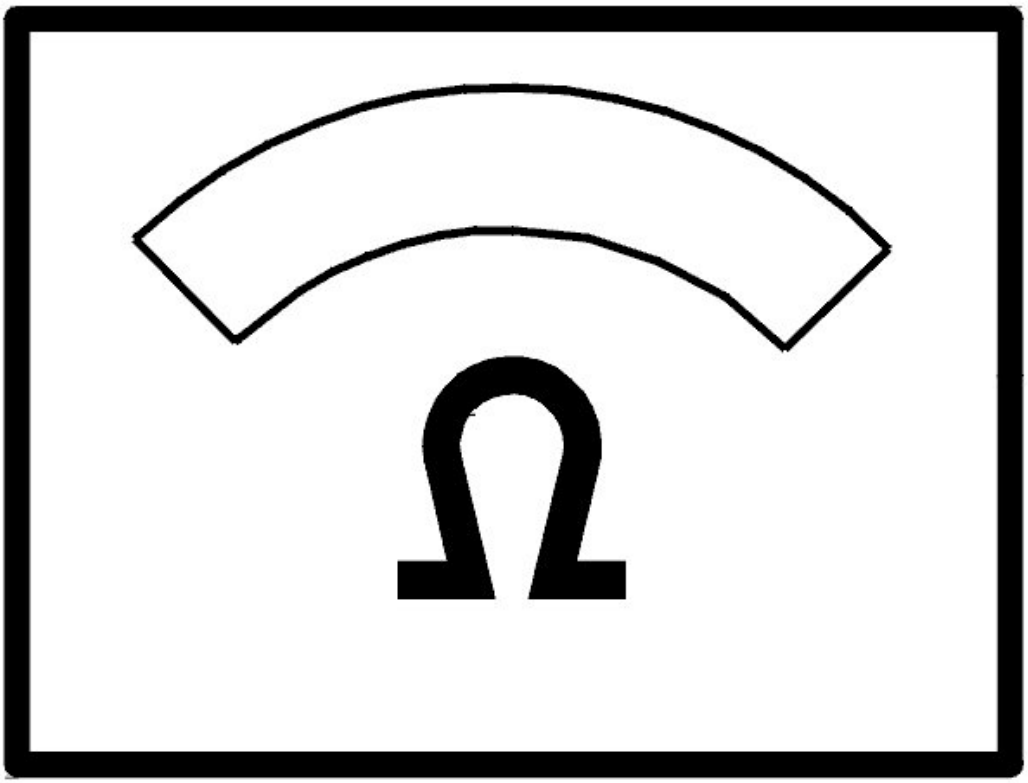
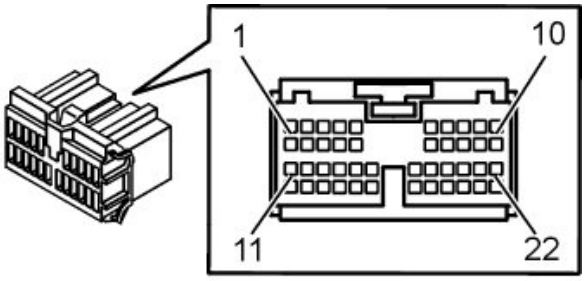




Was a fault detected?

Yes - Verification

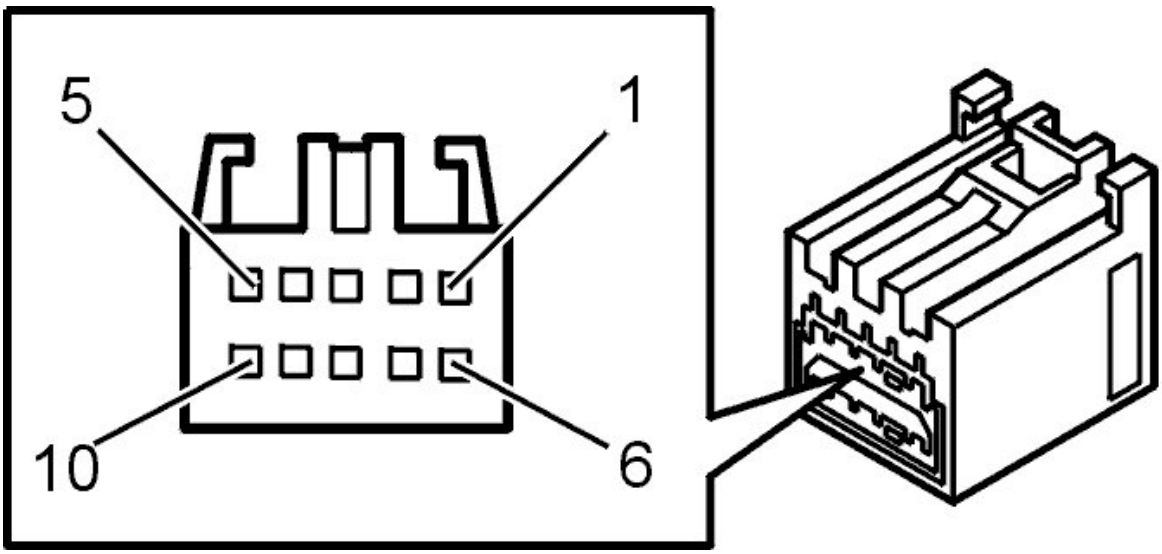
No - Replacing the component

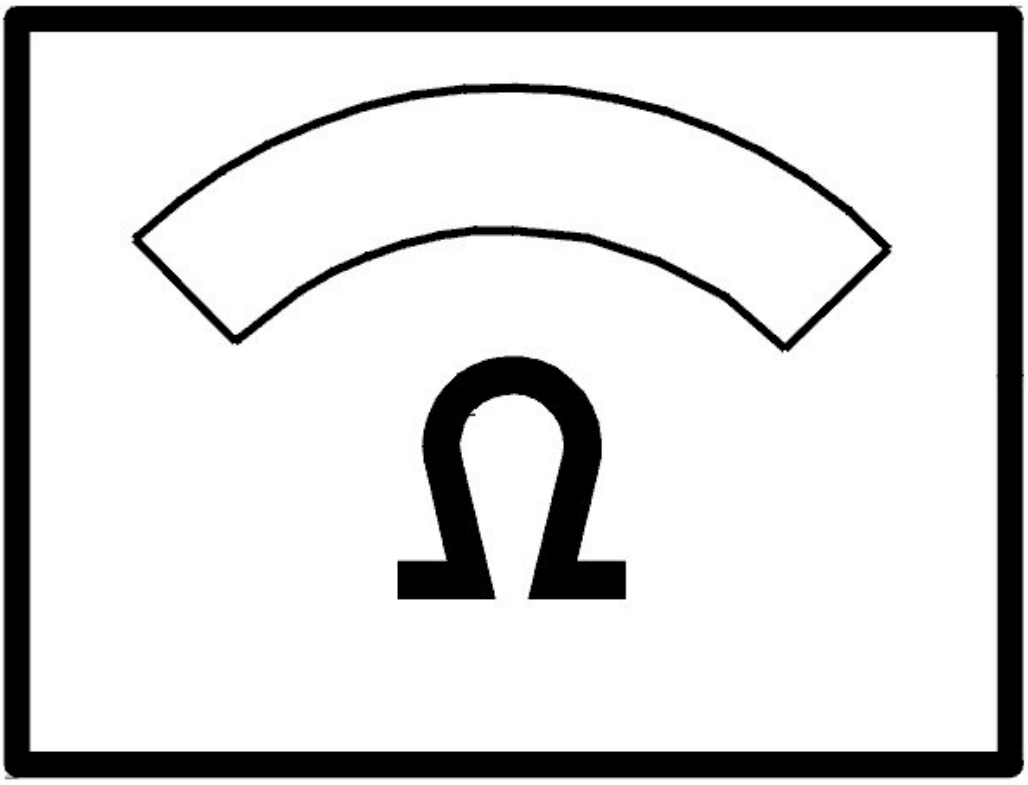
Intermittent fault

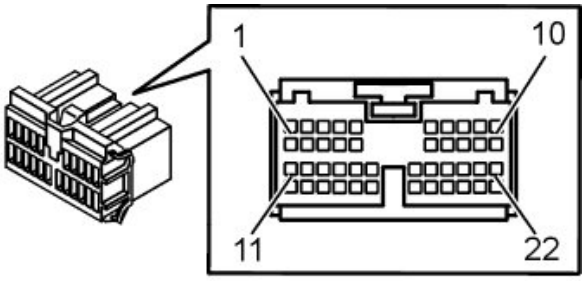
Check the cable between the sun roof module (SRM) terminal #6A and the upper electronic module (UEM) terminal #8A. Check for an intermittent open-circuit.
Replace the cable if a fault is found.
If no fault was found, try replacing the sun roof module (SRM).

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To access or replace the sun roof module (SRM) connector, see Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.

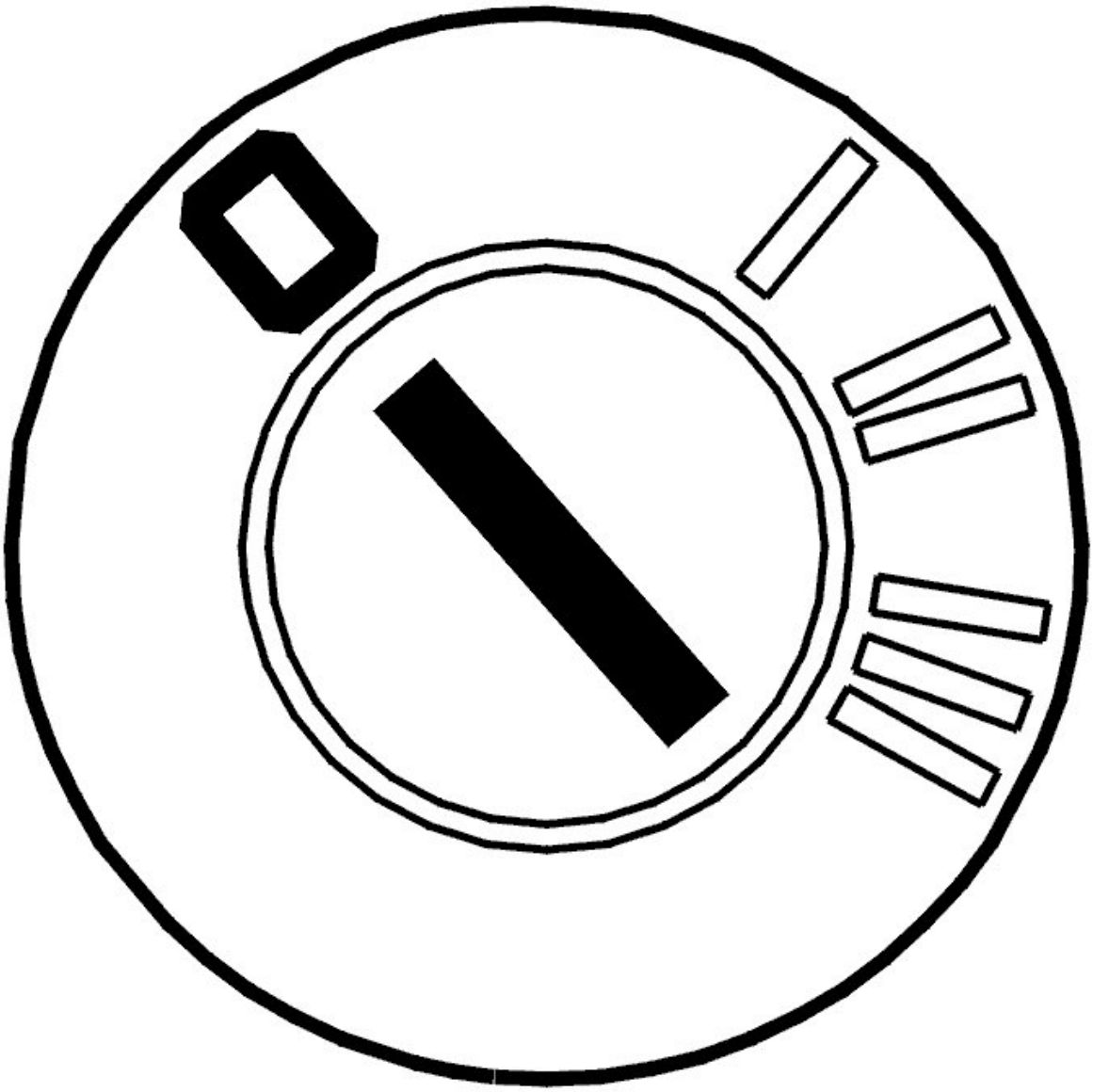






Continue - Fault-tracing information

Replacing the component



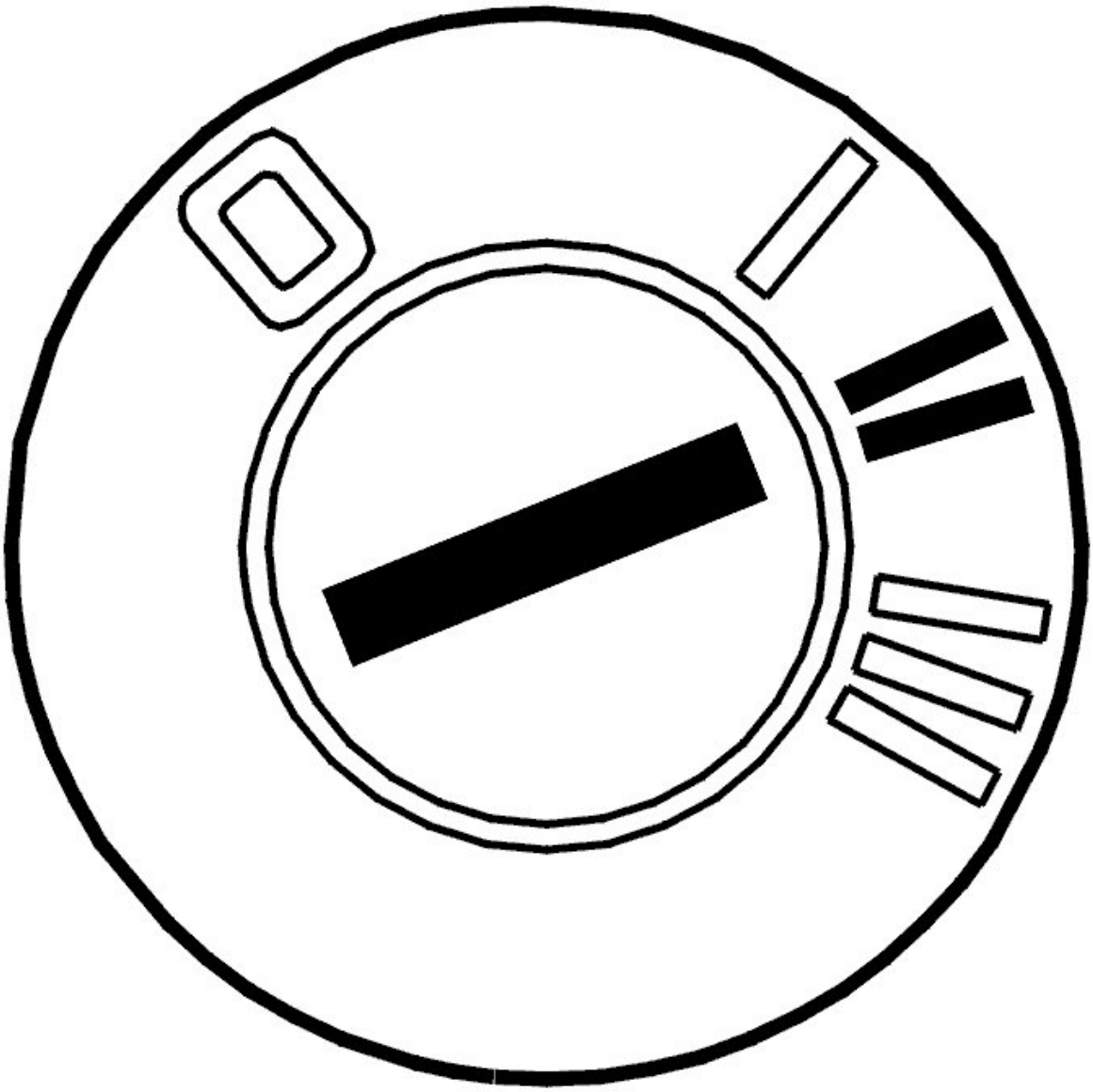
- Ignition off.

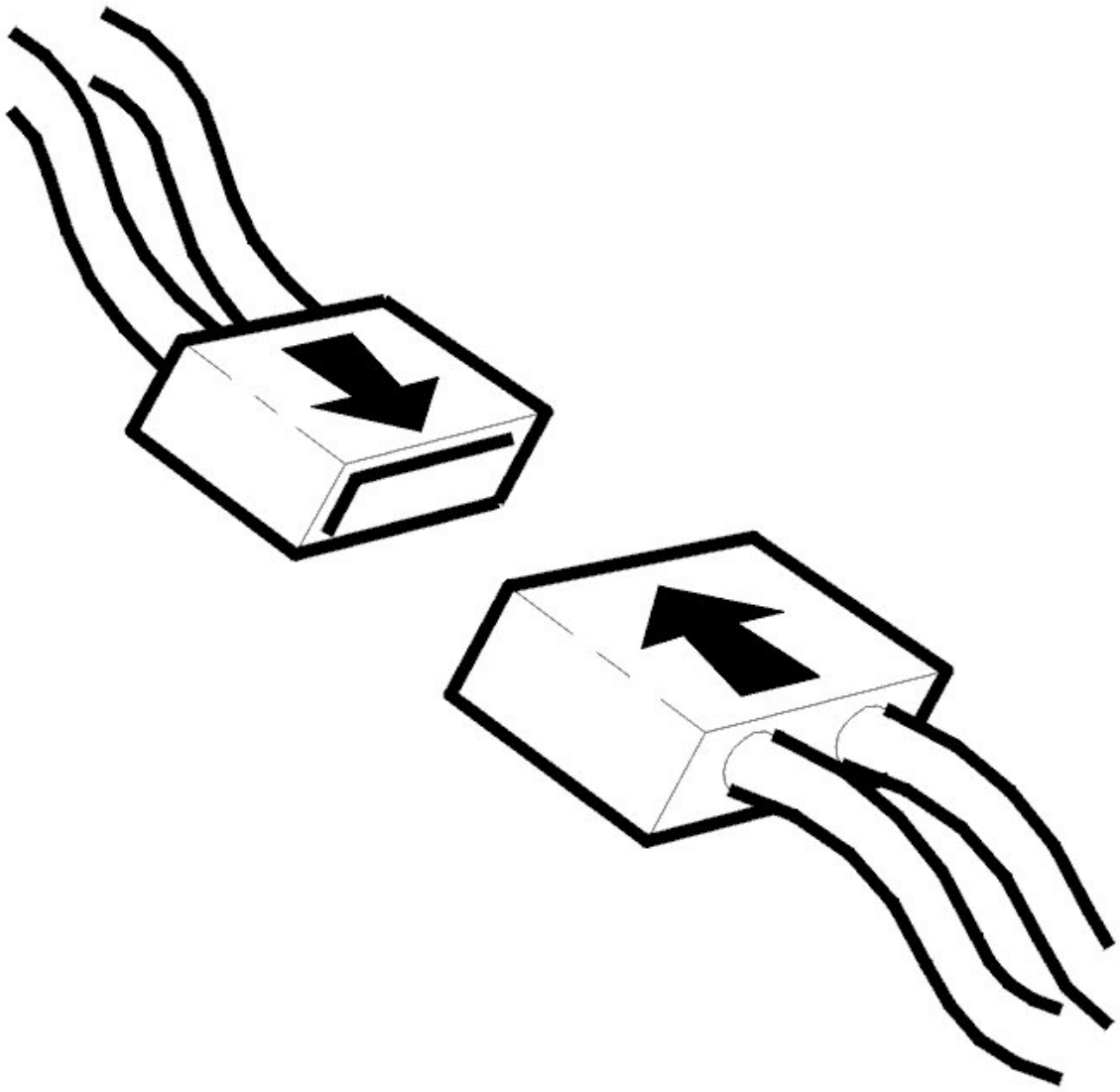
Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the sun roof can be operated automatically by pressing the switch 2 steps.

Can the sun roof be operated automatically?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Fault-tracing information

Information

Fault-tracing information

If the fault is intermittent, do not verify fault-tracing if the fault does not recur.
It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

Yes - Attempt New Test

No - Fault Found

FAULT FOUND - Fault Found

Attempt New Test - Checking for permanent or intermittent faults

---

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information

Condition

If the control unit detects that SRM-0022 is given when contact is made with the sunroof module (SRM), the diagnostic trouble code is displayed.

Substitute value
- Nothing.

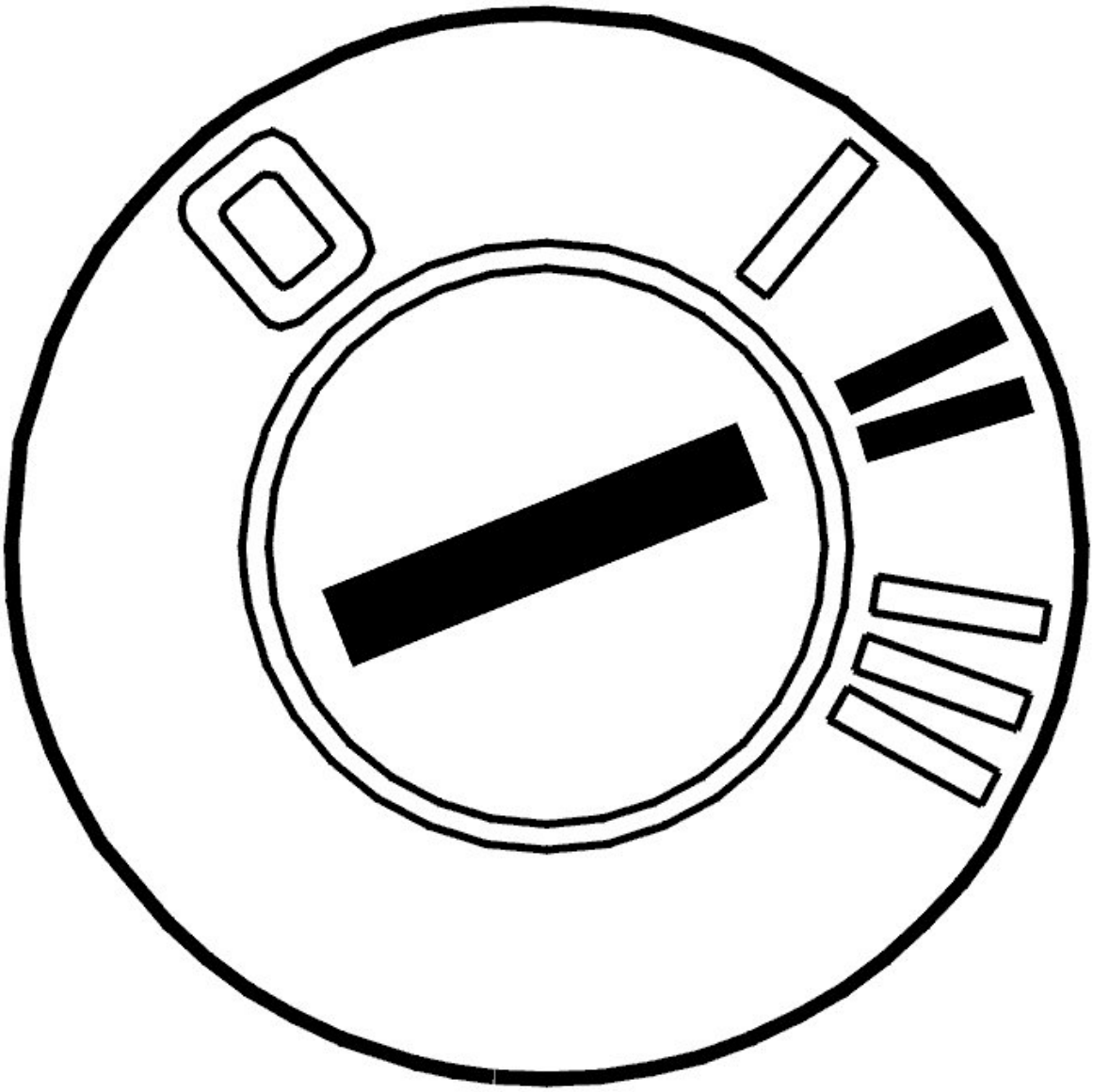
Possible source
- Fault in programming of or reading from EEPROM.

Fault symptom[s]
- Automatic sunroof closing does not work.

Internal Fault

Internal fault

Checking for permanent or intermittent faults



- Ignition on.

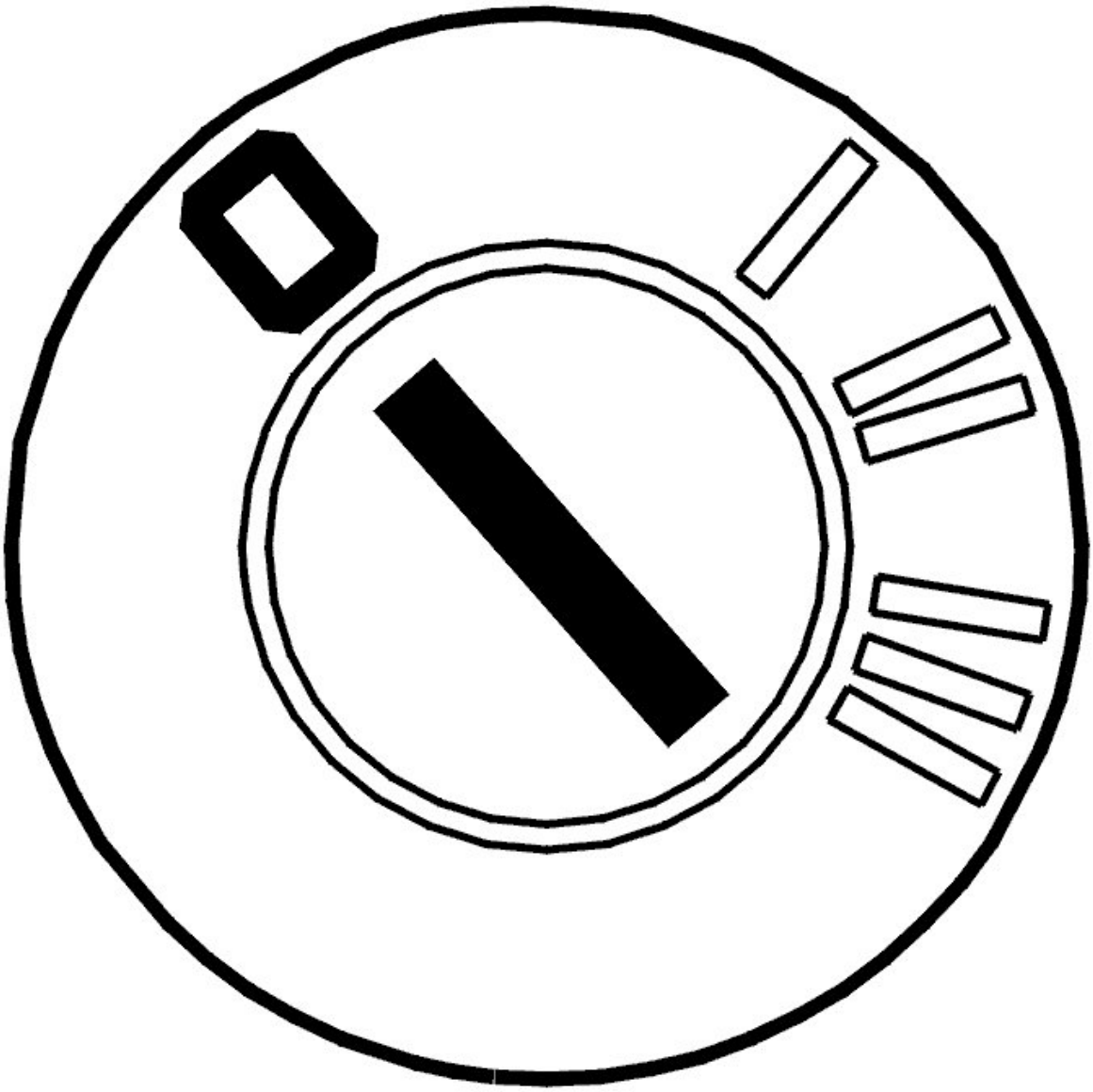
Check that the sun roof can be operated automatically by pressing the switch 2 steps.

Can the sun roof be operated automatically?

Yes - Intermittent fault

No - Replacing the component

Replacing the component



- Ignition off.

Replace the sun roof control module according to Sun roof module (SRM), replacing See: Body and Frame/Relays and Modules - Body and Frame/Sunroof / Moonroof Module/Service and Repair.

Continue - Verification

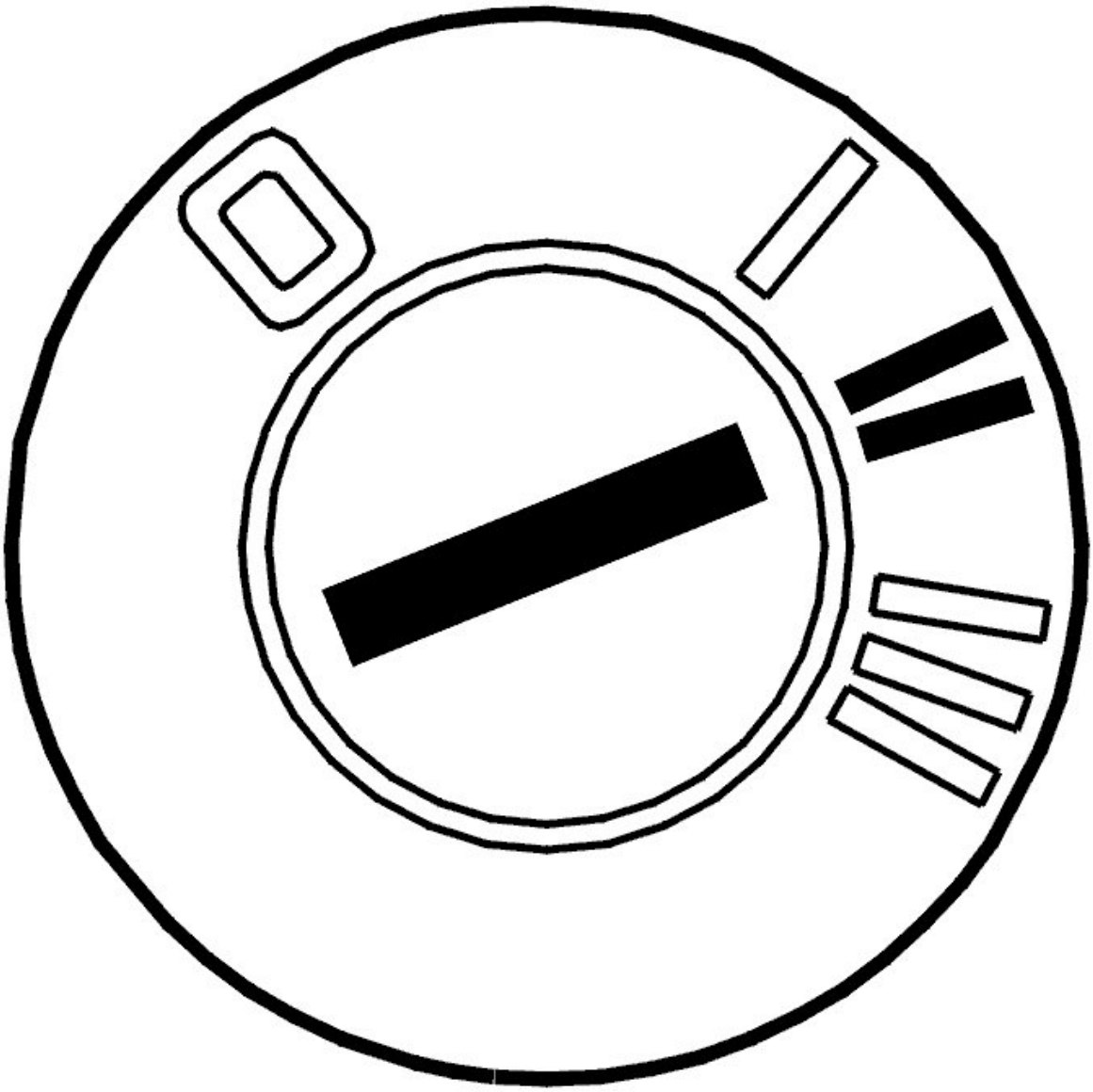
Intermittent fault

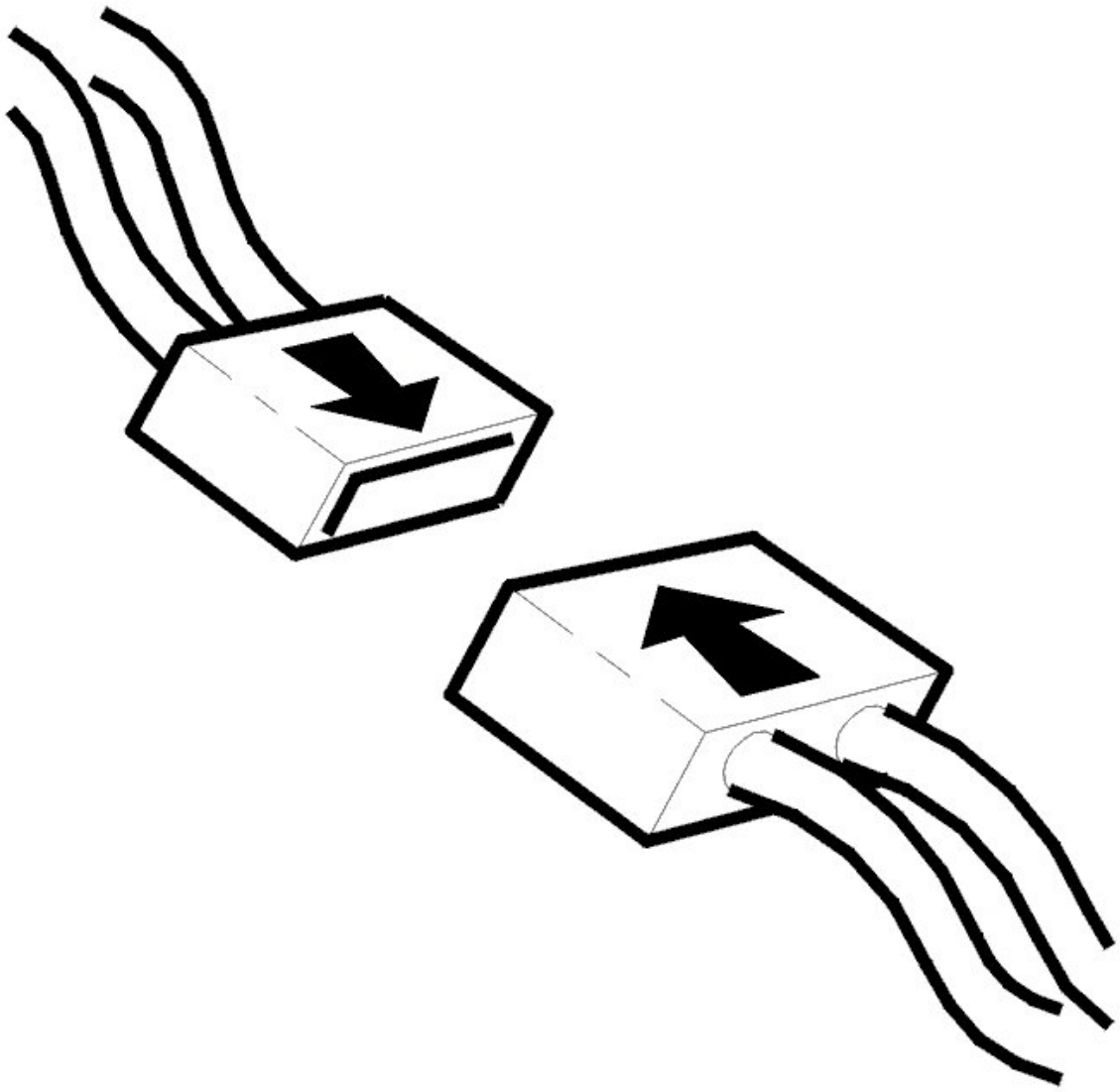
The control module has previously registered a fault. The fault is now no longer present.

Continue - **DONE**

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the sun roof can be operated automatically by pressing the switch 2 steps.

Can the sun roof be operated automatically?

Yes - Fault Found

No - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking for permanent or intermittent faults

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information

Condition

Diagnostic trouble code (DTC) UEM-0078 is stored if the control module registers that the configuration of the siren does not correspond to the car.

Substitute value
- None.

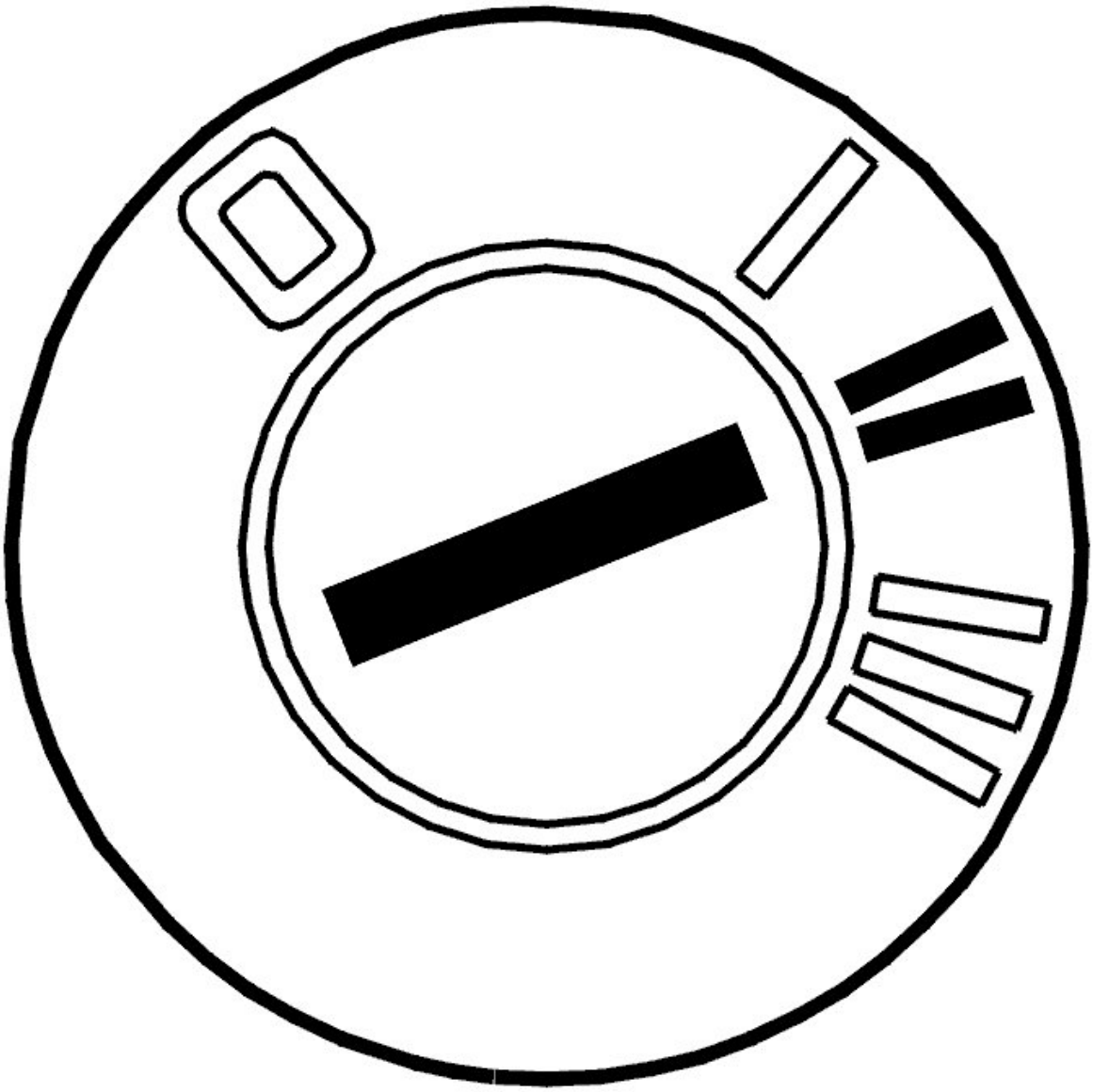
Possible source
- The siren has not been configured after replacement
- Failed configuration after replacing the siren.

Fault symptom[s]
- None.

Configuration Fault

Configuration fault

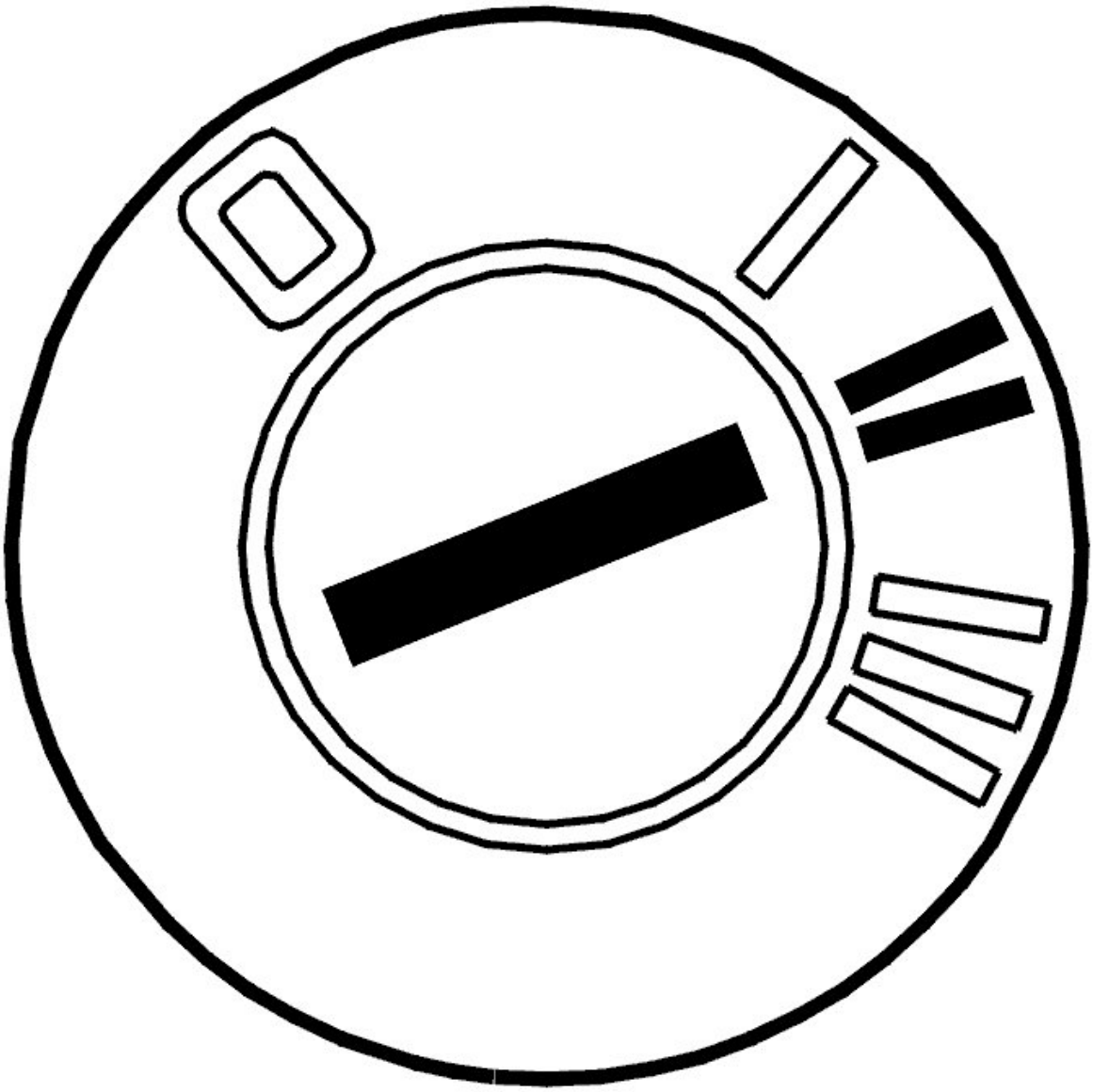
Re-configuration



- The configuration of the siren does not correspond to the configuration of the car
- Ignition on
- Click the VCT2000 symbol to re-configure the siren.

Continue - Reading off diagnostic trouble codes (DTC)

Reading off diagnostic trouble codes (DTC)



- Ignition on.

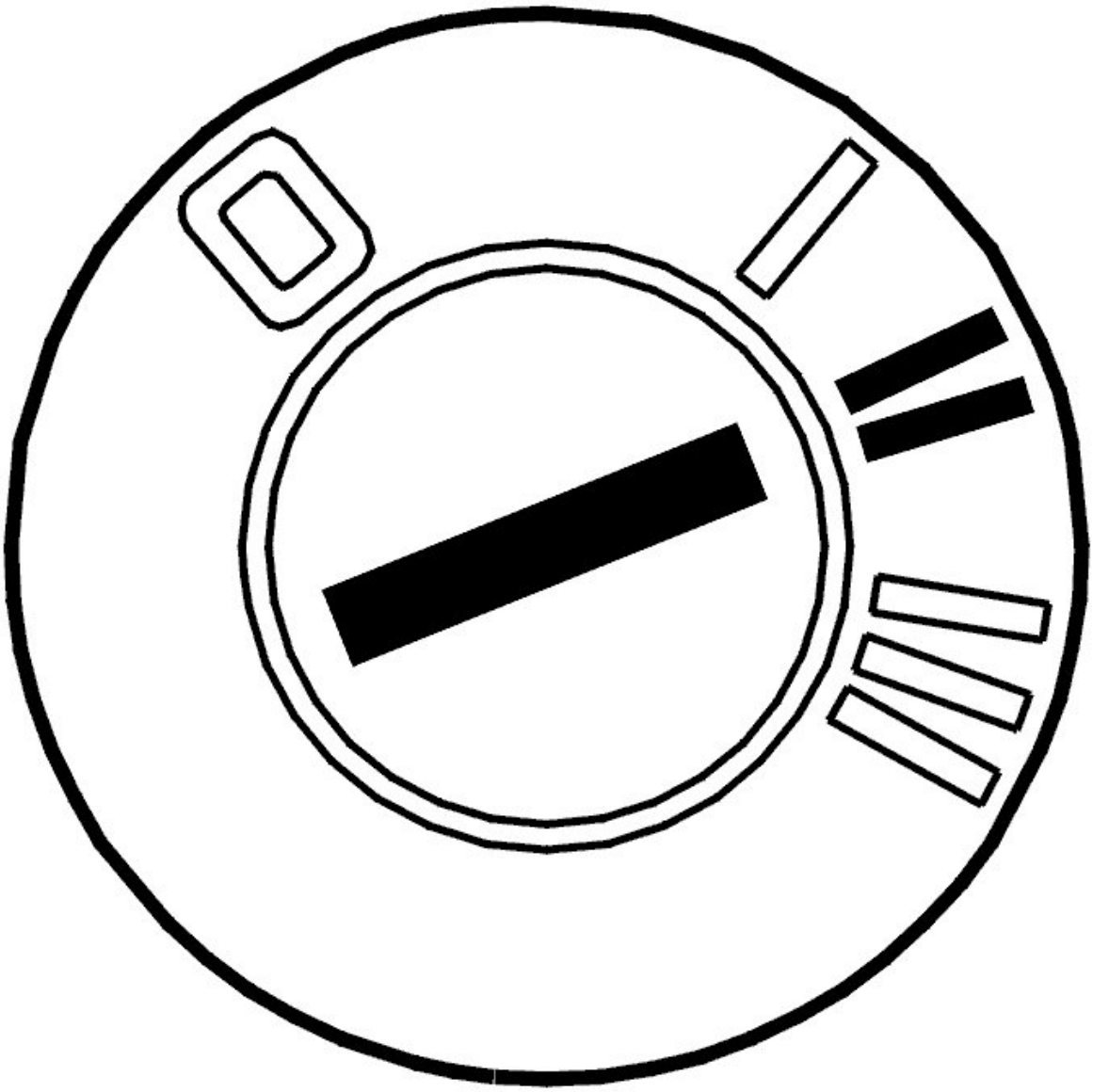
- Read off diagnostic trouble codes (DTCs).

Has diagnostic trouble code (DTC) UEM-0078 been stored again?

Yes - Replacing the component

No - **Fault Found**

Replacing the component



- A faulty siren is installed
- Replace the siren. See Siren, replacing See: Accessories and Optional Equipment/Antitheft and Alarm Systems/Alarm Horn/Service and Repair
- Ignition on.

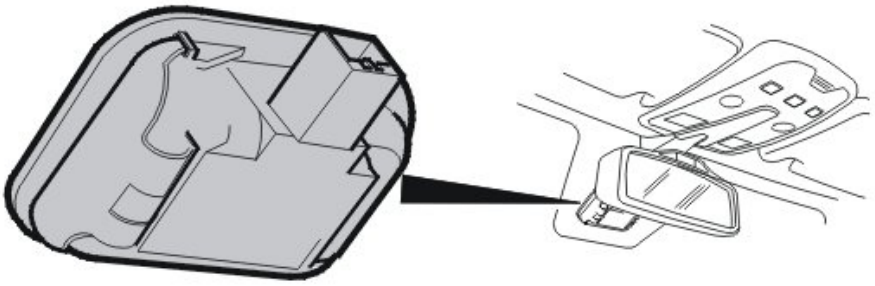
Activate the configuration.

Continue - Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0080

Condition



The upper electronic module (UEM) regularly checks the communication with the rain sensor module (RSM).
A diagnostic trouble code (DTC) is stored If the rain sensor module (RSM) does not respond to a request from the upper electronic module (UEM).
The diagnostic trouble code (DTC) can be diagnosed 20 seconds after the ignition is switched on. Diagnostic trouble code (DTC) UEM-0080 is not stored if UEM-0081 or UEM-0082 is stored.

Substitute value
- Intermittent windshield wipers
- The windshield wipers operate at high speed.

Possible source
- Open-circuit in the power supply cable for the rain sensor
- Short-circuit to ground in the power supply cable for the rain sensor
- Open-circuit, short-circuit to ground or supply voltage in the data cable for the rain sensor
- Open-circuit or short-circuit to supply in the ground lead for the rain sensor
- Contact fault on the sensor side and/or control module side
- Defective rain sensor
- Defective control module.

Fault symptom[s]
- No rain sensor function.

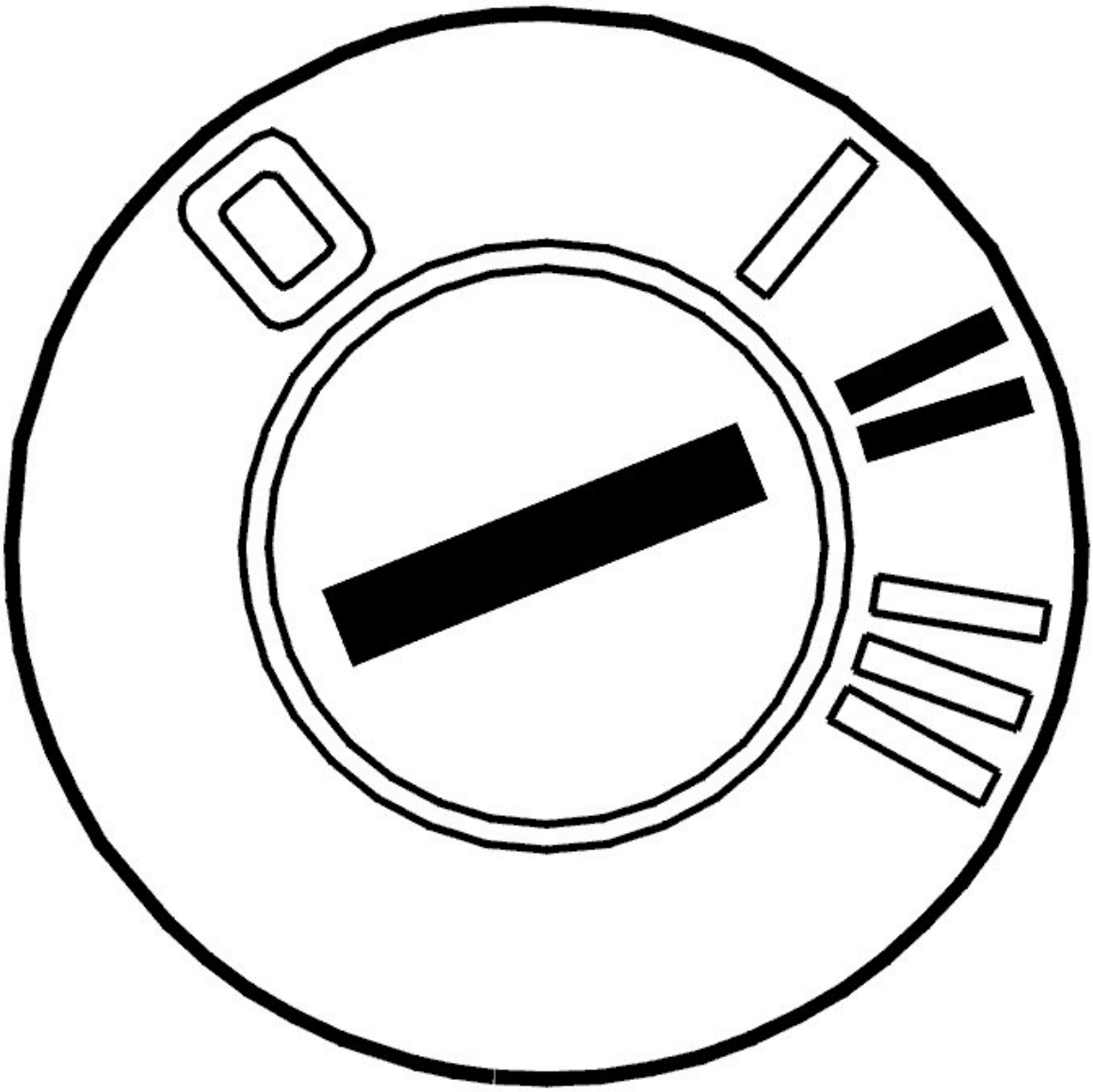
Signal Missing

Signal missing

Checking the function

Checking the rain sensor

Checking the function



- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the stalk to position "0" and then to intermittent wiping.

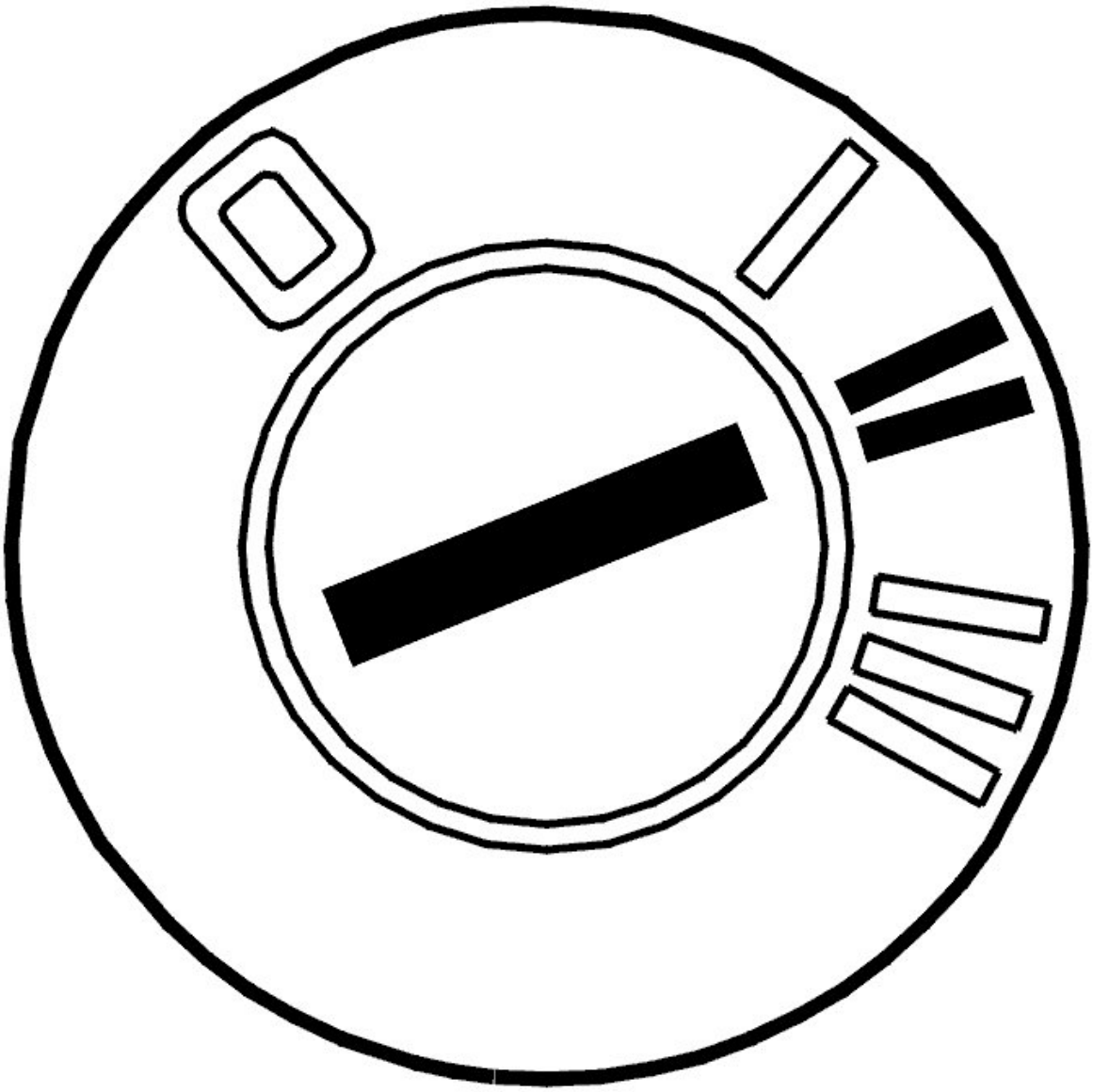
Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Hint: In cars equipped with the rain sensor it replaces the intermittent function. One way of checking the function of the rain sensor is to twist the collar on the lever. This changes the sensitivity of the rain sensor. The windshield wiper should make one stroke. If the intermittent or high speed functions are activated it indicates that the rain sensor function is missing.

Continue - ANOTHER TEST

ANOTHER TEST - Checking the supply to the rain sensor

Checking the supply to the rain sensor



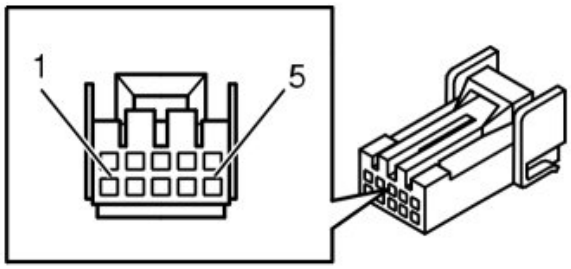
- A number of measurements are required to check the wiring for the rain sensor. Measurements should be carried out on the wiring connector with the rain sensor disconnected. The terminals correspond to ground, voltage and data cables. The data cable is connected to terminal #1 on the rain sensor, terminal #2 is the ground cable and terminal #3 is the power supply for the rain sensor
- Move the windshield wiper stalk to position "0".
- Ignition off
- Disconnect the rain sensor
- Ignition on.

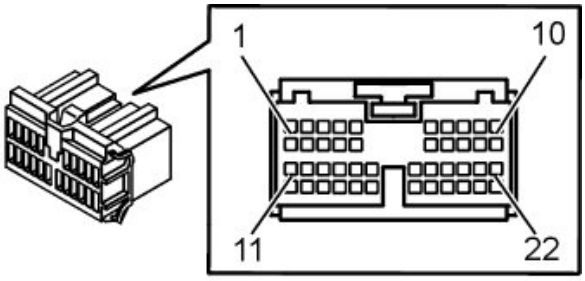
Check the voltage level between the voltage terminal #3 and ground terminal #2 of the wiring.

Hint: The voltage must be 12V.

Other information:

- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Is the voltage between the terminals 12V?

Yes - Checking the data cable

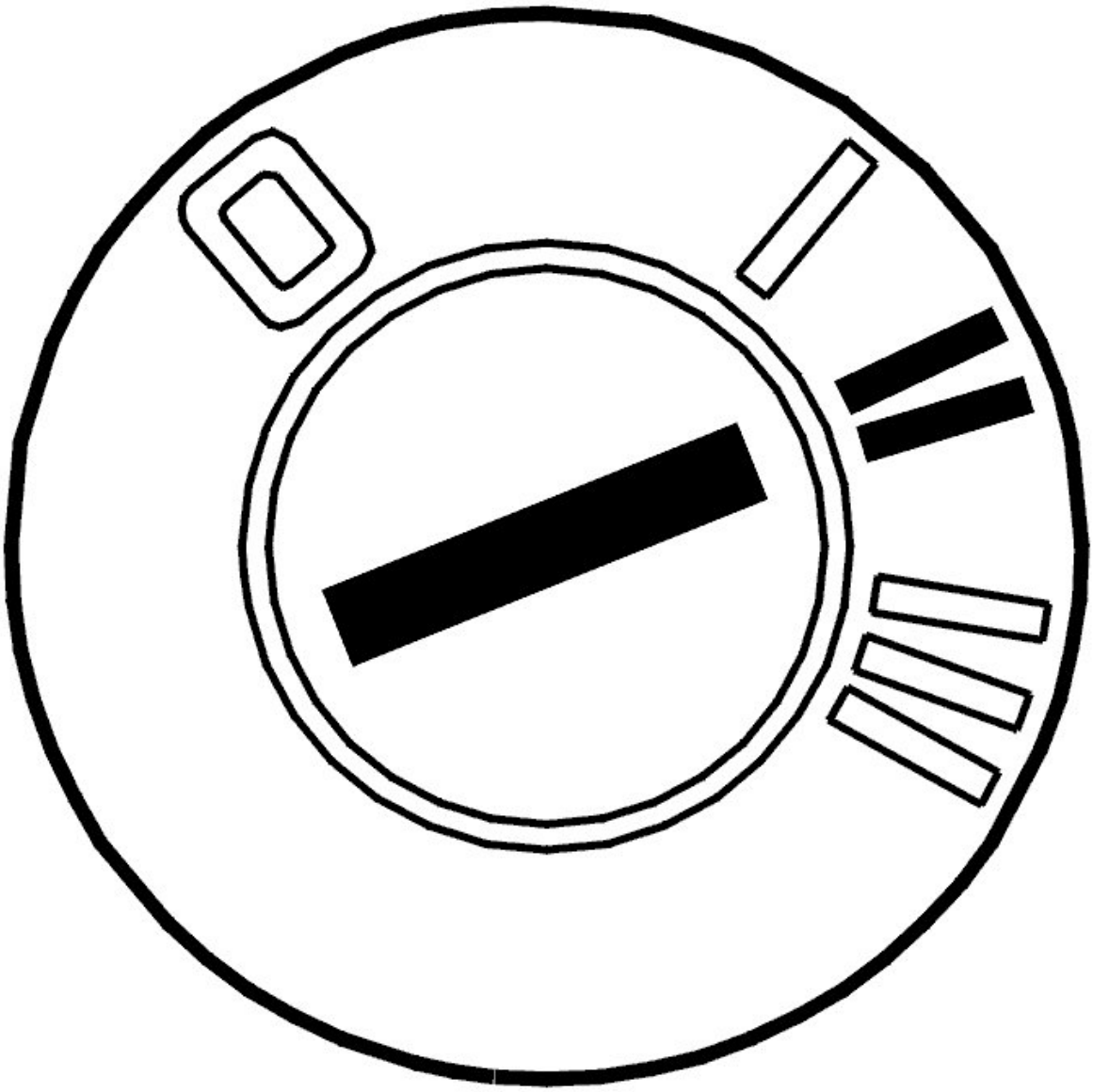
No - Checking the wiring

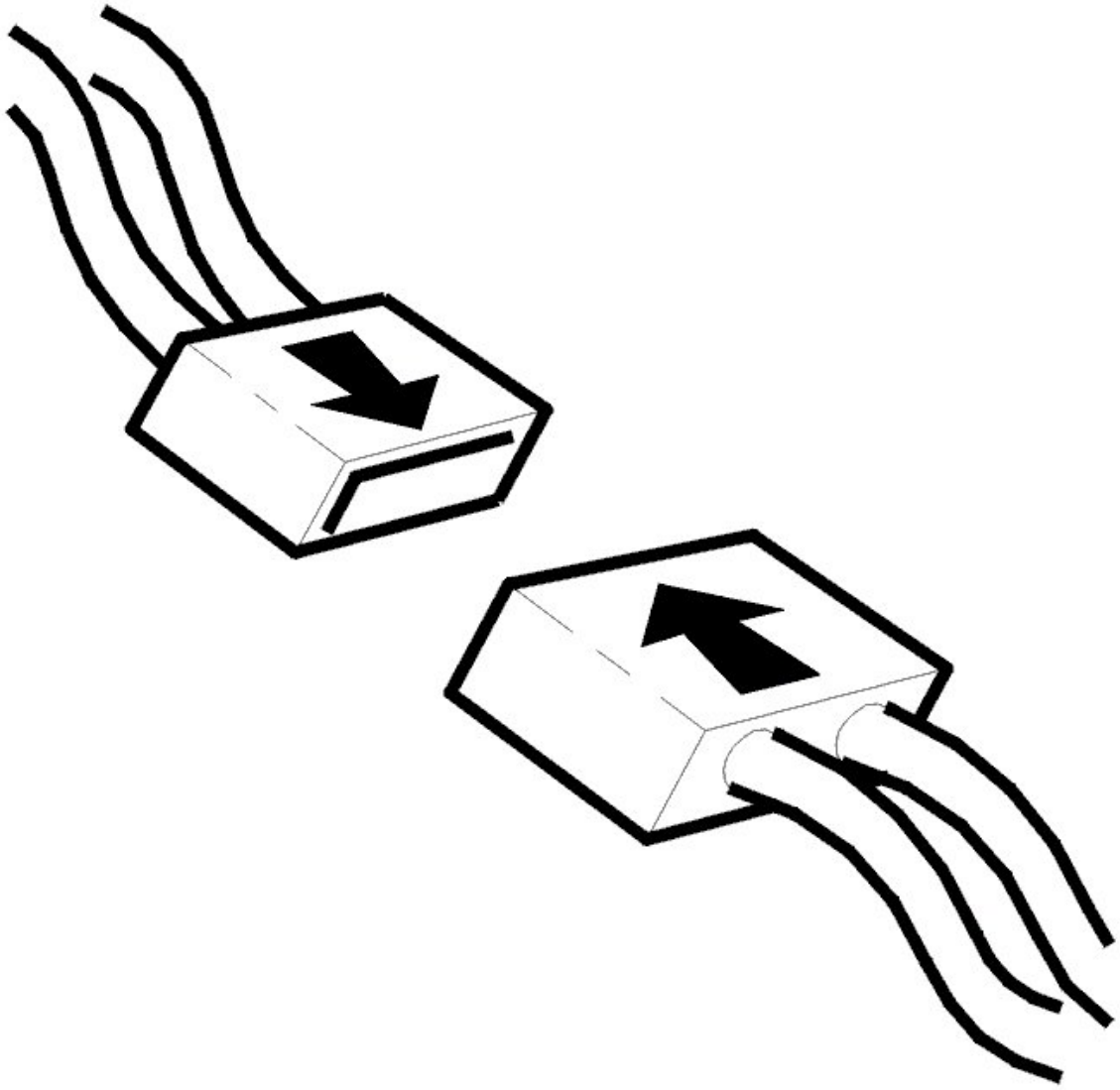
Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

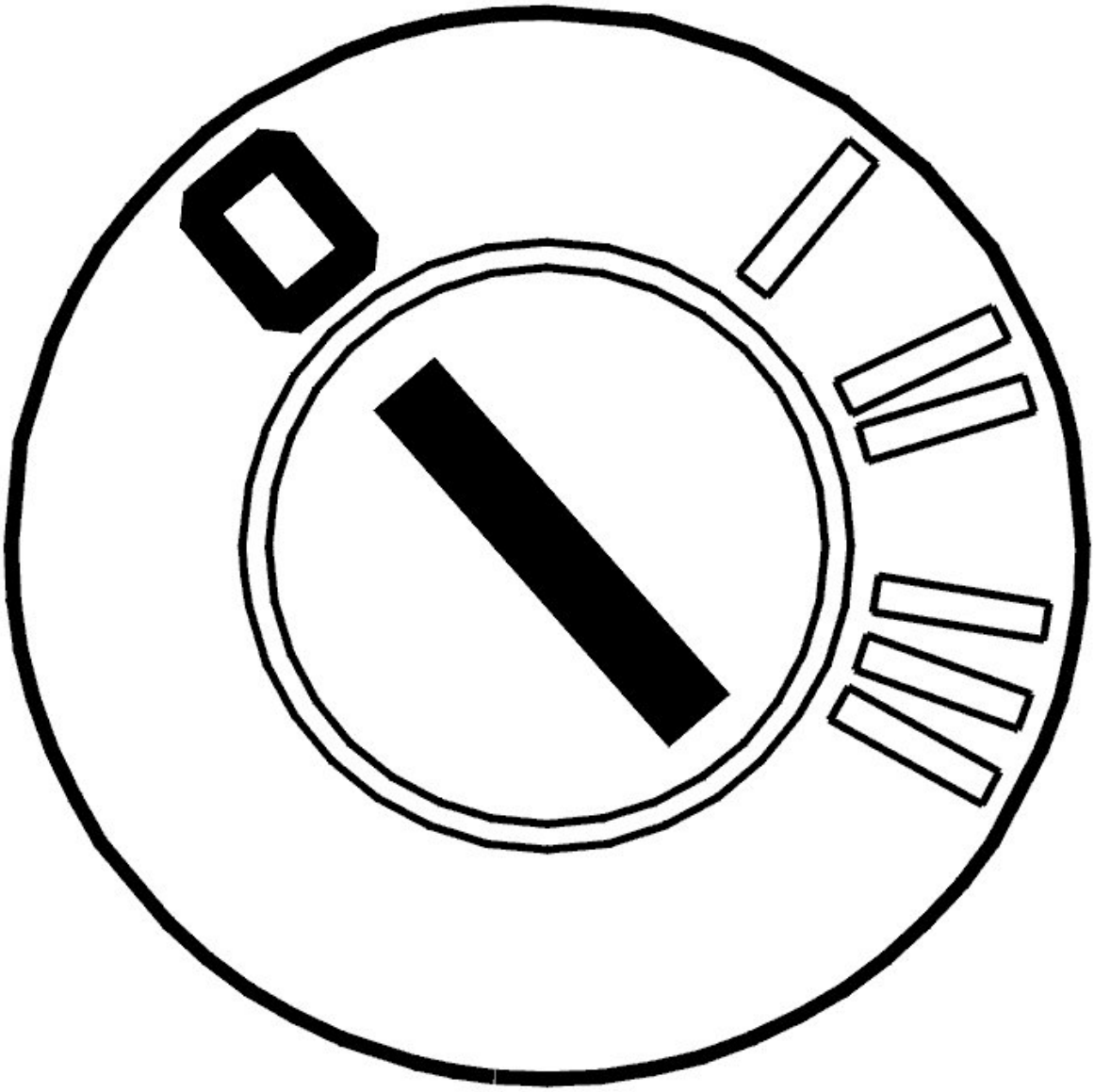
Yes - FAULT-TRACING FAILED

No - Attempt New Test

Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Checking the data cable



Hint: The wiring between upper electronic module (UEM) and the rain sensor consists of two cables.

The upper electronic module (UEM) transmits pulses to the rain sensor using the data cable.
Disconnect the rain sensor.
Check that the data is transmitted on the data cable terminal #1 by checking the voltage level between the data and ground cables for the wiring (that is terminals #1 and #2).

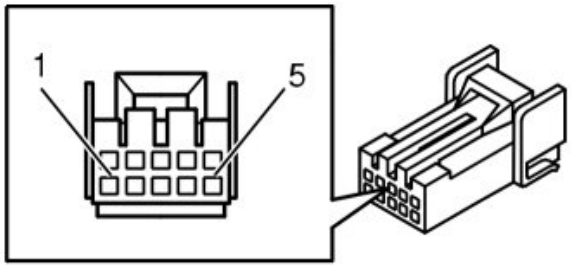
Hint: Use the oscilloscope function and check that a pulsed signal is transmitted. The difference between the high and low values of the pulses is

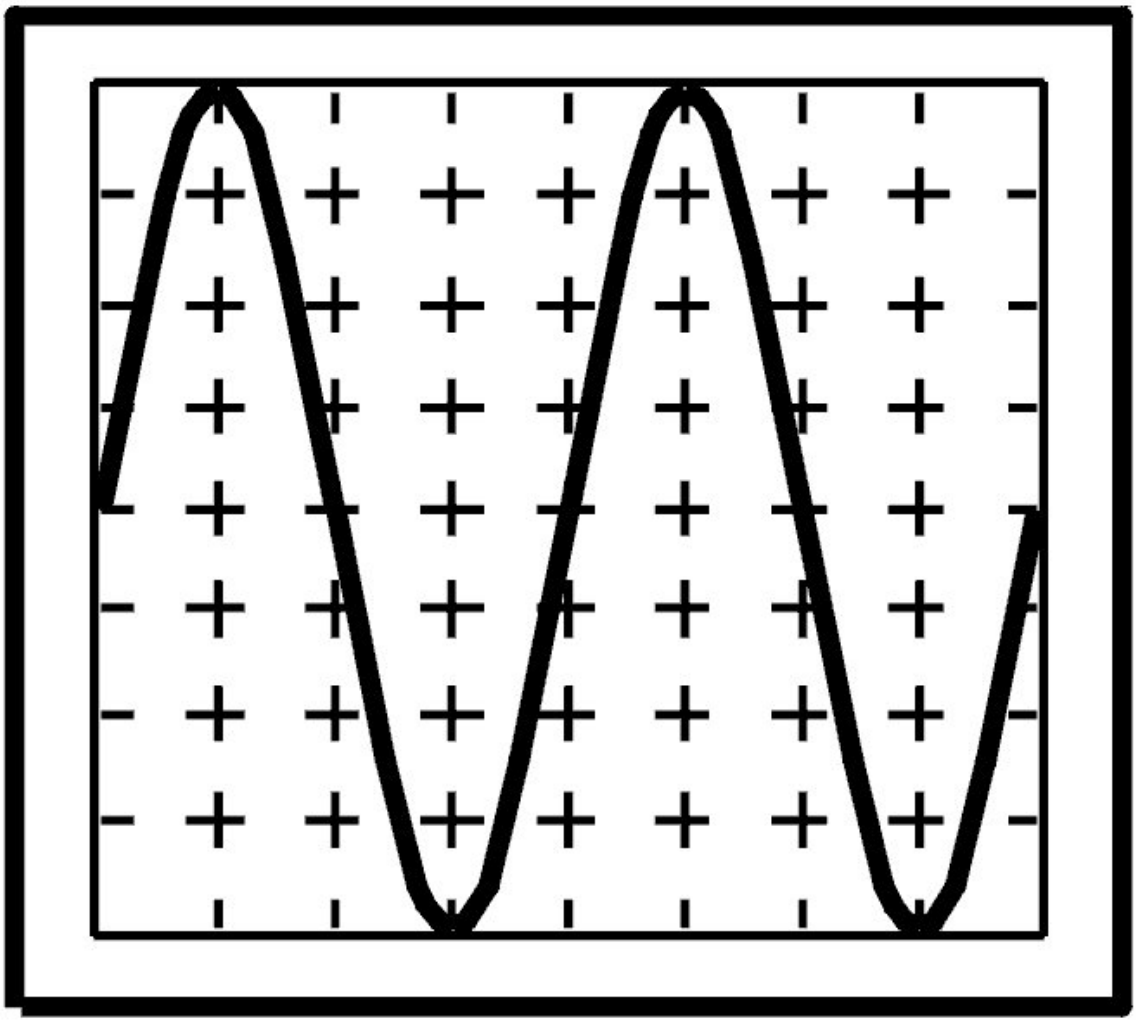
approximately 12 V. In the event of an open-circuit in the data cable no pulses are transmitted and a continuous voltage is displayed.

If the difference between high and low values of the pulses is between 2 V and 10 V it indicates that the wiring is oxidized or trapped. Replace the wiring between the rain sensor and the roof wiring in the event of a fault.
If no other fault is found try replacing the rain sensor.
Remedy as necessary.

Other information:

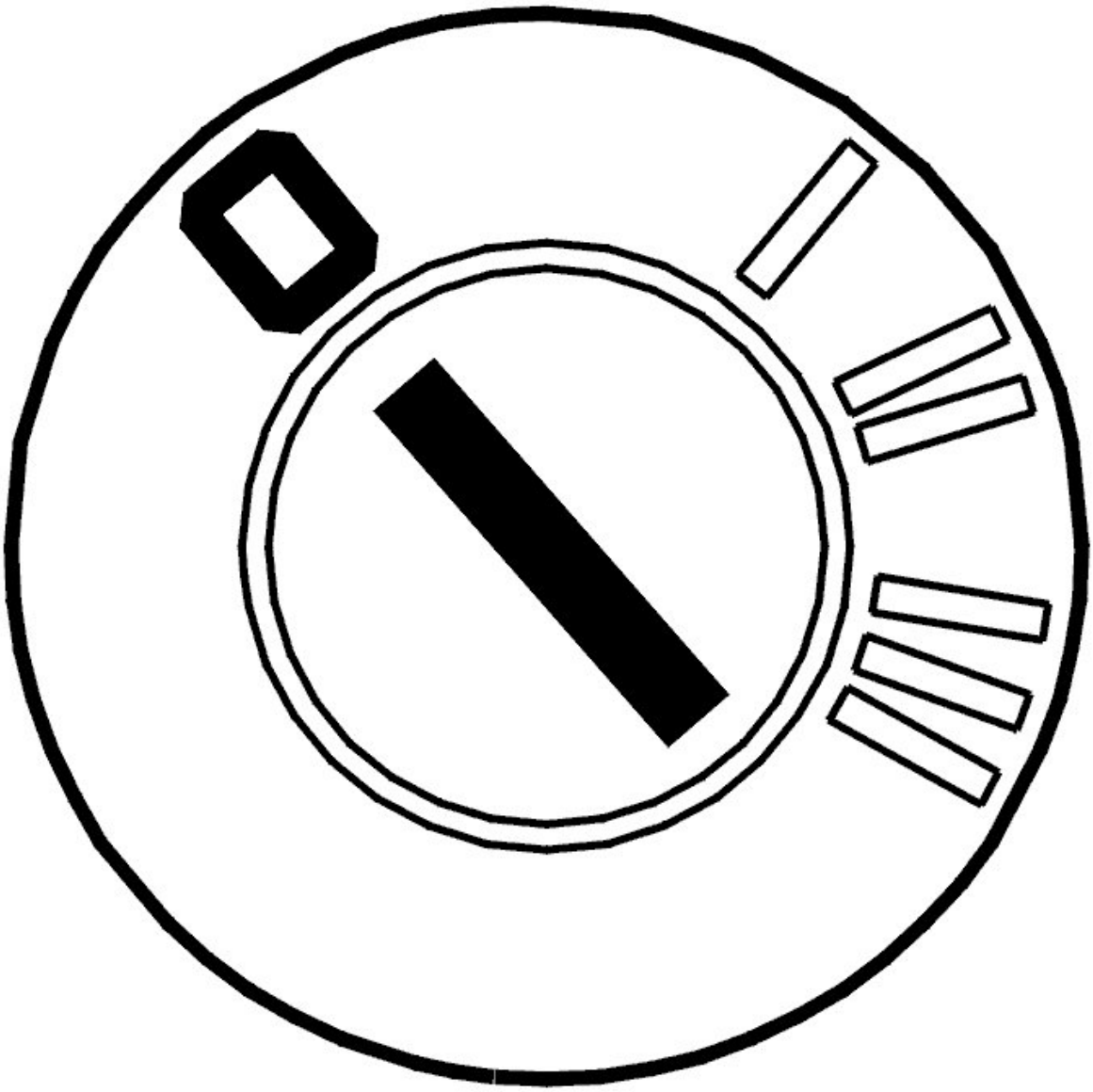
- To access or replace the control module, see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





Continue - Verification

Checking the wiring



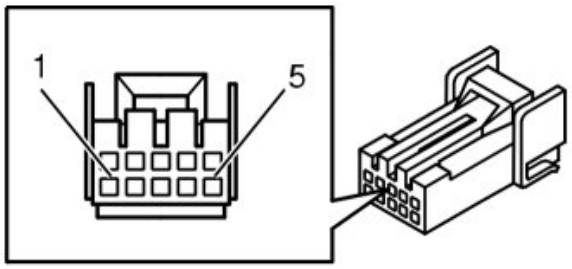
There is either a fault in the supply voltage or in the ground lead. Check the power supply cable against a ground terminal (the chassis).

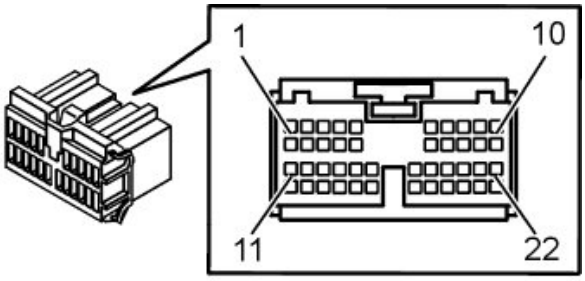
Hint: If the voltage is 12 V the fault is in the ground lead. Other wise the fault is in the power supply cable.

Remedy as necessary.

Other information:

- To access or replace the control module, see Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- For further information about signals and other values, see Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- To connect the breakout box, see Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- To fault-trace the wiring and terminals, see Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.





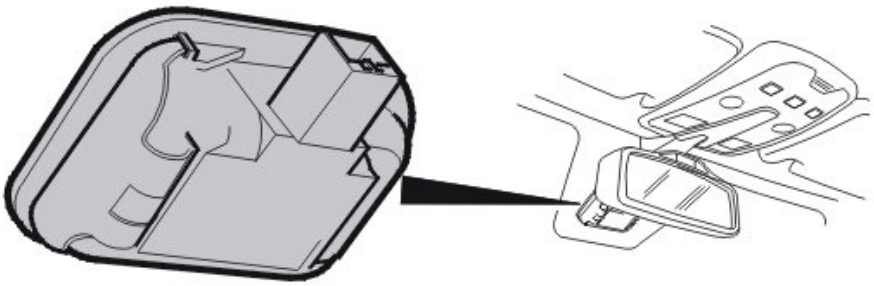
Select "Continue".

Continue - Verification

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information UEM-0081

Condition



The upper electronic module (UEM) regularly compares a communication test with the rain sensor.
The diagnostic trouble code (DTC) is generated if the upper electronic module (UEM) registers that the signal cable of the rain sensor is short-circuited to ground.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Intermittent windshield wiping.
- High speed windshield wiping.

Possible source
- The rain sensor's signal cable is short-circuited to ground.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

- Faulty rain sensor.

Fault symptom[s]
- No rain sensor function.

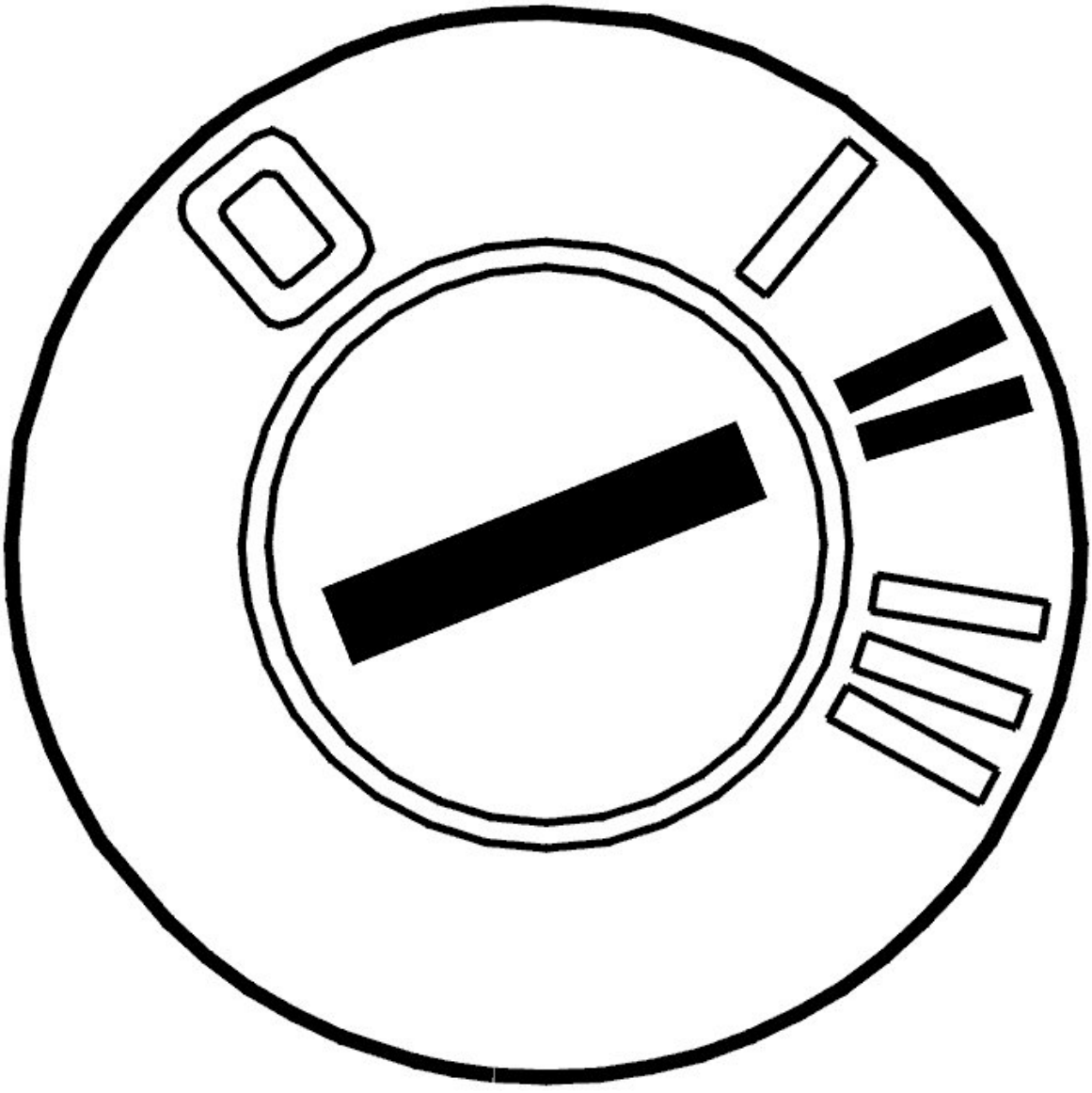
Signal Too Low

Signal too low

Checking the function

Checking the rain sensor

Checking the function



- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the stalk to position "0" and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

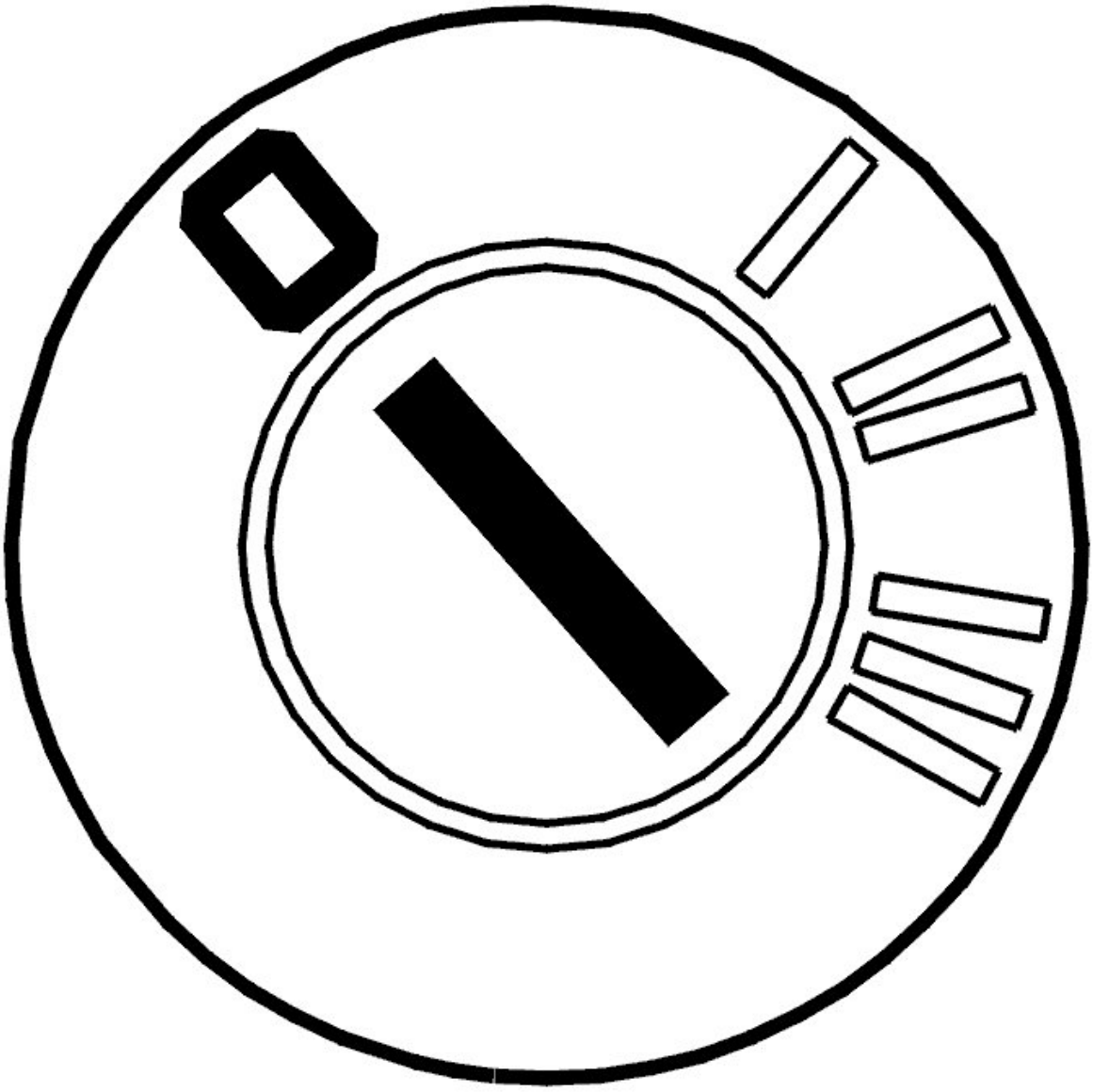
Hint: In cars equipped with the rain sensor it replaces the intermittent function. One way of checking the function of the rain sensor is to twist the collar on the lever. This changes the sensitivity of the rain sensor. The windshield wiper should make one stroke. If the intermittent or high speed functions are activated it indicates that the rain sensor function is missing.

Continue - ANOTHER TEST

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

ANOTHER TEST - Checking the wiring

Checking the wiring



Hint: The wiring between the upper electronic module (UEM) and the rain sensor consists of two cables.

- Windshield wiper stalk in position "0".

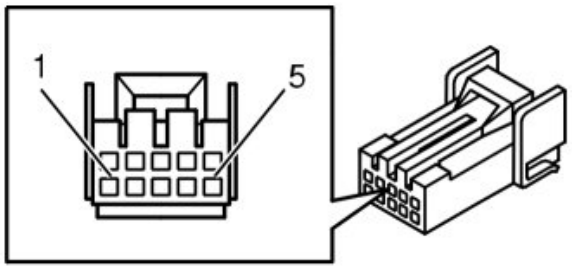
Check the cable between upper electronic module (UEM) terminal #13 (#A13) and rain sensor terminal #1. Check for a short-circuit to ground.

Hint: The upper electronic module (UEM) terminal #20 (#A20) is signal ground.

Remedy as necessary.

Other information:

- Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals.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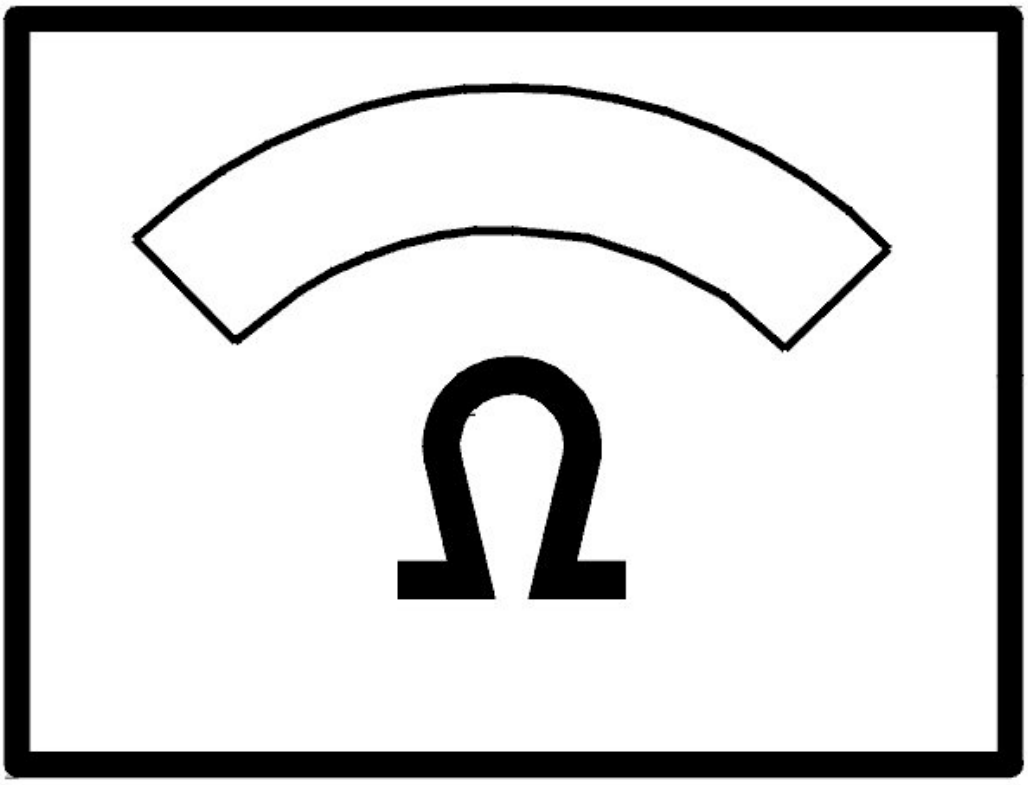
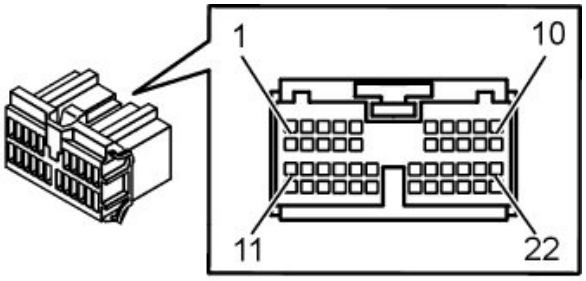




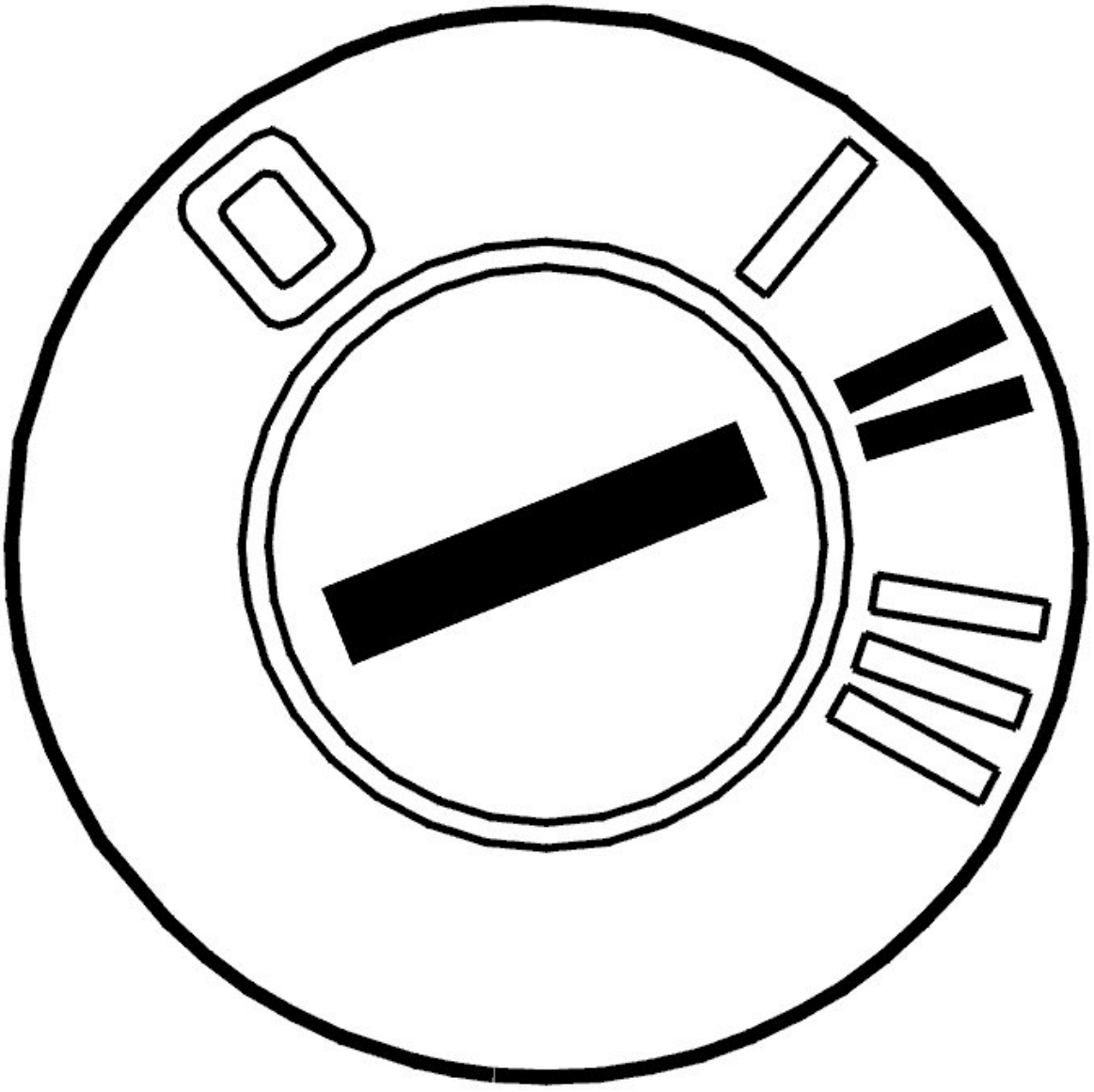
Continue - Verification

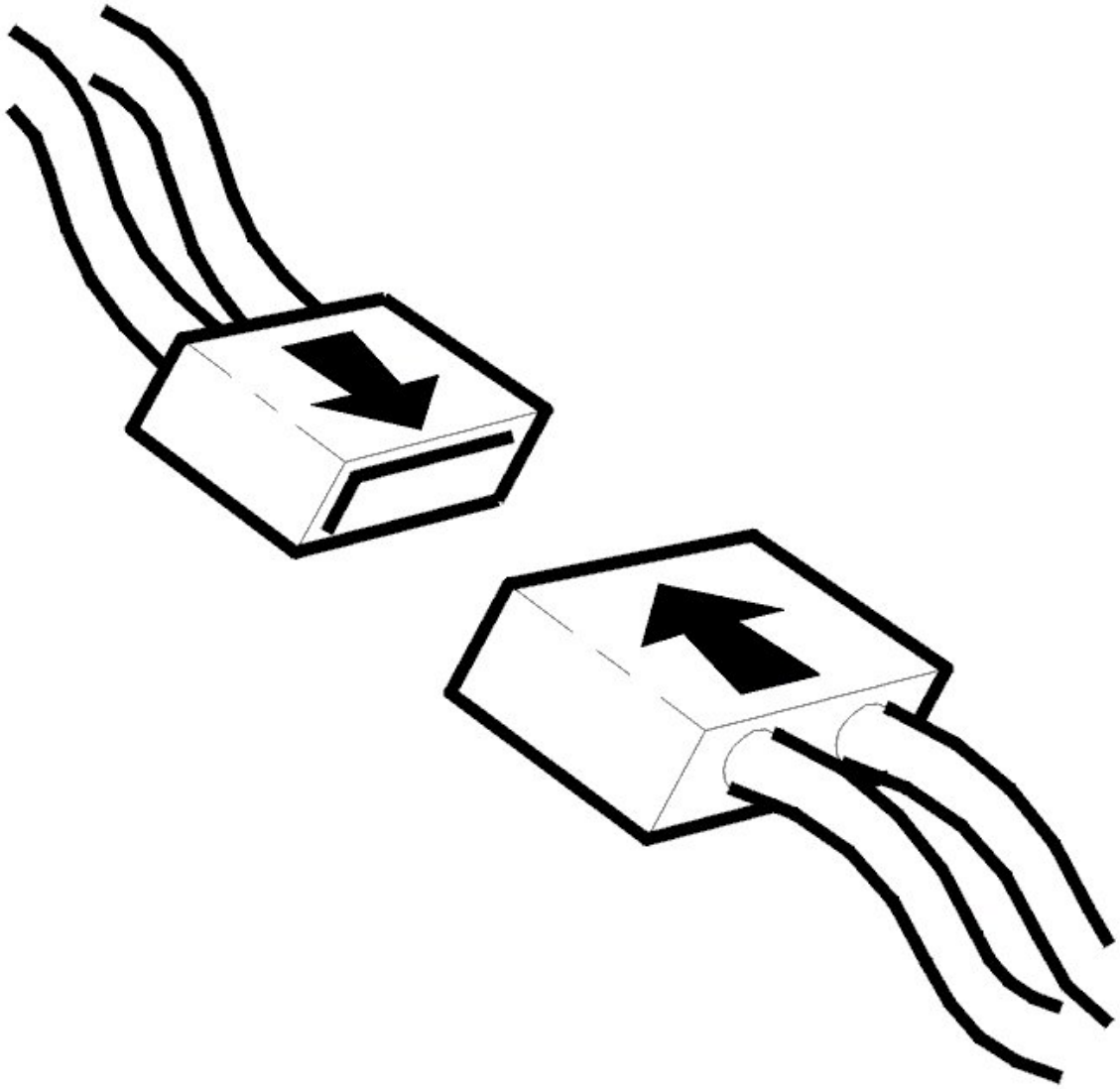
Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

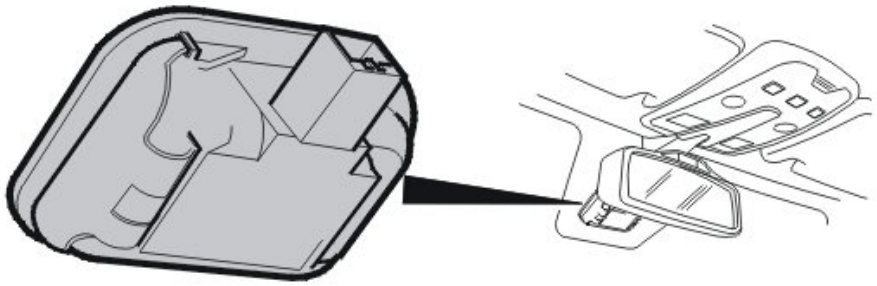
Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information UEM-0082

Condition



The upper electronic module (UEM) regularly compares a communication test with the rain sensor.
The diagnostic trouble code (DTC) is generated if the upper electronic module (UEM) registers that the signal cable of the rain sensor is short-circuited to supply voltage. The diagnostic trouble code (DTC) is not generated if UEM-0081 is stored.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Intermittent windshield wiping.
- High speed windshield wiping.

Possible source
- Short-circuit to supply voltage in the signal cable for the rain sensor
- Faulty rain sensor.

Fault symptom[s]
- No rain sensor function.

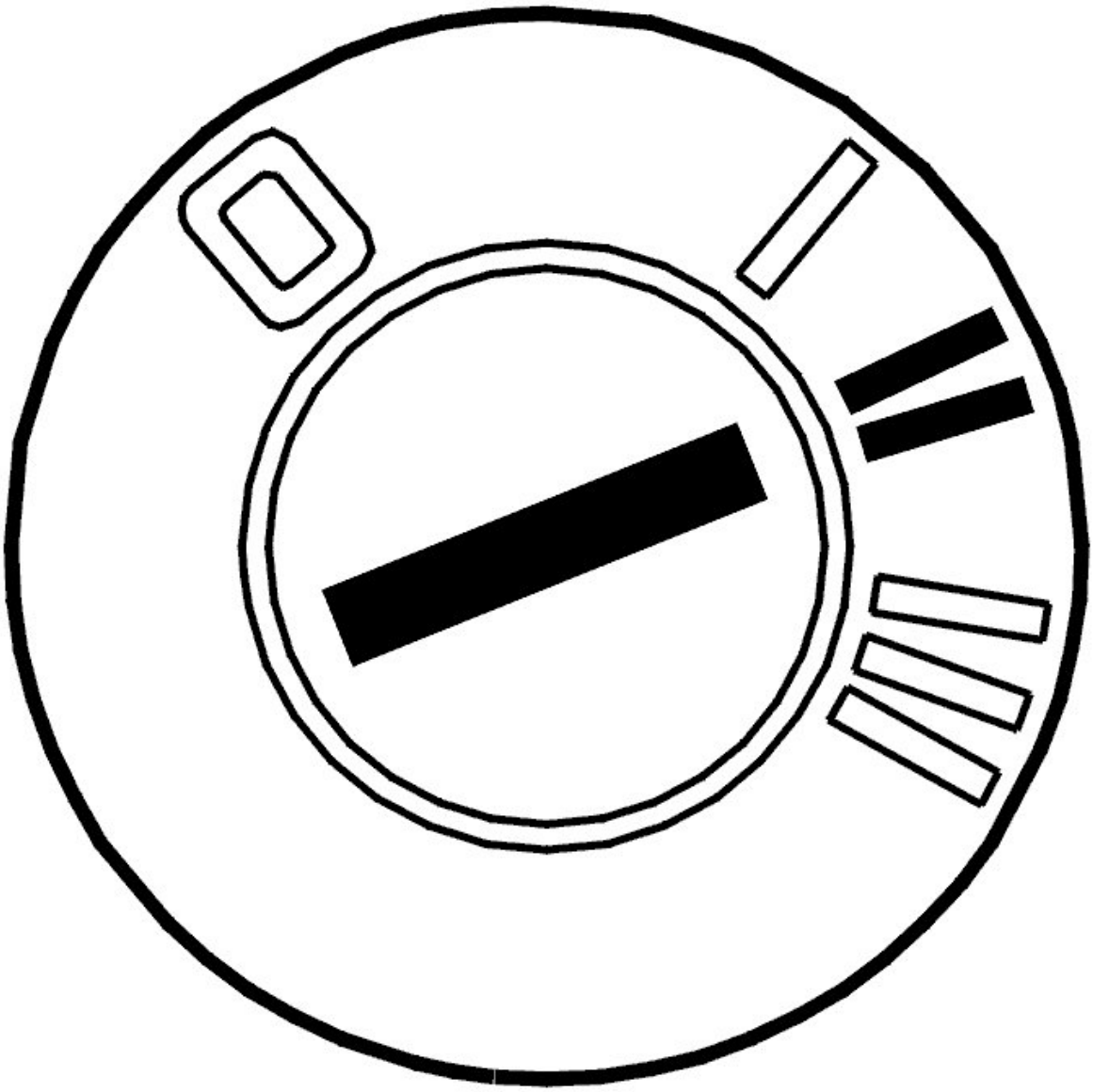
Signal Too High

Signal too high

Checking the function

Checking the rain sensor

Checking the function



- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the stalk to position "0" and then to intermittent wiping.

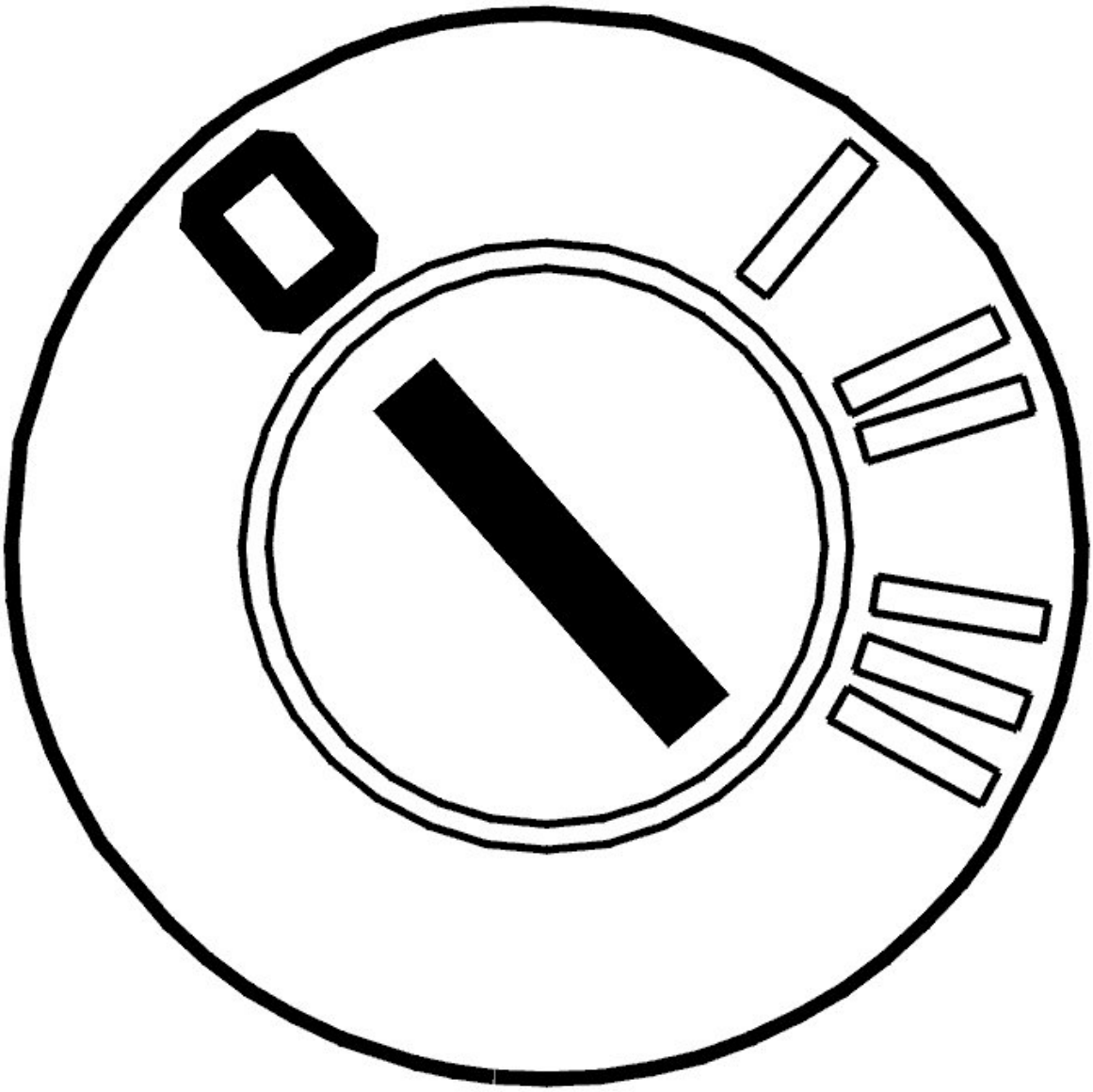
Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Hint: In cars equipped with the rain sensor it replaces the intermittent function. One way of checking the function of the rain sensor is to twist the collar on the lever. This changes the sensitivity of the rain sensor. The windshield wiper should make one stroke. If the intermittent or high speed functions are activated it indicates that the rain sensor function is missing.

Continue - ANOTHER TEST

ANOTHER TEST - Checking the wiring

Checking the wiring



Hint: The wiring between the upper electronic module (UEM) and the rain sensor consists of two cables.

- Windshield wiper stalk in position "0".

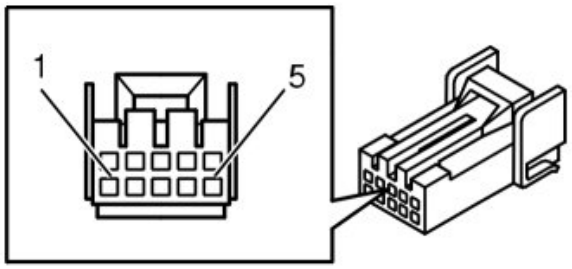
Check the cable between upper electronic module (UEM) terminal #13 (#A13) and rain sensor terminal #1. Check for a short-circuit to supply voltage.

Hint: Resistance between the power supply cable to the rain sensor terminal #8 (#A8) and the data cable to the rain sensor terminal #13 (#A13) should be infinite. The resistance between the data cable to the rain sensor terminal #13 (#A13) and the 30-supply to the upper electronic module (UEM) terminal #11 (#A11) should be infinite.

Remedy as necessary.

Other information

- Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Connecting the breakout box See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals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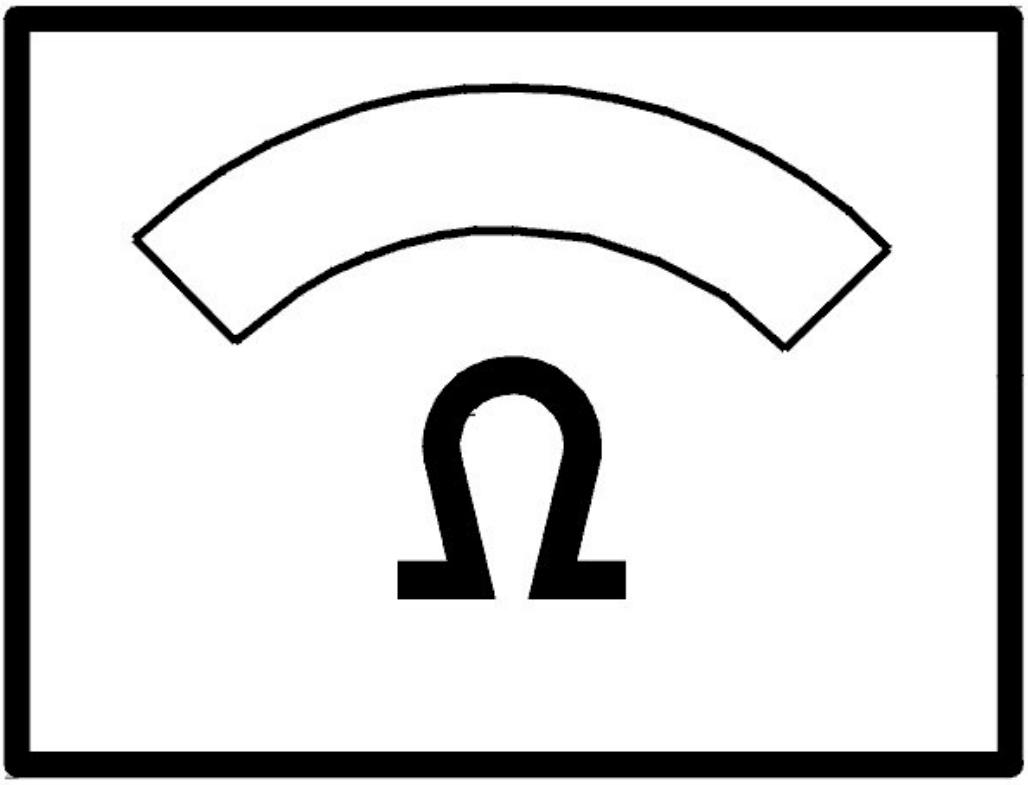
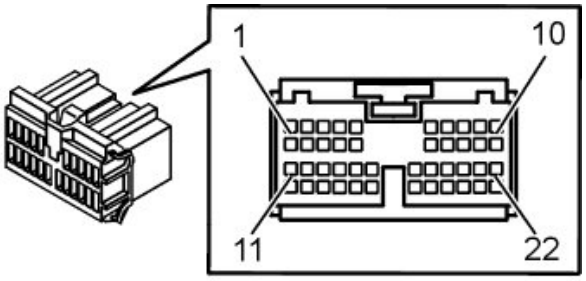




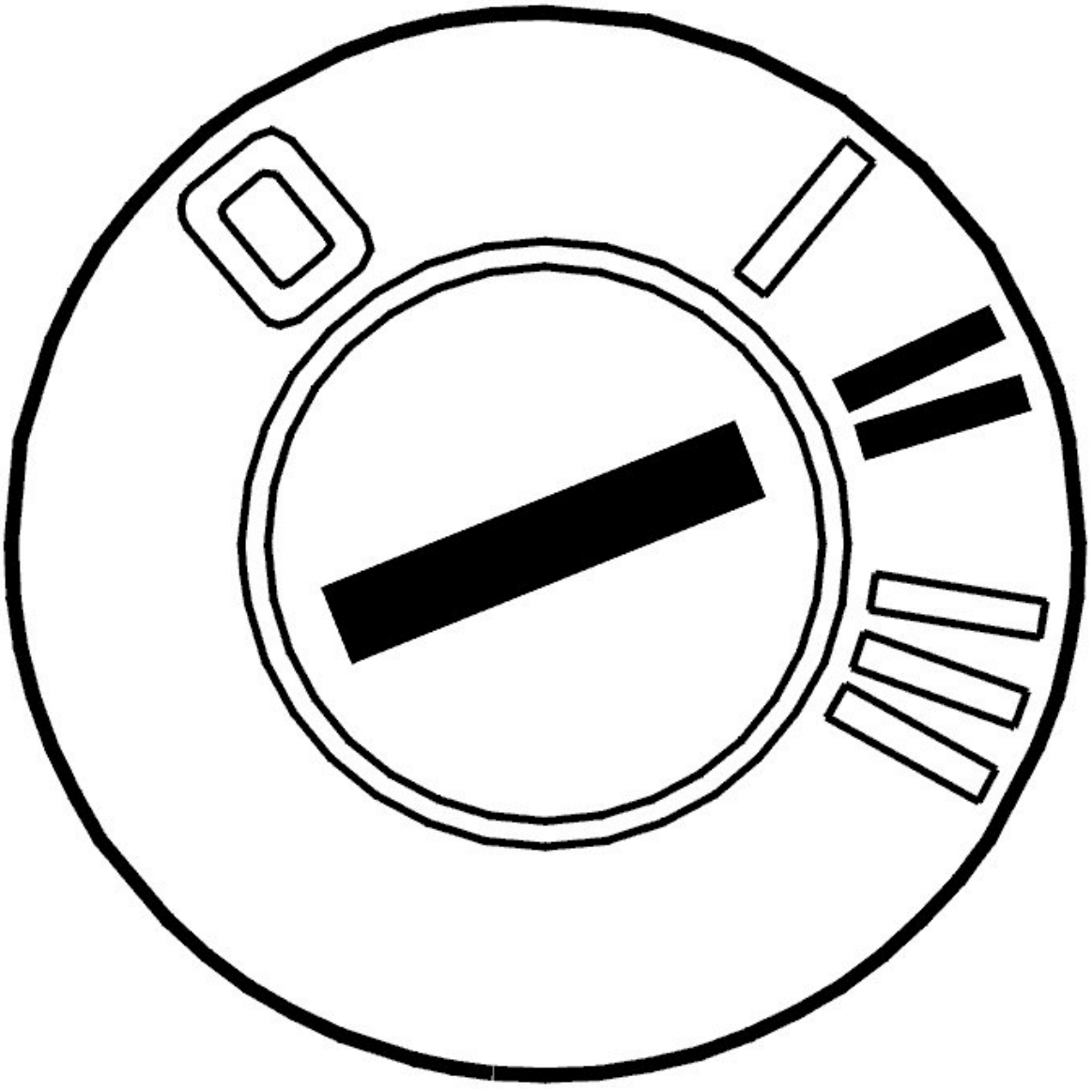
Continue - Verification

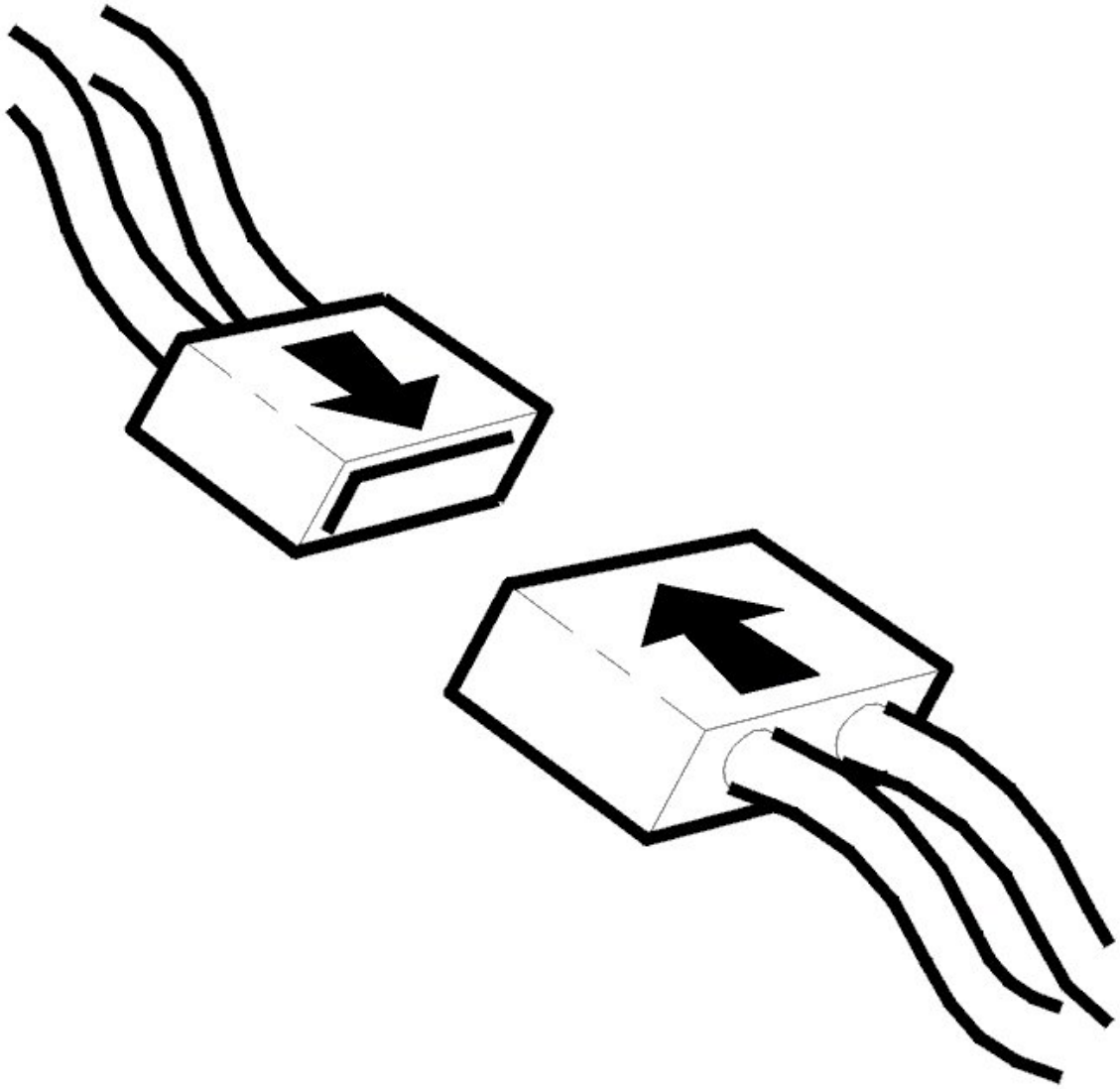
Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

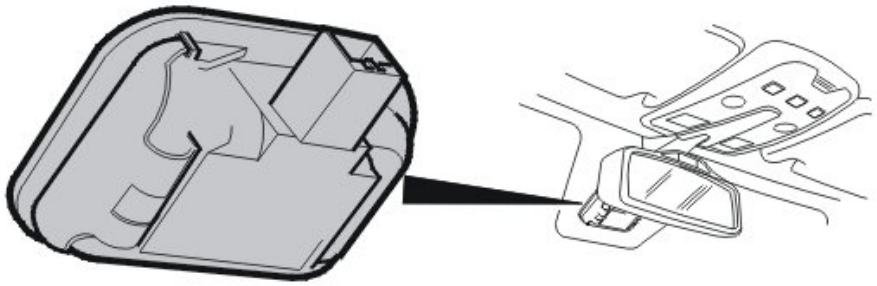
Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0083

Condition



The rain sensor checks itself at start.
The rain sensor checks factors such as reflections on the windshield.
The diagnostic trouble code (DTC) is stored if the rain sensor registers incorrect function.
The diagnostic trouble code (DTC) can be diagnosed with the ignition on and with an outside temperature above + 5 °C (41°F).

Note! On early model years, this diagnostic trouble code (DTC) may be stored if for example there was frost on the window when the check was run. In this case, it does not help to replace any components. Fault-trace the function of the rain sensor before replacing any components.

Substitute value
- Intermittent windshield wipers
- The windshield wipers operate at high speed.

Possible source
- Frost on the windshield during the check
- Crack in the windshield by the rain sensor
- Stone chip on the windshield close to the rain sensor
- The rain sensor is not properly secured to the windshield
- Defective rain sensor.

Fault symptom[s]
- No rain sensor function.

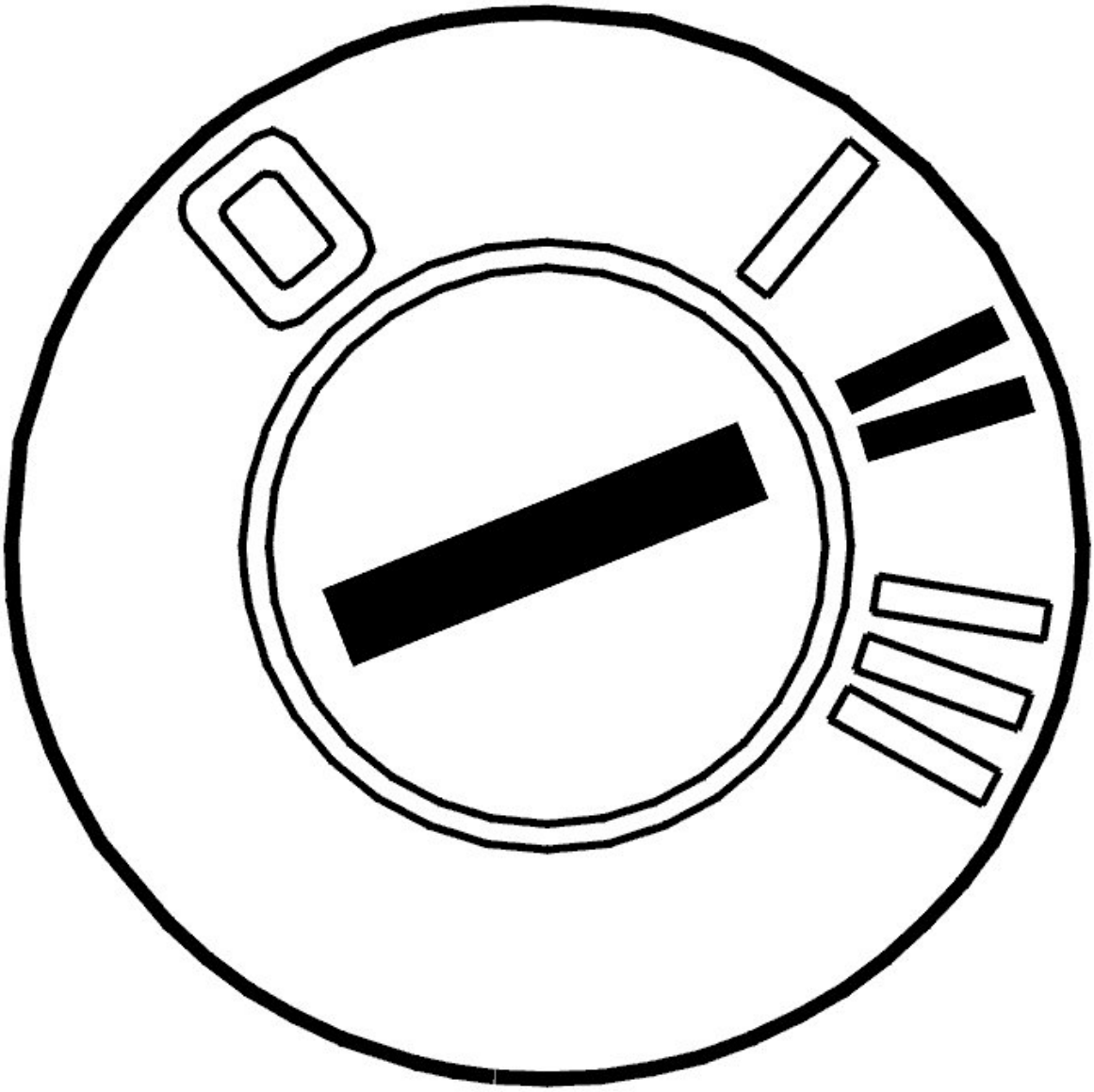
Internal Fault

Internal fault

Checking the function

Checking the rain sensor

Checking the function



- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the stalk to position "0" and then to intermittent wiping.

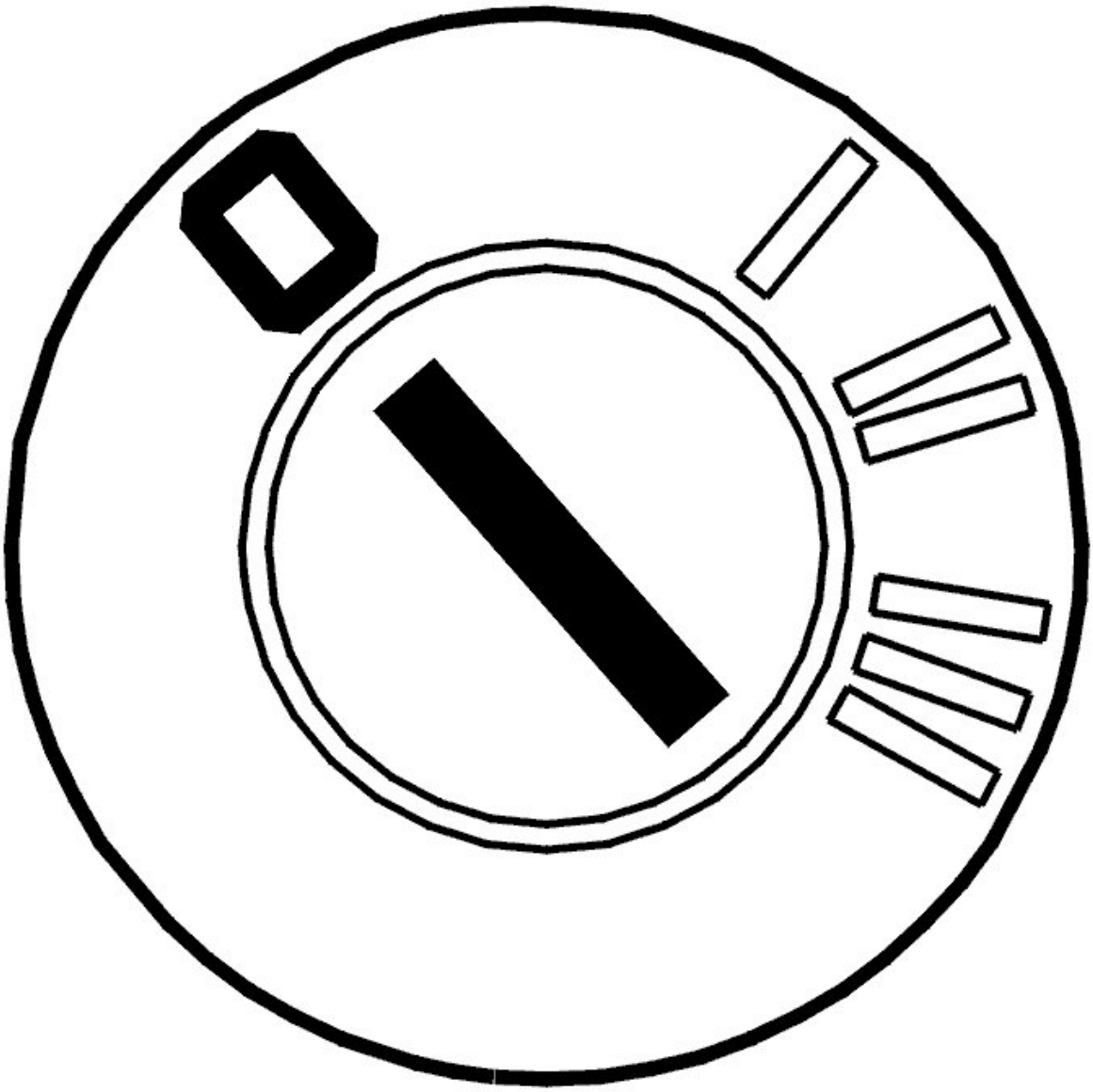
Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Hint: In cars equipped with the rain sensor it replaces the intermittent function. One way of checking the function of the rain sensor is to twist the collar on the lever. This changes the sensitivity of the rain sensor. The windshield wiper should make one stroke. If the intermittent or high speed functions are activated it indicates that the rain sensor function is missing.

Continue - ANOTHER TEST

ANOTHER TEST - Checking the rain sensor

Checking the rain sensor



- Ignition off.

Check that the rain sensor is properly secured. Check that there is no dirt on the inside of the windshield.
Check that there are no stone chips or damage to the windshield where the rain sensor is positioned.
Remedy as necessary.

Other information:

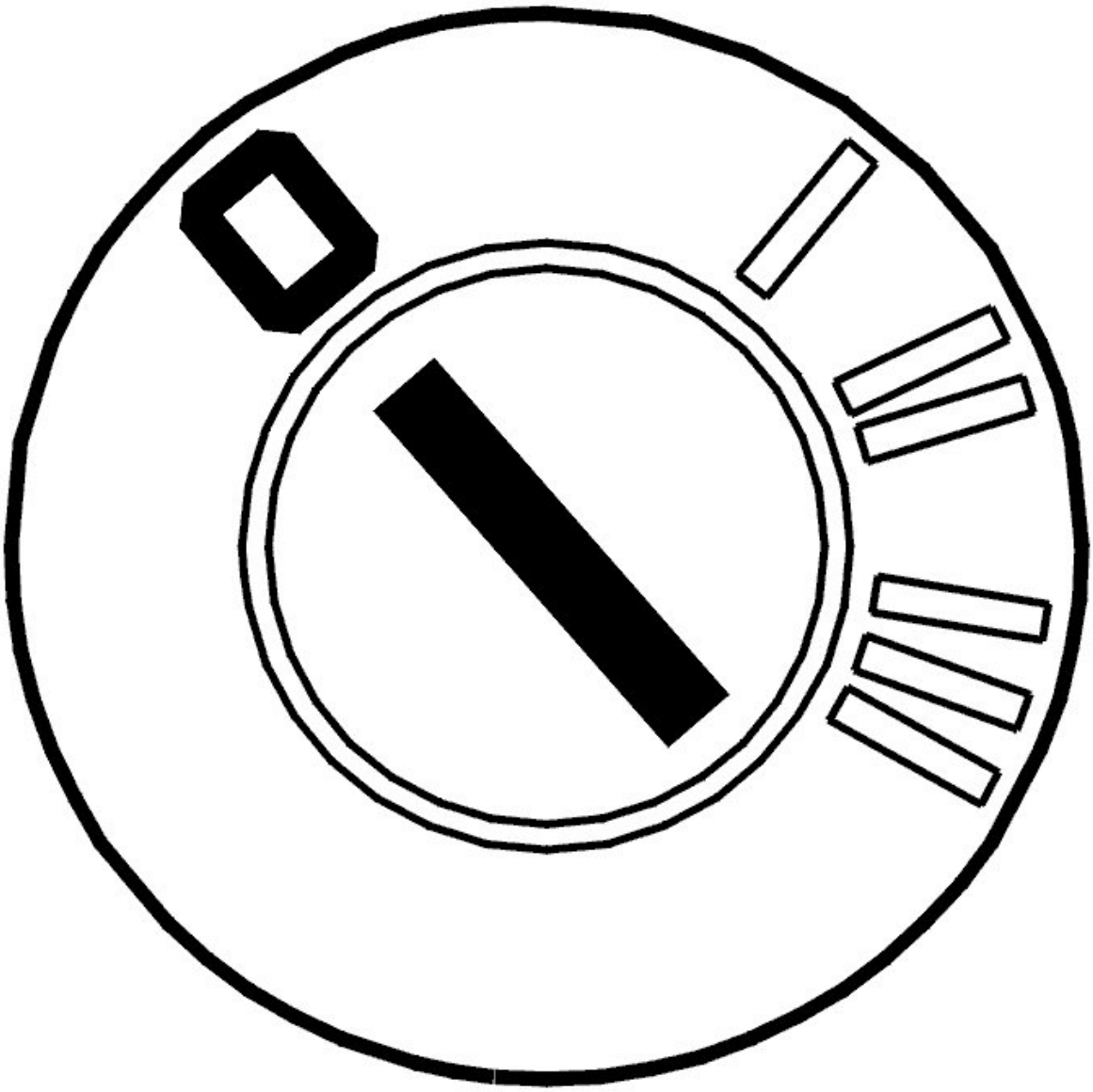
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair

Was a fault detected?

Yes - Verification

No - Replacing the rain sensor

Replacing the rain sensor



- Ignition off.

If no other fault is found, try replacing the rain sensor.

Other information

- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair

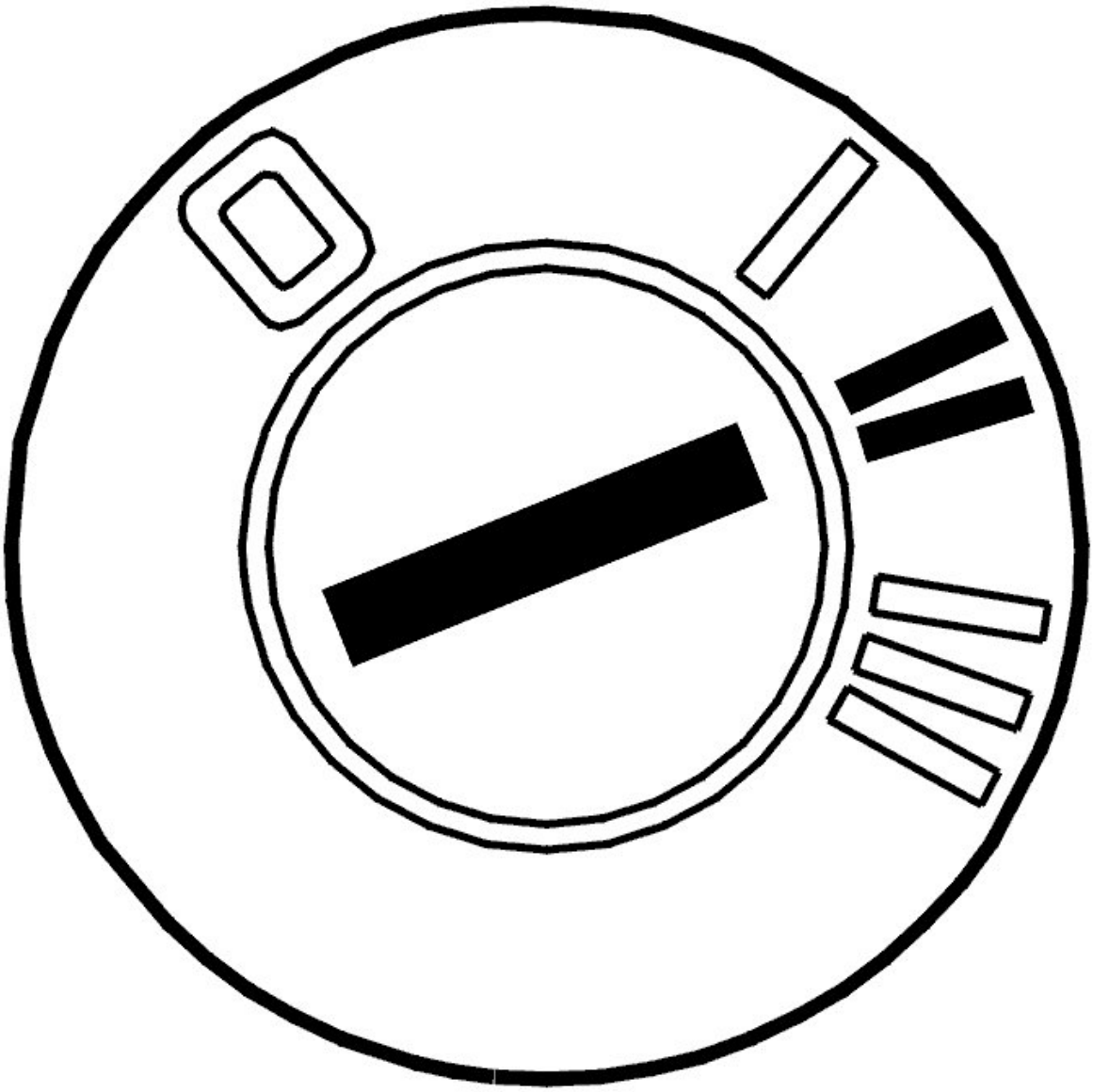
Continue - Verification

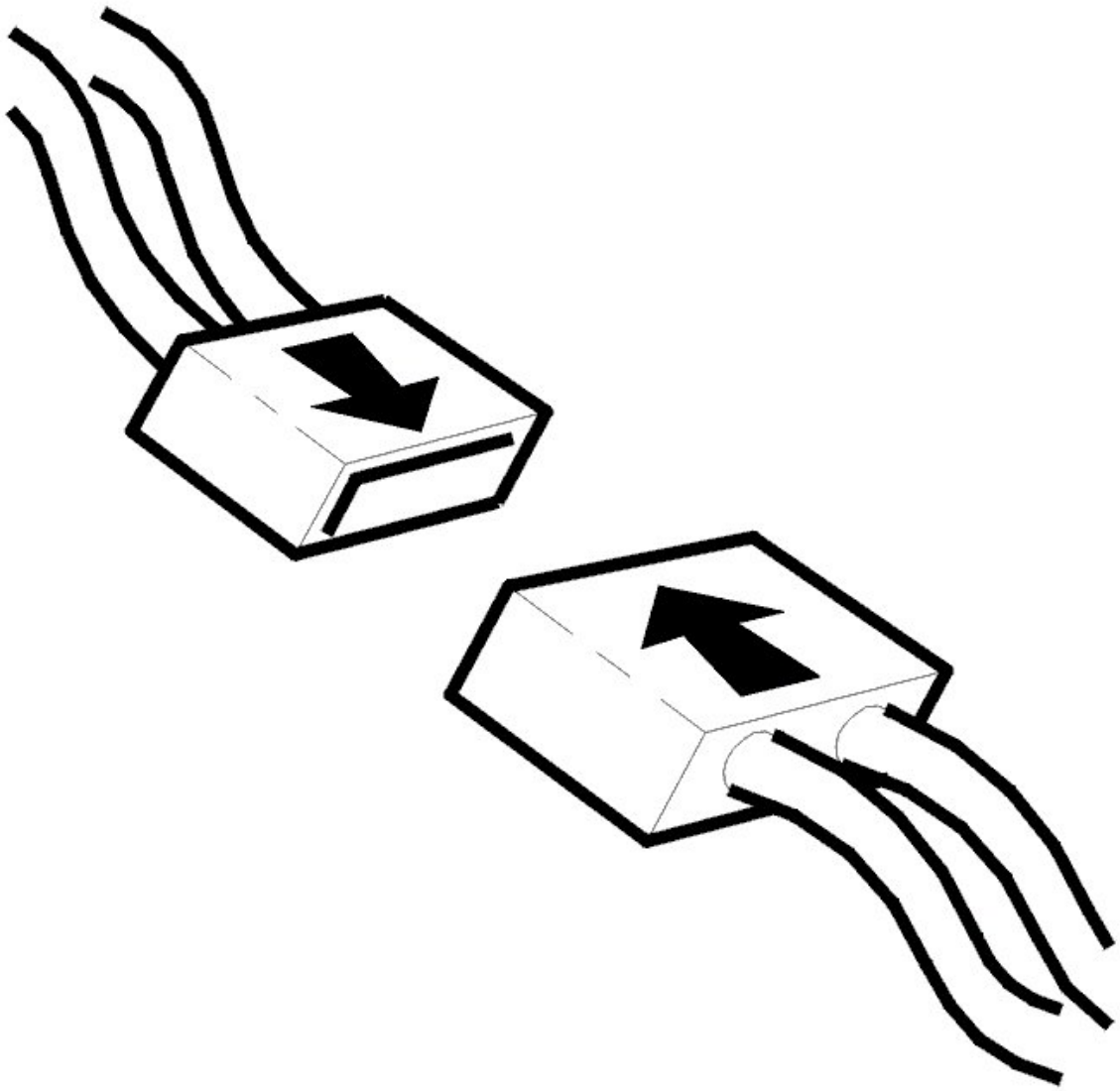
Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFICATION FAILED - Fault-tracing information

VERIFIED - Fault Found

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

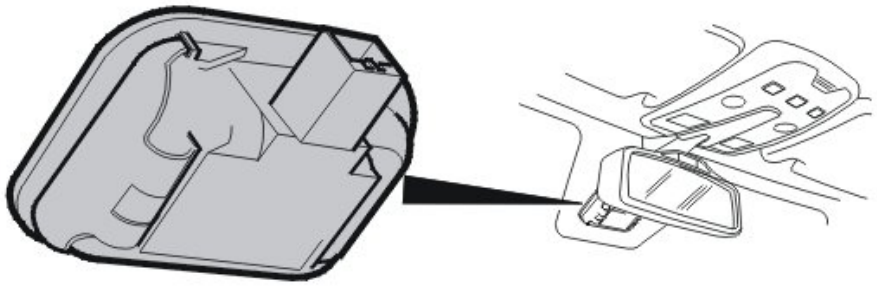
Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code information UEM-0084

Condition



The upper electronic module (UEM) regularly checks communication with the rain sensor.
The diagnostic trouble code (DTC) is generated if the upper electronic module or the rain sensor registers a fault in communication.
The diagnostic trouble code can be diagnosed when the ignition is on.

Substitute value
- Intermittent windshield wiping.
- High speed windshield wiping.

Possible source
- Contact resistance or oxidation on the signal cable.
- Communication disrupted.
- Faulty rain sensor.

Fault symptom[s]
- No rain sensor function.

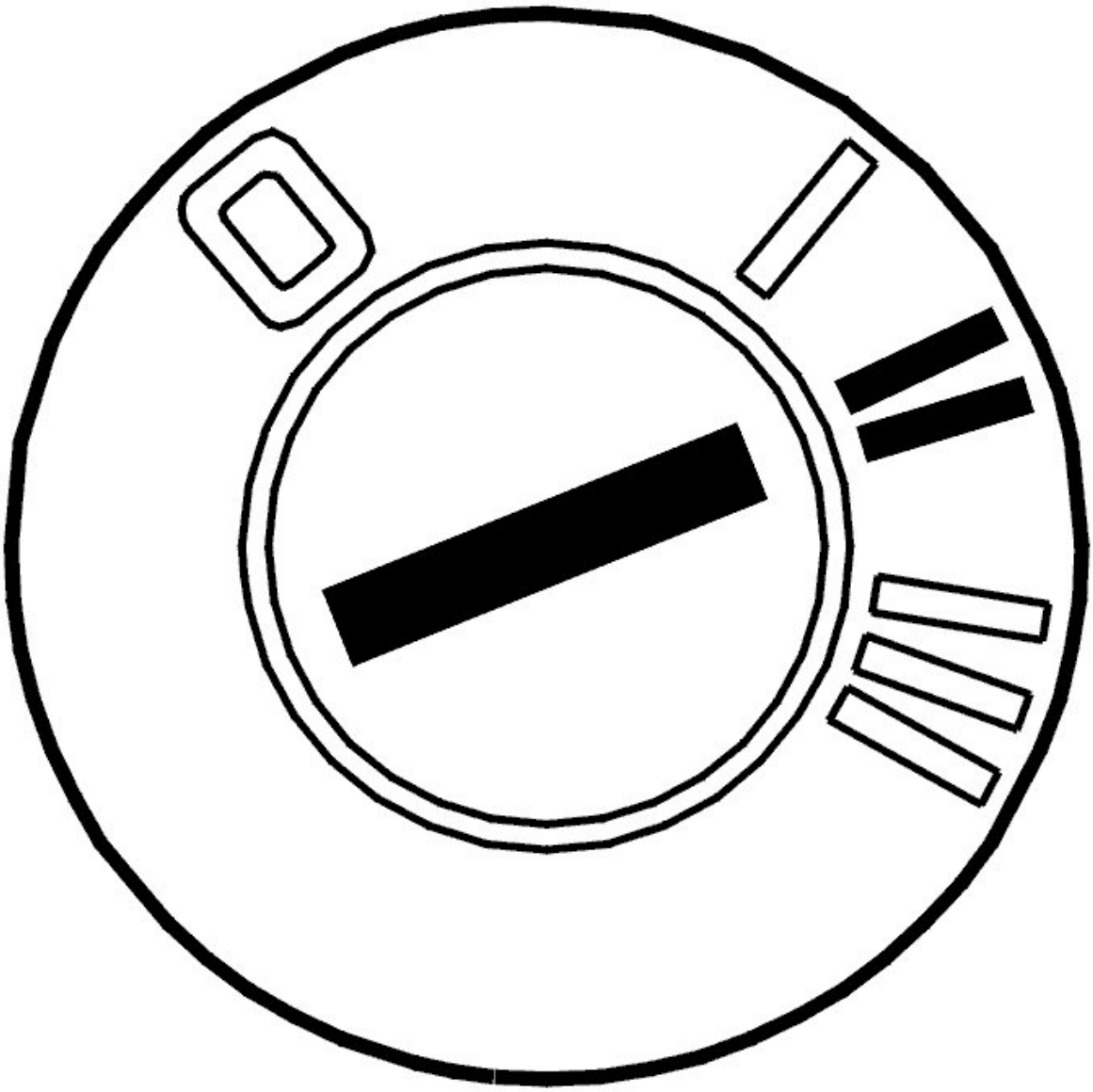
Faulty Signal

Faulty signal

Checking the function

Checking the rain sensor

Checking the function



- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the stalk to position "0" and then to intermittent wiping.

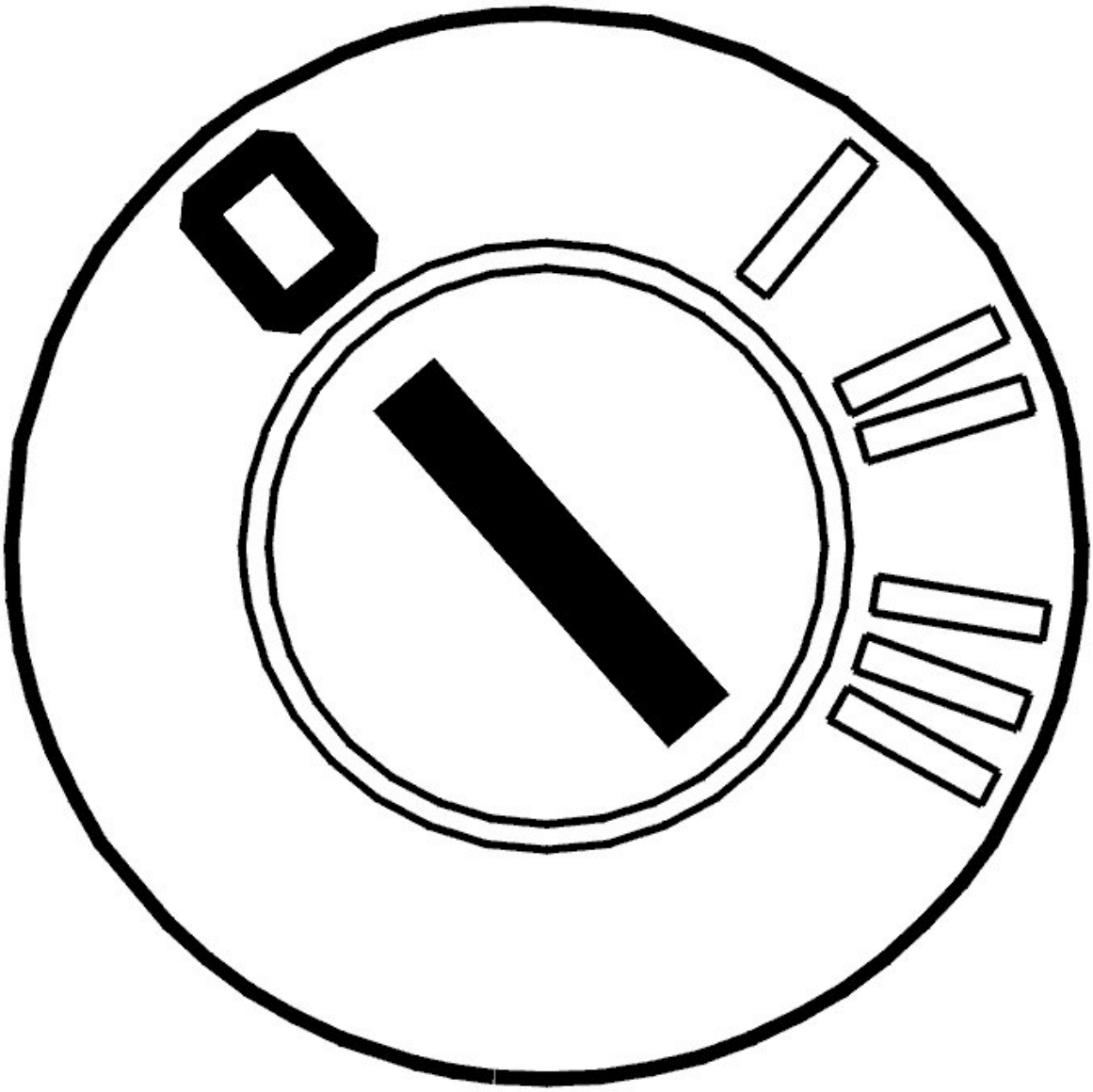
Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Hint: In cars equipped with the rain sensor it replaces the intermittent function. One way of checking the function of the rain sensor is to twist the collar on the lever. This changes the sensitivity of the rain sensor. The windshield wiper should make one stroke. If the intermittent or high speed functions are activated it indicates that the rain sensor function is missing.

Continue - ANOTHER TEST

ANOTHER TEST - Checking the wiring

Checking the wiring

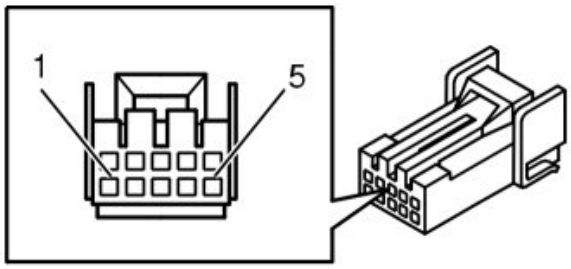


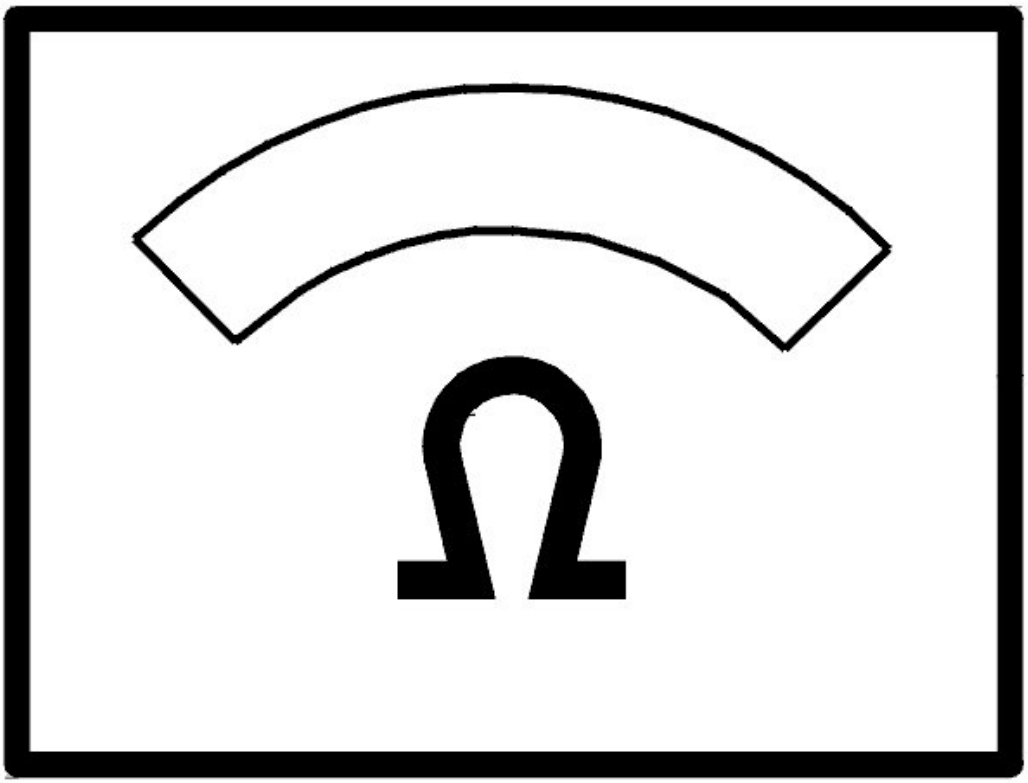
- Ignition off.

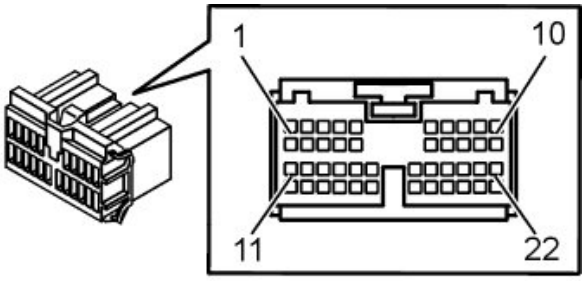
Check the connectors for the upper electronic module (UEM) and rain sensor. Check for contact resistance and oxidation.
Also check the rain sensor and GSM antenna wiring (if applicable). Ensure that there are no sources of interference nearby.
Remedy as necessary.

Other information:

- Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair
- Rain sensor See: Sensors and Switches/Sensors and Switches - Wiper and Washer Systems/Rain Sensor/Service and Repair
- Signal specification See: Body and Frame/Body Control Systems/Testing and Inspection/Pinout Values and Diagnostic Parameters/Signal Description / Specification/Signal Specification, Upper Electronic Module (UEM)
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





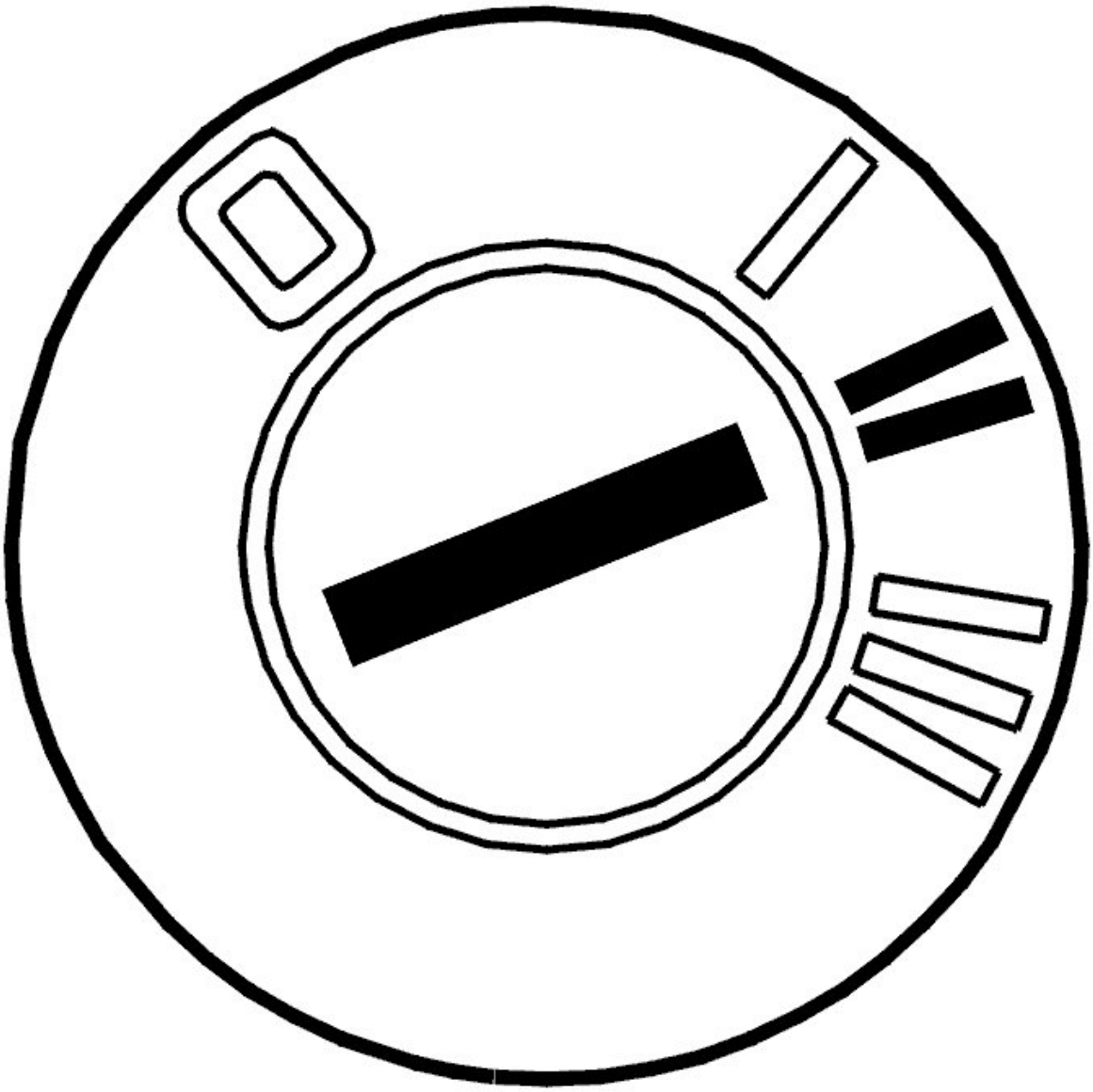


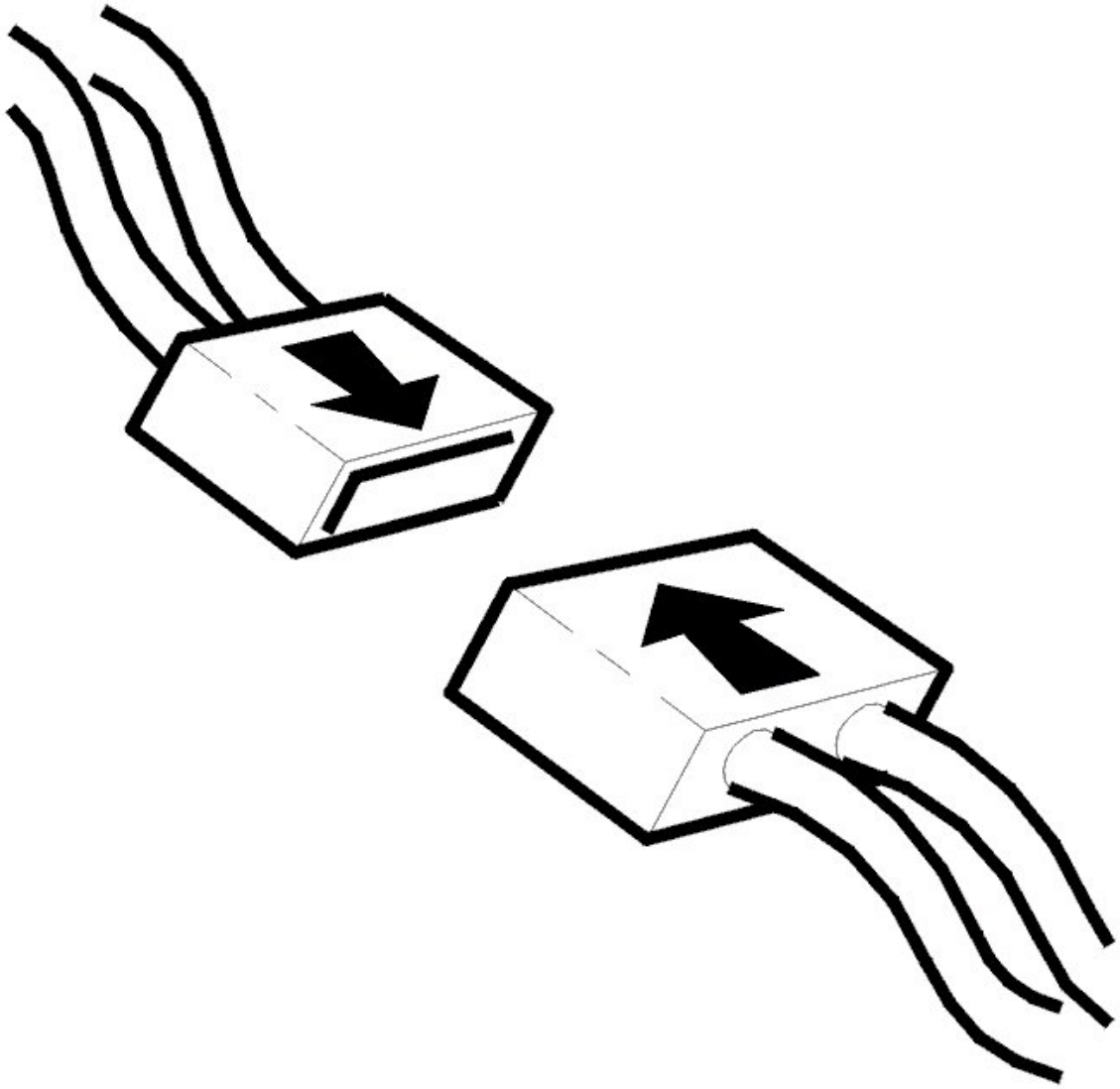
Continue - Verification

Verification

Verification

Note! After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on
- Activate the rain sensor.

Hint: The wiper blades make a reference stroke to determine the cleanliness and condition of the windshield when the rain sensor is activated. The rain sensor is deactivated when the ignition is switched off. To reactivate the rain sensor with the ignition on, move the lever to position 0 and then to intermittent wiping.

Spray water on the windshield where the rain sensor is positioned.
The wiper blades must now wipe the windshield clean.

Is the rain sensor functioning?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

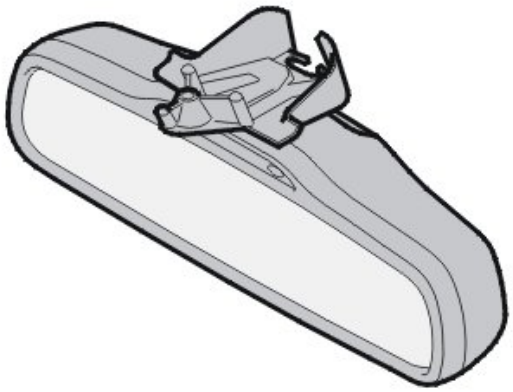
Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0090

Condition



The upper electronic module (UEM) checks the power supply to the LED for the PAD lamp (Passenger Airbag Deactivated). The LED is integrated in the rear view mirror.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the power supply signal to the PAD lamp is too low.
The diagnostic trouble code (DTC) can be diagnosed when the LEDs in the rear view mirror are supplied with power, i.e. when the LEDs in the display satisfy conditions for lighting.

Substitute value
- None.

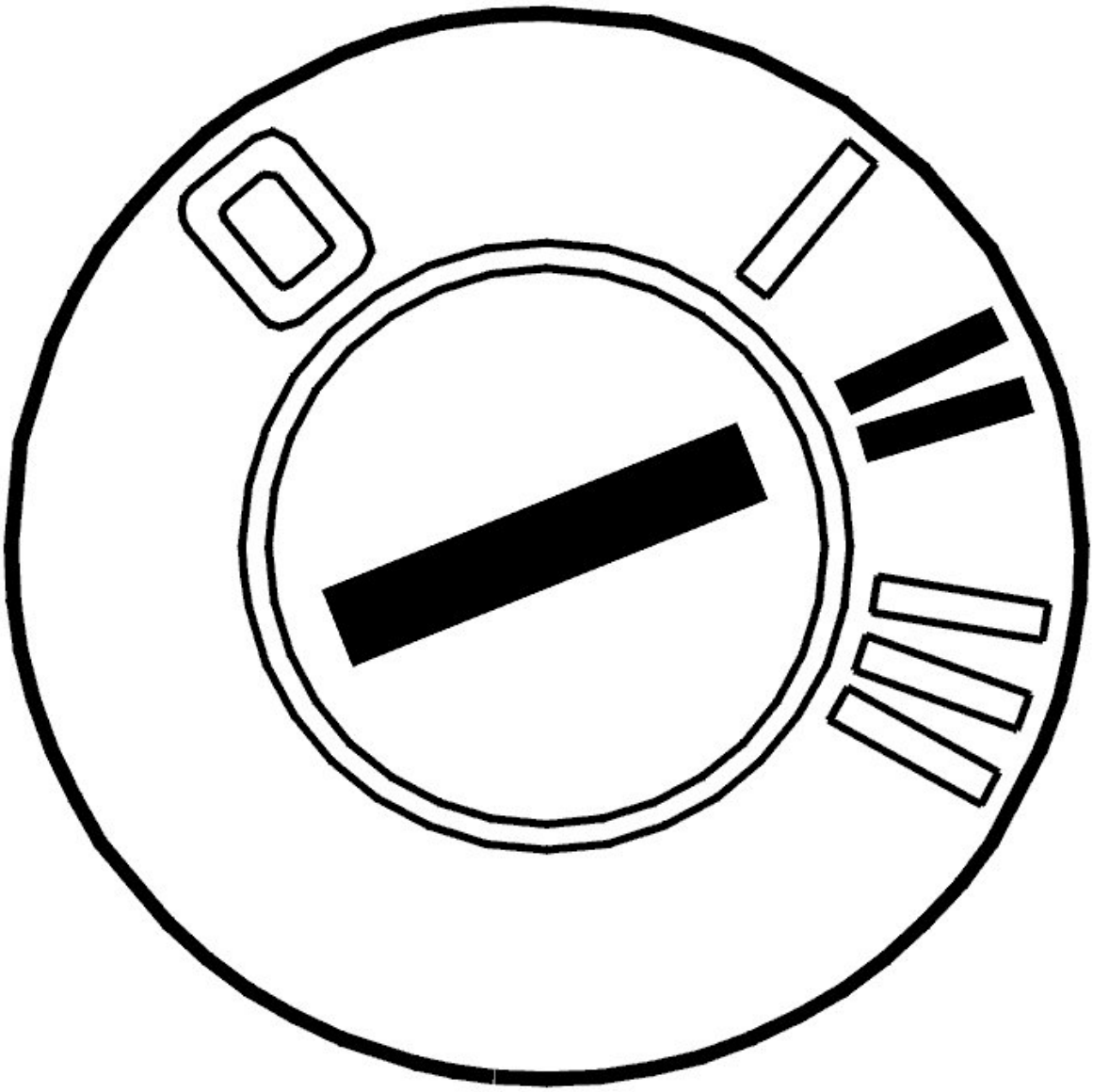
Possible source
- Defective upper electronic module (UEM) (internal fault).

Fault symptom[s]
- The SRS indicator lamp is lit.
- Message in the display.

Signal Too Low

Signal too low

Checking the PAD-light



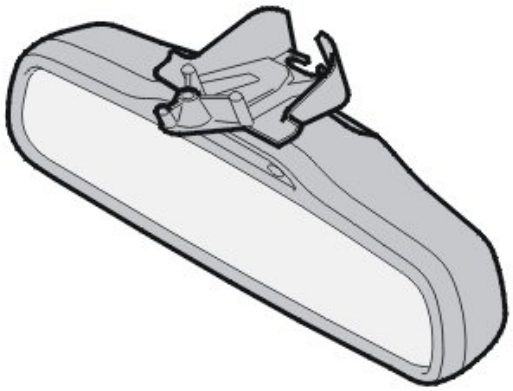
- Ignition off.
- Read off by clicking the VCT2000 symbol.
- Turn the ignition key to position I.
- Check that the requested status from the Supplemental restraint system module (SRS) is ON and that the status of the PAD lamp in the Upper electronic module (UEM) is ON when the lamp is lit. Also check if the Passenger airbag warning lamp (PAD) comes on after the ignition is switched on.

If the requested status from the Supplemental restraint system module (SRS) is ON, the Upper electronic module (UEM) has activated the lamp (status is ON) but the lamp does not come on, the lamp is probably broken. Replace the upper electronic module (UEM). Check that new hardware has the correct P/N.

If the requested status from the Supplemental restraint system module (SRS) is ON, but the Upper electronic module (UEM) has not activated the lamp (status is OFF), check DTCs for errors in CAN communication in the Central electronic module (CEM). Also check the CAN cables between the Upper electronic module (UEM) and the Supplemental restraint system module (SRS). Remedy as necessary.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

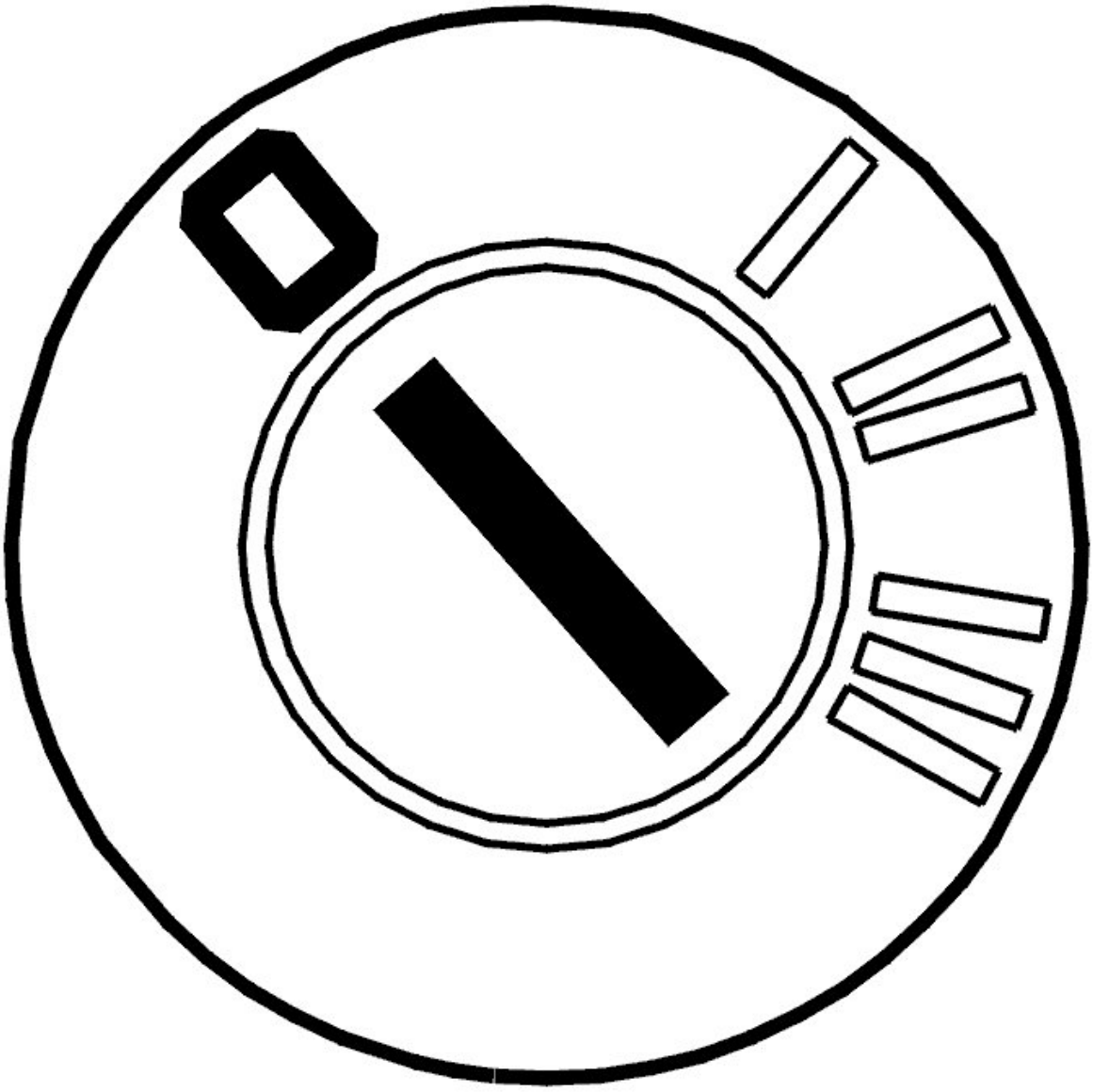


Is the function OK?

Yes - No Fault Found

No - Replacing control module and programming

Replacing control module and programming



- Ignition off.

The LED for the PAD lamp is mounted internally in the rear view mirror and cannot be replaced. Check there are no indications that the power supply to the upper electronic module (UEM) is faulty. Check that the fault in the LED remains after the power is switched off and on again. If the fault remains, the upper electronic module (UEM) must be replaced.

Note! If possible, read off the programmed data from the control module before it is replaced. This should be done as this information is not stored in Volvo's central database. Switch off the ignition before replacing the control module.

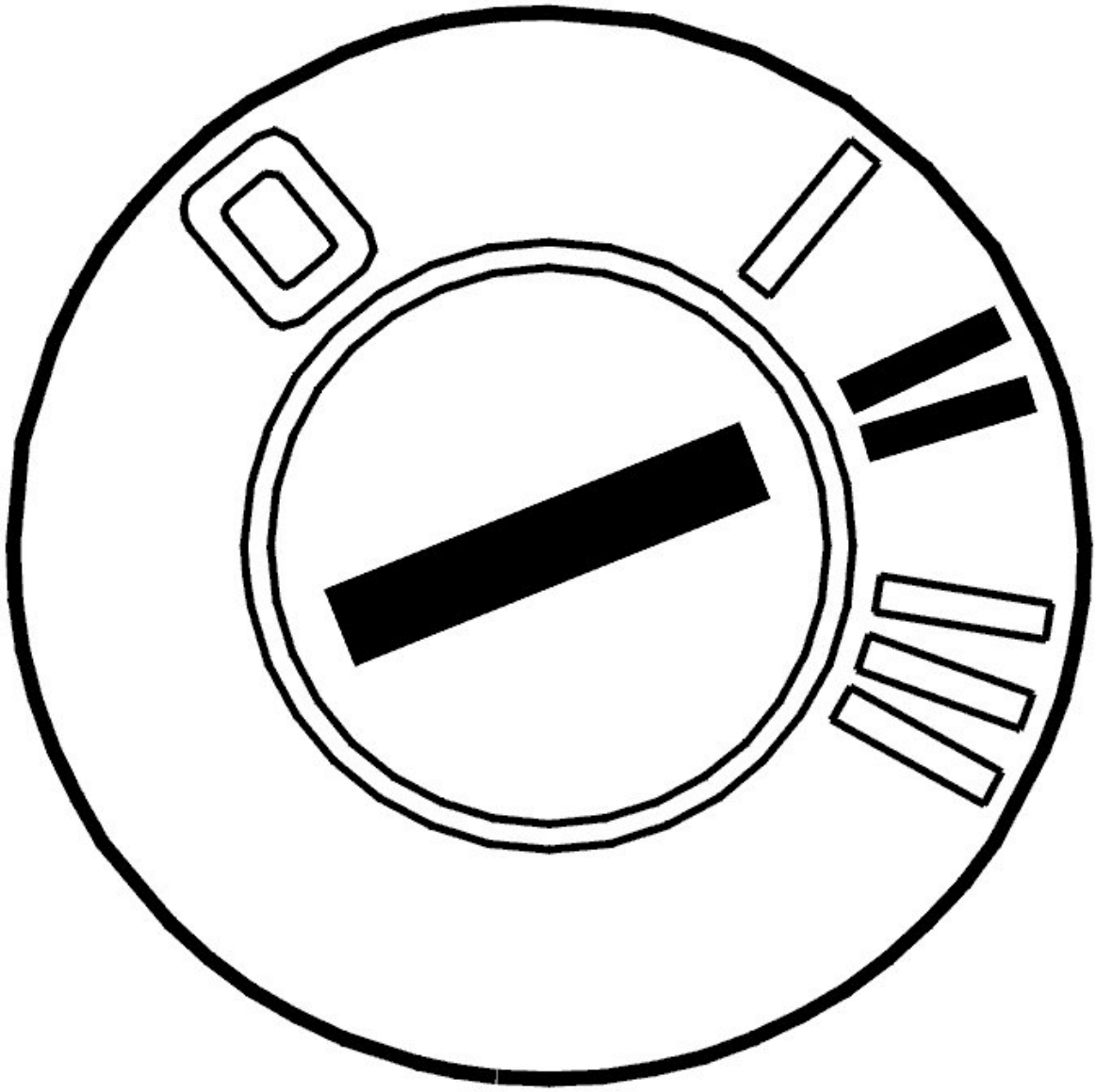
Continue - Replacing the control module

Replacing the control module

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

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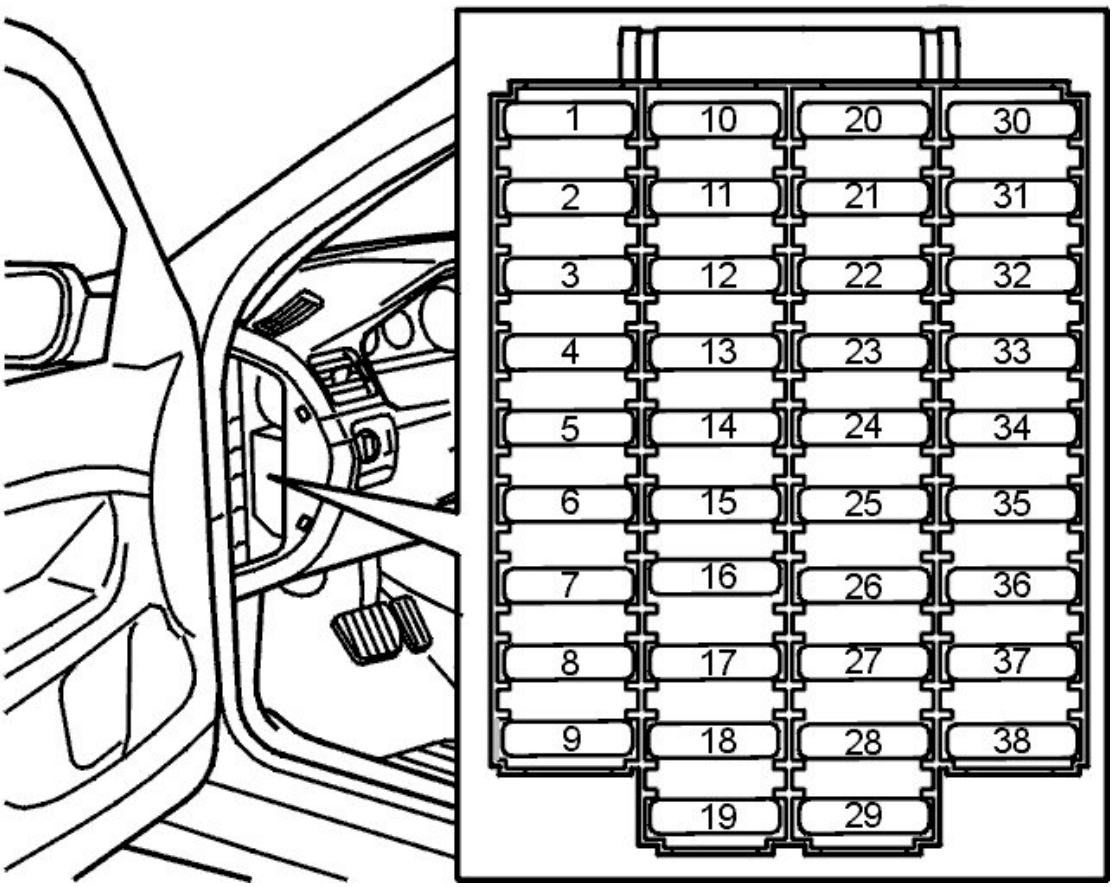
Replacing control modules and downloading software

Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting
2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short

- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long

- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:

- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:

- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:

- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - **DONE**

DONE - **DONE**

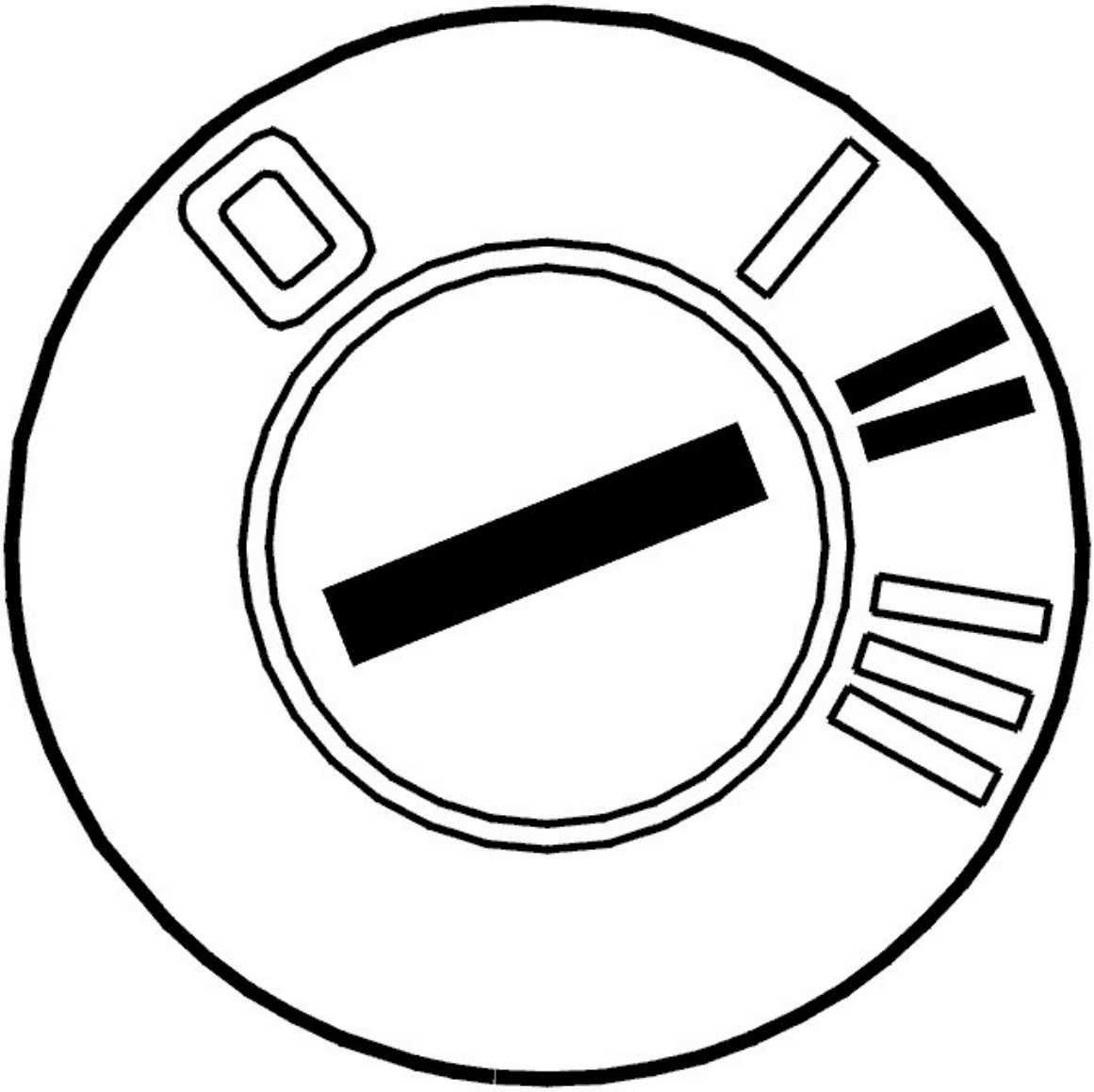
DONE - Verification

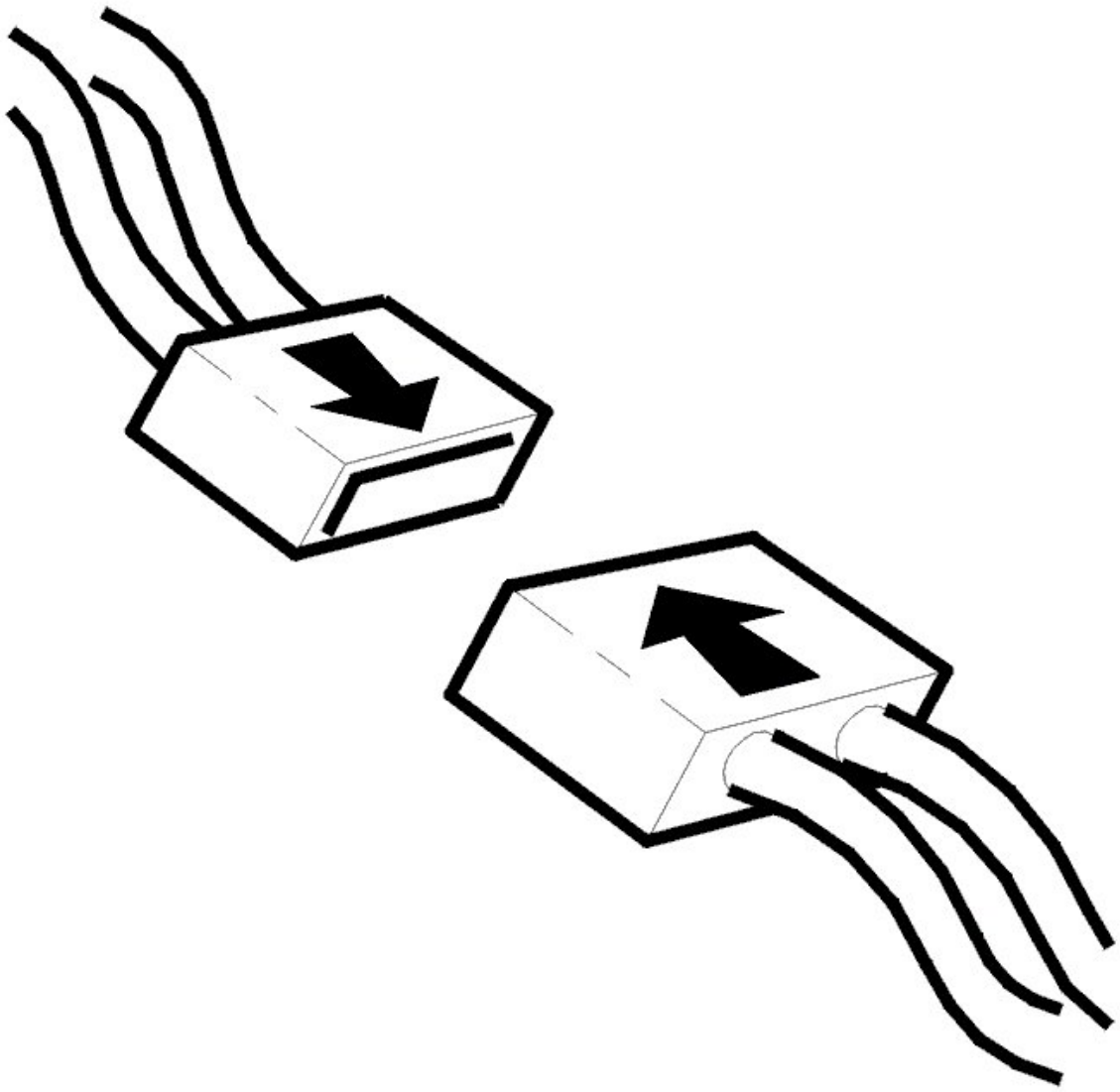
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the LEDs in the display in the rear view mirror light.

Are the LEDs in the display working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

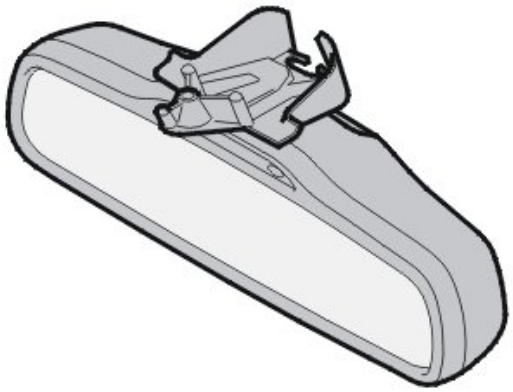
Attempt New Test - Checking the PAD-light

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0091

Condition



The upper electronic module (UEM) checks the power supply to the LED for the PAD lamp (Passenger Airbag Deactivated) in the rear view mirror. The LED is integrated in the rear view mirror.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the power supply signal to the PAD lamp is too high.
The diagnostic trouble code (DTC) can be diagnosed when the LEDs in the rear view mirror are not supplied with power, i.e. when the LEDs in the display do not satisfy conditions for lighting.

Substitute value
- None.

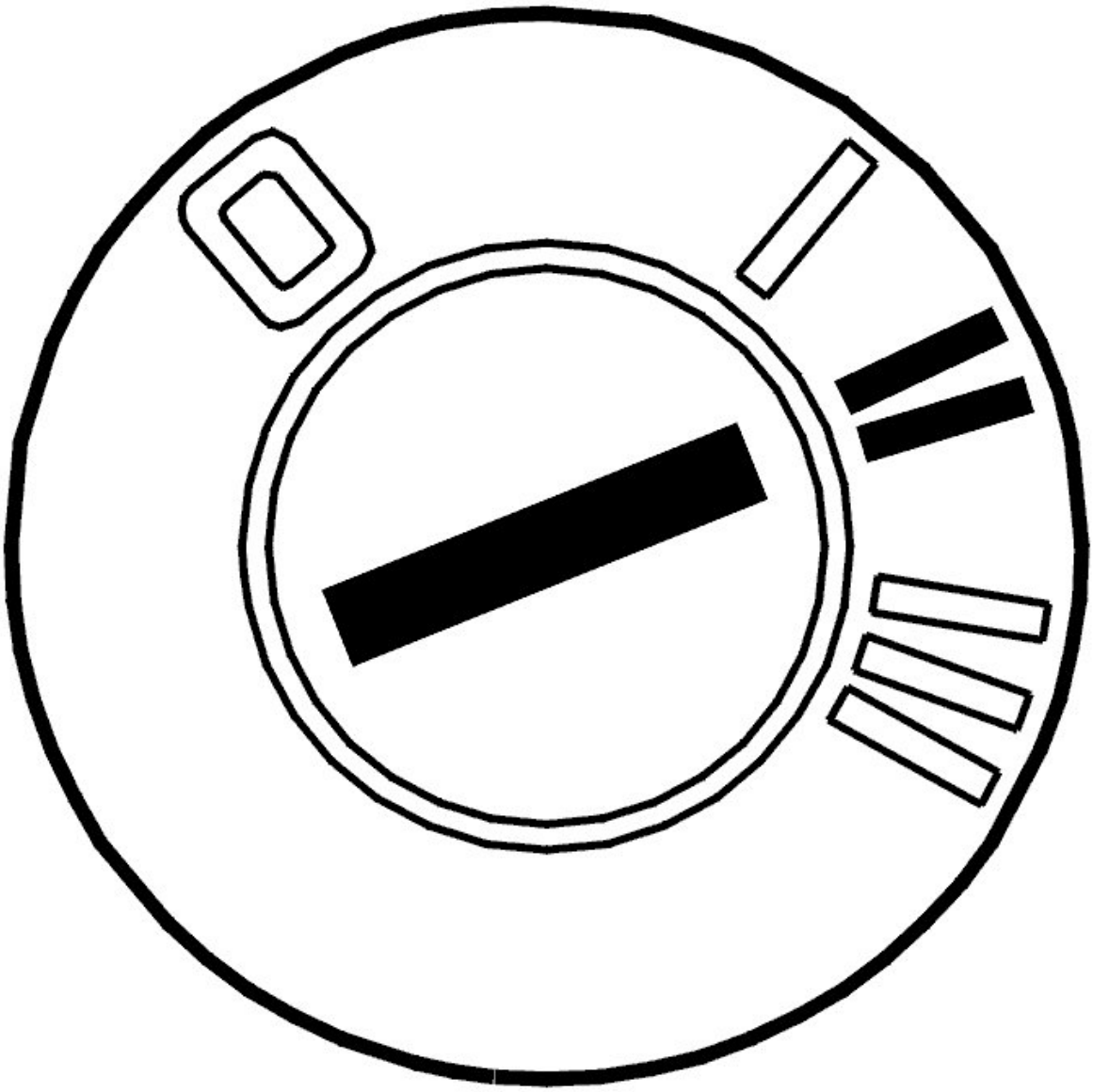
Possible source
- Defective upper electronic module (UEM) (internal fault).

Fault symptom[s]
- The SRS indicator lamp is lit.
- Message in the display.

Signal Too High

Signal too high

Checking the function

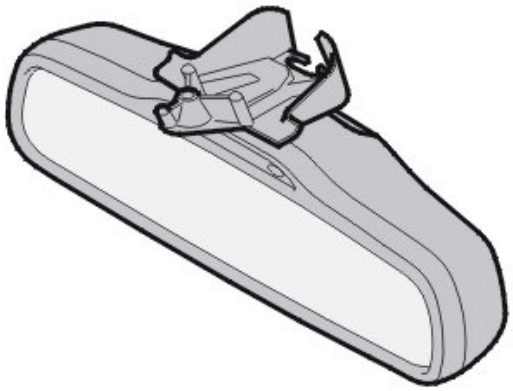


- Ignition off.

The light-emitting diode for indicating disconnected passenger airbag is located internally in the interior rearview mirror and cannot be replaced.
Check that the fault in the LED remains after the power is switched off and on again.

- Read off by clicking the VCT2000 symbol.
- Turn the ignition key to position I.
- Check that the requested status from the Supplemental restraint system module (SRS) is ON and that the status of the PAD lamp in the Upper electronic module (UEM) is ON when the lamp is lit. Check visually in the vehicle that the status of the PAD-light matches the read-out value.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

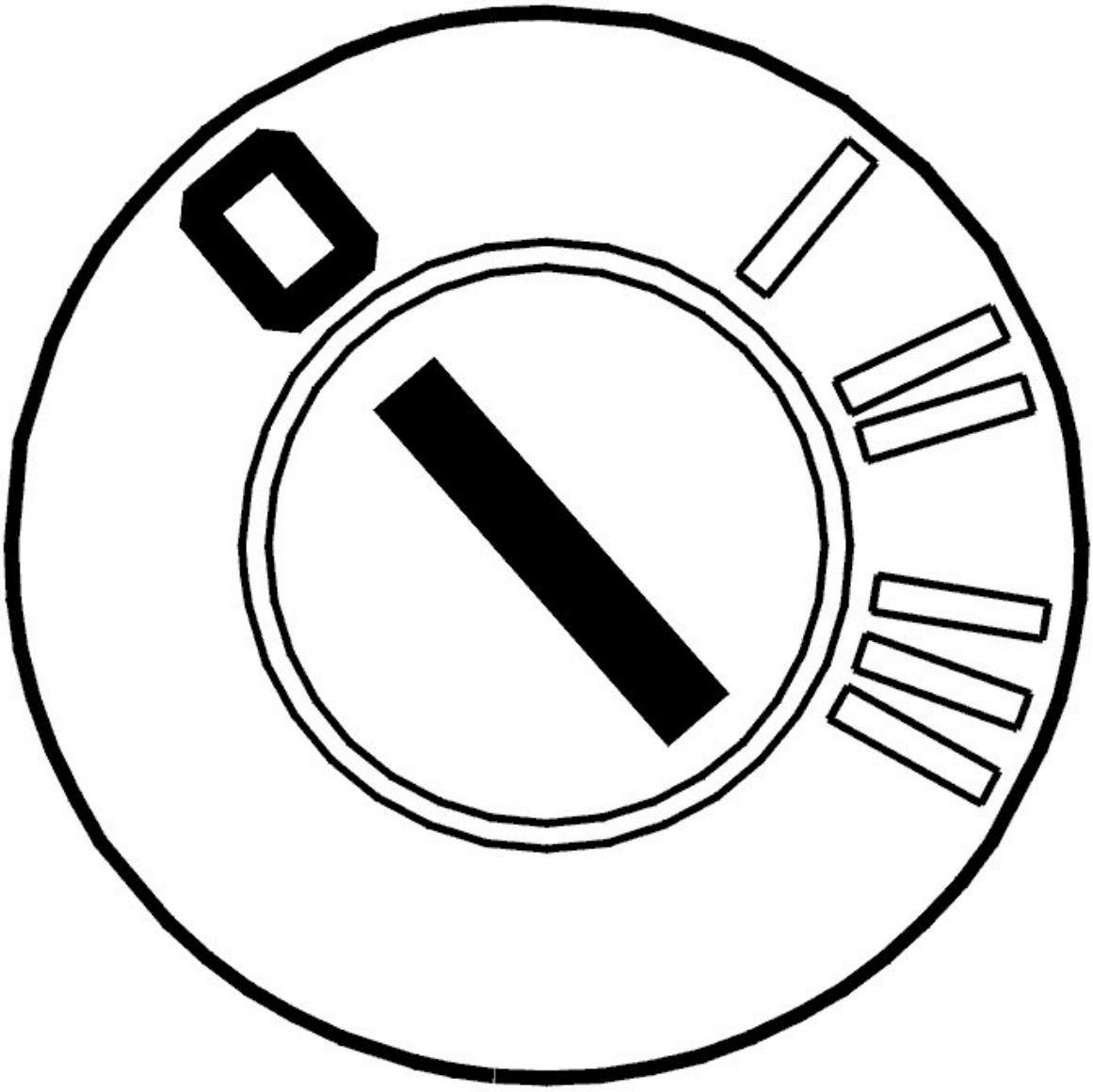


Does the LED work as it should?

Yes - No Fault Found

No - Replacing control module and programming

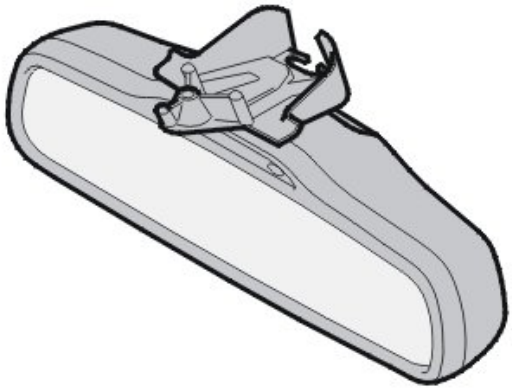
Replacing control module and programming



- Ignition off.

If the fault remains, the upper electronic module (UEM) must be replaced.

Note! If possible, read off the programmed data from the control module before it is replaced. This should be done as this information is not stored in Volvo's central database. Switch off the ignition before replacing the control module.



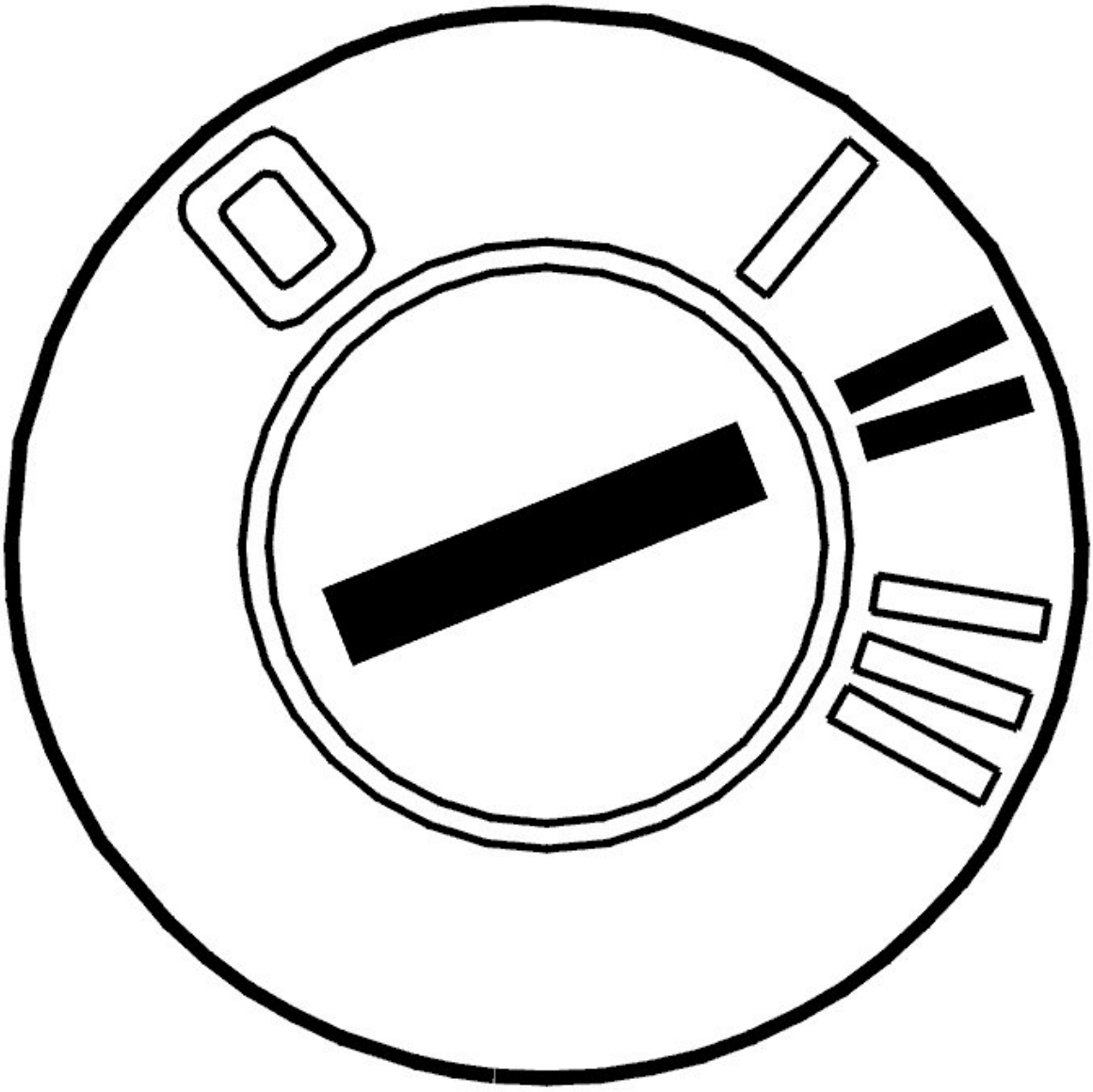
Continue - Replacing the control module

Replacing the control module

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

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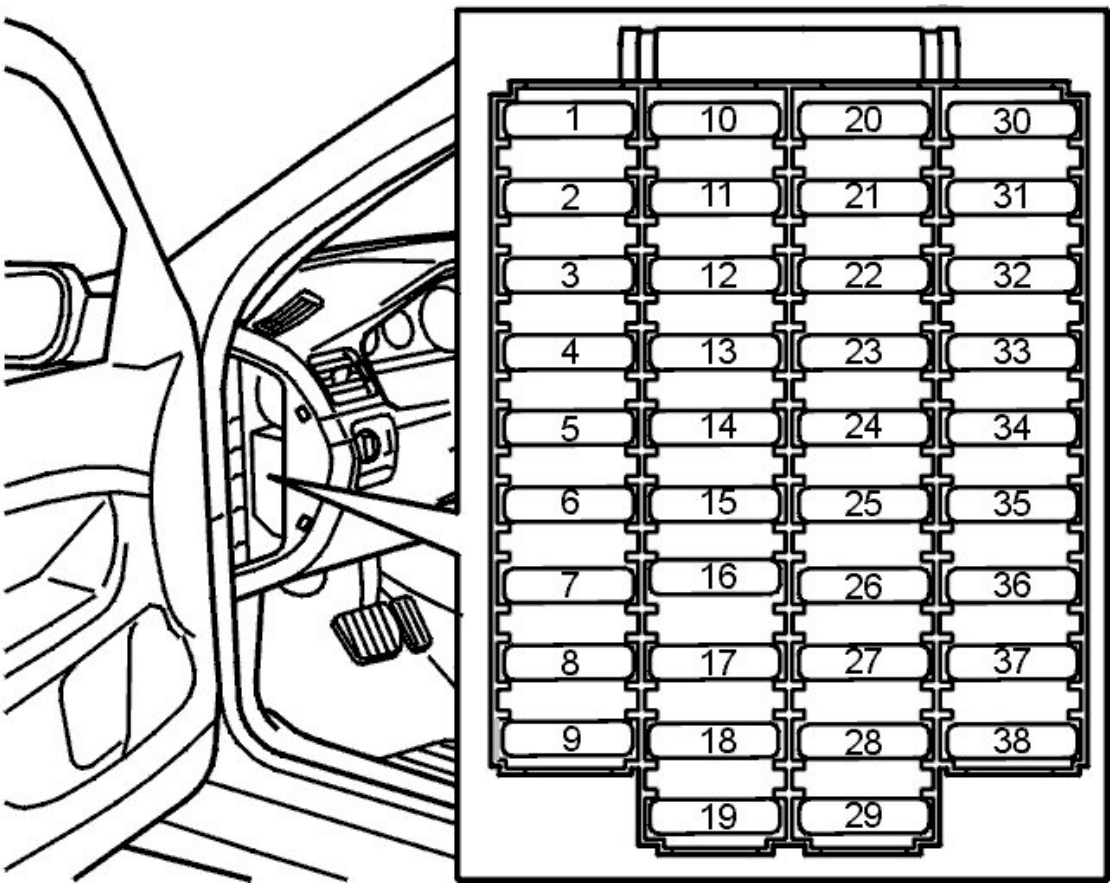
Replacing control modules and downloading software

Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting
2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short
- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long
- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:
- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - **Fault Found**

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - **Fault Found**

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control

module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:

- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - **DONE**

DONE - **DONE**

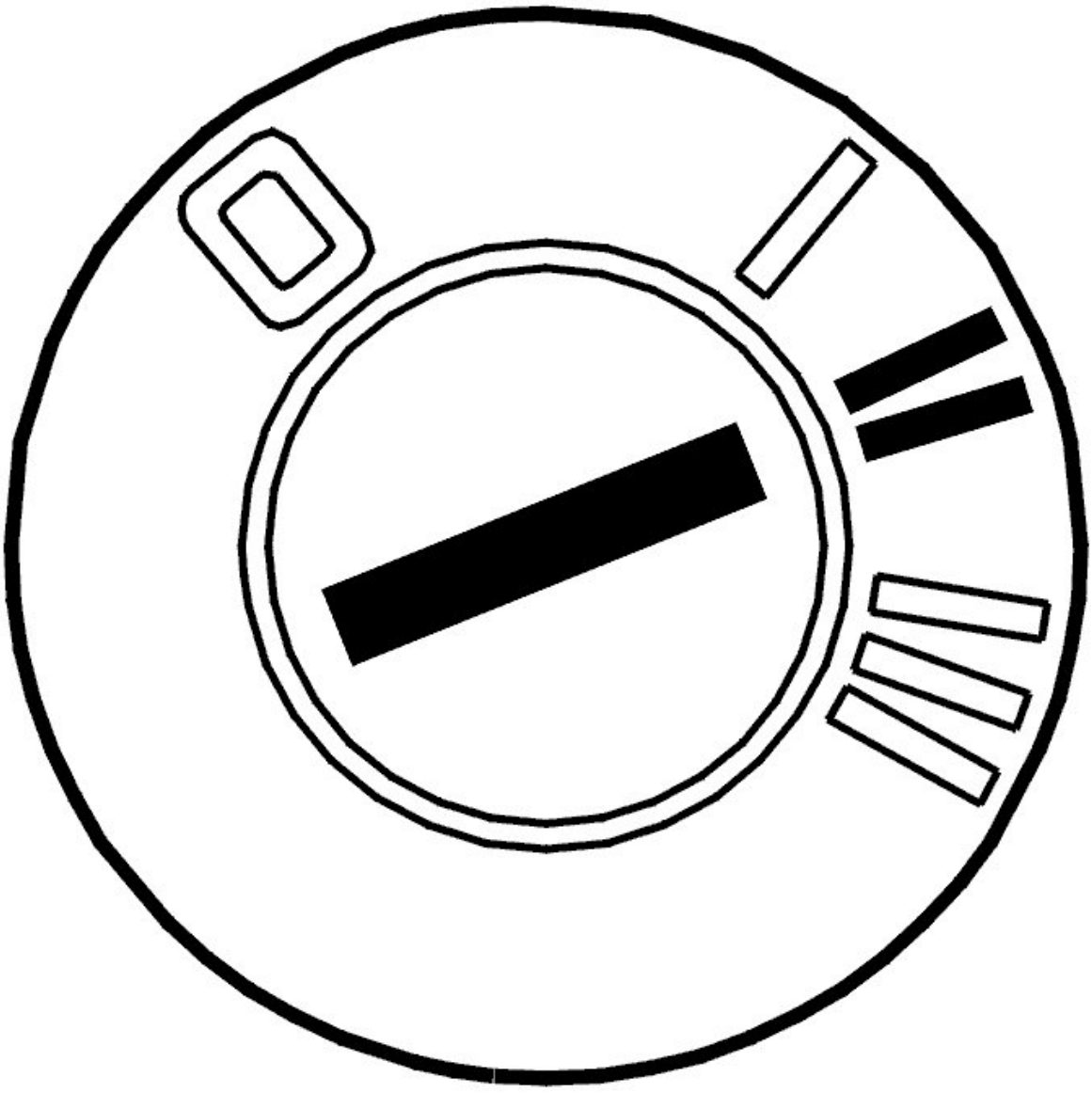
DONE - Verification

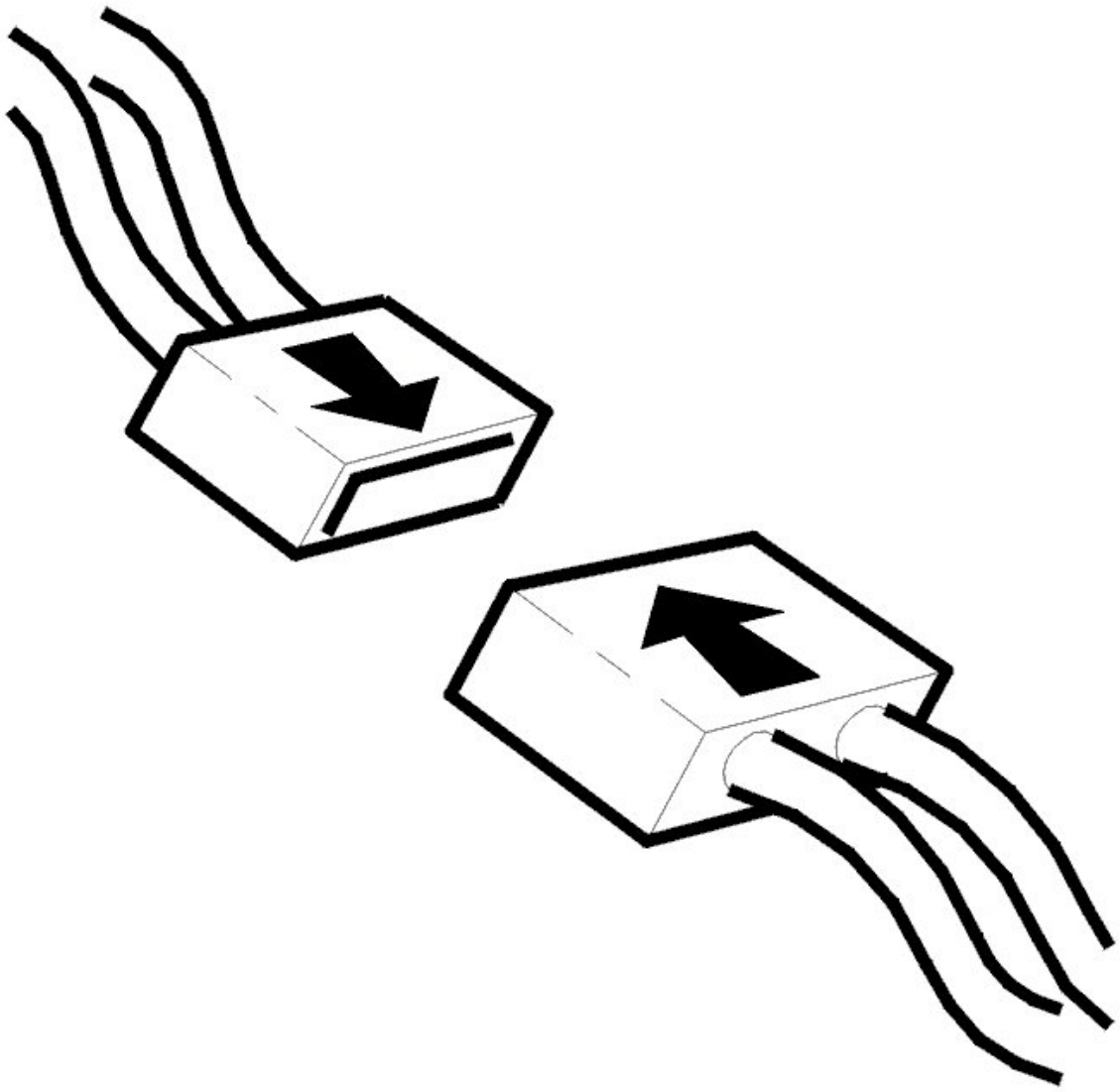
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the LEDs in the display in the rear view mirror light.

Are the LEDs in the display working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

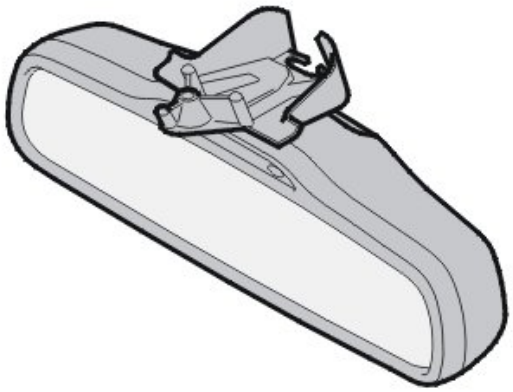
Attempt New Test - Checking the function

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0093

Condition



The upper electronic module (UEM) receives information via the controller area network (CAN) indicating whether the seat belt reminder lamp should be on or off. The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) is notified that there is a short-circuit to ground or open-circuit in the power supply for the seat belt reminder lamp when it should be lit.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

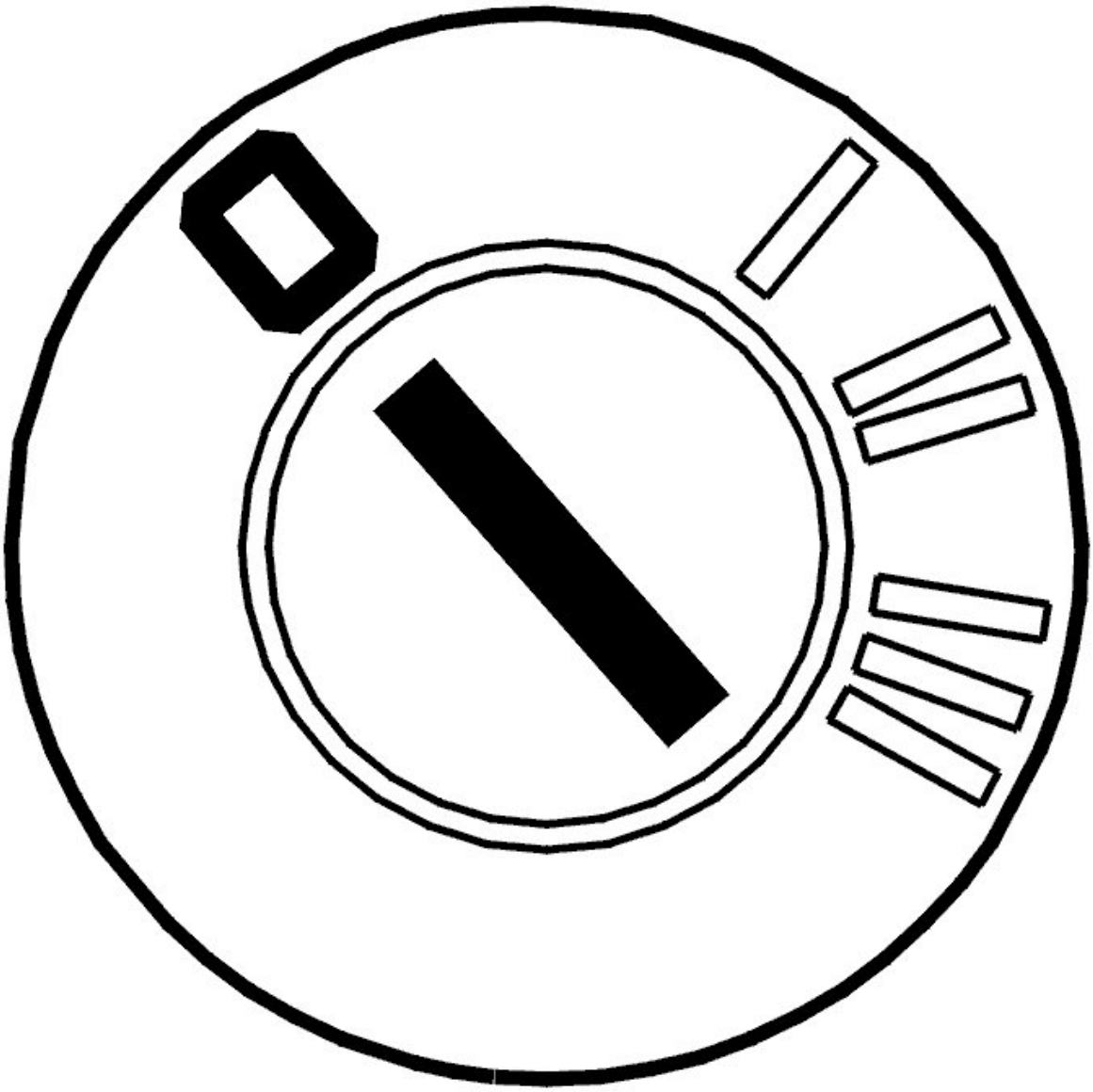
Possible source
- Defective upper electronic module (UEM) (internal fault).

Fault symptom[s]
- The seat belt lamp does not light.

Faulty Signal

Faulty signal

Replacing control module and programming



- Ignition off.

The LED for the seat belt reminder is mounted internally in the rear view mirror and cannot be replaced. Check there are no indications that the power supply to the upper electronic module (UEM) is faulty. Check that the fault in the LED remains after the power is switched off and on again. If the fault remains, the upper electronic module (UEM) must be replaced.

Note! If possible, read off the programmed data from the control module before it is replaced. This should be done as this information is not stored in Volvo's central database. Switch off the ignition before replacing the control module.

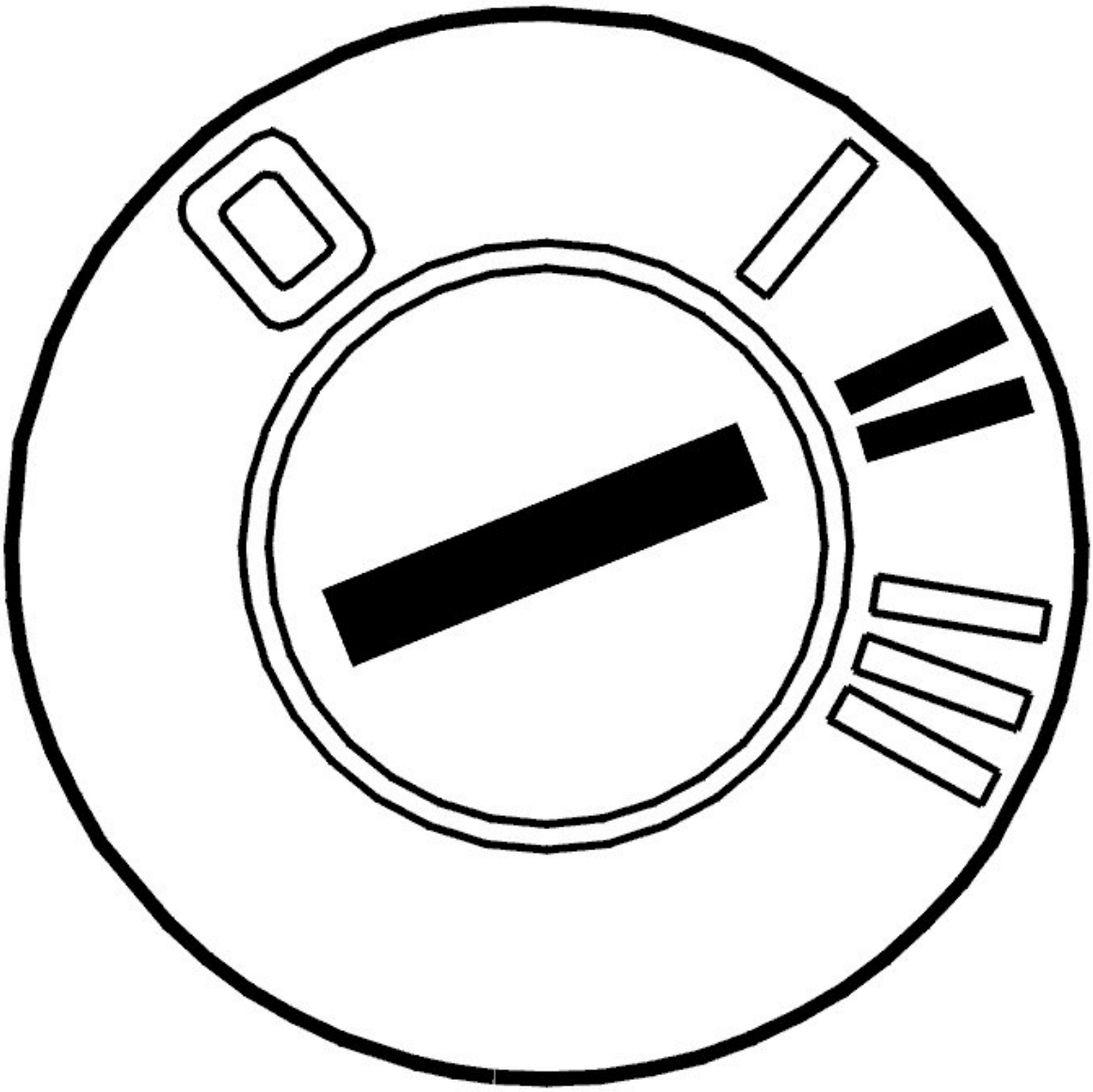
Continue - Replacing the control module

Replacing the control module

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

---

Replacing control modules and downloading software

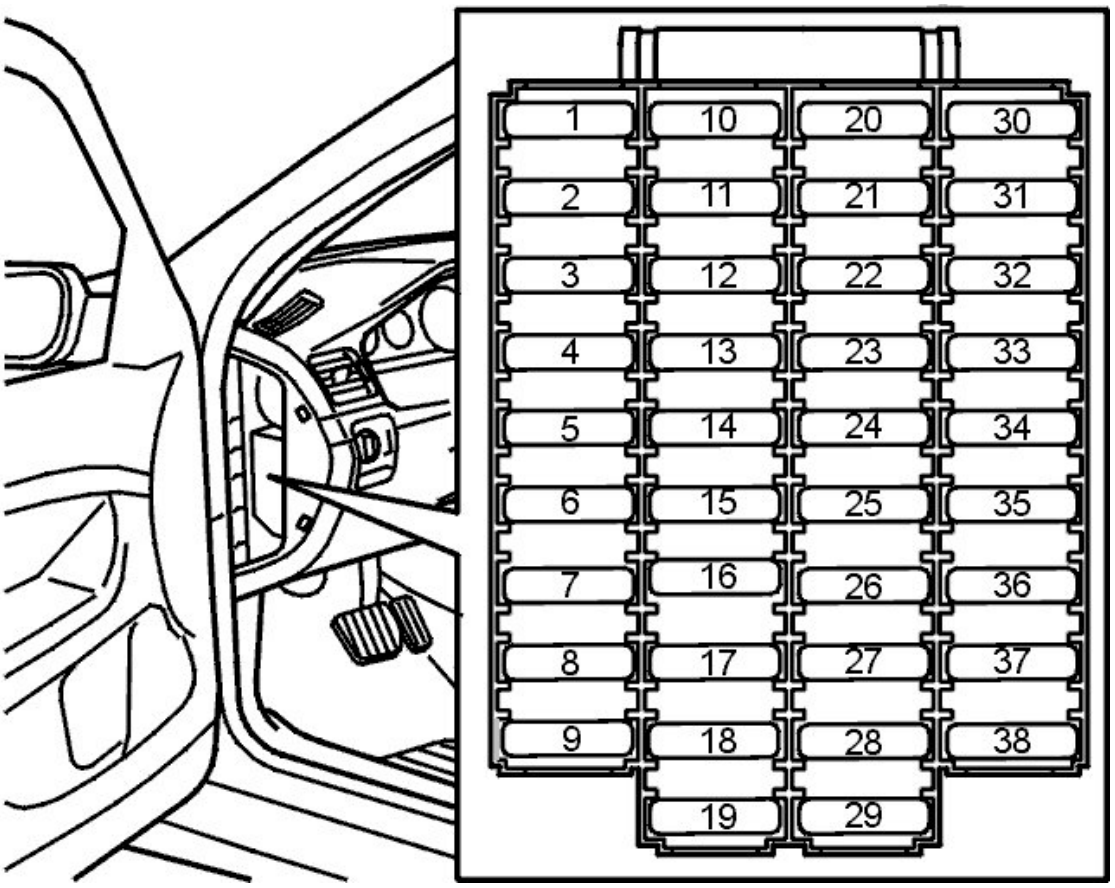
Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting

2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short

- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long

- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:

- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - DONE

DONE - DONE

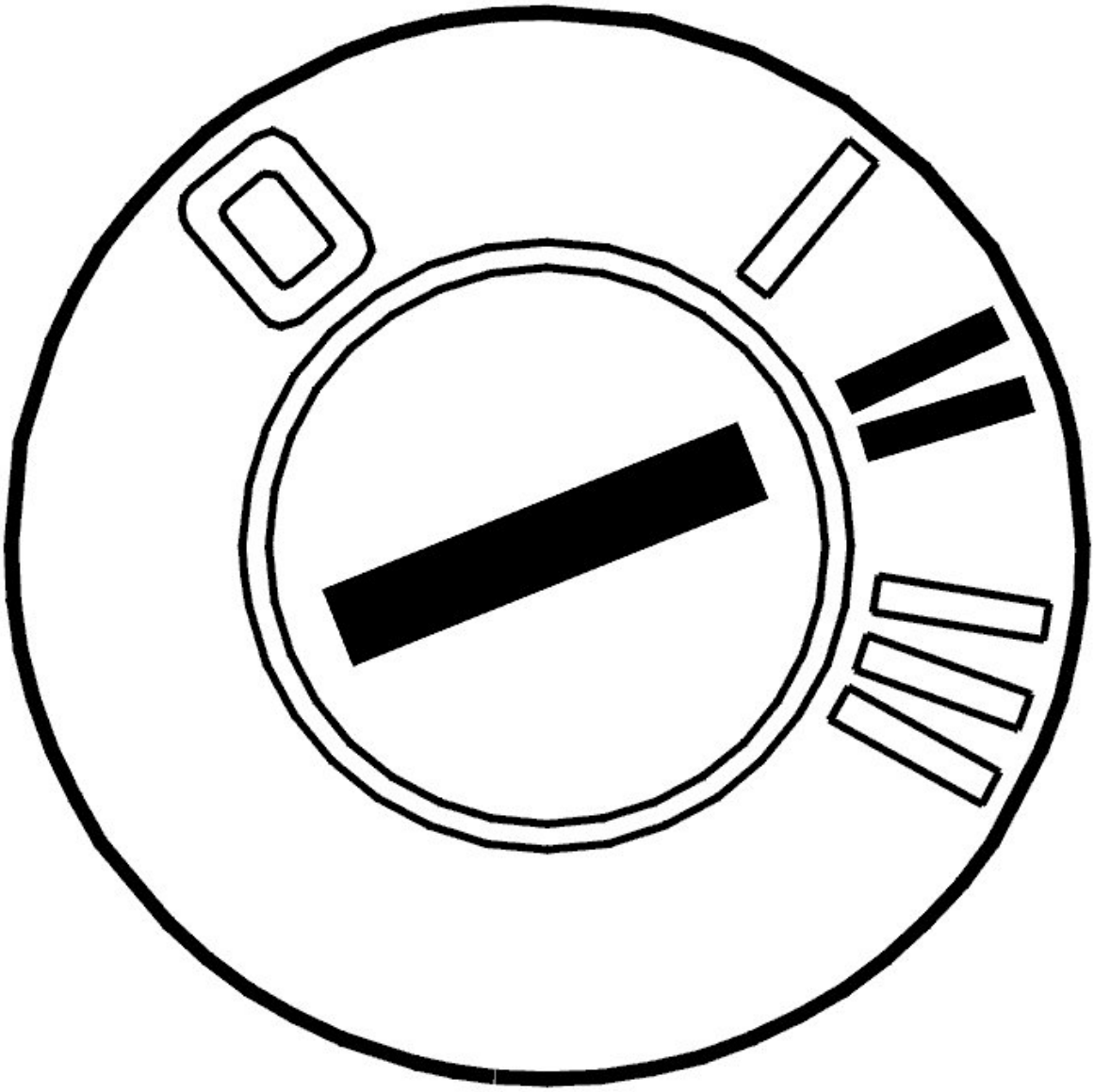
DONE - Verification

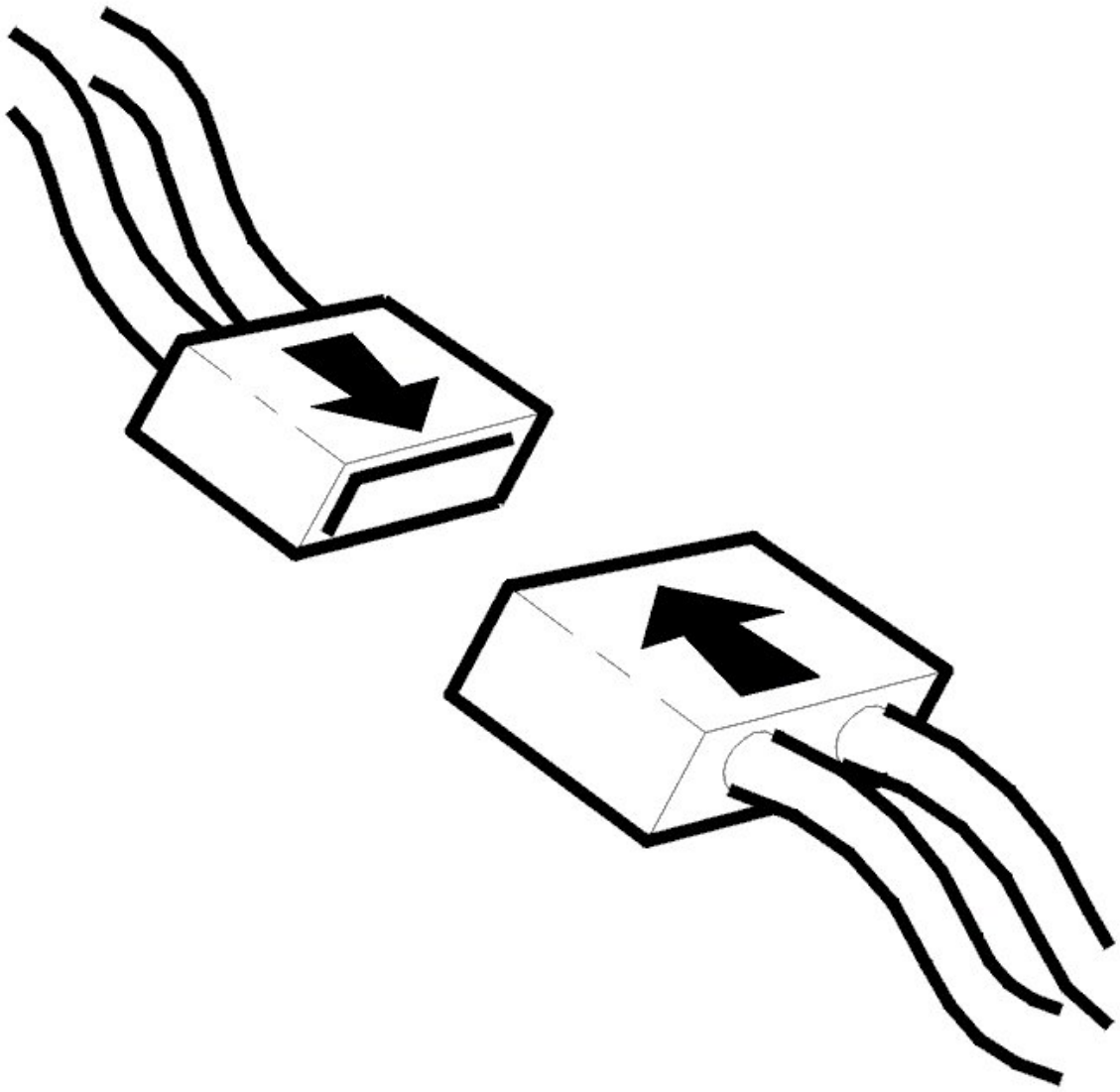
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the LEDs in the display in the rear view mirror light.

Are the LEDs in the display working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

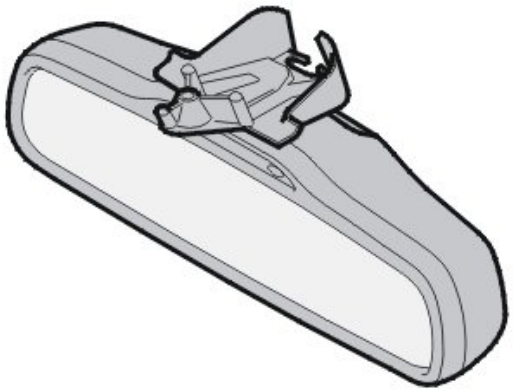
Attempt New Test - Replacing control module and programming

FAULT-TRACING FAILED - No Fault Found

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-0094

Condition



The upper electronic module (UEM) receives information via the controller area network (CAN) indicating whether the seat belt reminder lamp should be on or off. The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) receives an indication that the seat belt reminder lamp should not be lit but the lamp is lit anyway.
The diagnostic trouble code (DTC) can be diagnosed when the ignition is switched on.

Substitute value
- None.

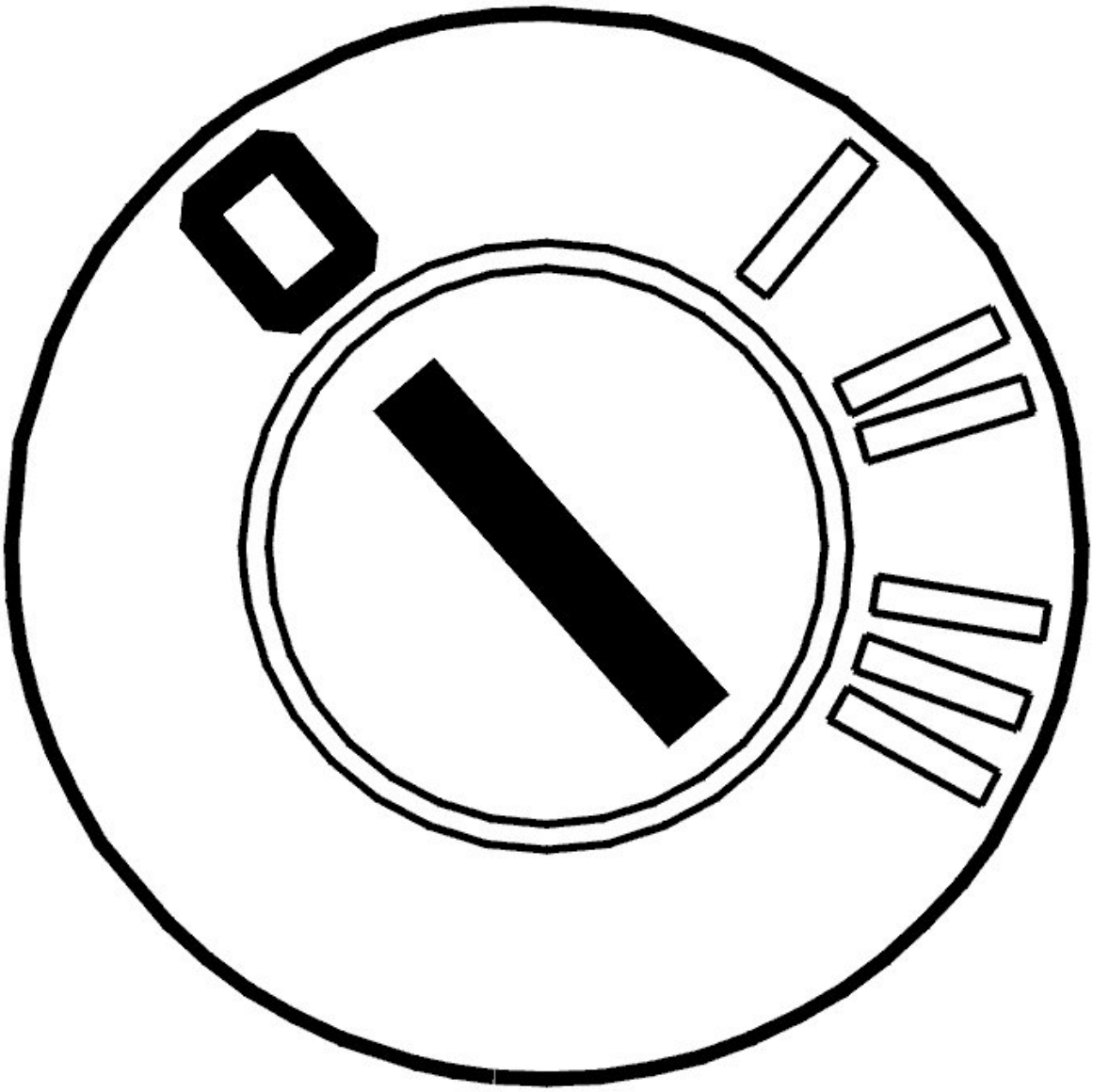
Possible source
- Defective upper electronic module (UEM) (internal fault).

Fault symptom[s]
- The seat belt reminder lamp is constantly on.
- The seat belt reminder lamp shines weakly

Signal Too High

Signal too high

Replacing control module and programming



- Ignition off.

The LED for the seat belt reminder is mounted internally in the rear view mirror and cannot be replaced. Check there are no indications that the power supply to the upper electronic module (UEM) is faulty. Check that the fault in the LED remains after the power is switched off and on again. If the fault remains, the upper electronic module (UEM) must be replaced.

Note! If possible, read off the programmed data from the control module before it is replaced. This should be done as this information is not stored in Volvo's central database. Switch off the ignition before replacing the control module.

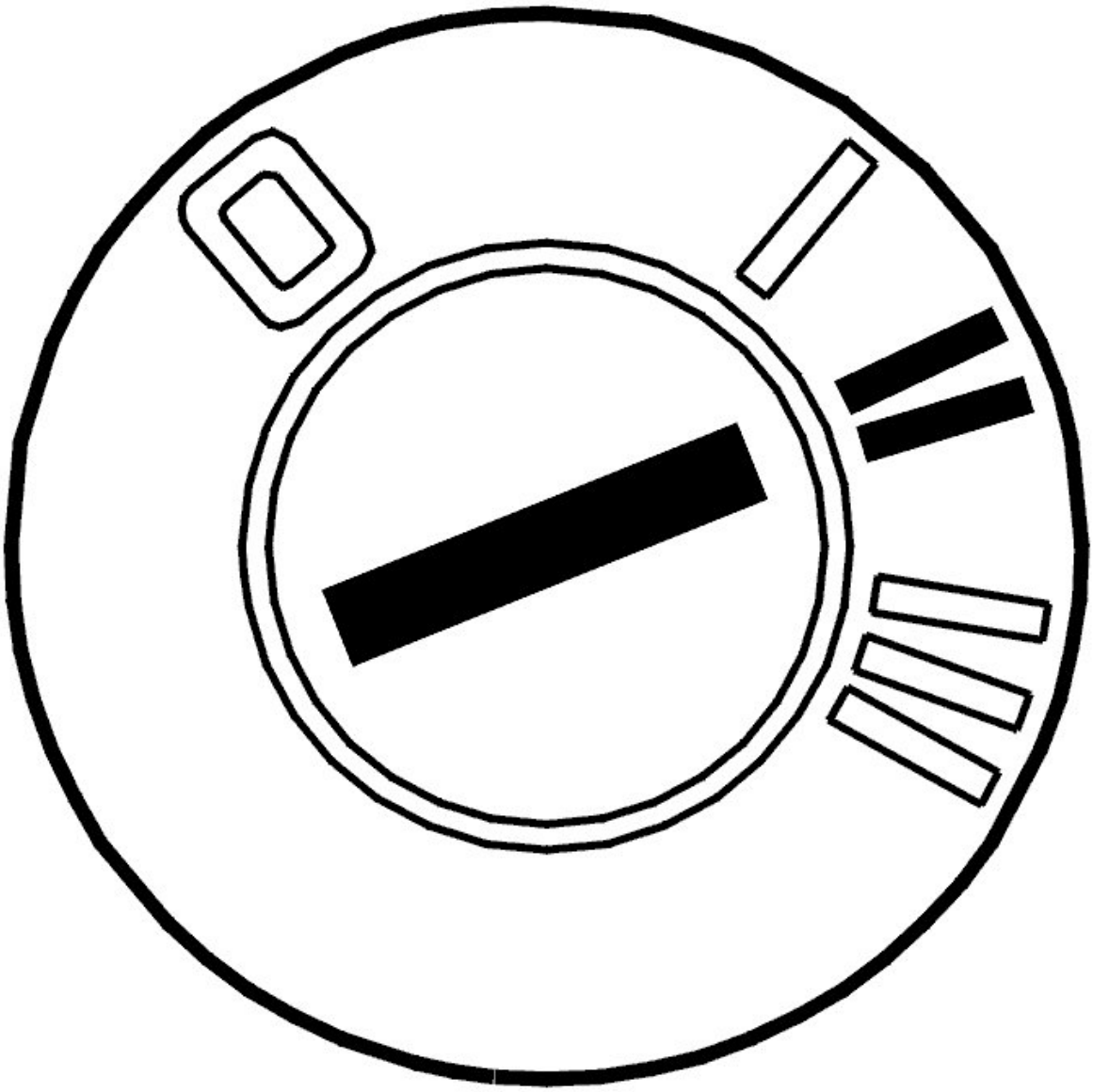
Continue - Replacing the control module

Replacing the control module

Replacing the control module

Reading off the programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before replacing the control module.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The retained values are programmed customer parameters in the upper electronic module (UEM). The retained values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

Continue - Replacing control modules and downloading software

---

Replacing control modules and downloading software

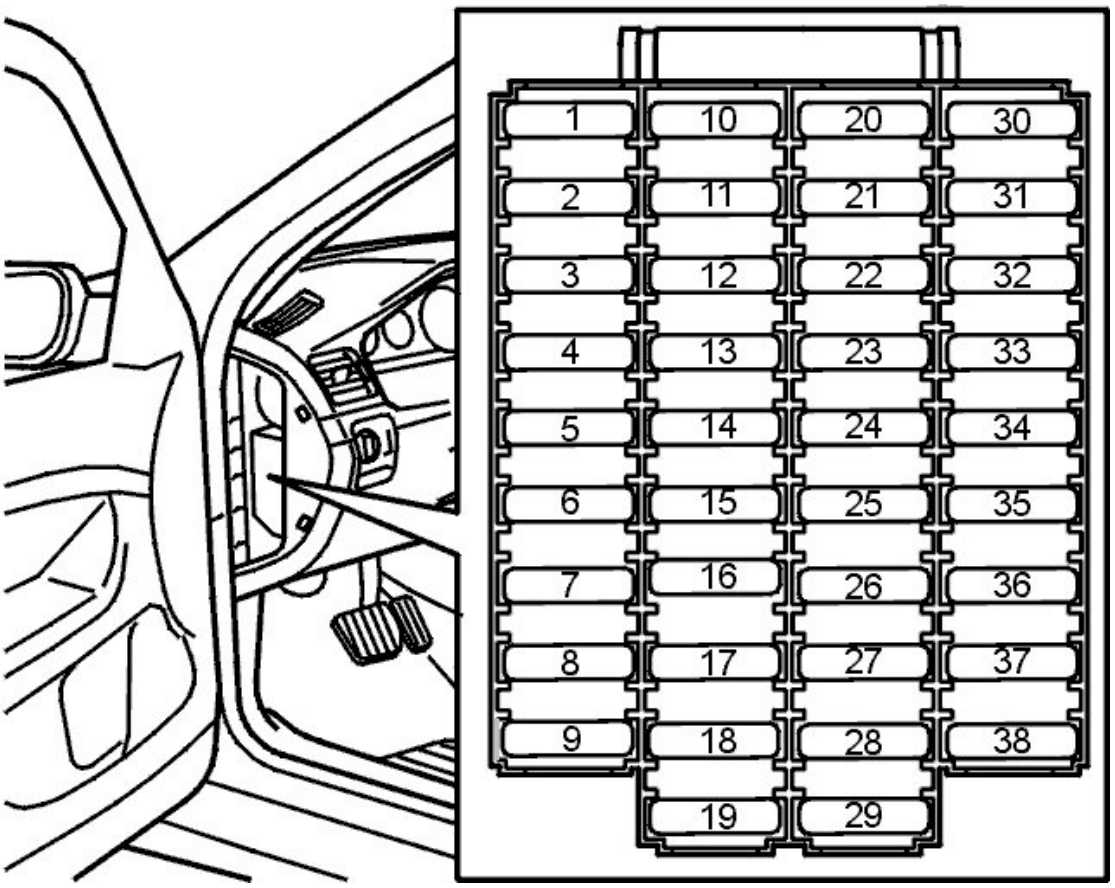
Caution! A new control module is delivered without software. In order for the control module to function new software must be programmed into the control module after it has been replaced.

Replace the control module and download the new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

Hint: When diagnostic trouble code (DTC) E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting

2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking the interior lighting

Checking the interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short

- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long

- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:

- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking the anti-dazzle function in the rear view mirror

---

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

Continue - DONE

DONE - DONE

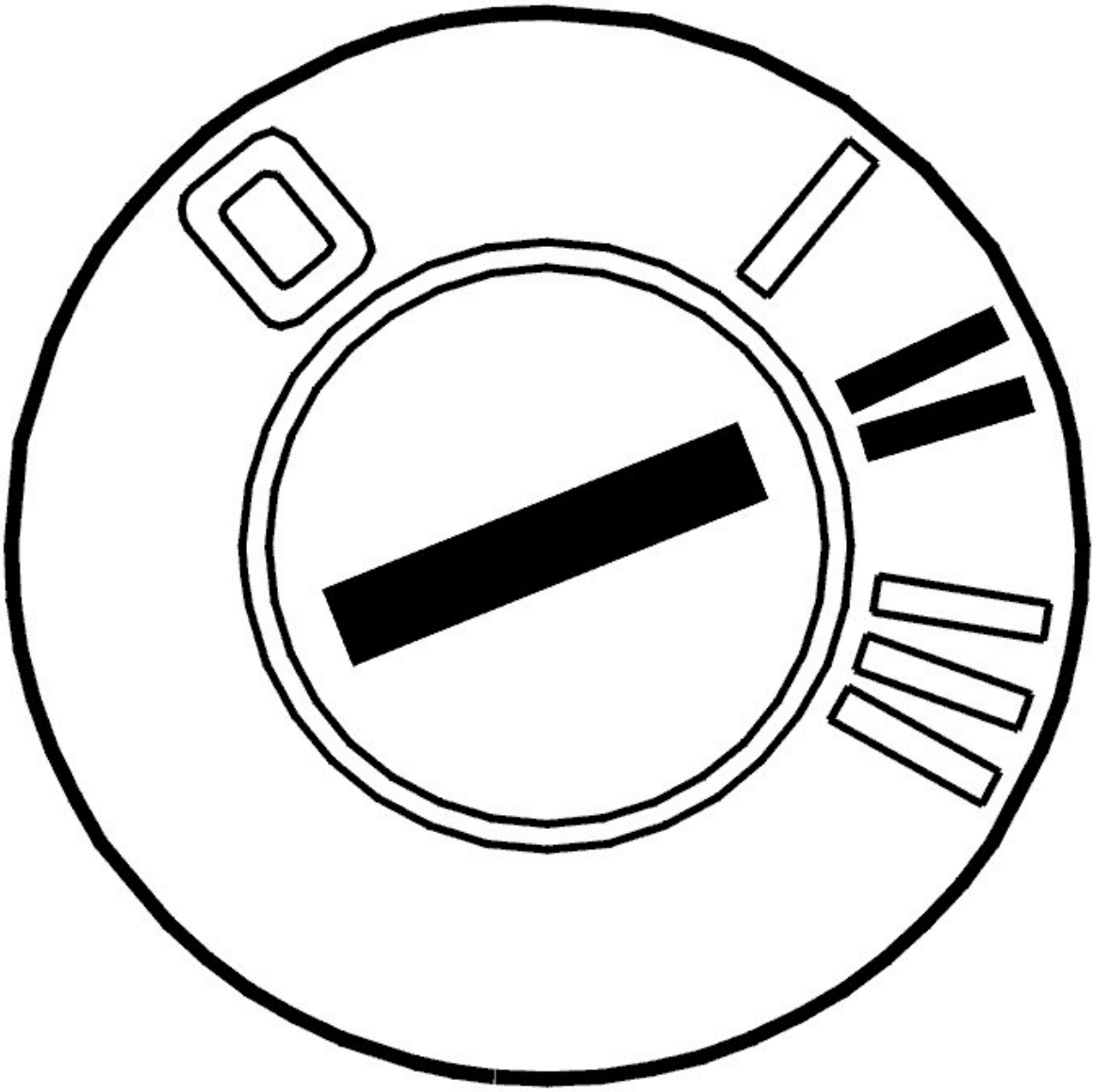
DONE - Verification

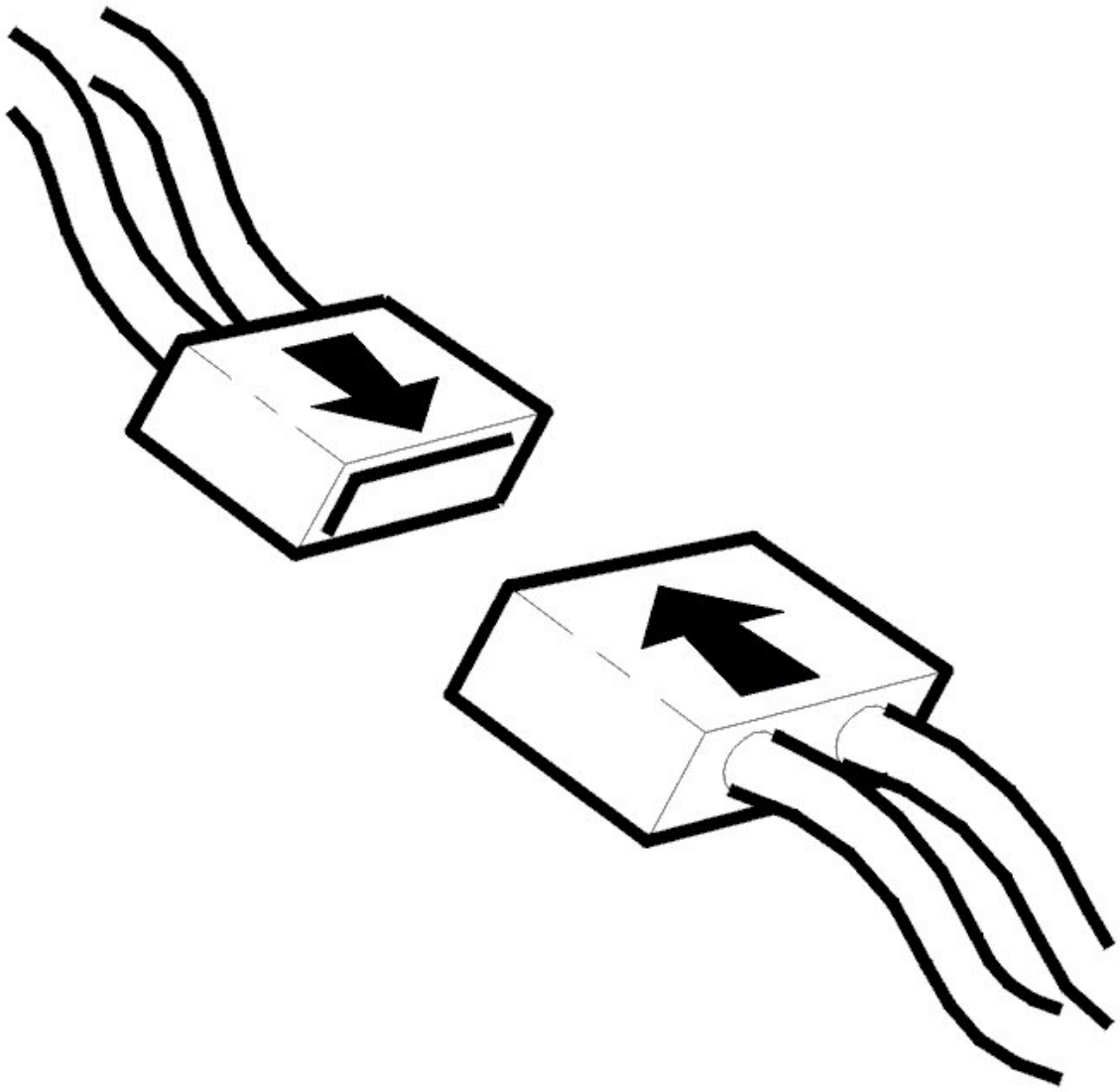
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Check that the LEDs in the display in the rear view mirror light.

Are the LEDs in the display working?

Yes - VERIFIED

No - VERIFICATION FAILED

VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

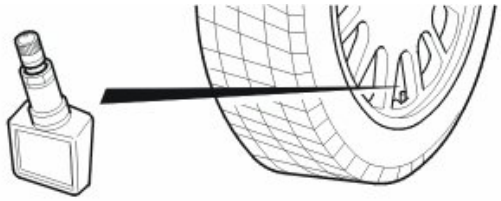
Attempt New Test - Replacing control module and programming

FAULT-TRACING FAILED - FAULT-TRACING FAILED

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A0

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM).
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the signal from the first of the four accepted sensors disappears whilst the vehicle is being driven.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Defective tire pressure sensor
- The receiver is not functioning.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

Signal Missing

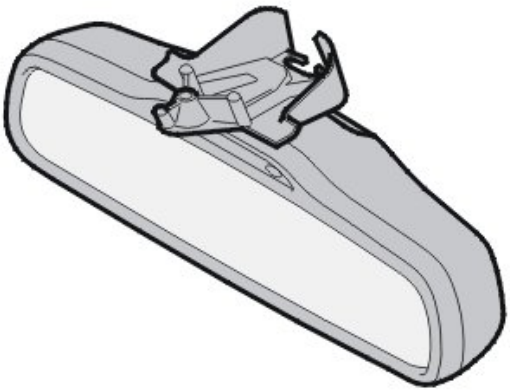
Signal missing

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

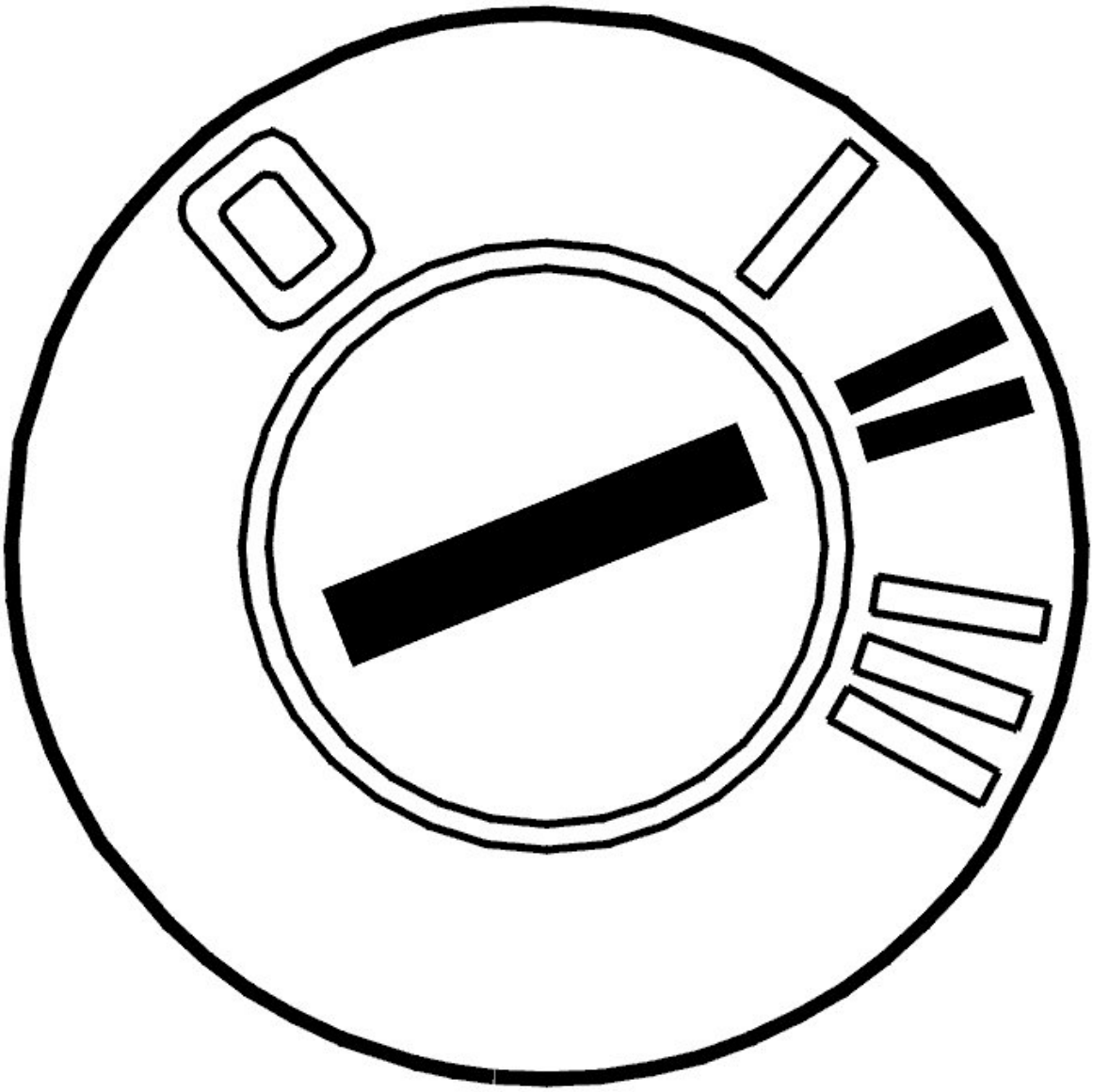


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again.

Note! Do not forget to press the correct button after each wheel has been activated.

Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.

If a sensor does not respond during the test:

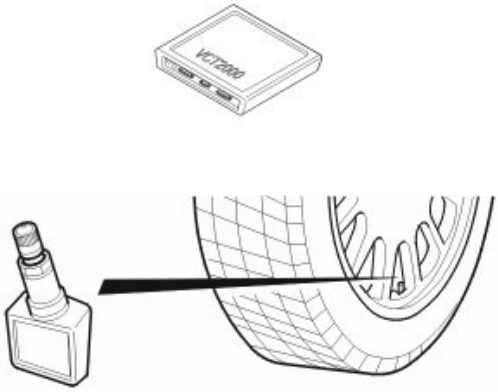
- Replace the tyre pressure sensor for the relevant wheel. It is probably the sensor that caused the DTC to be stored.

If all sensors respond:

- The sensor that caused the diagnostic trouble code to be stored has probably had an intermittent malfunction. Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

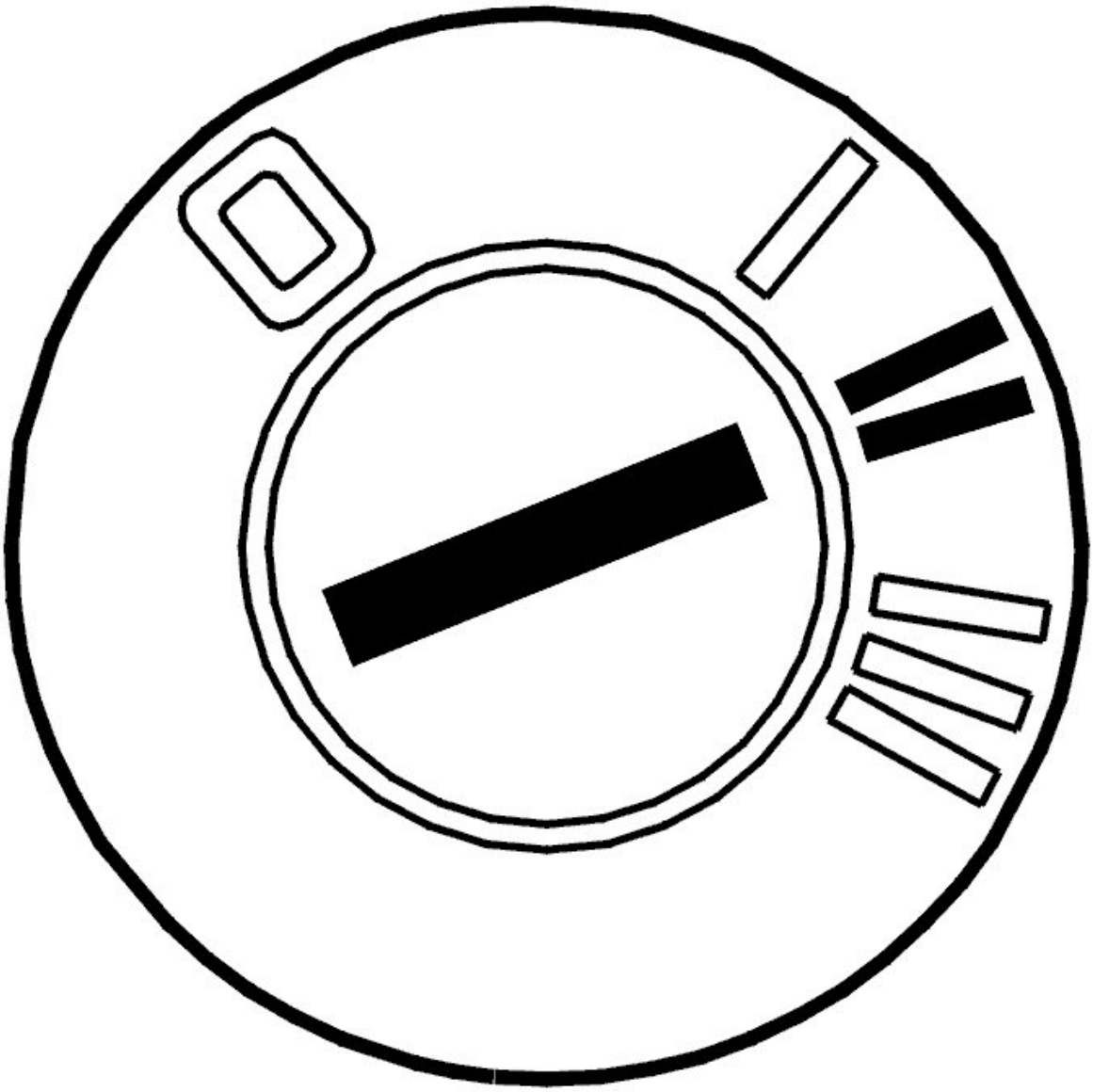
Attempt New Test - Checking the remote receiver

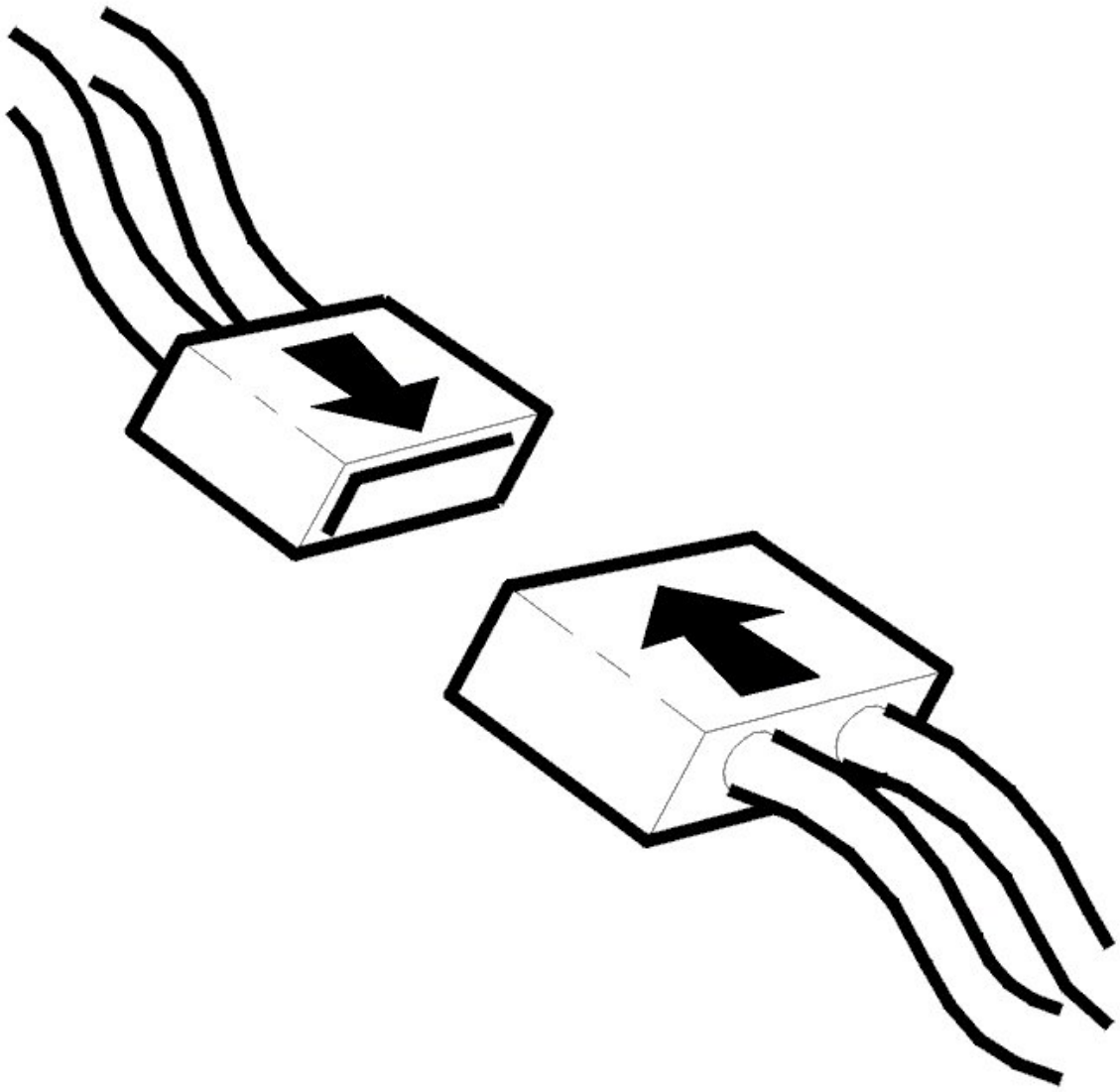
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

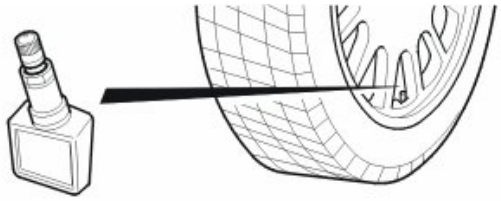
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

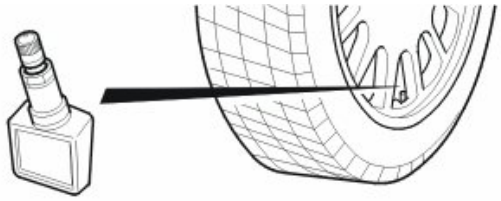
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A1

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM).
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the signal from the second of the four accepted sensors disappears whilst the vehicle is being driven.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Defective tire pressure sensor
- The receiver is not functioning.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

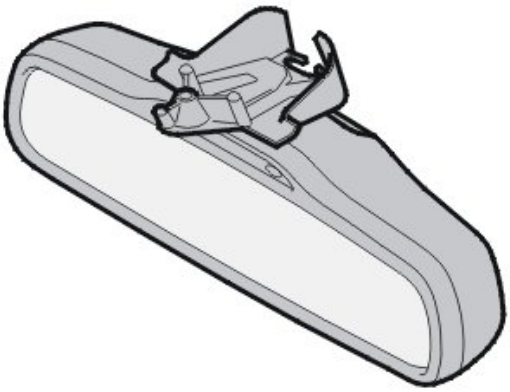
Signal Missing

Signal missing

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

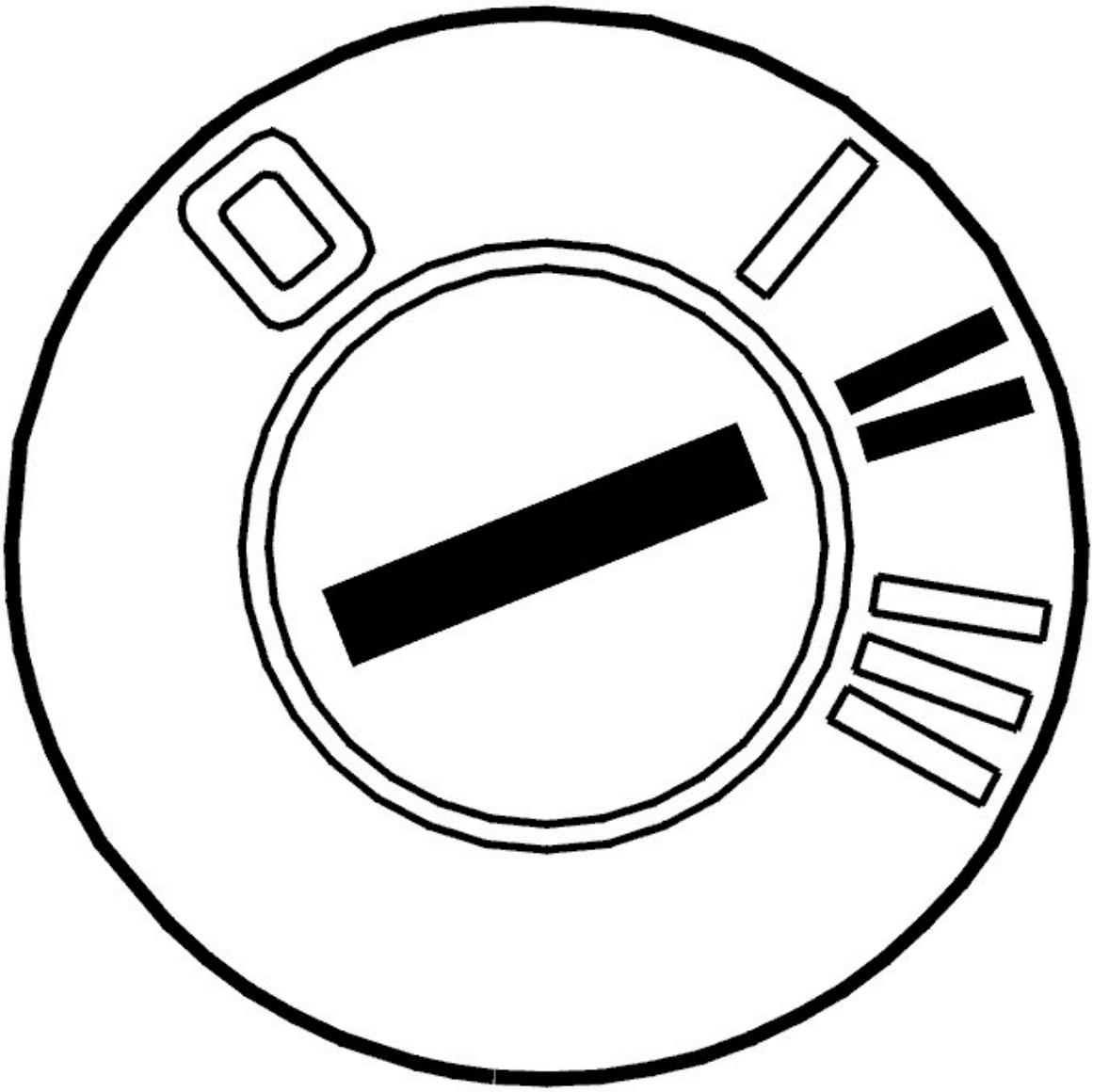


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again.

Note! Do not forget to press the correct button after each wheel has been activated.

Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.

If a sensor does not respond during the test:

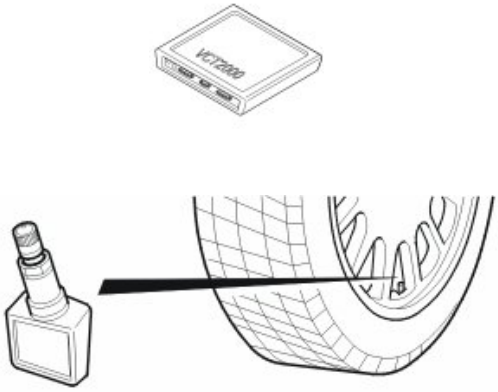
- Replace the tyre pressure sensor for the relevant wheel. It is probably the sensor that caused the DTC to be stored.

If all sensors respond:

- The sensor that caused the diagnostic trouble code to be stored has probably had an intermittent malfunction. Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

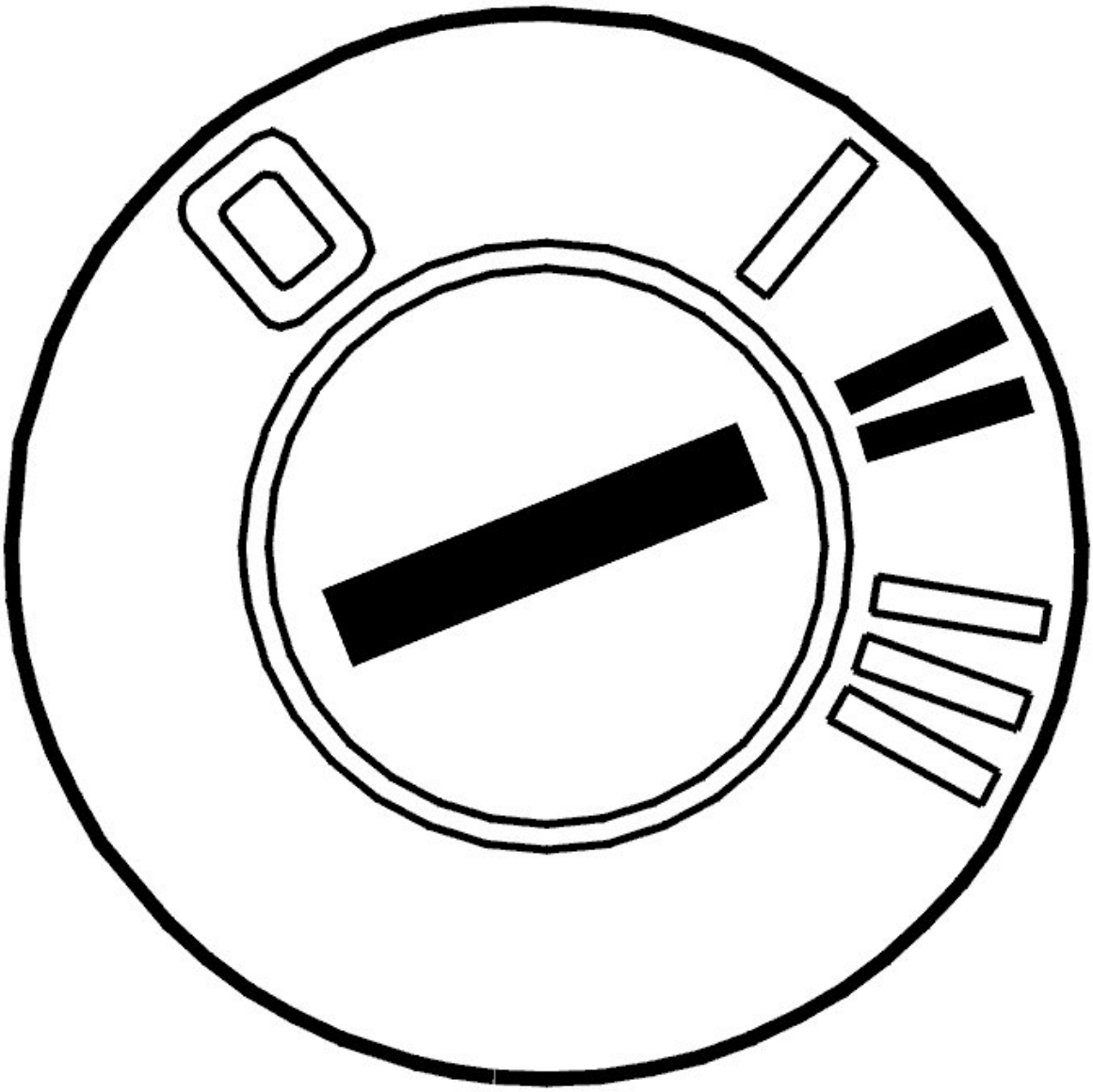
Attempt New Test - Checking the remote receiver

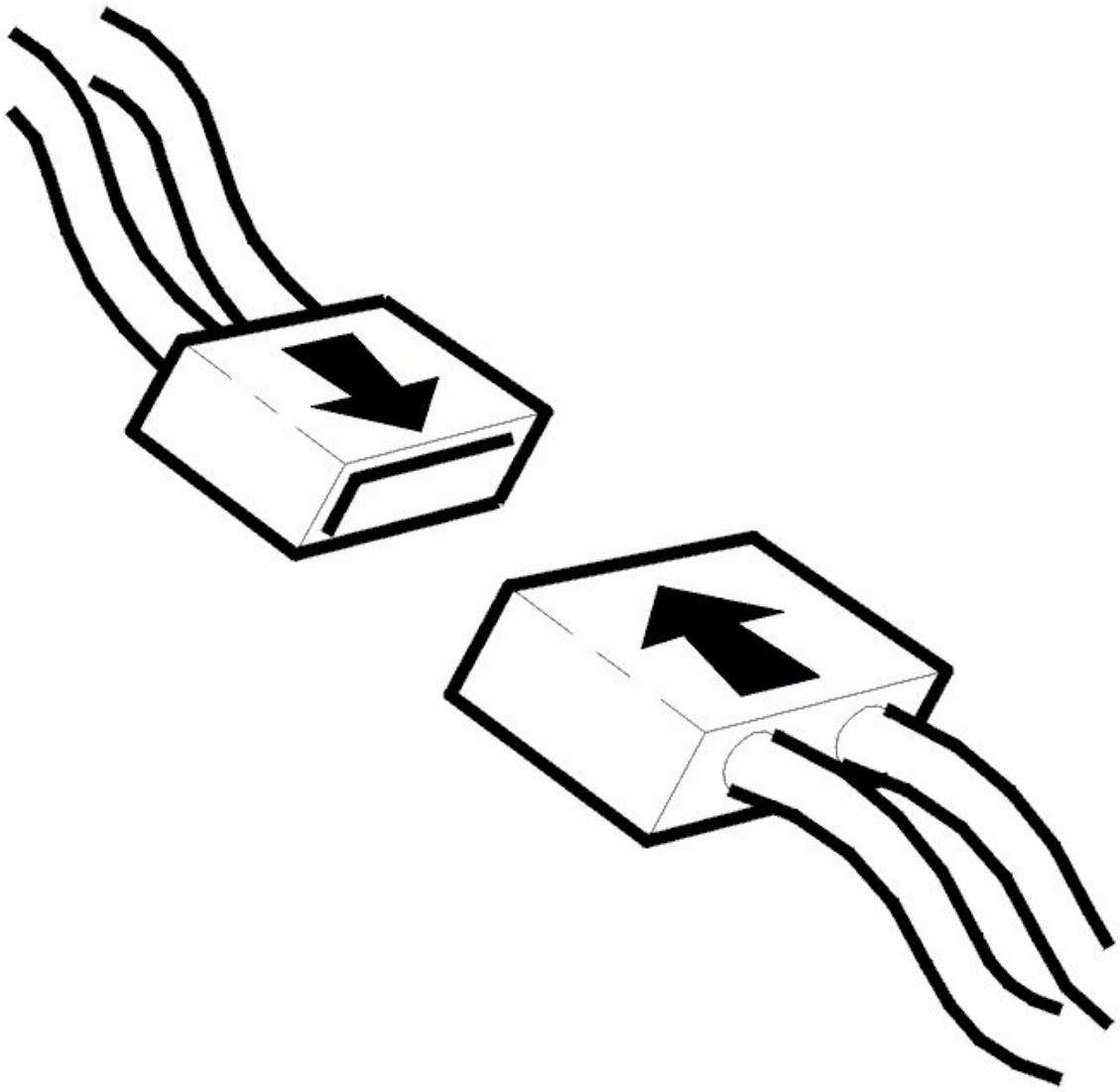
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

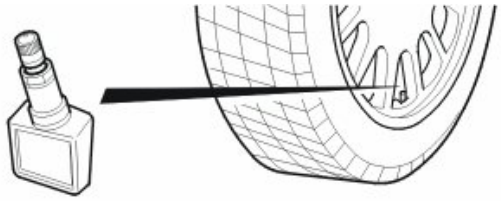
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

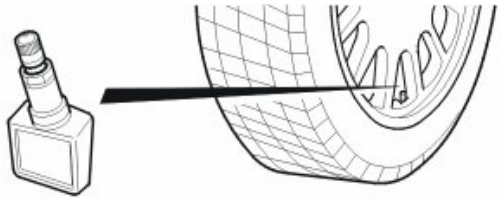
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A2

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM).
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the signal from the third of the four accepted sensors disappears whilst the vehicle is being driven.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Defective tire pressure sensor
- The receiver is not functioning.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

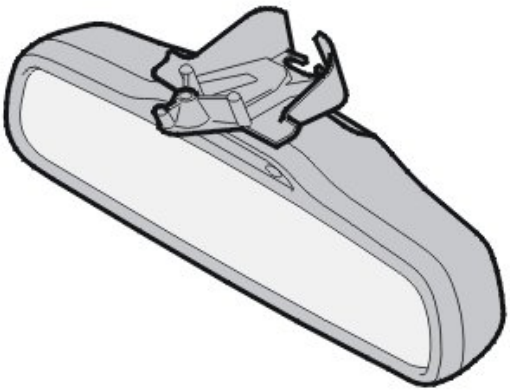
Signal Missing

Signal missing

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

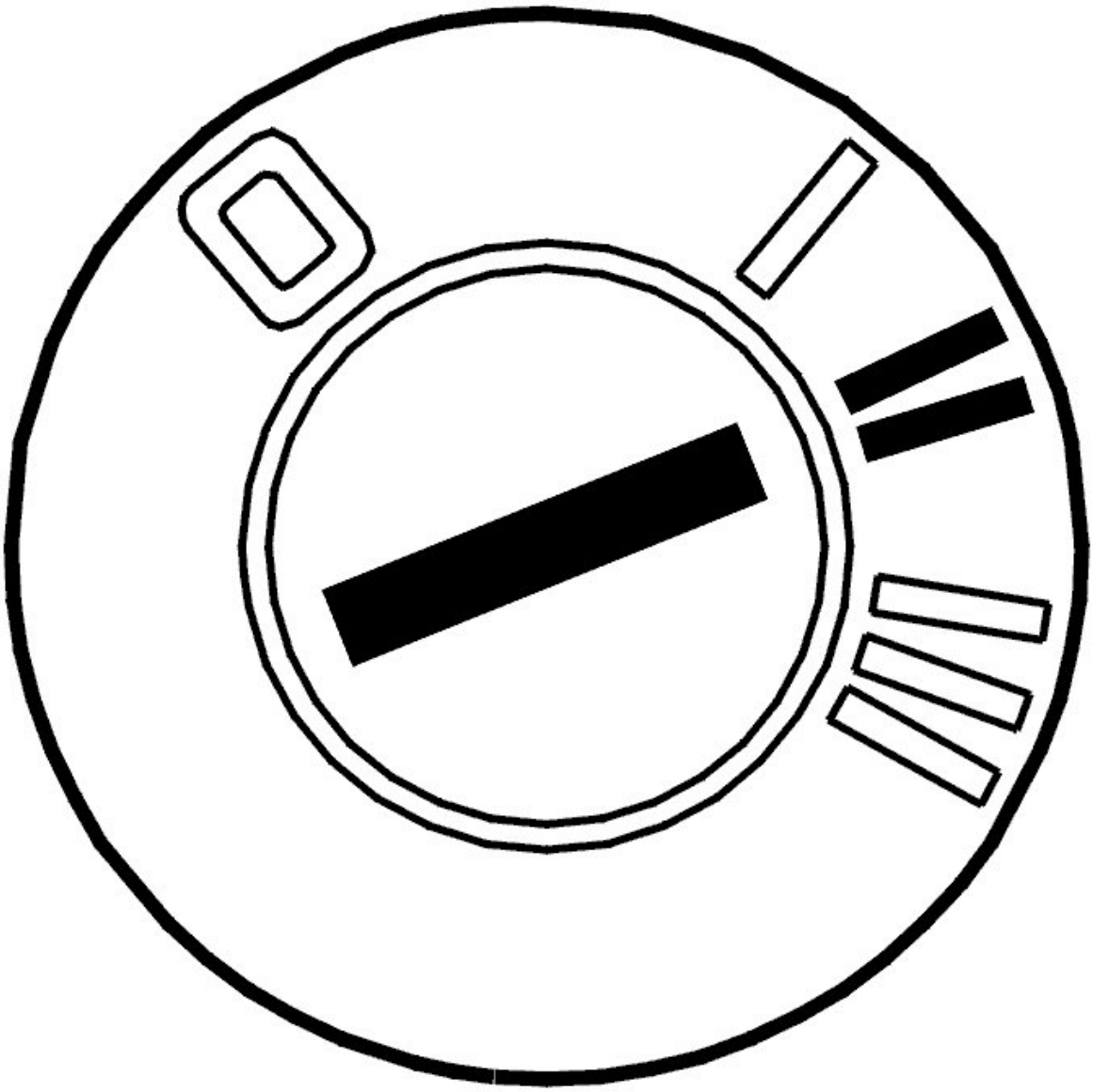


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again.

Note! Do not forget to press the correct button after each wheel has been activated.

Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.

If a sensor does not respond during the test:

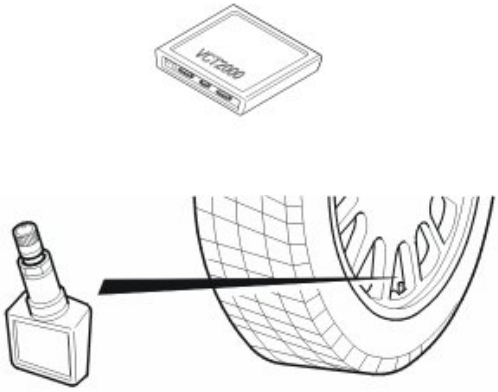
- Replace the tyre pressure sensor for the relevant wheel. It is probably the sensor that caused the DTC to be stored.

If all sensors respond:

- The sensor that caused the diagnostic trouble code to be stored has probably had an intermittent malfunction. Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

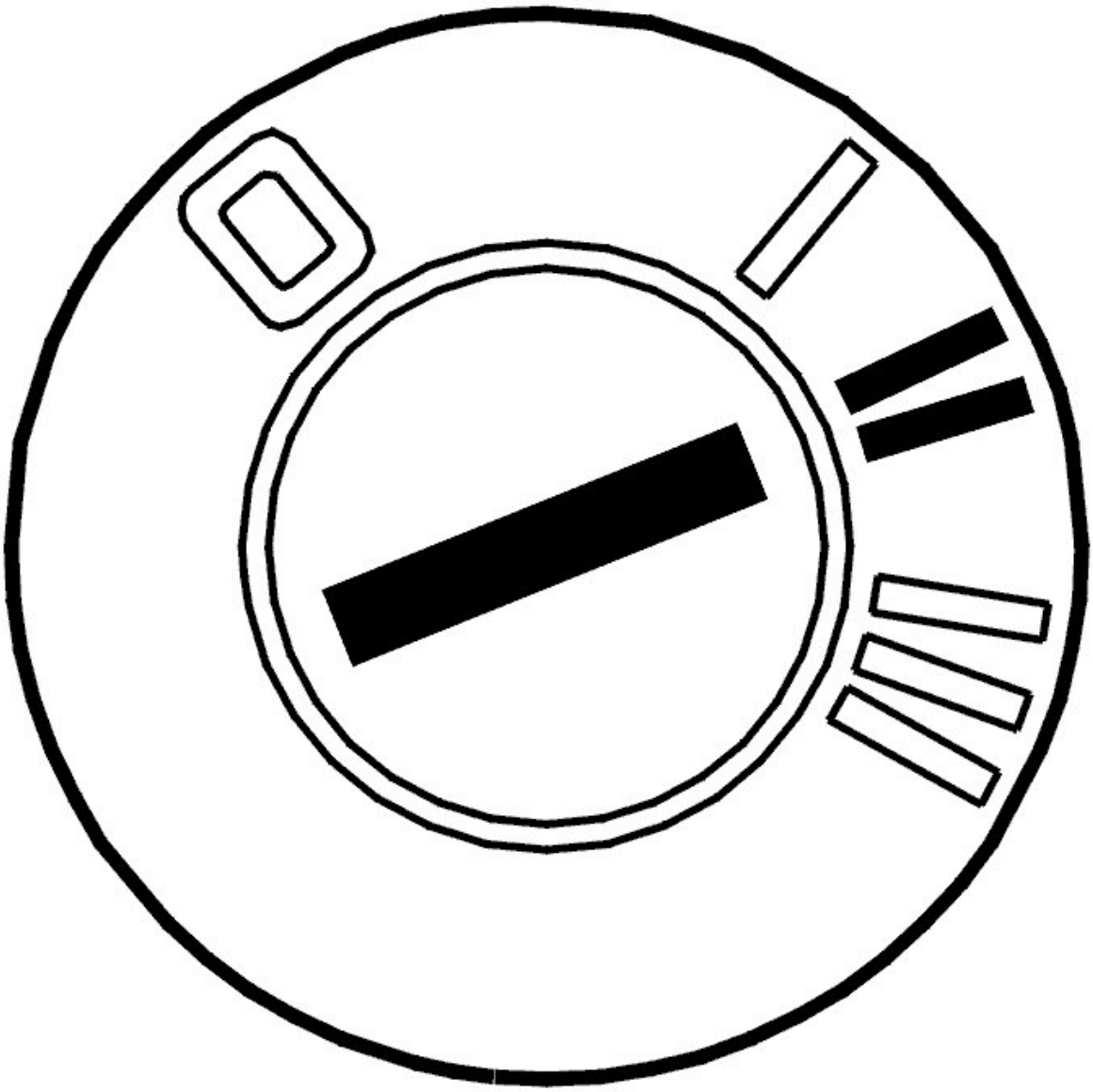
Attempt New Test - Checking the remote receiver

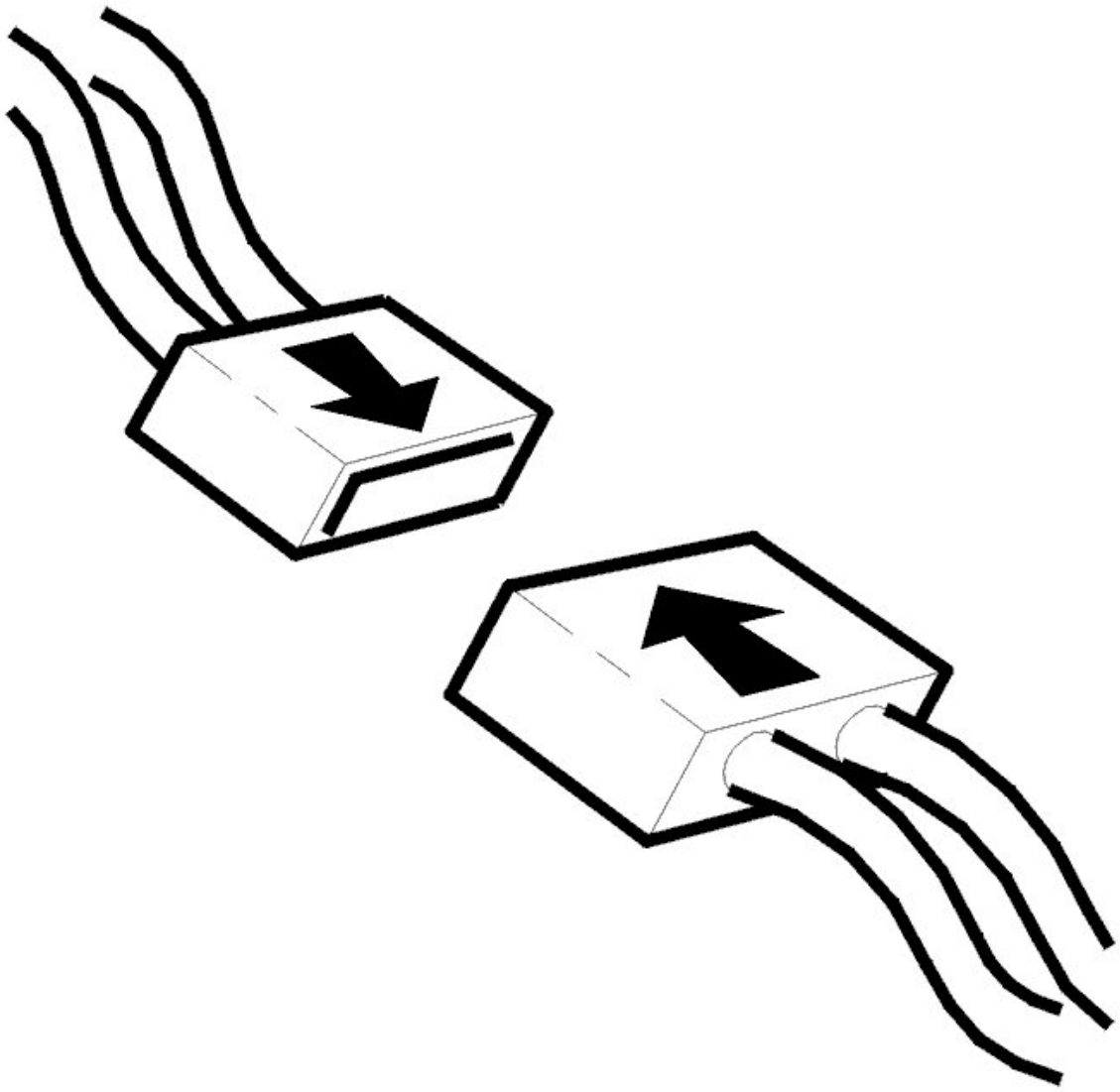
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

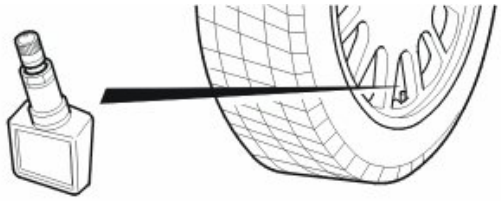
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

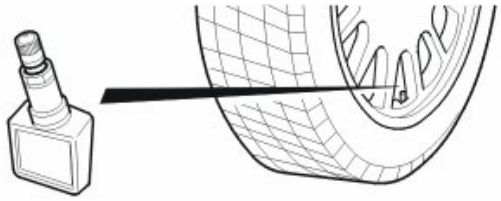
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A3

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM).
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the signal from the fourth of the four accepted sensors disappears whilst the vehicle is being driven.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Defective tire pressure sensor
- The receiver is not functioning.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

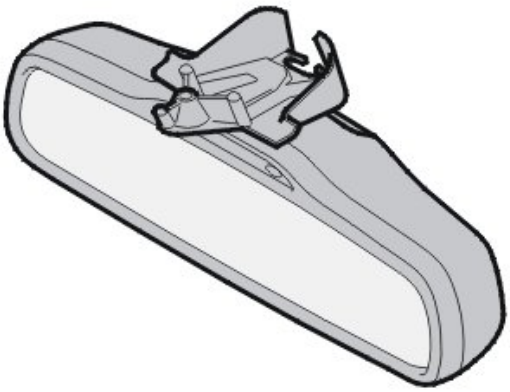
Signal Missing

Signal missing

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

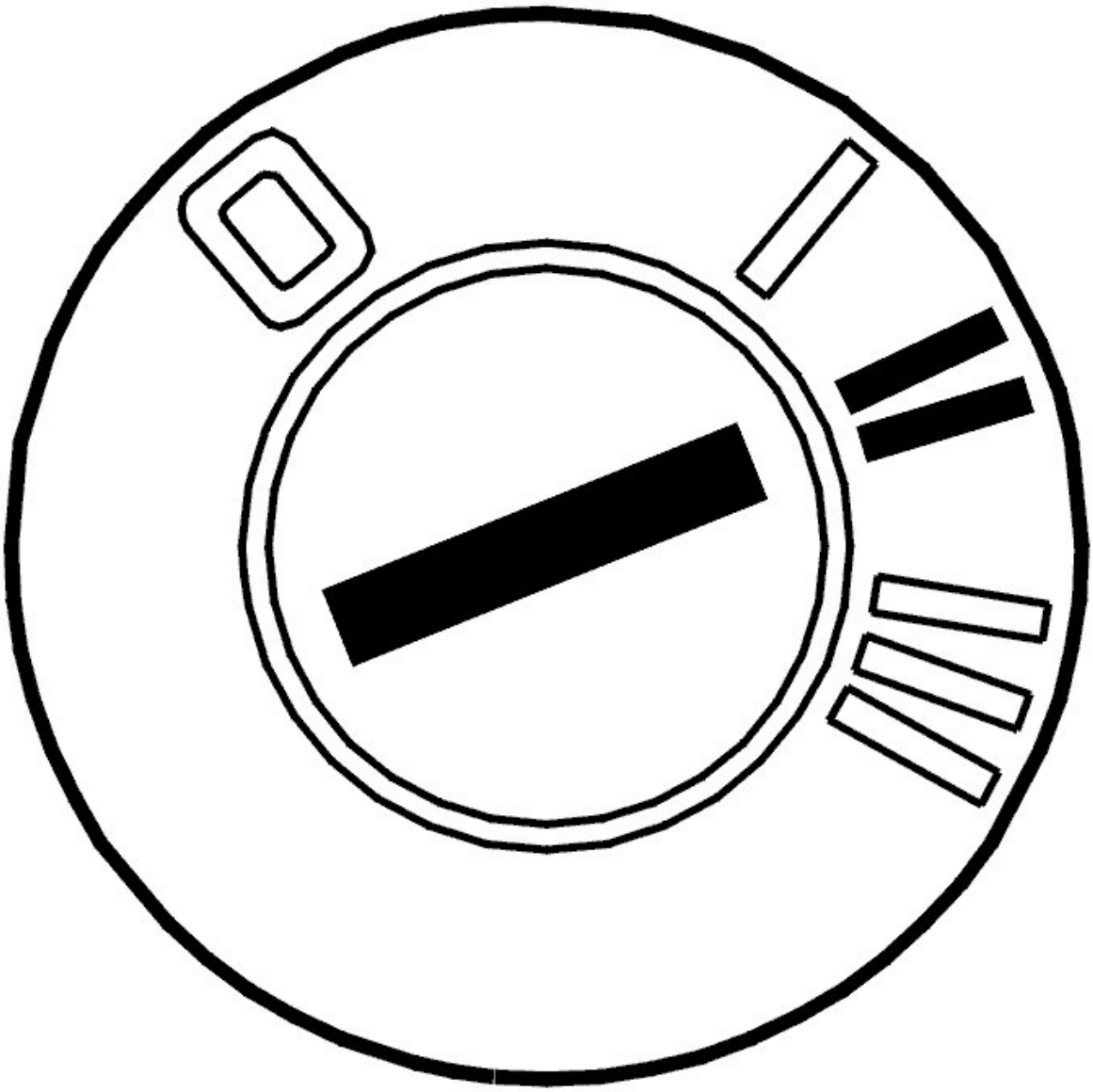


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again.

Note! Do not forget to press the correct button after each wheel has been activated.

Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.

If a sensor does not respond during the test:

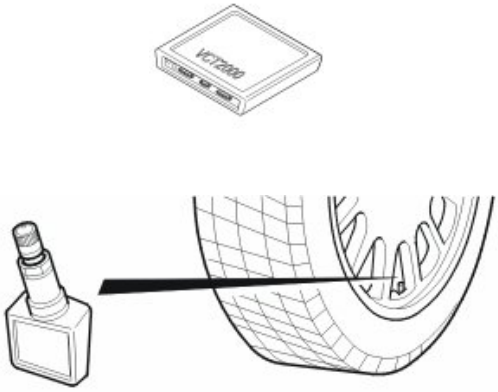
- Replace the tyre pressure sensor for the relevant wheel. It is probably the sensor that caused the DTC to be stored.

If all sensors respond:

- The sensor that caused the diagnostic trouble code to be stored has probably had an intermittent malfunction. Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

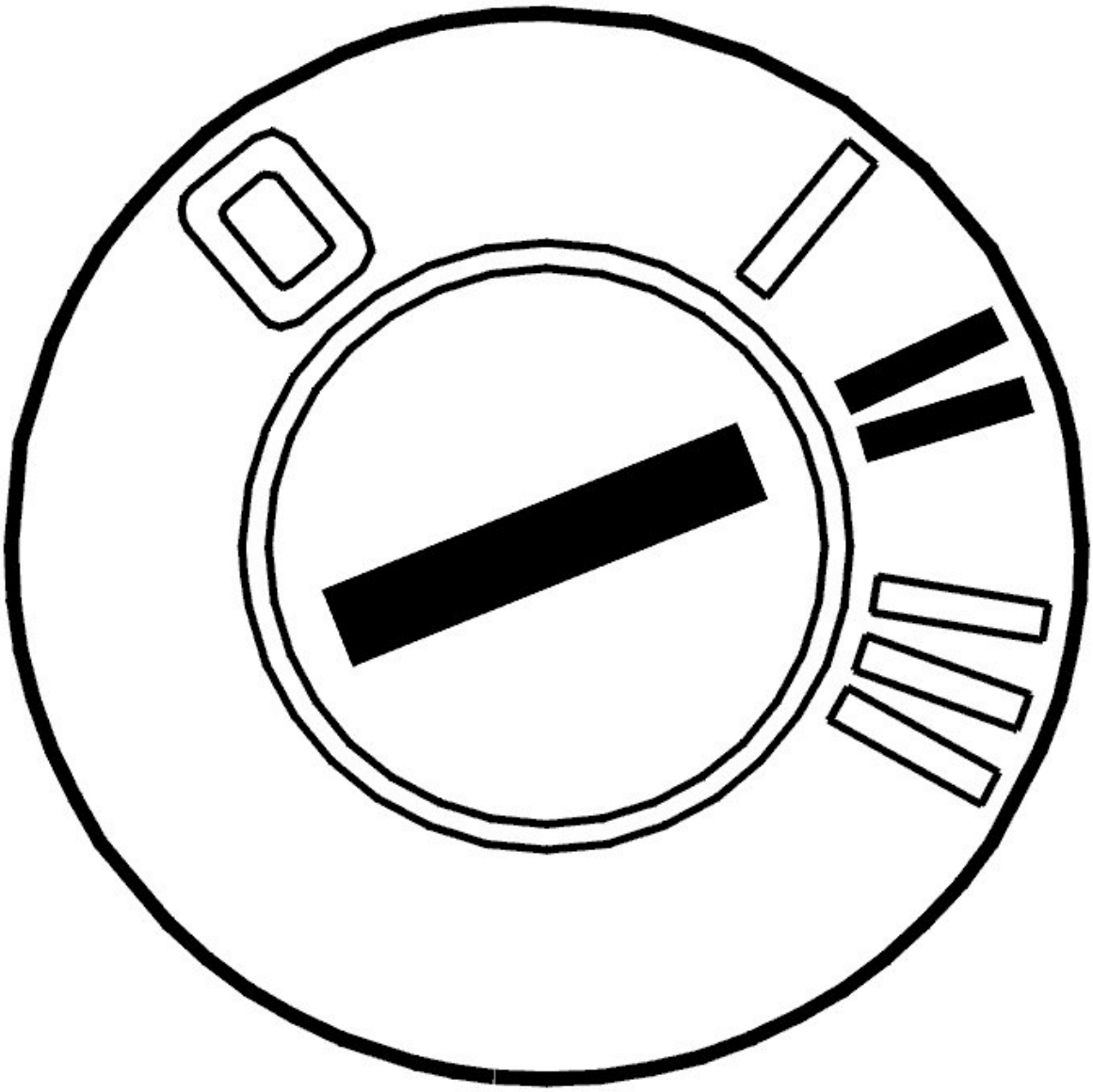
Attempt New Test - Checking the remote receiver

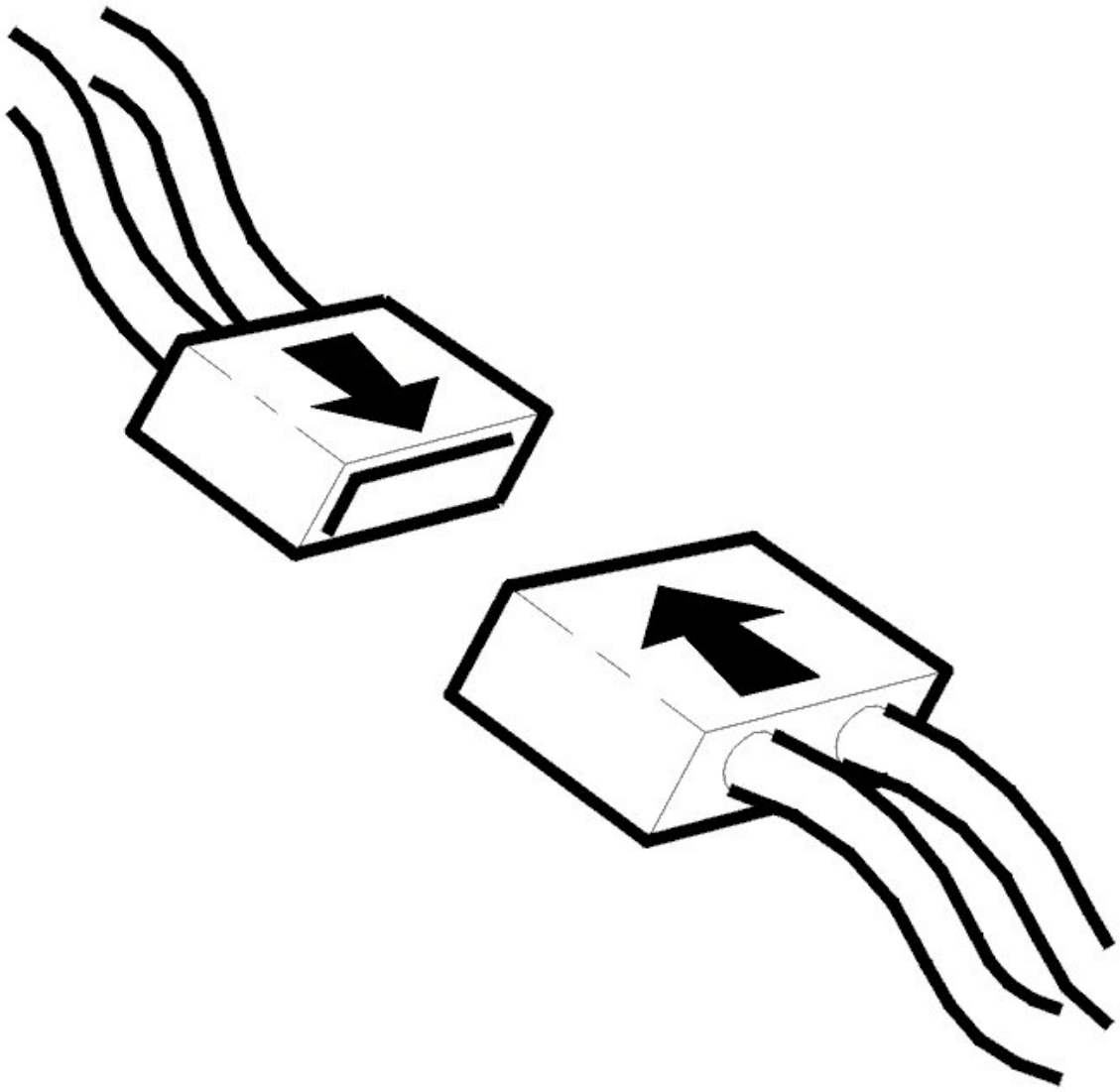
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

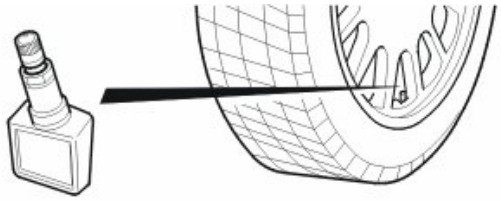
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

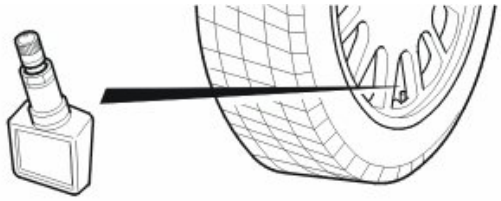
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A4

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM). The messages transmitted by the sensors contain information such as the voltage of the internal battery in the sensor.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) receives a message from the first of the four accepted sensors indicating low battery voltage.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Low battery voltage in the tire pressure sensor.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

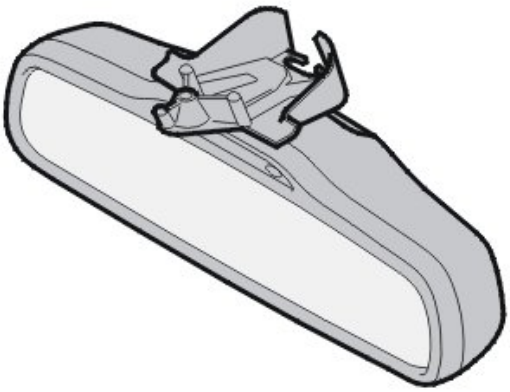
Low Battery

Low battery

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

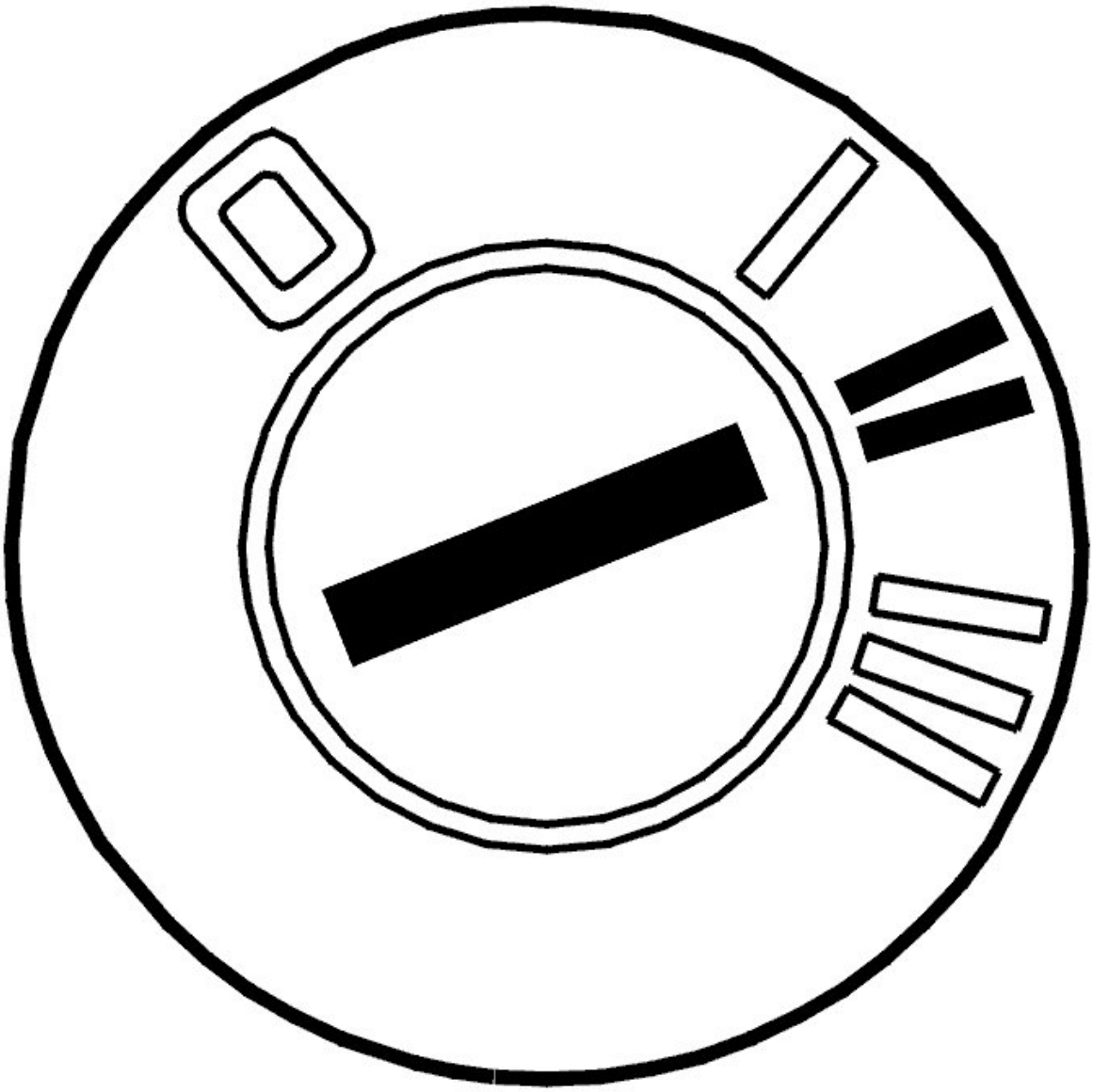


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again. If the sensor does not respond, the battery has probably been discharged or the sensor does not work. Replace the sensor for the relevant wheel.

Note! Do not forget to press the correct button after each wheel has been activated.

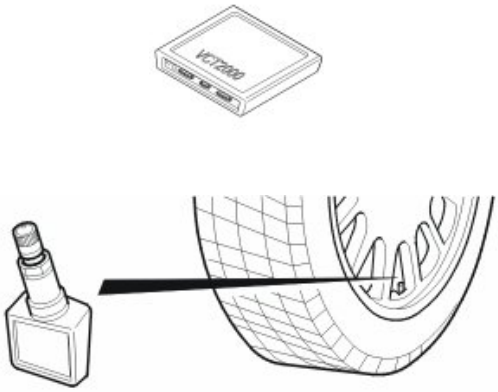
Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.
Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

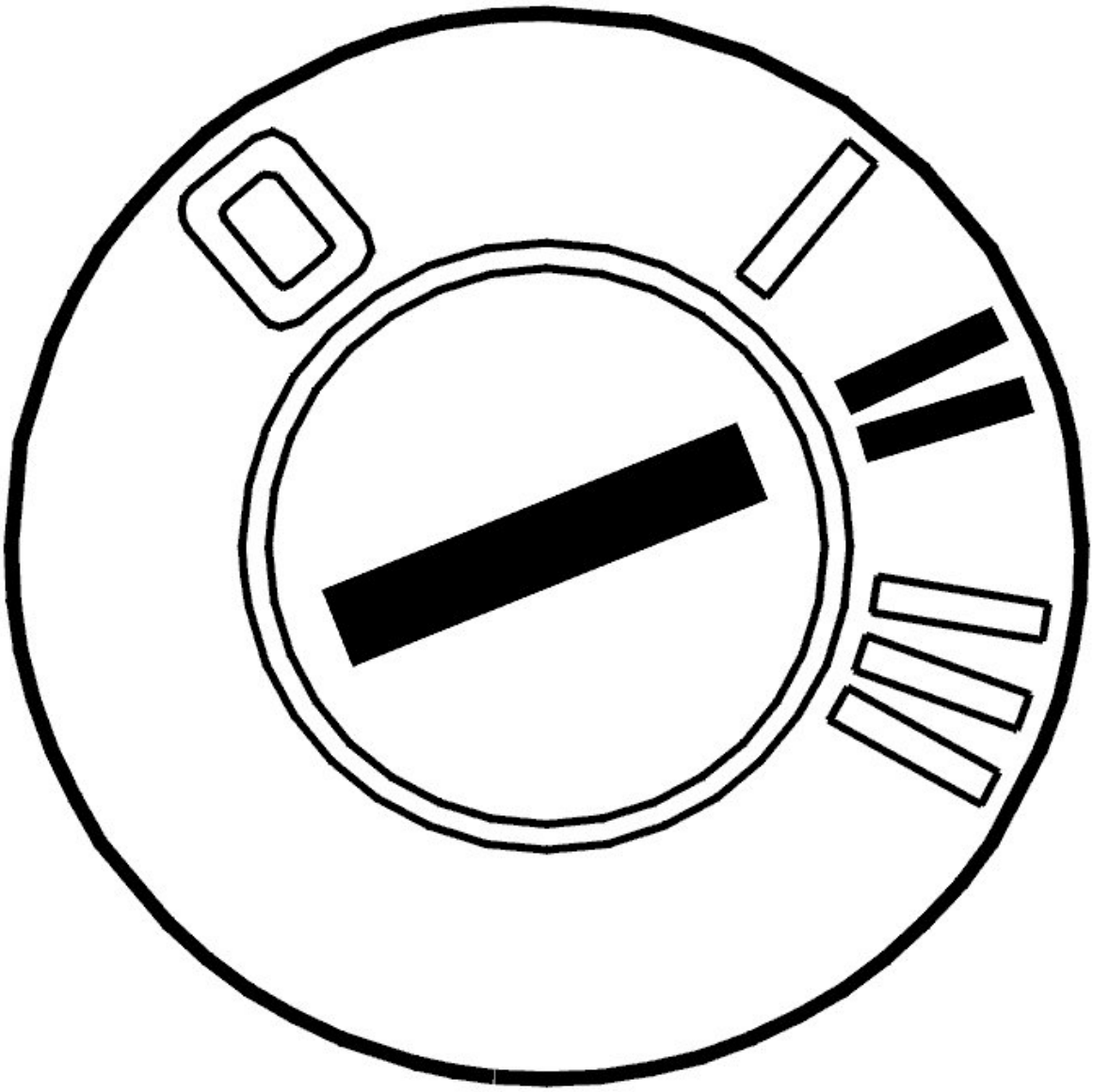
Attempt New Test - Checking the remote receiver

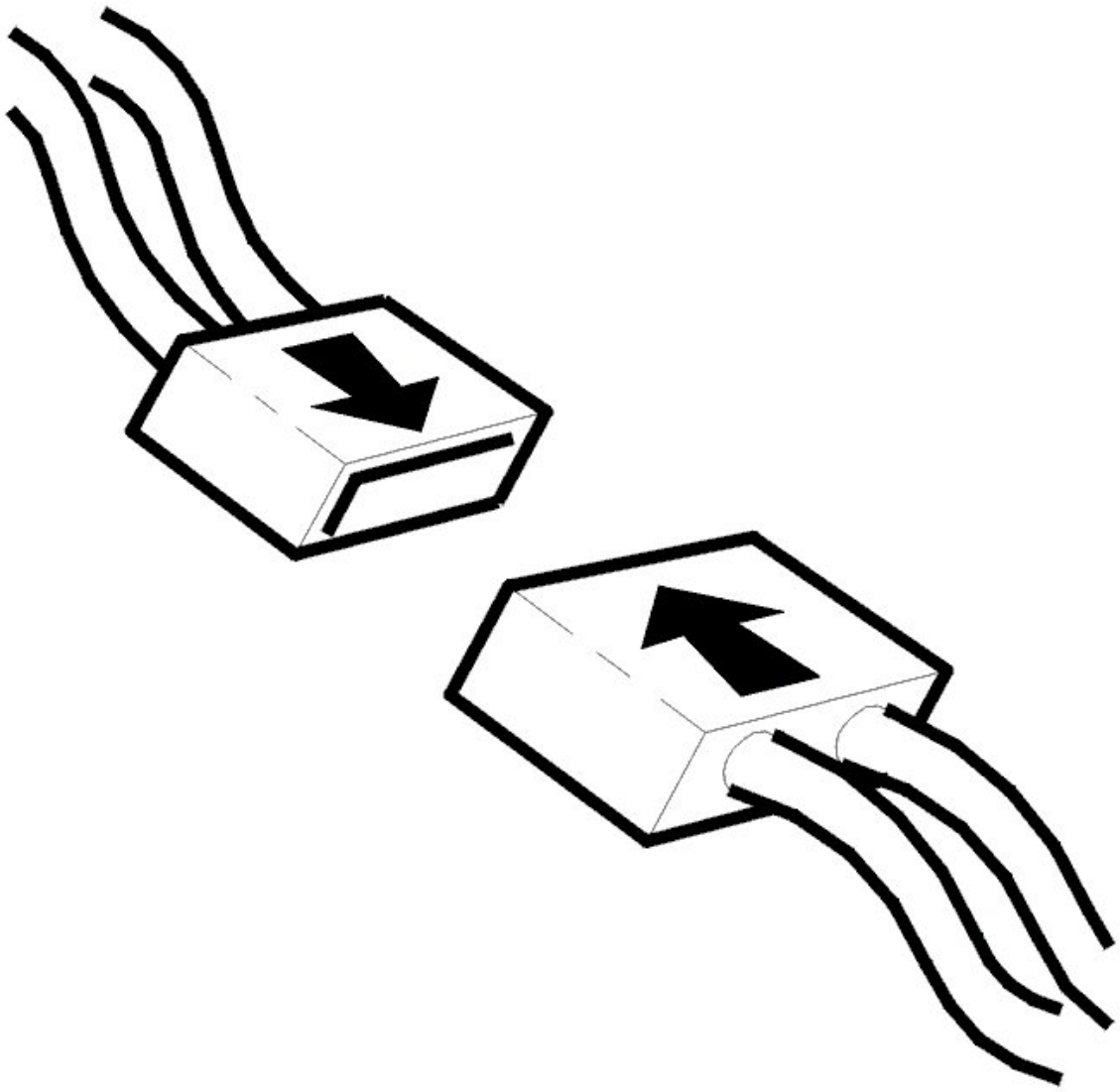
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

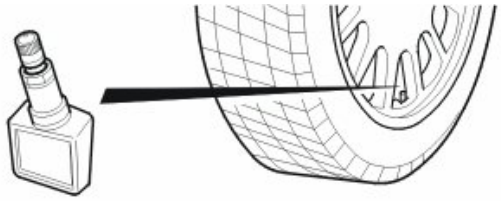
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

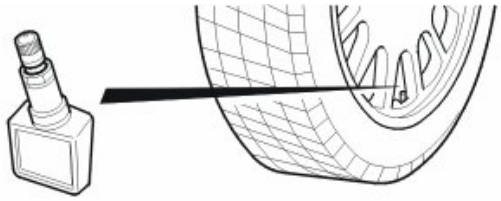
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A5

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM). The messages transmitted by the sensors contain information such as the voltage of the internal battery in the sensor.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) receives a message from the second of the four accepted sensors indicating low battery voltage.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Low battery voltage in the tire pressure sensor.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

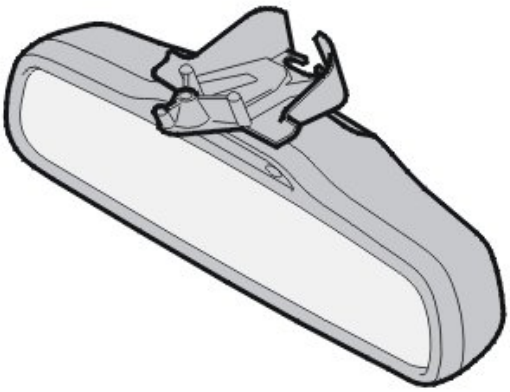
Low Battery

Low battery

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

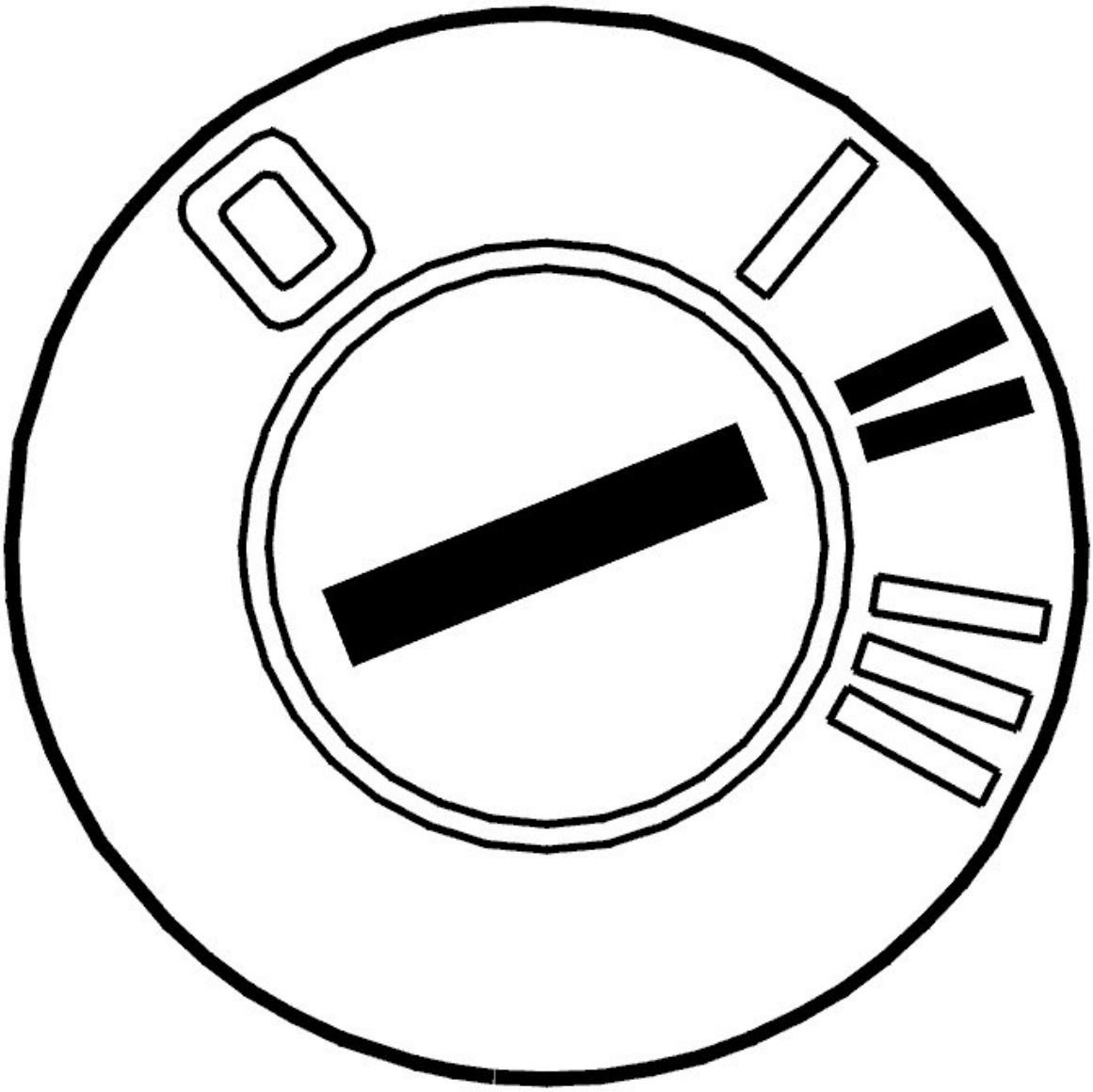


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again. If the sensor does not respond, the battery has probably been discharged or the sensor does not work. Replace the sensor for the relevant wheel.

Note! Do not forget to press the correct button after each wheel has been activated.

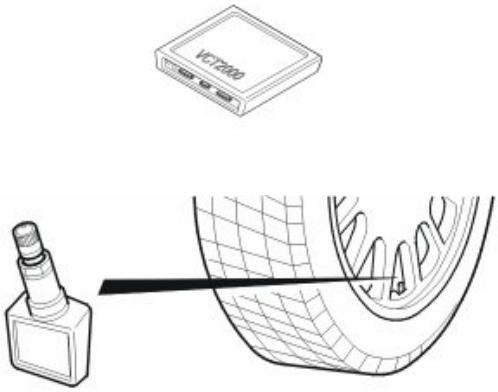
Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.
Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

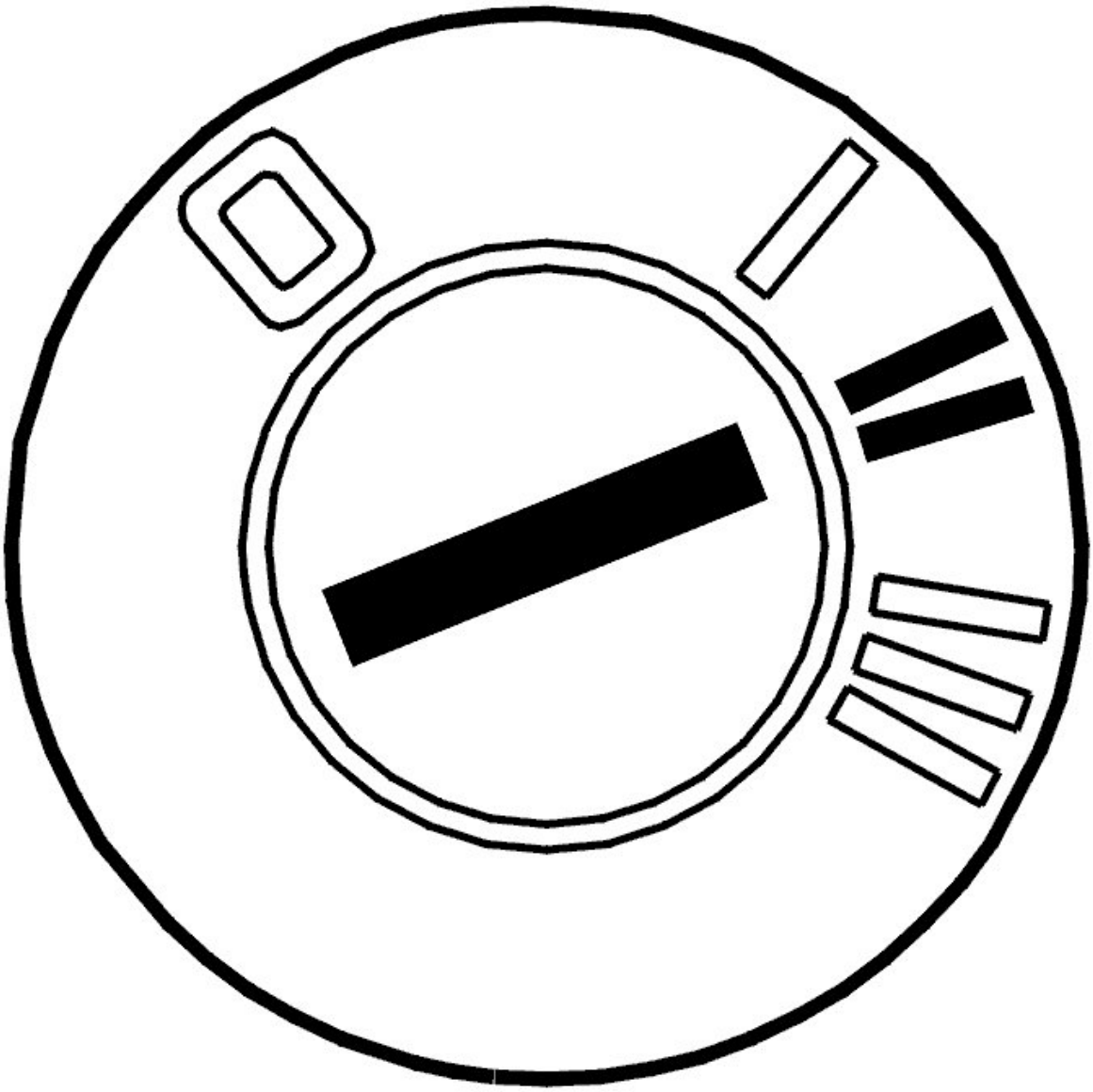
Attempt New Test - Checking the remote receiver

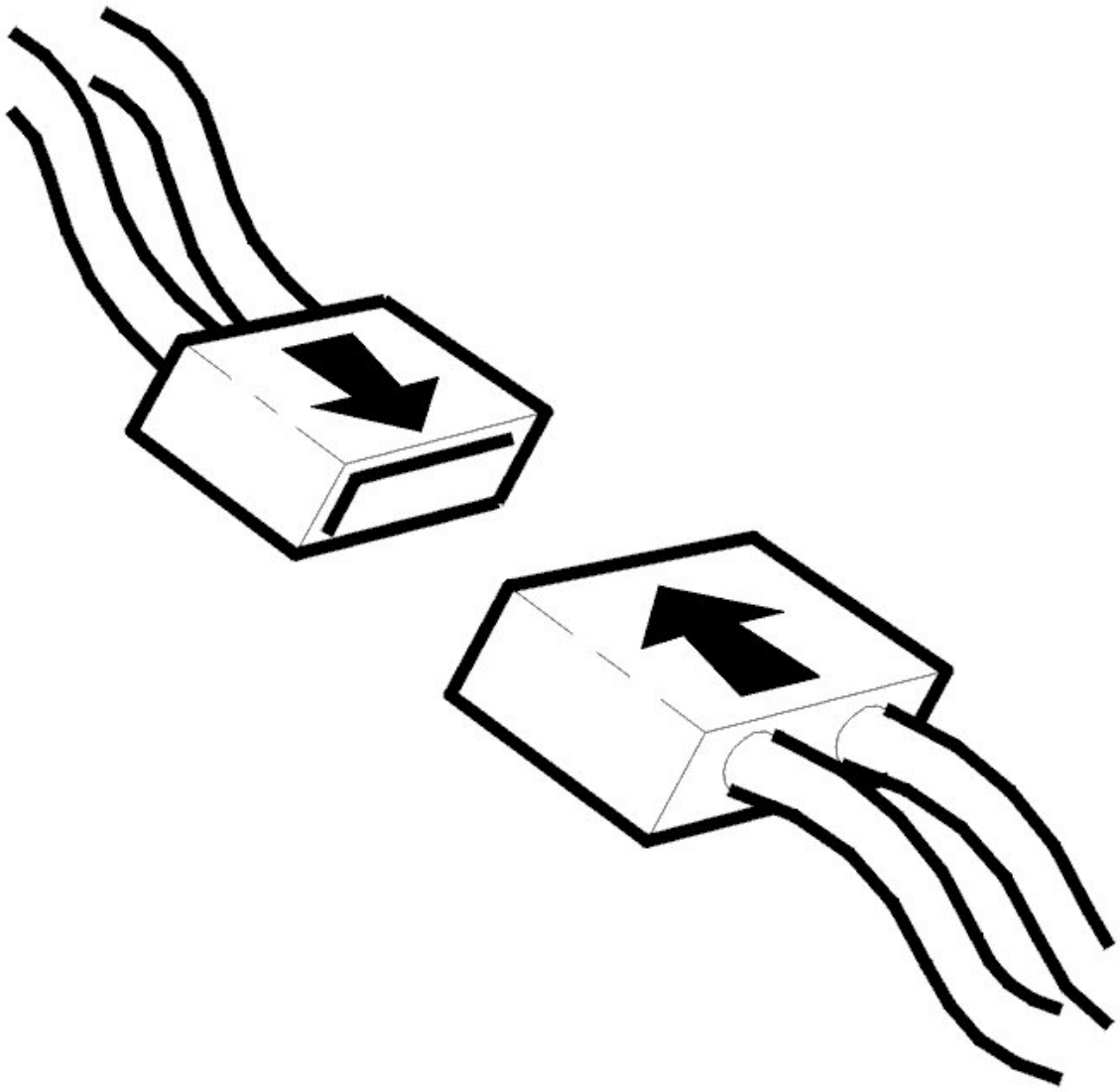
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

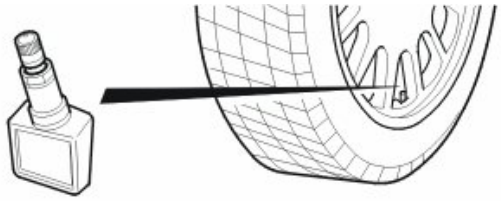
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

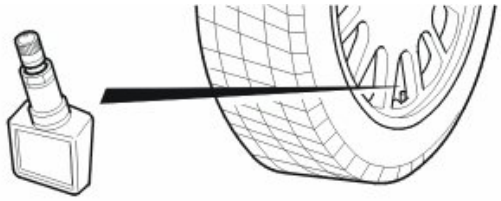
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A6

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM). The messages transmitted by the sensors contain information such as the voltage of the internal battery in the sensor.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) receives a message from the third of the four accepted sensors indicating low battery voltage.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Low battery voltage in the tire pressure sensor.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

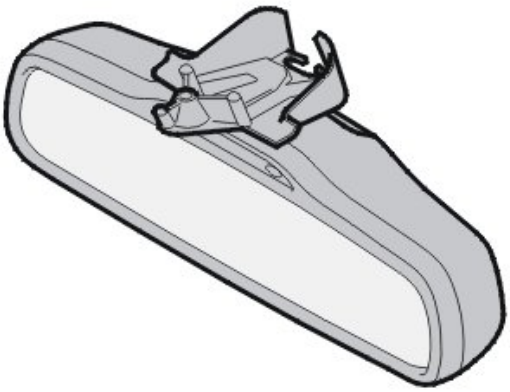
Low Battery

Low battery

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

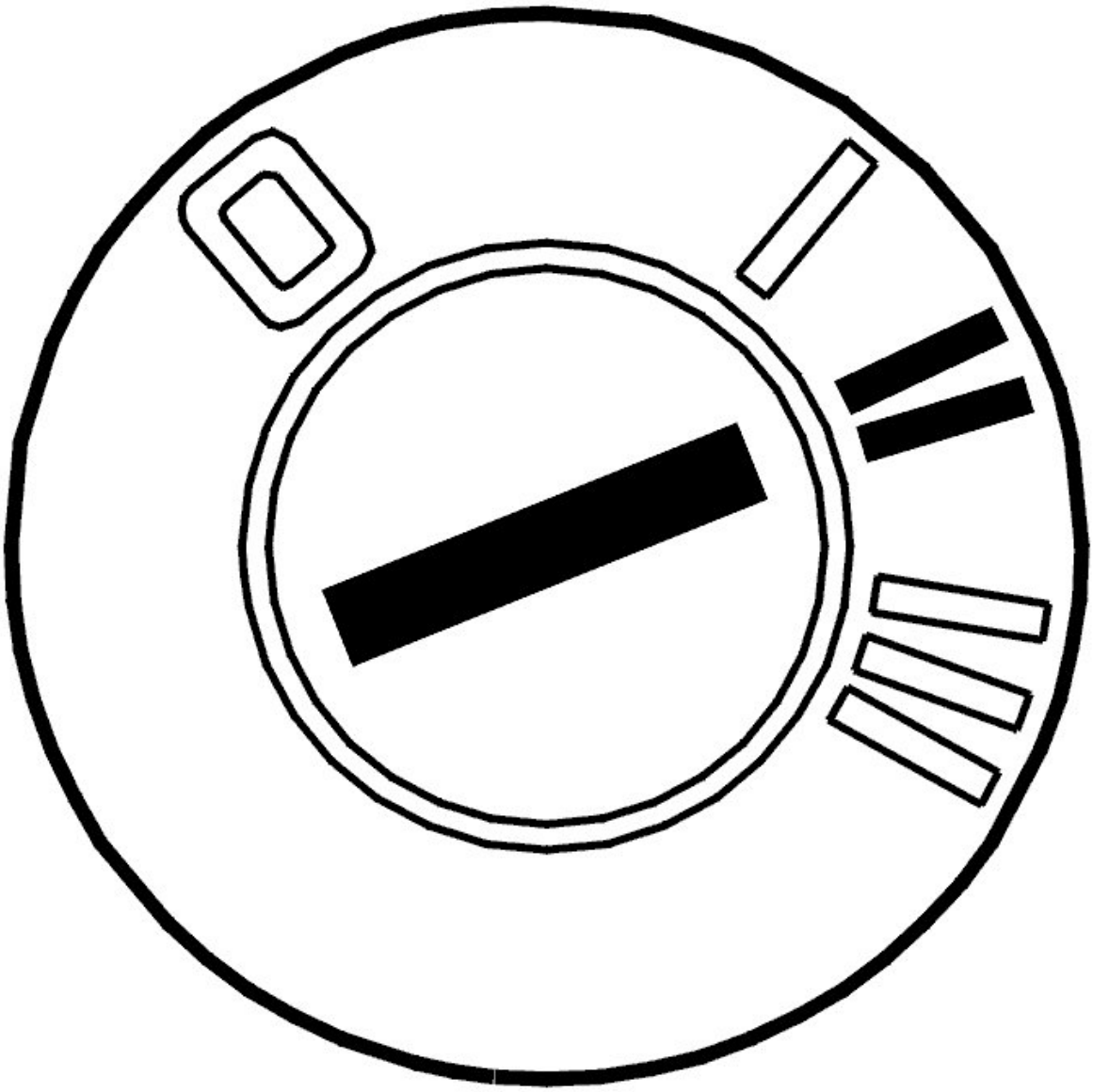


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again. If the sensor does not respond, the battery has probably been discharged or the sensor does not work. Replace the sensor for the relevant wheel.

Note! Do not forget to press the correct button after each wheel has been activated.

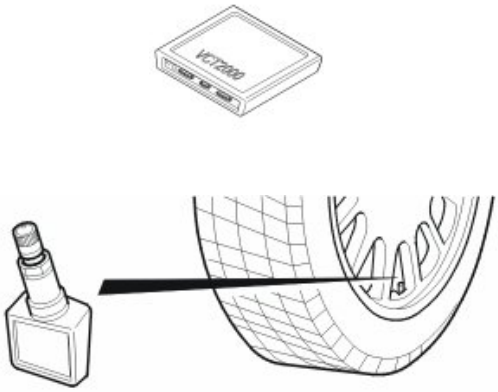
Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.
Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

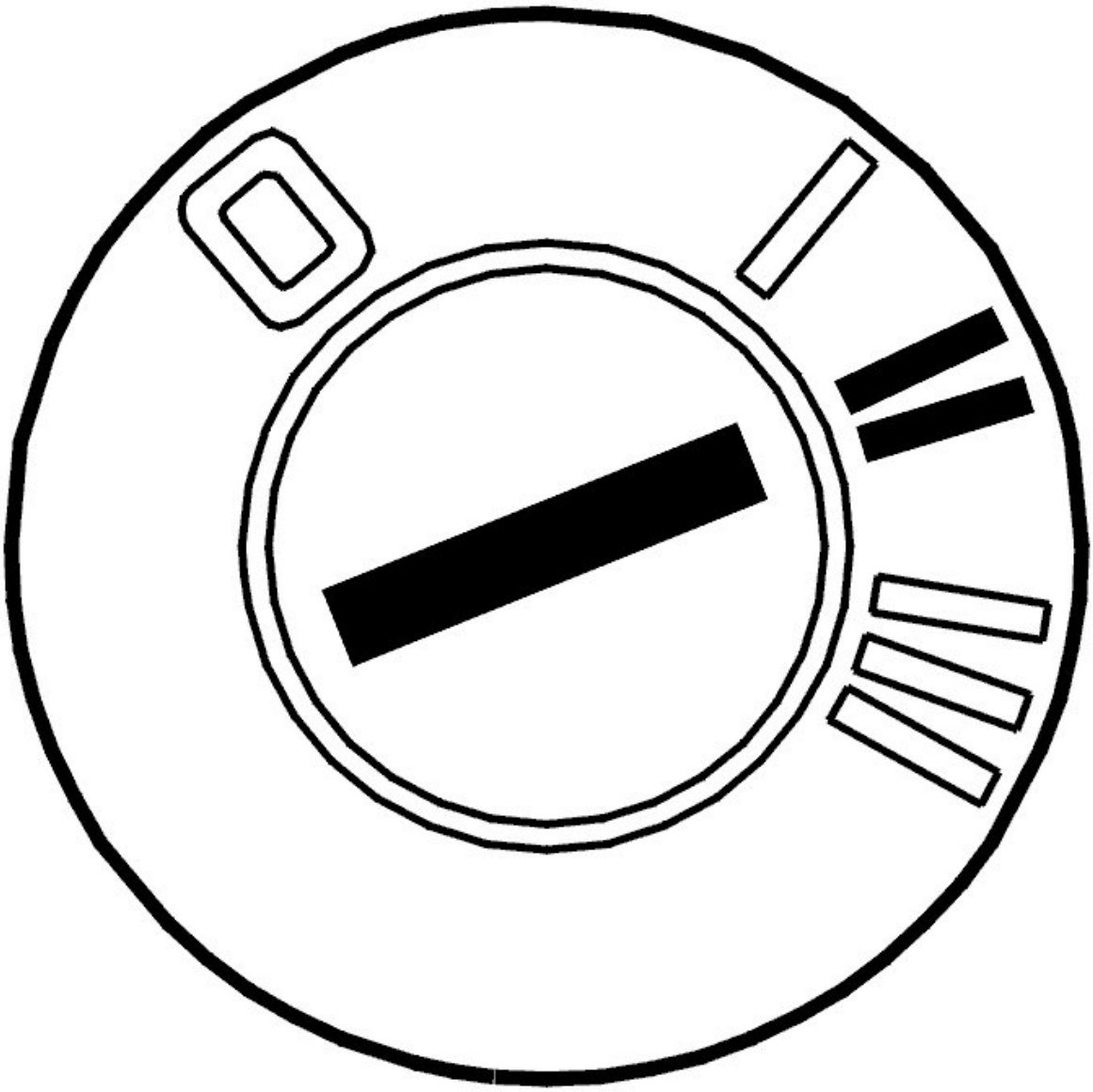
Attempt New Test - Checking the remote receiver

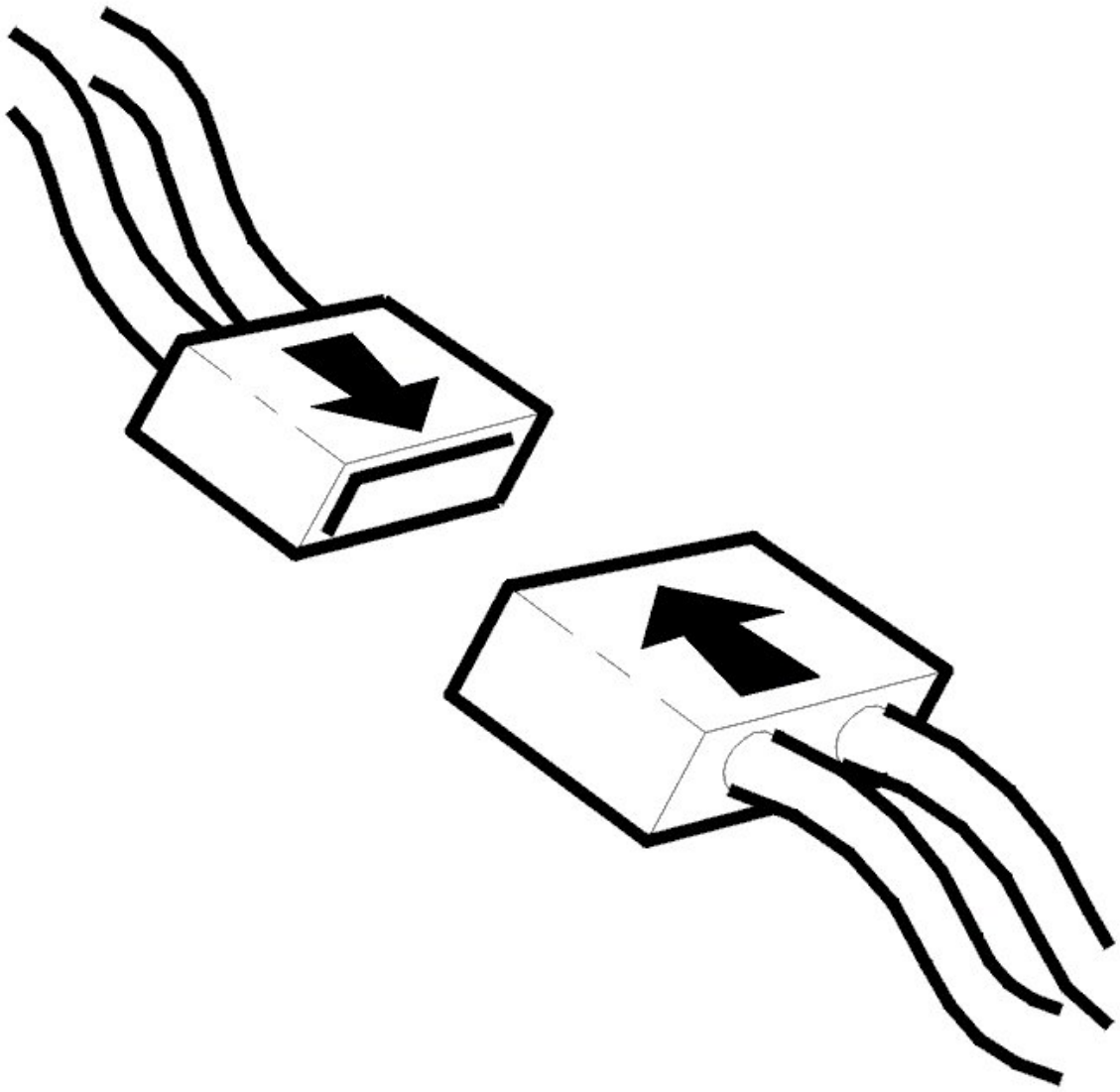
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

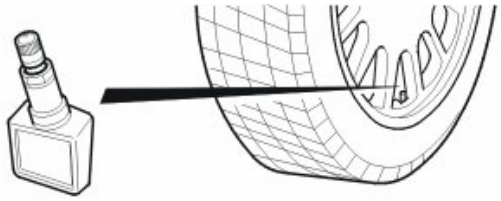
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

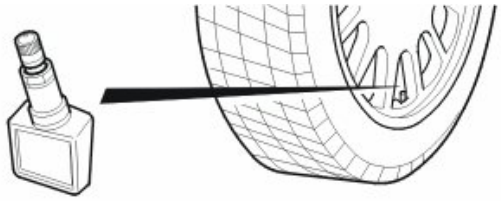
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A7

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM). The messages transmitted by the sensors contain information such as the voltage of the internal battery in the sensor.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) receives a message from the fourth of the four accepted sensors indicating low battery voltage.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- Low battery voltage in the tire pressure sensor.

Fault symptom[s]
- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

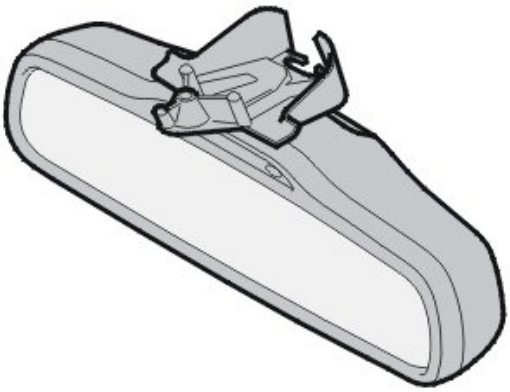
Low Battery

Low battery

Checking the remote receiver

The remote receiver is located in the inner rear view mirror, and receives signals from both the remote control and the tire pressure sensors. The function of the remote receiver can be checked using the remote control.
Check that the remote receiver works by pressing the lock and unlock button on the remote control. The vehicle should be locked and unlocked.

Note! Fault-trace the symptoms first, if the remote control and receiver are not working.

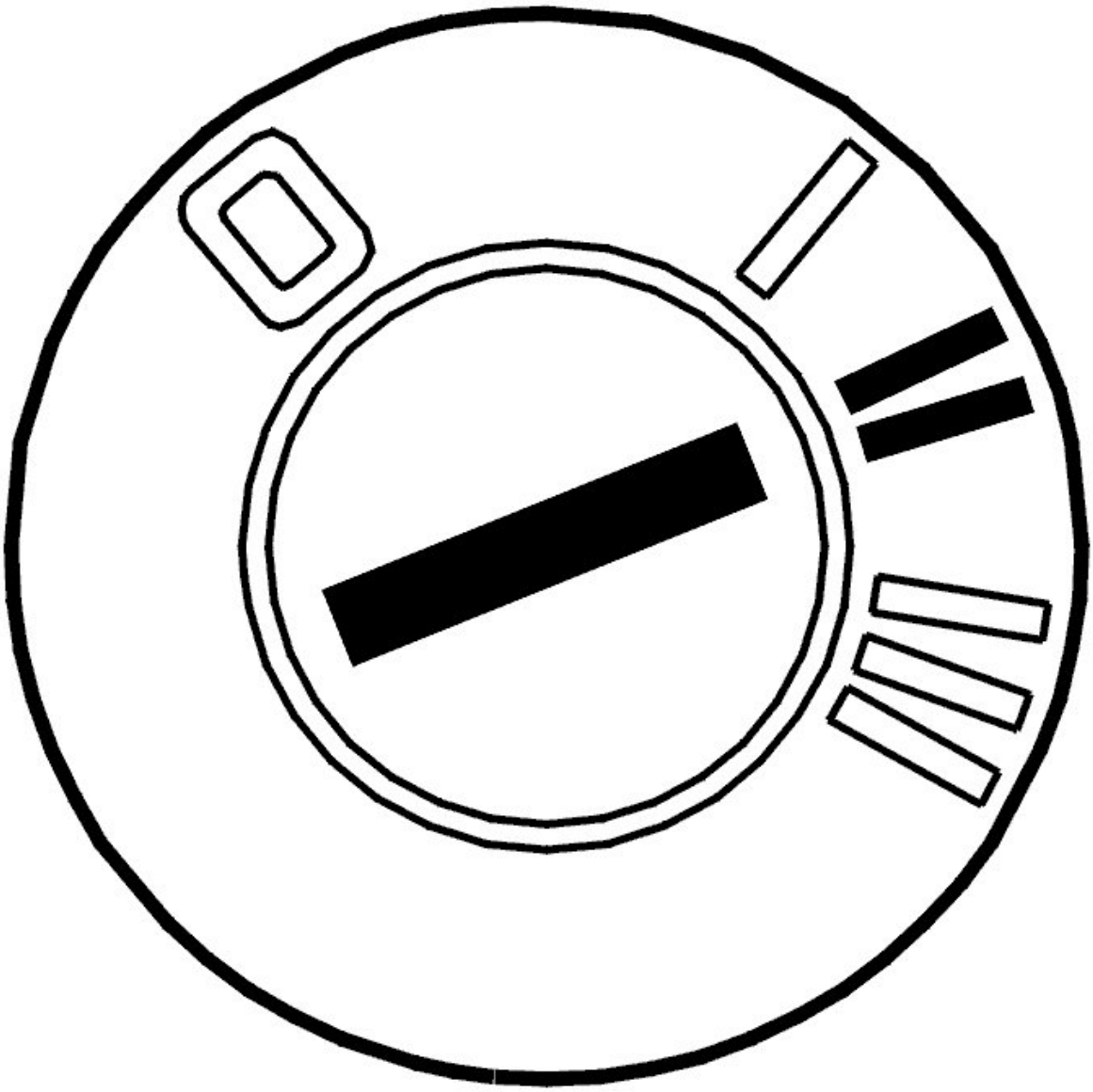


Does the remote control and remote receiver work?

Yes - Checking tire pressure sensors

No - DONE

Checking tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number and battery voltage status, which are sent to and stored in the Upper electronic module (UEM)
Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear. If the same ID number is displayed as for the previous wheel, activation has failed. Then activate the relevant wheel again and press the "Show data" button again. If the sensor does not respond, the battery has probably been discharged or the sensor does not work. Replace the sensor for the relevant wheel.

Note! Do not forget to press the correct button after each wheel has been activated.

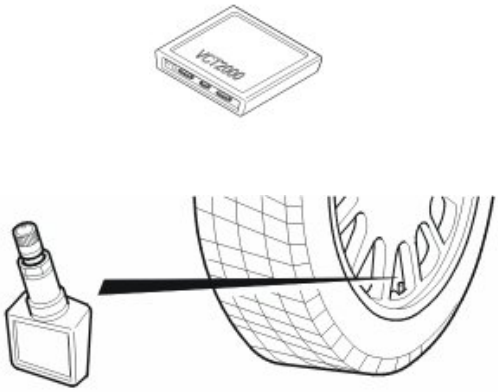
Note! Make sure no special tools lie under the edge of the rim against the tire where the sensor is installed. Activation will not happen if the tool is placed next to the rim. The tool must then be kept in position for 5 seconds for the signals to be received correctly. Use only one special tool at a time in the vicinity of the vehicle.

Note! Avoid positioning the vehicle close to other moving vehicles, the receiver may then receive signals from the sensors of these vehicles. The incorrect ID number may then appear.

Then read off the ID number that is stored for the relevant diagnostic trouble code, by clicking on the diagnostic trouble code in the list. The ID number is then displayed in the window above the list.
Compare the read-out ID number for the relevant wheel with the ID number that is stored with the DTC.
Replace the tyre pressure sensor for the relevant wheel.

Other information

- Tire pressure sensor, replacement



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

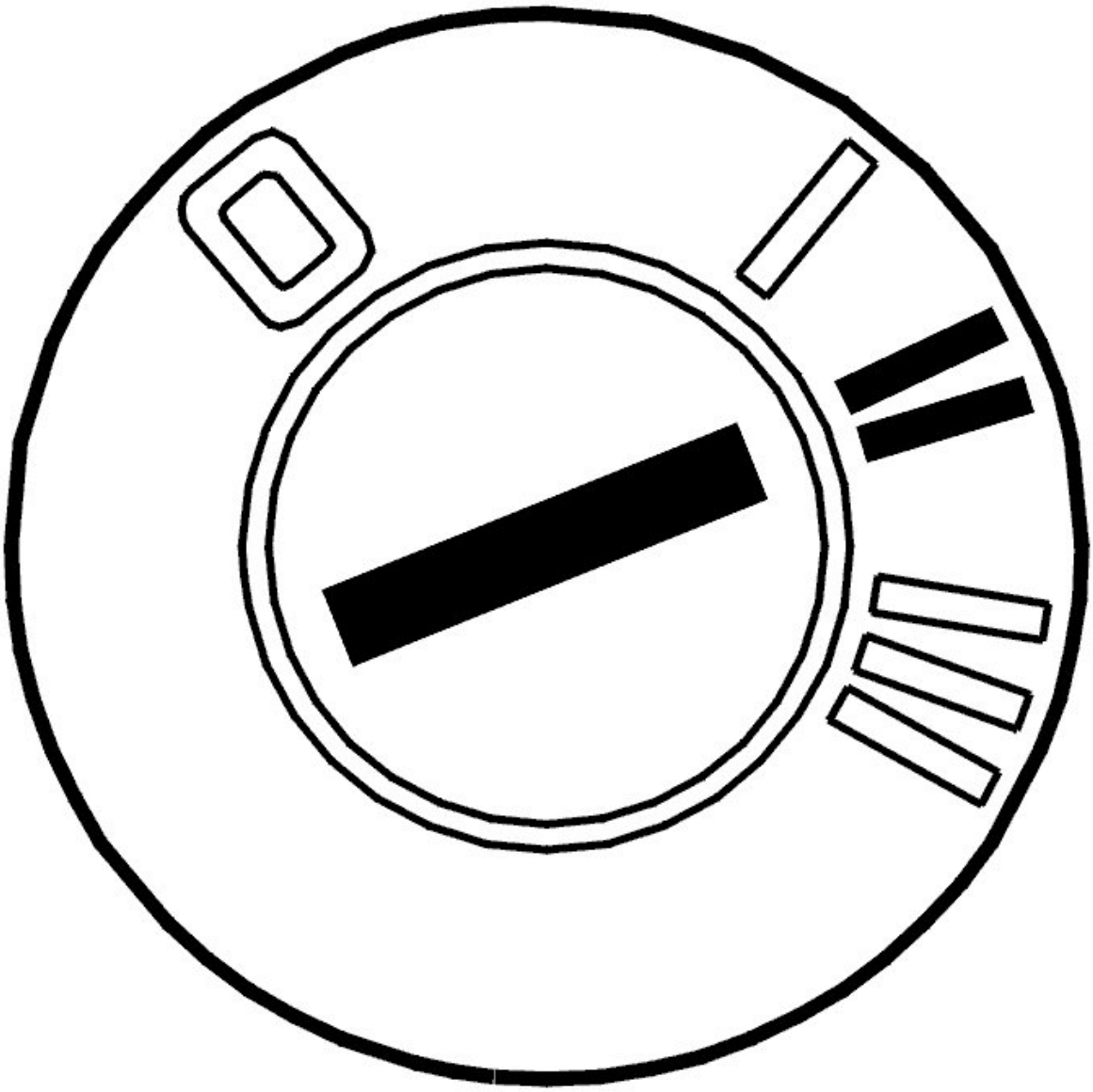
Attempt New Test - Checking the remote receiver

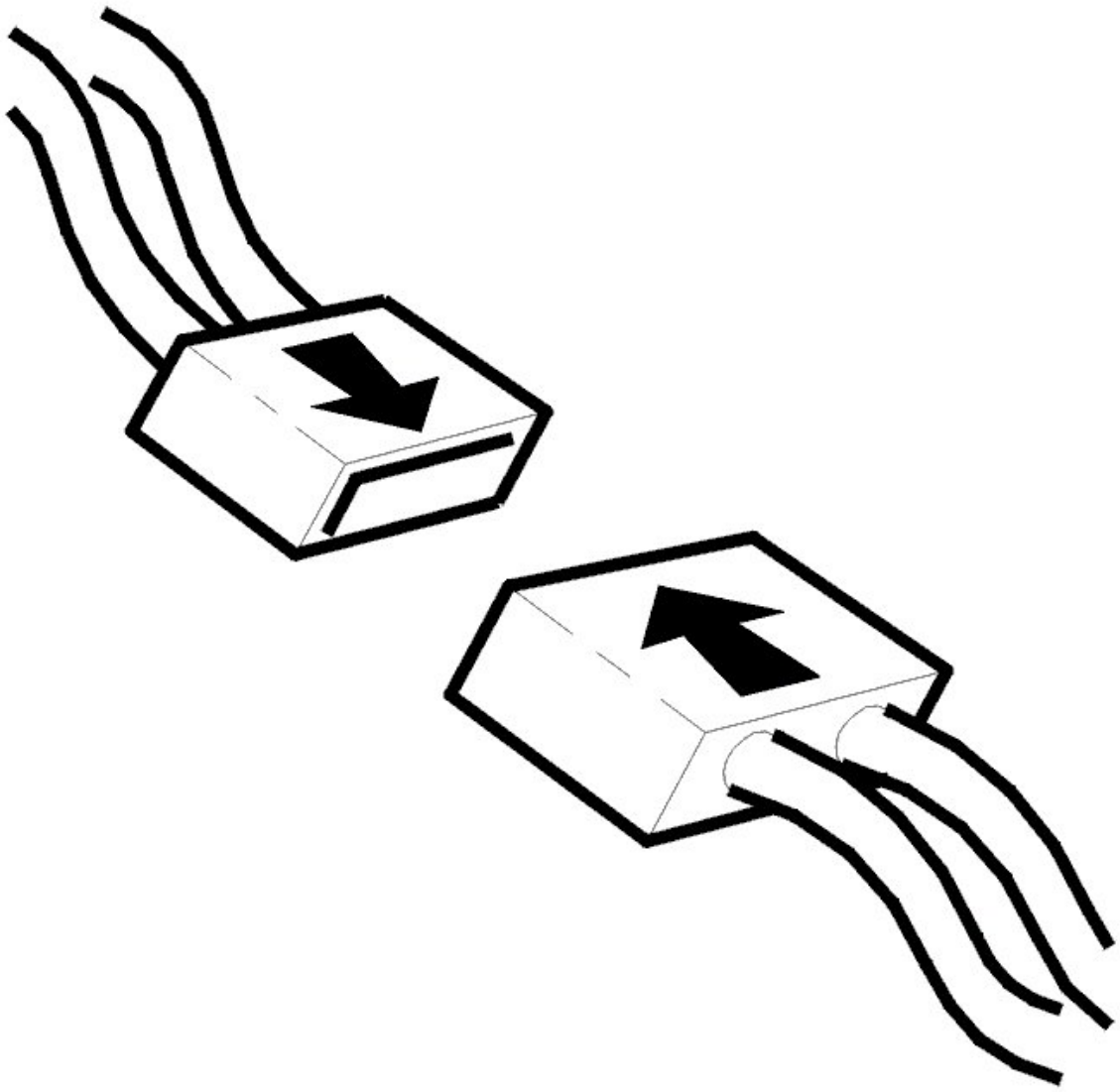
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

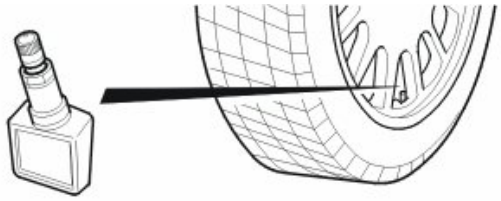
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

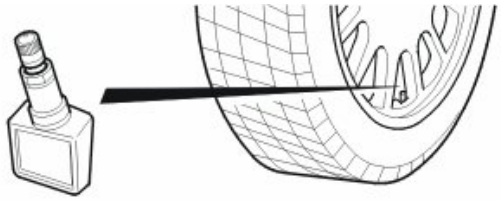
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A8

Condition



The upper electronic module (UEM) receives information transmitted by the tire pressure sensors in the wheels, irrespective of the car. The sensors which are registered in the vehicle can be checked by running a statistical selection. A list can then be stored internally in the upper electronic module (UEM).
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the signal from fewer than four of the accepted sensors has been received during an operating cycle.
The diagnostic trouble code (DTC) can be diagnosed after 10 minutes when the tire pressure warning system is active (vehicle speed is above 40 km/h (25 mph)).

Substitute value
- None.

Possible source
- A rim without a tire pressure sensor has been installed
- A rim with a tire pressure sensor not intended for this model has been installed (the sensor is unable to communicate with the receiver)
- Defective tire pressure sensor
- The receiver is not functioning.

Fault symptom[s]

- Message in the display.
- Warning lights and chimes/Tire pressure monitoring indication/no indication

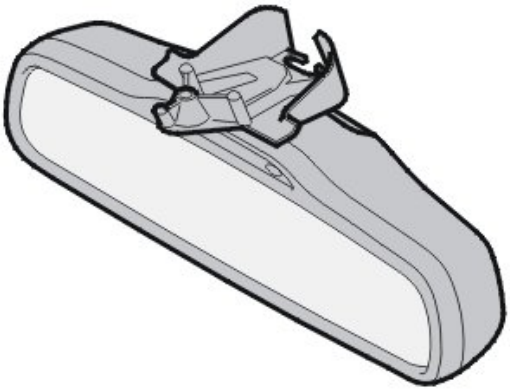
Sensor Missing

Sensor missing

Checking the receiver

The receiver is in the rear view mirror. It receives signals from both the remote control and tire pressure sensors. The remote control can be used to check that the receiver is working.
Check the function of the receiver by pressing the locking and unlocking button on the remote control. The vehicle must lock and unlock.

Note! Fault-trace the symptoms if the remote control and receiver are not working.

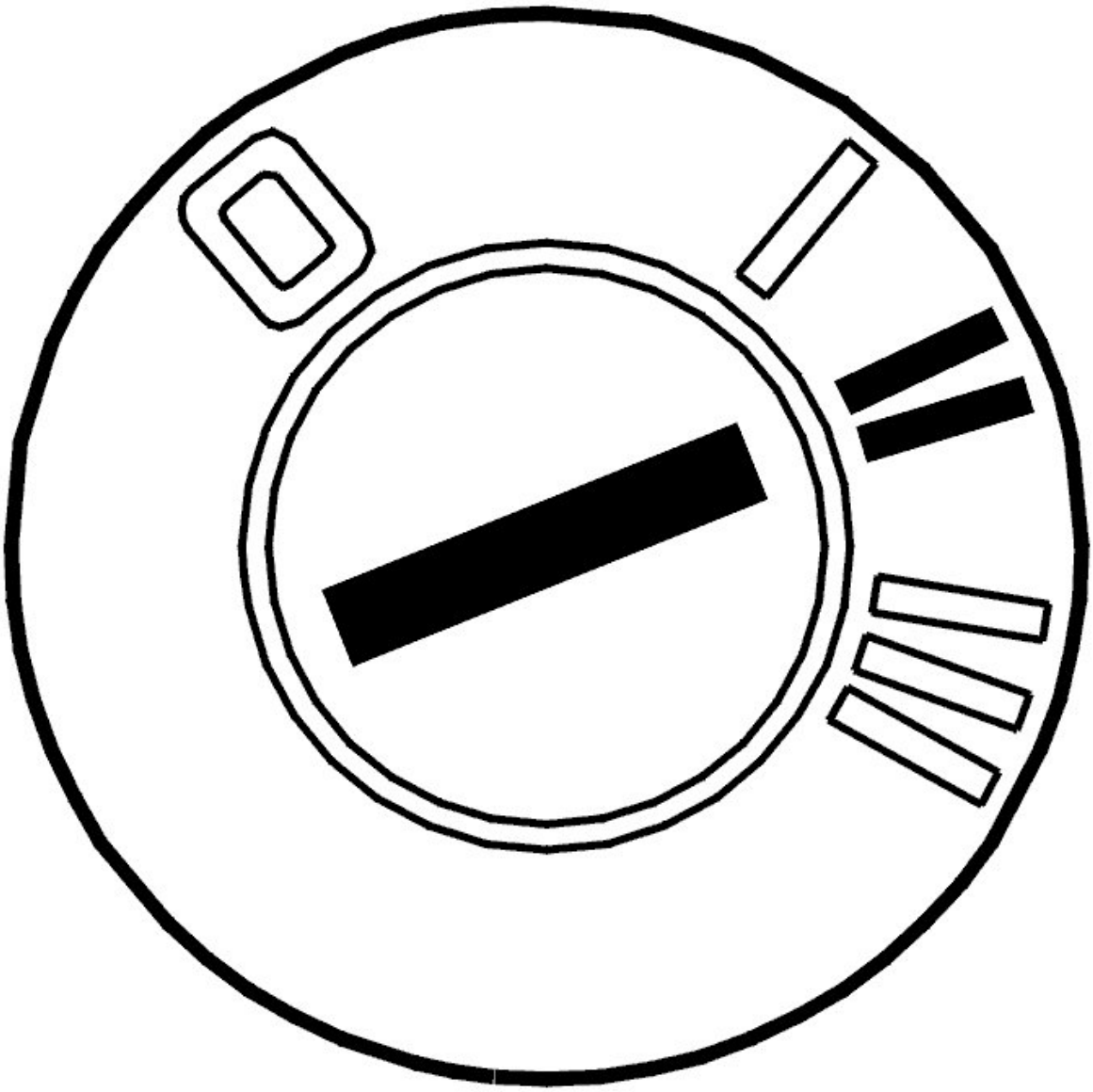


Are the remote control and receiver working?

Yes - Checking the tire pressure sensors

No - DONE

Checking the tire pressure sensors



- Ignition on.

Each tire pressure sensor has its own ID number which is transmitted to and stored in the upper electronic module (UEM). Read off the last stored ID number by clicking on the VCT2000 symbol. The last stored ID number is displayed until a new ID number is received and stored.

Note! The last stored value is erased when the ignition is switched off and on again.

Use special tool951 2963 See: Tools and Equipment/951 2963 to activate one of the sensors. The special tool activates the sensor which then starts to transmit information to the upper electronic module (UEM). The ID number of the sensor can then be read in the display.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

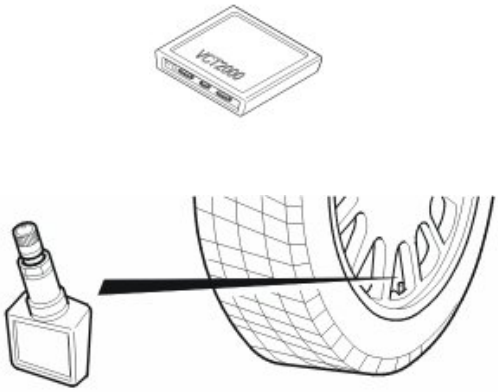
Repeat this procedure for each wheel. Different ID numbers must be displayed.

If a sensor does not respond during the test:

Check that a tire pressure sensor is installed on the rim. Install a new sensor if there is no sensor installed. If the sensor is installed but is still not working, it may be defective or be a sensor intended for another make or model. Replace the tire pressure sensor.

If all sensors respond:

Intermittent fault. The control module has previously detected that one or more sensors are not communicating. This may be because the vehicle previously had a wheel mounted without a functioning sensor.



Continue - Verification

Fault-tracing information

Information

Fault-tracing information

The fault should have been detected and remedied. As this is not the case fault-tracing has failed.
Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

Yes - FAULT-TRACING FAILED

No - Attempt New Test

FAULT-TRACING FAILED - FAULT-TRACING FAILED

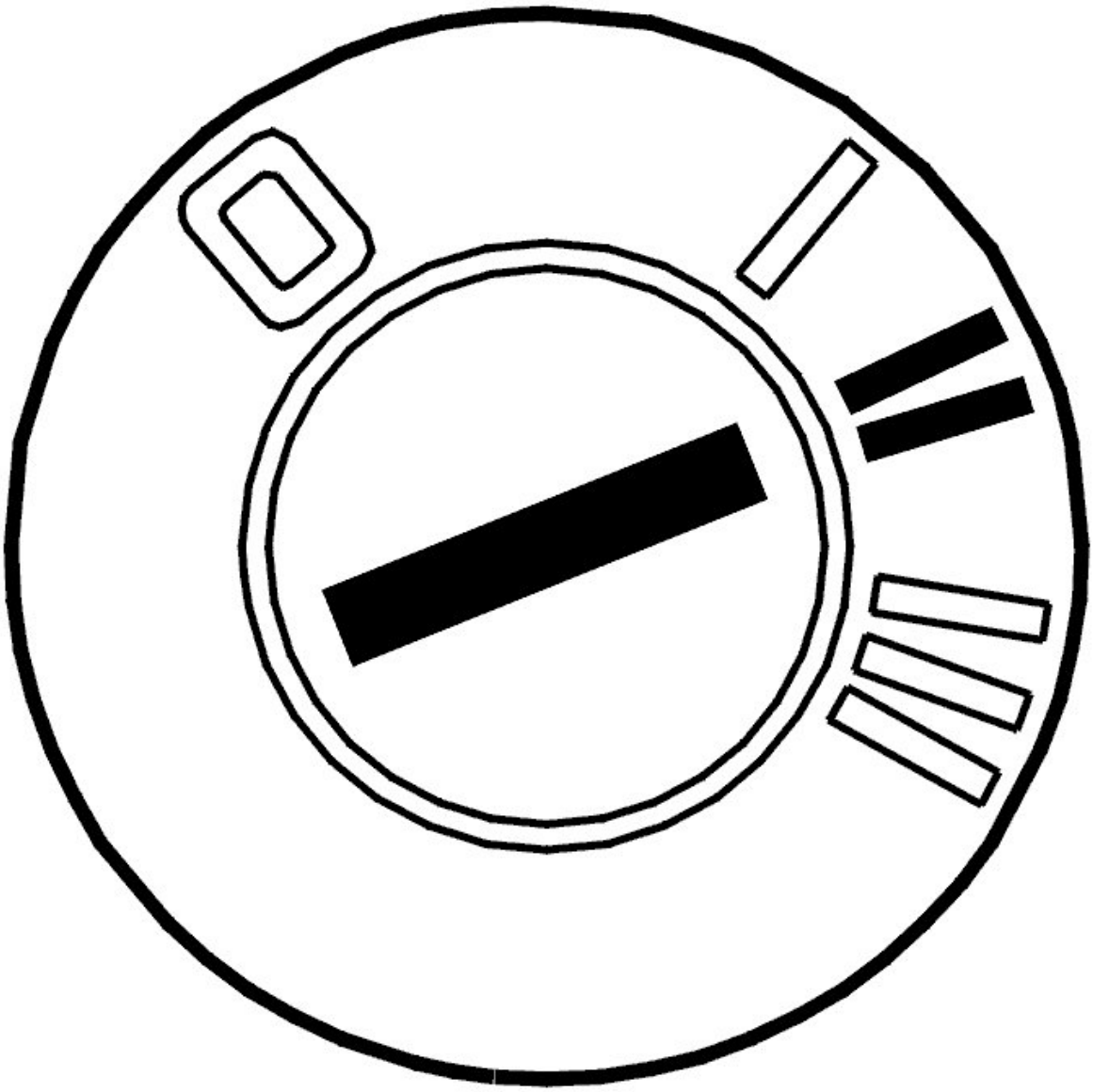
Attempt New Test - Checking the receiver

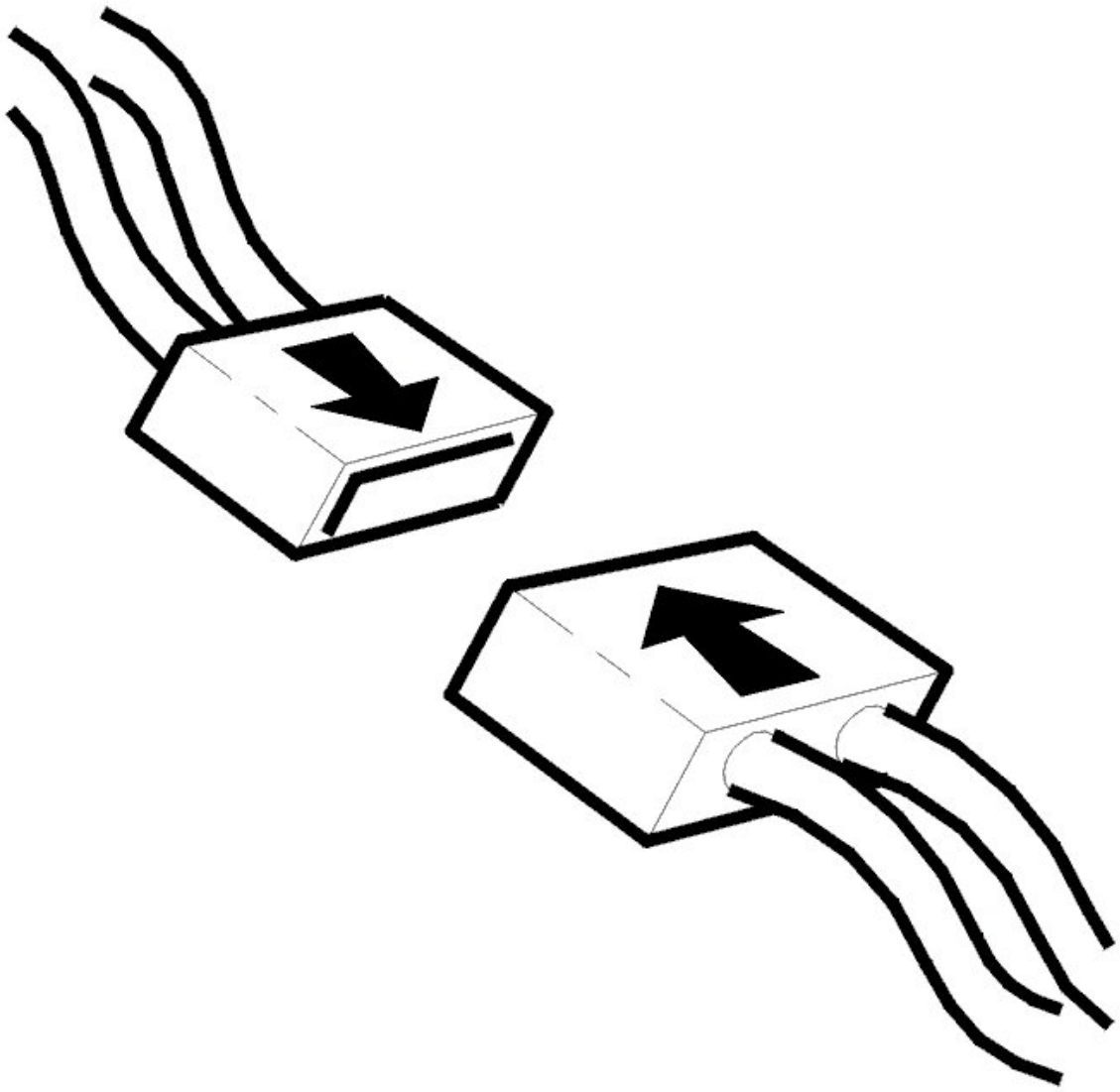
Verification

Verification

Verification

Hint: After carrying out the repair, check that the fault has been remedied.





- Ignition off
- Reinstall the connectors, components etc.
- Ignition on.

Read out the ID numbers for the tyre pressure sensors by clicking on the VCT2000 symbol.
Use the following special tools to activate the sensor.

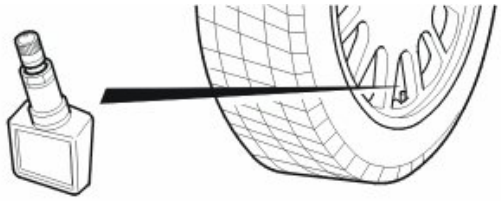
- 951 2963 See: Tools and Equipment/951 2963

The special tool activates the sensor, which then starts to send information to the Upper Electronic Module (UEM). After activating a sensor, press the "Show data" button for the relevant wheel. Repeat activation for all wheels. Different ID numbers should appear.

Note! Ensure that the special tool is positioned under the edge of the rim against the tire where the sensor is installed. The sensor will not be activated if the tool is against the rim. The sensor must then be held in place for approximately 5 seconds for the signals to be correctly received.Use only one special tool at a time in the vicinity of the car.

Note! Carry out the above in an area away from where other cars are being driven. The receiver can pick up signals from sensors on other cars. An incorrect ID number would then be displayed.

Check that the relevant sensor(s) respond. Test different wheels to ensure that different ID numbers are displayed.



Is the sensor OK?

Yes - VERIFIED

No - VERIFICATION FAILED

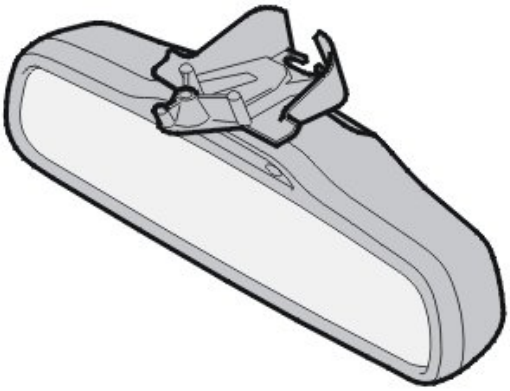
VERIFIED - Fault Found

VERIFICATION FAILED - Fault-tracing information

Diagnostic Trouble Code (DTC) Information

Diagnostic trouble code (DTC) information UEM-00A9

Condition



The upper electronic module (UEM) has a configuration file which controls certain internal settings. The upper electronic module (UEM) checks that the configuration file is correct.
The diagnostic trouble code (DTC) is stored if the upper electronic module (UEM) registers that the configuration file is incorrect or missing.
The diagnostic trouble code (DTC) can be detected when the control module is initialized after being reset or when diagnostic trouble codes (DTCs) are erased.

Substitute value
- Factory settings are used.

Possible source
- Incorrect or missing configuration file.

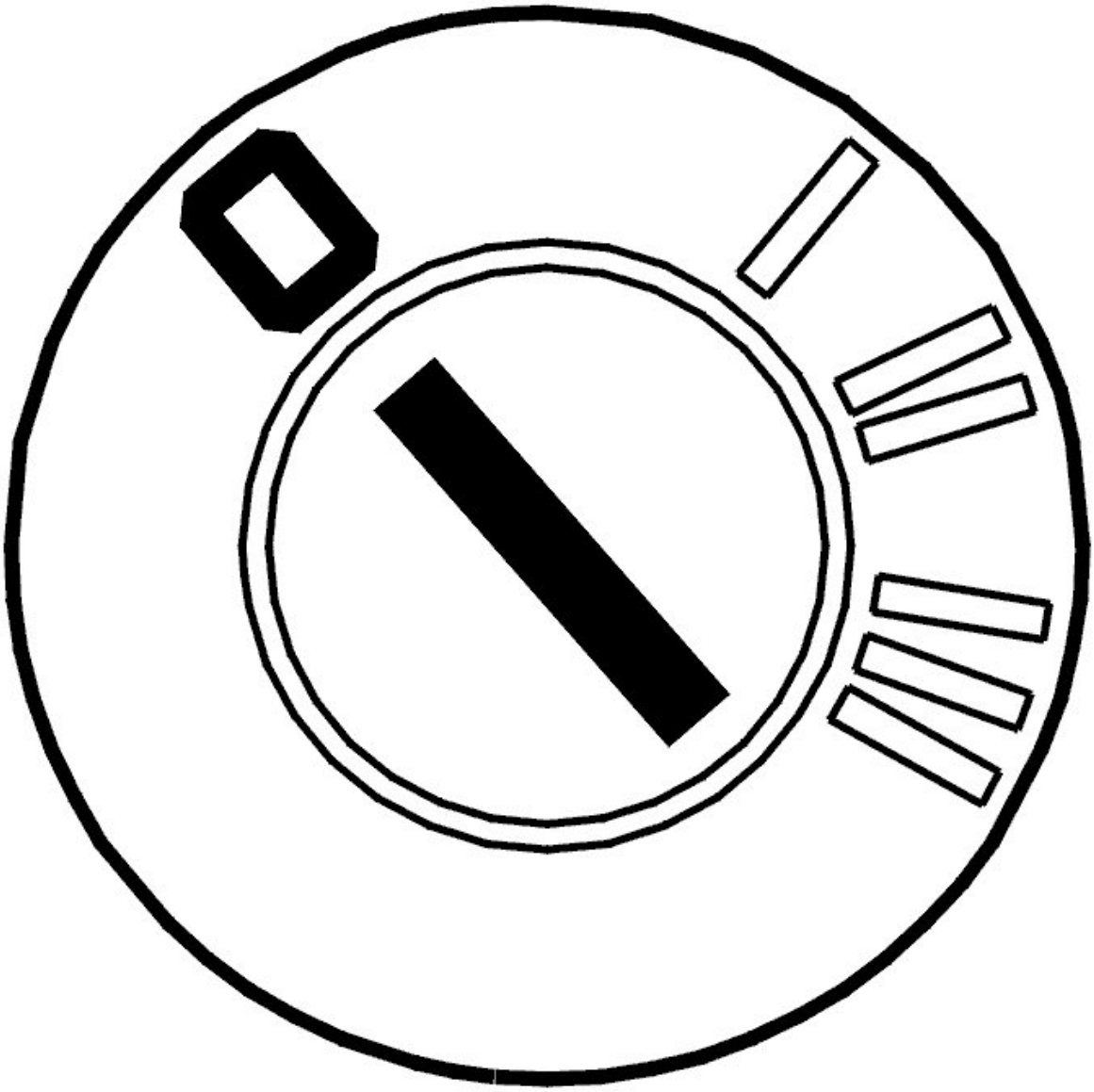
Fault symptom[s]
- None.

Configuration Fault

Configuration fault

Replacing software

Note! If possible, read off the programmed data before replacing software.



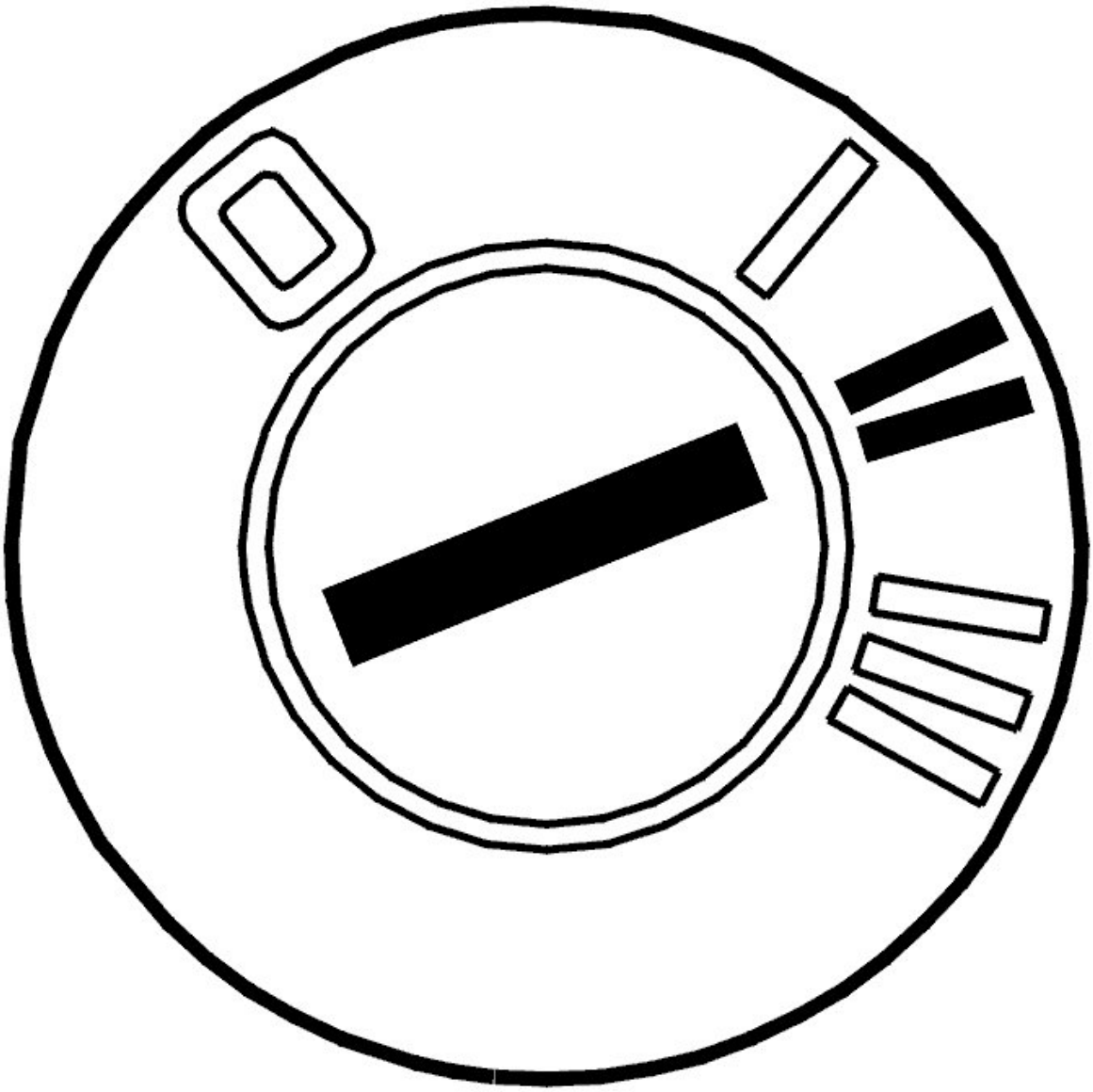
- Ignition off.

The upper electronic module (UEM) has registered a fault in the configuration file.
The fault may be due to a program fault. The software must be replaced.

Continue - Reading off programmed values

Reading off programmed values

Note! Read off the programmed values from the upper electronic module (UEM) before re-programming.



- Ignition on
- Click on the symbol for VCT2000 to read off the programmed values.

The obtained values are programmed customer parameters in the upper electronic module (UEM). These values should be noted for later use.

Other information

- For information about programming the customer parameters, see Diagnostic functions See: Body and Frame/Body Control Systems/Description and Operation/Upper Electronic Module (UEM)/Diagnostic Functions.

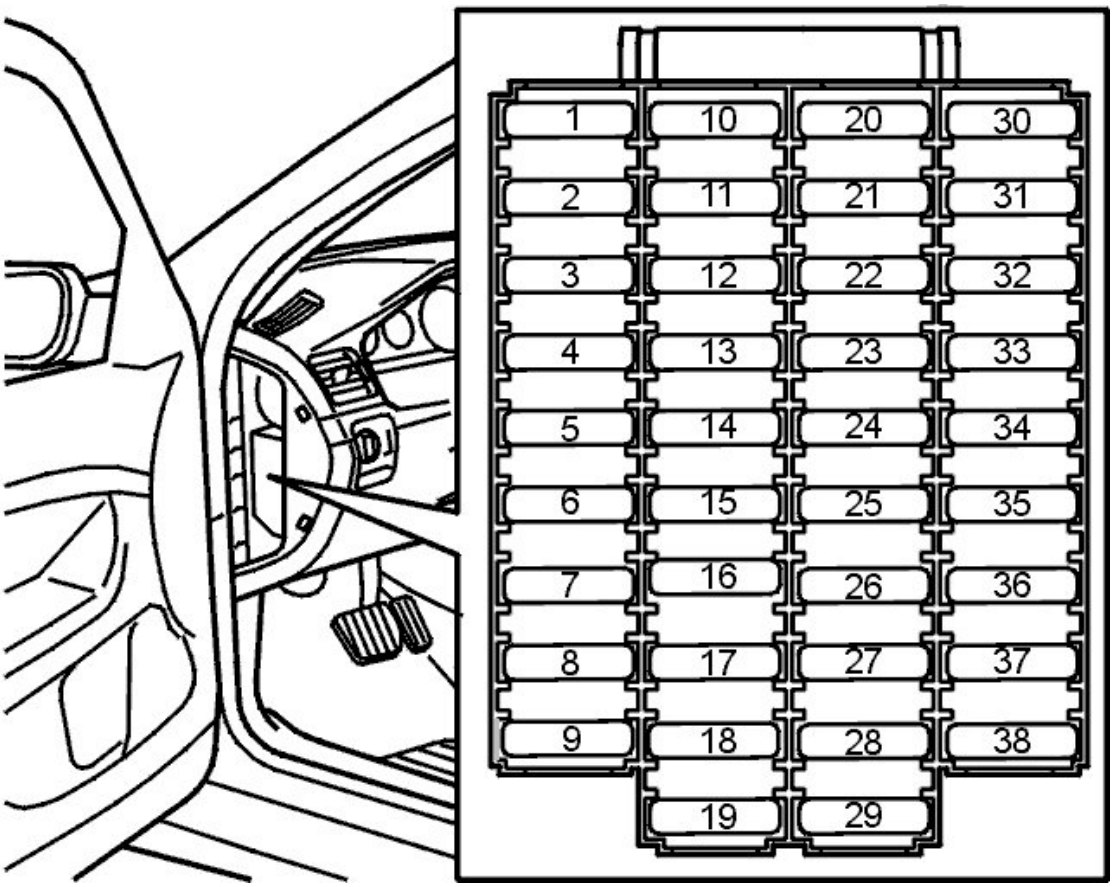
Continue - Downloading software

Downloading software

Download new software. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair. Do not replace the control module.

Hint: If diagnostic trouble code (DTC) UEM-E001 is stored, communication with the control module cannot be established. This can be remedied in two ways.

1. Press the remote control button for local lighting
2. Remove fuse 11C/28 from the fusebox in the passenger compartment. Reinstall the fuse again.



Continue - Checking interior lighting

Checking interior lighting

Checking the interior lighting (2)

Checking the interior lighting

Two times can be programmed for the interior lighting:

1. Short
- The period from when the door is unlocked, or the engine stops, to when the interior lighting goes out can be changed if it is too long or too short.

2. Long
- The period from when the door is opened, or a lamp is lit with a switch, to when the lamp goes out can be changed if it is too long or too short.

To program a long interior lighting period you must step ("click") through the short interior lighting period programming.

Continue - Programming a short interior lighting period

Programming a short interior lighting period

The general lighting and rear reading lamps light and remain lit for 30 seconds when:
- The door has been unlocked from outside with a key or the remote control.
- The engine has been stopped and the ignition key turned to 0.

The default period is 30 seconds. This can be changed to between 5 and 255 seconds.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Do you want to program any more parameters?

Yes - Programming a long interior lighting period

No - Fault Found

Programming a long interior lighting period

The general lighting and rear reading lamps light and remain lit for 10 minutes when:
- A door is opened after being unlocked.
- The lamp is lit with a switch.

The default period is 10 minutes. This can be changed to between 0 and 255 minutes at 10 minute intervals.
Read off the programmed values.
To change the time, mark the desired value in the scrolling list and start programming.

Continue - Fault Found

FAULT FOUND - Checking anti-dazzle function in rear view mirror

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Checking anti-dazzle function in rear view mirror

Checking the anti-dazzle function in the rear view mirror

Checking the anti-dazzle function

Note! If the upper electronic module (UEM) has been replaced software, specially developed for downloading after replacing the control module, must be downloaded to the control module before the anti-dazzle function is changed. See Upper electronic module (UEM) rear view / door mirror, replacing See: Body Control Module/Service and Repair.

The rear view mirror anti-dazzle function can be adjusted:
- If the rear view mirror anti-dazzle function is too powerful or too weak, it can be adjusted.

Specific software for setting the anti-dazzle function must be installed in the car to do this.
Order the software. See9499432.
Install the software. See9499432.

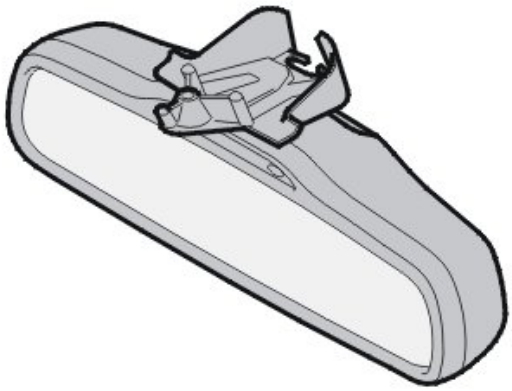
Continue - DONE

DONE - Fault Found

UEM-E001

Diagnostic trouble code (DTC) information UEM-E001

Condition



The control modules transmit and receive information via a standardized serial communication method - CAN (Controller Area Network). The diagnostic trouble code (DTC) is stored if the control module registers serious interference (CAN communication blocked).

Note! In the event of system communication problems, it is not possible to communicate with the control module. Therefore it will only be possible to read off the fault if it is intermittent.

Substitute value
- The control module shuts itself off ("bus-off").

  Hint: The control module will remain shut off until the power supply is broken (15, 30, X). When the power supply is connected the control module will make a new attempt to communicate.

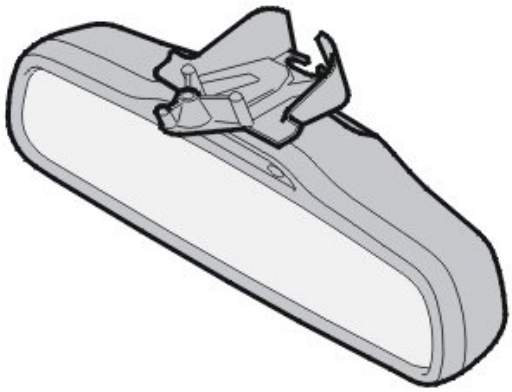
Possible source
- Short-circuit between the control area network (CAN) wiring
- Open-circuit in the control area network (CAN) wiring
- Internal fault in the control module
- Internal fault in another control module in the same part of the control area network (CAN).

Fault symptom[s]
- Cannot be controlled with the remote control
- The interior lighting does not operate
- The power sun roof does not operate
- The alarm does not function at all
- No rain sensor function.

UEM-E003

Diagnostic trouble code (DTC) information UEM-E003

Condition



The control module compares its configuration ID with the signal configuration transmitted on the control area network (CAN) by the central electronic module (CEM). If the configuration IDs do not correspond the fault code is stored. The diagnostic trouble code (DTC) is also stored if the communication between the control module and the central electronic module (CEM) is interrupted.

Note! In the event of open-circuit in both the control area network (CAN) cables, it is not possible to communicate with the control module. Therefore it will only be possible to read off the diagnostic trouble code (DTC) if this type of fault is intermittent. When the diagnostic trouble code (DTC) is stored, the control module responds to the diagnostic command, however normal control area network (CAN) communication does not work. ("Expulsion mode")

Substitute value
- None.

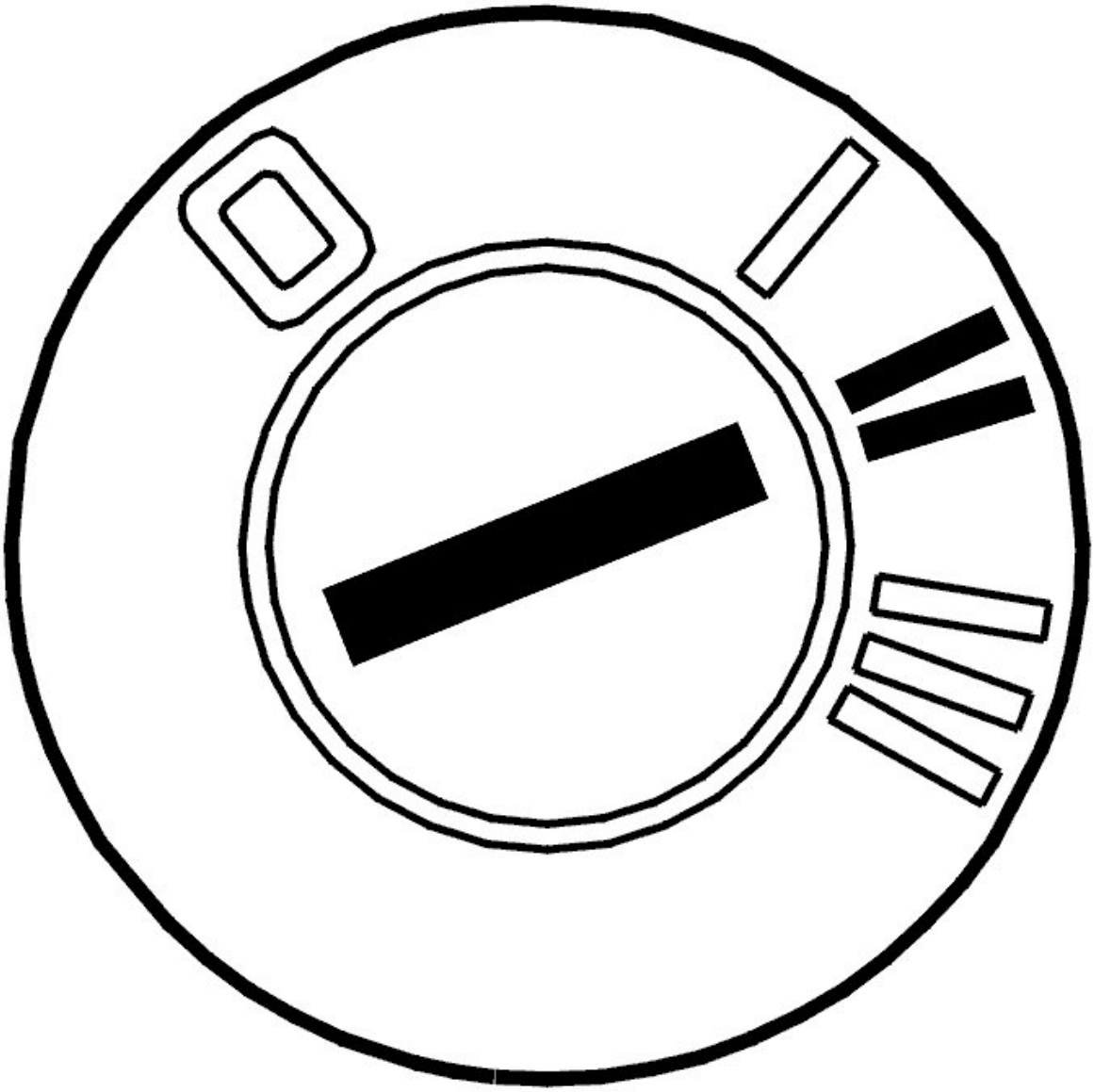
Possible source
- Faulty control area network (CAN) configuration ID. (The node is not intended for this car, for example a used control module with different software/hardware.)
- Open-circuit in the control area network (CAN) wiring between the control module and the central electrical module (CEM).

Fault symptom[s]
- Cannot be controlled with the remote control
- The interior lighting does not operate
- The power sun roof does not operate
- The alarm does not function at all
- No rain sensor function.

UEM-XXXX

Unknown diagnostic trouble code (DTC) for the current control module version

Reading off diagnostic trouble codes (DTCs)



- Ignition on.

Read off the diagnostic trouble code (DTC) that is stored in the car.
Make a note of the code. Report the code to VIDA customer support.

Continue - DONE

VIDA (Vehicle Information & Diagnostics For Aftersales)

VIDA (Vehicle Information & Diagnostics for Aftersales)

During the second half of 2004, VADIS (Volvo Aftersales Diagnostic and Information System) was phased out and replaced by VIDA (Vehicle Information & Diagnostics for Aftersales). The purpose of VIDA is to support service providers in repairing and servicing Volvo vehicles. VIDA provides Service and Parts information, as well as diagnostic fault tracing, and software downloads. As in VADIS, these areas are integrated into one single application. All functionality that could be found in VADIS will be found in VIDA. However, in some particular areas, e.g., the diagnostic work flow, search functionality, and the Parts catalogue, VIDA contains considerable enhancements when compared to VADIS.

Volvo's VIDA (Vehicle Information & Diagnostics for Aftersales) system ties together service and repair data, parts data, service bulletins, software (firmware) downloads, fault tracing and on-board diagnostic as well as other related information to decrease service time.

Much of the diagnostic information provided here is presented in a manner that assumes the technician is using the web-based Volvo diagnostic system (VIDA) to diagnose the vehicle. Volvo does not provide any information based on performing diagnosis with a third party diagnostic tool aside from a conversion from P Codes to Volvo ECM Codes. See: Diagnostic Trouble Code Descriptions

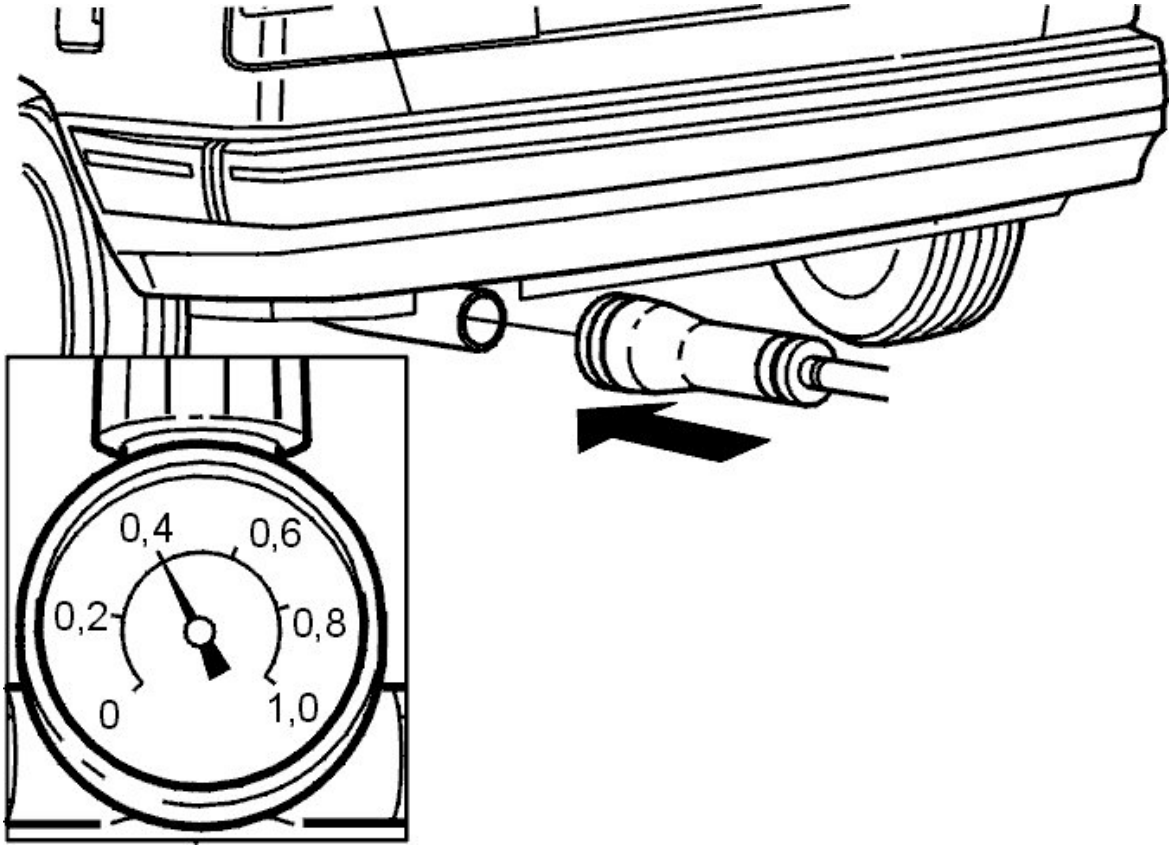
Air Leakage Exhaust System, Check

Checking for air leakage in the exhaust system

Special tools:

999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator
999 5546 ADAPTOR See: Tools and Equipment/999 5546 Adaptor

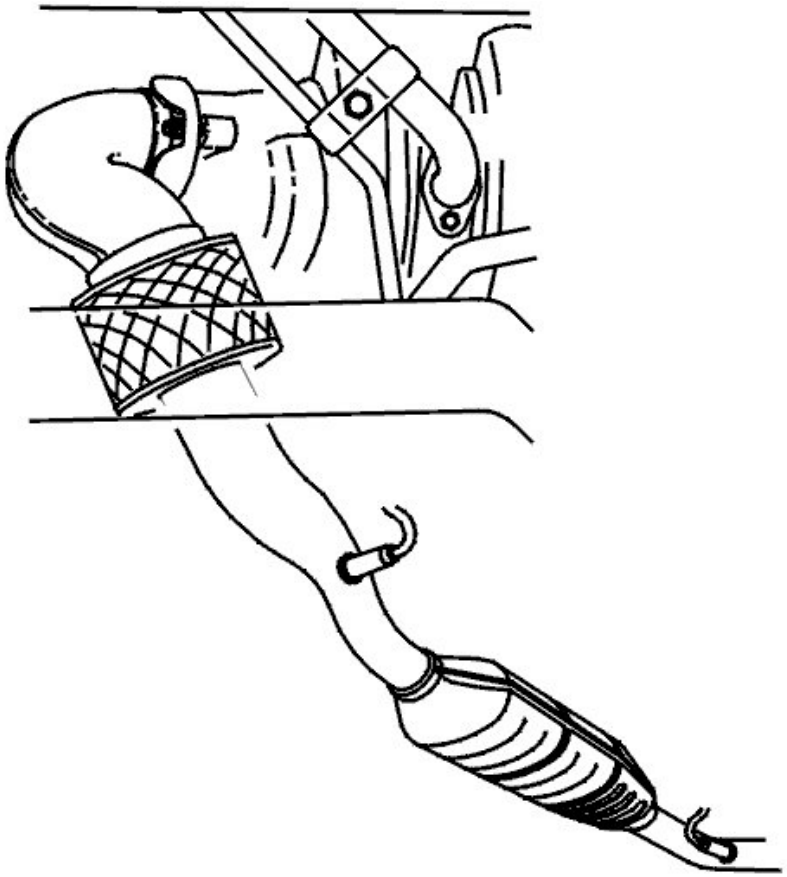
Connecting



Caution! If the car has been driven recently the exhaust system can be very hot, let it cool down a little. Otherwise the special tool may get burnt.

Remove the exhaust tail pipe.
Install tool999 5546 ADAPTOR See: Tools and Equipment/999 5546 Adaptor with pressure regulator999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator on the exhaust system.
Adjust the pressure to**0.4 bar**. Depending on the condition of the exhaust system a**lower**pressure may be necessary.

Check



Check exhaust system by spraying a soap solution on all joints and connections between cylinder head and rear heated oxygen sensor (HO2S).
Only very small and slow bubbles are permissible.
Install tail pipe on exhaust system after check.

Air Leaks in the Intake System, Checking

Air leaks in the intake system, checking

Special tools:

999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor
999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator

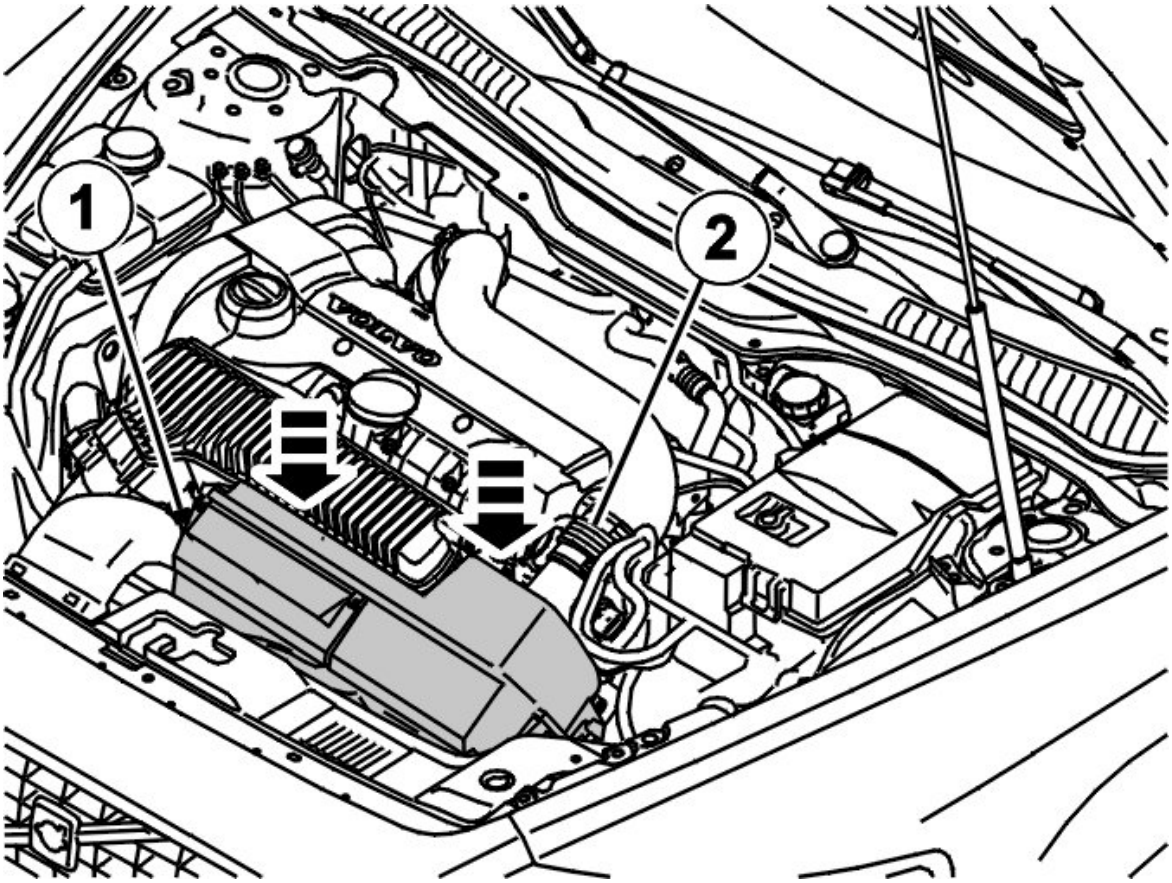
Note! The illustrations in this service information are used for different model years and/or models. Some variation may occur. However, the essential information in the illustrations is always correct.

Removal

Preparations

Check that all hoses are undamaged. Check that all hoses are in place with their hose clips tightened.

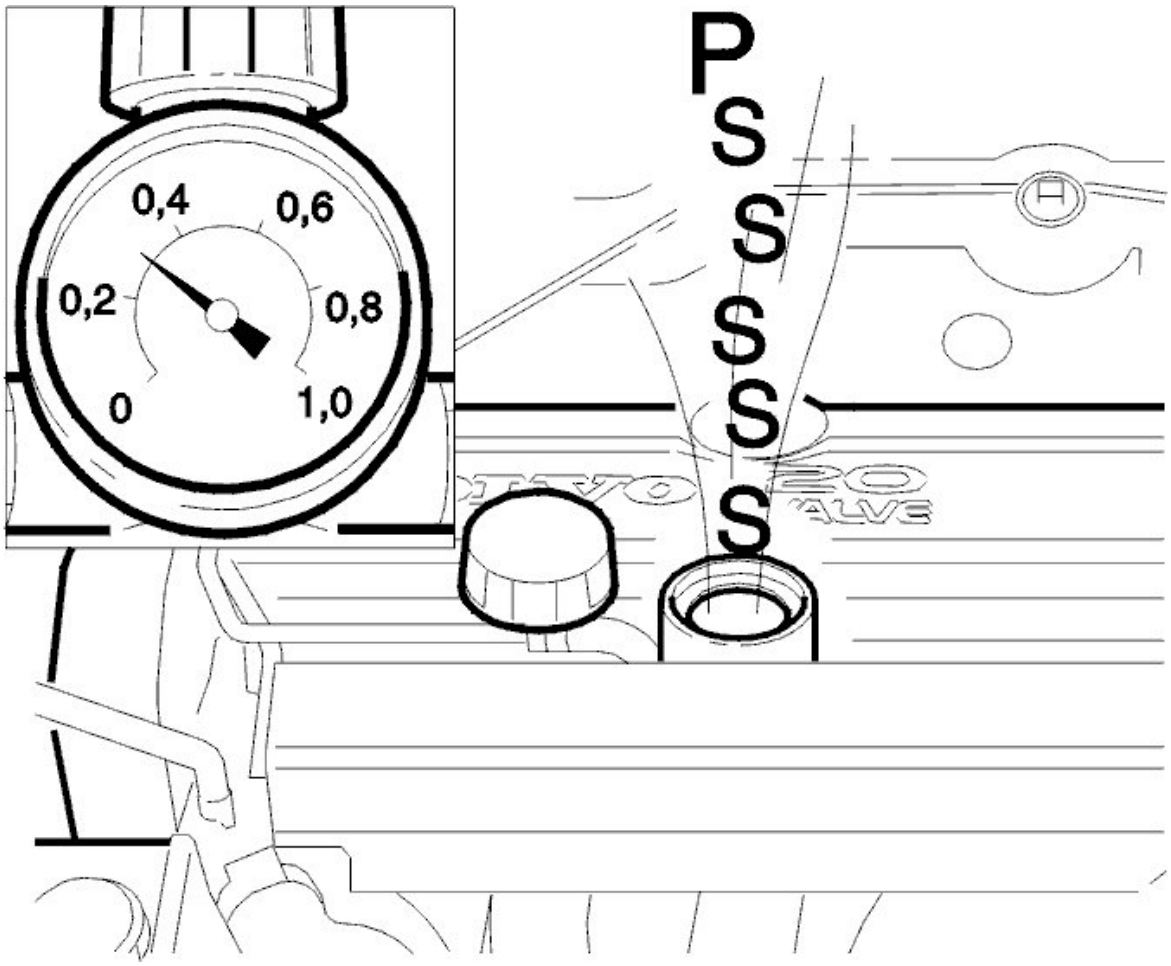
Connect the test pressurization equipment



Remove:

- the hose clamp (2) between the mass air flow (MAF) sensor and the intake manifold for the turbocharger (TC)
- the screws for the intake manifold. Fold the pipe up. Connect tool999 5545 ADAPTOR See: Tools and Equipment/999 5545 Adaptor and pressure regulator999 5544 REGULATOR See: Tools and Equipment/999 5544 Regulator to the intake manifold. Tighten the hose clamp.

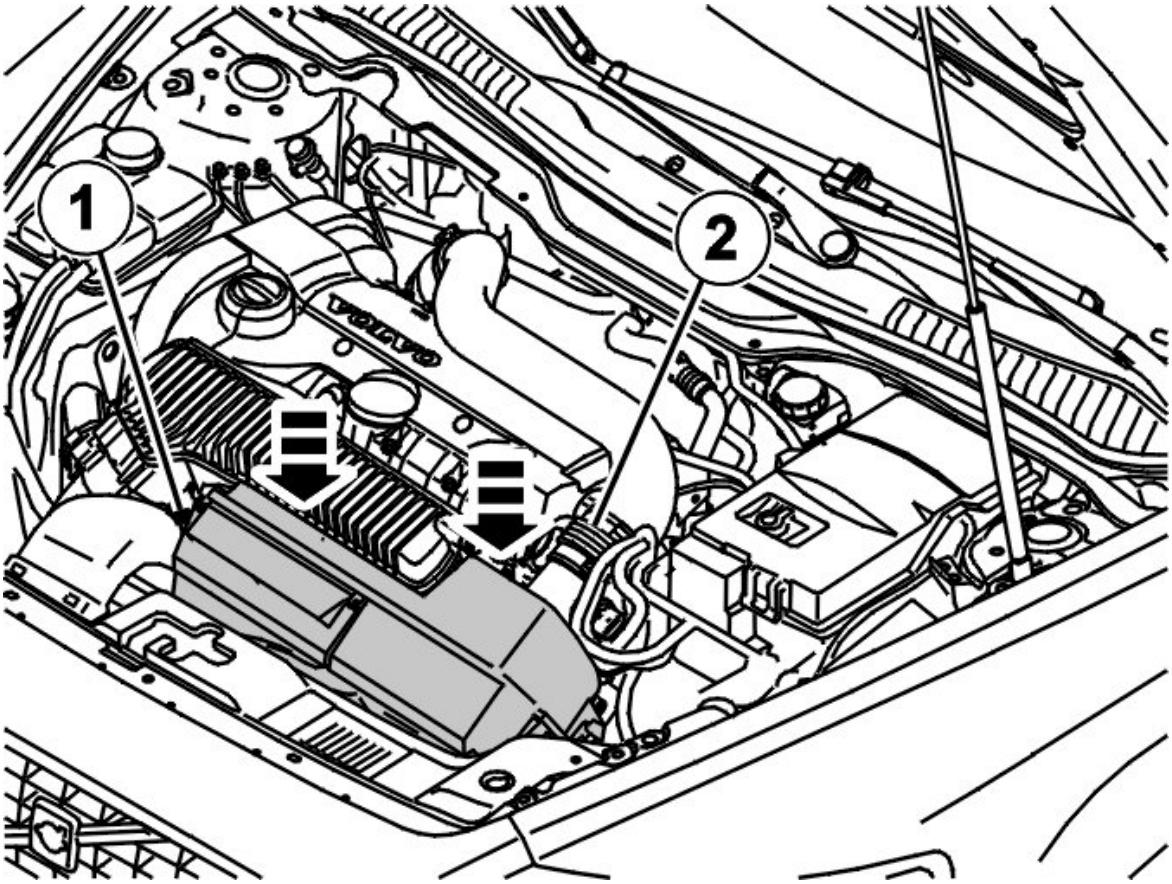
Check



Remove the oil filler cap. Connect the compressed air hose. Adjust the regulator to obtain a maximum pressure of**0.3 bar**.
There may be a gentle hissing sound from the oil filler opening. This is due to the opening of an intake valve and the leakage of cylinder pressure past the piston rings. If a leak is suspected, spray a soap solution onto the area. Remedy any leakage.

Installation

Installing components



Install:
- the intake manifold between the mass air flow (MAF) sensor and the turbocharger (TC)
- the screws for the intake manifold. Tighten
- the hose clamp (2) at the mass air flow (MAF) sensor.

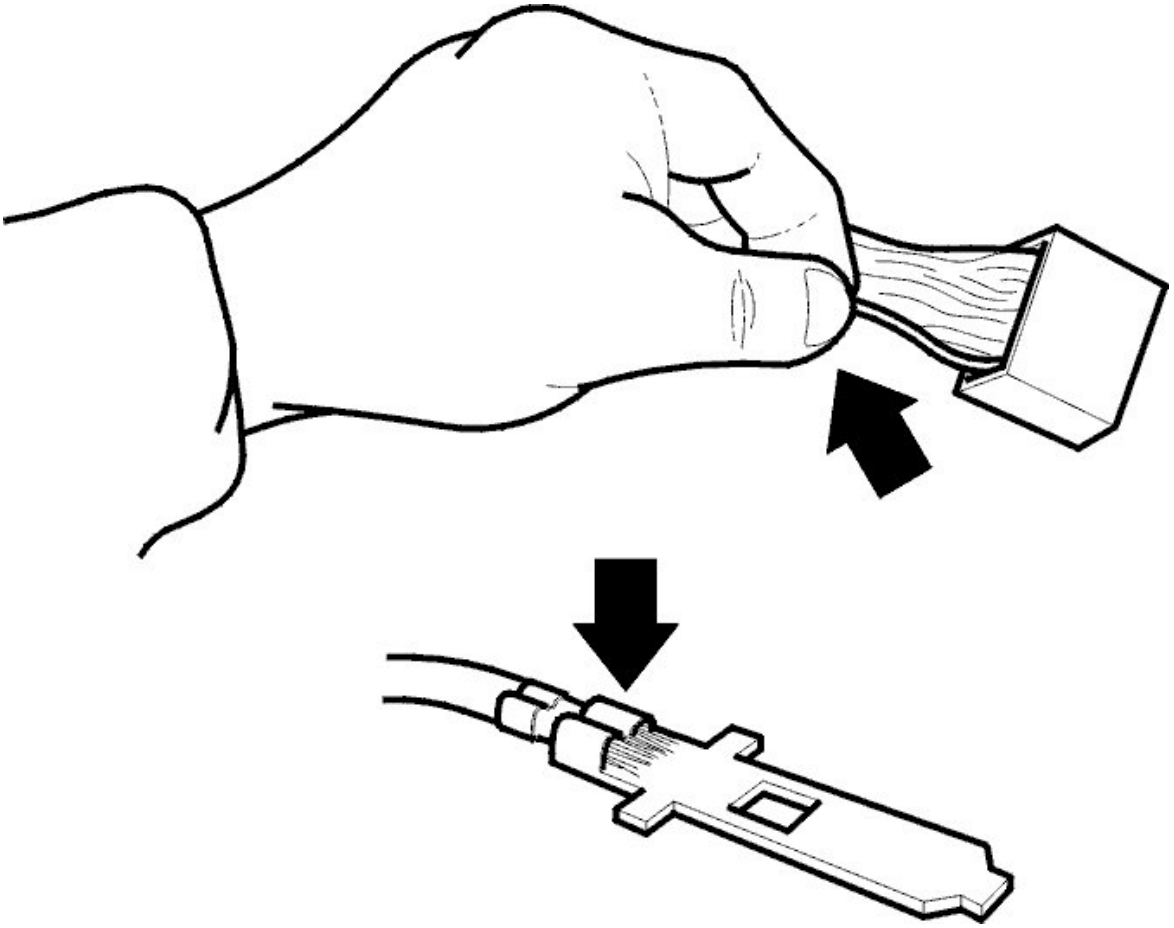
Checking Wiring And Terminals

Checking wiring and terminals

Contents

Select appropriate fault-tracing on wiring and connectors.
- Inspect terminals visually
- Open-circuit
- Short-circuit to ground
- Short-circuit to supply voltage
- Loose connections (terminals)
- Contact resistance and oxidation
- Intermittent fault-tracing See: Testing and Inspection/Component Tests and General Diagnostics/Intermittent Fault-Tracing

Inspect terminals visually



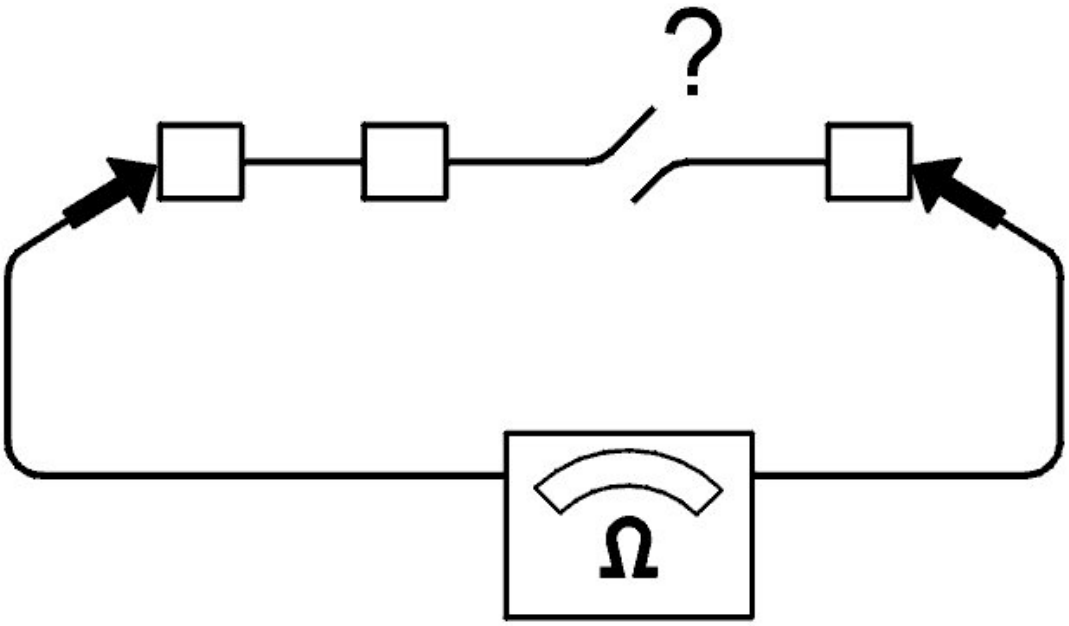
Note! When checking the engine control module (ECM), do not remove the control module from the car before the main relay has interrupted the power supply. This may take up to 4 minutes after the ignition has been switched off and the engine cooling fan (FC) has stopped running.

Inspect the terminals visually when checking, or taking readings from, opened connectors.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check for oxidation. This can cause poor connections in the terminals
- Check for damage to pins and terminals. Check that they are properly inserted into the connector. Check that the cable is properly connected to the pin or terminal. Check pins and terminals particularly carefully
- Using a loose male connector, test to see if the female connector provides a good contact and that the pin remains in place when the male connector is pulled lightly
- Shake the cable lightly and pull on connectors during measurement to locate damage.

Open-circuit



Caution! Avoid touching control module connector pins and corresponding cable harness connectors. There is a risk of electrostatic discharge, which could damage the control module. Relieve any charge on yourself and the tools to be used by holding the metal part of the tool and touching part of the body just before starting work.

An open-circuit in a cable will be indicated by the loss of a function (or functions).
Chafed and broken leads are common causes of faults.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

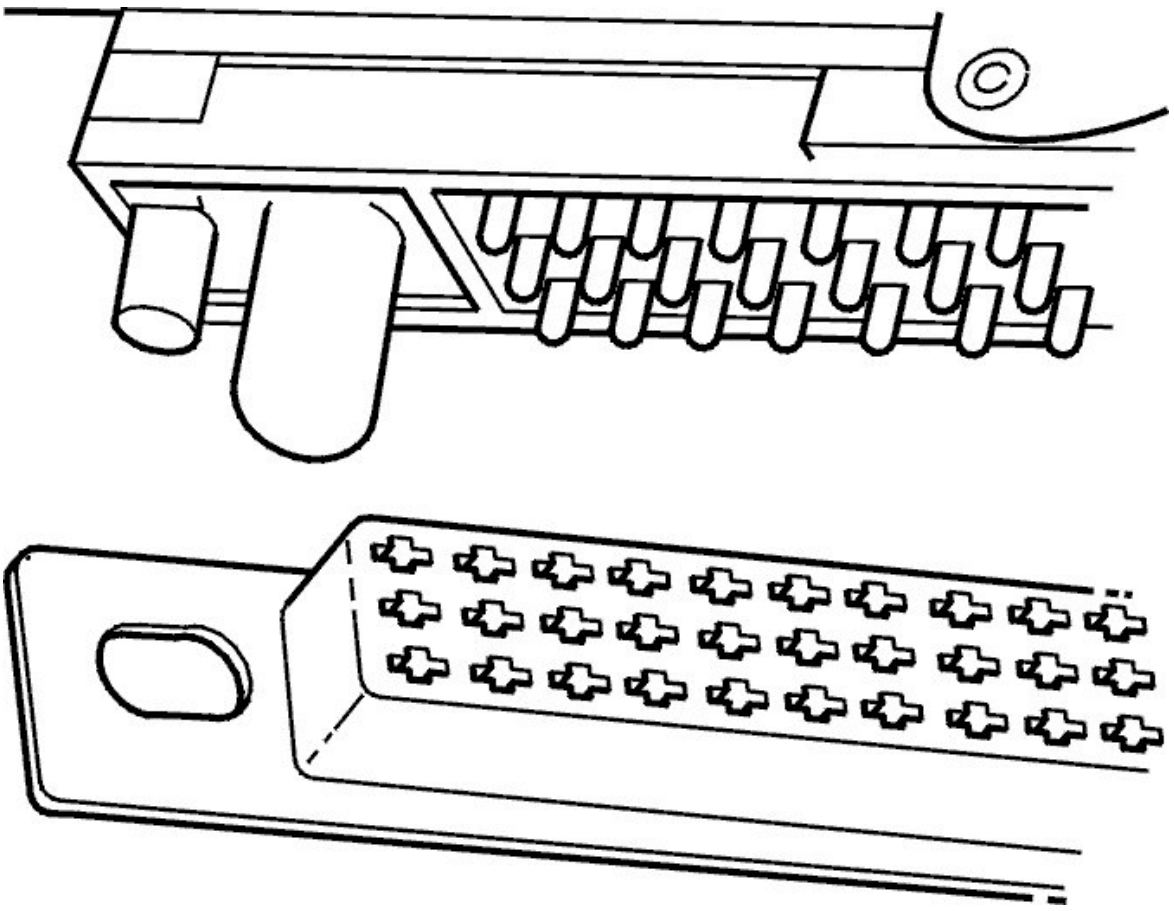
Checks:

- Disconnect the connectors at both ends of the cable.

Check the cables visually according to Inspect terminals visually.
Connect an ohmmeter between the ends of the cable.
The ohmmeter should read approximately 0ohms if there is no open-circuit in the cable.

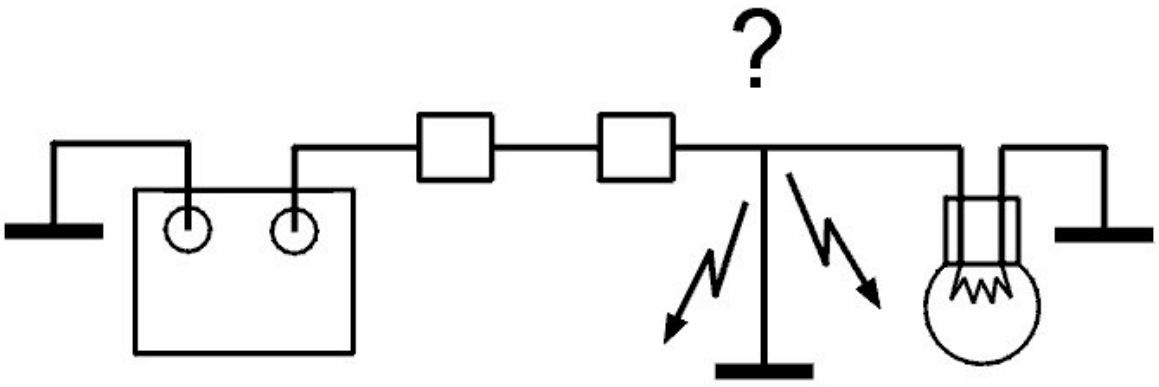
Note! When taking readings from the female connector it is important to position a replacement part between the female connector and the measuring instrument. The replacement part consists of a piece of cable with a cable terminal at one end. Never insert an object into the female connector. There is a risk of damaging the female connector.

Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct. Replace the cable and / or continue according to Contact resistance and oxidation.



Always check the control module and control module box connectors to ensure that their pins and sockets are not bent or damaged, this may cause faults.
Check pins and terminals particularly carefully.

Short-circuit to ground



Caution! Avoid touching control module connector pins and corresponding cable harness connectors. There is a risk of electrostatic discharge, which could damage the control module. Relieve any charge on yourself and the tools to be used by holding the metal part of the tool and touching part of the body just before starting work.

A short-circuit between a live cable and ground is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check the cables visually according to Inspect terminals visually.

Activate all switches and sensors in the circuit. Check whether the fuse blows

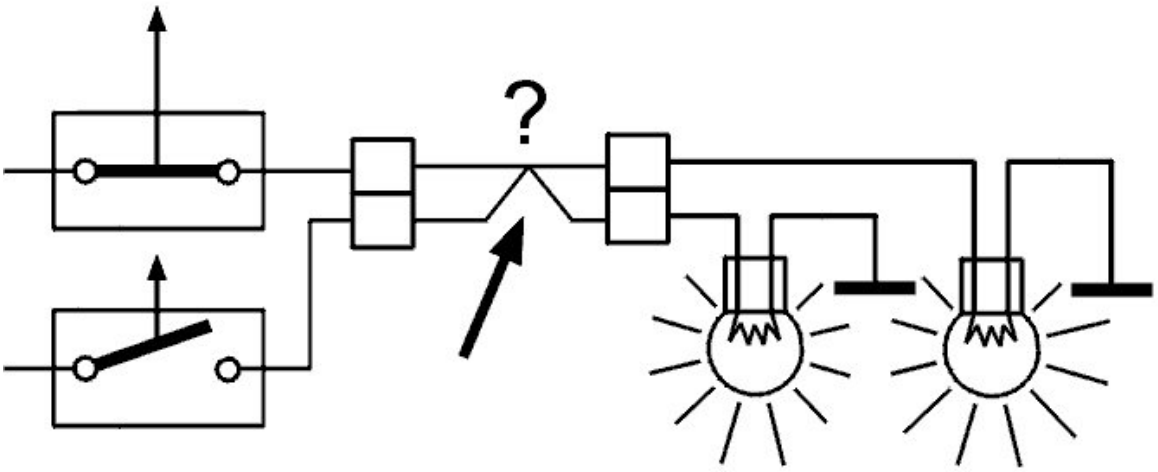
- Disconnect the connectors in the circuit to ensure that they do not affect readings.

Connect an ohmmeter between cable and ground.
The ohmmeter should read infinite resistance if no components are connected.

Note! When taking readings from the female connector it is important to position a replacement part between the female connector and the measuring instrument. The replacement part consists of a piece of cable with a cable terminal at one end. Never insert an object into the female connector. There is a risk of damaging the female connector.

Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct, replace the cable and / or continue according to Contact resistance and oxidation.

Short-circuit to supply voltage



Caution! Avoid touching control module connector pins and corresponding cable harness connectors. There is a risk of electrostatic discharge, which could damage the control module. Relieve any charge on yourself and the tools to be used by holding the metal part of the tool and touching part of the body just before starting work.

A short-circuit between a cable and supply voltage is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check the cables visually according to Inspect terminals visually.

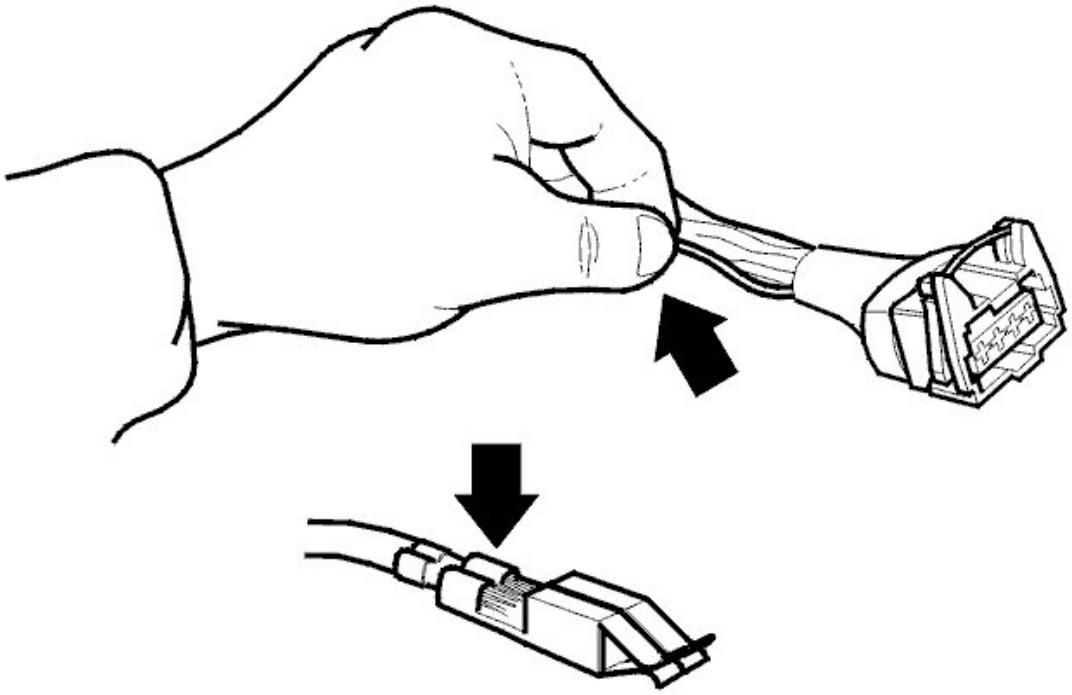
Use a voltmeter to take readings at various points in the circuit while operating switches and sensors.
The voltmeter reading depends on the circuit being tested and the positions of switches and sensors. Use the wiring diagram to determine the correct voltage in the circuit.
Use an ohmmeter between the suspect cables to detect short-circuits between them.
The ohmmeter should read infinite resistance between cables not connected to each other in the circuit.

Note! When taking readings from the female connector it is important to position a replacement part between the female connector and

the measuring instrument. The replacement part consists of a piece of cable with a cable terminal at one end. Never insert an object into the female connector. There is a risk of damaging the female connector.

Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct. Replace the cable and / or continue according to Contact resistance and oxidation.

Loose connections (terminals)



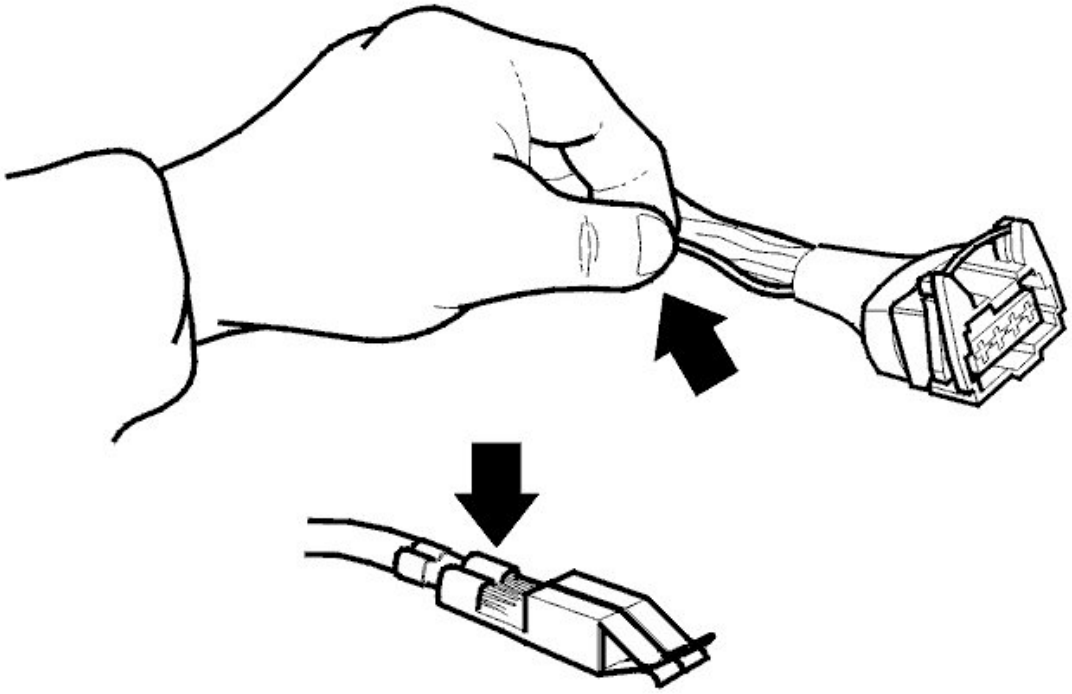
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.
Loose connections in terminals may be caused by oxidation of the pins and sockets, or by a faulty connection of a cable to its cable terminal. Loose connections produce the same faults as an intermittent open-circuit in a cable.

Checks:

- Inspect terminals visually according to Inspect terminals visually.

Continue according to Contact resistance and oxidation.

Contact resistance and oxidation

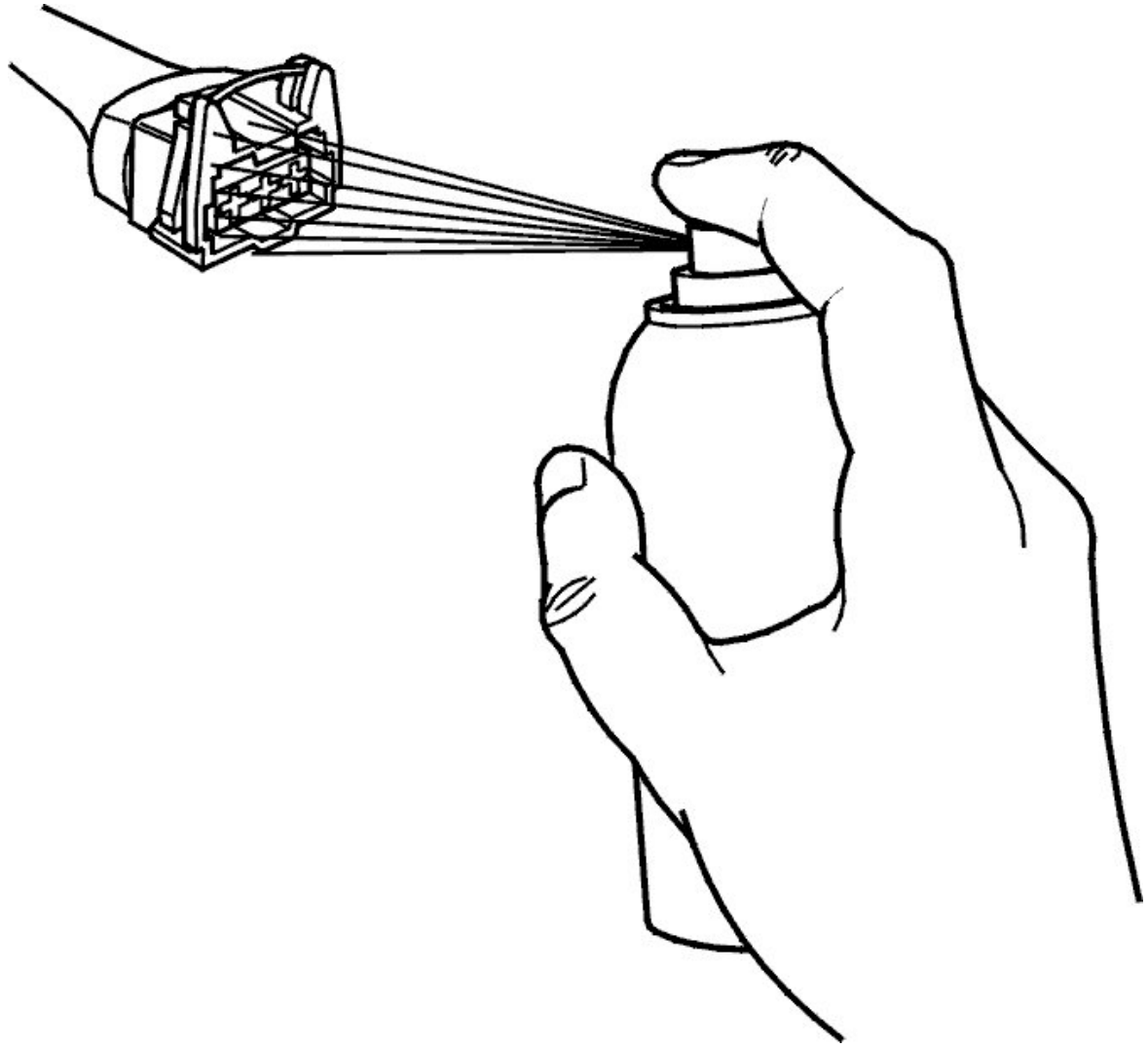


Caution! Avoid touching control module connector pins and corresponding cable harness connectors. There is a risk of electrostatic discharge, which could damage the control module. Relieve any charge on yourself and the tools to be used by holding the metal part of the tool and touching part of the body just before starting work.

The resistance in switches, cables and terminals should be 0 ohms. There is sometimes some resistance in connections due to oxidation.
If resistance is too great there will be function problems. The magnitude of the resistance before it causes a malfunction depends on the circuit load. A guideline would be a few ohms.

Note! When taking readings from the female connector it is important to position a replacement part between the female connector and the measuring instrument. The replacement part consists of a piece of cable with a cable terminal at one end. Never insert an object into the female connector. There is a risk of damaging the female connector.

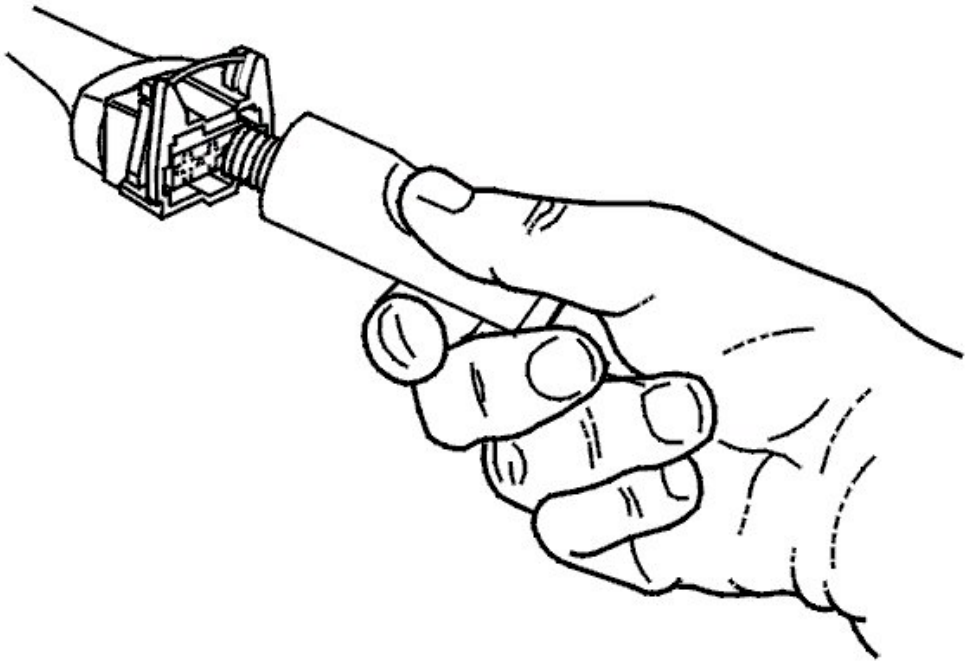
Cleaning female socket terminals and male pin terminals



Note! Do not apply rust solvent spray or grease to the catalyst monitor sensor or instrument cluster connectors.

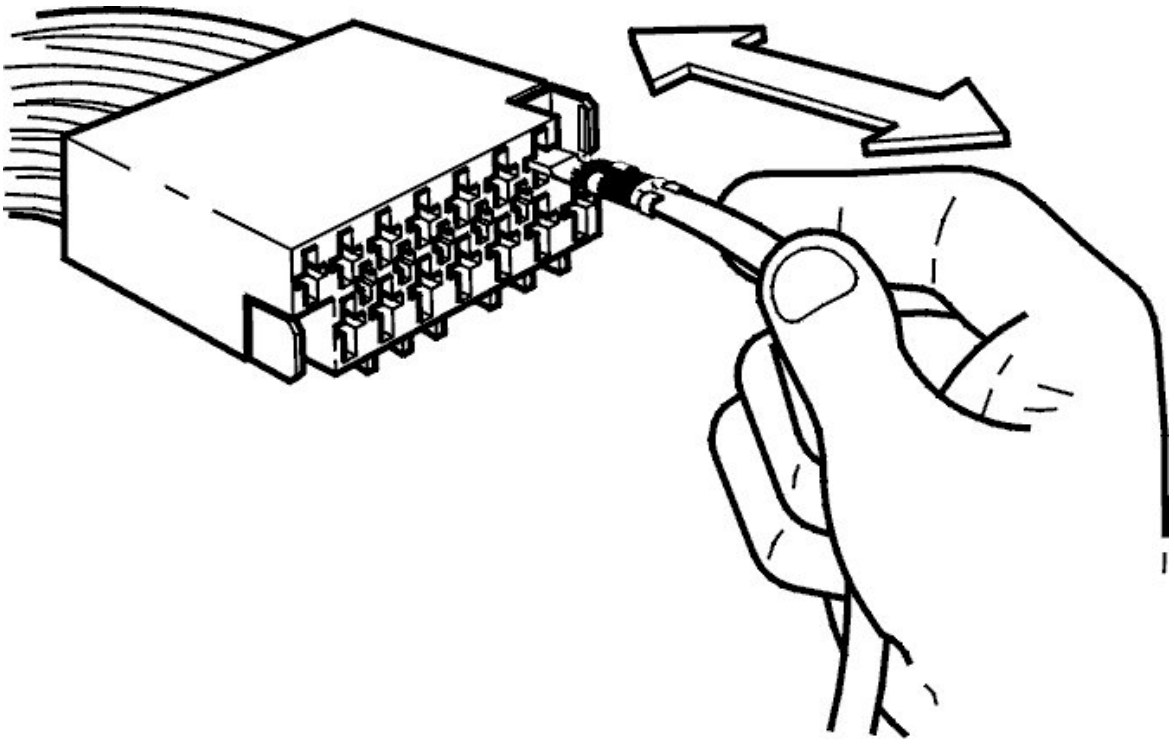
- Ignition off
- Disconnect the battery negative terminal
- Use compressed air to clean the disconnected connector
- Apply rust solvent spray 1161422 to the disconnected connectors
- Blow clean using compressed air.

Greasing female terminals



Note! Do not fill the protective cover with grease.

- Press grease, P/N 1161417-9, into the terminals directly from the tube
- Check that all the cavities in the connectors are filled
- Use a loose male pin to ensure that contact in sockets is good. The pin should remain in position when pulled gently.



Intermittent fault-tracing

General

The reason the car is in the workshop is because the customer has experienced abnormalities with the car. The symptoms experienced by the customer does not always coincide with a permanent fault. The fault might not occur when the customer arrives at the workshop but occurs on a single occasion.
In order to deduce the fault type is important to check the symptoms reported by the customer:

- How does the car behave? Is the car difficult to start, are the gears hard to shift, does the tachometer flicker etc.

- What are the circumstances when the fault occurs? under heavy load, is it dependent on the weather, outside temperature, on uneven roads, when making sharp turns, only when the engine is cold, under hard braking etc.

It is important to interview the customer about the surrounding circumstances in the event of a fault.
It may be an advantage to simulate the driving conditions for when the symptom occurs and carry out an analysis and deduce the fault. By deducing the fault, the symptom can be remedied so that the fault does not recur.
When a diagnostic trouble code (DTC) has been stored the freeze frames are also stored. These can be used to recreate the driving conditions for the diagnostic trouble code (DTC).
Tools:

- Reading off freeze frames, read off the freeze frame data for the relevant diagnostic trouble code (DTC)
- Status identifier, read off the status of the selected diagnostic trouble code (DTC)
- The counter indicates, amongst other things, how many fault free cycles have been carried out since the diagnostic trouble code (DTC) was stored.

Intermittent electrical fault

An intermittent electrical fault can be caused by faults in the wiring, components or connectors.
Possible fault causes for intermittent electrical faults are:

- Damaged terminal pins in the connector
- Loose connections in the connectors
- Poor ground connection (oxidation)
- Moisture, poor connections in the connector
- Defects, cracking, damage on the components
- Strong magnetic or other interference that has affected the control modules.

Intermittent functional faults

Intermittent functional faults could be caused by mechanical defects in the components.

- Cracked or blocked hoses
- Incorrect oils, fluids
- Incorrect fuel
- Sticking mechanical components.

Intermittent internal faults

Intermittent internal faults could be due to:

- Electromechanical interference
- Power supply too low
- Oxidized ground terminal for the control module
- Defective internal components.

Intermittent communication problems

Intermittent communication problems could be due to:

- Electromechanical interference
- Oxidation / loose connections in the connectors
- Defective signal cables.

Simulating fault causes

A large amount of input data is a required to recreate and simulate fault occurring circumstances.
Certain cases can be difficult to recreate. High speed driving and stalling to achieve high loads is not recommended.
In order to achieve high loads accelerate hard in quick succession a number of time instead.
Cases that are possible to simulate:

- high load
- moisture
- heat
- cold
- loose connections.

High load

High load can be simulated by accelerating hard repeatedly.

Moisture

Moisture can be simulated by spraying water on the suspected faulty component or connector using a spray bottle or hose.

Heat

Heat can be simulated by using a hot air gun or similar to heat up a suspected faulty component or connector.

In order to achieve a high engine temperature allow the engine to idle at a high load with the hood down to prevent air flowing through the engine compartment. Run the engine in hot conditions. Read off the engine coolant temperature (ECT) using VIDA, the temperature gauge in the combined instrument panel is progressive.

Cold

Cold can be simulated by cooling down the suspected faulty component or connector using a freeze spray.

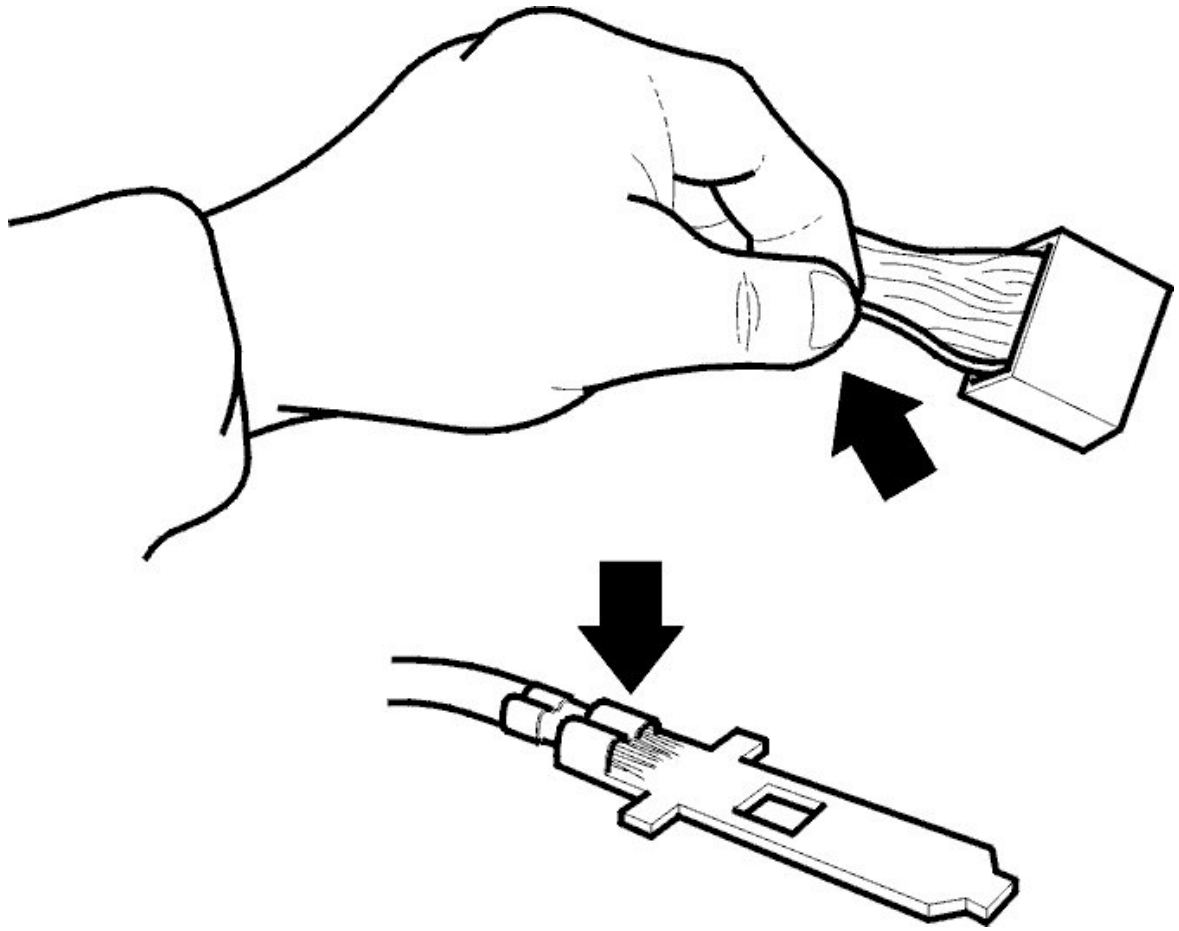
Loose connections

Loose connections can be simulated by twisting and shaking the connector whilst the function is activated.

Checking Wiring and Terminals - Intermittent Faults

Checking wiring and terminals. Intermittent faults

Inspect terminals visually



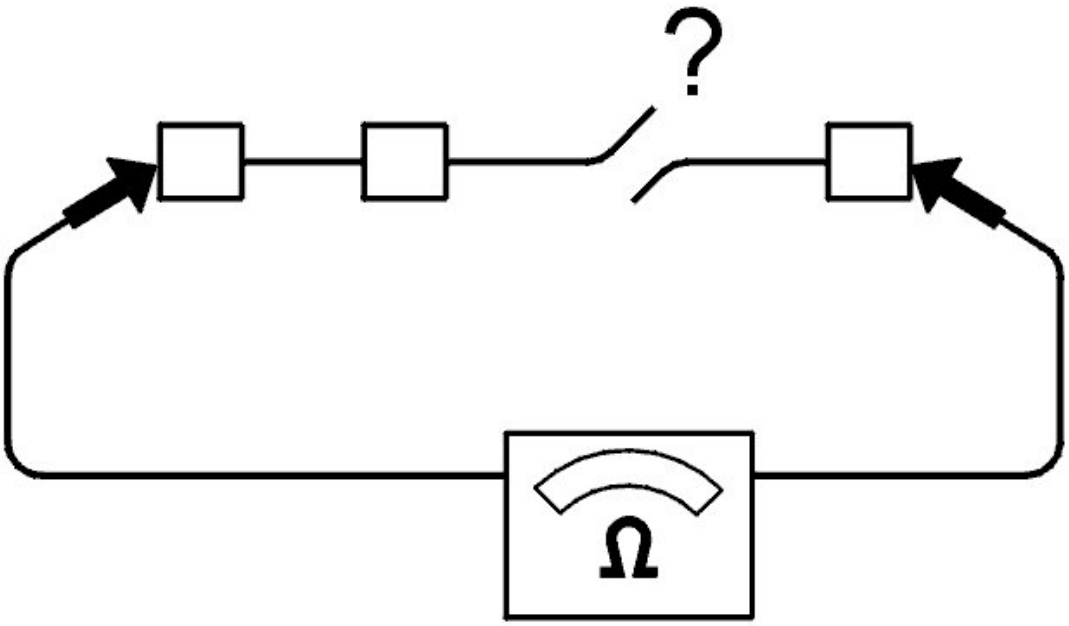
Note! When checking the engine control module (ECM), do not remove the control module from the car before the main relay has interrupted the power supply. This may take up to 4 minutes after the ignition has been switched off and the engine cooling fan (FC) has stopped running.

Inspect the terminals visually when checking, or taking readings from, opened connectors.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check for oxidation. This can cause poor connections in the terminals
- Check for damage to pins and terminals. Check that they are properly inserted into the connector. Check that the cable is properly connected to the pin or terminal. Check pins and terminals particularly carefully
- Using a loose male connector, test to see if the female connector provides a good contact and that the pin remains in place when the male connector is pulled lightly
- Shake the cable lightly and pull on connectors during measurement to locate damage.

Open-circuit, intermittent faults

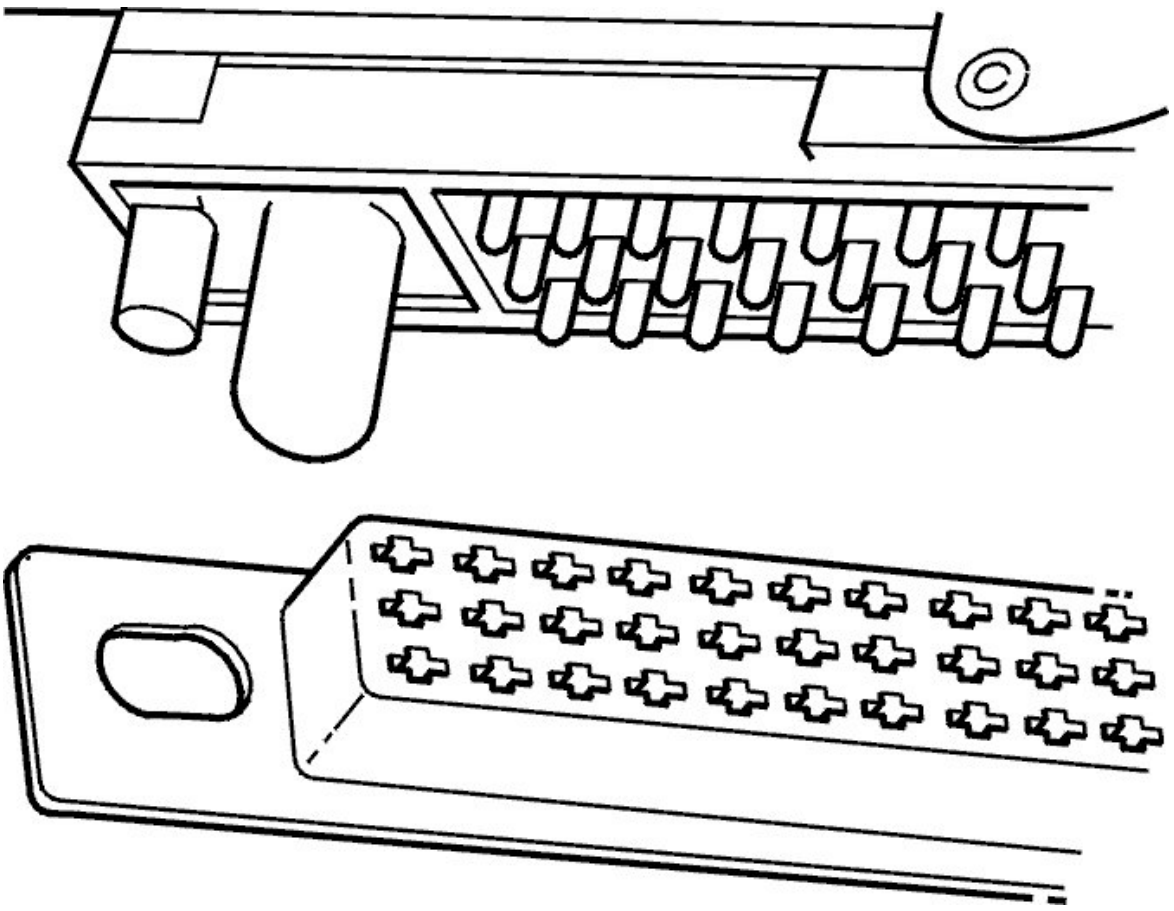


An open-circuit in a cable will be indicated by the loss of a function (or functions).
Chafed and broken leads are common causes of faults.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

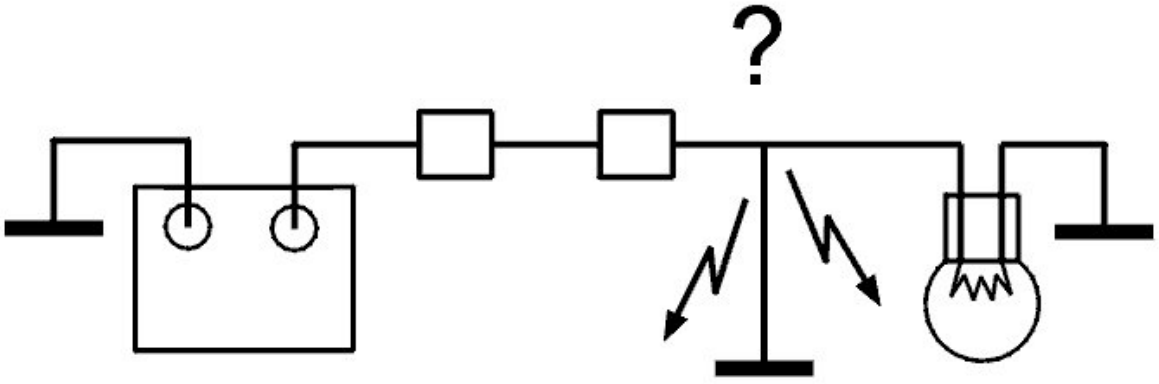
- Disconnect the connectors at both ends of the cable.

Check the cables visually according to Inspect terminals visually.
Connect an ohmmeter between the ends of the cable.
The ohmmeter should read approximately 0ohms if there is no open-circuit in the cable.
Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct. Replace the cable and / or continue according to Contact resistance and oxidation.



Always check the control module and control module box connectors to ensure that their pins and sockets are not bent or damaged, this may cause faults.
Check pins and terminals particularly carefully.

Short-circuit to ground, intermittent faults



A short-circuit between a live cable and ground is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and

fuses/371 Wiring.

Checks:

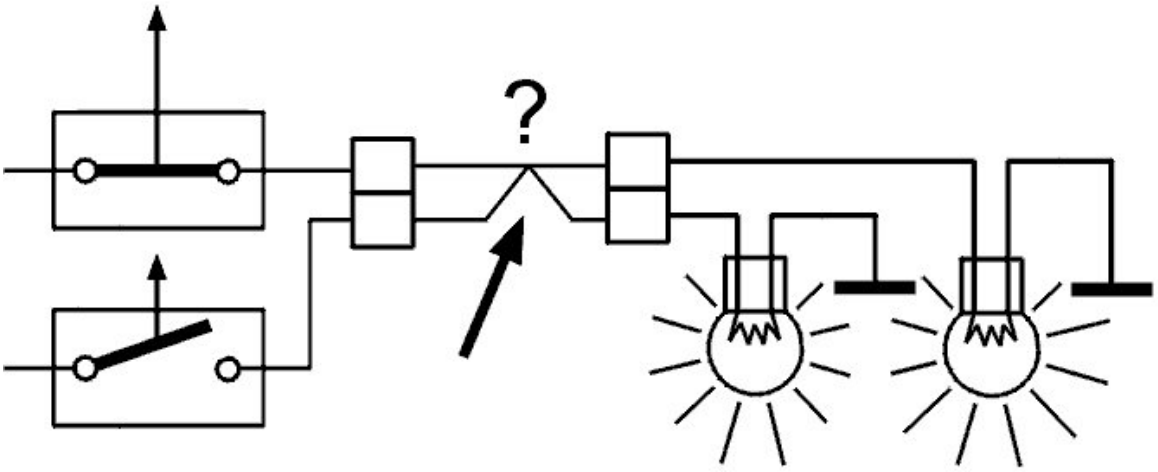
- Check the cables visually according to Inspect terminals visually.

Activate all switches and sensors in the circuit. Check whether the fuse blows

- Disconnect the connectors in the circuit to ensure that they do not affect readings.

Connect an ohmmeter between cable and ground.
The ohmmeter should read infinite resistance if no components are connected.
Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct, replace the cable and / or continue according to Contact resistance and oxidation.

Short-circuit to supply voltage, intermittent faults



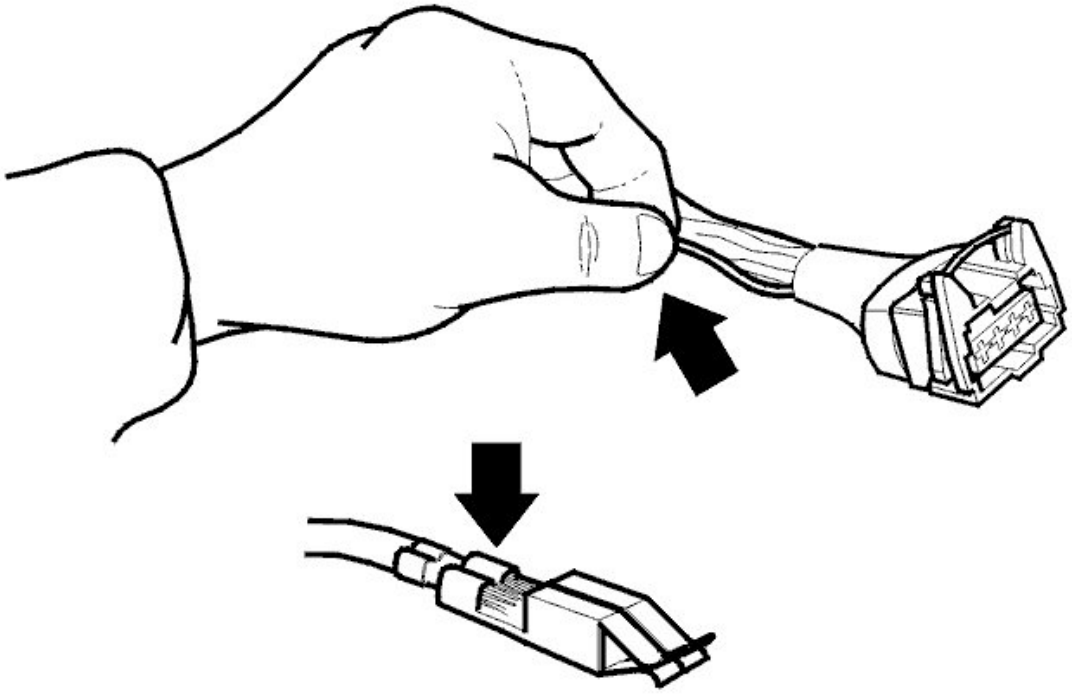
A short-circuit between a cable and supply voltage is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check the cables visually according to Inspect terminals visually.

Use a voltmeter to take readings at various points in the circuit while operating switches and sensors.
The voltmeter reading depends on the circuit being tested and the positions of switches and sensors. Use the wiring diagram to determine the correct voltage in the circuit.
Use an ohmmeter between the suspect cables to detect short-circuits between them.
The ohmmeter should read infinite resistance between cables not connected to each other in the circuit.
Shake the cable lightly and pull on connectors during measurement to locate the damage.
If the reading is not correct. Replace the cable and / or continue according to Contact resistance and oxidation.

Loose connections (terminals)



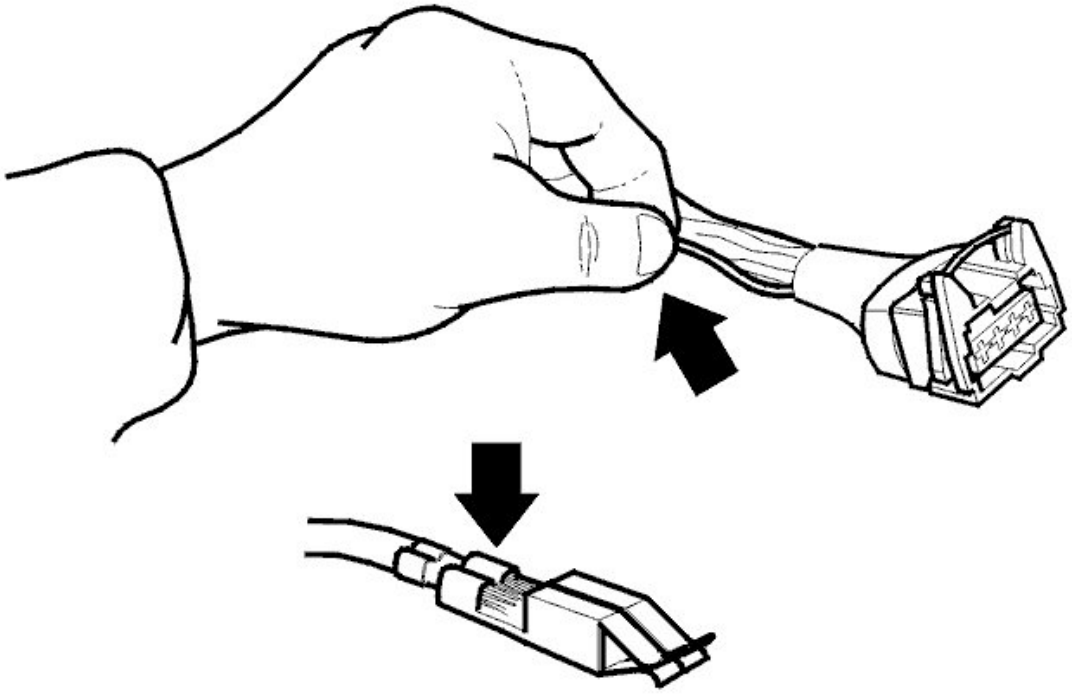
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.
Loose connections in terminals may be caused by oxidation of the pins and sockets, or by a faulty connection of a cable to its cable terminal. Loose connections produce the same faults as an intermittent open-circuit in a cable.

Checks:

- Inspect terminals visually according to Inspect terminals visually.

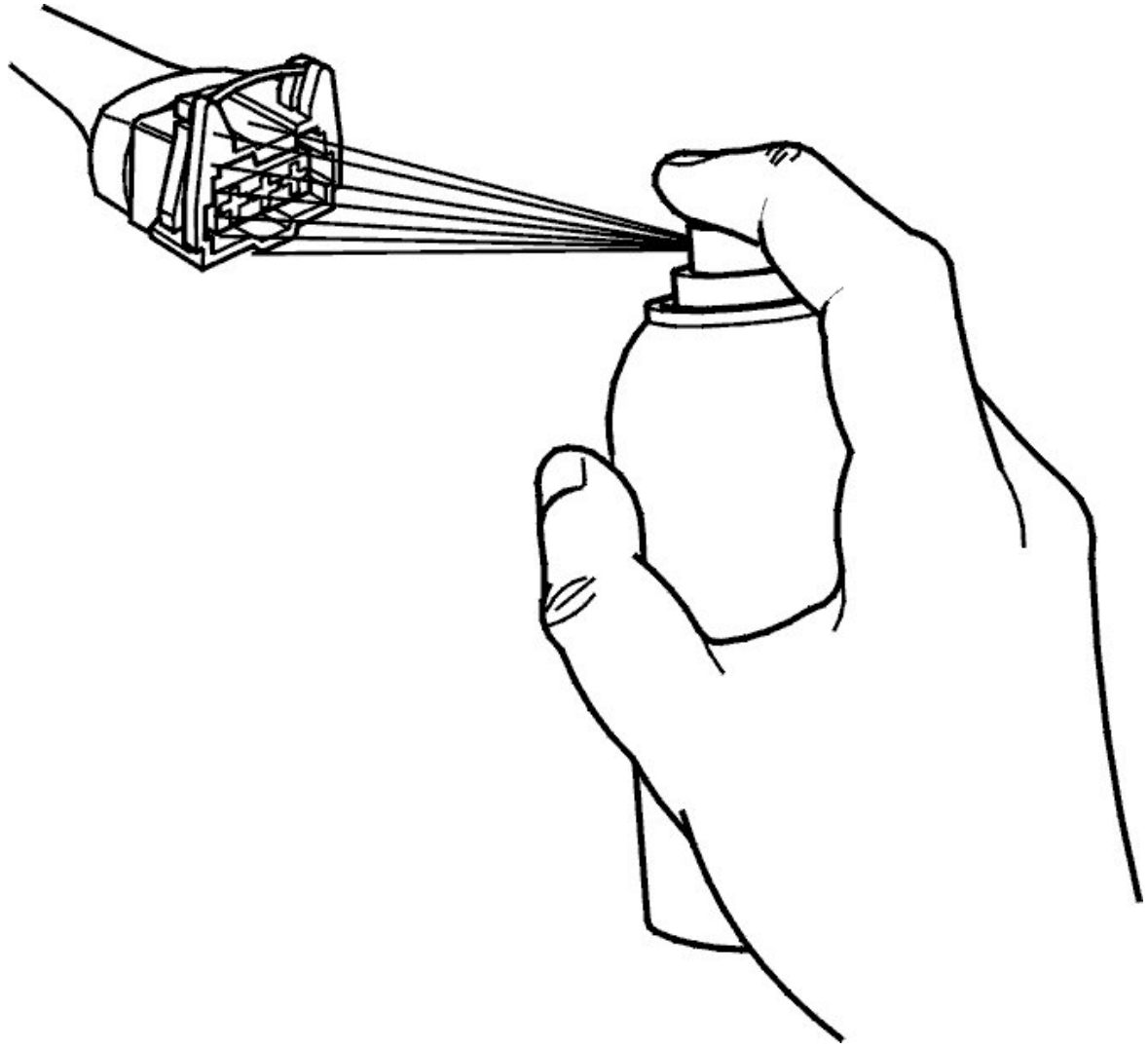
Continue according to Contact resistance and oxidation.

Contact resistance and oxidation



In theory, the resistance across contacts, leads and terminals should be 0 ohms. However, there is always some resistance due to terminal oxidation. If resistance is too great there will be function problems. The magnitude of the resistance before it causes a malfunction depends on the circuit load. A guideline would be a few ohms.

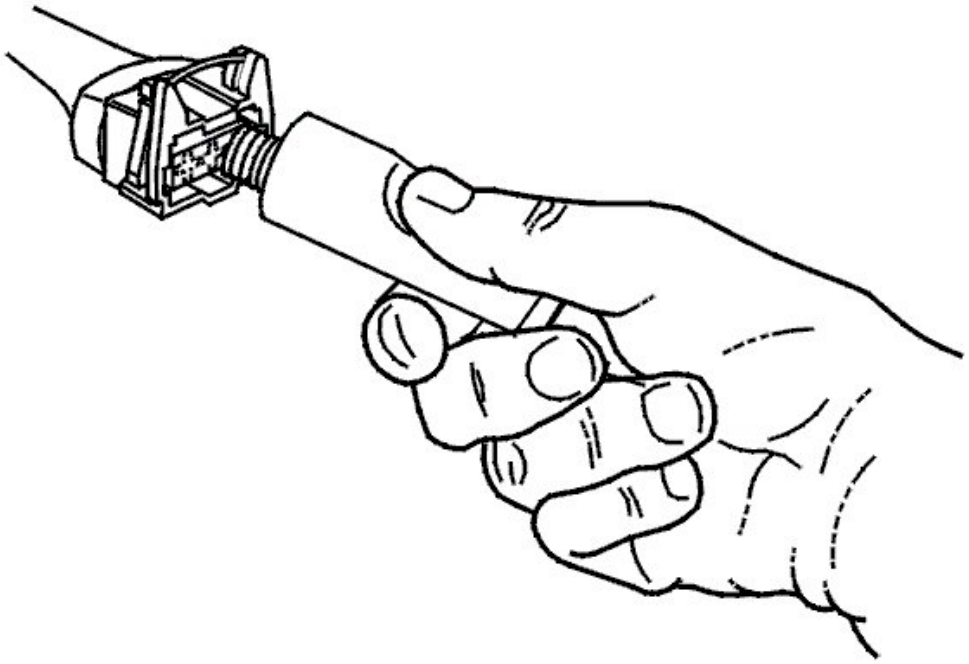
Cleaning female socket terminals and male pin terminals



Note! Do not apply rust solvent spray or grease to the catalyst monitor sensor or instrument cluster connectors.

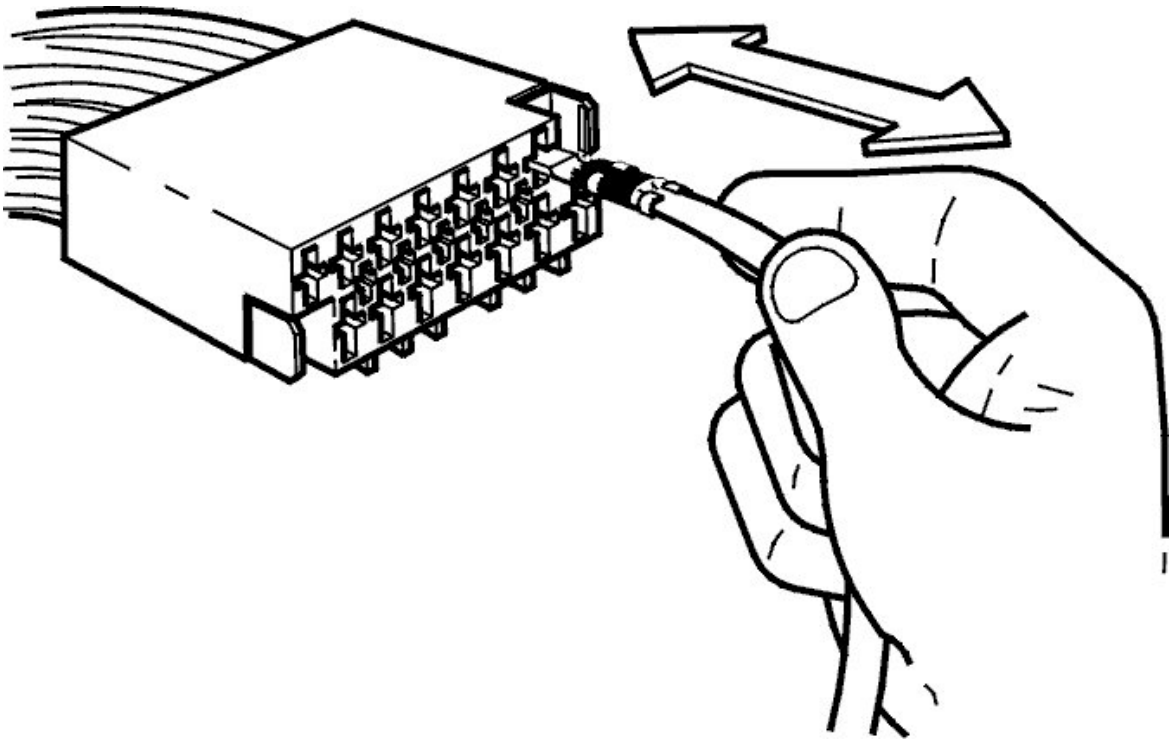
- Ignition off
- Disconnect the battery negative terminal
- Use compressed air to clean the disconnected connector
- Apply rust solvent spray 1161422 to the disconnected connectors
- Blow clean using compressed air.

Greasing female terminals



Note! Do not fill the protective cover with grease.

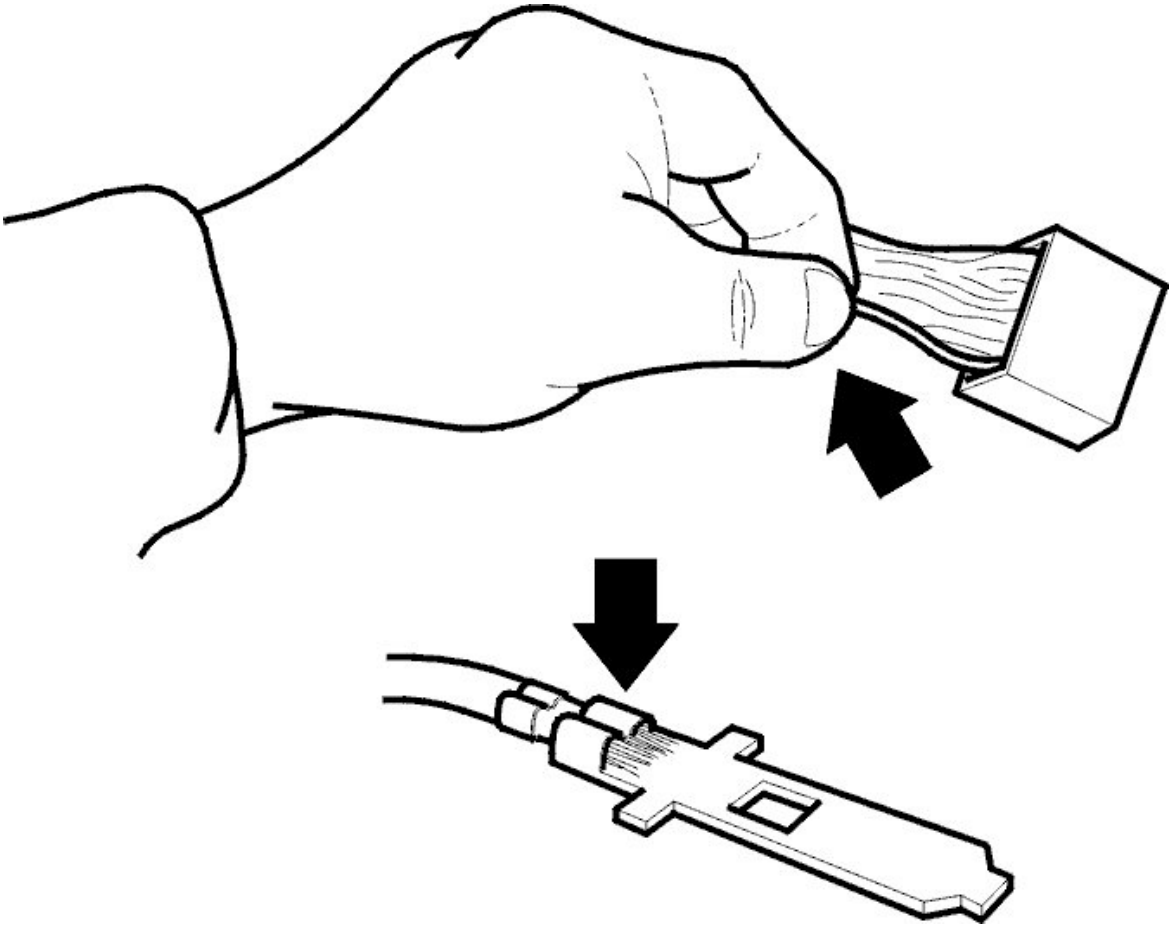
- Press grease, P/N 1161417-9, into the terminals directly from the tube
- Check that all the cavities in the connectors are filled
- Use a loose male pin to ensure that contact in sockets is good. The pin should remain in position when pulled gently.



Checking Wiring and Terminals - Permanent Faults

Checking wiring and terminals. Permanent fault

Check terminals visually



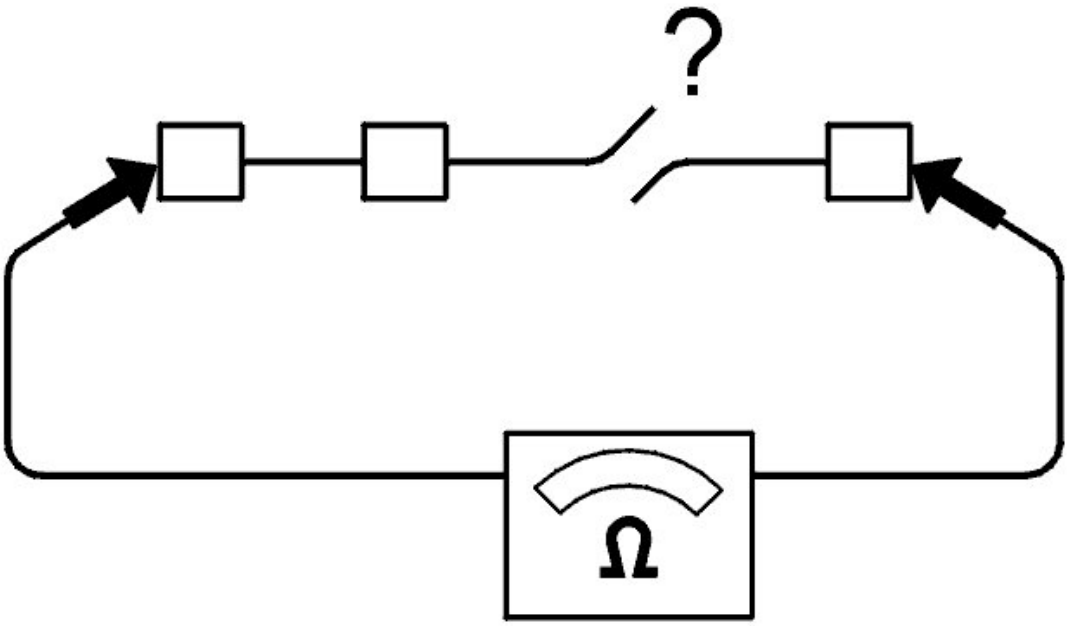
Note! When checking the engine control module (ECM), do not remove the control module from the car before the main relay has interrupted the power supply. This may take up to 4 minutes after the ignition has been switched off and the engine cooling fan (FC) has stopped running.

Inspect the terminals visually when checking, or taking readings from, opened connectors.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Check for oxidation. This can cause poor connections in the terminals
- Check for damage to pins and terminals. Check that they are properly inserted into the connector. Check that the cable is properly connected to the pin or terminal. Check pins and terminals particularly carefully
- Use a separate male terminal to check the female terminal. Check that they are secure: Pull on the pin.

Open-circuit, permanent faults

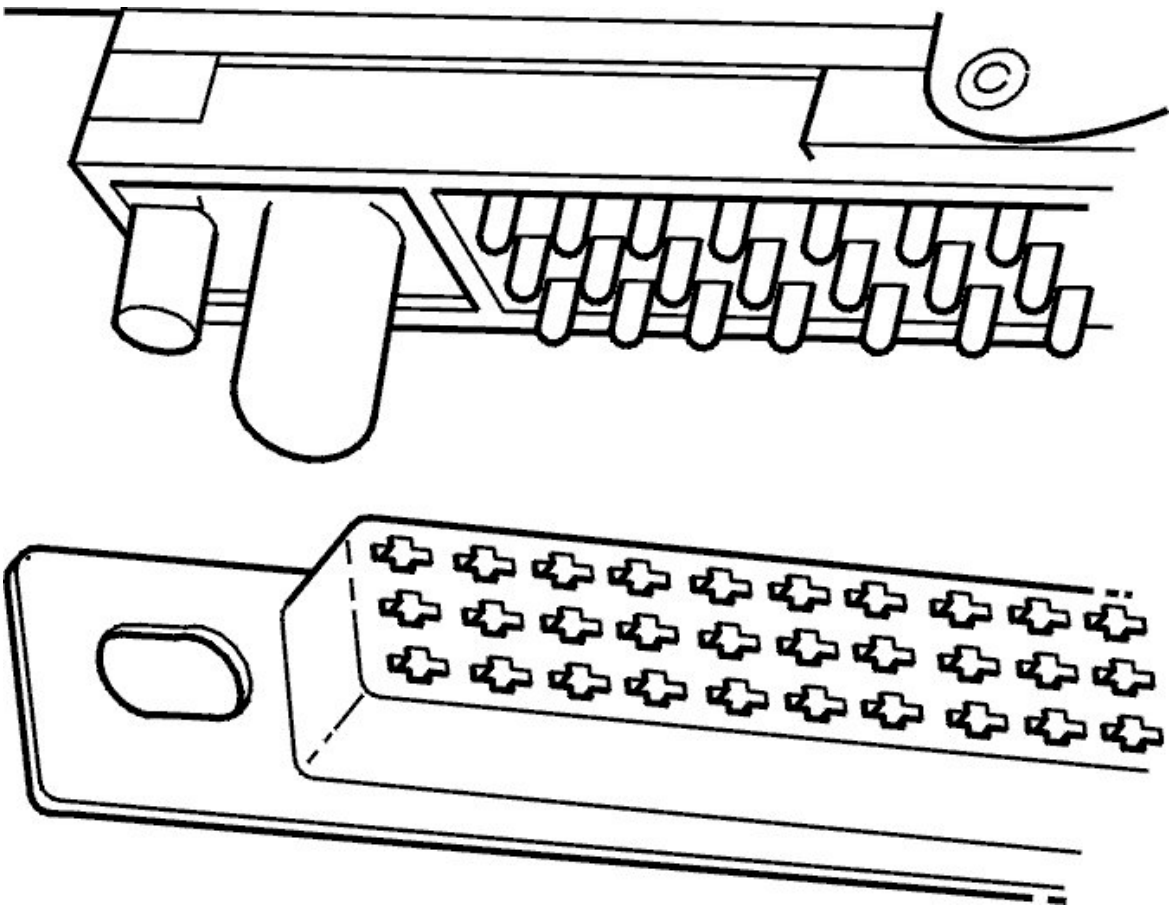


An open-circuit in a cable is indicated by a loss of one or more functions.
Chafed and broken cables or terminals that have come loose are common causes of faults in electrical systems.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

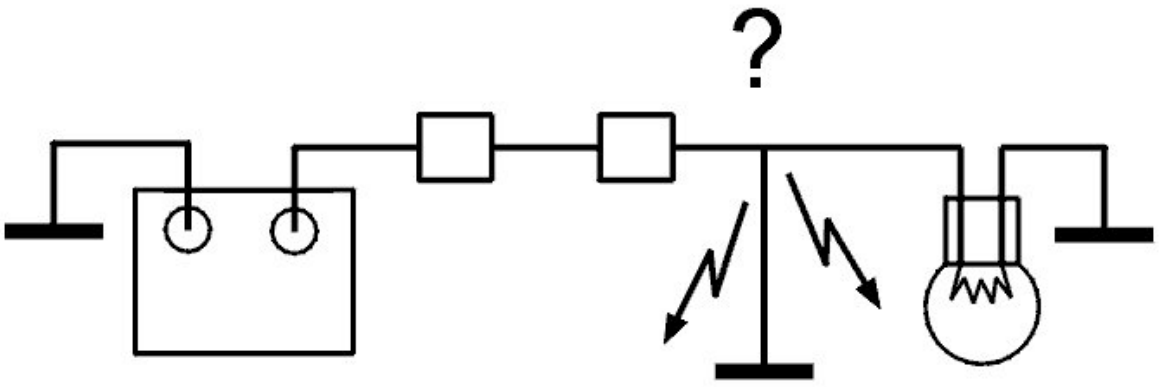
- Disconnect the connectors at both ends of the cable.

Connect an ohmmeter between the ends of the cable.
The ohmmeter should read approximately 0 ohms if there is no open-circuit in the cable.



Always check the control module and control module box connectors to ensure that their pins and sockets are not bent or damaged, as this can cause faults.
Check pins and terminals particularly for this fault. See Check terminals visually.

Short-circuit to ground, permanent faults



A short-circuit between a live cable and ground is often indicated by the loss of a function or a fuse blowing when a current is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and

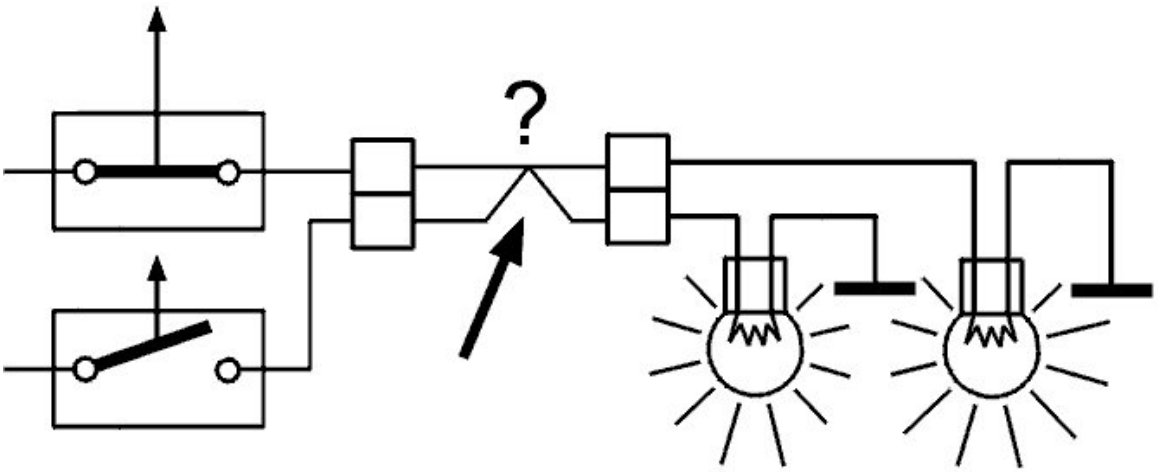
fuses/371 Wiring.

Checks:

- Activate all switches and sensors in the circuit. Check whether the fuse blows
- Disconnect the connectors in the circuit to ensure that they do not affect readings.

Use an ohmmeter to take a resistance reading between the cable and ground.
The ohmmeter should read infinite resistance if no components are connected.
Check pins and terminals particularly for this fault. See Check terminals visually.

Short-circuit to supply voltage. Permanent faults



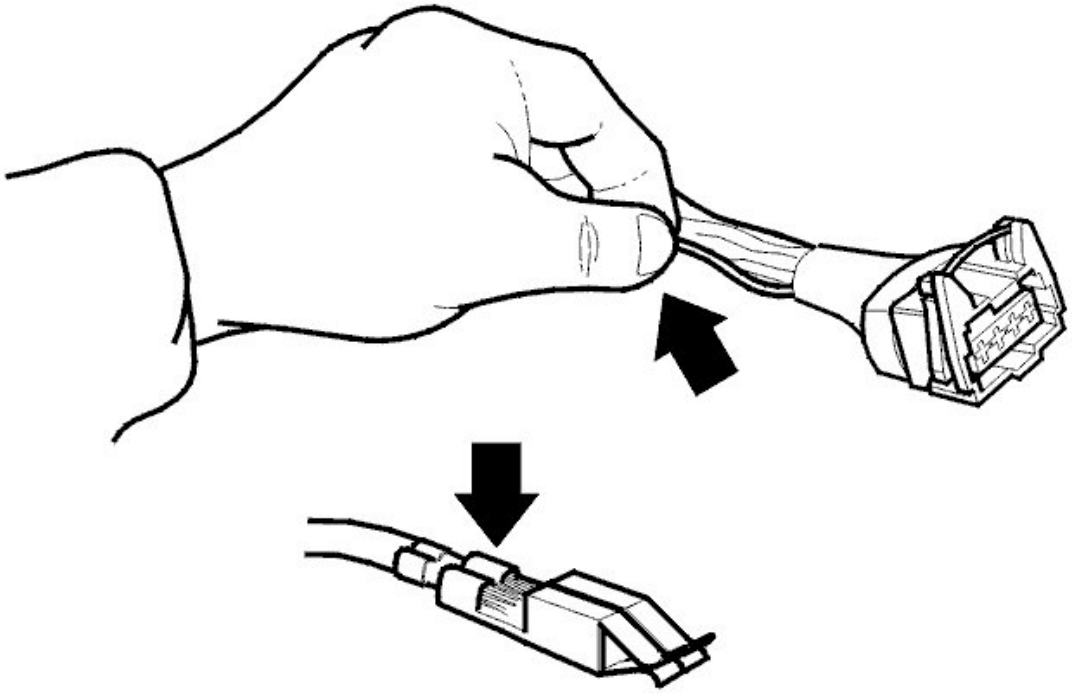
A short-circuit between a cable and supply voltage is often indicated by the loss of a function or a fuse blowing when voltage is passed through the cable.
For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.

Checks:

- Use a voltmeter to take readings at various points in the circuit while operating switches and sensors.

Voltmeter readings will depend on which circuit is tested and the status of switches and sensors. Use the wiring diagram to determine the correct voltage in the circuit.
Use an ohmmeter between the suspect cables to detect short-circuits between them.
The ohmmeter should read infinite resistance between cables not connected to each other in the circuit.
Check pins and terminals particularly for this fault. See Check terminals visually.

Contact resistance and oxidation

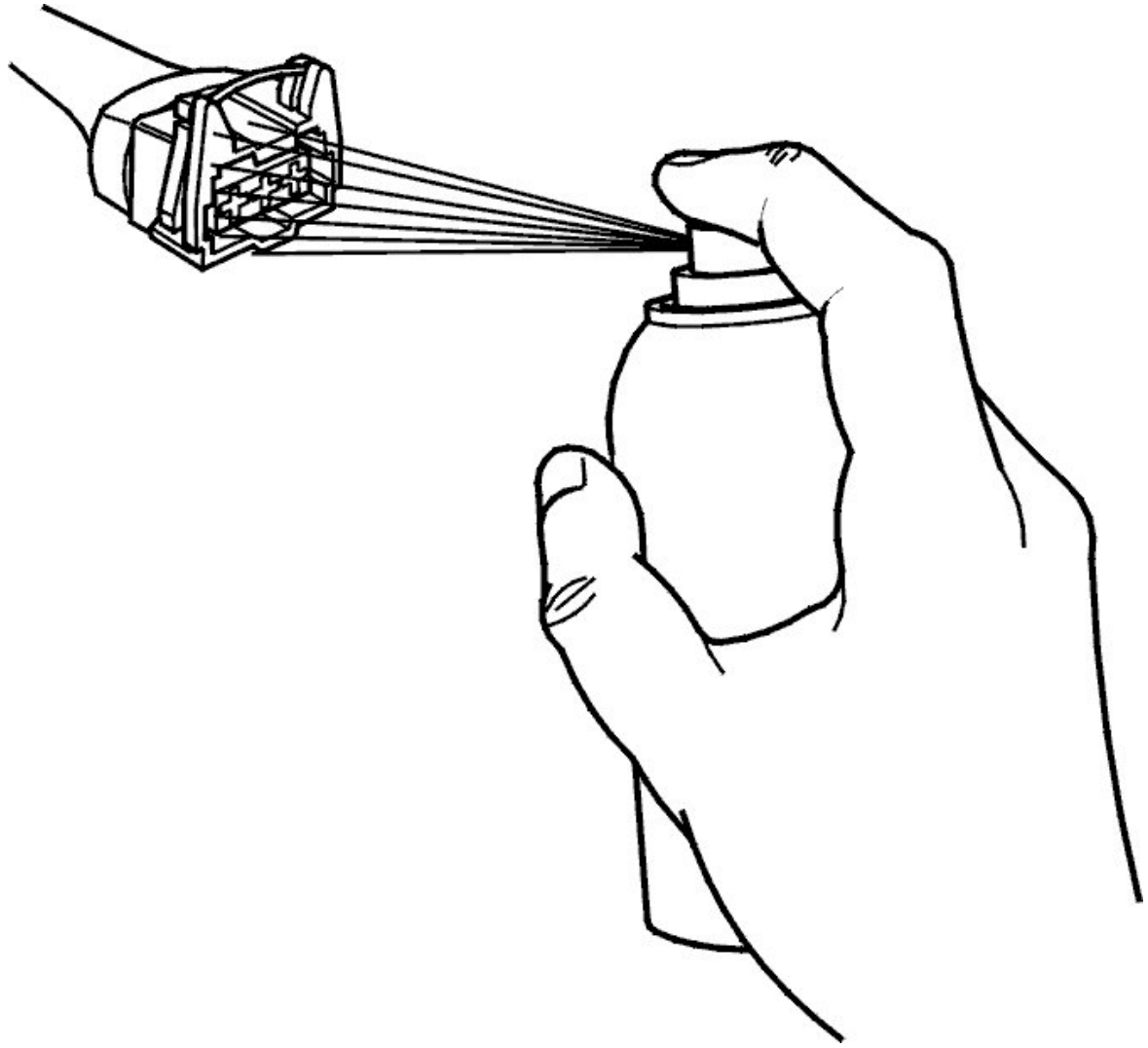


For repair of wiring and terminals, see VIDA/REPAIR/CLEANING, CHECKING AND ADJUSTMENT/3 Electrical system/37 Wiring and fuses/371 Wiring.
In theory, the resistance across contacts, leads and terminals should be 0 ohms. However, there is always some resistance due to terminal oxidation. If this resistance becomes too great the result will be a malfunction. The magnitude of the resistance before it causes a malfunction depends on the circuit load.

Checks:

- Check the cables visually according to Check terminals visually.

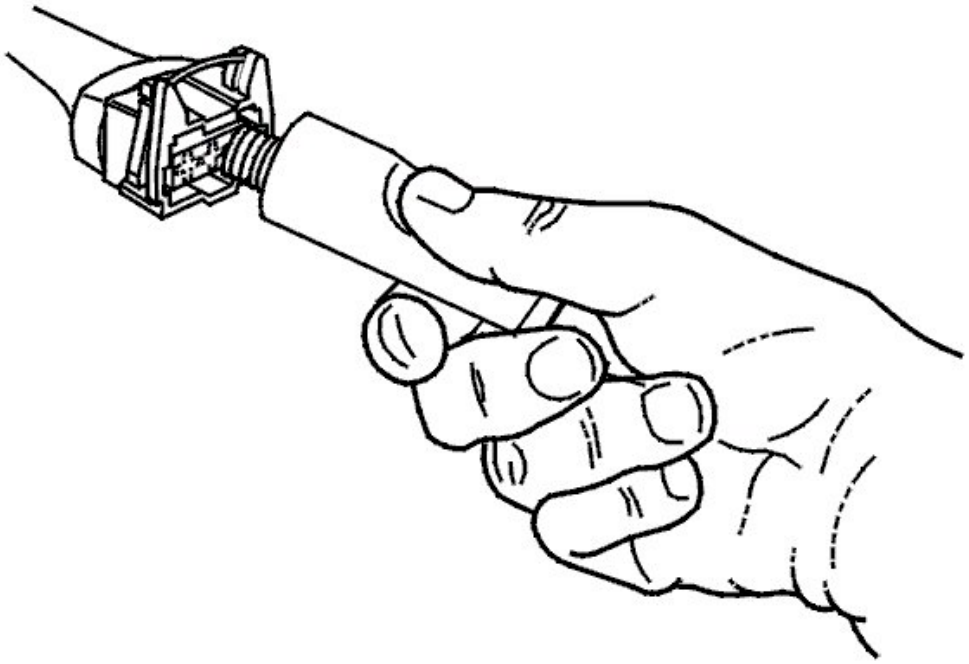
Cleaning female socket terminals and male pin terminals



Note! Do not apply rust solvent spray or grease to the catalyst monitor sensor or instrument cluster connectors.

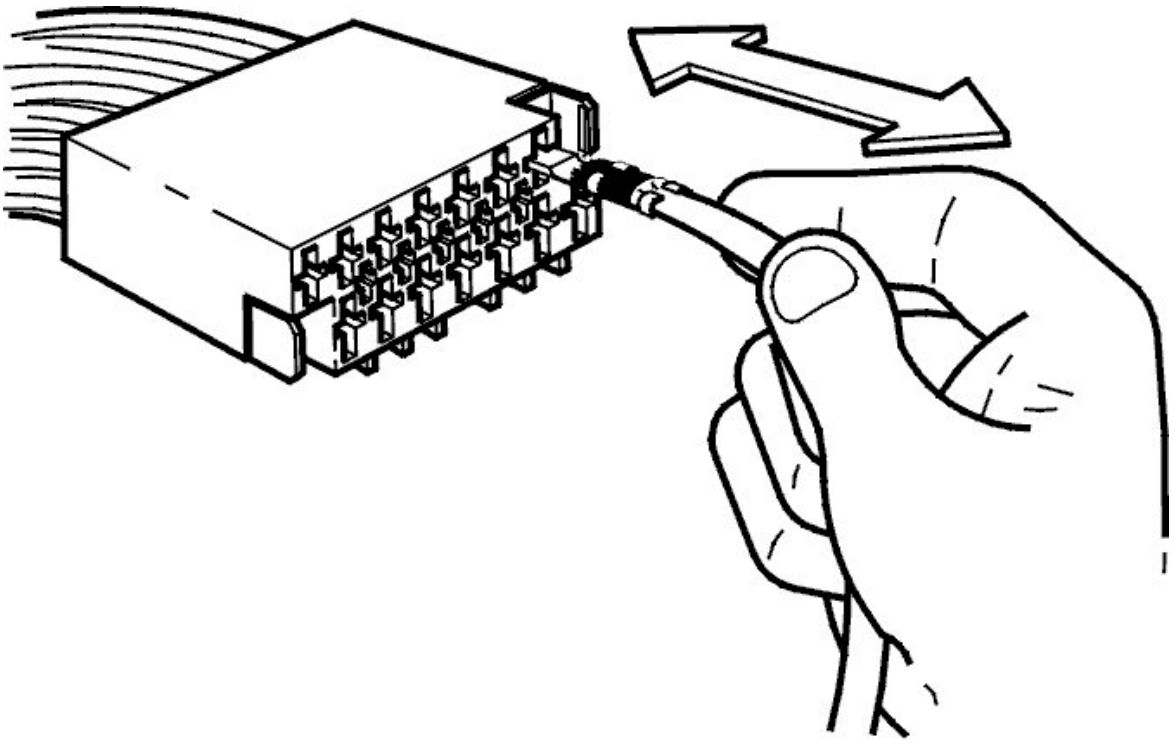
- Ignition off
- Disconnect the battery negative terminal
- Use compressed air to clean the disconnected connector
- Apply rust solvent spray 1161422 to the disconnected connectors
- Blow clean using compressed air.

Greasing female terminals



Note! Note! Do not fill the protective cover with grease.

- Press grease, P/N 1161417-9, into the female sockets directly from tube
- Check that all the terminal cavities are filled
- Use a loose male pin to ensure that the connection in the sockets is good. The pin should remain in position when pulled gently.



Component Specifications

Component specifications

The component specification gives the value of the component when the connector is disconnected. Where no value is given, it is not possible to measure a relevant value at the component.

The figure within the brackets indicates the terminal pin on the component to which the value refers.

Designation	Type	Supply voltage	Value	Other
Air conditioning (A/C) relay	Mechanical relay	12V (#1)	Approximately 96 Ω (coil)	
A/C pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Stop lamp switch	Position switch	12 V (#1)	The switch is closed when the pedal is depressed (terminals #1-#5)	
Fuel pump (FP) relay	Mechanical relay	-	Approximately 96 Ω (coil)	The relay is controlled by the central electronic module (CEM)
Fuel temperature sensor	NTC resistor	5V (#3)	5896 Ω at 0°C 3792 Ω at 10°C 2500Ω at 20°C 1707Ω at 30°C 1175 Ω at 40°C (#1-#2)	Integrated in the fuel pressure sensor
Fuel pressure sensor	Piezo resistive pressure sensor	5V (#3)	-	
Engine cooling fan (FC) control module	-	12 V (#2)	-	
Canister purge (CP) valve	Electromagnetic valve	12 V (#1)	17-24 Ω at 20°C (terminals #1-#2)	
Accelerator pedal (AP) position sensor	Electronic pedal sensor with two output signals, PWM and a linear analog signal	12 V (terminal #1) 5 V (terminal #6) Power supply analog position sensors	-	
Throttle unit	Electronic throttle control module with two integrated potentiometers and a damper motor	5 V (#3)	1.2-3.5 Ω (terminals #1-#4 motor winding). 1000-1500 Ω (terminals #2-#3 Parallel connection of potentiometers 1 and 2).	-

Designation	Type	Supply voltage	Value	Other
			Approximately 820 Ω when the throttle is closed. Approximately 1580 Ω at wide open throttle (terminals #2-#6 potentiometer 1). Approximately 1480 Ω when the throttle is closed. Approximately 500 Ω at wide open throttle (terminals #2-#5 potentiometer 2)	
Injector	Electromagnetic injector valve	12 V (#1)	Approximately 12 Ω at 20°C (terminal #1-#2)	
Camshaft sensor	Magneto-resistive sensor	5 V (#1)	-	
Knock sensor (KS)	Piezo electric component	-	Greater than 1 MΩ (terminal #1-#2 front knock sensor (KS)). Greater than 1 MΩ (terminals #3-#4 rear knock sensor (KS))	Separate signal ground for the knock sensors (KS)
Clutch pedal sensor	Slide potentiometer	5 V (#2)	Unaffected pedal: 1400-2400 Ω Fully depressed pedal: 200-800 Ω (#2-#4)	
Cooling fan for control modules	Fan motor	12 V (#1)	-	The engine cooling fan (FC) is controlled by the engine control module (ECM)
Coolant level sensor	Position switch	Connected to ground (terminal #2)	Closed when the engine coolant level is normal	
Boost pressure sensor	Absolute manifold absolute pressure (MAP) sensor	5 V (#3)	-	
Preheating, front heated oxygen sensor (HO2S)	PTC resistor	12 V (#3)	2.6-3.4 Ω at 20°C (terminals #3-#4)	
Preheating, rear heated oxygen sensor (HO2S)	PTC resistor	12 V (#1)	Approximately 9 Ω at 20°C (terminal #1-#2)	

Designation	Type	Supply voltage	Value	Other
Mass air flow (MAF) sensor	-	12 V (#2) 5 V (#4)	-	
Air temperature sensor, intake	NTC resistor	5 V (#3)	5886 Ω at 0°C 3791 Ω at 10°C 2510 Ω at 20°C 1715 Ω 30°C (#1-#2)	Integrated in the boost pressure sensor
Leak diagnostic unit	Consists of an air pump, an electromagnetic valve and an internal heating element (PTC resistor)	12 V (#4)	Approximately 118 Ω (terminals #1-#4 pump motor winding) 27.9 -34.1 Ω (terminals #3-#4 Valve coil)	The heating element for heating up the pulsed secondary air injection system (PAIR) pump is controlled by the central electronic module (CEM)
Engine coolant temperature (ECT) sensor	NTC resistor	5 V (#1)	15040 Ω at -20°C 2450 Ω at 20°C 318 Ω at 80°C (#1- #2)	
PTC resistor air preheating	PTC resistor	12 V (#1)	Approximately 10 Ω at 20°C	
Oil level sensor	Electronic sensor with PTC resistor and capacitive measurement element	5 V (#3)	-	
Oil pressure sensor	Pressure switch (Pressostat)	Grounded in the cylinder block	Closed switch when the oil pressure is low	
Camshaft reset valve	Electromagnetic valve	12 V (#1)	3.7-11.1 Ω (#1-#2)	
Flywheel sensor	Engine speed sensor	-	108.5-142.5 Ω at 20°C (terminals #1-#2)	
System relay	Mechanical relay	12V (#1)	Approximately 80 Ω (coil)	
Turbocharger (TC) control valve	Electromagnetic valve (3 way)	12 V (#1)	21.8-24.2 Ω at 20° C (terminals #1-#2)	
Outer temperature sensor	NTC resistor	5 V (#1)	18702 Ω at -20 °C 6318 Ω at 0°C 2424 Ω at 20°C 1034 Ω at 40°C (#1- #3)	

Example of Use of the Frozen Values

Information

Example of use of the frozen values

Faults can be intermittent, which is important to remember when fault-tracing for possible causes. If the fault is not present when the vehicle is in the workshop, a fault cause can be missed as the values can be correct when fault-tracing is carried out. A good indication of when the fault occurred the first time are the frozen values that can be read out using VIDA/Details.

The frozen values are stored immediately after a fault has been detected. Most parameters in the frozen values are the same for all faults and indicates a general status when a fault has been detected, e.g. engine speed, load, coolant temperature, vehicle speed and battery voltage. Some of them have been selected to give a better understanding of the specific fault. Diagnostic Trouble Code (DTC) ECM-903F Throttle position (TP) can be used as an example of how the frozen values can be used (this is only one example and there may be deviations in reality).

One of the checks given in fault-tracing is "voltage supply to throttle unit" and continues with a suggestion to check the battery and charging system. However, the battery's condition, with the vehicle in the workshop, does not show the battery voltage when the fault was detected. The best information is in the frozen values, i.e. the voltage that the Engine control module (ECM) detected, when the Electronic throttle module (ETM) indicated the fault.

However, remember that this is not an indication of the voltage supply to the Electronic throttle module (ETM), but to the Engine control module (ECM). If the Engine control module (ECM), according to the frozen values, had a good voltage, the battery worked. The voltage supply to the

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Electronic throttle module (ETM) should therefore be checked separately.

Frozen values for ECM-903F
- Status, lambda control bank 1 = LR: Closed circuit with two sensors
- Status, lambda control bank 2 = LR: Closed circuit with two sensors
- Calculated load = 4.71%
- Engine coolant temperature = 87°C
- Fuel trim, quick adjustment, bank 1 = 15.63%
- Fuel trim, slow adjustment, bank 1 = -0.78%
- Fuel trim, quick adjustment, bank 2 = 23.44%
- Fuel trim, slow adjustment, bank 2 = -0.78%
- Engine speed = 760 rpm
- Vehicle speed = 0 km/h
- Boost pressure = 30%
- Battery voltage = 12.50 V
- Throttle angle, desired value = 14.84%
- Air mass = 23.8 kg/h Outdoor temperature = 33°C

In this case, we assume that the vehicle had a low battery voltage in the workshop. As seen in the frozen values however, the battery voltage was correct when the fault occurred, and this was therefore probably not the cause.

This is an example of how the frozen values can be used, to make fault-tracing more efficient and prevent taking too much time fault-tracing incorrectly. This prevents fault-tracing and correcting a fault that was not actually the cause of the problem, which was originally to be solved.

The odometer setting (km) is included among the frozen values in the Engine control module (ECM). This makes a fast comparison with the odometer counter possible, so that one can determine if the fault occurred as part of the fault-tracing and can be ignored.

For example, the CAN related diagnostic Trouble Codes (DTCs) can be detected when the battery voltage drops when working on the vehicle, by the passenger compartment lighting and other loads draining the battery. The frozen values indicate the odometer setting in km. Multiplying this value by 0.62 gives the distance in miles. The current distance in miles and km can be read out using VIDA.

The following should be taken into account when using frozen values for fault-tracing. The frozen values, that should be used with care, are those that have been stored for CAN and are related to Diagnostic Trouble Codes (DTCs) for the Electronic throttle module (ETM).

If the Electronic throttle module (ETM) detects that the communication to the Engine control module (ECM) is interrupted, error flags are stored in the Electronic throttle module (ETM). These error flags are sent to the Engine control module (ECM) as soon as communication on the CAN is working again. This means that the Engine control module (ECM) stores the Diagnostic Trouble Codes (DTCs) as soon as the Electronic throttle module (ETM) supplies them. This, in turn means that it is at this time that the frozen values are stored. For the Electronic throttle module (ETM) this means that the frozen values occur from a point in time after the fault first occurred.

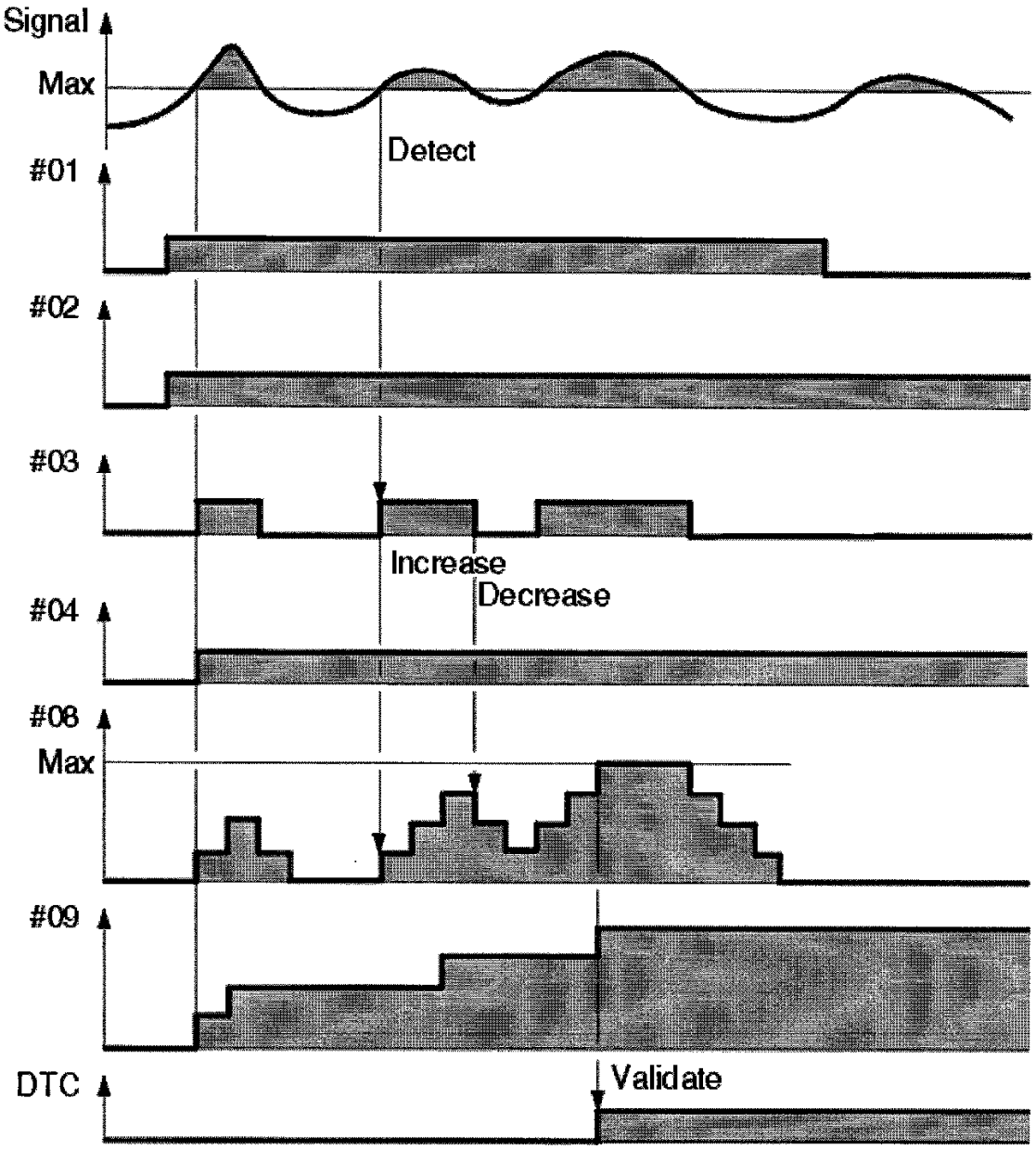
Description of Status Identifier

Status identifier	
There are different status identifiers that can be read off for each diagnostic trouble code (DTC). The control module tests each terminal almost continuously. By reading off the diagnostic trouble code (DTC) and the associated status identifier (which detects the fault and stores the DTC), information about the test is obtained. Not all status identifiers need to be implemented in one control module. This varies from system to system. All status identifiers are reset and start counting again each time the control module is powered up and when erasing diagnostic trouble codes (DTCs). The possible status identifiers are described below.	
Status identifier	**Explanation**
Upper graph	When the signal value is above or below a maximum or minimum value that is considered to be a fault by the control module, an instantaneous fault is registered (i.e. a fault is active). The value may vary depending on the specific diagnostic trouble code (DTC). Examples of this are U > 11.5 V, U < 2 V or f < 10 Hz.
SI#01 (see the graph)	The test is active. The control module can only detect faults and store diagnostic trouble codes (DTC) when the test is running.
SI#02 (see the graph)	The test has been active. Indicates whether the control module was able to detect faults and store diagnostic trouble codes (DTC).
SI#03 (see the graph)	The control module detects an instantaneous fault. This information is used by the control module to determine if or when a diagnostic trouble code (DTC) should be stored. As soon as a signal exceeds the permitted value (compare with the upper graph), there is an instantaneous fault.
SI#04 (see the graph)	The control module has detected an instantaneous fault. An instantaneous fault has been detected at some stage.
SI#05	Lamp lighting / Text message. Information about whether the diagnostic trouble code (DTC) activates a warning lamp or text message in the combined instrument panel.
SI#06	The test is disabled because another fault has occurred. The diagnostic trouble code (DTC) is stored at the point of the base fault. If this leads to further faults, related diagnostic trouble codes (DTCs) are not stored.
SI#08 (see the graph)	Counter for instantaneous faults. When an instantaneous fault is detected by the control module, a counter counts up for as long as the fault exists. When the fault is no longer present, the counter counts down again. The diagnostic trouble code (DTC) is stored in the car if the counter reaches a certain maximum value. The maximum value varies between different diagnostic trouble codes (DTCs). The speed of the count depends on how long the fault can persist before it results in customer symptoms.
SI#09 (see the graph)	Maximum value of counter SI#08. There are a variety of ways that the counter value for instantaneous faults can be read off depending on how often the diagnostic has been run.
Lower graph	Validating diagnostic trouble codes (DTCs). The diagnostic trouble code

Status Identifier, Description

	(DTC) is stored when the counter for instantaneous faults has reached its maximum value.

Status Identifier, Description (Continued)



Graphs

Description of Counters

COUNTERS, DESCRIPTION

Counter

A useful fault-tracing tool is the Diagnostic Trouble Code (DTC) counter. The control module stores 6 different counters for each Diagnostic Trouble Code (DTC), which describes the occurrence. The counters can be used to determine when and how often a fault has been detected. Using the counters for the Diagnostic Trouble Code (DTC) it is possible to see if the fault has only been registered during the current operating cycle or whether it has been detected previously.

If a fault is intermittent it is possible to determine how intermittent the fault is by studying the values of the different counters.

Example:

- Counter 1 = 15 Counts the number of operating cycles since the fault was last validated.
- Counter 3 = 69 Counts the number of operating cycles since the fault was first validated.
- Counter 4 = 1 Counts how many times the fault has occurred since the first time the fault was first validated.
- Counter 5 = 91764 The counter adds the time in seconds for which the control module has been operating since the fault was first validated and the diagnostic trouble code (DTC) was stored.
- Counter 6 = 0 The counter adds the time in seconds for which the test, the diagnostic, has run since the fault was first validated and the diagnostic trouble code (DTC) was stored.
- Counter 7 = 0 The counter adds the time in seconds for which the fault has been validated since the fault was first validated and the diagnostic trouble code (DTC) was stored.

In the examples given above, counter 1 gives the number of operating cycles where the diagnostic was run without a fault being detected. Counting takes place from when the fault was last detected. Counter 3 is the total number of operating cycles regardless of whether the

diagnostic was run or not. Counter 4 shows the number of operating cycles where the diagnostic detected a fault. Counters 3 and 4 start to count from the first operating cycle after the operating cycle when the fault was first detected.

In the example, counter 4 = 1, which means that the fault was detected twice. One can see that no fault was detected during the relevant operating cycle. Depending on the number of operating cycles and the customer1s driving pattern, it can assist in ruling out this control module from the customer's current problems. The counters can help us understand how intermittent the fault can be. If the counters 1 = 0, 3 = 0 and 4 = 0 it indicates that there have not been any operating cycles since the fault was detected and that the fault was probably generated in the workshop.

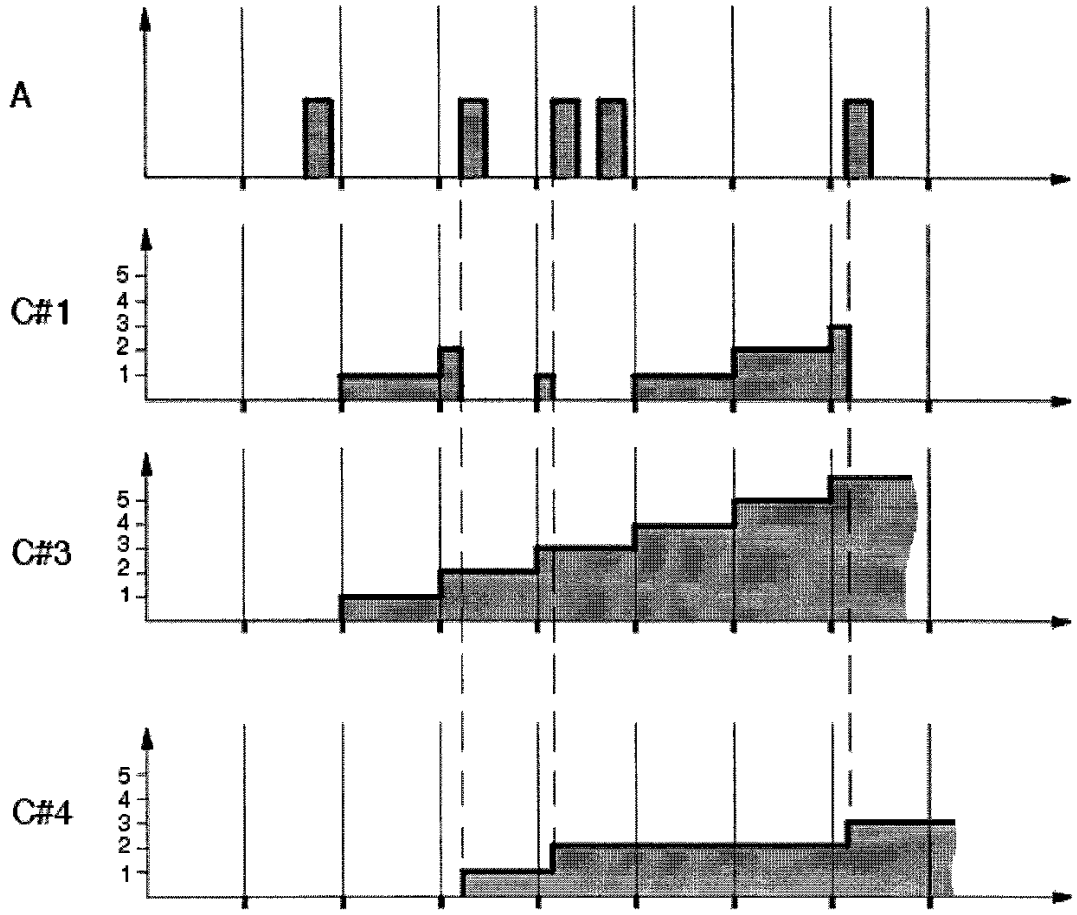
For an operating cycle to be recognized certain requirements may be necessary, for example, increasing the engine coolant temperature. In certain cases ignition on, ignition off and ignition on again are counted as an operating cycle.

Counter 5 can be useful if the fault was detected in this operating cycle. The time can be used to determine more exactly when the fault occurred.

NOTE: Not all counters need be implemented in a control module, this varies from system to system. The possible counters are described below.

Counter	Function
A (see the graph) Counter 1	The graph illustrates the time at which a fault occurs. In the illustration the control module has detected a fault in the second cycle. This fault has then occurred a total of 5 times. The counter can be read off for each diagnostic trouble code (DTC) in the control module in which this is implemented. Operating cycles are marked with vertical lines. An operating cycle usually begins at ignition on and finishes when the ignition is switched off.
C#1 (see the graph) Counter 2	Counts the number of operating cycles since the fault was *last* validated. This information can be used to determine whether the fault is active during the current operating cycle or not. The fault is present now if the value is zero. This counter is also used for most systems to give "Permanent fault" and " Intermittent fault" text messages in VIDA when reading off a diagnostic trouble code (DTC).
C#3 (see the graph) Counter 3	Counts the number of operating cycles since the fault was *first* validated. When a fault has been validated, the counter will count up by 1 for each subsequent operating cycle. The same as counter C#1 but monitors the number of cycles since the first fault occurred.
C#4 (see the graph) Counter 4	Counts the number of operating cycles in which the fault was validated since it was first validated. Counts the number of times the fault has occurred since the first time.
C#5 Counter 5	The counter assesses the number of seconds the control module has been operating since the fault was first validated and the diagnostic trouble code (DTC) was stored. The time the control module has been operating is only counted when it is active, not in "sleep mode".
C#6 Counter 6	The counter assesses the number of seconds the test (the diagnosis) has been operating since the fault was first validated and the diagnostic trouble code (DTC) was stored.
C#7 Counter 7	The counter assesses the number of seconds the fault has been valid since it was first validated and the diagnostic trouble code (DTC) was stored.

Counters, Description



Graphs

Description of Parameters, Quick Test of the Fuel Tank System

Description of parameters, quick test of the fuel tank system

Conditions

ECU power supply (V)

The value indicates the voltage supply from the system relay to the engine control module (ECM).

Atmospheric pressure (Pa)

The value indicates the ambient pressure. The Engine control module (ECM) receives a signal from the atmospheric pressure sensor.

Hint: The sensor is integrated in the Engine control module (ECM).

Fuel level (l)

The value shows the fuel level in the tank. The Engine control module (ECM) receives a signal from fuel level sensor.

Hint: The sensor is connected to the Central electronic module (CEM) and information is sent to the Engine control module (ECM) via CAN.

°

Ambient temperature (C)

The value indicates the ambient temperature. The Engine control module (ECM) receives a signal from the outside temperature sensor.

Hint: The sensor is connected to the Central electronic module (CEM) and information is sent to the Engine control module (ECM) via CAN.

Test status

Fuel tank system quick test

Shows the current status of the quick test (In progress/Not in progress)

Test phase

Shows the current phase of the leak diagnosis. For more information, see "Test phases, quick test tank system".

Fuel tank pressure (Pa)

The value indicates the calculated tank pressure. The Engine control module (ECM) calculates the average pressure with the help of the measured power consumption on the leak diagnostic unit's pump. The pressure will rise from 0 Pa to approx. 4500 Pa during the test.

Hint: The calculated pressure can differ from the measured pressure by ±15 %. This is normal.

Test result

DMTL, test result

Shows the test result on the leak diagnostic unit (DMTL).
If "Fault found" is shown, the Engine control module (ECM) has generated a diagnostic trouble code (DTC) for the fault. Fault tracing should be started/continued.

Tank system, test result

Shows the test result for the fuel tank system.
If "Minor leak found" or "Major leak found" is shown the Engine control module (ECM) has generated a diagnostic trouble code (DTC) for the fault. Fault tracing should be started/continued.

Estimated leak (mm)

The value shows the diameter of the leak. The Engine control module (ECM) calculates the diameter with the help of measurements made during testing.

Hint: The parameter should be used to get an understanding of how close to the diagnostic trouble code limit the system is. If the estimated size of the leak is very close to the diagnostic trouble code limit, fault tracing should probably be carried out despite the test result for the tank system showing "No leakage found", especially if the diagnostic trouble code (DTC) for leakage was initially generated.

Fault-Tracing Information - Intermittent Fault

Fault-Tracing Information
If the fault is intermittent, do not verify fault-tracing if the fault does not recur.

It is possible to view the information again, or leave fault-tracing for this diagnostic trouble code (DTC).

Do you want to view the information again?

YES: Repeat Procedure.
NO: Refer to Trouble code Descriptions. See: Diagnostic Trouble Code Descriptions

Fault-Tracing Information - Interrupted Fault

Fault-Tracing Information
Fault-tracing is not followed by verification for this fault.

The information can be displayed again or fault-tracing this fault can be interrupted.

Do you want to view the information again?

YES: Repeat Procedure.
NO: Refer to Trouble code Descriptions. See: Diagnostic Trouble Code Descriptions

Fault-Tracing Information - Permanent Fault

Fault-Tracing Information
The fault should have been detected and remedied. As this is not the case fault-tracing has failed.

Exit fault-tracing for this diagnostic trouble code (DTC) or make another attempt.

Do you want to exit fault-tracing?

YES: Refer to Trouble code Descriptions. See: Diagnostic Trouble Code Descriptions
NO: Repeat Procedure.

Fault-Tracing Information - Previously Registered

Fault-Tracing Information
The control module has previously registered a fault. The fault is now no longer present.

Continue: Refer to Fault-Tracing Information - Intermittent Fault. See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Fault-Tracing Information/Fault-Tracing Information - Intermittent Fault

Identifying Upgraded Software ECM/ETM

Identifying Upgraded Software ECM/ETM

Upgraded software for the engine control module (ECM) and electronic throttle module (ETM), available during 2006 or later, can be identified. The updated software has the diagnostic number/software number as set out in the table below. The diagnostic number/software number can be read using VIDA/DIAGNOSTICS/NETWORK.

CAUTION! For the USA/Canada market, with turbocharged and 6-cylinder normally aspirated engines the software of the engine control module (ECM) can be identified using the software number or diagnostic number, depending on the version of the software involved.

The differences between the first version, which is identified by the software number, and the second version, which is identified by the diagnostic number, include the following:

- Improved driveability after engine control module (ECM) reset. The start values for some system adaptations are adjusted to facilitate handling of aged/worn systems/components after diagnostic trouble code deletion or when the control module has been without power.
- Increased hardiness to certain combinations of aging/wear in the system. The work areas for some adaptations are adjusted to better match the aging of certain components.
- Supplements as to which faults are to generate a message to the driver.
- Improved serviceability (diagnostic trouble code generation) for some intermittent faults that generate driveability problems.

The diagnostic number (also known as diagnostic version in VIDA) and the software number can be read out via VIDA/DIAGNOSTICS/NETWORK. The electronic throttle module (ETM) is identified solely by the diagnostic number.

If the diagnostic number/software number is within the following series, it is the latest software downloaded:

- **5-cylinder non-turbo engines**, (all markets):
  Engine control module (ECM) diagnostic number 30785129 - 30785132 or 30785667 and electronic throttle module (ETM) 30785387.

- **Turbocharged and 6-cylinder normally aspirated engines** (USA/Canada market):
  First version, engine control module (ECM) software number 30785203 - 30785240 and electronic throttle module (ETM) diagnostic number 30785388.

  Second version, engine control module (ECM) diagnostic number 30785372 - 30785378 and electronic throttle module (ETM) diagnostic number 30785388.

- **Turbo engines and 6-cylinder non-turbo engines**, (all markets except the USA/Canada market):
  Engine control module (ECM) software number 30785372 - 30785378 and electronic throttle module (ETM) diagnostic number 30785388.

USA/Canada market

Turbo engines and 6 cyl non turbo engines ECM (Bosch)/ETM (Magneti Marelli) **Note! The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.**	
Model	Diagnostic number/software number
S70/V70 (-00)/V70 XC (-00)/C70 (-05)	• **ETM, 1999- :** ▪ 30785388 (diagnostic number) • **ECM, 1999:** ▪ 30785205 (software number) ▪ 30785206 (software number) ▪ 30785207 (software number) ▪ 30785208 (software number) ▪ 30785209 (software number) ▪ 30785372 (diagnostic number) • **ECM, 2000:** ▪ 30785212 (software number) ▪ 30785213 (software number) ▪ 30785214 (software number) ▪ 30785215 (software number) ▪ 30785216 (software number) ▪ 30785217 (software number) ▪ 30785218 (software number) ▪ 30785221 (software number) ▪ 30785222 (software number) ▪ 30785223 (software number) ▪ 30785224 (software number)

USA / Canada Market

	• **ECM, 2000- :** ▪ 30785373 (diagnostic number) • **ECM, 2001:** ▪ 30785235 (software number) ▪ 30785236 (software number) ▪ 30785237 (software number) • **ECM, 2002:** ▪ 30785238 (software number) ▪ 30785239 (software number) ▪ 30785240 (software number)
S60/V70 (00-)/V70 XC/ XC70 (01-)/S80 (-06)	• **ETM, 1999- :** ▪ 30785388 (diagnostic number) 5 cyl turbo engines: • **ECM, -2000:** ▪ 30785225 (software number) ▪ 30785226 (software number) ▪ 30785227 (software number) ▪ 30785228 (software number) ▪ 30785375 (diagnostic number) • **ECM, 2000- :** ▪ 30785229 (software number) ▪ 30785230 (software number) ▪ 30785231 (software number) ▪ 30785232 (software number) ▪ 30785376 (diagnostic number) 6 cyl engines: • **ECM, 1999:** ▪ 30785203 (software number) ▪ 30785204 (software number) ▪ 30785210 (software number) ▪ 30785211 (software number) ▪ 30785377 (diagnostic number) • **ECM, 2000:** ▪ 30785219 (software number) ▪ 30785220 (software number) ▪ 30785378 (diagnostic number) • **ECM, 2000- :** ▪ 30785233 (software number) ▪ 30785234 (software number)

5 cyl non turbo engines ECM (Denso) /ETM (Magneti Marelli)

Note! The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.

Model	Diagnostic number

S70/V70 (-00)/C70 (-05)	• **ETM, 1999- :** ▪ 30785387 (diagnostic number) • **ECM, 1999:** ▪ 30785131 (diagnostic number) • **ECM, 2000- :** ▪ 30785132 (diagnostic number)
S60/V70 (00-)/S80 (-06)	• **ETM, 1999- :** ▪ 30785387 (diagnostic number) • **ECM, 1999-2000:** ▪ 30785667 (diagnostic number) • **ECM, 2001 :** ▪ 30785129 (diagnostic number) • **ECM, 2002 :** ▪ 30785130 (diagnostic number)

USA / Canada Market

All markets except USA/Canada

Turbo engines and 6 cyl non turbo engines ECM (Bosch)/ETM (Magneti Marelli) **Note! The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.**	
Model	Diagnostic number
S70/V70 (-00)/V70 XC (-00)/C70 (-05)	• **ETM, 1999- :** ▪ 30785388 (diagnostic number) • **ECM, 1999:** ▪ 30785372 (diagnostic number) • **ECM, 2000- :** ▪ 30785373 (diagnostic number)
S60/V70 (00-)/V70 XC/ XC70 (01-)/S80 (-06)	• **ETM, 1999- :** ▪ 30785388 (diagnostic number) 5 cyl turbo engines: • **ECM, 1999:** ▪ 30785374 (diagnostic number) • **ECM, 2000:** ▪ 30785375 (diagnostic number) • **ECM 2000- :** ▪ 30785376 (diagnostic number) 6 cyl engines: • **ECM, 1999:** ▪ 30785377 (diagnostic number)

All Markets Except USA / Canada

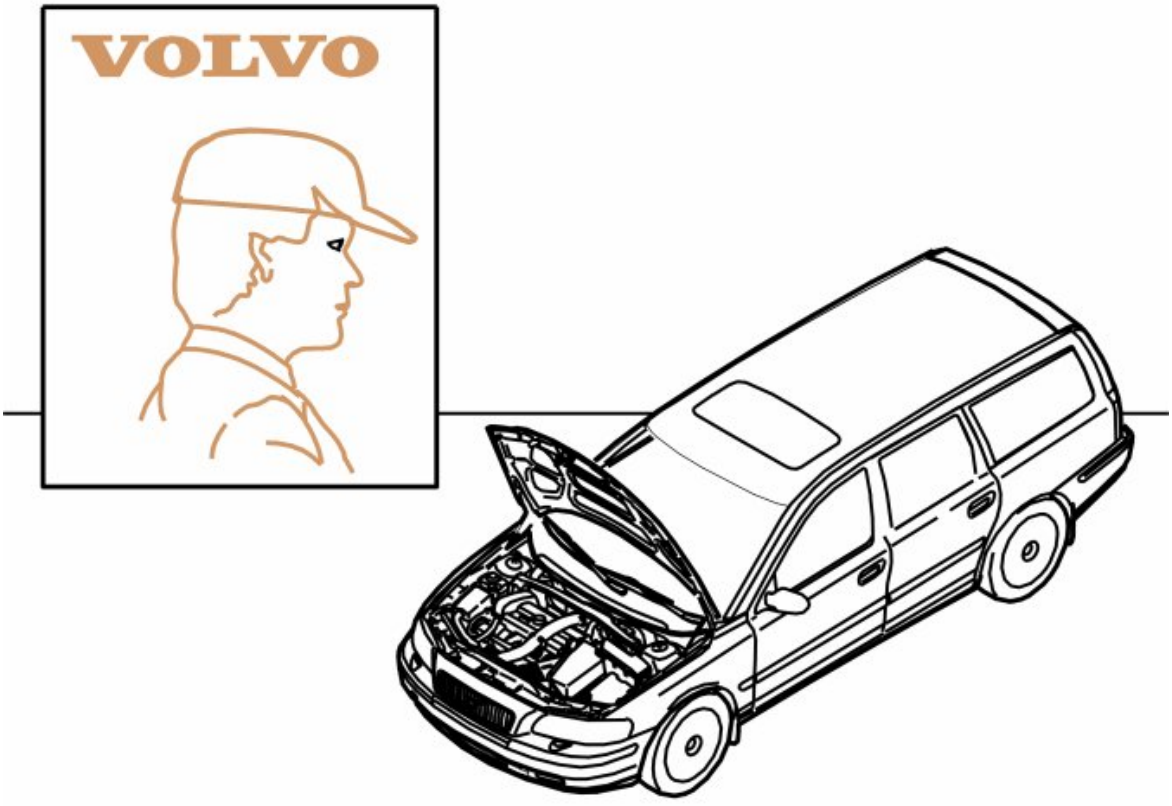
	• **ECM, 2000:** ▪ 30785378 (diagnostic number)
5 cyl non turbo engines ECM (Denso) /ETM (Magneti Marelli) **Note! The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.**	
Model	Diagnostic number
S70/V70 (-00)/C70 (-05)	• **ETM, 1999- :** ▪ 30785387 (diagnostic number) • **ECM, 1999:** ▪ 30785131 (diagnostic number) • **ECM, 2000- :** ▪ 30785132 (diagnostic number)
S60/V70 (00-)/S80 (-06)	• **ETM, 1999- :** ▪ 30785387 (diagnostic number) • **ECM, 1999-2000:** ▪ 30785667 (diagnostic number) • **ECM, 2001:** ▪ 30785129 (diagnostic number) • **ECM 2002- :** ▪ 30785130 (diagnostic number)

All Markets Except USA / Canada

Information

Information

Example of use of the frozen values



Faults can be intermittent, which is important to remember when fault-tracing for possible causes. If the fault is not present when the vehicle is in the workshop, a fault cause can be missed as the values can be correct when fault-tracing is carried out. A good indication of when the fault

occurred the first time are the frozen values that can be read out using VIDA/Details.
The frozen values are stored immediately after a fault has been detected. Most parameters in the frozen values are the same for all faults and indicates a general status when a fault has been detected, e.g. engine speed, load, coolant temperature, vehicle speed and battery voltage. Some of them have been selected to give a better understanding of the specific fault. Diagnostic Trouble Code (DTC) ECM-903F Throttle position (TP) can be used as an example of how the frozen values can be used (this is only one example and there may be deviations in reality).
One of the checks given in fault-tracing is "voltage supply to throttle unit" and continues with a suggestion to check the battery and charging system. However, the battery's condition, with the vehicle in the workshop, does not show the battery voltage when the fault was detected. The best information is in the frozen values, i.e. the voltage that the Engine control module (ECM) detected, when the Electronic throttle module (ETM) indicated the fault.
However, remember that this is not an indication of the voltage supply to the Electronic throttle module (ETM), but to the Engine control module (ECM). If the Engine control module (ECM), according to the frozen values, had a good voltage, the battery worked. The voltage supply to the Electronic throttle module (ETM) should therefore be checked separately.

Frozen values for ECM-903F
Status, lambda control bank 1 = LR: Closed circuit with two sensors
Status, lambda control bank 2 = LR: Closed circuit with two sensors
Calculated load = 4.71 %
Engine coolant temperature = 87 °C
Fuel trim, quick adjustment, bank 1= 15.63%
Fuel trim, slow adjustment, bank 1 = -0.78%
Fuel trim, quick adjustment, bank 2 = 23.44%
Fuel trim, slow adjustment, bank 2 = -0.78%
Engine speed = 760 rpm
Vehicle speed = 0 km/h
Boost pressure = 30%
Battery voltage = 12.50 V
Throttle angle, desired value = 14.84%
Air mass = 23.8 kg/h Outdoor temperature = 33 °C

In this case, we assume that the vehicle had a low battery voltage in the workshop. As seen in the frozen values however, the battery voltage was correct when the fault occurred, and this was therefore probably not the cause. This is an example of how the frozen values can be used, to make fault-tracing more efficient and prevent taking too much time fault-tracing incorrectly. This prevents fault-tracing and correcting a fault that was not actually the cause of the problem, which was originally to be solved.
The odometer setting (km) is included among the frozen values in the Engine control module (ECM). This makes a fast comparison with the odometer counter possible, so that one can determine if the fault occurred as part of the fault-tracing and can be ignored.
For example, the CAN related diagnostic Trouble Codes (DTCs) can be detected when the battery voltage drops when working on the vehicle, by the passenger compartment lighting and other loads draining the battery. The frozen values indicate the odometer setting in km. Multiplying this value by 0.62 gives the distance in miles. The current distance in miles and km can be read out using VIDA.
The following should be taken into account when using frozen values for fault-tracing. The frozen values, that should be used with care, are those that have been stored for CAN and are related to Diagnostic Trouble Codes (DTCs) for the Electronic throttle module (ETM).
If the Electronic throttle module (ETM) detects that the communication to the Engine control module (ECM) is interrupted, error flags are stored in the Electronic throttle module (ETM). These error flags are sent to the Engine control module (ECM) as soon as communication on the CAN is working again. This means that the Engine control module (ECM) stores the Diagnostic Trouble Codes (DTCs) as soon as the Electronic throttle module (ETM) supplies them.
This, in turn means that it is at this time that the frozen values are stored. For the Electronic throttle module (ETM) this means that the frozen values occur from a point in time after the fault first occurred.

Information About Combined Diagnostic Trouble Codes (DTCs)

Information About Combined Diagnostic Trouble Codes (DTCs)

5 Cyl Non Turbo Engines

Combined Diagnostic Trouble Codes (DTCs)

The following table is available to facilitate fault-tracing of ETM related diagnostic trouble codes (DTCs).

NOTE: Probable root diagnostic trouble codes (DTCs) are in bold and listed at the top of each cell.

Example of how to read the table: If the codes **903F** and 980F are generated in a vehicle with a Denso management system, then 903F is the probable root diagnostic trouble code. The diagnostic trouble codes (DTCs) can also be stored individually or together with other diagnostic trouble codes (DTCs) that do not affect ETM.

5 cyl non turbo engines

903F 980F	**9160** 903F 91B7 980F	**9150** 91B7
980F 9818	**9520** 918F	**9150 9160** 130A 903F 980F
91B7 91A7	**9150 9160** 903F 980F	**9150** 903F 91B7 980F
911A 912A	**950F** 951F	**91B7** 903F 980F
9160 91B7	**E003** 902B	**91F0** 91A7
902B 903F	**130A** 903F 980F	**950F** 917F 951F
902B 902A 903F 951F 980F	**150A** 980F 9818	**130A** 903F
902B 902A 903F 980F	**9150 9160** 903F 91B7 980F	**E003** 902B 903F
91A7 903F 980F	**9300** 930A	**902B** 902A
91A7 903F	**9530** 950F	**91A7** 903F 980F 9818
902B 902A 903F 951F	**9150 9160** 903F 91B7	**9200** 922A
902B 902A 903F	**9520** 918F 951F	**902B** 902A 951F
9400 941F	**91B7** 903F 91A7	**950F** 903F 917F 951F
9150 9160 903F	**918F** 917F 951F	**130A** 91B7

5 Cylinder Non-turbo Engines

5/6 cyl turbo and 6 cyl non turbo engines

Combined Diagnostic Trouble Codes (DTCs)
The following table is available to facilitate fault-tracing of ETM related diagnostic trouble codes (DTCs).

NOTE: Probable root diagnostic trouble codes (DTCs) are in bold and listed at the top of each cell.

Example of how to read the table: If the codes **130A** and 91CF are stored in a vehicle with a Bosch control system then 130A is the probable root diagnostic trouble code (DTC). The diagnostic trouble codes (DTCs) can also be stored individually or together with other diagnostic trouble codes (DTCs) that do not affect ETM.

5/6 cyl turbo and 6 cyl non turbo engines

130A 91CF	**9520** 917F 958F	**901E** 903C 903F
91A7 904D	**9150 9160** 903C 903F	**902A** 903F 904D
9150 9160 903F 904C 904D	**902A** 903F 959F	**9190** 903F 904D 91A7
9150 9160 903F 904C 904D 91A7	**958F** 959F	**91B7** 904D 91A7
902A 903F 904D 959F	**9150 9160** 903F 904C	**982A** 904D
9150 9160 903F 904C 904D 982A	**9150 9160** 903F 904C 904D 91B7	**958F** 917F
91A7 903C	**902A** 903C 903F 959F	**9150 9160** 903C 903F 91A7
91A7 903F 904D	**9150 9160** 903F 904C 91A7	**9150 9160** 903F 904C 904D 91A7 91B7
901E 903F	**981A** 904D	**902A** 928C
903F 904D	**130A** 904D 91A7	
130A 903F 904D 91CF	**981A** 6805 904D	

Ranking Values

Ranking values

There is a ranking value for each diagnostic trouble code (DTC). The ranking value describes the proximity of a real fault in the system. When the ranking value exceeds 128 a diagnostic trouble code (DTC) is stored. Misfire, which counts the number of missed combustions is an exceptions. The smart tool is able to read out the ranking values for the relevant diagnostic trouble codes (DTCs) (those that may have caused a diagnostic trouble codes (DTCs) to be stored). If the ranking value for any of the diagnostic trouble codes (DTCs) is close or over 128 carry out fault-tracing according to the relevant diagnostic trouble code (DTC), even if the diagnostic trouble code (DTC) has not been stored.
The ranking information consists of two values:

- "Latest" contains the ranking value at read off
- "Worst" contains the highest ranking value the diagnostic trouble code (DTC) has had.

These parameters are first set to zero when erasing the relevant diagnostic trouble code (DTC).

Signal Description

Signal description

General

All values given below are between the terminals stated in column 1 and breakout box terminal #B2. Control module terminals #A1-#A60 correspond to terminals #A1-#A60 on the breakout box, terminals #A61-#A70 correspond to terminals #B1-#B10 on the breakout box and terminals #B1-#B50 correspond to terminals #B10-#B60 on the breakout box.

Note! It is important to connect the breakout box and check the ground terminals before taking readings.

Hint: If the numbering of the connector is different from the numbering on the breakout box, the connector number is given first, terminal #A61, followed by the breakout box number in brackets, (terminal #B1). Example: #A61 (#B1).

U=	DC voltage in volts (V)	U A/C =	AC voltage in volts (V)
U bat =	Battery voltage in volts (V)	f =	Frequency in Hertz (Hz)
U low =	Voltage near 0V or 0V	%pulse =	Pulse ratio (%)
t =	Time in milliseconds (ms)		

Connector terminals #A1-#A70

Terminal	Breakout box	Signal type	Ignition on	Idling speed	Other
#A1	(#A1)	-	-	-	-
#A2	(#A2)	Control signal Canister purge (CP) valve	U=Ubat	-	PWM signal during activation of the EVAP canister shut off valve
#A3	(#A3)	-	-	-	-
#A4	(#A4)	Signal (+) intake temperature sensor, integrated in the mass air flow (MAF) sensor	-	(+10 C) U= 2.01 V (+20 C) U=2.62 V (+30 C) U=3.21 V	-
#A5	(#A5)	Control signal engine cooling fan (FC) high-speed	Engine cooling fan (FC) off U=Ubat Engine cooling fan (FC) on U=Ulow	-	-
#A6	(#A6)	Control signal engine cooling fan (FC) low-speed	Engine cooling fan (FC) off U=Ubat Engine cooling fan (FC) on U=Ulow	-	-
#A7	(#A7)	-	-	-	-
#A8	(#A8)	-	-	-	-
#A9	(#A9)	-	-	-	-
#A10	(#A10)	-	-	-	-
#A11	(#A11)	Control signal preheating rear heated oxygen sensor (HO2S)	U=Ubat	Preheating off U=Ubat Preheating U=Ulow	-
#A12	(#A12)	-	-	-	-
#A13	(#A13)	-	-	-	-
#A14	(#A14)	Control signal injector 5	U=Ubat	t= 2-3ms	t increases with engine speed (RPM) and load
#A15	(#A15)	Control signal injector 3	U=Ubat	tlow=2-3 ms	t increases with engine speed (RPM) and load
#A16	(#A16)	Control signal injector 1	U=Ubat	tlow=2-3 ms	t increases with engine speed (RPM) and load
#A17	(#A17)	-	-	-	-
#A18	(#A18)	Control signal preheating front heated oxygen sensor (HO2S)	U=Ubat	Preheating off U=Ubat Preheating U=Ubat	-
#A19	(#A19)	-	-	-	-
#A20	(#A20)	-	-	-	-
#A21	(#A21)	Signal A/C pressure sensor	U=0.9 V (at approximately 20 C)	-	U increases with increased pressure in the system
#A22	(#A22)	Mass air flow (MAF) sensor signal	U=0.58 V	U=1.33 V Unloaded, engine at operating temperature	U increases with increasing air mass
#A23	(#A23)	Signal manifold absolute pressure (MAP) sensor	U= 1.64 V atmospheric pressure at sea level	-	U increases with increasing pressure in the intake manifold

Terminal	Breakout box	Signal type	Ignition on	Idling speed	Other
#A24	(#A24)	Signal (+) front heated oxygen sensor (HO2S) signal (+)	-	λ=0.95 V>700 mV λ=1.10 V<200 mV	-
#A25	(#A25)	-	-	-	-
#A26	(#A26)	-	-	-	-
#A27	(#A27)	-	-	-	-
#A28	(#A28)	Signal ignition discharge module (IDM) check, ignition coils	-	-	-
#A29	(#A29)	Control signal ignition coil no. 3	U=Ulow	U=2.5 volt thigh=2 ms	the frequency varies according to engine speed (RPM)
#A30	(#A30)	Control signal ignition coil no. 2	U=Ulow	U=2.5 volt thigh=2 ms	the frequency varies according to engine speed (RPM)
#A31	(#A31)	Control signal ignition coil no. 1	U=Ulow	U=2.5 volt thigh=2.5 ms	the frequency varies according to engine speed (RPM)
#A32	(#A32)	-	-	-	-
#A33	(#A33)	Control signal injector 4	U=Ubat	tlow=2-3 ms	t increases with engine speed (RPM) and load
#A34	(#A34)	Control signal injector 2	U=Ubat	tlow=2-3 ms	t increases with engine speed (RPM) and load
#A35	(#A35)	-	-	-	-
#A36	(#A36)	Power ground preheating, front heated oxygen sensor (HO2S)	U=Ulow	-	-
#A37	(#A37)	Communication cable control modules (CAN H)	-	-	Between the engine control module (ECM) and the throttle unit
#A38	(#A38)	Control signal stop (brake) lamp - switch	U=Ulow (not activated) U=Uhigh (activated)	-	Between the engine control module (ECM) and the throttle unit
#A39	(#A39)	Oil pressure switch	U=Ulow (no oil pressure)	U=Ubat	-
#A40	(#A40)	Signal (+) Engine coolant temperature (ECT) sensor	-	(+20 C) U=3.1 V (+30 C) U=2.6 V (+80 C) U=0.9 V (+100 C) U=0.5 V	-
#A41	(#A41)	Signal (-) front heated oxygen sensor (HO2S)	-	λ=1 when the current is approximately +0.2 mA	Negative current when the fuel air mixture is rich. Range: -12 mA, +12 mA
#A42	(#A42)	Signal (+) front heated oxygen sensor (HO2S)	-	λ=1 when the current is approximately +0.2 mA	Positive current when the fuel air mixture is lean Range: -12 mA, +12 mA
#A43	(#A43)	-	-	-	-
#A44	(#A44)	-	-	-	-
#A45	(#A45)	-	-	-	-
#A46	(#A46)	Signal (+) knock sensor (KS)	-	-	-

Terminal	Breakout box	Signal type	Ignition on	Idling speed	Other
#A47	(#A47)	Signal (+) camshaft position (CMP) sensor	-	-	-
#A48	(#A48)	Signal (+) flywheel sensor	U=2.5 V	U=sine wave voltage Utop=3.5 V U offset=2.5 V	-
#A49	(#A49)	-	-	-	-
#A50	(#A50)	Control signal ignition coil no. 5	U=Ulow	U=2.5 volt thigh=2 ms	the frequency varies according to engine speed (RPM)
#A51	(#A51)	Control signal ignition coil no. 4	U=Ulow	U=2.5 volt thigh=2 ms	the frequency varies according to engine speed (RPM)
#A52	(#A52)	Control signal Air assisted control valve (AACV)	-	-	-
#A53	(#A53)	Power ground 3	Ulow	-	-
#A54	(#A54)	Power ground 2	Ulow	-	-
#A55	(#A55)	Communication cable control modules (CAN L)	-	-	Between the engine control module (ECM) and the throttle unit
#A56	(#A56)	Control signal accelerator pedal (AP) position sensor, PWM signal	Utop=12 V t=4ms pulse ratio= 8%-88%	-	Between the engine control module (ECM) and the throttle unit
#A57	(#A57)	Power supply, camshaft position (CMP) sensor	U=5 volt	-	-
#A58	(#A58)	Power supply, manifold absolute pressure (MAP) sensor A/C pressure sensor	U=5 volt	-	-
#A59	(#A59)	-	-	-	-
#A60	(#A60)	Signal ground Mass air flow (MAF) sensor	U=Ulow	-	-
#A61	(#B1)	Signal ground intake temperature Engine coolant temperature (ECT) sensor rear heated oxygen sensor (HO2S)	U=Ulow	-	-
#A62	(#B2)	Power ground 1	U=Ulow	-	-
#A63	(#B3)	-	-	-	-
#A64	(#B4)	Signal (-) knock sensor (KS)	-	-	-
#A65	(#B5)	Signal ground camshaft position (CMP) sensor	U=Ulow	-	-
#A66	(#B6)	Signal ground flywheel sensor	U=Ulow	-	-
#A67	(#B7)	-	-	-	-
#A68	(#B8)	-	-	-	-
#A69	(#B9)	Control signal preheating front HO2S	U=Ubat	Preheating off U=Ubat Preheating U=Ubat	B+ from the system relay

Terminal	Breakout box	Signal type	Ignition on	Idling speed	Other
#A70	(#B10)	Power supply	U=Ubat	-	B+ from the system relay

Connector terminals #B1-#B50

Terminal	Breakout box	Signal type	Ignition on	Idling speed	Other
#B1	(#B11)	Communication cable control modules (CAN L)	-	-	Between the engine control module (ECM) and the CAN driver module
#B2	(#B12)	-	-		-
#B3	(#B13)	-	-	-	-
#B4	(#B14)	Signal ground intake air temperature (IAT) sensor fuel tank pressure sensor clutch pedal sensor brake pedal sensor	U=Ulow	-	-
#B5	(#B15)	Signal ground accelerator pedal (AP) position sensor	U=Ulow	-	-
#B6	(#B16)	-	-	-	-
#B7	(#B17)	-	-	-	-
#B8	(#B18)	Engine coolant level switch	U=Ulow	-	-
#B9	(#B19)	Power supply accelerator pedal (AP) position sensor, analog sensor	U=5 volt	-	-
#B10	(#B20)	Power supply fuel tank pressure sensor	U=5 volt	-	-
#B11	(#B21)	30-supply (Power supply from the battery)	U=Ubat	-	-
#B12	(#B22)	-	-	-	-
#B13	(#B23)	Control modules communication cable (CAN H)	-	-	Between the engine control module (ECM) and the CAN driver module
#B14	(#B24)	-	-	-	-
#B15	(#B25)	Signal clutch pedal sensor	U=3.3 V (unaffected) U=2.2 volt (fully depressed, 100 mm)	-	Varies depending on the position of the clutch pedal
#B16	(#B26)	Signal brake sensor	U=3.1 V (unaffected) U=2.6 V (25 mm depressed)	-	Varies depending on the position of the brake pedal
#B17	(#B27)	Signal accelerator pedal (AP) position sensor, analog signal	U=0.4 V (idle) U=4.4 V (wide open throttle (WOT))	-	Varies depending on the position of the accelerator pedal (AP)
#B18	(#B28)	-	-	-	-
#B19	(#B29)	Signal (+) cruise control SET+	-	-	-
#B20	(#B30)	Signal (+) cruise control RESUME	-	-	-
#B21	(#B31)	Output signal (+) engine speed	U=Ulow	U=quadratic wave voltage Utop=Ubat	frequency increases with engine speed (RPM)

#B22	(#B32)	Diagnostic lead C-link	U=90% of Ubat	If a generic fault-tracing instrument is connected to the data link connector (DLC), other values apply	-
#B23	(#B33)	Signal (+) crank, +50 supply	U=Ulow	U=Ulow	U=Ubat at crank
#B24	(#B34)	-	-	-	-
#B25	(#B35)	Signal (+) accelerator pedal (AP) position sensor, PWM signal	Utop=Ubat T=4 ms pulse ratio= 8%-88%	-	Between the accelerator pedal (AP) position sensor and the engine control module (ECM)
#B26	(#B36	Signal (+) Stop (brake) lamp switch	U=Ubat when the brake pedal is depressed U=Ulow when the brake pedal is not depressed	-	-
#B27	(#B37)	Output signal Engine coolant temperature (ECT) to the air conditioning (A/C) system	Utop=Ubat T=4 ms pulse ratio = varies with engine coolant temperature (ECT)	-	-
#B28	(#B38)	-	-	-	-
#B29	(#B39)	Signal outside temperature sensor	(0C) U=2.34V (+10C) U=1.82 V (+20C) U=1.38 V (+25C) U=1.19 V (+30C) U=1.03 V	-	Temperature range: -40C to +110C
#B30	(#B40)	-	-	-	-
#B31	(#B41)	Signal fuel tank pressure sensor	U=2.5 V at 1kPa negative pressure U=3.3 V at atmospheric pressure (0kPa overpressure) U=4.1 V at 1kPa overpressure	-	-
#B32	(#B42)	Signal A/C request	U=Ubat on request, otherwise U=Ulow	-	-
#B33	(#B43)	Signal cruise control on / off	See terminal #B47	-	-
#B34	(#B44)	Signal cruise control SET-	See terminal #B47	-	-
#B35	(#B45)	-	-	-	-
#B36	(#B46)	-	-	-	-
#B37	(#B47)	Signal ignition on signal, +15 supply	U=Ubat	-	-
#B38	(#B48)	Control signal System relay	U=Ubat	-	The system relay runs on (2-15 mins)
#B39	(#B49)	-	-	-	-
#B40	(#B50)	Control signal EVAP canister shut-off valve	U=3.82 V	-	-

#B41	(#B51)	Control signal Electronic throttle system (ETS) warning lamp	U=Ulow	U=Ubat (not activated) U=Ulow (activated)	-
#B42	(#B52)	-	-	-	-
#B43	(#B53)	-	-	-	-
#B44	(#B54)	Control signal A/C activation	U=Ubat (not activated) U=Ulow (activated)	-	-
#B45	(#B55)	Control signal fuel pump (FP) activation	-	-	-
#B46	(#B56)	Control signal malfunction indicator lamp (MIL)	U=Ulow	U=Ubat (not activated) U=Ulow (activated)	-
#B47	(#B57)	Power supply Cruise Control	U=Ubat (not activated) U=pulse train Utop=Ubat t=20 ms thigh=0.5 ms	-	-
#B48	(#B58)	Control signal engine start inhibiting	U=Ulow (activated) U=Uhigh (not activated)	-	In certain markets, the engine can only be started with the clutch pedal depressed (U=Ulow)
#B49	(#B59)	-	-	-	-
#B50	(#B60)	-	-	-	-

Checking the Fuel Pressure and Residual Pressure in the Workshop

Checking the fuel pressure and residual pressure in the workshop

Choosing a method for taking a reading

Note! For vehicles with demand activated fuel pumps (FP), see VIDA vehicle communication Quick test of fuel pump (FP).

The fuel pressure can be measured with the car stationary or while being driven. Residual pressure is measured with the car stationary.
When the car is being driven, see Taking fuel pressure readings while driving the car See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Taking Fuel Pressure Readings While Driving the Car.

Continue - Measuring the line pressure

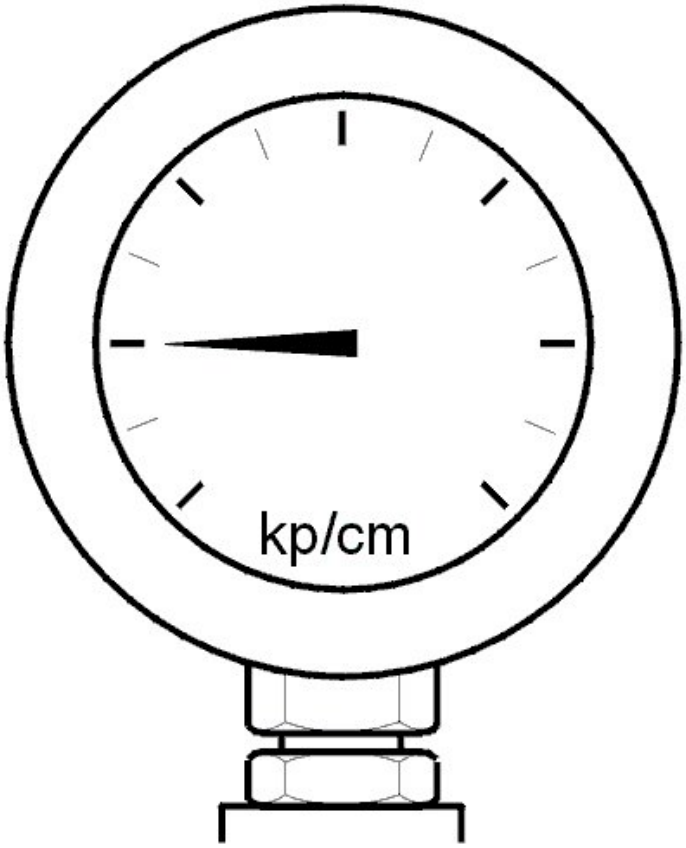
Measuring the line pressure

- Connect the pressure gauge according to Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge
- Remove the soundproofing panel
- Remove the fuel pump (FP) relay (CMI 12 in the passenger compartment)
- Connect a cable to the relay base as illustrated.

Read off the line pressure from the pressure gauge. The line pressure must be 375-395 kPa
Check the residual pressure if the fuel pressure is OK.
Remedy as necessary

Other information

- For the location of and to replace the fuel pump (FP) relay, see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For the location of and to replace the fuel pump (FP), see Right side fuel pump with level sensor See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair/Right Side Fuel Pump With Level Sensor
- Replacing the fuel filter See: Fuel Delivery and Air Induction/Fuel Filter/Service and Repair
- To disconnect the pressure gauge, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge.



Is the rest pressure to be checked?

Yes - Checking the residual pressure

No - DONE

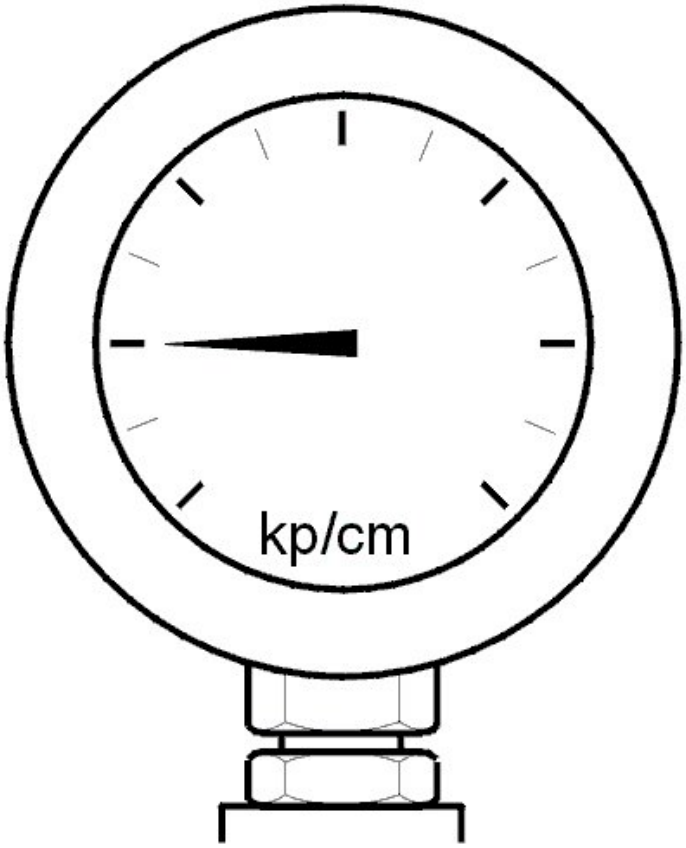
Checking the residual pressure

- Switch off the ignition
- Disconnect the cable between the terminals on the relay base
- Reinstall the fuel pump (FP) relay.

The line pressure must not fall below 200 kPa within 20 minutes of the fuel pump (FP) being shut-off.
Remedy as necessary

Other information

- For the location of and to replace the fuel pump (FP) relay, see Central electronic module (CEM), replacing See: Body Control Module/Service and Repair/Central Electronic Module (CEM), Replacing
- For the location of and to replace the fuel pump (FP), see Right side fuel pump with level sensor See: Fuel Delivery and Air Induction/Fuel Tank/Fuel Gauge Sender/Service and Repair/Right Side Fuel Pump With Level Sensor
- To disconnect the pressure gauge, see Fuel pressure gauge See: Fuel Delivery and Air Induction/Fuel Pressure/Testing and Inspection/Fuel Pressure Gauge.

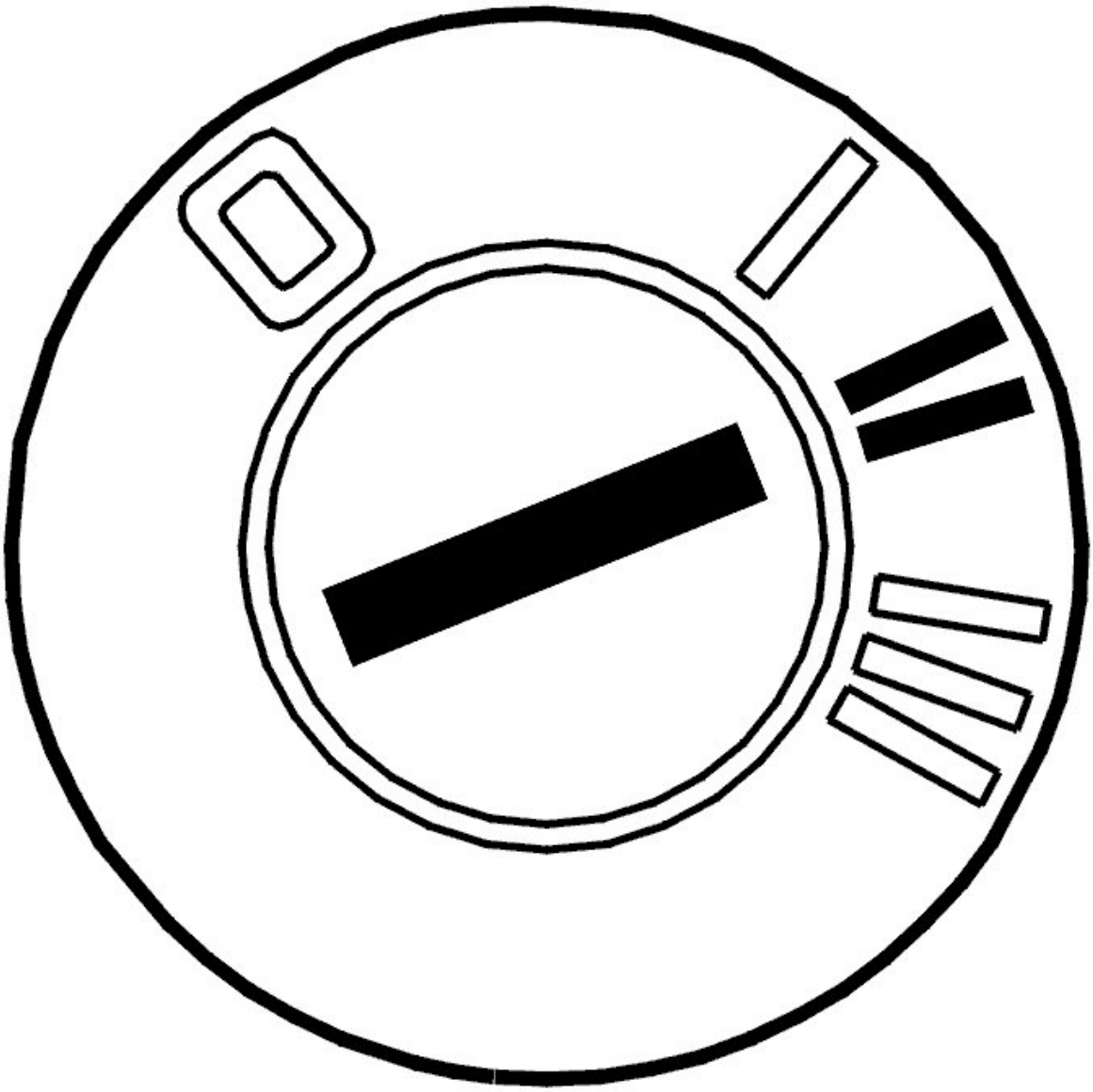


Continue - DONE

Checking the Status of the Pedal Position Sensor

Checking the status of the pedal position sensor

Checking the status of the pedal position sensor



A number conditions must be met for cruise control to be controlled by the engine control module (ECM). Some of these conditions are speed, the clutch and the brake pedal must not be depressed and certain diagnostic trouble codes (DTCs) must not be stored.
The clutch and brake pedal position sensors are checked to determine if they are in a position where the engine control module (ECM) allows cruise control.

Note! On cars with automatic transmissions, the parameter for the brake pedal position sensor displays "Active" (the brake pedal position sensor allows the cruise control to function).

- Ignition on
- Click on the VCT2000 symbol
- Check if the clutch pedal position sensor and the brake pedal position sensor are in the " Active" position when the pedals are in the unaffected positions.

Check that the status changes when the pedals are depressed.
The brake pedal and the clutch pedal must be in the "Active" position for the engine control module (ECM) to allow cruise control.

Continue - DONE

Readiness Code

Readiness Code

Read the readiness code

Read off diagnostic trouble codes (DTCs) and the readiness status.
If readiness is "OK" and no diagnostic trouble codes are stored, two cycles have run, i.e. the system's diagnostic functions have run two times without detecting a fault.

Hint: Readiness is reset (to "NOT OK") when the diagnostic trouble codes are cleared or if power is cut off to the engine control module (ECM).

US government information (US only)

The United States Environmental Protection Agency (EPA) has issued a guidance letter, "Performing Onboard Diagnostic System checks as Part of a Vehicle Inspection and Maintenance Program" (EPA420-R-01-015 June 2001), that incorporates various implementation issues associated with OBD-I/M testing. One being that the EPA has revised the readiness criteria to allow states to not reject MY 1996-2000 vehicles with two or fewer unset readiness codes, or MY 2001 and newer vehicles with no more than one unset readiness code. As mentioned herein this is suggested practice. Each individual state may abide by this guidance or enforce state regulations suited to their individual environmental needs. Please consult your State Department of Motor Vehicle for your current I/M testing regulations and procedures.

Select the appropriate remedy depending on this status:

1. If diagnostic trouble codes (DTCs) are stored
2. If readiness is "NOT OK".
3. If readiness is "OK" and no diagnostic trouble codes (DTCs) are stored.

1 - Diagnostic Trouble Code (DTC) stored

2 - Read the diagnostic status for readiness

3 - **DONE**

Read the diagnostic status for readiness

Read off the status of the diagnostic functions.

Select the appropriate remedy depending on this status:

1. Readiness for probe diagnostics, diagnostics for heated oxygen sensor (HO2S) preheating three-way catalytic converter (TWC) diagnostics "NOT READY".
2. Readiness for leak diagnostics "NOT READY".

Hint: The diagnostic for evaporative emission control is included in readiness for leak diagnostics.

1 - Carry out TRIP

2 - Quick test of the fuel tank system

Carry out TRIP

Perform a TRIP following Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs so that the engine control module (ECM) executes a diagnosis for diagnostic functions.

Continue - Read the readiness code

Quick test of the fuel tank system

Run a quick test of the fuel tank system via the vehicle communication socket.
The engine must be run to operating temperature and then left idling for a few minutes before the diagnostic function for EVAP control can be run.

Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) stored

Fault-trace and remedy stored diagnostic trouble codes (DTCs).

Continue - ANOTHER TEST

Check For Air Leaks In the Intake System

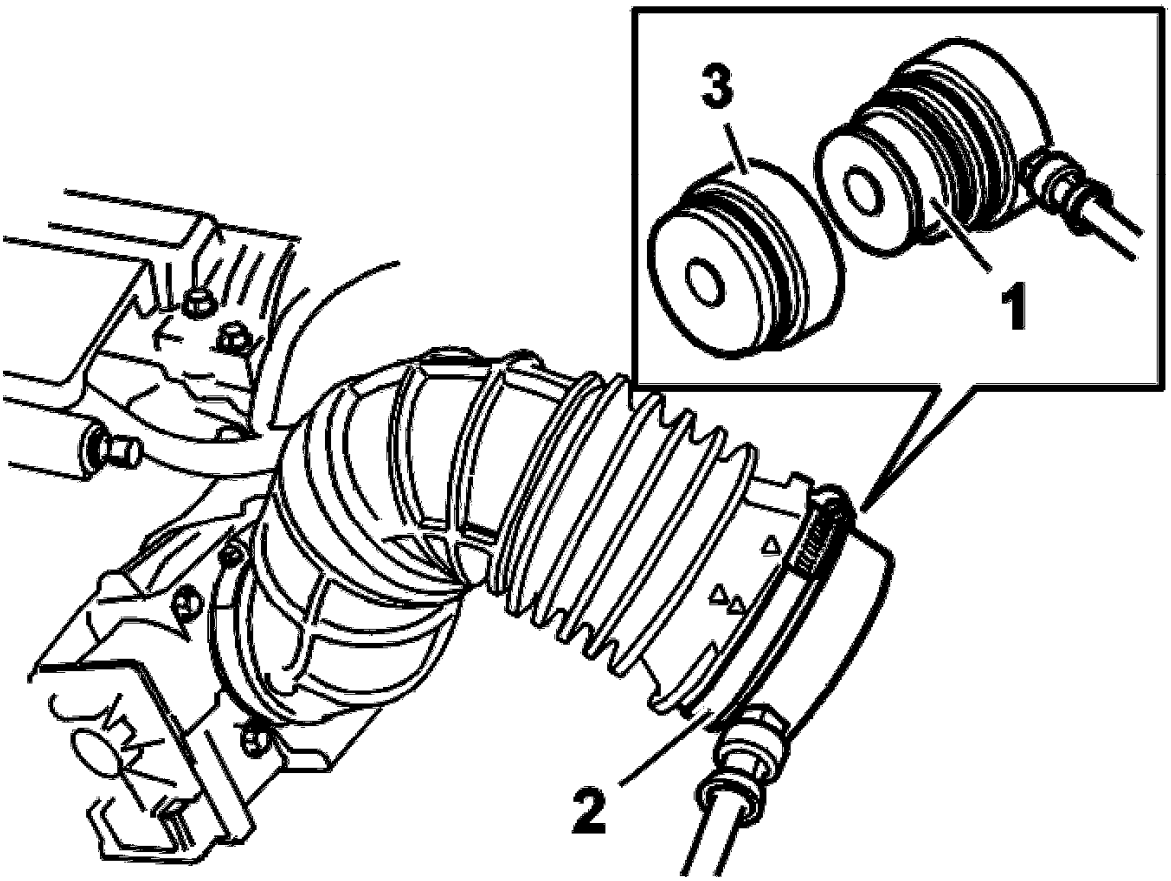
Air Leakage In The Intake System, Checking

Special Tools: 999 5545, 999 5544, 999 7080

NOTE: As the illustrations in this service information are used for different model years and/or models, some variation may occur. However, the essential information is always correct.

Preparations
Check that all hoses are undamaged and are in place with their hose clamps tightened.

Engagement



NOTE: S80 T6 and S60/V70 R use: 999 5545 (1) with 999 7080 (3). Lock 999 7080 on 999 5545.

Remove the fresh air hose from the mass air flow (MAF) sensor.

Install tool 999 5545 (1) and pressure regulator 999 5544 on the fresh air intake. Tighten the hose clamp (2).

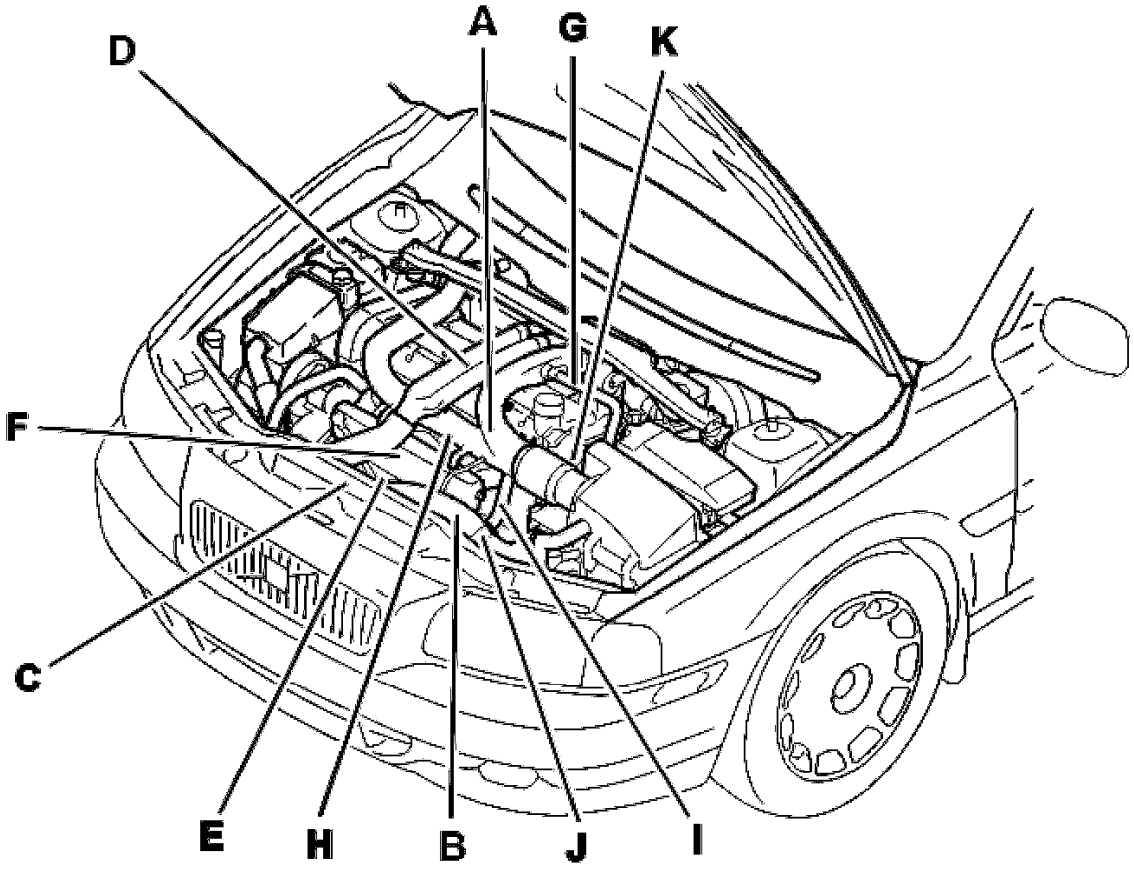
Remove the oil filler cap.

Check
Adjust the regulator to obtain a maximum pressure of **0.3 bar (0.15 psi)**. There may be a gentle hissing sound from the oil filler opening. This is due to the opening of an intake valve and the leakage of cylinder pressure past the piston rings.

Check components and connections.

If a leak is suspected, spray a soap solution onto the area. Check for air leakage from the canister purge (CP) valve. No leakage is permissible.

Checking components



A - fresh air intake
B - lower charge air pipe
C - charge air cooler (CAC)
D - upper charge air pipe
E - throttle body (TB)
F - intake manifold with vacuum hoses and gaskets
G - crankcase ventilation
H - injectors
I - brake servo hose
J - evaporative emission system (EVAP) valve
K - Turbocharger (TC) control valve.

Checking Power and Ground Terminals

Checking power supply and ground terminal, engine control module (ECM)

Checking power supply and ground terminal, engine control module (ECM)

Checking the power supply

- Check the fuse for power supply to engine control module (ECM) terminal #A17 (#A17).

If the fuse is blown, check the circuit for a short-circuit to ground

- Check the fuse for power supply to engine control module (ECM) terminal #B11 (#B21).

If the fuse is blown, check the circuit for a short-circuit to ground

- Check the power supply to engine control module (ECM) terminal #A17 (#A17). The voltage must be approximately battery voltage when the ignition is on.

If the voltage is incorrect, check the cable between ignition switch terminal 30 and system relay terminal #3 and the cable between system relay

terminal #5 and engine control module (ECM) terminal #A17 (#A17). Check for an open-circuit

- Check the power supply to engine control module (ECM) terminal #B11 (#B21). The voltage must be approximately battery voltage when the ignition is on.

If the voltage is incorrect, check the cable between ignition switch terminal 30 and engine control module (ECM) terminal #B11 (#B21). Check for an open-circuit.

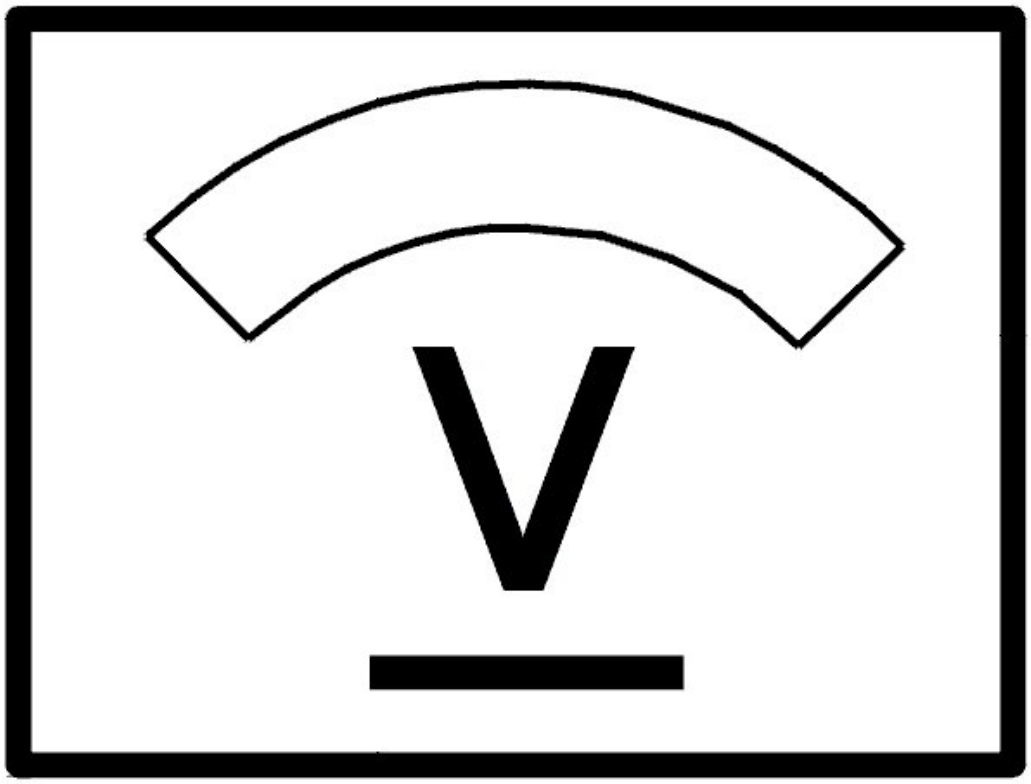
Checking ground terminal

- Check the ground leads between engine control module (ECM) terminals #A53 (#A53), #A54 (#A54), #A63 (#B3) and the common ground terminal in the body for the wiring. Check for an open-circuit
- Check the ground terminal in the body for the engine control module (ECM). Check for contact resistance and oxidation.

Remedy as necessary

Other information

- To connect the breakout box, see Connecting the breakout box, B5244T5, B5254T2 See: Pinout Values and Diagnostic Parameters/Connecting the Breakout Box
- For information about signals on 5 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For information about signals on 6 cylinder engines, see Signal specification See: Pinout Values and Diagnostic Parameters/Signal Description / Specification
- For further information about the fuses and relays, see the Wiring Diagram
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



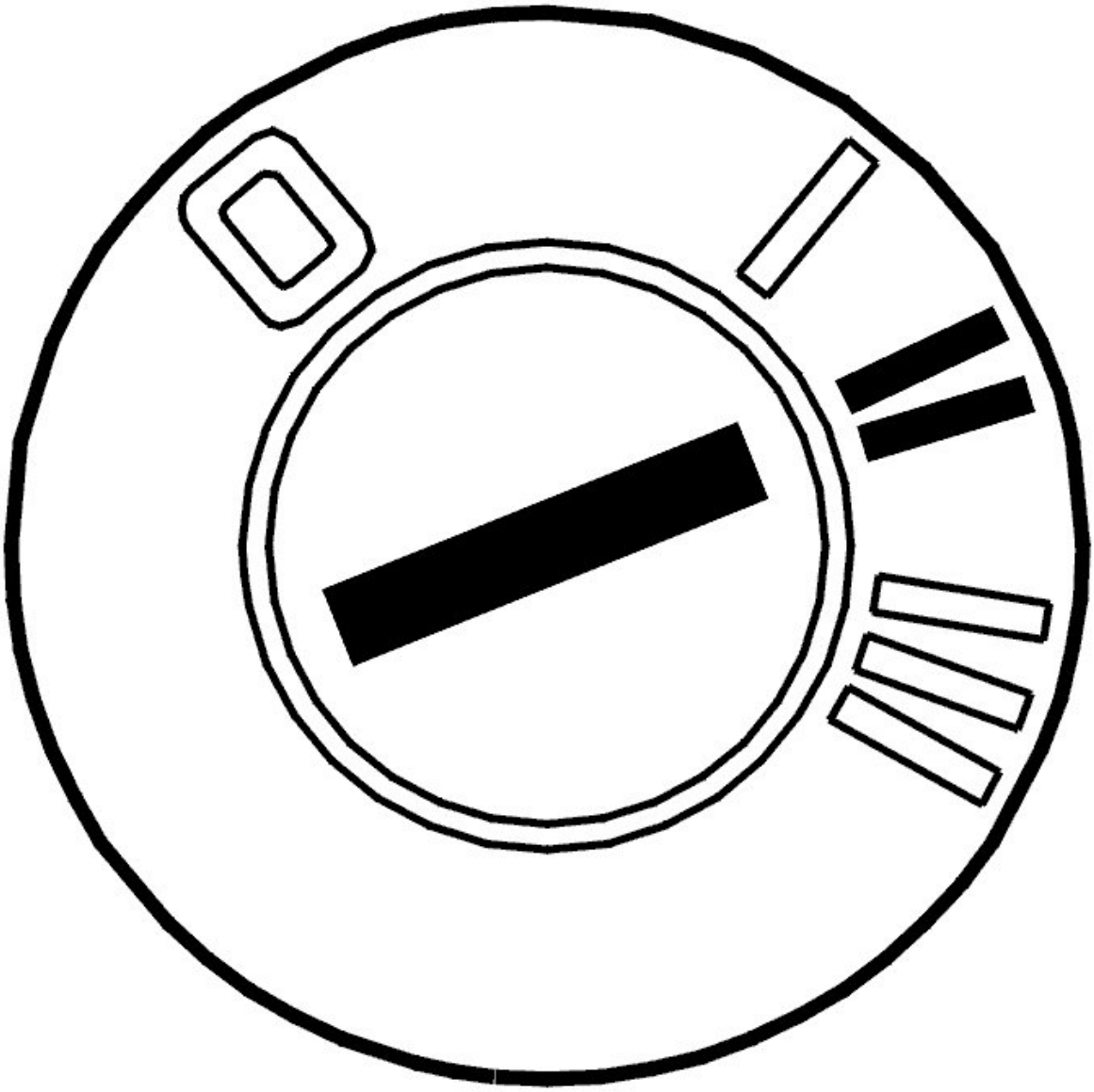
Was a fault detected?

Yes - Fault Found

No - No Fault Found

Activating Components and Functions

Activating components and functions



- Ignition on.

Activate components and/or functions by clicking the VCT2000 symbol.
Description of activation, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Activations

Continue - DONE

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.

- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Activating components and functions

2 - Checking communication faults

3 - **FAILED**

Checking communication faults

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

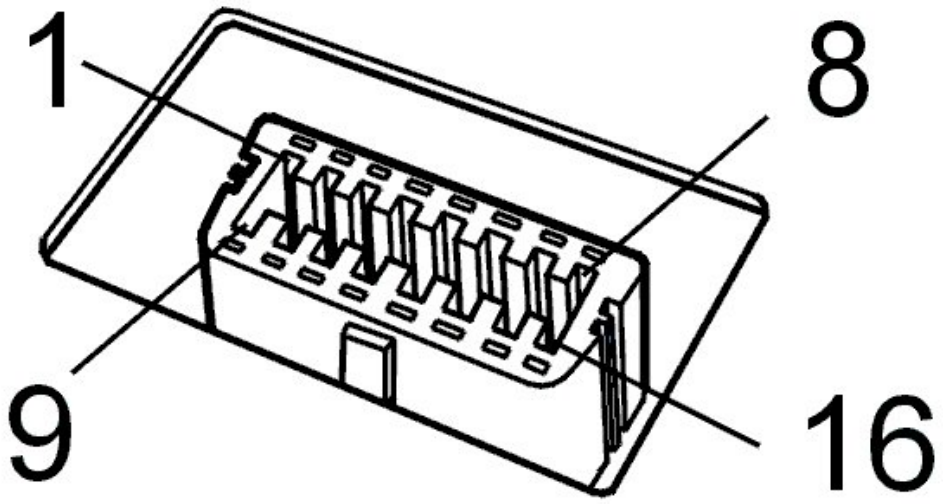
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.

- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:

- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:

- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

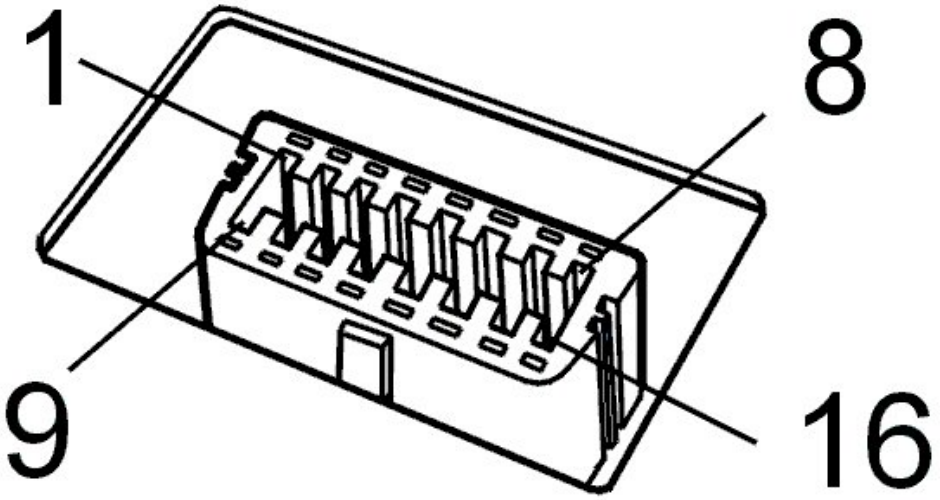
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates

a malfunction.

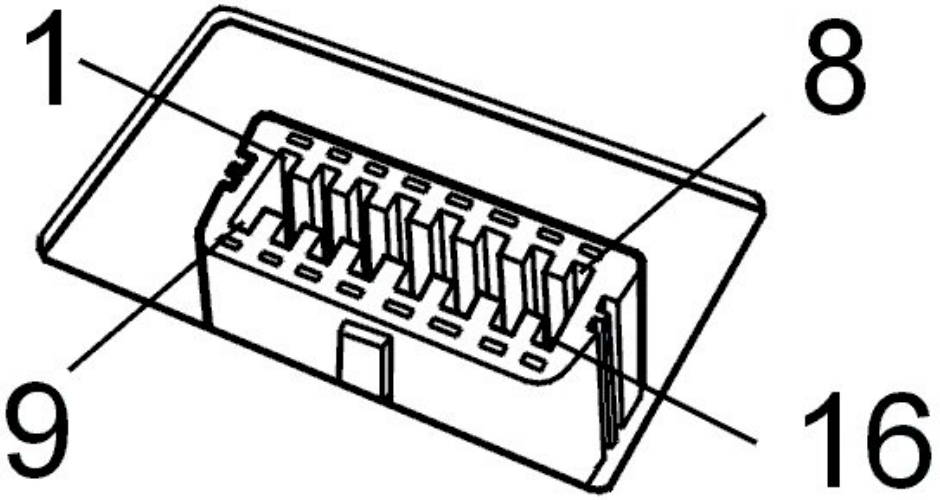
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

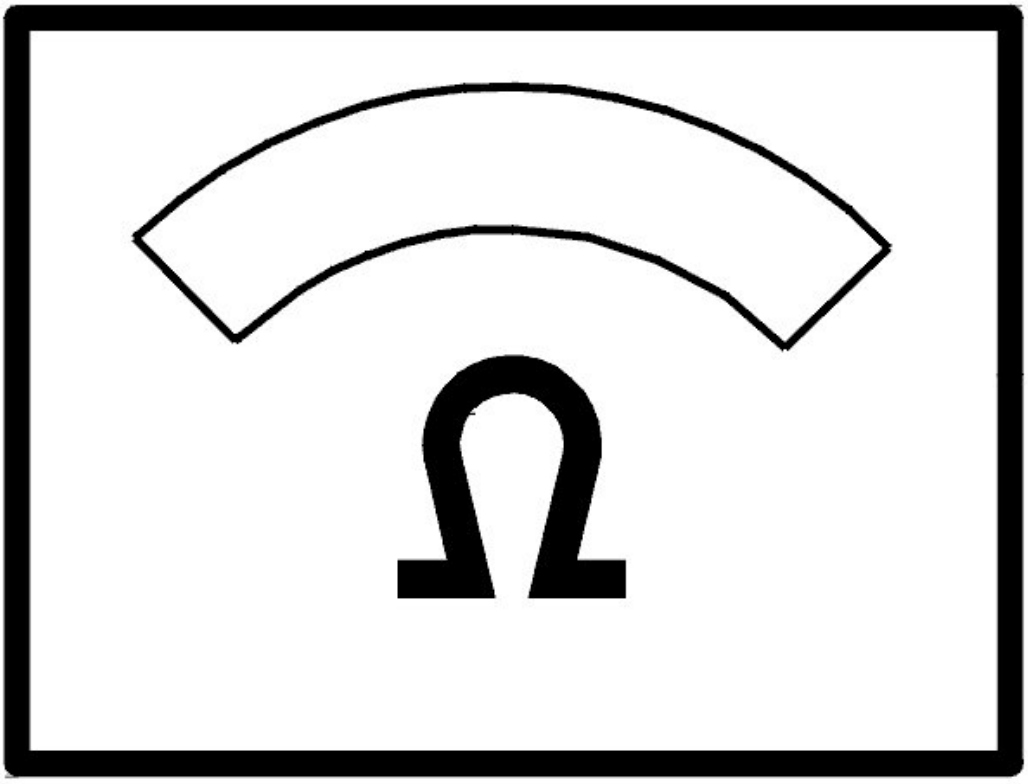
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line
- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

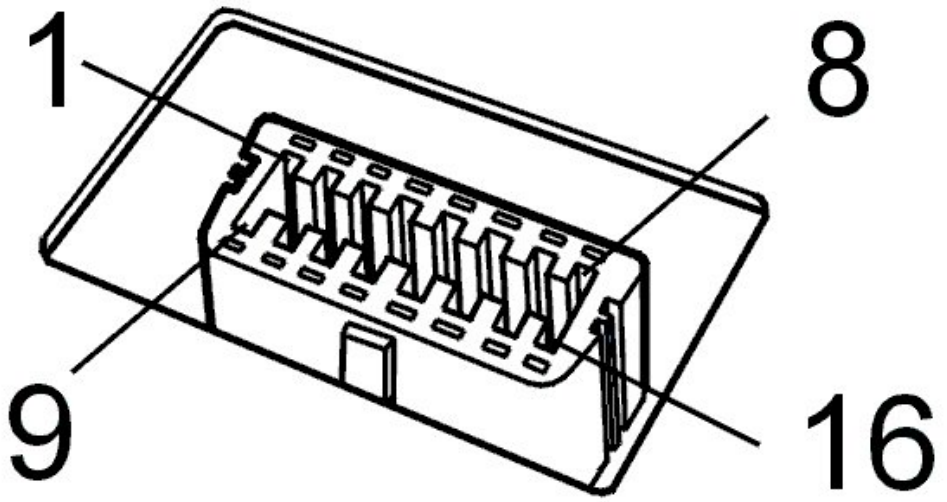
Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)
- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

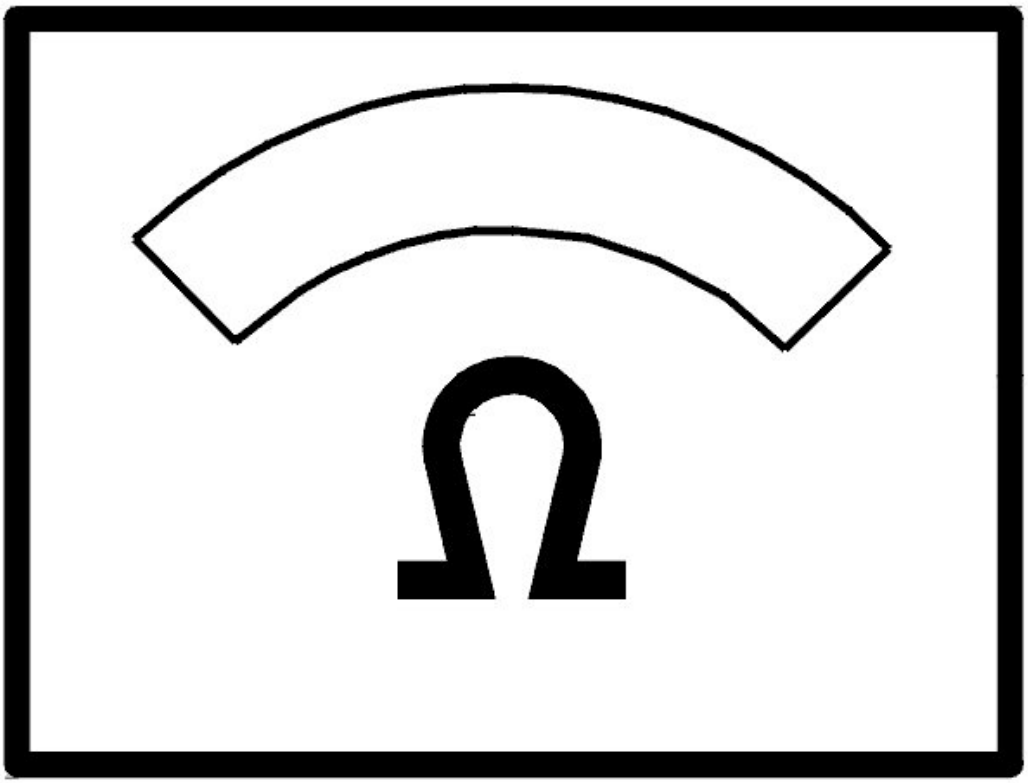
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

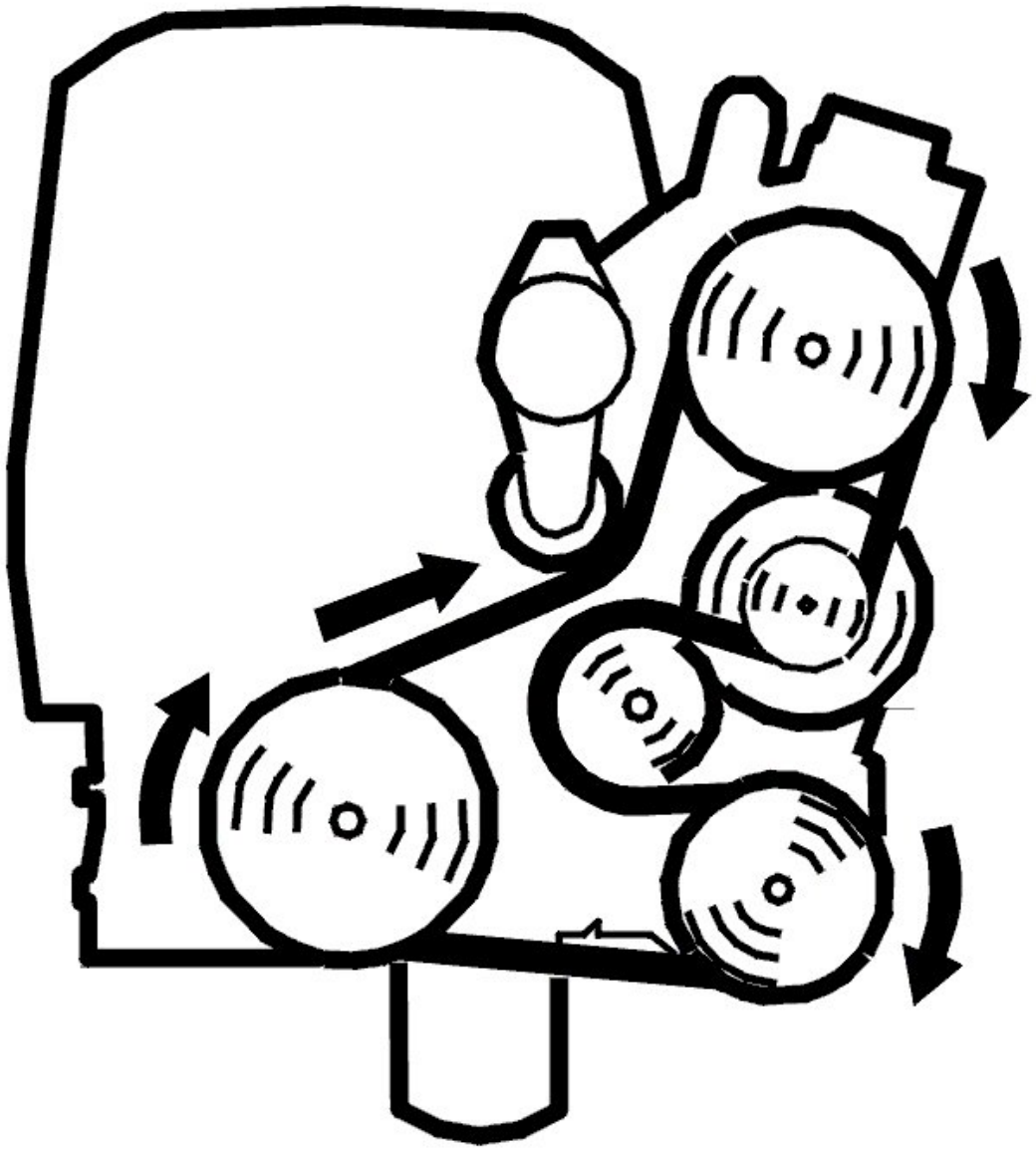
YES - Activating components and functions

NO - FAILED

Quick Test of Exhaust Camshaft Control

Quick test of exhaust camshaft control

Quick test of exhaust camshaft control



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft for the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Hint: A diagnostic trouble code (DTC) is stored in the control module if the control module detects a fault during the test.

Note! The test is active until the ignition is switched off. Switch off the ignition before delivering the car to the customer.

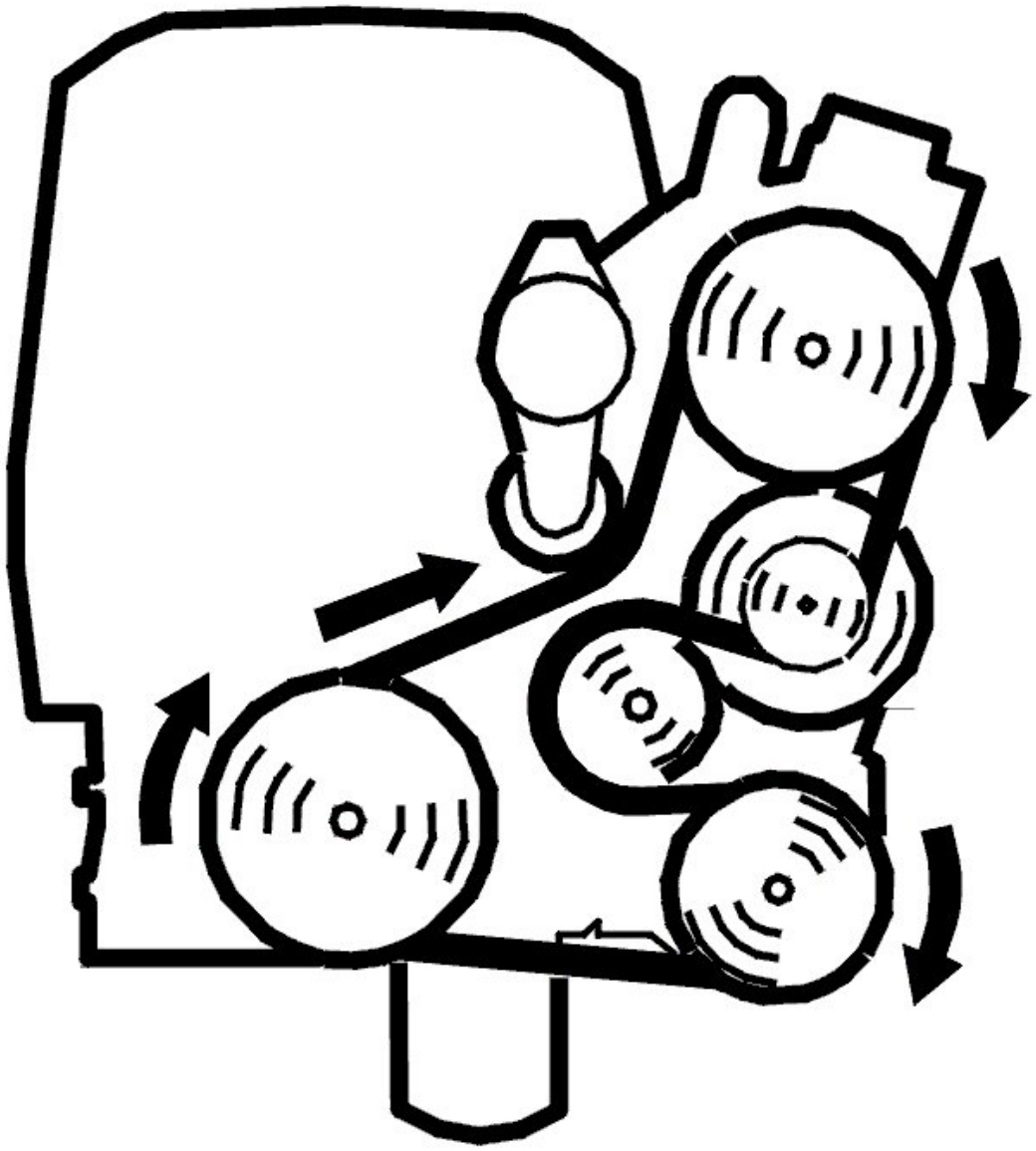
Select "Continue" to exit

Continue - DONE

Quick Test of Intake Camshaft Control

Quick test of intake camshaft control

Quick test of intake camshaft control



- Start the engine
- Read off the value for the camshaft shift angle and the desired value for the camshaft shift angle
- Active the quick test of camshaft control by clicking the start button
- Increase the engine speed (RPM) to approximately 2500 rpm and keep the engine running at this speed.

When the engine speed (RPM) increases, the control module will start the quick test to control the shift angle of the camshaft for the different target values.
During the quick test, check that the shift angle of the camshaft (actual value) corresponds to the target values to an accuracy of ±10°.
Deviation between the values can be read off in the lower display.
Carry out the check for approximately 15 seconds at an engine speed (RPM) of 2500 rpm. The test is completed when the shift angle of the camshaft returns to 0°. To restart the test, let the engine return to idle speed, then increase the engine speed to approximately 2500 rpm.

Hint: A diagnostic trouble code (DTC) is stored in the control module if the control module detects a fault during the test.

Note! The test is active until the ignition is switched off. Switch off the ignition before delivering the car to the customer.

Select "Continue" to exit

Continue - DONE

Quick Test of the Fuel Tank System

Quick test of the fuel tank system (USA/CDN)

Checking diagnostic trouble codes (DTCs), engine control module (ECM)
Note! There must be no diagnostic trouble code(s) (DTC) for the evaporative emission system (EVAP) and valve (ECM-420X, ECM-421X) or leak diagnostic unit (ECM-432X, ECM-433X). These could prevent the leak diagnostic. Check that none of these diagnostic trouble codes (DTCs) are stored.

- Ignition on.

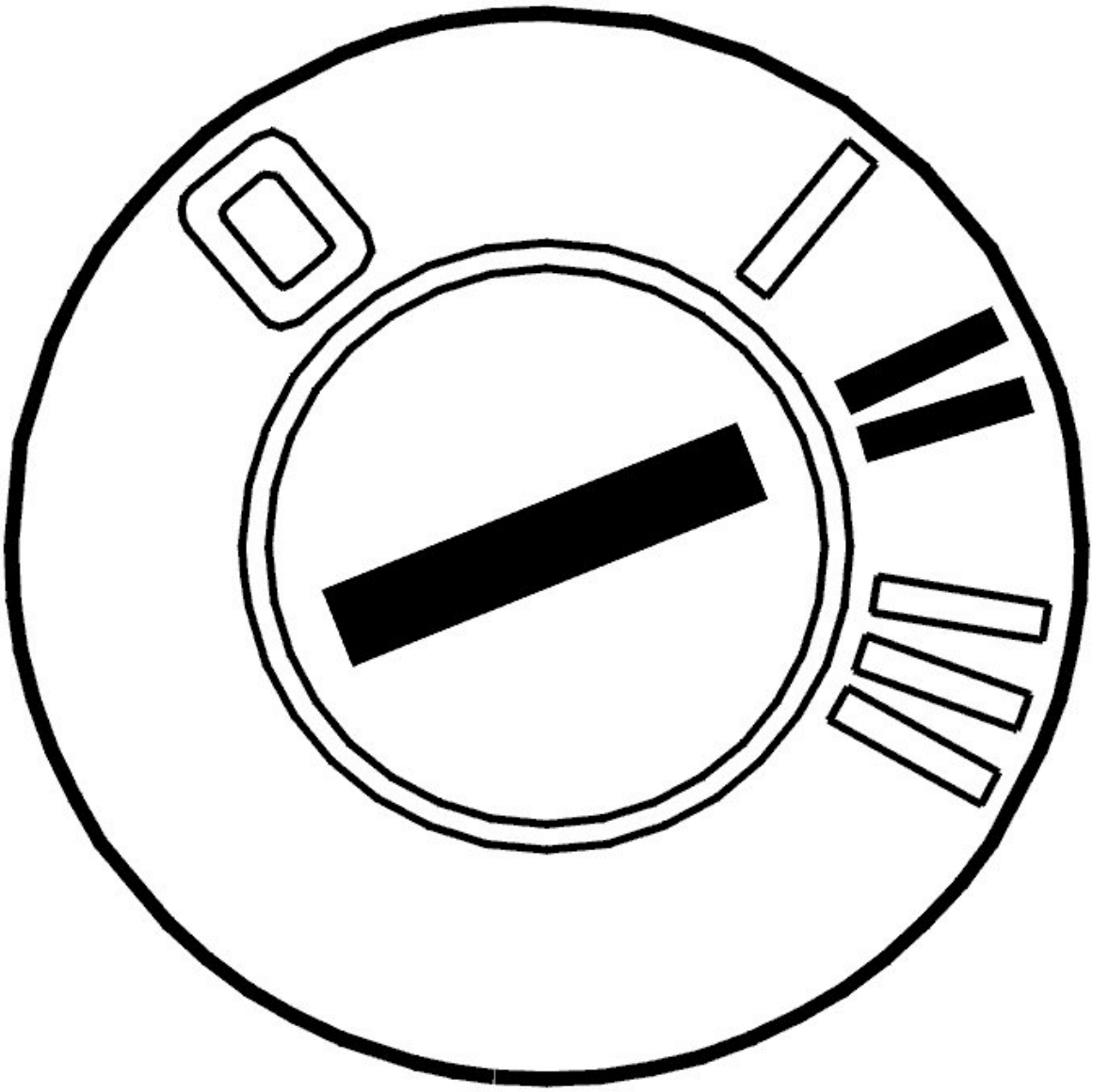
Activate reading off diagnostic trouble codes (DTCs).
If any of the above diagnostic trouble codes (DTCs) are stored they must be remedied and erased first.

Are any of the above diagnostic trouble codes (DTCs) stored?

Yes - No Fault Found

No - Quick test of the fuel tank system

Quick test of the fuel tank system



- Switch off the ignition to ensure that the status of the quick test for the fuel tank system is "Not completed". The test cannot be started if the status is "Completed".
- Ignition on
- Activate the quick test of the fuel tank system
- Read off the battery voltage, the status of the quick test of the fuel tank system and the status of the test phase. Check the parameters according to the conditions for starting the quick test of the fuel tank system.

Note! The following conditions must be met in order for the quick test of the fuel tank system to be run correctly.

Conditions for the quick test of the fuel tank system to start:

- There must be no diagnostic trouble codes (DTCs) stored for the evaporative emission system (EVAP) and valve or leak diagnostic unit
- Engine off, ignition on
- The battery voltage must be 11-14 V
- The status of the test phase must be "Not running".
- The status of the quick test for the fuel tank system must be "Not completed".

Note! The battery voltage must be correct throughout the entire test. The test can take up to 10 minutes depending on the amount of fuel in the tank. Connect a battery charger if necessary.

- Activate the quick test for the fuel tank system by clicking the start button. Click the stop button to cancel the test.

Check that the quick test has started by reading off the status of the test phase. The test has started when the status of the test phase is "Reference". Wait until the test is complete. When the test is completed, the status of the test phase must be "Not running" and the status of the quick test for the fuel tank system must be "Completed".
If no faults are detected after the quick test of the fuel tank system, the test result for the leak diagnostic unit and the fuel tank system will be "No fault found".
If a fault is detected after the quick test of the fuel tank system is complete, the test result for the fuel tank system or leak diagnostic unit will be "Fault found" with the corresponding relevant diagnostic trouble code (DTC), depending on the fault.

Hint: A diagnostic trouble code (DTC) for the fault will be stored in the engine control module (ECM) if the test result is "Fault found".

Other information

- For information about leak diagnostics, see VIDA Design and Function
- Description of parameters, quick test of the fuel tank system, B5244T5, B5254T2 See: Diagnostic Trouble Code Tests and Associated Procedures/Related Tests, Information and Procedures/Description of Parameters, Quick Test of the Fuel Tank System
- Test phases, quick test fuel tank system, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Quick Testing the System/Test Phases, Quick Test Fuel Tank System

Select an alternative to continue when the test is complete:

Select an alternative to continue when the test is completed:

1. All test results are OK, "No fault found".
2. The test result for the fuel tank system, major leak (ECM-439C) or minor leak (ECM-434C) is "Fault found".
3. The quick test does not start or the test result for the leak diagnostic unit (ECM-436X) is "Fault found".

1 - **No Fault Found**

2 - Fault-tracing information:

3 - Fault-tracing information:

Fault-tracing information:

- The engine control module (ECM) has detected a fault during the fuel tank system quick test. The diagnostic trouble code (DTC) is stored in the engine control module (ECM).

Read off diagnostic trouble codes (DTCs) from the vehicle communication socket. Fault trace the diagnostic trouble code (DTC) stored in the engine control module (ECM)

- Remedy as necessary.

Select a suitable alternative to continue:

1. Repeat the quick test for the fuel tank system
2. Exit.

1 - engine control module (ECM)

2 - **No Fault Found**

Fault-tracing information:

- The engine control module (ECM) cannot run the leak diagnostic by activating the quick test of the fuel tank system. This may be because the conditions for starting the quick test of the fuel tank system have not been met or because there is a fault preventing the quick test from starting
- The quick test for the fuel tank system cannot be run if the battery voltage varies too much. The voltage may vary if the battery is being charged with a battery charger. Charge the battery before beginning the quick test to avoid voltage variations.

Hint: Cancel fault-tracing for this fault. Then read off diagnostic trouble codes (DTCs) from the vehicle communication socket. Fault trace any other diagnostic trouble codes (DTCs) stored in the engine control module (ECM).

- Remedy as necessary.

Select a suitable alternative to continue:

1. Repeat the quick test for the fuel tank system
2. Exit.

1 - engine control module (ECM)

2 - **No Fault Found**

Test Phases, Quick Test Fuel Tank System

Test phases, quick test fuel tank system

Reference

The reference phase for leaks and the function test of the leak diagnostic unit are running. If no faults are detected during this phase the leak test in the fuel tank system starts. If any faults are detected during the phase, the test is interrupted and the test result for the leak diagnostic unit (ECM-436X) will be "Fault found".

Fuel tank system

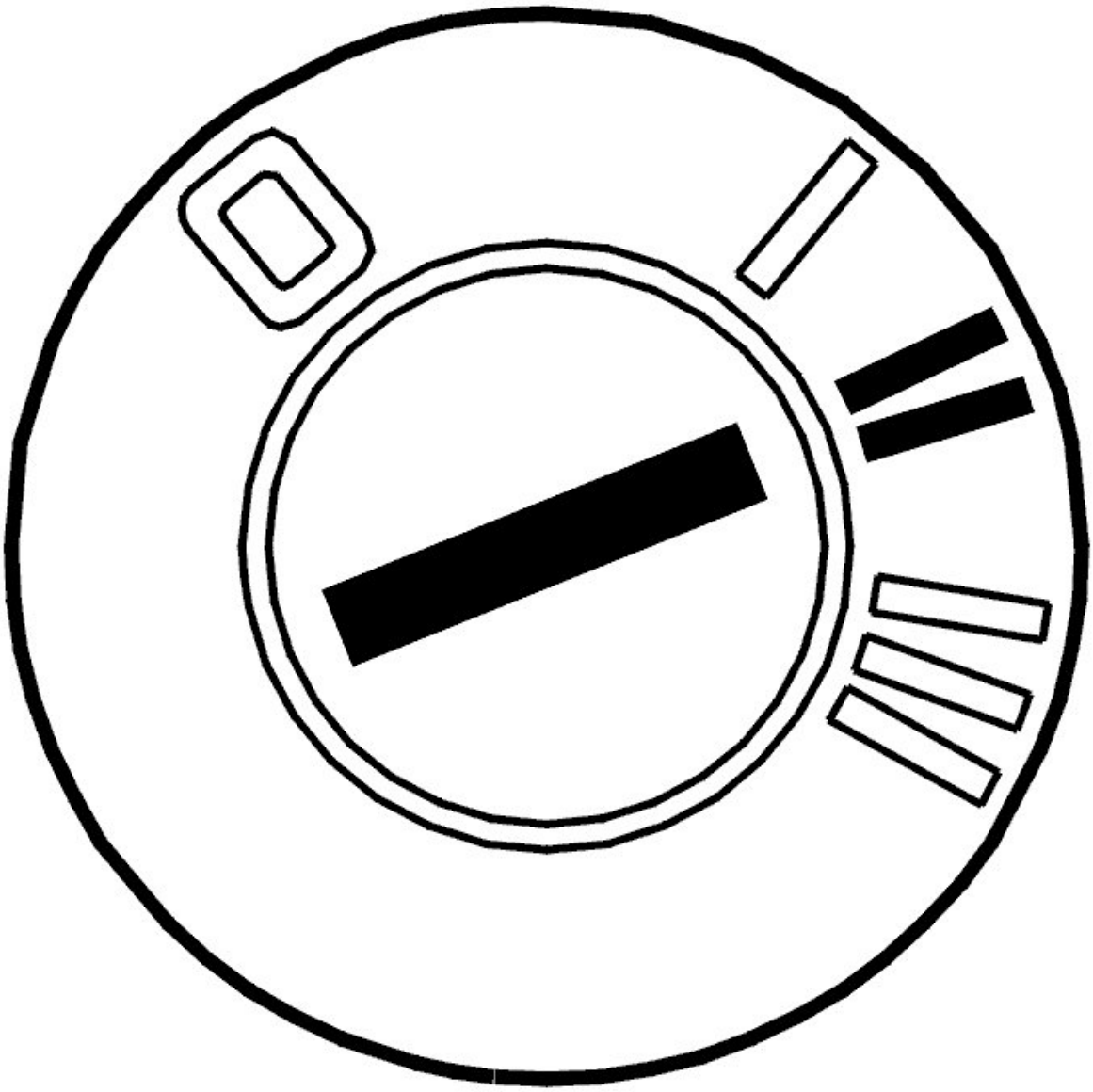
Testing for leakage in the fuel tank system is running. During the first half of the test, major leaks (leaks larger than 1.0 mm) can be detected. Diagnostic trouble code (DTC) is stored in the engine control module (ECM) if leakage is detected.
After a certain amount of time (time is dependent on the fuel level in the tank) the engine control module (ECM) assesses the seal of the fuel tank system. Assessment is made using the results of the calculations of time, measured reference power consumption of the pump, measured power consumption of the pump during the time of assessment and from the shape of the power supply curve and characteristics during pressurization. If the leak in the fuel tank system is larger than 0.5 mm but smaller than 1.0 mm a diagnostic trouble code (DTC) is stored for minor leakage in the engine control module (ECM).

Not running

The leak diagnostic is not running, the quick test of the fuel tank system has not started or has finished.

Reading Off Control Module ID

Reading off the control module ID



- Ignition on or start engine.

Read off control module ID by clicking on the VCT 2000 symbol.

Identifying control module

The information that is read off identifies the control module hardware and software versions and the diagnostic status.

Continue - DONE

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Reading off the control module ID

2 - Checking communication problems

3 - **FAILED**

Checking communication problems

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.

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4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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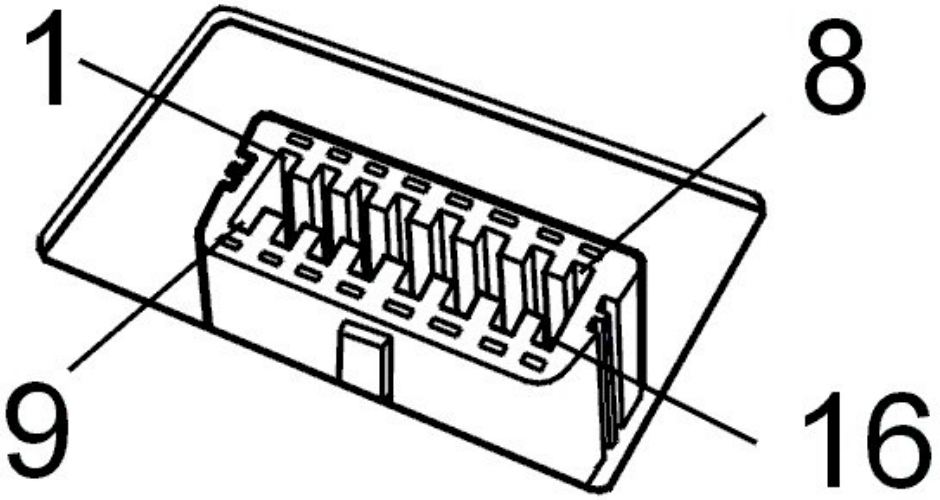


Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.
- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:
- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

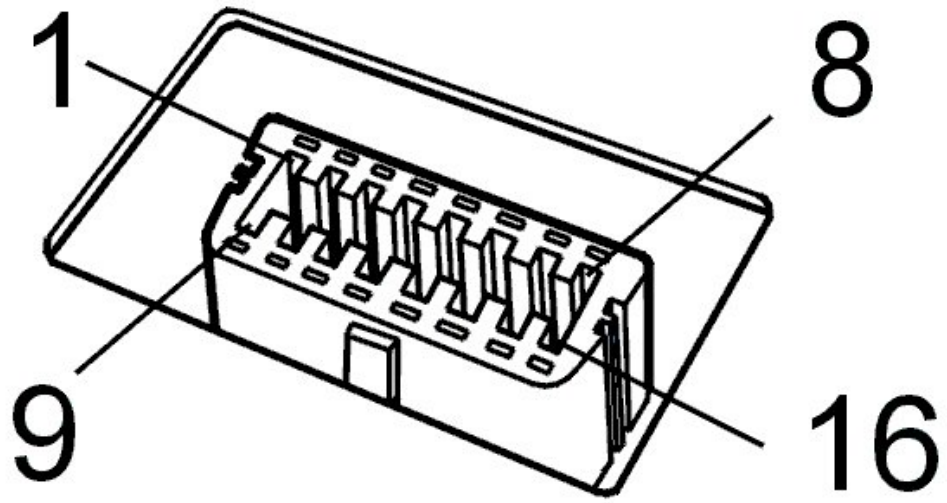
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2

- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

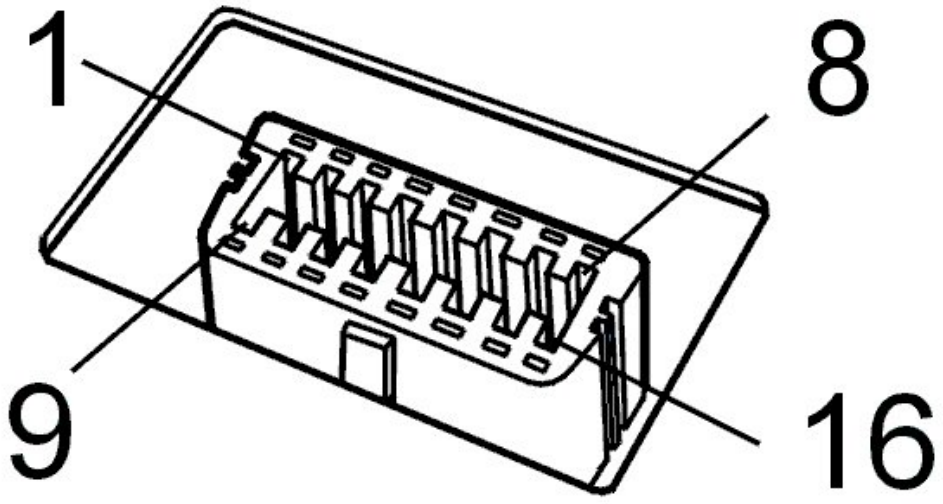
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

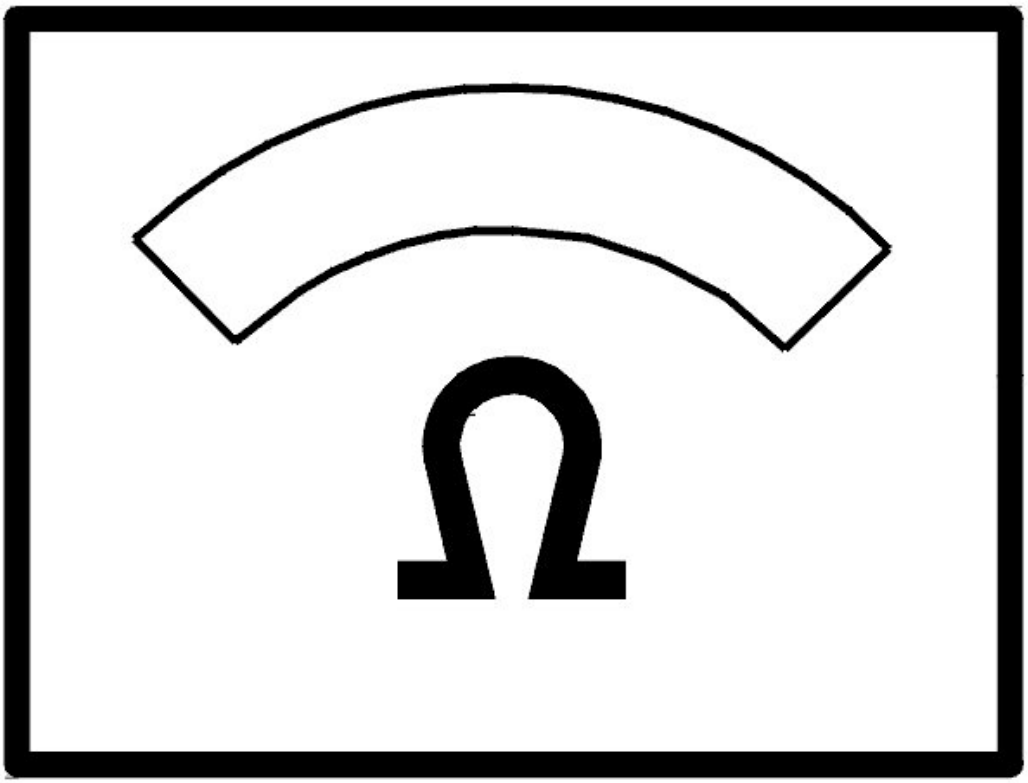
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

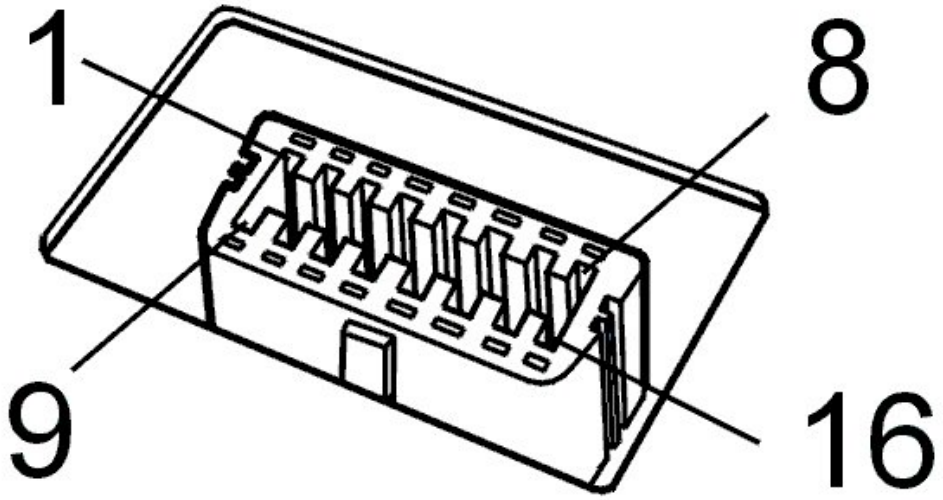
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

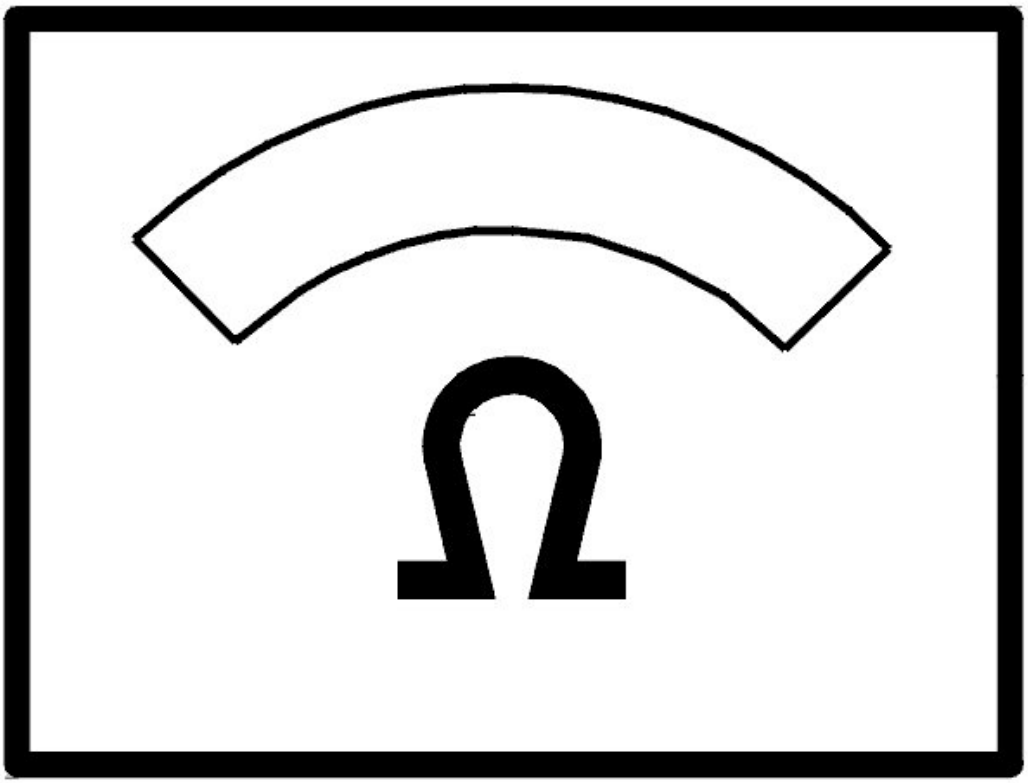
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - Reading off the control module ID

NO - FAILED

Reading Off Detailed Diagnostic Data

Reading off detailed diagnostic data

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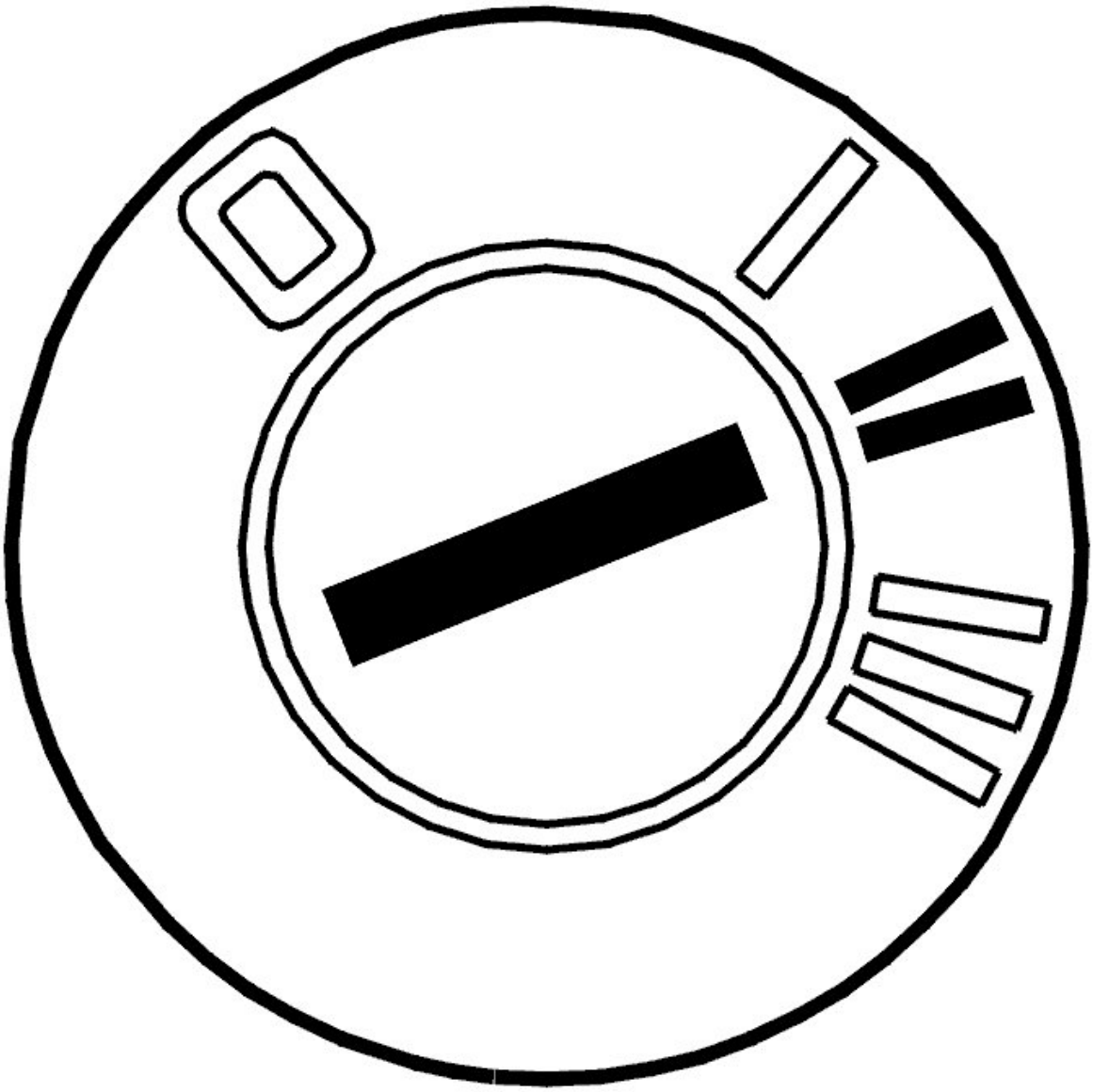
General information about reading off



- Ignition on.

This function is used to read off the diagnostic data from the control module in the**background**. If the VIDA log function is activated**while**the read out is taking place, all data that is read off will be logged. The VIDA log function allows logs to be saved or read off. This makes it easier to analyze data or to include the log files in a report for example.

- VIDA log function activated (log status on).

Note! If this has not already been done, exit this procedure. Select vehicle profile and set the logging status to On.

If the VIDA log function is already activated and has previously logged other activities which are not required, exit this procedure and log off VIDA. The existing log can then be removed. Delete the log and close it. Then log on to VIDA again.

Do you want to start reading off? The data read off starts automatically when YES is selected.

Yes - Reading off the engine control module (ECM) diagnostic data

No - DONE

Reading off the engine control module (ECM) diagnostic data

Continue - Finishing the read off

Numeric Result 0 - Communication fault

Finishing the read off

The read off is now complete.
Exit this procedure. Log off VIDA. The completed log can now be printed or saved.
Save the log to a disc or save it locally. To save it locally, name the file**vehcom.log**under**C:\volvo\logs**.

Continue - **DONE**

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging
- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information
- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.
1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - Reading off the engine control module (ECM) diagnostic data

2 - Checking communication

3 - **FAILED**

Checking communication

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives
1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

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1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals

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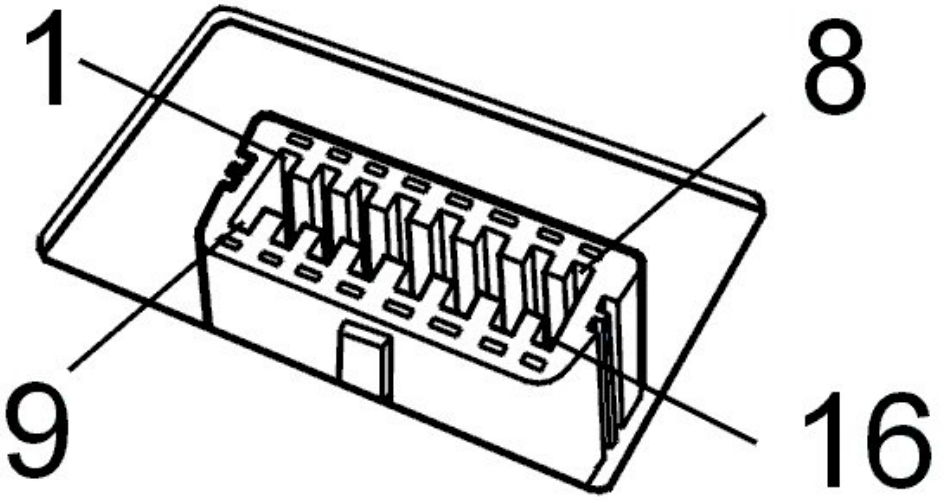

Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

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If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:
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- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:
- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

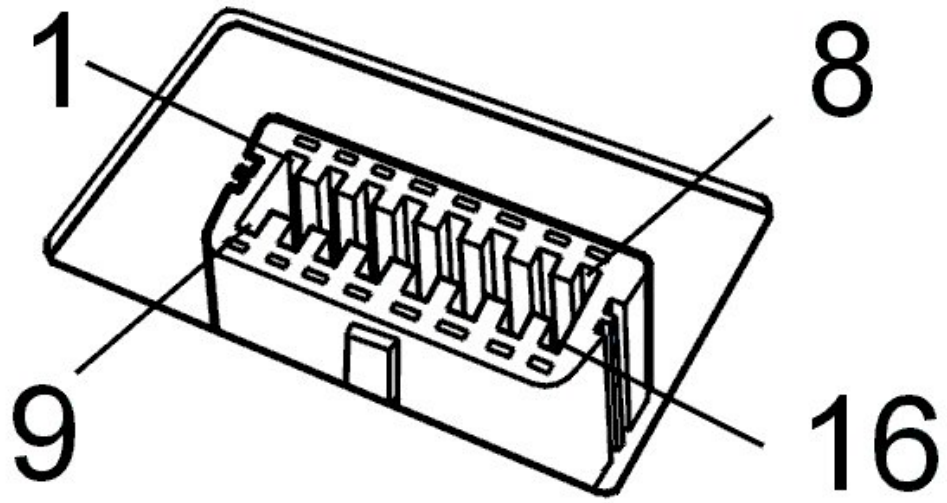
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2

- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness

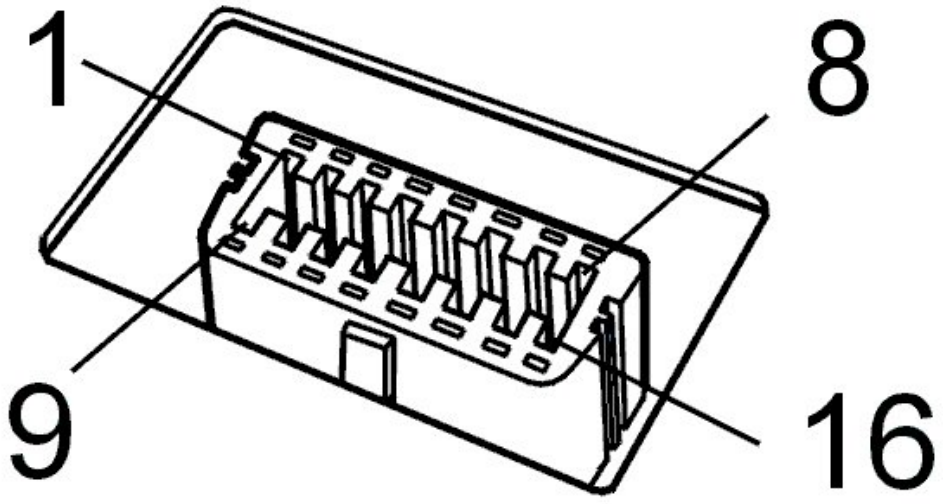
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

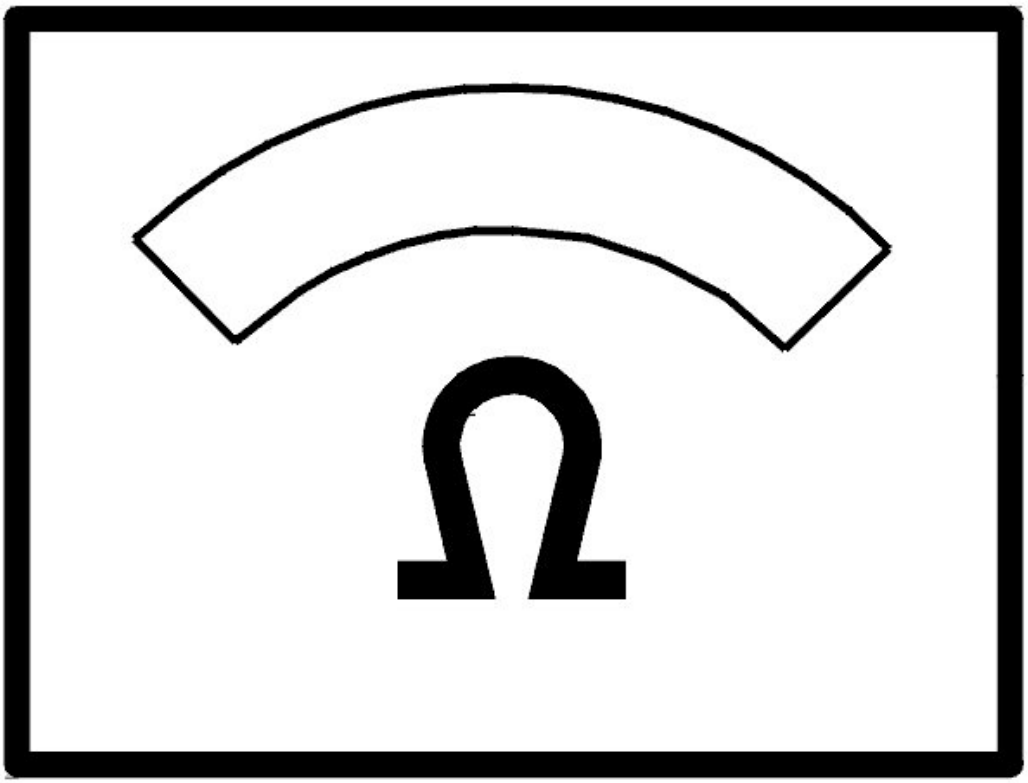
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

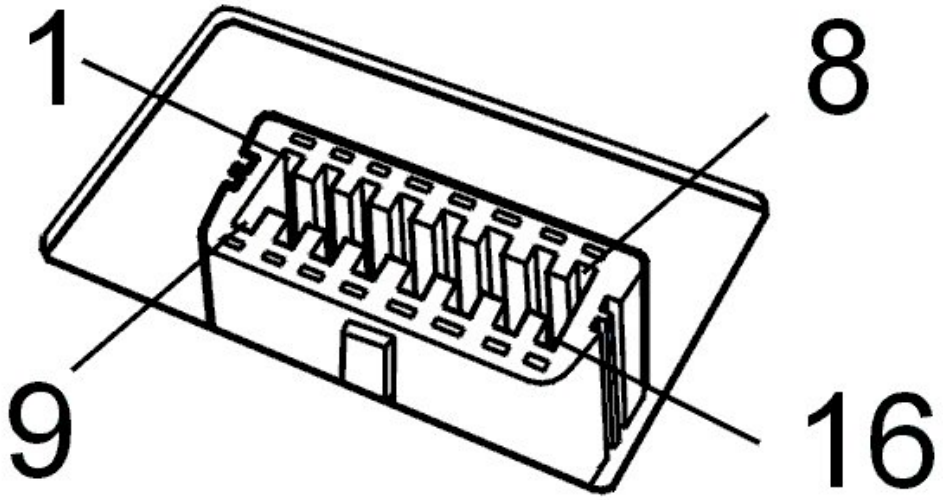
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

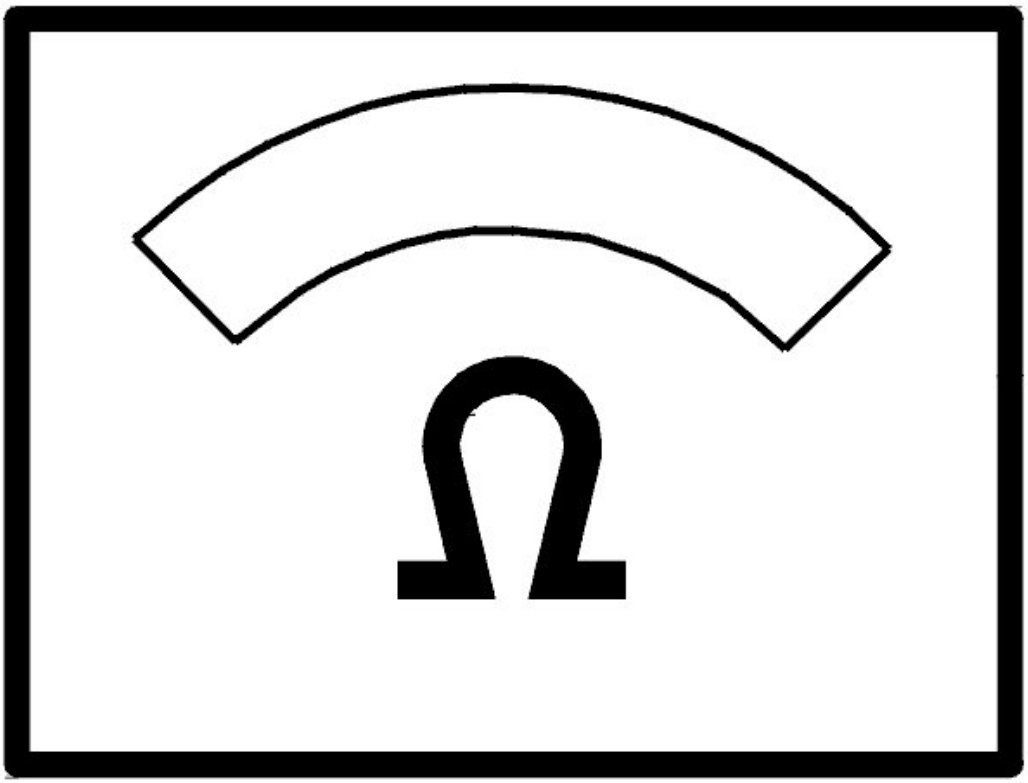
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - Reading off the engine control module (ECM) diagnostic data

NO - FAILED

Reading Off the Test Results / the Fuel Tank Values

Reading off the test results / the fuel tank values

Key for interpreting the results of the read off

Diagnostic Trouble Code (DTC)	Codes	Quantity of fuel in the fuel tank	Test result	Corrective action
ECM-4047	EVAP canister shut-off valve clogged Canister purge (CP) valve leakage	See the relevant valve for the values	See the relevant valve for the values	Check whether the EVAP canister shut-off valve is clogged and whether the canister purge (CP) valve is leaking
ECM-4047	Canister purge (CP) valve leakage	10 l 30 l 60 l	>100 >70 >50	The canister purge (CP) valve is leaking
ECM-4047	EVAP canister shut-off valve clogged	60 l 30 l 10 l	>100 >70 >50	Check whether the EVAP canister shut-off valve is blocked
ECM-4308	Small leak	>100	Check for leakage in the fuel tank system	
ECM-4308	Rough leak	>253	Check for leakage in the fuel tank system	

Information

Check the EVAP canister shut-off valve if the test results show:
- above 100 at approximately 60 liters of fuel in the tank
- above 70 at approximately 30 liters of fuel in the tank
- above 50 at approximately 10 liters of fuel in the tank.

Check the canister purge (CP) valve if the test results show:
- above 100 at approximately 10 liters of fuel in the tank
- above 70 at approximately 30 liters of fuel in the tank
- above 50 at approximately 60 liters of fuel in the tank.

Description of Detailed Diagnostic Trouble Code Information Readout

Description of detailed diagnostic trouble code information readout

Content

Select type of description:
- Description of frozen values See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Frozen Values
- Status identifier, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Status identifier, Description

- Counters, description See: Steering and Suspension/Suspension/Suspension Control (Automatic - Electronic Level)/Testing and Inspection/Scan Tool Testing and Procedures/Vehicle Communication Information, Suspension Module (SUM)/Counters, Description

Description of Activations

Description of activation

Hint: Not all the components/functions described need to be implemented in the control module. This varies between different systems and markets.

Parameters, value

Throttle position (TP) sensor, potentiometer 1 (V)

The parameter can be read off to check the function when activating the "Throttle unit".
Measurement range: 0 - 80 V.
The engine control module (ECM) derives the value from potentiometer 1 for the throttle position (TP) sensor.
The value must increase with increased throttle angle.
Approximately 0.5 V = throttle closed.
Approximately 4.0 V = wide open throttle (WOT).

Throttle position (TP) sensor, potentiometer 2 (V)

The parameter can be read off to check the function when activating the "Throttle unit".
Measurement range: 0-80 V.
The engine control module (ECM) derives the value from potentiometer 2 for the throttle position (TP) sensor.
The value must decrease with an increased throttle angle.
Approximately 4.0 V = throttle closed.
Approximately 0.5 V = wide open throttle (WOT).

Component / function

Injector x

The injector opens and closes at high frequency. A clicking or buzzing noise is heard from the valve.
The engine must be switched off at activation.

Throttle unit

The throttle in the throttle unit opens depending on which activation has been selected (50, 75 or 100 %).
Read off "Throttle position (TP) sensor, potentiometer 1" or "Throttle position (TP) sensor, potentiometer 2" to check the function.
The engine must be switched off at activation.

Air conditioning (A/C) relay

The air conditioning (A/C) relay is activated and powers the air conditioning (A/C) compressor magnetic clutch.
A clear click is heard from the air conditioning (A/C) relay and from the magnetic clutch for the air conditioning (A/C) compressor.

Engine cooling fan (FC)

The speed of the engine cooling fan (FC) changes depending on which activation is selected.
The fan can be heard.

Leak diagnostic unit, valve

Certain markets only.
A clicking noise is heard from the valve in the leak diagnostic unit at activation.

Evaporative emission system (EVAP) valve

The evaporative emission system (EVAP) valve opens and closes at a certain frequency.
There is a weak click from the EVAP valve.

Turbocharger (TC) control valve

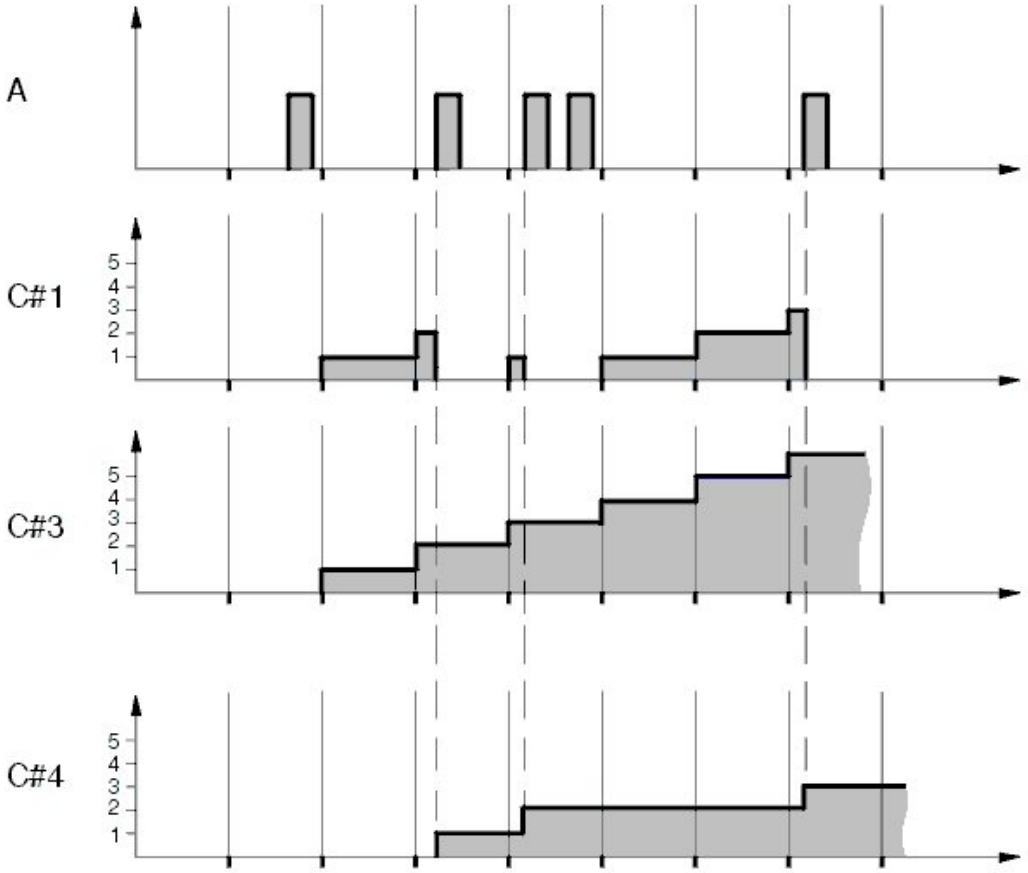
The turbocharger (TC) control valve opens and closes at a certain frequency.
There is a weak click from the turbocharger (TC) control valve.

Description of Counter

Description of counter

Counter
There are eight different counters that are stored individually for each diagnostic trouble code (DTC). For an intermittent malfunction, the values of the different counters can be studied to determine how intermittent the malfunction is. All counters do not need to be implemented in one control module, this varies from system to system. The possible counters are described below.

Counter	Function
C#1	Counts the number of operating cycles since the malfunction was**last**validated. This information can be used to determine whether the malfunction is active during the current operating cycle or not. The malfunction is present now if the value is zero.
C#2	Counts the number of operating cycles since the malfunction was**last**validated, where test for the diagnostic trouble code was performed without the malfunction being detected and validated. When a test is performed, no malfunction is detected, the counter will count up by 1 for each operating cycle.
C#3	Counts the number of operating cycles since the malfunction was validated**the first time**. For each completed operating cycle the counter will count up by 1.
C#4	Counts the number of operating cycles in which the malfunction was validated since it was first validated. Counts the number of times the malfunction has occurred since the first time.
C#5	Counts the number of warm-up cycles since the MIL-light has gone off.
C#6	The counter counts the number of internal detections of the malfunction that have been performed for the diagnostic trouble code. When this counter reaches + 127, the control module considers that the malfunction is active right now. When counter is at value -127 the malfunction is not active. The value is reset to zero at each new operating cycle. If the value increases toward +127 the control module has detected a malfunction and, for each internal test, the value counts up. When the malfunction is not active, the control module counts down to minimum -127. Value can only be changed when the control module has started the test for the diagnostic trouble code. The increments with which the control module counts up or down the value may vary between control modules.
C#7	Shows maximum value for current operating cycle.
C#8	Shows maximum value for current and/or earlier operating cycle.



Description of Frozen Values

Description of frozen values

Explanation

Hint: Not all described parameters are implemented in the control module. This varies between systems and markets.

Bank 1: indicates cylinders 1-3 on 6-cylinder engines and all cylinders on 5-cylinder engines. The rear heated oxygen sensor of a vehicle with closed loop control following the Y concept (two front and one rear heated oxygen sensor) is designated "Bank 1".
Bank 2: indicates cylinders 4-6 on 6-cylinder engines.

Engine speed (rpm)

The engine control module (ECM) calculates engine speed from the impulse sensor signal.

Boost pressure (hPa)

The value is calculated from the boost pressure sensor and indicates the pressure in the induction system after the turbocharger but before the throttle.
The engine control module (ECM) calculates boost pressure from the boost pressure sensor. The pressure is relative to atmospheric pressure.

°

Engine temperature (C)

The engine control module (ECM) calculates temperature from the engine temperature sensor signal.

°

Engine temperature, start (C)

The engine control module (ECM) calculates temperature from the engine temperature sensor signal. The value indicates the temperature of the engine upon engine start in the operating cycle in which the diagnostic trouble code (DTC) was generated.

Calculated load (%)

The value, calculated by the engine control module, indicates engine efficiency. The engine control module (ECM) calculates the value from air mass, engine speed, boost pressure, throttle angle, etc. A value over 100% indicates turbocharging (overpressure).

Fuel pressure (Pa)

The engine control module (ECM) calculates the pressure from the fuel pressure sensor signal.
The parameter indicates absolute pressure.

Speed (km/h)

The value indicates vehicle speed.
The engine control module (ECM) receives information on vehicle speed from the brake control module (BCM) via CAN communication.

°

Ignition angle (BTDC)

The value indicates the ignition angle for cylinder 1.

Atmospheric pressure (Pa)

The value indicates atmospheric pressure at the engine control module (ECM).
The engine control module (ECM) calculates the value from the integrated atmospheric pressure sensor.
The normal value at 0 meters above sea level is 1013 hPa.

°

Outside temperature (C)

The engine control module (ECM) calculates the temperature from the outside temperature sensor signal.

°

Intake air temperature (C)

The engine control module (ECM) calculates the temperature from the intake air temperature sensor.

EVAP valve (%)

The value indicates the control module output signal for EVAP valve regulation, i.e. how much the EVAP valve should open to purge the canister.
0 % = no regulation (EVAP valve closed).
100 % = full regulation (EVAP valve fully open).

Throttle angle (%)

The engine control module (ECM) calculates the value from the throttle position sensor. The value is calculated linearly from the throttle position sensor's output signal (0-5V) and indicates how much the throttle is open.
Approx. 6-14 % = idling (0% throttle angle, desired value).
Approx. 85-100 % = throttle fully open (100% throttle angle, desired value).

Accelerator pedal position sensor, PWM (%)

PWM signal from the accelerator pedal position sensor to the engine control module (ECM). The control module calculates the value from the accelerator pedal position sensor's digital output.
The value indicates the position of the accelerator pedal.

Approx. 8 % = accelerator pedal fully released.
Approx. 88 % = accelerator pedal fully depressed.

Accelerator pedal position sensor, analog (%)

Analog signal from the accelerator pedal position sensor to the engine control module (ECM). The control module calculates the value from the accelerator pedal position sensor's analog output.
The value indicates the position of the accelerator pedal.
Approx. 8 % = accelerator pedal fully released.
Approx. 88 % = accelerator pedal fully depressed.

Throttle angle, desired value (%)

The value indicates the engine control module (ECM) calculated value for throttle opening (throttle angle).
The parameter value cannot be directly compared to the actual value for the throttle angle.
0% = idling.
100% = throttle fully open.

Fuel trim, rapid adjustment, bank X (%)

Rapid adjustment is the continual adaptation of the fuel/air mixture during operation.
Bank 2 only applies to 6-cylinder engines.

Hint: Fuel trim returns to 0% once diagnostic trouble codes (DTCs) have been cleared.

Fuel trim, slow adjustment, bank X (%)

Slow adjustment is the fuel trim value that adjusts the fuel/air mixture for a longer period of time and factors in component aging, tolerances, etc.
Bank 2 only applies to 6-cylinder engines.

Hint: Fuel trim returns to 0% once diagnostic trouble codes (DTCs) have been cleared.

Power supply, engine control module (ECM) (V)

The value indicates the power supplied to the engine control module (ECM).

Time after engine start (s)

The value indicates how much time has elapsed between engine start and diagnostic trouble code (DTC) generation.

Description of Parameters

Description of parameters

Hint: Not all the parameters described need to be implemented in the control module. This varies between different systems and markets.
Bank 1: indicates cylinders 1-3 on 6 cylinder engines and **all cylinders on 5 cylinder engines.** The rear heated oxygen sensor (HO2S) on cars with fuel trim using the Y-concept (two front heated oxygen sensors (HO2S) and one rear heated oxygen sensors (HO2S)) is called "Bank 1".
Bank 2: indicates cylinders 4-6 on 6-cylinder engines.

Parameters, value

Engine speed (rpm)

Measurement range: 0-10400 rpm.
The engine control module (ECM) derives the engine speed (RPM) from the engine speed (RPM) sensor signal.
The idle speed varies depending on the engine coolant temperature (ECT).

Idling speed, difference desired value (rpm)

Measurement range: between -1280-1270 rpm.
The value indicates the idle speed deviation from the engine control module (ECM) desired value (target value).

Battery voltage (V)

Measurement range: 0-17.95 V.
The normal value is 13.5-14.5 V when the generator (GEN) is charging.
The value indicates the voltage from the system relay to the engine control module (ECM).

°

Engine coolant temperature (ECT) (C)

Measurement range: -48 to +143 °C.
The engine control module (ECM) derives the temperature from the engine coolant temperature (ECT) sensor signal.

°
Intake air temperature (IAT) (C)

Measurement range: -48 to +143 °C.
The engine control module (ECM) calculates the temperature from the temperature sensor for the intake air.
The temperature sensor is integrated in the boost pressure sensor.

°
Outside temperature (C)

Measurement range: -40 to +110 °C.
The engine control module (ECM) derives the temperature from the outside temperature sensor signal.

Atmospheric pressure (Pa)

Measurement range: 0-5120 hPa.
The value indicates atmospheric pressure at the engine control module (ECM).
The sensor is integrated in the engine control module (ECM).
Normal value at sea level is 1,013 hPa.

°
Ignition advance (BTDC)

Measurement range: -96 to +95.3° before top dead center (BTDC).
The value is calculated from the engine speed (RPM) sensor signal.
The value when idling varies depending on the engine coolant temperature (ECT).

Boost pressure (hPa)

Measurement range: 0-2550 hPA.
The value is calculated from the boost pressure. It indicates the pressure in the intake system downstream of the turbocharger (TC).
The engine control module (ECM) calculates the boost pressure from the boost pressure sensor. The pressure is relative to atmospheric pressure.

Turbocharger (TC) control valve (%)

Measurement range: 0-100%.
The value indicates the deployment signal from the control module for deploying the turbocharger (TC) control valve, the amount the turbocharger (TC) control valve opens to adjust the turbo pressure.
0% = no control (turbocharger (TC) control valve closed).
100% = full control (the turbocharger (TC) control valve opens completely).

Mass air flow (kg/h)

Measurement range: 0-1020 kg/h.
The value indicates the mass air flow that passes through the mass air flow (MAF) sensor.
The engine control module (ECM) calculates the value based on the signal from the mass air flow (MAF) sensor.
Normal value with the engine at operating temperature and idling, neutral and air conditioning (A/C) switched off: approximately 12-20 kg/h.

Note! Other values apply if the generator (GEN) is under load, if for example, high beam is on, the heated rear windshield is on etc.

Mass air flow, correction value

Measurement range: 0-4.
The value is a stored average of the correction factor of the mass air flow that the engine draws in.
Mass air flow, correction factor= The control module's calculated desired value for the mass air flow divided by (/) the actual measured mass air flow.
Normal range: 1 (±0.2).

Accelerator pedal (AP) position sensor, analog (V)

Measurement range: 0-320 V.
Analog signal from the accelerator pedal (AP) position sensor to the engine control module (ECM). The control module derives the value from the analog output for the accelerator pedal (AP) position sensor.
The value indicates the accelerator pedal (AP) position.
Approximately 0.5 V = the accelerator pedal (AP) completely released.

Approximately 4.0 V = the accelerator pedal (AP) completely depressed.

Throttle angle (%)

Measurement range: 0-100%.
The engine control module (ECM) calculates the value from potentiometer 1 for the throttle position (TP) sensor. The value indicates the throttle opening.
If a fault is detected in the throttle position (TP) sensor, potentiometer 1 by the engine control module (ECM), the value from the throttle position (TP) sensor potentiometer 2 will be used to represent the throttle angle.
0% = throttle shut.
100% = throttle fully open.

Hint: The value must follow the parameter "Throttle angle, desired value" when the accelerator pedal (AP) is affected.

Accelerator pedal (AP) position sensor, pulse width modulation (PWM) (%)

Measurement range: 0-100%.
The PWM signal from the accelerator pedal (AP) position sensor to the engine control module (ECM). The control module derives the value from the digital output for the accelerator pedal (AP) position sensor.
The value indicates the accelerator pedal (AP) position.
Approximately 5% = the accelerator pedal (AP) is completely released.
Approximately 80% = the accelerator pedal (AP) is fully depressed.

Throttle angle, desired value (%)

Measurement range: 0-100%.
The engine control module (ECM) calculates a target value for the throttle opening (throttle angle).
The value indicates what the throttle angle should be.
0% = throttle shut.
100% = throttle fully open.

Throttle position (TP) sensor, potentiometer 1 (V)

Measurement range: 0-80 V.
The engine control module (ECM) derives the value from potentiometer 1 for the throttle position (TP) sensor.
The value must increase with increased throttle angle.
Approximately 0.5 V = throttle closed.
Approximately 4.0 V = wide open throttle (WOT).

Throttle position (TP) sensor, potentiometer 2 (V)

Measurement range: 0-80 V.
The engine control module (ECM) derives the value from potentiometer 2 for the throttle position (TP) sensor.
The value must decrease with an increased throttle angle.
Approximately 4.0 V = throttle closed.
Approximately 0.5 V = wide open throttle (WOT).

Leakage flow over the throttle (kg/h)

Measurement range: 0-655 kg/h.
The value indicates how much air passes through the throttle at closed throttle position (CTP). The engine control module (ECM) calculates the value from the mass air flow (MAF) sensor and the throttle position (TP) sensor signals.

Air conditioning (A/C) pressure (kPa)

Measurement range: -176 to +3277 kPa.
The engine control module (ECM) calculates the value from the signal from the air conditioning (A/C) pressure sensor.
The value indicates the pressure at the high-pressure side of the air conditioning (A/C) system.
The engine control module (ECM) calculates the pressure based on the signal from the air conditioning (A/C) pressure sensor. The pressure is given as a value relative to the atmospheric pressure.

Evaporative emission system (EVAP) valve (%)

Measurement range: 0-100%.
The value indicates the deployment signal from the control module for deploying the evaporative emission system (EVAP) valve (the amount the valve opens to empty the canister).
0% = no control (Evaporative emission system (EVAP) valve closed).
100% = full control (Evaporative emission system (EVAP) valve opens completely).

EVAP, flow (kg/h)

Measurement range: 0-25 kg/h.
The engine control module (ECM) calculates the flow through the evaporative emission system (EVAP) valve. This value increases with increased flow.

Injection period bank x (ms)

Measurement range: 0.0-150 ms.
The signal transmitted by the engine control module (ECM) for injection period.
Normal value when the engine is idling at operating temperature: 1.0-3.0 ms

Short-term fuel trim, bank x

Measurement range: 0-2.
The value displays how much the injection period needs to be corrected (from the preprogrammed injection period in the control module) to reach lambda=1. If the engine runs lean or rich (lambda deviates from 1), the short-term fuel trim injection period is increased or decreased so that lambda=1. The average value of this parameter from different engine speed and load ranges is used for the different fuel trim adaptations (idling, lower partial load and upper partial load) so that the short-term fuel trim is always around 1.
Short-term fuel trim = the actual injection period required to reach lambda=1, divided by (/) the injection period in preprogrammed in the control module to reach lambda=1.
The normal value oscillates around 1, when the lambda adaptations for each engine speed (RPM) / load range are ready.
Value over 1: the control module increases the injection period (to prevent a lean fuel / air mix).
Value under 1: the control module decreases the injection period (to prevent a rich fuel air mix).
The parameter must be checked under stable conditions, such as stable engine speed (RPM) and load.

Hint: When lambda deviates from 1, the short-term fuel trim initially compensates at every engine speed (RPM) / load range (idle speed and load). When erasing the diagnostic trouble codes (DTCs), the adaptation values will be reset. This means the short-term fuel trim will be high or low when driving in the low engine speed/load ranges before the adaptations are ready. For more information about fuel-trim adaptation, see VIDA Design and Function, Fuel trim.

Long-term fuel trim bank x, idle speed (%)

Measurement range: between -72 and +72%.
Additive adaptation of the short-term fuel trim (correcting the injection period), adaptation that occurs at idle speed. The value indicates how much the short-term fuel trim has been corrected at idle speed so that the short-term fuel trim value can again oscillate around 1.
In the event of an air leakage for example, the value will increase at idle speed (= longer injection time). This is to compensate the fuel / air mix for air capacity. Regardless of the load /engine speed, the same injection time is added. This means that the parameter value does not significantly affect the fuel / air mix at higher loads / engine speeds.
Normal value when the engine is idling: 0 ±5%.
Value over 0%: the control module increases the injection period (to prevent a lean fuel / air mix).
Value less than 0%: the control module decreases the injection period (to prevent a rich fuel air mix).

Hint: When diagnostic trouble codes (DTCs) are erased, the adaptation returns to 0%. For more information about fuel-trim adaptation, see VIDA Design and Function, Fuel trim.

Long-term fuel trim bank x, lower part load

Measurement range: 0-2.
Multiplicative adaptation of the short-term fuel trim (correcting the injection period), adaptation that occurs at lower part load (normal road driving). The value stored in the control module indicates how much the short-term fuel trim in the upper part load range has been corrected so that the short-term fuel trim value can again oscillate around 1 at the lower part load. In the event of low fuel pressure for example, the value will increase (= longer injection time). This is to compensate the fuel/air mix for the lack of fuel. Normal value 1±0.1. The lower part load range of the engine must be reached for the value to be updated (normal road driving). Approximately 30 minutes of driving in the lower part load may be required before the adaptation is complete (complete = short-term fuel trim oscillates around 1 at lower part load). Value over 1: the control module increases the injection period (to prevent a lean fuel / air mix). Value under 1: the control module decreases the injection period (to prevent a rich fuel air mix).

Hint: When diagnostic trouble codes (DTCs) are erased, the adaptation returns to 1. For more information about fuel-trim adaptation, see VIDA Design and Function, Fuel trim.

Long-term fuel trim bank x, upper part load

Measurement range: 0-2.
Multiplicative adaptation of the short-term fuel trim (correcting the injection period), adaptation that occurs at lower part load (normal road driving). The value stored in the control module indicates how much the short-term fuel trim in the upper part load range has been corrected so that the short-term fuel trim value can again oscillate around 1 at the lower part load. In the event of low fuel pressure for example, the value will increase (= longer injection time). This is to compensate the fuel/air mix for the lack of fuel. Normal value 1±0.1. The lower part load range of the engine must be reached for the value to be updated (normal road driving). Approximately 30 minutes of driving in the lower part load may be required before the adaptation is complete (complete = short-term fuel trim oscillates around 1 at lower part load). Value over 1: the control module increases the injection period (to prevent a lean fuel / air mix). Value under 1: the control module decreases the injection period (to prevent a rich

fuel air mix).

Hint: When diagnostic trouble codes (DTCs) are erased, the adaptation returns to 1. For more information about fuel-trim adaptation, see VIDA Design and Function, Fuel trim.

lambda
Front heated oxygen sensor (HO2S), bank x ()

Measurement range: 0-16.
Normal value is lambda=1.
If the mixture is rich, lambda is less than 1.
If the mixture is lean, lambda is greater than 1.

Rear heated oxygen sensor (HO2S), bank x (V)

Measurement range: -0.2 to +1.13.
The signal from the rear heated oxygen sensor (HO2S) to the engine control module (ECM).
Normal value when the engine is running at even load is approximately 0.6 V.
The voltage may vary between -0.2 and 0.9 V. The voltage may, during engine braking for example, drop to -0.2 V.

Fuel pressure (Pa)

Measurement range: 50-4680 kPa.
The parameter indicates absolute pressure.
The engine control module (ECM) derives the pressure from the fuel pressure sensor signal. When idling, with the engine at operating temperature and in neutral, the value should be approximately 400 kPa.

Hint: The value must follow "Fuel pressure, desired value".

Fuel pressure, desired value (Pa)

Measurement range: 0-6553.5 kPa.
The parameter indicates absolute pressure.
The engine control module (ECM) calculates the target value for "Fuel pressure". The value indicates what the fuel pressure should be.

°
Fuel temperature (C)

Measurement range: -40 to +215 °C.
The engine control module (ECM) derives the temperature from the fuel temperature sensor signal. The fuel temperature sensor is integrated in the fuel pressure sensor.

Fuel pump (FP), workload (%)

Measurement range: 0-100%.
The value shows the PWM signal between the engine control module (ECM) and the fuel pump (FP) control module. A higher pulse ratio gives a higher fuel pressure. At 400 kPa the pulse ratio must be approximately 35% (±5%). The values are not relevant if the battery voltage is too low.

Oil level (%)

Measurement range 0-100%.
The value indicates the oil level signal pulse ratio from the PWM signal generated by the oil level sensor. The signal passes between the engine control module (ECM) and the oil level sensor. The value must be between 17-83% depending on the oil level.

Brake pedal position (via the brake control module (BCM))

Measurement range 0-100%.
The engine control module (ECM) receives the value from the brake control module (BCM) via the Control area network (CAN). The value indicates the brake pedal position.
When the brake pedal is not affected the value is approximately 0%. The value increases as the brake pedal is pressed.

Speed (km/h)

Measurement range: 0-319 km/h
The vehicle speed is shown from the brake control module (BCM) via the controller area network (CAN).

Engine cooling fan (FC) (%)

Measurement range: 0-100%
Pulse width modulation (PWM) signals transmitted by the engine control module (ECM) to the engine cooling fan (FC) control module to control

the speed of the engine cooling fan (FC).

Reset valve camshaft, intake / exhaust (CA)

Measurement range: 0-100%
The pulse ratio transmitted by the engine control module (ECM) to control the camshaft reset valve.
The value indicates control of the camshaft reset valve to control the camshaft position (angle).
The normal value when the camshaft is deployed and in the fixed position is approximately 50%. The value increases/decreases depending on control of the camshaft.

°

Camshaft shift angle, (intake/ exhaust) ()

Measurement range: between -256 CA and +256 CA.
The engine control module (ECM) calculates the value by comparing the position of the camshaft with the position of the crankshaft. The value indicates the angle of the camshaft. This is the offset of the camshaft 0 position in relation to the crankshaft TDC (0). (The camshaft 0-position = the set alignment of the camshaft position with the crankshaft.)

Desired value for the camshaft shift angle, intake/exhaust

Measurement range: between -256 CA and +256 CA.
The value indicates the target value of the engine control module (ECM) for "Camshaft shift angle " (actual shift angle). The "Desired value for the camshaft shift angle" can be altered by changing the engine speed (RPM)/load.

Camshaft shift angle leeway, intake/exhaust

Measurement range: between -256 CA and +256 CA.
The value indicates the difference between the "Camshaft shift angle" (actual shift angle) and the desired value for the camshaft shift angle (target value for the engine control module (ECM)). Changing the "Camshaft shift angle" is achieved by changing the engine speed (RPM)/load. The normal value varies depending on how far the camshaft is operated and the temperature/grade of the engine oil, although the value must never deviate by more than between ± 10 degrees for longer than approximately 4 seconds.

Camshaft adaptation, intake/exhaust (CA)

Measurement range: between -511 to +511 degrees.
The value indicates the camshaft deviation from the basic setting.
The value is 0 degrees when the camshaft position (angle) corresponds with the crankshaft position (angle). Normal value is 0 degrees ±8 degrees.
The value is updated following adaptation of the camshaft position (angle position). The adaptation is performed when the camshaft control is not active (fully returned camshaft).

Misfire counter

The engine control module (ECM) calculates the overall total for the number of misfires affecting emissions or causing catalytic converter damage for all cylinders during a certain number of crankshaft revolutions.
The normal value is 0 (no misfiring).

Misfire counter, cyl x

The value indicates the number of misfires for each cylinder during the present operating cycle.
The value is affected by misfires which affect emissions and cause catalytic converter damage.
The normal value is 0 (no misfiring).
The value is reset when the ignition is switched off.

Parameter, status

Coolant level sensor

The engine control module (ECM) calculates the status from the engine coolant level switch.
The status indicates the engine coolant level in the expansion tank.

Throttle unit adaptation

If necessary the engine control module (ECM) runs an adaptation of the throttle unit by guiding the throttle to the limit positions (open/closed) so that it " learns" the parameters of that actual throttle unit.
The status indicates if the adaptation has been run or not.
OK = Adaptation of the throttle unit has run.
NOT OK = Adaptation of the throttle unit has not run.

Note! The basic conditions must be met before an adaptation of the throttle unit can be carried out.

Automatic transmission

Only vehicles that have an automatic transmission.
The engine control module (ECM) calculates the status of the signal from the transmission control module (TCM) via CAN.
ON = the gear selector is in position "D" or another gear is selected.
OFF = the gear selector is in position "P" or "N"

Cruise control resume

The cruise control must be on when reading this parameter.
OFF= resume button unaffected.
ON = resume button activated.

Cruise control set+

The cruise control must be on when reading this parameter.
OFF= SET+ unaffected.
ON = SET+ affected.

Cruise control set-

The cruise control must be on when reading this parameter.
OFF= SET- unaffected.
ON = SET- affected.

Stop lamp switch

The engine control module (ECM) calculates the value from the stop lamp switch.
ON = stop lamp switch on.
OFF = stop lamp switch unaffected.

Air conditioning (A/C) compressor, active

The signal transmitted by the engine control module (ECM) for activating the air conditioning (A/C) compressor relay.
OFF = The engine control module (ECM) does not activate the air conditioning (A/C) compressor relay.
ON = The engine control module (ECM) activates the air conditioning (A/C) compressor relay.

Oil pressure sensor

The engine control module (ECM) calculates the value from the oil pressure switch signal.
ON = the oil pressure switch circuit is closed, signal to the driver information module (DIM) via CAN for lit oil pressure warning lamp.
OFF = the oil pressure switch circuit is open, signal to the driver information module (DIM) via CAN for oil pressure warning lamp not lit.

Long-term fuel trim, bank x

C/L= Closed Loop, fuel trim is active
O/L = Open Loop, fuel trim is not active

Fuel pump (FP) relay

OFF = The engine control module (ECM) does not request fuel pump (FP) relay activation.
ON = The engine control module (ECM) requests fuel pump (FP) relay activation via CAN to the central electronic module (CEM).

Boost pressure (actual value)

Measurement range: 0-2000 hPa, absolute pressure (boost pressure- absolute zero pressure(0 hPa)).
The Engine control module (ECM) receives information about the current boost pressure via the boost pressure sensor.
The actual value must correspond to the desired value ± 50hPa.

Boost pressure (desired value)

Measurement range: 0-2000 hPa, absolute pressure (boost pressure- absolute zero pressure(0 hPa)).
The engine control module (ECM) receives information about the current throttle angle via the throttle position sensor, speed (rpm), engine load, knocks etc. These parameters are used to calculate the boost pressure that is permitted in various operating conditions.

Description of Parameters, DENSO

Description of parameters, Denso

Hint: Not all the parameters described need to be implemented in the control module. This varies between different systems and markets.

Parameters, value

Speed (km/h)

Measurement range 0 -255 km/h
The value displays the vehicle speed.

Hint: Miles per hour in certain markets.

Engine speed (rpm)

Measurement range 0-10400 rpm.
The control module derives the engine speed (RPM) from the engine speed (RPM) sensor signal.
The idle speed varies depending on the engine coolant temperature (ECT) (850 ± 50 rpm).

Battery voltage (V)

Measurement range 0-20 V.
The normal value is 13-14.5 V when the generator (GEN) is charging.
The value indicates the voltage at the engine control module (ECM).

°
Engine coolant temperature (ECT) (C)

Measurement range -40 - +120 °C.
The control module derives the temperature from the engine coolant temperature (ECT) sensor signal.

Engine coolant temperature sensor (V)

Measurement range 0-5 V.
Operating range 0.28 - 4.83 V. The voltage drops as the temperature rises.

Atmospheric pressure (Pa)

Measurement range 0-2267 hPa.
The value indicates atmospheric pressure at the engine control module (ECM).
Normal value at sea level is 1,013 hPa.

°
Outside temperature (C)

Measurement range -40 - +120 °C.
The engine control module (ECM) derives the temperature from the outside temperature sensor signal.

Outside temperature sensor, signal (V)

Measurement range 0-5 V.
Operating range 0.09 -4.62 V. The voltage drops as the temperature rises.

Accelerator pedal (AP), analog (%)

Measurement range 0 -100 %.
Analog signal from the accelerator pedal (AP) position sensor to the engine control module (ECM).
The value indicates the accelerator pedal (AP) position.
Approximately 8 %= the accelerator pedal (AP) completely released.
Approximately 88 %= the accelerator pedal (AP) completely depressed.
The analog signal is usually used by the engine control module (ECM).

Hint: The value must follow the parameter "Accelerator pedal (AP), PWM".

Accelerator pedal (AP), PWM (%)

Measurement range 0 -100 %.
PWM signal from the accelerator pedal (AP) position sensor to the engine control module (ECM).
The value indicates the accelerator pedal (AP) position.
Approximately 8 %= the accelerator pedal (AP) completely released.
Approximately 88 %= the accelerator pedal (AP) completely depressed.

The PWM signal is used if there is a fault with the analog signal.

Hint: The value must follow the parameter "Accelerator pedal (AP), analog".

Accelerator pedal (AP) input signal, analog (V)

Measurement range 0-5 V.
The value is close to 0.4 V when the accelerator pedal (AP) is unaffected.
The voltage falls as the pedal is pressed.

Brake pedal position (%)

Measurement range 0 -100 %.
The value indicates the brake pedal position.
The normal value when the brake pedal is unaffected is approximately 0 %. The value increases as the pedal is depressed.

Hint: The brake pedal position sensor signal is transmitted to the engine control module (ECM) from the brake control module (BCM) via CAN.

Clutch pedal position (%)

Measurement range 0 -100 %.
The engine control module (ECM) calculates the value from the clutch pedal sensor signal.
The value indicates the clutch pedal position.
The value increases as the pedal is depressed.

Clutch pedal position sensor (V)

Measurement range 0-5 V.
Operating range approximately 3 - 4.5 V. The voltage drops as the pedal is pressed.

Throttle angle, desired value (%)

Measurement range 0 -100 %.
The value indicates the deployment signal from the engine control module (ECM) to the throttle unit.
0 % = throttle shut.
100 % = throttle fully open. This corresponds to an opening angle of approximately 84 degrees.

Throttle angle, actual value (%)

Measurement range 0 -100 %.
The control module derives the value from the throttle position (TP) sensor, potentiometer 1. The value indicates the throttle opening.
If a fault is detected in the throttle position (TP) sensor, potentiometer 1, by the engine control module (ECM), the value from the throttle position (TP) sensor, potentiometer 2, will be used to represent the throttle angle. This presumes that the function of throttle position (TP) sensor, potentiometer 2 is OK.
0 % = throttle shut.
100 % = throttle fully open. This corresponds to an opening angle of approximately 84 degrees.
Must follow the parameter "Throttle angle, desired value".

Throttle position, circuit 1 (%)

Measurement range -3 - +130 %.
Normal value 0 - 100 %.
There is an electrical fault if the displayed value is outside the measurement range.
The value must increase with increased throttle angle.
Approximately 0 % = throttle closed.
Approximately 100 % = wide open throttle (WOT). This corresponds to an opening angle of approximately 84 degrees.

Throttle position, circuit 2 (%)

Measurement range -4 - +140 %.
Normal value 0 - 100 %.
There is an electrical fault if the displayed value is outside the measurement range.
The value must increase with increased throttle angle.
Approximately 0 % = throttle closed.
Approximately 100 % = wide open throttle (WOT). This corresponds to an opening angle of approximately 84 degrees.

Air conditioning (A/C) linear pressure sensor (V)

Measurement range 0-5 V.
The value indicates the air conditioning (A/C) pressure sensor signal. The sensor must detect any change in pressure in the high pressure section of

the air conditioning (A/C) system.

Air conditioning (A/C) pressure (Pa)

Measurement range 0- +3100 kPa.
The engine control module (ECM) calculates the value from the signal from the air conditioning (A/C) pressure sensor.
The value indicates the pressure at the high-pressure side of the air conditioning (A/C) system.
The engine control module (ECM) calculates the pressure based on the signal from the air conditioning (A/C) pressure sensor. The pressure is given as a value relative to the atmospheric pressure.

°

Fuel temperature, raw (C)

Certain markets only.
Measurement range -40 - +120 °C.

Fuel pressure (Pa)

Certain markets only.
Measurement range 0-1067 kPa.
Normal value 380 ± 5 kPa when idling. The pressure drops when the ignition is switched off.

Fuel pump (FP), workload (%)

Certain markets only.
Measurement range 0 -100 %.
Operating range 10 - 85 %. >75 % is considered high load.
The value indicates the signal transmitted from the engine control module (ECM) to the fuel pump (FP) control module.

Leak diagnostic unit, pump (A)

Certain markets only.
Measurement range 0-65.5 mA.
The control module calculates the value from the pump in the leak diagnostic unit.
The value varies depending on the pressure in the fuel tank system. Higher pressure results in increased power consumption.
Normal value when the leak diagnostic is not running is 65 mA. A fictional value and not the actual power consumption.

Purge valve, flow (liters per minute)

Measurement range 0-100 liters per minute.
The value indicates the estimated flow of the system through the purge valve. Used as an input parameter during compensation for other parts of the system.
Normal value at idle is 0 liters per minute when there is no purging and 5 - 40 liters per minute during purging.

EVAP valve, operating time on (s)

Measurement range 0 - 100 000Âµs.
The value indicates the time that the PWM signal to the EVAP signal is high, i.e. the time that the valve is open and purging. 1 000 Âµs corresponds to 1 % opening.
The normal value at idle is 0 Âµs when there is no purging and 0 - 35 000 Âµs during purging.

Intake pressure sensor, signal (V)

Measurement range 0-5 V.
The normal value (atmospheric pressure at sea level) is approximately 3.6 V with the ignition on (open throttle) and approximately 1.9 V at idle.
The voltage increases with pressure in the intake manifold.

Pressure, intake manifold (Pa)

Measurement range -400 - +2267 hPa.
The pressure is given as a value relative to the atmospheric pressure.

°

Intake air temperature (IAT) (C)

Measurement range -40 - +120 °C.
The engine control module (ECM) calculates the temperature from the temperature sensor for intake air (integrated in the mass air flow (MAF) sensor).

Intake air temperature (IAT) sensor (V)

Measurement range 0-5 V.
Operating range 0.21 -4.87 V. The voltage drops as the temperature rises.
The engine control module (ECM) retrieves the value from the temperature sensor for intake air (integrated in the mass air flow (MAF) sensor).

Mass air flow (Ga, g/s)

Measurement range 0-200 g/s.
The value indicates the mass air flow that passes through the mass air flow (MAF) sensor.
The engine control module (ECM) calculates the value based on the signal from the mass air flow (MAF) sensor.
Normal value with the engine at operating temperature and idling and under no load, neutral and air conditioning (A/C) switched off: approximately 4 g/s.

Note! Other values apply if the generator (GEN) is under load, if for example, high beam is on, the heated rear windshield is on etc.

Air mass (V)

Measurement range 0-5 V.
Operating range approximately 0.5 - 4.5 V. The voltage increases with load.

Camshaft reset valve, desired value intake (CA)

Measurement range 0 - 160 CA.
The value indicates the expected control of the shift angle for the intake camshaft.
CA = Crank Angle.

Camshaft reset valve, actual value intake (CA)

Measurement range 0 - 160 CA.
The value indicates the controlled shift angle for the intake camshaft.
Must follow the parameter "Camshaft reset valve, desired value intake".
CA = Crank Angle.

Camshaft reset valve, desired value exhaust (CA)

Measurement range 0 - 160 CA.
The value indicates the expected control of the shift angle for the exhaust camshaft.
CA = Crank Angle.
The parameter value is not relevant for engines without exhaust camshaft control.

Camshaft reset valve, actual value exhaust (CA)

Measurement range 0 - 160 CA.
The value indicates the controlled shift angle for the exhaust camshaft.
Must follow the parameter "Camshaft reset valve, desired value exhaust".
CA = Crank Angle.
The parameter value is not relevant for engines without exhaust camshaft control.

Misfire counter 1-5

Counts the number of misfires in each cylinder.
Normal value is 0.

Knock sensor (CA)

Knock retardation requested due to knock in the cylinders.
Measurement range 0 -72 CA.
Normal value 0 CA.
This value indicates the mean value of the timing retardation for all cylinders.
CA = Crank Angle.

°
Ignition advance ()

Measurement range -20 - +62 °btdc.
Normal value at idle, engine at operating temperature, A/C off, is approximately +12 ° btdc.

Injection period (s)

Measurement range 0 - 262140 Âµs.

the signal transmitted by the engine control module (ECM) for injection period.
Normal value when the engine is idling at operating temperature: 2000 - 4000 Âµs.

Front heated oxygen sensor (HO2S), power consumption heater pad (A)

Probe heating in the front heated oxygen sensor (HO2S).
Measurement range -63 - +3163 mA.
Actual electrical consumption required to maintain the correct probe temperature.

Front heated oxygen sensor (HO2S)

Measurement range 0 -2.
Normal value is lambda=1.
At rich mixture is lambda < 1.
At lean mixture is lambda>1.

Signal, rear heated oxygen sensor (V)

Measurement range 0-5 V.
The signal from the rear heated oxygen sensor (HO2S) to the engine control module (ECM).
Normal value when the engine is running at even load is approximately 0.6 V.

Long term fuel trim

The parameter displays the adaptation factor of the lambda probe.
Measurement range 0-2 lambda-adap.
Compensates the injection period at the relevant load so that the lambda value can be correctly reached.
Normal value 1.
There are six adaptation windows. Which window is active depends on the load.
Works together with "Lambda compensation".
When there is adjustment, this is visible in "Adaptation area 1-6".

Lambda compensation

The parameter displays the compensation factor of the lambda probe.
Measurement range 0 -2.
lambda value compensation increases or reduces the injection period depending on the deviation.
Normal value 1.
Works together with "Long term fuel trim".

Actual adaptation range

This parameter displays which of the six adaptation ranges the engine is in.

B5244S/S2/S6, Model year2003-

Area	Load	Driving conditions
1	0.2 g/rev	Downhill deceleration without fuel shut-off.
2	0.3 g/rev	Idle to 40 km/h.
3	0.5 g/rev	Steady at approximately 70-90 km/h on a flat road.
4	1.1 g/rev	Higher speeds, acceleration.
5	1.5 g/rev	Full load.
6	2.0 g/rev	Will not be adapted.

Note! Note that the air conditioning (A/C) compressor increases the load by approximately 0.05 g per rpm. The use of the A/C compressor often results in a change of adaptation area.

Hint: The adaptations are weighted between the values of each adaptation point in an adaptation area.

Adaptation area 1-6

This parameter displays the actual adaptation value for each adaptation area.
Measurement range 0 -2.
Normal operating range 0.8-1.2.

Parameter, status

Air conditioning (A/C) compressor, active

The deployment signal from the engine control module (ECM) to the air conditioning (A/C) compressor relay.
OFF = The engine control module (ECM) does not activate the air conditioning (A/C) compressor relay.
ON = The engine control module (ECM) activates the air conditioning (A/C) compressor relay.

Engine cooling fan (FC)

ON = The engine control module (ECM) activates the engine cooling fan (FC).
OFF = The engine control module (ECM) does not activate the engine cooling fan (FC).

Stop lamp switch

The engine control module (ECM) calculates the value from the stop lamp switch signal.
ON = stop lamp switch on.
OFF = stop lamp switch unaffected.

Fuel pump (FP) relay

OFF = The engine control module (ECM) does not activate the fuel pump (FP) relay.
ON = The engine control module (ECM) activates the fuel pump (FP) relay via the central electronic module (CEM), 12 V.

EVAP canister shut-off valve

Certain markets only.
Displays whether the EVAP canister shut-off valve is open or closed.
The valve is normally open but closes when the leak diagnostic is run.

Camshaft position (CMP) sensor, intake

Displays the pulses from the camshaft position (CMP) sensor (intake).
Switches between high and low as the camshaft rotates.

Adaptation status

Activated = The adaptation has been activated.
Not activated = Adaptation is inactive.
When all conditions are met for fuel system adaptation, the adaptation is considered to be active.

Ignition key in position II

OFF = ignition off.
ON = ignition on.

Ignition key in position III

OFF = starting mode off.
ON= start mode on.

Cruise control ON/OFF button

OFF = ON/OFF button unaffected.
ON = ON/OFF button affected.

Cruise control resume button

The cruise control must be on when reading this parameter.
OFF = resume button unaffected.
ON = resume button activated.

Cruise control SET- button

The cruise control must be on when reading this parameter.
OFF= SET- button unaffected.
ON = SET- button affected.

Cruise control SET+ button

The cruise control must be on when reading this parameter.
OFF= SET+ button unaffected.
ON = SET+ button affected.

Description of Status Identifier

Description of status identifier

Status identifier
There are different status identifiers that can be read out for each diagnostic trouble code (DTC). The control module tests each connection more or less continuously. By reading out the diagnostic trouble code (DTC) and the associated status identifier (which detects the malfunction and stores the DTC), information about the test is obtained. Not all status identifiers need to be implemented in one control module, this varies from system to system. All status identifiers are reset and start counting again each time the control module is powered up and when erasing diagnostic trouble codes (DTCs). The possible status identifiers are described below.

Status identifier	Explanation
SI#01	The malfunction is validated now. Shows if the control module detects the malfunction right now. It is only when the test is in progress that the control module can detect malfunction and generate diagnostic trouble code.
SI#02	The malfunction is validated in the current operating cycle. Shows if the control module has detected the malfunction any time during this operating cycle.
SI#03	Intermittent not yet confirmed diagnostic trouble code.
SI#04	Confirmed diagnostic trouble code.
SI#05	Test status in current and/or earlier operating cycle. Shows if control module has performed test for this diagnostic trouble code in current and/or earlier operating cycle.
SI#06	The malfunction is validated in an earlier operating cycle. Shows if the control module has detected the malfunction any time during an earlier operating cycle.
SI#07	Test status in current operating cycle. Shows if control module has performed test for this diagnostic trouble code in current operating cycle.
SI#08	Request activate warning light/text message. Information about the diagnostic trouble code activates a warning light or text message.

Description of Parameters, Quick Test of the Fuel Tank System

Description Of Parameters, Quick Test Of The Fuel Tank System

Leak diagnostic unit pump
Graphic display in the fuel tank system quick test.

Measurement range **0-400 mA**.

The engine control module (ECM) calculates the value from the pump in the leak diagnostic unit.

The value varies depending on the pressure in the fuel tank system. Higher pressure results in increased power consumption.

Battery voltage
Measurement range **0-17.95 V**.

The value indicates the voltage from the system relay to the engine control module (ECM).

The voltage must not be below **11 V** when the quick test of the fuel tank system is run.

Fuel tank system quick test
In order for the quick test to start, the status of this parameter must be "Not completed".

- Completed = The engine control module (ECM) has completed the quick test / diagnostic of the fuel tank system during the present operating cycle
- Not completed = The engine control module (ECM) has not completed the quick test / diagnostic of the fuel tank system during the present operating cycle.

Test phase
In order for the quick test to start, the status of this parameter must be "Not running".

The parameter indicates the phase of the test.

- Reference= Reference phase for leaks and function test of the leak diagnostic unit is running
- Fuel tank system = Diagnostics for major leak and minor leak running
- Not running = No quick test or diagnostic is running.

For more information about these parameters:
Test phases, quick test fuel tank system

ECM-439C
The parameter indicates the result of the diagnostic for leakage in the fuel tank system.

This diagnostic is run during the "Fuel tank system" test phase
- No fault found= No leak corresponding to the definition of major leak detected by the engine control module (ECM)
- Fault found= Leakage >**1.0 mm** detected by the engine control module (ECM). Diagnostic Trouble Code (DTC) ECM-439C will be stored in the engine control module (ECM).

ECM-434C
The parameter indicates the result of the diagnostic for leakage in the fuel tank system.

This diagnostic is run during the "Fuel tank system" test phase.
- No fault found= No leak corresponding to the definition of minor leak detected by the engine control module (ECM)
- Fault found= **1.0 mm**>leakage ¡>=0.5 is detected by the engine control module (ECM).

Diagnostic Trouble Code (DTC) ECM-434C will be stored in the engine control module (ECM).

ECM-4360
The parameter displays the result of the diagnostic for the function in the leak diagnostic unit corresponding to the diagnostic trouble code (DTC) ECM-4360.

The diagnostic is run during "Reference" test phase.
- No fault found = No fault is detected by the engine control module (ECM)
- Fault found= Fault in the leak diagnostic unit detected by the engine control module (ECM).

Diagnostic Trouble Code (DTC) ECM-4360 will be stored in the engine control module (ECM).

ECM-436B
The parameter displays the result of the diagnostic for the function in the leak diagnostic unit corresponding to the diagnostic trouble code (DTC) ECM-436B.

The diagnostic is run during "Reference" test phase.
- No fault found = No fault is detected by the engine control module (ECM)
- Fault found= Fault in the leak diagnostic unit detected by the engine control module (ECM).

Diagnostic Trouble Code (DTC) ECM-436B will be stored in the engine control module (ECM).

ECM-436C
The parameter displays the result of the diagnostic for the function in the leak diagnostic unit corresponding to the diagnostic trouble code (DTC) ECM-436C.

The diagnostic is run during "Reference" test phase.
- No fault found = No fault is detected by the engine control module (ECM)
- Fault found= Fault in the leak diagnostic unit detected by the engine control module (ECM).

Diagnostic Trouble Code (DTC) ECM-436C will be stored in the engine control module (ECM).

ECM-436D
The parameter displays the result of the diagnostic for the function in the leak diagnostic unit corresponding to the diagnostic trouble code (DTC) ECM-436D.

The diagnostic is run during "Reference" test phase.
- No fault found = No fault is detected by the engine control module (ECM)
- Fault found= Fault in the leak diagnostic unit detected by the engine control module (ECM).

Diagnostic Trouble Code (DTC) ECM-436D will be stored in the engine control module (ECM).

Test Phases

Test phases

- **REFERENCE PHASE 1** Reference phase for leaks of 0.5 mm and function test of the leak diagnostic unit is running. If any faults are detected during this phase the major leak test starts. If any faults are detected during the phase the test and the test result for the leak diagnostic unit will be " FAULT FOUND" with the fault type

- **MAJOR LEAK** Leak diagnosis for major leaks is in progress. If leakage is detected during this phase the minor leak test starts. If leakage is detected during this phase (the power consumption of the pump is equal to or lower than a desired value) the test stops and the test result for the fuel tank system will be " FAULT FOUND, MAJOR LEAK".

- **MINOR LEAK** Leak diagnosis for minor leaks is in progress. If no leakage is detected during this phase the test stops and the test result for the fuel tank system will be "NO FAULT FOUND". If leakage is detected during this phase (the power consumption of the pump is equal to or lower than the power consumption during the reference phase), the control module will run reference phase 2

- **REFERENCE PHASE 2** The control module runs a second reference phase (the function of the leak diagnostic unit is checked) if leakage is detected during the leakage diagnostic phase (minor leak). When this phase is completed and if no fault is detected by the leak diagnostic unit, the test result for the fuel tank system will be "FAULT FOUND, MINOR LEAK".

- **NOT RUNNING** The leak diagnostic is not running, the quick test of the fuel tank system has not started or has finished.

System Overview

System Overview

The following modules communicate with the Engine Control Module (ECM) via the network:
- Electronic Throttle System (ETS) including Electronic Throttle Module (ETM) and Accelerator Pedal Module (APM),
- Continuously Variable Valve Timing (CVVT)
- Transmission Control Module (TCM)
- Anti-lock Braking System (ABS)
- Central Electronic Module (CEM)
- Data Link Connector (DLC) for connection to VADIS/ VIDA (Volvo Aftersales Diagnostic and Information System / Vehicle Information and Diagnostics for Aftersales)
- Driver Information Module (DIM), combined instrument panel
- Climate Control Module (CCM)
- Steering Wheel Module (SWM)

Central Electronic Module (CEM) is the central computer in the network, which handles the exchange between the network's high speed and low speed sections. The high-speed section covers the following modules: Engine Control Module (ECM), Electronic Throttle Module (ETM), Transmission Control Module (TCM), Anti-lock Braking System (ABS) and the Central Electronic Module (CEM).

ME 7.01 contain a large number of sensors that send information by analog signals directly to the ECM.

Diagnose Functions - Overview

DIAGNOSE FUNCTIONS - OVERVIEW

General

The Engine Control Module (ECM) in itself diagnoses internal signals and functions, together with signals and functions from connected components.

Conditions for diagnosis

To start a diagnosis of a component or function, specific conditions must be fulfilled. The conditions for a diagnosis are different depending on which component or function being diagnosed. To be able to complete the diagnosis its driving cycle has to be performed. A driving cycle varies depending on which component or function being diagnosed.

Certain diagnoses only demand ignition on and ignition off in order to have a driving cycle performed. Other diagnoses demands several different conditions to be fulfilled, for example concerning:
- Vehicle speed
- Engine temperature
- Time passed after start
- Different load ratio and ratio of revolutions during the same driving
- A certain event (for instance the EVAP-valve is regulating).

When Engine Control Module (ECM) has performed all implemented diagnoses it is called the ECM has run a "trip". To run a "trip" it demanded long time driving during different working conditions. Also, it can be demanded the engine be off during a specific time and then be driven again.

Emission related diagnosis functions

The Engine Control Module (ECM) controls that the emission related systems are worked properly. These systems are controlled by performing a diagnose function. In the diagnose function the included components and the very system function are controlled.

Fault code memory

When the Engine Control Module (ECM) detects a fault the fault code with qualifier and status is stored in the fault code memory of the ECM. At certain fault codes the failed signal is replaced with a substitute value so the system is able to continue working.

If a fault is healed the fault code will be still in the fault code memory a time period, but the status on the fault code will change.

Lighting of Check engine lamp

At emission related fault codes when the fault code is set, even a counter is stored which counts down to determine when check engine lamp shall be lighted. The conditions of check engine lamp lighting vary depending on which fault cod is set.

Component	Signal type/explanation
Ignition switch + 50 supply	Provides early information to the Engine Control Module (ECM) to prepare for start.
Brake light switch	Informs ECM that the car is braking. The signal is a safety feature in addition to the brake pedal sensor. The ECM carries out a range test between the signals from both sources.
Electronic Climate Control (ECC) Manual Climate Control (MCC)	Provides information if the A/C is switched on or not. The ECM controls connection/ disconnection of the compressor dependent on load, engine speed (RPM), engine coolant temperature etc.
Oil pressure switch	Provides information about engine oil pressure. The information is sent to Driver Information Module (DIM) which via the display informs the driver to stop the engine and/or check the oil level.
A/C pressure sensor (linear)	Provides information using a linear signal about any pressure changes on the high-pressure side. Depending on the pressure the ECM can activate the engine Cooling Fan (FC) at high/low speed and shut off the A/C compressor.
Front Oxygen Sensor (HO2S) Bank 1, (linear signal)	Provides information about the oxygen level in the exhaust gases downstream of combustion and upstream of the catalytic converter.
Rear Oxygen Sensor (HO2S) Bank 1	Provides information about the oxygen level downstream of the catalytic converter (TWC).
Front Oxygen Sensor (HO2S) Bank 2, (linear signal)	Provides information about the oxygen level in the exhaust gases upstream of the catalytic converter (TWC). (Only 6 cylinder engines)
Rear Oxygen Sensor (HO2S) Bank 2	Provides information about the oxygen level downstream of the catalytic converter (TWC). (Only 6 cylinders engine)
Engine coolant temperature sensor	Provides information about engine coolant temperature (ECT).
Mass Air Flow (MAF) sensor (heated film principle)	Provides information about the intake air mass. The Mass Air Flow (MAF) sensor for turbo charged engines has no resistor for the intake air temperature, but is complemented instead by a separate sensor downstream of the Charge Air Cooler (CAC).
Camshaft Position (CMP) sensor	Provides information about cylinder intake and compression phase.
Knock Sensor (KS) 1 Knock Sensor (KS) 2	Provides information if the engine knocks.
Engine speed (RPM)/position sensor	Informs about the crankshaft position and engine speed (RPM). Has flywheel adaptation for mechanical faults/damage.
Accelerator Pedal (AP) position sensor	Provides information about accelerator pedal position. The signal is sent via two separate cables at the same time, one analog signal and one digital signal.
Engine coolant level switch	Provides information about engine coolant level. The information is sent to Driver Information Module (DIM) which informs the driver via the display to stop the engine and/or check the engine coolant level.
Intake Air Temperature Sensor	Informs about the intake air actual temperature after Charge Air Cooler (CAC). Used for Boost Pressure Control (BPC). The sensor is used together with intake air pressure sensor. Turbos only.
Intake air pressure sensor	Provides information about the intake air actual pressure after Charge Air Cooler (CAC). The most important sensor for Boost Pressure Control (BPC). The sensor is used together with intake air pressure sensor. Turbochargers only.
Diagnosis Module Tank Leakage (DMTL) module	Provides information about changes of the currents in the fuel tank system. Used for leak diagnostic.
Ambient air temperature sensor (located in left door mirror)	Provides information about ambient air temperature. Affects control of the engine Cooling Fan (FC).
Clutch pedal position sensor	Provides information that the clutch pedal is depressed.
CAN communication	Exchange of information between the ECM and the following: BCM, TCM, CCM, CDM and DLC.

Input Signals

Component	Signal type/explanation
Air Conditioning (A/C) relay	Connecting and disconnecting A/C compressor.
Fuel Pump relay	Signal for Fuel Pump (FP) on/off switch. In a collision where the SRS is deployed it also sends a signal via the Central Electronic Module (CEM) to the Engine Control Module (ECM) to turn off supply to the Fuel Pump (FP).
System relay	Controlled by the ECM and provides sensors and functions with voltage supply.
Transmission Control Module (TCM)	Engine load, throttle opening, torque limiting, MIL request, constant idle speed compensation.
Electronic Climate Control (ECC) Manual Climate Control (MCC)	Signals engine coolant temperature to climate control system which can then determine how the blower fan should be controlled after cold start.
Electronic Throttle Actuator	Controls the air flow to the engine.
Electronic Fan Control Module	Electronic fan speed.
Central Electronic Module (CEM)	Controls communication between other modules.
Front Oxygen Sensor (HO2S) Bank 1, signal	Power supply for heating PTC element.
Rear Oxygen Sensor (HO2S) Bank 1, signal	Power supply for heating PTC element.
Front Oxygen Sensor (HO2S) Bank 2, signal	Power supply for heating PTC element. (Only 6 cylinder engines)
Rear Oxygen Sensor (HO2S) Bank 2, signal	Power supply for heating PTC element. (Only 6 cylinder engines)
Fuel Injectors	Controlled individually (sequentially).
Diagnosis Module Tank Leakage (DMTL) module	Provides information about changes of the currents in the fuel tank system. Used for leak diagnostic.
Canister Purge (CP) valve	Continuously controlled, it controls the flow from EVAP canister to engine intake side.
Continuously Variable Valve Timing control valve	Continuously controlled, it regulates camshaft setting. On turbocharged engines it regulates the exhaust camshaft and on normally aspirated it regulates the intake camshaft.
Turbocharger (TC) control valve	Controls turbocharger (TC) boost pressure, see turbocharger (TC) control system description section S0805.
Ignition coil/Ignition Discharge Module (IDM) for cylinders 1 – 5 (1 – 6 for 6 cylinder engines)	Separate ignition coil with integrated Ignition Discharge Modules (IDM) for each cylinder. Gives shorter charging interval and more power.
Malfunction Indicator Lamp (MIL) USA/CDN = Check Engine Other = Engine symbol	The lamp lights up for faults affecting the emissions. The lamp flashes for misfires, which cause risk of damage to the catalytic converter. Can also light up when requested by the Transmission Control Module (TCM).

Output Signals

Via CAN-Communication

Via CAN-Communication

Brake Control Module (BCM):
Provides information so that the ECM can determine whether any misfiring is due to road condition or to a fault in the engine management system. Also provides a vehicle speed signal.

Climate Control Module (CCM):
Informs the ECM about A/C selection and requests A/C activation.

Central Electronic Module (CEM):
Is the "main computer" in the network and coordinates required information between other modules. It also controls diagnostic function by connecting the Data Link Connector (DLC) to the network for programming and reading off diagnostic trouble codes (DTCs) and parameters. The CEM also includes the Immobilizer.

Steering Wheel Module (SWM):
Provides information to the ECM that the cruise control is selected and that the driver requests changing the cruise control speed.

Transmission Control Module (TCM):
The Transmission Control Module (TCM) is only implemented in automatic transmission cars. The following signals are being sent on the network from the ECM and picked up by the TCM:

- Engine load
- Throttle opening
- Response to torque limiting
- Accelerator pedal position
- Cruise control status

The following signals are sent out on the network from the TCM and taken up by the ECM:

- Request for torque limiting step I and II
- Request to light Malfunction Indicator Lamp (MIL)
- Signal for constant idle speed compensation (P/N position)
- Engaged gear

Data Link Connector (DLC) (OBD II):
The serial communication via the Data Link Connector (DLC) is used when reading off the Volvo on-board diagnostic (OBD) system.

Serial communication:
The ECM communicates serially with the Data Link Connector (DLC).

Misfire Diagnostic

Misfire Diagnostic

With the crankshaft sensor the segment time deviation between two following ignitions is measured. The crankshaft is divided into 5 or 6 segments depending on engine cylinder type. Each segment corresponds to a specific ignition/cylinder. To avoid incorrect segment time deviations, due to manufacturing tolerances, a crankshaft adaptation must be accomplished. The crankshaft adaptation is performed during fuel-on and fuel-off..

Misfire detection is shut-off for loads below the Zero Load-line at engine speeds up to **3000 rpm**, and also shut-off for loads under the 4"Hg-line from **3000 rpm** up to redline. It is also shut-off during rough road operation, which is determined by signal from the ABS control unit.

Misfire detection is enabled when the engine speed has reached **150 rpm** below warm idle speed plus two crankshaft revolutions or after nine ignitions, depending on which occurs first.For detection of emission related misfires, the number of misfires which have occurred within the first interval of 1000 engine revolutions or the 4th exceedance (for the rest of DCY) over the emission threshold value after the first 1000 engine revolutions are relevant. If the number is so high that the exhaust emission standard is exceeded by a factor of 1.5, then the emission related misfire rate has been reached and exceeded a fault code will be stored. If misfires occur and the threshold is exceeded in the following DCY, MIL illuminates.

For detection of catalyst damaging misfires, the numbers of misfires that have occurred during an interval of 200 engine revolutions are relevant. If the number of misfires are so high that the catalyst is endangered (by various number of misfires depending on actual engine operating range), then the cat. Damaging mis-fire rate has been reached and exceeded. The the fuel will be cut off to the misfiring cylinder and a fault code will be stored. MIL will blink with one Hertz as long as the engine has catalyst-damaging misfires. The fuel is cut off until engine is restarted.

Misfire Diagnostic Operation			Corresponding Monitor ID
DTCs	P0300 – P0306 P0300 – P0306	Misfire, Emission related Misfire, Catalyst damage	A2, A3, A4, A5, A6, A7
Monitor Strategy description	Misfire detected, emission related, Cylinder 1-6 (P0301-306). Misfire detected, catalyst damage Cylinder 1-6 (P0301-306).		

Typical misfire diagnostic enable conditions		
Enable condition	*Minimum*	*Maximum*
Intake air temp	-48°C	
Engine speed	480 rpm	6580 rpm

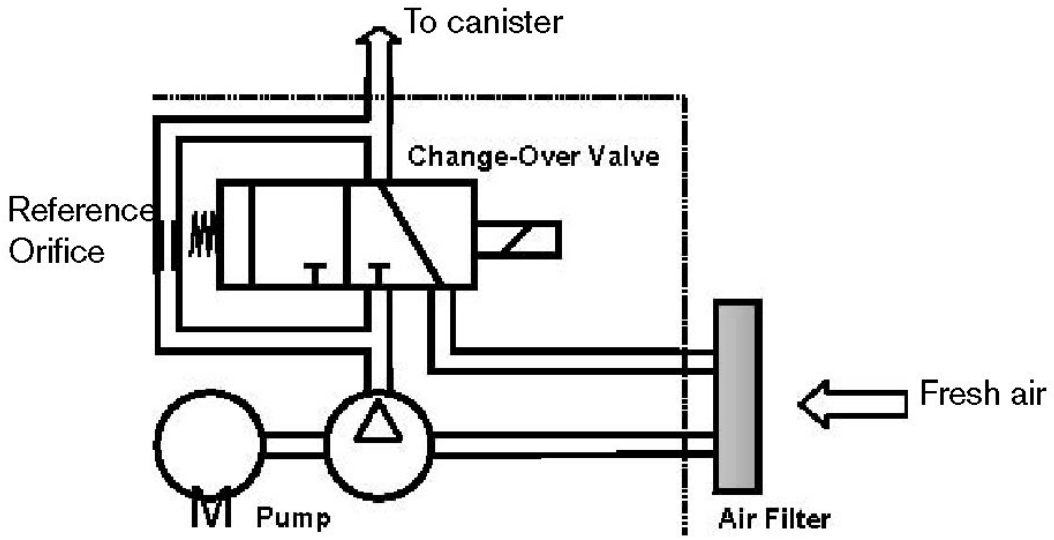
Typical misfire diagnostic malfunction thresholds	
Malfunction criteria	*Threshold value*
Counts misfire of all cylinders	> 36 per 1000 engine revolutions corresponds to 1.44 % misfire

Leakage Diagnostic

Leakage Diagnostic

Vapor that evaporates from the fuel in the fuel tank is routed to and stored in the EVAP canister from where it is introduced into the combustion process via the Canister Purge (CP) valve.

A leak diagnostic has been introduced in certain markets to ensure that there are no leaks in the fuel tank system. The diagnostic is designed to detect leakage corresponding to a **0.20 inch** or larger hole. The fuel tank system consists of fuel tank, fuel filler pipe, EVAP canister, CP valve and all pipes between these components. To be able to diagnose the fuel tank system, it is also equipped with a diagnostic module (DMTL = Diagnostic Module Tank Leakage) including the electrical driven air pump.



Leakage diagnostic (LD) is performed in after run mode, when key off.

The diagnostic is divided into different phases as follow:
- Reference leak measurement, performed every LD
- Rough leak test, performed every DCY
- Small leak test performed every second DCY when enabling conditions are met.

The diagnostic is performed by measuring the motor current and then compares it to a specified reference current. If a fault is detected in any of the phases the diagnostic is interrupted and the diagnostic trouble code (DTC) for the component identified is stored. Diagnosis is carried out in the following stages:
- While fuel level sensors are working correctly and the fuel level is higher than 85% all leakage tests and healing attempts are aborted.
- While the fuel level sensors are not working correctly, the test is aborted if the initial rate of change is higher than a calibrated level due to a combination of high fuel level and high evaporation. In case of healing when the fuel level sensor are not working correctly the attempt is aborted if the initial rate of change is higher than a calibrated level due to a combination of high fuel level and high evaporation. This level is calibrated to approximate 70%.

1. Reference leak measurement phase
   For the reference current measurement, the motor pump is switched on. In this mode fresh air is pumped through a **0.02-inch** reference orifice, situated internally in the module, and the pump motor current is measured. At some unusual operating conditions the pump current may not stabilize. In this case the leak check is aborted and a new leak check will be performed in the next after run. To prevent a permanent disablement of the leak check due to a DM-TL module problem, the number of subsequent irregular current measurements is counted and a module error is set as soon as the counter exceeds a calibrated value.

2. Rough leak test phase
   In this monitoring mode the changeover valve is switched over (the purge control valve remains closed). The motor current drops to a zero load level. Fresh air is now pumped through the canister into the tank. This creates a small overpressure at a tight evaporative system, which leads to a current increase.

   The rough leak check **(>= 0.04-inch)** is performed by monitoring the pump motor current gradient. Relative pump motor current is created by

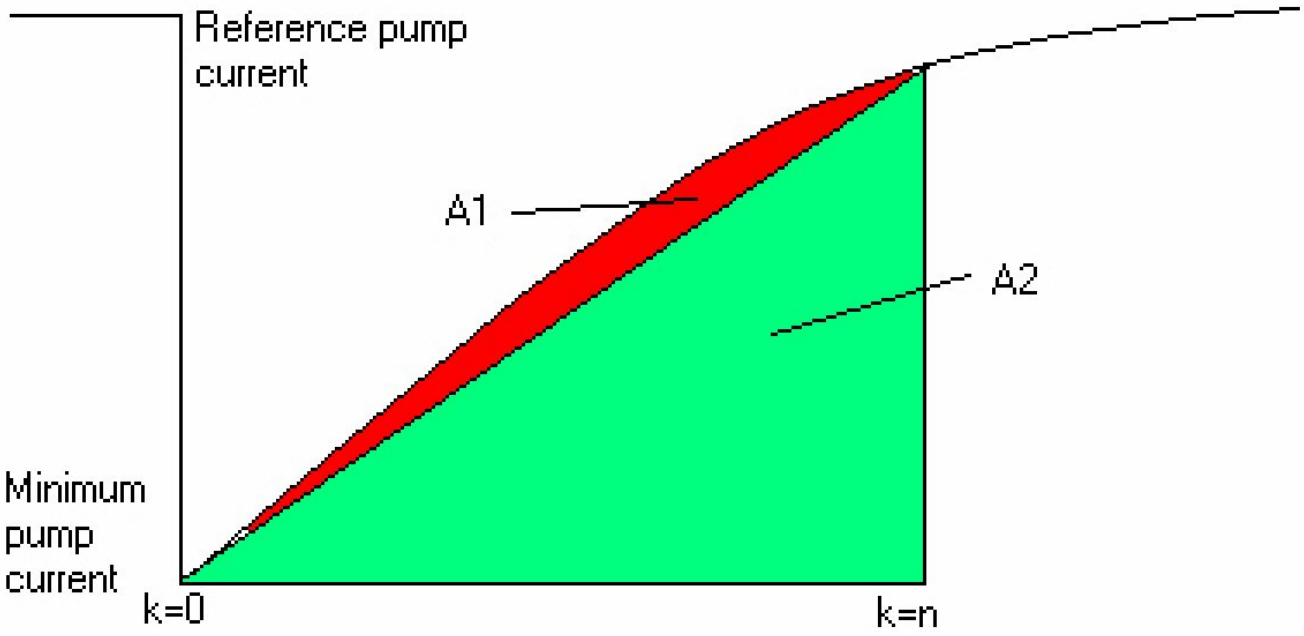
using minimum pump motor current and reference pump motor current. Area ratio is created by dividing integrated relative current with ideal area, which is the linear integrated area from minimum pump current to current sample of the current. If the relative current has increased above an upper limit but not exceeded a calibrated area, within a calibrated time, the rough leak check has passed without a fault. If the calibrated area ratio is reached before the relative pump current limit, within the calibrated time, a rough leak fault code is set. The integrated relative pump current area A-int is defined by;

A-int = A1 + A2

and the ideal area A-ideal,

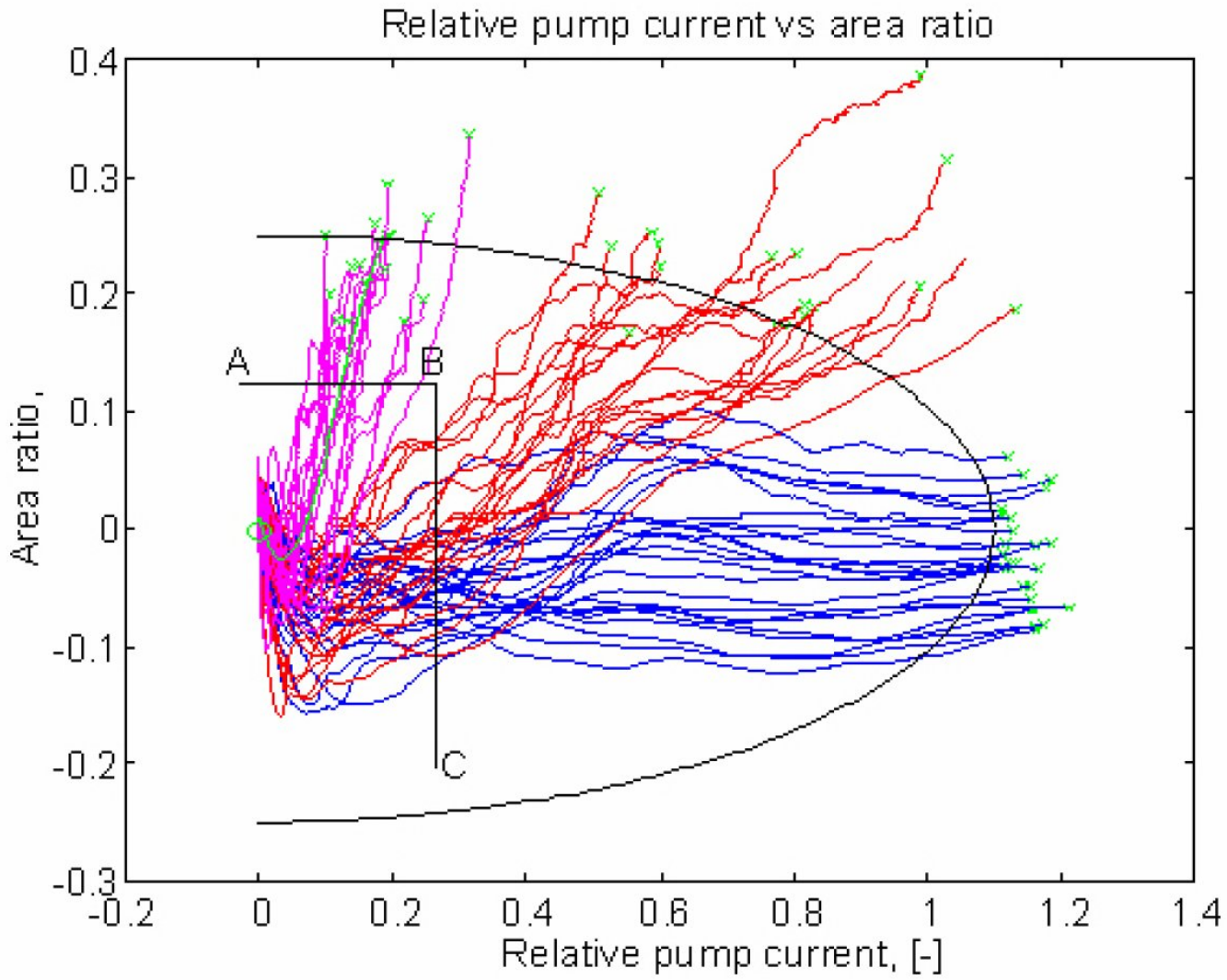
A-ideal = A2.

See figure below.

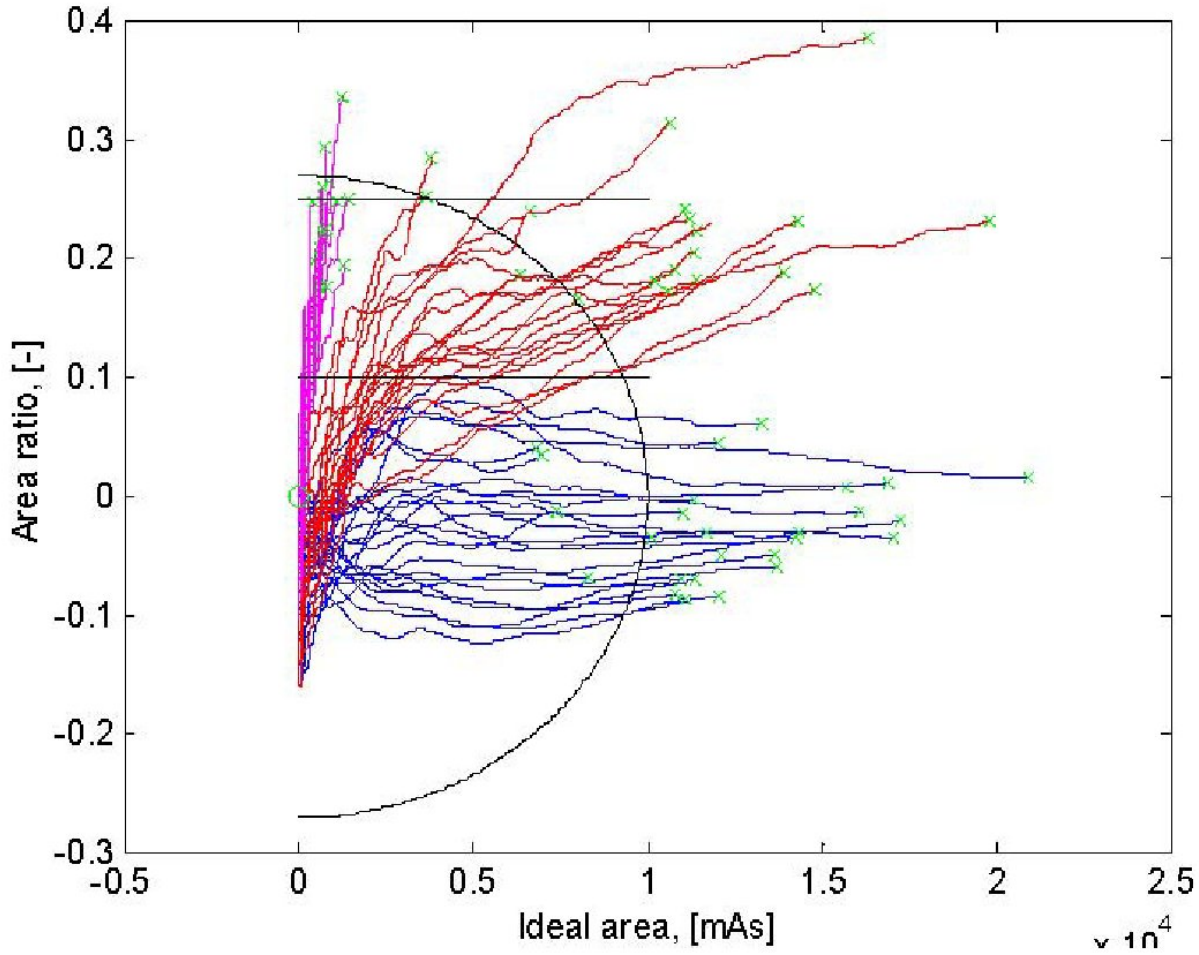


3. Small leak test phase
   If the conditions for a small leak check **(>=0.02-inch)** are set the pump motor remains on in monitoring mode until an elliptic combination of the relation pump current and area ratio are fulfilled, or a maximum time limit has been reached.The judgment is based on a test value which is a combination of the actual area ratio and gradient of area ratio with respect to relative pump current.

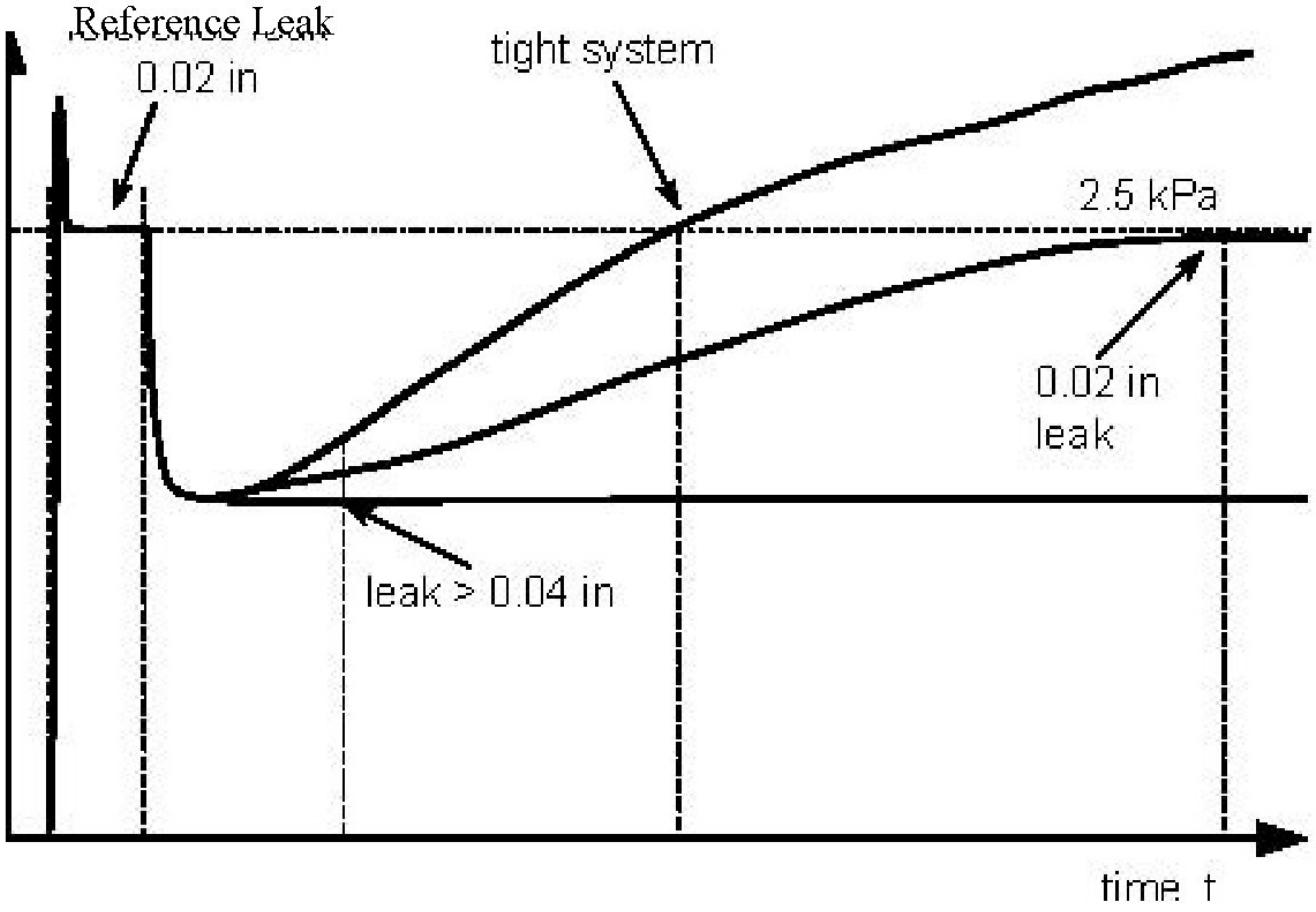
Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2



Results from simulation using old measurements and creating the area ratio and relative pump current and plot them versus each other.Blue curves correlates to no leakage, red curves to **0.5 mm** leakage and the magenta to **1.0 mm** leakage.



Results from simulation using old measurements and plotting the area ratio vs. the ideal area. Blue curves correlates to no leakage, red curves to **0.5 mm** leakage and the magenta to **1.0 mm** leakage.



If the motor current decreases or increases too much during one of the tests, the test is aborted and a new leak test will be performed in the next after-run.

Monitoring Conditions

Monitoring Conditions

To carry out the leak diagnostic it is necessary that:
- Engine-on time is at least **10 minutes** and last engine-off time is more than **5 hours**.
- ECM (=Engine Control Module) is in after run mode
- Engine speed is **0 rpm**
- Vehicle speed is **0 km/h**
- Altitude is less than (or equal to) **2500 meters**
- Engine coolant temperature is above (or equal to) **-5 Degrees C**
- Ambient temperature is between **-5 Degrees C and +35 Degrees C**
- Fuel level between 0% to 85%
- Concentration of fuel vapor in the EVAP canister is not excessive
- Battery voltage between **11.0 V and 14.5 V**
- Purge valve is closed

With the following errors the leakage detection monitoring can not be performed. These errors will therefore disable the leakage detection monitoring and the MIL (and the corresponding fault code) will be set. The disable conditions are:
- Error on power stages DM-TL pump (E_dmpme)
- Error on power stage purge valve (E_teve)
- Error on purge valve (E_tes)
- Error on change-over valve (E_dmmve)
- Error on vehicle speed signal (E_vfz)
- Error on coolant temperature sensor (E_tm)
- Error on altitude sensor (E_dsu).

Leakage Diagnostic Operation			Corresponding Monitor ID
	Evaporative Emission System	*Monitor Strategy description*	
DTCs	P2404 Plausibility error	Current drop check when switching from reference leak to tank measurement.	3D
	P2405-2406 Max and min error	Reference leak current limit check	3D
	P2407 Signal error	Current fluctuation check	3D

Typical leakage diagnostic enable conditions

Enable condition	*Minimum*	*Maximum*
Engine on time	600 s	
Ambient air temperature	-5°C	+35°C
Battery voltage	11.0 V	14.5 V

Typical leakage diagnostic malfunction thresholds

Malfunction criteria		*Threshold value*
Reference current, lower limit	Min error	≤ 15 mA
Reference current, upper limit	Max error	≥ 40 mA

Heated Oxygen Sensor Diagnostic

Heated Oxygen Sensor Diagnostic

Heated oxygen sensors are used in the system. These sensors are checked as usual for short-circuits and open-circuits. When these faults occur, corresponding errors are stored for each sensor.

Function of oxygen sensors

The basic functionality of these sensors is the concept of a pump current of the oxygen in fuel-air mixtures, from where the sensor system can compute the actual fuel-air mixture. Heating of the sensors is also undertaken in order to decrease the internal resistance and to further improve the performance of the sensors.

The internal resistance of the front sensors is constantly monitored for the heating diagnosis. A comparison is therefore made with a reference in

order to consider aging and sample deviations. Also, power stage diagnosis is made for the front sensors where a comparison of the control signal (input) and the output signal is made. Through this procedure all various possible types of short-circuits will be detected.

Diagnosis of oxygen sensors

Diagnosis of incorrect lambda measurements due to shunting effects is performed through a lambda offset of the downstream-control if a difference of air-fuel mixture exceeds a threshold (3%). By monitoring the voltage output of the specific processor CJ125 a check is made that it operates correct, avoiding hardware errors. Insufficient heating of the LSU, i.e., the front sensor, and disconnection of the pump current are detected through a comparison of the fuel-air mixture with the rear sensors. The criterion is that if the front sensor indicates a fuel-air mixture with a ratio of 1, while the rear sensor indicates a lean or rich mixture, one of these failures has occurred. Through different comparisons of the front and rear sensors, also short-circuits and high resistance to battery and ground, are detected for the front sensors. Low resistance connection between heater and the sensor, i.e. the heater coupling, is detected by monitoring lambda changes due to the heater pulse rate. A decrease of the actual performance, known as the dynamics, of the sensor due to aging or fouling can be detected through a comparison of the estimated (model based) signal and the actual measured signal.

Similar testing as these above are also undertaken for the rear sensors, where the major differences in the diagnosis can be found through oscillation checks, checking of the sensor voltage and the dynamics during fuel cut-off, for the rear sensors.

During active oxygen sensor aging diagnosis the sensor signal (shape and frequency) can be considered as characteristic for the quality of the installed upstream sensor. Thus, for this purpose several parameters are calculated continuously. These calculated values are then provided via a tester interface (Scan Tool), together with the correction value of the downstream controller, the dynamic property value of the upstream continuous sensor and different constants by this tester interface. It is by this functionality the legislative authorities (for instance CARB) determine the standard of the oxygen sensor system.

Catalyst Monitor Operation		**Corresponding Monitor ID**
DTCs	P0420 Main Catalyst, Bank 1 P0430 Main Catalyst, Bank 2 (6-cyl. stereo-sys.)	21 22
Monitor Strategy description	Efficiency below threshold (oxygen storage)	

Typical Catalyst monitor enable conditions		
Enable condition	*Minimum*	*Maximum*
Engine speed	1000-1440 rpm	2000-2520 rpm
Modeled bed catalyst temperature	470°C	719.991°C
Ambient air start temperature	-24.0°C	143.3°C

Typical Catalyst monitor malfunction thresholds	
Malfunction criteria	*Threshold value*
Normalized catalyst quality factor Sum of catalyst quality factors from cylinder bank 1 and 2	> 0.1992-0.5313 > 0.398-0.461
Cumulative catalyst monitoring time	> 60-80 s

Oxygen sensor check Operation - Bank 1

	Lambda sensor upstream catalyst	*Monitor Strategy description*	Corresponding Monitor ID
DTCs	P0040: oxygen sensor signals swapped (sensor 1)	Exchange of lambda sensors upstream catalyst, detection	
	P0041: oxygen sensor signals swapped (sensor 2)	Exchange of lambda sensors upstream catalyst, detection	
	P0131-P0132: control circuit input lines	IC CJ125 internal errors are detected by a voltage comparator check and sent to the main processor	
	P1646: evaluation IC	Circuit Range / Performance	
	P2096-P2097: lean / rich plausible test	Front sensor is detected as shifted erroneo-usly to lean side	01
	P2195-P2196: lean / rich plausible test	Front sensor signal characteristic lean / rich	
	P2237: pumping current pin	Line interruption on IP	
	P2251: virtual ground	Line interruption on VM	
	P2414: outside exhaust system	Front sensor is out of exhaust gas system	
	P2626: pumping current trim	Circuit Range / Performance	
	P2243: lambda sensor upstream cat, reference voltage output	Line interruption on UN	
	P0133: front sensor	Circuit Slow Response	01
	P2231: front sensor heating	Circuit Cross-coupling to sensor heating	42
	P0141: O2 sensor heater	Circuit	42

Oxygen sensor check Operation - Bank 2

	Lambda sensor upstream catalyst	*Monitor Strategy description*	Corresponding Monitor ID
	P0151-P0152: control circuit input lines	IC CJ125 internal errors are detected by a voltage comparator check and sent to the main processor	
	P1647: evaluation IC	Circuit Range / Performance	
	P2098-P2099: rich plausible test	Front sensor is detected as shifted erroneo-usly to rich side	05
	P2197-P2198: lean / rich plausible test	Front sensor signal characteristic lean / rich	
DTCs	P2096-P2097: lean / rich plausible test	Front sensor is detected as shifted erroneo-usly to lean side	01
	P2240: pumping current pin	Line interruption on IP	
	P2254: virtual ground	Line interruption on VM	
	P2415: outside exhaust system	Front sensor is out of exhaust gas system	
	P2629: pumping current trim	Circuit Range / Performance	
	P2247: lambda sensor upstream cat, reference voltage output	Line interruption on UN	
	P0153: front sensor	Circuit Slow Response	05
	P2234: front sensor heating	Circuit Cross-coupling to sensor heating	

Typical Oxygen sensor enable conditions

Enable condition	*Minimum*	*Maximum*
Battery voltage	10,7 V	16,0 V

Typical Oxygen sensor malfunction thresholds

Malfunction criteria	*Threshold value*
Sensor voltage upstream of the catalyst	> 4.81 V

Canister Purge Valve Diagnostic

Canister Purge Valve Diagnostic

The task of the canister purge valve diagnosis is to detect a defective purge control valve. The purge control valve is checked with regard to

controllability of the flow rate such as permanently open as well as permanently closed. In this cases purge control valve is detected. Minor leaks or slightly blocked valves are not detected if the valve is still controllable to a large extent. A check for absolute tightness must be performed separately or it can be derived from a possibly given canister leak test.

The diagnosis is used in addition to the electrical diagnosis. Provided the electrical diagnosis has already detected a fault, the canister purge valve diagnosis remains inactive. If the electrical diagnosis should not yet have detected a fault it will be detected by the canister purge valve diagnosis.

There are two possibilities for an OK check:

1. From active check at idle. A deviation of the Lambda controller from its value prior to opening, the purge control valve indicates that the purge control valve can be controlled and thus is OK.
2. If a stoichiometric mixture is coming there is no deviation of the Lambda controller.

a. Only the reaction of the idle control, which closes the throttle valve, can be evaluated.
b. Indication for an OK check is the decrease of the air mass flowing through the throttle valve
c. If the valve cannot close any further the ignition angle efficiency is worsened. This is also detected.

There is one possibility for defective purge control valve check:

1. If neither a reaction of the Lambda controller or of the idle controller can be observed during the active check by controlling the purge control valve open. Then the purge control valve can no longer be controlled (jammed at closed or open position), so the purge control valve is defective. The canister purge valve diagnosis is depending on lambda controller, throttle angle and ignition efficiency.

Monitoring conditions

To carry out the purge valve diagnosis it is that:

- Ambient temperature is above **-7.5 Degrees C**
- Engine temperature is above **+65 Degrees C**
- Altitude is less than (or equal to) **4000 meters**
- Vehicle speed is **0 km/h**
- Condition for Lambda closed loop control fulfilled
- Critical misfire or limp home on velocity pick-up signal not detected

With the following errors the purge control monitoring can not be performed. These errors will therefore disable the purge control diagnosis and the MIL (and the corresponding fault code) will be set. The disable conditions are:

- Condition for fault type "implausible signal" detected in the DM-TL module.
- Error on DM-TL change-over valve power stage, short circuit to ground.

Canister purge valve diagnostic

	Evaporative Emission System	*Monitor Strategy description*	Corresponding Monitor ID
DTCs	P0496 Max error P0497 Min error	Incorrect purge flow	3D

Typical canister purge valve diagnostic enable conditions

Enable condition	*Minimum*	*Maximum*
Engine temperature at start	65.25°C	
Altitude		4000 meters
Ambient air temperature	-7.5°C	

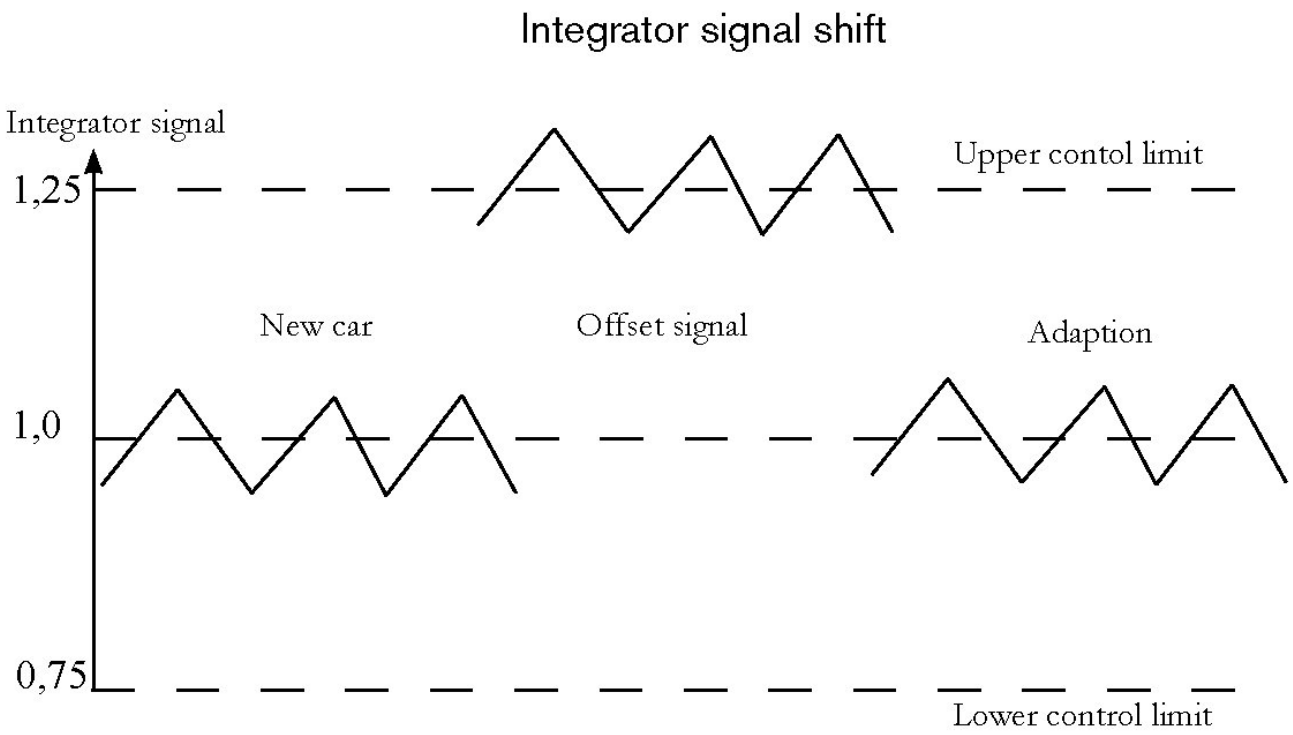
Typical canister purge valve diagnostic malfunction thresholds

Malfunction criteria	*Threshold value*
Delta resistant torque from resistant torque adaptation	<-2.99 %

Fuel System Monitoring

Fuel System Monitoring

The fuel injection system has a function which compensates for changes in the lambda (lambda) control which occur slowly over its service life. It is called lambda adaptation and its purpose is to keep the integrator signal within its limits of control (see figure below).



The integrator signal controls the fuel injection time, in a new car the integrator signal oscillates about 1 (equivalent lambda = 1).

The amount of lambda integrator offset is calculated when the set lambda is equal to 1 and the canister close valve is closed.

The fuel adaptation will compensate the fuel amount so that the lambda integrator will remain in the middle (lambda=1.0).

The lambda control adaptation is divided into two adaptation areas: The additive adaptation at idle conditions (ora) and the multiplicative adaptation area at loaded engine (frau).

The correction of the fuel amount = calculated fuel amount * frai + ora. The speed of the fuel adaptation is depending on the lambda integrator offset (big offset is equal to high adaptation speed). The amount of the lambda integrator offset is also used in calculation of the physical urgency. The purge functionality is also calculating a physical urgency (dependant of charcoal canister load). This means that the fuel adaptation will get more time for adaptation if there is an offset and/ or low charcoal canister load.

Fuel Pressure System Diagnosis

Fuel Pressure System Diagnosis

New fuel pressure system diagnosis function is implemented. It is due to new hardware design for this model year, with a variable fuel pump, a fuel pressure sensor and a fuel temperature sensor. The function target is to be able to point out the fuel pressure system as incorrect due to performance specification and fulfill legal requirements. The function will detect the fuel pressure to be stuck high (higher pressure than target), stuck low, noisy pressure signal or plausibility.

The function, fuel temperature sensor diagnosis will detect min and max error.

The function, fuel pressure sensor diagnosis will detect min and max error.

And the function fuel power stage diagnosis will detect min, max and signal error.

Fuel Monitor Operation		Corresponding Monitor ID
DTCs	ora: P2187 Lean P2188 Rich frau: P2177 Lean P2178 Rich	81 81 81 81
Monitor Strategy description	Long term fuel trim correction value is updated to maintain the short-term fuel trim at desired set value (0 % correction). The value of the long term fuel trim correction is monitored.	

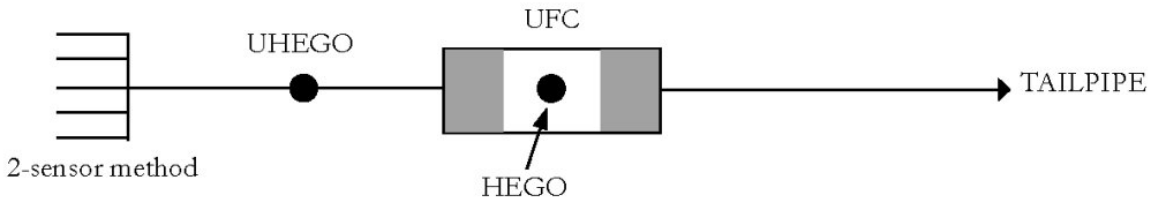
Typical fuel monitor enable conditions		
Enable condition	*Minimum*	*Maximum*
Filtered air mass flow	27 kg/h	325 kg/h
Engine temperature	69.8°C	
Intake air temperature		80.3°C

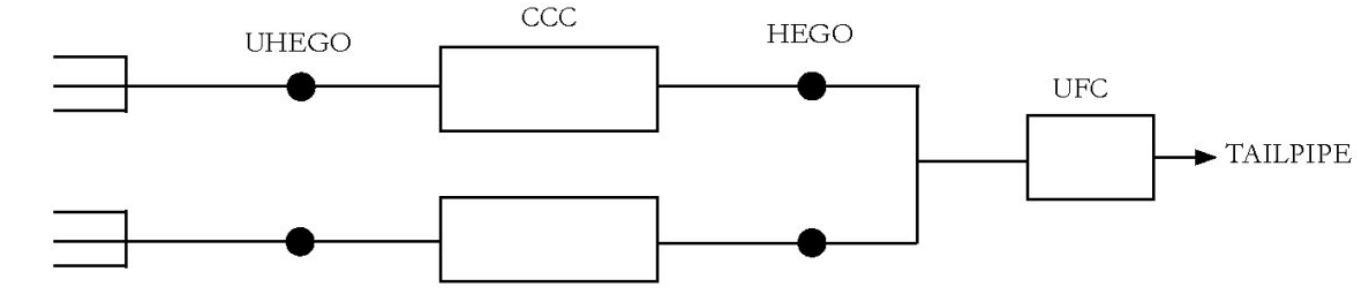
Typical fuel monitor malfunction thresholds	
Malfunction criteria	*Threshold value*
Multiplicative correction factor: frau, Lean frau, Rich	 ≥ 1.234985 ≤ 0.82
Additive correction: rkat, Lean rkat, Rich	 ≥ 8.531 % ≤ -7.406 %

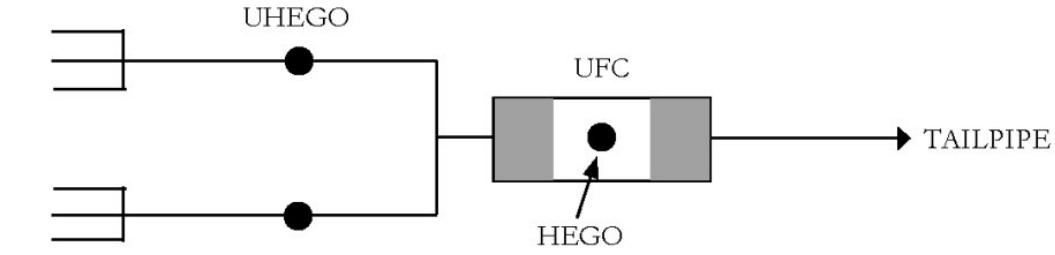
Catalyst Monitoring

Catalyst Monitoring

General Description







HEGO = Universal Heated Exhaust Gas Oxygen Sensor = ”Binary sensor”
UHEGO = Universal Heated Exhaust Gas Oxygen Sensor = ”Linear sensor”
CCC = Close Coupled Catalyst
UFC = Under Floor Catalyst

Sensor methods

- The two-sensor method makes use of one upstream and one downstream oxygen sensor, one sensor (UHEGO) before the catalytic converter and one sensor (HEGO) inserted into the catalytic converter, monitoring the front part of the catalyst.
- The two-sensor method stereo makes use of one upstream and one downstream oxygen sensor for each cylinder bank, each bank has one sensor (UHEGO) before the catalytic converter and one sensor (HEGO) after.
- The three-sensor method makes use of two upstream and one downstream sensor, two sensors (UHEGO) before the catalytic converter and one sensor (HEGO) inserted into the catalytic converter, monitoring the front part of the catalyst.

Catalyst monitoring is based on monitoring the oxygen storage capability. The (nonlinear) correlation between conversion efficiency and storage capability has been shown in various investigations.

The engine mixture control results in regular Lambda oscillations of the exhaust gas. When using a linear sensor Lambda control, Lambda oscillations are artificially created during catalyst monitoring.

These oscillations are dampened by the storage activity of the catalyst. The amplitude of the remaining Lambda oscillations downstream the catalyst indicates the storage capability. This information is evaluated during one single engine load and speed range. According to the described operating principle the following main parts can be distinguished:

- Computation of the amplitude of the downstream Lambda sensor
- Modeling of a borderline catalyst and of the signal amplitudes of the downstream Lambda sensor
- In the 3-sensor case, an additional modeling of a single air fuel mixture corresponding to the two front sensors, before the catalytic converter.
- Signal evaluation
- Fault processing
- Check of monitoring conditions

Continuous Variable Valve Timing (CVVT)

Continuous Variable Valve Timing (CVVT)

The Engine Control Module (ECM) infinitely variable controls the CVVT valve which in turn controls the CVVT unit with engine oil pressure.

The CVVT unit is mounted either on the exhaust camshaft or the intake camshaft or both, depending on which engine it is. The CVVT unit is used on all 5 and 6 cylinder engines.

The variable camshaft is hydraulically controlled by the engine oil. (The camshaft rotation takes place by the engine oil, using the CVVT valve it is transferred to either the CVVT unit front or rear chambers.) The chambers are divided by a piston.

When oil presses the piston back or forward it results in a rotating motion in the piston because it is installed in the CVVT unit cover with splines. The tooth wheel for the timing belt is located on the CVVT unit outer cover.

The control is fast and exact, it only takes approximately **500 ms** to transfer between the outer positions.

The variable camshaft main task is to minimize exhaust emissions, mainly at cold start, but also gives an improved idling quality.

Before the engine starts an internal check occurs as follows:

1. When the ignition is switched on an electrical check is carried out on the signal cable, the power supply cable and the solenoid. The check is carried out for a short-circuit to supply voltage/ground and open-circuit.
2. The camshaft checks if it is in the correct position compared to the flywheel, when the camshaft is in its 0-position (mechanical resting position). This can be done by comparing the signals from The Camshaft Position (CMP) sensor and the engine speed (RPM)/ position sensor. This is being done while the engine is running and is saved until the next start.

   If the deviations are too large between these the CVVT valve does not activate and the diagnostic trouble code (DTC) is stored.

3. In case of larger controlled deviations at the variable camshaft the time taken to regulate to the control value is measured. This time is used partially to determine how long it takes to alter the camshaft angle and partially to switch off the variable camshaft if the time exceeds a certain maximum time. The camshaft uses the engine oil and oil pressure to turn. The rotation time depends on engine speed (RPM), oil pressure, viscosity etc. which in turn depends on oil temperature and quality etc.
4. To check that the Camshaft Position (CMP) sensor is correct it is compared to the signal from the engine speed (RPM)/position sensor when the engine turns. If the check gives faulty values a DTC is stored and CVVT control ceases.

Engine Speed (RPM) Sensor

Engine Speed (RPM) Sensor

The periphery of the flywheel/flex plate is provided with a series of holes. As it passes, each transition between hole and metal induces a voltage in the pickup coil of RPM sensor. The resulting signal is an A/C signal whose frequency is a function of the number of holes passing per second and whose voltage can vary between **0.1 V and 100 V AC**, depending on the engine speed and the air gap. Voltage and frequency increases with engine speed. The engine control module (ECM) determines the engine speed and of the crankshaft by detecting the voltage pulses.

At approximately **90 degrees** before TDC for cylinder 1 there is a section without any gap. When this longer metal section (= missing holes) passes the RPM sensor, voltage pulses stop and the ECM can calculate angular crankshaft position.

Camshaft Position (CMP) Sensor

Camshaft Position (CMP) Sensor

The sensor consists of an MRE (Magnetic Resistance Element). It is a permanent magnet with 2 special semiconductor resistors, which are connected in series with each other, as described in the picture above. The output signal is an analog sine curve which passes through an analog/digital converter in the Camshaft Position (CMP) sensor before being sent on to the Engine Control Module(ECM).

When a tooth on the pulse wheel nears the sensor the magnetic field is bent and affects the resistor located nearest to the ground, resistance affects the voltage and the output signal to the ECM is low. When the same tooth continues past the sensor the magnetic field follows and so affects the other resistor that is located nearest to the voltage supply, this resistor affects the voltage so that the output signal to the ECM is high.

The magnetic field swings backwards and forwards between the teeth on the pulse wheel and the ECM senses the signals between the teeth, partly before and partly after the sensor.

The pulse wheel has 4 teeth. The ECM calculates the time interval from one tooth to the next and can decide exactly which cylinder must be supplied with fuel and ignition spark respectively.

Faults in the CMP sensor:

- The engine can still be started and driven in event of faults in the CMP sensor.
- The engine may need to be cranked for a long time before the ECM sends a spark to the correct cylinder and the engine starts.

Camshaft position sensor Operation		
	Sensor 1 (P0340-344), Sensor 2 (P0345-49)	*Monitor Strategy description*
DTCs	P0340: Signal error	Circuit
	P0342, P0343: Min, Max error	Circuit Low Input, Circuit High Input
	P0344: Plausibility error	Circuit Intermittent
	P0345: Signal error	Circuit
	P0347, P0348: Min, Max error	Circuit Low Input, Circuit High Input
	P0349: Plausibility error	Circuit Intermittent

Typical Camshaft position sensor enable conditions		
Enable condition	*Minimum*	*Maximum*
Clear fault path PH	TRUE	

Typical Camshaft position sensor system constant		
Enable condition	*Minimum*	*Maximum*
Detection of reversed rotation of the engine	TRUE	

Typical Camshaft position sensor malfunction thresholds	
Malfunction criteria	*Threshold value*
Sum of phase edges last 3 working cycles	> 11 and < 13
Number of camshaft sensor signal slopes permanently low	≥ 4

Mass Air Flow Meter (MAF)

Mass Air Flow Meter (MAF)

The mass air flow (MAF) sensor supplies the engine control module (ECM) with a signal describing the intake air mass.

This information is for instance used to:
- Regulate fuel/air conditions
- Regulate emission
- Calculate torque.

The MAF sensor consists of a plastic housing containing a connector, electronic circuitry and an aluminum heat sink. The MAF sensor measuring device is a heated film mounted in a pipe which is cooled by the intake air to the engine.

The heated film consists of four resistors. The MAF sensor is supplied with battery voltage and has separate power and signal ground points. The sensor signal varies from **0 V to 5 V**, depending on the air mass. Voltage increases with air flow.

The ECM will adopt substitute (limp home) values if the MAF sensor signal is missing or faulty.

The MAF sensor is located between the air cleaner cover and the intake air hose.

MAF meter operation		
	Mass Air Flow	*Monitor Strategy description*
DTCs	P0102: Max error	Circuit low input
	P0103: Min error	Circuit high input

Typical MAF enable conditions		
Enable condition	*Minimum*	*Maximum*
Time after engine start	0.40 s	
Throttle potentiometer fault	FALSE	

Typical MAF malfunction thresholds	
Malfunction criteria	*Threshold value*
Unfiltered MAF sensor value (min error)	< -38.1 kg/h
Unfiltered MAF sensor value (max error)	> 940.0 kg/h

Engine Coolant Temperature Sensor

Engine Coolant Temperature Sensor

The engine coolant temperature (ECT) sensor transmits a signal to the engine control module (ECM) describing the temperature of the engine coolant. This gives the ECT sensor a measurement of engine temperature and influences the control of:

- Injection period
- Idling speed
- Engine coolant fan (FC)
- Ignition timing
- On-board diagnostic (OBD) functions.

The sensor incorporates a temperature-sensitive resistance with a negative temperature coefficient (NTC). The sensor is supplied with a stabilized voltage of **5 V** from ECM.

The voltage across the sensor is a function of engine temperature and, therefore, of sensor resistance. Voltage can be between **0 V and 5 V**.

The ECM uses substitute values if the signal from the ECT sensor is missing or faulty, however, substitute values can cause starting problems in very cold weather.

The sensor is mounted in the thermostat housing.

Engine coolant temperature operation		
DTCs	Engine Coolant Temperature	Monitor Strategy description
	P0116: Plausibility error	Circuit Range/Performance
	P0117: Max error	Circuit low input
	P0118: Min error	Circuit high input
	P0125: Signal	Insufficient Coolant Temp. for Closed Loop Fuel Control

Mode $06 Data

Mode $06 Data

Request On-board Monitoring Test Results For Specific Monitored Systems

The purpose of this service is to allow access to the results for on-board diagnostic monitoring tests of specific components / systems that are continuously monitored (e.g. mis-fire monitoring) and non-continuously monitored (e.g. catalyst system).

The request message for test values includes an On-Board Diagnostic Monitor ID (see below) that indicates the information requested.

The latest test values (results) are to be retained, even over multiple ignition OFF cycles, until replaced by more recent test values (results). Test values (results) are requested by On-Board Diagnostic Monitor ID. Test values (results) are always reported with the Minimum and Maximum Test Limits. The Unit and Scaling ID included in the response message defines the scaling and unit to be used by the external test equipment to display the test values (results), Minimum Test Limit, and Maximum Test Limit information.

If an On-Board Diagnostic Monitor has not been completed at least once since Clear/reset emission-related diagnostic information or battery disconnect, then the parameters Test Value (Results), Minimum Test Limit, and Maximum Test Limit shall be set to zero ($00) values.

The diagnostic communication for external Scan Tools follows ISO 15765-4.

Monitor ID	Test ID	Description	DTCs
01	83	Front O2 sensor slow response.	P0133
	84	Difference between front and rear oxygen sensors.	P2096/P2097
02	81	O2 sensor Bank 1 Sensor 2 max. sensor voltage of oscillation check	P0140
	82	O2 sensor Bank 1 Sensor 2 mimimum sensor voltage of oscillation check	P0140
	83	02 for sensor diagnosis Bank 1 Sensor 2 sensor voltage of fuel cut-off	P0140
05*	83	Front O2 sensor Bank 2 slow response	P0153
	84	Difference between front and rear oxygen sensors Bank 2	P2098/P2099
06*	81	O2 sensor Bank 2 Sensor 2 max. sensor voltage of oscillation check	P0160
	82	O2 sensor Bank 2 Sensor 2 mimimum sensor voltage of oscillation check	P0160
	83	02 for sensor diagnosis Bank 2 Sensor 2 sensor voltage of fuel cut-off	P0160
21	80	Catalyst monitor Bank 1	P0420
22*	80	Catalyst monitor Bank 2	P0430
3B	81	1.0mm leak check (tank leak diagnosis)	P0442
3C	81	0.5mm leak check (tank leak diagnosis)	P0442
3D	80	CPV-Diagnosis	P0496/P0497
	83	CPV-Diagnosis	P0496/P0497
	86	TEV-Diagnosis	P0496/P0497
	8B	Component Check	P2407
	8C	AAV-Diagnosis	P2404
	8D	Component Check	P2406/P2405

* Only for 6 cyl engines

Monitor ID	Test ID	Description	DTCs
41	85	Bank1 Sensor1 heater power	P0053
42	81	O2 sensor Bank 1 Sensor 2, resistance of ceramic	P0141
45*	85	Bank2 Sensor1 heater power	P0059
46	81	O2 sensor Bank 2 Sensor 2, resistance of ceramic	P0161
81	80	Fuel System Monitor Bank 1 (Additive correction of the mixture adaptation)	P2187/P2188
	82	Fuel System Monitor Bank 1 (Multiplicative correction of the mixture adaptation)	P2177/P2178
82*	80	Fuel System Monitor Bank 2 - Additive correction of the mixture adaptation	P2189/P2190
	82	Fuel System Monitor Bank 2 - Multiplicative correction of the mixture adaptation	P2179/P2180
A2	0B	Misfire counts for complete driving cycle (Cylinder 1)	P0300/P0301
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0301
A3	0B	Misfire counts for complete driving cycle (Cylinder 2)	P0300/P0302
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0302
A4	0B	Misfire counts for complete driving cycle (Cylinder 3)	P0300/P0303
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0303
A5	0B	Misfire counts for complete driving cycle (Cylinder 4)	P0300/P0304
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0304
A6	0B	Misfire counts for complete driving cycle (Cylinder 5)	P0300/P0305
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0305
A7	0B	Misfire counts for complete driving cycle	P0300/P0306
	AC	Exponential weighted moving average of the misfire counts for the last 10 driving cycles	P0300/P0306

* Only for 6 cyl engines

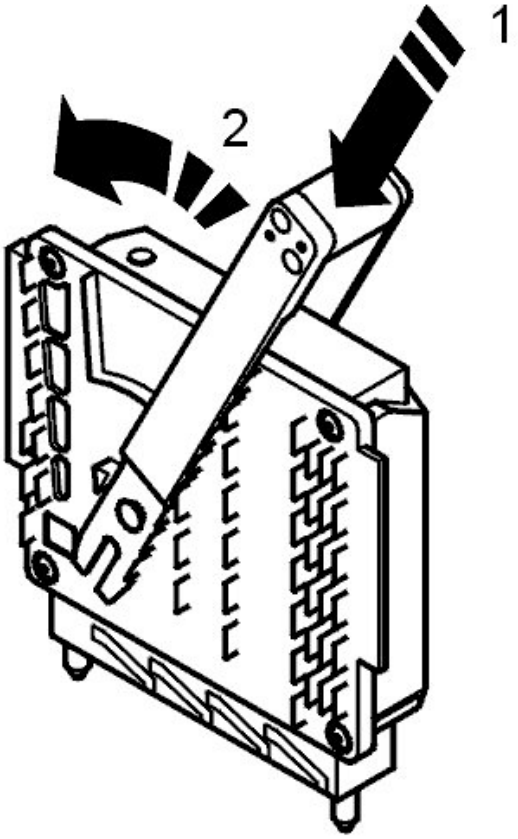
Connecting the Breakout Box

Connecting the breakout box

Special tools:

951 1504 Adapter 120 pin See: Tools and Equipment/951 1504 Adapter 120 Pin
951 1428 Breakout box See: Tools and Equipment/951 1428 Breakout Box
951 1499 Cable See: Tools and Equipment/951 1499 Cable
999 5722 Wrench See: Tools and Equipment/999 5722 Wrench

Removing the control module

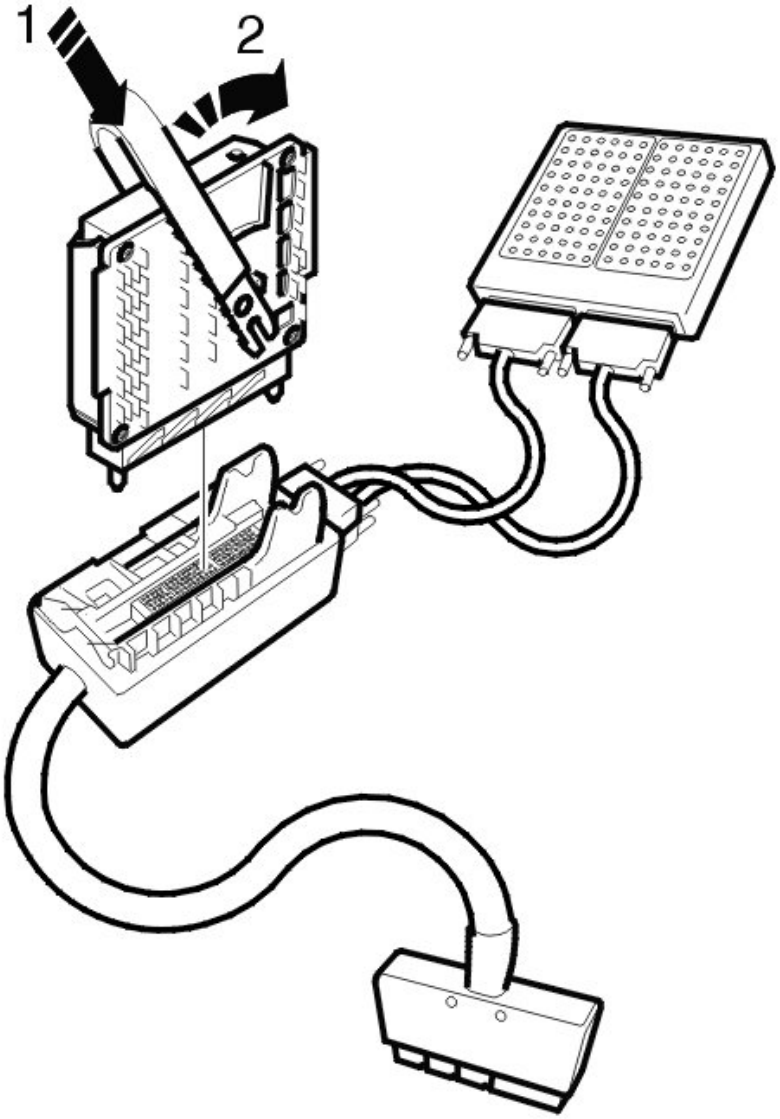


- Wait 2 minutes after the ignition has been switched off. The main relay must be voltage free**before**the control module is removed from the car. If the engine cooling fan (FC) runs on after the ignition has been switched off, wait until it stops and then wait for a further 2 minutes
- Remove the cover over the control module box. Put the cover to one side.

Note! Do not touch the control module terminal pins with your fingers. Static electricity may damage components in the control module.

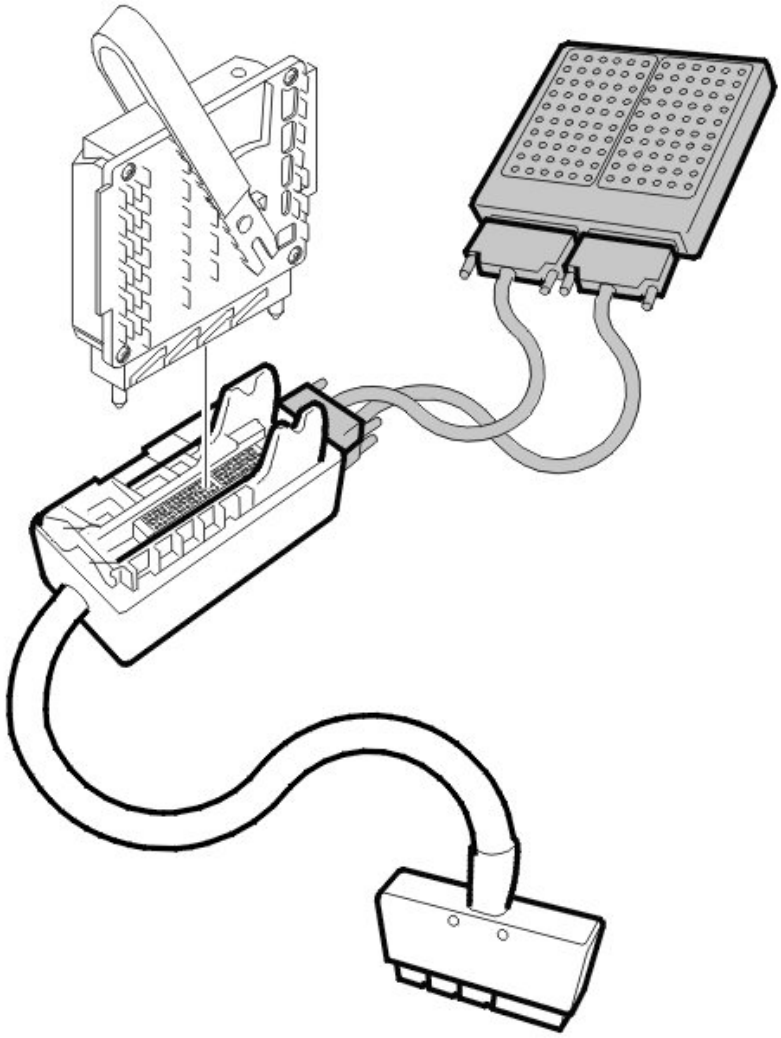
- Insert tool999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module
- Move the upper section of the tool backwards as far as it will go. Pull up the tool
- Carefully pull up the control module.

Connecting the adapter



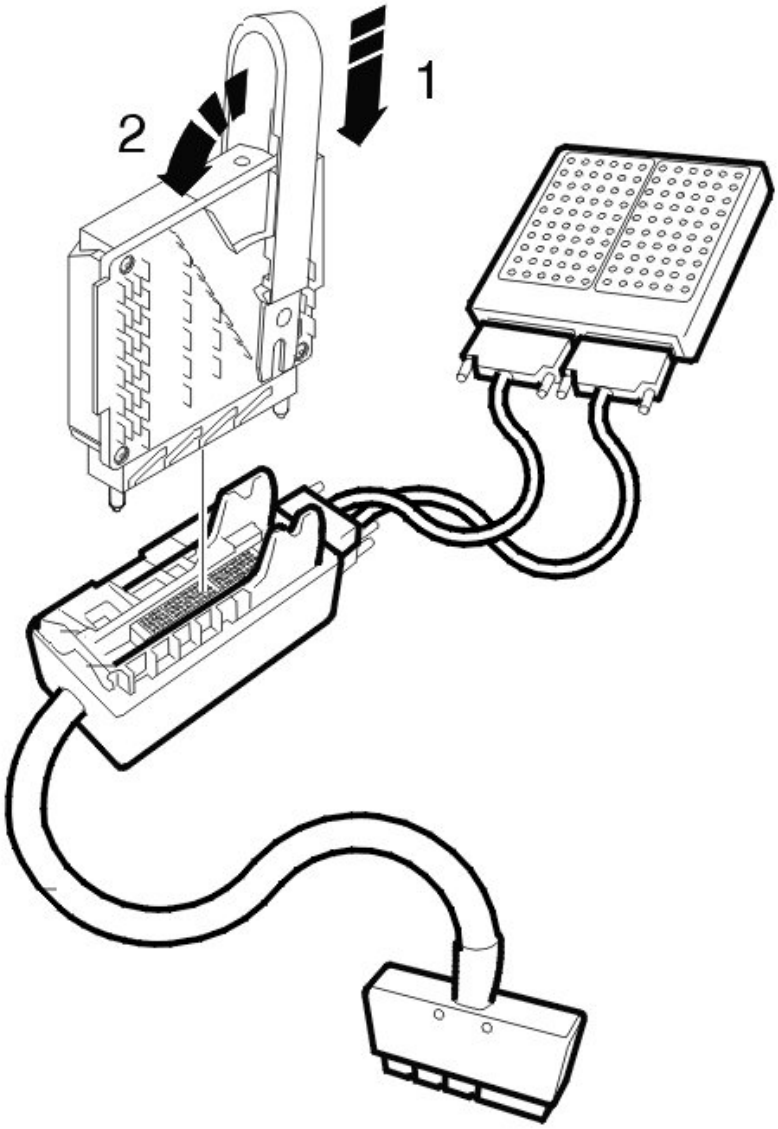
- Check that no pins or sockets are damaged on the connector
- Gently press adapter951 1504 Adapter 120 pin See: Tools and Equipment/951 1504 Adapter 120 Pin down into the grooves inside the control module box. Press to the limit position!
- Insert tool999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the adapter
- Move the upper section of the tool forwards as far as it will go. Pull the tool up.

Connecting the breakout box



- Check the control module and control module connectors to ensure that the male and female terminals are undamaged and secure (cannot be pressed in). Check that the cables to the female terminals are secured to the terminal pins
- Connect adapter951 1504 Adapter 120 pin See: Tools and Equipment/951 1504 Adapter 120 Pin to the control module connector (wiring side). Connect breakout box951 1428 Breakout box See: Tools and Equipment/951 1428 Breakout Box to the adapter via wiring951 1499 Cable See: Tools and Equipment/951 1499 Cable
- The breakout box is designed to facilitate reading off the control module input and output signals when the control module is connected; and the cable and component resistance when the control module is disconnected. The use of a breakout box reduces the risk of accidental short-circuits and damage to the connector pins.

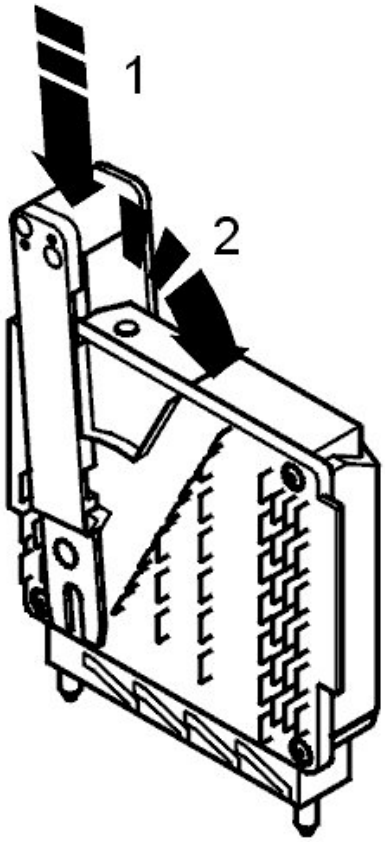
Removing the adapter



- Wait 2 minutes after the ignition has been switched off. The main relay must be voltage free**before**removing the control module from the car. If the engine cooling fan (FC) runs on after the ignition has been switched off, wait until it stops and then wait for a further 2 minutes
  Note! Do not touch the control module terminal pins with your fingers. Static electricity may damage components in the control module.

- Insert tool999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the adapter
- Move the upper section of the tool backwards as far as it will go. Pull up the tool
- Carefully pull up the adapter.

Installing the control module

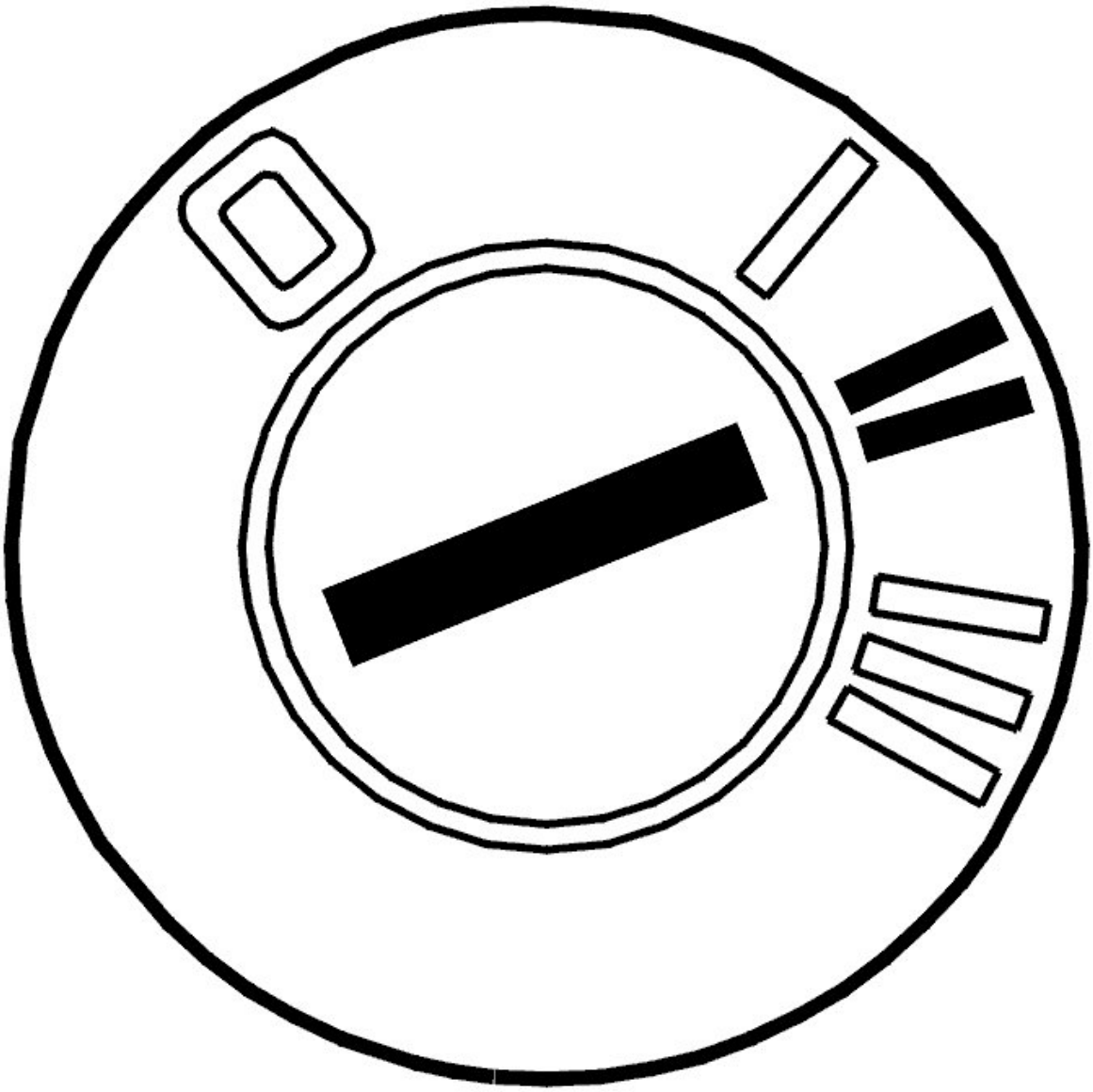


- Check that no pins or sockets are damaged on the connector
- Gently press the control module down into the grooves inside the control module box. Press to the limit position!
- Insert tool999 5722 Wrench See: Tools and Equipment/999 5722 Wrench around the control module
- Move the upper section of the tool forwards as far as it will go. Pull the tool up
- Press the cover into place over the control modules
- Check that the air ducts are correctly positioned.

Reading Off Parameters, Digital Display

Reading off parameters, digital display

Parameter, digital display



- Ignition on.

Activate reading off of the parameters: Click on the VCT2000 symbol.
Description of parameters, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Parameters

Continue - **DONE**

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:
- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.

- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging

- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information

- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.

1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - digital display

2 - Checking communication faults

3 - **FAILED**

Checking communication faults

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives

1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000

the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

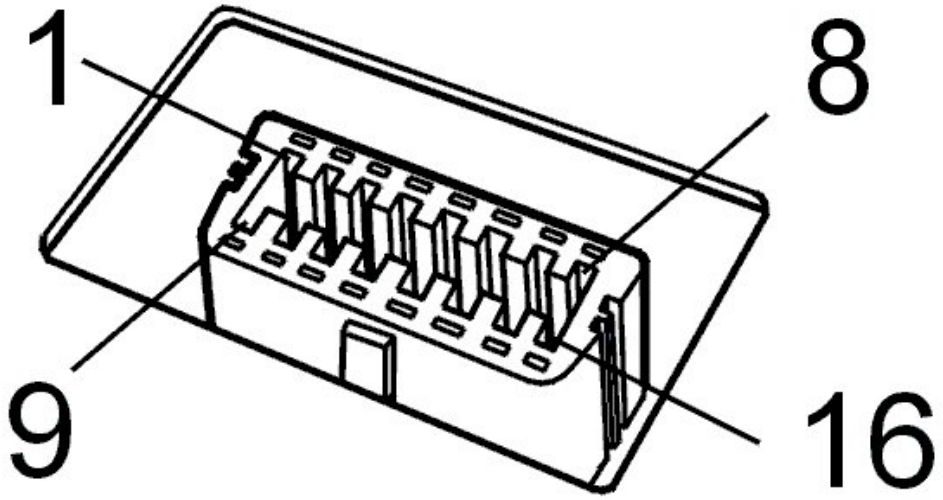
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.

- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".

If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:

- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:

- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

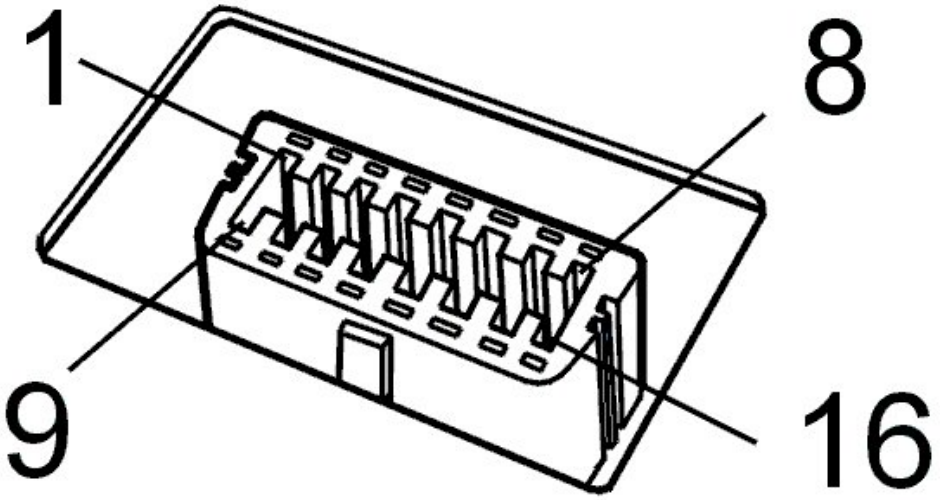
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates

a malfunction.

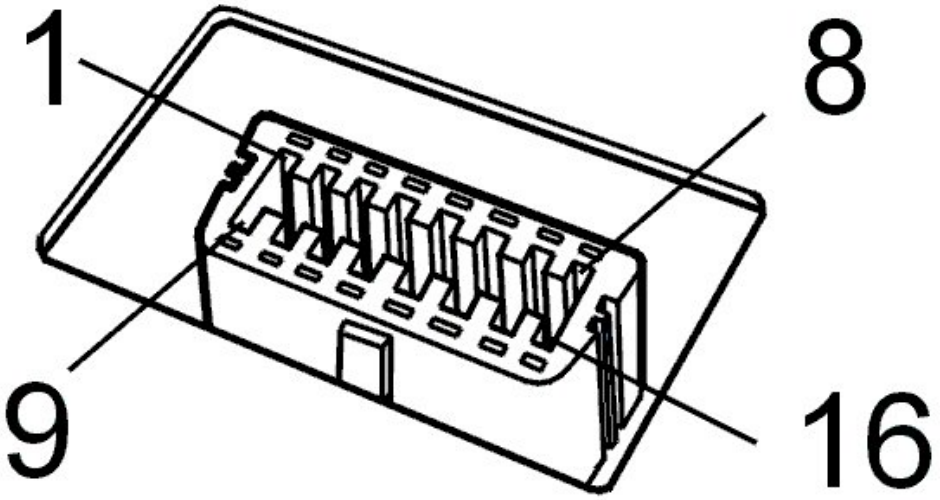
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

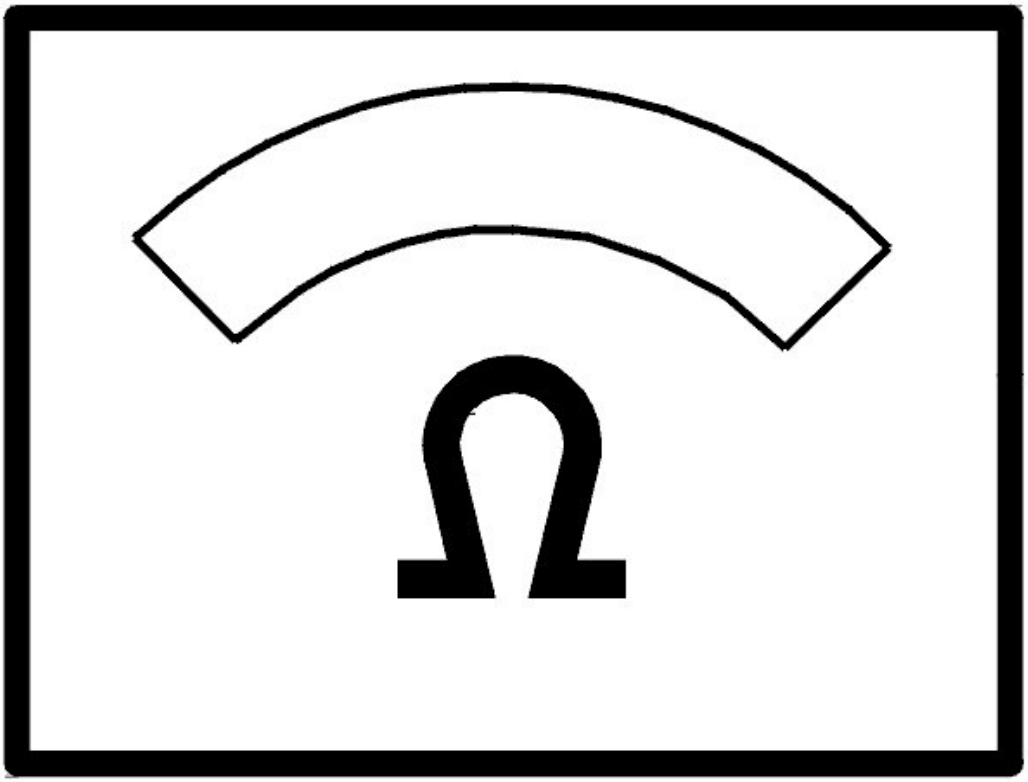
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line

- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)

- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)

- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness

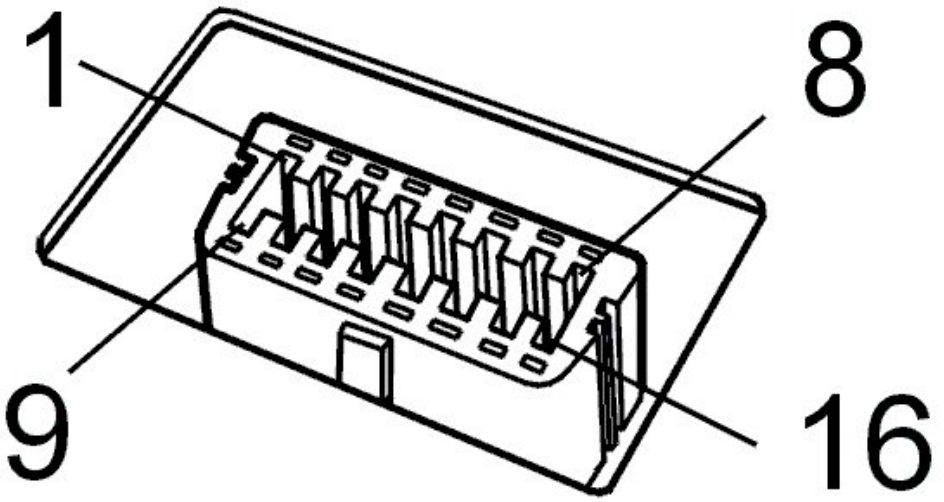
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

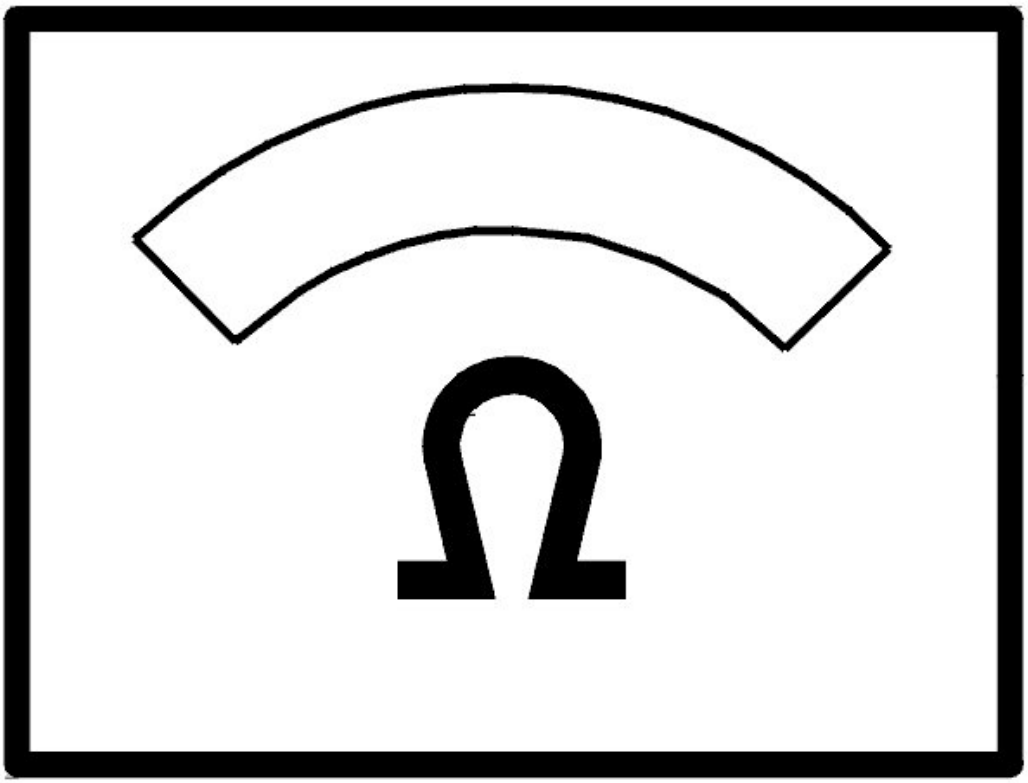
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

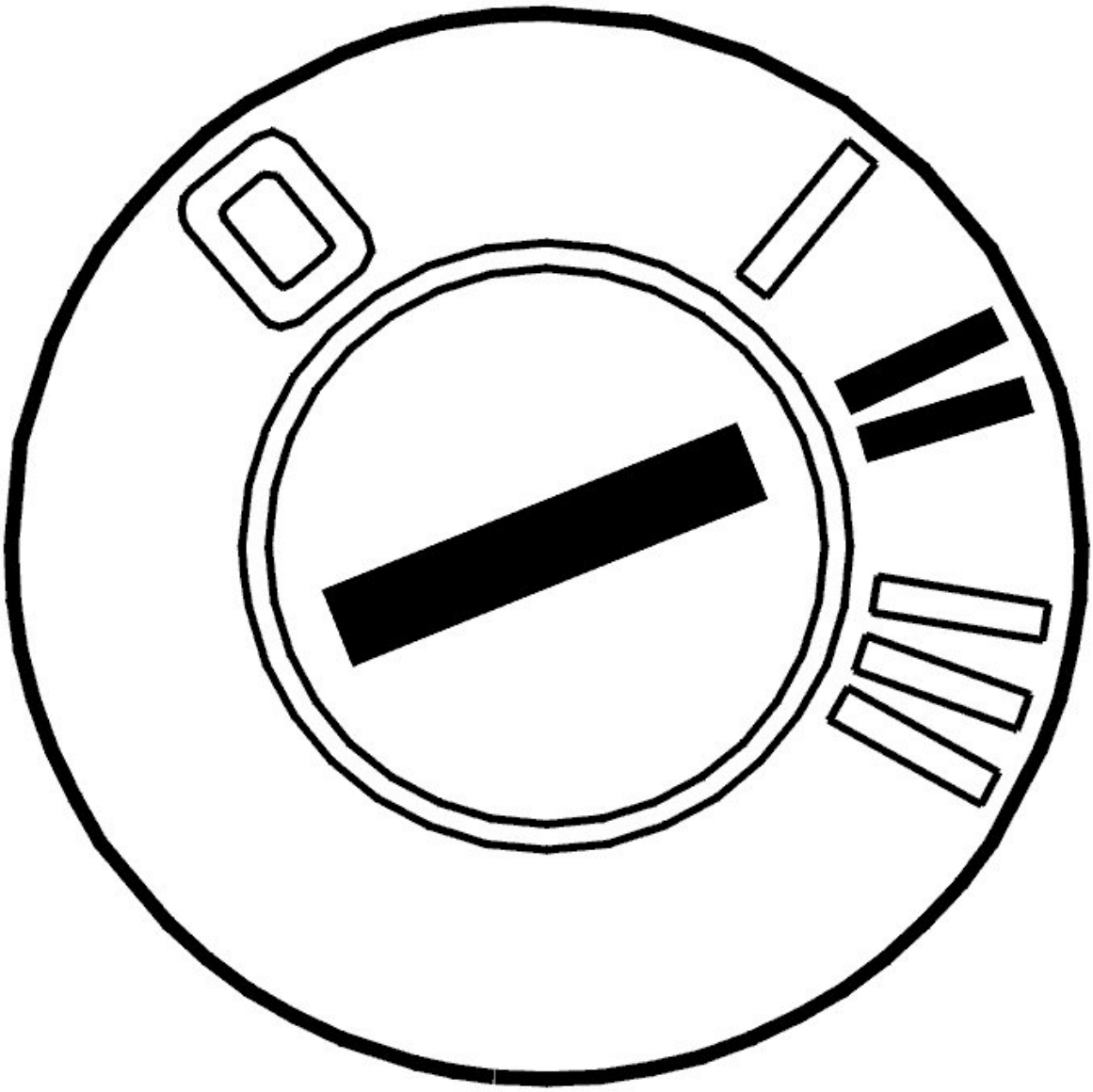
YES - digital display

NO - FAILED

Reading Off Parameters, Graphical Display

Reading off parameters, graphic display

Parameter, graphic display



- Ignition on.

Activate reading off of the parameters: Click on the VCT2000 symbol.
Description of parameters, B5244T5, B5254T2 See: Scan Tool Testing and Procedures/Vehicle Communication Information, Engine Control Module (ECM)/Description of Parameters

Continue - **DONE**

Numeric Result 0 - Communication fault

Communication fault

Communication has been interrupted for one of the following reasons:
- The ignition is switched off
- VCT2000 disconnected from the data link connector (DLC)
- VCT2000 disconnected from the VIDA cart
- Communication problems in VIDA application or in car.
- No voltage in the data link connector (DLC).

Check therefore:

- That the control module power supply and ground terminal are fault-free.
- That the fuse for the data link connector (DLC) is intact.
- that the ignition is on
- that the battery voltage (system voltage) is normal (approximately 12 V).

If necessary a battery charger can be connected during the test.
For information about charge currents and the battery, see: Battery, charging See: Starting and Charging/Battery/Service Precautions/Technician Safety Information/Battery, Charging

- that VCT2000 is correctly connected to the VIDA cart and the data link connector (DLC)
- that VCT2000 and the wiring is fault-free.

Other information

- For information about fuse and terminal numbers, see the relevant Wiring Diagram.

Try to establish communication again or exit reading off diagnostic trouble codes (DTCs). Depending on the communication fault, select one of the following options.

1. Try again
2. Fault-trace more comprehensively for the communication problem that has occurred
3. Exit fault-tracing / Read off from the next system.

Which alternative is requested?

1 - graphic display

2 - Checking communication faults

3 - **FAILED**

Checking communication faults

Checking communication errors

Selecting car model

Select car model to obtain relevant troubleshooting information.

Select one of the following model alternatives

1. S40 (04-) / V50.
2. V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90.
3. V70 (-00), V70 XC and S70 / C70.
4. S40 (-04)/ V40.

1 - car model S40 (04-) / V50

2 - car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

3 - car model V70 (-00), V70 XC and S70 / C70

4 - Checking communication errors car model S40 (-04) / V40

Checking communication errors, car model S40 (04-) / V50

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.

- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B11/ #B12 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B16/#B15 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

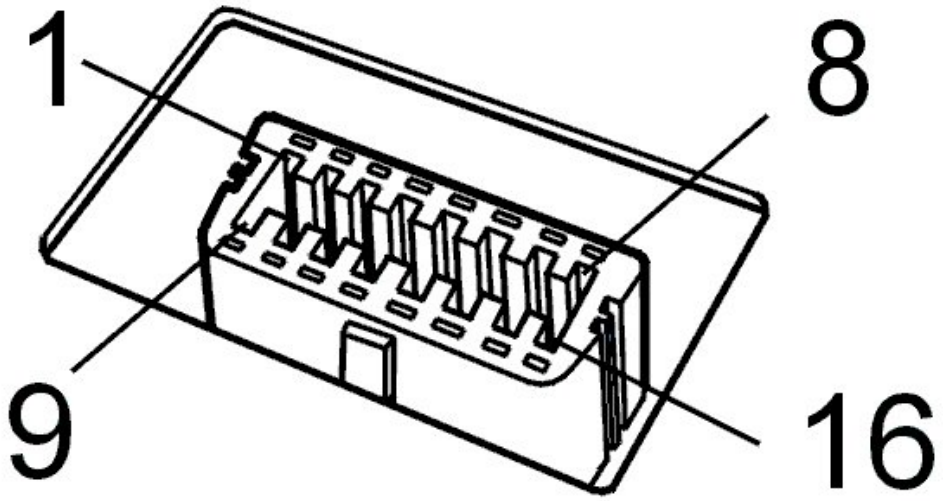
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (00-), V70 XC (01-) / XC70, S60, S80 and XC90

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Different speed on the CAN-communication can lead to problems

Volvo's vehicles have different speed of communication on the high-speed part of the CAN-network (HS-CAN), depending on model year.

- Model year -2004 communicates with 250 kbit/s.
- Model year 2005- communicates with 500 kbit/s.

Due to this, it is very important to specify correct vehicle profile before any communication is started with the vehicle's HS-CAN. This is normally done by pressing on " Retrieve VIN" or by manually specifying vehicle parameters under "Vehicle profile".
If the wrong model year has been selected, it may lead to blocking of the CAN-net, diagnostic trouble codes being stored in several control modules or missing response from control modules at continued communication. The following control modules may be affected by this problem:

- Brake control module (BCM)/(ABS)
- Engine control module (ECM)
- Electronic Throttle Module (ETM)
- Suspension Module (SUM)
- Central electronic module (CEM)
- Transmission control module (TCM)
- Steering wheel angle sensor module (SAS)
- Steering Wheel Module (SWM)
- Electrical Power Steering Module (EPS)

If this happens, take the following action:

- Turn off the ignition and remove the ignition key. Insert the key again in position II.
- If the above does not work, remove the battery cable and connect it again after a minute to reset the control modules.
- Select the correct vehicle profile in VIDA and erase the diagnostic trouble codes. Check that the symptoms have disappeared.

Diagnostic outlet

- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables

- Check the communication cable (k-line) between diagnostic outlet #7 and central electronic module (CEM) #D6 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on either the low or high-speed network. First when communication takes place on this cable, the low and high-speed cables between the diagnostic outlet and central electronic module (CEM) are connected to the rest of the network in the vehicle. This is controlled via a relay in the central electronic module (CEM). This relay is only found on vehicles of model year -2004.

- For communication problems with control units on**the high-speed network**, check communication cables between diagnostic outlet #6/ #14 and central electronic module (CEM) #B7/ #B8 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- For communication problems with control units on**the low-speed network**, check communication cables between diagnostic outlet #3/#11 and central electronic module (CEM) #B19/#B20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the low and high-speed net between the central electronic module (CEM) and the other connected control modules according to troubleshooting above.

Control modules

- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! If none of the above checks help, try reading out diagnostic trouble codes in the central electronic module (CEM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the car is that the central electronic module (CEM) is active and can be communicated with. If communication is not possible with the central electronic module (CEM), check the voltage feed and ground for the central electronic module (CEM).

VCT2000 and cable harness

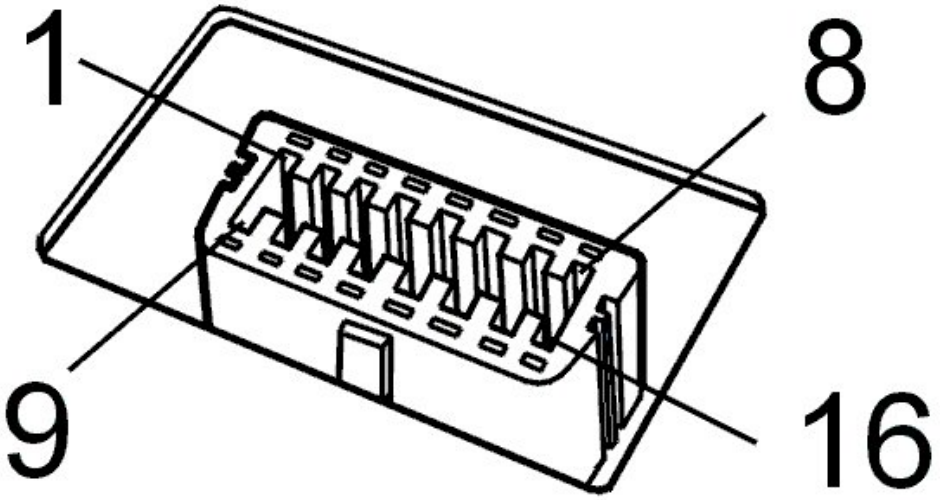
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals



Continue - Fault Found

Checking communication errors, car model V70 (-00), V70 XC and S70/C70

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables
- Check the communication cable (k-line) between diagnostic outlet #7 and the driver information module (DIM) #B4 and other connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Caution! In case of malfunction on this communication cable, communication cannot be established on the high-speed network. First when communication takes place on this cable, the high-speed cables between the diagnostic outlet and driver information module (DIM) are connected to the high-speed network in the vehicle. This is controlled via a relay in the driver information module (DIM).

- Check communication cables between diagnostic outlet #6/#14 and the driver information module (DIM) #A19/#A20 for open circuit, short-circuit to ground and short-circuit to voltage according to references above.
- Also check the communication cables for the**high-speed network**between the driver information module (DIM) and the other connected control modules according to troubleshooting above.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Communication cable for engine management system Fenix 5.2
- Check the communication cable between diagnostic outlet #3 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

Caution! Model year 99- and control modules on the CAN-network. If none of the above checks help, try reading out diagnostic trouble codes in the driver information module (DIM). Done via VIDA vehicle communication. A prerequisite for being able to communicate with the control modules in the vehicle is that the driver information module (DIM) is active and can be communicated with. If communication is not possible with the driver information module (DIM), check the voltage feed and ground for the control module.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates

a malfunction.

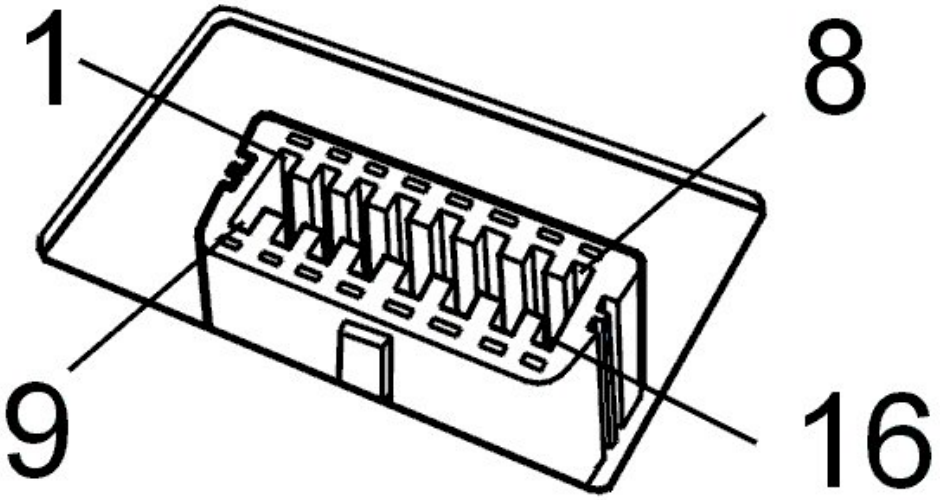
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

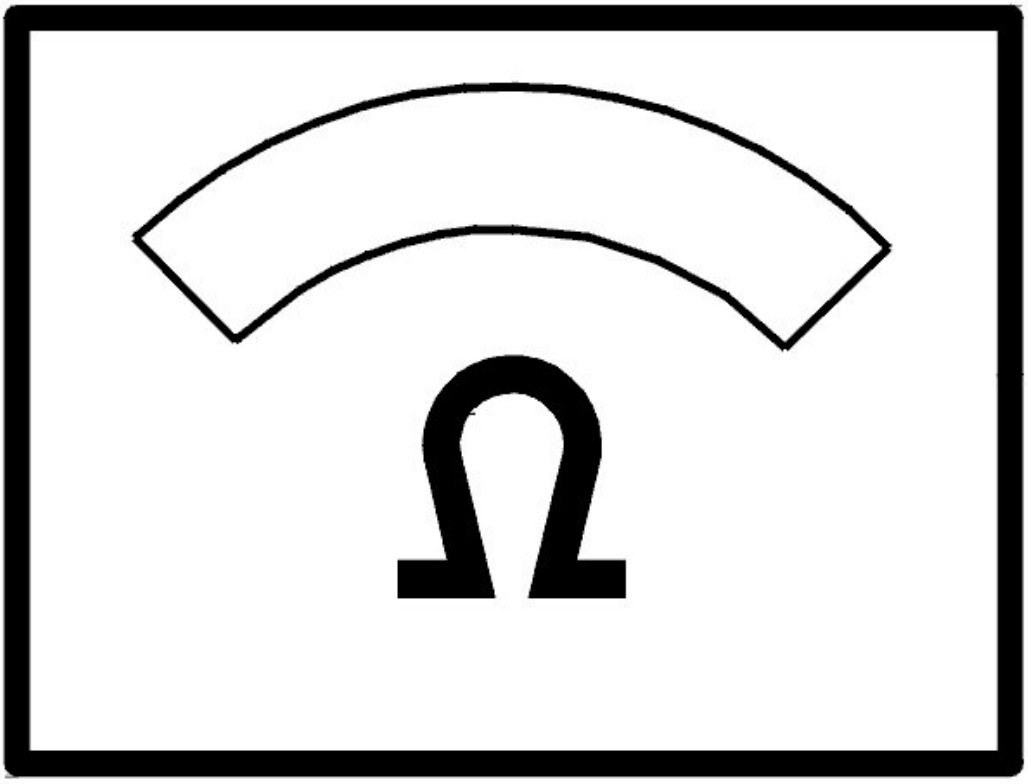
VIDA

- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information

- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

Checking communication errors car model S40 (-04) / V40

Hint: Test the communication with another corresponding vehicle to decide if the malfunction is in the vehicle or in VIDA/VCT/cable harness. If the communication works on another vehicle, the malfunction is in the vehicle.

Hint: For current information about each circuit and signals, see wiring diagram and signal description for each system.

Diagnostic outlet
- Check the voltage feed to diagnostic outlet #16. The voltage shall match battery voltage.
- Check the cable for power ground and signal ground to diagnostic outlet #4 and #5.

Hint: When VCT2000 is connected to the diagnostic outlet (is supplied with voltage), the indicator diode shall be activated with a green light. Then the indicator diode flashes quickly when communication takes place with a control module. In case of certain internal malfunctions on VCT2000 the indicator diode is activated with a red light!

Communication cables k-line
- Check the communication cables between diagnostic outlet #7 and connected control modules for open circuit, short-circuit to ground and short-circuit to voltage.

Communication cable for cruise control as own system (not integrated)
- Check the communication cable between diagnostic outlet #13 and cruise control for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

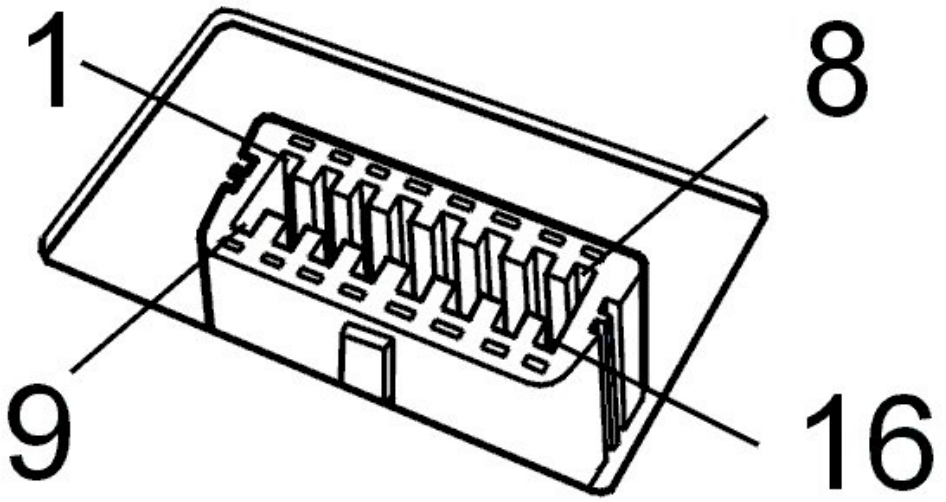
Communication cable for engine management system Fenix 5.1 and diesel (not Lucas)
- Check the communication cables between diagnostic outlet #11/#15 and engine control module (ECM) for open circuit, short-circuit to ground and short-circuit to voltage according to references above.

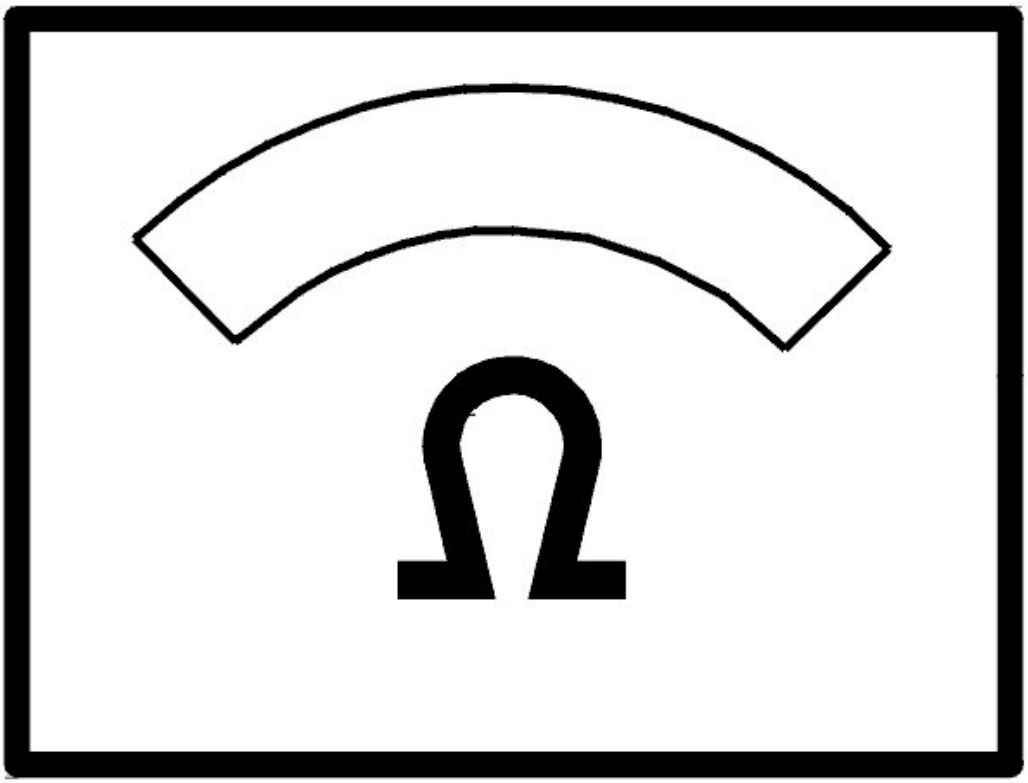
Control modules
- Check that the control module's voltage feed and ground connection are trouble-free.

VCT2000 and cable harness
- Connect VCT2000 to the vehicle so that it is supplied with voltage. Test VCT2000 by selecting the system's self-test and VCT Test in the VIDA main menu. If any malfunction is found according to the test, first replace the cable harness then the VCT2000, if the test still indicates a malfunction.
- If no malfunctions were found after troubleshooting according to above, try with a new cable harness and/or new VCT2000.

VIDA
- If no malfunctions were found after troubleshooting according to above, try performing a complete system reset of VIDA.

Other information
- Checking wiring and terminals See: Testing and Inspection/Component Tests and General Diagnostics/Checking Wiring and Terminals/Checking Wiring And Terminals





Continue - Fault Found

FAULT FOUND - Fault-tracing information

Fault-tracing information

Fault-tracing communication problems is now finished.

Do you want to try establishing communication again?

Yes - YES

No - NO

YES - graphic display

NO - FAILED

Signal Description / Specification

Signal specification

Volvo XC70 L5-2.5L Turbo VIN 59 B5254T2

General

All values given below are between the terminals stated in column 2 (Control module terminal) and breakout box terminal #B3 unless otherwise indicated in column 6 (Miscellaneous). Control module terminals #A1-#A70 correspond to terminals #A1-#B10 on the breakout box, terminals #B1-#B50 correspond to #B11 - #B60 on the breakout box.

Note! It is important to connect the breakout box and check the ground terminals before taking readings.

Hint: If the numbering of the connector is different from the numbering on the breakout box, the connector number is given first, terminal #A61, followed by the breakout box number in brackets, (#B1). Example: #A61 (#B1).

U=	DC voltage in volts (V)	U_{AC} =	AC voltage in volts (V)
U_{bat} =	Battery voltage (V)	f =	Frequency in Hertz (Hz)
U_{low} =	Voltage approximately 0 V	% duty =	Duty cycle (pulse ratio) as a percentage (%)
t =	Time in milliseconds (ms)	I =	Current in amperes (A)

Connector A

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#A1	#A1	Throttle unit signal, potentiometer 1 (circuit 1)	U≈ 0.4 - 4 V	-	The voltage varies depending on the position of the throttle. U increases with throttle opening.
#A2	#A2	Fuel pressure sensor signal	-	350 - 400 kPa (absolute pressure) U=1.8-2 V	The voltage increases with increased fuel pressure.
#A3	#A3	Fuel temperature sensor signal	-	U≈ 0.5 V- 4.5 V	The voltage falls with increased fuel temperature. The fuel temperature sensor is integrated in the fuel pressure sensor.
#A4	#A4	Engine coolant temperature (ECT) sensor signal	-	(+30°C) U=1.22 V (+80°C) U = 0.29 V (+100°C) U = 0.17 V	
#A5	#A5	Intake air temperature (IAT) sensor signal	-	(+20°C) U = 3.50 V (+30°C) U = 3.00 V (+40°C) U = 2.50 V	The intake air temperature (IAT) sensor is integrated in the boost pressure sensor.
#A6	#A6	Control signal, rear heated oxygen sensor (HO2S) preheating	$U=U_{bat}$	Preheating off: $U = U_{bat}$ Preheating on $U=U_{low}$	
#A7	#A7	Engine cooling fan (FC) control signal	Pulse width modulation (PWM) signal U_{high} at least 70% of U_{bat} U_{low} = 1.2 V f = 100 Hz Pulse ratio = 10-95%		
#A8	#A8	-	-	-	
#A9	#A9	Control signal, canister purge (CP) valve	$U=U_{bat}$	-	PWM signal during activation of the canister purge (CP) valve
#A10	#A10	-	-	-	
#A11	#A11	-	-	-	
#A12	#A12	-	-	-	
#A13	#A13	Control signal, intake camshaft reset valve	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ f=250 Hz (±12.5 Hz) Pulse ratio 20-95%	The pulse ratio governs control of the camshaft
#A14	#A14	Injector no. 5 control signal	$U=U_{bat}$	t= 2-3 ms	t increases with engine speed (RPM) and load
#A15	#A15	Injector no. 3 control signal	$U=U_{bat}$	t= 2-3 ms	t increases with engine speed (RPM) and load
#A16	#A16	Injector no. 1 control signal	$U=U_{bat}$	t= 2-3 ms	t increases with engine speed (RPM) and load
#A17	#A17	Power supply	$U=U_{bat}$	-	Supplied via the system relay
#A18	#A18	Control signal, front heated oxygen sensor (HO2S) preheating	$U=U_{bat}$	Preheating off: $U = U_{bat}$ Preheating on $U=U_{low}$	

#A19	#A19	Signal ground, throttle unit, potentiometers 1 and 2	$U=U_{low}$	-	
#A20	#A20	Throttle unit signal, potentiometer 2 (circuit 2)	U≈ 4-0.4 V	-	The voltage varies depending on the position of the throttle. U decreases with increasing throttle opening.
#A21	#A21	Exhaust camshaft reset valve control signal	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ f=250 Hz (±12.5 Hz) Pulse ratio 20-95%	The pulse ratio governs control of the camshaft
#A22	#A22	Mass air flow (MAF) sensor signal	U = 1 V	U = 1.7 V	U increases with increasing air mass
#A23	#A23	Boost pressure sensor signal	U = 1.96 V	-	U increases with increasing boost pressure.
#A24	#A24	Front heated oxygen sensor (HO2S), pump current	-	-	Pulsed current supply, not measured
#A25	#A25	-	-	-	
#A26	#A26	Oil pressure switch signal	$U=U_{low}$	$U=U_{bat}$	
#A27	#A27	Signal camshaft position (CMP) sensor 2, exhaust camshaft	U =5 V	U = Pulsed signal U_{top}=5 V U_{offset}=2.5V	The frequency varies according to engine speed (RPM)
#A28	#A28	Front heated oxygen sensor (HO2S), calibration current	-	-	Not measured
#A29	#A29	Power supply, 5 V camshaft position (CMP) sensor	U =5 V	-	
#A30	#A30	Control signal ignition coil C, cylinder 4	$U=U_{low}$	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A31	#A31	Control signal ignition coil B, cylinder 2	$U=U_{low}$	U=2.5 V t_{high}=2.5 ms	The frequency varies according to engine speed (RPM)
#A32	#A32	-	-	-	
#A33	#A33	Injector no. 4 control signal	$U=U_{bat}$	t_{low}=2-3 ms	t increases with engine speed (RPM) and load
#A34	#A34	Injector no. 2 control signal	$U=U_{bat}$	t_{low}=2-3 ms	t increases with engine speed (RPM) and load
#A35	#A35	Control signal (+) damper motor for the throttle unit	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ Pulse ratio 0-100% The polarity of the control signal changes when the damper motor is deployed against the direction of rotation.	The damper motor is controlled using a pulse width modulation (PWM) signal from the integrated power stage in the engine control module (ECM) measured to terminal #A36 (#A36)

#A36	#A36	Control signal (-) damper motor for the throttle unit	-	Pulse width modulation (PWM) signal $U_{top}=U_{bat}$ Pulse ratio 0-100% The polarity of the control signal changes when the damper motor is deployed against the direction of rotation.	The damper motor is controlled using a pulse width modulation (PWM) signal from the integrated power stage in the engine control module (ECM) measured to terminal #A35 (#A35)
#A37	#A37	-	-	-	
#A38	#A38	Turbocharger (TC) control valve control signal	$U=U_{bat}$	-	During turbocharger (TC) control: Pulse width modulation (PWM) signal f = 32 Hz
#A39	#A39	Sensor, power supply 5 V	U =5 V		See the relevant wiring diagram for information about connected sensors
#A40	#A40	Oil level sensor	-	Pulse width modulation (PWM) signal U_{top}=5 V Pulse ratio 17-83% T=120 ms Pulse train with three pulses, then pause for 1.2 seconds. Pulse no. 1= oil temperature. Pulse no. 2= oil level. Pulse no. 3= oil grade. The pulse ratio for each pulse changes depending on the present: - oil temperature - oil level - oil grade.	The PWM signal is generated by the oil level sensor.
#A41	#A41	Signal (+), front heated oxygen sensor (HO2S)	-	-	Pulsed current signal, not measured
#A42	#A42	Signal (-), front heated oxygen sensor (HO2S)	-	-	Pulsed current signal, not measured
#A43	#A43	-	-	-	
#A44	#A44	-	-	-	
#A45	#A45	Signal (+), rear knock sensor (KS)	$U=U_{low}$	-	
#A46	#A46	Signal (+) front knock sensor (KS)	$U=U_{low}$	-	
#A47	#A47	Signal camshaft position (CMP) sensor 1, intake camshaft	U =5 V	U = Pulsed signal U_{top}=5 V U_{offset}= 2.5 V	The frequency varies according to engine speed (RPM)
#A48	#A48	Signal (+), flywheel sensor	U=2.5 V	U= sine wave voltage U_{top}=5 V U_{offset}=2.5V	Measured to terminal #A66 #B6) The frequency increases with engine speed (RPM)
#A49	#A49	-	-	-	
#A50	#A50	Control signal ignition coil A, cylinder 1	$U=U_{low}$	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)

#A51	#A51	Control signal ignition coil E, cylinder 3	$U=U_{low}$	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A52	#A52	Control signal ignition coil D, cylinder 5	$U=U_{low}$	U=2.5 V t_{high}=2 ms	The frequency varies according to engine speed (RPM)
#A53	#A53	Power ground 3	U_{low}	-	Ground terminal, connected to the chassis
#A54	#A54	Power ground 2	U_{low}	-	Ground terminal, connected to the chassis
#A55	#A55	Control modules communication cable (CAN L)	-	-	-
#A56	#A56	-	-	-	
#A57	#A57	-	-	-	
#A58	#A58	Signal ground, mass air flow (MAF) sensor	$U=U_{low}$	-	
#A59	#A59	Power supply 5 V throttle unit, potentiometers 1 and 2	U =5 V	-	
#A60	#A60	Sensor, signal ground	$U=U_{low}$	-	See the relevant wiring diagram for information about connected sensors
#B1	#A61	Signal (+), rear heated oxygen sensor (HO2S)	U≈0.50 V	Above 0.6 V or below 0.3 V	
#B2	#A62	Signal (-), rear heated oxygen sensor (HO2S)	$U=U_{low}$	$U=U_{low}$	
#B3	#A63	Signal ground	$U=U_{low}$	-	Ground terminal, connected to the chassis
#B4	#A64	Signal (-) front knock sensor (KS)	$U=U_{low}$	-	
#B5	#A65	Camshaft position (CMP) sensor signal ground	$U=U_{low}$	-	
#B6	#A66	Signal (-) flywheel sensor	U=2.5 V	U = sine wave voltage U_{top}=5 V U_{offset}=2.5V	Measured to terminal #A48 (#A48) The frequency increases with engine speed (RPM)
#B7	#A67	Signal (-) rear knock sensor (KS)	$U=U_{low}$	-	
#B8	#A68	Signal air conditioning (A/C) pressure sensor	U=0.9 V (at approximately 20 °C)	-	U increases with pressure in the air conditioning (A/C) system
#B9	#A69	-	-	-	
#B10	#A70	-	-	-	

Connector B

Breakout box terminal	Control module terminal	Signal type	Ignition on	Engine idling	Other
#B11	#B1	Control modules communication cable (CAN L)	-	-	-
#B12	#B2	-	-	-	
#B13	#B3	-	-	-	
#B14	#B4	Sensor, signal ground	$U=U_{low}$	-	See the relevant wiring diagram for information about connected sensors
#B15	#B5	Signal ground, accelerator pedal (AP) position sensor	$U=U_{low}$	-	
#B16	#B6	-	-	-	
#B17	#B7	Control signal, leak diagnostic unit, pump	Pump motor running: $U=U_{low}$ Pump motor not running: $U = U_{bat}$	-	
#B18	#B8	Signal, coolant level sensor	$U=U_{low}$	Low engine coolant level: $U = U_{bat}$ Normal engine coolant level: U = Ulow	
#B19	#B9	Power supply, 5 V accelerator pedal (AP) position sensor	U =5 V	-	
#B20	#B10	-	-	-	
#B21	#B11	30-supply (Power supply from the battery)	$U=U_{bat}$	$U=U_{bat}$	Ignition off: $U = U_{bat}$
#B22	#B12	-	-	-	
#B23	#B13	Control module communication cable (CAN H)	-	-	
#B24	#B14	-	-	-	
#B25	#B15	Clutch pedal sensor signal	Unaffected: U=3.3 V Fully depressed: 100mm U = 2.2 V	-	U varies depending on the position of the clutch pedal
#B26	#B16	-	-	-	
#B27	#B17	Signal, accelerator pedal (AP) position sensor	U = 0.4±0.1 V with unaffected accelerator pedal (AP) U=2.5-4.4 V = the accelerator pedal (AP) fully depressed On certain vehicles the accelerator pedal (AP) will be at the limit position before the signal reaches 4.4 V.	-	U varies depending on the position of the accelerator pedal (AP)
#B28	#B18	-	-	-	
#B29	#B19	-	-	-	

#B30	#B20	-	-	-	
#B31	#B21	-	-	-	
#B32	#B22	Diagnostic lead C-link	U=90% of U_{bat}	-	Other values apply if a generic fault-tracing instrument is connected to the data link connector (DLC)
#B33	#B23	Signal crank, 50-supply	U=U_{low}	U=U_{low}	At crank: U = U_{bat}
#B34	#B24	-	-	-	
#B35	#B25	Signal, accelerator pedal (AP) position sensor	U_{top}=12 V t = 4 ms pulse ratio=8%±2% with unaffected accelerator pedal (AP) and 50% - 90% with fully depressed accelerator pedal (AP) On certain vehicles the accelerator pedal (AP) will be at the limit before the signal reaches 90%.	-	Pulse width modulation (PWM) signal from the accelerator pedal (AP) position sensor to the engine control module (ECM)
#B36	#B26	Stop lamp switch signal	When the brake pedal is depressed: U = U_{bat} When the brake pedal is not depressed U=U_{low}	-	
#B37	#B27	-	-	-	
#B38	#B28	-	-	-	
#B39	#B29	Signal, outside temperature sensor	(0° C) U=2.92 V (+10° C) U=2.40V (+20° C) U=1.90 V (+30°C) U = 1.46 V	-	Temperature range: -40 to +30°C
#B40	#B30	-	-	-	
#B41	#B31	-	-	-	
#B42	#B32	-	-	-	
#B43	#B33	-	-	-	
#B44	#B34	Control signal, leak diagnostic unit, heater pad		-	Heating element activated: U = Ulow Heater pad not activated: U = Ubat
#B45	#B35	-	-	-	
#B46	#B36	-	-	-	
#B47	#B37	Signal, ignition on, 15-supply	U=U_{bat}	U=U_{bat}	Ignition off: U=U_{low}
#B48	#B38	System relay control signal	-	U=U_{low}	Relay activated: U=U_{low} Relay not activated: U = U_{bat} The system relay runs on (2-5 minutes)
#B49	#B39	-	-	-	
#B50	#B40	Control signal, leak diagnostic unit, valve	-	-	Valve activated: U = Ulow Valve not activated: U = Ubat
#B51	#B41	-	-	-	
#B52	#B42	-	-	-	
#B53	#B43	-	-	-	

#B54	#B44	Control signal, air conditioning (A/C) relay	-	-	Air conditioning (A/C) relay activated: $U=U_{low}$ Air conditioning (A/C) relay not activated: $U = U_{bat}$
#B55	#B45		-	-	
#B56	#B46	Malfunction indicator lamp (MIL) control signal	$U=U_{low}$	Not activated $U=U_{bat}$ Activated: $U=U_{low}$	
#B57	#B47	Control signal, fuel pump (FP) control module	-	PWM signal pulse ratio 35% (+/-5%) engine at operating temperature	Pulse width modulation (PWM) signal transmitted by the engine control module (ECM) to the fuel pump (FP) control module. The pulse ratio varies with the requested fuel pressure.
#B58	#B48	Control signal, engine cooling fan (FC), control modules	-	Not activated $U=U_{bat}$ Activated: $U=U_{low}$	The engine cooling fan (FC) is controlled by the engine control module (ECM).
#B59	#B49	-	-	-	
#B60	#B50	-	-	-	

Readiness Monitor (Certain Markets Only)

Readiness Monitor (certain markets only)

This is a function in Engine control module (ECM) that controls the control module's emission-related sub-system. With the function you can read out if the control module has run all diagnostics for the following sub-systems:

- Misfiring
- Fuel system
- Catalytic converter
- Evaporative emission (EVAP) system
- Heated oxygen sensors (HO2S)
- Other related components

Thus, Readiness refers only to if the diagnostics (tests) have been run or not, not if a malfunction was found or not. If a malfunction is found during the test, a diagnostic trouble code is stored and the malfunction light (MIL-light) is lit.
If the tests are run in the driving cycle without detecting a malfunction, then "Readiness" is immediately generated to OK.
However, if a malfunction is found in the driving cycle, then Readiness is generated to Not OK, and another driving cycle is required where the test is run to generate Readiness to OK.

The following alternatives are possible:

- Readiness is run (OK), no malfunction detected, which means that the vehicle can be approved in a check.
- Readiness is run (OK), with malfunction detected, which means that the vehicle cannot be approved in a check.
- Readiness is not run (Not OK), which means that the vehicle cannot be approved in a check.

Readiness was originally a requirement from the American authority, United States Environmental Protection Agency (EPA), and is used there for Inspection and maintenance test (IM-test) (corresponds to annual inspection). Depending on legal requirements, the function may also be found on other markets.

Generic Drive Cycle

Readiness Code Resetting Procedure (Generic Drive Cycle)

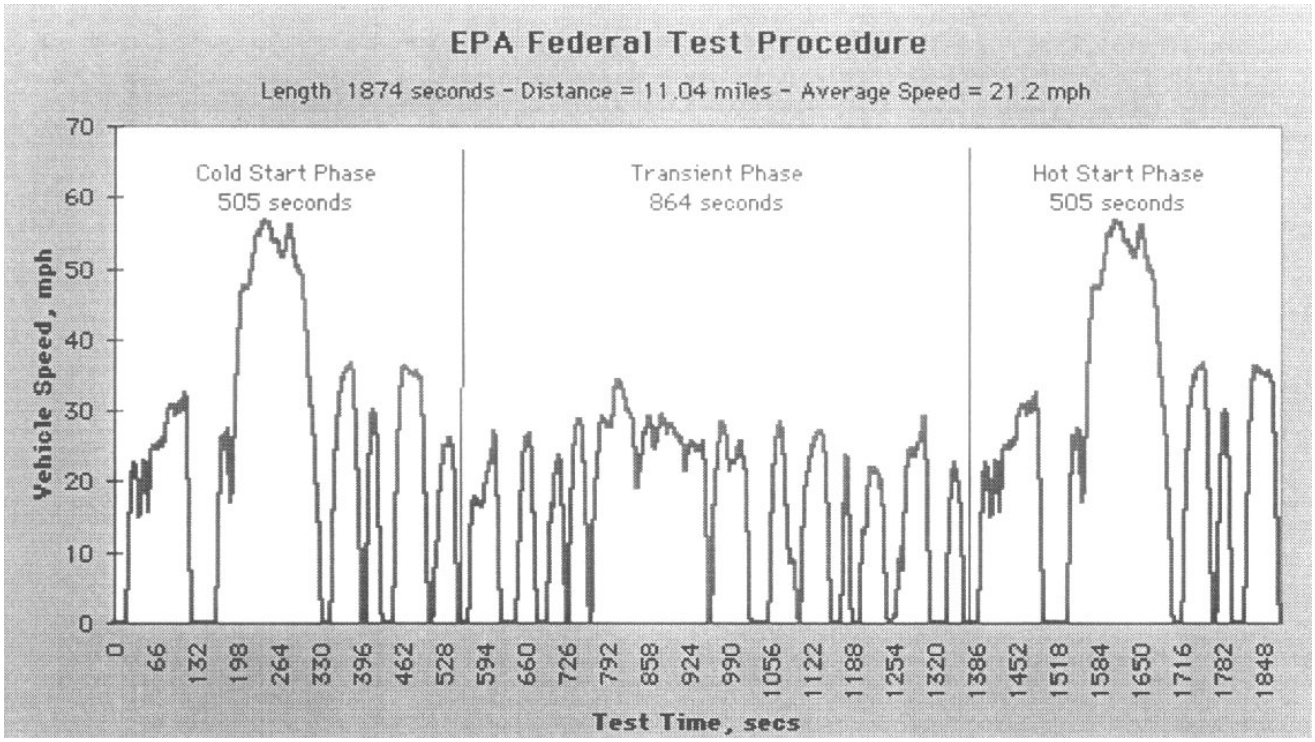
Readiness Monitors and Drive Cycles

"Readiness Monitors" are indicators that demonstrate whether or not emission system components are being monitored (checked) by the OBD-II system. If a monitor is set to "Ready" the monitor is checking its assigned component and, if no DTC's are present, the vehicle should pass an emissions test.

NOTE: If the appropriate number of Readiness Monitors (codes) are not flagged as "Ready", in most cases, the vehicle can not pass an emissions test. See State and Federal Laws.

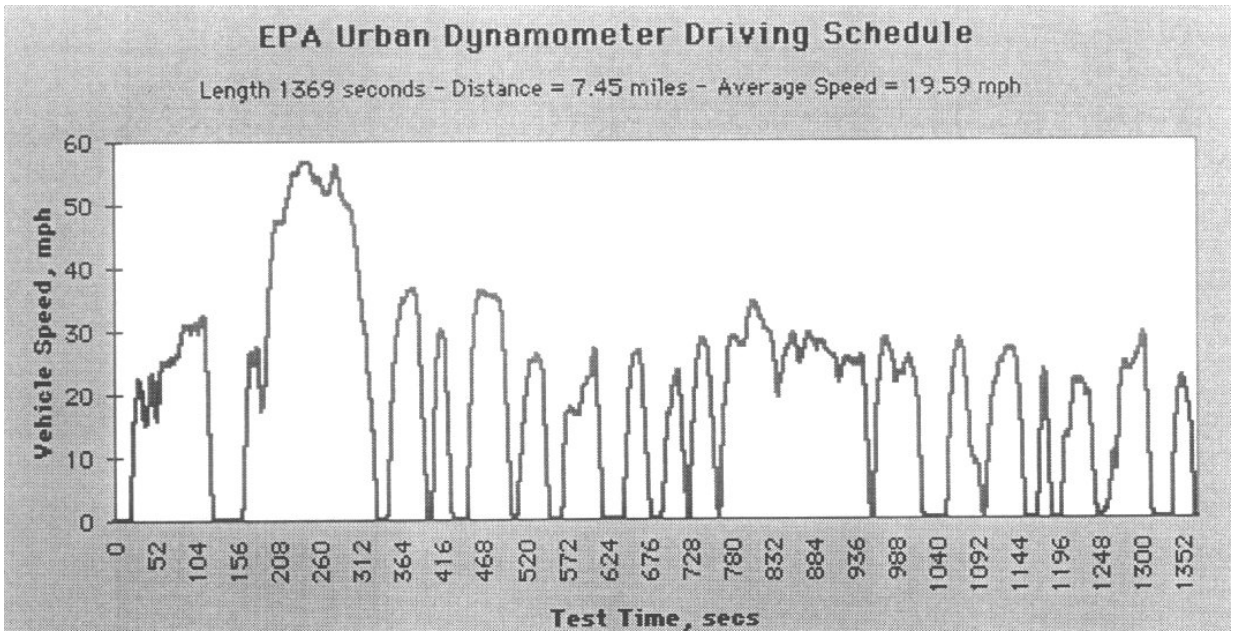
The status of all readiness monitors is reset to **"Not Ready"**:
Each time DTC's are cleared.
The battery is disconnected.
The ECM is disconnected.

The status of all readiness monitors is reset to **"Ready"**:
After DTC's are cleared and the appropriate drive cycle(s) is successfully completed.



EPA Federal Test Procedure

Manufacturers are required to validate monitors during the first 23 minutes (1372 seconds) of the Federal Test Procedure Drive Cycle.



EPA Urban Dynamometer Driving Schedule

Completing the Drive Cycle successfully one (1) time should reset most drive cycle monitors to a "Ready" status. However, there are "two trip" monitors, which require that the drive cycle be successfully completed two (2) times, to achieve a "Ready" status. Furthermore, systems which use averaging, may require the drive cycle to be completed more than 2 times.

Verify the status of the readiness monitors with the appropriate function of your scan tool.

NOTE: Certain vehicles have known OBD-II Readiness issues. Please be sure to review TSB's for special circumstances and or exceptions to readiness monitor resetting procedures.

Before Beginning the Drive Cycle

Check the status of the Readiness Monitors, check for DTC's, correct faults, clear DTC's before beginning the Drive Cycle.

Begin Drive Cycle

The vehicle should be driven approximately 7.5 miles within a period of approx. 23 minutes (1372 seconds) from a cold start. However, due to manufacture variations, it is necessary to perform only as much of the Drive Cycle as is necessary to reset the required monitors to a "Ready" status. Operate the throttle smoothly to obtain best results. **Do not shut the engine off** during the drive cycle.

CAUTION: Obey all traffic laws and drive in a safe manner!

NOTE: Extreme driving conditioning such as very high/low temperatures, rough roads and high altitudes may prevent some monitors from attaining a "Ready" status.

Step 1 **(Engine Cold)** Start engine, idle 20 seconds. Accelerate gradually and drive at 20-25 mph for 1 minute, varying speed.

Step 2 Accelerate gradually to 32 mph within 35 seconds. Decelerate to 0 mph in 10 seconds. Idle for 40 seconds.

Step 3 Accelerate at part throttle to 25 mph in 10 seconds. Cruise at 17-25 mph for 15 seconds. Accelerate gradually to 57 mph in 45 seconds. Cruise at 50-56 mph for 1 minute. Decelerate gradually to 0 mph in 40 seconds. Idle for 15 seconds.

Step 4 Accelerate at part throttle to 36 mph and maintain for 10 seconds. Decelerate to 0 mph in 15 seconds. Idle for 5 seconds.

Step 5 Accelerate to 30 mph and back to 0 mph within 30 seconds. Idle for 20 seconds.

Step 6 Accelerate to 36 mph in 20 seconds. Drive at 35 mph for 20 seconds. Decelerate to 0 mph in 15 seconds. Idle 5 seconds.

Step 7 Accelerate gradually to 26 mph and decelerate to 0 within 40 seconds. Idle 15 seconds.

Step 8 Accelerate to 27 mph in 40 seconds. Decelerate to 0 mph in 10 seconds. Idle 25 seconds.

Step 9 Accelerate to 26 mph in 15 seconds, maintain speed for 10 seconds, decelerate to 0 mph in 10 seconds. Idle 15 seconds.

Step 10 Accelerate to 23 mph in 20 seconds, decelerate to 0.5 mph in 10 seconds (no complete stop). Accelerate to 28 mph and back to 0 mph (momentary stop 1 second) within 35 seconds.

Step 11 Accelerate gradually to 34 mph in 45 seconds. Vary speed between 34 and 19 mph for 2 minutes. Decelerate from 25 to 0 mph in 25 seconds. Idle for 5 seconds.

Step 12 Accelerate to 29 mph in 15 seconds, decelerate gradually to 0 mph in 45 seconds. Idle for 30 seconds.

Step 13 Accelerate gradually to 28 mph and back to 0 mph (momentary stop 1 second) within 50 seconds. Accelerate gradually to 27 mph and back to 0 mph within 55 seconds. Idle for 15 seconds.

Step 14 Accelerate to 24 mph and back to 0 mph within 18 seconds. Idle for 10 seconds. Accelerate gradually to 22 mph and back to 0 mph within 50 seconds. Idle for 8 seconds.

Step 15 Accelerate gradually to 30 mph within 50 seconds. Decelerate to 0 mph in 10 seconds. Idle for 25 seconds.

Step 16 Accelerate to 23 mph and back to 0 mph within 30 seconds. Idle for 10 seconds.

Step 17 Repeat steps 1 - 16 once again. Recheck the status of the "Readiness Monitors".

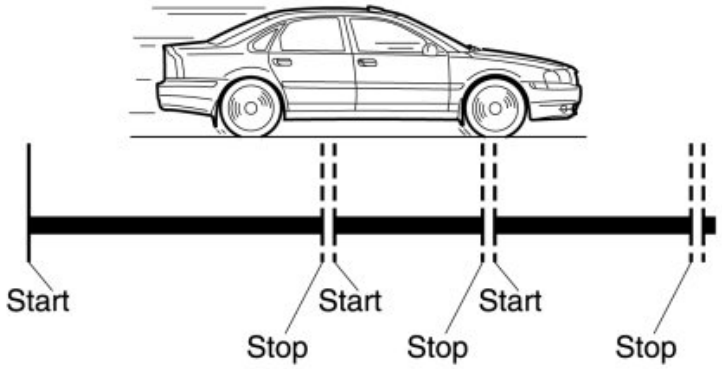
NOTE: Remember, clearing DTC's or interrupting power to the ECM after the readiness monitors have been reset to **"Ready"** will require that the Drive Cycle be repeated.

Completing the Drive Cycle successfully one (1) time should reset most drive cycle monitors to a "Ready" status. However, there are "two trip" monitors, which require that the drive cycle be successfully completed two (2) times, to achieve a "Ready" status. Furthermore, systems which use averaging, may require the drive cycle to be completed more than 2 times. It is necessary to perform only as much of the Drive Cycle as is necessary to reset the required monitors to a "Ready" status.

End Drive Cycle

Driving Cycle/Operation Cycle

Driving cycle/operation cycle



All control modules' diagnostics require that some form of driving cycle or operation cycle is run for diagnostics to be considered as complete. The terms driving cycle or operation cycle appear, these mean the same, they are only different designations.
Example

The illustration above shows an example of a driving cycle or operation cycle. The vehicle is started and driven **(Start)**, is stopped sometime and the ignition is turned off **(Stop)**. When the ignition is turned on again **(Start)** a new driving cycle starts.
A new driving cycle or operation cycle usually starts every time the ignition is turned on, which means that you should turn on the ignition, turn off the ignition, and then turn on the ignition again.
However, the condition varies from control module to control module, there are also, e.g., speed and temperature conditions, before a driving cycle or operation cycle is considered to be complete.
When a malfunction is detected and then is confirmed as a real malfunction and is stored, various counters are also stored, indicating how frequent the malfunction is. These counters use driving cycles or operation cycles as basis for updating the counters' values.
For information on counters, see further on in the document.

Readiness Code

Readiness Code

Read the readiness code

Read off diagnostic trouble codes (DTCs) and the readiness status.
If readiness is "OK" and no diagnostic trouble codes are stored, two cycles have run, i.e. the system's diagnostic functions have run two times without detecting a fault.

Hint: Readiness is reset (to "NOT OK") when the diagnostic trouble codes are cleared or if power is cut off to the engine control module (ECM).

US government information (US only)

The United States Environmental Protection Agency (EPA) has issued a guidance letter, "Performing Onboard Diagnostic System checks as Part of a Vehicle Inspection and Maintenance Program" (EPA420-R-01-015 June 2001), that incorporates various implementation issues associated with OBD-I/M testing. One being that the EPA has revised the readiness criteria to allow states to not reject MY 1996-2000 vehicles with two or fewer unset readiness codes, or MY 2001 and newer vehicles with no more than one unset readiness code. As mentioned herein this is suggested practice. Each individual state may abide by this guidance or enforce state regulations suited to their individual environmental needs. Please consult your State Department of Motor Vehicle for your current I/M testing regulations and procedures.

Select the appropriate remedy depending on this status:

1. If diagnostic trouble codes (DTCs) are stored
2. If readiness is "NOT OK".
3. If readiness is "OK" and no diagnostic trouble codes (DTCs) are stored.

1 - Diagnostic Trouble Code (DTC) stored

2 - Read the diagnostic status for readiness

3 - **DONE**

Read the diagnostic status for readiness

Read off the status of the diagnostic functions.

Select the appropriate remedy depending on this status:

1. Readiness for probe diagnostics, diagnostics for heated oxygen sensor (HO2S) preheating three-way catalytic converter (TWC) diagnostics "NOT READY".
2. Readiness for leak diagnostics "NOT READY".

Hint: The diagnostic for evaporative emission control is included in readiness for leak diagnostics.

1 - Carry out TRIP

2 - Quick test of the fuel tank system

Carry out TRIP

Perform a TRIP following Verifying repairs See: Monitors, Trips, Drive Cycles and Readiness Codes/Verifying Repairs so that the engine control module (ECM) executes a diagnosis for diagnostic functions.

Continue - Read the readiness code

Quick test of the fuel tank system

Run a quick test of the fuel tank system via the vehicle communication socket.
The engine must be run to operating temperature and then left idling for a few minutes before the diagnostic function for EVAP control can be run.

Select Continue

Continue - DONE

Diagnostic Trouble Code (DTC) stored

Fault-trace and remedy stored diagnostic trouble codes (DTCs).

Continue - ANOTHER TEST

Verifying Repairs

Verifying repairs

General

After carrying out repairs it may be necessary to check that the fault really has been remedied. One way of doing this is to check that the engine control module (ECM) has carried out a self diagnostic for the function / component that has been repaired, and that the diagnostic trouble code (DTC) has not recurred.
Verifying repairs is only intended as an aid if uncertain whether the fault persists or not. If an obvious fault is detected during fault-tracing it is not necessary to verify the repair.

Completing a TRIP

Check all diagnostic functions as follows.
To complete a TRIP as fast as possible follow a special driving schedule.

- If the engine control module (ECM) has been without power the engine must be started a few times before the test is carried out

- If the vehicle has been without power and misfire-related diagnostic trouble codes (DTCs) are being verified, a flywheel adaptation must be carried out before verification. See Misfire diagnostics under Design and Function.
- The test must take place on a road with little traffic where it is possible to drive slowly and stop at the side of the road
- The air conditioning (A/C) can be on when the engine is running at part load but must be switched off before the engine is run at idle speed
- For all diagnostics to be carried out, the engine coolant temperature (ECT) should not be above 25° C when the engine is started before the test
- Ensure that there are no diagnostic trouble codes (DTCs) stored in the system before carrying out verification
- Start the engine. Drive according to driving schedule.

Driving schedule:

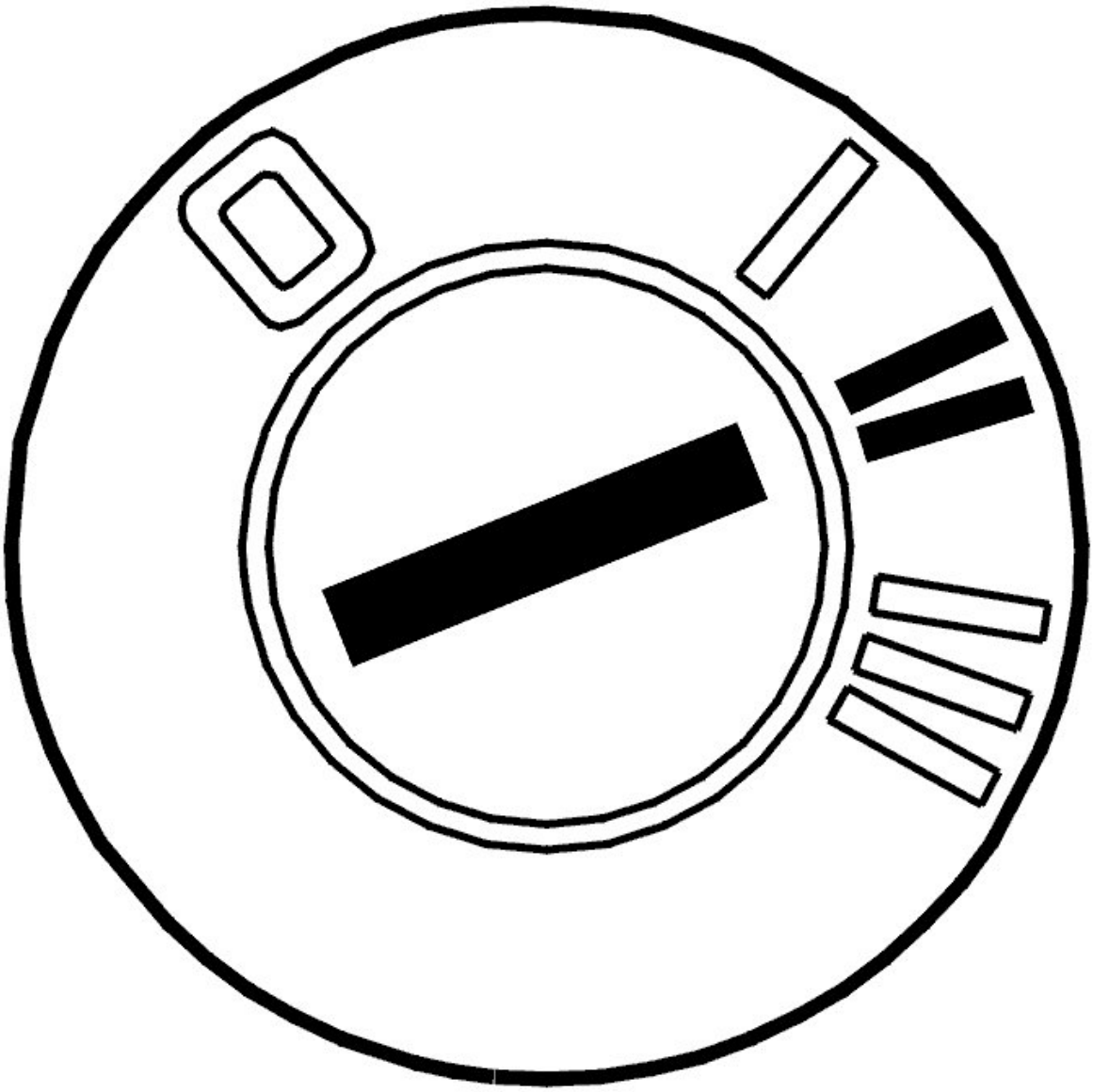
- Start the engine
- shift gear selector to drive
- accelerate gently to 1500-2000 rpm
- drive for 5 minutes at 1500-2000 rpm
- run the engine at idle speed for 70 seconds
- drive engaged, air conditioning (A/C) off
- drive for 6 minutes at 1500-2000 rpm
- run the engine at idle speed for 40 seconds
- drive engaged
- air conditioning (A/C) off
- drive for 5 minutes at 1500-2000 rpm
- run the engine at idle speed for 50 seconds
- drive for 5 minutes at 1500-2000 rpm
- Engine brake from 4000 rpm to approximately 1300 rpm a few times.

Note! Do not use the accelerator pedal (AP) during engine braking.

Adaptation of the Throttle Unit

Adaptation of the throttle unit

Checking diagnostic trouble codes (DTCs)



- Ignition on
- Read off diagnostic trouble codes (DTCs).

Check to see if any diagnostic trouble codes (DTCs) are stored. Any other diagnostic trouble codes (DTCs) may mean that adaptation of the engine control module (ECM) is not possible.

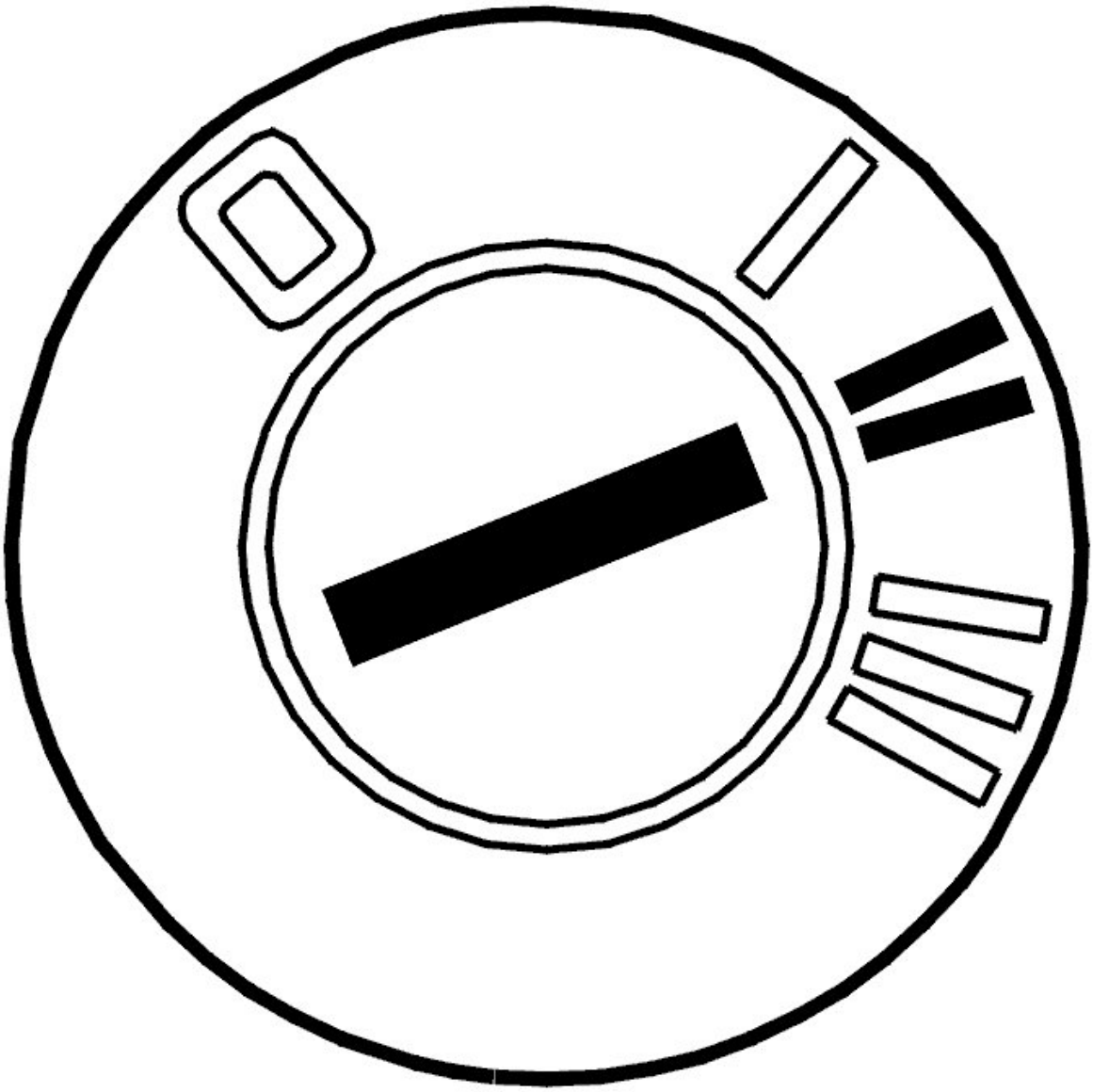
Are other diagnostic trouble codes (DTC) stored?

Yes - Fault-tracing information

No - Adaptation of the throttle unit

Adaptation of the throttle unit

Note! The ignition must be switched on for at least 30 seconds after the basic conditions are met in order for the adaptation to start. It takes approximately 10 seconds to run the adaptation.



- Ignition off
- Ignition on
- Read off the parameters.

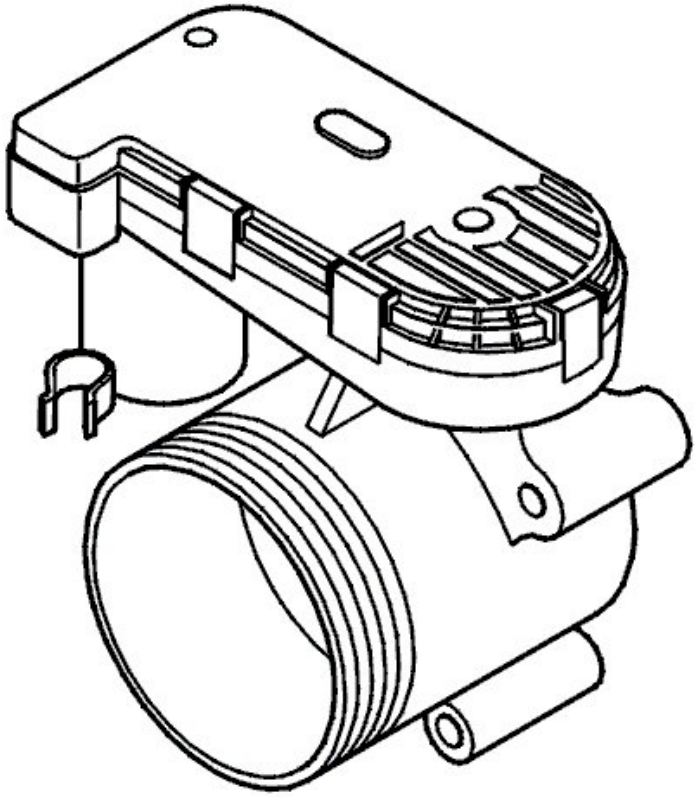
Check that the following basic conditions for adaptation of the throttle unit are met.

1. Ignition on / engine off
2. Battery voltage above 10 V
3. Accelerator pedal (AP) unaffected
4. The car must be stationary (no vehicle speed signal)
5. Engine coolant temperature (ECT) between 5-100 °C
6. Intake air temperature (IAT) above 5 °C.

Remedy as necessary.

Check that the adaptation is correctly run after the "Adaptation of the throttle unit running" parameter changes status from "YES" to "NO". When all basic conditions are met, the adaptation must be completed after approximately 40 seconds. When the adaptation is completed correctly, the following information will be displayed:

- Adaptation of the throttle unit: OK
- Adaptation of the throttle unit running: NO.



Continue - DONE

Fault-tracing information

Remedy stored diagnostic trouble code(s) (DTCs).
Remedy as necessary.

Continue - DONE

Downloading Software and Replacing the Control Module

Downloading software and replacing the control module

New software can be downloaded into the engine control module (ECM). When ordering software, the hardware and the software in the car is compared to the information in the Volvo central database. If the comparison is OK the software is downloaded to the control module. If the comparison between the car and Volvo central database is not OK, the database is updated with the car configuration. When this is complete the software is downloaded. For further information regarding downloading, see Design and Function, Downloading Software.
The engine control module (ECM) is positioned in the cool box in the engine compartment.
The engine control module (ECM) contains a unique code for each car for the immobilizer. The central electronic module (CEM) checks this code at engine start up. The engine will not start if the central electronic module (CEM) detects an incorrect code for the immobilizer. This means that the engine control module (ECM) cannot be switched from car to car.
The engine control module (ECM) must first be "unlocked" using a unique PIN for each car before it can be programmed with a code for the immobilizer. When the engine control module (ECM) has approved the PIN, the code for the immobilizer can be programmed.
The PIN and the code for the immobilizer are obtained from the Volvo central database and sent out with the software package when software for downloading has been ordered.
All new engine control modules (ECM) have the same PIN which is preprogrammed by the control module supplier. After the engine control module (ECM) has been programmed successfully the original PIN for the car will be programmed in the engine control module (ECM) memory and replace the preprogrammed PIN code.

Identifying Upgraded Software ECM/ETM

Identifying upgraded software ECM/ETM

Upgraded software for the engine control module (ECM) and electronic throttle module (ETM), available during 2006 or later, can be identified. The updated software has the **diagnostic number/software number** as set out in the table below. The diagnostic number/software number can be

read using VIDA/DIAGNOSTICS/NETWORK.
USA/Canada market
All markets except USA/Canada

Caution! For the USA/Canada market, with turbocharged and 6-cylinder normally aspirated engines the software of the engine control module (ECM) can be identified using the software number or diagnostic number, depending on the version of the software involved.

The differences between the **first version**, which is identified by the software number, and the **second version**, which is identified by the diagnostic number, include the following:

- Improved driveability after engine control module (ECM) reset. The start values for some system adaptations are adjusted to facilitate handling of aged/worn systems/components after diagnostic trouble code deletion or when the control module has been without power.
- Increased hardiness to certain combinations of aging/wear in the system. The work areas for some adaptations are adjusted to better match the aging of certain components.
- Supplements as to which faults are to generate a message to the driver.
- Improved serviceability (diagnostic trouble code generation) for some intermittent faults that generate driveability problems.

The diagnostic number (also known as diagnostic version in VIDA) and the software number can be read out via VIDA/DIAGNOSTICS/NETWORK. The electronic throttle module (ETM) is identified solely by the diagnostic number.
If the diagnostic number/software number is within the following series, it is the **latest** software downloaded:

- **5-cyl non-turbo engines B5244SG/B5244SG2 (Bifuel)**, (all markets excluding USA/Canada): Engine control module (ECM) diagnostic number 31219965 - 31219968 or 30788502 and Electronic throttle module (ETM) diagnostic number 30785387.
- **Other 5-cyl non-turbo engines**, (all markets): Engine control module (ECM) diagnostic number 30785129 - 30785132 or 30785667 and electronic throttle module (ETM) 30785387.
- **Turbocharged and 6-cylinder normally aspirated engines** (USA/Canada market):

First version, engine control module (ECM) **software number** 30785203 - 30785240 and electronic throttle module (ETM) diagnostic number 30785388.
Second version, engine control module (ECM) **diagnostic number** 30785372 - 30785378 and electronic throttle module (ETM) diagnostic number 30785388.

- **Turbo engines and 6-cylinder non-turbo engines**, (all markets except the USA/Canada market): Engine control module (ECM) software number 30785372 - 30785378 and electronic throttle module (ETM) diagnostic number 30785388.

USA/Canada market

Turbo engines and 6 cyl non turbo engines ECM (Bosch)/ETM (Magneti Marelli)
Note! The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.

Model	Diagnostic number/software number

S70/V70 (-00)/V70 XC (-00)/C70 (-05)	• **ETM, 1999- :**
	  ○ 30785388 (diagnostic number)
	• **ECM, 1999:**
	  ○ 30785205 (software number)
	  ○ 30785206 (software number)
	  ○ 30785207 (software number)
	  ○ 30785208 (software number)
	  ○ 30785209 (software number)
	  ○ 30785372 (diagnostic number)
	• **ECM, 2000:**
	  ○ 30785212 (software number)
	  ○ 30785213 (software number)
	  ○ 30785214 (software number)
	  ○ 30785215 (software number)
	  ○ 30785216 (software number)
	  ○ 30785217 (software number)
	  ○ 30785218 (software number)
	  ○ 30785221 (software number)
	  ○ 30785222 (software number)
	  ○ 30785223 (software number)
	  ○ 30785224 (software number)
	• **ECM, 2000- :**
	  ○ 30785373 (diagnostic number)
	• **ECM, 2001:**
	  ○ 30785235 (software number)
	  ○ 30785236 (software number)
	  ○ 30785237 (software number)
	• **ECM, 2002:**
	  ○ 30785238 (software number)
	  ○ 30785239 (software number)
	  ○ 30785240 (software number)

S60/V70 (00-)/V70 XC/ XC70 (01-)/S80 (-06)	• **ETM, 1999- :**
	  ○ 30785388 (diagnostic number)
	
	5 cyl turbo engines:
	• **ECM, -2000:**
	  ○ 30785225 (software number)
	  ○ 30785226 (software number)
	  ○ 30785227 (software number)
	  ○ 30785228 (software number)
	  ○ 30785375 (diagnostic number)
	
	• **ECM, 2000- :**
	  ○ 30785229 (software number)
	  ○ 30785230 (software number)
	  ○ 30785231 (software number)
	  ○ 30785232 (software number)
	  ○ 30785376 (diagnostic number)
	
	6 cyl engines:
	• **ECM, 1999:**
	  ○ 30785203 (software number)
	  ○ 30785204 (software number)
	  ○ 30785210 (software number)
	  ○ 30785211 (software number)
	  ○ 30785377 (diagnostic number)
	
	• **ECM, 2000:**
	  ○ 30785219 (software number)
	  ○ 30785220 (software number)
	  ○ 30785378 (diagnostic number)
	
	• **ECM, 2000- :**
	  ○ 30785233 (software number)
	  ○ 30785234 (software number)

5 cyl non turbo engines ECM (Denso) /ETM (Magneti Marelli) **Note!** The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.	
Model	Diagnostic number

S70/V70 (-00)/C70 (-05)	• **ETM, 1999- :**
	  ○ 30785387 (diagnostic number)
	
	• **ECM, 1999:**
	  ○ 30785131 (diagnostic number)
	
	• **ECM, 2000- :**
	  ○ 30785132 (diagnostic number)

S60/V70 (00-)/S80 (-06)	• **ETM, 1999- :**
	  ○ 30785387 (diagnostic number)
	
	• **ECM, 1999-2000:**
	  ○ 30785667 (diagnostic number)
	
	• **ECM, 2001 :**
	  ○ 30785129 (diagnostic number)
	
	• **ECM, 2002 :**
	  ○ 30785130 (diagnostic number)

All markets except USA/Canada

Turbo engines and 6 cyl non turbo engines ECM (Bosch)/ETM (Magneti Marelli) **Note!** The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.	
Model	Diagnostic number

S70/V70 (-00)/V70 XC (-00)/C70 (-05)	• **ETM, 1999- :**
	  ○ 30785388 (diagnostic number)
	• **ECM, 1999:**
	  ○ 30785372 (diagnostic number)
	• **ECM, 2000- :**
	  ○ 30785373 (diagnostic number)

S60/V70 (00-)/V70 XC/ XC70 (01-)/S80 (-06)	• **ETM, 1999- :**
	  ○ 30785388 (diagnostic number)
	5 cyl turbo engines:
	• **ECM, 1999:**
	  ○ 30785374 (diagnostic number)
	• **ECM, 2000:**
	  ○ 30785375 (diagnostic number)
	• **ECM 2000- :**
	  ○ 30785376 (diagnostic number)
	6 cyl engines:
	• **ECM, 1999:**
	  ○ 30785377 (diagnostic number)
	• **ECM, 2000:**
	  ○ 30785378 (diagnostic number)

5-cyl non-turbo engines (not B5244SG/B5244SG2) ECM (Denso)/ETM (Magneti Marelli) **Note!** The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.	
Model	Diagnostic number

S70/V70 (-00)/C70 (-05)	• **ETM, 1999- :**
	  ○ 30785387 (diagnostic number)
	• **ECM, 1999:**
	  ○ 30785131 (diagnostic number)
	• **ECM, 2000- :**
	  ○ 30785132 (diagnostic number)

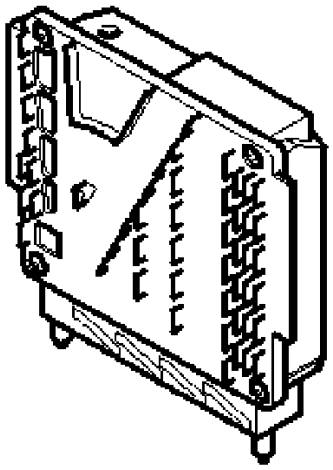
S60/V70 (00-)/S80 (-06)	• **ETM, 1999- :**
	  ○ 30785387 (diagnostic number)
	• **ECM, 1999-2000:**
	  ○ 30785667 (diagnostic number)
	• **ECM, 2001:**
	  ○ 30785129 (diagnostic number)
	• **ECM 2002- :**
	  ○ 30785130 (diagnostic number)

5-cyl non-turbo engines B5244SG/B5244SG2 (Bifuel) ECM (Denso)/ETM (Magneti Marelli) **Note!** The version letters at the end of the diagnostic number are not accounted for and should be ignored during identification.	
Model	Diagnostic number

S70/V70 (-00)
S60/V70 (00-)/S80 (-06)
	• **ETM, 2000- :**
	  ○ 30785387 (diagnostic number)
	• **ECM:**
	  ○ 30788502 (diagnostic number)
	  ○ 31219965 (diagnostic number)
	  ○ 31219966 (diagnostic number)
	  ○ 31219967 (diagnostic number)
	  ○ 31219968 (diagnostic number)

General

General



A control module can be reprogrammed in two ways using VIDA. Either different software can be downloaded or a customer parameter can be changed (via vehicle communication).

NOTE: Customer parameters are only programmed locally in one control module. Certain parameters have already been reprogrammed at the factory which makes this remedy very important.

The customer parameters are functions in certain control modules which can be modified or adjusted to the customer's wishes, for example the temperature of the heated seats or the duration of the interior lighting. It is important to read off the customer parameters before ordering software. These parameters are only stored in the control module and not in the Volvo central database.

Customer parameters are reset to the default value when new software is downloaded and must be reprogrammed after the download.

VIDA vehicle communication is used to read off and programming the customer parameters.

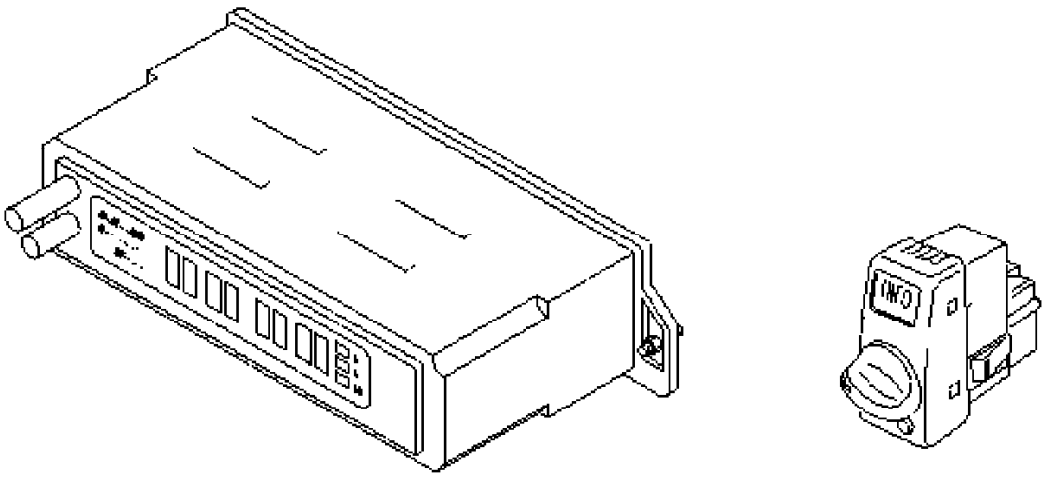
Usually a fault in the car is due to hardware faults such as: loose connections, oxidation, open-circuits, short-circuits or other faults which can lead to defective function.

Software is not perishable and does not deteriorate with time. However the software may behave in an unexpected manner because of the difficulty of testing all the possible combinations in such a complex system. It may also be necessary to upgrade the software to meet legal requirements or movement to another market.

It is recommended that the VIDA symptom input is used for fault-tracing. Suitable tests are also suggested for faults which do not generate a diagnostic trouble code (DTC).

History

History



In earlier cars each control module handled a particular specific function. Cars with a trip computer required an extra control module to run the trip computer functions. If a problem arose in a control module it was replaced, regardless of whether the fault was a hardware or a software fault.

As the number of variants and amount of functionality increased, it became both impractical and uneconomic to have one control module per

function as before. A new type of electrical system was required. The new electrical system uses distributed functionality, CAN communication and re-programmable control modules.

Distributed functionality means that a function need not be connected to a particular control module. A single function can be divided between several different control modules.

The lock and alarm system function is distributed between the central electronic module (CEM), upper electronic module (UEM), driver information module(DIM), driver door module (DDM), passenger door module (PDM) and rear electronic module (REM).

The controller area network (CAN) is a high speed digital network, which permits the control units in the car to transmit a large amount of information in a very short time.

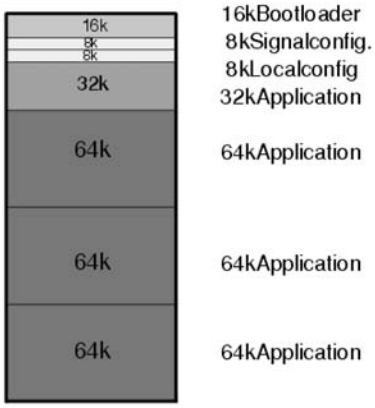
Re-programmable control units permit programming of increased functionality, without needing to replace the control module. This decreases the repair costs for the customer.

Software downloading has a number of advantages:
- To obtain a new function, for example to add a trip computer to a car without a trip computer, a new control stalk is installed and a new car configuration file is downloaded into the central electronic module (CEM). The other control modules in the car use the car configuration file to function in a particular way. The software in the driver information module (DIM), for example, reads off whether the trip computer information is to be displayed or not depending on the car's level of equipment
- Fewer control module variants. A good example is the engine control module (ECM). There are 60 different engine variants, which previously required 60 different replacement parts to be stored in the replacement parts stocks. When downloading software, three different hardware packages manage all the variants
- Market adaptation. The application file for the driver information module (DIM) can be the same for all markets. But other market files can be downloaded, to separate different market requirements
- Language. The language in the combined instrument panel can be changed by downloading different language files to the driver information module (DIM)
- This allows faster introduction of improved functionality
- Time saving when working with a particular type of fault. Previously it was necessary to replace a control module. Now a software upgrade can now be downloaded instead.

NOTE: All data is overwritten during a software download. This includes diagnostic trouble codes (DTCs) and frozen values which were stored.

Software

Software



General
Each control module requires a number of software files in order to function. Most of these are downloaded via VIDA, but in certain cases they are already in the system.

The files are stored in the Volvo central database and can be ordered via the replacement parts catalogue.

The exceptions are individual configurations which are not in the replacement part catalogue. These must be ordered using an action code via the software manager in VIDA. The part numbers are given in the Technical Journal.

Extended information about files in the control modules
The following is a technical explanation of which files are in the control modules. The information is not necessary for a mechanic to be able to repair the car. The information is presented here for those who wish to have a greater understanding of how the system functions.

The following types of software files are included:
- Primary boot loader
- Secondary boot loader
- Application file

- Signal configuration file
- Market file (driver information module (DIM) only)
- Language file (driver information module (DIM) only)
- Car configuration file (central electronic module (CEM) only)
- Security configuration file (central electronic module (CEM) only)
- Local configuration file (central electronic module (CEM) and rear electronic module (REM) only).

Most of the control modules on the controller area network (CAN) can download software via VIDA. All control modules need an application file and a signal configuration file to function. Not all control modules receive these two files when downloading software using VIDA.

In addition most of the control modules require a secondary boot load file to download the software to the control module.

Primary boot loader
The aim of the primary boot loader is to allow the download of software to a control module.

Secondary boot loader
The secondary boot loading file is a collection of instructions which work together with the primary boot loader to download the software package into the control module. It then has no other function.

Application file
The application file is the software which contains the control module functions. If software is updated because of quality improvements for example, a new application file is required.

Signal configuration file
All the control modules on the controller area network (CAN) must have the correct signal configuration file downloaded to communicate with each other. The file specifies which signals should be transmitted, where and which signals should be read, and where they can be found. This file ensures that all the control modules speak the same language. This means that an application file need not be modified if the controller area network (CAN) environment in the car is modified.

An example is two S80 model cars. One car is structure week 0135, the other has a structure week after 0135. The application file for these cars is the same, however the signal configuration files are different.

Car configuration file and security configuration file
The car configuration file and the security configuration file are always downloaded to the car when downloading via VIDA. The first file to be downloaded is the car configuration file. This is download into the central electronic module (CEM). This is loaded to indicate to VIDA that downloading has started. This file loads twice. The file is downloaded first and last in the download sequence. The first file sets an error flag and the second file resets the error flag. If the download is interrupted before the whole package has been downloaded, a user message is posted indicating that the vehicle is only half loaded.

The car configuration file is also downloaded to the central electronic module (CEM) to store general information about the car. The file is also used so that the car can continue in different modes. The file is generated in the factory just before the car is completed and is delivered by the Volvo central database when the software is ordered. The file is unique. No two cars have the same car configuration file. This file contains the car's VIN number, structure week and variant information. This information is distributed to the other control modules via the controller area network (CAN).

An example of how the car configuration file functions can be illustrated through the seat belt warning function. There are two different market requirements for how the seat belt warning should function. The central electronic module (CEM) reads out instructions from the car configuration file about how the seatbelt warning should function. The software sets itself for this function. In this way the number of variants of the software has decreased by half. In total there are over 100 parameters stored in the car configuration file. Each parameter can assume at least two values.

The car configuration file can be read off using VIDA. The file can contain a lot of information about the car which is useful for the mechanic such as the VIN, structure week and the configuration of the car. Structure week and week of manufacture are not necessarily the same week. Week of manufacture is the week that the car was built in the factory. The contents of the car are guided by the structure week. A structure week can stretch over several weeks of manufacture. An example of this is the new upper electronic module (UEM), which was introduced for structure week 0031.

Market, language and local configuration files
The market, language and local configuration files are different types of data files which contain parameters which guide the software.

The language file contains information about how the different text messages should be displayed in the text display in the combined instrument panel. There is a language file for each language. This file downloads to the driver information module (DIM).

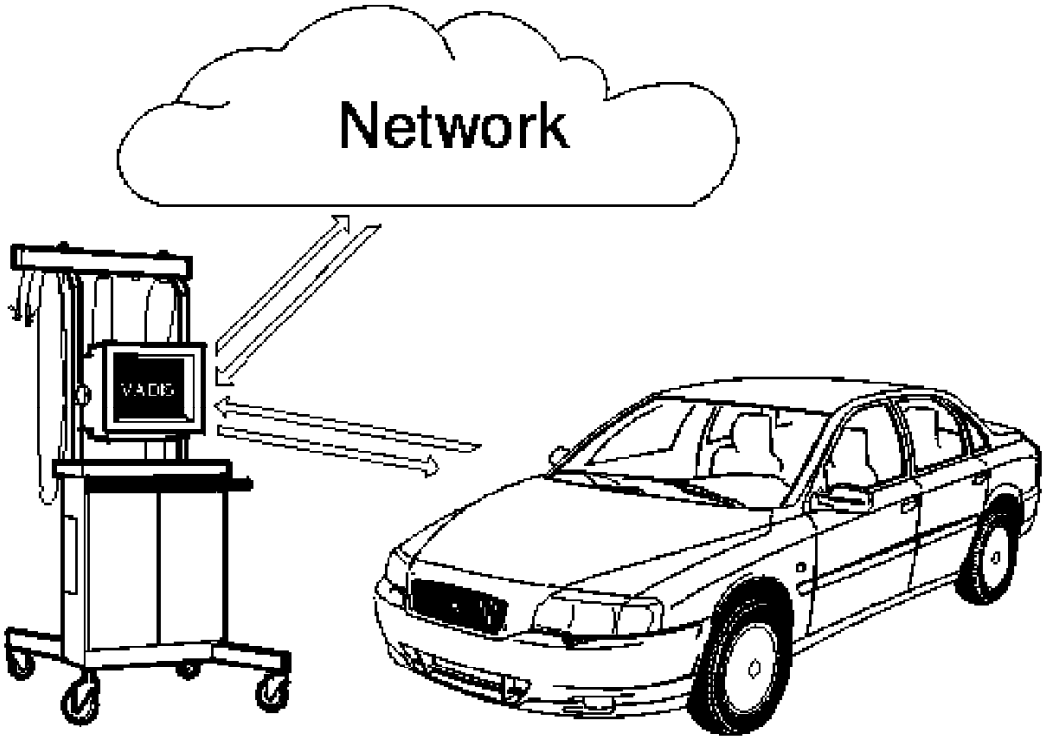
The market file contains information about when the service reminder indicator (SRI) should light and all the other market specific settings, such as units in the trip computer and temperature gauges. A number of market parameters, such as trip computers and service reminder indicator (SRI), can also be modified to the customer's requirements. This is carried out via VIDA vehicle communication.

Other market settings, such as fog lamps, cannot be reset because of legal requirements.

NOTE: Customer parameters are only programmed locally in one control module. Certain parameters have already been reprogrammed at the factory.

Ordering Software

Ordering Software



The ordering procedures for software can differ in different markets. Only ordering software via VIDA is described here.

Generally software downloading can be divided into two stages: First the software must be ordered and transmitted from the Volvo central database to the VIDA station. Then the software must be downloaded from VIDA to the car.

Each replacement part at Volvo has a part number. This also applies to software. Software is listed in the replacement parts catalogue in exactly the same way as any other component.

Each file in a control module also has a part number. This part number can be read from the car by reading off the control module ID via VIDA vehicle communication.

NOTE: It does not necessarily mean that these part numbers are not used in the replacement parts catalogue. These are the unique numbers for each file in the software package. The part number is used to determine if a software update, for a specific control module, has been carried out or not.

It is important to note that the files included in the software package are not chosen by the mechanic. The content of the software package is determined by the software designer when the software is designed.

Software is ordered as follows:

The mechanic specifies which article must be ordered, and for what car (model and chassis number). This can either be carried out from the replacement parts catalogue (via the part number) or using the VIDA software manager (via the software product).

A dialog box in VIDA asks if a control module has been replaced. If the mechanic responds that a control module has been replaced, the mechanic is instructed to connect VIDA to the vehicle so that the hardware number and serial numbers can be read off, before the software is ordered.

If the mechanic replies that the control module has not been changed, the system will assume that the car and the Volvo database correspond. A verification which ensures that this is the case will be carried out just before downloading.

If this verification indicates that the car and the database do not correspond, a fault adaptation will be run.

NOTE: The same software can be downloaded again without a new order being made. This is carried out by retrieving the same software package which failed, but this time VIDA ignores the error flag.

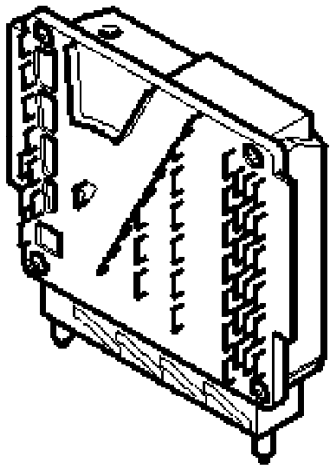
In all cases a check that the desired software applies to the relevant vehicle is made in the Volvo central database. An error message is displayed for the mechanic if any of these checks are not approved. The mechanic must determine what the fault is and reorder the software when the fault has been remedied.

HINT: Assistance in seeing what type of fault it is in the relevant software package can be obtained by clicking "Components".

Downloading can start when the software has been supplied to the VIDA station and is accessible.

Software Downloading

Software downloading



Software is ordered via VIDA replacement parts catalogue (upgrades are ordered via VIDA software manager). This section describes the procedure for software downloading between the VIDA station and the car.

The control modules are pre-programmed by the supplier using the primary boot loader. The aim of the software is that VIDA and the factory systems should be able to load software to the car. This software contains a number of commands, the primary boot loader commands, which handle the actual download and function while there are no applications in the control module.

The primary boot loader is located in a section of the control module which cannot be erased, in a Read Only Memory (ROM). This is necessary because if the primary boot loader file is erased no contact with the control module can be established. Downloading will also be impossible.

After VIDA has opened the control modules in the car for communication VIDA transmits a reset command to the vehicle. The reset command is sent so that all control modules are restarted. VIDA then transmits a command to continue the control modules in programming mode. This is always carried out by the primary boot loader, even if the control module is loaded with software. Each time that a control module is supplied with voltage the primary boot loader starts in the first **20 ms (0.02 seconds)**.

If the control module receives a programming command during these 20 ms the control module continues in programming mode.

Otherwise the application software of the control module takes over the function in the control module.

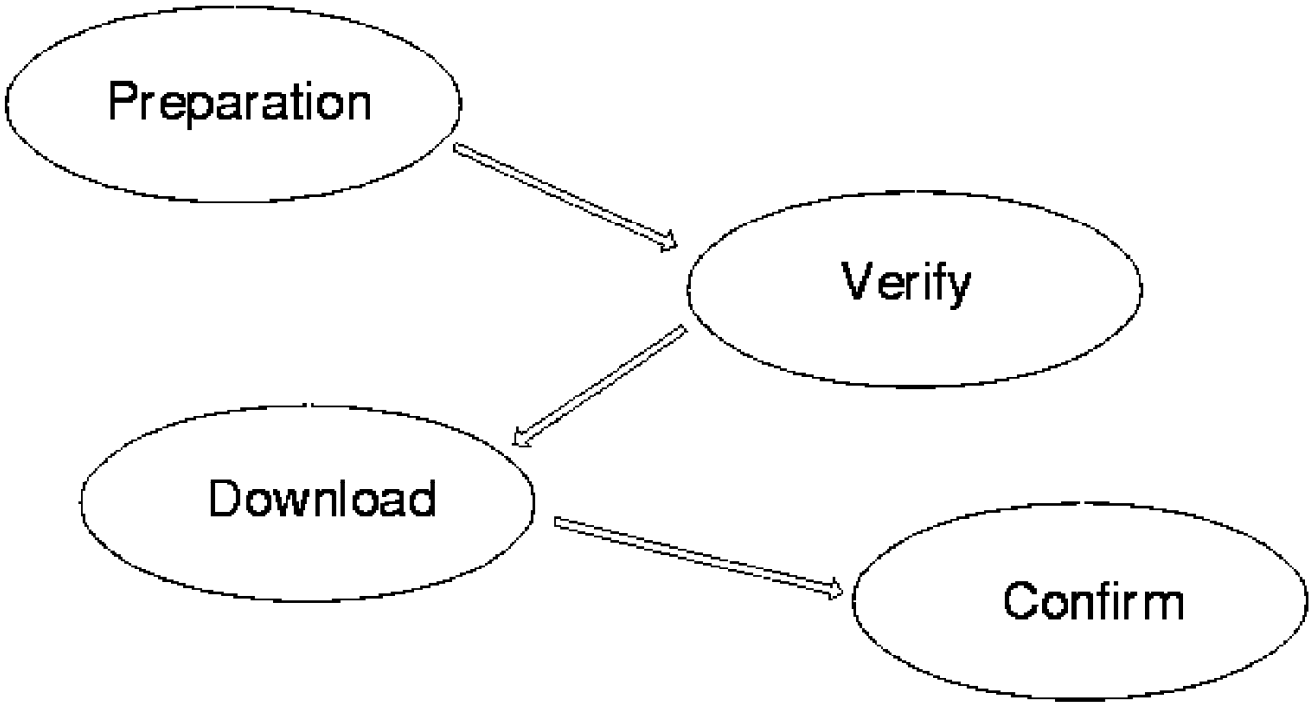
This means that it is always possible to continue with a control module in programming mode, even if the application software is corrupted. This could happen in the event of an unsuccessful download for example.

The programming command is transmitted for approximately **2 seconds** so that all the control modules will have time to carry out the command and continue in programming mode. In programming mode the control modules stop sending controller area network (CAN) messages and await new software.

After the primary boot load file, the secondary boot load file is run (if present). Any old software is erased so that it will not affect the new software being downloaded. The software is then downloaded into the control module. A reset command is sent to the vehicle so that it returns from programming mode to normal mode. All control modules then continue in normal operation.

Software Download Method

Software download method



When downloading software to the car there are several stages in VIDA. The stages in VIDA are as follows:

- Preparations
- Verification
- Downloading
- If necessary a method, for example entering PIN codes for new remote controls
- Confirmation.

The preparations include the user being asked to connect a battery charger. At which point a number of checks are made, such as of the voltage level and the ignition key positions to see if they are correct.

A verification is then carried out. During verification VIDA compares the software, hardware and serial numbers in the car with those delivered in the software package. If the reply via the dialog box is that the hardware has been replaced, the control module which has been replaced will not be included in the verification. This is because the new identity of the control module does not correspond to the old identity stored in the Volvo central database.

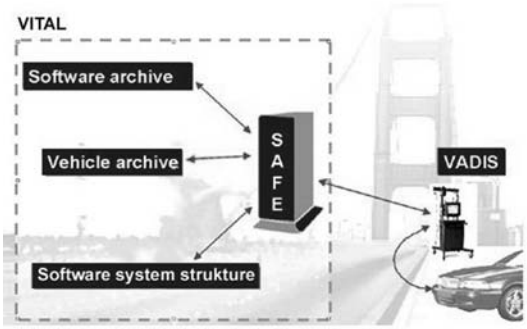
If the verification was OK, the car continues in programming mode and the software is downloaded. If the verification was not OK, a misalignment has occurred and the Volvo central database must be updated.

The confirmation means that a confirmation file, with the new configuration of the car, is created and sent to the Volvo central database. Upon confirmation, the configuration of the car is updated in the Volvo central database. This is so that a misalignment will not occur at the next download.

The Volvo Central Database

The Volvo central database
The Volvo central database has records of all the data of all the Volvo cars in the world from the 1999 model year inclusive (not including the S40 (-04) and V40).

All the VIDA stations where software downloading is possible are connected to the Volvo central database via a local area network (LAN) or a modem. There are two servers. One in North America and one in Europe. If communication cannot be established or if communication is interrupted with one server, a connection will automatically be made to the other server where all the information is available.



The Volvo central database is a collective name for a number of different databases. The databases are:
- The software archive
- Vehicle archive
- System structure for software.

SAFE is the interface between VIDA and the databases and handles the file transfer between the databases and VIDA.

The software archive
The software archive contains all the software produced by Volvo.

Vehicle archive
The vehicle archive contains all the vehicle unique information.

The system holds information about all the controller area network (CAN) control modules such as:
- Hardware numbers
- Software numbers, that is which files are in each individual control module
- Control module serial numbers
- Vehicle configuration, the equipment level of a vehicle, where the vehicle was built, the structure week and the VIN
- Software ID side impact sensors (SRS (supplemental restraint system))
- PIN codes.

The PIN codes are downloaded to VIDA when a control module has been replaced, and a reload has been ordered for the control module via the replacement parts catalogue.

The PIN codes are then used by VIDA (unseen by the user) to make the software work in the control module.

When a car is built in the factory the vehicle information is sent to the vehicle archive where the vehicle configuration is stored. When downloading using VIDA, the vehicle archive is updated with the modifications. This occurs when the confirmation file is sent to the Volvo central database.

System structure for software
System structure for software is the set of rules which determine which software should be downloaded to a vehicle. The system structure for software can alert the user to any error messages and warnings via VIDA. The system structure has complete control over whether a certain control module is suitable for the relevant vehicle.

Advantages of system structure for software over previous systems.

Some advantages of system structure for software are:
- When a software package arrives in VIDA it states which control modules will be loaded.

NOTE: The customer parameters must be read off prior to downloading.

- The exchange of control modules between vehicles can be managed. The control module will function if it is suitable for the that particular car. If not the User receives an error message
- An error message is displayed if a faulty control module is installed
- In certain cases when the software is to be downloaded to a control module, which in turn requires a certain status for hardware/software in another control module, the system also takes this into account
- Previously one was unaware if there was better software for a specific car. Now the database is aware of this. Therefore the most recent software status is available when replacing, reloading or upgrading a control module
- A control module no longer requires several different upgrades. It is however possible to run an individual configuration.
- If the car already has the most recent status it will not load, a message will be displayed instead.

Software Products

Software products
The following types of software products are available:
- Reloading
- Complete reloading
- Upgrading

- Complete upgrading
- Adding and removing functionality or accessories (with or without the addition of hardware)
- Individual configuration
- PIN codes.

Reloading
Software product type reloading is used when a control module has been replaced. To retain the software which corresponds to a replaced control module, the data of the vehicle is read when ordering. If the software is already in the car it is reloaded.

Complete reloading
Software product type complete reloading is used when more than one control module has been replaced at the same time.

Upgrading
The software product type upgrading is used to replace the software in a control module when there is a complaint and a solution is available to correct a characteristic. No data is read from the car when ordering because no hardware needs to be replaced. If the latest software is already in the car no software package is assembled. A message that the car already has the latest software status is displayed to the user.

Complete upgrading
The software product complete upgrading is used to replace the software in several control modules.

Add or remove functionality or accessories
The software product type add or remove functionality is used to expand or decrease the functionality in the car. This is mainly carried out by modifying the car configuration file in the central electronic module (CEM) (applies to accessories which do not require hardware to be replaced). Modifying this file results in new functionality for the car. There are certain functions which also require software, such as when adding a control module to the car.

The vehicle data is read off when adding a function but not when removing functionality.

The "remove" function does not actually erase any software. It is a parameter in the car configuration file which is modified so that the control modules in the controller area network (CAN) interpret the function as no longer being present. There is only one occasion on which software is erased and that is immediately before new software is loaded to a control module. This is so that the earlier software does not interfere with the new software.

Individual configuration
The software product individual configuration is used to replace the software in a control module so that it no longer corresponds to the system structure for the software. The software product individual configuration is not in the VIDA replacement parts catalogue.

If an individual configuration has been downloaded to the car previously, the mechanic receives a warning before it is overwritten.

A list of software products for individual configuration is available in the Technical Journals.

PIN codes
The software product PIN code is used to order a specific protected function. These functions are for example:
- for the immobilizer function
- when replacing the engine control module (ECM)
- for remote controls
- when replacing the upper electronic module (UEM).

System Type Number for the Control Module

System type number for the control module

The table indicates which system type number the control modules have.
VCT2000 and some of the control modules are supplied with power via the same fuse.
In these cases VCT2000 must be supplied with power separately via a network adapter. There is a power socket on VCT2000 (12V).
Check that the lamp comes on in VCT2000 when the fuse is removed.

System type number	Control module	Number of fuses for the power supply	Separate adapter
0	All control modules are in programming mode		
2560	Electronic throttle module	1	No
2841	Engine control module (ECM), diesel NED (2002-)	1	No
2842	Engine control module (ECM), gasoline, diesel MSA15.8 (1999-2001)	1	No
3601	Phone module (PHM)	1	No
3648	Accessory electronic module (AEM)	1	No
3650	Rear electronic module (REM)	1	No
3651	Central electronic module (CEM)	2	No
3670	Road traffic information module (RTI)	1	No
3680	Infotainment Control Module (ICM)	1	No
3811	Driver information module (DIM)	1	No
3901	Audio module (AUM)	1	No
3902	Antenna module (ATM)	1	No
3930	MD player module (MP1)	1	No
3931	CD player module (MP2)	1	No
3932	Multimedia module (MMM)	1	No
3933	Audio module (AUD)	1	No
3934	Subwoofer module (SUB)	1	No
4376	Transmission control module (TCM)	1	No
4601	Differential electronic module (DEM)	1	No
5931	Anti-lock brake system module(ABS)/Brake control module (BCM)	1	No
6401	Steering wheel angle sensor module (SAS)	1	No
6402	Steering wheel module (SWM)	1	Yes
7601	Suspension module (SUM)	1	No
8301	Passenger door module (PDM)	1	No
8302	Driver door module (DDM)	1	No
8527	Power seat module (PSM)	1	No
8711	Climate control module (CCM)	1	Yes
8847	Supplemental restraint system module (SRS)	1	No
8901	Upper electronic module (UEM)	1	No